

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS INC.,

Petitioner,

v.

PANTECH WIRELESS, LLC

Patent Owner.

Case IPR2023-01267

U.S. Patent No. 9,313,809

PETITION FOR *INTER PARTES* REVIEW

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EXHIBIT LIST

Exhibit ("Ex.")	Description
1001	U.S. Patent No. 9,313,809 ("809")
1002	File History of U.S. Application No. 14/319,608 ("809FH")
1003	Declaration of Dr. Bertrand Hochwald in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 9,313,809 ("Hochwald")
1004	Declaration of Friedhelm Rodermund in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 9,313,809 ("Rodermund")
1005	U.S. Patent Application Publication No. 2009/0225709 ("Wager")
1006	U.S. Provisional Application No. 61/015,316 ("Wager-Prov.")
1007	International Publication No. WO 2007/078155 ("Lee")
1008	R2-073254, <i>Further discussion on enhanced CELL_FACH in REL8</i> ("R2-073254" or "Nokia")
1009	3GPP Technical Specification TS 25.321 v7.5.0 (2007-06) ("TS25.321")
1010	U.S. Patent Application Publication No. 2006/0176845 ("Sarkkinen")
1011	3GPP Technical Specification TS 25.331 v7.5.0 (2007-06) ("TS25.331")
1012	U.S. Patent Application Publication No. 2006/0251027 ("Chun")
1013	U.S. Patent Application Publication No. 2009/0131052 ("Hakola")
1014	U.S. Provisional Application No. 60/985,537 ("Hakola-Prov.")
1015	International Publication No. WO 2008/081222 ("Lindskog")
1016	International Publication No. WO 2005/018241 ("Seidel")

Exhibit ("Ex.")	Description
1017	U.S. Patent Application Publication No. 2009/0006778 ("Sidi")
1018	U.S. Patent Publication No. 2005/0276266 ("Terry-266")
1019	WO Patent Application 2009/022855 ("Sung")
1020	U.S. Patent Publication No. 2005/0251722 ("Terry-722")
1021- 1025	(Reserved)
1026	U.S. Patent No. 8,774,104 ("104")
1027	File History of U.S. Application No. 12/238,910 ("104FH")
1028	U.S. Provisional Application No. 60/982,528 ("528-Prov.")
1029	U.S. Provisional Application No. 60/975,985 ("985-Prov.")
1030	Third Amended Docket Control Order, <i>Pantech Corp. et al. v. LG Electronics Inc. et al.</i> , Case 5:22-cv-00113-RWS-JBB (E.D. Texas), Dkt. No. 98.
1031	Docket Navigator "Time to Trial" report for Judge Robert W. Schroeder
1032	USCourts.gov "U.S. District Court – Judicial Caseload Profile" for Eastern District of Texas
1033	Joint Claim Construction and Prehearing Statement, <i>Pantech Corp. et al. v. LG Electronics Inc. et al.</i> , Case 5:22-cv-00113-RWS-JBB (E.D. Texas), Dkt. No. 118.
1034	University of Notre Dame, Wireless Institute, "RadioHound: Distributed Spectrum Sensing"
1035	3GPP, "Introducing 3GPP"
1036	3GPP, "About 3GPP"

Exhibit ("Ex.")	Description
1037	3GPP, "Specifications Per TSG Round"
1038	ShareTechnote, "4G/LTE RACH"
1039	3GPP, "36.321"
1040	3GPP Technical Specification TS 36.321 v8.0.0 (2007-12) ("TS36.321")
1041	U.S. Patent No. 6,363,121
1042- 1044	(Reserved)
1045	Declaration of Jonathan Bradford
1046- 1050	(Reserved)
1051	Webpage, available at https://archive.org/legal/affidavit.php
1052	Internet Archive Capture, available at https://web.archive.org/web/20070705003208/http://www.3gpp.org/tb/home.htm
1053	Internet Archive Capture, available at https://web.archive.org/web/20070707102325/http://www.3gpp.org/
1054	Internet Archive Capture, available at https://web.archive.org/web/20070710032216/http://www.3gpp.org/tb/RAN/RAN2/RAN2.htm
1055	Internet Archive Capture, available at https://web.archive.org/web/20070701154418/http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/

Exhibit ("Ex.")	Description
1056	Internet Archive Capture, available at https://web.archive.org/web/20071129220816/http://www.3gpp.org:80/ftp/tsg_ran/WG2_RL2/TSGR2_55/
1057	Webpage, available at ftp.3gpp.org/Specs
1058	Internet Archive Capture, available at https://web.archive.org/web/20070820091849/http://www.3gpp.org:80/specs/specs.htm
1059	Internet Archive Capture, available at https://web.archive.org/web/20070810002551/http://www.3gpp.org/specs/numbering.htm
1060	Internet Archive Capture, available at https://web.archive.org/web/20070810232434/http://www.3gpp.org/ftp/Specs/html-info/25-series.htm
1061	Internet Archive Capture, available at https://web.archive.org/web/20070905143259/http://www.3gpp.org/ftp/Specs/html-info/SpecReleaseMatrix.htm
1062	Internet Archive Capture, available at https://web.archive.org/web/20070525204220/http://www.3gpp.org/ftp/Specs/html-info/TSG-WG--R2.htm
1063	Internet Archive Capture, available at https://web.archive.org/web/20070523112802/http://www.3gpp.org/ftp/Specs/html-info/25321.htm
1064	3GPPP TS 25.321 V7.4.0 (2007-03), retrieved from https://web.archive.org/web/20070523112802/http://www.3gpp.org/ftp/Specs/archive/25_series/25.321/25321-740.zip (25321-740.doc in 25321-740.zip)

Exhibit ("Ex.")	Description
1065	Internet Archive Capture, available at https://web.archive.org/web/20070602105532/http://www.3gpp.org/ftp/Specs/latest/Rel-7/
1066	Internet Archive Capture, available at https://web.archive.org/web/20070907224517/http://www.3gpp.org/ftp/Specs/latest/Rel-7/25_series/
1067	Internet Archive Capture, available at https://web.archive.org/web/20070704003509/http://www.3gpp.org:80/ftp/specs/latest/
1068	Internet Archive Capture, available at https://web.archive.org/web/20060105222647/http://list.etsi.org/scripts/wa.exe?SUBED1=3gpp_tsg_ran_wg2&A=1
1069	Webpage, available at https://www.3gpp.org/FTP/tsg_ran/WG2_RL2/TSGR2_59/Docs/
1070	Webpage, available at https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG2;3cceb99d.0708&S=
1071	R2-073254, retrieved from https://list.etsi.org/scripts/wa.exe?A3=ind0708&L=3GPP_TSG_RAN_WG2&E=base64&P=7845927&B=-----_%3D_NextPart_001_01C7DE81.00F02165&T=application%2Fzip-compressed;%20name=%22R2-073254.zip%22&N=R2-073254.zip&attachment=q&XSS=3 (R2-073254 Enhanced RACH.doc in R2-073254.zip)
1072	Internet Archive Capture, available at https://web.archive.org/web/20070714151920/http://list.etsi.org:80/
1073	Internet Archive Capture, available at https://web.archive.org/web/20070816051307/http://list.etsi.org/

Exhibit ("Ex.")	Description
1074	Internet Archive Capture, available at https://web.archive.org/web/20080719190403/http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Docs/
1075	R2-073254, retrieved from https://web.archive.org/web/20080719190403/http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Docs/R2-073254.zip (R2-073254 Enhanced RACH.doc in R2-073254.zip)
1076	Draft0 minutes of the 59 TSG-RAN WG2 meeting (Athens, Greece, 25-29 June 2007), available at https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Minutes/Draft0_Minutes_RAN2-59.zip (Draft0_Minutes_RAN2-59.doc in Draft0_Minutes_RAN2-59.zip)
1077	Webpage, available at https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Minutes
1078	Excel file "3GPPRAN2_59.xls," retrieved from https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Minutes/R2-074444.zip (3GPPRAN2_59.xls in R2-074444.zip)
1079	Draft3 minutes of the 59 TSG-RAN WG2 meeting (Athens, Greece, 25-29 June 2007) (R2-074444), retrieved from https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Minutes/R2-074444.zip (Draft3_Minutes_RAN2-59.doc in R2-074444.zip)
1080	Webpage, available at https://www.3gpp.org/FTP/Specs/archive/25_series/25.321
1081	Webpage, available at https://www.etsi.org/deliver/etsi_ts/125300_125399/125321/07.05.00_60/
1082	ETSI Technical Specification 125 321 V7.5.0 (2007-06), retrieved from

Exhibit ("Ex.")	Description
	https://www.etsi.org/deliver/etsi_ts/125300_125399/125321/07.05.00_60/ts_125321v070500p.pdf
1083	Webpage, available at https://web.archive.org/web/20131115195236/http://webapp.etsi.org/key/key.asp?full_list=y
1084	Internet Archive Capture, available at https://web.archive.org/web/20070814155639/http://www.3gpp.org/ftp/Specs/archive/25_series/25.321/
1085	Internet Archive Capture, available at https://web.archive.org/web/20070827053924/http://www.3gpp.org:80/ftp/Specs/html-info/25321.htm
1086	(Reserved)
1087	Document entitled "3GPP specifications - List of all specification numbers and titles," retrieved from https://web.archive.org/web/20071101043800/http://www.3gpp.org/specs/3GPP-Spec-Titles.zip (3GPP-Spec-Titles.doc in 3GPP-Spec-Titles.zip)
1088	Internet Archive Capture, available at https://web.archive.org/web/20071112134824/http://www.3gpp.org/ftp/Specs/html-info/SpecReleaseMatrix.htm
1089	Internet Archive Capture, available at https://web.archive.org/web/20070815092224/http://www.3gpp.org/ftp/Specs/archive/
1090	Webpage, available at https://www.etsi.org/deliver/etsi_ts/125300_125399/125331/07.05.00_60/
1091	ETSI Technical Specification 125 331 V7.5.0 (2007-06), retrieved from

Exhibit ("Ex.")	Description
	https://www.etsi.org/deliver/etsi_ts/125300_125399/125331/07.05.00_60/ts_125331v070500p.pdf
1092	Webpage, available at https://www.3gpp.org/ftp/Specs/archive/25_series/25.331
1093	Internet Archive Capture, available at https://web.archive.org/web/20070902031859/http://www.3gpp.org:80/ftp/Specs/archive/25_series/25.331/
1094	(Reserved)
1095	3GPP Technical Specification 25.331 v7.5.0 (2007-06) printed in unmodified form, retrieved from https://www.3gpp.org/ftp/Specs/archive/25_series/25.331/25331-750.zip (25331-750.doc in 25331-750.zip)
1096	Internet Archive Capture, available at https://web.archive.org/web/20070525204220/http://www.3gpp.org:80/ftp/Specs/html-info/TSG-WG--R2.htm
1097	Internet Archive Capture, available at https://web.archive.org/web/20070818015343/http://www.3gpp.org/ftp/Specs/
1098	Internet Archive Capture, available at https://web.archive.org/web/20070815120847/http://www.3gpp.org/ftp/Specs/archive/25_series/
1099	Internet Archive Capture, available at https://web.archive.org/web/20070901000715/http://www.3gpp.org/ftp/Specs/latest/
1100	Internet Archive Capture, available at https://web.archive.org/web/20070901000642/http://www.3gpp.org/ftp/Specs/latest/Rel-7/

Exhibit ("Ex.")	Description
1101	Internet Archive Capture, available at https://web.archive.org/web/20070818215743/http://www.3gpp.org/ftp/Specs/html-info/25331.htm

TABLE OF ABBREVIATIONS

Abbreviation	Description
'809	U.S. Patent No. 9,313,809
'809FH	File History of U.S. Application No. 14/319,608
Chun	U.S. Patent Application Publication No. 2006/0251027
Claims	Claims 1-10 of '809
IPR	Inter Partes Review
Lee	International Publication No. WO 2007/078155
Nokia	R2-073254, Further discussion on enhanced CELL_FACH in REL8
Petitioner	Petitioner LG Electronics Inc.
PO	Patent Owner Pantech Wireless, LLC
POSITA	Person of Ordinary Skill in the Art
Sarkkinen	U.S. Patent Application Publication No. 2006/0176845
TS25.321	3GPP Technical Specification TS 35.321 v7.5.0 (2007-06)
TS25.331	3GPP Technical Specification TS 35.331 v7.5.0 (2007-06)
USPTO	United States Patent and Trademark Office
Wager	U.S. Patent Application Publication No. 2009/0225709
Wager-Prov.	U.S. Provisional Application No. 61/015,316

LIST OF CHALLENGED CLAIMS

[1.pre] A method performed by a wireless transmit/receive unit (WTRU) to communicate with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the method comprising:

[1.a] determining if a E-DCH buffer is empty;

[1.b] transmitting to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero when the E-DCH buffer is determined to be empty;

[1.c] determining if a hybrid automatic repeat request (HARQ) buffer is empty; and

[1.d] releasing the E-DCH resource when the transmission of the SI with the TEBS equal to zero has been made and the HARQ buffer is empty.

[2] The method as in claim 1, further comprising starting an inactivity timer when the E-DCH buffer is empty.

[3] The method as in claim 2, further comprising triggering the transmission of the SI when the inactivity timer expires.

[4] The method as in claim 1, further comprising transmitting using the E-DCH resource when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

[5] The method as in claim 1, further comprising completing an E-DCH transmission when a cell reselection or a radio link failure occurs.

[6.pre] A wireless transmit/receive unit (WTRU) capable of communicating with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the WTRU comprising:

[6.a] a E-DCH buffer;

[6.b] a transmitter;

[6.c] a hybrid automatic repeat request (HARQ) buffer; and

[6.d] a processor; wherein the processor:

[6.e] determines if the E-DCH buffer is empty;

[6.f] causes the transmitter to transmit to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero for the E-DCH buffer when the processor has determined that the E-DCH buffer is empty;

[6.g] determines if the HARQ buffer is empty; and

[6.h] releases the E-DCH resource when the transmission of the SI with the TEBS equal to zero has been made and the HARQ buffer is empty.

[7] The WTRU as in claim 6, wherein the processor completes an E-DCH transmission when a cell reselection or a radio link failure occurs.

[8] The WTRU as in claim 6, wherein the processor starts an inactivity timer when the E-DCH buffer is empty.

[9] The WTRU as in claim 8, wherein the transmitter transmits the SI when the inactivity timer expires.

[10] The WTRU as in claim 6, wherein the transmitter transmits using the E-DCH resource when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

Pursuant to §§311-319 and §42.1,¹ LG Electronics Inc. (“Petitioner”) petitions for *inter partes* review (“IPR”) of claims 1-10 (“Claims”) of US9,313,809 (“’809”) (Ex. 1001), assigned to Pantech Wireless, LLC (“PO”). There is a reasonable likelihood—and it is highly likely—that at least one challenged claim is unpatentable as explained herein. Petitioner requests review of the Claims, and judgment finding them unpatentable under §103.

I. INTRODUCTION

The ’809 describes methods for managing cellular network resources assigned to devices such as cell phones, referred to as “Wireless Transmit/Receive Units” (“WTRUs”) or user equipment (“UE”). ’809, 1:32-36; 2:66-3:8; Hochwald, ¶37.

Specifically, the Claims concern a method of releasing assigned resources used to transmit data on an enhanced dedicated channel (E-DCH) while a UE is in a state (called “CELL_FACH”) after determining that there is no further data to transmit. ’809, Abstract, 1:65-67, 2:21-38, 3:27-30, 3:59-4:9. Specifically, the Claims recite determining that two buffers are empty: an “E-DCH buffer,” which is

¹ Section cites reference 35 U.S.C. (pre-AIA) or 37 C.F.R. as context indicates. All emphasis/annotations added unless noted. Figure annotations herein generally quote the Claims for reference. Citations herein are exemplary and not meant to be limiting.

a transmit buffer for data to be sent via the E-DCH channel ('809, 2:54-55, 5:34-36, Fig. 6), and a “HARQ buffer,” which holds data to be retransmitted as part of an error correction process ('809, 2:27-38, 5:59-61, 6:46-62, 8:56-64). Ex. 1003 (“Hochwald”), ¶38. As shown in Figure 6, when these buffers are empty (the **Total E-DCH Buffer Status (“TEBS=0”)** and the **“HARQ buffer is empty”**), the **WTRU releases E-DCH resources**. '809, Fig. 6, 2:27-38, 5:34-61, 6:46-62; Hochwald, ¶38.

