

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

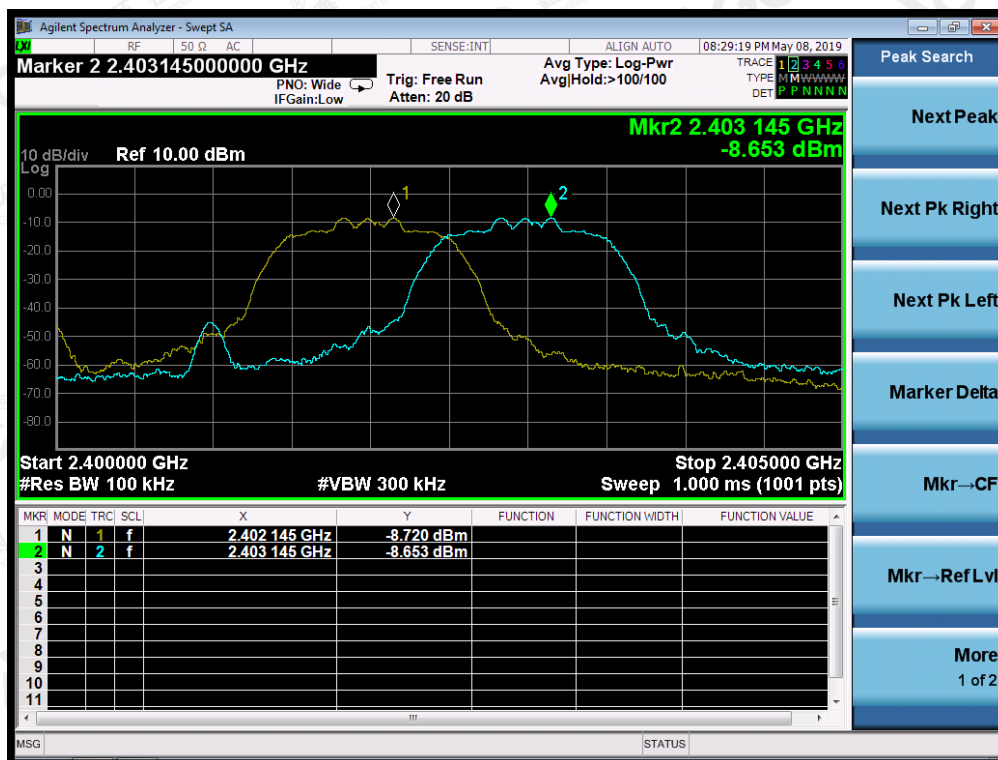
13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.3

13.4. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	
CH01-CH02	1000	≥ 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

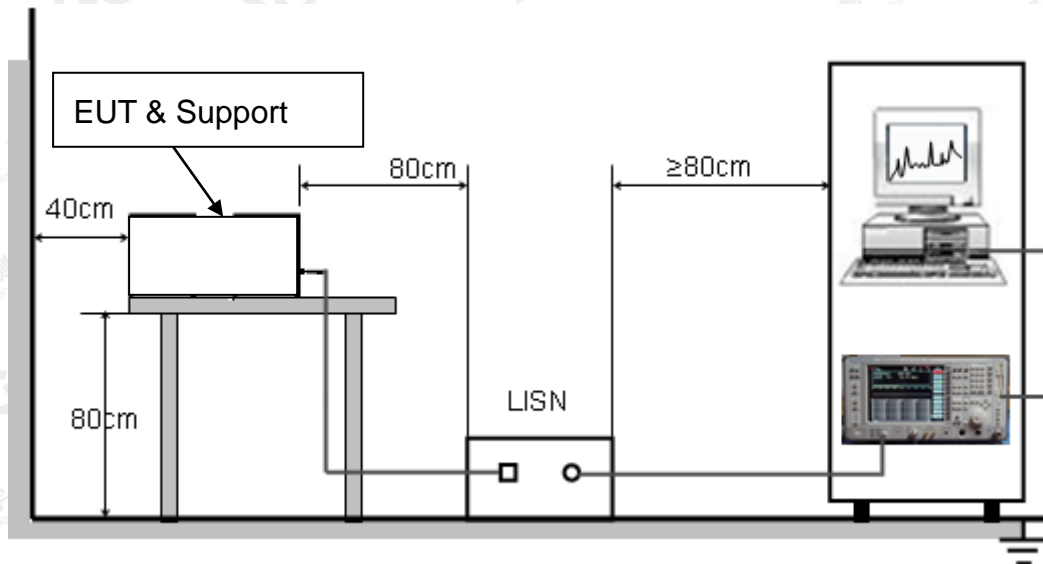
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

