

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

NIPPON TELEGRAPH AND TELEPHONE	)	
CORPORATION and ESSENTIAL WIFI	)	C.A. No. 1:20-cv-00583-ADA
LLC,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	
	)	
TEXAS INSTRUMENTS INC.,	)	
	)	
Defendant.	)	

NIPPON TELEGRAPH AND TELEPHONE	)	
CORPORATION and ESSENTIAL WIFI	)	C.A. No. 1:20-cv-00632-ADA
LLC,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	
	)	
MEDIATEK INC. and MEDIATEK USA	)	
INC.,	)	
	)	
Defendants.	)	

NIPPON TELEGRAPH AND TELEPHONE	)	
CORPORATION and ESSENTIAL WIFI	)	C.A. No. 1:20-cv-00769-ADA
LLC,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	
	)	
ACER INC. and ACER AMERICA INC.,	)	
	)	
Defendants.	)	

DEFENDANTS' PRELIMINARY INVALIDITY CONTENTIONS

Defendants Texas Instruments Inc. (“TI”), MediaTek Inc. and MediaTek USA Inc. (collectively, “MediaTek”), and Acer Inc. and Acer America Inc. (collectively, “Acer”) (all defendants collectively, “Defendants”) of the three above-captioned cases hereby disclose their Preliminary Invalidity Contentions with respect to the asserted claims of U.S. Patent No. 7,280,551 (the “’551 Patent”), U.S. Patent No. 7,545,781 (the “’781 Patent”), U.S. Patent No. 7,400,616 (the “’616 Patent”), and U.S. Patent No. 7,242,720 (the “’720 patent”) (collectively, the “Asserted Patents”). Plaintiffs Nippon Telegraph and Telephone Corporation and Essential WiFi, LLC (collectively, “Plaintiffs”) assert the same claims against each of the Defendants in each of the above-captioned cases. Therefore, Defendants’ Preliminary Invalidity Contentions are being served in conjunction with all three cases.

I. PRELIMINARY STATEMENT AND RESERVATION OF RIGHTS

In their Preliminary Infringement Contentions and Corrected Preliminary Infringement Contentions (“PICs”), Plaintiffs asserted the following claims against each Defendant: (i) claims 1-8 of the ’551 Patent; (ii) claims 1, 4, 6, 9, 16, 19, 21, and 24 of the ’781 Patent; (iii) claims 1 and 5 of the ’616 Patent; and (iv) claims 18, 19, 22, 31, and 32 of the ’720 Patent (collectively, the “Asserted Claims”). Based on this disclosure of the Asserted Claims, Defendants do not provide any contentions regarding any claims of the Asserted Patents not asserted in Plaintiffs’ PICs. To the extent the Court permits Plaintiffs to assert additional claims against Defendants in the future, Defendants reserve the right to disclose new or supplemental invalidity contentions.

The Court’s Order Governing Proceedings (e.g., Dkt. 25 in Case No. 1:20-cv-00632-ADA, Dkt. 19 in Case No. 1:20-cv-583-ADA, Dkt. 24 in Case No. 6:20-cv-00227-ADA) and Scheduling Order (e.g., Dkt. 31 in Case No. 1:20-cv-00632-ADA, Dkt. 23 in Case No. 1:20-cv-583-ADA, Dkt. 28 in Case No. 1:20-cv-00769-ADA) require these Preliminary Invalidity Contentions be served after Plaintiffs’ PICs. The Order Governing Proceedings require that

Plaintiffs' PICs include "a chart setting forth where in the accused product(s) each element of the asserted claim(s) are found." Plaintiffs' PICs are not compliant with the Court's Order and therefore fail to put Defendants on notice of Plaintiffs' infringement theories. In particular, Plaintiffs have failed to set forth where ***in the accused product(s)*** each element is because Plaintiffs have failed to cite any evidence regarding any specific accused product. Defendants reserve the right to supplement or amend these Preliminary Invalidity Contentions once Plaintiffs provide compliant infringement contentions, including to address any changes in Plaintiffs' allegations or interpretations of claim language.

These Preliminary Invalidity Contentions do not constitute an admission that any current, past, or future version of any accused products infringe the Asserted Patents either literally or under the doctrine of equivalents. In other words, these Preliminary Invalidity Contentions should not be deemed to be related to the non-infringement positions that Defendants may advance in these cases. In particular, Defendants' Preliminary Invalidity Contentions are made in addition to, and/or in the alternative to, Defendants' non-infringement positions, and should not be interpreted to rely upon, or in any way affect, the non-infringement arguments Defendants intend to assert in these cases.

Defendants provide these Preliminary Invalidity Contentions consistent with the schedule currently in place, but do so without waiving any right to receive from Plaintiffs such full and complete specific infringement Contentions as should have been provided in the PICs already served. Defendants' compliance with the current schedule should not be viewed as a waiver of any right to seek relief regarding the deficiencies in Plaintiffs' PICs, or of any right to amend or supplement their Preliminary Invalidity Contentions once Plaintiffs comply with the Court's requirements.

A. General Reservation of Rights

These Preliminary Invalidity Contentions are based on information currently available to Defendants, which is presently substantially limited. For example,

- i. Defendants offer these Preliminary Invalidity Contentions without the benefit of relevant discovery in these cases, including from Plaintiffs, the named inventors of the Asserted Patents, other third parties, or experts. Discovery from the persons involved in the drafting and prosecution of the Asserted Patents, and of the named inventors, for example, will likely reveal information that affects the disclosures and contentions herein.
- ii. These Preliminary Invalidity Contentions are also made without knowledge of or access to relevant documents from Plaintiffs, and without documents from the inventors of the Asserted Patents. Such discovery may reveal information that affects the disclosures and contentions herein.
- iii. Defendants have not had the opportunity to seek discovery from third parties regarding, *inter alia*, various prior art third-party methods, systems, and wireless devices, or expert opinion and/or discovery. Such discovery may also reveal information that affects the disclosures and contentions herein, including the identification of additional relevant prior art.
- iv. Defendants' positions on the invalidity of the Asserted Claims will depend on an claim construction from the Court, any findings as to the priority and/or invention dates of the Asserted Claims, any findings as to the level of ordinary skill in the art, and/or positions that Plaintiffs or expert witness(es) may take concerning claim construction, infringement, and/or invalidity.

- v. If Plaintiffs are permitted by the Court to modify any assertion or contention in their PICs or present any new assertion or contention relevant to these Preliminary Invalidity Contentions, Defendants reserve the right to supplement or otherwise amend these Preliminary Invalidity Contentions.
- vi. Defendants are currently unaware of the extent, if any, to which Plaintiffs will contend that limitations of the Asserted Claims are not disclosed in the prior art identified by Defendants.

In light of the unavailability of relevant discovery and the substantially limited information available to them, Defendants expressly reserve any and all rights that they may have. Such reservation includes Defendants' right to amend, modify, and/or supplement their Preliminary Invalidity Contentions, if necessary, as a matter of right, as permitted by the Court, and/or based on additional information (including additional prior art or investigation) obtained through formal discovery or other means. Defendants further reserve the right to seek changes to the Court's Scheduling Order or other scheduling orders in light of any failure by Plaintiffs to produce documents or information in a timely manner. Because discovery is at this time limited and because Defendants have not yet completed their search for and analysis of relevant prior art, Defendants reserve the right, to the extent permitted by the Court and the applicable statutes and rules, to revise, amend, and/or supplement the information provided herein, including identifying, charting, and relying on additional prior art references should Defendants' further search and analysis yield additional information or references, consistent with the applicable statutes and rules. Defendants expressly reserve the right, to the extent permitted by the Court and the applicable statutes and rules, to rely on witness testimony about the prior art references identified herein to supplement these Preliminary Invalidity Contentions, where appropriate.

Moreover, Defendants reserve the right, to the extent permitted by the Court and the applicable statutes and rules, to revise their ultimate contentions concerning the invalidity of the Asserted Claims, which may change depending on the Court's construction of the Asserted Claims, any findings as to the priority and/or invention dates of the Asserted Claims, and/or positions that Plaintiffs or their fact or expert witness(es) may take concerning claim construction, infringement, and/or invalidity issues. Because prior art not included in this disclosure, whether known or not known to Defendants, may become relevant, Defendants reserve the right to identify other references that would anticipate or render obvious any allegedly missing limitation(s) of the disclosed device, system, or method.

Defendants further reserve the right to rely on statements concerning the scope or content of the prior art relevant to the Asserted Patents found in, *inter alia*, the Asserted Patents; the prosecution history of the Asserted Patents (and any other related patents and/or patent applications, including non-U.S. counterpart patents and/or applications); IPR Nos. 2020-01404, 2020-01555, 2020-01607, and any other IPR petitions that have been filed or may be filed in the future against any of the Asserted Patents; and any evidence submitted by Plaintiffs involving or relating to the Asserted Patents (and any other related patents and/or patent applications, including non-U.S. counterpart patents and/or applications).

Prior art patents or publications included in these Preliminary Invalidity Contentions may be related (e.g., as a divisional, continuation, continuation-in-part, parent, child, or other relation or claim of priority) to earlier or later filed patents or publications, may have counterparts filed in other jurisdictions, or may incorporate (or be incorporated by) other patents or publications by reference. The listed patents or publications are intended to be representative of these other patents or publications, to the extent that they exist. On information and belief, each listed

publication or invention became prior art at least as early as the dates provided in those documents. Where Defendants cite and rely on a U.S. patent or U.S. patent publication, Defendants necessarily cite, rely upon, and incorporate by reference as additional prior art each and every foreign priority patent (and the applications for those foreign priority patents) cited in the identified U.S. patent or U.S. patent publication.

In addition to the prior art disclosed in or with these Preliminary Invalidity Contentions, Defendants also incorporate, in full, all prior art references cited in the Asserted Patents, in the Asserted Patents' prosecution histories, and all documents incorporated by reference into those prior art references. Defendants further incorporate by reference any additional invalidity contentions, identified prior art, or invalidity claim charts disclosed at any date by any part to any litigation or agency (including the USPTO) proceeding involving the Asserted Patents or any related patent, including, without limitation, any parties' invalidity contentions (including all amendments and/or supplementations thereto), *Inter Partes* Review petitions, expert reports (including all amendments and/or supplementations thereto), expert depositions, and any references identified in any reexamination request or proceeding relating to any of the Asserted Patents. Defendants may further rely on any prior art references or documents relating to the validity of the Asserted Patents, ever known or identified by or to Plaintiffs, the named inventors of the Asserted Patents, assignees of the Asserted Patents, or any person substantively involved in the prosecution of the Asserted Patents.

