

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of	)	
	)	<b>WT Docket No. 10-254</b>
Request for Updated Information and	)	
Comment on Wireless Hearing Aid	)	<b>WT Docket No. 07-250</b>
Compatibility and Regulations	)	

**REPLY COMMENTS OF THE HEARING INDUSTRIES ASSOCIATION**

**INTRODUCTION**

The Hearing Industries Association (“HIA”), through counsel, hereby replies to comments filed in the above-captioned proceeding.<sup>1</sup>

While many communication options exist for individuals with hearing loss who use hearing aids, the fact remains that these individuals expect, and should be able to expect, that their wireless handsets will work with their hearing aids and that they can use new wireless handset technologies as soon as they are released.<sup>2</sup> Their expectations are not currently being adequately met. It is thus appropriate, if not legally required, for the Commission to update its regulations to incorporate technologically neutral and all-inclusive hearing aid compatibility (“HAC”) requirements. As HIA and others have shown in their comments, broad HAC compliance is practical, and objections to it are unsupported.

---

<sup>1</sup> *In the Matter of Request for Updated Information and Comment on Wireless Hearing Aid Compatibility and Regulations*, Public Notice, 29 FCC Rcd. 13969 (WTB and CGB 2014) (“HAC Public Notice”).

<sup>2</sup> The survey findings of the Wireless RERC/CACP support the conclusion that such expectation exists. *See* Comments of The Georgia Institute of Technology (Georgia Tech), Center for Advanced Communications Policy (CACP) and the Rehabilitation Engineering Research Center for Wireless Technologies (Wireless RERC), WT Docket Nos. 10-254 and 07-250, at 4-5 (filed Jan. 22, 2015).

## DISCUSSION

Broad Consensus Among Commenters. The majority of parties filing in this proceeding embraced the Wireless Telecommunications and Consumer and Government Affairs Bureaus' (the "Bureaus") proposals to make HAC technologically neutral and to require all-inclusive compatibility. Small and rural wireless service providers explained that these changes will ease compliance problems they face and are unable to solve on their own, as well as benefit the consumers that they serve.<sup>3</sup> Advocates for persons with hearing loss confirmed that consumers with hearing loss who wear hearing aids experience confusion understanding what devices are compatible with their hearing aids, and they urged that these consumers "have access to the full range of choices of mobile wireless phones."<sup>4</sup>

Bluetooth. Several parties suggested that Bluetooth technology would be an effective solution and could or should be mandated by the Commission as the way to resolve compatibility issues. The Alaska Rural Coalition supported use of Bluetooth-enabled assistive listening devices (also referred to as "streamers"), and suggested that adoption of this technology would allow for a phase-down of the existing HAC requirements.<sup>5</sup> The Alaska Telephone Association agreed, asserting that "a move toward more universal compatibility through the use of Bluetooth

---

<sup>3</sup> See Comments of Competitive Carriers Association, WT Docket Nos. 10-254 and 07-250 (filed Feb. 5, 2015); Comments of the Rural Wireless Association, WT Docket Nos. 10-254 and 07-250 (filed Feb. 5, 2015); and Comments of the Alaska Telephone Association, WT Docket Nos. 10-254 and 07-250 (filed Feb. 5, 2015).

<sup>4</sup> Comments of the Hearing Loss Association of America, Association of Late-Deafened Adults (ALDA), Deaf and Hard of Hearing Consumer Advocacy Network (DHHCAN), National Association of the Deaf (NAD), Telecommunications for the Deaf and Hard of Hearing, Inc. (TDI), WT Docket Nos. 10-254 and 07-250, at 2 (filed Feb. 5, 2015); *see also* Comments of the American Speech-Language-Hearing Association (ASHA), WT Docket Nos. 10-254 and 07-250, at 2 (filed Feb. 4, 2015).

<sup>5</sup> Comments of Alaskan Rural Coalition at 6-7.

technology would make it easier for hearing impaired users to access devices and would also make it easier for carriers to provide more and lower cost choices.”<sup>6</sup>

HIA’s members are actively developing hearing aids with Bluetooth and related wireless features. While newer technologies may eventually replace tele-coil technology, and Bluetooth shows great promise, compatibility with tele-coil technology must be retained, for at least two reasons. One is that Bluetooth is not advanced enough or available enough to satisfy all consumers, in part because of its drain on the very small batteries that are necessary in hearing aids (because of user cosmetic demands) and in part because Bluetooth is generally only available in top-of-the-line hearing aids. The second is that tele-coil technology is incorporated into most hearing aids in use today, and it is likely to be used extensively by consumers for at least another decade. Forcing hearing aids into obsolescence is something the Commission should strenuously avoid, as hearing aids are a critical medical device which represents a significant financial investment by the person with hearing loss. It would be a serious burden on the public if product life were shorted because of premature abandonment of regulatory coverage.