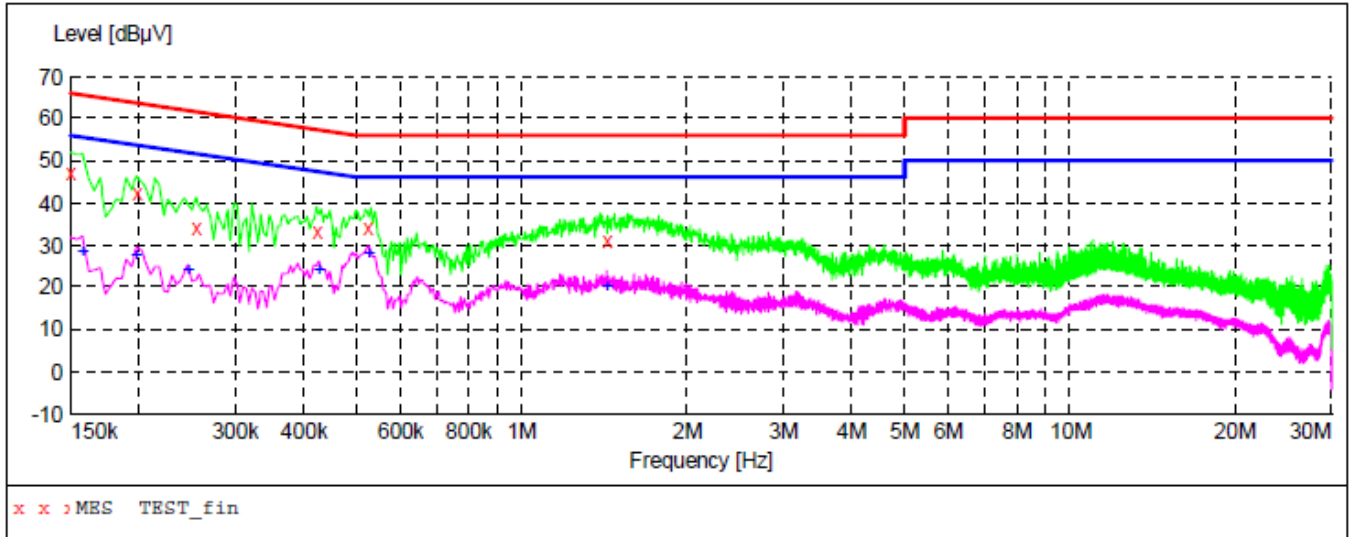
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

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.

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14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "TEST_fin"

5/9/2019 11:37AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	46.90	10.3	66	19.1	QP	L1	FLO
0.198000	42.10	10.3	64	21.6	QP	L1	FLO
0.254000	34.20	10.2	62	27.4	QP	L1	FLO
0.422000	33.40	10.5	57	24.0	QP	L1	FLO
0.522000	34.00	11.1	56	22.0	QP	L1	FLO
1.430000	31.20	10.9	56	24.8	QP	L1	FLO

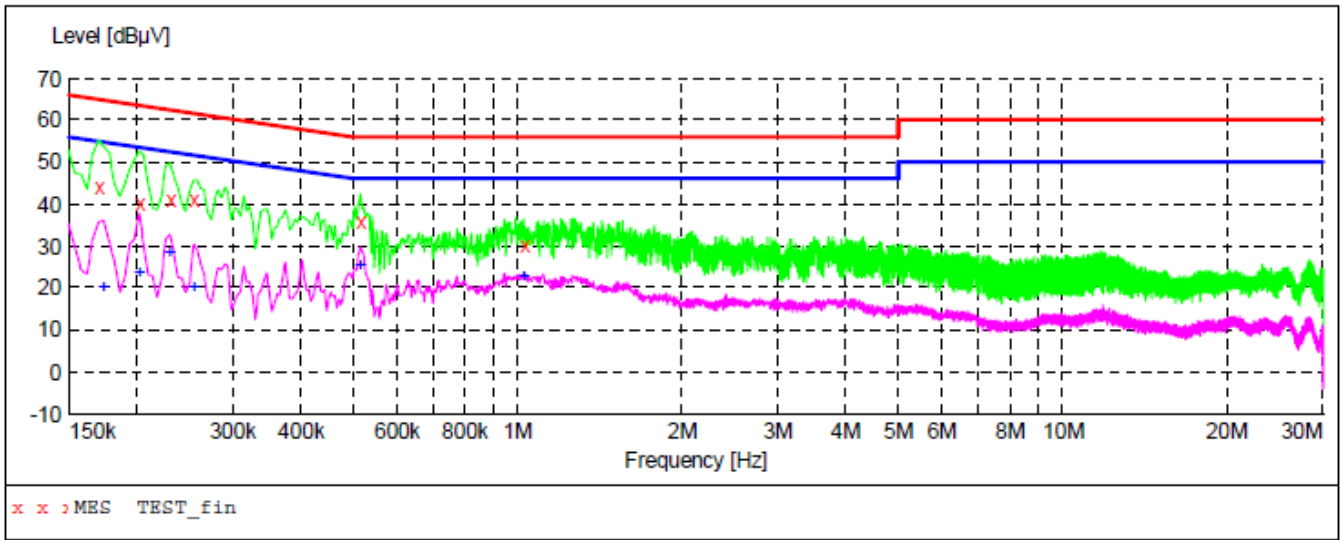
MEASUREMENT RESULT: "TEST_fin2"

