

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Apple Inc.,
Petitioner,

v.

Cobblestone Wireless LLC,
Patent Owner.

Case IPR2025-01497
Patent 7,924,802

PATENT OWNER'S PRELIMINARY RESPONSE

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35 U.S.C. § 312 -----	1, 7, 28
35 U.S.C. §314 -----	1

PATENT OWNER'S EXHIBIT LIST

No.	Description
Ex. 2001	<i>Cobblestone Wireless LLC v. Apple Inc.</i> , No. 7:24-cv-00232 ADA, Dkt. No. 23 Scheduling Order
Ex. 2002	Motion to Stay before Judge Albright, Docket Navigator
Ex. 2003	Guidance on USPTO's recission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation"
Ex. 2004	Western District of Texas Case Management Statistics
Ex. 2005	<i>Cobblestone Wireless LLC v. Apple Inc.</i> , No. 7:24-cv-00232 ADA, Dkt. No. 7 Proof of Service
Ex. 2006	Cobblestone's Preliminary Infringement Contentions
Ex. 2007	Apple's Invalidity Contentions
Ex. 2008	Apple's Invalidity Contentions – Appendix 1
Ex. 2009	Interim Processes for PTAB Workload Management
Ex. 2010	RIN 0651-AD89 Revision to Rules of Practice before the Patent Trial and Appeal Board, Dkt. No. PTO-P02025-0025
Ex. 2011	Cobblestone's Preliminary Infringement Contentions, '802 Claim Chart
Ex. 2012	Excerpt from <i>Qualcomm Incorporated v. Cobblestone Wireless, LLC</i> , IPR2024-01336, Paper 4, (PTAB Aug. 28, 2024)
Ex. 2013	<i>Cobblestone Wireless, LLC v Cisco Systems, Inc.</i> , Case No. 2:23-00454-JRG-RSP, Dkt. 87 (E.D. Tex. May 30, 2025)
Ex. 2014	<i>Cobblestone Wireless, LLC v Cellco Partnership d/b/a Verizon Wireless</i> , Case No. 2:23-00382-JRG-RSP – Subpoena to Apple
Ex. 2015	<i>Cobblestone Wireless, LLC v Cellco Partnership d/b/a Verizon Wireless</i> , Case No. 2:23-00382-JRG-RSP – Subpoena to Apple, Proof of Service
Ex. 2016	Control No. 90/019,458, Request for <i>Ex Parte</i> Reexamination
Ex. 2017	Control No. 90/019,458, Decision Granting <i>Ex Parte</i> Reexamination

No.	Description
Ex. 2018	U.S. Patent No. 8,416,879
Ex. 2019	Control No. 90/019,458, Non-Final Office Action

I. INTRODUCTION

Patent Owner respectfully requests that the Board deny institution because the Petition fails to demonstrate a reasonable likelihood that Petitioner will prevail on any challenged claim of U.S. Patent No. 7,924,802 (“the ’802 patent”). The Petition is premised entirely on obviousness theories, yet it never performs the required *Graham* analysis or explains how the cited prior art actually renders the claims obvious as a whole. Instead, Petitioner offers a claim-chart style listing of individual limitations, repeatedly asserting in conclusory fashion that Rofougaran (EX1004) “renders [them] obvious,” and then, in Ground 2, tacking on Shearer (EX1005) for two dependent claims without revisiting the independent-claim limitations that Ground 1 leaves unsatisfied. Those showings fall well short of Petitioner’s burden under 35 U.S.C. §§ 312(a)(3) and 314(a).

The ’802 patent describes an architecture in which two different information-bearing signals are separately converted to analog, independently upconverted, each with its own RF “frequency range” defined by a center, highest, and lowest frequency, and then combined, amplified, and transmitted on a single antenna. EX1001 at 1:60–2:5; Figs. 2–3; 6:22–7:14. The challenged independent claims capture this architecture, as well as the requirement that the transmitter actually transmit information across two distinct RF frequency ranges using the same wireless transmitter.

Ground 1 relies solely on Rofougaran. But Rofougaran never transmits two distinct RF ranges. Every embodiment in Figures 1–6 combines the contributions of different baseband signals into a single composite signal that is upconverted once using a single local oscillator, producing a single RF transmit band. Figure 7 adds a second mixer but still recombines the mixer outputs into a single RF composite signal before amplification. The Petition attempts to salvage its theory by re-labeling internal “portions” of a composite baseband or RF spectrum as if they were separate RF transmissions, and by treating a baseband offset frequency f_s as if it were separate. Those characterizations are inconsistent with Rofougaran’s actual disclosure.

Ground 1 also fails because Rofougaran never discloses, and the Petition never properly explains, the dual-path architecture required by claims 10 and 17. Those claims require, among other things, two separate DACs generating two separate analog signals, two separate upconverters producing two distinct RF center frequencies and RF ranges, a combiner that combines those two upconverted analog signals, and a power amplifier whose bandwidth is greater than the difference between the lower edge of the first RF range and the upper edge of the second. EX1001, claims 10 and 17. The Petition responds not by identifying a single disclosed embodiment that meets the claims, but by splicing together pieces from different figures (and even redrawing certain figures) without articulating any

supported rationale why a POSITA would make those modifications, or how the resulting, hypothetical system would operate. That is not a proper obviousness analysis.

Ground 2 fares no better. It relies on Shearer only for additional limitations in dependent claims 9 and 23 and never revisits the missing limitations of independent claims 1, 10, and 17 identified above. Because Ground 1 fails to show a reasonable likelihood of prevailing on any independent claim, and Ground 2 never cures those defects, the Petition necessarily fails as to all challenged claims.

Finally, as explained in Section VII, the Petition also suffers from an independent procedural defect: Apple has failed to name all real parties-in-interest. Qualcomm supplies the accused modem chipsets, is currently pursuing its own IPR against the same patent on behalf of another customer, and stands to benefit directly and substantially from invalidation of the '802 patent. Under 35 U.S.C. § 312(a)(3) and the Board's precedents, this omission alone warrants denial of institution.

