

FCC Test Report

FCC ID: 2AT9T-UBUDSINSIDE

Product: TRUE WIRELESS EARBUDS
Trade Mark: ulefone
Model Number: uBuds Inside
Family Model: N/A
Report No.: STR220505003003E

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name.....: Shenzhen Ulefone Technology Co., Ltd.
Address.....: 7A01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China
Manufacturer's Name.....: Shenzhen Ulefone Technology Co., Ltd.
Address.....: 7A01, Building A, Block 1, Anhongji Tianyao Plaza, Longhua District, Shenzhen City, Guangdong Province China

Product description

Product name.....: TRUE WIRELESS EARBUDS
Model and/or type reference : uBuds Inside
Family Model.....: N/A

Standards: FCC Part15B
ANSI C63.4:2014

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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Test Sample Number.....: STR2207070030

Date of Test

Date (s) of performance of tests: Jul 07, 2022 ~ Jul 15, 2022

Date of Issue: Jul.15, 2022

Test Result.....: Pass

Testing Engineer : [Signature]
(Mary Hu)

Authorized Signatory : [Signature]
(Alex Li)

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B ANSI C63.4: 2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	TRUE WIRELESS EARBUDS	
Trade Mark	ulefone	
Model Name	uBuds Inside	
Family Model	N/A	
Model Difference	N/A	
Product Description	Connecting I/O port:	N/A
	Operation Frequency:	2.4GHz
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Adapter	N/A	
Battery	Earphone: DC 3.7V, 30mAh Mobile phone: DC 3.85V, 6600mAh, 25.41Wh	
Power supply	Earphone: DC 3.7V from Battery or DC 3.7V form Mobile phone	
HW Version	WZX_TWS_V3.0	
SW Version	WZX_TWS_uBuds Inside_V6	

2.1.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

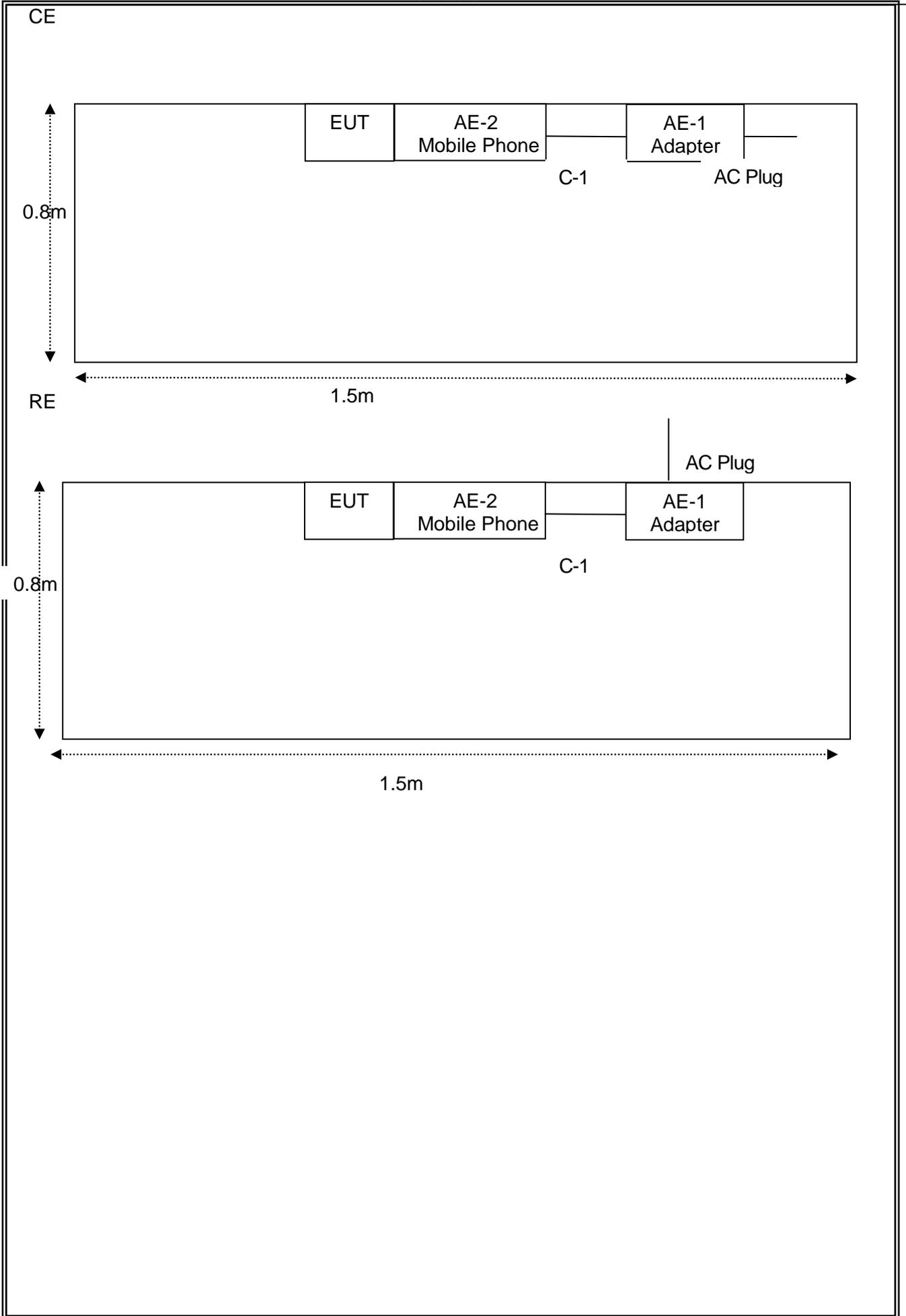
Pretest Mode	Description
Model 1	BT Link mode
Model 2	Charging

