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January 29, 2018

Submitted online: <http://apps.fcc.gov/ecfs/>

Marlene H. Dortch, Secretary
Federal Communications Commission
Technological Advisory Council
445 12th Street, SW
Washington DC 20554

Re: NEMA Comments on FCC Technological Advisory Council (TAC) Spectrum Policy
Recommendations (ET Docket No. 17-340, Proceeding DA 17-1165)

As the leading trade association representing the manufacturers of electrical and medical imaging equipment, the National Electrical Manufacturers Association (NEMA) submits the attached comments on the FCC Technological Advisory Council (TAC) Spectrum Policy Recommendations (ET Docket No. 17-340). These comments are submitted on behalf of NEMA Lighting Systems Division Member companies.

The National Electrical Manufacturers Association (NEMA) represents nearly 350 electrical equipment and medical imaging manufacturers at the forefront of electrical safety, reliability, and efficiency. Our combined industries account for 360,000 American jobs in more than 7,000 facilities covering every state. Our industry produces \$106 billion shipments of electrical equipment and medical imaging technologies per year with \$36 billion exports.

Please find our detailed comments attached. Our Member companies count on your careful consideration and we look forward to an outcome that meets their expectations. If you have any questions on these comments, please contact Muhammad Ali of NEMA at 703-841-3288 or muhammad.ali@nema.org.

Sincerely,



Kyle Pitsor
Vice President, Government Relations

Cc: Professor Dennis Roberson, FCC TAC Chairman
Walter Johnston, TAC Designated Officer

NEMA Comments on FCC Technological Advisory Council (TAC) Spectrum Policy Recommendations (ET Docket No. 17-340)

The NEMA Lighting Industry Members are in general support of the FCC Office of Engineering and Technology (OET) Technological Advisory Council (TAC) proposal to the FCC regarding the adoption of a policy statement setting forth spectrum management guidance and principles. This proposal describes three TAC Spectrum Policy Management Recommendations and nine Basic Spectrum Management Principles.

NEMA Comments Executive Summary

1. We believe recommendations such as adopting a risk-based interference assessment (recommendation # 2) from non-intended radiators already compliant with FCC emission limits needs further study.
2. We urge FCC to consider the four International Telecommunication Union (ITU) interference related definitions, to provide clarity to the Spectrum Management Policy as described in the comments section below. NEMA concurs with the TAC that the FCC is the proper authority to establish limits to prevent harmful interference.
3. We recommend amending the principle number three by deleting the first sentence and by rewording the third sentence as described in the comments section below.
4. NEMA proposes that FCC hold technical workshops inviting all interested stakeholders potentially related to the technical details needed by the Commission, to make predictions of interference levels.
5. NEMA suggests clarifying Principle number 8. If the intent is to talk about disturbance levels, it will be better to include that in the principle itself.

6. NEMA is in support of the TAC principle 9 stating, “a quantitative analysis of interactions between services shall be required before the Commission can make decisions regarding levels of protection” (FCC_DA_17_1165, 2017, p. 4).
7. FCC is advised to further clarify the meaning and limits of harmful interference. NEMA is in support of the TAC recommendation to the Commission to use quantitative risk assessments.

Comments

NEMA Lighting Industry Members are in general support of these three recommendations. However, recommendations such as adopting a risk-based interference assessment (recommendation # 2) from non-intended radiators already compliant with FCC emission limits needs further study.

TAC Spectrum Policy Management Recommendations	
Recommendation 1	Implement and formalize the TAC recommendations for <i>Basic Spectrum Principles</i> as policies, and set clear expectations about the affected system capabilities regarding interference, such as harm claim thresholds.
Recommendation 2	Adopt risk-informed interference assessment and statistical service rules.
Recommendation 3	Implement steps for improving interference resolution, including next-generation architecture for radio spectrum interference resolution, creating a public database of past radio-related enforcement activities, and incorporate interference hunters in the resolution process.

TAC Proposed Basic Spectrum Management Principles		
Principle 1	Realities	Harmful interference is affected by the characteristics of both a transmitting service and a nearby receiving service in frequency, space or time.
Principle 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.
Principle 3		Even under ideal conditions, the electromagnetic environment is unpredictable. Operators should expect and plan for occasional service degradation or interruption. The Commission should not base its rules on exceptional events.
Principle 4	Responsibilities of Radio Services	Receivers are responsible for mitigating interference outside their assigned channels.
Principle 5		Systems are expected to use techniques at all layers of the stack to mitigate degradation from interference.
Principle 6		Transmitters are responsible for minimizing the amount of their transmitted energy that appears outside their assigned frequencies and licensed areas.
Principle 7	Action Regulatory Requirements	Services under FCC jurisdiction are expected to disclose the relevant standards, guidelines and operating characteristics of their systems to the Commission if they expect protection from harmful interference.
Principle 8		The Commission may apply Interference Limits to quantify rights of protection from harmful interference.

