

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

TEST MODE	CHANNEL SEPARATION	LIMIT	RESULT
	MHz		
Hopping Mode	1.001	$\geq 2/3$ 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION



Note: The GFSK modulation is the worst case and recorded in the report.

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14. FCC LINE CONDUCTED EMISSION TEST

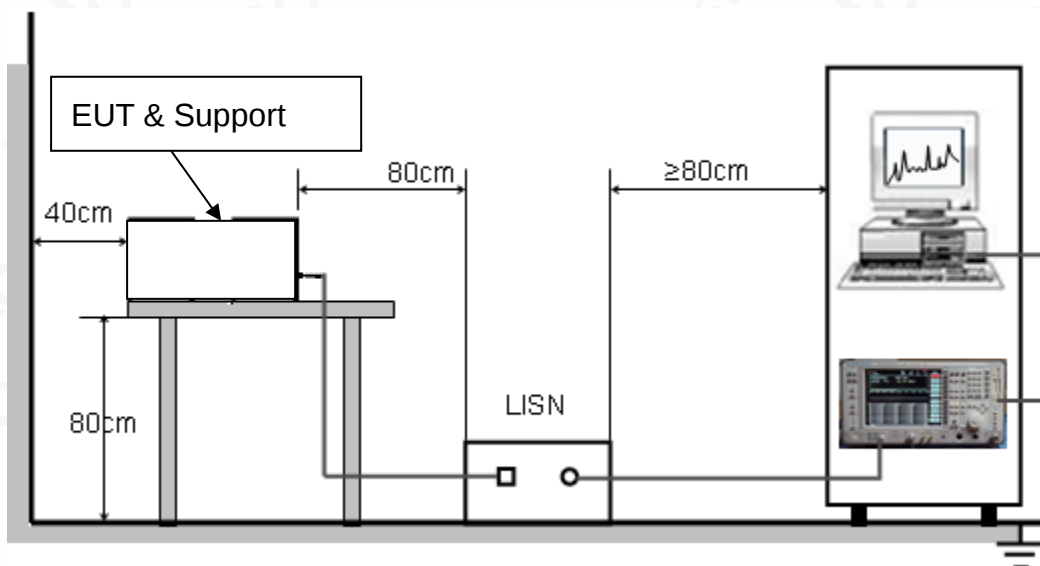
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. (dBμV)	Average (dBμV)
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 equipment 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.

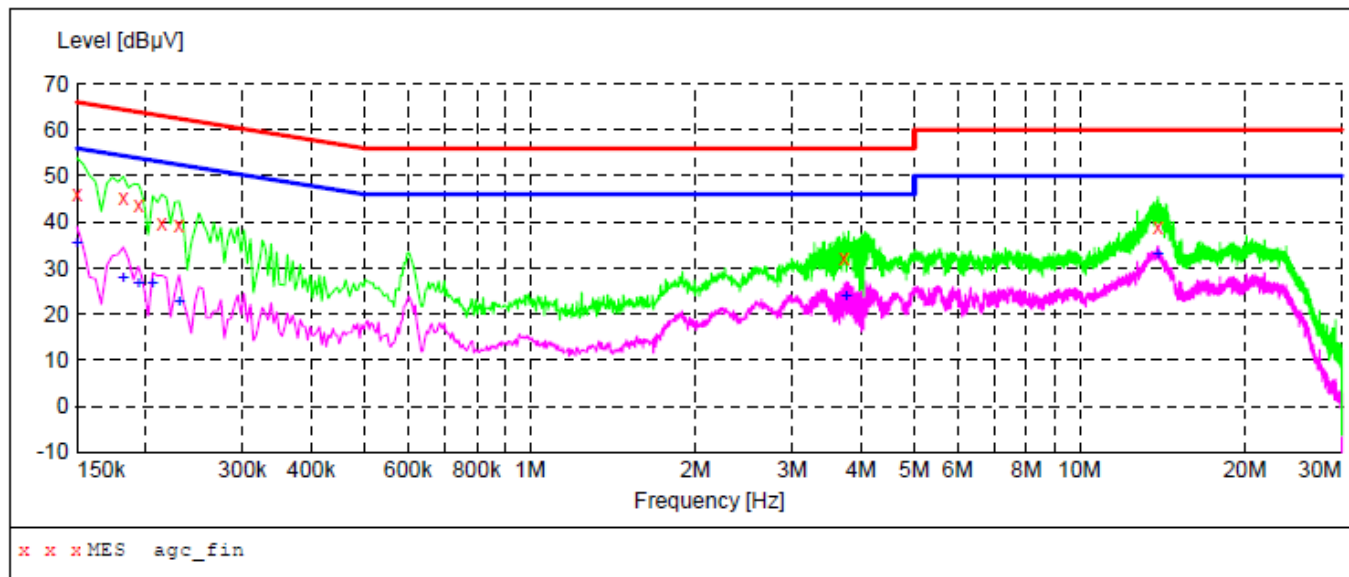
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14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2020/12/11 17:55

