HEARING AID COMPATIBILITY Volume Control Evaluation Report

Report No.	:	**PSU-NQN2403180115AC05**
FCC ID	:	**2AJOTTA-1600**
Equipment	:	**GSM/UMTS/LTE/5G Mobile phone**
Brand Name	:	**HMD**
Model Name	:	**TA-1600/TA-1688**
Applicant	:	**HMD Global Oy**
Address	:	**Bertel Jungin aukio 9,02600 Espoo, Finland**
Manufacturer	:	**HMD Global Oy**
Address	:	**Bertel Jungin aukio 9,02600 Espoo, Finland**
Receive Volume Control Results Lowest	:	**PASS**
Conversational Gain	:	**2N:14.47dB** **8N:19.06dB**
Standards	:	**ANSI C63.19-2019** **ANSI/TIA-5050-2018**
Date of Testing	:	**Apr.27,2024~May.22,2024**
FCC Designation No.		**CN1325 FCC Site Registration No.:434559**

CERTIFICATION: The above equipment have been tested by **Huarui 7layers High Technology (Suzhou) Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's HAC characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement any government agencies.

Prepared By : Gao Guannan /Engineer

Approved By : Peibo Sun /Manager

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Release Control Record

Report No.	Reason for Change	Date Issued
PSU-NQN2403180115AC05	Initial release	Jun. 04, 2024

1. Summary of Minimum Conv.Gain Value

Mode	Band	Mounting Force (N)	Conv.Gain(dB)	Result
GSM CMRS Voice	GSM850	2N	15.06	PASS
		8N	21.50	
	GSM1900	2N	15.03	PASS
		8N	20.88	
UMTS CMRS Voice	Band II	2N	14.47	PASS
		8N	21.35	
	Band IV	2N	15.07	PASS
		8N	21.37	
	Band V	2N	15.15	PASS
		8N	21.21	
VoLTE	Band 7	2N	14.79	PASS
		8N	20.94	
	Band 12	2N	15.01	PASS
		8N	19.57	
	Band 13	2N	14.80	PASS
		8N	19.64	
	Band 25	2N	14.91	PASS
		8N	21.42	
	Band 26	2N	15.49	PASS
		8N	20.94	
	Band 38	2N	14.96	PASS
		8N	21.13	
	Band 41	2N	15.02	PASS
		8N	20.27	
	Band 66	2N	14.88	PASS
		8N	20.82	
	Band 71	2N	15.22	PASS
		8N	20.92	
VoNR	FR1 n5	2N	15.51	PASS
		8N	21.07	
	FR1 n7	2N	15.84	PASS
		8N	19.97	
	FR1 n25	2N	14.68	PASS
		8N	19.06	
	FR1 n38	2N	16.29	PASS
		8N	22.58	
	FR1 n41	2N	16.23	PASS
		8N	22.07	
	FR1 n48	2N	16.91	PASS

		8N	22.46	
	FR1 n66	2N	15.58	PASS
		8N	21.43	
	FR1 n71	2N	15.45	PASS
		8N	21.26	
	FR1 n77_Part27Q	2N	15.52	PASS
		8N	19.86	
	FR1 n77_Part27O	2N	15.02	PASS
		8N	20.94	
	FR1 n78	2N	15.81	PASS
		8N	21.58	
VoWiFi	2.4G	2N	16.01	PASS
		8N	21.94	
	5.2G	2N	15.98	PASS
		8N	20.41	
	5.3G	2N	15.37	PASS
		8N	19.75	
	5.5G	2N	15.85	PASS
		8N	21.53	
	5.8G	2N	15.65	PASS
		8N	20.78	
	6E	2N	15.42	PASS
		8N	21.80	

2. Description of Equipemnt Under Test

Product Feature &Specification	
Applicant Name	HMD Global Oy
Brand Name	HMD
Model Name	TA-1600/TA-1688
Sample IMEI Code	Sample 1:355876370026779/355876370026787 Sample 2:355876370062113/355876370062121
FCC ID	2AJOTTA-1600
HW Version	V2
SW Version	00WW_0_340
Tx Frequency Bands (Unit: MHz)	GSM850 : 824 ~ 849 GSM1900 : 1850~ 1910 WCDMA Band II : 1850 ~ 1910 WCDMA Band IV : 1710 ~ 1755 WCDMA Band V : 824 ~ 849 LTE Band 2 : 1850 ~ 19010 LTE Band 4 : 1710 ~ 1755 LTE Band 5 : 824 ~ 849 LTE Band 7 : 2500 ~ 2570 LTE Band 12 : 699 ~ 716 LTE Band 13 : 777 ~ 787 LTE Band 17 : 704 ~ 716 LTE Band 25 : 1850 ~ 1915 LTE Band 26 : 814 ~ 849 LTE Band 38 : 2570 ~ 2620 LTE Band 41 : 2496 ~ 2690 LTE Band 66 : 1710 ~ 1780 LTE Band 71 : 663 ~ 698 NR Band n2 : 1850 ~ 1910 NR Band n5 : 824 ~ 849 NR Band n7 : 2500 ~ 2570 NR Band n25 : 1850 ~ 1915 NR Band n38 : 2570 ~ 2620 NR Band n41 : 2496 ~ 2690 NR Band n48 : 3550 ~ 3700 NR Band n66 : 1710 ~ 1780 NR Band n71 : 663 ~ 698 NR Band n77 : 3450 ~ 3550, 3700 ~ 3980 NR Band n78 : 3450 ~ 3550 WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5700, 5745 ~ 5825 WLAN 6E: 5945 ~ 6425, 6425 ~ 6525, 6525 ~ 6875, 6875 ~ 7125 Bluetooth : 2402 ~ 2480
EUT Stage	Identical Prototype
Uplink Modulations	GSM & GPRS & EDGE : GMSK, 8PSK WCDMA:QPSK LTE:QPSK,16QAM,64QAM NR:Pi/2 BPSK (DFT-s-OFDM),QPSK(DFT-s-OFDM,CP-OFDM); 16QAM(DFT-s-OFDM,CP-OFDM) 802.11b:DSSS 802.11a/g/n/ac:OFDM 802.11ax:OFDMA Bluetooth : GFSK, π/4-DQPSK, 8-DPSK,LE

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

3. Applied Standards

- FCC CFR47 PRT20.19
- ANSI C63.19-2019
- FCC KDB 285076 D01 HAC Guidance v06r04
- FCC KDB 285076 D04 Volume Control v02
- FCC KDB 285076 D05 CG Interim Waiver DA 23-914 v01
- ANSI/TIA-5050-2018

4. Air Interface and Operational Mode:

Air Interface	Bands	Transport Type	ANSI C63.19	Simultaneous But Not Tested	Name of Voice Service	Power Reduction
GSM	850	VO	Yes	WLAN, BT	CMRS Voice(1)	No
	1900					No
	EGPRS	VD	Yes	WLAN, BT	Google Meet(1)	No
UMTS	II	VO	Yes	WLAN, BT	CMRS Voice(1)	No
	IV					No
	V					No
	HSPA	VD	Yes	WLAN, BT	Google Meet(1)	No
LTE (FDD)	2	VD	Yes	5G NR,WLAN, BT	VoLTE(1) / Google Meet(1)	No
	4					No
	5					No
	7					No
	12					No
	13					No
	17					No
	25					No
	26					No
	66					No
	71					No
LTE (TDD)	38					No
	41					No
5G NR (FDD)	n2	VD	Yes	LTE.WLAN,BT	VoNR / Google Meet(1)	No
	n5					No
	n7					No
	n25					No
	n66					No
	n71					No
5G NR (TDD)	n38					No
	n41					No
	n48					No
	n77					No
	n78					No
WLAN	2.4G	VD	Yes	GSM, WCDMA, LTE,NR	VoWiFi(1) / Google Meet(1)	No
	5.2G					No
	5.3G					No
	5.5G					No
	5.8G					No
WLAN	6E	VD	No	GSM, WCDMA, LTE,NR	VoWiFi(1) / Google Meet(1)	No
Bluetooth	2.4G	DT	No	GSM, WCDMA, LTE,NR	N/A	No

Transport Type:
VO = Legacy Cellular Voice Service
DT = Digital Transport Only (No Voice)
VD = IP Voice Service over Digital Transport

Note:

1. For protocols not listed in Table 6.1 of ANSI C63.19:2019, the average speech level of −20 dBm0 should be used.
2. Per KDB 285076 D05 ,Wavier DA 23-914 only requires conversational gain compliance for CMRS narrowband and CMRS wideband voice codecs as started below.All other codecs either part of 3GPP set such as full-band and super-wideband codecs or OTT codecs are to be documented in the test report but not required to comply with the TIA 5050 Volume Control Standard
3. The device have similar frequency in some LTE and NR bands: LTE B4/66,B12/17,B2/25,B26/5, NR n2/25 since the supported frequency spans for the smaller LTE and NR bands are completely cover by the larger LTE and NR bands, therefore, only larger LTE and NR bands were required to be tested for hearing-aid compliance.
4. The UNII-5 was evaluated for operations which are entirely below 6GHz, above 6GHz were not evaluated due outside of the current scope of ANSI C63.19 and FCC HAC regulations.
5. Because features of Google Meet allow the option of voice-only communications, Meet has been tested for HAC/T-Coil compatibility to ensure the best user experience.

5. Volume Control Requirement

<Conversational Gain>

a. Per KDB 285076 D05,with a mounting force of 8N,the DUT shall have at least one volume control setting that wil produce a conversational gain of ≥ 6 dB
b. Per KDB 285076 D05,with a mounting force of 2N,the DUT shall have at least one volume control setting that wil produce a conversational gain of ≥ 6 dB
c. Calculate the Conversational Gain by subtracting 70dB from the measures dBSPL.
[Conversational Gain=(Measured dBSPL Level-70dsSPL)dB]

<Receive Distortion And Noise Performance>

With a mounting force of 8N and 2N,the ratio of the stimulus signal power to the 100Hz to 8000Hz total A-weighted distortion and noise power shall ≥20dB when tested over the range of 1/3 octave band center frequencies:

a. Narrowband transmission mode:Each 1/3 octave band center frequency from 400Hz to 3150Hz
b. Wideband transmission mode:Each 1/3 octave band center frequency from 250Hz to 5000Hz
c. Per KDB 285076 D05,choose one narrowband and one wideband for all voice services,bands of operation and air interfaces over which it operates using one codec bit rate of the applicant's choosing to meet Receive Distortion And Noise Performance requirement.

<Receive Acoustics Frequency Response Performance>

For the volume control settings determined in ANSI/TIA-5050-2018 section 5.1.1 with a mounting force of 8N and 2N,the receive frequency response shall be measured at the DRP in 1/12 octave bands.After translation to the FF,it shall fall between the applicable upper and lower limits.The exact limit values at any 1/12 octave band center frequency falling between two consecutive points specified in the table may be calculated using the formula given in Eq 2 below

$$X_f = X_1 + (X_2 - X_1) * \left(\frac{\log_{10} f - \log_{10} f_1}{\log_{10} f_2 - \log_{10} f_1}\right) \qquad \text{Eq 2}$$

Where

X_f = limit value at frequency f

X_1 = limit value at frequency f_1 as given in table

X_2 = limit value at frequency f_2 as given in table

For Narrowband:The 1/12 octave band frequency response after translation to the FF shall fall between the upper and lower limits given the Table 1

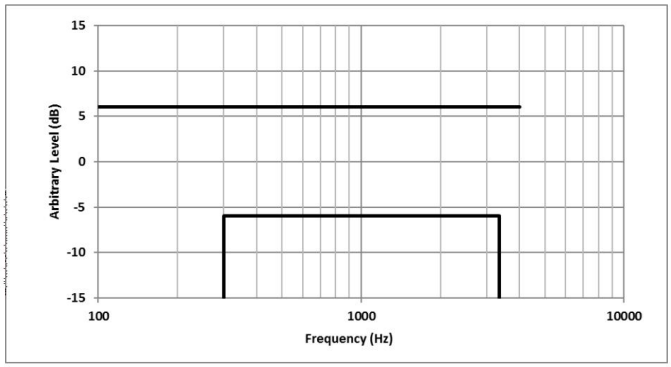
For wideband :The 1/12 octave band frequency response after translation to the FF shall fall between the upper and lower limits given the Table 2

Table 1 – Narrowband Receive Frequency Response Limits

Lower Limit Frequency (Hz)	Lower Limit (dB)	Upper Limit Frequency (Hz)	Upper Limit (dB)
300	-6	100	+6
3400	-6	4000	+6