For these reasons, and as detailed in the sections that follow, the Petition does not present a coherent or legally sufficient obviousness case. Petitioner never identifies the actual differences between the claimed inventions and Rofougaran, never articulates a supported motivation to modify the cited art to arrive at the claimed dual-band RF architectures, and never addresses the claims as a whole. The Board should therefore deny institution on all grounds and for all challenged claims.

II. LEVEL OF ORDINARY SKILL IN THE ART

The Petition proposes that a POSITA in the field of the '802 Patent “would have possessed at least a bachelor’s degree in electrical engineering or a related field, and two years of experience with cellular telecommunications, radio-access network architectures, protocols and signal propagation in wireless network. A person could also have qualified with more formal education and less technical experience, or vice versa.” Pet. at 6 (internal citations omitted). For purposes of this preliminary response, Patent Owner does not challenge that definition.

III. CLAIM CONSTRUCTION

The Petition states that “no formal claim constructions are necessary because claim terms need only be construed to the extent necessary to resolve the controversy” and identifies no specific terms for construction. *Id.* at 5 (internal quotation and citation omitted). Patent Owner agrees for purposes of this preliminary response.

IV. THE PETITION FAILS TO PERFORM A PROPER OBVIOUSNESS ANALYSIS

The Grounds in the petition rest solely upon obviousness, not anticipation. Pet. at 1. As such, the Petition must identify the differences between the challenged claims and the alleged prior art. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 794 (Fed. Cir. 2021) (“[T]he scope and content of the prior art are to be determined;

differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved.” (quoting *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966))); see also *Nat’l Rsch. & Dev. Corp. v. Varian Assocs., Inc.*, 883 F. Supp. 976, 984 (D.N.J. 1995) (“Although the claim must be considered as a whole, ‘the differences between the claim and the prior art need to be identified to place the obviousness analysis into proper perspective.’” (quoting *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 717 (Fed. Cir.1991))). Despite this clear precedent, the Petitioner fails to identify which limitations or elements are disclosed in the prior art or the differences between the prior art and the claims at issue, instead merely stating that each limitation is rendered obvious by Rofouguran. See e.g., Pet. at 14, 15. Similarly, the Petitioner failed to identify any motivation to modify Rofouguran, instead repeating for every limitation the vague language quoted above. The only time Petitioner provided a motivation in support of its obviousness case was with respect to the motivation to combine references for Ground 2.¹ Pet. at 74-75.

Petitioner’s failure to perform a proper obviousness analysis for Ground 1 and requires a finding that it failed to meet its burden as to all claims. Ground 2 is only directed to certain dependent claims. Petitioner did not perform a proper

¹ Patent Owner does not agree with the stated motivations to combine but reserves such disagreements for any later filings.

obviousness analysis as to any of the independent claims, which are addressed solely in Grounds 1. When addressing the dependent claims in Ground 2, Petitioner did not revisit or otherwise address the limitations in the independent claims which the dependent claims incorporate.

Petitioner cannot rely on its expert declaration to cure the deficiencies identified above. Petitioner's expert declaration copies the text of the Petition, with unsupported, conclusory opinions of obviousness. Such assertions cannot satisfy Petitioner's burden. *In re Magnum Oil Tools Int'l, Ltd.* 829 F.3d 1364, 1380 (Fed. Cir. 2016). (“[A] petitioner cannot satisfy its burden of proving obviousness by employing mere conclusory statements.”); *TQ Delta v. Cisco*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (rejecting obviousness theories depending solely on expert ipse dixit).

Moreover, the Petition fails to consider or address the obviousness of the challenged claims as a whole, instead merely addressing each limitation separately in Ground 1. The Petition is thus facially deficient as to the independent claims. *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004). “The ‘as a whole’ instruction in title 35 prevents evaluation of the invention part by part. This form of hindsight reasoning, using the invention as a roadmap to find its prior art components, would discount the value of combining various existing features or principles in a new way to achieve a new result—often the very definition of

invention.” *See also Princeton Biochemicals, Inc. v. Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005) (“[S]imply identifying all of the elements in a claim in the prior art does not render a claim obvious.”).

Thus, Petitioner failed to perform a proper obviousness analysis for *any* challenged claims. Petitioner’s failure to identify its position with particularity, by itself, compels a finding that Petitioner fails to meet its burden. *See* 35 U.S.C. § 312(a)(3); 37 C.F.R. §§ 42.104, 42.22; *Intelligent Bio- Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

V. THE PETITION FAILS TO SHOW A REASONABLE LIKELIHOOD OF PREVAILING FOR ANY CHALLENGED CLAIM.

The Petition raises two Grounds of invalidity, the first of which relies on Rofougaran (Ex. 1004) alone, and the second of which relies on Rofougaran in combination with Shearer (Ex. 1005). Ground 1, however, alone addresses the independent claims. Ground 1 fails because Rofougaran, the only reference relied upon for Petitioner’s single-reference obviousness contentions, fails to disclose multiple limitations required by the independent claims. Ground 2 only addresses certain dependent claims and does not address the requirements of the independent claims. Because each asserted ground fails to show invalidity in multiple ways, institution should be denied.

A. The Petition’s Ground 1 Theory Fails as to Claim 1

Petitioner asserts that Rofougaran discloses transmitting information “across

a first frequency range” and “across a second frequency range” as required by claim 1 of the ’802 patent. Pet. at 14–22. But Ground 1 fails as to claim 1 because Rofougaran never transmits two distinct ranges of any kind. For these reasons, Petitioner cannot demonstrate that Rofougaran discloses or renders obvious the limitations of claim 1.

