

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION

WILUS INSTITUTE OF STANDARDS AND  
TECHNOLOGY INC.,

Plaintiff,

v.

HP INC.

Defendant.

Civil Case No. 2:25-cv-00069-JRG

**JURY TRIAL DEMANDED**

WILUS INSTITUTE OF STANDARDS AND  
TECHNOLOGY INC.,

Plaintiff,

v.

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

Defendants.

Civil Case No. 2:25-cv-00070-JRG

**JURY TRIAL DEMANDED**

**DEFENDANTS' P.R. 3-3 AND 3-4 INVALIDITY CONTENTIONS  
AND SUBJECT MATTER ELIGIBILITY CONTENTIONS**

Pursuant to Docket Control Order (Dkt. No. 45) and Local Patent Rule 3-3, Defendants Samsung Electronics Co., Ltd. and, Samsung Electronics America, Inc., and HP, Inc. (collectively, "Defendants") hereby provide their Invalidity Contentions, which include the accompanying claim charts concerning U.S. Patent Nos. 10,911,186 ("186 patent"), 11,716,171 ("171 patent"), 11,664,926 ("926 patent"), and 12,004,262 ("262 patent") (collectively, "Asserted Patents") to Wilus Institute of Standards and Technology Inc. ("Plaintiff" or "Wilus"). Defendants also respectfully submit their subject matter eligibility contentions for the Asserted Claims of the

Asserted Patent in accordance with the July 25, 2019 Standing Order Regarding Subject Matter Eligibility Contentions Applicable to All Patent Infringement Cases Assigned to Chief District Judge Rodney Gilstrap (“Standing Order”).

The citation of prior art herein and the accompanying exhibits are not intended to reflect Defendants’ claim construction contentions, which will be disclosed in due course in accordance with the Docket Control Order and may instead reflect Plaintiff’s apparent (and potentially erroneous) claim constructions based on its Infringement Contentions.

## **I. Introduction**

As disclosed in its P.R. 3-1 Infringement Contentions served on Defendants, Plaintiff asserts the following patents and claims:

| <b>Patent</b>              | <b>Claims</b>      |
|----------------------------|--------------------|
| U.S. Patent No. 10,911,186 | <b>1-10, 11-18</b> |
| U.S. Patent No. 11,716,171 | <b>1-8, 9-16</b>   |
| U.S. Patent No. 11,664,926 | <b>1-7, 8-14</b>   |
| U.S. Patent No. 12,004,262 | <b>1-3, 4</b>      |

The claims identified above are referenced to as “the Asserted Claims” unless reference is made specifically with respect to particularly identified one or more of the Asserted Patents and/or one or more of the Asserted Claims.

As further detailed in and supported by these Invalidity Contentions, Defendants contend that each of the Asserted Claims is invalid under at least 35 U.S.C. §§ 101, 102, 103, and/or 112. Defendants reserve the right to prove the invalidity of the Asserted Claims on bases other than those required to be disclosed in these disclosures pursuant to P.R. 3-3.

## **II. Amendment/Supplementation**

Defendants’ Invalidity Contentions pertain to the Asserted Claims as identified in Plaintiff’s Infringement Contentions. To the extent the Court later allows Plaintiff to amend its

| <b>'262 Patent Term</b>                                                                                                                                                                                                                                                                                                                                        | <b>Relevant Claim(s)</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| communication terminal, wherein the trigger frame indicates a resource unit (RU) which is allocated to the wireless communication terminal,”                                                                                                                                                                                                                   |                          |
| “when a format of the PPDU including the trigger frame is a PPDU format in which at least one of physical layer signaling fields including a field for indicating a Basic Service Set (BSS) color is included, setting a value of a BSS color to be indicated by a trigger-based PPDU based on the BSS color indicated by the field,”                          | 4                        |
| “when the format of the PPDU including the trigger frame is a PPDU format in which any physical layer signaling field including the field for indicating the BSS color is not included, setting the value of the BSS color to be indicated by the trigger-based PPDU according to an active BSS color of the wireless communication terminal, and”             | 4                        |
| “transmitting the trigger-based PPDU based on the trigger frame,”                                                                                                                                                                                                                                                                                              | 4                        |
| “wherein the active BSS color is a BSS color actually used by the wireless communication terminal and set by an Operation element,”                                                                                                                                                                                                                            | 4                        |
| “wherein when the wireless communication terminal receives information on a BSS color change from the base wireless communication terminal and a BSS color change time point indicated by the information on the BSS color change is reached, the active BSS color is set to a value of a BSS color indicated by the information on the BSS color change, and” | 4                        |
| “wherein the BSS color is one of identifiers identifying a BSS.”                                                                                                                                                                                                                                                                                               | 4                        |

## **B. U.S. Patent No. 10,911,186**

Invalidity claim charts identifying disclosures in the references identified in Tables 1-A, 2-A, and 3-A as to the Asserted Claims of the '186 patent are provided in attached Exhibits A1-A19<sup>4</sup> and Appendix A.

**Table 1-A: Prior Art Patents and Printed Publications for the '186 patent**

| <b>No.</b> | <b>Patent No. or Title<br/>(Primary Inventor/Author)</b>                 | <b>Date of Issue/<br/>Publication</b> | <b>Filing<br/>Date</b> |
|------------|--------------------------------------------------------------------------|---------------------------------------|------------------------|
| RA-1       | IEEE 802.11-16/0949r2 “MAC trigger frame padding follow up” (“Zhou 949”) | July 27, 2016                         |                        |

<sup>4</sup> Defendants reserve the right to rely on patents or patent application publications that are in the same family as the charted references as well as other revisions of the charted IEEE documents.

| No.   | Patent No. or Title<br>(Primary Inventor/Author)                                                         | Date of Issue/<br>Publication | Filing<br>Date                                                                                     |
|-------|----------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------|
| RA-2  | U.S. Patent Application Publication No. 2015/0131517 (“Chu 517”)                                         | May 14, 2015                  | Nov. 11, 2014<br>(Priority<br>Appls. filed<br>March 2, 2014<br>& Nov. 11,<br>2013)                 |
| RA-3  | IEEE 802.11-16/0870r0 “Concluding MAC Trigger Padding” (“Asterjadhi 870”)                                | July 23, 2016                 |                                                                                                    |
| RA-4  | IEEE 802.11-17/1264r2 “MAC-CR- Misc Trigger frame format” (“Asterjadhi 1264”)                            | Sept. 5, 2017                 |                                                                                                    |
| RA-5  | IEEE 802.11-17/1275r4 “CIDs related to TF” (“Patil 1275”)                                                | Sept. 6, 2017                 |                                                                                                    |
| RA-6  | IEEE 802.11-19/0121r3 “Proposed Spec Text change on Trigger Frame MAC padding” (“Wu 121”)                | Jan. 16, 2019                 |                                                                                                    |
| RA-7  | IEEE 802.11-17/0250r2 “Proposed resolution for comments related to Various CIDs in 27.5.2” (“Patil 250”) | March 9, 2017                 |                                                                                                    |
| RA-8  | U.S. Patent Application Publication No. 2015/0230244 A1 (“Choi 244”)                                     | Aug. 13, 2015                 | Oct. 13, 2013                                                                                      |
| RA-9  | IEEE 802.11-17/1891r1 “Discussions on Trigger Frame MAC Padding” (“Zhang 1891”)                          | Nov. 9, 2018                  |                                                                                                    |
| RA-10 | U.S. Patent Application Publication No. 2014/0328313 (“Merlin 313”)                                      | Nov. 6, 2014                  | April 29, 2014<br>(Priority<br>Appls. Filed<br>May 3, 2013<br>& July 15,<br>2013)                  |
| RA-11 | WO2019017590A1 (“Chun 590”)                                                                              | Jan. 24, 2019                 | June 8, 2018<br>(Priority Appl.<br>Filed June 19,<br>2017)                                         |
| RA-12 | U.S. Patent Publication No. 2019/0357256 (“Kim 256”)                                                     | Nov. 21, 2019                 | July 8, 2018<br>(Priority<br>Appls. Filed<br>Jan. 12, 2017,<br>Jan. 12, 2017<br>& Jan. 8,<br>2017) |
| RA-13 | U.S. Patent Application Publication No. 2021/0250133 (“Chun 133”)                                        | Aug. 12, 2021                 | June, 2018<br>(Priority<br>Appls. Filed<br>April 2, 2018,                                          |

