Appendix F): Antenna Requirement

15.203 requirement:

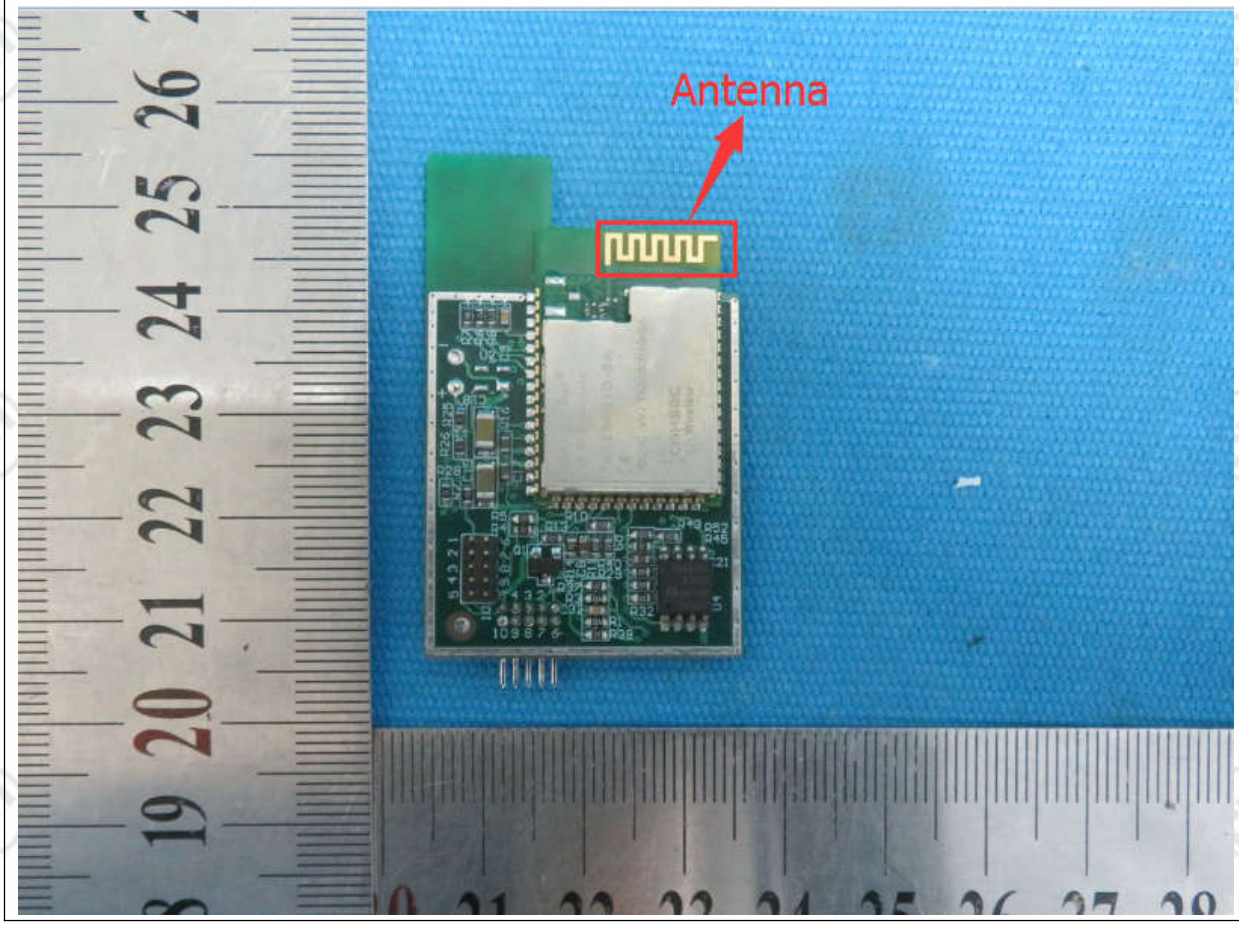
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1dBi.



Appendix G): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. 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.
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 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

Above 1GHz test procedure as below:

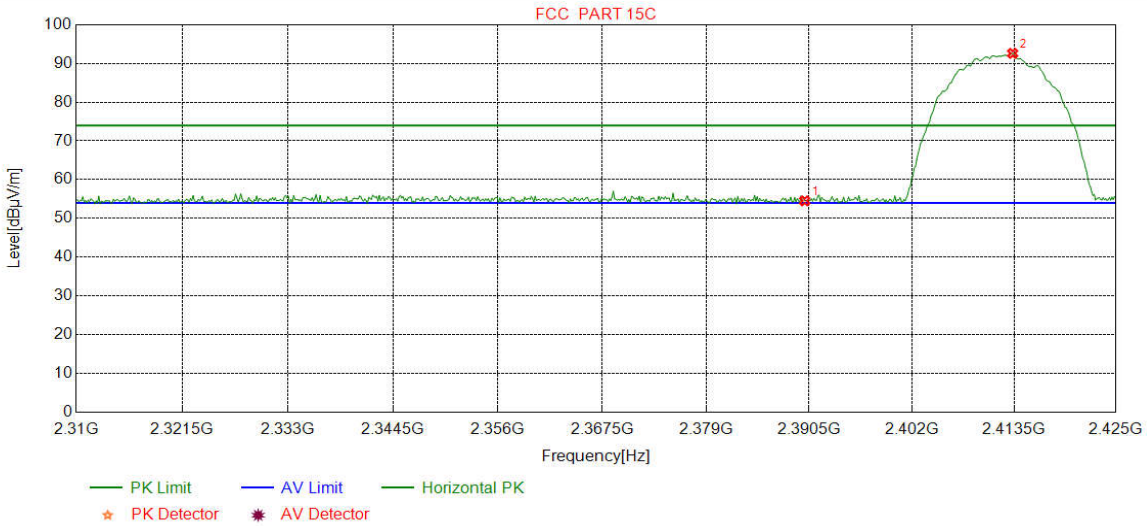
g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Limit (dBμV/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

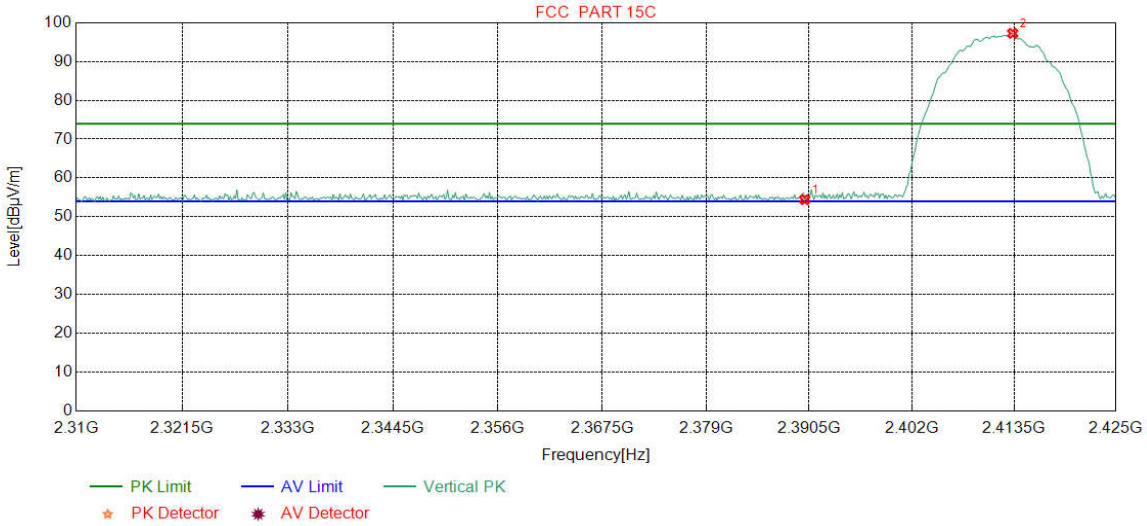
Test plot as follows:

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	Peak		



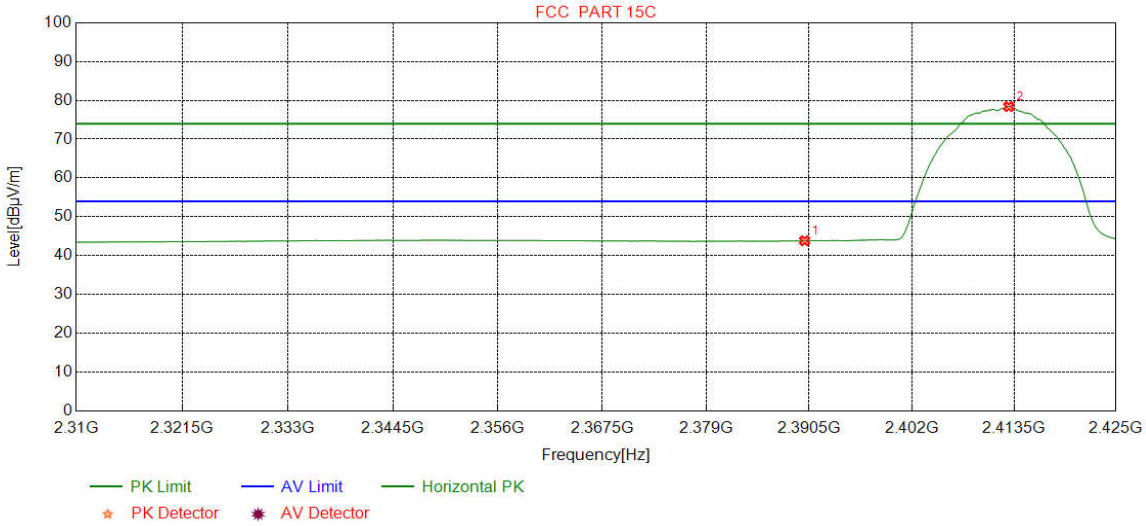
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	51.33	54.51	74.00	19.49	Pass	Horizontal
2	2413.3417	32.28	13.36	-42.43	89.41	92.62	74.00	-18.62	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	Peak		



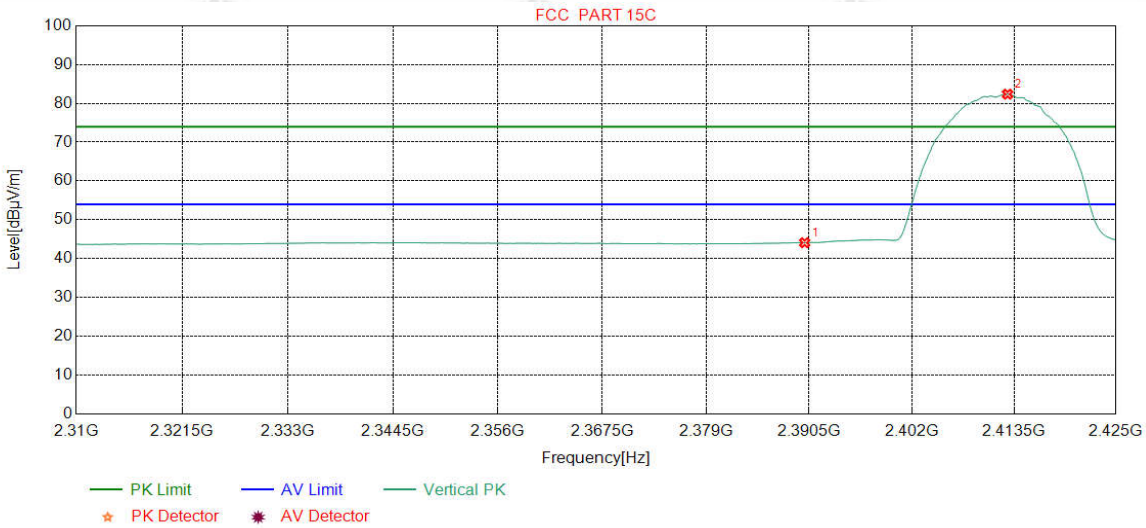
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	51.22	54.40	74.00	19.60	Pass	Vertical
2	2413.3417	32.28	13.36	-42.43	94.07	97.28	74.00	-23.28	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	Average		