Further, these Preliminary Invalidity Contentions cite particular teachings and disclosures of the prior art¹ as applied to the Asserted Claims. However, persons having ordinary skill in the

¹ In these Preliminary Invalidity Contentions (in either this cover pleading or in the exhibits hereto), reference to "one of ordinary skill," "skilled artisan," or any other similar term or phrase

art generally may view an item of prior art in the context of other publications, literature, products, technologies, and understanding. As such, the cited portions are only representative and/or illustrative examples, and not exhaustive. Where Defendants cite to a particular figure in a reference, the citation should be understood to encompass the caption and description of the figure and any text relating to the figure. Similarly, where Defendants cite to particular text referring to a figure, the citation should be understood to include the figure and caption as well. Hence, for any given quotation or excerpt, for example, Defendants expressly reserve the right to introduce other text and images (including but not limited to surrounding, related, or explanatory text, images, or uncited portions of the prior art references) from the same or other prior art references that may help to provide context to the quotation or excerpt, or to further show express or inherent disclosure of the limitations of the Asserted Claims. Defendants also reserve the right to rely on other uncited portions of the prior art references and on other publications and expert testimony as aids in understanding and interpreting the cited portions, as providing context thereto, and as additional evidence that the prior art discloses a claim limitation or the invention as a whole. Defendants further reserve the right to rely on uncited portions of the prior art references, or other publications and testimony, including expert testimony, to establish bases for combinations of certain cited references that render the Asserted Claims obvious. And because certain prior art systems and inventions are described in multiple related patents or publications with similar or identical specifications or disclosures, to the extent Defendants have identified a citation in one reference, Defendants reserve the right to rely on parallel or similar citations in related patents or publications.

refers to a person of ordinary skill in the art at the time of the alleged invention for whichever Asserted Patent is being discussed.

Defendants also reserve the right to rely on any documentary or testimonial evidence of the existence of any systems that embodied or practiced the disclosures found in the accompanying invalidity charts, for example as discussed in the prior art references cited herein, as such systems may qualify as prior art under 35 U.S.C. § 102(g) or other § 102 subsections.²

The references discussed in the accompanying charts may disclose the elements of the Asserted Claims explicitly and/or inherently, and/or they may be relied on to show the state of the art in the relevant timeframe. Obviousness combinations are provided in the alternative to Defendants' anticipation contentions and are not to be construed to suggest that any reference included in any combination is not by itself anticipatory, or does not by itself render an asserted claim obvious.

Because Defendants' investigation regarding the invalidity of the Asserted Patents is ongoing, certain defenses, including, for example, non-patentable subject matter under 35 U.S.C. § 101, knowledge or use by others under 35 U.S.C. § 102(a), public use and/or on-sale bar under 35 U.S.C. § 102(b), derivation or prior inventorship under 35 U.S.C. §§ 102(f)/(g), inequitable conduct, unenforceability, unclean hands, waiver, and estoppel, may only become apparent as additional information becomes available. As noted above, Defendants have not yet had the opportunity to conduct sufficient fact discovery regarding any unenforceability defenses. To the extent that during discovery any evidence is produced that supports a contention that any Asserted Patent is unenforceable due to inequitable conduct during prosecution or for any other reason, Defendants reserve all rights to amend and/or supplement their Preliminary Invalidity

² Because each of the Asserted Patents has a filing date before September 16, 2012, any reference to sections 35 U.S.C. in these Preliminary Invalidity Contentions refers to the pre-AIA versions of such sections.

Contentions to include such unenforceability contentions, if the governing rules require such amendment or supplementation.

B. Claim Construction

Claim construction proceedings for these cases have not yet occurred and Plaintiffs have not expressly provided their constructions of the Asserted Claims. Defendants therefore submit these Preliminary Invalidity Contentions without waiving any arguments about the sufficiency or substance of Plaintiffs' PICs, and without waiving any challenges to Plaintiffs' apparent claim constructions. Defendants thus reserve the right to modify, amend, and/or supplement their Preliminary Invalidity Contentions following the claim construction rulings, and/or upon Plaintiffs' disclosure, alteration, and/or clarification of their asserted claim constructions.

Defendants' Preliminary Invalidity Contentions are based in part on their present understanding of Plaintiffs' PICs. In addition to being deficient for the reasons discussed above, Plaintiffs' PICs contradict the teachings of the Asserted Patents, contradict the understanding of the claim terms by a person having ordinary skill in the art, are internally inconsistent, and are vague and conclusory concerning how the claim limitations supposedly read on the accused products and activities. As a result, Defendants are currently unable to fully discern Plaintiffs' positions regarding the construction of the Asserted Claims. To the extent that Plaintiffs are permitted by the Court to supplement their PICs, Defendants reserve the right to modify, amend, and/or supplement their Preliminary Invalidity Contentions.

Given the deficiencies in Plaintiffs' PICs, Defendants have relied on the broad claim constructions of the Asserted Claims that Plaintiffs have implicitly adopted in their PICs, to the extent any construction can be inferred from the PICs. Such reliance should not be taken to mean that Defendants understand, or are adopting or agreeing with, Plaintiffs' apparent constructions. These Preliminary Invalidity Contentions should not be construed or interpreted

as any admission regarding the proper construction of any Asserted Claim, and should not be deemed to represent or limit the claim constructions that Defendants will advance in these cases. Defendants object to any attempt to imply claim constructions from these Preliminary Invalidity Contentions, including from the accompanying charts. These Preliminary Invalidity Contentions are made under a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any Asserted Claim.

Defendants therefore take no position on any matter of claim construction in these Preliminary Invalidity Contentions. Defendants reserve the right to propose any claim construction they consider appropriate and to contest any claim construction they consider inappropriate. Defendants also reserve the right to argue that certain claim terms, phrases, and elements are indefinite, lack written description, are not enabled, are not patentable, are not novel and/or are otherwise invalid under 35 U.S.C. §§ 101, 102, 103, 112, *et seq.*

C. Plaintiffs' Failure to Disclose Doctrine of Equivalents Contentions

Plaintiffs have not provided any contentions regarding infringement under the doctrine of equivalents, and has therefore provided no bases for supporting any allegation of infringement under the doctrine of equivalents for any element of any Asserted Claim. Should the Court permit Plaintiffs to supplement their PICs with allegations under the doctrine of equivalents, Defendants reserve the right to amend or supplement these Preliminary Invalidity Contentions.

D. Alleged Priority and Invention Dates

Defendants dispute that any of the Asserted Claims are entitled to any priority date earlier than the U.S. filing date listed on the face of the respective Asserted Patents. Defendants reserve the right to amend these Preliminary Invalidity Contentions after any claim construction ruling or after discovery reveals different priority dates than the above or those alleged by Plaintiffs.

Similarly, Plaintiffs cannot assert an earlier invention date for any Asserted Patent than the dates set forth in their PICs, because the Court's Order Governing Proceedings required Plaintiffs to identify "the earliest date of invention" and to produce "all documents evidencing conception and reduction to practice for each claimed invention." Defendants reserve the right to amend or supplement these Preliminary Invalidity Contentions after any claim construction ruling, or if the Court permits Plaintiffs to rely on different priority and/or invention dates.

E. Invalidity Under 35 U.S.C. § 102(f)

Defendants have not yet taken depositions of the named inventors and reserve the right to assert that the Asserted Claims of the Asserted Patents are invalid under 35 U.S.C. § 102(f) in the event Defendants obtain evidence that any of the inventors named on the Asserted Patents or related patents, did not themselves "invent" the subject matter claims.

II. THE INVALIDITY OF THE ASSERTED PATENTS BASED ON PRIOR ART

Subject to the statements, reservations of rights, and qualifications presented in Section I above, Defendants disclose the following bases for invalidity based on prior art.

A. Identification of Prior Art

In addition to the prior art identified on the faces of the Asserted Patents and in their respective prosecution histories, Defendants identify the following prior art references (the "Prior Art") that anticipate the Asserted Claims and/or render the Asserted Claims obvious (e.g., by themselves, in light of the knowledge of a person having ordinary skill in the art and/or in combination with other Prior Art).

As noted above in Section I, Defendants reserve the right to modify, amend, and/or supplement this list, including to the extent Plaintiffs are permitted to amend, modify, or advance new or additional theories with respect to their PICs.

At least the Prior Art listed below in Sections II.A.1 – II.A.4, individually or in combination, invalidates the Asserted Claims. In some instances, Defendants may have treated certain Prior Art as anticipatory where certain elements are expressly, implicitly, or inherently present in the Prior Art based on Plaintiffs’ apparent claim construction in their PICs.

Defendants reserve the right to contend that each of the anticipatory references renders the claims obvious in view of the reference, either alone, in light of the knowledge of a person having ordinary skill in the art, and/or in combination with other references. The identification of any patent or patent application should be deemed an identification of any counterpart patent or application; the identification of any article should be deemed a disclosure of any substantially similar article if published in some other form; and the identification of any patent or article should be deemed an identification of any product described therein.

The obviousness combinations are provided in the alternative to Defendants’ anticipation contentions and are not to be construed to suggest that any reference included in any combination is not by itself anticipatory. Also, the obviousness combinations are provided as examples, and it should be understood that other combinations of the Prior Art disclosed and cited herein could be used in such combinations.

The claim charts accompanying these Preliminary Invalidity Contentions show in detail where each claim element of the Asserted Claims may be found in the particular reference(s) being charted. The identification of the Prior Art in the charts and below is not exclusive, and Defendants’ document production may contain now or in the future additional references that render the Asserted Claims invalid. Defendants reserve the right to rely on both the listed and unlisted references, as well as other art that may become known and/or relevant during the course of these cases or related litigation.

For those references for which detailed claim charts are provided as Exhibits, the “Exhibit No.” column below identifies the corresponding detailed claim chart for a given reference. Prior Art references which are not associated with an Exhibit Number are additional prior art references that are either included as secondary references obviousness charts or are otherwise pertinent to the invalidity of the Asserted Claims, either alone or in combination with other references. At this time, Defendants may not be providing claim charts for each of these additional references, either because they are cited in obviousness charts, and/or because these references have same or similar disclosures to the prior art references for which invalidity charts have been provided, and/or may be used to show the state of the art or reasons why a person having ordinary skill in the art would modify or combine prior art references.

Defendants not only rely on the Prior Art explicitly listed herein, but also rely on any commercial embodiments and accompanying literature of the various assignees that correspond to the respective disclosures found within the Prior Art disclosed herein.

Defendants also reserve the right to rely on related patents, published applications, foreign patents or publications, and other patent documents as necessary to establish prior art status or clarify the disclosures cited. Defendants further reserve the right to rely on the earliest publication or priority dates to which each of the prior art references is entitled, including dates on which a claim of priority may be based for patent references that are any of a divisional, continuation, or continuation-in-part of an earlier filed patent application.

