IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS AMERICA, INC.,

SAMSUNG ELECTRONICS CO., LTD.,

Petitioners,

v.

KONINKLIJKE KPN N.V.,

Patent Owner.

Case No. IPR2025-00533

U.S. Patent No. RE48,089

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. RE48,089

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LIST OF CHALLENGED CLAIMS

Claim	Limitation
6pre	An automatic coverage assessment method for generating a coverage assessment for a second wireless access network of a telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals, the method comprising
6a	collecting, at an information collector, information from terminals by
6b	selecting one or more terminals from at least part of the plurality of the terminals, the at least part of the plurality of the terminals capable of communicating with both the first wireless access network and the second wireless access network
6c	instructing the selected one or more terminals to measure signals from the second wireless access network
6d	obtaining measurement information indicative of the signals measured from the second wireless access network by the selected one or more terminals, and
6e	providing the measurement information to a coverage estimator generating, at the coverage estimator, the coverage assessment for the second wireless access network by:
6f	generating, at the coverage estimator, the coverage assessment for the second wireless access network by
6g	obtaining the measurement information from the information collector, and
6h	based on the obtained measurement information, generating the coverage assessment for the second wireless access network of the telecommunications infrastructure.

Claim	Limitation
7	The automatic coverage assessment method of claim 6, further comprising the step of triggering the information collector to select the one or more terminals.
8	The automatic coverage assessment method of claim 6, further comprising the step of obtaining location information for at least one of the at least part of the plurality of terminals prior to selecting the one or more terminals.
9	The automatic coverage assessment method of claim 8, further comprising the step of providing the location information valid upon obtaining the measurement information for at least one of the selected one or more terminals.
10a	The automatic coverage assessment method of claim 8, further comprising: associating the location information with at least one of the selected one or more terminals, and
10b	forwarding the location information associated with the at least one of the selected one or more terminals to the coverage estimator
12pre	A non-transitory computer-readable medium having instructions stored thereon that, when executed by a processor of a telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals, causes the telecommunications infrastructure to carry out operations of an automatic coverage assessment method for generating a coverage assessment for the second wireless access network, the operations including:
12a	collecting, at an information collector, information from terminals by:
12b	selecting one or more terminals from at least part of the plurality of the terminals, the at least part of the plurality of the terminals

Claim	Limitation
	capable of communicating with both the first wireless access network and the second wireless access network,
12c	instructing the selected one or more terminals to measure signals from the second wireless access network,
12d	obtaining measurement information indicative of the signals measured from the second wireless access network by the selected one or more terminals, and
12e	providing the measurement information to a coverage estimator; and
12f	generating, at the coverage estimator, the coverage assessment for the second wireless access network by:
12g	obtaining the measurement information from the information collector, and
12h	based on the obtained measurement information, generating the coverage assessment for the second wireless access network of the telecommunications infrastructure.

I. INTRODUCTION

Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. ("Petitioners") respectfully request IPR of Claims 6-10 and 12 of U.S. Patent No. RE 49,089 (the '089 patent). A reasonable likelihood exists that Petitioners will prevail on at least one claim.

The '089 patent relates to "assessing coverage of a wireless access network within a desired area via cooperating wireless access networks and terminals capable of measurement and reporting across the different wireless access networks." (EX1001, Abstract). While the patent purports to improve conventional methods of coverage assessment—*e.g.*, drive tests (EX1001, 1:46-2:9)—its alleged advancement of measuring signal quality using mobile devices instead of vehicles was old and well known when the '089 patent was filed. Indeed, the Board already invalidated all challenged claims of the reissued '089 patent (comprising the apparatus claims) in IPR2022-00079 (invalidating claims 1-5, 11, and 13-15). (*See* EX1009).

The same underlying references—Olofsson and Kuruvilla—cited in the previous IPR demonstrate that previously unchallenged method claims 6-10 and 12 are likewise unpatentable. Indeed, invalid claims 1-5 are substantially identical in scope and language as challenged claims 6-10, the main difference being that the former are directed to an apparatus and the latter are directed to a method. (EX1001 (*compare* claims 1-5 *with* claims 6-10)). In the previous IPR, the Board found Olofsson describes systems and methods for selecting mobile terminals, instructing them to collect signal information from wireless access networks, and using the signal information to assess coverage in the networks. (EX1009, 48-49). Kuruvilla builds on this idea by detailing how this data can be processed to generate coverage maps, further optimizing the network's performance. (*See e.g.*, *id.*, 67). As indicated by the Board's Final Written Decision, Olofsson and Kuruvilla, taken together, establish that the remaining claims of the '089 patent are likewise unpatentable. (EX1009).

This Petition also presents a second ground, based on Lee and Shrum, that independently confirms the challenged claims are unpatentable. Lee teaches "a system for collecting signal quality information in a mobile broadcasting network." (EX1006, [0026]). Lee's mobile devices are used to "measur[e] signal quality" and "transmit[] a reporting message" to a "measurement server." (EX1006, [0012], [0057]). The measurement server uses the collected measurement data to "determine how many terminals have a signal quality less than or equal to a threshold" (*i.e.*, assess coverage). (EX1006, [0058]). Shrum further discloses methods for processing collected measurement data into actionable coverage maps. (*E.g.*, EX1007, 2:32-36). In combination, Lee's real-time signal data collection would provide the input Shrum's system uses to produce comprehensive coverage assessments. (EX1003,

¶¶147-154). Thus, the obvious combination of Lee and Shrum discloses the full scope of the claims. (EX1003, ¶148).

Because the ’089 patent only reiterates concepts and systems that were already in widespread use before the critical date, this Petition seeks institution of IPR and a determination that Claims 6-12 of the ’089 patent are invalid.

II. STANDING

Petitioners certify the ’089 patent is available for *inter partes* review and they are not estopped from requesting IPR under 35 U.S.C. § 315(e)(1).

III. OVERVIEW OF THE ’089 PATENT

A. Priority

The ’089 patent is a reissue of U.S. Patent No. 8,626,175 (the ’175 patent). (EX1001). The PCT application to the ’175 patent was filed on December 16, 2010, and it entered the U.S. national stage on June 18, 2012. (EX1008 (’175 patent)). The reissue application that became the ’089 patent was filed on December 18, 2018. (EX1001, (22)). The ’089 patent claims priority to European Patent Application No. 09180130, filed on December 21, 2009. The prior art references relied upon in this petition predate December 21, 2009.

B. Prosecution History

The examiner allowed the applications that became the original ’175 patent and the ’089 reissue patent without issuing any Office Actions rejecting any claims.

(EX1002, 138-148). In the reasons for allowance, the examiner identified only the "selecting" and "instructing" limitations as the basis for allowance. (EX1002, 143-148).

Applicant sought reissue to "correct errors in the issued patents in claims 11 and 12, both of which are potentially subject to findings of invalidity under 35 U.S.C. §112." (EX1002, 339-341). Specifically, previous claim 11 contained a typographical error, repeating the phrase "configured for use in" twice: "[a] mobile user terminal ***configured for use in configured for use*** in the method of claim 6…" (EX1002, 340). Additionally, previous claim 12 "recit[ed] both a computer program comprising software portions and method limitations." (EX1002, 340).

C. Prior IPR (IPR2022-00079)

On November 5, 2021 Ericsson filed a petition challenging claims 1-5, 11, and 13-15 of the '089 patent based on Olofsson and Kuruvilla. The Board issued a final written decision on May 23, 2023, determining all challenged claims were unpatentable. (EX1009). Patent Owner's appeal of that decision to the Federal Circuit was dismissed on January 24, 2024.

D. Disclosure

The '089 patent describes "a method and system for assessing coverage of a wireless access network," in which selected terminals, capable of communicating with both a first and second wireless access network, measure signal information of the second network. (EX1001, Abstract). The measured signal information is then used to generate a coverage assessment of the second wireless access network. (*See id.*, Abstract). The '089 patent acknowledges prior art methods for generating coverage assessments, such as drive tests, which "consist of measurement routes that are traversed by a measurement terminal often mounted on a vehicle" to gather signal strength data and detect coverage issues. (EX1001, 1:46-62). The patent aims to generate coverage assessments "in a manner that minimizes or eliminates" reliance on drive tests. (*Id.*, 2:10-14, 1:46-62, 6:11-13, Fig. 1; EX1003, ¶¶47-51).

Figure 2 illustrates the applicable telecommunications infrastructure:

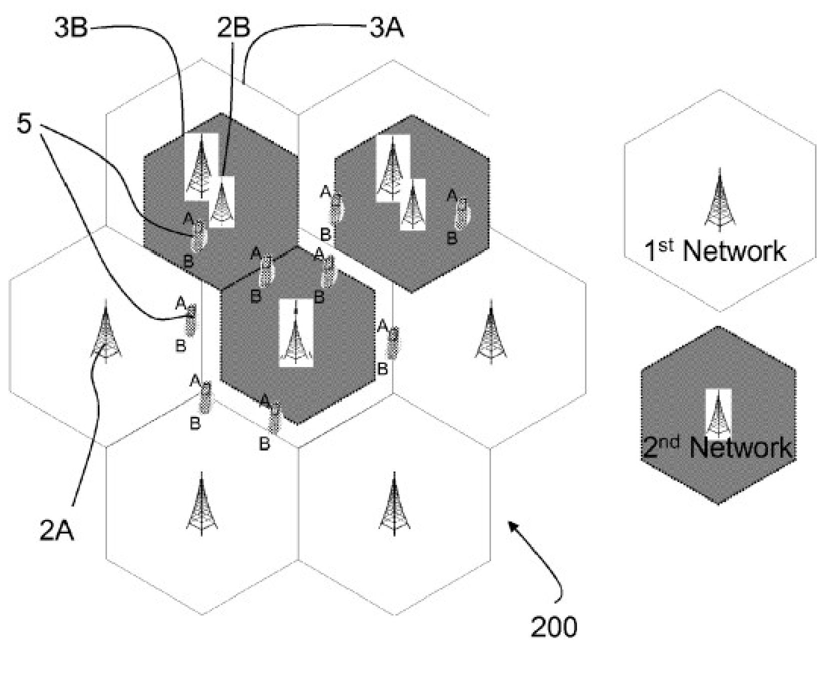


FIG. 2

(*Id.*, Fig. 2, 6:29-31).

The first wireless access network 2A and the second wireless access network 2B "may e.g., differ in radio access technology (e.g., GSM and UMTS or UMTS and LTE) or the used frequency spectrum (e.g. the 900 MHz and 1800 MHz frequency bands)." (*Id.,* 6:51-55). For example, the first network could be a 3G UMTS network, while the second network might be an LTE network. (*Id.,* 7:59-61). Mobile terminals 5 "are capable of communicating with both the first and second wireless access networks 2A, 2B" and "support multiple radio access systems." (*Id.,* 6:39-44, 7:65-67). The coverage assessment system 300 "includes an information collector 7 and a coverage estimator 8." (EX1001, 6:18-20, 7:12-22).

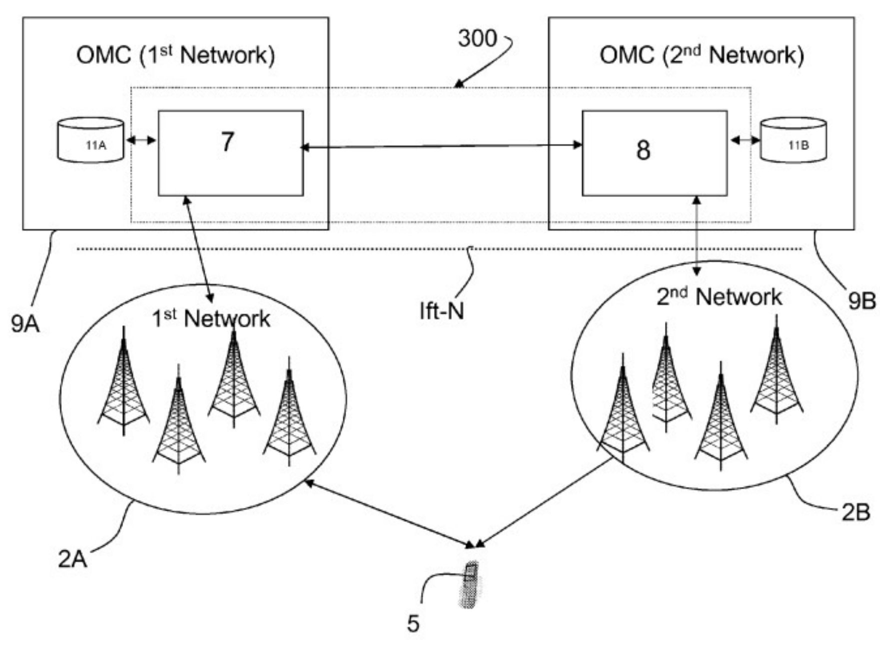


FIG. 3

(*Id.,* FIG. 3).

Figure 3 shows one configuration where an information collector 7 is located in the operations and maintenance center (OMC) of the first wireless access network 2A (OMC 9A) and the coverage estimator is located in the OMC of the second wireless access network 2B (OMC 9B). (EX1001, 7:22-28). Alternative configurations are also disclosed. (*Id.*, 2:26-34, 6:66-7:8, 7:22-28).

IV. TECHNICAL BACKGROUND

By the early 2000s, systems for collecting and mapping signal data were already widely implemented, leveraging standard methods and technologies. (EX1003, ¶¶33-35 (citing EX1011, 1:62-2:39, 3:15-32, 7:51-8:9; EX1013, 185; EX1010, 2:52-62, 3:46-50, 4:22-40, 5:17-24), ¶¶44-46 (citing EX1012, 342-344), ¶¶37-43). For example, the 3GPP standards provided standardized protocols, like 3GPP RRC for UMTS, GSM Radio Interface Layer 3, and LTE RRC, that facilitated the collection of signal and location data in cellular networks. (EX1003, ¶¶35, 44-46 (citing EX1012, 342-344)). Although these protocols were initially intended for network optimization and interference management, they were increasingly used for coverage mapping, leveraging metrics like signal strength and signal-to-noise ratio. (EX1003, ¶35). Using mobile terminals for coverage assessment became a recognized alternative to labor-intensive drive tests. (*Id.*, ¶35).

In addition, leveraging standardized systems to collect signal and location data and generate coverage maps was well-established in network management by 2009.