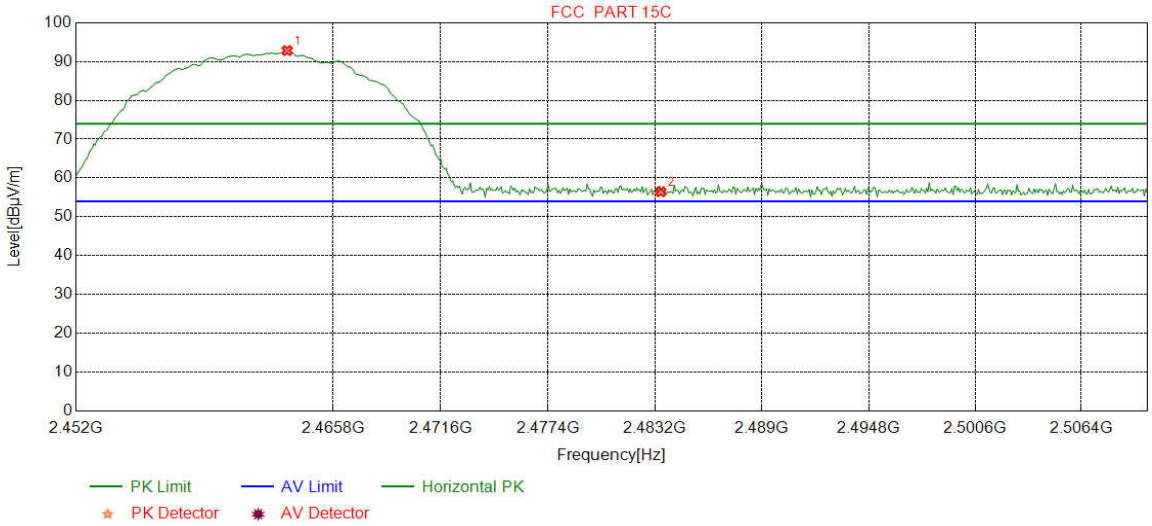
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.63	43.81	54.00	10.19	Pass	Horizontal
2	2412.9099	32.28	13.36	-42.43	75.19	78.40	54.00	-24.40	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	Average		



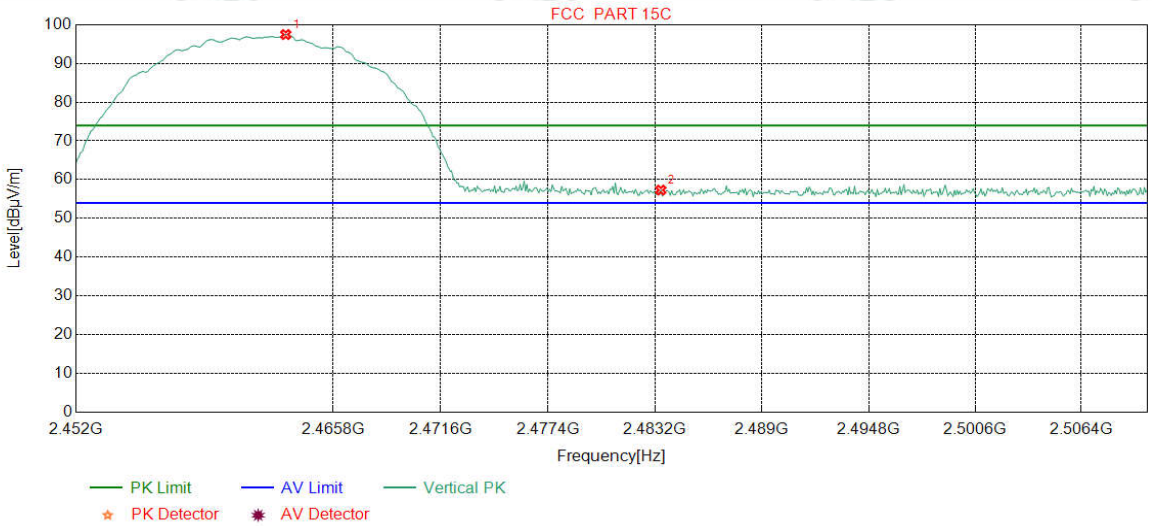
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.89	44.07	54.00	9.93	Pass	Vertical
2	2412.7660	32.28	13.36	-42.43	79.17	82.38	54.00	-28.38	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	Peak		



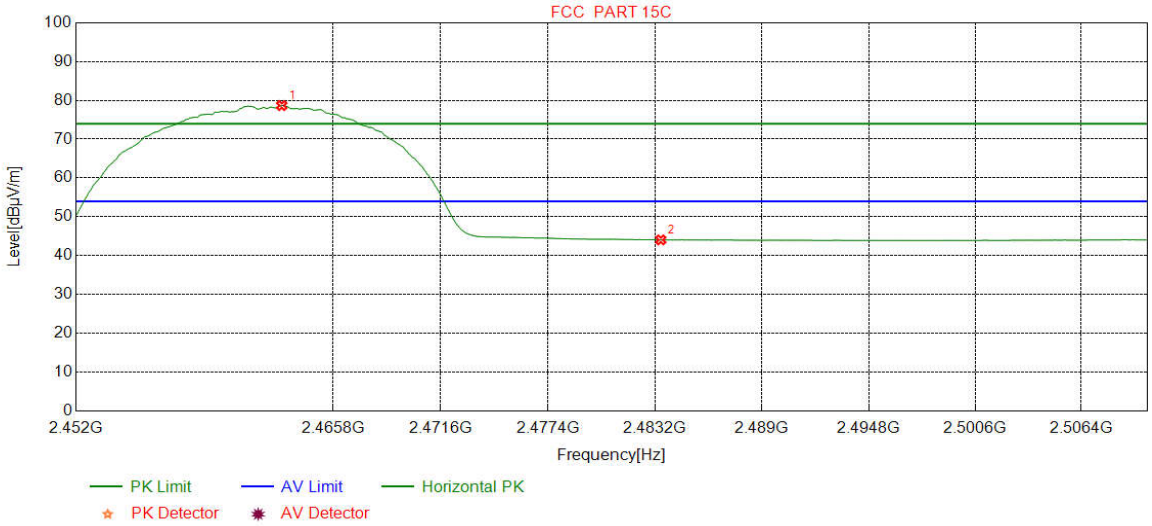
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.3242	32.35	13.47	-42.41	89.43	92.84	74.00	-18.84	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	53.07	56.43	74.00	17.57	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	Peak		



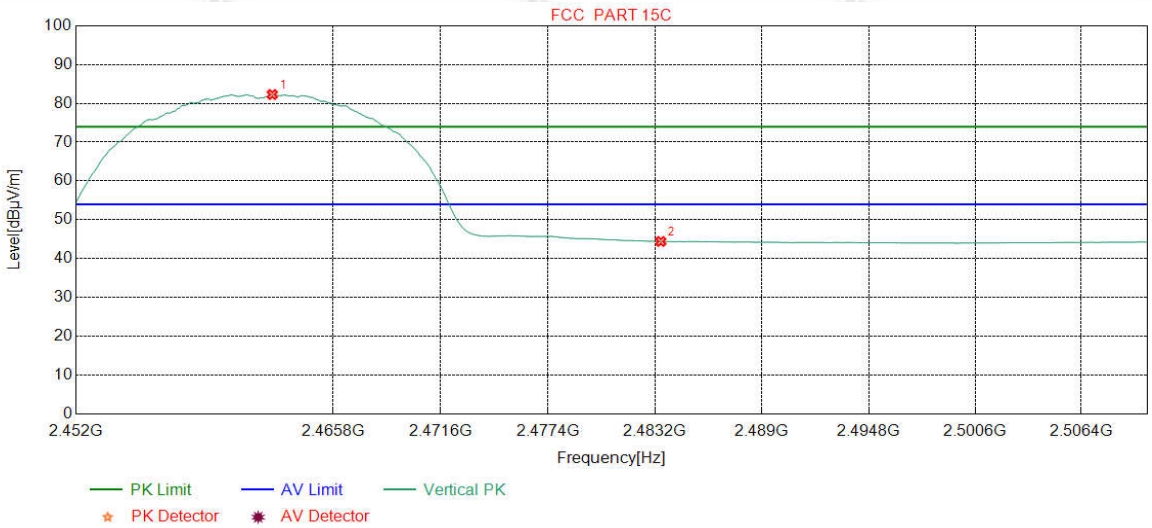
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.2516	32.35	13.47	-42.41	94.07	97.48	74.00	-23.48	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	53.94	57.30	74.00	16.70	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	Average		



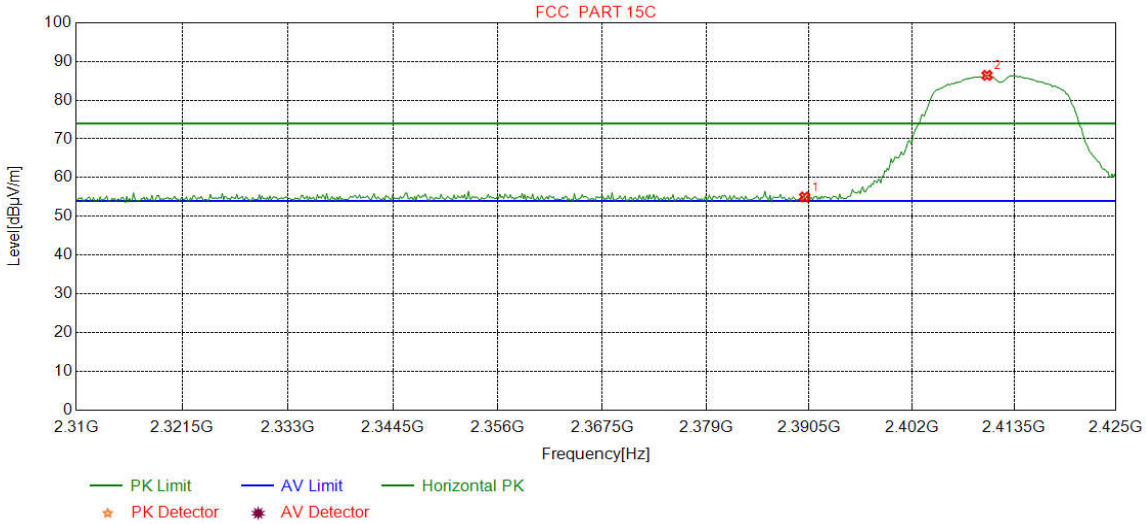
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.0338	32.35	13.47	-42.41	75.27	78.68	54.00	-24.68	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	40.67	44.03	54.00	9.97	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	Average		



