UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner

v.

APEX BEAM TECHNOLOGIES LLC,
Patent Owner.

U.S. Patent No. 10,912,081

Case No. IPR2023-00599

DECLARATION OF FRIEDHELM RODERMUND IN SUPPORT OF A PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,912,081

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I, Friedhelm Rodermund, do hereby declare as follows:

I. INTRODUCTION AND ENGAGEMENT

1. I have been retained in this matter by the Petitioner to provide testimony regarding the standard business practices of 3rd Generation Partnership Project ("3GPP") for record keeping and publishing technical specifications, change request proposals, reports, and other documents developed during the course of standards activities carried out by 3GPP and the European Telecommunications Standards Institute ("ETSI").

2. I have been asked to provide my opinions regarding the authenticity and dates of public accessibility of the following 3GPP documents:

- Version 6.0.0 of technical report 3GPP TR 25.892 ("Technical Specification Group Radio Access Network; Feasibility Study for Orthogonal Frequency Division Multiplexing (OFDM) for UTRAN enhancement (Release 6)") (hereinafter "TR 25.892 V6.0.0") (Ex. 1006)
- Version 12.5.0 of technical specification 3GPP TS 36.211 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and

Modulation (Release 12)") (hereinafter "TS 36.211 V12.5.0") (Ex. 1019).

- Version 12.4.0 of technical specification 3GPP TS 36.212 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding (Release 12)") (hereinafter "TS 36.212 V12.4.0") (Ex. 1020).
- Version 12.11.0 of technical specification 3GPP TS 36.213 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures (Release 12)") (hereinafter "TS 36.213 V12.11.0", Ex. 1007)
- Version 12.6.0 of technical specification 3GPP TS 36.321 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification (Release 12)") (hereinafter "TS 36.321 V12.6.0") (Ex. 1008)
- T-doc R1-1707475, which represents a 3GPP document with the title "Discussion on DL beam management" (hereinafter "R1-1707475") (Ex. 1021)

3. As an ETSI Project Manager and Secretary, from June 1998 to December 2004, I have personal knowledge of 3GPP's standard business and records keeping practices. I continued following 3GPP's work ever since. Thus, based on my experience, personal knowledge, and review of 3GPP's business records, I am able to testify regarding the authenticity of certain documents published by 3GPP and the timing of their publication.

4. I am also knowledgeable about document management practices and the usage of email reflectors in 3GPP TSG RAN WG1 and WG2. This is due to the fact that all 3GPP working groups used the same document repository on ftp.3gpp.org and all working groups use the same email exploder tool. Thus, I'm able to testify regarding the availability and authenticity of any 3GPP documents.

5. I am being compensated for my time spent on this matter at my usual rate of €450 per hour. My fee is not contingent on the outcome of this or any matter, or on the content of any of the testimony I give in this declaration. I have no financial interest in the Petitioner.

6. I have been informed that Apex Beam Technologies, LLC ("Apex Beam Technologies" or "Patent Owner") is the current assignee of U.S. Patent No. 10,912,081 ("the '081 Patent") (Ex. 1001). I have no financial interest in the Patent Owner or the '081 patent.

II. BACKGROUND AND QUALIFICATIONS

7. I have more than 20 years of experience working with standards development organizations including 3GPP, ETSI, and the Open Mobile Alliance ("OMA"). I have particular experience with the development of standards related to cellular telecommunications, including the standards for the Universal Mobile Telecommunications System ("UMTS"), Long Term Evolution ("LTE"), and 5G, which are all standards developed by the 3GPP.

8. I attended the University of Technology Aachen in Aachen, Germany, where I performed graduate studies in Electrical Engineering with a focus on telecommunications technologies ("Dipl.-Ing. TH" degree). I also attended the University of Technology Trondheim in Trondheim, Norway, and completed my Diploma thesis, "Design of a dual processor computer for digital signal processing in power electronics," in 1993.

9. From December 1993 to June 1998, I worked at Mannesmann Mobilfunk as a System Engineer and Project Manager in Quality Assurance and Technical Standards. One of my responsibilities was to ensure by managing and performing related test activities that cellular network equipment was compatible with the Global System for Mobile Communications ("GSM") standard developed by ETSI. During that time, I also started working as a standards delegate. I attended my first ETSI meeting in 1996 (although I was already following ETSI developments from 1992 during my studies).

10. From June 1998 to December 2004, I worked at ETSI as a project manager for various ETSI Special Mobile Group ("SMG") and 3GPP working groups. First, I served as a secretary of SMG4 "Data Services" and SMG8 "Base Stations Testing." Then, as a project manager with the ETSI Mobile Competence Center ("MCC"), I supported establishing 3GPP as the new international standards development organization for cellular telecommunications. One of my roles was acting as Secretary for 3GPP's Technical Specifications Group Terminals, Working Group ("T2"), the group which played a leading role in the creation of standards for Multimedia such as the Multimedia Messaging Service ("MMS").

11. Later, I was a secretary of the highest-level Technical Specifications Group Terminals which was besides other things responsible for the development of test specifications including tests for the radio interface.

12. I edited all technical specifications produced by my working groups and presented results to the parent body for approval. I attended all meetings (apart from some sub-working group meetings) and was also responsible for compiling meeting reports, for handling all the meeting documents, and managing the work plan. It was also my role to guide the groups and to advise the chairmen regarding 3GPP working methods and procedures including document handling, and to make sure delegates were aware of their company's obligations under the 3GPP Intellectual Property Rights policy.

13. As part of my responsibilities at ETSI, I acted as a 3GPP custodian of records by personally managing 3GPP's public File Transfer Protocol (ftp) folders, which I used to make publicly accessible various 3GPP documents, including versions of 3GPP specifications, technical reports, liaison statements, change requests, contributions, agendas, meeting reports, and other 3GPP documents from my working groups. I am also knowledgeable about document management practices used in other working groups and within 3GPP in general with regard to making documents publicly accessible through the same public ftp server of 3GPP.

14. Since I left ETSI as a staff member in 2005, I have been continuously involved in standardization activities, including with OMA, ETSI, and 3GPP. Since 2017, I also have been attending the ETSI Intellectual Property Rights ("IPR") Special Committee, which is responsible for the maintenance of the ETSI IPR Policy.

15. After I left ETSI, I worked from January 2005 to October 2014 at Vodafone, first as a Project Manager for Mobile Broadcast Standards, and then as Vice Chairman of the Device Management working group of the Open Mobile Alliance, and then as a Senior Standards Strategist, all with responsibilities as described on my curriculum vitae. At Vodafone, I was deeply involved in standards work with ETSI and 3GPP and other standards setting organizations, including as a delegate to 3GPP SA1 "Services." As part of my responsibilities, I attended selected

3GPP meetings, submitted documents to 3GPP, used 3GPP resources (including 3GPP's ftp server) extensively, and remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility. I was also involved in the creation of patents, defense activities related to patent litigations, and patent evaluation, mostly in the context of standards development.

16. Since leaving Vodafone in 2014, I have performed consulting work regarding Internet of Things (IoT) and Machine to Machine (M2M) technology and standards, first at Friedhelm Rodermund Consulting and then as the Founder and Director of IOTECC GmbH. In connection with my work, I regularly deal with standards such as OMA's Lightweight M2M (LwM2M) and 3GPP's LTE, Narrowband IoT (NB-IoT) and 5G standards. And I have extensively used 3GPP resources and have remained knowledgeable about 3GPP policies and procedures with regard to document management and public accessibility.

17. I also provide consulting services related to patents, in particular around 3GPP Standard Essential Patents ("SEPs"), and I have worked as an expert witness on a number of occasions. I continue to closely follow the maintenance of the ETSI IPR Policy as a delegate to the ETSI IPR Special Committee. Furthermore, I am conducting a seminar on SEPs and the Internet of Things at the Technical University of Ilmenau, Germany.

18. At the time of writing this declaration, I am following – including attending selected meetings – the following standards committees: ETSI oneM2M, ETSI IPR Special Committee, OMA, and 3GPP.

19. A copy of my curriculum vitae, which includes a detailed description of my experience and education, is attached as Appendix A. A list of litigation matters on which I have worked over the last five years is also included in my curriculum vitae.

III. SUMMARY OF MY OPINIONS

20. It is my opinion that TR 25.892 V6.0.0 (Ex. 1006) is a technical report published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of June 28, 2004.

21. It is my opinion that TS 36.211 V12.5.0 (Ex. 1019) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of March 16, 2015.

22. It is my opinion that TS 36.212 V12.4.0 (Ex. 1020) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of March 18, 2015.

23. It is my opinion that TS 36.213 V12.11.0 (Ex. 1007) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of September 29, 2016.

24. It is my opinion that TS 36.321 V12.6.0 (Ex. 1008) is a technical specification published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of June 30, 2015.

25. It is my opinion that R1-1707475 (Ex. 1021) is a T-doc published by 3GPP and would have been publicly accessible through ftp.3gpp.org at least as of May 6, 2017.

IV. PUBLICATION OF 3GPP SPECIFICATIONS AND RELATED DOCUMENTS

A. General Practices

26. Unless otherwise noted, the foregoing and following is an accurate description of 3GPP general practices from 1998 to the present, including from 2004-2017, regardless of whether I use the present or past tense to describe those practices.

27. 3GPP was established in 1998 by a group of telecommunications standard development organizations from Japan, Korea, China, Europe, and the United States to jointly develop worldwide standards for mobile telecommunications. Today, 3GPP consists of seven partners: Association of Radio Industries and Businesses, Japan ("ARIB"), Alliance for Telecommunications Industry Solutions, USA ("ATIS"), China Communications Standards Association

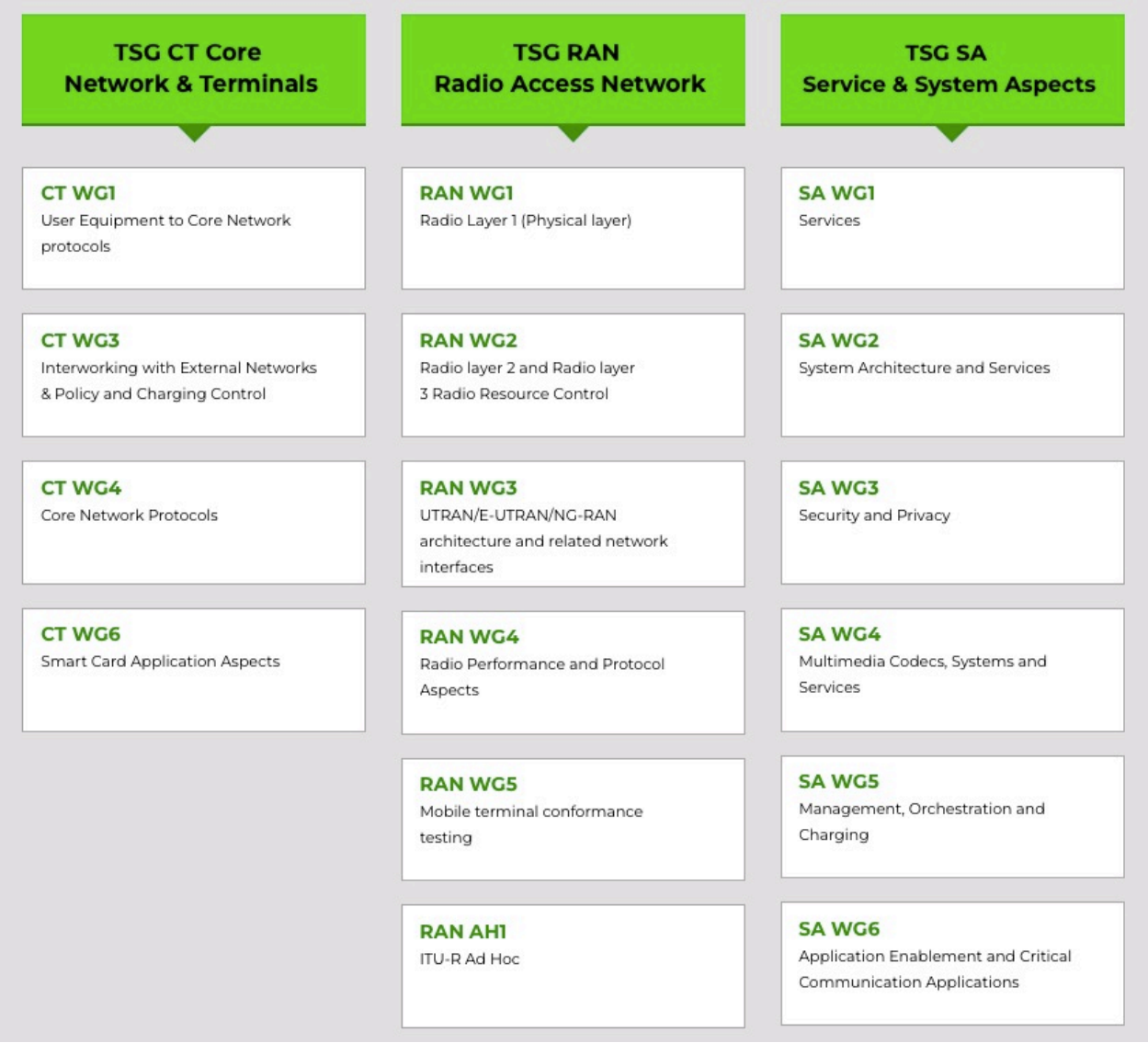
("CCSA"), European Telecommunications Standards Institute ("ETSI"), Telecommunications Standards Development Society, India ("TSDSI"), Telecommunications Technology Association, Korea ("TTA"), and Telecommunication Technology Committee, Japan ("TTC"). In addition to being one of the founding partners, ETSI hosts the Mobile Competence Centre ("MCC"), which provides administrative and technical support for the day-to-day work of 3GPP. Furthermore, ETSI manages 3GPP's IT services such as the 3GPP website, ftp server, and email exploders.

28. 3GPP is the world's leading organization for developing and maintaining cellular telecommunications standards, which it has done since its foundation in 1998. As noted above and in my curriculum vitae, I began working for 3GPP, as part of my work at ETSI, the European-based organizational partner of 3GPP.

29. In the ordinary course of its regularly conducted business activities, and pursuant to its standard business practices, 3GPP publishes technical specifications, proposals, reports, and other documents related to the development of cellular telecommunications standards. Such documents are published for the purposes of discussion and establishment of industry standards for cellular telecommunications. This has been 3GPP's ordinary course of business since when I began working at ETSI in 1998.

30. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, all draft technical specifications, proposals, reports, and other temporary documents to be discussed or considered in relation to 3GPP's telecommunications standards activities were, and continue to be, assigned a temporary document number and made publicly available, including on the ftp server associated with the 3GPP website, currently residing at ftp.3gpp.org. Such documents are referred to as "T-docs." Final versions of the technical specifications also were, and continue to be, publicly available from that same ftp server.

31. The names and the structure of 3GPP working groups, as of today, can be found at https://www.3gpp.org/3gpp-groups (reproduced below):



32. Each Technical Specification Group (TSG) or Working Group adopts a structured numbering system for the documents associated with their meetings, and those systems typically follow a consistent numbering system as shown in the following example: xminnzzzz. The numbering system normally comprises five logical elements: (1) x: a single letter corresponding to the TSG; wherein in 2007/2008 x was one of R (Radio Access Network), C (Core and Terminals), S

(Service and System Aspects), or G (GSM/EDGE Radio Access Network); (2) m: a single character corresponding to the Working Group identity (typically 1, 2, 3, etc.) or, in the case of the TSG itself, the letter "P"; (3) i: normally the hyphen character "-"; (4) nn: the calendar year of the meeting to which the document was submitted; and (5) zzzz: a running number (some working groups use 5 digits).

33. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, from December 1998 onwards, 3GPP published all of its T-docs and all final versions of its technical specifications on its ftp server, which has always been easily and publicly accessible from its website and currently resides at ftp.3gpp.org.

34. As early as December 1998, and including from 2004-2017, 3GPP's ftp server was freely accessible to the general public with no login, password, or membership requirement.

35. By 1999, at least 100 companies were members of 3GPP (719 companies by December 2020), ranging from Bosch to Ericsson to Nokia to Samsung and generally including those interested in the discussion, creation, and adoption of cellular telecommunications standards, including UMTS. Each of these companies typically delegated multiple individuals to regularly participate in 3GPP meetings. Further, pursuant to 3GPP's standard business practices, 3GPP working groups sent emails notifying these individuals as soon as new or additional

documents had been uploaded to 3GPP's ftp server. Thus, not only did the general public have access to the documents on the ftp server, but some of the most interested members of the public—those working to develop standards for cellular telecommunication or working to implement the standards—were personally informed of their availability by email. Based on my experience with 3GPP and the telecommunications industry, I would expect any person implementing a cellular network or device, e.g., an LTE network, to consult the corresponding specifications on the 3GPP ftp server, as well as other related documents. The whole purpose of 3GPP creating and making these specifications available was so that engineers and other individuals would have ready access to them when developing and implementing cellular networks and devices.

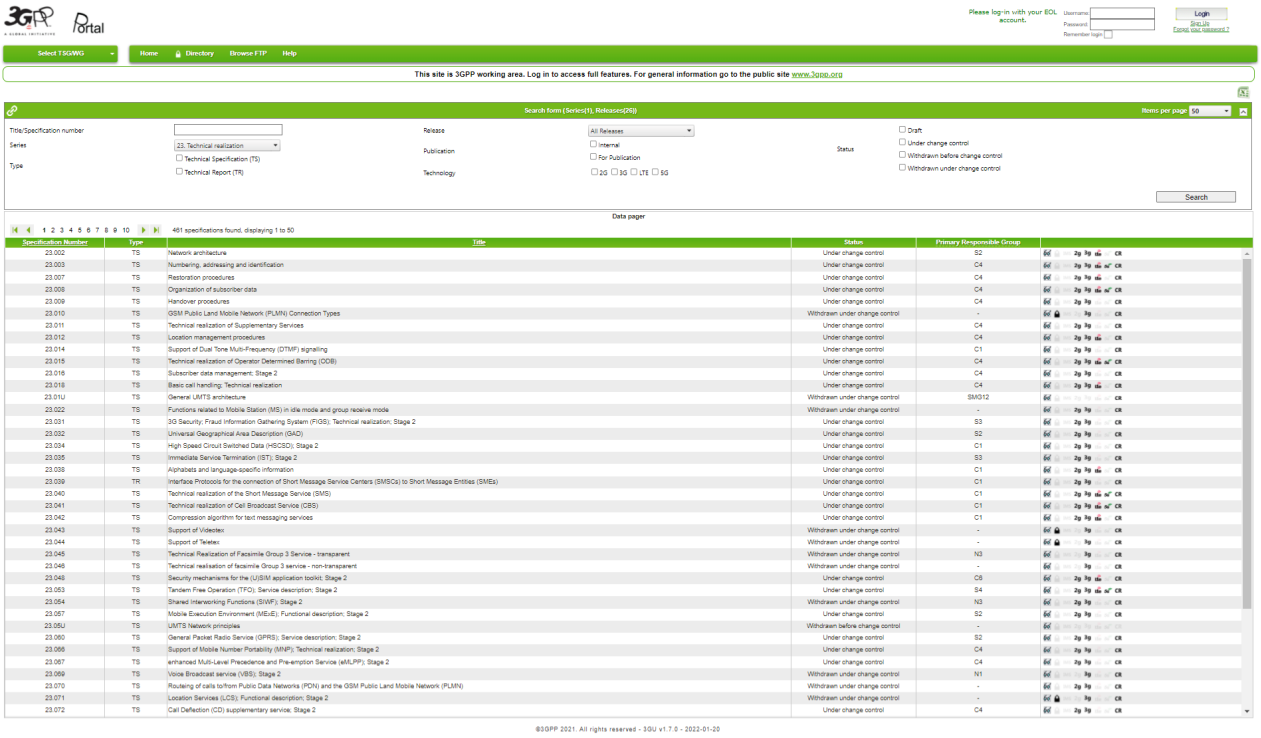
36. By June 1999, 3GPP's ftp server was well-known to persons in the cellular telecommunications industry as a source of public information regarding industry standards and technological advances.

37. 3GPP specifications bear a specification number consisting of four or five digits, e.g., 09.02 or 29.002. The first two digits define the specification series which are defined to group the different aspects of the 3GPP system into, e.g., requirements, service aspects, radio aspects codecs, security aspects, and test specifications. The series digits are followed by two additional digits for the 01 to 13 series or three further digits for the 21 to 55 series. The subjects of the individual

specification series are explained on 3GPP's website at https://www.3gpp.org/specifications-technologies/specifications-by-series, and reproduced below.

Subject of specification series	3G and beyond / GSM (R99 and later)	GSM only (Rel-4 and later)	GSM only (before Rel-4)
Requirements	21 series	41 series	01 series
Service aspects ("stage 1")	22 series	42 series	02 series
Technical realization ("stage 2")	23 series	43 series	03 series
Signalling protocols ("stage 3") - user equipment to network	24 series	44 series	04 series
Radio aspects	25 series	45 series	05 series
CODECs	26 series	46 series	06 series
Data	27 series	47 series (none exists)	07 series
Signalling protocols ("stage 3") -(RSS-CN) and OAM&P and Charging (overflow from 32.- range)	28 series	48 series	08 series
Signalling protocols ("stage 3") - intra-fixed-network	29 series	49 series	09 series
Programme management	30 series	50 series	10 series
Subscriber Identity Module (SIM / USIM), IC Cards. Test specs.	31 series	51 series	11 series
OAM&P and Charging	32 series	52 series	12 series
Access requirements and test specifications		13 series [1]	13 series [1]
Security aspects	33 series	(2)	(2)
UE and (U)SIM test specifications	34 series	(2)	11 series
Security algorithms [3]	35 series	55 series	(4)
LTE (Evolved UTRA), LTE-Advanced, LTE-Advanced Pro radio technology	36 series		
Multiple radio access technology aspects	37 series		
Radio technology beyond LTE	38 series		

38. Following a link for a series (e.g., "23 series" link) leads to a 3GPP web page providing access to all specifications in a series, as shown by the screenshot below:



39. As another example of a series, the LTE radio standard is covered in the "36 series" and is further subdivided into separate sections or specifications. The LTE radio specification series starts at TS 36.101 and ends at TR 36.978. Excluding withdrawn specifications, the LTE standard consists of more than 250 specifications.

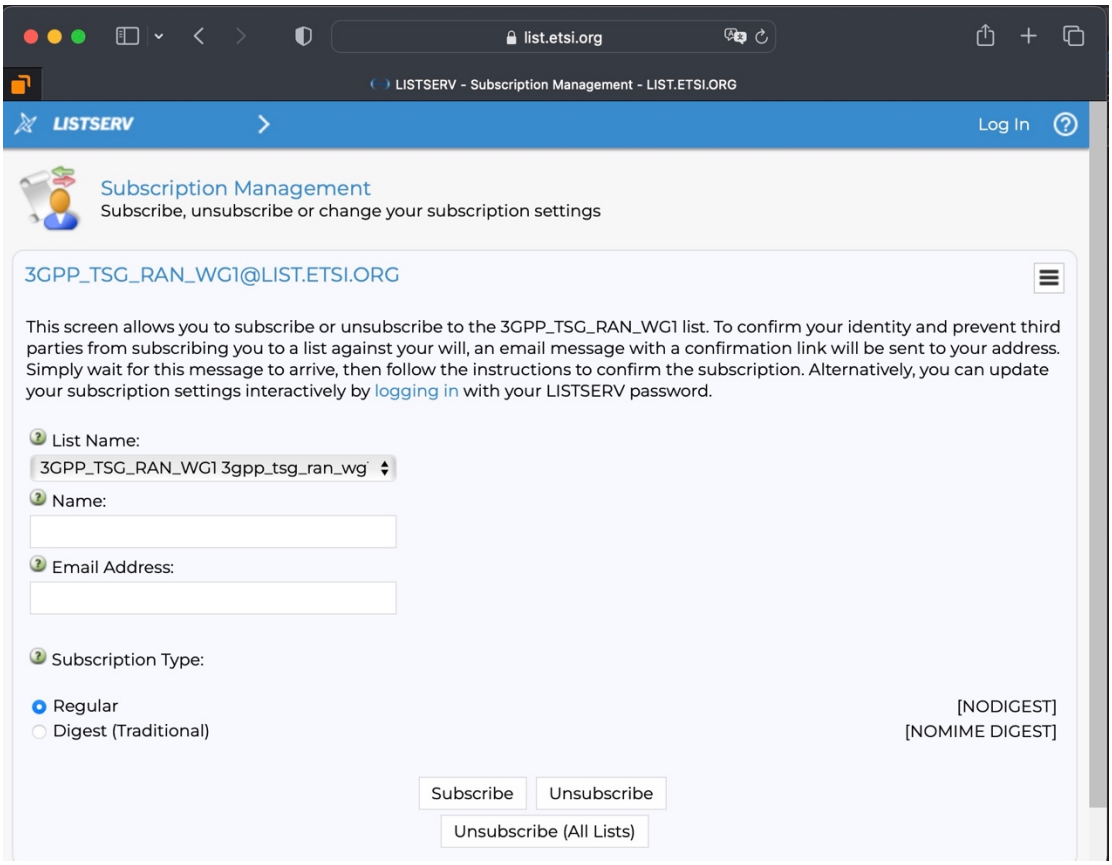
Each specification can span from a few pages to hundreds of pages. One full version of the LTE standard is massive, spanning tens of thousands of pages.

40. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, T-docs are usually uploaded to 3GPP's ftp server and website before the meeting where they are to be discussed. Documents created or revised during the course of a meeting are normally uploaded at the latest during the week following the meeting (e.g., the meeting report of the meeting is usually published for review during the week following the meeting).

41. In the ordinary course of 3GPP's regularly conducted business activities, and pursuant to its standard business practices, 3GPP maintains archives that include different versions of the specifications, as well as email communications to its membership, including emails announcing the uploading of new or additional documents to 3GPP's ftp server. These archives are created at the time the emails are initially sent.

42. At least as early as July 1999, including from 2004-2017, all of 3GPP's email archives, including the dedicated email lists for the 3GPP TSG RAN Working Groups were freely accessible to the general public with no login, password, or membership requirement. E.g., the screenshot below represents the subscription page of the 3GPP TSG RAN WG1 email list as of today

demonstrating that this webpage is publicly available and that only email address and name have to be entered to join the email list. Alternatively, everyone interested is able to obtain a LISTSERV password for managing subscriptions interactively without email confirmations. According to my experience the subscription page looked very similar and provided the same functionality already in 1999 and certainly also in the timeframe 2004-2017.



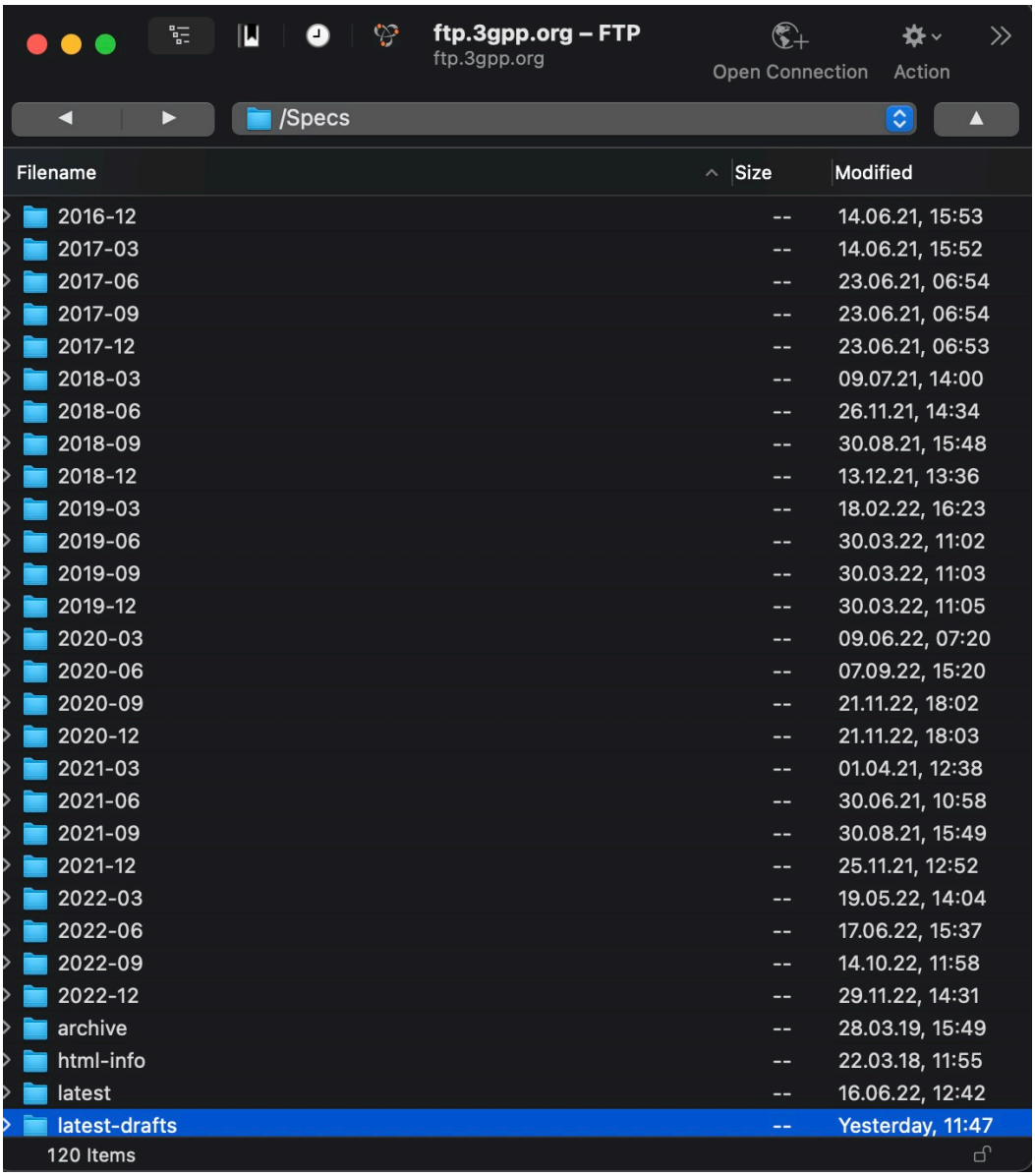
43. Each of 3GPP's member companies typically assigned one or more individuals to regularly participate in these email lists. Thus, not only did the general public have access to the emails in 3GPP's email archives, but some of the

most interested members of the public–those working to develop standards for cellular telecommunication–personally received copies of such emails through their participation in the email lists.

44. By June 1999, including from 2004-2017, 3GPP's email archives were well-known to persons in the cellular telecommunications industry as a source of public information and of technical specifications, proposals, meeting announcements, technical discussions and reports regarding industry standards and technological advances.

45. Based on my experience with 3GPP and the telecommunications industry, I would expect a person interested in the development of cellular standards, e.g., LTE or 5G, to consult the emails archives of the working groups and TSGs that person is interested in, and/or, to be subscribed to the corresponding email reflectors to receive any email notifications in real-time.

46. 3GPP specifications almost always are duplicated in at least two and sometime more locations on the ftp server. One location corresponds to a "snapshot" of the specifications corresponding to a particular plenary meeting cycle—for instance, the 2018-12 snapshot contains a snapshot of numerous specifications after the December 2018 3GPP plenary meetings. The second location is an "archive" that contains all versions over time for a given specification. The screenshot below shows an excerpt of the "Spec" folder at ftp.3gpp.org:



47. While 3GPP aims to upload the updated specifications to both locations at the same time, occasionally there may be a small difference in the upload date, and thus the date stamp, for the same specification uploaded to the two locations. Additionally, specifications which are not yet approved (so called "draft" specifications) are presented as T-docs at working group and at plenary meetings (as

soon as the working group decides to submit the specification to the plenary meeting for information or approval). In many cases, the T-docs are also distributed on the email exploder of the working group prior to the meeting, making the T-docs available to all those subscribed to the email distribution list.

48. The timestamp on 3GPP's ftp server shows the date when the document was uploaded the last time. Thus, the timestamp shows the latest possible date the document became publicly available and accessible on 3GPP's ftp server. The given document might have been available earlier and the original timestamp might have been overwritten because the document was uploaded again. According to my experience, this is something which happened occasionally. Thus, the ftp timestamp is reliable as the latest possible upload date but one cannot determine whether it represents the first upload of a document to the ftp server.

49. 3GPP's working practice to store their documents on its ftp server, as described above, has not changed over time. Starting from the first 3GPP meetings in 1998 until present, all WGs and plenary meetings are represented by dedicated meeting folders on the ftp server. These meeting folders include the documents discussed at the meetings. Both the folders and the documents are accessible to the public. Almost every week, a new meeting folder with the respective documents is added. In addition to the plenary and WG meeting folders, and some other folders, there is also the "Specs" folder, which holds all 3GPP specifications including the

aforementioned "snapshot" and archive folders. Since the early days of 3GPP a new folder is added inside the "Specs" folder after each TSG plenary meeting to hold the latest versions of specifications approved at those TSG plenary meetings. This is still 3GPP's working practice today; thus, this practice has not changed over time.

50. 3GPP maintains a set of publicly accessible documents[1] providing further details on its way of working:

- 3GPP Working Procedures
- Vocabulary for 3GPP Specifications 3GPP TR 21.905
- Working Methods 3GPP TR 21.900
- Specification Drafting Rules 3GPP TR 21.801

B. Specific Documents

1. TR 25.892 V6.0.0

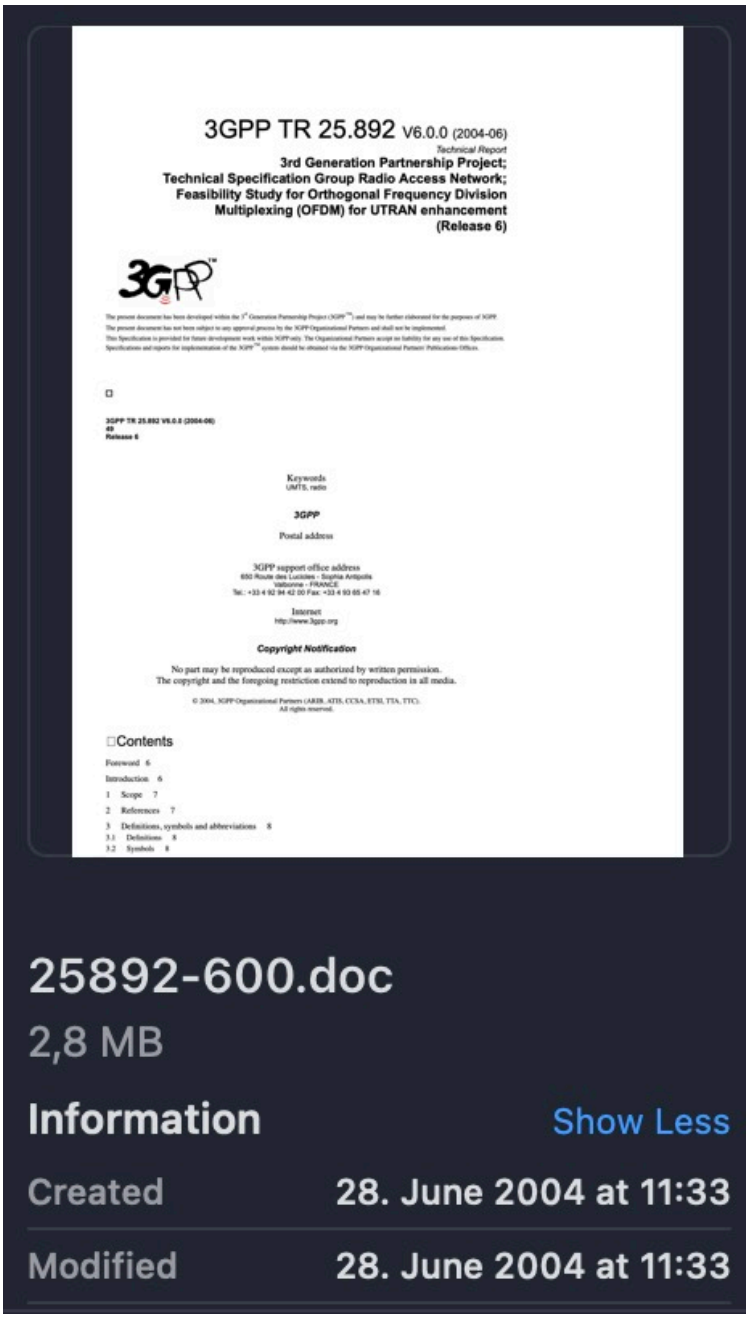
51. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1006 as a true and correct copy of version 6.0.0 of technical specification 3GPP TR 25.892 ("Technical Specification Group Radio Access Network; Feasibility Study for Orthogonal Frequency Division Multiplexing (OFDM) for UTRAN enhancement (Release 6)"), which shows on its cover page

[1] All available from https://www.3gpp.org/delegates-corner/3gpp-working-procedures.

"2004-06" as the year (2004) and month (June) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by June 28, 2004, at the latest. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("25892-600.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20060628153102/http://www.3gpp.org/ftp/Specs/archive/25_series/25.892/. The upload information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/25_series/25.892, as shown by the screenshot below:



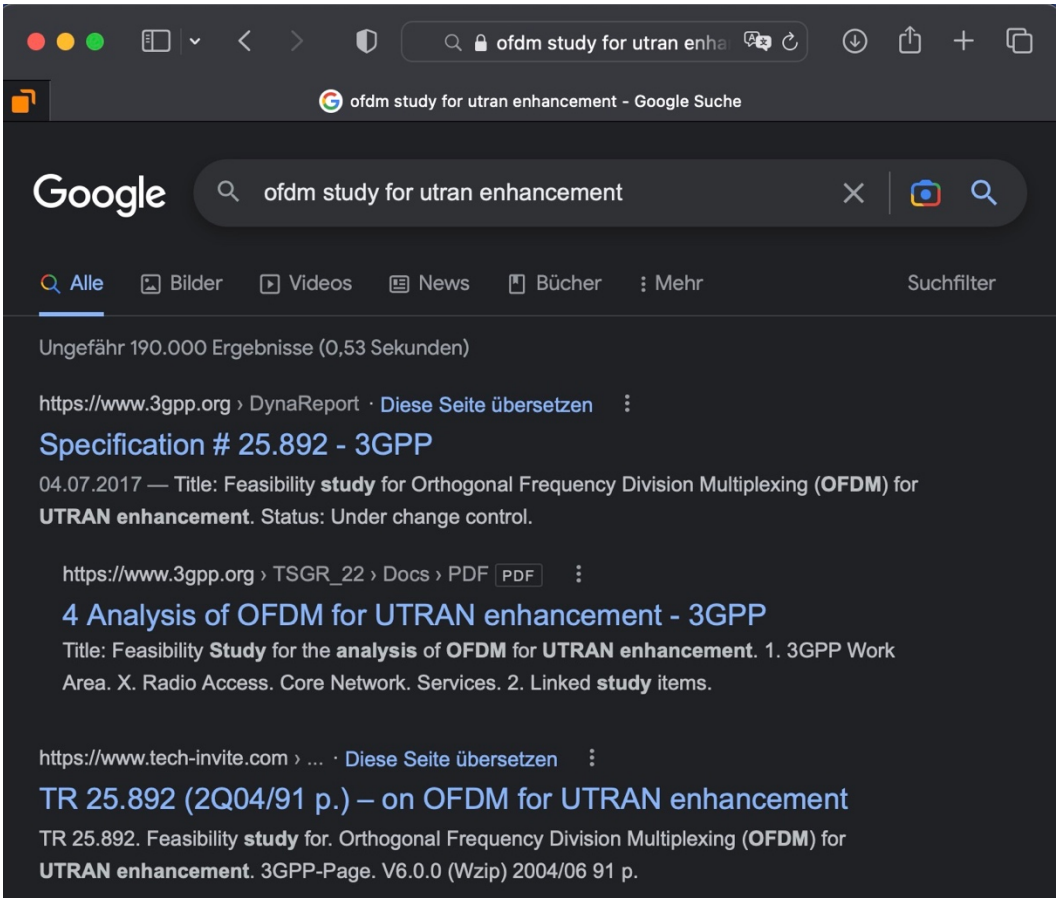
52. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of "28. June 2004", as shown in the screenshot below:



53. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document

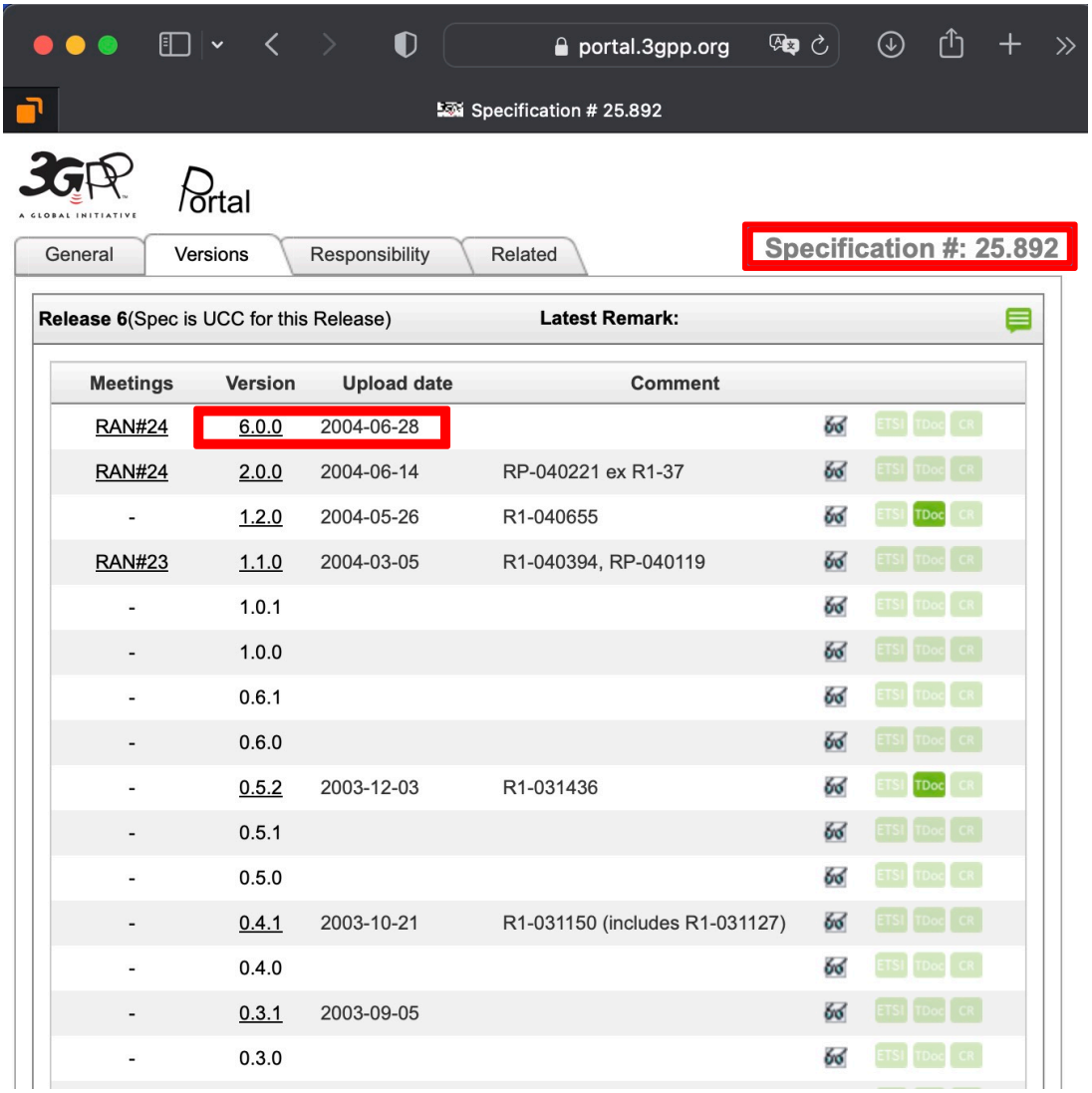
was available to all 3GPP members and the general public by June 28, 2004, at the latest.

54. I believe that a person without prior knowledge of 3GPP and/or the technical report (TR) number would have been able to also easily find the TR for download via internet search. For instance, a Google search for "ofdm study for utran enhancement" provides the TR number "25.892" as one of the top results as can be seen in the screenshot below:



55. Following the provided search result link "Specification # 25.892 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links

to all versions of TR 25.892 including version 6.0.0, as shown by the screenshot below:



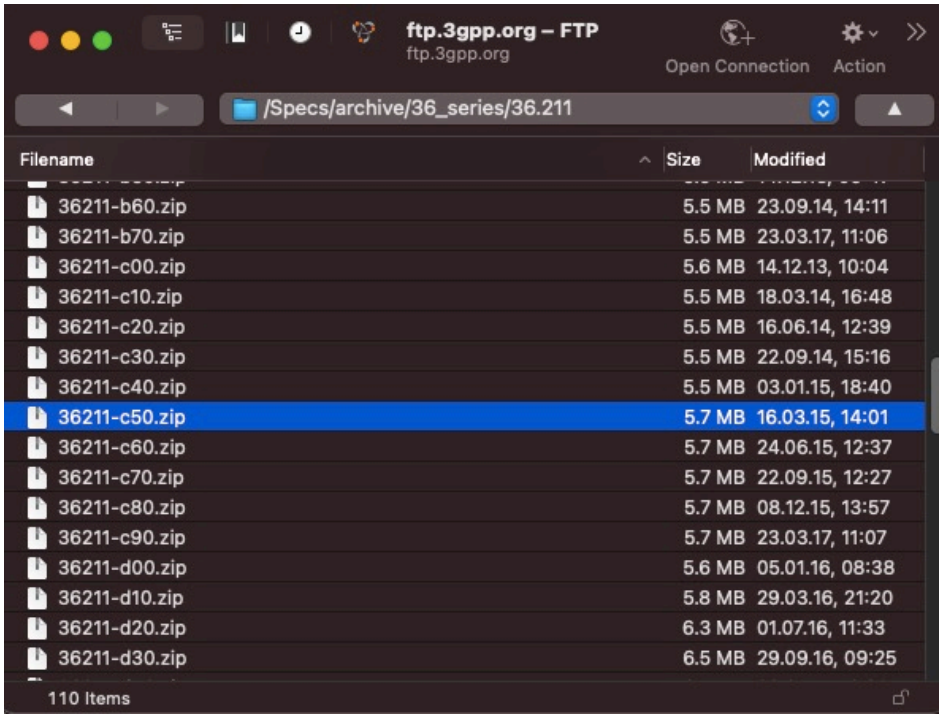
56. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TR number and even without prior knowledge of 3GPP to locate any version of TR 25.892, including version 6.0.0, for download.

57. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in 2004 or around that timeframe would have similarly provided the path to download version 6.0.0 of TR 25.892.

2. TS 36.211 V12.5.0

58. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1019 as a true and correct copy of version 12.5.0 of technical specification 3GPP TS 36.211 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation (Release 12)"), which shows on its cover page "2015-03" as the year (2015) and month (March) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by March 16, 2015. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("36211-c50.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20150405041021/http://www.3gpp.org:80/ftp/specs/archive/36_series/36.211. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at

https://www.3gpp.org/ftp/Specs/archive/36_series/36.211, as shown by the screen shot below:



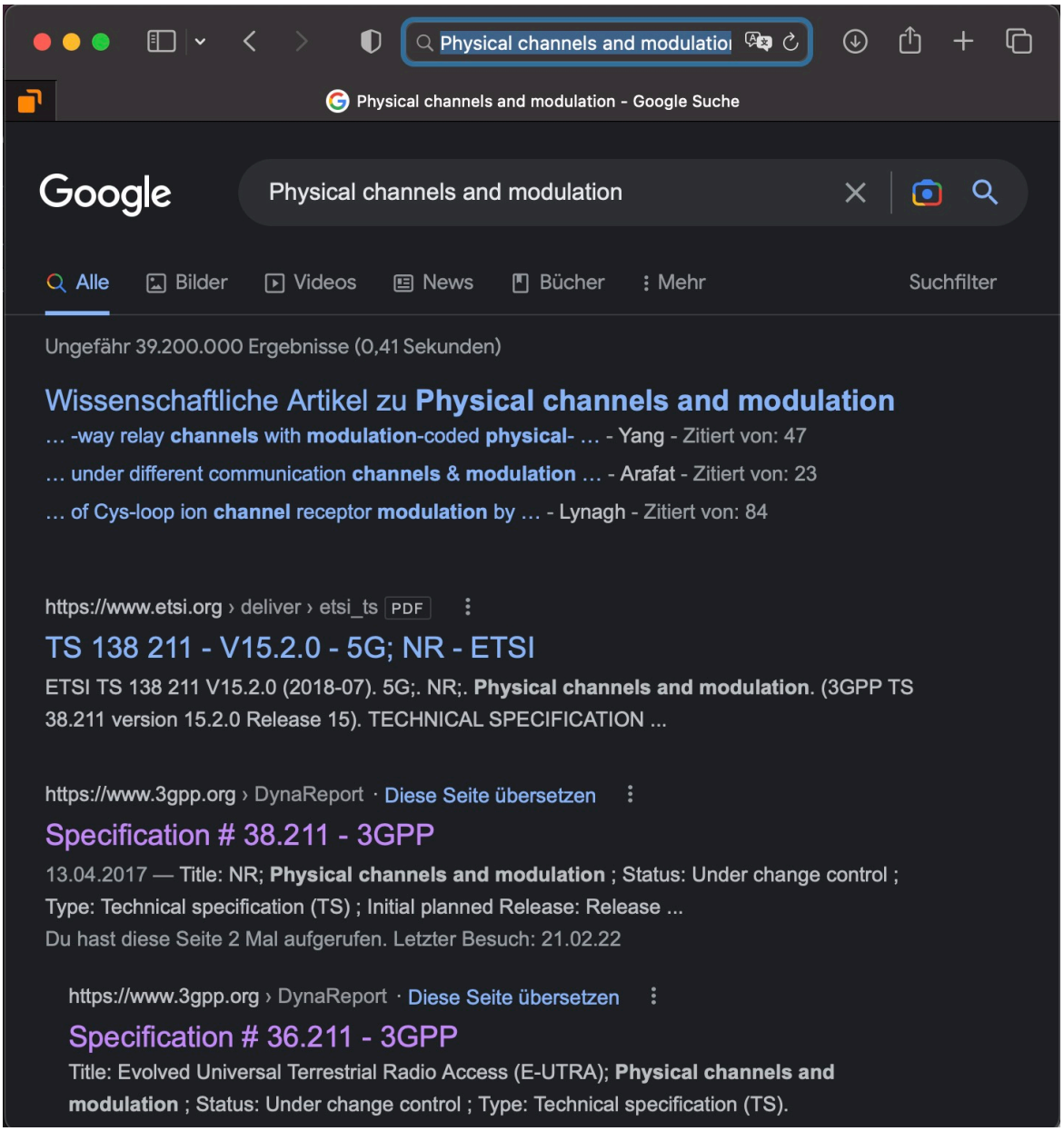
59. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of "16. March 2015", as shown in the screenshot below:



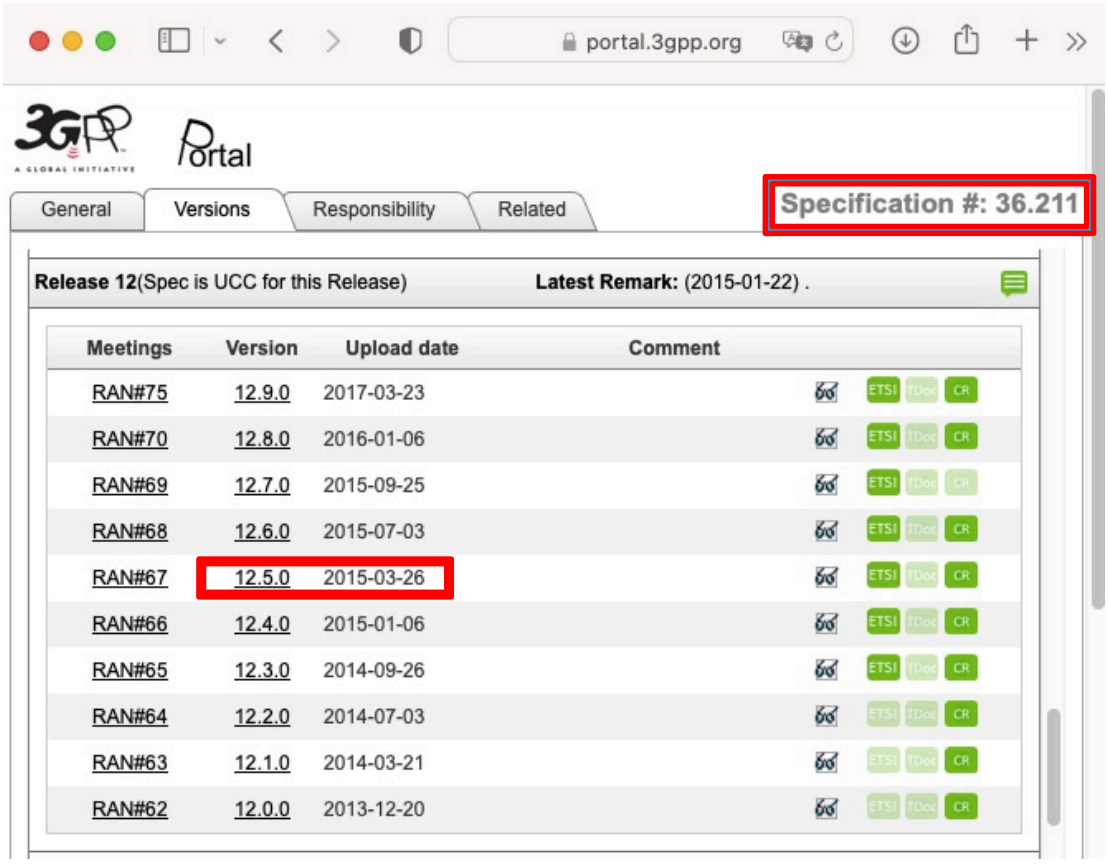
60. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by March 16, 2015, at the latest.

61. Furthermore, the availability of the new RAN1 specification versions which included TS 36.211 V12.5.0 was announced by the RAN WG1 secretary via the public 3GPP_TSG_RAN_WG1 email exploder on March 27, 2015, as shown in Appendix D. As of today, the 3GPP_TSG_RAN_WG1 email exploder has 1500 subscribers at https://list.etsi.org/scripts/wa.exe?INDEX. According to my experience I would expect a similar or only slightly lower number of subscribers around 2015.

62. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "Physical channels and modulation" provides the TS number "36.211" as one of the top results as can be seen in the screenshot below:



63. Following the provided search result link "Specification # 36.211 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links to all versions of TS 36.211 including version 12.5.0, as shown by the screenshot below:

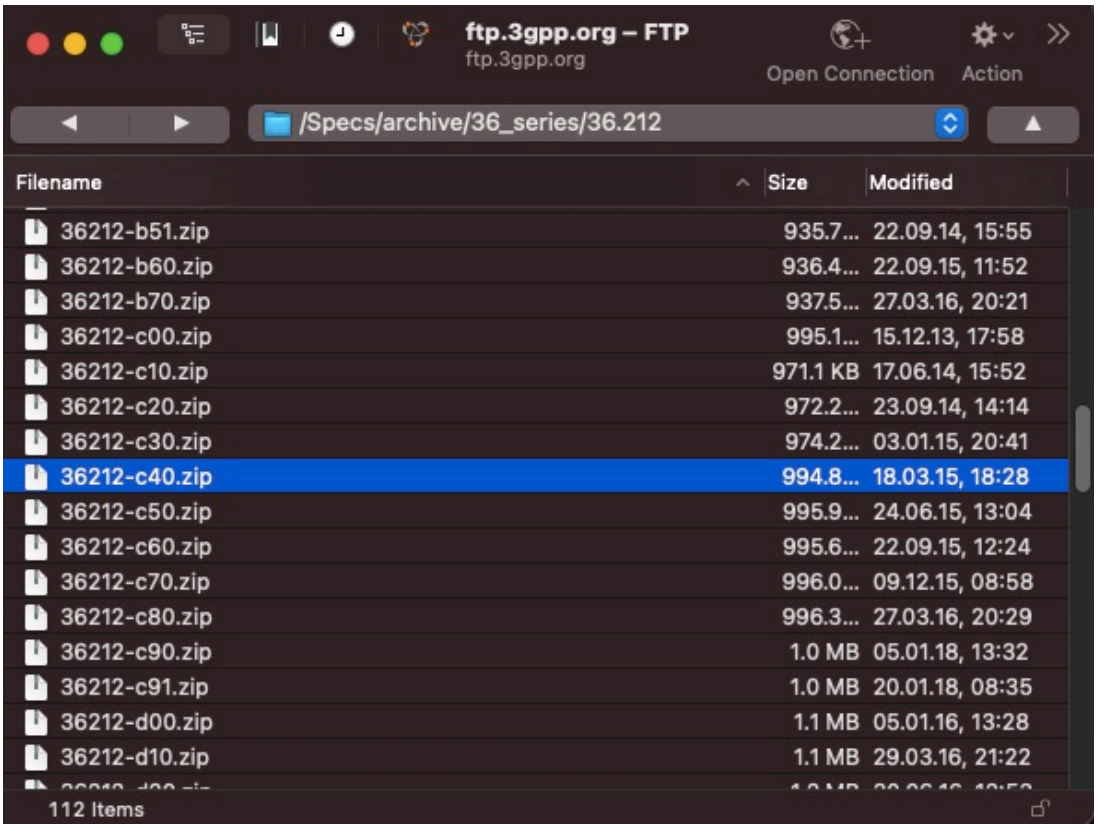


64. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 36.211, including version 12.5.0, for download.

65. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in April 2015 or around that timeframe would have similarly provided the path to download version 12.5.0 of TS 36.211.

3. TS 36.212 V12.4.0

66. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1020 as a true and correct copy of version 12.4.0 of technical specification 3GPP TS 36.212 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding (Release 12)"), which shows on its cover page "2015-03" as the year (2015) and month (March) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by March 18, 2015. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("36212-c40.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20150405041016/http://www.3gpp.org:80/ftp/Specs/archive/36_series/36.212. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/36_series/36.212, as shown by the screen shot below:



67. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of "18. March 2015", as shown in the screenshot below:

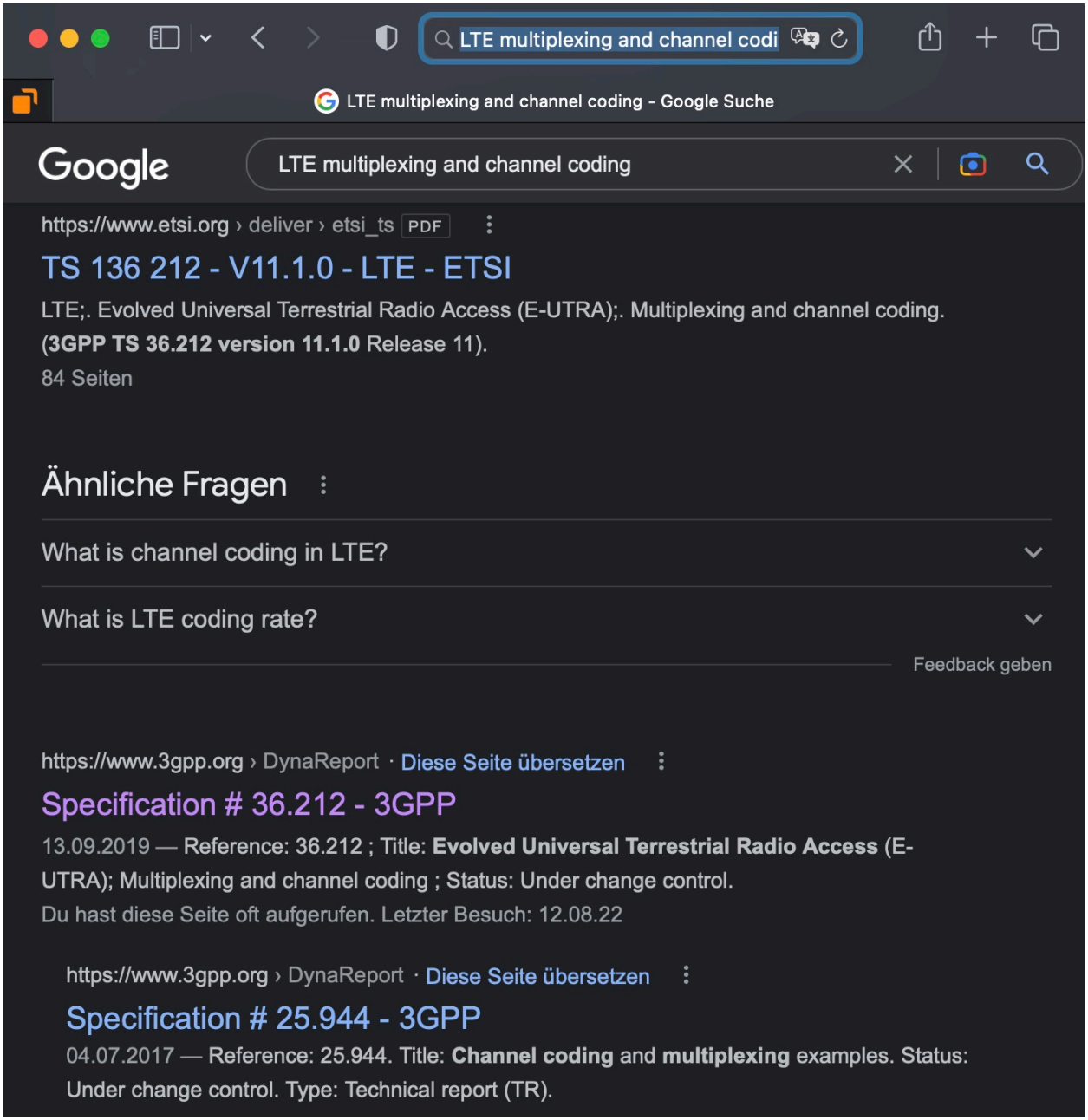


68. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by March 18, 2015, at the latest.

69. Furthermore, the availability of the new RAN1 specification versions which included TS 36.212 V12.4.0 was announced by the RAN WG1 secretary via

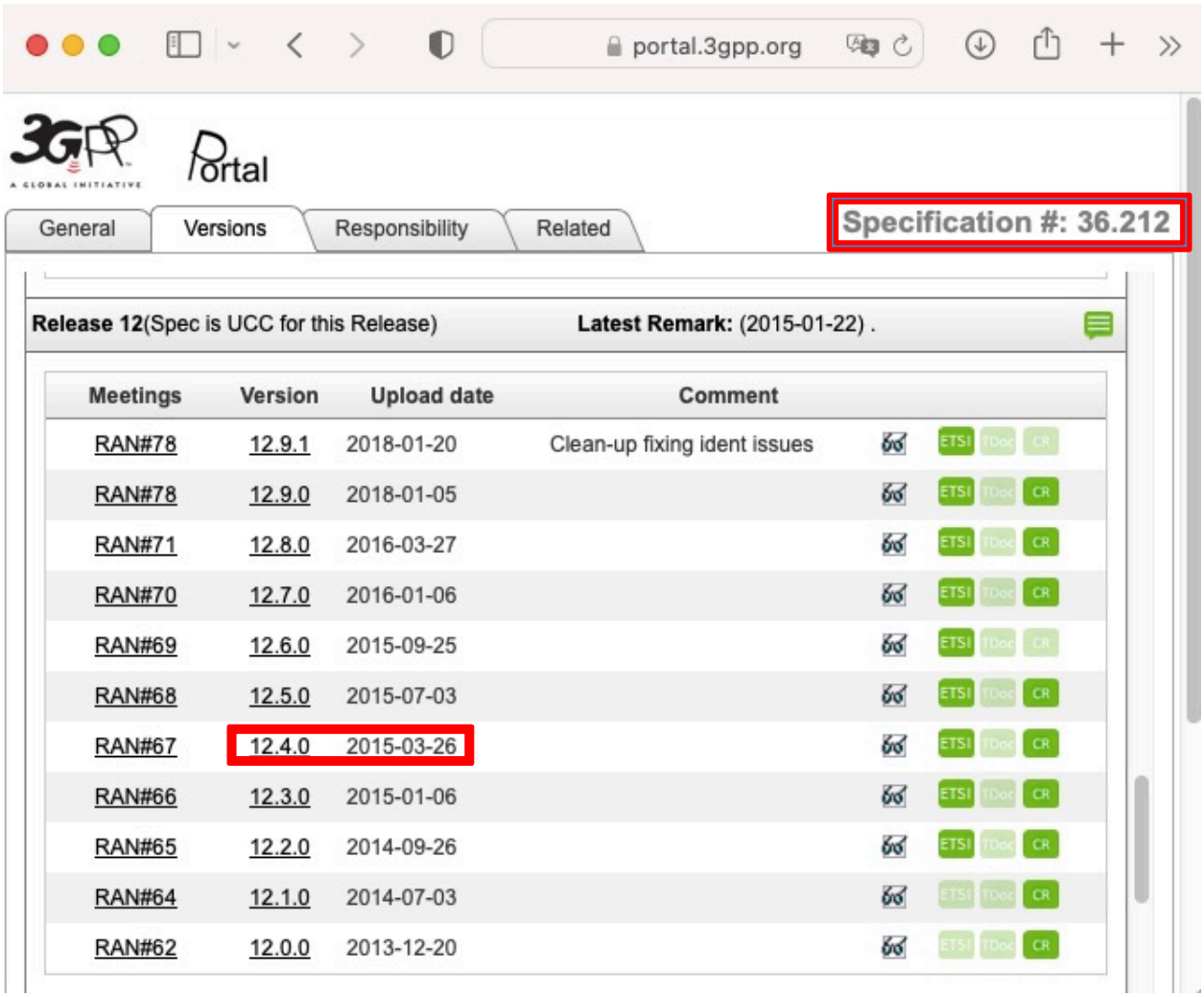
the public 3GPP_TSG_RAN_WG1 email exploder on March 27, 2015, as shown in Appendix D. As of today, the 3GPP_TSG_RAN_WG1 email exploder has 1500 subscribers at https://list.etsi.org/scripts/wa.exe?INDEX. According to my experience I would expect a similar or only slightly smaller number of subscribers around 2015.

70. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "LTE multiplexing and channel coding" provides the TS number "36.212" as one of the top results as can be seen in the screenshot below:



71. Following the provided search result link “Specification # 36.212 – 3GPP” leads to a 3GPP web page offering under the tab “Versions” download links

to all versions of TS 36.212 including version 12.4.0, as shown by the screenshot below:



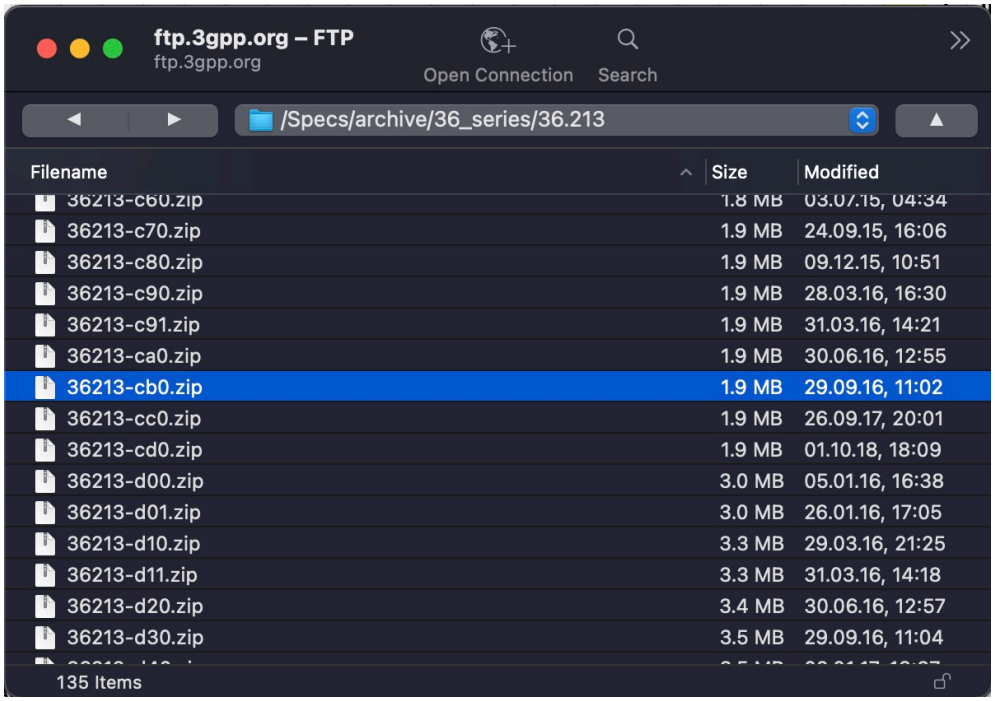
72. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 36.212, including version 12.4.0, for download.

73. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in April 2015 or around that timeframe would have similarly provided the path to download version 12.4.0 of TS 36.212.

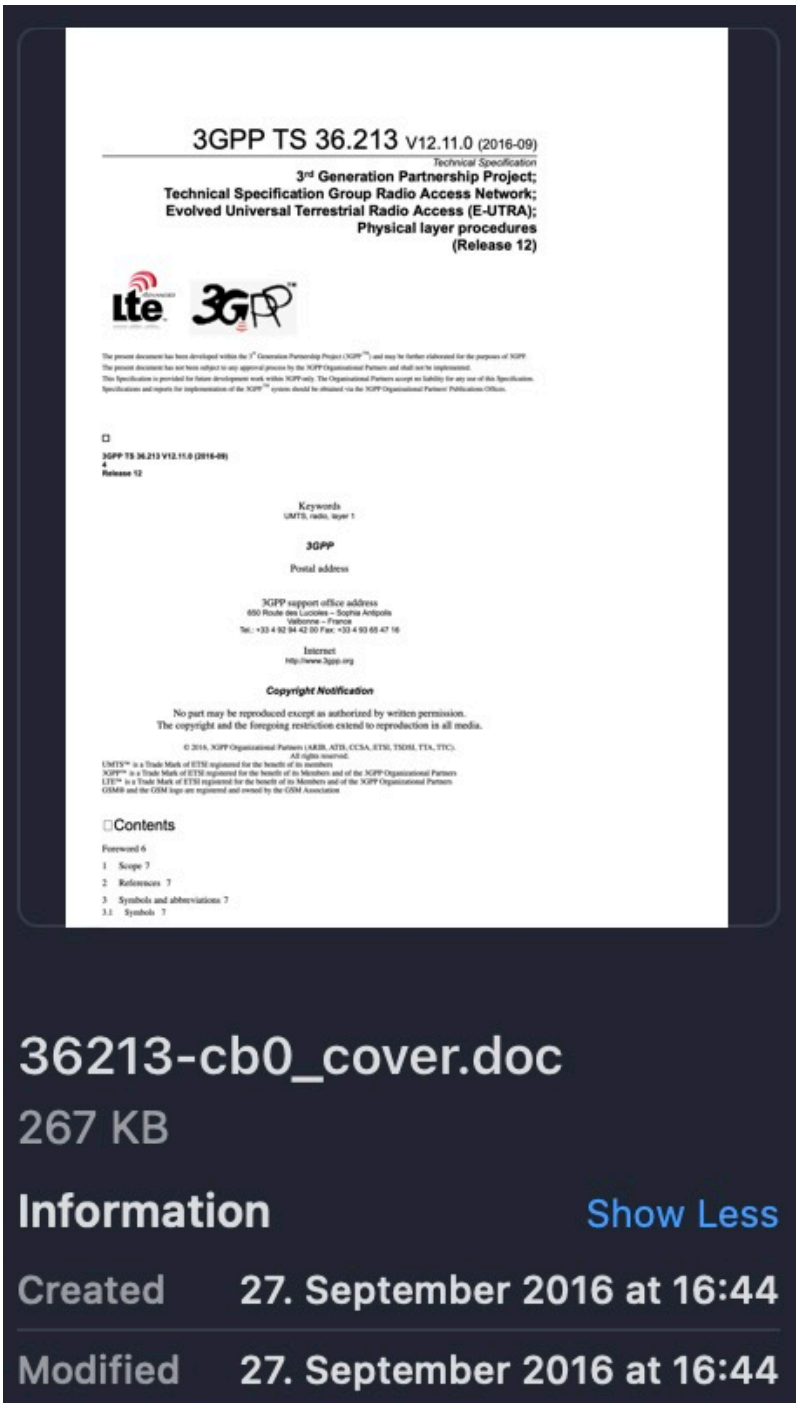
4. TS 36.213 V12.11.0

74. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1007 as a true and correct copy of version 12.11.0 of technical specification 3GPP TS 36.213 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures (Release 12)"), which shows on its cover page "2016-09" as the year (2016) and month (September) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by September 29, 2016. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("36213-cb0.zip"), as maintained by the Internet Archive at https://web.archive.org/web/20161228162506/http://www.3gpp.org:80/ftp/specs/archive/36_series/36.213. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at

https://www.3gpp.org/ftp/Specs/archive/36_series/36.213, as shown by the screenshot below:



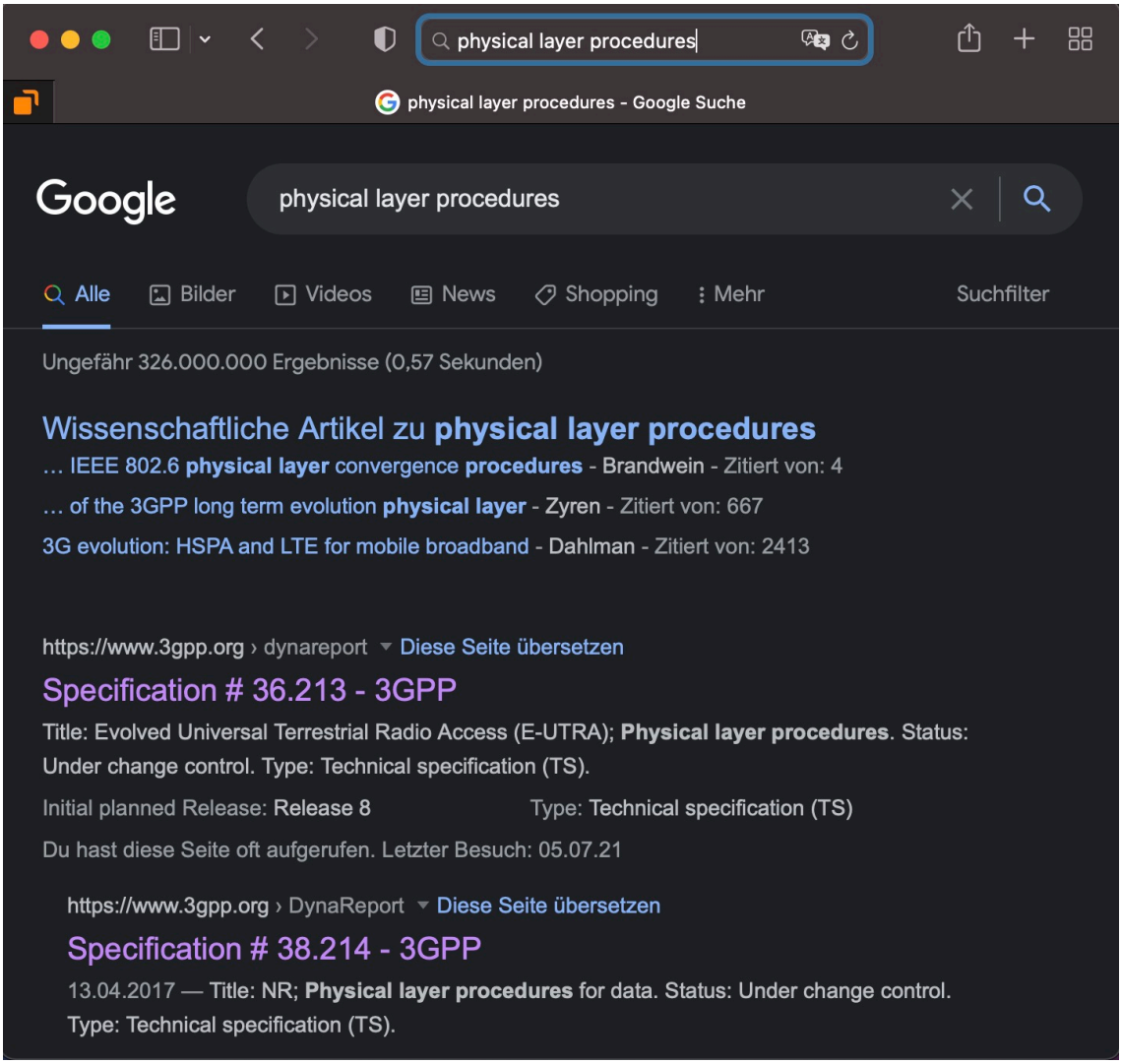
75. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of "27. September 2016", as shown in the screenshot below:



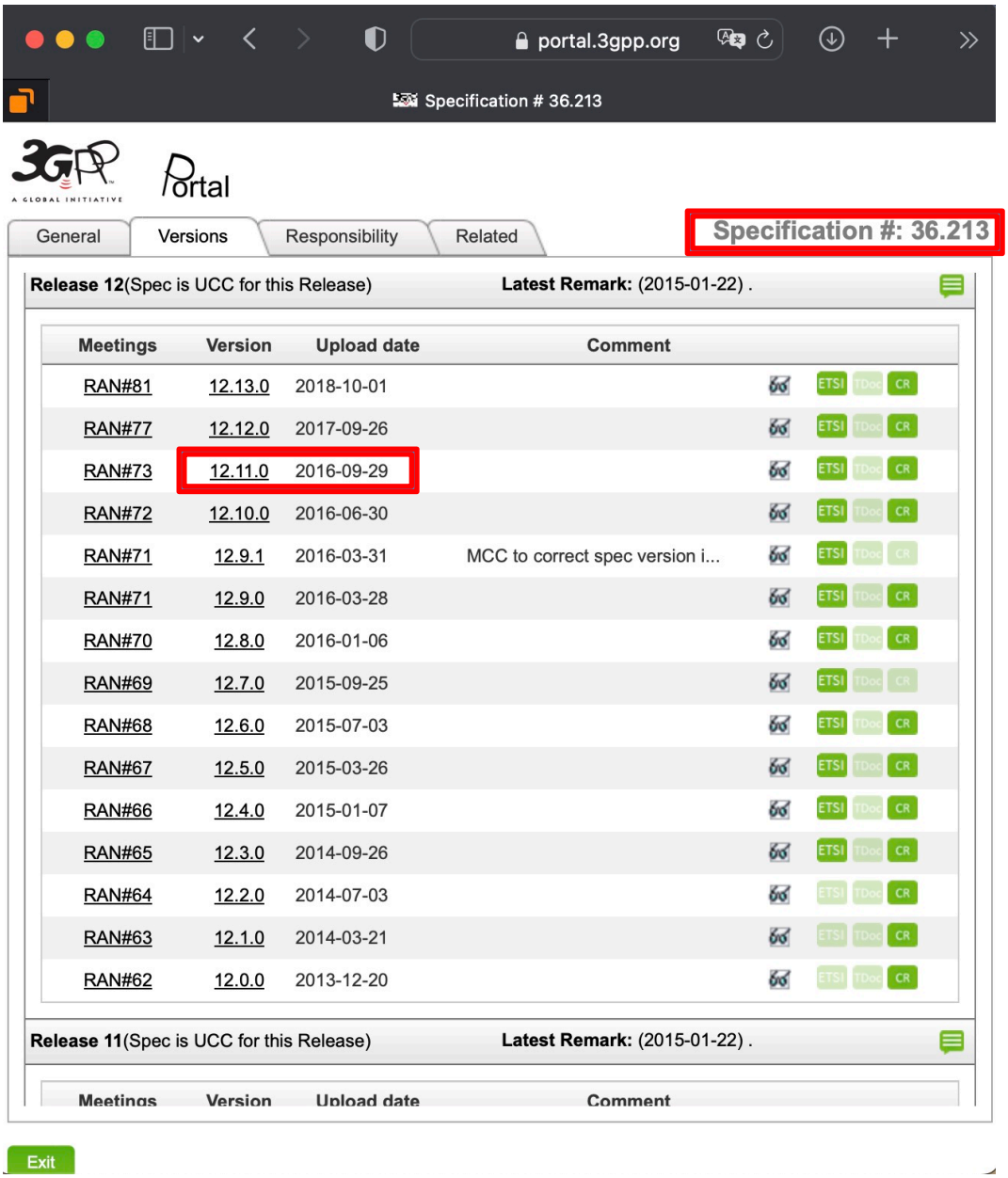
76. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document

was available to all 3GPP members and the general public by September 29, 2016, at the latest.

77. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "physical layer procedures" provides the TS number "36.213" as one of the top results as can be seen in the screenshot below:



78. Following the provided search result link "Specification # 36.213 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links to all versions of TS 36.213 including version 12.11.0, as shown by the screenshot below:



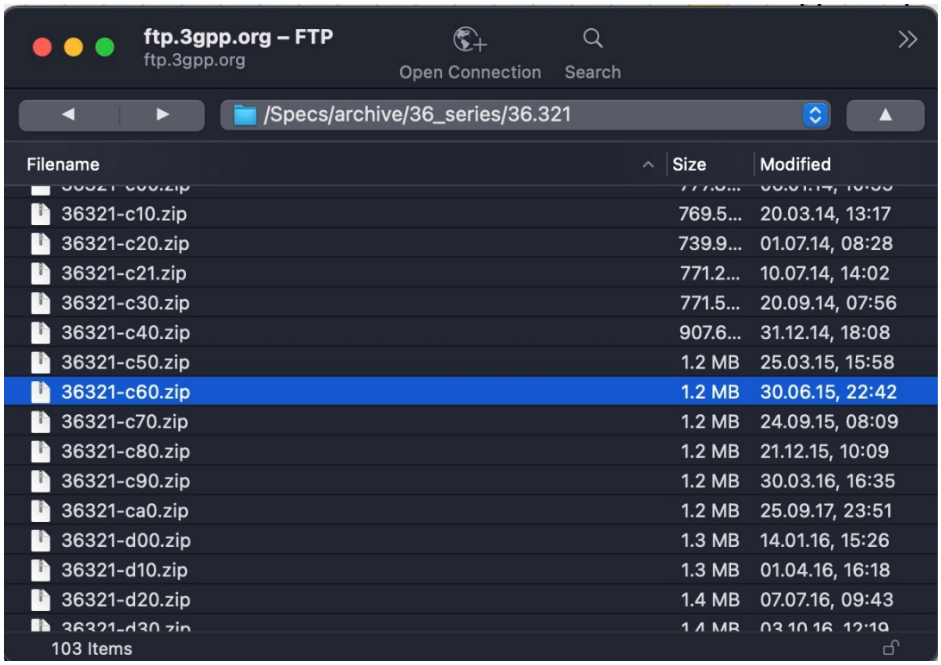
79. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 36.213, including version 12.11.0, for download.

80. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in September 2016 or around that timeframe would have similarly provided the path to download version 12.11.0 of TS 36.213.

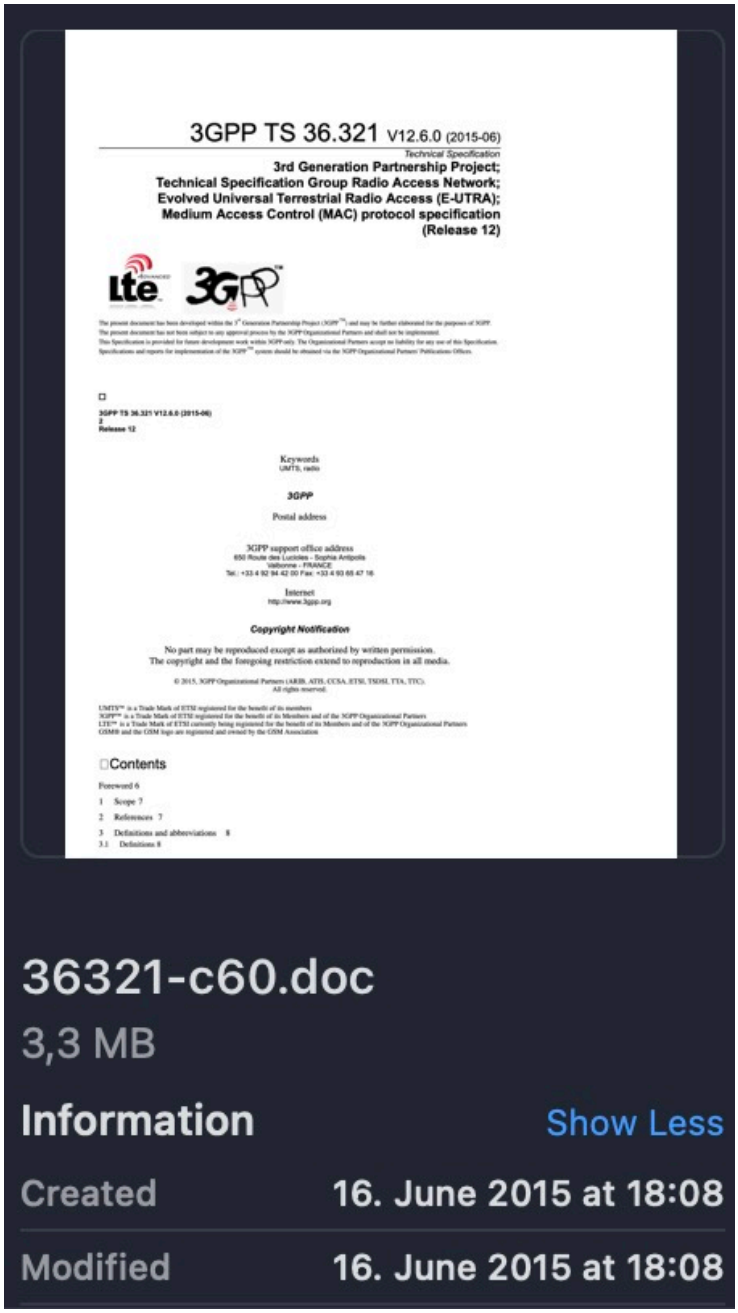
5. TS 36.321 V12.6.0

81. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1008 as a true and correct copy of version 12.6.0 of technical specification 3GPP TS 36.321 ("Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification (Release 12)"), which shows on its cover page "2015-06" as the year (2015) and month (December) during which this document was released by 3GPP. The document was published and freely available on 3GPP's ftp server by June 30, 2015. This is confirmed by the date stamp shown on the historic 3GPP ftp server for the corresponding downloadable file ("36321-c60.zip"), as maintained by the Internet Archive at

https://web.archive.org/web/20151025200702/http://www.3gpp.org:80/ftp/specs/archive/36_series/36.321. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/Specs/archive/36_series/36.321, as shown by the screen shot below:

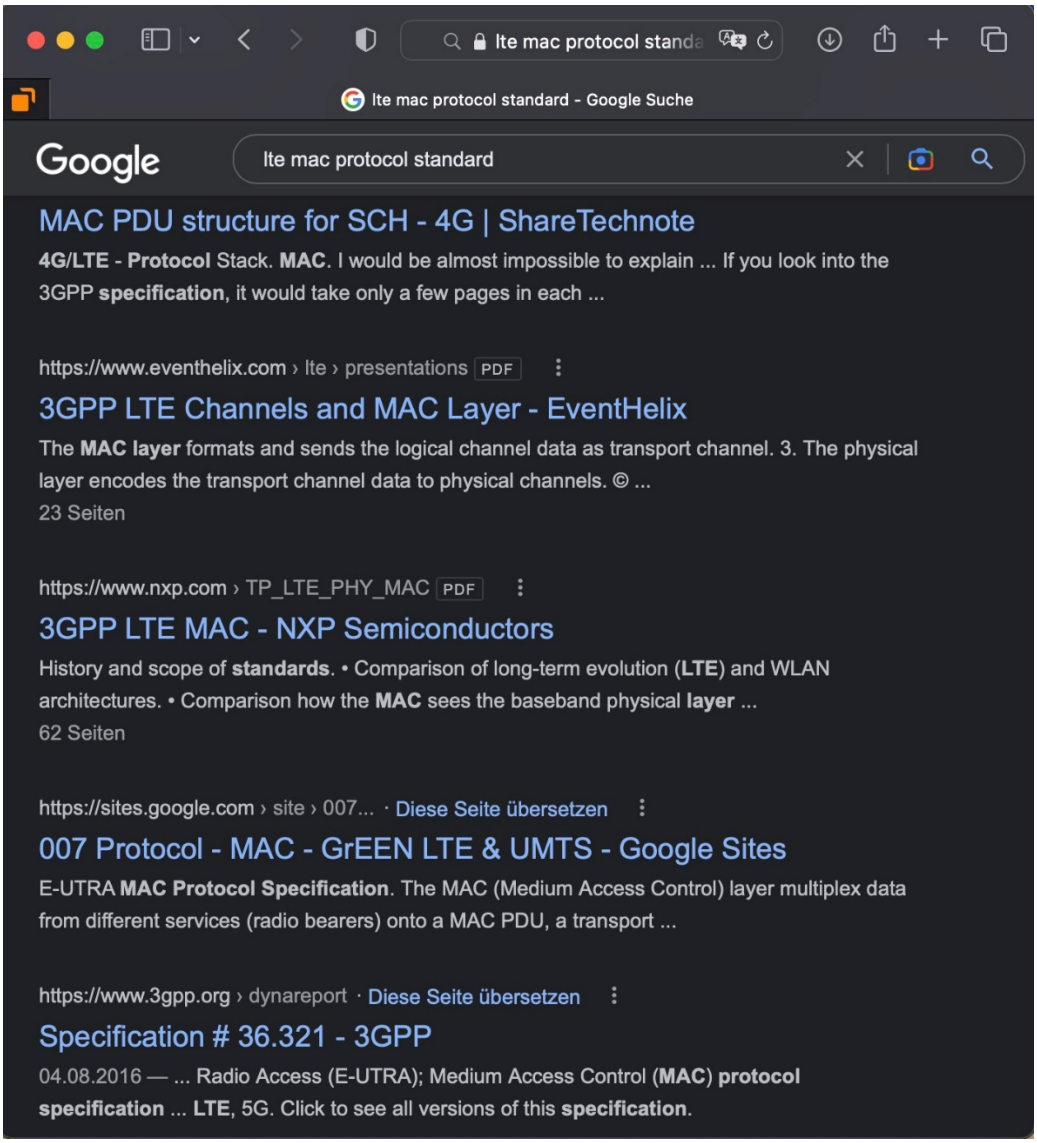


82. In addition, metadata information for the downloaded and extracted specification file states a last Modified date of "30. June 2015", as shown in the screenshot below:


3GPP TS 36.321 V12.6.0 (2015-06)
Technical Specification
3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Evolved Universal Terrestrial Radio Access (E-UTRA);
Medium Access Control (MAC) protocol specification
(Release 12)
Contents
36321-c60.doc
3,3 MB
Information
Show Less
Created
16. June 2015 at 18:08
Modified
16. June 2015 at 18:08

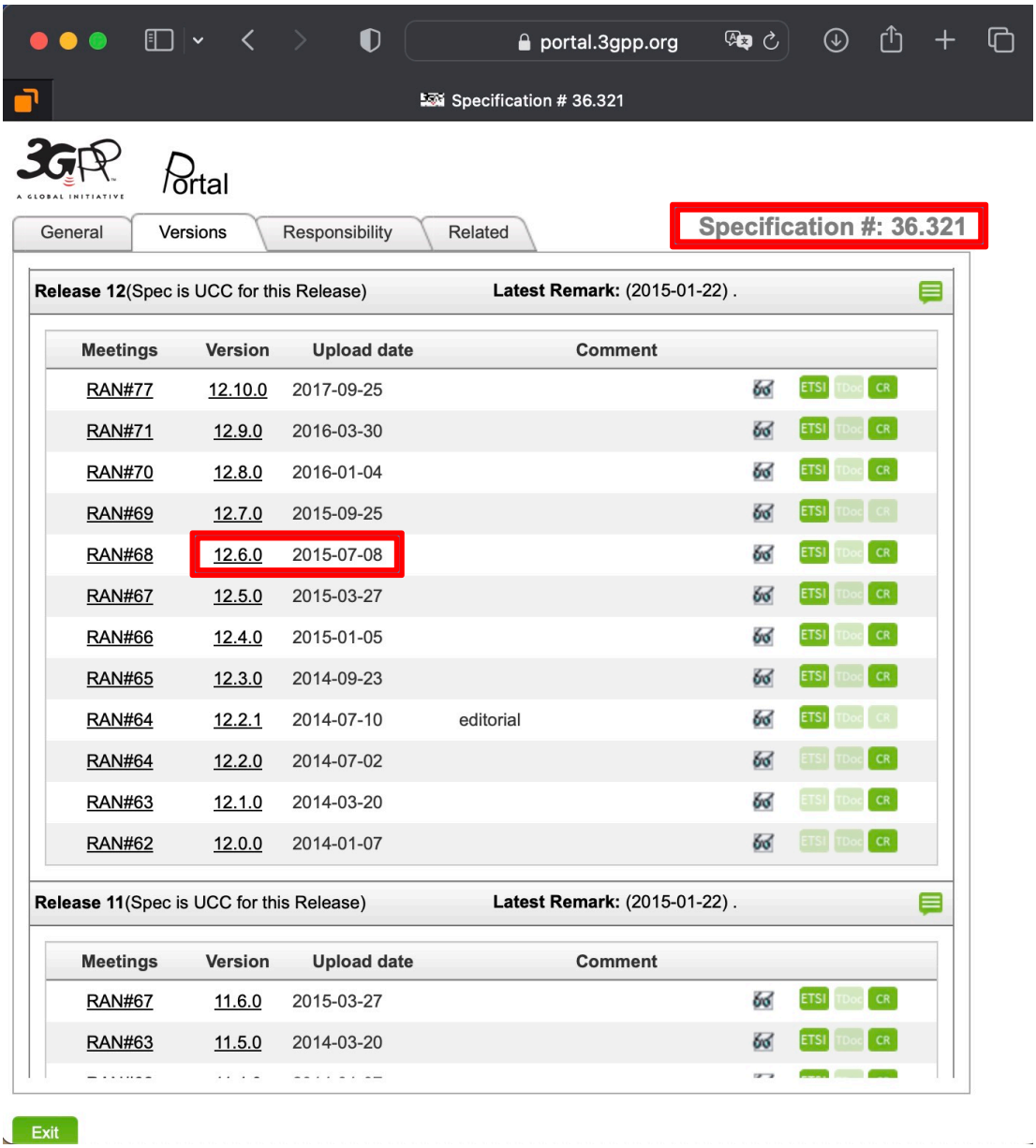
83. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that this document was available to all 3GPP members and the general public by June 30, 2015, at the latest.

84. I believe that a person without prior knowledge of 3GPP and/or the technical specification (TS) number would have been able to easily find the TS for download via internet search. For instance, a Google search for "LTE physical layer measurements" provides the TS number "36.321" as one of the top results as can be seen in the screenshot below:



85. Following the provided search result link "Specification # 36.321 – 3GPP" leads to a 3GPP web page offering under the tab "Versions" download links to all versions of TS 36.321 including version 12.6.0, as shown by the screenshot below[2]:

[2] The shown upload date is later than the upload date identified in paragraph 64. This is due to the fact that 3GPP specifications are stored at different locations on the 3GPP server and sometimes they are not uploaded on the same day - as explained in paragraph 45.



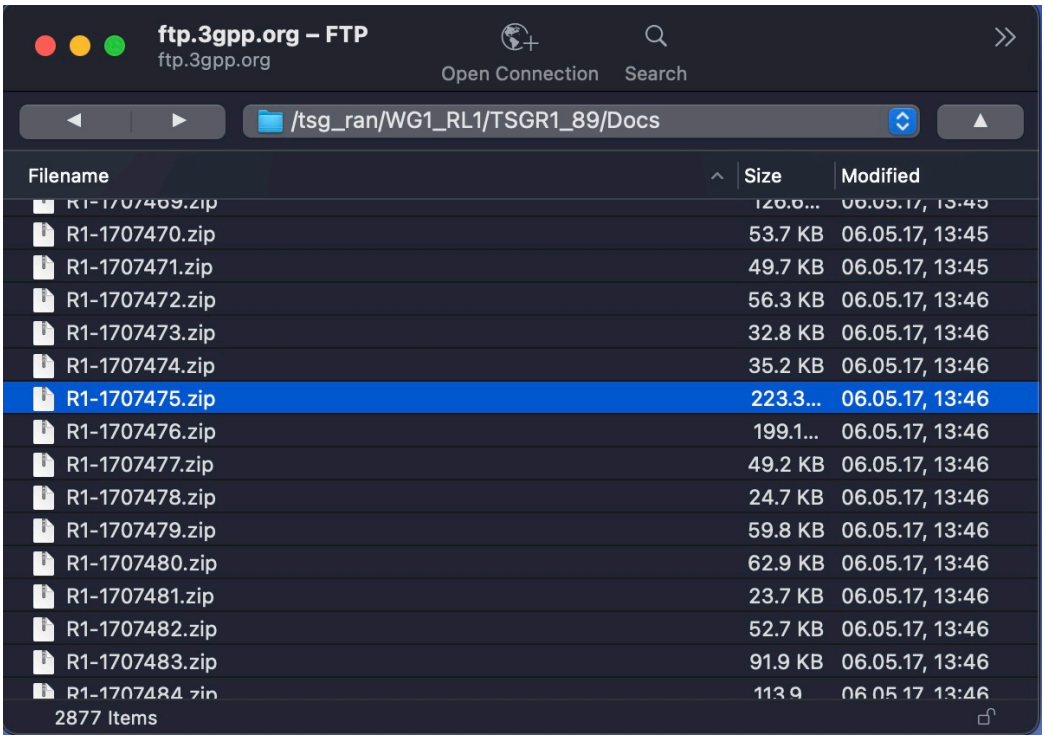
86. The above example search illustrates that it is very easy for an interested member of the public without prior knowledge of the TS number and even without prior knowledge of 3GPP to locate any version of TS 36.321, including version 12.6.0, for download.

87. The above search was performed at the time of writing this report. According to my personal experience, similar searches done in July 2015 or around that timeframe would have similarly provided the path to download version 12.6.0 of TS 36.321.

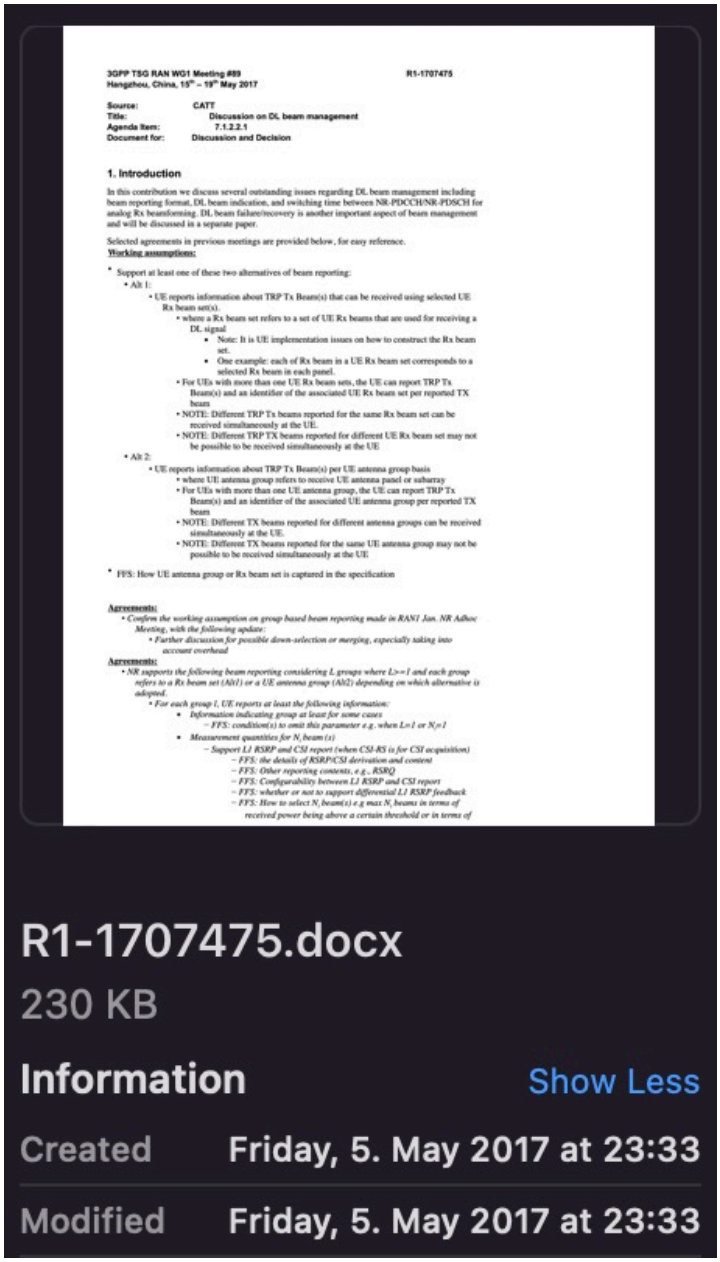
6. T-doc R1-1707475

88. Based on my personal knowledge and my review of 3GPP's business records, I recognize Ex. 1021 as a true and correct copy of 3GPP T-doc R1-1707475, which represents a 3GPP document with the title "Discussion on DL beam management." The document was authored by China Academy of Telecommunications Technology (CATT) and it covered several aspects of downlink beam management including beam reporting format, beam indication, and switching time between NR-PDCCH/NR-PDSCH for analog Rx beamforming. On its face, R1-1707475 refers to the RAN WG1 meeting #89 held on May 15-19, 2017, in Hangzhou, China. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that R1-1707475 was available either prior to or during that meeting to at least all attending 3GPP members. The public availability of the document is confirmed by the date stamp, May 6, 2017, shown on the historic 3GPP ftp server for the corresponding downloadable file ("R1-1707475.zip"), as maintained by the

Internet Archive at https://web.archive.org/web/20170516104941/http://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_89/Docs/. This information is also shown on the date stamp for the present-day listing of the same document on the 3GPP ftp server at https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_89/Docs/ as shown in the screenshot below:

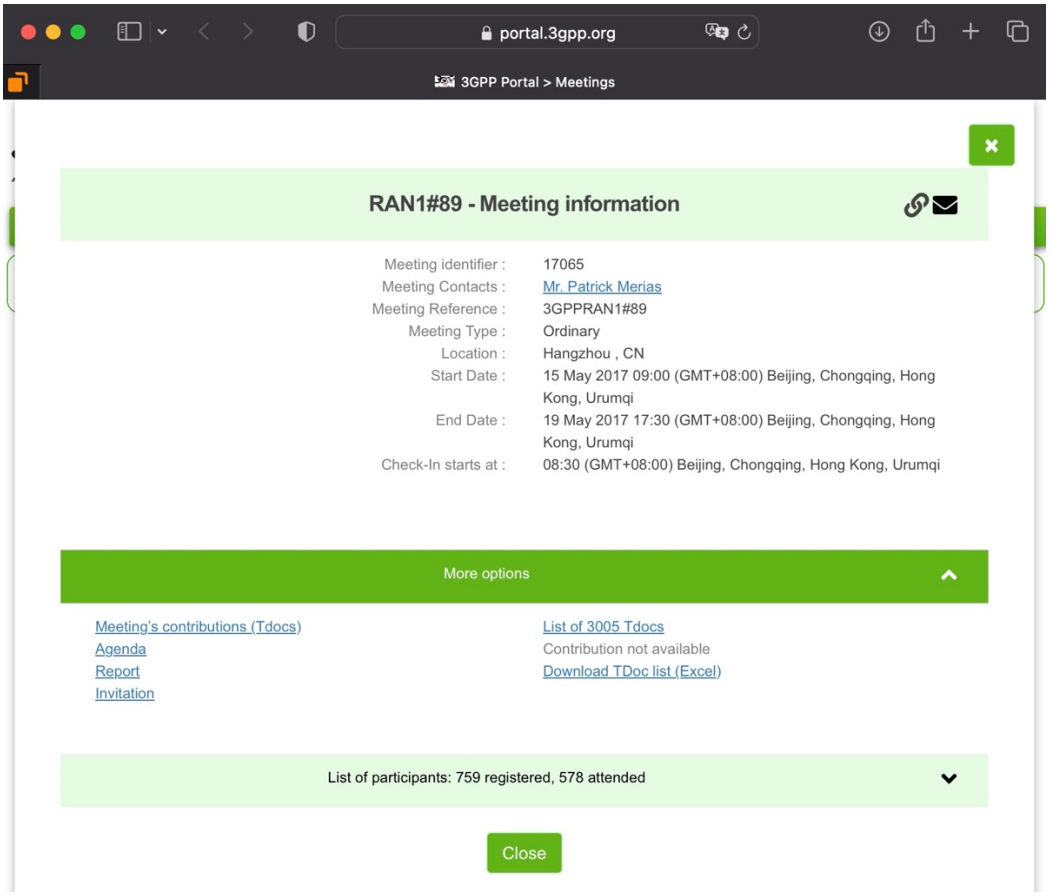


89. In addition, metadata information for the downloaded and extracted T-doc file states a last Modified date of "5. May 2017," as shown in the screenshot below:



90. The official meeting report of the RAN WG1 meeting #89 held on May 15-19, 2017, can be found in Appendix B. According to the 3GPP website at

https://portal.3gpp.org/Meetings.aspx#/ which is shown by the screenshot below, that meeting was attended by 578 individuals (out of 759 registered participants):



91. The meeting report includes in the zip file the meeting's document list which can be found in Appendix C. R1-1707475 is listed in row 612 and is tagged as "available" which clearly shows the document was available at the meeting. Furthermore, the "Upload" date is shown as "2017-05-06" as can be seen by the screenshot below:

	A	B	N	O	P
1	TDoc	Title	TDoc Status	Reservation date	Uploaded
612	R1-1707475	Discussion on DL beam management	available	2017-05-02 03:19:22	2017-05-06 13:55:58

92. Thus, based on my personal knowledge and experience with ETSI's and 3GPP's standard business practices, this information tells me that R1-1707475 was available via the public 3GPP ftp server by May 6, 2017, at the latest.

V. AVAILABILITY FOR CROSS-EXAMINATION

93. In signing this declaration, I recognize that the declaration may be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross examination will take place within the United States. If cross examination is required of me, I will cooperate to the best of my ability to appear for cross examination within the United States during the time allotted for cross examination.

A. Right To Supplement

94. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me.

B. Signature

95. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

96. I declare under penalty of perjury that the foregoing is true and correct.

Dated: February 27, 2023



Friedhelm Rodermund

APPENDIX A

CURRICULUM VITAE

I. PERSONAL DATA

Name: **Friedhelm RODERMUND**

Mailing address: Am Steiner Graben 18
56077 Koblenz, Germany

Phone: +49 172 2606489

Email: fred@iotecc.com

II. PROFESSIONAL EXPERIENCE

Summary

Senior expert in telecommunications and Internet of Things (IoT) technology. 25 years of experience within the mobile communications industry, and several years in the IoT domain in various roles such as project management, technology innovation and evolution, standards development, technology strategy, patent creation and patent litigations, and development/introduction of new services.

Recognized standards expert who was actively involved in leading roles in the development of key standards for mobile telephony/data and service anablers across standards development organizations such as 3GPP, ETSI, GSMA, IETF, OMA, and oneM2M. Currently focussing on standards for the Internet of Things.

Founder and director of IOTECC GmbH which provides consulting services around technologies and standards enabling the Internet of Things, and consulting and expert services related to patents for mobile telcommunications and IoT.

