Volume Control TEST REPORT

No.23T04Z80206-27

for

OnePlus Technology (Shenzhen) Co., Ltd.

Mobile Phone

CPH2611

FCC ID: 2ABZ2-AA560

with

Hardware Version: 11
Software Version: OxygenOS V14.0

Issued Date: 2023-11-28

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z80206-27	Rev.0	1st edition	2023-11-28

Note: the latest revision of the test report supersedes all previous version.

CONTENTS

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

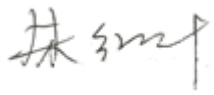
1.3. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	20-75%
Ambient noise of acoustic chamber	14dB(A) and is compliance with requirement of standards (SEE ANNEX H)

1.4. Project data

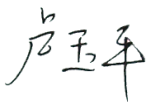
Testing Start Date:	2023-10-18
Testing End Date:	2023-11-23

1.5. Signature



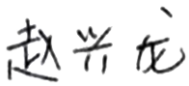
Zhu Hongye

(Prepared this test report)



Lu Yuping

(Reviewed this test report)



Zhao Xinglong

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.
City:	Shenzhen
Postal Code:	/
Country:	P.R. China
Telephone:	(86)75561882366
Fax:	/

2.2. Manufacturer Information

Company Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China.
City:	Shenzhen
Postal Code:	/
Country:	P.R. China
Telephone:	(86)75561882366
Fax:	/

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

General Information:

Description	Mobile Phone
Model name/HVIN	CPH2611
Marketing Name/PMN	/
Brand name	OnePlus
FCC ID	2ABZ2-AA560
Extreme Temperature	0/+35℃
Nominal Voltage	7.82V
Extreme High Voltage	9V
Extreme Low Voltage	6.6V

Supported Bands:

UMTS Frequency Band(s)	Band 1/2/4/5/8
GSM Frequency Band(s)	GSM850/900/1800/1900
E-UTRA Frequency Band(s)	Band 01/02/03/04/05/07/08/12/13/17/18/19/20/25/26/28/30/38/39/40/41/48/66/71
Wi-Fi Mode(s)	2.4G/5G/6G
5G Frequency Band(s)	N1/2/3/5/7/8/20/25/28/38/40/41/66/71/77/78

Supported Codecs:

UMTS Audio Codec(s)	AMR NB/AMR WB
GSM Audio Codec (s)	EFR/AMR NB/AMR WB
E-UTRA Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
Wi-Fi Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
5G Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
OTT	Google Meet

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT35a	IMEI1:869135060025693 IMEI2:869135060025685	11	OxygenOS V14.0	2023-10-08

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE

AE ID*	Description	SN
/	/	/

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex B for detailed information, is supplied by the client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
ANSI C63.19	American National Standard Methods of Measurement of Compatibility Between Wireless Communications Devices and Hearing Aids	2019
TIA 5050	Telecommunications Communications Products Receive Volume Control Requirements for Wireless (Mobile) Devices	2018 Edition
285076 D04 Volume Control v02	GUIDANCE FOR PERFORMING VOLUME CONTROL MEASUREMENTS ON MOBILE HANDSETS	2023.09.29
285076 D05 HAC Waiver DA 23-914 v01	HAC COMPLIANCE UNDER WAIVER DA 23-914	2023.09.29

5. Air Interfaces / Bands used for testing

The codec bit rates of the applicant's choosing are EVS-NB 24.4kbps and EVS-WB 24.4kbps.

Air-interface	Band	Tested Codec	Tested Rate(kbps)
GSM	850/1900	EFR	/
WCDMA (UMTS)	Band 2/4	AMR-NB	4.75/12.2
		AMR-WB	6.6/23.85
VoLTE	Band 1/2/4/7/25/41/71	AMR-NB	4.75/12.2
		AMR-WB	6.6/23.85
		EVS-NB	24.4
		EVS-WB	24.4
VoWiFi	802.11b/g	AMR-WB	6.6
		EVS-WB	24.4
VoNR	Band 2/25/41/71	AMR-WB	6.6
		EVS-WB	24.4

6. Test Results

6.1. Test summary and Conclusions

The volume control measurement method is in accordance with the TIA 5050-2018.
The EUT was tested in CTTL acoustics laboratory. All the detail results are showed in section 6.3.
The volume control investigation includes 2 parts:

(1) Part 1: Investigating the worst-case (Conversational Gain, Receive Distortion and Noise Performance, Receive Acoustic Frequency Response Performance) of the codec which the manufacturer chosen;

(2) Part 2: Investigating the worst-case (only Conversational Gain) besides the codec which the manufacturer chosen.

Table 6.1-1: the worst-case test results of the chosen codec of telephony call

Air-interface & Band	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Volume Level	Codec	NB/WB	Bit Rate [kbps]	2N/8N [N]	Conv. Gain (ANNEX D) [dB]	RFR (ANNEX D)	Minimum Distortion (ANNEX D) [Hz]	Minimum Distortion (ANNEX D) [dB]
LTE Band 2	18900	15	QPSK	1	0	max	EVS	NB	24.4	2N	22.54	PASS	1250	31.28
LTE Band 2	18900	15	QPSK	1	0	max	EVS	NB	24.4	8N	17.56	PASS	3150	29.64

LTE Band 2	18900	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.15	PASS	1250	21.19
LTE Band 2	18900	15	QPSK	1	0	max	EVS	WB	24.4	8N	17.64	PASS	1250	22.79

Table 6.1-2: the worst-case test results of other codecs of telephony call

Air-interface & Band	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Volume Level	Codec	NB/WB	Bit Rate [kbps]	2N/8N [N]	Conv. Gain (ANNEX E) [dB]	RFR (ANNEX E)	Minimum Distortion (ANNEX E) [Hz]	Minimum Distortion (ANNEX E) [dB]
LTE Band 1	18300	15	16QAM	75	0	max	AMR	NB	4.75	2N	22.31	/	/	/
LTE Band 1	18300	15	16QAM	75	0	max	AMR	NB	4.75	8N	17.51	/	/	/
LTE Band 1	18300	15	16QAM	75	0	max	AMR	WB	6.6	2N	22.02	/	/	/
LTE Band 1	18300	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.10	/	/	/
GSM 850	162	/	/	/	/	max	EFR	NB	/	2N	22.59	/	/	/
GSM 850	162	/	/	/	/	max	EFR	NB	/	8N	18.21	/	/	/

6.2. Description of Test Setup

In order to provide the complete information about the measurement environment within this report the setup is described in this chapter. Figure 6.2.1 shows a block diagram of the test arrangement.