| No.   | Patent No. or Title<br>(Primary Inventor/Author)                                     | Date of Issue/<br>Publication | Filing<br>Date                                                               |
|-------|--------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------|
|       |                                                                                      |                               | April 25, 2018<br>& April 25,<br>2018)                                       |
| RA-14 | U.S. Patent Application Publication No.<br>2016/0366701 (“Chu 701”)                  | Dec. 15, 2016                 | June 9, 2016<br>(Priority Appl.<br>Filed June 9,<br>2015 & March<br>9, 2016) |
| RA-15 | IEEE 802.11-16/0368r0 “MAC padding<br>options for legacy trigger frame” (“Zhou 368”) | March 14, 2016                |                                                                              |
| RA-16 | IEEE P802.11ax D1.0 (“Draft D1.0”)                                                   | Dec. 1, 2016                  |                                                                              |
| RA-17 | IEEE 802.11-2012                                                                     | March 29, 2012                |                                                                              |
| RA-18 | IEEE 802.11-2016 <sup>5</sup>                                                        | Dec. 14, 2016                 |                                                                              |
| RA-19 | IEEE 802.11ac-2013 (“802.11ac”) <sup>6</sup>                                         | Dec. 18, 2013                 |                                                                              |

Moreover, Defendants incorporate by reference the petition for *inter partes* review of the ’186 patent (PTAB-IPR2025-01111) filed on June 9, 2025, including the accompanying exhibits and expert declaration, which contains Defendant’s additional invalidity contentions based on references RA-2, RA-8, and RA-12.<sup>7</sup>

Further, Defendants are actively searching for information regarding at least the following devices and inventions:

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<sup>5</sup> IEEE 802.11-2016 is an amendment to IEEE 802.11-2012 & 802.11-2013ac, as such IEEE 802.11-2016 incorporates IEEE 802.11-2012 & 802.11-2013ac. Therefore, any reference in the instant document to IEEE 802.11-2016 should be interpreted to include IEEE 802.11-2012& 802.11-2013ac.

<sup>6</sup> IEEE 802.11ac is an amendment to IEEE 802.11-2012, as such IEEE 802.11ac incorporates IEEE 802.11-2012. Therefore, any reference in the instant document to IEEE 802.11ac should be interpreted to include IEEE 802.11-2012.

<sup>7</sup> Defendants also incorporate by reference the invalidity contentions served by Askey Computer Corporation et al., in the 2:24-cv-00753 and 2:24-cv-00766 actions and by Samsung and HP in Civil Case No. 2:24-cv-00752-JRG, 2:24-cv-00746-JRG, 2:24-cv-00764-JRG, 2:24-cv-00765-JRG

**Table 2-A: Prior Art Systems and Inventions for the '186 patent<sup>8</sup>**

| <b>No.</b> | <b>Name of System or Invention</b>                          | <b>Date of Sale / Offer for Sale / Public Use</b> |
|------------|-------------------------------------------------------------|---------------------------------------------------|
| RA-20      | Systems implementing IEEE 802.11ac ("Wi-Fi 5") <sup>9</sup> | 2013                                              |
| RA-21      | HP Spectre 13 (2013 Model)                                  | October 2013                                      |
| RA-22      | HP Envy 17 (2014 Model)                                     | February 2014                                     |
| RA-23      | Samsung Galaxy S4 Smartphone                                | April 2013                                        |
| RA-24      | Samsung Galaxy Note 3 Smartphone                            | October 2013                                      |
| RA-25      | Samsung Galaxy Tab Pro                                      | February 2014                                     |
| RA-26      | Samsung Galaxy Tab S                                        | July 2014                                         |
| RA-27      | Samsung ATIV Book 9 (2014 Edition)                          | May 2014                                          |
| RA-28      | Samsung ATIV Book 9 (2015 Edition)                          | December 2015                                     |
| RA-29      | Samsung Galaxy S7 Smartphone                                | March 2016                                        |
| RA-30      | Samsung Galaxy S8 Smartphone                                | April 2017                                        |
| RA-31      | Samsung Galaxy S9 Smartphone                                | March 2018                                        |
| RA-33      | Samsung Galaxy Note9                                        | August 2018                                       |
| RA-33      | Samsung Galaxy A9                                           | October 2018                                      |
| RA-34      | Samsung Galaxy Note8                                        | September 2017                                    |
| RA-35      | Samsung Galaxy Note7                                        | August 2016                                       |
| RA-36      | Samsung Galaxy A7                                           | September 2018                                    |
| RA-37      | Samsung Galaxy S10, S10e, S10+, and S10 5G                  | February 2019                                     |
| RA-38      | Samsung Galaxy A6                                           | May 2018                                          |
| RA-39      | Samsung Galaxy A8                                           | January 2018                                      |
| RA-40      | Samsung Galaxy J7, J7 Refine, J7 V, J7 Aura, J7 Crown       | June 2017                                         |

<sup>8</sup> All of the systems listed in this table are Wi-Fi 5 (802.11ac) enabled and capable, and thus invalidate the asserted claims of the '186 patent, alone or in combination with other art. Furthermore, one or more of those systems may be Wi-Fi 6 enabled and capable. Wilus's May 14, 2025 Infringement Contentions are based entirely on the Wi-Fi 6 standard. Thus, while Defendants disagree that Wilus's Infringement Contentions demonstrate infringement, to the extent the Court finds otherwise, the Wi-Fi 6 enabled and capable system(s) listed above also invalidate the asserted claims of the '186 patent.

<sup>9</sup> The attached invalidity chart over IEEE 802.11ac (RA-19) demonstrates how the systems implementing IEEE 802.11ac, listed in Table 2-A, disclose each element of each asserted claim.

For each of the prior art devices identified above, Defendants have listed and produced one or more documents as evidence of the relevant features and functionality. Defendants have obtained or are in the process of obtaining the identified devices and will make them available for inspection. To the extent that one or more documents (*e.g.*, user manual) may be used to describe aspects of a particular device, that device is a single reference for prior art purposes under 35 U.S.C. § 102. Some or all of the corroborating references may also separately qualify as prior art publications under 35 U.S.C. § 102 and may be used as invalidating references under 35 U.S.C. §§ 102 and/or 103.

Discovery is ongoing, and Defendants may serve third parties with document subpoenas. One or more of these devices, along with related documentation, may be invalidating, and Defendants reserve the right to supplement these contentions accordingly.

