



**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

# TEST REPORT

**47 CFR FCC Part 15 Subpart B - Unintentional Radiators  
ANSI C63.4: 2014**

**Report Reference No.**.....: **GTS20190709004-1-1**

**FCC ID**.....: **2ARI5-AP1001**

Compiled by

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Date of issue.....: July 16, 2019

**Testing Laboratory Name** .....: **Shenzhen Global Test Service Co.,Ltd.**

Address .....: No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

**Applicant's name** .....: **Shenzhen Lingyi Innovation Tech Co., Ltd.**

Address .....: 12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen, Guangdong, China

**Test specification** .....

Standard .....: **47 CFR FCC Part 15 Subpart B - Unintentional Radiators  
ANSI C63.4: 2014**

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**Test item description** .....: AirPodPal

Trade Mark .....: N/A

Manufacturer .....: Shenzhen Lingyi Innovation Tech Co., Ltd.

Model/Type reference.....: AP1001

List Model .....: AP1002

Modulation Type .....: ASK

Operation Frequency .....: From 110KHz to 205KHz

Hardware version .....: V1.0

Software version.....: V1.0

Ratings .....: DC 3.7V from battery, charged by DC 5V or wireless DC 5V

Result .....: **PASS**

# TEST REPORT

<b>Test Report No. :</b> <b>GTS20190709004-1-1</b>	July 16, 2019
	Date of issue

Equipment under Test            :    AirPodsPal

Model /Type                        :    AP1001

Listed Models                      :    AP1002

**Applicant**                         :    **Shenzhen Lingyi Innovation Tech Co., Ltd.**

Address                              :    12 F, Block C, Central Avenue Building, Xixiang BLVD  
West, Baoan District, Shenzhen, Guangdong, China

**Manufacturer**                    :    **Shenzhen Lingyi Innovation Tech Co., Ltd.**

Address                              :    12 F, Block C, Central Avenue Building, Xixiang BLVD  
West, Baoan District, Shenzhen, Guangdong, China

<b>Test Result:</b>	<b>PASS</b>
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The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B](#) - Unintentional Radiators

[ANSI C63.4: 2014](#) – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	July 08, 2019
Testing commenced on	:	July 09, 2019
Testing concluded on	:	July 16, 2019

### 2.2. Product Description

Product Name:	AirPodPal
Model/Type reference:	AP1001
Power supply:	DC3.7V from battery charged by apadter or wireless
Input Voltage:	Type-C Input: DC-5V/0.8A Qi Input: 5V/0.8A
Operation frequency:	110KHz~205KHz
Antenna type:	Coil antenna
Antenna gain:	0dBi

### 2.3. EUT operation mode

As the function of the EUT, test mode selected to test as below to conform this standard:

Operation mode	Description
Mode 1	Changing by adapter
Mode 2	Changing by wireless

Pre-scan above all test mode, found below test mode which it was worse case mode.

Test item	Test mode (Worse case operation mode)
Conducted emission	Mode 1
Radiated emission	Mode 2
EMS	All Modes

### 2.4. Peripheral devices

The following peripheral devices and interface cables were connected during the measurement:

Item	Manufacturer	Description	Model	Certificate	Note
1 <sup>Note1</sup>	Nolii Limited	Wireless charge base	CCBW	CE/QI	OFR=52KHz
2 <sup>Note1</sup>	MOSO	AC-DC Adapter	EP-TA20CBC	CE	Input:AC100-240V-50/60Hz, 0.5A Output:DC 5V,1A

Note1: This Auxiliary used during the test is provided by the test laboratory.

### 2.5. Modifications

No modifications were implemented to meet testing criteria



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### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street,Longgang District,Shenzhen,Guangdong,China

#### **3.2. Environmental conditions**

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

Normal Temperature:	25°C
Lative Humidity	55 %
Air Pressure	989 hPa

#### **3.3. Test Description**

<b>Emission Measurement requirements</b>		
Radiated Emission	Part15.109	PASS
Conducted Disturbance	Part15.107	PASS

Remark: 2.The measurement uncertainty is not included in the test result.

#### **3.4. 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 Shenzhen Global Test Service Co.,Ltd 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 Shenzhen Shenzhen Global Test Service Co.,Ltd for Products Quality is reported:

<b>Test</b>	<b>Range</b>	<b>Measurement Uncertainty</b>	<b>Notes</b>
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 dB	(1)
Conducted Disturbance	0.15~30MHz	3.39 dB	(1)

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

### 3.5. Equipments Used during the Test

RADIATED EMISSION						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU26	1166.1660.26	2018/10/25	1Y
2	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2018/10/25	1 Y
3	Double Ridged Horn Antenna	R&S	HF907	100276	2018/10/25	1 Y
4	Pre-Amplifier	R&S	SCU-01	10049	2018/10/25	1Y
5	Pre-amplifier	A.H.	PAM0-0118	360	2018/10/25	1Y
6	RF Cable	R&S	R01	10403	2018/10/25	1Y
7	RF Cable	R&S	R02	10512	2018/10/25	1Y
8	RF Cable	R&S	R01	10454	2018/10/25	1Y
9	RF Cable	R&S	R02	10343	2018/10/25	1Y

