

HEARING AID COMPATIBILITY Volume Control Evaluation Report

Report No. : W7L-P23120020AC04
FCC ID : V2X-PM95
Equipment : GSM/UMTS/LTE/5G Mobile phone
Brand Name : Point Mobile
Model Name : PM95
Applicant : POINTMOBILE CO.,LTD
Address : 9F Kabul Great Valley, 32, Digital-ro 9-gil, Geumcheon-gu, Seoul, Korea 08512
Manufacturer : POINTMOBILE CO.,LTD
Address : 9F Kabul Great Valley, 32, Digital-ro 9-gil, Geumcheon-gu, Seoul, Korea 08512
Receive Volume Control : PASS
Results Lowest
Conversational Gain : 2N:8.60dB
8N:15.59dB
Standards : ANSI C63.19-2019
ANSI/TIA-5050-2018
Date of Testing : Mar.18,2024~May.17,2024

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
Gao Guannan/Engineer

Approved By : Sam fei bo
Peibo Sun /Manager

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

Table of Contents

Table of Contents	2
1. Summary of Minimum Conv.Gain Value	4
2. Description of Equipemnt Under Test	6
3. Applied Standards	8
4. Air Interface and Operational Mode:	9
5. Volume Control Requirement	11
6. System Description	13
7. Volume Control Test Procedure	14
8. Test Equipment List	15
9. Device Support Codec	16
10. Volume Control Evaluation Results	18
11. Uncertainty Assessment	37
12. References	37
13. Information of the Testing Laboratories	38
Appendix A.Volume Control Evaluation Results	39
Appendix B: Calibration Certificate	39
Appendix C.Photographs of EUT and Setup	39



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

Release Control Record

Report No.	Reason for Change	Date Issued
W7L-P23120020AC04	Initial release	May. 27, 2024



1. Summary of Minimum Conv.Gain Value

Mode	Band	Mounting Force (N)	Conv.Gain(dB)	Result
GSM CMRS Voice	GSM850	2N	11.63	PASS
		8N	17.61	
	GSM1900	2N	11.63	PASS
		8N	17.31	
UMTS CMRS Voice	Band II	2N	10.33	PASS
		8N	16.64	
	Band IV	2N	10.41	PASS
		8N	16.90	
	Band V	2N	10.42	PASS
		8N	17.02	
VoLTE	Band 7	2N	11.67	PASS
		8N	17.37	
	Band 12	2N	11.45	PASS
		8N	17.65	
	Band 13	2N	11.36	PASS
		8N	17.58	
	Band 14	2N	11.25	PASS
		8N	17.28	
	Band 25	2N	10.90	PASS
		8N	16.98	
	Band 26	2N	11.09	PASS
		8N	17.64	
	Band 30	2N	11.18	PASS
		8N	17.31	
	Band 38	2N	11.19	PASS
		8N	17.39	
	Band 41	2N	11.21	PASS
		8N	17.20	
	Band 42	2N	11.28	PASS
		8N	17.41	
	Band 48	2N	11.07	PASS
		8N	17.20	
	Band 66	2N	10.95	PASS
		8N	16.93	
	Band 71	2N	10.88	PASS
		8N	17.05	
VoNR	FR1 n7	2N	10.77	PASS
		8N	18.25	
	FR1 n12	2N	11.20	PASS
		8N	17.43	



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

	FR1 n13	2N	10.95	PASS
		8N	17.25	
	FR1 n14	2N	10.77	PASS
		8N	17.43	
	FR1 n25	2N	10.97	PASS
		8N	17.38	
	FR1 n26	2N	10.48	PASS
		8N	17.02	
	FR1 n30	2N	10.96	PASS
		8N	17.21	
	FR1 n38	2N	10.95	PASS
		8N	17.19	
	FR1 n41	2N	10.97	PASS
		8N	17.38	
	FR1 n48	2N	10.73	PASS
		8N	16.43	
	FR1 n66	2N	10.19	PASS
		8N	16.69	
	FR1 n71	2N	9.89	PASS
		8N	16.52	
VoWiFi	FR1 n77_Part27Q	2N	10.91	PASS
		8N	18.26	
	FR1 n77_Part27O	2N	9.23	PASS
		8N	15.59	
	2.4G	2N	8.60	PASS
		8N	15.98	
	5.2G	2N	8.67	PASS
		8N	15.94	
	5.3G	2N	8.71	PASS
		8N	16.08	
	5.5G	2N	10.59	PASS
		8N	16.43	
	5.8G	2N	9.09	PASS
		8N	15.70	
	6E	2N	10.55	PASS
		8N	16.62	

2. Description of Equipemnt Under Test

Product Feature & Specification	
Applicant Name	POINTMOBILE CO.,LTD
Brand Name	Point Mobile
Model Name	PM95
Sample IMEI Code	IMEI 1:355801740002771 IMEI 2:355801740002789
FCC ID	V2X-PM95
HW Version	MP
SW Version	95.00
Tx Frequency Bands (Unit: MHz)	GSM850 : 824.2 ~ 848.8 GSM1900 : 1850.2 ~ 1909.8 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 14 : 788 ~ 798 LTE Band 17 : 704 ~ 716 LTE Band 25 : 1850 ~ 1915 LTE Band 26 : 814 ~ 849 LTE Band 30 : 2305 ~ 2315 LTE Band 38 : 2570 ~ 2620 LTE Band 41 : 2496 ~ 2690 LTE Band 42 : 3452.5 ~ 3547.5, 3552.5 ~ 3597.5 LTE Band 43 : 3600 ~ 3700 LTE Band 48 : 3550 ~ 3700 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 n12 : 699 ~ 716 NR Band n13 : 777 ~ 787 NR Band n14 : 788 ~ 798 NR Band n25 : 1850 ~ 1915 NR Band n26 : 814 ~ 849 NR Band n30 : 2305 ~ 2315 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: 5925 ~ 6425, 6425 ~ 6525, 6525 ~ 6875, 6875 ~ 7125 Bluetooth : 2402 ~ 2480



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

EUT Stage	Identical Prototype
Uplink Modulations	GSM & GPRS & EDGE : GMSK, 8PSK WCDMA:QPSK LTE:QPSK,16QAM,64QAM, 256QAM NR : Pi/2 BPSK (DFT-s-OFDM), QPSK (DFT-s-OFDM, CP-OFDM), 16QAM (DFT-s-OFDM, CP-OFDM), 64QAM (DFT-s-OFDM, CP-OFDM), 256QAM DFT-s-OFDM, CP-OFDM) 802.11b:DSSS 802.11a/g/n/ac:OFDM 802.11ax:OFDMA Bluetooth : GFSK, $\pi/4$ -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.



BUREAU
VERITAS



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
	14					No
	17					No
	25					No
	26					No
	30					No
	66					No
	71					No
LTE (TDD)	38					No
	41					No
	42					No
	43					No
	48					No
5G NR (FDD)	n2	VD	Yes	LTE.WLAN,BT	VoNR / Google Meet ⁽¹⁾	No
	n5					No
	n7					No
	n12					No
	n13					No
	n14					No
	n25					No
	n26					No
	n30					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	N/A	No
Bluetooth	2.4G	DT	No	GSM, WCDMA, LTE	N/A	No

Transport Type:

VO = Legacy Cellular Voice Service

DT = Digital Transport Only (No Voice)

VD = IP Voice Service over Digital Transport

Note:

- For protocols not listed in Table 6.1 of ANSI C63.19:2019, the average speech level of -20 dBm0 should be used.
- 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.
- The device have similar frequency in some LTE and NR bands: LTE B4/66,B12/17,B2/25,B5/26,B42/48,B48/43, NR n2/25,n5/n26,n78/77 since



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

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>

- Per KDB 285076 D05, with a mounting force of 8N, the DUT shall have at least one volume control setting that will produce a conversational gain of ≥ 6 dB
- Per KDB 285076 D05, with a mounting force of 2N, the DUT shall have at least one volume control setting that will produce a conversational gain of ≥ 6 dB
- 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 ≥ 20 dB when tested over the range of 1/3 octave band center frequencies:

- Narrowband transmission mode: Each 1/3 octave band center frequency from 400Hz to 3150Hz
- Wideband transmission mode: Each 1/3 octave band center frequency from 250Hz to 5000Hz
- 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

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

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

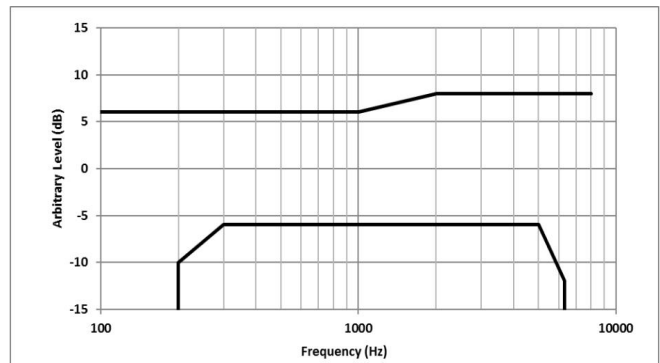
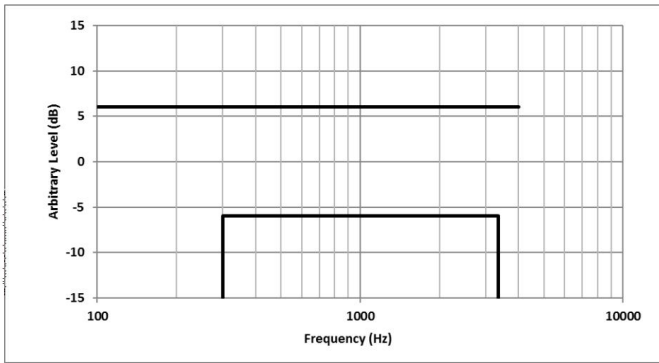


BUREAU
VERITAS

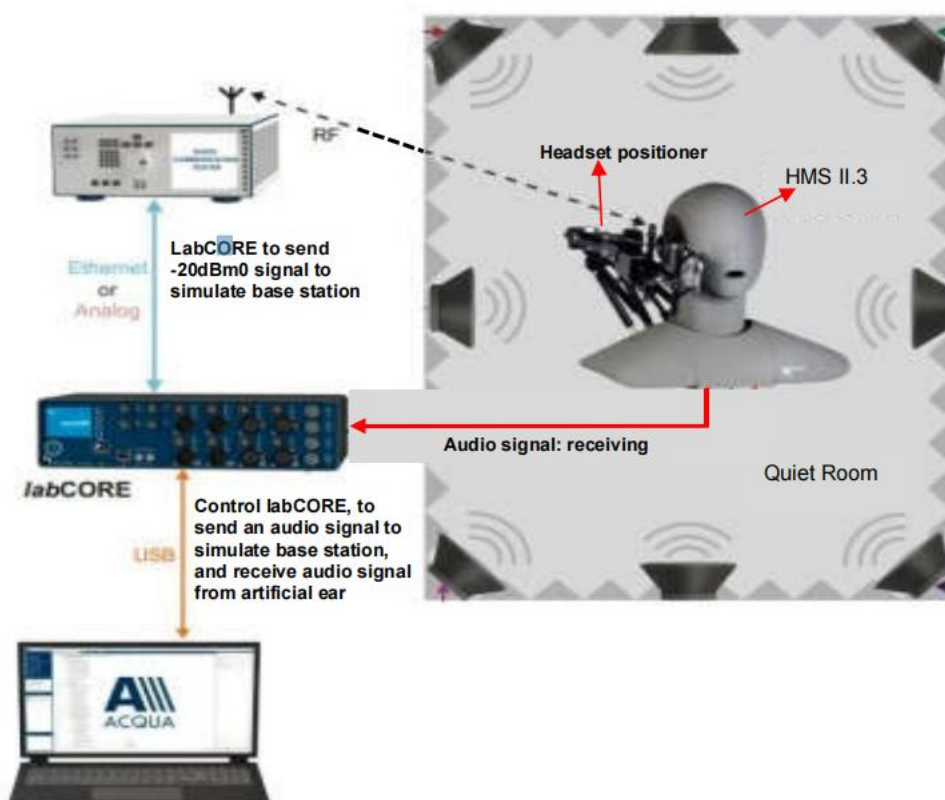
FCC HAC (TIA5050) Test Report



Certificate #6613.01



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 section 5.1, 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 5.3.1 shall 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 distortion 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:

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

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 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	2024/07/07
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



Certificate #6613.01

BUREAU VERITAS **FCC HAC (TIA5050) Test Report**

		23.85kbps
--	--	-----------

VOLTE/VoNR/VoWIFICodec/birate				
Codec	AMR NB	AMR WB	EVS NB	EVS WB
Birate	4.75kbps	6.60kbps	5.9kbps	5.9kbps
	5.15kbps	8.85kbps	7.2kbps	7.2kbps
	5.90kbps	12.65kbps	8kbps	8kbps
	6.70kbps	14.25kbps	9.6kbps	9.6kbps
	7.40kbps	15.85kbps	13.2kbps	13.2kbps
	7.95kbps	18.25kbps	16.4kbps	16.4kbps
	10.20kbps	19.85kbps	24.4kbps	24.4kbps
	12.20kbps	23.05kbps		32kbps
		23.85kbps		48kbps
				64kbps
				96kbps
				128kbps

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 B12/17,2/25,5/26,48/43,4/66, 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 8.60dB with a hearing aid.