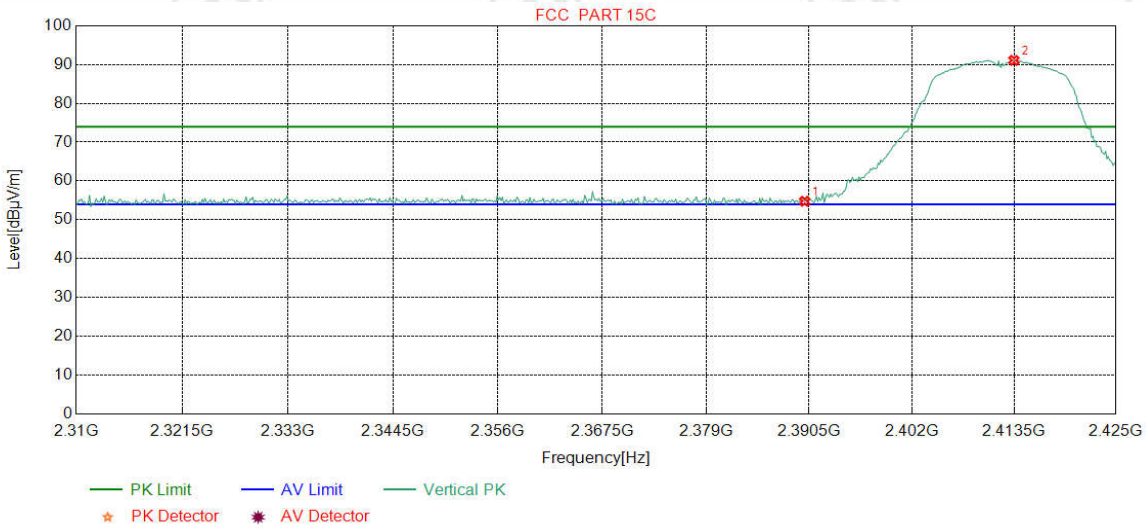
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2462.5257	32.35	13.47	-42.41	78.88	82.29	54.00	-28.29	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	41.04	44.40	54.00	9.60	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2412
Remark:	Peak		



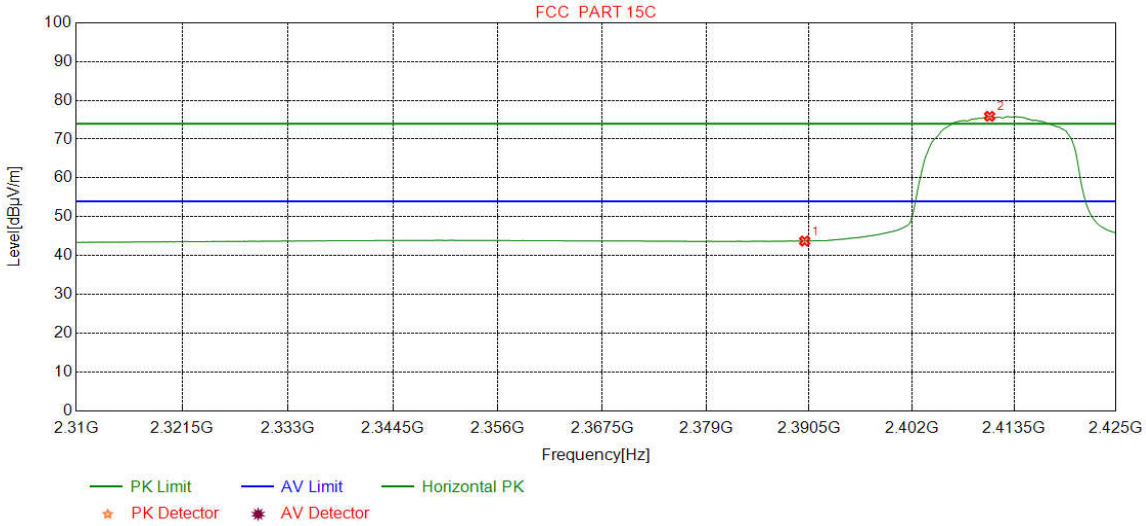
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	51.82	55.00	74.00	19.00	Pass	Horizontal
2	2410.4631	32.27	13.35	-42.43	83.22	86.41	74.00	-12.41	Pass	Horizontal

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2412
Remark:	Peak		



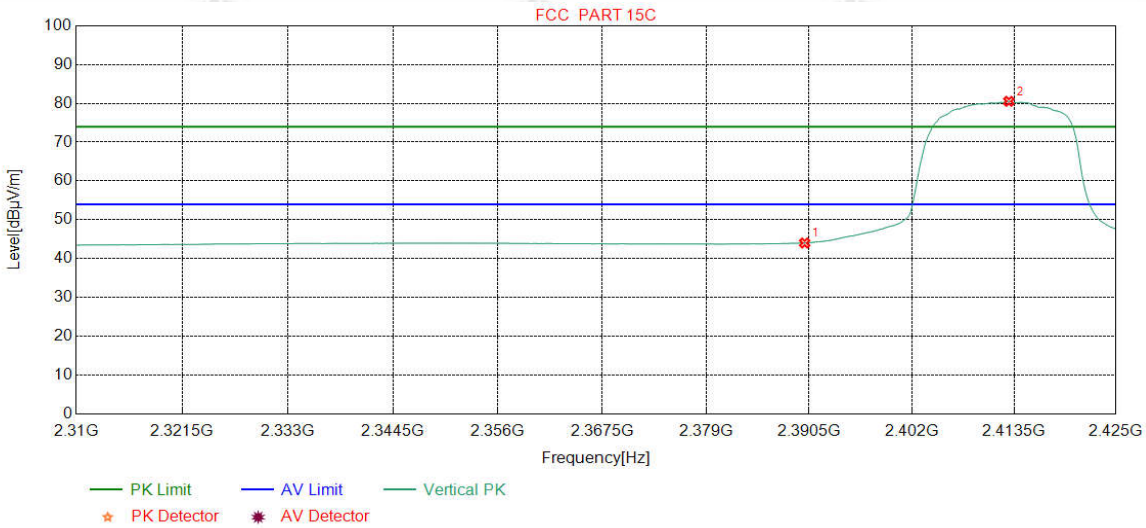
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	51.58	54.76	74.00	19.24	Pass	Vertical
2	2413.4856	32.28	13.36	-42.43	87.88	91.09	74.00	-17.09	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2412
Remark:	Average		



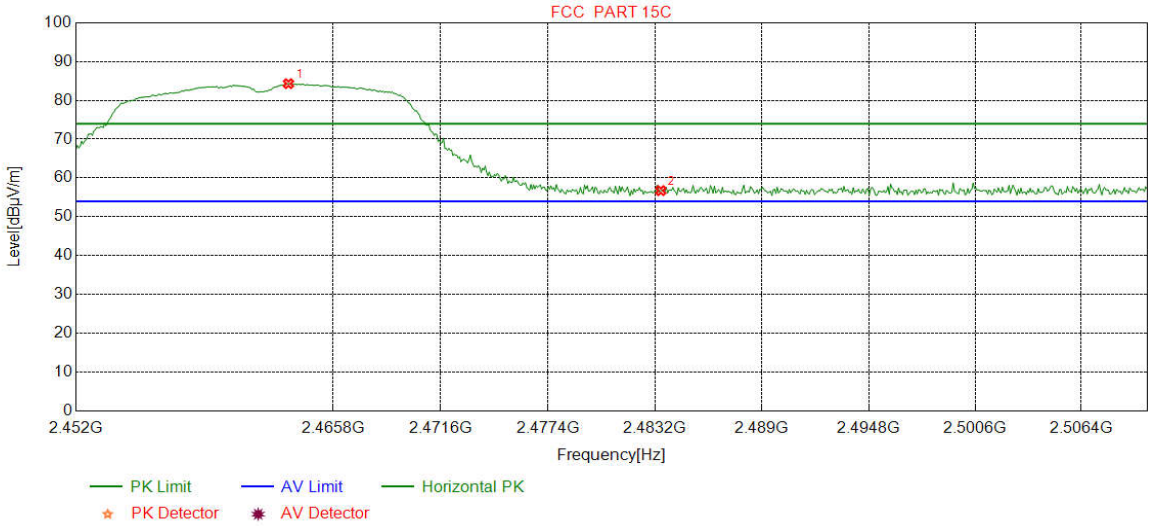
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.55	43.73	54.00	10.27	Pass	Horizontal
2	2410.7509	32.28	13.35	-42.43	72.70	75.90	54.00	-21.90	Pass	Horizontal

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2412
Remark:	Average		



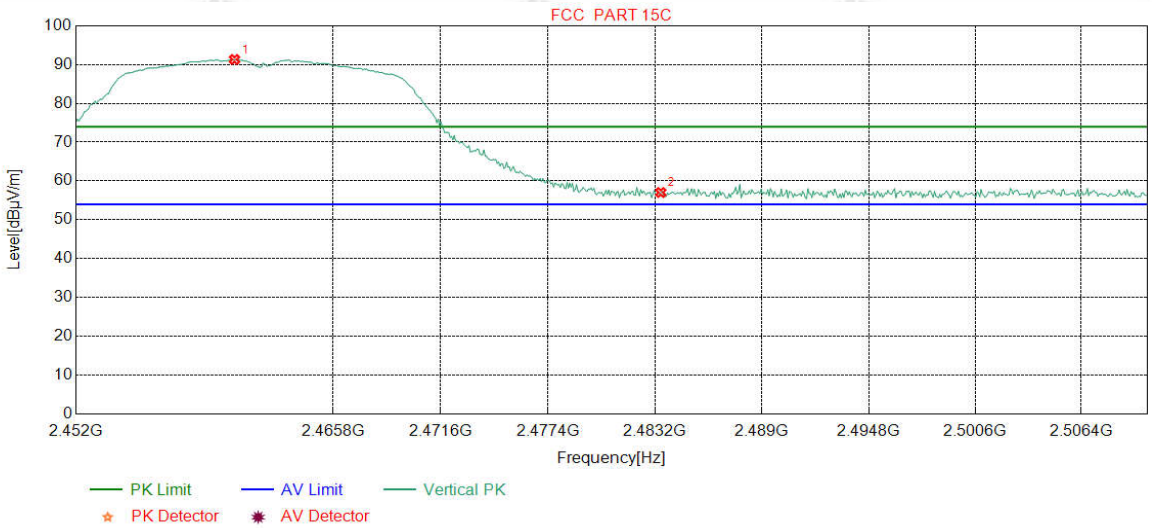
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.82	44.00	54.00	10.00	Pass	Vertical
2	2412.9099	32.28	13.36	-42.43	77.32	80.53	54.00	-26.53	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2462
Remark:	Peak		



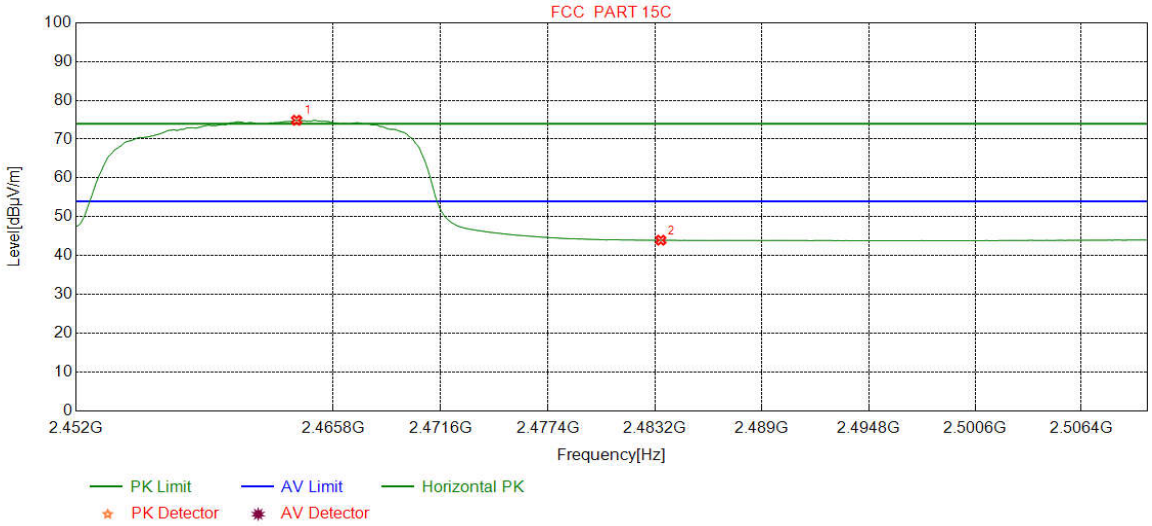
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.3967	32.35	13.47	-42.41	80.90	84.31	74.00	-10.31	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	53.37	56.73	74.00	17.27	Pass	Horizontal