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	46.20	12.4	66	19.8	QP	L1
0.182000	45.10	12.4	64	19.3	QP	L1
0.194000	43.70	12.4	64	20.2	QP	L1
0.214000	39.90	12.4	63	23.1	QP	L1
0.230000	39.40	12.4	62	23.0	QP	L1
3.718000	32.20	12.5	56	23.8	QP	L1
13.886000	38.90	14.0	60	21.1	QP	L1

MEASUREMENT RESULT: "agc_fin2"

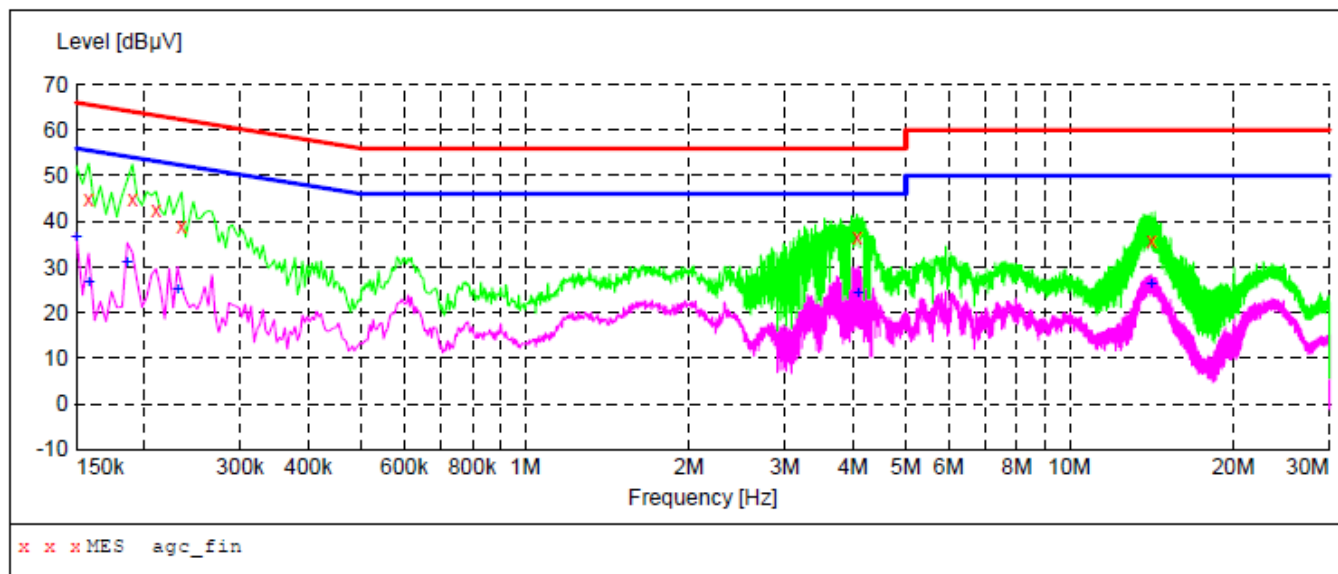
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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	35.50	12.4	56	20.5	AV	L1
0.182000	27.90	12.4	54	26.5	AV	L1
0.194000	26.70	12.4	54	27.2	AV	L1
0.206000	26.80	12.4	53	26.6	AV	L1
0.230000	22.60	12.4	52	29.8	AV	L1
3.762000	23.70	12.5	46	22.3	AV	L1
13.886000	32.90	14.0	50	17.1	AV	L1