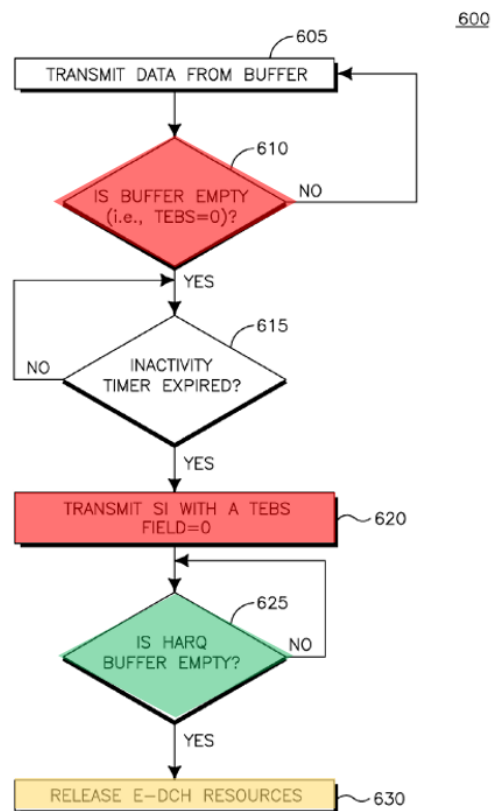


FIG. 6

But this resource release mechanism was already known in the prior art. Hochwald, ¶39. For example, **Wager (Ex. 1005)** discloses that once a UE “has

emptied” its “transmit buffer,” it initiates a “UE triggered resource release” process by sending “Scheduling Information” to the base station with “TEBS=0.” Wager-Prov., 4:8-20; Wager, ¶¶31, 50. After the base station acknowledges that “all HARQ processes have finished,” the “UE shall...release the...resources.” Wager-Prov., 2:9-10, 2:13-15, 4:8-20, 4:27-28; Wager, ¶¶7, 26-27, 31. **TS25.321 (Ex. 1009)** further teaches that in a HARQ protocol such as Wager’s, a UE “flush[es]” the HARQ buffer after receiving an acknowledgement from a base station of a HARQ process. TS25.321, 99-100. TS25.321, 99-100. A POSITA would have been motivated to modify **Wager** with **TS25.321’s** teachings, rendering obvious this claimed process. Hochwald, ¶39.

Prosecution of the ’809’s parent (’104 patent) further confirms that **Wager** at least renders obvious the Claims. The examiner repeatedly maintained that similar claims were anticipated by **Wager**, and allowed the Claims due only to a priority date issue (which does not apply here due to claim differences not material to the grounds here). See §§V.B-C; Hochwald, ¶40.

Similarly, **Lee (Ex. 1007)** discloses that once a UE has “no data left for transmission over an uplink path,” the “resources [are] released by [that] UE.” Lee, Fig. 6, 8:18-9:22, 10:9-11, 13:12-23, 15:8-17. **TS25.321** teaches that the E-DCH buffer is empty when there is no data left, and when transmission is successful the

HARQ buffer is flushed and, therefore, also empty. TS25.321, 67-68, 99-100. A POSITA would have been motivated to modify **Lee** with **TS25.321** (and **Nokia (Ex. 1008)**)—which teaches using E-DCH resources in a CELL_FACH state), again rendering obvious this process. Hochwald, ¶41.

As set forth herein, the identified combinations of **Wager**, **Lee**, **TS25.321**, **Nokia**, **TS25.331 (Ex. 1011)**, and **Sarkinnen (Ex. 1010)** (disclosing features in dependent Claims) and **Chun (Ex. 1012)** (disclosing hardware elements) thus render the Claims obvious. Petitioner requests that the Board institute trial and find the Claims unpatentable. Hochwald, ¶42.

II. MANDATORY NOTICES

A. Real Parties-in-Interest

Petitioner LG Electronics Inc., and LG Electronics U.S.A., Inc. are the real parties-in-interest. No other parties had access to or control over the present Petition, and no other party funded or participated in preparation of the present Petition.

B. Related Matters

The '809 is the subject of the following co-pending civil action:

- *Pantech Corporation et al. v. LG Electronics Inc. et al.*, No. 5:22-cv-00113-RWS-JBB (E.D. Tex.) (“LGE Litigation”)
- *Pantech Corporation et al v. GNJ Manufacturing, Inc. d/b/a CellAllure*, No. 0-21-cv-62474 (S.D. Fl.) (“GNJ Litigation”)

- *Pantech Corporation et al v. BLU Products, Inc.*, No. 1-21-cv-22663 (S.D. Fl.) (“BLU Litigation”)

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Petitioner consents to electronic service of documents to the email addresses of the counsel identified above.

III. PAYMENT OF FEES

The undersigned authorizes the Office to charge the fee required by §42.15(a) and any additional fees that might be due to Deposit Account No. 18-1945, under Order No. 104537-0034-657.

IV. REQUIREMENTS FOR *INTER PARTES* REVIEW

A. Grounds for Standing

Pursuant to §42.104(a), Petitioner certifies that the '809 is available for IPR. Petitioner and any real parties-in-interest are not barred or estopped from requesting IPR challenging the Claims on the grounds identified herein.

B. Identification of Challenge

Pursuant to §§42.104(b)-(b)(1), Petitioner requests IPR of Claims 1-10, and that the Board cancel the same as unpatentable.

1. Specific Art on Which the Challenge Is Based

Petitioner relies on the following prior art:

Name	Publication/ Title	Ex.	Filed	Published/ Issued	Prior art under at least (<i>see</i> §V.C)
Wager ²	US2009/0225709	1005	12/5/2008	9/10/2009	§§102(a),(e)
Lee	WO 2007/078155	1007	1/4/2007	7/12/2007	§§102(a),(b),(e)
Nokia	R2-073254	1008	N/A	By 8/24/2007	§§102(a),(b)
TS25.321	3GPP TS 25.321 v7.5.0	1009	N/A	By 7/17/2007	§§102(a),(b)
Sarkkinen	US2006/0176845	1010	1/5/2006	8/10/2006	§§102(a),(b)
TS25.331	3GPP TS 25.331 v7.5.0	1011	N/A	By 7/31/2007	§§102(a),(b)
Chun	US2006/251027	1012	5/4/2006	11/9/2006	§§102(a),(b)

Each of **TS25.321**, **TS25.331**, and **Nokia** was publicly accessible to, and accessed by, POSITAs and interested industry personnel and researchers well before the earliest '809 priority date (9/26/2008).³ Ex. 1004 (“Rodermund”), ¶¶1-141. **TS25.321** and **TS25.331** are technical specifications maintained by 3GPP

² Wager incorporates by reference App No. 61/015,316 (Ex. 1006) (“Wager-Prov.”). Wager, ¶1.

³ As discussed in §V.C, the Claims are not entitled to at least the '985-Prov. and '528-Prov. filing dates. But even if they were, the Claims would still be invalid based on this Petition’s grounds.

describing certain UMTS functionalities. Ex. 1004 (“Rodermund”), ¶¶2, 22-81, 97-138. **Nokia** is a proposal submitted by Nokia to 3GPP TSG-RAN Working Group 2 (WG2), part of an organization that developed the UMTS standard. Nokia, 1; Rodermund, ¶¶2, 21, 24-96, 138.

As shown in the table below, each reference was published and publicly available on 3GPP’s and/or ETSI’s ftp server(s), cited by multiple publications, and/or distributed on ETSI’s mailing list. Rodermund, ¶¶81-138; *see, e.g., Apple et al. v. Uniloc 2017 LLC*, IPR2019-00222, Pap. 28, *13-18; *LG Electronics, Inc. v. Core Wireless Licensing S.A.R.L.*, IPR2015-01986, Pap. 34, *26-31; *Samsung Electronics Co., Ltd. v. Ibex PT Holdings Co., Ltd.*, IPR2018-00011, Pap. 33, *4.

Reference	3GPP Server Availability	ETSI Server Availability	3GPP Meeting Availability	Mailing List
TS25.321	7/17/2007 ⁴	7/23/2007 ⁵	N/A	N/A

⁴ https://www.3gpp.org/ftp/Specs/archive/25_series/25.321 (Ex. 1080).

⁵ https://www.etsi.org/deliver/etsi_ts/125300_125399/125321/07.05.00_60/
(Ex. 1081).

Reference	3GPP Server Availability	ETSI Server Availability	3GPP Meeting Availability	Mailing List
TS25.331	7/31/2007 ⁶	8/14/2007 ⁷	N/A	N/A
Nokia	8/14/2007 ⁸	N/A	By 8/24/2007 ⁹	8/13/2007 ¹⁰

2. Statutory Grounds on Which the Challenge Is Based

Ground	Claims	References (§103)
1	1, 4, 6, 10	Wager in view of TS25.321
2		Lee in view of Nokia and TS25.321
3	2-3, 5, 7-9	Wager in view of TS25.321 and Sarkkinen
4		Lee in view of Nokia, TS25.321, and Sarkkinen
5	5, 7	Wager in view of TS25.321 and TS25.331
6		Lee in view of Nokia, TS25.321, and TS25.331
7-12	6-10	Grounds 1-6 in further view of Chun

Hochwald, ¶¶58-59.

⁶ https://www.3gpp.org/ftp/Specs/archive/25_series/25.331 (Ex. 1092).

⁷ https://www.etsi.org/deliver/etsi_ts/125300_125399/125331/07.05.00_60/
(Ex. 1090).

⁸ https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_59/Docs/ (Ex. 1069)

⁹ Nokia, 1; Rodermund ¶¶92-95 (discussing Ex. 1079, at 78, 93).

¹⁰ Rodermund ¶83 (discussing Exs. 1070-1072)

V. '809 PATENT AND PROSECUTION HISTORY

A. '809 Patent

The '809 is directed to methods of releasing radio resources by a wireless transmit/receive unit ("WTRU"), *e.g.*, a cellphone. '809, Abstract, 1:32-36, 2:21-38, 2:66-3:4, 3:59-4:9. These methods are performed while the WTRU is in a cell forward access channel ("CELL_FACH") state, and using enhanced dedicated channel ("E-DCH") resource(s) to transmit to a base station. '809, Abstract, 1:65-67, 2:12-14, 3:59-4:9; Hochwald, ¶43.

Specifically, the **WTRU releases E-DCH resources** when 1) there is no new data left to transmit in its transmission buffer—at which point the WTRU communicates to the base station "scheduling information (SI)" specifying a **"Total E-DCH Buffer Status (TEBS)" equal to zero**; and 2) there are no prior transmissions to retransmit, as indicated by the **Hybrid Automatic Repeat reQuest (HARQ) buffer being empty**. '809, 2:29-38, 4:7-10, 5:34-61, 6:46-69; Hochwald, ¶¶44-45.

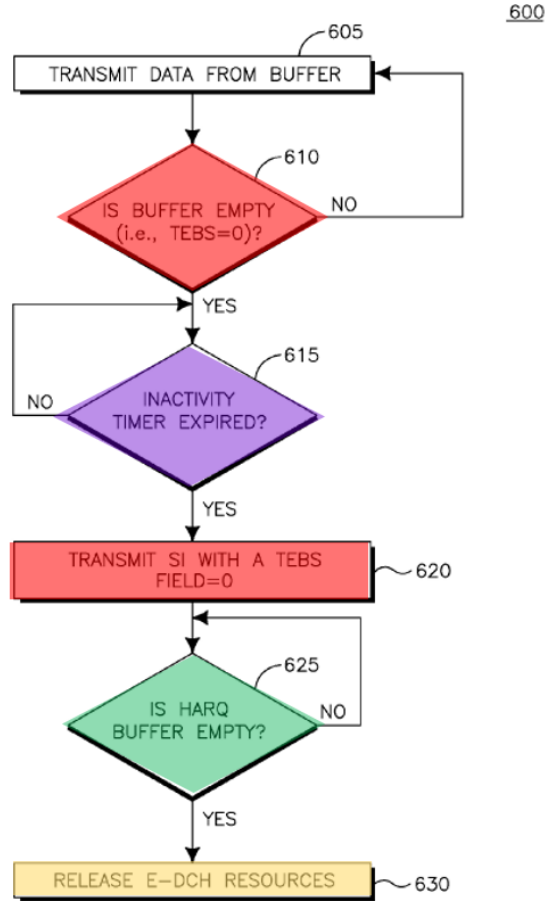


FIG. 6

Claims 2-3 and 8-9 further recite delaying release until after an inactivity timer expires. See '809, Fig. 6, 5:34-61. The WTRU also “**check[s] if an inactivity timer has expired**,” indicating that “no UL or downlink (DL) traffic has been received” before releasing resources. '809, Fig. 6, 5:40-61; Hochwald, ¶45.

Dependent Claims 5 and 7 recite completing an E-DCH transmission when “radio link failure” or “cell reselection” (*e.g.*, WTRU connects to a different serving cell) occurs. '809, 6:28-32, 6:43-45, 7:60-64, 9:61-10:3; Hochwald, ¶46.

And dependent Claims 4 and 10 recite a method for accessing an E-DCH resource using a “Prior Art” procedure (illustrated in Figure 1), where the WTRU **transmits a preamble, receives a response on an E-DCH acquisition channel (E-AICH) granting access to E-DCH resources, and uses the allocated resource for uplink transmission to the base station.** ’809, 1:42-45, 2:1-12, 3:62-4:8, Fig. 1; Hochwald, ¶47.

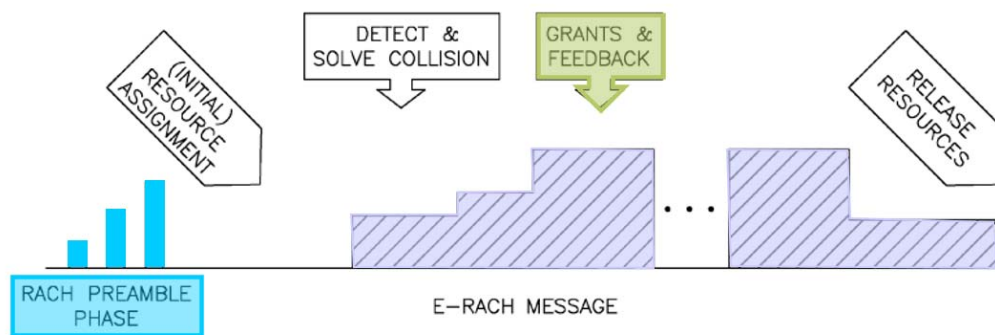


FIG. 1 (PRIOR ART)

B. Prosecution History

The ’809 Claims were allowed after Applicant filed a terminal disclaimer to overcome a double patenting rejection over its parent, US8,774,104 (Ex. 1026, “’104”), with no other rejections. Ex. 1002 (“’809FH”), 152-58, 178, 185-91, 365-83. During prosecution of the ’104, the Examiner issued multiple rejections finding that **Wager** anticipated similar claims to the ’809’s. Ex. 1027 (“’104FH”), 366-68, 381-88, 537-42, 586-87, 684-86, 703-09, 726. After multiple responses and

amendments (*id.*), the '104 claims were allowed after Applicant argued that **Wager** did not qualify as §102(e) art because '104 provisionals antedated **Wager's** effective filing date ('104FH, 753-54, 759).¹¹ Hochwald, ¶¶48-49. However, the '104 claims do not recite key features in the '809 Claims that affect the '809's priority date. *See* §§V.C–VI.A.

C. Priority Date of the Claims

The Claims are not entitled to the 2007 filing dates of its two earliest provisionals—Nos. 60/975,985 (“'985-Prov.,” Ex. 1029) and 60/982,528 (“'528-Prov.,” Ex. 1028)—because they do not provide written description support for at least “releasing the E-DCH resource when...the HARQ buffer is empty.” Hochwald, ¶¶50-51. '528-Prov. does not discuss HARQ buffers. Hochwald, ¶51. And '985-Prov.'s sole discussion of “HARQ buffers” (¶37) does not disclose releasing resources **when** the HARQ buffer is already empty. Instead, the HARQ buffer is flushed only **after** the release process has begun: once the “WTRU-initiated

¹¹ While Applicant later stated that Wager-Prov. does not support **Wager's** priority claim (Ex. 1027, 754), the arguments Applicant cites addressed the '985's support for the '104 claims. *See id.*, Ex. 1027, 560-562. As explained in §IX.A.1, **Wager** is entitled to Wager-Prov.'s priority date.

triggers” for release are satisfied (§§24-28), the WTRU “[c]lear[s]” all resources by, e.g., “*flushing the HARQ buffers*” (§37).¹² Hochwald, ¶51.

VI. §325(D) AND §314(A) DISCRETION DOES NOT APPLY

A. §325(d)

Under the two-part *Advanced Bionics* framework, the Board should not exercise discretion.