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2462
Remark:	Peak		



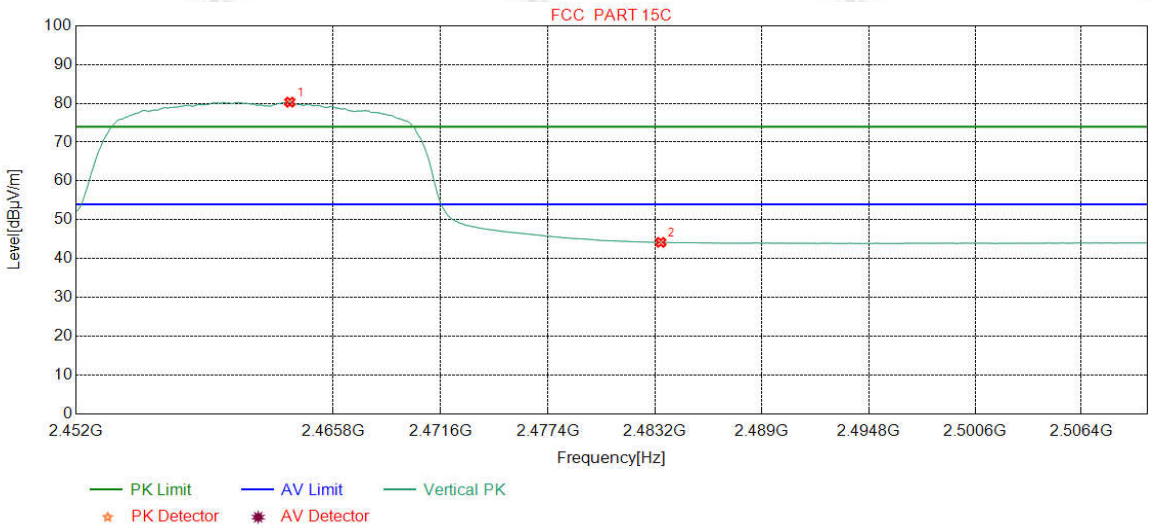
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2460.4931	32.34	13.48	-42.40	87.90	91.32	74.00	-17.32	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	53.67	57.03	74.00	16.97	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2462
Remark:	Average		



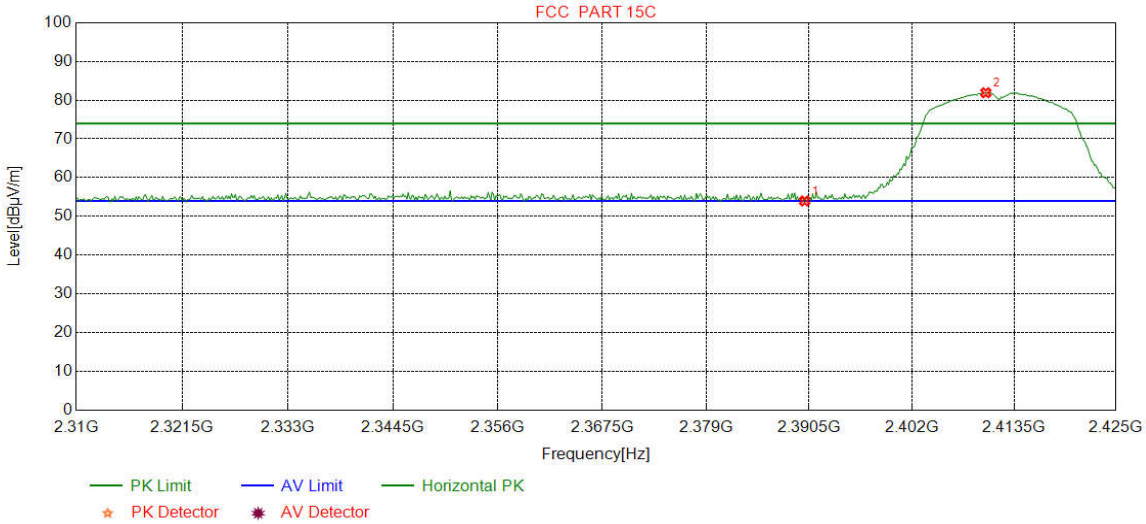
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.8323	32.35	13.47	-42.41	71.47	74.88	54.00	-20.88	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	40.59	43.95	54.00	10.05	Pass	Horizontal

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2462
Remark:	Average		



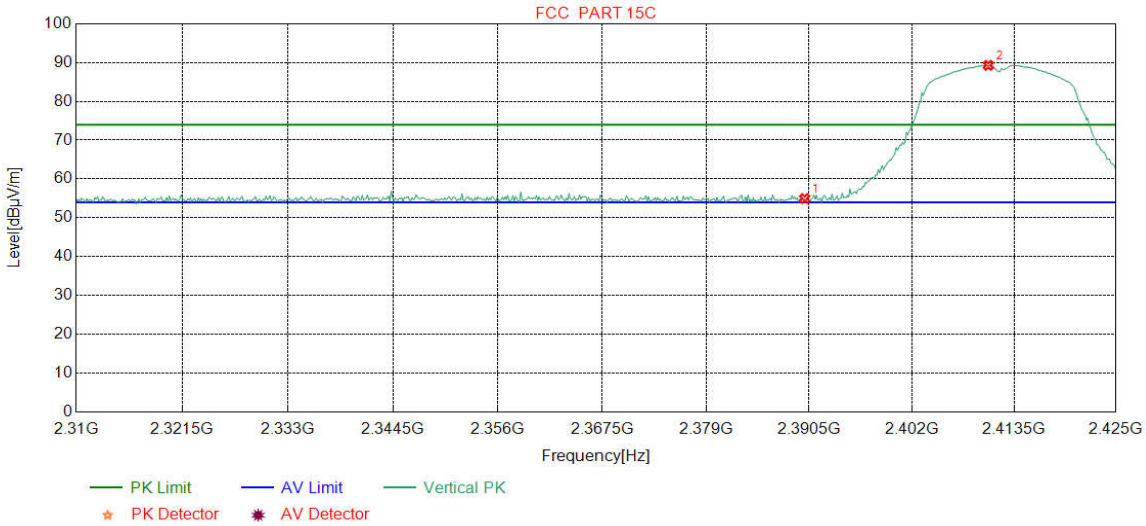
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2463.4693	32.35	13.47	-42.41	76.91	80.32	54.00	-26.32	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	40.81	44.17	54.00	9.83	Pass	Vertical

Mode:	802.11n(HT20)(6.5Mbps)Transmitting	Channel:	2412
Remark:	Peak		



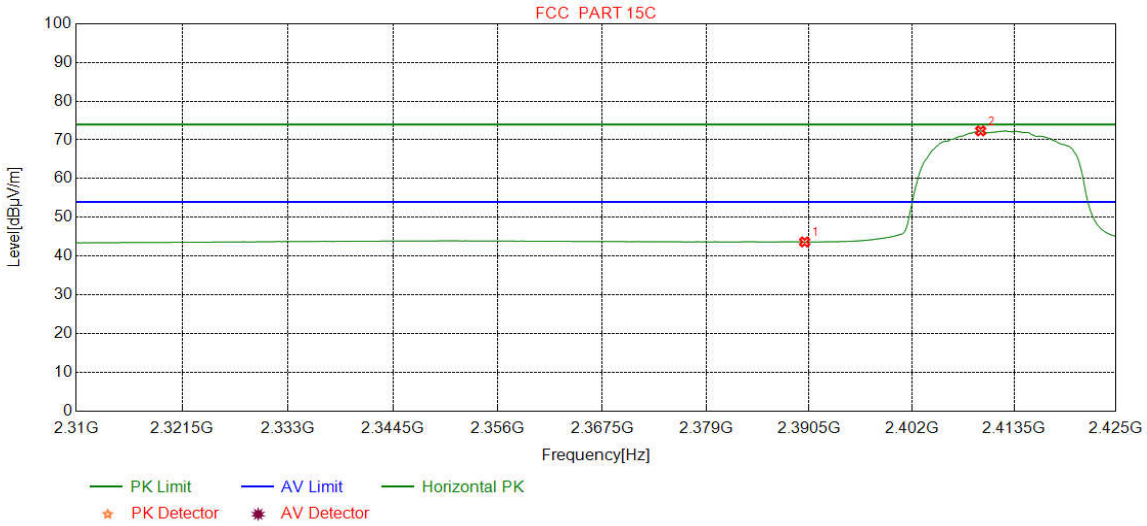
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	50.79	53.97	74.00	20.03	Pass	Horizontal
2	2410.3191	32.27	13.35	-42.43	78.74	81.93	74.00	-7.93	Pass	Horizontal

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2412
Remark:	Peak		



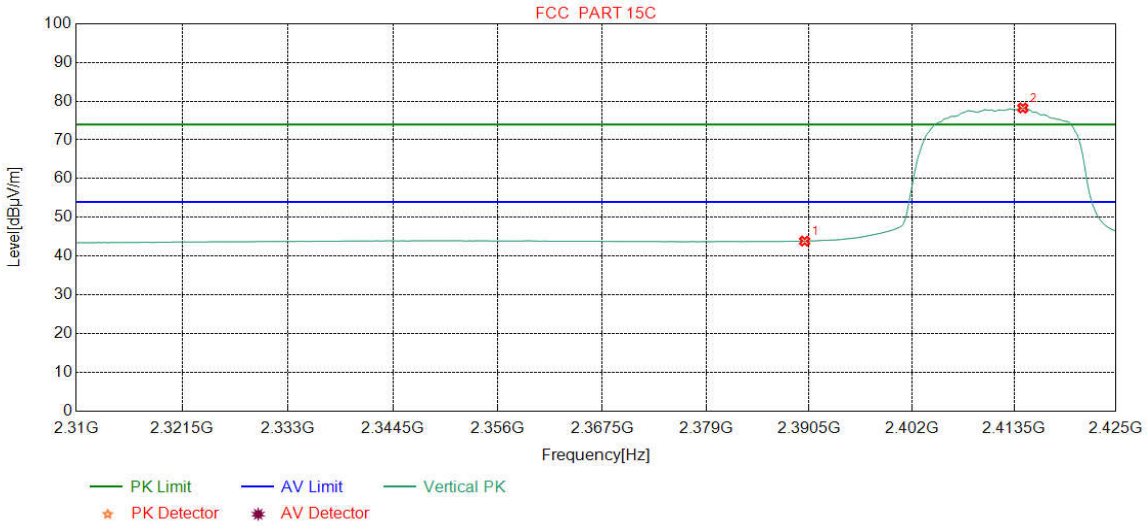
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	51.76	54.94	74.00	19.06	Pass	Vertical
2	2410.6070	32.27	13.35	-42.43	86.11	89.30	74.00	-15.30	Pass	Vertical