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Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2020/12/11 17:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.158000	44.90	12.4	66	20.7	QP	N
0.190000	44.90	12.4	64	19.1	QP	N
0.210000	42.50	12.4	63	20.7	QP	N
0.234000	39.00	12.4	62	23.3	QP	N
4.074000	36.60	12.5	56	19.4	QP	N
14.126000	35.70	14.1	60	24.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

2020/12/11 17:51

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	36.60	12.4	56	19.4	AV	N
0.158000	26.80	12.4	56	28.8	AV	N
0.186000	31.10	12.4	54	23.1	AV	N
0.230000	24.90	12.4	52	27.5	AV	N
4.086000	24.30	12.5	46	21.7	AV	N
14.126000	26.20	14.1	50	23.8	AV	N

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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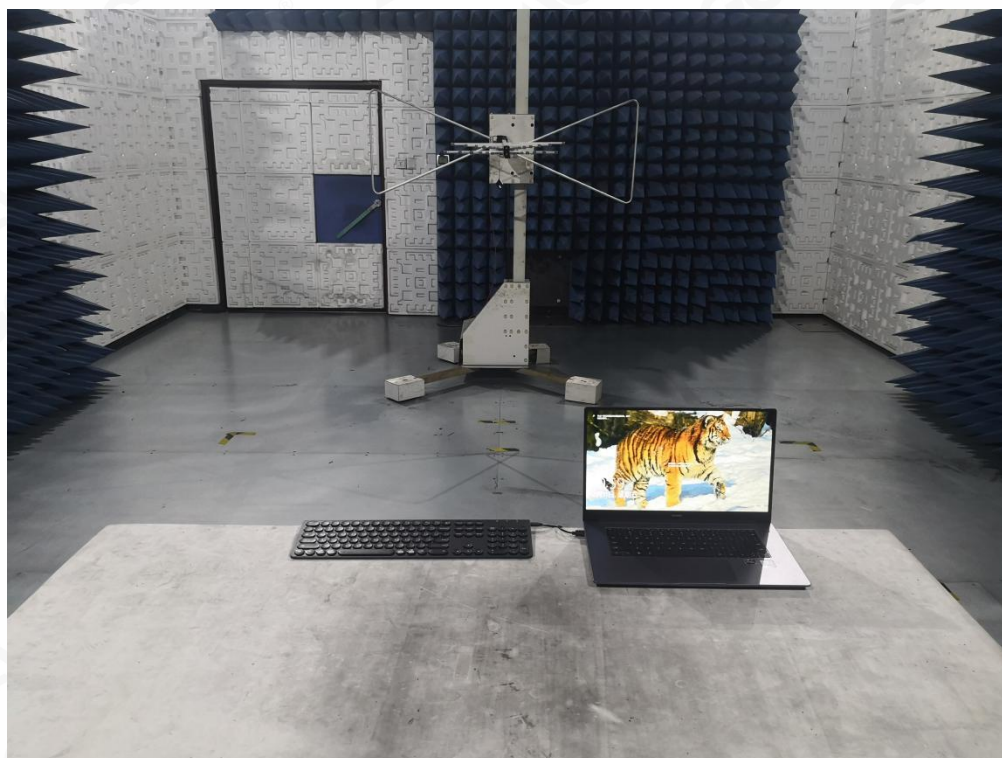
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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHz



RADIATED EMISSION TEST SETUP ABOVE 1GHz



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CONDUCTED EMISSION TEST SETUP