¹² The ’104, claims priority to the same provisionals, but unlike the ’809, its claims do not recite a “HARQ buffer.” Hochwald ¶49. While the ’104 recites “determining a last [HARQ] data transmission,” this does not require an “empty” “HARQ buffer.” For example, the ’104’s determination may encompass, *e.g.*, determining the current/next (last/final) or most recent (last-sent) HARQ data transmission, each of which does not require that the HARQ buffer “is empty.” Indeed, ’985-Prov. teaches emptying (i.e., “flushing”) the HARQ buffers is a separate step during resource release—not a condition triggering resource release. ’985 Prov., §§36-37. To the extent it is argued that it would have been obvious to flush/empty HARQ buffers from the ’104 claims, obviousness “is not sufficient” for written description. *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1158 (Fed. Cir. 1998). The later provisionals are immaterial because the prior art in the Grounds predates those provisionals.

This Petition’s Grounds are not the same or substantially the same as the art and arguments raised during ’809’s prosecution. Sarkkinen and TS25.331 were not considered during the ’809’s prosecution. **Lee, TS25.321, Nokia, and Chun** were identified in IDSs identifying over 100 references, but were not substantively addressed. *See* ’809FH, 62, 64, 93, 170. While **Wager** was discussed during the ’104’s prosecution (*see* §V.B), it was not substantively addressed for the ’809; as discussed above (§V.C), the Claims recite, e.g., “HARQ buffer” elements that are not in the ’104’s claims. These differences are material: as discussed above (§V.C), the ’809’s provisionals predating **Wager** do not support the “HARQ buffer” limitations; **Wager** therefore is §102(e) art. Moreover, each of the specific grounds presented here—which as explained below (§IX) render the Claims obvious—were never considered by the Examiner. *Hochwald*, ¶¶48-51; *Sony v. MZ Audio Scis., LLC*, IPR2022-01544, Pap. 12, *7 (§325(d) discretion improper where “Examiner did not consider the specific combination of references asserted”).

Even if the art or arguments relied on herein were considered or substantially the same as those considered, the Examiner erred in a manner material to the patentability of the Claims by not rejecting the Claims over the combinations relied on herein for the reasons discussed in §IX. As discussed above (§V.B), the Examiner repeatedly maintained that **Wager** disclosed the ’104’s

claims, which are similar to the Claims (*see* '104, Cl. 1)—aside from, e.g., the “HARQ buffer” elements discussed above. '104FH, 366-370, 541-545, 728-731; Hochwald, ¶¶48-51. As discussed in §V.B, even if the '104's claims were found to be entitled to the provisional priority dates predating Wager (they aren't), the '809 “HARQ buffer” limitations are not recited in the '104's claims, and are unsupported by the '809's earliest provisionals. Hochwald ¶¶48-51. Moreover, Wager is also entitled to its provisional date—*see* §IX.A.1. The Examiner therefore erred by not rejecting the '809 Claims over Wager. Finally, the '809 prosecution history did not discuss the art's disclosures; without such discussion, it is “impossible ... to determine the consideration the Examiner gave” to these references; the “absence of further evidence of” consideration of these references and this Petition's arguments in §IX further demonstrate that “the Office erred in a manner material to patentability.” *Ecobee Techs. v. Causam Enterprises, Inc.*, IPR2022-01339, Pap. 20, *20-21 (declining to exercise §325(d) discretion).

B. §314(a)

The co-pending litigation also does not warrant exercising discretion under §314(a) based on *Fintiv*.

1: Following institution, Petitioner intends to seek a stay of the LGE Litigation pending the outcome of this IPR.

2: Though the Texas Case’s trial is currently set for 7/29/2024,¹³ based on median trial time before the Texas Case’s presiding judge over the last 5 years, trial is expected 26 months¹⁴ from the 9/2/2022 filing date, in late 11/2024, (median time to trial in the district varies between 19 and 24 months over the last few years)¹⁵.

3: The case is in its early stages; the court has not ruled on the initial motion to dismiss and discovery has just begun.

4: After the final written decision, the same grounds and arguments could not be presented in the litigation.

5: The litigation and PTAB parties are the same.

6: The merits of this Petition are compelling as shown herein. For example, with the addition of the “HARQ buffer” limitations in the Claims, Wager is prior art and, combined with TS25.321, renders obvious these limitations—rendering the Claims obvious consistent with the Examiner’s rejections in the ’104 prosecution. See §§I, VI.A, IX.

¹³ Ex. 1030.

¹⁴ Ex. 1031.

¹⁵ Ex. 1032.

VII. LEVEL OF ORDINARY SKILL

For purposes of this Petition only, Petitioner assumes the Claims are entitled to the filing date of the provisional application (61/018,999) to which the '809 claims priority: 1/4/2008.¹⁶ See §V.C; Hochwald, ¶¶50-54.

A person of ordinary skill in the art (“POSITA”) as of the claimed priority date of the '809 would have had a bachelor’s degree in electrical and computer engineering, computer science, or the equivalent thereof, and, least two years of experience with networking and wireless communications systems. Hochwald, ¶¶53-54. More education can supplement practical experience, and vice-versa. *Id.*

VIII. CLAIM CONSTRUCTION

Claim terms subject to IPR are construed using *Phillips*. §42.100(b). Only terms necessary to resolve the controversy need construction. Because the prior art asserted herein discloses embodiments within the Claims’ indisputable scope, the Board need not construe the Claims’ outer bounds; the Claims should be construed according to their plain and ordinary meaning. Hochwald, ¶¶55-57.

¹⁶ Petitioner disputes that the Claims are entitled to the earlier claimed priority dates. See §V.C. But the Claims are obvious regardless.

The parties agreed that the preambles are limiting. *See* Ex. 1033, 1-2; Hochwald, ¶¶55-57.

IX. GROUNDS OF UNPATENTABILITY

This Petition is supported by the Declaration of Dr. Bertrand Hochwald, which describes the prior art's scope and content at the time of and well before the '809. The prior art renders the Claims unpatentable based on the below Grounds. Hochwald, ¶¶1-36.

A. Ground 1: Wager in view of TS25.321 (Claims 1, 4, 6, 10)

1. Wager's Effective Date

Wager was filed on 12/5/2008 and claims priority to U.S. Provisional Application No. 61/015,316 ("Wager-Prov."), filed 12/20/2007, and is 102(e) art. *See* §IX.A.1.

Wager is prior art as of Wager-Prov.'s 12/20/2007 filing date because Wager-Prov. provides enabling written description support for: **1)** at least claim 1 of **Wager** (as demonstrated by the example disclosures in the table below); and **2)** the subject matter disclosures in **Wager** that render the Claims invalid as obvious (as shown in §IX.A below). *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1381 (Fed. Cir. 2015); *Ex parte Mann*, 2016 WL 7487271, *3 n.5, *6 (P.T.A.B. Dec. 21, 2016); Hochwald ¶¶60-63.

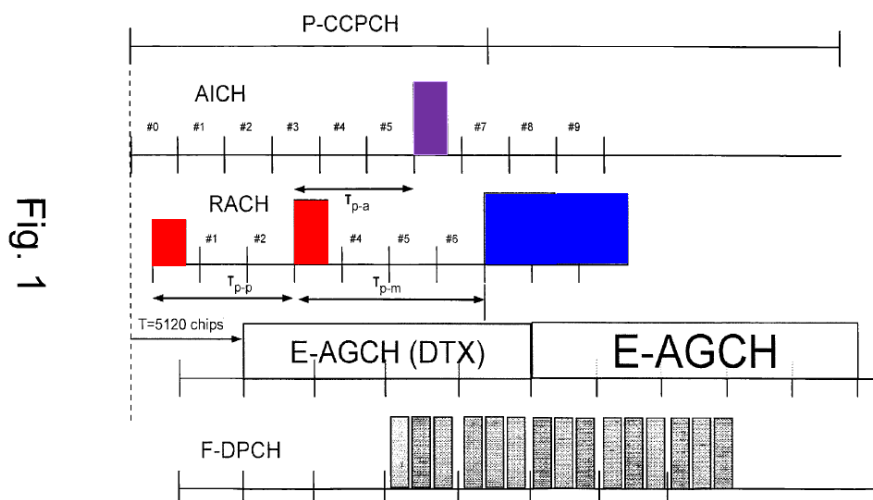
Wager Claim 1	Wager-Prov.—e.g.:
[1.pre] A method in a User Equipment (UE) of releasing a common Enhanced Dedicated Channel (E-DCH) resource allocated to the UE by a radio network node, the UE being in a CELL_FACH state, further comprising:	Fig. 1, 1:1-6, 1:8-23, 1:24-2:2, 3:3-5, 4:7-20
[1.a] determining that the common E-DCH resource allocated to the UE should be released; and	2:26-3:5, 4:7-5:4
[1.b] signaling to the radio network node release of the common EDCH resource.	4:1-20

2. Wager

Wager discloses improving “uplink performance” in a UMTS-based system (“3GPP Rel-8”) by providing a “UE triggered resource releaser” for “fast and reliable release of common E-DCH resources” after the UE has “completed transmission[s]” to a base station (e.g., “NodeB”) while in a CELL_FACH state. Wager-Prov., 1:3-8, 2:9-10, 2:13-15, 2:23-3:2, 4:8-5:4; Wager, Abstract, ¶¶4, 6-11, 33, 40, 45, 47; Hochwald, ¶¶64-65. Specifically, once the UE determines that its transmission buffer has “emptied,” it communicates that status to the NodeB in “Scheduling Information (SI)” that sets a “Total E-DCH Buffer Status” field to zero (“TEBS=0”). Wager-Prov., 4:8-15; Wager, ¶31; Hochwald, ¶65. The NodeB “interpret[s] this as the UE has finished transmission” and “release[s] the common E-DCH resource[] once all HARQ processes have finished” so that it can be used by

“other users.” Wager-Prov., 4:12-20; Wager, ¶¶36; Hochwald, ¶¶65. Once the UE “receive[s] an ACK” from the NodeB “for all HARQ processes,” the UE “release[s]” its “common E-DCH resources.” Wager-Prov. 4:27-5:4; Wager, ¶¶25, 32-34; Hochwald, ¶¶65.

Wager also discloses granting a UE access to the E-DCH resources while in CELL_FACH using an existing UMTS (“Rel-99”) “procedure.” Wager-Prov., Fig. 1, 1:24-2:2, 3:24-25, 4:8-10; Wager, Figs. 2-3, ¶¶25-26, 30, 33; Hochwald, ¶¶66. As shown Figure 1 below (annotated), the UE transmits “**randomly selected preamble signatures**” to the NodeB, which the NodeB “acknowledges” by transmitting “**an AICH sequence**” that “informs” the UE of the “**E-DCH resource**” assigned to the UE for UL transmissions. *Id.*



Additionally, to handle “error cases” like “signaling errors or UEs moving out of coverage,” the NodeB uses a “release timer” to “release the common E-DCH

resource” when no uplink activity is detected for a period of time. Wager-Prov, 5:6-8; Wager, Fig. 4, ¶¶25, 35-37; Hochwald, ¶67. This timer “start[s] when the common E-DCH resource is assigned to a UE” and “stop[s]” when “UL transmission” is detected. Wager-Prov., 5:8-16; Wager, ¶37; Hochwald, ¶67.

3. **TS25.321; Motivation to Modify Wager with TS25.321’s Teachings**

As discussed above in §IX.A.2, **Wager** teaches a UMTS “UE triggered resource release” that releases E-DCH resources when “all HARQ processes” are complete and the UE receives an “ACK” for all HARQ processes, but leaves to a POSITA how the UE manages HARQ processes. **TS25.321** teaches efficiently managing HARQ processes a UE. Hochwald, ¶68.

TS25.321 discloses a protocol for UE operation of a HARQ procedure in which prior transmissions that were “unsucessful[ly] rece[ived]” are retransmitted. TS25.321, 99. Each UE has “one HARQ entity” that manages a “number of parallel HARQ processes” in the UE, each of which is “associated with a physical buffer (HARQ buffer)” that stores prior transmission data for retransmission. *Id.* “[I]f an ACK is received from the RLS containing the serving cell,” indicating that a prior transmission was “successful[ly] rece[ived],” the HARQ process shall “flush the HARQ buffer,” causing the HARQ buffer to become “empty.” TS25.321, 12, 99-100. Hochwald, ¶69.

Wager and **TS25.321** are analogous art and in the same field as the '809—wireless communication—and reasonably pertinent to the alleged problems identified in the '809, including efficient release of radio resources. '809, 1:25-33, 3:59-4:15, 5:34-61, 6:21-27, 6:46-63; Wager-Prov., 1:3-6, 2:19-21; TS25.321, 2, 99-100; Hochwald, ¶70; Wager, Abstract, ¶¶7, 45-46. A POSITA would have been motivated to modify **Wager** with **TS25.321's** teachings, yielding a system that determines a HARQ buffer is empty when flushing the buffer once an ACK signal is received. Hochwald, ¶70.

First, **Wager** teaches using HARQ-based UMTS (“3GPP Rel-8”) features from **TS25.321**, which is a standards document defining UMTS Release 7 features. Wager-Prov., 1:8-9, 1:24-25; TS25.321, 7, 99-100; Hochwald, ¶71; Wager, ¶4.

Second, modifying **Wager** with **TS25.321's** HARQ buffer teachings advantageously improves the accuracy and speed of **Wager's** communication system by using HARQ to ensure reliable transmission. Wager-Prov., 4:6-5:4; Wager, ¶32-34; TS25.321, 99-100; Hochwald, ¶72.

Third, modifying **Wager's** HARQ-based signaling scheme with **TS25.321's** teachings of emptying the UE's HARQ buffer upon receiving an “ACK” from the base station further advantageously improves the reliability of **Wager's** resource release scheme. Hochwald, ¶73. Flushing the HARQ buffer improves data integrity

by avoiding accidental combinations of old and new data, improves memory utilization, and reduces production costs associated with maintaining a larger buffer. Wager-Prov., 4:7-20, 4:27-5:4; TS25.321, 99-100; Hochwald, ¶73; Wager, ¶36.

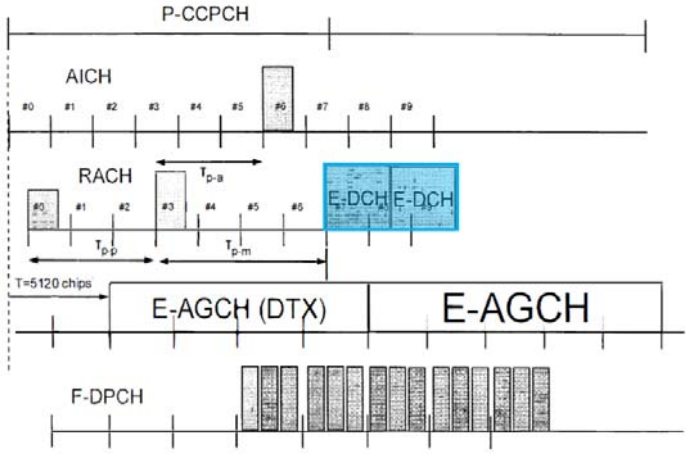
Additionally, releasing the E-DCH resource **when** the HARQ buffer is empty (through flushing) would have been obvious because there are only a finite number of options for timing the release with respect to flushing the HARQ buffer once an ACK is received from the Node-B—releasing before, simultaneously, or after the HARQ buffer is flushed. Hochwald, ¶74. Each of these finite options would have been obvious and, of these finite options, it would have been obvious to time the release *after* emptying the HARQ buffer because **TS25.321** teaches to flush the buffer upon successful reception of a retransmission sent using the resource (TS25.321, 99). Hochwald, ¶74.

A POSITA would have had a reasonable expectation of success modifying **Wager** with **TS25.321**'s teachings because this is merely a straightforward use of **TS25.321** for its intended purpose: standardizing protocols for UMTS systems like **Wager**'s. Wager-Prov., 1:8-2:2; Wager, ¶¶3-5, 48; Hochwald, ¶75. Indeed, **Wager** contemplates reusing existing UMTS protocols—which a POSITA would have recognized includes **TS25.321**. Wager-Prov., 1:24-25; Wager, ¶¶3-5, 25-26, 48; Hochwald, ¶75.

4. Claim Chart

As set forth below, **Wager** in view of **TS25.321** renders obvious Claims 1, 4, 6, and 10. **Wager** incorporates by reference **Wager-Prov.** (Wager, ¶1); **Wager-Prov** is therefore part of **Wager**'s disclosure. In addition to §§IX.A.1-IX.A.3, the following identifies example disclosures followed by bulleted excerpts that each disclose and/or render obvious the Claims. Hochwald, ¶76.

