FCC TEST REPORT
FCC ID:2A5YX-HY-029

Report No.....	:	ZHT-241105139W01
Product.....	:	3 in 1 Multi-function Wireless Charger
Trademark.....	:	KWIW
Model(s).....	:	HY-029, HY-030, HY-032
Model Difference.....	:	HY-029 is tested model, other models are derivative models. The models are identical in circuit, only different on the model names. So the test data of HY-029 can represent the remaining models.
Applicant.....	:	Shenzhen Zhiwoyi Technology Co.ltd
Address.....	:	2nd Floor, Building B, No. 7, Yuzhan 2nd Road, Dashuitian Industrial Zone, Guanlan Street, Longhua District, Shenzhen，China
Manufacturer.....	:	Shenzhen Zhiwoyi Technology Co.ltd
Address.....	:	2nd Floor, Building B, No. 7, Yuzhan 2nd Road, Dashuitian Industrial Zone, Guanlan Street, Longhua District, Shenzhen，China
Prepared by.....	:	Guangdong Zhonghan Testing Technology Co., Ltd.
Address.....	:	Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Date of Receipt.....	:	Nov. 05, 2024
Date of Test(s).....	:	Nov. 05, 2024 to Nov. 13, 2024
Date of Issue.....	:	Nov. 13, 2024
Standard.....	:	FCC CFR Title 47 Part 15 Subpart C
Test procedure.....	:	/

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

Tested by:	Reviewed by:	Approved by:
Kevin Yang/ Engineer	Baret Wu/ Director	Levi Lee/ Manager

Note: This device described above has been tested by ZHT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of ZHT, this document may be altered or revised by ZHT, personal only, and shall be noted in the revision of the document.

TABLE OF CONTENTS

1. VERSION

Report No.	Version	Description	Approved
ZHT-241105139W01	Rev.01	Initial issue of report	Nov. 13, 2024

2. TEST SUMMARY

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Spurious Emission	15.209(a)(f)	Pass
20dB Bandwidth	15.215	Pass

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

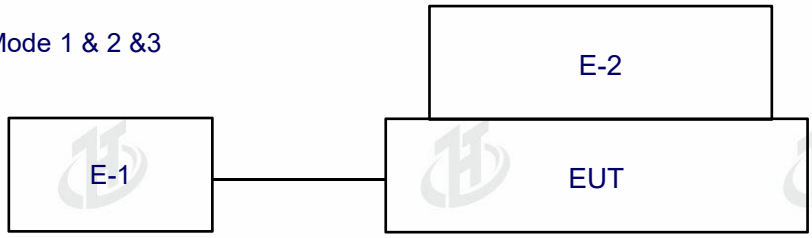
Product Name:	3 in 1 Multi-function Wireless Charger
Test Model No.:	HY-029
Hardware version:	V1.0
Software version:	V1.0
Operation Frequency:	Mobile phone: 110.2-205KHz Earphone: 110.2-205KHz Watch: 110.2-370KHz
Modulation type:	MSK
Antenna Type:	Coil Antenna
Antenna gain:	0dBi
Ratings	Input: DC5V/3A, DC9V/3A Outout1: 5W/10W/15W Max (Mobile phone) Output2: 5W Max (Earphone charging case) Output3: 2.5W Max (Watch)
Remark:The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Guangdong Zhonghan Testing Technology Co., Ltd. does not assume any responsibility.	

3.2 Test mode

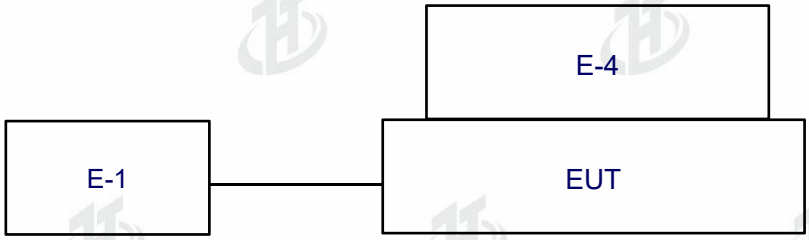
Test Modes:	
Mode 1	AC Adapter+Wireless charging mode (Mobile phone: 15W)
Mode 2	AC Adapter+Wireless charging mode (Mobile phone: 10W)
Mode 3	AC Adapter+Wireless charging mode (Mobile phone: 5W)
Mode 4	AC Adapter+Wireless charging mode (Earphone charging case: 5W)
Mode 5	AC Adapter+Wireless charging mode (Watch: 2.5W)
Mode 6	AC Adapter+Mobile phone (15W)+Watch (2.5W)
Mode 7	AC Adapter+Mobile phone (15W)+Earphone charging case (5W)
Mode 8	AC Adapter+Earphone charging case (5W)+Watch (2.5W)
Mode 9	AC Adapter+Mobile phone (15W)+Earphone charging case (5W)+Watch (2.5W)
Remark: All full load, half load, and no-load tests have been conducted in each mode, only the worst-case was recorded in the report. Mode 9 full load is the worst mode.	

3.3 Block Diagram of EUT Configuration

Mode 1 & 2 &3



Mode4



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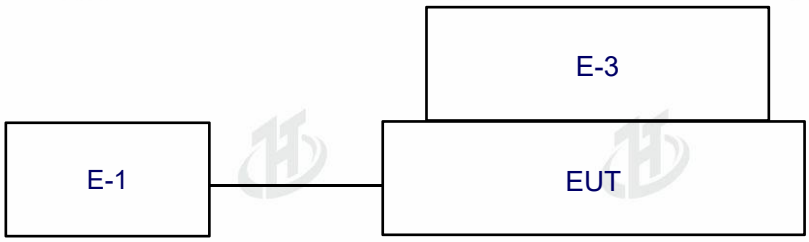
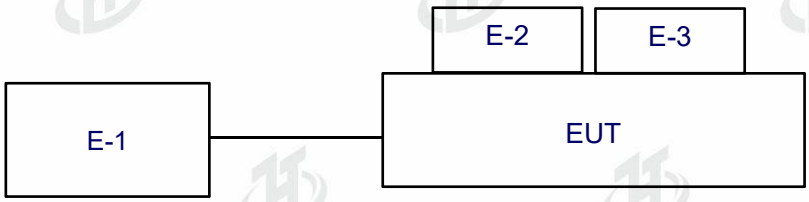


Mode 6



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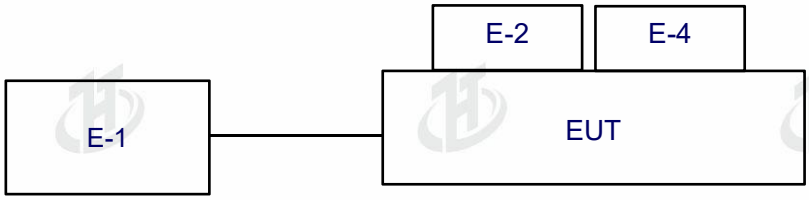
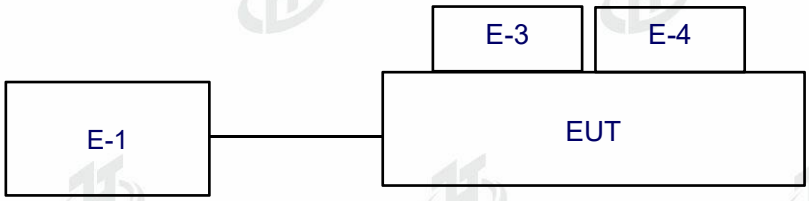
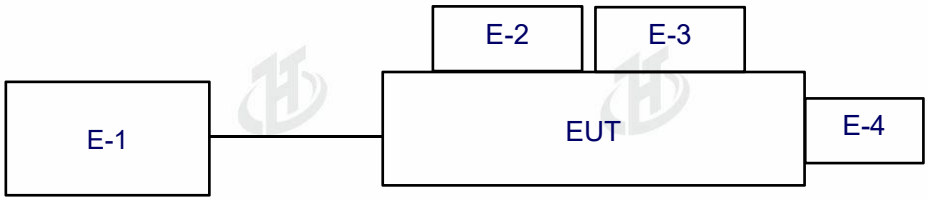


Mode 8



Mode 9



3.4 Test Conditions

Temperature: 25.6℃

Relative Humidity: 54.3 %

3.5 Description Of Support Units (Conducted Mode)

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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Adapter	HUAWEI	HW-059200CHQ	/	AE
E-2	Wireless charging load	/	EESON	/	AE
E-3	Wireless headset	Hege Technology Co.,Ltd	EA125	Wired headset	AE
E-4	Wireless charging load	/	YBZ	/	AE

Item	Shielded Type	Ferrite Core	Length	Note

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” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

4. TAEST FACILITY AND TEST INSTRUMENT USED

4.1 TEST FACILITY

Guangdong Zhonghan Testing Technology Co., Ltd.
Add.: Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

FCC Registration Number:255941
Designation Number: CN0325
IC Registered No.: 29832
CAB identifier: CN0143

4.2 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Model	Last Cal.	Next Cal.
1	Receiver	R&S	ESCI	May 10, 2024	May 09, 2025
2	Loop antenna	EMCI	LAP600	May 10, 2024	May 09, 2025
3	Amplifier	Schwarzbeck	BBV 9743 B	May 10, 2024	May 09, 2025
4	Amplifier	Schwarzbeck	BBV 9718 B	May 10, 2024	May 09, 2025
5	Bilog Antenna	Schwarzbeck	VULB9162	May 28, 2024	May 27, 2025
6	Horn Antenna	Schwarzbeck	BBHA9120D	May 16, 2024	May 15, 2025
7	Horn Antenna	A.H.SYSTEMS	SAS574	May 10, 2024	May 09, 2025
8	Amplifier	AEROFLEX	100KHz-40GHz	May 10, 2024	May 09, 2025
9	Spectrum Analyzer	R&S	FSV40	May 10, 2024	May 09, 2025
10	CDNE	Schwarzbeck	CDNE M2 + CDNE M3	May 10, 2024	May 09, 2025
11	966 Anechoic Chamber	EMToni	9m6m6m	Nov. 25, 2021	Nov. 24, 2024
12	Spectrum Analyzer	KEYSIGHT	N9020A	May 10, 2024	May 09, 2025
13	WIDBAND RADIO COMMUNICATION TESTER	R&S	CMW500	May 10, 2024	May 09, 2025
14	Single Generator	Agilent	N5182A	May 10, 2024	May 09, 2025
15	Power Sensor	MWRFtest	MW100-RFCB	May 10, 2024	May 09, 2025
16	Audio analyzer	R&S	UPL	May 10, 2024	May 09, 2025
17	Single Generator	R&S	SMB100A	May 10, 2024	May 09, 2025
18	Power Amplifier Shielding Room	EMToni	2m3m3m	Nov. 25, 2021	Nov. 24, 2024

Conduction Test equipment

Equipment	Manufacturer	Model	Last Cal.	Next Cal.
Receiver	R&S	ESCI	May 10, 2024	May 09, 2025
LISN	R&S	ENV216	May 10, 2024	May 09, 2025
ISN CAT 6	Schwarzbeck	NTFM 8158	May 10, 2024	May 09, 2025
ISN CAT 5	Schwarzbeck	CAT5 8158	May 10, 2024	May 09, 2025
Capacitive Voltage Probe	Schwarzbeck	CVP 9222 C	May 10, 2024	May 09, 2025
Current Transformer Clamp	Schwarzbeck	SW 9605	May 10, 2024	May 09, 2025
CE Shielding Room	EMToni	9m4m3m	Nov. 25, 2021	Nov. 24, 2024

Conducted Test Instrument

Item	Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
1	Spectrum Analyzer	R&S	FSV40	101413	May 10, 2024	May 09, 2025
2	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
3	Power Sensor	MWRFtest	MW100-RFCB	/	May 10, 2024	May 09, 2025

4.3 TESTING SOFTWARE

Project	Software name	Edition
Radiated Emission	EZ-EMC	FA-03A2 RE+
RF Test	MTS 8310	2.0.0.0

4.4 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF conducted power	±0.16dB
3	Spurious emissions conducted	±0.21dB
4	All radiated emissions (9k-30MHz)	±4.68dB
5	All radiated emissions (<1G)	±4.68dB
6	All radiated emissions (>1G)	±4.89dB
7	Temperature	±0.5°C
8	Humidity	±2%
9	Occupied Bandwidth	±4.96%
10	Power Spectral Density	±0.71dB

Decision Rule

☒ Uncertainty is not included

☐ Uncertainty is included

5. CONDUCTED EMISSION TEST

5.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

5.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	QP	AVG	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

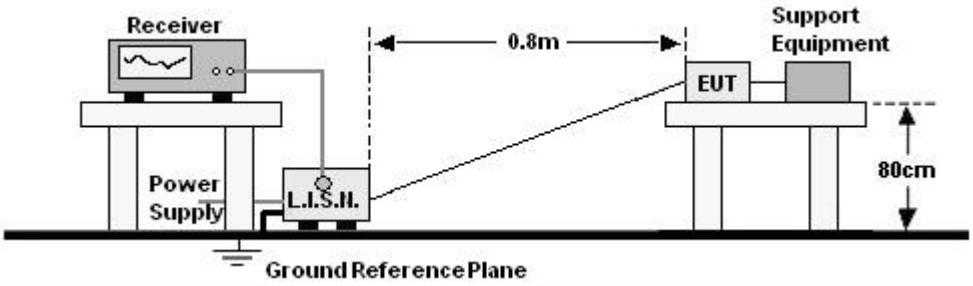
5.1.2 TEST PROCEDURE

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.

5.1.3 DEVIATION FROM TEST STANDARD

No deviation

5.1.4 TEST SETUP

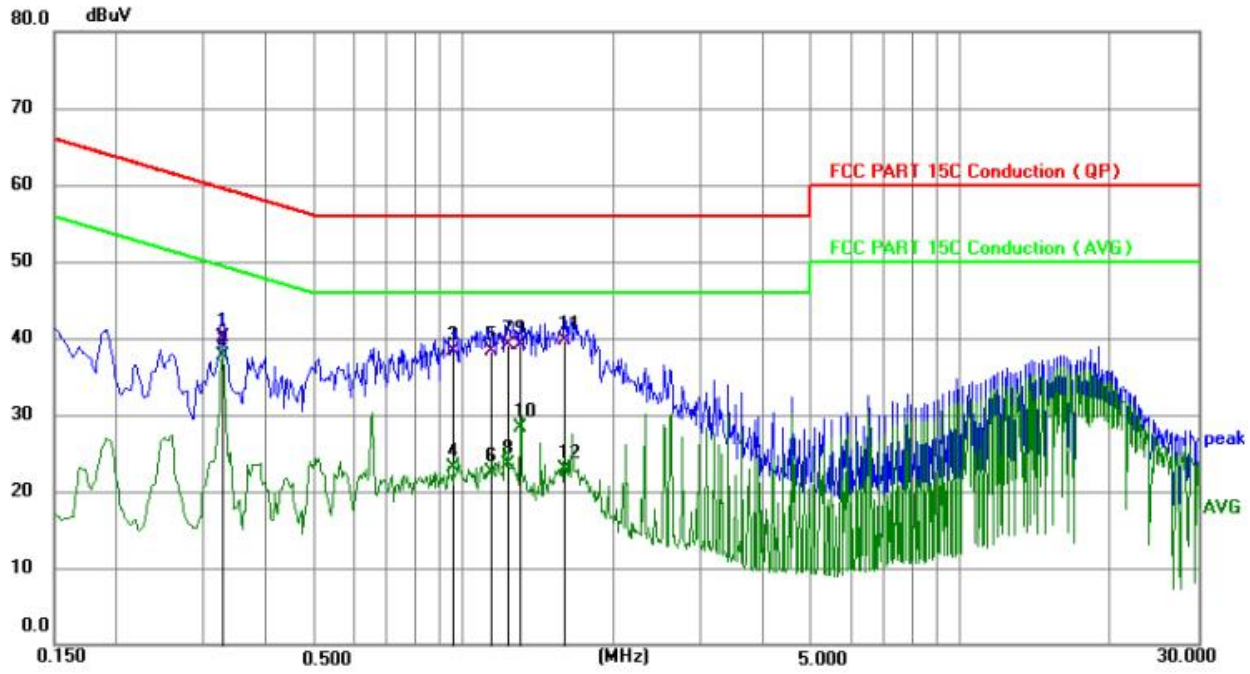


5.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

5.1.6 Test Result

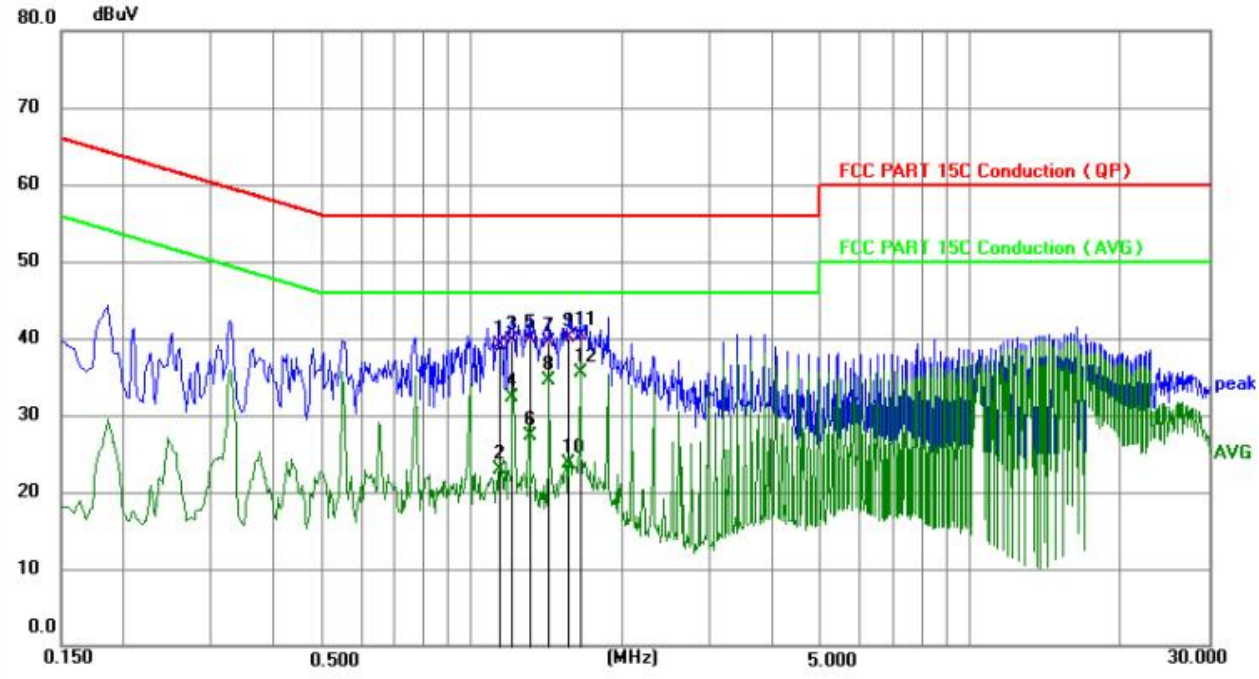
Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	L
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3255	30.20	9.96	40.16	59.57	-19.41	QP	P	
2 *	0.3255	27.68	9.96	37.64	49.57	-11.93	AVG	P	
3	0.9555	28.27	10.06	38.33	56.00	-17.67	QP	P	
4	0.9555	13.12	10.06	23.18	46.00	-22.82	AVG	P	
5	1.1355	28.26	10.06	38.32	56.00	-17.68	QP	P	
6	1.1355	12.52	10.06	22.58	46.00	-23.42	AVG	P	
7	1.2300	28.95	10.06	39.01	56.00	-16.99	QP	P	
8	1.2300	13.37	10.06	23.43	46.00	-22.57	AVG	P	
9	1.3020	29.07	10.06	39.13	56.00	-16.87	QP	P	
10	1.3020	18.31	10.06	28.37	46.00	-17.63	AVG	P	
11	1.5990	29.57	10.06	39.63	56.00	-16.37	QP	P	
12	1.5990	12.82	10.06	22.88	46.00	-23.12	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	N
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	1.1354	29.08	10.06	39.14	56.00	-16.86	QP	P	
2	1.1354	12.82	10.06	22.88	46.00	-23.12	AVG	P	
3	1.2075	29.59	10.06	39.65	56.00	-16.35	QP	P	
4	1.2075	22.33	10.06	32.39	46.00	-13.61	AVG	P	
5	1.3064	29.89	10.06	39.95	56.00	-16.05	QP	P	
6	1.3064	17.18	10.06	27.24	46.00	-18.76	AVG	P	
7	1.4325	29.43	10.07	39.50	56.00	-16.50	QP	P	
8	1.4325	24.37	10.07	34.44	46.00	-11.56	AVG	P	
9	1.5673	30.03	10.06	40.09	56.00	-15.91	QP	P	
10	1.5673	13.73	10.06	23.79	46.00	-22.21	AVG	P	
11	1.6485	30.24	10.06	40.30	56.00	-15.70	QP	P	
12 *	1.6485	25.35	10.06	35.41	46.00	-10.59	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

6. RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 1GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Peak Value
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

6.1 Radiated Emission Limits

Limits for frequency below 30MHz

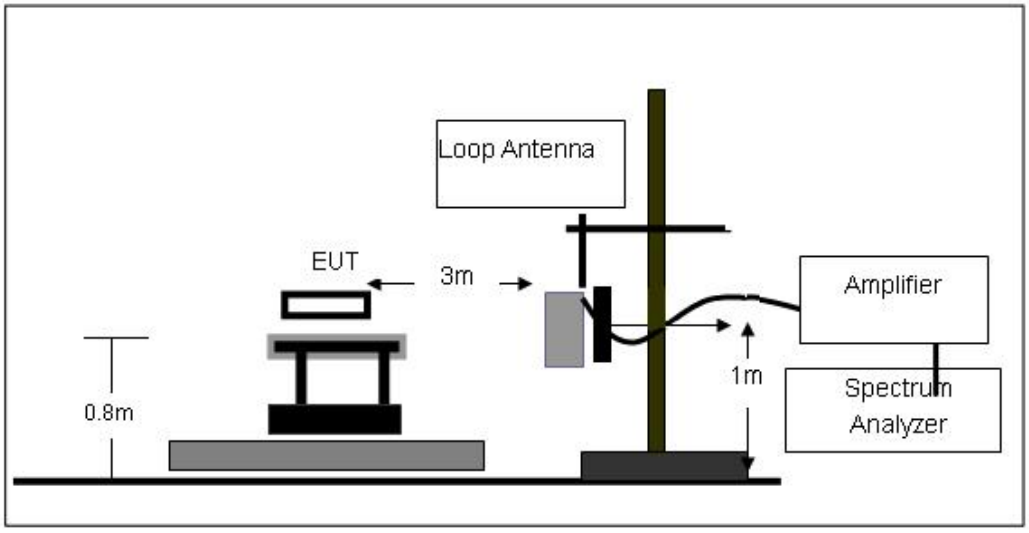
Frequency	Limit (uV/m)	Measurement Distance(m)	Remark
0.009-0.490	2400/F(kHz)	300	Peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-peak Value
1.705-30	30	30	Quasi-peak Value

Limits for frequency Above 30MHz

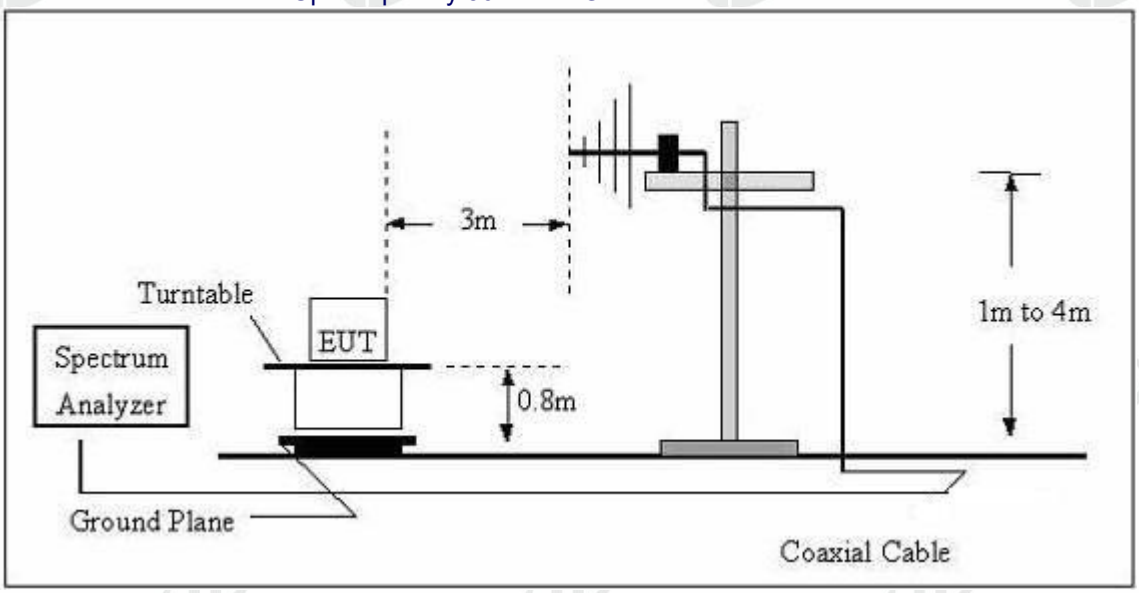
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.00	Quasi-peak Value
88MHz-216MHz	43.50	Quasi-peak Value
216MHz-960MHz	46.00	Quasi-peak Value
960MHz-1GHz	54.00	Quasi-peak Value
Above 1GHz	54.00	Average Value
	74.00	Peak Value

6.2 Anechoic Chamber Test Setup Diagram

（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

6.3 Test Procedure

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna (calibrated by dipole antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.

6.4 DEVIATION FROM TEST STANDARD

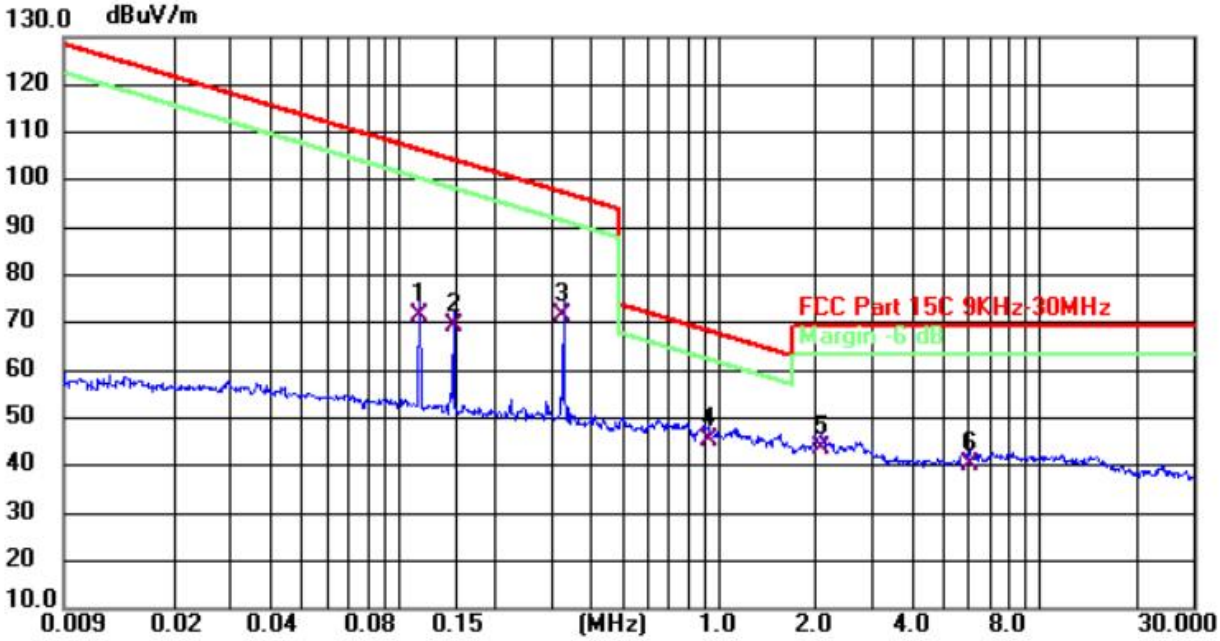
No deviation

6.5 Test Result

Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80
Limit dBuV/m @3m = Limit dBuV/m @30m + 40

9 kHz~30 MHz

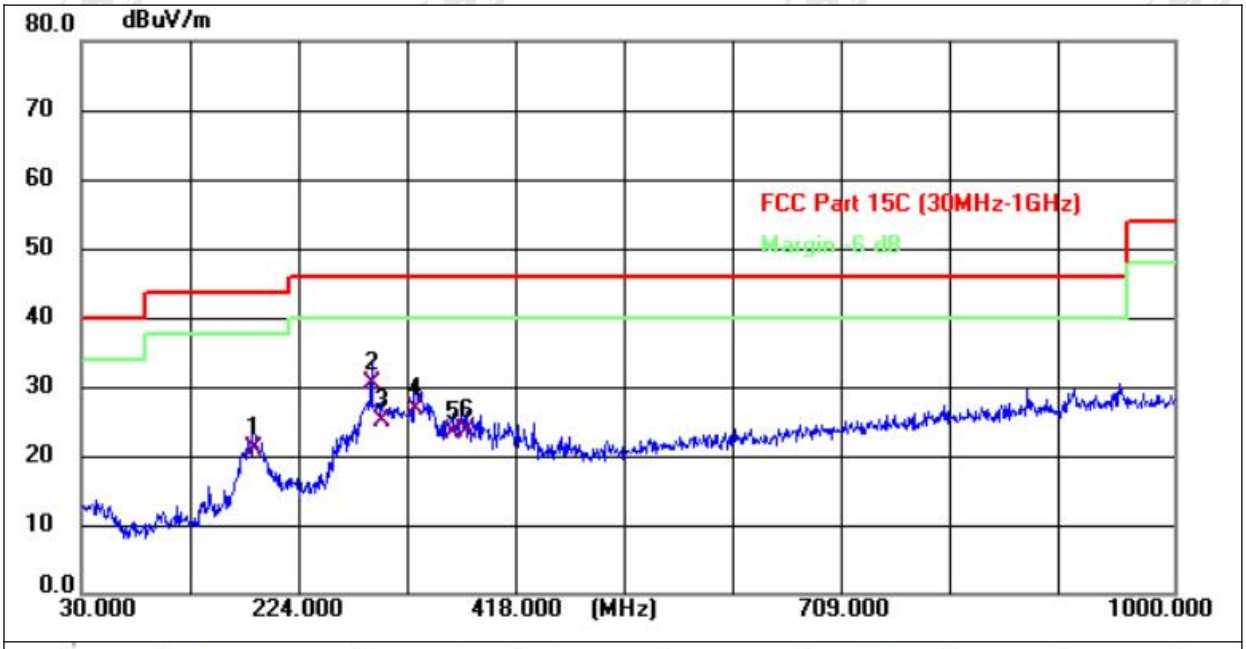


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.116	71.38	0.16	71.54	106.31	-34.77	Peak
2	0.148	69.31	0.16	69.47	104.20	-34.73	Peak
3	0.325	70.70	0.79	71.49	97.37	-25.88	Peak
4 *	0.924	43.28	1.95	45.23	68.29	-23.06	QP
5	2.080	39.12	4.32	43.44	69.54	-26.10	QP
6	6.020	27.69	12.35	40.04	69.54	-29.50	QP

Note:
Pre-scan in the all of mode, the worst case in of was recorded.
Factor = antenna factor + cable loss – pre-amplifier.
Emission Level = Meter Reading - Factor
Margin = Emission Level- Limit.
The amplitude of emissions which are attenuated by more than 20db below the permissible value has no need to be reported.

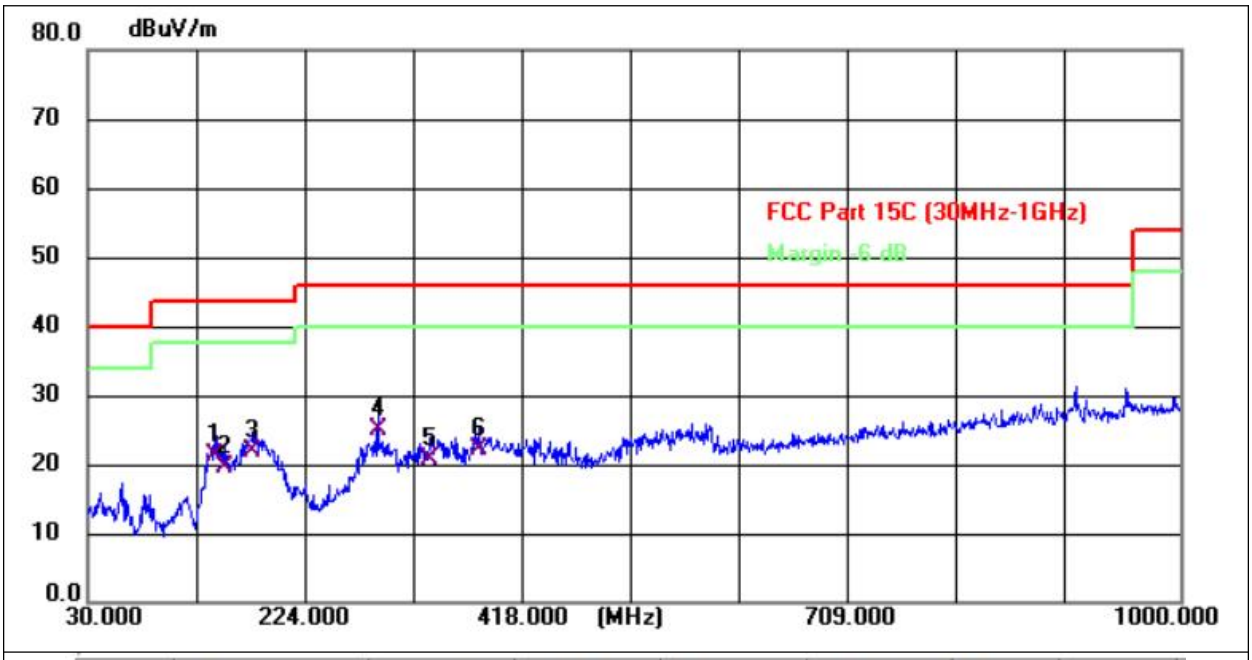
30MHz-1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	183.260	33.29	-12.27	21.02	43.50	-22.48	QP
2 *	288.020	38.98	-8.49	30.49	46.00	-15.51	QP
3	296.750	33.29	-8.32	24.97	46.00	-21.03	QP
4	326.820	34.26	-7.64	26.62	46.00	-19.38	QP
5	359.800	30.12	-6.87	23.25	46.00	-22.75	QP
6	371.440	30.06	-6.61	23.45	46.00	-22.55	QP

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	143.490	35.13	-13.88	21.25	43.50	-22.25	QP
2	151.250	33.56	-14.08	19.48	43.50	-24.02	QP
3	176.470	34.53	-12.69	21.84	43.50	-21.66	QP
4 *	288.020	33.55	-8.49	25.06	46.00	-20.94	QP
5	334.580	28.27	-7.45	20.82	46.00	-25.18	QP
6	378.230	28.66	-6.45	22.21	46.00	-23.79	QP

Remarks:
1. Factor = Antenna Factor + Cable Loss – Preamplifier Factor
2. Level = Reading + Factor
3. Margin = Emission Level- Limit.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

7. BANDWIDTH TEST

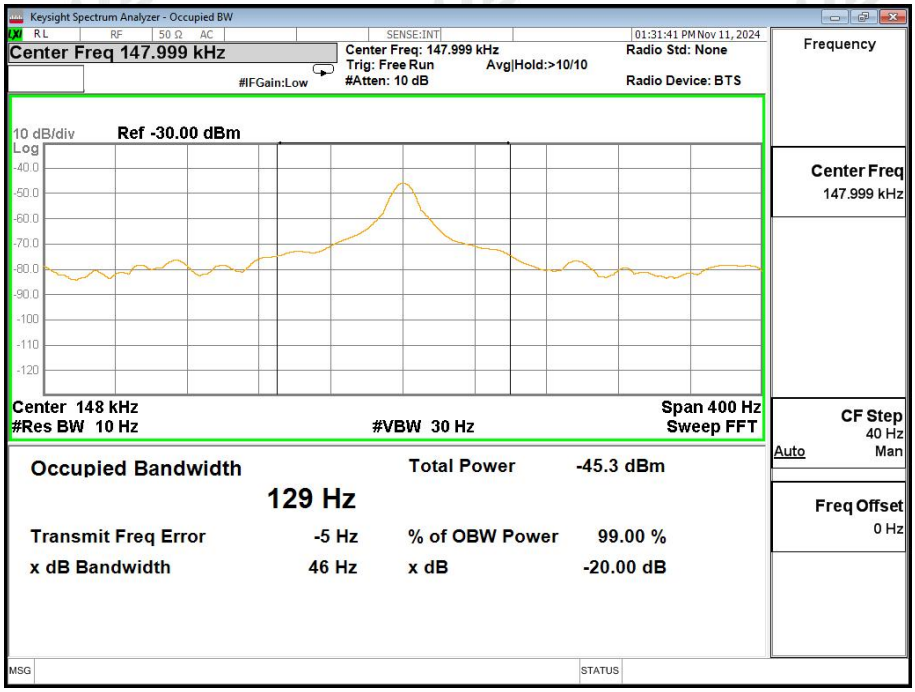
1. Set RBW = 10 Hz for 1%-5%OBW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP

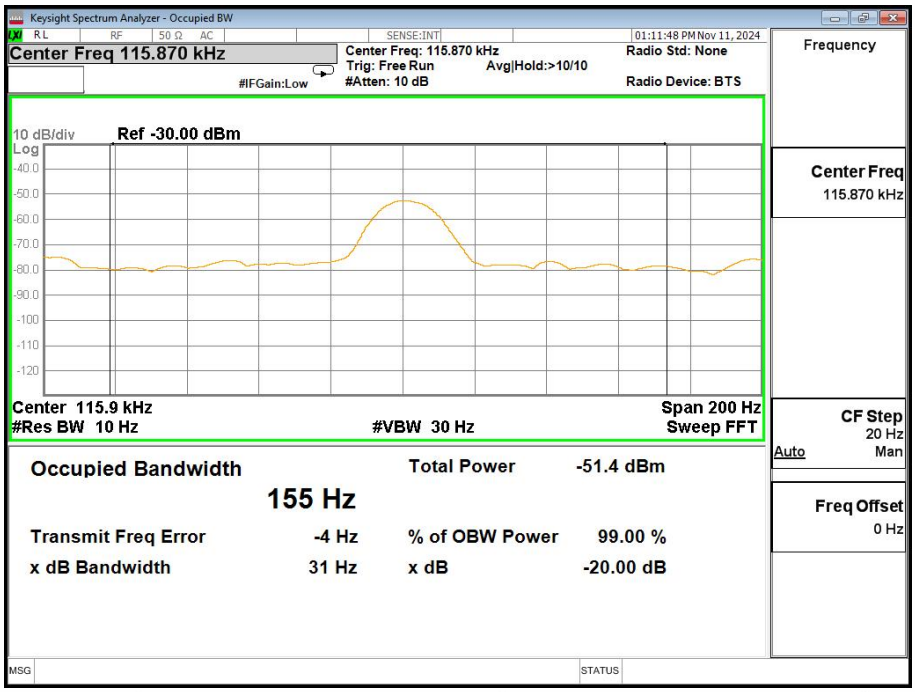
Temperature:	25.7 ℃	Relative Humidity:	55%
Pressure:	101kPa		

	Frequency (KHz)	20dB bandwidth (KHz)	Result
Mobile phone coil	148	0.046	Pass
Earphone coil	115.9	0.031	Pass
Watch coil	325.1	0.206	Pass

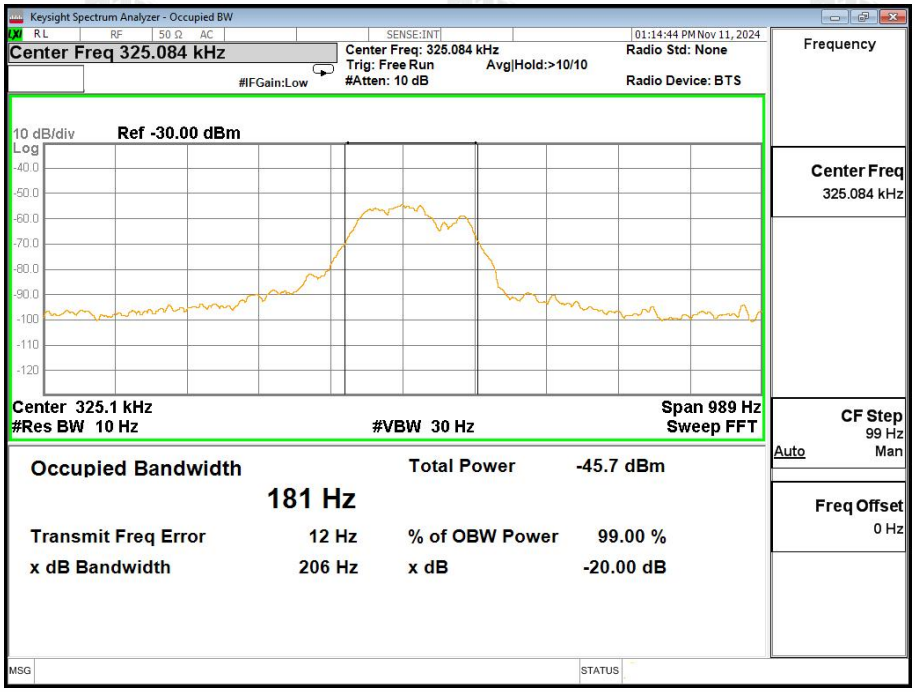
Mobile phone Antenna



Earphone charging case Antenna



Watch Antenna



8. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna is Coil Antenna, the best case gain of the antennas is 0dBi, reference to the appendix II for details	

9. TEST SETUP PHOTO

Reference to the appendix I for details.

10. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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