



**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**

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**EQUIPMENT AUTHORIZATION GUIDANCE
FOR HEARING AID COMPATIBILITY**

1. Introduction

- a) This publication provides guidance on the Hearing Aid Compatibility (HAC) equipment authorization requirements for wireless handsets, subject to Section 20.19, and submitted for certification on or after January 1, 2018. Prior to January 1, 2018, manufacturers may follow this guidance, or continue to follow previous KDB guidance¹ on equipment authorization for hearing aid compatibility.
- b) Manufacturers of wireless handsets that are seeking certification of a handset as hearing aid compatible under Section 20.19 must submit, as part of the equipment certification process, a test report that demonstrates HAC compliance in accordance with ANSI C63.19-2007² or ANSI C63.19-2011.
- c) A handset that operates only in bands that are not addressed in ANSI C63.19-2011 is not subject to Section 20.19 HAC requirements.

2. Equipment Certification Application Filing Requirements

- a) The HAC test report must be submitted as an exhibit with an application for equipment certification, either in an original application, or in a Class II Permissive Change application to add or change the HAC rating of a handset subject to Section 20.19.
- b) A certification application associated with a HAC-tested handset must include an exhibit containing one complete M-rating test report for each model marketed and reported as M# rated, or one complete M-rating report and one complete T-rating report (see example in Appendix A) for a model marketed and reported as M#T#.
- c) Concurrent connections or concurrent services are modes that permit active voice calls at the same time with other active connections for data or other voice calls. For the purposes of this document, “concurrent connections” are considered using two categories: (i) concurrent connections using simultaneous transmissions³; and (ii) concurrent connections not using simultaneous transmissions.

¹ KDB Publication 285076 D01 HAC Guidance v04r01 and 285076 D02 T-Coil testing for IP Services v02 will be available as attachments to KDB Publication 285076 until January 2018.

² The ANSI C63.19-2007 standard is limited in frequency bands and air interfaces and would be applicable only to handsets that have only those frequency bands and air interfaces specified in ANSI C63.19-2007. Because ANSI C63.19-2007 is a subset of ANSI C63.19-2011, this KDB publication references only ANSI C63.19-2011.

³ Concurrent connections using simultaneous transmissions (as defined for this document) means: transmitters that are radiating simultaneously, establishing independent concurrent connections, operating over separate or the same air interfaces/bands, such that each air interface/band transmission is contributing to the radiated field. Until measurement procedures are provided for simultaneous transmissions, devices offering this capability are not

(continued...)

- 1) At present ANSI C63.19 does not provide simultaneous transmission test procedures; therefore, handsets that have the ability to support concurrent connections using simultaneous transmissions shall be independently tested for each air interface/band given in ANSI C63.19-2011.
- 2) Handsets that provide concurrent connections not using simultaneous transmissions, such as time division multiplexing over the same air interface or packet IP multiplexing with an air interface/band(s) given in ANSI C63.19-2011, shall be tested in both modes (non-concurrent and concurrent) to determine the worst-case mode for determining the HAC rating. The worst-case mode⁴ shall be documented in the test report.
- 3) All air interfaces/bands that can be operated in a concurrent connection mode with another air interface/band (simultaneous transmission or other concurrent connection mode) shall be indicated in the test report. The test report shall identify the mode (simultaneous transmission or other) and the operation with which the indicated mode is concurrent.
- d) Manufacturers that qualify for the Global System for Mobile communications (GSM) 1900 MHz band power reduction option⁵ and provide test results where the HAC rating is based on reduced power in the 1900 MHz band, must provide in the certification application filing a statement documenting that they are so qualified, and must document the required information in the test report and user's manual exhibits.
- e) A certification application that shows test results in the M4 or M4T4 category cannot declare a lower rating (M3, M3T4). In all cases, the test report must have test results demonstrating the same rating declared by the manufacturer and reported to the FCC Wireless Telecommunications Bureau (WTB).