'809 Claim	Wager in view of TS25.321
[1.pre] A method performed by a wireless transmit/receive unit (WTRU) to communicate with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the method comprising:	Wager discloses a method performed by a wireless transmit/receive unit (WTRU) (e.g., “UE”) to communicate with a base station (e.g., “NodeB”) using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state (e.g., UE uses “common E-DCH resources” when “in [a] CELL_FACH” state to transmit to the “NodeB”). <u>E.g., Wager:</u> Wager discloses a method that is designed to “improve the uplink performance in CELL_FACH state” by “activati[ng]” the “E-DCH physical channel” in CELL_FACH. Wager-Prov., 1:8-16. In particular, Wager discloses “temporarily assign[ing]” users “E-DCH resources” from a “pool of E-DCH resources” for use in uplink transmission. Wager-Prov., 1:12-23. When in a CELL_FACH state, the “UE” uses the assigned “common E-DCH resource” to transmit to the “NodeB.” See, e.g., Wager-Prov., Fig. 1, 3:24-4:5, 4:9-12, 5:8-9, 5:17-19; Hochwald, ¶¶77-80. • Wager-Prov., Fig. 1

'809 Claim	Wager in view of TS25.321
	Fig. 1  - Wager-Prov., 1:8-23 (“...<i>The uplink improvement planned for Rel-8 is the activation also in CELL_FACH of the E-DCH physical channel This is performed by having a pool of E-DCH resources that can be temporarily assigned to a user in CELL_FACH state. These resources are called common E-DCH resources...the pool of common E-DCH resources will be managed by NodeB...</i>”) - Wager-Prov., 3:24-4:5 (“Figure 1 A diagram over common E-DCH transmission in CELL_FACH state...”) - Wager-Prov., 4:9-12 (“Once a UE in CELL FACH transmitting on a common E-DCH resource...”) - Wager-Prov., 5:8-9 (“...<i>the common E-DCH resource is assigned to a UE.</i>”) - Wager-Prov., 5:17-19 (“...<i>a UE...transmitting on a common E-DCH resource</i>”) <i>See also Wager-Prov., 1:3-6, 1:24-2:8, 2:19-21, 3:8-13, 4:17-20, 5:12-16; Wager, Figs. 1, 5A-B, ¶¶4-5, 7-8, 27, 42, 44.</i>

'809 Claim	Wager in view of TS25.321
[1.a] determining if a E-DCH buffer is empty;	Wager discloses determining if a E-DCH buffer is empty (<i>e.g.</i>, setting “Total E-DCH Buffer Status (TEBS) = 0” “[o]nce a UE...has emptied its RLC transmit buffer” and thus has determined its RLC transmit buffer is empty). <u>E.g., Wager:</u> Wager discloses that a UE sets “Total E-DCH Buffer Status (TEBS) = 0” in a Scheduling Information (SI) field “[o]nce a UE in CELL_FACH transmitting on a common E-DCH resource has emptied its RLC transmit buffer.” Wager-Prov., 4:9-15; Hochwald, ¶¶83-84. Setting the TEBS=0 reflects the UE determination that its E-DCH buffer, also called the “RLC transmit buffer,” is empty. Wager-Prov., 4:7-20; Hochwald, ¶¶81-85. • Wager-Prov., 4:7-20 (“<i>UE triggered resource release</i> Once <i>a UE</i> in CELL_FACH transmitting on a common E-DCH resource has emptied its RLC transmit buffer, it <i>shall include the Scheduling Information (SI) field</i> in the last MAC PDU, <i>indicating Total E-DCH Buffer Status (TEBS) = 0</i>. For users in CELL FACH, the NodeB will interpret this as the UE has finished transmission, and will release the common E-DCH resource, once all HARQ processes have finished...”) See also Wager-Prov., 1:3-23, 3:6-13, 4:2-5; Wager, Figs. 3, 4, 5A-B, 6, ¶¶8, 31, 33, 41, 43, 45-46.
[1.b] transmitting to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero when the E-DCH	Wager discloses transmitting to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero when the E-DCH buffer is determined to be empty (<i>e.g.</i>, transmitting “(SI) field” “indicating...(TEBS) = 0” when the E-DCH buffer is determined to be empty (<i>see</i> [1.a])). <u>E.g., Wager:</u> <i>See</i> [1.pre]-[1.a].

'809 Claim	Wager in view of TS25.321
buffer is determined to be empty;	Wager further discloses that “[o]nce a UE in CELL_FACH transmitting on a common E-DCH resource has emptied its RLC transmit buffer,” which is its E-DCH buffer (<i>see</i> [1.a]), the UE transmits “Scheduling Information (SI) field” to the NodeB “indicating...(TEBS)= 0.” Wager-Prov., 4:9-12; Hochwald, ¶¶86-90. • Wager-Prov., 4:7-20 ([1.a]) • <i>See also</i> Wager, Fig. 3-4, 6, ¶¶8, 31, 33, 42, 45-46, 50-51.
[1.c] determining if a hybrid automatic repeat request (HARQ) buffer is empty; and	Wager discloses determining if all HARQ processes have finished (<i>e.g.</i>, determining if “all HARQ processes have finished” by receiving “an ACK for all HARQ processes”). <u>E.g., Wager:</u> Wager discloses that the UE releases the common E-DCH resource when it determines that “all HARQ processes have finished” by receiving an “ACK for all HARQ processes” from the NodeB. Wager-Prov., 4:12-19, 4:27-28; Hochwald, ¶¶91-92, 94, 99. • Wager-Prov., 4:7-20 (<i>see</i> [1.a]) • Wager-Prov., 4:27-5:4 (“<i>The UE shall not release the common E-DCH resources until it has received an ACK for all HARQ processes, or reached the maximum number of HARQ transmissions...</i>”) • <i>See also</i> Wager, Figs. 5A-B, 6, ¶¶7, 34, 36, 38, 44-46, 50. TS25.321 discloses determining if a hybrid automatic repeat request (HARQ) buffer is empty (<i>e.g.</i>, UE “flush[es] the HARQ buffer”). <u>E.g., TS25.321:</u> Wager teaches that the UE receives an ACK from the NodeB after all HARQ processes are completed, but does not

'809 Claim	Wager in view of TS25.321
	disclose details about how the HARQ processes are managed in the UE. Wager-Prov., 4:7-20, 4:27-5:4; Hochwald, ¶95. TS25.321 discloses that a UE's "HARQ entity" implements HARQ processes, and "[e]ach HARQ process is associated with a physical buffer (HARQ buffer)." TS25.321, 99-100; Hochwald, ¶96. TS25.321 discloses the UE "flush[es]" its "HARQ buffer" "if an ACK is received." TS25.321, 100. Hochwald, ¶96. This affirmatively discloses that the UE determines the buffer is empty by flushing the buffer, and at minimum, it would have been obvious that flushing determines the buffer is empty as that is the purpose of flushing. Hochwald, ¶¶93, 96-97, 100. As TS25.321 discloses, the UE determines "if the buffer of the HARQ process corresponding to the next TTI is empty" in order to determine how to process subsequent transmissions. TS25.321, 99; Hochwald, ¶¶96-97. As discussed in §IX.A.3, a POSITA would have been motivated to modify Wager's resource release system according to TS25.321's HARQ process teachings to yield a system where the UE determines if its HARQ buffer is empty after flushing its HARQ buffer once an ACK is received. Hochwald, ¶¶98. • 99 ("There is one HARQ entity at the UE. A number of <i>parallel HARQ processes</i> are used <i>in the UE</i> to <i>support the HARQ</i> entity..., allowing transmissions to take place continuously while waiting for the feedback on the successful or unsuccessful reception of previous transmissions. ... After each TTI, <i>the HARQ entity shall:</i> <i>if the buffer of the HARQ process corresponding to the next TTI is empty:</i> ... <i>Each HARQ process is associated with a physical</i>

'809 Claim	Wager in view of TS25.321
	<i>buffer (HARQ buffer). ...")</i> • 100 (“<i>The HARQ process shall: [] if an ACK is received from the RLS containing the serving cell;...flush the HARQ buffer;</i>”) • See also TS25.321, 19.
[1.d] releasing the E-DCH resource when the transmission of the SI with the TEBS equal to zero has been made and the HARQ buffer is empty.	Wager discloses releasing the E-DCH resource (<i>e.g.</i>, the UE will “trigger” the “release [of] common E-DCH resources”) when the transmission of the SI with the TEBS equal to zero has been made (<i>e.g.</i>, when the UE includes the “(SI) field” indicating “(TEBS) = 0”; <i>see</i> [1.b]) and all HARQ processes have finished (<i>see</i> [1.c]). <u>E.g., Wager:</u> <i>See</i> [1.pre], [1.b]-[1.c]. Wager further discloses that the UE triggers release of the “common E-DCH resources as quickly as possible after completed transmission,” that is once “all HARQ processes have finished” and the UE receives “an ACK for all HARQ processes.” Wager-Prov., 4:8-28; Hochwald, 101-102, 104, 108. As part of this scheme, the UE “include[s] the...(SI) field in the last MAC PDU” sent to the NodeB “indicating...(TEBS)=0.” Wager-Prov., 4:7-20; <i>see</i> [1.b]; Hochwald, ¶104. • Wager-Prov., 2:9-15 (“...it is preferable if <i>each UE releases the common E-DCH resource</i> as quickly as possible <i>after completed transmission.</i>”) • Wager-Prov., 3:3-5 (“[T]he present invention...allows <i>a user equipment to release the common E-DCH resources in a fast and reliable manner.</i>”)

'809 Claim	Wager in view of TS25.321
	• Wager-Prov., 4:2-3 (“<i>The release of the common E-DCH resources is signaled between UE and NodeB</i> using existing signaling fields on L2 or L1.”) • Wager-Prov., 4:7-20 (see [1.a]), 4:27-5:4 (see [1.c]) • See also Wager, Figs. 3-4, 6, ¶¶7, 9, 26, 28, 31-34, 36, 40, 45-46, 51. TS25.321 discloses that the HARQ buffer is empty (e.g., HARQ “buffer” is “flush[ed]” such that the “buffer ... is empty”; see [1.c]). <u>E.g., TS25.321:</u> As discussed for [1.c], Wager in view of TS25.321 renders obvious that a UE’s HARQ buffer is flushed (TS25.321, 99-100) and thus emptied when “all HARQ processes have finished” and been ACKed. Wager-Prov., 4:9-15; Hochwald, ¶¶101, 103, 105-106, 109. As discussed in §IX.A.3, a POSITA would have been motivated to modify Wager’s “UE triggered resource release” scheme with TS25.321’s HARQ buffer teachings, yielding a system where the UE releases the E-DCH resource when the transmission of the SI with the TEBS=0 has been made (indicating that its E-DCH buffer is empty) and the UE’s HARQ buffer is empty after flushing its HARQ buffer once the base station acknowledges that “all HARQ processes have finished.” See [1.b]-[1.c]; Hochwald, ¶107.
[4] The method as in claim 1, further comprising transmitting using the E-DCH resource when a response is	See [1]. Wager discloses transmitting using the E-DCH resource when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU (e.g., UE transmits “preambles” to “access the common E-DCH channel”; the NodeB “having detected the preamble[s,]...acknowledges reception” by transmitting an “AICH sequence” to the UE and “informs the UE which

'809 Claim	Wager in view of TS25.321
received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.	common E-DCH resource it has [been] assigned”; the UE transmits using assigned “common E-DCH resource”). <u>E.g., Wager:</u> See [1]. Wager further discloses a procedure for a UE to “access the common E-DCH channel in CELL_FACH.” Wager-Prov., 1:24-27. First, the UE transmits a preamble to a NodeB. Wager-Prov., Fig. 1, 1:24-27, 5:1-4; Hochwald, ¶¶110-114. “Having detected the preamble, the NodeB acknowledges reception with an AICH sequence” over an AICH channel, which is an E-AICH because it “informs the UE which common E-DCH resource it has assigned to the UE.” Wager-Prov., 1:24-2:2; Fig. 1; Hochwald, ¶112. After the UE receives the “AICH sequence,” the UE transmits using the assigned common E-DCH resources. Wager-Prov., 1:24-2:2, Fig. 1; Hochwald, ¶112. Wager-Prov., Fig. 1 Wager-Prov., 3:24-25 (“Figure 1 A diagram over common E-DCH transmission in CELL_FACH state”)

'809 Claim	Wager in view of TS25.321
	• Wager-Prov., 1:24-2:2 (“<i>The procedure to access the common E-DCH channel in CELL_FACH starts in the same way as Rel 99 RACH transmission, i.e. with preamble power ramping using randomly selected preamble signatures. Having detected the preamble, the NodeB acknowledges reception with an AICH sequence. It also informs the UE which common E DCH resource it has assigned to the UE.</i>”) • Wager-Prov., 5:1-4 (“<i>...the UE shall start by transmitting preambles to request a new common E-DCH resource.</i>”) See also Wager, Figs. 2-3, ¶¶25, 30, 33.
[6.pre] A wireless transmit/receive unit (WTRU) capable of communicating with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the WTRU comprising:	See [1.pre]. Hochwald, ¶¶115-116.
[6.a] a E-DCH buffer;	See [1.a]. Hochwald, ¶¶117-118.

'809 Claim	Wager in view of TS25.321
[6.b] a transmitter;	Wager discloses that the WTRU (“UE,” <i>see</i> [6.pre]) comprises a transmitter (e.g., transmitter for “transmitting,” <i>see</i> [1.b], [4]). <u>E.g., Wager:</u> See, [6.pre], [1.b], [4]. As discussed in [1.b], [4], Wager also discloses a UE “transmitting on a common E-DCH resource,” “transmit[ing] the E-DCH resource release indication,” and “transmitting preambles to request a new common E-DCH resource.” Wager-Prov., 4:7-20, 4:27-5:4. A POSITA would have understood that Wager’s UE includes a transmitter to perform these transmissions, and at minimum, found obvious to use a transmitter to do so, as transmitters were known to be used for this purpose.¹⁷ Hochwald, ¶¶119-122. • Wager-Prov., 4:7-20 (<i>see</i> [1.a]), 4:27-5:4 (<i>see</i> [1.c], [4]) <i>See also</i> Wager, ¶¶2, 9, 25.
[6.c] a hybrid automatic repeat request (HARQ) buffer; and	See [1.c]. Hochwald, ¶¶123-124.
[6.d] a processor; wherein the processor:	Wager discloses that the WTRU (<i>see</i> [6.pre]) comprises a processor (e.g., processor that performs the “UE triggered resource release” process). <u>E.g., Wager:</u> See [6.pre], [1.a]-[1.d].

¹⁷ *See, e.g.*, Chun, Fig 8, ¶¶91-97; Hakola-Prov. (Ex. 1014), Fig. 7, ¶¶55-57; Hakola (Ex. 1013), Fig. 10, ¶70.

'809 Claim	Wager in view of TS25.321
[6.e] determines if the E-DCH buffer is empty; [6.f] causes the transmitter to transmit to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero for the E-DCH buffer when the processor has determined that the E-DCH buffer is empty; [6.g] determines if the HARQ buffer is empty; and [6.h] releases the E-DCH resource when the transmission of the SI with the TEBS equal to	Wager also discloses a “UE” that performs a resource release process as discussed in [1.a]-[1.d]. A POSITA would have understood that Wager’s UE includes a processor to perform the [6.e]-[6.h] resource release process, and at minimum, found it obvious to use a processor to do so, as processors were known to be used for this purpose.¹⁸ Hochwald, ¶¶125-141. See also Wager, ¶¶23-24.

¹⁸ See, e.g., Chun, Fig. 8, ¶¶91-97; Hakola-Prov, Fig. 7, ¶¶48, 55-61; Hakola, Figs. 9-10, ¶¶62-65, 67-70.

'809 Claim	Wager in view of TS25.321
zero has been made and the HARQ buffer is empty.	
[10] The WTRU as in claim 6, wherein the transmitter transmits using the E-DCH resource when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.	See [6]. As discussed in [6.b], Wager not only renders obvious but discloses that a transmitter performs the transmission ([6]). Hochwald, ¶¶142-144.

B. Ground 2: Lee in view of Nokia and TS25.321 (Claims 1, 4, 6, 10)

Lee, **Nokia**, and **TS25.321** all disclose communication systems built upon UMTS technologies. *See* §§IX.B.1–3; Hochwald, ¶145. **Lee** discloses a resource release process performed by an UE for an “evolved UMTS” (or LTE) system where a UE releases resources by sending an uplink (UL) communication to a base station when the UE’s transmission buffer is empty. *See* §IX.B.1; Hochwald, ¶146. **Nokia** proposes improving UMTS UL transmissions by, *e.g.*, allowing UEs to use a faster

dedicated channel (E-DCH) while in a CELL_FACH state, advantageously reducing signaling delays and increasing uplink data rates. See §IX.B.2; Nokia, 3; Hochwald, ¶146. TS25.321 further teaches standardized ways for a UMTS system to determine and communicate that a transmission (E-DCH) and HARQ buffers are empty. See §IX.B.3; Hochwald, ¶146. A POSITA would have been motivated to modify **Nokia** with **Lee's** and **TS25.321's** teachings to advantageously, *e.g.*, more efficiently allocate resources in an evolved UMTS system by using UE-initiated resource release to release resources more quickly. Hochwald, ¶146; §§IX.B.2-IX.B.3.