The 8N mounting force lowest conversational gain is 15.59 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-dBSP L 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	85.89	15.89	≥6	9.89	21.96	≥20	1.96	Pass
2	LTE Band 7	20_QPSK_100_0	21100	EVS NB 24.4kbps	8N	91.36	21.36	≥6	15.36	21.79	≥20	1.79	Pass
3	LTE Band 7	20_QPSK_100_0	21100	EVS WB 128kbps	2N	81.67	11.67	≥6	5.67	22.65	≥20	2.65	Pass
4	LTE Band 7	20_QPSK_100_0	21100	EVS WB 128kbps	8N	87.37	17.37	≥6	11.37	23.16	≥20	3.16	Pass
5	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	2N	86.10	16.10	≥6	10.10	25.33	≥20	5.33	Pass
6	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	8N	91.70	21.70	≥6	15.70	21.22	≥20	1.22	Pass
7	LTE Band 12	10_QPSK_50_0	23095	EVS WB 128kbps	2N	81.45	11.45	≥6	5.45	23.71	≥20	3.71	Pass
8	LTE Band 12	10_QPSK_50_0	23095	EVS WB 128kbps	8N	87.65	17.65	≥6	11.65	22.87	≥20	2.87	Pass
9	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	2N	84.07	14.07	≥6	8.07	28.53	≥20	8.53	Pass
10	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	8N	91.15	21.15	≥6	15.15	25.06	≥20	5.06	Pass
11	LTE Band 13	10_QPSK_50_0	23230	EVS WB 128kbps	2N	81.36	11.36	≥6	5.36	22.78	≥20	2.78	Pass
12	LTE Band 13	10_QPSK_50_0	23230	EVS WB 128kbps	8N	87.58	17.58	≥6	11.58	23.11	≥20	3.11	Pass
13	LTE Band 14	10_QPSK_50_0	23330	EVS NB 24.4kbps	2N	84.72	14.72	≥6	8.72	26.37	≥20	6.37	Pass
14	LTE Band 14	10_QPSK_50_0	23330	EVS NB 24.4kbps	8N	90.02	20.02	≥6	14.02	26.22	≥20	6.22	Pass
15	LTE Band 14	10_QPSK_50_0	23330	EVS WB 128kbps	2N	81.25	11.25	≥6	5.25	22.34	≥20	2.34	Pass
16	LTE Band 14	10_QPSK_50_0	23330	EVS WB 128kbps	8N	87.28	17.28	≥6	11.28	22.34	≥20	2.34	Pass
17	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	2N	84.91	14.91	≥6	8.91	26.06	≥20	6.06	Pass
18	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	8N	91.44	21.44	≥6	15.44	26.01	≥20	6.01	Pass
19	LTE Band 25	20_QPSK_100_0	26340	EVS WB 128kbps	2N	81.14	11.14	≥6	5.14	22.86	≥20	2.86	Pass
20	LTE Band 25	20_QPSK_100_0	26340	EVS WB 128kbps	8N	87.51	17.51	≥6	11.51	22.12	≥20	2.12	Pass
21	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	2N	84.18	14.18	≥6	8.18	29.26	≥20	9.26	Pass
22	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	8N	92.00	22.00	≥6	16.00	27.45	≥20	7.45	Pass
23	LTE Band 26	15_QPSK_75_0	26865	EVS WB 128kbps	2N	81.09	11.09	≥6	5.09	20.95	≥20	0.95	Pass
24	LTE Band 26	15_QPSK_75_0	26865	EVS WB 128kbps	8N	87.64	17.64	≥6	11.64	23.75	≥20	3.75	Pass
25	LTE Band 30	10_QPSK_50_0	27710	EVS NB 24.4kbps	2N	86.03	16.03	≥6	10.03	25.69	≥20	5.69	Pass
26	LTE Band 30	10_QPSK_50_0	27710	EVS NB 24.4kbps	8N	92.50	22.50	≥6	16.50	27.41	≥20	7.41	Pass
27	LTE Band 30	10_QPSK_50_0	27710	EVS WB 128kbps	2N	81.18	11.18	≥6	5.18	21.33	≥20	1.33	Pass
28	LTE Band 30	10_QPSK_50_0	27710	EVS WB 128kbps	8N	87.31	17.31	≥6	11.31	21.29	≥20	1.29	Pass
29	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	2N	84.66	14.66	≥6	8.66	26.67	≥20	6.67	Pass
30	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	8N	91.11	21.11	≥6	15.11	26.89	≥20	6.89	Pass
31	LTE Band 38	20_QPSK_100_0	38000	EVS WB 128kbps	2N	81.19	11.19	≥6	5.19	21.54	≥20	1.54	Pass
32	LTE Band 38	20_QPSK_100_0	38000	EVS WB 128kbps	8N	87.39	17.39	≥6	11.39	22.19	≥20	2.19	Pass
33	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 24.4kbps	2N	84.70	14.70	≥6	8.70	31.10	≥20	11.10	Pass
34	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 24.4kbps	8N	90.96	20.96	≥6	14.96	25.07	≥20	5.07	Pass
35	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 128kbps	2N	81.21	11.21	≥6	5.21	21.44	≥20	1.44	Pass



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

36	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 128kbps	8N	87.20	17.20	≥6	11.20	22.03	≥20	2.03	Pass
37	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 24.4kbps	2N	84.16	14.16	≥6	8.16	31.44	≥20	11.44	Pass
38	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 24.4kbps	8N	90.94	20.94	≥6	14.94	24.74	≥20	4.74	Pass
39	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 128kbps	2N	81.45	11.45	≥6	5.45	22.85	≥20	2.85	Pass
40	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 128kbps	8N	87.41	17.41	≥6	11.41	22.45	≥20	2.45	Pass
41	LTE Band 48	20_QPSK_100_0	56150	EVS NB 24.4kbps	2N	85.06	15.06	≥6	9.06	22.86	≥20	2.86	Pass
42	LTE Band 48	20_QPSK_100_0	56150	EVS NB 24.4kbps	8N	92.27	22.27	≥6	16.27	22.68	≥20	2.68	Pass
43	LTE Band 48	20_QPSK_100_0	56150	EVS WB 128kbps	2N	81.09	11.09	≥6	5.09	21.72	≥20	1.72	Pass
44	LTE Band 48	20_QPSK_100_0	56150	EVS WB 128kbps	8N	87.20	17.20	≥6	11.20	21.15	≥20	1.15	Pass
45	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	2N	84.16	14.16	≥6	8.16	23.76	≥20	3.76	Pass
46	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	8N	92.46	22.46	≥6	16.46	25.56	≥20	5.56	Pass
47	LTE Band 66	20_QPSK_100_0	132322	EVS WB 128kbps	2N	81.15	11.15	≥6	5.15	21.96	≥20	1.96	Pass
48	LTE Band 66	20_QPSK_100_0	132322	EVS WB 128kbps	8N	87.59	17.59	≥6	11.59	21.68	≥20	1.68	Pass
49	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	2N	84.75	14.75	≥6	8.75	30.05	≥20	10.05	Pass
50	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	8N	91.16	21.16	≥6	15.16	23.72	≥20	3.72	Pass
51	LTE Band 71	20_QPSK_100_0	133322	EVS WB 128kbps	2N	81.13	11.13	≥6	5.13	21.41	≥20	1.41	Pass
52	LTE Band 71	20_QPSK_100_0	133322	EVS WB 128kbps	8N	87.44	17.44	≥6	11.44	21.39	≥20	1.39	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-BSP Level	Conv. Gain (dB)	Limit (dB)	Margin to limit (dB)	Minimum PN-SDNR (dB)	Limit (dB)	Margin to Limit (dB)	Free Field (FF)
53	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 24.4kbps	2N	80.96	10.96	≥6	4.96	22.38	≥20	2.38	PASS
54	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 24.4kbps	8N	88.25	18.25	≥6	12.25	26.99	≥20	6.99	PASS
55	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 128kbps	2N	80.77	10.77	≥6	4.77	22.10	≥20	2.10	PASS
56	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 128kbps	8N	88.46	18.46	≥6	12.46	26.29	≥20	6.29	PASS
57	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 24.4kbps	2N	82.56	12.56	≥6	6.56	25.72	≥20	5.72	PASS
58	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 24.4kbps	8N	88.71	18.71	≥6	12.71	26.31	≥20	6.31	PASS
59	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 128kbps	2N	81.28	11.28	≥6	5.28	22.70	≥20	2.70	PASS
60	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 128kbps	8N	87.52	17.52	≥6	11.52	22.98	≥20	2.98	PASS
61	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 24.4kbps	2N	81.02	11.02	≥6	5.02	22.53	≥20	2.53	PASS
62	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 24.4kbps	8N	87.25	17.25	≥6	11.25	22.97	≥20	2.97	PASS
63	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 128kbps	2N	80.95	10.95	≥6	4.95	23.59	≥20	3.59	PASS
64	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 128kbps	8N	87.43	17.43	≥6	11.43	23.60	≥20	3.60	PASS



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

65	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 24.4kbps	2N	80.77	10.77	≥6	4.77	22.67	≥20	2.67	PASS
66	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 24.4kbps	8N	87.44	17.44	≥6	11.44	22.91	≥20	2.91	PASS
67	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 128kbps	2N	80.82	10.82	≥6	4.82	22.64	≥20	2.64	PASS
68	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 128kbps	8N	87.43	17.43	≥6	11.43	22.93	≥20	2.93	PASS
69	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 24.4kbps	2N	80.97	10.97	≥6	4.97	21.81	≥20	1.81	PASS
70	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 24.4kbps	8N	87.38	17.38	≥6	11.38	23.15	≥20	3.15	PASS
71	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 128kbps	2N	81.06	11.06	≥6	5.06	21.99	≥20	1.99	PASS
72	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 128kbps	8N	87.38	17.38	≥6	11.38	23.19	≥20	3.19	PASS
73	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 24.4kbps	2N	81.84	11.84	≥6	5.84	21.66	≥20	1.66	PASS
74	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 24.4kbps	8N	87.20	17.20	≥6	11.20	22.82	≥20	2.82	PASS
75	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 128kbps	2N	81.93	11.93	≥6	5.93	21.61	≥20	1.61	PASS
76	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 128kbps	8N	87.15	17.15	≥6	11.15	23.79	≥20	3.79	PASS
77	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 24.4kbps	2N	80.99	10.99	≥6	4.99	22.06	≥20	2.06	PASS
78	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 24.4kbps	8N	87.22	17.22	≥6	11.22	23.11	≥20	3.11	PASS
79	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 128kbps	2N	81.20	11.20	≥6	5.20	22.68	≥20	2.68	PASS
80	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 128kbps	8N	87.35	17.35	≥6	11.35	22.73	≥20	2.73	PASS
81	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 24.4kbps	2N	81.05	11.05	≥6	5.05	22.60	≥20	2.60	PASS
82	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 24.4kbps	8N	88.44	18.44	≥6	12.44	23.43	≥20	3.43	PASS
83	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 128kbps	2N	81.07	11.07	≥6	5.07	22.14	≥20	2.14	PASS
84	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 128kbps	8N	88.33	18.33	≥6	12.33	22.28	≥20	2.28	PASS
85	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 24.4kbps	2N	80.97	10.97	≥6	4.97	22.45	≥20	2.45	PASS
86	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 24.4kbps	8N	87.62	17.62	≥6	11.62	22.83	≥20	2.83	PASS
87	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 128kbps	2N	81.00	11.00	≥6	5.00	22.78	≥20	2.78	PASS
88	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 128kbps	8N	87.38	17.38	≥6	11.38	23.00	≥20	3.00	PASS
89	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 24.4kbps	2N	80.73	10.73	≥6	4.73	25.92	≥20	5.92	PASS
90	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 24.4kbps	8N	87.01	17.01	≥6	11.01	25.63	≥20	5.63	PASS
91	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 128kbps	2N	81.10	11.10	≥6	5.10	22.32	≥20	2.32	PASS
92	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 128kbps	8N	86.43	16.43	≥6	10.43	22.69	≥20	2.69	PASS
93	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 24.4kbps	2N	82.51	12.51	≥6	6.51	26.29	≥20	6.29	PASS
94	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 24.4kbps	8N	88.17	18.17	≥6	12.17	26.98	≥20	6.98	PASS
95	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 128kbps	2N	80.59	10.59	≥6	4.59	22.41	≥20	2.41	PASS
96	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 128kbps	8N	86.85	16.85	≥6	10.85	23.29	≥20	3.29	PASS
97	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 24.4kbps	2N	82.08	12.08	≥6	6.08	25.91	≥20	5.91	PASS



