Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Request by the TETRA Association	)	
Of a Waiver of	)	ET Docket No. 09-234
Sections 90.209, 90.210 and 2.1043 of	)	
The Commission's Rules	)	
	)	

REPLY COMMENTS OF THE TETRA ASSOCIATION

The TETRA Association ("the Association"), by its attorneys, hereby submits its reply comments in support of its request for waiver of Sections 90.209, 90.210 and 2.1043 of the Commission's rules ("Waiver Request" or "Request").[1]

Eight parties have filed comments opposing the Association's Waiver Request, including Motorola, which is the one of the largest TETRA manufacturers in the world.[2] These parties, however, have provided no technical analysis to support their claims,[3] nor have they demonstrated that grant of the waiver would increase the potential for harmful interference to any spectrum user. In addition to their opposition, striking a consistent theme, they argue that the issue presented by the TETRA request should be considered in a rulemaking proceeding rather than as a waiver.[4]

The Association demonstrates below that its waiver request provides ample opportunity to examine the technical aspects of permitting TETRA-based devices to operate in the United States. Initiation of a rulemaking proceeding would delay the entry

[1] *In the Matter of Request by the TETRA Association for Waiver of Sections 90.209, 90.210 and 2.1043 of the Commission's Rules*, Request for Waiver of Sections 90.209, 90.210 and 2.1043, ET Docket No. 09-234 (filed Nov. 20, 2009) ("Waiver Request").
[2] These parties are Motorola, the National Public Safety Telecommunications Council, the Land Mobile Communications Council, APCO, Telecommunications Industry Association, Harris Corporation, Aclara RF Systems, and Skybridge Spectrum Foundation *et al.*
[3] Apart from Aclara RF Systems, which comments are discussed separately below.
[4] A few parties also suggest that the Association lacks standing to bring this Waiver Request, but, whether as a petition for rulemaking or a waiver request, it is appropriate and respectful of Commission resources to permit the Association to act on behalf of its members.

into the U.S. marketplace of a valuable technology and yet provide no additional information to the Commission or benefit to the public.

Throughout the past two years, the Association has been approached by potential users and user groups, including UTC and the API, inquiring about the availability of TETRA in the U.S.[5] Thus, the Association recognized the immediate need for a wider choice of radio technologies than presently available in the United States and made the effort to introduce TETRA in the most expeditious manner available, that is, through the instant Request. In this regard, the Association understands the opposition to its Request from radio manufacturers who will face competition from TETRA-based radios, even when that opposition is implausible given their statements and actions outside the U.S. The Association also understands the interference concerns expressed by certain user associations, particularly when those concerns are heightened by the manufacturers that the users have relied upon for many years. The Association addresses the concerns of both groups below.

Suffice it to say, however, that TETRA co-exists without interference problems with other technologies throughout the world. The TETRA standard was created by an international Standards Development Organization ("SDO") with contributions from many radio manufacturers, including Motorola, Ericsson, Marconi, Nokia and others. The standard was explicitly designed to co-exist with other digital and analog technologies, whether from dedicated bands or by operating alongside other technologies in the same bands. The adjacent channel coupled power specification set by the TETRA standard, and recognized by the FCC as a method of managing interference, is designed to permit that degree of co-existence without causing interference. In its Request and in these comments below, the Association has shown that grant of the Request will not cause harm to other users. Opponents have not provided any valid reason why the waiver should not be granted.

[5] *See* Attachment A (letter from UTC); *see also* Comments of Bay Electronics and Comments of Sepura plc (both noting a need for TETRA in the U.S. by utilities).

DISCUSSION

That the TETRA standard differs from the Part 90 technical requirements does not mean that there is an increased likelihood of interference or incompatibility, but only that interference protection can be provided in a different way. Based on the technical information in the record of this proceeding, the Commission has sufficient basis for granting the Association's waiver request.