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2412
Remark:	Average		



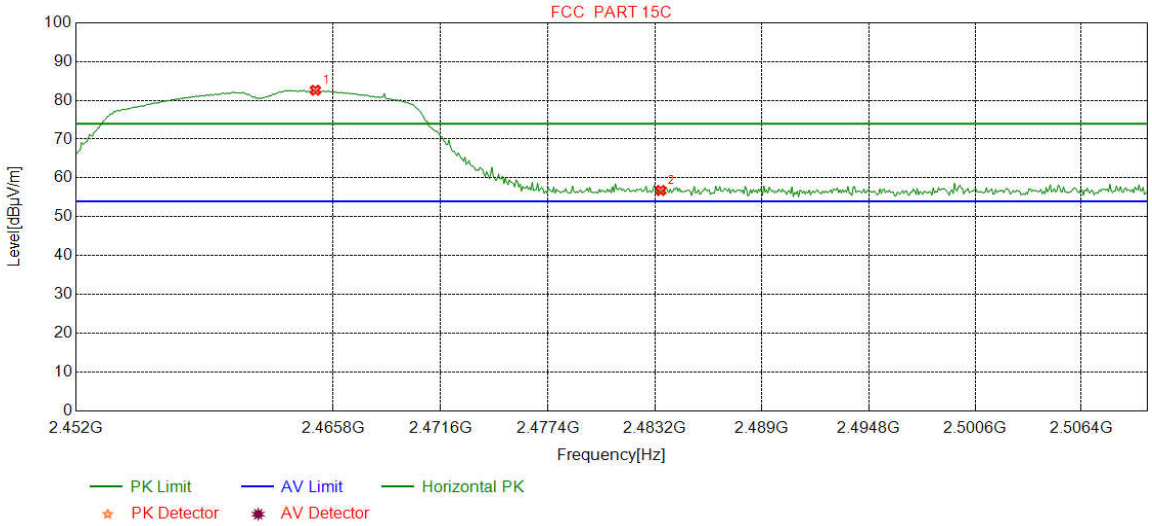
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.46	43.64	54.00	10.36	Pass	Horizontal
2	2409.7434	32.27	13.34	-42.42	69.13	72.32	54.00	-18.32	Pass	Horizontal

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2412
Remark:	Average		



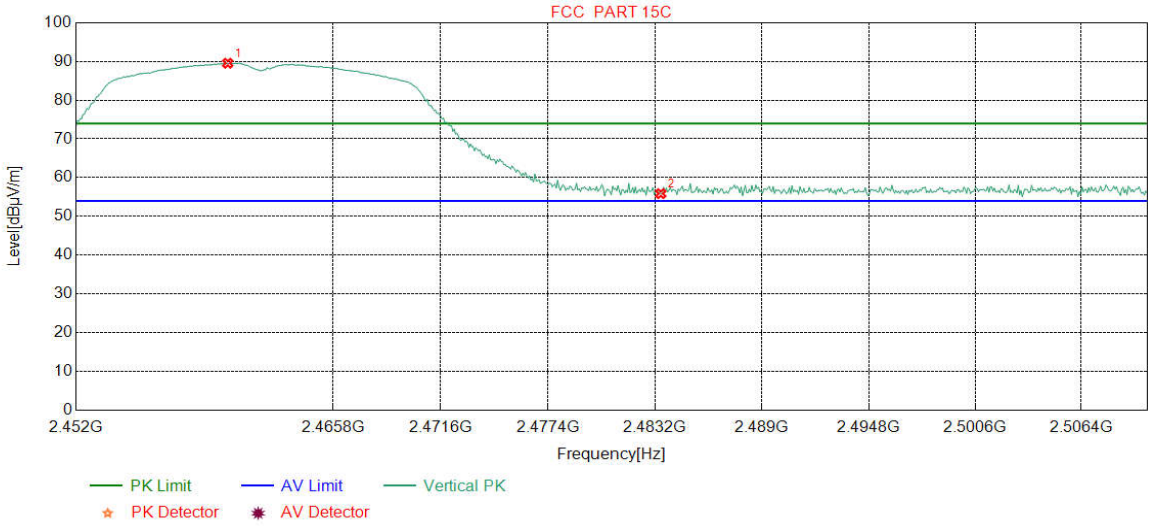
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	40.67	43.85	54.00	10.15	Pass	Vertical
2	2414.4931	32.28	13.37	-42.43	75.02	78.24	54.00	-24.24	Pass	Vertical

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2462
Remark:	Peak		



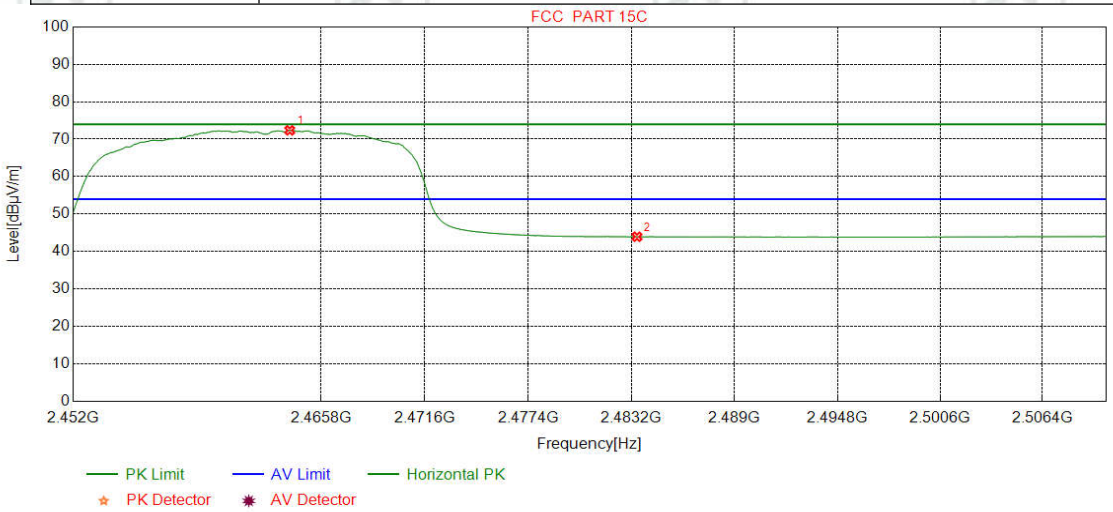
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2464.8486	32.35	13.46	-42.40	79.21	82.62	74.00	-8.62	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	53.42	56.78	74.00	17.22	Pass	Horizontal

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2462
Remark:	Peak		



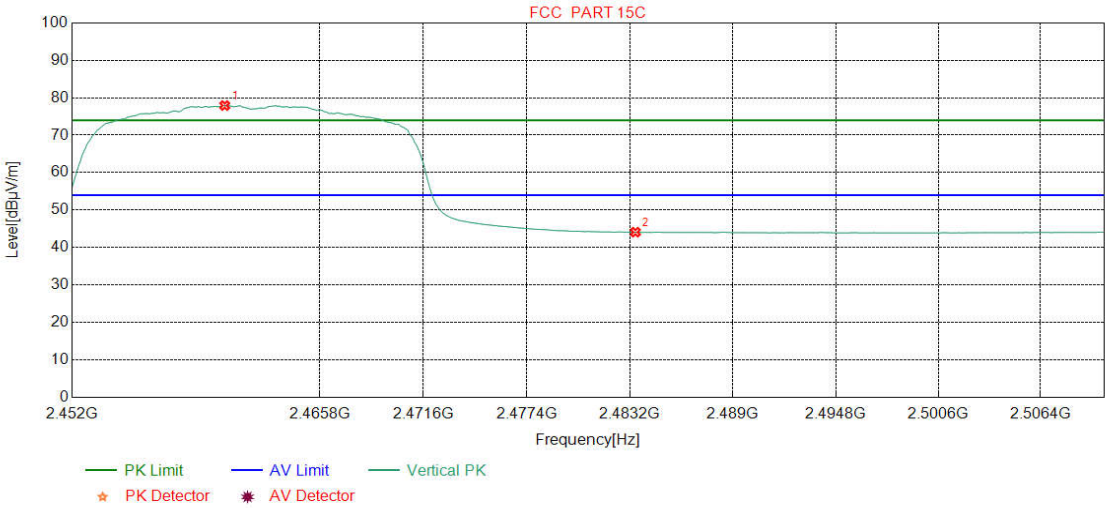
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2460.1302	32.34	13.48	-42.40	86.13	89.55	74.00	-15.55	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	52.50	55.86	74.00	18.14	Pass	Vertical

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2462
Remark:	Average		



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2464.0501	32.35	13.47	-42.41	68.96	72.37	54.00	-18.37	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	40.56	43.92	54.00	10.08	Pass	Horizontal

Mode:	802.11n(HT20)(6.5Mbps) Transmitting	Channel:	2462
Remark:	Average		



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2460.4931	32.34	13.48	-42.40	74.51	77.93	54.00	-23.93	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	40.72	44.08	54.00	9.92	Pass	Vertical

Note:
1) Through transmitter mode with all kind of modulation and data rate, find the 11Mbps 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).
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 - Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

Appendix H): Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. 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.
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 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.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter)..
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

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.

Radiated Spurious Emissions test Data:

Radiated Emission below 1GHz

Mode:	802.11 b(11Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	32.9103	10.62	0.64	-32.12	36.29	15.43	40.00	24.57	Pass	Horizontal
2	96.8397	10.49	1.14	-32.07	39.36	18.92	43.50	24.58	Pass	Horizontal
3	199.6700	10.87	1.67	-31.94	50.68	31.28	43.50	12.22	Pass	Horizontal
4	399.1219	15.38	2.38	-31.77	42.57	28.56	46.00	17.44	Pass	Horizontal
5	599.4469	18.99	2.96	-31.99	44.21	34.17	46.00	11.83	Pass	Horizontal
6	915.5046	22.19	3.63	-31.44	36.37	30.75	46.00	15.25	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	54.9315	12.41	0.84	-32.08	40.42	21.59	40.00	18.41	Pass	Vertical
2	199.8640	10.89	1.67	-31.94	50.63	31.25	43.50	12.25	Pass	Vertical
3	289.9860	13.00	2.03	-31.88	41.35	24.50	46.00	21.50	Pass	Vertical
4	399.8010	15.40	2.38	-31.77	40.08	26.09	46.00	19.91	Pass	Vertical
5	599.7380	18.99	2.96	-31.99	46.55	36.51	46.00	9.49	Pass	Vertical
6	843.9114	21.43	3.50	-31.83	34.68	27.78	46.00	18.22	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	96.8397	10.49	1.14	-32.07	37.14	16.70	43.50	26.80	Pass	Horizontal
2	199.1849	10.82	1.67	-31.94	53.36	33.91	43.50	9.59	Pass	Horizontal
3	322.7753	13.70	2.13	-31.81	41.44	25.46	46.00	20.54	Pass	Horizontal
4	399.5100	15.39	2.38	-31.76	41.80	27.81	46.00	18.19	Pass	Horizontal
5	599.6410	18.99	2.96	-31.99	41.24	31.20	46.00	14.80	Pass	Horizontal
6	799.0929	20.89	3.39	-32.03	36.03	28.28	46.00	17.72	Pass	Horizontal

Mode:	802.11 g(6Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	54.9315	12.41	0.84	-32.08	40.97	22.14	40.00	17.86	Pass	Vertical
2	199.2819	10.83	1.67	-31.94	46.48	27.04	43.50	16.46	Pass	Vertical
3	290.4710	13.01	2.03	-31.88	40.59	23.75	46.00	22.25	Pass	Vertical
4	399.5100	15.39	2.38	-31.76	38.53	24.54	46.00	21.46	Pass	Vertical
5	597.8948	18.96	2.95	-31.98	41.24	31.17	46.00	14.83	Pass	Vertical
6	796.5707	20.86	3.38	-32.01	37.32	29.55	46.00	16.45	Pass	Vertical

Mode:	802.11n(HT20)(6.5Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	59.9760	11.60	0.90	-32.04	32.27	12.73	40.00	27.27	Pass	Horizontal
2	129.1439	7.83	1.33	-32.03	40.73	17.86	43.50	25.64	Pass	Horizontal
3	199.6700	10.87	1.67	-31.94	46.30	26.90	43.50	16.60	Pass	Horizontal
4	398.6369	15.37	2.38	-31.77	42.89	28.87	46.00	17.13	Pass	Horizontal
5	623.9904	19.19	2.97	-31.98	42.35	32.53	46.00	13.47	Pass	Horizontal
6	833.7254	21.30	3.48	-31.93	37.55	30.40	46.00	15.60	Pass	Horizontal

