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March 22, 2013

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: In the Matter of Promoting Interoperability in the 700 MHz Commercial Spectrum & Interoperability of Mobile User Equipment Across Paired Commercial Spectrum Blocks in the 700 MHz Band, WT Docket No. 12-69 & RM-11592 (Terminated)

Dear Ms. Dortch:

Qualcomm recently announced the new Qualcomm® RF360 Front End Solution.¹ This is an important innovation in radio frequency front end design but it is irrelevant to this proceeding.

Regardless of the release of the Qualcomm® RF360, the fact remains that subscribers of Lower 700 MHz B and C Block operators would suffer harmful interference if the FCC were to impose a Band 12 mandate because Band 12 filters provide inferior attenuation that cannot adequately protect devices (and consumers) from high power operations on Channel 51 and the E Block. Nor would the release of this new front end solution diminish the costs a Band 12 mandate would impose on carriers and their subscribers. Even in devices equipped with the Qualcomm® RF360, a Band 12 mandate would still require carriers who only own Lower B and C licenses to support *both* Band 12 and Band 17 in every device. And to do so they would still be required to equip every device with *both* a Band 12 filter *and* a Band 17 filter – one more filter than they need or use today – as well as a new switch. The result: more cost, inferior performance, and form factor limitations, which would adversely affect competitiveness and user experience – all to enable operations on the Lower A Block, for which they do not own any license.² Thus, the release of Qualcomm’s new front end product is a non-event for this proceeding.

¹ Press Release, Qualcomm, Qualcomm RF360 Front End Solution Enables Single, Global LTE Design for Next-Generation Mobile Devices (Feb. 21, 2013), <http://www.qualcomm.com/media/releases/2013/02/21/qualcomm-rf360-front-end-solution-enables-single-global-lte-design-next>.

² See *Ex Parte* Letter from Joseph P. Marx, Assistant Vice President, AT&T Services, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 6, WT Docket No. 12-69 (Mar. 1, 2013) (“AT&T *Ex Parte*”).

Nevertheless, in a February 26, 2013 ex parte letter, the Competitive Carrier Association (“CCA”) claims that the Qualcomm® RF360 front end will permit equipment manufacturers to “restore interoperability to the Lower 700 MHz band without changing any device hardware other than replacing one duplex filter with another at a marginal cost approaching zero,”³ and that due to the availability of the product, “there are no barriers to implementing the interoperability requirement that all LTE-capable devices support operation in the Lower A, B and C Blocks.”⁴ As noted above and explained more fully below, both of these assertions are incorrect.

The “front end” of a mobile phone consists of the parts that manufacturers place between the antenna and the digital modem. The Qualcomm® RF360 offers significant advantages over prior front end solutions in that it reduces the amount of space that the front end components take on a phone’s board. As a result, Qualcomm believes that OEMs can use this new front end solution to design phones that can support at least one LTE frequency band in every country in the world in which LTE has been deployed.

But the Qualcomm® RF360 front end has no role whatsoever in interference management. It consists of a power amplifier and antenna switch, an antenna matching tuner, an envelope power tracker, and 3D RF packaging. In addition to those components that Qualcomm will supply, third-party filters and duplexers must be incorporated into the RF360’s 3D RF packaging. Qualcomm does not develop or supply such filters or duplexers, and they must be purchased from third-party providers. Importantly, it is only those filters and duplexers – not the RF360 components provided by Qualcomm – that play a role in attenuating signals from adjacent frequency bands so as to mitigate or avoid interference.

Because the Qualcomm RF360 solution has no role in mitigating or preventing interference, its release does not change the fact that high-powered transmissions from DTV stations on Channel 51 and wireless operations allowed on the E Block will cause harmful interference to consumer devices using a Band 12 filter operating on the Lower B and C Blocks.⁵ This interference includes: (1) blocking interference caused by E Block signals to devices seeking to receive a 5 MHz signal on the B Block or a 10 MHz signal on the B and C Blocks; (2) intermodulation interference caused by E Block signals to devices seeking to receive a 5 MHz signal on the B or C Block or a 10 MHz signal on the B and C Block; and (3) intermodulation interference to devices seeking to receive a 5 MHz signal on the C Block

³ *Ex Parte* Letter from Rebecca Murphy Thompson, General Counsel, CCA, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 1, WT Docket No. 12-69 (Feb. 26, 2013) (“CCA *Ex Parte*”).