01/2015 – present **IOTECC GmbH** **Koblenz, Germany**

Founder and CEO

- Mobile telecommunications, Internet of Things (IoT) technology and standards consulting
- Telecommunications and IoT patent consulting
  - Consulting services around telecommunications and IoT patents in particular related to 3GPP, ETSI and OMA standards
  - State of the art/prior art research services related to patent creation e.g. for new 5G patents
  - Prior art research, essentiality assessment, patent infringement analysis related to litigations and validity actions
  - Advising on IP strategy
  - Advising on Standards Development Organisations (SDO) working processes and IPR policy
  - Experienced expert witness (please see section III for a list of supported actions)

11/2014 – 12/2014 **Friedhelm Rodermund Consulting** **Koblenz, Germany**

Internet of Things (IoT) Consultant

- IoT standards development and introduction of new IoT services

Samsung Exhibit 1014, Page 61 of 480

01/2011 – 10/2014 **Vodafone Germany / Vodafone Group R&D** **Düsseldorf, Germany**

Senior Standards Strategist
- Representing Vodafone in various standardisation bodies
- Creating technical standards for the Internet of Things
- Work item lead, technical editor and key contributor of Open Mobile Alliance (OMA) "Lightweight M2M (LwM2M)" – the new standard for the Internet of Things
- Advising and supporting various IoT/M2M projects related to e.g. automotive, smart metering, health, industry
- Advising on the introduction of new IoT/M2M technologies and services
- Leading Proof of Concepts of emerging technologies
- Involved in innovation projects
- Supporting the creation and protection of Intellectual Property

01/2009 – 12/2010 **Vodafone Germany** **Düsseldorf, Germany**

Vice Chairman Open Mobile Alliance (OMA) Device Management (DM)
- Responsible for Vodafone's Device Management standardisation
- As OMA DM Vice Chairman, co-leading the group, chairing committee meetings and web conferences, steering the technical direction, management of the different work items
- Editor of several specifications, rapporteur of various work items
- Support of projects for the introduction of device management
- Delegate to 3GPP SA1 with responsiblity for the introduction of MTC (machine type communications) related service/network requirements

01/2005 – 12/2008 **Vodafone Germany** **Düsseldorf, Germany**

Project Manager Mobile Broadcast Standards
- Responsible for Mobile Broadcast standardisation across different broadcast systems/standards bodies and across all Vodafone local operations
- Responsible for Mobile Broadcast standardisation strategy development and implementation
- Delegation Lead for the Open Mobile Alliance (OMA) BCAST working group
- Initiated and managed the BCAST device profile development in the BMCO Forum
- Leading the "Service Protection" (pay-TV) stream of the German DVB-H Consortium
- Filed several patents
- Supporting patent litigations and patent portfolio evaluation (various technical areas)

04/2003 – 12/2003 **GSM Association** **London, United Kingdom**

Member of the MMS Task Force
- Verification of the MMS operator interworking framework
- Supporting the definition and specification of the MMS functional evolution
- Acting as a "link" between 3GPP and GSMA in the area of MMS

06/1998 – 12/2004 **European Telecommunications Standards Institute (ETSI)**
Sophia Antipolis, France

01/2002 – 12/2004: Secretary 3GPP Technical Specifications Group *"Terminals"* and Terminals Working Group 2 *"Terminal Services and Capabilities"*

01/1999 – 12/2001: Secretary 3GPP Terminals Working Group 2 *"Terminal Services and Capabilities"* and GERAN 3 *"Base Station Testing"*

06/1998 – 03/1999: Secretary ETSI SMG4 *"Data Services"* and SMG8 *"Base Station Testing"*

- Supported the establishment of 3GPP (3rd Generation Partnership Project) as the leading standards organization for mobile telecommunications
- Project manager and secretary of TSG "Terminals" reponsbile for Terminal Conformance Testing, Terminal Services and Capabilities, Universal Subscriber Identity Module (USIM)
- Project manager and secretary of Terminals Working Group 2 "Terminal Services and Capabilities" that was responsible for Terminal Execution Environments, Messaging including Short Message Service (SMS), Cell Broadcast Service (CBS), Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS), Terminal Interfaces incl. AT-commands, Generic User Profile, Data Synchronization and others
- Establishment and management of the Work Plan and follow-up and report on the progress of the related work items
- Advising the chairmen and the standards groups on technical, procedural and political issues
- Editorship of various GSM and UMTS technical specifications
- Responsible for presenting the technical results of the working groups to the parent body
- Responsible for the communication with other standards bodies inside and outside 3GPP
- PR activities (articles, interviews)

12/1993 – 06/1998 Mannesmann Mobilfunk GmbH Düsseldorf, Germany

System Engineer and Project Manager in Quality Assurance and Technical Standards

- Leadership and management of acceptance test projects in the area of GSM Base Station Controller (BSC) and GSM Base Station (BTS) hardware and software.
- Leading project teams of around 15 people
- Responsible for the clearance of releasing new software/hardware into the network
- Supported Request for Quotations, supplier evaluation and pre-selection, project manager of System Verification as a central part of the supplier selection process.
- Representation of Mannesmann Mobilfunk to the ETSI standardization group "Standardization Technical Committee SMG3 System Architecture"
- Conduction of product and hardware development quality audits
- Representative of Mannesmann Mobilfunk in A-interface interoperability testing activities
- Member of BSS product planning group which was defining operator requirements for future BSS releases
- Development of process improvements for type acceptance

Samsung Exhibit 1014, Page 63 of 480

III. LIST OF SUPPORTED PATENT LITIGATIONS AND VALIDITY ACTIONS

2022

Ericsson v. Apple
Certain Mobile Telephones, Tablet Computers With Cellular Connectivity, And Smart Watches With Cellular Connectivity, Components Thereof, And Products Containing Same, Inv. No. 337-TA-1299 (U.S.I.T.C.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services

2022

Ericsson v. Apple
Civil Action No. 2:21-cv-376 (E.D. Tex.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services

2022

Intellectual Ventures II LLC v. Toyota Motor Cooperation.
Inter Partes Review matters
On behalf of Toyota
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.
Role: Expert witness and consulting services

2022

Ericsson v. Apple
2nd Business Court, Rio de Janeiro, Brazil
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services

2022

Ericsson v. Apple
Civil Court, Bogotá, Columbia
On behalf of Apple
Counsel: WilmerHale
Role: Expert and consulting services

2022

Proven Networks LLC. v. NetApp Inc.
Inter Partes Review matters
On behalf of NetApp
Counsel: Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Ropes & Gray LLP
Role: Expert witness and consulting services

2022

Ericsson v. Apple
Inter Partes Review matters
On behalf of Apple
Counsel: Fish&Richardson, Erise IP
Role: Expert witness and consulting services

2021

AEGIS 11 LLC v. Hisense Company, Ltd. and Hisense USA Corporation
Inter Partes Review matters
On behalf of Hisense

Counsel: Orrik Herrington & Sutcliffe LLP
Role: Expert witness and consulting services

2021

Nokia v. Lenovo
Certain Electronic Devices, Including Computers, Tablet Computers, and Components and Modules Thereof, Inv. No. 337-TA-1208 (U.S.I.T.C.)
On behalf of Lenovo
Counsel: WilmerHale
Role: Expert witness and consulting services

2021

Optis Cellular Technology LLC et al. v. Apple
Claim No. HP-2019-000006 (High Court of Justice, Business and Property Courts of England and Wales)
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness and consulting services

2021

Ericsson v. Samsung
Inter Partes Review matters
On behalf of Samsung
Counsel: Kirkland&Ellis LLP, Fish&Richardson
Role: Expert witness and consulting services

2020

Panoptis Patent Management LLC et al. v. Apple Inc.
Civil Action No. 2:19-cv-66 (E.D. Tex.)
On behalf of Apple
Counsel: WilmerHale
Role: Expert witness at bench trial

2020

Sol IP, LLC v. AT&T Mobility, LLC et al.
Civil Action No. 2:18-cv-526 (E.D. Tex.)
On behalf of AT&T, Verizon, Sprint
Counsel: Gibson Dunn
Role: Expert witness and consulting services

2020

Bell Northern Research LLC v. LG Electronics Inc. et al.
Civil Action No. 18-CV-2864-CAB-BLM (S.D. Cal.)
On behalf of LG Electronics Inc.
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Conversant Wireless Licensing S.a.r.l. v. LG Electronics Deutschland GmbH
Civil Action No. 7 O 3277/18 (Landgericht Munich, Germany)
On behalf of LG Electronics Deutschland GmbH
Counsel: Wildanger Kehrwald Graf von Schwerin & Partner mbB
Role: Expert witness and consulting services

2019

Bell Northern Research, LLC v. Huawei Device Co., Ltd, et al.
Civil Action No. 3:18-cv-01784-CAB-BLM
On behalf of Huawei
Counsel: Fish&Richardson
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Samsung Electronics America, Inc. and Samsung Electronics Co. Ltd.
Civil Action Nos. 2:18-cv-00040-JRG, 2:18-cv-00041-JRG, 2:18-cv-00042-JRG and 2:18-cv-00044-JRG (United States District Court for the Eastern District of Texas)
On behalf of Samsung
Counsel: Greenberg Traurig
Role: Expert witness and consulting services

2019

Uniloc USA, Inc., et al. v. Huawei Device USA, Inc. et al.
Civil Action No. 2:18-cv- 00072-JRG-RSP (E.D. Tex.)
On behalf of Huawei
Counsel: McGuireWoods
Role: Expert witness and consulting services

2019

Microsoft Corporation v. Uniloc 2017 LLC
Inter Partes Review of U.S. Pat. No. 7,167,487
Inter Partes Review of U.S. Pat. No. 7,075,917
On behalf of Microsoft and on behalf of Apple as joinder petitioner
Counsel: Klarquist Sparkman (Microsoft), Erise IP (Apple)
Role: Expert witness and consulting services

2019

Qualcomm v. KFTC
South Korean Case, Seoul High Court
On behalf of intervenor Apple supporting the KFTC
Counsel: Boies Schiller Flexner
Role: Expert witness

2018/19

Evolved Wireless, LLC v. Apple, Inc.
Civil Action No. 1:15-cv-00542-JFB-SRF
On behalf of Apple
Counsel: DLA Piper
Role: Expert witness and consulting services

2018/19

Cisco Systems Inc. v. Traxcell Technologies
Inter Partes Review of Traxcell Technologies patents
On behalf of Cisco
Counsel: King&Spalding
Role: Expert witness and consulting services

2018/19

Qualcomm Inc. v. Apple Inc.
Civil Action No. 3:17- cv-02398-DMS-MDD (United States District Court for the Southern District of California)
Civil Action No. 3:17-cv-02402-WQH-MDD
Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof (II), Inv. No. 337-TA-1093
Inter Partes Review of U.S. PATENT NO. 9,154,356
Cases IPR2019-00047, IPR2019-00048, IPR2019-00049, IPR2019-00128, IPR2019-00129
On behalf of Apple and Intel
Counsel: WilmerHale
Role: Expert witness and consulting services

2018/19

Apple Inc. v. Qualcomm Inc.
Civil Action No. 3:17-CV-00108-GPC-MDD (United States District Court for the Southern District of California)
On behalf of Apple

Counsel: Fish&Richardson, Boies Schiller Flexner
Role: Expert witness and consulting services

2018

3G Licensing, S.A. et al. v. LG Electronics Inc. et al
Inter Partes Review of U.S. Patent No. 7,995,091
On behalf of LG Electronics
Counsel: Fish&Richardson
Role: Expert witness

2017

Huawei Technologies Co. LTD. v. T-Mobile US, Inc. & T-Mobile USA, Inc.
E.D. Tex. Case Nos. 2:16-cv-00052-JRG-RSP; 2:16-cv-00055-JRG-RSP; 2:16-cv-00056-JRG-RSP; and 2:16-cv-00057-JRG-RSP
On behalf of T-Mobile
Counsel: Gibson Dunn
Role: Expert witness and consulting services

2016

Koninklijke KPN N.V. v. Samsung Electronics America, Inc. et al.
Civil Action No. 14-cv-1165
On behalf of Samsung Electronics
Counsel: Baker Botts
Role: Expert witness and consulting services

2016

SSH v. Sony
OLG Düsseldorf, Germany
On behalf of SSH
Counsel: Cohausz&Florack
Role: Technical expert support

2015/16

LG Electronics v. Core Wireless Licensing S.A.R.L.
Inter Parles Review of U.S. Patent No. 8,165,049
On behalf of LG Electronics
Counsel: Greenberg Traurig
Role: Expert witness

2015/16

Core Wireless Licensing S.A.R.L. v. LG Electronics Inc. and LG Electronics MobileComm U.S.A., Inc
Civil Action No. 2:14-cv-911 (lead case) and Civil Action No. 2:14-cv-912 (consolidated)
On behalf of LG Electronics
Counsel: Greenberg Traurig, Sidley Austin
Role: Expert witness

2015

Intellectual Ventures I LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01632
Intellectual Ventures II LLC v. T-Mobile USA, Inc. & T-Mobile US, Inc.
D. Del. Case No. 1:13-cv-01633
On behalf of T-Mobile
Counsel: Gibson Dunn
Role: Technical expert support

IV. EDUCATION

10/1984 – 10/1993 University of Technology Aachen Aachen, Germany

Graduate of Electrical Engineering with a focus on telecommunications technologies (Dipl.-Ing. TH)

10/1992 – 04/1993 **University of Technology Trondheim** **Trondheim, Norway**
Diploma Thesis "Design of a dual processor computer for digital signal processing in power electronics"

V. LANGUAGES

German, English, French

VI. RECENT PUBLICATIONS

- ”Unlocking the internet of things and driving the need for interoperability”, Global Telecoms Business, December 2013
- “The need for standardisation in the M2M services layer”, Global Telecoms Business, February 2014
- Co-authored white paper “Lightweight M2M: Enabling device management and applications for the internet of things”, Open Mobile Alliance, March 2014
- “Objects are a new way to create M2M applications”, Global Telecoms Business, April 2014
- “The need for standardisation in the M2M services layer”, M2M Now, July 2015

APPENDIX B

3GPP TSG RAN WG1 Meeting #90 **R1-1712031**
Prague, Czech Rep, 21st – 25th August 2017

Source: **MCC Support**

Title: **Final Report of 3GPP TSG RAN WG1 #89 v1.0.0 (Hangzhou, China, 15th – 19th May 2017)**

Document for: **Approval**



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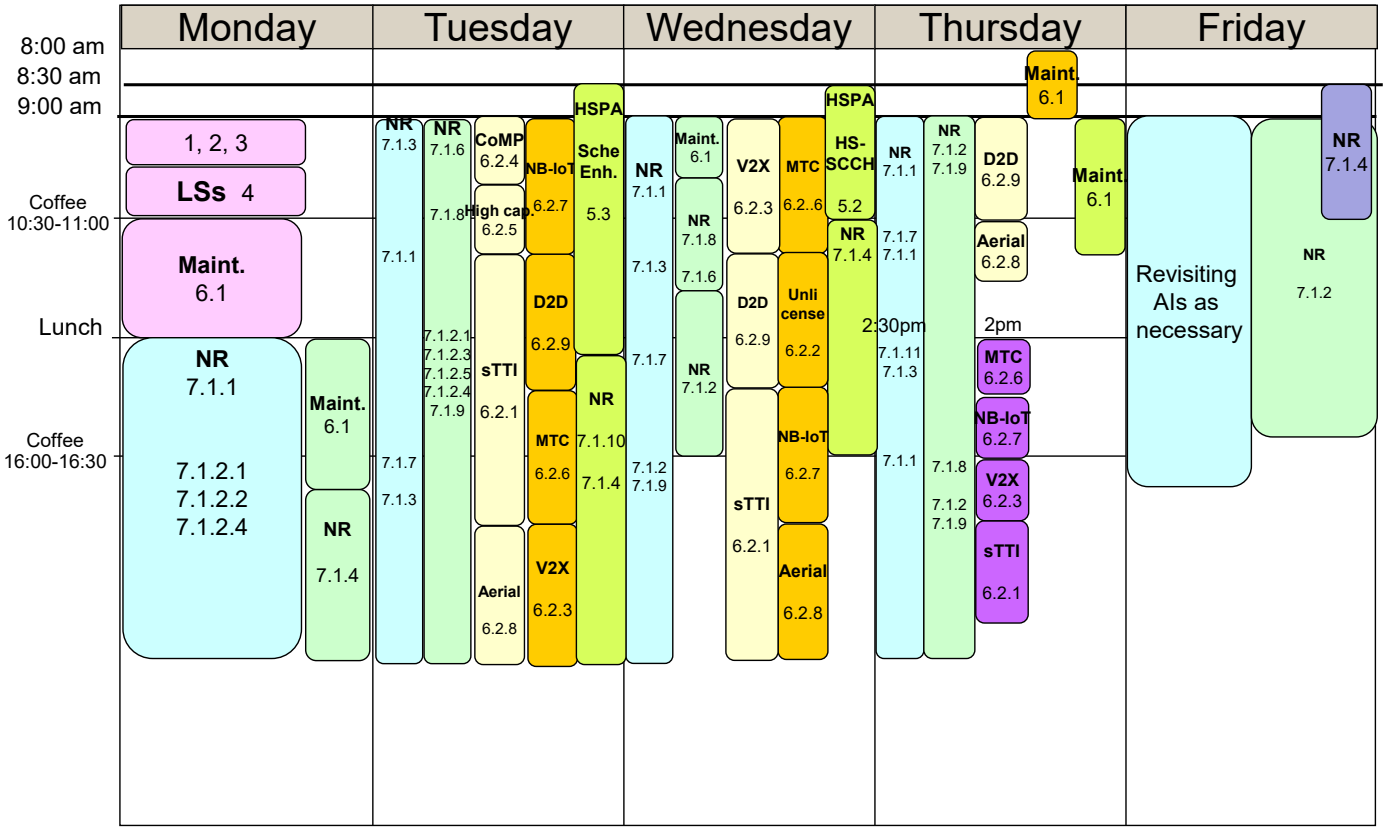
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Main facts summary

3GPP TSG WG RAN1 #89 meeting, hosted by Huawei Technologies, was held at the Midtown Shangri-La, Hangzhou, China.
The meeting started at 9:00 on Monday 15th May and finished at 17:40 on Friday 19th May 2017.
The number of attending delegates, having confirmed their participation through the electronic check-in application, was **586.**
Note that the number of registered was 759.

The schedule of the week was as follows:



Note: The empty slots are devoted to offline sessions.

The list of action points that required RAN1 close follow-up is listed in Annex F (end of document).

The number of contributions for this meeting was 2874.

Note: The amount of documents includes those discussed during the email discussion session post meeting.

	Contribution is agreed/approved
	Contribution is not pursued (no consensus)
	Further discussion is required – come-back needed
	Working assumption
	Specific action needed from MCC
	Contribution is for email discussion/approval

1 Opening of the meeting

Mr Matthew Baker (Vice Chairman) welcomed the participants of the RAN WG1 89 meeting and opened the meeting at 09:00.
Mr Brian Classon on behalf of Huawei Technologies welcomed the delegates, and detailed the domestic arrangements for the full week.

1.1 Call for IPR

*The attention of the members of this Technical Specification Group was drawn to the fact **that 3GPP Individual Members have the obligation** under the IPR Policies of their respective Organizational Partners to **inform their respective** Organizational Partners **of Essential IPRs they become aware of**.*
The members take note that they are hereby invited:

- *to investigate whether their organization or any other organization owns IPRs which were, or were likely to become Essential in respect of the work of 3GPP.*
- *to notify their respective Organizational Partners of all potential IPRs, e.g., for ETSI, by means of the IPR Information Statement and the Licensing declaration forms (e.g. see the ETSI IPR forms http://webapp.etsi.org/Ipr/).*

1.2 Competition law statement

The Chairman also drew Member's attention to the fact that 3GPP activities are subject to antitrust and competition laws and that compliance with said laws is therefore required of any participant of this WG meeting including the Chairman and Vice Chairmen. In case of question, please contact your legal counsel.
The present meeting will be conducted with strict impartiality and in the interests of 3GPP.
Furthermore, the Chairman reminded Members that timely submission of work items/contributions in advance of WG meetings is important to allow for full and fair consideration of such matters.

1.3 Network usage conditions

The PCG has laid down the following network usage conditions:

Users shall not use the network to engage in illegal activities. This includes activities such as copyright violation, hacking, espionage or any other activity that may be prohibited by local laws.

Users shall not engage in non-work related activities that consume excessive bandwidth or cause significant degradation of the performance of the network.
Since the **network is a shared resource**, users should exercise some basic etiquette when using the 3GPP network at a meeting. It is understood that high bandwidth applications such as downloading large files or video streaming might be required for business purposes, but delegates should be strongly discouraged in performing these activities for personal use. Downloading a movie or doing something in an interactive environment for personal use essentially wastes bandwidth that others need to make the meeting effective. The meeting chairman should remind end users that the network is a shared resource; the more one user grabs, the less there is for another. Email and its attachments already take up significant bandwidth (certain email programs are not very bandwidth efficient). In case of need the chair can ask the delegates to restrict IT usage to things that are essential for the meeting itself.

1. DON'T place your WiFi device in ad-hoc mode
2. DON'T set up a personal hotspot in the meeting room
3. DO try 802.11a if your WiFi device supports it
4. DON'T manually allocate an IP address
5. DON'T be a bandwidth hog by streaming video, playing online games, or downloading huge files
6. DON'T use packet probing software which clogs the local network (e.g., packet sniffers or port scanners)

2 Approval of Agenda

R1-1706865 Draft Agenda of RAN1#89 meeting RAN1 Chair
Matthew Baker (Vice Chairman) proposed the agenda for the meeting, as well the schedule of the week.
Decision: The agenda is approved.

3 Approval of Minutes from previous meeting

R1-1708890 Final report of RAN1#88bis meeting ETSI (MCC)
The document was presented by Patrick Merias from MCC (ETSI Mobile Competence Center) and provides the report from last RAN1#88 bis meeting in Spokane.
Discussion: MCC recalled that one CR (endorsed under email thread [88bis-08]) was accidently left over and will require a straightforward agreement at this meeting.
Decision: The document is approved.

4 Incoming Liaison Statements

LTE Pre-Rel-15
R1-1708746 Draft Response to IEEE 802 LMSC regarding LAA Qualcomm Incorporated
The document was presented by Peter Gaal from Qualcomm.
Discussion: Further updates have been incorporated thanks to email discussion. Still refinements are needed.
Decision: The document is noted. Companies are requested to provide comments to Jing Sun – revisit on Thursday - R1-1709207.
Friday: R1-1709839 [Draft] Response LS to IEEE 802 regarding LAA Qualcomm
Decision: Final LS is approved in R1-1709851, revised post-meeting in R1-1709854 due to a typo pointing to the wrong IEEE LS reference in the first paragraph.

R1-1708747 Draft Response to IEEE 802 LMSC on ED and PD issues. Qualcomm Incorporated
Decision: The document is noted. Companies are requested to provide comments to Jing Sun – revisit on Thursday - R1-1709208.
Friday: R1-1709839 [Draft] Response LS to IEEE 802 regarding LAA Qualcomm
Decision: Final LS is approved in R1-1709852 by modifying action point as follows: "RAN1 asks IEEE 802 LMSC to take the above into account". Further revised post-meeting in R1-1709855 to further clarify the title of the LS.

R1-1706879 LS on eMTC UE behaviour in case of collision between TA update and re-tuning gap for frequency hopping RAN4, Nokia
The document was presented by David Bhatoolaul from Nokia and asks RAN1 to take the case of collision between TA update and the re-tuning gap into account, and consider to make clarification on the UE behavior in RAN1 specification.
Discussion: .Draft CR is available in R1-1708288 (see 6.1.1).
Decision: The document is noted. To be treated in the eMTC session.

R1-1706866 LS on resource reselection for P2X UEs RAN2, Qualcomm
The document was presented by … from Qualcomm and asks RAN1 to answer the following question:
- What is the potential motivation or benefit of having a new resource selection mode for P-UEs performing random selection when sharing the same transmission pool with P-UEs performing partial sensing?

Decision: The document is noted. To be treated under AI 6.1.3

R1-1706875 LS on measurement capability for R14 Cat-M1/M2 UE RAN4, Intel
The document was presented by … from Intel asks RAN2 to feedback any concern, if required, on the above working assumptions.
Discussion: No action to RAN1.
Decision: The document is noted.

R1-1706878 LS response on positioning for NB-IoT RAN4, Ericsson
The document was presented by Yutao Sui from Ericsson and provides feedback to RAN4 on the value ranges for NRSRP and NRSRQ measured results requested via LPP, and whether UE Rx-Tx time difference measurements in connected mode can be supported.
Discussion: No action to RAN1.
Decision: The document is noted.

LTE Rel-15
R1-1706867 LS on QoS support of UE-to-Network Relay over LTE sidelink RAN2, Huawei
The document was presented by Philippe Sartori from Huawei and asks SA2 to clarify:
- Whether the same QoS framework and requirements related to QCI, e.g. latency, reliability, bit rate, etc., will also be applied for layer 2 UE-to-Network relay over LTE sidelink.
- Whether SA2 is considering any enhancement to the PC5 QoS framework.

Discussion: No action to RAN1.
Decision: The document is noted.

R1-1706873 LS on new UE power class for Rel-15 LTE_eMTC4 RAN4, Ericsson

The document was presented by Asbjorn Grovlen from Ericsson and requests RAN2 to consider specifying signaling to indicate the UE power class to the eNB in order to handle UEs that belong to different power classes efficiently.
Discussion: No action to RAN1.
Decision: The document is noted.

R1-1706874 Reply LS to RAN1 on possible RF impacts related to sPUSCH design RAN4, Ericsson
The document was presented by Marten Sundberg from Ericsson and provides the following answers to the questions in R1-1613334:

A1: To guaranty performance, both sTTIs should have same ouput power when sharing DMRS symbols.
A2: To guaranty performance, both sTTIs should have the same centre frequency, the same RB allocation and the same system bandwidth when sharing DMRS symbols.
A3: DMRS symbol could be shared in between 2 non-contiguous (in time) sTTI if the gap is equal to up to 2 sTTIs. There should not be any power change and have the same centre frequency, the same RB allocation and the same system bandwidth in between such non-contiguous sTTIs. When such non-contiguous sTTI would be scheduled, BS should indicate UE to keep its PLL ON to limit power consumption impact.

Discussion: To be taken into account under 6.2.1.
Decision: The document is noted.

NR related
R1-1706868 LS on RAN2 agreements on HARQ RAN2, Ericsson
The document was presented by Stefan Parkvall from Ericsson and provides the following RAN2's agreements on HARQ:

- RAN2 aims to make the L1 HARQ feedback transmission scheme (PUCCH, mapped to PUSCH, timing) transparent to MAC specification.
- Working assumption: One HARQ entity should only serve one carrier.
- HARQ information shall at least include the NDI, TBS, RV, and HARQ Process ID
- A UE not using DL spatial multiplexing shall expect at most one TB per HARQ process.
- A UE can transmit at most one TB per UL HARQ process per TTI.ovides the following RAN2's agreement

Discussion: Huawei→ should RAN1 discuss and maybe reconsider the working assumption on one HARQ entity serving one carrier only?
Decision: The document is noted. These agreements should be checked during the week in the respective sessions – esp. 7.1.2 and 7.1.3 – revisit on Friday for potential response.

R1-1706869 LS on Mixed numerologies in idle mode RAN2, Ericsson
The document was presented by Asbjorn Grovlen from Ericsson and provides the following RAN2's agreements:

- Mixed numerologies on a single carrier are only supported in connected mode. Idle mode and Inactive mode procedures (at least minimum system information broadcast and paging) use the default numerology per carrier frequency.
- FFS Whether initial access (i.e. random access in idle mode) is always on the default numerology or can use other numerologies.

Decision: The document is noted.

R1-1706870 LS to RAN1 on in-sync/out-of-sync indications for RLF RAN2, MediaTek
The document was presented by … from MediaTek and provides the following RAN2's agreements:

1/ For connected mode, UE declares RLF upon timer expiry due to DL OOS detection, random access procedure failure detection, and RLC failure detection.

FFS whether maximum ARQ retransmission is only criteria for RLC failure (needs to be discussed in common UP/CP session).

2/ In NR RLM procedure, physical layer performs out of sync / in sync indication and RRC declares RLF.
3/ For RLF purposes, RAN2 preference is that the in sync / out of sync indication should be a per cell indication, and we aim for a single procedure for both multi-beam and single beam operation.

RAN2 asks RAN1 feedback on the following two questions:
Q1: Can the in-sync/out-of-sync indications for RLF be provided per cell?
Q2: Is RAN1 planning to provide in-sync/out-of-sync indications that are periodic (similar to LTE)?
Decision: The document is noted.
R1-1707859 Draft LS Reply on in-sync/out-of-sync indications for RLF MediaTek Inc.

It is RAN1's understanding that RAN1 can provide i) in-sync/out-of-sync indications for RLF in a per-cell basis, and (ii) periodic in-sync/out-of-sync indications for RLF purpose.

Decision: The document is noted. See AI 7.1.1.5.3.

R1-1706871 LS on the feasibility of DC-related mobility enhancements in NR RAN2, Intel
The document was presented by Matthew Baker on behalf of Intel and asks RAN1 and RAN4 on the feasibility of simultaneous transmission and reception from two cells in NR.

- **Q1:** Is it feasible that the UE performs simultaneous reception from two intra-frequency cells in either synchronous or asynchronous network with single or dual RF chains?

- **Q2:** Is it feasible that the UE performs simultaneous transmission to two intra-frequency cells in either synchronous or asynchronous network with single or dual RF chains?
- **Q3:** Do the answers to Q1-Q2 change depending on the frequency bands?

Discussion: Intel believes that most of the questions relates to RAN4.
Panasonic agrees to leave it to RAN4 but still discussion/ progress in RAN1 is required during this week.
Decision: The document is noted. Contact person for collating views is Daewon (Intel).
Discuss under 7.1.1.5 – identify whether any other sessions need to discuss this.
Starting assumption is that RAN4 will take care of replying.
Friday:
R1-1709793 [DRAFT] Reply LS on the feasibility of DC-related mobility enhancements in NR Intel
Decision: Final LS is approved in R1-1709809 including the following updates

- **A1**: ~~From RAN1 perspective, it may be feasible to simultaneously receive signals from two intra-frequency cells in synchronous networks with single or dual RF chains. The conditions (e.g. number of RF chains, availability of SIC capability, scheduling from the two cells, etc) in which simultaneous reception of signals from two intra-frequency cells in asynchronous networks is feasible warrants further investigation and may be subjected to RAN4 guidance on needed performance requirements.~~ From RAN1 perspective, it may be feasible to simultaneously receive signals from two intra-frequency cells in synchronous and asynchronous networks for UE with dual RF chains and antennas. For synchronous and asynchronous networks for UE with a single RF chain case, RAN1 has not concluded and assumes that it is up to RAN4
- **A2**: ~~From RAN1 perspective, it may be feasible to simultaneously transmit signals to two intra-frequency cells in synchronous or asynchronous networks with single or dual RF chains. The conditions (e.g. transmit power of signals to each cell, required transmit modulation and intermodulation quality, scheduling from the two cells, etc) in which simultaneous transmission of signals to two intra-frequency cells is feasible is subject to RAN4 guidance on transmit characteristic requirements.~~ From RAN1 perspective, it may be feasible to simultaneously transmit signals to two intra-frequency cells in synchronous and asynchronous networks for UE with dual RF chains and antennas. For synchronous and asynchronous networks for UE with a single RF chain case, RAN1 has not concluded and assumes that it is up to RAN4
- **A3**: From RAN1 perspective, answers to Q1-Q2 ~~should not~~ may change depending on the frequency bands, e.g. high frequency bands when the UE only has a single antenna panel for beamforming. However, it should be noted that signal transmission and reception relevance to frequency bands is ultimately determined by RAN4.

R1-1706872 LS Reply on NR minimum carrier bandwidth RAN4, Qualcomm
The document was presented by Peter Gaal from Qualcomm and provides the following RAN4's agreements:

- The set of supported NR bandwidths for each frequency band will be band specific
- For frequency range up to 6 GHz, the minimum possible carrier bandwidth for NR is 5 MHz For frequency range from 6 GHz to 52.6 GHz, the minimum possible carrier bandwidth for NR is 50 MHz
- RAN4 will further determine mapping between frequency band and the set of support carrier bandwidth values in consideration with above

Decision: The document is noted.
Friday
R1-1709814 WF on SS Block Bandwidth and Minimum Carrier Bandwidth for NR AT&T, Verizon, T-Mobile USA
Agreement: RAN1 sends an LS to RAN4 informing them that because of the inability of the 50MHz minimum carrier bandwidth to support SS Blocks with 240kHz SCS, RAN1 is requesting that a minimum carrier bandwidth value of 100MHz is supported in addition to 50MHz in order to accommodate SS Blocks with 240kHz SCS for bands, where appropriate in the frequency range from 24 GHz to 52.6 GHz

R1-1709818 WF on SS Block Bandwidth and Minimum Carrier Bandwidth for NR below 6GHz CMCC
Agreement: RAN1 sends an LS to RAN4 informing them that because of the inability of the 5MHz minimum carrier bandwidth to support SS Blocks with 30kHz SCS, RAN1 is requesting that a minimum carrier bandwidth value of 10MHz is supported in addition to 5MHz in order to accommodate SS Blocks with 30kHz SCS for bands, where appropriate in the frequency range below 6 GHz

R1-1709820 [DRAFT] LS response on NR minimum carrier bandwidth AT&T, CMCC
Decision: The document is endorsed and final LS is approved in R1-1709842 by removing brackets.

R1-1706876 LS on required NR parameters from RAN4 perspective RAN4, NTT DOCOMO
The document was presented by Kazuaki Takeda from NTT DOCOMO and states that RAN4 agreed the NR RF/RRM work plans [R4-1704215] and lists the identified parameters related to physical layer necessary to complete the core part in December 2017 from RAN4 perspective so far. RAN4 would like to confirm the feasibility and possible time plan from RAN1's point of view.
Decision: The document is noted.

R1-1706877 **LS on SCS for NR** **RAN4, Huawei**
The document was presented by Yongxia Lyu from Huawei and asks RAN1 to confirm whether 60 KHz SCS can be excluded for bands below 1GHz from a use case perspective.
Decision: The document is noted.

R1-1706922 **Draft LS response on SCS for NRHuawei**
RAN1 would like to ask RAN4
- to specify support 60 kHz subcarrier spacing below 1 GHz in Rel-15, with both normal and extended cyclic prefix.
- to support both normal and extended cyclic prefix with 60 kHz subcarrier spacing between 1 GHz and 6 GHz.

Decision: The document is noted. Further revised in:
R1-1709749 **Draft LS response on SCS for NRHuawei**
R1-1709803 **Draft LS response on SCS for NRHuawei**
Decision: The document is endorsed and final LS is approved in R1-1709850.

R1-1706880 **Reply LS on time and frequency tracking RAN4, Ericsson**
The document was presented by Mattias Frenne from Ericsson and shows RAN4'response to RAN1 LS (R1-1704103).
Decision: The document is noted. Discuss under 7.1.2.4 – contact Mattias (Ericsson)

R1-1709061 **LS on CSI-RS for beam management and RRM measurements** **RAN2, ZTE**
The document was presented by Patrick Svedman from ZTE and raises the following questions:
Q1: Are the CSI-RS configured for beam management the same as the CSI-RS configured for RRM measurements for L3 mobility?
Q2: Besides being UE-specifically configurable, are the CSI-RS for RRM measurements for L3 mobility also intended to be:
- Cell-specifically configurable and/or
- Cell-specific and fixed (all UEs can derive the CSI-RS for RRM measurements for L3 mobility from the cell IDs of the serving and neighbor cells) or
- are multiple options foreseen?

Discussion: To be discuss under 7.1.2.2 (beam management)
ZTE suggested that discussion under mobility AI should better fit. AT&T ok assuming beam management expertise is present.
Decision: The document is noted. Discuss under 7.1.1.5.2 on Wednesday. Beam management delegates are requested to be present!
R1-1709014 [DRAFT] Response LS on CSI-RS for beam management and RRM measurements ZTE

R1-1709197 **Reply LS on Data rates and Latency with NR, E-UTRA, EPS and 5GS** **SA1,Vodafone**
The document was presented by Matthew Baker on behalf of Vodafone and provides the replies to S2-172398.
Discussion: .No action to RAN1.
Decision: The document is noted.

R1-1708666 On RAN2 LS on CSI-RS for beam management and RRM measurements Ericsson
R1-1708718 On in-sync/out-of-sync indications for RLF for reply LS to RAN2 Ericsson

LS received in the course of the week.

R1-1709652 RAN2 agreement on UAV requirements RAN2, NTT DOCOMO
Decision: Treated under AI 6.2.8.

Not treated.
R1-1709796 LS on SR design principles in NR RAN2, Samsung

5 UTRA

R1-1709569 **Chairpersons' summary of the UMTS sessions** **UMTS Session Chairpersons (Huawei, Ericsson)**
The document was presented by Peng Zhang (Huawei) and Gerardo Agni Medina Acosta (Ericsson).
Decision: The document is endorsed, and content is incorporated as below.

5.1 Maintenance of UTRA Releases 4 – 14

5.1.1 FDD

None.

5.1.2 TDD

None.

5.2 Simplified HS-SCCH for UMTS - SID in RP-170725.

5.2.1 Evaluation of the identified solution

R1-1708732 **Full performance evaluation (HS-SCCH part I & II) of the simplified HS-SCCH Type 1 versus the legacy HS-SCCH Type 1 Ericsson**

5.2.2 Impact on specifications

R1-1708546 **TP on impact on specifications Huawei, HiSilicon**
R1-1708734 **Text proposal: Impact on RAN Working Groups Ericsson**

5.2.3 Other

R1-1708545 **Discussion on network implementation for simplified HS-SCCH Huawei, HiSilicon**

Agreement: Reporting of UE's capability of the simplified HS-SCCH feature is supported.

R1-1708547 **TP on impact on network implementation Huawei, HiSilicon**
Revised and agreed in R1-1709324

R1-1708733 **Timing for receiving the simplified HS-SCCH Type 1 when the legacy CQI reports are used as triggering mechanism Ericsson**

Agreement: Once a UE has reported a low CQI value over the HS-DPCCH, the UE may assume that a HS-SCCH Type 1 transmission carrying control information corresponding to 1 code and QPSK would be transmitted in the first available HS-SCCH subframe once X sub-frames have passed after the end of the sub-frame where the HS-DPCCH was transmitted.
X is going to be specified either by a fixed value or by higher layer signalling.

R1-1708735 **On the conclusion for the study item on a simplified HS-SCCH for UMTS Ericsson**
R1-1708736 **Text proposal on the full performance evaluation (HS-SCCH part I & II) of the simplified HS-SCCH Type 1 versus the legacy HS-SCCH Type 1 Ericsson**
Revised and agreed in R1-1709323

R1-1708737 **Text proposal on the timing for receiving the simplified HS-SCCH Type 1 when the legacy CQI reports are used as triggering mechanism Ericsson**

R1-1708738 **Text proposal on the conclusion for the study item on a simplified HS-SCCH for UMTS Ericsson**
Revised and agreed in R1-1709325

Conclusion for the SI:

- The scenario for this SI is when the UE is in bad radio conditions, and only certain bit sequences (i.e., codewords) corresponding to one HS-DSCH code along with a QPSK modulation would be suitable to use.
- The identified solution for simplified HS-SCCH type 1 consists in making "known in advance" the bits corresponding to the "Modulation Scheme" and the "Number of codes" (code group indicator bits).
- The triggering mechanism for the UE to use the simplified HS-SCCH is based on the transmitted legacy CQI reports.
- In general, and after having seen the results it can be concluded that using a simplified HS-SCCH would bring the following benefits:
  - Easier decoding (i.e., less decoding hypothesis)
    - Improved BLER
    - Improved Miss detection Performance
    - Improved False detection Performance
  - Power savings in DL (can be translated to coverage improvements)
  - Backward compatibility: The gains will be seen for the Rel-15 UEs, while legacy UEs can decode the HS-SCCH as usual providing the legacy performance.
- Minimum standard impact (the HS-SCCH "L1 processing chain" is not modified at all).

- An acceptable BLER target for the HS-SCCH is around 1%. At that operation point the overall performance (i.e., HS-SCCH part I & II) of the simplified HS-SCCH provides a gain of around 1.3dB with respect to legacy.

R1-1709326 LS on the conclusions for the SI on a simplified HS-SCCH for UMTS RAN1, Ericsson
Decision: The LS is approved.

R1-1709327 TR 25.cde V0.0.2 Study on a simplified HS-SCCH for UMTS Ericsson
Update of the TR 25.cde, until Thursday May 25th - Gerardo (Ericsson)

5.3 Scheduling enhancements with carrier aggregation for UMTS - SID in RP-170719.

5.3.1 Evaluation of the identified solution

R1-1708548 Performance evaluation of enhanced scheduling in DB-DC scenario Huawei, HiSilicon

Conclusion on the use case scenario:

- The relative gain over the secondary carrier after receiving the HS-SCCH from the low frequency carrier ranges from 4.8% to 53.4%.
- Nonetheless, the overall throughput over both carriers is expected to be around 3% after the enhancement.
- Considering the performance improvement on the secondary carrier alone, it may be possible to use it for transmitting SRBs over the secondary carrier when the primary carrier is congested (overloaded).

R1-1708549 Discussion on HS-SCCH allocation and UE monitoring Huawei, HiSilicon
R1-1708739 Analysis of the code allocation impact on the primary carrier for the SI on scheduling enhancements with carrier aggregation for UMTS Ericsson

- Proposal 1 (Option 1-2) impacts the code allocation since moving 4 HS-SCCH control channels from the secondary to the primary carrier will lead to have a 50% change of losing one HS-DSCH code, which will decrease the maximum achievable throughput on the primary carrier with respect to the legacy.
- Proposal 2 (Option 1-1) won't impact the code allocation on the primary carrier, but it will impact the system's capacity (i.e., less UEs would be served per carrier per TTI) because the HS-SCCH codes available on the primary carrier will be used for handling the HS-DSCH transmissions of both the primary and the secondary carrier.

Proposal 1 may take away one HS-PDSCH code permanently from the primary carrier, while Proposal 2 will impact the number of UEs that can be served per carrier per TTI with respect to the legacy (when 4 UEs are intended to be served). Knowing the implications, it is desirable to avoid permanent impacts as in proposal 1, assuming that with proposal 2 it could be possible to find a trade-off using a proper scheduling strategy.

5.3.2 Impact on specifications

R1-1708550 Impact on specifications Huawei, HiSilicon

Agreement: After discussions, the TSG RAN WG1 concluded that Option 2 is not preferable due to its complexity.

The UE needs to distinguish if the HS-SCCH transmitted from the carrier having better propagation properties refers to the primary or secondary carrier. The H-RNTIs (one associated to each carrier) known by the UE can be re-used for this purpose.

R1-1708551 TP on background for enhanced scheduling Huawei, HiSilicon
R1-1708552 TP on scenarios for DB-DC enhanced scheduling Huawei, HiSilicon
Revised and agreed in R1-1709319

R1-1708553 TP on solution for DB-DC enhanced scheduling Huawei, HiSilicon
Revised and agreed in R1-1709320 (See conclusion under R1-1708550).

R1-1708554 TP on performance evaluation for DB-DC enhanced scheduling Huawei, HiSilicon
Revised and agreed in R1-1709322 (Add units to the figures, The Table should say "Relative Gains", which channels are included in the common channels assumption, capture the outcome of the comeback under R1-1708548)

R1-1708555 TP on impacts on specifications for DB-DC enhanced scheduling Huawei, HiSilicon
Revised and agreed in R1-1709318

R1-1708556 TP on conclusion for DB-DC enhanced scheduling Huawei, HiSilicon
Revised and agreed in R1-1709566

R1-1708740 Text proposal: Analysis of the code allocation impact on the primary carrier for the SI on scheduling enhancements with carrier aggregation for UMTS Ericsson

Revised and agreed in R1-1709321 (last two paragraphs only).

Conclusion for the SI:

- The relative gain over the secondary carrier after receiving the HS-SCCH from the low frequency carrier ranges from 4.8% to 53.4%. Nonetheless, the overall throughput over both carriers is expected to be around 3% after the enhancement.
- Considering the performance improvement on the secondary carrier alone, it may be possible to use it for transmitting SRBs over the secondary carrier when the primary carrier is congested (overloaded).
- For DB-DC enhanced scheduling, three options are discussed and compared.
- Option 2 is not preferable due to its complexity.
- Proposal 1 (option 1-2) may take away one HS-PDSCH code permanently from the primary carrier, while proposal 2 (option 1-1) will impact the number of UEs that can be served per carrier per TTI with respect to the legacy (when 4 UEs are intended to be served). Knowing the implications, it is desirable to avoid permanent impacts as in proposal 1, assuming that with proposal 2 it could be possible to find a trade-off using a proper scheduling strategy.
- The benefits identified for the feature of this SI also come with sensitive trade-offs that need to be made by the network.

R1-1709567 LS on enhanced scheduling for UMTS RAN1, Huawei
Decision: The LS is approved.

R1-1709568 Update of the TR 25.708, until Thursday May 25th – Jun (Huawei)
(Important to align the terminology of the solutions in the TR)

6 E-UTRA

6.1 Maintenance of E-UTRA Releases 8 – 14

Note that individual companies can submit draft CRs to this agenda item for Rel-13 items.

R1-1709685 Chairman's notes of AI 6.1 Maintenance of E-UTRA Releases 8 – 14 Ad-Hoc chair (Nokia)
The document was presented by Matthew Baker of Nokia.
Decision: The document is endorsed, and content is incorporated as below. Updates are maked as "Friday"

6.1.1 Maintenance of E-UTRA Release 8 – 13

eMTC-related
R1-1707796 Correction on total number of soft channel bits for Cat M1 UE in 36.212 NEC, Intel
Decision: Agreed in R1-1709222 as CR0262 to 36.212 (Rel-13, F) with correction of typo on cover sheet and using latest version of cover sheet.

R1-1708267 Correction of RAR window definition in CE mode B Ericsson LM
Draft LS to RAN2 - R1-1709224 – Johan (Ericsson)
Thursday: R1-1709224 [Draft] LS on RAR window definition for BL/CE UE Ericsson
Decision: Revised in R1-1709351 – and approved in R1-1709337 (with irrelevant RAN1 meetings deleted)

Check offline whether second change can be applied also to levels 0 & 1, and whether any other clarifications are needed. Revisit on Monday.
R1-1709236 Correction of RAR window definition in CE mode B Ericsson
Decision: CR0920 (36.213, Rel-13, F) is for offline discussion – Shadow Rel-14 CR is in R1-1709237
R1-1709238 Correction of RAR window definition for BL/CE UE Ericsson
Decision: Alternative option in CR0922 (36.213, Rel-13, F) is for offline discussion – Shadow Rel-14 CR is in R1-1709239
Thursday
R1-1709352 Correction of RAR window definition in CE mode B Ericsson, Huawei, HiSilicon, Qualcomm
Decision: Agreed in R1-1709352 as CR0920r1 to 36.213 (Rel-13/F), in R1-1709353 as CR0921r1to 36.213 (Rel-14/A).

R1-1708284 Draft CR for Clarification of RV Cycling in the presence of invalid SFs Nokia
Discuss offline
Thursday: Agreed in R1-1709338 36.213CR0932 Rel-13/F / R1-1709339 36.213CR0933 Rel-14/A.

R1-1708285 Draft CR for Clarification of frequency hopping for "PDCCH order" initiated msg3 PUSCH Nokia
Discuss offline

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Thursday: Agreed in R1-1709340 36.211CR0377 Rel-13/F / R1-1709341 36.211CR0378 Rel-14/A with deletion of duplicated "PUSCH transmission".

R1-1708286 **Draft CR for Clarification of the #repetitions used for msg3 retransmissionsNokia**
Decision: Agreed in R1-1709227 as CR0917 to 36.213 (Rel-13, F) / R1-1709228 as CR0918 to 36.213 (Rel-14, A)

R1-1708287 **Draft CR for Correction of the calculation of the #RV-blocks for a given PDSCH Nokia**
Decision: Discuss offline (contact David) on how to address the issue raised. Revisit on Thur.
Thursday: Revised in R1-1709418 – Nokia, NTT Docomo
Decision: Agreed in R1-1709342 36.213 CR0934 (Rel-13, Cat-F) / R1-1709343 36.213 CR0935 (Rel-14, Cat-A)

R1-1708288 **Draft CR for Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs Nokia**
Discuss offline and prepare a revision in R1-1709230 – revisit on Thur
Thursday: Agreed in R1-1709344 36.213 CR0936 (Rel-13, Cat-F) / R1-1709345 36.213 CR0937 (Rel-14, Cat-A)

R1-1708749 **Correction on determination of number of repetitions PUCCH format 1 Qualcomm Incorporated**
Discuss offline
Thursday: Agreed in R1-1709346 36.211 CR0379 (Rel-13, Cat-F) / R1-1709347 36.211 CR0380 (Rel-14, Cat-A) with correct specification indicated on cover sheet and indentations done to Johan's satisfaction.

R1-1708968 **Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe Huawei, HiSilicon**
Discuss offline
Thursday: Agreed in R1-1709713 36.213 CR0938 (Rel-13, Cat-F) / R1-1709714 36.213 CR0939 (Rel-14, Cat-A) with new CR cover sheet.

R1-1709045 **Draft CR on MPDCCH PRB Sets – Rel-14 Samsung**
Note that this is the shadow CR for R1-1706737 36.213CR0897 (Rel-13/Cat-F) that was agreed at RAN1#88bis.
Decision: Agreed in R1-1709235 36.213CR0919 (Rel-14/Cat-A)

R1-1709205 Draft CR 36.213 for correction on table reference number for PUSCH repetition levels NEC
Decision: Not pursued.

NB-IoT-related
R1-1708201 **Clarification on NRS presence assumptions on unicast non-anchor carriers Huawei, HiSilicon**

- Proposal 1: The NRS presence assumption for unicast on non-anchor carrier in Rel-13 and Rel-14 specification should be clarified between Understanding 1 and Understanding 2.
  - Understanding 1: when a UE is configured by RRC signaling on an non-anchor carrier for which *DL-CarrierConfigDedicated-NB* is present, the UE may assume NRS are transmitted in the minimum set for NRS presence and valid downlink subframes;
  - Understanding 2: when a UE is configured by RRC signaling on an non-anchor carrier for which *DL-CarrierConfigDedicated-NB* is present, the UE may assume NRS are only transmitted in valid downlink subframes;

Decision: Discuss offline and aim for an agreement by Thursday – Prepare draft CR in R1-1709240.
Thursday
R1-1709240 **Clarification on NRS presence assumptions on unicast non-anchor carriers Huawei, HiSilicon**
Objected by only Ericsson.

Friday: Ericsson confirmed their objection
Huawei there is a WF in R1-1709804 from a number of supporting companies – CR is not a new feature but the way it should be implemented
Ericsson: it would impact the implementation of Rel-13 features
Nokia (ad-hoc chair): there were other companies with similar view as Ericsson who accepted the principle of that CR.

R1-1709804 Way forward on clarifications on NRS presence on non-anchor unicast in Rel-13 NB-IoT Huawei, HiSilicon, Neul, Qualcomm, Intel, Vodafone, DT, China Unicom, ublox

- Approve the CR in R1-1709240, as attached in this slide, implementing the RAN1 conclusion
  - *RAN1 notes that NRS are present on a unicast non-anchor carrier in the same subframes as on an anchor carrier.*

Decision: The document is noted. Continue offline. Vodafone strongly recommended the clarification to be made.

After further offline, Ericsson (although still not in favor of the CR) withdrew their objection and the following CRs are agreed.
R1-1709846 NRS presence assumptions on unicast non-anchor carriers Huawei, HiSilicon
Decision: CR0382 to 36.211 Rel-13, F is agreed.
R1-1709847 NRS presence assumptions on unicast non-anchor carriers Huawei, HiSilicon
Decision: CR0383 to 36.211 Rel-14, F is agreed.

R1-1708405 Clarification on the definition of the nprach-NumCBRA-StartSubcarriers NTT DOCOMO, INC.
Thursday: Agreed with latest version of cover sheet in R1-1709241 36.211 CR0372 (Rel-13, Cat-F) / R1-1709242 36.211 CR0373 (Rel-14, Cat-A)

R1-1708748 Discussion on search space monitoring after search space change. Qualcomm Incorporated
Conclusion:

- It is RAN1's understanding that the UE is not required to monitor candidates that start before m+45 belonging to a new configuration (believed to be already captured in 36.331 s.11.2)

- There is currently not consensus on whether the UE is required to monitor candidates which start at or after m+45 belonging to a new configuration in a search space that starts before m+45
  - Discuss offline and revisit on Thursday to see whether consensus can be reached.

Thursday
On whether the current specifications require a UE to monitor candidates which start at or after m+45 belonging to a new configuration in a search space that starts before m+45:

- yes: Huawei, HiSilicon, Ericsson, Nokia, LG Electronics, Neul
- no: Qualcomm, Sony, Sierra, Intel

Conclusion:
Send an LS to RAN2 (R1-1709715, Alberto), stating that there are different views in RAN1 as to whether the current specifications require a UE to monitor candidates which start at or after m+45 belonging to a new configuration in a search space that starts before m+45, and requesting RAN2's confirmation of the required UE behaviour according to the RAN2 specifications. Also include the conclusion re. candidates starting before m+45.
Decision: Final LS is approved n R1-1709716.

R1-1709128 Correction on NB-IoT DMRS definition Ericsson
R1-1709129 Correction on NB-IoT DMRS definition Ericsson
Conclusion:

- The CR (along with the shadow CR in 9129) is endorsed by updating the tables with only the "phi" related changes
- Prepare final CRs. Agreed in R1-1709233 (as CR0368r1 to 36.211 Rel-13/F) and R1-1709234 (as shadow CR0369r1 to 36.211 Rel-14/A)

R1-1709130 Correction on NB-IoT SC-FDMA baseband signal generation Ericsson
R1-1709131 Correction on NB-IoT SC-FDMA baseband signal generation Ericsson
Conclusion:

- The CR (along with the shadow CR in 9131) is endorsed by updating the change of the presentation of the equation
- Prepare final CRs. Agreed in R1-1709269 (as CR0370r1 to 36.211 Rel-13/F) and R1-1709270 (as shadow CR0371r1 to 36.211 Rel-14/A)

R1-1709008 Correction on 3.75 kHz NPUSCH format 2 transmission Huawei, HiSilicon
Decision: CR0912 to 36.213 Rel-13/F in R1-1709008 is agreed.
R1-1709009 Correction on 3.75 kHz NPUSCH format 2 transmission Huawei, HiSilicon
Decision: CR0913 to 36.213 Rel-14/A in R1-1709009 is agreed.

Thursday

R1-1709672 **On uplink power control for Rel-13 NB-IoT Huawei**
Decision: Email discussion until RAN#76 to discuss whether there is a problem requiring a specification solution, and if so, possible solutions (Matthew, Huawei).
ZTE objects to having an email discussion.
Friday: ZTE expressed concern that its views were refused to be captured during the ad-hoc session. ZTE's view is extremely late contribution, such as those submitted at the end of the meeting should not be prioritized.
Nokia (Ad-hoc chair) recalled that looking at contribution is at the discretion of the chairman – in this particular case, there were a number of companies inc. operators who showed interest to it.
ZTE also recalled there were only two companies made explicit comments in the ad-hoc session supporting this email discussion.

CA-related
R1-1708750 **Correction on V_C-DAI value Qualcomm Incorporated**
Decision: Not pursued. The CR is not needed

LAA-related
R1-1708752 **Clarification for LAA RRM measurements with DRS transmission window Qualcomm Incorporated**
R1-1708753 Clarification for LAA RRM measurements with DRS transmission window Qualcomm Incorporated
Decision: Not pursued. Check on Friday – otherwise continue discussion till RAN1#90.
Friday: Continue discussion till RAN1#90.

6.1.2 Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum

R1-1707062 **Corrections on UL LBT in 36.213Huawei, HiSilicon**

R1-1708754 **Max TA limits for trigger based scheduling in eLAA Qualcomm Incorporated**
- The maximum timing advance for LAA SCells should be much smaller than 667us.
- For triggered grants, with l+k = 1, the maximum timing advance that the UE can support is 45us.
- For triggered grants, with l+k = 2 or 3, the maximum timing advance that the UE can support is on the order of 200 – 300us.

Decision: Continue discussion offline.
Friday: Continue discussion till RAN1#90.

R1-1709695 Way forward on the maximum TA for two-stage triggered PUSCH transmission Intel

6.1.3 Maintenance of Release 14 V2V/V2X services based on LTE sidelink

R1-1708557 **Discussion of RAN2 LS on resource reselection for P2X UEs Nokia, Alcatel-Lucent Shanghai Bell**
R1-1708982 **On resource reselection for P2X UEs Ericsson LM**
R1-1708990 **[Draft] Response LS on resource reselection for P2X UEs Ericsson LM**
Conclusion:
- Draft an LS to RAN2 based on the observations 4 & 5 as in R1-1708557. In addition, state that "there are benefits in terms of average PRR rof combining random resource selection with semi-persistent resource reservation"

Thursday
R1-1709297 – approved in R1-1709334.

36.212
R1-1707424 **Correction on abbreviation of Sidelink SPS RNTI in DCI Format 5A in 36.212 CATT**
Check further offline both RAN1 and RAN2 specs w.r.t. the parameter name
Thursday
R1-1709664 **Correction on abbreviation of Uplink SPS RNTI and Sidelink SPS RNTI in 36.213 CATT**
Decision: Agreed in R1-1709331 - 36.213 CR0941 (Rel-14, F)

36.213
R1-1709133 **Draft CR on correction of UE behavior to meet Crlimit Qualcomm Incorporated**
Decision: The CR is endorsed. Prepare final CR.
Thursday: Agreed in R1-1709645 as CR0925 to 36.213 Rel-14/F.

R1-1707866 **Discussion on definition of sensing window Samsung**
R1-1707867 **Draft CR on definition of sensing window Samsung**
Continue discussion offline
Thursday: Discuss until RAN1#90

R1-1707868 **Discussion on skipped subframe handling for partial sensing** **Samsung**
R1-1707869 **Draft CR on skipped subframe handling for partial sensing** **Samsung**
Continue discussion offline
Thursday:
R1-1709545 **WF on skipped subframe handling for partial sensing** **NTT DOCOMO, Panasonic, Samsung**
R1-1709694 **Draft CR on skipped subframe handling for partial sensing** **Samsung, NTT DOCOMO, Panasonic**
Decision: Agreed in R1-1709332 as 36.213 CR0940 (Rel-14, F).

R1-1708996 **Corrections to Mode 3 schedulingEricsson LM**

- Observation: The specification uses the same subframe indexing for transmissions on the Uu and PC5 carriers. However, these carriers may have different timings.
- Proposal: Mode 3 transmission takes place on the first valid PC5 subframe after the start of subframe n+4+m on the Uu carrier based on transmitter timing.

Decision: The document is noted. The proposal in R1-1708996 is endorsed in principle. Prepare a draft CR in R1-1709300.
Thursday
R1-1709300 [DRAFT] Corrections to Mode-3 scheduling Ericsson LM
Alternative possible ways forward:

1. Agree the CR for the case when DFN offset is not provided; and consider the case when DFN offset is provided again at RAN1#90.
2. Postpone the CR and consider both cases at RAN1#90.

Friday
Chair suggested to take it for email discussion
Ericsson: No, would like to see the names of objecting companies to the CR
The CR is objected by Intel, Qualcomm.

R1-1707061 **Miscellaneous corrections to 36.213** **Huawei, HiSilicon**
R1-1707423 **Correction on carrier indicator field value in DCI Format 5A for V2V in 36.213** **CATT**
Conclusion:

- To update v2x-InterFreqList-r14 to v2x-InterFreqInfoList in 36.213
  - Offline to check relevant places for the change
  - Offline to check the applicability of similar changes to other parameters
- The second change in R1-1707061 is endorsed
- Prepare a CR capturing the above two bullets

Thursday
R1-1709666 Miscellaneous corrections to 36.213 Huawei, HiSilicon
Decision: Further revised and agreed in R1-1709333 as 36.213 CR910r2 (Rel-14, F) with v11.2 of cover sheet.

R1-1709191 **CR for skipped subframe handling for shorter periodicity in PC5-based V2V** **CATT**
Decision: CR0916 to 36.213 Rel-14/F in R1-1709191 is agreed.

36.214
R1-1708991 **Corrections to 36.214** **Ericsson LM**

- The S-RSSI measurement is defined as a linear average over OFDM symbols 1, 2, 3, 4, 5, and 6 in the first slot and OFDM symbols 0, 1, 2, 3, 4, and 5 in the second slot.

Decision: The document is noted.
R1-1708993 **[DRAFT CR] Correction to the definition of S-RSSI measurement** **Ericsson LM**
Continue discussion offline
Thursday: CR is not pursued.

R1-1709219 **Draft CR on cyclic shift for DMRS of PSSCH** **Samsung**
Continue discussion offline
Thursday: CR is not pursued.

6.1.4 Maintenance of Release 14 Full-Dimension MIMO for LTE

36.211
R1-1709174 **Draft CR for precoding for spatial multiplexing using antenna ports with UE-specific reference signals in 36.211 ETRI** (Revision of R1-1708104)
Decision: The CR in R1-1709174 is endorsed. Prepare final CR.
Thursday: Agreed in R1-1709648 as CR0375 to 36.211 Rel-14/F

R1-1707809 **Draft CR 36.211 for correction to CSI-RS configuration NEC**
Decision: The CR is endorsed in principle. Prepare final CR (using the latest CR template).
Thursday: Agreed in R1-1709649 as CR0376 to 36.211 Rel-14/F

36.212
R1-1707871 **Draft CR on advanced CSI codebook [36.212] Samsung**
Continue discussion offline
Thursday: CR is not pursued.

R1-1708541 **i1,p Encoding on PUSCH and Single Beam Reporting in Advanced CSI Ericsson**
Decision: The document is noted.
Observations from Ericsson:
- Two companies (in R1-1708541 and R1-1704288) have observed a ~9-16% chance of single beam reporting for 16 ports
- Two companies (in R1-1708541 and R1-1708406) have observed a ~20-40% chance of single beam reporting for 32 ports
- Two beam reporting when one beam has zero power uses an additional 36 or 72 bits (for rank 1 and rank 2 respectively) for i2 reporting of the zero power beam for a 10 MHz carrier
  - These bits are unneeded since the beam is zero power

R1-1708406 **Clarification of advanced CSI feedback on PUSCH NTT DOCOMO, INC.**
- Proposal 1: Support separate fields for i1,p-2 and CQI/PMI(excluding i1,p-2) reporting on PUSCH feedback for advanced CSI.
- Proposal 2: RI and i1,p-2 can be separately encoded.

Decision: The document is noted.
R1-1708539 **i1,p Encoding on PUSCH and Single Beam Reporting in Advanced CSI Ericsson**
R1-1708540 **Single Beam Reporting in Advanced CSI Ericsson**
Continue discussion offline
Thursday conclusion: no consensus to make this change.

36.213
R1-1707873 **Draft CR on CSR for CSI feedback for semi-OL transmission Samsung**
R1-1708195 **Corrections on CSI reporting for semi-open loop in 36.213 Huawei, HiSilicon**
Prepare a CR by discussing further offline regarding the above two CRs, also taking into account single-stage codebook
Thursday
R1-1709536 **Draft CR on CSR for CSI feedback for semi-OL transmission Samsung, Huawei, HiSilicon**
Decision: Agreed in R1-1709335 36.213 CR0931 Rel-14, F.

R1-1707872 **Draft CR on advanced CSI codebook [36.213] Samsung**
Discuss further offline whether or not a CR is needed
R1-1707870 **Draft CR on CSI-RS Resource Activation [36.213] Samsung**
Continue discussion offline
Thursday conclusion: May reconsider in RAN1#90 depending on conclusions in RAN2.

Remaining Advanced CSI issues
R1-1708194 **Discussion on Codebook Subset Restriction in advanced CSI Huawei, HiSilicon**
Conclusion:
- Discuss further whether or not CBSR is supported for advanced CSI
  - Companies are encouraged to perform evaluations
  - Revisit in next RAN1 meeting

R1-1708542 **Advanced CSI Codebook Subset Restriction Ericsson**
Continue discussion offline
Thursday: Discuss further offline and may revisit at RAN1#90.

6.1.5 Maintenance of Release 14 Further Enhanced MTC for LTE

36.211
R1-1709212 **Correction on PRS hopping ZTE** (Revision of R1-1707800/R1-1709194)
Continue discussion offline

Thursday: Further revised in
R1-1709583 Correction on PRS hopping ZTE
Decision: Agreed in R1-1709717 36.211 CR0381 Rel-14, F.

R1-1708755 Draft CR for PUSCH allocation with frequency hopping Qualcomm Incorporated
Decision: No CR is necessary

R1-1708206 Correction on resource mapping in case of retuning in 36.211 Huawei, HiSilicon
Decision: CR0367 to 36.211 Rel-14, F is agreed.

36.212
R1-1707797 Corrections on total number of soft channel bits for UE Cat M1 and M2 in 36.212 NEC, Intel
Decision: The CR is endorsed. Prepare final CR.
Thursday: Agreed in R1-1709385 as CR0263 to 36.212 Rel-14/F

36.213
R1-1708204 Discussion on dynamic HARQ-ACK timing and HARQ-ACK bundling in feMTC Huawei, HiSilicon
R1-1708205 Correction on dynamic HARQ-ACK timing and HARQ-ACK bundling in 36.213 Huawei, HiSilicon
Conclusions:
- The first change in R1-1708205 is endorsed
- Further discussion offline regarding the second change
- Prepare final CR capturing the first bullet, and the second bullet (if the change is agreed)

Thursday: Agreed in R1-1709651 as CR0926 to 36.213 Rel-14/F

R1-1708268 Parallel reception of MPDCCH and PDSCH for BL/CE UE Ericsson LM
Conclusions:
- A CR is necessary to capture the agreements as listed in R1-1708268
- Further discussion offline how to capture the agreements (particularly a 211 or 213 CR)

Thursday: Agreed in R1-1709448 as CR0374 to 36.211 Rel-14/F

6.1.6 Maintenance of Release 14 Enhancements of NB-IoT for LTE

R1-1707799 Clarification on Rel-14 NPDCCH monitoring ZTE
Conclusions:
- For the single HARQ process case in Rel-14, the same NPDCCH monitoring behavior as in Rel-13 is applied to Rel-14 NB-IoT UEs.
  - No CR is needed
- Further discussion offline the case of two HARQ processes when configured

Thursday
R1-1709665 WF on NPDCCH monitoring for Rel-14 UE configured with 2-HARQ process ZTE, Nubia, Qualcomm, Samsung,Nokia, ASB
- For the case of two HARQ processes, the same NPDCCH monitoring behavior as in Rel-13 is applied to Rel-14 NB-IoT UEs.
  - No CR is needed

Decision: The document is noted. Discuss further until RAN1#90.

R1-1708756 Interference randomization for Rel-14 NB-IoT Qualcomm Incorporated
R1-1709190 Improved FH randomization for NB-IoT Rel-14 Ericsson
Continue discussion offline
Thursday
R1-1709563 WF on interference randomization for NB-IoT Qualcomm, Huawei, HiSilicon, Ericsson
- An interference randomization scheme based on rotated IQ symbols (similar to the one of NPBCH) is introduced in Rel-14:
  - For NPDCCH:
    - For Type-2 and Type1-CSS in non-anchor carriers
    - For Type-1A and Type-2A CSS
    - [For USS, based on RRC configuration]
  - For NPDSCH:
    - For NPDSCH scrambled by RA-RNTI, TC-RNTI and P-RNTI in non-anchor carriers
    - For G-RNTI

- [For NPDSCH scrambled by C-RNTI, based on RRC configuration]
- FFS details of the sequence initialization c_init.

- For NPUSCH in Rel-14:
  - In msg3 in non-anchor carrier, change the scrambling sequence initialization to a non-linear combination of cell ID and slot/frame number
  - [For NPUSCH scrambled with C-RNTI, change the scrambling sequence initialization to a non-linear combination of cell ID and slot/frame number based on RRC configuration]
  - FFS details of the sequence initialization c_init

Decision: The document is noted. Email discussion including both NPUSCH, NPDSCH, NPDCCH and NPRACH until RAN1#90 (Alberto, Qualcomm).

R1-1708757 Draft CR for timing relationships for 2 HARQ processes Qualcomm Incorporated
Continue discussion offline
Thursday
R1-1709663 Timing relationships for 2 HARQ processes Qualcomm Incorporated
Decision: Agreed in **R1-1709718 36.213 CR0942 Rel-14, F**.

6.1.7 Other

Including maintenances of indoor positioning enhancements, performance enhancements for high speed scenario, Downlink multiuser superposition transmission, eMBMS enhancements, SRS carrier based switching, UL capacity enhancements, voice and video enhancement

R1-1708751 Discussion on modulation scheme selection for 256QAM Qualcomm Incorporated
R1-1707875 New modulation table for throughput enhancement Samsung
Decision: Discuss further till next meeting

R1-1707874 Corrections on Power Control for SRS Switching Samsung
The CR is endorsed. Prepare final CR.
Thursday: Agreed in R1-1709655 as CR0927 to 36.213 Rel-14/F

R1-1708741 Correction on reference table for the repetition number field in DCI Format 0C NEC
Conclusions:

- The change in R1-1708741is endorsed in principle. Offline discussion further on how to number the table. Prepare final CR in R1-1709538 (which is endorsed).

Thursday: Finally agreed in R1-1709657 as CR0929 to 36.213 Rel-14/F (~~Rel-13 CR~~) and R1-1709656 as CR0928 to 36.213 Rel-13/F ~~(Rel-14 shadow CR)~~

R1-1709209 Corrections on PRB scaling for PUSCH in UpPTS Huawei
Revised in R1-1709336 36.213 CR0930
Thursday: Agreed in R1-1709719 36.213CR0930r1 Rel-14, F (correcting a typo in R1-1709336).

6.2 LTE Release 15

6.2.1 Shortened TTI and processing time for LTE - *WID in RP-170113*

Rapporteur: Sundberg, Mårten – Ericsson

R1-1709686 Chairman's notes of AI 6.2.1 Shortened TTI and processing time for LTE Ad-Hoc chair (Ericsson)
The document was presented by Mårten Sundberg of Ericsson.
Decision: The document is endorsed, and content is incorporated as below.

Friday
Rapporteur will provide the list of agreements and Was by June 1st ; the list may be updated again after email discussions
Editors will prepare draft CRs including all agreements/WAs until Friday 11th August.
Editors may update draft CRs for comments received until RAN1 #90 meeting.

6.2.1.1 *Shortened processing time for 1ms TTI*

6.2.1.1.1 Configuration of shortened processing time for 1ms TTI

Including DL/UL configuration of shortened processing time in single carrier and CA scenario

R1-1708184 UE capability and configuration of shortened processing time for 1ms TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1707876 Configuration of shortened processing time for 1ms TTI Samsung
R1-1708758 Configuration of shortened processing time for 1ms TTI Qualcomm Incorporated

R1-1707030 Configuration of shortened processing time for 1ms TTI Huawei, HiSilicon
R1-1707533 Discussion on configuration for shortened processing time in 1ms TTI LG Electronics
R1-1708407 Configuration of shortened processing time for 1ms TTI NTT DOCOMO, INC.
R1-1708854 Configuring reduced processing time for 1 ms TTI Ericsson

Agreement:
- The UE capability of reduced processing time for 1 ms TTI applies jointly for shortened processing time between UL grant and UL data and for shortened processing time between DL data and DL HARQ feedback.

Agreement:
- The UE capability of reduced processing time for 1 ms TTI is separately reported for FS1, FS2 and FS3

Agreement:
- For 1ms TTI, shortened processing times between UL grant and UL data and between DL data and DL HARQ feedback for one carrier are jointly configured.

Agreement:
Down-select between alt 1 and alt 2:
- Alt 1: Shortened processing time for 1 ms TTI is configured per CC. The cell carrying the PUCCH should be configured with n+3 timing
- Alt 2: Shortened processing time for 1 ms TTI is configured per PUCCH group

6.2.1.1.2 Handling collisions between n+4 and n+3

Including remaining issues of FS1/FS2 collisions

R1-1708365 Remaining issues on PUSCH collision handling between PHICH with n+4 timing and UL grant with n+3 timing Sharp

R1-1709576 WF on collision handling with different processing times in 1ms TTI LG Electronics, Ericsson, NTT DOCOMO

Agreement:
- For FS2, a UE is not expected to receive DL assignments with different processing time for the same carrier which result in HARQ-ACK occurring in the same subframe

R1-1709634 WF on conflicting PHICH handling for short processing time with 1ms TTI Sharp

Agreement:
- For a HARQ-process with n+4 timing, layer 1 delivers HARQ-ACK to MAC layer regardless of a later received n+3 UL grant detection.
- If there is a collision with an n+3 UL grant, an explicit DCI is required for the retransmission, i.e. autonomous non-adaptive PUSCH retransmission is not adopted

R1-1709704 [DRAFT] LS on UL HARQ processes and collision handling for short processing time with 1ms TTI Sharp
R1-1709243 LS on UL HARQ processes and collision handling for short processing time with 1ms TTI RAN1 Source: RAN1; To: RAN2

Not treated.
R1-1707269 Remaining issues of handling collisions between n+4 and n+3 ZTE
R1-1707425 Handling for the collisions between different processing timings for 1ms transmission CATT
R1-1707534 Collision handling between different processing times in 1ms TTI LG Electronics
R1-1707877 Handling collisions between n+4 and n+3 Samsung

R1-1708172 Remaining issues of collision handling between n+3 and n+4 Nokia, Alcatel-Lucent Shanghai Bell
R1-1708202 Handling collisions between n+4 and n+3 Huawei, HiSilicon
R1-1708759 Handling collisions between n+4 and n+3 for shortened processing time for 1ms TTI Qualcomm Incorporated
R1-1708855 Remaining aspects of collisions handling with reduced processing time for 1ms TTI Ericsson

6.2.1.1.3 FS2 aspects

Including DL HARQ and UL scheduling timing for the reduced processing time operation.

R1-1707270 TDD HARQ with reduced processing timingZTE
R1-1707426 HARQ and scheduling timing design for LTE processing timing reduction with 1ms TTI CATT
R1-1707535 Remaining details on shortened processing time for FS2 in 1ms TTI LG Electronics
R1-1707878 FS2 aspects for 1ms TTI Samsung
R1-1708173 DL HARQ-ACK feedback and UL Scheduling for FS2 with 1-ms TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708190 Remaining TDD-specific issues for 1ms TTIHuawei, HiSilicon
R1-1708385 Remaining UL scheduling timing for TDD with shorten processing time in 1ms TTI CMCC
R1-1708408 HARQ/Scheduling timing for shortened processing time for 1ms TTI NTT DOCOMO, INC.
R1-1708760 FS2 aspects Qualcomm Incorporated
R1-1708856 FS2 HARQ and UL scheduling timings for 1ms TTI and reduced processing Ericsson
R1-1708887 Remaining issues for TDD with reduced processing time ITRI

Agreement: For 1ms TTI in FS2 and for TDD UL/DL configuration 6, the DL HARQ-ACK timing from PDSCH to HARQ-ACK for a minimum timing of n+3 is supported with the following table.

UL-DL Configuration 6	Subframe n									
	0	1	2	3	4	5	6	7	8	9
	-	-	6	4	4	-	-	6	3	-

Agreement:

- For 1ms TTI in FS2, the scheduling timing for UL grant to PUSCH for a minimum timing of n+3 is supported as below.
  - For TDD UL/DL configuration 0 and special subframe configuration (SSC) 0-10: support the timing in the table below
  - Note: The timings highlighted in red are only applicable to special subframe configuration 10

UL-DL Configuration 0	Subframe n									
	0	1	2	3	4	5	6	7	8	9
	3/6	3/6				3/6	3/6			

Agreement:

- For 1ms TTI in FS2, the scheduling timing for UL grant to PUSCH for a minimum timing of n+3 is supported as below.
  - For TDD UL/DL configuration 6 and special subframe configuration (SSC), the timing is defined by the below table

UL-DL Configuration 6	Subframe n									
	0	1	2	3	4	5	6	7	8	9
SSC 0-9	4	6				3	6			4
SSC 10	3/4	5/6				3	5			3

6.2.1.1.4 Asynchronous UL HARQ

Including aspects related asynchronous HARQ in UL for the reduced processing time operation.

R1-1706982 Asynchronous UL HARQ Huawei, HiSilicon
R1-1707536 Discussion on UL HARQ for shortened processing time in 1ms TTI LG Electronics
R1-1708857 HARQ process handling with shortened processing time for 1ms TTI Ericsson
R1-1707271 Asynchronous UL HARQ ZTE
R1-1707287 Asynchronous HARQ for PUSCH transmissions Intel Corporation
R1-1707879 Asynchronous UL HARQ for 1ms TTI Samsung
R1-1708185 On asynchronous UL HARQ for 1ms TTI Nokia, Alcatel-Lucent Shanghai Bell

R1-1708409 Asynchronous UL HARQ for shortened processing time for 1ms TTI NTT DOCOMO, INC.
R1-1708761 Asynchronous UL HARQ Qualcomm Incorporated

Agreement: For a UE configured with n+3 1ms TTI, synchronous UL HARQ is supported for UL transmissions with legacy processing time (n+4)

Agreement: The maximum number of UL HARQ processes for n+3 1ms TTI is the same as for n+4 1ms TTI
- FFS: In case the UE is configured also with sTTI

Agreement: The PUSCH UL HARQ processes of n+3 1ms TTI and n+4 1ms TTI are not shared

6.2.1.1.5 CSI feedback

Including aspects related CSI feedback for the reduced processing time operation, e.g. FFS related to TM10.

R1-1708762 CSI feedback Qualcomm Incorporated
R1-1708191 CSI feedback for 1ms TTI Huawei, HiSilicon
R1-1708410 CSI feedback for 1ms TTI with shortened processing time NTT DOCOMO, INC.

R1-1707537 Remaining issues on CSI feedback for shortened processing time LG Electronics
R1-1707880 CSI measurement and reporting for processing time reduction Samsung
R1-1708858 Remaining aspects on CSI for 1ms TTI Ericsson

R1-1709577 WF on remaining issues of CSI feedback for 1ms TTI with shortened processing time LG Electronics, Qualcomm, Samsung, Huawei, HiSilicon, Ericsson
Not supported by: Huawei, HiSilicon

Agreement: For a UE configured with shortened processing time for 1ms TTI, the minimum value of n_{CQI_ref} for the UE configured in TM 10 with multiple CSI processes for a serving cell is {legacy value-1}.
- UE capability signaling on the maximum number of CSI processes a UE can update with shortened processing time. Details FFS

6.2.1.1.6 Other

R1-1707881 Clarification of fallback mode to n+4 timing Samsung
R1-1707882 FS3 aspects for 1ms TTI Samsung
R1-1708838 On the use of UL channel interleaver for 1 ms TTI Ericsson
R1-1708839 UE capabilities for short processing time Ericsson

6.2.1.2 Shortened TTI with shortened processing time

6.2.1.2.1 sTTI operation

6.2.1.2.1.1 sTTI configurations

Including the supported combinations of (s)TTI lengths in DL and UL in single carrier and CA scenarios, and configuration of sTTI in single carrier and CA scenarios, e.g. in terms of number of carriers supported, cross-carrier scheduling support.

R1-1708186 sTTI configurability for carrier aggregation Nokia, Alcatel-Lucent Shanghai Bell
R1-1708763 sTTI configurations Qualcomm Incorporated

Proposed working assumption:
Different UL sTTI lengths across different PUCCH groups can be configured.
- The decision to confirm the working assumption should be taken only when the details on the overall UL sTTI operation are available

R1-1709244 LS on the Power Splitting across Different TTI Lengths in UL source: RAN1; to: RAN4

Conclusion: There is no consensus to support {2,14} and {7,14} in this WI

Agreement:
- sTTI operation is configured per CC

Agreement
- If sTTI is configured on any SCell within a PUCCH group, the cell carrying PUCCH shall be configured with sTTI with the sTTI combination of the PUCCH group

Agreement:
- sTTI operation can also be configured in a DL only SCell

Working assumption
- UE capability signaling on the maximum number of CCs for sTTI operation is defined
  - FFS on joint or separate UE capability on the maximum number of DL CCs and UL CCs
  - FFS per sTTI combination
  - FFS: Whether sTTI specific band/band combination is required

Agreement:
If multiple processing timelines for a given sTTI combination are allowed, then only one processing timeline per PUCCH group is configured.

Not treated.
R1-1706984 sTTI combinations in CA scenarios Huawei, HiSilicon
R1-1707288 On support sTTI configurations for LTE Intel Corporation
R1-1707427 Discussions on DL and UL sTTI combinations CATT
R1-1707538 Discussion on sTTI length configuration LG Electronics
R1-1707883 sTTI configurations Samsung
R1-1708411 Views on sTTI configurations NTT DOCOMO, INC.
R1-1708840 On supported (s)TTI configurations Ericsson
R1-1709431 WF on UL sTTI length configurations LG Electronics, CATT, NTT DOCOMO, Samsung, Intel

6.2.1.2.1.2 Flexible UL DMRS position

Including candidate UL DMRS positions and the signalling of the DMRS position.

R1-1708764 Flexible UL DMRS Position Qualcomm Incorporated
R1-1708174 On details of UL DMRS signaling Nokia, Alcatel-Lucent Shanghai Bell
R1-1707272 Considerations on UL DMRS indication ZTE

R1-1706985 On UL DMRS indication for 2/3-symbol sPUSCH Huawei, HiSilicon
R1-1707428 Design for UL DMRS position CATT
R1-1707539 Discussion on flexible DMRS for sPUSCH LG Electronics
R1-1707884 Flexible UL DMRS position Samsung
R1-1708295 UL DMRS for sTTI Motorola Mobility, Lenovo
R1-1708412 Flexible UL DMRS position for 2-symbol sTTI NTT DOCOMO, INC.
R1-1708536 Uplink DMRS Design for 2-symbol sPUSCH Potevio
R1-1708859 On UL DMRS position for 2os TTI Ericsson

R1-1709628 WF for UL DMRS position for 2os TTI for DMRS multiplexing/sharing Ericsson, LG Electronics

Agreement:
In case of 2/3os in UL, the following DMRS placement can be indicated by an UL grant in sTTI#n-x which schedules sPUSCH in sTTI n, where x is processing time configured for a PUCCH group
Note: Other combinations are FFS.

DMRS position pattern indicated by a UL grant scheduling sPUSCH in sTTI n					
sTTI 0	**sTTI 1**	**sTTI 2**	**sTTI 3**	**sTTI 4**	**sTTI 5**
R D D	R D	R D	R D	R D	R D D
D D R	D R	D D	D R	D R	
	D D		D D | R	D D	
	D D | R			D D | R	
Note: | denotes the boundary of sTTI n					

6.2.1.2.1.3 Aspects related to dynamic switching between 1ms TTI and sTTI

Including HARQ processes handling when switching, and potential restrictions/solutions to avoid exceeding UE maximum processing capability.

R1-1708860 On dynamic switching between 1ms TTI and sTTI Ericsson
R1-1708187 HARQ process handling and maximum processing capability for shortened TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708765 Aspects related to dynamic switching between 1ms TTI and sTTI Qualcomm Incorporated

R1-1707273 HARQ to support dynamic switching between 1ms TTI and sTTI ZTE
R1-1706986 HARQ processes handling to support dynamic switching between 1ms TTI and sTTI Huawei, HiSilicon
R1-1707289 HARQ processes handling in support of dynamic sTTI switching Intel Corporation
R1-1707540 Dynamic switching between 1ms TTI and sTTI LG Electronics
R1-1707885 Remaining issues for dynamic switching between 1ms TTI and sTTI Samsung
R1-1708413 HARQ processes handling for 1m TTI and sTTI NTT DOCOMO, INC.
R1-1708566 On HARQ process for dynamic switching between sTTI and 1ms TTI InterDigital Inc

R1-1709458 WF on HARQ process handling when switching between 1ms TTI and sTTIEricsson, Nokia, Alcatel-Lucent Shanghai Bell, NTT DOCOMO

Proposed agreement
On a carrier configured with sTTI operation and shortened processing time (N+3) for 1ms TTI for a UE:
- For a HARQ process scheduled from USS, the retransmission can have a different TTI length than an earlier transmission of the same HARQ process
  - FFS: soft-buffer management in the UE
  - FFS: TX buffer management in the UE
- The number of HARQ processes for
  - sTTI is 16
  - 1ms TTI with N+3 scheduled from USS is 16
  - 1ms TTI scheduled from CSS is 8

Proposed agreement:
On a carrier configured with sTTI operation and shortened processing time (N+3) for 1ms TTI for a UE:
For a HARQ process scheduled from USS, the retransmission can have a different TTI length than an earlier transmission of the same HARQ process
- Share HARQ processes: Ericsson, Nokia, NTT DOCOMO, CATT, Intel
  - Objections: Qualcomm (implementation issue, unnecessary optimization)
- Not share HARQ processes: Qualcomm, InterDigital, LGE, Huawei, HiSilicon
  - Objections: Nokia (performance impact)

R1-1709761 WF on Dynamic Switching from PDSCH Scheduling to sPDSCH Scheduling Qualcomm, Samsung, Intel
Also supported by LG Electronics

Working assumption:
In case of dynamic switching from PDSCH scheduling within subframes n-X to n-1 to sPDSCH scheduling in subframe n over a given carrier, if UE's maximum processing capability is violated due to a need for decoding the sPDSCH received within a given subframe, a UE may stop processing the PDSCHs received during the past X subframes.
- The value of X is defined as a UE capability, and take a value between 0 to k-1, where k is the time between PDSCH reception and the associated feedback
- A UE should provide HARQ ACK/NAK feedback for the PDSCHs where processing has been stopped.
- FFS how maximum processing capability is defined

6.2.1.2.1.4 Collision of sTTI/TTI in UL

R1-1709434 WF on simultaneous transmission of TTI and sTTI in UL LG Electronics, Ericsson, Nokia, ASB, Intel

Agreement:
- Simultaneous transmission of TTI and sTTI UL channels is not allowed within the same carrier on overlapped symbols
  - PUSCH and sPUSCH (already agreed)
  - PUCCH and sPUCCH
  - PUSCH and sPUCCH
  - PUCCH and sPUSCH
- FFS in case of different carriers
- FFS on non-overlapping symbols

R1-1709429 WF on further collision handling of PUSCH and sPUSCH LG Electronics, NTT DOCOMO, KT, Qualcomm, Ericsson, Nokia, ASB

Agreement:
- In case of collision between PUSCH and sPUSCH in the same subframe on a given carrier for a UE
  - The UE shall attempt to drop/stop as soon as possible (up to UE implementation) the whole/remaining transmission of PUSCH without resuming the transmission
  - FFS: HARQ-ACK of PUSCH is transmitted on sPUSCH
    - FFS on how to map HARQ-ACK of PUSCH to sPUSCH
  - FFS on whether CSI of PUSCH is dropped or not
  - FFS if a requirement on the time of dropping prior to sPUSCH transmission is adopted

R1-1709430 WF on collision handling of PUCCH and sPUCCH LG Electronics, Ericsson, Nokia, ASB

Agreement:
- In case of collision between PUCCH format 2/4/5 and sPUCCH in the same subframe on a given carrier for a UE
  - The UE shall transmit sPUCCH
  - The UE shall attempt to drop/stop as soon as possible (up to UE implementation) whole/remaining transmission of PUCCH format 2/4/5 without resuming the transmission
  - FFS: HARQ-ACK of PUCCH is transmitted on sPUCCH
    - FFS on how to map HARQ-ACK of PUCCH to sPUCCH
  - CSI of PUCCH is dropped
  - FFS if a requirement on the time of dropping prior to sPUCCH transmission is adopted
- FFS for other PUCCH formats

R1-1709478 WF on handling collisions of TTI/sTTI in UL Huawei, HiSilicon

R1-1709759 WF on collision handling of PUCCH and sPUSCH LG Electronics, NTT DOCOMO, Qualcomm, Intel

Agreement:
- In case of collision between PUCCH format 2/4/5 and sPUSCH in the same subframe on a given carrier for a UE
  - The UE shall transmit sPUSCH
  - The UE shall attempt to drop/stop as soon as possible (up to UE implementation) whole/remaining transmission of PUCCH format 2/4/5 without resuming the transmission
  - FFS: If HARQ-ACK of PUCCH is transmitted
  - FFS on whether CSI of PUCCH is dropped or not
  - FFS if a requirement on the time of dropping prior to sPUSCH transmission is adopted
- FFS for other PUCCH formats

Not treated.
R1-1706987 Handling collisions of sTTI/TTI in UL Huawei, HiSilicon
R1-1707274 Simultaneous transmission in sTTI ZTE
R1-1707290 Collision handling for UL sTTI and normal TTI transmissions Intel Corporation
R1-1707429 Discussion on multiplexing of normal TTI and sTTI in UL CATT
R1-1707541 UL Collision handling between 1ms TTI and sTTI LG Electronics
R1-1707886 Collision handling of sTTI and TTI in UL Samsung
R1-1708175 On collisions between sTTI and TTI transmissions in UL Nokia, Alcatel-Lucent Shanghai Bell
R1-1708296 Collision of sTTI/TTI in UL Motorola Mobility, Lenovo
R1-1708414 Collision handling between sTTI and TTI for UL NTT DOCOMO, INC.
R1-1708766 Collision of sTTI and TTI in UL Qualcomm Incorporated
R1-1708841 Handling collisions of sTTI and TTI in UL Ericsson
R1-1709769 WF on handling collision between PUCCH and sPUSCH Huawei, HiSilicon

6.2.1.2.2 DL control channel design

6.2.1.2.2.1 sTTI scheduling

Considering fields for sDCI1, potential support of sDCI2 and corresponding sDCI2 candidate fields, potential support of multi-sTTI scheduling

R1-1706988 sTTI scheduling Huawei, HiSilicon

R1-1707275 Discussion on sTTI scheduling ZTE
R1-1707291 Discussions on DCI formats for sTTI scheduling Intel Corporation
R1-1707430 On sDCI design CATT
R1-1707542 Discussion on sTTI scheduling LG Electronics
R1-1707887 sTTI scheduling Samsung
R1-1708084 Discussion on sDCI and sPDCCH design Panasonic
R1-1708209 On scheduling of sPDSCH and sPUSCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708297 sTTI scheduling Motorola Mobility, Lenovo
R1-1708386 Discussion on downlink control monitoring resources design for sTTI CMCC
R1-1708543 On sPDCCH resource configuration InterDigital Inc.
R1-1708767 sTTI scheduling Qualcomm Incorporated
R1-1708861 On sTTI scheduling options Ericsson
R1-1708878 Discussion on resource allocation of two downlink short TTI lengths ASUSTEK COMPUTER (SHANGHAI)
R1-1709445 WF on multi-sTTI scheduling Ericsson, KT Corporation

6.2.1.2.2.2 sPDCCH design

Considering sREG definition, mapping alternatives, RB sets, number of aggregation levels, the location of sPDCCH candidates for different aggregation levels per user, etc.

R1-1706989 sPDCCH design Huawei, HiSilicon
R1-1707276 sPDCCH design for short TTI ZTE
R1-1707292 Remaining details of sPDCCH design for shortened TTI Intel Corporation
R1-1707431 Design of sPDCCH structure CATT
R1-1707543 Design aspects on sPDCCH LG Electronics
R1-1707888 sPDCCH design Samsung
R1-1708210 On DL control channel design for shorter TTI operation Nokia, Alcatel-Lucent Shanghai Bell
R1-1708298 sPDCCH design Motorola Mobility, Lenovo
R1-1708415 Views on sPDCCH design NTT DOCOMO, INC.
R1-1708768 sPDCCH design Qualcomm Incorporated
R1-1708862 Design aspects of sPDCCH Ericsson
R1-1709432 WF on sPDCCH transmission scheme LG Electronics, KT
R1-1709433 WF on the composition of sPDCCH RB set LG Electronics, KT

Agreement
- A CRS based sPDCCH RB set can be configured to a UE by higher-layer signalling either with distributed or localized mapping of sCCE to sREG
  - FFS definition of localized mapping

Proposed agreement
A DMRS based sPDCCH RB set can be configured to a UE by higher-layer signalling to be
- Option 1: Localized or distributed: Nokia, Ericsson, Huawei, HiSilicon, LGE, DCM, ZTE
- Option 2: Only localized: QC, Samsung

Option 1 objected by Qualcomm.

Agreement
- A UE can be configured to monitor at most two sPDCCH RB set(s) containing the sTTI USS in an sTTI.
  - One sPDCCH candidate is contained within one RB set

Agreement
- An sREG consists of 1 RB within 1 OFDM symbol including REs for CRS and/or DMRS applied to CRS based sPDCCH

Agreement
- SFBC is supported for CRS-based sPDCCH
  - FFS number of antenna ports
- Single port DMRS-based sPDCCH demodulation is supported
  - FFS bundling size
- FFS if two port DMRS-based sPDCCH demodulation is supported
  - FFS bundling size

Agreement:
- A sPDCCH RB set can be configured with at least the following information:
  - A set of RBs

    - EPDCCH PRB allocation is reused
  - Transmission scheme (e.g., CRS-based or DMRS-based)
    - FFS: Dependent on subframe type
  - Localized or distributed sCCE to sREG mapping (at least for CRS, and, if supported DMRS-based sPDCCH)
  - FFS: Localized or distributed sPDCCH candidate to sCCE mapping
  - Number of sPDCCH candidates/aggregation levels of the RB set
    - FFS: Same or different sPDCCH candidates for different sTTI index
  - Number of symbols for sPDCCH duration at least in case of CRS-based transmission
  - RS scrambling sequence (e.g., VCID) in case of DMRS-based transmission
  - FFS: other information (if needed)

Proposed agreement:
In case the starting symbol index of the first potential sPDSCH for 2/3os sTTI is equal to one, sDCI in sTTI0 is transmitted in:

- Option 1: legacy PDCCH region or in the sPDCCH region based on higher layer configuration and UE capability – Samsung, Qualcomm, Huawei, HiSilicon
  - Objections: Nokia, LGE
- Option 2: legacy PDCCH region or in the sPDCCH region based on higher layer configuration – Nokia, LGE, Ericsson, Intel, Huawei, HiSilicon, NTT DOCOMO, CATT
  - Objections: Qualcomm, ZTE
- Option 3: legacy PDCCH region – Huawei, HiSilicon, Samsung, ZTE, NTT DOCOMO, Qualcomm
  - Objections: Ericsson
- Option 4: sPDCCH region – Qualcomm, Nokia, LGE, Ericsson, Intel
  - Objections: Huawei, HiSilicon, ZTE

Agreement:

- The number of OFDM symbols per RB set for DMRS based sPDCCH for 1-slot sTTI is 2
- The number of OFDM symbols for DMRS based sPDCCH for 2/3-symbol sTTI is
  - 2 for 2-symbol sTTI#1,2,3,4
  - FFS: 3 for 3-symbol sTTI#1 and #5
  - FFS: sTTI#0

Email discussion on sPDCCH design until 13th June - Qualcomm (Kianoush)

6.2.1.2.2.3 Search space for sTTI operation

Considering the number of sPDCCH candidates per user, supported aggregation levels, number of blind decodes, etc.

R1-1707031	Search space for sTTI	Huawei, HiSilicon
R1-1708211	On search space design for sPDCCH	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708769	Search space for sTTI operation	Qualcomm Incorporated
R1-1707277	Search space for sTTI operation	ZTE
R1-1707293	Search space for shortened DL control channels	Intel Corporation
R1-1707432	Design of sPDCCH search space	CATT
R1-1707544	Discussion on search space for sTTI operation	LG Electronics
R1-1707889	Search space for sTTI operation	Samsung
R1-1708299	Search space for sTTI operation	Motorola Mobility, Lenovo
R1-1708416	Search space for sTTI operation	NTT DOCOMO, INC.
R1-1708661	On sPDCCH search space design	InterDigital Inc.
R1-1708863	Search space for sTTI	Ericsson

Email discussion on search space for sTTI operation until 16th June - Huawei (Chengyan)

6.2.1.2.2.4 sPDCCH multiplexing with data

R1-1706990	sPDCCH multiplexing with data	Huawei, HiSilicon
R1-1707278	sPDCCH multiplexing with sPDSCH	ZTE
R1-1707433	Design on sPDCCH multiplexing with data	CATT
R1-1707545	Discussion on sPDCCH multiplexing with data	LG Electronics
R1-1707890	sPDCCH multiplexing with data	Samsung
R1-1708212	On reuse of vacant sPDCCH resource for sPDSCH	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708300	sPDCCH and sPDSCH multiplexing	Motorola Mobility, Lenovo
R1-1708417	Resource sharing between sPDCCH and sPDSCH	NTT DOCOMO, INC.

R1-1708770 sPDCCH multiplexing with data Qualcomm Incorporated
R1-1708864 Multiplexing sPDCCH with sPDSCH/PDSCH Ericsson

Email discussion on sPDCCH multiplexing with sPDSCH until 22nd June - Nokia (Karol)

6.2.1.2.3 UL control channel design

6.2.1.2.3.1 sPUCCH format design

R1-1706991 sPUCCH design Huawei, HiSilicon
R1-1707279 sPUCCH format design ZTE
R1-1707434 sPUCCH design for sTTI CATT
R1-1707546 Further discussion on sPUCCH design LG Electronics
R1-1707891 sPUCCH format design Samsung
R1-1708207 sPUCCH Design for shortened TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708418 Views on sPUCCH design NTT DOCOMO, INC.
R1-1708662 On sPUCCH Format Design InterDigital Inc.
R1-1708771 sPUCCH format design Qualcomm Incorporated
R1-1708842 sPUCCH format design Ericsson

R1-1709446 WF on sequence-based sPUCCH in 2OS and 3OS sTTI ZTE, InterDigital, LG Electronics, NTT DoCoMo, KT Corp. Ericsson
Also supported by Samsung

Working assumption:

- The sequence-based sPUCCH w/o DMRS is supported for up to two HARQ-ACK bits in 2OS sTTI and 3OS sTTI.
  - ACK/NACK information map to different cyclic shifts (i.e., ACK and NACK are indicated based on cyclic shift index)
  - The cyclic shifts on different sPUCCH symbols can be different due to cyclic shift randomization
    - Cyclic shift randomization is re-used from 1 ms operation to support multiplexing with legacy PUCCH
  - Only frequency hopping between sPUCCH symbol(s) is supported (no FH is not supported).
  - 1 RB allocation per symbol
  - FFS: How to handle SR + HARQ, hopping pattern, A/N information mapping to CS
- To be confirmed by RAN1#90

R1-1709578 WF on remaining details of 7-symbol sPUCCH carrying up to 2 bits LG Electronics, Samsung, Huawei, HiSilicon, Ericsson

Agreement:

- For sPUCCH format carrying up to 2 bits and SR (if any), for 7-symbol sTTI, the following hopping pattern is supported
  - {D R D | D R R D} for the first slot, {D R R D | D R D} for the second slot

R1-1709579 WF on 7-symbol sPUCCH carrying more than 2 bits LG Electronics, Ericsson, NTT DOCOMO, Intel

Agreement:

- For 7-symbol sPUCCH format carrying more than 2 HARQ bits, and SR, if any, PF4-based sPUCCH format is supported.
- PF4-based sPUCCH format:

	PF4-based sPUCCH format
Modulation	QPSK
DMRS sequence	Reuse legacy DMRS sequence for PUCCH
Intra-sTTI hopping	FFS if hopping and/or no hopping is used
DMRS pattern	Non-hopping (if supported): Reuse DMRS pattern of PUCCH format 4 Hopping (if supported): {X X X | X X X X} for the first slot, {X X X X | X X X} for the second slot ✓ Note that the bar | indicates a hopping boundary and X can be either data or DMRS symbol

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	▪ FFS on DMRS pattern
Number of RBs for PUCCH resource	1 or multiple RBs

- RAN1 down-select between the following three alternatives:
  - Alt 1: No additional sPUCCH format is supported
  - Alt 2: Support in addition PF3-based 7OS sPUCCH
  - Alt 3: Support in addition PF3-based, and PF5-based 7OS sPUCCH
- FFS: Coding methods
- In case multiple formats are supported, FFS on format selection
- PF5-based sPUCCH format details FFS.
- PF3-based sPUCCH format, if supported

	PF3-based sPUCCH format
Modulation	QPSK
DMRS sequence	Reuse DMRS sequence for PUCCH format 3
Intra-sTTI hopping	Non-hopping, FFS: hopping
DMRS pattern and OCC	Non-hopping: Reuse DMRS pattern of PUCCH format 3 and OCC Hopping: FFS on details if supported
Number of RBs for PUCCH resource	1 RB

R1-1709629 WF on remaining issues of 2-symbol sPUCCH with large payload size Huawei, HiSilicon, Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, CATT

Agreement:

- For sPUCCH carrying more than 2-bit ACK/NACK and SR (if any) in 2os/3os sTTI
  - Reuse legacy DMRS sequence generation
  - The DMRS is in the first symbol for 2/3OS sPUCCH
  - the number of RB(s) is configured by higher layer signaling as a value from 1 to X, FFS X.
  - FFS on whether IFDMA is used

6.2.1.2.3.2 sPUCCH resource management

R1-1706992 sPUCCH resource allocation Huawei, HiSilicon
R1-1707280 sPUCCH resource management ZTE
R1-1707294 sPUCCH resource allocation for sTTI Intel Corporation
R1-1707435 Resource allocation for sPUCCH CATT
R1-1707547 Further discussion on sPUCCH resource management LG Electronics
R1-1707892 sPUCCH resource management Samsung
R1-1708176 sPUCCH resource management for shortened TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708419 sPUCCH resource management NTT DOCOMO, INC.
R1-1708772 sPUCCH resource management Qualcomm Incorporated
R1-1708843 sPUCCH resource management Ericsson

6.2.1.2.3.3 UCI on sPUSCH

R1-1706993 UCI on sPUSCH Huawei, HiSilicon
R1-1707281 UCI transmission on sPUSCH in sTTI ZTE
R1-1707295 UCI transmission on sPUSCH Intel Corporation
R1-1707436 UCI on sPUSCH CATT
R1-1707548 Discussion on UCI transmission on sPUSCH LG Electronics
R1-1707893 UCI on sPUSCH Samsung
R1-1708177 UCI on sPUSCH Nokia, Alcatel-Lucent Shanghai Bell

R1-1708420 Views on UCI on sPUSCH NTT DOCOMO, INC.
R1-1708773 UCI on sPUSCH Qualcomm Incorporated
R1-1708844 UCI on sPUSCH with short TTI Ericsson

6.2.1.2.3.4 CSI reporting for sTTI

R1-1706983 CSI feedback for short TTI Huawei, HiSilicon
R1-1707437 CSI reporting for sTTI CATT
R1-1707549 Discussion on sTTI based CSI LG Electronics
R1-1707894 CSI reporting for sTTI Samsung
R1-1708178 On CSI Reporting for sTTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708301 CSI aspects of shortened TTI Motorola Mobility, Lenovo
R1-1708421 CSI feedback for shortened TTI with shortened processing time NTT DOCOMO, INC.
R1-1708774 CSI reporting for sTTI Qualcomm Incorporated
R1-1708845 On CSI reporting for sTTI Ericsson
R1-1709580 WF on CSI reporting for sTTI LG Electronics, KT, Huawei, HiSilicon, NTT DOCOMO

6.2.1.2.3.5 sPUCCH power control

R1-1706999 UL power control for short TTI Huawei, HiSilicon
R1-1707438 sPUCCH power control CATT
R1-1707550 Discussion on sPUCCH power control LG Electronics
R1-1707895 sPUCCH power control Samsung
R1-1708775 sPUCCH power control Qualcomm Incorporated
R1-1708846 sPUCCH power control Ericsson

6.2.1.2.4 DL data channel design

6.2.1.2.4.1 sPDSCH design

Including aspects related to sPDSCH resource allocation, TM, TBSs.

R1-1706994 sPDSCH design Huawei, HiSilicon
R1-1707282 Study on sPDSCH transmission in sTTI ZTE
R1-1707296 On the details of sPDSCH designs Intel Corporation
R1-1707551 Design aspects on sPDSCH LG Electronics
R1-1707896 sPDSCH design Samsung
R1-1708213 On details of short PDSCH design Nokia, Alcatel-Lucent Shanghai Bell
R1-1708776 sPDSCH design Qualcomm Incorporated
R1-1708865 Design aspects of sPDSCH Ericsson

R1-1709631 WF on resource allocation for sPDSCH Huawei, HiSilicon, NTT DOCOMO, Ericsson

Agreement: Resource allocation type 1 for sPDSCH is not supported

R1-1709633 WF on RBG size for sPDSCH Huawei, HiSilicon, Ericsson, ZTE, LGE
Also supported by Samsung

Proposed offline consensus:
- The RBG size for sPDSCH is N (N>1) times of legacy RBG size
  - Where N is down-selected from {2,3,4} for 1-slot sPDSCH, {2,3,4,6} for 2/3-symbol sPDSCH

6.2.1.2.4.2 DL DMRS design

Including aspects related to number of layers and DMRS patterns.

R1-1708214 On details of DMRS design for 2-OS and 7-OS DL shorter TTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1707897 DL DMRS design Samsung
R1-1708777 DL DMRS design for sPDSCH Qualcomm Incorporated
R1-1706995 DL DMRS design for short TTI Huawei, HiSilicon
R1-1707283 DL DMRS design in sTTI ZTE
R1-1707439 Discussion on DMRS design for DL sTTI CATT
R1-1707552 Discussion on DL DMRS for sTTI LG Electronics
R1-1708866 DL DMRS design for short TTI Ericsson

R1-1709615 WF on DL DMRS bundling size Nokia, Alacatel-Lucent Shanghai Bell, Ericsson, Samsung, Intel

Agreement:
- The sPRG size for 2/3os sPDSCH is *N* (sPRG of *N* RBs)
  - FFS: *N* is the same for all system BW or is system BW specific
  - Down-select *N* from [2, 3, 4 and 6]

R1-1709630 WF on DMRS pattern for sPDSCH Huawei, HiSilicon, Nokia, Alcatel-Lucent Shanghai, Samsung, Ericsson, Intel, CATT

Agreement:
- The DL DMRS pattern is fixed for 2-layer 2/3-symbol sPDSCH.
  - Down-selected between option 1, 2, 3(X=2N+1 or X=2N, where N is the number of RBs).
- DL DMRS can be shared among 2 consecutive sTTIs for the same UE for 2/3-symbol sPDSCH.
  - Sharing across subframes is not supported
  - FFS: Sharing across slots
  - FFS: 3 consecutive sTTIs
- DL DMRS RE shift in frequency domain is supported when colliding with CRS RE.

6.2.1.2.5 UL data channel design

6.2.1.2.5.1 sPUSCH design

Including aspects related to sPUSCH resource allocation, TM, TBS.

R1-1706996 sPUSCH design Huawei, HiSilicon
R1-1707284 Study on sPUSCH transmission in sTTI ZTE
R1-1707898 sPUSCH design Samsung
R1-1708215 On details of short PUSCH design Nokia, Alcatel-Lucent Shanghai Bell
R1-1708544 On sPUSCH Design InterDigital Inc.
R1-1708778 sPUSCH design Qualcomm Incorporated
R1-1708847 Design aspects of sPUSCH Ericsson

R1-1709632 WF on resource allocation for sPUSCH Huawei, HiSilicon, Ericsson

Agreement:
- An allocation based on the indication of the start and the length of allocation is supported in the UL for sPUSCH

6.2.1.2.5.2 UL DMRS design

Including aspects related to sPUSCH number of layers.

R1-1706997 UL DMRS design for 2/3-symbol sPUSCH Huawei, HiSilicon
R1-1707440 Discussion on DMRS design for UL sTTI CATT
R1-1707899 UL DMRS design Samsung
R1-1708179 UL DMRS Design for sTTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708422 UL DMRS design for sPUSCH NTT DOCOMO, INC.
R1-1708779 UL DMRS design for sPUSCH Qualcomm Incorporated
R1-1708848 On UL DMRS design Ericsson

R1-1709627 WF on IFDMA DMRS for 2/3-symbol sPUSCH Huawei, HiSilicon, Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, ZTE, CATR, NTT DOCOMO, Sharp, Intel, LG Electronics, Samsung

Agreement:
- More than 2 combs are not supported for IFDMA DMRS for 2/3-symbol sPUSCH.
- Each comb supports up to 2 layers multiplexing for IFDMA DMRS for 2/3-symbol sPUSCH.

6.2.1.2.5.3 sPUSCH power control

R1-1707285 sPUSCH power control ZTE
R1-1707441 sPUSCH power control CATT
R1-1707553 Discussion on sPUSCH power control LG Electronics
R1-1707900 sPUSCH power control Samsung
R1-1708423 Uplink power control for sTTI NTT DOCOMO, INC.
R1-1708780 sPUSCH power control Qualcomm Incorporated

R1-1708867 sPUSCH power control and PHR report for sTTI Ericsson

6.2.1.2.6 FS2 aspects

R1-1707001 TDD-specific design for short TTI Huawei, HiSilicon
R1-1707286 TDD-specific considerations on sTTI ZTE
R1-1707442 sTTI partition for TDD special subframe CATT
R1-1707554 Discussion on FS2 aspects for sTTI operation LG Electronics
R1-1707901 TDD-specific issues on sTTI operation Samsung
R1-1708387 Discussion on DL HARQ timing for shortened TTI in TDD CMCC
R1-1708781 FS2 aspects Qualcomm Incorporated
R1-1708837 Slot-level FS2 aspects for sTTI Nokia, Alcatel-Lucent Shanghai Bell
R1-1708868 FS2 aspects of short TTI Ericsson

Email discussion on FS2 aspects for sTTI until 4th Aug. - Huawei (Yubo)

6.2.1.2.7 Other

R1-1707000 TBS determination for short TTI Huawei, HiSilicon
R1-1707032 Discussion on CA issues for shortened TTI operation Huawei, HiSilicon
R1-1707033 Discussion on SR in shortened TTI scenario Huawei, HiSilicon
R1-1707443 Discussion on the simultaneous transmissions of (s)PUCCH and (s)PUSCH CATT
R1-1707444 UCI transmission on sPUCCH CATT
R1-1707445 UCI combination on sPUCCH CATT
R1-1708664 Discussion on PHR for sTTI operation ITRI
R1-1708849 TBS scaling for short TTI Ericsson
R1-1708850 On sTTI operation with small system bandwidth Ericsson
R1-1708851 UE capabilities for sTTI Ericsson
R1-1708869 Asynchronous HARQ for UL retransmissions with short TTI Ericsson
R1-1709147 Discussion on CSI reporting in sTTI KT Corp.

6.2.1.3 Maximum TA and processing time

Including maximum supported TA for sTTI and 1 ms operation, minimum data processing time for short TTI and potential relationship between them.

R1-1706998 Maximum TA and processing time reduction Huawei, HiSilicon
R1-1707446 HARQ and scheduling timing design for LTE sTTI CATT
R1-1707555 Discussion on maximum TA and processing time LG Electronics
R1-1707902 Reduction of maximum TA and processing time Samsung
R1-1708188 On maximum timing advance and processing time Nokia, Alcatel-Lucent Shanghai Bell
R1-1708424 Views on maximum TA and processing time reduction NTT DOCOMO, INC.
R1-1708782 Maximum TA and processing time for sTTI and 1ms operation Qualcomm Incorporated
R1-1708852 On maximum TA and reduced processing time Ericsson

R1-1709422 WF on maximum Timing Advance and processing time for LTE reduced processing time operation
Nokia, Ericsson, AT&T, CMCC, China Telecom, Deutsche Telekom, KDDI, KT Corporation, NTT DOCOMO Inc., Softbank, Sprint, T-Mobile USA, Verizon, Alcatel-Lucent Shanghai Bell

Proposed agreement:

1. Support a maximum timing advance of x=0.33ms for n+3 processing timing for 1ms TTI.
2. For the same DL/UL 7-symbol sTTI length, a processing time of n+4 assuming a maximum TA of 0.33ms is supported for DL data to DL HARQ / UL grant to UL data
3. For the same DL/UL 2/3-symbol sTTI length, a UE is configured by higher layer to support
   - a processing time of n+6 assuming a maximum TA of 0.33ms for DL data to DL HARQ / UL grant to UL data, or
   - a processing time of n+4 assuming a maximum TA of 0.067ms for DL data to DL HARQ / UL grant to UL data

6.2.1.4 Other

R1-1708783 Link evaluation of DL data transmission under symbol-dependent puncturing/interferenceQualcomm Incorporated

6.2.2 Enhancements to LTE operation in unlicensed spectrum - *WID in RP-170848*

Rapporteur: Lunttila, Timo - Nokia

R1-1709687 Chairman's notes of AI 6.2.2 Enhancements to LTE operation in unlicensed spectrum Ad-Hoc chair (Nokia)
The document was presented by Timo Lunttila of Nokia.
Decision: The document is endorsed, and content is incorporated as below.

6.2.2.1 Multiple starting positions in a subframe for DL

R1-1707028 Support for multiple starting positions in a subframe for DL on SCell with frame structure 3 Huawei, HiSilicon
R1-1707297 On the additional downlink starting positions in a subframe for FS3 Intel Corporation
R1-1707556 Discussion on multiple starting positions for LAA DL LG Electronics
R1-1707903 Multiple starting positions for DL Samsung
R1-1708189 On multiple DL starting positions in a subframe for feLAA Nokia, Alcatel-Lucent Shanghai Bell
R1-1708885 Multiple starting positions in a subframe for DL Qualcomm Incorporated
R1-1708961 Multiple starting and ending positions for LAA DL Ericsson
R1-1708964 Considerations and throughput evaluation of new DL partial subframes PANASONIC R&D Center Germany
R1-1708971 DL multiple starting position for LAA WILUS Inc.
R1-1709057 Discussion on multiple starting positions for DL in LAA BROADCOM LIMITED

6.2.2.2 Multiple starting and ending positions in a subframe for UL

R1-1707029 Support for multiple starting and ending positions in a subframe for UL on SCell with frame structure 3 Huawei, HiSilicon
Endorsed

R1-1708425 DMRS for PUSCH in partial subframe transmission NTT DOCOMO, INC.

FFS: UL DMRS enhancements, if any

R1-1709585 Outcome of the offline discussion on UL partial subframes Nokia

Agreements:
- UL partial subframe transmission starting at symbol #7 is supported with both following modes Mode 1 and Mode 2
- Mode 1. The UE may start at a Rel-14 starting point or at symbol #7 depending on e.g. the outcome of LBT
  - The TBS is determined as for the full subframe regardless of the starting point (i.e. no TBS scaling)
  - FFS: channel access within shared COT
  - FFS: how to indicate to which UL subframes this applies
  - FFS: UCI mapping, if supported
- Mode 2. The UL grant indicates starting position at number #7
  - FFS: additional starting points between symbols #7 and #8
  - The TB(s) is rate matched into the second slot
  - TBS Scaling is used similarly as in FS2
    - FFS: TBS scaling details
  - FFS: UCI mapping, if supported

Agreement: For Mode 1:
- When transmission starts at symbol #7, the first slot of a subframe is punctured
- FFS: new MCS table and when that would be applicable

Agreements:
- UL partial subframe transmission ending in the end of symbol #6 is supported (in addition to #12 and #13 already supported)
  - FFS: #3 and #10
  - The ending position is indicated with the UL grant
  - The TB(s) is rate matched into the allocated symbols
  - TBS Scaling is used similarly as in FS2
    - FFS: TBS scaling details
  - FFS: UCI mapping, if supported
  - FFS: whether the starting symbols is always #0 or as in Rel-14
  - SRS transmission is not supported in these cases

Not treated.
R1-1707298 Uplink partial subframe transmission for FS3 Intel Corporation
R1-1707904 Multiple starting and ending positions for UL Samsung

R1-1708180 Multiple starting and ending positions in a subframe for UL Nokia, Alcatel-Lucent Shanghai Bell
R1-1708785 Multiple starting positions in a subframe for UL Qualcomm Incorporated
R1-1708880 On additional starting and ending points in LAA UL subframe Sequans Communications
R1-1708962 Multiple starting and ending positions for LAA UL Ericsson
R1-1708972 UL additional starting and ending position for LAA WILUS Inc.
R1-1709058 Discussion on multiple starting and ending positions for UL in LAA BROADCOM LIMITED
R1-1709160 Discussion on multiple starting and ending positions for LAA UL LG Electronics
R1-1709457 WF on multiple starting positions in a subframe for uplink in FeLAA Huawei, HiSilicon

6.2.2.3 Other

R1-1707299 Considerations for autonomous uplink access on LAA Scells Intel Corporation
R1-1708963 Autonomous UL access for LAA unlicensed cells Ericsson
R1-1709048 Discussion on Autonomous UL Access for LAA ASUSTEK COMPUTER (SHANGHAI)

6.2.3 3GPP V2X Phase 2 - WID in RP-170798

Rapporteur: Philippe Sartori - Huawei

R1-1709688 Chairman's notes of AI 6.2.3 3GPP V2X Phase 2 Ad-Hoc chair (Huawei)
The document was presented by Philippe Sartori of Huawei.
Decision: The document is endorsed, and content is incorporated as below.

6.2.3.1 Additional PC5 Functionalities

6.2.3.1.1 Carrier Aggregation (up to 8 PC5 carriers)

R1-1708426 On carrier aggregation for sidelink V2x NTT DOCOMO, INC.
R1-1709766 Offline discussion on carrier aggregation Ericsson, Nokia, NEC, NTT Docomo, CATT

Agreement:
- For RAN1, 3 use cases are considered for CA (Note that all use cases may not necessarily be supported):
  - Parallel transmission of MAC PDUs ('parallel' means at the same or different transmission time, but on different carriers). The MAC PDU payloads are different.
  - Parallel transmission of replicated copies of the same packet ('parallel' means at the same or different transmission time, but on different carriers)
    - FFS at which layer replication is done
  - Capacity improvements from the receiver perspective
    - Note: From the receiver's perspective, simultaneous reception over multiple carriers is assumed. From a transmitter's perspective, transmission occurs over a subset of the available carriers
    - For example, capacity could be increased a UE transmits on a single carrier (which can be different for each UE), but receives over all carriers

R1-1709784 [Draft] LS on RAN1 agreements on CA Ericsson
Agreed in R1-1709826

Cross-carrier scheduling:
R1-1708080 Discussion on UE behaviour of mode 4 in case of multiple carriers Panasonic
R1-1707778 Cross-carrier or cross-pool scheduling in PC5 CA NEC

Sensing:
R1-1708786 Carrier Aggregation for V2X Phase 2 Qualcomm Incorporated
R1-1708879 On carrier aggregation on PC5 Ericsson LM

Synchronization:
R1-1707300 Sidelink carrier aggregation for LTE V2V communication Intel Corporation

SA design:
R1-1707447 Discussion on carrier aggregation in V2X Phase 2 CATT

R1-1707034 Discussion on carrier aggregation for R15 sidelink Huawei, HiSilicon
R1-1707211 Considering CA on PC5 carrier ZTE
R1-1707905 Carrier aggregation in V2X Samsung
R1-1707558 Discussion on carrier aggregation in PC5 operation LG Electronics

R1-1709506 WF on sidelink scheduling in PC5 carrier aggregation LG Electronics, ZTE, NTT Docomo, Panasonic
Also supported by Samsung

Agreement:
- In rel. 15 V2X WI, PSCCH and its associated PSSCH are transmitted in same carrier.
- This does not preclude the PSCCH to contain information about other carriers, as long as within the scope of the WID

R1-1709543 WF on Resource selection for carrier aggregation NTT DOCOMO
R1-1709753 WF on Resource selection for carrier aggregation NTT DOCOMO, LG Electronics, ZTE, Panasonic, Qualcomm

Continue discussion on resource selection at RAN1#90.

R1-1709507 WF on synchronization in sidelink CA LG Electronics, NTT Docomo, Intel
R1-1709557 WF on resource selection in V2X CA Samsung
R1-1709531 WF on Carrier Selection in PC5 operation LGE, ZTE

6.2.3.1.2 Support for 64-QAM

R1-1707002 Discussion on supporting 64QAM for R15 sidelink Huawei, HiSilicon
R1-1707212 Support for 64-QAM ZTE
R1-1707301 Support of higher order modulations for LTE V2V sidelink communication Intel Corporation
R1-1707448 Discussion on 64QAM modulation scheme in V2X Phase 2 CATT
R1-1707559 Discussion on 64QAM support in PC5 operation LG Electronics
R1-1707906 High order modulation in V2X Samsung
R1-1708208 Discussion on 64 QAM for LTE V2X Phase 2 Shenzhen Coolpad Technologies
R1-1708787 Support of 64-QAM for 3GPP V2X Phase 2 Qualcomm Incorporated
R1-1708886 On 64QAM modulation operation for Sidelink Communications Ericsson LM
R1-1709524 WF on criterion of using 64QAM LG Electronics, ZTE,…
R1-1709558 WF on 64QAM support Samsung
R1-1709561 WF on 64QAM Support for Sidelink V2V Communication Intel
R1-1709562 WF on 64QAM SCI Signaling Intel

6.2.3.1.3 Other

Including reduction of the maximum time between packet arrival at Layer 1 and resource selected for transmission, and radio resource pool sharing between UEs using mode 3 and UEs using mode 4.

R1-1707106 Discussion on resource pool sharing between Mode 3 and Mode 4 Beijing Xinwei Telecom Techn.
R1-1707107 Discussion on latency reduction of resource selection Beijing Xinwei Telecom Techn.
R1-1707213 Considerations for shared resource pool between mode 3 and mode 4 ZTE
R1-1707302 Resource selection latency reduction for LTE V2V sidelink communication Intel Corporation
R1-1707303 Sharing resource pool for eNB-controlled and UE-autonomous V2V transmission modes Intel Corporation
R1-1707450 Discussion on resource pool sharing between mode 3 and mode 4 CATT
R1-1707560 Discussion on maximum time reduction between packet arrival and selected transmission resource LG Electronics
R1-1707561 Discussion on resource pool sharing between UEs using mode 3 and 4 LG Electronics
R1-1707776 Considerations for latency reduction ZTE
R1-1707779 On radio resource pool sharing NEC
R1-1707907 Discussion on latency smaller than 20 Samsung
R1-1707908 Resource pool sharing among mode 3/4 UEs Samsung
R1-1708081 Discussion on resource pool sharing between UEs in mode 3 and UEs in mode 4 Panasonic
R1-1708192 Discussion on resource pool sharing between Mode 3 and Mode 4 Huawei, HiSilicon
R1-1708193 Discussion on further latency reduction for R15 sidelink Huawei, HiSilicon
R1-1708381 Discussion on the co-existance of mode 3 and mode 4 in V2X ITRI
R1-1708427 Resource pool sharing between UEs using mode 3 and UEs using mode 4 NTT DOCOMO, INC.
R1-1708428 Reducing the maximum time between packet arrival and selected resource for data transmission NTT DOCOMO, INC.
R1-1708788 Reduction of time between packet arrival and transmisison Qualcomm Incorporated
R1-1708938 Reducing time-to-transmit for V2X Ericsson LM
R1-1708942 Radio resource pool sharing between mode 3 and mode 4 UEs Ericsson LM
R1-1709523 WF on reduction of maximum time between packet arrival and transmission LG Electronics, ZTE,…
R1-1709544 WF on resource pool sharing for mode 3 and mode 4 NTT DOCOMO

6.2.3.2 *Feasibility and gain of PC5 operation with Transmit Diversity*

6.2.3.2.1 Transmit diversity solutions

DMRS design

R1-1708966 DMRS design for Rel-15 V2X transmissions with transmit diversity Ericsson LM

Agreement: Legacy Rel-14 DMRS pattern with single antenna port, including time-frequency location, sequence, and cyclic shift, is applied to PSCCH transmission.

