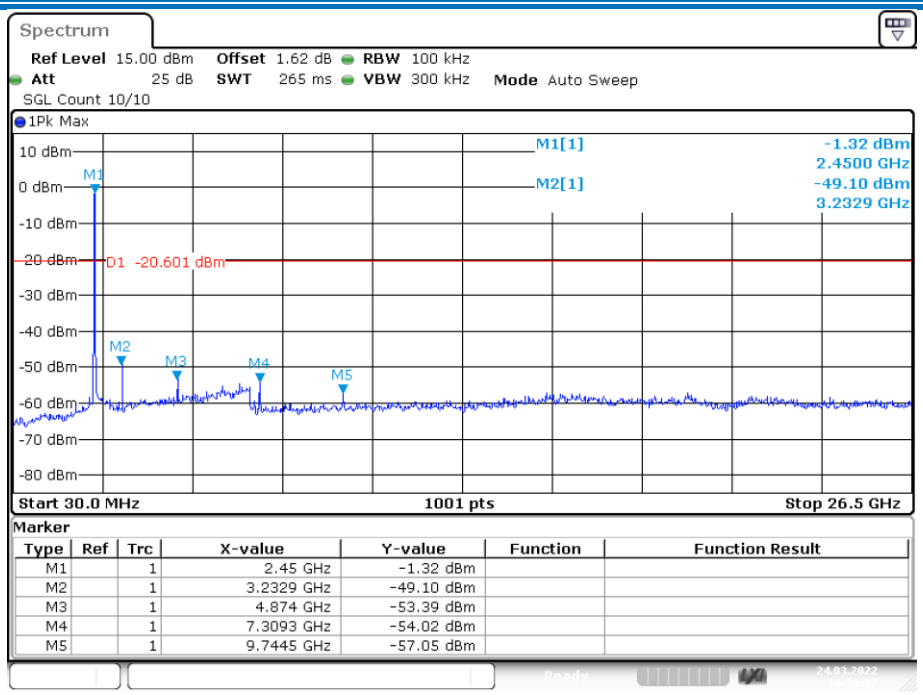
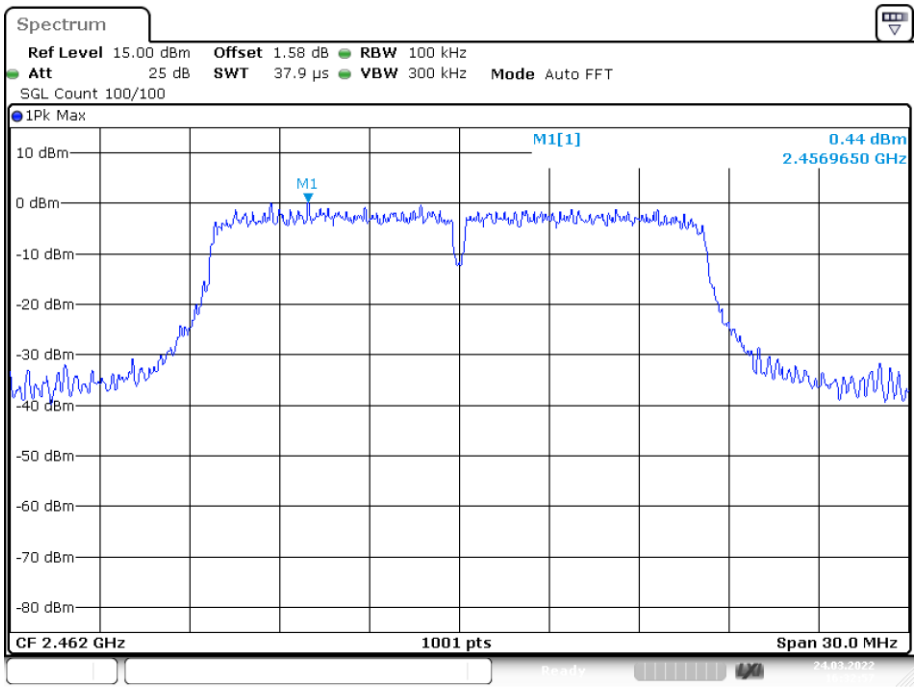
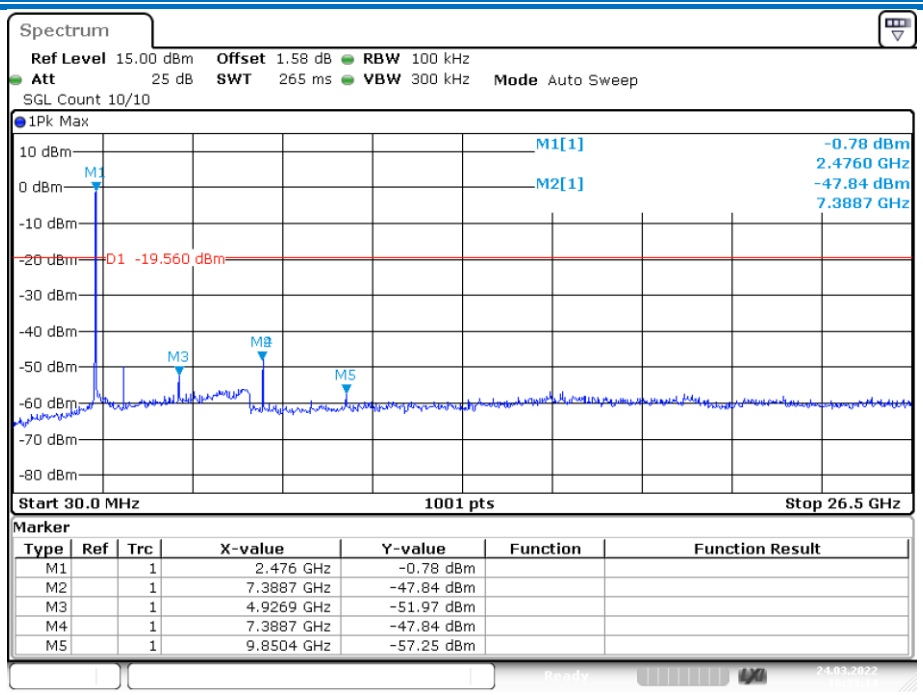


Tx. Spurious NVNT g 2437MHz Ant1 Emission



Tx. Spurious NVNT g 2462MHz Ant1 Ref



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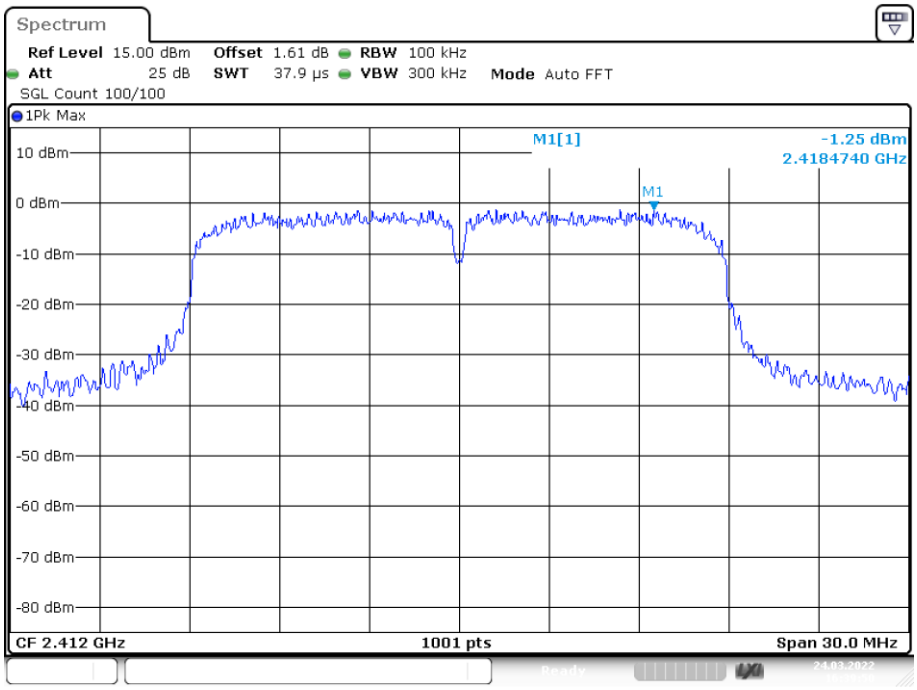