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

98	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 24.4kbps	8N	88.02	18.02	≥6	12.02	26.06	≥20	6.06	PASS
99	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 128kbps	2N	80.57	10.57	≥6	4.57	22.12	≥20	2.12	PASS
100	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 128kbps	8N	86.68	16.68	≥6	10.68	22.38	≥20	2.38	PASS
101	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 24.4kbps	2N	80.91	10.91	≥6	4.91	22.71	≥20	2.71	PASS
102	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 24.4kbps	8N	88.60	18.60	≥6	12.60	26.57	≥20	6.57	PASS
103	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 128kbps	2N	81.10	11.10	≥6	5.10	22.41	≥20	2.41	PASS
104	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 128kbps	8N	88.41	18.41	≥6	12.41	23.65	≥20	3.65	PASS
105	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 24.4kbps	2N	81.66	11.66	≥6	5.66	26.56	≥20	6.56	PASS
106	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 24.4kbps	8N	88.02	18.02	≥6	12.02	26.83	≥20	6.83	PASS
107	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 128kbps	2N	80.45	10.45	≥6	4.45	23.14	≥20	3.14	PASS
108	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 128kbps	8N	86.21	16.21	≥6	10.21	22.15	≥20	2.15	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)
109	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	2N	78.8	8.80	≥6	2.8	21.41	≥20	1.41	Pass
110	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	8N	87.47	17.47	≥6	11.47	23.65	≥20	3.65	Pass
111	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 128kbps	2N	78.8	8.80	≥6	2.8	21.01	≥20	1.01	Pass
112	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 128kbps	8N	87.68	17.68	≥6	11.68	21.25	≥20	1.25	Pass
113	WIFI 5.2GHz	802.11a 6M	40	EVS NB 24.4kbps	2N	78.79	8.79	≥6	2.79	21.58	≥20	1.58	Pass
114	WIFI 5.2GHz	802.11a 6M	40	EVS NB 24.4kbps	8N	87.35	17.35	≥6	11.35	26.59	≥20	6.59	Pass
115	WIFI 5.2GHz	802.11a 6M	40	EVS WB 128kbps	2N	78.88	8.88	≥6	2.88	20.48	≥20	0.48	Pass
116	WIFI 5.2GHz	802.11a 6M	40	EVS WB 128kbps	8N	86.14	16.14	≥6	10.14	20.68	≥20	0.68	Pass
117	WIFI 5.3GHz	802.11a 6M	60	EVS NB 24.4kbps	2N	78.82	8.82	≥6	2.82	21.94	≥20	1.94	Pass
118	WIFI 5.3GHz	802.11a 6M	60	EVS NB 24.4kbps	8N	87.26	17.26	≥6	11.26	25.68	≥20	5.68	Pass
119	WIFI 5.3GHz	802.11a 6M	60	EVS WB 128kbps	2N	78.71	8.71	≥6	2.71	22.41	≥20	2.41	Pass
120	WIFI 5.3GHz	802.11a 6M	60	EVS WB 128kbps	8N	87.13	17.13	≥6	11.13	21.99	≥20	1.99	Pass
121	WIFI 5.5GHz	802.11a 6M	132	EVS NB 24.4kbps	2N	81.87	11.87	≥6	5.87	22.65	≥20	2.65	Pass
122	WIFI 5.5GHz	802.11a 6M	132	EVS NB 24.4kbps	8N	86.43	16.43	≥6	10.43	23.11	≥20	3.11	Pass
123	WIFI 5.5GHz	802.11a 6M	132	EVS WB 128kbps	2N	80.85	10.85	≥6	4.85	21.33	≥20	1.33	Pass
124	WIFI 5.5GHz	802.11a 6M	132	EVS WB 128kbps	8N	87.2	17.20	≥6	11.2	23.35	≥20	3.35	Pass
125	WIFI 5.8Hz	802.11a 6M	157	EVS NB 24.4kbps	2N	79.91	9.91	≥6	3.91	25.82	≥20	5.82	Pass
126	WIFI 5.8Hz	802.11a 6M	157	EVS NB 24.4kbps	8N	87.98	17.98	≥6	11.98	26.20	≥20	6.2	Pass
127	WIFI 5.8Hz	802.11a 6M	157	EVS WB 128kbps	2N	79.09	9.09	≥6	3.09	21.54	≥20	1.54	Pass
128	WIFI 5.8Hz	802.11a 6M	157	EVS WB 128kbps	8N	85.7	15.70	≥6	9.7	22.27	≥20	2.27	Pass
129	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	2N	82.14	12.14	≥6	6.14	23.94	≥20	3.94	Pass
130	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	8N	88.06	18.06	≥6	12.06	23.54	≥20	3.54	Pass
131	WIFI 6GHz	802.11ax-HE20	5	EVS WB 128kbps	2N	80.55	10.55	≥6	4.55	21.36	≥20	1.36	Pass
132	WIFI 6GHz	802.11ax-HE20	5	EVS WB 128kbps	8N	86.95	16.95	≥6	10.95	22.39	≥20	2.39	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	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
1	GSM 850	Voice	189	EFR NB 12.2kbps	2N	82.53	12.53	≥6	6.53
2	GSM 850	Voice	189	AMR NB 4.75kbps	2N	81.70	11.70	≥6	5.70
3	GSM 850	Voice	189	AMR NB 12.2kbps	2N	81.63	11.63	≥6	5.63
4	GSM 850	Voice	189	AMR WB 6.6kbps	2N	81.66	11.66	≥6	5.66
5	GSM 850	Voice	189	AMR WB 23.85kbps	2N	81.86	11.86	≥6	5.86
6	GSM 850	Voice	189	EFR NB 12.2kbps	8N	87.61	17.61	≥6	11.61
7	GSM 850	Voice	189	AMR NB 4.75kbps	8N	87.94	17.94	≥6	11.94
8	GSM 850	Voice	189	AMR NB 12.2kbps	8N	88.07	18.07	≥6	12.07
9	GSM 850	Voice	189	AMR WB 6.6kbps	8N	88.19	18.19	≥6	12.19
10	GSM 850	Voice	189	AMR WB 23.85kbps	8N	87.85	17.85	≥6	11.85
11	GSM 1900	Voice	661	EFR NB 12.2kbps	2N	83.47	13.47	≥6	7.47
12	GSM 1900	Voice	661	AMR NB 4.75kbps	2N	81.63	11.63	≥6	5.63
13	GSM 1900	Voice	661	AMR NB 12.2kbps	2N	81.66	11.66	≥6	5.66
14	GSM 1900	Voice	661	AMR WB 6.6kbps	2N	82.02	12.02	≥6	6.02
15	GSM 1900	Voice	661	AMR WB 23.85kbps	2N	81.84	11.84	≥6	5.84
16	GSM 1900	Voice	661	EFR NB 12.2kbps	8N	87.31	17.31	≥6	11.31
17	GSM 1900	Voice	661	AMR NB 4.75kbps	8N	87.93	17.93	≥6	11.93
18	GSM 1900	Voice	661	AMR NB 12.2kbps	8N	87.82	17.82	≥6	11.82
19	GSM 1900	Voice	661	AMR WB 6.6kbps	8N	88.10	18.10	≥6	12.10
20	GSM 1900	Voice	661	AMR WB 23.85kbps	8N	88.12	18.12	≥6	12.12

<UMTS>

HAC(Volume control)Test Record						Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
21	WCDMA II	Voice	9400	AMR NB 4.75kbps	2N	81.29	11.29	≥6	5.29
22	WCDMA II	Voice	9400	AMR NB 12.2kbps	2N	82.34	12.34	≥6	6.34
23	WCDMA II	Voice	9400	AMR WB 6.6kbps	2N	80.33	10.33	≥6	4.33
24	WCDMA II	Voice	9400	AMR WB 23.85kbps	2N	81.16	11.16	≥6	5.16
25	WCDMA II	Voice	9400	AMR NB 4.75kbps	8N	87.87	17.87	≥6	11.87
26	WCDMA II	Voice	9400	AMR NB 12.2kbps	8N	88.65	18.65	≥6	12.65
27	WCDMA II	Voice	9400	AMR WB 6.6kbps	8N	86.64	16.64	≥6	10.64
28	WCDMA II	Voice	9400	AMR WB 23.85kbps	8N	87.59	17.59	≥6	11.59
29	WCDMA IV	Voice	1413	AMR NB 4.75kbps	2N	81.80	11.80	≥6	5.80
30	WCDMA IV	Voice	1413	AMR NB 12.2kbps	2N	82.54	12.54	≥6	6.54
31	WCDMA IV	Voice	1413	AMR WB 6.6kbps	2N	80.41	10.41	≥6	4.41
32	WCDMA IV	Voice	1413	AMR WB 23.85kbps	2N	81.17	11.17	≥6	5.17



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

33	WCDMA IV	Voice	1413	AMR NB 4.75kbps	8N	87.75	17.75	≥6	11.75
34	WCDMA IV	Voice	1413	AMR NB 12.2kbps	8N	88.53	18.53	≥6	12.53
35	WCDMA IV	Voice	1413	AMR WB 6.6kbps	8N	86.90	16.90	≥6	10.90
36	WCDMA IV	Voice	1413	AMR WB 23.85kbps	8N	87.54	17.54	≥6	11.54
37	WCDMA V	Voice	4182	AMR NB 4.75kbps	2N	81.58	11.58	≥6	5.58
38	WCDMA V	Voice	4182	AMR NB 12.2kbps	2N	82.09	12.09	≥6	6.09
39	WCDMA V	Voice	4182	AMR WB 6.6kbps	2N	80.42	10.42	≥6	4.42
40	WCDMA V	Voice	4182	AMR WB 23.85kbps	2N	81.03	11.03	≥6	5.03
41	WCDMA V	Voice	4182	AMR NB 4.75kbps	8N	87.67	17.67	≥6	11.67
42	WCDMA V	Voice	4182	AMR NB 12.2kbps	8N	88.50	18.50	≥6	12.50
43	WCDMA V	Voice	4182	AMR WB 6.6kbps	8N	87.02	17.02	≥6	11.02
44	WCDMA V	Voice	4182	AMR WB 23.85kbps	8N	87.65	17.65	≥6	11.65

