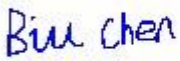
TEST REPORT

Application No.:	SZEM2010010537CR
Applicant:	OnePlus Technology (Shenzhen) Co., Ltd.
Address of Applicant:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, China
Manufacturer:	OnePlus Technology (Shenzhen) Co., Ltd.
Address of Manufacturer:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, China
Factory:	Shenzhen sunynn Technology Co., Ltd.
Address of Factory:	2F, Block C, Jianxing Technology Building, Shahe West Road, Xili Street, Nanshan District, Shenzhen
Equipment Under Test (EUT):	
EUT Name:	OnePlus Buds
Model No.:	E501A
Trade Mark:	ONEPLUS
FCC ID:	2ABZ2-E501A
Standard(s) :	47 CFR Part 15, Subpart B
Date of Receipt:	2020-05-13
Date of Test:	2020-05-13 to 2020-05-17
Date of Issue:	2020-10-28
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020-10-28		Original

Authorized for issue by:				
				
		Bill Chen /Project Engineer		
				
		Eric Fu /Reviewer		

2 Test Summary

Emission Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass
Radiated Emissions (above 1GHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	Class B	Pass

Internal Source	Upper Frequency
Below 1.705MHz	30MHz
1.705MHz to 108MHz	1GHz
108MHz to 500MHz	2GHz
500MHz to 1GHz	5GHz
Above 1GHz	5th harmonic of the highest frequency or 40GHz, whichever is lower

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4 General Information

4.1 Details of E.U.T.

Power Supply:	Charging BOX: Rechargeable battery DC 3.8V 420mAh(Charge by Type-C) Left earphone: Rechargeable battery DC 3.8V 35mAh(Charge by Charging BOX) Right earphone: Rechargeable battery DC 3.8V 35mAh(Charge by Charging BOX)
Type-C Cable:	20cm unshielded
The highest working frequency:	Above 108MHz

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	Apple	A1357 W010A051	REF. No.SEA0500

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.5dB (30MHz-1GHz)
		± 4.8dB (1GHz-6GHz)
3	Temperature test	± 1°C
4	Humidity test	± 3%

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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Shielding Room	ChangZhou ZhongYu	GB-88	SEM001-06	2019-06-13	2022-06-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019-07-11	2020-07-10
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019-09-24	2020-09-23
LISN	ETS-LINDGREN	3816/2	SEM007-02	2020-04-01	2021-03-31
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2020-03-24	2021-03-23

Radiated Emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10
MXE EMI receiver	KEYSIGHT	N9038A	SEM004-15	2019-12-16	2020-12-15
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31

Radiated Emissions (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08
Horn Antenna	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23

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General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06

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6 Emission Test Results

6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

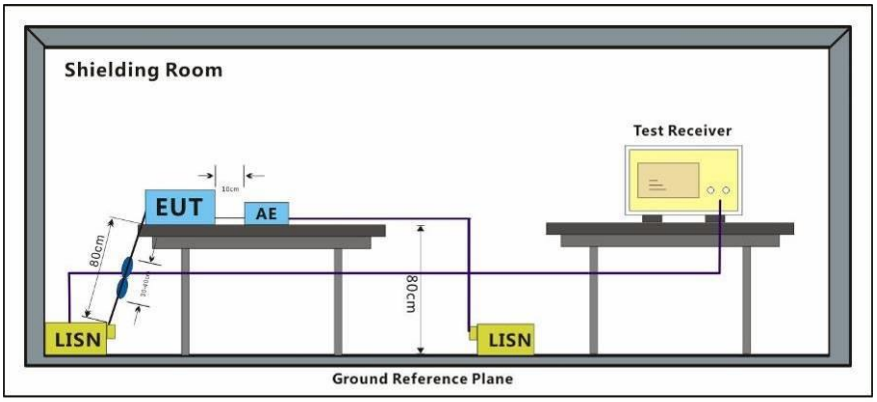
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 57.5 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:	g:Charging BOX+earphone charge mode_Keep the EUT charging i:Charging BOX charge mode_Keep the EUT charging
The worst case for final test:	g:Charging BOX+earphone charge mode_Keep the EUT charging