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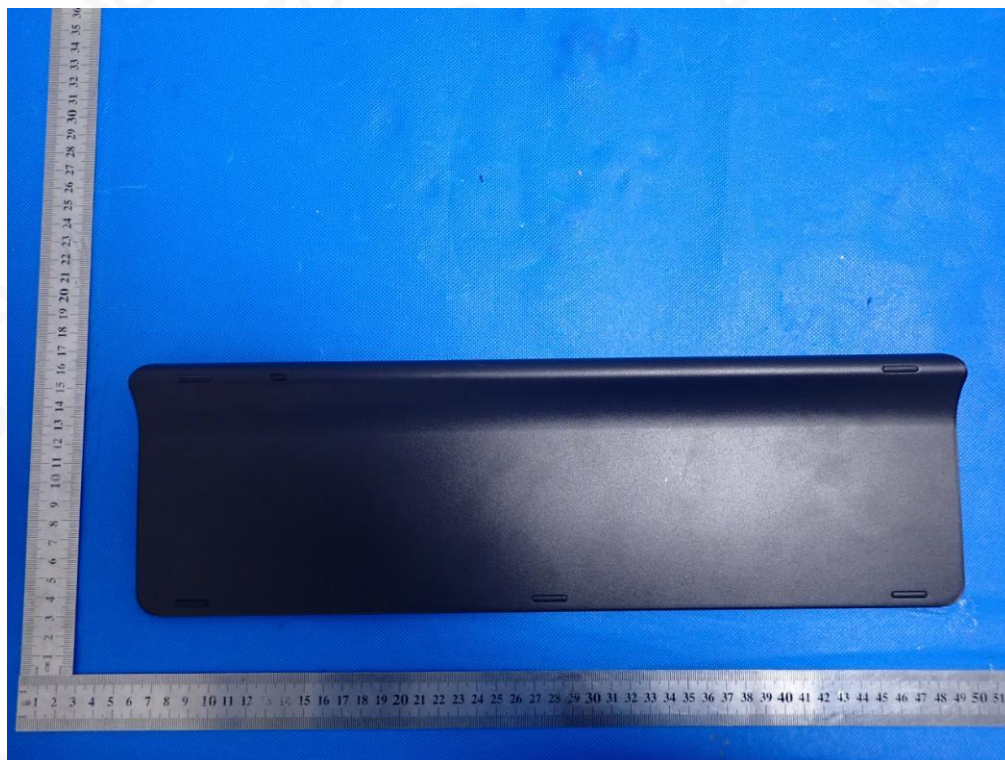
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APPENDIX B: PHOTOGRAPHS OF EUT
EXTERNAL VIEW-1 OF EUT