100% HAC Compliance. Some parties contended that 100% HAC compliance would be too technically difficult for handset manufacturers to achieve, although they do not present compelling technical reasons in support of these assertions.<sup>7</sup> In contrast, the Rehabilitation Engineering Research Center on Technology for Individuals who are Deaf or Hard of Hearing explained that a new test protocol in the latest revision of ANSI 63.19 will simplify HAC testing

---

<sup>6</sup> Comments of the Alaska Telephone Association, at 5; *see also* Comments of CTIA, WT Docket Nos. 10-254 and 07-250, at 5 (filed Feb. 5, 2015); Comments of the Mobile Manufacturers Forum, WT Docket Nos. 10-254 and 07-250, at 12 (filed Feb. 5, 2015).

<sup>7</sup> *See* Comments of CTIA at 8; Comments of TIA, WT Docket Nos. 10-254 and 07-250, at 8 (filed Feb. 5, 2015); Comments of the Mobile Manufacturers Forum at 7-8.

and greatly reduce the need to test individual products.<sup>8</sup> RERC concluded “that the burden of making all handset type devices HAC should ease over time, especially if the requirements can be clear and incorporated at the earliest conceptual design stages across broad product categories and protocols less interference-prone than GSM become widespread.”<sup>9</sup>

Hearing Aid Design. CTIA speculated that customer dissatisfaction arises out of hearing aid design, including immunity to emissions from handsets, suggesting that the Commission’s focus should be on what changes can be made by the hearing aid industry.<sup>10</sup> Both hearing aids and HAC wireless handsets are designed to meet American National Standards Institute (“ANSI”) technical standard C63.19, and hearing aids are tested to meet International Electrotechnical Committee (“IEC”) standards before introduction to the market, which ensures a high degree of hearing aid immunity.<sup>11</sup> These standards were established by representatives of both industries and adopted by regulators to ensure that hearing aids do in fact withstand immunity from interference of wireless handsets.<sup>12</sup> Studies show that, since the mid-1990s, hearing aid immunity has improved by a factor of more than 30 dB.<sup>13</sup> HIA members have committed to providing a minimum M2/T2 performance, which when paired with widely

---

<sup>8</sup> Comments of Rehabilitation Engineering Research Center on Technology for Individuals who are Deaf or Hard of Hearing, WT Docket Nos. 10-254 and 07-250, at 4 (filed Feb. 5, 2015).

<sup>9</sup> *Id.* at 5.

<sup>10</sup> Comments of CTIA at 7.

<sup>11</sup> *See* IEC 60118-13, third edition.

<sup>12</sup> *See* 47 C.F.R. § 20.19(b)(1)(ii), (b)(2)(ii). The 2011 ANSI C63.19 standard, incorporated into the Commission’s rules, provides for a method for measuring RF interference level of wireless devices to hearing aids by wireless devices operating over any RF air interface or protocol.

<sup>13</sup> *See* Attachment A (Study by Delta Technical-Audiological Laboratory, Denmark).

available M3/T3 handsets provides reasonable assurance of compatibility.<sup>14</sup> HIA is unaware of any consumer dissatisfaction with HAC that can be traced to hearing aid design, but it would welcome engaging in joint research with the wireless handset industry to examine this issue.<sup>15</sup>

Information Exchange. Meanwhile, as the record in these proceedings demonstrates, HIA long has attempted to work with the wireless handset manufacturers to exchange information that would allow hearing aid manufacturers to improve hearing aids to work seamlessly with wireless handsets and has sought FCC support in this process.<sup>16</sup> As well, HIA is in the process of evaluating a HAC sampling effort conducted in conjunction with the Hearing Loss Association of America (“HLAA”) to attempt to identify specific reasons why people with hearing loss report continuing problems with HAC.<sup>17</sup> HIA has also advocated for the expansion of in-store testing requirements, so that consumers can be assured of their satisfaction with the

---

<sup>14</sup> The general rule of thumb is that the sum of the handset and hearing aid ratings should be at least “5” to achieve compatibility. A combined rating of 6 is considered “best” or “excellent” and would provide highly useable, excellent performance. A combined rating of 5 is considered “normal” and provides for an acceptable level of normal, regular phone use. And a combined level of 4 is considered “usable,” allowing users to complete a brief call, but not providing acceptable quality for normal, regular phone use. *See* <http://www.asha.org/public/hearing/Hearing-Aids-and-Cell-Phones/>.