Action on a Waiver Request rather than a Petition for Rulemaking is an Appropriate Process

The Commission's rules allow it to waive its regulations for good cause shown, subject to the provisions of the Administrative Procedures Act ("APA").[6] Here, all APA requirements for a notice and comment proceeding have been met and all interested parties have been given a meaningful opportunity to participate and provide relevant technical information to inform the Commission's decision.

A two-step rulemaking proceeding – *i.e.,* a proceeding initiated by a party's petition for rulemaking then followed by a proceeding initiated by a Commission notice of proposed rulemaking – would serve only to delay by multiple years the introduction into the United States of a technology that is being used to great public benefit all over the world. The only interest served by such a delay would be maintaining a less than competitive *status quo.*

Response to Objections

The Association's technical showing demonstrates that there will be no risk of harmful interference to other devices. TETRA was explicitly designed to coexist with analog and digital technologies. To avoid interference into adjacent channels, an adjacent channel coupled power ("ACCP") specification was created to ensure that spurious radiation from the technology was kept at a very low level. This specification was considered to be an effective protection and is simply an alternative to the "masks" set out in the Commission's rules. Indeed, as discussed further below, this same mechanism is used by the FCC for operations in the 700 MHz band. The Waiver Request seeks only an exception to the part of the masks that is within the occupied

[6] *See* 47 C.F.R. § 1.925.

channel, and does not seek any relaxation of the adjacent channel performance, which TETRA meets with a very high margin.

Specifically, at the frequency center, TETRA offers considerably better performance than offered by the Part 90 emission masks.[7] TETRA devices deviate from the Part 90 emission masks just at the edge of the TETRA occupied bandwidth, and elsewhere TETRA is well within the masks.[8] The small excursion outside the masks that would occur at 10 kHz contains a great deal less power than the integrated power that TETRA saves within the adjacent channel by staying so far below the masks in that area, even before the TETRA emission spectrum is multiplied by the adjacent channel receiver's input filter.[9] Critically, as compared to the legacy analog systems presently used by utilities that are seeking to switch to TETRA, the shape of the receiver response is such that there is low sensitivity at the allocated band edges but much more sensitivity at the center where TETRA offers considerably better performance than the Part 90 masks. As such, co-existence will not be an issue.

Several comments support this conclusion. Bay Electronics notes that TETRA "looks to meet the requirements of the FCC rules, and the requirement not to cause harmful interference. In fact, it looks cleaner than some previously accepted digital systems."[10] And Wireless Engineering Systems and Technology ("WEST"), which reviewed the technical issues raised in the comments upon request from Sepura, concludes that TETRA technology not only meets the intent of the FCC masks but also would *reduce* the likelihood of interference.[11] WEST's analysis finds that "[f]or all tested FCC approved (type accepted) digital equipment types (this includes EDACS, iDEN and OpenSky) the test data shows that the Tetra system generates less interference."[12]

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[7] Attachment to Waiver Request
[8] *Id.*
[9] *Id.*
[10] Comments of Bay Electronics at 2 (noting also that "[a]fter reading the comments thus far, I can only say that each and every manufacturer filing comments against, has at least one reason to keep TETRA out of the US, and it is not the fact that they are worried about interference and proper waiver filings.").
[11] Comments of Wireless Engineering Systems and Technology (WEST), ET Docket No. 09-234 (filed Jan. 28, 2010) ("WEST Comments").
[12] *Id.* at 2.

Nonetheless, a number of user groups and radio manufacturers have opposed the Association's Request. Their oppositions can be grouped as follows:

- User Groups, including APCO, NPSTC
- Manufacturers, including Harris, Motorola and TIA
- Commercial Users, including Aclara and Skybridge Spectrum Foundation

The Association addresses each group in turn.

User Groups:

It is understandable that certain user groups, especially those involved in public safety, would be wary of any new technology that could possibly lead to increased interference.[13] Nonetheless, the technical showing made in the Request and in these comments should be sufficient to allay those concerns.