5/9/2019 11:37AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	28.30	10.3	56	27.3	AV	L1	FLO
0.198000	27.70	10.3	54	26.0	AV	L1	FLO
0.246000	24.10	10.3	52	27.8	AV	L1	FLO
0.426000	24.10	10.6	47	23.2	AV	L1	FLO
0.526000	27.90	11.1	46	18.1	AV	L1	FLO
1.430000	20.40	10.9	46	25.6	AV	L1	FLO

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Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "TEST_fin"

5/9/2019 11:17AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.170000	44.00	10.3	65	21.0	QP	N	FLO
0.202000	40.20	10.3	64	23.3	QP	N	FLO
0.230000	40.90	10.3	62	21.5	QP	N	FLO
0.254000	40.90	10.2	62	20.7	QP	N	FLO
0.514000	35.90	11.1	56	20.1	QP	N	FLO
1.026000	30.20	11.4	56	25.8	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

5/9/2019 11:17AM

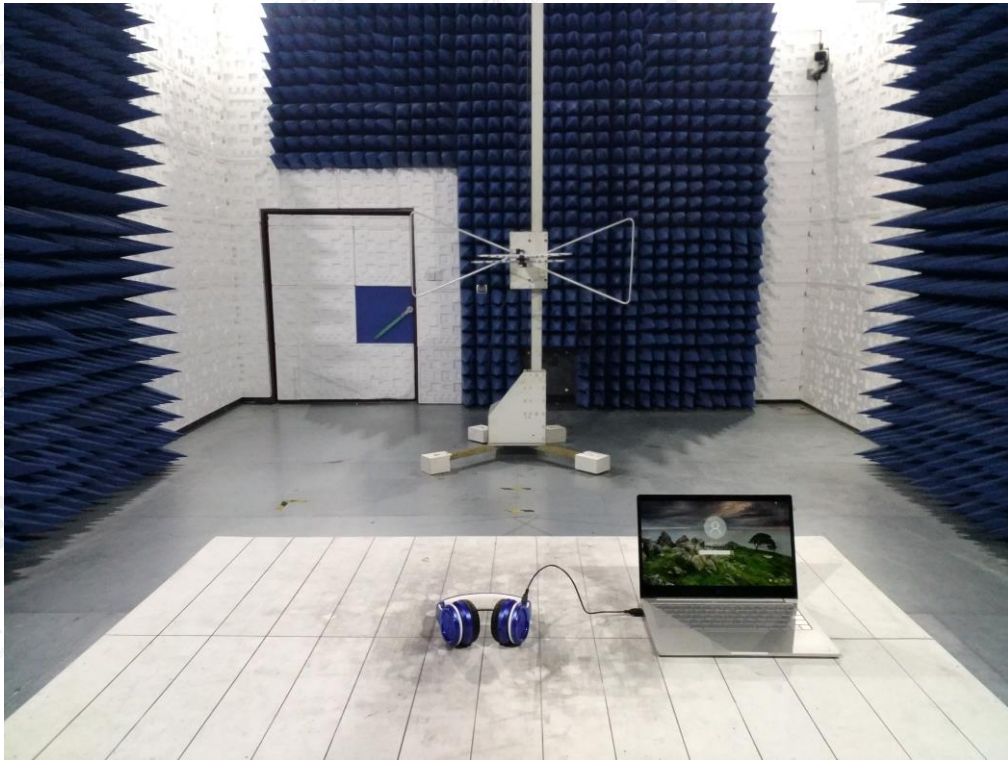
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.174000	20.30	10.3	55	34.5	AV	N	FLO
0.202000	23.60	10.3	54	29.9	AV	N	FLO
0.230000	28.70	10.3	52	23.7	AV	N	FLO
0.254000	20.10	10.2	52	31.5	AV	N	FLO
0.514000	25.50	11.1	46	20.5	AV	N	FLO
1.026000	22.60	11.4	46	23.4	AV	N	FLO