For Conducted Test	
Final Test Mode	Description
Model 1	BT Link mode
Model 2	Charging

For Radiated Test	
Final Test Mode	Description
Model 1	BT Link mode
Model 2	Charging

Note: Final Test Mode: Through Pre-scan, find the model 1 is the worst case. Only the worst case mode is recorded in the report.

2.2 DESCRIPTION OF TEST SETUP



2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
AE-1	Adapter	N/A	U312QC1801	N/A	N/A
AE-2	Mobile Phone	GQ3101	N/A	EUT	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	NO	1.0m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.4 MEASUREMENT INSTRUMENTS LIST

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2022.04.01	2023.03.31	1 year
2	Test Receiver	R&S	ESPI	101318	2022.04.06	2023.04.05	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2020.05.11	2023.05.10	3 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2021.11.07	2022.11.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2022.03.31	2023.03.30	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2021.11.07	2022.11.06	1 year
8	Amplifier	EMC	EMC051835SE	980246	2021.07.01 2022.06.17	2022.06.30 2023.06.16	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2021.07.01 2022.06.17	2022.06.30 2023.06.16	1 year
10	Power Meter	DARE	RPR3006W	15I00041SNO84	2021.07.01 2022.06.16	2022.06.30 2023.06.15	1 year
11	Power Sensor	R&S	URV4-Z4	0395.1619.05	2021.07.01 2022.06.17	2022.06.30 2023.06.16	1 year
12	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2019.06.28 2022.06.17	2022.06.27 2025.06.16	3 year
13	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2019.06.28 2022.06.17	2022.06.27 2025.06.16	3 year
14	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2019.06.28 2022.06.17	2022.06.27 2025.06.16	3 year
15	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2022.04.06	2023.04.05	1 year
2	LISN	R&S	ENV216	101313	2022.04.06	2023.04.05	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2022.04.06	2023.04.05	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2020.05.11	2023.05.10	3 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2020.05.11	2023.05.10	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2020.05.11	2023.05.10	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2020.05.11	2023.05.10	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