<LTE>

HAC(Volume control)Test Record						Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	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	AMR NB 4.75kbps	2N	82.19	12.19	≥6	6.19
46	LTE Band 7	20_QPSK_100_0	21100	AMR NB 12.2kbps	2N	82.12	12.12	≥6	6.12
47	LTE Band 7	20_QPSK_100_0	21100	AMR WB 6.6kbps	2N	82.06	12.06	≥6	6.06
48	LTE Band 7	20_QPSK_100_0	21100	AMR WB 23.85kbps	2N	82.04	12.04	≥6	6.04
49	LTE Band 7	20_QPSK_100_0	21100	EVS NB 5.9 kbps	2N	82.30	12.30	≥6	6.30
50	LTE Band 7	20_QPSK_100_0	21100	EVS NB 24.4kbps	2N	85.89	15.89	≥6	9.89
51	LTE Band 7	20_QPSK_100_0	21100	EVS WB 5.9kbps	2N	82.17	12.17	≥6	6.17
52	LTE Band 7	20_QPSK_100_0	21100	EVS WB 128kbps	2N	81.67	11.67	≥6	5.67
53	LTE Band 7	20_QPSK_100_0	21100	AMR NB 4.75kbps	8N	88.56	18.56	≥6	12.56
54	LTE Band 7	20_QPSK_100_0	21100	AMR NB 12.2kbps	8N	88.46	18.46	≥6	12.46
55	LTE Band 7	20_QPSK_100_0	21100	AMR WB 6.6kbps	8N	88.49	18.49	≥6	12.49
56	LTE Band 7	20_QPSK_100_0	21100	AMR WB 23.85kbps	8N	88.47	18.47	≥6	12.47
57	LTE Band 7	20_QPSK_100_0	21100	EVS NB 5.9 kbps	8N	88.45	18.45	≥6	12.45
58	LTE Band 7	20_QPSK_100_0	21100	EVS NB 24.4kbps	8N	91.36	21.36	≥6	15.36
59	LTE Band 7	20_QPSK_100_0	21100	EVS WB 5.9kbps	8N	88.54	18.54	≥6	12.54
60	LTE Band 7	20_QPSK_100_0	21100	EVS WB 128kbps	8N	87.37	17.37	≥6	11.37
61	LTE Band 12	10_QPSK_50_0	23095	AMR NB 4.75kbps	2N	81.94	11.94	≥6	5.94
62	LTE Band 12	10_QPSK_50_0	23095	AMR NB 12.2kbps	2N	82.23	12.23	≥6	6.23
63	LTE Band 12	10_QPSK_50_0	23095	AMR WB 6.6kbps	2N	82.06	12.06	≥6	6.06
64	LTE Band 12	10_QPSK_50_0	23095	AMR WB 23.85kbps	2N	82.01	12.01	≥6	6.01
65	LTE Band 12	10_QPSK_50_0	23095	EVS NB 5.9 kbps	2N	82.24	12.24	≥6	6.24
66	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	2N	86.10	16.10	≥6	10.10
67	LTE Band 12	10_QPSK_50_0	23095	EVS WB 5.9kbps	2N	82.12	12.12	≥6	6.12
68	LTE Band 12	10_QPSK_50_0	23095	EVS WB 128kbps	2N	81.45	11.45	≥6	5.45
69	LTE Band 12	10_QPSK_50_0	23095	AMR NB 4.75kbps	8N	88.12	18.12	≥6	12.12
70	LTE Band 12	10_QPSK_50_0	23095	AMR NB 12.2kbps	8N	87.90	17.90	≥6	11.90



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

71	LTE Band 12	10_QPSK_50_0	23095	AMR WB 6.6kbps	8N	87.94	17.94	≥6	11.94
72	LTE Band 12	10_QPSK_50_0	23095	AMR WB 23.85kbps	8N	87.99	17.99	≥6	11.99
73	LTE Band 12	10_QPSK_50_0	23095	EVS NB 5.9 kbps	8N	87.90	17.90	≥6	11.90
74	LTE Band 12	10_QPSK_50_0	23095	EVS NB 24.4kbps	8N	91.70	21.70	≥6	15.70
75	LTE Band 12	10_QPSK_50_0	23095	EVS WB 5.9kbps	8N	87.96	17.96	≥6	11.96
76	LTE Band 12	10_QPSK_50_0	23095	EVS WB 128kbps	8N	87.65	17.65	≥6	11.65
77	LTE Band 13	10_QPSK_50_0	23230	AMR NB 4.75kbps	2N	81.97	11.97	≥6	5.97
78	LTE Band 13	10_QPSK_50_0	23230	AMR NB 12.2kbps	2N	82.09	12.09	≥6	6.09
79	LTE Band 13	10_QPSK_50_0	23230	AMR WB 6.6kbps	2N	82.04	12.04	≥6	6.04
80	LTE Band 13	10_QPSK_50_0	23230	AMR WB 23.85kbps	2N	82.06	12.06	≥6	6.06
81	LTE Band 13	10_QPSK_50_0	23230	EVS NB 5.9 kbps	2N	82.10	12.10	≥6	6.10
82	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	2N	84.07	14.07	≥6	8.07
83	LTE Band 13	10_QPSK_50_0	23230	EVS WB 5.9kbps	2N	82.10	12.10	≥6	6.10
84	LTE Band 13	10_QPSK_50_0	23230	EVS WB 128kbps	2N	81.36	11.36	≥6	5.36
85	LTE Band 13	10_QPSK_50_0	23230	AMR NB 4.75kbps	8N	88.40	18.40	≥6	12.40
86	LTE Band 13	10_QPSK_50_0	23230	AMR NB 12.2kbps	8N	88.63	18.63	≥6	12.63
87	LTE Band 13	10_QPSK_50_0	23230	AMR WB 6.6kbps	8N	88.57	18.57	≥6	12.57
88	LTE Band 13	10_QPSK_50_0	23230	AMR WB 23.85kbps	8N	88.48	18.48	≥6	12.48
89	LTE Band 13	10_QPSK_50_0	23230	EVS NB 5.9 kbps	8N	88.74	18.74	≥6	12.74
90	LTE Band 13	10_QPSK_50_0	23230	EVS NB 24.4kbps	8N	91.15	21.15	≥6	15.15
91	LTE Band 13	10_QPSK_50_0	23230	EVS WB 5.9kbps	8N	88.57	18.57	≥6	12.57
92	LTE Band 13	10_QPSK_50_0	23230	EVS WB 128kbps	8N	87.58	17.58	≥6	11.58
93	LTE Band 14	10_QPSK_50_0	23330	AMR NB 4.75kbps	2N	81.94	11.94	≥6	5.94
94	LTE Band 14	10_QPSK_50_0	23330	AMR NB 12.2kbps	2N	82.04	12.04	≥6	6.04
95	LTE Band 14	10_QPSK_50_0	23330	AMR WB 6.6kbps	2N	82.02	12.02	≥6	6.02
96	LTE Band 14	10_QPSK_50_0	23330	AMR WB 23.85kbps	2N	82.08	12.08	≥6	6.08
97	LTE Band 14	10_QPSK_50_0	23330	EVS NB 5.9 kbps	2N	82.05	12.05	≥6	6.05
98	LTE Band 14	10_QPSK_50_0	23330	EVS NB 24.4kbps	2N	84.72	14.72	≥6	8.72
99	LTE Band 14	10_QPSK_50_0	23330	EVS WB 5.9kbps	2N	82.13	12.13	≥6	6.13
100	LTE Band 14	10_QPSK_50_0	23330	EVS WB 128kbps	2N	81.25	11.25	≥6	5.25
101	LTE Band 14	10_QPSK_50_0	23330	AMR NB 4.75kbps	8N	88.00	18.00	≥6	12.00
102	LTE Band 14	10_QPSK_50_0	23330	AMR NB 12.2kbps	8N	88.04	18.04	≥6	12.04
103	LTE Band 14	10_QPSK_50_0	23330	AMR WB 6.6kbps	8N	88.03	18.03	≥6	12.03
104	LTE Band 14	10_QPSK_50_0	23330	AMR WB 23.85kbps	8N	88.19	18.19	≥6	12.19
105	LTE Band 14	10_QPSK_50_0	23330	EVS NB 5.9 kbps	8N	88.21	18.21	≥6	12.21
106	LTE Band 14	10_QPSK_50_0	23330	EVS NB 24.4kbps	8N	90.02	20.02	≥6	14.02
107	LTE Band 14	10_QPSK_50_0	23330	EVS WB 5.9kbps	8N	88.22	18.22	≥6	12.22
108	LTE Band 14	10_QPSK_50_0	23330	EVS WB 128kbps	8N	87.28	17.28	≥6	11.28
109	LTE Band 25	20_QPSK_100_0	26340	AMR NB 4.75kbps	2N	81.23	11.23	≥6	5.23
110	LTE Band 25	20_QPSK_100_0	26340	AMR NB 12.2kbps	2N	80.95	10.95	≥6	4.95
111	LTE Band 25	20_QPSK_100_0	26340	AMR WB 6.6kbps	2N	80.99	10.99	≥6	4.99
112	LTE Band 25	20_QPSK_100_0	26340	AMR WB 23.85kbps	2N	81.25	11.25	≥6	5.25
113	LTE Band 25	20_QPSK_100_0	26340	EVS NB 5.9 kbps	2N	80.90	10.90	≥6	4.90
114	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	2N	84.91	14.91	≥6	8.91
115	LTE Band 25	20_QPSK_100_0	26340	EVS WB 5.9kbps	2N	81.15	11.15	≥6	5.15
116	LTE Band 25	20_QPSK_100_0	26340	EVS WB 128kbps	2N	81.14	11.14	≥6	5.14



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

117	LTE Band 25	20_QPSK_100_0	26340	AMR NB 4.75kbps	8N	87.15	17.15	≥6	11.15
118	LTE Band 25	20_QPSK_100_0	26340	AMR NB 12.2kbps	8N	87.02	17.02	≥6	11.02
119	LTE Band 25	20_QPSK_100_0	26340	AMR WB 6.6kbps	8N	86.99	16.99	≥6	10.99
120	LTE Band 25	20_QPSK_100_0	26340	AMR WB 23.85kbps	8N	86.98	16.98	≥6	10.98
121	LTE Band 25	20_QPSK_100_0	26340	EVS NB 5.9 kbps	8N	87.25	17.25	≥6	11.25
122	LTE Band 25	20_QPSK_100_0	26340	EVS NB 24.4kbps	8N	91.44	21.44	≥6	15.44
123	LTE Band 25	20_QPSK_100_0	26340	EVS WB 5.9kbps	8N	87.13	17.13	≥6	11.13
124	LTE Band 25	20_QPSK_100_0	26340	EVS WB 128kbps	8N	87.51	17.51	≥6	11.51
125	LTE Band 26	15_QPSK_75_0	26865	AMR NB 4.75kbps	2N	82.12	12.12	≥6	6.12
126	LTE Band 26	15_QPSK_75_0	26865	AMR NB 12.2kbps	2N	81.89	11.89	≥6	5.89
127	LTE Band 26	15_QPSK_75_0	26865	AMR WB 6.6kbps	2N	81.85	11.85	≥6	5.85
128	LTE Band 26	15_QPSK_75_0	26865	AMR WB 23.85kbps	2N	82.08	12.08	≥6	6.08
129	LTE Band 26	15_QPSK_75_0	26865	EVS NB 5.9 kbps	2N	81.97	11.97	≥6	5.97
130	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	2N	84.18	14.18	≥6	8.18
131	LTE Band 26	15_QPSK_75_0	26865	EVS WB 5.9kbps	2N	82.10	12.10	≥6	6.10
132	LTE Band 26	15_QPSK_75_0	26865	EVS WB 128kbps	2N	81.09	11.09	≥6	5.09
133	LTE Band 26	15_QPSK_75_0	26865	AMR NB 4.75kbps	8N	88.12	18.12	≥6	12.12
134	LTE Band 26	15_QPSK_75_0	26865	AMR NB 12.2kbps	8N	88.05	18.05	≥6	12.05
135	LTE Band 26	15_QPSK_75_0	26865	AMR WB 6.6kbps	8N	88.11	18.11	≥6	12.11
136	LTE Band 26	15_QPSK_75_0	26865	AMR WB 23.85kbps	8N	88.09	18.09	≥6	12.09
137	LTE Band 26	15_QPSK_75_0	26865	EVS NB 5.9 kbps	8N	87.99	17.99	≥6	11.99
138	LTE Band 26	15_QPSK_75_0	26865	EVS NB 24.4kbps	8N	92.00	22.00	≥6	16.00
139	LTE Band 26	15_QPSK_75_0	26865	EVS WB 5.9kbps	8N	88.10	18.10	≥6	12.10
140	LTE Band 26	15_QPSK_75_0	26865	EVS WB 128kbps	8N	87.64	17.64	≥6	11.64
141	LTE Band 30	10_QPSK_50_0	27710	AMR NB 4.75kbps	2N	82.12	12.12	≥6	6.12
142	LTE Band 30	10_QPSK_50_0	27710	AMR NB 12.2kbps	2N	81.91	11.91	≥6	5.91
143	LTE Band 30	10_QPSK_50_0	27710	AMR WB 6.6kbps	2N	82.06	12.06	≥6	6.06
144	LTE Band 30	10_QPSK_50_0	27710	AMR WB 23.85kbps	2N	82.16	12.16	≥6	6.16
145	LTE Band 30	10_QPSK_50_0	27710	EVS NB 5.9 kbps	2N	82.05	12.05	≥6	6.05
146	LTE Band 30	10_QPSK_50_0	27710	EVS NB 24.4kbps	2N	86.03	16.03	≥6	10.03
147	LTE Band 30	10_QPSK_50_0	27710	EVS WB 5.9kbps	2N	82.13	12.13	≥6	6.13
148	LTE Band 30	10_QPSK_50_0	27710	EVS WB 128kbps	2N	81.18	11.18	≥6	5.18
149	LTE Band 30	10_QPSK_50_0	27710	AMR NB 4.75kbps	8N	87.94	17.94	≥6	11.94
150	LTE Band 30	10_QPSK_50_0	27710	AMR NB 12.2kbps	8N	87.99	17.99	≥6	11.99
151	LTE Band 30	10_QPSK_50_0	27710	AMR WB 6.6kbps	8N	88.09	18.09	≥6	12.09
152	LTE Band 30	10_QPSK_50_0	27710	AMR WB 23.85kbps	8N	88.12	18.12	≥6	12.12
153	LTE Band 30	10_QPSK_50_0	27710	EVS NB 5.9 kbps	8N	87.99	17.99	≥6	11.99
154	LTE Band 30	10_QPSK_50_0	27710	EVS NB 24.4kbps	8N	92.50	22.50	≥6	16.50
155	LTE Band 30	10_QPSK_50_0	27710	EVS WB 5.9kbps	8N	88.07	18.07	≥6	12.07
156	LTE Band 30	10_QPSK_50_0	27710	EVS WB 128kbps	8N	87.31	17.31	≥6	11.31
157	LTE Band 38	20_QPSK_100_0	38000	AMR NB 4.75kbps	2N	82.16	12.16	≥6	6.16
158	LTE Band 38	20_QPSK_100_0	38000	AMR NB 12.2kbps	2N	82.36	12.36	≥6	6.36
159	LTE Band 38	20_QPSK_100_0	38000	AMR WB 6.6kbps	2N	82.10	12.10	≥6	6.10
160	LTE Band 38	20_QPSK_100_0	38000	AMR WB 23.85kbps	2N	82.17	12.17	≥6	6.17
161	LTE Band 38	20_QPSK_100_0	38000	EVS NB 5.9 kbps	2N	82.40	12.40	≥6	6.40
162	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	2N	84.66	14.66	≥6	8.66
163	LTE Band 38	20_QPSK_100_0	38000	EVS WB 5.9kbps	2N	82.44	12.44	≥6	6.44