1. Prior Art to U.S. Patent No. 7,280,551

a. Patents and Printed Publication Prior Art

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
IEEE 802.11-1999	n/a	1999	551-A1
IEEE 802.11a	n/a	December 30, 1999	

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
IEEE 802.11b	n/a	January 20, 2000	
IEEE 802.11g	n/a	June 27, 2003	
US Pat. Pub. No. US2003/0220112 (Bugeja)	January 16, 2002	November 27, 2003	551-A2
US Pat. Pub. No. US2002/0060995 (Cervello)	September 15, 2000	May 23, 2002	551-A3
US Pat. No. 7,301,924 (Gurbuz)	July 15, 2002	November 27, 2007	551-A4
US Pat. No. 7,630,403 (Ho I)	March 8, 2002	December 8, 2009	551-A5
US Pat. Pub. No. US2004/0242252 (Hoeben)	March 26, 2003	January 22, 2008	551-A6
IEEE P802.11 Wireless LANs Response to Call For Proposal for P802.11n (doc.: IEEE 802.11-04/0915r0) (IEEE Response)	n/a	August 13, 2004	551-A7
JP2003-101457 (Iwasaki)	September 20, 2001	April 4, 2003	551-A8
US Pat. No. 7,346,357 (Kim)	November 8, 2001	Issued March 18, 2008	551-A9
US Pat. No. 6,560,292 (Lundby)	April 7, 2000	May 6, 2003	551-A10
US Pat. Pub. No. US2002/0003783 (Niemela)	September 27, 2000	January 10, 2002	551-A11
US Pat. No. 7,039,412 (Sandhu)	August 8, 2003	May 2, 2006	551-A12
US Pat. Pub. No. US2003/0206532 (Shpak)	March 6, 2002	November 6, 2003	551-A13
US Pat. No. 7,701,912 (Thompson)	April 18, 2000	April 20, 2010	551-A14

In addition to the above prior art references, Defendants identify the following patents, printed publications, product literature, and other materials that are pertinent to the invalidity of the Asserted Claims. Defendants may rely on these references as invalidating prior art, evidence of the knowledge of those skilled in the art, and/or evidence to support a motivation to combine or modify other prior art. *See* Ex. 551-B. Defendants reserve all rights to supplement or modify these invalidity contentions and to rely on these references to prove invalidity of the Asserted Claims in a manner consistent with the Federal Rules of Civil Procedure and the rules of this Court.

Reference	Priority Date	Issued or Published Date
Martone, Multiantenna digital radio transmission (2002)	2002	2002
US Pat. No. 6,747,964 (Bender)	September 15, 2000	June 8, 2004
US Pat. No. 7,352,718 (Perahia)	July 22, 2003	April 1, 2008
US Pat. No. 5,856,999 (Robinson)	January 24, 1996	January 5, 1999
US Pat. Pub. No. 2003/0035388 (Schmidt)	August 15, 2001	February 20, 2003
US Pat. Pub. No. 2003/0003863 (Thielecke)	May 4, 2001	January 2, 2003
US Pat. Pub. No. 2002/0078235 (Yen)	September 27, 2000	June 20, 2002

b. Systems and Products

Because discovery is currently limited, Defendants have not yet had the opportunity to serve subpoenas to any entity seeking information on systems and/or products relevant to the Asserted Claims of the '551 Patent. Nonetheless, Defendants identify the Atheros Super-G system (Exhibit 551-A15) and the Airgo Networks AGN100 system (Exhibit 551-A16) as prior art to the Asserted Claims of the '551 Patent. To the extent those subpoenas result in relevant documents and/or testimony, Defendants will promptly supplement these Preliminary Invalidity Contentions as necessary.

2. Prior Art to U.S. Patent No. 7,545,781

a. Patents and Printed Publication Prior Art

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
IEEE 802.11-1999	n/a	1999	781-A1
IEEE 802.11a	n/a	December 30, 1999	
IEEE 802.11b	n/a	January 20, 2000	
IEEE 802.11g	n/a	June 27, 2003	
US Pat. No. 7,995,544 (Benveniste 1)	November 2, 2001	August 9, 2011	781-A2
US Pat. Pub. No. US2004/0002357 (Benveniste 2)	June 25, 2002	January 1, 2004	781-A3

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
US Pat. Pub. No. 2005/0141448 (Bolinth)	March 28, 2002	June 30, 2005	781-A4
US Pat. Pub. No. 2003/0220112 (Bugeja)	January 16, 2002	November 27, 2003	781-A5
US Pat. Pub. No. US2002/0071448 (Cervello)	July 7, 2000	June 13, 2002	781-A6
US Pat. Pub. No. 2004/0242252 (Hoeben)	March 26, 2002	December 2, 2004	781-A7
US Pat. No. 7,813,385 (Hyun)	March 1, 2004	October 12, 2010	781-A8
US Pat. Pub. No. US2002/0181492 (Kasami)	May 29, 2001	Published December 5, 2002	781-A9
US Pat. No. 7,346,357 (Kim)	November 8, 2001	March 18, 2008	781-A10
US Pat. No. 7,039,412 (Sandhu)	August 8, 2003	May 2, 2006	781-A11
US Pat. No. 7,039,358 (Shellhammer)	January 10, 2000	Issued May 2, 2006	781-A12
US Pat. No. 7,161,951 (Sherman 1)	April 17, 2002	January 9, 2007	781-A13
US Pat. Pub. No. US2002/0181426 (Sherman 2)	March 4, 2002	December 5, 2002	781-A14
US Pat. No. 6,671,284 (Yonge)	Filed August 4, 2000	December 30, 2003	781-A15

In addition to the above prior art references, Defendants identify the following patents, printed publications, product literature, and other materials that are pertinent to the invalidity of the Asserted Claims. Defendants may rely on these references as invalidating prior art, evidence of the knowledge of those skilled in the art, and/or evidence to support a motivation to combine or modify other prior art. *See* Ex. 781-B. Defendants reserve all rights to supplement or modify these invalidity contentions and to rely on these references to prove invalidity of the Asserted Claims in a manner consistent with the Federal Rules of Civil Procedure and the rules of this Court.

Reference	Priority Date	Issued or Published Date
US Pat. No. 6,747,964 (Bender)	September 15, 2000	June 8, 2004
US Pat. No. 6,560,292 (Lundby)	April 7, 2000	May 6, 2003
US Pat. No. 5,856,999 (Robinson)	January 24, 1996	January 5, 1999
US Pat. Pub. No. 2003/0035388 (Schmidt)	August 15, 2001	February 20, 2003
US Pat. Pub. No. 2002/0078235 (Yen)	September 27, 2000	June 20, 2002

b. Systems and Products

Because discovery is currently limited, Defendants have not yet had the opportunity to serve subpoenas to any entity seeking information on systems and/or products relevant to the Asserted Claims of the '781 Patent. Nonetheless, Defendants identify the Atheros Super-G system (Exhibit 781-A16) as prior art to the Asserted Claims of the '781 Patent. To the extent those subpoenas result in relevant documents and/or testimony, Defendants will promptly supplement these Preliminary Invalidity Contentions as necessary.

3. Prior Art to U.S. Patent No. 7,400,616

a. Patents and Printed Publication Prior Art

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
Block Acknowledgement: Redesigning the Window Protocol (Brown)	n/a	1989	616-A1
US Pat. Pub. No. 2003/0067890 (Goel)	October 10, 2001	April 10, 2003	616-A2
US Pat. No. 6,574,668 (Gubbi)	Filed July 12, 2000	June 3, 2003	616-A3
US Pat. No. 7,630,403 (Ho I)	March 8, 2002	December 8, 2009	616-A4
US Pat. Pub. No. US2003/0125640 (Ho II)	January 14, 2002	July 17, 2003	616-A5
Burst Transmission and Acknowledgment (IEEE 802.11-02/004r2)	n/a	January 2002	616-A6
Normative Text for Burst Ack (IEEE 802.11-02/004r3a)	n/a	January 23, 2002	616-A7

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
Normative Text for Group ACK Activation (IEEE 802.11-03/119r0)	n/a	January 2003	616-A8
IEEE Std 802.11e/D4.0	n/a	November 2002	616-A9
US Pat. No. 7,224,704 (Lu)	April 1, 2002	May 29, 2007	616-A10
US Pat. No. 6,778,501 (“Malmgren”)	April 7, 1999	August 17, 2004	616-A11
US Pat. Pub. No. 2002/0159431 (Moulsley)	April 25, 2001	October 31, 2002	616-A12
US Pat. No. 6,487,184 (Pecen)	August 25, 2000	November 26, 2002	616-A13
US Pat. No. 6,697,331 (Riihinen)	November 17, 1999	February 24, 2004	616-A14
US Pat. No. 6,128,283 (Sabaa)	Filed December 3, 1997	October 3, 2000	616-A15
The Evolution of 5 GHz WLAN Toward Higher Throughput (Simoens)	December, 2003	Published	616-A16
US Pat. No. 7,701,975 (Tsang)	Filed April 26, 2004	April 20, 2010	616-A17
MAC Performance Analysis and Enhancement Over 100 Mbps Data Rates for IEEE 802.11 (Xiao)	n/a	2003	616-A18

In addition to the above prior art references, Defendants identify the following patents, printed publications, product literature, and other materials that are pertinent to the invalidity of the Asserted Claims. Defendants may rely on these references as invalidating prior art, evidence of the knowledge of those skilled in the art, and/or evidence to support a motivation to combine or modify other prior art. *See* Ex. 616-B. Defendants reserve all rights to supplement or modify these invalidity contentions and to rely on these references to prove invalidity of the Asserted Claims in a manner consistent with the Federal Rules of Civil Procedure and the rules of this Court.

Reference	Priority Date	Issued or Published Date
Giangaspero et al., “Co-Channel Interference Cancellation Based on MIMO OFDM Systems” (Giangaspero)	n/a	January 2003
US Pat. No. 7,301,924 (Gurbuz)	July 15, 2002	November 27, 2007

Reference	Priority Date	Issued or Published Date
IEEE 802.11-1999	n/a	1999
IEEE 802.11a	n/a	December 30, 1999
IEEE 802.11b	n/a	January 20, 2000
IEEE 802.11g	n/a	June 27, 2003
US Pat. Pub. No. 2003/0072280 (McFarland)	September 24, 2001	April 17, 2003
US Pat. No. 8,149,810 (Narasimhan)	February 14, 2003	April 3, 2012
US Pat. No. 7,352,718 (Perahia)	July 22, 2003	April 1, 2008
US Pat. Pub. No. 2003/0012318 (Pirainen)	June 29, 2001	January 16, 2003
US Pat. No. 2003/0066004 (Rudrapatna)	September 28, 2001	April 3, 2003

b. Systems and Products

Because discovery is currently limited, Defendants have not yet had the opportunity to serve subpoenas to any entity seeking information on systems and/or products relevant to the Asserted Claims of the '616 Patent. Nonetheless, Defendants identify the Airgo Networks AGN100 system (Exhibit 616-A19) as prior art to the Asserted Claims of the '616 Patent. To the extent those subpoenas result in relevant documents and/or testimony, Defendants will promptly supplement these Preliminary Invalidity Contentions as necessary.