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

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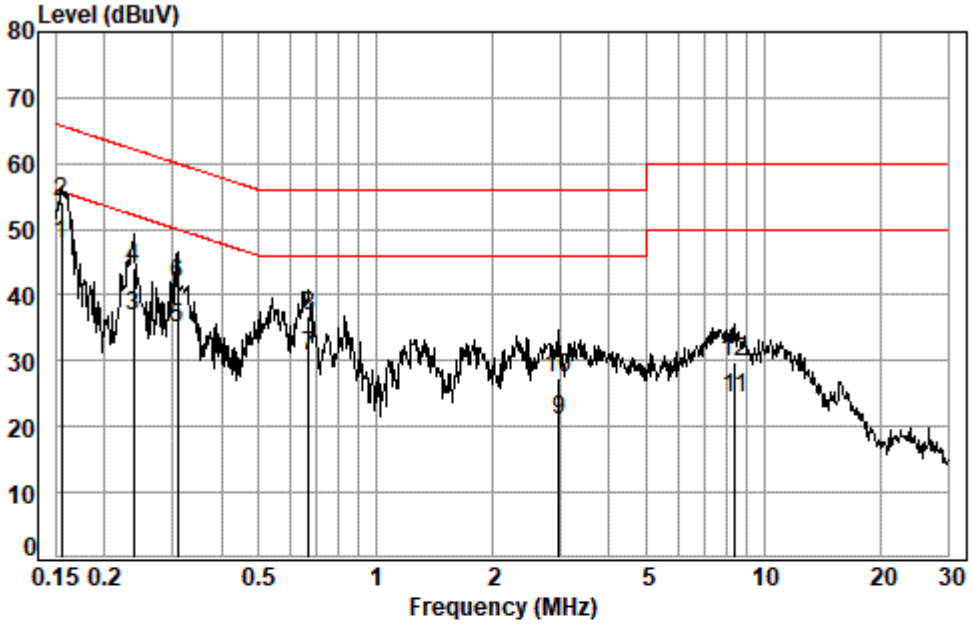
Mode:g; Line:Live Line



Site : Shielding Room
Condition: Line
Job No. : 10537CR
Test mode: g

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1548	0.01	9.59	38.22	47.82	55.74	-7.92	Average
2	0.1548	0.01	9.59	44.41	54.01	65.74	-11.73	QP
3	0.2378	0.03	9.59	27.04	36.66	52.17	-15.51	Average
4	0.2378	0.03	9.59	34.47	44.09	62.17	-18.08	QP
5	0.3083	0.04	9.59	25.32	34.95	50.02	-15.07	Average
6	0.3083	0.04	9.59	31.92	41.55	60.02	-18.47	QP
7	0.6719	0.07	9.60	20.90	30.57	46.00	-15.43	Average
8	0.6719	0.07	9.60	27.04	36.71	56.00	-19.29	QP
9	2.9619	0.16	9.67	11.30	21.13	46.00	-24.87	Average
10	2.9619	0.16	9.67	17.67	27.50	56.00	-28.50	QP
11	8.4562	0.17	9.77	14.42	24.36	50.00	-25.64	Average
12	8.4562	0.17	9.77	19.89	29.83	60.00	-30.17	QP

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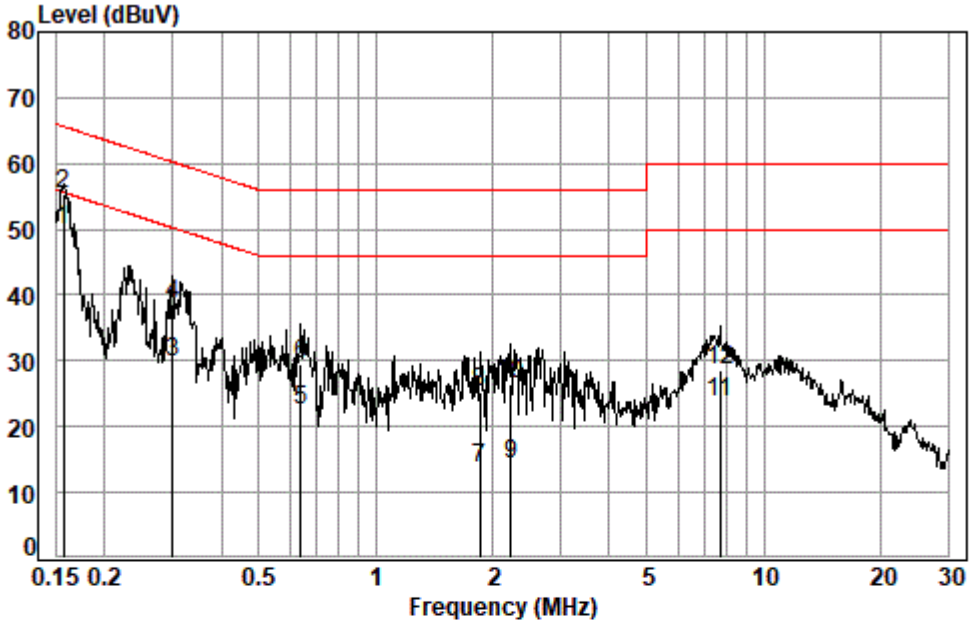
Mode:g; Line:Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 10537CR
Test mode: g