<sup>15</sup> The ANSI C63.19 Committee could function as a coordinator of these efforts. It should be noted that persons with hearing loss constitute 100% of the customers of HIA’s members, so hearing aid manufacturers have every incentive to maximize the usability of their product in all environments. In contrast, persons with hearing loss are a relatively small portion of handset users, so manufacturers of those products are more strongly motivated by design factors other than from hearing aid compatibility.

<sup>16</sup> Comments of the Hearing Industries Association, WT Docket Nos. 10-254 and 07-250, at 8-10 (filed Feb. 5, 2015).

<sup>17</sup> HLAA conducted large surveys in 2011, 2012 and 2014. Among other points, these results showed that more than 60% of hearing aid users had experienced interference from a cell phone. *See* Attachment to Comments of Hearing Loss Association of American, WT Docket No. 10-254 (filed Feb. 14, 2011); *see also* Letter to Marlene H. Dortch, Secretary, Federal Communications Commission, from Lise Hamlin, Director of Public Policy, The Hearing Loss Association of America, WT Docket No. 07-250 (filed Nov. 11, 2014) (attaching 2014 survey results).

compatibility of their wireless handsets with their hearing aids before they buy, thus reducing instances of post-purchase dissatisfaction that might have been avoided.<sup>18</sup>

Interference from Hearing Aids. CTIA also asserted that hearing aids cause “interference” to wireless handsets and that the Commission should regulate the performance of hearing aids.<sup>19</sup> CTIA does not provide enough specific information to identify how and when such interference might occur. HIA believes that such interference is either non-existent or exceptionally rare. To the extent that hearing aids radiate radiofrequency energy, they must meet FCC standards, including obtaining equipment certification if they incorporate wireless features that constitute intentional radiation. Most hearing aids with wireless functionality have typical peak output power in the microwatt range, lack power and battery strength to overpower wireless handsets, and do not operate in cellphone transmission/reception bands.<sup>20</sup> Hearing aids must also meet FDA emission requirements to assure that they do not interfere with other medical devices, in compliance with the international standard IEC 60601-1-2. Thus there is no justification to conclude that hearing aids cause interference to wireless handsets that requires regulatory intervention.

Moreover, the FCC and the FDA have a long-standing agreement to coordinate on RF issues related to medical devices, and HIA believes the two agencies have been effective in protecting the public interest through that process.

“Power Down” Option. CTIA asked the Commission to broaden the availability of the “power down” compliance option in the HAC rules that is now limited to manufacturers or service providers that offer only one or two GSM handset models operating in the 1900 MHz

---

<sup>18</sup> See Comments of the Hearing Industries Association at 7-8.

<sup>19</sup> CTIA Comments at 13-14.

<sup>20</sup> A very few, recently-introduced hearing aids, which incorporate integrated Bluetooth wireless technology, have peak output power less than ½ milliwatts (< 500 microwatts).

band.<sup>21</sup> While GSM is an older technology, it is still very widely deployed, especially in rural areas where 2G wireless service may be the only voice service that is available. According to the most recent FCC summary of device manufacturer handset totals by air interface, more than 140 types of handsets sold have GSM capabilities and would be implicated by this decision.<sup>22</sup> Given the time needed to build out advanced networks nationwide and to replace enough handsets so that legacy networks can be decommissioned, GSM will remain in use for a long time. HIA is concerned that allowing the “power down” option will impede the ability of individuals with hearing loss to achieve an “M3” or better HAC rating and that there will be many dropped calls when phones operate in this mode and cannot adjust their power sufficiently to reach the nearest base station. Dropped calls are more than an inconvenience; they can cost lives if the call that is dropped or cannot get through at all is an emergency call to 911.