Petitioner fails to show that Rofougaran discloses a core limitation of claim 1: **simultaneously transmitting first and second information across two distinct frequency ranges, each having its own center, highest, and lowest frequencies, using the same wireless transmitter.** This requirement is incompatible with the identified disclosures in Rofougaran, despite the Petitioner’s identification of a composite signal containing two baseband-origin components (Pet. at 19-20, 22-23). The Petition fails to identify any embodiment that transmits two independent information-bearing RF signals across two RF spectral bands. Instead, Petitioner relies on internal baseband manipulation within Rofougaran’s transmitter and recharacterizes internal “portions” of a single composite baseband spectrum as if they were independent RF transmissions. That interpretation is inconsistent with the intrinsic record of the ’802 patent, the actual disclosures of Rofougaran, and basic RF transmitter architecture.

The ’802 patent repeatedly and expressly treats the claimed “frequency ranges” as portions of the transmitted RF signal, not as baseband constructs. The

patent explains that the invention addresses limitations of prior art transmitters that upconverted only one signal “to one center frequency,” limiting transmitted bandwidth. EX1001, 1:29–40. To overcome this, the patent discloses transmitting two upconverted analog signals, each occupying its own transmitted RF frequency range, each with its own center, highest, and lowest frequencies. EX1001, 1:60–2:5; Fig. 2; Fig. 3; 6:22–7:14. Nothing in the intrinsic record suggests that internal digital-domain frequency shaping or spectral placement prior to upconversion defines the claimed frequency ranges.

The Petition relies on Figure 2 and the associated discussion surround Figure 2 for its claim 1 argument. Pet. at 15-24. But in the cited portions of Rofougaran, only a single signal is sent. Indeed, Petitioner’s quoted text emphasizes this fact, referring repeatedly to the “composite signal” (singular) being transmitted and “*a signal*” as the output of the converter. Pet. at 22. “The output of the upconverter 240 may, for example, comprise *a signal* indicative of the composite signal spectrally shifted to *an RF frequency*. Pet. at 18-19 (quoting Ex1004 at 7:35-36). Thus, the cited discussion pertaining to Figure 2 discloses generating one RF output, centered at one LO frequency, with two baseband components embedded within that RF band. Once the composite baseband is upconverted, everything is shifted together into a single RF frequency range.

Petitioner argues that “portion 242” has a center frequency at f_{RF} and that

“portion 243” has a center frequency at $f_{RF} + f_s$, allegedly satisfying the claimed requirement of two RF frequency ranges. Petition at 20. But Rofouguran itself forecloses that interpretation.

Rofouguran’s f_s is not an RF carrier frequency and is never used as one. Rather, f_s is only the digital-domain spectral shift applied by spectral placement module 210 prior to mixing. EX1004 [¶0041]. Petitioner’s attempt to treat this digital frequency shift as a second RF center frequency is contrary to the reference’s explicit teaching: upconverter 240 applies **one** RF mixing frequency (f_{RF}), producing **one** RF-domain output signal. *Id.* Nothing in the Petition or the identified prior art indicates that a POSITA would view a baseband offset frequency as a “center frequency,” much less as the center frequency of a transmitted RF signal

Rofouguran’s f_s is not an RF carrier frequency and is never used as one. Rather, f_s is presented as a baseband spectral shift performed by the spectral placement module before any RF upconversion occurs. For example, EX1004 explains that the spectral placement module “may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal by a frequency f_s .” EX1004 [¶0041]. The surrounding discussion (paragraphs thirty-seven to forty-three) makes clear that this shifting occurs entirely in baseband, before the signals are combined and long before any RF-domain processing. The description of Fig. 2 reinforces this point. EX1004 identifies the resulting “frequency

spectrum 231” as a composite baseband spectrum containing a “first portion 233” and “second portion 232,” each occupying a different “frequency space.” *Id.* at [¶0044]. These “upper” and “lower” components and “mirror portions” (*id.* at [¶¶0044–0047]) are artifacts of baseband spectral manipulation, not RF carriers. The only RF mixing frequency Rofougaran discloses appears in paragraph forty-six, where the composite signal is mixed with “an RF mixing signal at frequency f_{RF} from a local oscillator 246,” producing a single RF upconverted signal. *Id.* at [¶¶0046–0047]. Nothing in EX1004 states or implies that f_s becomes an RF carrier or functions as a center frequency of any transmitted RF signal. The reference consistently teaches that the RF center frequency is determined solely by the LO (*e.g.*, element 246), whereas f_s remains a baseband offset applied before mixing. Thus, the Petition’s attempt to treat f_s as the “center frequency” of a transmitted RF frequency range misreads Rofougaran and contradicts the reference’s explicit description of its signal processing chain.

Moreover, the Petition makes multiple errors regarding the requirements that “the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency” and “the second frequency range having a second center frequency greater than the first center frequency, a second highest frequency, and a second lowest frequency.” First, the Petitioner’s assertion that the boundaries of those internal “portions” correspond to the “highest” and “lowest” frequencies of

separate RF signals misreads the claims. The claimed highest/lowest frequencies refer to the edges of each transmitted RF band, as shown in Figure 3 of the '802 patent, not to internal mathematical boundaries of a mixed baseband signal. *Compare* EX1001, Fig. 3; [¶0035-0040]. Second, the Petitioner reverses the requirement of limitation 1[b], arguing that “the ***center frequency of the first portion*** 243 ($f_{RF} + F_s$) [which Petitioner contends corresponds to the first signal component] ***is greater than the center frequency of the second portion*** 242 (f_{RF}) [which Petitioner contends corresponds to the second signal component].... Pet. at 20. But claim 1 requires the second frequency range has a ***second center frequency greater than the first center*** frequency. Perhaps recognizing that Rofouguran directly contradicts the requirements of claim 1, the Petitioner attempts to relabel these component parts, referring to the “first portion” as the “second signal” and the “second portion” as the “first signal,” but this inconsistent with Rofouguran’s own labelling and disclosures.

