

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, T-MOBILE USA, INC., AT&T SERVICES, INC., NOKIA OF AMERICA, CORP.,
AND ERICSSON INC.

Petitioners

v.

KT CORPORATION (Patent Owner) and
PEGASUS WIRELESS INNOVATION LLC (Exclusive Licensee)

Case No. IPR2025-00291
Patent 10,594,460

**PETITIONERS' REPLY TO PATENT OWNER'S
PRELIMINARY RESPONSE**

TABLE OF CONTENTS

	Page
I. ANALYSIS.....	1
A. Shen Discloses or Renders Obvious Transmitting FHCI through one Transmission BWP	1
B. Zhang Discloses or Renders Obvious Transmitting FHCI through one Transmission BWP	3
C. Yin Discloses FHCI	4
II. CONCLUSION.....	5
APPENDIX A - LIST OF EXHIBITS	
CERTIFICATE OF SERVICE	

This Reply is responsive to Patent Owner’s Preliminary Response (Paper 13, “POPR”). The Board authorized filing this Reply in its email dated June 2, 2025.

I. ANALYSIS

The Petition presents compelling evidence of invalidity. PO challenges the Petition’s analysis of receiving frequency hopping configuration information (“FHCI”) for a UL control channel and a UL data channel transmitted through one transmission BWP. As detailed below, Shen (EX1013) sends FHCI for UL control/data channels through one BWP—the “activated BWP.” Zhang (EX1020) sends the same information through one BWP—the “BWP resource.” Yin (EX1021) sends FHCI for a UL control channel through one BWP—and the prior art makes clear that sending the same information for a data channel would have been obvious.

A. Shen Discloses or Renders Obvious Transmitting FHCI through one Transmission BWP

The Petition explains that Shen discloses FHCI, i.e., “at least one frequency domain displacement.” Pet., 25 (citing EX1013 at 6:17-29). The frequency domain displacement information is provided for the physical channel, including both uplink (UL) control and data channels. *Id.* (citing EX1013 at 5:19-31). The frequency domain displacement information is transmitted through one transmission BWP of a BWP set, namely, the “activated BWP.” *Id.* (citing EX1013 at 13:29-34). PO does not dispute that Shen discloses transmitting FHCI, or that the configuration information transmission includes both UL control and data channel configuration

information. PO solely disputes whether Shen's FHCI is transmitted through "one transmission BWP" of the BWP set. PO's argument fails to address the evidence provided in the Petition, and is therefore unfounded for multiple reasons.

First, Shen discloses transmitting the FHCI for UL control/data channels through one transmission BWP. Pet., 25 (citing EX1013, 4:14-22, 5:19-31, 6:20-37) and 27 (citing EX1013, 5:26-28; 13:21-36). Shen's transmission BWP (i.e., Shen's "activated BWP") is configured by the BWP configuration information (information used to configure the BWP) and the FHCI (i.e., information transmitted in the physical channel of the BWP, such as Shen's "frequency domain displacement" information). Pet., 27 (citing EX1013 13:27-36 and Fig. 1B).

Shen discloses that downlink control information (DCI) containing the FHCI for the UL data/control channels is transmitted via a physical channel (e.g. the physical downlink control channel (PDCCH)) configured for each BWP. Pet., 26-27 (citing EX1013, 5:21-37, 6:17-22). Thus, the FHCI in the DCI is transmitted through one transmission BWP in order to "indicate an activated BWP." *Id.*

Second, Shen's disclosure of transmitting UL control and data channel FHCI is identical to the disclosure of the '460 Patent. Shen teaches that FHCI can be transmitted using "high-level signaling" such as "radio resource control (RRC) signaling." Pet., 26 (citing EX1013, 5:19-37, 6:9-22). This is exactly what the '460 Patent teaches: "The BWP configuration information and the frequency

hopping configuration information may be indicated by the BS through higher layer signaling (e.g., RRC signaling).” *Id.* (citing EX1001, 15:8-10). These identical disclosures demonstrate a POSITA would understand Shen as disclosing transmitting FHCI through one transmission BWP.

B. Zhang Discloses or Renders Obvious Transmitting FHCI through one Transmission BWP

Like Shen, the Petition explains that Zhang discloses FHCI, e.g., “resource allocation of ... frequency hopping.” Pet., 45 (citing EX1020, ¶[224]). The frequency hopping resource allocation information is transmitted through one “BWP resource” of a BWP set. *Id.* (citing EX1020, ¶¶[0010-12]; [0020-21]).

