

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, DC 20554

In the Matter of )  
 )  
Office of Engineering and Technology Seeks Comment ) ET Docket No. 17-340  
On Technological Advisory Council Spectrum Policy )  
Recommendations )

**COMMENTS OF THE  
TELECOMMUNICATIONS INDUSTRY ASSOCIATION**

The Telecommunications Industry Association (“TIA”)<sup>1</sup> hereby submits these comments in response to the Commission’s *Public Notice* (“Notice”)<sup>2</sup> in the above-captioned proceeding. TIA commends the work of the Commission’s Technological Advisory Council (“TAC”) for proposing principles<sup>3</sup> by which radio spectrum can potentially be utilized more intensively vs. prior uses, while also providing guidance the Commission can use in administering and resolving cases of potential harmful interference that will arise. We also support the view that a principle-based approach to interference mitigation would be preferable to the adoption of mandatory receiver standards, requirements or rules. We look forward to continued progress by the TAC, and to working with them and with the Commission on these issues.

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<sup>1</sup> TIA is the leading trade association for the information and communications technology (“ICT”) industry, representing companies that manufacture or supply the products and services used in global communications across all technology platforms. TIA represents its members on the full range of policy issues affecting the ICT industry and forges consensus on industry standards.

<sup>2</sup> [Public Notice](#), *Office of Engineering and Technology Seeks Comment on Technological Advisory Council Spectrum Policy Recommendations*, ET Docket No. 17-340, DA 17-1165, rel. Dec. 1, 2017 [“Notice”].

<sup>3</sup> FCC Technological Advisory Council, [Basic Principles for Assessing Compatibility of New Spectrum Allocations: A White Paper](#), Release 1.1, Dec. 11, 2015 [“TAC Principles Paper”].

## **I. A Principle-Based Approach to Interference Issues Would Be Constructive.**

A set of spectrum use principles could provide an important foundation for market-driven behavior that advances good spectrum stewardship. Specifically, such principles could ensure that every spectrum user has a choice. Ideally, they would choose to help themselves by following the good engineering practices implied by these principles. Or they could choose not to do so, with the consequence that their equipment may receive less protection in a case of subsequent harmful interference, for example.

However, both the TAC and the Commission should clarify what is meant by “principle” and/or “policy” in this specific context. TIA’s understanding is that the TAC is not proposing – and the Commission is not considering adopting – mandatory rules or requirements.<sup>4</sup> Importantly, this means that while the principles can provide useful guidance, they can also be disregarded in particular cases if their application would not serve the public interest.

Adopting non-mandatory principles would not mean that they “have no teeth” or that they can be ignored by stakeholders – or by the Commission – whenever it is convenient. To the contrary, non-mandatory spectrum use principles can be very helpful in guiding manufacturers, users, and operators alike in being good stewards of spectrum. With possible rough analogies to high-level principles found in other professional fields like accounting, law, or medicine, a set of generally accepted spectrum use principles can provide guidance to engineers as they seek to develop and deploy new products and services in a responsible, spectrum-efficient manner.

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<sup>4</sup> TAC Principles Paper at 32 (“Through the application of these nine principles, we can expect that the spectrum will be used in an efficient and effective manner. This does not mean that a standard set of regulations can be adopted to realize this goal. The many differences between the requirements of various types of systems that use the spectrum will not permit such standardization of regulations.”)

Once adopted, such principles would also be of significant help to regulators as well. They could inform the Commission's work as it goes about the business of enforcement, rulemaking, and administering the US Table of Allocations. For example, during an enforcement proceeding or a dispute between users in a case of harmful interference, the Commission could consider whether a particular spectrum user has followed appropriate principles when designing and deploying the products and services in question. Partially for that reason, policies that state preferred outcomes in lieu of specific regulatory mandates would be more flexible and easier to apply in particular cases. And of course, the Commission would retain the ability to disregard a principle if applying it in a given case would produce a result at odds with the public interest.

Finally, the Commission should recognize that while several of the principles proposed by the TAC are very constructive, additional work needs to be done. The Commission's next step should be to share the feedback collected in this comment cycle with the TAC so that the principles can be further refined by that body. TIA and its members welcome the opportunity for continued engagement with the TAC as it continues that work. However, the Commission should not immediately adopt, nor open a proceeding with the intention of adopting, these principles at this time. Regardless of any proposed adoption, additional comments should be solicited before adoption of any version of these principles as Commission policies.

## **II. Planning for Interference is Essential.**

1. *Harmful interference is not susceptible to a single definition, but is affected by the characteristics of both the transmitting service and nearby receiver in frequency, space and time.*

TIA supports **Principle 1**, since we agree that what constitutes “harmful” interference will vary based upon many factors. We recommend substituting the word “subject” in place of “susceptible” to avoid any possible negative connotations.

2. All radio services should plan for non-harmful interference from signals that are nearby in frequency, space or time, both now and for any changes that occur in the future.