Mode:	802.11 n(HT20)(6.5Mbps) Transmitting									
Remark:	(QP)									
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity
1	55.0285	12.40	0.84	-32.08	41.38	22.54	40.00	17.46	Pass	Vertical
2	129.0469	7.84	1.33	-32.02	38.28	15.43	43.50	28.07	Pass	Vertical
3	199.1849	10.82	1.67	-31.94	51.25	31.80	43.50	11.70	Pass	Vertical
4	398.7339	15.37	2.38	-31.77	37.34	23.32	46.00	22.68	Pass	Vertical
5	597.7978	18.96	2.94	-31.97	42.31	32.24	46.00	13.76	Pass	Vertical
6	945.4805	22.37	3.70	-31.19	33.82	28.70	46.00	17.30	Pass	Vertical

Transmitter Emission above 1GHz

Mode:		802.11b(11Mbps) Transmitting			Channel:				2412		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1650.5301	29.39	3.14	-42.77	51.58	41.34	74.00	32.66	Pass	H	Peak
2	3321.7822	33.33	4.55	-41.92	49.78	45.74	74.00	28.26	Pass	H	Peak
3	4022.8773	33.83	4.33	-40.78	52.90	50.28	74.00	23.72	Pass	H	Peak
4	4824.0000	34.50	4.61	-40.65	49.00	47.46	74.00	26.54	Pass	H	Peak
5	7236.0000	36.34	5.79	-40.99	45.64	46.78	74.00	27.22	Pass	H	Peak
6	9648.0000	37.66	6.72	-40.73	46.80	50.45	74.00	23.55	Pass	H	Peak
7	1798.9598	30.37	3.32	-42.71	53.80	44.78	74.00	29.22	Pass	V	Peak
8	4015.0765	33.82	4.33	-40.78	52.28	49.65	74.00	24.35	Pass	V	Peak
9	4824.0000	34.50	4.61	-40.65	46.73	45.19	74.00	28.81	Pass	V	Peak
10	6432.3432	35.89	5.45	-41.18	49.73	49.89	74.00	24.11	Pass	V	Peak
11	7236.0000	36.34	5.79	-40.99	45.39	46.53	74.00	27.47	Pass	V	Peak
12	9648.0000	37.66	6.72	-40.73	45.11	48.76	74.00	25.24	Pass	V	Peak

Mode:		802.11b(11Mbps) Transmitting			Channel:				2437		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1718.5437	29.84	3.21	-42.67	54.27	44.65	74.00	29.35	Pass	H	Peak
2	3316.9067	33.33	4.56	-41.93	50.17	46.13	74.00	27.87	Pass	H	Peak
3	4060.9061	33.89	4.33	-40.80	53.00	50.42	74.00	23.58	Pass	H	Peak
4	4874.0000	34.50	4.78	-40.61	49.53	48.20	74.00	25.80	Pass	H	Peak
5	7311.0000	36.41	5.85	-40.93	45.56	46.89	74.00	27.11	Pass	H	Peak
6	9748.0000	37.70	6.77	-40.63	46.27	50.11	74.00	23.89	Pass	H	Peak
7	1398.4797	28.30	2.90	-42.69	60.13	48.64	74.00	25.36	Pass	V	Peak
8	4058.9559	33.88	4.33	-40.79	51.98	49.40	74.00	24.60	Pass	V	Peak
9	4874.0000	34.50	4.78	-40.61	48.44	47.11	74.00	26.89	Pass	V	Peak
10	6498.6499	35.90	5.47	-41.19	50.04	50.22	74.00	23.78	Pass	V	Peak
11	7311.0000	36.41	5.85	-40.93	46.76	48.09	74.00	25.91	Pass	V	Peak
12	9748.0000	37.70	6.77	-40.63	45.66	49.50	74.00	24.50	Pass	V	Peak

Mode:		802.11b(11Mbps) Transmitting			Channel:				2462		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1396.0792	28.30	2.89	-42.68	54.34	42.85	74.00	31.15	Pass	H	Peak
2	4101.8602	33.94	4.33	-40.81	53.23	50.69	74.00	23.31	Pass	H	Peak
3	4924.0000	34.50	4.85	-40.56	47.64	46.43	74.00	27.57	Pass	H	Peak
4	6110.5611	35.82	5.26	-41.11	48.06	48.03	74.00	25.97	Pass	H	Peak
5	7386.0000	36.49	5.85	-40.87	45.78	47.25	74.00	26.75	Pass	H	Peak
6	9848.0000	37.74	6.83	-40.54	45.63	49.66	74.00	24.34	Pass	H	Peak
7	1199.2398	28.10	2.66	-42.89	56.68	44.55	74.00	29.45	Pass	V	Peak
8	3282.7783	33.31	4.54	-41.95	53.50	49.40	74.00	24.60	Pass	V	Peak
9	4101.8602	33.94	4.33	-40.81	52.55	50.01	74.00	23.99	Pass	V	Peak
10	4924.0000	34.50	4.85	-40.56	47.97	46.76	74.00	27.24	Pass	V	Peak
11	7386.0000	36.49	5.85	-40.87	46.25	47.72	74.00	26.28	Pass	V	Peak
12	9848.0000	37.74	6.83	-40.54	46.47	50.50	74.00	23.50	Pass	V	Peak

Mode:		802.11g(6Mbps) Transmitting			Channel:				2412		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1397.2795	28.30	2.90	-42.69	54.25	42.76	74.00	31.24	Pass	H	Peak
2	4021.9022	33.83	4.33	-40.79	51.34	48.71	74.00	25.29	Pass	H	Peak
3	4824.0000	34.50	4.61	-40.65	48.39	46.85	74.00	27.15	Pass	H	Peak
4	6432.3432	35.89	5.45	-41.18	48.42	48.58	74.00	25.42	Pass	H	Peak
5	7236.0000	36.34	5.79	-40.99	45.24	46.38	74.00	27.62	Pass	H	Peak
6	9648.0000	37.66	6.72	-40.73	45.21	48.86	74.00	25.14	Pass	H	Peak
7	1398.0796	28.30	2.90	-42.69	61.07	49.58	74.00	24.42	Pass	V	Peak
8	4014.1014	33.82	4.33	-40.78	52.34	49.71	74.00	24.29	Pass	V	Peak
9	4824.0000	34.50	4.61	-40.65	47.31	45.77	74.00	28.23	Pass	V	Peak
10	6432.3432	35.89	5.45	-41.18	49.56	49.72	74.00	24.28	Pass	V	Peak
11	7236.0000	36.34	5.79	-40.99	46.46	47.60	74.00	26.40	Pass	V	Peak
12	9648.0000	37.66	6.72	-40.73	45.91	49.56	74.00	24.44	Pass	V	Peak

Mode:		802.11g(6Mbps) Transmitting			Channel:				2437		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1394.4789	28.29	2.89	-42.68	53.35	41.85	74.00	32.15	Pass	H	Peak
2	4059.9310	33.88	4.33	-40.79	50.22	47.64	74.00	26.36	Pass	H	Peak
3	4874.0000	34.50	4.78	-40.61	48.51	47.18	74.00	26.82	Pass	H	Peak
4	6429.4179	35.89	5.43	-41.18	48.22	48.36	74.00	25.64	Pass	H	Peak
5	7311.0000	36.41	5.85	-40.93	45.72	47.05	74.00	26.95	Pass	H	Peak
6	9748.0000	37.70	6.77	-40.63	45.90	49.74	74.00	24.26	Pass	H	Peak
7	1198.4397	28.10	2.66	-42.89	55.43	43.30	74.00	30.70	Pass	V	Peak
8	4067.7318	33.89	4.33	-40.80	53.19	50.61	74.00	23.39	Pass	V	Peak
9	4874.0000	34.50	4.78	-40.61	48.53	47.20	74.00	26.80	Pass	V	Peak
10	6498.6499	35.90	5.47	-41.19	49.02	49.20	74.00	24.80	Pass	V	Peak
11	7311.0000	36.41	5.85	-40.93	45.12	46.45	74.00	27.55	Pass	V	Peak
12	9748.0000	37.70	6.77	-40.63	45.55	49.39	74.00	24.61	Pass	V	Peak

Mode:		802.11g(6Mbps) Transmitting			Channel:				2462		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1598.1196	29.05	3.07	-42.90	52.11	41.33	74.00	32.67	Pass	H	Peak
2	4105.7606	33.95	4.34	-40.81	50.30	47.78	74.00	26.22	Pass	H	Peak
3	4924.0000	34.50	4.85	-40.56	48.21	47.00	74.00	27.00	Pass	H	Peak
4	6572.7573	35.93	5.43	-41.19	47.96	48.13	74.00	25.87	Pass	H	Peak
5	7386.0000	36.49	5.85	-40.87	45.54	47.01	74.00	26.99	Pass	H	Peak
6	9848.0000	37.74	6.83	-40.54	45.11	49.14	74.00	24.86	Pass	H	Peak
7	1393.2787	28.29	2.89	-42.68	58.78	47.28	74.00	26.72	Pass	V	Peak
8	4100.8851	33.94	4.32	-40.80	53.51	50.97	74.00	23.03	Pass	V	Peak
9	4924.0000	34.50	4.85	-40.56	48.15	46.94	74.00	27.06	Pass	V	Peak
10	6564.9565	35.93	5.40	-41.19	48.32	48.46	74.00	25.54	Pass	V	Peak
11	7386.0000	36.49	5.85	-40.87	45.17	46.64	74.00	27.36	Pass	V	Peak
12	9848.0000	37.74	6.83	-40.54	44.73	48.76	74.00	25.24	Pass	V	Peak

Mode:		802.11n(HT20)(6.5Mbps)			Channel:				2412		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1395.6791	28.30	2.89	-42.69	52.91	41.41	74.00	32.59	Pass	H	Peak
2	4022.8773	33.83	4.33	-40.78	50.39	47.77	74.00	26.23	Pass	H	Peak
3	4824.0000	34.50	4.61	-40.65	46.87	45.33	74.00	28.67	Pass	H	Peak
4	6432.3432	35.89	5.45	-41.18	48.00	48.16	74.00	25.84	Pass	H	Peak
5	7236.0000	36.34	5.79	-40.99	45.01	46.15	74.00	27.85	Pass	H	Peak
6	9648.0000	37.66	6.72	-40.73	46.45	50.10	74.00	23.90	Pass	H	Peak
7	1397.6795	28.30	2.90	-42.69	59.56	48.07	74.00	25.93	Pass	V	Peak
8	4017.0267	33.82	4.33	-40.78	52.92	50.29	74.00	23.71	Pass	V	Peak
9	4824.0000	34.50	4.61	-40.65	46.63	45.09	74.00	28.91	Pass	V	Peak
10	6432.3432	35.89	5.45	-41.18	49.83	49.99	74.00	24.01	Pass	V	Peak
11	7236.0000	36.34	5.79	-40.99	45.55	46.69	74.00	27.31	Pass	V	Peak
12	9648.0000	37.66	6.72	-40.73	45.24	48.89	74.00	25.11	Pass	V	Peak