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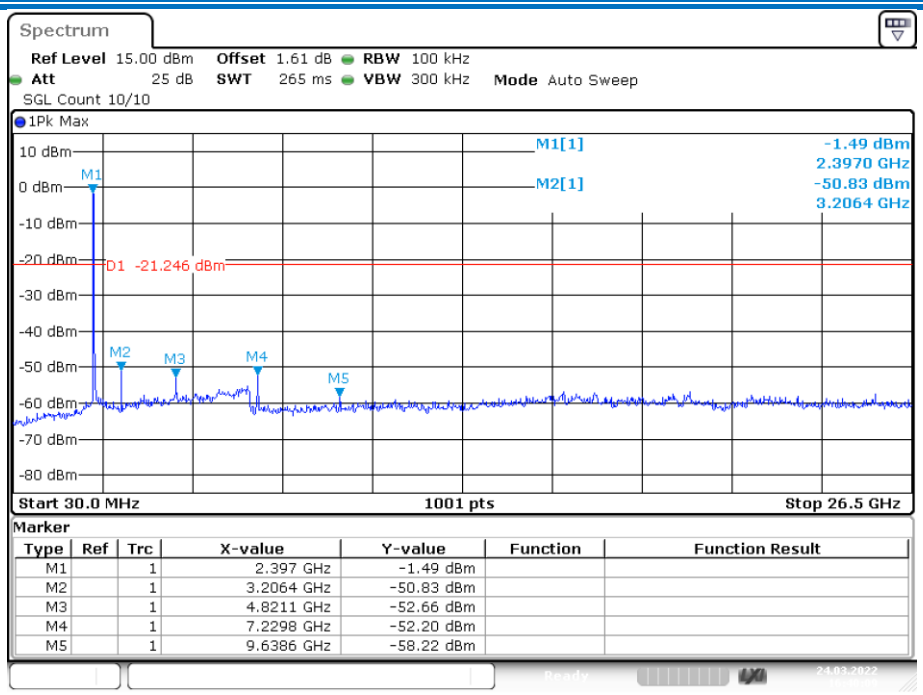
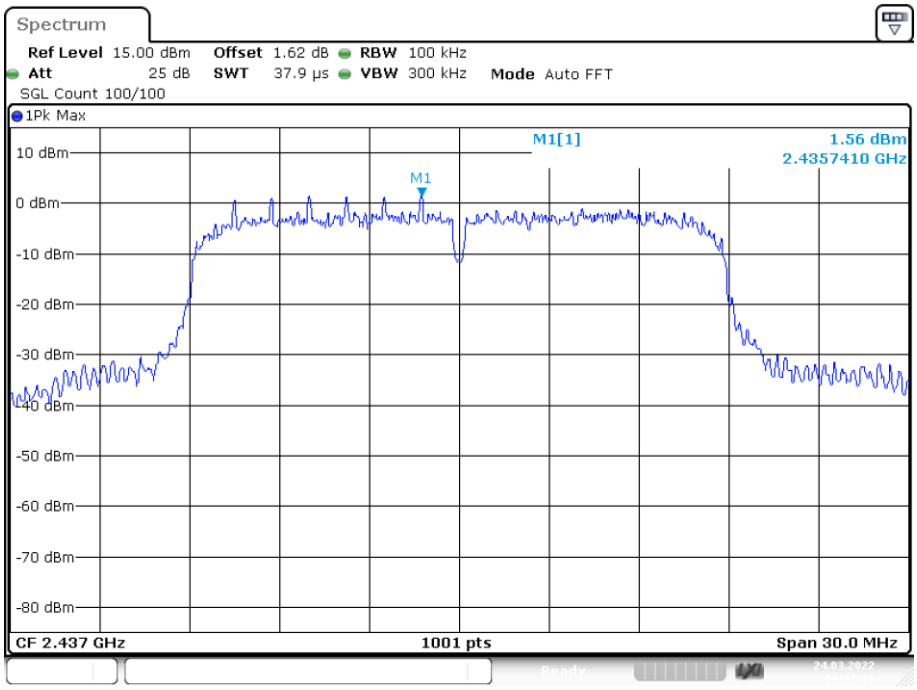


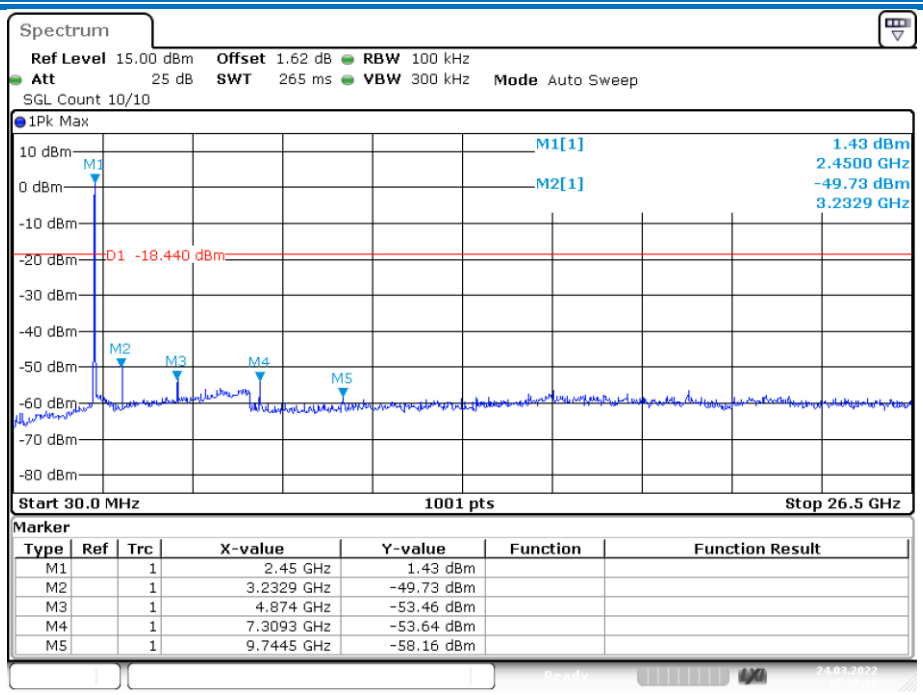
Date: 24.MAR.2022 16:40:08

Tx. Spurious NVNT n20 2412MHz Ant1 Emission

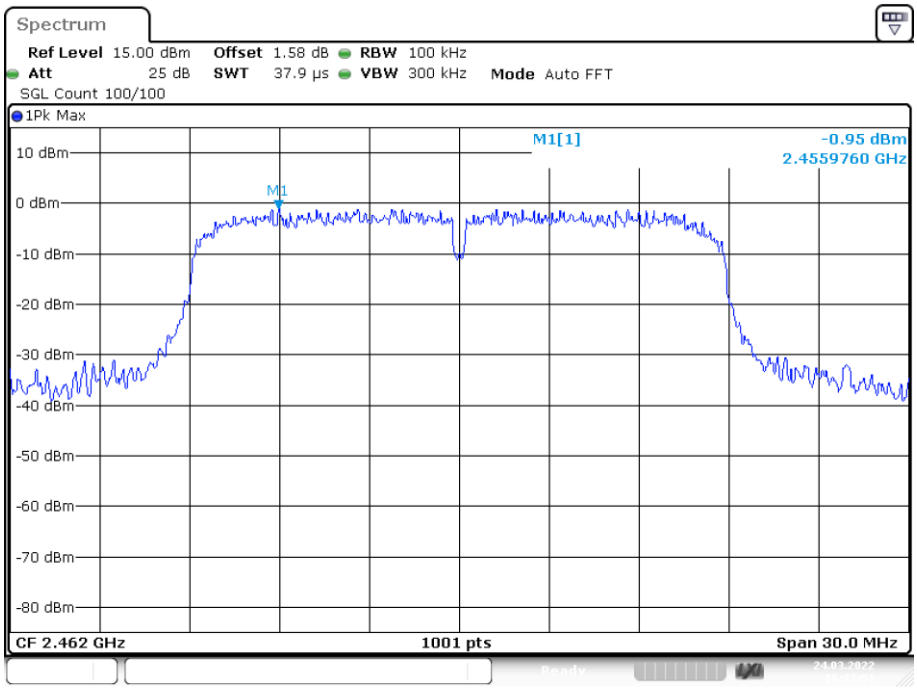


Date: 24.MAR.2022 16:37:13

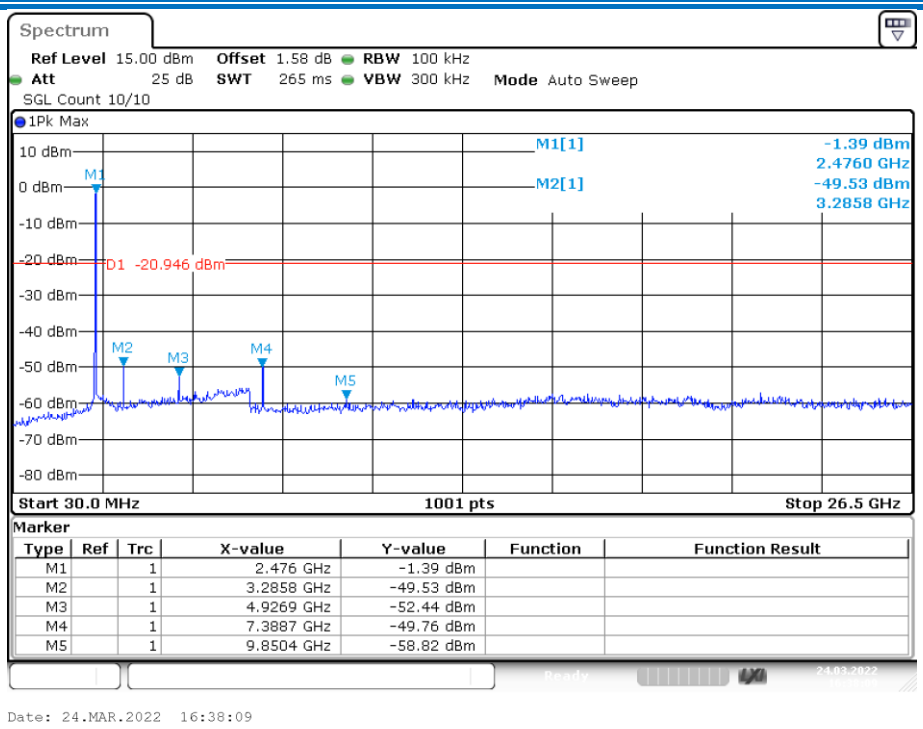
Tx. Spurious NVNT n20 2437MHz Ant1 Ref



Tx. Spurious NVNT n20 2437MHz Ant1 Emission



Tx. Spurious NVNT n20 2462MHz Ant1 Ref



Tx. Spurious NVNT n20 2462MHz Ant1 Emission

Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

5.8 Radiated Spurious Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10 2013</td></tr>
<tr><td>Test Site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30kHz</td><td>Peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30kHz</td><td>Average</td></tr>
<tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100 kHz</td><td>300kHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Field strength (microvolt/meter)</th><th>Limit (dBuV/m)</th><th>Remark</th><th>Measurement distance (m)</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr>
</table>
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.
</td></tr>
</table>