Regarding **Principle 2**, TIA agrees that planning to avoid interference from nearby signals that are currently present or reasonably foreseeable would be an appropriate principle of service and device design. However, planning for an unknown future that is not reasonably foreseeable would be challenging. Also, some confusion may arise regarding the meaning of “non-harmful” interference. For example, all services must account for the noise floor, sunspots, etc. But even non-harmful sources of interference could potentially become harmful in the aggregate, particularly with the passage of time. We recommend further refinement of this principle to clarify these issues, and to acknowledge that planning for future spectrum allocation changes or significantly increased aggregate usage could be difficult.

3. Given the lack of predictability of the electromagnetic environment, operators should expect and plan for occasional service degradation or interruption.

We recommend changing the wording of **Principle 3** to replace “operators” with “users of spectrum.” This would better reflect the intended wide-ranging nature of these principles across different types of services, notably including licensed, unlicensed, and potentially other types of spectrum assignment mechanisms. In addition, we view this principle as being closely related to Principle 2. A receiver may work very well given neighboring signals at a certain level, but may not have been designed for other levels or the additive effect of signals from multiple sources. Moreover, what constitutes an exceptional event for one party might not be the same for another.

## II. Radio Services Have a General Responsibility to Promote Efficient Spectrum Use.

### 4. Receivers are responsible for mitigating interference outside of assigned channels.

TIA supports **Principle 4** as a non-mandatory aspirational goal. More broadly, we applaud the idea that the Commission continue to avoid prescriptive regulation of receivers in favor of principles that target intended outcomes. That said, engineers will invariably encounter both technological and cost barriers, and device designs are based upon reasonable limits. Engineers should be able to design against reasonable limits on power levels in, or out-of-band emissions from, adjacent spectrum allocations. Moreover, a level of protection that might appear to be perfectly fine today might not be good enough to protect against harmful interference in the future. Receivers simply cannot protect against everything, thus establishing this principle as a hard-and-fast requirement would create challenges.

That said, this principle would still give manufacturers flexibility and incentives to design receivers using good engineering practices, whether via standards-based or proprietary technologies. It would encourage manufacturers to look toward the future, and give some consideration to the fact that “something might be out there.” It would promote continuous improvement over time, and dis-incentivize companies from continuing to deploy the same equipment without accounting for changing radio environments. As part of a code of conduct – and like many of the other proposed principles – the Commission could take account of this principle if it becomes apparent in a later proceeding that it was ignored by any stakeholder.

### 5. Systems are expected to use techniques at all layers of the stack to mitigate degradation from interference.

TIA supports **Principle 5** in general, while understanding that the specific techniques used would vary by system. Similar to Principle 4, engineers making prudent decisions must

consider cost and other factors in determining which mitigation techniques to use. For example, conformity with standards-based technologies could be a possible metric for making evaluations of whether this principle has been appropriately followed in particular cases. However, any further exposition or eventual applications of this principle should also ensure that there is room for innovative proprietary technologies as well.

6. Transmitters are responsible for minimizing the amount of transmitted energy that appears outside their assigned frequencies and licensed areas.

TIA agrees with **Principle 6** insofar as transmitters should be – and typically already are – responsible for minimizing the amount of transmitted energy that appears outside their assigned frequencies or, if applicable, license areas. Most services supported by TIA member companies are already subject to out-of-band emissions (“OOBE”) requirements that govern adjacent channel emissions. Moreover, such specific mandatory requirements would apply in lieu of the general principle proposed.

Regarding license areas, there are many techniques for influencing the geographic footprint of a transmitter. While electromagnetic transmissions are not always tidy or predictable, as a non-mandatory principle TIA can agree that transmitters should minimize energy into adjacent geographies.

### **III. Confidential Disclosure of Operating Characteristics May Be Appropriate.**

7. Services are expected to disclose the relevant standards, guidelines and operating characteristics of their systems if they expect protection from harmful interference.

TIA supports **Principle 7**, subject to appropriate confidentiality safeguards for proprietary information. As the TAC notes, *transmitter* characteristics such as emission type, power level, height above average terrain, antenna gain, pattern, etc. are often supplied and made

part of the public record.<sup>5</sup> We agree that obtaining information about receiver operations would likely be very useful to aid both stakeholder analysis and the Commission's decision-making processes.

Regarding confidentiality, there are generally two instances where services would seek protection: when an existing band is being opened to new uses, and when a complaint from an incumbent service is received. TIA believes it would be reasonable for the agency to expect that incumbents or complainants should disclose relevant data about their systems to the staff, relying upon the Commission's ability to extend confidential treatment to proprietary data. In this context, TIA is less concerned with public disclosure of radio emissions characteristics that would be available to anyone with a spectrum analyzer, which could be made available publicly. Rather, the key consideration from an industry perspective is that innovative new technologies should not be exposed in the public domain unless the inventor chooses to do so.