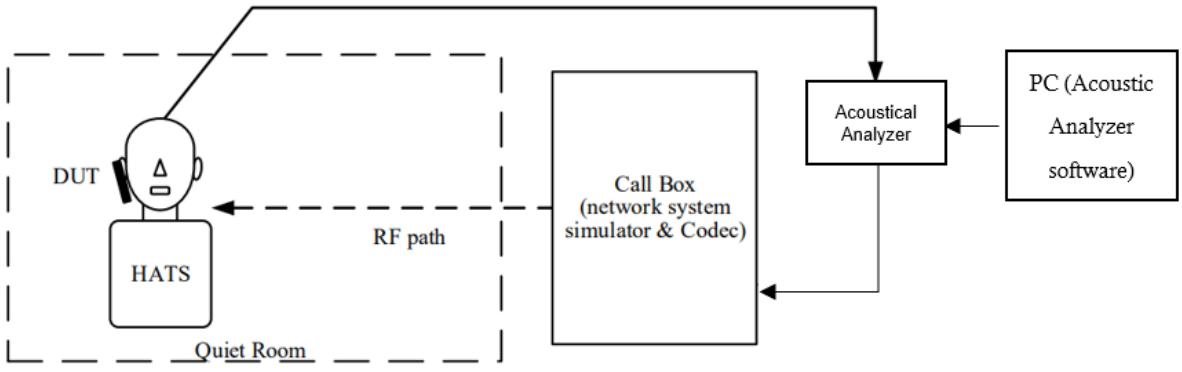


Fig. 6.2.1: Block diagram of the test setup

An artificial head measurement system according to ITU-T Recommendation P.58 equipped with

artificial ears (Type3.3 acc. ITU-T Rec. P.57) are used. The artificial head is placed in the center of an anechoic test room. The measurements are implemented in the HEAD acoustics software ACQUA and can be carried out automatically. They allow signal recording at the artificial ears and feeding at the network simulator.

The network simulators (e.g. Rohde & Schwarz CMW500, CMX500) establish the call to the mobile phone via an antenna connection. The EUT was tested using EFR/AMR-NB/AMR-WB/EVS-NB/EVS-WB codecs.

ANNEX C shows the handheld Positioner with mounted EUT. The application force between the phone and the artificial ear is adjusted. A mounting force of 2N or 8 N is adjusted.

6.3. Test Detail Results

6.3.1 VoLTE IMS call investigation

Table 6.3.1-1: the **Codec** and **Bandwidth** investigating results of **VoLTE** IMS call

Band	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Volume Level	Codec	NB/WB	Bit Rate [kbps]	2N/8N [N]	Conversational Gain [dB]	RFR	Minimum Distortion [Hz]	Minimum Distortion [dB]
Band 1	18300	10	QPSK	50	0	max	EVS	NB	24.4	2N	22.70	PASS	400	27.97
Band 1	18300	10	QPSK	50	0	max	EVS	NB	24.4	8N	17.93	PASS	1250	33.31
Band 1	18300	10	QPSK	50	0	max	EVS	WB	24.4	2N	22.24	PASS	250	22.89
Band 1	18300	10	QPSK	50	0	max	EVS	WB	24.4	8N	17.51	PASS	1250	29.67
Band 1	18300	10	QPSK	50	0	max	AMR	NB	4.75	2N	22.40	/	/	/
Band 1	18300	10	QPSK	50	0	max	AMR	NB	12.2	8N	17.55	/	/	/
Band 1	18300	10	QPSK	50	0	max	AMR	NB	4.75	8N	17.42	/	/	/
Band 1	18300	10	QPSK	50	0	max	AMR	WB	6.6	2N	22.08	/	/	/
Band 1	18300	10	QPSK	50	0	max	AMR	WB	23.85	8N	17.75	/	/	/
Band 1	18300	10	QPSK	50	0	max	AMR	WB	6.6	8N	17.22	/	/	/

Table 6.3.1-2: the **Radio Configuration** investigating results of **VoLTE** IMS call

Band	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Volume Level	Codec	NB/WB	Bit Rate [kbps]	2N/8N [N]	Conversational Gain [dB]	RFR	Minimum Distortion [Hz]	Minimum Distortion [dB]

Band 1	18300	10	QPSK	16	0	max	EVS	WB	24.4	2N	22.15	PASS	1250	22.92
Band 1	18300	10	QPSK	16	34	max	EVS	WB	24.4	2N	22.15	PASS	2000	24.49
Band 1	18300	10	16QAM	1	0	max	EVS	WB	24.4	2N	22.17	PASS	1250	29.93
Band 1	18300	10	16QAM	1	49	max	EVS	WB	24.4	2N	22.13	PASS	250	31.91
Band 1	18300	10	16QAM	50	0	max	EVS	WB	24.4	2N	22.14	PASS	3150	33.27
Band 1	18300	20	QPSK	100	0	max	EVS	WB	24.4	2N	22.21	PASS	1250	24.17
Band 1	18300	20	16QAM	10	90	max	EVS	WB	24.4	2N	22.20	PASS	250	32.38
Band 1	18300	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.15	PASS	2000	22.62
Band 1	18300	15	16QAM	1	0	max	EVS	WB	24.4	2N	22.13	PASS	2000	24.81
Band 1	18300	5	QPSK	1	0	max	EVS	WB	24.4	2N	22.14	PASS	1250	31.44
Band 1	18300	5	16QAM	1	0	max	EVS	WB	24.4	2N	22.15	PASS	2000	25.61
Band 1	18300	5	QPSK	16	0	max	EVS	WB	24.4	2N	22.15	PASS	1250	28.24
Band 1	18300	10	QPSK	16	0	max	AMR	WB	6.6	8N	17.19	/	/	/
Band 1	18300	10	QPSK	16	34	max	AMR	WB	6.6	8N	17.26	/	/	/
Band 1	18300	10	16QAM	1	0	max	AMR	WB	6.6	8N	17.21	/	/	/
Band 1	18300	10	16QAM	1	49	max	AMR	WB	6.6	8N	17.33	/	/	/
Band 1	18300	10	16QAM	50	0	max	AMR	WB	6.6	8N	17.29	/	/	/
Band 1	18300	20	QPSK	100	0	max	AMR	WB	6.6	8N	17.19	/	/	/
Band 1	18300	20	QPSK	16	0	max	AMR	WB	6.6	8N	17.24	/	/	/
Band 1	18300	20	16QAM	100	0	max	AMR	WB	6.6	8N	17.17	/	/	/
Band 1	18300	20	16QAM	16	0	max	AMR	WB	6.6	8N	17.32	/	/	/
Band 1	18300	20	16QAM	1	0	max	AMR	WB	6.6	8N	17.21	/	/	/
Band 1	18300	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.10	/	/	/
Band 1	18300	15	16QAM	1	0	max	AMR	WB	6.6	8N	17.27	/	/	/
Band 1	18300	15	QPSK	75	0	max	AMR	WB	6.6	8N	17.19	/	/	/
Band 1	18300	5	16QAM	25	0	max	AMR	WB	6.6	8N	17.17	/	/	/