⁴ *Id.* at 3.

⁵ *See, e.g.*, Comments of Qualcomm Inc., WT Docket No. 12-69 & RM-11592 (Terminated) (filed June 1, 2012) (“Qualcomm Analysis”); Reply Comments of Qualcomm Inc. at 32-33, WT Docket No. 12-69 & RM-11592 (Terminated) (July 16, 2012) (“Qualcomm Reply Comments”).

or a 10 MHz signal on the B and C Blocks.⁶ This interference would seriously degrade the performance of devices using a Band 12 filter operating on the B or C Blocks.

Because of these interference concerns, 3GPP created Band 17. Using a Band 17 filter allows licensees to avoid harmful interference by effectively using the A Block as a 6 MHz guard band. This guard band produces enough spectral separation to allow Band 17 devices to filter out unwanted signals from Channel 51 and the E Block. B and C Block carriers simply cannot rely on a Band 12 filter without exposing consumers to harmful interference because doing so would eliminate this guard band. As a result, an FCC Band 12 mandate would force B and C Block carriers to include a Band 12 filter and a Band 17 filter in every consumer device – despite the fact that these carriers do not need the Band 12 filter because they do not possess any Lower 700 MHz A Block licenses.

Because Lower B and C Block licensees would be forced to install both a Band 12 filter and a Band 17 filter in every device to comply with a Band 12 mandate – as well as a switch to toggle back and forth between the two filters⁷ – CCA’s assertion that the FCC could “restore interoperability to the Lower 700 MHz band without changing any device hardware other than replacing one duplex filter with another at a marginal cost approaching zero” is simply wrong. Likewise, there is no basis for CCA’s claim that the Qualcomm® RF360 solution results in an environment where “there are no barriers to implementing the interoperability requirement.”⁸ The same interference barriers would continue to exist because the RF360 front end plays no role in mitigating or avoiding the interference that would be suffered if the FCC imposed such a requirement.

Finally, in a March 14, 2013 filing, Vulcan Wireless (“Vulcan”) states that the Qualcomm® RF360 will benefit all Lower A Block licensees, but implies incorrectly that the RF360 solution, by itself, is sufficient to support GSM/WCDMA and CDMA within a device. Although the power amplifier in the new front end supports different bandwidths that can correspond to different technology modes, such as GSM/WCDMA or CDMA, the Qualcomm® RF360 alone does not enable a phone to operate in GSM/WCDMA, CDMA, or GSM/WCDMA/CDMA – to do so requires a modem that supports GSM/WCDMA/CDMA and radio transceiver also with such support. Qualcomm, for many years now, has supplied modem chips with transceiver chips that support GSM/WCDMA or CDMA or GSM/WCDMA/CDMA. And consistent with the FCC’s highly successful, more than twenty-year old policy of technology neutrality in 2G and 3G, carriers and OEMs choose whether to sell different types of devices at various price points. But to this day, most devices do not

⁶ See Qualcomm Analysis at 6-57; Qualcomm Reply Comments at 5-11, 16-45.

⁷ We assume that Lower B and C Block operators who do not own Lower A Block spectrum would have to comply with a Band 12 mandate by using such a switch. Forcing these operators to expend a low port on a RF chip on a spectrum band that they do not own or need to support would impose even greater costs. See AT&T *Ex Parte* at 6-7.

⁸ CCA *Ex Parte* at 3.

support GSM/WCDMA/CDMA, and we are not aware of any US carrier that offers only phones with such support. Vulcan's argument is therefore incorrect.⁹

For all of these reasons, the Commission should disregard CCA's February 26th filing and should not impose a Band 12 mandate on Lower 700 MHz licensees.

Respectfully submitted,



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cc: Zachary Katz
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James Schlichting

⁹ Vulcan also repeats CCA's incorrect claim that the costs of an FCC mandate that Lower B and C Block operators support Band 12 would be minimal. *See Ex Parte Letter from Michelle C. Farquhar, Counsel to Vulcan Wireless to Marlene H. Dortch, Secretary, Federal Communications Commission, at 1, WT Docket No. 12-69 (Mar. 14, 2013).* For the reasons explained above regarding the CCA filing, Vulcan's assertion is also incorrect in this regard.