



Shenzhen CTL Testing Technology Co., Ltd.  
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# TEST REPORT

## FCC PART 15 SUBPART C

Report Reference No. .... : CTL2207053064-WF05

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Tested by: Gary Gao  
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Gary Gao

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( position+printed name+signature) (Manager)

Ivan Xie

Product Name ..... : Mondo Duo Smart Internet Radio

Model/Type reference ..... : GDI-WHAMD201

List Model(s)..... : GDI-WHAMD205

Trade Mark..... : gracedigital

FCC ID..... : 2AAUI-MONDODUO

Applicant's name ..... : Grace Digital Inc.

Address of applicant ..... : 10531 4S Commons Drive #166 Suite #430 San Diego, CA 92127

Test Firm..... : Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm ..... : Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,  
Nanshan District, Shenzhen, China 518055

Test specification..... :

Standard ..... : FCC Rules Part 15.207,15.209, 15.215(c)  
ANSI C63.10-2013

TRF Originator ..... : Shenzhen CTL Testing Technology Co., Ltd.

Master TRF..... : Dated 2011-01

Date of receipt of test item ..... : Jul. 25, 2022

Date of sampling..... : Jul. 25, 2022

Date of Test Date..... : Jul. 25, 2022 - Sept. 06, 2022

Date of Issue ..... : Sept. 06, 2022

Result..... : Pass

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# TEST REPORT

<b>Test Report No.:</b>	<b>CTL2207053064-WF05</b>	Sept. 06, 2022
		Date of issue

Equipment under Test : Mondo Duo Smart Internet Radio

Sample No. : CTL220705306-4-S001(Normal sample)  
CTL220705306-4-S002(Engineer sample)

Model /Type : GDI-WHAMD201

Listed Models : GDI-WHAMD205

**Applicant** : **Grace Digital Inc.**

Address : 10531 4S Commons Drive #166 Suite #430 San Diego,  
CA 92127

**Manufacturer** : **Ming Le Electronics Factory**

Address : NO. 33 Lane 7, XinZhuangShe, LianTang, XinHua Town,  
HuaDu District, GuangZhou, CHINA.

<b>Test result</b>	<b>Pass *</b>
--------------------	---------------

\* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

## **\*\* Modified History \*\***

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## 1. SUMMARY

### 1.1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.207, 15.209, 15.215\(c\)](#)

[ANSI C63.10: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

### 1.2. Test Description

Test Item	Test Standards	Test Result
Electric Field Radiated Emissions	FCC Part 15 C (Section15.209)	PASS
20dB Bandwidth/99% Bandwidth	FCC Part 15 C (Section15.215(c))	PASS
Conducted Emissions	FCC Part 15 C (Section15.207)	PASS
Antenna Requirement	FCC Part 15 C (Section15.203)	PASS

### 1.3. Test Facility

#### 1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

#### 1.3.2 Laboratory accreditation

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

##### **CNAS-Lab Code: L7497**

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

##### **A2LA-Lab Cert. No. 4343.01**

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

##### **IC Registration No.: 9618B CAB identifier: CN0041**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

##### **FCC-Registration No.: 399832 Designation No.: CN1216**

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

### 1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 9KHz ~30MHz	±3.40dB	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)

Radiated Emission Above 1GHz	$\pm 4.32\text{dB}$	(1)
Conducted Disturbance 0.15~30MHz	$\pm 3.20\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 2. GENERAL INFORMATION

### 2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

### 2.2. General Description of EUT

Product Name:	Mondo Duo Smart Internet Radio
Model/Type reference:	GDI-WHAMD201
Power supply:	DC 18V from adapter
Adapter information:	Model No: GM42-180220-1A Input: AC 100-240V 50/60Hz 1.5A Output: 18V---2.0A
Hardware version:	V1.0
Software version:	V1.0
<b>Wireless Charger:</b>	
Operation frequency:	110KHz-205KHz
Modulation type:	ASK
Rated power:	10W
Antenna type:	Coil antenna

Note1: For more details, please refer to the user's manual of the EUT.

### 2.3. Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

☒ Charging and communication mode

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

### 2.4. Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Wireless charger tester	/	SW-MK-89898	Full Protocol Wireless Chager Tester, 5W / 7.5W / 10W / 15W four gear switchable	CE/FCC	laboratory
/	/	/	/	/	/
/	/	/	/	/	/



## 2.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2022/05/06	2023/05/05
LISN	R&S	ESH2-Z5	860014/010	2022/05/06	2023/05/05
Double Cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2020/04/07	2023/04/06
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Horn Antenna	Ocean Microwave	OBH100400	26999002	2019/11/28	2022/11/27
EMI Test Receiver	R&S	ESCI	1166.5950.03	2022/05/06	2023/05/05
Spectrum Analyzer	Agilent	N9020	US46220290	2022/05/07	2023/05/06
Spectrum Analyzer	RS	FSP	1164.4391.38	2022/05/07	2023/05/06
Controller	EM Electronics	EM 1000	060859	2022/05/20	2023/05/19
Amplifier	Agilent	8449B	3008A02306	2022/05/07	2023/05/06
Amplifier	Agilent	8447D	2944A10176	2022/05/06	2023/05/05
Amplifier	Brief&Smart	LNA-4018	2104197	2022/05/07	2023/05/06
Temperature/Humidity Meter	Ji Yu	MC501	/	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130004	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130006	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY54510008	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55060003	2022/05/07	2023/05/06
High-Pass Filter	micro-tranics	HPM50108	G174	2022/05/07	2023/05/06
High-Pass Filter	micro-tranics	HPM50111	G142	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2022/05/07	2023/05/06
RF Cable	Megalon	RF-A303	N/A	2022/05/07	2023/05/06
Test Software					
Name of Software			Version		
TST-PASS			1.0.5		
EZ_EMC(Below 1GHz)			V1.1.4.2		
EZ_EMC(above 1GHz)			V1.1.4.2		

The calibration interval was one year

## **2.6. Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended to comply with FCC Part 15 Subpart C Rules.

## **2.7. Modifications**

No modifications were implemented to meet testing criteria.

### 3. TEST CONDITIONS AND RESULTS

#### 3.1. Conducted Emissions Test

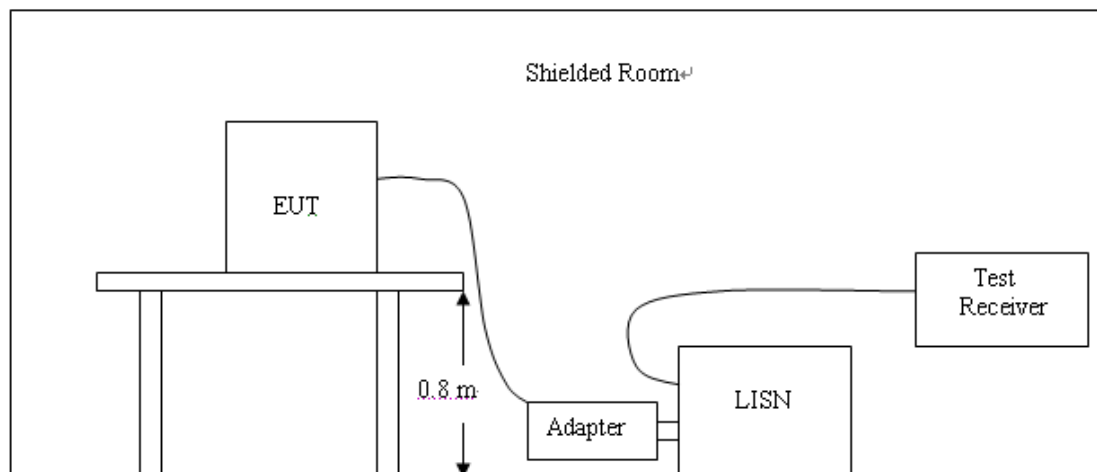
##### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