Table 2 – Wideband Receive Frequency Response Limits

Lower Limit Frequency (Hz)	Lower Limit (dB)	Upper Limit Frequency (Hz)	Upper Limit (dB)
200	-10	100	+6
300	-6	1000	+6
5000	-6	2000	+8
6300	-12	8000	+8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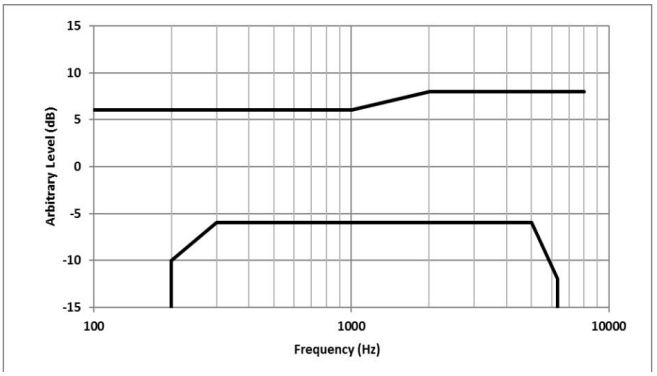
5
0
-5
-10
-15
Arbitrary Level (dB)
100
1000
10000
Frequency (Hz)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-10
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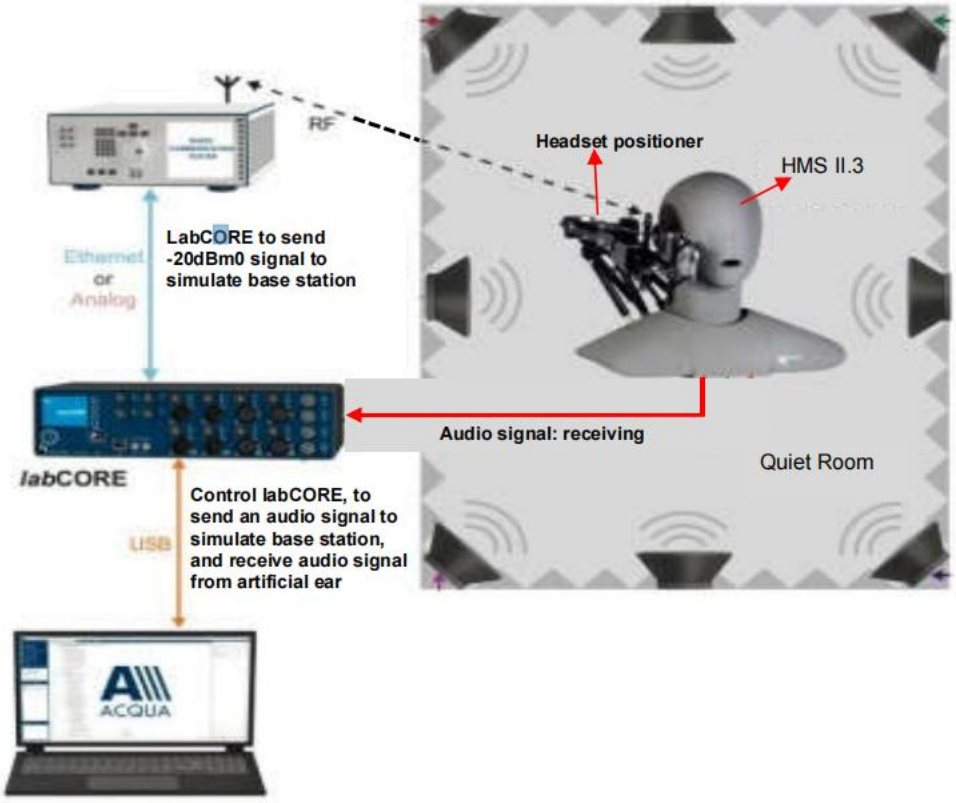
Arbitrary Level (dB)
100
1000
10000
Frequency (Hz)

6. System Description



System Components:

Name of Equipment	Equipment Description
LabCORE Audio Analyzer	labCORE is a high-precision measurement hardware platform. It provides multiple channels, a wide variety of analog and digital inputs and outputs, high processing power and high-performance interfaces. labCORE is an all-in-one solution for measuring the voice and audio quality of a wide range of devices. labCore is used in conjunction with the communication quality analysis system ACQUA. Connected to a computer via USB (Plug & Play), it is configured and controlled by ACQUA. Combinations with other HEAD acoustics hardware platforms and software applications are possible. labCORE settings are controlled via the intuitive ACQUA settings. They can be stored and assigned to selectable measurement sequences.
HMSII.3 artificial HEAD	HMS II.3 supports measurement in sending and receiving direction.For this purpose,the artificial head is equipped with an impedance simulator in the right ear and a two-way mouth loudspeaker-both meeting the requirement in the recommendations ITU-T P.57 and P.58
Handset Positioner	Control the Newton's force(2N/8N) of the mobile phone on the artificial head
ACQUA,TIA 5050 Test Software	The SW version 5.1.200 can be evaluated TIA-5050 section5.1,5.2,5.3
R&S Base Station Simulator	RF connect with the mobile phone

7. Volume Control Test Procedure

<Conversational Gain>

According to ANSI /TIA-5050, the test procedure for wireless communications device is as below.

1. Configure the DUT with a mounting force of 8N and test equipment as shown in section 4 in an active call state with the applicable codec for the transmission mode under test.
2. Set the DUT volume control to the maximum setting.
3. If the DUT has an adjustable tone control feature,a tone control setting that meets the frequency response requirements in ANSI/TIA-5050 section 5.3.1shall be used.
4. The ACQUA system is apply the real speech test signal at a level of -20dBm0 at the RETP and measure the acoustic output at the Drum Reference Point(DRP) over one complete sequence of the test signal.
5. Translate the measurement made at DRP to Free Filed(FF) using the translation data in ANSI/TIA-5050 Annex B.
6. Over the applicable frequency band,determine the ASL in dBSPL for the resulting sound pressure level in accordance with Method B of ITU-T Recommendation P.56
   - Narrowband 100Hz through 4000 Hz
   - Wideband 100Hz through 7720 Hz

   Calculate the Conversational Gain by subtracting 70dB from the measured dBSPL.
   [Conversational Gain=(Measured dBSPL Level-70dBSPL)dB]
7. Measure output distortion per ANSI/TIA-5050 clause 5.2 .If a distortion failure occurs at the maximum volume control setting.reduce the volume control setting and repeat the measurement to determine if a setting can be found for which the conversational gain requirement is met without a distorton failure.
8. Repeat steps 2-8 with a mounting force of 2N.

<Receive Distortion and Noise Performance>

1. Configure the DUT with a mounting force of 8N and test equipment as shown in section in an active call state with the applicable codec for the transmission mode under test.
2. Receive distortion and noise is measured using the PN-SDNR procedure.
3. To ensure DUT activation, apply the real speech test signal at a level of -20 dBm0 followed immediately by the initial 1/3 octave center frequency PN test signal based on the narrowband or wideband operating mode. Measure the acoustic output at the DRP over the complete sequence of the PN test signal.
4. Translate the measurement made at DRP to the FF.
5. Calculate the acoustic out unweighted test signal power of the stimulus measurement band.
6. Calculate the notched A-weighting distortion and noise components .
7. Calculate the ratio of signal power to the total A-weighted distortion and noise power ad follow:

$$\text{PN-SDNR (dB)} = 20 * Log \left[\frac{measured\ stimulus\ amplitude}{measured\ distortion\ amplitude} \right]$$

8. Repeat for each of the remaining 1/3 octave center frequencies based on the narrowband or wideband operating mode.
9. Repeat steps 2-8 with a mounting force of 2N.

10. The measured value that the system equipment will automatically calculate or converts to define whether it meets the requirements of ANSI/TIA-5050 annex A and annex B.

<Receive Acoustic Frequency Response Performance>

1. Configure the DUT with a mounting force of 8N and test equipment as shown in Figure 1 in an active call state with the applicable codec for the transmission mode under test .
2. If the DUT has an adjustable tone control feature the initial measurement is to be performed with the default tone control setting.
3. Apply the real speech test signal with a level of -20 dBm0 at the RETP.
4. Capture the frequency spectrum at the DRP of the HATS using real-time analysis with 1/12 octave bands over the frequency range from 100 Hz to 4000 Hz for narrowband measurements, or over the frequency range from 100 Hz to 8000 Hz for wideband measurements, averaged over the entire duration of the test signal.
5. Transform the DRP frequency spectrum measurement to the FF .
6. Divide the 1/12 octave measurement data by the 1/12 octave frequency spectrum of the test signal at the RETP and present the measurement in terms of dB(Pa/V).
7. Apply the applicable frequency response limits to determine compliance.
8. If the default tone control setting does not meet the requirement, repeat the above steps for other tone control settings to determine a tone control setting that meets the requirements.
9. Repeat with a mounting force of 2N.
10. The receive acoustic frequency response performance was perform at max-1 tone control setting.

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Next CAL.
R&S	Wideband Radio Communication Station	CMW500	169199	2024/06/26
R&S	Wideband Radio Communication Station	CMX500	101872	2024/07/07
HEAD acoustic GmbH	Audio Analyzer	labCORE	77000207	2024/12/14
HEAD acoustic GmbH	Artificial head	HMSII.3	1236613	2025/04/23
HEAD acoustic GmbH	Handset Positioner	HHP IV	14060074	N/A
Deli	Hygrometer	8813	YP2020008	2024/09/06

9. Device Support Codec

General Note:

1. Per KDB 285076 D04, it is expected to investigate and document only the worst-case test conditions and results. Each submitted test report shall document the codec type (i.e., NB, WB, EVS, etc.), every air interface (i.e., LTE, 5G NR, WI-FI) and band supported for the worst-case codec bit rate, band channel, bandwidth, air interface bit rate, subcarrier spacings, and resource blocks
2. Through Internal codec and air interface configuration investigation (e.g. (i.e., NB, WB, EVS codec, bandwidth, modulation data rate, subcarrier spacing, and resource blocks) that the worst investigate results of codec, air interface configuration etc. were include in section 9
3. Per KDB 285076 D05, Waiver DA 23-914 only requires conversational gain compliance for CMRS narrowband and CMRS wideband voice codecs as stated below. All other codecs either part of 3GPP set such as full-band and super-wideband codecs or OTT codecs are to be documented in the test report but not required to comply with the TIA 5050 Volume Control Standard
4. If a handset does not have a wideband codec or the handset only has an AMR wideband codec, then the test report must document this fact and the passing requirement under these circumstances for the wideband codec test is waived. The passing results for the distortion/noise and frequency response tests must be reported in the handset's test report .

GSM Codec/bitrate			
Codec	AMR NB	AMR WB	EFR NB
Birate	4.75kbps	6.60kbps	12.2kbps
	5.15kbps	8.85kbps	
	5.90kbps	12.65kbps	
	6.70kbps		
	7.40kbps		
	7.95kbps		
	10.20kbps		
	12.20kbps		

WCDMA Codec/bitrate		
Codec	AMR NB	AMR WB
Birate	4.75kbps	6.60kbps
	5.15kbps	8.85kbps
	5.90kbps	12.65kbps
	6.70kbps	14.25kbps
	7.40kbps	15.85kbps
	7.95kbps	18.25kbps
	10.20kbps	19.85kbps
	12.20kbps	23.05kbps

		23.85kbps

VOLTE/VoNR/VoWIFICodec/birate				
Codec	AMR NB	AMR WB	EVS NB	EVS WB
Birate	4.75kbps	6.60kbps	5.9kbps	9.6kbps
	5.15kbps	8.85kbps	7.2kbps	13.2kbps
	5.90kbps	12.65kbps	8kbps	16.4kbps
	6.70kbps	14.25kbps	9.6kbps	24.4kbps
	7.40kbps	15.85kbps	13.2kbps	
	7.95kbps	18.25kbps	16.4kbps	
	10.20kbps	19.85kbps	24.4kbps	
	12.20kbps	23.05kbps		
		23.85kbps		

10. Volume Control Evaluation Results

General Note:

1. All the test result was done at quiet room and ambient noise is less than 40dBA.
2. Per KDB 285076 D05, in section2 addresses the technical testing requirements for the conversational gain, distortion, and frequency response tests that amends KDB 285076 D04 Volume Control under the conditions of the limited-term waiver DA 23-914, as follows:
   a. Under the waiver, only CMRS narrowband and CMRS wideband voice codecs are required to comply with the volume control requirements of the TIA 5050-2018 Volume Control Standard as amended as follows:
      1. For the 2N mounting force test, one narrowband and one wideband voice codec embedded with the handset must pass with at least one volume control setting with a conversational gain of ≥ 6 dB for all voice services, bands of operation and air interfaces over which it operates using one codec bit rate of the applicant's choosing .
      2. For the 8N mounting force test, one narrowband and one wideband voice codec embedded with the handset must pass with at least one volume control setting with a conversational gain of ≥ 6 dB 8 for all voice services, bands of operation and air interfaces over which they operate but is not required to meet or exceed the full 18 dB of conversational gain specified in section 5.1.1 of the TIA 5050 Volume Control Standard using one codec bit rate of the applicant's choosing
   b. For all other narrowband and wideband codecs not evaluated in 2.a. above, TIA 5050-2018 Receive Distortion and Noise Performance and Receive Acoustic Frequency Response Performance evaluations are not required; however, these codecs shall be assessed for conversational gain and documented in the test report at the 2N and 8N levels with a gain of ≥ 6 dB for all voice services, bands of operation and air interfaces over which they operate. The handset volume setting used to comply with 2.a. shall be used for these other CMRS codec evaluations.
   c. Any other codec for voice services embedded in the handset, not identified in 2.a. and 2.b. above, is not required to comply or demonstrate in the test reports for conversational gain.
3. All the test results were set the DUT volume control to the maximum setting.
4. Conversational Gain = (measured dBSPL Level – 70 dBSPL) dB

5. Through Internal radio configuration investigation (e.g. bandwidth, modulation data rate, subcarrier spacing, and resource blocks) that the worst radio configuration was document as below table.
6. Per DA 23-914 item 30, for the distortion/noise and frequency response tests at the 2N and 8N force levels, manufacturers must choose codecs that are within the scope of the TIA 5050 Standard, which include narrowband and wideband codecs, but these codecs do not necessarily have to be AMR codecs. That is, we are not limiting the codecs that manufacturers can choose for testing to just AMR narrowband and AMR wideband codecs as defined in sections 4.5.1 and 4.5.2 of the TIA 5050 Standard. While manufacturers may choose to test AMR narrowband and AMR wideband codecs, they can also choose EVS narrowband and EVS wideband codecs or any other narrowband or wideband codecs that are within the scope of the TIA 5050 Standard.
7. The device have similar frequency in some LTE and NR bands: LTE B12/17,2/25,4/66,26/5 and NR n2/25 since the supported frequency spans for the smaller LTE and NR bands are completely cover by the larger LTE and NR bands, therefore, only larger LTE and NR bands were required to be tested for hearing-aid compliance.