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1573	0.01	9.55	40.47	50.03	55.60	-5.57	Average
2	0.1573	0.01	9.55	45.90	55.46	65.60	-10.14	QP
3	0.3003	0.04	9.54	20.34	29.92	50.24	-20.32	Average
4	0.3003	0.04	9.54	28.95	38.53	60.24	-21.71	QP
5	0.6406	0.07	9.55	12.93	22.55	46.00	-23.45	Average
6	0.6406	0.07	9.55	19.86	29.48	56.00	-26.52	QP
7	1.8581	0.15	9.56	4.13	13.84	46.00	-32.16	Average
8	1.8581	0.15	9.56	15.44	25.15	56.00	-30.85	QP
9	2.2367	0.16	9.57	4.60	14.33	46.00	-31.67	Average
10	2.2367	0.16	9.57	16.74	26.47	56.00	-29.53	QP
11	7.7278	0.17	9.73	13.85	23.75	50.00	-26.25	Average
12	7.7278	0.17	9.73	18.73	28.63	60.00	-31.37	QP

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6.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz -88MHz	40.0(dBμV/m) quasi-peak
88MHz-216MHz	43.5(dBμV/m) quasi-peak
216MHz-960MHz	46.0(dBμV/m) quasi-peak
960MHz-1000MHz	54.0(dBμV/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz

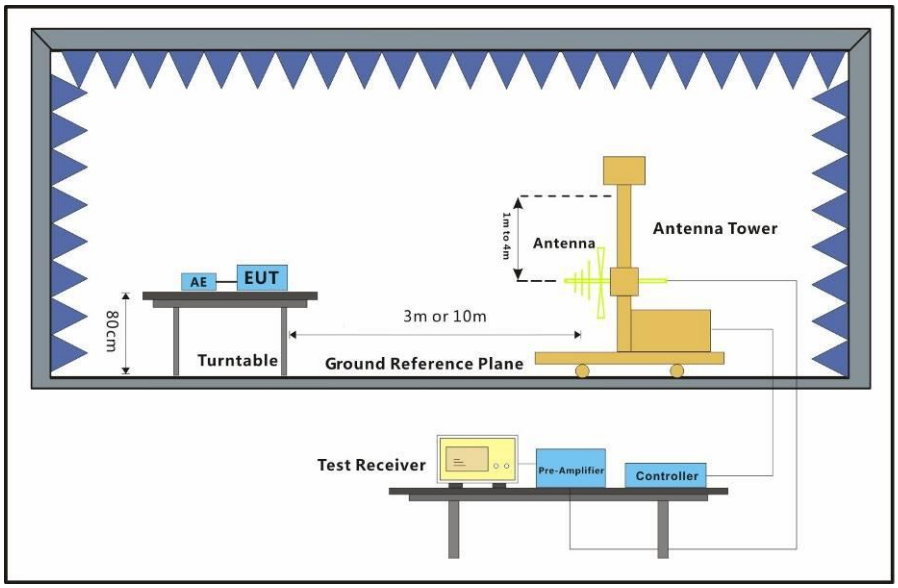
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.1 °C Humidity: 65.2 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:	g:Charging BOX+earphone charge mode_Keep the EUT charging h:Earphone charge mode_Keep the EUT charging i:Charging BOX charge mode_Keep the EUT charging
The worst case for final test:	g:Charging BOX+earphone charge mode_Keep the EUT charging