VoLTE. HIA notes that a similar interference issue may arise regarding voice over LTE (“VoLTE”) handsets. While the LTE systems deployed thus far in the United States have been based on frequency division multiple access (“FDMA”), some organizations have advocated that time division multiple access (“TDMA”) is more efficient, so at some point, LTE TDMA systems may be deployed. HIA’s consultants have found that HAC test results for LTE TDMA handsets are not comparable to the results from LTE FDMA handsets. Thus each technology must be independently tested to establish hearing aid compatibility.

In addition, the Commission must monitor current industry discussions about introducing LTE technology for voice communication in unlicensed Wi-Fi bands. It appears that the

---

<sup>21</sup> CTIA Comments at 12-13. *See* 47 CFR § 20.19(e)(1)(iii).

<sup>22</sup> FCC Wireless Telecommunications Bureau, Summary Report of Device Manufacturer Hearing Aid Compatibility Reports, Device Manufacturer Handset Totals by Air Interface, Reporting Period: July 1, 2013 – June 30, 2014, *available at* [http://wireless.fcc.gov/hac/index.htm?job=reports\\_dm](http://wireless.fcc.gov/hac/index.htm?job=reports_dm).

demodulated signature of this technology has a strong 200 Hz component that can generate an audio “buzz” in hearing aids not unlike the 217 Hz product from GSM. HAC issues must not be neglected when LTE/Wi-Fi devices are used for voice communication and held up to the ear, and testing and performance standards must be developed at the start.

Public Safety and Enterprise Radios. Finally, Motorola asked to exclude HAC requirements from public safety and enterprise equipment on the basis that the primary purpose of these devices is public safety and business, not consumer use.<sup>23</sup> Motorola offered no technological reason why HAC cannot be incorporated into its devices that are held to the ear. Its position results in individuals with hearing loss who use hearing aids being excluded from jobs that require use of this equipment, strongly contrary to the public policy goal of accessibility to economic opportunities for all citizens, as HIA noted in its initial Comments.<sup>24</sup>

Legal Authority. The Commission clearly has the legal authority to require HAC compliance by public safety and enterprise equipment. Section 710(b)(2)(B) of the Communications Act specifically provides that the FCC “shall” reassess the exemption of telephones used with public mobile services and private radio services under the following conditions: 1) it is in the public interest; 2) hearing-impaired individuals are adversely affected by application of the exemptions; 3) it is technologically feasible; and 4) the costs of doing so will not impede successful marketability.<sup>25</sup> These criteria have been met, and thus FCC has a statutory requirement to “revoke or otherwise limit” the exemptions for PMRS handsets. As noted above, individuals with hearing loss who use hearing aids may be unable to take advantage

---

<sup>23</sup> Comments of Motorola Solutions, Inc., WT Docket Nos. 10-254 and 07-250 (filed Feb. 5, 2015).

<sup>24</sup> Comments of the Hearing Industries Association at 4-5.

<sup>25</sup> 47 U.S.C. § 610(B)(2)(b).

of radio-dependent job opportunities if handsets that must be used in those jobs cannot be used with their hearing aids. And, as PMRS and CMRS technologies converge, the technological and cost barriers to HAC compliance will be greatly reduced, if not eliminated. There is every reason to revoke the exemption.

### CONCLUSION

The record clearly supports Commission action to require a technically neutral “hold to the ear” requirement for hearing aid compatibility and an all-inclusive HAC compatibility requirement for wireless handsets. HIA continues to urge the Commission to move strongly in that direction.

Respectfully submitted,

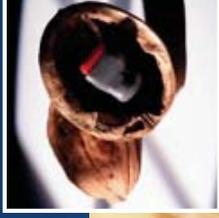


Peter Tannenwald  
Laura Stefani  
FLETCHER, HEALD & HILDRETH, P.L.C.  
1300 North 17th Street, 11th floor  
Arlington VA 22209-3801  
(703) 812-0404/0450  
E-mail: [Tannenwald@fhhlaw.com](mailto:Tannenwald@fhhlaw.com)  
[Stefani@fhhlaw.com](mailto:Stefani@fhhlaw.com)

February 20, 2015

*Counsel for The Hearing Industries Association*

# DELTA - Technical-Audiological Laboratory, Denmark



- >50 years' experience
- Independent self-governing foundation
- Staff 270 (>120 university educated)
- Turnover 40 Mill USD
- 40% export
- 2500 client assignments/year