In addition, Defendants identify, responsive to Plaintiff's infringement contentions, the following patents, publications, and systems as evidence of the state of the art as it relates to padding in trigger frames:<sup>10</sup>

- WO2014110764A1
- US9854606B2
- US9806868B2
- US8400962B2
- US20150382283A
- US20150071272A1
- US20150063191A1
- US20150009985A1
- US20130272319A
- US20120207117A1
- US20110149882A1
- S. Zheng and Z. Lei, "TIM encoding for IEEE 802.11ah based WLAN," 2014 IEEE International Conference on Communication Systems, Macau, China, 2014, pp. 559-563, doi: 10.1109/ICCS.2014.7024865.

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<sup>10</sup> Defendants reserve their right to rely on any unlisted patents, patent application publications, provisional applications that are related to the listed reference.

- IEEE 802.11-15/0091r1
- IEEE 802.11-12/0328r0
- IEEE 802.11-11/0931r1
- U.S. Patent No. 8,400,962 (“Harada 962”)

Each of these references (and other references in the same family) show that padding in trigger frames is not novel, and was well-known in the art for many years. In light of the references discussed herein, the Asserted Claims of the ’186 patent cannot be valid.

Defendants’ reference to a particular product, device, or software program in these contentions should be interpreted as a reference to the system itself and any corresponding patents, publications, or product literature relating to the cited system. Upon information and belief, the systems were publicly disclosed, used, sold, or offered for sale in the United States before the alleged priority date of the Asserted Claims of the ’186 patent. Defendants’ investigation of such prior art systems is still ongoing and discovery has not yet been received from third parties who may have information concerning such prior art systems. Accordingly, subsequent discovery may reveal information that affects the disclosures and contentions herein. For example, subsequent discovery may provide additional information regarding whether or not any of the third party prior art systems anticipate or render obvious the Asserted Claims of the ’186 patent. As such, Defendants reserve all rights to supplement their invalidity contentions.

Many of the inventive, research, design, and development activities concerning these systems and technologies occurred in the United States before the alleged priority date of the Asserted Claims of the ’186 patent. Defendants have obtained, and are in the process of obtaining, additional information regarding the dates by which the cited products and services were publicly disclosed, used, sold, or offered for sale, the circumstances under which the

research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities through publicly available patents, publications, and product literature. The actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit, which Defendants reserve the right to rely upon to corroborate the prior art status of the prior art identified herein. Defendants reserve the right to modify, amend, or supplement these contentions if additional information becomes available during the course of this lawsuit. Furthermore, Defendants will make all such devices, software programs, or other products in Defendants’ possession, custody, or control available for inspection by Plaintiff.

Consequently, Defendants reserve the right to amend, modify, or supplement these Invalidity Contentions should additional information become available to them through discovery.

**C. U.S. Patent No. 11,716,171**

Invalidity claim charts identifying disclosures in the references identified in Tables 1-B, 2-B, and 3-B as to the Asserted Claims of the ’171 patent are provided in attached Exhibits B-1-B-21<sup>11</sup> and Appendix B.

**Table 1-B: Prior Art Patents and Printed Publications for the ’171 patent**

| <b>No.</b> | <b>Patent No. or Title<br/>(Primary Inventor/Author)</b>                 | <b>Date of Issue/<br/>Publication</b> | <b>Filing<br/>Date</b>                                       |
|------------|--------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------|
| RB-1       | IEEE 802.11-16/0949r2 “MAC trigger frame padding follow up” (“Zhou 949”) | July 27, 2016                         |                                                              |
| RB-2       | U.S. Patent Application Publication No. 2015/0131517 (“Chu 517”)         | May 14, 2015                          | Nov. 11, 2014<br>(Priority<br>Appls. filed<br>March 2, 2014) |

<sup>11</sup> Defendants reserve their right to rely on patents or patent application publications that are in the same family as the charted references as well as other revisions of the charted IEEE documents.

upon to corroborate the prior art status of the prior art identified herein. Defendants reserve the right to modify, amend, or supplement these contentions if additional information becomes available during the course of this lawsuit. Furthermore, Defendants will make all such devices, software programs, or other products in Defendants' possession, custody, or control available for inspection by Plaintiff.

Consequently, Defendants reserve the right to amend, modify, or supplement these Invalidity Contentions should additional information become available to them through discovery.

#### **IV. P.R. 3-3(b) – Invalidity Grounds**

Pursuant to P.R. 3-3(b), Defendants contend that certain prior art references below anticipate one or more Asserted Claims and that to the extent the identified prior art references do not anticipate the Asserted Claims, those claims are invalid as obvious under 35 U.S.C. §103. Each anticipatory prior art reference, either alone or in combination with other prior art, also renders the Asserted Claims invalid as obvious. In particular, each anticipatory prior art reference may be combined with (1) information generally known to persons skilled in the art at the time of the alleged invention, and/or (2) any of the other anticipatory prior art references. To the extent that Plaintiff contends that any of the anticipatory prior art fails to disclose one or more limitations of the Asserted Claims, Defendants contend that any difference between the reference and the corresponding patent claims would have been obvious to one of ordinary skill in the art. Thus, all anticipation charts should be interpreted as both reflecting anticipation by the reference as well as invalidity due to single reference obviousness, to the extent that Plaintiff contends that any limitation is missing.

##### **A. Anticipation**

As stated above, Defendants incorporate by reference all other invalidity contentions related to the Asserted Patents served on or otherwise provided to Plaintiff, whether past or future. In accordance with P.R. 3-3(a), prior art references anticipating the Asserted Claims are provided below. The prior art listed below anticipates the Asserted Claims under the proper construction of the claims and/or under Plaintiff's apparent interpretation of the claims as set forth by Plaintiff in its Complaint and Infringement Contentions.

**1. U.S. Patent No. 10,911,186**

The Asserted Claims of the '186 patent are anticipated and/or rendered obvious by prior art. Pursuant to P.R. 3-3(a), Defendants identify the prior art references that anticipate or render obvious the '186 patent Asserted Claims in the claim charts of Exhibits A1 through A19 which are hereby incorporated by reference as if fully set forth herein. The claim charts and Appendix A provide an explanation showing how these prior art references teach or suggest each and every element of the '186 patent Asserted Claims. For each reference or combination of references suggested by each chart, Defendants indicate whether the prior art renders the claim anticipated and/or obvious pursuant to P.R. 3-3(b).

In addition to contending that the '186 patent Asserted Claims are invalid in view of the prior art references cited in the claim charts and Appendix A, Defendants further contend that the '186 patent Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102 and/or 103 in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, Defendants continue to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

Defendants' reference to a particular communications device, modem, circuit, software program, device or product in the claim charts and Appendix A should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix A that relates to the cited memory module, circuit, software program, device, or product. In addition, Defendants may rely on other documents or things that have not yet been located to support its contentions regarding such prior art communications device(s), modem(s), circuit(s), software program(s), device(s) or product(s) that are referenced in the charts. Furthermore, Defendants' reference to a wireless communications standard, such as for example IEEE 802.11ac, in the claim charts and Appendix A should be interpreted as a reference to the products implementing and/or complying with such standard.

Defendants incorporate by reference, as if set forth fully herein, all prior art cited during the prosecution of the '186 patent, all prior art as described in any *inter partes* review proceedings of the '186 patent, and all prior art disclosed during previous litigation proceedings involving the '186 patent.