Test Setup:	

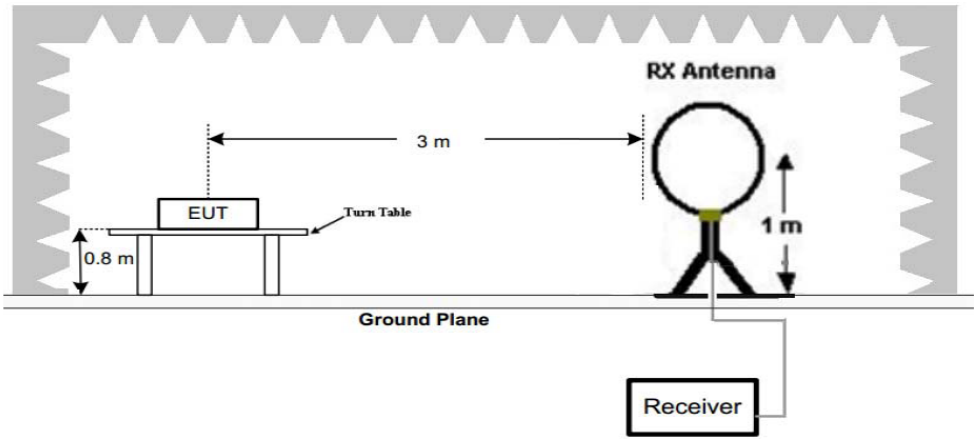


Figure 1. Below 30MHz

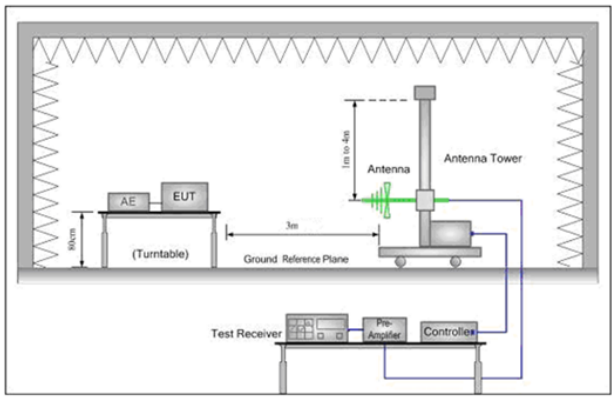


Figure 2. 30MHz to 1GHz

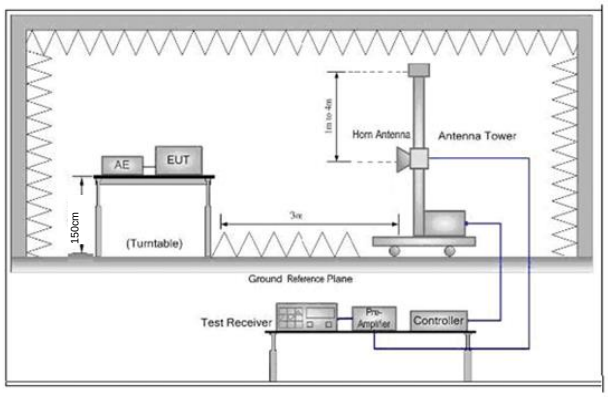


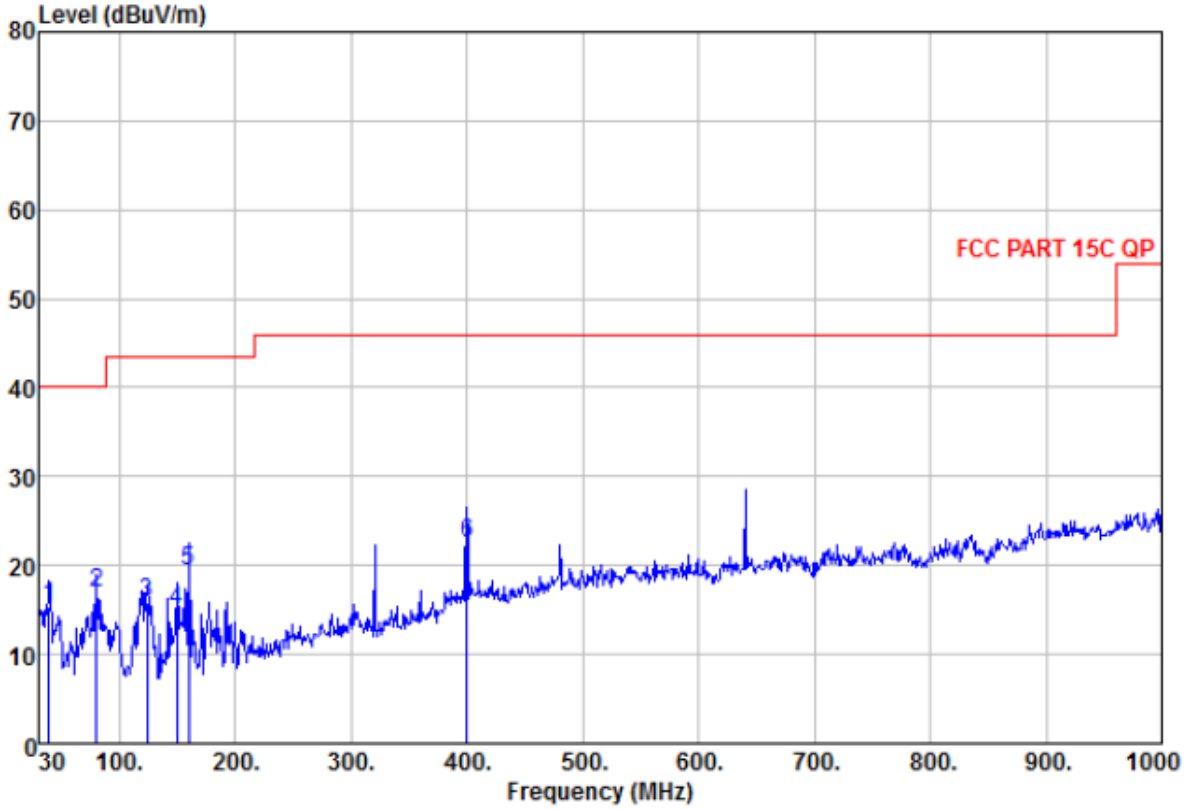
Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel ,the middle channel ,the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test voltage	AC 120V/60Hz
Test Results:	Pass

