



Via Electronic Filing

June 24, 2015

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: *Ex Parte Notice – Request For Updated Information And Comment on Wireless Hearing Aid Compatibility Regulations, WT Docket Nos. 07-250, 10-254*

Dear Ms. Dortch:

On June 22, 2015, the Telecommunications Industry Association (“TIA”) met with the Federal Communications Commission’s (“Commission”) Wireless Telecommunications Bureau (“WTB”), Consumer and Governmental Affairs Bureau (“CGB”), and Office of Engineering and Technology (“OET”). The purpose of the meeting was to discuss the Commission’s consideration of proposed changes to the hearing aid compatibility (“HAC”) requirements.

At the meeting, TIA emphasized its support, and that of its members, for the Commission’s goal of ensuring new products and services are accessible to people with hearing loss, noting that manufacturers of wireless handsets with commercial mobile radio service (“CMRS”) capabilities are currently achieving a high percentage of HAC-compliance for their handsets. TIA further noted that, as of July 2014, 82 percent of wireless CMRS handsets were HAC M-rated, and 66 percent were T-rated.¹ In addition, we explained that while manufacturers are committed to improved accessibility, there are concerns about the HAC proposals proffered by the Commission in its *Public Notice*,² particularly the possible replacement of the fractional compliance framework with a 100 percent compliance regime, and the significant technical challenges presented by such a change.

TIA also discussed the need for HAC to be recognized as an ecosystem with a balanced consideration of the characteristics and operations of both wireless handsets and hearing aid technologies. Hearing aid immunity is a key component of the wireless HAC equation that has not received sufficient attention in technical and policy discussions regarding HAC. Despite this reality, handset manufacturers’ commitment to accessibility has resulted in a high rate of compliance in the

¹ Based on data in manufacturer’s July 2014 hearing aid compatibility reports filed with the Commission, *available at* http://wireless.fcc.gov/hac/index.htm?job=rpt_dm_c.

² See *Request for Updated Information and Comment on Wireless Hearing Aid Compatibility Regulations*, Public Notice, WT Docket No. 07-250, 10-254, DA 14-1688 (rel. Nov. 21, 2014).



wireless handset market today. Thus, we expressed that raising the HAC percentage requirement is not likely to address the real problems users are experiencing. TIA and its members explained our intent to initiate meaningful dialogue and engage with consumers to help determine the real problems they are experiencing and identify what specific concerns are related to wireless hearing aid usability, including planned dialogue at the upcoming Hearing Loss Association of America (HLAA) Convention being held in St. Louis, MO later this week.

In addition, TIA provided focused views on the specific technical design challenges and tradeoffs manufacturers must engage in to achieve M- and T-rated handsets and how the Commission's proposal for a 100 percent HAC requirement would further restrict manufacturers and harm the diversity of the U.S. wireless handset marketplace. The following is a summary of the key points addressed:

Radio Frequency Interference (M-rating)

TIA noted that the work to meet HAC requirements is challenging for manufacturers as there are a number of tradeoffs in designing and building HAC-compliant wireless handsets. One such key challenge is designing HAC for handsets on the GSM 1900 MHz spectrum band as compromises must be made to antenna design to meet M-rating for this technology. Compromises to antenna design for M-rating always trade against total radiated power ("TRP") performance as higher carrier TRP requirements result in higher radio frequency ("RF") emission and can make it challenging to achieve a M3 rating on GSM 1900. Additionally, based on RF power level and modulation interference factor ("MIF"), together with the more stringent absolute field limit above 1 GHz, GSM1900 HAC is often at the margins of passing or failing for any phone.

Manufacturers attending the meeting explained that they consider HAC for all U.S. phones, assessing it along with antenna performance and other regulatory requirements, like specific absorption rate ("SAR"), and carrier performance requirements at each stage of product development. The trade-offs between these conflicting goals are investigated and design choices made via simulation and experiment at the early stages of development. Early in the design process (simulation stage), a significant fraction of products for the U.S. market with the antenna optimally tuned for the bandwidth, TRP/Total Isotropic Sensitivity ("TIS"), and SAR requirements will be predicted to fail HAC. Therefore, with re-tuning the antenna to meet M-rating manufacturers forgo some performance. For example, in order to make a phone containing a GSM 1900 radio M-rated, a manufacturer may have to give up 2 dB of GSM performance, reducing its margin of complying with carrier performance requirements from over 2 dB to only 0.1 dB. This reduction in margin has a tangible impact for all users of such a device as it will be far more likely to drop a call in a challenging coverage area such as an elevator in a building. In another example, selecting the necessary antenna and speaker configuration to satisfy GSM 1900 M-rating increases the correlation between main and multiple-input and multiple-output ("MIMO")/diversity receive antennas in a product that also supports Long Term Evolution ("LTE"), leading to reduced data throughput performance when the device is in an area with strong LTE coverage. In both of these examples, the product may still meet all minimum requirements and specifications, but it will not perform as optimally as it might have for all users on the network.



