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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* AJIT NIMBALKER, RAVI KUCHIBHOTLA, ROBERT T. LOVE, VIJAY NANGIA, and RAVIKIRAN NORY

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Appeal 2018-003870
Application 14/692,204[1]
Technology Center 2600

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Before HUNG H. BUI, SHARON FENICK, and JOHN R. KENNY, *Administrative Patent Judges*.

BUI, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellants seek our review under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 8–14, 16–22, 26, and 27, which are all the claims pending in the application. Claims 1–4, 7, 24, 25, and 28 are withdrawn. App. Br. 12–16 (Claims App.). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.[2]

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[1] According to Appellants, Google Technology Holdings LLC is the real party in interest. App. Br. 1.

[2] Our Decision refers to Appellants' Appeal Brief filed July 25, 2017 ("App. Br."); Reply Brief filed February 26, 2018 ("Reply Br."); Examiner's Answer mailed January 4, 2018 ("Ans."); Final Office Action mailed January 27, 2017 ("Final Act."); and original Specification filed April 21, 2015 ("Spec.").

## STATEMENT OF THE CASE

### *Appellants' Invention*

Appellants' invention relates to "device-to-device [D2D] communication in a wireless [cellular] network" with user equipment [UE] where "UEs are able to communicate directly with one another using so-called Device-to-Device (D2D) communication" "without passing through a network of other intermediate entity." Spec. ¶¶ 2, 19–20. "Benefits of D2D communication in a cellular network include (1) increased cellular system throughput (e.g., D2D traffic uses fewer resources to communicate same amount of data), and (2) improved user experience (e.g., faster data transfer and reduced latency)." Spec. ¶ 21. According to Appellants,

> the determination as to whether or not UEs should communicate using D2D is made based on one or more of a variety of factors, including [1] the proximity of the UEs to one another, [2] the strength of reference signals that one of the UEs receives from the other UE, [3] the strength of the signals that the network entity receives from one or more of the UEs, [4] the detection of a user input.

Spec. ¶ 91 (bracketing added).

### *Illustrative Claim*

Claims 8 and 16 are independent. Claim 8 is illustrative of the claimed subject matter, as reproduced below with disputed limitations italicized:

> 8. A method in a first user equipment, the method comprising:
>
> wirelessly communicating with a network element on a carrier;
>
> configuring a device-to-device link with a second user equipment for exchanging encoded messages between the first user equipment and the second user equipment;

> *configuring, by the first user equipment, soft buffer configuration based on a category of the second user equipment;*
> *encoding a packet in accordance with a capability partitioning configuration of the second user equipment*; and
> wirelessly transmitting the encoded packet on the carrier directly to the second user equipment.

App. Br. 12 (Claims App.).

## EXAMINER'S REJECTION

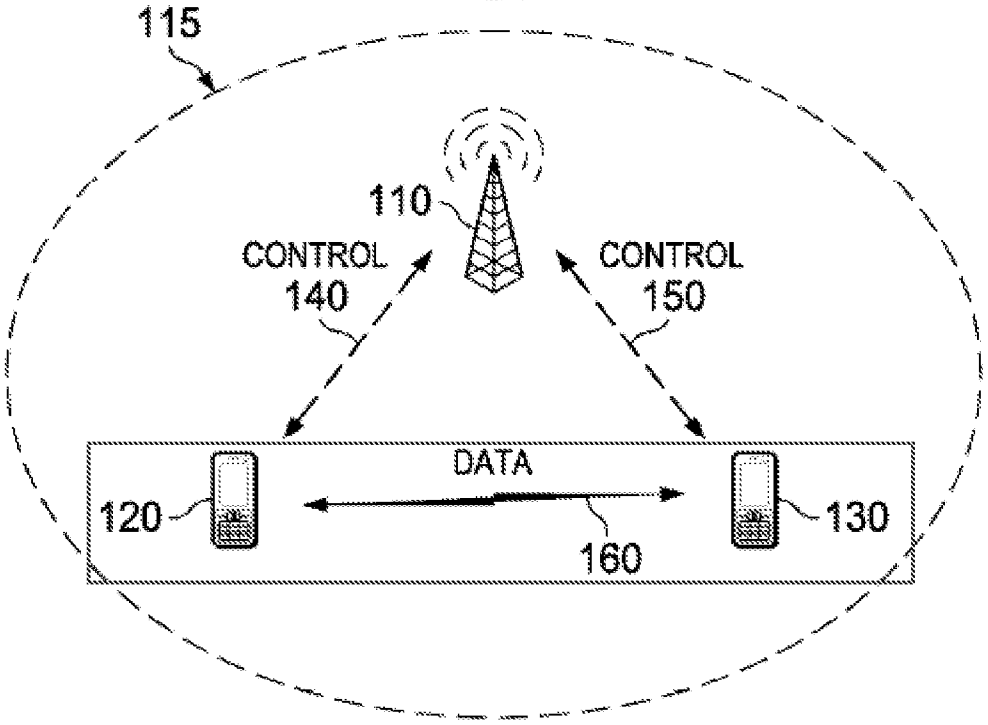
Claims 8–14, 16–22, 26, and 27 stand rejected under 35 U.S.C. § 103(a) as being obvious over Liu et al. (US 2013/0225184 A1; published Aug. 29, 2013; "Liu") and Che et al. (US 2010/0050034 A1; published Feb. 25, 2010; "Che"). Final Act. 5–10.