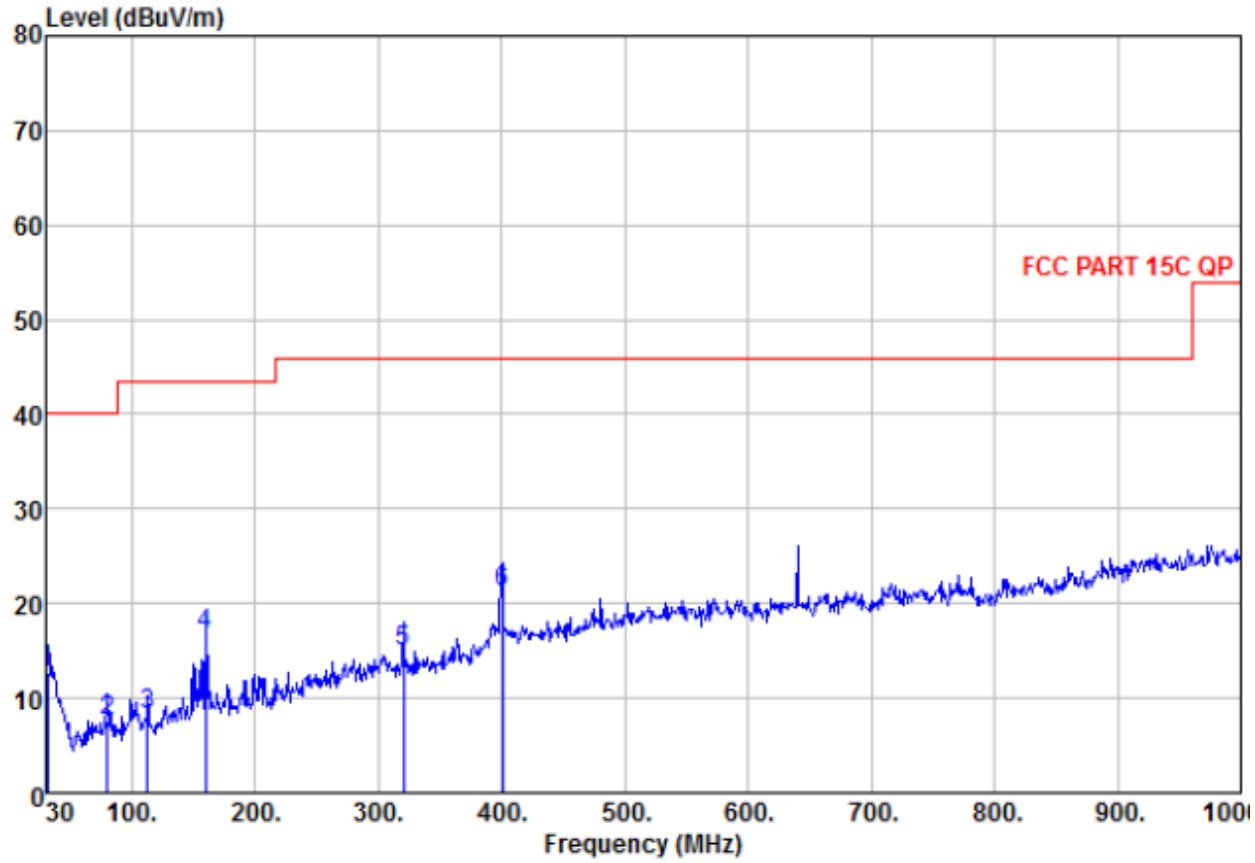
5.8.1 Radiated emission below 1GHz

30MHz~1GHz		
Test mode:	Transmitting	Vertical



No.	Freq	Reading	Antenna Factor	Cable Loss	Measured	Limit Line	Preamp Factor	Over limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	dB	
1	38.73	35.13	12.57	0.13	15.30	40.00	32.53	-24.70	QP
2	80.44	41.39	7.81	0.17	16.97	40.00	32.40	-23.03	QP
3	124.09	39.05	8.77	0.22	15.89	43.50	32.15	-27.61	QP
4	149.31	36.73	10.16	0.25	15.04	43.50	32.10	-28.46	QP
5	159.98	40.67	10.60	0.26	19.45	43.50	32.08	-24.05	QP
6	399.57	34.81	18.26	0.44	22.51	46.00	31.00	-23.49	QP

Test mode:	Transmitting	Horizontal



No.	Freq	Reading	Antenna Factor	Cable Loss	Measured	Limit Line	Preamp Factor	Over limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	dB	
1	30.97	28.22	16.69	0.12	12.62	40.00	32.41	-27.38	QP
2	80.44	31.99	7.81	0.17	7.57	40.00	32.40	-32.43	QP
3	112.45	31.93	8.32	0.21	8.28	43.50	32.18	-35.22	QP
4	159.98	37.86	10.60	0.26	16.64	43.50	32.08	-26.86	QP
5	320.03	31.58	14.04	0.40	15.02	46.00	31.00	-30.98	QP
6	400.54	33.56	18.28	0.44	21.28	46.00	31.00	-24.72	QP

Note: Measured [dB μ V/m] = Reading [dB μ V] + Factor [dB/m]
Factor = Antenna Factor + Cable Loss - Preamp Factor
Over limit [dB] = Measured [dB μ V/m] - limit [dB μ V/m]

5.8.2 Transmitter emission(1GHz-26GHz)

Test mode:	802.11b(1Mbps)	Test channel:	Lowest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4824.000	51.86	-5.18	46.68	74	-27.32	peak	H
4824.000	36.63	-5.18	31.45	54	-22.55	AVG	H
7236.000	52.19	-6.45	45.74	74	-28.26	peak	H
7236.000	37.75	-6.45	31.30	54	-22.70	AVG	H
4824.000	53.57	-5.18	48.39	74	-25.61	peak	V
4824.000	38.53	-5.18	33.35	54	-20.65	AVG	V
7236.000	55.68	-6.45	49.23	74	-24.77	peak	V
7236.000	40.30	-6.45	33.85	54	-20.15	AVG	V

Test mode:	802.11b(1Mbps)	Test channel:	Middle

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4874.000	48.72	-5.19	43.53	74	-30.47	peak	H
4874.000	36.76	-5.19	31.57	54	-22.43	AVG	H
7311.000	48.38	-6.47	41.91	74	-32.09	peak	H
7311.000	36.95	-6.47	30.48	54	-23.52	AVG	H
4874.000	49.35	-5.19	44.16	74	-29.84	peak	V
4874.000	37.17	-5.19	31.98	54	-22.02	AVG	V
7311.000	49.10	-6.47	42.63	74	-31.37	peak	V
7311.000	35.36	-6.47	28.89	54	-25.11	AVG	V

Test mode:	802.11b(1Mbps)	Test channel:	Highest

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
4924.000	50.58	-5.2	45.38	74	-28.62	peak	H
4924.000	38.33	-5.2	33.13	54	-20.87	AVG	H
7386.000	49.93	-6.47	43.46	74	-30.54	peak	H
7386.000	37.70	-6.47	31.23	54	-22.77	AVG	H
4924.000	49.41	-5.2	44.21	74	-29.79	peak	V
4924.000	38.46	-5.2	33.26	54	-20.74	AVG	V
7386.000	50.38	-6.47	43.91	74	-30.09	peak	V
7386.000	37.42	-6.47	30.95	54	-23.05	AVG	V

Remark:

1) The 1Mbps of rate of 802.11b is the worst case.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

5.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:

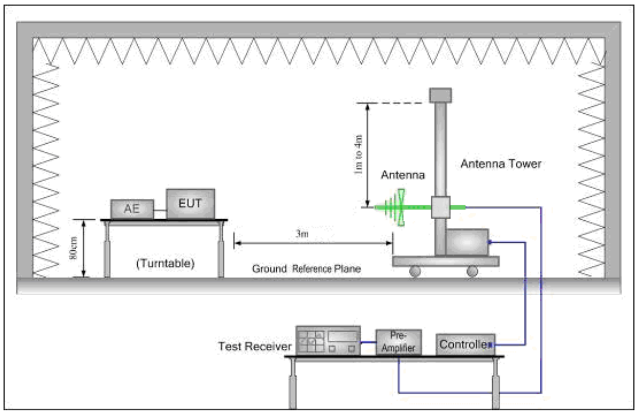


Figure 1. 30MHz to 1GHz

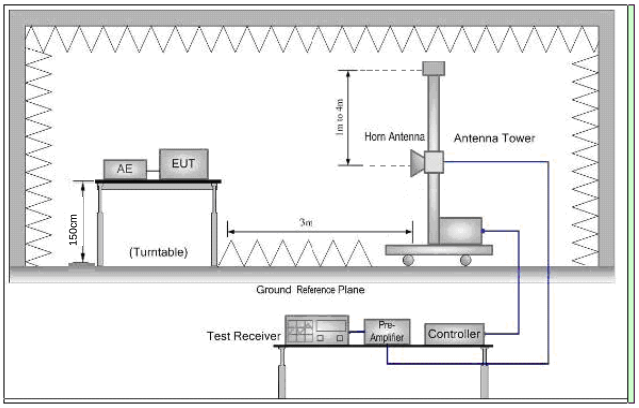


Figure 2. Above 1 GHz

Test Procedure:

a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the

	measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel g. Test the EUT in the lowest channel , the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode, found the Transmitting mode which it is worse case Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test voltage	AC 120V/60Hz
Test Results:	Pass

Test data:

Worse case mode:		802.11b(1Mbps)		Test channel:		Lowest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390.000	48.46	-4.36	44.10	74	-29.90	peak	H
2390.000	35.05	-4.36	30.69	54	-23.31	AVG	H
2400.000	53.73	-4.36	49.37	74	-24.63	peak	H
2400.000	40.38	-4.36	36.02	54	-17.98	AVG	H
2390.000	48.76	-4.36	44.40	74	-29.60	peak	V
2390.000	35.15	-4.36	30.79	54	-23.21	AVG	V
2400.000	53.77	-4.36	49.41	74	-24.59	peak	V
2400.000	40.28	-4.36	35.92	54	-18.08	AVG	V

Worse case mode:		802.11b(1Mbps)		Test channel:		Highest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2483.500	52.29	-4.22	48.07	74	-25.93	peak	H
2483.500	35.80	-4.22	31.58	54	-22.42	AVG	H
2483.500	50.90	-4.22	46.68	74	-27.32	peak	V
2483.500	36.92	-4.22	32.70	54	-21.30	AVG	V

Worse case mode:		802.11g(6Mbps)		Test channel:		Lowest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390.000	48.51	-4.36	44.15	74	-29.85	peak	H
2390.000	35.94	-4.36	31.58	54	-22.42	AVG	H
2400.000	54.96	-4.36	50.60	74	-23.40	peak	H
2400.000	41.36	-4.36	37.00	54	-17.00	AVG	H
2390.000	49.50	-4.36	45.14	74	-28.86	peak	V
2390.000	35.09	-4.36	30.73	54	-23.27	AVG	V
2400.000	52.07	-4.36	47.71	74	-26.29	peak	V
2400.000	41.77	-4.36	37.41	54	-16.59	AVG	V