##### TEST CONFIGURATION

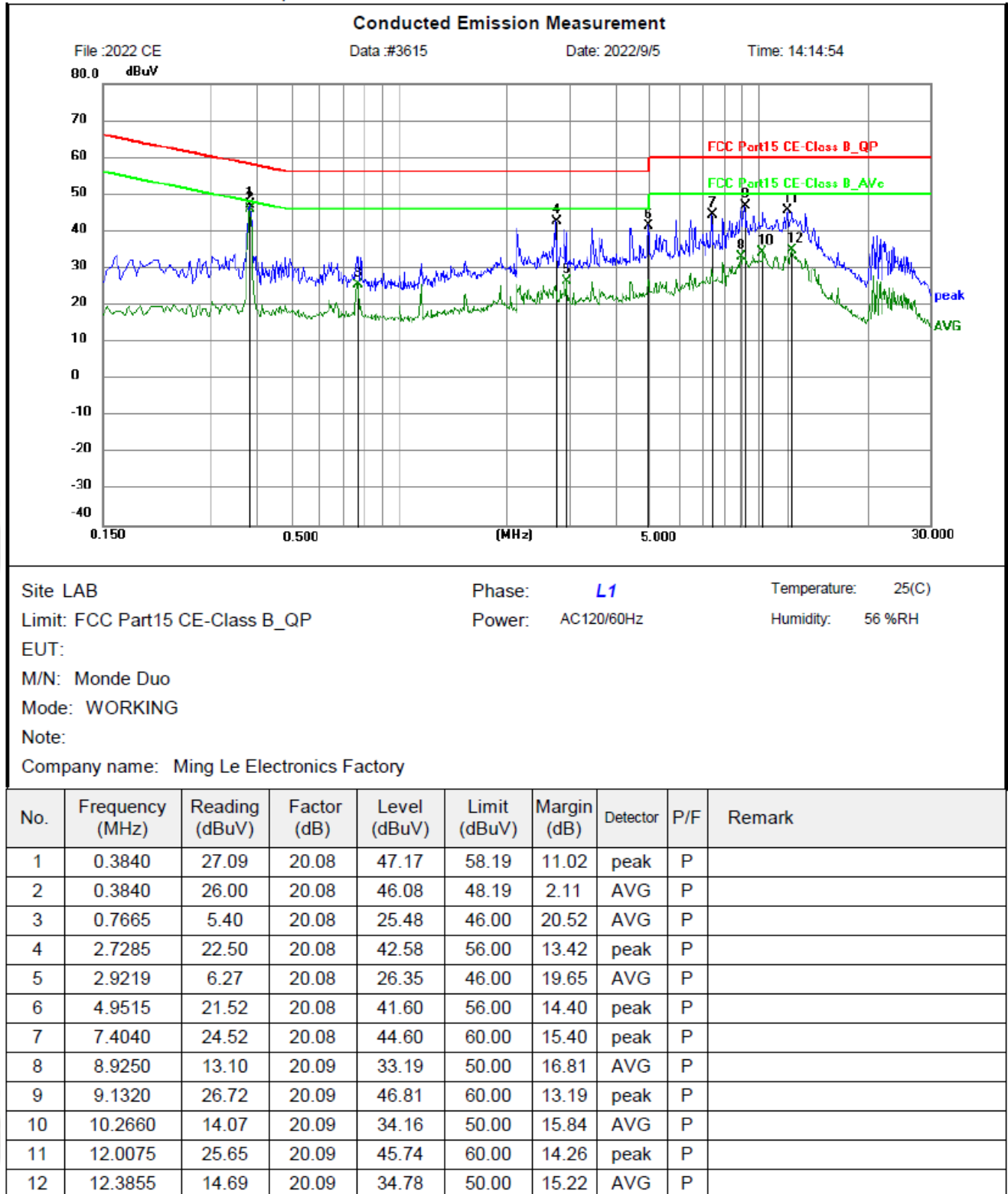


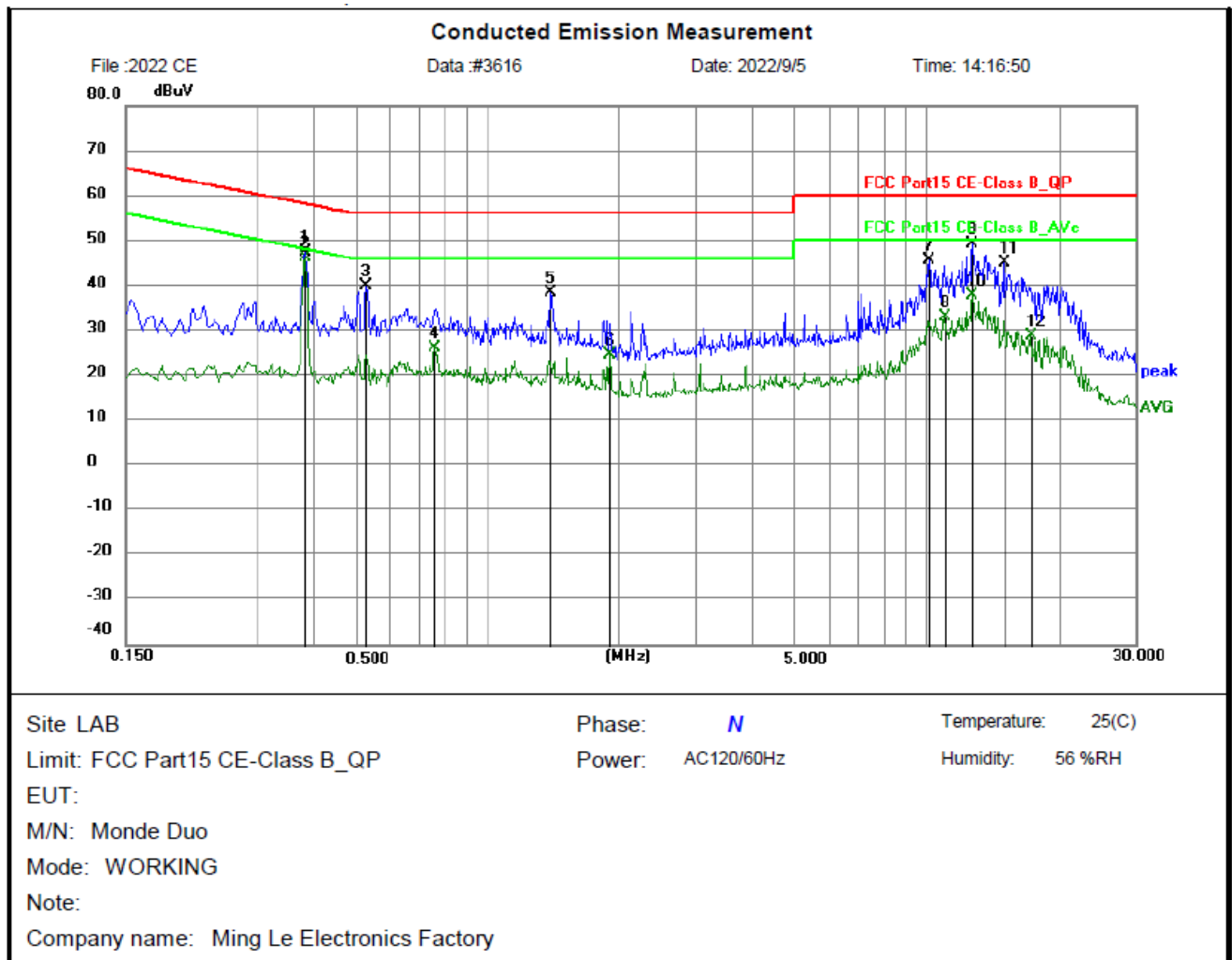
##### TEST PROCEDURE

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 C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The 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.
8. During the above scans, the emissions were maximized by cable manipulation.