4. Prior Art to U.S. Patent No. 7,242,720

a. Patents and Printed Publication Prior Art

Reference	Priority Date	Issued or Published Date	Chart Exhibit No.
USPN 6,144,711 (Raleigh)	August 29, 1996	November 7, 2000	720-A1
USPN 6,058,105 (Hochwald)	September 26, 1997	May 2, 2000	720-A2
USPN 7,068,628 (Li)	May 22, 2000	June 27, 2006	720-A3
Tehrani et al., "Space-Time Coding Over a Code Division Multiple Access System" (1999) (Tehrani)	n/a	1999	720-A4
USPN 6,937,665 (Vandenameele)	April 19, 1999	August 30, 2005	720-A5
USPN 6,473,467 (Wallace)	March 22, 2000	October 29, 2002	720-A6

In addition to the above prior art references, Defendants identify the following patents, printed publications, product literature, and other materials that are pertinent to the invalidity of the Asserted Claims. Defendants may rely on these references as invalidating prior art, evidence of the knowledge of those skilled in the art, and/or evidence to support a motivation to combine or modify other prior art. *See* Ex. 720-B. Defendants reserve all rights to supplement or modify these invalidity contentions and to rely on these references to prove invalidity of the Asserted Claims in a manner consistent with the Federal Rules of Civil Procedure and the rules of this Court.

Reference	Priority Date	Issued or Published Date
van Rooyen, Lotter, van Wyk, Space-Time Processing for CDMA Mobile Communications (2000)	2000	2000
IEEE 802.11-1999	n/a	1999
IEEE 802.11a	n/a	December 30, 1999
IEEE 802.11b	n/a	January 20, 2000
IEEE 802.11g	n/a	June 27, 2003
USPAPN 2002/0111142 (Klimovitch)	December 18, 2000	August 15, 2002
USPN 7,006,848 (Ling)	March 23, 2001	February 28, 2006
USPN 7,233,625 (Ma)	September 1, 2000	June 19, 2007
USPN 6,351,499 (Paulraj)	December 15, 1999	February 26, 2002
Patrick Vandenamee, <i>A Combined OFDM/SDMA Approach</i> , IEEE (Nov. 2000)	n/a	November 2000
A. van Zelst, <i>Space Division Multiplexing Algorithms</i> , 10 th Mediterranean Electrotechnical Conf., IEEE (2000)	n/a	2000

b. Systems and Products

Because discovery is currently limited, Defendants have not yet had the opportunity to serve subpoenas to any entity seeking information on systems and/or products relevant to the Asserted Claims of the '720 Patent. Nonetheless, Defendants identify the Airgo Networks

AGN100 system and any designs and/or prototypes (Exhibit 720-A7) as prior art to the Asserted Claims of the '720 Patent. To the extent those subpoenas result in relevant documents and/or testimony, Defendants will promptly supplement these Preliminary Invalidity Contentions as necessary.

B. Invalidity Under 35 U.S.C. § 103

1. Obviousness Combinations

To the extent that these Asserted Claims are not rendered invalid purely on anticipatory grounds or are not rendered obvious by a single prior art reference in light of the general knowledge in the field and/or of a person having ordinary skill in the art, multiple prior art references can be combined to render the Asserted Claims obvious. Those prior art combinations are identified in the accompanying charts and/or below.

Each of the references charted in Exhibits 551-A1 to 551-A16 may be combined with any of the other references in those charts, or with any of the art charted in Exhibit 551-B. Each of the references charted in Exhibits 781-A1 to 781-A16 may be combined with any of the other references in those charts, or with any of the art charted in Exhibit 781-B. Each of the references charted in Exhibits 616-A1 to 616-A19 may be combined with any of the other references in those charts, or with any of the art charted in Exhibit 616-B. Each of the references charted in Exhibits 720-A1 to 720-A7 may be combined with any of the other references in those charts, or with any of the art charted in Exhibit 720-B. The claims are also rendered obvious by any of the references identified in these Preliminary Invalidity Contentions with any other such references, with the knowledge of a person having ordinary skill in the art, and/or with admitted prior art.

The identification of any combinations should not be taken to mean that the combinations are necessarily required to prove invalidity. To the contrary, certain claims may be anticipated under one claim interpretation and obvious under another. Further, if any element should be

found to be missing from a particular item of prior art, Defendants assert that the item of prior art could be modified and/or combined with other items of prior art to disclose that element.

These combinations are not exclusive, and Defendants reserve the right to supplement the obviousness arguments listed below, using any references listed above and any references that may become known to Defendants during the course of discovery.

2. Motivations to Combine Generally Applicable to All Combinations

In *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007), the Supreme Court clarified the standard for what types of inventions are patentable. In particular, the Supreme Court emphasized that inventions arising from ordinary innovation, ordinary skill, or common sense should not be patentable. *Id.* at 1732, 1738-39, 1742-43, 1746. In that regard, a patent claim may be obvious if the combination of elements was obvious to try or there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent's claims. In addition, when work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, Section 103 likely bars its patentability.

“[T]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 1739. A key inquiry is whether the “improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* at 1740. Because each of the Asserted Patents simply arranges old elements with each performing the same function it had been known to perform and yields no more than what one would expect from such an arrangement, each combination is obvious. *Id.* at 1742. The Asserted Claims are therefore invalid under 35 U.S.C. § 103, because they do nothing

more than combine known techniques and apparatuses according to their known and ordinary uses to yield predictable results.

Although Defendants contend that no specific motivation to combine is necessary for the references cited herein and in the accompanying charts, Defendants nonetheless hereby identify additional motivations and reasons to modify and/or combine the cited art.

One or more combinations of the prior art references identified in these Preliminary Invalidity Contentions, including in the accompanying charts, would have been obvious because these references would have been combined (1) using known methods to yield predictable results; (2) because each uses known techniques in the same way; (3) via a simple substitution of one known, equivalent element for another to obtain predictable results; and/or (4) due to a teaching, suggestion, or motivation in the prior art generally. Moreover, each of the above-identified references describes methods that were known to offer improvements and benefits to the art, and, accordingly, one of skill in the art would have been motivated to combine or modify the references as identified in each of the combinations identified herein, including in the accompanying charts. Defendants incorporate herein any and all motivations to combine prior art references that are identified, discussed, and/or included in these Preliminary Invalidity Contentions, Exhibits 551-A1 through 551-A16, Exhibit 551-B, Exhibits 781-A1 through 781-A16, Exhibit 781-B, Exhibits 616-A1 through 616-A19, Exhibit 616-B, Exhibits 720-A1 through 720-A7, and Exhibit 720-B.

In addition, it would have been obvious to try combining the prior art references identified herein and in the accompanying charts, 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. As the Supreme Court explained, “[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill” *Id.* at 1740. Accordingly, a person having ordinary skill in the art at the time of the alleged inventions would have been motivated to combine or adapt known or familiar methods in the art, especially where market forces prompt such variations.

Because there were a finite number of predictable solutions, a person of ordinary skill in the art had good reason to pursue the known options. The prior art references identified in these Preliminary Invalidity Contentions merely use those familiar elements for their primary or well-known purposes in a manner well within the ordinary level of skill in the art. Common sense and the knowledge of the prior art render the Asserted Claims invalid under either Section 102 or Section 103. This is particularly true for prior art references that contain multiple embodiments. A person having ordinary skill in the art would recognize that a single prior art reference disclosing multiple related embodiments as part of the same invention or set of inventions, discloses a finite number of combinations and would be motivated to combine or modify embodiments in a manner within the ordinary level of skill in the art.

A person having ordinary skill in the art would also have been motivated to combine the above prior art based on his or her knowledge, the nature of the problem to be solved, and the teachings of the prior art. The identified prior art addresses the same or similar technical issues, are directed to the same or similar technology, suggests the same or similar solutions to those

issues, and/or refer to or discuss other prior art and thus illustrate the close technical relationship among the prior art. In fact, the rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem come from the same field, and correspond well, as is the case here. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001).

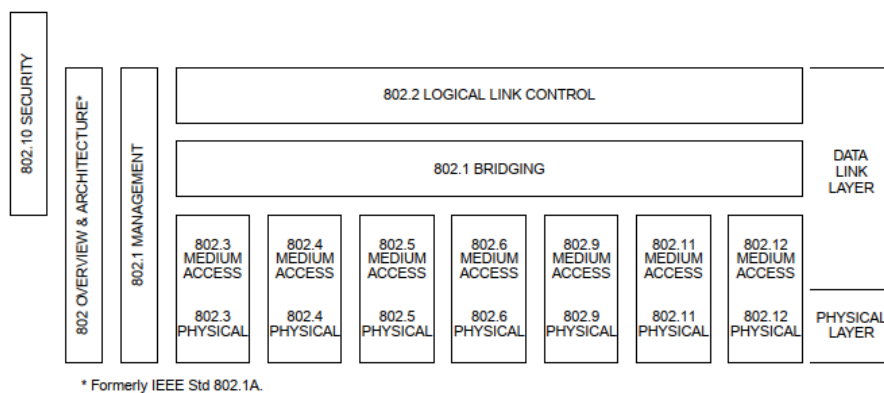
This motivation to combine the identified prior art is particularly applicable here, because the prior art all comes from the fields of wireless communication and wireless local area networks, and many incorporate teachings of the IEEE 802.11 family of standards. In particular, a person having ordinary skill in the art would recognize that wireless communication methods and protocols can be adjusted to make use of different protocols or different physical layer components. A person having ordinary skill in the art would recognize that improvements in a wireless communication system, such as a wireless local area network, would generally be implementable in other systems, especially when both incorporate or are based on the 802.11 family of standards, and would have been motivated to combine different teachings building on that family of standards.

A person of ordinary skill looking to improve the IEEE 802.11 standards or other patents, publications, or technology describing the same would also look to similar wired and wireless standards, because the person would understand that benefits conferred by similar technology in one standard is also applicable to other standards. For example, a person of ordinary skill working on improving the IEEE 802.11 standard would look to the standards released by the 3GPP, such as GSM, UMTS, CDMA, and LTE. Both standard setting organizations are working towards the same goal – improving wireless transmissions – and technology released by these

two standard setting organizations, and others, is frequently compatible and can be used to improve the other standards with minimum changes.

A person having ordinary skill in the art would also be motivated to combine references describing different layers of a network stack. A person having ordinary skill would think of networking technology, including IEEE 802.11 and other standards, as a set of layers. For example, the OSI model specifies 7 layers: physical, data link (which includes the MAC and LLC sublayers), network, transport, session, presentation, and application. As another example, the IP/TCP stack consists of 5 layers: physical, data link (which includes the MAC and LLC sublayers), network, transport, and application. The purpose of this layered approach is to allow innovation and improvement to one layer without affecting other layers. Thus, one of ordinary skill would understand and consider it obvious to combine a physical layer implementation from one patent, publication, or system with a MAC layer implementation from another patent, publication, or system. Indeed, the 802.11 standards themselves recognize that networks can be thought of in layers and encourage persons of ordinary skill to combine teachings on different layers as appropriate. See IEEE 802.11-1999 at v:

This standard is part of a family of standards for local and metropolitan area networks. The relationship between the standard and other members of the family is shown below. (The numbers in the figure refer to IEEE standard numbers.)