Worse case mode:		802.11g(6Mbps)		Test channel:		Highest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2483.500	52.52	-4.22	48.30	74	-25.70	peak	H
2483.500	36.91	-4.22	32.69	54	-21.31	AVG	H
2483.500	51.93	-4.22	47.71	74	-26.29	peak	V
2483.500	38.36	-4.22	34.14	54	-19.86	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Lowest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2390.000	48.47	-4.36	44.11	74	-29.89	peak	H
2390.000	35.39	-4.36	31.03	54	-22.97	AVG	H
2400.000	53.05	-4.36	48.69	74	-25.31	peak	H
2400.000	40.79	-4.36	36.43	54	-17.57	AVG	H
2390.000	49.57	-4.36	45.21	74	-28.79	peak	V
2390.000	35.22	-4.36	30.86	54	-23.14	AVG	V
2400.000	53.74	-4.36	49.38	74	-24.62	peak	V
2400.000	40.10	-4.36	35.74	54	-18.26	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		Highest	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
2483.500	51.67	-4.22	47.45	74	-26.55	peak	H
2483.500	35.96	-4.22	31.74	54	-22.26	AVG	H
2483.500	51.12	-4.22	46.90	74	-27.10	peak	V
2483.500	37.10	-4.22	32.88	54	-21.12	AVG	V

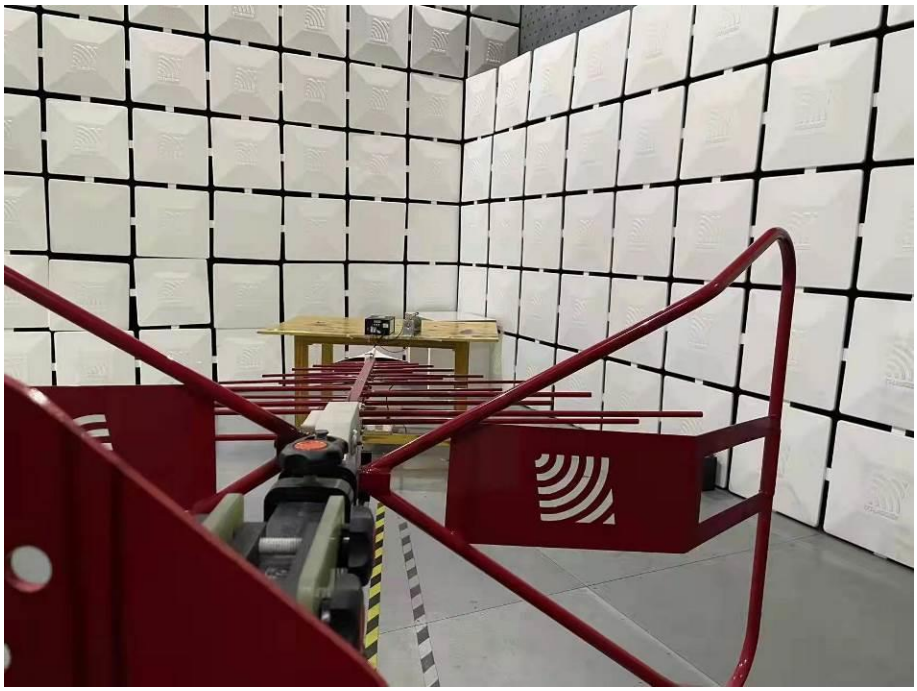
Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

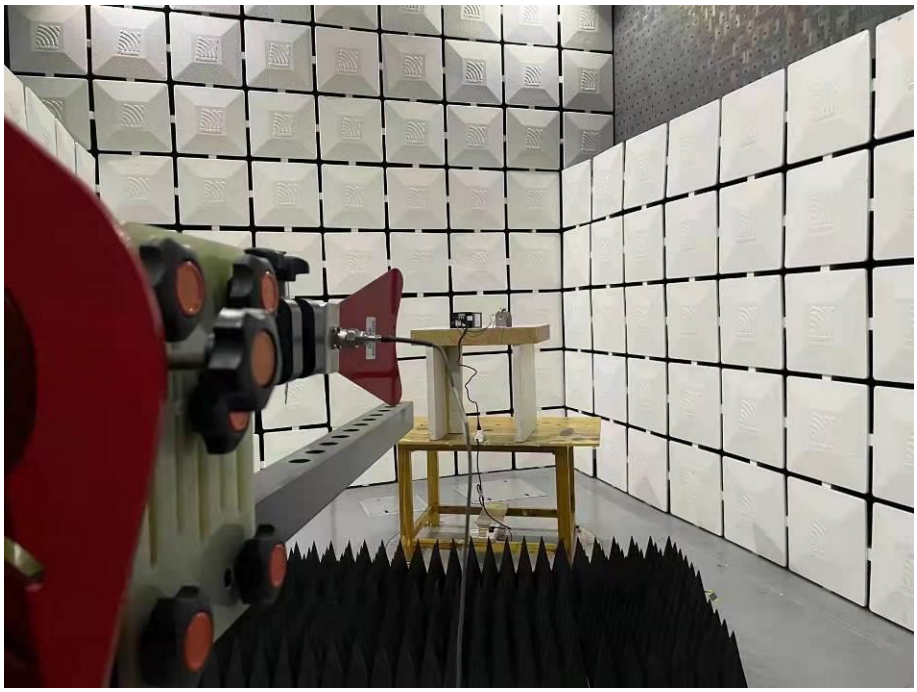
6 Photographs - EUT Test Setup

Test model No.: HOSL05D

6.1 Radiated Spurious Emission

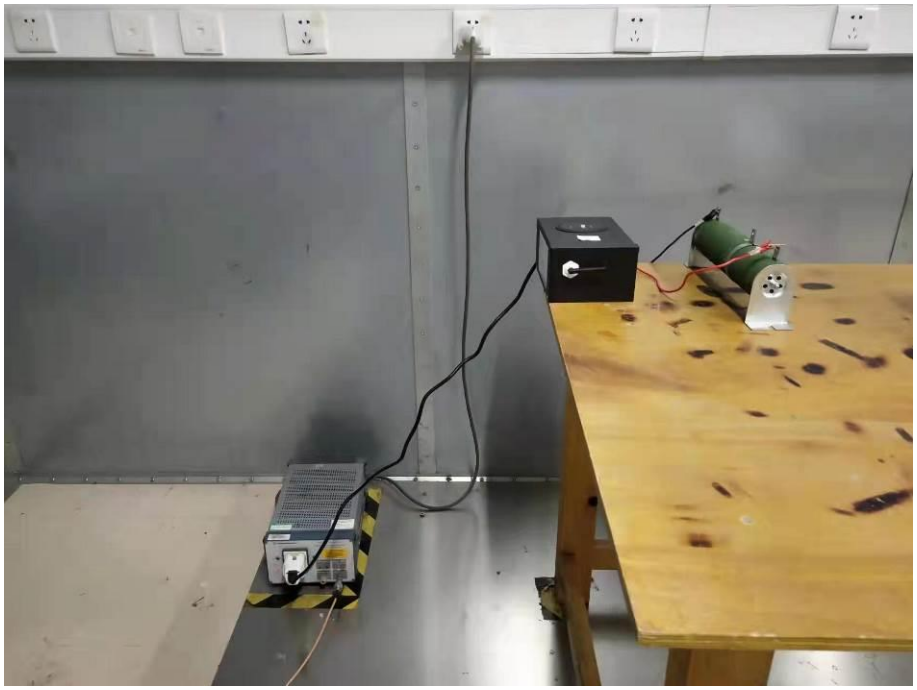


Below 1GHz: The EUT is placed in the 0.8 m high test table



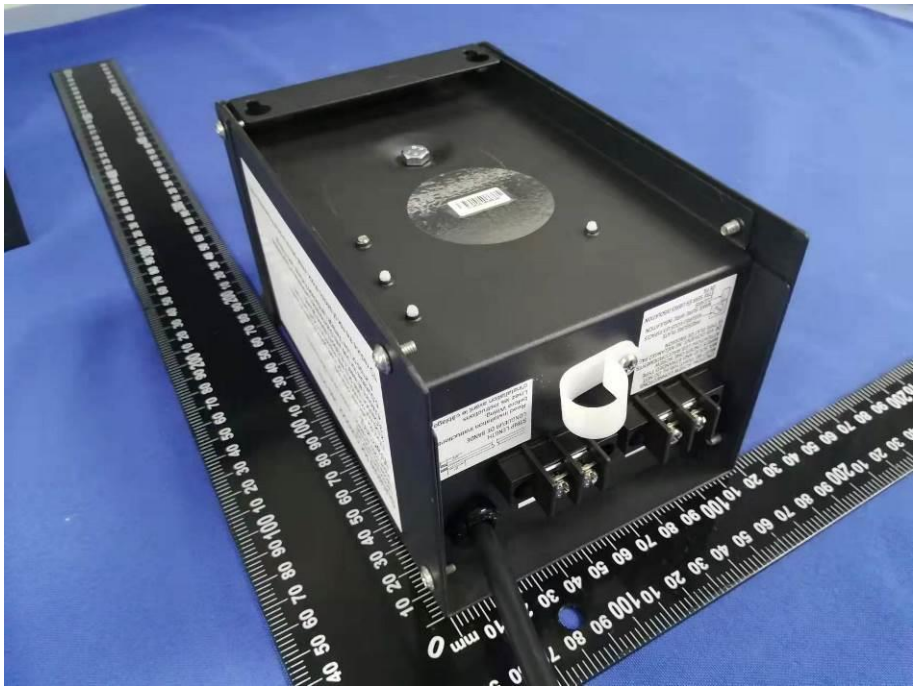
Above 1GHz: Test Height is 1.5m, the styrofoam block placed in the 0.8 m high test table