Conducted Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Cal. Interval
1	LISN	EMCO	3816/2	00042991	2018/10/25	1Y
2	LISN	EMCO	3816/2	00042990	2018/10/25	1 Y
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	2018/10/25	1 Y
4	50Ω Terminator	N/A	N/A	N/A	2018/10/25	1Y
5	Test Cable	N/A	C01	N/A	2018/10/25	1Y
6	EMI Test Receiver	R&S	ESCI	100082	2018/10/25	1Y

The calibration interval is 1 year.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. Radiated Emission

#### LIMIT

##### LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

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

##### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 3m) dBuV/m		Class B (at 3m) dBuV/m	
	Peak	Avg	Peak	Avg
Above 1000	80	60	74	54

Notes:

- 1) The limit for radiated test was performed according to as following:  
CISPR 22/ FCC PART 15B /ICES-003.
- 2) The tighter limit applies at the band edges.
- 3) Emission level (dBuV/m)=20log Emission level (uV/m).

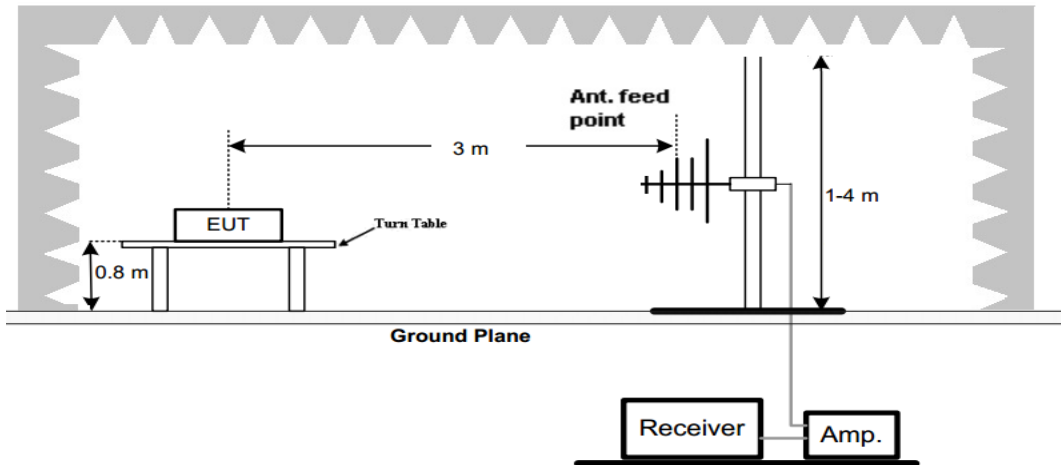
#### TEST PROCEDURE

- a) The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c) The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP (AV) Limits and then no additional QP Mode measurement performed.
- f) For the actual test configuration, please refer to the related Item –EUT Test Photos.

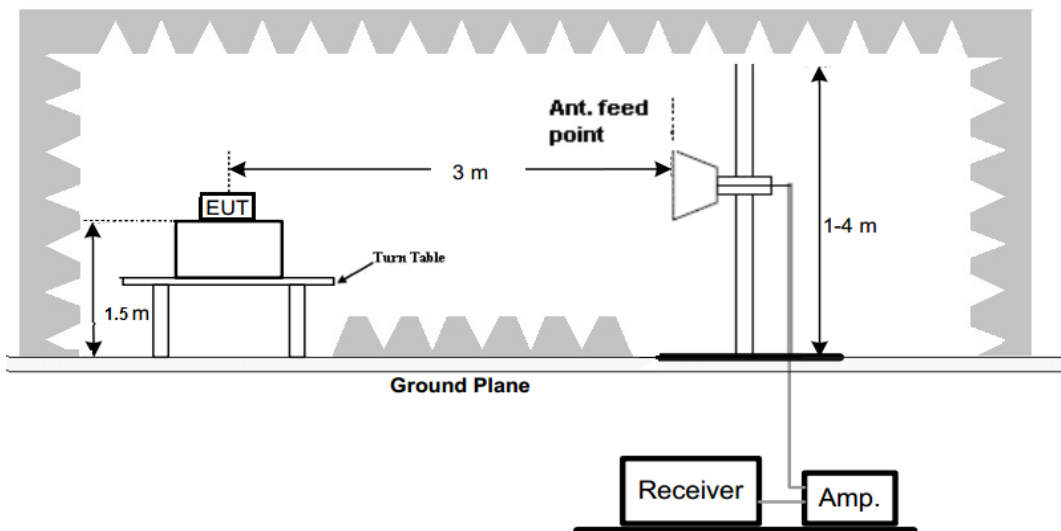


**TEST CONFIGURATION**

a) Radiated emission test set-up, frequency below 1000MHz:



b) Radiated emission test set-up, frequency above 1000MHz



**TEST RESULTS**

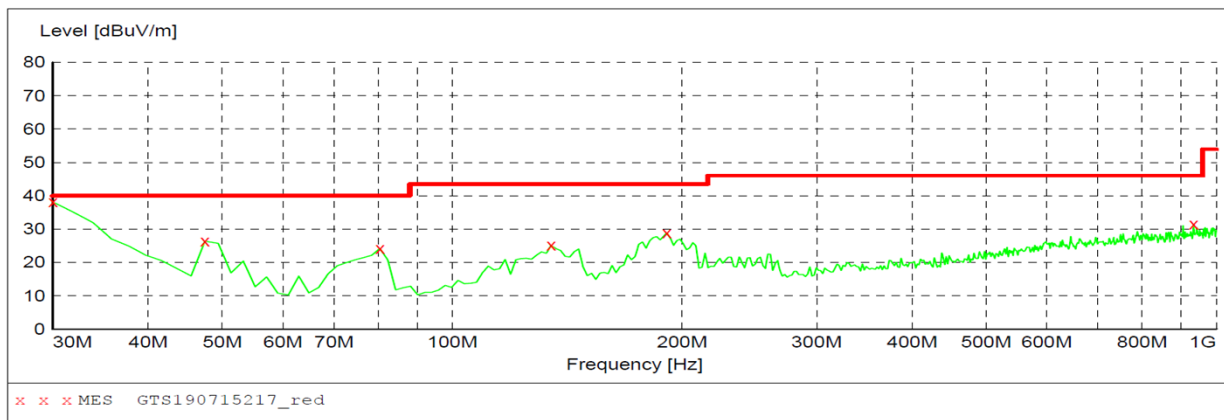
*-----Passed-----*

Please refer to the below test data:

<b>Polarization:</b>	<b>Vertical</b>	<b>Test mode:</b>	<b>Mode 2</b>
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**SWEEP TABLE: "test (30M-1G)"**

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	VULB9163



**MEASUREMENT RESULT: "GTS190715217\_red"**

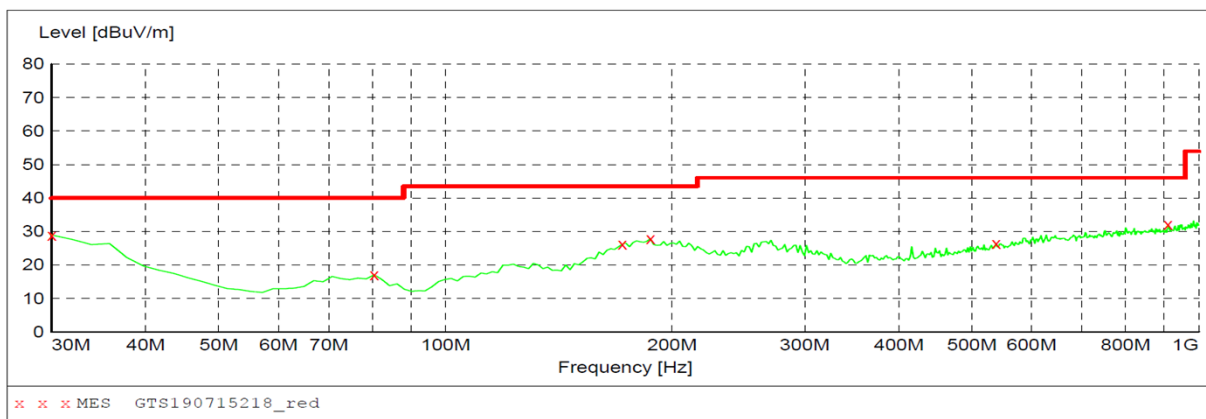
2019-7-15 8:57

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	38.10	22.1	40.0	1.9	---	0.0	0.00	VERTICAL
47.460000	26.40	9.9	40.0	13.6	---	0.0	0.00	VERTICAL
80.440000	24.20	9.0	40.0	15.8	---	0.0	0.00	VERTICAL
134.760000	25.10	15.1	43.5	18.4	---	0.0	0.00	VERTICAL
191.020000	28.90	14.6	43.5	14.6	---	0.0	0.00	VERTICAL
934.040000	31.40	27.0	46.0	14.6	---	0.0	0.00	VERTICAL

<b>Polarization:</b>	<b>Horizontal</b>	<b>Test mode:</b>	<b>Mode 2</b>
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**SWEEP TABLE: "test (30M-1G)"**

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	VULB9163



**MEASUREMENT RESULT: "GTS190715218\_red"**

2019-7-15 8:59

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	28.90	22.1	40.0	11.1	---	0.0	0.00	HORIZONTAL
80.440000	17.10	9.0	40.0	22.9	---	0.0	0.00	HORIZONTAL
171.620000	26.10	14.5	43.5	17.4	---	0.0	0.00	HORIZONTAL
187.140000	27.90	14.6	43.5	15.6	---	0.0	0.00	HORIZONTAL
538.280000	26.40	21.5	46.0	19.6	---	0.0	0.00	HORIZONTAL
914.480000	31.70	27.9	46.0	14.3	---	0.0	0.00	HORIZONTAL