Mode:		802.11n(HT20)(6.5Mbps)			Channel:				2437		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1645.7291	29.36	3.13	-42.78	51.69	41.40	74.00	32.60	Pass	H	Peak
2	4058.9559	33.88	4.33	-40.79	49.98	47.40	74.00	26.60	Pass	H	Peak
3	4874.0000	34.50	4.78	-40.61	48.03	46.70	74.00	27.30	Pass	H	Peak
4	5947.7198	35.72	5.31	-41.05	47.81	47.79	74.00	26.21	Pass	H	Peak
5	7311.0000	36.41	5.85	-40.93	46.24	47.57	74.00	26.43	Pass	H	Peak
6	9748.0000	37.70	6.77	-40.63	45.52	49.36	74.00	24.64	Pass	H	Peak
7	1756.5513	30.09	3.24	-42.68	56.55	47.20	74.00	26.80	Pass	V	Peak
8	4062.8563	33.89	4.33	-40.80	52.75	50.17	74.00	23.83	Pass	V	Peak
9	4874.0000	34.50	4.78	-40.61	46.20	44.87	74.00	29.13	Pass	V	Peak
10	6498.6499	35.90	5.47	-41.19	49.18	49.36	74.00	24.64	Pass	V	Peak
11	7311.0000	36.41	5.85	-40.93	45.17	46.50	74.00	27.50	Pass	V	Peak
12	9748.0000	37.70	6.77	-40.63	46.92	50.76	74.00	23.24	Pass	V	Peak

Mode:		802.11n(HT20)(6.5Mbps)			Channel:				2462		
NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Magin [dB]	Result	Polarity	Remark
1	1399.6799	28.30	2.90	-42.68	53.07	41.59	74.00	32.41	Pass	H	Peak
2	4101.8602	33.94	4.33	-40.81	49.38	46.84	74.00	27.16	Pass	H	Peak
3	4924.0000	34.50	4.85	-40.56	48.38	47.17	74.00	26.83	Pass	H	Peak
4	6471.3471	35.89	5.50	-41.18	48.37	48.58	74.00	25.42	Pass	H	Peak
5	7386.0000	36.49	5.85	-40.87	46.63	48.10	74.00	25.90	Pass	H	Peak
6	9848.0000	37.74	6.83	-40.54	44.83	48.86	74.00	25.14	Pass	H	Peak
7	2079.4159	31.81	3.57	-42.57	53.58	46.39	74.00	27.61	Pass	V	Peak
8	4107.7108	33.95	4.35	-40.81	53.26	50.75	74.00	23.25	Pass	V	Peak
9	4924.0000	34.50	4.85	-40.56	46.84	45.63	74.00	28.37	Pass	V	Peak
10	5582.0582	35.13	5.12	-40.72	48.20	47.73	74.00	26.27	Pass	V	Peak
11	7386.0000	36.49	5.85	-40.87	44.79	46.26	74.00	27.74	Pass	V	Peak
12	9848.0000	37.74	6.83	-40.54	45.62	49.65	74.00	24.35	Pass	V	Peak

Note:

1) Through transmitting mode with all kind of modulation and data rate, find the 11Mbps of rate is the worst case of 802.11b; 6Mbpsof rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20) .

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

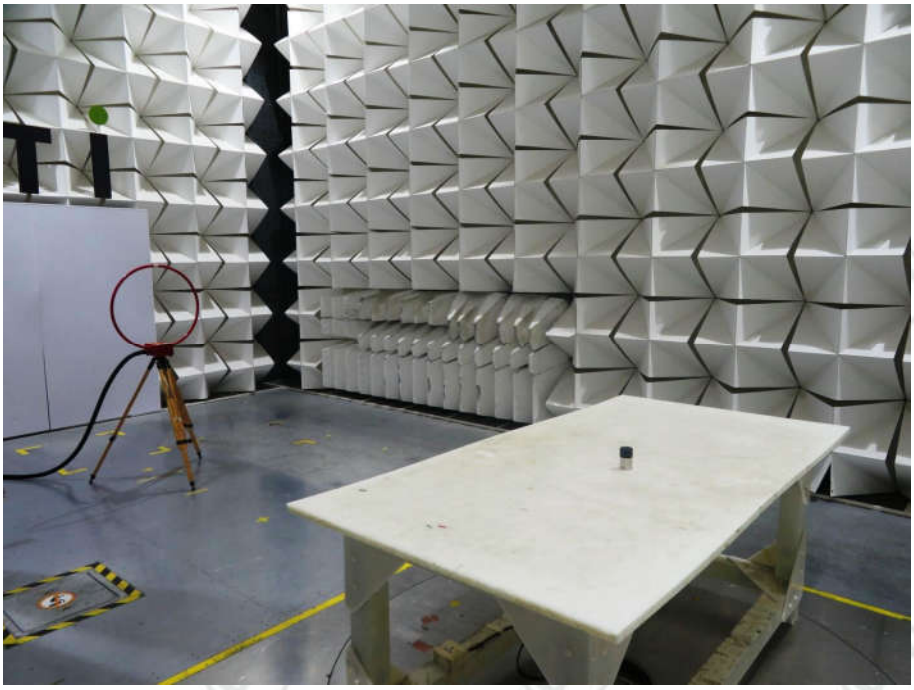
Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

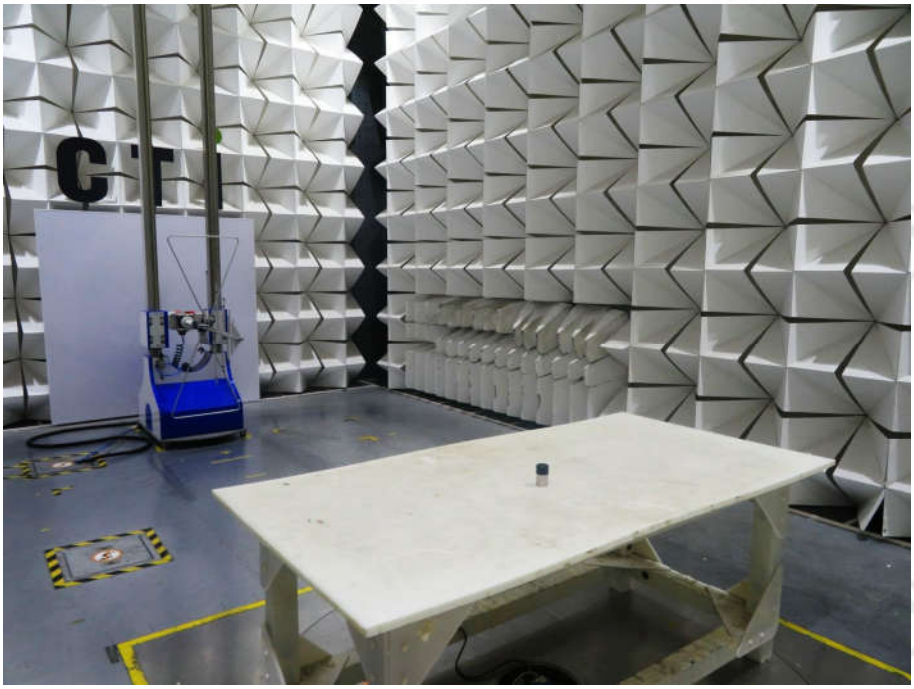
3) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below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

PHOTOGRAPHS OF TEST SETUP

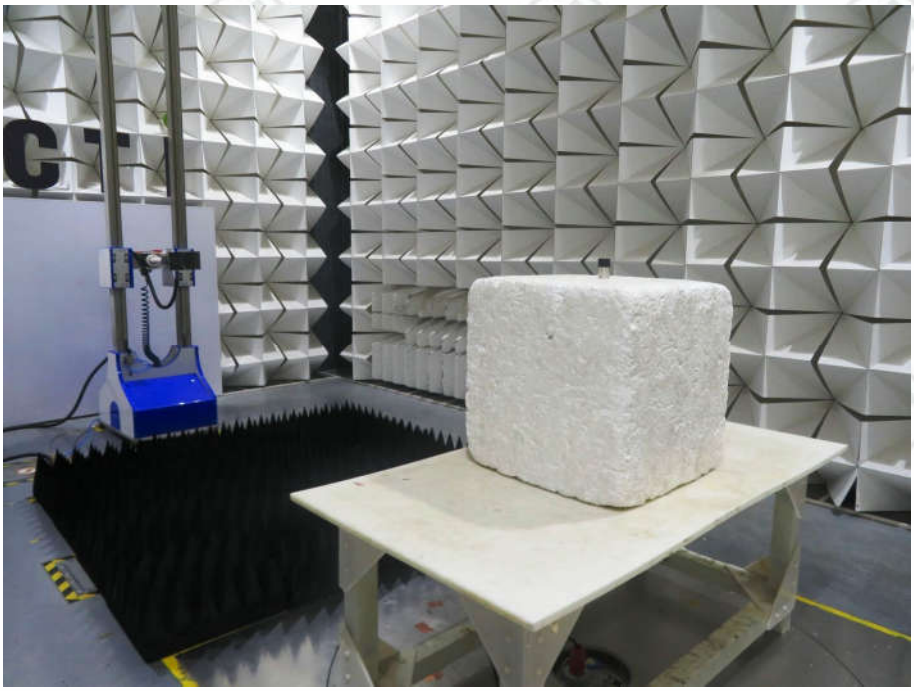
Test model No.: WS500



Radiated spurious emission Test Setup-1(Below 30MHz)



Radiated spurious emission Test Setup-2(30MHz - 1GHz)

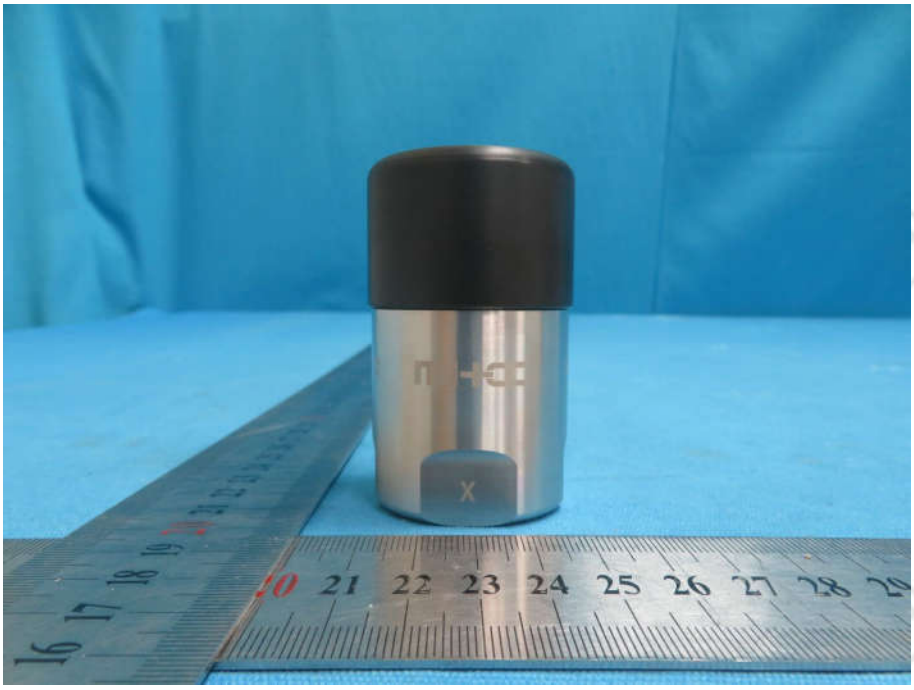


Radiated spurious emission Test Setup3(Above 1GHz)