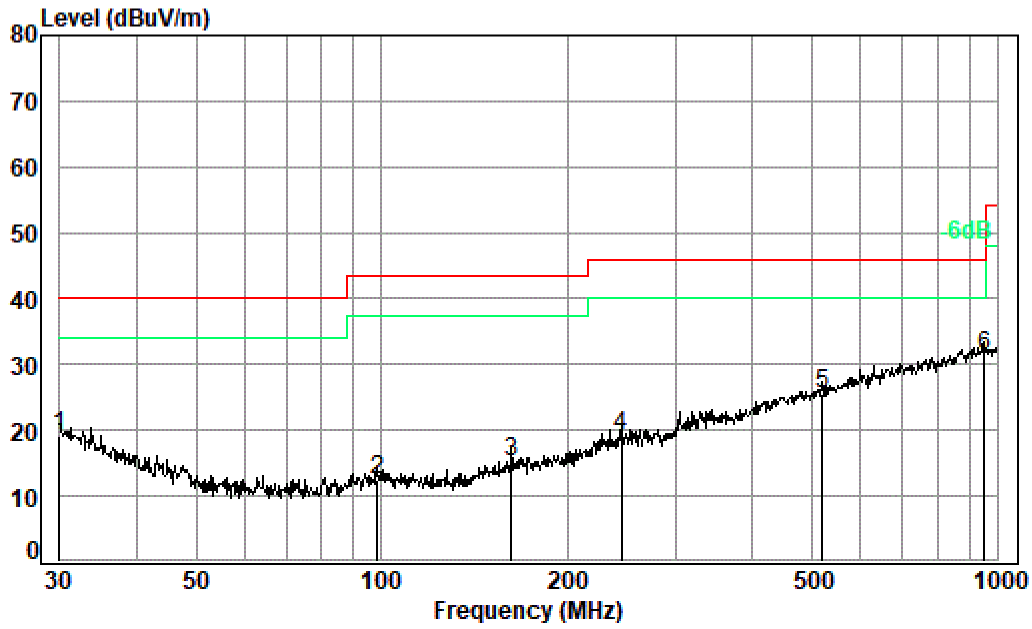
6.2.2 Test Setup Diagram



6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

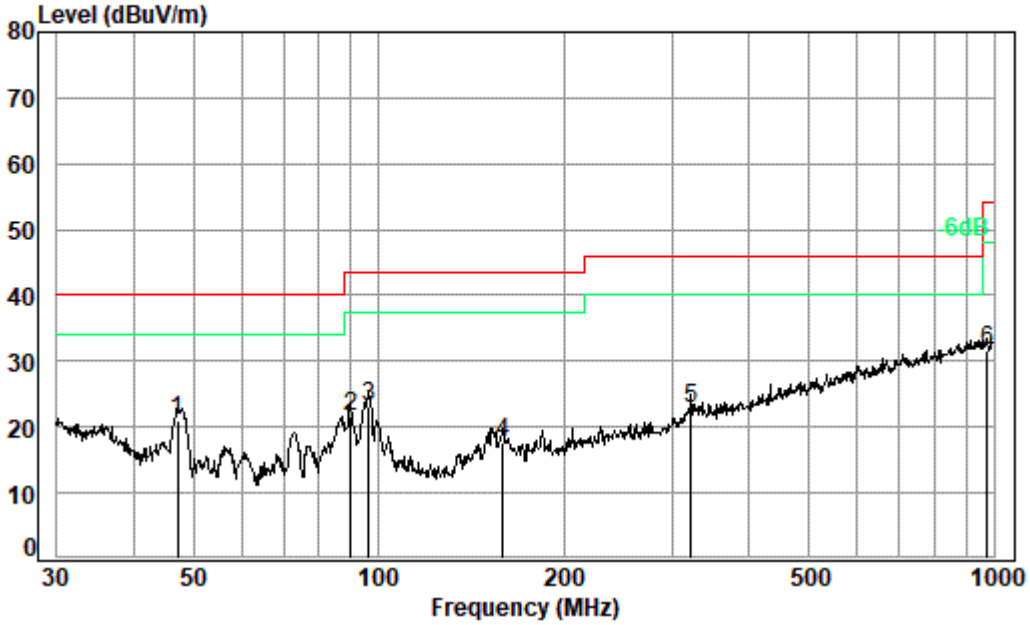
Mode:g; Polarization:Horizontal



Condition: 3m HORIZONTAL
Job No. : 10537CR
Test Mode: g

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.00	0.60	22.50	27.73	23.64	19.01	40.00	-20.99	QP
2	98.49	1.19	13.87	27.64	24.98	12.40	43.50	-31.10	QP
3	162.61	1.34	15.55	27.31	25.64	15.22	43.50	-28.28	QP
4	245.09	1.65	18.88	27.03	25.59	19.09	46.00	-26.91	QP
5	519.06	2.62	25.01	27.90	25.71	25.44	46.00	-20.56	QP
6 pp	952.09	3.65	30.07	27.09	24.75	31.38	46.00	-14.62	QP

Mode:g; Polarization:Vertical



Condition: 3m VERTICAL
Job No. : 10537CR
Test Mode: g

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	47.16	0.75	15.06	27.70	32.83	20.94	40.00	-19.06	QP
2	90.22	1.10	13.12	27.65	35.16	21.73	43.50	-21.77	QP
3	96.44	1.17	13.69	27.64	35.91	23.13	43.50	-20.37	QP
