

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Case IPR2024-00435
Patent No. 11,381,866 B2

**REPLY DECLARATION OF DAVID B. LETT
IN SUPPORT OF PETITIONER'S REPLY**

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I, David B. Lett, declare that I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

1. Introduction

1. I have been retained as an expert witness on behalf of the Petitioner, Comcast Cable Communications, LLC, for the above-referenced *inter partes* review proceeding.

2. I have been asked to provide a reply declaration regarding certain matters pertaining to U.S. Patent No. 11,381,866 (“the ’866 patent”) (Ex. 1001) and the unpatentability grounds set forth in the Petition for this proceeding.

3. I am being compensated at my usual consulting rate or testimony rate. My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding. I have no financial interest in the party or in the outcome of this proceeding.

2. Materials considered

4. In addition to those mentioned in my previous declaration, I have reviewed the following documents:

- Patent Owner’s Response and its accompanying exhibits, including Dr. Russ’s Declaration (Ex. 2009)

- All other documents referenced herein

3. Zhang expressly identifies C_1 - C_n as “desired channels” and the number of them to be less than the number of channels received in the digitized plurality of frequencies

5. Zhang expressly refers to C_1 - C_n as “desired RF channels” and repeatedly states that the exact number “n” of selected channels will depend on the specific application. Ex. 1013, ¶ [0032], claims 34, 36, 37; Pet., 6, 22-24, 29-30; Ex. 1002, ¶¶ 79-80, 106, 111, 126-127.

6. Zhang further states that “ C_1 to C_n contain content channels that are selected or used by a subscriber,” and that each of C_1 - C_n is output for demodulation via D_1 - D_m . Pet., 5, 24, 30; Ex. 1013, ¶¶ [0028]-[0029], [0038]-[0039], claim 3; Ex. 1002, ¶¶ 78-79, 111-113, 126, 130. In my view and that of a POSITA’s, it would defy common sense for Zhang to refer to undesired channels as “desired channels” as Dr. Russ argues. Ex. 2009, ¶¶ 31, 35-36.

7. Zhang places no restrictions on “n” and “m,” as I explained in my declaration, D_1 - D_m can include all or some of C_1 - C_n , and the user may output some or all n channels to the demodulator. Ex. 1002, ¶¶ 112-113, 119; Ex. 1013, ¶¶ [0028]-[0029], [0038]-[0039]. So, for example, if the number of “C” channels is 8 ($n=8$) and the number of “D” outputs is 4 ($m=4$), then there are more C channels than there are D outputs, so only four of channels C_1 - C_8 can be output simultaneously. But all of the C channels are still output.

8. I also note that Zhang's claims support the teaching that C_1 - C_n disclose the claimed selecting and demultiplexing of desired channels. Ex. 1002, ¶¶ 106-107, 110-112, 126-127, 129-130. For example, claim 21 recites that “at least one complex multiplier ... receive[s] a multi-channel digital RF signal.” In each of these examples, the number of channels demultiplexed from a multi-channel digital RF signal can be as little as a single channel (e.g., demultiplexed by “one complex multiplier”). In my view, because this claim recites receiving a multi-channel signal (i.e., a signal with a plurality of channels), but can include a single complex multiplier or filter, a POSITA would have understood that the claim shows that C_1 - C_n can include less than all channels, and thus exclude undesired channels. Claim 34 is another example that refers to a “plurality of select frequencies” used to demultiplex separate RF channels (e.g., C_1 - C_n) from “at least one multi-channel RF signal.” Nothing in this claim requires the number of channels in the at least one multi-channel RF signal and the separate RF channels to be the same (i.e., the claims do not require C_1 - C_n to include all channels, desired and undesired from the multi-channel RF signal). Zhang's claims instead teach a number of channels in the multi-channel RF signal that is independent from the number of demultiplexer channels C_1 - C_n . *Id.* These claims show that C_1 - C_n can include less than all channels and thus exclude undesired channels.

