

## 13. FREQUENCY SEPARATION

### 13.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or average) bandwidth (VBW)  $\geq$  RBW.
4. Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

### 13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

### 13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.3

### 13.4. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	
CH01-CH02	1001	$\geq 25$ KHz or 2/3 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION



Note: The  $\pi/4$ -DQPSK modulation is the worst case and recorded in the report.



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## 14. FCC LINE CONDUCTED EMISSION TEST

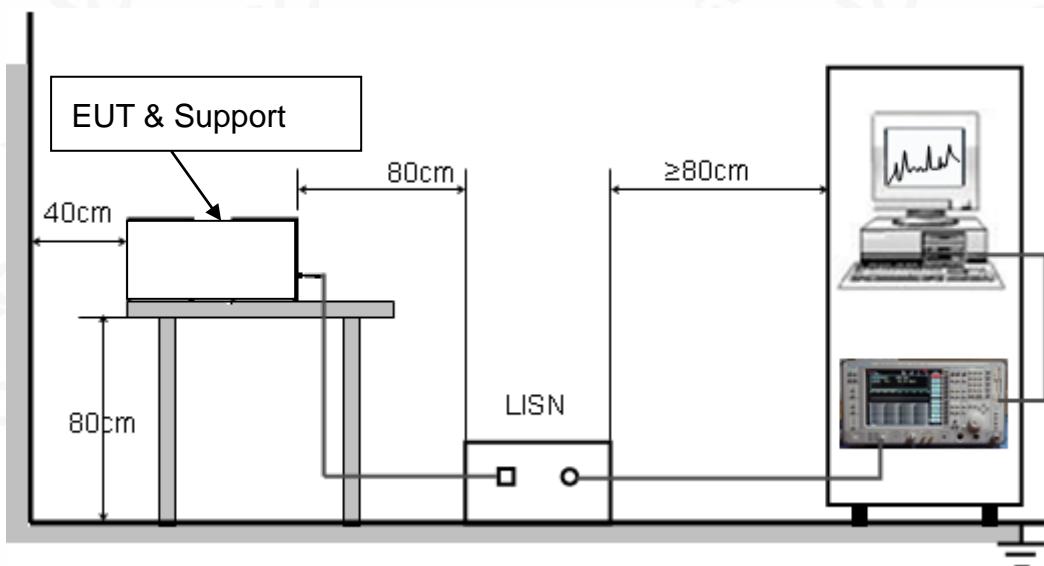
### 14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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#### 14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
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. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The 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.
9. The test mode(s) were scanned during the preliminary test.

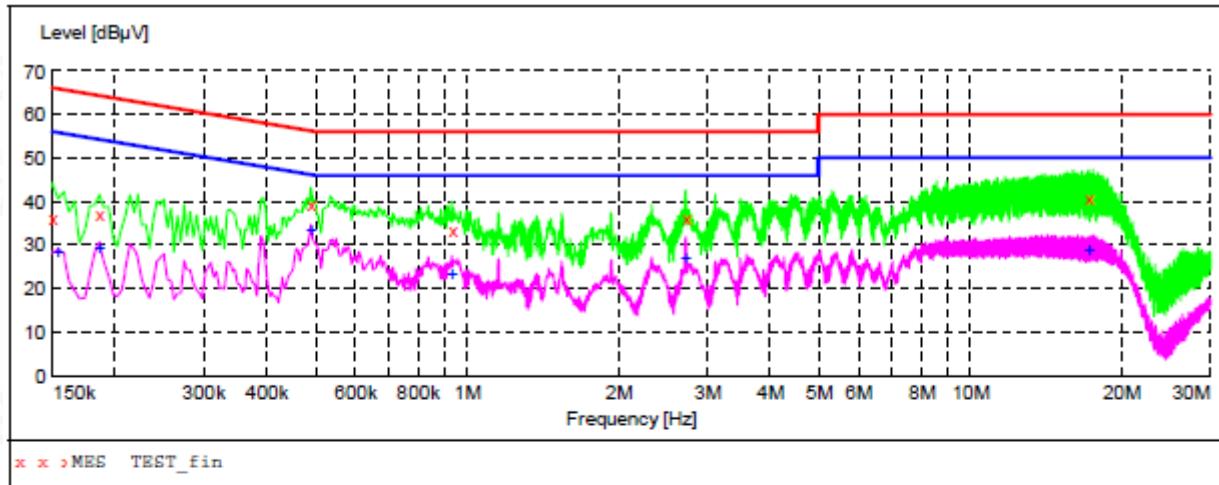
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

#### 14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



#### MEASUREMENT RESULT: "TEST\_fin"

2019/10/21 10:44

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.150000	36.40	10.6	66	29.6	QP	L1	FLO
0.186000	37.20	10.8	64	27.0	QP	L1	FLO
0.490000	39.40	11.0	56	16.8	QP	L1	FLO
0.934000	33.70	11.0	56	22.3	QP	L1	FLO
2.722000	36.20	11.3	56	19.8	QP	L1	FLO
17.206000	40.80	12.4	60	19.2	QP	L1	FLO

#### MEASUREMENT RESULT: "TEST\_fin2"

2019/10/21 10:44

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.154000	28.30	10.7	56	27.5	AV	L1	FLO
0.186000	29.20	10.8	54	25.0	AV	L1	FLO
0.490000	33.50	11.0	46	12.7	AV	L1	FLO
0.934000	23.40	11.0	46	22.6	AV	L1	FLO
2.722000	26.80	11.3	46	19.2	AV	L1	FLO
17.206000	28.90	12.4	50	21.1	AV	L1	FLO