R1-1707214 Discussion on transmit diversity solutions on PC5 ZTE (section 2.3 only)
R1-1707451 Discussion on Tx diversity scheme in PC5 CATT (section 2.1 only)

Continue discussion on DMRS design. Questions to answers are:

- FDM vs. CDM
- Whether a Rel-14 DMRS sequence is always transmitted on at least one port
- Whether a new structure is needed
- Whether the RS is precoded or not

R1-1709479 WF on DMRS for V2X TxD CATT, Huawei, HiSilicon, OPPO

Not treated

R1-1707003 Transmit diversity solutions for R15 sidelink Huawei, HiSilicon
R1-1707304 Candidate transmit diversity schemes for LTE V2V sidelink communication Intel Corporation
R1-1707562 Discussion on the transmit diversity scheme for the PC5 operation LG Electronics
R1-1707909 Discussion on transmit diversity scheme for PSSCH in V2X Samsung
R1-1708429 Transmission diversity scheme for PSSCH NTT DOCOMO, INC.
R1-1708558 Transmit diversity schemes for V2X PC5 Nokia, Alcatel-Lucent Shanghai Bell
R1-1708953 Transmit diversity solutions for Rel-15 PSCCH and PSSCH transmissions Ericsson LM

6.2.3.2.2 Initial evaluations

R1-1707004 Evaluation results of transmit diversity solutions for R15 sidelink Huawei, HiSilicon
R1-1707305 Evaluation of candidate transmit diversity schemes for LTE V2V sidelink communication Intel Corporation
R1-1707452 Initial evaluation for Tx diversity schemes in PC5 CATT
R1-1707563 Initial evaluation results for TxD schemes in the PC5 operation LG Electronics
R1-1707910 Evaluation results for Tx diversity for PSCCH Samsung

Working Assumption:

- MMSE-MRC receiver is the baseline for Rel-14 UEs
  - Companies can bring results with advanced receivers for Rel-14 UEs

R1-1709518 WF on Transmit Diversity solutions for R15 sidelink Huawei, HiSilicon, CATT

For PSSCH, further evaluate candidate schemes. Select at RAN1#90 which scheme(s) to support. The following aspects can be taken into account:

- Transparent vs. non-transparent
- MPR increase for SFBC, including whether to take into account the IBE
- Impact on PRR for Rel-14 Ues

Not treated.

R1-1708559 Initial evaluations of transmit diversity schemes for V2X PC5 Nokia, Alcatel-Lucent Shanghai Bell
R1-1709157 Initial evaluation for transmit diversity for V2X Ericsson LM

6.2.3.2.3 Other

R1-1707911 Discusssion on the impacts of Tx diversity transmission Samsung

6.2.3.3 *Feasibility and gain of PC5 operation with Short TTI*

R1-1708969 Short TTI transmission for PC5-based V2X Ericsson LM

6.2.3.3.1 Remaining details of evaluation methodology

R1-1707564 Discussion on remaining details of short TTI evaluation methodology LG Electronics

R1-1707005 Remaining details of evaluation methodology for short TTI in R15 sidelink Huawei, HiSilicon
R1-1707217 Remaining details of evaluation methodology of Short TTI ZTE
R1-1707306 Remaining details of evaluation methodology for LTE V2V sidelink communication using short TTIs Intel Corporation
R1-1708970 Outstanding issues on simulation assumptions for sTTI on PC5 Ericsson LM

R1-1709480 WF on further evaluation methodology for V2X sTTI CATT, Huawei, Hisilicon, OPPO

Agreement:

- Time-varying interference and noise within one subframe is modeled both at link and system level
- Rel-14 UEs do not expect interference variation in time within one subframe
- The impact of transient period of short TTI (sTTI) should be taken into account for study and evaluation of PC5 operation with sTTI.
- Companies should provide assumptions for noise/interference estimation at least for Rel-14 UEs and how it is reflected in the simulation (e.g., link-to-system mapping)

R1-1709532 WF on transient period impact for PC5 operation with Short TTI LGE, Qualcomm

R1-1709526 WF on Open Aspects of Short TTI Evaluation Methodology for V2V Communication Intel, LGE

Agreement:

- ADC quantization errors (AGC impact) are taken into account, if appropriate, in system level evaluations of short TTI performance
- Agree on 10 ADC bits to be used for baseline system level evaluations.
  - Companies can provide results for other ADC resolution
- SQNR curve from R1-1709526 is used to take into account ADC quantization and clipping noise

Working Assumption:

- ADC backoff (BO) is set to -18 dB

Agreement:

- RF saturation modeling:
  - UE calculates RX power level (P1) used for AGC settling
  - UE calculates RX power level (P2) in demodulation symbol
  - If (P2 > P1+Threshold), reception is declared as failed
  - Working Assumption: Threshold = 10 dB

Companies are requested to clarify how the AGC is set according to the ADC model

R1-1709744 WF on additional evaluation assumption for V2X sTTI CATT, CMCC, Huawei, Hisillicon, Nokia, ASB, OPPO, ZTE

Agreement:

- To include the additional mixed transmission scenario for V2X sTTI evaluation assumption
  - Periodicity of 20ms for R15 and periodicity of 100ms for R14 in case of 140km/h
- Percentages of R14 and R15 UEs is 50%-50% for mixed scenario 1 and is up to companies for mixed scenario 2 (must be reported)
- Mixed scenario 2 is lower priority than mixed scenario 1

Traffic model	Periodic broadcast traffic: Mixed scenario 1(supported already in #88bis): • Rel-14: 4 x 190 byte + 1 x 300 byte; 100 ms period; 100 ms latency • Rel-15: 4 x 190 byte + 1 x 300 byte; 100 ms period; 20 ms latency Mixed scenario 2: • Rel-14: 4 x 190 byte + 1 x 300 byte; 100 ms period; 100 ms latency • Rel-15: 4 x 190 byte + 1 x 300 byte; 20 ms period; 20 ms latency Companies can bring results for other traffic models and latency.

6.2.3.3.2 Short TTI solutions

R1-1708789 Study of short TTI for V2X Phase 2 Qualcomm Incorporated
R1-1707307 Considerations on support of short TTI for LTE V2V sidelink communication Intel Corporation
R1-1707453 Discussion on shorten TTI in PC5 CATT
R1-1709000 Short TTI for increasing the reliability for PC5-based V2X Ericsson LM
R1-1708560 Further Discussion On short TTI Nokia, Alcatel-Lucent Shanghai Bell

R1-1707006 Short TTI solutions for R15 sidelink Huawei, HiSilicon
R1-1707108 Discussion on Short TTI in V2X Phase 2 Beijing Xinwei Telecom Techn.
R1-1707565 Discussion on handling Short TTI in PC5 operation LG Electronics
R1-1707777 Discussion on Short TTI with eV2X ZTE
R1-1707912 Discussion on short TTI in V2X Samsung
R1-1709517 WF on short TTI evaluations for R15 sidelink Huawei, HiSilicon, CATT

6.2.3.3.3 Initial evaluations

R1-1707218 Initial evaluations of Short TTI ZTE
R1-1707308 Evaluation of short-TTI LTE-V2V sidelink communication Intel Corporation
R1-1707454 Initial evaluation for shorten TTI in PC5 CATT
R1-1707566 Initial evaluation results for Short TTI in PC5 operation LG Electronics
R1-1708981 Initial evaluation results on sTTI for PC5 Ericsson LM
R1-1709211 Evaluation results of short TTI solutions for Rel-15 sidelink Huawei, HiSilicon
R1-1709481 WF on initial evaluation results conclusion CATT

6.2.4 Further enhancements to CoMP Operation for LTE - *WID in RP-170750*

Rapporteur: Davydov, Alexei – Intel

R1-1709689 Chairman's notes of AI 6.2.4 Further enhancements to Coordinated Multi-Point Operation Ad-Hoc chair (ZTE)
The document was presented by Alexei Davydov of Intel.
Decision: The document is endorsed, and content is incorporated as below.

6.2.4.1 Remaining details on QCL assumptions for DMRS antenna ports

Including control signalling aspects

R1-1707008 QCL assumption for DMRS antenna ports Huawei, HiSilicon
R1-1707142 Remaining details on QCL assumptions for DMRS ZTE
R1-1707309 Remaining details on QCL assumption Intel Corporation
R1-1707913 Remaining details on QCL assumptions for DMRS antenna ports Samsung
R1-1708790 Enhancements to QCL assumptions for DMRS antenna ports Qualcomm Incorporated
R1-1708939 On QCL assumptions for DMRS antenna ports Ericsson

R1-1709390 WF on QCL for FeCoMP Huawei, HiSilicon, Intel, Ericsson, ZTE

Agreements:

- Introduce new QCL type with new QCL assumption for DM-RS antenna port groups
  - New QCL type is configured by RRC
  - New QCL type has the same QCL assumption as QCL type B except for DM-RS antenna ports

        - Regardless of the initial PDSCH transmission or retransmission
            - UE should assume that all DM-RS antenna ports associated with each CW are co-located wrt to all parameters
            - UE should not assume that DM-RS antenna ports associated with different CWs are co-located wrt to all parameters, unless indicated
            - UE is informed regarding QCL assumptions between DM-RS antenna ports and CSI-RS resource
            - Note: Dynamic switching between NC-JT and single point transmission is supported
- New QCL type configuration
    - The existing PDSCH-RE-MappingQCL is extended by allowing configuration of the 2nd set of following parameters
        - CRS port number
        - CRS shift
        - MBSFN configuration
        - ID of ZP CSI-RS ID
        - ID NZP CSI-RS for QCL
    - UE should assume the same PDSCH start for the 1st and 2nd sets
- The number of bits for PDSCH-RE-MappingQCL indication in DCI format 2D is 2 bits (same as in Rel-14)
    - FFS support of more than 2 bits

R1-1709315 WF on the QCL assumption for DM-RS Ports ZTE, Ericsson, Intel, ASTRI, Huawei, HiSilicon

Agreements:
- Support QCL assumption for DM-RS antenna ports as follow:
    - Two CWs
        - 1st CW: DM-RS antenna port (s) associated with 1st CW are QCL-ed with NZP CSI-RS defined by 'ID NZP CSI-RS for QCL' in the 1st set of parameters in PDSCH-RE-Mapping QCL
        - 2nd CW: DM-RS antenna port(s) associated with 2nd CW are QCL-ed with NZP CSI-RS defined by 'ID NZP CSI-RS for QCL' in the 2nd set of parameters in PDSCH-RE-Mapping QCL
    - One CW
        - All DM-RS antenna ports are QCL-ed with NZP CSI-RS defined by 'ID NZP CSI-RS for QCL' in the 1st set of parameters in PDSCH-RE-Mapping QCL

6.2.4.2 Enhancement to PDSCH RE mapping and resource allocation

R1-1707009 Enhancement to PDSCH RE mapping and resource allocation for non-coherent JT Huawei, HiSilicon
R1-1707143 Enhnacements on control signaling related to PDSCH RE mapping and resource allocation ZTE
R1-1707188 Discussion on enhancement to resource allocation for NC-JT ASTRI
R1-1707310 On the need of PDSCH RE mapping and RA enhancements Intel Corporation
R1-1707914 Enhancement to PDSCH RE mapping and resource allocation Samsung
R1-1708791 Enhancements to control signaling Qualcomm Incorporated
R1-1708943 On enhancements to PDSCH RE mapping and resource allocation Ericsson

R1-1709374 WF on the PDSCH RE mapping for TM10 Intel

Agreements:
- PDSCH RE mapping for new QCL type
    - Two CWs
        - 1st CW: PDSCH layers associated with 1st CW follows PDSCH RE mapping according to the 1st set of parameters in PDSCH-RE-MappingQCL
        - 2nd CW: PDSCH layers associated with 2nd CW follows PDSCH RE mapping according to the 2nd set of parameters in PDSCH-RE-MappingQCL
    - One CW
        - PDSCH layers associated with CW follows PDSCH RE mapping according to the 1st set of parameters in PDSCH-RE-MappingQCL
- FFS whether to support PDSCH RE mapping around two sets of PDSCH RE parameters in PDSCH-RE-MappingQCL

Possible agreements:
- Resource allocation
    - Alt 1: Fully overlapping RA from different CWs
        - Supported by: Samsung, QC, Softbank, Ericsson, Nokia, ASB
    - In addition to Alt 1 support of non overlapping RA from different CWs

- Supported by: ZTE, IAESI, ASTRI, Huawei, HiSilicon, Intel

Agreements:
- Fully overlapping RA from different CWs is supported
- FFS additional support of non overlapping RA from different CWs taking into account the following issues:
  - Performance of non overlapping RA comparing to the existing CoMP schemes
  - DCI payload

R1-1709316 WF on DMRS port to layer mapping for NC-JT Ericsson, Huawei, HiSilicon, Intel

Possible agreements:
- When NC-JT transmission is indicated in PQI, the following DMRS port to layer mapping is used
  - Note: This implies that layers corresponding to different CWs are mapped to FDMed DMRS ports for rank 3-8. Rank-2 port mapping is the same as legacy to maintain DMRS overhead.

Rank	DMRS-to-layer mapping	
	DMRS group1 (CW1)	DMRS group2 (CW2)
1	N/A	
2	7	8
3	7	9, 10
4	7, 8	9, 10
5	7, 8	9, 10, 12
6	7, 8, 11	9, 10, 12
7	7, 8, 11	9, 10, 12, 14
8	7, 8, 11, 13	9, 10, 12, 14

Conclusion:
- Continue discussion on DMRS port to layer mapping for NC-JT on RAN1#90

6.2.4.3 Enhancement to CSI feedback

R1-1707010 CSI measurement and reporting for non-coherent JT Huawei, HiSilicon
R1-1707144 Enhancements to CSI feedback ZTE
R1-1707311 CSI enhancements for NC-JT Intel Corporation
R1-1707915 Enhancement to CSI feedback Samsung
R1-1708792 Enhancements to CSI feedback Qualcomm Incorporated
R1-1708995 On CSI feedback enhancements supporting non-coherent JT Ericsson
R1-1709392 WF on Enhancement to CSI Feedback Samsung, Ericsson, LGE

Possible agreements:
- No inter-dependency between CSI processes is supported in R15 feCoMP.
- At least aperiodic reporting should be supported in Rel-15 feCoMP. High layer configuration, DCI triggering bits design and feedback reporting overhead reduction are FFS.

R1-1709391 WF on CSI measurement and feedback for non-coherent JT Huawei, HiSilicon, ZTE, Intel

Possible agreements:
For CSI measurement and reporting,
- Support inter-layer interference measurement for CSI calculation
  - Using NZP CSI-RS resource for interference measurement
    - In case of multiple CSI processes, dependency between multiple CSI processes is introduced for interference measurement

Conclusion:
- Email discussion on CSI feedback enhancements for NC-JT from 28th July to 11th August – Alexei (Intel)

6.2.4.4 Other

R1-1707225 NCJT on TM9 SoftBank Corp.
R1-1708289 Support of NC-JT in TM9 Intel Corporation

6.2.5 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - *WID in RP-170838*

Rapporteur: Xiao, Weimin - Huawei

R1-1709690 Chairman's notes of AI 6.2.5 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE Ad-Hoc chair (Huawei)
The document was presented by Weimin Xiao of Huawei.
Decision: The document is endorsed, and content is incorporated as below.

6.2.5.1 *Support for 1024QAM for DL channels*

Including at least the study of the feasibility and performance benefit for 1024QAM for DL channels

R1-1707186 Performance evaluation of 1024QAM ZTE
R1-1707312 1024QAM link level evaluation results Intel Corporation
R1-1709196 Evaluation results for 1024QAM Qualcomm Incorporated
Updated from R1-1708793
R1-1708196 Evaluation on DL 1024 QAM Huawei, HiSilicon

R1-1709395 Summary of evaluation on DL 1024 QAM Huawei, HiSilicon, Qualcomm

Agreements: ***Observations based on the results submitted for RAN1#89:***

- *With increased number of receiving antennas, the crossover SNR is decreased.*
- *With increased TX/RX EVM, the crossover SNR is increased.*
- *The gains provided by 1024QAM are higher in scenarios with LOS component.*
- *The crossover SNR is lower for scenarios with LOS component.*
- *For 2T2R under TDL-A/B channel, 1024QAM provides performance gain of 3%~10% at 40dB for TX EVM less than or equal to 2%.*
- *For 2T4R under TDL-A/B channel, 1024QAM provides performance gain of 10%~22% at 35dB for TX EVM less than or equal to 2%.*
- *For 2T8R under TDL-B/D channel, 1024QAM starts to provide performance gain at 24~28dB for TX EVM less than or equal to 2%.*
- *For 2T2R under TDL-D/E channel with correlated LOS, 1024QAM provides performance gain of 0-11% at 30dB SNR for TX EVM less than or equal to 2%*
- *For 2T4R under TDL-D/E channel with correlated LOS, 1024QAM provides performance gains of 11-16% at 30dB SNR for TX EVM less than or equal to 2%*
- *For 2T2R under TDL-D/E channel with uncorrelated LOS, 1024QAM provides performance gain of 0-19% at 30dB SNR for Tx EVM less than or equal to 2%*
- *For 2T4R under TDL-D/E channel with uncorrelated LOS, 1024QAM provides performance gain of 8-22% at 30dB SNR for Tx EVM less than or equal to 2%*
- *For 2T2R and 2T4R TDL-D/E channel with uncorrelated LOS, 1024QAM provides performance gains of 16-22% gain at 35dB SNR*
- *For 2T8R TDL-D channel, 1024QAM provides performance gains of 12.8%~21% at 35dB SNR for TX EVM less than or equal to 2%*
- *For 2T2R TDL-A, 1024QAM doesn't provide performance gains over 256QAM when 2 MIMO layer for Tx/Rx EVMs of {3,1.5}%*
- *For 2T2R TDL-A, 1024QAM doesn't provide performance gains over 256QAM when 2 MIMO layer for Tx/Rx EVMs of {3,3}%*
- *For 2T2R TDL-A, 1024QAM, the peak spectral efficiency of 1024QAM has not been observed for {3,1.5}% Tx/Rx*

Conclusions:

- *Capture the observations in the TR*
- *Capture in the TR the evaluation results from contributions for RAN1#88bis and #89. Editor to provide an updated TR before RAN1#90.*
  - *May exclude results that are not aligned with the agreed assumptions.*

Email discussion until 25th May about TR evaluation results – Yubo (Huawei)

Not treated.
R1-1707011 Discussion on support of DL 1024QAM Huawei, HiSilicon
R1-1707313 System-level evaluation assumption for 1024QAM Intel Corporation

6.2.5.2 DMRS overhead reduction

Including at least initial design considerations for DM-RS overhead reduction using OCC4 for DL SU-MIMO rank3/4 in TM9/10

R1-1707012 Discussion on DM-RS Overhead Reduction Huawei, HiSilicon
R1-1708377 Signaling design for DM-RS overhead reduction China Telecommunications
R1-1708742 Design considerations for DM-RS overhead reduction Nokia, Alcatel-Lucent Shanghai Bell

R1-1709415 WF on DMRS density reduction Huawei, HiSilicon, China Telecom
Also supported by Qualcomm

Agreements:

- New entries in DMRS table to support DMRS density reduction
  - At least including the following entries in DMRS table at least for two enabled CWs.
    - 3 layers, ports 7,8,11 (OCC=4)
    - 4 layers, ports 7,8,11,13 (OCC=4)
    - FFS: also for one enabled CW case
    - This applied to both TM9 and 10
    - FFS: new DMRS table or modification based on legacy table
  - FFS: introducing n_scid for MU-MIMO
- FFS: Additional DMRS overhead reduction scheme for rank 3/4 transmission

R1-1707187 Considerations for LTE Downlink DMRS Overhead Reduction ZTE
R1-1707314 Overhead reduction for DM-RS Intel Corporation
R1-1708794 Reduced DMRS overhead Qualcomm Incorporated

6.2.6 Even further enhanced MTC for LTE - *WID in RP-170732*

Rapporteur: Bergman, Johan - Ericsson

R1-1709691 Chairman's notes of AI 6.2.6 Even further Enhanced MTC for LTE Ad-Hoc chair (Ericsson)
The document was presented by Johan Bergman of Ericsson.
Decision: The document is endorsed, and content is incorporated as below.

6.2.6.1 Reduced system acquisition time

Improved cell search and/or system information (including MIB and SIB1-BR) acquisition performance

R1-1706881 Reduced system acquisition time for MTC Ericsson
R1-1707017 Cell search and system information acquisition improvements in eFeMTC Huawei, HiSilicon
R1-1707090 Discussion on system acquisition time reduction for MTC ZTE
R1-1707567 System information acquisition time enhancement in MTC LG Electronics
R1-1707861 Reducing system acquisition time for efeMTC Nokia, Alcatel-Lucent Shanghai Bell
R1-1707917 Enhanced synchronization signals for efeMTC Samsung
R1-1708245 Synchronisation channels for efe-MTC Sony
R1-1708310 Reduced PSS/SSS Acquisition Time Analysis Sierra Wireless, S.A.
R1-1708363 System acquisition time reduction for efeMTC Intel Corporation
R1-1708795 Reduced system acquisition time Qualcomm Incorporated
R1-1709472 Reduced system acquisition time for MTC Ericsson

R1-1709364 WF on reduced system acquisition time ZTE, Nubia, Sony
R1-1709471 WF on Reduced MIB acquisition time for MTC Ericsson, Nokia, ASB
R1-1709514 WF on improved cell acquisition for eMTC Qualcomm

RAN1#88bis agreements:

- Techniques for system acquisition time reduction to be considered:
  - PSS/SSS
    - Enhanced (e.g. repeated) PSS/SSS based on PSS/SSS or NPSS/NSSS design
    - Use of NPSS/NSSS on NB-IoT anchor carrier
  - PBCH
    - Enhanced (e.g. repeated) PBCH based on PBCH or NPBCH design
    - Use of NPBCH on NB-IoT anchor carrier
    - Combining across 40-ms PBCH periods (unless already part of Rel-14 demodulation requirements)
    - New mechanism allowing to skip MIB message reading
  - SIB1-BR

- Additional repetitions of SIB1-BR
- Accumulation across SIB1-BR modification periods (unless already part of Rel-14 demodulation requirements)
- New mechanism allowing to skip SIB1-BR reading
  - E.g. SI update indication or other indication in MIB or another channel

- SI messages
  - Additional repetitions of SI messages
  - New mechanism allowing to skip SI message reading
    - E.g. SI update indication or other indication in MIB or another channel

Agreement:
- In addition to the techniques for system acquisition time reduction agreed to be considered in RAN1#88bis, the following technique can be considered:
  - SI messages
    - Accumulation across SI modification periods

Draft LS in **R1-1709467** (Ericsson) to RAN2 and RAN4 to ask for feedback on techniques under consideration.
R1-1709474 [DRAFT] LS on System acquisition time reduction for Rel-15 LTE MTC Ericsson
Agreed in R1-1709834.

6.2.6.2 Downlink channel power efficiency

Study and, if found beneficial for idle mode paging and/or connected mode DRX, specify physical signal/channel that can be efficiently decoded or detected prior to decoding the physical downlink control/data channel.

R1-1706882 Downlink channel power efficiency for MTC Ericsson
R1-1707018 On 'wake-up signal' for eFeMTC Huawei, HiSilicon
R1-1707101 Power consumption reduction for physical channels for MTC ZTE
R1-1707223 Motivation of paging power consumption reduction for efeMTC SoftBank Corp.
R1-1707315 Analysis of impact of Wake-up signaling on power consumption and resource efficiency for efeMTC Intel Corporation
R1-1707455 UE wakeup mechanism and on-demand access for efeMTC UE power saving CATT
R1-1707568 UE power consumption reduction by new physical signal/channel in MTC LG Electronics
R1-1707688 Considerations on the DL power consumption reduction for efeMTC Guangdong OPPO Mobile Telecom.
R1-1707862 Signalling for efficient decoding of physical channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1708246 Power consumption evaluation of wake-up signal technique Sony
R1-1708311 Idle Mode Power Efficiency Reduction Sierra Wireless, S.A.
R1-1708796 Efficient monitoring of DL control channels Qualcomm Incorporated
R1-1709284 DL power consumption reduction for eMTC Samsung

R1-1709466 WF on power saving signal in MTC Ericsson

Agreement:
- A physical signal/channel indicating whether the UE needs to decode subsequent physical channel(s) is introduced, at least for idle mode paging. Candidates for the signal/channel are:
  - Wake-up signal or DTX
  - Go-to-sleep signal or DTX
  - Wake-up signal with no DTX
  - Downlink control information
  - FFS whether synchronization to the camped-on cell is assumed for detecting/decoding WUS/GTS, depending on the (e)DRX cycle length
  - Design details are FFS
- Connected mode DRX is FFS

R1-1709470 WF on the impact of power saving signal on paging reliability for MTC Ericsson, Intel, Sony

Agreement:
- The impact of the physical signal/channel, on Idle mode physical layer paging performance (missed paging detection and paging reception latency) should be studied and reported with the physical signal/channel design.
- The current paging mechanism is used as the baseline for evaluation.

6.2.6.3 Uplink HARQ-ACK feedback

Study and, if found beneficial for connected mode, specify physical signal/channel/DCI for HARQ-ACK feedback in DL for data transmission in UL.

R1-1706883	Uplink HARQ-ACK feedback for MTC	Ericsson
R1-1707091	Detailed design on UL HARQ-ACK feedback enhancement for MTC	ZTE
R1-1707316	HARQ-ACK feedback for efeMTC UL transmission	Intel Corporation
R1-1707569	Discussion on early termination of uplink repetitions for MTC	LG Electronics
R1-1707689	Discussion on UL HARQ-ACK feedback	Guangdong OPPO Mobile Telecom.
R1-1707774	Design of uplink HARQ-ACK feedback for efeMTC	Lenovo, Motorola Mobility
R1-1707863	Uplink HARQ-ACK feedback in efeMTC	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708248	On early uplink early termination of PUSCH repetitions	Sony
R1-1708430	Views on UL HARQ-ACK feedback design	NTT DOCOMO, INC.
R1-1708797	**Uplink HARQ-ACK feedback**	**Qualcomm Incorporated**
R1-1707019	**On HARQ-ACK feedback for PUSCH in eFeMTC**	**Huawei**
R1-1707919	**Uplink HARQ-ACK feedback for eMTC**	**Samsung**
R1-1709541	**WF on UL HARQ-ACK feedback**	**ZTE, Nubia, Huawei, HiSilicon, Ericsson, Lenovo**

Agreement: If explicit UL HARQ-ACK feedback is supported, it is based on MPDCCH.

6.2.6.4 Increased PDSCH spectral efficiency

Specify optional support for 64QAM for unicast PDSCH (no UE peak rate increase is intended).

R1-1706884	Increased PDSCH spectral efficiency for MTC	Ericsson
R1-1707020	Remaining details for supporting 64QAM for unicast PDSCH	Huawei, HiSilicon
R1-1707092	Details on support of 64QAM for unicast PDSCH for MTC	ZTE
R1-1707317	PDSCH spectral efficiency increase for efeMTC	Intel Corporation
R1-1707864	Increasing PDSCH spectral efficiency in efeMTC	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708798	Increased PDSCH spectral efficiency	Qualcomm Incorporated
R1-1709292	**WF on increased PDSCH spectral efficiency**	**Huawei, HiSilicon**

Agreement:

- A capability is introduced for Rel-15 BL/CE UEs for the support of 64QAM.
- For Rel-15 BL/CE UEs, when 64QAM is enabled via higher layer configuration,
  - When the DCI indicates no PDSCH repetition,
    - The MCS field in DCI format 6-1A UE-specific search space is extended to 5 bits by reinterpreting the frequency hopping flag as the MSB
      - The size of DCI format 6-1A is not changed.
    - The modulation and TBS index table is reused from Table 7.1.7.1-1 in TS 36.213.
    - The TBS is determined using Table 7.1.7.2.1-1 in TS 36.213 with the following restriction:
      - The max TBS in Rel-14 is used wherever the TBS value in Table 7.1.7.2.1-1 exceeds the max TBS in Rel-14.

Working assumption:

- For Rel-15 BL/CE UEs, when 64QAM is enabled via higher layer configuration,
  - The CQI table is as below.

CQI index	modulation	code rate x 1024 x R^{CSI}	efficiency x R^{CSI}
0	out of range		
1	QPSK	40	0.0781
2	QPSK	78	0.1523
3	QPSK	120	0.2344
4	QPSK	193	0.3770
5	QPSK	308	0.6016
6	QPSK	449	0.8770
7	QPSK	602	1.1758
8	16QAM	378	1.4766
9	16QAM	490	1.9141
10	16QAM	616	2.4063
11	64QAM	466	2.7305
12	64QAM	567	3.3223
13	64QAM	666	3.9023
14	64QAM	772	4.5234
15	64QAM	873	5.1152

6.2.6.5 *Increased PUSCH spectral efficiency*

E.g. sub-PRB resource allocation, with no less than 3 subcarriers within a sub-PRB allocation

R1-1706885 Increased PUSCH spectral efficiency for MTC Ericsson
R1-1707093 Discussion on increased PUSCH spectral efficiency for MTC ZTE
R1-1707318 PUSCH spectral efficiency increase for efeMTC Intel Corporation
R1-1707865 Increasing PUSCH spectral efficiency in efeMTC Nokia, Alcatel-Lucent Shanghai Bell
R1-1708249 PUSCH spectral efficiency techniques for efeMTC Sony
R1-1708312 PUSCH Spectral Efficiency Solution Analysis Sierra Wireless, S.A.
R1-1708366 Increased PUSCH spectral efficiency for efeMTC Sharp
R1-1708799 Increased PUSCH spectral efficiency Qualcomm Incorporated
R1-1708853 On UL spectral efficiency enhancement Huawei, HiSilicon
R1-1708873 Discussion on UL and overall spectral efficiency improvement using MU-MIMO Sequans Communications

R1-1709542 WF on UL Spectral Efficiency for eMTC Sierra Wireless, Ericsson, ZTE, Nubia, Intel, LGE
Also supported by Nokia, ASB, Sony, Qualcomm, Sharp

Agreement:
- MU-MIMO enhancements will not be specified as part of this WI.
- At least one of the following techniques to improve UL spectral efficiency will be supported as part of this WI:
  - Sub-PRB allocation (with or without increased DMRS density)
  - CDMA (with or without increased DMRS density)
- Support for switching between LTE and NB-IoT air interfaces can be further considered.

6.2.6.6 *Other*

Note that data transmission during the random access procedure will be treated with lower priority until RAN2 begins work after RAN#76

R1-1706886 Early data transmission for MTC Ericsson
R1-1707097 On early data transmission for eMTC ZTE
R1-1707570 Data transmission during random access procedure in MTC LG Electronics
R1-1708071 Data transmission during random access procedure Nokia, Alcatel-Lucent Shanghai Bell
R1-1708198 On early data transmission for eFeMTC Huawei, HiSilicon
R1-1708800 Early data transmission Qualcomm Incorporated

R1-1709469 WF on Early data transmission for MTC Ericsson, Huawei, HiSilicon

Agreement: From RAN1 perspective, it is beneficial to support early data transmission for BL/CE UEs with any CE level or coverage.

R1-1709475 [DRAFT] LS on early data transmission in MTC and NB-IoT Ericsson

Agreed in R1-1709835

R1-1708269	Flexible PDSCH/PUSCH resource allocation for MTC	Ericsson LM
R1-1709468	WF on Flexible PDSCH/PUSCH resource allocation for MTC	Ericsson, Orange
R1-1707100	Discussion on CRS muting for MTC	ZTE
R1-1708801	Modulation enhancements for eMTC	Qualcomm Incorporated
R1-1708937	Aspects of Small Batteries for Even Further Enhanced MTC	Sony Europe Limited

6.2.7 Further NB-IoT enhancements - *WID in RP-170852*

Rapporteur: Matthew Webb - Huawei

R1-1709692 Chairman's notes of AI 6.2.7 Further enhancements of NB-IoT Ad-Hoc chair (Huawei)
The document was presented by Matthew Webb of Huawei.
Decision: The document is endorsed, and content is incorporated as below.

Friday:
VEOLIA, involved in the smart water market business was invited to introduce their proposal for hosting an additional ad-hoc meeting on NB_IOT – could be a 3 days meeting from 10th to 12th July 2017 (possible location in ETSI premises in Sophia Antipolis – France).
RAN1 chair commented that final decision is out of RAN1 scope and will require confirmation by RAN plenary
LGE: very interested in this business / welcomed the idea of an ad-hoc but suggested looking at other options like increasing the meeting time (TUs) on NB_IOT during the upcoming ordinary meetings
RAN1 chair added that an updated WID needs to be discussed (at next RAN/RAN1 meeting)
Qualcomm: it would be good clarifying the scope of this ad-hoc (agenda)
Huawei: from rapporteur's perspective, fine having an ad-hoc – response to Qualcomm is that the agenda should cover the open issues listed in the WI status report
Ericsson: similar view as Qualcomm, understands that RAN2 should also get involved
LGE: Note that July is a vacation period – wants to see the updated WID
Nokia: topic should by raised at plenary – RAN should manage the overall work plan of the WGs, where all possible options should be studied
CMCC: also interested but noted that the late notice about it makes very difficult to attend it (dynamic travelling schedule should be avoided)
Vodafone: the agenda should cover both Rel-14 and Rel-15 (possible enhancements)
Nokia: Involvement of RAN4 may also become an issue
RAN1 Chair thanked VEOLIA for the proposal – topic is postponed to next RAN plenary.

6.2.7.1 *Latency and power consumption reduction*

6.2.7.1.1 Power consumption reduction for paging and connected-mode DRX

Physical signal/channel that can be efficiently decoded or detected prior to decoding NPDCCH/NPDSCH.

Evaluations
R1-1708802 Efficient monitoring of DL control channels Qualcomm Incorporated
R1-1707319 Analysis of impact of Wake-up signaling on power consumption and resource efficiency for feNB-IoT Intel Corporation
R1-1708247 Power consumption evaluation of wake-up signal technique Sony
Section 3
R1-1708072 Signalling for efficient decoding of physical channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1707021 On 'wake-up signal' for paging and connected-mode DRX Huawei, HiSilicon
Section 5

Agreements:
- A physical signal/channel indicating whether the UE needs to decode subsequent physical channel(s) is introduced, at least for idle mode paging. Candidates for the signal/channel are:
  - Wake-up signal or DTX
  - Go-to-sleep signal or DTX
  - Wake-up signal with no DTX
  - Downlink control information
  - FFS whether synchronization to the camped-on cell is assumed for detecting/decoding WUS/GTS, depending on the (e)DRX cycle length
  - Design details are FFS
- Connected mode DRX is FFS

Design

R1-1706887 Power consumption reduction for paging and connected-mode DRX for NB-IoT Ericsson
Section 5

R1-1709552 WF on the impact of power saving signal on paging reliability in NB-IoT Ericsson

Agreements:

- The impact of the physical signal/channel, on Idle mode physical layer paging performance (missed paging detection and paging reception latency) should be studied and reported with the physical signal/channel design.
- The current paging mechanism is used as the baseline for evaluation.

R1-1707021 On 'wake-up signal' for paging and connected-mode DRX Huawei, HiSilicon
Section 2,3,4

R1-1709161 Discussion on wake-up signal for power consumption reduction for feNB-IoT Sequans Communications (Revision of R1-1707781)
R1-1707102 Power consumption reduction for physical channels for NB-IoT ZTE
R1-1709285 Power saving for paging and connected-mode DRX for NB-IoT Samsung (Revision of R1-1707920)
R1-1707571 UE power consumption reduction by new physical signal/channel in NB-IoT LG Electronics
R1-1707224 Motivation of paging power consumption reduction for feNB-IoT SoftBank Corp.
R1-1707690 Considerations on the DL power consumption reduction for feNB-IoT Guangdong OPPO Mobile Telecom.
R1-1707456 UE wakeup mechanism and on-demand access for fNB-IoT UE power saving CATT

R1-1709371 WF on power saving signal in NB-IoT Huawei, HiSilicon
R1-1709367 WF on Power Consumption Reduction for NB-IoT ZTE, Nubia
R1-1709605 WF on evaluation for power saving physical/signal channel LG

Recommendations for evaluations:

- In the evaluation of new physical signal/channel indicating whether the UE needs to decode subsequent physical channel(s), provide assumptions on the followings based on the link level simulation
  - Required amount of time units (e.g. subframe, symbol) for the new physical signal/channel transmission
  - Required amount of time units (e.g. subframe, symbol) for subsequent NPDCCH/NPDSCH transmission

6.2.7.1.2 Physical layer scheduling request

R1-1707022 On physical layer SR Huawei, HiSilicon
R1-1708803 Physical layer scheduling request Qualcomm Incorporated
R1-1707320 Design of scheduling request for feNB-IoT Intel Corporation
R1-1708073 Design of physical layer SR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708431 Discussion on SR design for NB-IoT NTT DOCOMO, INC
R1-1706888 Physical layer scheduling request for NB-IoT Ericsson
R1-1707094 Physical layer scheduling request design for NB-IoT ZTE
R1-1707572 Scheduling request by dedicated physical channel in NB-IoT LG Electronics
R1-1707921 Discussion on scheduling request for NB IoT Samsung

R1-1709368 WF on Physical layer SR ZTE, Nubia

Agreements:

- Piggybacked SR with HARQ-ACK is chosen between the following options, with evaluations encouraged at RAN1#90:
  - Option 1: QPSK-based constellation
  - Option 3: Cover code/Orthogonal sequence on ACK/NACK data symbols and/or DM-RS symbols

R1-1709213 Way forward on evaluation scenarios of physical layer SR in NB-IoT Ericsson
R1-1709611 Way forward on physical layer SR in NB-IoT Huawei, HiSilicon, Qualcomm, Nokia, ASB, ZTE

6.2.7.1.3 Semi-persistent scheduling

R1-1706889 Semi-persistent scheduling for NB-IoT Ericsson
R1-1707023 On support of semi-persistent scheduling Huawei, HiSilicon

R1-1708074 Support for semi-persistent scheduling in NB-IoT Nokia, Alcatel-Lucent Shanghai Bell
R1-1707321 Support of semi-persistent scheduling for feNB-IoT Intel Corporation

R1-1707573 SPS support in NB-IoT LG Electronics
R1-1707922 New SPS mechanism for power saving Samsung
R1-1708804 Semi-persistent scheduling Qualcomm Incorporated

R1-1709394 WF on SPS for NB-IoT Samsung
R1-1709214 Way forward on evaluation scenarios of Semi-persistent scheduling in NB-IoT Ericsson

6.2.7.2 Narrowband measurement accuracy improvements

R1-1706890 Narrowband measurement accuracy improvements for NB-IoTEricsson
R1-1708805 Improvement of PHY measurements Qualcomm Incorporated
R1-1707024 Further consideration on narrowband measurement accuracy improvement Huawei, HiSilicon

R1-1707098 Narrowband Measurement accuracy improvement for NB-IoT ZTE
R1-1707574 RRM measurement enhancement in NB-IoT LG Electronics
R1-1708075 Improving measurement accuracy in NB-IoT Nokia, Alcatel-Lucent Shanghai Bell

R1-1709372 Way forward on narrowband measurement accuracy enhancement Huawei, HiSilicon

Agreements:

- For connected mode in the serving cell and idle mode in camped cell and neighbour cells, it is feasible from RAN1 point of view to use NSSS on an anchor carrier for RRM measurement
  - RAN4 are requested to consider if NSSS is a suitable transmission
  - How to use, i.e. if and/or under what circumstances to combine NRS with NSSS depend on RAN4 study
  - Send an LS containing the above to RAN4, including the agreement from RAN1#88bis that "At least NSSS is used additionally to NRS for in-band, guard-band, standalone"
- Continue to study
  - CRS for in-band operation mode
  - NPBCH, NPDCCH, NPDSCH on an anchor carrier in the serving cell

R1-1709592 Draft LS on narrowband measurement accuracy enhancement Huawei
The draft LS in R1-1709592 is agreed, final LS in R1-1709781.

R1-1709304 WF on NSSS-based measurement accuracy enhancement LG Electronics
Also supported by ZTE – further updated in R1-1709678.

Working assumption, confirmation depending on RAN4 feedback:

- For NSSS-aided measurement accuracy enhancement at least in idle mode, the NSSS-NRS EPRE ratios of serving cell and neighbour cells are signaled to UE by higher layers.
  - FFS on details of sets of power offset (e.g., {-3, …, 0, …, 3} in dB}
  - FFS on power offset information per-neighbor cell or common for all neighbor cells or common for serving cell and neighbor cells.
  - The possibility to use NSSS is indicated by higher layers.
  - Detailed signaling design would be left to RAN2.

6.2.7.3 NPRACH false alarm and cell range enhancements

R1-1707105 Summary of email discussion for NPRACH reliability simulation assumptions ZTE

Cell range enhancements
R1-1708806 NPRACH support for large cell access Qualcomm Incorporated
R1-1707025 On support of larger cell radius for NPRACH Huawei, HiSilicon
R1-1707104 NPRACH range enhancements for NB-IoT ZTE
R1-1707575 NPRACH range enhancement for NB-IoT LG Electronics

R1-1706892 NPRACH range enhancement for NB-IoT Ericsson
R1-1708076 NPRACH cell range enhancement Nokia, Alcatel-Lucent Shanghai Bell

R1-1709369 WF on NPRACH range enhancement ZTE, Nubia, Ericsson
R1-1709590 Way forward on NPRACH cell range enhancement Huawei, HiSilicon, Qualcomm

Agreements:

- To support of cell range of at least 100 km, FFS between:

- Cat 1: Rel-13 NPRACH
- Cat 2: Sharing the same NPRACH resources as Rel-13 NPRACH formats, with symbol or symbol-group level scrambling; maintaining feasibility of FFT processing and orthogonality of preambles on different tones
  - CP length FFS between same as or longer than Rel-13 formats
- Cat 3: New NPRACH numerology with CP length FFS between same as or longer than Rel-13 formats
  - Option A: 1.25 kHz subcarrier spacing with minimum hop distance of 1.25 kHz
  - Option B: 3.75 kHz subcarrier spacing with minimum hop distance 1.25 kHz
  - Option C: 3.75 kHz subcarrier spacing with minimum hop distance 3.75 kHz with new hopping pattern
- Combinations of Category 2 and Category 3 solutions are not precluded

False alarm enhancements

R1-1707026 On NPRACH false alarm probability due to inter-cell interference Huawei, HiSilicon
R1-1706891 NPRACH false alarm reduction for NB-IoT Ericsson

R1-1707103 NPRACH reliability enhancement for NB-IoT ZTE
R1-1707576 NPRACH reliability for NB-IoT LG Electronics

R1-1709370 WF on NPRACH reliability enhancement ZTE, Nubia, Ericsson
R1-1709635 WF on NPRACH Reliability Enhancements Qualcomm

Agreements:
For reduction of NPRACH false alarm probability, FFS between:

- Alt 1: Sharing the same NPRACH resources as Rel-13 NPRACH formats, with symbol or symbol-group level scrambling; maintaining feasibility of FFT processing and orthogonality of preambles on different tones
- Alt 2: A frequency shift of k*0.75 kHz is applied to all NPRACH signal in a Cell.
  - FFS k=[-2, -1, 0, 1, 2] or [-2, -1 1 2].
  - FFS if to apply a phase rotation of m*pi/2 with m=0,1,2,3 is applied to the 4th symbol group of each repetition.
  - Signaling of the above frequency shift and phase rotation is FFS.
- Alt 3: 3.75 kHz subcarrier spacing with minimum hop distance 3.75 kHz with new hopping pattern
- Combinations of the above alternatives are not precluded

R1-1709747 WF on NPRACH range enhancement LG Electronics, ZTE

6.2.7.4 NB-IoT small cell support

R1-1707923 Power control for extended coverage UE Samsung
R1-1708077 Small cell support in NB-IoT Nokia, Alcatel-Lucent Shanghai Bell
R1-1707577 UL power control enhancement for NB-IoT small cell LG Electronics

R1-1706893 NB-IoT small cell support Ericsson
R1-1707099 On small cell support for NB-IoT ZTE
R1-1708199 On the support of NB-IoT small cell Huawei, HiSilicon
R1-1708807 Support of small cells Qualcomm Incorporated

R1-1709215 Way forward on UL power control in NB-IoT small cell support Ericsson, Samsung
R1-1709218 Way forward on coverage in NB-IoT small cell Ericsson

Agreements:

- The number of repetitions in the DL and UL for small cells is not increased
  - NOTE: This may imply a reduction in MCL for small cells compared to wide area basestations.
  - Inform RAN4
- FFS other aspects of small cells to identify possible RAN1 impacts.

R1-1709679 [DRAFT] LS on NB-IoT small cell Ericsson

- The draft LS is agreed, final LS in R1-1709780

6.2.7.5 Reduced system acquisition time

R1-1706894 Reduced system acquisition time for NB-IoT Ericsson
R1-1707578 System information acquisition time enhancement in NB-IoT LG Electronics
R1-1707027 On cell search and system acquisition time improvement Huawei, HiSilicon
R1-1707095 Consideration on system acquisition time reduction for NB-IoT ZTE

R1-1708364 System acquisition time reduction for feNB-IoT Intel Corporation
R1-1708078 Reducing system acquisition time for feNB-IoT Nokia, Alcatel-Lucent Shanghai Bell
R1-1708808 Reduced system acquisition time Qualcomm Incorporated
R1-1707109 Reduced system acquisition time for FeNB-IoT Beijing Xinwei Telecom Techn.
R1-1707775 Design of reducing system acquisition time for FeNB-IoT Lenovo, Motorola Mobility

R1-1709591 Way forward on reduced system acquisition time Huawei, HiSilicon, Neul

Agreements:

- Additional transmissions of NPSS/NSSS in subframes other than those used in Rel-13 for in-band, guard-band and standalone are not considered in Rel-15 for an anchor carrier
  - FFS: NPSS/NSSS transmission using unused 3-OFDM symbols in existing subframe#5,9 on anchor carrier at least for stand-alone and guard band modes

R1-1709216 Way forward on reduced system acquisition time in NB-IoT Ericsson

6.2.7.6 Other

Note that data transmission during the random access procedure will be treated with lower priority until RAN2 begins work after RAN#76.

R1-1706895 Early data transmission for NB-IoT Ericsson
R1-1707096 On early data transmission for NB-IoT ZTE
R1-1707579 Data transmission during random access procedure in NB-IoT LG Electronics
R1-1708079 Data transmission during random access procedure Nokia, Alcatel-Lucent Shanghai Bell
R1-1708200 On early data transmission for NB-IOT Huawei, HiSilicon
R1-1708809 Modulation enhancements for NB-IoT Qualcomm Incorporated
R1-1708810 Early data transmission Qualcomm Incorporated

Agreement:

- From RAN1 perspective, it is beneficial to support early data transmission for NB-IoT UEs with any coverage.
- Include the NB-IoT agreement in the draft LS R1-1709475.

6.2.8 Enhanced Support for Aerial Vehicles - *WID in RP-170779*

RAN2 lead SI – Rapporteurs: Wuri A. Hapsari (RAN2) - NTT DOCOMO; Muruganathan, Siva (RAN1) - Ericsson

R1-1709693 Chairman's notes of AI 6.2.8 Enhanced Support for Aerial VehiclesAd-Hoc chair (Ericsson)
The document was presented by Siva Muruganathan of Ericsson.
Decision: The document is endorsed, and content is incorporated as below.

R1-1709652 LS on RAN2 agreement on UAV requirements RAN2, NTT DOCOMO
The LS deals with the requirements for UAV and provides RAN2's agreed parameters to be considered for performance evaluations.
Decision: The document is noted.

6.2.8.1 Channel modelling of aerial UEs

LOS/NLOS for aerial UTs,LOS probability when applicable, Modelling of pathloss/shadowing/fast fading for aerial vehicles

Email Discussion on Remaining details of channel modelling until June 8th, 2017 – Siva (Ericsson)
Conclusions:
All proponents need to finalize the channel model until 8th June to have email discussion

R1-1709511 WF on LoS probability model for aerial vehicle ZTE

Agreements:

- Reuse the existing LoS probability model for UE below 10m for RMa, 22.5m for UMa and UMi.
- All UEs should be assumed to be in LoS if their heights are above a certain threshold:
  - **Working Assumption:** For RMa AV, the threshold height is 40m
  - **Working Assumption:** For UMa AV, the threshold height is 100m
  - No threshold for UMi AV

Working Assumption For LOS probability, the following function is adopted (note that m below represents meters):

$$P_{LOS} = \begin{cases} 1 & ,d_{2D} \le d_1 \text{m} \\ \frac{d_1}{d_{2D}} + \exp\left(-\frac{d_{2D}}{p_1}\right)\left(1-\frac{d_1}{d_{2D}}\right) & ,d_1 \text{m} < d_{2D} \end{cases}$$

Where the parameters d1 and p1 for the three scenarios are defined as follows:

Scenarios		
RMa AV	d_1	$d_1 = \max(18, 1350.8 \cdot \log_{10}(h_{UT}) - 1602)$
	p_1	$p_1 = \max(1000, 15021 \cdot \log_{10}(h_{UT}) - 16053)$
UMa AV	d_1	d1= max(18, 460*log10(hUT)-700)
	p_1	p1=4300*log10(hUT)-3800)
UMi AV	d_1	$d_1 = \max(18, 294.05 \cdot \log_{10}(h_{UT}) - 432.94)$
	p_1	$p_1 = 233.98 \cdot \log_{10}(h_{UT}) - 0.95$

R1-1709650 WF on LOS channel models for UMa AV and RMa AV Ericsson

Agreement:

- For UMa AV LOS pathloss
  - For aerial UE height below 22.5m, reuse the same UMa LOS pathloss in TR38.901
  - For aerial UE height between 22.5m and 300m
- Reuse the PL1 formula from UMa TR38.901
- Note: since the height dependency of pathloss exponent based on current contributions is weak in UMa, the existing model for PL1 is adopted
- Further investigation into height dependency of pathloss exponent is encouraged
- Max applicability range in 2D distance is 4km

Agreement:

- For UMa AV LOS shadowing
  - Below 22.5m, 4dB, which is the same UMa LOS shadowing in TR38.901
  - Between 22.5m and 300m, shadowing is height dependent (example: sigma_SF = A*exp(-B*h_UT)+C, where A, B, and C are FFS)
    - Values of A, B and C are FFS
    - A, B and C are determined such that when sigma_SF = 4dB at h_UT =22.5m
    - Note that the value of C could be 0
- For RMa AV LOS pathloss
  - For aerial UE height below 10m, reuse the same RMa LOS pathloss in TR38.901

Proposal:

- For UMa AV LOS shadowing between 22.5m and 300m, the value of A=4.64 and B = 0.0066 are assumed, where the modelling function is given by $\sigma_{SF} = A \cdot \exp(-B \cdot h_{UT})$
- 22.5 m < hUT < 300 m

R1-1709644 WF on shadowing for LOS RMa AV Intel

Working Assumption:

- Adopt following function as standard deviation of shadow fading in dB for LOS aerial UEs in RMa AV scenario.
  - A = 4.2; B = 0.0046
  - 10 m < hUT < 300 m
  - $\sigma_{SF} = A \cdot \exp(-B \cdot h_{UT})$
- Note: the above model was derived by averaging the shadow fading standard deviation proposals multiple companies.
- Note: some companies have some concern with this methodology.

R1-1709460 WF on shadowing for aerial vehicles Intel

Agreement: For UMa AV NLOS with UE heights below 22.5m, reuse the existing UMa NLOS pathloss formula from TR38.901.

Proposal:
- For UMa AV NLOS with UE heights above 22.5m, average over the two options for pathloss model and develop a height dependent function similar to Option 2.

Option 1:

$PL = \max(PL', PL'') \quad 10m \le d_{2D} \le 5\text{km}$

$PL'' = 13.54 + 39.08\log_{10}(d_{3D}) + 20\log_{10}(f_c) - 10\log_{10}(h_{UT})$

PL' is the pathloss corresponding to UMa AV LOS

Option 2:

$PL = 32.4 + p \cdot \log_{10}(d_{3D}) + 20\log_{10}(f_c)$

$p = \max(20, -9.3911\log_{10}(h_{UT}) + 45.35)$

Agreement: For UMa AV with UE heights below 22.5m, the existing fast fading model from TR38.901 is reused.

R1-1709669 Way forward on fast fading model for LTE Aerials Huawei, HiSilicon

Proposal:
- On using the averaged fast fading models for RMa and UMa in the following table:
- Other proposals are not precluded.

Para\Scenario			RMa	UMa
DS	LoS	μ	$-0.6390\log_{10}(h_{UT})$-6.7300	$-0.31\log_{10}(h_{UT})$-6.845
		σ	1.0545exp(-0.0083h_{UT})	0.7294exp(0.0014h_{UT})
	NLoS	μ	$-0.5440\log_{10}(h_{UT})$-6.7370	$0.0965\log_{10}(h_{UT})$-7.5030
		σ	0.8415exp(0.0066h_{UT})	0.9745exp($-0.0045\,h_{UT}$)
ASA	LoS	μ	$-1.8410\log_{10}(h_{UT})$-0.0920	$-1.8650\log_{10}(h_{UT})$-1.8700
		σ	1.9350exp(-0.0041h_{UT})	0.8830exp(0.0022h_{UT})
	NLoS	μ	$-0.7520\log_{10}(h_{UT})$-1.7445	$-1.3230\log_{10}(h_{UT})$-2.8600
		σ	0.9066exp($-0.0072\,h_{UT}$)	1.1674exp(-0.0033h_{UT})
ASD	LoS	μ	$-1.0190\log_{10}(h_{UT})$+0.3445	$-0.0135\log_{10}(h_{UT})$+1.3450
		σ	1.6181exp(0.0046h_{UT})	1.0188exp($-0.0001\,h_{UT}$)
	NLoS	μ	$-0.4863\log_{10}(h_{UT})$+0.8112	$1.17\log_{10}(h_{UT})$-0.6650
		σ	0.7998exp(0.0080h_{UT})	1.2387exp($-0.0046\,h_{UT}$)
ESA	LoS	μ	$-0.5685\log_{10}(h_{UT})$+0.024	$-0.2895\log_{10}(h_{UT})$+0.2250
		σ	0.7738exp(-0.0074h_{UT})	0.9576exp(-0.0018h_{UT})
	NLoS	μ	$-0.4805\log_{10}(h_{UT})$+0.4260	$-0.0005\log_{10}(h_{UT})$-0.4695
		σ	1.0557exp(-0.0041h_{UT})	1.6237exp(-0.0076h_{UT})
ESD	LoS	μ	$-0.3910\log_{10}(h_{UT})$+0.3570	$0.0925\log_{10}(h_{UT})$-0.1425
		σ	1.1446exp(-0.0077h_{UT})	1.1227exp(-0.0026h_{UT})
	NLoS	μ	$-0.7470\log_{10}(h_{UT})$-0.0725	$0.9250\log_{10}(h_{UT})$-2.7250
		σ	0.9860exp(-0.0067h_{UT})	1.6421exp($-0.0092\,h_{UT}$)

Not treated.
R1-1707015 Consideration on channel model for LTE Aerial Huawei, HiSilicon
R1-1707196 Channel Modelling for Aerial Vehicles in Rural Macro Scenario Nokia, Alcatel-Lucent Shanghai Bell
R1-1707263 Enhancements on the large scale channel model for LTE-based aerial vehicles ZTE
R1-1707264 Enhancements on the small scale channel model for LTE-based aerial vehicles ZTE
R1-1707322 Discussion on chanel models for aerial UEs Intel Corporation

R1-1708197 Field measurement results for drones Huawei, HiSilicon
R1-1708291 On channel models for aerial UEs Ericsson
R1-1708292 On line of sight probability for aerial UEs Ericsson
R1-1708811 Channel model for aerial vehicles Qualcomm Incorporated
R1-1709291 Consideration on channel model for LTE Aerial Huawei, HiSilicon
R1-1709525 WF on LOS channel models for UMa AV Ericsson
R1-1709653 WF on LOS channel models for RMa-AV Nokia, Alcatel-Lucent Shanghai Bell

6.2.8.2 Remaining details of evaluationassumptions

Need for 37 site cell layout, BS antenna configurations for FD-MIMO, BS antenna pattern, Terrestrial UT height for non-FD-MIMO, Aerial UE ratio, Number of total UEs per sector,
Traffic modeling details,Terrestrial UT mobility/speed assumptions, Minimum BS to Aerial UT distance, Baseline power control parameters

Email discussion on remaining issues on evaluation assumptions until June 1st, 2017 – Shinpei (DOCOMO)

Potential remaining evaluation assumptions include:
- Parameter settings for UE speed
- Parameter for control traffic
- Additional BS antenna configuration on FD-MIMO
- Additional aerial UE height for fixed height evaluation assumption
- Handover margin issue
- Additional UE antenna numbers
- Backhaul delay for interference coordination scheme (e.g., COMP)
- Performance metrics for command and control traffic

R1-1709487 WF on evaluation assumption for aerial vehicle NTT DOCOMO, SoftBank, Ericsson

Agreement:

- For UMa AV, RMa AV (with ISD 1732m), and UMi AV, cell layout with 37 sites, 3 sectors per site is supported for evaluation.
  - Decide if 37 cell layout is optional or mandatory in next meeting.
  - Companies are encouraged to bring results taking into account cell layouts that have more than 37 sites, 3 sectors per site for UMi AV.
- The minimum BS to Aerial UT distance is 10m for UMi AV, UMa AV, and RMa AV in 3D.
- System bandwidth: 10 MHz
- BS antenna pattern for non-FD MIMO
  - Antenna element pattern according to TR 36.873
  - (M, N, P) = (8, 1, 2) according to TR36.873
  - 0.8λ spacing of vertical elements
  - Companies are encouraged to report down tilt angle in their evaluations, e.g., 100 degree for UMa AV, 104 for UMi AV, 96 degree for RMa AV
  - Note: Companies can provide additional simulation results with realistic antenna pattern
- UL power control
  - Companies are encouraged to report the power control parameters including Pcmax in the contributions
- UT mobility (horizontal plane only)
  - Terrestrial UE (outdoor): 30 km/h
  - Terrestrial UE (indoor): 3 km/h
  - Aerial UE: [161] km/h, horizontal for evaluation purposes only
  - Note: Velocity of aerial UE can be revised according to RAN2 agreement including the possibility of scenario dependent aerial UE velocity.
- Number of aerial UE
  - Case 1: 0 UE per sector for reference
  - Case 2: 1 UE per 10 sectors
  - Case 3: 1 UE per sector
  - Case 4: 3 UEs per sector
  - Case 5: 5 UEs per sector
  - Note: Companies are encouraged to provide evaluation results at least for case 1 and case 5.
- Number of total UE per sector is 15
- Traffic model
  - For terrestrial UE, data type traffic is assumed in downlink and uplink

- Packet size of 0.5 MB
- Packet arrival rate is selected to achieve resource utilization values of 20% and 50% including resource utilization of aerial UEs
  - For aerial UE, command and control traffic is assumed in downlink and data type traffic is assumed in uplink
- Command and control traffic in DL
  - Periodic traffic with fixed packet size is assumed:
    - inter-packet arrival time interval of D = [100ms]
    - FFS: packet size X
    - Note: X is determined based on the requirement on DL data rate and latency for command and control traffic. and D can be revised according to RAN2 agreement.
    - Note: Command and control traffic in UL is not precluded.
- Data traffic in UL
    - Same traffic model including packet size and packet arrival rate as for terrestrial UE
- For baseline simulation assumption, there is no QoS in scheduler
- Note: QoS in scheduler is not precluded.

R1-1709417 Remaining evaluation assumptions for aerial study Qualcomm Incorporated

Agreement:
- For UE height in non-FD MIMO cases, indoor terrestrial UE dropping methodology is the same as in TR36.873.
  - Note: One company has some concerns on performance of UEs on high floors.

R1-1707805 Further clarification of IoT SoftBank Corp., Sharp, Ericsson, NTT DOCOMO, ZTE
Also supported by Huawei

Agreement:

Add the following note to further clarify the agreement in RAN1#88bis:
- Interference
  - UL IoT (interference over thermal) and DL wideband SINR statistics for reference
    - Note: UL IoT means effective IoT defined in section A.2.1.8 of TR36.814

R1-1709697 WF on Simulation Assumptions for Backhaul Latency and Fixed UE Height Nokia, Alcatel-Lucent Shanghai Bell
R1-1709742 WF on UL Command and Control Traffic for Aerial Vehicles Nokia, Alcatel-Lucent Shanghai Bell
R1-1709373 On remaining issues of evaluation parameters Huawei, HiSilicon (rev of R1-1707014)
R1-1707197 Traffic models and remaining issues for aerial vehicles Nokia, Alcatel-Lucent Shanghai Bell
R1-1707222 Requirements and traffic models for aerials SoftBank Corp.
R1-1707265 Discussion on the simulation assumptions for aerial vehicles ZTE
R1-1707323 Remaining details of evaluation assumptions Intel Corporation
R1-1708293 On the remaining evaluation assumptions for low altitude aerial vehicles Ericsson
R1-1708432 Remaining detail of simulation assumption for aerial vehicle NTT DOCOMO, INC.
R1-1708812 Remaining evaluation assumptions for aerial study Qualcomm Incorporated
R1-1709022 Evaluation Assumptions for Aerial Study VODAFONE Group Plc

6.2.8.3 Potential enhancements for drones

Identify potentialenhancements

R1-1707016 Potential enhancements for drones Huawei, HiSilicon
R1-1707198 Potential enhancements for aerial vehicles Nokia, Alcatel-Lucent Shanghai Bell
R1-1707266 Consideration on the potential enhancements for LTE-based aerial vehicles ZTE
R1-1707324 Preliminary results of interference distribution for aerial UEs Intel Corporation
R1-1707580 Potential enhancements for drones LG Electronics
R1-1707924 Potential enhancements for drones Samsung
R1-1708294 On potential enhancements for low altitude aerial vehicles Ericsson
R1-1708433 Initial views on potential problems and solutions for aerial vehicles NTT DOCOMO, INC.
R1-1708813 System level performance and interference mitigation techniques for aerial vehicles Qualcomm Incorporated

6.2.8.4 Other

R1-1709170 Summary of channel modeling proposals for RMa AV Ericsson
R1-1709168 Summary of channel modeling proposals for UMa AV Ericsson
R1-1709171 Summary of fast fading models for aerials Ericsson

Not treated.
R1-1707013 Requirements of connectivity services for drones Huawei, HiSilicon
R1-1708203 Positioning for aerial vehicle Huawei, HiSilicon
R1-1709169 Summary of channel models for UMi-AV Ericsson
R1-1709564 WF on potential problems for aerial vehicles communication Huawei, HiSilicon
R1-1709707 TP on potential problems for study on enhanced support of aerial vehicles Huawei, HiSilicon

Email approval of TP until 1st June – Siva (Ericsson)

6.2.9 Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - *SID in RP-170295*

RAN2 lead SI - Rapporteurs: Nathan Tenny (RAN2) – Huawei; Alexey Khoryaev (RAN1) – Intel

R1-1709763 Chairman's notes of AI 6.2.9 on further enhancements to LTE D2D, UE to network relays for IoT and wearables Ad-Hoc chair (Intel)
The document was presented by Alexey Khoryaev of Intel.
Decision: The document is endorsed, and content is incorporated as below.

R1-1707325 Draft LS on TP to capture RAN1#88bis Agreements in the 3GPP TR 36.746 Intel Corporation
R1-1707326 TP to capture RAN1#88bis Agreements in the 3GPP TR 36.746 Intel Corporation

Agreement
- Text proposal in R1-1709676 is agreed to be captured in TR 36.746

R1-1709676 TP to capture RAN1#88bis and RAN1#89 Agreements in 3GPP TR 36.746 Intel

R1-1709674 Draft LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746 Intel

Agreement
- LS is agreed in R1-1709675

R1-1709675 LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746 RAN1

R1-1709675 is revised and approved in R1-1709755 to indicate attachment of the agreed text proposal captured in R1-1709676

6.2.9.1 Preliminary evaluation results

Results are planned to be captured in TR before RAN1 meeting in August.

R1-1707327 Evaluation of Sidelink Communication Enhancements for Wearable-centric Scenario Intel Corporation
R1-1707328 Evaluation of Sidelink Communication Enhancements for IoT-centric Scenario Intel Corporation
R1-1707329 Evaluation of Sidelink Discovery Enhancements for Wearable and IoT Use Cases Intel Corporation
R1-1708561 Evaluation results for scenario 1 Nokia, Alcatel-Lucent Shanghai Bell
R1-1708562 Evaluation results for scenario 2 Nokia, Alcatel-Lucent Shanghai Bell

R1-1709677 Template for evaluation results in 3GPP TR 36.746 Intel

Agreement:
- R1-1709677 is agreed in principle.

E-mail discussion till May 29, 2017 to agree on template for FeD2D evaluation results collection (Intel, Sergey)
E-mail discussion from August 14 to August 18 2017 to collect FeD2D evaluation results (Intel, Sergey)

6.2.9.2 *Sidelink design enhancements*

6.2.9.2.1 Synchronization aspects

R1-1707035 Discussion on synchronization aspects for feD2D Huawei, HiSilicon
R1-1707206 Considerations on synchronization aspects for feD2D ZTE
R1-1707330 Sidelink Synchronization Enhancements for Wearable and IoT Use Cases Intel Corporation
R1-1707581 Discussion on synchronization enhancement for IoT and wearables LG Electronics
R1-1708382 Considerations of Synchronization Aspects for UE-to-Network Relay for Further Enhanced Device-to-Device Communication ITRI
R1-1708563 Synchronization aspects of FeD2D Nokia, Alcatel-Lucent Shanghai Bell
R1-1708814 FeD2D Synchronization aspects Qualcomm Incorporated

R1-1709435 WF on SLSS/PBCH transmission of Remote UE in FeD2D LG Electronics, Intel
R1-1709436 WF on SLSS/PSBCH physical design for FeD2D LG Electronics, Intel

Agreement
- For sidelink communication in FeD2D, Remote UE does not transmit SLSS/PSBCH
  - FFS for the case when Relay and Remote UEs use different asynchronous reference cells
- FFS on Remote UE's SLSS/PSBCH transmission for sidelink discovery in FeD2D
- SLSS/PSBCH format in Rel-12/13 can be reused for FeD2D at least for 6 PRB bandwidth limited UEs.
  - FFS for 1 PRB BW limited UEs

R1-1709437 WF on synchronization procedure in FeD2D LG Electronics, Intel
R1-1709398 WF on Relay UE Synchronization Assistance Intel
R1-1709399 WF on Sidelink Synchronization for Bandwidth Limited UEs Intel

6.2.9.2.2 Discovery aspects

R1-1707038 Discussion on efficient discovery Huawei, HiSilicon
R1-1707207 Considerations on discovery aspects for feD2D ZTE
R1-1707331 Sidelink Discovery Enhancements for Wearable and IoT Use Cases Intel Corporation
R1-1707582 Discussion on discovery enhancement for IoT and wearables LG Electronics
R1-1708262 Discussion on discovery enhancements for feD2D Sony

R1-1709400 WF on Discovery Enhancements for Bandwidth Limited Remote UEs Intel, Sony

Agreement
- The following discovery design enhancements are further studied
  - Multi-shot discovery transmission across bandwidth of discovery pool(s) for Relay UE
  - eNB assistance signaling to allow/improve Relay UE discovery
  - Association of discovery transmission and reception resources
  - Narrowband definition for discovery operation including 1 PRB and 6 PRB narrowband
- FFS whether discovery enhancements can be discovery model specific
- Other design options are not precluded
- Prepare LS and inform other WGs that RAN1 is evaluating discovery enhancements and ask for feedback about the possibility of awareness of discovery model at access stratum

R1-1709620 Draft LS on Relay UE discovery for bandwidth limited Remote UEs Intel Corporation

Agreement
- Draft LS in R1-1709620 is agreed in R1-1709621 with removing SA2 WG from CC list.

R1-1709621 LS on Relay UE discovery for bandwidth limited Remote UEs RAN1

R1-1709423 WF on FeD2D discovery enhancements Huawei, HiSilicon, ITRI
R1-1709401 WF on Discovery Enhancements for UE-to-NW Relaying with Bandwidth Limited Remote UEs Intel, Huawei, HiSilicon, LGE

Agreement
- For bandwidth limited Remote UEs, discovery enhancements to aid communication establishment for UE-to-NW relaying are beneficial
- The following enhancements are further studied

- eNB assistance signaling
- Association of discovery and communication resources

- Other design options are not precluded

R1-1709402 WF on Relay UE Selection Criteria Enhancements Intel, Sony, ITRI, Huawei, HiSilicon
R1-1709403 WF on Discovery Models for Wearable and IoT Use Cases Intel
R1-1709404 WF on Discovery for UEs with 1 PRB Bandwidth Limitation Intel, ZTE, ZTE Microelectronics, Huawei, HiSilicon

6.2.9.2.3 Communication and UE-to-NW relaying aspects

6.2.9.2.3.1 Sidelink UE-to-NW relaying

R1-1707039 Considerations on sidelink UE-to-NW relaying mode Huawei, HiSilicon
R1-1707208 Discussion on FeD2D Relay Mode ZTE
R1-1707332 Sidelink UE-to-NW Relaying for Wearable and IoT Use Cases Intel Corporation
R1-1707583 Discussion on UE to network relaying options for IoT and wearables LG Electronics
R1-1708263 Discussion on sidelink UE-to-NW relaying Sony
R1-1708383 Discussion on Relay associated selection procedure for Sidelink UE-to-NW relaying ITRI
R1-1708815 Uni-directional sidelink UE-to-NW relaying Qualcomm Incorporated

R1-1709405 WF on Conflict Free UE-to-NW Relaying Intel, Sony, ITRI, Huawei, HiSilicon

Agreement

- Study further whether and how to limit collisions of SL TX/RX and UL TX
- Study further whether and how to limit collisions of DL RX and SL RX for Remote UE

R1-1709406 WF on L1 Comparison of Unidirectional and Bidirectional Relaying Intel, ITRI, Huawei, HiSilicon

Agreement

- Table below is agreed to be captured in TR 36.746

Design Aspects		Bidirectional Relaying	Unidirectional Relaying
Synchronization	Remote UE coverage	In-coverage and partial coverage scenarios.	In-coverage and DL only coverage scenarios
	Sync Source	eNB or Relay UE transmitting SLSS	eNB
Discovery procedure	PSDCH based Relay UE discovery enhancements	The enhancements are beneficial and can be considered	The enhancements are required
Relaying operation	DL-SCH reception	From Relay UE	From eNB without relaying
	UL-SCH transmission	Through Relay UE	Through Relay UE
Resource management	Whether eNB can control Remote UE TX/RX resources	Yes	Yes
	Whether Relay UE can control Remote UE TX/RX resources	Yes	No
	Whether Remote UE can use autonomous resource allocation mode	Yes	Yes
ACK/NACK feedback	From Relay UE perspective, whether legacy HARQ operation can be reused for DL and UL	Yes	Yes

	transmission with potential enhancements for DL transmission		
	From Remote UE perspective	For UL transmission, either legacy principle is reused or relaying of feedback can be used	For UL transmission, only Legacy principle of operation can be reused
		For DL transmission either legacy principle is reused or relaying of feedback can be used	For DL transmission either legacy principle is reused or relaying of feedback can be used
Measurements	Whether Relay UE can perform sidelink measurements (e.g. PC5 RSRP/RSSI)	Yes	Yes
	Whether Remote UE can perform sidelink measurements (e.g. PC5 RSRP/RSSI)	Yes	No
Sidelink Power Control	--	Bidirectional sidelink power control is possible w/o tight eNB involvement, i.e. sidelink power control can be done at both the Relay and Remote UE side.	Remote UE sidelink power control can be done through additional eNB signaling.
DL CSI Feedback	From Relay UE perspective	Legacy principle can be reused	Legacy principle can be reused
	From Remote UE perspective	In DL relaying scenario the DL CSI feedback may not be necessary	DL CSI either needs to be relayed or transmitted directly to eNB or omitted

6.2.9.2.3.2 Sidelink resource allocation and configuration

R1-1707040 **Discussion on sidelink resource allocation and configuration** **Huawei, HiSilicon**
R1-1707209 FeD2D Resource Scheme ZTE
R1-1707333 Sidelink Resource Allocation and Configuration for Wearable and IoT Use Cases Intel Corporation
R1-1707584 **Discussion on sidelink resource allocation and pool configuration for IoT and wearables** **LG Electronics**
R1-1707772 Sidelink resource allocation and configuration Lenovo, Motorola Mobility
R1-1708264 **Discussion on sidelink resource allocation and configuration** **Sony**
R1-1708564 Sidelink resource allocation with relay UE Nokia, Alcatel-Lucent Shanghai Bell
R1-1708816 Sidelink resource allocation and configuration for bi-directional UE-to-NW relaying Qualcomm Incorporated

R1-1709439 WF on PSCCH/PSSCH transmission for FeD2D LG Electronics

Agreement
- At least TDM multiplexing between PSCCH and PSSCH is supported from both the Relay and Remote UE transmission perspective.

Conclusion:
- Continue discussion including the impact on specification and possibility to reuse R12-R14 sidelink resource pool configurations

R1-1709407 WF on eNB-controlled Resource Allocation Intel, Sony

Agreement
- eNB can schedule sidelink transmission resource for Remote and Relay UE transmission by sending sidelink grant

- Relay UE can forward sidelink grant generated by eNB to Remote UE

R1-1709408 WF on Relay UE-assisted Resource Allocation Intel, Sony, ITRI, Huawei, HiSilicon, LGE

Agreement

- Relay UE can control sidelink radio-resources used for transmission and reception by Remote UEs within sidelink resource pools which are configured by eNB
  - FFS control signaling details

R1-1709425 WF on SPS in FeD2D Huawei, HiSilicon, Sony, Intel

Agreement

- Sidelink SPS is studied in RAN1, and following enhancements are considered:
  - eNB schedules sidelink SPS via relay UE forwarding for the remote UE linked with the relay UE.
  - eNB schedules sidelink SPS for the remote UE linked with the relay UE.
  - Relay UE schedules sidelink SPS for the remote UE linked with the relay UE.

R1-1709426 Way Forward on FeD2D resource allocation Huawei, HiSilicon, Lenovo
R1-1709427 Way Forward on FeD2D resource configuration Huawei, HiSilicon, ITRI, Intel

Agreement

- For Relay UE assisted resource allocation, the following control signaling options are considered
  - SCI
  - Higher layer signaling (e.g. MAC CE)
- Companies are encouraged to provide more details on control signaling enhancements at RAN1#90

6.2.9.2.3.3 Sidelink power control

R1-1707036 Discussion on sidelink power control Huawei, HiSilicon
R1-1707334 Sidelink Power Control for Wearable and IoT Use Cases Intel Corporation
R1-1707585 Discussion on sidelink power control for IoT and wearables LG Electronics
R1-1708565 Discussion on sidelink power control Nokia, Alcatel-Lucent Shanghai Bell

R1-1709440 WF on sidelink power control for FeD2D LG Electronics
R1-1709698 Revised WF on sidelink power control for FeD2D LGE, Huawei, HiSilicon

Agreement

- For sidelink power control for FeD2D, unless instructed by TPC command from the eNB, the UE transmits at a power no larger than the calculated power based on open loop power control between the UE and the eNB as described in Section 14.1.1.5 of TS 36.213
  - Maximum power of sidelink transmission, and open loop power control parameters (P0, alpha) are configured by eNB.
  - For out of coverage operation power control parameters (P0, alpha = 0) can be pre-configured
  - FFS if UE is not required to monitor DL

R1-1709428 Way Forward on feD2D sidelink power control Huawei, HiSilicon, Sony, Intel, KDDI

Agreement

- UE can set transmit power below the upper limit based on UE-UE channel propagation conditions
  - FFS details and specification impact (e.g. whether the power setting can be up to UE implementation or mandated by specification)

R1-1709409 WF on Sidelink Power Control Loops Intel
R1-1709410 WF on Sidelink Power Control for Unidirectional Relaying Intel, ZTE, ZTE Microelectronics

6.2.9.2.3.4 Sidelink feedback information

Including decoding status, adaptation of MCS, number of (re)transmissions and resource for transmission, SL measurement

R1-1707041 Sidelink link adaptation with feedback information for FeD2D Huawei, HiSilicon
R1-1707210 Discussion on FeD2D Feedback scheme ZTE
R1-1707335 Sidelink Feedback Information and Signalling for Wearable and IoT Use Cases Intel Corporation
R1-1707586 Discussion on feedback information on sidelink LG Electronics

R1-1707773 sidelink feedback information Lenovo, Motorola Mobility
R1-1708265 Discussion on sidelink adaptation and feedback information Sony.

R1-1709438 WF on SL measurement/feedback for FeD2D LG Electronics, Intel, Sony

Agreement
- Time-frequency resource specific SL-RSSI measurement/report are supported in FeD2D.

R1-1709593 WF on Control of Sidelink Transmission Parameters Intel

Agreement
- In case of Relay UE assisted resource allocation, two mechanisms to determine transmission parameters (MCS, TX power, number of TTIs, frequency sub-channel, etc.) of Remote UE are considered
  - Relay UE may constrain Remote UE resource pool
  - FFS if sidelink grant can be generated by Relay UE or Remote UE or both options are supported

R1-1709424 WF on link adaptation in FeD2D Huawei, HiSilicon, ITRI
R1-1709594 WF on Feedback for Resource Allocation Intel

6.2.9.3 Other

R1-1707037 Consideration on Narrow Band feD2D communication Huawei, HiSilicon

7 NR

7.1 New Radio Access Technology - WID in RP-170855

R1-1708434 Work plan for Rel-15 NR WI NTT DOCOMO, INC.

Friday
R1-1708435 Skeleton of TS38.201 Physical layer; General description NTT DOCOMO, INC.
R1-1708567 Skeleton of TS 38.202 Services provided by the physical layer Qualcomm Incorporated
R1-1708219 Skeleton of 38.211 Physical channels and modulation Ericsson
R1-1707082 Skeleton of TS38.212 Multiplexing and channel coding Huawei
R1-1708892 Skeleton of TS38.yyy Physical layer procedures for data channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1707925 Skeleton of TS38.xxx Physical layer procedures for control channels Samsung
R1-1709124 Skeleton of TS38.215 (Physical layer measurement) Intel Corporation
All skeletons are endorsed in principle. Contents and sections structure will require further RAN1 discussions.
It is noted that some refinements will be needed (e.g., reference, terminology, spec name).
MCC to upload these skeletons into 3GU as basis for further updates, except (R1-1708892/R1-1707925) as their TS numbers can only be allocated after a revised WID has been duly approved by the plenary.

R1-1708105 Discussion on the options in NR design Panasonic

7.1.1 Initial access and mobility

R1-1709821 Updated work plan for NR initial access and mobility NTT DOCOMO, INC., Ericsson, Intel, Huawei, Samsung
Decision: The document is noted. All proponents are recommended to follow this work plan to finalize initial access and mobility.

7.1.1.1 Synchronization signal and initial access procedure

7.1.1.1.1 Remaining details on SS sequence design

Include confirmation of WA of NR-PSS, NR-SSS M-sequence parameters and scrambling details, and mapping from Cell IDs to sequences

R1-1707926 Remaining details on SS sequence design Samsung
- Proposal 1: NR shall support single NR-PSS sequence, where no cell identity hypothesis is included in NR-PSS and all cell ID information is included in NR-SSS.
- Proposal 2: NR shall support using long M-sequences with cyclic shifts to construct NR-SSS sequences.
- Proposal 3: NR UEs should assume same antenna port for NR-PSS, NR-SSS, and NR-PBCH.

Decision: The document is noted.

R1-1708160 **Remaining details for synchronization signals** **Huawei, HiSilicon**

Proposal 1: *Confirm the working assumption and adopt the NR PSS defined in RAN1#88bis:*

- *Number of PSS sequences: 3*
  - *PSS sequence details:*
    - *Frequency domain-based pure BPSK M sequence (fixing the time/freq. offset ambiguity)*
      - *1 polynomial: Decimal 145 (i.e. g(x) = $x^7 + x^4 + 1$)*
      - *In freq. domain 3 cyclic shifts (0, 43, 86) to get the 3 PSS signals*
      - *Initial poly shift register value: 1110110*

Proposal 2: *The NR SSS sequences are defined by:*

$$d(n) = 1 - 2\left(\left(c_0^{(m_0)}(n) + c_1^{(m_1)}(n)\right) \bmod 2\right), n = 0, 1, 2, \ldots, 126$$

where

$$c_0^{(m_0)}(n) = s_0((n + m_0) \bmod 127)$$
$$c_1^{(m_1)}(n) = s_1((n + m_1) \bmod 127)$$

and $s_0(n)$ and $s_1(n)$ are two m-sequences with generator polyminals $g_0(x) = x^7 + x^4 + 1$ and $g_1(x) = x^7 + x + 1$, respectively, and initial state [0000001].

The cyclic shift values m_0 and $m_1$are jointly determined by the cell IDs carried by NR PSS (i.e., $N_{ID}^{(2)} = 0, 1, 2$) and NR SSS (i.e., $N_{ID}^{(1)} = 0, 1, \ldots, 335$)) as follows, where the cell ID is given by $N_{ID}^{cell} = 3N_{ID}^{(1)} + N_{ID}^{(2)}$.

$$m_0 = 3\left\lfloor \frac{N_{ID}^{(1)}}{112} \right\rfloor + N_{ID}^{(2)}$$
$$m_1 = \left(N_{ID}^{(1)} \bmod 112\right) + m_0 + 1.$$

The generated NR SSS sequence is mapped on the same antenna port and the same set of consecutive subcarriers as the PSS without special treatment of DC subcarrier.

Decision: The document is noted.

R1-1708436 **Discussion and evaluation on NR-SS sequence design** **NTT DOCOMO, INC.**

- Proposal 1: Working assumption regarding on NR-PSS sequence design should be confirmed.
- Proposal 2: Following three polynomials are used for NR-SSS sequence generation.
  - $g(x) = x^7 + x^1 + 1$
  - $g(x) = x^7 + x^3 + 1$
  - $g(x) = x^7 + x^3 + x^2 + x^1 + 1$
- Proposal 3: LTE-like sequence generation including scrambling sequence and ID mapping to sequence is applied for NR-SSS.
- Proposal 4: NR-PSS/SSS sequence should be mapped to consecutive 127 subcarriers.
- Proposal 5: RAN1 should discuss on possibility and impact of supporting NW adaptation/indication of numerology used for SS block signals in NSA NR carrier/cell.

Decision: The document is noted.

R1-1707457 **NR-PSS and NR-SSS Sequence Design** **CATT**

- Proposal 1: Numerology agnostic ZC sequence as introduced in Appendix II should be used as the PSS sequence
- Proposal 2: If M sequence in the working assumption of RAN1 #88bis were accepted as the PSS sequence, at least cyclic shift 55 should be considered as one of the cyclic shifts for PSS sequences. The other two cyclic shifts should be selected by the consideration of PAPR values and the cyclic shift distance from the cyclic shift 55. The cyclic shifts 65 and 123 are two good candidates.
- Proposal 3: For NR SSS, preferred pairs of polynomials should be used for the generation of the SSS m-sequences.
- Proposal 4: For NR SSS, if more than two polynomials are used for the generation of the SSS m-sequences, the primitive polynomials should be selected from the same connected set.
- Proposal 5: NR SSS Sequences should be generated with one of the three methods presented in the paper.

Decision: The document is noted.

R1-1709220 **WF on NR-SS sequence design** **NTT DOCOMO, ZTE**

The document was presented by Hiroki Harada from NTT DOCOMO.

- Confirm following working assumptions on NR-PSS as agreements
  - Number of PSS sequences: 3
    - PSS sequence details:
      - Frequency domain-based pure BPSK M sequence (fixing the time/freq. offset ambiguity)
        - » 1 polynomial: Decimal 145 (i.e. $g(x) = x^7 + x^4 + 1$)
        - » In freq. domain 3 cyclic shifts (0, 43, 86) to get the 3 PSS signals
        - » Initial poly shift register value: 1110110
- Down select NR-SSS sequence design from following options

- Option 1: 1 polynomial with 127 cyclic shifts, and 1 another polynomial with 9 cyclic shifts
  - Two generator polynomials will be defined for m-sequences, and cyclic shift according to NR-cell ID is applied to each m-sequence
  - See appendix A for detailed example
- Option 2: 3 polynomials with 127 cyclic shifts, and 1 another polynomial with 3 cyclic shifts
  - Three generator polynomials will be defined for m-sequences, and one out of three is selected and cyclic-shifted according to the part of NR-cell ID
  - One additional generator polynomial will be defined for scrambling sequence, and cyclic shift according to PSS ID is applied to generated scrambling-sequence

Discussion: Some companies believe that there is place for optimizing the working assumptions.
Huawei: the goal from previous meeting was to show that it works (which has been proven to be the case), no way companies were tasked to optimize it – therefore the WA should be confirmed as an agreement – optimization can be made at a later stage.
Decision: The document is noted.

Tuesday session
Proposed agreement:

- Confirm following working assumptions on NR-PSS as agreements
  - Number of PSS sequences: 3
    - PSS sequence details:
      - Frequency domain-based pure BPSK M sequence (fixing the time/freq. offset ambiguity)
        - 1 polynomial: Decimal 145 (i.e. $g(x) = x^7 + x^4 + 1$)
        - Alt. 1: In freq. domain 3 cyclic shifts (0, 43, 86) to get the 3 PSS signals
        - Alt. 2: In freq. domain 3 cyclic shifts (36, 95, 106) to get the 3 PSS signals
        - Initial poly shift register value: 1110110

Agreements:

- Confirm following working assumptions on NR-PSS as agreements
  - Number of PSS sequences: 3
    - PSS sequence details:
      - Frequency domain-based pure BPSK M sequence (fixing the time/freq. offset ambiguity)
        - 1 polynomial: Decimal 145 (i.e. $g(x) = x^7 + x^4 + 1$)
        - In freq. domain 3 cyclic shifts (0, 43, 86) to get the 3 PSS signals
        - Initial poly shift register value: 1110110

Offline agreement:

- Down select NR-SSS sequence design from following options within this meeting
  - Option 1: 1 polynomial with 127 cyclic shifts, and 1 another polynomial with 9 cyclic shifts
    - Two generator polynomials will be defined for m-sequences, and cyclic shift according to NR-cell ID is applied to each m-sequence
    - See appendix A for detailed example
    - With or without additional scrambling can be discussed
  - Option 2: 3 polynomials with 127 cyclic shifts, and 1 another polynomial with 3 cyclic shifts
    - Three generator polynomials will be defined for m-sequences, and one out of three is selected and cyclic-shifted according to the part of NR-cell ID
    - One additional generator polynomial will be defined for scrambling sequence, and cyclic shift according to PSS ID is applied to generated scrambling-sequence
    - See appendix B for detailed example
- Companies need to check PSS-SSS cross-correlation results with CFO in the proposed designs by Wednesday.

Wednesday session

R1-1709512	**Evaluation of NR-SSS**	**Huawei, HiSilicon**
R1-1709550	**Analysis of SSS Proposals**	**Intel**
R1-1709533	**WF on NR-SSS sequence design**	**ITL, CATT, KRRI, KT**
R1-1707829	**NR SSS Design and Evaluation**	**MediaTek Inc.**

Further revised in R1-1709151.

The following could not get agreed – MediaTek requested to keep it as working assumption to give time for further evaluation of the different solutions.
Working assumption:

- NR-SSS sequence design is 1 polynomial with 127 cyclic shifts, and 1 another polynomial with 9 cyclic shifts
  - Two generator polynomials will be defined for m-sequences, and cyclic shift according to NR-cell ID is applied to each m-sequence
  - Two polynomials are generated by $g_0(x) = x^7 + x^4 + 1$ and $g_1(x) = x^7 + x + 1$

        - Initial state is [0000001]
    - The cyclic shift values m_0 and m_1 are jointly determined by the cell IDs carried by NR PSS (i.e., $N_{\mathrm{ID}}^{(2)} = 0, 1, 2$) and NR SSS (i.e., $N_{\mathrm{ID}}^{(1)} = 0, 1, \ldots, 335$)), where the cell ID is given by $N_{\mathrm{ID}}^{\mathrm{cell}} = 3N_{\mathrm{ID}}^{(1)} + N_{\mathrm{ID}}^{(2)}$
        - $m_0 = 3\left\lfloor \frac{N_{\mathrm{ID}}^{(1)}}{112} \right\rfloor + N_{\mathrm{ID}}^{(2)}$
        - $m_1 = \left(N_{\mathrm{ID}}^{(1)} \mod 112\right) + m_0 + 1$

Not treated.

R1-1707042	NR-SS sequence design and evaluation	ZTE
R1-1707220	Discussion on NR-SSS design with radio frame boundary indication	Sequans Communications
R1-1707336	Remaining details on SS sequence design	Intel Corporation
R1-1707587	NR SS sequence design	LG Electronics
R1-1708231	Remaining details on SS sequence design	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708302	NR-SS sequence design and evaluation	Motorola Mobility, Lenovo
R1-1708320	Mathematical analysis based on theorems of M-sequence for NR-SSS	Innovative Technology Lab Co.
R1-1708322	On Design of Synchronization Signal Sequences in NR	InterDigital, Inc.
R1-1708384	Synchronization Sequence Design Considerations and Evaluation for New Radio	ITRI
R1-1708568	Synchronization signal sequence design	Qualcomm Incorporated
R1-1708719	NR synchronization signal design	Ericsson
R1-1708951	Consideration on details of NR-PSS and NR-SSS	CATR
R1-1709151	NR SSS Design and Evaluation	MediaTek Inc.
R1-1709595	Evaluation Results for NR-SSS Sequences	Samsung

7.1.1.1.2 SS block composition and SS burst set composition

Include maximum number of SS blocks in an SS burst set and mapping of NR-PSS, NR-SSS and NR-PBCH to SS block of SS burst set configurations

R1-1708720 SS Block Composition and SS Burst Set Composition Ericsson

- Proposal 1: The proposed symbol mapping for the SS block in the time domain is the first NR-PBCH symbol, the NR-SSS symbol, the second NR-PBCH symbol and the NR-PSS symbol
- Proposal 2: In the frequency domain, the NR-PBCH mapping is symmetric to the NR-PSS and NR-SSS mapping.
- Proposal 3: The maximum number of SS blocks in a SS burst set, L, shall be
    - <3 GHz: L=4,
    - 3-6 GHz: L=8, and,
    - >6 GHz: L=64.
- Proposal 4: L shall only define the timing index format, and does not warrant the feasibility of such a timing index format.
- Proposal 5: NR shall allow for a compact SS burst and burst set composition for energy efficiency.
- Proposal 6: The SS burst and burst set compositions shall consider competing system functionalities, e.g., (PDCCH) scheduling in the beginning of a slot/beam and/or UL URLLC at the end of a slot/beam, and (e.g., PUCCH) signalling in-between bursts.
- Proposal 7: NR shall adopt a coherent burst and burst set structure to have predictable performance.
- Proposal 8: Placement of an SS block within the radio frame should be limited to avoid large overhead from SS block timing signaling.
- Proposal 9: Licensed and unlicensed NR may have different SSB burst and burst set composition mappings.

Decision: The document is noted.

R1-1707043 The composition of SS blocks and SS burst sets ZTE

Proposal 1: 'always on' CSI-RS in SS block should be avoided.

- *during initial access, CSI-RS can be triggered by preamble*

Proposal 2: NR should support CSI-RS in SS block

- *CSI-RS in SS block should share the same design (e.g. pattern) as CSI-RS transmitted in other slot/subframe*
- *SS block should have a common structure no matter if CSI-RS is transmitted in it*
- *CSI-RS and SS/PBCH should be multiplexed in FDM manner in the same OFDM symbols*

Proposal 3: Frequency multiplexed DL control/data transmission in SS blocks is supported.

Proposal 4: For a given frequency band, structure of SS burst set is predefined as follows:

- *an SS burst set comprises a fixed number (N) of nominal SS bursts, the nominal SS burst location within the SS burst set is fixed (e.g. per 5ms)*
- *an SS burst comprises a fixed number (L) of nominal SS blocks and the maximum SS burst duration is fixed*

- *an SS burst set comprises a fixed number (N*L) of nominal SS blocks*
- *the nominal SS blocks are indexed according to such fixed number of nominal SS blocks regardless of whether SS blocks are actually transmitted*
- *the actual number of SS bursts and the actual number of SS blocks in one SS burst are configurable*
- *the actual number of SS blocks in different SS burst can be different*
- *the actual SS blocks transmitted by gNB are a subset of nominal SS blocks*

Proposal 5: NR should support mapping of SS blocks to SS burst in a distributed manner by reserving UC and DC symbols between two neighbour SS blocks.
Proposal 6: The following two options can be further considered for mapping SS blocks to SS burst:
Option (a):

- *the first two symbols are fixed reserved for DL control domain or mini-slot transmission.*
- *three nominal SS blocks are mapping to the remaining twelve symbols continuously.*
- *whether actually transmitting the last SS block in each slot is determined flexibly.*
- *a discontinuous SS burst can be achieved by connecting several slots with the same manner of SS block mapping .*

Option (b):

- *an equal time interval between two nominal SS blocks within SS burst, i.e. 7 symbols offset for both intra-slot blocks and inter-slot blocks.*
- *the first symbol, the last two symbols and the three symbols between two SS blocks within SS burst are fixed reserved for GP and UL control domain or DL control domain or mini-slot transmission.*
- *a discontinuous SS burst can be achieved by connecting several slots with the same manner of SS block mapping .*

Proposal 7: NR should support distributed SS bursts mapping to SS burst set.
Proposal 8: It is benefit for combination of signal/channel during initial access to limit the duration of SS burst to no longer than 0.5ms.
Proposal 9: SS blocks can be divided into two categories, and bitmap and number based scheme can be considered for informing actual transmitted positions of two categories SS blocks respectively.
Decision: The document is noted.

R1-1708569 SS block and SS burst set composition consideration Qualcomm Incorporated

- Proposal 1: The synchronization signals and physical broadcast channel are time-multiplexed within an SS block with an order presented in Figure 1.
- Proposal 2: For frequency range up to 3 GHz, the maximum number of SS-blocks, L, within SS burst set is L = 2. For frequency range from 3GHz to 6 GHz, L=4
- Proposal 3: For sub-6GHz, consider Sub6-Alt1 or Sub6-Alt2 for SS burst set composition, as illustrated in Figure 3 and 4.
- Proposal 4: For above-6GHz, consider SS burst set composition as illustrated in Figure 5. Burst-set is built using 7 consecutive SS blocks, followed by a gap of equal duration.

Decision: The document is noted.

Tuesday session
R1-1709263 WF on SS block composition Huawei, HiSilicon

Agreements:

- For SS block composition, the following should be supported
  - Confirm the working assumption that NR-PSS, NR-SSS and NR-PBCH are present in every SS block
  - NR-PSS is mapped before NR-SSS.
  - In case that number of PBCH symbols is two within a SS block,
    - Option 1: The mapping order of SS blocks is PSS-SSS-PBCH-PBCH
    - Option 2: The mapping order of SS blocks is PSS-PBCH-SSS-PBCH
    - Option 3: The mapping order of SS blocks is PBCH- PSS-SSS-PBCH
    - Option 4: The mapping order of SS blocks is PSS-PBCH-PBCH-SSS
  - Down selection from above options should be done together with NR-PBCH design decision

Possible agreements:

- For sub-carriers spacing of 15kHz, 30kHz and 120kHz the SS burst consist of 2 SS blocks that are mapped to one slot of 14 symbols
  - FFS for 240kHz sub-carrier spacing
- In SS burst
  - At least 2 symbols are preserved from the beginning from the SS burst for DL control
  - At least 2 symbols are preserved at the end of the SS burst for e.g. guard period and UL control
  - SS block does not cross the slot (of 7 symbols) boundary

Continue offline discussion until Wednesday – Nokia

Wednesday session

R1-1709489 **On SS burst composition Nokia**

- For the possible SS block time locations following mapping is followed:
  - For sub-carriers spacing of 15kHz, 30kHz and 120kHz , two possible SS block time locations are mapped to one slot of 14 symbols
  - For sub-carriers spacing of 240kHz, five possible SS blocks time locations are mapped to one duration of 28 symbols
  - In the mapping following requirements are met
    - At least 2 symbols are preserved from the beginning from the SS burst for DL control
    - At least 2 symbols are preserved at the end of the SS burst for e.g. guard period and UL control
    - SS block does not cross the slot (of 7 symbols) boundary

Decision: The document is noted. Continue offline discussion until Thursday – Nokia

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Thursday session

Agreements:

- For the possible SS block time locations following mapping is followed:
  - In the mapping with 15 and 30 kHz subcarreir spacing, following requirements are met
    - At least [1 or 2] symbol are preserved for DL control at the beginning of the slot of 14 symbols
    - At least 2 symbols are preserved for e.g. guard period and UL control at the end of the slot of 14 symbols
    - Note: slot is defined based on SS subcarrier spacing
    - At most two possible SS block time locations are mapped to one slot of 14 symbols
  - In the mapping with 120 kHz subcarreir spacing, following requirements are met
    - At least 2 symbol are preserved for DL control at the beginning of the slot of 14 symbols
    - At least 2 symbols are preserved for e.g. guard period and UL control at the end of the slot of 14 symbols
    - Note: slot is defined based on SS subcarrier spacing
    - At most two possible SS block time locations are mapped to one slot of 14 symbols
  - In the mapping with 240 kHz subcarrier spacing across two consecutive slots, following requirements are met
    - At least 4 symbol are preserved for DL control at the beginning of the first slot of 14 symbols
    - At least 4 symbols are preserved for e.g. guard period and UL control at the end of the second slot of 14 symbols
    - Note: slot is defined by 240 kHz subcarrier spacing
    - At most four possible SS block time locations are mapped to two consecutive slots of 14 symbols each
  - SS block does not cross the middle of the slot of 14 symbols defined by 15 kHz sub-carrier spacing
- Mapping of SS block time locations for NR unlicensed band operation is FFS
- Above agreements does not preclude 7 OFDM symbol slot operation

R1-1709488 On number of SS blocks Nokia
R1-1709612 WF on NR SS measurement duration Intel Corporation, InterDigital, MediaTek, Qualcomm, Samsung, Ericsson

Agreements:

- The transmission of SS blocks within SS burst set is confined to a 5 ms window regardless of SS burst set periodicity
- Within this 5 ms window, number of possible candidate SS block locations is L
- The maximum number of SS-blocks within SS burst set, L, for different frequency ranges are
  - For frequency range up to 3 GHz, L is **4**
  - For frequency range from 3 GHz to 6 GHz, L is **8**
  - For frequency range from 6 GHz to 52.6 GHz, L is **64**
  - Note that RAN1 assumes minimum number of SS blocks transmitted within each SS burst set is one to define performance requirements

Not treated.

R1-1707226 NR SS block and SS burst set design vivo
R1-1707337 SS block composition Intel Corporation
R1-1707458 SS Burst Set Composition and SS Block Configuration CATT
R1-1707588 Discussion on SS block composition and SS burst set composition LG Electronics
R1-1707691 Discussion on design of SS block Guangdong OPPO Mobile Telecom.
R1-1707754 NR SS block and burst set composition AT&T
R1-1707793 Discussion on maximum number of SS blocks in an SS burst set Spreadtrum Communications

R1-1707927 SS block composition and SS burst set composition Samsung
R1-1708091 NR SS block and burst set composition ETRI
R1-1708161 Discussion on SS block composition and SS burst set composition Huawei, HiSilicon
R1-1708232 On SS Burst and Burst Set Composition Nokia, Alcatel-Lucent Shanghai Bell
R1-1708303 Design of SS block and SS burst set Motorola Mobility, Lenovo
R1-1708323 NR SS block and SS burst set composition Innovative Technology Lab Co.
R1-1708324 On SS Block and Burst Set Composition and Multiplexing InterDigital, Inc.
R1-1708437 Discussion on SS block composition and SS burst set composition for NR NTT DOCOMO, INC.
R1-1708537 Discussion on SS block composition for NR Potevio
R1-1709051 Synchronization in NR considering beam sweeping ASUSTEK COMPUTER (SHANGHAI)
R1-1709052 Discussion on SS Block and SS Burst Set Design Convida Wireless LLC

7.1.1.1.3 SS block time index indication

R1-1708253 Discussion on SS block time index indication Sony

- Observation 1: To meet the same coverage requirement as LTE, soft-combining of NR-PBCHs across different SS blocks is necessary.
- Observation 2: The UE should be able to combine NR-PBCHs without knowing the association between the SS block time index and the beam used in the SS block
- Proposal: NR should support implicit indication by NR-PBCH to indicate the SS block time index.
  - NR-MIB contents should be the same within the NR-PBCH TTI to easily enable soft-combining of NR-PBCH.
  - DMRS sequence based indication is the most preferable considering the impact on neighbour cell measurement.

Decision: The document is noted.

R1-1708277 Signaling of SS block index Apple Inc.

- Proposal 1: nominal SS blocks are partitioned into SS bursts (or groups). The SS blocks may or may not be contiguous across the SS burst boundaries.
- Proposal 2: SS burst index is included in information bits of PBCH, while SS block index within a SS burst is signaled through PBCH implicitly, e.g., with different scrambling codes.
- Proposal 3: SS blocks within each SS burst can be combined to improve PBCH decoding reliability.
- Proposal 4: the set of K different scrambling codes can be selected from existing class of LFSR based sequences, such as M-sequence, Gold sequence, etc.
- Proposal 5: the number of SS blocks per SS burst (or group) ***K*** should be pre-determined, and can be band dependent.
- Observation: gNB beam mapping to SS blocks is transparent to UEs, regardless of the selection of ***K***and ***M***

Decision: The document is noted.

Tuesday session

R1-1709442 WF on Time Index Indication of SS Block Huawei, HiSilicon, InterDigital, NTT DOCOMO

- For SS block time index indication, the following should be supported
  - Combination of explicit and implicit indications by PBCH
    - Implicit bits are used for SS block time index indication within SS burst
    - Explicit bits are used for SS burst time index within SS burst set

Decision: The document is noted.

R1-1709490 WF on SS Block Index Indication Samsung, Sony, ITL, Fujitsu

- Down select the scheme for NR-SS block index indication
  - Option 1: DMRS in PBCH is utilized to indicate the SS block indices in a SS burst set
    - FFS on the DMRS sequence/resource design
  - Option 2: DMRS in PBCH is utilized to indicate the NR-SS block indices in a SS burst
    - FFS definition of SS burst (e.g., maximum number of SS blocks within SS burst)
    - FFS on the indication of SS burst indices in a SS burst set
    - FFS on the DMRS sequence/resource design

Decision: The document is noted.
Continue offline discussion (based on R1-1709442/R1-1709490) until Wednesday – Huawei/Samsung

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Wednesday session

R1-1709488 On number of SS blocks Nokia

- The considered maximum number of SS-blocks, L, within SS burst set for different frequency ranges are
  - For frequency range up to 3 GHz, the maximum number of SS-blocks, L, within SS burst set is [**2 or 4**]
  - For frequency range from 3GHz to 6 GHz, the maximum number of SS-blocks, L, within SS burst set is [**4** or **8**]
  - For frequency range from 6 GHz to 52.6 GHz, the maximum number of SS-blocks, L, within SS burst set is **64**

Decision: The document is noted.

Friday session

R1-1709701 Summary on Time Index Indication of SS Block Huawei, HiSilicon, Samsung, MediaTek, InterDigital, ZTE

- Option 1: PBCH coding-based indication
  - Explicit and/or implicit indications.

Note: PBCH-DMRS sequence is not used to indicate time index of SS block

- Option 2: Sequence-based PBCH-DMRS
- Option 3: Combinations of Option 1 + Option 2
  - Opt 3a: Combinations of PBCH-coded explicit indication and PBCH-DMRS
  - Opt 3b: Combination of PBCH-coded implicit indication and PBCH-DMRS

Decision: The document is noted.

Not treated.

R1-1707044	On SS block time index indication	ZTE
R1-1707219	Discussion on SS time index indication	Sequans Communications
R1-1707227	Discussion on SS block time index indication	vivo
R1-1707252	Consideration on SS block time index indication	Fujitsu
R1-1707338	SS block time index indication	Intel Corporation
R1-1707459	SS-block time index indication	CATT
R1-1707589	Discussion on SS block time index indication	LG Electronics
R1-1707692	Discussion on the timing indication of SS block	Guangdong OPPO Mobile Telecom.
R1-1707755	SS block time index indication	AT&T
R1-1707847	Discussion on SS block time index indication	MediaTek Inc.
R1-1707928	Discussion on SS block timing indication	Samsung
R1-1708166	Discussion on SS block time index indication	Huawei, HiSilicon
R1-1708233	SS block time index indication	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708304	Indication of SS block timing information	Motorola Mobility, Lenovo
R1-1708325	NR SS block time indexing	Innovative Technology Lab Co.
R1-1708326	On SS Block Time Index Indication in NR	InterDigital, Inc.
R1-1708367	SS block and SS burst set composition	Sharp
R1-1708438	Discussion on SS block time index indication for NR	NTT DOCOMO, INC.
R1-1708570	SS block time index indication consideration	Qualcomm Incorporated
R1-1708721	SSB Time Index Indication	Ericsson

7.1.1.2 Broadcast signal/channel

7.1.1.2.1 NR-PBCH

Include Tx scheme, PBCH DMRS design, contents and corresponding payload, etc.

R1-1707590 NR-PBCH design LG Electronics

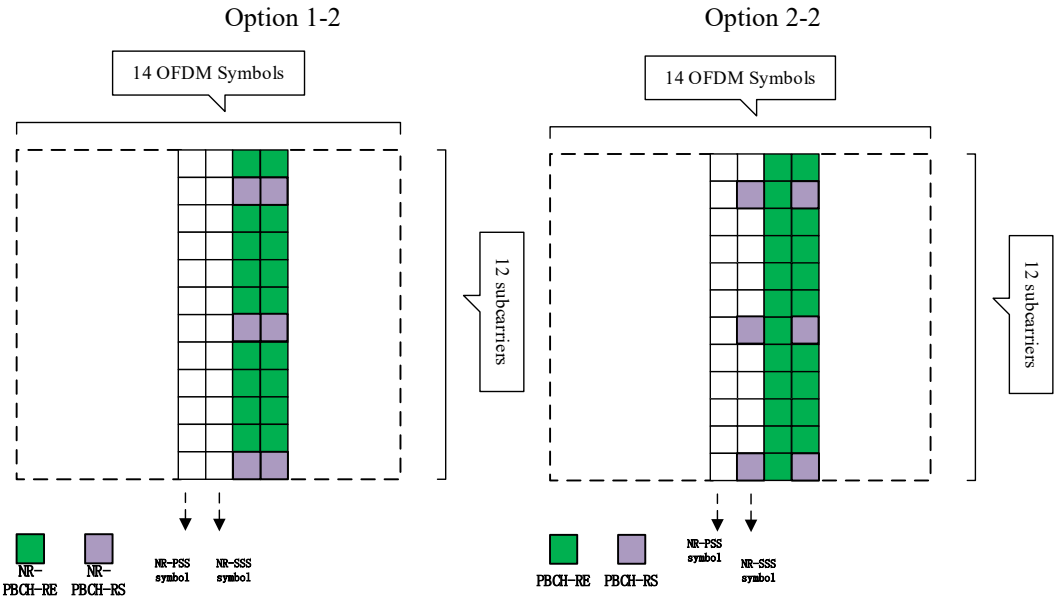
- Proposal 1: The payload size of MIB can be 64bits (i.e. 48bits for information and 16 bits for CRS). In the MIB, at least following contents can be included:
  - At least part of SFN/H-SFN
  - Configuration information for common search space
  - Center frequency information of NR carrier
- Proposal 2: For NR-PBCH transmission, Time Domain Precoding Vector Switching (TD-PVS) and Cyclic Delay Diversity (CDD) scheme should be considered.
- Proposal 3: In initial access state, it should be assumed that antenna port of NR-SS and NR-PBCH is different for network flexibility for NR-SS and NR-PBCH transmission.
- Proposal 4: NR-PBCH DMRS should be designed based on the assumption that NR-SSS is not used as reference signal for NR-PBCH demodulation.
- Proposal 5: For PBCH transmission, it should be assumed that 192REs for DMRS and 384REs for MIB are used when two OFDM symbols are assigned.
- Proposal 6: Each OFDM symbol for NR-PBCH transmission should contain DMRS.
- Proposal 7: PBCH DMRS can be used as fine time/frequency tracking RS. In order to increase fine frequency tracking accuracy, 1st and 4th OFDM symbols within SS block are assigned for NR-PBCH transmission.
- Proposal 8: For frequency position of DMRS, interleaved mapping in frequency domain should be assumed. Also, frequency domain shift according to cell-ID can be assumed.
- Proposal 9: The sequence of DMRS can be initialized by cell-ID and slot number/OFDM symbol index within default periodicity of SS burst set (i.e. 20ms).

- Proposal 10: Similar with LTE PBCH, it can be introduced that NR-PBCH TTI boundary is indicated by scrambling sequence of NR-PBCH.
- Proposal 11: Scrambling sequence of NR-PBCH is initialization by cell-ID, TTI boundary indication and SS block related index (e.g. OFDM symbol index, slot index).
- Proposal 12: For NR-PBCH TTI boundary indication for shorter periodicity, it can be considered to introduce different scrambling sequence of NR-PBCH for shorter periodicity. Also, in order to distinguish between NR-SSS with default periodicity and additionally transmitted NR-SSS within default periodicity, different NR-SSS sequence for shorter periodicity can be introduced.
- Proposal 13: NR should support at least SS burst set wise soft combining.
- Proposal 14: For NR-PBCH design, it should be assumed that UE does not need to decode neighbor cell NR-PBCH for neighbor cell measurement.

Decision: The document is noted.

R1-1707228 DMRS design for NR-PBCH vivo

- Proposal 1: Confirm working assumptions made at RAN#88bis meeting:
  - For NR-PBCH transmission, NR supports a single antenna port based transmission scheme only.
  - NR-PSS, NR-SSS and NR-PBCH are presented in every SS block.
- Proposal 2: Same antenna port is defined for NR-PSS, NR-SSS and NR-PBCH within an SS block.
- Proposal 3: Two column DMRS symbols are supported for NR-PBCH demodulation to guarantee high speed NR-PBCH performance, e.g. Option 1-2 or Option 2-2.



- Proposal 4: Option 2-2 is recommended as NR-PBCH DMRS pattern for it shows the best performance among the potential candidate patterns.

Decision: The document is noted.

Tuesday session

R1-1709441 WF on PBCH DMRS Design Huawei, HiSilicon

- Confirm working assumption on antenna port for NR-PBCH in RAN1#88bis
  - For NR-PBCH transmission, NR supports a single antenna port based transmission scheme only
- Same antenna port is defined for NR-PSS, NR-SSS and NR-PBCH within an SS block
  - Note: NR-SSS can be used for NR-PBCH demodulation
  - For PBCH DMRS mapping, the following should be supported
  - PBCH DMRS is mapped into the PRBs with PSS/SSS and the ones without PSS/SSS with different density in both frequency and time domains
  - PBCH DMRS is mapped into two OFDM symbols of each SS block in time domain
    - FFS: the number of PBCH symbols into which PBCH DMRS is mapped
- For PBCH DMRS sequence generation, the following should be supported,
  - PBCH DMRS sequence is generated based on Cell ID only

Decision: The document is noted.

R1-1709221 WF on NR-PBCH transmission scheme and DMRS design NTT DOCOMO, InterDigital, ZTE

- For NR-PBCH transmission, NR supports a single antenna port based transmission scheme only.
  - Same antenna port is defined for NR-PSS, NR-SSS and NR-PBCH within an SS block

  - Single antenna port based transmission scheme for NR-PBCH is transparent to UEs
- DMRS for NR-PBCH is mapped on every NR-PBCH symbol
  - Down select RE mapping scheme for the DMRS
    - Option 1: DMRS sequence is mapped on subcarriers with equal interval
    - Option 2: DMRS sequence is mapped on subcarriers with unequal interval (e.g., less or no mapping within NR-SSS transmission bandwidth)
  - At least, DMRS sequence and/or resource is(are) different among different cells according to different cell IDs
  - Down select further DMRS sequence design principle
    - Option 1: DMRS sequence is common among different SS blocks within a same cell
    - Option 2: DMRS sequence is different among different SS blocks within a same cell
    - Option 3: DMRS sequence is different among different SS blocks within a same SS burst within a same cell
      - FFS definition of SS burst (e.g., maximum number of SS blocks within SS burst)

Decision: The document is noted.

Agreements:
- For NR-PBCH transmission, NR supports a single antenna port based transmission scheme only.
  - Same antenna port is defined for NR-PSS, NR-SSS and NR-PBCH within an SS block
  - Single antenna port based transmission scheme for NR-PBCH is transparent to UEs
    - Note that frequency domain PC is precluded
- DMRS for NR-PBCH is mapped on every NR-PBCH symbol
  - Note: frequency domain RE density for DMRS is FFS
- Down select RE mapping scheme for the DMRS with consideration for required amount of REs for NR-PBCH
  - Option 1: DMRS sequence is mapped on subcarriers with equal interval
  - Option 2: DMRS sequence is mapped on subcarriers with unequal interval (e.g., less or no mapping within NR-SSS transmission bandwidth)
- DMRS sequence depends on at least cell IDs

R1-1709348 **WF on PBCH RE mapping** **Samsung**
- NR-PBCH coded bits are mapped across REs in N PBCH symbols, where N is the number of PBCH symbols in a NR-SS block.
  - FFS on DMRS RE mapping

Decision: The document is noted.

Thursday

Agreements:
- Down select from following alternatives based on further evaluation/analysis in the next meeting
  - Alt. 1: NR-PBCH coded bits are mapped across REs in N PBCH symbols, where N is the number of PBCH symbols in a NR-SS block
  - Alt. 2: NR-PBCH coded bits are mapped across REs in a PBCH symbol, the NR-PBCH symbol is copied to N-1 NR-PBCH symbol in a NR-SS block
  - ~~Alt. 3: NR-PBCH coded bits are mapped across REs in a PBCH symbol, and the different coded bits are mapped to each NR-PBCH symbol in a NR-SS block~~
    - ~~Note that Intel will clarify more about Alt. 3 in the reflector until Friday~~
  - Other Alternatives are not precluded
    - Note that all proponents need to provide their own proposal until May 26th
- For evaluation purposes, followings should be considered
  - Channel coding
  - Rate matching
  - Accuracy of CFO estimation
  - DMRS RE mapping
  - Channel estimation performance
  - NR-PBCH one to four shot(s) performance within 80 msec
  - Complexity of NR-PSS/SSS/NR-PBCH decoding and mobility measurement
  - Reliability of time index
- All proponents need to provide followings until June 2nd to achieve further evaluation/analysis – Asbjorn (Ericsson)
  - NR-PBCH RE mapping
  - SS-block composition
  - SS-block time index indication
  - SFN indication
  - DMRS RE mapping
  - PBCH payload size

- PBCH channel coding scheme (all proponents need to follow the latest agreements/WAs in channel coding session)
  - Note that all decisions of channel coding scheme should be done in channel coding session/agenda
- Receiver algorithms

Friday
Intel confirmed that Alt.3 is no longer an option and can be deleted.