Table 6.3.1-3: the **LTE Band** investigating results of **VoLTE** IMS call

Band	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Volume Level	Codec	NB / WB	Bit Rate [kbps]	2N/8N [N]	Conversational Gain [dB]	RFR	Minimum Distortion [Hz]	Minimum Distortion [dB]
Band 2	18900	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.15	PASS	1250	21.19
Band 4	20175	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.21	PASS	1250	28.23
Band 7	21100	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.20	PASS	315	28.83
Band 25	26365	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.17	PASS	1250	25.95
Band 41	132322	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.10	PASS	1250	22.56
Band 71	133297	15	QPSK	1	0	max	EVS	WB	24.4	2N	22.17	PASS	1250	22.09
Band 2	18900	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.37	/	/	/
Band 4	20175	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.28	/	/	/
Band 7	21100	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.31	/	/	/
Band 25	26365	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.39	/	/	/
Band 41	132322	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.38	/	/	/
Band 71	133297	15	16QAM	75	0	max	AMR	WB	6.6	8N	17.13	/	/	/

6.3.2 VoWiFi IMS call investigation

Table 6.3.2: the investigating results of **VoWiFi** IMS call

Mode	Channel	Modulation	Data Rate [Mbps]	Volume Level	Codec	NB/ WB	Bit Rate [kbps]	2N/8N [N]	Conversational Gain [dB]	RFR	Minimum Distortion [Hz]	Minimum Distortion [dB]
802.11b	6	DSSS	1	max	EVS	WB	24.4	2N	22.06	PASS	1250	24.76
802.11b	6	DSSS	2	max	EVS	WB	24.4	2N	22.09	PASS	2000	24.61

802.11b	6	CCK	5.5	max	EVS	WB	24.4	2N	22.12	PASS	250	32.77
802.11b	6	CCK	11	max	EVS	WB	24.4	2N	22.18	PASS	1250	25.35
802.11g	6	BPSK	6	max	EVS	WB	24.4	2N	22.30	PASS	1250	31.99
802.11g	6	BPSK	9	max	EVS	WB	24.4	2N	22.28	PASS	1250	22.71
802.11g	6	QPSK	12	max	EVS	WB	24.4	2N	22.23	PASS	1250	30.25
802.11g	6	QPSK	18	max	EVS	WB	24.4	2N	22.28	PASS	1600	30.76
802.11g	6	16-QAM	24	max	EVS	WB	24.4	2N	22.22	PASS	1250	32.39
802.11g	6	16-QAM	36	max	EVS	WB	24.4	2N	22.09	PASS	1250	30.30
802.11g	6	64-QAM	48	max	EVS	WB	24.4	2N	22.06	PASS	1250	29.20
802.11g	6	64-QAM	54	max	EVS	WB	24.4	2N	22.03	PASS	250	33.03
802.11b	6	DSSS	1	max	AMR	WB	6.6	8N	17.65	/	/	/
802.11b	6	DSSS	2	max	AMR	WB	6.6	8N	17.62	/	/	/
802.11b	6	CCK	5.5	max	AMR	WB	6.6	8N	17.60	/	/	/
802.11b	6	CCK	11	max	AMR	WB	6.6	8N	17.65	/	/	/
802.11g	6	BPSK	6	max	AMR	WB	6.6	8N	17.56	/	/	/
802.11g	6	BPSK	9	max	AMR	WB	6.6	8N	17.57	/	/	/
802.11g	6	QPSK	12	max	AMR	WB	6.6	8N	17.78	/	/	/
802.11g	6	QPSK	18	max	AMR	WB	6.6	8N	17.50	/	/	/
802.11g	6	16-QAM	24	max	AMR	WB	6.6	8N	17.70	/	/	/
802.11g	6	16-QAM	36	max	AMR	WB	6.6	8N	17.57	/	/	/
802.11g	6	64-QAM	48	max	AMR	WB	6.6	8N	17.64	/	/	/
802.11g	6	64-QAM	54	max	AMR	WB	6.6	8N	17.42	/	/	/

6.3.3 GSM call investigation

Table 6.3.3: the investigating results of **GSM** call

Band	Channel	Volume Level	Codec	Voice bandwidth	Bit Rate	2N/8N	Conversational Gain	RFR	Minimum Distortion	
					[kbps]	[N]	[dB]		[Hz]	[dB]
GSM850	162	max	EFR	NB	/	2N	22.59	/	/	/
GSM850	162	max	EFR	NB	/	8N	18.21	/	/	/
GSM1900	600	max	EFR	NB	/	2N	22.75	/	/	/
GSM1900	600	max	EFR	NB	/	8N	18.24	/	/	/

6.3.4 WCDMA call investigation

Table6.3.4: the investigating results of **WCDMA** call

air interface	Band	Channel	Volume Level	Codec	Voice band width	Bit Rate	2N/8N	Conversational Gain	RFR	Minimum Distortion	
						[kbps]	[N]	[dB]		[Hz]	[dB]
WCDMA	Band2	9800	max	AMR	NB	4.75	2N	22.25	/	/	/
WCDMA	Band2	9800	max	AMR	NB	4.75	8N	17.44	/	/	/
WCDMA	Band2	9800	max	AMR	NB	12.2	8N	18.04	/	/	/
WCDMA	Band2	9800	max	AMR	WB	6.6	2N	21.91	/	/	/
WCDMA	Band2	9800	max	AMR	WB	6.6	8N	17.17	/	/	/
WCDMA	Band2	9800	max	AMR	WB	23.85	8N	17.85	/	/	/
WCDMA	Band4	1738	max	AMR	WB	6.6	8N	17.20	/	/	/