The 2N mounting force lowest conversational gain is 14.47dBwith a hearing aid.
The 8N mounting force lowest conversational gain is 19.06 dB without a hearing aid.

<Evaluation results for KDB 285076 D05 2.a>

<LTE>

HAC(Volume control)Test Record						Conversational Gain				Receive Distortion And Noise Performance			Acoustic Frequency Response Performance
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force (N)	Measured-dBSPL Level	Conv. Gain(dB)	Limit(dB)	Margin to limit(dB)	Minimum PN-SDNR(dB)	Limit(dB)	Margin to Limit(dB)	Free Field(FF)
1	LTE Band 7	20_QPSK_100_0	21100	EVS NB 24.4kbps	2N	87.08	17.08	≥6	11.08	26.36	≥20	6.36	Pass
2	LTE Band 7	20_QPSK_100_0	21100	EVS NB 24.4kbps	8N	93.45	23.45	≥6	17.45	24.62	≥20	4.62	Pass
3	LTE Band 7	20_QPSK_100_0	21100	EVS WB 24.4kbps	2N	85.08	15.08	≥6	9.08	23.50	≥20	3.50	Pass
4	LTE Band 7	20_QPSK_100_0	21100	EVS WB 24.4kbps	8N	91.47	21.47	≥6	15.47	21.25	≥20	1.25	Pass
5	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	2N	87.38	17.38	≥6	11.38	26.26	≥20	6.26	Pass
6	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	8N	93.72	23.72	≥6	17.72	23.64	≥20	3.64	Pass
7	LTE Band 12	10_QPSK_50_0	23095	EVS WB 24.4kbps	2N	85.38	15.38	≥6	9.38	22.55	≥20	2.55	Pass
8	LTE Band 12	10_QPSK_50_0	23095	EVS WB 24.4kbps	8N	91.39	21.39	≥6	15.39	21.11	≥20	1.11	Pass
9	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	2N	87.40	17.40	≥6	11.40	26.30	≥20	6.30	Pass
10	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	8N	93.57	23.57	≥6	17.57	23.97	≥20	3.97	Pass
11	LTE Band 13	10_QPSK_50_0	23230	EVS WB 24.4kbps	2N	85.48	15.48	≥6	9.48	23.17	≥20	3.17	Pass
12	LTE Band 13	10_QPSK_50_0	23230	EVS WB 24.4kbps	8N	91.53	21.53	≥6	15.53	20.98	≥20	0.98	Pass
13	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	2N	87.15	17.15	≥6	11.15	26.54	≥20	6.54	Pass
14	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	8N	93.21	23.21	≥6	17.21	26.27	≥20	6.27	Pass
15	LTE Band 25	20_QPSK_100_0	26340	EVS WB 24.4kbps	2N	85.17	15.17	≥6	9.17	22.93	≥20	2.93	Pass
16	LTE Band 25	20_QPSK_100_0	26340	EVS WB 24.4kbps	8N	91.59	21.59	≥6	15.59	21.10	≥20	1.10	Pass
17	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	2N	87.50	17.50	≥6	11.50	26.14	≥20	6.14	Pass
18	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	8N	92.88	22.88	≥6	16.88	26.75	≥20	6.75	Pass
19	LTE Band 26	15_QPSK_75_0	26865	EVS WB 24.4kbps	2N	85.67	15.67	≥6	9.67	22.50	≥20	2.50	Pass
20	LTE Band 26	15_QPSK_75_0	26865	EVS WB 24.4kbps	8N	90.94	20.94	≥6	14.94	22.28	≥20	2.28	Pass
21	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	2N	87.32	17.32	≥6	11.32	26.22	≥20	6.22	Pass
22	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	8N	93.28	23.28	≥6	17.28	26.61	≥20	6.61	Pass
23	LTE Band 38	20_QPSK_100_0	38000	EVS WB 24.4kbps	2N	85.22	15.22	≥6	9.22	23.16	≥20	3.16	Pass
24	LTE Band 38	20_QPSK_100_0	38000	EVS WB 24.4kbps	8N	91.43	21.43	≥6	15.43	23.06	≥20	3.06	Pass
25	LTE Band 41_PC2	20_QPSK_100_0	40620	EVS NB 24.4kbps	2N	87.05	17.05	≥6	11.05	26.84	≥20	6.84	Pass
26	LTE Band 41_PC2	20_QPSK_100_0	40620	EVS NB 24.4kbps	8N	93.62	23.62	≥6	17.62	23.05	≥20	3.05	Pass
27	LTE Band 41_PC2	20_QPSK_100_0	40620	EVS WB 24.4kbps	2N	85.02	15.02	≥6	9.02	23.92	≥20	3.92	Pass
28	LTE Band 41_PC2	20_QPSK_100_0	40620	EVS WB 24.4kbps	8N	91.17	21.17	≥6	15.17	22.73	≥20	2.73	Pass
29	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	2N	87.77	17.77	≥6	11.77	26.61	≥20	6.61	Pass
30	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	8N	92.46	22.46	≥6	16.46	25.42	≥20	5.42	Pass
31	LTE Band 66	20_QPSK_100_0	132322	EVS WB 24.4kbps	2N	85.82	15.82	≥6	9.82	23.54	≥20	3.54	Pass
32	LTE Band 66	20_QPSK_100_0	132322	EVS WB 24.4kbps	8N	90.82	20.82	≥6	14.82	23.11	≥20	3.11	Pass
33	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	2N	86.78	16.78	≥6	10.78	25.98	≥20	5.98	Pass
34	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	8N	93.40	23.40	≥6	17.40	26.72	≥20	6.72	Pass
35	LTE Band 71	20_QPSK_100_0	133322	EVS WB 24.4kbps	2N	85.25	15.25	≥6	9.25	23.02	≥20	3.02	Pass
36	LTE Band 71	20_QPSK_100_0	133322	EVS WB 24.4kbps	8N	91.30	21.30	≥6	15.30	22.24	≥20	2.24	Pass

<VoNR>

HAC(Volume control)Test Record						Conversational Gain				Receive Distortion And Noise Performance			Acoustic Frequency Response Performance
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain (dB)	Limit(dB)	Margin to limit(dB)	Minimum PN-SDNR (dB)	Limit (dB)	Margin to Limit(dB)	Free Field
37	FR1 n5	20_DFT-s-OFDM QPSK	167300	EVS NB 24.4kbps	2N	85.56	15.56	≥6	9.56	22.64	≥20	2.64	PASS
38	FR1 n5	20_DFT-s-OFDM QPSK	167300	EVS NB 24.4kbps	8N	91.97	21.97	≥6	15.97	21.13	≥20	1.13	PASS
39	FR1 n5	20_DFT-s-OFDM QPSK	167300	EVS WB 24.4kbps	2N	85.51	15.51	≥6	9.51	22.46	≥20	2.46	PASS
40	FR1 n5	20_DFT-s-OFDM QPSK	167300	EVS WB 24.4kbps	8N	92.14	22.14	≥6	16.14	21.96	≥20	1.96	PASS
41	FR1 n7	20_DFT-s-OFDM QPSK	507000	EVS NB 24.4kbps	2N	87.59	17.59	≥6	11.59	26.45	≥20	6.45	PASS
42	FR1 n7	20_DFT-s-OFDM QPSK	507000	EVS NB 24.4kbps	8N	93.64	23.64	≥6	17.64	24.66	≥20	4.66	PASS
43	FR1 n7	20_DFT-s-OFDM QPSK	507000	EVS WB 24.4kbps	2N	85.90	15.90	≥6	9.90	23.31	≥20	3.31	PASS
44	FR1 n7	20_DFT-s-OFDM QPSK	507000	EVS WB 24.4kbps	8N	91.46	21.46	≥6	15.46	20.72	≥20	0.72	PASS
45	FR1 n25	20_DFT-s-OFDM QPSK	376500	EVS NB 24.4kbps	2N	87.53	17.53	≥6	11.53	26.63	≥20	6.63	PASS
46	FR1 n25	20_DFT-s-OFDM QPSK	376500	EVS NB 24.4kbps	8N	93.69	23.69	≥6	17.69	25.38	≥20	5.38	PASS
47	FR1 n25	20_DFT-s-OFDM QPSK	376500	EVS WB 24.4kbps	2N	85.51	15.51	≥6	9.51	23.23	≥20	3.23	PASS
48	FR1 n25	20_DFT-s-OFDM QPSK	376500	EVS WB 24.4kbps	8N	91.52	21.52	≥6	15.52	22.26	≥20	2.26	PASS
49	FR1 n38	40_DFT-s-OFDM QPSK	519000	EVS NB 24.4kbps	2N	87.66	17.66	≥6	11.66	25.71	≥20	5.71	PASS
50	FR1 n38	40_DFT-s-OFDM QPSK	519000	EVS NB 24.4kbps	8N	94.00	24.00	≥6	18.00	23.42	≥20	3.42	PASS
51	FR1 n38	40_DFT-s-OFDM QPSK	519000	EVS WB 24.4kbps	2N	86.29	16.29	≥6	10.29	22.74	≥20	2.74	PASS
52	FR1 n38	40_DFT-s-OFDM QPSK	519000	EVS WB 24.4kbps	8N	92.64	22.64	≥6	16.64	22.69	≥20	2.69	PASS
53	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	EVS NB 24.4kbps	2N	88.40	18.40	≥6	12.40	22.79	≥20	2.79	PASS
54	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	EVS NB 24.4kbps	8N	94.03	24.03	≥6	18.03	21.72	≥20	1.72	PASS
55	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	EVS WB 24.4kbps	2N	87.76	17.76	≥6	11.76	22.01	≥20	2.01	PASS
56	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	EVS WB 24.4kbps	8N	93.52	23.52	≥6	17.52	22.01	≥20	2.01	PASS
57	FR1 n48	40_DFT-s-OFDM QPSK	641666	EVS NB 24.4kbps	2N	88.62	18.62	≥6	12.62	26.62	≥20	6.62	PASS
58	FR1 n48	40_DFT-s-OFDM QPSK	641666	EVS NB 24.4kbps	8N	94.37	24.37	≥6	18.37	22.76	≥20	2.76	PASS
59	FR1 n48	40_DFT-s-OFDM QPSK	641666	EVS WB 24.4kbps	2N	86.91	16.91	≥6	10.91	23.35	≥20	3.35	PASS
60	FR1 n48	40_DFT-s-OFDM QPSK	641666	EVS WB 24.4kbps	8N	92.50	22.50	≥6	16.50	23.53	≥20	3.53	PASS
61	FR1 n66	20_DFT-s-OFDM QPSK	349000	EVS NB 24.4kbps	2N	87.55	17.55	≥6	11.55	26.44	≥20	6.44	PASS
62	FR1 n66	20_DFT-s-OFDM QPSK	349000	EVS NB 24.4kbps	8N	93.56	23.56	≥6	17.56	26.38	≥20	6.38	PASS
63	FR1 n66	20_DFT-s-OFDM QPSK	349000	EVS WB 24.4kbps	2N	85.73	15.73	≥6	9.73	23.31	≥20	3.31	PASS
64	FR1 n66	20_DFT-s-OFDM QPSK	349000	EVS WB 24.4kbps	8N	91.76	21.76	≥6	15.76	21.70	≥20	1.70	PASS
65	FR1 n71	20_DFT-s-OFDM QPSK	136100	EVS NB 24.4kbps	2N	87.54	17.54	≥6	11.54	26.81	≥20	6.81	PASS
66	FR1 n71	20_DFT-s-OFDM QPSK	136100	EVS NB 24.4kbps	8N	93.67	23.67	≥6	17.67	26.26	≥20	6.26	PASS
67	FR1 n71	20_DFT-s-OFDM QPSK	136100	EVS WB 24.4kbps	2N	85.69	15.69	≥6	9.69	22.80	≥20	2.80	PASS
68	FR1 n71	20_DFT-s-OFDM QPSK	136100	EVS WB 24.4kbps	8N	91.80	21.80	≥6	15.80	21.92	≥20	1.92	PASS
69	FR1 n77_Part27Q	100_DFT-s-OFDM QPSK	633334	EVS NB 24.4kbps	2N	88.36	18.36	≥6	12.36	26.65	≥20	6.65	PASS
70	FR1 n77_Part27Q	100_DFT-s-OFDM QPSK	633334	EVS NB 24.4kbps	8N	92.73	22.73	≥6	16.73	25.48	≥20	5.48	PASS
71	FR1 n77_Part27Q	100_DFT-s-OFDM QPSK	633334	EVS WB 24.4kbps	2N	85.89	15.89	≥6	9.89	22.71	≥20	2.71	PASS
72	FR1 n77_Part27Q	100_DFT-s-OFDM QPSK	633334	EVS WB 24.4kbps	8N	90.84	20.84	≥6	14.84	22.82	≥20	2.82	PASS
73	FR1 n77_Part27O	100_DFT-s-OFDM QPSK	656000	EVS NB 24.4kbps	2N	86.93	16.93	≥6	10.93	22.11	≥20	2.11	PASS
74	FR1 n77_Part27O	100_DFT-s-OFDM QPSK	656000	EVS NB 24.4kbps	8N	93.26	23.26	≥6	17.26	25.45	≥20	5.45	PASS
75	FR1 n77_Part27O	100_DFT-s-OFDM QPSK	656000	EVS WB 24.4kbps	2N	85.17	15.17	≥6	9.17	23.40	≥20	3.40	PASS