Proposed agreements:

- NR supports combining NR-PBCH:
  - Across SS burst set
  - Within at least subset of an SS burst set
    - FFS the details
  - Across system frame(s) in 80ms TTI
    - FFS the details, E.g., every 10ms or every 20ms

Wednesday session
Continue discussion about DMRS sequence dependency and PBCH contents and payload size, DMRS RE density – Hiroki (DOCOMO)

R1-1709556 WF on NR-PBCH combining Huawei, HiSilicon, Interdigital, Xiaomi

- Within 80ms TTI, NR supports combining of NR-PBCH at least for:
  - Across SS burst set(s) for all SS burst set periodicity smaller than 80ms
- Note: how/whether to combine is up to UE's implementation

Decision: The document is noted. Also supported by NEC

Thursday session
R1-1709754 WF on NR-PBCH contents and payload size NTT DOCOMO

Agreements:

- Following contents are carried in NR-MIB
  - (Part of) SFN: [7 - 10] bits
    - At least 80 ms granularity
      - FFS: indication within 80 ms
  - [H-SFN: 10 bits]
    - RAN1 will ask RAN2
  - Timing information within radio frame: [0 - 7] bits
    - E.g., SS block time index: [0 - 6] bits
    - E.g., half radio frame timing: [0 - 1] bit
  - RMSI scheduling information: [x] bits
    - CORESET(s) information: [x] bits
      - Simplified information of CORESET(s) compared to CORESET(s) information for UE-specific configuration is considered
      - E.g., Time/frequency resource configuration of CORESET(s)
      - [Numerology of RMSI: [0 - 2] bits]
    - [Information regarding frequency resources for PDSCH scheduling: [x] bits]
  - [Information regarding bandwidth part: [x] bits]
  - [Information for quick identification that there is no corresponding RMSI to the PBCH: [0 - 1] bit]
  - [Information for quick identification that UE can not camp on the cell: [0-1] bit]
    - RAN1 will ask RAN2
  - [SS burst set periodicity: [0 - 3] bits]
  - [Information on actual transmitted SS block(s): [0 - x] bits]
  - [Area ID: x bits]
    - RAN1 will ask RAN2
  - [Value tag: x bits]
    - RAN1 will ask RAN2
  - [cell ID extension: x bits]
    - RAN1 will ask RAN2
  - [Information on tracking RS: x bits]
  - Reserved bits: [x > 0] bits
- CRC size for NR-MIB is [16 + y] bits

R1-1709758 [DRAFT]LS on NR-PBCH content Ericsson
Decision: Final LS is approved in R1-1709789 with the following updates:
RAN1 discussed the content of the NR-PBCH in order to determine the number of bits that needed to be carried by the NR-PBCH.
RAN1 has agreed to include the following information in the NR-PBCH:

- (Part of) SFN: [7 - 10] bits
- ~~Timing information within radio frame: [0 - 7] bits~~
- Information for remaining minimum system information scheduling: [x] bits
- Bits reserved for future use: [x] bits
- CRC: [16+y] bits

Additionally, RAN1 is discussing whether the following L1 related information needs to be included:

- Information regarding bandwidth part: [x] bits
- Information for quick identification that there is no corresponding RMSI to the PBCH: [0-1] bits
- SS burst set periodicity: [0-3] bits
- Information on actual transmitted SS block(s): [0-x] bits
- Information on tracking RS: [x] bits
- Timing information within radio frame: [0 - 7] bits
-

Finally, it is RAN1's understanding that RAN2 is considering the necessity of including the following higher layer information in the NR-PBCH

- Hyper-SFN
- Information for quick identification that UE cannot camp on the cell
- Area ID
- Value tag
- Cell ID extension

For the payload carried by the NR-PBCH, RAN1 has agreed to target the payload size to be no larger than 72 bits and no less than 40 bits including the CRC. It should be noted that for the performance evaluation done so far, the range for the upper limit is between 48 and 72 bits.
Action to RAN2~~1~~:
In order to decide on the NR-PBCH payload and which information to include in the NR-PBCH, RAN1 needs RAN2's view on the need for ~~including in the NR-PBCH~~ the listed higher layer related information elements in the NR-PBCH and the associated number of bits. Further, RAN1 respectfully asks RAN2 to provide ~~the need for~~ any additional higher layer related information not listed above if needed.

Agreement:

- RAN1 targets design of NR-PBCH payload size to be no larger than 72 bits and no less than 40 bits including CRC.
  - Note: Based on the performance evaluation done so far, the upper limit range is between 72 and 48 bits

Not treated.

R1-1707045	NR-PBCH design	ZTE
R1-1707253	Discussion on PBCH design	Fujitsu
R1-1707339	Details on NR PBCH design	Intel Corporation
R1-1707460	Transmission Scheme and DM RS of NR PBCH	CATT
R1-1707816	Discussion on PBCH design	MediaTek Inc.
R1-1708092	NR PBCH design	ETRI
R1-1708162	Discussion and evaluation on NR-PBCH design	Huawei, HiSilicon
R1-1708234	NR-PBCH design	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708256	Discussion on NR-PBCH Reference Sequence Design	Sony
R1-1708327	On NR Physical Broadcast Channel	InterDigital, Inc.
R1-1708328	NR-PBCH design aspects	Innovative Technology Lab Co.
R1-1708362	NR PBCH Design Consideration	Sierra Wireless, S.A.
R1-1708571	PBCH design consideration	Qualcomm Incorporated
R1-1708722	NR physical broadcast channel design	Ericsson
R1-1709026	Discussion on NR-PBCH combining	Xiaomi Technology
R1-1709180	Remaining issues of NR-PBCH	Samsung
R1-1709192	Discussion and evaluation on NR-PBCH design	NTT DOCOMO, INC.
R1-1709817	WF on DMRS sequence for NR-PBCH	LG Electronics

7.1.1.2.2 Remaining system information delivery

how to deliver the remaining minimum system information and other SI

R1-1707046 Delivery of remaining minimum SI and other SI ZTE

- Proposal 1: On-demand transmission should be supported for other SI in NR.
- Proposal 2: NR-PDCCH is preferred as the scheduling information of other SI.
- Proposal 3: For on-demand delivery of other SI, different parts of other SI should be requested independently by e.g. different PRACH resources, and these different PRACH resources should be configured in the remaining minimum SI.
- Proposal 4: Duo to the long time-domain duration, discrete burst need be introduced for remaining minimum SI.
- Proposal 5: When the system bandwidth is sufficient, option 1 is preferred. Otherwise, option 4-b is preferred.

Decision: The document is noted.

R1-1708106 Relation among NR-PBCH, SIBs and subcells Panasonic
None was available for presenting further to Chair's request

Tuesday session

R1-1709264 WF on numerology for RMSI Huawei, HiSilicon

- The SCS of the control and data channel for the remaining minimum system information is the same as the SCS for PBCH

Decision: The document is noted.

From offline:

- The same SCS is used for delivering the remaining minimum system information and paging
  - For these, the same SCS is used for control and data channels

Agreements:

- For RMSI, the same subcarrier spacing is used for data and control channels
- For paging, the same subcarrier spacing is used for data and control channels
- RAN1 will strive to minimize the subcarrier spacing switching point during the initial access and idle mode
- FFS: Whether the subcarrier spacing of data and control channel is the same between RMSI and paging

Proposed agreements:

- Alternative 1: The SCS of the control and data channel for the remaining minimum system information is the same as the SCS for PBCH
- Alternative 2: PBCH signals the SCS of the remaining minimum system information
  - The SCS of the remaining minimum system information is selected from candidate SCS for data/control in the frequency band

Not treated.

R1-1707340 Remaining system information delivery mechanisms Intel Corporation
R1-1707461 NR PBCH and and NR physical channel conveying system information CATT
R1-1707591 System Information Delivery LG Electronics
R1-1707693 Discussion on the on-demand SI Guangdong OPPO Mobile Telecom.
R1-1707817 Discussion on remaining system information delivery MediaTek Inc.
R1-1707930 Remaining system information delivery Samsung
R1-1708163 Discussion on NR system information delivery Huawei, HiSilicon
R1-1708235 On Remaining System Information Delivery Nokia, Alcatel-Lucent Shanghai Bell
R1-1708329 On Remaining System Information Delivery InterDigital, Inc.
R1-1708440 Discussion on system information delivery for NR NTT DOCOMO, INC.
R1-1708723 NR delivery of remaining system information Ericsson
R1-1709155 Remaining system information delivery consideration Qualcomm Incorporated

7.1.1.3 Paging design

R1-1706975 Multi-beam Paging for NR Huawei, HiSilicon
R1-1707047 Paging design in NR ZTE
R1-1707462 NR Paging Channel CATT
R1-1707592 Paging design in NR LG Electronics
R1-1707818 Discussion on Paging design MediaTek Inc.
R1-1707931 Paging design Samsung
R1-1708236 Paging in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708441 Discussion on paging design for NR NTT DOCOMO, INC.

R1-1708573 Paging design consideration Qualcomm Incorporated
R1-1708724 On NR paging design Ericsson
R1-1708870 Discussion on paging design Institute for Information Industry (III)
R1-1709053 Discussion on Paging Burst Design Convida Wireless LLC

7.1.1.4 Physical random access channel and random access procedure

7.1.1.4.1 PRACH design

Include RACH preamble sequence length and subcarrier spacing, and RACH format design

R1-1708574 PRACH design consideration Qualcomm Incorporated

- Proposal 1: NR should select a length 139 pure ZC sequence as PRACH preamble with at least 7.5 and 60 kHz tone spacing for small cell deployment.
- Proposal 2: For the large cells, NR supports multiple PRACH SCS options. In addition, the SCS for large cells is band-dependent.
- Proposal 3: NR should support both option 1 and option 2 for multiple/repeated preamble formats. Option 2 should be supported with OCC across multiple/repeated PRACH preambles.
- Proposal 4: Proposed formats in over-6 GHz band is given below:

Format	Sequence type	Sequence length	Tone spacing	BW	N_OS	N_RP	Ts (ms)	Cp (Ts)
#1	ZC	139	60	8.64	1	1	1/(8*30720)	1024
#2	ZC	139	60	8.64	1	2	1/(8*30720)	1024
#3	ZC	139	60	8.64	1	4	1/(8*30720)	1024

Proposed formats for small and medium cells in sub-6 GHz band are given below:

Format	Sequence type	Sequence length	Tone spacing	BW	N_OS	N_RP	Ts (ms)	Cp (Ts)
#4	ZC	139	7.5	1.08	1	1	1/30720	720
#5	ZC	139	7.5	1.08	1	1	1/30720	3481
#6	ZC	139	7.5	1.08	2	1	1/30720	720

Decision: The document is noted.

R1-1708164 PRACH preamble sequences and formats Huawei, HiSilicon

- Proposal 1: NR should support PRACH preambles with ZC sequences of length L=127.
- Proposal 2: NR should support at least 64 PRACH preamble sequences per cell constructed from a single-root ZC sequence with m-sequence cover sequences.
  - The m-sequence cover sequences have length L=127, and are obtained by cyclic-shifts of a single m-sequence generated from the generator polynomial $g(D) = D^7 + D^3 + 1$.
- Proposal 3: NR supports option 4 for gNB sweeping.

Decision: The document is noted.

Tuesday session
R1-1709260 WF on NR-RACH preamble formats ZTE

Agreement:

- NR supports PRACH preamble formats 0 and 1 for the sequence length of 839.

Format	L	SCS(kHz)	BW (MHz)	N_OS	N_RP	T_SEQ (Ts)	T_CP (Ts)	T_GP (Ts)	Format
0	839	1.25	1.08	1	1	24576	3168	2975	LTE refarming
1	839	1.25	1.08	2	1	2*24576	21024	21904	Large cell, up to 100km

Possible agreements:

- Continue discussion on PRACH preamble formats 2, 3 and 4
  - FFS on the necessity of format 2 for the sequence length of 839
  - FFS on whether the SCS for format 3 is 2.5 kHz or wider
  - FFS on whether use cases of format 4 can be covered by other formats such as format 1 and 3 or not

R1-1709259 WF on PRACH sequence details ZTE

- For L = 839, NR supports subcarrier spacing of:

  - 1.25kHz and 2.5kHz
- For the shorter sequence length 63/71 or 127/139 do down selection between:
  - Alt1: NR supports sequence L = 127/139
    - SCS = {7,5, 15, 30, 60, 120}kHz
  - Alt2: NR supports sequence L = 63/71
    - SCS = {15, 30, 60, 120, 240}kHz

Decision: The document is noted, modified as follows:

Agreements:

- For L = 839, NR at least supports subcarrier spacing of:
  - 1.25 kHz
  - FFS: which one of 2.5 kHz or 5 kHz will be supported
- ~~For the shorter sequence length 63/71 or 127/139 do down selection between:~~
  - ~~Alt1: NR supports sequence L = 127/139~~
    - ~~SCS = {7.5, 15, 30, 60, 120}kHz~~
  - ~~Alt2: NR supports sequence L = 63/71~~
    - ~~SCS = {15, 30, 60, 120}kHz~~

Thursday: Above agreement is modified as follows

Agreements:

- For the shorter sequence length than L=839, NR supports sequence length of L = 127 or 139 with subcarrier spacing of {15, 30, 60, 120}kHz
  - Note: this is based on the assumption that 240 kHz subcarrier spacing is not available for data/control
  - FFS: 7.5 kHz subcarrier spacing

Thursday session

R1-1709573 WF on NR-RACH preamble format for high speed case ZTE

Working assumption:

- NR supports PRACH preamble format indicated in the table below for the sequence length of 839
  - FFS on restricted set
  - FFS other sequence(s) for large cell radius

Format	L	SCS(kHz)	BW (MHz)	N_OS	N_RP	T_SEQ (Ts)	T_CP (Ts)	T_GP (Ts)	Format
3 (1ms)	839	5	4.32	4	1	4*6144	3168	2976	High speed case

R1-1709700 WF on PRACH capacity enhancement NTT DOCOMO

Conclusions:

- Continue study on necessity of RACH capacity enhancement and possible solutions (if capacity enhancement is necessary) until next meeting with considering at least following aspects
  - Capacity limit due to short sequence length (e.g., which can be applied to beam sweeping)
  - Capacity due to higher subcarrier spacing
  - Supported cell radius as function of PRACH preamble reuse distance
  - Capacity impact due to cell radius impact on Ncs
  - Possibility to exploit spatial separation
  - Arrival rate of UEs within a beam/cell
  - UE distribution within cell

R1-1709589 NR PRACH Preamble Design with Multiple Different ZC Sequences CATT, Huawei, HiSilicon
R1-1709738 Capacity enh. for option 1 LGE

R1-1709708 WF on NR-RACH preamble format for coverage enhancement ZTE, CMCC

R1-1709711 WF on RACH sequence for high speed large radius cells Nokia

Conclusion: Continue study on necessity support RACH preamble sequence that is more resilient to frequency offsets and supports larger cell radius than the Zadoff-Chu sequence until next meeting

- Potential sequences as listed in R1-1704144

R1-1709767 WF on NR-RACH preamble format for short sequence ZTE

Conclusion: Use proposals in R1-1709767 as a starting point for evaluation until next meeting

- Companies to provide tables of supported preamble formats with SCS/CP/GP and support cell ranges on the reflector by June 9th – Jan (ZTE)

Friday session
R1-1709777 WF on optimization on PRACH design for UL transmission request Mediatek
R1-1709811 WF on PRACH preamble format for NR new use cases MediaTek, CHTTL, Intel

Agreements:

- Consider following new use cases for RACH design,
  - beam recovery requests
  - on demand SI requests
- Study the following aspects:
  - requirements to satisfy above new use cases
  - impact on capacity
  - whether additional preamble format(s) is needed
  - impact on RACH procedure

Not treated.
R1-1707048 NR-PRACH design ZTE
R1-1707342 Details on NR PRACH design Intel Corporation
R1-1707463 On NR RACH Preamble Design CATT
R1-1707756 PRACH design for NR AT&T
R1-1707840 Discussion on PRACH design to support uplink requests MediaTek Inc.
R1-1708093 On RACH format design for NR ETRI
R1-1708218 PRACH design resolving Time Ambiguity and Increasing Capacity TCL Communication Ltd.
R1-1708225 Discussion on PRACH designs to support over one symbol latency Sequans Communications
R1-1708243 NR Physical Random Access Channel Nokia, Alcatel-Lucent Shanghai Bell
R1-1708313 PRACH Design Cohere Technologies
R1-1708725 NR PRACH design Ericsson
R1-1708889 NR PRACH design Samsung
R1-1708950 Consideration on the length of NR-PRACH sequence CATR
R1-1709017 PRACH design for Beam SweepingTCL Communication Ltd.
R1-1709184 Discussion on NR PRACH preamble LG Electronics
R1-1709187 Discussion and evaluation on NR PRACH design NTT DOCOMO, INC.
R1-1709574 WF on NR-RACH preamble format for coverage enhancementZTE

7.1.1.4.2 4-step RA procedure

Include RACH configuration, RA procedure, power control/power ramping, etc.

R1-1708244 NR 4-step RACH procedure Nokia, Alcatel-Lucent Shanghai Bell

- Proposal 1: Support also cell specific CSI-RS to PRACH resource association.
- Proposal 2: Reporting UE capability on beam correspondence by RACH procedure is not supported.
- Proposal 3: If the UE increments the power ramping counter until the preamble reaches maximum UE transmit power. The UE resets the power ramping counter when selecting a new beam.
- Proposal 4: If the UE conducts beam switching the power ramping counter remains unchanged, or under network control, the UE can drop its power by a configurable amount.
- Proposal 5: Consider the following definitions:
  - RACH Burst = Set of RACH Occasions allocated consecutively in time domain.
  - RACH Burst Set = Set of RACH Bursts to enable full RX sweep.
- Proposal 6: RACH occasions can be allocated to uplink slots and to uplink-centric bidirectional slots.
- Proposal 7: Multiple RACH occasions can be allocated consecutively in an uplink slot or an uplink-centric bidirectional slot, which can be referred to as RACH slot.
- Proposal 8: The RACH configuration index identifies:
  - The UL slots, or UL-centric bidirectional slots allocated to RACH
  - The rate of occurrence of RACH slots
  - The number of RACH occasions per RACH slot per RACH frequency band
  - RACH preamble format including the number of RACH OFDM symbols per RACH preamble, the number of RACH preambles per RACH preamble format and the CP length.

  - The number of RACH frequency bands per RACH slot.
- Proposal 9: Support at least the following parameter categories:
  - PRACH preamble format parameters
  - RACH Burst set parameters
  - Parameters related to association between PRACH preambles and downlink RSs (cell specific CSI-RSs), and between PRACH preambles and SS blocks.

Decision: The document is noted.

Wednesday session

R1-1709493 WF on power ramping for UE changes Tx beam Samsung, Nokia, ASB

Also supported by Sony

Proposed agreements:

- If the UE conducts beam switching,
  - Alt 2: the counter of power ramping remains unchanged.
    - Supported by Samsung, Nokia, ASB, Sony, Sharp, Fujitsu, Intel
  - Alt 4: as proposed on slide 4 and illustrated on slide 5 in R1-1706613
    - Supported by Mitsubishi, DOCOMO, Ericsson, LG
  - Alt.5: NW configures either Alt.2 or Alt.3 with single power ramping counter
    - Supported by Huawei, HiSilicon, ZTE
- RAN1 will definitely decide power ramping mechanism for UE changes Tx beam from above alternatives at next meeting

Thursday

Agreements:

- If the UE conducts beam switching, the counter of power ramping remains unchanged
  - FFS: UE behavior after reaching the maximum power
- RAN1 will definitely decide above FFS point

R1-1709494 WF on reporting UE capability of beam correspondence Samsung, Intel

Proposed agreements:

- Alt.1: NR supports to report UE capability of beam correspondence by RACH procedure via Msg. 1.
  - Supported by CMCC
- Alt.2: NR supports to report UE capability of beam correspondence by RACH procedure via Msg. 3.
  - Supported by Samsung, Intel
- Alt.3: NR does not support to report UE capability of beam correspondence during RACH procedure.
  - Note that UE capability of beam correspondence is reported after RACH procedure
  - Supported by Nokia, ASB, Qualcomm, Huawei, HiSilicon, ZTE, LG, MediaTek, Sony, Ericsson

Agreement: NR does not support to report UE capability of beam correspondence during RACH procedure.

- Note that UE capability of beam correspondence is reported after RACH procedure

R1-1709416 WF on Random access configuration ZTE

Agreements:

- Random access (RA) configuration is included in remaining minimum SI.
- Continue discussion on
  - Whether all RA configuration information is transmitted in all beams used for RMSI within a cell or not
  - Whether NW is mandated to use the same set of beams for RMSI and SS block or not
  - Whether SS block and RMSI are spatial QCLed or not

Proposed agreements:

- Remaining minimum SI is identical in all beams within a cell.
- Support RA association based on both
  a) maximum number of SS blocks (for the frequency carrier) and
  b) the actually transmitted SS blocks.
- Indication of actually transmitted SS blocks can be included in remaining minimum SI.
- Note: If indication of actually transmitted SS blocks is not included in remaining minimum SI, then the RA association is based on the maximum number of SS blocks.
- Note: This does not preclude a dedicated configuration of PRACH resources, RA association and/or indication of actually transmitted SS blocks for CONNECTED mode UEs.

Friday conclusion: Continue discussion whether indication of actually transmitted SS blocks can be included in remaining minimum SI or not.

R1-17xxxxx WF on CSI-RS based RACH Configuration Samsung
Proposal:
- At least for CONNECTED mode random access, gNB can configure an association between CSI-RS and a subset of RACH resources and/or preambles
  - A UE uses either SS block or CSI-RS, based on gNB configuration
  - FFS: same or different RACH resources between CSI-RS based and SS block based

Friday
R1-1709598 WF on CSI-RS based RACH Configuration Samsung, Ericsson, ZTE, Nokia, ASB, MTI
Also supported by Intel, Mediatek

Agreement: RAN1 will study transmitting PRACH preambles in CONNECTED mode in resources based on CSI-RS
- FFS: use cases and configurations details based on CSI-RS

R1-1709776 WF on Alternative DL Tx Beam Indication in Msg. 3 for RACH Procedure in Multi-Beam Scenario AT&T, Qualcomm

Not treated.
R1-1706976 RACH procedures and resource configuration Huawei, HiSilicon
R1-1707049 4-step random access procedure ZTE
R1-1707254 Discussion on 4-step RA procedure Fujitsu
R1-1707343 Details on NR PRACH procedures Intel Corporation
R1-1707464 Further details on NR 4-step RA Procedure CATT
R1-1707594 Discussion on RACH procedure LG Electronics
R1-1707694 NR 4-Step Random Access Procedure Guangdong OPPO Mobile Telecom.
R1-1707749 Considerations on DL Tx beam reporting in msg. 3 AT&T
R1-1707787 Discussion on beam refinement Spreadtrum Communications
R1-1707841 Discussion on random access procedure in NR MediaTek Inc.
R1-1707933 Discussion on NR 4-step RACH procedure Samsung
R1-1708252 Remaining Issues on 4-step RACH Procedure Sony
R1-1708305 RACH configuration and procedure Motorola Mobility, Lenovo
R1-1708368 Power ramping procedure for multi-beam case Sharp
R1-1708389 Discussion on RACH configuration CMCC
R1-1708443 Discussion on 4-step random access procedure for NR NTT DOCOMO, INC.
R1-1708575 4 step RACH procedure consideration Qualcomm Incorporated
R1-1708726 NR mapping between SS-blocks and PRACH preambles Ericsson
R1-1708992 Multiple Msg1 transmissions for one monitored RAR window InterDigital Inc.
R1-1709172 On RACH retransmission Mitsubishi Electric Co.

7.1.1.5 Mobility procedure
R1-1709614 Discussion on LS R1-1706871 Intel Corporation

7.1.1.5.1 Measurement based on SS block
Details on SS block RSRP including whether to use additional PBCH-DMRS for measurement

R1-1708167 Discussion on measurement based on SS block Huawei, HiSilicon
- Observation 1: NR-SSS with sequence length 127 can provide enough RSRP accuracy performance.
- Proposal 1: In addition to NR-SSS, UE may optionally use DMRS for PBCH to derived SS block RSRP as cell level quality for L3 mobility. Whether and how to use DMRS for PBCH is up to UE implementation. No mobility requirement using PBCH-DMRS is needed, pending confirmation from RAN4.
- Proposal 2: CSI-RS RSRP can be used to derived the cell level quality for L3 mobility. Network can signal the UE the report type to use: SS Block RSRP and/or CSI-RS RSRP. RAN2 should confirm if RAN1 needs to define a combined SS block and CSI-RS RSRP.

Decision: The document is noted.

Tuesday session
R1-1709412 WF on measurement based on SS block NTT DOCOMO

Decision: The document is noted.

Possible agreement:
- RAN1 assumes at least SSS is used for SS block RSRP
  - FFS: Note that NR-PBCH DMRS can also be used for SS block RSRP if UE can know the power offset of NR-PBCH DMRS and NR-SSS

Wenesday session

Agreements:
- RAN1 assumes at least SSS is used for SS block RSRP
  - Note that NR-PBCH DMRS can also be used for SS block RSRP if UE can know the power offset of NR-PBCH DMRS and NR-SSS
- RAN1 asks RAN4 about above RAN1 assumptions
  - RAN1 will send LS to RAN4 after deciding DMRS design

Prepare draft LS to RAN4 in R1-1709596 – Hiroki (DOCOMO)
Thursday: As DMRS design is not fixed yet, NTT DOCOMO confirmed that there was no need for sending LS to RAN4 now.

Thursday session

R1-1709624 WF on RRM measurement MediaTek, Intel
- Continue discussion until Friday separately for idle mode and connected mode UEs on whether one or more periodicities needs to be supported from UE perspective – Tao (Mediatek)

Friday session

R1-1709810 WF on RRM measurement Mediatek
R1-1709838 WF on RRM measurement MediaTek, Intel

Conclusion: RAN1 should conclude one or multiple SS burst periodicity and the timing for UE RRM measurement per frequency carrier if indicated in the next meeting

Not treated.

R1-1707050	RRM measurements on IDLE mode RS	ZTE
R1-1707344	SS Block based RRM measurements	Intel Corporation
R1-1707465	IDLE and CONNECTED mode UE mobility based on SS-block measurements	CATT
R1-1707595	SS block based RRM Measurement	LG Electronics
R1-1707695	Discussion on the mobility measurement for the connected mode UE	Guangdong OPPO Mobile Telecom.
R1-1707757	Measurement based on SS block	AT&T
R1-1707819	Discussion on SS block RSRP for DL RRM Measurement	MediaTek Inc.
R1-1707934	Measurement based on SS block	Samsung
R1-1708237	SS block RSRP measurements	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708444	Discussion and evaluation on NR RRM measurement based on SS block	NTT DOCOMO, INC.
R1-1708576	Measurement based on SS block consideration	Qualcomm Incorporated
R1-1709185	Mobility measurements based on SS block	Ericsson

7.1.1.5.2 Measurement based on CSI-RS for L3 mobility

Properties of CSI-RS for RRM measurement for L3 mobility including timing, bandwidth, numerology, number of Res in frequency domain, resource mapping and parameters, configuration, etc.

R1-1708577 Measurement based on CSI-RS for L3 mobility consideration Qualcomm Incorporated
- Proposal 1: In synchronous networks, the timing reference for CSI-RS for L3 mobility is the frame/slot/symbol timing derived from the serving cell.
- Proposal 2: In asynchronous deployments, network can assist a UE in CSI-RS for L3 mobility by providing frame/slot timing of neighbor cell with respect to the serving cell.

Decision: The document is noted.

Tuesday session

R1-1709413 WF on measurement based on CSI-RS for L3 mobility NTT DOCOMO, ZTE

Agreements:
- Following CSI-RS properties for RRM measurement for L3 mobility are supported in NR
  - Periodic CSI-RS transmission with configurable periodicity
    - Note that CSI-RS transmission can be turned on and off

- FFS: candidate periodicity values
- Configurable transmission/measurement bandwidth
  - FFS: whether/how transmission and/or measurement bandwidth is indicated to UE
- Configurable CSI-RS time/frequency resource
  - Note that this property is the same with that for beam management based on CSI-RS
  - Note that the numerology for CSI-RS should consider neighbor cell measurement aspects

R1-1709201 WF on CSI-RS configurations ZTE, Huawei, HiSilicon, InterDigital

Agreements:

- RAN1 provides the following response to Question 1 (response to R1-1709061):
  - The design of CSI-RS for L3 mobility should reuse the CSI-RS design for beam management as a baseline.
  - CSI-RS for L3 mobility can have same, partly same or different configuration from CSI-RS for beam management.
    - For example, they could be the same when both are configured to be periodic with same periodicity
    - For example, they could be different when CSI-RS for L3 mobility is configured to be periodic and CSI-RS for beam management is configured to be aperiodic
    - For example, they could be partly the same when both are configured to be periodic but with different periodicities
- Prepare draft reply LS to RAN2 in R1-1709449 – Patrick (ZTE)

Wednesday
R1-1709449 [DRAFT] Response LS on CSI-RS for beam management and RRM measurements ZTE
Decision: The document is endorsed and final LS is approved in **R1-1709581**.

R1-1709202 WF on cell-specific configurable CSI-RS for L3 mobility ZTE, Huawei, HiSilicon, InterDigital

Agreement: RAN1 provides the following response to the "cell-specific and configurable" part of Question 2 in R1-1709061:

- RAN1 does not see the need to support cell-specific configuration for CSI-RS for RRM measurements

Thursday session
R1-1709203 WF on cell-specific and fixed CSI-RS for L3 mobility ZTE
R1-1709709 WF on CSI-RS based RRM measurements on detected cells ZTE, NTT DOCOMO

Agreements:

- RAN1 studies the following methods for a CONNECTED UE to obtain parameters for CSI-RS for L3 mobility:
  - Method 1: Configuration of a parameter that is valid for one CSI-RS resource
  - Method 2: Configuration of a parameter, e.g. periodicity, that is valid for all CSI-RS resources on a carrier frequency
  - Method 3: UE derives a parameter that is valid for all CSI-RS resources associated with detected cells on a carrier frequency, at least partly, from the cell ID
  - Method 4: Configuration of a parameter, e.g. periodicity, scramble ID (if specified), UE (group) ID (if specified), virtual cell ID (if specified), that is valid for a group of CSI-RS resources on a carrier frequency
  - Method 5: NW provides a parameter that is valid for CSI-RS resources associated with detected cells on a carrier frequency, e.g. based on UE measurement reporting
  - Other methods are not precluded
- Different parameters may be obtained by different methods.
- Note: "configuration" above means UE specific configuration by RRC signaling

R1-1709771 WF on CSI-RS properties for L3 mobility Huawei, HiSilicon
R1-1709785 WF on CSI-RS properties for L3 mobility Huawei, HiSilicon

Agreements:

- At least the following properties of a CSI-RS for L3 mobility can be signalled to the UE using dedicated signaling:
  - *NR Cell ID*
  - *timing configuration, including time offset and periodicity*
  - *number of antenna ports*
  - *configurable time/frequency resource to indicate RE mapping*
  - *configurable transmission/measurement bandwidth*
    - *Note: it relates to wideband operation*
  - *parameters for sequence generation*

  - *FFS: configurable numerology*
  - *FFS: Spatial QCL assumption e.g. QCL between SS block and CSI-RS*
- FFS: Which parameters are common or partial-common to multiple CSI-RSs
- FFS: Serving cell assists to derive the reference time of target cell in synchronous system

Not treated.

R1-1707051	RRM measurements on CSI-RS for L3 mobility	ZTE
R1-1707345	CSI-RS design for L3 Mobility	Intel Corporation
R1-1707466	L3 Mobility based on CSI-RS based measurments	CATT
R1-1707596	CSI-RS based RRM Measurement for L3 mobility	LG Electronics
R1-1707758	Measurement based on CSI-RS for L3 mobility	AT&T
R1-1707820	Discussion on Properties of CSI-RS for RRM measurement	MediaTek Inc.
R1-1707935	Measurement based on CSI-RS for L3 mobility	Samsung
R1-1708165	CSI-RS Design for L3 Mobility	Huawei, HiSilicon
R1-1708238	CSI-RS for mobility purposes	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708445	Discussion on NR RRM measurement based on CSI-RS for L3 mobility	NTT DOCOMO, INC.
R1-1709186	Measurements based on CSI-RS for L3 mobility	Ericsson

7.1.1.5.3 Radio link monitoring

R1-1707467 NR Radio Link Monitoring CATT

- Proposal 1: NR RLM design should be effective and easy to implement and test.
- Proposal 2: NR RLM should be developed with one of the following options:
  - Option 1: NR RLM design can be based on the SS-block RSRP measurements. UE determines its out-of-sync and in-sync status based on the direct comparison of the SS-block RSRP measurement from the serving beam, with the predefined or configured Q_{out} and Q_{in} thresholds for SS-block RSRP.
  - Option 2: If NR CSI-RS for RRM measurements is configured, NR RLM design can be based on both of SS-block RSRP and CSI-RS RSRP measurements. UE determines its out-of-sync and in-sync status based on the comparison of the maximum of SS-block RSRP and CSI-RS RSRP measurement from the serving beam with the predefined or configured Q_{out} and Q_{in} thresholds.
  - Option 3: NR RLM design can be based on the PBCH detection performance. UE determines its out-of-sync and in-sync status based on the comparison of the PBCH BLER from the serving beam with the predefined or configured Q_{out} and Q_{in} thresholds.

Decision: The document is noted.

Wednesday session

R1-1709555 Offline outcome regarding radio link monitoring NTT DOCOMO

Agreements:

- IS and OOS indications are based on SINR-like metric (e.g., hypothetical PDCCH BLER) as in LTE
  - SINR-like metric as in LTE represents whether or not UE can receive PDCCH
  - FFS: PDCCH in U-SS and/or PDCCH in C-SS
- RS used to derive SINR-like metric is down selected from following options
  - Opt.1: CSI-RS
  - Opt.2: DMRS for NR-PDCCH in C-SS
  - Opt.3: DMRS for NR-PBCH
  - Opt.4: NR-SSS
  - Opt.5: RS for time/frequency tracking (if separate RS from above is defined for time/frequency tracking)
  - FFS: how many options are used
- RAN1 assumes that single IS or OOS is indicated per reporting instance regardless number of beams available in cell. RAN1 has not concluded whether IS/OOS indications for RLF are per cell or not.
- RAN1 plans to provide at least periodic IS/OOS indications.
  - FFS: possibility of additional aperiodic IS indication e.g., based on beam failure recovery mechanism.

Proposed reply to RAN2:

Q1: *Can the in-sync/out-of-sync indications for RLF be provided per cell?*
A1: RAN1 assumes that single IS or OOS is indicated per reporting instance regardless number of beams available in cell. RAN1 has not concluded whether IS/OOS indications for RLF are per cell or not.

Q2: *Is RAN1 planning to provide in-sync/out-of-sync indications that are periodic (similar to LTE)?*
A2: RAN1 plans to provide at least periodic IS/OOS indications.

Prepare draft LS to RAN2 in R1-1709571 – Liu Liu (DOCOMO)
Thursday
R1-1709571 [DRAFT] Reply LS on in-sync/out-of-sync indication for RLF NTT DOCOMO
Decision: The document is endorsed and final LS is approved in R1-1709705

Not treated.
R1-1706974 Discussion and evaluation on NR-SS periodicity Huawei, HiSilicon
R1-1707052 Radio link monitoring in NR ZTE
R1-1707346 Discussion on NR RLM Intel Corporation
R1-1707597 Discussion on Radio Link Monitoring in NR LG Electronics
R1-1707759 Radio link monitoring AT&T
R1-1707936 Usage of RS for radio link monitoring in connected Samsung
R1-1708239 NR Radio lin monitoring Nokia, Alcatel-Lucent Shanghai Bell
R1-1708446 Discussion on NR RLM and RLF NTT DOCOMO, INC.
R1-1708578 Radio link monitoring consideration Qualcomm Incorporated
R1-1708729 Radio link monitoring Ericsson
R1-1709491 WF on In-sync/Out-of-sync indications for RLF MediaTek Inc.

7.1.1.6 Other

R1-1706977 Minimum UE bandwidth in NR Huawei, HiSilicon
R1-1706978 On numerology determination during initial access Huawei, HiSilicon
R1-1707054 RACH procedure in non-standalone operation Mitsubishi Electric Co.
R1-1707229 Identification NSA mode during initial access vivo
R1-1707813 RACH related parameters transmitting during initial access NEC
R1-1707937 Considerations on contention-free random access Samsung
R1-1707938 Considerations on cyclic shift dimensioning for PRACH design Samsung
R1-1707939 Considerations on PRACH design Samsung
R1-1707940 Power ramping for 4 step RACH procedure Samsung
R1-1707941 Beam management related issues in RACH procedure Samsung
R1-1708107 Mobility procedure and subcell Panasonic
R1-1708240 Cell Identification in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708730 System information for low complexity and extended coverage Ericsson
R1-1708731 NR random-access response design Ericsson
R1-1709031 Composite beam transmission for SS block Samsung
R1-1709032 Discussion on SS periodicity and PBCH TTI Samsung

7.1.2 MIMO

R1-1709853 Work plan for NR MIMO NTT DOCOMO
Decision: The document is noted. All proponents are recommended to follow this work plan to finalize MIMO.

7.1.2.1 Multi-antenna scheme

Physical control channel related issues are to be discussed in the agenda item for scheduling/HARQ aspects.

7.1.2.1.1 Codeword mapping

Including codeword-to-layer mapping and interleaving

R1-1709261 Summary of Open Issues on Layer Mapping Samsung

Agreement: For >4-layer transmission, each of the two CWs is mapped to at most 4 layers

R1-1709356 WF on configurable codeword to layer mapping LG Electronics, AT&T, ZTE

Agreements:
- At least support the following layer split for L >4 layer transmission: the 1st $\lfloor L/2 \rfloor$ layers → CW0 and remaining layers → CW1
- For >4 layer transmission, investigate further whether or not to support additional correspondence with limited number of possibilities
  - The mapping is configured by gNB to the UE
    - FFS whether by RRC signaling or DCI or both
    - FFS possible mapping configured by gNB
  - FFS whether the UE report the preferred layer mapping

R1-1709360 **WF on CW to layer mapping scheme for data channels** **Qualcomm, Samsung, Panasonic, Intel, Sharp, Ericsson, CATT, KDDI, Interdigital, ATT, Nokia, ASB**
R1-1709313 **WF on CW to resource mapping** **ZTE, Huawei, HiSilicon, NTT DOCOMO, Xinwei, ASTRI**

Working assumption:
- In NR, support at least the following mapping order for modulated symbol stream to the allocated resource for DL data channel
  - First across layers associated with the codeword, then across subcarriers (frequency) and then across OFDM symbols (time)
  - FFS whether the resource is associated with a CW or with a CB group
  - FFS other schemes (e.g., Layer→ Time→ Frequency, Time→ Frequency →Layer, Frequency→ Layer→ Time)
    - If so, details of configuration signalling, e.g. RRC, DCI
    - Companies are strongly encouraged to perform evaluations especially for high-speed scenarios, and interference limited/varying scenarios

Agreements:
- Companies are encouraged to perform further evaluations on whether or not to support frequency interleaving, and if supported, the detailed interleaving scheme (e.g. as summarized in R1-1709261, per-OFDM-symbol interleaver, either used all the time or conditionally multi-OFDM-symbol interleaver, configurable interleaver, etc.)
  - Aim to make a decision in the next RAN1 meeting

Agreements:
- NR supports in one DCI containing one MCS (for the case of one CW) and two MCSs (for the case of two CWs) for a given UE
  - FFS details

R1-1709193 **Codeword mapping in NR** **MediaTek Inc.** (Revision of R1-1707833)

Not treated
R1-1707083 Further Evaluation and Discussion on Codeword to Layer Mapping Beijing Xinwei Telecom Techn.
R1-1707111 Codeword to layer mapping and interleaving ZTE
R1-1707347 Remaining details on CW to MIMO layer mapping Intel Corporation
R1-1707468 Discussion on codeword mapping CATT
R1-1707598 Discussion on codeword mapping LG Electronics
R1-1707737 Remaining issue for CW to Layer mapping AT&T
R1-1707765 Discussion of codeblock mapping for DL and UL data channel Lenovo, Motorola Mobility
R1-1708128 Codeword to layer mapping in NR Huawei, HiSilicon
R1-1708448 Views on CW mapping NTT DOCOMO, INC.
R1-1708579 CW to layer mapping and frequency domain interleaving Qualcomm Incorporated
R1-1708667 Codeword to layer mapping for DL and UL Ericsson
R1-1709231 Finalizing Layer Mapping Samsung
R1-1709513 WF on MCS and CQI configuration for NR Intel

7.1.2.1.2 Transmission scheme 2 for DL

R1-1707852 **Analysis of transmission scheme 2** **MediaTek Inc.**

R1-1709357 **WF on DL transmission scheme 2** **LG Electronics, Qualcomm, Ericsson, Samsung, Intel, NTT DOCOMO, ZTE, WILUS Inc., Nokia, ASB, OPPO, Fujitsu, Panasonic, IITH, CEWiT, IITM, Tejas Networks, KDDI, CHTTL, AT&T**
R1-1709294 **WF on DL transmission scheme 2** **Huawei, HiSilicon, China Unicom, Xinwei, CMCC, Softbank, Mitsubishi Electric, Interdigital, Deutsche Telekom, CATR**

Agreement: For NR in Rel-15, DL transmission scheme 2 is not explicitly supported for unicast PDSCH in specification
- Note: CSI feedback assuming open-loop/semi-open-loop and/or closed-loop transmissions is to be discussed separately

Not treated.
R1-1707112 Diversity based downlink transmission schemes ZTE
R1-1707348 Discussion on transmission scheme 2 for DL Intel Corporation
R1-1707469 Further discussion on DL transmission scheme 2 CATT

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R1-1707599 Discussion on transmission scheme 2 for DLLG Electronics
R1-1707738 On Transmission Scheme 2 for DL AT&T
R1-1708129 Transmission scheme 2 for DL Huawei, HiSilicon
R1-1708330 On Selection of DL Transmission Scheme 2 InterDigital, Inc.
R1-1708390 Discussion on DL Transmission Scheme 2 for rank-1 CMCC
R1-1708449 Discussion on DL transmission scheme 2 NTT DOCOMO, INC.
R1-1708668 Downlink Tx Scheme 2: Summary, Recent Developments, & Way Forward Ericsson
R1-1708893 On the support of open-loop transmission in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1709453 Discussions on transmission scheme 2 for NR Samsung
R1-1709734 On DL transmission scheme 2 Qualcomm Incorporated
R1-1709778 WF on DL transmission scheme 2 Samsung, KDDI, Fujutsi

7.1.2.1.3 Codebook based transmission for UL

Including codebook design and PRG size

R1-1709661 Summary of Issues and WFs on Codebook based transmission for UL Intel
R1-1709495 WF on UL codebook design principle LG Electronics, Xinwei, Samsung, MediaTek
R1-1709798 WF on UL codebook LG Electronics, Samsung, InterDigital

Agreements:

- One of the following UL codebook design principles is down-selected until next meeting.
  - Alt1:
    - NR supports UL codebook at least for a single panel.
      - Note: This does not preclude the use of components of single panel UL codebook for multi-panel.
    - FFS on multi-panel UL codebook
      - Whether or not support additional components (e.g., panel co-phase)
      - NR supports a UL codebook optimized for single-panel and support multi-panel via indicating multiple TPMIs
      - Focus on single panel based UL codebook design first, then support multi-panel via selecting a panel via SRI or indicating TPMI per SRS resource.
  - Alt 2:
    - Focus on designing a common framework UL codebook for single-panel and multi-panel
  - Alt 3:
    - Design different UL codebooks for single-panel and multi-panel, respectively.
- Codebook details are FFS
- Existing LTE codebooks should be considered as baseline.

R1-1709492 WF on UL Codebook Structure Nokia, Nokia Shanghai Bell, CATT, Interdigital

R1-1709548 WF on Codebook Based UL-MIMO Transmission Huawei, HiSilicon, Samsung
Also supported by InterDigital

R1-1709673 NR UL MIMO Signaling Mechanism Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, Qualcomm, CATT, ZTE

R1-1709743 UL codebook-based transmission Samsung (Revision of R1-1707944)
R1-1708669 UL MIMO procedures for codebook based transmission Ericsson

Not treated.
R1-1707113 Codebook based UL transmission ZTE
R1-1707349 On codebook based UL tansmission Intel Corporation
R1-1707470 Further discussion on codebook basded UL transmission CATT
R1-1707600 Discussion on codebook based transmission for UL LG Electronics
R1-1707944 UL codebook-based transmission Samsung
R1-1708130 Codebook based transmission for UL MIMO Huawei, HiSilicon
R1-1708331 TPMI Indication for Frequency Selective UL Precoding InterDigital, Inc.
R1-1708581 Codebook based UL transmission Qualcomm Incorporated
R1-1708894 Codebook design for UL MIMO Nokia, Alcatel-Lucent Shanghai Bell
R1-1709206 Codebook based transmission for UL MIMO Huawei, HiSilicon

7.1.2.1.4 Non-codebook based transmission for UL

Including PRG size

R1-1709741 Summary of issues on UL non-codebook based transmissions Nokia, Nokia Shanghai Bell
R1-1709597 WF on Frequency-Selective Precoding in UL Transmission Qualcomm, Nokia, ASB, CATT, Ericsson, MediaTek
R1-1709607 WF on frequency-selective precoding in UL transmission Huawei, HiSilicon, Samsung, IITM, AT&T, Tejas Networks, Softbank, IITH, CeWiT, KDDI, Deutsche Telekom, CATR, SHARP, Interdigital, Xinwei

Agreements:
- When the number of transmission ports is less than or equal to 2, frequency selective precoding is not supported for both schemes A and B
- When the number of transmission ports is >2, frequency selective precoding for CP-OFDM can be configured by gNB for both schemes A and B
  - FFS how to support/indicate frequency selective precoding (including potentially spec-transparent support)
  - Note: frequency-selective TPMI is to be discussed separately

R1-1709549 WF on UL non-codebook based transmission Huawei, HiSilicon, LGE, CATT, Ericsson, CeWiT, Deutsche Telekom, China Telecom, Xinwei, Tejas Networks, CATR, MediaTek, IITH, IITM
Also supported Reliance Jio, InterDigital
R1-1709484 WF on non-codebook based transmission for UL NTT DOCOMO, InterDigital, Intel

R1-1707945 Discussion on Non-Codebook-Based UL Transmission Samsung

Not treated.
R1-1706923 Non codebook based transmission for UL MIMO Huawei, HiSilicon
R1-1707114 Non-Codebook based and Hybrid based UL transmission ZTE
R1-1707350 On non-codebook based UL transmission Intel Corporation
R1-1707471 Further discussion on non-codebook basded UL transmission CATT
R1-1707601 Discussion on non-codebook based transmission for UL LG Electronics
R1-1708450 Beam determination for non-codebook based transmission for uplink NTT DOCOMO, INC.
R1-1708582 Non-codebook based UL transmission Qualcomm Incorporated
R1-1708670 UL MIMO procedures for non-codebook based transmission Ericsson
R1-1708895 Non-codebook based UL-MIMO transmission Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.1.5 Diversity transmission for UL

R1-1707602 Discussion on diversity transmission for UL LG Electronics
R1-1708671 Robust Transmission Scheme for PUSCH Ericsson

R1-1709800 Summary of AI 7.1.2.1.5 UL transmit diversity Mitsubishi

Agreements:
- For UL transmit diversity for CP-OFDM, down-select between the following alternatives
  - Alt. 1: transmit diversity is not explicitly supported for PUSCH in Rel. 15
  - Alt. 2 non-transparent UL transmit diversity for CP-OFDM (e.g., SFBC, Non-transparent precoder cycling)
- For UL transmit diversity for DFTsOFDM and CP-OFDM, companies are encouraged to provide evaluation results and implementation analysis for the next RAN1 meeting

Not treated.
R1-1707115 Diversity based uplink transmission schemes ZTE
R1-1707351 On diversity based UL transmission Intel Corporation
R1-1707472 Further discussion on transmission diversity scheme in UL CATT
R1-1707739 TxD for UL AT&T
R1-1707798 UL diversity transmission for DFTsOFDM Mitsubishi Electric RCE
R1-1707946 Diversity transmission for UL Samsung
R1-1708131 Diversity-based transmission for UL Huawei, HiSilicon
R1-1708223 Uplink diversity scheme for DFT-S-OFDM IITH
R1-1708583 On UL diversity transmission scheme Qualcomm Incorporated
R1-1708896 UL diversity schemes Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.1.6 PRB bundling for DL

R1-1709354 Summary of Issues on DL PRB bundling Xinwei
R1-1709622 WF on DL PRB Bundling Size Indication Xinwei, HW, HiSilicon, CATT, MTK, Intel, Ericsson, Samsung, ZTE, LG, Nokia, Alcatel-Lucent Shanghai Bell
R1-1709623 WF on DL PRB Bundling Size Value Set Xinwei, HW, HiSilicon, CATT, MTK, Intel, ZTE
R1-1709791 WF on DL PRB Bundling Size Value Set Xinwei, CATT, MTK, Intel, ZTE

Agreements:
- For DL data transmission
  - PRB bundling size include (including possible downselection)
    - Case 1: value(s) based on RBG
      - FFS RBG/k, where k is integer, FFS the value(s) of k
      - FFS m * RBG, where m is integer, FFS whether m is always equal to 1
    - Case 2: other values based on bandwidth part, and/or scheduled bandwidth and/or UE capability etc.
      - E.g., Consecutive scheduled bandwidth
        - FFS restrictions
      - E.g., Values equal or larger than scheduled BW
        - FFS restrictions
    - FFS other cases;
    - FFS the relationship between above values with e.g. DMRS patterns
  - FFS UE feedback assisted PRB bundling size with respect to UE complexity, feedback overhead increase and performance gains.
  - FFS joint or separate indication of PRB bundling size on data and DMRS

Not treated.
R1-1707084 Further Evaluation and Discussion on PRB Bundling Size Beijing Xinwei Telecom Techn.
R1-1707116 On PRB Bundling ZTE
R1-1707473 Discussion on PRB bundling for DL CATT
R1-1709451 PRB bundling for NR DMRS Samsung rev of R1-1707947
R1-1708133 PRB bundling size for DL data precoding Huawei, HiSilicon
R1-1708332 PRG Size Indication in NR InterDigital, Inc.
R1-1708584 Discussion on PRB bundling for DL Qualcomm Incorporated
R1-1708672 On DL PRB bundling Ericsson
R1-1708897 On details of PRB Bundling Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.1.7 Multi-TRP and Multi-panel transmission

R1-1709299 Remaining issues on multi-TRP and multi-panel transmission CATT

Agreements:
- Adopt the following for NR reception:
  - Single NR-PDCCH schedules single NR-PDSCH where separate layers are transmitted from separate TRPs
  - Multiple NR-PDCCHs each scheduling a respective NR-PDSCH where each NR-PDSCH is transmitted from a separate TRP
  - Note: the case of single NR-PDCCH schedules single NR-PDSCH where each layer is transmitted from all TRPs jointly can be done in a spec-transparent manner
    - Note: CSI feedback details for the above case can be discussed separately

R1-1709350 WF on control channel for multi-TRP transmission Huawei, HiSilicon, Ericsson, ATT, CATT, MediaTek, Interdigital, China Telecom, China Unicom, BT, Nokia, Alcatel-Lucent Shanghai Bell, Qualcomm

Agreements:
- For the reception of multiple NR-PDCCHs each scheduling a respective NR-PDSCH where each NR-PDSCH is transmitted from a separate TRP, NR supports:
  - The maximum supported number of NR-PDCCHs/PDSCHs is either 2 or 3 or 4
    - To be decided next meeting
    - FFS signaling (explicit or implicit) of the maximum number of NR-PDCCHs/PDSCHs for a UE, including the case of signaling a single NR-PDCCH/PDSCH

R1-1709735 Way Forward on Uplink Multi-panel and Multi-TRP operation Intel, Ericsson, InterDigital

Not treated.

R1-1707117	Multi-TRP Transmission and interference coordination	ZTE
R1-1707352	Discussion on uplink multi-panel and multi-TRP operation	Intel Corporation
R1-1707353	Support of downlink NC-JT in NR	Intel Corporation
R1-1707474	Further discussuin on multi-panel/multi-TRP transmission	CATT
R1-1707603	Discussion on cooperative transmission	LG Electronics
R1-1707760	Support multiple DCI based transmission	AT&T
R1-1707837	Multi-TRP and Multi-panel transmissions	MediaTek Inc.
R1-1707948	Discussions on NR DL multi-TRP and multi-panel support	Samsung
R1-1707949	Discussions on NR UL multi-TRP and multi-panel support	Samsung
R1-1708132	NR-PDCCH design for Multi-TRP coordinated transmission	Huawei, HiSilicon
R1-1708333	On Multi-TRP/Panel Transmission for DL	InterDigital, Inc.
R1-1708378	NR-PDCCH for multi-TRP transmission	China Telecommunications
R1-1708585	OTA calibration for multi-TRP transmission	Qualcomm Incorporated
R1-1708673	On Multi-TRP and Multi-panel transmission	Ericsson
R1-1708674	UL multi-panel transmission	Ericsson
R1-1708898	Non-coherent Multi-node Transmission in the 5G New Radio	Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.1.8 Other

R1-1706924	Discussion on transmission parameter sets	Huawei, HiSilicon
R1-1707118	On Transmission Setting	ZTE
R1-1707740	Multi Codeword MIMO Implementation using Multiple DCI	AT&T
R1-1707950	Continuous precoding for NR DMRS in time domain	Samsung
R1-1707951	Multi-TA procedures for Multi-TRP	Samsung
R1-1708675	On transmission parameter sets	Ericsson
R1-1708899	DL transmission mode configuration for NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708900	On frequency selective precoding for UL-MIMO	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708901	UL DCI signaling details	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708902	Performance Evaluation of DPS CoMP scheme for NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708903	erformance Evaluation of DPS CoMP in 28 GHz	Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.2 Beam management

7.1.2.2.1 Beam management details

R1-1708666	On RAN2 LS on CSI-RS for beam management and RRM measurements	Ericsson
R1-1709014	[DRAFT] Response LS on CSI-RS for beam management and RRM measurements	ZTE

Possible agreement:

- For UE RRC connected mode, cell-specifically configured periodic CSI-RS is supported at least for P1 procedure (Tx/Rx beam alignment)
  - Configuration of CSI-RS is obtained from the broadcast message (e.g., MIB, SIB)

Continue offline discussion until Tuesday – Sundar (Qualcomm)

Wednesday

R1-1709496	**Potential agreements on beam management**	**Qualcomm**

Agreements:

- Support spatial QCL assumption between antenna port(s) within a CSI-RS resource(s) and antenna port of an SS Block (or SS block time index) of a cell
  - The other QCL parameters not precluded
  - FFS: indication either explicit or implicit or configurable or a default
  - Note: default assumption may be no QCL
- Configuration of QCL for UE specific NR-PDCCH is by RRC and MAC-CE signalling
  - Note that MAC-CE is not always needed
  - FFS: necessity of DCI signalling
  - Note: For example, DL RS QCLed with DMRS of PDCCH for delay spread, Doppler spread, Doppler shift, and average delay parameters, spatial parameters

Agreement: Cell-specifically configured CSI-RS is not supported for beam management

Continue offline discussion until Thursday by utilizing R1-1709496 – Sundar (Qualcomm)

Friday session

R1-1709774 Potential agreements on beam management Qualcomm

Agreements:

- The following beam grouping criteria are considered:
  - A1 (based on Alt 1): Different TRP TX beams reported for the same group can be received simultaneously at the UE.
  - A2 (based on Alt 2): Different TRP TX beams reported for different groups can be received simultaneously at the UE.
  - Down selection of the beam grouping criteria by next meeting
- FFS in addition to the above grouping criteria, the following grouping criteria can be considered
  - C1 (in combination with A1): Different TRP TX beams reported for different groups cannot be received simultaneously at the UE.
  - C2(in combination with A2): Different TRP TX beams reported for the same group cannot be received simultaneously at the UE.

Agreements:

- For beam management with beam group reporting the following quantities should be considered
  - the max number of groups supported in the specification M,
  - the max number of Tx beams per group supported in the specification N
  - the number of groups to report L
  - the number of Tx beams per group in the report Q
  - FFS: UE-specific configuration of the parameters L, Q incorporating UE-capability information
- L = 1, Q = 1 are supported which implies no impact to reporting and indication overhead
- Companies are encouraged to evaluate performance to determine values of M, N, L, Q for the first release of NR
  - Decide on the values of L, M, N, Q supported by the spec to be able to determine impact on reporting and indication overhead

R1-1709617 WF on CSI-RS design for beam management Samsung, Intel, KT, Ericsson
R1-1709797 WF on CSI-RS pattern for beam management Huawei, HiSilicon, CATT, ZTE, OPPO
R1-1709668 WF on CSI-RS for beam management ZTE, LG Electronics, ASTRI, Huawei, HiSilicon, Samsung, Ericsson, InterDigital, CATT
Also supported by Nokia, Intel, Qualcomm

Agreements:

- NR supports CSI-RS configuration to support Tx and/or Rx beam sweeping for beam management conveying at least the following information
  - Information related to CSI-RS resource configuration
    - E.g., CSI-RS RE pattern, number of CSI-RS antenna ports, CSI-RS periodicity (if applicable) etc.
  - Information related to number of CSI-RS resources
  - Information related to number of time-domain repetitions (if any) associated with each CSI-RS resource
    - FFS: details of time-domain repetitions, e.g., signaling for time-domain repetitions may not be explicit
  - FFS signaling details, e.g., explicit indication vs implicit indication
  - Note this does not imply particular option (IFDMA or subcarrier scaling or DFT based) for sub time unit partition
  - FFS: whether different sub-time units have same or different ports

R1-1709554 WF on aperiodic SRS for UL beam management OPPO, Xinwei, Xiaomi, Coolpad, Spreadtrum, Nokia, ASB, CATT, China Telecom, Intel, Samsung, MediaTek, CATR, NTT DoCoMo, Ericsson, Huawei, HiSilicon

Agreements:

- For aperiodic SRS transmission triggered by single aperiodic SRS triggering field, the UE can be configured to transmit N(N>1) SRS resources for UL beam management
  - FFS transmit power for the N SRS resources for UL beam management

R1-1709808 WF on using SS block for beam management ZTE

R1-1709773 WF on UL Beam Management Huawei, HiSilicon, Intel, Xinwei, MediaTek, InterDigital

R1-1709483 WF on beam switching CATT

Not treated.

R1-1706925	UL beam management	Huawei, HiSilicon
R1-1707085	Discussion on DL Beam Management	Beijing Xinwei Telecom Techn.
R1-1707119	DL beam management for NR MIMO	ZTE
R1-1707120	UL beam management for NR MIMO	ZTE
R1-1707244	DL beam management and beam reporting	vivo
R1-1707354	Details for UL Beam Management	Intel Corporation
R1-1707355	Details for DL Beam Management	Intel Corporation
R1-1707475	Discussion on DL beam management	CATT
R1-1707476	Discussion on UL beam management	CATT
R1-1707604	Discussion on DL beam management	LG Electronics
R1-1707605	Discussion on UL beam management	LG Electronics
R1-1707696	Discussion on the DL Beam Management	Guangdong OPPO Mobile Telecom.
R1-1707697	Discussion on the UL Beam Management	Guangdong OPPO Mobile Telecom.
R1-1707750	DL beam mangement details	AT&T
R1-1707830	Details on DL Beam management	MediaTek Inc.
R1-1707831	Discussion on UL beam management with imperfect beam correspondence	MediaTek Inc.
R1-1707952	UL beam management	Samsung
R1-1707953	Downlink beam management details	Samsung
R1-1708134	DL beam management	Huawei, HiSilicon
R1-1708258	Considerations on beam reporting	Sony
R1-1708270	Discussion on Nested Usage of RS for Beam Measurement	National Instruments Corp.
R1-1708334	On Beam Management for DL Control and Data Channels	InterDigital, Inc.
R1-1708335	On Efficient UL Beam Management	InterDigital, Inc.
R1-1708451	Views on beam management details	NTT DOCOMO, INC.
R1-1708586	Beam management for NR	Qualcomm Incorporated
R1-1708676	DL beam management details	Ericsson
R1-1708677	UL beam management details	Ericsson
R1-1708904	Reference signals and measurements for beam management	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709046	Considerations on UE Beamforming Management	ASUSTEK COMPUTER (SHANGHAI)
R1-1709307	WF on beam reporting	ZTE
R1-1709308	WF on UL and DL RS association	ZTE
R1-1709312	WF on beam indication	ZTE
R1-1709359	WF on Configuration of CSI-RS	Ericsson, AT&T, Huawei
R1-1709377	WF on QCL for CSI-RS as beam-related indication	LG Electronics
R1-1709380	WF on RS for P1 procedure	Samsung, KT Corp., Nokia, ASB
R1-1709381	WF on beam indication for PDCCH	Samsung
R1-1709382	WF on beam indication for PDSCH	Samsung
R1-1709482	WF on beam indication for PDSCH	CATT
R1-1709647	WF on Group-based Beam Reporting	Intel
R1-1709667	WF on UL beam management with UE assistance information	MediaTek, Samsung

7.1.2.2.2 Mechanism to recover from beam failure

Possible agreements:

- In addition to periodic CSI-RS, SS-block within the serving cell can be configured for the following aspects:
  - Beam failure detection
  - New candidate beam identification
    - FFS: combination of SS block and periodic CSI-RS resources can be configured together for identifying candidate beams.
- Notes: Periodic CSI-RS has been agreed for beam failure detection and new candidate beam indication

Friday session

R1-1709606 Summary from offline for beam recovery mechanism MediaTek

Working assumption:

- Support at least the following triggering condition(s) for beam failure recovery request transmission:
  - Condition 1: when beam failure is detected and candidate beam is identified at least for the case when only CSI-RS is used for new candidate beam identification

- FFS Condition 2: Beam failure is detected alone at least for the case of no reciprocity
  - FFS how the recovery request is transmitted without knowledge of candidate beam
- Note: if both conditions are supported, which triggering condition to use by UE also depends on both gNB configuration and UE capability

R1-1709309 WF on beam recovery ZTE, MediaTek, vivo, Spreadtrum, Qualcomm, ASTRI, AT&T, OPPO, Ericsson, LGE, Xinwei

Conclusion:

- FFS SS-block in addition to CSI-RS is at least supported for P-1 in beam management
  - FFS with or without L1-RSRP reporting

Agreements:

- Support the following channel(s) for beam failure recovery request transmission:
  - Non-contention based channel based on PRACH, which uses a resource orthogonal to resources of other PRACH transmissions, at least for the FDM case
    - FFS other ways of achieving orthogonality, e.g., CDM/TDM with other PRACH resources
    - FFS whether or not have different sequence and/or format than those of PRACH for other purposes
    - Note: this does not prevent PRACH design optimization attempt for beam failure recovery request transmission from other agenda item
    - FFS: Retransmission behavior on this PRACH resource is similar to regular RACH procedure
  - Support using PUCCH for beam failure recovery request transmission
    - FFS whether PUCCH is with beam sweeping or not
    - Note: this may or may not impact PUCCH design
  - FFS Contention-based PRACH resources as supplement to contention-free beam failure recovery resources
    - From traditional RACH resource pool
    - 4-step RACH procedure is used
    - Note: contention-based PRACH resources is used e.g., if a new candidate beam does not have resources for contention-free PRACH-like transmission
  - FFS whether a UE is semi-statically configured to use one of them or both, if both, whether or not support dynamic selection of one of the channel(s) by a UE if the UE is configured with both

R1-1709639 WF on handling beam failure recovery for unexpected cases vivo, Qualcomm, KT Corp, Ericsson

Agreements:

- To receive gNB response for beam failure recovery request, a UE monitors NR PDCCH with the assumption that the corresponding PDCCH DM-RS is spatial QCL'ed with RS of the UE-identified candidate beam(s)
  - FFS whether the candidate beam(s) is identified from a preconfigured set or not
  - Detection of a gNB's response for beam failure recovery request during a time window is supported
    - FFS the time window is configured or pre-determined
    - FFS the number of monitoring occasions within the time window
    - FFS the size/location of the time window
    - If there is no response detected within the window, the UE may perform re-tx of the request
      - FFS details
  - If not detected after a certain number of transmission(s), UE notifies higher layer entities
    - FFS the number of transmission(s) or possibly further in combination with or solely determined by a timer

Not treated.

R1-1707121	Discussion on beam recovery mechanism	ZTE
R1-1707245	Beam recovery based on NR-PDCCH and NR-PDSCH	vivo
R1-1707255	Discussion on beam failure recovery procedure	Fujitsu
R1-1707356	Discussion for Mechanism to Recover from Beam Failure	Intel Corporation
R1-1707477	Discussion on DL beam recovery	CATT
R1-1707606	Discussion on beam failure recovery	LG Electronics
R1-1707698	On Beam Recovery Mechanism	Guangdong OPPO Mobile Telecom.
R1-1707751	Design principles of beam recovery mechanism	AT&T
R1-1707782	Discussion on beam recovery	Spreadtrum Communications
R1-1707814	Low latency beam failure recovery by PRACH/PRACH-like	NEC
R1-1707832	Discussion on Beam Recovery Mechanism	MediaTek Inc.
R1-1707954	Discussion on beam recovery procedure	Samsung

R1-1708135 Beam failure recovery Huawei, HiSilicon
R1-1708336 Remaining Issues on Beam Recovery for NR InterDigital, Inc.
R1-1708369 Discussion on mechanisms for beam failure recovery Sharp
R1-1708380 Discussion on beam failure recovery CHTTL
R1-1708452 Further views on mechanism to recover from beam failure NTT DOCOMO, INC.
R1-1708678 Beam failure recovery mechanism Ericsson
R1-1708874 Discussion on beam failure recovery mechanism Institute for Information Industry (III)
R1-1708905 Beam Recovery in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1709613 WF on information carried by beam failure recovery request LG Electronics, ZTE

7.1.2.2.3 Other

R1-1706928 Beam management across multiple carriers Huawei, HiSilicon
R1-1707122 Beam grouping evaluation for beam management ZTE
R1-1707357 On Timing Advance for multi-beam operation Intel Corporation
R1-1707478 Discussion on additional beam management RS CATT
R1-1707479 Discussion on need of DL and UL RS association CATT
R1-1707699 Beam association relationship between data and control channels Guangdong OPPO Mobile Telecom.
R1-1707955 Link level simulation assumptions for beam management Samsung
R1-1707956 System level simulation assumptions for beam management Samsung
R1-1707957 Discussion on Tx beam grouping Samsung
R1-1708136 Multi-beam transmission for robustness Huawei, HiSilicon
R1-1708271 Discussion on Robust Beam Management National Instruments Corp.
R1-1708453 Evaluation on beam management NTT DOCOMO, INC.
R1-1708679 On cell specific CSI-RS Ericsson
R1-1708680 On the use of SS for beam management Ericsson
R1-1708681 Beam management in C-DRX Ericsson
R1-1708682 Further results on beam management without beam indication Ericsson
R1-1708683 Performance of beam grouping for different UE antenna architectures Ericsson
R1-1708871 Discussion on beam correspondence validity China Unicom
R1-1708906 BPL definition and Spatial QCL time indication Nokia, Alcatel-Lucent Shanghai Bell
R1-1708907 On beam grouping and reporting Nokia, Alcatel-Lucent Shanghai Bell
R1-1708908 Multi beam transmission of UL channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1708909 Multi-beam control channel transmission Nokia, Alcatel-Lucent Shanghai Bell
R1-1708910 Beam management - QCL association between DL RS and DMRS for NR-PDCCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708911 Beam Measurements and TX/RX Beam Correspondence Nokia, Alcatel-Lucent Shanghai Bell
R1-1708912 SRS transmission for beam management Nokia, Alcatel-Lucent Shanghai Bell
R1-1708947 Evaluation results of beam selection based on multiple panel CATR
R1-1709033 System level evaluation results for beam management Samsung
R1-1709034 Link level evaluation results for beam management Samsung
R1-1709035 Beam measurement and reporting Samsung
R1-1709036 Discussion on Rx beam set based reporting Samsung

7.1.2.3 CSI acquisition

7.1.2.3.1 CSI framework

Including beam management framework

R1-1708454 Views on CSI framework NTT DOCOMO, INC.
R1-1708684 Further details of CSI framework Ericsson

R1-1709447 WF on CSI-RS framework CATT, Ericsson, Nokia, ASB, Intel, OPPO
R1-1709485 WF on Triggering Mechanism for CSI Reporting NTT DOCOMO, LGE, Huawei, HiSilicon, Sharp, Mitsubishi
Also supported by Intel

> Regarding dynamic signaling at least focusing on SPS CSI-RS and SPS CSI-RS feedback, discuss further offline especially on the resulting overhead associated with DCI-based vs. MAC CE-based approaches, taking into account maximum number of CSI reporting settings (N value), maximum number of resources settings (M value), maximum number of resource sets (S value), the number of links (L), and/or maximum number resources per resource set (Ks value) in both non-CA and CA scenarios (note: multiple sets of values may be used for the overhead analysis) – Rakesh (CATT)

Friday
R1-1709775 Summary of offline discussion on CSI framework CATT

Agreement**:** Maximum value of Ks for CSI acquisition is no more than 8

Email discussion till next meeting on the following – Rakesh (CATT)

- Maximum number of CSI reporting settings (N value), maximum number of resources settings (M value), maximum number of resource sets (S value), the number of links (L), and/or maximum number resources per resource set (Ks value) in both non-CA and CA scenarios

R1-1709396 WF on CSI timing LG Electronics, ZTE, Intel, InterDigital, NTT DOCOMO, Samsung, Nokia, Alcatel-Lucent Shanghai Bell, Ericsson
Continue offline discussion – Xiaoyi (ATT)
Friday
R1-1709604 Offline discussion summary on CSI feedback framework ATT

Agreements:

- RAN1 supports aperiodic CSI report on PUSCH, including two cases:
  - Case-1: CSI reports multiplexing with uplink data in PUSCH
  - Case-2: CSI reports only in PUSCH (no uplink data)
  - Note: how to multiplex UCI with PUSCH is under discussing in UCI multiplexing A.I.
- FFS: aperiodic CSI report on PUCCH

R1-1709609 WF on CSI timing LG Electronics, AT&T, KT Corp., Xinwei, WILUS Inc., InterDigital, Samsung, ZTE

R1-1709535 WF on PDSCH rate matching Electronics, AT&T, Huawei, Hisilicon, NTT DOCOMO, Panasonic, Ericsson

Not treated.
R1-1706926 Discussion on CSI Framework Design Huawei, HiSilicon
R1-1707086 Discussion on CSI Framework and Aperiodic CSI-RS Resources and Reports Activation Beijing Xinwei Telecom Techn.
R1-1707123 On CSI framework details ZTE
R1-1707358 On NR CSI framework Intel Corporation
R1-1707480 Further discussion on CSI framework CATT
R1-1707607 Discussion on CSI framework LG Electronics
R1-1707752 Considerations on CSI acquisition framework AT&T
R1-1707958 CSI Acquisition and Beam Management Framework Samsung
R1-1708216 ZP CSI-RS for PDSCH rate matching PANASONIC
R1-1708337 On CSI framework for NR InterDigital, Inc.
R1-1708589 Details of CSI framework Qualcomm Incorporated

7.1.2.3.2 Details of CSI acquisition

Including channel and interference measurement and reporting

R1-1706927 Channel and interference measurement for CSI acquisition Huawei, HiSilicon
R1-1708455 On CSI measurement for NR NTT DOCOMO, INC.

R1-1709515 WF on CSI Measurement Details NTT DOCOMO, Nokia, ASB, Samsung
R1-1709295 WF on NZP CSI-RS for interference measurement Huawei, HiSilicon, Xinwei, MediaTek, AT&T, CeWiT, Intel, ZTE, ZTE Microelectronics, IITH, IITM, China Unicom, Tejas Networks, Softbank, Qualcomm, LGE, Ericsson, KDDI, Deutsche Telekom, Mitsubishi Electric, InterDigital, NEC, SONY, Spreadtrum, China Telecom, CATR, SHARP

Working assumption:

- Support at least NZP CSI-RS based interference measurement
  - select at least one of following scheme

        - Scheme-1: Estimation on NZP CSI-RS for channel estimation (by subtracting NZP CSI-RS from Rx signal)
        - Scheme-2: Emulation on NZP CSI-RS which is represented by multiplied value of channel and precoding matrix
        - Aim to conclude whether to support one of them or both in the next RAN1 meeting
    - FFS whether or not to support signaling of power boosting for NZP CSI-RS
    - Other schemes are not precluded

- FFS whether or not support DM-RS based interference measurement, aim to decide in the next RAN1 meeting
    - Companies are strongly encouraged to carry out analysis of the resulting overhead comparing NZP CSI-RS and DM-RS based approaches (e.g., as in contribution R1-1709452)

Continue offline discussion – Yuichi (DCM)

Friday
R1-1709815 Summary of CSI Acquisition Details NTT DOCOMO
R1-1709779 WF on CSI acquisition Samsung, Ericsson

Agreements:
- Support following features for NR CSI acquisition
    - FFS Frequency domain subset restriction
        - FFS on number of configurable subsets
        - FFS on detailed signaling/configuration
        - FFS measurement restriction of interference measurement
            - FFS on measurement restriction of channel measurement
    - For time domain, measurement restriction of channel and interference measurement
    - CSI reporting via short duration PUCCH
        - FFS on detailed setting in CSI reporting setting
    - CSI reporting via long duration PUCCH
        - FFS on detailed setting in CSI reporting setting
    - PUCCH reporting which is contained in a single slot
        - FFS on PUCCH reporting which is contained in multiple slots

Not treated.
R1-1707124 Details of CSI acquisition ZTE
R1-1707359 Discussion on Interference Measurement for CSI Intel Corporation
R1-1707481 Discussion on additional IMR resource CATT
R1-1707608 Discussion on interference measurement and rate matching for NR LG Electronics
R1-1707761 On the details of CSI acuisition AT&T
R1-1707959 Discussions on CSI measurements and reporting for NR Samsung
R1-1708259 Considerations on interference measurement Sony
R1-1708338 Remaining Issues on CSI acquisition for NR InterDigital, Inc.
R1-1708391 Joint selection and CSI feedback for analog and digital beam CMCC
R1-1708590 On interference measurement resource Qualcomm Incorporated
R1-1708685 On CSI acquisition and reporting Ericsson
R1-1708913 Performance analysis of interference estimation in NR Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.3.3 CSI acquisition for reciprocity based operation

R1-1708137 Discussion on reciprocity based CSI acquisition mechanism Huawei, HiSilicon
R1-1708686 CSI acquisition for reciprocity-based operation Ericsson
Continue offline discussion – Ruyue (ZTE)

Friday
R1-1709786 Summary of offline discussion of CSI acquisition for reciprocity based ZTE

Not treated.
R1-1707125 On reciprocity based CSI acquisition ZTE
R1-1707482 Further discussion on reciprocity based CSI acquisition CATT
R1-1707609 Discussion on CSI acquisition for reciprocity based operation LG Electronics
R1-1707834 CSI acquisition for reciprocity based operations MediaTek Inc.

R1-1707960 CSI Reporting for Reciprocity Operation Samsung
R1-1708591 CSI acquisition for reciprocity based operation Qualcomm Incorporated
R1-1708914 On the channel reciprocity support for CSI acquisition Nokia, Alcatel-Lucent Shanghai Bell
R1-1709768 WF on reciprocity based CSI acquisition Huawei, HiSilicon

7.1.2.3.4 CSI feedback Type I

R1-1707610 Discussion on CSI feedback Type I LG Electronics
R1-1707961 Type I CSI reporting Samsung
R1-1708456 CSI Feedback Type I for NR MIMO NTT DOCOMO, INC.
R1-1708687 Codebook design for Type I single-panel CSI feedback Ericsson'
R1-1709268 On type I CSI feedback in NR Nokia, Alcatel-Lucent Shanghai Bell (Revision of R1-1708915)
Continue offline discussion – Haewook (LGE)

Not treated.
R1-1707126 On Type I CSI feedback details ZTE
R1-1707360 On CSI feedback Type I Intel Corporation
R1-1707483 Discussion on Type I CSI feedback CATT
R1-1707835 CSI feedback Type I MediaTek Inc.
R1-1708138 Design and evaluation results for Type I codebook Huawei, HiSilicon
R1-1708339 On Type I CSI feedback for Multi-panel InterDigital, Inc.
R1-1708592 On Type I CSI feedback Qualcomm Incorporated
R1-1708665 Discussion on Type I CSI feedback ITRI

7.1.2.3.5 CSI feedback Type II

R1-1707127 Type II CSI feedback based on linear combination ZTE
R1-1708139 Category 1 codebook design for Type II codebook Huawei, HiSilicon
R1-1708593 On Type II CSI feedback Qualcomm Incorporated
R1-1708688 Codebook design for Type II CSI feedback Ericsson
R1-1709183 Discussion on CSI feedback Type II LG Electronics (rev of R1-1707611)

R1-1709232 WF on Type I and II CSI codebooks Samsung, Ericsson, Huawei, HiSilicon, NTT DOCOMO, Intel Corporation, CATT, ZTE, Nokia, Alcatel-Lucent Shanghai Bell, AT&T, BT, CATR, China Telecom, CHTTL, Deutsche Telekom, Fujitsu, Interdigital, KDDI, Mitsubishi Electric, NEC, OPPO, Reliance Jio, SK Telecom, Sharp, Sprint, Verizon, Xiaomi, Xinwei, CEWiT, IITH, Tejas Networks, IITM

Agreements:
- Slides 4 to 24 in R1-1709232 are agreed
  - For slide 20, FFS whether or not support frequency-dependent parameterization and if so, the details
  - FFS whether or not to further enhance analog beamforming related operations especially for >1 layers

Not treated.
R1-1707361 On CSI feedback Type II Intel Corporation
R1-1707484 Type II CSI feedback design CATT
R1-1707763 High level view on type II codebook AT&T
R1-1707790 On the type II feedback configurations Spreadtrum Communications
R1-1707856 Overhead reduction on CSI feedback Type II MediaTek Inc.
R1-1707962 Type II CSI reporting Samsung
R1-1708457 CSI Feedback Type II for NR MIMO NTT DOCOMO, INC.
R1-1708916 On type II CSI feedback in NR Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.3.6 Other

R1-1707963 Discussion on CSI-RS Resource Allocation Samsung
R1-1707964 Differential reporting for Type II CSI Samsung
R1-1707965 System-level evaluation for Type II CSI Samsung
R1-1707966 CSI parameters and multiplexing Samsung
R1-1707967 CSI Feedback Overhead Reduction for NCJT Samsung
R1-1707968 Discussions on channel and interference measurements for NR Samsung
R1-1707969 Discussions on service specific CSI for NR Samsung
R1-1708140 The remaining issues for Type II codebook Huawei, HiSilicon
R1-1708689 On Dynamic Triggering for CSI Reports and CSI-RS Ericsson

R1-1708690	A comparison of CSI-RS activation schemes based on MAC CE and DCI	Ericsson
R1-1708691	Identifying bounds on parameters in CSI framework	Ericsson
R1-1708692	Semi-persistent CSI reporting on PUSCH	Ericsson
R1-1708693	Scalable codebook for up to 32 ports	Ericsson
R1-1708694	PDSCH rate matching	Ericsson
R1-1708695	Multi-panel codebook	Ericsson
R1-1708696	NR CSI Computation Capability	Ericsson
R1-1708697	On CSI reporting for short PUCCH	Ericsson
R1-1708698	Frequency parametrization for Type II CSI codebook	Ericsson
R1-1708699	Type II CSI for beamformed CSI-RS and hybrid operation	Ericsson
R1-1708700	Further details of measurement restriction configuration	Ericsson
R1-1708818	Multi-panel and Multi-level Codebook Design	ZTE
R1-1708917	Interference estimation options and configuration in NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708918	On the CRI definition and usability in NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708919	On the CSI timing relationhips	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708920	On hybrid CSI report: from LTE MIMO to NR MIMO	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708921	Codebook design for multi-panel operation	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709452	Discussions on channel and interference measurements for NR	Samsung

7.1.2.4 Reference signals and QCL

7.1.2.4.1 CSI-RS

R1-1707981 Remaining issues on NR CSI-RS Samsung
The document was presented by Hoondong Noh from Samsung..
Decision: The document is noted.

R1-1709204 Summary of remaining issues and views on NR CSI-RS Huawei, HiSilicon, Samsung
The document was presented by Lu Wu from Huawei.
Decision: The document is noted.

Agreements:
- At least for CSI acquisition, for N=2 OFDM symbols, support adjacent OFDM symbols for one CSI-RS resource
  - For N=4 OFDM symbols, down-selection between 2 and 4 for the minimum number of adjacent OFDM symbols for one CSI-RS resource
- At least for CSI acquisition, for N=2 OFDM symbols, support a uniform RE mapping pattern wherein the same sub-carriers are occupied in each symbol of one CSI-RS resource
  - FFS: For N=4 OFDM symbols, the RE mapping pattern of one CSI-RS resource

Continue offline discussion until Tuesday – Lu (Huawei) / Hoondong (Samsung)

Tuesday session
R1-1709456 Summary of offline discussion on CSI-RS Huawei, HiSilicon

Agreements:
- Support at least OCC as one type of CDM sequence
  - FFS: CDM of CSI-RS antenna ports on an RE-level comb based on phase rotation (cyclic shift) sequences
- Support at least CDM 8 for an X-port CSI-RS resource at least when X=32
  - FFS: Support for other pairings of CDM value and number of ports X
- For an X-port CSI-RS resource, at least for X = 1, support density D >= 1 RE/port/PRB
  - FFS: Support for D > 1 for other values of X
  - Note: For X = 1, CDM code value(s) assumed to be 1

R1-1709303 Way Forward on CSI-RS for Beam Management Intel, InterDigital, Samsung, MediaTek, Nokia, Alcatel Lucent Shanghai Bell, CATT, KT, NEC, Xinwei, Ericsson, Qualcomm, ZTE, China Telecom, vivo, AT&T, OPPO, LG, Huawei, HiSilicon

Agreements:
- Confirm the WA of CSI-RS for Beam Management in RAN1 #88bis (copied below).
  - For CSI-RS for Beam Management, NR supports sub-time units equal to and smaller than an OFDM symbol in a reference numerology

        - FFS details including configurability, e.g., taking into account UE implementation complexity/capability and impact on CSI-RS design
        - FFS the case of time unit larger than an OFDM symbol in a reference numerology
        - E.g.,
            - Opt-1: IFDMA
            - Opt-2: Larger subcarrier spacing
            - Opt-3: DFT-based
- Down-select from the below options when sub-time unit smaller than an OFDM symbol in a reference numerology:
    - Opt-1: IFDMA
    - Opt-2: Larger subcarrier spacing
    - Opt-3: DFT-based
- Note: for beam management, the reference numerology for a bandwidth part is determined based on the UE-specific configuration for the bandwidth part

R1-1709608 WF on location of CSI-RS OFDM symbols Samsung, InterDigital, LGE

Conclusion:
- FFS how NZP CSI-RS REs can be mapped (e.g., matching-around or puncturing) in a slot, considering potential overlapping with other channels/signals (e.g., DMRS, PTRS, SS block, some CORESET, etc.)

R1-1709572 WF on CSI-RS pattern design Huawei, HiSilicon, ZTE

Agreements:
- At least for CSI acquisition, for density D=1 RE/port/PRB and X>4 ports,
    - For N=1 OFDM symbol, support X=8, 12 ports
    - For N=2 OFDM symbols, support X= 8, 12, 16ports
        - FFS the case of X=24
    - For N=4 OFDM symbols, support at least X=32 ports
        - FFS the case of X=8/16/24

Agreements:
- At least for CSI acquisition, for density D=1 RE/port/PRB and X>4 ports, at least the following option is supported:
    - For N=1 OFDM symbol, support [2 or 4] as the minimum number of adjacent REs in frequency domain for one CSI-RS resource
        - FFS whether it's 2 or 4
    - For N=2 OFDM symbols, support [2 or 4] as the minimum number of adjacent REs in frequency domain for one CSI-RS resource
        - FFS whether it's 2 or 4
    - For N=4 OFDM symbols, support [2 or 4] as the minimum number of adjacent REs in frequency domain for one CSI-RS resource
        - FFS whether it's 2 or 4
    - FFS whether or not to support other options such as CDM CSI-RS antenna ports on a RE level comb based on phase rotation [cyclic shifts/sequences] including D=1 and D≠1

R1-1709599 WF on CDM pattern of CSI-RS for CSI acquisition ZTE, Huawei, HiSilicon

Agreements:
- For CDM pattern(s) per X port CSI-RS for CSI acquisition
    - For X=2 with CSI-RS RE pattern (M,N)=(2,1),
        - FFS support no CDM
        - Support FD-CDM2
    - For X=4 with CSI-RS RE pattern (M,N)=(4,1)
        - FSS support no CDM
        - Support FD-CDM2
        - FFS CDM4
    - For X=4 with CSI-RS RE pattern (M,N)=(2,2)
        - FFS support no CDM
        - Support FD-CDM2
        - FFS support TD-CDM2
        - FFS CDM4

R1-1709317 WF on CSI-RS for beam management ZTE, LGE, ASTRI
Proposals:
- NR supports the following CSI-RS configuration to support Tx and Rx beam sweeping for beam management
  - Parameter(s) indicating number of OFDM symbols/sub time units associated with one CSI-RS resource ID and one port ID
    - One CSI-RS resource can locate across more than 1 slot
    - Note this does not imply particular option for sub time unit partition
  - Parameter(s) indicating ON/OFF of time-domain measurement restriction (MR)
    - FFS: Details of MR
  - Note: in one MR window, UE assumes same Tx beam is used for the same CSI-RS resource ID and port ID, whereas UE cannot assume same Tx beam is used for different CSI-RS resource IDs or port IDs

Continue offline discussion

Not treated.
R1-1706931 CSI-RS design for beam management Huawei, HiSilicon
R1-1706932 CSI-RS design for CSI acquisition Huawei, HiSilicon
R1-1707128 On CSI-RS for beam management ZTE
R1-1707129 On CSI-RS for CSI acquisition ZTE
R1-1707246 On CSI-RS design for NR vivo
R1-1707362 On CSI-RS for beam management Intel Corporation
R1-1707363 On CSI-RS for CSI acquisition Intel Corporation
R1-1707485 Discussion on CSI-RS for CSI acquisition CATT
R1-1707486 Discussion on CSI-RS for beam management CATT
R1-1707612 On CSI-RS design for beam management LG Electronics
R1-1707613 On CSI-RS design for CSI acquisition LG Electronics
R1-1707700 CSI-RS design for beam management Guangdong OPPO Mobile Telecom.
R1-1707748 CSI-RS design principle AT&T
R1-1707783 On using sub-time unit in CSI-RS for beam management Spreadtrum Communications
R1-1707810 On CSI-RS design for beam management NEC
R1-1707853 On CSI-RS design for potential extension to support fine time and frequency tracking MediaTek Inc.
R1-1707970 Discussions on CSI-RS design for NR MIMO Samsung
R1-1707971 CSI-RS for beam management Samsung
R1-1708340 On CSI-RS Design for Beam Management InterDigital, Inc.
R1-1708458 Views on CSI-RSNTT DOCOMO, INC.
R1-1708594 Discussion on CSI-RS design Qualcomm Incorporated
R1-1708701 On CSI-RS design Ericsson
R1-1708702 On CSI-RS design for beam management Ericsson
R1-1708922 On the CSI-RS configurations for NR CSI acquisitionNokia, Alcatel-Lucent Shanghai Bell
R1-1708923 On CSI-RS Design for DL Beam Management Nokia, Alcatel-Lucent Shanghai Bell
R1-1709146 CSI-RS design for DL beam management KT Corp.
R1-1709397 WF on location of CSI-RS OFDM symbols Samsung, Ericsson, Xinwei, LGE

7.1.2.4.2 DMRS

R1-1708603 Remaining issues for DMRS Qualcomm Incorporated
The document was presented by Alexandros Manolakos from Qualcomm.
Decision: The document is noted.

R1-1709305 WF on additional DMRS structure Samsung, Qualcomm Incorporated, Ericsson, CATT, Nokia, Alcatel-Lucent Shanghai Bell, vivo, Mitsubishi Electric Co., NTT DOCOMO, INC., ETRI, KT Corp., MediaTek Inc.
- *Support additional DMRS symbols with same density in frequency domain compared to front loaded DMRS.*
- *At least for DL CP-OFDM, frequency domain density of front loaded DMRS is configurable.*

Discussion: Also supported by InterDigital.
Intel: concern with second bullet
Huawei cannot agree with first bullet, suggested adding a sub-bullet "FFS: necessity of reduced DMRS density in additional DMRS symbols"
Decision: The document is noted.

Agreement:
- Support additional DMRS symbols with same density in frequency domain compared to front loaded DMRS
  - FFS: Necessity of reduced DMRS density in additional DMRS symbols

Possible agreement:

- At least for DL CP-OFDM, frequency domain density of front loaded DMRS is configurable.

R1-1709310 WF on DL DMRS for self-contained feedback ZTE, Qualcomm, Intel, MediaTek, Xinwei

- When ACK/NACK feedback is configured in the same slot with corresponding DL data transmission
  - For 7-symbol slot
    - Support the case which the last DMRS symbol is the last symbol of *front loaded DMRS.*
  - For 14-symbol slot
    - Support the case which the last DMRS symbol is the last symbol of *front loaded DMRS.*
    - Support the case where one additional DMRS is together with the front-load DMRS
      - FFS: location of the additional DMRS
        - Example: Support the nth [6,7,8,9] OFDM symbol of the slot for the additional DMRS
  - Note: The maximum number of symbols carrying DMRS in the slot is 2

Discussion: whether having more additional DMRS symbols is FFS
Decision: The document is noted. Continue offline discussion – Alex (Qualcomm)

R1-1706934 Evaluation results of DMRS design for DL data channel Huawei, HiSilicon

- Proposal 1: DMRS in basic/front-loaded pattern should consist of 2 consecutive symbols at least for 8 orthogonal ports.
- Proposal 2: The size of CDM for multiplexing in frequency should not be very large. CDM across two consecutive REs in time and/or frequency domain should be supported in NR DMRS.
- Proposal 3: Support both TD-OCC and TDM to multiplex DMRS ports in time domain.
- Proposal 4: NR should consider configurable frequency density for DL front-loaded DMRS.
- Proposal 5: Lower density should be considered in additional DMRS compared to front-loaded DMRS.

Decision: The document is noted.

Tuesday session
R1-1709420 WF on DL DMRS for self-contained feedback ZTE, Qualcomm, Mitsubishi Electric Co., Xinwei

Conclusion:

- When ACK/NACK feedback is configured in the same slot with corresponding DL data transmission
  - For 7-symbol slot. down selection should be done in next meeting
    - Alt.1: Only support front loaded DMRS
    - Alt.2 :Support front loaded DMRS +additional DMRS
    - Alt.3 :Configurable between Alt.1 and Alt.2
  - For 14-symbol slot, down selection should be done in next meeting
    - Alt.1: Only support front loaded DMRS
    - Alt.2 :Support front loaded DMRS +additional DMRS
    - Alt.3 : Configurable between Alt.1 and Alt.2
  - Companies are encouraged to provide simulation results for additional DMRS position for mobility scenarios and the assumed number of symbols for front loaded DMRS and additional DMRS, and consider the minimum time to support fast demodulation for DM-RS pattern related design

R1-1709477 WF on DL DMRS multiplexing in the time domain ZTE, Qualcomm

- For DMRS port multiplexing schemes on 2 adjacent front-loaded DMRS symbols in the time domain:
  - Alternative 1: Support DMRS configurations with two alternatives
    - Time domain OCC (TD-OCC) of antenna ports is supported. In addition, for the other alternative only one of following is supported:
      - Option 1A: TDM of antenna ports
      - Option 1B: Time domain repetition of all antenna ports
  - Alternative 2: Support DMRS configurations with one alternative:
    - Option 2A: TDM of antenna ports
    - Option 2B: Time domain repetition of antenna ports
    - Option 2C: TD-OCC of antenna ports
  - Notes:
    - This is for both SU-MIMO and MU-MIMO
    - If 1B or 2B is chosen then whether and/or not pattern shift is used must be decided

Alternative 1 supported by: Ericsson, Nokia, ASB, ZTE, Qualcomm, NTT DOCOMO,
Alternative 2 supported by: Samsung

Decision: The document is noted. Continue offline.

Wednesday session

Working assumptions:

- For DMRS port multiplexing schemes on 2 adjacent front-loaded DMRS symbols in the time domain:
  - Support DMRS configurations with two alternatives
    - Time domain OCC (TD-OCC) of antenna ports is supported. In addition, for the other alternative only one of following is supported:
      - Option 1A: TDM of antenna ports
      - Option 1B: Time domain repetition of all antenna ports
  - Notes:
    - This is for both SU-MIMO and MU-MIMO
    - If 1B is chosen then whether and/or not pattern shift is used must be decided

Objected by Huawei, HiSilicon

R1-1709588 WF on DMRS port multiplexing in the frequency domain Samsung, ZTE, Intel, Mediatek, Huawei, HiSilicon, CATT, ITL, KRRI, Spreadtrum, Mitsubishi Electric Co., ETRI, China Unicom, Deutsche Telekom, China Telecom, ITRI, CHTTL, CATR
R1-1709287 WF on DM-RS for CP-OFDM NTT DOCOMO, Qualcomm, CEWiT, IIT-H, IIT-M, Cohere Technologies, Ericsson, Nokia, ASB, LG Electronics, Xinwei, InterDigital, AT&T, NEC, KDDI, OPPO, Sharp, Fujitsu
Also supported by KT

Possible agreements:

- For CP-OFDM, on the DMRS port multiplexing in the frequency domain of the front-load DMRS:
  - Support multiplexing with OCC in adjacent DMRS REs in frequency
    - FFS OCC length=2,4
    - FFS specific FDM patterns
    - Note: for OCC=4, may or may not all the DMRS REs be contiguous

Possible agreements:

- When single symbol DMRS is configured, the DL and UL CP-OFDM DM-RS are mapped to resource elements using a comb structure (IFDM).
  - Orthogonal DM-RS ports are constructed by the use of IFDM and CDM (e.g., cyclic shift) in frequency
  - FFS: Fixed or configurable repetition factor (RPF)
  - FFS: RPF=1, 2, 4
  - FFS: configuration method (DCI, RRC,..)

Possible agreements:

- For DL DMRS multiplexing in the time and frequency domain,
  - Alt. 1: TDM + Frequency domain OCC
    - Supported by Samsung, Mediatek, Mitsubishi, Huawei, HiSilicon, ITL, CATT, ZTE, Spreadtrum, Intel
  - Alt. 2: Option 1B + R1-1709287
    - Supported by LGE, NTT DOCOMO, Nokia, Qualcomm, Ericsson, CEWiT, Interdigital, KT, ASB, AT&T, IITH, Cohere, OPPO

Possible agreements:

- DL DMRS multiplexing in the time and frequency domain supports
  - TDM + Frequency domain OCC
  - Time domain OCC + Comb

R1-1709618 WF on UL DMRS pattern for DFT-S-OFDM LG Electronics, Qualcomm, NTT DOCOMO, Ericsson, InterDigital, Nokia, ASB, CATT, KDDI, NEC, AT&T, Xinwei, Cohere Technologies, OPPO
Possible agreements:

- Within one OFDM symbol, for DFT-S-OFDM based PUSCH DMRS, DMRS are mapped to resource elements using a comb structure (IFDMA).
  - Orthogonal DM-RS ports are constructed by the use of IFDM and CDM (e.g. by cyclic shifts) in frequency
  - DMRS and associated PUSCH are multiplexed in time domain
  - FFS: Fixed or configurable repetition factor (RPF), e.g. RPF=1,2,3, or 4, and configuration method, if needed

Possible agreements:

- For DMRS design for CP-OFDM
  - For the 1-symbol front-load DMRS with a configuration with up to X ports, at least support
    - IFDM based pattern with cyclic shifts
      - X will be downselected to one value from [4,6,8]
  - For the 2-symbol front-load DMRS with up to 12 ports, support both the following:
    - Scheme 1: TDM + FD-OCC on adjacent REs
    - Scheme 2: TD-OCC + IFDM with cyclic shifts
      - Repetition can be supported for up to 6 ports with TD-OCC (1 1)

R1-1708704 Evaluation results for DL DMRS Ericsson

Friday
R1-1709833 WF on Front-load DMRS design Qualcomm, Huawei, HiSilicon, ZTE, Mediatek, Ericsson, Mitsubishi, LGE, ITL, NTT DOCOMO, ETRI, CATT

Working assumption:

- UEs in a cell are higher layer configured with 2 DMRS configurations for the front-load DMRS for UL/DL CP-OFDM
  - Front-load DMRS Configuration 1: Supports up to 8 ports
    - IFDM based pattern with Comb [2] and/or [4] w cyclic shifts (CS)
      - One OFDM symbol:
        - To be down selected to 1 Alt:
          - Alt 1: Comb 2 + 2 CS, up to 4 ports
          - Alt 2: Comb 4 + 2 CS, up to 8 ports
      - Two OFDM symbols:
        - To be down selected to 2 Alts:
          - Alt. 1: Comb 2 + 2 CS + TD-OCC ({1 1} and {1 -1}), up to 8 ports
          - Alt. 2: Comb 2 + 4 CS + TD-OCC ({1 1}), up to 8 ports
          - Alt. 3: Comb 4 + 2 CS + TD-OCC ({1 1}), up to 8 ports
  - Front-load DMRS Configuration 2: Supports up to 12 ports
    - FD-OCC pattern with adjacent REs in the frequency domain
      - One OFDM symbol:
        - To be down selected to 1 Alt:
          - Alt. 1: 2-FD-OCC across adjacent REs in the frequency domain up to 6 ports
          - Alt. 2: 2-FD-OCC across adjacent REs in the frequency domain up to 4 ports
          - Alt. 3: 2-FD-OCC across adjacent REs in the frequency domain up to 2 ports
      - Two OFDM symbols:
        - 2-FD-OCC across adjacent REs in the frequency domain + TDM up to 12 ports
        - 2-FD-OCC across adjacent REs in the frequency domain + TD-OCC (both {1,1} and {1,-1}) up to 12 ports
  - FFS: DMRS pattern before configuration, e.g., SIB1

Not treated.

R1-1706933	Design of DL DMRS for data transmission	Huawei, HiSilicon
R1-1706935	UL DMRS design for data transmission	Huawei, HiSilicon
R1-1706936	Evaluation results of DMRS design for UL data channel	Huawei, HiSilicon
R1-1707087	Further evalution on DMRS Design Details	Beijing Xinwei Telecom Techn.
R1-1707130	Discussion on downlink DMRS design	ZTE
R1-1707131	Discussion on uplink DMRS design	ZTE
R1-1707135	DL DMRS simulation results	ZTE
R1-1707247	On DL DMRS design for NR	vivo
R1-1707364	DM-RS design for DL	Intel Corporation
R1-1707365	DM-RS design for UL	Intel Corporation
R1-1707488	Discussion on DMRS design for UL	CATT
R1-1707614	On DL DMRS design	LG Electronics
R1-1707615	On UL DMRS design	LG Electronics
R1-1707784	On front-loaded DMRS pattern and port multiplexing	Spreadtrum Communications
R1-1707811	Considerations on the sequence design of DMRS	NEC

R1-1707854 On downlink DMRS pattern MediaTek Inc.
R1-1707972 Discussion on DL DMRS design for NR Samsung
R1-1707973 Evaluation results on DL DMRS for NR Samsung
R1-1707974 Discussion on UL DMRS design for NR Samsung
R1-1707975 Evaluation results on UL DMRS for NR Samsung
R1-1708094 Discussion on downlink DMRS design ETRI
R1-1708095 Discussion on uplink DMRS designETRI
R1-1708321 Considerations on DMRS pattern for NR Innovative Technology Lab Co.
R1-1708341 On DM-RS design for NR InterDigital, Inc.
R1-1708459 Views on DM-RS NTT DOCOMO, INC.
R1-1708460 Evaluation results of DM-RS NTT DOCOMO, INC.
R1-1708595 Discussion on UL DMRS design Qualcomm Incorporated
R1-1708596 Discussion on DL DMRS design Qualcomm Incorporated
R1-1708597 Evaluation of UL DMRS design Qualcomm Incorporated
R1-1708598 Evaluation of DL DMRS design Qualcomm Incorporated
R1-1708703 On DL DMRS design Ericsson
R1-1708705 On UL DMRS design Ericsson
R1-1708706 Evaluation results for UL DMRS Ericsson
R1-1708924 On details of DL DM-RS for NR physical data channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1708925 DL DM-RS patterns link performance evaluation Nokia, Alcatel-Lucent Shanghai Bell
R1-1708926 On details of UL DM-RS for NR physical data channels Nokia, Alcatel-Lucent Shanghai Bell
R1-1709023 DMRS designs for NR MIMO: views on density reduction for DMRS Mitsubishi Electric Co.
R1-1709165 Discussion on DMRS design for DL CATT
R1-1709282 DMRS designs for NR MIMO: evaluation results Mitsubishi Electric Co.
R1-1709306 WF on UL DMRS pattern for DFT-S-OFDM LG Electronics
R1-1709314 WF on multiplexing of DMRS in time domain ZTE
R1-1709358 WF on the number of front loaded DMRS symbols LG Electronics
R1-1709603 WF on TD multiplexing of DL DMRS for 2-symbol front-load DMRS Qualcomm
R1-1709680 WF on DMRS port multiplexing Samsung, Huawei, HiSilicon
R1-1709788 WF on DM-RS for NR Intel

7.1.2.4.3 PT-RS

R1-1707803 Summary of PTRS open issues and companies views Ericsson

R1-1709286 WF on PT-RS NTT DOCOMO, Mitsubishi Electric, Ericsson, Sharp, IITH, CEWIT, IITM, Tejas Networks, Reliance Jio, Spreadtrum, Qualcomm, LGE, Nokia, InterDigital
Also supported by CMCC

Agreements:

- Confirm the following working assumption.
  - Uplink PTRS for DFT-s-OFDM waveform is supported.
    - Presence of PTRS for DFT-s-OFDM is UE-specifically configurable
    - Multiple pattern/density of PTRS for DFT-s-OFDM is supported
    - FFS: implicit or explicit signaling
- Working assumption: Support Pre-DFT PT-RS insertion for UL DFT-S-OFDM.

R1-1709502 WF on PTRS position for CP-OFDM ZTE, vivo, Nokia, Alcatel-Lucent Shanghai Bell, Xinwei, ASTRI, Ericsson, Huawei, HiSilicon, Samsung, LG Electronics, NTT DOCOMO

Agreements:

- The RBs containing PTRS can be derived from the scheduled RBs and the associated frequency density
- For a given RB, if present, one PTRS port should be mapped on one subcarrier carrying one or more DMRS ports of the associated DMRS port group
  - FFS: to support different subcarriers by complementary option
- Support non-overlapping between PTRS and CSI-RS
  - FFS whether PTRS or CSI-RS should be punctured or shifted on overlapping part if PTRS and CSI-RS are collided
- Support non-overlapping between PTRS and SRS
  - FFS whether PTRS or SRS should be punctured or shifted on overlapping part if PTRS and SRS are collided
- FFS: Support non-overlapping between PTRS and SS block
  - FFS whether PTRS or SS block should be punctured or shifted on overlapping part if PTRS and SS block are collided

R1-1709521 WF on PTRS for CP-OFDM Huawei, HiSilicon, National Instruments, Xinwei, NTT DOCOMO, Panasonic, Samsung, ZTE, Nokia, Alcatel-Lucent Shanghai Bell, Ericsson

Agreements:

- For SU-MIMO, support predefined and RRC-configured association between PTRS densities and scheduled MCS/BW
  - FFS: RRC configuration can override the predefined association
  - Table 1 in R1-1709521 to represent association between PTRS time density and scheduled MCS
  - Table 2 in R1-1709521 to represent association between PTRS frequency density and scheduled BW
  - Note: The number of rows in Table 1 and 2 can be reduced if the densities are down-selected
  - FFS: UE to suggest MCS/BW thresholds in Table 1 and 2
  - FFS: complementary DCI signaling
- For CP-OFDM and the tables on next page, the time-densities (TD) of PTRS include every 4th symbol, every 2nd symbol, and every symbol, while the frequency-densities (FD) of PTRS include occupying one subcarrier (not necessarily in all REs, depending on the time density) in [every RB], every 2nd RB, every 4th RB, [every 8th RB, and every 16th RB]
  - The time density of PTRS is expected to increase with increasing the scheduled MCS (except for those reserved MCSs).
  - The frequency density of PTRS is expected to decrease with increasing the scheduled BW (i.e., the number of scheduled RBs)
    - FFS: frequency localized mapping
  - FFS: The frequency density of PTRS is expected to increase with increasing the scheduled MCS
- For a UE, the configured PTRS ports are FDMed
  - FFS: TDM ~~and/or CDM~~
- Support association between one PTRS port and one DMRS port per DMRS port group
  - FFS: Configurable or fixed association
  - FFS: Signalling methods, e.g., RRC, MAC-CE, DCI
- FFS: Support association between one or multiple PTRS ports and multiple DMRS ports per DMRS port group
- Study the benefits of configuring the number of PTRS ports for a UE, based on UE capability or UE report on
  - Panels/TXRUs sharing a common oscillator or not, and/or
  - Maximum number of independent oscillators at this UE, and/or
  - Whether phase errors measured on PTRS ports are same or different

R1-1709414 WF on PT-RS configuration LG Electronics, Samsung, ZTE

Agreements:

- For CP-OFDM,
  - For SU-MIMO, dynamic presence of PTRS is determined by allocated MCS, BW, and subcarrier spacing
    - FFS: For MU-MIMO case
  - For SU-MIMO, time pattern of PTRS is determined by allocated MCS, and subcarrier spacing
    - FFS: For MU-MIMO case

Possible agreements:

- For MU, NR supports both orthogonal and non-orthogonal multiplexing between PT-RS/PT-RS and PT-RS/data.
  - ZP PT-RS is supported at least for DL.
  - Note: Quasi-orthogonal multiplexing is not precluded.
  - Note: Non-orthogonal multiplexing may be spec-transparent from MU perspective.

Continue discussion until Thursday - LGE
Prepare draft LS to RAN4 in R1-1709658 until Thursday – Mattias (Ericsson)

Friday
R1-1709772 WF on Orthogonal multiplexing of PT-RS LG Electronics, Samsung, ZTE, Sharp

- For DL MU-MIMO, further investigation on orthogonal multiplexing of PT-RS is needed.
  - Companies are encouraged to provide simulation results.
  - Intra/inter-cell interference.

Also supported by Panasonic

Friday conclusion: No consensus to send an LS.

R1-1709658 [DRAFT] LS related to phase tracking reference signal (PT-RS) design Ericsson

Not treated.

R1-1706937 PTRS for CP-OFDM Huawei, HiSilicon
R1-1707088 Evaluation and Discussion on DL Phase Tracking RS Design Beijing Xinwei Telecom Techn.
R1-1707132 Discussion on RS for phase tracking ZTE
R1-1707189 DL PT-RS port association, multiplexing and indication Panasonic Corporation
R1-1707248 Discussion on PTRS design vivo
R1-1707366 On PT-RS for CP-OFDM Intel Corporation
R1-1707367 On PT-RS for DFT-s-OFDM Intel Corporation
R1-1707489 Further discssion on RS for phase tracking CATT
R1-1707616 On DL PT-RS design LG Electronics
R1-1707617 On UL PT-RS design LG Electronics
R1-1707785 PT-RS design for DFT-s-OFDM Spreadtrum Communications
R1-1707976 On DL PTRS design Samsung
R1-1707977 On PTRS for DFT-s-OFDM Samsung
R1-1708142 PTRS for DFT-s-OFDM Huawei, HiSilicon
R1-1708226 pre-DFT multiplexing of PT-RS for DFT-S-OFDM IITH
R1-1708272 Discussion on explicit and implicit signaling for PT-RS National Instruments Corp.
R1-1708342 Remaining Issues on PTRS for DFT-s-OFDM InterDigital, Inc.
R1-1708392 Phase-tracking reference signal design for DL CP-OFDM CMCC
R1-1708393 Phase-tracking reference signal for DFT-s-OFDM systems CMCC
R1-1708461 Views on PT-RS NTT DOCOMO, INC.
R1-1708599 Phase and frequency tracking reference signal considerations Qualcomm Incorporated
R1-1708707 On DL PTRS design Ericsson
R1-1708708 On UL PTRS design Ericsson
R1-1708927 Discussion on PT-RS design for CP-OFDM Nokia, Alcatel-Lucent Shanghai Bell
R1-1708997 UL PTRS for DFTsOFDM waveform Mitsubishi Electric RCE

7.1.2.4.4 SRS

R1-1709164 Open issues on SRS design Sony

Agreement: ZC based sequences shall be used for NR SRS sequence design

Possible agreement:
- Alt-1 SRS sequence design, wherein SRS sequence generation is not a function of allocated PRB position, shall be supported in NR

Continue offline discussion – Takano (Sony)
Friday
Conclusion:
- Regarding SRS sequence design, companies are encouraged to perform evaluations considering:
  - Alt-1 SRS sequence generation is not a function of allocated PRB position
  - Alt-2 SRS sequence generation is a function of allocated PRB position
  - Aim to conclude next meeting

Wednesday session

R1-1709363 Open issues on SRS design Sony
Revised in **R1-1719730**

R1-1709528 WF on SRS partial band hopping CATT, Nokia, Huawei, Sony

Agreements:
- Support switching between partial bands for SRS transmissions in a CC
  - At least when an UE is not capable of simultaneous transmission in partial bands in a CC
  - Consider RF retuning requirement for partial band switching
- Note: definition of partial band is equivalent to "bandwidth part" definition in wider bandwidth operation agenda item

R1-1709378 WF on Number of symbols for SRS Ericsson, Sony, Mitsubishi Electric

Agreements: NR supports configuration of an X-port SRS resource spanning N adjacent OFDM symbols within the same slot where
- N = 1, 2, 4 at least

R1-1709376 WF on SRS Tx beam determination LG Electronics, Intel Corporation

Agreements:
- When UE beam correspondence is not hold,
  - NR supports a UL RS indication for a configured SRS resource, where UE transmits the SRS using the beam used for transmitting the indicated UL RS
    - The UL RS indication can be SRI (SRS resource indicator), at least
    - FFS: The indication via MAC CE and/or DCI

Agreements:
- When UE beam correspondence holds,
  - NR supports the indication for a configured SRS resource, where the transmission of the SRS resource is performed with the same spatial filtering as the one used for the reception of the indicated DL RS
    - The indication can be based on CSI-RS resource,
      - FFS: signaling details (e.g., a low overhead mechanism, reciprocal QCL (if supported))
    - FFS: The indication via MAC CE and/or DCI
  - NR supports a UL RS indication for a configured SRS resource, where UE transmits the SRS using the beam used for transmitting the indicated UL RS
    - The UL RS indication can be SRI (SRS resource indicator), at least
    - FFS: The indication via MAC CE and/or DCI

Possible agreements:
- In case when no explicit Tx beam indication is provided for a configured SRS resource for UL beam management,
  - it is supported that the UE may transmit the SRS using the beam used for Msg.3
- In case when UE is not configured with any SRS resources,
  - it is supported that the UE may transmit PUSCH using the beam used for Msg.3

R1-1709610 WF on SRS framework CATT

Possible agreements:
- Support single SRS transmission framework for CSI acquisition and beam management
- Support SRS framework with
  - M SRS settings (or sets)
    - Need to agree on max M value
  - Each SRS setting (set) comprised of K SRS resources
    - Need to agreed on Max K value
  - Each SRS resource has N ports, max N=4(?)
  - One SRS resource can be mapped on one OFDM symbol
- Periodic SRS
  - An UE can be configured with N≥1 periodic SRS, with same or different periodicity, same or different slot offset
- Semi-persistent SRS
  - An UE can be configured to transmit SRS in each OFDM (or sub time unit smaller than OFDM symbol if supported) symbol for semi-persistent SRS transmission
- Aperiodic SRS
  - An UE can be triggered N≥1 aperiodic SRS resources transmission by one signal

Friday

R1-1709764 WF on SRS configuration CATT, Ericsson, LG

Agreements:
- For the purposes of DL/UL CSI acquisition and beam management
  - A UE can be configured with K >= 1 SRS resources where
    - A given X-port SRS resource spans N = 1,2, or 4 adjacent symbols within a slot where all X ports are mapped to each symbol of the resource
      - FFS whether or not support N adjacent sub-time-units
      - FFS whether or not to additionally support non-adjacent symbols/sub-time-units
      - FFS whether to not to additionally N>4
      - FFS the details for transmission of SRS (e.g., w.r.t., beams, etc.) within the N symbols/sub-time-units
      - FFS whether or not/how to support antenna switching using SRS
  - A given SRS resource can be configured as aperiodic, periodic, or semi-persistent, where
    - Periodic: The resource is configured with a slot-level periodicity and slot-offset
    - Semi-persistent: The resource is configured with a slot-level periodicity and slot-offset
      - Multiple SRS resources can be activated/deactivated with a single message

- FFS: Activation/deactivation details
- Aperiodic: The resource is configured without a slot-level periodicity and slot offset
  - Multiple SRS resources can be triggered with a single message
- Note: For periodic/semi-persistent, different resources may have different periodicities and/or slot offsets

- FFS the location(s) of SRS symbol(s) within a slot
- FFS: Configuration details including grouping of SRS resources to allow low signaling overhead for indicating allocated SRS resources

R1-1709638 WF on SRS sequence generation Mitsubishi Electric, Huawei, HiSilicon, Nokia

Possible agreements:

- Support SRS sequence ID to generate SRS sequences where SRS sequence ID is UE specifically configured
- Root of a Zadoff-Chu sequence of an SRS sequence is at least a function of SRS sequence ID
  - FFS on details of the function
  - Examples:
    - The function is parameterized only by SRS sequence ID
    - The function is parameterized by SRS sequence ID, length of SRS sequence, SRS sequence scheduled time
    - The function is a random number generator, interrcnded for sequence hopping, with a SRS sequence ID as a random seed
- Configure SRS sequence ID using
  - RRC
  - FFS: UE specific ID (example: C-RNTI) if no RRC signaling
  - FFS: for combination of RRC and DCI

Friday

R1-1709699 WF on SRS sequence generation Mitsubishi Electric, Huawei, HiSilicon, Nokia, AT&T, Intel, ZTE, LG Electronics, Panasonic, Ericsson

Agreements:

- Support SRS sequence ID to generate SRS sequences where SRS sequence ID is UE specifically configured using
  - RRC
  - FFS: UE specific ID (example: C-RNTI) which can be overwritten by RRC signaling
  - FFS: for combination of RRC and DCI
- Root(s) of Zadoff-Chu based sequence(s) of an SRS sequence is at least a function of SRS sequence ID
  - FFS on details of the function,
  - Examples:
    - The function is parameterized only by SRS sequence ID
    - The function is parameterized by SRS sequence ID, length of SRS sequence, SRS sequence scheduled time
    - The function is a random number generator, intended for sequence hopping, with a SRS sequence ID as a random seed
    - The function is parameterized by SRS sequence ID, scheduled time and frequency location of the SRS sequence
- FFS: sub-time-units for SRS (if supported), SRS sequence generation details, e.g., block wise sequence generation and concatenation (one/multiple roots), long sequence based designs (one root), etc.