(EX1003, ¶36). The alleged novelty of the claims, particularly the "selecting" and "instructing" functions, reflects minor variations on well-understood principles. By 2009, leveraging mobile terminals to collect and report data was a widely adopted practice. (EX1003, ¶¶44-46 (citing EX1012)). Standardized protocols had already paved the way for systems that automated the process of selecting devices, triggering data collection, and integrating the results into comprehensive network maps. (EX1003, ¶45). These technologies and methods were not only common but also foundational to the industry's transition away from cumbersome and costly drive tests. (EX1003, ¶46)

V. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") at the time of the '544 patent would have had at least a Bachelor of Science degree in electrical engineering, computer engineering, computer science, physics, or an equivalent field, and at least two years of experience with cellular telecommunications, radio-access network architectures and protocols, and signal propagation in wireless networks. (EX1003, ¶¶54-58). More education can supplement practical experience and vice versa. *Id.* Petitioners' expert exceeded this skill level by the priority date. (*Id.*, ¶¶4-16).

VI. CLAIM CONSTRUCTION

In the previous IPR and related district court litigation, several means-plus-function limitations were construed. (EX1009 (FWD), 8-26); (EX1015 (*Markman*

Order), 8-60). Those limitations do not appear in the claims challenged in this Petition. Accordingly, for the purposes of this proceeding, Petitioners contend no claim terms need construction because the claims read on the prior art presented below under any construction consistent with *Phillips*, and should thus be given their plain and ordinary meaning. (EX1003, ¶¶59-60).

VII. GROUNDS

Ground	Basis	Reference(s)	Claims
1	§103	Olofsson in view of Kuruvilla	6-10, and 12
2	§103	Lee in view of Shrum	6-10, and 12

VIII. <u>GROUND 1:</u> CLAIMS 6-10 AND 12 ARE RENDERED OBVIOUS BY OLOFSSON IN VIEW OF KURUVILLA[1]

Olofsson discloses a telecommunications infrastructure comprising a first and second wireless access network, referred to as an "originating network" and "target network," respectively. (EX1003, ¶¶71-74). Mobile devices within the networks are selected and instructed to perform test measurements on the target network "for determining service quality and radio coverage." (EX1004, 12:25-27). Measurement reports are processed in a "test evaluation server, TES," which

[1] Petitioners are not aware of any secondary considerations of non-obviousness identified by Patent Owner. (EX1003, ¶¶215-219).

"estimate[s] the[] service quality and radio coverage provided" in the test network. (EX1004, 5:2-4, 18:11-13, 24:8-9, Abstract). Olofsson's TES performs a coverage assessment method as recited in claims 6-10 and 12 of the '089 patent.

Olofsson alone discloses every limitation of the challenged claims as recited. To the extent Patent Owner argues the challenged claims require generating a coverage map, however, Kuruvilla discloses this additional step, among other recited limitations as discussed below. Like Olofsson, Kuruvilla teaches an automatic coverage assessment system and implementation details of the coverage assessment process. Kuruvilla further expressly teaches a coverage map printer "capable of printing a coverage map" corresponding to the coverage assessment. (EX1005, [0034]).

A POSITA would have been motivated to combine the teachings of Olofsson and Kuruvilla, rendering the challenged claims obvious. (EX1003, ¶¶75-85).

A. Overview of Prior Art

1. Olofsson (EX1004)

The PCT application published as Olofsson was filed on September 26, 2008, and published on April 1, 2010. Olofsson qualifies as prior art under at least pre-AIA 35 U.S.C. § 102(e).

Olofsson focuses on the same objective as the '089 patent—*i.e.*, eliminating the inefficiencies associated with performing drive tests to assess signal coverage of geographic areas. (EX1003, ¶61-64; EX1004, 3:13-4:15; 7:9-10 ("[I]t is greatly desirable to reduce the need of drive tests for planning or estimating, e.g., radio coverage or service quality of a wireless communication system.")). Olofsson solves this problem by using UEs to "measure (13) on signals of [a] new cell and send[] a report (14) . . . on the outcome of the measurement(s)." (*Id.,* 9:21-23). "[T]he UE should report the result of the measurement to a network entity being responsible for evaluating the measurements." (*Id.,* 14:19-20). "Measurement reports received are processed in a test evaluation server, TES, (56)." (*Id.,* 18:11-13).

2. Kuruvilla (EX1005)

Kuruvilla was filed on January 15, 2008, and published on July 16, 2009. Kuruvilla qualifies as prior art under at least pre-AIA 35 U.S.C. §102(e).

Kuruvilla discloses post processing network element 18 in communication with coverage map printer 20, which is "capable of printing a coverage map 22," corresponding to a coverage assessment. (EX1003, ¶¶65-66; EX1005, [0034]). Kuruvilla's method "begins with the trigger (at step 203)," which causes the data collection module 14 (i.e., information collector) to select the terminals that will perform measurements. (EX1005, [0041]-[0042]). Those measurements are used to generate a coverage map, which can be used for a variety of purposes, including to "locate areas with poor RF signaling capabilities," "locate geographical locations where there is high traffic density," "show[] coverage area network problems," and "determine geographic areas where signal strengths are poor." (*Id.,* [0046], [0050]).

B. Motivation to Combine

A POSITA would have been motivated to combine Olofsson with Kuruvilla. (EX1003, ¶¶75-82).

First, Olofsson and Kuruvilla are analogous to the challenged claims and to each other. Specifically, both references are in the same field of endeavor and directed to solving the same problem as the '089 patent. The relevant field of endeavor is utilizing mobile devices to assess signal coverage in wireless telecommunication networks. (EX1001, 2:18-24; EX1004, 9:5-7; EX1005, [0009]). And the pertinent problem is avoiding the cost and time inefficiencies of conventional drive tests. (EX1004 (Olofsson), 4:10-15, 8:25-9:4; EX1005 (Kuruvilla), [0005]-[0006]); EX1001 ('089 patent), 1:32-2:9).

Second, regarding claim limitation 6[f], a POSITA would have been motivated to modify Olofsson's TES (56) to generate a ***visual*** coverage assessment (e.g., coverage map), as disclosed in Kuruvilla, to enhance the accuracy and granularity of coverage assessments, enabling faster and more precise identification of network deficiencies and areas for improvement. (EX1003, ¶77). Visual representations of data are often easier to interpret than the data in numerical form. (EX1003, ¶77). This capability would align with industry goals of efficiently ensuring optimal network performance before deployment, thereby increasing consumer satisfaction and reducing post-deployment troubleshooting efforts. (EX1003, ¶77).

Third, regarding claim 7, a POSITA would have been motivated to combine Olofsson's selection step with Kuruvilla's trigger (e.g., dropped call, UE receives weak signals, etc.) such that if a UE experiences a trigger event like weak test signals, Olofsson's base station (52) or base station controller (53) could select the relevant UE by sending it a parameter over "a dedicated channel." (*See* EX1004, 10:26-11:7, 12:6; EX1005, [0041]-[0042] (discussing Kuruvilla's triggers); EX1003, ¶78). Olofsson explains that only "a subset of available UEs is preferably selected to participate in the measuring to limit the amount of data to communicate and to process" because "[a]n excessive amount of selected UEs would risk causing unnecessary load of the target cell without providing a corresponding improvement as regards to measurement certainty," (EX1004, 10:20-24). Thus, in view of Olofsson and Kuruvilla, a POSITA would have been motivated to select only UEs that are experiencing an undesirable trigger event (e.g., low signal strength and/or radio coverage) to reduce unnecessary load on the ***second wireless access network*** (i.e. target network of Olofsson) that would occur if the measurements from every UE in the vicinity were collected and analyzed.

Fourth, regarding claim 9, a POSITA would have been motivated to consider the location information for the UE when assessing coverage because recording and mapping the precise location data of the UE when it measures the RF signals is necessary for "identify[ing] geographical areas which distribute poor radio frequency coverage." (EX1004, Abstract; EX1003, ¶79). Specifically, a POSITA would have been motivated to modify Olofsson's base station (52) or base station controller (53) to provide the location information valid upon obtaining the measurement information for at least one of the selected one or more terminals, as taught in Kuruvilla. Indeed, "recording the precise location data for the mobile unit and storing the precise location data in a database," is essential to achieving the goals of service providers. (EX1003, ¶79). For example, "service providers generally want to provide exceptional voice quality, [so] it is important for service providers to identify areas with poor RF coverage." (EX1005, [0003], [0033] ("[a] network administrator may gather this [location] information and use it in order to correct areas with poor coverage"). Further, "[s]ervice providers also want to identify areas of poor RF coverage areas in order to maximize efficiency when deciding where to place a new cell towner." (EX1005, [0003]).

Fifth*,* to the extent Patent Owner argues limitation 9 requires a validation step, a POSITA would have been motivated to modify the teachings of Olofsson-Kuruvilla to allow "the step of providing the location information [is] valid," *i.e.,* validating the location information based on the teachings of Kuruvilla and Olofsson. (EX1003, ¶80). Specifically, Kuruvilla discloses "recording the precise location data for the mobile unit and storing the precise location data in a database." (EX1005, [0009]). Similarly, Olofsson teaches recording the location information and the further step of using the location information of the UE in its selection process (*infra* § VIII.D.1.3-4). A POSITA would have appreciated the importance of periodically verifying the location information for each UE so that the most up to date location information for each UE is being used when generating a coverage map and in the selection process. (EX1003, ¶80).

Finally, regarding claim 10, a POSITA would have been motivated to associate a terminal with its corresponding location information to ensure the "recording [of] precise location data for the mobile unit" and "mapping the precise location data of the radio frequency representing the positioning of the mobile unit at a given time." (EX1005, [0009]). As a POSITA would understand, doing so is required to successfully achieve the goals of Olofsson and Kuruvilla—i.e., to "identify[] geographical areas which distribute poor radio frequency coverage," (EX1005, Abstract), and/or "estimate [] service quality and radio coverage provided in order not to receive a great number of complaints and for being capable of putting a price on [] offered service in relation to perceived value of a customer and expected demand for offered services," (EX1004, 5:2-7). (*See also* EX1003, ¶81).

C. Reasonable Expectation of Success

A POSITA would have reasonably expected success when combining Olofsson and Kuruvilla because both references disclose well-established systems for automatic coverage assessment. (EX1003, ¶¶82-85). Applying the additional details from Kuruvilla's teachings in Olofsson's method would have thus represented a straightforward application of known techniques, including generating coverage maps, using event triggers, and using location data, in a predictable way.

A POSITA would have recognized that complementing Olofsson's teachings with Kuruvilla's teaching of coverage map generation is a straightforward integration of known components and software. (EX1003, ¶83). Programming UEs to forward signal measurement data to post-processing system that can generate coverage maps would have been considered by a POSITA to be a routine software implementation that would yield predictable results. (EX1003, ¶83). Furthermore, because Olofsson's TES (56) "comprise[s] processing equipment" that "operates according to one or more computer program products," (EX1004, 18:23-27), and Kuruvilla's post processing module (16) is a "software module," (EX1005, [0008]), a skilled artisan would have reasonably expected a successful combination.

Further, because Olofsson's TES (56) "comprise[s] processing equipment" that "operates according to one or more computer program products," (EX1004, 18:23-27), and Kuruvilla's post processing module (16) is a "software module," (EX1005, [0008]), a skilled artisan would have reasonably expected a successful combination using known software modifications well within his knowledge and skill level.

Moreover, a POSITA would have reasonably expected success when making the obvious modifications to Kuruvilla and Olofsson to add the step of validating the location information and creating a *visual* coverage assessment, *infra* §§ VIII.D[6f], VIII.D[9], as these additions are nothing more than an application of known techniques, such as data validation and coverage map generation, using conventional components in a predictable way. (EX1003, ¶85).

D. Claim-by-Claim Analysis

1. Claim 6

(a) [6pre]

To the extent it is limiting, Olofsson discloses the preamble.

- ***"An automatic coverage assessment method for generating a coverage assessment for a second wireless access network"***

Olofsson discloses a method of "perform[ing] radio coverage or service quality measurements" (*i.e.*, a ***coverage assessment method***). (EX1004, 5:22-6:3; EX1003, ¶¶86-89). Olofsson explains that "[p]rior to open[ing] a communications system for public use and commercial services, most providers or operators would like to *estimate* their service quality and radio coverage provided in order not to receive a great number of complaints and for being capable of putting a price on their offered service in relation to perceived value of a customer and expected demand for offered services." (*Id.,* 5:2-7 (emphasis added)). The method involves "triggering of user equipment to perform test or measurement of a target network [i.e., a ***second wireless access network***]." (*Id.,* Abstract). The "estimate [of] service quality and radio coverage" ascertained from the measurement information is a ***coverage assessment for the second wireless access network***. Olofsson's coverage assessment method is ***automatic***, as it involves automated triggers and processing without human operation. *See* EX1004, 9:8-14. Figure 1 illustrates the automatic coverage assessment method taught in Olofsson:

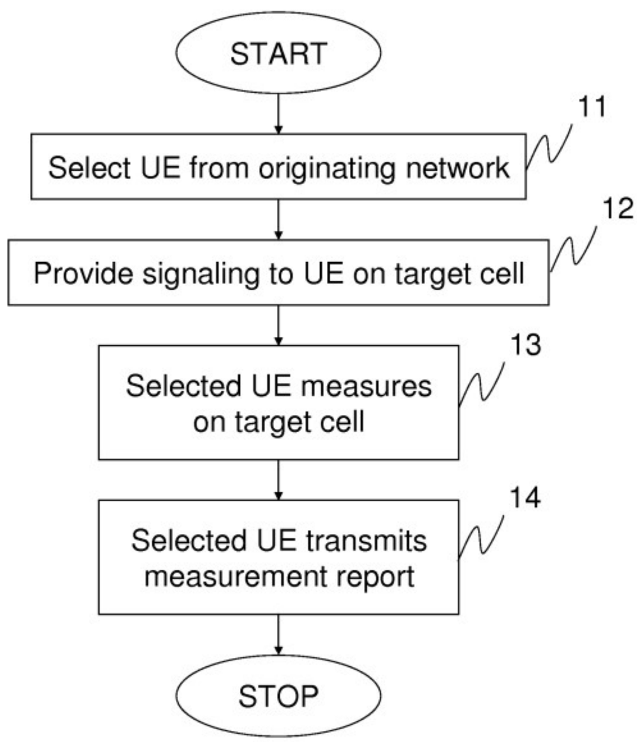


Fig. 1

(EX1004, Fig. 1).

- ***"of a telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals"***

Olofsson discloses a ***first wireless access network*** (i.e., "originating network") ***and a second wireless access network*** (i.e., "target network"), ***the first and second wireless access networks capable of providing services to a plurality of terminals*** (i.e., "user equipment" or "UE"). (EX1004, 20:2-4 ("A method of wireless service provision in a wireless cellular communications system comprising a first and a second communications network and user equipment equipped for communications in both networks" (emphases added)); 9:1-4 ("[T]he UEs controlled to assist in the testing must support the one or more radio access technologies required for performing the measurements of the cells of the target network."); 9:12-14 ("One required selection criterion is UEs to support the radio access technology or mode of operation for measurements of the target network/target cell."). The two networks are part of a ***telecommunications infrastructure***. (*Id.*, 13:11-25 (describing the invention in the context of a "cellular communication system"), 21:11-13 (first and second networks are telecommunication networks such as "WCDMA and LTE networks" or "GSM and WCDMA networks")).