TIA noted that GSM 1900 will not sunset in the United States to the point where manufacturers can discontinue its inclusion on wireless handsets for several more years. Furthermore, even when GSM 1900 is out of the U.S. market, it will still be in the global market for much longer because developing countries' investments and upgrades to wireless networks are not as frequent. As a result, manufacturers may need to keep GSM 1900 capabilities on U.S. wireless handsets past the U.S. sunset time period to accommodate international roaming.

TIA explained that new use modes and modulations also add to the complexity of achieving M-rating. M-rating for any new modulation, or use mode, is strongly driven by the MIF, which is dependent upon the choice of RF waveform as well as the CODEC implementation. In the future, depending on the "next" system or modulation scheme or air interface technology, a new, unknown HAC challenge as great as GSM could develop. For example, MIF for voice over LTE ("VoLTE") was not uniquely defined at technology introduction, and its value ultimately is dependent on carriers' various CODEC implementations. For VoLTE, it took the Commission over a year to determine that equipment is sufficiently available for testing. Any new band/mode that would have a high MIF could become similarly challenging as GSM 1900. For example, we do not know how the millimeter wave component of 5G will impact M-rating as 5G systems are likely to include a component that operates in new millimeter wave bands (28 GHz and up), have a new air interface and will require large-index antenna arrays on the device to accomplish adaptive beamforming..

TIA further stated that certain otherwise desirable product characteristics and design considerations impact the ability to achieve M-rating for HAC. These characteristics include the form factor, size and thickness of the phone, impact antenna radiation, and RF emissions as well as the increased use of metallic housings (impacts antenna, radiation pattern, and RF emission). Inherently, any design constraint that tends to increase antenna quality, which is essentially all desirable design trends, will increase M-rating fields for a constant TRP as higher quality means more energy stored in the near fields. Currently, about eighteen percent of handset models in the U.S. market do not meet M-rating, indicating that under a 100 percent HAC compliance regime, these models with their unique industrial design characteristics would not be permitted to be brought to the marketplace.

The current percentage of handsets that do not meet HAC is based on form factor that is prevalent today, however, it has been nearly ten years that this form factor has been dominant and this combined with changes in consumer behavior and handset use indicates that a form factor change in the near future is likely. For example, due to increased emphasis on browsing and data usage it may be more common to find TX antennas located on the top end of the phone. Moving the TX antennas to the top of the phone will help avoid hand blockages when the phone is typically held by users at the bottom when browsing on the phone. M-rating requirements also conflict with other current and future regulatory requirements like SAR. For example, the preferred antenna method for meeting M-rating is sub-optimal for addressing SAR under body worn conditions.



Inductive Coupling (T-rating):

Similar to M-rating, designing for T-rating adds complexities (e.g., transducers & amplifiers) to every device. Certain product characteristics/design considerations impact the ability to achieve T-rating for HAC, including:

- Form factor - Size and thickness of the phone impact desired signal level, and proximity of baseband noise sources to the T-coil and user.
- Metallic housings - Such materials are very challenging as they can shield desired signals and duct noise from its source up to the earpiece region, negatively influencing the ability of the phone to receive a T-rating.
- Large displays - Can have a large influence on achieving T-rating due to impact on signal passing through the display as well as the placement of the speaker/telecoil components. Large displays force designers to push earpiece and telecoil components behind displays that shield the desired signal from the user. Past experience has shown that displays can shield telecoils by over 7 dB
- Spacing, location, and choice of components – The form factor choice significantly influences the spacing, location, and choice of components as there is always a challenge to remove noise sources from near the earpiece of the phone. Placement and orientation of the battery is also critical to audio band magnetic signal – undesired (“ABM2”) noise performance. This can lead to inefficient packaging of the device, growing the size and complexity of the product, as well as forcing non-optimal routing and placement of components from a power perspective.