This family of standards deals with the Physical and Data Link layers as defined by the International Organization for Standardization (ISO) Open Systems Interconnection (OSI) Basic Reference Model (ISO/IEC 7498-1: 1994). The access standards define seven types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

Moreover, a person having ordinary skill in the art would also have been motivated to combine the different publications and patents that were authored by employees of a given company or assigned to the same assignee and/or related to the same subject matter.

Additionally, a person having ordinary skill in the art would have been motivated to combine different references that were authored, developed, or invented by the same individual(s) related to the same subject matter. The common inventor/author/architect of the references demonstrates that they relate to continued work in a common field of effort and continued related developments in that field. A person having ordinary skill in the art would, therefore, combine the references related to each individual. Additionally, based on the teachings of the references and/or the knowledge of one of ordinary skill, one of skill in the art would have been motivated to combine different references from the same company. And, a person having ordinary skill in the art would have been motivated to combine prior art systems or products with any related or applicable documentation or literature for that system, including for the reason that these materials are related.

There are many additional motivations to combine that may be applicable, and the examples listed herein and in the accompanying charts are merely illustrative and exemplary rather than exhausting or limiting. As discovery and their investigation are ongoing, Defendants reserve the right to identify additional motivations to combine.

Exemplary combinations are listed in the below sections for the Asserted Patents for purposes of explaining and exemplifying possible combinations under the motivation discussed in a particular paragraph. These combinations are not intended to be limiting but rather intended to provide notice of the reasoning behind particular motivations to combine. In many instances, multiple different motivations would apply to a particular combination (for example, if multiple

references were both authored by the same person and referred to the same product/system, then both of those motivations would apply) and the specific combinations were not duplicated.

Should any prior art be deemed not to disclose, explicitly or inherently, any limitation of a claim, Defendants reserve the right to argue that any such difference between that prior art and the corresponding claim would have been obvious to one of ordinary skill in the art. To the extent that such an argument is deemed a “combination” analysis for purposes of obviousness, Defendants disclose their present intention to rely on the separate combination of the knowledge of a person having ordinary skill in the art with each item of prior art identified. The knowledge of a person having ordinary skill in the art is demonstrated by, for example, the full list of references above, the prior art produced in this litigation, and forthcoming expert reports.

3. Additional Motivations to Combine

a. The 802.11 Standards

The IEEE 802.11 family of standards were well known prior to the Asserted Patents, as admitted in the Asserted Patents themselves. 802.11 was formally standardized first in 1997, with 802.11a and 802.11b formally standardized in 1999. Thus, a person having ordinary skill in the art would be well aware of the various aspects of those standards, including the protocols, physical layer components, and modulation techniques used, which included OFDM. At least the following prior art incorporates and/or builds upon the teachings of the 802.11 family of standards: U.S. Pat. No. 7,346,357; U.S. Pat. No. 7,701,912; U.S. Pat. No. 7,224,704; U.S. Pat. No. 7,630,403; U.S. Pat. Pub. No. 2003/0135640; U.S. Pat. No. 7,995,544; U.S. Pat. Pub. No. 2002/0071448; U.S. Pat. No. 7,039,358; U.S. Pat. Pub. No. 2002/0181492; U.S. Pat. Pub. No. 2004/0002357; U.S. Pat. No. 7,301,924; U.S. Pat. No. 7,039,412; U.S. Pat. Appl. Pub. No. 2003/0206532; U.S. Pat. Appl. Pub. No. 2004/0242252; U.S. Pat. Appl. Pub. No. 2005/0141448; U.S. Pat. Appl. Pub. No. 2003/0220112; IEEE 802.11-02/004r2; IEEE 802.11-02/004r3a; IEEE

802.11-03/119r0; IEEE Std 802.11e/D4.0; Airgo Networks AGN100; Super-G (Husted). Thus, this art is from the same field of endeavor, and a person having ordinary skill in the art would be motivated to look to this art and seek ways to modify this art to solve problems in the same field of endeavor, which is the same or closely related field to each of the Asserted Patents. Indeed, a person having ordinary skill in the art would have understood that “any improvement to the efficiency of wireless communications is desirable.” U.S. Pat. No. 7,630,403 at 2:66-67.

b. Simultaneous Transmission Was Well Known

It was well known that simultaneous transmissions of data packets allows for increased throughput and efficient use of the wireless spectrum. For example, including multiple data packets in an FFT that is transmitted as a single OFDM frame ensures that all available bandwidth is used. As a second example, transmitting multiple data packets simultaneously may ensure necessary header information is kept with the payload. As a third example, and as further discussed below, technologies such as MIMO and channel bonding were well known and further lend themselves to transmission of multiple data packets simultaneously. Indeed, the Asserted Patents admit that simultaneous transmission of data packets was known. *See, e.g.*, ’551 Patent at 1:23-2:37, Figs. 13-17; ’616 patent at 1:25-2:41, Figs. 14-16; ’781 patent at 1:28-2:51, Figs. 49-50; ’720 patent at 2:1-3:51, Fig. 37. The Prior Art is replete with use of simultaneous transmissions in wireless systems. *See, e.g.*, U.S. Pat. No. 7,630,403 at 2:21-32, 9:21-10:6, Fig. 3; U.S. Pat. No. 7,701,912 at 26:3-18; U.S. Pat. No. 7,346,357 at 5:11-29, Fig. 2, Figs. 5-6; U.S. Pat. No. 7,224,704 at 1:66-2:49, Fig. 3; U.S. Pat. Pub. 2002/0181492 at [0061]-[0063], [0069]-[0070], [0090]-[0091], [109], [0168]-[0173], [0178]-[0181], [0183]-[0187], Figs. 1-2, Figs. 4-5, Fig. 8, Fig. 11, Fig. 20, Figs. 23-25; U.S. Pat. Pub. 2004/0002357 at [0008], [0045], Figs. 3-4; JP2003-101457 at [0039]-[0041], [0056], [0059], Fig. 7; U.S. Pat. Pub. 2002/0003783 at [0026]-[0030], [0060]-[0065], Figs. 1A-1C, 4A, 4B, 5; U.S. Pat. No. 6,560,292 at 2:62-3:15, 6:9-29,

6:35-37, 7:5-20, 7:32-11:10, 14:4-11, 15:20-30, 16:12-22, 16:38-52, Figures 1-3, 5-7; U.S. Pat. No. 7,039,412 at 1:17-34, 2:20-32, 2:54-3:12, 3:21-41, 3:42-58, 4:17-39, 4:63-5:10, 5:37-44, 5:51-6:4, 6:35-65, 7:22-45, 7:60-65, 8:9-29, 8:30-35, Figures 2-6; U.S. Pat. Appl. Pub. No. 2004/0242252 at [0004]-[0007], [0018]-[0031]; [0034], [0037], [0039], [0042], [0044], [0051]-[0053], [0055]-[0057], [0086], Figures 2-5; Airgo Networks AGN100; Cervello at paras 3, 22-23; IEEE Response at 14-15; Super-G (Husted) at abstract, 2:13-25.

It would have been obvious to a person having ordinary skill in the art to use simultaneous transmissions of multiple data packets. It was well known that simultaneous transmissions allow for increased throughput and efficient use of the wireless spectrum. As such, adapting a wireless system to use simultaneous transmission would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing simultaneous transmissions with art disclosing wireless systems.

c. MIMO Was Well Known

It was well known that use of a MIMO system allows for increased throughput and efficient use of the wireless spectrum. As described in an exemplary prior art reference, in a MIMO configuration, “stations 10, 12 each includes a pair of antennas that communicate with the pair of antennas on the other station. Thus, for example, antenna 40 can communicate with antenna 44 and antenna 42 can communicate with antenna 46, thereby establishing two simultaneously available communication links 48 and 50 between stations 10 and 12. This type of MIMO configuration is referred to as a ‘2x2’ MIMO configuration, and other types of MIMO configurations exist in which more than two antennas at each station are implemented such as ‘3x3’ MIMO, etc.” U.S. Pat. No. 7,630,403 at 2:2-14. The same exemplary references describes

some of the benefits of MIMO. For example, “[w]ith MIMO, the bit stream can be broken into two parts and the parts can then be transmitted simultaneously via the two communication links 48 and 50. Thus, the overall time required to transfer the same information is advantageously reduced.” U.S. Pat. No. 7,630,403 at 2:21-28. Thus, MIMO improves overall data rates. *See id.* at 1:66-2:32. Indeed, even the concept of using MIMO specifically to improve IEEE 802.11 was well known. U.S. Pat. No. 7,301,924 (“Gurbuz”) at 1:29-61. As another example, the Asserted Patents admit that MIMO was known. *See, e.g.*, ’551 Patent at 1:23-2:37, Figs. 13-17; ’616 Patent at 1:25-2:41, Figs. 14-16; ’720 Patent at 1:29-38, 2:1-6, Fig. 37. The Prior Art is replete with use of MIMO to obtain such benefits. *See, e.g.*, U.S. Pat. No. 7,630,403 at 9:21-10:6, Fig. 3; U.S. Pat. No. 7,224,704 at Abstract, 2:10-49, 9:13-51, Fig. 3; Airgo Networks AGN100; Cervello at paras 3, 22-23; Super-G (Husted) at abstract, 2:13-25; U.S. Pat. No. 7,301,924 at 1:29-61; US Patent Appl. Pub. No. 2003/0067890 at Abstract, [0003]-[0004], [0006], [0008], [0011]-[0014], [0016]-[0018], [0029], [0032]-[0033], [0037], [0040], [0041] [0045]-[0046], [0048], [0053], [0057]-[0058], [0060]-[0061], [0075]-[0076], Figs. 1-3; US Patent Appl. Pub. No. 2002/0159431 at Abstract, [0003]-[0009], [0011], [0013]-[0016], [0026], [0028]-[0030], [0032]-[0036], [0039], [0042]-[0043], [0048]-[0049], Figs. 1-2, 4, 6-7.