RESULT: PASS

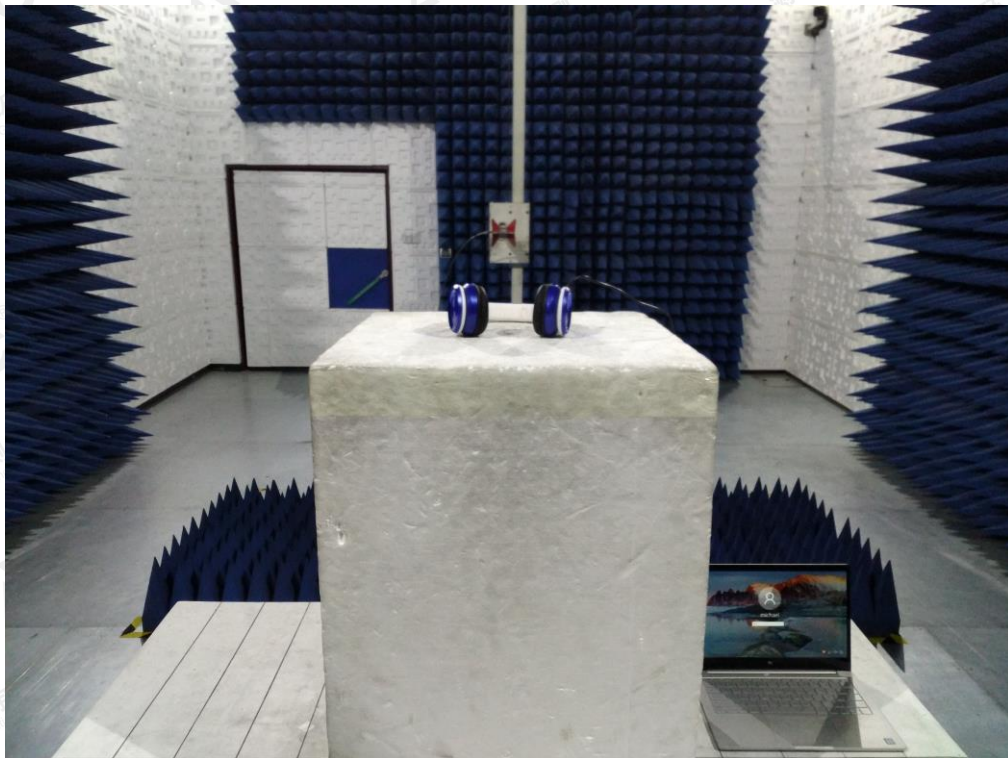
Note: All the test modes had been tested, the mode 5 was the worst case. Only the data of the worst case would be record in this test report.

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP
RADIATED EMISSION TEST SETUP BELOW 1GHZ



RADIATED EMISSION TEST SETUP ABOVE 1GHZ



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CONDUCTED EMISSION TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF EUT

The model comes in three colors

TOP VIEW OF EUT (blue)