(b) [6a]: collecting, at an information collector, information from terminals by:

Olofsson discloses ***collecting, at an information collector*** (i.e., receiving base station (52) or base station controller (53)) ***information from terminals*** (i.e., UEs). (EX1004, 14:18-19 ("Measurement reports are preferably transmitted . . . to the base station of the target cell."), claim 2 (The method comprising "in user equipment . . . providing one or more measurement reports comprising the recorded information"), Fig. 1 (step 14: "Selected UE transmits measurement report")). (EX1003, ¶90-91). Olofsson explains that the second network comprises one or more antennas (51) connected to the base station (52) for transmitting or receiving signals to or from a UE (40)." (*Id.,* 18:7-9).

(c) [6b]: selecting one or more terminals from at least part of the plurality of the terminals, the at least part of the plurality of the terminals capable of communicating with both the first wireless access network and the second wireless access network,

Olofsson teaches ***selecting one or more terminals from at least part of the plurality of the terminals***. (EX1003, ¶¶92-94). For example, Olofsson discloses a "***selection*** process" (11) wherein "a subset of available UEs [*i.e.*, ***one or more terminals from at least part of the plurality of terminals***] is preferably selected to participate in the measuring." (EX1004, 10:20-22). Specifically, the "at least part of the plurality of terminals" are the UEs that "support the radio access technology or mode of operation for measurements of the target network/target cell," *i.e.,* the

UEs that can perform the claimed measurements. (*Id.,* 9:12-14). Out of the "at least part of the plurality of terminals," one or more terminals is selected based a "network originated parameter" as described in Olofsson. (*Id.,* 10:26-11:7). For example, Olofsson explains that "a network originated parameter is transmitted (12) on a common channel" and "[a] UE receiving one or more such parameters and being enabled for participating in the (test) measurements comprises circuitry arranged for determining from inclusion of the one or more parameters whether the UE should participate and perform the test/measurements from a selection criterion." (*Id.,* 10:26-11:7). "[T]he signaling is transmitted from the target network," (*Id.,* 12:6), which a POSITA would have understood as a signal transmission from the base station (52) of the target network, (EX1003, ¶93).

Olofsson's "selection process (11) preferably includes, UE capabilities for performing and reporting measurements [and] UE location, i.e. the geographical position for which measurement data is desired." (*Id.,* 10:3-6). In addition, Olofsson notes that "[o]ne required selection criterion is UEs to support the radio access technology or mode of operation for measurements of the target network/target cell. (*Id.,* 9:12-14). Figure 1 illustrates the coverage assessment method, including the first step of selecting **(11)** a UE from the originating network.

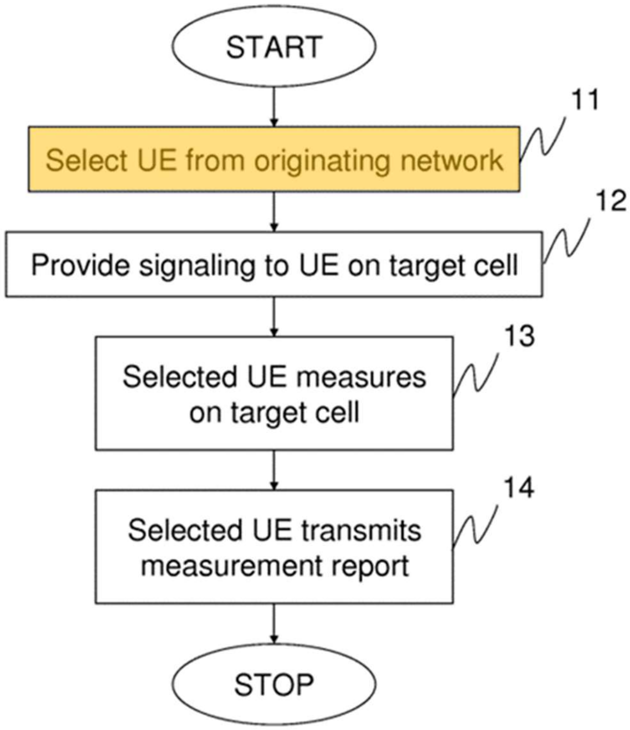


Fig. 1

(EX1004, Fig. 1 (color annotations added)).

(d) [6c]: instructing the selected one or more terminals to measure signals from the second wireless access network,

Olofsson discloses ***instructing the selected one or more terminals*** (i.e., UEs) ***to measure signals from the second wireless access network*** (i.e., target network). (EX1003, ¶¶95-97). Specifically, Olofsson explains that the selected "UE should measure (13) signals and parameters of the target cell *according to signaled instructions* from originating network." (EX1004, 14:1-3 (emphasis added); *see also id.*, 12:6-7 (alternative embodiment where "the signaling is transmitted from the target network")). The "signaling (12) to UE includes *instructions* for UE to perform one or more access attempts to the target cell to verify operations." (*Id.,* 3:26-28 (emphasis added)). For example, "the target cell transmits such example signaling by transmitting a single bit indicating that *test measurements should be performed* for that cell." (*Id.,* 12: 15-18; *see also id.*, 10:7-10 ("The signaling (12) to UE preferably includes [s]ignals or parameters to measure on or to determine from measured data [and] [r]eporting format comprising e.g. what to report and preferably also when and in what format to report.")).

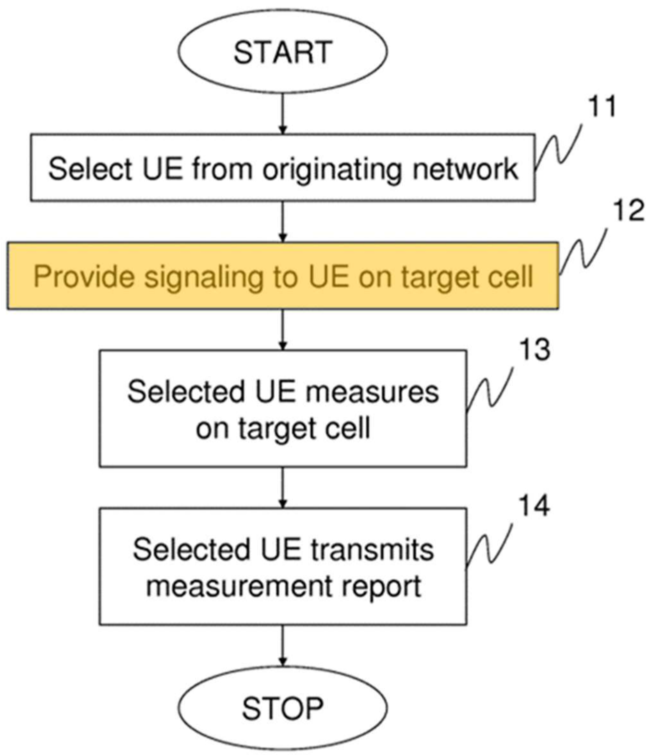


Fig. 1

(EX1004, Fig. 1 (color annotations added)).

(e) [6d]: obtaining measurement information indicative of the signals measured from the second wireless access network by the selected one or more terminals, and

Olofsson discloses ***obtaining measurement information indicative of the signals measured from the second wireless access network*** (i.e., target network) ***by the selected one or more terminals*** (*i.e.*, UEs). (EX1003, ¶¶98-99; EX1004, 10:11-19 ("a UE performs measurements of the one or more target cells")). Specifically, Olofsson explains that the selected "UE should measure (13) signals and parameters of the target cell according to signaled instructions from originating network." (EX1004, 14:1-3). "[T]he predefined measurements according to the system specification are satisfactory for determining service quality and radio coverage." (*Id.,* 12:25-27).

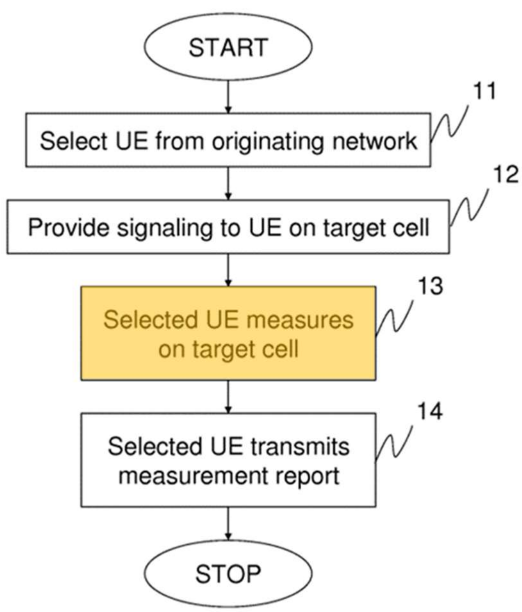


Fig. 1

(EX1004, Fig. 1 (color annotations added)).

(f) [6e]: providing the measurement information to a coverage estimator

Olofsson discloses ***providing the measurement information*** (i.e., "measurement report" (22)) ***to a coverage estimator*** (i.e., "test evaluation server" or "TES" (56)). (EX1003, ¶¶100-103). As shown in Figure 1 of Olofsson, "UEs participating in the test/measurement measure (13) on signals of the new cell and sends a *report* (14), preferably over the radio interface of the target cell, on the outcome of the measurement(s)." (EX1004, 9:21 (emphasis added)).

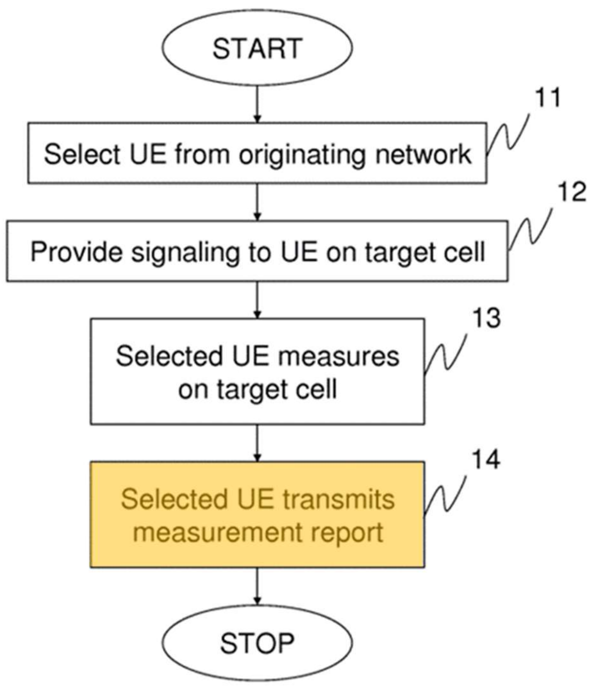


Fig. 1

(EX1004, Fig. 1 (color annotations added)).

Per Olofsson, "*[m]easurement reports* are preferably transmitted (14), (22) to the base station [(52)] of the target cell." (EX1004, 14:18-20 (emphasis added); *see* *supra* Ground I, [6b]). Figure 2 of Olofsson "shows a simplified flow chart for measurement report transmission to a target base station." (*Id.,* 15:4-5).

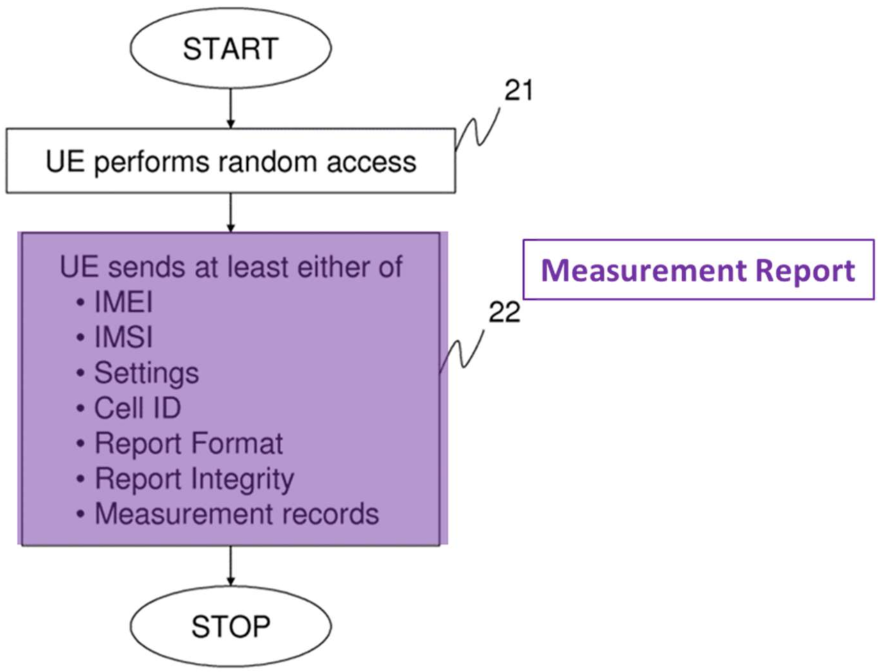


Fig. 2

(EX1004, Fig. 2 (color annotations added)). As illustrated in Figure 2, "[t]he transmitted (22) measurement report" includes information such as the "[m]easurement record" and "information on various one or more measurement records." (*Id.,* 15:19-27). According to Olofsson, these measurements are "satisfactory for determining service quality and radio coverage." (*Id.,* 12:25-27).

"[T]he receiving base station or base station controller will forward received information to the relevant TES [*i.e.*, the ***coverage estimator***]." (*Id.,* 14:26-15:1). In particular, the "[m]easurement reports received are processed in … [the] TES." (*Id.,* 18:11-13; *see also id.*, 24:8-9 ("the second communications network comprises a test evaluation server for storing and evaluating measurement reports")). Figure 5 illustrates "a simplified block diagram of a sub-network of an example target network," including TES (56) (the ***coverage estimator***).

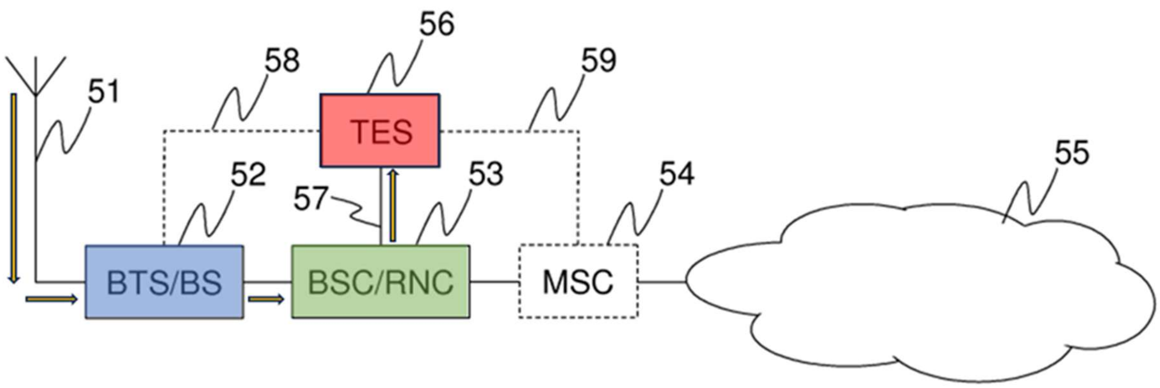


Fig. 5

(EX1004, Fig. 5 (color annotations added)).