Defendants further identify and hereby incorporate by reference as if set forth fully herein the prior art references and invalidity contentions as described in any Other Wilus Proceedings wherein invalidity contentions have been, or will be, provided regarding the '186 patent, its foreign counterparts, or any parent or child patent of the '186 patent. Defendants reserve the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where Defendants identify a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. Defendants therefore reserve the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

Defendants also reserve the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix A.

same time period providing further motivation for combination. These disclosures were provided without prejudice to any arguments or objections concerning the relevance of motivation to combine in connection with any invalidity contentions.

Defendants reserve the right to further specify the motivations to combine the prior art in response to positions that Plaintiff may take later in this case and as discovery, including third party discovery, proceeds. Defendants may rely on any and all portions of the prior art, other documents, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the claims invalid as obvious. Moreover, Defendants reserve the right to rely on later identified sources of information, including but not limited to witness testimony and other discovery, to establish the state of the art in the relevant time frame pertaining to the Asserted Patents.

While Defendants reserve the right to rely on any combination of the references reflected in their charts or incorporated herein by reference, Defendants provide the following exemplary and non-exhaustive references and/or combinations evidencing invalidity of the claims of the Asserted Patents. The combinations of prior art listed below render obvious the Asserted Claims under the proper construction of the claims and/or under Plaintiff's apparent interpretation of the claims as set forth by Plaintiff in its Complaint and Infringement Contentions.

**1. U.S. Patent No. 10,911,186**

A Pursuant to P.R. 3-3(a) and (b), Defendants identify in Appendix A the prior art references that render obvious the Asserted Claims of the '186 patent and include below exemplary combinations showing the obviousness of the '186 patent Asserted Claims in view of the prior art. To the extent Plaintiff contends that an element is not disclosed in any one of the anticipatory references described in Appendix A, the limitation would have been obvious in light of the

disclosures within the reference and the knowledge of one of skill in the art at the time of the '186 patent. Moreover, to the extent Plaintiff contends that an element is not disclosed in any one of the anticipatory references described in Appendix A, such reference may be combined with any other references listed in Appendix A for such element, thereby rendering the claims invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the '186 patent Asserted Claims is not disclosed by one of the references identified above pursuant to P.R. 3-3(a), the claim is nevertheless unpatentable as obvious because they contain nothing that constitutes a patentable innovation. To the extent a finder of fact determines that a limitation of the '186 patent Asserted Claims is not anticipated, it does not go beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

**(a) Obviousness Rationale**

For at least the reasons described in these contentions, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those prior art references identified in Appendix A along with the knowledge of one of ordinary skill in the art to meet the limitations of the '186 patent Asserted Claims. Moreover, as mentioned above, Defendants have not yet completed their search or discovery concerning additional prior art. As such, Defendants' inclusion of exemplary combinations does not preclude them from identifying other invalidating combinations as appropriate, and Defendants reserve the right to identify additional specific combinations as well as to detail and explain such combinations.

To the extent not anticipated, the '186 patent Asserted Claims represent no more than the result of ordinary variations of the prior art. Defendants further believe that no showing of a

specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts, as each combination of art would have no unexpected results, and at most would simply represent a known alternative to one of skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 415-16 (2007) (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, instead espousing an "expansive and flexible" approach). Indeed, the Supreme Court held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420-21. Nevertheless, in addition to the information contained elsewhere in these contentions, Defendants identify motivation and reason to combine the cited art.

One or more combinations of the prior art references identified in Appendix A would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. Further, the combinations of the prior art references identified in Appendix A would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified above includes the interrelated teachings of multiple prior art references;

common authorship; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the '186 patent Asserted Claims; the existence of a known need or problem in the field of the endeavor at the time of the alleged invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art.

Thus, the motivation to combine the teachings of the prior art references disclosed in Appendix A is found in the references themselves and also in: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the predictable results obtained in combining the different elements of the prior art; (5) the predictable results obtained in simple substitution of one known element for another; (6) the use of a known technique to improve similar devices, methods, or products in the same way; (7) the predictable results obtained in applying a known technique to a known device, method, or product ready for improvement; (8) the finite number of identified predictable solutions that had a reasonable expectation of success; and (9) known work in various technological fields that could be applied to the same or different technological fields based on design incentives or other market forces.

Additionally, it would be obvious to one of skill in the art to consult and/or combine any of the prior art listed in Appendix A because all of these references relate to the same area of technology and/or are from analogous art. The references, like the claims of the '186 patent Asserted Claims, are directed to the field of wireless communications, and more specifically to the use of padding in trigger frames. '186 patent at 20:16-19. The references, like the '186 patent, are also reasonably pertinent to wireless communications issues in the MAC layer or issues related stations' different processing speed, requiring mechanisms such as padding to ensure each station

has sufficient time to process the incoming frames. The '186 patent Asserted Claims merely united old elements, well known in the field, with no change in their respective function or result. Given the interrelated teachings of the prior art, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art, it would have been obvious for one of ordinary skill in the art to combine these familiar elements, disclosed and/or embodied in the prior art listed above to practice the '186 patent Asserted Claims.

Similarly, it would be obvious to one of skill in the art to consult and/or combine any of the prior art listed in Appendix A because all of these references are works by people in the same technical field. For example, many of the authors of the prior art references are members of the same IEEE 802.11ax High Efficiency (HE) working group. *See e.g.*, IEEE 802.11-16/0024r1 ("Stacey 0024") (identifying authors of prior art references (Table 3-A) as authors of draft specification). Moreover, one of ordinary skill in the art would have recognized that members of an IEEE working group frequently collaborate with, and build on, each other's work. In fact, some of the prior art references are comments regarding other members' submissions or proposed additions to the IEEE standard. Thus, one of ordinary skill in the art would have recognized that the works of the same IEEE working group are likely compatible or otherwise work harmoniously when combined.

All of the '186 patent Asserted Claims are directed to the use of padding in trigger frames to address the problem of the receiving terminal needing additional time to process the trigger frame. Implementing such technology, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, was a common problem with a well-known solution before the alleged priority date of the '186 patent, as evidenced by the references

in Appendix A. *See, e.g.*, Appendix A at [2].

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix A because at the time of the alleged invention using the use of padding in a frame to give sufficient time for a receiving terminal to process the frame was a well-known technique in wireless communications. *See, e.g.*, Appendix A at [1f], [1g], [2].

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that a wireless communication terminal can receive, through the transceiver, a trigger frame indicating uplink transmission of one or more terminals, and/or perform, through the transceiver, an uplink transmission in response to the trigger frame. *See, e.g.*, Appendix A at [1a], [1c], [1e].