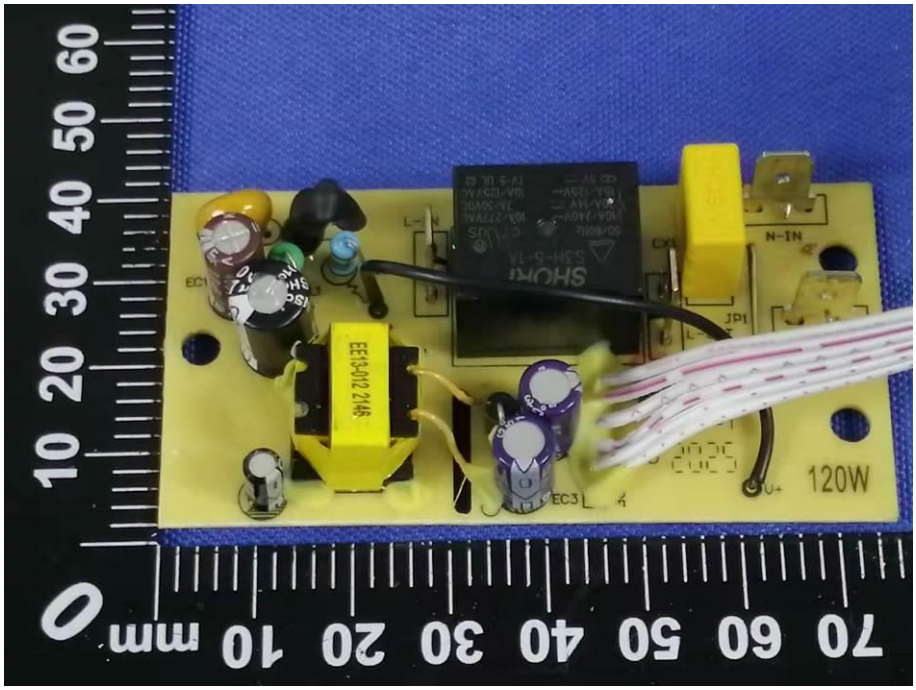
6.2 Conducted Emission

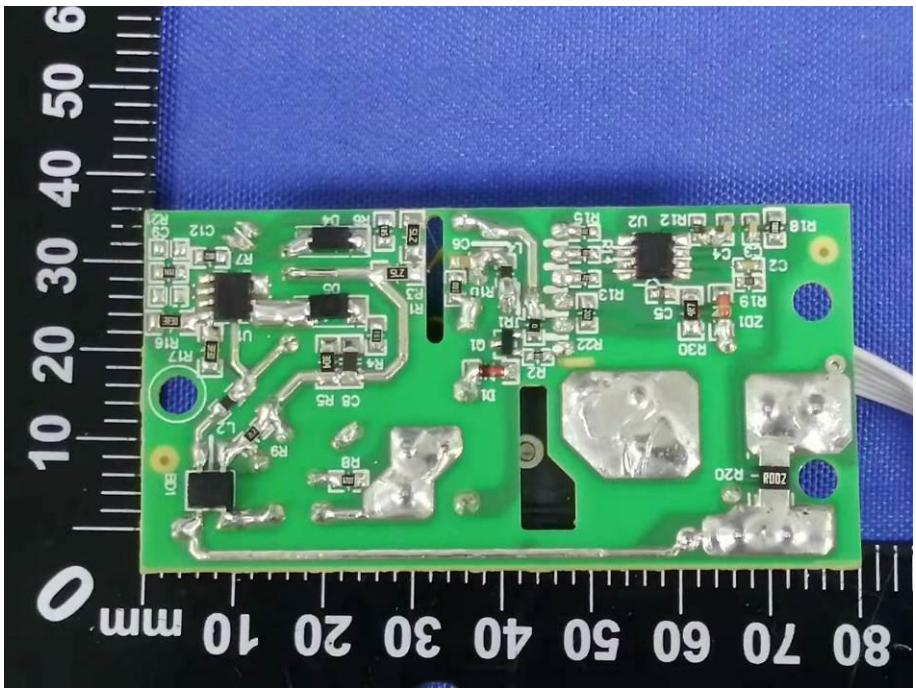


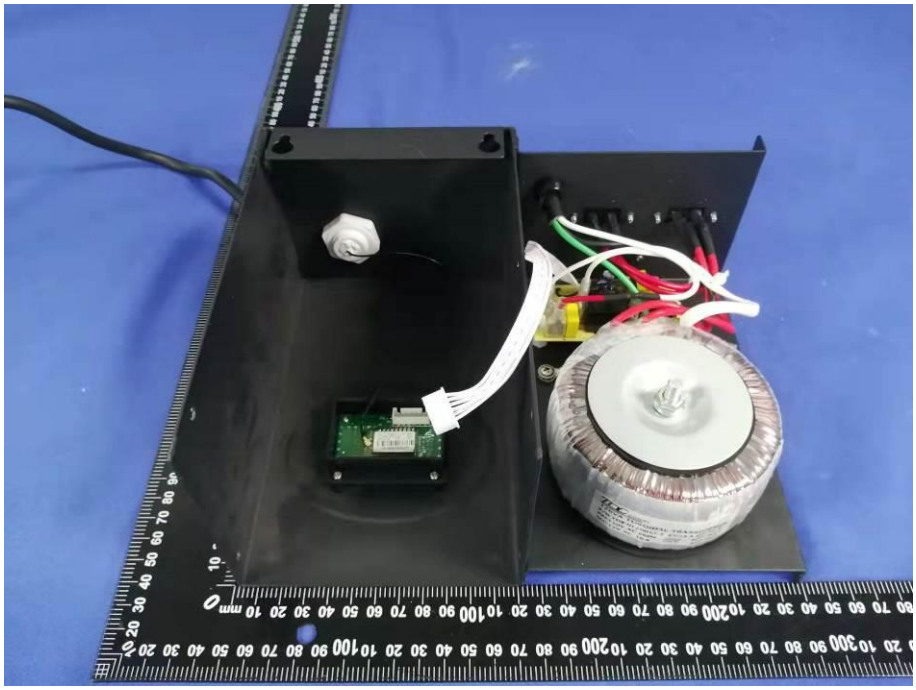
7 Photographs - EUT Constructional Details