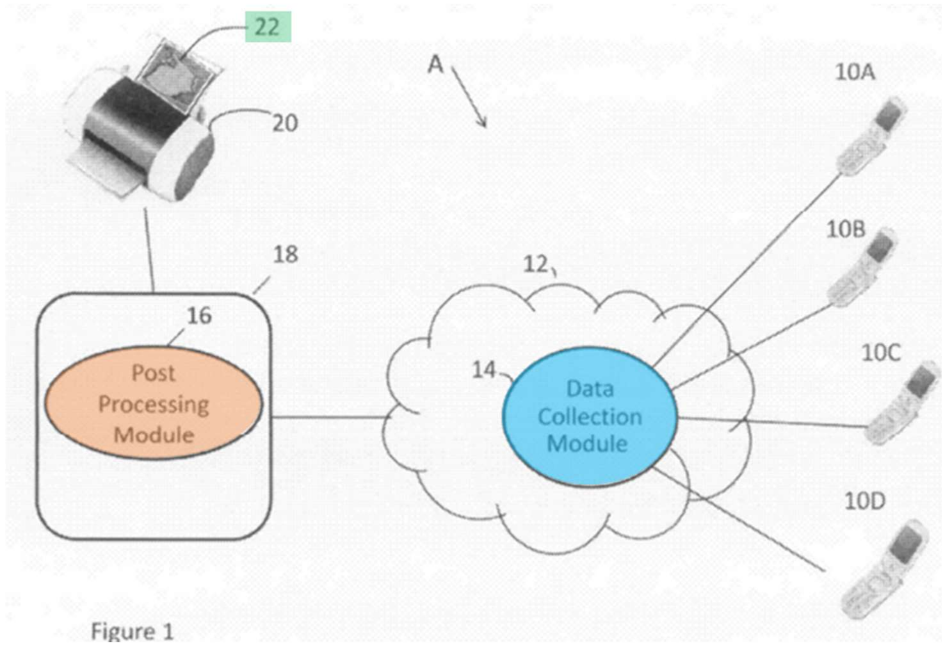
(g) [6f]: generating, at the coverage estimator, the coverage assessment for the second wireless access network by:

Olofsson discloses ***generating, at the coverage estimator*** (i.e., TES (56)) ***the coverage assessment for the second wireless access network*** (i.e., target network). (EX1003, ¶¶104-110). Specifically, Olofsson explains that "the second communications network [i.e., target network] comprises a test evaluation server [TES] for storing and *evaluating* measurement reports." (EX1004, 24:8-9 (emphasis added)). "[T]he predefined measurements according to the system specification are satisfactory for determining *service quality and radio coverage*." (*Id.,* 12:25-27 (emphasis added); *see also id.*, 5:2-7 (describing the need to "*estimate* … service quality and radio coverage" in a communications network)). A POSITA would have understood that the estimate of service quality and radio coverage is a ***coverage assessment***. (EX1003, ¶106).

To the extent Patent Owner argues that Olofsson's estimates are not a "coverage assessment," Kuruvilla discloses a coverage map, which is doubtless a "coverage assessment." In Kuruvilla, a data collection module 14 collects data, (EX1005, [0037] ("the data collection module 14 collects data"), which "is forwarded to a post processing network element 18 which includes a post processing module 16." (*Id.,* [0040]). And the post processing module 16 "creat[es] a map based on the location information" (i.e., ***generates a coverage assessment***). (*Id.,* [0046]; EX1003, ¶107).

Kuruvilla describes the map (22) as a "coverage map" *(Id.,* [0032]) and teaches that the "post processing module *plots the RF coverage information on a map* using data uploaded from the data collection module (14)," (EX1005, [0008] (emphasis added)). The map may also be used "in order to determine geographic areas where signal strengths are poor." (EX1005, [0050]). Kuruvilla's coverage assessment corresponds directly to the '089 patent's description of the coverage assessment as "a representation of locations/pixels and e.g. associated signal strengths of the second wireless access network." (EX1001, 5:20-22; EX1003, ¶107).

Figure 1 of Kuruvilla illustrates the above-described process:



(EX1005, Figure 1 (color annotations added)).

A POSITA would have been motivated to modify Olofsson's TES (56) to generate a visual coverage assessment (e.g., coverage map), as disclosed in Kuruvilla, and would have reasonably expected the combination to succeed, for the reasons provided in §§ VIII.B-C *supra*.

(h) [6g]: obtaining the measurement information from the information collector, and

Olofsson discloses ***obtaining the measurement information from the information collector*** (i.e., receiving base station (52) or base station controller (53)), and specifically by TES (56) (*i.e.*, the ***coverage estimator***). (EX1003, ¶¶111-112). As Olofsson explains, "the TES is connected (57) to a control unit (53) of the target radio communications system, such as a base station controller, BSC, . . . for access and data retrieval." (EX1004, 18:13-16; *see also id.*, 21-3 ("In an alternative realization, . . . TES (56) is connected (58) directly to the base station unit (52).")). "When measurement reports are transmitted to the target network, the receiving base station or base station controller will forward received information to the relevant TES [(56)]." (EX1004, 14:26-15:1).

(i) [6h]: based on the obtained measurement information, generating the coverage assessment for the second wireless access network of the telecommunications infrastructure.

Based on the obtained measurement information (i.e., measurement reports), Olofsson's TES (56) ***generates a coverage assessment*** (i.e., estimate of service quality and radio coverage) ***for the second wireless network of the telecommunications infrastructure*** (i.e., the target network). (EX1003, ¶¶113-114). As discussed in Limitation [6f] *supra*, Olofsson teaches a method and system for "perform[ing] radio coverage or service quality measurements" and "provid[ing] measurement reports" on a target network. (EX1004, 5:22-24, 6:4-6). "Measurement reports received are processed in a test evaluation server, TES, (56)," (EX1004, 18:11-13), and are used to determine estimates of "service quality and radio coverage" (i.e., a ***coverage assessment***). (*Id.,* 5:2-7, 12:25-27; EX1003, ¶113).

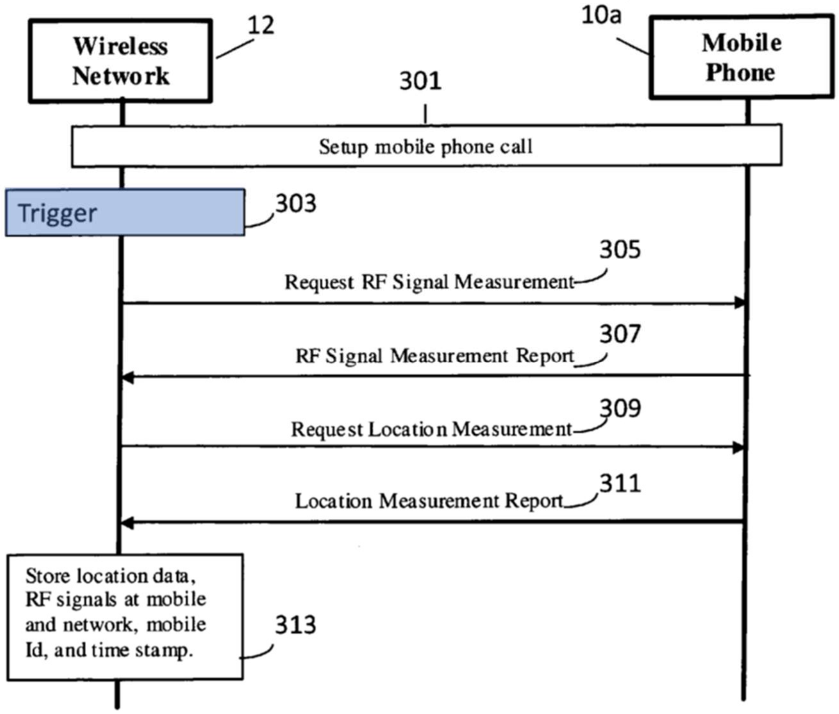
To the extent Patent Owner argues that Olofsson's estimates of service quality and radio coverage are not a ***coverage assessment***, this limitation is obvious in view of Kuruvilla. As discussed in Limitation [6f] *supra*, Kuruvilla discloses a post processing module 16 that generates a coverage map, which is a ***coverage assessment based on obtained measurement information***. (EX1005, [0008], [0032], [0037], [0040], [0046], [0050]). A POSITA would have been motivated to modify Olofsson's TES (56) to generate a visual coverage assessment (e.g., coverage map), as disclosed in Kuruvilla, and would have reasonably expected the combination to succeed, for the reasons provided in §§ VIII.B-C *supra.*

2. Claim 7: The automatic coverage assessment method of claim 6, further comprising the step of triggering the information collector to select the one or more terminals.

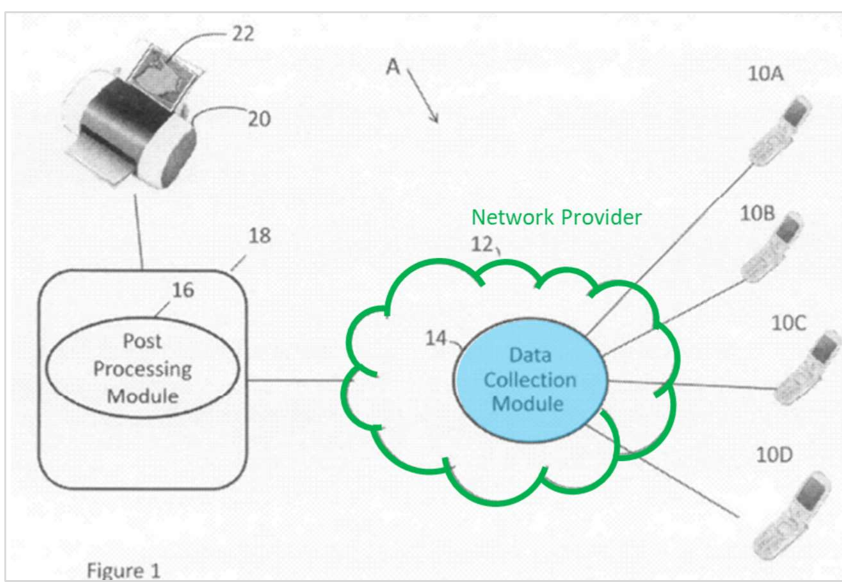
Olofsson discloses ***triggering the information collector*** (i.e., base station (52) or base station controller (53)) ***to select one or more terminals*** to perform measurements of the target network. (EX1003, ¶¶115-119). As discussed above, *see supra* § VIII.D.1[6b], the base station of the target network ***selects*** UEs (i.e., ***terminals***) to perform measurements by signaling parameters to the UE so that the UE can "determin[e] from inclusion of the one or more parameters whether the UE should participate," (EX1004, 11:3-7, 12:6 ("[T]he signaling is transmitted from the target network.")). A POSITA would have understood that because the selection step occurred, something must have caused (i.e., triggered) it to do so.

However, Olofsson does not expressly describe when or how the base station is triggered to send the parameters to the UE, and to the extent that Patent Owner argues that Olofsson fails to teach a trigger step, Kuruvilla expressly discloses this limitation. Specifically, Kuruvilla discloses that its "method begins with the ***trigger***," which "may be a variety of events," including "a timer expiring," "a mobile power increase signaling a reduction in signal strength," "a dropped call, " etc. (EX1005, [0041]; Figs. 2-4). According to Kuruvilla, this "[v]ariety of events may constitute a trigger which *prompts the data collection module 14* [i.e., an ***information collector***] collects [sic] data." (*Id.,* [0037] (emphasis added)). In the combined system, the trigger would initiate the measurement process, which in Olofsson's system begins with the selection of terminals to perform measurements in order to reduce unnecessary load on the target cell, as described above. (EX1003, ¶117).

Figure 3 of Kuruvilla illustrates the trigger occurring at step 303. (EX1005, Fig 3, [0048]):



(EX1005, Fig. 3 (color annotations added)). Note, as shown in Figure 1, "[t]he network provider 12 includes [the] data collection module." (*Id.,* [0034], [0036], Fig, 1):



(EX1005, Figure 1 (color annotations added)).

A POSITA would have been motivated to apply Kuruvilla's trigger events to Olofsson's system, and would have reasonably expected the combination to succeed, for the reasons provided in §§ VIII.B-C *supra.*

3. Claim 8*:* The automatic coverage assessment method of claim 6, further comprising the step of obtaining location information for at least one of the at least part of the plurality of terminals prior to selecting the one or more terminals.

Olofsson discloses that the selection process includes ***obtaining location information for at least one of the at least part of the of the plurality of terminals*** (UEs) ***prior to selecting the one or more terminals***. (EX1003, ¶¶120-121). Specifically, Olofsson expressly discloses that "[t]he selection process (11) preferably includes . . . UE ***location***, i.e. the geographical position for which measurement data is desired." (EX1005, 10:3-6). As discussed above, the information collector (i.e., base station (52) or base station controller (53)) selects one or more terminals (40) by transmitting one or more parameters to the UE. (*See supra* IX.A.3(c); EX1005, 10:26-11:7, 12:6). Olofsson's information collector therefore is the component that obtains the UE location information for at least one of the at least part of the plurality of terminals prior to selecting the one or more terminals, since UE location is taken into account as part of the selection process.

Moreover, in IPR2022-00079, the Board found that a POSITA would have understood from this disclosure of Olofsson that "the system obtains the UE location information for the terminal(s) prior to selecting the terminal(s)" [and] that "Olofsson discloses obtaining location information prior to selecting the terminal(s), and that, in the proposed Olofsson-Kuruvilla combination, this would have been performed by the 'information collector,' as discussed above." (EX1009, pp. 65-66).

4. Claim 9: The automatic coverage assessment method of claim 8, further comprising the step of providing the location information valid upon obtaining the measurement information for at least one of the selected one or more terminals.

Olofsson discloses an information collector (i.e., base station (52) or base station controller (53)) that performs the step of ***providing the location information valid upon obtaining the measurement information*** (i.e., measurement report) ***for at least one of the selected one or more terminals*** (UEs). (EX1003, ¶¶122-128). The '089 patent explains that this step may be performed by "the information collector 7[, which] may be configured to update the location information for each of the selected one or more terminals with the *location information valid when the measurement information was obtained* from them." (EX1001, 9:25-29 (emphasis added)).