EXTERNAL VIEW-2 OF EUT



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EXTERNAL VIEW-3 OF EUT



EXTERNAL VIEW-4 OF EUT



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EXTERNAL VIEW-5 OF EUT



EXTERNAL VIEW-6 OF EUT



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EXTERNAL VIEW-7 OF EUT



INTERNAL VIEW-1 OF EUT

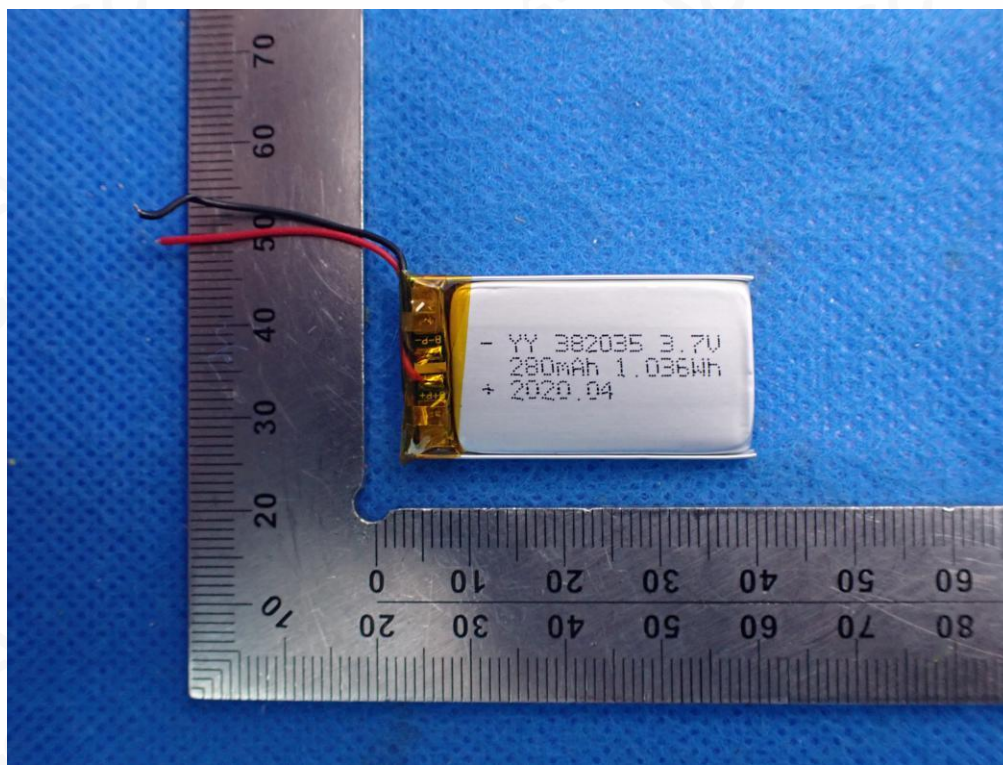


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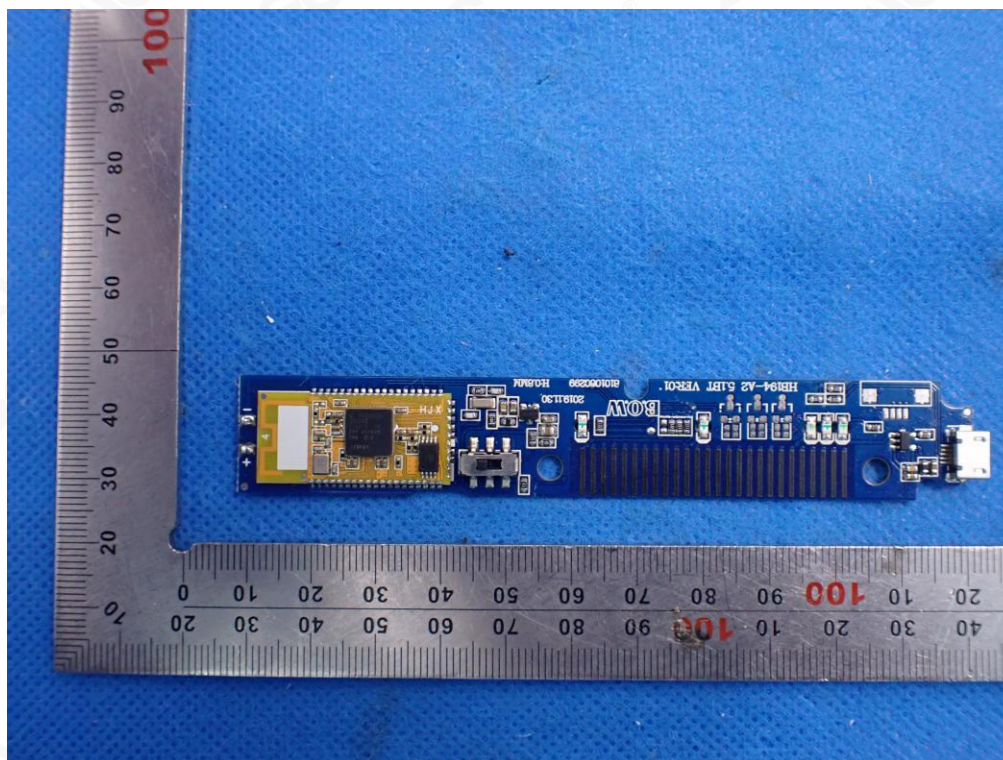
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INTERNAL VIEW-2 OF EUT