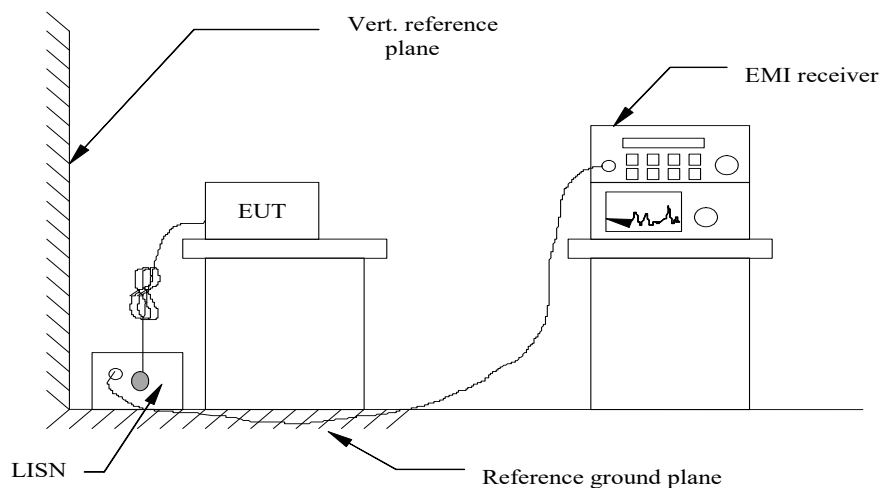
## 4.2. Conducted Emission

### LIMIT

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following:

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

### TEST CONFIGURATION



### TEST PROCEDURE

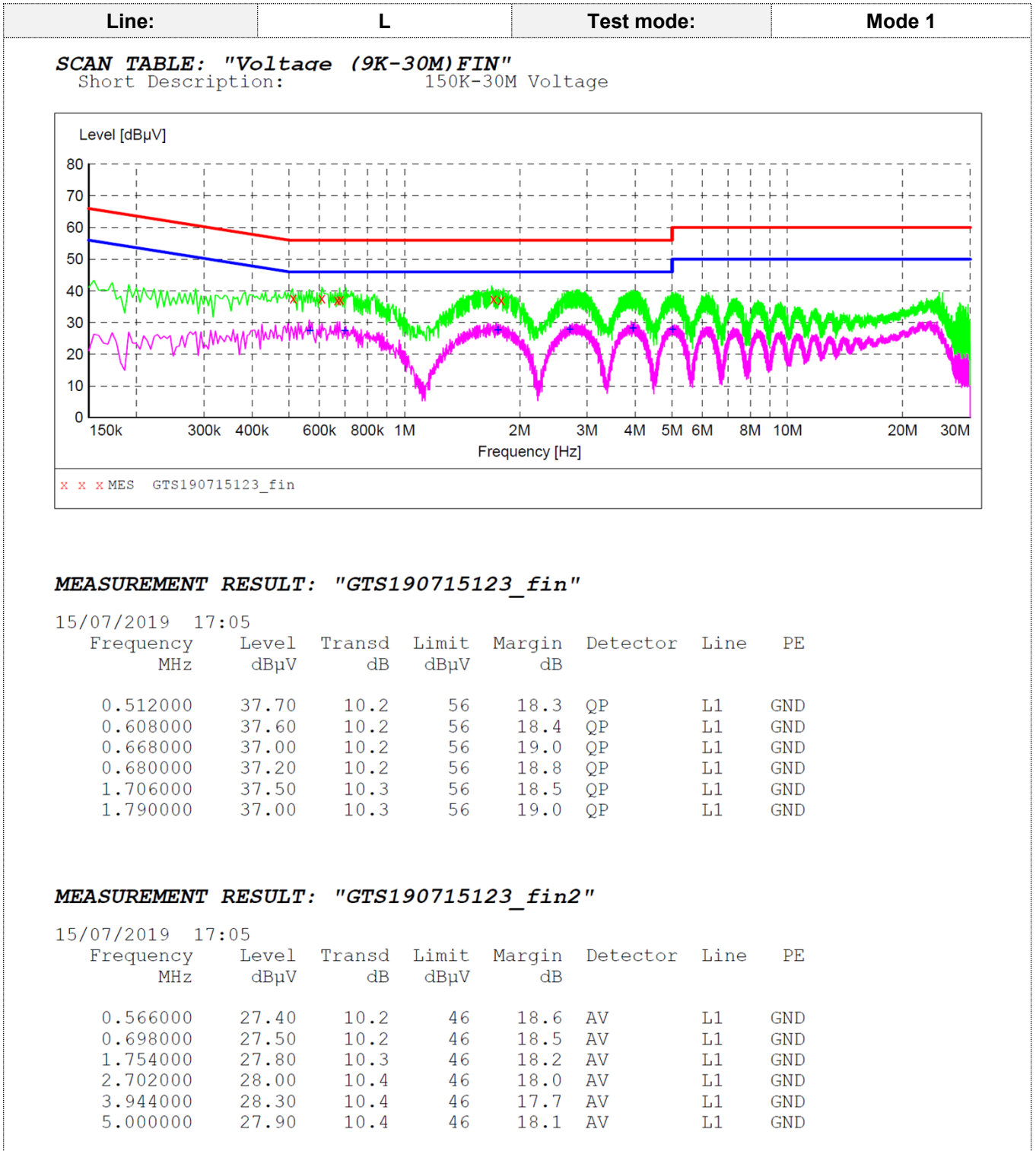
- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2014.
- Support equipment, if needed, was placed as per ANSI C63.4-2014.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2014.
- The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- All support equipments received AC power from a second LISN, if any.
- 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.
- Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