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

164	LTE Band 38	20_QPSK_100_0	38000	EVS WB 128kbps	2N	81.19	11.19	≥6	5.19
165	LTE Band 38	20_QPSK_100_0	38000	AMR NB 4.75kbps	8N	88.42	18.42	≥6	12.42
166	LTE Band 38	20_QPSK_100_0	38000	AMR NB 12.2kbps	8N	88.45	18.45	≥6	12.45
167	LTE Band 38	20_QPSK_100_0	38000	AMR WB 6.6kbps	8N	88.51	18.51	≥6	12.51
168	LTE Band 38	20_QPSK_100_0	38000	AMR WB 23.85kbps	8N	88.33	18.33	≥6	12.33
169	LTE Band 38	20_QPSK_100_0	38000	EVS NB 5.9 kbps	8N	88.43	18.43	≥6	12.43
170	LTE Band 38	20_QPSK_100_0	38000	EVS NB 24.4kbps	8N	91.11	21.11	≥6	15.11
171	LTE Band 38	20_QPSK_100_0	38000	EVS WB 5.9kbps	8N	88.44	18.44	≥6	12.44
172	LTE Band 38	20_QPSK_100_0	38000	EVS WB 128kbps	8N	87.39	17.39	≥6	11.39
173	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR NB 4.75kbps	2N	81.44	11.44	≥6	5.44
174	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR NB 12.2kbps	2N	81.57	11.57	≥6	5.57
175	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR WB 6.6kbps	2N	81.53	11.53	≥6	5.53
176	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR WB 23.85kbps	2N	81.47	11.47	≥6	5.47
177	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 5.9 kbps	2N	81.47	11.47	≥6	5.47
178	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 24.4kbps	2N	84.70	14.70	≥6	8.70
179	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 5.9kbps	2N	81.49	11.49	≥6	5.49
180	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 128kbps	2N	81.21	11.21	≥6	5.21
181	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR NB 4.75kbps	8N	87.67	17.67	≥6	11.67
182	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR NB 12.2kbps	8N	87.57	17.57	≥6	11.57
183	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR WB 6.6kbps	8N	87.57	17.57	≥6	11.57
184	LTE Band 41_PC3	20_QPSK_100_0	40620	AMR WB 23.85kbps	8N	87.59	17.59	≥6	11.59
185	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 5.9 kbps	8N	87.49	17.49	≥6	11.49
186	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS NB 24.4kbps	8N	90.96	20.96	≥6	14.96
187	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 5.9kbps	8N	87.59	17.59	≥6	11.59
188	LTE Band 41_PC3	20_QPSK_100_0	40620	EVS WB 128kbps	8N	87.20	17.20	≥6	11.20
189	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR NB 4.75kbps	2N	81.28	11.28	≥6	5.28
190	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR NB 12.2kbps	2N	81.34	11.34	≥6	5.34
191	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR WB 6.6kbps	2N	81.38	11.38	≥6	5.38
192	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR WB 23.85kbps	2N	81.39	11.39	≥6	5.39
193	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 5.9 kbps	2N	81.34	11.34	≥6	5.34
194	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 24.4kbps	2N	84.16	14.16	≥6	8.16
195	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 5.9kbps	2N	81.43	11.43	≥6	5.43
196	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 128kbps	2N	81.45	11.45	≥6	5.45
197	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR NB 4.75kbps	8N	87.82	17.82	≥6	11.82
198	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR NB 12.2kbps	8N	87.83	17.83	≥6	11.83
199	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR WB 6.6kbps	8N	87.76	17.76	≥6	11.76
200	LTE Band 42 Part27Q	20_QPSK_100_0	42590	AMR WB 23.85kbps	8N	87.72	17.72	≥6	11.72
201	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 5.9 kbps	8N	87.70	17.70	≥6	11.70
202	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS NB 24.4kbps	8N	90.94	20.94	≥6	14.94
203	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 5.9kbps	8N	87.70	17.70	≥6	11.70
204	LTE Band 42 Part27Q	20_QPSK_100_0	42590	EVS WB 128kbps	8N	87.41	17.41	≥6	11.41
205	LTE Band 48	20_QPSK_100_0	55990	AMR NB 4.75kbps	2N	81.12	11.12	≥6	5.12
206	LTE Band 48	20_QPSK_100_0	55990	AMR NB 12.2kbps	2N	81.07	11.07	≥6	5.07
207	LTE Band 48	20_QPSK_100_0	55990	AMR WB 6.6kbps	2N	81.19	11.19	≥6	5.19
208	LTE Band 48	20_QPSK_100_0	55990	AMR WB 23.85kbps	2N	81.08	11.08	≥6	5.08
209	LTE Band 48	20_QPSK_100_0	55990	EVS NB 5.9 kbps	2N	81.07	11.07	≥6	5.07



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

210	LTE Band 48	20_QPSK_100_0	55990	EVS NB 24.4kbps	2N	85.06	15.06	≥6	9.06
211	LTE Band 48	20_QPSK_100_0	55990	EVS WB 5.9kbps	2N	81.36	11.36	≥6	5.36
212	LTE Band 48	20_QPSK_100_0	55990	EVS WB 128kbps	2N	81.09	11.09	≥6	5.09
213	LTE Band 48	20_QPSK_100_0	55990	AMR NB 4.75kbps	8N	87.46	17.46	≥6	11.46
214	LTE Band 48	20_QPSK_100_0	55990	AMR NB 12.2kbps	8N	87.45	17.45	≥6	11.45
215	LTE Band 48	20_QPSK_100_0	55990	AMR WB 6.6kbps	8N	87.24	17.24	≥6	11.24
216	LTE Band 48	20_QPSK_100_0	55990	AMR WB 23.85kbps	8N	87.36	17.36	≥6	11.36
217	LTE Band 48	20_QPSK_100_0	55990	EVS NB 5.9 kbps	8N	87.38	17.38	≥6	11.38
218	LTE Band 48	20_QPSK_100_0	55990	EVS NB 24.4kbps	8N	92.27	22.27	≥6	16.27
219	LTE Band 48	20_QPSK_100_0	55990	EVS WB 5.9kbps	8N	87.53	17.53	≥6	11.53
220	LTE Band 48	20_QPSK_100_0	55990	EVS WB 128kbps	8N	87.20	17.20	≥6	11.20
221	LTE Band 66	20_QPSK_100_0	132322	AMR NB 4.75kbps	2N	80.95	10.95	≥6	4.95
222	LTE Band 66	20_QPSK_100_0	132322	AMR NB 12.2kbps	2N	81.06	11.06	≥6	5.06
223	LTE Band 66	20_QPSK_100_0	132322	AMR WB 6.6kbps	2N	81.06	11.06	≥6	5.06
224	LTE Band 66	20_QPSK_100_0	132322	AMR WB 23.85kbps	2N	80.96	10.96	≥6	4.96
225	LTE Band 66	20_QPSK_100_0	132322	EVS NB 5.9 kbps	2N	81.12	11.12	≥6	5.12
226	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	2N	84.16	14.16	≥6	8.16
227	LTE Band 66	20_QPSK_100_0	132322	EVS WB 5.9kbps	2N	81.08	11.08	≥6	5.08
228	LTE Band 66	20_QPSK_100_0	132322	EVS WB 128kbps	2N	81.15	11.15	≥6	5.15
229	LTE Band 66	20_QPSK_100_0	132322	AMR NB 4.75kbps	8N	87.08	17.08	≥6	11.08
230	LTE Band 66	20_QPSK_100_0	132322	AMR NB 12.2kbps	8N	86.97	16.97	≥6	10.97
231	LTE Band 66	20_QPSK_100_0	132322	AMR WB 6.6kbps	8N	87.02	17.02	≥6	11.02
232	LTE Band 66	20_QPSK_100_0	132322	AMR WB 23.85kbps	8N	86.98	16.98	≥6	10.98
233	LTE Band 66	20_QPSK_100_0	132322	EVS NB 5.9 kbps	8N	86.94	16.94	≥6	10.94
234	LTE Band 66	20_QPSK_100_0	132322	EVS NB 24.4kbps	8N	92.46	22.46	≥6	16.46
235	LTE Band 66	20_QPSK_100_0	132322	EVS WB 5.9kbps	8N	86.93	16.93	≥6	10.93
236	LTE Band 66	20_QPSK_100_0	132322	EVS WB 128kbps	8N	87.59	17.59	≥6	11.59
237	LTE Band 71	20_QPSK_100_0	133322	AMR NB 4.75kbps	2N	81.09	11.09	≥6	5.09
238	LTE Band 71	20_QPSK_100_0	133322	AMR NB 12.2kbps	2N	80.88	10.88	≥6	4.88
239	LTE Band 71	20_QPSK_100_0	133322	AMR WB 6.6kbps	2N	80.98	10.98	≥6	4.98
240	LTE Band 71	20_QPSK_100_0	133322	AMR WB 23.85kbps	2N	80.90	10.90	≥6	4.90
241	LTE Band 71	20_QPSK_100_0	133322	EVS NB 5.9 kbps	2N	81.00	11.00	≥6	5.00
242	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	2N	84.75	14.75	≥6	8.75
243	LTE Band 71	20_QPSK_100_0	133322	EVS WB 5.9kbps	2N	80.94	10.94	≥6	4.94
244	LTE Band 71	20_QPSK_100_0	133322	EVS WB 128kbps	2N	81.13	11.13	≥6	5.13
245	LTE Band 71	20_QPSK_100_0	133322	AMR NB 4.75kbps	8N	87.55	17.55	≥6	11.55
246	LTE Band 71	20_QPSK_100_0	133322	AMR NB 12.2kbps	8N	87.24	17.24	≥6	11.24
247	LTE Band 71	20_QPSK_100_0	133322	AMR WB 6.6kbps	8N	87.25	17.25	≥6	11.25
248	LTE Band 71	20_QPSK_100_0	133322	AMR WB 23.85kbps	8N	87.20	17.20	≥6	11.20
249	LTE Band 71	20_QPSK_100_0	133322	EVS NB 5.9 kbps	8N	87.18	17.18	≥6	11.18
250	LTE Band 71	20_QPSK_100_0	133322	EVS NB 24.4kbps	8N	91.16	21.16	≥6	15.16
251	LTE Band 71	20_QPSK_100_0	133322	EVS WB 5.9kbps	8N	87.05	17.05	≥6	11.05
252	LTE Band 71	20_QPSK_100_0	133322	EVS WB 128kbps	8N	87.44	17.44	≥6	11.44