Ground 1 fails because Petitioner does not identify any disclosure in Rofouguran that teaches or suggests transmitting first and second information across two distinct frequency ranges, each with its own center, highest, and lowest frequencies, using the same wireless transmitter. Indeed, Petitioner admits that Rofouguran teaches the opposite of limitation 1[b]. The Petition’s obviousness arguments do not address this deficiency in the art and Petitioner does not claim that

the knowledge of a POSITA fills this gap. Therefore, Petitioner has not established a reasonable likelihood of prevailing on claim 1, and Ground 1 as to claim 1, and claims 2-4 and 6-8 which depend therefrom, should be denied.

B. The Petition's Ground 1 Theory Fails as to Claim 10

Claim 10 specifies an ordered multipath signal-generation architecture involving: (1) receiving first and second digital signals; (2) converting each separately into its own analog signal using distinct DACs; (3) independently upconverting each analog signal into its own RF center frequency with its own RF frequency range defined relative to that center frequency; (4) combining the resulting two, independently upconverted RF analog signals; and (5) amplifying and transmitting the combined RF signal on a single antenna, with the power amplifier having sufficient bandwidth to accommodate the union of the two distinct RF frequency ranges. Rofougaran discloses none of this.

As explained below, the Petition's arguments regarding Rofougaran are misplaced. Rofougaran does **not** teach separate DACs generating separate analog signals that are then upconverted to distinct RF center frequencies. Instead, Figures 1–6 generate only **one** composite analog signal, relying on **one** upconversion operation and **one** LO. Figure 7 adds a second mixer but still does not disclose separate analog signals originating from discrete DAC paths, nor does it disclose two RF frequency ranges as defined in claim 10. Moreover, Figure 6, which the

Petition cites for its DAC arguments, confirms the opposite: it shows both baseband signals being converted to analog independently by two DACs *before* the spectral placement module, not after, and it still results in only a single composite analog signal prior to upconversion. Nothing in Rofougaran teaches the dual-RF-path architecture required by claim 10. Accordingly, Ground 1 fails as to Claim 10.

1. Rofougaran Does Not Disclose Converting Each Digital Signal Into its Own Analog Signal Using Two Distinct DACs Carrying Distinct Frequency Ranges

The Petition contends that a POSITA “would have understood or at least found obvious” that the “received signals are digital and later converted to the analog domain.” Pet. at 41 (citing EX1004 at 5:64–6:4). The Petition further argues that Figures 4–6 illustrate “various non-limiting exemplary configurations including such converters.” Pet. at 37. The Petition then suggests that these disclosures support the conclusion that, modifying the architecture of Figure 7 in light of the “teachings” of Figure 6, the first and second digital signals would be separately converted into distinct analog signals using two DACs, each carrying its own “frequency range,” satisfying limitations 10[a] and 10][b]. Pet. at 37-39.

This reasoning misreads EX1004 and mischaracterizes the teachings of the figures. Nothing in the cited portions of EX1004 discloses, teaches, or suggests converting the first digital signal into a first analog signal carrying a first frequency range, and converting the second digital signal into a second analog signal carrying

a second frequency range, *before* the signals enter separate RF upconversion paths with different RF center frequencies. To satisfy claim 10, the DACs must generate **two distinct analog signals**, each carrying **its own information across its own frequency range**, and each fed into **its own upconverter** operating at **its own RF center frequency**.

Petitioner's argument that a POSITA "would have understood or at least found it obvious" that the inputs in Figure 7 are digital signals later converted to analog using "the teachings of FIG. 6" (Pet. at 41) misstates both what EX1004 discloses and what Figure 6 actually teaches. As an initial matter, Figure 6 does not describe or suggest any architecture in which two analog signals are independently upconverted at different RF frequencies after DAC conversion, which is the structure claim 10 requires. Instead, Figure 6 merely illustrates one possible placement of DACs in a system that otherwise matches the single-upconverter architecture of Figures 1–4. In Figure 6, the DACs appear only to show that spectral placement may occur in the digital domain before a single mixing and transmission chain. Nothing in EX1004's discussion of Figure 6 teaches or suggests duplicating DACs to create two independent upconversion paths, nor does it suggest modifying Figure 7 to implement two distinct analog-domain frequency ranges that persist after mixing. Petitioner's modification therefore conflates fundamentally different architectural purposes: Figure 6's DAC placement concerns domain conversion (digital vs.

analog), while Figure 7's two-mixer configuration concerns multi-mode signal combination into a single transmitted RF signal. EX1004 nowhere indicates that the functionality of Figure 6 should be imported into Figure 7 in a way that generates two separately identifiable analog signals each carrying data across its own frequency range prior to upconversion, as claim 10 requires. To the contrary, EX1004 expressly teaches that all embodiments, including Figure 7, ultimately produce one RF composite signal for transmission, not two independent upconverted analog signals. Petitioner's proposed modification therefore lacks foundational support in EX1004 and does not cure the fundamental defect that Rofougaran never produces or transmits the distinct upconverted analog signals across independent RF ranges required by claim 10.

2. Rofougaran Does Not Disclose or Render Obvious Independently Upconverting Two Analog Signals to Two RF Center Frequencies, Each Producing its Own RF Frequency Range

Claim 10 requires upconverting each analog signal **separately** into its own RF center frequency, producing its own RF frequency range defined relative to that center frequency. EX1001, Cl.10 (first up-converted analog signal comprising “a first up-converted frequency range from the first RF center frequency minus one-half the first frequency range to [plus one-half] the first frequency range”; second up-converted analog signal comprising “a second up-converted frequency range”).

No embodiment in Figures 1–6 of EX1004 discloses independent upconversion paths. In each of these embodiments, Rofougaran produces a **single composite baseband (or analog) signal**, which is then upconverted as a whole using **one mixer** and **one LO**. The intrinsic record makes clear that a transmitter relying on a single LO can generate only a single RF center frequency (EX1001, 1:29–32), which is why the '802 patent introduces independent upconversion paths to generate separate RF signals at separate RF center frequencies.