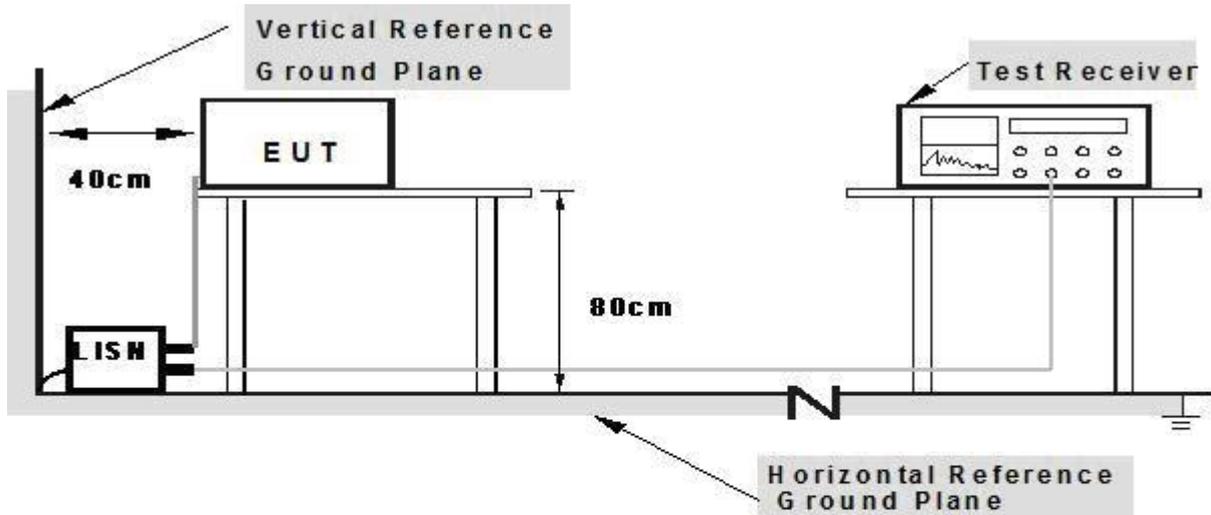
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



- Note: 1. Support units were connected to second LISN.**
- 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

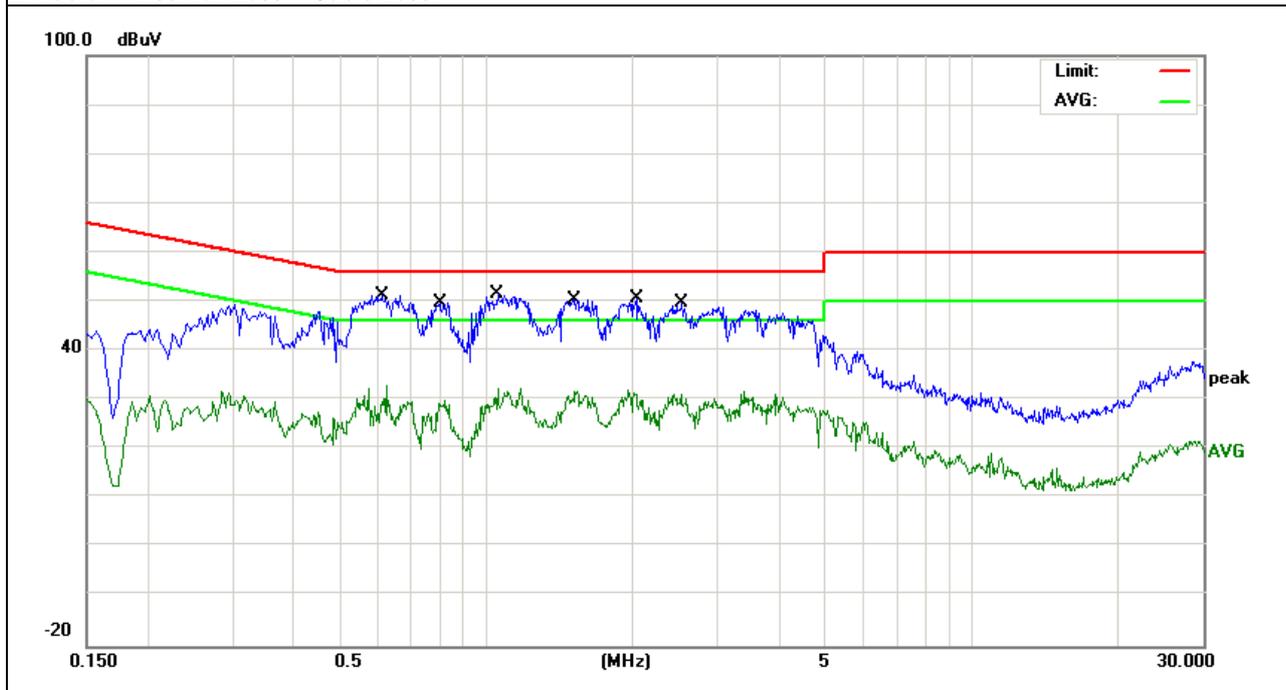
3.1.5 TEST RESULTS

EUT:	TRUE WIRELESS EARBUDS	Model Name. :	uBuds Inside
Temperature:	24.5 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2022-7-10
Test Mode:	Mode 2	Phase :	L
Test Voltage:	AC 120V/60Hz		

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.6097	41.74	9.66	51.40	56.00	-4.60	QP
0.6097	23.21	9.66	32.87	46.00	-13.13	AVG
0.8020	40.02	9.66	49.68	56.00	-6.32	QP
0.8020	20.27	9.66	29.93	46.00	-16.07	AVG
1.0580	41.93	9.67	51.60	56.00	-4.40	QP
1.0580	22.56	9.67	32.23	46.00	-13.77	AVG
1.5220	40.73	9.67	50.40	56.00	-5.60	QP
1.5220	22.08	9.67	31.75	46.00	-14.25	AVG
2.0379	41.01	9.67	50.68	56.00	-5.32	QP
2.0379	22.40	9.67	32.07	46.00	-13.93	AVG
2.5339	39.99	9.68	49.67	56.00	-6.33	QP
2.5339	21.37	9.68	31.05	46.00	-14.95	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

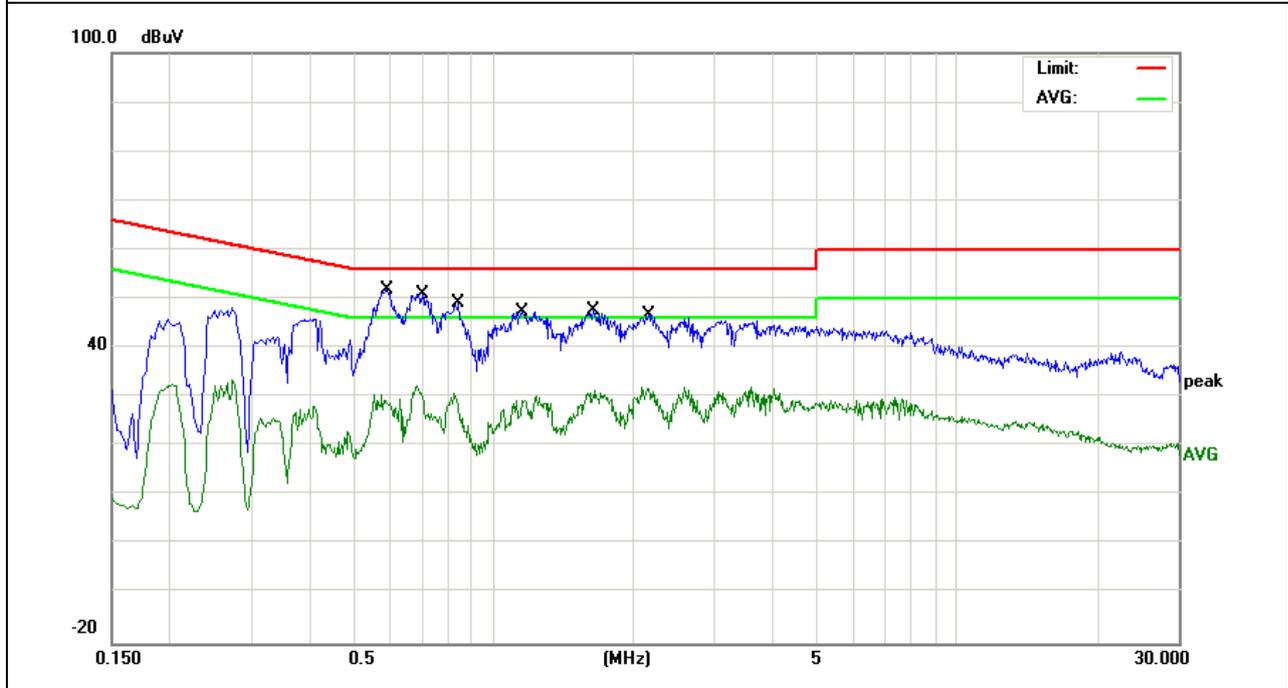


EUT:	TRUE WIRELESS EARBUDS	Model Name. :	uBuds Inside
Temperature:	24.5 °C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2022-7-10
Test Mode:	Mode 2	Phase :	N
Test Voltage:	AC 120V/60Hz		

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1556	42.77	9.65	52.42	65.69	-13.27	QP
0.1556	28.57	9.65	38.22	55.69	-17.47	AVG
0.2020	38.49	9.62	48.11	63.52	-15.41	QP
0.2020	20.80	9.62	30.42	53.52	-23.10	AVG
0.6140	27.30	9.66	36.96	56.00	-19.04	QP
0.6140	16.50	9.66	26.16	46.00	-19.84	AVG
1.5180	31.75	9.67	41.42	56.00	-14.58	QP
1.5180	23.19	9.67	32.86	46.00	-13.14	AVG
22.5300	25.10	10.21	35.31	60.00	-24.69	QP
22.5300	22.87	10.21	33.08	50.00	-16.92	AVG
26.6260	23.95	10.25	34.20	60.00	-25.80	QP
26.6260	21.05	10.25	31.30	50.00	-18.70	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

Test Arrangement for Radiated Emissions up to 1 GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.

Test Arrangement for Radiated Emissions above 1 GHz.

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

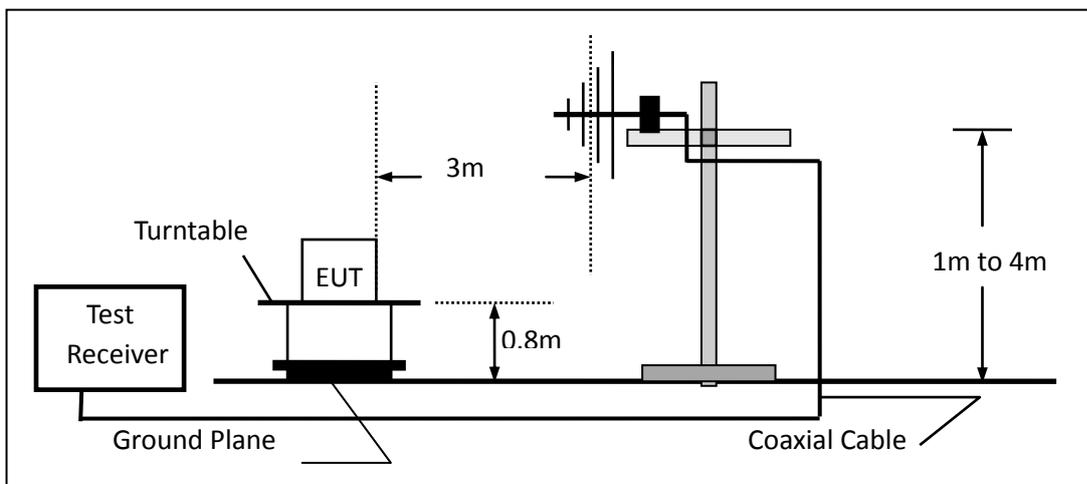
Note: For the hand-held device, the EUT should be measured for all 3 axes and only the worst case is recorded in the report

During the radiated emission test, according to ANSI C63.4-2014(4.2), the Spectrum Analyzer was set with the following configurations:

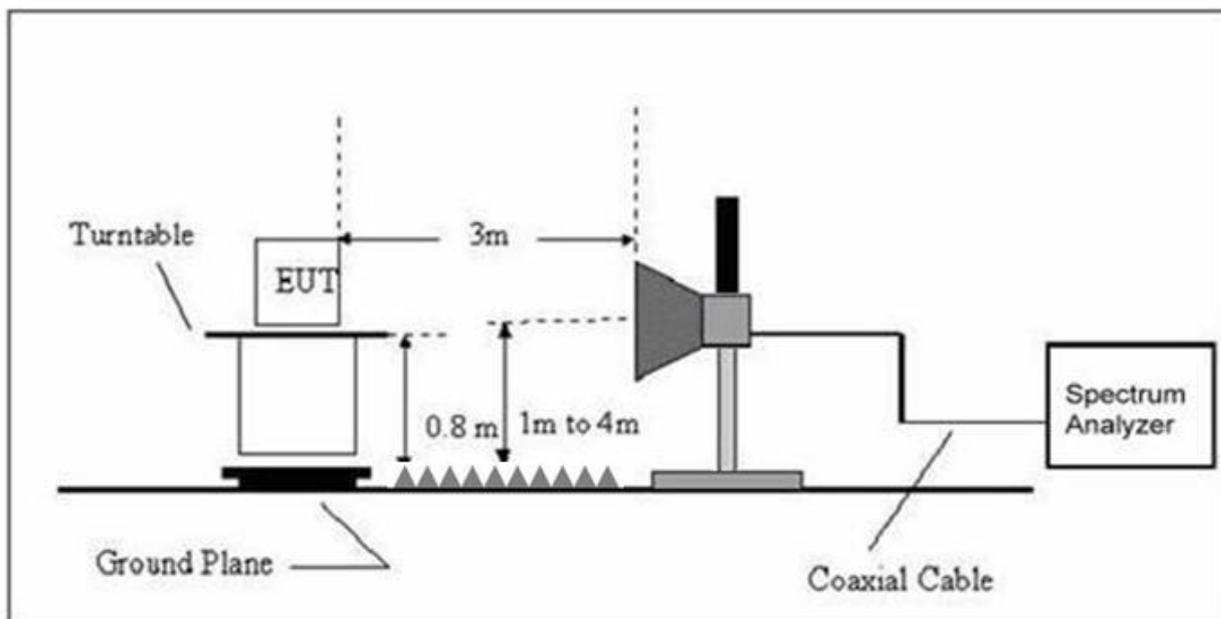
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Avg	1 MHz	10 Hz

3.2.3 TEST SETUP

For Radiated Emission 30~1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



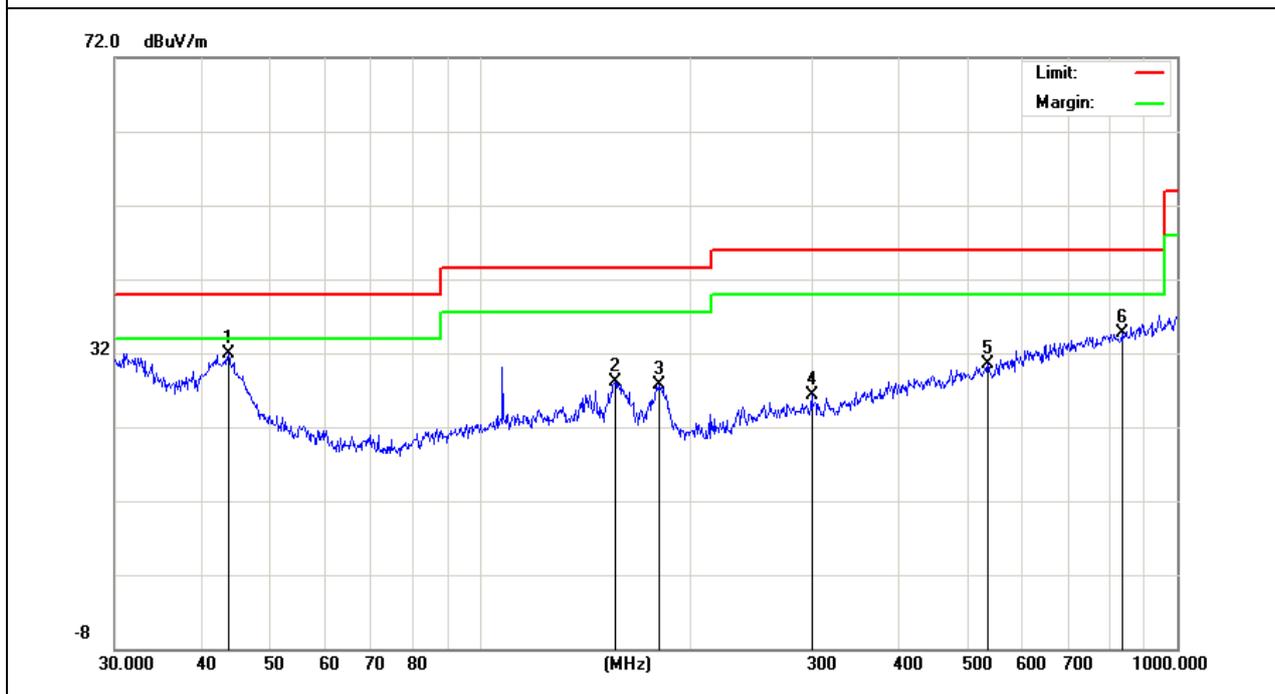
3.2.4 TEST RESULTS

TEST RESULTS (30~1000 MHz)

EUT:	TRUE WIRELESS EARBUDS	Model Name:	uBuds Inside
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2022-7-10
Test Mode :	Mode 2	Polarization :	Horizontal
Test Power :	AC 120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	43.6584	13.11	18.71	31.82	40.00	-8.18	QP
H	156.4578	10.04	18.16	28.20	43.50	-15.30	QP
H	180.6488	11.02	16.64	27.66	43.50	-15.84	QP
H	299.3158	6.47	19.82	26.29	46.00	-19.71	QP
H	535.7073	6.11	24.40	30.51	46.00	-15.49	QP
H	833.3170	5.99	28.64	34.63	46.00	-11.37	QP

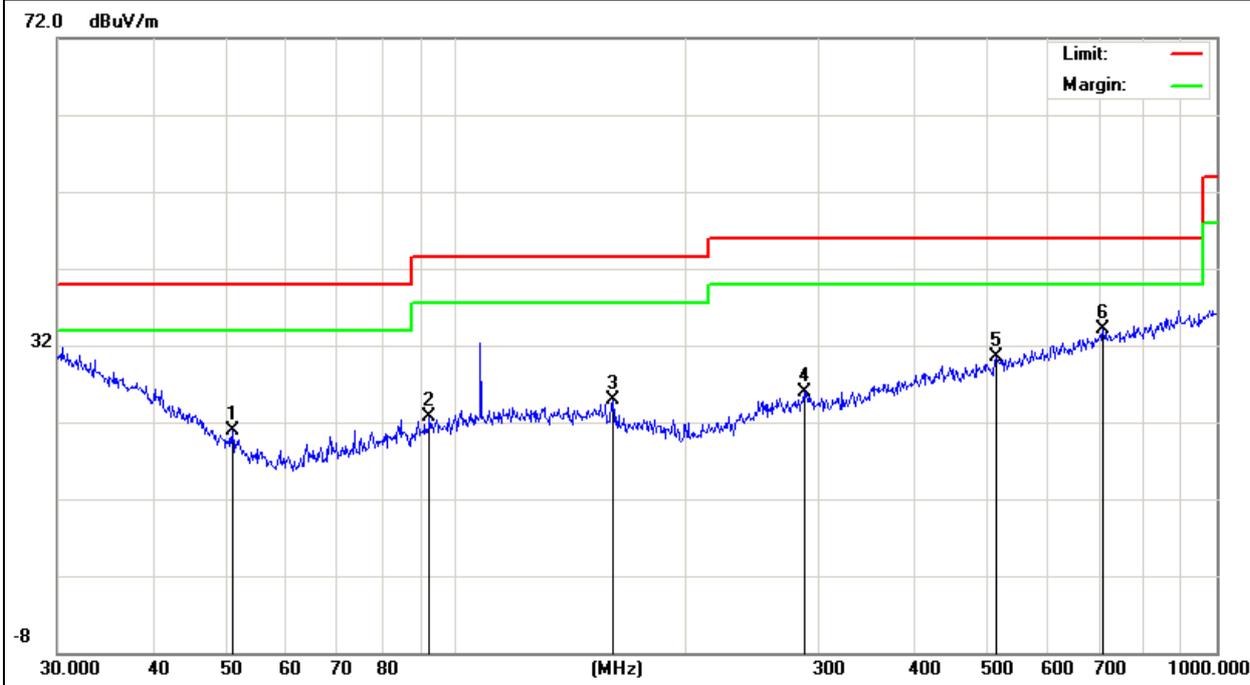
Remark:
Factor = Antenna Factor + Cable Loss - Amplifier.



EUT:	TRUE WIRELESS EARBUDS	Model Name :	uBuds Inside
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2022-7-10
Test Mode :	Mode 2	Polarization :	Vertical
Test Power :	AC 120V/60Hz		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	30.0000	5.97	26.11	32.08	40.00	-7.92	QP
V	59.4405	19.39	12.43	31.82	40.00	-8.18	QP
V	195.8220	13.83	16.35	30.18	43.50	-13.32	QP
V	268.4852	10.79	19.14	29.93	46.00	-16.07	QP
V	661.1503	8.36	26.45	34.81	46.00	-11.19	QP
V	906.4823	10.76	29.25	40.01	46.00	-5.99	QP

Remark:
Factor = Antenna Factor + Cable Loss - Amplifier.



3.2.5 TEST RESULTS(1000~18000MHz)

EUT:	TRUE WIRELESS EARBUDS	Model Name :	uBuds Inside
Temperature:	24.5 °C	Relative Humidity:	55%
Pressure:	1010 hPa	Test Date :	2022-7-10
Test Mode :	Mode 2		
Test Power :	AC 120V/60Hz		

All the modulation modes have been tested, and the worst result was report as below:

Polar (H/V)	Frequency	Reading	Correct	Result	Limit	Over Limit	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
V	3677.500	37.80	5.99	43.79	74.00	-30.21	peak
V	5590.000	35.70	7.87	43.57	74.00	-30.43	AVG
V	8097.500	36.15	9.77	45.92	74.00	-28.08	peak
V	9755.000	34.92	10.93	45.85	74.00	-28.15	AVG
V	13707.500	36.24	13.07	49.31	74.00	-24.69	peak
V	15832.500	36.10	14.37	50.47	74.00	-23.53	AVG
H	2955.000	40.03	4.78	44.81	74.00	-29.19	peak
H	4230.000	37.79	6.68	44.47	74.00	-29.53	AVG
H	5420.000	35.37	7.75	43.12	74.00	-30.88	peak
H	9075.000	35.76	10.50	46.26	74.00	-27.74	AVG
H	14260.000	37.01	13.19	50.20	74.00	-23.80	peak
H	16725.000	36.75	14.78	51.53	74.00	-22.47	AVG

Remark:

Result = Reading + Correct, Over Limit= Result - Limit

Note: Only the worst results data points are reported in the report.

Other emissions are attenuated 20dB below the limit that does not recorded in the report.

END OF REPORT