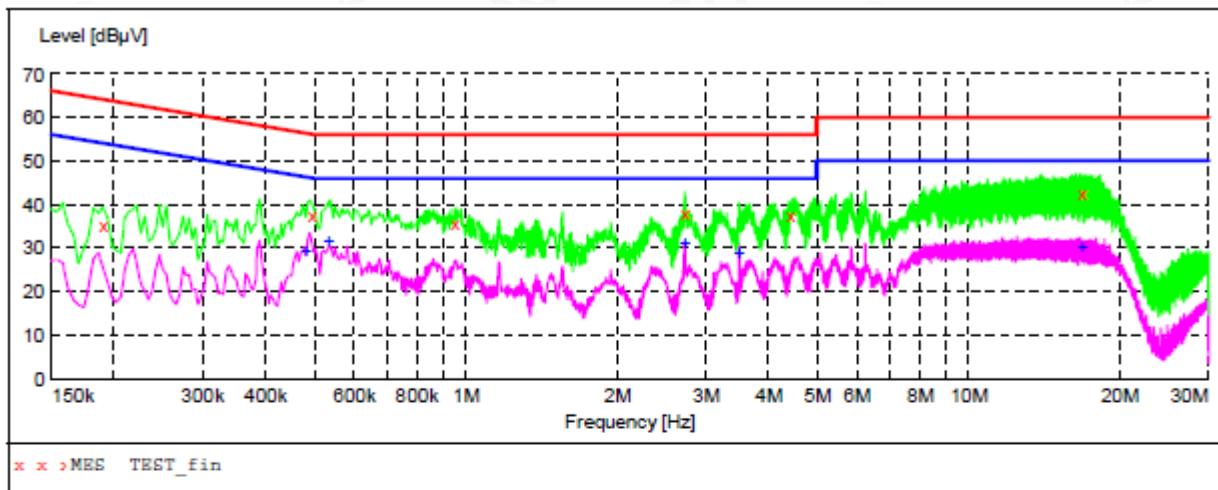
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## Line Conducted Emission Test Line 2-N


**MEASUREMENT RESULT: "TEST\_fin"**

2019/10/21 10:50

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.190000	35.20	10.8	64	28.8	QP	N	FLO
0.494000	37.40	11.0	56	18.7	QP	N	FLO
0.950000	36.00	11.1	56	20.0	QP	N	FLO
2.722000	37.80	11.3	56	18.2	QP	N	FLO
4.406000	37.60	11.4	56	18.4	QP	N	FLO
16.802000	42.80	12.4	60	17.2	QP	N	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

2019/10/21 10:50

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.482000	29.50	10.9	46	16.8	AV	N	FLO
0.534000	31.80	10.9	46	14.2	AV	N	FLO
2.730000	31.00	11.3	46	15.0	AV	N	FLO
3.502000	29.00	11.4	46	17.0	AV	N	FLO
16.798000	30.40	12.4	50	19.6	AV	N	FLO

**RESULT: PASS**

Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

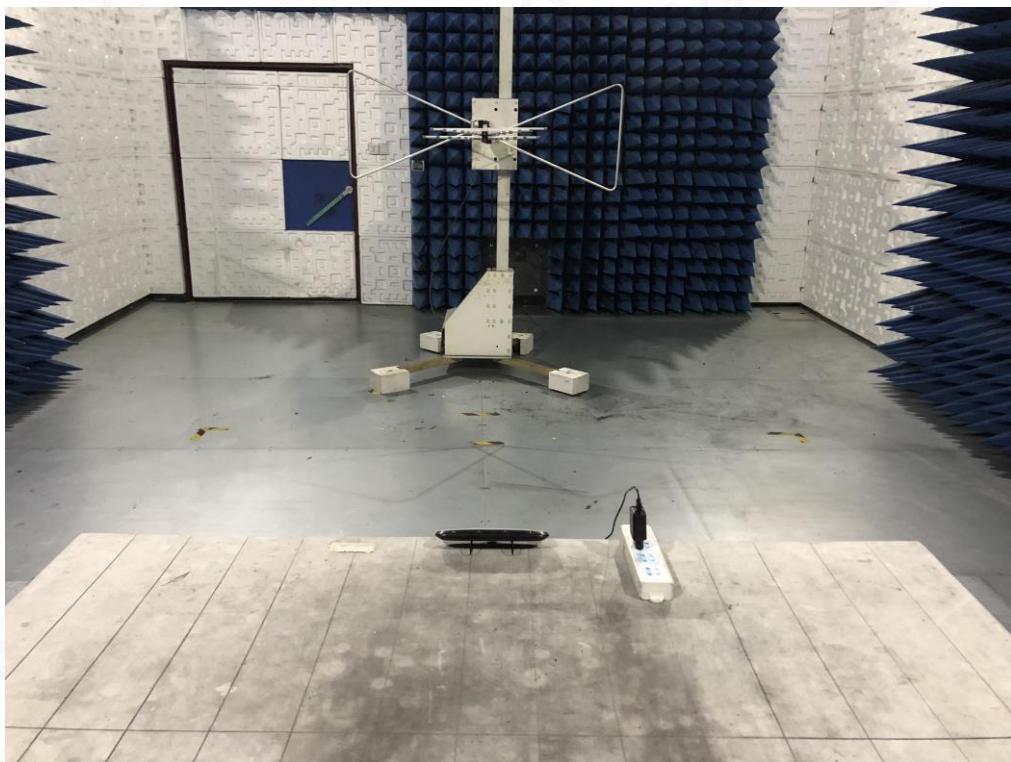
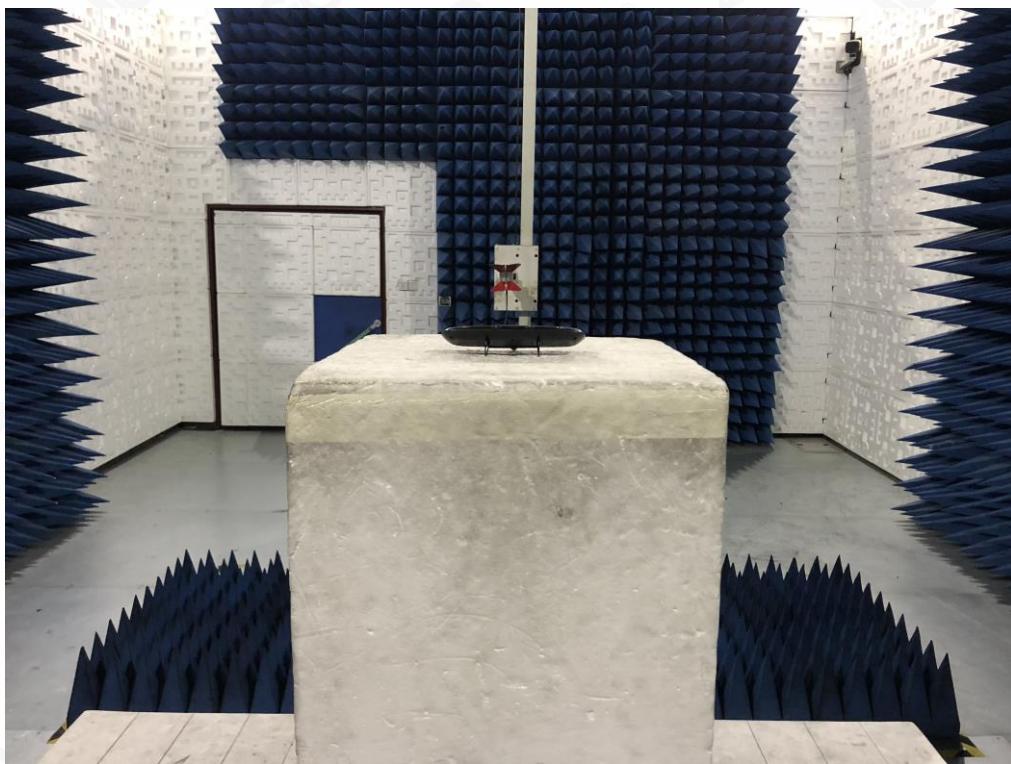