6.3.5 VoNR call investigation

Table6.3.5: the investigating results of **VoNR** call

Band	Channel	Bandwidth [MHz]	Modulation	SCS (kHz)	RB	Volume Level	Codec	NB/WB	Bit Rate [kbps]	2N/8N [N]	Conversational Gain [dB]	RFR	Minimum Distortion	
													[Hz]	[dB]
Band 41	132322	100	QPSK	30	273	max	EVS	WB	24.4	2N	22.16	PASS	1250	26.01
Band 41	132322	100	QPSK	30	137	max	EVS	WB	24.4	2N	22.20	PASS	1250	25.33
Band 41	132322	100	QPSK	30	270	max	EVS	WB	24.4	2N	22.25	PASS	800	31.63
Band 41	132322	100	16QAM	30	137	max	EVS	WB	24.4	2N	22.14	PASS	1250	22.29
Band 41	132322	100	16QAM	30	1	max	EVS	WB	24.4	2N	22.11	PASS	1250	27.25
Band 41	132322	100	64QAM	30	273	max	EVS	WB	24.4	2N	22.27	PASS	1250	30.85
Band 41	132322	80	QPSK	30	109	max	EVS	WB	24.4	2N	22.16	PASS	250	32.42
Band 41	132322	80	16QAM	30	109	max	EVS	WB	24.4	2N	22.20	PASS	250	32.29
Band 41	132322	80	16QAM	30	1	max	EVS	WB	24.4	2N	22.28	PASS	250	32.22

Band 41	132322	50	QPSK	30	67	max	EVS	WB	24.4	2N	22.20	PASS	250	32.14
Band 41	132322	50	16QAM	30	67	max	EVS	WB	24.4	2N	22.20	PASS	250	32.11
Band 41	132322	50	16QAM	30	1	max	EVS	WB	24.4	2N	22.26	PASS	5000	31.99
Band 41	132322	20	QPSK	30	51	max	EVS	WB	24.4	2N	22.22	PASS	250	32.07
Band 41	132322	20	16QAM	30	1	max	EVS	WB	24.4	2N	22.18	PASS	250	32.76
Band 2	18900	20	QPSK	15	20	max	EVS	WB	24.4	2N	22.07	PASS	250	32.35
Band 2	18900	20	16QAM	15	1	max	EVS	WB	24.4	2N	22.03	PASS	250	32.01
Band B71	133297	20	16QAM	15	1	max	EVS	WB	24.4	2N	22.10	PASS	250	32.01
Band B25	26365	20	16QAM	15	1	max	EVS	WB	24.4	2N	22.09	PASS	250	32.22
Band 41	132322	100	QPSK	30	273	max	AMR	WB	6.6	8N	17.35	/	/	/
Band 41	132322	100	QPSK	30	137	max	AMR	WB	6.6	8N	17.33	/	/	/
Band 41	132322	100	QPSK	30	270	max	AMR	WB	6.6	8N	17.32	/	/	/
Band 41	132322	100	16QAM	30	137	max	AMR	WB	6.6	8N	17.21	/	/	/
Band 41	132322	100	16QAM	30	1	max	AMR	WB	6.6	8N	17.31	/	/	/
Band 41	132322	100	64QAM	30	273	max	AMR	WB	6.6	8N	17.28	/	/	/
Band 41	132322	80	QPSK	30	109	max	AMR	WB	6.6	8N	17.28	/	/	/
Band 41	132322	80	16QAM	30	1	max	AMR	WB	6.6	8N	17.20	/	/	/
Band 41	132322	50	QPSK	30	67	max	AMR	WB	6.6	8N	17.28	/	/	/
Band 41	132322	50	16QAM	30	1	max	AMR	WB	6.6	8N	17.43	/	/	/
Band 41	132322	20	QPSK	30	51	max	AMR	WB	6.6	8N	17.36	/	/	/
Band 41	132322	20	16QAM	30	1	max	AMR	WB	6.6	8N	17.39	/	/	/

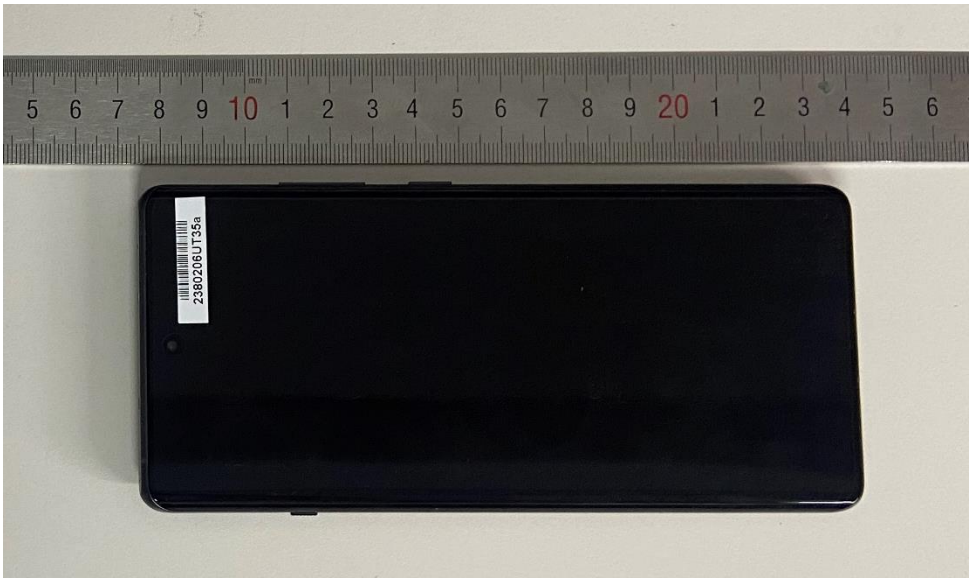
Band 2	18900	20	QPSK	15	20	max	AMR	WB	6.6	8N	17.90	/	/	/
Band 2	18900	20	16QAM	15	1	max	AMR	WB	6.6	8N	17.87	/	/	/
Band B71	133297	20	16QAM	15	1	max	AMR	WB	6.6	8N	17.81	/	/	/
Band B25	26365	20	16QAM	15	1	max	AMR	WB	6.6	8N	17.93	/	/	/