**TEST RESULTS**

- Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:
- All test modes described in section 2.3 has been tested, only the worst result of Mode 1 is recorded.





No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3840	27.46	20.08	47.54	58.19	10.65	peak	P	
2	0.3840	26.30	20.08	46.38	48.19	1.81	AVG	P	
3	0.5280	19.94	20.08	40.02	56.00	15.98	peak	P	
4	0.7620	6.16	20.08	26.24	46.00	19.76	AVG	P	
5	1.3965	18.40	20.08	38.48	56.00	17.52	peak	P	
6	1.9050	4.72	20.08	24.80	46.00	21.20	AVG	P	
7	10.1264	25.53	20.09	45.62	60.00	14.38	peak	P	
8	11.0130	12.82	20.09	32.91	50.00	17.09	AVG	P	
9	12.7725	29.22	20.09	49.31	60.00	10.69	peak	P	
10	12.7725	17.62	20.09	37.71	50.00	12.29	AVG	P	
11	14.9955	24.98	20.09	45.07	60.00	14.93	peak	P	
12	17.2230	8.78	20.09	28.87	50.00	21.13	AVG	P	

## 3.2. Radiated Emissions

### Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

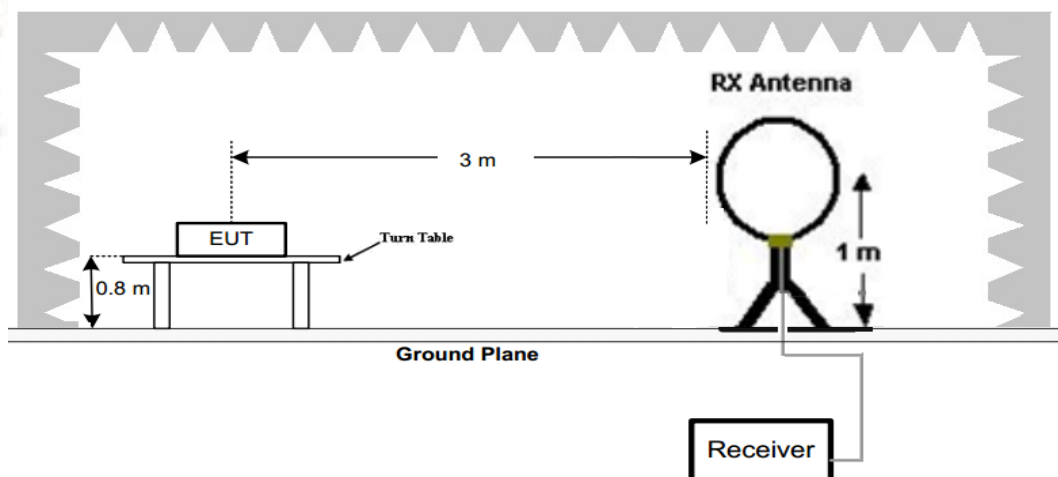
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

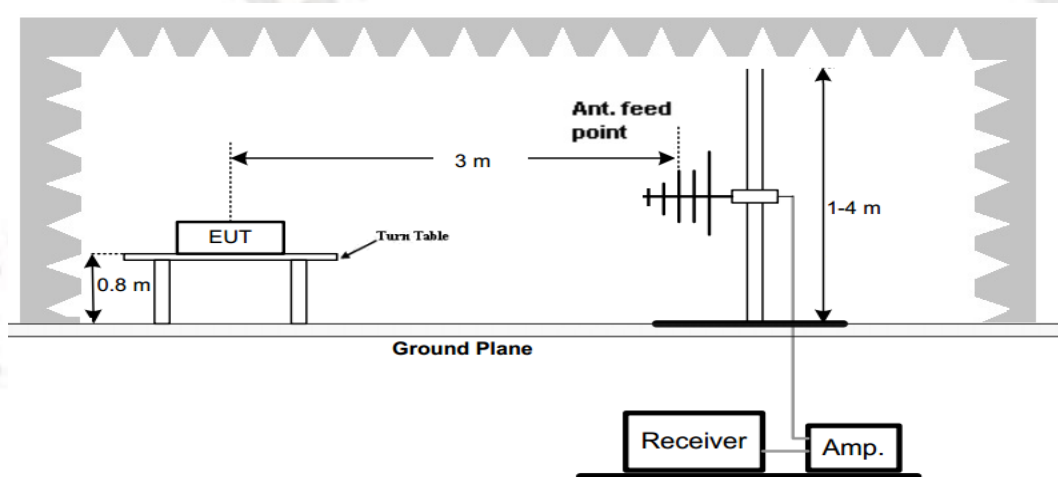
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

### TEST CONFIGURATION

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



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



**Test Procedure**

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1000MHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3