**TEST RESULTS**

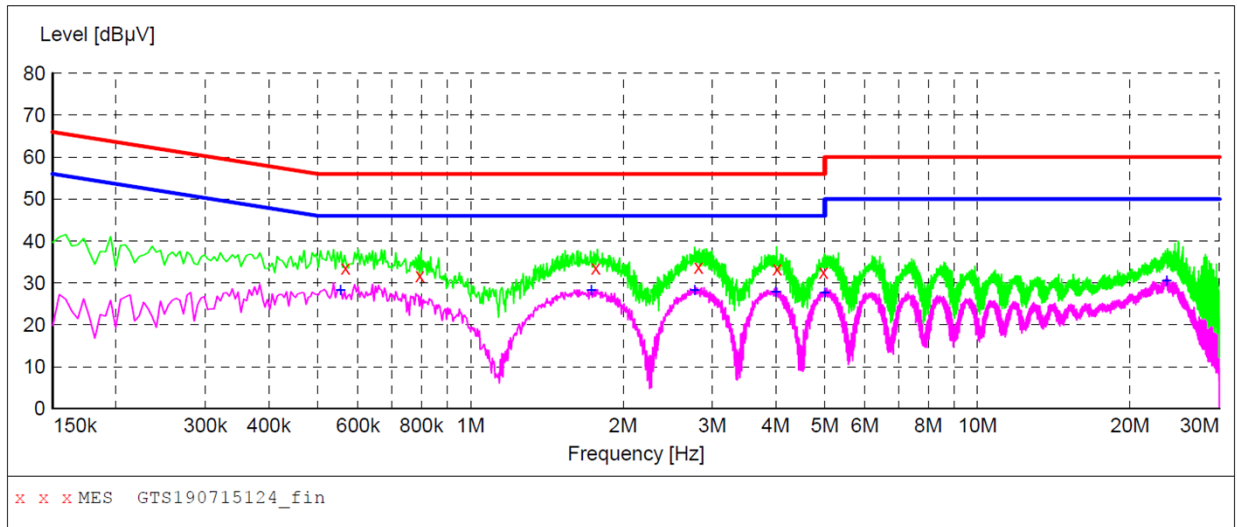
-----Passed-----

Please refer to the below test data:



<b>Line:</b>	<b>N</b>	<b>Test mode:</b>	<b>Mode 1</b>
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**SCAN TABLE: "Voltage (9K-30M)FIN"**  
 Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "GTS190715124\_fin"**

15/07/2019 17:09

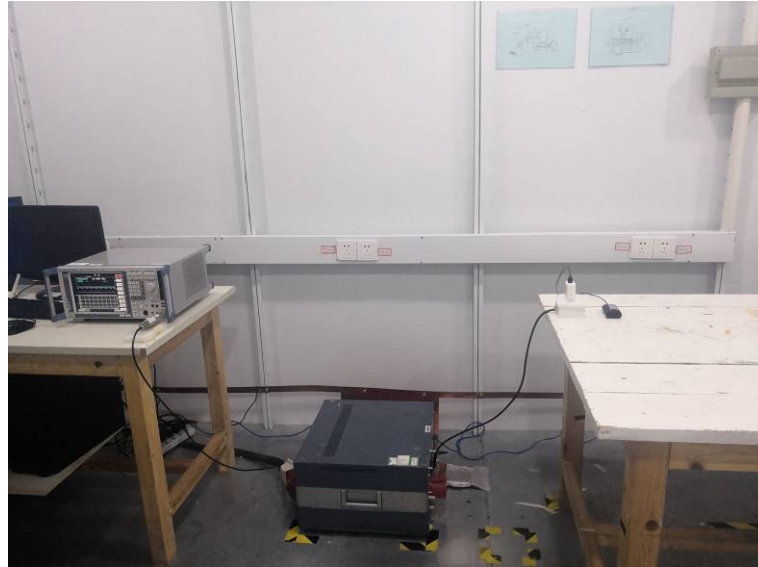
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.566000	33.50	10.2	56	22.5	QP	N	GND
0.794000	31.70	10.2	56	24.3	QP	N	GND
1.766000	33.50	10.3	56	22.5	QP	N	GND
2.816000	33.70	10.4	56	22.3	QP	N	GND
4.028000	33.30	10.4	56	22.7	QP	N	GND
4.970000	32.60	10.4	56	23.4	QP	N	GND