7. Test Facilities Utilized

No	Name	Type	SN	Manufacturer	Cal.Due Date
1	Measurement Frontend	Labcore	77000136	HEAD acoustics GmbH	2023-12-18
2	HEAD measurement system	HMS II.3	12306194 (torso137 40182)	HEAD acoustics GmbH	2024-10-25
3	Universal communication tester	CMW500	170430	Rohde&Schwarz	2024-08-03
4	Universal communication tester	CMX500	101626	Rohde&Schwarz	2024-08-05
5	Acoustic chamber	4.70 m×4.30 m×2.10 m	None	Ruisen	2026-10-26
Software					
Name		**Version**			
ACQUA		V 5.1.200			

END OF REPORT BODY

ANNEX A: EUT photograph



Pic A- 1 Mobile Phone(top)

Pic A- 2 Mobile Phone(back)

ANNEX B: EUT parameters

Disclaimer: The bands and codecs of EUT provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

General Information:

Description	Mobile Phone
Model name/HVIN	CPH2611
Marketing Name/PMN	/
Brand name	OnePlus
FCC ID	2ABZ2-AA560
Extreme Temperature	0/+35℃
Nominal Voltage	7.82V
Extreme High Voltage	9V
Extreme Low Voltage	6.6V

Supported Bands:

UMTS Frequency Band(s)	Band 1/2/4/5/8
GSM Frequency Band(s)	GSM850/900/1800/1900
E-UTRA Frequency Band(s)	Band 01/02/03/04/05/07/08/12/13/17/18/19/20/25/26/28/30/38/39/40/41/48/66/71
Wi-Fi Mode(s)	2.4G/5G/6G
5G Frequency Band(s)	N1/2/3/5/7/8/20/25/28/38/40/41/66/71/77/78

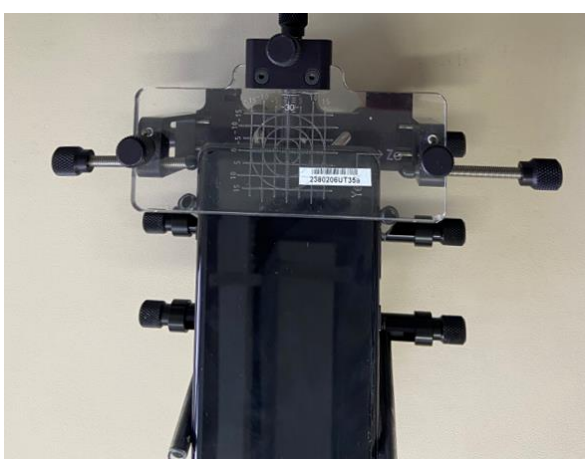
Supported Codecs:

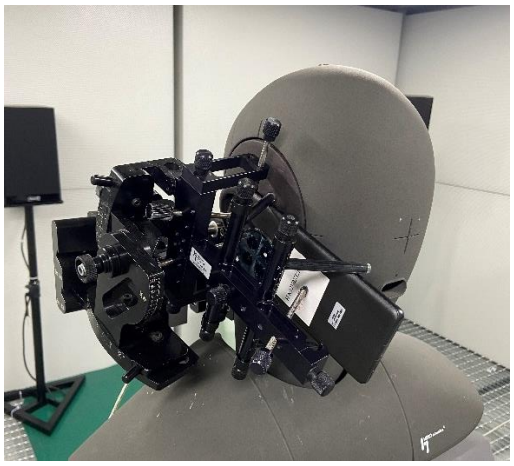
UMTS Audio Codec(s)	AMR NB/AMR WB
GSM Audio Codec (s)	EFR/AMR NB/AMR WB
E-UTRA Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
Wi-Fi Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
5G Audio Codec(s)	AMR NB/AMR WB/EVS NB/EVS WB/EVS SWB
OTT	Google Meet

ANNEX C: Test Layout

Artificial Ear Type		3.3
Mounting Force [N]		2 and 8
Center Fork Offset [°]		0
Volume Level		9/ (1-9)
Angle settings		
Xe [°]	Ye [°]	Ze[°]
0	0	5

NOTE: The handset shall be placed in either the standard test position as specified in IEEE Std 269 or a recommended test position specified by the manufacturer that complies with the recommended test position requirements in IEEE Std 269.

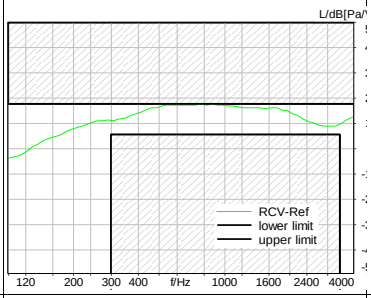


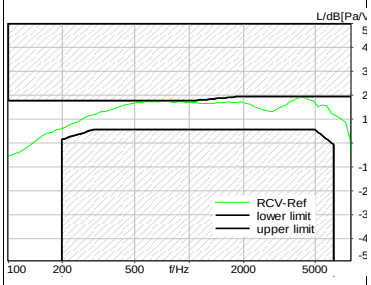


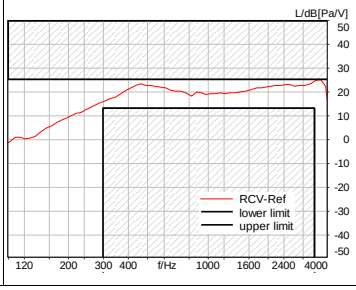
Pic C-1: Handset Positioner (HHPIII) with mounted EUT mobile phone

ANNEX D: The Worst-case Measurement Data of The Chosen Codec of Telephony Call

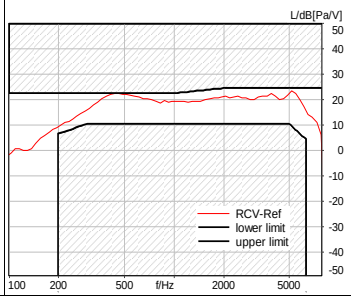
SMD	Status	Single Value Description	Single Value	Object
5.1 Receive Volume Control Performance 8N Table-8	Done	Speech Level [dB[SPL]]	87.56	23T04Z80206 VoLTE EVS
5.1.1 -1 Conversation Gain 8N Table-8	Ok	Calculated Value [dB]	17.56	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 400Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	41.21	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	39.06	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 630Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	47.68	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 800Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	44.50	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	45.04	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1250Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	32.95	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1600Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	30.29	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	41.14	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	38.99	23T04Z80206 VoLTE EVS