HOSL03B

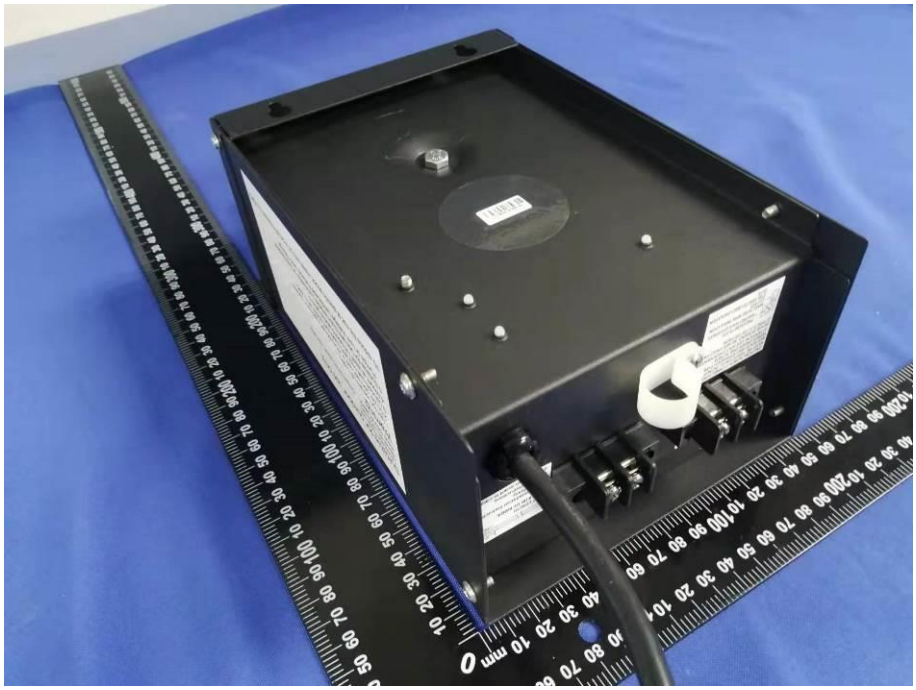


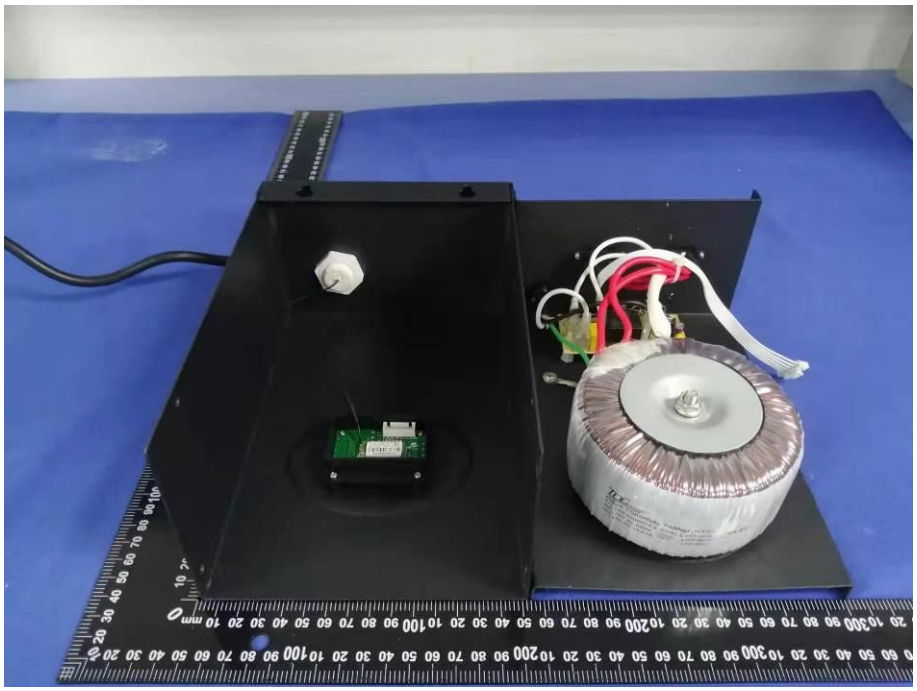

SHOKI
120W
N-IN
mm

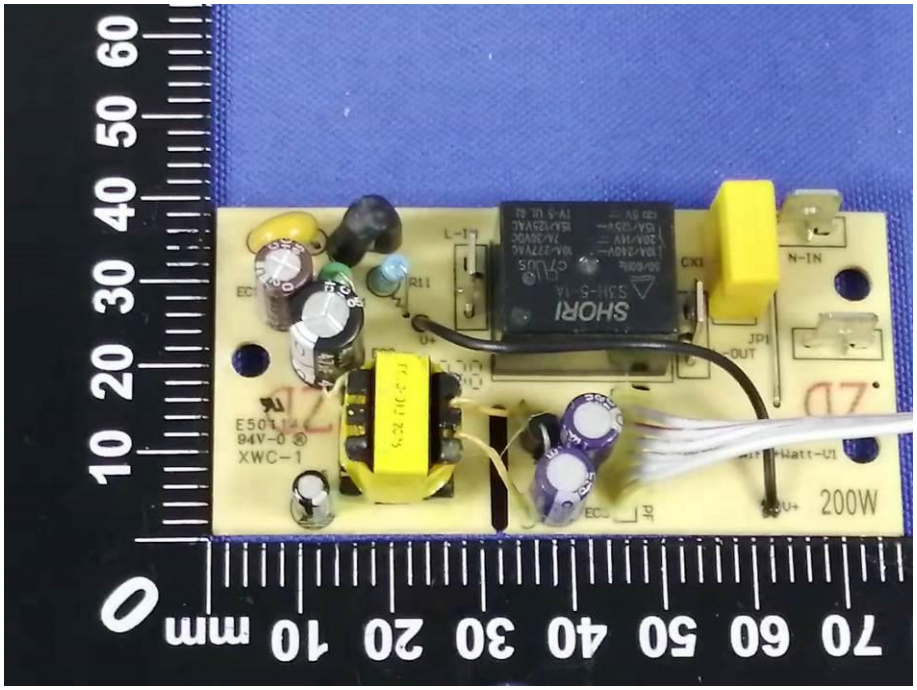

mm

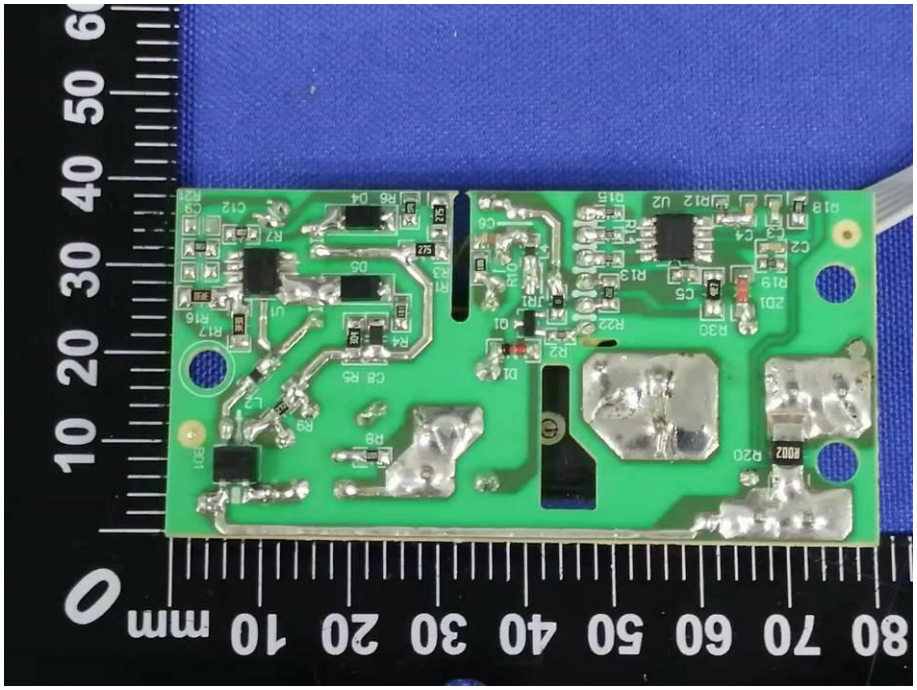


HOSL04C

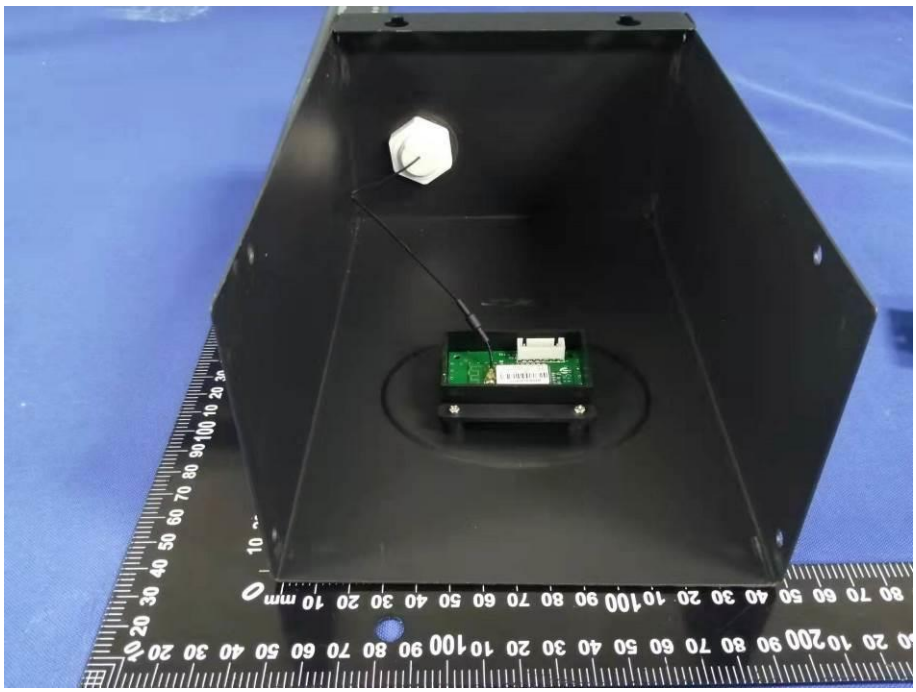




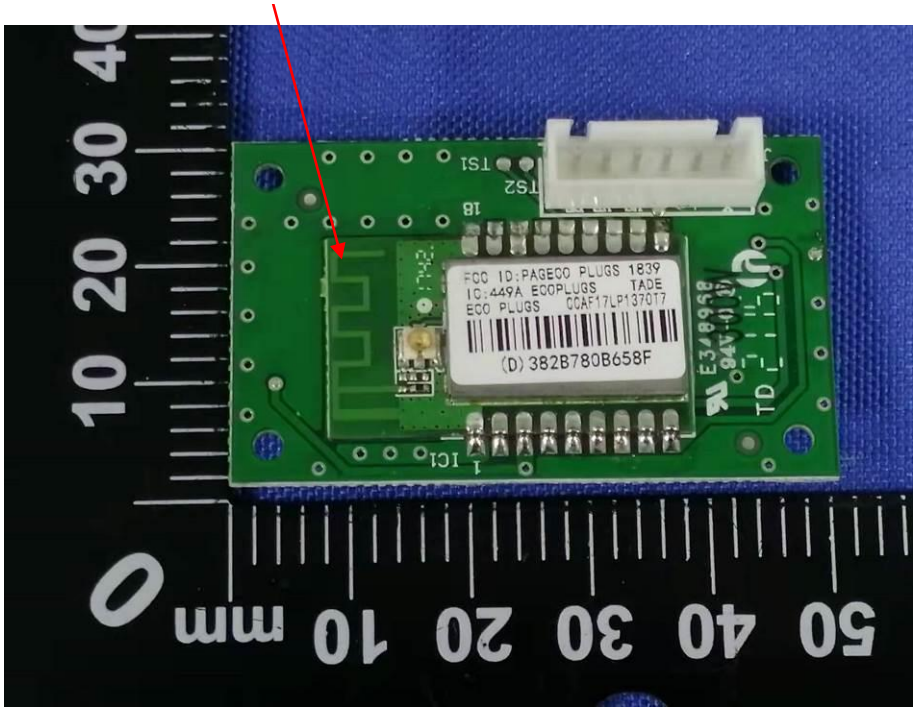