76	FR1 n77_Part27O	100_DFT-s-OFDM QPSK	656000	EVS WB 24.4kbps	8N	91.27	21.27	≥6	15.27	21.29	≥20	1.29	PASS
77	FR1 n78	100_DFT-s-OFDM QPSK	633334	EVS NB 24.4kbps	2N	88.04	18.04	≥6	12.04	26.90	≥20	6.90	PASS
78	FR1 n78	100_DFT-s-OFDM QPSK	633334	EVS NB 24.4kbps	8N	93.73	23.73	≥6	17.73	26.20	≥20	6.20	PASS
79	FR1 n78	100_DFT-s-OFDM QPSK	633334	EVS WB 24.4kbps	2N	86.14	16.14	≥6	10.14	22.93	≥20	2.93	PASS
80	FR1 n78	100_DFT-s-OFDM QPSK	633334	EVS WB 24.4kbps	8N	91.68	21.68	≥6	15.68	22.73	≥20	2.73	PASS

<WLAN>

HAC(Volume control)Test Record						Conversational Gain				Receive Distortion And Noise Performance			Acoustic Frequency Response Performance
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)	Minimum PN-SDNR(dB)	Limit(dB)	Margin to Limit(dB)	Free Field(FF)
81	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	2N	88.24	18.24	≥6	12.24	26.92	≥20	6.92	Pass
82	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	8N	94.08	24.08	≥6	18.08	23.84	≥20	3.84	Pass
83	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 24.4kbps	2N	86.27	16.27	≥6	10.27	22.28	≥20	2.28	Pass
84	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 24.4kbps	8N	92.03	22.03	≥6	16.03	20.94	≥20	0.94	Pass
85	WIFI 5.2GHz	802.11a 6M	40	EVS NB 24.4kbps	2N	87.89	17.89	≥6	11.89	24.57	≥20	4.57	Pass
86	WIFI 5.2GHz	802.11a 6M	40	EVS NB 24.4kbps	8N	92.60	22.60	≥6	16.60	22.48	≥20	2.48	Pass
87	WIFI 5.2GHz	802.11a 6M	40	EVS WB 24.4kbps	2N	86.05	16.05	≥6	10.05	22.84	≥20	2.84	Pass
88	WIFI 5.2GHz	802.11a 6M	40	EVS WB 24.4kbps	8N	90.41	20.41	≥6	14.41	20.13	≥20	0.13	Pass
89	WIFI 5.3GHz	802.11a 6M	60	EVS NB 24.4kbps	2N	87.99	17.99	≥6	11.99	21.80	≥20	1.80	Pass
90	WIFI 5.3GHz	802.11a 6M	60	EVS NB 24.4kbps	8N	91.74	21.74	≥6	15.74	22.59	≥20	2.59	Pass
91	WIFI 5.3GHz	802.11a 6M	60	EVS WB 24.4kbps	2N	86.30	16.30	≥6	10.30	21.11	≥20	1.11	Pass
92	WIFI 5.3GHz	802.11a 6M	60	EVS WB 24.4kbps	8N	89.75	19.75	≥6	13.75	20.98	≥20	0.98	Pass
93	WIFI 5.5GHz	802.11a 6M	132	EVS NB 24.4kbps	2N	87.78	17.78	≥6	11.78	23.12	≥20	3.12	Pass
94	WIFI 5.5GHz	802.11a 6M	132	EVS NB 24.4kbps	8N	93.69	23.69	≥6	17.69	22.12	≥20	2.12	Pass
95	WIFI 5.5GHz	802.11a 6M	132	EVS WB 24.4kbps	2N	85.90	15.90	≥6	9.90	21.85	≥20	1.85	Pass
96	WIFI 5.5GHz	802.11a 6M	132	EVS WB 24.4kbps	8N	91.74	21.74	≥6	15.74	21.46	≥20	1.46	Pass
97	WIFI 5.8GHz	802.11a 6M	157	EVS NB 24.4kbps	2N	87.80	17.80	≥6	11.80	22.18	≥20	2.18	Pass
98	WIFI 5.8GHz	802.11a 6M	157	EVS NB 24.4kbps	8N	93.14	23.14	≥6	17.14	23.33	≥20	3.33	Pass
99	WIFI 5.8GHz	802.11a 6M	157	EVS WB 24.4kbps	2N	85.65	15.65	≥6	9.65	20.34	≥20	0.34	Pass
100	WIFI 5.8GHz	802.11a 6M	157	EVS WB 24.4kbps	8N	91.07	21.07	≥6	15.07	20.23	≥20	0.23	Pass
101	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	2N	87.42	17.42	≥6	11.42	22.84	≥20	2.84	Pass
102	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	8N	93.68	23.68	≥6	17.68	22.72	≥20	2.72	Pass
103	WIFI 6GHz	802.11ax-HE20	5	EVS WB 24.4kbps	2N	85.57	15.57	≥6	9.57	20.66	≥20	0.66	Pass
104	WIFI 6GHz	802.11ax-HE20	5	EVS WB 24.4kbps	8N	91.80	21.80	≥6	15.80	20.71	≥20	0.71	Pass

<Codec Investigation and Evaluation results for KDB 285076 D05 2.b>

<GSM>

HAC(Volume control)Test Record							Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Sample	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain (dB)	Limit(dB)	Margin to limit(dB)
1	GSM 850	Voice	189	1	EFR NB 12.2kbps	2N	87.10	17.10	≥6	11.10
2	GSM 850	Voice	189	1	EFR NB 12.2kbps	8N	92.40	22.40	≥6	16.40
3	GSM 850	Voice	189	1	AMR NB 4.75kbps	2N	86.83	16.83	≥6	10.83
4	GSM 850	Voice	189	1	AMR NB 4.75kbps	8N	92.01	22.01	≥6	16.01
5	GSM 850	Voice	189	1	AMR NB 12.2kbps	2N	87.60	17.60	≥6	11.60
6	GSM 850	Voice	189	1	AMR NB 12.2kbps	8N	91.97	21.97	≥6	15.97
7	GSM 850	Voice	189	1	AMR WB 6.6kbps	2N	85.06	15.06	≥6	9.06
8	GSM 850	Voice	189	1	AMR WB 6.6kbps	8N	91.63	21.63	≥6	15.63
9	GSM 850	Voice	189	1	AMR WB 23.85kbps	2N	85.12	15.12	≥6	9.12
10	GSM 850	Voice	189	1	AMR WB 23.85kbps	8N	91.50	21.50	≥6	15.50
11	GSM 1900	Voice	661	1	EFR NB 12.2kbps	2N	86.91	16.91	≥6	10.91
12	GSM 1900	Voice	661	1	EFR NB 12.2kbps	8N	92.26	22.26	≥6	16.26
13	GSM 1900	Voice	661	1	AMR NB 4.75kbps	2N	86.82	16.82	≥6	10.82
14	GSM 1900	Voice	661	1	AMR NB 4.75kbps	8N	92.92	22.92	≥6	16.92
15	GSM 1900	Voice	661	1	AMR NB 12.2kbps	2N	86.88	16.88	≥6	10.88
16	GSM 1900	Voice	661	1	AMR NB 12.2kbps	8N	92.03	22.03	≥6	16.03
17	GSM 1900	Voice	661	1	AMR WB 6.6kbps	2N	85.03	15.03	≥6	9.03
18	GSM 1900	Voice	661	1	AMR WB 6.6kbps	8N	91.04	21.04	≥6	15.04
19	GSM 1900	Voice	661	1	AMR WB 23.85kbps	2N	85.18	15.18	≥6	9.18
20	GSM 1900	Voice	661	1	AMR WB 23.85kbps	8N	90.88	20.88	≥6	14.88
	GSM 1900	Voice	661	2	AMR WB 6.6 kbps	2N	86.53	16.53	≥6	10.53
	GSM 1900	Voice	661	2	AMR WB 23.85kbps	8N	91.73	21.73	≥6	15.73

<UMTS>

HAC(Volume control)Test Record							Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Sample	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
21	WCDMA II	Voice	9400	1	AMR NB 4.75kbps	2N	86.29	16.29	≥6	10.29
22	WCDMA II	Voice	9400	1	AMR NB 4.75kbps	8N	93.03	23.03	≥6	17.03
23	WCDMA II	Voice	9400	1	AMR NB 12.2kbps	2N	87.07	17.07	≥6	11.07
24	WCDMA II	Voice	9400	1	AMR NB 12.2kbps	8N	93.95	23.95	≥6	17.95
25	WCDMA II	Voice	9400	1	AMR WB 6.6kbps	2N	84.47	14.47	≥6	8.47
26	WCDMA II	Voice	9400	1	AMR WB 6.6kbps	8N	91.35	21.35	≥6	15.35
27	WCDMA II	Voice	9400	1	AMR WB 23.85kbps	2N	85.21	15.21	≥6	9.21
28	WCDMA II	Voice	9400	1	AMR WB 23.85kbps	8N	91.71	21.71	≥6	15.71
29	WCDMA IV	Voice	1413	1	AMR NB 4.75kbps	2N	86.71	16.71	≥6	10.71
30	WCDMA IV	Voice	1413	1	AMR NB 4.75kbps	8N	92.93	22.93	≥6	16.93
31	WCDMA IV	Voice	1413	1	AMR NB 12.2kbps	2N	87.64	17.64	≥6	11.64

32	WCDMA IV	Voice	1413	1	AMR NB 12.2kbps	8N	93.71	23.71	≥6	17.71
33	WCDMA IV	Voice	1413	1	AMR WB 6.6kbps	2N	85.07	15.07	≥6	9.07
34	WCDMA IV	Voice	1413	1	AMR WB 6.6kbps	8N	91.37	21.37	≥6	15.37
35	WCDMA IV	Voice	1413	1	AMR WB 23.85kbps	2N	85.51	15.51	≥6	9.51
36	WCDMA IV	Voice	1413	1	AMR WB 23.85kbps	8N	91.67	21.67	≥6	15.67
37	WCDMA V	Voice	4182	1	AMR NB 4.75kbps	2N	86.67	16.67	≥6	10.67
38	WCDMA V	Voice	4182	1	AMR NB 4.75kbps	8N	92.48	22.48	≥6	16.48
39	WCDMA V	Voice	4182	1	AMR NB 12.2kbps	2N	87.39	17.39	≥6	11.39
40	WCDMA V	Voice	4182	1	AMR NB 12.2kbps	8N	93.19	23.19	≥6	17.19
41	WCDMA V	Voice	4182	1	AMR WB 6.6kbps	2N	85.15	15.15	≥6	9.15
42	WCDMA V	Voice	4182	1	AMR WB 6.6kbps	8N	91.21	21.21	≥6	15.21
43	WCDMA V	Voice	4182	1	AMR WB 23.85kbps	2N	85.26	15.26	≥6	9.26
44	WCDMA V	Voice	4182	1	AMR WB 23.85kbps	8N	91.67	21.67	≥6	15.67
	WCDMA II	Voice	9400	2	AMR WB 6.6kbps	2N	86.85	16.85	≥6	10.85
	WCDMA V	Voice	4182	2	AMR WB 6.6kbps	8N	91.82	21.82	≥6	15.82