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**APPENDIX A: PHOTOGRAPHS OF TEST SETUP****RADIATED EMISSION TEST SETUP BELOW 1GHZ****RADIATED EMISSION TEST SETUP ABOVE 1GHZ****Attestation of Global Compliance**

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## CONDUCTED EMISSION TEST SETUP



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**APPENDIX B: PHOTOGRAPHS OF EUT****ALL VIEW OF EUT****TOP VIEW OF EUT**

## BOTTOM VIEW OF EUT



## FRONT VIEW OF EUT



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## BACK VIEW OF EUT



## LEFT VIEW OF EUT



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## RIGHT VIEW OF EUT



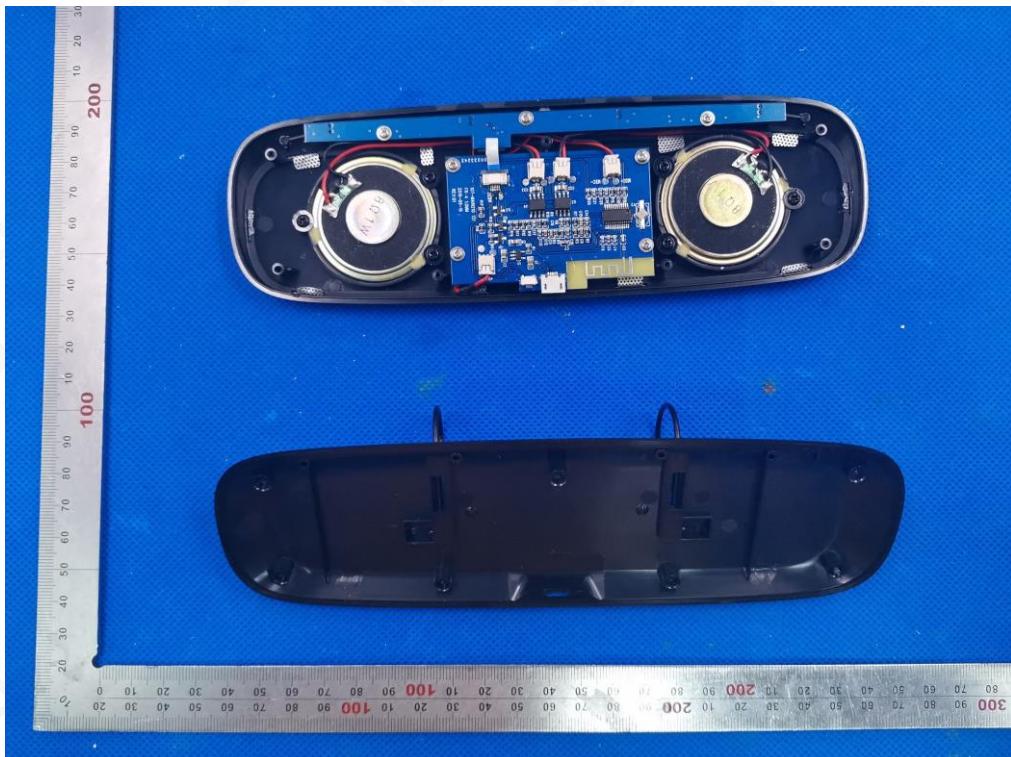
VIEW OF EUT(PORT)