1. Lee

Lee discloses releasing radio resources no longer required for transmission in an “evolved version of a conventional wireless UMTS system” (e.g., “LTE”) by having a UE initiate a resource release, and contemplates using a “conventional” HARQ scheme to perform error checking and control for at least its downlink transmissions. Lee, 1:9-15, 6:19-7:14, 8:8-9:22, 13:18-15:12, 17:1-6, Figs. 1, 5. When the UE determines that its “buffer” has “no data left for transmission,” it “transmit[s] an indication” to an eNode-B “that the radio resources are no longer needed,” and then the “resources [are] released by [the] UE.” Lee, 9:13-20, 10:9-11, 13:18-23, 15:9-17, 16:7-10, Figs. 6, 7; Hochwald, ¶147.

2. **Nokia; Motivation to Modify Lee with Nokia's Teachings**

Whereas **Lee** discloses efficiently using and releasing radio resources for uplink transmissions in an evolved UMTS (LTE) system, it leaves to a POSITA the details of efficiently communicating UL transmissions to a base station. Lee, Abstract, 1:5-6, 1:9-15, 3:19-4:5, 8:8-17, 12:24-15:20, 17:1-6; Hochwald, ¶148.

Nokia discloses an improvement for UMTS Release 8 uplink transmissions. Nokia, 1-3; Hochwald, ¶149. **Nokia** discloses “apply[ing]” faster dedicated channels (“E-DCH channels”) for a “CELL_FACH state for uplink transmissions,” which “provide[s] HARQ,” “fast power control,” “reduce[d] signalling delays and increase[d] uplink data rates.” Nokia, 2-3. This allows “significantly larger data amounts to be delivered in CELL_FACH state with high reliability,” thus enabling UEs to conserve resources without compromising UL performance. Nokia, 1-3; Hochwald, ¶149. The UE is granted “direct access to E-DCH channels” by employing an existing “preamble/AICH acknowledgment” procedure in which the UE transmits a “preamble” to the base station and receives an acknowledgement on an “acquisition indication channel” (AICH) containing “UL resource allocation[s]” in response. Nokia, 2. Once the UE gains “uplink access,” the UE uses the allocated E-DCH resources on E-DCH channels for uplink data transmissions to the base station. Nokia, 2; Hochwald, ¶149.

Lee and **Nokia** are analogous prior art and in the same field as the '809—wireless communication—and are reasonably pertinent to the alleged problems identified in the '809, including efficient radio resource releases. '809, 1:25-33, 3:59-4:13, 5:34-61, 6:21-27, 6:46-63; **Lee**, Abstract, 1:5-6, 8:8-17, 12:24-15:19, 17:1-6; **Nokia**, 1-2; Hochwald, ¶150. A POSITA would have been motivated to modify **Lee** with **Nokia's** teachings, yielding a system that improves **Lee's** UE uplink transmission resource utilization by using dedicated E-DCH resources to communicate with a base station while in a CELL_FACH state, and using HARQ for these UL transmissions (as taught by **Nokia**). Hochwald, ¶150.

First, modifying **Lee** with **Nokia's** E-DCH and HARQ teachings improves uplink data transmissions. **Nokia**, 1-2; Hochwald, ¶151. **Nokia's** proposed use of “E-DCH channels” and “HARQ” for “CELL_FACH state uplink transmissions” advantageously “enabl[es] significantly larger data amounts to be delivered in CELL_FACH state with high reliability” as well as “fast and dynamic UL resource allocation,” and “reduce[d] signalling delays.” **Nokia**, 2-3; Hochwald, ¶151.

Second, **Nokia** further discloses that a UE obtains “uplink access” to E-DCH resources by performing the “PRACH preamble/AICH acknowledgement procedure” according to existing UMTS standards. **Nokia**, 2; Hochwald, ¶152. A POSITA would have understood that **Nokia** provides additional details regarding

UMTS technologies, including describing how UEs in **Lee**'s evolved UMTA system obtain "uplink access" to E-DCH resources to carry out uplink transmissions. Hochwald, ¶152.

A POSITA would have had a reasonable expectation of success modifying **Lee** with **Nokia**'s teachings because **Lee**'s "Evolved UMTS" system was built upon "conventional UMTS" technologies and thus designed to operate according to UMTS protocols, like **Nokia**'s. *Nokia*, 1, 3; *Lee*, 1:9-15; Hochwald, ¶153. Moreover, **Lee** and **Nokia** disclose similar schemes for releasing allocated resources that are no longer in use. *Nokia* 1-2, Figs. 1-2; *Lee*, 14:4-12; Hochwald, ¶153.

3. **TS25.321; Motivation to Modify Lee (and Nokia) with TS25.321's Teachings**

In addition to **Lee**'s teachings of using HARQ and employing signaling mechanisms for a UE to release resources when there is no data left in its "transmission buffer," **TS25.321** provides detailed teachings of determining and communicating when a UE's data buffers are empty through standardized UMTS protocols. *Lee*, 6:19-8:17, 12:24-15:19, Fig. 6; *TS25.321*, 2, 8, 67-68, 99-100; Hochwald, ¶154.

TS25.321 discloses that the UE determines how much data is available in its E-DCH transmission buffer and communicates that information to the base station ("serving E_DCH Node-B") in a "Scheduling Information" message by including a

“Total E-DCH Buffer Status” (TEBS) field to indicate “the amount of resources the [UE] require[s].” TS25.321, 67; Hochwald, ¶155. For example, the UE sets TEBS=0 when it determines that the E-DCH buffer is empty. TS25.321, 67-68; Hochwald, ¶155. Additionally, as discussed above in §IX.A, **TS25.321** teaches using and flushing a HARQ buffer when all prior transmissions have been successfully received and no retransmissions are needed. TS25.321, 99-100; Hochwald, ¶155.

Like **Lee** and **Nokia**, **TS25.321** is also in the same field as the ’809 and reasonably pertinent to the ’809’s alleged problems, including efficient release of radio resources. TS25.321, 8, 67-68, 99-100; Hochwald ¶156; see §IX.B.2. A POSITA would have been motivated to modify **Lee** with **TS25.321’s** teachings, yielding a system where the UE releases resources and transmits SI indicating that its E-DCH transmission buffer is empty when the UE has no new data to transmit and the HARQ buffer is empty. Hochwald, ¶156.

First, **Lee** in view of **Nokia** renders obvious a communication system that employs “HARQ” for “CELL_FACH state uplink transmissions” (see §IX.B.2), but leaves to a POSITA how to store and manage HARQ-related transmissions at the UE. Modifying **Lee/Nokia** with **TS25.321’s** HARQ teachings, including flushing a HARQ buffer after successful transmission, advantageously improves reliability,

data integrity, memory utilization, and production costs for similar reasons to those explained in §IX.A.3. Hochwald, ¶157.

Second, while **Lee** teaches the UE releasing resources when its “transmission buffer” is empty, **TS25.321** provides additional teachings on how to communicate that information to a base station (e.g., UE transmits Scheduling Information setting TEBS=0 when its E-DCH Buffer is empty). See §IX.B.1; TS25.321, 67-68; Hochwald, ¶158. Modifying **Lee** with these teachings advantageously improves resource utilization by allowing the base station to promptly reallocate unused resources to other UEs. TS25.321, 67; Hochwald, ¶158.

Third, modifying **Lee** with **TS25.231**’s teachings of triggering resource release when the UE’s E-DCH transmission and HARQ buffers are both empty advantageously ensures that resources are not prematurely released, advantageously reducing “wasted resources.” See Lee, 8:13-15; Hochwald, ¶159.

A POSITA would have had a reasonable expectation of success modifying **Lee** (and **Nokia**) with **TS25.321**’s teachings because **Lee**’s “Evolved UMTS” system was built upon “conventional UMTS” technologies and thus designed to operate according to UMTS protocols, like those standardized by **TS25.321**. Hochwald, ¶160.

4. Claim Chart

As set forth below, **Lee** in view of **Nokia** and **TS25.321** renders obvious Claims 1, 4, 6, and 10. In addition to §§IX.A.1-IX.A.3, the following identifies example disclosures followed by bulleted excerpts that each disclose and/or render obvious the Claims. Hochwald, ¶161.

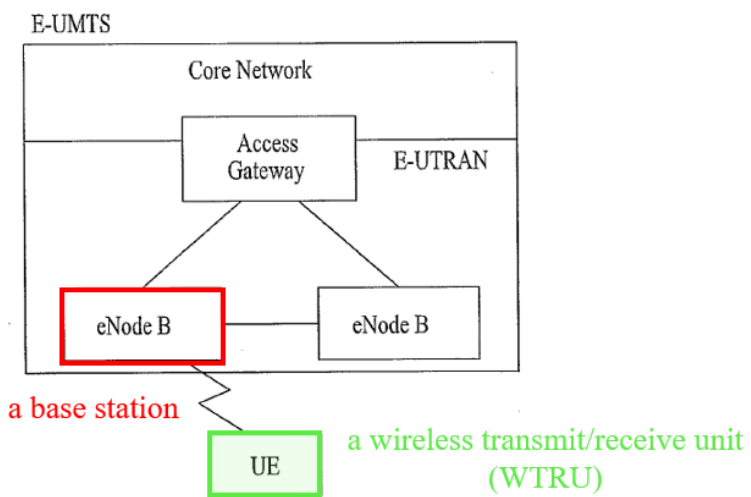
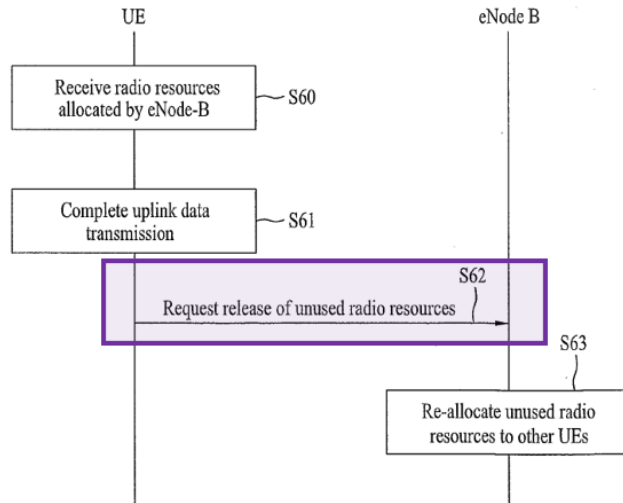
'809 Claim	Lee in view of Nokia and TS25.321
[1.pre] A method performed by a wireless transmit/receive unit (WTRU) to communicate with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the method comprising:	Lee discloses a method performed by a wireless transmit/receive unit (WTRU) to communicate with a base station using a resource (<i>e.g.</i>, UE “perform[ing] transmission/reception of data” to/from an “eNode-B” using “allocated radio resources”). <u>E.g. Lee:</u> Lee discloses “a method” in which “specific User Equipment (UE)” communicates with a “eNode-B” base station by “perform[ing] transmission/reception of data” using “radio resources allocated by the eNode-B.” Hochwald, ¶¶162-163, 165, 168. • Figs. 1, 6: FIG. 1  The diagram illustrates an E-UMTS network architecture. A large box labeled 'E-UMTS' contains a 'Core Network' box. Inside the Core Network is an 'Access Gateway' box. To the right of the Core Network is an 'E-UTRAN' label. Below the Access Gateway are two 'eNode B' boxes, connected by a horizontal line. A red box highlights the left 'eNode B' box, with a red label 'a base station' pointing to it. Below the eNode B boxes is a green box labeled 'UE', with a green label 'a wireless transmit/receive unit (WTRU)' pointing to it. A red zigzag line connects the highlighted eNode B box to the UE box.

FIG. 6



- **Abstract** (“*A method for scheduling radio resources in a mobile communication system* is disclosed. The method includes *allocating radio resources to a specific User Equipment (UE)*...”)
- **12:22-23** (“*The UE or the eNode-B can perform transmission/reception of data using the allocated RBs.*”)
- **13:10-13** (“*Each UE receives uplink radio resources allocated by the eNode-B* (step S60). *Each UE completes uplink data transmission using the allocated radio resources* in an uplink transmission path in which the UE is a transmitter (Step S61).”
- **See also 12:12-16; 13:4-5.**

Nokia discloses a WTRU that communicates with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state (*e.g.*, UE “appl[ies] E-DCH channels...for uplink transmissions” to the “Node B” while “in [a] CELL_FACH” state).

E.g. Nokia:

Lee discloses a UMTS-based system where a UE communicates with an eNode-B base station, but is silent on how the UE does so while operating in a CELL_FACH state. Hochwald, ¶166. **Nokia** proposes improvements to UMTS uplink transmissions for “UEs in [a] CELL_FACH state” by granting UEs access to “E-DCH channels.” Nokia, 1-3, Hochwald, ¶¶164, 166. The UE uses E-DCH resources while in CELL_FACH by sending uplink transmissions to the “Node B” base station on the E-DCH channel. Nokia, 1-2; Hochwald, ¶¶164, 166, 169.

As discussed in §IX.B.2, a POSITA would have been motivated to modify **Lee** with **Nokia’s** teachings, yielding a system in which Lee’s UE uses E-DCH resources to perform uplink transmissions to the base station while in a CELL_FACH state. Hochwald, ¶167; Nokia, 1-2; Lee, 1:5-6.

• **Figs. 1-2**

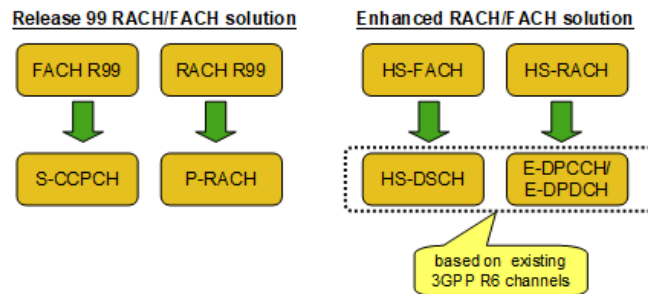
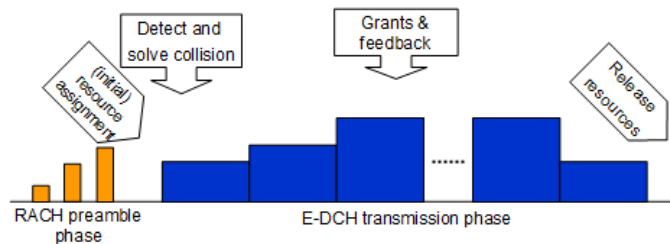


Figure 1: An illustration of data transmission in Rel'99 and Rel-8 CELL_FACH states



• **1 (“This document analyses the current state of uplink data transmissions in CELL_FACH,**

	CELL_PCH and URA_PCH and outlines a proposal for a way forward for <i>improved UL for CELL_FACH state</i> allowing a direct UE access to both HSDPA and HSUPA <i>by combining the random access procedure with the E-DCH concept.</i>") • 2 ("...<i>A natural complement of enhanced CELL_FACH is to apply E-DCH channels for an enhanced CELL_FACH for uplink transmissions...</i>") • 2-3 ("<i>Using EDCH principles for data transmission</i> for extending the random access procedure allows... <i>EDCH resource coordination for dedicated and common users can be co-ordinated within the Node B...</i>")
[1.a] determining if a E-DCH buffer is empty;	Lee discloses determining if a transmission buffer is empty (e.g., determining "there is no more data for transmission left in the buffer of the...UE"). <u>E.g., Lee:</u> Lee discloses that the UE determines whether "there is no more data for transmission left in [its] buffer"—and thus it is empty. Hochwald, ¶¶170-171, 173, 176. • 14:4-12 ("...<i>The radio resource allocation release request message may employ a 1-bit indicator... The 1-bit indicator is set to '0' to indicate that there is no more data for transmission left in the buffer of the specific UE.</i>") • See also Lee, 8:18-23, 9:3-14, 13:18-23, 14:10-16, 15:4-7, 16:7-10. TS25.321 discloses determining if an E-DCH buffer is empty (e.g., UE setting "TEBS" to 0 after determining that its E-DCH Buffer is empty). <u>E.g., TS25.321:</u> When Nokia's and TS25.321's teachings of using E-DCH transmissions are applied to Lee (as discussed in