R1-1709551 WF on Sequence design for SRS Ericsson, Panasonic

Continue offline discussion until Thursday – Takano (Sony)

Friday session

R1-1709379 WF on Frequency hopping for SRS Ericsson, Sony, Mitsubishi Electric

Conclusion:

- Send an LS to RAN4 regarding the following:
  - RAN1 is discussing the possibility of enabling SRS hopping within a slot. For an X-port SRS resource spanning N adjacent OFDM symbols within the same slot, all X ports may be sounded as frequently as up to each of the N symbols in a different portion of the band. In addition to other aspects that need to be investigated in RAN1, RAN1 is also wondering UE RF implementation aspects that may place constraints on the design (e.g., total SRS hopping bandwidth) of the hopping pattern, e.g., required time for frequency re-tuning (if re-tuning needed) or transient period if re-tuning is not needed. Note that RAN1 also made an agreement as follows (Mattias to copy previous agreements on SRS switching across bandwidth parts)
  - Draft LS by Mattias (Ericsson) R1-1709819, which is endorsed. Final LS approved in R1-1709836

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R1-1709662 WF on the Number of Ports for UL Transmission Samsung, Nokia, Alcatel-Lucent Shanghai Bells, Xinwei, AT&T, National Instruments, Motorola Mobility, Lenovo

Not treated.

R1-1706938	UL SRS design for beam management, CSI acquisition	Huawei, HiSilicon
R1-1707133	Discussion on SRS design for NR	ZTE
R1-1707368	Discussion on SRS for NR	Intel Corporation
R1-1707490	Further discussion on SRS transmission	CATT
R1-1707618	On SRS design and related operations	LG Electronics
R1-1707701	On SRS design for NR	Guangdong OPPO Mobile Telecom.
R1-1707764	Discussion of SRS resource configuration	Lenovo, Motorola Mobility
R1-1707836	SRS design in NR	MediaTek Inc.
R1-1707978	NR-SRS design for NR	Samsung
R1-1708085	Discussion on SRS transmission for NR	Panasonic Corporation
R1-1708343	On SRS for NR	InterDigital, Inc.
R1-1708600	Discussion on SRS design	Qualcomm Incorporated
R1-1708709	SRS Design	Ericsson
R1-1708928	UL SRS design considerations in NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709006	Views on SRS sequence ID and generation of SRS sequences	Mitsubishi Electric Co.

7.1.2.4.5 QCL

R1-1707795 Summary of [88b-12] Email discussion on QCL types for NR ZTE
Revised in **R1-1709812.**

R1-1709298 Summary of QCL Nokia
The document was presented by Mihai Enescu from Nokia.
Proposal: NR supports QCL indication across carriers, the default assumption being QCL assumptions per CC
Proposal:

- NR signaling of QCL comprises of higher layer signalling (RRC), MAC-CE signalling and dynamic signalling (DCI)
  - RRC and MAC-CE signalling for NR-PDCCH
  - RRC and DCI signalling for NR-PDSCH
- QCL between SSblock and other RS (e.g. PRACH, CSI-RS for mobility/BM, PBCH-DMRS) is implicitly or explicitly captured in the specification, separate from the shared channel QCL.
- RS QCL for RRM is implicitly assumed in specification (e.g. ports in a CSI-RS resource per CC, DMRS ports in a group per CC)

Decision: The document is noted. Continue offline discussion – Mihai (Nokia)

Friday session

R1-1709636 WF on QCL Nokia

Conclusion:

- RAN1 considers a generic term "spatial Rx parameters" and defers to RAN4 performance testing the exact interpretation of "spatial Rx parameters".
  - The following interpretation alternatives for "spatial Rx parameters" can be further considered by RAN4:
    - One or more of: AoA, Dominant AoA, average AoA, Power Angular Spectrum (PAS) of AoA, average AoD, PAS of AoD, transmit/receive channel correlation, transmit/receive beamforming, spatial channel correlation etc.
    - Prepare an LS – Mihai (Nokia) **R1-1709822**, endorsed by updating the 3rd paragraph with the above agreements, final LS is approved in R1-1709837

Conclusion:

- FFS For CSI-RS RSRP determination, CSI-RS RSRP is measured per CSI-RS port
  - FFS reporting per CSI-RS port or not (if not per CSI-RS port, detailed reporting approaches)
  - FFS impact due to sub-time-unit CSI-RS

Agreements:

- PDSCH DMRS ports in a PDSCH DMRS group per [bundled PRB] in CC are implicitly assumed QCLed w.r.t average gain, delay spread, Doppler spread, Doppler shift, and average delay parameters, spatial Rx parameters).
- PTRS port and PDSCH DMRS port can be assumed QCL
  - w.r.t average gain, delay spread, Doppler spread, Doppler shift, and average delay parameters, spatial Rx parameters (e.g. PTRS and PDSCH DMRS sharing the same beam)
  - w.r.t Doppler spread, Doppler shift (e.g. PTRS and PDSCH DMRS sharing the same RF chain)
  - FFS impact due to configurable association between PTRS port and PDSCH DM-RS port (if supported)
- CSI-RS ports within a CSI-RS resource have at least two types of QCL assumptions
  - QCL w.r.t average gain, delay spread, Doppler spread, Doppler shift, and average delay parameters, spatial Rx parameters
  - Not QCL'ed (e.g. for beam selection based on beamformed CSI-RS codebook)
    - FFS whether some parameters can still be QCL'ed

Not treated.

R1-1706940	Details of QCL assumptions and related RS design considerations	Huawei, HiSilicon
R1-1707134	QCL/QCB design for UL and DL MIMO	ZTE
R1-1707369	On QCL for NR	Intel Corporation
R1-1707619	Discussion on QCL for NR	LG Electronics
R1-1707979	On QCL for NR	Samsung
R1-1708344	On QCL assumption for NR	InterDigital, Inc.
R1-1708601	Discussion on QCL	Qualcomm Incorporated
R1-1708710	On QCL	Ericsson
R1-1708888	Discussion on QCL for NR	CATT
R1-1708929	On QCL Framework and Configurations in NR	Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.4.6 Fine time/frequency tracking of channel

R1-1709290 Summary of issues and views on fine time and frequency tracking of channel MediaTek Inc.

The document was presented by Chiao-yao Chuang from MediaTek.

- Proposal 1: The further simulation is needed for checking the performance of the proposed RS patterns from the companies and for comparing with the existing RS(s)
- Proposal 2: Build up the email discussion thread so that the companies can propose the RS pattern and further simulation assumption as previously did for DMRS evaluation. Bring the results in June ad-hoc meeting
- Proposal 3: The more detail of fine time and frequency tracking for multi-beam and multi-TRP operation should be proposed in June ad-hoc meeting

Decision: The document is noted. Continue offline discussion until Tuesday – Chiao-Yao (Mediatek)

Wednesday session

R1-1709640 WF on RS design requirement for fine time and frequency tracking MediaTek, Huawei, Hisilicon, Ericsson, Samsung

Also supported by Intel

Agreements:

- Fine/time frequency tracking RS (TRS) structure may include burst structure and TRS structure inside a burst
  - Whether the term "TRS" appear in specifications is FFS
  - RS(s) can be the existing ones, revision of the existing ones, or new ones
- The parameters for burst structure are at least
  - **X**: the length of TRS burst in terms of number of slots
  - **Y**: the TRS burst periodicity in terms of number of slots
- TRS supports a single port
  - FFS: Other numbers of TRS ports, resources, etc
- TRS has an equal RE spacing in frequency domain within a TRS bandwidth
  - FFS: Whether multiple values are supported
  - Note that more than one equal RE spacing can be considered
- FFS on TRS configuration details

Conclusions:

- All proponents are recommended to evaluate TRS until the next meeting
- Evaluation assumptions for TRS
  - The parameters for TRS structure inside a burst are least
    - S_f: TRS subcarrier spacing

- S_t: TRS symbol spacing within a slot
- **N**: Number of OFDM symbols per TRS within a slot
- **B**: TRS bandwidth in terms of number of RBs

- The different slots in a TRS burst may have different TRS parameters (N,B, S_f, S_t) (FFS)
- FFS: TRS may have a repetition or staggered structure in time domain within a slot
  - FFS: Whether symbol spacing is equal or non-equal within slot
- Note that pages 6 – 9 in R1-1706940 are candidate parameters for evaluations
  - Note that other candidate parameters are not precluded

Continue offline discussion until Thursday – Chiao-Yao (Mediatek)
Friday: no further progress.

Not treated.

R1-1706939	Reference signal for fine time and frequency tracking	Huawei, HiSilicon
R1-1707136	Discussion on fine time/frequency tracking of channel	ZTE
R1-1707370	On RS for time/frequency offset tracking	Intel Corporation
R1-1707620	Discussion on fine time/frequency tracking of channel	LG Electronics
R1-1707855	RS design requirement for fine time and frequency tracking	MediaTek Inc.
R1-1707980	Discussions on fine time/frequency tracking for NR	Samsung
R1-1708260	Considerations on fine time/frequency tracking	Sony
R1-1708602	Further analysis on fine time/frequency tracking RS design	Qualcomm Incorporated
R1-1708711	On time and frequency tracking of the channel	Ericsson
R1-1708930	Views on the fTFT-RS in NR	Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.4.7 Other

R1-1707371	Control signalling to support 12 MIMO layers in MU-MIMO	Intel Corporation
R1-1707802	Summary of PTRS open issues	Ericsson
R1-1707982	RS options for P1 beam management	Samsung
R1-1708141	Common UL/DL DMRS design	Huawei, HiSilicon
R1-1708170	DMRS design and simulation results for ECP	Huawei, HiSilicon
R1-1708171	UL SRS sequence design in NR	Huawei, HiSilicon
R1-1708712	On a unified CSI-RS design to support multiple use cases	Ericsson
R1-1708713	On the collision between DMRS and DC subcarrier	Ericsson
R1-1708931	On the PT-RS Design for DFT-s-OFDM	Nokia, Alcatel-Lucent Shanghai Bell

7.1.2.5 Other

Including MIMO calibration

R1-1707794 Draft CR for TR38.802 Section 7.1.6 MIMO calibration ZTE
Companies are encouraged to check the CR especially w.r.t. the tdoc number cited.
R1-1709832 TR38.802_CR_Section_7.1.6_MIMO calibration ZTE
Decision: CR0002 to 38.802 Rel-14, F is agreed.

Not treated.

R1-1706929	Considerations on timing advance design in NR	Huawei, HiSilicon
R1-1706979	Discussion on phase3 system-level calibration for NR-MIMO	Huawei, HiSilicon
R1-1706980	Higher layer implications of NC-JT transmission from multiple TRPs	Huawei, HiSilicon
R1-1707089	NR MIMO System Level Phase 3 Calibration Results	Beijing Xinwei Telecom Techn.
R1-1707138	Further clarification for Phase 3 NR MIMO calibration	ZTE
R1-1707139	Calibration results for Phase 1 NR MIMO system level calibration	ZTE
R1-1707140	Calibration results for Phase 2 NR MIMO link level calibration	ZTE
R1-1707141	Calibration results for Phase 2 NR MIMO system level calibration	ZTE
R1-1707372	Calibration results for Phase 1 NR MIMO link level calibration	Intel Corporation
R1-1707373	Calibration results for Phase 1 NR MIMO system level calibration	Intel Corporation
R1-1707374	Calibration results for Phase 2 NR MIMO link level calibration	Intel Corporation
R1-1707622	Phase 2 LLS Calibration Results for NR MIMO	LG Electronics
R1-1707984	Evaluation results for dense urban scenario on 30GHz frequency band	Samsung
R1-1708096	NR MIMO Phase 2 SLS calibration results	ETRI
R1-1708274	Calibration results for Phase 1 NR MIMO link level calibration	ZTE

R1-1708275 Calibration results for Phase 3 NR MIMO calibration ZTE
R1-1708462 Phase-3 SLS MIMO Calibration Results NTT DOCOMO, INC.
R1-1708604 MIMO calibration results for sub6GHz Qualcomm Incorporated
R1-1708932 Phase 3 SLS NR MIMO calibration results on 30 GHz Nokia, Alcatel-Lucent Shanghai Bell
R1-1708948 Phase 1 calibration Results of NR MIMO CATR
R1-1708949 Phase 2 calibration Results of NR MIMO CATR
R1-1709037 MIMO Phase-2 SLS calibration results on 30GHz frequency band Samsung
R1-1709038 MIMO Phase-2 LLS calibration results on 30GHz frequency band Samsung
R1-1709125 Calibration results for Phase 2 NR MIMO system level calibration Intel Corporation
R1-1709199 Phase 2 and Phase 3 SLS Calibration Results for NR MIMO LG Electronics
R1-1709827 Calibration results for Phase 1 NR MIMO link level calibration ZTE
R1-1709828 Calibration results for Phase 1 NR MIMO system level calibration ZTE
R1-1709829 Calibration results for Phase 2 NR MIMO link level calibration ZTE
R1-1709830 Calibration results for Phase 2 NR MIMO system level calibration ZTE
R1-1709831 Calibration results for Phase 3 NR MIMO calibration ZTE

7.1.3 Scheduling/HARQ aspects

Friday
R1-1709848 Proposals on work plan for scheduling/HARQ aspects NTT DOCOMO
Decision: The document is noted, for email discussion until May 31st – Fred (NTT DOCOMO)

R1-1708121 Unified design for slot and mini-slot Huawei, HiSilicon

7.1.3.1 Physical downlink control channel

R1-1709375 WF on PDCCH NTT DOCOMO, INC., Huawei, HiSilicon, Ericsson, ZTE, InterDigital, KT Corp., LG Electronics, ETRI, OPPO, NEC
The document was presented by Fred Takeda from NTT DOCOMO.
Decision: The document is noted, later modified as follows:

Tuesday session

Agreements:

- CCE = 6 REGs (confirm Working Assumption)
- One of following is configured for REG-to-CCE mapping for a 1-symbol CORESET:
  - Opt.1: No interleaving – 6 REGs for a given CCE are grouped to form a REG bundle and all REGs for a given CCE are consecutive
    - CCE(s) of one PDCCH is/are also consecutive
    - FFS: Whether the UE can assume the same precoder across multiple REG bundles
  - Opt.2: Interleaving – [2 or 3 or 6] REGs for a given CCE are grouped to form a REG bundle and REG bundles are interleaved in the CORESET
    - FFS: Whether the UE can assume the same precoder across multiple REG bundles
    - FFS: down selection among {2}, {3}, {2,3}, {2,6}, {3,6}, {2,3,6}
  - Note: UE can assume the same precoder within a REG bundle
- For REG-to-CCE mapping for a CORESET with more than 1-symbol;
  - REG bundle is defined in time and frequency-domain
  - At least support following:
    - Time-first mapping where one of the following is configured
      - Support REG bundle in time-domain being equal to the CORESET semi-statically configured time duration
        - Opt.1: Non interleaving - 6 REGs for a given CCE are grouped to form a REG bundle and all REGs for a given CCE are time and frequency localized
          - FFS: Whether the UE can assume the same precoder across multiple REG bundles
        - Opt.2: Interleaving – [2 or 3 or 6] REGs for a given CCE are grouped to form a REG bundle and REG bundles are interleaved in the CORESET
          - FFS: Whether the UE can assume the same precoder across multiple REG bundles
  - FFS: time-domain precoder-cycling
    - Support REG bundle in time-domain being equal to 1 symbol, or;
    - Support following:
      - REG-to-CCE mapping is exactly same as the case where a CORESET with 1 symbol
      - A PDCCH candidate can be mapped across OFDM symbols

Not treated.
R1-1708394 Discussion on the semi-static DL and UL transmission CMCC
R1-1709062 Overview of DL Control Channel Design Ericsson
R1-1709386 Open issues list and comments for AI 7.1.3.1 NTT DOCOMO

7.1.3.1.1 PDCCH structure and the transmission schemes

Including CCE-to-REG mapping, PDCCH-to-CCE mapping, RS structure/mapping, etc, of a PDCCH. Transmission schemes including single/multi-beam should also be discussed.

R1-1709522 WF on NR DL Control TX and DMRS ZTE, Qualcomm, Ericsson

Agreements:

- Confirm working assumption:
  - One-port transmit diversity scheme with REG bundling per CCE is used for NR-PDCCH
- FFS: DMRS RE overhead for the REG transmitting DMRS is 1/3
  - FFS on DMRS pattern

R1-1709540 WF on front-loaded RS for NR-PDCCH LG Electronics, ZTE, Sharp
Also supported by Samsung

Not treated.
R1-1706941 Transmit diversity for DL control channel Huawei, HiSilicon
R1-1706942 DMRS for DL control channel Huawei, HiSilicon
R1-1706946 CCE-to-REG mapping Huawei, HiSilicon
R1-1706947 PDCCH-to-CCE mapping Huawei, HiSilicon
R1-1707156 Further evaluation results on PDCCH diversity scheme ZTE
R1-1707157 Analysis and simulation of REG bundling ZTE
R1-1707158 Resource mapping and Interleaving of PDCCH ZTE
R1-1707159 Issues related to PDCCH DMRS ZTE
R1-1707199 PDCCH structure for NR NEC
R1-1707230 DMRS design for NR-PDCCH vivo
R1-1707231 CCE size and bunlding size for NR-PDCCH vivo
R1-1707375 NR PDCCH structure and its transmission Intel Corporation
R1-1707376 Evaluations on distributed NR PDCCH transmission schemes. Intel Corporation
R1-1707377 On DM-RS design for NR PDCCH Intel Corporation
R1-1707378 PDCCH transmission schemes and multi-beam operation Intel Corporation
R1-1707492 Further details of NR-PDCCH transmission schemes CATT
R1-1707493 Support of MU-MIMO CATT
R1-1707494 Details of NR-PDCCH structure CATT
R1-1707623 Discussion on REG bundling LG Electronics
R1-1707624 Discussion on RS structure LG Electronics
R1-1707625 Discussion on NR-PDCCH structure LG Electronics
R1-1707702 NR-PDCCH CCE-to-REG mapping with REG bundling Guangdong OPPO Mobile Telecom.
R1-1707741 Attaching UE-ID for PDCCH Transmisison using Polar Codes AT&T
R1-1707791 Discussion on NR-PDCCH structure Spreadtrum Communications
R1-1707821 Discussion on PDCCH structure and transmission scheme MediaTek Inc.
R1-1707985 Resource Mapping for NR-PDCCH Samsung
R1-1707986 DMRS structure for NR-PDCCH Samsung
R1-1707987 Multi-beam Transmission for NR-PDCCH Samsung
R1-1708097 Evaluation of 1-port TxD schemes with wideband and narrowband RS for NR-PDCCH ETRI
R1-1708098 On REG interleaving for distributed NR-PDCCH ETRI
R1-1708099 On DMRS density in time and frequency for NR-PDCCH ETRI
R1-1708108 The relation among RS, REG, CCE, and CORESET Panasonic
R1-1708306 NR DL control channel structure Motorola Mobility, Lenovo
R1-1708345 Design considerations for beam-based PDCCH InterDigital, Inc.
R1-1708346 On REG bundling for PDCCH InterDigital, Inc.
R1-1708370 REG bundling per CCE for NR PDCCH Sharp
R1-1708395 Evaluation on CCE-to-PDCCH Mapping CMCC
R1-1708396 Transmit Diversity on NR-PDCCH with Assisting RS CMCC
R1-1708463 Views on resource mapping for NR-PDCCH NTT DOCOMO, INC.

R1-1708464 DM-RS pattern design for NR-PDCCH NTT DOCOMO, INC.

R1-1708498 On the remaining details of PDCCH transmission scheme and reference signal structure Nokia, Alcatel-Lucent Shanghai Bell
R1-1708499 Evaluation of intereaved CCE-to-REG mapping schemes for DL control channel Nokia, Alcatel-Lucent Shanghai Bell
R1-1708500 On the remaining details of NR PDCCH stucture Nokia, Alcatel-Lucent Shanghai Bell
R1-1708501 PDCCH support for multi-beam system Nokia, Alcatel-Lucent Shanghai Bell
R1-1708606 Wideband RS and narrowband RS Qualcomm Incorporated
R1-1708607 RS density and REG bundling size for DL control channel Qualcomm Incorporated
R1-1708608 PDCCH structure Qualcomm Incorporated
R1-1708716 Discussion on REG bundle in time-domain ITRI
R1-1709063 On NR-PDCCH Structure Ericsson
R1-1709064 On DM-RS for NR-PDCCH Ericsson
R1-1709065 On Performance of Pre-Coder Cycling for NR-PDCCH Ericsson
R1-1709066 On REG Bundle and CCE Size for NR-PDCCH Ericsson
R1-1709145 Considerations on NR PDCCH structure KT Corp.
R1-1709182 Transmit Diversity Aspects for NR-PDCCH Samsung
R1-1709223 Beamforming on NR-PDCCH CMCC
R1-1709229 Way Forward on Transmit Diversity Scheme for NR-PDCCH MediaTek Inc.
R1-1709646 WF on RS configuration for NR-PDCCH LG Electronics, Intel, …

7.1.3.1.2 Search space configuration/design and PDCCH monitoring

Including CORESET configuration, search space structure/configuration, UE procedures on PDCCH monitoring, etc.

R1-1709266 WF on DL CORESET configuration OPPO, Ericsson, Panasonic, ZTE, CATT, Intel
Also supported by DOCOMO, Xiaomi

Agreements:

- In time domain, a CORESET can be configured with one or a set of contiguous OFDM symbols
  - The configuration can indicate the starting OFDM symbol and time duration
- A CORESET is configured with only one CCE-to-REG mapping

Possible agreements:

- Support 1-3 OFDM symbol as time duration for a CORESET
  - FFS: Other time duration
  - FFS: Relationship of a first PDSCH DMRS symbol with one or more symbols of a CORESET for slot-based scheduling

Thursday

Working assumptions:

- For a time-duration of a CORESET:
  - Support 1-3 OFDM symbol as time duration for a CORESET on the NR carrier with less than or equal to X PRBs
  - Support 1-2 OFDM symbol as time duration for a CORESET on the NR carrier with wider than X PRBs
  - FFS: X values
  - FFS: Other time duration
  - FFS: Relationship of a first PDSCH DMRS symbol with one or more symbols of a CORESET for slot-based scheduling
  - FFS: restriction in the certain conditions

Not treated.
R1-1706943 Configuration of control resourrce set Huawei, HiSilicon
R1-1706944 Search space design Huawei, HiSilicon
R1-1706945 Nested search space structure Huawei, HiSilicon
R1-1707160 Time domain definition for CORESET ZTE
R1-1707161 SS splitting among different CORESETs and blind decoding ZTE
R1-1707162 PDCCH monitoring in slot and mini-slot ZTE
R1-1707232 CORESET and BD for NR-PDCCH vivo
R1-1707379 CORESETs for NR PDCCH Intel Corporation
R1-1707380 Search space design for NR PDCCH Intel Corporation
R1-1707381 On DL control channel monitoring Intel Corporation
R1-1707382 Considerations on blind decoding for NR PDCCH Intel Corporation

R1-1707495 Search space design for NR-PDCCH CATT
R1-1707496 Discussion on NR-PDCCH monitoring CATT
R1-1707497 Configuration aspects of the NR-PDCCH CATT
R1-1707626 Discussion on CORESET configuration LG Electronics
R1-1707627 Discussion on CSS configuration for wideband operation LG Electronics
R1-1707628 Discussion on mmWave control and data operation LG Electronics
R1-1707629 Discussion on hierarchical search space structure LG Electronics
R1-1707703 PDCCH CORESET configuration and UE procedure on NR-PDCCH monitoring Guangdong OPPO Mobile Telecom.
R1-1707704 NR PDCCH search space design with nested structure Guangdong OPPO Mobile Telecom.
R1-1707705 Search space design consideration for NR PDCCH with BF Guangdong OPPO Mobile Telecom.
R1-1707815 DL control channel monitoring granularity configuration Guangdong OPPO Mobile Telecom.
R1-1707822 Design of search space and UE blind decoding MediaTek Inc.
R1-1707989 Search Space Design Parameters Samsung
R1-1707990 On Hierarchical Search Space Structure Samsung
R1-1707991 Configurations for PDCCH Monitoring Samsung
R1-1707992 NR-PDCCH design for Short Monitoring Periods Samsung
R1-1708100 Discussion on configuration of search space and CORESET ETRI
R1-1708109 Configuration of CORESET and Search space design Panasonic
R1-1708110 PDCCH BD reduction Panasonic
R1-1708122 UE procedure of PDCCH monitoring for URLLC Huawei, HiSilicon
R1-1708273 Blind Detection with Polar Codes McGill University
R1-1708347 On UE-specific search space design InterDigital, Inc.
R1-1708398 Discussion on NR-PDCCH search space design CMCC
R1-1708465 Search space design NTT DOCOMO, INC.
R1-1708502 On the PDCCH search space configuration for NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708503 On the hierarchical search space and UE blind detection Nokia, Alcatel-Lucent Shanghai Bell
R1-1708538 Configuration for search spaces and control resource sets HTC Corporation
R1-1708609 Nested search space design Qualcomm Incorporated
R1-1708610 Control resource set and search space Qualcomm Incorporated
R1-1708611 Common control resource set signaling in MIB Qualcomm Incorporated
R1-1708973 Discussion on blind decoding enhancement for NR-PDCCH WILUS Inc.
R1-1709015 Control Channel Monitoring for Bandwidth Adaptation InterDigital Inc.
R1-1709016 Control channel monitoring with multiple coresets InterDigital Inc.
R1-1709067 On Configuration of Control Resource Sets and Search Spaces Ericsson
R1-1709068 On Blind Decoding of NR-PDCCH Ericsson
R1-1709069 On Aggregation Levels Ericsson
R1-1709070 On a Wake-Up Signal for Active Mode UEs Ericsson
R1-1709783 WF on the hierarchical search space structure LG Electronics, OPPO

7.1.3.1.3 Resource sharing between PDCCH and PDSCH

Including multiplexing between PDCCH and PDSCH for various data durations.

R1-1706948 Resource multiplexing of downlink control and data Huawei, HiSilicon
R1-1707163 Resource sharing between PDCCH and PDSCH ZTE
R1-1707383 Dynamic resource sharing between control and data Intel Corporation
R1-1707498 Flexible reuse of DL control resources for data transmission CATT
R1-1707630 Discussion on multiplexing between control and data LG Electronics
R1-1707631 Discussion on rate matching for NR-PDSCH and NR-PUSCH LG Electronics
R1-1707708 On resource sharing between PDCCH and PDSCH Guangdong OPPO Mobile Telecom.
R1-1707729 Multiplexing between PDCCH and PDSCH for various data durations AT&T
R1-1707823 Resource sharing between PDCCH and PDSCH MediaTek Inc.
R1-1707993 Multiplexing NR-PDCCH and PDSCH Samsung
R1-1707994 Signaling for NR-PDCCH and PDSCH Multiplexing Samsung
R1-1708111 Resource sharing between PDCCH and PDSCH Panasonic
R1-1708144 Resource sharing between NR-PDCCH and data Huawei, HiSilicon
R1-1708371 Indication of PDSCH starting position for NR Sharp
R1-1708466 Resource sharing between data and control channels NTT DOCOMO, INC.
R1-1708504 Resource sharing between PDCCH and PDSCH in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708612 Resource reuse for data in DL control region Qualcomm Incorporated
R1-1709020 PDSCH Starting position in NR InterDigital Inc.
R1-1709071 On Data Transmission in Control Resource Sets Ericsson
R1-1709072 On Resource Sharing Between PDCCH and PDSCH Ericsson

7.1.3.1.4 DCI contents

Including possible DCI contents/fields, configurability of DCI contents/fields, etc.

Friday: Email discussion regarding the UE-specific DCI fields until the next meeting – Stefan (Ericsson)
- Focus on collecting agreed fields/information to be included in the DCI.

Not treated.

R1-1706916	DCI design for URLLC	Huawei, HiSilicon
R1-1706949	DCI contents in NR and two-stage DCI designs	Huawei, HiSilicon
R1-1707164	About dynamic indication of data transmission	ZTE
R1-1707233	Design principle of RA field	vivo
R1-1707234	DCI content size and compression	vivo
R1-1707384	DCI design considerations for NR	Intel Corporation
R1-1707499	Discussion on NR DCI formats	CATT
R1-1707632	Discussion on DCI contents	LG Electronics
R1-1707633	Discussion on configurability of DCI contents	LG Electronics
R1-1707730	DCI design for TDD operation	AT&T
R1-1707824	DCI contents in NR	MediaTek Inc.
R1-1707995	DCI Contents for NR	Samsung
R1-1707996	DCI Formats for NR	Samsung
R1-1708399	Discussion on DCI in NR	CMCC
R1-1708467	Initial views on DCI fields	NTT DOCOMO, INC.
R1-1708505	On DCI contents and the configurability of DCI fields in NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708613	Views on DCI contents	Qualcomm Incorporated
R1-1709073	On Downlink Control Information Design	Ericsson
R1-1709074	On Control Channel Design for Bandwidth Adaptation	Ericsson

7.1.3.1.5 Group-common PDCCH

Including contents and structures of group-common PDCCH and the related UE procedures.

R1-1709706 WF on monitoring of the group-common PDCCH CATT, Intel, OPPO, InterDigital
Also supported by LGE

Agreements:
- The SFI transmitted in a group-common PDCCH can indicate the slot format related information for one or more slots
  - The slot format related information informs the UEs of the number of slots and the slot format(s) related information of those slots
  - FFS: how to interpret the SFI when the UE is configured with multiple bandwidth parts
  - FFS: details for UE behaviour
- FFS: A UE may be configured to monitor for at most one group-common PDCCH carrying slot format related information (SFI) in a slot

R1-1709582 WF on Group Common PDCCH Qualcomm, Ericsson
Discussions continue offline:
- In 'Slot format related information', 'other' is at least:
  - 'N/A and unknown'
    - UE shall not assume any for the symbol with 'N/A and unknown', i.e.,
      - UE cannot assume the transmission from gNB
      - UE cannot assume UE can transmit
      - UE behavior is FFS when SFI and UE-specific DCI and semi-static signaling/configuration are conflict
  - FFS: 'Empty'
    - UEs can use this resource for interference measurement
    - UE may assume there is no transmission

Discussions continue offline:
- The UE-group common PDCCH can be configured to indicate a scaling for the PDCCH blind decoding operations per CCE aggregation level across configured CORESETs
- And/or, BD reduction is RRC configurable?
- AL dependency.

R1-1709795 WF on assignment for DL and UL transmission CMCC

Discussions continue offline:

- Regarding to the higher layer signalling for the semi-static assignment of DL/UL transmission direction for NR,
  - The periodicity set where the configuration applies at least include: roughly 0.125ms, roughly 0.25ms, 0.5ms, 1ms, 2ms, 5ms, 10ms;
    - Each periodicity is supported for particular SCS(s)/slot duration(s)
      - FFS: details

Friday session

R1-1709795 WF on assignment for DL and UL transmission CMCC

Agreements:

- Regarding to the periodicity that included in the higher layer signalling for the semi-static assignment of DL/UL transmission direction for NR, at least the following values are supported:
  - [Roughly 0.125ms, roughly 0.25ms,] 0.5ms, 1ms, 2ms, 5ms, 10ms;
    - Each periodicity is supported for particular SCS(s)/slot duration(s)
  - FFS: details

Agreements:

- In 'Slot format related information', 'other' is at least:
  - 'Unknown'
    - UE shall not assume anything for the symbol with 'Unknown' by this information
    - FFS: UE behavior when the UE receives the information for the symbol from SFI and broadcast DCI and/or UE-specific DCI and/or semi-static signaling/configuration
  - FFS: 'Empty'
    - UEs can use this resource for interference measurement
    - UE may assume there is no transmission

Email discussion until the next meeting – Tony (CATT)

- Left-over FFSs regarding SFI including:
  - FFS: 'Empty'
  - FFS: UE behavior when the UE receives the information for the symbol from SFI and broadcast DCI and/or UE-specific DCI and/or semi-static signaling/configuration
- Contents
  - What should be informed?
- Structure
  - CCE re-use or completely reuse PDCCH?
- Type
  - Depending on contents, different group-common PDCCH?
- UE behaviour
- Search space
  - Relation with common search space?

Not treated.

R1-1706920	HARQ feedback indication design for UL grant-free transmission	Huawei, HiSilicon
R1-1707165	Common PDCCH design for NR	ZTE
R1-1707235	Group common NR-PDCCH	vivo
R1-1707385	Group-common PDCCH: Contents	Intel Corporation
R1-1707386	Group-common PDCCH: Physical structure	Intel Corporation
R1-1707500	Group-common PDCCH structure and configuration	CATT
R1-1707501	Contents of the group-common PDCCH	CATT
R1-1707634	Discussion on the contents and the signaling of group common PDCCH	LG Electronics
R1-1707635	Discussion on UE behavior for the group common PDCCH	LG Electronics
R1-1707709	Impact on common channel reception to PDCCH design	Guangdong OPPO Mobile Telecom.
R1-1707742	Design features of Group Common PDCCH	AT&T
R1-1707743	Attaching common UE-ID for group common PDCCH	AT&T
R1-1707825	Discussion on group-common PDCCH	MediaTek Inc.
R1-1707997	Functionalities for UE-Common NR-PDCCH	Samsung
R1-1707998	Configuration and Functionalities of Common Search Space	Samsung
R1-1707999	UE-Common NR-PDCCH Transmission Aspects	Samsung
R1-1708112	Discussion on DL/UL transmission direction	Panasonic
R1-1708113	Discussion on group common PDCCH	Panasonic

R1-1708114 Frequency/time resource assignment of the operation modes Panasonic
R1-1708145 Structure of group-common PDCCH Huawei, HiSilicon
R1-1708146 Contents of group-common PDCCH Huawei, HiSilicon
R1-1708280 Group-common PDCCH for NR Apple Inc.
R1-1708283 Control indicator channel for UE power saving Apple Inc.
R1-1708307 On NR group-common control channel Motorola Mobility, Lenovo
R1-1708372 Group common PDCCH for NR Sharp
R1-1708468 Views on contents of group-common PDCCH NTT DOCOMO, INC.
R1-1708469 Views on structure of group-common PDCCH NTT DOCOMO, INC.
R1-1708506 On common PDCCH for NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708614 Contents of group common PDCCH Qualcomm Incorporated
R1-1708823 Discussion on the design of group common PDCCH Beijing Xiaomi Mobile Software
R1-1708974 Contents and structure of group common PDCCH for NR WILUS Inc.
R1-1708975 UE procedure for group common PDCCH for NR WILUS Inc.
R1-1709003 PDCCH Blind decoding in NR InterDigital Inc.
R1-1709075 On Blind Decoding Complexity Ericsson
R1-1709076 On 'Group Common PDCCH' Structure and Configuration Ericsson
R1-1709077 On UE Procedures Related to 'Group Common PDCCH' Ericsson
R1-1709539 WF on slot format indication with group common PDCCH LG Electronics

7.1.3.1.6 Other

R1-1706899 Numerology for DL control channel Huawei, HiSilicon
R1-1707710 DL control channel design for URLLC Guangdong OPPO Mobile Telecom.
R1-1708000 DL and UL Assignment for NR TDD Samsung
R1-1708348 On low latency PDCCH InterDigital, Inc.
R1-1708507 On the usage of PDCCH DMRS as a complementary synchronization signal in DL Nokia, Alcatel-Lucent Shanghai Bell
R1-1708717 Discussion on two-stage DCI for NR ITRI
R1-1708946 Consideration on physical downlink control channel for URLLC CATR
R1-1709039 Indication of reserved resources Samsung
R1-1709040 DMRS design for Short Scheduling Periods Samsung
R1-1709078 On Low Latency Specific Features for DL Control Ericsson

7.1.3.2 Physical uplink control channel

Possible observations:

- Following proposals are discussed:
  - Option 4 is supported for UCI of up to 2 bits.
    - NTT DOCOMO, Qualcomm, MediaTek, Ericsson
  - Option 1 is supported for UCI of up to 2 bits.
    - Huawei, HiSilicon, OPPO, Nokia, Intel
- Observation 1: Option 4 can achieve lower PAPR in principle.
  - Sequence can be optimized for low PAPR and/or can be reuse of other sequence.
- Observation 2: RAN1 has different understanding of the merit of higher multiplexing capacity by Option 1
  - Companies have different understanding on how much important multiplexing capacity of a 1-symbol PUCCH for UCI of up to 2 bits is.

R1-1709387 Open issues list and comments for AI 7.1.3.2 NTT DOCOMO

7.1.3.2.1 Structure of PUCCH in short-duration

Including structures of 1-symbol PUCCH for up to 2 bits and for more than 2 bits, and of 2-symbol PUCCH.
Details including time-/frequency-/code-domain structures, RS mapping/structures, necessary PUCCH formats for various UCI payloads, etc, should also be discussed.

R1-1709080 On the Design of 1-Symbol PUCCH for 1-2 bits UCI Ericsson

- Considering both only-ACK/NACK or only-SR transmission on 1-symbol PUCCH, sequence selection and sequence modulation have comparable user multiplexing capacity.
- Sequence selection based 1-symbol PUCCH outperforms sequence modulation based 1-symbol PUCCH from the operating SNR perspective.
- **Proposals:**
  - Sequence selection is supported in NR for transmission of 1-2 UCI bits by 1-symbol PUCCH.
  - Simultaneous transmission of ACK/NACK and SR by 1-symbol PUCCH based on sequences selection is supported in NR.
    - *Consider bundling of ACK/NACK to reduce the number of PUCCH resources.*

Decision: The document is noted.

R1-1706951 **Structure of 1-symbol PUCCH for more than 2 bits** **Huawei, HiSilicon**

- Proposal 1: 1-symbol PUCCH with more than 2 bits, 1/3 DMRS overhead should be applied.
- Proposal2： Two DMRS groups (e.g. First group with 3th and 4th REs; Second group with 9th and 10th REs) are uniformly distributed over the whole RB.

Decision: The document is noted.

R1-1708472 **Short-PUCCH for 2 symbols** **NTT DOCOMO, INC.**

- Short-PUCCH spanning 2 symbols is realized by following:
  - For up to 2 bits, same UCI is repeated across the symbols.
  - For more than 2 bits, UCI is encoded and the encoded UCI bits are distributed across the symbols.
  - Frequency-hopping across symbols is enabled.
- Short-PUCCH spanning 2 symbols with each symbol carrying different UCIs is realized by configuring two short-PUCCHs having 1 symbol at different symbol positions.
  - E.g., HARQ-ACK on a short-PUCCH at the second last symbol, CSI on a short-PUCCH at the last symbol.
  - The benefit of RS overhead reduction is not comparable to the benefit of frequency-hopping.

Decision: The document is noted.

Tuesday session

R1-1709267 **WF on 2-symbol NR-PUCCH** **OPPO, Samsung, LGE, Intel, Nokia, DOCOMO, Panasonic, Ericsson, CATT, WILUS, Huawei, HiSilicon**

Discussion: Supported by Sharp, vivo.

Decision: The document is noted and modified as follows:

Agreements:

- For 2-symbol NR-PUCCH
  - option 1-1 is supported for sending UCI with up to 2 bits.
    - Note that sequence hopping is not precluded for option 1-1
  - FFS method for sending UCI with more than 2 bits
  - option 2 is not supported.
    - Note: The functionality of option 2 can be achieved by two 1-symbol short PUCCHs transmitted on one slot in TDM manner (as already agreed in RAN1 #88bis meeting) and therefore it is considered as not necessary to introduce option 2.

R1-1709499 **WF on 1-symbol NR-PUCCH with more than 2 bits** **LG Electronics, MediaTek, Ericsson, Panasonic, CATT**

Decision: The document is noted and modified as follows:

Agreements:

- For 1-symbol NR-PUCCH with more than 2 bits based on the agreed Option 1,
  - DM-RS overhead of 1/3 is supported
    - FFS on other values for DM-RS overhead, if necessary
    - FFS on detailed DM-RS pattern

Wednesday session

R1-1709600 **Frequency hopping for 2-symbol PUCCH LG Electronics, Nokia, ASB, Ericsson, InterDigital**

- For 2-symbol NR-PUCCH, frequency hopping is supported at least for localized (contiguous) PRB allocation in each symbol
  - FFS for distributed (non-contiguous) PRB allocation

Decision: The document is noted. Continue offline.

Thursday: **R1-1709600** is agreed

R1-179584 WF on 1-symbol NR-PUCCH with 1 or 2 bit(s) UCI payload **Qualcomm**

Discussions continue offline:

- Companies are encouraged to investigate performances for option 1 and option 4.
  - Design of sequences should consider tradeoff among PAPR, A-to-N, N-to-A, and DTX-to-ACK performances, and UE multiplexing capacity.
- Evaluation assumptions summarized by Yi Huang (Qualcomm) within Thursday.

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Friday session

R1-1709792 WF on simulation assumptions for 1-symbol NR-PUCCH with 1 or 2 bit(s) UCI payload Qualcomm

Agreements:

- All proponents are recommended to have evaluations for 1-symbol NR-PUCCH until the next meeting
- Simulation assumptions for 1-symbol NR-PUCCH with 1 or 2 bit(s) UCI payload
  - System bandwidth = 20Mhz
  - Subcarrier spacing = {15Khz, 60Khz}
  - TDL-A or TDL-C channel with delay spread = {30nS, 300nS, 1000nS}
  - # UE Tx =1, # eNB Rx =2
  - # UCI bits = {1,2}
  - Number of RB = {1 RB, 2 contiguous RBs, 2 dis-contiguous RBs}
  - Carrier frequency = 4Ghz
  - Number of UEs = {1}
  - For option 1: evaluate both UCI based on repetition coding and UCI with modulated sequence.
  - Practical channel estimation and ideal noise estimation
- Note: design target for 1-symbol PUCCH with 1 or 2 bits is a separate discussion.
- Design of 1-symbol short-PUCCH for UCI of 1 or 2 bits should consider tradeoff among PAPR, A-to-N, N-to-A, and DTX-to-ACK performances, and UE multiplexing capacity.

Not treated.

R1-1706950 Structure of 1-symbol PUCCH for up to 2 bits Huawei, HiSilicon
R1-1706952 Structure of 2-symbol PUCCH Huawei, HiSilicon
R1-1707167 Design principles of NR short PUCCH ZTE
R1-1707168 NR short PUCCH structure for up to 2-bit UCI ZTE
R1-1707169 NR short PUCCH structure for more than 2-bit UCI ZTE
R1-1707236 Support of intra-slot NR-PUCCH repetition vivo
R1-1707387 Short PUCCH formats for 1~2 UCI bits Intel Corporation
R1-1707388 Short PUCCH format for >2 UCI bits Intel Corporation
R1-1707389 Cyclic shift assignment and CM for FDM DMRS and UCI Intel Corporation
R1-1707390 Short PUCCH design with 2 symbol duration Intel Corporation
R1-1707502 Design of 1-symbol PUCCH structure CATT
R1-1707503 Design of 2-symbol PUCCH structure CATT
R1-1707636 Design of 1-symbol NR-PUCCH for up to 2 bits LG Electronics
R1-1707637 Design of 1-symbol NR-PUCCH for more than 2 bits LG Electronics
R1-1707638 Design of 2-symbol NR-PUCCH structure LG Electronics
R1-1707639 Performance evaluations on short NR-PUCCH structures LG Electronics
R1-1707711 Discussion on 2-symbol uplink control channel Guangdong OPPO Mobile Telecom.
R1-1707712 Discussion on RS of short uplink control channel Guangdong OPPO Mobile Telecom.
R1-1707812 Design for structure of PUCCH in short duration NEC
R1-1707842 Performance evaluation on channel structure of short PUCCH for 1 or 2 bits UCI MediaTek Inc.
R1-1708001 On 1-symbol Short PUCCH with 1 or 2 Bits Samsung
R1-1708002 On 1-symbol Short PUCCH with more than 2 Bits Samsung
R1-1708003 On 2-symbol Short PUCCH with 1 or 2 Bits Samsung
R1-1708004 On 2-symbol Short PUCCH with more than 2 Bits Samsung
R1-1708086 Discussion on uplink control channel structure in short-duration Panasonic Corporation
R1-1708147 Transmit diversity scheme for short duration PUCCH Huawei, HiSilicon
R1-1708228 Sequence based design for 1 and 2-bit PUCCH short duration IITH
R1-1708229 Pre DFT multiplexing of RS and Data for PUCCH short duration IITH
R1-1708290 On pre-DFT RS/UCI multiplexing for PUCCH in short duration Mitsubishi Electric RCE
R1-1708308 Short PUCCH structure Motorola Mobility, Lenovo
R1-1708349 On 1-symbol short-PUCCH for more than 2 bits InterDigital, Inc.
R1-1708350 On 1-symbol short-PUCCH for up to 2 bits InterDigital, Inc.
R1-1708373 Structure and configuration of NR PUCCH in short duration Sharp
R1-1708470 Sequence-based PUCCH for UCI of up to 2 bits NTT DOCOMO, INC.
R1-1708471 FDM-based PUCCH for UCI of more than 2 bits NTT DOCOMO, INC.
R1-1708508 On the design of short PUCCH for NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708509 On the short PUCCH for small UCI payloads Nokia, Alcatel-Lucent Shanghai Bell
R1-1708510 Short PUCCH format for UCI from a few bits to tens of bits Nokia, Alcatel-Lucent Shanghai Bell
R1-1708511 Multiplexing between SR and other UCI on short PUCCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708615 Channelization of 1-symbol short PUCCH with more than 2 bits payload Qualcomm Incorporated
R1-1708617 MPR issue with distributed RB allocation in UL Qualcomm Incorporated

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R1-1708618 Channelization of 2-symbol Short PUCCH Qualcomm Incorporated
R1-1708976 On short PUCCH structure for NR WILUS Inc.
R1-1709079 Overview of Short PUCCH Design Ericsson
R1-1709081 On the Design of 1-Symbol PUCCH for more than 2 bits UCI Ericsson
R1-1709082 On the Design of 2-Symbols PUCCH Ericsson
R1-1709173 Structure of PUCCH in short-duration ETRI
R1-1709195 Channelization of 1-symbol Short PUCCH with 1 or 2 bits payload Qualcomm Incorporated

7.1.3.2.2 Structure of PUCCH in long-duration

Including structures of long-PUCCH in a slot having {4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14} OFDM symbols, necessary PUCCH formats for various UCI payloads, RS mapping/structures, transmit diversity scheme, etc.

R1-1709083 Overview of Long PUCCH Design Ericsson

- Block-spreading over DFTS-OFDM symbols should be avoided if possible.
- The number of formats should be minimized unless there is any significant benefit to adding more.
- Two long PUCCH format are supported in NR:
  - One PUCCH format similar to 1a/1b for 1-2 bits with its multiplexing capacity and performance depending on the length of the long PUCCH
  - One additional format similar to Format 5 for up to 100s of bits where additional multiplexing capacity can be achieved either via Frequency combs or via OCCs in time
- Frequency hopping should be supported for long PUCCH.

Decision: The document is noted.

Tuesday session

R1-1709504 WF on Structure of Long duration NR-PUCCH for up to 2 bits LG Electronics, Panasonic, NTT DOCOMO

Decision: The document is noted and modified as follows:

Agreements:

- Long duration NR-PUCCH for up to 2 bits in a given slot is composed as the followings:
  - HARQ ACK by BPSK or QPSK modulation is repeated in time domain and multiplied with sequence(s)
    - FFS: pi/2 BPSK usage
  - Two states SR is based on on-off-keying
  - Time domain OCC can be applied over multiple UCI/DMRS symbols per frequency hop

R1-1709527 WF on Long PUCCH Qualcomm

- For long PUCCH, support DMRS at fixed locations with respect to symbol 0 in the slot, regardless of the starting symbol of long PUCCH.
  - For 1 or 2 bit(s) UCI payload
    - The set of DMRS locations are symbol {1, 3, 5} for 7-symbol slot
    - The set of DMRS locations {1, 3, 5, 8, 10, 12} for 14-symbol slot
- Depending on the long PUCCH duration, a subset of the above DMRS locations can be used

Decision: The document is noted. Continue offline discussion.

Friday session

R1-1709527 WF on Long PUCCH Qualcomm

Agreements:

- NR supports following long-PUCCH:
  - One PUCCH format for UCI with up to 2 bits with high multiplexing capacity
  - One PUCCH format for UCI with large payload with no multiplexing capacity
- FFS: One PUCCH format for UCI with moderate payload with some multiplexing capacity
  - Note: this could be a variation of one of the former PUCCH formats.
- Email discussion for collecting companies views on the following until the next meeting – Sorour (Ericsson):
  - Detailed long-PUCCH structure(s) for a given slot taking into account various number (4 – 14) of OFDM symbols and multiple PUCCH formats, and various number of UCI bits, especially regarding to:
    - DMRS location(s)
    - Frequency-hopping boundary(ies) in time-domain

R1-1709642 WF on Frequency Hopping for Long Duration NR-PUCCH LG Electronics, Samsung, Intel

Agreements:

- Study whether to support frequency re-tuning within a slot for PUSCH or for PUCCH in the Rel.15 NR.
  - More specifically, investigate the impact of frequency-hopping for PUSCH or for PUCCH for a given slot, i.e., intra-slot hopping, within a certain bandwidth or across bandwidths
    - The certain bandwidth is maximum UE transmission bandwidth capability.

Not treated.

R1-1706953 Long duration PUCCH structure Huawei, HiSilicon
R1-1706954 Long duration PUCCH formats Huawei, HiSilicon
R1-1706955 Evaluation of long duration PUCCH structure Huawei, HiSilicon
R1-1706956 Transmit diversity for long duration PUCCHHuawei, HiSilicon
R1-1707170 long PUCCH - 1/2 bits UCI ZTE
R1-1707171 long PUCCH - more than 2 bits ZTE
R1-1707391 Long PUCCH formats Intel Corporation
R1-1707392 Structure of 1~2 bits HARQ-ACK long PUCCH with TDM DMRS Intel Corporation
R1-1707393 Configurations of various long PUCCH lengths Intel Corporation
R1-1707504 Long duration PUCCH structure CATT
R1-1707640 Overall structure of long NR-PUCCH formats LG Electronics
R1-1707641 Design of long NR-PUCCH for up to 2 bits LG Electronics
R1-1707642 Design of long NR-PUCCH for more than 2 bits LG Electronics
R1-1707643 Discussion on diversity transmission for long NR-PUCCH LG Electronics
R1-1707713 Slot aggregation and configuration for NR long PUCCH Guangdong OPPO Mobile Telecom.
R1-1707714 Design of NR PUCCH with long duration Guangdong OPPO Mobile Telecom.
R1-1707767 Long PUCCH structure Lenovo, Motorola Mobility
R1-1707804 Transmit diversity for DFTsOFDM-based PUCCH in long duration Mitsubishi Electric RCE
R1-1708005 Structures for Long PUCCH Samsung
R1-1708006 Long PUCCH Transmission Aspects Samsung
R1-1708007 Performance Results for Long PUCCH Samsung
R1-1708008 Transmit Diversity for Long PUCCH Samsung
R1-1708087 Discussion on design for long-PUCCH considering coverage Panasonic Corporation
R1-1708230 Design options for long duration PUCCH IITH
R1-1708282 On channel design for long PUCCH Apple Inc.
R1-1708314 Structure of PUCCH in long-duration Cohere Technologies
R1-1708351 On transmit diversity for Long PUCCH InterDigital, Inc.
R1-1708473 Long-PUCCH for up to 2 bits NTT DOCOMO, INC.
R1-1708474 Long-PUCCH for UCI of more than 2 bits NTT DOCOMO, INC.
R1-1708512 On the design of long PUCCH for NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708513 Long PUCCH formats for small payloads Nokia, Alcatel-Lucent Shanghai Bell
R1-1708514 Long PUCCH formats for large payloads Nokia, Alcatel-Lucent Shanghai Bell
R1-1708515 CP-OFDM waveform for long PUCCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708619 Channel multiplexing for long PUCCH Qualcomm Incorporated
R1-1708620 Long PUCCH Design Considerations Qualcomm Incorporated
R1-1709084 On the Design of Long PUCCH for 1-2 bits UCI Ericsson
R1-1709085 On the Design of Long PUCCH for more than 2 bits UCI Ericsson
R1-1709748 WF on long PUCCH hopping design Huawei, HiSilicon, vivo, NTT DOCOMO

7.1.3.2.3 Resource allocation for PUCCH

Including dynamic/semi-static PUCCH resource allocation for HARQ-ACK feedback, CSI/beam-related information feedback, scheduling request, etc.

R1-1707505 PUCCH resource allocation CATT

Proposal 1: The time domain resource of a short duration PUCCH format can be dynamically signaled in the DL DCI scheduling the associated DL data transmission using the following methods:

- Method 1: DL DCI indicates both the length of the short duration PUCCH format and the starting symbol index.
- Method 2: DL DCI indicates the starting symbol in each slot. The length of the time domain resource is semi-statically configured by higher layer signaling for each slot.
- The starting symbol can be any symbol in one slot or one of multiple predefined time domain positions or symbols in a predefined short duration PUCCH format region.

Proposal 2: If the short duration PUCCH format can be used for both self-contained and non-self-contained HARQ-ACK feedback scenarios, the slot index should be either semi-statically configured or dynamically signaled to the UE.

Proposal 3: The time domain resource for a short duration PUCCH format carrying P-CSI/SR can be configured by higher layer signaling.

Proposal 4: The time domain resource of a long duration PUCCH format can be indicated with the following methods:

- Method 1: Reuse the time domain resource indication method for short duration PUCCH format.
- Method 2: Reuse the starting symbol indication method for short duration PUCCH format and determine the end of the long duration PUCCH format implicitly based on a pre-defined short duration PUCCH format region in the UL region in one slot.
- Method 3: Predefine a UL region for long duration PUCCH transmission in each slot.

Proposal 5: The number of slots for the long duration PUCCH format conveying HARQ-ACK feedback can be configured by higher layer signaling or indicated in the DL DCI scheduling the corresponding DL assignment.
Proposal 6: The time domain resource for a long duration PUCCH format carrying P-CSI/SR can be configured by higher layer signaling.
Proposal 7: The frequency domain resource of both short duration PUCCH format and long duration PUCCH format can be configured by higher layer for P-CSI/SR.
Proposal 8: The indication field for HARQ-ACK PUCCH resource should always be present in the DCI.
Proposal 9: Joint indication of time domain resource and frequency domain resource can be considered.
Discussion: .
Decision: The document is noted.

Not treated.

R1-1706921 Discussion on PUCCH for URLLC Huawei, HiSilicon
R1-1706960 PUCCH resource allocation for HARQ-ACK and SR Huawei, HiSilicon
R1-1707172 NR PUCCH resource allocation ZTE
R1-1707256 PUCCH resource allocation Fujitsu
R1-1707394 Resource allocation for scheduling request Intel Corporation
R1-1707395 Resource allocation for PUCCH during initial access Intel Corporation
R1-1707396 Time and frequency domain resource allocation for long PUCCH Intel Corporation
R1-1707644 Consideration on NR-PUCCH resource allocation LG Electronics
R1-1707645 Consideration on long NR-PUCCH resource LG Electronics
R1-1707646 Discussion on NR-PUCCH allocation for CSI reporting LG Electronics
R1-1707715 Resource indication for UL control channel Guangdong OPPO Mobile Telecom.
R1-1708009 Resource Allocation for PUCCH with HARQ-ACK Samsung
R1-1708011 Resource Allocation for PUCCH with SR Samsung
R1-1708012 UE-group CSI Reporting Samsung
R1-1708088 Discussion on resource allocation for uplink control channel Panasonic Corporation
R1-1708102 Resource allocation for PUCCH ETRI
R1-1708126 Discussion on scheduling request for URLLC Huawei, HiSilicon
R1-1708149 Discussion on CSI feedback in NR Huawei, HiSilicon
R1-1708227 Resource allocation for PUCCH Sequans Communications
R1-1708309 Resource allocation for short PUCCH Motorola Mobility, Lenovo
R1-1708352 On interference randomization for Short PUCCH InterDigital, Inc.
R1-1708400 Discussion on subband-based PUCCH resource allocation and indication CMCC
R1-1708475 PUCCH resource allocation NTT DOCOMO, INC.
R1-1708516 On the resource allocation for PUCCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708621 Resource allocation for PUCCH Qualcomm Incorporated
R1-1708622 Uplink Resource for SR Qualcomm Incorporated
R1-1709086 On Frequent Short PUCCH Resources Ericsson
R1-1709087 On PUCCH Resource Allocation Ericsson

7.1.3.2.4 UCI multiplexing

Including multiplexing between long-/short-PUCCH and PUSCH, multiplexing between PUCCHs, piggyback UCI on PUSCH. If necessary, UCI dropping rules can also be discussed.

R1-1707174 **Multiplexing of PUSCH and short PUCCH ZTE**
In order to fully reuse the remaining resources of the short PUCCH area, one of the following two options can be supported.

- Option1:The end symbol of the PUSCH allocated to a UE should be explicitly indicated.
  - The UE gets informed whether its PUSCH resources also contain its own short PUCCH. If included, the UE needs to remove them from the allocated PUSCH resources in order to prepare the PUSCH transmission.
  - Or, the UE always assumes that the PUSCH resources of the UE contain its own short PUCCH, the UE always performs the necessary checks and derives the actual applicable resources for PUSCH transmission.
- Option2: The UE always assumes that the PUSCH resources of the UE contain (its own or other UE's) short PUCCH, the UE always performs the necessary checks and derives the actual applicable resources for PUSCH transmission, according to the short PUCCH resource allocation information in the slot broadcast by the base station.

Decision: The document is noted.

R1-1707399 UCI multiplexing onto PUSCH Intel Corporation

Proposal 1
- A unified resource mapping rule for UCI on PUSCH is preferred for CP-OFDM and DFT-s-OFDM based waveforms.
- Rate matching (repetition) factor can be separately configured for each UCI type.

Proposal 2
- HARQ-ACK punctures data symbols and is mapped in a distributed manner.
- HARQ-ACK is transmitted starting from the first symbol after DM-RS.
- Whether to employ time-first or frequency-first mapping for HARQ-ACK on PUSCH can be configured by higher layers.

Proposal 3
- RI, CQI/PMI and beam related information can be rate-matched around the data symbols.
- RI follows a similar mapping scheme as HARQ-ACK feedback.
- CQI/PMI and beam related information are transmitted on both edges of allocated resources for PUSCH.

Proposal 4: UCI can be rate-matched around PT-RS and additional DM-RS symbol(s) if present.

Decision: The document is noted.

R1-1708518 On the multiplexing between PUCCHs and PUSCH Nokia, Alcatel-Lucent Shanghai Bell
- Multiplexing between long PUCCH and PUSCH:
  - Observation 1: UCI on PUSCH should be used in cases where simultaneous transmission of long PUCCH and PUSCH is problematic.
  - Proposal 1: Simultaneous transmission of PUCCH and PUSCH per UE is supported only with CP-OFDM waveform.
  - Proposal 2: Simultaneous transmission of PUCCH and PUSCH per UE does not change the PUCCH frequency location.
- Multiplexing between PUCCHs:
  - Proposal 3: Long PUCCH and short PUCCH can be transmitted from one UE in the same slot in FDM manner.
  - Proposal 4: Long PUCCH and short PUCCH can be transmitted from one UE in the same slot in CDM manner.

Decision: The document is noted.

Thursday

Agreement: Confirm that UCI piggyback on PUSCH is supported for both DFT-s-OFDM waveform and CP-OFDM waveform.
- FFS: Whether common UCI piggyback rule for different waveforms.

Conclusion:
- Continue further study of UCI piggyback of following options:
  - Opt.1: For all types of UCI, UL data is rate-matched.
    - FFS: the case where UE missed the DL assignment.
  - Opt.2: For all types of UCI, UL data is punctured.
  - Opt.3: At least for UCI other than HARQ-ACK, UL data is rate-matched, while for HARQ-ACK, UL data is punctured.
    - FFS: handling of large HARQ-ACK payload

Not treated.

R1-1706957	Multiplexing of PUCCH and PUSCH	Huawei, HiSilicon
R1-1706958	On transmission of UCI on PUSCH	Huawei, HiSilicon
R1-1706959	Multiplexing of UL control channel and SRS in NR	Huawei, HiSilicon
R1-1707173	UCI multiplexing on PUSCH	ZTE
R1-1707257	UCI multiplexing in short duration PUCCH	Fujitsu
R1-1707397	Short PUCCH and data multiplexing	Intel Corporation
R1-1707398	Long PUCCH and data multiplexing	Intel Corporation
R1-1707506	Multiplexing of different UL control channels	CATT
R1-1707507	Multiplexing of UCI and UL data	CATT
R1-1707647	Consideration on UL multiplexing with short NR-PUCCH	LG Electronics
R1-1707648	Consideration on UL multiplexing with long NR-PUCCH	LG Electronics
R1-1707649	Discussion on UCI piggyback on NR-PUSCH	LG Electronics
R1-1707716	Multiplexing of short PUCCH and long PUCCH	Guangdong OPPO Mobile Telecom.
R1-1707717	Multiplexing of short UCI and UL data	Guangdong OPPO Mobile Telecom.
R1-1707718	On UCI and data multiplexing in PUSCH	Guangdong OPPO Mobile Telecom.
R1-1707843	Discussion on UCI on PUSCH	MediaTek Inc.
R1-1708013	On UCI Multiplexing in PUSCH	Samsung

R1-1708014 Performance Results for UCI and Data Multiplexing Samsung
R1-1708015 On Simultaneous PUSCH and PUCCH Transmissions Samsung
R1-1708016 PUCCH Multiplexing Samsung
R1-1708089 Discussion on UCI and data multiplexing Panasonic Corporation
R1-1708090 Discussion on multiplexing of SR and 1 or 2 bits HARQ-ACK Panasonic Corporation
R1-1708103 UCI multiplexing ETRI
R1-1708148 Multiplexing between PUCCHs Huawei, HiSilicon
R1-1708374 UCI reporting on PUCCH and PUSCH Sharp
R1-1708476 Multiplexing of PUCCH and PUSCH NTT DOCOMO, INC.
R1-1708477 UCI on PUSCH NTT DOCOMO, INC.
R1-1708517 UCI multiplexing on PUSCH Nokia, Alcatel-Lucent Shanghai Bell
R1-1708623 UCI and data multiplexing Qualcomm Incorporated
R1-1708977 On simultaneous transmission for PUCCH and PUSCH WILUS Inc.
R1-1709088 On Long PUCCH with Simultaneous Data Transmission Ericsson
R1-1709089 On Multiplexing of Different PUCCH Formats Ericsson
R1-1709090 On Short PUCCH with Simultaneous Data Transmission Ericsson
R1-1709091 On UCI on PUSCH Ericsson

7.1.3.2.5 Other

R1-1707400 Short UL control channel early in a slot Intel Corporation
R1-1707401 Link level evaluation of DMRS structure and overhead for short UL control channel Intel Corporation
R1-1708519 On low-latency UCI transmission Nokia, Alcatel-Lucent Shanghai Bell

7.1.3.3 DL/UL data scheduling and HARQ procedure

Note that this sub-agenda can address the low latency requirement as well as non-latency sensitive case

R1-1707195 Discussion on resource allocation for NR Fiberhome Technologies Group
R1-1709388 Open issues list and comments for AI 7.1.3.3 NTT DOCOMO

7.1.3.3.1 DL data scheduling

Including frequency- and/or time-domain resource allocation, scheduling timing, MCS/transport block determination, etc.

R1-1707403 Timing relationships for DL scheduling Intel Corporation

- Proposal 1: Scheduling delays are indicated using the 'K0' and 'K2' values in units of slots of the corresponding numerology and the starting symbol within a slot for the corresponding data channel (PDSCH and PUSCH respectively).
- Proposal 2: For cross-numerology scheduling (if supported), scheduling delays, K0 and K2 values, are indicated in terms of slots corresponding to the numerology with larger subcarrier spacing (SCS).
- Proposal 3: In cases wherein the UE may need to decode the PDCCH in order to receive the PDSCH, sufficient amount of minimum scheduling delay should be guaranteed considering the time necessary for PDCCH blind decoding in the search space.
- Proposal 4: During initial access:
  - For Msg2 scheduling: The time gap between PDCCH and corresponding PDSCH carrying RAR is fixed to 0.
  - For Msg3 initial transmission: The time gap between the RAR and the initial Msg3 transmission is predefined in the specification with support of indication of an additional delay using a 1-bit UL delay field in the RAR.
  - For Msg3 retransmission: The time gap between the PDCCH and the PUSCH carrying Msg3 is indicated using the UL grant in the PDCCH from a set of values configured via SIB signaling.
  - For Msg4 scheduling: The time gap between the PDCCH and the PDSCH carrying Msg4 is indicated using the DL assignment in the PDCCH from a set of values configured via SIB signaling.
- Proposal 5: During RRC reconfiguration, within a specified timing gap, e.g., N slots after PUCCH carrying ACK feedback for corresponding PDSCH carrying RRC reconfiguration, UE may still use the old set of values for K0, K1 and K2 before RRC reconfiguration for data scheduling and HARQ timing.

Decision: The document is noted.

Agreements:

- In frequency-domain, for PDSCH and for PUSCH with CP-OFDM waveform, starting point is at least LTE DL RA type 0.
- Working assumption: In frequency-domain, for PUSCH with DFT-s-OFDM waveform, only contiguous resource allocation is supported in Rel. 15.
- In frequency-domain, NR allows to schedule a PDSCH and PUSCH at least with CP-OFDM waveform with large resource allocation and small resource allocation in dynamic manner.
  - E.g., scheduling a slot with full or almost full bandwidth and scheduling next slot with one or a few RBs.

Not treated.
R1-1706901 TB mapping for slot aggregation Huawei, HiSilicon
R1-1706917 Data transmission for DL URLLC Huawei, HiSilicon
R1-1707190 NR DL scheduling considerations for URLLC ZTE
R1-1707200 Frequency and time resource allocation schemes for NR NEC
R1-1707237 Discussion on flexible length scheduling vivo
R1-1707238 Discussion on resource allocation in NR vivo
R1-1707239 NR transmission on anchor bandwidth part vivo
R1-1707402 Support of flexible data channel durations Intel Corporation
R1-1707508 NR DL scheduling mechanism CATT
R1-1707650 Discussion on DL data scheduling and RA method for NR LG Electronics
R1-1707651 Discussion on multi-slot/cross-slot scheduling for NR LG Electronics
R1-1707652 Discussion on Resource Allocation LG Electronics
R1-1707719 On bandwidth part configuration Guangdong OPPO Mobile Telecom.
R1-1707720 DL resource allocation and indication for NR Guangdong OPPO Mobile Telecom.
R1-1707731 On forward compatible resources in NR AT&T
R1-1707857 HARQ procedure for DL URLLC MediaTek Inc.
R1-1708017 DL Resource Allocation Aspects Samsung
R1-1708018 DL resource allocation: Time Domain Aspects Samsung
R1-1708019 Scheduling Timing for DL Data Channels Samsung
R1-1708020 Retuning Aspects for DL Scheduling Samsung
R1-1708123 Discussion on data transmission duration Huawei, HiSilicon
R1-1708150 Slot based scheduling for data channels Huawei, HiSilicon
R1-1708478 Resource allocation for DL data NTT DOCOMO, INC.
R1-1708520 On PDSCH/PUSCH scheduling intervals and slot aggregation Nokia, Alcatel-Lucent Shanghai Bell
R1-1708521 On resource allocation and TBS determination for PDSCH and CP-OFDM based PUSCH in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708522 PDSCH scheduling timing in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708624 Discussion TB size determination Qualcomm Incorporated
R1-1709010 DL data scheduling InterDigital Inc.
R1-1709028 Indication of Transmission Duration KT Corp.
R1-1709049 Two-step resource allocation for data channel in NR ASUSTEK COMPUTER (SHANGHAI)
R1-1709092 On Resource Allocation for UEs Not Supporting the Full Carrier Bandwidth Ericsson
R1-1709093 On MCS/transport Block Size Determination for PDSCH Ericsson
R1-1709094 On Mixed Numerology Ericsson
R1-1709095 On Frequency-domain and Time-domain Resource Allocation Ericsson

7.1.3.3.2 UL data scheduling

Including frequency-domain and/or time-domain resource allocation, scheduling timing, MCS/transport block determination, scheduling request mechanism/procedure, UL transmission without grant, etc.

R1-1708116 The relation between UL grant-free and SPS Panasonic
Proposal: grant free transmission supports following:
- The time/frequency resource for grant free should be allowed to be modified by L1 signalling (DL control).
- The periodicity to check L1 signalling to modify the grant-free time/frequency resource need to be configurable at least the order from 1 minutes to 1 hour.
- The periodicity to check L1 signalling to modify the grant-free time/frequency resource need to be independent from the periodicity of grant-free time/frequency resource allocation.

Observations:
- In SPS, the periodicity of the DL control reception is same with the periodicity of transmission candidate resource. In grant-free, the periodicity of the DL control reception should be independent from the periodicity of transmission candidate resource.
- In SPS reactivation, only frequency resource can be modified. In grant free, both time and frequency resource needs to be allowed to be modified.
- The time and frequency resource indication just after semi-static enable of URLLC can be based on L1 signalling to indicate time and frequency resource.

Decision: The document is noted.

Tuesday session
R1-1709500 WF on UL resource allocation for PUSCH LG Electronics, NEC, Panasonic, NTT DOCOMO
Decision: The document is noted and modified as follows:

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Agreements:

- For DFT-s-OFDM based NR-PUSCH transmission, contiguous RB allocation with/without frequency hopping are supported
  - At least intra-slot frequency hopping is supported for 14 symbol slot case
  - FFS on detailed resource allocation
  - FFS on detailed frequency hopping for PUSCH

R1-1709510 WF on HARQ combining for UL URLLC without grant LG Electronics, Panasonic, Huawei, HiSilicon, Sony

- Soft combining between initial TB transmission without grant and retransmission of the same TB with grant is supported.
  - There is a mapping rule between the ID used in grant-free UL transmission and ID used in UL grant
    - FFS: details of the mapping rule (e.g. based on time/frequency resource and RS sequence)
    - FFS: details of ID used in grant-free UL
    - FFS: details of ID used in UL grant
  - Mechanisms to determine the parameter(s) associated with a TB (e.g. NDI, HPN, RV) is supported
- FFS: More than one HARQ processes are supported for UL transmission without grant

Decision: The document is noted. Continue offline.

Conclusion:

- All proponents are encouraged to bring-up detailed mechanisms to support UL data transmission without UL grant
- Email discussion about UL data transmission without UL grant until 9th June – Daesung (LGE)

Wednesday session

R1-1709537 WF on procedures of grant-free transmission Huawei, HiSilicon, CATR, Convida Wireless, Intel, InterDigital, Telefonica, Nokia, NTT DOCOMO, Orange

Discussion: Also supported by Sharp, NEC.

Decision: The document is noted.

Possible agreements:

- UL transmission without grant can be performed after semi-static resource configuration in RRC without L1 activation
  - The configuration includes at least time and frequency resources, RS parameters, MCS index or equivalently TBS, number of repetition K, and power control parameters
- L1 signaling for activation/deactivation and/or modification on some parameters can be applied if network configures
  - L1 signaling can modify at least time/frequency resources
  - L1 signaling reception can be configured to be much less frequent than grant-free transmission opportunities

Thursday

Agreements:

- If network configures, UL data transmission without UL grant can be performed after semi-static resource configuration in RRC without L1 signalling
- If network configures, L1 signaling for activation/deactivation and/or modification on parameters for UL data transmission without UL grant can be applied
- RAN1 is discussing whether the mechanism to distinguish UL SPS and UL data transmission without UL grant is necessary.
- Prepare draft LS to RAN2 in R1-1709745 to inform above agreements

Friday

R1-1709745 [Draft] LS on UL data transmission without UL grant for NR Huawei

Decision: The document is endorsed and final LS is approved in R1-1709805

R1-1709516 WF on Scheduling Request for NR Idaho National Laboratory, IITH, CEWIT, IITM, Tejas Networks, Sharp, Lenovo, Motorola Mobility, KDDI, Interdigital

Also supported by Qualcomm

R1-1709419 WF on RS configuration for UL transmission without grant ZTE, InterDigital, CATT

Conclusion: "semi-static resource configuration in RRC" agreed by R1-1709537 includes UE-specific semi-static configuration for RS.

Not treated.

R1-1706896 Enhanced Scheduling Request Transmission for NR Idaho National Laboratory

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R1-1706909 On uplink data scheduling Huawei, HiSilicon
R1-1706919 Grant-free transmission for UL URLLC Huawei, HiSilicon
R1-1707053 DMRS design considerations in grant-free transmission ZTE
R1-1707166 HARQ for URLLC UL grant-free transmission ZTE
R1-1707192 Scheduling Request for NR ZTE
R1-1707258 Discussions on HARQ for grant-free transmission Fujitsu
R1-1707259 Scheduling requests for URLLC and eMBB Fujitsu
R1-1707406 Enhancements to SR targeting low latency requirements Intel Corporation
R1-1707407 On UL grant free transmissions Intel Corporation
R1-1707509 NR UL scheduling mechanism CATT
R1-1707510 Discussion on NR scheduling request mechanism CATT
R1-1707511 Further details of UL grant-free transmission for URLLC CATT
R1-1707653 Discussion on UL data scheduling and RA method for NR LG Electronics
R1-1707654 Discussion on scheduling request for multiple service requirements LG Electronics
R1-1707655 Discussion on grant-free uplink transmission LG Electronics
R1-1707684 UL grant free transmission for low latency NICT
R1-1707721 Discussions on uplink grant-free transmission Guangdong OPPO Mobile Telecom.
R1-1707722 HARQ for uplink grant-free transmission Guangdong OPPO Mobile Telecom.
R1-1707723 Discussion on the SR enhancement Guangdong OPPO Mobile Telecom.
R1-1707724 Discussion on the UL waveform indication Guangdong OPPO Mobile Telecom.
R1-1707766 Discussion of procedures for UL transmission with and without grant Lenovo, Motorola Mobility
R1-1707770 UL grant-free transmission for URLLC Lenovo, Motorola Mobility
R1-1707780 On resource configuration for UL transmission without grant NEC
R1-1707844 Starting and ending position in time domain of PUSCH MediaTek Inc.
R1-1707858 Grant-free Scheduling and retransmission schemes for UL URLLC MediaTek Inc.
R1-1708021 UL Resource Allocation Aspects Samsung
R1-1708022 Scheduling Timing for UL Data Channels Samsung
R1-1708023 Transmission of UL Data Channels Samsung
R1-1708024 Grant-free and Grant-Based UL Transmissions Samsung
R1-1708115 Repetition/retransmission of UL grant-free Panasonic
R1-1708120 On uplink resource allocation Huawei, HiSilicon
R1-1708250 On using uplink grant free resource for URLLC Sony
R1-1708255 Discussion on resource indication for uplink grant-free transmission Sony
R1-1708353 On Scheduling and HARQ for uplink low latency traffic InterDigital, Inc.
R1-1708375 Activation before Transmission: Why It's Good for UL Grantless Access Sharp
R1-1708479 UL data transmission without grant NTT DOCOMO, INC.
R1-1708480 Scheduling request design in NR system NTT DOCOMO, INC.
R1-1708523 On PUSCH resource allocation and scheduling timing in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708524 On L1 activation for UL grant-free URLLC transmission Nokia, Alcatel-Lucent Shanghai Bell
R1-1708525 UL grant-free HARQ operation for URLLC Nokia, Alcatel-Lucent Shanghai Bell
R1-1708626 Simultaneous UL SR channel Qualcomm Incorporated
R1-1708967 On support of Grant-free and Grant-based transmission for UL URLLC MediaTek Inc.
R1-1709096 On MCS/transport Block Size Determination for PUSCH Ericsson
R1-1709097 Scheduling Request Enhancements Ericsson
R1-1709098 On SPS UL transmission Ericsson
R1-1709099 On Frequency-domain and Time-domain Resource Allocation Ericsson
R1-1709126 Uplink grant-free transmission for URLLC Institute for Information Industry (III)
R1-1709198 Preamble design for UL grant-free transmission Nokia, Alcatel-Lucent Shanghai Bell
R1-1709601 WF on SR resource configuration LG Electronics
R1-1709824 WF on evaluation assumption on UL transmission without UL grant in a DCI LG Electronics, NICT

7.1.3.3.3 HARQ-ACK feedback

Including HARQ-ACK feedback timing, relation with PDCCH monitoring periodicity and/or data duration/timing, HARQ-ACK multiplexing for one more PDSCHs on one or more PUCCH(s) and/or PUSCH(s), etc.

R1-1709102 On Fixed HARQ Codebook Design Ericsson

- Proposal 1: A UE can be configured with fixed HARQ codebook for UCI sizes up to 11 bit.
- Proposal 2: One part of the fixed HARQ codebook size is given by the number of configured or activated component carriers.
- Proposal 3: One part of the fixed HARQ codebook size is based on the number of configured/specified HARQ processes. Consider possibilities to limit the number of reported HARQ processes within a report.
- Proposal 4: Indexing into the fixed HARQ codebook is given by a combination of component carrier index and HARQ process ID.

Decision: The document is noted.

Not treated.

R1-1706961	HARQ feedback timing for NR	Huawei, HiSilicon
R1-1706981	On HARQ-ACK bundling in NR	Huawei, HiSilicon
R1-1707512	NR HARQ-ACK multiplexing	CATT
R1-1707656	Consideration on HARQ-ACK feedback method for NR	LG Electronics
R1-1707657	Consideration on aggregated HARQ-ACK feedback for NR	LG Electronics
R1-1707732	HARQ-ACK feedback considerations from a network deployment perspective	AT&T
R1-1708025	HARQ-ACK Codeword Determination	Samsung
R1-1708026	HARQ-ACK Feedback Timing	Samsung
R1-1708027	HARQ-ACK Feedback for Numerology Multiplexing	Samsung
R1-1708028	Triggered HARQ-ACK Transmissions	Samsung
R1-1708151	Multiplexing of multiple HARQ-ACK feedback	Huawei, HiSilicon
R1-1708152	PDCCH monitoring conditional on data scheduling	Huawei, HiSilicon
R1-1708481	HARQ-ACK feedback mechanisms	NTT DOCOMO, INC.
R1-1708527	On HARQ feedback determination	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708528	Timing aspects for downlink HARQ in NR	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708627	Mixed HARQ Processing Time Support	Qualcomm Incorporated
R1-1709012	Resource Allocation for DL HARQ Feedback	InterDigital Inc.
R1-1709100	On Polled Hybrid-ARQ Acknowledgement	Ericsson
R1-1709101	On HARQ Codebook	Ericsson

7.1.3.3.4 Processing time and HARQ process number

Including maximum HARQ process number for a given carrier with certain radio parameters (e.g., subcarrier-spacing), soft-buffer size/dimension/partitioning, etc.

R1-1708631 Email discussion on number of HARQ processes, soft buffer size for NR Qualcomm Incorporated
The document was presented by Joseph Soriaga from Qualcomm.
Decision: The document is noted.

Thursday session
R1-1709765 WF on HARQ Process Number Qualcomm, vivo

Possible agreements:

- For the purpose of soft buffer dimensioning,
  - The time span of HARQ processes should be within [2 ms] at least for data rates of [X] Gbps or higher
    - Maximum total number of HARQ processes is [8 or 16]
      - Note: A larger time span of HARQ processes may be supported at lower data rates
      - FFS: down-selection of 8 or 16
    - Total number of HARQ processes may be less than the maximum total number depending on the slot duration
      - Note: The time span of 16 processes exceeds 2 ms for SCS less than 120 kHz
    - FFS value of X
    - FFS other conditions (e.g., lower data rate)

Friday session
Agreements:

- A set of reference parameters is used for the purpose of soft buffer dimensioning
  - A reference set of parameters includes at least DL HARQ RTT [*Y* ms] and data rate(s) of *X* Gbps
  - FFS: values of *X* and *Y*
  - FFS: other conditions
  - This does not imply UE has to have a HARQ-ACK timing based on the reference HARQ RTT
  - FFS: how different UE categories are defined
  - LBRM is taken into account
- Maximum number of HARQ processes per carrier supported in NR is 8 or 16
  - This is at least for the single numerology case and a slot-level scheduling and single-TRxP transmission
  - FFS: down-selection of 8 or 16
  - FFS: soft-buffer handling
  - FFS: the value may be different depending on a certain condition (e.g., subcarrier spacing)

R1-1709696 WF on Processing Time Requirements Qualcomm, ZTE, Ericsson, Deutsche Telekom

R1-1709702 WF on UE Processing Time Huawei, HiSilicon, MediaTek

Agreement: All Rel. 15 UE supports minimum value of K0 equal to 0, i.e., DL assignment and the scheduled DL data are in the same slot.

Not treated.
R1-1707409 On number of HARQ processes in NR Intel Corporation
R1-1707410 Defining soft-buffer requirements in NR Intel Corporation
R1-1707513 Discussion on processing time and number of HARQ processes CATT
R1-1707658 Consideration on HARQ process and soft buffer for NR LG Electronics
R1-1707659 Discussion on potential HARQ operations for NR LG Electronics
R1-1707827 Maximal HARQ process number for NR MediaTek Inc.
R1-1708029 On Number of HARQ Processes Samsung
R1-1708030 Soft Buffer Partioning Samsung
R1-1708031 HARQ process management in NR Samsung
R1-1708117 The standardization approach around HARQ soft buffer Panasonic
R1-1708153 Number of HARQ processes Huawei, HiSilicon
R1-1708154 Soft buffer handling Huawei, HiSilicon
R1-1708155 Discussion on processing time Huawei, HiSilicon
R1-1708281 Number of HARQ processes and UE category Apple Inc.
R1-1708482 Processing time and HARQ process number for NR NTT DOCOMO, INC.
R1-1708529 On the number of HARQ processes Nokia, Alcatel-Lucent Shanghai Bell
R1-1708628 Number of HARQ processes Qualcomm Incorporated
R1-1708629 Processing time requirements Qualcomm Incorporated
R1-1708630 Scaled Numerology for UL Channel Design Qualcomm Incorporated
R1-1708884 Soft buffer handling for NR Sony
R1-1709103 On Minimum Processing Time Ericsson
R1-1709104 On HARQ and Soft Buffer Handling Ericsson
R1-1709105 On the Number of HARQ Processes in NR Ericsson
R1-1709158 NR HARQ Process number vivo
R1-1709703 WF on the number of HARQ process Huawei, HiSilicon

7.1.3.3.5 CBG-based transmission with single/multi-bit HARQ-ACK feedback

Including CBG construction, CBG-based HARQ-ACK feedback, scheduling mechanisms for CBG-based re-transmission, etc.

R1-1709148 Summary of [88b-13] Email discussion on: "CBG based retransmission, Transmission/retransmission of preempted data before/after ACK NACK feedback, Preemption indication for NR" ZTE
The document was presented by Thorsten Schier from ZTE.
Decision: The document is noted.

R1-1708484 CBG based (re)transmission, preemption indication and subsequent trasnmission in NR NTT DOCOMO, INC.
Proposal 1:
- Following use cases can benefit from the CBG-based (re)transmission:
  - Uncorrelated errors within a transport block (e.g., high-speed)
  - Part of a TB being punctured by another transmission
- A unified solution is preferred for CBG-based (re)transmission to cover either of or both of the above cases.

Proposal 2: UE monitors DCIs for TB-based (re)transmission and for CBG-based (re)transmission.
  - DCI for TB-based (re)transmission schedules initial transmission or re-transmission of a TB.
    - NDI in the DCI informs whether this is initial transmission or re-transmission.
  - DCI for CBG-based re-transmission schedules re-transmission of one or more of CBG(s).
    - FFS: how to inform which CBG(s) is/are scheduled.

Proposal 3:
- Two UE behaviors are defined for receiving CBG-based re-transmission.
  - As in LTE, combine the stored soft bits and the received soft bits before decoding.
  - Flush the stored soft bits and the received soft bits only are used for decoding.
- In order to tell the UE about the decoding behavior, following two options should be investigated.
  - Opt. 1: Introduce one bit field in the scheduling DCI.
  - Opt.2: Re-use RV field.
    - Different UE behavior depending on whether the RV value is same or different from the previous value.

Proposal 4: When the UE is configured with CBG-based re-transmission, the UE generates HARQ-ACK per CBG for the following cases:

- Initial transmission of a TB is scheduled.
- Re-transmission of a CBG(s) is/are scheduled.

Proposal 5:

- To support CBG-based HARQ-ACK feedback, following three options can be considered to determine the HARQ-ACK codebook size.
  - Option 1: Fixed codebook size which is based on the initial transmission.
  - Option 2: Dynamic codebook size which is based on the actual transmitted CBG(s)
  - Option 3: Dynamic codebook size which is based on TB-level HARQ-ACK bit plus the actual transmitted CBG(s)-level HARQ-ACK bit(s).

Proposal 6: The preemption indication is CBG-level and is included in the DCI scheduling the subsequent transmission.

- Opt. 1: Introduce one bit field in the scheduling DCI.
- Opt.2: Re-use RV field.

Proposal 7:

- Subsequent transmission can be realized by TB-based or CBG-based retransmission.
- UE behavior on HARQ-ACK feedback for the previous transmission and subsequent transmission need to be defined.
  - If the time allowed for UE to adjust the HARQ-ACK feedback timing based on DCI scheduling the subsequent transmission is not enough, UE shall transmit HARQ-ACK for both previous transmission and subsequent transmission on the timings/resources indicated by respective DCIs.
  - Else, it is possible for UE to suspend the HARQ-ACK for previous transmission and transmit the HARQ-ACK after decoding the subsequent transmission based on the DCI indication.

Decision: The document is noted.

Tuesday session

R1-1709509 Proposals from discussion Tuesday's offline on CBG ZTE, DOCOMO, MediaTek, Ericsson, Intel, Panasonic, Samsung, CATT

Agreements:

- For downlink data transmission with CBG based (re)transmission,
  - The number of CBG HARQ ACK bits for a TB is at least equal to the number of CBGs indicated or implied for transmission
    - FFS whether or not the UE transmits HARQ ACK bits for CBGs not indicated or implied for transmission
    - FFS "indicated or implied" is realized by RRC, MAC, L1 signalling, or implicitly derived
    - FFS HARQ ACK feedback on one channel for the case of multiple TBs
    - FFS for fallback

R1-1709262 WF on CBG-based (re)transmission NTT DOCOMO, Panasonic, OPPO, CATT, Ericsson

Possible agreements:

- For CBG-based retransmission,
  - When configured, following information can be indicated in the same DCI:
    - Which CBG(s) is/are transmitted
    - Which CBG(s) in the soft buffer should be flushed
      - FFS the flushing indication is configurable or not
- FFS the physical resource level pre-emption indication

Possible agreements:

- For CBG-based (re)transmission,
  - Even when the UE is configured with CBG-based transmission, UE can be dynamically informed to report one HARQ-ACK bit for that TB, i.e. fallback

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Wednesday session

R1-1709602 Harmonized proposal for CBG and preemption indication NTT DOCOMO, INC., ZTE, Sharp, Ericsson, KT Corp., Samsung, Huawei, HiSilicon, Sony, InterDigital, MediaTek, Fujitsu, Intel, Panasonic, Nokia, ASB, OPPO, CATR, CATT

Agreements:

- For DL CBG-based (re)transmission,
  - Following information can be configured to be included in the same DCI:
    - Which CBG(s) is/are (re)transmitted.
    - Which CBG(s) is/are handled differently for soft-buffer/HARQ combining.
      - FFS: whether/how UE behavior is specified, e.g., part/whole of soft-buffer of indicated CBG(s) is flushed.

- FFS: timing of CBG-based (re)transmission.
- For preemption indication;
  - When configured, the indication tells the UE(s) which DL physical resources has been preempted.
  - The preemption indication is transmitted using a PDCCH.
    - The preemption indication is not included in the DCI that schedules the (re)transmission of the data transmission.
  - FFS: the granularity of the time and/or frequency resources.
  - FFS: what DCI is used.
  - FFS: timing of the preemption indication.

Friday session

R1-1709794 WF on CBG Construction Samsung, ZTE, NTT DOCOMO (Revision of R1-1709752)

Agreements:

- For grouping CB(s) into CBG(s), following is adopted.
  - With indicated number of CBGs, the number of CBs in a CBG changes according to TBS.
    - FFS for the case of re-transmission or the case when the number of CBs is smaller than the indicated number of CBG
    - FFS "indicated" is realized by RRC, MAC, L1 signalling

R1-1709728 WF on CB grouping for CBG based HARQ LG Electronics, MediaTek

Also supported by Huawei, HiSilicon

Agreements:

- At least following is supported.
  - For a given number of CBGs for a given TB, the number of CBs per CBG should be as uniform as possible.
    - The difference of CB number per CBG between any two CBGs is either 0 or 1.
    - FFS on the detailed rule for the CB grouping.
- Study further benefit and realization of non-uniform CB distribution across CBGs.

Not treated.

R1-1706962 Scheduling mechanisms for CBG-based re-transmission Huawei, HiSilicon
R1-1706963 Discussion on CBG construction Huawei, HiSilicon
R1-1706964 Discussion on CBG-based feedback Huawei, HiSilicon
R1-1707175 CBG based transmission ZTE
R1-1707194 Discussion on CBG-based HARQ-ACK feedback for NR Fiberhome Technologies Group
R1-1707241 DAI indication for CBG vivo
R1-1707260 Discussion on CBG based HARQ-ACK Design Fujitsu
R1-1707411 General considerations on CBG-based transmissions Intel Corporation
R1-1707412 On CBG-based HARQ-ACK feedback Intel Corporation
R1-1707413 Scheduling of CBG-based transmissions Intel Corporation
R1-1707514 Further details of CBG-based HARQ transmission CATT
R1-1707515 CBG-based UL HARQ transmission CATT
R1-1707660 Consideration on CB group construction and configuration LG Electronics
R1-1707661 Consideration on CB group based HARQ operation LG Electronics
R1-1707662 Consideration on CB group based HARQ-ACK feedback LG Electronics
R1-1707663 Discussion on CBG-based retransmission for pre-emption recovery LG Electronics
R1-1707725 Discussion on CBG-based transmission Guangdong OPPO Mobile Telecom.
R1-1707744 CBG Based transmission procedures AT&T
R1-1707768 HARQ-ACK feedback for CBG-based retransmission Lenovo, Motorola Mobility
R1-1707769 CBG construction for CBG-based retransmission Lenovo, Motorola Mobility
R1-1707851 CBG-based transmission with single/multi-bit HARQ-ACK feedback MediaTek Inc.
R1-1708032 CBG Construction Samsung
R1-1708033 HARQ-ACK Feedback for CBG-Based Retransmissions Samsung
R1-1708034 DL Scheduling for CBG-based Retransmissions Samsung
R1-1708035 UL Scheduling for CBG-based Retransmissions Samsung
R1-1708118 PDCCH for DL URLLC resource puncturing indication Panasonic
R1-1708217 DCI considerations for CBG transmission from two TBs ZTE
R1-1708224 CBG based HARQ Sequans Communications
R1-1708254 Discussion on the CBG-based retransmission Sony
R1-1708354 HARQ feedback design improvements when considering impact of low latency traffic InterDigital, Inc.

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R1-1708376 Resource mapping of CBG based transmission Sharp
R1-1708379 CBG-based transmission with pre-emption indication China Telecommunications
R1-1708483 CBG construction NTT DOCOMO, INC.
R1-1708530 On CBG-based (re-)transmissions in NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708633 Use cases of multi-bit HARQ-ACK feedback Qualcomm Incorporated
R1-1708743 CB-Group based HARQ-ACK feedback and retransmission Shenzhen Coolpad Technologies, Xiaomi Technology
R1-1708872 Discussion on CBG-based retransmission HTC Corporation
R1-1708876 Discussion on CBG-based HARQ feedback HTC Corporation
R1-1708882 CBG Construction Principles for CBG-based Transmission with Multi-Bit HARQ Qualcomm Incorporated
R1-1708952 Discussions on the design of CBG CATR
R1-1708978 Discussion on CBG-based transmission for NR WILUS Inc.
R1-1709013 Code Block based HARQ for NR InterDigital Inc.
R1-1709106 On CRC Attachments for Code Block Group Based HARQ-ACK Feedback Ericsson
R1-1709107 On Design of CBG HARQ-ACK Feedback Schemes Ericsson
R1-1709108 On Formation of Code Block Groups Ericsson
R1-1709109 On Retransmission Decoder Throughput Issues and CBG-based HARQ Protocol Ericsson
R1-1709226 On aligning CBG with symbol(s) Huawei, HiSilicon

7.1.3.3.6 Multiplexing data with different transmission durations

Including details of indication of DL resources being pre-empted by another DL transmission, e.g., how/where/when the indication is received and what granularity it can indicate.
Note that this agenda is for both downlink and uplink.

R1-1706915 Consideration on subsequent transmission/retransmission after pre-emption Huawei, HiSilicon
R1-1706918 Discussion on UL multiplexing of grant-based eMBB and grant-free URLLC Huawei, HiSilicon
R1-1707176 Multiplexing data with different transmisison durations ZTE
R1-1707193 Uplink multiplexing for different transmission durations ZTE Corporation
R1-1707242 Discussion on DL multiplexing of eMBB and URLLC vivo
R1-1707243 Discussion on UL multiplexing of eMBB and URLLC vivo
R1-1707261 Discussion on Preemption Indicator Design Fujitsu
R1-1707414 Indication of preemption of DL transmissions Intel Corporation
R1-1707415 Multiplexing of UL transmissions with different data durations and latency requirements Intel Corporation
R1-1707516 Multiplexing of different DL data transmission durations CATT
R1-1707664 Discussion on pre-emption indication design LG Electronics
R1-1707665 Discussion on eMBB and URLLC multiplexing for uplink LG Electronics
R1-1707726 On symbol-level time-domain resource allocation Guangdong OPPO Mobile Telecom.
R1-1707733 Further details on NR mini-slot based design AT&T
R1-1707771 On eMBB/URLLC multiplexing for uplink transmission Lenovo, Motorola Mobility
R1-1707788 Discussion on pre-emption indication method for DL multiplexing of URLLC and eMBB Spreadtrum Communications
R1-1707789 DL eMBB and URLLC multiplexing under mixed numerology Spreadtrum Communications
R1-1708036 Indication of Preempted Resources Samsung
R1-1708037 Considerations on signaling design for indicating Preemted Resources Samsung
R1-1708038 Indication of Preempted Resources Prior to HARQ-ACK Feedback Samsung
R1-1708039 Evaluation Results of Preemption Indication Samsung
R1-1708124 On pre-emption indication for DL multiplexing of URLLC and eMBB Huawei, HiSilicon
R1-1708125 Discussion on UL multiplexing of grant-based eMBB and URLLC Huawei, HiSilicon
R1-1708251 Further considerations on using pre-emption indicator for DL URLLC/eMBB multiplexing Sony
R1-1708257 On eMBB/URLLC multiplexing for Uplink Sony
R1-1708266 Preemption Indication Details for eMBB URLLC Multiplexing TCL Communication Ltd.
R1-1708279 eMBB and URLLC multiplexing for NR Apple Inc.
R1-1708355 Multiplexing of low-latency traffic and non-latency sensitive traffic in UL InterDigital, Inc.
R1-1708485 Multiplexing of different data durations for downlink NTT DOCOMO, INC.
R1-1708486 Multiplexing of different data durations for uplink NTT DOCOMO, INC.
R1-1708531 On scheduling of mini-slots within slots Nokia, Alcatel-Lucent Shanghai Bell
R1-1708532 Open issues for preemptive scheduling Nokia, Alcatel-Lucent Shanghai Bell
R1-1708533 Pause-Resume Scheduling for Low Latency Uplink Transmissions Nokia, Alcatel-Lucent Shanghai Bell
R1-1708634 UL URLLC capacity study and URLLC/eMBB dynamic multiplexing design principle Qualcomm Incorporated
R1-1708635 Indication design for UL URLLC and eMBB multiplexing Qualcomm Incorporated
R1-1708636 URLLC DL control and indication channel Qualcomm Incorporated

R1-1708637 DL indication channel design principle for URLLC/eMBB dynamic multiplexing Qualcomm Incorporated
R1-1708745 Pre-emption indication and Sub-sequent transmission Shenzhen Coolpad Technologies
R1-1708954 On multiplexing of URLLC and eMBB in DL Sequans Communications
R1-1708979 Impact on eMBB DMRS puncturing by URLLC burst WILUS Inc.
R1-1708980 Pre-emption indication on DL multiplexing between eMBB and URLLC WILUS Inc.
R1-1709005 Considerations on multiplexing with different transmission durations KDDI Corporation
R1-1709059 Discussion on DL Preemption Indication Convida Wireless
R1-1709110 Performance Evaluation of DL Puncturing Ericsson
R1-1709111 On Pre-empted Transmissions for Downlink Ericsson
R1-1709112 On Inter-UE UL Puncturing Ericsson
R1-1709113 On Intra-UE UL Puncturing Ericsson
R1-1709144 Considerations on pre-emption indication for DL transmission KT Corp.

7.1.3.3.7 Other

R1-1706914 Numerology for multiplexing of eMBB and URLLC Huawei, HiSilicon
R1-1708040 Scheduling Aspects for Short Scheduling Durations Samsung
R1-1708127 Link adaption for URLLC transmission Huawei, HiSilicon
R1-1709114 On Evaluation Assumption for Contention-Resolution for UL SPS Ericsson
R1-1709670 Numerology for multiplexing of eMBB and URLLC Huawei, HiSilicon

7.1.3.4 Scheduling/HARQ aspects for carrier aggregation and dual connectivity

Carrier Aggregation within NR, for which the priority is the functionality of PSCell and SCell.
Dual Connectivity between E-UTRA and NR, for which the priority is where E-UTRA is the master and the second priority is where NR is the master, and Dual Connectivity within NR.

R1-1706903 On NR carrier aggregation Huawei, HiSilicon

- Observation 1: UE generally has the capability of aggregating larger number of DL carriers than that in the UL.
- Proposal 1: Cross-carrier scheduling with multiple numerologies and multi-slot scheduling should be supported in NR CA/DC.
- Proposal 2: Cross-carrier retransmission could be considered in NR CA/DC.
- Proposal 3: Joint UCI feedback for carriers with different numerologies should be supported in NR CA and DC.
- Proposal 4: Different UL carriers can carry joint UCI for different sets of DL carriers. The sets of DL carriers should not be smaller than 2.
- Proposal 5: Fast carrier switching should be supported in NR CA and DC.

Discussion: Qualcomm/Ericsson → proposal 2 is not in line with RAN2 assumptions – Huawei agrees
Decision: The document is noted.

Thursday session
R1-1709616 WF on NR multiple carriers operation Huawei, HiSilicon, CMCC, KT, OPPO, CATR, CATT

Agreements:

- Support cross-carrier scheduling for aggregated carriers with the same and different numerology.
  - FFS: the timing relationship between DCI and the corresponding PDSCH/PUSCH
  - FFS: impact on the maximum number of HARQ processes
  - FFS: potential restrictions (e.g., on combination of different numerology)
- Support joint UCI feedback for aggregated carriers with the same or different numerology.
  - FFS: the timing relationship between PDSCH and the corresponding HARQ-ACK
  - FFS: impact on maximum number of HARQ process
  - FFS: potential restrictions (e.g., on combination of different numerology)
- Support SRS fast switching among N uplink carriers
  - The number of M uplink carriers supported by the UE for simultaneous transmission can be smaller than N
    - Note: M can be 1 or larger depending on UE capability
  - FFS: potential restrictions (e.g., on combination of different numerology, on combination of different frequency bands)
- Support one PUCCH in one cell group for NR DC/CA
  - FFS: The carrier for PUCCH transmission can be configured within one cell group
  - FFS: potential restrictions (e.g., on combination of different numerology, on combination of different frequency bands)

Not treated.
The document was presented by … from ...

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Discussion: .
Decision: The document is noted.

R1-1706902	On decoupling DL and UL for CA/DC	Huawei, HiSilicon
R1-1706908	On NR dual connectivity	Huawei, HiSilicon
R1-1707191	NR scheduling and HARQ for supporting CA/DC	ZTE
R1-1707416	Scheduling aspects for carrier aggregation	Intel Corporation
R1-1707417	HARQ aspects for carrier aggregation	Intel Corporation
R1-1707517	Scheduling and HARQ support for NR CA	CATT
R1-1707518	Scheduling and HARQ support for NR DC	CATT
R1-1707666	Discussion on scheduling and HARQ for NR CA	LG Electronics
R1-1707667	Discussion on Scheduling/HARQ for dual connectivity	LG Electronics
R1-1707734	NR CA Design	AT&T
R1-1707826	Scheduling for carrier aggregation in NR	MediaTek Inc.
R1-1708041	Carrier Aggregation Aspects in NR	Samsung
R1-1708042	Dual Connectivity Aspects in NR	Samsung
R1-1708043	RACH Aspects for CA and DC	Samsung
R1-1708487	Scheduling and HARQ for CA and DC	NTT DOCOMO, INC.
R1-1708534	On CA configuration	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708535	On CA/DC control design	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709115	On Modelling of FDD, TDD, and Carrier Aggregation	Ericsson
R1-1709116	On Dual Connectivity for NR	Ericsson
R1-1709117	Other Topics on Carrier Aggregation for NR	Ericsson
R1-1709389	Open issues list and comments for AI 7.1.3.4	NTT DOCOMO

7.1.4 Channel coding

R1-1709681 Chairman's notes of AI 7.1.4 Channel coding Ad-Hoc chair (Nokia)
The document was presented by Matthew Baker (Vice Chair).
Decision: The document is endorsed, and content is incorporated as below.

Friday: Keeth (Nokia) will provide channel coding work plan to the RAN1 reflector until May 26th

7.1.4.1 LDPC code

7.1.4.1.1 Coding chain

7.1.4.1.1.1 CRC attachment

R1-1707063	CRC Attachment for Code Block Group	Ericsson
R1-1707064	Study of Number of CRC Bits for Code Blocks	Ericsson
R1-1707177	Consideration on coding chain for eMBB data channel	ZTE
R1-1707201	Study of Number of CRC Bits for Small Transport Blocks	Ericsson Inc.
R1-1707519	Consideration on CRC attachment for eMBB data	CATT
R1-1707668	Discussion on CRC length reduction for eMBB data	LG Electronics
R1-1707746	Attaching CRC for data and control channels	AT&T
R1-1707848	On CRC attachment for LDPC	MediaTek Inc.
R1-1708044	CRC attachment for data channel	Samsung
R1-1708356	Data Channel Processing and CRC Attachment	InterDigital, Inc.
R1-1708638	CRC attachment	Qualcomm Incorporated
R1-1708824	CRC attachment for CBG	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708825	CRC attachment for Smaller TBs	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709024	Considerations on CRC Length	KT Corp.
R1-1709271	WF on CRC Attachment for CBGs	Ericsson
R1-1709272	WF on Criterion for Selection of CRC length	Ericsson
R1-1709281	WF on TB-level CRC reduction for small size TBs	LG Electronics

7.1.4.1.1.2 Segmentation

R1-1707065 Code Block Segmentation Ericsson

Agreement: If bit-level interleaving is applied, it should be limited to each code block individually

Next steps:
- Evaluation of bit-level interleaving and decision on its adoption will take place in the channel coding session.

- If adopted, decide the location of bit-level interleaving relative to circular buffer.

R1-1708045 Segmentation and concatenation for data channel Samsung

Agreement:
- FFS: how CB sizes are determined within a TB
- One of the following approaches will be selected at June Adhoc for determining the Z values of code blocks within a TB:
  - Alt 1. Same value of Z
  - Alt 2. At most two different values of Z for a given TB

R1-1708639 LDPC segmentation Qualcomm Incorporated

Not treated.

R1-1707669	Code block segmentation for eMBB data	LG Electronics
R1-1708159	Segmentation for eMBB data	Huawei, HiSilicon
R1-1708357	Code Block Segmentation for Data Channel	InterDigital, Inc.
R1-1708826	Code block segmentation of eMBB	Nokia, Alcatel-Lucent Shanghai Bell
R1-1708827	Padding techniques for LDPC	Nokia, Alcatel-Lucent Shanghai Bell
R1-1709273	WF on Channel Interleaver of Data Channel	Ericsson

7.1.4.1.1.3 Rate matching

R1-1706973 Rate matching for LDPC codes Huawei, HiSilicon

Working Assumption:
- The number of redundancy versions is at least 4
  - FFS whether 8, 16 RVs should be available

R1-1709274 WF on highest code rate supported by LDPC Ericsson, Fujitsu, Intel, LG, Qualcomm

Conclusion:
- The maximum supported effective code rate for DL and UL transport blocks will be determined after selecting the code.

Not treated.

R1-1707066	LDPC Code Performance at High Code Rate	Ericsson
R1-1707067	Bit Ordering for Circular Buffer of LDPC Codes	Ericsson
R1-1707068	Rate Matching for NR LDPC codes	Ericsson
R1-1707520	IR-HARQ scheme for eMBB LDPC codes	CATT
R1-1707670	On rate matching with LDPC code for eMBB	LG Electronics
R1-1707849	Rate matching for LDPC codes	MediaTek Inc.
R1-1708640	LDPC rate matching	Qualcomm Incorporated
R1-1708828	Rate matching for eMBB	Nokia, Alcatel-Lucent Shanghai Bell

7.1.4.1.1.4 Other

R1-1707069	Throughput Requirements of LDPC Decoder	Ericsson
R1-1709720	WF on LDPC decoder throughput requirements	Ericsson, MediaTek, Fujitsu
R1-1707671	Discussion on interleaving for eMBB data	LG Electronics
R1-1707745	Impact of frequency domain and time domain symbol interleaver	AT&T
R1-1709200	Frequency domain interleaving	Qualcomm Incorporated (rev of R1-1708641)

7.1.4.1.2 LDPC code design

Finalise number of base graphs, compact vs. extended design, and other design details

R1-1706970 LDPC design for eMBB data Huawei, HiSilicon
R1-1706971 Performance evaluation of LDPC codes Huawei, HiSilicon
R1-1709289 NR LDPC design ZTE (Revision of R1-1707179)
R1-1707180 Further consideration on flexibility of LDPC codes ZTE
R1-1709150 On design and performance of NR eMBB LDPC Code MediaTek Inc. (Revision of R1-1709149/R1-1707850)
R1-1709276 LDPC code design for eMBB Samsung (Revision of R1-1708046)
R1-1709181 LDPC rate compatible design Qualcomm Incorporated (Revision of R1-1708642)

R1-1709189 **Performance of LDPC design for eMBB** **Nokia, Alcatel-Lucent Shanghai Bell** (Revision of R1-1708830)

Agreement: The selection of base graph design is narrowed down to Alts 1a and 2 from RAN1#88bis

Agreement:
- For base graph #1:
  - The dimensions of the base matrix are 68 columns, 46 rows (to support R=1/3)
  - Seven 46x68 base matrices are identified as the set of candidates:
    - Provided in the excel file R1_1709751.xlsx in R1-1709751 as Candidates A to G.
  - By constructive email discussion until Thursday 1st June – Keeth (Nokia), agree (from the set of candidates or a merged solution), for evaluation and downselection until June adhoc:
    - a single 46x68 base matrix,
    - the set of shift sizes
- For base graph #2:
  - By constructive email discussion until Monday 12th June – Keeth (Nokia), agree a single base matrix for Alt 1a and a single base matrix for Alt 2, for evaluation and downselection until June adhoc
  - Kbmax = 10
  - Design supports Kmax2 =
    - Working assumption 2560
    - 3840 can be considered further if significant benefit is shown
  - The dimensions of the base matrix are 42x52
  - Evaluations are to be performed up to Kmax2; primary focus for code selection is performance for K up to around 1024

Open points to be concluded at June adhoc:
- Selection between Alt 1a and Alt 2
- All coefficients and shift sizes to generate the final parity check matrices

Agreement:
- 1st version of set of Alt2 BG2 candidates are those sent to RAN1 by 31st May 11pm PST
- Final version of set of Alt2 BG2 candidates should be provided by 5th June 11pm PST
  - Note that additional candidates can be included that were not in the first version

Summary of deadlines and process:
NxAlt2BG2 (31st May) -> 1xBG1 (1st June) -> 1xAlt1aBG2 (12th June)
-> NxAlt2BG2' (5th June) -> 1xAlt2BG2' (12th June)

R1-1709751 **WF on candidate LDPC base matrices** **Nokia, ASB, Samsung, Huawei, ZTE, MediaTek, Qualcomm, LG**
R1-1709296 **WF on LDPC design convergence** **MediaTek, Huawei, HiSilicon, ITRI, Nokia, ZTE, CATT**
R1-1709288 **Performance evaluation of LDPC codes for eMBB ZTE** (Revision of R1-1707178)

Not treated.
R1-1706972 Throughput of LDPC codes Huawei, HiSilicon
R1-1707070 LDPC Code Design Ericsson
R1-1707521 LDPC Design for NR data channel CATT
R1-1707522 Offset optimization on base matrices for LDPC design CATT
R1-1708319 Discussion on LDPC code design details Intel Corporation
R1-1708829 LDPC design for eMBB Nokia, Alcatel-Lucent Shanghai Bell
R1-1709275 WF on Number of Base Graphs for LDPC Codes Ericsson
R1-1709533 Performance evaluation of LDPC codes for eMBB ZTE
R1-1709534 NR LDPC design ZTE
R1-1709641 LDPC codes design for eMBB data channel LG Electronics
R1-1709816 LDPC Rate-Compatible Design Qualcomm Incorporated
R1-1709856 On Design and Performance of NR eMBB LDPC Code MediaTek Inc.

7.1.4.2 Control channel coding

7.1.4.2.1 Polar code

7.1.4.2.1.1 Code construction

R1-1709176 **Early termination for polar codes** **Qualcomm Incorporated** (Revision of R1-1708644)

R1-1709152 **Early Termination of Polar Codes in Downlink** **Ericsson** (Revision of R1-1707072)
R1-1708316 **Study of early-termination techniques for Polar code** **Intel Corporation**
R1-1707686 **Early block discrimination with polar codes for DCI blind detection** **Coherent Logix**
R1-1706965 **Polar code design** **Huawei, HiSilicon**
R1-1708831 **Performance evaluation of polar code constructions** **Nokia, Alcatel-Lucent Shanghai Bell**

Agreement:
- For DL:
  - J' = 3 or 6, to be downselected at June adhoc
  - J'' = 0
  - At least some of the J + J' bits are appended
  - FFS until June adhoc:
    - how the J + J' bits are obtained
  - If J'=6, working assumption that at least some of the J + J' bits are distributed (including to support early termination in the code construction) (Consideration of J'=6 proposals without distributed J+J' bits are not precluded.)
  - If J'=3, FFS until June adhoc whether some of the J + J' bits are distributed (including to support early termination in the code construction)
  - Consideration of distribution of bits shall consider complexity versus benefit and comparison to implementable purely implementation based methods for early termination

Email discussion until Thursday 1st June to align calculation methods for latency and complexity with early termination – Zukang (Huawei).
Companies are requested to provide proposed schemes for evaluation by Thursday 8th June.
Qualcomm, Ericsson have strong concerns on the maturity of code-construction based early termination.
Qualcomm has strong concerns on the fifth bullet.
At least some of the J + J' bits are distributed in order to support early termination in the code construction:
- yes: DCM, Nokia, HW, ZTE, CATT, IDC, CL, NEC, Mediatek, Accelercomm, Spreadtrum
- no: Intel, LG, QC, Eri, Sams, Fuji, ETRI, Tsofun, IAESI

R1-1709520 **WF on polar code construction** **NTT DOCOMO, Qualcomm, IAESI, Ericsson**
R1-1708643 **Comparison of Polar codes between CA and PC for control channel** **Qualcomm Incorporated**

Not treated.
R1-1707058 Evaluation of rate-matching schemes for polar codes NEC Corporation
R1-1707071 Polar Code Construction Ericsson
R1-1707181 Performance evaluations on Polar codes with distributed CRC bits ZTE
R1-1707182 Further Consideration on Polar codes with maximum mother code size ZTE
R1-1707221 Enhancements for Polar code construction Sequans Communications
R1-1707523 Performance evaluation of polar codes for eMBB control channel CATT
R1-1707524 Design of polar codes for early termination CATT
R1-1707673 Discussion on early termination for control channel LG Electronics
R1-1707792 Discussion on Polar code construction Spreadtrum Communications
R1-1708048 CA-polar codes for small block length Samsung
R1-1708049 Comparison of CA polar codes and PC-CA polar codes Samsung
R1-1708315 Design aspects of Polar Code Intel Corporation
R1-1708358 Rate Matching Design for Polar Codes InterDigital, Inc.
R1-1708488 Distributed simple parity check Polar codes NTT DOCOMO, INC.
R1-1708645 Polar Coding Construction and Rate Matching Impact on Complexity and Latency Qualcomm Incorporated
R1-1708833 Design details of distributed CRC Nokia, Alcatel-Lucent Shanghai Bell
R1-1709134 Implementation Considerations for Polar Code Construction Coherent Logix
R1-1709159 Early termination of polar decoding Samsung
R1-1709188 Early termination benefits of CRC distribution Nokia, Alcatel-Lucent Shanghai Bell
R1-1709497 Design of assistance bit aided polar codes for NR control channel NEC Corporation
R1-1709782 Early termination for polar codes Qualcomm Incorporated

7.1.4.2.1.2 Sequence design

R1-1706966 **Sequence design for polar codes** **Huawei, HiSilicon**
R1-1709153 **Impact of Information Bit Locations to Polar Codes with High Order Modulations** **Ericsson**
Revision of R1-1707073

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R1-1708051 **Design of nested polar code sequence** **Samsung**
R1-1708157 **Analysis of the sequence for polar codes** **Huawei, HiSilicon**
R1-1709178 **FRANK polar construction for NR control channel and performance comparison** **Qualcomm Incorporated** (Revision of R1-1708646)
R1-1709361 **WF on information and frozen bit selection on NR polar codes** **LG Electronics, Ericsson, KT, AT&T, InterDigital**

Agreement:
- Working assumption (1) that a single fixed sequence is provided for information and frozen bit selection for each mother code size
  - FFS until June adhoc whether an additional fixed sequence per mother code size is beneficial for:
    - 16QAM vs other modulations
    - UL vs DL
  - FFS until June adhoc the impact of channel interleaving on the possible need for multiple sequences
- A set of fixed sequences for different mother code sizes are derived from a single sequence for a single reference mother code size
  - The single reference mother code size is either:
    - the largest mother code size, max($N_{max,UCI}$, 512), or
    - 64
    - To be decided in June adhoc
  - If the working assumption (1) above is modified such that there is more than one sequence for the largest mother code size, additional set(s) of sequences may be derived for the other mother code sizes.
- When selecting the sequences, take into account at least the known CCE sizes and if possible typical payloads

R1-1708491 **Rate matching design of Polar codes** **NTT DOCOMO, INC.**
R1-1707845 **Polar code rate-matching design** **MediaTek Inc.**
R1-1707075 **Rate Matching Schemes for Polar Codes** **Ericsson**

Terminology for use in RAN1 from now on:
- Puncturing refers to non-transmission of coded bits such that the non-transmitted bits are unknown at the receiver and the corresponding LLRs can be set to zero.
- Shortening involves setting input bits to a known value, and non-transmission of coded bits corresponding to those input bits, such that the corresponding LLRs can be set to a large value at the receiver.