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

<VoNR>

HAC(Volume control)Test Record						Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
349	FR1 n7	25_DFT-s-OFDM	507000	AMR NB 4.75kbps	2N	81.87	11.87	≥6	5.87
350	FR1 n7	25_DFT-s-OFDM	507000	AMR NB 12.2kbps	2N	81.79	11.79	≥6	5.79
351	FR1 n7	25_DFT-s-OFDM	507000	AMR WB 6.6kbps	2N	81.85	11.85	≥6	5.85
352	FR1 n7	25_DFT-s-OFDM	507000	AMR WB 23.85kbps	2N	81.79	11.79	≥6	5.79
353	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 5.9 kbps	2N	81.94	11.94	≥6	5.94
354	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 24.4kbps	2N	80.96	10.96	≥6	4.96
355	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 5.9kbps	2N	81.99	11.99	≥6	5.99
356	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 128kbps	2N	80.77	10.77	≥6	4.77
357	FR1 n7	25_DFT-s-OFDM	507000	AMR NB 4.75kbps	8N	88.33	18.33	≥6	12.33
358	FR1 n7	25_DFT-s-OFDM	507000	AMR NB 12.2kbps	8N	88.39	18.39	≥6	12.39
359	FR1 n7	25_DFT-s-OFDM	507000	AMR WB 6.6kbps	8N	88.55	18.55	≥6	12.55
360	FR1 n7	25_DFT-s-OFDM	507000	AMR WB 23.85kbps	8N	88.40	18.40	≥6	12.40
361	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 5.9 kbps	8N	88.43	18.43	≥6	12.43
362	FR1 n7	25_DFT-s-OFDM	507000	EVS NB 24.4kbps	8N	88.25	18.25	≥6	12.25
363	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 5.9kbps	8N	88.33	18.33	≥6	12.33
364	FR1 n7	25_DFT-s-OFDM	507000	EVS WB 128kbps	8N	88.46	18.46	≥6	12.46
365	FR1 n12	15_DFT-s-OFDM	141500	AMR NB 4.75kbps	2N	81.48	11.48	≥6	5.48
366	FR1 n12	15_DFT-s-OFDM	141500	AMR NB 12.2kbps	2N	81.20	11.20	≥6	5.20
367	FR1 n12	15_DFT-s-OFDM	141500	AMR WB 6.6kbps	2N	81.26	11.26	≥6	5.26
368	FR1 n12	15_DFT-s-OFDM	141500	AMR WB 23.85kbps	2N	81.29	11.29	≥6	5.29
369	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 5.9 kbps	2N	81.24	11.24	≥6	5.24
370	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 24.4kbps	2N	82.56	12.56	≥6	6.56
371	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 5.9kbps	2N	81.29	11.29	≥6	5.29
372	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 128kbps	2N	81.28	11.28	≥6	5.28
373	FR1 n12	15_DFT-s-OFDM	141500	AMR NB 4.75kbps	8N	87.43	17.43	≥6	11.43
374	FR1 n12	15_DFT-s-OFDM	141500	AMR NB 12.2kbps	8N	87.76	17.76	≥6	11.76
375	FR1 n12	15_DFT-s-OFDM	141500	AMR WB 6.6kbps	8N	87.77	17.77	≥6	11.77
376	FR1 n12	15_DFT-s-OFDM	141500	AMR WB 23.85kbps	8N	87.71	17.71	≥6	11.71
377	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 5.9 kbps	8N	87.74	17.74	≥6	11.74
378	FR1 n12	15_DFT-s-OFDM	141500	EVS NB 24.4kbps	8N	88.71	18.71	≥6	12.71
379	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 5.9kbps	8N	87.60	17.60	≥6	11.60
380	FR1 n12	15_DFT-s-OFDM	141500	EVS WB 128kbps	8N	87.52	17.52	≥6	11.52
381	FR 1 n13	10_DFT-s-OFDM	156400	AMR NB 4.75kbps	2N	81.31	11.31	≥6	5.31
382	FR 1 n13	10_DFT-s-OFDM	156400	AMR NB 12.2kbps	2N	81.14	11.14	≥6	5.14
383	FR 1 n13	10_DFT-s-OFDM	156400	AMR WB 6.6kbps	2N	81.26	11.26	≥6	5.26
384	FR 1 n13	10_DFT-s-OFDM	156400	AMR WB 23.85kbps	2N	81.34	11.34	≥6	5.34
385	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 5.9 kbps	2N	81.17	11.17	≥6	5.17
386	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 24.4kbps	2N	81.02	11.02	≥6	5.02
387	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 5.9kbps	2N	81.33	11.33	≥6	5.33
388	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 128kbps	2N	80.95	10.95	≥6	4.95
389	FR 1 n13	10_DFT-s-OFDM	156400	AMR NB 4.75kbps	8N	87.44	17.44	≥6	11.44
390	FR 1 n13	10_DFT-s-OFDM	156400	AMR NB 12.2kbps	8N	87.80	17.80	≥6	11.80
391	FR 1 n13	10_DFT-s-OFDM	156400	AMR WB 6.6kbps	8N	87.61	17.61	≥6	11.61
392	FR 1 n13	10_DFT-s-OFDM	156400	AMR WB 23.85kbps	8N	87.83	17.83	≥6	11.83



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

393	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 5.9 kbps	8N	87.84	17.84	≥6	11.84
394	FR 1 n13	10_DFT-s-OFDM	156400	EVS NB 24.4kbps	8N	87.25	17.25	≥6	11.25
395	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 5.9kbps	8N	87.70	17.70	≥6	11.70
396	FR 1 n13	10_DFT-s-OFDM	156400	EVS WB 128kbps	8N	87.43	17.43	≥6	11.43
397	FR1 n14	10_DFT-s-OFDM	158600	AMR NB 4.75kbps	2N	81.37	11.37	≥6	5.37
398	FR1 n14	10_DFT-s-OFDM	158600	AMR NB 12.2kbps	2N	81.18	11.18	≥6	5.18
399	FR1 n14	10_DFT-s-OFDM	158600	AMR WB 6.6kbps	2N	81.32	11.32	≥6	5.32
400	FR1 n14	10_DFT-s-OFDM	158600	AMR WB 23.85kbps	2N	81.29	11.29	≥6	5.29
401	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 5.9 kbps	2N	81.21	11.21	≥6	5.21
402	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 24.4kbps	2N	80.77	10.77	≥6	4.77
403	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 5.9kbps	2N	81.30	11.30	≥6	5.30
404	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 128kbps	2N	80.82	10.82	≥6	4.82
405	FR1 n14	10_DFT-s-OFDM	158600	AMR NB 4.75kbps	8N	87.62	17.62	≥6	11.62
406	FR1 n14	10_DFT-s-OFDM	158600	AMR NB 12.2kbps	8N	87.51	17.51	≥6	11.51
407	FR1 n14	10_DFT-s-OFDM	158600	AMR WB 6.6kbps	8N	87.71	17.71	≥6	11.71
408	FR1 n14	10_DFT-s-OFDM	158600	AMR WB 23.85kbps	8N	87.73	17.73	≥6	11.73
409	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 5.9 kbps	8N	87.65	17.65	≥6	11.65
410	FR1 n14	10_DFT-s-OFDM	158600	EVS NB 24.4kbps	8N	87.44	17.44	≥6	11.44
411	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 5.9kbps	8N	87.65	17.65	≥6	11.65
412	FR1 n14	10_DFT-s-OFDM	158600	EVS WB 128kbps	8N	87.43	17.43	≥6	11.43
413	FR1 n25	40_DFT-s-OFDM	376500	AMR NB 4.75kbps	2N	81.24	11.24	≥6	5.24
414	FR1 n25	40_DFT-s-OFDM	376500	AMR NB 12.2kbps	2N	81.26	11.26	≥6	5.26
415	FR1 n25	40_DFT-s-OFDM	376500	AMR WB 6.6kbps	2N	81.46	11.46	≥6	5.46
416	FR1 n25	40_DFT-s-OFDM	376500	AMR WB 23.85kbps	2N	81.42	11.42	≥6	5.42
417	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 5.9 kbps	2N	81.37	11.37	≥6	5.37
418	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 24.4kbps	2N	80.97	10.97	≥6	4.97
419	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 5.9kbps	2N	81.45	11.45	≥6	5.45
420	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 128kbps	2N	81.06	11.06	≥6	5.06
421	FR1 n25	40_DFT-s-OFDM	376500	AMR NB 4.75kbps	8N	87.45	17.45	≥6	11.45
422	FR1 n25	40_DFT-s-OFDM	376500	AMR NB 12.2kbps	8N	87.43	17.43	≥6	11.43
423	FR1 n25	40_DFT-s-OFDM	376500	AMR WB 6.6kbps	8N	87.52	17.52	≥6	11.52
424	FR1 n25	40_DFT-s-OFDM	376500	AMR WB 23.85kbps	8N	87.51	17.51	≥6	11.51
425	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 5.9 kbps	8N	87.47	17.47	≥6	11.47
426	FR1 n25	40_DFT-s-OFDM	376500	EVS NB 24.4kbps	8N	87.38	17.38	≥6	11.38
427	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 5.9kbps	8N	87.51	17.51	≥6	11.51
428	FR1 n25	40_DFT-s-OFDM	376500	EVS WB 128kbps	8N	87.38	17.38	≥6	11.38
429	FR1 n26	20_DFT-s-OFDM	166300	AMR NB 4.75kbps	2N	80.48	10.48	≥6	4.48
430	FR1 n26	20_DFT-s-OFDM	166300	AMR NB 12.2kbps	2N	80.80	10.80	≥6	4.80
431	FR1 n26	20_DFT-s-OFDM	166300	AMR WB 6.6kbps	2N	80.81	10.81	≥6	4.81
432	FR1 n26	20_DFT-s-OFDM	166300	AMR WB 23.85kbps	2N	80.50	10.50	≥6	4.50
433	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 5.9 kbps	2N	80.75	10.75	≥6	4.75
434	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 24.4kbps	2N	81.84	11.84	≥6	5.84
435	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 5.9kbps	2N	80.71	10.71	≥6	4.71
436	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 128kbps	2N	81.93	11.93	≥6	5.93
437	FR1 n26	20_DFT-s-OFDM	166300	AMR NB 4.75kbps	8N	87.05	17.05	≥6	11.05
438	FR1 n26	20_DFT-s-OFDM	166300	AMR NB 12.2kbps	8N	87.08	17.08	≥6	11.08
439	FR1 n26	20_DFT-s-OFDM	166300	AMR WB 6.6kbps	8N	87.17	17.17	≥6	11.17
440	FR1 n26	20_DFT-s-OFDM	166300	AMR WB 23.85kbps	8N	87.02	17.02	≥6	11.02
441	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 5.9 kbps	8N	87.15	17.15	≥6	11.15
442	FR1 n26	20_DFT-s-OFDM	166300	EVS NB 24.4kbps	8N	87.20	17.20	≥6	11.20