3. Test Report Exhibits

- a) An example of the items to be included in the test report is provided in Appendix A.
- b) In addition, test reports should include a list of air interfaces and bands (M- and T-report, see Appendix B for an example of the list to be provided):
- c) MIF evaluation section (M-report) (per ANSI C63.19-2011).
 - 1) If the MIF values are tested, include a description of the method and test equipment (manufacturer and model number) used to establish the Modulation Index Factor (MIF) (as described in 5.5.1.3 of ANSI C63.19-2011). Provide any justification for MIF values if the value is less than the sample values listed in D.7 Table D.5 of ANSI C63.19-2011, and values approaching the margin.
 - 2) If the handset uses the MIF values predetermined by the test equipment manufacturer: i) Provide a separate exhibit or attestation, signed from the applicant (device manufacturer) that the values used represent worst-case air interfaces and operation of the device; and ii) list the same MIF value specified by the test equipment manufacturer in the test report. For the MIF values used,

required to be tested in the simultaneous transmission mode. NOTE: Transmitters radiating simultaneously, establishing a single bonded connection, are not considered concurrent simultaneous transmissions, and must be tested for that mode.

⁴ The worst-case mode might not be under the condition where multiple connections are multiplexed over a single air interface transmission.

⁵ The option to meet the M3 HAC standard through a user-selectable power reduction for GSM operations in the 1900 MHz band (Section 20.19(e)(1)(iii)) is available only to entities that otherwise would have qualified for the *de minimis* exception (Section 20.19(e)(1)(i)) but are required to offer one hearing aid-compatible handset because of their employee size (see Section 20.19(e)(1)(ii)).

document the version number/version date of the MIF values provided (manufacturer files, etc.) and the supporting documentation for the related (version number/version and date) values.

- d) Telecoil (T-Coil) testing is to be performed in accordance with 7.3.2 (Base station Simulator method) or 7.3.3 (Manufacturers test mode method) of ANSI C63.19-2011. See also KDB Publication 285076 D02 for additional guidance.

4. Grant Note Codes

Use a Form-731 grant note code of “HC” in the grant note field for the frequency bands and air interfaces for which the tests have been performed and the HAC rating obtained.⁶

5. Grant Comments

- a) Add the text indicating the HAC rating in the grant comments field: “*HAC Rating M# or M#T#-20YY (-2007 or -2011).*”
- b) For air interfaces/bands included in ANSI C63.19-2011 that have voice capability and are certified for HAC (for which the grant note “HC” is used), the following grant comments will be automatically added: “*This equipment complies with the hearing aid compatibility technical requirements of Section 20.19 of the rules.*”
- c) When multiple models⁷ have been offered with different HAC ratings under the same FCC ID, the HAC ratings must list the ratings for each model: “*M#T#-20YY, M#T#-20YY.*” It is not required to list the actual model associated with the multiple ratings.
- d) If the HAC rating requires a user-selectable mode reducing the power for the GSM air interface in the 1900 MHz band, then add the following grant comment: “*HAC rating requires user activation of a special mode for GSM operation in the 1900 MHz band.*”

6. User Manual and Disclosures

The user manual shall include the required disclosure statements as specified in Section 20.19(f). This includes, as appropriate:

- a) Section 20.19(f)(1): an explanation of the ANSI C63.19 rating system.
- b) Section 20.91(f)(3): disclosure statement for HAC-rated handsets operating over the GSM air interface in the 1900 MHz band with a user-selectable mode or a special mode necessary to meet the hearing aid compatibility standard for reducing the power under the provisions of Section 20.19(c)(1).

7. Permissive Changes, Product Changes, and Model Variations

- a) Multiple compliance reports under a single FCC ID that represent distinct models⁸ with different HAC ratings are permissible.

⁶ Use of the HX code is no longer required.

⁷ The grant comment must list all HAC ratings for handsets under one FCC ID that have been offered and reported to FCC as HAC-compliant. The format is “*HAC Ratings: M#T#-200N, M#T#-20YY*” after the colon with each distinctive rating/model separated by a comma. When a permissive change has been granted for a new distinctive model, the new grant comment shall list all the HAC ratings offered under the single FCC ID, even if the previous model is no longer available from the manufacturer.