## DISCUSSION

In support of the § 103 rejection of independent claim 8 and, similarly, claim 16, the Examiner finds Liu teaches direct device-to-device (D2D) communication between UEs in a wireless network, shown in Figure 1, including all limitations, except for an express disclosure of "*a capability partitioning* configuration of the second user equipment" in the context of "encoding a packet" for transmission. Final Act. 5–6 (citing Liu ¶¶ 26, 77, 93, 96, Fig. 1).

Liu's Figure 1 is reproduced below with additional markings for illustration.

FIG. 1




Liu's Figure 1 shows wireless network 115 where UEs 120–130 communicate directly with each other via direct device-to-device (D2D) communication ("DMC") 160 without involving network entity (i.e., communication with a cellular base station 110). Liu ¶¶ 23–27.

Liu also teaches (1) communication resources are allocated to multiple UEs for direct device-to-device (D2D) communication ("DMC") when a DMC link is established between UEs; and (2) "if one UE is transmitting on the DMC link, the other DMC UEs should be prepared to receive" and for purposes of data packet transmission and reception, "UEs involved in a DMC group [] are informed when, the time resources, where, the frequency resources, and how, the related HARQ [hybrid automatic retransmit request] procedure, modulation and coding scheme ('MCS'), power, and multi-input/multi-output ('MIMO') scheme to transmit and receive [along with data]." Liu ¶¶ 30–31, 34. For example, each UE

configures its HARQ processes for the DMC link and manages those processes for data communication, including its soft buffer memory requirement and sub-frame allocation. Liu ¶¶ 77, 79–81. Liu further teaches a "UE can receive data . . . decoded the data packets" and "ACK/NACK feedback can be encoded with, or separately from, the data" for transmission. Liu ¶¶ 93, 98.

To the extent necessary, the Examiner relies on Che for expressly teaching "*a capability partitioning* configuration of the second user equipment" in the context of "soft buffer memory partitions" for data transmission to support the conclusion of obviousness. Final Act. 6 (citing Che ¶¶ 35, 37).

Appellants dispute the Examiner's factual findings regarding Liu and Che. First, Appellants argue neither Liu nor Che teaches or suggests "configuring, by the first user equipment, soft buffer configuration based on a category of the second user equipment" recited in claims 8 and 16. App. Br. 5–6; Reply Br. 1–2. Appellants acknowledge Liu teaches resource allocation and related HARQ processes of a UE including its soft buffer memory requirement, but argue Liu does not teach any configuration or "category" of a second user equipment. App. Br. 6 (citing Liu ¶ 77). Likewise, Appellants acknowledge Che teaches partitioning or allocating soft buffer memory between HARQ and MIMO processes, but argue Che makes "no mention of configuring a soft buffer configuration 'based on a category of the second user equipment.'" *Id.*

Second, Appellants argue neither Liu nor Che teaches or suggests "encoding a packet in accordance with a capability partitioning configuration of the second user equipment" recited in claim 8, or

alternatively, "decoding the packet in accordance with a capability partitioning configuration of the second user equipment" recited in claim 16. App. Br. 7–8; Reply Br. 2–3. According to Appellants, "[p]aragraph [0035] and [0036] of *Che* have nothing to do with encoding packets" and make "no reference to either 'encoding' or to a 'capability partitioning configuration'" or even "second user equipment" recited in claims 8 and 16. App. Br. 7.