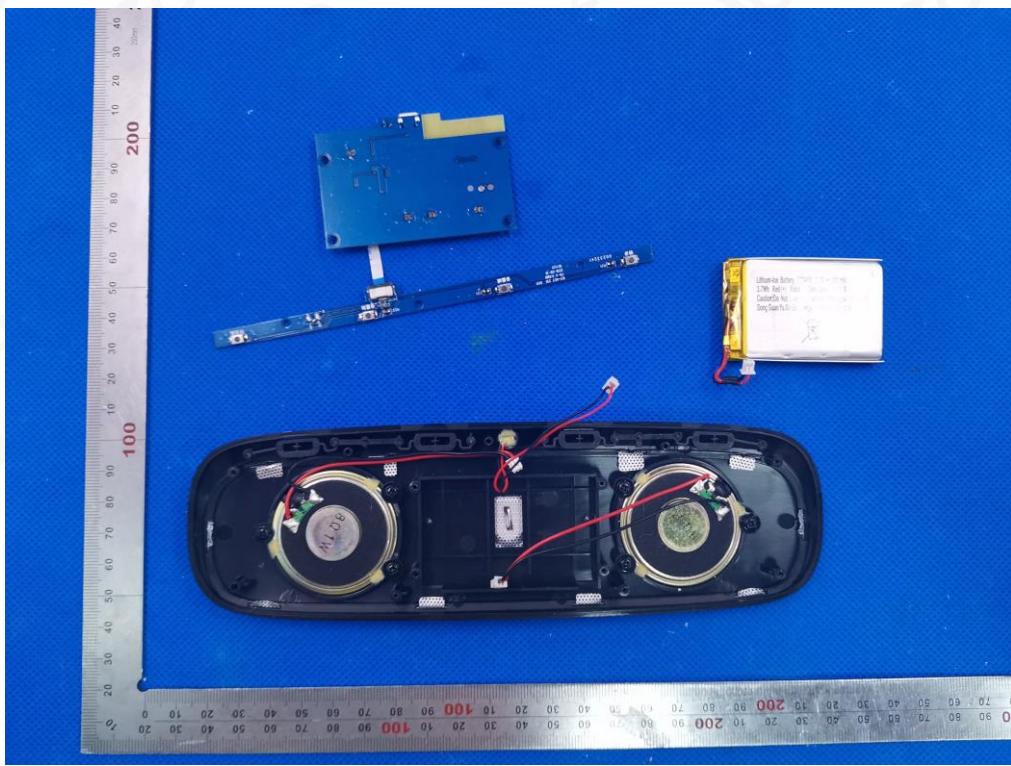
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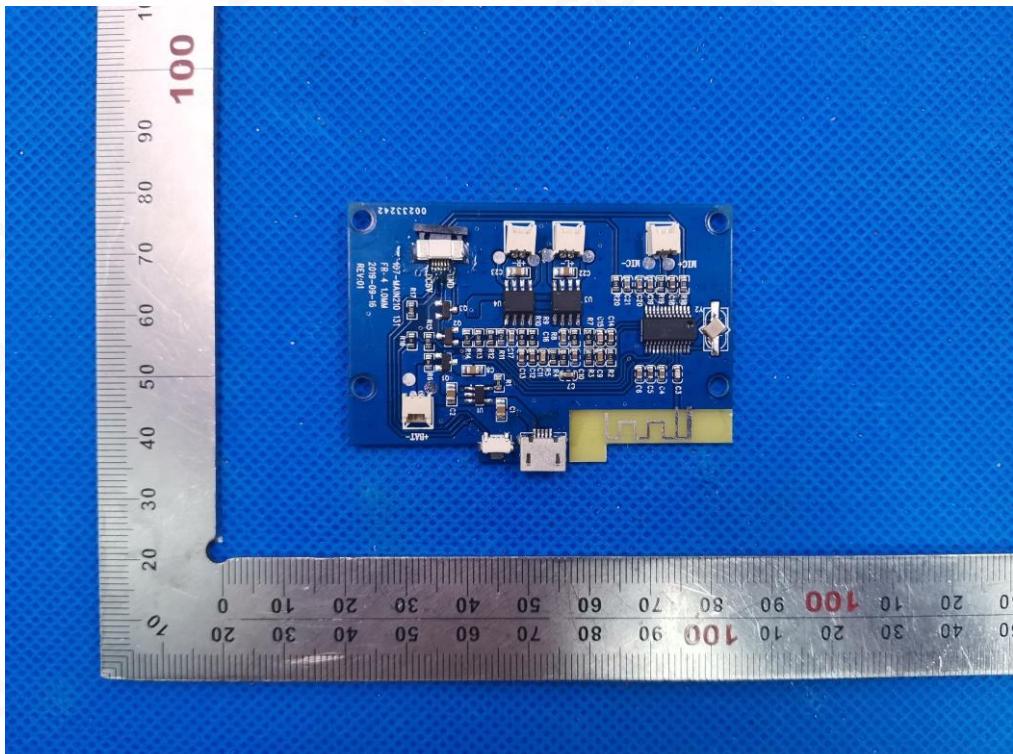
## OPEN VIEW OF EUT-1