Thus, designing for T-rating must be balanced between engineering realities and market desirability and requirements. For example, there is a market demand for advanced multimedia smartphones that contain loudspeakers for playing music and videos but, the inclusion of such features and the necessary components to have them operate effectively raise serious challenges for achieving T-rating and addressing acoustic shock issues. Increasingly loudspeakers are being used as earpieces in mobile devices in order to provide these enhanced features while maintaining device size. The added efficiency of a loudspeaker over an earpiece can cause acoustic shock issues if not properly designed. The design of these systems results is a compromise between telecoil level and acoustic output level that was not experienced with traditional earpieces. A 100 percent HAC requirement would also present significant marketing challenges for manufacturers who produce global phones, forcing manufacturers to design and build U.S-specific handsets instead of being able to design one global platform device. This reduces efficiencies in the research and development and manufacturing processes and significantly increases the complexity of producing wireless handsets.

Impacts of a 100% HAC Regime

TIA explained that manufacturers face each of the above-described technical challenges with every phone they produce as they try to design the device to achieve M and T-ratings. There are constant trade-offs between features, functionalities, components, and performance requirements in the design process. While, as described above, HAC is a high priority for manufacturers, there are instances where it cannot be achieved, at least initially, in designing and marketing certain devices.



Therefore, a mandate for 100 percent of phones to be HAC-compliant would **certainly** result in manufacturers not being able to introduce certain wireless handsets to the U.S. marketplace that previously would have been made available. Additionally, these models may have other accessibility features that will no longer be available to customers with various disabilities or may be the lowest cost models.

TIA noted that addition of a 100 percent HAC burden to the current certification process required by the Commission for global phones not intended for use in the U.S. market, but that may roam in the United States, could present additional complexities by increasing the amount time to test devices and raise cost, leading to uncompetitive devices. Further, handsets with antennas compromised to meet GSM 1900 HAC have lesser performance in international bands, and when added to the complexities of achieving a T-rating this may result in the device being limited to the U.S. market thereby reducing manufacturers' international competitiveness by precluding their ability to leverage designs across markets.

Wireless handset manufacturers are continually experimenting with new designs to meet new consumer needs and new air interface technologies, without HAC definition, are regularly being researched and developed. TIA discussed how the current fractional HAC compliance framework provides manufacturers with the flexibility necessary to enable introduce and test new types of handsets in the market and this needed regulatory flexibility would be harmed by a 100 percent HAC mandate. Further, TIA emphasized that this necessary approach could not be sufficiently addressed by a process that requires manufacturers to seek Commission review and approval of specific exemptions because manufacturers have to commit R&D dollars to the projects far in of any efforts to develop a working model that can be provided to the Commission for consideration.

As a final point, TIA and its members discussed that if the Commission wanted to make significant changes to the HAC requirements, the required next step in the regulatory process is the issuance of a notice of proposed rulemaking. We explained that the governing statutes as well as the Commission's own regulatory precedent show that technical standards must be in place before HAC obligations can be imposed on new technologies and this should be done through a public rulemaking process. We provided Commission staff with the attached memorandum outlining the legal rationale supporting our position. In the course of our discussion, a question arose regarding the Commission's open 2010 Further Notice Of Proposed Rulemaking that proposed changes to the HAC rules and whether that was sufficient to serve as the public rulemaking process to address the changes at issue in the *Public Notice*. An addendum to the memorandum has been included below in response to this question.

In attendance were: Avonne Bell, TIA; Brian Scarpelli, TIA; Stella Park, TIA; Chuck Eger, Motorola Mobility; Laura Ellinger, Motorola Mobility; Eric Krenz, Motorola Mobility; Rob Kubik, Samsung and Leo Fitzsimon, Wiley Rein LLP. In addition, the following attended by telephone: Paula Boyd, Microsoft; Dave Dougall, BlackBerry; Larry Hawker, BlackBerry; Paul Kenefick, BlackBerry; Bob Zurek, Motorola Mobility; Steve Hauswirth, Motorola Mobility; Chuck Powers, Motorola Solutions; and Scott Kelley, LG. Attendees from the Commission were: Robert Aldrich,



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CGB; Saurbh Chhabra, WTB; Sean Conway, WTB; Patrick Forster, OET; Bill Stafford, WTB; Karen Peltz Strauss, CGB; and Peter Trachtenberg, WTB.