7. Setting test receiver/spectrum as following table states:

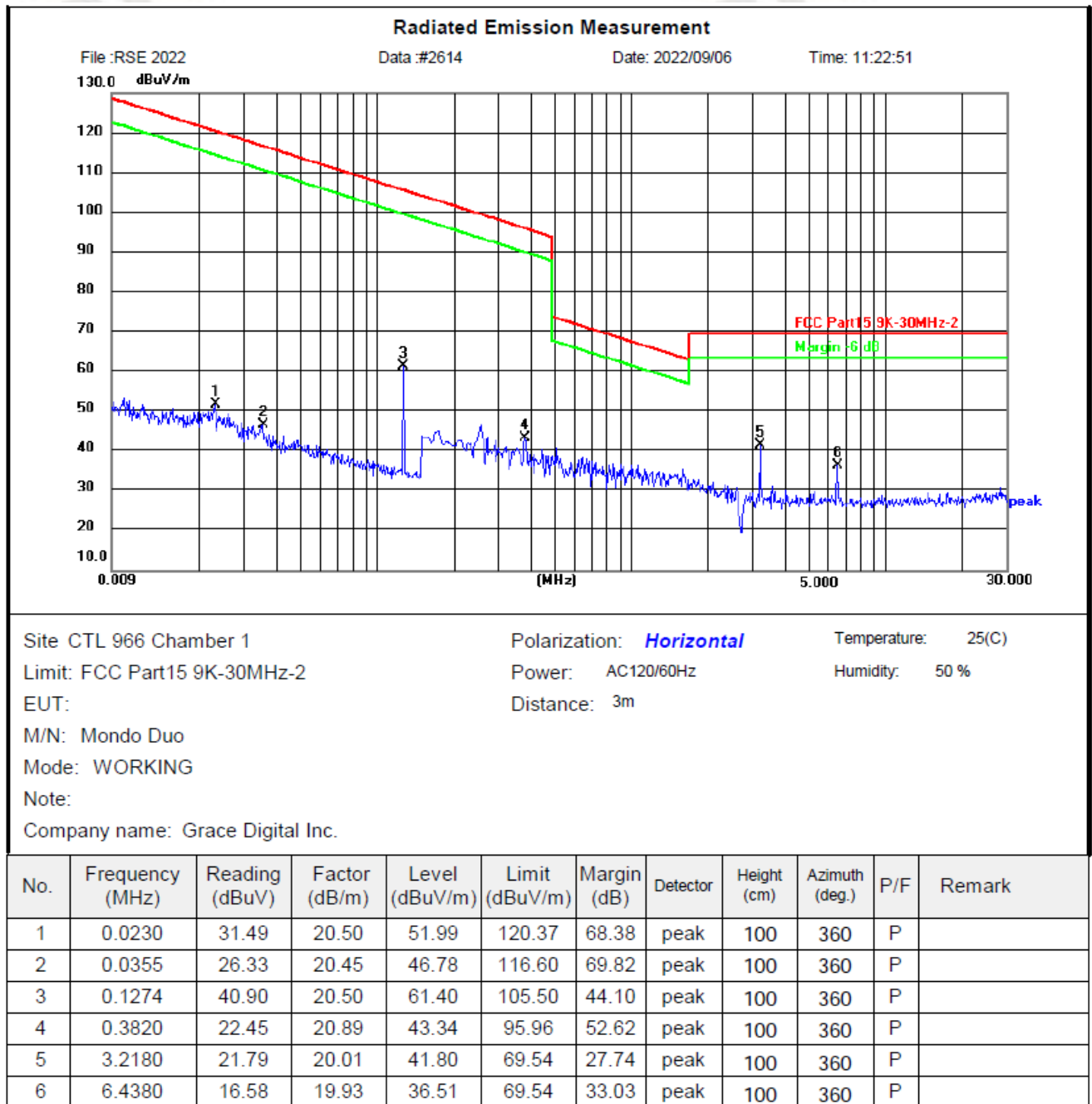
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP

**Test Results**

Remark: All test modes described in section 2.3 has been tested, only the worst result of Mode 1 is recorded as below:



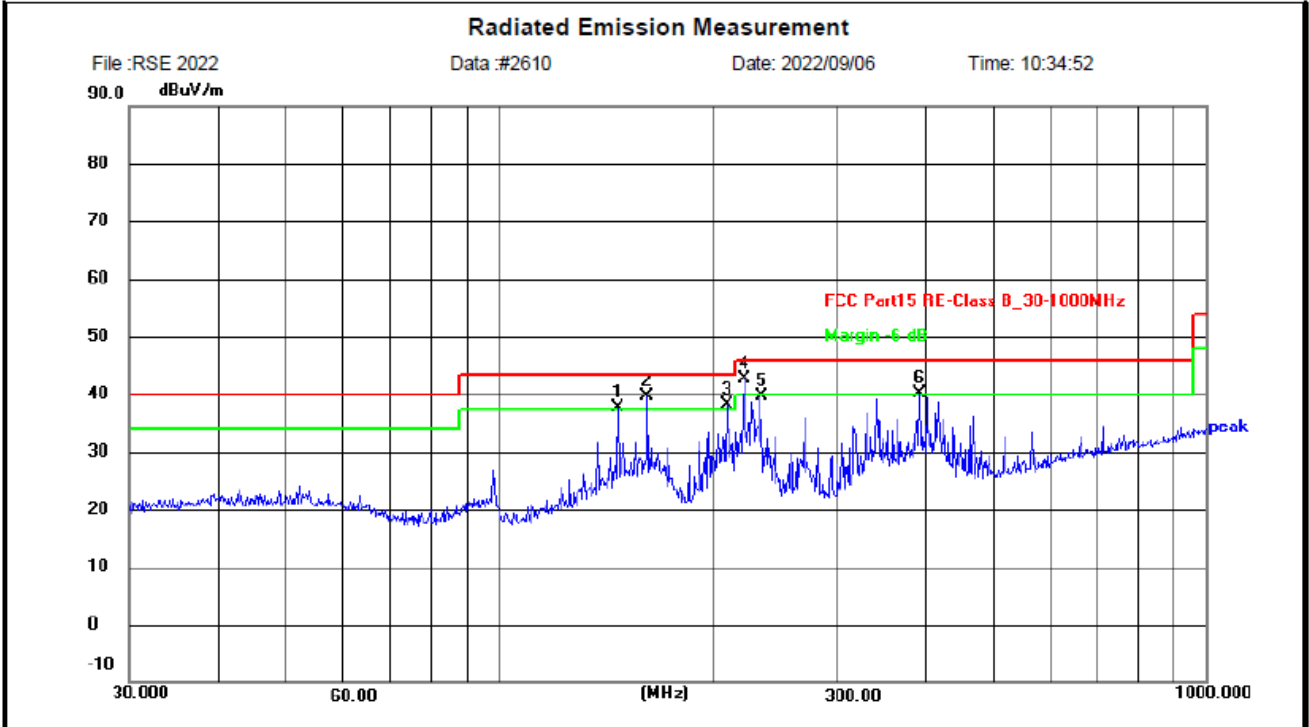
## For 9KHz-30MHz





## For 30MHz-1GHz

## Horizontal



Site CTL 966 Chamber 1

Polarization: **Horizontal**

Temperature: 25(C)

Limit: FCC Part15 RE-Class B\_30-1000MHz

Power: AC120/60Hz

Humidity: 50 %

EUT:

Distance: 3m

M/N: Mondo Duo

Mode: WORKING

Note:

Company name: Grace Digital Inc.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	147.4036	50.81	-13.30	37.51	43.50	5.99	peak	100	294	P	
2	162.0413	52.62	-13.10	39.52	43.50	3.98	peak	100	51	P	
3	210.0481	55.34	-17.31	38.03	43.50	5.47	peak	100	99	P	
4	222.1697	59.26	-16.73	42.53	46.00	3.47	peak	100	24	P	
5	234.1683	55.79	-16.28	39.51	46.00	6.49	peak	100	37	P	
6	393.4723	53.06	-12.89	40.17	46.00	5.83	peak	100	77	P	