9. I also opined during my deposition that Zhang's architecture is flexible, where "n" is a variable that can be equal to or less than all channels in the signal band, and the exact number will depend on the specific application. Ex. 2018, 78:2-22, 79:17-80:10, 81:1-20, 83:10-14, 84:11-85:13, 85:24-86:12, 89:5-9.

10. As I explained, in the demultiplexer in Figure 3 of Zhang, the purpose of the numeric controlled oscillators 310 is to tune the channel selection to different frequencies so that for a particular application, the user can decide which channels in the frequency band are desired. Ex. 2018, 86:1-12. Had Zhang demultiplexed all channels, programmable frequencies would not have been needed because those frequencies would have been static values, one for every channel in the band.

4. I repeatedly explained that "n" is a variable less than or equal to the number of channels in the plurality of frequencies.

11. The Patent Owner Response cites a single response in my deposition testimony in which I agreed that paragraph 27 of Zhang says "n" channels refers to both desired and undesired channels in the entire signal band from the ADC. POR, 12 (citing Ex. 2018, 78:14-22). I was answering specifically about **just one embodiment** disclosed by Zhang paragraph 27, "(In this specific embodiment, ADC 220 is a high-speed ADC so that an entire signal band with n channels can be converted.") *emphasis added*. The Patent Owner Response leaves out that I go on to opine (before and after the portion of my deposition testimony cited in the POR) that Zhang discloses that "n" is a variable that can be equal to or less than all channels

in the signal band. Ex. 2018, 78:2-13, 79:17-80:10, 81:1-20, 83:10-14, 84:11-85:13, 85:24-86:12, 89:5-9.

12. For example, I clarified that paragraph 42 of Zhang (referring to Figure 6) explains “in a different way [from paragraph 28]” that “n” can be any value up to the total number of channels in the signal band. Ex. 2018, 84:11-86:1; Ex. 1013, ¶¶ [0041]-[0042].

13. The Patent Owner Response also identifies my declaration as allegedly supporting that C_1 - C_n include all channels. POR, 14-15 (citing Ex. 2020 (IPR2024-00432, Ex. 1002), ¶ 79). The paragraph cited is a general background where I give an overview of Zhang based on one embodiment. I further explained in my detailed analysis of Zhang that n can be less than all channels that are in the multi-channel input. Ex. 1002, ¶¶ 111-112; Ex. 2020, ¶¶ 104-106. I reiterated this during my deposition. Ex. 2018, 87:24-91:4.

5. Dr. Russ’s assertion that Zhang’s selector 240 is only needed because C_1 - C_n includes all channels is incorrect

14. Dr. Russ provides the opinion that Zhang’s channel selector 240, which selects and outputs channels D_1 - D_m from C_1 - C_n , is only needed because C_1 - C_n includes all channels. Ex. 2009, ¶¶ 57-58. I disagree with this opinion.

15. Dr. Russ correctly cites paragraph 28 of Zhang for stating that selector 240 provides fast channel search capabilities. Ex. 2009, ¶ 64. Dr. Russ’s conclusion

from these statements, however, does not logically follow. The presence of selector 240 does not mean that C_1-C_n necessarily includes all channels.

16. The same benefit of fast switching that selector 240 provides applies equally where C_1-C_n includes all or less than all of the channels in the input, but more channels than the demodulator is capable of decoding at one time.

17. If a user never wanted to watch a particular channel, there would be no reason to include it in channels C_1-C_n , and thus it would be an undesired channel. An example of such would be an optional channel that the user did not subscribe to (e.g., HBO) that cable providers at the time charged extra fees for a customer to view.

18. By extracting the channels C_1-C_n the user desires to watch at different times, the user is able to quickly switch between these desired channels using selector 240. Just because the user is not capable of watching all desired channels C_1-C_n at the same time does not mean they are undesired, especially where Zhang calls them “desired.” Ex. 1013, ¶ [0032].

6. The prosecution history of Zhang’s related EPO application does not appear to be applicable.

19. Dr. Russ further discusses the prosecution history in Zhang’s related EPO application that allegedly supports that Zhang’s C_1-C_n include all channels. Ex. 2009, ¶¶ 47-49. Dr. Russ quotes a communication from the EPO, apparently discussing the claims in that case in comparison to prior art references D1 and D2.