The Petition's attempt to recharacterize the “portions” of the upconverted composite in Figure 2 as if they were separate RF frequency ranges (Pet. at 20–21, 35-43) is therefore misplaced as described above. The “first portion 243” and “second portion 242” of EX1004, Fig. 2 are not separately upconverted RF signals. They are the mathematical decomposition of a **single composite signal**—an artifact of how the input spectra are shaped and combined at baseband—not distinct RF signals generated through distinct upconversion operations. The LO of the upconverter 240 sets **one** RF center frequency, not two. A POSITA would understand this unambiguously. Thus, Rofougaran does not disclose the independent upconversion steps required by claim 10.

3. Figure 7 Does Not Disclose Two Independently Upconverted Analog Signals Carrying Distinct Frequency Ranges

Figure 7 is the only embodiment in EX1004 that includes two mixers. But

even here, the Petition's reliance is misplaced because Figure 7 still does not meet the claim. First, Figure 7 does not disclose that the two mixers receive **two independently generated analog signals**, each produced by its own DAC. Nothing in EX1004 teaches or suggests inserting DACs before the mixers in Figure 7. The Petition's reliance on Figures four to six to imply such a structure (Pet. at 36–37) rewrites the disclosure.

Second, even though Figure 7 mixes each input with its own RF mixing signal (EX1004, 10:23–34), these mixed outputs are immediately combined **before** entering the RF transmission stage (10:35–40). The RF transmission stage 750 transmits only one RF output waveform, not two independently transmitted signals.

Third, Figure 7 does not disclose that the mixer outputs retain separate RF “frequency ranges” as defined in claim 10. Once combined, the waveform fed to the power amplifier is a single signal, treated and transmitted as a single RF output. Therefore, Figure 7 does not disclose the dual-RF-path architecture required by claim 10.

Petitioner's argument that a POSITA “would have understood or at least found obvious” that the baseband signals in Figure 7 are digital signals later converted to analog using separate DACs is not supported by Rofougaran's disclosure. The Petition cites general language in EX1004 stating that various components “may be implemented in analog and/or digital circuitry” (Pet. at 37

(citing EX1004, 5:64–67)), but this statement does not teach that Figure 7 includes—or should be modified to include—two independent digital-to-analog conversions of two distinct baseband signals, as required by claim 10. The intrinsic disclosure demonstrates the opposite. Figure 6 is the *only* embodiment in Rofougaran that actually shows digital baseband signals being independently converted into analog signals using two separate DACs (EX1004, Fig. 6) and even there, the DACs appear **after** spectral placement modules and **before** a signal combiner—not before two separate upconversion paths as required by claim 10. In contrast, Figure 7 contains no DACs at all and no suggestion of inserting them. Instead, Figure 7 depicts the “first signal based on the first baseband signal” and the “second signal based on the second baseband signal” being fed **directly** into two RF mixers (EX1004 at [0070-0072]), with no disclosure that these signals are digital, no disclosure that they are converted into analog using distinct DACs, and no disclosure that two such DACs exist anywhere in the architecture. Petitioner therefore impermissibly rewrites Figure 7 by importing DACs from a different embodiment and relocating them into a fundamentally different architecture. Nothing in EX1004 teaches or renders obvious converting two separate digital signals into two separate analog signals *prior to* upconversion by two distinct mixers, as required by claim 10. Absent such disclosure, Rofougaran cannot meet—or render obvious—the specific DAC-to-analog-frequency-range limitations of claim 10.

Because Rofougaran never discloses independently upconverted RF signals, it necessarily does not disclose combining them. Every embodiment of EX1004 combines signals only at baseband or low-intermediate frequencies **before** upconversion. Claim 10 requires combining **after** separate upconversion to distinct RF center frequencies.

4. Petitioner's Obviousness Arguments Are Unsupported and Insufficient to Demonstrate Unpatentability

The Petition tacitly acknowledges that Rofougaran fails to disclose limitations 10[a], 10[b], 10[c], 10[d], 10[e], 10[f], 10[h], and 10[i], relying instead on Figures modified by the Petitioner seeking to support its obviousness allegations. But Petitioner does not identify a single system or even cobbled-together embodiment that is capable of meeting all the claim elements. This incongruent mash-up of disclosures only emphasizes the dearth of Rofougaran's teachings in terms of claim 10. Moreover, Petitioner fails to provide any support for its proposed modifications to the disclosures in Rofougaran, providing hollow, unsupported conclusions that such would have been obvious to a POSITA. Petitioner has put forward insufficient evidence to demonstrate that Rofougaran renders claim 10 obvious.

First, Petitioner relies on a "modification to Rofougaran's Fig. 7 based on teachings of Fig. 6" for limitations 10[a] to 10[e]:

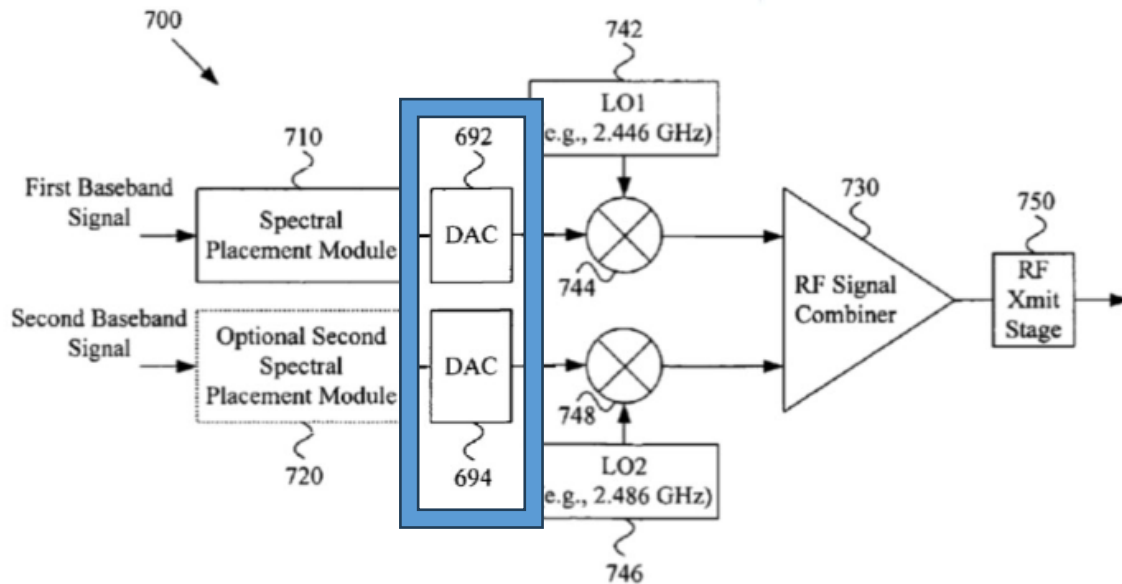


Figure 7

**Modification to Rofougaran's FIG. 7
Based on Teachings of FIG. 6**

Pet. at 36-52 (modified for emphasis). In particular, the Petitioner inserted the DACs 692 and 694 before mixers 744 and 748, shown in blue. Notably, in this hypothetical embodiment, the DAC precedes the signal combiner and LO, which precede the RF signal combiner. No power amplifier is disclosed. With respect to limitations 10[h] and 10[i], Petitioner instead relies on a Figure 2, and in particular the power amplifier 252 and antenna 254. Pet. at 58-60.

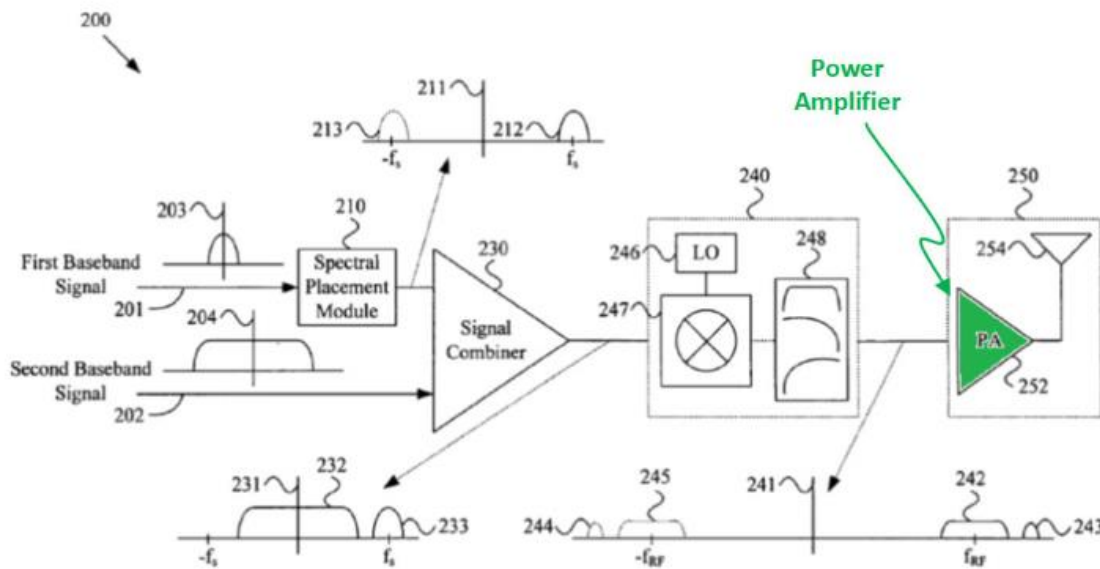


Figure 2

Rofougaran's FIG. 2 (annotations added in color)

But in the Figure 2 embodiment, the signal combiner precedes the LO and mixer. Claim 10, when viewed as a whole, requires two DACs which precede two upconverters, which precede the combiner, which in turn precedes the amplifier and antenna. Petitioner fails to identify any disclosure in Rofougaran of such an embodiment or to provide any support or even argument that such would be obvious. *See Princeton Biochemicals, Inc. v. Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005) (“[S]imply identifying all of the elements in a claim in the prior art does not render a claim obvious.”).

Moreover, Petitioner fails to provide any support for its repeated contentions that such modifications would have been obvious to a POSITA. “To satisfy its

burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *Magnum Oil*, 829 F.3d at 1380. Petitioner’s expert, likewise fails to provide any support for these arguments, and provides the same conclusory opinions that are expressed in the Petition. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[Petitioner’s] expert testimony in support of this theory is equally unavailing, adding nothing beyond the conclusory statements in [the] petition.”); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-16 (P.T.A.B. Aug. 24, 2022) (precedential).

5. Petitioner Fails to Make a Showing as to Limitation 10[j]

Limitation 10[j] adds the further requirement that “the bandwidth of said power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range.” Petitioner identifies no disclosure in Rofouguran of this limitation, and instead alleges that the reference renders “Element [10.j] obvious for at least the same reasons described above with respect to claim 6.” Pet. at 60 (citing the Petition’s discussion of claim 6 and Ex. 1003, ¶103). But claim 6 only adds the element that “the first information [of claim 1] corresponds to a first wireless

protocol and the second information [of claim 1] corresponds to a second wireless protocol.” Whether or not the transmitted information corresponds to a wireless protocol has nothing to do with whether the bandwidth of a power amplifier is greater than a specified frequency. Indeed, claim 6 (when read in combination with claim 1) does not disclose a power amplifier at all. Petitioner presents no additional evidence or argument as to why its discussion of claim 6 is relevant to limitation 10[j] or how the cited disclosure in Rofougaran as to claim 6 applies to limitation 10[j]. The cited paragraph of Petitioner’s expert declaration likewise does not aid Petitioner, merely copying and pasting the inaccurate and unsupported text of the Petition.

6. Conclusion as to Claim 10

Claim 10 requires a transmitter architecture that separately converts two digital signals into two analog signals, independently upconverts each analog signal into two distinct RF center frequencies, produces two distinct RF frequency ranges, and then combines, amplifies, and transmits the resulting dual-RF-range signal.