Presented by Gert Ravn & Allan G. Kristensen

*We help ideas meet the real world*

**DELTA**

# DELTA - Technical-Audiological Laboratory



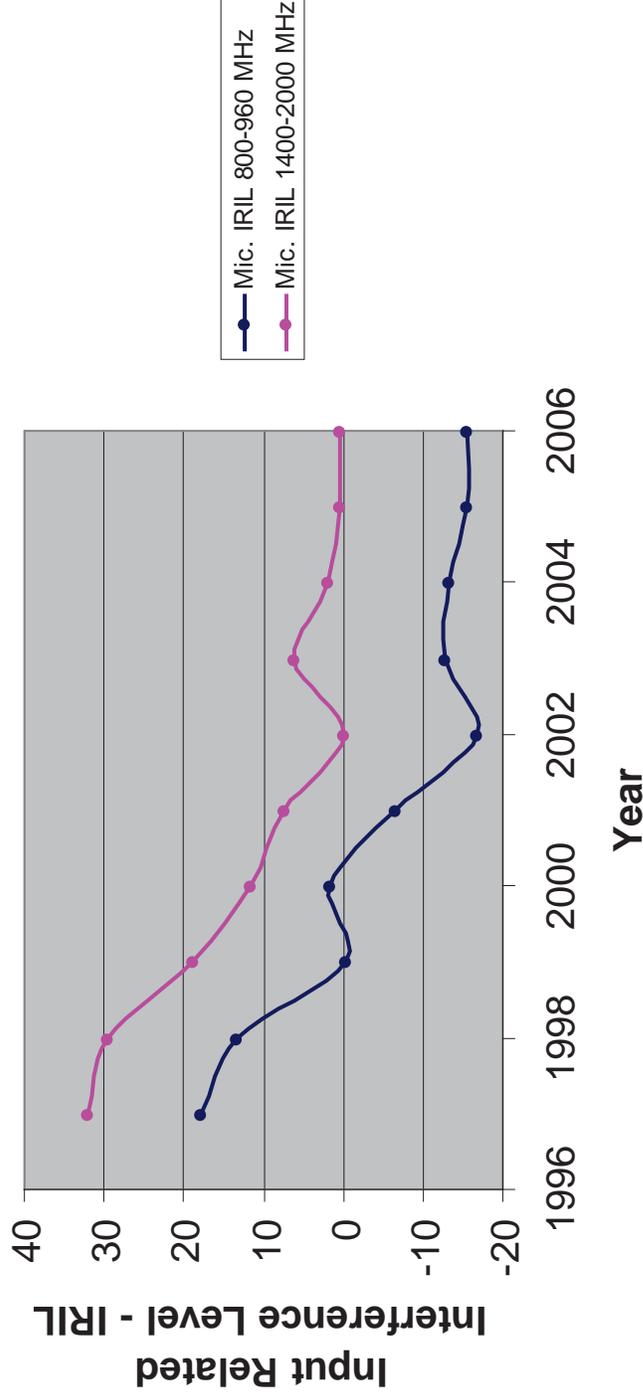
- >40 years of experience in technical solutions for audiology
- Broad knowledge in all aspects of audiology
- Widespread international network
- Accredited hearing aid testing IEC/ANSI
  - Electroacoustic
  - EMC
- Certification of hearing clinics
- Software solutions