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that a trigger frame can include an association identifier (AID) field. *See, e.g.*, Appendix A at [1d]. A POSITA would have been motivated to add this feature or combine with another prior art disclosing this feature (and have a reasonable expectation of success in doing so) so as to enable the wireless system to be able to identify/target the STA that needs to be triggered by the trigger frame.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that the AID field can be used to identify whether the trigger frame includes a padding field to which padding is applied, and/or that the padding field can be included when the AID field is set to a specific (e.g., reserved) value. *See, e.g.*, Appendix A at [1f], [1g]. A POSITA would

have been motivated to add this feature or combine with another prior art disclosing this feature (and have a reasonable expectation of success in doing so) so that the recipient processing the frame can expect the upcoming padding as it is processing the trigger frame.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that trigger frames can include a frame check sequence (FCS) field at the end of the frame. *See, e.g.*, Appendix A at [3]. A POSITA would have been motivated to add this feature or combine with another prior art disclosing this feature (and have a reasonable expectation of success in doing so) to be able to detect any errors within the padding field.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that when the AID field is set to a specific value, the AID field can indicate the start the padding. *See, e.g.*, Appendix A at [1f], [1g], [4]. A POSITA would have been motivated to add this feature or combine with another prior art disclosing this feature (and have a reasonable expectation of success in doing so) so that the recipient processing the frame can expect the upcoming padding as it is processing the frame.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that advantageously the specific value of AID field to indicate the presence/start of padding field should be either the lowest or the largest value possible for the AID field's size, and that the lowest and the largest value consists of all 0s or all 1s. *See, e.g.*, Appendix A at [5]. It would have been obvious to one of skilled in the art at the time that that duplicating 0 or 1 to fill the field (e.g., AID field or padding field) has the predictable result of producing the minimum

value (0s) or maximum value (1s) for the given field. It would have been obvious to one of skill in the art at the time that it would have been advantageous to use either the lowest number or the highest value possible for the AID field's size because doing so has the predictable result of maximizing the field's contiguous range available for non-reserved values (e.g., AIDs). A POSITA would have been motivated to add this feature or combine with another prior art disclosing this feature (and have a reasonable expectation of success in doing so) so that AID field's contiguous range can be maximized so that the field has the capability to identify the maximum number of AIDs and also be able to indicate the presence/start padding.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, that all 1s or all 0s are used for padding or for the specific value of the AID field to indicate start/presence of a padding. *See, e.g.*, Appendix A at [4], [5], [6], [7], [10] It would have been obvious to one of skilled in the art at the time that that duplicating 0 or 1 to fill the field (e.g., AID field or padding field) has the predictable result of producing the minimum value (0s) or maximum value (1s) for the given field. It would have been obvious to one of skill in the art at the time that it would have been advantageous to use either the lowest number or the highest value possible for the AID field's size because doing so has the predictable result of maximizing the field's contiguous range (e.g., maximize the contiguous range of AID values). It would have been obvious it would have been advantageous to use all 1s or 0s for padding so as to simplify the generation/detection of the padding. Moreover, it would have been obvious to a POSITA that the content of the padding is immaterial to the operation of the system.

It was well-known to one of skill in the art before the time of the '186 patent, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement

contentions, that all 1s and 0s can be generated by duplicate a 1 or 0. *See, e.g.*, Appendix A at [4], [5], [6], [7], [10].

In addition, the prior art also provided sets of finite, identified, predictable solutions for known problems that would have been obvious to those of ordinary skill to try with a reasonable expectation of success. For example, it would have been obvious to one of skill in the art at the time that the start (or presence) of a padding can be indicated using a specific value in the frame field immediately preceding the padding with the predictable result that the recipient processing the frame can expect the upcoming padding as it is processing the frame. *See, e.g.*, Appendix A at [1f], [1g].

It would have been obvious to one of skill in the art at the time that it would have been advantageous to use either the lowest number or the highest value possible for the AID field's size because doing so has the predictable result of maximizing the field's contiguous range (e.g., maximize the contiguous range of AID values). *See, e.g.*, Appendix A at [4]-[7], [10]. It would have been obvious to one of skill in the art at the time that in binary, the lowest or the highest value would consist of 0s (for the lowest value) or 1s (for the maximum value). It would have been obvious to one of skilled in the art at the time that that duplicating 0 or 1 to fill the field (e.g., AID field or padding field) has the predictable result of producing the minimum value (0s) or maximum value (1s) for the given field. *See, e.g.*, Appendix A at [4]-[7], [10].

A finite number of solutions existed as to the placement of frame check sequence (FCS) in a frame with respect to padding. Thus, it would have been obvious to include the FCS either before or after the padding. It would have been obvious to one of ordinary skill at the time that including the FCS at the end of the frame (i.e., after the padding) has the added benefit of being able to detect any errors within the padding field. *See, e.g.*, Appendix A at [3]. Further, it would have been

obvious to one of skilled in the art at the time that, because the padding field is indicated in the AID field (typically included before the FCS field), including the FCS field after the padding/AID field has the added benefit of being able to detect any errors within the padding/AID field. Further, it would have been obvious to one of skilled in the art at the time that, because the padding field is indicated in the AID field, including the FCS field after the padding/AID field has the added benefit of detect an error in the padding/AID field and prevent the recipient of the frame to mistakenly treat a non-padding field as a padding field and vice versa.

It would have been obvious to one of skilled in the art to use all 0s, all 1s, or another predetermined value as padding so that the receiving system can identify the end of the padding and/or identify the field that comes after the padding (e.g., FCS). Given this finite choice, it would have been obvious to one of skilled in the art to use either the repeated 0s or 1s for simplicity. *See, e.g.,* Appendix A at [4]-[7], [10]. It would have been obvious to one of skilled in the art at the time that that repeated 0s or 1s can be generated by duplicating a 0 or a 1 until the padding is filled.

It would have been obvious to one of ordinary skill at the time to apply the padding when the trigger frame is generated or before the trigger frame is transmitted as the padding is one of the fields within the trigger frame. It would have been obvious to one of ordinary skill at the time to apply the padding at a designated time, such as when the trigger frame is generated or before the trigger frame is transmitted. It would have been obvious to one of ordinary skill at the time to apply the padding at a designated time because changing the time (relative to the generation of the rest of the trigger frame) at which padding is applied would be unnecessarily complex.

It would have been obvious to one of ordinary skill at the time to apply the padding when the uplink transmission is generated or before the outgoing frame is transmitted as the padding is one of the fields within the outgoing frame. It would have been obvious to one of ordinary skill at

the time to apply the padding at a designated time, such as when the outgoing frame is generated or before the trigger frame is transmitted. It would have been obvious to one of ordinary skill at the time to apply the padding at a designated time because changing the time (relative to the generation of the rest of the trigger frame) at which padding is applied would be unnecessarily complex.

In particular, it would have been obvious to one of ordinary skill at the time to generate an uplink packet to perform the uplink transmission, and perform the uplink transmission in response to the trigger frame by using the generated uplink packet, wherein a padding is applied to the uplink packet to terminate the uplink transmission at a designated time. For example, RA-12(Kim 256) discloses that each STA receiving the trigger frame generates and transmits an uplink packet in response. Specifically, RA-12(Kim 256) explains that “the STAs may transmit a UL data frame using a HE trigger based PPDU format after SIFS from a PPDU including the trigger frame.” RA-12(Kim 256), [0133]. The uplink packet—the HE trigger-based PPDU—is thus generated by the STA in direct response to receiving the trigger frame. Moreover, RA-12(Kim 256)’s trigger frame includes information that enables the terminal to determine transmission timing and configuration, such as resource allocation and a designated transmission duration. RA-12(Kim 256), [0136]-[0138]. This shows that the uplink packet is not pre-formed or arbitrary, but is instead generated by the STA to conform to the instructions in the trigger frame.

RA-12(Kim 256) also teaches that the STAs transmit uplink data using a High Efficiency (HE) trigger-based PPDU format after a SIFS from receiving a trigger frame. RA-12(Kim 256), [0133]. These uplink transmissions occur in response to a common trigger frame received by multiple STAs. In particular, RA-12(Kim 256) discloses that this trigger frame includes a Length subfield, which “indicates the L-SIG length of a HE trigger-based PPDU (e.g., UL MU PPDU).”