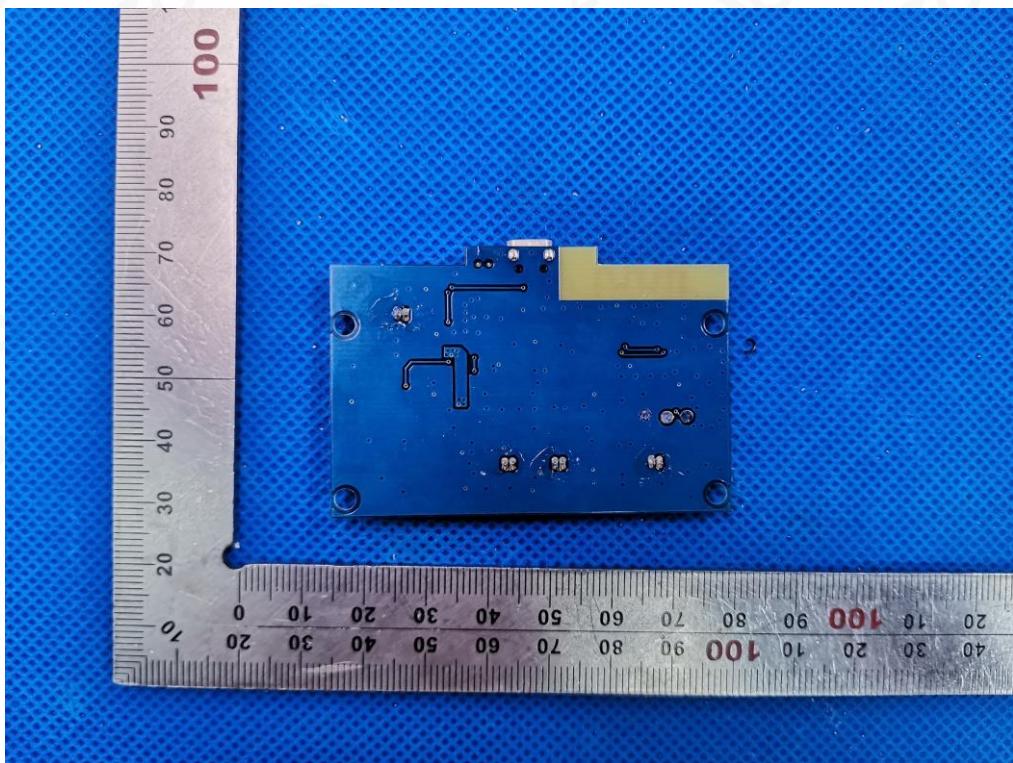
## OPEN VIEW OF EUT-2



## INTERNAL VIEW OF EUT-1



## INTERNAL VIEW OF EUT-2



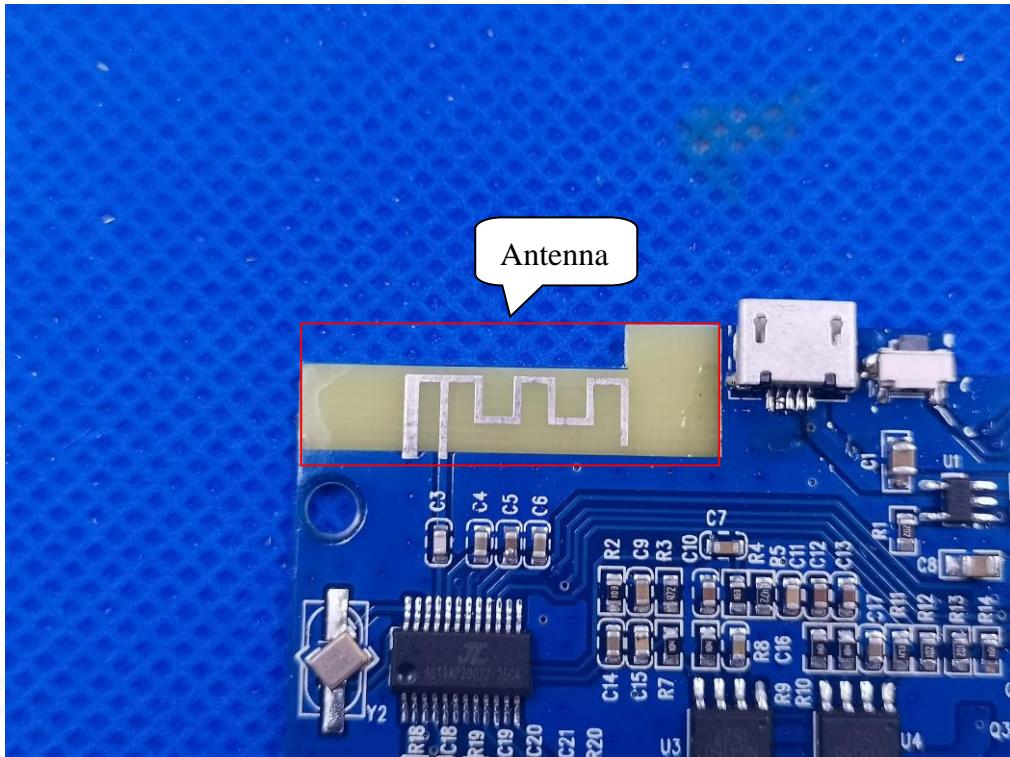