BOTTOM VIEW OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



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LEFT VIEW OF EUT



RIGHT VIEW OF EUT



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VIEW OF EUT (PORT)-1

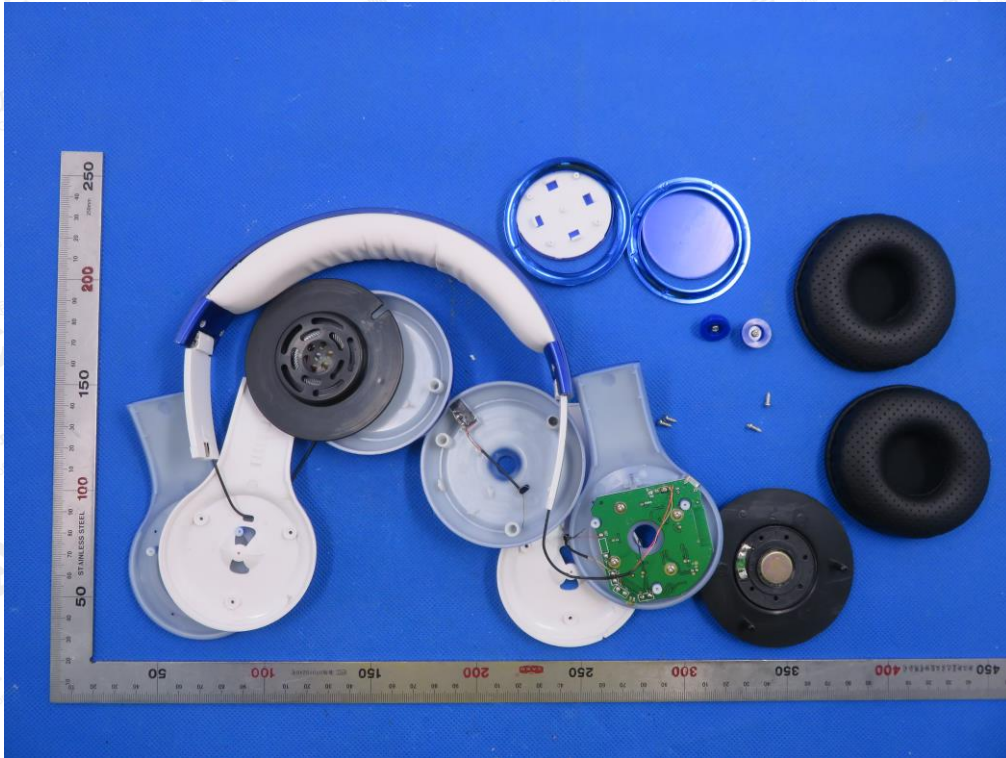


VIEW OF EUT (PORT)-2



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OPEN VIEW OF EUT-1

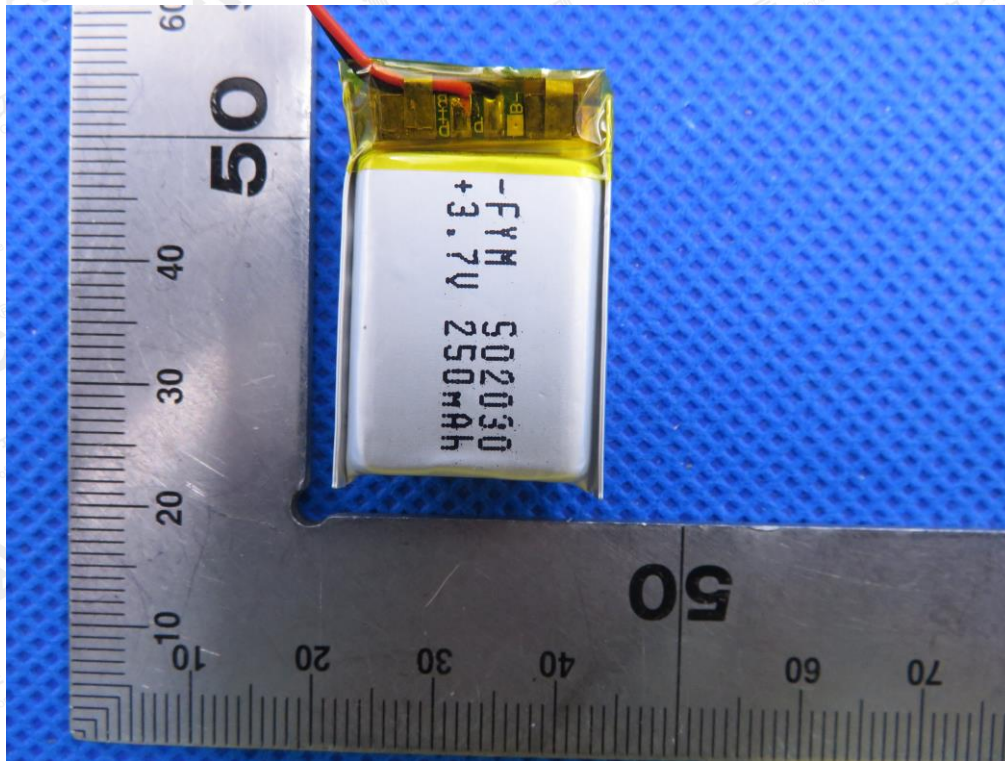


OPEN VIEW OF EUT-2

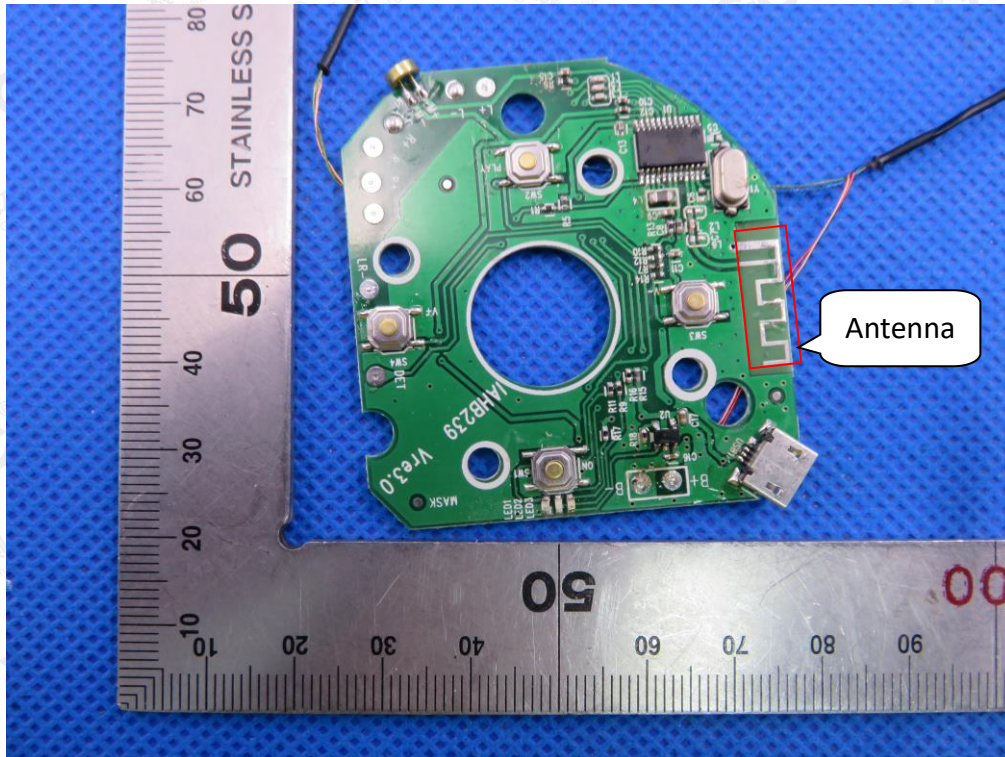