R1-1708647 **Rate-matching scheme for polar code and performance evaluation** **Qualcomm Incorporated**
R1-1706967 **Rate matching for polar codes** **Huawei, HiSilicon**
R1-1709464 **WF on repeating coded bits of polar code** **Ericsson, ZTE, MediaTek, Qualcomm, InterDigital**

Working Assumption is confirmed:
- Maximum code size, $N_{max}=2^n$, at the output of Polar encoding for Uplink Control Information (UCI) is:
  - $N_{max,UCI}$ = 1024 for uplink control information

R1-1709362 **WF on rate matching for polar codes** **Qualcomm, Ericsson, Intel, LG Electronics, ZTE**

Agreement:
After segmentation (if any):
- K is the number of information bits (including CRC if one is attached)
- M is the number of coded bits for transmission
- N_{DM} is the smallest power of 2 that is >=M
- N_M is
  - $N_{DM}/2$ if $M < \beta * N_{DM}/2$ and $K/M < R_{repthr}$, $1<=\beta<2$ (exact value FFS; it is not precluded that β is a function of N_{DM})
  - Otherwise, N_{DM}
  - FFS the value of R_{repthr}; R_{repthr} = 0 not precluded
- N_R is the smallest power of 2 that is >= K/R_{min}
  - R_{min} is the supported minimum coding rate,
  - ~1/12<=R_{min}<=~1/5, FFS the exact value
- N_{max} is the maximum supported mother code size
- The mother code size N is determined as min(N_M, N_R, N_{max})
- Repetition is applied when M > N
- Puncturing or shortening is applied when M < N
  - Puncturing for lower code rates, e.g. in cases where code rate <= R_{psthr}, and/or other condition(s)
  - Shortening for higher code rates, e.g. in cases where code rate > R_{psthr}, and/or other condition(s)

– Details FFS

Not treated.
R1-1707059 Evaluation of sequence design for polar codes NEC Corporation
R1-1707076 Performance Comparison of Rate Matching Schemes for Polar Codes Ericsson
R1-1707077 Puncturing and Repetition of Polar Codes Ericsson
R1-1707183 Polar codes construction and rate matching scheme ZTE
R1-1707674 Information bit allocation of Polar codes LG Electronics
R1-1707747 Polar code construction for control channels AT&T
R1-1708050 Consideration on polar codes for high order modulation Samsung
R1-1708317 Sequence design for Polar codes Intel Corporation
R1-1708489 Sequence design of Polar codes NTT DOCOMO, INC.
R1-1708490 Performance evaluation of sequence design for Polar codes NTT DOCOMO, INC.
R1-1708834 Sequence design for Polar codes Nokia, Alcatel-Lucent Shanghai Bell
R1-1709465 WF on Puncturing Methods for Polar Codes Ericsson
R1-1709731 WF on Polar Code for NR Control Channels Samsung
R1-1709760 WF on Polar Sequence and Rate-Matching Designs MediaTek Inc.

7.1.4.2.1.3 Other

R1-1707202 Polar Code Performance in Fading Channel Ericsson Inc.
R1-1707675 Discussion of rate matching for Polar codes LG Electronics
R1-1708649 Interleaver design for Polar codes Qualcomm Incorporated
R1-1708835 Rate matching for Polar codes Nokia, Alcatel-Lucent Shanghai Bell

7.1.4.3 PBCH

R1-1709154 Coding Techniques for NR-PBCH Ericsson (Revision of R1-1707080)
R1-1707525 Evaluation of coding schemes for PBCH CATT
R1-1708053 Implicit data transmission over PBCH using LDPC code Samsung
R1-1708650 PBCH channel coding Qualcomm Incorporated
R1-1708836 Coding scheme for PBCH Nokia, Alcatel-Lucent Shanghai Bell

Agreement:
- Polar coding is adopted for NR-PBCH
  - Using same polar code construction as for the control channel
  - $N_{max} = 512$
- Working assumption that the data, including time index if carried by NR-PBCH excluding DMRS, is transmitted explicitly
  - Can be revisited if significant benefit is shown from partial implicit transmission of time index if allowed by the polar code design

Not treated.
R1-1706969 Channel coding for PBCH Huawei, HiSilicon
R1-1707079 Study of Number of CRC Bits for PBCH Ericsson
R1-1707184 Consideration on Channel Coding for NR-PBCH ZTE
R1-1707676 Comparison of LDPC and polar codes for PBCH LG Electronics
R1-1707801 Multi-RAT system level considerations for NR PBCH Channel Coding AccelerComm Ltd
R1-1707846 Channel coding for NR PBCH MediaTek Inc.
R1-1708052 Channel coding for PBCH Samsung
R1-1708158 Soft-combining for PBCH Huawei, HiSilicon
R1-1708318 Coding scheme for PBCH Intel Corporation
R1-1708359 Channel Codes for PBCH InterDigital, Inc.
R1-1709508 WF on NR PBCH Coding MediaTek Inc.

7.1.4.4 Other

R1-1709044 Draft CR on LDPC code [38.802] Samsung
Decision: Agreed in R1-1709721 38.802 CR0003 Rel-14, F with correction of "base graph" -> "base matrix" on cover sheet, and with latest CR cover sheet.
Change consequences if not approved to "Terminology is not consistent".

R1-1709729 Draft CR on LDPC code [38.912] Samsung
Decision: Draft CR is endorsed in R1-1709722 38.912 CRxxxx with latest CR cover sheet.

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Not treated.
R1-1706968 Channel coding chain for control channel Huawei, HiSilicon
R1-1707007 Channel coding for URLLC Huawei, HiSilicon
R1-1707185 Consideration on outer code for NRZTE

7.1.5 Modulation

R1-1708222 Next steps for pi/2 BPSK with spectrum shaping IITH
- Recommendation-1: Adopt ZC based RS for pi/2 with spectrum shaping
- Recommendation-2: Specify the spectrum shaping function in RAN-1. Details of spectrum shaping FFS
- Recommendation-3: Expand the applicability of pi/2 BPSK with spectrum shaping to frequency bands below 6 GHz

Decision: The document is noted.

Not treated.
R1-1707249 Feasibility study on subband constellation rotation for uplink PAPR reduction for CP-OFDM waveform vivo
R1-1708054 Modulation Schemes for NR Samsung
R1-1708143 Further consideration on pi/2 BPSK with FDSS Huawei, HiSilicon
R1-1708360 Performance Evaluation of Dual Carrier Modulation for New Radio InterDigital, Inc.
R1-1709002 On spectrum shaping for uplink Pi/2 BPSK with DFT-S-OFDM Nokia, Alcatel-Lucent Shanghai Bell
R1-1709055 On p/2-BPSK DFT-s-OFDM with spectrum shaping Ericsson

7.1.6 Duplexing

Focus on cross-link interference management for duplexing flexibility

R1-1709683 Chairman's notes of AI 7.1.6 Duplex and interference management Ad-Hoc chair (Qualcomm)
The document was presented by Wanshi Chen (Vice Chair).
Decision: The document is endorsed, and content is incorporated as below.

R1-1707203 Overview of Duplex and interference management ZTE

7.1.6.1 Cross-link interference management

Note that potential schemes are listed in Section 10.1 of TR38.802

R1-1706911 UE-to-UE measurement for cross-link interference mitigation Huawei, HiSilicon
R1-1707204 Discussion on Measurement and RS Design for CLI ZTE
R1-1707418 On cross-link interference measurement for NR duplex flexibility Intel Corporation
R1-1707526 Support of interference management schemes in duplexing flexbility CATT
R1-1707677 Discussion on details of backhaul signaling for duplexing flexibility LG Electronics
R1-1707753 Details of cross link interference measurements AT&T
R1-1707839 Cross link interference measurements MediaTek Inc.
R1-1708056 Cross-link Interference Management based on Coordinated Beamforming Samsung
R1-1708083 Discussion on timing alignment for flexible duplex in NR Panasonic
R1-1708492 Discussion on cross link interference mitigation for duplexing flexibility NTT DOCOMO, INC.
R1-1708651 Dynamic TDD UE to UE measurement considerations Qualcomm Incorporated
R1-1708820 Xn Support to aid TDD Interference Mitigation and Coordination Nokia, Alcatel-Lucent Shanghai Bell
R1-1709121 Considerations on the Proposed Cross-link Interference Mitigation Schemes Ericsson

R1-1709393 WF on UE-UE cross-link interference measurement Huawei, HiSilicon
R1-1709384 WF on Enablers for CLI Mitigation in NR ZTE
Agreements:
- Companies are encouraged to provide more details on and to further evaluate enablers for CLI management using an existing RS covering UE-to-UE interference
  - Details for the enablers, including:
    - detailed configurations (RS time/frequency positions, periodicity, # of ports, bandwidth, etc.)
    - detailed reporting
    - performance metrics
    - long-term and/or short-term
    - timing offset considerations
    - overhead
    - whether or not to identify the aggressor(s)
    - whether or not to use the same framework as in MIMO (if so, how)

- Aim to make a decision whether or not to support CLI management using an existing RS covering UE-to-UE interference in the next RAN1 meeting and if so, the details
- Companies are encouraged to provide more details on and to further evaluate enablers for CLI management using an existing RS covering TRP-to-TRP interference

R1-1709529 WF on inter-TRP signaling for cross-link interference mitigation LG Electronics, NTT DOCOMO

Conclusion:

- Study further whether or not at least the following information is provided among gNBs via backhaul signaling:
  - Configurations of reference signal for CLI management, which is transmitted from gNBs
    - FFS Details
  - Also the connection with TRP-to-TRP measurement

R1-1706910 TRP-to-TRP measurement for cross-link interference mitigation Huawei, HiSilicon
R1-1707205 Channel sensing based schemes for CLI mitigation in NR ZTE
R1-1707419 On RS transmission for short-term cross-link interference measurement for NR duplex flexibility Intel Corporation
R1-1707678 Discussion on CLI measurement for duplexing flexibility LG Electronics
R1-1707838 Cross link interference management techniques MediaTek Inc.
R1-1708055 Cross-link Interference Management Based on UE Measurements Samsung
R1-1708082 Discussion on CSI measurement for flexible duplex in NR Panasonic
R1-1708401 Discussion on Remote Interference Management CMCC
R1-1708402 Considerations on DL-UL interference coordination CMCC
R1-1708652 Dynamic TDD Cross-link interference management consideration Qualcomm Incorporated
R1-1708819 On Cross-Link Interference Management Nokia, Alcatel-Lucent Shanghai Bell
R1-1709021 Considerations on cross-link interference management China Unicom
R1-1709120 On Hybrid TDD for Cross-link Interference Mitigation Ericsson

7.1.6.2 Other

R1-1706912 UL Power control for cross-link interference mitigation Huawei, HiSilicon
R1-1706913 Dynamic and semi-static DL/UL resource partition Huawei, HiSilicon
R1-1708057 Performance evaluation of cross-link interference management Samsung
R1-1708058 Timing alignment on cross-link for dynamic TDD Samsung
R1-1708059 Cross-link Interference Management based on Power Control Samsung
R1-1708493 Discussion on prioritized scenarios for duplexing flexibility NTT DOCOMO, INC.
R1-1708821 LBT-based UL transmission for dynamic TDD Nokia, Alcatel-Lucent Shanghai Bell
R1-1709041 Interference measurement table for beam coordination Samsung
R1-1709122 On Dynamic TDD Scenarios Ericsson
R1-1709123 On Duplexing in Paired Spectrum Ericsson

7.1.7 Wider bandwidth operations

R1-1707828 Efficient wider bandwidth operations for NR MediaTek Inc.

- Proposal #1: For single numerology within a carrier, RAN1 specifies the maximal number of subcarriers as 3300 or PRBs as 275 within a carrier, instead of maximal carrier bandwidth.
- Proposal #2: For mixed numerology within a carrier, RAN1 specifies the maximal number of subcarriers as 3300 or PRBs as 275 within a carrier, instead of maximal carrier bandwidth, no matter which combination of subcarrier spacings is applied within a carrier.
- Proposal #3: The configuration of a DL common bandwidth part for a component carrier should be provided to a UE in NR-PBCH.
  - A DL common bandwidth part at least contains SS block(s), remaining system information broadcast, RAR and paging messages
- Proposal #4: The configuration of a UL common bandwidth part for a component carrier should be provided to a UE in the remaining minimum system information carried by PDCCH scheduled PDSCH over a DL common bandwidth part.
  - A UL common bandwidth part at least contains PRACH and PUCCH resources
- Proposal #5: A bandwidth part should contain SS block(s).
- Proposal #6: Single bandwidth part configuration is indicated by MAC CE to a UE for dynamic scheduling at a given part.
  - FFS the content of MAC CE
  - FFS the interruption time with no data transmission for bandwidth part configuration switch
- Proposal #7: Each bandwidth part configuration should contain a CORESET with UE-specific search space.
- Proposal #8: All bandwidth part configurations should contain the CORESET with common search space, which is broadcasted in NR-PBCH.

- Proposal #9: Further discuss whether & how to optimize the data channel decoding performance immediately after the bandwidth part configuration switch in Release 15.
- Proposal #10: Further study the transition time of bandwidth part configuration switch and its corresponding impact on UE throughput.

Decision: The document is noted.

R1-1709265 **WF on bandwidth part configuration** **OPPO, Ericsson**
Further revised in R1-1709519.

R1-1709503 **WF on PRB grid structure for wider bandwidth operation LGE**

- Same PRB grid structure is assumed for single band UEs, CA UEs and wideband UEs within a NR carrier
  - PRB grid is constructed based on the reference point, FFS following options for the reference point
    - the center of NR carrier
      - The center frequency of wideband CC can be informed to UEs via PBCH
    - The center or the edge of the SS block
  - At least support scramble sequence of CSI-RS, (DMRS) and SRS based on PRB grid on wideband

Decision: The document is noted.

R1-1709505 WF on initial access and mobility for wider BW NTT DOCOMO
Continue offline discussion until Wednesday – OPPO/Ericsson, LGE, NTT DOCOMO

Wednesday session
R1-1709519 WF on bandwidth part configuration OPPO, Ericsson, Huawei, HiSilicon, MediaTek, Intel, DOCOMO, LGE, ETRI, CATR, NEC, ZTE, CATT, Samsung

Agreements:

- Confirm the WA of RAN1#88bis.
- Each bandwidth part is associated with a specific numerology (sub-carrier spacing, CP type)
  - FFS: slot duration indication if RAN1 decides to not to downselect between 7 symbol and 14 symbols for NR slot duration
- UE expects at least one DL bandwidth part and one UL bandwidth part being active among the set of configured bandwidth parts for a given time instant.
  - A UE is only assumed to receive/transmit within active DL/UL bandwidth part(s) using the associated numerology
    - At least PDSCH and/or PDCCH for DL and PUCCH and/or PUSCH for UL
      - FFS: down selection of combinations
  - FFS if multiple bandwidth parts with same or different numerologies can be active for a UE simultaneously
    - It does not imply that it is required for UE to support different numerologies at the same instance.
    - FFS: TB to bandwidth part mapping
- The active DL/UL bandwidth part is not assumed to span a frequency range larger than the DL/UL bandwidth capability of the UE in a component carrier.
- Specify necessary mechanism to enable UE RF retuning for bandwidth part switching

R1-1709505 WF on initial access and mobility for wider BW NTT DOCOMO, CATT, Ericsson, LG Electronics, MediaTek, OPPO

Agreements:

- Support single and multiple SS block transmissions in wideband CC in the frequency domain
  - For non CA UE with a smaller BW capability and potentially for CA UE, the measurement gap for RRM measurement and potentially other purposes (e.g., path loss measurement for UL power control) using SS block is supported (if it is agreed that there is no SS block in the active BW part(s))
  - UE can be informed of the presence/parameters of the SS block(s) and parameters necessary for RRM measurement
    - FFS: via either RMSI, other system information, or RRC signaling
  - FFS: number of SS blocks in wideband
  - FFS: number of SS blocks for RRM measurement
  - FFS: Details of measurement configuration

Agreements:

- The maximum bandwidth for CORESET for RMSI scheduling and NR-PDSCH carrying RMSI should be equal to or smaller than a certain DL bandwidth of NR that all UE can support in each frequency range
- At least, for one RACH preamble format ,the bandwidth should be equal to or smaller than a certain UL bandwidth of NR that all UE can support in each frequency range
  - This implies there could be other RACH preamble format with larger bandwidth than a certain bandwidth of NR that all UE can support

Agreements:

- For frequency location of CORESET for RMSI scheduling and NR-PDSCH for RMSI, RAN1 will select one or more alternative(s) from followings in the next meeting
  - Alt. 1: CORESET for RMSI scheduling and NR-PDSCH for RMSI are confined within the BW of one NR-PBCH
  - Alt. 2: CORESET for RMSI scheduling is confined within the BW of one NR-PBCH and NR-PDSCH for RMSI is not confined within the BW of one NR-PBCH
  - Alt. 3: CORESET for RMSI scheduling and NR-PDSCH for RMSI are not confined within the BW of one NR-PBCH

R1-1709503 WF on PRB grid structure for wider bandwidth operation LGE
R1-1709625 WF on PRB grid structure for wider bandwidth operation LG Electronics, OPPO, ASUSTEK, Ericsson, Intel, DOCOMO, Huawei, HiSilicon

Agreements:

- Same PRB grid structure for a given numerology is assumed for narrow band UEs, CA UEs and wideband UEs within a wideband NR carrier
  - FFS: PRB indexing

Thursday session
R1-1709737 WF on PRB indexing for a UE in wider bandwidth operation LGE

Possible agreements:

- The PRB indexing for a UE (at least for other data/control channels for RMSI) for a given numerology in a wideband NR carrier can have following options,
  - Option 1: shared among different UEs (narrowband, wideband, CA UEs)
    - At least following options are considered
      - PRB indexing may be start from the center of system bandwidth
        - » FFS details
      - PRB indexing may be start from the center of one of SS block (common to all UEs)
        - » FFS details
  - Option 2: Locally indexed based on the active bandwidth part
    - FFS if multiple bandwidth parts can be activated
  - Option 3: Locally indexed based on the configured bandwidth
    - FFS details of configured bandwidth

Possible conclusions:
Editors will take care it in their specifications

R1-1709736 Way Forward on bandwidth part for efficient wideband operation in NR MediaTek, Huawei, HiSilicon
R1-1709746 WF on PRB indexing for a UE in wider bandwidth operation LGE
Possible agreements:

- Configuration of a DL bandwidth part further includes at least one CORESET

Proposal from Ericsson

  - In the case of PDCCH transmission scheduled with PDSCH transmission starting in the same slot, PDCCH and PDSCH are transmitted in the same bandwidth part (the PDCCH carrying the scheduling assignment for the PDSCH) [FFS: Later-slot scheduling, mini-slot scheduling]

Proposal from Intel

  - In the case of PDCCH transmission scheduled with PDSCH transmission starting in the same slot, from UE perspective, UE is not expected to receive PDSCH starting instance which is earlier than the indicated RF retuning time capability
  - UE signal is capability on RF retuning time
- For the indication of active DL/UL bandwidth part(s) to a UE, the following options are considered (including combinations thereof)
  - Option #1: DCI (explicitly and/or implicitly)
  - Option #2: MAC CE
  - Option #3: Time pattern (e.g. DRX like)

R1-1709740 Way forward on RBG size NTT DOCOMO

Agreements:

- The set of RBG size includes at least 2, [3,] 4, [6,] 8, 16
  - FFS: necessity of other RBG sizes
- RBG size may or may not depend on the number of symbols for data

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- For determining RBG size, the following options are considered
  - Opt. 1: RBG size is determined by the NW channel BW
    - FFS: Necessity of signaling
  - Opt. 2: RBG size is determined by BW for the configured BW part
    - FFS: Necessity of signaling
    - FFS: Multiple configured BW parts
  - Opt. 3: RBG size is configured by NW
    - FFS: Set of configurable RBG sizes may depend on frequency range
  - Opt. 4: RBG size is determined by DCI
    - FFS: Signaling details

Friday session

R1-1709802 Way Forward on bandwidth part for efficient wideband operation in NR Ericsson

Also supported by Intel, Mediatek, OPPO

Agreements:

- In case of one active DL BWP for a given time instant,
  - Configuration of a DL bandwidth part includes at least one CORESET.
  - A UE can assume that PDSCH and corresponding PDCCH (PDCCH carrying scheduling assignment for the PDSCH) are transmitted within the same BWP if PDSCH transmission starts no later than K symbols after the end of the PDCCH transmission.
  - In case of PDSCH transmission starting more than K symbols after the end of the corresponding PDCCH, PDCCH and PDSCH may be transmitted in different BWPs
  - FFS: Value of K (may depend on numerology, possibly reported UE retuning time, etc)
- For the indication of active DL/UL bandwidth part(s) to a UE, the following options are considered (including combinations thereof)
  - Option #1: DCI (explicitly and/or implicitly)
  - Option #2: MAC CE
  - Option #3: Time pattern (e.g. DRX like)
  - Details FFS

Not treated.

R1-1706900 On bandwidth part and bandwidth adaptation Huawei, HiSilicon
R1-1707262 Maximum number of subcarriers in NR NEC Corporation
R1-1707420 Bandwidth part configuration and operation Intel Corporation
R1-1707527 NR wider bandwidth operation CATT
R1-1707679 Discussion on further details on wideband operation LG Electronics
R1-1707727 Discussion on UE specific RF bandwidth adaptation in NR Guangdong OPPO Mobile Telecom.
R1-1707735 Design considerations for NR operation with wide bandwidths AT&T
R1-1708060 Wider Bandwidth Operations Samsung
R1-1708278 Synchronization and tracking in wideband carrier Apple Inc.
R1-1708494 Further views on wider bandwidth operations for NR NTT DOCOMO, INC.
R1-1708653 Views on wideband NR operation Qualcomm Incorporated
R1-1708822 On wider band aspects of NR Nokia, Alcatel-Lucent Shanghai Bell
R1-1708998 Bandwidth adaptation in NR InterDigital Inc.
R1-1709054 On bandwidth parts Ericsson
R1-1709841 Open issues and work plan for Wider BW operation NTT DOCOMO

7.1.8 NR-LTE co-existence

R1-1709684 Chairman's notes of AI 7.1.8 NR-LTE co-existence Ad-Hoc chair (Qualcomm)

The document was presented by Wanshi Chen (Vice Chair).

Decision: The document is endorsed, and content is incorporated as below.

R1-1709844 Open Issue and Work Plan for LTE/NR Coexistence Huawei

R1-1706906 Consideration on subcarrier mapping for LTE-NR coexistence Huawei, HiSilicon
R1-1707421 NR LTE coexistence remaining issues Intel Corporation
R1-1707680 Discussion on large duplex gap between DL and UL for LTE UL sharing LG Electronics
R1-1707736 Remaining issues for efficient NR-LTE co-existence AT&T
R1-1707807 Considerations of NR-LTE coexistence in uplink ZTE
R1-1708062 LTE-NR coexistence for UL Samsung
R1-1708276 Uplink sharing in NSA mode Apple Inc.

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R1-1708403 **Discussion on UL NR-LTE co-existence** **CMCC**
R1-1708495 **Further views on LTE-NR co-existence** **NTT DOCOMO, INC.**
R1-1708655 **NR-LTE co-channel coexistence consideration** **Qualcomm Incorporated**
R1-1709001 **NR-LTE sharing of uplink carrier frequency** **Nokia, Alcatel-Lucent Shanghai Bell**
R1-1709056 **On uplink half-tone shift Ericsson**
R1-1709560 **LTE performance in NR-LTE UL sharing Nokia, Alcatel-Lucent Shanghai Bell**

R1-1709586 **WF on UL Sharing for NSA NR UE** **Apple Inc, Huawei, HiSilicon, Deusche Telecom, Samsung, Orange, OPPO, vivo, INL**

Agreements:
- For NR NSA for a UE, NR supports the case that when the UE is configured with multiple UL carriers on different frequencies (where there is at least one LTE carrier and at least one NR carrier of a different carrier frequency), the UE operates on only one of the carriers at a given time among a pair of LTE and NR carriers
  - FFS whether or not there is specification impact
    - If there is RAN1 specification impact, aim to minimize the specification impact for NR
    - Note: this feature by itself is not intended to have any LTE RAN1 specification impact
  - Note: the other case of allowing simultaneous operation on two or more UL carriers is already agreed to be supported

R1-1709587 **Way forward on the support of Supplementary Uplink in NR** **CMCC**
R1-1709732 **Way forward on the support of Supplementary Uplink in NR** **CMCC**

Agreements:
- Specify mechanisms for supporting supplementary Uplink frequency
  - Note: SUL herein refers to the case when there is only UL resource for a carrier from NR perspective
  - Use SUL as complimentary access link (including from random access point of view) to NR TDD and to NR FDD, where the UE may select PRACH resources either in the NR TDD/FDD uplink frequency or the SUL frequency.
  - Note: The SUL frequency can be a frequency shared with LTE UL(at least for the case when NR spectrum is below 6 Ghz).
    - Minimize impact to NR physical layer design to enable this co-existence
  - Note: whether or not UE has to support simultaneous transmission on uplink frequencies is a separate discussion
- Sent LS accommodating above agreement to RAN2 and RAN4 – Xiaodong (CMCC)

R1-1709813 **[Draft] LS on the support of supplementary uplink in NR** **CMCC**
Agreed in R1-1709843

R1-1709770 **WF on LTE-NR Coexistence with UL sharing** **Huawei, HiSilicon, AsusTek, CATR, MediaTek**
R1-1709807 **WF on LTE-NR Coexistence with UL sharing** **Huawei, HiSilicon, AsusTek, CATR, MediaTek, vivo, Spreadtrum**
Also supported by OPPO
R1-1709825 **WF on LTE-NR Coexistence with UL sharing** **Huawei, HiSilicon, AsusTek, CATR, MediaTek, vivo, Spreadtrum, OPPO, Intel, III, Ericsson, Orange**

Agreements:
- For NR standalone operation for a UE,
  - NR supports that the UE is allowed to transmit on UL carriers on different frequency ranges but the UE has the capability to only transmit on one of the carriers at a given time in the following case:
    - case of SRS carrier switching with at least one of the frequency ranges agreed for LTE-NR UL sharing by RAN4 (e.g. refer to R4-1704411)

Not treated.
R1-1706907 Summary of [88b-15] email discussion on LTE-NR coexistence Huawei, HiSilicon
R1-1707528 Support of UL carrier sharing between NR-LTE CATT
R1-1707806 Discussion of NR-LTE coexistence on DL ZTE
R1-1708061 LTE-NR coexistence for DL Samsung
R1-1708654 NR-LTE adjacent channel coexistence consideration Qualcomm Incorporated
R1-1709132 Reserved resources supporting NR co-existence with LTE and NB-IoT Ericsson
R1-1709383 Overview of NR UL for LTE-NR coexistence Huawei, HiSilicon
R1-1709750 Draft LS on LTE NR coexistence with UL sharing Huawei
R1-1709845 Updated views on LTE NR co-existence NTT DOCOMO

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7.1.9 UL power control

Including power control for PUSCH/PUCCH/SRS, PHR calculation for single carrier, carrier aggregation and dual connectivity (both CP-OFDM and DFT-S-OFDM)
Note that RAN4 requested RAN1 to study the feasibility of the power sharing mechanisms between LTE and NR as soon as possible.

R1-1707137 UL MIMO power control ZTE
R1-1708361 Power Control for Multi Beam Transmission in NR InterDigital, Inc.
R1-1709118 Impact of Multiple Waveforms on UL Power Control for NR Ericsson

R1-1708068 Power Control for Multi-Beam Operation Samsung
R1-1708404 Beam specific UL power control procedure CMCC

R1-1709486 WF on UL power sharing between LTE and NR NTT DOCOMO, Ericsson, InterDigital, Nokia, Huawei
Proposals:
- Support power sharing mechanism for LTE-NR dual connectivity by RAN1 specification at least for <6GHz
  - Pcmax is shared between LTE and NR
  - LTE mode 2 like operation as starting point.
    - Other schemes, e.g., LTE mode1 like is not precluded
- Applicability of power sharing mechanism for NR in particular bands, e.g., greater than 24GHz, should be discussed in RAN4
- Send back a LS to RAN4 with the above statements

Continue offline discussion

Friday session

R1-1709712 WF on UL power sharing between LTE and NR NTT DOCOMO, Ericsson, InterDigital, Nokia, Huawei, Samsung, LG
Also supported by Sharp, NEC

Agreements:
- From RAN1 perspective, it is feasible to have power sharing mechanism for LTE-NR dual connectivity at least for <6GHz
  - FFS: power sharing mechanism
  - RAN1 will continue discussing the power sharing mechanism, including potential RAN1 specification impact
- Applicability of power sharing mechanism for NR in particular bands, e.g., greater than 24GHz, should be discussed in RAN4
- Send back a LS to RAN4 with the above statements – Ryosuke (DCM)

R1-1709762 [DRAFT] LS on power sharing mechanism between LTE and NR NTT DOCOMO, INC. [RAN WG1]
The LS is agreed with the update of the title using "Reply LS" – final LS approved in R1-1709790

R1-1709660 Summary of Power Control Issues ZTE
R1-1709787 WF on uplink power control Nokia, ABS, LGE, InterDigital, Oppo, Intel, Samsung

Agreements:
- Support beam specific pathloss for ULPC

R1-1709659 WF on UL power control ZTE, Intel, Ericsson, InterDigital, Samsung, MediaTek, Nokia, ASB
Also supported by Mitsubishi, Oppo

Agreements:
- The following DL RS can be used for PL calculation for UL PC
  - If the power offset between SSS and DM-RS for PBCH is known by the UE, both SSS and DM-RS for PBCH of SS block
  - If the power offset between SSS and DM-RS for PBCH is not known by the UE, SSS only of SS block
  - CSI-RS;
  - FFS: the applicable case for above DL RSs; if both are used, whether/how to combine/handle the measurement

Not treated.
R1-1706904 Power control for CA and DC Huawei, HiSilicon

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R1-1706930 Detailed considerations on UL power control design for NR Huawei, HiSilicon
R1-1707057 UL transmission power control Mitsubishi Electric Co.
R1-1707422 Discussion On UL Power Control for data channel Intel Corporation
R1-1707529 PUSCH Power Control in Multi-beam configuration CATT
R1-1707530 PUCCH Power Control and Priority in Power Scaling CATT
R1-1707531 SRS Power Control in Multi-beam configuration CATT
R1-1707532 NR Power Headroom Calculation CATT
R1-1707681 Discussion on beam-specific power control for UL LG Electronics
R1-1707682 Discussion on UL power control for NR LG Electronics
R1-1707683 Discussion on power sharing for LTE-NR DC LG Electronics
R1-1707728 Discussion on uplink power control Guangdong OPPO Mobile Telecom.
R1-1707808 Dual Connectivity between E-UTRA and NR NEC
R1-1708063 UL Power Control Aspects in NR Samsung
R1-1708064 Feasibility for Power Sharing between LTE an NR Samsung
R1-1708065 Power Control for Transmissions with Different Numerologies Samsung
R1-1708066 On PHR aspects for NR Samsung
R1-1708067 Power Control for UL CA Samsung
R1-1708069 Power Control for PUCCH Samsung
R1-1708220 UL Power Control for MIMO Nokia, Alcatel-Lucent Shanghai Bell
R1-1708221 On power sharing between LTE and NR in DC Nokia, Alcatel-Lucent Shanghai Bell
R1-1708496 Uplink power control considering waveform switching NTT DOCOMO, INC.
R1-1708497 Power sharing between LTE and NR in NSA NTT DOCOMO, INC.
R1-1708656 Power control and PHR for different waveforms Qualcomm Incorporated
R1-1708714 On reference signals for UL power control Ericsson
R1-1708715 On UL power control for NR Ericsson
R1-1709004 Power Sharing in NR InterDigital Inc.
R1-1709047 UL power control in multi-beam based approaches ASUSTEK COMPUTER (SHANGHAI)
R1-1709119 On Power Control Options for LTE-NR NSA Operation Ericsson
R1-1709156 Power control with multiple waveforms and numerologies InterDigital Inc.

7.1.10 Channel model

R1-1709682 Chairman's notes of AI 7.1.10 Channel model Ad-Hoc chair (Nokia)
The document was presented by Matthew Baker (Vice Chair).
Decision: The document is endorsed, and content is incorporated as below.

The document was presented by … from ...
Discussion: .
Decision: The document is noted.

R1-1708744 Correction of scope Ericsson
Decision: The CR0085 to 38.900 Rel-14, F is agreed.

R1-1709140 TR36.873_CR_Correction_for_LOS_probability Fraunhofer HHI
Decision: The CR0027 to 36.873 Rel-12, F is agreed.

R1-1709141 TR36.873_CR_Scaling_factor_notation Fraunhofer HHI
Decision: The CR0028 to 36.873 Rel-12, F is agreed.
R1-1709142 TR36.873_CR_Notation_of_log-normal_distributed_random_variables Fraunhofer HHI
Decision: The CR0029 to 36.873 Rel-12, F is agreed.
R1-1709143 TR36.873_CR_Missing_LOS_Doppler Fraunhofer HHI
Decision: The CR0030 to 36.873 Rel-12, F is agreed.

R1-1709139 Realistic_Antenna_Polarization_Modelling Fraunhofer IIS, Fraunhofer HHI
R1-1709136 TR38.901_CR_Antenna_Model Fraunhofer HHI, Fraunhofer IIS
Continue discussion until June adhoc.

R1-1708169 Correction on LoS probability model for RMa in TR 38.901 Huawei, HiSilicon
Already corrected in R1-1705803.

R1-1707267 Discussion on Procedure A for spatially-consistency UT mobility modeling ZTE
R1-1707268 Correction on Procedure A of spatially-consistency UT mobility modeling ZTE
Revisit on Wed - R1-1709328
Decision: CR# is missing in R1-1709328 CR coversheet. Agreed in R1-1709330 38.901CR0015r1 Rel-14, F.

R1-1708168 **Discussion on spatially-consistent UT mobility modelling Huawei, HiSilicon**
R1-1708447 **Enhancement to Mobility Procedure A NTT DOCOMO, INC.**
R1-1708817 **Correction for mobility model A Ericsson, Fraunhofer HHI**
Decision: Superseded by R1-1709330
R1-1707081 **Correction on spatial consistent procedure model A in TR 38.901 Huawei, HiSilicon**
Decision: Superseded by R1-1709330

R1-1709138 TR38.901_CR_TDL_Spatial_Filter Fraunhofer HHI
Decision: The CR0014 to 38.901 Rel-14, F is agreed.

R1-1709137 TR38.901_CR_Scenarios_in_Simulation_Assumptions Fraunhofer HHI
Decision: The CR0013 to 38.901 Rel-14, F is agreed.

7.1.11 Other

R1-1709710 WF on extended CP Huawei, HiSilicon, VODAFONE, DOCOMO, Ericsson, Orange, OPPO, Nokia, ASB, InterDigital, China Unicom, Intel, Sony, Mediatek, LGE

Agreements:

- Confirm work assumption : LTE scaled extended CP is supported at least for NR 60kHz SCS in Rel-15
  - UL and DL can be configured separately with different CP types
- When a UE is configured with 60kHz ECP for a downlink bandwidth part
  - The UE monitors UE-specific PDCCH with ECP
  - The UE assumes ECP is used for PDSCH and associated DMRS scheduled by UE-specific PDCCH DCI with ECP
- When a UE is configured with 60kHz ECP for a uplink bandwidth part
  - The UE assumes ECP is used for PUSCH and associated DMRS scheduled by UE-specific PDCCH DCI
  - The UE transmits PUCCH with ECP
- FFS whether and how UE measure and report the delay spread for downlink channel

Not treated.
R1-1706897 Updated simulation results on ECP Huawei, HiSilicon
R1-1706898 Discussion on NR design for ECP Huawei, HiSilicon
R1-1707250 PAE consideration on supporting CP-OFDM and DFT-S-OFDM vivo
R1-1707251 Forward compatibility consideration for ECP design and NR-MBMS vivo
R1-1707685 Uplink Grant Free Transmission Supporting Different Services Dish Network
R1-1708070 ECP aspects for 60 kHz SCS Samsung
R1-1708119 Comment on NR specification Panasonic
R1-1708934 CP configuration for NR VODAFONE Group Plc
R1-1708940 Further details on scrambling Ericsson
R1-1709042 DC Subcarrier Handling Samsung
R1-1709175 Spectrum shaping for p/2-BPSK DFT-s-OFDM Samsung

7.2 Other

Friday: Email discussion until the August meeting about eV2X evaluation methodology – Hanbyul (LGE)

Not treated
R1-1708181 NR-NTN proposed scope THALES
R1-1708182 NR-NTN proposed template for the TR THALES
R1-1708183 NR-NTN channel models THALES
R1-1708242 Non-Terrestrial Network: Propagation delay and Doppler characterisation THALES
R1-1708955 Discussion of Multi-Antenna and Highly Directional Beam-Forming for Operation in Unlicensed Spectrum Ericsson
R1-1708956 On Autonomous UL Transmissions for NR in Unlicensed Spectrum Ericsson
R1-1708957 On Channel Access Mechanisms for NR in Unlicensed Spectrum Ericsson
R1-1708958 On NR Operation in the 60 GHz Unlicensed Band Ericsson
R1-1708959 On Physical Layer Design Policies for Unlicensed Operation of NR Ericsson
R1-1708960 Technology Components for Unlicensed Operation Ericsson
R1-1709029 Discussion on modulation schemes for high spectral efficiency Samsung
R1-1709030 Transmission and reception for high-order modulation in conjunction with MIMO Samsung

8 Closing of the meeting

Mr Chair thanked all for the hard work during the week. Special thanks to the Vice chairmen, and all dedicated chairpersons for taking care of their respective sessions.
Mr Chair thanked the host Huawei for the organization, and the flexible arrangements for providing extra meeting rooms during the week. Offline seesions using mobile projectors (thanks to ZTE) were also very helpful making progress through the all week.

Mr Chair confirmed that June ad-hoc meeting, hosted by ZTE in Qingdao, China will be mainly chaired by Vice chairmen as he is not certain to be present - his participation or not will be confirmed later on.

MCC post-meeting: The purpose of the ad-hoc meeting in June 2017 is clearly meant to address NR-related topics only associated with the WI RP-170855. It is common understanding that RAN1 mandates this Ad hoc meeting with full decision power for NR WI RP-170855.

Meeting was closed at 17:40.
See you all in Prague, and in Qingdao for NR interested.

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Annex A: List of Tdocs at RAN1 #89

Please see excel file attached to this report

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Annex B: List of CRs agreed at RAN1 #89

TS/TR	CR	Rev	Rel	Title	Cat	Vsn	@ Mtg	TD#	Source to WG	Work Item
36.211	367	-	Rel-14	Correction on resource mapping in case of retuning in 36.211	F	14.2.0	R1#89	R1-1708206	Huawei, HiSilicon	LTE_feMTC-Core
36.211	368	1	Rel-13	Correction on NB-IoT DMRS definition in 36.211	F	13.5.0	R1#89	R1-1709233	Ericsson	NB_IOT-Core
36.211	369	1	Rel-14	Correction on NB-IoT DMRS definition in 36.211	A	14.2.0	R1#89	R1-1709234	Ericsson	NB_IOT-Core
36.211	370	1	Rel-13	Correction on NB-IoT SC-FDMA baseband signal generation in 36.211	F	13.5.0	R1#89	R1-1709269	Ericsson	NB_IOT-Core
36.211	371	1	Rel-14	Correction on NB-IoT SC-FDMA baseband signal generation in 36.211	A	14.2.0	R1#89	R1-1709270	Ericsson	NB_IOT-Core
36.211	372	-	Rel-13	Clarification on the definition of the nprach-NumCBRA-StartSubcarriers	F	13.5.0	R1#89	R1-1709241	NTT DOCOMO, INC.	NB_IOT-Core
36.211	373	-	Rel-14	Clarification on the definition of the nprach-NumCBRA-StartSubcarriers	A	14.2.0	R1#89	R1-1709242	NTT DOCOMO, INC.	NB_IOT-Core
36.211	374	-	Rel-14	Parallel reception of MPDCCH and PDSCH for BL/CE UE	F	14.2.0	R1#89	R1-1709448	Ericsson, Qualcomm, Huawei, HiSilicon	LTE_feMTC-Core
36.211	375	-	Rel-14	CR for precoding for spatial multiplexing using antenna ports with UE-specific reference signals in 36.211	F	14.2.0	R1#89	R1-1709648	ETRI	LTE_eFDMIMO-Core
36.211	376	-	Rel-14	Correction to CSI-RS configuration	F	14.2.0	R1#89	R1-1709649	NEC	LTE_eFDMIMO-Core
36.211	377	-	Rel-13	Clarification of frequency hopping for "PDCCH order" initiated PUSCH	F	13.5.0	R1#89	R1-1709340	Nokia	LTE_MTCe2_L1-Core
36.211	378	-	Rel-14	Clarification of frequency hopping for "PDCCH order" initiated PUSCH	A	14.2.0	R1#89	R1-1709341	Nokia	LTE_MTCe2_L1-Core
36.211	379	-	Rel-13	Correction on determination of number of repetitions PUCCH format 1	F	13.5.0	R1#89	R1-1709346	Qualcomm Incorporated	LTE_MTCe2_L1-Core
36.211	380	-	Rel-14	Correction on determination of number of repetitions PUCCH format 1	A	14.2.0	R1#89	R1-1709347	Qualcomm Incorporated	LTE_MTCe2_L1-Core
36.211	381	-	Rel-14	Correction on PRS hopping	F	14.2.0	R1#89	R1-1709717	ZTE	LTE_feMTC-Core
36.211	382	-	Rel-13	NRS presence assumptions on unicast non-anchor carriers	F	13.5.0	R1#89	R1-1709846	Huawei, HiSilicon	NB_IOT-Core
36.211	383	-	Rel-14	NRS presence assumptions on unicast non-anchor carriers	F	14.2.0	R1#89	R1-1709847	Huawei, HiSilicon	NB_IOTenh-Core
36.212	262	-	Rel-13	Correction on total number of soft channel bits for Cat M1 UE in 36.212	F	13.5.0	R1#89	R1-1709222	NEC, Intel	LTE_MTCe2_L1-Core
36.212	263	-	Rel-14	Corrections on total number of soft channel bits for UE Cat M1 and M2 in 36.212	F	14.2.0	R1#89	R1-1709385	NEC, Intel	LTE_feMTC-Core
36.213	910	2	Rel-14	Miscellaneous corrections to 36.213	F	14.2.0	R1#89	R1-1709333	Huawei, HiSilicon	LTE_SL_V2V-Core
36.213	912	-	Rel-13	Correction on 3.75 kHz NPUSCH format 2 transmission	F	13.5.0	R1#89	R1-1709008	Huawei, HiSilicon	NB_IOT-Core

TS/TR	CR	Rev	Rel	Title	Cat	Vsn	@ Mtg	TD#	Source to WG	Work Item
36.213	913	-	Rel-14	Correction on 3.75 kHz NPUSCH format 2 transmission	A	14.2.0	R1#89	R1-1709009	Huawei, HiSilicon	NB_IOT-Core
36.213	916	-	Rel-14	CR for skipped subframe handling for shorter periodicity in PC5-based V2V	F	14.2.0	R1#89	R1-1709191	CATT	LTE_V2X-Core
36.213	917	-	Rel-13	Clarification of the #repetitions used for msg3 retransmissions	F	13.5.0	R1#89	R1-1709227	Nokia	LTE_MTCe2_L1-Core
36.213	918	-	Rel-14	Clarification of the #repetitions used for msg3 retransmissions	A	14.2.0	R1#89	R1-1709228	Nokia	LTE_MTCe2_L1-Core
36.213	919	-	Rel-14	CR on MPDCCH PRB Sets - Rel-14	A	14.2.0	R1#89	R1-1709235	Samsung	LTE_MTCe2_L1-Core
36.213	920	1	Rel-13	Correction of RAR window definition in CE mode B	F	13.5.0	R1#89	R1-1709352	Ericsson, Huawei, HiSilicon, Qualcomm	LTE_MTCe2_L1-Core
36.213	921	1	Rel-14	Correction of RAR window definition in CE mode B	A	14.2.0	R1#89	R1-1709353	Ericsson, Huawei, HiSilicon, Qualcomm	LTE_MTCe2_L1-Core
36.213	925	-	Rel-14	Correction of UE behavior to meet Crlimit	F	14.2.0	R1#89	R1-1709645	Qualcomm Incorporated	LTE_V2X-core
36.213	926	-	Rel-14	Correction on HARQ-ACK bundling and dynamic HARQ-ACK timing in 36.213	F	14.2.0	R1#89	R1-1709651	Huawei, HiSilicon	LTE_feMTC-Core
36.213	927	-	Rel-14	Corrections on Power Control for SRS Switching	F	14.2.0	R1#89	R1-1709655	Samsung	LTE_SRS_switch-Core
36.213	928	-	Rel-13	Corrections on the numbering of the tables in 8.0	F	13.5.0	R1#89	R1-1709656	NEC	TEI13
36.213	929	-	Rel-14	Corrections on the numbering of the tables in 8.0	F	14.2.0	R1#89	R1-1709657	NEC	TEI14
36.213	930	1	Rel-14	Corrections on PRB scaling for PUSCH in UpPTS	F	14.2.0	R1#89	R1-1709719	Huawei	LTE_UL_CAP_enh-Core
36.213	931	-	Rel-14	CR on CSR for CSI feedback for semi-OL transmission	F	14.2.0	R1#89	R1-1709335	Samsung, Huawei, HiSilicon	LTE_eFDMIMO-Core
36.213	932	-	Rel-13	Clarification of RV Cycling in the presence of invalid SFs	F	13.5.0	R1#89	R1-1709338	Nokia	LTE_MTCe2_L1-Core
36.213	933	-	Rel-14	Clarification of RV Cycling in the presence of invalid SFs	A	14.2.0	R1#89	R1-1709339	Nokia	LTE_MTCe2_L1-Core
36.213	934	-	Rel-13	Correction of the calculation of the #RV-blocks for a given PDSCH	F	13.5.0	R1#89	R1-1709342	NOKIA, NTT DoCoMo	LTE_MTCe2_L1-Core
36.213	935	-	Rel-14	Correction of the calculation of the #RV-blocks for a given PDSCH	A	14.2.0	R1#89	R1-1709343	NOKIA	LTE_MTCe2_L1-Core
36.213	936	-	Rel-13	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	F	13.5.0	R1#89	1-17093444	Nokia	LTE_MTCe2_L1-Core
36.213	937	-	Rel-14	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	A	14.2.0	R1#89	R1-1709345	Nokia	LTE_MTCe2_L1-Core
36.213	938	-	Rel-13	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	F	13.5.0	R1#89	R1-1709713	Huawei, HiSilicon	LTE_MTCe2_L1-Core

TS/TR	CR	Rev	Rel	Title	Cat	Vsn	@ Mtg	TD#	Source to WG	Work Item
36.213	939	-	Rel-14	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	A	14.2.0	R1#89	R1-1709714	Huawei, HiSilicon	LTE_MTCe2_L1-Core
36.213	940	-	Rel-14	CR on skipped subframe handling for partial sensing	F	14.2.0	R1#89	R1-1709332	Samsung, DoCoMo, Panasonic	LTE_V2X-Core
36.213	941	-	Rel-14	Correction on abbreviation of Uplink SPS RNTI and Sidelink SPS RNTI in 36.213	F	14.2.0	R1#89	R1-1709331	CATT	LTE_V2X-Core
36.213	942	-	Rel-14	Timing relationships for 2 HARQ processes	F	14.2.0	R1#89	R1-1709718	Qualcomm Incorporated	NB_IOTenh-Core
36.873	27	-	Rel-12	TR36.873_CR_Correction_for_LOS_probability	F	12.4.0	R1#89	R1-1709140	Fraunhofer HHI	FS_LTE_3D_channel
36.873	28	-	Rel-12	TR36.873_CR_Scaling_factor_notation	F	12.4.0	R1#89	R1-1709141	Fraunhofer HHI	FS_LTE_3D_channel
36.873	29	-	Rel-12	TR36.873_CR_Notation_of_log-normal_distributed_random_variables	F	12.4.0	R1#89	R1-1709142	Fraunhofer HHI	FS_LTE_3D_channel
36.873	30	-	Rel-12	TR36.873_CR_Missing_LOS_Doppler	F	12.4.0	R1#89	R1-1709143	Fraunhofer HHI	FS_LTE_3D_channel
38.802	2	-	Rel-14	TR38.802_CR_Section_7.1.6_MIMO calibration	F	14.0.0	R1#89	R1-1709832	ZTE	FS_NR_newRAT
38.802	3	-	Rel-14	Draft CR on LDPC code [38.802]	F	14.0.0	R1#89	R1-1709721	Samsung	FS_NR_newRAT
38.900	85	-	Rel-14	Correction for scope	F	14.2.0	R1#89	R1-1708744	Ericsson	FS_6GHz_CH_model
38.901	13	-	Rel-14	TR38.901_CR_Scenarios_in_Simulation_Assumptions	F	14.0.0	R1#89	R1-1709137	Fraunhofer HHI	FS_NR_newRAT
38.901	14	-	Rel-14	TR38.901_CR_TDL_Spatial_Filter	F	14.0.0	R1#89	R1-1709138	Fraunhofer HHI	FS_NR_newRAT
38.901	15	1	Rel-14	Correction of spatial-consistency UE mobility modelling Procedure A	F	14.0.0	R1#89	R1-1709330	ZTE, NTT DOCOMO, INC.	FS_NR_newRAT

Annex C-1: List of Outgoing LSs from RAN1 #89

TDoc #	Title	Source	Release	Related WIs	Reply to	To	Cc	Original LS	Reply in
R1-1709243	LS on UL HARQ processes and collision handling for short processing time with 1ms TTI	RAN1, Sharp	Rel-15	LTE_sTTIandPT-Core		RAN2			
R1-1709244	LS on the Power Splitting across Different TTI Lengths in UL	RAN1, Qualcomm	Rel-15	LTE_sTTIandPT-Core		RAN4			
R1-1709326	LS on the conclusions for the SI on a simplified HS-SCCH for UMTS	RAN1, Ericsson	Rel-15	FS_UTRA_simple_HSSCCH		RAN2	RAN3		
R1-1709334	Response LS on resource reselection for P2X UEs	RAN1, Nokia	Rel-14	LTE_V2X-Core	R2-1703942	RAN2			
R1-1709337	LS on RAR window definition in CE mode B	RAN1, Ericsson	Rel-13	LTE_MTCe2_L1-Core		RAN2			
R1-1709567	LS on enhanced scheduling for UMTS	RAN1, Huawei	Rel-15	FS_UTRA_CA_sched_enh		RAN2	RAN3		
R1-1709581	Response LS on CSI-RS for beam management and RRM measurements	RAN1, ZTE	Rel-15	NR_newRAT-Core	R2-1703974	RAN2			
R1-1709621	LS on Relay UE discovery for bandwidth limited Remote UEs	RAN1, Intel	Rel-15	FS_feD2D_IoT_relay_wearable		RAN2			
R1-1709705	Reply LS on in-sync/out-of-sync indication for RLF	RAN1, NTT DOCOMO	Rel-15	NR_newRAT-Core	R2-1703964	RAN2			
R1-1709716	Monitoring of partial NPDCCH search spaces	RAN1, Qualcomm	Rel-13	NB_IOT-Core		RAN2			
R1-1709755	LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746	RAN1, Intel	Rel-15	FS_feD2D_IoT_relay_wearable		RAN2	RAN4		
R1-1709780	LS on NB-IoT small cell	RAN1, Ericsson	Rel-15	NB_IOTenh2-Core		RAN4	RAN2		
R1-1709781	LS on narrowband measurement accuracy enhancement	RAN1, Huawei	Rel-15	"NB_IOTenh2-Core		RAN4			
R1-1709789	LS on NR-PBCH content	RAN1, Ericsson	Rel-15	"		RAN2			
R1-1709790	Reply LS on power sharing mechanism between LTE and NR	RAN1, NTT DOCOMO	Rel-15	NR_newRAT-Core	R4-1704216	RAN4	RAN2		
R1-1709805	LS on UL data transmission without UL grant for NR	RAN1, Huawei	Rel-15	NR_newRAT-Core		RAN2			
R1-1709809	Reply LS on the feasibility of DC-related mobility enhancements in NR	RAN1, Intel	Rel-15	NR_newRAT-Core	R2-1703971	RAN2	RAN4		
R1-1709826	LS on RAN1 agreements on CA	RAN1, Ericsson	Rel-15	NR_newRAT-Core		RAN2			
R1-1709834	LS on System acquisition time reduction for Rel-15 LTE MTC	RAN1, Ericsson	Rel-15	LTE_eV2X-Core		RAN2, RAN4			
R1-1709835	LS on early data transmission in MTC and NB-IoT in Rel-15	RAN1, Ericsson	Rel-15	LTE_eMTC4-Core		RAN2			
R1-1709836	LS related to SRS hopping	RAN1, Ericsson	Rel-15	LTE_eMTC4-Core, NB_IOTenh2-Core		RAN4			
R1-1709837	LS related to quasi co-location assumptions	RAN1, Nokia	Rel-15	NR_newRAT-Core		RAN4			
R1-1709842	LS response on NR minimum carrier bandwidth	RAN1, A&T, CMCC	Rel-15	NR_newRAT-Core	R4-1703100	RAN4			

TDoc #	Title	Source	Release	Related WIs	Reply to	To	Cc	Original LS	Reply in
R1-1709843	LS on the support of supplementary UL in NR	RAN1, CMCC	Rel-15	NR_newRAT-Core		RAN2, RAN4			
R1-1709850	LS response on SCS for NR	RAN1, Huawei	Rel-15	NR_newRAT-Core	R4-1704223	RAN4			
R1-1709854	Response to IEEE 802 LMSC regarding LAA	RAN1, Qualcomm	Rel-13	LTE_LAA-Core	IEEE EC-17-0065-00-00EC	IEEE 802 LAN/MAN Standards Committee, RAN			
R1-1709855	Response to IEEE LS to 3GPP RAN/RAN1/RAN4 related to PD and ED issues	RAN1, Qualcomm	Rel-13	LTE_LAA-Core	IEEE EC-17-0064-00-00EC	IEEE 802 LAN/MAN Standards Committee, RAN			
R1-1709862	LS on RAN1 agreements on key performance indicator, evaluation assumptions, and channel modelling	RAN1, Ericsson	Rel-15	FS_LTE_Aerial		RAN2			
R1-1709869	LS on RAN1 agreements on channel modelling	RAN1, Ericsson	Rel-15	FS_LTE_Aerial		RAN2			

Annex C-2: List of Incoming LSs from RAN1 #89

TDoc #	Title	Source	Release	Related WIs	Reply to	To	Cc	Original LS	Reply in
R1-1706866	LS on resource reselection for P2X UEs	RAN2, Qualcomm	Rel-14	LTE_V2X-Core		RAN1		R2-1703942	
R1-1706867	LS on QoS support of UE-to-Network Relay over LTE sidelink	RAN2, Huawei	Rel-15	FS_feD2D_IoT_relay_wearable		SA2	SA1, RAN1, RAN3	R2-1703945	
R1-1706868	LS on RAN2 agreements on HARQ	RAN2, Ericsson	Rel-15	NR_newRAT-Core		RAN1		R2-1703946	
R1-1706869	LS on Mixed numerologies in idle mode	RAN2, Ericsson	Rel-15	NR_newRAT-Core		RAN1		R2-1703962	
R1-1706870	LS to RAN1 on in-sync/out-of-sync indications for RLF	RAN2, MediaTek	Rel-15	NR_newRAT-Core		RAN1		R2-1703964	
R1-1706871	LS on the feasibility of DC-related mobility enhancements in NR	RAN2, Intel	Rel-15	NR_newRAT-Core		RAN1, RAN4		R2-1703971	
R1-1706872	LS Reply on NR minimum carrier bandwidth	RAN4, Qualcomm	Rel-15	NR_newRAT-Core	R1-1704100	RAN1		R4-1703100	
R1-1706873	LS on new UE power class for Rel-15 LTE eMTC4	RAN4, Ericsson	Rel-15	LTE_eMTC4		RAN2	RAN1	R4-1703377	
R1-1706874	Reply LS to RAN1 on possible RF impacts related to sPUSCH design	RAN4, Ericsson	Rel-15	LTE_sTTIandPT	R1-1613334	RAN1		R4-1704089	
R1-1706875	LS on measurement capability for R14 Cat-M1/M2 UE	RAN4, Intel	Rel-14	LTE_feMTC-Core		RAN2	RAN1	R4-1704163	
R1-1706876	LS on required NR parameters from RAN4 perspective	RAN4, NTT DOCOMO	Rel-15	NR_newRAT-Core		RAN1	RAN2	R4-1704216	
R1-1706877	LS on SCS for NR	RAN4, Huawei	Rel-15	NR_newRAT-Core		RAN1		R4-1704223	
R1-1706878	LS response on positioning for NB-IoT	RAN4, Ericsson	Rel-14	NB_IOTenh-Core	R2-1702323	RAN2	SA2, RAN1	R4-1704297	
R1-1706879	LS on eMTC UE behaviour in case of collision between TA update and re-tuning gap for frequency hopping	RAN4, Nokia	Rel-13	LTE_MTCe2_L1-Core		RAN1		R4-1704300	
R1-1706880	Reply LS on time and frequency tracking	RAN4, Ericsson	Rel-15	NR_newRAT-Core	R1-1704103	RAN1		R4-1704359	
R1-1709061	LS on CSI-RS for beam management and RRM measurements	RAN2, ZTE	Rel-15	NR_newRAT-Core		RAN1		R2-1703974	
R1-1709197	Reply LS on Data rates and Latency with NR, E-UTRA, EPS and 5GS	Vodafone	Rel-15	SMARTER	S2-172398	SA2	RAN1, RAN2, RAN3, CT1, CT4	S1-172409	
R1-1709652	RAN2 agreement on UAV requirements	RAN2, NTT DOCOMO	Rel-15	FS_LTE_Aerial		RAN1		R2-1706013	
R1-1709796	LS on SR design principles in NR	RAN2, Samsung	Rel-15	NR_newRAT-Core		RAN1		R2-1705867	

Annex D: List of Approved updated WIDs

None

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Annex E: List of draft TSs/TRs agreed at RAN1 #89

Tdoc Number	Title	Source	Conclusion/Decision
R1-1709570	TR 25.708 V1.0.0 Study on Scheduling Enhancements with Carrier Aggregation for UMTS	Huawei	Agreed for one step approval
R1-1709327	TR 25.cde V0.1.0 Study on a simplified HS-SCCH for UMTS	Ericsson	Endorsed – actually for one step approval once SID is up-to-date and TR number known
R1-1707082	Skeleton of TS38.212 Multiplexing and channel coding	Huawei	Endorsed in principle as basis for further discussion/refinements
R1-1708219	Skeleton of 38.211 Physical channels and modulation	Ericsson	Endorsed in principle as basis for further discussion/refinements
R1-1708435	Skeleton of TS38.201 Physical layer; General description	NTT DOCOMO, INC.	Endorsed in principle as basis for further discussion/refinements
R1-1708567	Skeleton of TS 38.202 Services provided by the physical layer	Qualcomm Incorporated	Endorsed in principle as basis for further discussion/refinements
R1-1709124	Skeleton of TS38.215 Physical layer measurement	Intel Corporation	Endorsed in principle as basis for further discussion/refinements

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Annex F: List of actions

- **Outgoing LS**

[89-12] Siva (Ericsson)
Done: LS informing and asking RAN2 to capture the endorsed TP (R1-1709859) in TR36.777 "Study on Enhanced LTE Support for Aerial Vehicles" is approved in R1-1709862.

[89-10] Siva (Ericsson)
Channel model for aerial vehicle
Email Discussion on Remaining details of channel modelling until June 8th (extended to June 22nd)
Done: According to email's conclusion posted on July 16th, the ageements on channel modelling for aerials are summarized in the approved LS to RAN2 in R1-1709869.

- **CR approval**

None

- **Text proposal for TS and TR**

[89-40] Gerardo (Ericsson)
R1-1709327 **TR 25.cde V0.0.2 Study on a simplified HS-SCCH for UMTS Ericsson**
For email approval until Thursday 25th May
Done: As per Mr Chair's decision posted on May 26th, draft version is endorsed. MCC shall provide a clean version for one step approval by the plenary.

[89-41] Jun (Huawei)
R1-1709568 **TR 25.708 V0.2.0 Study on Scheduling Enhancements with Carrier Aggregation for UMTS Huawei**
For email approval until Thursday 25th May
Done: As per Mr Chair's decision posted on May 26th, v0.2.0 of TR25.708 is agreed. MCC to produce v1.0.0 in R1-1709570 for one step approval by the plenary.

[89-12] Siva (Ericsson)
TP for aerial vehicle for email approval until June 1st
Done: TP for Key performance indicator, evaluation assumptions, and channel modelling is endorsed in R1-1709859.

- **Miscellaneous**

[89-01] Matthew (Huawei)
R1-1709672 **On uplink power control for Rel-13 NB-IoT Huawei**

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Email discussion until RAN #76 to discuss whether there is a problem requiring a specification solution, and if so, possible solutions
Done: As stated in RAN1 Chair's email posted on June 8th (also confirmed from RAN#76 discussion), there was no common understandings of the potential solution. Final conclusion is no consensus.

[89-02] Alberto (Qualcomm)
R1-1709563 **WF on interference randomization for NB-IoT Qualcomm, Huawei, HiSilicon, Ericsson**
Email discussion including both NPUSCH, NPDSCH, NPDCCH and NPRACH until RAN1#90
Done: Status to be checked at RAN#90.

[89-03] Editors
sTTI and processing time
Editors to prepare draft CRs including agreements/WAs until Fri. Aug. 11th.
Editors may update draft CRs for comments received until RAN1 #90 meeting.
Rapporteur to provide agreements and WA list by 1st June, and may be updated again after email discussions
Done: Agreements / working assumptions for the work on sTTI and shortened processings are summarized in R1-1709865.

[89-04] Kianoush (Qualcomm)
sPDCCH design for sTTI for email discussion until June 13th
Done: (Mr Chair's email dated June 14th) Prepare summary for presentation at RAN1#90 – Status to be checked

[89-05] Chengyan (Huawei)
Search space for sTTI operation for email discussion until June 16th
Done: (Mr Chair's email dated June 18th) Prepare summary for presentation at RAN1#90 – Status to be checked

[89-06] Karol (Nokia)
sPDCCH multiplexing with sPDSCH for sTTI for email discussion until June 22nd
Done: (Mr Chair's email dated June 23rd) Prepare summary for presentation at RAN1#90 – Status to be checked

[89-07] Yubo (Huawei)
FS2 aspects for sTTI for email discussion until Aug. 4th
Done: Status to be checked at RAN#90.

[89-08] Alexei (Intel)
CSI feedback enh. for NC-JT for FeCoMP for email discussion from July 28th to August 11th
Done: Status to be checked at RAN#90.

[89-09] Yubo (Huawei)
TR evaluation results for 1024QAM for email discussion until May 25th

Done: According to email's conclusion posted on May 27th, the following TP is agreed:
R1-1709857 Summary of evaluation on DL 1024 QAM Huawei, HiSilicon
R1-1709858 TP on Summary of evaluation for DL 1024 QAM Huawei, HiSilicon (revision of R1-1709411 TP on Summary of evaluation for DL 1024 QAM Huawei, HiSilicon, Qualcomm)

[89-11] Shinpei (DOCOMO)
Remaining issues on evaluation assumptions for aerial vehicle for email discussion until June 1st
Done: According to email's conclusion posted on June 2nd , the evaluation assumptions are agreed in R1-1709866.

[89-13] Sergey (Intel)
FeD2D evaluation results template for email discussion till May 29th
Done: According to email's conclusion posted on May 30th, the template is agreed in R1-1709867.

[89-14] Sergey (Intel)
FeD2D evaluation results collection – for email discussion from August 14th to August 18th 2017.
Done: Done: Status to be checked at RAN#90.

[89-15] Asbjorn (Ericsson)
NR-PBCH alternatives

- Down select from following alternatives based on further evaluation/analysis in the next meeting
  - Alt. 1: NR-PBCH coded bits are mapped across REs in N PBCH symbols, where N is the number of PBCH symbols in a NR-SS block
  - Alt. 2: NR-PBCH coded bits are mapped across REs in a PBCH symbol, the NR-PBCH symbol is copied to N-1 NR-PBCH symbol in a NR-SS block
  - Other Alternatives are not precluded
    - Note that all proponents need to provide their own proposal until May 26th
- All proponents need to provide followings until June 2nd to achieve further evaluation/analysis – Asbjorn (Ericsson)
  - NR-PBCH RE mapping
  - SS-block composition
  - SS-block time index indication
  - SFN indication
  - DMRS RE mapping
  - PBCH payload size
  - PBCH channel coding scheme (all proponents need to follow the latest agreements/WAs in channel coding session)
    - Note that all decisions of channel coding scheme should be done in channel coding session/agenda
  - Receiver algorithms

Done: (Mr Chair's email dated June 14th) Summary is submitted in R1-1709868. Status to be checked

[89-16] Jan (ZTE)

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NR-PRACH preamble format

Companies to provide tables of supported preamble formats with SCS/CP/GP and support cell ranges on the reflector by June 9th

Done: (Mr Chair's email dated June 10th) Prepare summary for presentation at RAN1#AH_NR2 – Status to be checked

[89-17] Rakesh (CATT)
NR CSI framework
Email discussion till next meeting on the following

- Maximum number of CSI reporting settings (N value), maximum number of resources settings (M value), maximum number of resource sets (S value), the number of links (L), and/or maximum number resources per resource set (Ks value) in both non-CA and CA scenarios

Done: Status to be checked at RAN1#AH_NR2.

[89-18] Fred (DOCOMO)
R1-1709848 Proposals on work plan for scheduling/HARQ aspects NTT DOCOMO
Email discussion until May 31st
Done: Work plan for scheduling/HARQ aspects revised and submitted in R1-1709863. As per Mr Chair's recommendation posted on June 1st , all proponents are invited to follow this work plan to finalize scheduling and HARQ aspects.

[89-19] Stefan (Ericsson)
UE-specific DCI fields for NR for email discussion until the next meeting (Focus on collecting agreed fields/information to be included in the DCI).
Done: Status to be checked at RAN1#AH_NR2.

[89-20] Tony (CATT)
Group-common PDCCH for NR for email discussion until the next meeting

- Left-over FFSs regarding SFI including:
  - FFS: 'Empty'
  - FFS: UE behavior when the UE receives the information for the symbol from SFI and broadcast DCI and/or UE-specific DCI and/or semi-static signaling/configuration
- Contents
  - What should be informed?
- Structure
  - CCE re-use or completely reuse PDCCH?
- Type
  - Depending on contents, different group-common PDCCH?
- UE behaviour
- Search space
  - Relation with common search space?

Done: Status to be checked at RAN1#AH_NR2.

[89-21] Sorour (Ericsson)
Long-PUCCH for NR

- Email discussion for collecting companies views on the following until the next meeting
  - Detailed long-PUCCH structure(s) for a given slot taking into account various number (4 – 14) of OFDM symbols and multiple PUCCH formats, and various number of UCI bits, especially regarding to:
    - DMRS location(s)
    - Frequency-hopping boundary(ies) in time-domain

Done: Status to be checked at RAN1#AH_NR2.

[89-22] Daesung (LGE)
UL data transmission without UL grant for NR for email discussion until June 9th
Done: (Mr Chair's email dated June 21st) Prepare summary for presentation at RAN1#AH_NR2 – Status to be checked

[89-23] Keeth (Nokia)
Work plan for NR channel coding
Keeth (Nokia) will provide work plan to the RAN1 reflector until 26th May of channel coding
Done: Work plan for NR channel coding submitted in R1-1709864. As per Mr Chair's recommendation posted on June 1st (confirmed on June 5th), all proponents are invited to follow this work plan to finalize channel coding aspects.

[89-24] Keeth (Nokia)
LDPC code base graph #1 for NR

- By constructive email discussion until Thursday 1st June – Keeth (Nokia), agree (from the set of candidates or a merged solution), for evaluation and down selection until June adhoc:
  - a single 46x68 base matrix,
  - the set of shift sizes

Done: Status to be checked at RAN1#AH_NR2.

[89-25] Keeth (Nokia)
LDPC code base graph #2 for NR

- By constructive email discussion until Monday 12th June – Keeth (Nokia), agree a single base matrix for Alt 1a and a single base matrix for Alt 2, for evaluation and downselection until June adhoc

Done: Status to be checked at RAN1#AH_NR2.

[89-26] Zukang (Huawei)
Polar code for NR for email discussion until Thursday 1st June to align calculation methods for latency and complexity with early termination..
Done: (Mr Chair's email dated June 2nd) Prepare summary for presentation at RAN1#AH_NR2 – Status to be checked

[89-27] Zukang (Huawei)
Polar code proposal for NR
Companies are requested to provide proposed schemes for evaluation by Thursday 8th June.
Done: (Mr Chair's email dated June 13th) Prepare summary for presentation at RAN1#AH_NR2 – Status to be checked

[89-28] Hanbyul (LGE)
eV2X evaluation methodology for email discussion until 21st August
Done: Status to be checked at RAN1#90.

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Annex G: List of participants at RAN1 #89

Please see excel file attached to this report

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Annex H: TSG RAN WG1 meetings in 2017 – 2018

TITLE	TYPE	DATES	LOCATION	CTRY
3GPPRAN1#90	WG	21 – 25 Aug 2017	Prague	Rep Czech
3GPPRAN1-NR	AH	18 – 21 Sep 2017	Nagoya	Japan
3GPPRAN1#90bis	WG	09 – 13 Oct 2017	Prague	Rep Czech
3GPPRAN1#91	WG	27 Nov – 01 Dec 2017	Reno	US
3GPPRAN1-AH-1801	AH	22 – 26 Jan 2018	TBD	
3GPPRAN1#92	WG	26 Feb – 2 Mar 2018	Athens	Greece
3GPPRAN1#92bis	WG	16 – 20 Apr 2018	TBD	China
3GPPRAN1#93	WG	21 – 25 May 2018	TBD	Korea
3GPPRAN1#94	WG	20 – 24 Aug 2018	Gothenburg	Sweden
3GPPRAN1#94bis	WG	8 – 12 Oct 2018	TBD	China
3GPPRAN1#95	WG	12 – 16 Nov 2018	TBD	US

MEETING TYPES		
AH = Ad Hoc	ST = Startup Meeting	RG = Rapporteurs Group
JM = Joint	WG = Working Group	SG = Steering Group
PM = Preparatory Meeting	CM = Chairmen's meeting	TG = Task Group
RM = Resolution Meeting	OR = Ordinary	XO = Extraordinary

End of document

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APPENDIX C

TDoc	Title	Source	Contact	Contact ID	Type	For	Abstract	Secretary Remarks	Agenda item sort order	Agenda item	Agenda item description
R1-1706865	Draft Agenda of RAN1#89 meeting	RAN1 Chair	Patrick Merias	52292	agenda				2	2	Approval of Agenda
R1-1706866	LS on resource reselection for P2X UEs	RAN2, Qualcomm	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706867	LS on QoS support of UE-to-Network Relay over LTE sidelink	RAN2, Huawei	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706868	LS on RAN2 agreements on HARQ	RAN2, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706869	LS on Mixed numerologies in idle mode	RAN2, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706870	LS to RAN1 on in-sync/out-of-sync indications for RLF	RAN2, MediaTek	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706871	LS on the feasibility of DC-related mobility enhancements in NR	RAN2, Intel	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706872	LS Reply on NR minimum carrier bandwidth	RAN4, Qualcomm	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706873	LS on new UE power class for Rel-15 LTE_eMTC4	RAN4, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706874	Reply LS to RAN1 on possible RF impacts related to sPUSCH design	RAN4, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706875	LS on measurement capability for R14 Cat-M1/M2 UE	RAN4, Intel	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706876	LS on required NR parameters from RAN4 perspective	RAN4, NTT DOCOMO	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706877	LS on SCS for NR	RAN4, Huawei	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706878	LS response on positioning for NB-IoT	RAN4, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706879	LS on eMTC UE behaviour in case of collision between TA update and re-tuning gap for frequency	RAN4, Nokia	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706880	Reply LS on time and frequency tracking	RAN4, Ericsson	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1706881	Reduced system acquisition time for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1706882	Downlink channel power efficiency for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1706883	Uplink HARQ-ACK feedback for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1706884	Increased PDSCH spectral efficiency for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			96	6.2.6.4	Increased PDSCH spectral efficiency
R1-1706885	Increased PUSCH spectral efficiency for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1706886	Early data transmission for MTC	Ericsson	Johan Bergman	51222	discussion	Decision			98	6.2.6.6	Other
R1-1706887	Power consumption reduction for paging and connected-mode DRX for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1706888	Physical layer scheduling request for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1706889	Semi-persistent scheduling for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			103	6.2.7.1.3	Semi-persistent scheduling
R1-1706890	Narrowband measurement accuracy improvements for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1706891	NPRACH false alarm reduction for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1706892	NPRACH range enhancement for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1706893	NB-IoT small cell support	Ericsson	Johan Bergman	51222	discussion	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1706894	Reduced system acquisition time for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1706895	Early data transmission for NB-IoT	Ericsson	Johan Bergman	51222	discussion	Decision			108	6.2.7.6	Other
R1-1706896	Enhanced Scheduling Request Transmission for NR	Idaho National Laboratory	Ramon Khalona	19055	other	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1706897	Updated simulation results on ECP	Huawei, HiSilicon	Brian Classon	45750	other				221	7.1.11	Other
R1-1706898	Discussion on NR design for ECP	Huawei, HiSilicon	Brian Classon	45750	other				221	7.1.11	Other
R1-1706899	Numerology for DL control channel	Huawei, HiSilicon	Brian Classon	45750	other				182	7.1.3.1.6	Other
R1-1706900	On bandwidth part and bandwidth adaptation	Huawei, HiSilicon	Brian Classon	45750	other				217	7.1.7	Wider bandwidth operations
R1-1706901	TB mapping for slot aggregation	Huawei, HiSilicon	Brian Classon	45750	other				190	7.1.3.3.1	DL data scheduling
R1-1706902	On decoupling DL and UL for CA/DC	Huawei, HiSilicon	Brian Classon	45750	other				197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1706903	On NR carrier aggregation	Huawei, HiSilicon	Brian Classon	45750	other				197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1706904	Power control for CA and DC	Huawei, HiSilicon	Brian Classon	45750	other				219	7.1.9	UL power control
R1-1706905	Overview of NR UL for LTE-NR coexistence	Huawei, HiSilicon	Brian Classon	45750	other				218	7.1.8	NR-LTE co-existence
R1-1706906	Consideration on subcarrier mapping for LTE-NR coexistence	Huawei, HiSilicon	Brian Classon	45750	other				218	7.1.8	NR-LTE co-existence
R1-1706907	Summary of [88b-15] email discussion on LTE-NR coexistence	Huawei, HiSilicon	Brian Classon	45750	other				218	7.1.8	NR-LTE co-existence
R1-1706908	On NR dual connectivity	Huawei, HiSilicon	Brian Classon	45750	other				197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1706909	On uplink data scheduling	Huawei, HiSilicon	Brian Classon	45750	other				191	7.1.3.3.2	UL data scheduling
R1-1706910	TRP-to-TRP measurement for cross-link interference mitigation	Huawei, HiSilicon	Brian Classon	45750	other				215	7.1.6.1	Cross-link interference management

R1-1706911	UE-to-UE measurement for cross-link interference mitigation	Huawei, HiSilicon	Brian Classon	45750	other				215	7.1.6.1	Cross-link interference management
R1-1706912	UL Power control for cross-link interference mitigation	Huawei, HiSilicon	Brian Classon	45750	other				216	7.1.6.2	Other
R1-1706913	Dynamic and semi-static DL/UL resource partition	Huawei, HiSilicon	Brian Classon	45750	other				216	7.1.6.2	Other
R1-1706914	Numerology for multiplexing of eMBB and URLLC	Huawei, HiSilicon	Brian Classon	45750	other				196	7.1.3.3.7	Other
R1-1706915	Consideration on subsequent transmission/retransmission after pre-emption	Huawei, HiSilicon	Brian Classon	45750	other				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1706916	DCI design for URLLC	Huawei, HiSilicon	Brian Classon	45750	other				180	7.1.3.1.4	DCI contents
R1-1706917	Data transmission for DL URLLC	Huawei, HiSilicon	Brian Classon	45750	other				190	7.1.3.3.1	DL data scheduling
R1-1706918	Discussion on UL multiplexing of grant-based eMBB and grant-free URLLC	Huawei, HiSilicon	Brian Classon	45750	other				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1706919	Grant-free transmission for UL URLLC	Huawei, HiSilicon	Brian Classon	45750	other				191	7.1.3.3.2	UL data scheduling
R1-1706920	HARQ feedback indication design for UL grant-free transmission	Huawei, HiSilicon	Brian Classon	45750	other				181	7.1.3.1.5	Group-common PDCCH
R1-1706921	Discussion on PUCCH for URLLC	Huawei, HiSilicon	Brian Classon	45750	other				186	7.1.3.2.3	Resource allocation for PUCCH
R1-1706922	Draft LS response on SCS for NR	Huawei, HiSilicon	Brian Classon	45750	LS out	Decision			4	4	Incoming Liaison Statements
R1-1706923	Non codebook based transmission for UL MIMO	Huawei, HiSilicon	Brian Classon	45750	other				150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1706924	Discussion on transmission parameter sets	Huawei, HiSilicon	Brian Classon	45750	other				154	7.1.2.1.8	Other
R1-1706925	UL beam management	Huawei, HiSilicon	Brian Classon	45750	other				156	7.1.2.2.1	Beam management details
R1-1706926	Discussion on CSI Framework Design	Huawei, HiSilicon	Brian Classon	45750	other				160	7.1.2.3.1	CSI framework
R1-1706927	Channel and interference measurement for CSI acquisition	Huawei, HiSilicon	Brian Classon	45750	other				161	7.1.2.3.2	Details of CSI acquisition
R1-1706928	Beam management across multiple carriers	Huawei, HiSilicon	Brian Classon	45750	other				158	7.1.2.2.3	Other
R1-1706929	Considerations on timing advance design in NR	Huawei, HiSilicon	Brian Classon	45750	other				174	7.1.2.5	Other
R1-1706930	Detailed considerations on UL power control design for NR	Huawei, HiSilicon	Brian Classon	45750	other				219	7.1.9	UL power control
R1-1706931	CSI-RS design for beam management	Huawei, HiSilicon	Brian Classon	45750	other				167	7.1.2.4.1	CSI-RS
R1-1706932	CSI-RS design for CSI acquisition	Huawei, HiSilicon	Brian Classon	45750	other				167	7.1.2.4.1	CSI-RS
R1-1706933	Design of DL DMRS for data transmission	Huawei, HiSilicon	Brian Classon	45750	other				168	7.1.2.4.2	DMRS
R1-1706934	Evaluation results of DMRS design for DL data	Huawei, HiSilicon	Brian Classon	45750	other				168	7.1.2.4.2	DMRS
R1-1706935	UL DMRS design for data transmission	Huawei, HiSilicon	Brian Classon	45750	other				168	7.1.2.4.2	DMRS
R1-1706936	Evaluation results of DMRS design for UL data	Huawei, HiSilicon	Brian Classon	45750	other				168	7.1.2.4.2	DMRS
R1-1706937	PTRS for CP-OFDM	Huawei, HiSilicon	Brian Classon	45750	other				169	7.1.2.4.3	PT-RS
R1-1706938	UL SRS design for beam management, CSI acquisition	Huawei, HiSilicon	Brian Classon	45750	other				170	7.1.2.4.4	SRS
R1-1706939	Reference signal for fine time and frequency tracking	Huawei, HiSilicon	Brian Classon	45750	other				172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1706940	Details of QCL assumptions and related RS design considerations	Huawei, HiSilicon	Brian Classon	45750	other				171	7.1.2.4.5	QCL
R1-1706941	Transmit diversity for DL control channel	Huawei, HiSilicon	Brian Classon	45750	other				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1706942	DMRS for DL control channel	Huawei, HiSilicon	Brian Classon	45750	other				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1706943	Configuration of control resourrce set	Huawei, HiSilicon	Brian Classon	45750	other				178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1706944	Search space design	Huawei, HiSilicon	Brian Classon	45750	other				178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1706945	Nested search space structure	Huawei, HiSilicon	Brian Classon	45750	other				178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1706946	CCE-to-REG mapping	Huawei, HiSilicon	Brian Classon	45750	other				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1706947	PDCCH-to-CCE mapping	Huawei, HiSilicon	Brian Classon	45750	other				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1706948	Resource multiplexing of downlink control and data	Huawei, HiSilicon	Brian Classon	45750	other				179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1706949	DCI contents in NR and two-stage DCI designs	Huawei, HiSilicon	Brian Classon	45750	other				180	7.1.3.1.4	DCI contents
R1-1706950	Structure of 1-symbol PUCCH for up to 2 bits	Huawei, HiSilicon	Brian Classon	45750	other				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1706951	Structure of 1-symbol PUCCH for more than 2 bits	Huawei, HiSilicon	Brian Classon	45750	other				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1706952	Structure of 2-symbol PUCCH	Huawei, HiSilicon	Brian Classon	45750	other				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1706953	Long duration PUCCH structure	Huawei, HiSilicon	Brian Classon	45750	other				185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1706954	Long duration PUCCH formats	Huawei, HiSilicon	Brian Classon	45750	other				185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1706955	Evaluation of long duration PUCCH structure	Huawei, HiSilicon	Brian Classon	45750	other				185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1706956	Transmit diversity for long duration PUCCH	Huawei, HiSilicon	Brian Classon	45750	other				185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1706957	Multiplexing of PUCCH and PUSCH	Huawei, HiSilicon	Brian Classon	45750	other				187	7.1.3.2.4	UCI multiplexing
R1-1706958	On transmission of UCI on PUSCH	Huawei, HiSilicon	Brian Classon	45750	other				187	7.1.3.2.4	UCI multiplexing
R1-1706959	Multiplexing of UL control channel and SRS in NR	Huawei, HiSilicon	Brian Classon	45750	other				187	7.1.3.2.4	UCI multiplexing
R1-1706960	PUCCH resource allocation for HARQ-ACK and SR	Huawei, HiSilicon	Brian Classon	45750	other				186	7.1.3.2.3	Resource allocation for PUCCH

R1-1706961	HARQ feedback timing for NR	Huawei, HiSilicon	Brian Classon	45750	other				192	7.1.3.3.3	HARQ-ACK feedback
R1-1706962	Scheduling mechanisms for CBG-based re-transmission	Huawei, HiSilicon	Brian Classon	45750	other				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1706963	Discussion on CBG construction	Huawei, HiSilicon	Brian Classon	45750	other				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1706964	Discussion on CBG-based feedback	Huawei, HiSilicon	Brian Classon	45750	other				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1706965	Polar code design	Huawei, HiSilicon	Brian Classon	45750	other				208	7.1.4.2.1.1	Code construction
R1-1706966	Sequence design for polar codes	Huawei, HiSilicon	Brian Classon	45750	other				209	7.1.4.2.1.2	Sequence design
R1-1706967	Rate matching for polar codes	Huawei, HiSilicon	Brian Classon	45750	other				209	7.1.4.2.1.2	Sequence design
R1-1706968	Channel coding chain for control channel	Huawei, HiSilicon	Brian Classon	45750	other				212	7.1.4.4	Other
R1-1706969	Channel coding for PBCH	Huawei, HiSilicon	Brian Classon	45750	other				211	7.1.4.3	PBCH
R1-1706970	LDPC design for eMBB data	Huawei, HiSilicon	Brian Classon	45750	other				205	7.1.4.1.2	LDPC code design
R1-1706971	Performance evaluation of LDPC codes	Huawei, HiSilicon	Brian Classon	45750	other				205	7.1.4.1.2	LDPC code design
R1-1706972	Throughput of LDPC codes	Huawei, HiSilicon	Brian Classon	45750	other				205	7.1.4.1.2	LDPC code design
R1-1706973	Rate matching for LDPC codes	Huawei, HiSilicon	Brian Classon	45750	other				203	7.1.4.1.1.3	Rate matching
R1-1706974	Discussion and evaluation on NR-SS periodicity	Huawei, HiSilicon	Brian Classon	45750	other				143	7.1.1.5.3	Radio link monitoring
R1-1706975	Multi-beam Paging for NR	Huawei, HiSilicon	Brian Classon	45750	other				136	7.1.1.3	Paging design
R1-1706976	RACH procedures and resource configuration	Huawei, HiSilicon	Brian Classon	45750	other				139	7.1.1.4.2	4-step RA procedure
R1-1706977	Minimum UE bandwidth in NR	Huawei, HiSilicon	Brian Classon	45750	other				144	7.1.1.6	Other
R1-1706978	On numerology determination during initial access	Huawei, HiSilicon	Brian Classon	45750	other				144	7.1.1.6	Other
R1-1706979	Discussion on phase3 system-level calibration for NR-MIMO	Huawei, HiSilicon	Brian Classon	45750	other				174	7.1.2.5	Other
R1-1706980	Higher layer implications of NC-JT transmission from multiple TRPs	Huawei, HiSilicon	Brian Classon	45750	other				174	7.1.2.5	Other
R1-1706981	On HARQ-ACK bundling in NR	Huawei, HiSilicon	Brian Classon	45750	other				192	7.1.3.3.3	HARQ-ACK feedback
R1-1706982	Asynchronous UL HARQ	Huawei, HiSilicon	Brian Classon	45750	other				33	6.2.1.1.4	Asynchronous UL HARQ
R1-1706983	CSI feedback for short TTI	Huawei, HiSilicon	Brian Classon	45750	other				51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1706984	sTTI combinations in CA scenarios	Huawei, HiSilicon	Brian Classon	45750	other				38	6.2.1.2.1.1	sTTI configurations
R1-1706985	On UL DMRS indication for 2/3-symbol sPUSCH	Huawei, HiSilicon	Brian Classon	45750	other				39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1706986	HARQ processes handling to support dynamic switching between 1ms TTI and sTTI	Huawei, HiSilicon	Brian Classon	45750	other				40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1706987	Handling collisions of sTTI/TTI in UL	Huawei, HiSilicon	Brian Classon	45750	other				41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1706988	sTTI scheduling	Huawei, HiSilicon	Brian Classon	45750	other				43	6.2.1.2.2.1	sTTI scheduling
R1-1706989	sPDCCH design	Huawei, HiSilicon	Brian Classon	45750	other				44	6.2.1.2.2.2	sPDCCH design
R1-1706990	sPDCCH multiplexing with data	Huawei, HiSilicon	Brian Classon	45750	other				46	6.2.1.2.2.4	sPDCCH multiplexing with data
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R1-1706994	sPDSCH design	Huawei, HiSilicon	Brian Classon	45750	other				54	6.2.1.2.4.1	sPDSCH design
R1-1706995	DL DMRS design for short TTI	Huawei, HiSilicon	Brian Classon	45750	other				55	6.2.1.2.4.2	DL DMRS design
R1-1706996	sPUSCH design	Huawei, HiSilicon	Brian Classon	45750	other				57	6.2.1.2.5.1	sPUSCH design
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R1-1707016	Potential enhancements for drones	Huawei, HiSilicon	Brian Classon	45750	other				112	6.2.8.3	Potential enhancements for drones
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R1-1707024	Further consideration on narrowband measurement accuracy improvement	Huawei, HiSilicon	Brian Classon	45750	other				104	6.2.7.2	Narrowband measurement accuracy improvements
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R1-1707037	Consideration on Narrow Band feD2D communication	Huawei, HiSilicon	Brian Classon	45750	other				124	6.2.9.3	Other
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R1-1707045	NR-PBCH design	ZTE	Yifei Yuan	58525	discussion				134	7.1.1.2.1	NR-PBCH
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R1-1707052	Radio link monitoring in NR	ZTE	Yifei Yuan	58525	discussion				143	7.1.1.5.3	Radio link monitoring
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R1-1707055	On design of PC-CA polar codes	NEC Corporation	Prakash Chaki	70856	discussion				208	7.1.4.2.1.1	Code construction
R1-1707056	On RACH retransmission	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1707057	UL transmission power control	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				219	7.1.9	UL power control
R1-1707058	Evaluation of rate-matching schemes for polar codes	NEC Corporation	Prakash Chaki	70856	discussion				208	7.1.4.2.1.1	Code construction
R1-1707059	Evaluation of sequence design for polar codes	NEC Corporation	Prakash Chaki	70856	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707060	Design of assistance bit aided polar codes for NR control channel	NEC Corporation	Prakash Chaki	70856	discussion				208	7.1.4.2.1.1	Code construction
R1-1707061	Miscellaneous corrections to 36.213	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink

R1-1707062	Corrections on UL LBT in 36.213	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision			21	6.1.2	Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum
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R1-1707064	Study of Number of CRC Bits for Code Blocks	Ericsson	Yufei Blankenship	59257	discussion				201	7.1.4.1.1.1	CRC attachment
R1-1707065	Code Block Segmentation	Ericsson	Yufei Blankenship	59257	discussion				202	7.1.4.1.1.2	Segmentation
R1-1707066	LDPC Code Performance at High Code Rate	Ericsson	Yufei Blankenship	59257	discussion				203	7.1.4.1.1.3	Rate matching
R1-1707067	Bit Ordering for Circular Buffer of LDPC Codes	Ericsson	Yufei Blankenship	59257	discussion				203	7.1.4.1.1.3	Rate matching
R1-1707068	Rate Matching for NR LDPC codes	Ericsson	Yufei Blankenship	59257	discussion				203	7.1.4.1.1.3	Rate matching
R1-1707069	Throughput Requirements of LDPC Decoder	Ericsson	Yufei Blankenship	59257	discussion				204	7.1.4.1.1.4	Other
R1-1707070	LDPC Code Design	Ericsson	Yufei Blankenship	59257	discussion				205	7.1.4.1.2	LDPC code design
R1-1707071	Polar Code Construction	Ericsson	Yufei Blankenship	59257	discussion				208	7.1.4.2.1.1	Code construction
R1-1707072	Early Termination of Polar Codes in Downlink	Ericsson	Yufei Blankenship	59257	discussion				208	7.1.4.2.1.1	Code construction
R1-1707073	Impact of Information Bit Locations to Polar Codes with High Order Modulations	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707074	On the Design of Polar Codes	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707075	Rate Matching Schemes for Polar Codes	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707076	Performance Comparison of Rate Matching Schemes for Polar Codes	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707077	Puncturing and Repetition of Polar Codes	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707078	Impact of Puncturing on Bit-channel Capacities	Ericsson	Yufei Blankenship	59257	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707079	Study of Number of CRC Bits for PBCH	Ericsson	Yufei Blankenship	59257	discussion				211	7.1.4.3	PBCH
R1-1707080	Coding Techniques for NR-PBCH	Ericsson	Yufei Blankenship	59257	discussion				211	7.1.4.3	PBCH
R1-1707081	Correction on spatial consistent procedure model A in TR 38.901	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision		Superseded by R1-1709330	220	7.1.10	Channel model
R1-1707082	Skeleton of TS38.212 Multiplexing and channel coding	Huawei	Yuan Xia	41032	draft TS	Endorsement		draft TS	127	7.1	New Radio Access Technology - WID in RP-170855
R1-1707083	Further Evaluation and Discussion on Codeword to Layer Mapping	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			147	7.1.2.1.1	Codeword mapping
R1-1707084	Further Evaluation and Discussion on PRB Bundling Size	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1707085	Discussion on DL Beam Management	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707086	Discussion on CSI Framework and Aperiodic CSI-RS Resources and Reports Activation	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			160	7.1.2.3.1	CSI framework
R1-1707087	Further evalution on DMRS Design Details	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1707088	Evaluation and Discussion on DL Phase Tracking RS Design	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1707089	NR MIMO System Level Phase 3 Calibration Results	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			174	7.1.2.5	Other
R1-1707090	Discussion on system acquisition time reduction for MTC	ZTE	Shupeng Li	58860	discussion	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1707091	Detailed design on UL HARQ-ACK feedback enhancement for MTC	ZTE	Shupeng Li	58860	discussion	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1707092	Details on support of 64QAM for unicast PDSCH for MTC	ZTE	Shupeng Li	58860	discussion	Decision			96	6.2.6.4	Increased PDSCH spectral efficiency
R1-1707093	Discussion on increased PUSCH spectral efficiency for MTC	ZTE	Shupeng Li	58860	discussion	Decision			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1707094	Physical layer scheduling request design for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1707095	Consideration on system acquisition time reduction for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1707096	On early data transmission for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			108	6.2.7.6	Other
R1-1707097	On early data transmission for eMTC	ZTE	Shupeng Li	58860	discussion	Decision			98	6.2.6.6	Other
R1-1707098	Narrowband Measurement accuracy improvement for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1707099	On small cell support for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1707100	Discussion on CRS muting for MTC	ZTE	Shupeng Li	58860	discussion	Decision			98	6.2.6.6	Other
R1-1707101	Power consumption reduction for physical channels for MTC	ZTE	Shupeng Li	58860	discussion	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1707102	Power consumption reduction for physical channels for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1707103	NPRACH reliability enhancement for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1707104	NPRACH range enhancements for NB-IoT	ZTE	Shupeng Li	58860	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1707105	summary of email discussion for NPRACH reliability simulation assumptions	ZTE	Shupeng Li	58860	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1707106	Discussion on resource pool sharing between Mode 3 and Mode 4	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			72	6.2.3.1.3	Other

R1-1707107	Discussion on latency reduction of resource selection	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			72	6.2.3.1.3	Other
R1-1707108	Discussion on Short TTI in V2X Phase 2	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			79	6.2.3.3.2	Short TTI solutions
R1-1707109	Reduced system acquisition time for FeNB-IoT	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1707110	Discussion on Short TTI in V2X Phase 2	Beijing Xinwei Telecom Techn.	Peng Sun	62183	discussion	Decision			79	6.2.3.3.2	Short TTI solutions
R1-1707111	Codeword to layer mapping and interleaving	ZTE	Ruyue Yu-Ngok Li	43128	discussion				147	7.1.2.1.1	Codeword mapping
R1-1707112	Diversity based downlink transmission schemes	ZTE	Ruyue Yu-Ngok Li	43128	discussion				148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1707113	Codebook based UL transmission	ZTE	Ruyue Yu-Ngok Li	43128	discussion				149	7.1.2.1.3	Codebook based transmission for UL
R1-1707114	Non-Codebook based and Hybrid based UL transmission	ZTE	Ruyue Yu-Ngok Li	43128	discussion				150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1707115	Diversity based uplink transmission schemes	ZTE	Ruyue Yu-Ngok Li	43128	discussion				151	7.1.2.1.5	Diversity transmission for UL
R1-1707116	On PRB Bundling	ZTE	Ruyue Yu-Ngok Li	43128	discussion				152	7.1.2.1.6	PRB bundling for DL
R1-1707117	Multi-TRP Transmission and interference coordination	ZTE	Ruyue Yu-Ngok Li	43128	discussion				153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1707118	On Transmission Setting	ZTE	Ruyue Yu-Ngok Li	43128	discussion				154	7.1.2.1.8	Other
R1-1707119	DL beam management for NR MIMO	ZTE	Ruyue Yu-Ngok Li	43128	discussion				156	7.1.2.2.1	Beam management details
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R1-1707123	On CSI framework details	ZTE	Ruyue Yu-Ngok Li	43128	discussion				160	7.1.2.3.1	CSI framework
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R1-1707126	On Type I CSI feedback details	ZTE	Ruyue Yu-Ngok Li	43128	discussion				163	7.1.2.3.4	CSI feedback Type I
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R1-1707130	Discussion on downlink DMRS design	ZTE	Ruyue Yu-Ngok Li	43128	discussion				168	7.1.2.4.2	DMRS
R1-1707131	Discussion on uplink DMRS design	ZTE	Ruyue Yu-Ngok Li	43128	discussion				168	7.1.2.4.2	DMRS
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R1-1707137	UL MIMO power control	ZTE	Ruyue Yu-Ngok Li	43128	discussion				219	7.1.9	UL power control
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R1-1707438	sPUCCH power control	CATT	Teng Ma	67340	discussion	Decision			52	6.2.1.2.3.5	sPUCCH power control
R1-1707439	Discussion on DMRS design for DL sTTI	CATT	Teng Ma	67340	discussion	Decision			55	6.2.1.2.4.2	DL DMRS design
R1-1707440	Discussion on DMRS design for UL sTTI	CATT	Teng Ma	67340	discussion	Decision			58	6.2.1.2.5.2	UL DMRS design
R1-1707441	sPUSCH power control	CATT	Teng Ma	67340	discussion	Decision			59	6.2.1.2.5.3	sPUSCH power control
R1-1707442	sTTI partition for TDD special subframe	CATT	Teng Ma	67340	discussion	Decision			60	6.2.1.2.6	FS2 aspects
R1-1707443	Discussion on the simultaneous transmissions of (s)PUCCH and (s)PUSCH	CATT	Teng Ma	67340	discussion	Decision			61	6.2.1.2.7	Other
R1-1707444	UCI transmission on sPUCCH	CATT	Teng Ma	67340	discussion	Decision			61	6.2.1.2.7	Other
R1-1707445	UCI combination on sPUCCH	CATT	Teng Ma	67340	discussion	Decision			61	6.2.1.2.7	Other
R1-1707446	HARQ and scheduling timing design for LTE sTTI	CATT	Teng Ma	67340	discussion	Decision			62	6.2.1.3	Maximum TA and processing time
R1-1707447	Discussion on carrier aggregation in V2X Phase 2	CATT	Teng Ma	67340	discussion	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1707448	Discussion on 64QAM modulation scheme in V2X Phase 2	CATT	Teng Ma	67340	discussion	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1707449	Discussion on time reduction between packet arrival and transmission in V2X Phase 2	CATT	Teng Ma	67340	discussion	Decision			72	6.2.3.1.3	Other
R1-1707450	Discussion on resource pool sharing between mode 3 and mode 4	CATT	Teng Ma	67340	discussion	Decision			72	6.2.3.1.3	Other
R1-1707451	Discussion on Tx diversity scheme in PC5	CATT	Teng Ma	67340	discussion	Decision			74	6.2.3.2.1	Transmit diversity solutions
R1-1707452	Initial evaluation for Tx diversity schemes in PC5	CATT	Teng Ma	67340	discussion	Decision			75	6.2.3.2.2	Initial evaluations
R1-1707453	Discussion on shorten TTI in PC5	CATT	Teng Ma	67340	discussion	Decision			79	6.2.3.3.2	Short TTI solutions
R1-1707454	Initial evaluation for shorten TTI in PC5	CATT	Teng Ma	67340	discussion	Decision			80	6.2.3.3.3	Initial evaluations
R1-1707455	UE wakeup mechanism and on-demand access for efeMTC UE power saving	CATT	Teng Ma	67340	discussion	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1707456	UE wakeup mechanism and on-demand access for fNB-IoT UE power saving	CATT	Teng Ma	67340	discussion	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1707457	NR-PSS and NR-SSS Sequence Design	CATT	Teng Ma	67340	discussion	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
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R1-1707516	Multiplexing of different DL data transmission durations	CATT	Teng Ma	67340	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations

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R1-1707533	Discussion on configuration for shortened processing time in 1ms TTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			30	6.2.1.1.1	Configuration of shortened processing time for 1ms TTI
R1-1707534	Collision handling between different processing times in 1ms TTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1707535	Remaining details on shortened processing time for FS2 in 1ms TTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			32	6.2.1.1.3	FS2 aspects
R1-1707536	Discussion on UL HARQ for shortened processing time in 1ms TTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			33	6.2.1.1.4	Asynchronous UL HARQ
R1-1707537	Remaining issues on CSI feedback for shortened processing time	LG Electronics	Youngwoo Yun	45048	discussion	Decision			34	6.2.1.1.5	CSI feedback
R1-1707538	Discussion on sTTI length configuration	LG Electronics	Youngwoo Yun	45048	discussion	Decision			38	6.2.1.2.1.1	sTTI configurations
R1-1707539	Discussion on flexible DMRS for sPUSCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1707540	Dynamic switching between 1ms TTI and sTTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
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R1-1707542	Discussion on sTTI scheduling	LG Electronics	Youngwoo Yun	45048	discussion	Decision			43	6.2.1.2.2.1	sTTI scheduling
R1-1707543	Design aspects on sPDCCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			44	6.2.1.2.2.2	sPDCCH design
R1-1707544	Discussion on search space for sTTI operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			45	6.2.1.2.2.3	Search space for sTTI operation
R1-1707545	Discussion on sPDCCH multiplexing with data	LG Electronics	Youngwoo Yun	45048	discussion	Decision			46	6.2.1.2.2.4	sPDCCH multiplexing with data
R1-1707546	Further discussion on sPUCCH design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1707547	Further discussion on sPUCCH resource	LG Electronics	Youngwoo Yun	45048	discussion	Decision			49	6.2.1.2.3.2	sPUCCH resource management
R1-1707548	Discussion on UCI transmission on sPUSCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			50	6.2.1.2.3.3	UCI on sPUSCH
R1-1707549	Discussion on sTTI based CSI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1707550	Discussion on sPUCCH power control	LG Electronics	Youngwoo Yun	45048	discussion	Decision			52	6.2.1.2.3.5	sPUCCH power control
R1-1707551	Design aspects on sPDSCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			54	6.2.1.2.4.1	sPDSCH design
R1-1707552	Discussion on DL DMRS for sTTI	LG Electronics	Youngwoo Yun	45048	discussion	Decision			55	6.2.1.2.4.2	DL DMRS design
R1-1707553	Discussion on sPUSCH power control	LG Electronics	Youngwoo Yun	45048	discussion	Decision			59	6.2.1.2.5.3	sPUSCH power control
R1-1707554	Discussion on FS2 aspects for sTTI operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			60	6.2.1.2.6	FS2 aspects
R1-1707555	Discussion on maximum TA and processing time	LG Electronics	Youngwoo Yun	45048	discussion	Decision			62	6.2.1.3	Maximum TA and processing time
R1-1707556	Discussion on multiple starting positions for LAA DL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1707557	Discussion on multiple starting and ending positions for LAA UL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1707558	Discussion on carrier aggregation in PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1707559	Discussion on 64QAM support in PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1707560	Discussion on maximum time reduction between packet arrival and selected transmission resource	LG Electronics	Youngwoo Yun	45048	discussion	Decision			72	6.2.3.1.3	Other
R1-1707561	Discussion on resource pool sharing between UEs using mode 3 and 4	LG Electronics	Youngwoo Yun	45048	discussion	Decision			72	6.2.3.1.3	Other
R1-1707562	Discussion on the transmit diversity scheme for the PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			74	6.2.3.2.1	Transmit diversity solutions
R1-1707563	Initial evaluation results for TxD schemes in the PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			75	6.2.3.2.2	Initial evaluations
R1-1707564	Discussion on remaining details of short TTI evaluation methodology	LG Electronics	Youngwoo Yun	45048	discussion	Decision			78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1707565	Discussion on handling Short TTI in PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			79	6.2.3.3.2	Short TTI solutions
R1-1707566	Initial evaluation results for Short TTI in PC5 operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			80	6.2.3.3.3	Initial evaluations

R1-1707567	System information acquisition time enhancement in MTC	LG Electronics	Youngwoo Yun	45048	discussion	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1707568	UE power consumption reduction by new physical signal/channel in MTC	LG Electronics	Youngwoo Yun	45048	discussion	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1707569	Discussion on early termination of uplink repetitions for MTC	LG Electronics	Youngwoo Yun	45048	discussion	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1707570	Data transmission during random access procedure in MTC	LG Electronics	Youngwoo Yun	45048	discussion	Decision			98	6.2.6.6	Other
R1-1707571	UE power consumption reduction by new physical signal/channel in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1707572	Scheduling request by dedicated physical channel in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1707573	SPS support in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			103	6.2.7.1.3	Semi-persistent scheduling
R1-1707574	RRM measurement enhancement in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1707575	NPRACH range enhancement for NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1707576	NPRACH reliability for NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1707577	UL power control enhancement for NB-IoT small cell	LG Electronics	Youngwoo Yun	45048	discussion	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1707578	System information acquisition time enhancement in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1707579	Data transmission during random access procedure in NB-IoT	LG Electronics	Youngwoo Yun	45048	discussion	Decision			108	6.2.7.6	Other
R1-1707580	Potential enhancements for drones	LG Electronics	Youngwoo Yun	45048	discussion	Decision			112	6.2.8.3	Potential enhancements for drones
R1-1707581	Discussion on synchronization enhancement for IoT and wearables	LG Electronics	Youngwoo Yun	45048	discussion	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1707582	Discussion on discovery enhancement for IoT and wearables	LG Electronics	Youngwoo Yun	45048	discussion	Decision			118	6.2.9.2.2	Discovery aspects
R1-1707583	Discussion on UE to network relaying options for IoT and wearables	LG Electronics	Youngwoo Yun	45048	discussion	Decision			120	6.2.9.2.3.1	Sidelink UE-to-NW relaying
R1-1707584	Discussion on sidelink resource allocation and pool configuration for IoT and wearables	LG Electronics	Youngwoo Yun	45048	discussion	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1707585	Discussion on sidelink power control for IoT and wearables	LG Electronics	Youngwoo Yun	45048	discussion	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1707586	Discussion on feedback information on sidelink	LG Electronics	Youngwoo Yun	45048	discussion	Decision			123	6.2.9.2.3.4	Sidelink feedback information
R1-1707587	NR SS sequence design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1707588	Discussion on SS block composition and SS burst set composition	LG Electronics	Youngwoo Yun	45048	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1707589	Discussion on SS block time index indication	LG Electronics	Youngwoo Yun	45048	discussion	Decision			132	7.1.1.1.3	SS block time index indication
R1-1707590	NR-PBCH design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1707591	System Information Delivery	LG Electronics	Youngwoo Yun	45048	discussion	Decision			135	7.1.1.2.2	Remaining system information delivery
R1-1707592	Paging design in NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			136	7.1.1.3	Paging design
R1-1707593	Discussion on NR PRACH preamble	LG Electronics	Youngwoo Yun	45048	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1707594	Discussion on RACH procedure	LG Electronics	Youngwoo Yun	45048	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1707595	SS block based RRM Measurement	LG Electronics	Youngwoo Yun	45048	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1707596	CSI-RS based RRM Measurement for L3 mobility	LG Electronics	Youngwoo Yun	45048	discussion	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1707597	Discussion on Radio Link Monitoring in NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1707598	Discussion on codeword mapping	LG Electronics	Youngwoo Yun	45048	discussion	Decision			147	7.1.2.1.1	Codeword mapping
R1-1707599	Discussion on transmission scheme 2 for DL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1707600	Discussion on codebook based transmission for UL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1707601	Discussion on non-codebook based transmission for UL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1707602	Discussion on diversity transmission for UL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1707603	Discussion on cooperative transmission	LG Electronics	Youngwoo Yun	45048	discussion	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1707604	Discussion on DL beam management	LG Electronics	Youngwoo Yun	45048	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707605	Discussion on UL beam management	LG Electronics	Youngwoo Yun	45048	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707606	Discussion on beam failure recovery	LG Electronics	Youngwoo Yun	45048	discussion	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707607	Discussion on CSI framework	LG Electronics	Youngwoo Yun	45048	discussion	Decision			160	7.1.2.3.1	CSI framework
R1-1707608	Discussion on interference measurement and rate matching for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1707609	Discussion on CSI acquisition for reciprocity based operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1707610	Discussion on CSI feedback Type I	LG Electronics	Youngwoo Yun	45048	discussion	Decision			163	7.1.2.3.4	CSI feedback Type I
R1-1707611	Discussion on CSI feedback Type II	LG Electronics	Youngwoo Yun	45048	discussion	Decision			164	7.1.2.3.5	CSI feedback Type II

R1-1707612	On CSI-RS design for beam management	LG Electronics	Youngwoo Yun	45048	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1707613	On CSI-RS design for CSI acquisition	LG Electronics	Youngwoo Yun	45048	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1707614	On DL DMRS design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1707615	On UL DMRS design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1707616	On DL PT-RS design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1707617	On UL PT-RS design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1707618	On SRS design and related operations	LG Electronics	Youngwoo Yun	45048	discussion	Decision			170	7.1.2.4.4	SRS
R1-1707619	Discussion on QCL for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			171	7.1.2.4.5	QCL
R1-1707620	Discussion on fine time/frequency tracking of channel	LG Electronics	Youngwoo Yun	45048	discussion	Decision			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1707621	Phase 2 and Phase 3 SLS Calibration Results for NR MIMO	LG Electronics	Youngwoo Yun	45048	discussion	Information			174	7.1.2.5	Other
R1-1707622	Phase 2 LLS Calibration Results for NR MIMO	LG Electronics	Youngwoo Yun	45048	discussion	Information			174	7.1.2.5	Other
R1-1707623	Discussion on REG bundling	LG Electronics	Youngwoo Yun	45048	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707624	Discussion on RS structure	LG Electronics	Youngwoo Yun	45048	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707625	Discussion on NR-PDCCH structure	LG Electronics	Youngwoo Yun	45048	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707626	Discussion on CORESET configuration	LG Electronics	Youngwoo Yun	45048	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707627	Discussion on CSS configuration for wideband operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707628	Discussion on mmWave control and data operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707629	Discussion on hierarchical search space structure	LG Electronics	Youngwoo Yun	45048	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707630	Discussion on multiplexing between control and data	LG Electronics	Youngwoo Yun	45048	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1707631	Discussion on rate matching for NR-PDSCH and NR-PUSCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1707632	Discussion on DCI contents	LG Electronics	Youngwoo Yun	45048	discussion	Decision			180	7.1.3.1.4	DCI contents
R1-1707633	Discussion on configurability of DCI contents	LG Electronics	Youngwoo Yun	45048	discussion	Decision			180	7.1.3.1.4	DCI contents
R1-1707634	Discussion on the contents and the signaling of group common PDCCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1707635	Discussion on UE behavior for the group common PDCCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1707636	Design of 1-symbol NR-PUCCH for up to 2 bits	LG Electronics	Youngwoo Yun	45048	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707637	Design of 1-symbol NR-PUCCH for more than 2 bits	LG Electronics	Youngwoo Yun	45048	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707638	Design of 2-symbol NR-PUCCH structure	LG Electronics	Youngwoo Yun	45048	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707639	Performance evaluations on short NR-PUCCH structures	LG Electronics	Youngwoo Yun	45048	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707640	Overall structure of long NR-PUCCH formats	LG Electronics	Youngwoo Yun	45048	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707641	Design of long NR-PUCCH for up to 2 bits	LG Electronics	Youngwoo Yun	45048	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707642	Design of long NR-PUCCH for more than 2 bits	LG Electronics	Youngwoo Yun	45048	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707643	Discussion on diversity transmission for long NR-PUCCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707644	Consideration on NR-PUCCH resource allocation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1707645	Consideration on long NR-PUCCH resource	LG Electronics	Youngwoo Yun	45048	discussion	Decision			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1707646	Discussion on NR-PUCCH allocation for CSI reporting	LG Electronics	Youngwoo Yun	45048	discussion	Decision			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1707647	Consideration on UL multiplexing with short NR-PUCCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707648	Consideration on UL multiplexing with long NR-	LG Electronics	Youngwoo Yun	45048	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707649	Discussion on UCI piggyback on NR-PUSCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707650	Discussion on DL data scheduling and RA method for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1707651	Discussion on multi-slot/cross-slot scheduling for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1707652	Discussion on Resource Allocation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1707653	Discussion on UL data scheduling and RA method for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707654	Discussion on scheduling request for multiple service requirements	LG Electronics	Youngwoo Yun	45048	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707655	Discussion on grant-free uplink transmission	LG Electronics	Youngwoo Yun	45048	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707656	Consideration on HARQ-ACK feedback method for	LG Electronics	Youngwoo Yun	45048	discussion	Decision			192	7.1.3.3.3	HARQ-ACK feedback
R1-1707657	Consideration on aggregated HARQ-ACK feedback for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			192	7.1.3.3.3	HARQ-ACK feedback
R1-1707658	Consideration on HARQ process and soft buffer for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			193	7.1.3.3.4	Processing time and HARQ process number

R1-1707659	Discussion on potential HARQ operations for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			193	7.1.3.3.4	Processing time and HARQ process number
R1-1707660	Consideration on CB group construction and configuration	LG Electronics	Youngwoo Yun	45048	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707661	Consideration on CB group based HARQ operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707662	Consideration on CB group based HARQ-ACK feedback	LG Electronics	Youngwoo Yun	45048	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707663	Discussion on CBG-based retransmission for pre-emption recovery	LG Electronics	Youngwoo Yun	45048	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707664	Discussion on pre-emption indication design	LG Electronics	Youngwoo Yun	45048	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707665	Discussion on eMBB and URLLC multiplexing for uplink	LG Electronics	Youngwoo Yun	45048	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707666	Discussion on scheduling and HARQ for NR CA	LG Electronics	Youngwoo Yun	45048	discussion	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1707667	Discussion on Scheduling/HARQ for dual connectivity	LG Electronics	Youngwoo Yun	45048	discussion	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1707668	Discussion on CRC length reduction for eMBB data	LG Electronics	Youngwoo Yun	45048	discussion	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1707669	Code block segmentation for eMBB data	LG Electronics	Youngwoo Yun	45048	discussion	Decision			202	7.1.4.1.1.2	Segmentation
R1-1707670	On rate matching with LDPC code for eMBB	LG Electronics	Youngwoo Yun	45048	discussion	Decision			203	7.1.4.1.1.3	Rate matching
R1-1707671	Discussion on interleaving for eMBB data	LG Electronics	Youngwoo Yun	45048	discussion	Decision			204	7.1.4.1.1.4	Other
R1-1707672	LDPC codes design for eMBB data channel	LG Electronics	Youngwoo Yun	45048	discussion	Decision			205	7.1.4.1.2	LDPC code design
R1-1707673	Discussion on early termination for control channel	LG Electronics	Youngwoo Yun	45048	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1707674	Information bit allocation of Polar codes	LG Electronics	Youngwoo Yun	45048	discussion	Decision			209	7.1.4.2.1.2	Sequence design
R1-1707675	Discussion of rate matching for Polar codes	LG Electronics	Youngwoo Yun	45048	discussion	Decision			210	7.1.4.2.1.3	Other
R1-1707676	Comparison of LDPC and polar codes for PBCH	LG Electronics	Youngwoo Yun	45048	discussion	Decision			211	7.1.4.3	PBCH
R1-1707677	Discussion on details of backhaul signaling for duplexing flexibility	LG Electronics	Youngwoo Yun	45048	discussion	Decision			215	7.1.6.1	Cross-link interference management
R1-1707678	Discussion on CLI measurement for duplexing flexibility	LG Electronics	Youngwoo Yun	45048	discussion	Decision			215	7.1.6.1	Cross-link interference management
R1-1707679	Discussion on further details on wideband operation	LG Electronics	Youngwoo Yun	45048	discussion	Decision			217	7.1.7	Wider bandwidth operations
R1-1707680	Discussion on large duplex gap between DL and UL for LTE UL sharing	LG Electronics	Youngwoo Yun	45048	discussion	Decision			218	7.1.8	NR-LTE co-existence
R1-1707681	Discussion on beam-specific power control for UL	LG Electronics	Youngwoo Yun	45048	discussion	Decision			219	7.1.9	UL power control
R1-1707682	Discussion on UL power control for NR	LG Electronics	Youngwoo Yun	45048	discussion	Decision			219	7.1.9	UL power control
R1-1707683	Discussion on power sharing for LTE-NR DC	LG Electronics	Youngwoo Yun	45048	discussion	Decision			219	7.1.9	UL power control
R1-1707684	UL grant free transmission for low latency	NICT	Masayuki Oodo	69716	discussion	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1707685	Uplink Grant Free Transmission Supporting Different Services	Dish Network	MEHDI ALASTI	66485	discussion	Discussion			221	7.1.11	Other
R1-1707686	Early block discrimination with polar codes for DCI blind detection	Coherent Logix	Kevin Shelby	67999	discussion	Decision	Describes method of embedding UE ID in frozen bits as a means to facilitate early termination.		208	7.1.4.2.1.1	Code construction
R1-1707687	Early Termination Based on UE ID Frozen Bit Insertion	Coherent Logix	Kevin Shelby	67999	discussion	Discussion	Examines early termination based on UE ID frozen bit		208	7.1.4.2.1.1	Code construction
R1-1707688	Considerations on the DL power consumption reduction for efeMTC	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1707689	Discussion on UL HARQ-ACK feedback	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1707690	Considerations on the DL power consumption reduction for feNB-IoT	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1707691	Discussion on design of SS block	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1707692	Discussion on the timing indication of SS block	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			132	7.1.1.1.3	SS block time index indication
R1-1707693	Discussion on the on-demand SI	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			135	7.1.1.2.2	Remaining system information delivery
R1-1707694	NR 4-Step Random Access Procedure	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1707695	Discussion on the mobility measurement for the connected mode UE	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block