Appellants' arguments are not persuasive. Instead, we find the Examiner has provided a comprehensive response to Appellants' arguments supported by evidence. Ans. 7–15. As such, we adopt the Examiner's findings and explanations provided therein, as discussed below. *Id.* For additional emphasis, we note claim terms are given their broadest reasonable interpretation (BRI) consistent with the specification. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Under the broadest reasonable interpretation, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

The term "capability partitioning configuration" is described in Appellants' Specification as "a [divided] set of capabilities" of a UE, i.e., "a capability configuration" that includes "one or more of:

> (1) the data rate (e.g., the maximum data rate) that a UE supports;
> (2) how many transmit and/ or receive antennas the UE has;
> (3) the types of transmission schemes supported by the UE;
> (4) the soft buffer configuration of the UE;
> (5) the UE's MIMO capability (e.g., supported number of layers per band, support of UL MIMO);
> (6) the UE's the carrier aggregation capability;
> (7) the UE's battery life;

> (8) the maximum number of transport block bits rate per TTI supported by the UE[; and]
> (9) the UE's processing capability (e.g., the number of processors a UE has, the number of simultaneous processes it can execute at one time)."

Spec. ¶¶ 126–127.

Based on Appellants' Specification, the term "capability partitioning configuration" can be broadly, but reasonably, interpreted to encompass both (1) Liu's allocation of communication resources for UEs, including "related HARQ procedure [i.e., soft buffer memory allocation], modulation and coding scheme ('MCS'), power, and multi-input/multi-output ('MIMO') scheme to transmit and receive [along with data]" (*see* Liu ¶¶ 30–31, 77, 79–81), or alternatively (2) Che's partition or allocation of soft buffer memory to HARQ processes, as implicitly recognized by the Examiner. Final Act. 6 (citing Che ¶¶ 35–36); *see also* Che ¶¶ 11, 37, 47 ("soft buffer memory sizes are dimensioned to fit the received bits at the minimum coding rate of 1/3 for UE categories 1 and 2. For UE categories 3, 4, and 5, all received bits fit into the soft buffer memory at the minimum coding rate of 2/3.").

meaning of the term "capability partitioning configuration" recited in Appellants' claims 8 and 16, we now turn to the cited prior art references, including Liu and Che. At the outset, we note these cited prior art references need not recite the claim language *ipsissimis verbis*. *See Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015). For example, Liu teaches two main ways of implementing DMC where communication resources are allocated to UEs, including: (1) a device-centric approach where one UE initiates the DMC connection with another UE; and (2) a network-centric approach where the network initiates the

DCM connection between UEs. Liu ¶¶ 27–30. According to Liu, "if one UE is transmitting on the DMC link, the other DMC UE should be prepared to receive," and for purposes of data packet transmission and reception, UEs "are informed when, the time resources, where, the frequency resources, and how, the related HARQ procedure, modulation and coding scheme ('MCS'), power, and multi-input/multi-output ('MIMO') scheme to transmit and receive [along with data]." Liu ¶¶ 31, 34. For example, each UE configures its HARQ processes for the DMC link and manages those processes for data communication, including its soft buffer memory requirement and sub-frame allocation. Liu ¶¶ 77, 79–81, 85, Fig. 5. Liu further teaches a "UE can receive data . . . decoded the data packets" and "ACK/NACK feedback can be encoded with, or separately from, the data" for transmission. Liu ¶¶ 93, 97.