SHORI
94V-0
XWC-1
200W

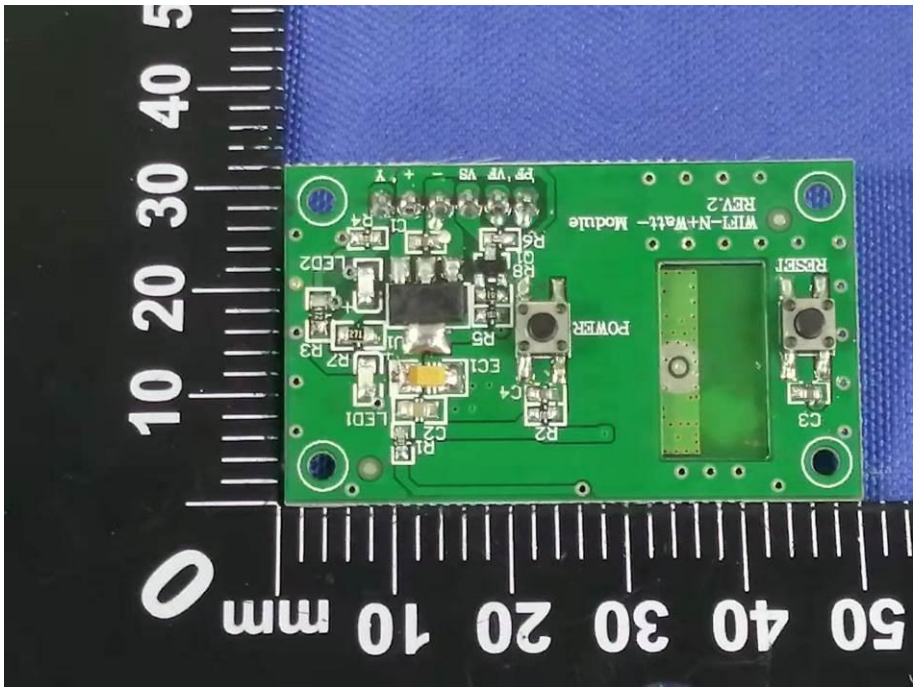


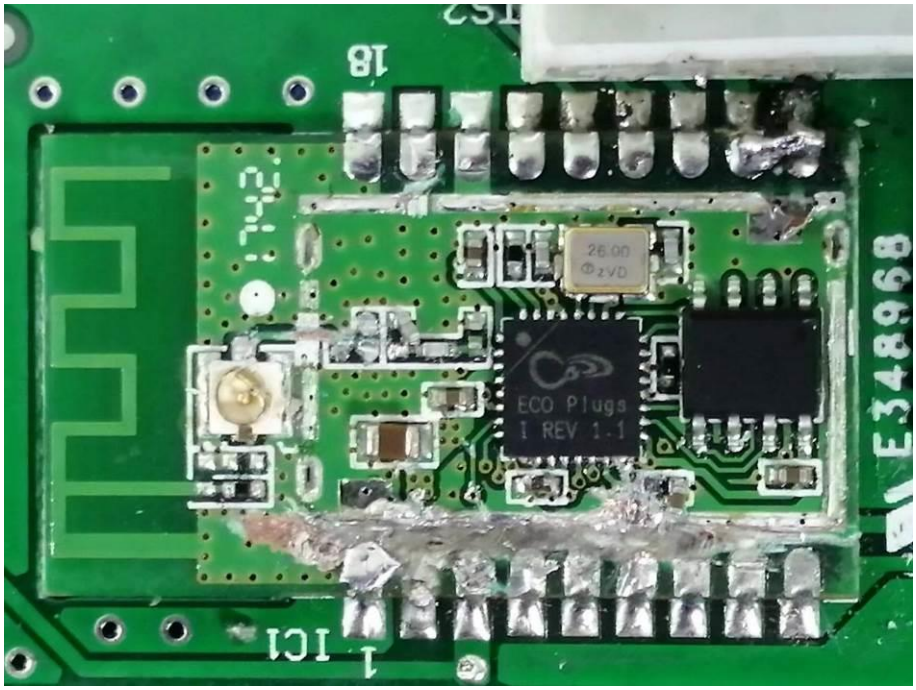
HOSL05D

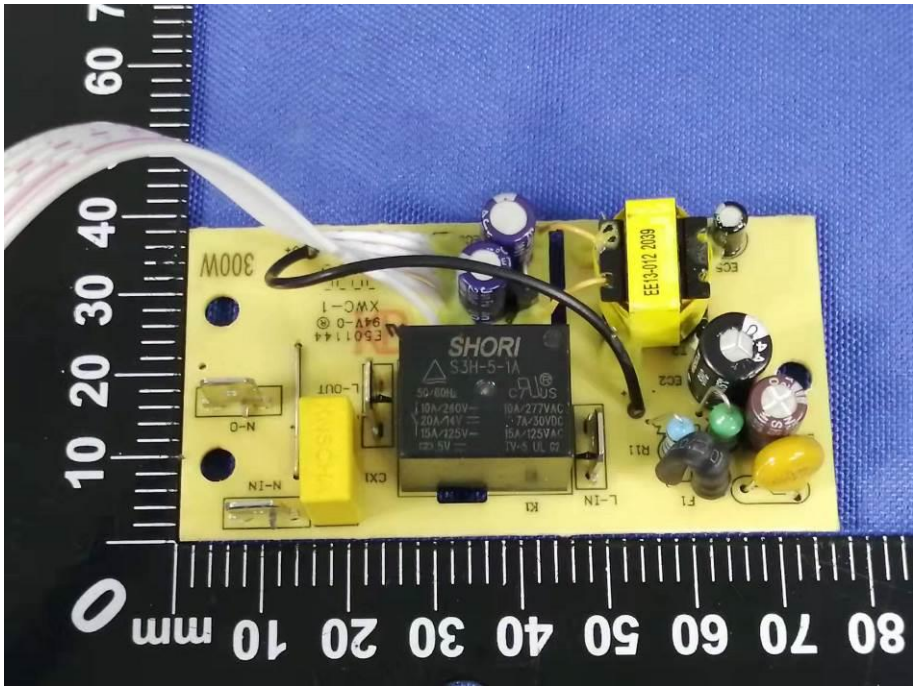


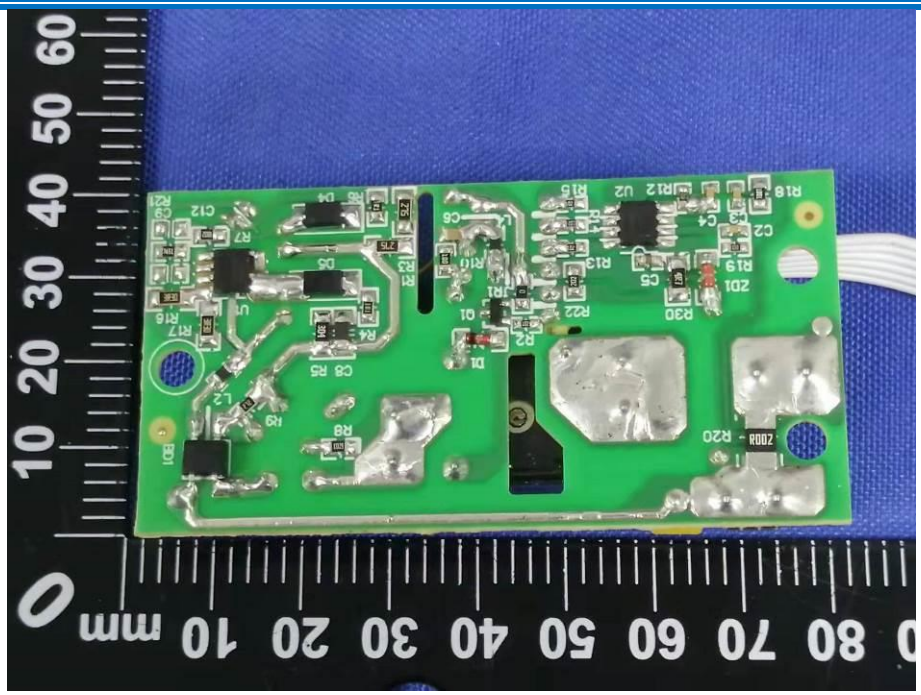
Unusable antenna






ECO Plugs
I REV 1.1
E348968


SHORI
S3H-5-1A
300W



END OF THE REPORT