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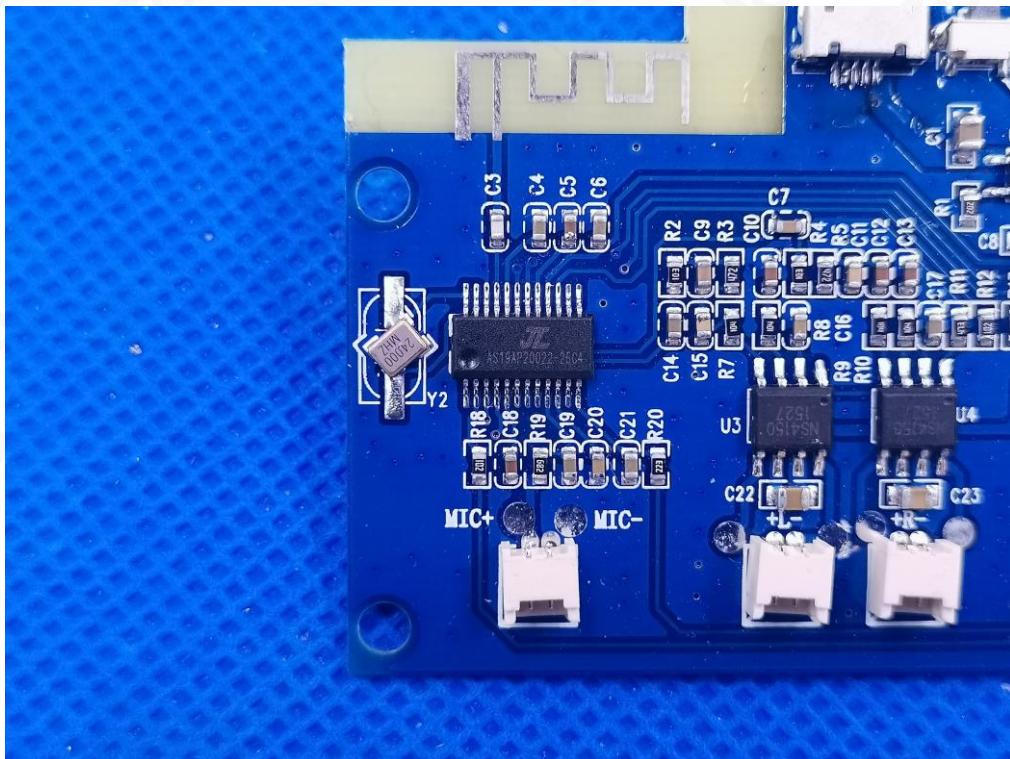
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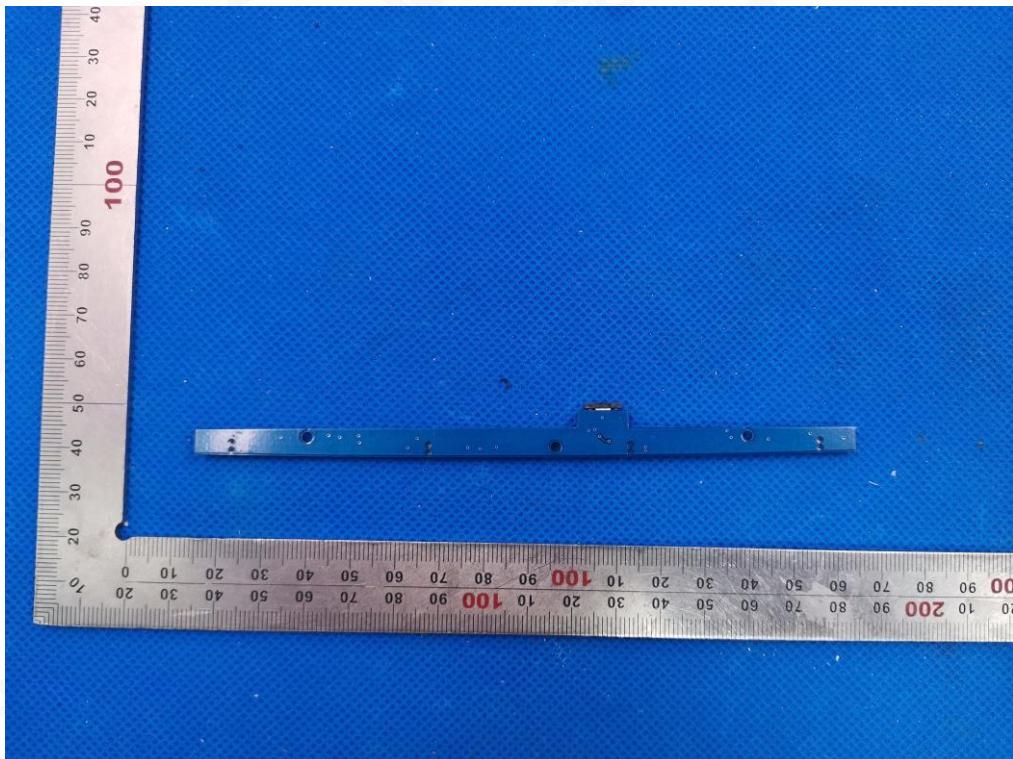
## INTERNAL VIEW OF EUT-3