**MEASUREMENT RESULT: "GTS190715124\_fin2"**

15/07/2019 17:09

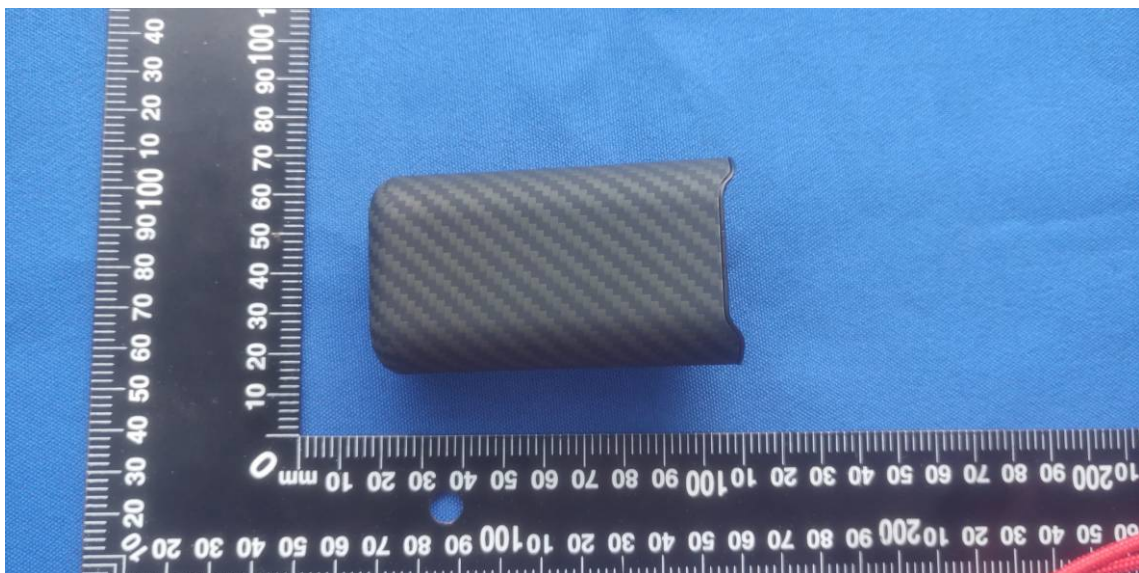
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.554000	28.30	10.2	46	17.7	AV	N	GND
1.730000	28.30	10.3	46	17.7	AV	N	GND
2.768000	28.30	10.4	46	17.7	AV	N	GND
3.998000	28.00	10.4	46	18.0	AV	N	GND
4.994000	27.80	10.4	46	18.2	AV	N	GND
23.630000	30.60	11.1	50	19.4	AV	N	GND

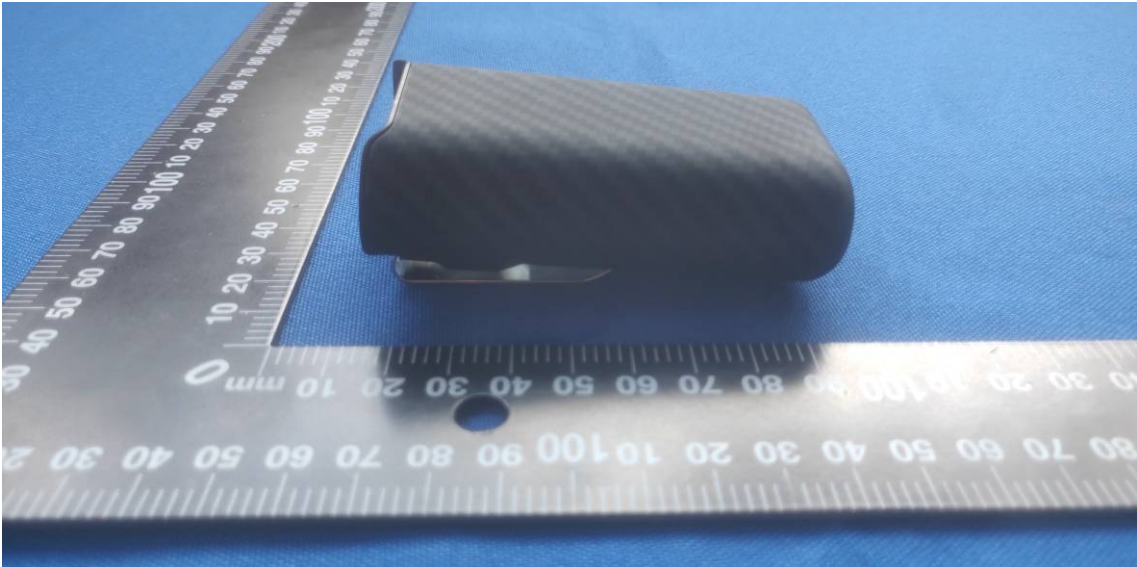
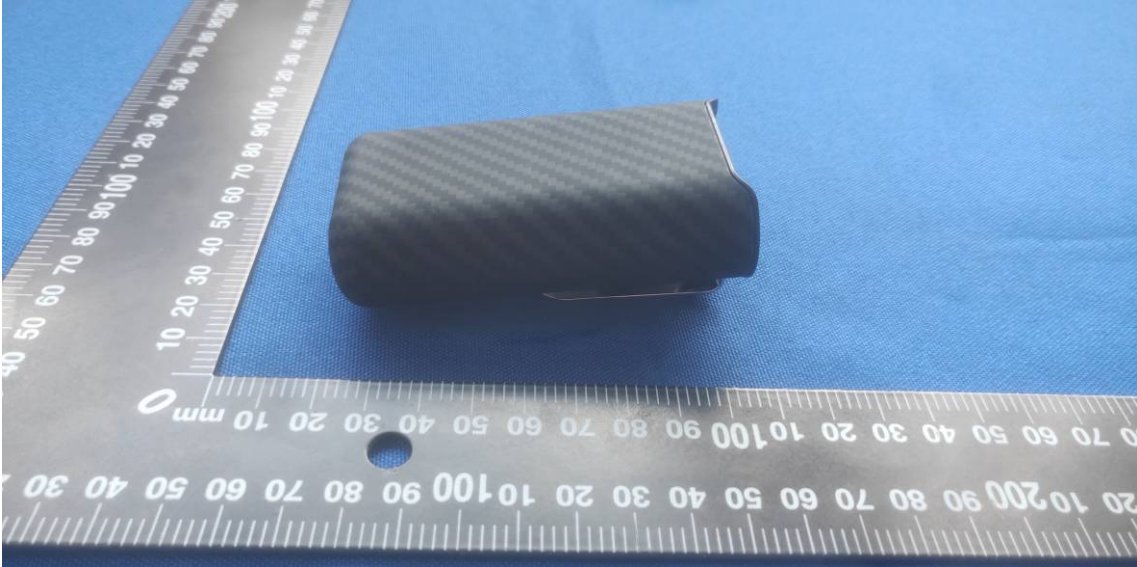
## 5. Test Set-up Photos of the EUT