Receive path - distortion and noise 3150Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	29.64	23T04Z80206 VoLTE EVS
5.2 Receive path – distortion and noise Table-8	Ok			23T04Z80206 VoLTE EVS
5.3 Receive Acoustic Frequency response Performance Table-8	Ok	Min. dist. to tolerance scheme [dB], 3058.6 Hz 	3.27	23T04Z80206 VoLTE EVS
5.1 Receive Volume Control Performance 8N Table-8	Done	Speech Level [dB[SPL]]	87.64	23T04Z80206 VoLTE EVS
5.1.1 -1 Conversation Gain 8N Table-8	Ok	Calculated Value [dB]	17.64	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 250 WBonly Table-8	Done	Distortion (Noise) [dB], 0.0 dB	32.70	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 315Hz WBonly Table-8	Done	Distortion (Noise) [dB], 0.0 dB	35.29	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 400Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	39.49	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	35.58	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 630Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	41.66	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 800Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	40.69	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	32.89	23T04Z80206 VoLTE EVS

Receive path - distortion and noise 1250Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	22.79	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1600Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	25.09	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	42.36	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	39.90	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 3150Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	42.27	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 4000Hz WBonly Table-8	Done	Distortion (Noise) [dB], 0.0 dB	42.90	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 5000Hz WBonly Table-8	Done	Distortion (Noise) [dB], 0.0 dB	40.51	23T04Z80206 VoLTE EVS
5.2 Receive path – distortion and noise Table-8	Ok			23T04Z80206 VoLTE EVS
5.3 Receive Acoustic Frequency response Performance Table-8	Ok	Min. dist. to tolerance scheme [dB], 205.7 Hz 	4.90	23T04Z80206 VoLTE EVS
5.1 Receive Volume Control Performance 2N Table-8	Done	Speech Level [dB[SPL]]	92.54	23T04Z80206 VoLTE EVS
5.1.1 -1 Conversation Gain 2N Table-8	Ok	Calculated Value [dB]	22.54	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 400Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	37.08	23T04Z80206 VoLTE EVS

Receive path - distortion and noise 500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	38.27	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 630Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	41.39	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 800Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	40.60	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	42.39	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1250Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	31.28	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1600Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	39.22	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2000Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	38.62	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2500Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	37.17	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 3150Hz WB&NB Table-8	Done	Distortion (Noise) [dB], 0.0 dB	38.46	23T04Z80206 VoLTE EVS
5.2 Receive path – distortion and noise Table-8	Ok			23T04Z80206 VoLTE EVS
5.3 Receive Acoustic Frequency response Performance Table-8	Ok	Min. dist. to tolerance scheme [dB], 305.9 Hz 	2.88	23T04Z80206 VoLTE EVS

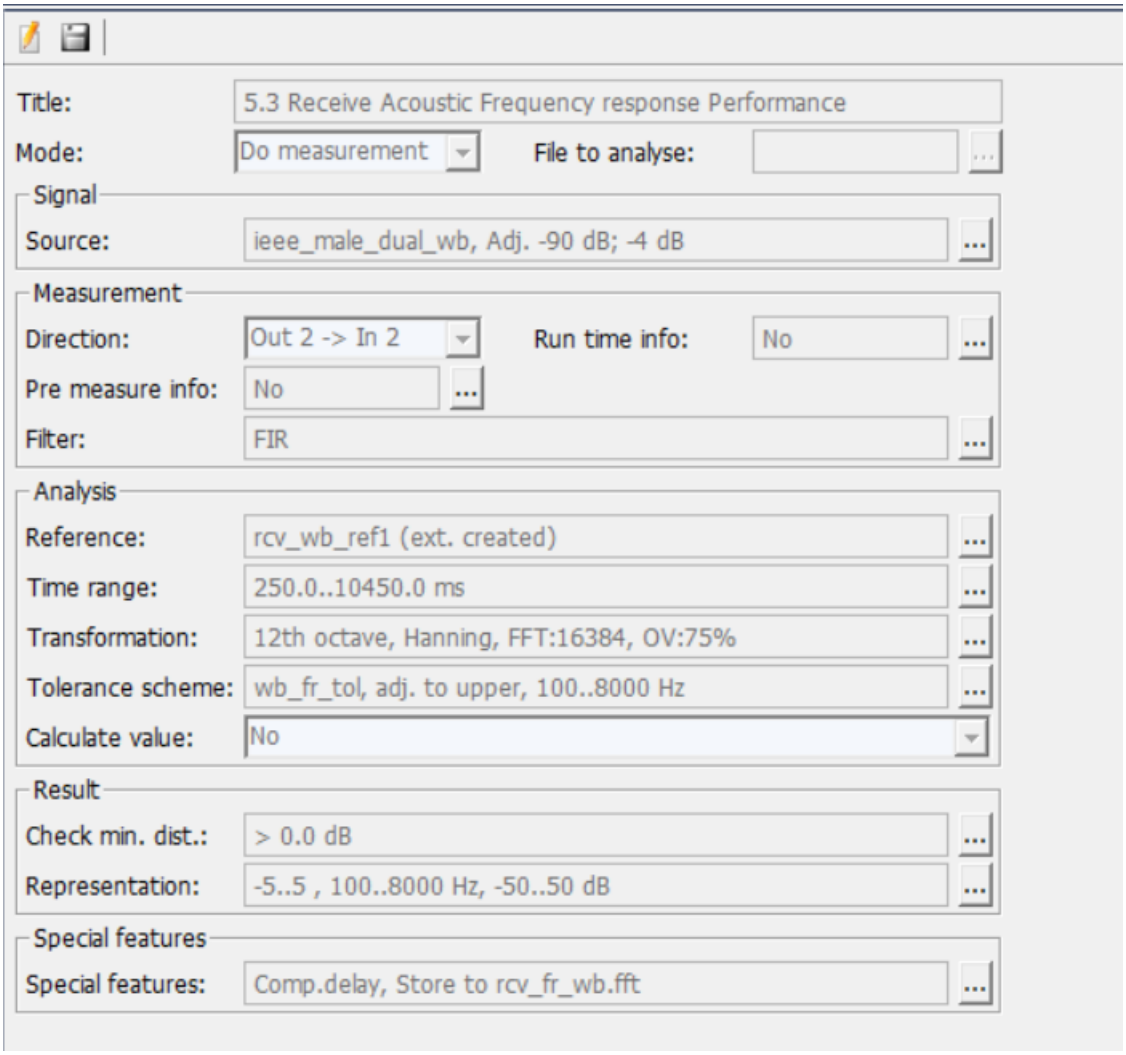
5.1 Receive Volume Control Performance 2N Band 2; Table-3	Done	Speech Level [dB[SPL]]	92.15	23T04Z80206 VoLTE EVS
5.1.1 -1 Conversation Gain 2N Band 2; Table-3	Ok	Calculated Value [dB]	22.15	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 250 WBonly Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	33.00	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 315Hz WBonly Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	37.60	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 4000Hz WBonly Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	44.07	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 400Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	35.64	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 500Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	39.48	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 630Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	41.54	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 800Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	41.42	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1000Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	43.70	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1250Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	21.19	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 1600Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	46.49	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2000Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	22.27	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 2500Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	44.88	23T04Z80206 VoLTE EVS