Pursuant to the Commission's rules,³ this letter is being electronically filed via ECFS and a copy of this submission is being provided electronically to the meeting attendees.

Respectfully submitted,

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³ 47 C.F.R. § 1.1206.



ADDENDUM TO LEGAL PRECEDENT MEMORANDUM

RE: 2010 Further Notice of Proposed Rulemaking

As discussed in the attached memorandum provided at the meeting, the Commission must initiate a rulemaking proceeding and release an NPRM before adopting the proposals introduced in the *Public Notice*. The Commission's August 2010 Further Notice of Proposed Rulemaking⁴ cannot sufficiently serve as a basis for these proposals, given both the developments that have occurred since August 2010—particularly the passage of the CVAA—and the substantial differences between the FNPRM's proposals and those introduced in the *Public Notice*. To ensure that the Commission satisfies the public participation requirements of the HAC Act and CVAA and the notice requirements imposed by the Administrative Procedure Act ("APA"),⁵ the Commission must initiate a new rulemaking proceeding if it seeks to implement the *Public Notice* proposals and properly engage stakeholders in the evaluation of these proposals and the availability of technical standards.

First, the 2010 FNPRM is insufficient in light of the passage of the CVAA. Because the CVAA was enacted after the Commission issued the 2010 FNPRM, the FNPRM neither addresses the impact of the CVAA nor proposes rules that take into account the CVAA's new definitions and mandates.⁶ As the recent *Public Notice* acknowledges, the CVAA "amended the [HAC Act] in several relevant respects," including a redefinition of the term "telephones."⁷ The Commission may not use an FNPRM issued before new legislation to support proposals clearly implicated by that legislation. In addition to rendering stale the 2010 FNPRM, the passage of the CVAA further strengthens the Commission's obligation to conduct rulemakings to establish technical standards. As discussed at length in the attached memorandum, the CVAA requires adherence to "technical standards developed through a public participation process and in consultation with interested

⁴ Amendment of the Commission's Rules Governing Hearing Aid Compatible Mobile Handsets, *Policy Statement and Second Report and Order and Further Notice of Proposed Rulemaking*, WT Docket No. 07-250, FCC 10-145 (2010) ("2010 FNPRM").

⁵ As discussed at length in the attached memorandum, the Commission has long interpreted the HAC Act to require the establishment of technical standards through an NPRM prior to expanding hearing aid compatibility requirements, an interpretation which has only been strengthened by the CVAA's discussion of public participation and stakeholder consultation in the development of technical standards. See pp. 3-4 of the attached memorandum. Section 553 of the APA requires notices of proposed rulemaking to include "either the terms or substance of the proposed rule or a description of the subjects and issues involved," 5 U.S.C. § 553(b)(3), which courts have interpreted as requiring that a final rule be the "logical outgrowth" of a proposed rule. See *Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 174 (2007).

⁶ This is evidenced by the Commission's release of a public notice in October 2010, two weeks before the comment deadline, requesting that comments on the FNPRM address the effect of the CVAA on the proposed rules. See Wireless Telecommunications Bureau Requests that Comments in Hearing Aid Compatibility Proceeding Address Effects of New Legislation, Public Notice, WT Docket No. 07-250, 25 FCC Rcd 14280 (2010). This public notice neither addressed the impact of the CVAA in a substantive manner nor amended the proposed rules in light of the CVAA, and therefore cannot serve as a substitute for substantive consideration of the law by the Commission through a notice of proposed rulemaking.

⁷ *Public Notice* ¶ 5.



consumer stakeholders.”⁸ Thus, in both respects the passage of the CVAA merits a new rulemaking proceeding before the Commission can expand HAC requirements in the manner suggested in the *Public Notice*.