⁸ Distinct models are defined in Section 20.19(a)(3)(iii). If a manufacturer assigns different model designations solely to distinguish units sold to different carriers (for either the same or different FCC IDs), or to signify other

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- b) A Class II permissive change application must contain a complete HAC compliance report for all applicable air interfaces/bands.
- c) A permissive change is permitted for multi-band and multi-mode handsets that were previously tested under ANSI C63.19-2007 and can now be tested under ANSI C63.19-2011 to include all the additional bands and modes. The new standard must be used to test all the modes and air interfaces covered in ANSI C63.19-2011. If the HAC rating changes, then a new model designation must be assigned to ensure distinction from the prior version.
- d) Any changes⁹ that affect the HAC rating must be reported as a Class II permissive change. The handset must be given a new model designation distinct from that of the prior version of the handset.
- e) A Class II permissive change application that only includes an M-rating report for a handset previously granted with a rating of M#T# is acceptable as a distinctive new model Section 20.19(g). The grant comment associated with the Class II permissive change would then be “*HAC Ratings: M#T#, M#.*”
- f) When adding a T-Coil rating for a device according to the Class II permissive change procedures for handsets, a complete M-rating report and a complete T-rating report must be submitted with the certification application. Only if there has been no product change to add the T-Coil, or the T-Coil is at the same location as the acoustical output location (see 5.5 of ANSI C63.19-2011), can the previous M-rating report can be resubmitted as an exhibit in the permissive change application. This is because it is possible that under a single FCC ID there could be model variations with different M-ratings. A T-rating report must be associated with its specific M-rating report.
- g) If the manufacturer builds the product with alternative components, it must be tested to show compliance using the components representing the worst-case situation, according to the guidance for the permissive change procedure.¹⁰

8. Testing Guidance

- a) HAC test environments (probes, equipment, test fixtures, etc.) must be properly calibrated according to manufacturer’s and ANSI C63.19 requirements.
- b) Testing must be done in accordance with ANSI C63.19 under the worst-case operating mode (highest interference potential that results in a lower rating).
- c) No external special parts or ancillary devices are permitted in order to demonstrate HAC compliance.
- d) Handset models with user instructions that disable any of its features, degrade performance, reduce RF output power, degrade battery performance, etc. for the purpose of meeting HAC compliance are not permitted. However, a 2.5 dB transmitter power reduction is permitted for the GSM air interface in the 1900 MHz band for certain manufacturers of handsets using a user-selectable mode of reducing the power under the provisions of Section 20.19(c)(1). Handsets using this provision must be so noted in the test report and provide the appropriate text in the grant comment field and disclosure statements.

distinctions that do not relate to either form, features, or capabilities, such designations shall not count as distinct models for purposes of compliance to the required schedules set out in Sections 20.19(c) and 20.19(d).

⁹ Any type of equipment modification (antenna position, design, metallic surface, adding system processes, changing battery capacity or type, etc.) has the potential to change the rating. The manufacturer must evaluate the equipment modification to determine if there is a change in the rating and if a Class II permissive change is required. Equipment changes that do not result in a change of the HAC rating being marketed and reported to the WTB do not require a Class II permissive change.

¹⁰ See: Permissive Change Policies, KDB Publication 178919.

- e) Certain user controls and settings may be acceptable for processing audio signals in accordance with ANSI C63.19-2007 or ANSI C63.19-2011 requirements, to improve the performance for people with hearing loss. A clear description of these controls must be provided in the test report submitted with each application.
- f) The antenna must be tested in a position of maximum antenna efficiency for voice operation, for the handset held to the ear position. When the handset can be used in more than one position (for example, with antenna retracted or extended, keyboard extended, etc.), only the position of maximum antenna efficiency for held to the ear voice calls, as defined by the manufacturer, must be tested. All typical handset positions for held to the ear operation, which can result in an increase of the antenna efficiency, must be tested.
- g) In addition to the air interfaces/bands documentation, the application shall document all other key features of the device tested, including:¹¹
 - 1) Special HAC audio configurations permitted in accordance with ANSI C63.19-2011.
 - 2) Statements regarding special antenna positions for HAC compliance (see 8) f)).
 - 3) The applicant shall provide a general declaration in cases where specific transmission modes do not operate in the held-to-ear mode for providing voice service (i.e., held-to-ear modes do not include Wi-Fi or Bluetooth profile).
 - 4) Use of any feature, not discussed above, which is disabled during testing must be clearly documented in the test report.
- h) For interpretations and explanations issued by ANSI-ASC C63, see: http://www.c63.org/documents/misc/posting/new_interpretations.htm
- i) A handset that has the capability to allow an optional modular accessory that attaches to a handset such that the handset and accessory can be held to the ear needs to be tested as a unit only if the accessory is included with the handset as a packaged sale item, or any accessory that enables or is used as part of a voice service(s) as defined in Section 20.19(a) (1) (i).