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

443	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 5.9kbps	8N	87.26	17.26	≥6	11.26
444	FR1 n26	20_DFT-s-OFDM	166300	EVS WB 128kbps	8N	87.15	17.15	≥6	11.15
445	FR1 n30	10_DFT-s-OFDM	462000	AMR NB 4.75kbps	2N	81.01	11.01	≥6	5.01
446	FR1 n30	10_DFT-s-OFDM	462000	AMR NB 12.2kbps	2N	80.99	10.99	≥6	4.99
447	FR1 n30	10_DFT-s-OFDM	462000	AMR WB 6.6kbps	2N	81.02	11.02	≥6	5.02
448	FR1 n30	10_DFT-s-OFDM	462000	AMR WB 23.85kbps	2N	81.00	11.00	≥6	5.00
449	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 5.9 kbps	2N	80.96	10.96	≥6	4.96
450	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 24.4kbps	2N	80.99	10.99	≥6	4.99
451	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 5.9kbps	2N	81.01	11.01	≥6	5.01
452	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 128kbps	2N	81.20	11.20	≥6	5.20
453	FR1 n30	10_DFT-s-OFDM	462000	AMR NB 4.75kbps	8N	87.21	17.21	≥6	11.21
454	FR1 n30	10_DFT-s-OFDM	462000	AMR NB 12.2kbps	8N	87.23	17.23	≥6	11.23
455	FR1 n30	10_DFT-s-OFDM	462000	AMR WB 6.6kbps	8N	87.23	17.23	≥6	11.23
456	FR1 n30	10_DFT-s-OFDM	462000	AMR WB 23.85kbps	8N	87.43	17.43	≥6	11.43
457	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 5.9 kbps	8N	87.51	17.51	≥6	11.51
458	FR1 n30	10_DFT-s-OFDM	462000	EVS NB 24.4kbps	8N	87.22	17.22	≥6	11.22
459	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 5.9kbps	8N	87.39	17.39	≥6	11.39
460	FR1 n30	10_DFT-s-OFDM	462000	EVS WB 128kbps	8N	87.35	17.35	≥6	11.35
461	FR1 n38	40_DFT-s-OFDM	519000	AMR NB 4.75kbps	2N	81.04	11.04	≥6	5.04
462	FR1 n38	40_DFT-s-OFDM	519000	AMR NB 12.2kbps	2N	80.95	10.95	≥6	4.95
463	FR1 n38	40_DFT-s-OFDM	519000	AMR WB 6.6kbps	2N	81.02	11.02	≥6	5.02
464	FR1 n38	40_DFT-s-OFDM	519000	AMR WB 23.85kbps	2N	81.01	11.01	≥6	5.01
465	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 5.9 kbps	2N	80.97	10.97	≥6	4.97
466	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 24.4kbps	2N	81.05	11.05	≥6	5.05
467	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 5.9kbps	2N	81.03	11.03	≥6	5.03
468	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 128kbps	2N	81.07	11.07	≥6	5.07
469	FR1 n38	40_DFT-s-OFDM	519000	AMR NB 4.75kbps	8N	87.19	17.19	≥6	11.19
470	FR1 n38	40_DFT-s-OFDM	519000	AMR NB 12.2kbps	8N	87.23	17.23	≥6	11.23
471	FR1 n38	40_DFT-s-OFDM	519000	AMR WB 6.6kbps	8N	87.24	17.24	≥6	11.24
472	FR1 n38	40_DFT-s-OFDM	519000	AMR WB 23.85kbps	8N	87.52	17.52	≥6	11.52
473	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 5.9 kbps	8N	87.68	17.68	≥6	11.68
474	FR1 n38	40_DFT-s-OFDM	519000	EVS NB 24.4kbps	8N	88.44	18.44	≥6	12.44
475	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 5.9kbps	8N	87.49	17.49	≥6	11.49
476	FR1 n38	40_DFT-s-OFDM	519000	EVS WB 128kbps	8N	88.33	18.33	≥6	12.33
477	FR1 n41	100_DFT-s-OFDM	518598	AMR NB 4.75kbps	2N	82.10	12.10	≥6	6.10
478	FR1 n41	100_DFT-s-OFDM	518598	AMR NB 12.2kbps	2N	81.94	11.94	≥6	5.94
479	FR1 n41	100_DFT-s-OFDM	518598	AMR WB 6.6kbps	2N	81.99	11.99	≥6	5.99
480	FR1 n41	100_DFT-s-OFDM	518598	AMR WB 23.85kbps	2N	82.02	12.02	≥6	6.02
481	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 5.9 kbps	2N	81.98	11.98	≥6	5.98
482	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 24.4kbps	2N	80.97	10.97	≥6	4.97
483	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 5.9kbps	2N	82.01	12.01	≥6	6.01
484	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 128kbps	2N	81.00	11.00	≥6	5.00
485	FR1 n41	100_DFT-s-OFDM	518598	AMR NB 4.75kbps	8N	88.47	18.47	≥6	12.47
486	FR1 n41	100_DFT-s-OFDM	518598	AMR NB 12.2kbps	8N	88.42	18.42	≥6	12.42
487	FR1 n41	100_DFT-s-OFDM	518598	AMR WB 6.6kbps	8N	88.50	18.50	≥6	12.50
488	FR1 n41	100_DFT-s-OFDM	518598	AMR WB 23.85kbps	8N	88.48	18.48	≥6	12.48
489	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 5.9 kbps	8N	88.36	18.36	≥6	12.36
490	FR1 n41	100_DFT-s-OFDM	518598	EVS NB 24.4kbps	8N	87.62	17.62	≥6	11.62
491	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 5.9kbps	8N	88.46	18.46	≥6	12.46
492	FR1 n41	100_DFT-s-OFDM	518598	EVS WB 128kbps	8N	87.38	17.38	≥6	11.38



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

493	FR1 n48	40_DFT-s-OFDM	641666	AMR NB 4.75kbps	2N	82.65	12.65	≥6	6.65
494	FR1 n48	40_DFT-s-OFDM	641666	AMR NB 12.2kbps	2N	82.48	12.48	≥6	6.48
495	FR1 n48	40_DFT-s-OFDM	641666	AMR WB 6.6kbps	2N	81.00	11.00	≥6	5.00
496	FR1 n48	40_DFT-s-OFDM	641666	AMR WB 23.85kbps	2N	80.97	10.97	≥6	4.97
497	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 5.9 kbps	2N	81.92	11.92	≥6	5.92
498	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 24.4kbps	2N	80.73	10.73	≥6	4.73
499	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 5.9kbps	2N	81.04	11.04	≥6	5.04
500	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 128kbps	2N	81.10	11.10	≥6	5.10
501	FR1 n48	40_DFT-s-OFDM	641666	AMR NB 4.75kbps	8N	86.93	16.93	≥6	10.93
502	FR1 n48	40_DFT-s-OFDM	641666	AMR NB 12.2kbps	8N	86.94	16.94	≥6	10.94
503	FR1 n48	40_DFT-s-OFDM	641666	AMR WB 6.6kbps	8N	86.88	16.88	≥6	10.88
504	FR1 n48	40_DFT-s-OFDM	641666	AMR WB 23.85kbps	8N	87.10	17.10	≥6	11.10
505	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 5.9 kbps	8N	86.94	16.94	≥6	10.94
506	FR1 n48	40_DFT-s-OFDM	641666	EVS NB 24.4kbps	8N	87.01	17.01	≥6	11.01
507	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 5.9kbps	8N	86.45	16.45	≥6	10.45
508	FR1 n48	40_DFT-s-OFDM	641666	EVS WB 128kbps	8N	86.43	16.43	≥6	10.43
509	FR1 n66	40_DFT-s-OFDM	349000	AMR NB 4.75kbps	2N	81.22	11.22	≥6	5.22
510	FR1 n66	40_DFT-s-OFDM	349000	AMR NB 12.2kbps	2N	81.09	11.09	≥6	5.09
511	FR1 n66	40_DFT-s-OFDM	349000	AMR WB 6.6kbps	2N	80.39	10.39	≥6	4.39
512	FR1 n66	40_DFT-s-OFDM	349000	AMR WB 23.85kbps	2N	80.19	10.19	≥6	4.19
513	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 5.9 kbps	2N	82.54	12.54	≥6	6.54
514	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 24.4kbps	2N	82.51	12.51	≥6	6.51
515	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 5.9kbps	2N	80.67	10.67	≥6	4.67
516	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 128kbps	2N	80.59	10.59	≥6	4.59
517	FR1 n66	40_DFT-s-OFDM	349000	AMR NB 4.75kbps	8N	87.23	17.23	≥6	11.23
518	FR1 n66	40_DFT-s-OFDM	349000	AMR NB 12.2kbps	8N	87.26	17.26	≥6	11.26
519	FR1 n66	40_DFT-s-OFDM	349000	AMR WB 6.6kbps	8N	86.70	16.70	≥6	10.70
520	FR1 n66	40_DFT-s-OFDM	349000	AMR WB 23.85kbps	8N	86.74	16.74	≥6	10.74
521	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 5.9 kbps	8N	88.04	18.04	≥6	12.04
522	FR1 n66	40_DFT-s-OFDM	349000	EVS NB 24.4kbps	8N	88.17	18.17	≥6	12.17
523	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 5.9kbps	8N	86.69	16.69	≥6	10.69
524	FR1 n66	40_DFT-s-OFDM	349000	EVS WB 128kbps	8N	86.85	16.85	≥6	10.85
525	FR1 n71	20_DFT-s-OFDM	136100	AMR NB 4.75kbps	2N	81.77	11.77	≥6	5.77
526	FR1 n71	20_DFT-s-OFDM	136100	AMR NB 12.2kbps	2N	81.82	11.82	≥6	5.82
527	FR1 n71	20_DFT-s-OFDM	136100	AMR WB 6.6kbps	2N	79.89	9.89	≥6	3.89
528	FR1 n71	20_DFT-s-OFDM	136100	AMR WB 23.85kbps	2N	79.99	9.99	≥6	3.99
529	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 5.9 kbps	2N	81.98	11.98	≥6	5.98
530	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 24.4kbps	2N	82.08	12.08	≥6	6.08
531	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 5.9kbps	2N	80.08	10.08	≥6	4.08
532	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 128kbps	2N	80.57	10.57	≥6	4.57
533	FR1 n71	20_DFT-s-OFDM	136100	AMR NB 4.75kbps	8N	88.09	18.09	≥6	12.09
534	FR1 n71	20_DFT-s-OFDM	136100	AMR NB 12.2kbps	8N	88.09	18.09	≥6	12.09
535	FR1 n71	20_DFT-s-OFDM	136100	AMR WB 6.6kbps	8N	86.52	16.52	≥6	10.52
536	FR1 n71	20_DFT-s-OFDM	136100	AMR WB 23.85kbps	8N	86.66	16.66	≥6	10.66
537	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 5.9 kbps	8N	88.22	18.22	≥6	12.22
538	FR1 n71	20_DFT-s-OFDM	136100	EVS NB 24.4kbps	8N	88.02	18.02	≥6	12.02
539	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 5.9kbps	8N	86.67	16.67	≥6	10.67
540	FR1 n71	20_DFT-s-OFDM	136100	EVS WB 128kbps	8N	86.68	16.68	≥6	10.68



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

541	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR NB 4.75kbps	2N	82.12	12.12	≥6	6.12
542	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR NB 12.2kbps	2N	82.19	12.19	≥6	6.19
543	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR WB 6.6kbps	2N	82.25	12.25	≥6	6.25
544	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR WB 23.85kbps	2N	82.29	12.29	≥6	6.29
545	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 5.9 kbps	2N	82.21	12.21	≥6	6.21
546	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 24.4kbps	2N	80.91	10.91	≥6	4.91
547	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 5.9kbps	2N	82.12	12.12	≥6	6.12
548	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 128kbps	2N	81.10	11.10	≥6	5.10
549	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR NB 4.75kbps	8N	88.36	18.36	≥6	12.36
550	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR NB 12.2kbps	8N	88.31	18.31	≥6	12.31
551	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR WB 6.6kbps	8N	88.33	18.33	≥6	12.33
552	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	AMR WB 23.85kbps	8N	88.26	18.26	≥6	12.26
553	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 5.9 kbps	8N	88.45	18.45	≥6	12.45
554	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS NB 24.4kbps	8N	88.60	18.60	≥6	12.60
555	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 5.9kbps	8N	88.34	18.34	≥6	12.34
556	FR1 n77_Part27Q	100_DFT-s-OFDM	633334	EVS WB 128kbps	8N	88.41	18.41	≥6	12.41
557	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR NB 4.75kbps	2N	81.62	11.62	≥6	5.62
558	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR NB 12.2kbps	2N	81.59	11.59	≥6	5.59
559	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR WB 6.6kbps	2N	79.23	9.23	≥6	3.23
560	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR WB 23.85kbps	2N	79.24	9.24	≥6	3.24
561	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 5.9 kbps	2N	81.46	11.46	≥6	5.46
562	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 24.4kbps	2N	81.66	11.66	≥6	5.66
563	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 5.9kbps	2N	79.34	9.34	≥6	3.34
564	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 128kbps	2N	80.45	10.45	≥6	4.45
565	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR NB 4.75kbps	8N	87.78	17.78	≥6	11.78
566	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR NB 12.2kbps	8N	87.83	17.83	≥6	11.83
567	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR WB 6.6kbps	8N	85.72	15.72	≥6	9.72
568	FR1 n77_Part27O	100_DFT-s-OFDM	656000	AMR WB 23.85kbps	8N	85.59	15.59	≥6	9.59
569	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 5.9 kbps	8N	87.82	17.82	≥6	11.82
570	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS NB 24.4kbps	8N	88.02	18.02	≥6	12.02
571	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 5.9kbps	8N	85.64	15.64	≥6	9.64
572	FR1 n77_Part27O	100_DFT-s-OFDM	656000	EVS WB 128kbps	8N	86.21	16.21	≥6	10.21