## Vertical

## Radiated Emission Measurement

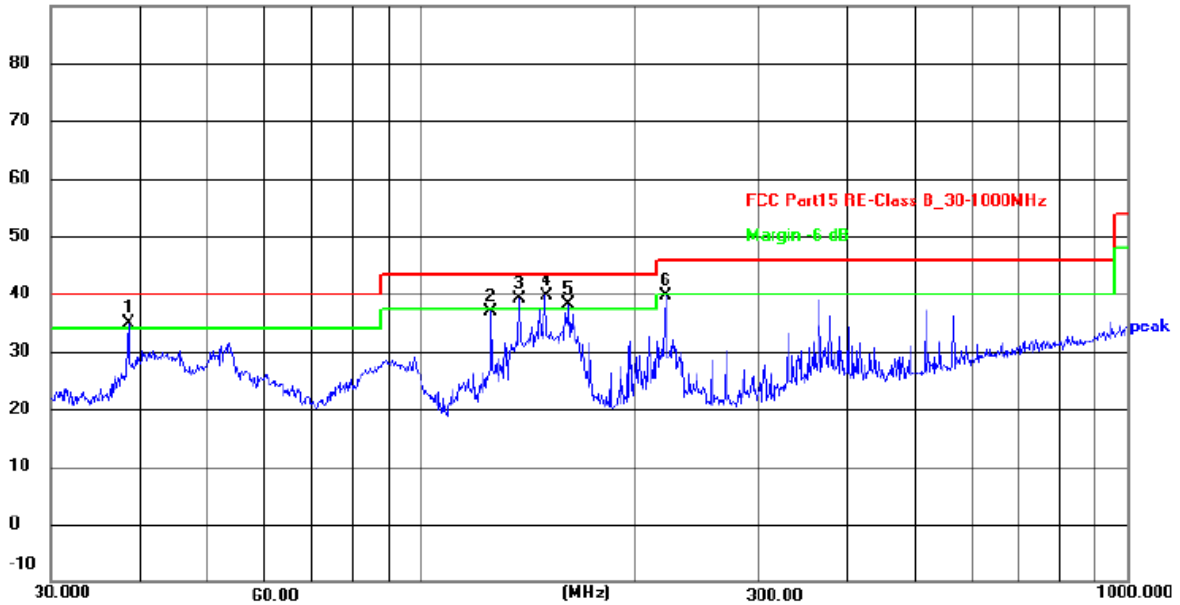
File :RSE 2022

Data :#2611

Date: 2022/09/06

Time: 10:36:11

90.0 dBuV/m



Site CTL 966 Chamber 1

Polarization: **Vertical**

Temperature: 25(C)

Limit: FCC Part15 RE-Class B\_30-1000MHz

Power: AC120/60Hz

Humidity: 50 %

EUT:

Distance: 3m

M/N: Mondo Duo

Mode: WORKING

Note:

Company name: Grace Digital Inc.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	38.6160	50.20	-15.33	34.87	40.00	5.13	peak	100	8	P	
2	125.8863	52.03	-15.08	36.95	43.50	6.55	peak	100	214	P	
3	137.9028	53.09	-14.08	39.01	43.50	4.49	peak	100	219	P	
4	150.0108	52.77	-13.08	39.69	43.50	3.81	peak	100	255	P	
5	162.0413	51.26	-13.10	38.16	43.50	5.34	peak	100	65	P	
6	222.1697	56.42	-16.73	39.69	46.00	6.31	peak	100	255	P	

Remark: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Margin= Level(dBuV/m)-Limit(dBuV/m)

### 3.3. 20dB Bandwidth

#### Limit

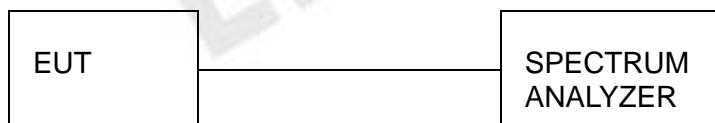
The 20dB bandwidth shall be less than 80% of the permitted frequency band.

#### Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### Test Configuration



#### Test Results

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Conclusion
Tx Mode	127.70	2.783	2.709	PASS



### 3.4. Antenna Requirement

#### Standard Applicable

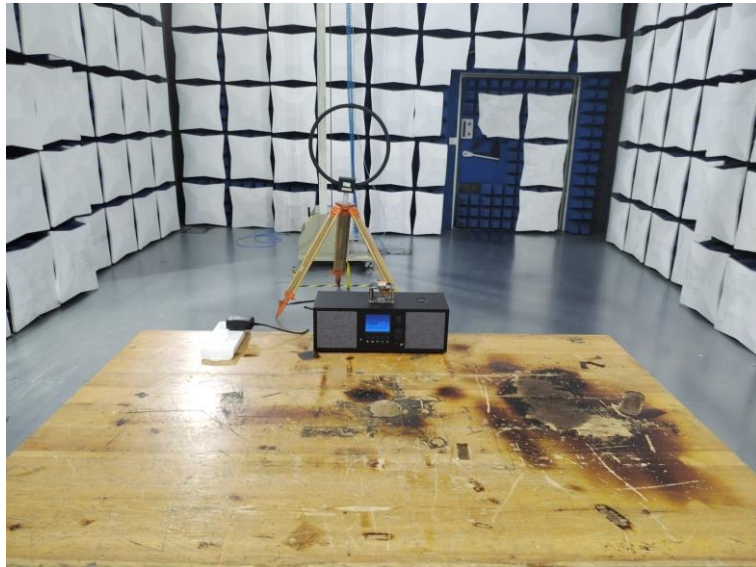
#### **Standard Applicable**

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.