<LTE>

HAC(Volume control)Test Record							Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Sample	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
45	LTE Band 7	20_QPSK_100_0	21100	1	AMR NB 4.75kbps	2N	86.47	16.47	≥6	10.47
46	LTE Band 7	20_QPSK_100_0	21100	1	AMR NB 4.75kbps	8N	91.55	21.55	≥6	15.55
47	LTE Band 7	20_QPSK_100_0	21100	1	AMR NB 12.2kbps	2N	86.27	16.27	≥6	10.27
48	LTE Band 7	20_QPSK_100_0	21100	1	AMR NB 12.2kbps	8N	91.53	21.53	≥6	15.53
49	LTE Band 7	20_QPSK_100_0	21100	1	AMR WB 6.6kbps	2N	84.79	14.79	≥6	8.79
50	LTE Band 7	20_QPSK_100_0	21100	1	AMR WB 6.6kbps	8N	90.94	20.94	≥6	14.94
51	LTE Band 7	20_QPSK_100_0	21100	1	AMR WB 23.85kbps	2N	84.85	14.85	≥6	8.85
52	LTE Band 7	20_QPSK_100_0	21100	1	AMR WB 23.85kbps	8N	90.95	20.95	≥6	14.95
53	LTE Band 7	20_QPSK_100_0	21100	1	EVS NB 5.9 kbps	2N	86.34	16.34	≥6	10.34
54	LTE Band 7	20_QPSK_100_0	21100	1	EVS NB 5.9 kbps	8N	91.51	21.51	≥6	15.51
55	LTE Band 7	20_QPSK_100_0	21100	1	EVS NB 24.4kbps	2N	87.08	17.08	≥6	11.08
56	LTE Band 7	20_QPSK_100_0	21100	1	EVS NB 24.4kbps	8N	93.45	23.45	≥6	17.45
57	LTE Band 7	20_QPSK_100_0	21100	1	EVS WB 9.6 kbps	2N	84.86	14.86	≥6	8.86
58	LTE Band 7	20_QPSK_100_0	21100	1	EVS WB 9.6 kbps	8N	91.05	21.05	≥6	15.05
59	LTE Band 7	20_QPSK_100_0	21100	1	EVS WB 24.4 kbps	2N	85.08	15.08	≥6	9.08
60	LTE Band 7	20_QPSK_100_0	21100	1	EVS WB 24.4 kbps	8N	91.47	21.47	≥6	15.47
61	LTE Band 12	10_QPSK_50_0	23095	1	AMR NB 4.75kbps	2N	86.61	16.61	≥6	10.61
62	LTE Band 12	10_QPSK_50_0	23095	1	AMR NB 4.75kbps	8N	91.37	21.37	≥6	15.37
63	LTE Band 12	10_QPSK_50_0	23095	1	AMR NB 12.2kbps	2N	86.48	16.48	≥6	10.48
64	LTE Band 12	10_QPSK_50_0	23095	1	AMR NB 12.2kbps	8N	91.46	21.46	≥6	15.46
65	LTE Band 12	10_QPSK_50_0	23095	1	AMR WB 6.6kbps	2N	85.02	15.02	≥6	9.02
66	LTE Band 12	10_QPSK_50_0	23095	1	AMR WB 6.6kbps	8N	89.61	19.61	≥6	13.61
67	LTE Band 12	10_QPSK_50_0	23095	1	AMR WB 23.85kbps	2N	85.01	15.01	≥6	9.01
68	LTE Band 12	10_QPSK_50_0	23095	1	AMR WB 23.85kbps	8N	89.59	19.59	≥6	13.59

69	LTE Band 12	10_QPSK_50_0	23095	1	EVS NB 5.9 kbps	2N	86.52	16.52	≥6	10.52
70	LTE Band 12	10_QPSK_50_0	23095	1	EVS NB 5.9 kbps	8N	91.45	21.45	≥6	15.45
71	LTE Band 12	10_QPSK_50_0	23095	1	EVS NB 24.4kbps	2N	87.38	17.38	≥6	11.38
72	LTE Band 12	10_QPSK_50_0	23095	1	EVS NB 24.4kbps	8N	93.72	23.72	≥6	17.72
73	LTE Band 12	10_QPSK_50_0	23095	1	EVS WB 9.6 kbps	2N	85.04	15.04	≥6	9.04
74	LTE Band 12	10_QPSK_50_0	23095	1	EVS WB 9.6 kbps	8N	89.57	19.57	≥6	13.57
75	LTE Band 12	10_QPSK_50_0	23095	1	EVS WB 24.4 kbps	2N	85.38	15.38	≥6	9.38
76	LTE Band 12	10_QPSK_50_0	23095	1	EVS WB 24.4 kbps	8N	91.39	21.39	≥6	15.39
77	LTE Band 13	10_QPSK_50_0	23230	1	AMR NB 4.75kbps	2N	86.26	16.26	≥6	10.26
78	LTE Band 13	10_QPSK_50_0	23230	1	AMR NB 4.75kbps	8N	92.51	22.51	≥6	16.51
79	LTE Band 13	10_QPSK_50_0	23230	1	AMR NB 12.2kbps	2N	86.14	16.14	≥6	10.14
80	LTE Band 13	10_QPSK_50_0	23230	1	AMR NB 12.2kbps	8N	92.52	22.52	≥6	16.52
81	LTE Band 13	10_QPSK_50_0	23230	1	AMR WB 6.6kbps	2N	84.80	14.80	≥6	8.80
82	LTE Band 13	10_QPSK_50_0	23230	1	AMR WB 6.6kbps	8N	89.75	19.75	≥6	13.75
83	LTE Band 13	10_QPSK_50_0	23230	1	AMR WB 23.85kbps	2N	84.91	14.91	≥6	8.91
84	LTE Band 13	10_QPSK_50_0	23230	1	AMR WB 23.85kbps	8N	89.65	19.65	≥6	13.65
85	LTE Band 13	10_QPSK_50_0	23230	1	EVS NB 5.9 kbps	2N	86.17	16.17	≥6	10.17
86	LTE Band 13	10_QPSK_50_0	23230	1	EVS NB 5.9 kbps	8N	92.53	22.53	≥6	16.53
87	LTE Band 13	10_QPSK_50_0	23230	1	EVS NB 24.4kbps	2N	87.40	17.40	≥6	11.40
88	LTE Band 13	10_QPSK_50_0	23230	1	EVS NB 24.4kbps	8N	93.57	23.57	≥6	17.57
89	LTE Band 13	10_QPSK_50_0	23230	1	EVS WB 9.6 kbps	2N	84.93	14.93	≥6	8.93
90	LTE Band 13	10_QPSK_50_0	23230	1	EVS WB 9.6 kbps	8N	89.64	19.64	≥6	13.64
91	LTE Band 13	10_QPSK_50_0	23230	1	EVS WB 24.4 kbps	2N	85.48	15.48	≥6	9.48
92	LTE Band 13	10_QPSK_50_0	23230	1	EVS WB 24.4 kbps	8N	91.53	21.53	≥6	15.53
93	LTE Band 25	20_QPSK_100_0	26340	1	AMR NB 4.75kbps	2N	86.33	16.33	≥6	10.33
94	LTE Band 25	20_QPSK_100_0	26340	1	AMR NB 4.75kbps	8N	92.49	22.49	≥6	16.49
95	LTE Band 25	20_QPSK_100_0	26340	1	AMR NB 12.2kbps	2N	86.31	16.31	≥6	10.31
96	LTE Band 25	20_QPSK_100_0	26340	1	AMR NB 12.2kbps	8N	92.41	22.41	≥6	16.41
97	LTE Band 25	20_QPSK_100_0	26340	1	AMR WB 6.6kbps	2N	84.91	14.91	≥6	8.91
98	LTE Band 25	20_QPSK_100_0	26340	1	AMR WB 6.6kbps	8N	91.42	21.42	≥6	15.42
99	LTE Band 25	20_QPSK_100_0	26340	1	AMR WB 23.85kbps	2N	84.97	14.97	≥6	8.97
100	LTE Band 25	20_QPSK_100_0	26340	1	AMR WB 23.85kbps	8N	91.56	21.56	≥6	15.56
101	LTE Band 25	20_QPSK_100_0	26340	1	EVS NB 5.9 kbps	2N	86.41	16.41	≥6	10.41
102	LTE Band 25	20_QPSK_100_0	26340	1	EVS NB 5.9 kbps	8N	92.49	22.49	≥6	16.49
103	LTE Band 25	20_QPSK_100_0	26340	1	EVS NB 24.4kbps	2N	87.15	17.15	≥6	11.15
104	LTE Band 25	20_QPSK_100_0	26340	1	EVS NB 24.4kbps	8N	93.21	23.21	≥6	17.21
105	LTE Band 25	20_QPSK_100_0	26340	1	EVS WB 9.6 kbps	2N	84.98	14.98	≥6	8.98
106	LTE Band 25	20_QPSK_100_0	26340	1	EVS WB 9.6 kbps	8N	91.54	21.54	≥6	15.54
107	LTE Band 25	20_QPSK_100_0	26340	1	EVS WB 24.4 kbps	2N	85.17	15.17	≥6	9.17
108	LTE Band 25	20_QPSK_100_0	26340	1	EVS WB 24.4 kbps	8N	91.59	21.59	≥6	15.59
109	LTE Band 26	15_QPSK_75_0	26865	1	AMR NB 4.75kbps	2N	86.90	16.90	≥6	10.90
110	LTE Band 26	15_QPSK_75_0	26865	1	AMR NB 4.75kbps	8N	92.14	22.14	≥6	16.14
111	LTE Band 26	15_QPSK_75_0	26865	1	AMR NB 12.2kbps	2N	86.82	16.82	≥6	10.82
112	LTE Band 26	15_QPSK_75_0	26865	1	AMR NB 12.2kbps	8N	92.12	22.12	≥6	16.12
113	LTE Band 26	15_QPSK_75_0	26865	1	AMR WB 6.6kbps	2N	85.65	15.65	≥6	9.65
114	LTE Band 26	15_QPSK_75_0	26865	1	AMR WB 6.6kbps	8N	91.55	21.55	≥6	15.55