Second, the 2010 FNPRM cannot provide a basis for implementing the *Public Notice* due to the significant differences between the proposals within the two documents. The *Public Notice* seeks comment on two proposals: applying the HAC regulatory requirements to all wireless devices that can be used for voice communications and eliminating the fractional compliance regime by requiring 100 percent HAC compliance for all covered devices,⁹ neither of these proposals is contained as such within the 2010 FNPRM. Because the 2010 FNPRM did not propose to require that all newly manufactured handsets be hearing aid compatible, it plainly cannot serve as a basis for adopting the 100 percent compliance policy described in the *Public Notice*.¹⁰ Indeed, while the 2010 item did suggest that deployment benchmarks might be addressed in the context of a subsequent review of the HAC rules, the item sought no comment and made no proposals regarding changes to the fractional compliance regime, let alone suggesting wholesale elimination of that regime.¹¹

Additionally, to the extent that the 2010 FNPRM proposed to expand the definition of “telephone” and apply HAC to a broader range of devices, the proposed expansion was significantly different from that introduced in the *Public Notice*. Specifically, the FNPRM’s proposal was rooted in an understanding that established technical standards for HAC compliance must be available before new regulatory obligations can be imposed, consistent with the Commission’s statutory mandate. The FNPRM proposed to apply hearing aid compatibility requirements to “all customer equipment used to provide wireless voice communications over any type of network among members of the public or a substantial portion of the public via a built-in speaker where the equipment is typically held to the ear, *so long as meeting hearing aid compatibility standards is technologically feasible and would not increase costs to an extent that would preclude successful marketing.*”¹² Significantly, the rule proposed in the 2010 FNPRM would have applied HAC requirements only to devices operating “over frequencies in the 800-950 MHz or 1.6-2.5 GHz bands using any air interface for which technical standards are stated in [ANSI C63.19-2007].”¹³ It is also worthy of note that the 2010 FNPRM references the 2007 version of the C63.19 standard, which has since been updated. Wireless air interface technologies have changed significantly since 2007 and a

⁸ See the attached memorandum at p. 4.

⁹ *Public Notice* ¶ 2.

¹⁰ See *Kooritzky v. Reich*, 17 F.3d 1509, 1513 (D.C. Cir. 1994) (invalidating a Department of Labor interim final rule which had no basis in the relevant NPRM, explaining that “[s]omething is not a logical outgrowth of nothing”).

¹¹ 2010 FNPRM ¶ 17. In fact, the Wireless Telecommunications Bureau first introduced the 100 percent compliance proposal in a December 2010 Public Notice, in which the Bureau explicitly recognized that a rulemaking would be needed to adopt new proposals. See Comment Sought on 2010 Review of Hearing Aid Compatibility Regulations, *Public Notice*, WT Docket No. 10-254, 25 FCC Rcd 17566 (2010) (explaining that based on its review, “the Bureau will consider whether to recommend to the Commission both rule revisions and non-regulatory measures to ensure that persons with hearing loss will continue to have broad access to evolving modes of wireless communication”).

¹² *Id.* ¶ 77 (emphasis added).

¹³ *Id.* at Appendix C (proposed new rule Section 20.19(a)).



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new version of the ANSI C63.19 standard was later adopted in 2011¹⁴, which the Commission later adopted as the standard for the HAC requirement, but only after conducting a public rulemaking proceeding.¹⁵ Thus, devices including technologies or frequency bands not covered by the 2007 version of the ANSI C63.19 standard would not have had to demonstrate HAC compliance for those bands or technologies under the 2010 proposal.¹⁶ The *Public Notice* would effect a much broader expansion, under which the HAC requirements would apply to “all mobile wireless devices that can be used for voice communications”¹⁷ regardless of the availability of technical standards for HAC compliance or testing. Moreover, the *Public Notice* merely seeks comment on cost and technological feasibility without stating those factors as necessary preconditions to HAC compliance obligations. In this regard, the *Public Notice* is significantly different from the 2010 *FNPRM* and, moreover, runs afoul of the CVAA and HAC Act’s mandate that the Commission extend HAC requirements to new devices only where technical standards are available and in place.

¹⁴ See <http://www.c63.org/>.

¹⁵ See Amendment of the Commission’s Rules Governing Hearing Aid Compatible Mobile Handsets, *Third Report and Order*, WT Docket No. 07-250, FCC 12-550 (rel. Apr. 9, 2012).

¹⁶ 2010 *FNPRM* at Appendix C (proposed new rule Section 20.19(b)) (“A wireless handset that incorporates an air interface or operates over a frequency band for which no technical standards are stated in ANSI C63.19-2007 (June 8, 2007) is hearing aid-compatible if the handset otherwise satisfies the requirements of this paragraph.”).

¹⁷ *Id.* ¶ 2.