*We help ideas meet the real world*

**DELTA**

# Improvement of HA Electro-Magnetic Immunity through the last nine years

IRIL values EHIMA Hearing Aid manufacturers Year 1997-2006

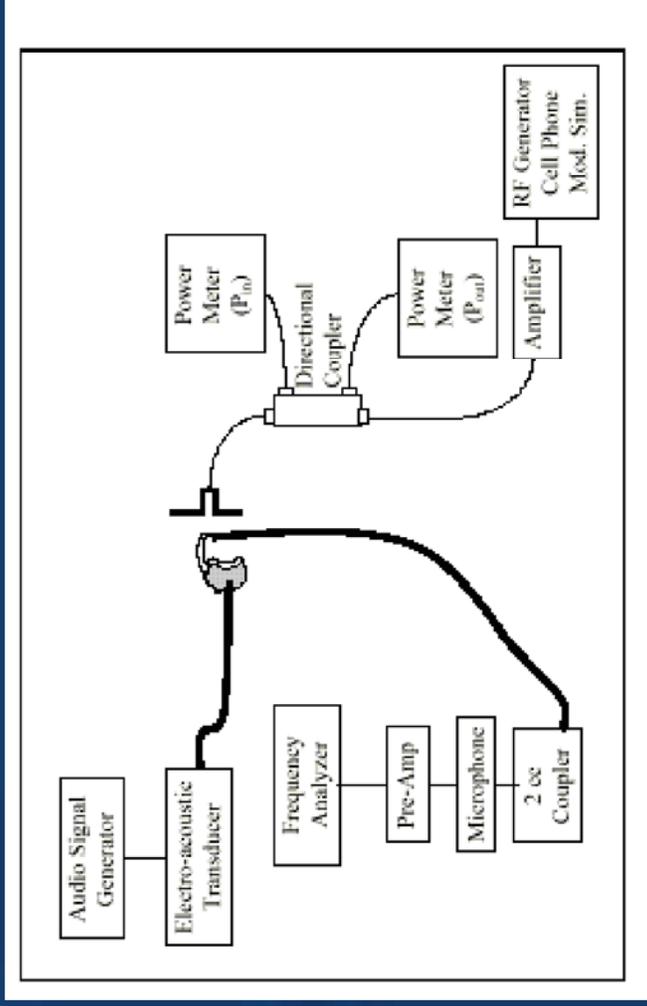


DELTA has carried out IEC 60118-13 hearing aid tests on almost 1000 different hearing aid types from all international leading manufacturers during the last 10 year's.

Overall immunity of hearing aids has improved by more than 30 dB !

*We help ideas meet the real world*

# ANSI C63.19 dipole test – HA part



## Advantages

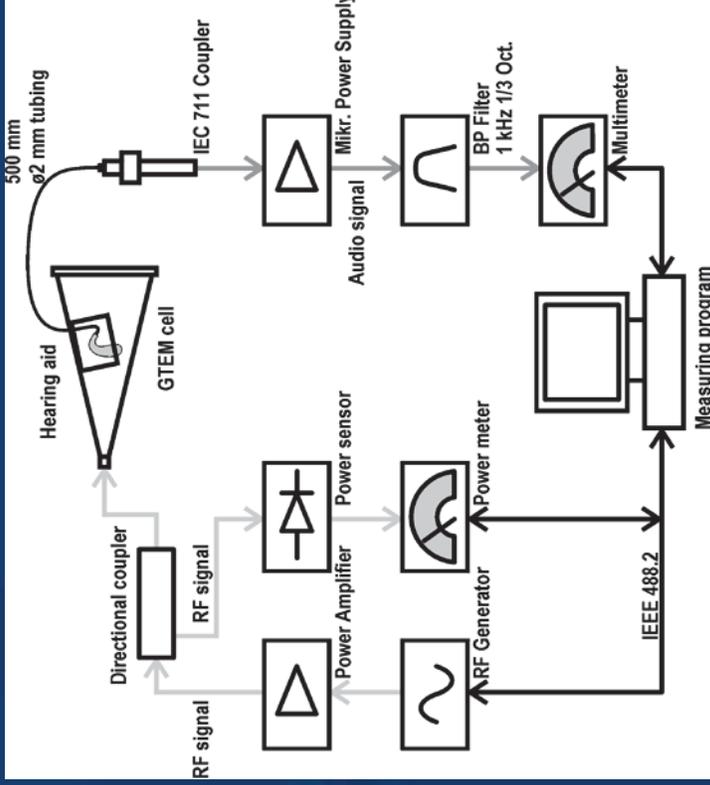
- Test field strength > 200 V/m
- Test freq > 3GHz
- Near field test

## Disadvantages

- Poor test/retest repeatability
- Expensive setup (shielded room/calibration)
- Time consuming test
- HA shell size matters
- Categorization criteria not documented
- Not widespread in HA industry
- Little experience in test

*We help ideas meet the real world*

# ANSI C63.19 GTEM / IEC 60118-13 test



## Advantages

- Good test/retest reproducibility
- Quicker test
- Homogeneous field (far field)
- Shielded environment not needed
- Widespread in HA industry
- Pass/fail criteria thoroughly documented
- >10 year's experience in testing