Rofougaran discloses none of these features. All of its embodiments (Figures 1–6) combine signals before upconversion and use a single LO to produce a single RF signal. Figure 7 adds a second mixer but still does not disclose the required dual-DAC, dual-analog-signal, dual-RF-path architecture, and does not produce or transmit two distinct RF frequency ranges. Petitioner relies on a mish-mash of edited

figures that still fail to disclose or render obvious the invention of claim while making unsubstantiated and conclusory statements of obviousness. Finally Petitioner fails to make any showing of argument, let alone evidence as to limitation 10[j]. Accordingly, the Petition fails to establish a reasonable likelihood of prevailing on Claim 10 or claim 13 which depends therefrom.

C. The Petition's Ground 1 theory fails as to Claim 17

Claim 17 and claim 10 contain several similar or overlapping limitations. Like claim 10, claim 17 requires receiving first and second digital signals; two distinct DACs which receive the first and second signals respectively; (3) two distinct upconverters, two convert the first and second signals their own RF center frequency with their own RF frequency range defined relative to that center frequency, and a power amplifier that has a certain specified bandwidth. *See* limitations 17[b]-17[f].

Petitioner presents reiterates its claim 10 arguments in its attempt to invalidate claim 17. For the same reasons described above, the Petitioner fails to meet its burden. The Petitioner presents the same cobbled together mish-mash of embodiments and the same conclusory and unsupported allegations of obviousness. For the reasons described above, Rofougaran fails to disclose or render obvious claim 17.

As with limitation 10[j], Petitioner again fails to address one of the limitations of claim 17, namely 17[f]. Limitation 17[f] requires “a power amplifier coupled to receive the first and second up-converted analog signals, wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range.” While Petitioner addresses the first element of this limitation—“a power amplifier coupled to receive the first and second up-converted analog signals” (which Patent Owner also disputes for the reasons provided above)—the Petitioner again completely fails to address the further requirement that “the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range.” Petitioner merely contends that this element is substantially the same as element 10[j] and Rofouguran renders element 17[f] obvious for the same reasons. Pet. at 70. But it bears repeating that Petitioner’s failed to actually address the text of element 10[j] as written and claimed, presenting no evidence or argument that this element regarding the bandwidth of the power amplifier is disclosed or otherwise rendered obvious.

Claim 17 requires a transmitter architecture that separately converts two digital signals into two analog signals, independently upconverts each analog signal into two distinct RF center frequencies, produces two distinct RF frequency ranges,

and then amplifies the resulting dual-RF-range signal.

Again, Rofougaran discloses none of these features. All of its embodiments (Figures 1–6) combine signals before upconversion and use a single LO to produce a single RF signal. Figure 7 adds a second mixer but still does not disclose the required dual-DAC, dual-analog-signal, dual-RF-path architecture, and does not produce or transmit two distinct RF frequency ranges. Petitioner relies on a mish-mash of edited figures that still fail to disclose or render obvious the invention of claim while making unsubstantiated and conclusory statements of obviousness. Finally Petitioner fails to make any showing of argument, let alone evidence as to limitation 17[f]. Accordingly, the Petition fails to establish a reasonable likelihood of prevailing on Claim 17 or claim 21 which depends therefrom.

D. The Dependent Claims

Because the independent claims are not obvious, the Board should deny the Petition on the dependent claims for the same reasons. *See Neptune Generics, LLC v. Eli Lilly & Co.*, 921 F.3d 1372, 1378 (Fed. Cir. 2019).

E. The Petition's Ground 2 Does Not Prove Unpatentability of the Challenged Claims

In Ground 2, the Petitioner relies on the combination of Shearer and Rofougaran to argue that dependent claims 9 and 23 are obvious. Petitioner does not address independent claims 1, 10, or 17 in Ground 2 or any of the deficiencies addressed above. In light of the deficiencies in Ground 1 as to independent claims

1, 10, and 17 which Ground 2 does not cure, Ground 2 does not render the challenged claims unpatentable.

VI. THE PETITION FAILS TO NAME ALL REAL PARTIES-IN-INTEREST

Under 35 U.S.C. §312, a petition “may be considered only if ... the petition identifies all real parties in interest.” *See also Corning Optical Communications RF, LLC v. PPC Broadband Inc.*, IPR2014-00440, Paper 68 (PTAB Aug. 18, 2015). Apple fails to identify its supplier, who has a concurrent challenge against the ’802 Patent, as a real party-in-interest. The Petition, therefor, cannot be considered for institution or otherwise.²

Before institution, the burden of a patent owner challenging a petitioner’s RPI disclosure is to “provide[] sufficient evidence that reasonably brings into question the accuracy of a petitioner’s identification of RPI, the overall burden remains with the petitioner to establish that it has complied with the statutory requirement to identify all RPI.” *Corning Optical*, IPR2014-00440, Paper 68 at 13 citing (*Zerto, Inc. v. EMC Corp.*, Case IPR2014-01254, slip op. at 6–7 (PTAB Feb 12, 2015) (Paper 32)). “Determining whether a non-party is a ‘real party in interest’ demands a flexible approach ... with an eye toward determining whether the non-party is a

² Should Apple choose to amend its disclosure of real parties-in-interest to include Qualcomm, this would only demonstrate why the petition should be denied as a repeat petition by a single party as discussed in Patent Owner’s Request for Discretionary Denial.

clear beneficiary that has a preexisting, established relationship with the petitioner. ... [T]he two questions lying at its heart are whether a non-party ‘desires review of the patent’ and whether a petition has been filed at a nonparty’s ‘behest.’” *Applications in Internet Time, LLC v. RPX Corp.*, 897 F.3d 1336, 1351 (Fed. Cir. 2018). As explained below, there is sufficient evidence to reasonably bring into question if Qualcomm is the clear beneficiary of its customer’s petition and had Apple file the instant petition on its behalf.

Qualcomm has a preexisting relationship with Apple supplying the key infringing component and is currently seeking the invalidation of the ’802 Patent after another customer was similarly accused of infringement. Taken together, this shows Qualcomm is clearly an unnamed real party-in-interest.