The exhibits provided by the Patent Owner do not include the related EPO patent application or the prior art that was allegedly being distinguished in that case. Therefore, I cannot determine whether a POSITA would concur with the EPO opinion. Nevertheless, the discussion in the EPO application references a “selector,” and to the extent this refers to selector 240, the discussion would appear to be how selector 240 selecting channels D_1 - D_m is distinguishable over the cited art (presuming the EPO and the '866 patent have the same disclosure.) In my view, this is irrelevant since the operation of selector 240 does not affect or provide any indication about what channels are included in C_1 - C_n .

7. Zhang’s channels C_1 - C_n are “select[ed]” according to the plain and ordinary meaning of this term

20. PO alleges that extracting all channels from the digitized plurality of frequencies is excluded from the claims because the '866 patent allegedly “selects and down converts *only* the desired channels [from the digitized input RF signal] without selecting or down converting any undesired channels.” POR, 4. I believe this is wrong. First, the only requirement about undesired channels is in Element [1C], which says they are not *provided*. Element [1C] does not include a requirement regarding *selecting* undesired channels and Element [14C] does not include requirements on how the system treats undesired channels in any respect.

21. Dr. Russ misrepresents the '866 patent disclosure. Dr. Russ, explains that in Figure 2 of the '866 patent, there is a bank of N mixers for selecting “N

desired channels, without selecting or down converting any undesired channels.” POR, 4-5; Ex. 2009, ¶ 34 (citing Ex. 1001, 5:55-51, 5:63-6:6). While Dr. Russ describes one embodiment, he skips over the other embodiments described in the same paragraph in which N is “equal to the number of *all* available channels ... in the licensed frequency spectrum” or “*all* receivable channels within a geographic area.” Ex. 1001, 5:56-61 (emphasis added), Fig. 2. “[A]ll” channels include the undesired channels shown in Figure 2. *Id.* Thus, just like Zhang as described above, the ’866 patent also discloses that the number of output channels can be less than or equal to the number of channels in the input frequency spectrum.

22. A POSITA would have understood that plain and ordinary meaning of “select ... each of the plurality of desired television channels ...” and “each digital down converter ... operable to generate a digital channel output corresponding to each desired channel” is what each signal path shown in Figures 2 and 3 in the ’866 system does. Each path includes a mixer 250 and filter 260 that picks out one channel from the plurality of frequencies in the digitized RF signal and outputs that channel on its own output path 272. Ex. 1001, 6:3-18, 6:64-7:9. In the ’866 patent, a plurality of desired channels is selected as required by Element [1C] as long as two of the paths 272 include desired channels, irrespective of what the other paths include. Ex. 1001, 5:55-61, Fig. 2. Likewise, each digital down converter, of the plurality of digital down converters, is operable to generate a digital channel output

corresponding to each desired channel as required by Element [14C], as long as two of the digital down converters generate an output corresponding to two desired channels, irrespective of what the other digital down converters generate. *Id.* This plain and ordinary meaning of “select” and “generate” is entirely consistent with the ’866 patent disclosure. *Id.*

23. Properly understood, Zhang’s demultiplexer 230 and selector 240, which selects and provides desired channels C_1 - C_n , meet Element [1C] and Zhang’s demultiplexer 230, which generates C_1 - C_n as down converted digital channel outputs, meets Element [14C]. Zhang’s demultiplexer 230 receives a digitized wideband signal having a plurality of frequencies on which channels C_1 - C_n are modulated. Pet., 21-24; Ex. 1013, ¶¶ [0027]-[0028], [0030]-[0032], [0042], claim 8, Figs. 2-3. The demultiplexer 230 outputs only channels C_1 - C_n , each at baseband and each isolated on its own path, thus enabling the demodulator to decode them. The Patent Owner acknowledges this basic point, that each of channels C_1 - C_n is picked out from the plurality of frequencies in the wideband signal. POR, 20-23; Ex. 2009, ¶¶ 57-61. Selector 240 further outputs some or all of C_1 - C_n as digital channel outputs D_1 - D_m from a serial interface. POR, 7, 20-28. This is “select[ing]” under its plain and ordinary meaning of the term, and is identical to how each path in the ’866 patent works to select a channel. Pet., 29-30.