4	159.23	1.33	15.43	27.32	28.29	17.73	43.50	-25.77	QP
5	322.19	1.97	20.29	27.02	27.70	22.94	46.00	-23.06	QP
6	975.75	3.68	30.18	27.00	24.65	31.51	54.00	-22.49	QP

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6.3 Radiated Emissions (above 1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Frequency Range:	Above 1GHz
Measurement Distance:	3m
Limit:	
Above 1GHz	74(dBμV/m) peak, 54(dBμV/m) average
Detector:	Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

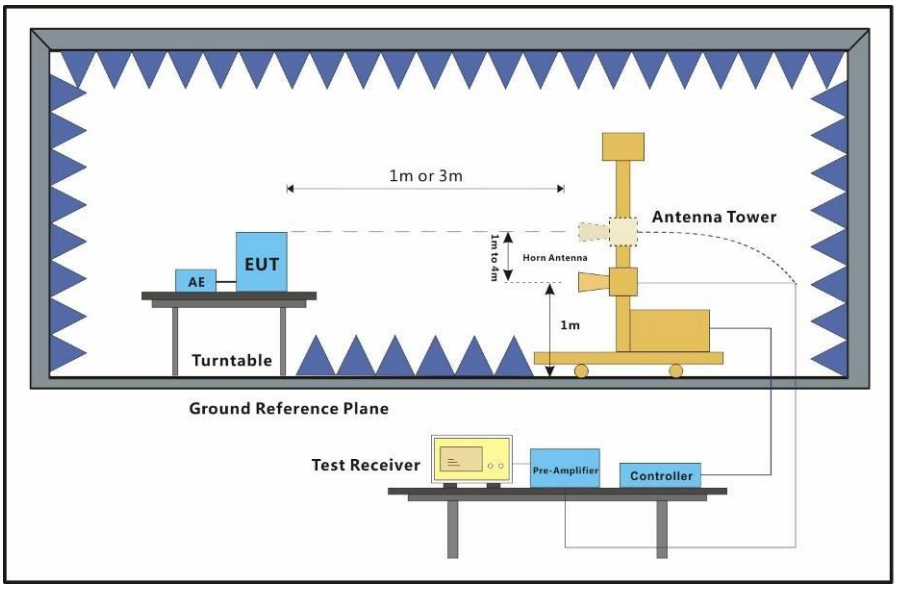
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24.4 °C Humidity: 54.4 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:	g:Charging BOX+earphone charge mode_Keep the EUT charging h:Earphone charge mode_Keep the EUT charging i:Charging BOX charge mode_Keep the EUT charging
The worst case for final test:	g:Charging BOX+earphone charge mode_Keep the EUT charging