<WLAN>

HAC(Volume control)Test Record						Conversational Gain			
Plot No.	Air Interface	Modulation/Mode	Channel	Codec	Mounting Force(N)	Measured-dBSPL Level	Conv.Gain(dB)	Limit(dB)	Margin to limit(dB)
253	WIFI2.4GHz	802.11b 1Mbps	6	AMR NB 4.75kbps	2N	78.65	8.65	≥6	2.65
254	WIFI2.4GHz	802.11b 1Mbps	6	AMR NB 12.2kbps	2N	78.68	8.68	≥6	2.68
255	WIFI2.4GHz	802.11b 1Mbps	6	AMR WB 6.6kbps	2N	78.67	8.67	≥6	2.67
256	WIFI2.4GHz	802.11b 1Mbps	6	AMR WB 23.85kbps	2N	78.71	8.71	≥6	2.71
257	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 5.9 kbps	2N	78.60	8.60	≥6	2.60
258	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	2N	78.80	8.80	≥6	2.80
259	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 5.9kbps	2N	78.75	8.75	≥6	2.75
260	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 128kbps	2N	78.80	8.80	≥6	2.80
261	WIFI2.4GHz	802.11b 1Mbps	6	AMR NB 4.75kbps	8N	86.17	16.17	≥6	10.17



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

262	WIFI2.4GHz	802.11b 1Mbps	6	AMR NB 12.2kbps	8N	86.12	16.12	≥6	10.12
263	WIFI2.4GHz	802.11b 1Mbps	6	AMR WB 6.6kbps	8N	86.35	16.35	≥6	10.35
264	WIFI2.4GHz	802.11b 1Mbps	6	AMR WB 23.85kbps	8N	86.15	16.15	≥6	10.15
265	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 5.9 kbps	8N	86.21	16.21	≥6	10.21
266	WIFI2.4GHz	802.11b 1Mbps	6	EVS NB 24.4kbps	8N	87.47	17.47	≥6	11.47
267	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 5.9kbps	8N	85.98	15.98	≥6	9.98
268	WIFI2.4GHz	802.11b 1Mbps	6	EVS WB 128kbps	8N	87.68	17.68	≥6	11.68
269	WIFI5GHz	802.11a 6M	40	AMR NB 4.75kbps	2N	78.79	8.79	≥6	2.79
270	WIFI5GHz	802.11a 6M	40	AMR NB 12.2kbps	2N	78.75	8.75	≥6	2.75
271	WIFI5GHz	802.11a 6M	40	AMR WB 6.6kbps	2N	78.67	8.67	≥6	2.67
272	WIFI5GHz	802.11a 6M	40	AMR WB 23.85kbps	2N	78.82	8.82	≥6	2.82
273	WIFI5GHz	802.11a 6M	40	EVS NB 5.9 kbps	2N	78.76	8.76	≥6	2.76
274	WIFI5GHz	802.11a 6M	40	EVS NB 24.4kbps	2N	78.79	8.79	≥6	2.79
275	WIFI5GHz	802.11a 6M	40	EVS WB 5.9kbps	2N	78.86	8.86	≥6	2.86
276	WIFI5GHz	802.11a 6M	40	EVS WB 128kbps	2N	78.88	8.88	≥6	2.88
277	WIFI5GHz	802.11a 6M	40	AMR NB 4.75kbps	8N	85.97	15.97	≥6	9.97
278	WIFI5GHz	802.11a 6M	40	AMR NB 12.2kbps	8N	86.41	16.41	≥6	10.41
279	WIFI5GHz	802.11a 6M	40	AMR WB 6.6kbps	8N	86.30	16.30	≥6	10.30
280	WIFI5GHz	802.11a 6M	40	AMR WB 23.85kbps	8N	86.14	16.14	≥6	10.14
281	WIFI5GHz	802.11a 6M	40	EVS NB 5.9 kbps	8N	85.94	15.94	≥6	9.94
282	WIFI5GHz	802.11a 6M	40	EVS NB 24.4kbps	8N	87.35	17.35	≥6	11.35
283	WIFI5GHz	802.11a 6M	40	EVS WB 5.9kbps	8N	86.28	16.28	≥6	10.28
284	WIFI5GHz	802.11a 6M	40	EVS WB 128kbps	8N	86.14	16.14	≥6	10.14
285	WIFI5GHz	802.11a 6M	60	AMR NB 4.75kbps	2N	78.77	8.77	≥6	2.77
286	WIFI5GHz	802.11a 6M	60	AMR NB 12.2kbps	2N	78.72	8.72	≥6	2.72
287	WIFI5GHz	802.11a 6M	60	AMR WB 6.6kbps	2N	78.79	8.79	≥6	2.79
288	WIFI5GHz	802.11a 6M	60	AMR WB 23.85kbps	2N	78.74	8.74	≥6	2.74
289	WIFI5GHz	802.11a 6M	60	EVS NB 5.9 kbps	2N	78.87	8.87	≥6	2.87
290	WIFI5GHz	802.11a 6M	60	EVS NB 24.4kbps	2N	78.82	8.82	≥6	2.82
291	WIFI5GHz	802.11a 6M	60	EVS WB 5.9kbps	2N	78.72	8.72	≥6	2.72
292	WIFI5GHz	802.11a 6M	60	EVS WB 128kbps	2N	78.71	8.71	≥6	2.71
293	WIFI5GHz	802.11a 6M	60	AMR NB 4.75kbps	8N	86.08	16.08	≥6	10.08
294	WIFI5GHz	802.11a 6M	60	AMR NB 12.2kbps	8N	86.14	16.14	≥6	10.14
295	WIFI5GHz	802.11a 6M	60	AMR WB 6.6kbps	8N	86.25	16.25	≥6	10.25
296	WIFI5GHz	802.11a 6M	60	AMR WB 23.85kbps	8N	86.47	16.47	≥6	10.47
297	WIFI5GHz	802.11a 6M	60	EVS NB 5.9 kbps	8N	86.39	16.39	≥6	10.39
298	WIFI5GHz	802.11a 6M	60	EVS NB 24.4kbps	8N	87.26	17.26	≥6	11.26
299	WIFI5GHz	802.11a 6M	60	EVS WB 5.9kbps	8N	86.18	16.18	≥6	10.18
300	WIFI5GHz	802.11a 6M	60	EVS WB 128kbps	8N	87.13	17.13	≥6	11.13
301	WIFI5GHz	802.11a 6M	132	AMR NB 4.75kbps	2N	80.63	10.63	≥6	4.63
302	WIFI5GHz	802.11a 6M	132	AMR NB 12.2kbps	2N	80.65	10.65	≥6	4.65
303	WIFI5GHz	802.11a 6M	132	AMR WB 6.6kbps	2N	80.59	10.59	≥6	4.59
304	WIFI5GHz	802.11a 6M	132	AMR WB 23.85kbps	2N	80.66	10.66	≥6	4.66
305	WIFI5GHz	802.11a 6M	132	EVS NB 5.9 kbps	2N	80.70	10.70	≥6	4.70
306	WIFI5GHz	802.11a 6M	132	EVS NB 24.4kbps	2N	81.87	11.87	≥6	5.87
307	WIFI5GHz	802.11a 6M	132	EVS WB 5.9kbps	2N	80.65	10.65	≥6	4.65
308	WIFI5GHz	802.11a 6M	132	EVS WB 128kbps	2N	80.85	10.85	≥6	4.85
309	WIFI5GHz	802.11a 6M	132	AMR NB 4.75kbps	8N	87.20	17.20	≥6	11.20
310	WIFI5GHz	802.11a 6M	132	AMR NB 12.2kbps	8N	86.95	16.95	≥6	10.95
311	WIFI5GHz	802.11a 6M	132	AMR WB 6.6kbps	8N	87.20	17.20	≥6	11.20



**BUREAU
VERITAS**

FCC HAC (TIA5050) Test Report



Certificate #6613.01

312	WIFI5GHz	802.11a 6M	132	AMR WB 23.85kbps	8N	86.94	16.94	≥6	10.94
313	WIFI5GHz	802.11a 6M	132	EVS NB 5.9 kbps	8N	86.96	16.96	≥6	10.96
314	WIFI5GHz	802.11a 6M	132	EVS NB 24.4kbps	8N	86.43	16.43	≥6	10.43
315	WIFI5GHz	802.11a 6M	132	EVS WB 5.9kbps	8N	86.92	16.92	≥6	10.92
316	WIFI5GHz	802.11a 6M	132	EVS WB 128kbps	8N	87.20	17.20	≥6	11.20
317	WIFI5GHz	802.11a 6M	157	AMR NB 4.75kbps	2N	82.10	12.10	≥6	6.10
318	WIFI5GHz	802.11a 6M	157	AMR NB 12.2kbps	2N	82.05	12.05	≥6	6.05
319	WIFI5GHz	802.11a 6M	157	AMR WB 6.6kbps	2N	82.12	12.12	≥6	6.12
320	WIFI5GHz	802.11a 6M	157	AMR WB 23.85kbps	2N	82.04	12.04	≥6	6.04
321	WIFI5GHz	802.11a 6M	157	EVS NB 5.9 kbps	2N	81.91	11.91	≥6	5.91
322	WIFI5GHz	802.11a 6M	157	EVS NB 24.4kbps	2N	79.91	9.91	≥6	3.91
323	WIFI5GHz	802.11a 6M	157	EVS WB 5.9kbps	2N	82.28	12.28	≥6	6.28
324	WIFI5GHz	802.11a 6M	157	EVS WB 128kbps	2N	79.09	9.09	≥6	3.09
325	WIFI5GHz	802.11a 6M	157	AMR NB 4.75kbps	8N	88.19	18.19	≥6	12.19
326	WIFI5GHz	802.11a 6M	157	AMR NB 12.2kbps	8N	88.11	18.11	≥6	12.11
327	WIFI5GHz	802.11a 6M	157	AMR WB 6.6kbps	8N	88.45	18.45	≥6	12.45
328	WIFI5GHz	802.11a 6M	157	AMR WB 23.85kbps	8N	88.07	18.07	≥6	12.07
329	WIFI5GHz	802.11a 6M	157	EVS NB 5.9 kbps	8N	88.28	18.28	≥6	12.28
330	WIFI5GHz	802.11a 6M	157	EVS NB 24.4kbps	8N	87.98	17.98	≥6	11.98
331	WIFI5GHz	802.11a 6M	157	EVS WB 5.9kbps	8N	88.24	18.24	≥6	12.24
332	WIFI5GHz	802.11a 6M	157	EVS WB 128kbps	8N	85.70	15.70	≥6	9.70
333	WIFI 6GHz	802.11ax-HE20	5	AMR NB 4.75kbps	2N	81.08	11.08	≥6	5.08
334	WIFI 6GHz	802.11ax-HE20	5	AMR NB 12.2kbps	2N	81.27	11.27	≥6	5.27
335	WIFI 6GHz	802.11ax-HE20	5	AMR WB 6.6kbps	2N	81.17	11.17	≥6	5.17
336	WIFI 6GHz	802.11ax-HE20	5	AMR WB 23.85kbps	2N	81.10	11.10	≥6	5.10
337	WIFI 6GHz	802.11ax-HE20	5	EVS NB 5.9 kbps	2N	81.18	11.18	≥6	5.18
338	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	2N	87.98	17.98	≥6	11.98
339	WIFI 6GHz	802.11ax-HE20	5	EVS WB 5.9kbps	2N	81.35	11.35	≥6	5.35
340	WIFI 6GHz	802.11ax-HE20	5	EVS WB 128kbps	2N	80.55	10.55	≥6	4.55
341	WIFI 6GHz	802.11ax-HE20	5	AMR NB 4.75kbps	8N	86.75	16.75	≥6	10.75
342	WIFI 6GHz	802.11ax-HE20	5	AMR NB 12.2kbps	8N	87.02	17.02	≥6	11.02
343	WIFI 6GHz	802.11ax-HE20	5	AMR WB 6.6kbps	8N	86.74	16.74	≥6	10.74
344	WIFI 6GHz	802.11ax-HE20	5	AMR WB 23.85kbps	8N	86.72	16.72	≥6	10.72
345	WIFI 6GHz	802.11ax-HE20	5	EVS NB 5.9 kbps	8N	86.89	16.89	≥6	10.89
346	WIFI 6GHz	802.11ax-HE20	5	EVS NB 24.4kbps	8N	88.06	18.06	≥6	12.06
347	WIFI 6GHz	802.11ax-HE20	5	EVS WB 5.9kbps	8N	86.62	16.62	≥6	10.62
348	WIFI 6GHz	802.11ax-HE20	5	EVS WB 128kbps	8N	86.95	16.95	≥6	10.95

Test Engineer: Gao Guannan and Wang Yuyan

11. Uncertainty 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



BUREAU
VERITAS

FCC HAC (TIA5050) Test Report



Certificate #6613.01

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:

Add: Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

Tel: [+86 \(0557\) 368 1008](tel:+86(0557)3681008)

The road map of all our labs can be found in our web site also

Web: <http://www.7Layers.com>

---END---



BUREAU
VERITAS



Appendix A. Volume Control Evaluation Results

Appendix B: Calibration Certificate

Appendix C. Photographs of EUT and Setup