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Via Electronic Filing

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, D.C. 20554

Re: Ex Parte Notice, WT Docket No. 11-69, ET Docket No. 09-234

Dear Ms. Dortch:

Harris Corporation (Harris) submits further information with regard to use of TETRA technology in public safety frequencies, and seeks immediate and final declaration by the Commission that no TETRA equipment – regardless of power level – can be operated in public safety frequencies or otherwise in the vicinity of public safety systems.

I. Diverse Support for Prohibition of All TETRA Operations in Public Safety Frequencies.

Harris strongly supports the Commission’s clear intent to “ensure that TETRA equipment would not be operated in the vicinity of public safety systems.”¹ Harris agrees with many public safety stakeholders that to allow TETRA operations in public safety frequencies will cause serious interference concerns that could jeopardize lives,² and lauds the Commission for making this interim decision. Harris urges the Commission to heed the serious interference and interoperability concerns associated with allowing TETRA operations in public safety frequencies and make this determination final.

Representatives of TETRA technology concur. On February 24, 2012, Phil Godfrey, Chairman, the TETRA and Critical Communications Association (TETRA Association), addressed the National

¹ See *Order on Clarification*, WT Docket No. 11-69 and ET Docket No. 09-234, 26 FCC Rcd 13360 (rel. Sept. 28, 2011) (“Clarification Order”).

² See Comments of The Association of Public-Safety Communications Officials-International, Inc. (APCO), WT Docket No. 11-69, ET Docket No. 09-234, p. 2 (filed June 27, 2011) (“Congress, the Executive Branch, and the FCC have correctly placed a very high priority on establishing and maintaining interoperability for public safety. The Commission must avoid steps that would undermine that interoperability or block further improvements by creating new islands of incompatible public safety communications.”); Comments of The National Public Safety Telecommunications Council (NPSTC), WT Docket No. 11-69, ET Docket No. 09-234, p. 5 (filed June 27, 2011) (“It is not clear how operation of TETRA digital trunked radio equipment in public safety spectrum in the U.S. would avoid exacerbating interoperability, or how TETRA equipment would meet the Commission’s current requirements in the NPSPAC 800 MHz and 450-470 MHz bands.”); Comments of The Project 25 Technology Interest Group, WT Docket No. 11-69, ET Docket No. 09-234, p. 4 (filed June 27, 2011) (“Enabling TETRA as another disparate technology into the mix of available technologies does not enhance future interoperability, but complicates it, and thereby makes it less achievable, and more costly to sustain.”).

Public Safety Telecommunication Council (NPSTC) in Las Vegas, NV. At this meeting, the topic of allowing TETRA equipment to operate in public safety frequencies was raised.

Mr. Godfrey made clear that TETRA should not ever be deployed in National Public Safety Planning Advisory Committee frequencies or 700 MHz public safety frequencies.

II. Even Reduced Power TETRA Cannot Operate in National Public Safety Planning Advisory Committee (NPSPAC) Frequencies.

Despite this clear prohibition and support thereof, one party attempts to operate TETRA technology in public safety frequencies. It makes claims that its current “reduced power TETRA” equipment does not apply to the Clarification Order’s prohibition and is marketing these products as authorized for use in public safety frequencies.³ To be clear, the FCC’s Clarification Order addresses all TETRA equipment and makes no distinction between “reduced power” and any other TETRA equipment.

We believe the Commission’s decision not to distinguish between varying powers of TETRA equipment is well founded due to the fact that the emissions mask “reduced power TETRA” equipment meets under the commission’s rules is less stringent than that which applies to other digital technologies presently used in public safety frequencies. FCC part 90.210 rules permit type certification with different masks. Mask B is used for systems that contain audio filtering. This mask is referenced to the emissions bandwidth of the signal and is not applied to digitally modulated signals.⁴ “Reduced power” TETRA equipment is based on a slightly modified TETRA waveform that enables it to operate pursuant to Mask B.

However, Mask B is not the emissions level applied for digital technologies in the NPSPAC band. Mask H is used for systems that do not contain audio filtering.⁵ This mask is independent of emissions bandwidth and is used for digitally modulated signals such as P25 systems – the very systems public safety uses in public safety frequencies.

It is the distinction between these emissions masks that require that TETRA – even in a “reduced power” mode – not be operated in public safety frequencies or otherwise in the vicinity of public safety operations. Under emissions Mask B, TETRA-type waveforms emit considerable amounts of energy in the two adjacent channels 12.5 kHz away from the channel center. This will result in significant adjacent channel interference to incumbent P25 systems.