## Disadvantages

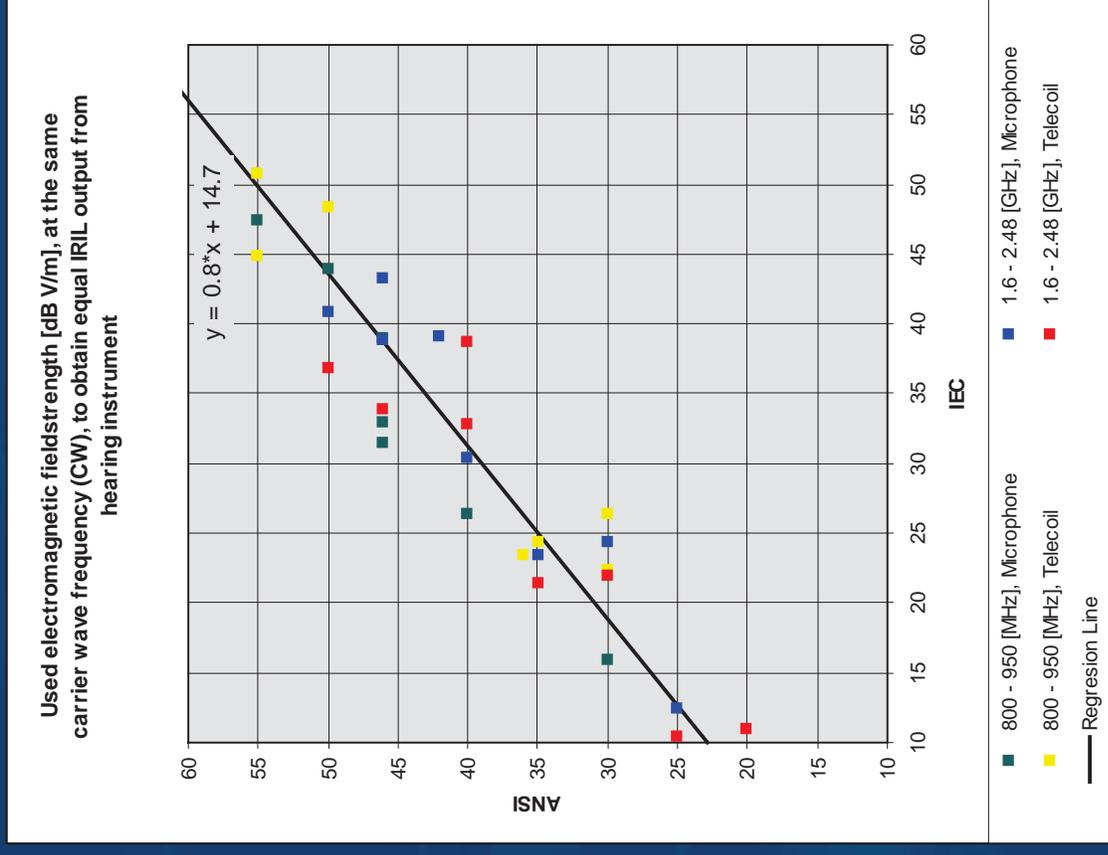
- Limitation's on very high field strength's
- Test > 3 GHz not possible

# HA GTEM / dipole comparison

At equal field strength the GTEM test method inducts a relative higher IRIL value than the dipole.

Tolerances on hearing aid immunity measurements are quite large, but it can be concluded that the difference is in the range 5-10 dB.

This difference in field strength will typically result in an acoustic difference of 10 – 20 dB IRIL.



## Suggested test field strengths for GTEM measurement's ANSI (M3/T3) and IEC

Frequency range GHz	Bystander compatibility Test field strengths (unmodulated carrier) for IRIL=55 dB in V/m	User compatibility Test field strengths (unmodulated carrier) for IRIL=55 dB in V/m
0,8 to 0,96 M and T mode	>=3,5	>=90
1,4 to 2,0 M and T mode	>=2	>=50
2,0 to 2,48 M and T mode	>=1,5	>=35
>=2,48	to be considered	to be considered

Field strengths of RF test signals to be used to establish immunity for bystander compatibility<sup>(1)</sup> and user compatible hearing aids<sup>(2)</sup>.

The user compatibility level's is suggested for the ANSI M3/T3 categorisation.

Dipole test has to be carried out for M4/T4 categorisation

Test field strengths in the frequency range above 2,48 GHz will be considered for use of new generations of digital wireless devices

---

(1): Hearing aid users will not be annoyed by interference from bystanders using mobile phones

(2): Hearing aid users will be able to use mobile phones themselves in most situations