115	LTE Band 26	15_QPSK_75_0	26865	1	AMR WB 23.85kbps	2N	85.49	15.49	≥6	9.49
116	LTE Band 26	15_QPSK_75_0	26865	1	AMR WB 23.85kbps	8N	91.39	21.39	≥6	15.39
117	LTE Band 26	15_QPSK_75_0	26865	1	EVS NB 5.9 kbps	2N	86.78	16.78	≥6	10.78
118	LTE Band 26	15_QPSK_75_0	26865	1	EVS NB 5.9 kbps	8N	92.17	22.17	≥6	16.17
119	LTE Band 26	15_QPSK_75_0	26865	1	EVS NB 24.4kbps	2N	87.50	17.50	≥6	11.50
120	LTE Band 26	15_QPSK_75_0	26865	1	EVS NB 24.4kbps	8N	92.88	22.88	≥6	16.88
121	LTE Band 26	15_QPSK_75_0	26865	1	EVS WB 9.6 kbps	2N	85.50	15.50	≥6	9.50
122	LTE Band 26	15_QPSK_75_0	26865	1	EVS WB 9.6 kbps	8N	91.38	21.38	≥6	15.38
123	LTE Band 26	15_QPSK_75_0	26865	1	EVS WB 24.4 kbps	2N	85.67	15.67	≥6	9.67
124	LTE Band 26	15_QPSK_75_0	26865	1	EVS WB 24.4 kbps	8N	90.94	20.94	≥6	14.94
125	LTE Band 38	20_QPSK_100_0	38000	1	AMR NB 4.75kbps	2N	86.84	16.84	≥6	10.84
126	LTE Band 38	20_QPSK_100_0	38000	1	AMR NB 4.75kbps	8N	91.28	21.28	≥6	15.28
127	LTE Band 38	20_QPSK_100_0	38000	1	AMR NB 12.2kbps	2N	86.98	16.98	≥6	10.98
128	LTE Band 38	20_QPSK_100_0	38000	1	AMR NB 12.2kbps	8N	91.34	21.34	≥6	15.34
129	LTE Band 38	20_QPSK_100_0	38000	1	AMR WB 6.6kbps	2N	85.14	15.14	≥6	9.14
130	LTE Band 38	20_QPSK_100_0	38000	1	AMR WB 6.6kbps	8N	91.17	21.17	≥6	15.17
131	LTE Band 38	20_QPSK_100_0	38000	1	AMR WB 23.85kbps	2N	84.96	14.96	≥6	8.96
132	LTE Band 38	20_QPSK_100_0	38000	1	AMR WB 23.85kbps	8N	91.19	21.19	≥6	15.19
133	LTE Band 38	20_QPSK_100_0	38000	1	EVS NB 5.9 kbps	2N	86.78	16.78	≥6	10.78
134	LTE Band 38	20_QPSK_100_0	38000	1	EVS NB 5.9 kbps	8N	91.36	21.36	≥6	15.36
135	LTE Band 38	20_QPSK_100_0	38000	1	EVS NB 24.4kbps	2N	87.32	17.32	≥6	11.32
136	LTE Band 38	20_QPSK_100_0	38000	1	EVS NB 24.4kbps	8N	93.28	23.28	≥6	17.28
137	LTE Band 38	20_QPSK_100_0	38000	1	EVS WB 9.6 kbps	2N	85.06	15.06	≥6	9.06
138	LTE Band 38	20_QPSK_100_0	38000	1	EVS WB 9.6 kbps	8N	91.13	21.13	≥6	15.13
139	LTE Band 38	20_QPSK_100_0	38000	1	EVS WB 24.4 kbps	2N	85.22	15.22	≥6	9.22
140	LTE Band 38	20_QPSK_100_0	38000	1	EVS WB 24.4 kbps	8N	91.43	21.43	≥6	15.43
141	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR NB 4.75kbps	2N	86.71	16.71	≥6	10.71
142	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR NB 4.75kbps	8N	91.60	21.60	≥6	15.60
143	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR NB 12.2kbps	2N	86.77	16.77	≥6	10.77
144	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR NB 12.2kbps	8N	91.60	21.60	≥6	15.60
145	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR WB 6.6kbps	2N	85.07	15.07	≥6	9.07
146	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR WB 6.6kbps	8N	90.27	20.27	≥6	14.27
147	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR WB 23.85kbps	2N	85.13	15.13	≥6	9.13
148	LTE Band 41_PC2	20_QPSK_100_0	40620	1	AMR WB 23.85kbps	8N	90.37	20.37	≥6	14.37
149	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS NB 5.9 kbps	2N	86.99	16.99	≥6	10.99
150	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS NB 5.9 kbps	8N	91.64	21.64	≥6	15.64
151	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS NB 24.4kbps	2N	87.05	17.05	≥6	11.05
152	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS NB 24.4kbps	8N	93.62	23.62	≥6	17.62
153	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS WB 9.6 kbps	2N	85.17	15.17	≥6	9.17
154	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS WB 9.6 kbps	8N	90.42	20.42	≥6	14.42
155	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS WB 24.4 kbps	2N	85.02	15.02	≥6	9.02
156	LTE Band 41_PC2	20_QPSK_100_0	40620	1	EVS WB 24.4 kbps	8N	91.17	21.17	≥6	15.17
157	LTE Band 66	20_QPSK_100_0	132322	1	AMR NB 4.75kbps	2N	86.35	16.35	≥6	10.35
158	LTE Band 66	20_QPSK_100_0	132322	1	AMR NB 4.75kbps	8N	92.67	22.67	≥6	16.67
159	LTE Band 66	20_QPSK_100_0	132322	1	AMR NB 12.2kbps	2N	86.25	16.25	≥6	10.25
160	LTE Band 66	20_QPSK_100_0	132322	1	AMR NB 12.2kbps	8N	92.63	22.63	≥6	16.63

161	LTE Band 66	20_QPSK_100_0	132322	1	AMR WB 6.6kbps	2N	84.88	14.88	≥6	8.88
162	LTE Band 66	20_QPSK_100_0	132322	1	AMR WB 6.6kbps	8N	91.24	21.24	≥6	15.24
163	LTE Band 66	20_QPSK_100_0	132322	1	AMR WB 23.85kbps	2N	84.94	14.94	≥6	8.94
164	LTE Band 66	20_QPSK_100_0	132322	1	AMR WB 23.85kbps	8N	91.22	21.22	≥6	15.22
165	LTE Band 66	20_QPSK_100_0	132322	1	EVS NB 5.9 kbps	2N	86.25	16.25	≥6	10.25
166	LTE Band 66	20_QPSK_100_0	132322	1	EVS NB 5.9 kbps	8N	92.65	22.65	≥6	16.65
167	LTE Band 66	20_QPSK_100_0	132322	1	EVS NB 24.4kbps	2N	87.77	17.77	≥6	11.77
168	LTE Band 66	20_QPSK_100_0	132322	1	EVS NB 24.4kbps	8N	92.46	22.46	≥6	16.46
169	LTE Band 66	20_QPSK_100_0	132322	1	EVS WB 9.6 kbps	2N	84.96	14.96	≥6	8.96
170	LTE Band 66	20_QPSK_100_0	132322	1	EVS WB 9.6 kbps	8N	91.21	21.21	≥6	15.21
171	LTE Band 66	20_QPSK_100_0	132322	1	EVS WB 24.4 kbps	2N	85.82	15.82	≥6	9.82
172	LTE Band 66	20_QPSK_100_0	132322	1	EVS WB 24.4 kbps	8N	90.82	20.82	≥6	14.82
173	LTE Band 71	20_QPSK_100_0	133322	1	AMR NB 4.75kbps	2N	86.83	16.83	≥6	10.83
174	LTE Band 71	20_QPSK_100_0	133322	1	AMR NB 4.75kbps	8N	92.49	22.49	≥6	16.49
175	LTE Band 71	20_QPSK_100_0	133322	1	AMR NB 12.2kbps	2N	86.68	16.68	≥6	10.68
176	LTE Band 71	20_QPSK_100_0	133322	1	AMR NB 12.2kbps	8N	92.58	22.58	≥6	16.58
177	LTE Band 71	20_QPSK_100_0	133322	1	AMR WB 6.6kbps	2N	85.22	15.22	≥6	9.22
178	LTE Band 71	20_QPSK_100_0	133322	1	AMR WB 6.6kbps	8N	90.94	20.94	≥6	14.94
179	LTE Band 71	20_QPSK_100_0	133322	1	AMR WB 23.85kbps	2N	85.24	15.24	≥6	9.24
180	LTE Band 71	20_QPSK_100_0	133322	1	AMR WB 23.85kbps	8N	90.92	20.92	≥6	14.92
181	LTE Band 71	20_QPSK_100_0	133322	1	EVS NB 5.9 kbps	2N	86.72	16.72	≥6	10.72
182	LTE Band 71	20_QPSK_100_0	133322	1	EVS NB 5.9 kbps	8N	92.58	22.58	≥6	16.58
183	LTE Band 71	20_QPSK_100_0	133322	1	EVS NB 24.4kbps	2N	86.78	16.78	≥6	10.78
184	LTE Band 71	20_QPSK_100_0	133322	1	EVS NB 24.4kbps	8N	93.40	23.40	≥6	17.40
185	LTE Band 71	20_QPSK_100_0	133322	1	EVS WB 9.6 kbps	2N	85.26	15.26	≥6	9.26
186	LTE Band 71	20_QPSK_100_0	133322	1	EVS WB 9.6 kbps	8N	90.94	20.94	≥6	14.94
187	LTE Band 71	20_QPSK_100_0	133322	1	EVS WB 24.4 kbps	2N	85.25	15.25	≥6	9.25
188	LTE Band 71	20_QPSK_100_0	133322	1	EVS WB 24.4 kbps	8N	91.30	21.30	≥6	15.30
	LTE Band 7	20_QPSK_100_0	21100	2	AMR WB 6.6kbps	2N	85.37	15.37	≥6	9.37
	LTE Band 12	10_QPSK_50_0	23095	2	EVS WB 9.6 kbps	8N	91.56	21.56	≥6	19.56

<VoNR>

HAC(Volume control)Test Record							Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Sample	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
189	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR NB 4.75kbps	2N	88.10	18.10	≥6	12.10
190	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR NB 4.75kbps	8N	93.30	23.30	≥6	17.30
191	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR NB 12.2kbps	2N	87.95	17.95	≥6	11.95
192	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR NB 12.2kbps	8N	93.38	23.38	≥6	17.38
193	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR WB 6.6kbps	2N	85.97	15.97	≥6	9.97
194	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR WB 6.6kbps	8N	91.07	21.07	≥6	15.07
195	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR WB 23.85kbps	2N	85.97	15.97	≥6	9.97
196	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	AMR WB 23.85kbps	8N	91.12	21.12	≥6	15.12
197	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS NB 5.9 kbps	2N	87.97	17.97	≥6	11.97

198	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS NB 5.9 kbps	8N	93.18	23.18	≥6	17.18
199	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS NB 24.4kbps	2N	85.56	15.56	≥6	9.56
200	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS NB 24.4kbps	8N	91.97	21.97	≥6	15.97
201	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS WB 9.6 kbps	2N	86.16	16.16	≥6	10.16
202	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS WB 9.6 kbps	8N	91.09	21.09	≥6	15.09
203	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS WB 24.4 kbps	2N	85.51	15.51	≥6	9.51
204	FR1 n5	20_DFT-s-OFDM QPSK	167300	1	EVS WB 24.4 kbps	8N	92.14	22.14	≥6	16.14
205	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR NB 4.75kbps	2N	88.04	18.04	≥6	12.04
206	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR NB 4.75kbps	8N	92.80	22.80	≥6	16.80
207	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR NB 12.2kbps	2N	88.05	18.05	≥6	12.05
208	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR NB 12.2kbps	8N	92.82	22.82	≥6	16.82
209	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR WB 6.6kbps	2N	85.84	15.84	≥6	9.84
210	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR WB 6.6kbps	8N	90.05	20.05	≥6	14.05
211	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR WB 23.85kbps	2N	85.91	15.91	≥6	9.91
212	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	AMR WB 23.85kbps	8N	89.97	19.97	≥6	13.97
213	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS NB 5.9 kbps	2N	87.97	17.97	≥6	11.97
214	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS NB 5.9 kbps	8N	92.84	22.84	≥6	16.84
215	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS NB 24.4kbps	2N	87.59	17.59	≥6	11.59
216	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS NB 24.4kbps	8N	93.64	23.64	≥6	17.64
217	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS WB 9.6 kbps	2N	85.90	15.90	≥6	9.90
218	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS WB 9.6 kbps	8N	90.18	20.18	≥6	14.18
219	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS WB 24.4 kbps	2N	85.90	15.90	≥6	9.90
220	FR1 n7	20_DFT-s-OFDM QPSK	507000	1	EVS WB 24.4 kbps	8N	91.46	21.46	≥6	15.46
221	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR NB 4.75kbps	2N	87.75	17.75	≥6	11.75
222	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR NB 4.75kbps	8N	92.01	22.01	≥6	16.01
223	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR NB 12.2kbps	2N	87.92	17.92	≥6	11.92
224	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR NB 12.2kbps	8N	92.00	22.00	≥6	16.00
225	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR WB 6.6kbps	2N	84.68	14.68	≥6	8.68
226	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR WB 6.6kbps	8N	89.20	19.20	≥6	13.20
227	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR WB 23.85kbps	2N	84.82	14.82	≥6	8.82
228	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	AMR WB 23.85kbps	8N	89.09	19.09	≥6	13.09
229	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS NB 5.9 kbps	2N	87.83	17.83	≥6	11.83
230	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS NB 5.9 kbps	8N	92.02	22.02	≥6	16.02
231	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS NB 24.4kbps	2N	87.53	17.53	≥6	11.53
232	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS NB 24.4kbps	8N	93.69	23.69	≥6	17.69
233	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS WB 9.6 kbps	2N	84.89	14.89	≥6	8.89
234	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS WB 9.6 kbps	8N	89.06	19.06	≥6	13.06
235	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS WB 24.4 kbps	2N	85.51	15.51	≥6	9.51
236	FR1 n25	20_DFT-s-OFDM QPSK	376500	1	EVS WB 24.4 kbps	8N	91.52	21.52	≥6	15.52
237	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR NB 4.75kbps	2N	88.13	18.13	≥6	12.13
238	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR NB 4.75kbps	8N	93.86	23.86	≥6	17.86
239	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR NB 12.2kbps	2N	88.28	18.28	≥6	12.28
240	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR NB 12.2kbps	8N	93.84	23.84	≥6	17.84
241	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR WB 6.6kbps	2N	86.30	16.30	≥6	10.30
242	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR WB 6.6kbps	8N	92.58	22.58	≥6	16.58
243	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR WB 23.85kbps	2N	86.35	16.35	≥6	10.35