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VIEW OF BATTERY

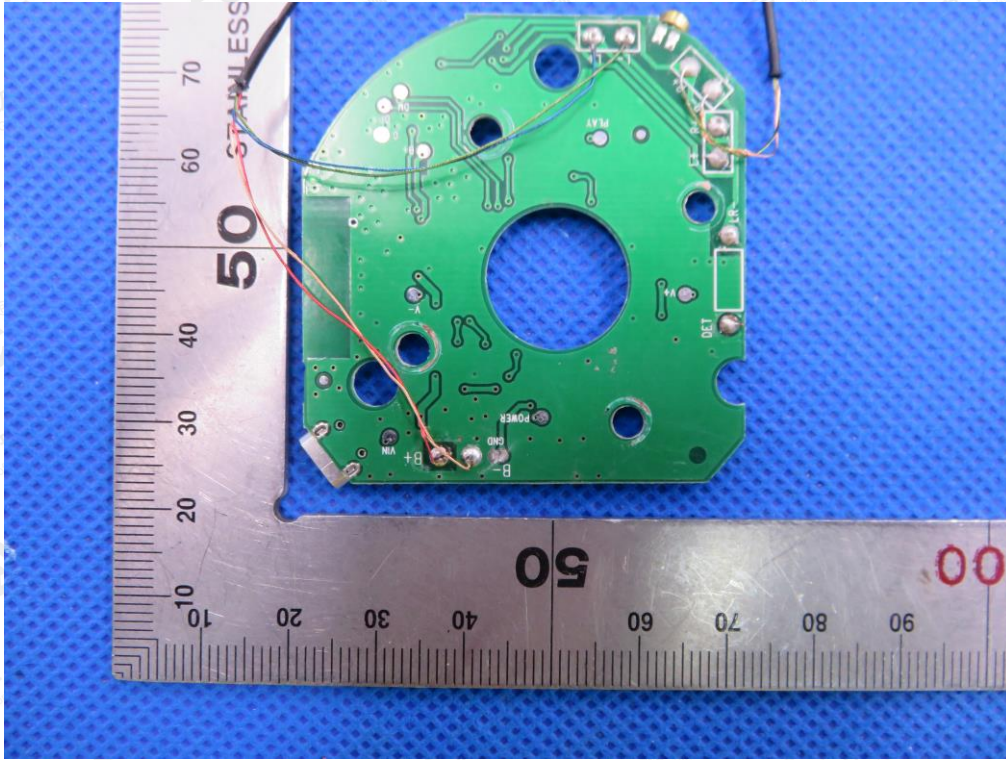


INTERNAL VIEW OF EUT-1

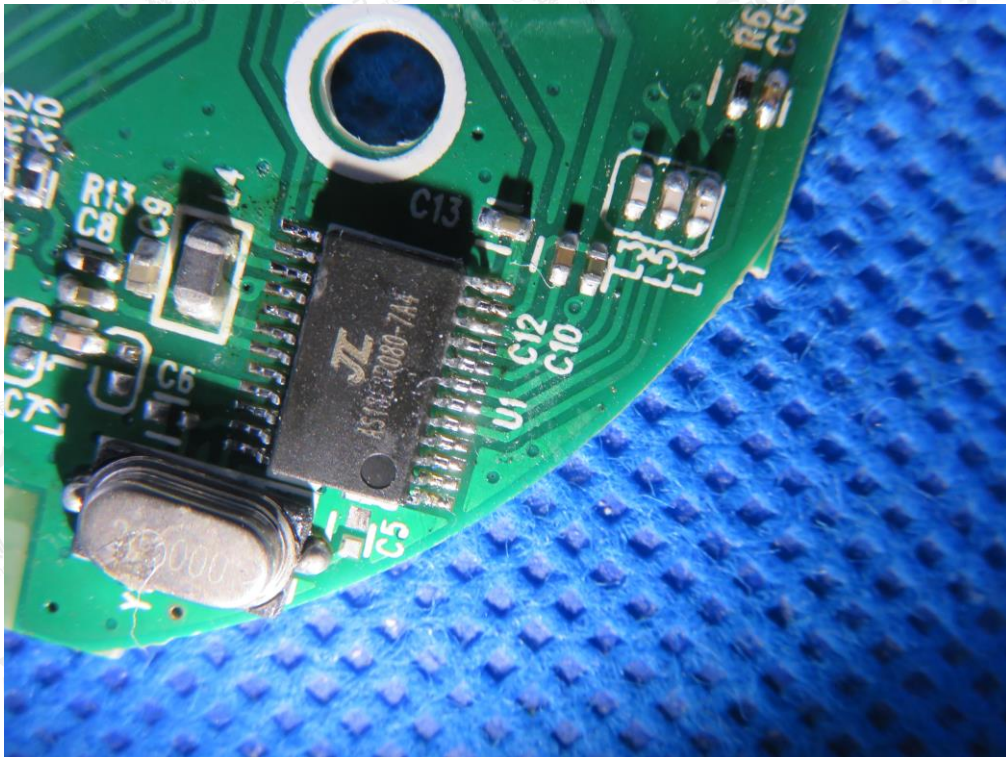


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INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3