	§§IX.B.2–3), the resulting system renders obvious determining if an “E-DCH Buffer” is empty. Hochwald, ¶¶170, 172, 174. Specifically, TS25.321 discloses that a UE sets a “Total E-DCH Buffer Status” (“TEBS”) field to 0 when “the amount of data ... that is available for transmission and retransmission” is 0. TS25.321, 67-68. Thus, to set TEBS=0, the UE determines that the E-DCH buffer is empty. Hochwald, ¶174, 177. As discussed in §IX.B.3, a POSITA would have been motivated to modify Lee’s system (in view of Nokia) with TS25.321’s teachings of an E-DCH buffer, yielding a system where the UE determines that its E-DCH buffer is empty when there is no more data to transmit. Hochwald, ¶175. • 67 (“9.2.5.3 UL Scheduling information <i>This control information is used by UEs to indicate to their serving E-DCH Node-B the amount of resources they require.</i>”) • 67 (“9.2.5.3.2 Scheduling Information <i>The Scheduling Information</i> is located at the end of the MAC-e PDU and <i>is used to provide the serving Node B with a better view of the amount of system resources needed by the UE....</i> This information includes the following fields: ...Total E-DCH Buffer Status (<i>TEBS</i>): <i>... indicates the amount of data in number of bytes that is available for transmission and retransmission in RLC layer.</i>”) • 68 (“The values taken by TEBS are shown in Table 9.2.5.3.2.1.)
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	• Table 9.2.5.3.2.1: Table 9.2.5.3.2-1: TEBS Values <table border="1"> <thead> <tr> <th>Index</th><th>TEBS Value (bytes)</th></tr> </thead> <tbody> <tr> <td>0</td><td>TEBS = 0</td></tr> <tr> <td>1</td><td>$0 < \text{TEBS} \leq 10$</td></tr> <tr> <td>2</td><td>$10 < \text{TEBS} \leq 14$</td></tr> <tr> <td>3</td><td>$14 < \text{TEBS} \leq 18$</td></tr> <tr> <td>4</td><td>$18 < \text{TEBS} \leq 24$</td></tr> <tr> <td>5</td><td>$24 < \text{TEBS} \leq 32$</td></tr> </tbody> </table>	Index	TEBS Value (bytes)	0	TEBS = 0	1	$0 < \text{TEBS} \leq 10$	2	$10 < \text{TEBS} \leq 14$	3	$14 < \text{TEBS} \leq 18$	4	$18 < \text{TEBS} \leq 24$	5	$24 < \text{TEBS} \leq 32$
Index	TEBS Value (bytes)														
0	TEBS = 0														
1	$0 < \text{TEBS} \leq 10$														
2	$10 < \text{TEBS} \leq 14$														
3	$14 < \text{TEBS} \leq 18$														
4	$18 < \text{TEBS} \leq 24$														
5	$24 < \text{TEBS} \leq 32$														
[1.b] transmitting to the base station scheduling information (SI), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero when the E-DCH buffer is determined to be empty;	Lee discloses transmitting to the base station information when the transmission buffer is determined to be empty (e.g., transmits “radio resource allocation release request message” with “indicator that is set to 0” when “there is no more data for transmission left in [its] buffer”). <u>E.g., Lee:</u> Lee discloses that when “there is no more data for transmission left in [its] buffer,” the UE transmits a “radio resource allocation release request message” to a base station with an “indicator” that is set to 0. Lee, 14:6-12; 16:7-10. This resource release request is sent as a message in a “MAC PDU,” which is a “Protocol Data Unit (PDU) of the MAC layer.” <i>Id</i>; Hochwald, ¶¶178-179, 181, 184. • 14:4-12 (“...<i>The radio resource allocation release request message may employ a 1-bit indicator</i> if the radio resource allocation release request message is contained in the MAC PDU such that the MAC PDU including the radio resource allocation release request is transmitted to a destination. <i>The 1-bit indicator is set to “0” to indicate that there is no more data for transmission left in the buffer of the specific UE.</i>”) • 16:7-10 (“<i>Setting the 1-bit indicator to ‘0’ indicates that there is no more data for transmission left in the buffer of the UE.</i> In this way, the UE can inform the														

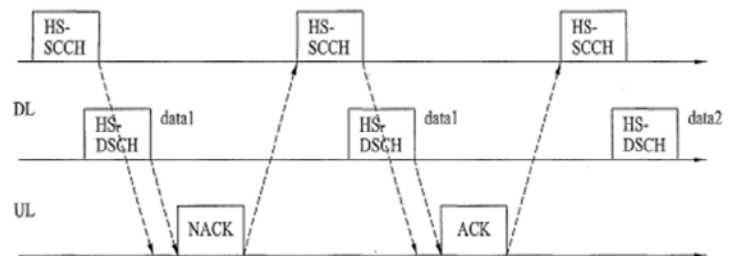
	eNode-B of information regarding the state of the buffer.”) TS25.321 discloses transmitting to the base station scheduling information (SI) (<i>e.g.</i>, UE transmitting to its “serving Node-B” “Scheduling Information”), wherein the SI includes a total E-DCH buffer status (TEBS) equal to zero when the E-DCH buffer is determined to be empty (<i>e.g.</i>, “Scheduling Information” specifies “TEBS” set to “0” when the UE has determined its E-DCH buffer is empty (<i>see</i> [1.a])). <u>E.g., TS25.321:</u> Like Lee, TS25.321 also discloses communicating that a transmission buffer is empty in a MAC PDU, but provides more detailed teachings about how to track and communicate whether a particular type of transmission buffer, an E-DCH buffer, is empty. For example, TS25.321 discloses that a UE transmits a “TEBS” field in a “Scheduling Information” (SI) message “at the end of the MAC-e PDU” to inform the base station “the amount of resources [it] requires.” TS25.321, 67-68; Hochwald, ¶182. When the UE determines that there is no “data available” for transmission in the E-DCH buffer (<i>i.e.</i>, the E-DCH buffer is empty), the UE sets “TEBS=0.” TS25.321, 67-68; Hochwald, ¶¶180, 182, 185. As discussed in §IX.B.3, a POSITA would have been motivated to modify Lee with TS25.321’s SI teachings such that the UE transmits a “radio resource allocation release request message” to the base station that contains SI having a TEBS=0 when the E-DCH buffer is determined to be empty. Hochwald, ¶183. • 67 (9.2.5.3, 9.2.5.3.2), 68 (Table 9.2.5.3.2.1) (<i>see</i> [1.a])
[1.c] determining if a hybrid automatic repeat request (HARQ)	Lee discloses using a hybrid automatic repeat request (HARQ) scheme to perform downlink transmissions (<i>e.g.</i>, “implementing HARQ in the downlink physical layer”). <u>E.g., Lee:</u>

buffer is empty;
and

Lee discloses using a “conventional hybrid ARQ (HARQ) scheme” in a “downlink” direction. Lee, 6:19-21, 11:25; Hochwald, ¶¶186-187, 190, 195.

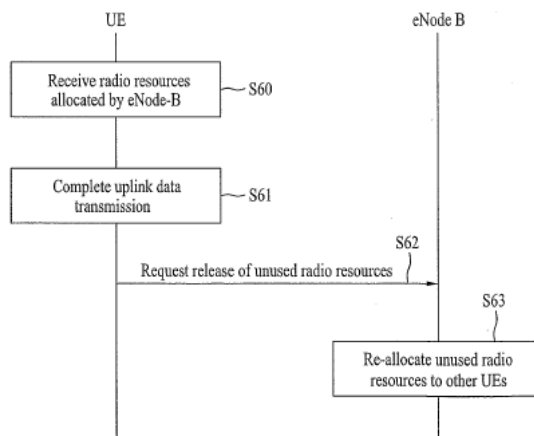
- **Figure 5**

FIG. 5



- **Figure 6**

FIG. 6



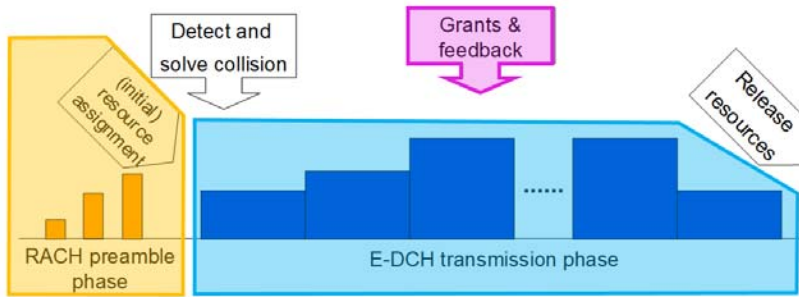
- 6:19-21 (“FIG. 5 is a conceptual diagram illustrating a *hybrid ARQ (HARQ) scheme*. A *method for implementing HARQ in the downlink physical layer of a radio packet communication system* will be described with reference to FIG. 5.”)
- 11:25 (“FIG. 5 is a *conceptual diagram illustrating a conventional hybrid ARQ (HARQ) scheme*.”)
- 13:12-13 (“*Each UE completes uplink data transmission* using the allocated radio resources in an

	uplink transmission path in which the UE is a transmitter (Step S61)”) Nokia discloses using HARQ to perform uplink transmissions (e.g., “provide HARQ...for the CELL_FACH state uplink transmissions”). <u>E.g., Nokia:</u> Whereas Lee is silent on whether HARQ is implemented on the uplink channel, Nokia discloses improving uplink transmissions by “provid[ing] HARQ...for the CELL_FACH state uplink transmissions.” Nokia, 2; Hochwald, ¶¶, 188, 191, 196. As discussed in §IX.B.2, a POSITA would have been motivated to modify Lee with Nokia’s HARQ, yielding a UE that uses HARQ to perform error correction for both downlink and uplink transmissions. Hochwald, ¶192. • 2 (“A natural complement of enhanced CELL_FACH is to <i>apply E-DCH channels for</i> an enhanced <i>CELL_FACH</i> for uplink transmissions. <i>This would provide HARQ and power control for the CELL_FACH state uplink transmissions</i> enabling significantly larger data amounts to be delivered in CELL_FACH state with high reliability from the UE to the network.”) TS25.321 discloses determining if a HARQ buffer is empty (e.g., UE “flush[es] the HARQ buffer”). <u>E.g., TS25.321:</u> In addition to the HARQ teachings of Lee in view of Nokia, TS25.321 provides detailed HARQ teachings, including that a UE “flush[es]” its “HARQ buffer” “if an ACK is received” for “successful...reception of previous transmissions.” TS25.231, 99-100. Thus, as discussed in [1.c] of §IX.A.4, TS25.321 affirmatively discloses that the UE determines the buffer is empty by flushing the buffer, and at minimum, it would have been obvious to a POSITA to determine that the HARQ buffer is empty after flushing it to keep track of the
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	HARQ buffer status for future transmissions. Hochwald, ¶¶189, 193. As discussed in §IX.B.3, a POSITA would have been motivated to modify Lee in view of Nokia with TS25.321’s HARQ buffer teachings, yielding a system where the UE determines if a HARQ buffer is empty after flushing its HARQ buffer once an ACK is received. Hochwald, ¶194.
[1.d] releasing the E-DCH resource when the transmission of the SI with the TEBS equal to zero has been made and the HARQ buffer is empty.	Lee discloses releasing a resource when the transmission of information that the transmission buffer is empty has been made (<i>e.g.</i>, “radio resources released by a specific UE” when UE transmits a “radio resource allocation release request” that “indicate[s] that there is no more data for transmission left in the [UE’s] buffer,” <i>see</i> [1.b]). <u>E.g., Lee:</u> See [1.a]-[1.b]. Lee further discloses a UE-initiated resource release process, where “radio resources [are] released by a specific UE” when the UE transmits to a base station a “radio resource allocation release request” that “indicate[s] that there is no more data for transmission left in the [UE’s] buffer. <i>See</i> [1.a]; Lee, 13:9-23, 14:4-12; 15:8-12, Fig. 6; Hochwald, ¶¶197-198, 201, 205. This release request causes the eNode-B to “recognize[] the presence of the [UE’s] unused radio resources”—i.e., that those resources have been released by the UE—and re-allocates these released resources to other UEs. Lee, 15:8-12, Fig. 6; Hochwald, ¶201. • Fig. 6, Abstract (<i>see</i> [1.a]) • 13:9-11 (“The UE radio resource request process...”). • 13:18-23 (“<i>The specific UE transmits a message including a specific information to the eNode-B in order to inform the eNode-B of remaining radio resources (step S62) if there are remaining radio resources after the specific UE completes uplink data transmission.</i> Preferably, the specific information is included in a “Request for de-allocation of the

	allocated uplink radio resource” message, hereinafter referred to as a “radio resource allocation release request message,” for requesting the eNode-B to release the allocated radio resources.”) • 14:4-12 (see [1.b]) • 15:9-13 (“The eNode-B recognizes the presence of unused radio resources when it receives the radio resource allocation release request message. The eNode-B then re-allocates the unused radio resources, such as radio resources released by a specific UE, to other UEs (step S63). The eNode-B may re-allocate the unused radio resources to the specific UE.”) • See also Lee, 6:19-21, 9:3-7, 13:12-14, 14:13-14, 14:20-24, 15:9-10, 16:3-10, 16:17-19. As discussed in [1.pre], Lee in view of Nokia renders obvious using an E-DCH resource (e.g., see [1.pre]). Hochwald, ¶¶199, 202, 206. TS25.321 discloses that the transmission of the SI with TEBS equal to zero has been made and determining that the HARQ buffer is empty (e.g., UE has transmitted “Scheduling Information” to “serving Node-B” with “TEBS” set to “0” (see [1.b]), and determined that the UE’s HARQ buffer is empty (see [1.b]-[1.c])). <u>E.g., TS25.321:</u> See [1.b]-[1.c]. As discussed above, Lee discloses a UE-initiated resource release scheme where the UE informs the base station that it has released its resources when the UE determines that its transmission buffer is empty, and Nokia teaches that the UE uses E-DCH resources for transmission (see [1.pre]). As explained above in [1.b]-[1.c], TS25.321 further teaches
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	determining and communicating when resources are no longer needed for transmission or retransmission by: 1) setting TEBS=0 in the Scheduling Information transmission it sends to the base station to indicate that a UE's E-DCH Buffer is empty, and 2) emptying the UE's HARQ buffer when there is no data left to retransmit. Hochwald, ¶¶200, 203, 207. As discussed in §IX.B.3, a POSITA would have been motivated to modify Lee (in view of Nokia) with TS25.321's SI teachings, yielding a UE that releases E-DCH resources when SI with TEBS=0 is transmitted and its HARQ buffer is empty. Hochwald, ¶204.
[4] The method as in claim 1, further comprising transmitting using the E-DCH resource when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.	See [1]. Nokia further discloses transmitting using the E-DCH resource (see [1.pre]; UE “deliver[ing]” message “payload” using “E-DCH channels”) when a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU (see [1.pre]; e.g., UE receives an “acquisition indication” on an AICH channel “grant[ing] ... access to E-DCH channels” in response to a “PRACH preamble” transmitted by a UE”). <u>E.g., Nokia:</u> In addition to Lee's teachings (in view of Nokia) of using E-DCH channels to make uplink transmissions (see [1.pre]), Nokia discloses that “uplink access” to “E-DCH channels” are initiated by performing a “PRACH preamble/AICH acknowledgement procedure.” Nokia, 2; Hochwald, ¶210. First, the UE sends a PRACH preamble to a “Node B,” and in response, the Node B sends “an acquisition indication” on an <u>a</u>cquisition <u>i</u>ndication <u>ch</u>annel (AICH) back to the UE, which contains UL resource allocation[s]” that “grant” the UE “direct access to E-DCH channels for payload delivery.” Nokia, 1-2; Hochwald, ¶210 The “UL resource allocation” allocates E-DCH resources to the UE for transmission on the E-DCH channel. Nokia, 2. Because the acquisition indication channel is used to send an acquisition indication

	to allocate E-DCH resources to the UE (Nokia, 2), it is called an <u>E</u>-DCH AICH channel, or “E-AICH.” Hochwald, ¶¶208-210, 212. As discussed in §§IX.B.2-IX.B.3, a POSITA would have been motivated to modify Lee (and Nokia/TS25.312—see [1.pre]-[1.d]) with Nokia’s teachings of a “PRACH preamble/AICH acknowledgement procedure,” yielding a system where the UE sends transmissions on the E-DCH (e.g., see [1.pre]) using the E-DCH resources allocated by the base station through the PRACH preamble/AICH procedure. Hochwald, ¶211. • 2 (annotated)  “transmitting using the E-DCH resource when a response is received on an E-DCH acquisition channel (E-AICH) to a preamble transmitted by the WTRU” • 2 (“<i>The uplink access can be initiated as in Rel’99 by PRACH preamble/AICH acknowledgement procedure, but after receiving the acquisition indication, instead of transmitting the message part over a PRACH channel specifically designed for this sole purpose the UE can be granted with a direct access to E-DCH channels for the payload delivery.</i>”) • 2 (“Using EDCH principles for data transmission for extending the random access procedure allows...<i>fast and dynamic UL resource allocation using scheduling grants.</i>”) • See also Nokia, 1-3.
[6.pre] A wireless transmit/receive	See [1.pre]. Hochwald, ¶¶213-215.

unit (WTRU) capable of communicating with a base station using an enhanced dedicated channel (E-DCH) resource while in a cell forward access channel (CELL_FACH) state, the WTRU comprising:	
[6.a] a E-DCH buffer;	See [1.a]. Hochwald, ¶¶216-218.
[6.b] a transmitter;	Lee discloses the WTRU (see [6.pre]) comprises a transmitter (e.g., UE functions as “a transmitter of an uplink signal”). <u>E.g., Lee:</u> See [6.pre], [1.b], [4]. Lee discloses that a UE functions as a “transmitter of an uplink signal.” Lee, 12:12-16. For example, a UE uses its allocated resources to “transmit data or control signals” on “uplink channels” to an eNode-B. Lee, 13:15-17, 7:24-25; Hochwald, ¶221. This not only renders obvious, but affirmatively discloses, that the UE comprises a transmitter in order to perform these transmissions.¹⁹ Hochwald, ¶¶219-222. • Fig. 1 (see [1.pre])

¹⁹ See, e.g., Chun, Fig. 8, ¶¶91-97; Hakola-Prov, Fig. 7, ¶¶55-57; Hakola, Fig. 10, ¶70.