244	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	AMR WB 23.85kbps	8N	92.70	22.70	≥6	16.70
245	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS NB 5.9 kbps	2N	88.03	18.03	≥6	12.03
246	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS NB 5.9 kbps	8N	93.88	23.88	≥6	17.88
247	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS NB 24.4kbps	2N	87.66	17.66	≥6	11.66
248	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS NB 24.4kbps	8N	94.00	24.00	≥6	18.00
249	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS WB 9.6 kbps	2N	86.40	16.40	≥6	10.40
250	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS WB 9.6 kbps	8N	92.63	22.63	≥6	16.63
251	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS WB 24.4 kbps	2N	86.29	16.29	≥6	10.29
252	FR1 n38	40_DFT-s-OFDM QPSK	519000	1	EVS WB 24.4 kbps	8N	92.64	22.64	≥6	16.64
253	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR NB 4.75kbps	2N	87.52	17.52	≥6	11.52
254	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR NB 4.75kbps	8N	93.49	23.49	≥6	17.49
255	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR NB 12.2kbps	2N	87.57	17.57	≥6	11.57
256	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR NB 12.2kbps	8N	93.56	23.56	≥6	17.56
257	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR WB 6.6kbps	2N	86.29	16.29	≥6	10.29
258	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR WB 6.6kbps	8N	92.10	22.10	≥6	16.10
259	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR WB 23.85kbps	2N	86.23	16.23	≥6	10.23
260	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	AMR WB 23.85kbps	8N	92.07	22.07	≥6	16.07
261	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS NB 5.9 kbps	2N	87.60	17.60	≥6	11.60
262	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS NB 5.9 kbps	8N	93.83	23.83	≥6	17.83
263	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS NB 24.4kbps	2N	88.40	18.40	≥6	12.40
264	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS NB 24.4kbps	8N	94.03	24.03	≥6	18.03
265	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS WB 9.6 kbps	2N	86.23	16.23	≥6	10.23
266	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS WB 9.6 kbps	8N	92.11	22.11	≥6	16.11
267	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS WB 24.4 kbps	2N	87.76	17.76	≥6	11.76
268	FR1 n41_PC2	100_DFT-s-OFDM QPSK	518598	1	EVS WB 24.4 kbps	8N	93.52	23.52	≥6	17.52
269	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR NB 4.75kbps	2N	88.51	18.51	≥6	12.51
270	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR NB 4.75kbps	8N	94.51	24.51	≥6	18.51
271	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR NB 12.2kbps	2N	88.57	18.57	≥6	12.57
272	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR NB 12.2kbps	8N	94.66	24.66	≥6	18.66
273	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR WB 6.6kbps	2N	86.93	16.93	≥6	10.93
274	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR WB 6.6kbps	8N	92.46	22.46	≥6	16.46
275	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR WB 23.85kbps	2N	86.94	16.94	≥6	10.94
276	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	AMR WB 23.85kbps	8N	92.48	22.48	≥6	16.48
277	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS NB 5.9 kbps	2N	88.50	18.50	≥6	12.50
278	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS NB 5.9 kbps	8N	94.65	24.65	≥6	18.65
279	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS NB 24.4kbps	2N	88.62	18.62	≥6	12.62
280	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS NB 24.4kbps	8N	94.37	24.37	≥6	18.37
281	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS WB 9.6 kbps	2N	86.96	16.96	≥6	10.96
282	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS WB 9.6 kbps	8N	92.47	22.47	≥6	16.47
283	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS WB 24.4 kbps	2N	86.91	16.91	≥6	10.91
284	FR1 n48	40_DFT-s-OFDM QPSK	641666	1	EVS WB 24.4 kbps	8N	92.50	22.50	≥6	16.50
285	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR NB 4.75kbps	2N	87.63	17.63	≥6	11.63
286	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR NB 4.75kbps	8N	93.57	23.57	≥6	17.57
287	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR NB 12.2kbps	2N	87.65	17.65	≥6	11.65
288	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR NB 12.2kbps	8N	93.56	23.56	≥6	17.56
289	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR WB 6.6kbps	2N	85.59	15.59	≥6	9.59

290	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR WB 6.6kbps	8N	91.43	21.43	≥6	15.43
291	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR WB 23.85kbps	2N	85.58	15.58	≥6	9.58
292	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	AMR WB 23.85kbps	8N	91.64	21.64	≥6	15.64
293	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS NB 5.9 kbps	2N	87.69	17.69	≥6	11.69
294	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS NB 5.9 kbps	8N	93.45	23.45	≥6	17.45
295	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS NB 24.4kbps	2N	87.55	17.55	≥6	11.55
296	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS NB 24.4kbps	8N	93.56	23.56	≥6	17.56
297	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS WB 9.6 kbps	2N	85.61	15.61	≥6	9.61
298	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS WB 9.6 kbps	8N	91.49	21.49	≥6	15.49
299	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS WB 24.4 kbps	2N	85.73	15.73	≥6	9.73
300	FR1 n66	20_DFT-s-OFDM QPSK	349000	1	EVS WB 24.4 kbps	8N	91.76	21.76	≥6	15.76
301	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR NB 4.75kbps	2N	88.14	18.14	≥6	12.14
302	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR NB 4.75kbps	8N	93.39	23.39	≥6	17.39
303	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR NB 12.2kbps	2N	88.00	18.00	≥6	12.00
304	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR NB 12.2kbps	8N	93.23	23.23	≥6	17.23
305	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR WB 6.6kbps	2N	85.56	15.56	≥6	9.56
306	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR WB 6.6kbps	8N	91.27	21.27	≥6	15.27
307	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR WB 23.85kbps	2N	85.58	15.58	≥6	9.58
308	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	AMR WB 23.85kbps	8N	91.26	21.26	≥6	15.26
309	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS NB 5.9 kbps	2N	88.16	18.16	≥6	12.16
310	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS NB 5.9 kbps	8N	93.25	23.25	≥6	17.25
311	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS NB 24.4kbps	2N	87.54	17.54	≥6	11.54
312	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS NB 24.4kbps	8N	93.67	23.67	≥6	17.67
313	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS WB 9.6 kbps	2N	85.45	15.45	≥6	9.45
314	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS WB 9.6 kbps	8N	91.36	21.36	≥6	15.36
315	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS WB 24.4 kbps	2N	85.69	15.69	≥6	9.69
316	FR1 n71	20_DFT-s-OFDM QPSK	136100	1	EVS WB 24.4 kbps	8N	91.80	21.80	≥6	15.80
317	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR NB 4.75kbps	2N	88.43	18.43	≥6	12.43
318	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR NB 4.75kbps	8N	92.14	22.14	≥6	16.14
319	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR NB 12.2kbps	2N	88.37	18.37	≥6	12.37
320	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR NB 12.2kbps	8N	92.00	22.00	≥6	16.00
321	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR WB 6.6kbps	2N	85.64	15.64	≥6	9.64
322	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR WB 6.6kbps	8N	90.02	20.02	≥6	14.02
323	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR WB 23.85kbps	2N	85.52	15.52	≥6	9.52
324	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	AMR WB 23.85kbps	8N	89.87	19.87	≥6	13.87
325	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS NB 5.9 kbps	2N	88.38	18.38	≥6	12.38
326	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS NB 5.9 kbps	8N	92.01	22.01	≥6	16.01
327	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS NB 24.4kbps	2N	88.36	18.36	≥6	12.36
328	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS NB 24.4kbps	8N	92.73	22.73	≥6	16.73
329	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS WB 9.6 kbps	2N	85.58	15.58	≥6	9.58
330	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS WB 9.6 kbps	8N	89.86	19.86	≥6	13.86
331	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS WB 24.4 kbps	2N	85.89	15.89	≥6	9.89
332	FR1 n77	100_DFT-s-OFDM QPSK	633334	1	EVS WB 24.4 kbps	8N	90.84	20.84	≥6	14.84
333	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR NB 4.75kbps	2N	86.27	16.27	≥6	10.27
334	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR NB 4.75kbps	8N	92.65	22.65	≥6	16.65
335	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR NB 12.2kbps	2N	87.02	17.02	≥6	11.02

336	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR NB 12.2kbps	8N	93.34	23.34	≥6	17.34
337	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR WB 6.6kbps	2N	85.16	15.16	≥6	9.16
338	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR WB 6.6kbps	8N	90.94	20.94	≥6	14.94
339	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR WB 23.85kbps	2N	85.13	15.13	≥6	9.13
340	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	AMR WB 23.85kbps	8N	91.31	21.31	≥6	15.31
341	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS NB 5.9 kbps	2N	86.23	16.23	≥6	10.23
342	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS NB 5.9 kbps	8N	92.61	22.61	≥6	16.61
343	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS NB 24.4kbps	2N	86.93	16.93	≥6	10.93
344	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS NB 24.4kbps	8N	93.26	23.26	≥6	17.26
345	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS WB 9.6 kbps	2N	85.02	15.02	≥6	9.02
346	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS WB 9.6 kbps	8N	91.13	21.13	≥6	15.13
347	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS WB 24.4 kbps	2N	85.17	15.17	≥6	9.17
348	FR1 n77	100_DFT-s-OFDM QPSK	656000	1	EVS WB 24.4 kbps	8N	91.27	21.27	≥6	15.27
349	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR NB 4.75kbps	2N	88.20	18.20	≥6	12.20
350	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR NB 4.75kbps	8N	93.64	23.64	≥6	17.64
351	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR NB 12.2kbps	2N	88.22	18.22	≥6	12.22
352	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR NB 12.2kbps	8N	93.82	23.82	≥6	17.82
353	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR WB 6.6kbps	2N	85.83	15.83	≥6	9.83
354	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR WB 6.6kbps	8N	91.58	21.58	≥6	15.58
355	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR WB 23.85kbps	2N	85.81	15.81	≥6	9.81
356	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	AMR WB 23.85kbps	8N	91.61	21.61	≥6	15.61
357	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS NB 5.9 kbps	2N	88.21	18.21	≥6	12.21
358	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS NB 5.9 kbps	8N	93.55	23.55	≥6	17.55
359	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS NB 24.4kbps	2N	88.04	18.04	≥6	12.04
360	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS NB 24.4kbps	8N	93.73	23.73	≥6	17.73
361	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS WB 9.6 kbps	2N	86.09	16.09	≥6	10.09
362	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS WB 9.6 kbps	8N	91.61	21.61	≥6	15.61
363	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS WB 24.4 kbps	2N	86.14	16.14	≥6	10.14
364	FR1 n78	100_DFT-s-OFDM QPSK	633334	1	EVS WB 24.4 kbps	8N	91.68	21.68	≥6	15.68
	FR1 n25	20_DFT-s-OFDM QPSK	376500	2	AMR WB 6.6kbps	2N	85.79	15.79	≥6	9.79
	FR1 n25	20_DFT-s-OFDM QPSK	376500	2	EVS WB 9.6 kbps	8N	92.03	22.03	≥6	16.03

<WLAN>

HAC(Volume control)Test Record							Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Sample	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
365	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR NB 4.75kbps	2N	87.35	17.35	≥6	11.35
366	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR NB 4.75kbps	8N	92.55	22.55	≥6	16.55
367	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR NB 12.2kbps	2N	87.41	17.41	≥6	11.41
368	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR NB 12.2kbps	8N	92.68	22.68	≥6	16.68
369	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR WB 6.6kbps	2N	86.01	16.01	≥6	10.01
370	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR WB 6.6kbps	8N	91.94	21.94	≥6	15.94
371	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR WB 23.85kbps	2N	86.11	16.11	≥6	10.11
372	WIFI2.4GHz	802.11b 1Mbps	6	1	AMR WB 23.85kbps	8N	92.11	22.11	≥6	16.11