8. Zhang's Circuits That Output Desired Channels D_1 - D_m are the Same as Those Disclosed in the '866 Patent

24. As my previous declaration describes, “Zhang teaches the claimed ‘digital frontend (DFE)’ as described with respect to Digital Channel Demultiplexer 230 and all or a portion of Digital Selector 240 (collectively purple), which are coupled to ADC 220.” Ex. 1013, ¶ [0028]; Ex. 1002, ¶ 109. I then detailed how demultiplexer 230 and selector 240 work, concluding “Collectively, Digital Channel Demultiplexer 230 and Digital Selector 240 output only user selected channels (either all or a subset of the user selected “C” channels) and filter out all other channels from the digitized multi-channel RF signal.” Ex. 1002, ¶¶ 110-112.

25. As I show below, the '866 patent specification and Zhang use the same circuitry. Zhang's digital circuitry (in the **red** box) that selects and down converts and provides D_1 - D_m matches the '866 patent's Figure 2 digital circuitry that selects and down converts and provides outputs desired channels 272a-272n. *See e.g.*, Pet., 4-7, 22-26, 28-33; Ex. 1013, ¶¶ [0028], [0030]-[0032], [0038]-[0039], [0042], [0048], claims 21, 34, 36-41; Ex. 1002, ¶¶ 79, 108-116. The yellow annotation is referring to the digitized output of the ADCs.

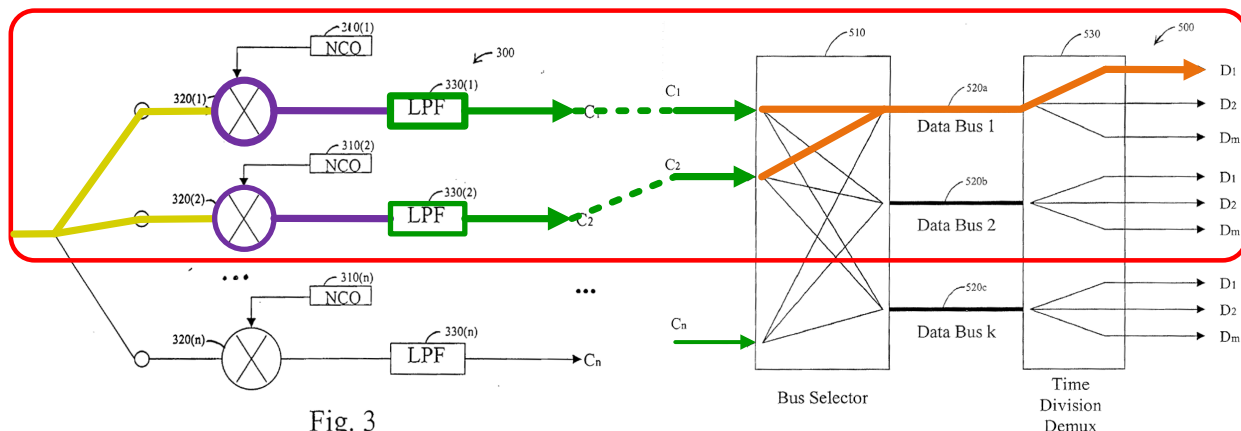
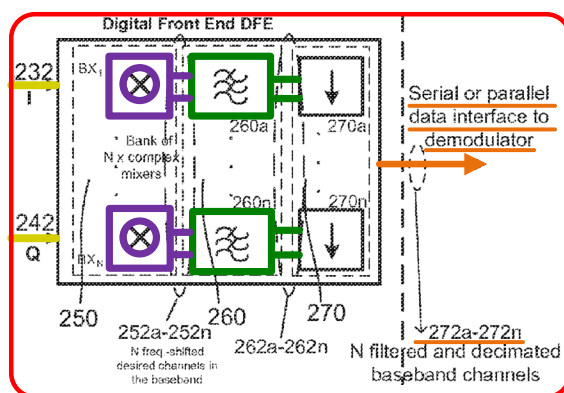