R1-1707696	Discussion on the DL Beam Management	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707697	Discussion on the UL Beam Management	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707698	On Beam Recovery Mechanism	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Discussion			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707699	Beam association relationship between data and control channels	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			158	7.1.2.2.3	Other
R1-1707700	CSI-RS design for beam management	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1707701	On SRS design for NR	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			170	7.1.2.4.4	SRS
R1-1707702	NR-PDCCH CCE-to-REG mapping with REG bundling	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707703	PDCCH CORESET configuration and UE procedure on NR-PDCCH monitoring	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707704	NR PDCCH search space design with nested structure	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707705	Search space design consideration for NR PDCCH with BF	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707706	Search space design consideration for NR PDCCH with BF	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707707	Search space design consideration for NR PDCCH with BF	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707708	On resource sharing between PDCCH and PDSCH	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1707709	Impact on common channel reception to PDCCH design	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1707710	DL control channel design for URLLC	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			182	7.1.3.1.6	Other
R1-1707711	Discussion on 2-symbol uplink control channel	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707712	Discussion on RS of short uplink control channel	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707713	Slot aggregation and configuration for NR long PUCCH	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707714	Design of NR PUCCH with long duration	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707715	Resource indication for UL control channel	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1707716	Multiplexing of short PUCCH and long PUCCH	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707717	Multiplexing of short UCI and UL data	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707718	On UCI and data multiplexing in PUSCH	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			187	7.1.3.2.4	UCI multiplexing
R1-1707719	On bandwidth part configuration	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1707720	DL resource allocation and indication for NR	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1707721	Discussions on uplink grant-free transmission	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707722	HARQ for uplink grant-free transmission	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707723	Discussion on the SR enhancement	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707724	Discussion on the UL waveform indication	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707725	Discussion on CBG-based transmission	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707726	On symbol-level time-domain resource allocation	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707727	Discussion on UE specific RF bandwidth adaptation in NR	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			217	7.1.7	Wider bandwidth operations
R1-1707728	Discussion on uplink power control	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			219	7.1.9	UL power control
R1-1707729	Multiplexing between PDCCH and PDSCH for various data durations	AT&T	Arun Ghosh	57084	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1707730	DCI design for TDD operation	AT&T	Arun Ghosh	57084	discussion	Decision			180	7.1.3.1.4	DCI contents
R1-1707731	On forward compatible resources in NR	AT&T	Arun Ghosh	57084	discussion	Decision			190	7.1.3.3.1	DL data scheduling

R1-1707732	HARQ-ACK feedback considerations from a network deployment perspective	AT&T	Arun Ghosh	57084	discussion	Decision			192	7.1.3.3.3	HARQ-ACK feedback
R1-1707733	Further details on NR mini-slot based design	AT&T	Arun Ghosh	57084	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707734	NR CA Design	AT&T	Arun Ghosh	57084	discussion	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1707735	Design considerations for NR operation with wide bandwidths	AT&T	Arun Ghosh	57084	discussion	Decision			217	7.1.7	Wider bandwidth operations
R1-1707736	Remaining issues for efficient NR-LTE co-existence	AT&T	Arun Ghosh	57084	discussion	Decision			218	7.1.8	NR-LTE co-existence
R1-1707737	Remaining issue for CW to Layer mapping	AT&T	Arun Ghosh	57084	discussion	Decision			147	7.1.2.1.1	Codeword mapping
R1-1707738	On Transmission Scheme 2 for DL	AT&T	Arun Ghosh	57084	discussion	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1707739	TxD for UL	AT&T	Arun Ghosh	57084	discussion	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1707740	Multi Codeword MIMO Implementation using Multiple DCI	AT&T	Arun Ghosh	57084	discussion	Decision			154	7.1.2.1.8	Other
R1-1707741	Attaching UE-ID for PDCCH Transmisison using Polar Codes	AT&T	Arun Ghosh	57084	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707742	Design features of Group Common PDCCH	AT&T	Arun Ghosh	57084	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1707743	Attaching common UE-ID for group common PDCCH	AT&T	Arun Ghosh	57084	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1707744	CBG Based transmission procedures	AT&T	Arun Ghosh	57084	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707745	Impact of frequency domain and time domain symbol interleaver	AT&T	Arun Ghosh	57084	discussion	Decision			204	7.1.4.1.1.4	Other
R1-1707746	Attaching CRC for data and control channels	AT&T	Arun Ghosh	57084	discussion	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1707747	Polar code construction for control channels	AT&T	Arun Ghosh	57084	discussion	Decision			209	7.1.4.2.1.2	Sequence design
R1-1707748	CSI-RS design principle	AT&T	Arun Ghosh	57084	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1707749	Considerations on DL Tx beam reporting in msg. 3	AT&T	Arun Ghosh	57084	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1707750	DL beam mangement details	AT&T	Arun Ghosh	57084	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1707751	Design principles of beam recovery mechanism	AT&T	Arun Ghosh	57084	discussion	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707752	Considerations on CSI acquisition framework	AT&T	Arun Ghosh	57084	discussion	Decision			160	7.1.2.3.1	CSI framework
R1-1707753	Details of cross link interference measurements	AT&T	Arun Ghosh	57084	discussion	Decision			215	7.1.6.1	Cross-link interference management
R1-1707754	NR SS block and burst set composition	AT&T	Arun Ghosh	57084	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1707755	SS block time index indication	AT&T	Arun Ghosh	57084	discussion	Decision			132	7.1.1.1.3	SS block time index indication
R1-1707756	PRACH design for NR	AT&T	Arun Ghosh	57084	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1707757	Measurement based on SS block	AT&T	Arun Ghosh	57084	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1707758	Measurement based on CSI-RS for L3 mobility	AT&T	Arun Ghosh	57084	discussion	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1707759	Radio link monitoring	AT&T	Arun Ghosh	57084	discussion	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1707760	Support multiple DCI based transmission	AT&T	Arun Ghosh	57084	discussion	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1707761	On the details of CSI acuisition	AT&T	Arun Ghosh	57084	discussion	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1707762	Design principle of CSI feedback	AT&T	Arun Ghosh	57084	discussion	Decision			163	7.1.2.3.4	CSI feedback Type I
R1-1707763	High level view on type II codebook	AT&T	Arun Ghosh	57084	discussion	Decision			164	7.1.2.3.5	CSI feedback Type II
R1-1707764	Discussion of SRS resource configuration	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			170	7.1.2.4.4	SRS
R1-1707765	Discussion of codeblock mapping for DL and UL data channel	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			147	7.1.2.1.1	Codeword mapping
R1-1707766	Discussion of procedures for UL transmission with and without grant	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1707767	Long PUCCH structure	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1707768	HARQ-ACK feedback for CBG-based retransmission	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707769	CBG construction for CBG-based retransmission	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707770	UL grant-free transmission for URLLC	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1707771	On eMBB/URLLC multiplexing for uplink transmission	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707772	sidelink resouce allocation and configuration	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1707773	sidelink feedback information	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			123	6.2.9.2.3.4	Sidelink feedback information
R1-1707774	Design of uplink HARQ-ACK feedback for efeMTC	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			95	6.2.6.3	Uplink HARQ-ACK feedback

R1-1707775	Design of reducing system acquisition time for FeNB-IoT	Lenovo, Motorola Mobility	Chenxi Zhu	64707	discussion	Discussion			107	6.2.7.5	Reduced system acquisition time
R1-1707776	Considerations for latency reduction	ZTE	Carolyn Taylor	19440	discussion				72	6.2.3.1.3	Other
R1-1707777	Discussion on Short TTI with eV2X	ZTE	Carolyn Taylor	19440	discussion				79	6.2.3.3.2	Short TTI solutions
R1-1707778	Cross-carrier or cross-pool scheduling in PC5 CA	NEC	Rajitha Palipana	57803	discussion	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1707779	On radio resource pool sharing	NEC	Rajitha Palipana	57803	discussion	Decision			72	6.2.3.1.3	Other
R1-1707780	On resource configuration for UL transmission without grant	NEC	Rajitha Palipana	57803	discussion	Decision			191	7.1.3.3.2	UL data scheduling
R1-1707781	Discussion on wake-up signal for power consumption reduction for feNB-IoT	Sequans Communications	Roy Ron	49992	discussion				101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1707782	Discussion on beam recovery	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707783	On using sub-time unit in CSI-RS for beam management	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1707784	On front-loaded DMRS pattern and port multiplexing	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1707785	PT-RS design for DFT-s-OFDM	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1707786	Discussion on SS block mapping	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1707787	Discussion on beam refinement	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1707788	Discussion on pre-emption indication method for DL multiplexing of URLLC and eMBB	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707789	DL eMBB and URLLC multiplexing under mixed numerology	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1707790	On the type II feedback configurations	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			164	7.1.2.3.5	CSI feedback Type II
R1-1707791	Discussion on NR-PDCCH structure	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707792	Discussion on Polar code construction	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1707793	Discussion on maximum number of SS blocks in an SS burst set	Spreadtrum Communications	Arto Lehti	61519	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1707794	TR38.802_CR_Section_7.1.6_MIMO calibration	ZTE	Ruyue Yu-Ngok Li	43128	draftCR	Decision			174	7.1.2.5	Other
R1-1707795	Summary of [88b-12] Email discussion on QCL types for NR	ZTE	Ruyue Yu-Ngok Li	43128	discussion				171	7.1.2.4.5	QCL
R1-1707796	Correction on total number of soft channel bits for Cat M1 UE in 36.212	NEC, Intel	Yassin Awad	37300	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1707797	Corrections on total number of soft channel bits for UE Cat M1 and M2 in 36.212	NEC, Intel	Yassin Awad	37300	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1707798	UL diversity transmission for DFTsOFDM	Mitsubishi Electric RCE	Cristina Ciochina-Duchesne	56339	discussion	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1707799	Clarification on Rel-14 NPDCCH monitoring	ZTE	Shupeng Li	58860	discussion	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1707800	Correction on PRS hopping	ZTE	Shupeng Li	58860	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1707801	Multi-RAT system level considerations for NR PBCH Channel Coding	AccelerComm Ltd	Zhi Zhong (John) Yu	69793	discussion	Decision	The already slow Multi-RAT ACQ issue requires NR PBCH to be designed with shorter interleaving structure for quicker camp-on. Due to the shorter PBCH messages are preferred, polar code would be more suitable		211	7.1.4.3	PBCH
R1-1707802	Summary of PTRS open issues	Ericsson	Mattias Frenne	33019	discussion				173	7.1.2.4.7	Other
R1-1707803	Summary of PTRS open issues and companies views	Ericsson LM	Mattias Frenne	33019	discussion	Information	Summaries the main proposals in tdocs submitted for PTRS agenda for which there is substantial support. Note, this document will be submitted to RAN1 email reflector around May 12th.		169	7.1.2.4.3	PT-RS
R1-1707804	Transmit diversity for DFTsOFDM-based PUCCH in long duration	Mitsubishi Electric RCE	Cristina Ciochina-Duchesne	56339	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration

R1-1707805	Further clarification of IoT	SoftBank, Ericsson, NTT DOCOMO, Sharp, ZTE	Yosuke Akimoto	59235	discussion	Decision			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1707806	Discussion of NR-LTE coexistence on DL	ZTE	Wenfeng Zhang	71639	discussion				218	7.1.8	NR-LTE co-existence
R1-1707807	Considerations of NR-LTE coexistence in uplink	ZTE	Wenfeng Zhang	71639	discussion				218	7.1.8	NR-LTE co-existence
R1-1707808	Dual Connectivity between E-UTRA and NR	NEC	Wang Gang	43643	discussion	Discussion			219	7.1.9	UL power control
R1-1707809	Draft CR 36.211 for correction to CSI-RS configuration	NEC	Wang Gang	43643	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1707810	On CSI-RS design for beam management	NEC	Wang Gang	43643	discussion	Discussion			167	7.1.2.4.1	CSI-RS
R1-1707811	Considerations on the sequence design of DMRS	NEC	Wang Gang	43643	discussion	Discussion			168	7.1.2.4.2	DMRS
R1-1707812	Design for structure of PUCCH in short duration	NEC	Wang Gang	43643	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707813	RACH related parameters transmitting during initial access	NEC	Wang Gang	43643	discussion	Discussion			144	7.1.1.6	Other
R1-1707814	Low latency beam failure recovery by PRACH/PRACH like	NEC	Wang Gang	43643	discussion	Discussion			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707815	DL control channel monitoring granularity configuration	Guangdong OPPO Mobile Telecom.	Jia Shen	67727	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707816	Discussion on PBCH design	MediaTek Inc.	Tao Chen	56050	discussion				134	7.1.1.2.1	NR-PBCH
R1-1707817	Discussion on remaining system information delivery	MediaTek Inc.	Tao Chen	56050	discussion				135	7.1.1.2.2	Remaining system information delivery
R1-1707818	Discussion on Paging design	MediaTek Inc.	Tao Chen	56050	discussion				136	7.1.1.3	Paging design
R1-1707819	Discussion on SS block RSRP for DL RRM Measurement	MediaTek Inc.	Tao Chen	56050	discussion				141	7.1.1.5.1	Measurement based on SS block
R1-1707820	Discussion on Properties of CSI-RS for RRM measurement	MediaTek Inc.	Tao Chen	56050	discussion				142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1707821	Discussion on PDCCH structure and transmission scheme	MediaTek Inc.	Tao Chen	56050	discussion				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1707822	Design of search space and UE blind decoding	MediaTek Inc.	Tao Chen	56050	discussion				178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1707823	Resource sharing between PDCCH and PDSCH	MediaTek Inc.	Tao Chen	56050	discussion				179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1707824	DCI contents in NR	MediaTek Inc.	Tao Chen	56050	discussion				180	7.1.3.1.4	DCI contents
R1-1707825	Discussion on group-common PDCCH	MediaTek Inc.	Tao Chen	56050	discussion				181	7.1.3.1.5	Group-common PDCCH
R1-1707826	Scheduling for carrier aggregation in NR	MediaTek Inc.	Tao Chen	56050	discussion				197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1707827	Maximal HARQ process number for NR	MediaTek Inc.	Tao Chen	56050	discussion				193	7.1.3.3.4	Processing time and HARQ process number
R1-1707828	Efficient wider bandwidth operations for NR	MediaTek Inc.	Tao Chen	56050	discussion				217	7.1.7	Wider bandwidth operations
R1-1707829	NR SSS Design and Evaluation	MediaTek Inc.	Tao Chen	56050	discussion				130	7.1.1.1.1	Remaining details on SS sequence design
R1-1707830	Details on DL Beam management	MediaTek Inc.	Tao Chen	56050	discussion				156	7.1.2.2.1	Beam management details
R1-1707831	Discussion on UL beam management with imperfect beam correspondence	MediaTek Inc.	Tao Chen	56050	discussion				156	7.1.2.2.1	Beam management details
R1-1707832	Discussion on Beam Recovery Mechanism	MediaTek Inc.	Tao Chen	56050	discussion				157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1707833	Codeword mapping in NR	MediaTek Inc.	Tao Chen	56050	discussion				147	7.1.2.1.1	Codeword mapping
R1-1707834	CSI acquisition for reciprocity based operations	MediaTek Inc.	Tao Chen	56050	discussion				162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1707835	CSI feedback Type I	MediaTek Inc.	Tao Chen	56050	discussion				163	7.1.2.3.4	CSI feedback Type I
R1-1707836	SRS design in NR	MediaTek Inc.	Tao Chen	56050	discussion				170	7.1.2.4.4	SRS
R1-1707837	Multi-TRP and Multi-panel transmissions	MediaTek Inc.	Tao Chen	56050	discussion				153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1707838	Cross link interference management techniques	MediaTek Inc.	Tao Chen	56050	discussion				215	7.1.6.1	Cross-link interference management
R1-1707839	Cross link interference measurements	MediaTek Inc.	Tao Chen	56050	discussion				215	7.1.6.1	Cross-link interference management
R1-1707840	Discussion on PRACH design to support uplink requests	MediaTek Inc.	Tao Chen	56050	discussion				138	7.1.1.4.1	PRACH design
R1-1707841	Discussion on random access procedure in NR	MediaTek Inc.	Tao Chen	56050	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1707842	Performance evaluation on channel structure of short PUCCH for 1 or 2 bits UCI	MediaTek Inc.	Tao Chen	56050	discussion				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1707843	Discussion on UCI on PUSCH	MediaTek Inc.	Tao Chen	56050	discussion				187	7.1.3.2.4	UCI multiplexing
R1-1707844	Starting and ending position in time domain of	MediaTek Inc.	Tao Chen	56050	discussion				191	7.1.3.3.2	UL data scheduling
R1-1707845	Polar code rate-matching design	MediaTek Inc.	Tao Chen	56050	discussion				209	7.1.4.2.1.2	Sequence design
R1-1707846	Channel coding for NR PBCH	MediaTek Inc.	Tao Chen	56050	discussion				211	7.1.4.3	PBCH
R1-1707847	Discussion on SS block time index indication	MediaTek Inc.	Tao Chen	56050	discussion				132	7.1.1.1.3	SS block time index indication
R1-1707848	On CRC attachment for LDPC	MediaTek Inc.	Tao Chen	56050	discussion				201	7.1.4.1.1.1	CRC attachment
R1-1707849	Rate matching for LDPC codes	MediaTek Inc.	Tao Chen	56050	discussion				203	7.1.4.1.1.3	Rate matching
R1-1707850	On design and performance of NR eMBB LDPC Code	MediaTek Inc.	Tao Chen	56050	discussion				205	7.1.4.1.2	LDPC code design

R1-1707851	CBG-based transmission with single/multi-bit HARQ-ACK feedback	MediaTek Inc.	Tao Chen	56050	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1707852	Analysis of transmission scheme 2	MediaTek Inc.	Tao Chen	56050	discussion				148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1707853	On CSI-RS design for potential extension to support fine time and frequency tracking	MediaTek Inc.	Tao Chen	56050	discussion				167	7.1.2.4.1	CSI-RS
R1-1707854	On downlink DMRS pattern	MediaTek Inc.	Tao Chen	56050	discussion				168	7.1.2.4.2	DMRS
R1-1707855	RS design requirement for fine time and frequency tracking	MediaTek Inc.	Tao Chen	56050	discussion				172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1707856	Overhead reduction on CSI feedback Type II	MediaTek Inc.	Tao Chen	56050	discussion				164	7.1.2.3.5	CSI feedback Type II
R1-1707857	HARQ procedure for DL URLLC	MediaTek Inc.	Tao Chen	56050	discussion				190	7.1.3.3.1	DL data scheduling
R1-1707858	Grant-free Scheduling and retransmission schemes for UL URLLC	MediaTek Inc.	Tao Chen	56050	discussion				191	7.1.3.3.2	UL data scheduling
R1-1707859	Draft LS Reply on in-sync/out-of-sync indications for RLF	MediaTek Inc.	Tao Chen	56050	LS out	Decision			4	4	Incoming Liaison Statements
R1-1707860	TDD-specific considerations on sTTI	ZTE	Xianghui Han	65696	discussion	Decision			60	6.2.1.2.6	FS2 aspects
R1-1707861	Reducing system acquisition time for efeMTC	Nokia, Alcatel-Lucent Shanghai Bell	David Bhatoolaul	70745	discussion				93	6.2.6.1	Reduced system acquisition time
R1-1707862	Signalling for efficient decoding of physical channels	Nokia, Alcatel-Lucent Shanghai Bell	David Bhatoolaul	70745	discussion				94	6.2.6.2	Downlink channel power efficiency
R1-1707863	Uplink HARQ-ACK feedback in efeMTC	Nokia, Alcatel-Lucent Shanghai Bell	David Bhatoolaul	70745	discussion				95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1707864	Increasing PDSCH spectral efficiency in efeMTC	Nokia, Alcatel-Lucent Shanghai Bell	David Bhatoolaul	70745	discussion				96	6.2.6.4	Increased PDSCH spectral efficiency
R1-1707865	Increasing PUSCH spectral efficiency in efeMTC	Nokia, Alcatel-Lucent Shanghai Bell	David Bhatoolaul	70745	discussion				97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1707866	Discussion on definition of sensing window	Samsung	Younsun Kim	43499	other	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1707867	Draft CR on definition of sensing window	Samsung	Younsun Kim	43499	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1707868	Discussion on skipped subframe handling for partial sensing	Samsung	Younsun Kim	43499	other	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1707869	Draft CR on skipped subframe handling for partial sensing	Samsung	Younsun Kim	43499	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1707870	Draft CR on CSI-RS Resource Activation [36.213]	Samsung	Younsun Kim	43499	draftCR	Decision		May reconsider in RAN1#90 depending on conclusions in RAN2	23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1707871	Draft CR on advanced CSI codebook [36.212]	Samsung	Younsun Kim	43499	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1707872	Draft CR on advanced CSI codebook and reporting [36.213]	Samsung	Younsun Kim	43499	draftCR	Decision		May reconsider in RAN1#90 depending on conclusions in RAN2	23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1707873	Draft CR on CSR for CSI feedback for semi-OL transmission	Samsung	Younsun Kim	43499	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1707874	Corrections on Power Control for SRS Switching	Samsung	Younsun Kim	43499	draftCR	Decision			26	6.1.7	Other
R1-1707875	New modulation table for throughput enhancement	Samsung	Younsun Kim	43499	other	Decision			26	6.1.7	Other
R1-1707876	Configuration of shortened processing time for 1ms TTI	Samsung	Younsun Kim	43499	other	Decision			30	6.2.1.1.1	Configuration of shortened processing time for 1ms TTI
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R1-1708173	DL HARQ-ACK feedback and UL Scheduling for FS2 with 1-ms TTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				32	6.2.1.1.3	FS2 aspects
R1-1708174	On details of UL DMRS signaling	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1708175	On collisions between sTTI and TTI transmissions in UL	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1708176	sPUCCH resource management for shortened TTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				49	6.2.1.2.3.2	sPUCCH resource management
R1-1708177	UCI on sPUSCH	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				50	6.2.1.2.3.3	UCI on sPUSCH
R1-1708178	On CSI Reporting for sTTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1708179	UL DMRS Design for sTTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				58	6.2.1.2.5.2	UL DMRS design
R1-1708180	Multiple starting and ending positions in a subframe for UL	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1708181	NR-NTN proposed scope	THALES	Nicolas Chuberre	21633	discussion	Information	Proposed scope for upcoming TR "NR-NTN study item"		222	7.2	Other
R1-1708182	NR-NTN proposed template for the TR	THALES	Nicolas Chuberre	21633	discussion	Information	proposed template for the TR "NR-NTN study item"		222	7.2	Other
R1-1708183	NR-NTN channel models	THALES	Nicolas Chuberre	21633	discussion	Information	NTN Channel model considerations for discussion		222	7.2	Other
R1-1708184	UE capability and configuration of shortened processing time for 1ms TTI	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			30	6.2.1.1.1	Configuration of shortened processing time for 1ms TTI
R1-1708185	On asynchronous UL HARQ for 1ms TTI	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			33	6.2.1.1.4	Asynchronous UL HARQ
R1-1708186	sTTI configurability for carrier aggregation	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			38	6.2.1.2.1.1	sTTI configurations
R1-1708187	HARQ process handling and maximum processing capability for shortened TTI	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1708188	On maximum timing advance and processing time	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			62	6.2.1.3	Maximum TA and processing time
R1-1708189	On multiple DL starting positions in a subframe for feLAA	Nokia, Alcatel-Lucent Shanghai Bell	Klaus Hugl	68338	other	Decision			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708190	Remaining TDD-specific issues for 1ms TTI	Huawei, HiSilicon	Brian Classon	45750	other				32	6.2.1.1.3	FS2 aspects
R1-1708191	CSI feedback for 1ms TTI	Huawei, HiSilicon	Brian Classon	45750	other				34	6.2.1.1.5	CSI feedback
R1-1708192	Discussion on resource pool sharing between Mode 3 and Mode 4	Huawei, HiSilicon	Brian Classon	45750	other				72	6.2.3.1.3	Other
R1-1708193	Discussion on further latency reduction for R15 sidelink	Huawei, HiSilicon	Brian Classon	45750	other				72	6.2.3.1.3	Other
R1-1708194	Discussion on Codebook Subset Restriction in advanced CSI	Huawei, HiSilicon	Brian Classon	45750	other				23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1708195	Corrections on CSI reporting for semi-open loop in 36.213	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1708196	Evaluation on DL 1024 QAM	Huawei, HiSilicon	Brian Classon	45750	other				89	6.2.5.1	Support for 1024QAM for DL channels
R1-1708197	Field measurement results for drones	Huawei, HiSilicon	Brian Classon	45750	other				110	6.2.8.1	Channel modelling of aerial UEs
R1-1708198	On early data transmission for eFeMTC	Huawei, HiSilicon	Brian Classon	45750	other				98	6.2.6.6	Other
R1-1708199	On the support of NB-IoT small cell	Huawei, HiSilicon	Brian Classon	45750	other				106	6.2.7.4	NB-IoT small cell support
R1-1708200	On early data transmission for NB-IOT	Huawei, HiSilicon	Brian Classon	45750	other				108	6.2.7.6	Other

R1-1708201	Clarification on NRS presence assumptions on unicast non-anchor carriers	Huawei, HiSilicon	Brian Classon	45750	other				20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708202	Handling collisions between n+4 and n+3	Huawei, HiSilicon	Brian Classon	45750	other				31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1708203	Positioning for aerial vehicle	Huawei, HiSilicon	Brian Classon	45750	other				113	6.2.8.4	Other
R1-1708204	Discussion on dynamic HARQ-ACK timing and HARQ-ACK bundling in feMTC	Huawei, HiSilicon	Brian Classon	45750	discussion				24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1708205	Correction on HARQ-ACK bundling and dynamic HARQ-ACK timing in 36.213	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1708206	Correction on resource mapping in case of retuning in 36.211	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1708207	sPUCCH Design for shortened TTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				48	6.2.1.2.3.1	sPUCCH format design
R1-1708208	Discussion on 64 QAM for LTE V2X Phase 2	Shenzhen Coolpad Technologies	Yixue Lei	60382	discussion	Discussion			71	6.2.3.1.2	Support for 64-QAM
R1-1708209	On scheduling of sPDSCH and sPUSCH	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			43	6.2.1.2.2.1	sTTI scheduling
R1-1708210	On DL control channel design for shorter TTI operation	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			44	6.2.1.2.2.2	sPDCCH design
R1-1708211	On search space design for sPDCCH	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			45	6.2.1.2.2.3	Search space for sTTI operation
R1-1708212	On reuse of vacant sPDCCH resource for sPDSCH	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			46	6.2.1.2.2.4	sPDCCH multiplexing with data
R1-1708213	On details of short PDSCH design	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			54	6.2.1.2.4.1	sPDSCH design
R1-1708214	On details of DMRS design for 2-OS and 7-OS DL shorter TTI	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			55	6.2.1.2.4.2	DL DMRS design
R1-1708215	On details of short PUSCH design	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			57	6.2.1.2.5.1	sPUSCH design
R1-1708216	ZP CSI-RS for PDSCH rate matching	PANASONIC	Quan Kuang	64589	discussion				160	7.1.2.3.1	CSI framework
R1-1708217	DCI considerations for CBG transmission from two TBs	ZTE	Yifei Yuan	58525	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708218	PRACH design resolving Time Ambiguity and Increasing Capacity	TCL Communication Ltd.	Umer Salim	70602	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1708219	Skeleton of 38.211 Physical channels and modulation	Ericsson	Stefan Parkvall	28759	draft TS	Endorsement		draft TS	127	7.1	New Radio Access Technology - WID in RP-170855
R1-1708220	UL Power Control for MIMO	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			219	7.1.9	UL power control
R1-1708221	On power sharing between LTE and NR in DC	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			219	7.1.9	UL power control
R1-1708222	Next steps for pi/2 BPSK with spectrum shaping	IITH	Kuchi Kiran	61192	discussion	Decision			213	7.1.5	Modulation
R1-1708223	Uplink diversity scheme for DFT-S-OFDM	IITH	Kuchi Kiran	61192	other	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1708224	CBG based HARQ	Sequans Communications	GUANG LIU	64119	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708225	Discussion on PRACH designs to support over one symbol latency	Sequans Communications	GUANG LIU	64119	discussion				138	7.1.1.4.1	PRACH design
R1-1708226	pre-DFT multiplexing of PT-RS for DFT-S-OFDM	IITH	Kuchi Kiran	61192	other	Decision			169	7.1.2.4.3	PT-RS
R1-1708227	Resource allocation for PUCCH	Sequans Communications	GUANG LIU	64119	discussion				186	7.1.3.2.3	Resource allocation for PUCCH
R1-1708228	Sequence based design for 1 and 2-bit PUCCH short duration	IITH	Kuchi Kiran	61192	other				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708229	Pre DFT multiplexing of RS and Data for PUCCH short duration	IITH	Kuchi Kiran	61192	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708230	Design options for long duration PUCCH	IITH	Kuchi Kiran	61192	other	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1708231	Remaining details on SS sequence design	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			130	7.1.1.1.1	Remaining details on SS sequence design

R1-1708232	On SS Burst and Burst Set Composition	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1708233	SS block time index indication	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			132	7.1.1.1.3	SS block time index indication
R1-1708234	NR-PBCH design	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1708235	On Remaining System Information Delivery	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			135	7.1.1.2.2	Remaining system information delivery
R1-1708236	Paging in NR	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			136	7.1.1.3	Paging design
R1-1708237	SS block RSRP measurements	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1708238	CSI-RS for mobility purposes	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1708239	NR Radio lin monitoring	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1708240	Cell Identification in NR	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			144	7.1.1.6	Other
R1-1708241	One issue for SS block frequency location	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			144	7.1.1.6	Other
R1-1708242	Non-Terrestrial Network: Propagation delay and Doppler characterisation	THALES	Nicolas Chuberre	21633	discussion		Non-Terrestrial Network: Propagataion delay and Doppler		222	7.2	Other
R1-1708243	NR Physical Random Access Channel	Nokia, Alcatel-Lucent Shanghai Bell	Emad Farag	66840	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1708244	NR 4-step RACH procedure	Nokia, Alcatel-Lucent Shanghai Bell	Emad Farag	66840	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1708245	Synchronisation channels for efe-MTC	Sony	Martin Beale	59973	discussion				93	6.2.6.1	Reduced system acquisition time
R1-1708246	Power consumption evaluation of wake-up signal technique	Sony	Martin Beale	59973	discussion				94	6.2.6.2	Downlink channel power efficiency
R1-1708247	Power consumption evaluation of wake-up signal technique	Sony	Martin Beale	59973	discussion				101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1708248	On early uplink early termination of PUSCH	Sony	Martin Beale	59973	discussion				95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1708249	PUSCH spectral efficiency techniques for efeMTC	Sony	Martin Beale	59973	discussion				97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1708250	On using uplink grant free resource for URLLC	Sony	Martin Beale	59973	discussion				191	7.1.3.3.2	UL data scheduling
R1-1708251	Further considerations on using pre-emption indicator for DL URLLC/eMBB multiplexing	Sony	Martin Beale	59973	discussion				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708252	Remaining Issues on 4-step RACH Procedure	Sony	Martin Beale	59973	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1708253	Discussion on SS block time index indication	Sony	Martin Beale	59973	discussion				132	7.1.1.1.3	SS block time index indication
R1-1708254	Discussion on the CBG-based retransmission	Sony	Martin Beale	59973	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708255	Discussion on resource indication for uplink grant-free transmission	Sony	Martin Beale	59973	discussion				191	7.1.3.3.2	UL data scheduling
R1-1708256	Discussion on NR-PBCH Reference Sequence	Sony	Martin Beale	59973	discussion				134	7.1.1.2.1	NR-PBCH
R1-1708257	On eMBB/URLLC multiplexing for Uplink	Sony	Martin Beale	59973	discussion				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708258	Considerations on beam reporting	Sony	Martin Beale	59973	discussion				156	7.1.2.2.1	Beam management details
R1-1708259	Considerations on interference measurement	Sony	Martin Beale	59973	discussion				161	7.1.2.3.2	Details of CSI acquisition
R1-1708260	Considerations on fine time/frequency tracking	Sony	Martin Beale	59973	discussion				172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1708261	Open issues on SRS design	Sony	Martin Beale	59973	discussion				173	7.1.2.4.7	Other
R1-1708262	Discussion on discovery enhancements for feD2D	Sony	Martin Beale	59973	discussion				118	6.2.9.2.2	Discovery aspects
R1-1708263	Discussion on sidelink UE-to-NW relaying	Sony	Martin Beale	59973	discussion				120	6.2.9.2.3.1	Sidelink UE-to-NW relaying
R1-1708264	Discussion on sidelink resource allocation and configuration	Sony	Martin Beale	59973	discussion				121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1708265	Discussion on sidelink adaptation and feedback information	Sony	Martin Beale	59973	discussion				123	6.2.9.2.3.4	Sidelink feedback information

R1-1708266	Preemption Indication Details for eMBB URLLC Multiplexing	TCL Communication Ltd.	Umer Salim	70602	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708267	Correction of RAR window definition in CE mode B	Ericsson LM	Johan Bergman	51222	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708268	Parallel reception of MPDCCH and PDSCH for BL/CE UE	Ericsson LM	Johan Bergman	51222	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1708269	Flexible PDSCH/PUSCH resource allocation for MTC	Ericsson LM	Johan Bergman	51222	discussion	Decision			98	6.2.6.6	Other
R1-1708270	Discussion on Nested Usage of RS for Beam Measurement	National Instruments Corp.	Nikhil Kundargi	57928	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1708271	Discussion on Robust Beam Management	National Instruments Corp.	Nikhil Kundargi	57928	discussion	Decision			158	7.1.2.2.3	Other
R1-1708272	Discussion on explicit and implicit signaling for PT-RS	National Instruments Corp.	Nikhil Kundargi	57928	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1708273	Blind Detection with Polar Codes	McGill University	Carlo Condo	70564	discussion		We propose a blind detection scheme based on polar codes, where the radio network temporary identifier is transmitted instead of some of the frozen bits. A low-complexity decoding stage decodes all candidates, selecting a subset that is decoded by a high-performance algorithm. Simulations results show good missed detection and false alarm rates, that meet the system specifications. We also propose an early stopping criterion for the second decoding stage that can reduce the number of operations performed, improving both average latency and energy consumption. The detection speed is analyzed and different system parameter combinations are shown to meet the timing requirements,		178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708274	Calibration results for Phase 1 NR MIMO link level calibration	ZTE	Ruyue Yu-Ngok Li	43128	discussion				174	7.1.2.5	Other
R1-1708275	Calibration results for Phase 3 NR MIMO calibration	ZTE	Ruyue Yu-Ngok Li	43128	discussion				174	7.1.2.5	Other
R1-1708276	Uplink sharing in NSA mode	Apple Inc.	Wei Zeng	70918	discussion	Discussion			218	7.1.8	NR-LTE co-existence
R1-1708277	Signaling of SS block index	Apple Inc.	Wei Zeng	70918	discussion	Discussion			132	7.1.1.1.3	SS block time index indication
R1-1708278	Synchronization and tracking in wideband carrier	Apple Inc.	Wei Zeng	70918	discussion	Discussion			217	7.1.7	Wider bandwidth operations
R1-1708279	eMBB and URLLC multiplexing for NR	Apple Inc.	Wei Zeng	70918	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708280	Group-common PDCCH for NR	Apple Inc.	Wei Zeng	70918	discussion	Discussion			181	7.1.3.1.5	Group-common PDCCH
R1-1708281	Number of HARQ processes and UE category	Apple Inc.	Wei Zeng	70918	discussion	Discussion			193	7.1.3.3.4	Processing time and HARQ process number
R1-1708282	On channel design for long PUCCH	Apple Inc.	Wei Zeng	70918	discussion	Discussion			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1708283	Control indicator channel for UE power saving	Apple Inc.	Wei Zeng	70918	discussion	Discussion			181	7.1.3.1.5	Group-common PDCCH
R1-1708284	Clarification of RV Cycling in the presence of invalid SFs	Nokia	David Bhatoolaul	70745	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708285	Clarification of frequency hopping for “PDCCH order” initiated msg3 PUSCH	Nokia	David Bhatoolaul	70745	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708286	Clarification of the #repetitions used for msg3 retransmissions	Nokia	David Bhatoolaul	70745	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708287	Correction of the calculation of the #RV-blocks for a given PDSCH	Nokia	David Bhatoolaul	70745	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708288	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	Nokia	David Bhatoolaul	70745	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708289	Support of NC-JT in TM9	Intel Corporation	Seunghee Han	47329	discussion	Decision			87	6.2.4.4	Other

R1-1708290	On pre-DFT RS/UCI multiplexing for PUCCH in short duration	Mitsubishi Electric RCE	Cristina Ciochina-Duchesne	56339	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708291	On channel models for aerial UEs	Ericsson	Siva Muruganathan	59639	other				110	6.2.8.1	Channel modelling of aerial UEs
R1-1708292	On line of sight probability for aerial UEs	Ericsson	Siva Muruganathan	59639	other				110	6.2.8.1	Channel modelling of aerial UEs
R1-1708293	On the remaining evaluation assumptions for low altitude aerial vehicles	Ericsson	Siva Muruganathan	59639	other				111	6.2.8.2	Remaining details of evaluationassumptions
R1-1708294	On potential enhancements for low altitude aerial vehicles	Ericsson	Siva Muruganathan	59639	other				112	6.2.8.3	Potential enhancements for drones
R1-1708295	UL DMRS for sTTI	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1708296	Collision of sTTI/TTI in UL	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1708297	sTTI scheduling	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				43	6.2.1.2.2.1	sTTI scheduling
R1-1708298	sPDCCH design	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				44	6.2.1.2.2.2	sPDCCH design
R1-1708299	Search space for sTTI operation	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				45	6.2.1.2.2.3	Search space for sTTI operation
R1-1708300	sPDCCH and sPDSCH multiplexing	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				46	6.2.1.2.2.4	sPDCCH multiplexing with data
R1-1708301	CSI aspects of shortened TTI	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1708302	NR-SS sequence design and evaluation	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708303	Design of SS block and SS burst set	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1708304	Indication of SS block timing information	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				132	7.1.1.1.3	SS block time index indication
R1-1708305	RACH configuration and procedure	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1708306	NR DL control channel structure	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708307	On NR group-common control channel	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				181	7.1.3.1.5	Group-common PDCCH
R1-1708308	Short PUCCH structure	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708309	Resource allocation for short PUCCH	Motorola Mobility, Lenovo	Vijay Nangia	34148	discussion				186	7.1.3.2.3	Resource allocation for PUCCH
R1-1708310	Reduced PSS/SSS Acquisition Time Analysis	Sierra Wireless, S.A.	Gustav Vos	31476	discussion	Discussion			93	6.2.6.1	Reduced system acquisition time
R1-1708311	Idle Mode Power Efficiency Reduction	Sierra Wireless, S.A.	Gustav Vos	31476	discussion	Discussion			94	6.2.6.2	Downlink channel power efficiency
R1-1708312	PUSCH Spectral Efficiency Solution Analysis	Sierra Wireless, S.A.	Gustav Vos	31476	discussion	Discussion			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1708313	PRACH Design	Cohere Technologies	Christian Ibars Casas	66231	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1708314	Structure of PUCCH in long-duration	Cohere Technologies	Christian Ibars Casas	66231	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1708315	Design aspects of Polar Code	Intel Corporation	Seunghee Han	47329	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1708316	Study of early-termination techniques for Polar code	Intel Corporation	Seunghee Han	47329	discussion	Decision			208	7.1.4.2.1.1	Code construction
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R1-1708318	Coding scheme for PBCH	Intel Corporation	Seunghee Han	47329	discussion	Decision			211	7.1.4.3	PBCH
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R1-1708320	Mathematical analysis based on theorems of M-sequence for NR-SSS	Innovative Technology Lab Co.	Sung Jun Yoon	58632	other				130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708321	Considerations on DMRS pattern for NR	Innovative Technology Lab Co.	Sung Jun Yoon	58632	other				168	7.1.2.4.2	DMRS
R1-1708322	On Design of Synchronization Signal Sequences in NR	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708323	NR SS block and SS burst set composition	Innovative Technology Lab Co.	Sung Jun Yoon	58632	other				131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1708324	On SS Block and Burst Set Composition and Multiplexing	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1708325	NR SS block time indexing	Innovative Technology Lab Co.	Sung Jun Yoon	58632	other				132	7.1.1.1.3	SS block time index indication
R1-1708326	On SS Block Time Index Indication in NR	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				132	7.1.1.1.3	SS block time index indication
R1-1708327	On NR Physical Broadcast Channel	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				134	7.1.1.2.1	NR-PBCH

R1-1708328	NR-PBCH design aspects	Innovative Technology Lab Co.	Sung Jun Yoon	58632	other				134	7.1.1.2.1	NR-PBCH
R1-1708329	On Remaining System Information Delivery	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				135	7.1.1.2.2	Remaining system information delivery
R1-1708330	On Selection of DL Transmission Scheme 2	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1708331	TPMI Indication for Frequency Selective UL Precoding	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				149	7.1.2.1.3	Codebook based transmission for UL
R1-1708332	PRG Size Indication in NR	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				152	7.1.2.1.6	PRB bundling for DL
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R1-1708337	On CSI framework for NR	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				160	7.1.2.3.1	CSI framework
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R1-1708339	On Type I CSI feedback for Multi-panel	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				163	7.1.2.3.4	CSI feedback Type I
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R1-1708346	On REG bundling for PDCCH	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708347	On UE-specific search space design	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708348	On low latency PDCCH	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				182	7.1.3.1.6	Other
R1-1708349	On 1-symbol short-PUCCH for more than 2 bits	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708350	On 1-symbol short-PUCCH for up to 2 bits	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708351	On transmit diversity for Long PUCCH	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				185	7.1.3.2.2	Structure of PUCCH in long-duration
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R1-1708358	Rate Matching Design for Polar Codes	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				208	7.1.4.2.1.1	Code construction
R1-1708359	Channel Codes for PBCH	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				211	7.1.4.3	PBCH
R1-1708360	Performance Evaluation of Dual Carrier Modulation for New Radio	InterDigital, Inc.	Shahrokh Nayeb Nazar	72080	discussion				213	7.1.5	Modulation
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R1-1708377	Signaling design for DM-RS overhead reduction	China Telecommunications	Jianchi Zhu	58216	discussion	Discussion			90	6.2.5.2	DMRS overhead reduction
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R1-1708394	Discussion on the semi-static DL and UL transmission	CMCC	Hui Tong	58245	other	Discussion			176	7.1.3.1	Physical downlink control channel
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R1-1708396	Transmit Diversity on NR-PDCCH with Assisting RS	CMCC	Hui Tong	58245	other	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708397	Beamforming on NR-PDCCH	CMCC	Hui Tong	58245	other	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
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R1-1708434	Work plan for Rel-15 NR WI	NTT DOCOMO, INC.	Hiroki Harada	47533	Work Plan				127	7.1	New Radio Access Technology - WID in RP-170855
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R1-1708448	Views on CW mapping	NTT DOCOMO, INC.	Hiroki Harada	47533	discussion				147	7.1.2.1.1	Codeword mapping
R1-1708449	Discussion on DL transmission scheme 2	NTT DOCOMO, INC.	Hiroki Harada	47533	discussion				148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1708450	Beam determination for non-codebook based transmission for uplink	NTT DOCOMO, INC.	Hiroki Harada	47533	discussion				150	7.1.2.1.4	Non-codebook based transmission for UL
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R1-1708594	Discussion on CSI-RS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			167	7.1.2.4.1	CSI-RS
R1-1708595	Discussion on UL DMRS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			168	7.1.2.4.2	DMRS
R1-1708596	Discussion on DL DMRS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			168	7.1.2.4.2	DMRS
R1-1708597	Evaluation of UL DMRS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			168	7.1.2.4.2	DMRS
R1-1708598	Evaluation of DL DMRS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			168	7.1.2.4.2	DMRS
R1-1708599	Phase and frequency tracking reference signal considerations	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			169	7.1.2.4.3	PT-RS
R1-1708600	Discussion on SRS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			170	7.1.2.4.4	SRS
R1-1708601	Discussion on QCL	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			171	7.1.2.4.5	QCL
R1-1708602	Further analysis on fine time/frequency tracking RS design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1708603	Remaining issues for DMRS	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion		Late contribution	168	7.1.2.4.2	DMRS
R1-1708604	MIMO calibration results for sub6GHz	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			174	7.1.2.5	Other
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R1-1708606	Wideband RS and narrowband RS	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708607	RS density and REG bundling size for DL control channel	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708608	PDCCH structure	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708609	Nested search space design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708610	Control resource set and search space	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708611	Common control resource set signaling in MIB	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708612	Resource reuse for data in DL control region	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1708613	Views on DCI contents	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			180	7.1.3.1.4	DCI contents
R1-1708614	Contents of group common PDCCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			181	7.1.3.1.5	Group-common PDCCH
R1-1708615	Channelization of 1-symbol short PUCCH with more than 2 bits payload	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708616	Channelization of 1-symbol Short PUCCH with 1 or 2 bits payload	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708617	MPR issue with distributed RB allocation in UL	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708618	Channelization of 2-symbol Short PUCCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708619	Channel multiplexing for long PUCCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1708620	Long PUCCH Design Considerations	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1708621	Resource allocation for PUCCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1708622	Uplink Resource for SR	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			186	7.1.3.2.3	Resource allocation for PUCCH
R1-1708623	UCI and data multiplexing	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			187	7.1.3.2.4	UCI multiplexing
R1-1708624	Discussion TB size determination	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			190	7.1.3.3.1	DL data scheduling
R1-1708625	SR transmission in >6GHz bands	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1708626	Simultaneous UL SR channel	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			191	7.1.3.3.2	UL data scheduling

R1-1708627	Mixed HARQ Processing Time Support	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			192	7.1.3.3.3	HARQ-ACK feedback
R1-1708628	Number of HARQ processes	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			193	7.1.3.3.4	Processing time and HARQ process number
R1-1708629	Processing time requirements	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			193	7.1.3.3.4	Processing time and HARQ process number
R1-1708630	Scaled Numerology for UL Channel Design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			193	7.1.3.3.4	Processing time and HARQ process number
R1-1708631	Email discussion on number of HARQ processes, soft buffer size for NR	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			193	7.1.3.3.4	Processing time and HARQ process number
R1-1708632	Multi-bit HARQ-ACK feedback HARQ design principle	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708633	Use cases of multi-bit HARQ-ACK feedback	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708634	UL URLLC capacity study and URLLC/eMBB dynamic multiplexing design principle	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708635	Indication design for UL URLLC and eMBB multiplexing	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708636	URLLC DL control and indication channel	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708637	DL indication channel design principle for URLLC/eMBB dynamic multiplexing	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708638	CRC attachment	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			201	7.1.4.1.1.1	CRC attachment
R1-1708639	LDPC segmentation	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			202	7.1.4.1.1.2	Segmentation
R1-1708640	LDPC rate matching	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			203	7.1.4.1.1.3	Rate matching
R1-1708641	Frequency domain interleaving	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			204	7.1.4.1.1.4	Other
R1-1708642	LDPC rate compatible design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			205	7.1.4.1.2	LDPC code design
R1-1708643	Comparison of Polar codes between CA and PC for control channel	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1708644	Early termination for polar codes	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1708645	Polar Coding Construction and Rate Matching Impact on Complexity and Latency	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1708646	FRANK polar construction for NR control channel and performance comparison	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			209	7.1.4.2.1.2	Sequence design
R1-1708647	Rate-matching scheme for polar code and performance evaluation	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			209	7.1.4.2.1.2	Sequence design
R1-1708648	On UCI aspects (design of Polar code for large UCI with segmentation)	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			210	7.1.4.2.1.3	Other
R1-1708649	Interleaver design for Polar codes	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			210	7.1.4.2.1.3	Other
R1-1708650	PBCH channel coding	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			211	7.1.4.3	PBCH
R1-1708651	Dynamic TDD UE to UE measurement considerations	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			215	7.1.6.1	Cross-link interference management
R1-1708652	Dynamic TDD Cross-link interference management consideration	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			215	7.1.6.1	Cross-link interference management
R1-1708653	Views on wideband NR operation	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			217	7.1.7	Wider bandwidth operations
R1-1708654	NR-LTE adjacent channel coexistence consideration	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			218	7.1.8	NR-LTE co-existence
R1-1708655	NR-LTE co-channel coexistence consideration	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			218	7.1.8	NR-LTE co-existence
R1-1708656	Power control and PHR for different waveforms	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			219	7.1.9	UL power control
R1-1708657	Multi-beam PDCCH design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			219	7.1.9	UL power control
R1-1708658	Performance comparison between CA-polar and PC-polar for very small block length	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			219	7.1.9	UL power control
R1-1708659	PDSCH structure	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			219	7.1.9	UL power control
R1-1708660	PUSCH structure	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			219	7.1.9	UL power control
R1-1708661	On sPDCCH search space design	InterDigital Inc.	Moon-il Lee	46436	discussion				45	6.2.1.2.2.3	Search space for sTTI operation

R1-1708662	On sPUCCH Format Design	InterDigital Inc.	Moon-il Lee	46436	discussion				48	6.2.1.2.3.1	sPUCCH format design
R1-1708663	Remaining issues for TDD with reduced processing time	ITRI	Hung-hsiang Wang	46683	discussion				32	6.2.1.1.3	FS2 aspects
R1-1708664	Discussion on PHR for sTTI operation	ITRI	Hung-hsiang Wang	46683	discussion				61	6.2.1.2.7	Other
R1-1708665	Discussion on Type I CSI feedback	ITRI	Hung-hsiang Wang	46683	discussion				163	7.1.2.3.4	CSI feedback Type I
R1-1708666	On RAN2 LS on CSI-RS for beam management and RRM measurements	Ericsson	Stephen Grant	65572	discussion				4	4	Incoming Liaison Statements
R1-1708667	Codeword to layer mapping for DL and UL	Ericsson	Stephen Grant	65572	discussion				147	7.1.2.1.1	Codeword mapping
R1-1708668	Downlink Tx Scheme 2: Summary, Recent Developments, & Way Forward	Ericsson	Stephen Grant	65572	discussion				148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1708669	UL MIMO procedures for codebook based transmission	Ericsson	Stephen Grant	65572	discussion				149	7.1.2.1.3	Codebook based transmission for UL
R1-1708670	UL MIMO procedures for non-codebook based transmission	Ericsson	Stephen Grant	65572	discussion				150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1708671	Robust Transmission Scheme for PUSCH	Ericsson	Stephen Grant	65572	discussion				151	7.1.2.1.5	Diversity transmission for UL
R1-1708672	On DL PRB bundling	Ericsson	Stephen Grant	65572	discussion				152	7.1.2.1.6	PRB bundling for DL
R1-1708673	On Multi-TRP and Multi-panel transmission	Ericsson	Stephen Grant	65572	discussion				153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1708674	UL multi-panel transmission	Ericsson	Stephen Grant	65572	discussion				153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1708675	On transmission parameter sets	Ericsson	Stephen Grant	65572	discussion				154	7.1.2.1.8	Other
R1-1708676	DL beam management details	Ericsson	Stephen Grant	65572	discussion				156	7.1.2.2.1	Beam management details
R1-1708677	UL beam management details	Ericsson	Stephen Grant	65572	discussion				156	7.1.2.2.1	Beam management details
R1-1708678	Beam failure recovery mechanism	Ericsson	Stephen Grant	65572	discussion				157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1708679	On cell specific CSI-RS	Ericsson	Stephen Grant	65572	discussion				158	7.1.2.2.3	Other
R1-1708680	On the use of SS for beam management	Ericsson	Stephen Grant	65572	discussion				158	7.1.2.2.3	Other
R1-1708681	Beam management in C-DRX	Ericsson	Stephen Grant	65572	discussion				158	7.1.2.2.3	Other
R1-1708682	Further results on beam management without beam indication	Ericsson	Stephen Grant	65572	discussion				158	7.1.2.2.3	Other
R1-1708683	Performance of beam grouping for different UE antenna architectures	Ericsson	Stephen Grant	65572	discussion				158	7.1.2.2.3	Other
R1-1708684	Further details of CSI framework	Ericsson	Stephen Grant	65572	discussion				160	7.1.2.3.1	CSI framework
R1-1708685	On CSI acquisition and reporting	Ericsson	Stephen Grant	65572	discussion				161	7.1.2.3.2	Details of CSI acquisition
R1-1708686	CSI acquisition for reciprocity-based operation	Ericsson	Stephen Grant	65572	discussion				162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1708687	Codebook design for Type I single-panel CSI	Ericsson	Stephen Grant	65572	discussion				163	7.1.2.3.4	CSI feedback Type I
R1-1708688	Codebook design for Type II CSI feedback	Ericsson	Stephen Grant	65572	discussion				164	7.1.2.3.5	CSI feedback Type II
R1-1708689	On Dynamic Triggering for CSI Reports and CSI-RS	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708690	A comparison of CSI-RS activation schemes based on MAC CE and DCI	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708691	Identifying bounds on parameters in CSI framework	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708692	Semi-persistent CSI reporting on PUSCH	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708693	Scalable codebook for up to 32 ports	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708694	PDSCH rate matching	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708695	Multi-panel codebook	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708696	NR CSI Computation Capability	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708697	On CSI reporting for short PUCCH	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708698	Frequency parametrization for Type II CSI codebook	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708699	Type II CSI for beamformed CSI-RS and hybrid operation	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708700	Further details of measurement restriction configuration	Ericsson	Stephen Grant	65572	discussion				165	7.1.2.3.6	Other
R1-1708701	On CSI-RS design	Ericsson	Stephen Grant	65572	discussion				167	7.1.2.4.1	CSI-RS
R1-1708702	On CSI-RS design for beam management	Ericsson	Stephen Grant	65572	discussion				167	7.1.2.4.1	CSI-RS
R1-1708703	On DL DMRS design	Ericsson	Stephen Grant	65572	discussion				168	7.1.2.4.2	DMRS
R1-1708704	Evaluation results for DL DMRS	Ericsson	Stephen Grant	65572	discussion				168	7.1.2.4.2	DMRS
R1-1708705	On UL DMRS design	Ericsson	Stephen Grant	65572	discussion				168	7.1.2.4.2	DMRS
R1-1708706	Evaluation results for UL DMRS	Ericsson	Stephen Grant	65572	discussion				168	7.1.2.4.2	DMRS
R1-1708707	On DL PTRS design	Ericsson	Stephen Grant	65572	discussion				169	7.1.2.4.3	PT-RS
R1-1708708	On UL PTRS design	Ericsson	Stephen Grant	65572	discussion				169	7.1.2.4.3	PT-RS
R1-1708709	SRS Design	Ericsson	Stephen Grant	65572	discussion				170	7.1.2.4.4	SRS
R1-1708710	On QCL	Ericsson	Stephen Grant	65572	discussion				171	7.1.2.4.5	QCL
R1-1708711	On time and frequency tracking of the channel	Ericsson	Stephen Grant	65572	discussion				172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1708712	On a unified CSI-RS design to support multiple use cases	Ericsson	Stephen Grant	65572	discussion				173	7.1.2.4.7	Other
R1-1708713	On the collision between DMRS and DC subcarrier	Ericsson	Stephen Grant	65572	discussion				173	7.1.2.4.7	Other
R1-1708714	On reference signals for UL power control	Ericsson	Stephen Grant	65572	discussion				219	7.1.9	UL power control

R1-1708715	On UL power control for NR	Ericsson	Stephen Grant	65572	discussion				219	7.1.9	UL power control
R1-1708716	Discussion on REG bundle in time-domain	ITRI	Hung-hsiang Wang	46683	discussion				177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1708717	Discussion on two-stage DCI for NR	ITRI	Hung-hsiang Wang	46683	discussion				182	7.1.3.1.6	Other
R1-1708718	On in-sync/out-of-sync indications for RLF for reply LS to RAN2	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			4	4	Incoming Liaison Statements
R1-1708719	NR synchronization signal design	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708720	SS Block Composition and SS Burst Set Composition	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1708721	SSB Time Index Indication	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			132	7.1.1.1.3	SS block time index indication
R1-1708722	NR physical broadcast channel design	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1708723	NR delivery of remaining system information	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			135	7.1.1.2.2	Remaining system information delivery
R1-1708724	On NR paging design	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			136	7.1.1.3	Paging design
R1-1708725	NR PRACH design	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1708726	NR mapping between SS-blocks and PRACH preambles	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1708727	Mobility measurements based on SS block	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1708728	Measurements based on CSI-RS for L3 mobility	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1708729	Radio link monitoring	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1708730	System information for low complexity and extended coverage	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			144	7.1.1.6	Other
R1-1708731	NR random-access response design	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			144	7.1.1.6	Other
R1-1708732	Full performance evaluation (HS-SCCH part I & II) of the simplified HS-SCCH Type 1 versus the legacy HS-SCCH Type 1	Ericsson	Gerardo Medina	58678	other				10	5.2.1	Evaluation of the identified solution
R1-1708733	Timing for receiving the simplified HS-SCCH Type 1 when the legacy CQI reports are used as triggering mechanism	Ericsson	Gerardo Medina	58678	discussion				12	5.2.3	Other
R1-1708734	Text proposal: Impact on RAN Working Groups	Ericsson	Gerardo Medina	58678	other				11	5.2.2	Impact on specifications
R1-1708735	On the conclusion for the study item on a simplified HS-SCCH for UMTS	Ericsson	Gerardo Medina	58678	discussion				12	5.2.3	Other
R1-1708736	Text proposal on the full performance evaluation (HS-SCCH part I & II) of the simplified HS-SCCH Type 1 versus the legacy HS-SCCH Type 1	Ericsson	Gerardo Medina	58678	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1708737	Text proposal on the timing for receiving the simplified HS-SCCH Type 1 when the legacy CQI reports are used as triggering mechanism	Ericsson	Gerardo Medina	58678	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1708738	Text proposal on the conclusion for the study item on a simplified HS-SCCH for UMTS	Ericsson	Gerardo Medina	58678	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1708739	Analysis of the code allocation impact on the primary carrier for the SI on scheduling enhancements with carrier aggregation for UMTS	Ericsson	Gerardo Medina	58678	other				14	5.3.1	Evaluation of the identified solution
R1-1708740	Text proposal: Analysis of the code allocation impact on the primary carrier for the SI on scheduling enhancements with carrier aggregation for UMTS	Ericsson	Gerardo Medina	58678	discussion	Decision			15	5.3.2	Impact on specifications
R1-1708741	Correction on reference table for the repetition number field in DCI Format 0C	NEC	Wang Gang	43643	draftCR	Decision			26	6.1.7	Other
R1-1708742	Design considerations for DM-RS overhead reduction	Nokia, Alcatel-Lucent Shanghai Bell	Jari Lindholm	68379	discussion				90	6.2.5.2	DMRS overhead reduction
R1-1708743	CB-Group based HARQ-ACK feedback and retransmission	Shenzhen Coolpad Technologies, Xiaomi Technology	Mingju Li	60196	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708744	Correction for scope	Ericsson	Mattias Frenne	33019	CR	Decision	Introduced reference to 38.901 and clarified that the current TR will not be maintained beyond Release 14.		220	7.1.10	Channel model
R1-1708745	Pre-emption indication and Sub-sequent transmission	Shenzhen Coolpad Technologies	Mingju Li	60196	discussion				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708746	Draft Response to IEEE 802 LMSC regarding LAA	Qualcomm Incorporated	Peter Gaal	57198	LS out	Decision			4	4	Incoming Liaison Statements
R1-1708747	Draft Response to IEEE 802 LMSC on ED and PD issues.	Qualcomm Incorporated	Peter Gaal	57198	LS out	Decision			4	4	Incoming Liaison Statements

R1-1708748	Discussion on search space monitoring after search space change.	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708749	Correction on determination of number of repetitions PUCCH format 1	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision		Typo: wrong spec number on coversheet (36.213-->36.211)	20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708750	Correction on V_C-DAI value	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708751	Discussion on modulation scheme selection for 256QAM	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			26	6.1.7	Other
R1-1708752	Clarification for LAA RRM measurements with DRS transmission window	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708753	Clarification for LAA RRM measurements with DRS transmission window	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708754	Max TA limits for trigger based scheduling in eLAA	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			21	6.1.2	Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum
R1-1708755	PUSCH allocation with frequency hopping	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1708756	Interference randomization for Rel-14 NB-IoT	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1708757	Timing relationships for 2 HARQ processes	Qualcomm Incorporated	Peter Gaal	57198	draftCR	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1708758	Configuration of shortened processing time for 1ms TTI	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			30	6.2.1.1.1	Configuration of shortened processing time for 1ms TTI
R1-1708759	Handling collisions between n+4 and n+3 for shortened processing time for 1ms TTI	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1708760	FS2 aspects	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			32	6.2.1.1.3	FS2 aspects
R1-1708761	Asynchronous UL HARQ	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			33	6.2.1.1.4	Asynchronous UL HARQ
R1-1708762	CSI feedback	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			34	6.2.1.1.5	CSI feedback
R1-1708763	sTTI configurations	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			38	6.2.1.2.1.1	sTTI configurations
R1-1708764	Flexible UL DMRS Position	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1708765	Aspects related to dynamic switching between 1ms TTI and sTTI	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1708766	Collision of sTTI and TTI in UL	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1708767	sTTI scheduling	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			43	6.2.1.2.2.1	sTTI scheduling
R1-1708768	sPDCCH design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			44	6.2.1.2.2.2	sPDCCH design
R1-1708769	Search space for sTTI operation	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			45	6.2.1.2.2.3	Search space for sTTI operation
R1-1708770	sPDCCH multiplexing with data	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			46	6.2.1.2.2.4	sPDCCH multiplexing with data
R1-1708771	sPUCCH format design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			48	6.2.1.2.3.1	sPUCCH format design
R1-1708772	sPUCCH resource management	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			49	6.2.1.2.3.2	sPUCCH resource management
R1-1708773	UCI on sPUSCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			50	6.2.1.2.3.3	UCI on sPUSCH
R1-1708774	CSI reporting for sTTI	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1708775	sPUCCH power control	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			52	6.2.1.2.3.5	sPUCCH power control
R1-1708776	sPDSCH design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			54	6.2.1.2.4.1	sPDSCH design
R1-1708777	DL DMRS design for sPDSCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			55	6.2.1.2.4.2	DL DMRS design
R1-1708778	sPUSCH design	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			57	6.2.1.2.5.1	sPUSCH design
R1-1708779	UL DMRS design for sPUSCH	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			58	6.2.1.2.5.2	UL DMRS design
R1-1708780	sPUSCH power control	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			59	6.2.1.2.5.3	sPUSCH power control
R1-1708781	FS2 aspects	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			60	6.2.1.2.6	FS2 aspects

R1-1708782	Maximum TA and processing time for sTTI and 1ms operation	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			62	6.2.1.3	Maximum TA and processing time
R1-1708783	Link evaluation of DL data transmission under symbol-dependent puncturing/interference	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			63	6.2.1.4	Other
R1-1708784	Multiple starting positions in a subframe for DL	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708785	Multiple starting positions in a subframe for UL	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1708786	Carrier Aggregation for V2X Phase 2	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1708787	Support of 64-QAM for 3GPP V2X Phase 2	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			71	6.2.3.1.2	Support for 64-QAM
R1-1708788	Reduction of time between packet arrival and transmisison	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			72	6.2.3.1.3	Other
R1-1708789	Study of short TTI for V2X Phase 2	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			79	6.2.3.3.2	Short TTI solutions
R1-1708790	Enhancements to QCL assumptions for DMRS antenna ports	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			84	6.2.4.1	Remaining details on QCL assumptions for DMRS antenna ports
R1-1708791	Enhancements to control signaling	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			85	6.2.4.2	Enhancement to PDSCH RE mapping and resource allocation
R1-1708792	Enhancements to CSI feedback	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			86	6.2.4.3	Enhancement to CSI feedback
R1-1708793	Evaluation results for 1024QAM	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1708794	Reduced DMRS overhead	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			90	6.2.5.2	DMRS overhead reduction
R1-1708795	Reduced system acquisition time	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			93	6.2.6.1	Reduced system acquisition time
R1-1708796	Efficient monitoring of DL control channels	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			94	6.2.6.2	Downlink channel power efficiency
R1-1708797	Uplink HARQ-ACK feedback	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1708798	Increased PDSCH spectral efficiency	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			96	6.2.6.4	Increased PDSCH spectral efficiency
R1-1708799	Increased PUSCH spectral efficiency	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1708800	Early data transmission	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			98	6.2.6.6	Other
R1-1708801	Modulation enhancements for eMTC	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			98	6.2.6.6	Other
R1-1708802	Efficient monitoring of DL control channels	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1708803	Physical layer scheduling request	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			102	6.2.7.1.2	Physical layer scheduling request
R1-1708804	Semi-persistent scheduling	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			103	6.2.7.1.3	Semi-persistent scheduling
R1-1708805	Improvement of PHY measurements	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1708806	NPRACH support for large cell access	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1708807	Support of small cells	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			106	6.2.7.4	NB-IoT small cell support
R1-1708808	Reduced system acquisition time	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			107	6.2.7.5	Reduced system acquisition time
R1-1708809	Modulation enhancements for NB-IoT	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			108	6.2.7.6	Other
R1-1708810	Early data transmission	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			108	6.2.7.6	Other
R1-1708811	Channel model for aerial vehicles	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			110	6.2.8.1	Channel modelling of aerial UEs
R1-1708812	Remaining evaluation assumptions for aerial study	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1708813	System level performance and interference mitigation techniques for aerial vehicles	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			112	6.2.8.3	Potential enhancements for drones
R1-1708814	FeD2D Synchronization aspects	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			117	6.2.9.2.1	Synchronization aspects
R1-1708815	Uni-directional sidelink UE-to-NW relaying	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			120	6.2.9.2.3.1	Sidelink UE-to-NW relaying
R1-1708816	Sidelink resource allocation and configuration for bi-directional UE-to-NW relaying	Qualcomm Incorporated	Peter Gaal	57198	discussion	Discussion			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration

R1-1708817	Correction for mobility model A	Ericsson, Fraunhofer HHI	Mattias Frenne	33019	CR	Decision	Specified that mobility model A should only be used for local	Superseded by R1-1709330	220	7.1.10	Channel model
R1-1708818	Multi-panel and Multi-level Codebook Design	ZTE	Ruyue Yu-Ngok Li	43128	discussion				165	7.1.2.3.6	Other
R1-1708819	On Cross-Link Interference Management	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			215	7.1.6.1	Cross-link interference management
R1-1708820	Xn Support to aid TDD Interference Mitigation and Coordination	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			215	7.1.6.1	Cross-link interference management
R1-1708821	LBT-based UL transmission for dynamic TDD	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			216	7.1.6.2	Other
R1-1708822	On wider band aspects of NR	Nokia, Alcatel-Lucent Shanghai Bell	Karol Schober	68456	other	Approval			217	7.1.7	Wider bandwidth operations
R1-1708823	Discussion on the design of group common PDCCH	Beijing Xiaomi Mobile Software	Yajun Zhu	71337	discussion				181	7.1.3.1.5	Group-common PDCCH
R1-1708824	CRC attachment for CBG	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1708825	CRC attachment for Smaller TBs	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1708826	Code block segmentation of eMBB	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			202	7.1.4.1.1.2	Segmentation
R1-1708827	Padding techniques for LDPC	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			202	7.1.4.1.1.2	Segmentation
R1-1708828	Rate matching for eMBB	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			203	7.1.4.1.1.3	Rate matching
R1-1708829	LDPC design for eMBB	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			205	7.1.4.1.2	LDPC code design
R1-1708830	Performance of LDPC design for eMBB	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			205	7.1.4.1.2	LDPC code design
R1-1708831	Performance evaluation of polar code constructions	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1708832	Early termination benefits of CRC distribution	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1708833	Design details of distributed CRC	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1708834	Sequence design for Polar codes	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			209	7.1.4.2.1.2	Sequence design
R1-1708835	Rate matching for Polar codes	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			210	7.1.4.2.1.3	Other
R1-1708836	Coding scheme for PBCH	Nokia, Alcatel-Lucent Shanghai Bell	Keeth Jayasinghe	64118	discussion	Decision			211	7.1.4.3	PBCH
R1-1708837	Slot-level FS2 aspects for sTTI	Nokia, Alcatel-Lucent Shanghai Bell	Timo Lunttila	69949	discussion				60	6.2.1.2.6	FS2 aspects
R1-1708838	On the use of UL channel interleaver for 1 ms TTI	Ericsson	Marten Sundberg	37909	discussion	Decision			35	6.2.1.1.6	Other
R1-1708839	UE capabilities for short processing time	Ericsson	Marten Sundberg	37909	discussion	Decision			35	6.2.1.1.6	Other
R1-1708840	On supported (s)TTI configurations	Ericsson	Marten Sundberg	37909	discussion	Decision			38	6.2.1.2.1.1	sTTI configurations
R1-1708841	Handling collisions of sTTI and TTI in UL	Ericsson	Marten Sundberg	37909	discussion	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1708842	sPUCCH format design	Ericsson	Marten Sundberg	37909	discussion	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1708843	sPUCCH resource management	Ericsson	Marten Sundberg	37909	discussion	Decision			49	6.2.1.2.3.2	sPUCCH resource management
R1-1708844	UCI on sPUSCH with short TTI	Ericsson	Marten Sundberg	37909	discussion	Decision			50	6.2.1.2.3.3	UCI on sPUSCH
R1-1708845	On CSI reporting for sTTI	Ericsson	Marten Sundberg	37909	discussion	Decision			51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1708846	sPUCCH power control	Ericsson	Marten Sundberg	37909	discussion	Decision			52	6.2.1.2.3.5	sPUCCH power control
R1-1708847	Design aspects of sPUSCH	Ericsson	Marten Sundberg	37909	discussion	Decision			57	6.2.1.2.5.1	sPUSCH design
R1-1708848	On UL DMRS design	Ericsson	Marten Sundberg	37909	discussion	Decision			58	6.2.1.2.5.2	UL DMRS design

R1-1708849	TBS scaling for short TTI	Ericsson	Marten Sundberg	37909	discussion	Decision			61	6.2.1.2.7	Other
R1-1708850	On sTTI operation with small system bandwidth	Ericsson	Marten Sundberg	37909	discussion	Decision			61	6.2.1.2.7	Other
R1-1708851	UE capabilities for sTTI	Ericsson	Marten Sundberg	37909	discussion	Decision			61	6.2.1.2.7	Other
R1-1708852	On maximum TA and reduced processing time	Ericsson	Marten Sundberg	37909	discussion	Decision			62	6.2.1.3	Maximum TA and processing time
R1-1708853	On UL spectral efficiency enhancement	Huawei, HiSilicon	Brian Classon	45750	other				97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1708854	Configuring reduced processing time for 1 ms TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			30	6.2.1.1.1	Configuration of shortened processing time for 1ms TTI
R1-1708855	Remaining aspects of collisions handling with reduced processing time for 1ms TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1708856	FS2 HARQ and UL scheduling timings for 1ms TTI and reduced processing	Ericsson	Laetitia Falconetti	63379	discussion	Decision			32	6.2.1.1.3	FS2 aspects
R1-1708857	HARQ process handling with shortened processing time for 1ms TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			33	6.2.1.1.4	Asynchronous UL HARQ
R1-1708858	Remaining aspects on CSI for 1ms TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			34	6.2.1.1.5	CSI feedback
R1-1708859	On UL DMRS position for 2os TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1708860	On dynamic switching between 1ms TTI and sTTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1708861	On sTTI scheduling options	Ericsson	Laetitia Falconetti	63379	discussion	Decision			43	6.2.1.2.2.1	sTTI scheduling
R1-1708862	Design aspects of sPDCCH	Ericsson	Laetitia Falconetti	63379	discussion	Decision			44	6.2.1.2.2.2	sPDCCH design
R1-1708863	Search space for sTTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			45	6.2.1.2.2.3	Search space for sTTI operation
R1-1708864	Multiplexing sPDCCH with sPDSCH/PDSCH	Ericsson	Laetitia Falconetti	63379	discussion	Decision			46	6.2.1.2.2.4	sPDCCH multiplexing with data
R1-1708865	Design aspects of sPDSCH	Ericsson	Laetitia Falconetti	63379	discussion	Decision			54	6.2.1.2.4.1	sPDSCH design
R1-1708866	DL DMRS design for short TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			55	6.2.1.2.4.2	DL DMRS design
R1-1708867	sPUSCH power control and PHR report for sTTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			59	6.2.1.2.5.3	sPUSCH power control
R1-1708868	FS2 aspects of short TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			60	6.2.1.2.6	FS2 aspects
R1-1708869	Asynchronous HARQ for UL retransmissions with short TTI	Ericsson	Laetitia Falconetti	63379	discussion	Decision			61	6.2.1.2.7	Other
R1-1708870	Discussion on paging design	Institute for Information Industry (III)	Chun-che Chien	43585	discussion				136	7.1.1.3	Paging design
R1-1708871	Discussion on beam correspondence validity	China Unicom	Xiao Han	46713	discussion				158	7.1.2.2.3	Other
R1-1708872	Discussion on CBG-based retransmission	HTC Corporation	Ling-san Meng	59466	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708873	Discussion on UL and overall spectral efficiency improvement using MU-MIMO	Sequans Communications	Efstathios Katranaras	64062	discussion	Decision			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1708874	Discussion on beam failure recovery mechanism	Institute for Information Industry (III)	Hai-Han Wang	63209	discussion				157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1708875	PRACH Design for Beam Sweeping	TCL Communication Ltd.	bruno jechoux	71921	discussion	Discussion			138	7.1.1.4.1	PRACH design
R1-1708876	Discussion on CBG-based HARQ feedback	HTC Corporation	Ling-san Meng	59466	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708877	PRACH Design for Beam Sweeping	TCL Communication Ltd.	bruno jechoux	71921	discussion	Discussion			138	7.1.1.4.1	PRACH design
R1-1708878	Discussion on resource allocation of two downlink short TTI lengths	ASUSTEK COMPUTER (SHANGHAI)	Denny Huang	65852	discussion				43	6.2.1.2.2.1	sTTI scheduling
R1-1708879	On carrier aggregation on PC5	Ericsson LM	Ricardo Blasco Serrano	63151	other				70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1708880	On additional starting and ending points in LAA UL subframe	Sequans Communications	Efstathios Katranaras	64062	discussion	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1708881	NPRACH Reliability Enhancement	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1708882	CBG Construction Principles for CBG-based Transmission with Multi-Bit HARQ	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708883	Initial access bandwidth considerations	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			144	7.1.1.6	Other
R1-1708884	Soft buffer handling for NR	Sony	Patrick Merias	52292	discussion				193	7.1.3.3.4	Processing time and HARQ process number
R1-1708885	Multiple starting positions in a subframe for DL	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708886	On 64QAM modulation operation for Sidelink Communications	Ericsson LM	Ricardo Blasco Serrano	63151	other				71	6.2.3.1.2	Support for 64-QAM
R1-1708887	Remaining issues for TDD with reduced processing time	ITRI	Patrick Merias	52292	discussion				32	6.2.1.1.3	FS2 aspects
R1-1708888	Discussion on QCL for NR	CATT	Patrick Merias	52292	discussion	Decision			171	7.1.2.4.5	QCL
R1-1708889	NR PRACH design	Samsung	Patrick Merias	52292	discussion	Decision			138	7.1.1.4.1	PRACH design

R1-1708890	Final report of RAN1#88bis meeting	ETSI	Patrick Merias	52292	report				3	3	Approval of Minutes from previous meeting
R1-1708891	void	ETSI	Patrick Merias	52292	other				220	7.1.10	Channel model
R1-1708892	Skeleton of TS38.yyy Physical layer procedures for data channels	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	other	Endorsement		draft TS	127	7.1	New Radio Access Technology - WID in RP-170855
R1-1708893	On the support of open-loop transmission in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1708894	Codebook design for UL MIMO	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1708895	Non-codebook based UL-MIMO transmission	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1708896	UL diversity schemes	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1708897	On details of PRB Bundling	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1708898	Non-coherent Multi-node Transmission in the 5G New Radio	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1708899	DL transmission mode configuration for NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			154	7.1.2.1.8	Other
R1-1708900	On frequency selective precoding for UL-MIMO	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			154	7.1.2.1.8	Other
R1-1708901	UL DCI signaling details	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			154	7.1.2.1.8	Other
R1-1708902	Performance Evaluation of DPS CoMP scheme for NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			154	7.1.2.1.8	Other
R1-1708903	erformance Evaluation of DPS CoMP in 28 GHz	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			154	7.1.2.1.8	Other
R1-1708904	Reference signals and measurements for beam management	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			156	7.1.2.2.1	Beam management details
R1-1708905	Beam Recovery in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1708906	BPL definition and Spatial QCL time indication	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708907	On beam grouping and reporting	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708908	Multi beam transmission of UL channels	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708909	Multi-beam control channel transmission	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708910	Beam management - QCL association between DL RS and DMRS for NR-PDCCH	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708911	Beam Measurements and TX/RX Beam Correspondence	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708912	SRS transmission for beam management	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			158	7.1.2.2.3	Other
R1-1708913	Performance analysis of interference estimation in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			161	7.1.2.3.2	Details of CSI acquisition

R1-1708914	On the channel reciprocity support for CSI acquisition	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1708915	On type I CSI feedback in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			163	7.1.2.3.4	CSI feedback Type I
R1-1708916	On type II CSI feedback in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			164	7.1.2.3.5	CSI feedback Type II
R1-1708917	Interference estimation options and configuration in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			165	7.1.2.3.6	Other
R1-1708918	On the CRI definition and usability in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			165	7.1.2.3.6	Other
R1-1708919	On the CSI timing relationhips	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			165	7.1.2.3.6	Other
R1-1708920	On hybrid CSI report: from LTE MIMO to NR MIMO	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			165	7.1.2.3.6	Other
R1-1708921	Codebook design for multi-panel operation	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			165	7.1.2.3.6	Other
R1-1708922	On the CSI-RS configurations for NR CSI acquisition	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1708923	On CSI-RS Design for DL Beam Management	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1708924	On details of DL DM-RS for NR physical data channels	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1708925	DL DM-RS patterns link performance evaluation	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1708926	On details of UL DM-RS for NR physical data channels	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1708927	Discussion on PT-RS design for CP-OFDM	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1708928	UL SRS design considerations in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			170	7.1.2.4.4	SRS
R1-1708929	On QCL Framework and Configurations in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			171	7.1.2.4.5	QCL
R1-1708930	Views on the fTFT-RS in NR	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1708931	On the PT-RS Design for DFT-s-OFDM	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			173	7.1.2.4.7	Other
R1-1708932	Phase 3 SLS NR MIMO calibration results on 30 GHz	Nokia, Alcatel-Lucent Shanghai Bell	Mihai Enescu	68296	discussion	Decision			174	7.1.2.5	Other
R1-1708933	void	ETSI	Patrick Merias	52292	other				220	7.1.10	Channel model
R1-1708934	CP configuration for NR	VODAFONE Group Plc	Razieh Razavi	63862	discussion				221	7.1.11	Other
R1-1708935	void	ETSI	Patrick Merias	52292	other				220	7.1.10	Channel model
R1-1708936	void	ETSI	Patrick Merias	52292	other				220	7.1.10	Channel model
R1-1708937	Aspects of Small Batteries for Even Further Enhanced MTC	Sony Europe Limited	Martin Beale	59973	discussion				98	6.2.6.6	Other
R1-1708938	Reducing time-to-transmit for V2X	Ericsson LM	Ricardo Blasco Serrano	63151	other				72	6.2.3.1.3	Other
R1-1708939	On QCL assumptions for DMRS antenna ports	Ericsson	Sebastian Faxér	63374	discussion				84	6.2.4.1	Remaining details on QCL assumptions for DMRS antenna ports
R1-1708940	Further details on scrambling	Ericsson	Asbjorn Grovlen	45069	discussion	Decision			221	7.1.11	Other
R1-1708941	void	ETSI	Patrick Merias	52292	other				220	7.1.10	Channel model

R1-1708942	Radio resource pool sharing between mode 3 and mode 4 UEs	Ericsson LM	Ricardo Blasco Serrano	63151	other				72	6.2.3.1.3	Other
R1-1708943	On enhancements to PDSCH RE mapping and resource allocation	Ericsson	Sebastian Faxér	63374	discussion				85	6.2.4.2	Enhancement to PDSCH RE mapping and resource allocation
R1-1708944	Discussion on NR-PBCH combining	Beijing Xiaomi Mobile Software	Yang Liu	66714	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1708945	Discussion on NR-PBCH combining	Beijing Xiaomi Mobile Software	Yang Liu	66714	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1708946	Consideration on physical downlink control channel for URLLC	CATR	Yanping Xing	57090	other	Discussion			182	7.1.3.1.6	Other
R1-1708947	Evaluation results of beam selection based on multiple panel	CATR	Yanping Xing	57090	other	Discussion			158	7.1.2.2.3	Other
R1-1708948	Phase 1 calibration Results of NR MIMO	CATR	Yanping Xing	57090	other	Discussion			174	7.1.2.5	Other
R1-1708949	Phase 2 calibration Results of NR MIMO	CATR	Yanping Xing	57090	other	Discussion			174	7.1.2.5	Other
R1-1708950	Consideration on the length of NR-PRACH sequence	CATR	Yanping Xing	57090	other	Discussion			138	7.1.1.4.1	PRACH design
R1-1708951	Consideration on details of NR-PSS and NR-SSS	CATR	Yanping Xing	57090	other	Discussion			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708952	Discussions on the design of CBG	CATR	Yanping Xing	57090	other	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708953	Transmit diversity solutions for Rel-15 PSCCH and PSSCH transmissions	Ericsson LM	Ricardo Blasco Serrano	63151	other				74	6.2.3.2.1	Transmit diversity solutions
R1-1708954	On multiplexing of URLLC and eMBB in DL	Sequans Communications	Efstathios Katranaras	64062	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708955	Discussion of Multi-Antenna and Highly Directional Beam-Forming for Operation in Unlicensed Spectrum	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708956	On Autonomous UL Transmissions for NR in Unlicensed Spectrum	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708957	On Channel Access Mechanisms for NR in Unlicensed Spectrum	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708958	On NR Operation in the 60 GHz Unlicensed Band	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708959	On Physical Layer Design Policies for Unlicensed Operation of NR	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708960	Technology Components for Unlicensed Operation	Ericsson	Yu Yang	47798	discussion	Information			222	7.2	Other
R1-1708961	Multiple starting and ending positions for LAA DL	Ericsson	Yu Yang	47798	discussion	Decision			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708962	Multiple starting and ending positions for LAA UL	Ericsson	Yu Yang	47798	discussion	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1708963	Autonomous UL access for LAA unlicensed cells	Ericsson	Yu Yang	47798	discussion	Decision			67	6.2.2.3	Other
R1-1708964	Considerations and throughput evaluation of new DL partial subframes	PANASONIC R&D Center Germany	Alexander Golitschek edler von elbwart	37304	discussion	Decision			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708965	Initial evaluation for transmit diversity for V2X	Ericsson LM	Ricardo Blasco Serrano	63151	other				75	6.2.3.2.2	Initial evaluations
R1-1708966	DMRS design for Rel-15 V2X transmissions with transmit diversity	Ericsson LM	Ricardo Blasco Serrano	63151	other				74	6.2.3.2.1	Transmit diversity solutions
R1-1708967	On support of Grant-free and Grant-based transmission for UL URLLC	MediaTek Inc.	Kader Medles	72258	discussion				191	7.1.3.3.2	UL data scheduling
R1-1708968	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1708969	Short TTI transmission for PC5-based V2X	Ericsson LM	Ricardo Blasco Serrano	63151	other				77	6.2.3.3	Feasibility and gain of PC5 operation with Short TTI
R1-1708970	Outstanding issues on simulation assumptions for sTTI on PC5	Ericsson LM	Ricardo Blasco Serrano	63151	other				78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1708971	DL multiple starting position for LAA	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			65	6.2.2.1	Multiple starting positions in a subframe for DL
R1-1708972	UL additional starting and ending position for LAA	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1708973	Discussion on blind decoding enhancement for NR-PDCCH	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1708974	Contents and structure of group common PDCCH for NR	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			181	7.1.3.1.5	Group-common PDCCH
R1-1708975	UE procedure for group common PDCCH for NR	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			181	7.1.3.1.5	Group-common PDCCH
R1-1708976	On short PUCCH structure for NR	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1708977	On simultaneous transmission for PUCCH and PUSCH	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			187	7.1.3.2.4	UCI multiplexing
R1-1708978	Discussion on CBG-based transmission for NR	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback

R1-1708979	Impact on eMBB DMRS puncturing by URLLC burst	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708980	Pre-emption indication on DL multiplexing between eMBB and URLLC	WILUS Inc.	Minseok Noh	62848	discussion	Discussion			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1708981	Initial evaluation results on sTTI for PC5	Ericsson LM	Ricardo Blasco Serrano	63151	other				80	6.2.3.3.3	Initial evaluations
R1-1708982	On resource reselection for P2X UEs	Ericsson LM	Ricardo Blasco Serrano	63151	other				22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708983	void	CATR	Yanping Xing	57090	other	Discussion			182	7.1.3.1.6	Other
R1-1708984	void	CATR	Yanping Xing	57090	other	Discussion			158	7.1.2.2.3	Other
R1-1708985	void	CATR	Yanping Xing	57090	other	Discussion			174	7.1.2.5	Other
R1-1708986	void	CATR	Yanping Xing	57090	other	Discussion			174	7.1.2.5	Other
R1-1708987	void	CATR	Yanping Xing	57090	other	Discussion			138	7.1.1.4.1	PRACH design
R1-1708988	void	CATR	Yanping Xing	57090	other	Discussion			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1708989	void	CATR	Yanping Xing	57090	other	Discussion			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1708990	[Draft] Response LS on resource reselection for P2X UEs	Ericsson LM	Ricardo Blasco Serrano	63151	LS out	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708991	Corrections to 36.214	Ericsson LM	Ricardo Blasco Serrano	63151	other				22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708992	Multiple Msg1 transmissions for one monitored RAR window	InterDigital Inc.	Aata El Hamss	71288	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1708993	[DRAFT CR] Correction to the definition of S-RSSI measurement	Ericsson LM	Ricardo Blasco Serrano	63151	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708994	[DRAFT CR] Correction to the definition of S-RSSI measurement	Ericsson LM	Ricardo Blasco Serrano	63151	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708995	On CSI feedback enhancements supporting non-coherent JT	Ericsson	Sebastian Faxér	63374	discussion				86	6.2.4.3	Enhancement to CSI feedback
R1-1708996	Corrections to Mode 3 scheduling	Ericsson LM	Ricardo Blasco Serrano	63151	discussion				22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1708997	UL PTRS for DFTsOFDM waveform	Mitsubishi Electric RCE	Cristina Ciochina-Duchesne	56339	discussion				169	7.1.2.4.3	PT-RS
R1-1708998	Bandwidth adaptation in NR	InterDigital Inc.	Aata El Hamss	71288	discussion				217	7.1.7	Wider bandwidth operations
R1-1708999	Corrections to Mode 3 scheduling	Ericsson LM	Ricardo Blasco Serrano	63151	discussion				22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709000	Short TTI for increasing the reliability for PC5-based V2X	Ericsson LM	Ricardo Blasco Serrano	63151	other				79	6.2.3.3.2	Short TTI solutions
R1-1709001	NR-LTE sharing of uplink carrier frequency	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			218	7.1.8	NR-LTE co-existence
R1-1709002	On spectrum shaping for uplink Pi/2 BPSK with DFT-S-OFDM	Nokia, Alcatel-Lucent Shanghai Bell	Karri Ranta-aho	64268	discussion	Decision			213	7.1.5	Modulation
R1-1709003	PDCCH Blind decoding in NR	InterDigital Inc.	Aata El Hamss	71288	discussion				181	7.1.3.1.5	Group-common PDCCH
R1-1709004	Power Sharing in NR	InterDigital Inc.	Aata El Hamss	71288	discussion				219	7.1.9	UL power control
R1-1709005	Considerations on multiplexing with different transmission durations	KDDI Corporation	Takeo Ohseki	58533	other				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1709006	Views on SRS sequence ID and generation of SRS sequences	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				170	7.1.2.4.4	SRS
R1-1709007	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	Huawei, HiSilicon	Brian Classon	45750	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709008	Correction on 3.75 kHz NPUSCH format 2 transmission	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709009	Correction on 3.75 kHz NPUSCH format 2 transmission	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709010	DL data scheduling	InterDigital Inc.	Aata El Hamss	71288	discussion				190	7.1.3.3.1	DL data scheduling
R1-1709011	Power control with multiple waveforms and numerologies	InterDigital Inc.	Aata El Hamss	71288	discussion				219	7.1.9	UL power control
R1-1709012	Resource Allocation for DL HARQ Feedback	InterDigital Inc.	Aata El Hamss	71288	discussion				192	7.1.3.3.3	HARQ-ACK feedback
R1-1709013	Code Block based HARQ for NR	InterDigital Inc.	Aata El Hamss	71288	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback

R1-1709014	[DRAFT] Response LS on CSI-RS for beam management and RRM measurements	ZTE	Patrick Svedman	57740	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709015	Control Channel Monitoring for Bandwidth Adaptation	InterDigital Inc.	Aata El Hamss	71288	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709016	Control channel monitoring with multiple coresets	InterDigital Inc.	Aata El Hamss	71288	discussion	Discussion			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709017	PRACH design for Beam Sweeping	TCL Communication Ltd.	bruno jechoux	71921	discussion	Discussion			138	7.1.1.4.1	PRACH design
R1-1709018	Correction on 3.75 kHz NPUSCH format 2 transmission	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709019	Correction on 3.75 kHz NPUSCH format 2 transmission	Huawei, HiSilicon	Brian Classon	45750	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709020	PDSCH Starting position in NR	InterDigital Inc.	Aata El Hamss	71288	discussion				179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1709021	Considerations on cross-link interference	China Unicom	Xiao Han	46713	discussion				215	7.1.6.1	Cross-link interference management
R1-1709022	Evaluation Assumptions for Aerial Study	VODAFONE Group Plc	Siva Subramani	61870	discussion	Decision			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1709023	DMRS designs for NR MIMO: views on density reduction for DMRS	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				168	7.1.2.4.2	DMRS
R1-1709024	Considerations on CRC Length	KT Corp.	Kyu Jin Park	58528	discussion	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1709025	DMRS designs for NR MIMO: evaluation results	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				168	7.1.2.4.2	DMRS
R1-1709026	Discussion on NR-PBCH combining	Xiaomi Technology	Yang Liu	66714	discussion	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709027	DMRS designs for NR MIMO: evaluation results	Mitsubishi Electric Co.	Fumihiro Hasegawa	61720	discussion				168	7.1.2.4.2	DMRS
R1-1709028	Indication of Transmission Duration	KT Corp.	Kyu Jin Park	58528	discussion	Decision			190	7.1.3.3.1	DL data scheduling
R1-1709029	Discussion on modulation schemes for high spectral efficiency	Samsung	Younsun Kim	43499	other	Decision			222	7.2	Other
R1-1709030	Transmission and reception for high-order modulation in conjunction with MIMO	Samsung	Younsun Kim	43499	other	Decision			222	7.2	Other
R1-1709031	Composite beam transmission for SS block	Samsung	Younsun Kim	43499	other	Decision			144	7.1.1.6	Other
R1-1709032	Discussion on SS periodicity and PBCH TTI	Samsung	Younsun Kim	43499	other	Decision			144	7.1.1.6	Other
R1-1709033	System level evaluation results for beam	Samsung	Younsun Kim	43499	other	Decision			158	7.1.2.2.3	Other
R1-1709034	Link level evaluation results for beam management	Samsung	Younsun Kim	43499	other	Decision			158	7.1.2.2.3	Other
R1-1709035	Beam measurement and reporting	Samsung	Younsun Kim	43499	other	Decision			158	7.1.2.2.3	Other
R1-1709036	Discussion on Rx beam set based reporting	Samsung	Younsun Kim	43499	other	Decision			158	7.1.2.2.3	Other
R1-1709037	MIMO Phase-2 SLS calibration results on 30GHz frequency band	Samsung	Younsun Kim	43499	other	Decision			174	7.1.2.5	Other
R1-1709038	MIMO Phase-2 LLS calibration results on 30GHz frequency band	Samsung	Younsun Kim	43499	other	Decision			174	7.1.2.5	Other
R1-1709039	Indication of reserved resources	Samsung	Younsun Kim	43499	other	Decision			182	7.1.3.1.6	Other
R1-1709040	DMRS design for Short Scheduling Periods	Samsung	Younsun Kim	43499	other	Decision			182	7.1.3.1.6	Other
R1-1709041	Interference measurement table for beam	Samsung	Younsun Kim	43499	other	Decision			216	7.1.6.2	Other
R1-1709042	DC Subcarrier Handling	Samsung	Younsun Kim	43499	other	Decision			221	7.1.11	Other
R1-1709043	Spectrum shaping for p/2-BPSK DFT-s-OFDM	Samsung	Younsun Kim	43499	other	Decision			221	7.1.11	Other
R1-1709044	Draft CR on LDPC code [38.802]	Samsung	Younsun Kim	43499	draftCR	Decision			212	7.1.4.4	Other
R1-1709045	Draft CR on MPDCCH PRB Sets – Rel-14	Samsung	Younsun Kim	43499	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709046	Considerations on UE Beamforming Management	ASUSTEK COMPUTER (SHANGHAI)	Mingche Li	53966	discussion				156	7.1.2.2.1	Beam management details
R1-1709047	UL power control in multi-beam based approaches	ASUSTEK COMPUTER (SHANGHAI)	Mingche Li	53966	discussion				219	7.1.9	UL power control
R1-1709048	Discussion on Autonomous UL Access for LAA	ASUSTEK COMPUTER (SHANGHAI)	Mingche Li	53966	discussion				67	6.2.2.3	Other
R1-1709049	Two-step resource allocation for data channel in NR	ASUSTEK COMPUTER (SHANGHAI)	Eddie Lin	40159	other				190	7.1.3.3.1	DL data scheduling
R1-1709050	Calibration results for Phase 1 NR MIMO system level calibration	MOTOROLA MOBILITY LLC	Colin Frank	46352	discussion	Information			174	7.1.2.5	Other
R1-1709051	Synchronization in NR considering beam sweeping	ASUSTEK COMPUTER (SHANGHAI)	Eddie Lin	40159	other				131	7.1.1.1.2	SS block composition and SS burst set composition
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R1-1709053	Discussion on Paging Burst Design	Convida Wireless LLC	Qing Li	65106	discussion				136	7.1.1.3	Paging design
R1-1709054	On bandwidth parts	Ericsson	Patrick Merias	52292	discussion				217	7.1.7	Wider bandwidth operations
R1-1709055	On p/2-BPSK DFT-s-OFDM with spectrum shaping	Ericsson	Patrick Merias	52292	discussion				213	7.1.5	Modulation

R1-1709056	On uplink half-tone shift	Ericsson	Patrick Merias	52292	discussion				218	7.1.8	NR-LTE co-existence
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R1-1709058	Discussion on multiple starting and ending positions for UL in LAA	BROADCOM LIMITED	Patrick Merias	52292	discussion				66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1709059	Discussion on DL Preemption Indication	Convida Wireless	Patrick Merias	52292	discussion				195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1709060	Performance comparison between CA-polar and PC-polar for very small block length	Qualcomm Incorporated	Patrick Merias	52292	discussion				208	7.1.4.2.1.1	Code construction
R1-1709061	LS on CSI-RS for beam management and RRM measurements	RAN2, ZTE	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1709062	Overview of DL Control Channel Design	Ericsson	Patrick Merias	52292	discussion	Decision			176	7.1.3.1	Physical downlink control channel
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R1-1709064	On DM-RS for NR-PDCCH	Ericsson	Patrick Merias	52292	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709065	On Performance of Pre-Coder Cycling for NR-PDCCH	Ericsson	Patrick Merias	52292	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
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R1-1709068	On Blind Decoding of NR-PDCCH	Ericsson	Patrick Merias	52292	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709069	On Aggregation Levels	Ericsson	Patrick Merias	52292	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709070	On a Wake-Up Signal for Active Mode UEs	Ericsson	Patrick Merias	52292	discussion	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709071	On Data Transmission in Control Resource Sets	Ericsson	Patrick Merias	52292	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
R1-1709072	On Resource Sharing Between PDCCH and PDSCH	Ericsson	Patrick Merias	52292	discussion	Decision			179	7.1.3.1.3	Resource sharing between PDCCH and PDSCH
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R1-1709075	On Blind Decoding Complexity	Ericsson	Patrick Merias	52292	discussion	Decision			181	7.1.3.1.5	Group-common PDCCH
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R1-1709078	On Low Latency Specific Features for DL Control	Ericsson	Patrick Merias	52292	discussion	Decision			182	7.1.3.1.6	Other
R1-1709079	Overview of Short PUCCH Design	Ericsson	Patrick Merias	52292	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709080	On the Design of 1-Symbol PUCCH for 1-2 bits UCI	Ericsson	Patrick Merias	52292	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709081	On the Design of 1-Symbol PUCCH for more than 2 bits UCI	Ericsson	Patrick Merias	52292	discussion	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
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R1-1709083	Overview of Long PUCCH Design	Ericsson	Patrick Merias	52292	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709084	On the Design of Long PUCCH for 1-2 bits UCI	Ericsson	Patrick Merias	52292	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709085	On the Design of Long PUCCH for more than 2 bits UCI	Ericsson	Patrick Merias	52292	discussion	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
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R1-1709103	On Minimum Processing Time	Ericsson	Patrick Merias	52292	discussion	Decision			193	7.1.3.3.4	Processing time and HARQ process number
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R1-1709106	On CRC Attachments for Code Block Group Based HARQ-ACK Feedback	Ericsson	Patrick Merias	52292	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709107	On Design of CBG HARQ-ACK Feedback Schemes	Ericsson	Patrick Merias	52292	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709108	On Formation of Code Block Groups	Ericsson	Patrick Merias	52292	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709109	On Retransmission Decoder Throughput Issues and CBG-based HARQ Protocol	Ericsson	Patrick Merias	52292	discussion	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709110	Performance Evaluation of DL Puncturing	Ericsson	Patrick Merias	52292	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1709111	On Pre-empted Transmissions for Downlink	Ericsson	Patrick Merias	52292	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
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R1-1709114	On Evaluation Assumption for Contention-Resolution for UL SPS	Ericsson	Patrick Merias	52292	discussion	Decision			196	7.1.3.3.7	Other
R1-1709115	On Modelling of FDD, TDD, and Carrier Aggregation	Ericsson	Patrick Merias	52292	discussion	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1709116	On Dual Connectivity for NR	Ericsson	Patrick Merias	52292	discussion	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
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R1-1709118	Impact of Multiple Waveforms on UL Power Control for NR	Ericsson	Patrick Merias	52292	discussion	Decision			219	7.1.9	UL power control
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R1-1709120	On Hybrid TDD for Cross-link Interference Mitigation	Ericsson	Patrick Merias	52292	discussion	Decision			215	7.1.6.1	Cross-link interference management
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R1-1709122	On Dynamic TDD Scenarios	Ericsson	Patrick Merias	52292	discussion	Decision			216	7.1.6.2	Other
R1-1709123	On Duplexing in Paired Spectrum	Ericsson	Patrick Merias	52292	discussion	Decision			216	7.1.6.2	Other
R1-1709124	Skeleton of TS38.215 Physical layer measurement	Intel Corporation	Patrick Merias	52292	draft TS	Endorsement		draft TS	127	7.1	New Radio Access Technology - WID in RP-170855
R1-1709125	Calibration results for Phase 2 NR MIMO system level calibration	Intel Corporation	Patrick Merias	52292	discussion	Decision			174	7.1.2.5	Other
R1-1709126	Uplink grant-free transmission for URLLC	Institute for Information Industry (III)	Patrick Merias	52292	discussion	Discussion			191	7.1.3.3.2	UL data scheduling
R1-1709127	Discussion on beam failure recovery mechanism	Institute for Information Industry (III)	Patrick Merias	52292	discussion	Discussion			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709128	Correction on NB-IoT DMRS definition in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709129	Correction on NB-IoT DMRS definition in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709130	Correction on NB-IoT SC-FDMA baseband signal generation in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709131	Correction on NB-IoT SC-FDMA baseband signal generation in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709132	Reserved resources supporting NR co-existence with LTE and NB-IoT	Ericsson	Patrick Merias	52292	discussion	Discussion			218	7.1.8	NR-LTE co-existence

R1-1709133	Draft CR on correction of UE behavior to meet Crlimit	Qualcomm Incorporated	Patrick Merias	52292	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709134	Implementation Considerations for Polar Code Construction	Coherent Logix	Patrick Merias	52292	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1709135	WF: Embedded UE_ID for Early Termination	Coherent Logix	Patrick Merias	52292	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1709136	TR38.901_CR_Antenna_Model	Fraunhofer HHI, Fraunhofer IIS	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709137	TR38.901_CR_Scenarios_in_Simulation_Assumption	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709138	TR38.901_CR_TDL_Spatial_Filter	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709139	Realistic_Antenna_Polarization_Modelling	Fraunhofer IIS, Fraunhofer HHI	Patrick Merias	52292	discussion				220	7.1.10	Channel model
R1-1709140	TR36.873_CR_Correction_for_LOS_probability	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709141	TR36.873_CR_Scaling_factor_notation	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709142	TR36.873_CR_Notation_of_log-normal_distributed_random_variables	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709143	TR36.873_CR_Missing_LOS_Doppler	Fraunhofer HHI	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709144	Considerations on pre-emption indication for DL transmission	KT Corp.	Patrick Merias	52292	discussion	Decision			195	7.1.3.3.6	Multiplexing data with different transmission durations
R1-1709145	Considerations on NR PDCCH structure	KT Corp.	Patrick Merias	52292	discussion	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709146	CSI-RS design for DL beam management	KT Corp.	Patrick Merias	52292	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1709147	Discussion on CSI reporting in sTTI	KT Corp.	Patrick Merias	52292	discussion	Decision			61	6.2.1.2.7	Other
R1-1709148	Summary of [88b-13] Email discussion on: “CBG based retransmission, Transmission/retransmission of preempted data before/after ACK NACK feedback, Preemption indication for NR”	ZTE	Patrick Merias	52292	other				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709149	On design and performance of NR eMBB LDPC Code	MediaTek Inc.	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709150	On design and performance of NR eMBB LDPC Code	MediaTek Inc.	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709151	NR SSS Design and Evaluation	MediaTek Inc.	Patrick Merias	52292	discussion				130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709152	Early Termination of Polar Codes in Downlink	Ericsson	Patrick Merias	52292	discussion				208	7.1.4.2.1.1	Code construction
R1-1709153	Impact of Information Bit Locations to Polar Codes with High Order Modulations	Ericsson	Patrick Merias	52292	discussion				209	7.1.4.2.1.2	Sequence design
R1-1709154	Coding Techniques for NR-PBCH	Ericsson	Patrick Merias	52292	discussion				211	7.1.4.3	PBCH
R1-1709155	Remaining system information delivery consideration	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			135	7.1.1.2.2	Remaining system information delivery
R1-1709156	Power control with multiple waveforms and numerologies	InterDigital Inc.	Patrick Merias	52292	discussion				219	7.1.9	UL power control
R1-1709157	Initial evaluation for transmit diversity for V2X	Ericsson LM	Patrick Merias	52292	other				75	6.2.3.2.2	Initial evaluations
R1-1709158	NR HARQ Process number	vivo	Patrick Merias	52292	discussion				193	7.1.3.3.4	Processing time and HARQ process number
R1-1709159	Early termination of polar decoding	Samsung	Patrick Merias	52292	other	Decision			208	7.1.4.2.1.1	Code construction
R1-1709160	Discussion on multiple starting and ending positions for LAA UL	LG Electronics	Patrick Merias	52292	discussion	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1709161	Discussion on wake-up signal for power consumption reduction for feNB-IoT	Sequans Communications	Patrick Merias	52292	discussion				101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709162	LDPC code design for eMBB	Samsung	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709163	Summary of remaining issues and views on NR CSI-RS	Huawei, HiSilicon, Samsung	Patrick Merias	52292	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1709164	Open issues on SRS design	Sony	Patrick Merias	52292	discussion				170	7.1.2.4.4	SRS
R1-1709165	Discussion on DMRS design for DL	CATT	Patrick Merias	52292	discussion	Decision			168	7.1.2.4.2	DMRS
R1-1709166	On channel models for aerial UEs	Ericsson	Patrick Merias	52292	discussion				110	6.2.8.1	Channel modelling of aerial UEs
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R1-1709168	Summary of channel models for UMa-AV	Ericsson	Patrick Merias	52292	discussion				113	6.2.8.4	Other
R1-1709169	Summary of channel models for UMi-AV	Ericsson	Patrick Merias	52292	discussion				113	6.2.8.4	Other
R1-1709170	Summary of channel models for RMa-AV	Ericsson	Patrick Merias	52292	discussion				113	6.2.8.4	Other
R1-1709171	Summary of fast fading models for Aerials	Ericsson	Patrick Merias	52292	discussion				113	6.2.8.4	Other
R1-1709172	On RACH retransmission	Mitsubishi Electric Co.	Patrick Merias	52292	discussion				139	7.1.1.4.2	4-step RA procedure
R1-1709173	Structure of PUCCH in short-duration	ETRI	Patrick Merias	52292	discussion				184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709174	Draft CR for precoding for spatial multiplexing using antenna ports with UE-specific reference signals in 36.211	ETRI	Patrick Merias	52292	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1709175	Spectrum shaping for p/2-BPSK DFT-s-OFDM	Samsung	Patrick Merias	52292	other	Decision			221	7.1.11	Other
R1-1709176	Early termination for polar codes	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1709177	Performance comparison between CA-polar and PC-polar for very small block length	Qualcomm Incorporated	Patrick Merias	52292	discussion				208	7.1.4.2.1.1	Code construction

R1-1709178	FRANK polar construction for NR control channel and performance comparison	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			209	7.1.4.2.1.2	Sequence design
R1-1709179	On UCI aspects (design of Polar code for large UCI with segmentation)	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			210	7.1.4.2.1.3	Other
R1-1709180	Remaining issues of NR-PBCH	Samsung	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709181	LDPC Rate-Compatible Design	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			205	7.1.4.1.2	LDPC code design
R1-1709182	Transmit Diversity Aspects for NR-PDCCH	Samsung	Patrick Merias	52292	other	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709183	Discussion on CSI feedback Type II	LG Electronics	Patrick Merias	52292	discussion	Decision			164	7.1.2.3.5	CSI feedback Type II
R1-1709184	Discussion on NR PRACH preamble	LG Electronics	Patrick Merias	52292	discussion	Decision			138	7.1.1.4.1	PRACH design
R1-1709185	Mobility measurements based on SS block	Ericsson	Patrick Merias	52292	discussion	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709186	Measurements based on CSI-RS for L3 mobility	Ericsson	Patrick Merias	52292	discussion	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709187	Discussion and evaluation on NR PRACH design	NTT DOCOMO, INC.	Patrick Merias	52292	discussion				138	7.1.1.4.1	PRACH design
R1-1709188	Early termination benefits of CRC distribution	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	discussion	Decision			208	7.1.4.2.1.1	Code construction
R1-1709189	Performance of LDPC design for eMBB	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	discussion	Decision			205	7.1.4.1.2	LDPC code design
R1-1709190	Improved FH randomization for NB-IoT Rel-14	Ericsson	Patrick Merias	52292	discussion			Late contribution	25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1709191	CR for skipped subframe handling for shorter periodicity in PC5-based V2V	CATT	Patrick Merias	52292	CR	Approval		Draft CR endorsed over email thread [88b-08]	22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709192	Discussion and evaluation on NR-PBCH design	NTT DOCOMO, INC.	Patrick Merias	52292	discussion				134	7.1.1.2.1	NR-PBCH
R1-1709193	Codeword mapping in NR	MediaTek Inc.	Patrick Merias	52292	discussion				147	7.1.2.1.1	Codeword mapping
R1-1709194	Correction on PRS hopping	ZTE	Patrick Merias	52292	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709195	Channelization of 1-symbol Short PUCCH with 1 or 2 bits payload	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709196	Evaluation results for 1024QAM	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1709197	Reply LS on Data rates and Latency with NR, E-UTRA, EPS and 5GS	Vodafone	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1709198	Preamble design for UL grant-free transmission	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	discussion				191	7.1.3.3.2	UL data scheduling
R1-1709199	Phase 2 and Phase 3 SLS Calibration Results for NR MIMO	LG Electronics	Patrick Merias	52292	discussion	Information			174	7.1.2.5	Other
R1-1709200	Frequency domain interleaving	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			204	7.1.4.1.1.4	Other
R1-1709201	WF on CSI-RS configurations	ZTE, Huawei, HiSilicon, InterDigital	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709202	WF on cell-specific configurable CSI-RS for L3 mobility	ZTE, Huawei, HiSilicon, InterDigital	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709203	WF on cell-specific and fixed CSI-RS for L3 mobility	ZTE	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709204	Summary of remaining issues and views on NR CSI-RS	Huawei, HiSilicon, Samsung	Patrick Merias	52292	discussion	Decision			167	7.1.2.4.1	CSI-RS
R1-1709205	Draft CR 36.213 for correction on table reference number for PUSCH repetition levels	NEC	Patrick Merias	52292	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709206	Codebook based transmission for UL MIMO	Huawei, HiSilicon	Patrick Merias	52292	other				149	7.1.2.1.3	Codeword based transmission for UL
R1-1709207	Draft Response to IEEE 802 LMSC regarding LAA	Qualcomm Incorporated	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709208	Draft Response to IEEE 802 LMSC on ED and PD issues.	Qualcomm Incorporated	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709209	Corrections on PRB scaling for PUSCH in UpPTS	Huawei	Patrick Merias	52292	draftCR	Decision			26	6.1.7	Other
R1-1709210	Reply LS on Mixed numerologies in idle mode	Ericsson	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709211	Evaluation results of short TTI solutions for Rel-15 sidelink	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			80	6.2.3.3.3	Initial evaluations

R1-1709212	Correction on PRS hopping	ZTE	Patrick Merias	52292	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709213	Way forward on evaluation scenarios of physical layer SR in NB-IoT	Ericsson	Patrick Merias	52292	other	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1709214	Way forward on evaluation scenarios of Semi-persistent scheduling in NB-IoT	Ericsson	Patrick Merias	52292	other	Decision			103	6.2.7.1.3	Semi-persistent scheduling
R1-1709215	Way forward on uplink power control in NB-IoT small cell A.I. 6.2.7.4	Ericsson	Patrick Merias	52292	other	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1709216	Way forward on Reduced system acquisition time	Ericsson	Patrick Merias	52292	other	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1709217	Way forward on Narrowband measurement accuracy improvements A.I. 6.2.7.2	Ericsson	Patrick Merias	52292	other	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709218	Way forward on coverage in NB-IoT small cell A.I. 6.2.7.4	Ericsson	Patrick Merias	52292	other	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1709219	Draft CR on cyclic shift for DMRS of PSSCH	Samsung	Patrick Merias	52292	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709220	WF on NR-SS sequence design	NTT DOCOMO, INC.	Patrick Merias	52292	other	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709221	WF on NR-PBCH transmission scheme and DMRS design	NTT DOCOMO, InterDigital, ZTE	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709222	Correction on total number of soft channel bits for Cat M1 UE in 36.212	NEC, Intel	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709223	Beamforming on NR-PDCCH	CMCC	Patrick Merias	52292	other	Discussion			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709224	[Draft] LS on RAR window definition for BL/CE UE	Ericsson	Patrick Merias	52292	LS out	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709225	On UL PT-RS design	LG Electronics	Patrick Merias	52292	discussion	Decision			169	7.1.2.4.3	PT-RS
R1-1709226	On aligning CBG with symbol(s)	Huawei, HiSilicon	Patrick Merias	52292	discussion				194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709227	Clarification of the #repetitions used for msg3 retransmissions	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709228	Clarification of the #repetitions used for msg3 retransmissions	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709229	Way Forward on Transmit Diversity Scheme for NR-PDCCH	MediaTek Inc.	Patrick Merias	52292	other	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709230	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	Nokia	Patrick Merias	52292	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709231	Finalizing Layer Mapping	Samsung	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709232	WF on Type I and II CSI Codebooks	Samsung, Ericsson, Huawei, HiSilicon, NTT DOCOMO, Intel Corporation, CATT, ZTE, Nokia, Alcatel-Lucent Shanghai Bell, AT&T, BT, CATR, China Telecom, CHTTL, Deutsche Telekom, Fujitsu, Interdigital, KDDI, Mitsubishi Electric, NEC, OPPO, Reliance Jio, SK Telecom, Sharp, Sprint, Verizon, Xiaomi, Xinwei, CEWiT, IITH, Tejas Networks, IITM	Patrick Merias	52292	other	Decision			164	7.1.2.3.5	CSI feedback Type II
R1-1709233	Correction on NB-IoT DMRS definition in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709234	Correction on NB-IoT DMRS definition in 36.211	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709235	CR on MPDCCH PRB Sets	Samsung	Patrick Merias	52292	CR	Decision		Shadow CR for R1-1706737 36.213CR0897 (Rel-13/Cat-F) agreed at RAN1#88bis	20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709236	Correction of RAR window definition in CE mode B	Ericsson LM	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709237	Correction of RAR window definition in CE mode B	Ericsson LM	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13