It would have been obvious to a person having ordinary skill in the art to use a MIMO system. It was well known that use of a MIMO system allows for increased throughput and efficient use of the wireless spectrum. As such, adapting a wireless system to use MIMO would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated

to combine prior art disclosing MIMO with art disclosing wireless systems, and especially art disclosing wireless systems with multiple antennas and/or multiple transceivers.

d. Using Multiple Wireless Channels Was Well Known

It was well known that use of multiple wireless channels allows for increased throughput and efficient use of the wireless spectrum. As described in an exemplary prior art reference, “wireless access points may each utilize a plurality of the RF channels, e.g., may use each of the non-overlapping channels 1, 6 and 11 to effectively provide up to three times the normal channel capacity.” U.S. Pat. No. 7,701,912 at 25:57-61. Thus, use of multiple channels provides the benefit of increased channel capacity. The same exemplary references further describes, “if a wireless access point using only one RF channel could only handle fifty PCDs 110 on that respective channel, the wireless access point may operate to use all three non-overlapping RF channels to effectively triple this capacity to a total of 150 simultaneous PCDs 110.” U.S. Pat. No. 7,701,912 at 25:65-26:2; *see also id.* at 26:3-28. Another specific example of this is “channel bonding,” as described for example in IEEE Response at 14-15 and Super-G (Husted) at abstract, 2:13-25, which according to Plaintiffs’ infringement contentions teach that transmission may occur on multiple wireless channels. As another example, the Asserted Patents admit that using multiple wireless channels was known. *See* ’551 Patent at 1:23-2:37, Figs. 13-17; ’781 patent at 1:28-2:51, Figs. 49-50. The Prior Art is replete with use of multiple wireless channels in wireless systems. *See, e.g.,* U.S. Pat. No. 7,346,357 at 5:11-29, Fig. 2, Figs. 5-6; U.S. Pat. No. 7,039,358 at 5:65-6:27, 7:41-62, 8:52-9:13, 9:28-65, Fig. 1, Figs. 3-4; U.S. Pat. Pub. 2002/0181492 at [0061]-[0063], [0069]-[0070], [0090]-[0091], [109], [0168]-[0173], [0178]-[0181], [0183]-[0187], Figs. 1-2, Figs. 4-5, Fig. 8, Fig. 11, Fig. 20, Figs. 23-25; U.S. Pat. Pub. 2004/0002357 at [0008], [0045], Figs. 3-4; JP2003-101457 at [0039]-[0041], [0056], [0059], Fig. 7; U.S. Pat. No. 7,630,403 at 2:21-32, 9:21-10:6, Fig. 3; U.S. Pat. No. 7,224,704 at

Abstract, 2:10-49, 9:13-51, Fig. 3; U.S. Pat. Pub. 2002/0003783 at [0026]-[0030], [0060]-[0065], Figs. 1A-1C, 4A, 4B, 5; U.S. Pat. No. 6,560,292 at 2:62-3:15, 6:9-29, 6:35-37, 7:5-20, 7:32-11:10, 14:4-11, 15:20-30, 16:12-22, 16:38-52, Figures 1-3, 5-7; U.S. Pat. No. 7,039,412 at 1:17-34, 2:20-32, 2:54-3:12, 3:21-41, 3:42-58, 4:17-39, 4:63-5:10, 5:37-44, 5:51-6:4, 6:35-65, 7:22-45, 7:60-65, 8:9-29, 8:30-35, Figures 2-6; U.S. Pat. Appl. Pub. No. 2004/0242252 at [0004]-[0007], [0018]-[0031]; [0034], [0037], [0039], [0042]. [0044], [0051]-[0053], [0055]-[0057], [0086], Figures 2-5; U.S. Pat. Appl. Pub. No. 2003/0220112 at [0002]-[0004], [0007]-[0009], [0023], [0025], [0027], [0028], [0030]-[0035], [0037], [0040], [0042]-[0043], [0045]-[0047], [0050], [0052]-[0053], [0056], [0058]-[0059], Figures 2-10; Airgo Networks AGN100; Cervello at paras 3, 22-23; IEEE Response at 14-15; Super-G (Husted) at abstract, 2:13-25; Martone, Multiantenna digital radio transmission (2002) at 91-119, 235-291.

It would have been obvious to a person having ordinary skill in the art to use multiple wireless channels. It was well known that use of multiple wireless channels allows for increased throughput and efficient use of the wireless spectrum. As such, adapting a wireless system to use multiple wireless channels would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing use of multiple wireless channels with art disclosing wireless systems.

e. Transmitting on Mandatory Channels Was Well Known

It was well known that transmission occurs on a mandatory channel, including in multiple-channel systems, which allows for increased throughput and efficient use of the wireless spectrum. One specific example of this is “channel bonding,” as described for example in IEEE Response at 14-15 and Super-G (Husted) at abstract, 2:13-25, which according to

Plaintiffs' infringement contentions teaches that transmission may occur on multiple wireless channels, but always occurs on a mandatory channel. As described in U.S. Pat. No. 7,620,028 regarding Super-G, "binding a plurality of communications channels" allows one "to realize an aggregate throughput improvement." Super-G (Husted) at 1:5-11. As described, "data is received on a master channel and one or more secondary channels." *Id.* at 3:54-59. Moreover, to the extent Plaintiffs are mapping the "mandatory channel" simply to the operating channel used by a particular access point, this feature has existed since at least IEEE 802.11-1999. Using a mandatory channel ensures that all devices are coordinating their transmissions and allows for allocation of channels by each particular access point in a manner that limits interference between adjacent access points. The Prior Art is thus replete with transmission that occurs on a mandatory channel. *See, e.g.*, U.S. Pat. No. 7,630,403 at 8:66-10:6, Figs. 8-10; U.S. Pat. No. 7,346,357 at 6:6-58, 12:26-41, Figs. 4-6; JP2003-101457 at [0045]-[0047], Fig. 7; Cervello at para 45; IEEE Response at 14-15; Super-G (Husted) at abstract, 2:13-25; U.S. Pat. No. 6,560,292 at 2:62-3:15, 6:9-29, 6:35-37, 7:5-20, 7:32-11:10, 14:4-11, 15:20-30, 16:12-22, 16:38-52, Figures 1-3, 5-7; U.S. Pat. No. 7,039,412 at 1:17-34, 2:20-32, 2:54-3:12, 3:21-41, 3:42-58, 4:17-39, 4:63-5:10, 5:37-44, 5:51-6:4, 6:35-65, 7:22-45, 7:60-65, 8:9-29, 8:30-35, Figures 2-6; U.S. Pat. Appl. Pub. No. 2004/0242252 at [0004]-[0007], [0018]-[0031]; [0034], [0037], [0039], [0042], [0044], [0051]-[0053], [0055]-[0057], [0086], Figures 2-5; U.S. Pat. Appl. Pub. No. 2003/0220112 at [0002]-[0004], [0007]-[0009], [0023], [0025], [0027], [0028], [0030]-[0035], [0037], [0040], [0042]-[0043], [0045]-[0047], [0050], [0052]-[0053], [0056], [0058]-[0059], Figures 2-10.

It would have been obvious to a person having ordinary skill in the art to transmit using a mandatory channel, at least under Plaintiffs' apparent construction of the claims of the '551

Patent. It was well known to use multiple available channels in a channel bonded configuration to increase throughput and efficiently use the wireless spectrum. As such, adapting a wireless system to use, for example, multiple channels in a channel bonded configuration would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing transmission on a mandatory channel with art disclosing wireless systems.

f. Transmitting ACK Packets Without Using MIMO Was Well Known

It was well known for a receiver to use acknowledgement (“ACK”) packets to inform a transmitter that a packet was received successfully. As described in an exemplary prior art reference, “[i]t is generally desirable for the transmitting station to know whether its frames are being received by the intended recipient so that all failed data can be resent, if necessary. Accordingly, many communication protocols require the receiving station to send back an acknowledgment to the transmitting station immediately following receipt of a frame. The acknowledgment generally informs the transmitting station that the frame was correctly and completely received by the receiving station.” U.S. Pat. Pub. 2003/0135640 at [0007]. Moreover, it was well known that, due to their size, there is little benefit to transmitting ACK packets using MIMO, and the transmitting device may, therefore, send ACK packets without using MIMO to (1) conserve power; (2) improve likelihood that the ACK packet is successfully received; and (3) ensure that even a legacy device is able to receive the ACK packet. *See, e.g.*, U.S. Patent No. 7,630,403 at 1:55-2:42. Finally, using SISO to transmit ACK packets is the default manner of transmitting ACK packets in much of the prior art, and a person of ordinary skill modifying a SISO system to introduce MIMO would apply MIMO to the forward path and

(absent additional teachings) would not be compelled to also apply MIMO to the feedback path. The Prior Art, including the admitted prior art in the '616 Patent, is replete with use of ACK packets in wireless systems, including transmitting ACK packets without using MIMO. *See, e.g.,* U.S. Pat. Pub. 2003/0135640 at [0017], [0046]-[0047]; U.S. Pat. No. 7,224,704 at 10:1-30; IEEE 802.11-02/004r2 at 8; IEEE 802.11-03/119r0 at 3; Brown at 128-130; Gubbi at 7:15-33; Sabaa at Fig. 3, 6:50-58; Simoens at 4-5; Tsang at 4:52-65; Xiao at 1869, 1872; Lu at 1:66-2:49, 5:27-49, 6:1-19, 9:14-51, 10:1-30, Figures 2, 3, 4a-4c; U.S. Pat. Appl. Pub. 2003/0012318 at [0052], [0075]-[0078], Fig. 6.

It would have been obvious to a person having ordinary skill in the art to transmit ACK packets using a non-MIMO transmission, as that was in common practice and a person of ordinary skill in the art would have recognized there was minimal benefit to transmitting a single ACK packet using a MIMO configuration. Thus, transmitting ACK packets using a non-MIMO transmission involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. In particular, in a MIMO system, the options for an ACK packet would be to either transmit MIMO, or transmit non-MIMO. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing use of ACK packets, including transmitting ACK packets using a non-MIMO transmission with art disclosing wireless systems.

g. Group ACK Packets Were Well Known

It was well known that use of group ACK packets (also called “block acknowledgements” or “burst acknowledgements”) reduced unnecessary use of the wireless medium. As described in an exemplary prior art reference, “[t]ransmissions from a transmitting station to a receiving station typically involve transmitting a succession of frames. . . . In FIG. 2, a series of frame exchange sequences 20 is shown in which a transmitting station sends a

plurality of (e.g., 4) data frames 22 and a receiving station responds with four acknowledgments 24, one acknowledgment following each data frame.” U.S. Pat. Pub. 2003/0135640 at [0009]. The same references notes that this approach “is generally satisfactory, but does require an acknowledgment frame for each data frame. Acknowledgment frames require use of the transmission medium (wire or wireless) and take a finite amount of time to transmit upon receipt of the data frame. As such, a non-trivial amount of resources is spent just for the acknowledgments. During the time an acknowledgment frame is to be and being transmitted, useful data generally cannot be transmitted.” *Id.* “A solution to this problem is the provision for a group acknowledgment frame as shown in FIG. 3. Rather than sending an acknowledgment for each of the four data frames, a group of data frames are burst transmitted in sequence as shown followed by a single acknowledgment. . . . This type of acknowledgment scheme is called ‘group acknowledgment’ or ‘burst acknowledgment.’” *Id.* at [0010]. “Group acknowledgment thus advantageously reduces the number of acknowledgment frames and the associated time intervals between the respective data and acknowledgment frames” *Id.* at [0011]. The Prior Art is replete with use of group ACKs in wireless systems. *See, e.g.*, U.S. Pat. Pub. 2003/0135640 at [0016]-[0017], [0031], [0035], [0046]-[0047], Figs. 3-4; U.S. Pat. No. 7,224,704 at 10:1-30; U.S. Pat. No. 7,630,403 at 11:6-25; IEEE 802.11-02/004r2; IEEE 802.11-02/004r3a; IEEE 802.11-03/119r0; Brown at 128-130; Gubbi at 7:15-33; Sabaa at Fig. 3, 6:50-58; Simoens at 4-5; Tsang at 4:52-65; Xiao at 1869, 1872.