Olofsson teaches the same process, i.e., "[i]f the UE is capable of receiving GPS (Global Positioning System) information, *positioning information* from a GPS receiver is preferably included with test results in a measurement report. (EX1004, 14:10-12 (emphasis added); *see also id.*, 17:27-29 ("measurement data is preferably combined with a *geographical position* of the measurement." (emphasis added))). As discussed above, Olofsson discloses that the base station (52) or base station controller (53) is the component that provides the measurement reports (and thus, the location information) to the test evaluation server, TES (56). (*Id.,* 14:19-26 ("The UE should report the result of the measurements to a network entity being responsible for evaluating the measurements."); 14:26-15:3 ("When measurements reports are transmitted to the target network, the receiving base station or base station controller will forward received information to the relevant TES.")).

This is consistent with the Board's prior decision in IPR2022-00079 wherein the Board considered similar language when invalidating claim 5 of the '089 patent. EX1001, cl. 5 (". . . wherein the information collector is further configured to provide location information valid upon obtaining the measurement information for at least one of the selected one or more terminals.); (EX1009, 22-24, 69-70).

Alternatively, to the extent Patent Owner argues that Olofsson does not disclose this limitation, the limitation Kuruvilla does. Specifically, Kuruvilla independently discloses an information collector (i.e., data collection module (14)) that performs the step of ***providing the location information valid upon obtaining the measurement information*** (i.e., measurement report) ***for at least one of the selected one or more terminals*** (10A). Specifically, Kuruvilla teaches that "a report of the RF signal measurement [is] sent from the mobile phone 10A to the wireless network 12 (at step 407)" and "the wireless network 12 makes the location measurement (at step 409)." (EX1005, [0053-0054]). Next, "the location measurement, along with the RF signal of pilot channels at the mobile 10A . . . are stored (at step 411)." (*Id*., [0054]). Then, "[t]he post processing module 16 [(i.e., the claimed coverage estimator)] periodically uploads the data collected by the data collection module 14 [(i.e., the claimed information collector)]." (*Id.,* [0056]). A POSITA would have understood this periodic uploading (i.e., updating) to determine whether the location information remains valid over time.

A POSITA would have been motivated modify Olofsson's base station (52) or base station controller (53) to provide the location information valid upon obtaining the measurement information for at least one of the selected one or more terminals, and would have reasonably expected the combination to succeed, for the reasons provided in §§ VIII.B-C *supra.*

To the extent Patent Owner argues that location verification is missing from the Olofsson-Kuruvilla combination, location verification is not a recited claim step, and even if it were, a POSITA would have been motivated to modify the combination of Olofsson and Kuruvilla to include location verification with a reasonable expectation of success for the reasons provided in *supra* §§ VIII.B-C.

5. Claim 10

(a) [10a]: The automatic coverage assessment method of claim 8, further comprising: associating the location information with at least one of the selected one or more terminals, and

Olofsson discloses ***associating the location information with at least one of the selected one or more terminals*** (40). (EX1003, ¶129). Specifically, Olofsson teaches that "the measurement data is preferably combined with a geographical position of the measurement." (EX1004, 9:14-17, 17:28-29). A POSITA would understand that the geographical position of the *measurement* is the same as (and hence, ***associated with***) the geographical position of the *UE* because the UE performs the measurement. (EX1003, ¶129; EX1004, 10:11-15 ("a UE performs measurements of the one or more target cells)). Indeed, as Olofsson explains, "[a] UE preferably then comprises receiver (49) for receiving GPS (global position system) signals." (EX1004, 17:29-18:1). "If the UE is capable of receiving GPS (Global Positioning System) information, positioning information from a GPS receiver is preferably included with test results in a measurement report." (*Id.,* 14:10-12). The measurement report also includes self-identifying information for the UE, such as its international mobile equipment identity (IMEI), which associates the reported GPS location with the particular UE. (EX1004, 20:20-21 ("including in a measurement report . . . international mobile equipment identity"), 15:19-20 ("The transmitted (22) measurement report preferably comprises at least one of

International Mobile Equipment Identity, IMEI, ...")). Further, if the "UE is not capable of receiving GPS information . . . , a coarse position information is preferably derived from the cell ID of the source cell or the target cell on which the UE is camping, the measurement report including position information or cell ID of the source or target cell." (*Id.,* 14:130-16). Thus, regardless of the approach used, the resulting position information is associated with the particular UE.

While Olofsson alone discloses ***associating the location information with at least one of the selected one or more terminals***, Kuruvilla does so as well. (EX1003, ¶130). For example, Kuruvilla's UEs include "a global positioning system which is used in order to derive the location information," (EX1005, [0021]), or "the system includes a location module which is configured to derive the location from the associate mobile unit's positioning at a given time," (*Id.,* [0022]). Kuruvilla explains that "[m]obile unit location measurement can be performed through methods known in the art," (*Id.,* [0044]), and the "location data, RF signals at the mobile and the network, mobile ID, and timestamp (at step 217)" are "stored at the post-processing module 16," (*Id.,* [0046]), which a POSITA would understand to be the claimed coverage estimator, (EX1003, ¶130), as discussed above, *see supra* § IX.A.3(g).

A POSITA would have been motivated to associate a terminal with its corresponding location information to ensure the "recording [of] precise location data for the mobile unit" and "mapping the precise location data of the radio frequency representing the positioning of the mobile unit at a given time." (EX1005, [0009]). As a POSITA would understand, doing so is required to successfully achieve the goals of Olofsson and Kuruvilla—i.e., to "identify[] geographical areas which distribute poor radio frequency coverage," (EX1005, Abstract), and/or "estimate [] service quality and radio coverage provided in order not to receive a great number of complaints and for being capable of putting a price on [] offered service in relation to perceived value of a customer and expected demand for offered services," (EX1004, 5:2-7). (*See also* EX1003, ¶131).

(b) [10b]: forwarding the location information associated with the at least one of the selected one or more terminals to the coverage estimator

Olofsson discloses ***forwarding the location information associated with the at least one of the selected one or more terminals*** (UEs) ***to the coverage estimator*** (TES). (EX1003, ¶132). Specifically, Olofsson teaches providing the UE location with the signal measurements in the measurement report (as discussed above for Limitation [10a]), and the measurement report is forwarded to the TES. (EX1004, 14:26-15:1 ("When measurement reports are transmitted to the target network, the receiving base station or base station controller will forward received information to the relevant TES."), 14:6-17 (GPS location or position information is included in the measurement report), 17:27-29 ("measurement data is preferably combined with a geographical position of the measurement")).

Although Olofsson alone teaches ***forwarding the location information associated with the at least one of the selected one or more terminals to the coverage estimator***, Kuruvilla also provides this teaching. (EX1003, ¶133). Specifically, Kuruvilla discloses that "data collection module 14 is used to collect data" that "stems from the radio frequency and represents the positioning of the mobile unit 10A – 10D at a given time" and "includes location information and the given time when the data was collected." (EX1005, [0036]). Kuruvilla's ***coverage estimator*** (i.e., post processing module 16) "periodically uploads the data collected by the data collection module 14." (1005, [0055]). Kuruvilla discloses that after the data is forwarded to the coverage estimator, "the data may then be sent to a printer 20 in order to create a [coverage] map 22 to be used by an administrator." (*Id.,* [0056]).

A POSITA would have been motivated to ***forward the location information associated with the at least one of the selected one or more terminals to the coverage estimator***, as taught in Olofsson and Kuruvilla, in order to "evaluat[e] the measurements," (EX1004, 14:19-21, 18:11-13), and "record and store the data and organize [it] into a report," (EX1005, [0040]). (*See also* EX1003, ¶134).

6. Claim 12

(a) [12pre]

To the extent the preamble is limiting, Olofsson discloses the preamble.

- ***"A non-transitory computer-readable medium having instructions stored thereon"***

Olofsson discloses "software enabled units and devices," which would include computer-readable media having instructions stored thereon to implement the disclosed functionalities. (EX1004, 19:7-12). A POSITA would understand that the described processes—such as selecting and instructing UEs, transmitting measurement reports, and processing the data in a test evaluation server (TES 56)—require executing program instructions. (EX1003, ¶¶135-136; EX1004, 5:22-6:3; 18:11-13).

- ***"when executed by a processor of a telecommunications infrastructure . . .* [*the non-transitory computer-readable medium*] *causes the telecommunications infrastructure to carry out operations of an automatic coverage assessment method for generating a coverage assessment for a second wireless access network,***

Olofsson's telecommunications infrastructure includes, *inter alia*, a base station, base station controller, test evaluation server (TES 56)—that work together to automatically generate a coverage assessment for a second wireless access network, as discussed above for Claim 6. A POSITA would understand that these components operate under software instructions stored on a non-transitory computer-readable medium and executed by a processor. (EX1004, 18:11-13 ("Measurement reports received are processed in a test evaluation server, TES, (56) comprising storage elements and processing circuitry"); EX1003, ¶137)). A POSITA would recognize that the processor of the TES executes instructions to: (1) receive measurement reports from the UEs; (2) store the data in storage elements; and (3) process the data to generate the coverage assessment for the second wireless access network. (EX1004, 5:22-24, 6:4-6; EX1003, ¶137). The TES processes these reports to generate a performance comparison or validation of the target network—a coverage assessment that allows providers to evaluate service quality and radio coverage prior to opening the network for public use. (EX1004, 6:10-12, 5:2-7).

- ***the telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals, the operations including:***

See supra § VIII.D.1(a) above regarding limitation [6pre]. (EX1003, ¶138).

(b) [12a]-[12h]

Limitations [12a]-[12h] are identical to limitations [6a]-[6h], respectively, and are disclosed and/or rendered obvious for the reasons set forth in *supra* § VIII.D.1[6a]-[6h]. (EX1003, ¶¶139-146).

IX. GROUND 2: CLAIMS 6-10 AND 12 ARE RENDERED OBVIOUS BY LEE IN LIGHT OF SHRUM

Lee discloses an broadcast server 100 and management server 150 (i.e., collectively, an information collector) to collect signal quality and location information in a telecommunications infrastructure comprising a first and second wireless access network—i.e., a mobile communications network and a mobile broadcasting network, respectively. (EX1006, [0026]). It discloses using mobile terminals to collect signal quality information at a particular location and report the signal quality measurement results to the management server portion of the information collector. (EX1006, Abstract). Lee does not, however, expressly disclose a coverage estimator. Shrum does. Specifically, Shrum discloses server/processor 128 (i.e., coverage estimator) that processes signal quality and location data collected from wireless devices and generates coverage maps. These maps identify areas with poor signal strength, dropped connections, or restricted usage zones and provide actionable insights to improve network performance and plan infrastructure upgrades. (EX1007, 7:27-34).

A POSITA would have been motivated to generate a coverage map, as disclosed in Shrum, based on the information collected by Lee's information collector, rendering the challenged claims obvious. (EX1003, ¶¶149-156).

A. Overview of Prior Art

1. Lee (EX1006)

Lee was filed on February 5, 2009, and was published on August 6, 2009. Lee qualifies as prior art under at least pre-AIA 35 U.S.C. §102(e).

Lee discloses "a system for collecting signal quality information in a broadcasting network." (EX1003, ¶¶67-68, EX1006, [0026]). Lee's "broadcast server 100 generates a control message including a reporting condition for signal quality, and broadcasts it within the mobile broadcasting network 110." (*Id.,* [0027]). "The mobile terminal 120 measures signal quality at the current location referring to the reporting condition, and then transmits a reporting message composed of measurement results and area information corresponding to the current location." (*Id.,* [0028]). Finally, "[t]he management server 150 collects signal quality measurements of each area based on the reporting message transmitted from one or more mobile broadcasting terminals, and manages the collected signal quality measurements of each area." (*Id.,* [0031]).

2. Shrum (EX1007)

Shrum was filed on January 3, 2008, and issued on October 12, 2012. Shrum qualifies as prior art under at least pre-AIA 35 U.S.C. §102(e).

Shrum discloses a system for collecting and analyzing wireless session data to generate coverage maps. (EX1003, ¶¶69-70; *see also*, EX1007, Abstract).

Measurement data, including "overall signal strength, signal-to-noise ratio (SNR), and failed versus successful wireless signal session status," is stored in a database (126) and processed by a server/processor (128), which acts as a coverage estimator. (EX1007, 4:1-2, 3:1-2). The coverage estimator analyzes the data to identify areas with poor signal quality, such as those prone to "call dropping," and determines where additional resources may be needed. (EX1007, 4:37-45). Shrum further teaches that the coverage estimator (i.e., server/processor (128)) generates coverage maps showing signal availability and geographic details, including areas of poor coverage, restricted usage zones, and resource locations. (EX1007, 4:33-45, 7:22-42)). When a user requests coverage mapping, the system accesses the database, processes the measurement data, and generates a map reflecting the signal conditions along the requested route. (EX1007, 4:18-25, 5:18-30).

B. Motivation to Combine

A POSITA would have been motivated to combine Lee with Shrum.

First, Lee and Shrum are analogous art because they are in the same field of endeavor as each other and the '089 patent—the relevant field being using mobile devices to collect signal quality information and transmit measurement results to the system, which assesses signal coverage in wireless telecommunication networks. (EX1006, [0026]; EX1007, 2:25-36; EX1001, 2:18-24).

Second, a POSITA would recognize that the teachings of Lee and Shrum complement each other because they provide different but related components of a system designed to enhance cellular and mobile network performance through signal data collection and analysis. (EX1003, ¶151; EX1006, [0026]; EX1007, 1:43-50). Specifically, Lee teaches an information collector using mobile devices to collect and store signal data in a second wireless access network (i.e., mobile broadcasting network), (EX1006, [0026]), but does not disclose a coverage estimator for generating coverage map. However, Shrum teaches using collected signal data to generate coverage maps identifying geographic areas with poor coverage or service interruptions, but does not expressly describe how the data is collected in the first instance. (EX1007, 1:43-50). Accordingly, a POSITA would have been motivated to combine the teachings of Lee and Shrum to provide a method for collecting and evaluating (e.g., assessing) information relating to signal coverage. (EX1003, ¶151).

Third, regarding claim 6, a POSITA would have been motivated to incorporate components necessary to perform a ***visual*** coverage assessment (e.g., coverage map (400) or (500)) at a coverage estimator (i.e., server/processor (128)), as taught in Shrum, to enhance the accuracy and granularity of coverage assessments, enabling faster and more precise identification of network deficiencies and areas for improvement. (EX1003, ¶152). Visual representations of data are often easier to interpret than the data in numerical form. (EX1003, ¶152). And coverage maps "advise a user to seek (or avoid) certain wireless signal service areas, and provide general wireless signal availability information for a particular geographic area." (EX1007, 7:58-63). The maps may also include "geographic information, roads and highways, types and locations of wireless support resources, areas of known inadequate (i.e., poor) or non-existent wireless signal coverage, real-time information regarding wireless signal outages, restricted wireless usage zones, and other data." (EX1007, 5:18-25).