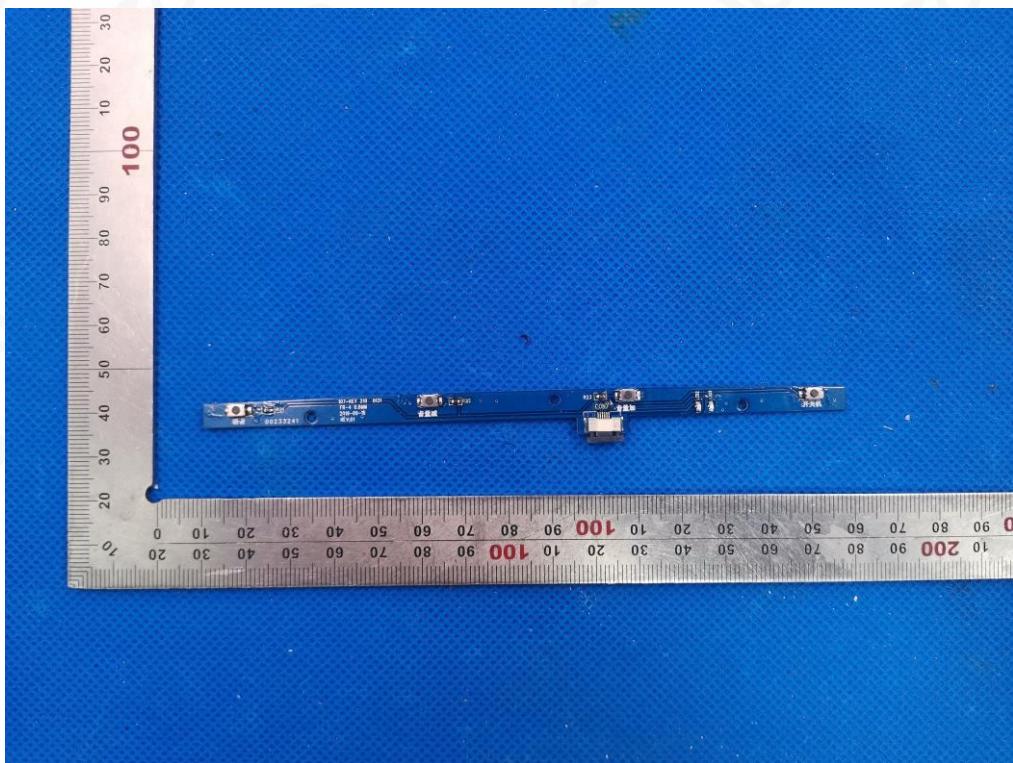
## INTERNAL VIEW OF EUT-4



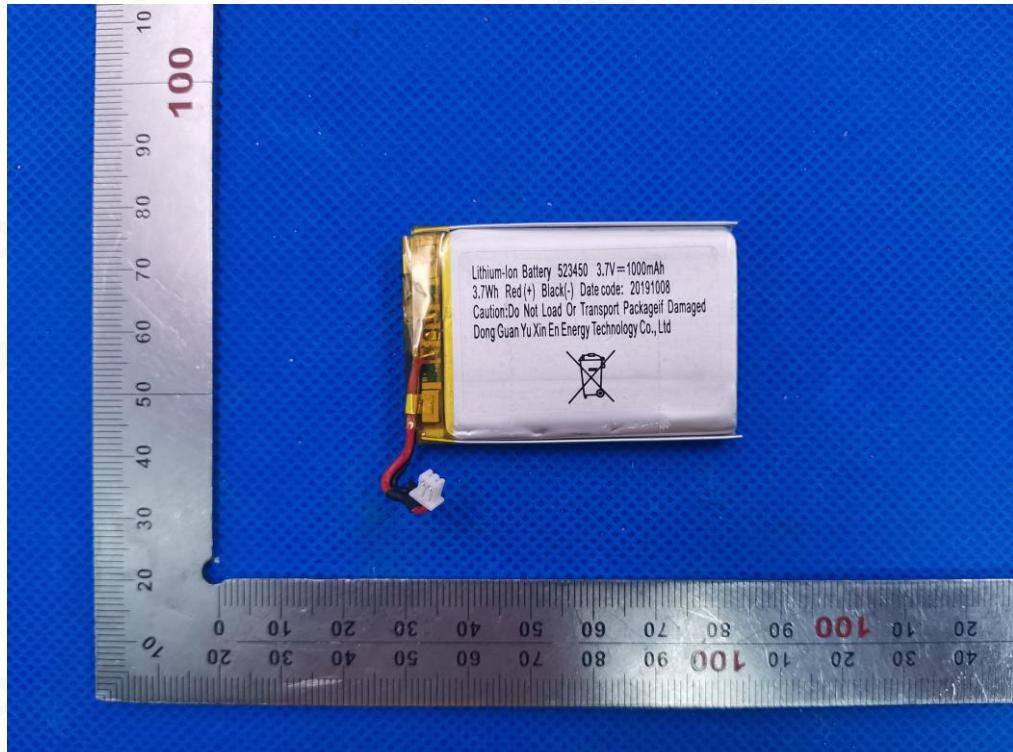
## INTERNAL VIEW OF EUT-5



## INTERNAL VIEW OF EUT-6



## VIEW OF BATTERY



Car charger

## TOP VIEW OF EUT



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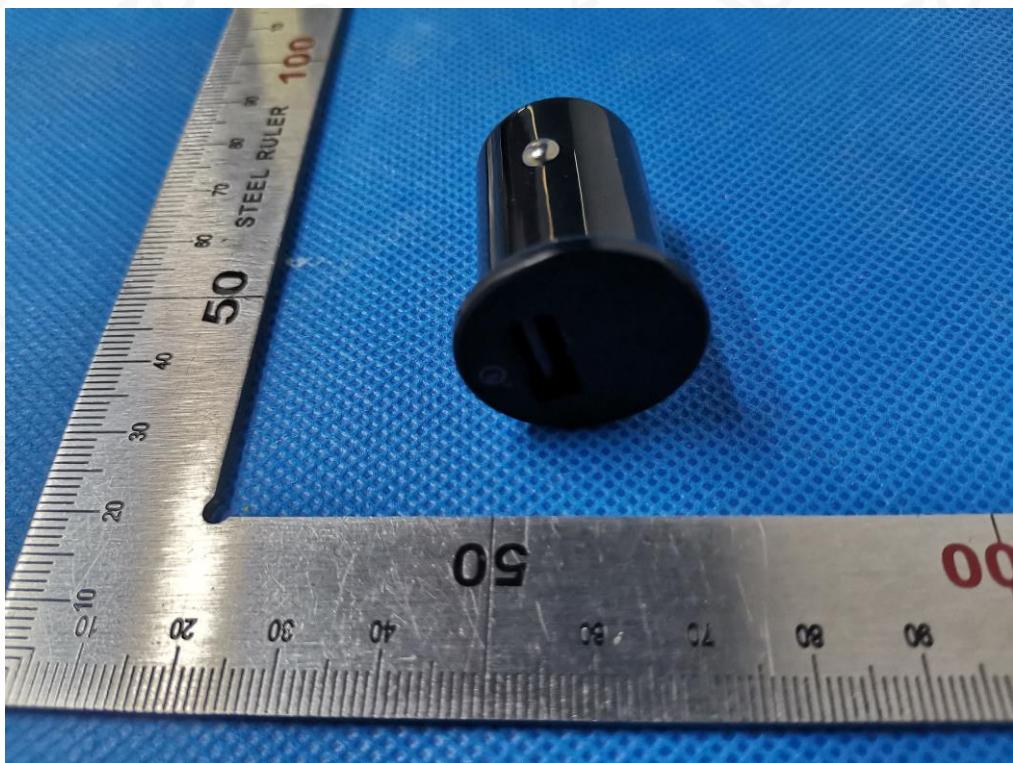
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## BOTTOM VIEW OF EUT