For example, APCO expresses concern about the use of ACCP as a means of interference protection, yet this already is in use by the FCC for 700 MHz band spectrum used by the public safety community.[14] In adopting use of ACCP, the FCC explained why it is useful:

> [a]s wireless communications evolve, the complexity of determining compatibility between different types of systems increases and ACCP is an industry-developed method to assess compatibility within the complex channel environment resulting from the initial *Refarming Report and Order*.[15]

[13] Given the decisions made in the public safety community to achieve interoperability through the use of a single technology and that Project25 has been chosen for that purpose, however, the TETRA Association does not plan to market TETRA technology to public safety users in the United States.

[14] *See* 47 C.F.R. 90.543.

[15] *Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements through the Year 2010*, Sixth Notice of Proposed Rulemaking, 17 FCC Rcd 19303 at n.5 (2002). The Commission also noted that "ACCP is an emission limit based upon the absolute and relative levels of coupled power as a function of frequency that ensures that the adjacent channel interference potential of transmitters at various bandwidths is consistent and predictable." (The Commission subsequently adopted the term "ACP.").

In fact, in that proceeding, the Wireless Radio Section of the Telecommunications Industry Association filed comments recommending the use of ACCP.[16] Given the precedent set by the FCC in adopting ACCP/ACP for modern digital technologies, as well as TIA's support for it, concern expressed about its use in this proceeding is misplaced.

The filing from NPSTC is similar in many respects to that of APCO in expressing concern about the potential for interference and, in particular, to relaxing the rules that protect against adjacent channel interference. However, in common with other submissions, NPSTC does not take into account the fact that TETRA's adjacent channel performance is better than many other technologies that already are approved for use in the U.S. Indeed, radiation from TETRA transmissions into the adjacent channel is substantially below the levels already permitted by the current FCC limits.[17]

The Association recognizes the concerns of the public safety community regarding interoperability, but notes that TETRA already is in use in many other countries within the same bands that are home to other analog and digital technologies used by public safety, including Project 25 ("P25"). The attached brief analysis by the Association indicates just a few of countries in which coexistence has been demonstrated.[18] The government of New Zealand, among others, after a technical consultation issued guidelines for the sharing of the 800 MHz band by analog, TETRA and P25 technologies, for example.[19] As well, the Association is aware that in the U.K. a nationwide TETRA network has been in operation alongside a P25 public

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[16] *See* 17 FCC Rcd 19303 at ¶ 4 and n.8.

[17] Regarding the "near/far" problems that were raised, these are well-recognized issues that need to be taken into account during any spectrum planning and frequency co-ordination process. The issue does not occur as a result of using TETRA technology but will occur wherever low sites and high sites are mixed regardless of the technology employed, and particularly when there is a high density of base stations operating at low power to create many smaller cells. While TETRA has a cellular structure, the cell sizes are much larger than, for example, GSM or CDMA. This means that the opportunity for a near/far effect is much reduced. Moreover, good adjacent channel power performance actually minimizes the likelihood of interference in this situation, and, as already demonstrated, TETRA's ACCP performance is better than many technologies that are already in use in North America.

[18] *See* Appendix A, below.

[19] *See* Attachment B (Ministry of Economic Government, Radio Spectrum Management, "Engineering guidelines for trunked radio systems in the 800 MHz TS band" (June 2008)).

safety (Customs and Excise) network for years, with no reported instances of interference.[20] These showings of co-existence of TETRA and P25 in other countries should ally public safety concern.

With respect to LMCC's statement that "relaxing the authorized bandwidth and/or emission masks puts more energy in adjacent channels," the Association notes that the energy produced in an adjacent channel is significantly less than that which is allowed under the Part 90 rules and that if the LMMC's concerns are based on this premise then their concern is unfounded.

Manufacturers:

Harris asserts that the Commission has adopted specific bandwidth, emission mask, and certification rules as a result of extensive data and testing. This is well recognized by the Association. However, the masks currently in use were in fact created in an analog environment and have not been updated to account for more spectrum efficient technologies. Indeed, as noted above with respect to ACCP/ACP, the FCC has moved away from such masks with the rules for the 700 MHz band.