Fourth, regarding claim 8, a POSITA would have been motivated to obtain the location information of prospective terminals ***prior to selecting*** them to perform measurements when attempting to assess the coverage in a particular geographic area. (EX1003, ¶153). Indeed, a POSITA may want to verify that the mobile terminal is located in the relevant area before causing it to measure signal information and assessing the coverage and also have the ability to measure signal quality in several, or all areas. (EX1006, [0009]; EX1003, ¶153). Thus, in this case, the POSITA would need to have the location information ***before*** measurement information is collected to have the flexibility to select a single location or multiple locations. A POSITA would have further understood that location information could be collected both ***before*** and ***after*** measurement information is collected for coverage assessment to accomplish the same result. (EX1003, ¶153; *see Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) ("because the [two identified solutions] were both well known in the art, and were the only two identified, predictable solutions for [meeting the limitation], it would have been obvious to substitute [one solution for the other].").

Fifth, regarding claim 10, a POSITA would have been motivated to forward location information to the coverage estimator to enable it to generate an accurate coverage map, which identifies specific locations with low signal coverage. EX1007, 7:19-42; EX1003, ¶154).

C. Reasonable Expectation of Success

A POSITA would have reasonably expected success when combining Lee and Shrum because both references disclose systems that perform well-defined, complementary functions using established technologies. (EX1003, ¶155-156). Accordingly, combining the references would have involved nothing more than the application of known techniques in a predictable way. For example, a POSITA would have recognized that the data collected in Lee's information collector—e.g., signal strength, location, and quality information—is precisely the type of data that Shrum's server/processor uses to generate coverage maps. Combining the two would be a logical and predictable step, as the output of Lee's system (measurement data) can serve as input to Shrum's system to generate coverage map. (EX1003, ¶156). A POSITA would have considered this hardware/software integration to routine and well within the knowledge and skill of a POSITA, as it merely requires transmitting measured data from Lee's information collector (i.e., illustrated in FIG. 1) to Shrum's coverage estimator (i.e., server/processor 128). (EX1003, ¶156).

D. Claim-by-Claim Analysis

1. Claim 6

(a) [6pre]

To the extent it is limiting, Lee discloses the preamble.

- ***"An automatic coverage assessment method for generating a coverage assessment for a second wireless access network of a telecommunications infrastructure"***

Lee discloses "a method for measuring signal quality information in a mobile broadcasting network [(110)]" (i.e., an ***automatic coverage assessment method***) (EX1006, [0003]; EX1003, ¶¶157-163). Lee's coverage assessment method is "***automatic***," as it involves automated triggers and processing without human operation. (EX1007, Abstract, [0024], [0058], [0059] ("mobile broadcasting terminal automatically collects low-signal strength area information, and provides it to the server, so that the mobile broadcasting provider can costly, rapidly and easily analyze the state of the mobile network on an area-by area basis").

Lee's method further involves ***generating a coverage assessment for a second wireless network*** (mobile broadcasting network (110)) ***of a telecommunication infrastructure*** as illustrated in Fig. 1:

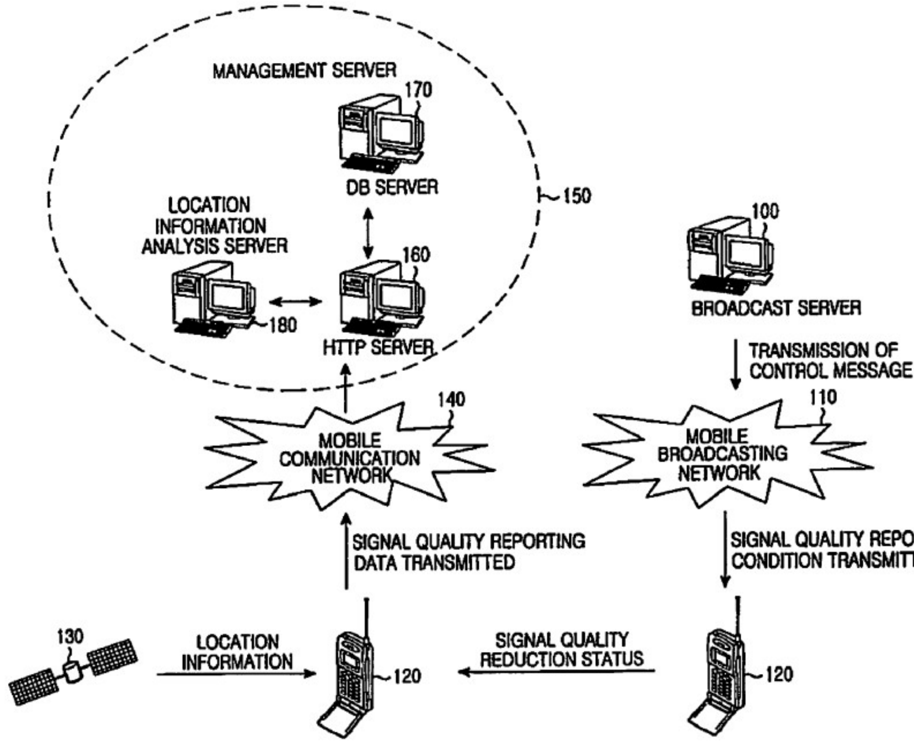


FIG.1

(EX1006, FIG. 1). Figure 1 illustrates an infrastructure supporting digital multimedia broadcasting, digital video broadcasting, or media forward link only, which are each telecommunication means. EX1003, ¶159.

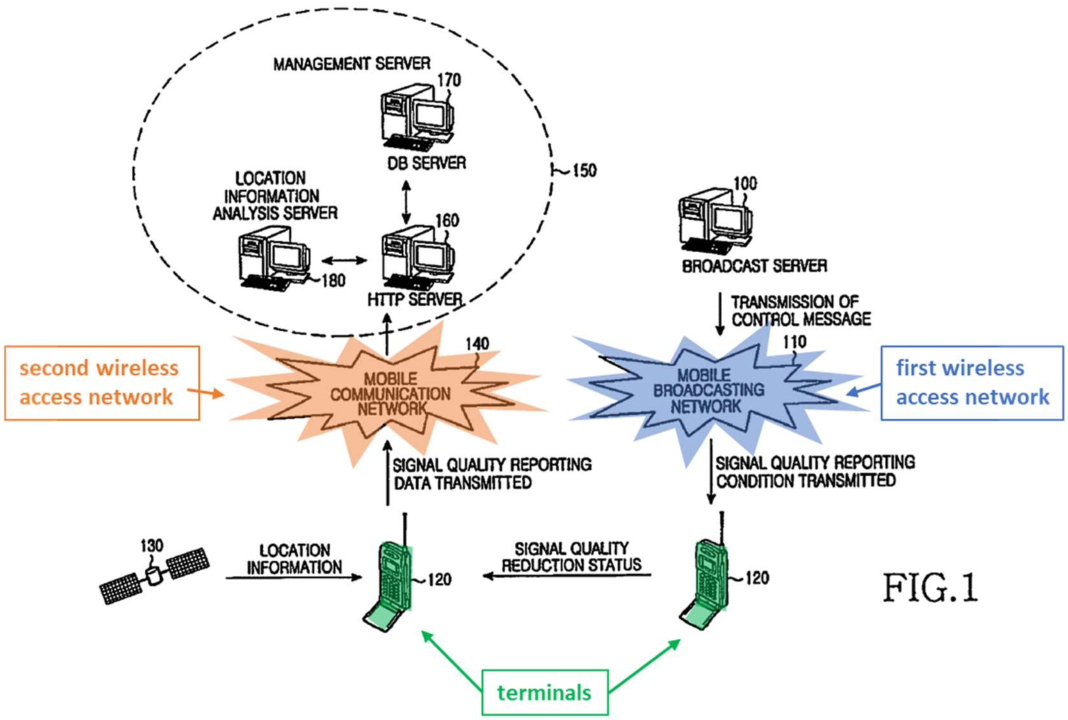
According to Lee, "data for the areas where signal quality of each mobile terminal is less than or equal to a threshold is accumulated in [a] DB server 170." (EX1006, [0057]). "FIG. 7 [of Lee] illustrates a database for collected data, and data is accumulated in the database so that it is possible to comprehend temporal/regional distribution of mobile terminals." (EX1006, [0058]). "[S]ince it is possible to comprehend temporal/regional distribution of mobile terminals using the collected information, the mobile broadcasting provider can efficiently manage the mobile broadcasting service." (EX1006, [0059]).

AREA	Signal Quality (SNR)	reporting time	Terminal Name	IMEI
A	10db	2007-10-1 11:00	SGH-P930	000000000000000
B	20db	2007-10-2 09:00	SGH-P930	000000000001001
C	5db	2007-10-2 17:13	SGH-P940	000000000000203
D	3db	2007-10-4 22:00	SGH-P940	000000000200400
E	25db	2007-10-3 10:30	SGH-P930	000000000030040

(EX1006, FIG. 7). As described in more detail below, Lee's method of "manag[ing] the mobile broadcasting service" using the collected signal quality data comprises generating a ***coverage assessment***. (EX1006, [0059] ("By accumulating the automatically collected data, the management server 150 can easily determine how many terminals have a signal quality less than or equal to a threshold in certain areas."), EX1003, ¶160).

- ***"telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals"***

Lee discloses a ***telecommunications infrastructure comprising a first wireless access network*** (i.e., "mobile communication network 140") ***and a second wireless access network*** (i.e., "mobile broadcasting network 110"). (EX1003, ¶161; EX1006, [0027], [0030]). FIG. 1 illustrates "a system configuration for collecting information on low-reception strength areas in a mobile broadcasting network." (EX1006, [0025]).

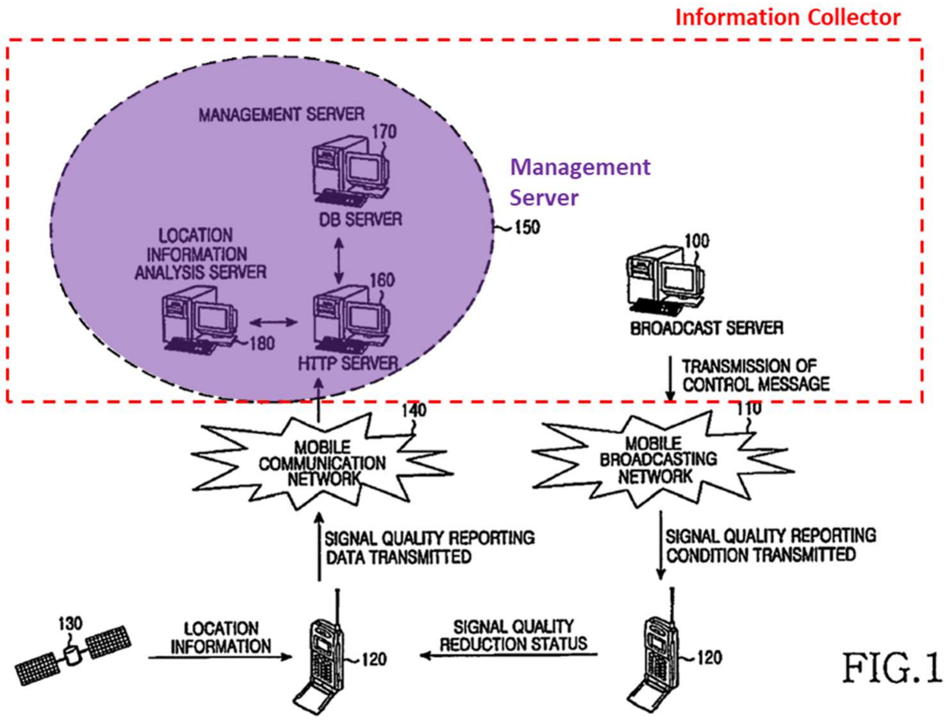


(EX1006, FIG. 1 (color annotations added)).

Lee discloses that both ***the first wireless access network*** (140) ***and second wireless access network*** (110) ***are capable of providing services to a plurality of terminals*** (120). EX1003, ¶162. For example, Lee discloses that "[a] mobile terminal supporting mobile broadcasting, such as terrestrial DMB, satellite DMB, DVB-H, and Media FLO, receives signals from a mobile broadcasting server . . . in order to perform broadcasting reception and reproduction" (i.e., ***services***) (EX1006, [0006], [0025]). "Although only one mobile terminal 120 is illustrated in FIG. 1," Lee explains that "reporting data for signal quality is collected in one or more terminals [i.e. ***a plurality of terminals***]." (EX1006, [0026]). In fact, Lee teaches that "it is preferable to collect reporting data from one or more mobile terminals." (*Id.*).

(b) [6a]

Lee discloses ***collecting, at an information collector*** (i.e., "system for collecting signal quality information" (EX1003, ¶¶164-165; EX1006, [0026]) (annotated FIG. 1 below)) ***information from terminals*** (120). Lee explains that "[t]he management server 150 [of the system for collecting signal quality information (FIG. 1)] collects signal quality measurements of each area based on the reporting message transmitted from one or more mobile broadcasting terminals [(120)]." (EX1006, [0031]). "By accumulating the automatically collected data, the management server 150 can easily determine how many terminals [(120)] have a signal quality less than or equal to a threshold in certain areas." (EX1006, [0058]).



(EX1006, FIG. 1 (color annotations added)).