Qualcomm is a clear beneficiary of Apple’s petition and has a preexisting, established relationship. Apple’s iPhone products use Qualcomm Snapdragon modems. Ex. 2011 at 3. Thus, Qualcomm has a preexisting, established supplier-customer relationship with Apple. Further, these Qualcomm modems are the basis for Apple’s infringement of the ’802 Patent. *See id.* This alone shows that Qualcomm would be a beneficiary of Apple’s petition. Such a petition, if successful, would free Qualcomm and any other Qualcomm customers of liability for infringing the ’802 Patent.

But Qualcomm's own petitioning activity clearly shows that it owes an indemnification obligation to its customers and itself desires the '802 Patent be invalidated. Qualcomm is currently pursuing IPR2024-01336 despite itself never being sued in district court by Cobblestone. *See Qualcomm Incorporated v. Cobblestone Wireless, LLC*, IPR2024-01336 Paper 4 at 105-06 (listing no related matters including Qualcomm). Instead, Qualcomm identifies only Cisco Systems, Inc. as a real party in interest based on it being named as a defendant in a then pending litigation. *Id.* Qualcomm's actions with regard to its customer Cisco is strongly suggestive of its relationship with all its customers, including Apple. As these indemnification agreements obligate a supplier to cover any patent infringement damages, they also include provision obligation Qualcomm to fund Apple's defense and entitle Qualcomm to control said defense. It is thus clear Qualcomm has an interest in the review of the '802 Patent and highly likely Qualcomm funds and controls the instant petition.

This is reinforced by Qualcomm's actions in IPR2024-01336. Despite Cobblestone's district court action against Cisco being resolved, *Cobblestone Wireless, LLC v. Cisco Systems, Inc.*, Case No. 2:23-cv-00454, Dkt. 90 (E.D. Tex. Jun. 2, 2025), Qualcomm has maintained its petition against the '802 Patent at no small cost. Why? Because Qualcomm is still, independently, invested in invalidating the '802 Patent. The only remaining assertion of the '802 Patent is against

Qualcomm's customer, Apple. Clearly, Qualcomm believes it would benefit from the invalidation of the '802 Patent based on its assertion against Apple.³

Taken together and at the very least, this evidence reasonably brings into question the accuracy of omitting Qualcomm as a real party in interest. As Apple's indemnifying supplier and a separate petitioner, Qualcomm "is a clear beneficiary that has a preexisting, established relationship with the petitioner." *See Applications*, 897 F.3d at 1351. Qualcomm's actions in maintaining a petition in its own name despite not being accused of infringement demonstrates it desires review of the '802 Patent. *See id.* And given the typical provisions of supplier indemnification agreements, Qualcomm is likely to both fund and control the instant petition. *Id.* at 1342-43. Without identifying Qualcomm as a real party-in-interest, the petition cannot be considered and must be denied.

VII. CONCLUSION

For the reasons set forth above, Patent Owner respectfully requests that the instant Petition be denied. All grounds fail to perform proper obviousness analysis and consider the claims as a whole. Indeed, as to every claim, the grounds fail to disclose the claimed two signals. Further still, the Petition fails procedurally by omitting a clear real party-in-interest. Because the Petition has not shown a

³ Moreover, the instant petition is largely repetitive of an EPR filed by Unified Patents. *See Paper 7* at 18-20. As the only member of Unified Patents accused of infringement is Cisco, Qualcomm's other customer, it is apparent that Qualcomm seeks to have those grounds reviewed in a faster IPR.

reasonable likelihood of success as to any claim and fails to identify all real parties-in-interest institution should be denied.

Date: December 10, 2025

Respectfully submitted,

/ Qi Tong /

Qi (Peter) Tong, Reg. No. 74,292
ptong@raklaw.com
Russ August & Kabat
8080 N. Central Expy., Suite 1503
Dallas, TX 75206

Reza Mirzaie, Reg. No. 69,138
Neil A. Rubin, Reg. No. 67,030
Susan Y. Tull, Reg. No. 61,551
Josh Scheufler, (PHV to be Filed)
RUSS, AUGUST & KABAT
12424 Wilshire Blvd., 12th Floor
Los Angeles, CA 90025

Counsel for Patent Owner

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I certify that there are 6,832 words in this paper, excluding the portions exempted under 37 C.F.R. § 42.24(a)(1), according to the word count tool in Microsoft Word.

Dated: December 10, 2025

/ Qi Tong /

Qi (Peter) Tong, Reg. No. 74,292
ptong@raklaw.com
Russ August & Kabat
8080 N. Central Expy., Suite 1503
Dallas, TX 75206

Reza Mirzaie, Reg. No. 69,138
Neil A. Rubin, Reg. No. 67,030
Susan Y. Tull, Reg. No. 61,551
Josh Scheufler, (PHV to be Filed)
RUSS, AUGUST & KABAT
12424 Wilshire Blvd., 12th Floor
Los Angeles, CA 90025

Counsel for Patent Owner

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on December 10, 2025, by filing this document through the Patent Trial and Appeal Case Tracking System as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioner:

W. Karl Renner, Reg. No. 41,265
Hyun Jin In, Reg. No. 70,014
Jonathan C. Driesslein, Reg. No. 82,202
IPR50095-0250IP1@fr.com.
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402

Date: December 10, 2025

/ Qi Tong /
Qi (Peter) Tong, Reg. No. 74,292
ptong@raklaw.com
Russ August & Kabat
8080 N. Central Expy., Suite 1503
Dallas, TX 75206

Reza Mirzaie, Reg. No. 69,138
Neil A. Rubin, Reg. No. 67,030
Susan Y. Tull, Reg. No. 61,551
Josh Scheufler, (PHV to be Filed)
RUSS, AUGUST & KABAT
12424 Wilshire Blvd., 12th Floor
Los Angeles, CA 90025

Counsel for Patent Owner