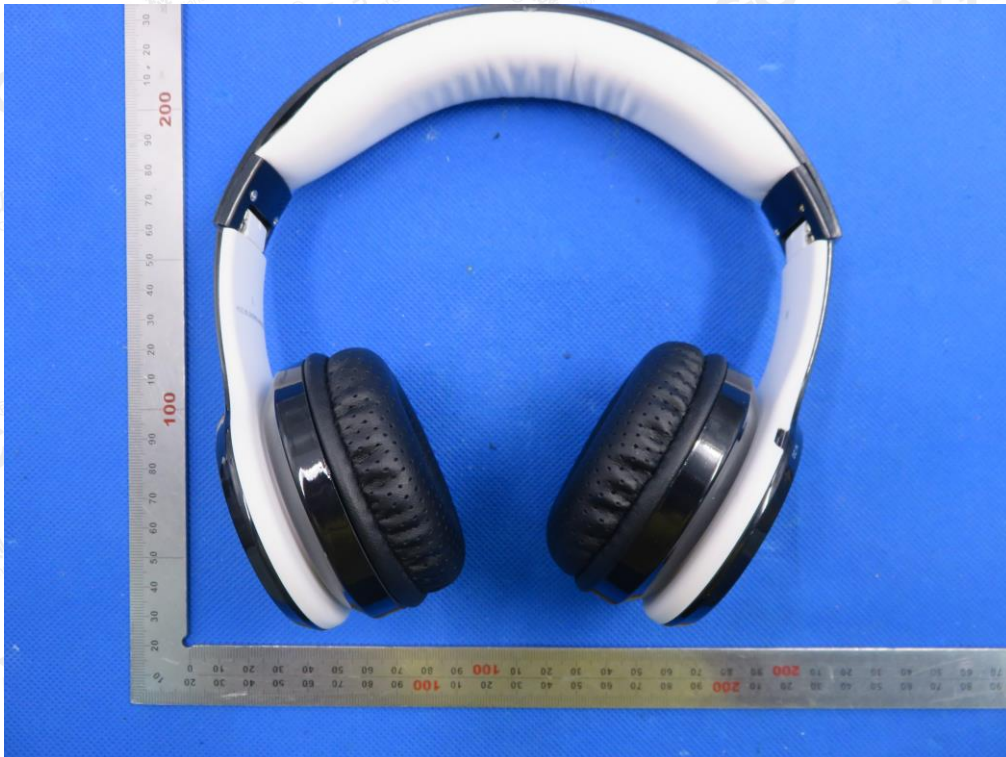


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TOP VIEW OF EUT (black)



BOTTOM VIEW OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



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LEFT VIEW OF EUT



RIGHT VIEW OF EUT



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VIEW OF EUT (PORT)-1



VIEW OF EUT (PORT)-2

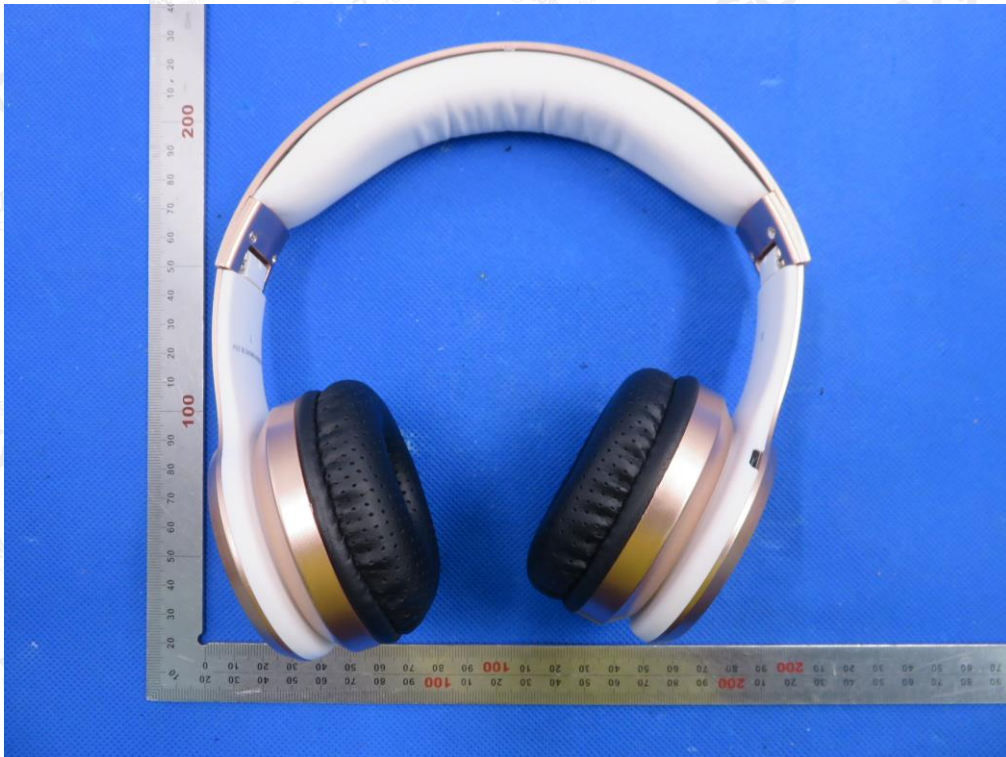


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TOP VIEW OF EUT (golden)



BOTTOM VIEW OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



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LEFT VIEW OF EUT



RIGHT VIEW OF EUT



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VIEW OF EUT (PORT)-1



VIEW OF EUT (PORT)-2



---END OF REPORT---

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