It would have been obvious to a person having ordinary skill in the art to use ACK packets to acknowledge groups or multiple received data packets. It was well known that use of group ACK packets reduced unnecessary use of the wireless medium. As such, adapting a wireless system to use group ACK packets would have involved choosing from a number of

identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing use of group or block ACK packets with art disclosing wireless systems.

h. Use of Physical and Virtual Carrier Sense Were Well Known

It was well known to use both physical and virtual carrier sense. As described in an exemplary prior art reference, “[a]ll stations, including legacy SISO-only stations, receive the allocation frame and set their NAV (network allocation vector) to the received duration value so that they will not transmit within that duration unless otherwise specified to transmit within the duration by the allocation vector. The NAV is a virtual carrier sense mechanism, as opposed to an actual carrier sense mechanism and is also specified by the 802.11 standard.” U.S. Pat. No. 7,630,403 at 9:10-17. Thus, the prior art 802.11 standard included both virtual carrier sense, the NAV, and actual or physical carrier sense. The same exemplary references describes the importance of having both: “This prevents stations that do not physically sense an actually busy medium to be busy from transmitting during the intended transmission period.” U.S. Pat. No. 7,630,403 at 9:17-20. “This reduces the probability of collision.” U.S. Pat. Pub. 2002/0071448 at [0014]. As another example, the ’551 Patent admits that at least physical carrier sense was known. See ’551 Patent at 1:23-2:3. The Prior Art is replete with use of physical and/or virtual carrier sense, including because both were already part of the prior art 802.11 standards. See, e.g., U.S. Pat. No. 7,346,357 at 6:6-35, 6:49-58; U.S. Pat. No. 7,039,358 at 8:15-51, 8:52-9:13, Fig. 3, Fig. 5; U.S. Pat. No. 7,995,544 at 5:1-22, 6:34-54, 10:32-58; U.S. Pat. Pub. 2002/0181492 at [0005], [0120], [0178]-[0180]; U.S. Pat. Pub. 2004/0002357 at [0017], [0045], Fig. 4; U.S. Pat. Pub. 2002/0071448 at [0014], Fig. 2; Sherman 1 at 1:23-44; Sherman 2 at paras 8, 37, 43; Yonge at 3:27-44, 19:13-41.

It would have been obvious to a person having ordinary skill in the art to use both physical and virtual carrier sense together, at least because both were used in the prior art 802.11 standards. Use of both physical and virtual carrier sense together would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing physical and virtual carrier sense with art disclosing wireless systems.

i. Setting a Transmit Inhibition Time Was Well Known

It was well known to use a transmit inhibition time in wireless networks, including to set the inhibition time to correspond to the longest transmission. As described above, virtual carrier sense was well known and performs this function. With virtual carrier sense, or the network allocation vector (NAV), it was well known that “[t]he NAV operates similarly to a timer, starting with a value equal to the Duration Field of the last frame transmission sensed on the medium and counting down to zero.” U.S. Pat. No. 7,995,544 at 5:18-22. “The MAC coordination monitors the Duration Field in all MAC frames and places this information in the station’s Network Allocation Vector (NAV) if the value is greater than the current NAV value.” *Id.* at 5:13-18. As described in an exemplary prior art reference, “[a]ll stations, including legacy SISO-only stations, receive the allocation frame and set their NAV (network allocation vector) to the received duration value so that they will not transmit within that duration unless otherwise specified to transmit within the duration by the allocation vector. The NAV is a virtual carrier sense mechanism, as opposed to an actual carrier sense mechanism and is also specified by the 802.11 standard.” U.S. Pat. No. 7,630,403 at 9:10-17. Thus, the prior art 802.11 standard included setting a NAV, which Plaintiffs equate to setting a transmit inhibition time. The same exemplary reference describes the importance of NAV: “This prevents stations that do not

physically sense an actually busy medium to be busy from transmitting during the intended transmission period.” U.S. Pat. No. 7,630,403 at 9:17-20. The Prior Art is replete with use of physical and/or virtual carrier sense, including because both were already part of the prior art 802.11 standards. *See, e.g.*, U.S. Pat. No. 7,346,357 at 6:6-35, 6:49-58; U.S. Pat. No. 7,039,358 at 8:52-9:13, 9:28-65, Figs. 3-4; U.S. Pat. No. 7,995,544 at 12:1-13, 12:42-13:25, Figs. 4-6; U.S. Pat. Pub. 2002/0181492 at [0083]-[0109], [0123-0132], [0135]-[0140], [0168]-[0173], [0178]-[0181], [0183]-[0187], Figs. 5-10, Figs. 12-14, Figs. 16A-16C, Figs. 17-18, Fig. 20, Figs. 23-25; U.S. Pat. Pub. 2002/0071448 at [0037]-[0039], Fig. 5; U.S. Pat. Pub. 2004/0002357 at [0017], [0045], [0055], Figs. 3-4; Hyun at 4:43-5:3; Sherman 1 at 7:31-35, 9:6-10; Sherman 2 at paras 53, 54; Yonge at 21:22-65, 22:47-64, 27:15-35.

It would have been obvious to a person having ordinary skill in the art to set a transmission inhibition time to a longest transmission time. As described above, virtual carrier sense was well known and performs this function. As such, adapting a wireless system to set a transmit inhibition time to a longest transmission time would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing transmit inhibition times with art disclosing wireless systems.

j. Pilot Signal Generators Were Well Known

It was well known to use a pilot signal generator and pilot signals, including for purposes of channel estimation. Indeed, pilot signals are described in IEEE 802.11a, which also introduced to 802.11 using OFDM signals to transmit data. With MIMO, where the goal is to leverage differences in the channel between individual antenna pairs to maximize throughput, and doing so requires knowledge of those channels, which in turn creates a need for pilot signal

generators and pilot signals. Use of pilot signal generators is so commonplace that individual prior art references may not have found it necessary to describe them to persons of ordinary skill in the art. Nonetheless, the Prior Art is replete with use pilot signal generators in the context of MIMO. *See, e.g.*, U.S. Patent No. 6,144,711 at 6:6-20, 6:42-48, 16:24-29, 16:34-35, 16:36-49, 18:47-19:1, 29:27-31:61, Fig. 1; U.S. Patent 6,363,121 at 4:61-5:14, Fig. 1; U.S. Patent No. 6,473,467 at 16:17-29, 16:50-17:16, Figures 1A, 3; U.S. Patent No. 6,937,665 at 8:61-9:9, 9:13-24, 10:32-53, 11:34-44, 15:63-16:12, 18:25-19:37, Figures 1-2; U.S. Patent No. 7,068,628 at 3:29-58, 8:1-31, Fig. 4; Airgo AGN100 and earlier design work and prototypes.

It would have been obvious to a person having ordinary skill in the art to include a pilot signal generator in a wireless system. It was well known to use pilot signals in a wireless system to perform tasks like channel estimation. As such, using a pilot signal generator in a wireless system would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing pilot signal generators with art disclosing wireless systems.

k. Calculating and Using Inverse Channel Matrices Was Well Known

It was well known to calculate and use an inverse channel matrix for interference reduction. Specifically, the mathematical formulae disclosed in the '720 Patent for using the inverse channel matrix were well-understood in the art prior to the '720 Patent. In fact, it is the most straightforward method for implementing MIMO – undo the effect of the channel, by inverting it. The Prior Art is replete with calculation and use of inverse channel matrices. *See, e.g.*, van Rooyen, Lotter, van Wyk, Space-Time Processing for CDMA Mobile Communications

(2000) at 93-123, 183-220; U.S. Patent No. 6,144,711 at Abstract, 18:47-19:1; U.S. Patent No. 6,473,467 at 24:25-25:30, 26:29-48; U.S. Patent No. 6,937,665 at 9:13-24, 15:63-16:12; U.S. Patent No. 7,068,628 at 6:11-7:43; Airgo AGN100 and earlier design work and prototypes.

It would have been obvious to a person having ordinary skill in the art to calculate and use an inverse channel matrix. It was well known to use inverse matrices to reverse or reduce the effect of the channel on wireless signals. As such, calculating and using inverse channel matrices in a wireless system would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. For the same reasons, it would have been obvious to calculate and/or use the inverse matrix at the transmitter or receiver – the same mathematics would be involved on either end, there are only two options (both of which are equally likely to be successful), and a person of ordinary skill would understand that deciding whether to perform the calculations for/using an inverse matrix at a transmitter or receiver is a simply design choice largely driven by the computation resources available at the transmitter and receiver. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing calculating and using inverse channel matrices with art disclosing wireless systems.

I. The Components of Wireless Transmitters and Receivers Were Well Known

It would have been obvious to use components such as data converters, FFT and IFFT blocks, frequency converters, local oscillators, modulators and demodulators, including use of these components in OFDM systems. All of these components were well known in OFDM systems in the Prior Art. *See, e.g.*, Raleigh at 2:44-48, 5:39-51, 6:32-34, 6:41-45, 7:24-35, 7:54-65, 14:33-38, 16:10-15, 16:36-56, 16:66-67; Hochwald at 2:24-50, 2:51-3:21, 4:61-5:14, 5:15-

30, 10:35-46; Wallace at 14:40-55, 19:22-21:44; Vandenameele at 16:34-67, 9:62-10:31; Li at 1:44-64, 3:29-58, Fig. 1, Fig. 4; IEEE 802.11 at 22; IEEE 802.11a at 24. As such, use of such components would have involved choosing from a number of identified, predictable solutions, with a high expectation of success, and would have been known to skilled artisans at the relevant times of the Asserted Patents. Thus, persons having ordinary skill in the art would have been motivated to combine prior art disclosing these types of wireless system components with art disclosing wireless systems.

Moreover, the following art discloses OFDM and MIMO OFDM systems: Raleigh; Wallace; Vandenameele; Li; Tehrani; Airgo AGN100. Thus, this art is from the same field of endeavor, and a person having ordinary skill in the art would be motivated to look to this art and seek ways to modify this art to solve problems in the same field of endeavor, which is the same field or closely related field to each of the Asserted Patents.

III. INVALIDITY OF THE ASSERTED PATENTS BASED ON 35 U.S.C. § 112

Subject to the statements, reservations of rights, and qualifications presented in Section I above, Defendants disclose the following bases for invalidity based on 35 U.S.C. § 112.

A. Invalidity for Lack of Written Description and/or Enablement

Defendants hereby identify the following grounds of invalidity based on lack of written description and/or lack of enablement under 35 U.S.C. § 112.