INTERNAL VIEW-3 OF EUT

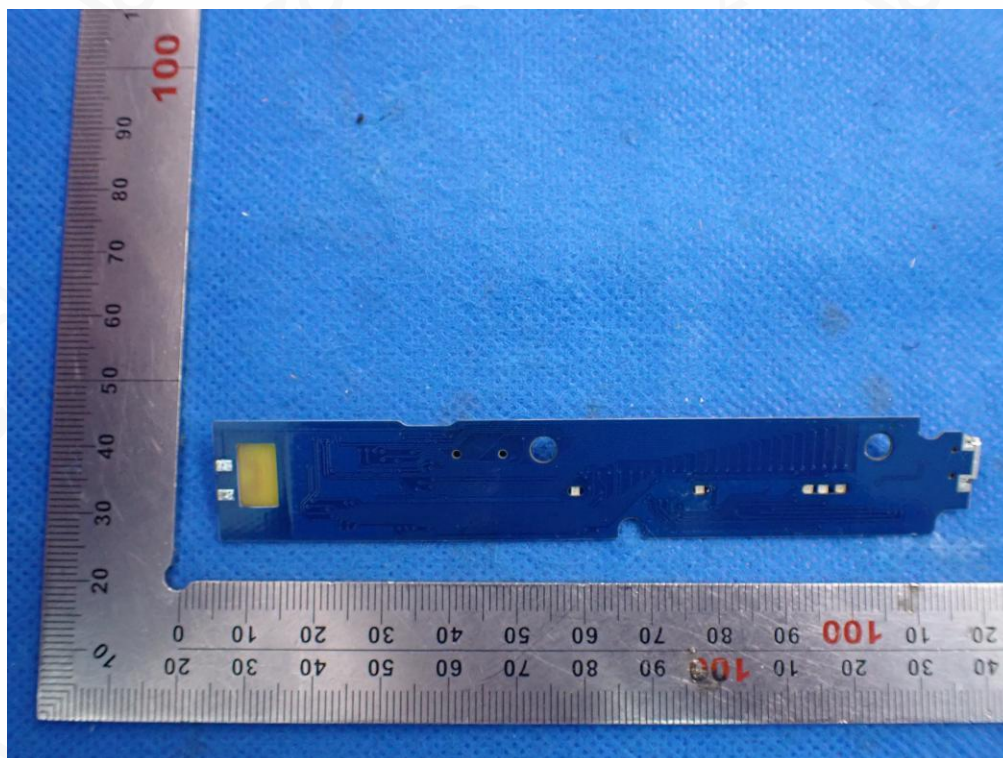


INTERNAL VIEW-4 OF EUT

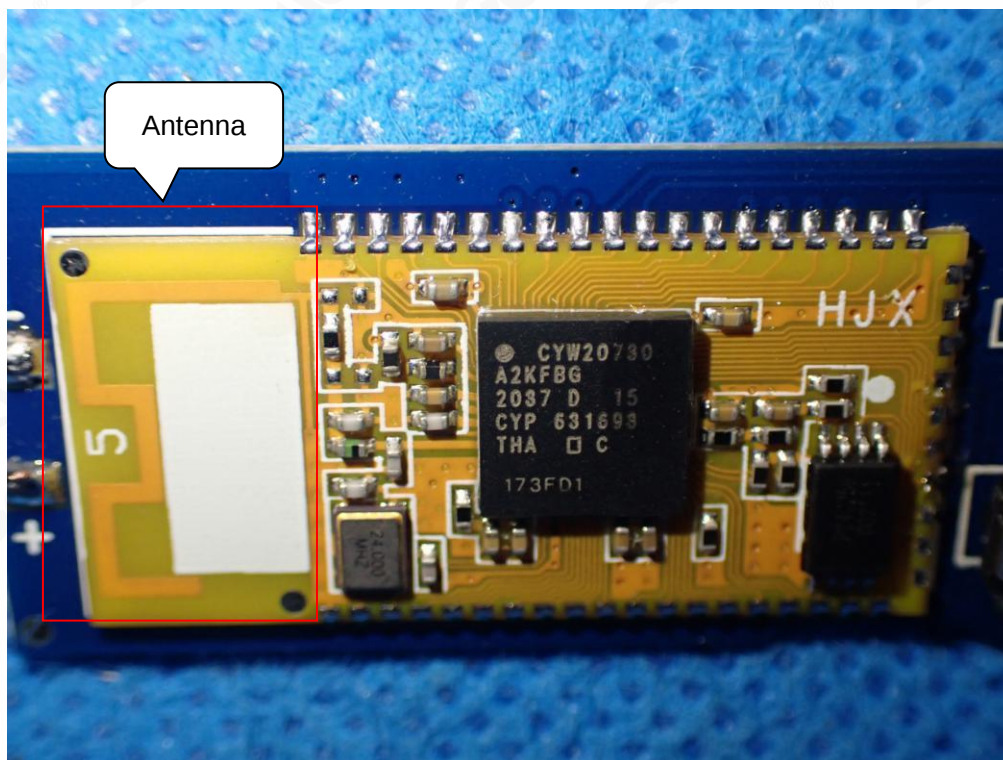
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INTERNAL VIEW-5 OF EUT



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7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
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9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
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