	• 7:24-8:1 (“<i>The UEs transmit data or control signals</i> using prescribed radio resources allocated by the eNode-B...”) • 12:12-16 (“...‘<i>terminal</i>’ is used to refer to a <i>transmitter of an uplink signal</i> and “base station” is used as a receiver of the uplink signal...‘<i>terminal</i>’ and “base station” <i>may also be used to refer to, respectively, a UE...</i>”) • 13:12-17 (“<i>Each UE completes uplink data transmission</i> using the allocated radio resources in an uplink transmission path in which <i>the UE is a transmitter</i> (Step S61). Uplink radio resources may be left after <i>the UE completes the data transmission</i> using the radio resources...”) • See also Lee, Figs. 3:19-21, 2:12-14, 5:12-15, 7:6-7, 7:12-13, 8:15-17, 11:23-24, 13:12-20, 14:23-24, 15:4-7, 17:22-25.
[6.c] a hybrid automatic repeat request (HARQ) buffer; and	See [1.c]. Hochwald, ¶¶223-224.
[6.d] a processor; wherein the processor [6.e] determines if the E-DCH buffer is empty; [6.f] causes the transmitter to transmit to the base station scheduling information (SI), wherein the SI	Lee discloses the WTRU (see [6.pre]; “UE”) comprises a processor (e.g., processor that performs a “resource release” process, see [1.a]-[1.d]). <u>E.g., Lee:</u> See [6.pre], [1.pre]-[1.d]. As discussed in [6.pre], [1.a]-[1.d], Lee discloses a UE that performs a resource release process when there is no data left in its transmission buffer. A POSITA would have understood that Lee’s UE includes a processor to perform the [6.e]-[6.h] resource release process, and at minimum,

includes a total E-DCH buffer status (TEBS) equal to zero for the E-DCH buffer when the processor has determined that the E-DCH buffer is empty; [6.g] determines if the HARQ buffer is empty; and [6.h] releases the E-DCH resource when the transmission of the SI with the TEBS equal to zero has been made and the HARQ buffer is empty.	found obvious to use a processor to so, as processors were known to be used for this purpose.²⁰ Hochwald, ¶¶225-240.
[10] The WTRU as in claim 6, wherein the transmitter transmits using the E-DCH resource when a response is received on an E-DCH acquisition	See [6]. As discussed in [6.b], Lee not only renders obvious but discloses that the transmission ([6]) is performed by a transmitter. Hochwald, ¶¶241-242.

²⁰ See, e.g., Chun, Fig. 8, ¶¶91-97; Hakola-Prov. at Fig. 7, ¶¶48, 55-61; Hakola, Figs. 9-10, ¶¶62-65, 67-70.

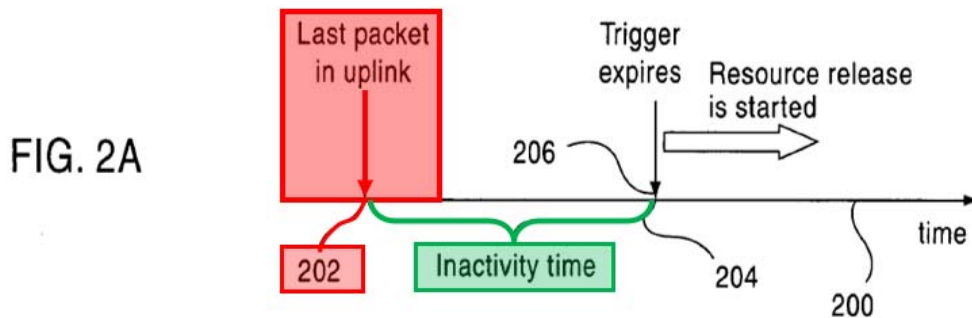
indication channel (E-AICH) to a preamble transmitted by the WTRU.	
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C. Grounds 3-4: Grounds 1-2 in view of Sarkkinen (Claims 2-3, 5, 7-9)

1. Sarkkinen

Sarkkinen discloses additional teachings that address delay in releasing resources. Sarkkinen, ¶¶34, 37-38, 41, 47-48; Hochwald, ¶243.

Sarkkinen discloses improving “resource release procedures” to “ensure that [the] proper utilization of the network resources is maintained.” Sarkkinen, ¶¶6, 36. For example, **Sarkkinen** teaches that network (i.e., node)-based timers “may lead to inefficient use of the resources in high bit rate channels” due to “delays in releasing resources,” and that using “a timer in user equipment” minimizes premature release of resources “when data transmission is stopped temporarily” (e.g., “due to a reading process”), triggers “faster” resource release, and allows “valuable...resources [to] be allocated to other users.” Sarkkinen, ¶¶6-8, 34, 36-38, 53; Hochwald, ¶244. Specifically, **Sarkkinen** discloses using an inactivity “timer” at the “user equipment” that starts “**when the last packet of a data transmission is received**” on the uplink and **expires after an “inactivity period,”** upon which resource release is triggered. Sarkkinen, ¶¶25, 27-28, 36-38; Fig. 2A; Hochwald, ¶244.



Additionally, **Sarkkinen** discloses releasing resources assigned to the UE when “an error condition” “compromise[s] the transmission of data”—such as a radio link failure—so that the UE will “re-establish the connection with a new configuration or channel.” Sarkkinen, ¶¶47-49; Hochwald, ¶245. The UE sends an “indicator” “field in a packet” to the network to “indicate that transmission should be terminated.” *Id.*

Like **Wager**, **Lee**, **Nokia**, and **TS25.321**, **Sarkkinen** is in the same field as the '809 and is reasonably pertinent to the '809's alleged problems, including implementing an efficient release of radio resources. *See, e.g.*, Sarkkinen, ¶¶7-8, 32-34, 37-38; §§IX.A.3, IX.B.2–3; Hochwald ¶246.

2. Motivation to Modify **Wager** (in view of **TS25.321**) with **Sarkkinen's** Teachings

A POSITA would have been motivated to modify **Wager's** Node-B side timer to be implemented at the UE to yield a system where **Wager's** UE-triggered resource release begins after the UE-based inactivity timer expires. Hochwald, ¶247.

First, **Sarkkinen** explicitly teaches improving upon timers like **Wager's** by implementing UE-side timers. Hochwald, ¶248. **Wager** discloses using network-side inactivity timers to release E-DCH resources when no “UL transmission has been detected.” *Wager-Prov.*, 3:14-16, 5:7-16; *Wager*, ¶¶37, 41; Hochwald, ¶248. **Sarkkinen** teaches that network-based timers, like **Wager's** Node-B timer, are “not...suitable for high bit rate channels” and add “additional delays to release unused resources” because it is inefficient for the Node-B to determine the status of a UE's transmissions rather than receive an indication from a UE regarding its status. *Sarkkinen*, ¶¶7-8; Hochwald, ¶248. Implementing UE-side inactivity timers advantageously releases resources “faster” than such network-side timers by releasing resources “as soon as uplink traffic is finished.” *Sarkkinen*, ¶¶6-8, 33-34, 37-38. Hochwald, ¶248.

Second, modifying **Wager** with **Sarkkinen's** UE-side timer teachings avoids releasing resources prematurely. Hochwald, ¶249. **Sarkkinen** teaches that communications may be intermittent and “stopped temporarily...due to a reading process.” *Sarkkinen*, ¶34. Implementing UE-side timers advantageously minimizes premature release by using a timed delay that is longer than, *e.g.*, such as a typical reading processes. *Id.*; Hochwald, ¶249.

Third, modifying **Wager** with **Sarkkinen's** teachings of transmitting an indicator to the network to terminate **Wager's** E-DCH transmissions when an "error condition" (e.g., radio link failure) occurs advantageously improves the "integrity" and "correctness of the data" that is transmitted by stopping transmission during faulty connections, advantageously minimizing wasted resources. Sarkkinen, ¶¶43-45, 47-49, 54; Wager-Prov., 4:6-5:4; Hochwald, ¶250; Wager, ¶¶8, 28-31.

A POSITA would have had a reasonable expectation of success modifying **Wager** (in view of TS25.321) with **Sarkkinen's** teachings because **Sarkkinen's** inactivity timer teachings were explicitly designed to be "compatible" with existing wireless communication systems, "applicable for all channel types," and "implemented with other resource release process," such that **Wager's** "current release procedure[] may not be necessarily removed from existing networks, but may be improved by implementing [**Sarkkinen's**] invention." Sarkkinen, ¶¶36-37, 54; Hochwald, ¶251.

3. **Motivation to Modify Lee (in view of Nokia/TS25.321) with Sarkkinen's Teachings**

Lee discloses that a UE initiates a resource release process after determining its transmission buffer is empty by sending a resource release request to the eNodeB, but **Lee** does not contemplate how to handle resource releases for systems in which message transmission is occasionally interrupted. Lee, 9:13-20, 10:9-11, 13:18-23,

16:7-10; Hochwald, ¶252. A POSITA would have been motivated to modify **Lee** to use the UE-side timer taught by **Sarkkinen**, yielding a system that minimizes premature releases by triggering release of resources used for transmission after the UE-based inactivity timer expires, and ensures release during faulty transmissions. Hochwald, ¶252. For the reasons discussed in §IX.C.2 and separate and apart from Wager’s teachings, modifying **Lee** with **Sarkkinen’s** UE-based inactivity timer teachings would have advantageously improved the speed of resource release achieved by UE-based timers and minimized premature release. Hochwald, ¶252.

Thus, a POSITA would have had a reasonable expectation of success modifying **Lee** with **Sarkkinen’s** teachings because **Sarkkinen** explicitly discloses that its teachings are designed for existing systems with their own release procedures, as discussed in §IX.C.2. Sarkkinen, ¶¶36-37, 54; Hochwald, ¶253.

4. **Claims 2-3/8-9: Inactivity Timer Teachings**

As explained in §§IX.A–B, **Wager** in view of **TS25.321**, and **Lee** in view of **Nokia** and **TS25.321** render obvious [1]/[6]. Hochwald, ¶254.

Regarding [2]/[8] (“[starting/the processor starts] an inactivity timer when the E-DCH buffer is empty”), for Ground 3, **Wager** discloses and renders obvious a processor (see [6.d]) and that the E-DCH buffer is empty when a **WTRU’s data transmission is complete** (e.g., setting “(TEBS)=0” once the UE has

emptied its transmit buffer, *see* [1.a], [6.e]). *See, e.g.*, Wager-Prov., 4:1-5, 4:6-20; 4:27-5:4; Hochwald, ¶255; *see also* [1.a], [6.e]; Wager, ¶¶23-24, 27-31. As discussed above for [1.a], **Wager** also discloses a “UE triggered resource release” system where the UE sets TEBS=0 in SI when transmission is complete. *See* §IX.A.4 ([1.a]). For Ground 4, **Lee discloses and renders obvious a processor** (*see* [6.d]), **and Lee in view of TS25.321 renders obvious the processor determining that a WTRU’s E-DCH buffer is empty** (*see* [1.a], [6.e]). Hochwald, ¶255. As explained above in [1.a], **Lee** (in view of **TS25.321**) renders obvious a system where a UE determines that the E-DCH buffer is empty and communicates that determination by setting TEBS=0 in the “Scheduling Information” of its “radio resource allocation release request message” sent to the base station. Lee, Fig. 6, 13:9-14, 13:18-20, 14:4-9, 14:10-12; TS25.321, 67, 68, Table 9.2.5.3.2-1; Hochwald, ¶256.

Sarkkinen discloses the wireless transmit/receive unit (WTRU) starting an inactivity timer when its data transmission is complete (*e.g.*, “start” a “timer...located in user equipment” “due to the inactivity on the [up]link” when “the last packet of a data transmission is received at a controller in the uplink direction”). Sarkkinen, ¶¶257, 27-28, 34, 36-38, Fig. 2A. **Sarkkinen** discloses “releasing resources using a timer” located at the “user equipment” to “determine inactivity

time.” Sarkkinen, ¶¶33-34, 37-38. The timer starts when the UE transmits its “last packet of data transmission” and expires if no activity occurs. Sarkkinen, Fig. 2A, ¶¶37-38. Modifying **Wager** or **Lee** with these teachings renders obvious implementing a UE-side inactivity timer that starts when data transmission is complete. Hochwald, ¶257.

As discussed above in §§IX.C.2–3, a POSITA would have been motivated to modify **Wager** (in view of TS25.321) or **Lee** (in view of TS25.321) with **Sarkkinen’s** UE-based inactivity timer, rendering obvious these Claims. Hochwald, ¶258.

Regarding [3]/[9] (“[triggering the transmission of/the transmitter transmits] the SI when the inactivity timer expires”), for Ground 3, **Wager discloses and renders obvious that the transmitter (see [6.b]) transmits the SI** (e.g., UE transmits “Scheduling Information” with TEBS=0 to NodeB to trigger resource release, *see* [1.b], [6.f]). **Wager-Prov.**, Fig. 1, 3:24-25, 4:1-5; 4:6-20; 4:27-5:4; **Wager**, Figs. 3-4, 5A-B, 6, ¶¶2, 7-9, 28-31; Hochwald, ¶259. As discussed above and in [1.b], **Wager** discloses that the UE triggers the release of resources by transmitting SI with TEBS=0 to cause a release of resources. *See* §IX.A.4 ([1.b]). For Ground 4, **Lee discloses/renderers obvious a transmitter (see [6.b]) and Lee in view of TS25.321 renders obvious that the transmitter transmits the SI (see**

[1.b], [1.d], [6.f]). Hochwald, ¶¶259-260. As discussed above in [1.b] and [1.d], **Lee’s** system (as modified by the teachings of **Nokia** and **TS25.321**) begins the process of releasing E-DCH resources when the UE transmits a “radio resource allocation release request message” with Scheduling Information indicating that its E-DCH buffer is empty. *See* [1.d]); Hochwald, ¶261.

Sarkkinen discloses triggering the release of resources when the inactivity timer expires (*see* [2], [8]; *e.g.*, “time[] 206 indicates when the timer expires and a trigger for releasing resources to the uplink”). Sarkkinen, ¶38; Hochwald, ¶262. “[W]hen the timer expires” at “time[] 206,” “releasing resources to the uplink” is “trigger[ed].” Sarkkinen, Fig. 2A, ¶38. Modifying Wager (Ground 3) or Lee (Ground 4) with these teachings renders obvious the UE triggering release of resources upon expiration of the timer. Hochwald, ¶262.

As discussed in §§IX.C.2-IX.C.3, a POSITA would have been motivated to modify **Wager** (in view of **TS25.321**) and **Lee** (in view of **Nokia** and **TS25.321**) with **Sarkkinen’s** UE inactivity timer teachings, rendering obvious these Claims. Hochwald ¶263.

5. **Claims 5/7: Radio Link Failure Teachings**

As explained in §§IX.A–B, **Wager** in view of **TS25.321** and **Lee** in view of **Nokia** and **TS25.321** render obvious [1]/[6]. Hochwald, ¶264.