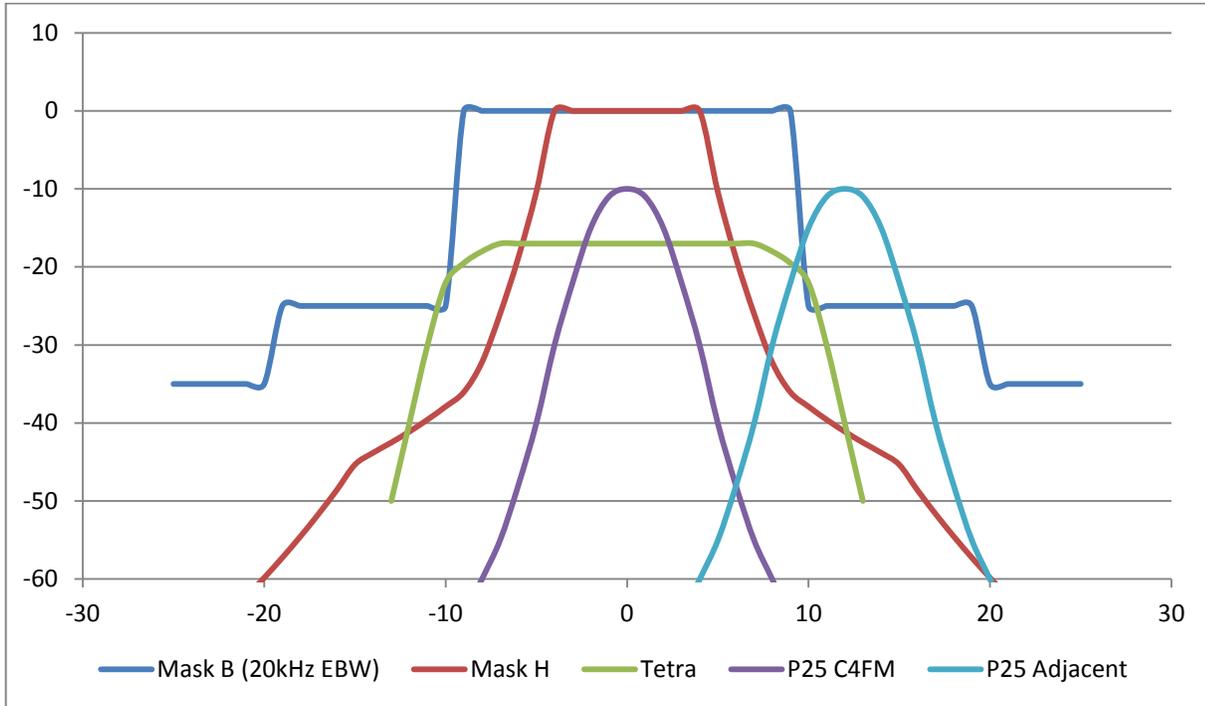
It is important to note that while “low power TETRA” ostensibly employs an audio low pass filter, use of such a filter is not relevant to technologies that employ digital voice coding and digital modulation techniques. In fact, the use of such an audio filter in no way impacts the emissions of digital waveforms. Further, while a TETRA station is not transmitting voice, it continues to transmit a forward channel that is “Data Only.” In this frequent circumstance, TETRA offers no audio filtering, and the emissions from the station are identical to those experienced when the station is transmitting digitally-coded voice.

³ See Letter from Jose M. Martin, Executive Vice President & Chief Operating Officer, PowerTrunk, Inc. to Marlene Dortch, Secretary, FCC, WT Docket No. 11-69 (June 8, 2011).

⁴ See 47 U.S.C. § 90.210(b).

⁵ See 47 U.S.C. § 90.210(h).

The graphic below illustrates emissions for Mask B, Mask H (applicable to NPSPAC channels), and power spectrum densities for TETRA and P25 technologies. This graphic illustrates the very distinct emissions under Mask B and Mask H and make clear the inevitable interference occurring when TETRA-type systems operate adjacent to a P25 system.⁶



There are also frequency coordination consequences beyond the inevitable interference resulting from mixing technologies certified to Mask B (TETRA) with technologies certified to Mask H (P25 systems). Under this scenario, a TETRA system requires a much larger exclusion area for the adjacent channels than a P25 system requires. Having large geographic exclusion zones around TETRA transmitters results in considerable loss in actual realized spectrum efficiency. Due to regional planning based on 12.5 kHz center frequencies in the NPSPAC band, in effect a TETRA transmitter will require use of 12.5 kHz x 3 = 37.5 kHz of bandwidth. The benefits of 4 slot TDMA thereby become substantially reduced. When comparing TETRA to P25 Phase 2, one then finds that a Phase 2 system is considerably more spectrum efficient than TETRA, when deployed in a NPSPAC frequency plan.

The Commission is well aware of the serious interference and frequency coordination problems resulting from merging incompatible technologies in or near specific frequencies. On March 12 and 13, 2012, the Commission focused on this problem in its workshop on “Spectrum Efficiency and Receiver Performance.” This event highlighted past examples of severe impact one technology has upon another that is relied upon for critical communications services. The lessons learned from these

⁶ In this graphic, it is important to note that the reference level of the waveform relative to its mask is such that the unmodulated carrier is at 0 dB. For example, if one were to conceptually turn off the P25 modulation, the carrier power would be at 0 dB. This is the case for the TETRA waveform as well.

examples and those demonstrated by the Commission at its workshop dictate immediate action to prevent first responder service interruption from any TETRA technology.

For the very interference and frequency coordination concerns that prompted the Commission to prohibit all TETRA operations in public safety frequencies regardless of power level, and due to the fact that one entity is disregarding the Clarification Order's words and intent, we urge the Commission to immediately:

- 1) Affirm that pre-existing type certifications are not grand-fathered and that "low power TETRA" equipment is not exempt from the Clarification Order's clear statement that all TETRA equipment and operations are prohibited in public safety frequencies or otherwise in the vicinity of public safety systems.
- 2) Require that digitally modulated signals be certified under the more stringent H-Mask for use in NPSPAC spectrum. This policy should apply to all digital technologies, not only to those based on TETRA standards.
- 3) Withdraw the NPSPAC portion of any existing certification for digital equipment that only applied the Mask B when determining compliance in NPSPAC spectrum.
- 4) Affirm that equipment type certified for use in public safety spectrum must also include support for mutual aid channels and equipment type certifications must include these modes of operation.

We thank the Commission for its consideration, and urge the actions described above.

Respectfully submitted,

/s/

Patrick Sullivan
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