R1-1709238	Correction of RAR window definition for BL/CE UE	Ericsson LM	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709239	Correction of RAR window definition for BL/CE UE	Ericsson LM	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709240	Clarification on NRS presence assumptions on unicast non-anchor carriers	Huawei, HiSilicon	Patrick Merias	52292	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709241	Clarification on the definition of the nprach-NumCBRA-StartSubcarriers	NTT DOCOMO, INC.	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709242	Clarification on the definition of the nprach-NumCBRA-StartSubcarriers	NTT DOCOMO, INC.	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709243	LS on UL HARQ processes and collision handling for short processing time with 1ms TTI	RAN1, Sharp	Patrick Merias	52292	LS out	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1709244	LS on the Power Splitting across Different TTI Lengths in UL	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision			38	6.2.1.2.1.1	sTTI configurations
R1-1709245	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709246	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709247	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709248	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709249	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709250	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709251	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709252	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709253	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709254	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709255	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709256	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709257	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709258	void	ETSI	Patrick Merias	52292	other	Decision			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709259	WF on PRACH sequence details	ZTE	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709260	WF on RACH preamble formats	ZTE	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709261	Summary for Open Issues on Layer Mapping	Samsung	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709262	WF on CBG-based (re)transmission	NTT DOCOMO, Panasonic, OPPO, CATT, Ericsson	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709263	WF on NR SS block composition	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1709264	WF on numerology for RMSI	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			135	7.1.1.2.2	Remaining system information delivery
R1-1709265	WF on bandwidth part configuration	OPPO, Ericsson	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709266	WF on DL CORESET configuration	OPPO	Patrick Merias	52292	other	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709267	WF on 2-symbol NR-PUCCH	OPPO	Patrick Merias	52292	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709268	On type I CSI feedback in NR	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	discussion	Decision			163	7.1.2.3.4	CSI feedback Type I
R1-1709269	Correction on NB-IoT SC-FDMA baseband signal generation	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709270	Correction on NB-IoT SC-FDMA baseband signal generation	Ericsson	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709271	WF on CRC Attachment for CBGs	Ericsson	Patrick Merias	52292	other	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1709272	WF on Criterion for Selection of CRC length	Ericsson	Patrick Merias	52292	other	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1709273	WF on Channel Interleaver of Data Channel	Ericsson	Patrick Merias	52292	other	Decision			202	7.1.4.1.1.2	Segmentation
R1-1709274	WF on Highest Code Rates Supported by LDPC	Ericsson	Patrick Merias	52292	other	Decision			203	7.1.4.1.1.3	Rate matching
R1-1709275	WF on Number of Base Graphs for LDPC Codes	Ericsson	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709276	LDPC code design for eMBB	Samsung	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design

R1-1709277	RAN1 agreements for Rel-14 FeMTC	Ericsson	Patrick Merias	52292	other	Information			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709278	WF on LDPC Segmentation	Samsung	Patrick Merias	52292	other	Decision			202	7.1.4.1.1.2	Segmentation
R1-1709279	WF on LDPC Parameters	Samsung	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709280	WF on Polar Code for High-Order Modulation	Samsung	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709281	WF on TB-level CRC reduction for small size TBs	LG Electronics	Patrick Merias	52292	other	Decision			201	7.1.4.1.1.1	CRC attachment
R1-1709282	DMRS designs for NR MIMO: evaluation results	Mitsubishi Electric Co.	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709283	Requirements and discussion on NR PRACH preamble format Design	CMCC	Patrick Merias	52292	discussion	Discussion			138	7.1.1.4.1	PRACH design
R1-1709284	DL power consumption reduction for eMTC	Samsung	Patrick Merias	52292	other	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1709285	Power saving for paging and connected-mode DRX for NB-IoT	Samsung	Patrick Merias	52292	other	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709286	WF on PT-RS	NTT DOCOMO, Mitsubishi Electric, Ericsson, Sharp, IITH, CEWIT, IITM, Tejas Networks, Reliance Jio, Spreadtrum, Qualcomm, LGE, Nokia, InterDigital	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709287	WF on DM-RS for CR-OFDM	NTT DOCOMO, Qualcomm, CEWiT, IIT-H, IIT-M, Cohere Technologies, Ericsson, Nokia, ASB, LG Electronics, Xinwei, InterDigital, AT&T, NEC, KDDI, OPPO, Sharp, Fujitsu	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709288	Performance evaluation of LDPC codes for eMBB	ZTE	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709289	NR LDPC design	ZTE	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709290	Summary of issues and views on fine time and frequency tracking of channel	MediaTek Inc.	Patrick Merias	52292	other	Decision			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1709291	Consideration on channel model for LTE Aerial	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709292	WF on increased PDSCH spectral efficiency	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			96	6.2.6.4	Increased PDSCH spectral efficiency
R1-1709293	WF on frequency-selective precoding in UL transmission	Huawei, HiSilicon, China Unicom, Xinwei, CMCC, Softbank, Mitsubishi Electric	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709294	WF on DL transmission scheme 2	Huawei, HiSilicon, China Unicom, Xinwei, CMCC, Softbank, Mitsubishi Electric, Interdigital, Deutsche Telekom, CATR	Patrick Merias	52292	other	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1709295	WF on NZP CSI-RS for interference measurement	Huawei, HiSilicon, Xinwei, MediaTek, AT&T, CeWiT, Intel, ZTE, ZTE Microelectronics, IITH, IITM, China Unicom, Tejas Networks, Softbank, Qualcomm, LGE, Ericsson, KDDI, Deutsche Telekom, Mitsubishi Electric, InterDigital, NEC, SONY, Spreadtrum, China Telecom, CATR, SHARP	Patrick Merias	52292	other	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1709296	WF on LDPC Design Convergence	MediaTek Inc.	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709297	[Draft] Response LS on resource reselection for P2X UEs	Nokia	Patrick Merias	52292	LS out	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink

R1-1709298	Summary of QCL	Nokia	Patrick Merias	52292	other	Decision			171	7.1.2.4.5	QCL
R1-1709299	Remaining issues on multi-TRP and multi-panel transmission	CATT	Patrick Merias	52292	other	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1709300	[DRAFT] Corrections to Mode-3 scheduling	Ericsson LM	Patrick Merias	52292	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709301	Corrections to Mode 3 scheduling	Ericsson LM	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709302	WF on observations of LDPC performance	Huawei	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709303	WF on CSI-RS for beam management	Intel, InterDigital, Samsung, MediaTek, Nokia, Alcatel Lucent Shanghai Bell, CATT, KT, NEC, Xinwei, Ericsson, Qualcomm, ZTE, China Telecom, vivo, AT&T, OPPO, LG, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709304	WF on NSSS-based measurement accuracy enhancement	LG Electronics	Patrick Merias	52292	other	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709305	WF on additional DMRS structure	Samsung, Qualcomm Incorporated, Ericsson, CATT, Nokia, Alcatel-Lucent Shanghai Bell, vivo, Mitsubishi Electric Co., NTT DOCOMO, INC., ETRI, KT Corp., MediaTek Inc.	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709306	WF on UL DMRS pattern for DFT-S-OFDM	LG Electronics	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709307	WF on beam reporting	ZTE	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709308	WF on UL and DL RS association	ZTE	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709309	WF on beam recovery	ZTE, MediaTek, vivo, Spreadtrum, Qualcomm, ASTRI, AT&T, OPPO, Ericsson, LGE, Xinwei	Patrick Merias	52292	other	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709310	WF on DL DMRS for self-contained feedback	ZTE, Qualcomm, Intel, MediaTek, Xinwei	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709311	WF on PTRS position for CP-OFDM	ZTE, vivo, Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709312	WF on beam indication	ZTE	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709313	WF on CW to resource mapping	ZTE, Huawei, HiSilicon, NTT DOCOMO, Xinwei, ASTRI	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709314	WF on multiplexing of DMRS in time domain	ZTE	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709315	WF on control signaling on QCL for DMRS	ZTE, Ericsson, Intel, ASTRI, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			84	6.2.4.1	Remaining details on QCL assumptions for DMRS antenna ports
R1-1709316	WF on DMRS port to layer mapping for NC-JT	Ericsson	Patrick Merias	52292	other	Decision			85	6.2.4.2	Enhancement to PDSCH RE mapping and resource allocation
R1-1709317	WF on CSI-RS for beam management	ZTE, LGE, ASTRI	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709318	TP on impacts on specifications for DB-DC enhanced scheduling	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications
R1-1709319	TP on scenarios for DB-DC enhanced scheduling	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications
R1-1709320	TP on solution for DB-DC enhanced scheduling	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications
R1-1709321	Text proposal: Analysis of the code allocation impact on the primary carrier for the SI on scheduling enhancements with carrier aggregation for UMTS	Ericsson	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications
R1-1709322	TP on performance evaluation for DB-DC enhanced scheduling	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications

R1-1709323	Text proposal on the full performance evaluation (HS-SCCH part I & II) of the simplified HS-SCCH Type 1 versus the legacy HS-SCCH Type 1	Ericsson	Patrick Merias	52292	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1709324	TP on impact on network implementation	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1709325	Text proposal on the conclusion for the study item on a simplified HS-SCCH for UMTS	Ericsson	Patrick Merias	52292	discussion	Decision		FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1709326	LS on the conclusions for the SI on a simplified HS-SCCH for UMTS	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			12	5.2.3	Other
R1-1709327	TR 25.cde V0.1.0 Study on a simplified HS-SCCH for UMTS	Ericsson	Patrick Merias	52292	other			FS_UTRA_simple_HSSCCH	12	5.2.3	Other
R1-1709328	Correction of spatial-consistency UE mobility modelling Procedure A	ZTE, NTT DOCOMO	Patrick Merias	52292	CR	Decision		CR# is missing in CR coversheet	220	7.1.10	Channel model
R1-1709329	void	ETSI	Patrick Merias	52292	other				198	7.1.4	Channel coding
R1-1709330	Correction of spatial-consistency UE mobility modelling Procedure A	ZTE, NTT DOCOMO	Patrick Merias	52292	CR	Decision			220	7.1.10	Channel model
R1-1709331	Correction on abbreviation of Sidelink SPS RNTI in DCI Format 5A in 36.212	CATT	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709332	CR on skipped subframe handling for partial sensing	Samsung, DoCoMo, Panasonic	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709333	Miscellaneous corrections to 36.213	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709334	Response LS on resource reselection for P2X UEs	RAN1, Nokia	Patrick Merias	52292	LS out	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709335	CR on CSR for CSI feedback for semi-OL transmission	Samsung, Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1709336	Corrections on PRB scaling for PUSCH in UpPTS	Huawei	Patrick Merias	52292	CR	Decision			26	6.1.7	Other
R1-1709337	LS on RAR window definition in CE mode B	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision		sent	20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709338	Clarification of RV Cycling in the presence of invalid SFs	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709339	Clarification of RV Cycling in the presence of invalid SFs	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709340	Clarification of frequency hopping for “PDCCH order” initiated msg3 PUSCH	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709341	Clarification of frequency hopping for “PDCCH order” initiated msg3 PUSCH	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709342	Correction of the calculation of the #RV-blocks for a given PDSCH	Nokia, NTT DOCOMO	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709343	Correction of the calculation of the #RV-blocks for a given PDSCH	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709344	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709345	Clarification for the overlap of UL TA update and retuning gaps for BL/CE UEs	Nokia	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709346	Correction on determination of number of repetitions PUCCH format 1	Qualcomm Incorporated	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709347	Correction on determination of number of repetitions PUCCH format 1	Qualcomm Incorporated	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709348	WF on PBCH RE Mapping	Samsung	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709349	WF on SRS Sequence Design	Huawei	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709350	WF on control channel for multi-TRP transmission	Huawei, HiSilicon, Ericsson, ATT, CATT, MediaTek, Interdigital, China Telecom, China Unicom, BT, Nokia, Alcatel-Lucent Shanghai Bell, Qualcomm	Patrick Merias	52292	other	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1709351	[Draft] LS on RAR window definition for BL/CE UE	Ericsson	Patrick Merias	52292	LS out	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709352	Correction of RAR window definition in CE mode B	Ericsson, Huawei, HiSilicon, Qualcomm	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13

R1-1709353	Correction of RAR window definition in CE mode B	Ericsson, Huawei, HiSilicon, Qualcomm	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709354	Summary of issues on DL PRB bundling	Xinwei	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709355	WF on DL PRB bundling	Xinwei	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709356	WF on configurable codeword to layer mapping	LG Electronics, AT&T, ZTE	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709357	WF on DL transmission scheme 2	LG Electronics, Qualcomm, Ericsson, Samsung, Intel, NTT DOCOMO, ZTE, WILUS Inc., Nokia, ASB, OPPO, Fujitsu, Panasonic, IITH, CEWiT, IITM, Tejas Networks, KDDI, CHTTL, AT&T	Patrick Merias	52292	other	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1709358	WF on the number of front loaded DMRS symbols	LG Electronics	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709359	WF on Configuration of CSI-RS	Ericsson, AT&T, Huawei	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709360	WF on CW to layer mapping scheme for data channels	Qualcomm, Samsung, Panasonic, Intel, Sharp, Ericsson, CATT, KDDI, Interdigital, ATT, Nokia, ASB	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709361	WF on information and frozen bit selection on NR Polar Codes	LG Electronics	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709362	WF on rate matching for Polar codes	Qualcomm Incorporated	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709363	Open issues on SRS design	Sony	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709364	WF on reduced system acquisition time	ZTE, Nubia, Sony	Patrick Merias	52292	other	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709365	WF on Power Consumption Reduction for eFeMTC	ZTE	Patrick Merias	52292	other	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1709366	WF on UL HARQ-ACK feedback	ZTE	Patrick Merias	52292	other	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1709367	WF on Power Consumption Reduction for NB-IoT	ZTE	Patrick Merias	52292	other	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709368	WF on Physical layer SR	ZTE, Nubia	Patrick Merias	52292	other	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1709369	WF on NPRACH range enhancement	ZTE, Nubia, Ericsson	Patrick Merias	52292	other	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1709370	WF on NPRACH reliability enhancement	ZTE	Patrick Merias	52292	other	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1709371	WF on power saving signal in NB-IoT	Huawei	Patrick Merias	52292	other	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709372	Way forward on narrowband measurement accuracy enhancement	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709373	On remaining issues of evaluation parameters	Huawei, HiSilicon	Patrick Merias	52292	discussion				111	6.2.8.2	Remaining details of evaluationassumptions
R1-1709374	WF on the PDSCH RE mapping for TM10	Intel	Patrick Merias	52292	other	Decision			85	6.2.4.2	Enhancement to PDSCH RE mapping and resource allocation
R1-1709375	WF on PDCCH	NTT DOCOMO, INC., Huawei, HiSilicon, Ericsson, ZTE, InterDigital, KT Corp., LG Electronics, ETRI, OPPO, NEC	Patrick Merias	52292	other	Decision			176	7.1.3.1	Physical downlink control channel
R1-1709376	WF on SRS Tx beam determination	LG Electronics, Intel Corporation	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709377	WF on QCL for CSI-RS as beam-related indication	LG Electronics	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709378	WF on Number of symbols for SRS	Ericsson, Sony, Mitsubishi Electric	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709379	WF on Frequency hopping for SRS	Ericsson, Sony, Mitsubishi Electric	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709380	WF on RS for P1 procedure	Samsung, KT Corp., Nokia, ASB	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709381	WF on beam indication for PDCCH	Samsung	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709382	WF on beam indication for PDSCH	Samsung	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709383	Overview of NR UL for LTE-NR coexistence	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709384	WF on enablers for CLI mitigation in NR	ZTE	Patrick Merias	52292	other	Decision			215	7.1.6.1	Cross-link interference management

R1-1709385	Corrections on total number of soft channel bits for UE Cat M1 and M2 in 36.212	NEC, Intel	Patrick Merias	52292	CR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709386	Open issues list and comments for AI 7.1.3.1	NTT DOCOMO	Patrick Merias	52292	other	Decision			176	7.1.3.1	Physical downlink control channel
R1-1709387	Open issues list and comments for AI 7.1.3.2	NTT DOCOMO	Patrick Merias	52292	other	Decision			183	7.1.3.2	Physical uplink control channel
R1-1709388	Open issues list and comments for AI 7.1.3.3	NTT DOCOMO	Patrick Merias	52292	other	Decision			189	7.1.3.3	DL/UL data scheduling and HARQ procedure
R1-1709389	Open issues list and comments for AI 7.1.3.4	NTT DOCOMO	Patrick Merias	52292	other	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1709390	WF on QCL for FeCoMP	Huawei, HiSilicon, Intel, Ericsson, ZTE	Patrick Merias	52292	other	Decision			84	6.2.4.1	Remaining details on QCL assumptions for DMRS antenna ports
R1-1709391	WF on CSI measurement and feedback for non-coherent JT	Huawei, HiSilicon, ZTE, Intel	Patrick Merias	52292	other	Decision			86	6.2.4.3	Enhancement to CSI feedback
R1-1709392	WF on Enhancement to CSI Feedback	Samsung, Ericsson, LG Electronics	Patrick Merias	52292	other	Decision			86	6.2.4.3	Enhancement to CSI feedback
R1-1709393	WF on UE-UE cross-link interference measurement	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			215	7.1.6.1	Cross-link interference management
R1-1709394	WF on SPS for NB-IoT	Samsung	Patrick Merias	52292	other	Decision			103	6.2.7.1.3	Semi-persistent scheduling
R1-1709395	Summary of evaluation on DL 1024 QAM	Huawei, HiSilicon, Qualcomm	Patrick Merias	52292	other	Decision			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1709396	WF on CSI timing	LG Electronics, ZTE, Intel, InterDigital, NTT DOCOMO, Samsung, Nokia, Alcatel-Lucent Shanghai Bell, Ericsson	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709397	WF on location of CSI-RS OFDM symbols	Samsung, Ericsson, Xinwei, LGE	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709398	WF on Relay UE Synchronization Assistance	Intel Corporation, Sony	Patrick Merias	52292	other	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1709399	WF on Sidelink Synchronization for Bandwidth Limited UEs	Intel Corporation	Patrick Merias	52292	other	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1709400	WF on Discovery Enhancements for Bandwidth Limited Remote UEs	Intel Corporation, Sony	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709401	WF on Discovery Enhancements for UE-to-NW Relaying with Bandwidth Limited Remote UEs	Intel, Huawei, HiSilicon, LGE	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709402	WF on Relay UE Selection Criteria Enhancements	Intel Corporation, ITRI, Sony	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709403	WF on Discovery Models for Wearable and IoT Use Cases	Intel Corporation	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709404	WF on Discovery for UEs with 1 PRB Bandwidth Limitation	Intel, ZTE, ZTE Microelectronics	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709405	WF on Conflict Free UE-to-NW Relaying	Intel Corporation, Sony, ITRI, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			120	6.2.9.2.3.1	Sidelink UE-to-NW relaying
R1-1709406	WF on L1 Comparison of Unidirectional and Bidirectional Relaying	Intel Corporation, ITRI, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			120	6.2.9.2.3.1	Sidelink UE-to-NW relaying
R1-1709407	WF on eNB-controlled Resource Allocation	Intel Corporation, Sony	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709408	WF on Relay UE-assisted Resource Allocation	Intel, Sony, ITRI, Huawei, HiSilicon, LGE	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709409	WF on Sidelink Power Control Loops	Intel Corporation	Patrick Merias	52292	other	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1709410	WF on Sidelink Power Control for Unidirectional Relaying	Intel Corporation, ZTE, ZTE Microelectronics	Patrick Merias	52292	other	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1709411	TP on summary of evaluation for DL 1024 QAM	Huawei, HiSilicon, Qualcomm	Patrick Merias	52292	other	Decision			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1709412	WF on measurement based on SS-block	NTT DOCOMO, ZTE	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709413	WF on measurement based on CSI-RS for L3 mobility	NTT DOCOMO, ZTE	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709414	WF on PT-RS configuration	LG Electronics, Samsung, ZTE	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709415	WF on DMRS density reduction	Huawei, HiSilicon, China Telecom	Patrick Merias	52292	other	Decision			90	6.2.5.2	DMRS overhead reduction
R1-1709416	WF on Random access configuration	ZTE	Patrick Merias	52292	other	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1709417	Remaining evaluation assumptions for aerial study	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			111	6.2.8.2	Remaining details of evaluationassumptions

R1-1709418	Correction of the calculation of the #RV-blocks for a given PDSCH	Nokia, NTT DOCOMO	Patrick Merias	52292	draftCR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709419	WF on RS configuration for UL transmission without grant	ZTE	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709420	WF on DL DMRS for self-contained feedback	ZTE, Qualcomm, Mitsubishi Electric Co., Xinwe	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709421	WF on DMRS port multiplexing in the frequency domain	Samsung	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709422	WF on maximum Timing Advance and processing time for LTE reduced processing time operation	Nokia, Ericsson, AT&T, CMCC, China Telecom, Deutsche Telekom, KDDI, KT Corporation, NTT DOCOMO Inc., Softbank, Sprint, T-Mobile USA, Verizon, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			62	6.2.1.3	Maximum TA and processing time
R1-1709423	WF on FeD2D discovery enhancements	Huawei, HiSilicon, ITRI	Patrick Merias	52292	other	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709424	WF on link adaptation in FeD2D	Huawei, HiSilicon, ITRI	Patrick Merias	52292	other	Decision			123	6.2.9.2.3.4	Sidelink feedback information
R1-1709425	WF on SPS in FeD2D	Huawei, HiSilicon, Sony, Intel	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709426	Way Forward on FeD2D resource allocation	Huawei, HiSilicon, Lenovo	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709427	Way Forward on FeD2D resource configuration	Huawei, HiSilicon, ITRI, Intel	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709428	Way Forward on feD2D sidelink power control	Huawei, HiSilicon, Sony, Intel, KDDI	Patrick Merias	52292	other	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1709429	WF on further collision handling of PUSCH and sPUSCH	LG Electronics, NTT DOCOMO, KT, Qualcomm, Ericsson, Nokia, ASB	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709430	WF on collision handling of PUCCH and sPUCCH	LG Electronics, Ericsson, Nokia, ASB	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709431	WF on UL sTTI length configurations	LG Electronics, CATT, NTT DOCOMO, Samsung, Intel	Patrick Merias	52292	other	Decision			38	6.2.1.2.1.1	sTTI configurations
R1-1709432	WF on sPDCCH transmission scheme	LG Electronics, KT	Patrick Merias	52292	other	Decision			44	6.2.1.2.2.2	sPDCCH design
R1-1709433	WF on the composition of sPDCCH RB set	LG Electronics, KT	Patrick Merias	52292	other	Decision			44	6.2.1.2.2.2	sPDCCH design
R1-1709434	WF on simultaneous transmission of TTI and sTTI in UL	LG Electronics, Ericsson, Nokia, ASB, Intel	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709435	WF on SLSS/PBCH transmission of Remote UE in FeD2D	LG Electronics, Intel	Patrick Merias	52292	other	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1709436	WF on SLSS/PSBCH physical design for FeD2D	LG Electronics, Intel	Patrick Merias	52292	other	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1709437	WF on synchronization procedure in FeD2D	LG Electronics	Patrick Merias	52292	other	Decision			117	6.2.9.2.1	Synchronization aspects
R1-1709438	WF on SL measurement/feedback for FeD2D	LG Electronics, Intel, Sony	Patrick Merias	52292	other	Decision			123	6.2.9.2.3.4	Sidelink feedback information
R1-1709439	WF on PSCCH/PSSCH transmission for FeD2D	LG Electronics	Patrick Merias	52292	other	Decision			121	6.2.9.2.3.2	Sidelink ressorce allocation and configuration
R1-1709440	WF on sidelink power control for FeD2D	LG Electronics	Patrick Merias	52292	other	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1709441	WF on PBCH DMRS Design	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709442	WF on time index indication of SS block	Huawei, HiSilicon, InterDigital, NTT DOCOMO	Patrick Merias	52292	other	Decision			132	7.1.1.1.3	SS block time index indication
R1-1709443	WF on SS burst set indication	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			132	7.1.1.1.3	SS block time index indication
R1-1709444	WF on HARQ process handling when switching between 1ms TTI and sTTI	Ericsson, Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1709445	WF on multi-sTTI scheduling	Ericsson, KT Corporation	Patrick Merias	52292	other	Decision			43	6.2.1.2.2.1	sTTI scheduling
R1-1709446	WF on sequence-based sPUCCH in 2OS and 3OS sTTI	ZTE	Patrick Merias	52292	other	Decision			48	6.2.1.2.3.1	sPUCCH format design

R1-1709447	WF on CSI-RS framework	CATT, Ericsson, Nokia, ASB, Intel, OPPO	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709448	Parallel reception of MPDCCH and PDSCH for BL/CE UE	Ericsson, Qualcomm, Huawei, HiSilicon	Patrick Merias	52292	CR	Decision		CR relates to R1-1708268 - issue solved in 36.211 instead of in 36.213	24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709449	[DRAFT] Response LS on CSI-RS for beam management and RRM measurements	ZTE	Patrick Merias	52292	LS out	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709450	WF on Aperiodic CSI-RS Activation	Samsung	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709451	PRB bundling for NR DMRS	Samsung	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709452	Discussions on channel and interference measurements for NR	Samsung	Patrick Merias	52292	other	Decision			165	7.1.2.3.6	Other
R1-1709453	Discussions on transmission scheme 2 for NR	Samsung	Patrick Merias	52292	other	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1709454	Channel coding for block length between 12 and 22 bits	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			208	7.1.4.2.1.1	Code construction
R1-1709455	WF on CDM design	Huawei, HiSilicon, Intel, MediaTek, Samsung	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709456	Summary of offline discussion on CSI-RS	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709457	WF on multiple starting positions in a subframe for uplink in FeLAA	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1709458	WF on HARQ process handling when switching between 1ms TTI and sTTI	Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, NTT DOCOMO	Patrick Merias	52292	other	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1709459	void	ETSI	Patrick Merias	52292	other	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709460	WF on shadowing for aerial vehicles	Intel	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709461	void	ETSI	Patrick Merias	52292	other	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709462	void	ETSI	Patrick Merias	52292	other	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709463	void	ETSI	Patrick Merias	52292	other	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709464	WF on Repeating Coded Bits of Polar Code	Ericsson	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709465	WF on Puncturing Methods for Polar Codes	Ericsson	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709466	WF on power saving signal in MTC	Ericsson	Patrick Merias	52292	other	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1709467	Draft LS on System acquisition time reduction for	Ericsson	Patrick Merias	52292	LS out	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709468	WF on Flexible PDSCH/PUSCH resource allocation for MTC	Ericsson, Orange	Patrick Merias	52292	other	Decision			98	6.2.6.6	Other
R1-1709469	WF on Early data transmission for MTC	Ericsson, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			98	6.2.6.6	Other
R1-1709470	WF on the impact of power saving signal on paging reliability in MTC	Ericsson, Intel, Sony	Patrick Merias	52292	other	Decision			94	6.2.6.2	Downlink channel power efficiency
R1-1709471	WF on Reduced MIB acquisition time	Ericsson, Nokia, ASB	Patrick Merias	52292	other	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709472	Reduced system acquisition time for MTC	Ericsson	Patrick Merias	52292	other	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709473	void	ETSI	Patrick Merias	52292	other				92	6.2.6	Even further enhanced MTC for LTE - WID in RP-170732
R1-1709474	Draft LS on System acquisition time reduction for	Ericsson	Patrick Merias	52292	LS out	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709475	Draft LS on Early data transmission for MTC	Ericsson	Patrick Merias	52292	LS out	Decision			98	6.2.6.6	Other
R1-1709476	WF on remaining issues of 2-symbol sPUCCH with large payload size	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1709477	WF on DL DMRS multiplexing in the time domain	ZTE, Qualcomm	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709478	WF on handling collisions of TTI/sTTI in UL	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709479	WF on DMRS for V2X TxD	CATT, Huawei, HiSilicon, OPPO	Patrick Merias	52292	other	Decision			74	6.2.3.2.1	Transmit diversity solutions
R1-1709480	WF on further evaluation methodology for V2X sTTI	CATT, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1709481	WF on initial evaluation results conclusion	CATT	Patrick Merias	52292	other	Decision			80	6.2.3.3.3	Initial evaluations
R1-1709482	WF on beam indication for PDSCH	CATT	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709483	WF on beam switching for PDSCH	CATT	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709484	WF on non-codebook based transmission for UL	NTT DOCOMO, InterDigital, Intel	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709485	WF on Triggering Mechanism for CSI Reporting	NTT DOCOMO, LGE, Huawei, HiSilicon, Sharp, Mitsubishi	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709486	WF on UL power sharing between LTE and NR	NTT DOCOMO	Patrick Merias	52292	other	Decision			219	7.1.9	UL power control

R1-1709487	WF on evaluation assumption for aerial vehicle	NTT DOCOMO, SoftBank, Ericsson	Patrick Merias	52292	other	Decision			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1709488	On number of SS blocks	Nokia	Patrick Merias	52292	other	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1709489	On SS burst composition	Nokia	Patrick Merias	52292	other	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1709490	WF on SS block index indication	Samsung, Sony, ITL, Fujitsu	Patrick Merias	52292	other	Decision			132	7.1.1.1.3	SS block time index indication
R1-1709491	WF on In-sync/Out-of-sync indications for RLF	MediaTek Inc.	Patrick Merias	52292	other	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1709492	WF on UL codebook structure	Nokia, Nokia Shanghai Bell, CATT, Interdigital	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709493	WF on power ramping for UE changes UL Tx beam	Samsung, Nokia, ASB	Patrick Merias	52292	other	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1709494	WF on reporting UE capability of beam correspondence via RACH procedure	Samsung, Intel	Patrick Merias	52292	other	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1709495	WF on UL codebook design principle	LG Electronics, Xinwei, Samsung, MediaTek	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709496	Summary of topics and WFs in beam management	Qualcomm Incorporated	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709497	Design of assistance bit aided polar codes for NR control channel	NEC Corporation	Patrick Merias	52292	discussion				208	7.1.4.2.1.1	Code construction
R1-1709498	WF on handling beam failure recovery for unexpected cases	Vivo, Qualcomm	Patrick Merias	52292	other	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709499	WF on l-symbol NR-PUCCH with more than 2 bits	LG Electronics	Patrick Merias	52292	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709500	WF on UL resource allocation for PUSCH	LG Electronics	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709501	Summary of Issues and WFs on Codebook based transmission for UL	Intel	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709502	WF on PTRS position for CP-OFDM	ZTE, vivo, Nokia, Alcatel-Lucent Shanghai Bell, Xinwei, ASTRI, Ericsson, Huawei, HiSilicon, Samsung, LG Electronics, NTT DOCOMO	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709503	WF on PRB grid structure for wider bandwidth operation	LG Electronics	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709504	WF on structure of long duration NR-PUCCH for up to 2 bits	LGE	Patrick Merias	52292	other	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709505	WF on initial access and mobility for wider BW operation	NTT DOCOMO	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709506	WF on sidelink scheduling in PC5 carrier aggregation	LGE	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709507	WF on synchronization in sidelink CA	LG Electronics, NTT Docomo, Intel	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709508	WF on NR PBCH Coding	MediaTek Inc.	Patrick Merias	52292	other	Decision			211	7.1.4.3	PBCH
R1-1709509	Proposals on CBG from discussion in Tuesday's offline on CBG	ZTE	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709510	WF on HARQ combining for UL URLLC without grant	LG Electronics, Panasonic, Huawei, HiSilicon, …	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709511	WF on the LoS probabiltity model for aerial vehicle	ZTE	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709512	Evaluation of NR-SSS	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709513	WF on MCS and CQI configuration for NR	Intel	Patrick Merias	52292	other	Decision			147	7.1.2.1.1	Codeword mapping
R1-1709514	WF on sync signal enhancements for eMTC	Qualcomm Incorporated	Patrick Merias	52292	other	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709515	WF on CSI measurement details	NTT DOCOMO, Nokia, ASB, Samsung	Patrick Merias	52292	other	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1709516	WF on scheduling request for NR	Idaho National Laboratory, IITH, CEWIT, IITM, Tejas Networks, Sharp, Lenovo, Motorola Mobility, KDDI, Interdigital	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling

R1-1709517	WF on short TTI evaluations for R15 sidelink.	Huawei, HiSilicon, CATT	Patrick Merias	52292	other	Decision			79	6.2.3.3.2	Short TTI solutions
R1-1709518	WF on Transmit Diversity solutions for R15 sidelink	Huawei, HiSilicon, CATT	Patrick Merias	52292	other	Decision			75	6.2.3.2.2	Initial evaluations
R1-1709519	WF on bandwidth part configuration	OPPO	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709520	WF on construction of polar codes	NTT DOCOMO	Patrick Merias	52292	other	Decision			208	7.1.4.2.1.1	Code construction
R1-1709521	WF on PTRS for CP-OFDM	Huawei, HiSilicon, National Instruments, Xinwei, NTT DOCOMO, Panasonic, Samsung, ZTE, Nokia, Alcatel-Lucent Shanghai Bell, Ericsson	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709522	WF on NR DL control TX and DMRS	ZTE	Patrick Merias	52292	other	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709523	WF on reduction of maximum time between packet arrival and transmission	LG Electronics, ZTE,…	Patrick Merias	52292	other	Decision			72	6.2.3.1.3	Other
R1-1709524	WF on criterion of using 64QAM	LG Electronics, ZTE,…	Patrick Merias	52292	other	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1709525	WF on LOS channel models for UMa AV	Ericsson	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709526	WF on Open Aspects of Short TTI Evaluation Methodology for V2V Communication	Intel, LG Electronics	Patrick Merias	52292	other	Decision			78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1709527	WF on long PUCCH	Qualcomm Incorporated	Patrick Merias	52292	other	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709528	WF on SRS partial band hopping	CATT, Nokia, Huawei, Sony	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709529	WF on inter-TRP signaling for cross-link interference mitigation	LG Electronics, …	Patrick Merias	52292	other	Decision			215	7.1.6.1	Cross-link interference management
R1-1709530	WF on Aperiodic CSI-RS Activation	Samsung	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709531	WF on Carrier Selection in PC5 operation	LG Electronics, ZTE	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709532	WF on transient period impact for PC5 operation with Short TTI	LG Electronics, Qualcomm	Patrick Merias	52292	other	Decision			78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1709533	Performance evaluation of LDPC codes for eMBB	ZTE	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709534	NR LDPC design	ZTE	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709535	WF on PDSCH rate matching	LG Electronics, AT&T, Huawei, Hisilicon, NTT DOCOMO, Panasonic, Ericsson	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709536	Draft CR on CSR for CSI feedback for semi-OL transmission	Samsung, Huawei, HiSilicon	Patrick Merias	52292	draftCR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1709537	WF on procedures of grant-free transmision	Huawei, HiSilicon, CATR, Convida Wireless, Intel, InterDigital, Telefonica, Nokia, NTT docomo, Orange	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709538	Correction on the numbering of the tables in 8.0	NEC	Patrick Merias	52292	draftCR	Decision			26	6.1.7	Other
R1-1709539	WF on slot format indication with group common PDCCH	LG Electronics	Patrick Merias	52292	other	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1709540	WF on front-loaded RS for NR-PDCCH	LG Electronics, ZTE, …	Patrick Merias	52292	other	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709541	WF on UL HARQ-ACK feedback	ZTE, Nubia, Huawei, HiSilicon, Ericsson, Lenovo	Patrick Merias	52292	other	Decision			95	6.2.6.3	Uplink HARQ-ACK feedback
R1-1709542	WF on UL Spectral Efficiency for eMTC	Sierra Wireless, Ericsson, ZTE, Nubia, Intel, LGE	Patrick Merias	52292	other	Decision			97	6.2.6.5	Increased PUSCH spectral efficiency
R1-1709543	WF on Resource selection for carrier aggregation	NTT DOCOMO	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709544	WF on resource pool sharing for mode 3 and mode 4	NTT DOCOMO	Patrick Merias	52292	other	Decision			72	6.2.3.1.3	Other
R1-1709545	WF on skipped subframe handling for partial sensing	NTT DOCOMO, Panasonic, Samsung	Patrick Merias	52292	other	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709546	WF on evaluation assumptions for aerial vehicles	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			111	6.2.8.2	Remaining details of evaluationassumptions

R1-1709547	RAN1 agreements for Rel-15 LTE-MTC	Ericsson	Patrick Merias	52292	other	Information			92	6.2.6	Even further enhanced MTC for LTE - WID in RP-170732
R1-1709548	WF on Codebook Based UL-MIMO Transmission	Huawei, HiSilicon, Samsung	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709549	WF on UL non-codebook based transmission	Huawei, HiSilicon, LGE, CATT, Ericsson, CeWiT, Deutsche Telekom, China Telecom, Xinwei, Tejas Networks, CATR, MediaTek, IITH, IITM	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709550	Analysis of SSS Proposals	Intel Corporation	Patrick Merias	52292	other	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709551	WF on Sequence Design for SRS	Ericsson, Panasonic	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709552	WF on the impact of power saving signal on paging reliability in NB-IoT	Ericsson	Patrick Merias	52292	other	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709553	WF on NR-SSS sequence design	LG Electronics	Patrick Merias	52292	other	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709554	WF on aperiodic SRS for UL beam management	OPPO, Xinwei, Xiaomi, Coolpad, Spreadtrum, Nokia, ASB, CATT, China Telecom, Intel, Samsung, MediaTek, CATR, NTT DoCoMo, Ericsson, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709555	Offline outcome regarding radio link monitoring	NTT DOCOMO	Patrick Merias	52292	other	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1709556	WF on NR-PBCH combining	Huawei, HiSilicon, Interdigital, Xiaomi	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709557	WF on resource selection in V2X CA	Samsung	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709558	WF on 64QAM support	Samsung	Patrick Merias	52292	other	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1709559	WF on CSI-RS based RRM measurements on detected cells	ZTE	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709560	LTE performance in LTE-NR UL sharing	Nokia	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709561	WF on 64QAM Support for Sidelink V2V Communication	Intel	Patrick Merias	52292	other	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1709562	WF on 64QAM SCI Signaling	Intel	Patrick Merias	52292	other	Decision			71	6.2.3.1.2	Support for 64-QAM
R1-1709563	WF on interference randomization for NB-IoT	Qualcomm, Huawei, HiSilicon, Ericsson	Patrick Merias	52292	other	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1709564	WF on potential problems for aerial vehicles communication	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			113	6.2.8.4	Other
R1-1709565	WF on RS design requirement for fine time and frequency tracking	MediaTek Inc.	Patrick Merias	52292	other	Decision			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1709566	TP on conclusion for DB-DC enhanced scheduling	Huawei, HiSilicon	Patrick Merias	52292	discussion	Decision			15	5.3.2	Impact on specifications
R1-1709567	LS on enhanced scheduling for UMTS	RAN1, Huawei	Patrick Merias	52292	LS out	Decision			15	5.3.2	Impact on specifications
R1-1709568	TR 25.708 V0.2.0 Study on Scheduling Enhancements with Carrier Aggregation for UMTS	Huawei	Patrick Merias	52292	draft TR				15	5.3.2	Impact on specifications
R1-1709569	Chairpersons' summary of the UMTS sessions	UMTS Session Chairpersons (Huawei, Ericsson)	Patrick Merias	52292	other	Endorsement			5	5	UTRA
R1-1709570	TR 25.708 V1.0.0 Study on Scheduling Enhancements with Carrier Aggregation for UMTS	Huawei	Patrick Merias	52292	draft TR				15	5.3.2	Impact on specifications
R1-1709571	[DRAFT] Reply LS on in-sync/out-of-sync indication for RLF	NTT DOCOMO	Patrick Merias	52292	LS out	Decision			143	7.1.1.5.3	Radio link monitoring
R1-1709572	WF on CSI-RS pattern design	Huawei, HiSilicon, ZTE	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709573	WF on NR-RACH preamble format for high speed	ZTE	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709574	WF on NR-RACH preamble format for coverage enhancement	ZTE	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709575	WF on collision handling of PUSCH and sPUCCH	LG Electronics, Qualcomm, ZTE, NTT DOCOMO, Samsung	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL

R1-1709576	WF on collision handling with different processing times in 1ms TTI	LG Electronics, Ericsson, NTT DOCOMO	Patrick Merias	52292	other	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1709577	WF on remaining issues of CSI feedback for 1ms TTI with shortened processing time	LG Electronics, Qualcomm, Samsung, Huawei, HiSilicon, Ericsson	Patrick Merias	52292	other	Decision			34	6.2.1.1.5	CSI feedback
R1-1709578	WF on remaining details of 7-symbol sPUCCH carrying up to 2 bits	LG Electronics, Samsung, Huawei, HiSilicon, Ericsson	Patrick Merias	52292	other	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1709579	WF on 7-symbol sPUCCH carrying more than 2 bits	LG Electronics, Ericsson, NTT DOCOMO, Intel	Patrick Merias	52292	other	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1709580	WF on CSI reporting for sTTI	LG Electronics, KT, Huawei, HiSilicon, NTT DOCOMO	Patrick Merias	52292	other	Decision			51	6.2.1.2.3.4	CSI reporting for sTTI
R1-1709581	Response LS on CSI-RS for beam management and RRM measurements	RAN1, ZTE	Patrick Merias	52292	LS out	Decision		sent	142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709582	WF on group common PDCCH	Qualcomm, Ericsson	Patrick Merias	52292	other	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1709583	Correction on PRS hopping	ZTE	Patrick Merias	52292	draftCR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709584	WF on I-symbol NR-PUCCH with 1 or 2 bits UCI payload	Qualcomm	Patrick Merias	52292	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709585	Outcome of the offline discussion on UL partial subframes	Nokia	Patrick Merias	52292	other	Decision			66	6.2.2.2	Multiple starting and ending positions in a subframe for UL
R1-1709586	WF on UL Sharing for NSA NR UE	Apple	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709587	WF on the support of supplementary UL in NR	CMCC	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709588	WF on DMRS port multiplexing in the frequency domain	Samsung, ZTE, Intel, Mediatek, Huawei, HiSilicon, CATT, ITL, KRRI, Spreadtrum, Mitsubishi Electric Co., ETRI, China Unicom, Deutsche Telekom, China Telecom, ITRI, CHTTL, CATR	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709589	NR PRACH preamble design with mutliple different ZC sequences	CATT, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709590	Way forward on NPRACH cell range enhancement	Huawei, HiSilicon, Qualcomm	Patrick Merias	52292	other	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1709591	Way forward on reduced system acquisition time	Huawei, HiSilicon, Neul	Patrick Merias	52292	other	Decision			107	6.2.7.5	Reduced system acquisition time
R1-1709592	Draft LS on narrowband measurement accuracy enhancement	Huawei	Patrick Merias	52292	LS out	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709593	WF on Control of Sidelink Transmission Parameters	Intel	Patrick Merias	52292	other	Decision			123	6.2.9.2.3.4	Sidelink feedback information
R1-1709594	WF on Feedback for Resource Allocation	Intel	Patrick Merias	52292	other	Decision			123	6.2.9.2.3.4	Sidelink feedback information
R1-1709595	Evaluation Results for NR-SSS Sequences	Samsung	Patrick Merias	52292	other	Decision			130	7.1.1.1.1	Remaining details on SS sequence design
R1-1709596	Reply LS on SS block	NTT DOCOMO	Patrick Merias	52292	LS out	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709597	WF on Frequency-Selective Precoding in UL Transmission	Qualcomm, Nokia, ASB, CATT, Ericsson, MediaTek	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709598	WF on CSI-RS based RACH configuration	Samsung, Ericsson, ZTE, Nokia, ASB, MTI	Patrick Merias	52292	other	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1709599	WF on CDM pattern of CSI-RS for CSI acquisition	ZTE, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709600	WF on 2-symbol NR-PUCCH	LG Electronics	Patrick Merias	52292	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709601	WF on SR resource configuration	LG Electronics	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709602	Harmonized proposal for CBG and preemption indication	NTT DOCOMO	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709603	WF on TD multiplexing of DL DMRS for 2-symbol front-load DMRS	Qualcomm	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709604	Offline discussion summary of CSI feedback framework	AT&T	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework

R1-1709605	WF on evaluation for power saving physical signal/channel	LG Electronics	Patrick Merias	52292	other	Decision			101	6.2.7.1.1	Power consumption reduction for paging and connected-mode DRX
R1-1709606	Summary from offline for beam recovery mechanism	MediaTek Inc.	Patrick Merias	52292	other	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709607	WF on frequency-selective precoding in UL transmission	Huawei, HiSilicon, Samsung, IITM, AT&T, Tejas Networks, Softbank, IITH, CeWiT, KDDI, Deutsche Telekom, CATR, SHARP, Interdigital, Xinwei	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709608	WF on location of CSI-RS OFDM symbols	Samsung, InterDigital, LGE	Patrick Merias	52292	other	Decision			167	7.1.2.4.1	CSI-RS
R1-1709609	WF on CSI timing	LG Electronics, AT&T, KT Corp., Xinwei, WILUS Inc., InterDigital, Samsung, ZTE	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709610	WF on SRS framework	CATT	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709611	Way forward on physical layer SR in NB-IoT	Huawei, HiSilicon, Qualcomm, Nokia, ASB, ZTE	Patrick Merias	52292	other	Decision			102	6.2.7.1.2	Physical layer scheduling request
R1-1709612	WF on NR SS measurement duration	Intel Corporation, InterDigital, MediaTek, Qualcomm, Samsung, Ericsson	Patrick Merias	52292	other	Decision			131	7.1.1.1.2	SS block composition and SS burst set composition
R1-1709613	WF on information carried by beam failure recovery request	LG Electronics, ZTE	Patrick Merias	52292	other	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709614	Discussion on LS R1-1706871	Intel Corporation	Patrick Merias	52292	other	Decision			140	7.1.1.5	Mobility procedure
R1-1709615	WF on DL DMRS bundling size	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			55	6.2.1.2.4.2	DL DMRS design
R1-1709616	WF on NR multiple carriers operation	Huawei, HiSilicon, KT, OPPO, CATR, CATT	Patrick Merias	52292	other	Decision			197	7.1.3.4	Scheduling/HARQ aspects for carrier aggregation and dual connectivity
R1-1709617	WF on CSI-RS design for beam management	Samsung, Intel, KT, Ericsson	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709618	WF on UL DMRS pattern for DFT-S-OFDM	LG Electronics, Qualcomm, NTT DOCOMO, Ericsson, InterDigital, Nokia, ASB, CATT, KDDI, NEC, AT&T, Xinwei, Cohere Technologies, OPPO	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709619	WF on Rate-matching of LDPC codes	Huawei, Hisilicon	Patrick Merias	52292	other	Decision			203	7.1.4.1.1.3	Rate matching
R1-1709620	Draft LS on Relay UE discovery for bandwidth limited Remote UEs	Intel	Patrick Merias	52292	LS out	Decision			118	6.2.9.2.2	Discovery aspects
R1-1709621	LS on Relay UE discovery for bandwidth limited Remote UEs	RAN1, Intel	Patrick Merias	52292	LS out	Decision		sent - "Draft" should be removed from title	118	6.2.9.2.2	Discovery aspects
R1-1709622	WF on PRB bundling size indication	Xinwei, HW, HiSilicon, CATT, MTK, Intel, Ericsson, Samsung, ZTE, LG, Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709623	WF on PRB bundling size value set	Xinwei, HW, HiSilicon, CATT, MTK, Intel, ZTE	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709624	WF on RRM measurement	MediaTek Inc.	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709625	WF on PRB grid structure for wider bandwidth operation	LG Electronics	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709626	WF on resource allocation for UL	ZTE	Patrick Merias	52292	other	Decision			57	6.2.1.2.5.1	sPUSCH design

R1-1709627	WF on IFDMA DMRS for 2/3-symbol sPUSCH	Huawei, HiSilicon, Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, ZTE, CATR, NTT DOCOMO, Sharp, Intel, LG Electronics, Samsung	Patrick Merias	52292	other	Decision			58	6.2.1.2.5.2	UL DMRS design
R1-1709628	WF on UL DMRS position for 2os TTI for DMRS multiplexing/sharing	Ericsson, LG Electronics	Patrick Merias	52292	other	Decision			39	6.2.1.2.1.2	Flexible UL DMRS position
R1-1709629	WF on remaining issues of 2-symbol sPUCCH with large payload size	Huawei, HiSilicon, Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, CATT	Patrick Merias	52292	other	Decision			48	6.2.1.2.3.1	sPUCCH format design
R1-1709630	WF on DMRS pattern for sPDSCH	Huawei, HiSilicon, Nokia, Alcatel-Lucent Shanghai, Samsung, Ericsson, Intel, CATT	Patrick Merias	52292	other	Decision			55	6.2.1.2.4.2	DL DMRS design
R1-1709631	WF on resource allocation for sPDSCH	Huawei, HiSilicon, NTT DOCOMO, Ericsson	Patrick Merias	52292	other	Decision			54	6.2.1.2.4.1	sPDSCH design
R1-1709632	WF on resource allocation for sPUSCH	Huawei, HiSilicon, Ericsson	Patrick Merias	52292	other	Decision			57	6.2.1.2.5.1	sPUSCH design
R1-1709633	WF on RBG size for sPDSCH	Huawei, HiSilicon, Ericsson, ZTE, LGE	Patrick Merias	52292	other	Decision			54	6.2.1.2.4.1	sPDSCH design
R1-1709634	WF on conflicting PHICH handling for short processing time with 1ms TTI	Sharp	Patrick Merias	52292	other	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1709635	WF on NPRACH Reliability Enhancements	Qualcomm	Patrick Merias	52292	other	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1709636	WF on QCL	Nokia	Patrick Merias	52292	other	Decision			171	7.1.2.4.5	QCL
R1-1709637	WF on measurement based on SS-block	MediaTek Inc.	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709638	WF on SRS sequence generation	Mitsubishi Electric, Huawei, HiSilicon, Nokia	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709639	WF on handling beam failure recovery for unexpected cases	Vivo, Qualcomm, KT Corp., Ericsson	Patrick Merias	52292	other	Decision			157	7.1.2.2.2	Mechanism to recover from beam failure
R1-1709640	WF on RS design requirement for fine time and frequency tracking	MediaTek, Huawei, Hisilicon, Ericsson, Samsung	Patrick Merias	52292	other	Decision			172	7.1.2.4.6	Fine time/frequency tracking of channel
R1-1709641	LDPC codes design for eMBB data channel	LG Electronics	Patrick Merias	52292	discussion	Decision			205	7.1.4.1.2	LDPC code design
R1-1709642	WF on Frequency Hopping for Long Duration NR-PUCCH	LG Electronics	Patrick Merias	52292	other	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709643	Way Forward on Beam reporting contents	Samsung	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709644	WF on shadowing for LOS RMa AV	Intel	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709645	Correction of UE behavior to meet Crlimit	Qualcomm Incorporated	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709646	WF on RS configuration for NR-PDCCH	LG Electronics, Intel, …	Patrick Merias	52292	other	Decision			177	7.1.3.1.1	PDCCH structure and the transmission schemes
R1-1709647	WF on Group-based Beam Reporting	Intel	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709648	CR for precoding for spatial multiplexing using antenna ports with UE-specific reference signals in	ETRI	Patrick Merias	52292	CR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1709649	Correction to CSI-RS configuration	NEC	Patrick Merias	52292	CR	Decision			23	6.1.4	Maintenance of Release 14 Full-Dimension MIMO for LTE
R1-1709650	WF on LOS channel models for UMa AV and RMa AV	Ericsson	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709651	Correction on HARQ-ACK bundling and dynamic HARQ-ACK timing in 36.213	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709652	RAN2 agreement on UAV requirements	RAN2, NTT DOCOMO	Patrick Merias	52292	LS in	Decision		Relates to AI 6.2.8	4	4	Incoming Liaison Statements
R1-1709653	WF on LOS channel models for RMa-AV	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709654	WF on LOS channel models for UMa AV and RMa AV	Ericsson	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709655	Corrections on Power Control for SRS Switching	Samsung	Patrick Merias	52292	CR	Decision			26	6.1.7	Other
R1-1709656	Correction on the numbering of the tables in 8.0	NEC	Patrick Merias	52292	CR	Decision			26	6.1.7	Other
R1-1709657	Correction on the numbering of the tables in 8.0	NEC	Patrick Merias	52292	CR	Decision			26	6.1.7	Other

R1-1709658	LS related to phase tracking reference signal (PT-RS) design	Ericsson	Patrick Merias	52292	LS out	Decision			169	7.1.2.4.3	PT-RS
R1-1709659	WF on UL power control	ZTE	Patrick Merias	52292	other	Decision			219	7.1.9	UL power control
R1-1709660	Offline Summary of Power Control	ZTE	Patrick Merias	52292	other	Decision			219	7.1.9	UL power control
R1-1709661	Summary of Issues and WFs on Codebook based transmission for UL	Intel	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709662	WF on the Number of Ports for UL Transmission	Samsung, Nokia, Alcatel-Lucent Shanghai Bells, Xinwei, AT&T, National Instruments, Motorola Mobility, Lenovo	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709663	Timing relationships for 2 HARQ processes	Qualcomm Incorporated	Patrick Merias	52292	draftCR	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1709664	Correction on abbreviation of Sidelink SPS RNTI in DCI Format 5A in 36.212	CATT	Patrick Merias	52292	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709665	WF on NPDCCH monitoring for Rel-14 UE configured with 2-HARQ process	ZTE, Nubia, Qualcomm, Samsung, Nokia, ASB	Patrick Merias	52292	other	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1709666	Miscellaneous corrections to 36.213	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709667	WF on UL beam management with UE assistance information	MediaTek, Samsung	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709668	WF on CSI-RS for beam management	ZTE, LG Electronics, ASTRI, Huawei, HiSilicon, Samsung, Ericsson, InterDigital, CATT	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709669	Way forward on fast fading model for LTE Aerials	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709670	Numerology for multiplexing of eMBB and URLLC	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			196	7.1.3.3.7	Other
R1-1709671	WF on system acquisition time reduction	Qualcomm	Patrick Merias	52292	other	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709672	On NPRACH power control for Rel-13 NB-IoT	Huawei	Patrick Merias	52292	other	Decision		Email discussion	20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709673	NR UL MIMO Signaling Mechanism	Ericsson, Nokia, Alcatel-Lucent Shanghai Bell, Qualcomm, CATT, ZTE	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709674	Draft LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746	Intel	Patrick Merias	52292	LS out	Decision			114	6.2.9	Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - SID in RP-170295
R1-1709675	LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746	RAN1, Intel	Patrick Merias	52292	LS out	Decision			114	6.2.9	Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - SID in RP-170295
R1-1709676	TP to capture RAN1#88bis and RAN1#89 Agreements in 3GPP TR 36.746	Intel	Patrick Merias	52292	other	Decision			114	6.2.9	Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - SID in RP-170295
R1-1709677	Template for evaluation results in 3GPP TR 36.746	Intel	Patrick Merias	52292	other	Decision		Agreed in principle	115	6.2.9.1	Preliminary evaluation results
R1-1709678	WF on NSSS-based measurement accuracy enhancement	LG Electronics, ZTE	Patrick Merias	52292	other	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709679	Draft LS on NB-IoT Small cells	Ericsson	Patrick Merias	52292	LS out	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1709680	WF on DMRS port multiplexing	Samsung, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709681	Chairman's notes of AI 7.1.4 Channel coding	Ad-Hoc chair (Nokia)	Patrick Merias	52292	other	Endorsement			198	7.1.4	Channel coding
R1-1709682	Chairman's notes of AI 7.1.10 Channel model	Ad-Hoc chair (Nokia)	Patrick Merias	52292	other	Endorsement			220	7.1.10	Channel model
R1-1709683	Chairman's notes of AI 7.1.6 Duplex and interference management	Ad-Hoc chair (Qualcomm)	Patrick Merias	52292	other	Endorsement			214	7.1.6	Duplexing
R1-1709684	Chairman's notes of AI 7.1.8 NR-LTE co-existence	Ad-Hoc chair (Qualcomm)	Patrick Merias	52292	other	Endorsement			218	7.1.8	NR-LTE co-existence
R1-1709685	Chairman's notes of AI 6.1 Maintenance of E-UTRA Releases 8 – 14	Ad-Hoc chair (Nokia)	Patrick Merias	52292	other	Endorsement			19	6.1	Maintenance of E-UTRA Releases 8 – 14

R1-1709686	Chairman's notes of AI 6.2.1 Shortened TTI and processing time for LTE	Ad-Hoc chair (Ericsson)	Patrick Merias	52292	other	Endorsement			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709687	Chairman's notes of AI 6.2.2 Enhancements to LTE operation in unlicensed spectrum	Ad-Hoc chair (Nokia)	Patrick Merias	52292	other	Endorsement			64	6.2.2	Enhancements to LTE operation in unlicensed spectrum - WID in RP-170848
R1-1709688	Chairman's notes of AI 6.2.3 3GPP V2X Phase 2	Ad-Hoc chair (Huawei)	Patrick Merias	52292	other	Endorsement			68	6.2.3	3GPP V2X Phase 2 - WID in RP-170798
R1-1709689	Chairman's notes of AI 6.2.4 Further enhancements to Coordinated Multi-Point Operation	Ad-Hoc chair (Intel)	Patrick Merias	52292	other	Endorsement			83	6.2.4	Further enhancements to CoMP Operation for LTE - WID in RP-170750
R1-1709690	Chairman's notes of AI 6.2.5 Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE	Ad-Hoc chair (Huawei)	Patrick Merias	52292	other	Endorsement			88	6.2.5	Enhancements for high capacity stationary wireless link and introduction of 1024 QAM for LTE - WID in RP-170838
R1-1709691	Chairman's notes of AI 6.2.6 Even further Enhanced MTC for LTE	Ad-Hoc chair (Ericsson)	Patrick Merias	52292	other	Endorsement			92	6.2.6	Even further enhanced MTC for LTE - WID in RP-170732
R1-1709692	Chairman's notes of AI 6.2.7 Further enhancements of NB-IoT	Ad-Hoc chair (Huawei)	Patrick Merias	52292	other	Endorsement			99	6.2.7	Further NB-IoT enhancements - WID in RP-170852
R1-1709693	Chairman's notes of AI 6.2.8 Enhanced Support for Aerial Vehicles	Ad-Hoc chair (Ericsson)	Patrick Merias	52292	other	Endorsement			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709694	Draft CR on skipped subframe handling for partial sensing	Samsung, NTT DOCOMO, Panasonic	Patrick Merias	52292	draftCR	Decision			22	6.1.3	Maintenance of Release 14 V2V/V2X services based on LTE sidelink
R1-1709695	Way forward on the maximum TA for two-stage triggered PUSCH transmission	Intel	Patrick Merias	52292	other	Decision			21	6.1.2	Maintenance of Release 14 Enhanced Licensed-Assisted Access to Unlicensed Spectrum
R1-1709696	WF on Processing Time Requirements	Qualcomm	Patrick Merias	52292	other	Decision			193	7.1.3.3.4	Processing time and HARQ process number
R1-1709697	WF on Simulation Assumptions for Backhaul Latency and Fixed UE Height	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1709698	Revised WF on sidelink power control for FeD2D	LG Electronics, Huawei, HiSilicon	Patrick Merias	52292	other	Decision			122	6.2.9.2.3.3	Sidelink power control
R1-1709699	WF on SRS sequence generation	Mitsubishi Electric, Huawei, HiSilicon, Nokia, AT&T, Intel, ZTE, LG Electronics, Panasonic, Ericsson	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709700	WF on PRACH capacity enhancement	NTT DOCOMO	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709701	Summary on time index indication of SS block	Huawei, HiSilicon, Samsung, MediaTek, InterDigital, ZTE	Patrick Merias	52292	other	Decision			132	7.1.1.1.3	SS block time index indication
R1-1709702	WF on UE Processing Time	Huawei, HiSilicon, MediaTek	Patrick Merias	52292	other	Decision			193	7.1.3.3.4	Processing time and HARQ process number
R1-1709703	WF on the number of HARQ process	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			193	7.1.3.3.4	Processing time and HARQ process number
R1-1709704	[DRAFT] LS on UL HARQ processes and collision handling for short processing time with 1ms TTI	Sharp	Patrick Merias	52292	LS out	Decision			31	6.2.1.1.2	Handling collisions between n+4 and n+3
R1-1709705	Reply LS on in-sync/out-of-sync indication for RLF	RAN1, NTT DOCOMO	Patrick Merias	52292	LS out	Decision		sent	143	7.1.1.5.3	Radio link monitoring
R1-1709706	WF on monitoring of the group-common PDCCH	CATT, Intel, OPPO, InterDigital	Patrick Merias	52292	other	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1709707	TP on potential problems for study on enhanced support of aerial vehicles	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			113	6.2.8.4	Other
R1-1709708	WF on NR-RACH preamble format for deep coverage enhancement	ZTE, CMCC	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709709	WF on CSI-RS based RRM measurements on detected cells	ZTE, NTT DOCOMO	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709710	WF on extended CP	Huawei, HiSilicon, VODAFONE, DOCOMO, Ericsson, Orange, OPPO, Nokia, ASB, InterDigital, China Unicom, Intel, Sony, Mediatek, LGE	Patrick Merias	52292	other	Decision			221	7.1.11	Other
R1-1709711	WF on RACH sequence for high speed large radius cells	Nokia	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design

R1-1709712	WF on UL power sharing between LTE and NR	NTT DOCOMO	Patrick Merias	52292	other	Decision			219	7.1.9	UL power control
R1-1709713	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709714	Correction on starting OFDM symbol for MPDCCH and PDSCH in special subframe	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709715	[Draft] Monitoring of partial NPDCCH search spaces	Qualcomm	Patrick Merias	52292	LS out	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709716	Monitoring of partial NPDCCH search spaces	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision		sent	20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709717	Correction on PRS hopping	ZTE	Patrick Merias	52292	CR	Decision			24	6.1.5	Maintenance of Release 14 Further Enhanced MTC for LTE
R1-1709718	Timing relationships for 2 HARQ processes	Qualcomm Incorporated	Patrick Merias	52292	CR	Decision			25	6.1.6	Maintenance of Release 14 Enhancements of NB-IoT for LTE
R1-1709719	Corrections on PRB scaling for PUSCH in UpPTS	Huawei	Patrick Merias	52292	CR	Decision			26	6.1.7	Other
R1-1709720	WF on LDPC decoder throughput requirements	Ericsson, MediaTek, Fujitsu	Patrick Merias	52292	other	Decision			204	7.1.4.1.1.4	Other
R1-1709721	CR on LDPC code [38.802]	Samsung	Patrick Merias	52292	CR	Decision			212	7.1.4.4	Other
R1-1709722	Draft CR on LDPC code [38.912]	Samsung	Patrick Merias	52292	draftCR	Decision			212	7.1.4.4	Other
R1-1709723	void	ETSI	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709724	void	ETSI	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709725	void	ETSI	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709726	void	ETSI	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709727	void	ETSI	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709728	WF on CB grouping for CBG based HARQ	LG Electronics	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709729	Draft CR on LDPC code [38.912]	Samsung	Patrick Merias	52292	draftCR	Decision			212	7.1.4.4	Other
R1-1709730	Open issues on SRS design	Sony	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709731	WF on Polar Code for NR Control Channels	Samsung	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709732	WF on the support of supplementary UL in NR	CMCC	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709733	Observations on LDPC Performance	Qualcomm	Patrick Merias	52292	other	Decision			198	7.1.4	Channel coding
R1-1709734	On DL transmission scheme 2	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1709735	WF on Uplink multi-panel and multi-TRP operation	Intel, Ericsson, InterDigital	Patrick Merias	52292	other	Decision			153	7.1.2.1.7	Multi-TRP and Multi-panel transmission
R1-1709736	WF on bandwidth part for efficient wideband operation in NR	MediaTek, Huawei, Hisilicon	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709737	WF on PRB indexing for a UE in wider bandwidth operation	LG Electronics	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709738	WF on capacity enhancement for option 1 of PRACH preamble	LG Electronics	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709739	WF on DMRS pattern	Samsung	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709740	WF on RBG size	NTT DOCOMO	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709741	Summary of issues on UL non codebook based transmissions	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			150	7.1.2.1.4	Non-codebook based transmission for UL
R1-1709742	WF on UL Command and Control Traffic for Aerial Vehicles	Nokia, Alcatel-Lucent Shanghai Bell	Patrick Merias	52292	other	Decision			111	6.2.8.2	Remaining details of evaluationassumptions
R1-1709743	UL codebook-based transmission	Samsung	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709744	WF on additional evaluation assumption for V2X sTTI	CATT, CMCC, Huawei, HiSilicon, Nokia, ASB, OPPO, ZTE	Patrick Merias	52292	other	Decision			78	6.2.3.3.1	Remaining details of evaluation methodology
R1-1709745	[Draft] LS on UL data transmission without UL grant for NR	Huawei	Patrick Merias	52292	LS out	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709746	WF on PRB indexing for a UE in wider bandwidth operation	LG Electronics	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709747	WF on NPRACH range enhancement	LG Electronics, ZTE	Patrick Merias	52292	other	Decision			105	6.2.7.3	NPRACH false alarm and cell range enhancements
R1-1709748	WF on long PUCCH hopping design	Huawei, HiSilicon, vivo, NTT DOCOMO	Patrick Merias	52292	other	Decision			185	7.1.3.2.2	Structure of PUCCH in long-duration
R1-1709749	Draft LS response on SCS for NR	Huawei	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709750	Draft LS on LTE NR coexistence with UL sharing	Huawei	Patrick Merias	52292	LS out	Decision			218	7.1.8	NR-LTE co-existence
R1-1709751	WF on candidate LDPC base matrices	Nokia	Patrick Merias	52292	other	Decision			205	7.1.4.1.2	LDPC code design
R1-1709752	WF on CBG Construction	Samsung, ZTE, ZTE Microelectronics, NTT DOCOMO	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback

R1-1709753	WF on Resource selection for carrier aggregation	NTT DOCOMO, LG Electronics, ZTE, Panasonic, Qualcomm	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709754	WF on NR-PBCH contents and payload size	NTT DOCOMO	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709755	LS to RAN2 on text proposal capturing RAN1 agreements in 3GPP TR 36.746	RAN1, Intel	Patrick Merias	52292	LS out	Decision		sent	114	6.2.9	Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - SID in RP-170295
R1-1709756	Multiple/repeated PRACH preamble transmission with OCC across preambles	Qualcomm	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709757	WF on ZP PT-RS	LG Electronics	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709758	[DRAFT]LS on NR-PBCH content	Ericsson	Patrick Merias	52292	LS out	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709759	WF on collision handling of PUCCH and sPUSCH	LG Electronics, NTT DOCOMO, Qualcomm, Intel	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709760	WF on Polar Sequence and Rate-Matching Designs	MediaTek Inc.	Patrick Merias	52292	other	Decision			209	7.1.4.2.1.2	Sequence design
R1-1709761	WF on Dynamic Switching from PDSCH Scheduling to sPDSCH Scheduling	Qualcomm, Samsung, Intel	Patrick Merias	52292	other	Decision			40	6.2.1.2.1.3	Aspects related to dynamic switching between 1ms TTI and sTTI
R1-1709762	[Draft] LS on power sharing mechanism between LTE and NR	NTT DOCOMO	Patrick Merias	52292	LS out	Decision			219	7.1.9	UL power control
R1-1709763	Chairman's notes of AI 6.2.9 on further enhancements to LTE D2D, UE to network relays for IoT and wearables	Ad-Hoc chair (Intel)	Patrick Merias	52292	other	Endorsement			114	6.2.9	Study on further enhancements to LTE D2D, UE to network relays for IoT and wearables - SID in RP-170295
R1-1709764	WF on SRS configuration	CATT, Ericsson, LG Electronics	Patrick Merias	52292	other	Decision			170	7.1.2.4.4	SRS
R1-1709765	WF on HARQ Process Number	Qualcomm	Patrick Merias	52292	other	Decision			193	7.1.3.3.4	Processing time and HARQ process number
R1-1709766	Offline discussion on carrier aggregation	Ericsson, Nokia, NEC, NTT Docomo, CATT	Patrick Merias	52292	other	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709767	WF on NR-RACH preamble format for short sequence	ZTE	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709768	WF on reciprocity based CSI acquisition	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1709769	WF on handling collision between PUCCH and sPUSCH	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			41	6.2.1.2.1.4	Collision of sTTI/TTI in UL
R1-1709770	WF on LTE-NR Coexistence with UL sharing	Huawei, HiSilicon, AsusTek, CATR	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709771	CSI-RS properties for L3 mobility	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709772	WF on orthogonal multiplexing of PT-RS	LG Electronics, Samsung, ZTE, Sharp	Patrick Merias	52292	other	Decision			169	7.1.2.4.3	PT-RS
R1-1709773	WF on UL beam management	Huawei, HiSilicon, Intel, Xinwei, MediaTek, InterDigital	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709774	Summary of beam management related proposals	Qualcomm	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709775	Summary of offline discussion on CSI framework	CATT	Patrick Merias	52292	other	Decision			160	7.1.2.3.1	CSI framework
R1-1709776	WF on Alternative DL Tx Beam Indication in Msg. 3 for RACH Procedure in Multi-Beam Scenario	AT&T, Qualcomm	Patrick Merias	52292	other	Decision			139	7.1.1.4.2	4-step RA procedure
R1-1709777	WF on PRACH preamble format for NR new use	MediaTek	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709778	WF on DL transmission scheme 2	Samsung, KDDI, Fujutsi	Patrick Merias	52292	other	Decision			148	7.1.2.1.2	Transmission scheme 2 for DL
R1-1709779	WF on CSI acquisition	Samsung, Ericsson	Patrick Merias	52292	other	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1709780	LS on NB-IoT small cell	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			106	6.2.7.4	NB-IoT small cell support
R1-1709781	LS on narrowband measurement accuracy enhancement	RAN1, Huawei	Patrick Merias	52292	LS out	Decision			104	6.2.7.2	Narrowband measurement accuracy improvements
R1-1709782	Early termination for polar codes	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			208	7.1.4.2.1.1	Code construction
R1-1709783	WF on the hierarchical search space structure	LG Electronics, OPPO	Patrick Merias	52292	other	Decision			178	7.1.3.1.2	Search space configuration/design and PDCCH monitoring
R1-1709784	[Draft] LS on RAN1 agreements on CA	Ericsson	Patrick Merias	52292	LS out	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709785	CSI-RS properties for L3 mobility	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			142	7.1.1.5.2	Measurement based on CSI-RS for L3 mobility
R1-1709786	Summary of offline discussion of CSI acquisition for reciprocity based operation	ZTE	Patrick Merias	52292	other	Decision			162	7.1.2.3.3	CSI acquisition for reciprocity based operation
R1-1709787	WF on UL PC parameters	Nokia	Patrick Merias	52292	other	Decision			219	7.1.9	UL power control
R1-1709788	WF on DM-RS for NR	Intel	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS

R1-1709789	LS on NR-PBCH content	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709790	Reply LS on power sharing mechanism between LTE and NR	RAN1, NTT DOCOMO	Patrick Merias	52292	LS out	Decision			219	7.1.9	UL power control
R1-1709791	WF on DL PRB bundling size value set	Xinwei, CATT, MTK, Intel, ZTE	Patrick Merias	52292	other	Decision			152	7.1.2.1.6	PRB bundling for DL
R1-1709792	WF on simulation asumptions for 1-symbol NR-PUCCH with 1 or 2 bits UCI payload	Qualcomm	Patrick Merias	52292	other	Decision			184	7.1.3.2.1	Structure of PUCCH in short-duration
R1-1709793	[DRAFT] Reply LS on the feasibility of DC-related mobility enhancements in NR	Intel	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709794	WF on CBG Construction	Samsung, ZTE, NTT DOCOMO	Patrick Merias	52292	other	Decision			194	7.1.3.3.5	CBG-based transmission with single/multi-bit HARQ-ACK feedback
R1-1709795	WF on assignment for DL and UL transmission	CMCC	Patrick Merias	52292	other	Decision			181	7.1.3.1.5	Group-common PDCCH
R1-1709796	LS on SR design principles in NR	RAN2, Samsung	Patrick Merias	52292	LS in				4	4	Incoming Liaison Statements
R1-1709797	WF on CSI-RS pattern for beam management	Huawei, HiSilicon, CATT, ZTE, OPPO	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709798	WF on UL codebook	LGE, Samsung, InterDigital	Patrick Merias	52292	other	Decision			149	7.1.2.1.3	Codebook based transmission for UL
R1-1709799	WF on DMRS pattern in frequency domain	MediaTek	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709800	Summary of AI 7.1.2.1.5 UL transmit diversity	Mitsubishi Electric	Patrick Merias	52292	other	Decision			151	7.1.2.1.5	Diversity transmission for UL
R1-1709801	WF on RRM measurement	MediaTek	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709802	Way Forward on bandwidth part for efficient wideband operation in NR	Ericsson, Intel, MediaTek, OPPO	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709803	Draft LS response on SCS for NR	Huawei	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709804	Way forward on clarifications on NRS presence on non-anchor unicast in Rel-13 NB-IoT	Huawei, HiSilicon, Neul, Qualcomm, Intel, Vodafone, DT, China Unicom, ublox	Patrick Merias	52292	other	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709805	LS on UL data transmission without UL grant for NR	RAN1, Huawei	Patrick Merias	52292	LS out	Decision		sent	191	7.1.3.3.2	UL data scheduling
R1-1709806	[DRAFT] LS related to phase tracking reference signal (PT-RS) design	Ericsson	Patrick Merias	52292	LS out	Decision			169	7.1.2.4.3	PT-RS
R1-1709807	WF on LTE-NR Coexistence with UL sharing	Huawei, HiSilicon, AsusTek, CATR, MediaTek, Spreadtrum	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709808	WF on using SS block for beam management	ZTE	Patrick Merias	52292	other	Decision			156	7.1.2.2.1	Beam management details
R1-1709809	Reply LS on the feasibility of DC-related mobility enhancements in NR	RAN1, Intel	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709810	WF on RRM measurement	MediaTek	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709811	WF on PRACH preamble format for NR new use	MediaTek	Patrick Merias	52292	other	Decision			138	7.1.1.4.1	PRACH design
R1-1709812	Summary of [88b-12] Email discussion on QCL types for NR	ZTE	Patrick Merias	52292	other	Decision			171	7.1.2.4.5	QCL
R1-1709813	[draft] LS on the support of supplementary UL in NR	CMCC	Patrick Merias	52292	LS out	Decision			218	7.1.8	NR-LTE co-existence
R1-1709814	WF on SS Block Bandwidth and Minimum Carrier Bandwidth for NR	AT&T, Verizon, T-Mobile USA	Patrick Merias	52292	other	Decision			4	4	Incoming Liaison Statements
R1-1709815	Summary of CSI Acquisition Details	NTT DOCOMO	Patrick Merias	52292	other	Decision			161	7.1.2.3.2	Details of CSI acquisition
R1-1709816	LDPC Rate-Compatible Design	Qualcomm Incorporated	Patrick Merias	52292	discussion	Discussion			205	7.1.4.1.2	LDPC code design
R1-1709817	WF on DMRS sequence for NR-PBCH	LG Electronics	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709818	WF on SS block bandwidth and Minimum Carrier Bandwidth for NR below 6GHz	CMCC	Patrick Merias	52292	other	Decision			4	4	Incoming Liaison Statements
R1-1709819	[Draft] LS Related to SRS hopping	Ericsson	Patrick Merias	52292	LS out	Decision			170	7.1.2.4.4	SRS
R1-1709820	[DRAFT] LS response on NR minimum carrier bandwidth	AT&T, CMCC	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709821	Updated work plan for NR initial access and mobility	NTT DOCOMO, INC., Ericsson, Intel, Huawei, Samsung	Patrick Merias	52292	other	Decision			128	7.1.1	Initial access and mobility
R1-1709822	[Draft] LS related to Quasi-Colocation assumptions	Nokia	Patrick Merias	52292	LS out	Decision			171	7.1.2.4.5	QCL
R1-1709823	void	ETSI	Patrick Merias	52292	other				171	7.1.2.4.5	QCL
R1-1709824	WF on evaluation assumption on UL transmission without UL grant in a DCI	LG Electronics, NICT, …	Patrick Merias	52292	other	Decision			191	7.1.3.3.2	UL data scheduling
R1-1709825	WF on LTE-NR Coexistence with UL sharing	Huawei, HiSilicon, AsusTek, CATR, MediaTek, Spreadtrum, Oppo	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709826	LS on RAN1 agreements on CA	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			70	6.2.3.1.1	Carrier Aggregation (up to 8 PC5 carriers)
R1-1709827	Calibration results for Phase 1 NR MIMO link level calibration	ZTE	Patrick Merias	52292	other	Decision			174	7.1.2.5	Other

R1-1709828	Calibration results for Phase 1 NR MIMO system level calibration	ZTE	Patrick Merias	52292	other	Decision			174	7.1.2.5	Other
R1-1709829	Calibration results for Phase 2 NR MIMO link level calibration	ZTE	Patrick Merias	52292	other	Decision			174	7.1.2.5	Other
R1-1709830	Calibration results for Phase 2 NR MIMO system level calibration	ZTE	Patrick Merias	52292	other	Decision			174	7.1.2.5	Other
R1-1709831	Calibration results for Phase 3 NR MIMO calibration	ZTE	Patrick Merias	52292	other	Decision			174	7.1.2.5	Other
R1-1709832	TR38.802_CR_Section_7.1.6_MIMO calibration	ZTE	Patrick Merias	52292	CR	Decision			174	7.1.2.5	Other
R1-1709833	WF on Front-load DMRS design	Qualcomm, Huawei, HiSilicon, ZTE, Mediatek, Ericsson, Mitsubishi, LGE, ITL, NTT DOCOMO, ETRI, CATT	Patrick Merias	52292	other	Decision			168	7.1.2.4.2	DMRS
R1-1709834	LS on System acquisition time reduction for Rel-15 LTE MTC	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			93	6.2.6.1	Reduced system acquisition time
R1-1709835	LS on early data transmission in MTC and NB-IoT in Rel-15	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			98	6.2.6.6	Other
R1-1709836	LS related to SRS hopping	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			170	7.1.2.4.4	SRS
R1-1709837	LS related to quasi co-location assumptions	RAN1, Nokia	Patrick Merias	52292	LS out	Decision			171	7.1.2.4.5	QCL
R1-1709838	WF on RRM measurement	MediaTek	Patrick Merias	52292	other	Decision			141	7.1.1.5.1	Measurement based on SS block
R1-1709839	Draft Response to IEEE 802 LMSC regarding LAA	Qualcomm Incorporated	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709840	Draft Response to IEEE 802 LMSC on ED and PD issues.	Qualcomm Incorporated	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709841	Open issues and work plan for Wider BW operation	NTT DOCOMO	Patrick Merias	52292	other	Decision			217	7.1.7	Wider bandwidth operations
R1-1709842	LS response on NR minimum carrier bandwidth	RAN1, A&T, CMCC	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709843	LS on the support of supplementary UL in NR	RAN1, CMCC	Patrick Merias	52292	LS out	Decision		"Draft" should be removed from title	218	7.1.8	NR-LTE co-existence
R1-1709844	Open Issue and Work Plan for LTE/NR Coexistence	Huawei	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709845	Updated views on LTE NR co-existence	NTT DOCOMO	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709846	NRS presence assumptions on unicast non-anchor carriers	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709847	NRS presence assumptions on unicast non-anchor carriers	Huawei, HiSilicon	Patrick Merias	52292	CR	Decision			20	6.1.1	Maintenance of E-UTRA Release 8 – 13
R1-1709848	Proposals on work plan for scheduling/HARQ aspects	NTT DOCOMO	Patrick Merias	52292	other	Information			175	7.1.3	Scheduling/HARQ aspects
R1-1709849	WF on LTE-NR Coexistence with UL sharing	Huawei	Patrick Merias	52292	other	Decision			218	7.1.8	NR-LTE co-existence
R1-1709850	LS response on SCS for NR	RAN1, Huawei	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709851	Response to IEEE 802 LMSC regarding LAA	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision		Post meeting: typo (reference to IEEE LS) is corrected	4	4	Incoming Liaison Statements
R1-1709852	Response LS to 3GPP RAN/RAN1/RAN4 related to PD and ED issues	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision		Post meeting: LS title is clarified	4	4	Incoming Liaison Statements
R1-1709853	Work plan for NR MIMO	NTT DOCOMO	Patrick Merias	52292	Work Plan	Information			145	7.1.2	MIMO
R1-1709854	Response to IEEE 802 LMSC regarding LAA	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709855	Response to IEEE LS to 3GPP RAN/RAN1/RAN4 related to PD and ED issues	RAN1, Qualcomm	Patrick Merias	52292	LS out	Decision			4	4	Incoming Liaison Statements
R1-1709856	On Design and Performance of NR eMBB LDPC	MediaTek Inc.	Patrick Merias	52292	discussion				205	7.1.4.1.2	LDPC code design
R1-1709857	Summary of evaluation on DL 1024 QAM	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1709858	TP on Summary of evaluation for DL 1024 QAM	Huawei, HiSilicon	Patrick Merias	52292	other	Decision			89	6.2.5.1	Support for 1024QAM for DL channels
R1-1709859	TP for Key performance indicator, evaluation assumptions, and channel modelling	Ericsson, NTT DOCOMO, Inc.	Patrick Merias	52292	other	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709860	Draft LS on RAN1 agreements on key performance indicator, evaluation assumptions, and channel modelling	Ericsson	Patrick Merias	52292	LS out	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709861	Shortened TTI and short processing time - Collection of RAN1 agreements sorted per topic	Ericsson	Patrick Merias	52292	other	Information			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709862	LS on RAN1 agreements on key performance indicator, evaluation assumptions, and channel modelling	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779
R1-1709863	Proposals on work plan for scheduling/HARQ aspects	NTT DOCOMO	Patrick Merias	52292	other	Information			175	7.1.3	Scheduling/HARQ aspects
R1-1709864	Work plan for NR Channel Coding	Nokia	Patrick Merias	52292	other	Information			198	7.1.4	Channel coding

R1-1709865	RAN1 decisions for WI Shortened TTI and processing time for LTE (LTE_sTTIandPT)	Ericsson	Patrick Merias	52292	other	Information			28	6.2.1	Shortened TTI and processing time for LTE - WID in RP-170113
R1-1709866	Summary of [89-11] Email discussion on the remaining evaluation assumption for aerial vehicle	NTT DOCOMO	Patrick Merias	52292	other	Decision			110	6.2.8.1	Channel modelling of aerial UEs
R1-1709867	FeD2D evaluation results template	Intel	Patrick Merias	52292	other	Decision			115	6.2.9.1	Preliminary evaluation results
R1-1709868	Summary of email discussion [89-15] Details for NR-PBCH evaluation	Ericsson	Patrick Merias	52292	other	Decision			134	7.1.1.2.1	NR-PBCH
R1-1709869	LS on RAN1 agreements on channel modelling	RAN1, Ericsson	Patrick Merias	52292	LS out	Decision			109	6.2.8	Enhanced Support for Aerial Vehicles - WID in RP-170779

TDoc sort order within agenda item	TDoc Status	Reservation date	Uploaded	Is revision of	Revised to	Release	Spec	Version	Related WIs	CR	CR revision	CR category	TSG CR Pack	Reply to
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0	available	2017-05-05 10:52:44	2017-05-06 17:27:58											
0	available	2017-05-05 10:52:44	2017-05-07 08:07:56											

0	**available**	2017-05-05 10:52:44	2017-05-06 17:27:58											
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0	**available**	2017-05-05 10:52:46	2017-05-06 17:27:58											
0	**available**	2017-05-05 10:52:46	2017-05-06 17:27:58											
0	**available**	2017-05-05 10:52:46	2017-05-07 08:07:56											
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0	withdrawn	2017-05-05 10:53:10												
0	withdrawn	2017-05-05 10:55:11												
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0	**available**	2017-05-05 11:02:39	2017-05-07 13:57:56											
0	withdrawn	2017-05-05 11:02:57												

0	available	2017-05-05 11:11:54	2017-05-06 15:17:58												
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0	withdrawn	2017-05-05 11:13:14													
0	available	2017-05-05 11:13:16	2017-05-06 12:18:01												
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0	available	2017-05-05 11:23:08	2017-05-05 15:36:11		R1-1714480										
0	revised	2017-05-05 11:31:44	2017-05-06 15:17:58		R1-1709157										
0	noted	2017-05-05 11:41:24	2017-05-06 15:17:58												
0	available	2017-05-05 11:43:11	2017-05-05 16:25:47												
0	revised	2017-05-05 11:47:06	2017-05-06 12:18:01		R1-1709713	Rel-13	36.213	13.5.0	LTE_MTCe2_L1-Core			F			
0	available	2017-05-05 11:51:26	2017-05-06 15:17:58												
0	available	2017-05-05 11:53:08	2017-05-06 15:17:58												
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0	available	2017-05-05 12:03:28	2017-05-07 08:07:56												
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0	available	2017-05-05 12:03:28	2017-05-07 08:07:56												
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0	available	2017-05-05 12:03:28	2017-05-07 08:07:56											
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0	noted	2017-05-05 12:12:43	2017-05-06 15:17:58											
0	withdrawn	2017-05-05 12:15:17												
0	withdrawn	2017-05-05 12:15:17												
0	withdrawn	2017-05-05 12:15:17												
0	withdrawn	2017-05-05 12:15:17												
0	withdrawn	2017-05-05 12:15:18												
0	withdrawn	2017-05-05 12:15:18												
0	withdrawn	2017-05-05 12:15:18												
0	noted	2017-05-05 12:21:42	2017-05-06 15:17:58			Rel-14			LTE_V2X-Core					R2-1703942
0	noted	2017-05-05 12:22:26	2017-05-06 15:17:58											
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0	not pursued	2017-05-05 12:31:53	2017-05-06 15:17:58			Rel-14	36.214	14.2.0	LTE_V2X-Core			F		
0	withdrawn	2017-05-05 12:32:39				Rel-14	36.214	14.2.0	LTE_V2X-Core			F		
0	available	2017-05-05 12:32:40	2017-05-05 15:50:06											
0	noted	2017-05-05 12:40:59	2017-05-06 15:17:58											
0	available	2017-05-05 12:41:14	2017-05-05 17:02:47											
0	available	2017-05-05 12:41:54	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	withdrawn	2017-05-05 12:41:57												
0	noted	2017-05-05 12:53:06	2017-05-06 15:17:58											
0	noted	2017-05-05 12:56:22	2017-05-05 19:22:27											
0	available	2017-05-05 12:56:22	2017-05-05 19:22:27											
0	available	2017-05-05 13:01:58	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	available	2017-05-05 13:12:03	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	available	2017-05-05 13:30:42	2017-05-07 08:07:56											
0	available	2017-05-05 13:35:33	2017-05-06 13:14:36											
0	withdrawn	2017-05-05 14:00:30				Rel-13	36.213	13.5.0	LTE_MTCe2_L1-Core			F		
0	agreed	2017-05-05 14:02:49	2017-05-06 12:18:01			Rel-13	36.213	13.5.0	NB_IOT-Core	0912		F	RP-171197	
0	agreed	2017-05-05 14:03:00	2017-05-06 12:18:01			Rel-14	36.213	14.2.0	NB_IOT-Core	0913		A	RP-171197	
0	available	2017-05-05 14:43:25	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	revised	2017-05-05 14:44:49	2017-05-06 12:18:01		R1-1709156	Rel-15			NR_newRAT					
0	available	2017-05-05 14:45:58	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	available	2017-05-05 14:51:37	2017-05-06 12:18:01			Rel-15			NR_newRAT					

0	revised	2017-05-05 14:52:00	2017-05-06 12:18:01		R1-1709449	Rel-15			NR_newRAT-Core					R2-1703974
0	available	2017-05-05 14:52:55	2017-05-06 12:18:01			Rel-15			NR_newRAT					
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0	withdrawn	2017-05-05 15:02:26				Rel-14	36.213	14.2.0	NB_IOT-Core	0915		A		
0	available	2017-05-05 15:16:39	2017-05-06 12:18:01			Rel-15			NR_newRAT					
0	available	2017-05-05 15:24:09	2017-05-06 11:47:17											
0	available	2017-05-05 15:26:24	2017-05-05 19:05:40			Rel-15								
0	available	2017-05-05 15:36:38	2017-05-06 13:14:36											
0	available	2017-05-05 15:36:50	2017-05-06 12:18:01											
0	withdrawn	2017-05-05 15:50:13												
0	available	2017-05-05 15:50:46	2017-05-05 16:17:30											
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0	available	2017-05-05 16:37:48	2017-05-05 19:58:43											
0	available	2017-05-05 16:37:48	2017-05-05 19:58:43											
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0	available	2017-05-05 16:37:48	2017-05-06 20:34:52											
0	available	2017-05-05 16:37:48	2017-05-05 19:58:43											
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0	available	2017-05-05 16:37:48	2017-05-05 19:38:34											
0	revised	2017-05-05 16:37:48	2017-05-05 19:58:43		R1-1709175									
0	revised	2017-05-05 16:37:48	2017-05-05 19:58:43			Rel-14	38.802	14.0.0	FS_NR_newRAT			F		
0	revised	2017-05-05 16:37:48	2017-05-06 15:04:53		R1-1709235	Rel-14	36.213	14.2.0	LTE_MTCe2_L1-Core			A		
0	available	2017-05-05 16:51:39	2017-05-05 17:03:12											
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0	available	2017-05-05 16:54:12	2017-05-05 17:03:12											
0	available	2017-05-05 17:04:21	2017-05-05 18:45:23											
0	withdrawn	2017-05-05 17:05:24												
0	available	2017-05-05 17:05:32	2017-05-05 18:44:30											
0	available	2017-05-05 17:25:37	2017-05-06 12:18:01											
0	available	2017-05-05 17:27:06	2017-05-06 12:18:01											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											

0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709177									
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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											

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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00												
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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
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0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	endorsed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-15	38.215	0.0.0	NR_newRAT-Core						
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00												
0	available	2017-05-08 00:00:00	2017-05-08 00:00:00												
0	withdrawn	2017-05-08 08:59:19													
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709233	Rel-13	36.211	13.5.0	NB_IOT-Core	0368		F			
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709234	Rel-14	36.211	14.2.0	NB_IOT-Core	0369		A			
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709269	Rel-13	36.211	13.5.0	NB_IOT-Core	0370		F			
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709270	Rel-14	36.211	14.2.0	NB_IOT-Core	0371		A			
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0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00		R1-1709645	Rel-14	36.213	14.2.0	LTE_V2X-Core			F		
0	available	2017-05-08 08:59:31	2017-05-10 07:36:49											
0	withdrawn	2017-05-08 08:59:31												
0	postponed	2017-05-07 00:00:00	2017-05-07 00:00:00	R1-1706095		Rel-14	38.901	14.0.0	FS_NR_newRAT	0006	1	F		
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-14	38.901	14.0.0	FS_NR_newRAT	0013		F	RP-171208	
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-14	38.901	14.0.0	FS_NR_newRAT	0014		F	RP-171208	
0	noted	2017-05-07 00:00:00	2017-05-07 00:00:00	R1-1705168										
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-12	36.873	12.4.0	FS_LTE_3D_channel	0027		F	RP-171202	
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-12	36.873	12.4.0	FS_LTE_3D_channel	0028		F	RP-171202	
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-12	36.873	12.4.0	FS_LTE_3D_channel	0029		F	RP-171202	
0	agreed	2017-05-07 00:00:00	2017-05-07 00:00:00			Rel-12	36.873	12.4.0	FS_LTE_3D_channel	0030		F	RP-171202	
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	available	2017-05-07 00:00:00	2017-05-07 00:00:00											
0	noted	2017-05-08 09:06:45	2017-05-16 00:33:47											
0	revised	2017-05-07 00:00:00	2017-05-07 00:00:00	R1-1707850	R1-1709150									
0	revised	2017-05-08 15:36:09	2017-05-16 00:33:47	R1-1709149	R1-1709856									
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0	noted	2017-05-09 11:37:57	2017-05-14 22:37:58	R1-1707073										
0	noted	2017-05-09 11:38:29	2017-05-14 22:37:58	R1-1707080										
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0	available	2017-05-10 07:33:14	2017-05-13 02:04:58	R1-1707240										
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0	available	2017-05-10 07:42:48	2017-05-10 09:31:20	R1-1707557		Rel-15								
0	available	2017-05-10 09:25:50	2017-05-10 11:43:24	R1-1707781										
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0	available	2017-05-12 06:28:37	2017-05-13 01:55:33	R1-1709043										
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0	noted	2017-05-14 22:36:31	2017-05-17 00:38:44			Rel-15								
0	noted	2017-05-16 00:22:44	2017-05-16 00:33:47											
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0	withdrawn	2017-05-16 00:22:46		R1-1708747		Rel-13			LTE_LAA-Core					
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0	noted	2017-05-16 00:22:50	2017-05-19 04:11:42											
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0	noted	2017-05-16 00:23:04	2017-05-17 00:38:44											
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0	noted	2017-05-16 00:25:07	2017-05-19 04:11:41												
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0	available	2017-05-18 00:19:29	2017-05-18 00:29:01											

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0	revised	2017-05-18 00:20:16	2017-05-18 00:27:32		R1-1709621	Rel-15			FS_feD2D_IoT_relay_wearable					
0	approved	2017-05-18 00:20:17	2017-05-18 00:27:32	R1-1709620		Rel-15			FS_feD2D_IoT_relay_wearable					
0	noted	2017-05-18 00:20:18	2017-05-18 00:27:32											
0	noted	2017-05-18 00:20:18	2017-05-18 00:22:44											
0	revised	2017-05-18 00:20:19	2017-05-19 04:11:41		R1-1709801									
0	noted	2017-05-18 00:20:20	2017-05-18 00:22:44	R1-1709503										
0	withdrawn	2017-05-18 00:20:21												

0	noted	2017-05-18 00:20:21	2017-05-18 00:22:44											
0	available	2017-05-18 00:20:22	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:22	2017-05-18 00:22:44	R1-1709476										
0	noted	2017-05-18 00:20:23	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:24	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:24	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:25	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:26	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:26	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:27	2017-05-19 09:07:54											
0	withdrawn	2017-05-18 00:20:28												
0	noted	2017-05-18 00:20:28	2017-05-18 00:22:44		R1-1709699									
0	noted	2017-05-18 00:20:29	2017-05-18 00:22:44	R1-1709498										
0	noted	2017-05-18 00:20:30	2017-05-18 00:22:44	R1-1709565										
0	available	2017-05-18 00:20:30	2017-05-18 00:22:44	R1-1707672										
0	noted	2017-05-18 00:20:31	2017-05-19 04:11:41											
0	withdrawn	2017-05-18 00:20:31												
0	noted	2017-05-18 00:20:32	2017-05-18 00:22:44											
0	agreed	2017-05-18 00:20:33	2017-05-19 04:11:41	R1-1709133		Rel-14	36.213	14.2.0	LTE_V2X-Core	0925		F	RP-171203	
0	available	2017-05-18 00:20:36	2017-05-19 04:11:41											
0	available	2017-05-18 00:20:36	2017-05-19 04:11:41											
0	agreed	2017-05-18 00:20:37	2017-05-19 04:11:41	R1-1709174		Rel-14	36.211	14.2.0	LTE_eFDMIMO-Core	0375		F	RP-171194	
0	agreed	2017-05-18 00:20:40	2017-05-18 00:22:44	R1-1707809		Rel-14	36.211	14.2.0	LTE_eFDMIMO-Core	0376		F	RP-171194	
0	noted	2017-05-18 00:20:43	2017-05-18 00:22:44		R1-1709654									
0	agreed	2017-05-18 00:20:43	2017-05-19 04:11:41	R1-1708205		Rel-14	36.213	14.2.0	LTE_feMTC-Core	0926		F	RP-171204	
0	treated	2017-05-18 00:20:46	2017-05-18 00:22:44			Rel-15			FS_LTE_Aerial					
0	available	2017-05-18 00:20:47	2017-05-19 04:11:41											
0	withdrawn	2017-05-18 00:20:47		R1-1709650										
0	agreed	2017-05-18 00:20:48	2017-05-19 04:11:41	R1-1707874		Rel-14	36.213	14.2.0	LTE_SRS_switch-Core	0927		F	RP-171200	
0	agreed	2017-05-18 00:20:51	2017-05-19 04:04:16			Rel-13	36.213	13.5.0	TEI13	0928		F	RP-171198	
0	agreed	2017-05-18 00:20:54	2017-05-19 04:04:16	R1-1709538		Rel-14	36.213	14.2.0	TEI14	0929		F	RP-171210	

0	noted	2017-05-18 00:20:56	2017-05-19 09:07:54											
0	noted	2017-05-18 00:20:57	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:58	2017-05-18 00:22:44											
0	noted	2017-05-18 00:20:58	2017-05-19 04:04:16	R1-1709501										
0	noted	2017-05-18 00:20:59	2017-05-19 09:07:54											
0	revised	2017-05-18 00:20:59	2017-05-19 04:04:16	R1-1708757	R1-1709718	Rel-14	36.213	14.2.0	NB_IOTenh-Core			F		
0	revised	2017-05-18 00:21:00	2017-05-19 04:04:16			Rel-14	36.213	14.2.0	LTE_V2X-Core			F		
0	noted	2017-05-18 00:21:01	2017-05-19 04:04:16											
0	revised	2017-05-18 00:21:01	2017-05-19 04:04:16	R1-1707061		Rel-14	36.213	14.2.0	LTE_SL_V2V-Core	0910	1	F		
0	available	2017-05-18 00:21:02	2017-05-19 09:07:54											
0	noted	2017-05-18 00:21:03	2017-05-19 09:07:54											
0	noted	2017-05-18 00:21:03	2017-05-18 00:22:44											
0	available	2017-05-18 00:21:04	2017-05-19 04:04:16	R1-1706914										
0	withdrawn	2017-05-18 00:21:05												
0	noted	2017-05-18 00:21:05	2017-05-19 04:04:16											
0	noted	2017-05-18 00:21:06	2017-05-19 04:04:16											
0	revised	2017-05-18 00:21:07	2017-05-19 04:04:16		R1-1709675	Rel-15			FS_feD2D_IoT_relay_wearable					
0	revised	2017-05-18 00:21:08	2017-05-19 04:04:16	R1-1709674	R1-1709755	Rel-15			FS_feD2D_IoT_relay_wearable					
0	agreed	2017-05-18 00:21:08	2017-05-19 04:04:16											
0	revised	2017-05-18 00:21:09	2017-05-19 04:04:16											
0	available	2017-05-18 00:21:09	2017-05-19 04:04:16											
0	revised	2017-05-18 00:21:10	2017-05-19 04:04:16		R1-1709780	Rel-15			NB_IOTenh2-Core					
0	available	2017-05-18 00:21:11	2017-05-18 00:22:44											
0	endorsed	2017-05-19 03:57:43	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:43	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:43	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:43	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:43	2017-05-19 09:07:54											

0	endorsed	2017-05-19 03:57:43	2017-05-19 04:04:16											
0	endorsed	2017-05-19 03:57:43	2017-05-19 04:04:16											
0	endorsed	2017-05-19 03:57:44	2017-05-19 04:04:16											
0	endorsed	2017-05-19 03:57:44	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:44	2017-05-19 09:07:54											
0	endorsed	2017-05-19 03:57:44	2017-05-19 04:04:16											
0	endorsed	2017-05-19 03:57:44	2017-05-19 04:04:16											
0	endorsed	2017-05-19 03:57:44	2017-05-19 04:04:16											
0	revised	2017-05-19 03:57:44	2017-05-19 04:04:16	R1-1707869		Rel-14	36.213	14.2.0	LTE_V2X-Core			F		
0	available	2017-05-19 03:57:45	2017-05-19 04:04:16											
0	available	2017-05-19 03:57:45	2017-05-19 04:04:16											
0	available	2017-05-19 03:57:45	2017-05-19 04:04:16											
0	noted	2017-05-19 03:57:45	2017-05-19 04:04:16											
0	noted	2017-05-19 03:57:45	2017-05-19 09:07:54	R1-1709638										
0	noted	2017-05-19 03:57:45	2017-05-19 04:04:16											
0	noted	2017-05-19 03:57:46	2017-05-19 04:04:16											
0	available	2017-05-19 03:57:46	2017-05-19 04:12:38											
0	available	2017-05-19 03:57:46	2017-05-19 04:12:38											
0	revised	2017-05-19 03:57:46	2017-05-19 04:04:16		R1-1709243	Rel-15			LTE_sTTIandPT-Core					
0	approved	2017-05-19 03:57:46	2017-05-19 04:04:16	R1-1709571		Rel-15			NR_newRAT-Core					R2-1703964
0	noted	2017-05-19 03:57:46	2017-05-19 04:04:16											
0	available	2017-05-19 03:57:46	2017-05-19 04:04:16											
0	agreed	2017-05-19 03:57:47	2017-05-19 04:04:16											
0	noted	2017-05-19 03:57:47	2017-05-19 04:04:16	R1-1709559										
0	noted	2017-05-19 03:57:47	2017-05-19 04:04:16											
0	noted	2017-05-19 03:57:47	2017-05-19 04:04:16											

0	noted	2017-05-19 03:57:47	2017-05-19 04:04:16											
0	agreed	2017-05-19 03:57:47	2017-05-19 09:07:54	R1-1708968		Rel-13	36.213	13.5.0	LTE_MTCe2_L1-Core	0938		F	RP-171196	
0	agreed	2017-05-19 03:57:50	2017-05-19 09:07:54			Rel-14	36.213	14.2.0	LTE_MTCe2_L1-Core	0939		A	RP-171196	
0	revised	2017-05-19 03:57:52	2017-05-19 04:01:45		R1-1709716	Rel-13			NB_IOT-Core					
0	approved	2017-05-19 03:57:52	2017-05-19 09:07:54	R1-1709715		Rel-13			NB_IOT-Core					
0	agreed	2017-05-19 03:57:52	2017-05-20 03:17:54	R1-1709583		Rel-14	36.211	14.2.0	LTE_feMTC-Core	0381		F	RP-171204	
0	agreed	2017-05-19 03:57:54	2017-05-19 09:07:54	R1-1709663		Rel-14	36.213	14.2.0	NB_IOTenh-Core	0942		F	RP-171205	
0	agreed	2017-05-19 03:57:56	2017-05-19 04:01:45	R1-1709336		Rel-14	36.213	14.2.0	LTE_UL_CAP_enh-Core	0930	1	F	RP-171192	
0	available	2017-05-19 03:57:57	2017-05-19 04:01:45											
0	agreed	2017-05-19 03:57:57	2017-05-29 16:47:53			Rel-14	38.802	14.0.0	FS_NR_newRAT	0003		F	RP-171208	
0	endorsed	2017-05-19 03:57:58	2017-05-29 16:47:53	R1-1709729		Rel-14	38.912	14.0.0	FS_NR_newRAT			F		
0	withdrawn	2017-05-19 03:57:58												
0	withdrawn	2017-05-19 03:57:58												
0	withdrawn	2017-05-19 03:57:58												
0	withdrawn	2017-05-19 03:57:58												
0	withdrawn	2017-05-19 03:57:58												
0	noted	2017-05-19 03:57:59	2017-05-19 04:01:45											
0	revised	2017-05-19 03:57:59	2017-05-19 09:07:54		R1-1709722	Rel-14	38.912	14.0.0	FS_NR_newRAT			F		
0	available	2017-05-19 03:57:59	2017-05-19 09:07:54											
0	available	2017-05-19 03:57:59	2017-05-19 04:01:45											
0	noted	2017-05-19 03:57:59	2017-05-19 04:01:45	R1-1709587										
0	withdrawn	2017-05-19 03:57:59	2017-05-19 04:01:45											
0	available	2017-05-19 03:58:00	2017-05-19 04:01:45	R1-1708580		Rel-15								
0	noted	2017-05-19 03:58:00	2017-05-19 04:01:45											
0	noted	2017-05-19 03:58:00	2017-05-19 04:01:45											
0	revised	2017-05-19 03:58:00	2017-05-19 04:01:45		R1-1709746									
0	available	2017-05-19 03:58:00	2017-05-19 09:07:54											
0	withdrawn	2017-05-19 03:58:00												
0	noted	2017-05-19 03:58:00	2017-05-19 04:01:45											
0	noted	2017-05-19 03:58:01	2017-05-19 04:01:45											
0	available	2017-05-19 03:58:01	2017-05-19 04:01:44											
0	noted	2017-05-19 03:58:01	2017-05-19 04:01:44	R1-1707944										
0	noted	2017-05-19 03:58:01	2017-05-19 04:01:44											
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0	noted	2017-05-19 03:58:01	2017-05-19 04:01:44	R1-1709737										
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0	available	2017-05-19 03:58:02	2017-05-19 04:01:44											
0	revised	2017-05-19 03:58:02	2017-05-19 04:01:44	R1-1706922	R1-1709803	Rel-15			NR_newRAT-Core					R4-1704223
0	available	2017-05-19 03:58:02	2017-05-19 09:07:54											
0	noted	2017-05-19 03:58:02	2017-05-19 04:01:44											
0	revised	2017-05-19 03:58:02	2017-05-19 04:01:44		R1-1709794									

0	noted	2017-05-19 03:58:03	2017-05-19 04:01:44	R1-1709543										
0	noted	2017-05-19 03:58:03	2017-05-19 04:01:44											
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0	withdrawn	2017-05-19 03:58:03												
0	withdrawn	2017-05-19 03:58:03												
0	revised	2017-05-19 03:58:03	2017-05-19 04:01:44		R1-1709789	Rel-15			NR_newRAT-Core					
0	noted	2017-05-19 03:58:04	2017-05-19 04:01:44	R1-1709575										
0	available	2017-05-19 03:58:04	2017-05-19 09:07:54											
0	noted	2017-05-19 03:58:04	2017-05-19 04:01:44											
0	revised	2017-05-19 03:58:04	2017-05-19 04:01:44		R1-1709790	Rel-15			NR_newRAT-Core					R4-1704216
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0	noted	2017-05-19 03:58:04	2017-05-19 04:00:04											
0	noted	2017-05-19 03:58:05	2017-05-19 04:00:04											
0	noted	2017-05-19 03:58:05	2017-05-19 04:00:04											
0	available	2017-05-19 03:58:05	2017-05-19 09:07:54											
0	available	2017-05-19 03:58:05	2017-05-19 04:00:04											
0	revised	2017-05-19 03:58:05	2017-05-19 04:00:04		R1-1709807									
0	revised	2017-05-19 03:58:05	2017-05-19 04:00:04		R1-1709785									
0	noted	2017-05-19 03:58:05	2017-05-19 04:00:04											
0	noted	2017-05-19 03:58:06	2017-05-19 04:00:04											
0	noted	2017-05-19 03:58:06	2017-05-19 09:07:54											
0	noted	2017-05-19 03:58:06	2017-05-19 04:00:04											
0	noted	2017-05-19 03:58:06	2017-05-19 04:00:04											
0	revised	2017-05-19 03:58:06	2017-05-19 04:00:04		R1-1709811									
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0	approved	2017-05-19 03:58:07	2017-05-19 04:00:04	R1-1709592		Rel-15			NB_IOTenh2-Core					
0	available	2017-05-19 03:58:07	2017-05-19 09:07:54	R1-1709176		Rel-15								
0	available	2017-05-19 03:58:07	2017-05-19 09:07:54											
0	revised	2017-05-19 03:58:07	2017-05-19 04:00:04		R1-1709826	Rel-15			LTE_eV2X-Core					
0	noted	2017-05-19 03:58:08	2017-05-19 04:00:04	R1-1709771										
0	noted	2017-05-19 03:58:08	2017-05-19 09:07:54											
0	noted	2017-05-19 03:58:08	2017-05-19 04:00:04											
0	available	2017-05-19 03:58:08	2017-05-19 04:00:04											

0	approved	2017-05-19 03:58:08	2017-05-19 04:00:04	R1-1709758		Rel-15			NR_newRAT-Core					
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0	noted	2017-05-19 03:58:09	2017-05-19 04:00:04											
0	revised	2017-05-19 03:58:09	2017-05-19 08:57:53		R1-1709809	Rel-15			NR_newRAT-Core					R2-1703971
0	noted	2017-05-19 03:58:09	2017-05-19 08:57:53	R1-1709752										
0	noted	2017-05-19 03:58:09	2017-05-19 08:57:53											
0	postponed	2017-05-19 03:58:09	2017-05-19 04:00:04			Rel-15			NR_newRAT-Core					
0	noted	2017-05-19 03:58:10	2017-05-19 08:57:53											
0	noted	2017-05-19 03:58:10	2017-05-19 08:57:53											
0	withdrawn	2017-05-19 03:58:10												
0	noted	2017-05-19 00:00:00	2017-05-22 15:37:54											
0	revised	2017-06-24 14:31:18	2017-06-24 14:37:53	R1-1709624	R1-1709810									
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	revised	2017-05-19 00:00:00	2017-05-19 00:00:00	R1-1709749	R1-1709850	Rel-15			NR_newRAT-Core					R4-1704223
0	noted	2017-05-22 19:56:30	2017-05-22 19:57:54											
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0	withdrawn	2017-05-20 03:26:13												
0	revised	2017-08-18 14:35:54		R1-1709770	R1-1709825									
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	approved	2017-05-20 03:26:13	2017-05-20 03:27:56	R1-1709793		Rel-15			NR_newRAT-Core					R2-1703971
0	revised	2017-06-24 14:31:19	2017-06-24 14:37:53	R1-1709801	R1-1709838									
0	noted	2017-06-24 14:31:19	2017-06-24 14:37:53	R1-1709777										
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00	R1-1707795										
0	revised	2017-05-20 03:26:13	2017-05-20 03:27:56		R1-1709843	Rel-15			NR_newRAT-Core					
0	agreed	2017-05-20 13:49:50	2017-05-20 13:57:53											
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	available	2017-05-18 00:00:00	2017-05-18 00:00:00	R1-1709181		Rel-15								
0	available	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	agreed	2017-05-20 13:49:50	2017-05-20 13:57:53											
0	revised	2017-05-19 00:00:00	2017-05-19 00:00:00		R1-1709836									
0	revised	2017-05-20 03:26:13	2017-05-20 03:27:56		R1-1709842	Rel-15			NR_newRAT-Core					R4-1703100
0	noted	2017-06-24 14:31:23	2017-06-24 14:37:53											
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0	withdrawn	2017-05-20 03:26:14												
0	available	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	revised	2017-08-18 14:35:58		R1-1709807	R1-1709849									
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709784		Rel-15			LTE_eV2X-Core					
0	available	2017-05-24 15:53:06	2017-05-24 15:57:53											

0	available	2017-05-24 15:53:06	2017-05-24 15:57:53											
0	available	2017-05-24 15:53:06	2017-05-24 15:57:53											
0	available	2017-05-24 15:53:06	2017-05-24 15:57:53											
0	available	2017-05-24 15:53:06	2017-05-24 15:57:53											
0	agreed	2017-05-24 15:53:06	2017-05-24 15:57:53	R1-1707794		Rel-14	38.802	14.0.0	FS_NR_newRAT	0002		F	RP-171208	
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709474		Rel-15			LTE_eMTC4-Core					
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709475		Rel-15			LTE_eMTC4-Core, NB_IOTenh2-Core					
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709819		Rel-15			NR_newRAT-Core					
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709822		Rel-15			NR_newRAT-Core					
0	noted	2017-06-24 14:31:23	2017-06-24 14:37:53	R1-1709810										
0	revised	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1708746	R1-1709851	Rel-13			LTE_LAA-Core					IEEE EC-17-0065-00-00EC
0	revised	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1708747	R1-1709852	Rel-13			LTE_LAA-Core					IEEE EC-17-0064-00-00EC
0	available	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709820		Rel-15			NR_newRAT-Core					R4-1703100
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709813		Rel-15			NR_newRAT-Core					
0	noted	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	available	2017-05-18 00:00:00	2017-05-18 00:00:00											
0	agreed	2017-05-22 19:56:30	2017-05-22 19:57:54	R1-1709240		Rel-13	36.211	13.5.0	NB_IOT-Core	0382		F	RP-171197	
0	agreed	2017-05-22 19:56:33	2017-05-22 19:57:54			Rel-14	36.211	14.2.0	NB_IOT-Core	0383		F	RP-171197	
0	revised	2017-06-07 08:23:23	2017-06-07 08:28:21		R1-1709863									
0	withdrawn	2017-06-07 08:23:25		R1-1709825										
0	approved	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709803		Rel-15			NR_newRAT-Core					R4-1704223
0	revised	2017-05-20 03:26:14	2017-05-20 03:27:56	R1-1709839	R1-1709854	Rel-13			LTE_LAA-Core					IEEE EC-17-0065-00-00EC
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0	noted	2017-06-07 08:23:26	2017-06-07 08:28:22											
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0	noted	2017-06-07 08:23:26	2017-06-07 08:28:22	R1-1709395										
0	agreed	2017-06-07 08:23:27	2017-06-07 08:28:22	R1-1709411										
0	agreed	2017-06-07 08:23:29	2017-06-07 08:26:51			Rel-15			FS_LTE_Aerial					
0	revised	2017-06-07 08:23:30	2017-06-07 08:25:08		R1-1709862	Rel-15			FS_LTE_Aerial					
0	noted	2017-06-07 08:23:30	2017-06-07 08:25:08											
0	approved	2017-06-07 08:23:31	2017-06-07 14:23:19	R1-1709860		Rel-15			FS_LTE_Aerial					
0	noted	2017-06-07 08:23:31	2017-06-22 13:51:28	R1-1709848										
0	noted	2017-06-07 08:23:31	2017-06-07 08:25:08											

0	**noted**	2017-06-08 08:24:25	2017-06-12 11:52:41												
0	**agreed**	2017-06-21 17:13:25	2017-06-22 13:48:16												
0	**agreed**	2017-06-21 17:13:25	2017-06-21 17:13:39												
0	**available**	2017-06-22 13:50:05	2017-06-22 13:50:28												
0	**approved**	2017-07-17 11:48:08	2017-08-18 12:58:11			**Rel-15**			**FS_LTE_Aerial**						

To	Cc	Original LS	Reply in
RAN1		R2-1703942	
SA2	SA1, RAN1, RAN3	R2-1703945	
RAN1		R2-1703946	
RAN1		R2-1703962	
RAN1		R2-1703964	
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RAN1		R4-1703100	
RAN2	RAN1	R4-1703377	
RAN1		R4-1704089	
RAN2	RAN1	R4-1704163	
RAN1	RAN2	R4-1704216	
RAN1		R4-1704223	
RAN2	SA2, RAN1	R4-1704297	
RAN1		R4-1704300	
RAN1		R4-1704359	

RAN4			

RAN2	RAN4		

RAN2			

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RAN2			

RAN2			

RAN1		R2-1703974	

SA2	RAN1, RAN2, RAN3, CT1, CT4	S1-172409	
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RAN4			R4-1706851
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RAN2			

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APPENDIX D

3GPP_TSG_RAN_WG1 Archives
March 2015, Week 4

New in LISTSERV 17.0 ×

3GPP_TSG_RAN_WG1@LIST.ETSI.ORG

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Subject: New specs post RAN#67 decisions
From: Patrick Merias <Patrick.Merias@ETSI.ORG>
Reply To: Patrick Merias <Patrick.Merias@ETSI.ORG>
Date: Fri, 27 Mar 2015 12:34:49 +0000
Content-Type: multipart/alternative
Parts/Attachments: text/plain (483 bytes) , text/html (17 kB)

Dear all,

The following specs are now available – they should be used as basis for any new CR you may have.

Number	event	vers
25.214	RP-67	12.2.0
25.215	RP-67	12.1.0
25.225	RP-67	12.1.0
25.705	RP-67	1.0.0
36.201	RP-67	12.2.0
36.211	RP-67	12.5.0
36.212	RP-67	12.4.0
36.213	RP-67	11.10.0
36.213	RP-67	12.5.0
36.214	RP-67	12.2.0
36.873	RP-67	12.1.0

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