*Id.*, [0137]. That is, the trigger frame defines a target duration for the uplink transmissions.

RA-12(Kim 256) further explains that the “data field [of the PPDU] may also include padding bits as necessary,” and that such padding “may be used to adjust the length of the data field to a predetermined unit.” RA-12(Kim 256), [0108]. In the context of RA-12(Kim 256)’s disclosure, the “predetermined unit” corresponds to the common length specified in the trigger frame’s Length subfield. *Id.*, [0137]. Because each STA aligns its transmission with this designated length, the inclusion of padding becomes necessary whenever the actual data payload is insufficient to fill the full duration. Thus, a POSITA would have understood that padding is applied to the uplink packet, the HE trigger-based PPDU generated in response to the trigger frame, for the purpose of terminating the STA’s transmission at the designated time indicated in the Length field. A POSITA would have been motivated to do so because the padding ensures that all uplink transmissions initiated by the same trigger frame end concurrently, where multiple STAs transmit within a coordinated uplink window. *Id.*, FIG. 16. In another example, RA-2 (Chu 517) describes behavior from which a POSITA would understand that the terminal generates such a packet. In particular, RA-2 (Chu 517) explains that after receiving an uplink scheduling frame from the AP, “the plurality of client stations 25 transmit respective OFDM data unit 906 that collectively form an OFDMA data unit 904.” RA-2 (Chu 517), [0093], [0097], [0099], FIGS. 9A, 9B, 10A, 10B. RA-2 (Chu 517) further teaches that this uplink transmission begins after a predefined interval—e.g., SIFS or a longer delay—following receipt of the scheduling frame. *Id.*, [0093]. This inter-frame delay is described as providing time for the client stations to “decode the scheduling frame 902 and to prepare for uplink transmission.” *Id.* In particular, RA-2 (Chu 517) describes that the scheduling frame includes information such as the “length or duration ... to be used for transmission of an uplink data unit during the TXOP.” RA-2 (Chu 517), [0090]. This

transmission-specific information is directed to each client station and governs the content and structure of each transmitted OFDM data unit 906. *Id.*, [0092], [0094].

In view of this, a POSITA would understand that each terminal constructs a data unit—i.e., generate an uplink packet—based on the allocation parameters conveyed in the scheduling frame. Because the data unit 906 complies with the assigned sub-channel and the duration specified by the AP, it cannot be pre-generated or arbitrary. Rather, the packet is dynamically assembled in response to the received instructions, with timing and structure dictated by the scheduling frame. Thus, Chu discloses that the uplink data unit transmitted by each STA is prepared in real time, based on scheduling directives received just prior. A POSITA would recognize this preparation step as encompassing the generation of an uplink packet for transmission. The act of preparing and transmitting a data unit in direct response to the trigger frame, with its specified timing and allocation, requires packet generation. Moreover, RA-2 (Chu 517) teaches that padding is used in uplink data units to equalize the lengths of transmissions from multiple client stations. Specifically, RA-2 (Chu 517) explains that “padding is used in one or more of the OFDM data units 302 to equalize lengths of the OFDM data units 302. Accordingly, the length of each of the OFDM data units 302 correspond to the length of the OFDMA data unit 302, in this embodiment.” RA-2 (Chu 517), [0057]. A POSITA would recognize that these are structurally and functionally equivalent to the OFDM data units 906 shown in FIG. 9A. Both represent uplink data units transmitted by client stations under the coordination of the AP and are part of a multi-user OFDMA data unit. RA-2 (Chu 517), [0054]-[0056], [0093]-[0094], FIGS. 3, 9A. Given this parallel structure and function, a POSITA would understand that RA-2 (Chu 517)’s padding technique for data units 302 would also apply to data units 906. Further, RA-2 (Chu 517) describes that the AP transmits an uplink scheduling frame 902 to client stations, which includes allocation details such

as sub-channel assignments and “a length or duration (e.g., using the UL PPDU length field 762 of FIG. 7B) to be used for transmission of an uplink data unit during the TXOP.” RA-2 (Chu 517), [0090]. This scheduling information informs each station of a designated time window for its uplink transmission. RA-2 (Chu 517) then confirms that “each client station 25 transmits its OFDM data unit 906 ... [and] the length or duration of each of the OFDM data units 906 corresponds to the length or duration indicated in the scheduling frame.” RA-2 (Chu 517), [0094]. This means that regardless of payload size, each station adjusts its transmission—either by trimming or padding—to meet the scheduled transmission length. Accordingly, a POSITA would understand that if a station’s data does not occupy the entire duration specified in the scheduling frame, it applies padding to its uplink data unit (906) to ensure that the transmission terminates precisely at the designated time. RA-2 (Chu 517)’s earlier discussion of equalizing data unit lengths through padding reinforces that this adjustment mechanism is expected and necessary for coordinating multi-user transmissions. RA-2 (Chu 517), [0057]. Thus, a POSITA would have recognized that the padding serves not only to structurally align data units but also to enforce timing uniformity across uplink transmissions, ensuring that all client stations terminate their transmissions in accordance with the AP’s scheduling instructions.

The prior art references provide motivations to combine because they describe the field of the ’186 patent, teach improvements, explain desired features, and even expressly state that one of skill in the art would be able to apply their teachings to related systems or methods. *See, e.g.*, RA-5 (Patil 1275) at 2 (suggesting, approving, and/or rejecting changes to RA-16 (Draft D1.0)); RA-7 (Patil 250) at 2 (suggesting, approving, and/or rejecting changes to RA-16 (Draft D1.0)). Further, the prior art references provide motivations to combine because they explicitly suggest utilizing the teachings and disclosures of other references. For example, the prior art references

provide the motivation for including a padding. *See, e.g.*, Appendix A at [4]. In another example, a POSITA, for example having the benefit of certain disclosure in the prior art references, would have understood the advantages and benefits (e.g., enhanced throughput) of implementing multiuser/OFDMA transmissions (e.g., using trigger frames to trigger them). *See, e.g.*, Appendix A at [1c]-[1e].

In accordance with these advances, the prior art could have been combined according to methods known to those of ordinary skill within the field of the '186 patent to yield predictable results. The addition of a trigger frame that triggers an uplink transmission (e.g., multi-user/OFDMA uplink data) or addition of (multiuser/OFDMA communication in general) would have had the predictable result of improving communications performance and/or efficiency in conventional Wi-Fi systems. *See, e.g.*, Appendix A at [1c],[1e]. It would have been obvious to a skilled artisan that a Wi-Fi system supports a wide range of stations/client devices, and that certain devices may require additional time to process incoming frames. The addition of a padding field in a trigger frame would have had the predictable result of giving these devices more (or sufficient) time to process the incoming trigger frame. *See, e.g.*, Appendix A at [2]. The addition of a padding field in an outgoing frame (e.g., in BlockACK) would have had the predictable result of giving these devices more (or sufficient) time to process the incoming trigger frame. *Id.* Many of the prior art references (e.g., RA-12(Kim 256)) indicate that the trigger frame may include one or more Per User Information fields and a Padding field, and that both the Trigger-Dependent Per User Info subfield and the Padding field are of variable length. *See*, RA-12(Kim 256), [0136]-[0139], FIG. 17. This structural flexibility allows for the padding field to contain one or more 12-bit segments filled with 1s—corresponding to the AID 12 field value of 4095. Accordingly, a POSITA would have understood that the padding is applied by duplicating the entire 12-bit predetermined AID

field value (i.e., 4095 = 111111111111). The uniform bit pattern (all 1s) in both the AID 12 subfield and the padding field, coupled with the ability to construct the padding field in multiples of 12 bits, teaches or renders obvious that the padding is implemented through duplication of the full AID 12 field value.