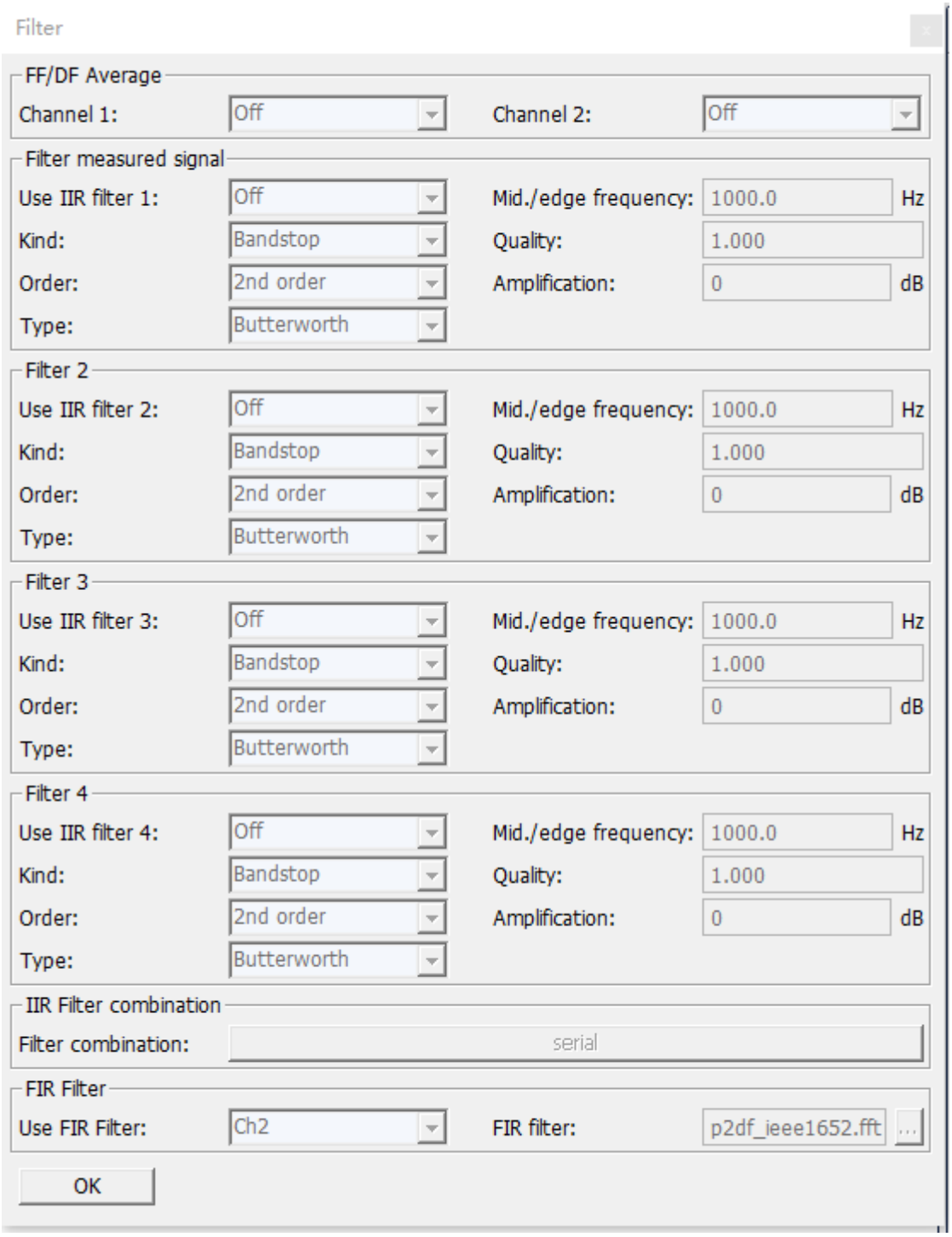
Receive path - distortion and noise 3150Hz WB&NB Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	31.76	23T04Z80206 VoLTE EVS
Receive path - distortion and noise 5000Hz WBonly Band 2; Table-3	Done	Distortion (Noise) [dB], 0.0 dB	40.81	23T04Z80206 VoLTE EVS
5.2 Receive path – distortion and noise Band 2; Table-3	Ok			23T04Z80206 VoLTE EVS
5.3 Receive Acoustic Frequency response Performance Band 2; Table-3	Ok	Min. dist. to tolerance scheme [dB], 205.7 Hz 	3.22	23T04Z80206 VoLTE EVS