373	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS NB 5.9 kbps	2N	87.29	17.29	≥6	11.29
374	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS NB 5.9 kbps	8N	92.91	22.91	≥6	16.91
375	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS NB 24.4kbps	2N	88.24	18.24	≥6	12.24
376	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS NB 24.4kbps	8N	94.08	24.08	≥6	18.08
377	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS WB 9.6 kbps	2N	86.06	16.06	≥6	10.06
378	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS WB 9.6 kbps	8N	92.01	22.01	≥6	16.01
379	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS WB 24.4 kbps	2N	86.27	16.27	≥6	10.27
380	WIFI2.4GHz	802.11b 1Mbps	6	1	EVS WB 24.4 kbps	8N	92.03	22.03	≥6	16.03
381	WIFI5GHz	802.11a 6M	40	1	AMR NB 4.75kbps	2N	87.77	17.77	≥6	11.77
382	WIFI5GHz	802.11a 6M	40	1	AMR NB 4.75kbps	8N	92.45	22.45	≥6	16.45
383	WIFI5GHz	802.11a 6M	40	1	AMR NB 12.2kbps	2N	87.93	17.93	≥6	11.93
384	WIFI5GHz	802.11a 6M	40	1	AMR NB 12.2kbps	8N	92.57	22.57	≥6	16.57
385	WIFI5GHz	802.11a 6M	40	1	AMR WB 6.6kbps	2N	86.10	16.10	≥6	10.10
386	WIFI5GHz	802.11a 6M	40	1	AMR WB 6.6kbps	8N	90.58	20.58	≥6	14.58
387	WIFI5GHz	802.11a 6M	40	1	AMR WB 23.85kbps	2N	86.10	16.10	≥6	10.10
388	WIFI5GHz	802.11a 6M	40	1	AMR WB 23.85kbps	8N	90.56	20.56	≥6	14.56
389	WIFI5GHz	802.11a 6M	40	1	EVS NB 5.9 kbps	2N	87.67	17.67	≥6	11.67
390	WIFI5GHz	802.11a 6M	40	1	EVS NB 5.9 kbps	8N	92.56	22.56	≥6	16.56
391	WIFI5GHz	802.11a 6M	40	1	EVS NB 24.4kbps	2N	87.89	17.89	≥6	11.89
392	WIFI5GHz	802.11a 6M	40	1	EVS NB 24.4kbps	8N	92.60	22.60	≥6	16.60
393	WIFI5GHz	802.11a 6M	40	1	EVS WB 9.6 kbps	2N	85.98	15.98	≥6	9.98
394	WIFI5GHz	802.11a 6M	40	1	EVS WB 9.6 kbps	8N	90.56	20.56	≥6	14.56
395	WIFI5GHz	802.11a 6M	40	1	EVS WB 24.4 kbps	2N	86.05	16.05	≥6	10.05
396	WIFI5GHz	802.11a 6M	40	1	EVS WB 24.4 kbps	8N	90.41	20.41	≥6	14.41
397	WIFI5GHz	802.11a 6M	60	1	AMR NB 4.75kbps	2N	87.35	17.35	≥6	11.35
398	WIFI5GHz	802.11a 6M	60	1	AMR NB 4.75kbps	8N	93.17	23.17	≥6	17.17
399	WIFI5GHz	802.11a 6M	60	1	AMR NB 12.2kbps	2N	87.31	17.31	≥6	11.31
400	WIFI5GHz	802.11a 6M	60	1	AMR NB 12.2kbps	8N	93.19	23.19	≥6	17.19
401	WIFI5GHz	802.11a 6M	60	1	AMR WB 6.6kbps	2N	85.40	15.40	≥6	9.40
402	WIFI5GHz	802.11a 6M	60	1	AMR WB 6.6kbps	8N	91.39	21.39	≥6	15.39
403	WIFI5GHz	802.11a 6M	60	1	AMR WB 23.85kbps	2N	85.37	15.37	≥6	9.37
404	WIFI5GHz	802.11a 6M	60	1	AMR WB 23.85kbps	8N	91.49	21.49	≥6	15.49
405	WIFI5GHz	802.11a 6M	60	1	EVS NB 5.9 kbps	2N	87.30	17.30	≥6	11.30
406	WIFI5GHz	802.11a 6M	60	1	EVS NB 5.9 kbps	8N	93.48	23.48	≥6	17.48
407	WIFI5GHz	802.11a 6M	60	1	EVS NB 24.4kbps	2N	87.99	17.99	≥6	11.99
408	WIFI5GHz	802.11a 6M	60	1	EVS NB 24.4kbps	8N	91.74	21.74	≥6	15.74
409	WIFI5GHz	802.11a 6M	60	1	EVS WB 9.6 kbps	2N	85.37	15.37	≥6	9.37
410	WIFI5GHz	802.11a 6M	60	1	EVS WB 9.6 kbps	8N	91.37	21.37	≥6	15.37
411	WIFI5GHz	802.11a 6M	60	1	EVS WB 24.4 kbps	2N	86.30	16.30	≥6	10.30
412	WIFI5GHz	802.11a 6M	60	1	EVS WB 24.4 kbps	8N	89.75	19.75	≥6	13.75
413	WIFI5GHz	802.11a 6M	132	1	AMR NB 4.75kbps	2N	86.81	16.81	≥6	10.81
414	WIFI5GHz	802.11a 6M	132	1	AMR NB 4.75kbps	8N	92.79	22.79	≥6	16.79
415	WIFI5GHz	802.11a 6M	132	1	AMR NB 12.2kbps	2N	86.98	16.98	≥6	10.98
416	WIFI5GHz	802.11a 6M	132	1	AMR NB 12.2kbps	8N	92.83	22.83	≥6	16.83
417	WIFI5GHz	802.11a 6M	132	1	AMR WB 6.6kbps	2N	86.01	16.01	≥6	10.01
418	WIFI5GHz	802.11a 6M	132	1	AMR WB 6.6kbps	8N	91.53	21.53	≥6	15.53

419	WIFI5GHz	802.11a 6M	132	1	AMR WB 23.85kbps	2N	86.02	16.02	≥6	10.02
420	WIFI5GHz	802.11a 6M	132	1	AMR WB 23.85kbps	8N	91.57	21.57	≥6	15.57
421	WIFI5GHz	802.11a 6M	132	1	EVS NB 5.9 kbps	2N	87.12	17.12	≥6	11.12
422	WIFI5GHz	802.11a 6M	132	1	EVS NB 5.9 kbps	8N	92.74	22.74	≥6	16.74
423	WIFI5GHz	802.11a 6M	132	1	EVS NB 24.4kbps	2N	87.78	17.78	≥6	11.78
424	WIFI5GHz	802.11a 6M	132	1	EVS NB 24.4kbps	8N	93.69	23.69	≥6	17.69
425	WIFI5GHz	802.11a 6M	132	1	EVS WB 9.6 kbps	2N	85.85	15.85	≥6	9.85
426	WIFI5GHz	802.11a 6M	132	1	EVS WB 9.6 kbps	8N	91.59	21.59	≥6	15.59
427	WIFI5GHz	802.11a 6M	132	1	EVS WB 24.4 kbps	2N	85.90	15.90	≥6	9.90
428	WIFI5GHz	802.11a 6M	132	1	EVS WB 24.4 kbps	8N	91.74	21.74	≥6	15.74
429	WIFI5GHz	802.11a 6M	157	1	AMR NB 4.75kbps	2N	88.22	18.22	≥6	12.22
430	WIFI5GHz	802.11a 6M	157	1	AMR NB 4.75kbps	8N	93.58	23.58	≥6	17.58
431	WIFI5GHz	802.11a 6M	157	1	AMR NB 12.2kbps	2N	88.26	18.26	≥6	12.26
432	WIFI5GHz	802.11a 6M	157	1	AMR NB 12.2kbps	8N	93.50	23.50	≥6	17.50
433	WIFI5GHz	802.11a 6M	157	1	AMR WB 6.6kbps	2N	85.84	15.84	≥6	9.84
434	WIFI5GHz	802.11a 6M	157	1	AMR WB 6.6kbps	8N	90.78	20.78	≥6	14.78
435	WIFI5GHz	802.11a 6M	157	1	AMR WB 23.85kbps	2N	85.74	15.74	≥6	9.74
436	WIFI5GHz	802.11a 6M	157	1	AMR WB 23.85kbps	8N	91.63	21.63	≥6	15.63
437	WIFI5GHz	802.11a 6M	157	1	EVS NB 5.9 kbps	2N	88.13	18.13	≥6	12.13
438	WIFI5GHz	802.11a 6M	157	1	EVS NB 5.9 kbps	8N	93.64	23.64	≥6	17.64
439	WIFI5GHz	802.11a 6M	157	1	EVS NB 24.4kbps	2N	87.80	17.80	≥6	11.80
440	WIFI5GHz	802.11a 6M	157	1	EVS NB 24.4kbps	8N	93.14	23.14	≥6	17.14
441	WIFI5GHz	802.11a 6M	157	1	EVS WB 9.6 kbps	2N	85.67	15.67	≥6	9.67
442	WIFI5GHz	802.11a 6M	157	1	EVS WB 9.6 kbps	8N	91.79	21.79	≥6	15.79
443	WIFI5GHz	802.11a 6M	157	1	EVS WB 24.4 kbps	2N	85.65	15.65	≥6	9.65
444	WIFI5GHz	802.11a 6M	157	1	EVS WB 24.4 kbps	8N	91.07	21.07	≥6	15.07
445	WIFI 6GHz	802.11ax-HE20	5	1	AMR NB 4.75kbps	2N	86.85	16.85	≥6	10.85
446	WIFI 6GHz	802.11ax-HE20	5	1	AMR NB 4.75kbps	8N	93.09	23.09	≥6	17.09
447	WIFI 6GHz	802.11ax-HE20	5	1	AMR NB 12.2kbps	2N	86.90	16.90	≥6	10.90
448	WIFI 6GHz	802.11ax-HE20	5	1	AMR NB 12.2kbps	8N	93.28	23.28	≥6	17.28
449	WIFI 6GHz	802.11ax-HE20	5	1	AMR WB 6.6kbps	2N	85.42	15.42	≥6	9.42
450	WIFI 6GHz	802.11ax-HE20	5	1	AMR WB 6.6kbps	8N	91.92	21.92	≥6	15.92
451	WIFI 6GHz	802.11ax-HE20	5	1	AMR WB 23.85kbps	2N	85.54	15.54	≥6	9.54
452	WIFI 6GHz	802.11ax-HE20	5	1	AMR WB 23.85kbps	8N	91.87	21.87	≥6	15.87
453	WIFI 6GHz	802.11ax-HE20	5	1	EVS NB 5.9 kbps	2N	87.00	17.00	≥6	11.00
454	WIFI 6GHz	802.11ax-HE20	5	1	EVS NB 5.9 kbps	8N	93.00	23.00	≥6	17.00
455	WIFI 6GHz	802.11ax-HE20	5	1	EVS NB 24.4kbps	2N	87.42	17.42	≥6	11.42
456	WIFI 6GHz	802.11ax-HE20	5	1	EVS NB 24.4kbps	8N	93.68	23.68	≥6	17.68
457	WIFI 6GHz	802.11ax-HE20	5	1	EVS WB 9.6 kbps	2N	85.58	15.58	≥6	9.58
458	WIFI 6GHz	802.11ax-HE20	5	1	EVS WB 9.6 kbps	8N	91.89	21.89	≥6	15.89
459	WIFI 6GHz	802.11ax-HE20	5	1	EVS WB 24.4 kbps	2N	85.57	15.57	≥6	9.57
460	WIFI 6GHz	802.11ax-HE20	5	1	EVS WB 24.4 kbps	8N	91.80	21.80	≥6	15.80
	WIFI5GHz	802.11a 6M	60	2	AMR WB 23.85kbps	2N	86.96	16.96	≥6	10.96
	WIFI5GHz	802.11a 6M	60	2	EVS WB 24.4 kbps	8N	91.82	21.82	≥6	15.82

Test Engineer: Gao Guannan and Wang Yuyan

11. Uncertainy Assessment

For ANSI/TIA5050 testing, the EUT was linked and controlled by base station emulator. Communication between the EUT and the emulator was established by coaxial connection. The EUT was set from the emulator to radiate maximum output power during testing. Also EUT was set to backlight off during testing.

Item	Accuracy
Electrical signal power of labCORE analog inputs	±0.1dB at 1kHz for levels>-50dBm
	±0.2dB at 1kHz for levels>-100dBm
	±0.05dB spectral flatness for 20Hz to 20 kHz
Sound pressure	±0.2dB[1]
Time	±2.25 ppm[2]
Frequency	±2.25 ppm[2]
Clock	±2.25 ppm

Note:1.Depends on the microphone calibration.The value is valid if calibration is carried out with recommended pistonphone/calibrator in the HMS II.3 manual.

2.Time and frequency accuracies of labCORE determined by the internal clock accuracy.The time and frequency resolution and accuracy may change due to analysis of the digital signals in ACQUA or if an external clock is applied.

12. References

[1] ANSI C63.19:2019, “ American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids”, Aug. 2019.

[2] FCC KDB 285076 D01v06r04, “Equipment Authorization Guidance for Hearing Aid Compatibility”, Sep. 2023.

[3] FCC KDB 285076 D04 Volume Control v02, “GUIDANCE FOR PERFORMING VOLUME CONTROL MEASUREMENTS ON MOBILE HANDSETS”, Sep. 2023

[4] FCC KDB 285076 D05 HAC Waiver DA 23-914 v01, “HAC COMPLIANCE UNDER WAIVER DA 23-914”, Sep. 2023

[5] ANSI/TIA-5050-2018, “Receive Volume Control Requirements for Wireless (Mobile) Devices”, Jan. 2018

[6] Head Acoustic System Handbook

13. Information of the Testing Laboratories

We, Huarui 7layers High Technology (Suzhou) Co., Ltd., were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation.

If you have any comments, please feel free to contact us at the following:

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The road map of all our labs can be found in our web site also
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Appendix A. Volume Control Evaluation Results

Appendix B: Calibration Certificate

Appendix C. Photographs of EUT and Setup