#### **Antenna Information**

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

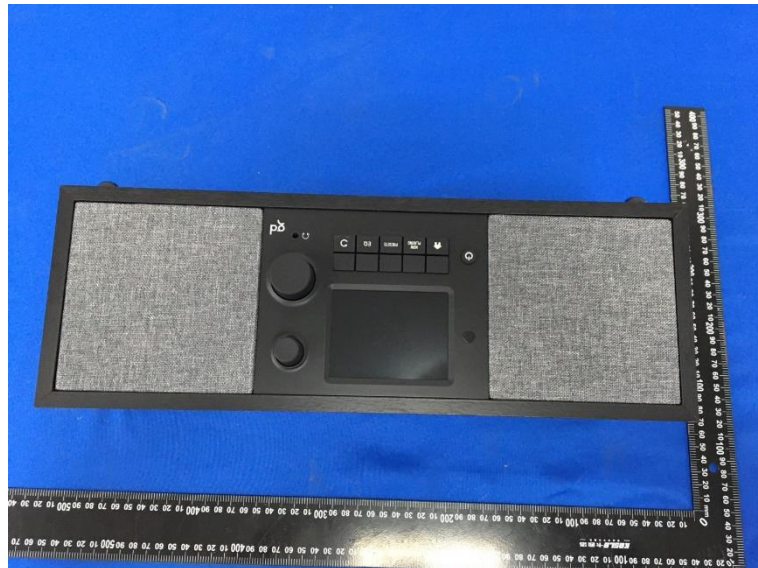
#### 4. Test Setup Photos of the EUT

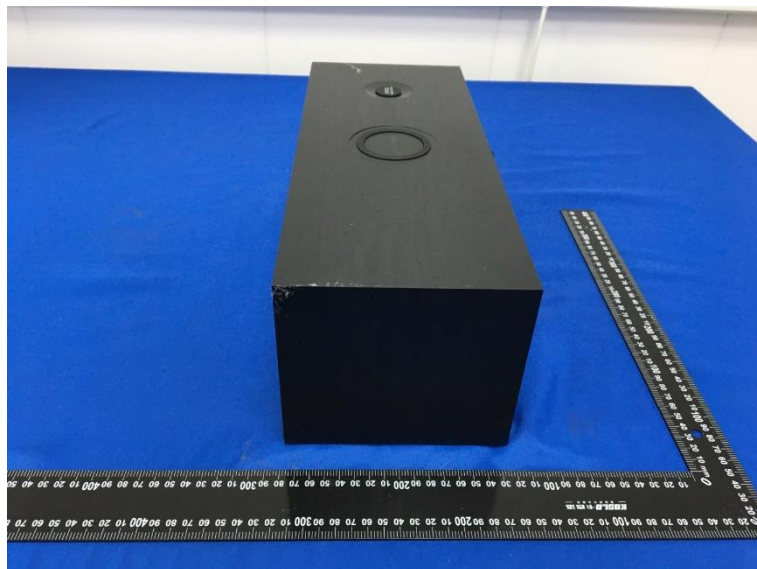




## 5. Photos of the EUT

### External Photos of EUT

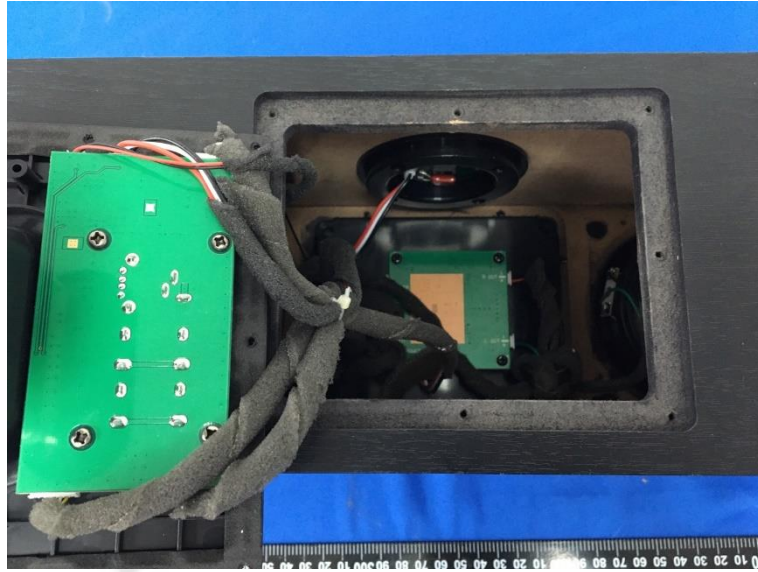








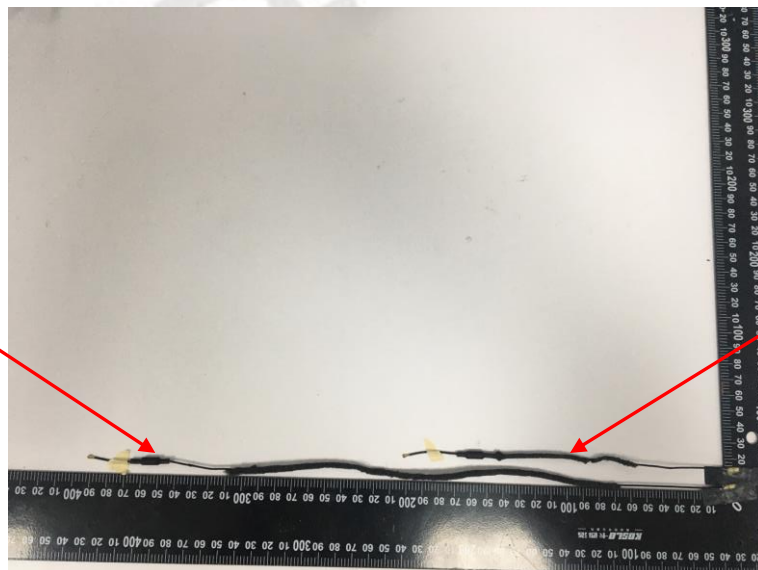


Internal Photos of EUT

BT Antenna 2 /  
WIFI Antenna 1

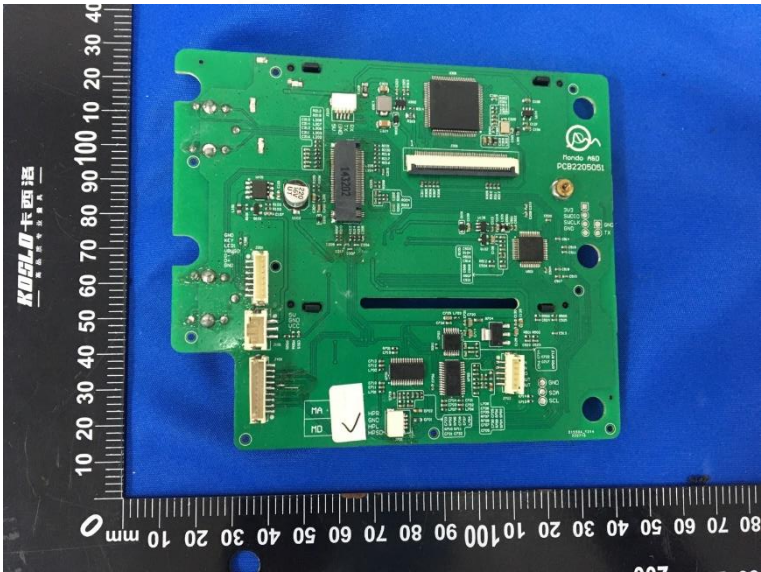
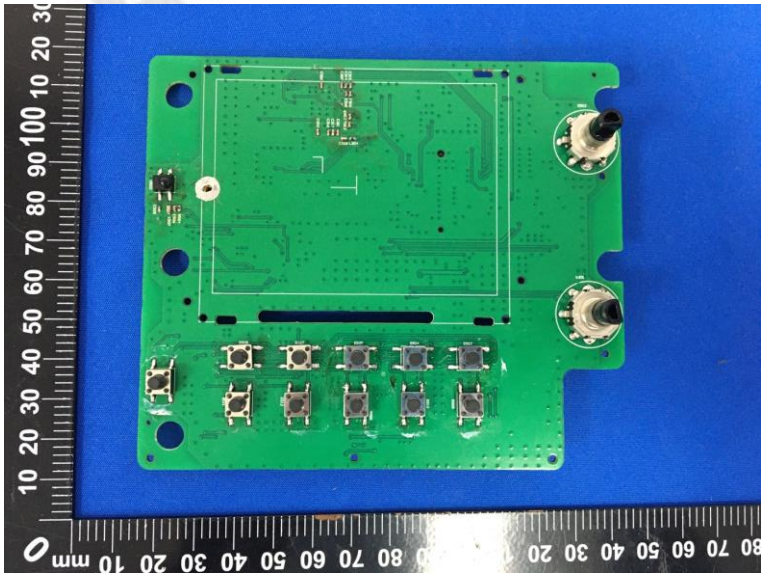
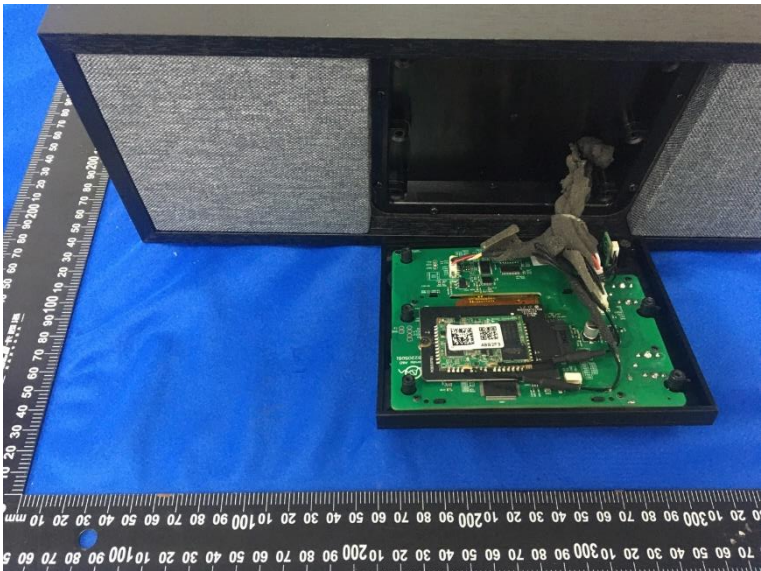