Principle 9		A quantitative analysis of interactions between services shall be required before the Commission can make decisions regarding levels of protection.
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NEMA provides the following comments and recommendations on the above mentioned nine principles:

Interference Realities, Principles 1, 2, and 3

We recommend replacing “~~plan for non-harmful interference~~” by to avoid harmful interference under principle number 2.

As the FCC Technological Advisory Council noted, a clear definition of harmful interference may help to clarify the intent of the spectrum policy (FCC_DA_17_1165, 2017). The International Telecommunication Union (ITU) included in their 2012 regulation summary, four interference related definitions (ITU, 2012):

1.166 *interference*: The effect of unwanted energy due to one or a combination of *emissions, radiations*, or inductions upon reception in a *radio communication* system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.

1.167 *permissible interference*: Observed or predicted *interference* which complies with quantitative *interference* and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.

1.168 *accepted interference*: *Interference* at a higher level than that defined as *permissible interference* and which has been agreed upon between two or more *administrations* without prejudice to other *administrations*.

1.169 *harmful interference*: Interference which endangers the functioning of a *radio navigation service* or of other *safety services* or seriously degrades, obstructs, or repeatedly interrupts a *radio communication service* operating in accordance with Radio Regulations (CS).

We urge FCC to consider the four ITU interference related definitions to provide clarity to the Spectrum Management Policy. NEMA concurs with the TAC that it is under the FCC’s authority to establish limits to prevent harmful interference.

The interaction between the transmitter and the receiver is the foundation of proper radio communication. As described in the *American National Standard Recommended Practice for Electromagnetic Compatibility Limits*, section 5.21, “there has been an effort, particularly in data transmission, to use various coding techniques to improve the performance of radio circuits in the presence of fading and interference with varying degrees of success” (ANSI_C63_12, 1999, p. 5). Thus, radio communication technologies with a good degree of interference mitigation continue to be developed.

NEMA supports TAC proposed principle numbers 2 and 3 (Refer to *The Use of Harm Claim Thresholds to Improve the Interference Tolerance of Wireless Systems* white paper (FCC_TAC, 2013) and ANSI_C63_12, 1999). These two realities are of a serious consideration for industry; reliable radio communications and connected lighting products (EIA, 2017; NEMA, 2018a) are building blocks for smart buildings.

We recommend amending the principle number three by deleting the first sentence and by rewording the third sentence as follows:

~~Even under ideal conditions, the electromagnetic environment is unpredictable.~~
Operators should expect and plan for occasional service degradation or interruption. ~~The~~

~~Commission should not base its rules on exceptional events.~~ However, the commission should not base its rules on worst case interference scenarios.

Responsibilities of Radio Services, Principles 4, 5 and 6

NEMA Members, as manufacturers and users of radio communication services embedded in devices and systems, are in support of the TAC proposed principles 4, 5 and 6. These three principles are in alignment with ANSI_C63_12, 1999.

Regulatory Requirements and Actions, Principles 7, 8 and 9

NEMA suggests clarifying Principle number 8. If the intent is to talk about disturbance levels, it will be better to include that in the principle itself.

NEMA is in support of the TAC belief stating that the Commission needs “sufficient technical details about all of the affected radio services, including detailed information about the operation of radio services and quantitative modeling about the interactions between radio services over a wide variety of expected conditions” The Commission has maintained their continuous consideration to digital devices.

NEMA proposes that FCC hold technical workshops inviting all interested stakeholders potentially related to the technical details needed by the Commission, to make predictions of interference levels.

Following on with the standards public access question, we are taking this opportunity to mention that lighting device EMC-related industry standards are published and maintained by NEMA and the IEEE. Included are ANSI (Lighting Group) C82 (NEMA, 2018b), and ANSI (EMC Group) C63 (EMC_Corporation, 2018). They are publicly available at the sites shown here below:

United States Lighting Devices EMC Related Industry Standards Sites	
ANSI C82	http://www.nema.org/Standards/pages/default.aspx
ANSI C63	http://www.c63.org/index.htm

NEMA concurs with the TAC principle number 8 proposing, “the Commission may apply Interference Limits to quantify rights of protection from harmful interference” (FCC_DA_17_1165, 2017, p. 4). RF devices such as digital devices are subject to FCC rules (FCC-47-Part-15, 2009; FCC-47-Part-18, 2010; FCC_LED_Lighting, 2016).

NEMA is in support of the TAC principle number 9 stating, “a quantitative analysis of interactions between services shall be required before the Commission can make decisions regarding levels of protection” (FCC_DA_17_1165, 2017, p. 4). Similarly with the Commission’s comment, NEMA is proposing that a workshop among all interested parties shall be held when a quantitative model can be developed with the intention of proposing it to the Commission’s protection levels.

FCC is advised to further clarify the meaning and limits of harmful interference. NEMA is in support of the TAC recommendation to the Commission to use quantitative risk assessments.

References

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