Fig. 3

Ex. 1013, Figs. 3, 5 (annotated)



Ex. 1001, Fig. 2 (annotated)

9. Zhang discloses “concurrently” in Element [1C] as described in the Petition and as I explained in my deposition.

26. With respect to “concurrently select and provide each of the plurality of desired channels” in Element [1C], the Petition described and I described how Zhang’s Figure 3, like the ’866 patent’s Figure 2, includes multiple parallel signal paths for “concurrently selecting and providing a plurality of desired channels C_1 - C_n .” Pet., 23-24; Ex. 1002, ¶¶ 110-112. That is, Zhang’s demultiplexer 230 selects and provides each “C” channel concurrently with every other “C” channel. During

my deposition, I was asked about “concurrently” and gave a series of explanations. Ex. 2019, 72:10-82:21.

27. The POR quotes one of my responses in the deposition, alleging that I expressed a view that “selecting” must be concurrent with “providing.” That is not my view and my explanations did not deviate from my views put forth in my original declaration. POR, 42-43.

28. When the entirety of my testimony is read, it is clear that I was not proposing a claim construction, or suggesting that Element [1C] excludes the way in which the ’866 patent and Zhang (which use the same circuitry) select a channel and output it sequentially using a serial output. Ex. 2019, 72:10-82:21. I repeatedly tried to explain that data travels from left to right in the circuit diagram and would first be selected and then output some brief time later. Ex. 2019, 77:7-79:4. I did not agree that the claim excluded the outputting of a piece of data after it had been selected. For example, when asked “[i]f I select each of the plurality of desired channels at one step, and at a later time provide each of the plurality of desired channels, would that disclose claim 27” I responded, “[p]erhaps in another place it says something about the later – you can’t do it later. But to me in this claim element it doesn’t say anything about timing.” *Id.*, 74:21-75:4.

29. I never interpreted “concurrently” to preclude the manner in which Zhang and the ’866 patent disclose performing Element [1C]. Pet., 24-26. Instead,

I made two points that in my view support the Petition's arguments regarding how Zhang teaches "concurrently."

30. First, I explained, in the '866 patent's system, "concurrent" does not mean "absolutely concurrently" because there is inherently a small amount of delay as a signal propagates from input to output. Ex. 2019, 77:6-79:24. Patent Owner's position is also contrary to the requirements in claim 1, which recites that "currently select and provide" is "via a serial interface." A serial interface selects between different channels sequentially to transmit them across a serial path. Patent Owner's proposed meaning of "concurrently" would exclude sequential operations, which would include the sequential operations of the serial interface. So, a POSITA would not understand "concurrently" to mean selecting and providing could not be performed with some time delay between them.

31. My second point was that, even with the signal propagation delay, in Zhang and in the '866 patent the desired channels are data streams, meaning that they include a time sequence of data. I pictorially showed this in my previous declaration as the channels passing through the serial interface. Ex. 1002, ¶¶ 131-132. As I described during my deposition, when a channel is first selected, there is a time lapse to when the channel starts streaming from the output. However, after that, the channel continues to stream and, thus, it is concurrently being selected and provided. Ex. 2019, 78:16-25, 81:4-11. That is, some data in the channel's data

stream is received at the input of Zhang's demultiplexer 230 concurrently with other data in the stream output from the serial interface of selector 240. To the extent that Element [1C] requires "selecting" to be concurrent with "providing," Zhang discloses it.

[SIGNATURE PAGE FOLLOWS]

10.CONCLUSION

32. All of the statements made in this declaration of my own knowledge are true. All statements made based on information and belief are believed to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: 4/16/2025

By: David B. Lett
David B. Lett