9. References

- KDB Publication 285076 D02, *Guidance for Performing T-Coil tests for Air Interfaces Supporting Voice over IP (e.g., LTE and Wi-Fi) to support CMRS based Telephone Services.*
- KDB Publication 285076 D03, *HEARING AID COMPATIBILITY Frequently Asked Questions.*
- KDB Publication 178919 D01, *PERMISSIVE CHANGE POLICY.*
- KDB Publication 178919 D02, *PERMISSIVE CHANGE FREQUENTLY-ASKED QUESTIONS.*
- ANSI C63.19-2007, *American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.*
- ANSI C63.19-2011, *American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.*
- DA 12-550; *Amendment of the Commission's Rules Governing Hearing Aid-Compatible Mobile Handsets*, Docket No. 07-250, THIRD REPORT AND ORDER; Adopted: April 9, 2012; released: April 9, 2012.
- FCC 15-155; *Improvements to Benchmarks and Related Requirements Governing Hearing Aid-Compatible Mobile Handsets*, Docket No. 15-285, NOTICE OF PROPOSED RULEMAKING; *Amendment of the Commission's Rules Governing Hearing Aid-Compatible Mobile Handsets*,

¹¹ An applicant has the option to submit the description of the EUT in the operational description application folder, and request long-term or short-term confidentiality.

Docket No. 07-250, FOURTH REPORT AND ORDER; Adopted: November 19, 2015; Released: November 20, 2015.

- Section 20.19 References in this document:
- [Section 20.19 Hearing aid-compatible mobile handsets.](#)
 - 20.19(a)(3)(iii) Definitions Model
 - 20.19(c) Phase-in of requirements relating to radio frequency interference
 - 20.19(c)(1) Phase-in of requirements relating to radio frequency interference (M-Rating) Manufacturers
 - 20.19(d) Phase-in of requirements relating to inductive coupling capability
 - 20.19(d)(1) Phase-in of requirements relating to inductive coupling (T-Rating) Manufacturers
 - 20.19(e)(1)(iii) *De minimis* exception Manufacturers and service providers that offer one or two digital handset
 - 20.19(e)(1)(i) *De minimis* exception Manufacturers and service providers that offer one or two digital handset of this section, beginning September 10, 2012
 - 20.19(e)(1)(ii) *De minimis* exception Manufacturers and service providers that offer one or two digital handset of this section purposes of this paragraph, employees
 - 20.19(f)(1) Labeling and disclosure requirements Labeling requirements
 - 20.19(f)(2)(i) Labeling and disclosure, requirements manufacturer and service provider shall ensure
 - 20.19(f)(3) Disclosure requirement relating to handsets that allow the user to reduce the maximum power
 - 20.19(g) Model designation requirements
 - 20.19(i) Reporting requirements

Change Notice

10/31/2013: 285076 D01 HAC Guidance v0302 has been changed to 285076 D01 HAC Guidance v04. Revisions reflect further guidance provided for attachment 285076 D02 T-Coil testing for CMRS IP of this KDB.

04/26/2016: 285076 D01 HAC Guidance v04 has been changed to 285076 D01 HAC Guidance v04r01. Revisions reflect update of KDB Publication 285076 D02 T-Coil testing for CMRS IP v02 removing the exemption for T-Coil testing for VoLTE and clarifying the exemption for WI-FI Calling. Editorial corrections including updating the document format.