Regarding [5]/[7] (“[completing/the processor completes] an E-DCH transmission when a cell reselection or a radio link failure occurs”), for Ground 3, **Wager discloses/renderers obvious a processor** (see [6.d]) **that completes an E-DCH transmission** (e.g., UE releases “the common E-DCH resources”; see [1.d], [6.h]). Wager-Prov., 4:1-5, 4:6-20; 4:27-5:4; Hochwald, ¶¶265; Wager, ¶¶23-24, 27-31, 34. As discussed above for [1.d], **Wager** discloses a “UE triggered resource release” scheme where the UE releases the “common E-DCH resources” once the UE completes all E-DCH transmissions (e.g., by emptying its “E-DCH Buffer” and setting TEBS=0) and has received “an ACK for all HARQ processes.” See §IX.A.4; Hochwald, ¶¶265. For Ground 4, **Lee in view of Nokia and TS25.321 renders obvious a processor completing an E-DCH transmission** (see §IX.B.4 ([6.d]) e.g., UE releases “E-DCH resources” after the last E-DCH transmission; see [1.d], [6.h]). Lee, Abstract, 13:9-11, 13:18-23, 14:6-14, 15:9-13; Nokia, 1-2; TS25.321, 67, 68, Table 9.2.5.3.2.1; Hochwald, ¶¶266-267. As discussed above in [1.d], **Lee in view of Nokia and TS25.321 renders obvious a UE that releases its allocated “E-DCH resources” after completing E-DCH transmissions by emptying its E-DCH Buffer and setting TEBS=0.** See §IX.B.4 ([1.d]); Hochwald, ¶267.

Sarkkinen discloses completing a transmission (e.g., UE sends an “indicator” to indicate that “transmission should be terminated”; UE terminates

“transmission” by releasing resources) **when a radio link failure occurs** (*e.g.*, “the resource may need to be released because of an error condition” that “compromise[s] the transmission of data between the user equipment and the controller”). Sarkkinen, Fig. 4, ¶¶47-48; Hochwald, ¶268. **Sarkkinen** discloses “releas[ing]” a “resource...because of an error condition or other problem with the user equipment, the controller, the resource and the like.” Sarkkinen, ¶47; Hochwald, ¶268. **Sarkkinen** discloses that an “error condition[] may compromise the transmission of data between the user equipment and the controller.” *Id.*; Hochwald, ¶268. Thus, **Sarkkinen’s** “error condition” discloses a radio link failure, or at minimum renders it obvious because radio link failures are common types of errors that occur in a network. Hochwald, ¶268. **Sarkkinen** discloses that the UE completes at least two types of transmissions to begin resource release when the error condition occurs. Hochwald, ¶268. *First*, the UE completes the transmission of an “indicator” to “indicate” that data “transmission should be terminated” by including the indicator as a field in a packet sent to a network-side controller. Sarkkinen, ¶48; Hochwald, ¶268. *Second*, because the purpose of the indicator is to terminate transmission, **Sarkkinen** also discloses that the UE completes transmission by terminating an in-process transmission. Sarkkinen, ¶¶47-49. Hochwald, ¶268.

As discussed in §§IX.C.2-IX.C.3, a POSITA would have been motivated to modify Wager or Lee with these teachings, yielding a UE that releases resources when detecting a radio link failure, rendering obvious these Claims. Hochwald, ¶269.

D. Grounds 5-6: Grounds 1-2 in view of TS25.331 (Claims 5/7)

Independent from Grounds 3-4, Grounds 5-6 render obvious Claims 5/7 based on **TS25.331**'s radio link failure and cell reselection teachings. Hochwald, ¶270.

1. TS25.331

TS25.331 discloses additional teachings that address the known issue of releasing resources under certain conditions that cause disruption to resource usage, such as cell reselection (when a UE connects to a different cell) or radio link failure. **TS25.331**, Fig. 8.3.1-7, 97-98, 169-205, 230-231, 263-264; Hochwald, ¶271.

TS25.331 sets forth a UMTS protocol that teaches that the UE “release[s] all UTRAN specific resources” (or “clear the dedicated physical channel configuration” to release its resources) under certain conditions, including when “reselecting a cell” or “a radio link failure occurs.” **TS25.331**, Fig. 8.3.1-7, 97-98, 169-205, 230-231, 263-264; Hochwald, ¶272.

Like **Wager**, **Lee**, **Nokia**, and **TS25.321**, **TS25.331** is in the same field as the '809 and is reasonably pertinent to the '809's alleged problems, including

implementing an efficient release of radio resources. *See, e.g.*, TS25.331, Fig. 8.3.1-7, 97-98, 169-205, 230-231, 263-264; §§IX.A.3, IX.B.2–3, IX.C.2–3; Hochwald ¶273.

2. **Motivation to Modify Wager (and TS25.321) with TS25.331’s Teachings**

A POSITA would have been motivated to modify **Wager in view of TS25.321** according to **TS25.331’s** teachings to improve the overall efficiency and reliability of **Wager’s** release system, yielding a system where **Wager’s** UE operating in CELL_FACH initiates release of its assigned E-DCH resources when cell reselection or radio link failure occurs. Hochwald, ¶274.

First, modifying **Wager/TS25.321** with **TS25.331’s** “cell reselection” teachings advantageously ensures that resources are timely released when a UE moves to another cell and thus no longer needs them. *See* Wager-Prov., 1:3-6, 2:1-18; Wager, Abstract, ¶¶37, 44; Hochwald, ¶275.²¹

Second, modifying **Wager/TS25.321** with **TS25.331’s** “radio link failure” teachings advantageously improves the integrity and correctness of any transmitted data. *See* Hochwald, ¶276.²²

²¹ *See, e.g.*, Hakola-Prov., ¶2, 14, 17, 19, 21; Hakola, ¶¶2, 3, 31.

²² *See, e.g.*, Sarkkinen, ¶¶47, 54.

A POSITA would have had a reasonable expectation of success modifying **Wager in view of TS25.321** with **TS25.331's** teachings because the protocols set forth in **TS25.331** are designed to be applied to UMTS-based systems like **Wager's**. **TS25.331**, 2; **Wager-Prov.**, 1:8-23, 1:24-25; **Wager**, ¶¶3-5, 25-26, 48; §IX.A.2, **Hochwald**, ¶277. Additionally, **TS25.321** expressly references **TS25.331** (**TS25.321**, 8) and vice versa (**TS25.331**, 32)—providing explicit motivations to consider **TS25.331's** resource management teachings with **TS25.321's** teachings. **Hochwald**, ¶277.

3. **Motivation to Modify Lee (in view of Nokia/TS25.321) with TS25.331's Teachings**

For the reasons discussed in §IX.D.2, a POSITA would have also been motivated to modify **Lee (in view of Nokia/TS25.321)** with **TS25.331's** cell reselection and radio link failure teachings, yielding a system where **Lee's** UE initiates release of its E-DCH resources (as taught by **Nokia** and **TS25.321**, see [1.pre]-[1.b], [1.d]) if cell reselection or radio link failure occurs. **Hochwald**, ¶278. Modifying **Lee** with **TS25.321's** teachings addresses **Lee's** concern with improving the “efficiency of data communication in a mobile communication system” such that “wasted radio resources are minimized.” **Lee**, 7:16-17, 8:2-5, 8:13-17, 17:1-6; **Hochwald**, ¶278.

A POSITA would have had a reasonable expectation of success modifying **Lee** (in view of **Nokia/TS25.321**) with **TS25.331**'s teachings because **TS25.331**'s protocols are designed to be applied to UMTS-based systems like **Lee**'s (TS25.331, 2; Lee, 1:9-15), and **TS25.321**'s resource management teachings are expressly intended to be used with **TS25.321**'s resource release teachings for UEs. Hochwald, ¶279; *see* §IX.D.2.

4. Claims 5/7

As explained in §§IX.A–B, **Ground 1 (Wager in view of TS25.321)** and **Ground 2 (Lee in view of Nokia and TS25.321)** render obvious [1]/[6]. Hochwald, ¶280.

Regarding [5]/[7] (“[completing/the processor completes] an E-DCH transmission when a cell reselection or a radio link failure occurs”), for Ground 5, **Wager discloses/renders obvious a processor** (*see* [6.d]) **that completes an E-DCH transmission** (e.g., UE releases “the common E-DCH resources”; *see* [1.d], [6.h]). Wager-Prov., 4:1-5, 4:6-20; 4:27-5:4; Hochwald, ¶281; Wager, ¶¶23-24, 27-31, 34. *See* discussion of **Wager** in §IX.C.5 (Claims 5, 7 of Grounds 3-4).

For Ground 6, **Lee discloses/renders obvious a processor** (*see* [6.d]) **and Lee in view of Nokia and TS25.321 renders obvious that the processor completes an E-DCH transmission** (e.g., UE releases “E-DCH resources” after the

last E-DCH transmission; *see* [1.d], [6.h]). Lee, Abstract, 13:9-11, 13:18-23, 14:6-14, 15:9-13; Nokia, 1-2; TS25.321, 67, 68, Table 9.2.5.3.2.1; Hochwald, ¶282. *See* discussion of **Lee** in §IX.C.5 (Claims 5, 7 of Grounds 3-4).

TS25.331 discloses completing a transmission when a cell reselection occurs (*e.g.*, “[w]hen the UE has succeeded in reselecting a cell...the UE shall[...]...release all UTRAN specific resources”) **or a radio link failure occurs** (*e.g.*, “[w]hen a radio link failure occurs...the UE shall[...]...clear the dedicated physical channel configuration”). TS25.331, 97-98, 169-205, 230-231, 263-264; Hochwald, ¶283. **TS25.331** discloses that a “UE shall”: (1) “release all UTRAN specific resources,” and thus complete a transmission, when the UE “has succeeded in reselecting a cell” (*i.e.*, cell reselection occurs); and (2) “clear the dedicated physical channel configuration,” and thus complete a transmission, “[w]hen a radio link failure occurs.” *Id.*; Hochwald, ¶¶283-284.

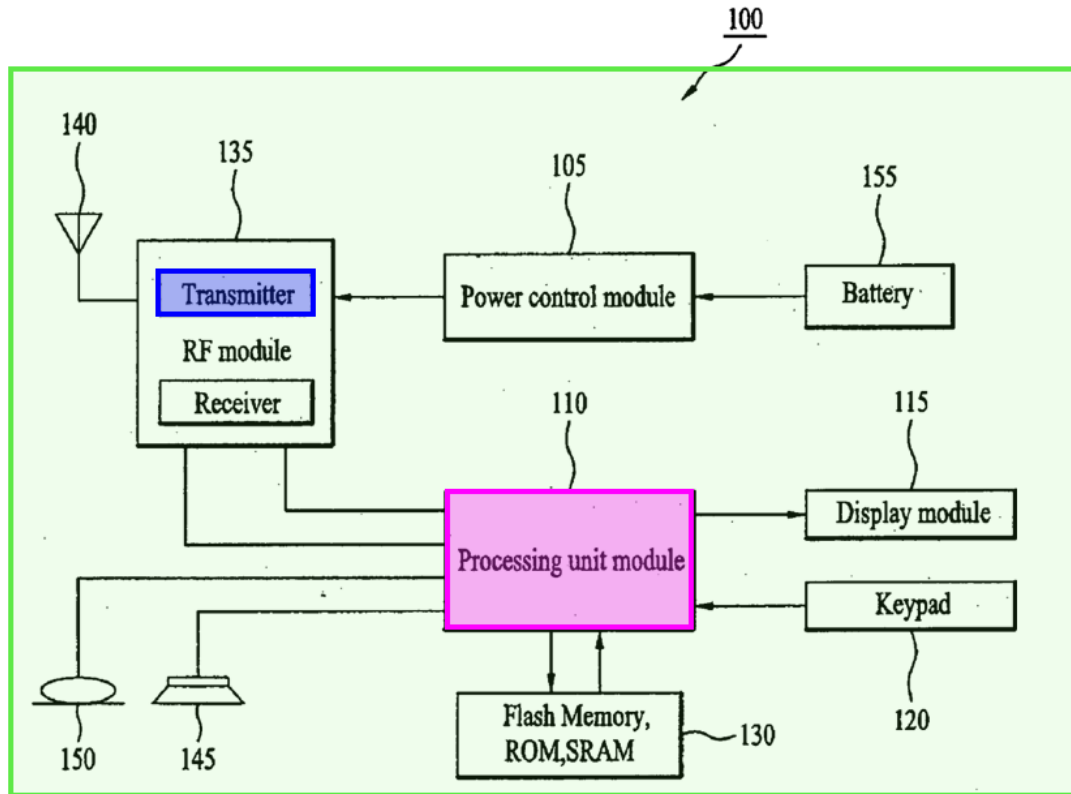
As discussed in §§IX.D.2–3, a POSITA would have been motivated to modify **Wager** (in view of **TS25.321**) or **Lee** (in view of **Nokia** and **TS25.321**) with these teachings from **TS25.331**, yielding systems where the UE completes an E-DCH transmission as part of releasing its E-DCH resources when cell selection or radio link failure occurs. Hochwald, ¶285.

E. Ground 7-12: Grounds 1-6 in view of Chun

As discussed above, Grounds 1-6 render obvious the Claims. To the extent further disclosure of the claim 6 “transmitter” or “processor” is required, **Chun** discloses these components. Chun, Fig. 8, ¶¶40, 51, 91-97; Hochwald, ¶286.

Chun discloses “a wireless communication apparatus 100” (e.g., “mobile terminal”) that “includes a processing unit module 110” (e.g., “microprocessor and a digital processor”) and a “RF module 135...[that] includes a transmitter.” Chun, Fig. 8 (annotated below), ¶¶2, 91-95; Hochwald, ¶287. The “processing unit module” is “adapted to process control information to be transmitted and generate a data block.” Chun, ¶¶94-96. The “transmitter” is controlled by the “processor unit module” and used to “transmit a radio signal” that is “measured or generated by the wireless communication apparatus to the network.” Chun, ¶¶94-95; Hochwald, ¶287.

FIG. 8



Thus, **Chun**’s “processing unit module” and “transmitter” disclose the “transmitter” and “processor,” respectively, of the Claims. Hochwald, ¶287. A POSITA would have been motivated to modify the references in **Grounds 1-6** with these teachings to facilitate the required processing and communication in the UEs. *See, e.g.*, Chun, Fig. 8, ¶¶15, 21, 30, 38 92, 94, 96-97; Hochwald, ¶287.

Like the **Grounds 1-6** references, **Chun** is in the same field as the ’809 and is reasonably pertinent to the ’809’s alleged problems, including implementing a wireless communications device. *See, e.g.*, Chun, ¶¶67, 88; Hochwald ¶288.

Wager and **Lee** teach that a UE performs processing and transmission functionality. See §§IX.A.4, IX.B.4 ([6.b], [6.d]); Hochwald, ¶289. Thus, a POSITA would have been motivated to look to references, including **Chun**, for well-understood hardware teachings for processing and transmitting information. Hochwald, ¶289. Modifying **Wager/Lee** with **Chun's** teachings yields devices that use processors to handle processing operations, and transmitters to communicate with a base station, rendering obvious Claims 6-10. Hochwald, ¶289.

A POSITA would have had a reasonable expectation of success modifying **Wager** (in view of **TS25.321/Sarkkinen/TS25.331**), and **Lee** (in view of **Nokia/TS25.321/Sarkkinen/TS25.331**) with **Chun's** transmitter/processor teachings because these components were well-understood components used for their well-understood intended purposes of transmitting and processing information.²³ Hochwald, ¶290. Indeed, **Chun** teaches that its “RF module” that includes a “transmitter” and “processing unit module” can be “readily applied to

²³ See, e.g., Terry-266 (Ex. 1018), Fig. 1, ¶¶6, 8, 16; Sung (Ex. 1019), ¶268; Terry-722 (Ex. 1020), Fig.1, ¶¶16-18; Hakola-Prov., Fig. 7, ¶¶55-61; Hakola, Figs. 9-10, ¶¶62-65, 67-70.

other types of apparatuses,” such as **Wager’s** or **Lee’s** devices. Chun, ¶99; Hochwald, ¶290.

Thus, **Grounds 1-6, in further view of Chun**, further render obvious claims 6-10. Hochwald, ¶291.

X. SECONDARY CONSIDERATIONS

There is no evidence in the ’809’s prosecution history or elsewhere supporting any secondary considerations arguments, or evidence of nexus to any challenged Claim. *See generally* ’809FH; Hochwald, ¶292. Indeed, as demonstrated by the prior art referenced herein, any purported solutions to problems or unexpected results in the ’809 were already well known. Hochwald, ¶292. To the extent PO asserts the existence of any secondary considerations in its responses, Petitioner reserves the right to address any such evidence.

XI. CONCLUSION

Substantial, new, and noncumulative technical teachings have been presented for Claims 1-10, which are obvious for the reasons set forth above. Hochwald, ¶¶293-296. There is a reasonable likelihood that Petitioner will prevail as to the Claims. *Inter partes* review of the Claims is accordingly requested.

Respectfully submitted,

Dated: August 11, 2023

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CERTIFICATE OF COMPLIANCE

Pursuant to §42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,313,809 contains, as measured by the word-processing system used to prepare this paper, 13,997 words. This word count does not include the items excluded by §42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: August 11, 2023

By: /Abed R. Balbaky/
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CERTIFICATE OF SERVICE

I hereby certify that on August 10, 2023, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,313,809 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

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