1. U.S. Patent No. 7,280,551

Claims 4 and 8 of the '551 Patent lack written description and/or enablement support for “a number of MIMOs that depends on a channel condition.” The specification provides no written description or enabling disclosure for how a person having ordinary skill in the art would determine how many MIMOs to use based on channel conditions, or even what is meant by the term “channel conditions.”

Claims 1-4 and 5-8 of the '551 Patent lack written description and/or enablement support for the phrase “method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO.” To the extent the claims require each of these three conditions to be met, then the specification provides no written description or enabling disclosure for how a person having ordinary skill in the art would determine what method or system would implement all three requirements.

Claims 2-4 the '551 Patent lack written description and/or enablement support for “distinguishing an STA A from an STA B, the STA A for which a mandatory channel is set, the STA B for which no mandatory channel is set.” The specification provides no written description or enabling disclosure for how a person having ordinary skill in the art could or should distinguish the two categories of STA. For the same reasons, claims 6-8 lack written description and/or enablement support for “distinguishing an STA A from an STA B” and “the STA A for which the mandatory channel is set, the STA B for which no mandatory channel is set.”

2. U.S. Patent No. 7,545,781

The Asserted Claims of the '781 Patent lack written description and/or enablement support for “predetermined time Ts.” The specification provides no written description or enabling disclosure for a person having ordinary skill in the art as to what the predetermined time Ts is or how it should be determined and set.

3. U.S. Patent No. 7,400,616

Claim 5 of the '616 Patent lacks written description and/or enablement support for “a lowest one of transmission rates the STA has.” The specification provides no written description or enabling disclosure for a person having ordinary skill in the art as to what the phrase means.

B. Invalidity for Indefiniteness

Defendants hereby identify the following grounds of invalidity based on indefiniteness under 35 U.S.C. § 112.

1. U.S. Patent No. 7,280,551

Claims 1-8 of the '551 Patent are invalid for indefiniteness with respect to the phrases “channel” and “channels.” The claims of the '551 Patent, especially as apparently interpreted by Plaintiffs based on their infringement contentions, do not reasonably convey the scope of the “channel” terms and especially do not allow a person of ordinary skill to differentiate with reasonable certainty between one “channel” and multiple “channels.”

Claims 1-8 of the '551 Patent are invalid for indefiniteness with respect to the phrase “setting a mandatory channel that is always used for transmission,” especially as other limitations leave open the possibility that “no mandatory channel” is set for some stations and to the extent Plaintiffs contend that “always” may be limited in time and/or does not actually require “always.”

Claims 1-8 of the '551 Patent are invalid for indefiniteness with respect to the phrase “by using a wireless channel/wireless channels that includes/include the mandatory channel.” A person having ordinary skill in the art would not be reasonably certain about the scope of the claims as to whether using one wireless channel, which is the mandatory channel, satisfies the claims, or if multiple wireless channels must be used.

Claims 1-8 of the '551 Patent are invalid for indefiniteness with respect to the phrase “method for transmitting a plurality of wireless packets simultaneously by using multiple wireless channels determined to be idle by carrier sense, a single wireless channel determined to be idle and MIMO, or the multiple wireless channels and the MIMO.” A person having ordinary

skill in the art would not be reasonably certain about the scope of the claims as to whether each of these three conditions must be met, or only one.

To the extent the “unit” terms of claims 5-8 of the ’551 Patent are means-plus-function terms, claims 5-8 are invalid because the specification lacks corresponding structure for performing the claimed functions. First, there is no corresponding structure clearly linked in the specification for performing the dual functions of “setting a mandatory channel that is always used for transmission, and transmitting the wireless packets only when the mandatory channel is idle by using a wireless channel or wireless channels that includes/include the mandatory channel.” Second, there is no corresponding structure clearly linked in the specification for performing the dual functions of “distinguishing an STA A from an STA B,” and “determining destinations of the wireless packets so as to transmit wireless packets addressed to said STA A only when said mandatory channel is idle by using a wireless channel or wireless channels that includes/include a mandatory channel, and to transmit wireless packets addressed to said STA B by using idle wireless channel or channels.” Third, there is no corresponding structure clearly linked in the specification for performing the function of “simultaneously transmitting wireless packets selectively using the multiple wireless channels or the MIMO in accordance with a number of pieces of data or a number of MIMOs that depends on a channel condition.”

2. U.S. Patent No. 7,545,781

The Asserted Claims of the ’781 Patent are invalid for indefiniteness because a person having ordinary skill in the art would not be reasonably certain about the scope of the claims. Specifically, the claims recite a “predetermined time T_s ,” but do not provide a person having ordinary skill in the art any understanding of what T_s means, where it comes from, or whether it could be zero and entirely superfluous to the claims.

The Asserted Claims of the '781 Patent are invalid for indefiniteness with respect to the phrase “channel.” The claims of the '781 Patent, especially as apparently interpreted by Plaintiffs based on their infringement contentions, do not reasonably convey the scope of the “channel” term and especially do not allow a person of ordinary skill to differentiate with reasonable certainty between one “channel” and multiple “channels.” This indefiniteness is only rendered worse by the “other than a wireless channel which requires longest transmission time T_{max} among wireless channels used for simultaneous transmission” phrase, since Plaintiffs appear to read this limitation onto what is effectively a single channel and/or has a single transmission time.

3. U.S. Patent No. 7,400,616

Claim 5 of the '616 Patent is invalid for indefiniteness because a person having ordinary skill in the art would not be reasonably certain about the scope of the claim. Specifically, the claim recites “a lowest one of transmission rates at which the STA has successfully received data packets.” The claim does not specify which data packets are considered in this analysis, leaving the range of transmission rates uncertain.

4. U.S. Patent No. 7,242,720

Claims 18, 19, 22, and 31 of the '720 Patent are invalid for indefiniteness because a person having ordinary skill in the art would not be reasonably certain about the scope of the claims. In particular, a person having ordinary skill in the art would not know which limitations are required by the claims and which are not and where (at the transmitter or the receiver) each limitation must be located, rendering the scope uncertain and the claim indefinite. For example, claims 18 and 19 recite “the OFDM signal transmitting device comprises at least an interference canceller among an inverse matrix computer, the interference canceller, and a pilot signal generator,” and each of the “inverse matrix computer,” “interference canceller,” and “pilot signal

generator” have requirements set forth in the claims, but the claim does not convey with reasonable certainty whether each of these limitations must be located at the “OFDM signal transmitting device,” at either the “OFDM signal transmitting device” or an “OFDM signal receiving device,” or neither. A similar indefinite structure exists in claims 22 and 31.

The Asserted Claims of the ’720 Patent are invalid for indefiniteness for claiming mixed subject matter; specifically, a method and apparatus. Each of the claims recite structural elements for a transmitting or receiving device, but also require that the device is “used in an OFDM signal communication system for transmitting OFDM signals over the same radio frequency from [the/an] OFDM signal transmitting device comprising a plurality of N transmitting antennas to [an/the] OFDM signal receiving device comprising N receiving antennas.”

IV. INVALIDITY OF THE ASSERTED PATENTS BASED ON 35 U.S.C. § 101

Section 101 of the Patent Act defines patent-eligible subject matter. Under the two-step framework laid out in *Alice* and *Mayo*, courts determine whether patent claims are drawn to patent-ineligible subject matter by: (1) “determin[ing] whether the claims at issue are directed to [an abstract idea],” and (2) if the answer is yes, looking to “additional features” of the claims to see if there is an “‘inventive concept’—i.e., an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Alice Corp. Pty. V. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Mayo Collaborative Servs. V. Prometheus Labs, Inc.*, 566 U.S. 66, 77 (2012)).

A. U.S. Patent No. 7,280,551

The ’551 Patent is directed to the abstract idea of transmitting when clear to send. For example, claim 1 recites a method for setting a “mandatory channel,” and then transmits only if the “mandatory channel” is idle. At *Alice* step 1, courts “look at the focus of the claimed

advance over the prior art to determine if the claim’s character as a whole is directed to” an abstract idea. *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (internal quotations omitted). Courts also “look to whether the claims in the patent focus on a specific means or method, or are instead directed to a result or effect that itself is the abstract idea and merely invokes generic processes and machinery.” *Two-Way Media Ltd. V. Comcast Cable Commc’ns, LLC*, 874 F.3d 1329, 1337 (Fed. Cir. 2017). As discussed in the preceding sections, every component in the claims was generic, conventional, and well known in the Prior Art. And there is no description in the body of the claims as to how a mandatory channel should be set, or even how to determine if the mandatory channel is idle. In short, “[t]here is nothing in [the ’551 Patent’s Asserted Claims] that is directed to *how* to implement” to transmit only when a mandatory channel is idle. *Affinity Labs*, 838 F.3d at 1258. Moreover, the specification and especially the claims themselves do not recite any technical improvement over the prior art or address any technical problem. For example, while the specification discusses power leakage, this concept is found nowhere in the claims, and Plaintiffs are reading the claims broadly to accuse features that have no connection to power leakage. Thus, claims 1-8 of the ’551 Patent are directed to the abstract idea of transmitting when clear to send.

At *Alice* step 2, the claims of the ’551 Patent do not add significantly more to the claimed abstract idea. As discussed in preceding sections, every component in the claims, including in the dependent claims, was generic, conventional, and well known in the prior art. Nor does the combination of elements together add significantly more or present any technology-based solution. For example, in claim 1 the combination of steps does not limit the claimed abstract idea or inform how the abstract idea is obtained. *See, e.g., Two-Way Media*, 874 F.3d at 1339. Other steps and elements of the claims represent only insignificant pre- or post-solution activity

that do not transform the claimed abstract idea into a patentable invention. *See, e.g., Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 939 F.3d 1355, 1367-68 (Fed. Cir. 2019). Thus, the overall combinations of elements of the claims of the '551 Patent do nothing to limit the abstract idea of transmitting when clear to send.

Defendants reserve the right to identify additional grounds of invalidity under § 101 in response to Plaintiffs' arguments and positions, any amendments to Plaintiffs' PICs, the Court's claim construction, or information uncovered during further discovery.

V. DOCUMENT PRODUCTION

Pursuant to the Court's Scheduling Order, Defendants have produced the prior art cited herein or in any attached exhibits bearing bates stamps DEF-EWF-00000001 to DEF-EWF-00013677. To the extent any item is not in English, an English translation has been or will be produced, and Defendants reserve the right to provide additional translations.

Defendants have also produced technical documents sufficient to show the operation of the accused products and summary, annual sales information for the accused products for the prior two years.

Defendants reserve the right to supplement their document productions pursuant to the orders of the Court, the Federal Rules of Civil Procedure, and any relevant governing laws and/or rules.

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CERTIFICATE OF SERVICE

I hereby certify that on this 6th day of October, 2020, I served the foregoing electronically to all counsel of record.

/s/ Ognjen Zivojnovic-
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