As with Shen, PO disputes whether Zhang’s FHCI is transmitted through “one transmission BWP.” Despite acknowledging that Zhang discloses transmitting through “a BWP resource,” PO argues that this “BWP resource” is not the same as a “transmission BWP.” This argument misses the point. The record makes clear that a POSITA would understand Zhang’s disclosure of transmitting “intra-BWP resource indication information” through “a BWP resource” to mean transmitting such information through “one transmission BWP.” Pet., 46 (citing EX1020, ¶[0231]; EX1031, ¶¶[239-242]). Zhang’s use of “intra”-BWP demonstrates to a POSITA that the information is provided “within” one transmission BWP. Put another way, Zhang’s use of resource indication information for “the BWP resource” indicates or renders obvious the use of one BWP to transmit the information. *Id.*

PO goes on to argue that Zhang’s transmission of FHCI does not occur for “both Zhang’s UL data channel and UL control channel.” PO is mistaken. As explained in the Petition, Zhang’s transmission of resource allocation for frequency hopping (e.g., Zhang’s FHCI) is performed for Zhang’s UL grant, which includes UL control and data channels. Pet., 45 (citing EX1020, ¶[0224]). The intra-BWP resource indication information indicates the BWP resources within the BWP, and a POSITA would understand that those resources include a data channel and a control channel for each BWP. Pet., 47 (citing EX1020, ¶[0262]; EX1031, ¶[245-247]). Thus, a POSITA would understand Zhang to disclose transmitting/receiving FHCI for both a UL control channel and a UL data channel.

C. Yin Discloses FHCI

PO does not dispute that Yin discloses FHCI transmitted through one transmission BWP of the BWP set. Instead, PO contends that, despite Yin’s disclosure of transmitting FHCI for a UL control channel, it would not have been obvious to transmit the same FHCI for a UL data channel. PO ignores the Petition’s detailed explanation of the obvious expansion of functionality already taught by Yin.

PO does not dispute that “Yin discloses receiving, from the BS, frequency hopping configuration information for a UL control channel....” Pet., 56 (citing EX1021, ¶[0112]). Nor does PO dispute that the secondary references disclose frequency hopping for a UL data channel. Pet., 56 (citing EX1024, §5.3.4, p.22;

EX1025, §8.4, pp.114-115). A POSITA would require no further guidance to combine Yin’s control channel frequency hopping communication with the data channel frequency hopping communication taught by TS 36.211 and TS 36.213. Indeed, the Petition expressly explains that such a modification would be beneficial as it would enable 5G-capable UEs to retain backwards compatibility in 4G LTE systems. Pet., 56 (citing EX1021, ¶[0048]; EX1022, ¶[0040]).

Further, the Petition explains that modifying Yin to provide for data channel frequency hopping can be performed “in exactly the manner contemplated by Yin” for control channel frequency hopping. Pet., 57. “Such a modification would have been routine, and according to known methods, to obtain predictable results with a high probability of success.” *Id.* (citing EX1031, ¶¶296-301). This explanation is not conclusory—it is premised on the detailed frequency hopping implementations already taught by the references themselves. Pet., 55 (citing EX1021, ¶¶[0042], [0085], [0213]; EX1024, §5.3.4, p.22; EX1025, §8.4, pp.114-115).

Pursuant to the Director’s Memorandum dated March 26, 2025, Petitioners explained why discretionary denial is inappropriate in their Opposition to Patent Owner’s Request for Discretionary Denial filed June 5, 2025.

II. CONCLUSION

Petitioners have shown a reasonable likelihood of success on the merits. Therefore, the Board should institute trial.

Date: June 16, 2025

Respectfully submitted,

/Patrick C. Keane/

Patrick C. Keane, Esq.

Registration No. 32,858

BUCHANAN INGERSOLL & ROONEY PC

1737 King Street, Suite 500

Alexandria, Virginia 22314

Direct Telephone (703) 838-6522

Main Facsimile (703) 836-2021

patrick.keane@bipc.com

Counsel for Petitioner

APPENDIX A - LIST OF EXHIBITS

Exhibit No.	Description
1001	U.S. Patent No. 10,594,460, issued on March 17, 2020 (“the ‘460 Patent”)
1013	Certified English Translation of PCT International Publication No. WO 2019/136597 (“Shen”)
1020	PCT International Publication No. WO 2018/203727, published on November 8, 2018 (“Zhang”)
1021	PCT International Publication No. WO 2018/129085, published on July 12, 2018 (“Yin”)
1022	U.S. Provisional Application No. 62/442,864, filed on January 5, 2017 (“Yin ’864”)
1024	Technical Specification, 3GPP TS 36.211 V11.6.0 (September 2014) (“TS 36.211”)
1025	Technical Specification, 3GPP TS 36.213 V11.6.0 (March 2014) (“TS 36.213”)
1031	Declaration of Mark Lanning

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 16th day of June, 2025, a true and correct copy of the foregoing **PETITIONERS' REPLY TO PATENT OWNER'S PRELIMINARY RESPONSE** is being served via electronic mail upon counsel for Patent Owner as follows:

Wayne Helge
James Wilson
BUNSOW DE MORY LLP
whelge@bdiplaw.com
jwilson@bdiplaw.com
erobinson@bdiplaw.com

Date: June 16, 2025

/Patrick C. Keane/
Patrick C. Keane, Esq.
Registration No. 32,858
BUCHANAN INGERSOLL & ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-6522
Main Facsimile (703) 836-2021
patrick.keane@bipc.com
Counsel for Petitioner