Motorola by its own admission is a major supplier of land mobile radio equipment worldwide and has participated in the development of the TETRA standard. It should be noted that Motorola, contrary to its position in this proceeding, has stated in a submission to the Australian Government that modern TETRA equipment can coexist in the same bands as other technologies without causing harmful interference.[21] The contradictions in its response to this Request are clear. Motorola is comfortable to supply equipment in countries where ACCP/ACP is accepted as a means of protecting against interference and yet argues that it is not safe in the U.S. Motorola participates in the creation of a standard that uses ACCP/ACP and yet claims that it is not safe. Motorola also claims that ACCP/ACP is no substitute for masks and yet states "ACP and emission masks are

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[20] In that instance, both the TETRA and the P25 equipment were supplied by Motorola.

[21] *Australian Communications and Media Authority, Spectrum Proposals: 403-520 MHz, Proposals for Future Arrangements in the 400 MHz Band*, Motorola Response (dated June 22, 2009) (stating that "a trunking only band is unnecessary, even for TETRA. . . . The tighter specifications for newer [TETRA] equipment means that transmitted energy now fits within the spectral limits of the channel allocation thereby negating the need for this outdated and inefficient practice.") (found in Attachment C hereto).

fundamentally the same from the standpoint that they act to limit transmitter out-of-band power to a known amount independent of receiver technology." [22]

Moreover, Motorola cites its experience with its own with iDEN technology as a justification for denying the waiver request. However, Motorola provides no evidence that TETRA has caused interference in other parts of the world or that iDEN specifications are similar to TETRA. In fact, a report commissioned by Sepura from Wireless Engineering Systems and Technology clearly differentiates the iDEN experience from the entry of TETRA-based products into the U.S, noting that iDEN systems required far more base station sites to support a larger customer base.[23] Moreover, the report notes that that TETRA systems are not even capable of providing the type or service or amount of traffic demand as iDEN systems.[24]

Commercial Users:

Aclara has made a technical analysis of the impact on its services of allowing TETRA to be used in its frequency band and has concluded that interference would be caused if 25 kHz TETRA licenses were issued on 12.5 kHz channel centers. While this concern is more one of effective spectrum planning and frequency coordination rather than any issue presented by the Request, the Association concurs with Aclara's analysis and has no objection to their request to avoid such allocations.

The TETRA Association has been in contact with the Skybridge Spectrum Foundation for some time and is aware of its desire to make TETRA technology available to its users, particularly in the transportation industry. Although, Skybridge raises the issue of Motorola's intellectual property, the Association believes that this issue is not relevant to the issues presented by its Request.

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[22] Comments of Motorola at n.13.
[23] WEST Comments at 3.
[24] *Id.*

CONCLUSION

Not one commenter has put forth any material reason that interference would increase if the waiver is granted or explained how other users would be threatened by interference by TETRA devices. While some parties seek additional technical analysis and even field testing, this must be seen as a delaying tactic. Additional testing would not accomplish anything in this instance in which a fully vetted technology has been operating all over the world alongside other technologies for years without harmful interference to other users.

Accordingly, the Association urges the Commission to act expeditiously and grant a waiver of Sections 90.209, 90.210 and 2.1043, as set forth in the Waiver Request.

Respectfully submitted,

The TETRA Association

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Appendix A

Below is a table providing examples of where TETRA and Project 25 co-exist or is planned.

Country	**Regions**
Columbia	Bogota Cali Bucamarnga
Russia	Moscow (10 BS, 60 frequencies, digital + analogue modes) St. Petersburg Kazan UFA
Latvia	Not using same sites but TETRA overlaps the P25
Kazahkstan	Have both
China	Beijing
New Zealand	
Saudi Arabia	
Brazil	Rio de Janeiro
Turkey	TETRA pilot with the Police. P25 already in use
UK	Nationwide Public Safety network using TETRA, nationwide P25 network for UK Customs and Excise. Both supplied by Motorola.