## FRONT VIEW OF EUT



BACK VIEW OF EUT



LEFT VIEW OF EUT



## RIGHT VIEW OF EUT



VIEW OF EUT(PORT)



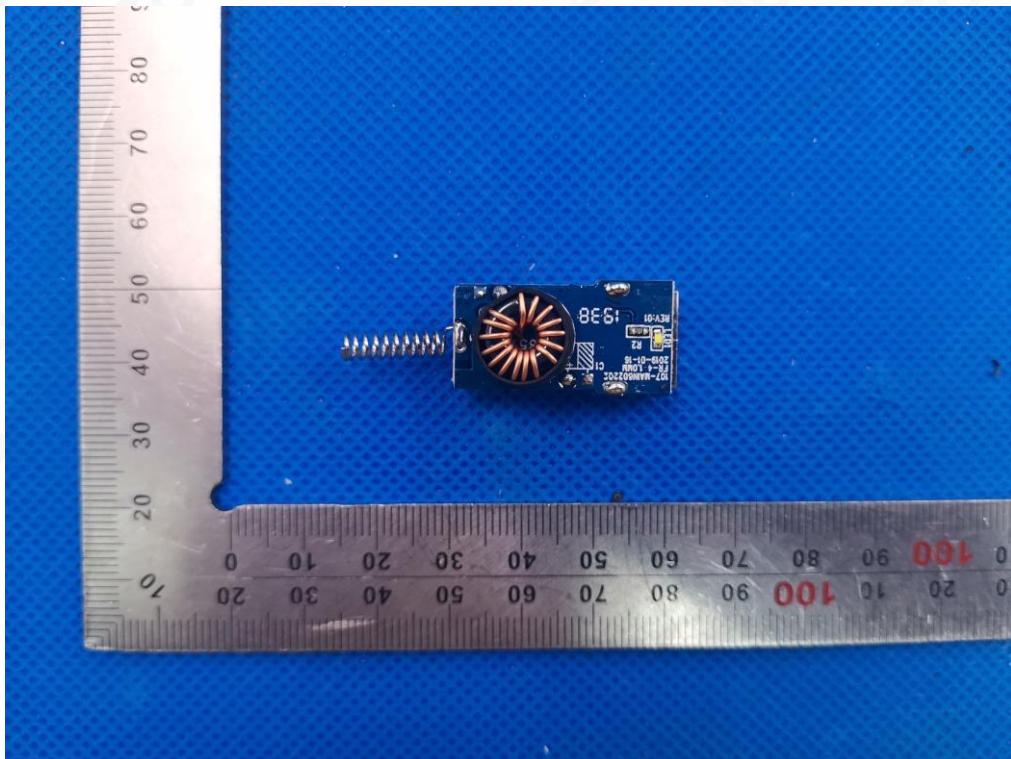
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## OPEN VIEW OF EUT



## INTERNAL VIEW OF EUT-1



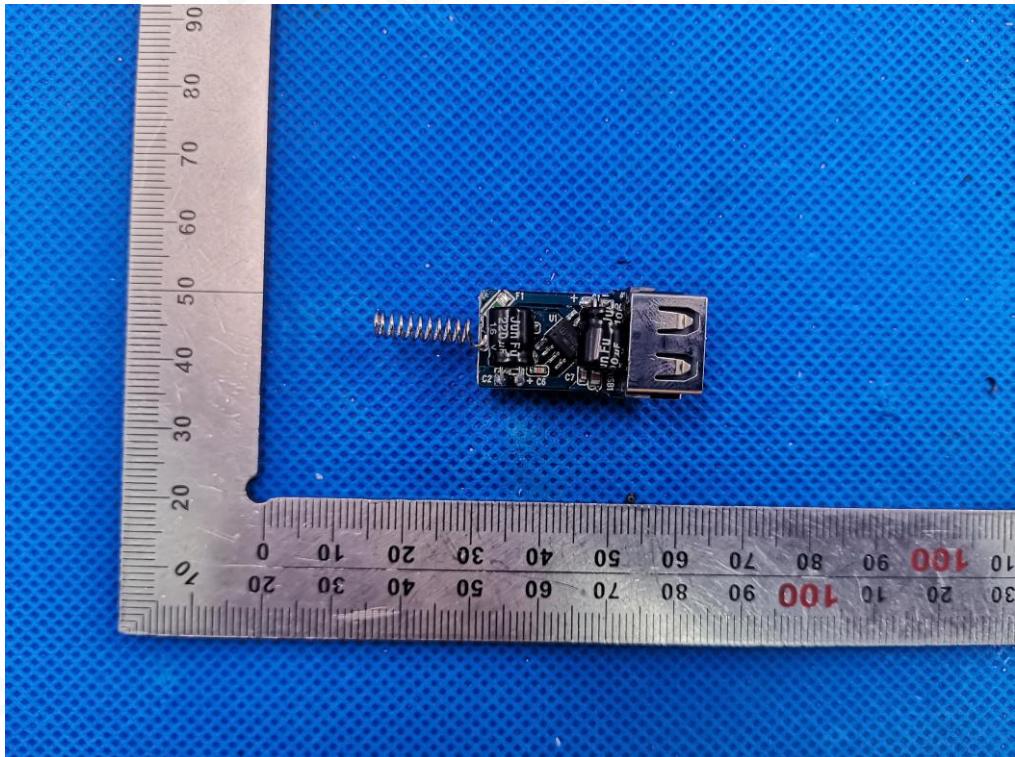
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## INTERNAL VIEW OF EUT-2

**----END OF REPORT----**

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