ANNEX E: The Worst-case Measurement Data of Other Codecs of Telephony Call

SMD	Status	Single Value Description	Single Value	Object
5.1 Receive Volume Control Performance 8N Table-9	Done	Speech Level [dB[SPL]]	87.51	23T0480206 VoLTE AMR
5.1.1 -1 Conversation Gain 8N Table-9	Ok	Calculated Value [dB]	17.51	23T0480206 VoLTE AMR
5.1 Receive Volume Control Performance 8N 15MHz,16QAM,RB Size=75,RB Offset=0; Table-2; Table-9	Done	Speech Level [dB[SPL]]	87.10	23T0480206 VoLTE AMR
5.1.1 -1 Conversation Gain 8N 15MHz,16QAM,RB Size=75,RB Offset=0; Table-2; Table-9	Ok	Calculated Value [dB]	17.10	23T0480206 VoLTE AMR
5.1 Receive Volume Control Performance 2N Table-9	Done	Speech Level [dB[SPL]]	92.31	23T0480206 VoLTE AMR
5.1.1 -1 Conversation Gain 2N Table-9	Ok	Calculated Value [dB]	22.31	23T0480206 VoLTE AMR
5.1 Receive Volume Control Performance 2N Table-9	Done	Speech Level [dB[SPL]]	92.02	23T0480206 VoLTE AMR
5.1.1 -1 Conversation Gain 2N Table-9	Ok	Calculated Value [dB]	22.02	23T0480206 VoLTE AMR
5.1 Receive Volume Control Performance 8N GSM850	Done	Speech Level [dB[SPL]]	88.21	23T04Z80206 GSM
5.1.1 -1 Conversation Gain 8N GSM850	Ok	Calculated Value [dB]	18.21	23T04Z80206 GSM
5.1 Receive Volume Control Performance 2N GSM 850	Done	Speech Level [dB[SPL]]	92.59	23T04Z80206 GSM
5.1.1 -1 Conversation Gain 2N GSM 850	Ok	Calculated Value [dB]	22.59	23T04Z80206 GSM

ANNEX F: FREQUENCY RESPONSE USED DF and 1/12 OCTAVE





ANNEX G: HATS CERTIFICATE

中 国 计 量 科 学 研 究 院

证书编号 LSsx2022-08382

校 准 结 果

表 2 HATS 右耳校准结果

频率/Hz	31.5	63	125	250
REF/dB	92.45	92.40	92.39	92.46
(REF+10)/dB	102.45	102.40	102.38	102.47
差值/dB	10.00	10.00	9.99	10.01
频率/Hz	500	1000	2000	16000
REF/dB	92.83	94.00	98.20	94.12
(REF+10)/dB	102.83	104.00	108.19	103.81
差值/dB	10.00	10.00	9.99	9.69

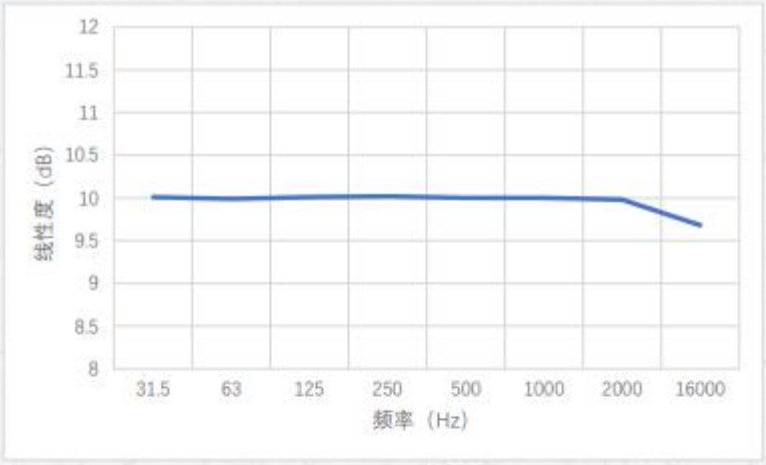


图 2 HATS 右耳线性度图

输出部分

2、频率响应

校准时用 B&K 4938 型压力场传声器在 HATS 嘴正前方，在其参考点处进行校准，测得其嘴（配 PA50 型功率放大器）的频谱如图 3 所示，100 Hz 至 20 kHz 范围内 1/3 倍频程中心频率频谱数据见表 3。

2019-jz-R0520

ANNEX H: ACOUSTIC CHAMBER CERTIFICATE

中 国 计 量 科 学 研 究 院

证书编号 LSsx2021-19386

校 准 结 果

二、背景噪声校准结果

正常情况下，消声室的 A 计权背景噪声为 14 dB，其 1/3 倍频频谱见图 2。

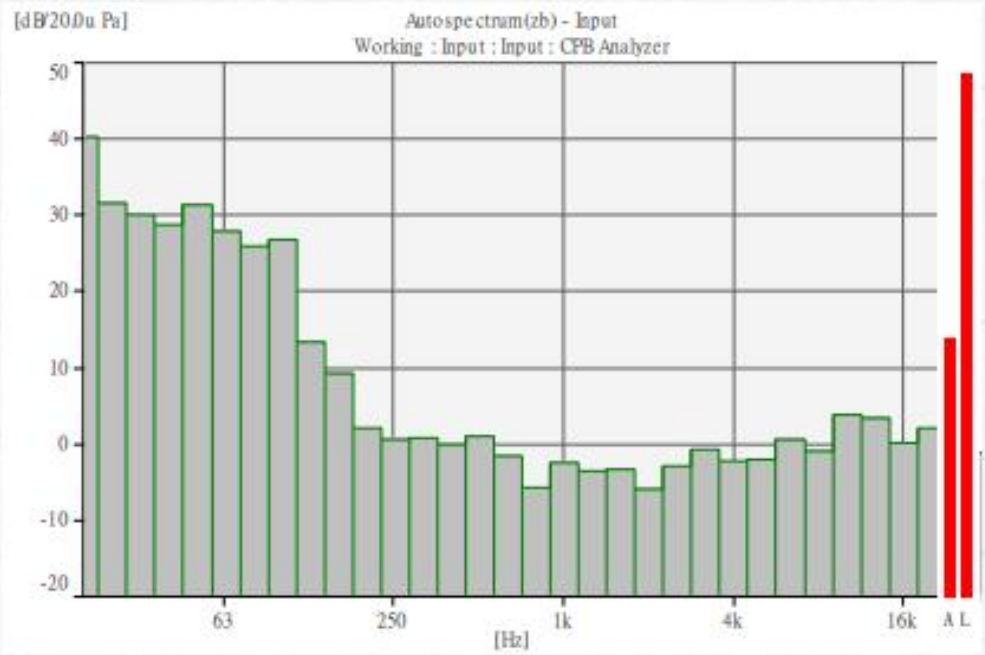


图 2 背景噪声频谱图

声压级校准结果不确定度：U=0.6 dB (k=2)

----------以下空白----------

说明：

根据校准规范 JJF 1147-2006 的规定，通常情况下 60 个月校准一次。

声明：

1. 我院仅对加盖“中国计量科学研究院校准专用章”的完整证书负责。
2. 本证书的校准结果仅对本次所校准的计量器具有效。

校 准 员：郑云山　　核 验 员：牛津

2019-jz-R0520

第15页共15页

ANNEX I: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 26th day of June 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*****END OF REPORT*****