(c) [6b]

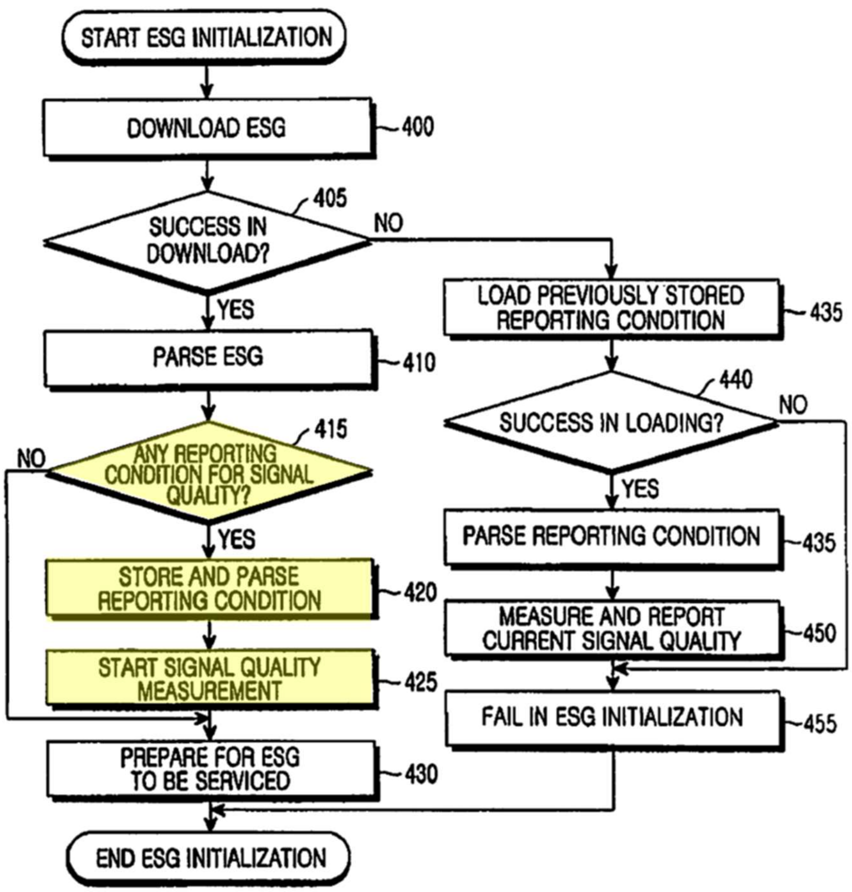
Lee teaches that the combination of broadcast server 100 and management server 150 (i.e., collectively "information collector") ***selects one or more terminals*** (120) ***from at least part of the plurality of the terminals*** (120). (EX1003, ¶¶166-168). As an initial matter, "***at least part*** of the plurality of terminals" necessarily encompasses ***all*** of the plurality of terminals. Further, Lee discloses that "broadcast server 100 provides reporting conditions for signal quality to the mobile terminal 120 via a mobile broadcasting network 110." (EX1006, [0027]). Specifically, "broadcast server 100 generates a control message including a reporting condition for signal quality, and broadcasts it within the mobile broadcasting network 110."

(EX1006, [0027]). "The mobile terminal transmits a reporting message for signal quality to a server (management server) managing signal qualities, if it satisfies the reporting condition." (EX1006, [0024]). Thus, a POSITA would have understood that the broadcast server (100) of the ***information collector*** (FIG. 1) selects one or more of the plurality of terminals by broadcasting the control message for the terminals (120) to receive. (EX1003, ¶167).

Further, as discussed above for limitation [6pre] (*supra* § IX.D.1[6pre]), the plurality of terminals in Lee are ***capable of communicating with both the first wireless access network*** (140) ***and the second wireless access network*** (110). (EX1006, FIG. 1 (showing terminal 120 connected to mobile communication network 140 and mobile broadcasting network 110), [0026] (confirming that only one mobile terminal is illustrated in FIG. 1, but noting that a plurality of terminals are used for data collection)).

(d) [6c]

Lee discloses ***instructing the selected one or more terminals to measure signals from the second wireless access network*** (110). Specifically, Lee discloses a "broadcast server (100) [that] generates a control message" (EX1003, ¶¶169-170; EX1006, [0012]), and "[t]he control message can include, for example, an Electronic Service Guide (ESG) message," (EX1006, [0027]). Lee explains that "[t]he terminal 120 measures signal quality only when a reporting condition is included in the ESG message." (EX1006, [0028]). Thus, a POSITA would have understood that broadcast server 100 of the information collector (FIG. 1) instructs a terminal 120 to measure signals by including a reporting condition in the control message. (EX1003, ¶170). FIG. 5 illustrates the instruction steps 415, 420, 425:



(EX1006, FIG. 4 (color annotations added)).

(e) [6d]

Lee discloses a broadcast server 100 and management server 150 (i.e., collectively an "***information collector***") ***obtaining measurement information indicative of the signals measured from the second wireless access network*** (110)

by the selected one or more terminals (120). (EX1003, ¶171-172). Specifically, Lee teaches that "[t]he mobile terminal 120 measures signal quality at the current location referring to the reporting condition, and then transmits a reporting message composed of measurement results and area information corresponding to the current location." (EX1006, [0028]). Lee discloses that the signals are measured ***from the second wireless access network*** because the terminals "measur[e] signal quality information in a mobile broadcasting network." (EX1006, [0024] ("Since information on low-signal quality areas is automatically collected from the mobile terminal in this way, it is possible to rapidly and easily detect the status of the mobile broadcasting network depending on the collected information."); EX1003, ¶172). "Subsequently, the mobile terminal 120 reports the generated signal quality reporting messages to the management server 150" portion of the information collector. (EX1006), [0030]). "The management server 150 collects signal quality measurement of each area based on the reporting message . . . ." (EX1006, [0031]).

(f) [6e]

As discussed above, Lee discloses a combined broadcast server 100 and management server 150 (i.e., collectively, "information collector"), having "a database in which reporting data for signal quality is stored." (EX1003, ¶¶173-176; EX1006, [0022], [0058] ("Specifically, signal quality data is stored in DB server 170."). According to Lee, "data is accumulated in the database so that it is possible to comprehend temporal/regional distribution of mobile terminals." (EX1006, [0058]). And "[b]y accumulating the automatically collected data, the management server 150 can easily determine how many terminals have a signal quality less than or equal to a threshold in certain areas." (EX1006, [0058]). A POSITA would understand the signal quality data received and stored in Lee's database to be ***measurement information***. (EX1003, ¶174).

Lee does not expressly disclose that the measurement information is provided to a ***coverage estimator***. However, this limitation is obvious in view of Shrum.

Like Lee, Shrum discloses "acquiring data pertaining to wireless sessions and storing that data (typically, but not necessarily) as discrete records (one record per wireless session) into a database, such as database 126." (EX1007, 4:33-37). Shrum explains that "[i]n this way, a growing deposit of information, including records corresponding to any number of wireless systems users (i.e., clients) can be accumulated over time and analyzed for meaningful information." (EX1007, 4:37-40). For example, "poor signal strength or 'call dropping' in an area can indicate localities where additional wireless system 124 resources are needed" and such information can be used to advise users of wireless devices about areas prone to, or presently experiencing, wireless access trouble." (EX1007, 4:40-45).

To accomplish these ends, Shrum discloses ***providing the measurement information*** (i.e., data, such as "overall signal strength, signal-to-noise ratio (SNR) and failed versus successful wireless signal session status" (EX1007, 4:1-2)) to a server 128 (i.e., a ***coverage estimator***). Specifically, Shrum's wireless system (124) includes "a database 126, a server 128 and computer-readable storage media 130." (EX1007, 3:1-2). Shrum teaches that when a wireless device 102 "requests signal coverage mapping from their present location to a user-defined destination," the wireless system 124 accesses the database 126 . . . having information relevant to the user's request." (EX1007, 4-18). "[T]he wireless system 124 determines the recommended route for the user" and "provides a signal coverage map including the recommended route to the wireless device 102 of the user." (EX1007, 5:29-30, 43-45, 10:27-29 ("A system comprising a processor to generate a map").

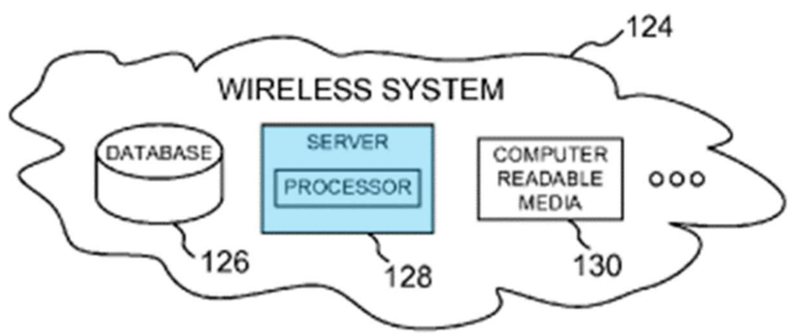


FIG. 1

(EX1007, FIG. 1 (excerpted and color annotations added)). A POSITA would have understood that it is the server/processor 128 in Shrum's wireless system that estimates the coverage and generates the coverage map based on the measurement information stored in the database. (EX1003, ¶175).

A POSITA would have been motivated to add coverage assessment and estimation, as taught by Shrum, to Lee's system, and to use Lee's measurement information for coverage estimation, and would have reasonably expected the combination to succeed, for the reasons provided in §§ IX.B-C *supra.*

(g) [6f]

Lee renders this limitation obvious in view of Shrum. As discussed above for Limitation [6d], Lee teaches "collecting signal quality information in a mobile broadcasting network" (i.e., a ***second wireless access network***). (EX1003, ¶¶177-178; EX1006, [0026]).

Lee does not expressly disclose a coverage estimation that performs coverage assessment. However, Shrum teaches ***generating, at a coverage estimator*** (server/processor (128)), ***a coverage assessment*** (signal coverage map (400) or (500)) ***for a second wireless access network***. (EX1007, 10:27-30 ("A system comprising: *a processor to generate a map*, the map comprising content indicative of at least a geographic area . . . ."); 9:15-20 ("generate, based on data acquired during wireless sessions in a geographic area, a map in accordance with a request from a wireless device, the request corresponding to the geographic area, the map including content corresponding to a *wireless service associated with the geographic area*, . . .").

A POSITA would have been motivated to apply coverage assessment and estimation, as taught by Shrum, to Lee's system, and would have reasonably expected the combination to succeed, for the reasons provided in §§ IX.B-C *supra.*

(h) [6g]

Lee renders this limitation obvious in view of Shrum. (EX1003, ¶¶179-181). For example, as described above for Limitation [6d], Lee discloses a broadcast server 100 and management server 150 (i.e., collectively, "information collector") having "a database in which reporting data for signal quality is stored." (EX1006, [0022], [0058] ("Specifically, signal quality data is stored in DB server 170.").

Lee does not expressly disclose that the measurement information is ***obtained from the information collector*** by a coverage estimator. However, this limitation is obvious in view of Shrum.

As discussed in Limitations [6e] and [6f] Shrum discloses ***a coverage estimator*** (i.e., server/processor 128) that ***obtains measurement information*** (i.e., data, such as "overall signal strength" or "signal-to-noise ratio (SNR)") from a database (126). (EX1007, 4:1-2)). In the combined system, the coverage estimator as taught by Shrum would obtain the measurement information from the database provided by Lee's information collector. (EX1003, ¶180).

A POSITA would have been motivated to add coverage assessment and estimation, as taught by Shrum, to Lee's system, and to use Lee's measurement information for coverage estimation, and would have reasonably expected the combination to succeed, for the reasons provided in §§ IX.B-C *supra.*

(i) [6h]

Lee renders this limitation obvious in view of Shrum. As discussed above for Limitation [6g], Lee discloses an information collector (FIG. 1) that ***obtains measurement information*** (i.e., signal quality) ***from a second wireless access network*** (i.e., broadcasting network (110)) ***of the telecommunications infrastructure***. (EX1003, ¶¶182-185; EX1006, [0028] ("The mobile terminal 120 measures signal quality at the current location"), [0026] ("collecting signal quality information in a mobile broadcasting network")). The "signal quality data is stored in DB server 170" in a "database for collected data" (FIG. 7). (EX1006, [0058]).

Shrum discloses a ***coverage estimator*** (server/processor (128)) that ***generates a coverage assessment*** (i.e., map (400)/(500)) ***based on obtained measurement information*** (i.e., signal quality data). (EX1007, 9:15-18 ("one or more processors . . . generate, based on data acquired during wireless sessions in a geographic area, a map in accordance with a request from a wireless device.").

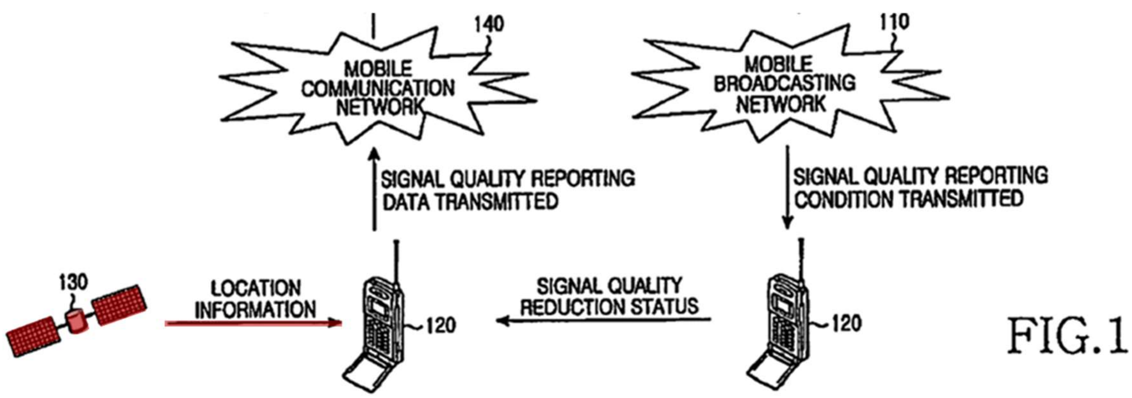
A POSITA would have been motivated to add coverage assessment and estimation, as taught by Shrum, to Lee's system, and to use Lee's measurement information for coverage estimation, and would have reasonably expected the combination to succeed, for the reasons provided in §§ IX.B-C *supra.*

2. Claim 7

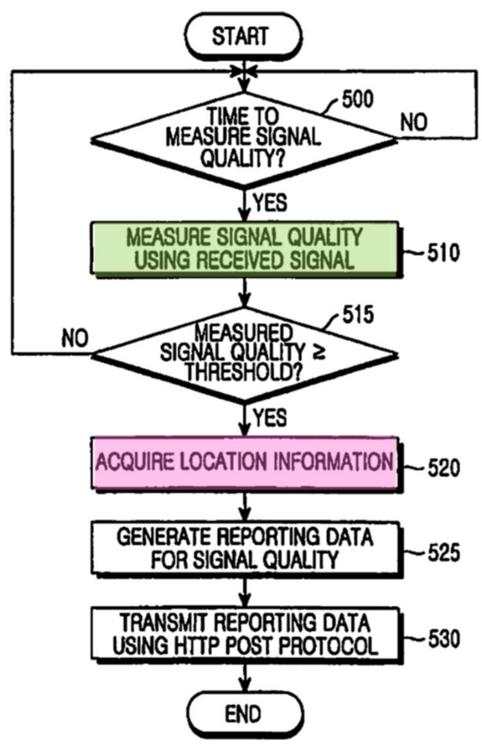
Lee discloses a broadcast server 100 and management server 150 (i.e. collectively, an "information collector") that selects one or more terminals (120) by broadcasting a control message within the mobile broadcasting network (110). (EX1003, ¶¶186-187; EX1006, [0027] ("The broadcast server 100 generates a control message including a reporting condition for signal quality, and broadcasts it within the mobile broadcasting network 110."); [0026] ("Referring to FIG. 1, a system for collecting signal quality information [(i.e., ***information collector***)] in a mobile broadcasting network includes a broadcast server 100 . . . and a management server 150."); [0024] ("The mobile terminal transmits a reporting message for signal quality to a server (management server) managing signal qualities, ***if*** it satisfies the reporting condition") (emphasis added)). A POSITA would have understood that the broadcast server (100) necessarily must be triggered (or caused) to broadcast a control message, at least initially, with program instructions, a trigger event, or the like. (EX1003, ¶187).