Based on these disclosures, we agree with the Examiner that a skilled artisan would understand (1) Liu's UE configuring its HARQ processes and preparing the soft buffer memory requirement for data encoding and transmission as teaching or suggesting Appellants' claimed "configuring . . . soft buffer configuration" (Ans. 12–13); (2) Liu's UE's managing its HARQ processes and sub-frame allocation when communicating another UE within a DMC link as teaching or suggesting Appellants' claimed "configuring . . . soft buffer configuration based on a category of the second user equipment" (Ans. 13); and (3) both Liu's data packets/frames and Che's data packets/frames are digital data and, as such, need to be encoded for transmission and decoded for reception for MIMO communication (Ans. 14). In addition to Liu, Che also teaches soft buffer memory partitions per HARQ process and soft buffer memory sizes dimensioned to fit receive bits

at different coding rates for different categories of a UE. *See* Che ¶¶ 11, 35–37, 47 ("soft buffer memory sizes are dimensioned to fit the received bits at the minimum coding rate of 1/3 for UE categories 1 and 2. For UE categories 3, 4, and 5, all received bits fit into the soft buffer memory at the minimum coding rate of 2/3."), Figure 5 ("downlink physical layer parameter values set by user equipment category), and Figure 6 ("uplink shared channel transport block transmitted . . . as a function of user equipment category"). *See* Che ¶¶ 17, 18.

For these reasons, we are not persuaded of Examiner error. Accordingly, we sustain the Examiner's obviousness rejection of independent claim 8 and 16 and respective dependent claims 13, 21, and 22, which Appellants do not argue separately.

*Dependent Claims 9, 10, 17, and 19*

Claim 9 depends from claim 8, and further recites "receiving information regarding the capability partitioning configuration of the second user equipment from the network element *on a second carrier*." Claim 17 depends from claim 16, and recites the same limitation. Similarly, claims 10 and 19 only differ from claims 9 and 17 in that the carrier is identified as "*a downlink carrier*."

Appellants argue neither paragraph [77] nor paragraph [96] of Liu teaches "whether information is received on a first carrier or a second carrier" or "using different carriers, let alone specifically uplink and downlink carriers." App. Br. 8–9.

We disagree and adopt the Examiner's explanation provided on pages 15–17 of the Examiner's Answer, i.e., all data is encoded during transmission, and decoded during reception, via carriers, for example, an

uplink carrier for transmission and a downlink carrier for reception. *See* Liu ¶¶ 23, 26, 76, Fig. 1 ("uplink/downlink wireless communication links **140**, **150**); Che ¶¶ 28, 35, 40. As such, we also sustain the Examiner's obviousness rejection of dependent claims 9, 10, 17, and 19.

*Dependent Claims 11, 12, 18, and 20*

Claim 11 depends from claim 8, and further recites "wherein the encoding further comprises encoding the packet in accordance with the category of the second user equipment." Claim 18 depends from claim 16, and recites the same limitation.

Claim 12 depends from claim 8, and further recites "wherein the capability partitioning configuration of the second user equipment comprises a configuration a soft buffer of the second user equipment." Claim 20 depends from claim 16, and recites the same limitation.

Appellants reiterate the same argument presented against claims 8 and 16, i.e., the cited art further fails "to describe that the encoding (or decoding) includes encoding (or decoding) the packet in accordance with the category of the second user device" and "to teach the capability partitioning configuration of the second user device includes a configuration a soft buffer of the second user device." App. Br. 9. We disagree and sustain the Examiner's obviousness rejection of dependent claims 11, 12, 18, and 20 for the same reasons discussed relative to claims 8 and 16.

*Dependent Claim 27*

Claim 11 depends from claim 8, and further recites "wherein a number of soft channel bits for encoding the packet is based on at least a signaled category of the second user equipment and a maximum number of layers supported by the second user equipment on the carrier."

Appellants argue Liu makes "no mention that a number of soft channel bits for encoding the packet is based on at least a signaled category of the second user equipment and a maximum number of layers supported by the second user equipment." App. Br. 10.

We disagree. As recognized by the Examiner, Che's Figures 5–6 show the number of soft channel bits for encoding the packet based on different categories of a UE and the maximum number of supported layers. Ans. 16–17. For these reasons, we also sustain the Examiner's obviousness rejection of dependent claim 27.

## CONCLUSION

On the record before us, we conclude Appellants have not demonstrated the Examiner erred in rejecting claims 8–14, 16–22, 26, and 27 under 35 U.S.C. § 103(a).

## DECISION

As such, we AFFIRM the Examiner's rejection of claims 8–14, 16–22, 26, and 27 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED