FCC TEST REPORT

Test report
On Behalf of
MDiff Co.,LTD.
For
Magnetic Wireless Charger
Model No.: ADVQ-T8, ADVQ-T8S, AD-CHAC01, AD-CHAC02, AD-CHAC03, AD-CHAC04, AD-CHAC05

FCC ID: 2AZWM-ADVQT8

Prepared for :	**MDiff Co.,LTD.** **#929, Dongmun Tower II, 358-25, Hosu-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea**
Prepared By :	**Shenzhen Tongzhou Testing Co.,Ltd** **1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China**
Date of Test:	**Apr. 28, 2021 ~ May. 6, 2021**
Date of Report:	**May. 7, 2021**
Report Number:	**TZ210302115-E1**

The test report apply only to the specific sample(s) tested under stated test conditions
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TEST RESULT CERTIFICATION

Applicant's name ..... :	MDiff Co.,LTD.
Address ..... :	#929, Dongmun Tower II, 358-25, Hosu-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea
Manufacture's Name..... :	Shenzhen Whakin Innovation Technology Co.,Ltd.
Address ..... :	South Area 4/F, L Type Building, Jingtie Technology Industrial Park, No.49 Changjiangpu RD, Heao Community, Yuanshan Street, Longgang District, Shenzhen, China
Product description	
Trade Mark ..... :	AIRDOCK
Product name ..... :	Magnetic Wireless Charger
Model and/or type reference :	ADVQ-T8
Standards ..... :	FCC Rules and Regulations Part 15 Subpart C ANSI C63.10: 2013

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Date of Test ..... :	
Date (s) of performance of tests ..... :	Apr. 28, 2021 ~ May. 6, 2021
Date of Issue..... :	May. 7, 2021
Test Result..... :	**Pass**

Testing Engineer : Nancy Li

(Nancy Li)

Technical Manager : Hugo Chen

(Hugo Chen)

Authorized Signatory : Andy Zhang

(Andy Zhang)

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1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC Rules Part	DESCRIPTION OF TEST	RESULT
15.207	CONDUCTED EMISSIONS TEST	COMPLIANT
15.209	RADIATED EMISSION TEST	COMPLIANT
15.215(c)	OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
15.203	ANTENNA REQUIREMENT	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen Tongzhou Testing Co.,Ltd

Address 1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty(9kHz-30MHz)	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2 GENERAL INFORMATION

2.1 General Description of EUT

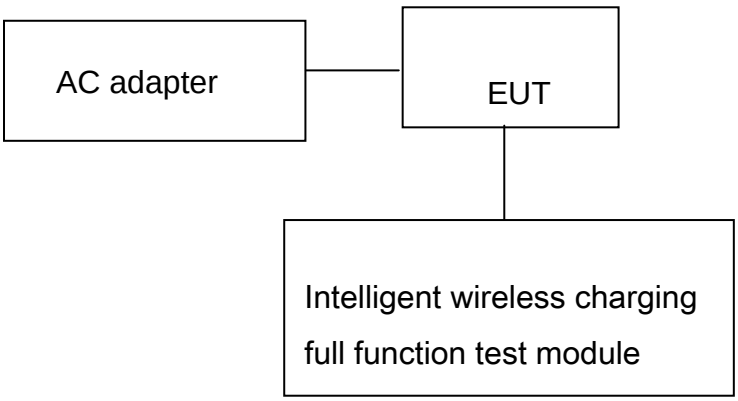
Equipment	Magnetic Wireless Charger
Model Name	ADVQ-T8
Serial No.	ADVQ-T8S, AD-CHAC01, AD-CHAC02, AD-CHAC03, AD-CHAC04, AD-CHAC05
Model Difference	All the same except for the model name
Trade Mark	AIRDOCK
FCC ID	2AZWM-ADVQT8
Antenna Type	Coil Antenna
Antenna Gain	0dBi
Operation frequency	110-205KHz
Modulation Type	ASK
Power Rating	Input: 5V⎓2A, 9V⎓2A, 12V⎓1.5A Output: 5V⎓1A, 7.5V⎓1A, 9V⎓1.12A, 9V⎓1.67A
Test Sample ID	TZ210302115-1#

2.2 Operation of EUT during testing

Test Modes:		
Mode 1	AC/DC Adapter (12V/1.5A) + EUT + Wireless charger tester (Load 15W)	Record
Mode 2	AC/DC Adapter (12V/1.5A) + EUT + Wireless charger tester (Load 10W)	Pre-test
Mode 3	AC/DC Adapter (12V/1.5A) + EUT + Wireless charger tester (Load 7.5W)	Pre-test
Mode 4	AC/DC Adapter (12V/1.5A) + EUT + Wireless charger tester (Load 5W)	Pre-test
Mode 5	AC/DC Adapter (9V/2A) + EUT + Wireless charger tester (Load 15W)	Pre-test
Mode 6	AC/DC Adapter (9V/2A) + EUT + Wireless charger tester (Load 10W)	Pre-test
Mode 7	AC/DC Adapter (9V/2A) + EUT + Wireless charger tester (Load 7.5W)	Pre-test
Mode 8	AC/DC Adapter (9V/2A) + EUT + Wireless charger tester (Load 5W)	Pre-test
Mode 9	AC/DC Adapter (5V/2A) + EUT + Wireless charger tester (Load 15W)	Pre-test
Mode 10	AC/DC Adapter (5V/2A) + EUT + Wireless charger tester (Load 10W)	Pre-test
Mode 11	AC/DC Adapter (5V/2A) + EUT + Wireless charger tester (Load 7.5W)	Pre-test
Mode 12	AC/DC Adapter (5V/2A) + EUT + Wireless charger tester (Load 5W)	Pre-test
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

2.3 Description of Test Setup

Operation of EUT during testing



Setup: Transmission mode

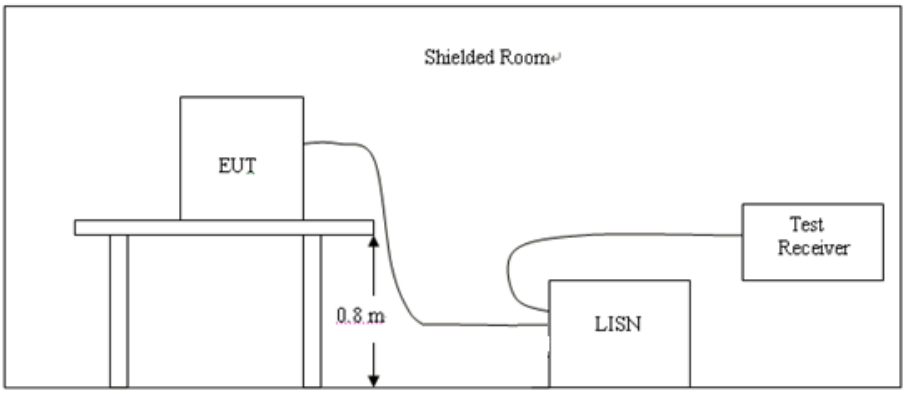
- AC adapter information
  Model: MDY-10-EH
  Input: 100-240VAC, 50/60Hz 0.7A
  Output : 5V⎓2A, 9V⎓3A, 12V⎓2.25A, 20V⎓1.35A
- Intelligent wireless charging full function test module information
  Manufacturer: YBZ

3 MEASUREMENT INSTRUMENTS LIST

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Wideband Antenna	schwarzbeck	VULB 9163	958	2019/11/16	2022/11/15
2	EMI Test Receiver	R&S	ESCI	100849/003	2021/1/4	2022/1/3
3	Controller	MF	MF7802	N/A	N/A	N/A
4	RF Cable(below 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
5	RF Cable(above 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
6	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
7	Loop Antenna	schwarzbeck	FMZB 1519 B	23	2019/11/16	2022/11/15
8	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2021/1/4	2022/1/3
9	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71	N/A	N/A
10	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2021/1/4	2022/1/3

4 CONDUCTED EMISSION TEST

4.1 Block Diagram of Test Setup



4.2 Conducted Power Line Emission Limit

According to FCC Part 15.207(a)

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency
For intentional device, according to §15.207Line Conducted Emission Limit is same as above table.

4.3 Test Procedure

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes

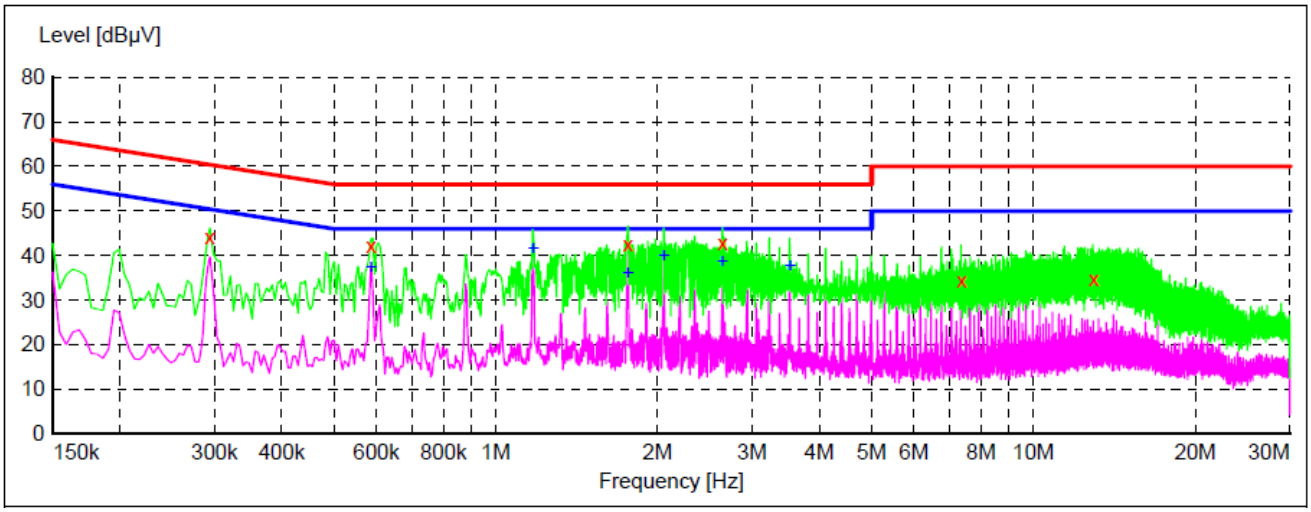
4.4 Test Result

PASS

Temperature	22.8℃	Humidity	55%
Test Engineer	Tony Luo	Configurations	Mode 1

Please refer to following diagram for individual

Test Specification: Line

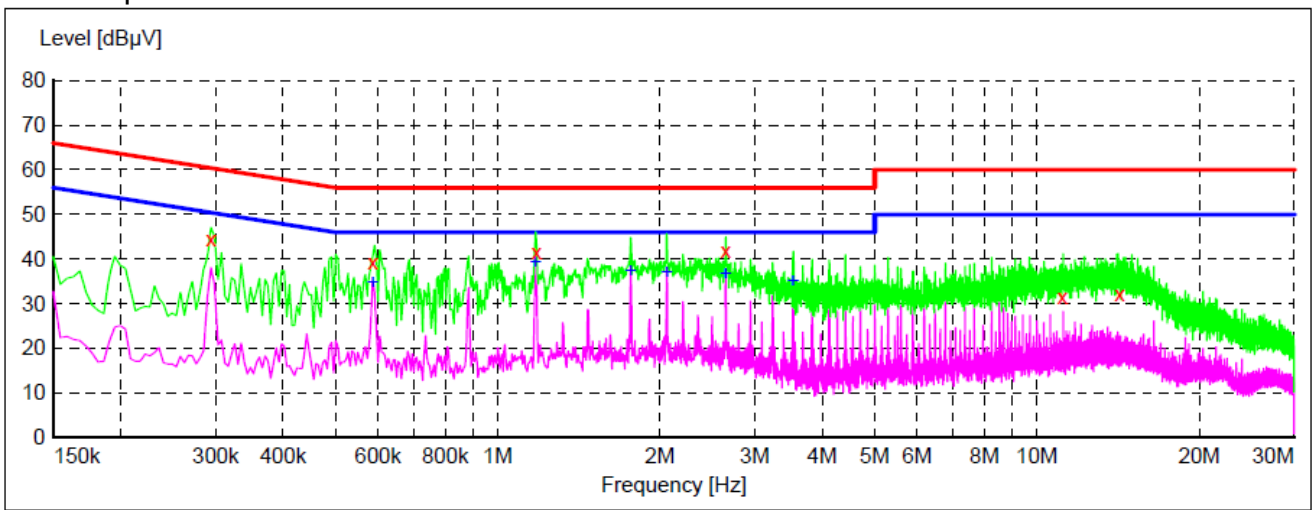


Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.294000	44.20	10.2	60	16.2	QP	L1	GND
0.586500	42.20	9.9	56	13.8	QP	L1	GND
1.761000	42.50	9.7	56	13.5	QP	L1	GND
2.643000	42.70	9.7	56	13.3	QP	L1	GND
7.350000	34.50	9.8	60	25.5	QP	L1	GND
12.943500	34.60	9.8	60	25.4	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.586500	37.30	9.9	46	8.7	AV	L1	GND
1.176000	41.40	9.8	46	4.6	AV	L1	GND
1.761000	36.10	9.7	46	9.9	AV	L1	GND
2.058000	40.00	9.7	46	6.0	AV	L1	GND
2.643000	38.60	9.7	46	7.4	AV	L1	GND
3.529500	37.50	9.7	46	8.5	AV	L1	GND

Remark: Margin = Limit – Level

Test Specification: Neutral



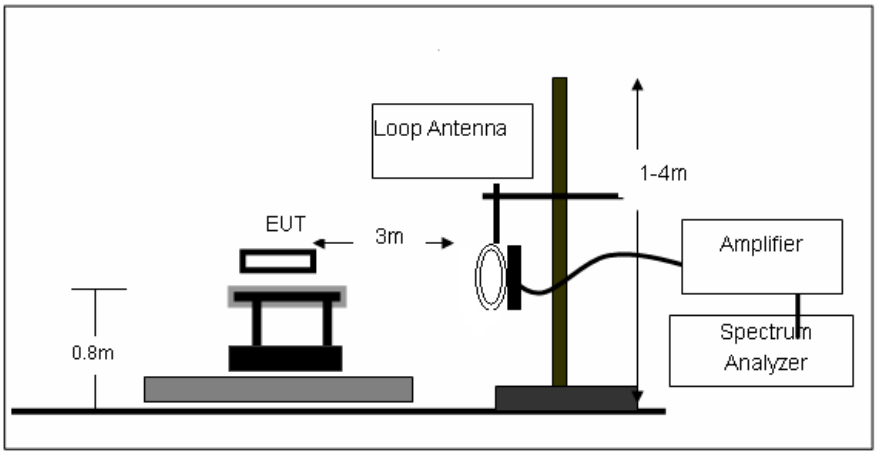
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.294000	44.40	10.2	60	16.0	QP	N	GND
0.586500	39.20	9.9	56	16.8	QP	N	GND
1.180500	41.70	9.8	56	14.3	QP	N	GND
2.647500	41.90	9.7	56	14.1	QP	N	GND
11.143500	31.50	9.8	60	28.5	QP	N	GND
14.221500	32.20	9.8	60	27.8	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.586500	34.80	9.9	46	11.2	AV	N	GND
1.176000	39.10	9.8	46	6.9	AV	N	GND
1.765500	37.40	9.7	46	8.6	AV	N	GND
2.062500	36.90	9.7	46	9.1	AV	N	GND
2.647500	36.50	9.7	46	9.5	AV	N	GND
3.534000	35.10	9.7	46	10.9	AV	N	GND

Remark: Margin = Limit – Level

5 BANDWIDTH

5.1 Block Diagram of Test Setup



5.2 Rules and specifications

CFR 47 Part 15.215(c)

ANSI C63.10-2013

5.3 Test Procedure

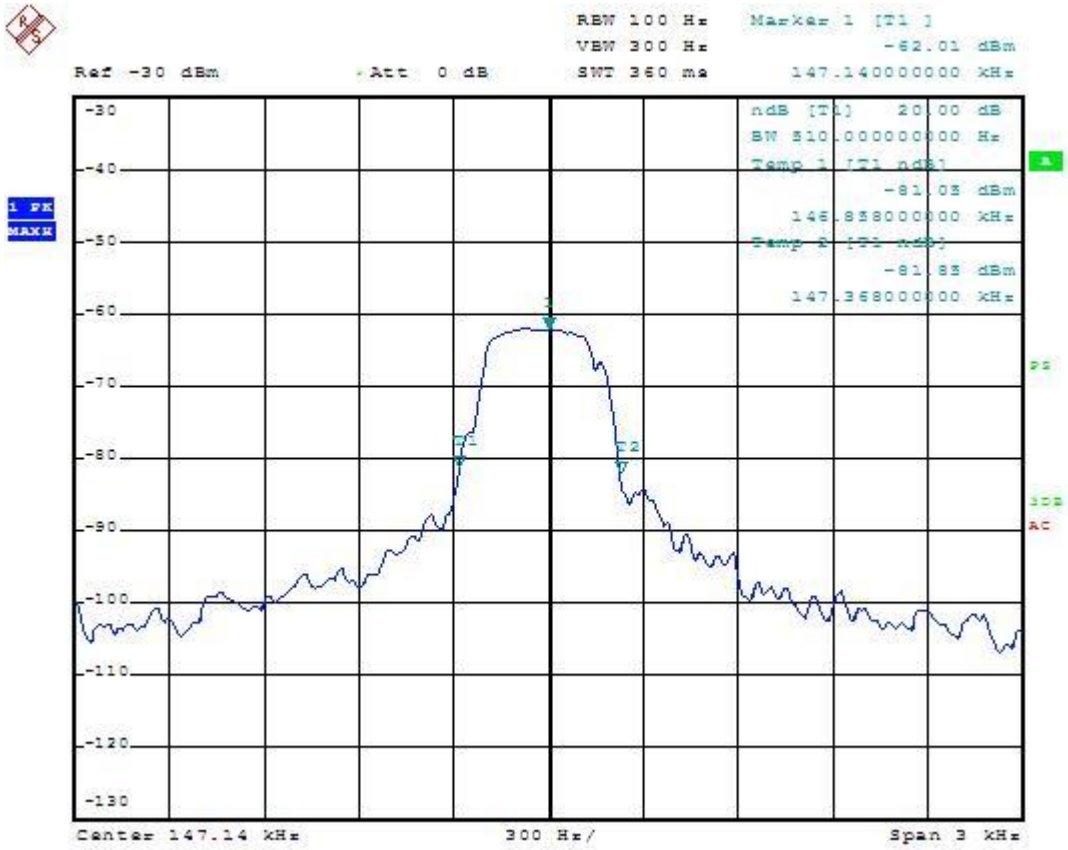
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be deomonstrated by measuring the radiated emissions.

5.4 Test Result

PASS

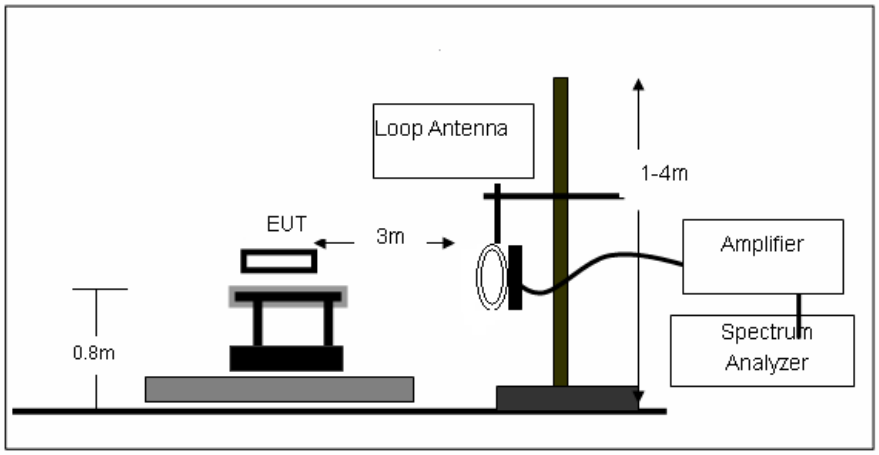
Temperature	22.8℃	Humidity	55%
Test Engineer	Tony Luo	Configurations	Mode 1

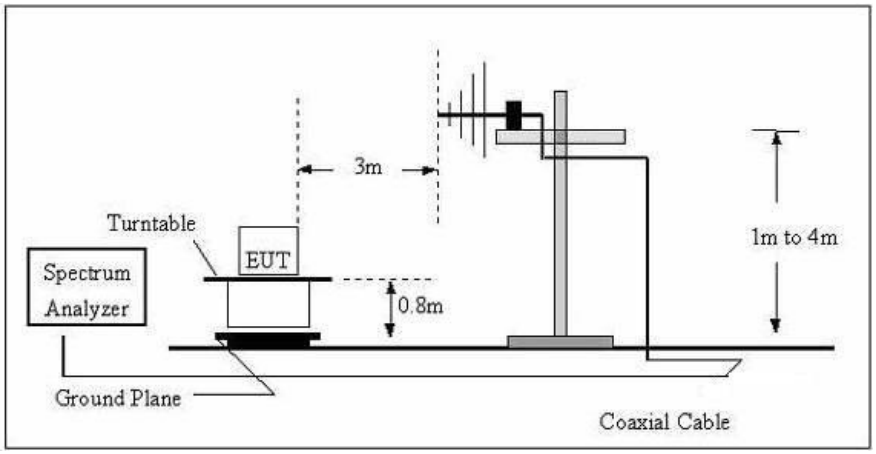
Mode	Freq (KHz)	20dB Bandwidth (Hz)	Limit (kHz)	Conclusion
Tx Mode	147	510	/	PASS



6 RADIA TED EMISSIONS

6.1 Block Diagram of Test Setup





6.2 Rules and specifications

CFR 47 Part 15, section 15.205

Only spurious emissions are permitted in any of the frequency bands listed the tables in these sections.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(\2\)
13.36-13.41			

CFR 47 Part 15, section 15.209

The emissions from an intentional radiator shall not exceed the limits in the tables in these sections using an average detector

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Limit calculation and transfer to 3m distance as showed in the following table:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
0.009-0.490	20log(2400/F(KHz))+40log(300/3)	3
0.490-1.705	20log(24000/F(KHz))+40log(30/3)	3
1.705-30.0	69.5	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

CFR 47 Part 15, section 15.35

When average radiated emission measurements are specified, the limit on the peak level of the radio Frequency emission is 20dB above the maximum permitted average emission limit.

Transmitter Spurious Emissions 9KHz-30MHz			
	9-150KHz	150-490KHz	490KHz-30MHz
Resolution Bandwidth	200Hz	9KHz	9KHz
Video Bandwidth	2KHz	100KHz	100KHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

6.3 Test Procedure

Measurement distance 3m
For the measurement range up to 30MHz in the following plots the field strength result from 3m Distance measurement are extrapolated to 300m and 30m distance respectively, by 40dB/decade, According to part 15.31(f)(2), per antenna factor scaling.
Measurements below 1000MHz are performed with a peak detector and compared to average limits, Measurements with an average detector are not required.

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

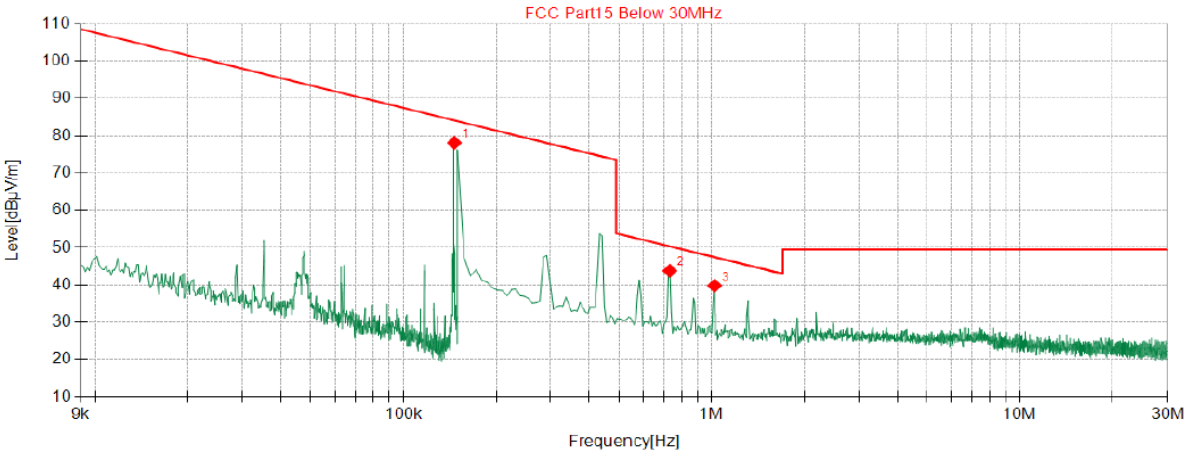
6.4 Test Result

PASS

Temperature	22.8℃	Humidity	55%
Test Engineer	Tony Luo	Configurations	Mode 1

For 9KHz-30MHz

Note: Measured at both 0 degree and 90 degree, recorded worst case at 90 degree.

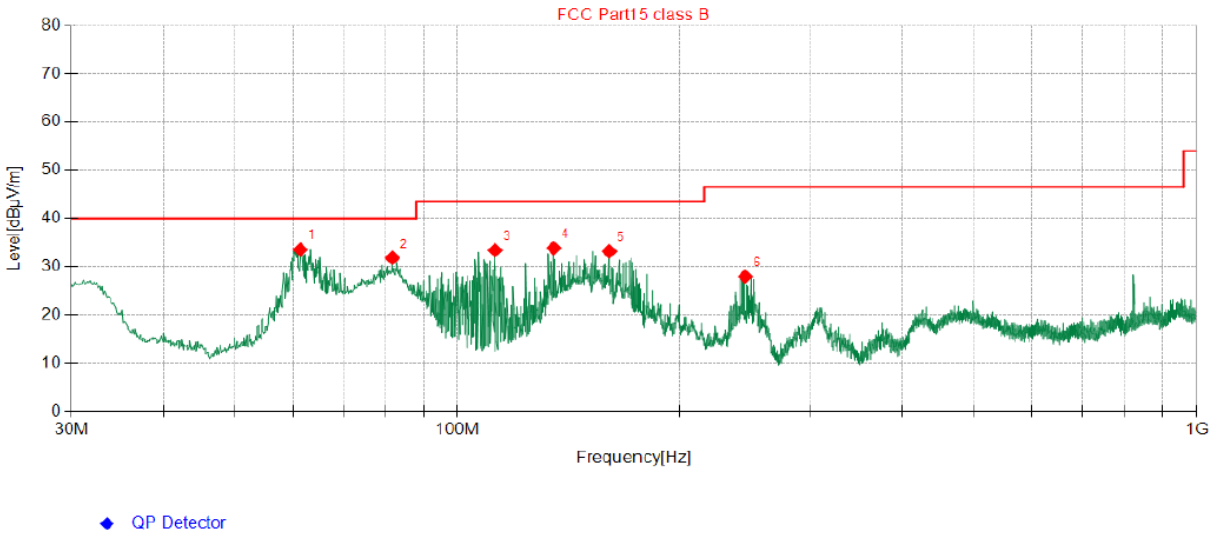


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	0.146	57.54	20.55	78.09	84.08	5.99	100	104	Horizontal
2	0.732	22.84	20.95	43.79	50.32	6.53	100	122	Horizontal
3	1.023	18.92	20.90	39.82	47.42	7.60	100	113	Horizontal

Remark：Actual FS = Reading + Factor;
Margin = Limits - Actual FS

For 30MHz-1GHz

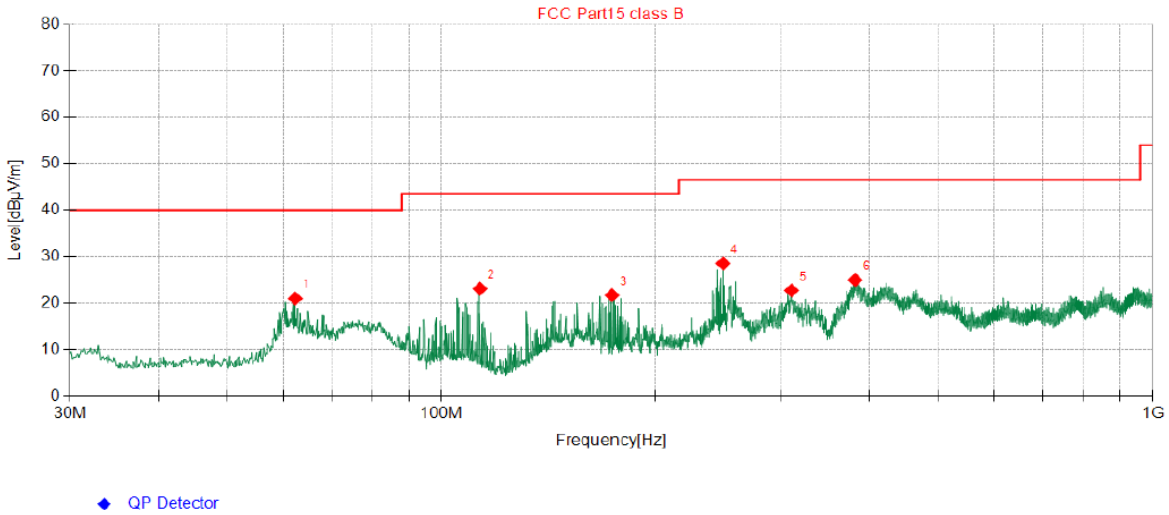
Antenna polarity: V



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	61.28	48.87	-15.34	33.53	40.00	6.47	100	276	Vertical
2	81.65	50.86	-19.02	31.84	40.00	8.16	100	358	Vertical
3	112.4	49.16	-15.76	33.40	43.50	10.10	100	7	Vertical
4	135.0	52.33	-18.48	33.85	43.50	9.65	100	280	Vertical
5	160.5	50.83	-17.65	33.18	43.50	10.32	100	233	Vertical
6	245.3	41.91	-13.94	27.97	46.50	18.53	100	261	Vertical

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Antenna polarity: H



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	62.25	37.23	-16.23	21.00	40.00	19.00	100	346	Horizontal
2	113.2	39.65	-16.55	23.10	43.50	20.40	100	90	Horizontal
3	173.8	39.56	-17.84	21.72	43.50	21.78	100	244	Horizontal
4	249.2	42.43	-13.89	28.54	46.50	17.96	100	256	Horizontal
5	311.0	35.24	-12.50	22.74	46.50	23.76	100	290	Horizontal
6	382.3	35.50	-10.52	24.98	46.50	21.52	100	299	Horizontal

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

7 ANTENNA REQUIREMENT

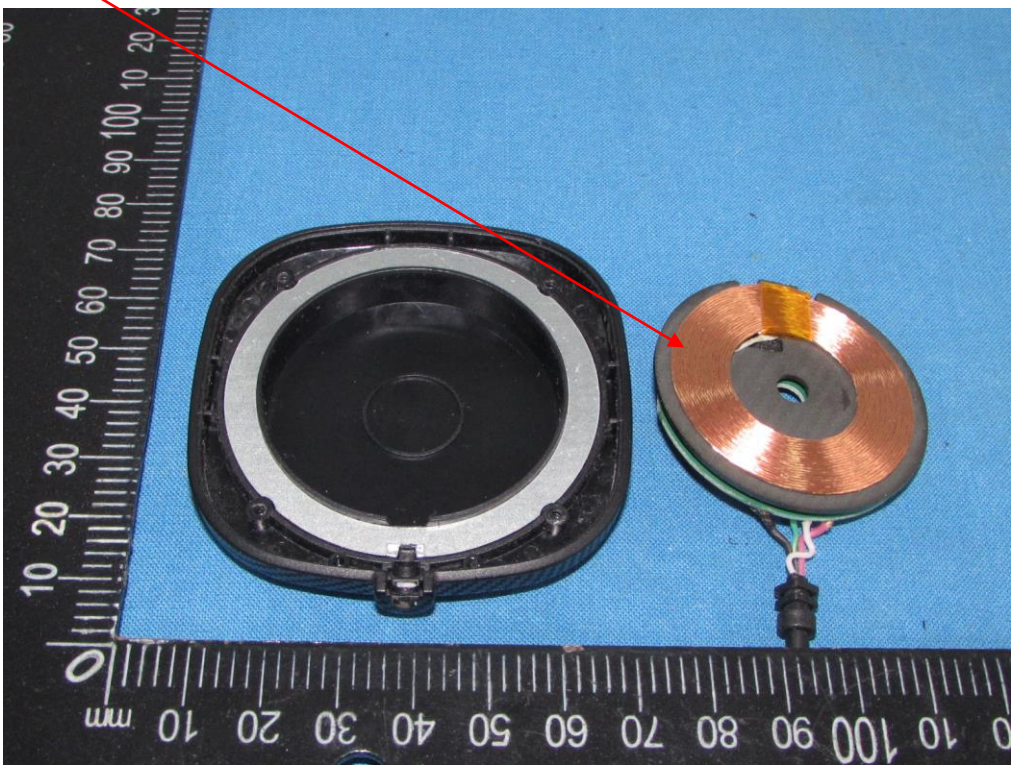
Standard Applicable
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

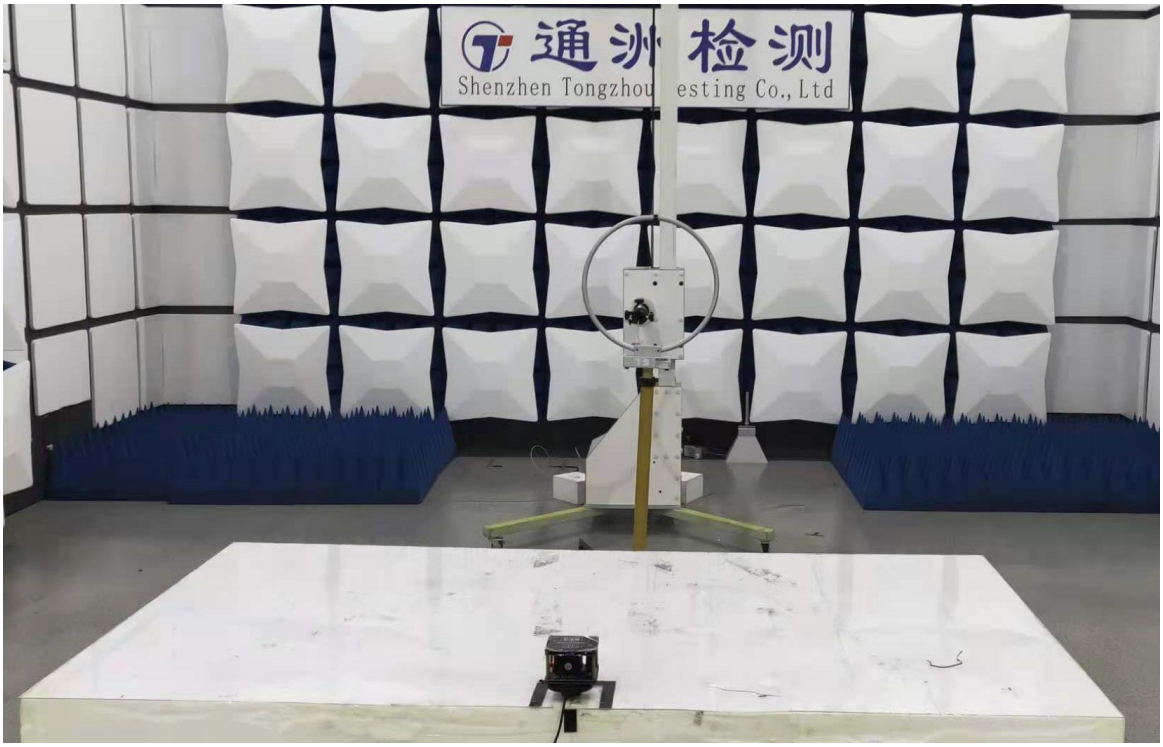
The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.

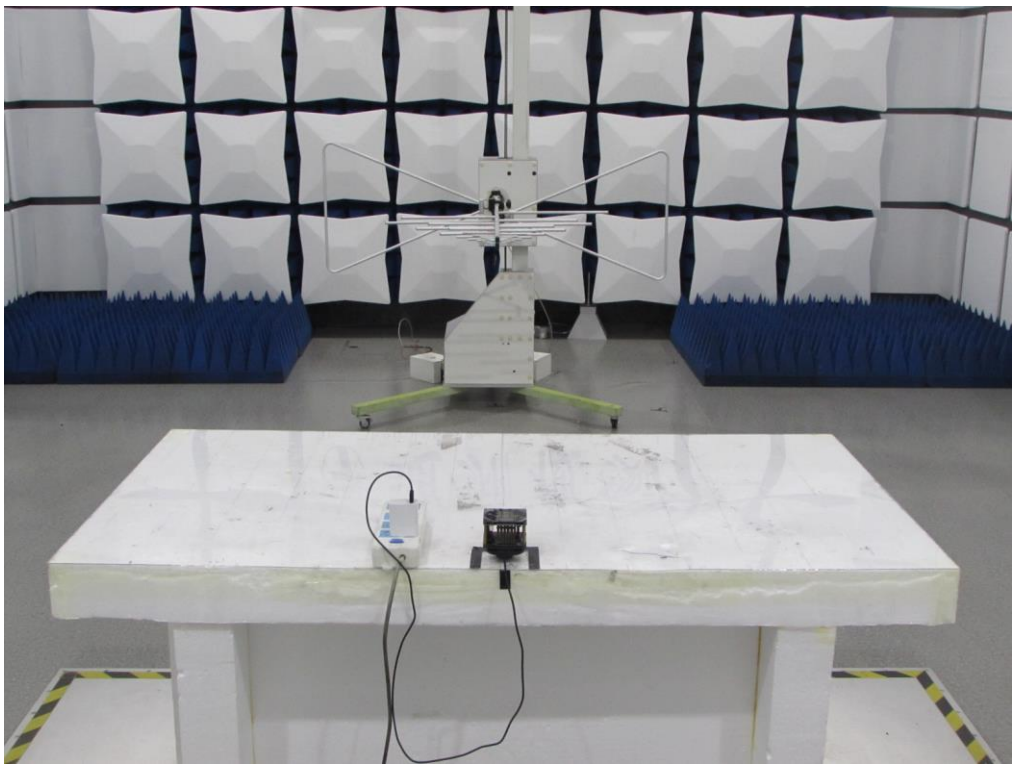
ANTENNA



8 PHOTOGRAPH OF TEST

8.1 Radiated Emission





8.2 Conducted Emission

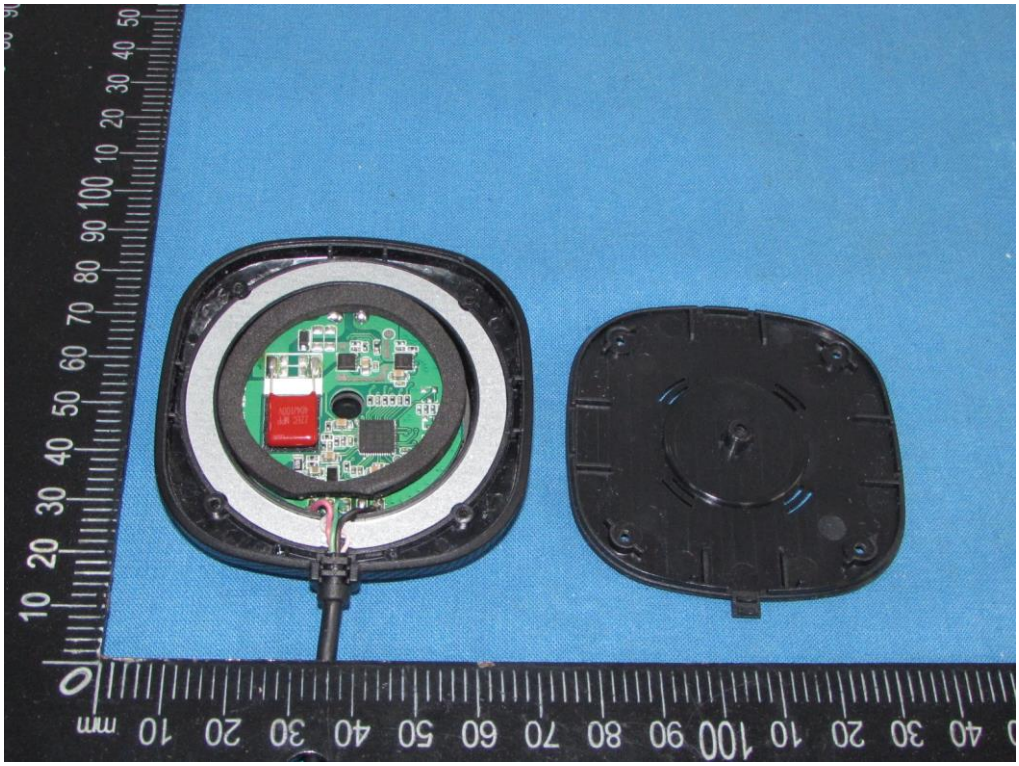
9 PHOTOGRAPH OF EUT

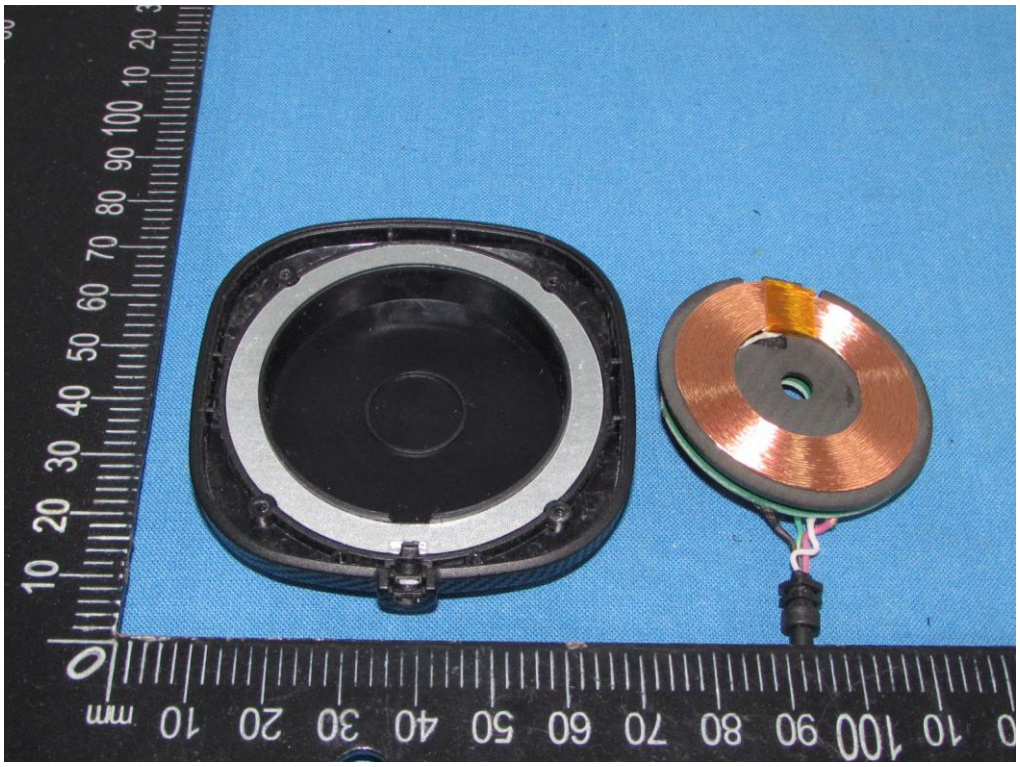
External Photos

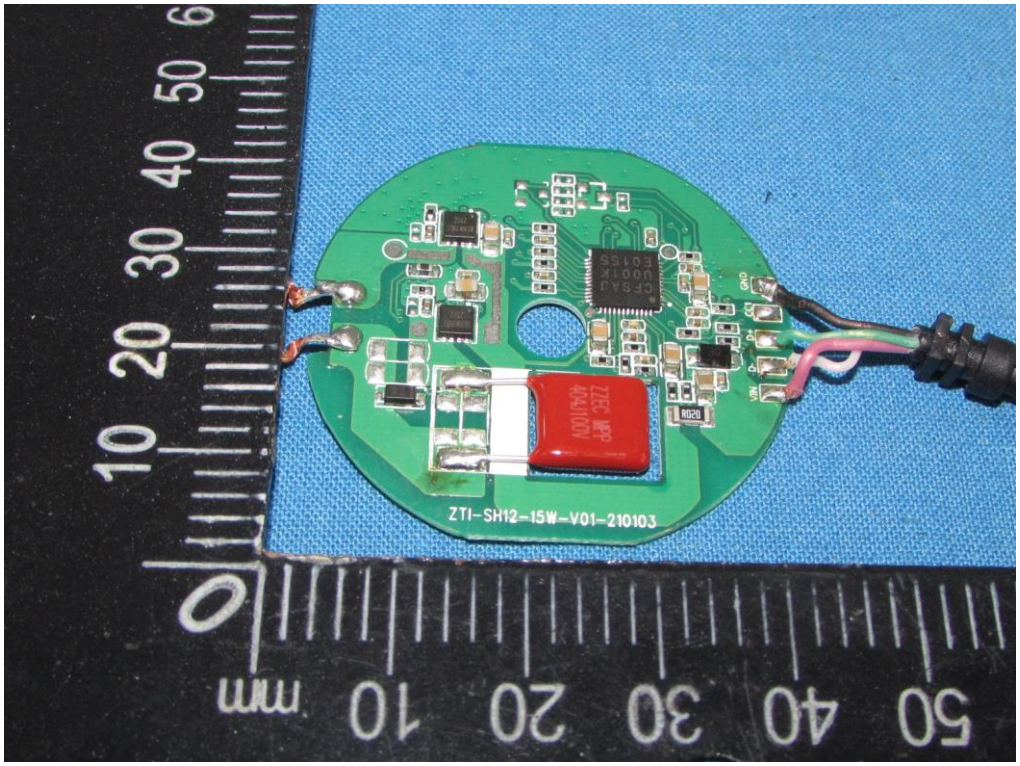
Choc

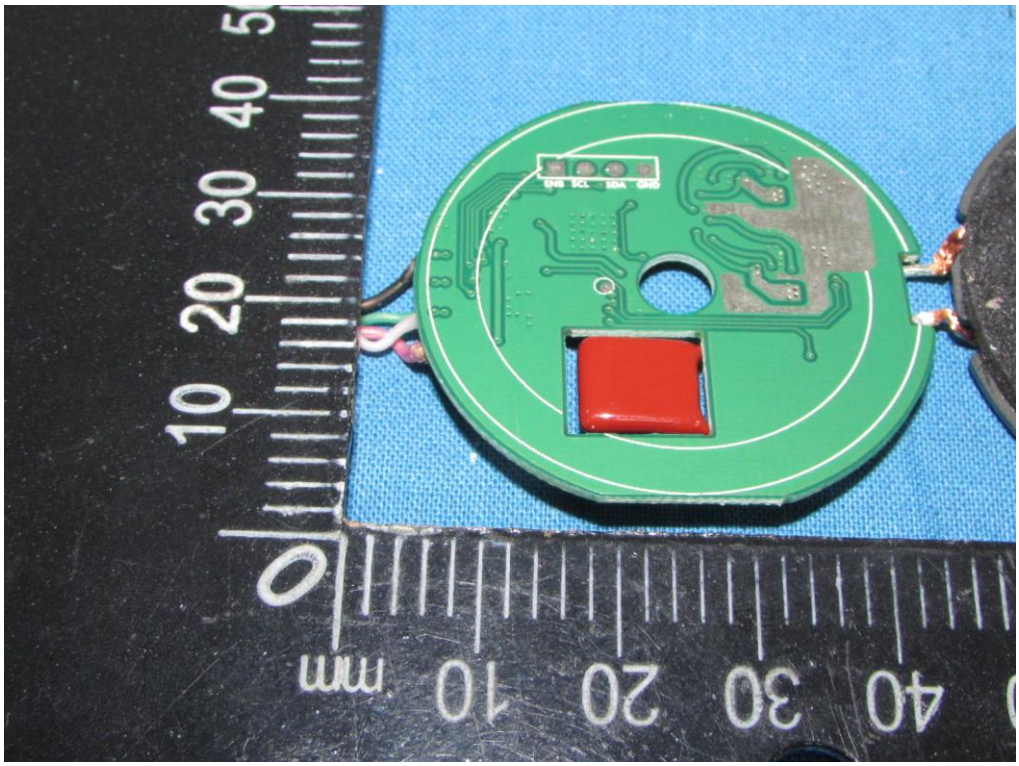
Chac

Internal Photos






ZTI-SH12-15W-V01-210103



※※※※※THE END※※※※※