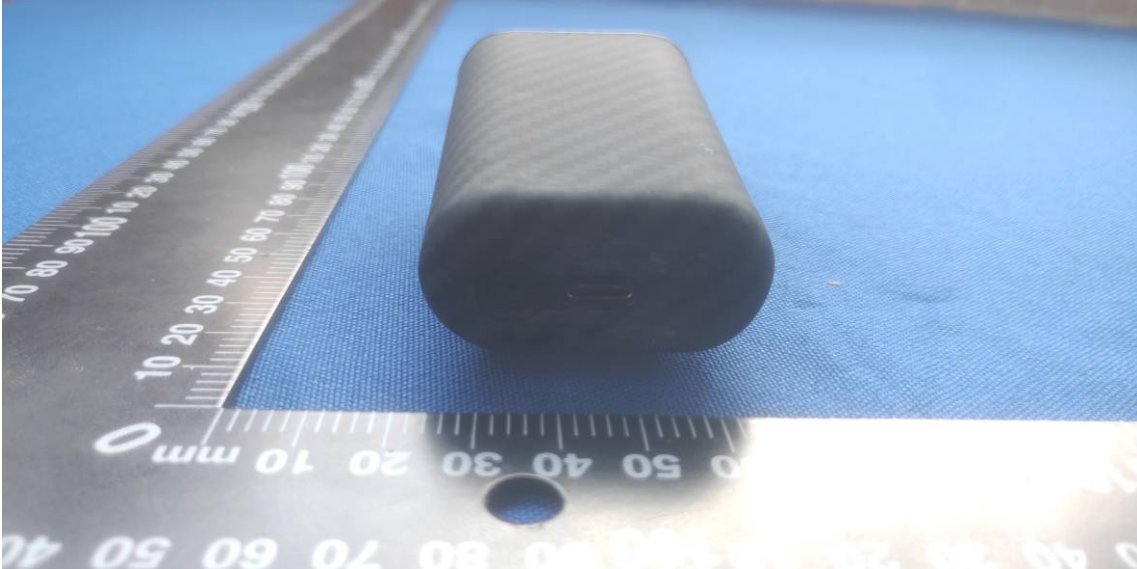
## 6. External and Internal Photos of the EUT