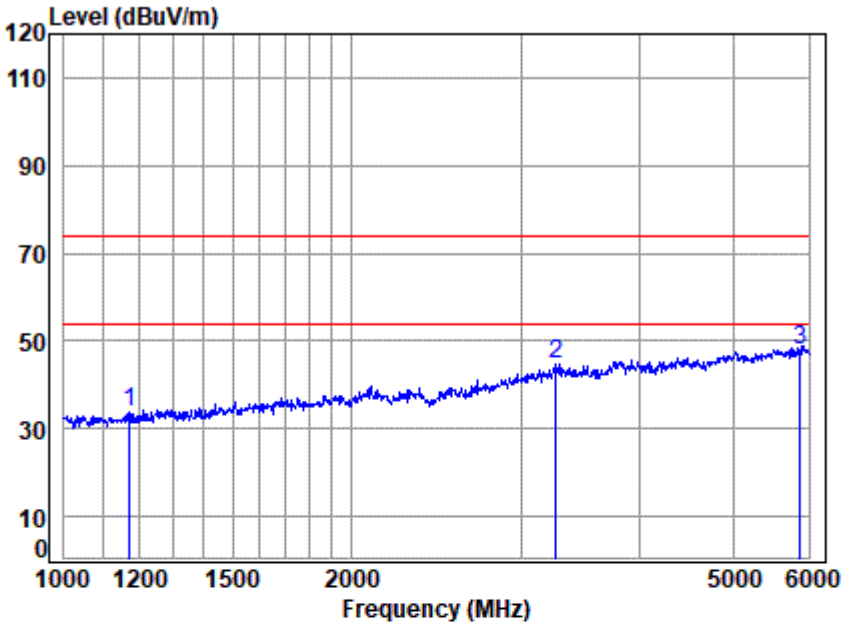
6.3.2 Test Setup Diagram



6.3.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Mode:g; Polarization:Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : 10537CR
Mode : g
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1170.785	2.51	24.46	40.26	47.26	33.97	74.00	-40.03	Peak
2	3262.720	5.75	31.34	41.48	49.22	44.83	74.00	-29.17	Peak
3	5882.902	7.09	34.99	42.31	48.08	47.85	74.00	-26.15	Peak

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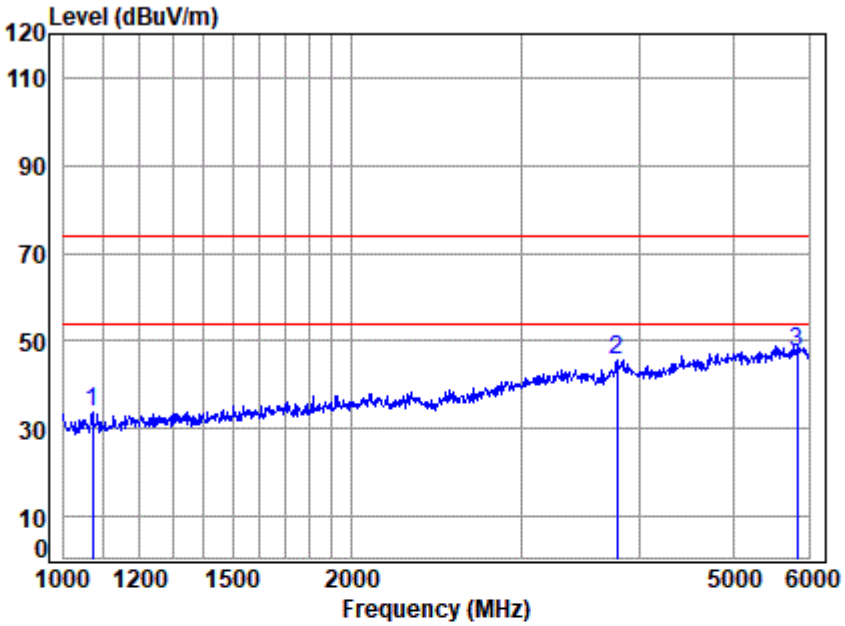
Mode:g; Polarization:Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : 10537CR
Mode : g
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1070.458	2.19	23.97	40.17	47.70	33.69	74.00	-40.31	Peak
2	3779.099	6.66	32.27	41.97	48.64	45.60	74.00	-28.40	Peak
3	5840.889	7.05	34.95	42.34	47.72	47.38	74.00	-26.62	Peak

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7 Photographs

7.1 Test Setup

Please refer to setup photos.

7.2 EUT Constructional Details (EUT Photos)

Please Refer to external and internal photos for details.

- End of the Report -