09/12/2017: 285076 D01 HAC Guidance v04r01 has been changed to 285076 D01 HAC Guidance v05. This change represents a major revision to address the FOURTH REPORT AND ORDER FCC 15-155 rule for expansion of voice service and eliminate the exclusion permitted by the Third Report and Order (DA 12-550, April 9, 2012) for testing VoLTE and Wi-Fi calling.

04/06/2020: 285076 D01 HAC Guidance v05 has been changed to 285076 D01 HAC Guidance v05r01. minor updates to Appendix B.

Appendix A

Example of Test Report Contents

The following items should be included in a HAC test report for a handset applying for certification under Section 20.19:

1. Summary
2. Air Interfaces and Bands
3. Test Site Description
4. Description of Test System
5. Equipment List
6. Description of EUT
7. Modes, Features, and Capabilities for each model tested
8. Justification of Held to Ear Modes Tested
9. Test Procedure
10. Test System Validation, Calibration, and Alignment Procedures
11. MIF evaluation (M-rating report)
12. T-Coil (T-rating report)
13. Detailed Measurements (M-rating and T-rating Reports)
14. References and Supporting Test Data
15. Detailed Test Measurement Plots

Appendix B
Example of Test Report List of Air Interfaces and Frequency Bands
This an Example only and does not indicate specific configurations.

Air Interface	Band MHz	Type	ANSI C63.19 Tested	Simultaneous Transmitter	Name of Voice Service	Power Reduction
GSM	850	VO	Yes	BT and Wi-Fi		NA
	1900					Yes
	GPRS/EDGE	VD	Yes		DUO**	NA
WCDMA (UMTS)	850	VO	Yes	BT and Wi-Fi	*	NA
	1900					
	HSPA	VD			DUO**	
CDMA	800	VO	Yes	BT and Wi-Fi	*	NA
	1900					
LTE	700	VD	Yes	BT and Wi-Fi	VoLTE* DUO** XYNet***	NA
	850					
	1700					
	1900					
Wi-Fi	2450	VD	NA	BT and GSM, LTE, CDMA, WCDMA or GSM	Wi-Fi-Calling** DUO**	NA
	5200 (U-NII-1)					
	5300 (U-NII-2A)					
	5500 (U-NII-2C)					
	5800 (U-NII-3)					
BT	2450	DT	NA	Wi-Fi and BT and GSM, LTE, CDMA, WCDMA or GSM	NA	NA
<p>where:</p> <p>VO: legacy Cellular Voice Service from Table 7.1 in 7.4.2.1 of ANSI C63.19-2011</p> <p>DT: Digital Transport only (no voice)</p> <p>VD: IP Voice Service over Digital Transport</p> <p>BT: Bluetooth</p> <p>* Ref Lev in accordance with 7.4.2.1 of ANSI C63.19-2011 and the July 2012 VoLTE interpretation</p> <p>** Ref Lev -20 dBm0</p> <p>*** Ref Lev XYNet established by KDB Inquiry NNNNNN @ -16 dBm0</p>						

- 1) **Air Interface/ Band MHz:** List of all air interfaces and bands supported by the handset.
- 2) **Type::** For each air interface, indicate the type of voice transport mode:
 - i) VO = legacy Cellular Voice Service, from Table 7.1 in 7.4.2.1 of ANSI C63.19-2011;
 - ii) DT = Digital Transport only (no voice); and

- iii) VD = IP Voice Service over Digital Transport.
- 2) **ANSI C63.19 Tested:** Yes or No
- 3) **Simultaneous Transmitter:** Indicate any air interface/bands that operate in simultaneous or concurrent service transmission mode.
- 4) **Name of Voice Service:** See Q4 in 285076 D03 HAC FAQ for further clarification.
 - a. * Ref Lev in accordance with 7.4.2.1 of ANSI C63.19-2011 and the July 2012 VoLTE interpretation
 - b. ** Ref Lev -20 dBm0
 - c. *** Ref Lev XYNet established by KDB Inquiry NNNNNN @ -16 dBm0
- 5) **Power Reduction:** If the 1900 MHz band GSM air interface was tested using the option to reduce the power, state in the test report the maximum power in the 1900 MHz band, and the reduced power used for testing compliance to demonstrate compliance to the requirement that power be reduced by no more than 2.5 dB.