One of ordinary skill in the art would have been aware of these various applications, and would have been able to select appropriate attributes of one for inclusion in another. Those of ordinary skill in the art could have employed known techniques to improve similar prior art devices in the same way as claimed in the '186 patent.

In addition, one of ordinary skill in the art would be motivated to combine the prior art references because the elements found in the Asserted Claims of the '186 patent were well known in the art, as discussed above. Indeed, the listed inventors of the '186 patent admitted as much in the specification of the '186 patent. *See, e.g.*, '186 patent at 1:30-2:46.

Moreover, it would have been obvious to one of ordinary skill in the art at the time to combine the teachings of a document submitted as part of the IEEE 802.11ax standard development process (*e.g.*, working group documents, draft specifications, technical submissions, working group meeting presentations) with a system implementing an older IEEE standard such as IEEE 802.11ac or a draft standard. For example, one of ordinary skill in the art would have been motivated to combine the teachings of a document submitted as part of the IEEE 802.11ax standard development process with a real wireless communications hardware/device to yield a working wireless communication system with the improvements and benefits offered by the new standard. In another example, one of ordinary skill in the art would have been motivated to simply substitute an older version of a wireless module implemented on a wireless device/hardware with one implementing a newer version of the standard that addresses the shortcomings of the older standard.

In yet another example, one of ordinary skill in the art would have been motivated to apply the known techniques disclosed in the documents submitted as part of the IEEE 802.11ax standard development process to an older wireless communications system implementing IEEE 802.11ac to yield the predictable results of improved wireless communication performance. Further, one of ordinary skill in the art would have been prompted by the teachings in the documents submitted as part of the IEEE 802.11ax standard development process to modify the wireless communications hardware/device to meet market demands for improved wireless performance.

It would have been obvious to one of ordinary skill in the art at the time to combine teachings of a document submitted as part of IEEE 802.11ax standard development process (e.g., working group documents, draft specification, technical submissions, working group meeting presentations) with teachings of a reference pertaining to hardware/devices (e.g., non-access-point stations) for wireless communications (e.g., wireless local area network (WLAN)). For instance, a person of ordinary skill would have been motivated to combine the teachings of a document submitted as part of the IEEE 802.11ax standard development process—which generally address narrow technical issues and solutions—with references disclosing WLAN devices and hardware more broadly (e.g., devices with transceivers and configurable processors) to yield a blueprint for a working device that addresses the technical problem disclosed in the IEEE 802.11ax standard development document. Such a combination amounts to combining known prior art elements according to known methods to yield predictable results. Further, to the extent any prior art WLAN devices/hardware documents disclose deficiencies or technical issues with the state of the art, one of ordinary skill in the art would have been prompted to combine these references with the teachings in documents submitted as part of the IEEE 802.11ax standard development process to meet market demands for improved wireless performance. This disclosure of deficiencies and/or

technical issues would provide a teaching, suggestion, or motivation for a person of ordinary skill to modify the prior art reference based on the IEEE 802.11ax standard working documents.

It would have been obvious to one of ordinary skill in the art at the time to combine teachings of a document submitted as part of IEEE 802.11ax standard development process (*e.g.*, working group documents, draft specification, technical submissions, working group meeting presentations) with teachings of another document submitted as part of IEEE 802.11ax standard development process. For instance, considering the common underlying technical subject matter of the IEEE 802.11ax standard development documents, it would be obvious to one of ordinary skill to try combining the teachings of multiple documents. In doing so, a person of ordinary skill would have a reasonable expectation of success. Moreover, given the common goals and design incentives among authors of IEEE 802.11ax standard development documents (*e.g.*, improving WLAN device performance), a person of ordinary skill would find it obvious to combine the technical solutions disclosed in multiple IEEE 802.11ax standard development documents. Further, given the additive nature of the IEEE standard development process, a person of ordinary skill would have understood that various IEEE 802.11ax standard development documents could be combined to create a cohesive solution. Thus, a person of ordinary skill would have a reasonable expectation of success in combining the teachings in these documents.

Any reference or combination of references that anticipates or makes obvious an asserted independent claim also makes obvious any asserted claim dependent on that independent claim, as the element of each dependent '186 patent Asserted Claim was known by a person of ordinary skill at the time of the alleged invention, at least partially based on, but not limited by, the claim constructions implicit in Plaintiff's infringement contentions, and it would have been obvious to combine those known elements with the independent claims at least as a matter of common sense

and routine innovation. Accordingly, Defendants contend that each Asserted Claim would have been obvious not only by the combinations described in these contentions, but also by any combination of references that renders obvious an Asserted Claim.

In addition to the specific examples of motivation provided above, Defendants reserve the right to rely on the disclosures of the references listed in Appendix A for additional motivation to combine. The above-identified examples of combinations are given merely to illustrate various motivations to combine and are not intended to provide an exhaustive list of every possible combination to which the motivation may apply. Defendants reserve the right to contend that the above-described motivations to combine apply to other combinations at the appropriate time, i.e., in expert reports regarding invalidity.

In particular, it would have been obvious to a POSITA to incorporate padding mechanism (e.g., RA-8 (Choi 244))—specifically, the use of a specific AID field value to indicate the presence of padding bits—into the trigger frame structure (e.g., disclosed in RA-2 (Chu 517)), in order to facilitate uplink transmission coordination in a multi-user environment.

For example, RA-2 (Chu 517) discloses the use of a frame to initiate uplink Orthogonal Frequency Division Multiple Access (OFDMA) transmissions from multiple client devices, whereby each device transmits data over a sub-channel allocated by the AP. RA-2 (Chu 517), [0042]; *see also* Appendix A at [1c], [3]. RA-2 (Chu 517), for example, describes that the frame “includes one or more padding bits at the end of the scheduling frame 902 to provide sufficient time for the client stations 25 to prepare for uplink transmission based on the uplink scheduling information provided by the scheduling frame 902.” *Id.*, [0093].

While RA-2 (Chu 517) mentions the presence of padding bits to allow for processing time, it does not describe how these padding bits are implemented or identified within the scheduling

frame. In particular, RA-2 (Chu 517) is silent as to any indication, flag, or marker that distinguishes the padding portion of the frame from other fields. It provides no detail on how the receiving client station would know which bits correspond to padding versus meaningful scheduling content.

This lack of specificity creates an implementation gap. In practical multi-user systems, where frame parsing to be fast and accurate, the ability to distinguish padding from data or control information is beneficial for reliable operation. A POSITA, encountering this absence of guidance in RA-2 (Chu 517), would have recognized the need for additional implementation details to operationalize RA-2 (Chu 517)'s contemplated padding feature in a robust manner.

Accordingly, the POSITA would have been motivated to consult other references that provide practical mechanisms for padding identification. RA-8 (Choi 244) would have been an obvious choice for such purposes, as it addresses this issue.