BT Antenna 1 /  
WIFI Antenna 2

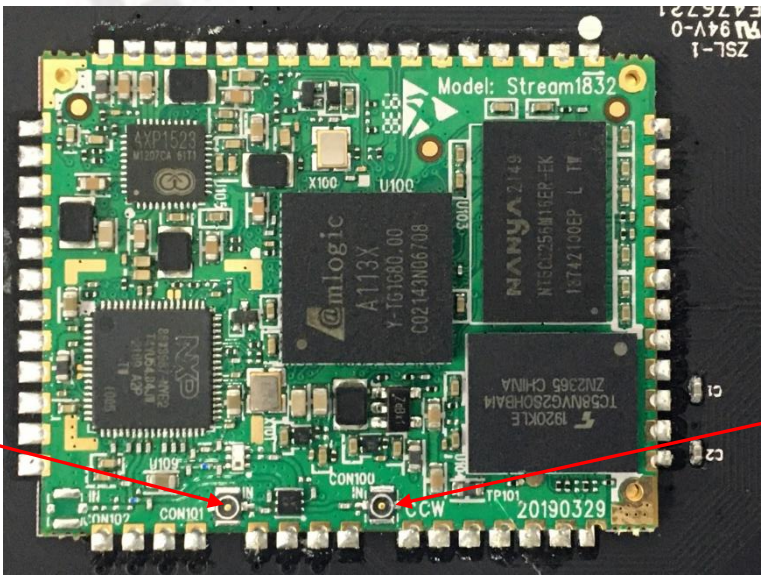
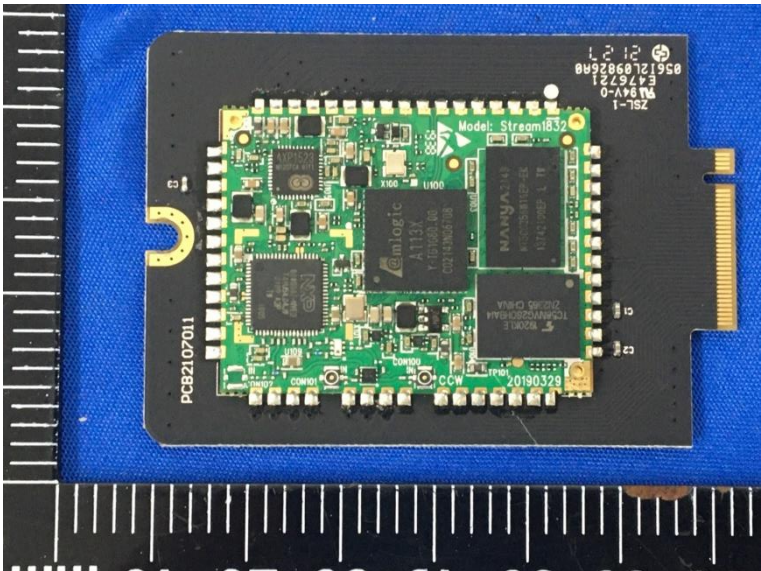


BT Antenna 2 /  
WIFI Antenna 1

BT Antenna 1 /  
WIFI Antenna 2

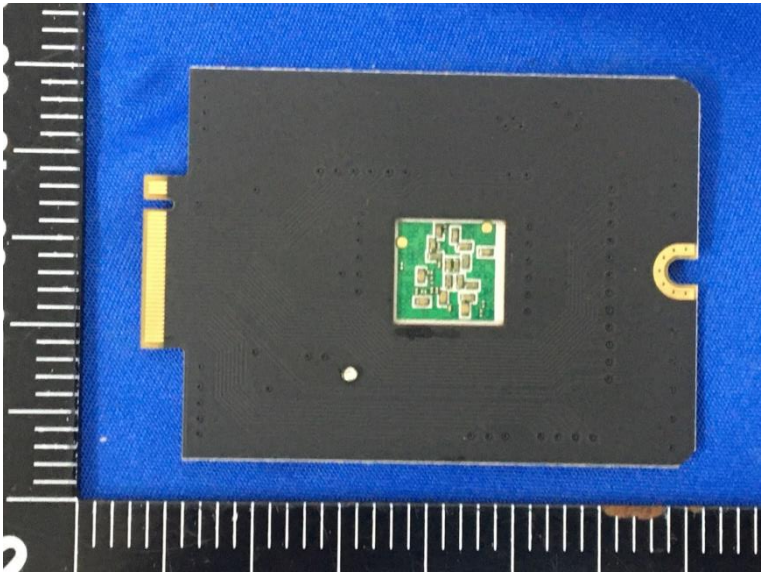




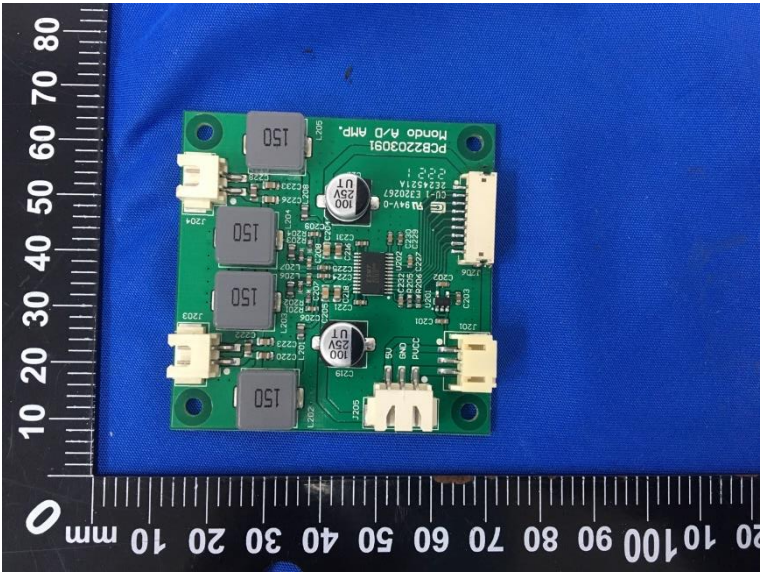
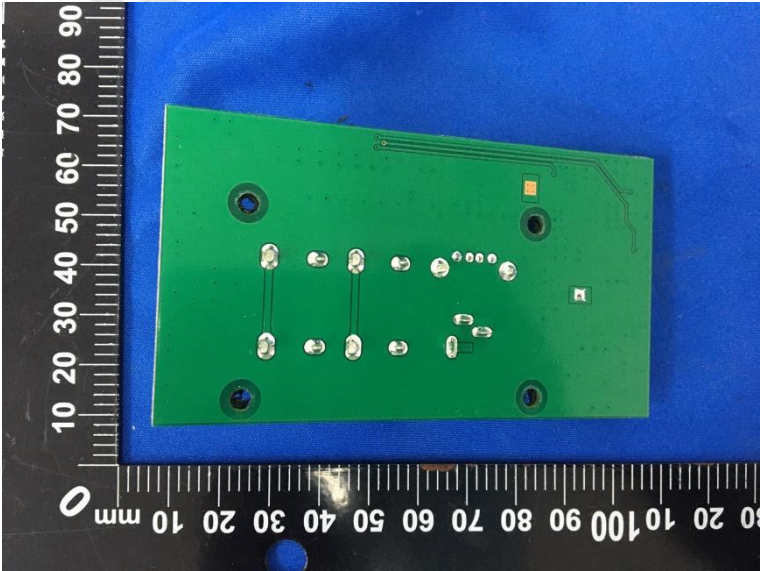
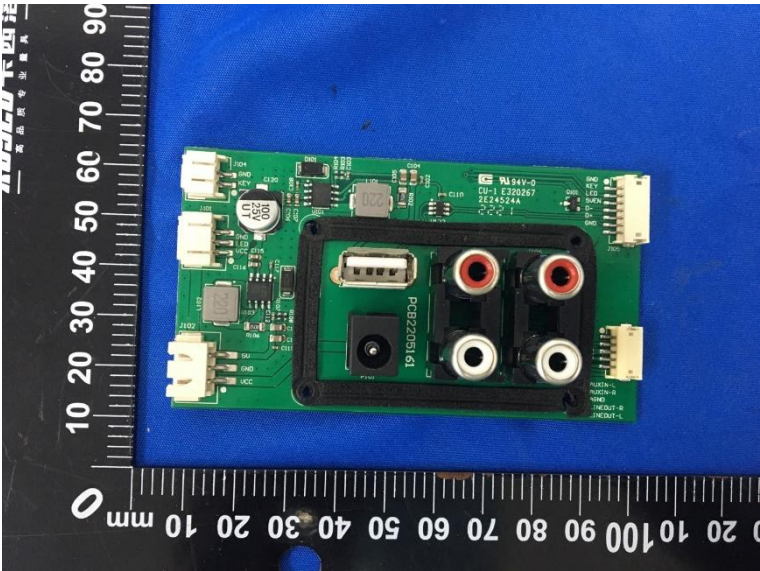