### External Photos of EUT

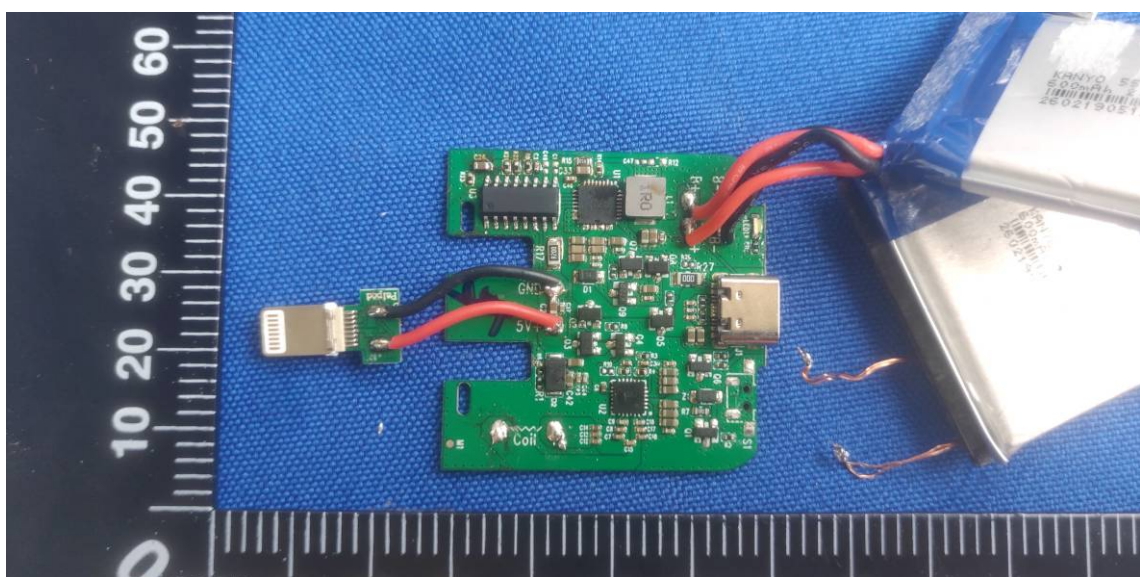
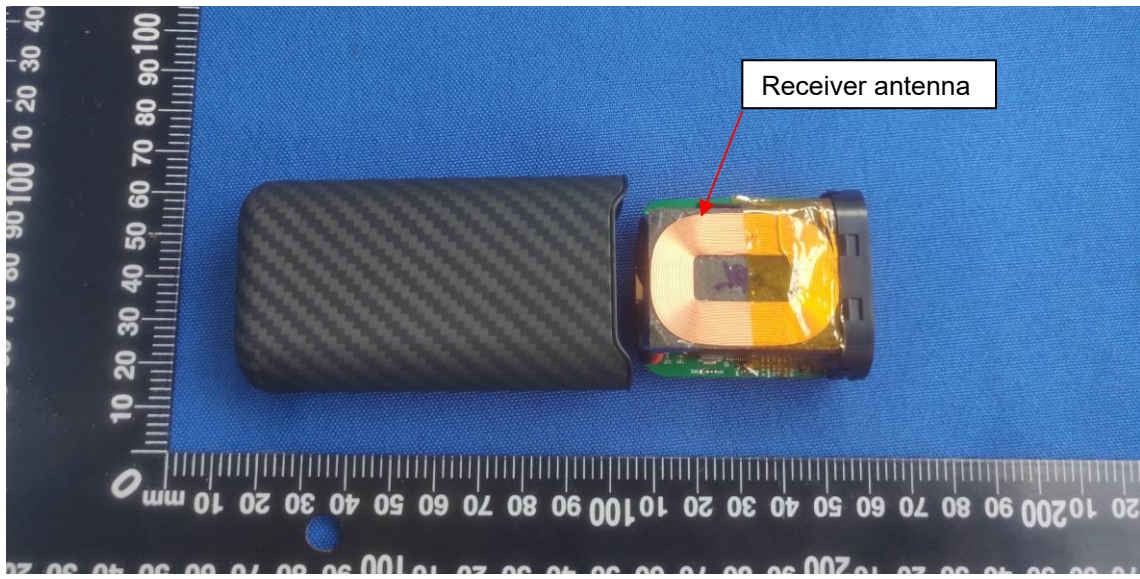


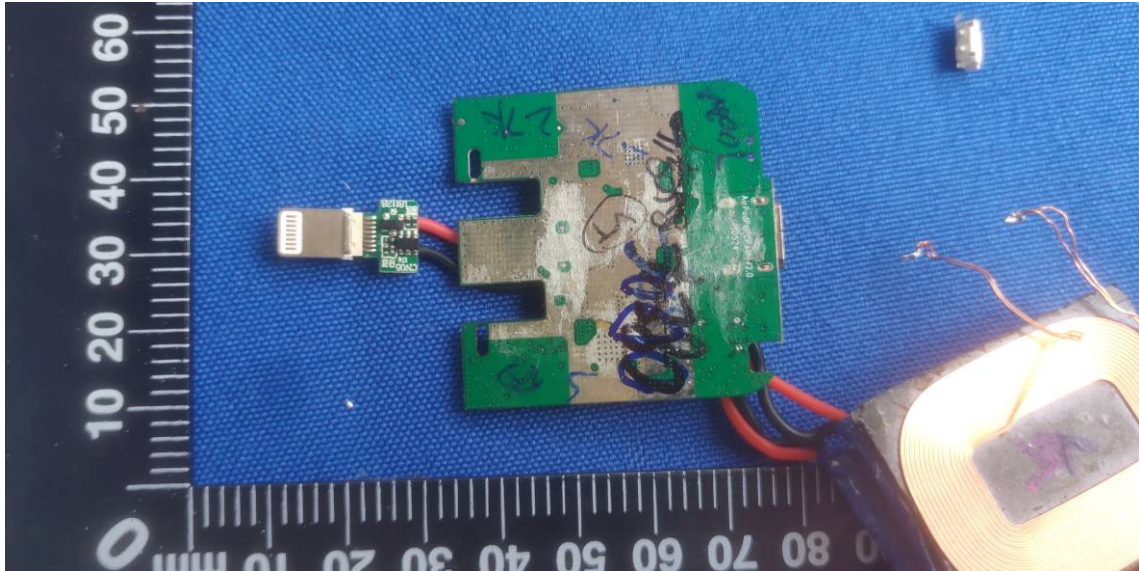






Internal Photos of EUT





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