Many of the prior art references (e.g. RA-8 (Choi 244)) disclose using a specific value in the AID ( $\Delta$ AID) field to signal the start of padding within a frame. *See, e.g.*, Appendix A at [4]-[5], [10]. In particular, RA-8 (Choi 244) teaches that, when the  $\Delta$ AID field is set to a certain reserved value (e.g., 11), it serves as a marker that the subsequent bits are padding, used to fill out the remaining octets of the frame. RA-8 (Choi 244), [0007], [0214], [0214]. This allows the receiver to distinguish meaningful data from padding, simplifying frame parsing and ensuring proper interpretation.

References such as RA-8 (Choi 244) emphasize the importance of such signaling for managing frame alignment and decoding, particularly in systems with variable-length fields. RA-8 (Choi 244), [0005], [0024], [0231] [0239].

Both RA-2 (Chu 517) and RA-8 (Choi 244), for example, recognize the utility of padding

to manage timing, synchronization and processing overhead. RA-2 (Chu 517) uses padding to give client stations sufficient time to prepare for uplink transmission, while RA-8 (Choi 244) highlights padding as a tool for maintaining octet alignment and support reliable decoding. RA-2 (Chu 517), [0093]; RA-8 (Choi 244), [0024], [0184].

A POSITA would have had a reasonable expectation of success in incorporating padding signaling mechanism (e.g., RA-8 (Choi 244)) into scheduling frame (e.g., disclosed in RA-2 (Chu 517)). In this example, both RA-8 and RA-2 both are directed to similar systems—multi-user wireless uplink environments using scheduled transmissions—and share the common goal of efficient and reliable coordination among client devices. RA-2 (Chu 517), Abstract, [0002], [0042], [0090]-[0095]; RA-8 (Choi 244), Abstract, [0001], [0003]-[0005], [0159]. The mechanism disclosed in RA-8 (Choi 244) is self-contained, using reserved values in existing fields (AID or  $\Delta$ AID) to signal padding boundaries. RA-8 (Choi 244), [0214]. This approach is modular and does not require fundamental changes to the underlying frame structure, making it easily portable to RA-2 (Chu 517)’s scheduling frame. Moreover, it provides the type of feature that RA-2 (Chu 517) omits—an implementation detail that facilitates padding recognition and reliable decoding.

This combination would have resulted in predictable benefits such as (i) improved parsing efficiency, (ii) enhanced synchronization, and (iii) reduced likelihood of misinterpreting padding as data. Incorporating padding signaling technique (e.g., RA-8 (Choi 244)) into frame structure (e.g., RA-2 (Chu 517)) would have been an obvious design choice for a POSITA, as it applies a known solution (RA-8 (Choi 244)’s use of a specific field value to indicate padding) to address a known problem (RA-2 (Chu 517)’s lack of detail regarding padding implementation) in a related context (multi-user wireless scheduling).

In sum, references such as RA-2 (Chu 517) describe padding conceptually but fails to

explain how to implement or signal it. References such as RA-8 (Choi 244) provides that missing detail through its use of specific AID values to mark padding regions. A POSITA would have recognized this synergy and been motivated to combine these teachings to produce a more robust and reliable scheduling frame. The result would have been a predictable improvement in MU uplink scheduling, one well within the routine design capabilities of a POSITA.

For at least the reasons described above, it would have been obvious to one of ordinary skill in the art to combine each prior art reference listed in Appendix A with any other reference or references listed in Appendix A along with the knowledge of one of ordinary skill in the art to arrive at the inventions claims in the '186 patent. For example, and without limitation, the Asserted Claims of the '186 patent would have been obvious to one of ordinary skill in the art in view of the following combinations:

| <b>Patent No. or Title<br/>(Primary Inventor/Author)</b> | <b>In Combination with One or More of:<br/>(Patent No. or Title<br/>(Primary Inventor/Author))</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RA-1 (Zhou 949)                                          | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> </ul> |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| RA-2 (Chu 517)                                   | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-3 (Asterjadhi 870)                            | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> </ul>                                                                                       |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| RA-4 (Asterjadhi 1264)                           | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-5 (Patil 1275)                                | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> </ul>                                                                                                               |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| RA-6 (Wu 121)                                    | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-7 (Patil 250)                                 | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> </ul>                                                                                                                                                           |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| RA-8 (Choi 244)                                  | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-9 (Zhang 1891)                                | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> </ul>                                                                                                                                                                                        |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| RA-10 (Merlin 313)                               | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-11 (Chun 590)                                 | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> </ul>                                                                                                                                                                                                                |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| RA-12 (Kim 256)                                  | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-13 (Chun 133)                                 | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> </ul>                                                                                                                                                                                                                                              |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| RA-14 (Chu 701)                                  | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-15 (Zhou 368)                                 | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> </ul>                                                                                                                                                                                                                                                                         |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |
| RA-16 (Draft D1.0)                               | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-17 (IEEE 802.11-2012)                         | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> </ul>                                                                                                                                                                                                                                                                                                  |

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| RA-18 (IEEE 802.11-2016)                         | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-19 (802.11ac)</li> <li>• Knowledge of a person of ordinary skill</li> </ul> |
| RA-19 (802.11ac) <sup>31</sup>                   | <ul style="list-style-type: none"> <li>• Asserted Patents Admitted Prior Art (APA)</li> <li>• RA-1 (Zhou 949)</li> <li>• RA-2 (Chu 517)</li> <li>• RA-3 (Asterjadhi 870)</li> <li>• RA-4 (Asterjadhi 1264)</li> <li>• RA-5 (Patil 1275)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |

<sup>31</sup> This combination of references further means that any prior art systems listed in Table 2-A that are Wi-Fi 5 (802.11ac) enabled and capable can further be combined with one or more prior art references noted in the second column in this row.

| Patent No. or Title<br>(Primary Inventor/Author) | In Combination with One or More of:<br>(Patent No. or Title<br>(Primary Inventor/Author))                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <ul style="list-style-type: none"> <li>• RA-6 (Wu 121)</li> <li>• RA-7 (Patil 250)</li> <li>• RA-8 (Choi 244)</li> <li>• RA-9 (Zhang 1891)</li> <li>• RA-10 (Merlin 313)</li> <li>• RA-11 (Chun 590)</li> <li>• RA-12 (Kim 256)</li> <li>• RA-13 (Chun 133)</li> <li>• RA-14 (Chu 701)</li> <li>• RA-15 (Zhou 368)</li> <li>• RA-16 (Draft D1.0)</li> <li>• RA-17 (IEEE 802.11-2012)</li> <li>• RA-18 (IEEE 802.11-2016)</li> <li>• Knowledge of a person of ordinary skill</li> <li>• </li> </ul> |

## 2. U.S. Patent No. 11,716,171

A Pursuant to P.R. 3-3(a) and (b), Defendants identify in Appendix B the prior art references that render obvious the Asserted Claims of the '171 patent and include below exemplary combinations showing the obviousness of the '171 patent Asserted Claims in view of the prior art. To the extent Plaintiff contends that an element is not disclosed in any one of the anticipatory references described in Appendix B, the limitation would have been obvious in light of the disclosures within the reference and the knowledge of one of skill in the art at the time of the '171 patent. Moreover, to the extent Plaintiff contends that an element is not disclosed in any one of the anticipatory references described in Appendix B, such reference may be combined with any other references listed in Appendix B for such element, thereby rendering the claims invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the '171 patent Asserted Claims is not disclosed by one of the references identified above pursuant to P.R. 3-3(a), the claim

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Respectfully submitted,

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