3. Claim 8

Lee discloses ***obtaining location information for at least one of the at least part of the plurality of terminals prior to selecting the one or more terminals***. (EX1003, ¶¶188-193).Lee discloses that "[t]he current location can be acquired with various methods such as, for example, a Global Positioning System (GPS) satellite 130." (EX1006, [0030]; FIG. 1).



(EX1006, FIG. 1 (excerpted and color annotations added)). "If it is determined that the measured signal quality is less than or equal to the threshold, the mobile terminal 120 acquires its current location information in step 520." (EX1006, [0055]).



(EX1006, FIG. 5 (color annotations added)).

Lee does not expressly disclose that location information may also be obtained ***before*** selecting the terminals to measure signal quality. However, it would have been obvious to obtain location information before selection in view of Shrum.

Shrum discloses a registration process that includes an initial "instantaneous geographic location" determination when a wireless device 102 establishes communication with the wireless system infrastructure (e.g., initiates a phone call). (EX1007, 3:55-4:4). As part of this process, an initial geographic location (i.e., ***location information***) for the terminal is obtained before any signal quality measurement are performed. (EX1007, 9:5-11) ("The method . . . comprising: determining a present location of the wireless device; determining a signal metric corresponding to the wireless communication between the wireless system and the wireless device; and writing the present location and the signal metric to a database resource of the wireless system."). For example, Shrum discloses that the wireless system is "aware of the user's origin and destination" even when it has not yet measured the terminals signal quality. (EX1007, 5:14-15).

In view of Lee and Shrum, in my opinion a POSITA would have understood that location information could be collected both before and after measurement information is collected for coverage assessment. (EX1003, ¶191; *see Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) ("because the [two identified solutions] were both well known in the art, and were the only two identified, predictable solutions for [meeting the limitation], it would have been obvious to substitute [one solution for the other].").

Further, when attempting to assess the coverage in a particular geographic area, a POSITA would have been motivated to obtain the location information of prospective terminals ***prior to selecting*** them to perform measurements. (EX1003, ¶192). Indeed, a POSITA may want to verify that the mobile terminal is located in the relevant area before causing it to measure signal information and assessing the coverage and also have the ability to measure signal quality in several, or all areas. (EX1006, [0009]; EX1003, ¶192). Thus, in this case, the POSITA would need to have the location information ***before*** measurement information is collected to have the flexibility to select a single location or multiple locations.

Moreover, a POSITA would have reasonably expected success when making this combination for the reasons discussed above. (*Supra* § IX.C; EX1003, ¶¶149-154, 193).

4. Claim 9

The Lee-Shrum combination discloses a broadcast server 100 and management server 150 (i.e., collectively, "information collector") ***providing the location information valid upon obtaining the measurement information*** ("measured signal quality") ***for at least one of the selected one or more terminals*** (120). (EX1003, ¶¶194-196). Specifically, Lee teaches that "the reporting message is generated using the measurement signal quality [(i.e., ***measurement information***)] and area information corresponding to the current location [(i.e., ***location information***)]" of the mobile terminal (120). (EX1006, [0013]). According to Lee, "the mobile terminal 120 transmits the reporting message to the management server 150." (EX1006, [0057]).

In more detail, "the reporting message is first delivered to the HTTP server 160 and then provided to the location information analysis server 180, so that HTTP server 160 is provided with correct [(i.e., ***valid***)] area information from the location information analysis server 180." (EX1006, [0057] (emphasis added)). "Then the HTTP server 160 adds the reporting message and it's [sic] associated area information together, and stores it in the DB server 170." (*Id.*).

Note, Lee's disclosure is consistent with the '089 patent, which provides that, "the information collector 7 may be configured to update the location information for each of the selected one or more terminals with the *location information valid when the measurement information was obtained* from them." (EX1001, 9:25-29 (emphasis added)).

5. Claim 10

(a) [10a]

Lee discloses ***associating the location information with at least one of the selected one or more terminals*** (120). Specifically, Lee teaches that "the mobile terminal 120 acquires its current ***location information***." (EX1003, ¶197; EX1006 [0055]). "After acquiring its location information, the mobile terminal 120 generates a reporting message for signal quality." (EX1006, [0055]). According to Lee, "the current location information, a measurement time, and identification information for the mobile terminal can be included in the reporting message." (EX1006, [0056]). FIG. 6 illustrates an exemplary reporting message ***associating the location information with at least one of the selected one or more terminals***:

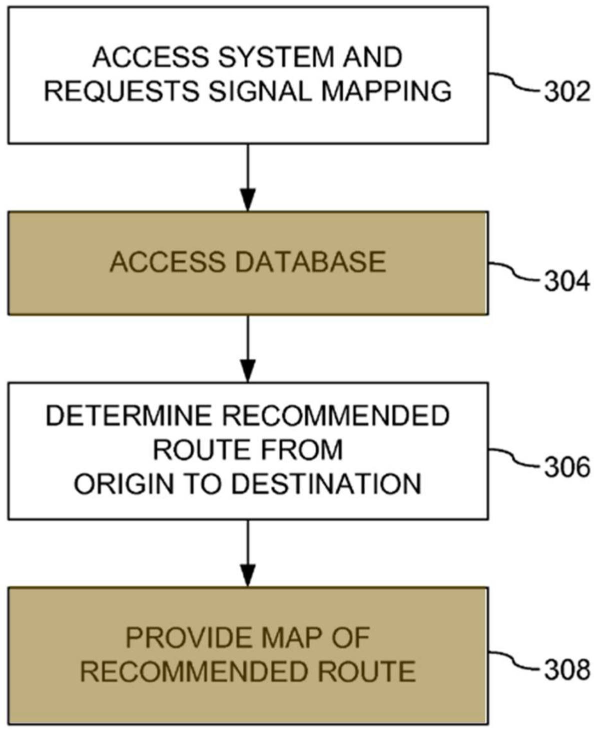
```
<complexType name="SNRReportingData">
    <Sequence>
        <element name="currTime" type="dateTime"/>
        <element name="TerminalName" type="mpeg7:TextualType" minOccurs="0"/>
        <element name="IMEI" type="mpeg7:TextualType" minOccurs="0"/>
        <element name="SNR" type="Integer"/>
        <element name="LocationInfo" type="anyType"/>
    </Sequence>
</complexType>
```

(EX1006, FIG. 6 (color annotations added)).

(b) [10b]

The Lee-Shrum combination further discloses ***forwarding the location information associated with the at least one of the selected one or more terminals to the coverage estimator***. (EX1003, ¶¶198-202). As discussed above, supra § X.D.5(a), Lee discloses ***location information associated with the at least one of the selected one or more terminals*** (120). (EX1006, [0056] (referring to the reporting message of FIG. 6, "'LocationInfo' indicates the current location information of the mobile terminal or area information at the current location."). Per Lee, "[w]hen ***location information*** is including in the reporting message, the HTTP server 160 delivers the location information included in the reporting message to the location information analysis server 180 in order to acquire area information such as detailed area names." (EX1006, [0032]). Next, "the HTTP server 160 adds the reporting message and it's [sic] associated area information together, and stores it in the DB server 170," which contains "a database for collected data." (EX1006, [0057]-[0058]).

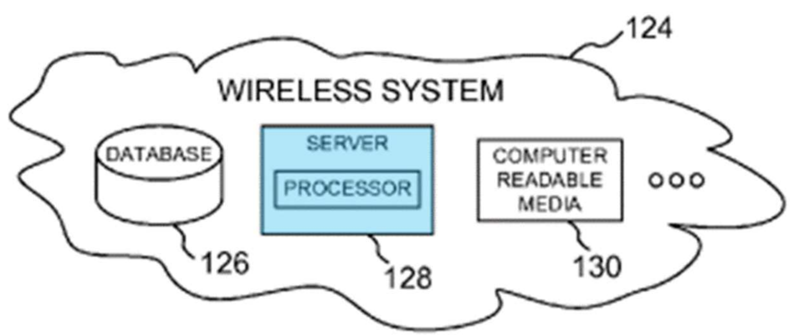
Shrum discloses ***forwarding location information associated with the at least one of the selected one or more terminals*** (102) ***to a coverage estimator*** (i.e., server/processor (128))." Shrum teaches that "[t]he geographic location of the wireless device 102 can be determined in any suitable way including, as non-limiting examples, global position system (GPS) signals received by the wireless device 102. (EX1007, 3:55-60). Per Shrum, "the geographic location . . . [is] written to the database 126." (EX1007, 4:14-16). If a user "requests signal coverage mapping from their current location," Shrum's "wireless system 124 accesses the database 126 . . . having information relevant to the user's request" (e.g., geographic information, areas of known inadequate (i.e., poor) or non-existent wireless signal coverage, real-time information regarding wireless signal outages, restricted wireless usage zones, and other data (individually or collectively, ***location information***)). (EX1007, 5:16-25). FIG. 3 illustrates this process:



(EX1007, FIG. 3 (color annotations added)).

Wireless system (124) includes a server (128) having a processor. (EX1007, [FIG. 1], 1:51-61).

FIG. 1



(EX1007, FIG. 1 (excerpted and color annotations added)).

A POSITA would have understood that when server/processor 128 accesses database 126, ***the location information*** stored in database 126 is ***forwarded to the coverage estimator*** (i.e., server/processor 128). The processor of server 128 then "generate[s], based on data acquired during wireless session in a geographic area, a map in accordance with a request from a wireless device." (EX1007, 9:16-18).

A POSITA would have been motivated to combine the teachings of Lee and Shrum such that location information is forwarded from the information collector to the coverage estimator for the reasons provided above. *See supra* §§ IX.B, IX.C.

6. Claim 12

(a) [12pre]

To the extent the preamble is limiting, the Lee-Shrum combination discloses the preamble. (EX1003, ¶¶203-206).

- ***"A non-transitory computer-readable medium having instructions stored thereon when executed by a processor of a telecommunications infrastructure "***

The Lee discloses a ***non-transitory computer-readable medium*** having instructions stored thereon. Specifically, Lee discloses that "[a] broadcast server," *i.e,* provides a reporting condition for signal quality to a mobile phone using a control message . . . [i]n this way, information on the low-signal quality area is automatically collected from the mobile terminal." (EX1007, 1:51-52). A POSITA would have understood that the "broadcast server," which is ***part of the***

telecommunications infrastructure, must contain ***a processor*** to carry out Lee's teachings. (EX1003, ¶204). This processor would have executed software ***instruction found on a non-transitory computer-readable medium***. (EX1003, ¶204).

- ***"... [the non-transitory computer-readable medium] causes the telecommunications infrastructure to carry out operations of an automatic coverage assessment method for generating a coverage assessment for a second wireless access network,***

See supra § IX.D.1[6pre] above regarding limitation [6pre].

- ***the telecommunications infrastructure comprising a first wireless access network and the second wireless access network, the first and second wireless access networks capable of providing services to a plurality of terminals, the operations including:***

See supra § IX.D.1[6pre] above regarding limitation [6pre].

(b) [12a]-[12h]

Limitations [12a]-[12h] are identical to limitations [6a]-[6h], respectively, and are disclosed and/or rendered obvious for the reasons set forth above. *Supra* § IX.D.1[6a]-[6h]. (EX1003, ¶¶207-214).

X. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY INSTITUTION

A. *Fintiv*

Fintiv Factors 1-5—concerning effects on (and of) parallel district court litigation—all favor institution because ***there is no parallel litigation*** between

Petitioners and Patent Owner. Petitioners have filed a separate action concerning non-infringement of the ’089 patent but Petitioners did not challenge the validity of the ’089 Patent. Further, the Petition’s merits are compelling (Factor 6), which alone demonstrates that the PTAB should not discretionarily deny institution under Fintiv.

B. § 314(a)

The ’089 patent was previously subject to an earlier IPR proceeding challenging every claim ***not*** challenged in this petition, the petition was filed on November 5, 2021, instituted on May 25, 2022, and resulted in a Final Written Decision (EX1009) canceling all challenged claims on May 23, 2023. Here, the seven factors do not favor denial.

For factor 1, Petitioners are not the same petitioner from IPR2022-00079, Ericsson, nor is Ericsson an real party in interest to this petition. Factors 2-5 favor institution of this Petition because it is not a follow-on petition to Ericsson’s petition filed to cure the deficiencies of the previous petition. Indeed, here, the Ericsson petition led to the invalidation of all challenged claims. For factor 6, because the earlier proceeding resulted in the invalidation of the challenged claims and different claims are challenged here, the Board’s finite resources would not be wasted by instituting this Petition. For factor 7, there is no pending proceeding related to invalidity that requires the Board to issue a final determination with respect to the ’089 patent.

Thus, every *General Plastic* factor weighs against discretionary denial.

C. § 325(d)

The same or substantially the same prior art or arguments were ***not*** previously presented to the Office. None of the references relied upon in this Petition were considered or discussed by the examiner. Nor are any of them substantially the same as the art considered by the examiner.

XI. MANDATORY NOTICES AND FEES

A. Real Party-In-Interest

The real parties-in-interest for Petitioners are Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd.

B. Related Matters

Petitioners filed a declaratory judgment of non-infringement against the '151 patent in related district court litigation captioned *Samsung Electronics Co. Ltd et al, v. Koninklijke KPN N.V. et al*, 1:24-cv-01433 (D. Del.).

C. Counsel and Service Information

Petitioners provide the following counsel and service information. Petitioners consent to electronic service the email addresses listed in the table below. Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this Petition.

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D. Payment of Fees

The undersigned authorizes the Office to charge the fee required for this Petition for *Inter Partes* Review to Deposit Account No. 50-5708. Any additional fees that might be due are also authorized.

XII. CONCLUSION

For the reasons above, *inter partes* review is requested.

Date: January 25, 2025

Respectfully submitted,

By: /s/ *James M. Glass*
James M. Glass

Counsel for Petitioners

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 13,450 words, as counted using the Microsoft Word software that was used to prepare this paper, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman.

Date: January 25, 2025

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on January 27, 2025, true and correct copies of the foregoing document and supporting materials were served in its entirety on the Patent Owner at the following address of record as listed on PAIR via Priority Mail Express® or Express Mail:

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Date: January 25, 2025

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