#### **IV. The Use of Harms Claim Thresholds Should Be Studied Further.**

8. *The Commission may apply Interference Limits to quantify rights of protection from harmful interference.*

**Principle 8** requires significant further study, and it would not be appropriate for the Commission to consider adopting it at this time. As the TAC observed, the complexities in creating such a system are not insignificant.<sup>6</sup> For example, with regard to public safety services, there are unique issues that must be addressed for receivers that are used consistent with the frequency allocation but are not controlled by the license holder. Section 1.907 of the

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<sup>5</sup> TAC Principles Paper at 19.

<sup>6</sup> See TAC Principles Paper at pp. 20-23 (describing circumstances where existing or adjacent band systems are evolving or changing).

Commission’s rules<sup>7</sup> incorporates the same definition for harmful interference as the ITU, establishing a higher burden to protect radionavigation and other safety services as compared to other radiocommunication services. The TAC itself took note of this:

[T]he use of interference limits may require special consideration where receivers are not controlled by a license holder, or for life-safety systems like aviation and public safety. Alternative or additional measures may be required to ensure that devices that are brought to market in these cases can operate successfully in the presence of interference up to the specified limit.<sup>8</sup>

As the TAC White Paper also notes, there could be potential benefits of a “harms claim threshold” approach to resolving harmful interference cases. The benefits, particularly to the Commission, could include a straightforward mechanism to approach the resolution of harmful interference, as well as clarity to industry once the system is defined. Again, we encourage further study of these various complexities and opportunity for public comment before moving forward with a broad policy that would be applicable to all bands and all types of services.

#### **V. Quantitative Analyses Can Be Useful, But Are Not Necessary in All Cases.**

9. *A quantitative analysis of interactions between services shall be required before the Commission can make decisions regarding levels of protection.*

In general, TIA agrees that when opening bands to new uses, the Commission should make an interference assessment against a baseline of current impairments. In some cases, quantitative interference analysis can be a useful step when a system needs protection from another system – regardless of whether a “harms claim threshold” system is ultimately accepted.

However, **Principle 9** should not be adopted as currently written. While quantitative analyses can be useful in some circumstances, a blanket requirement could chill innovation. Quantitative interference analysis can be very costly, and works best in situations where mature

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<sup>7</sup> 47 CFR § 1.907.

<sup>8</sup> TAC Principles Paper at 21.



branches of the wireless industry are the stakeholders. But such an analysis may create a high barrier to a new entrant, particularly if that new entrant offers mitigation that would address possible harmful interference, obviating the need for a study (or reducing the scope and complexity of any such study).

Moreover, a key issue in the recent history of spectrum policy has been the challenge of obtaining information from the federal government that would enable a quantitative risk assessment of the danger to government systems when evaluating federal spectrum sharing. This has been a sticking point in the 5 GHz band, the AWS-3 bands, and elsewhere. In such cases, the Commission should not require that a quantitative risk assessment be filed in response to NOIs or NPRMs, as such an assessment might not be possible to perform in the absence of data about governmental systems. Thus, if this principle or any version of it is ultimately adopted by the Commission, the agency should confer with NTIA about how to address the information asymmetry problem.

Finally, any quantitative assessment approach requires that the Commission be properly staffed to evaluate such assessments. Should the Commission adopt this principle, it must ensure that the Office of Engineering and Technology and/or possibly other Bureaus are staffed with engineers who understand such assessments. From industry's perspective, this process cannot be a "shot in the dark" – industry needs to be able to work with informed staff to ensure that there is a fair opportunity to present analyses that the FCC would consider to be in the zone of reasonableness.

## **VI. Interference Resolution and Enforcement Processes Could Be Improved.**

TIA urges the Commission to create a public database of past radio-related enforcement activities. The Enforcement Bureau has been inconsistent in revealing such information in

publicly-released documents, which impedes private sector analysis from which industry can learn. A citation to the FCC ID number should be included for both offending transmitter and victim receiver. For these purposes, the ICT industry is less concerned about who entered into a consent decree and what fines or forfeiture was imposed. Rather, industry is far more concerned with the operation of the offending transmitter relative to the victim receiver.

TIA also generally endorses the idea that professional interference hunters could be part of the interference resolution process. If so, the Commission should also incorporate any learnings from those processes into a database in the public domain.

## **VII. One-Size-Fits-All Approaches Will Not Suffice.**

As described above, TIA supports many of the TAC's proposed principles, and believe they could be useful non-mandatory guidelines for both the Commission and industry to follow in the future. However, TIA does not subscribe to the view that any one-size-fits-all next generation architecture for improving interference resolution is a useful approach. Ultimately, interference mitigation technologies are not cost-free, and the use of them in any given band must make economic and business sense. Interference issues are going to vary in complexity, and so will the solutions.

## VIII. Conclusion

TIA appreciates the work of the TAC on these issues and the opportunity to provide feedback. We look forward to working further with the TAC and the Commission as these principles are developed further.

Respectfully submitted,

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ASSOCIATION

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