BT Antenna 2 /  
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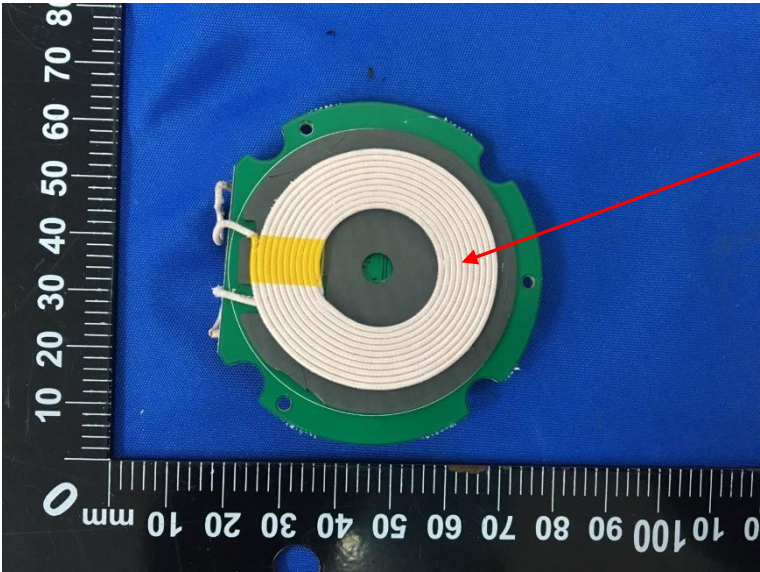
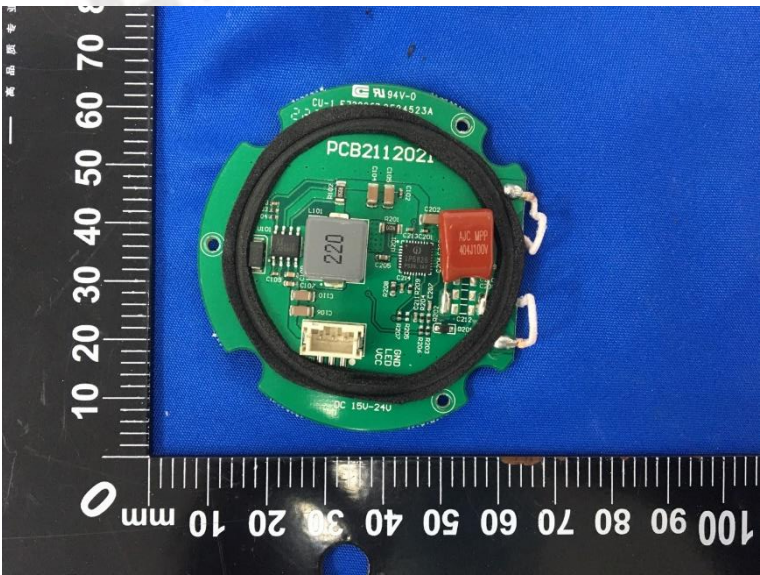
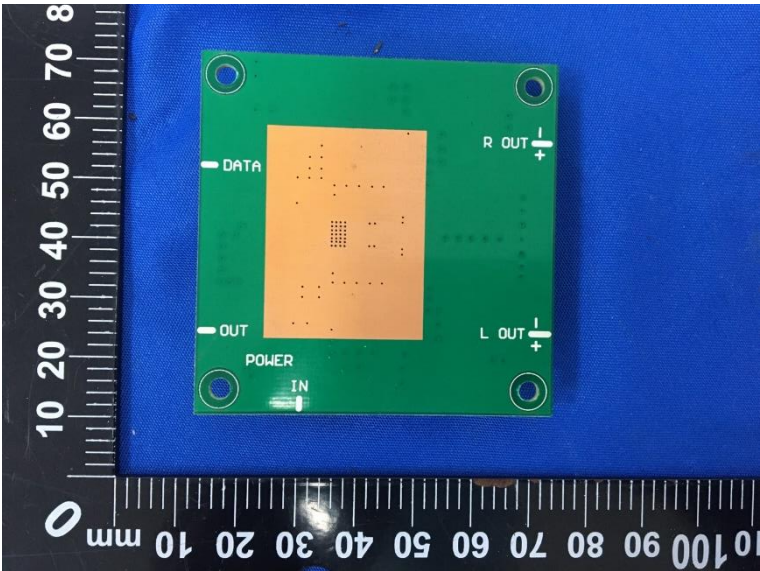
BT Antenna 1 /  
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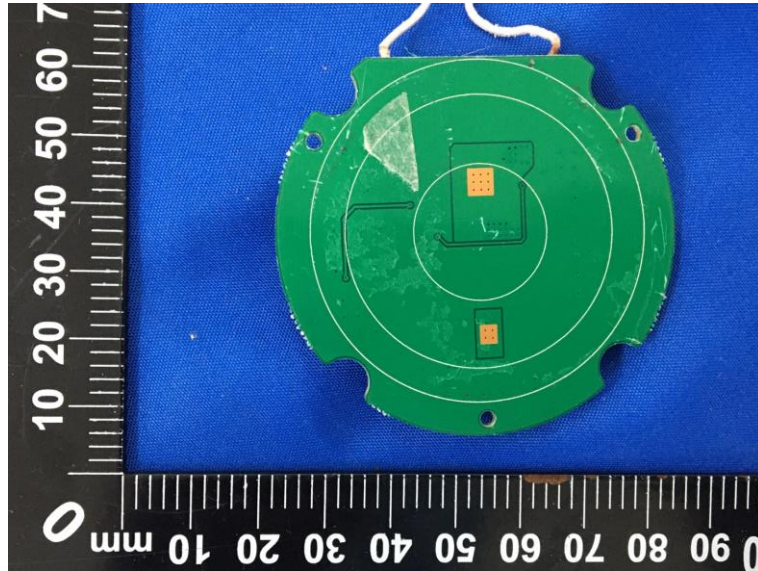








Wireless charger antenna



\*\*\*\*\* End of Report \*\*\*\*\*