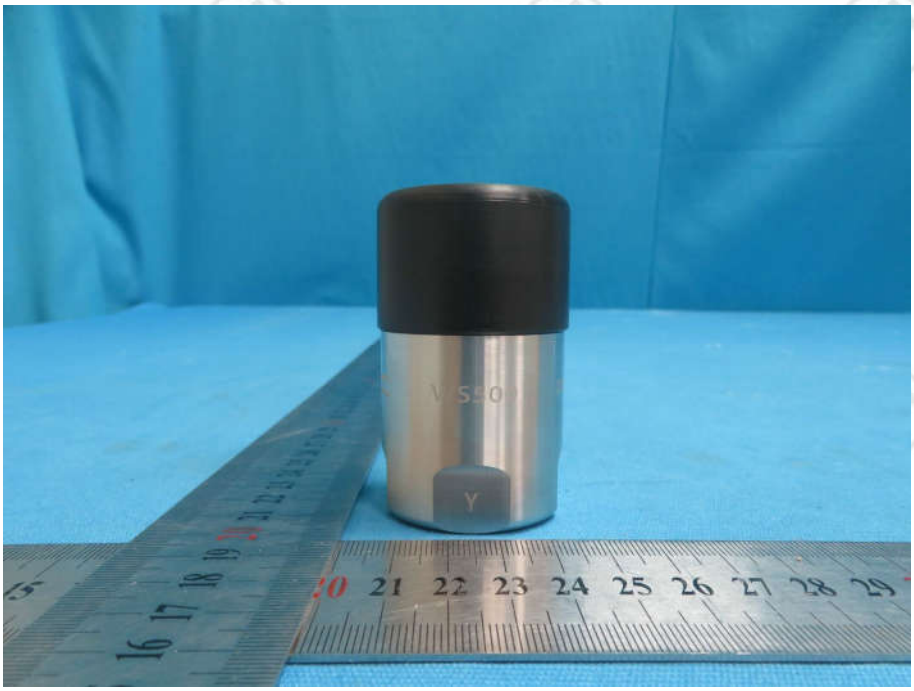
PHOTOGRAPHS OF EUT Constructional Details

Test model No.: WS500

View of Product-1



View of Product-2



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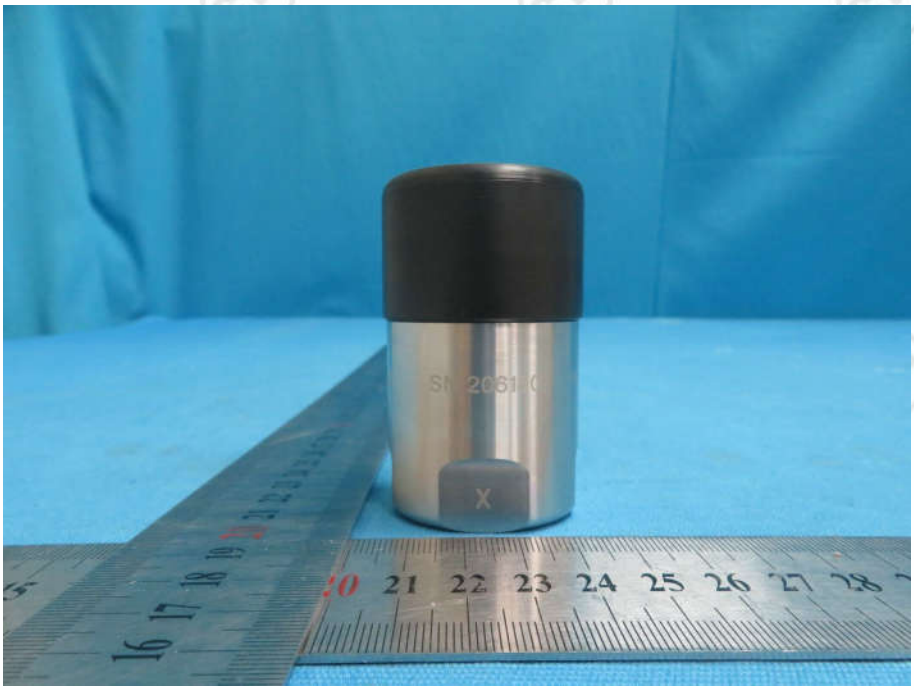

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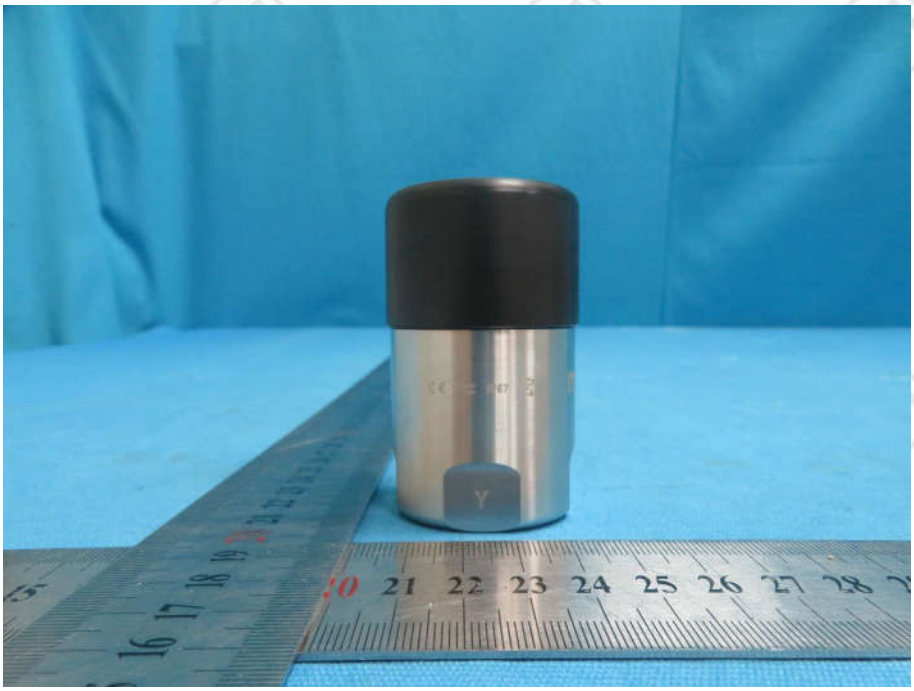

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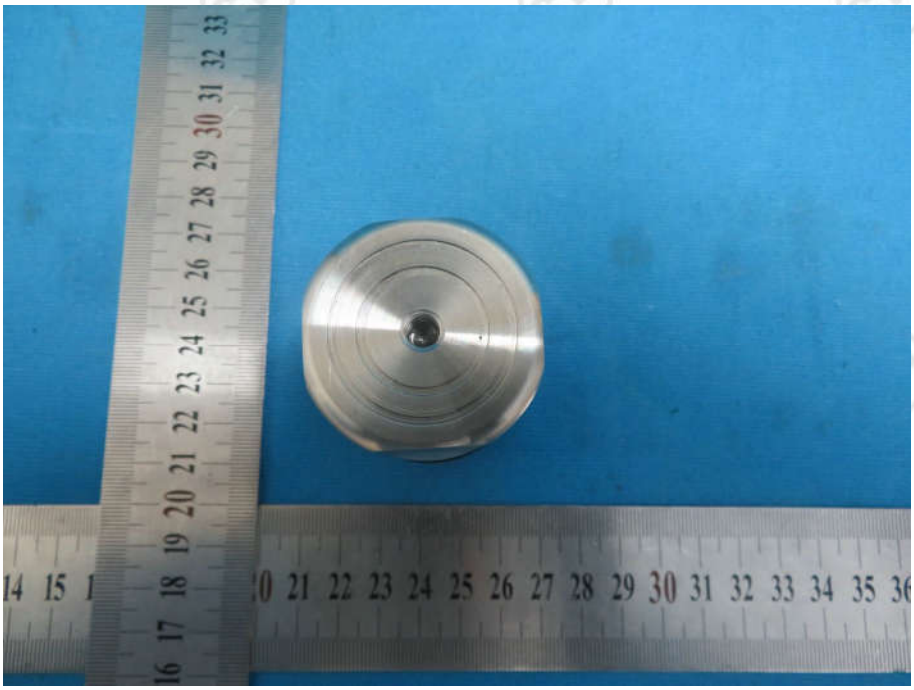

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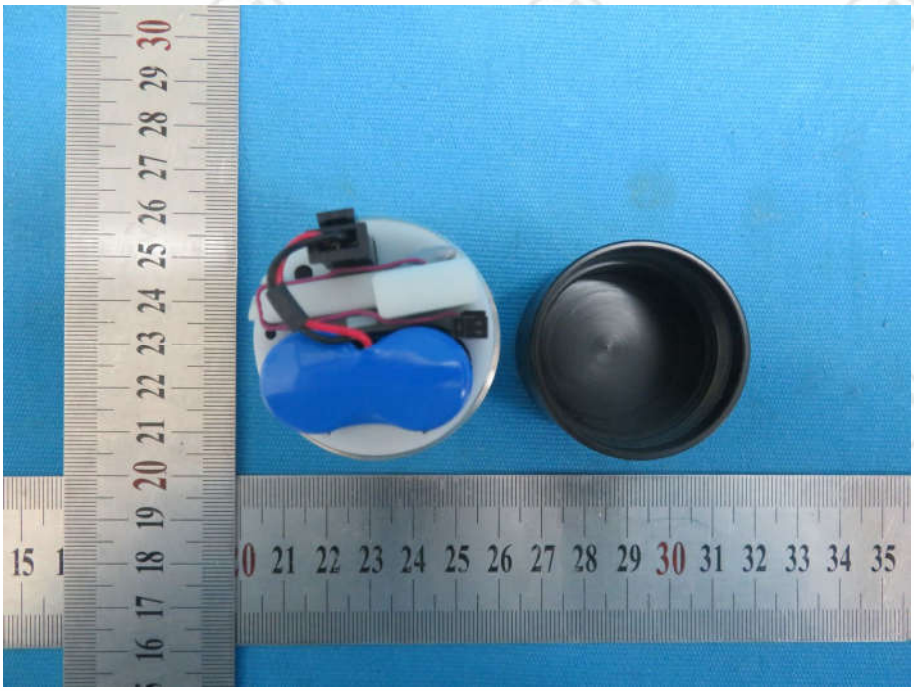

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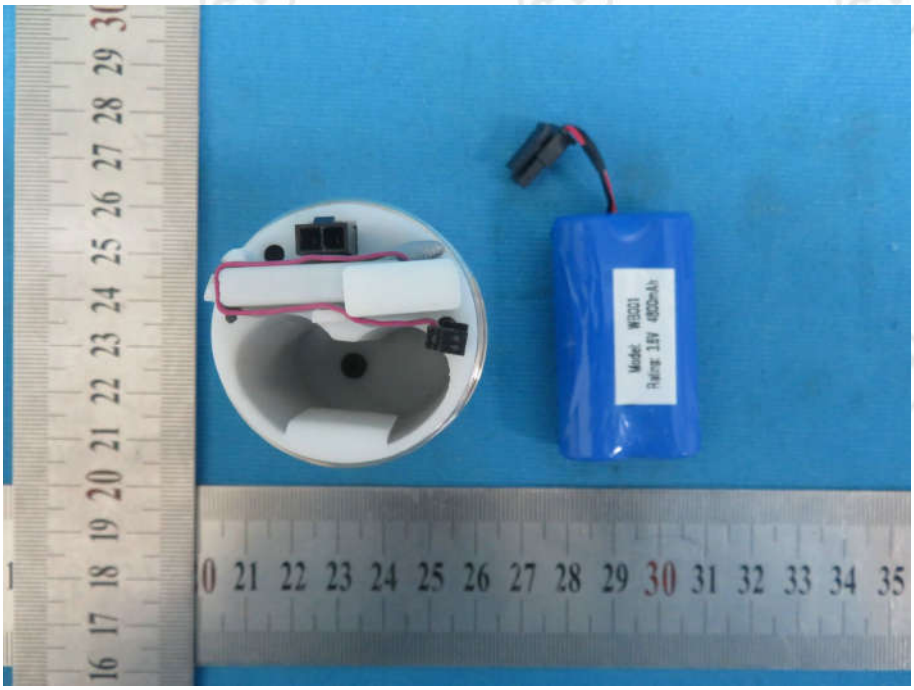

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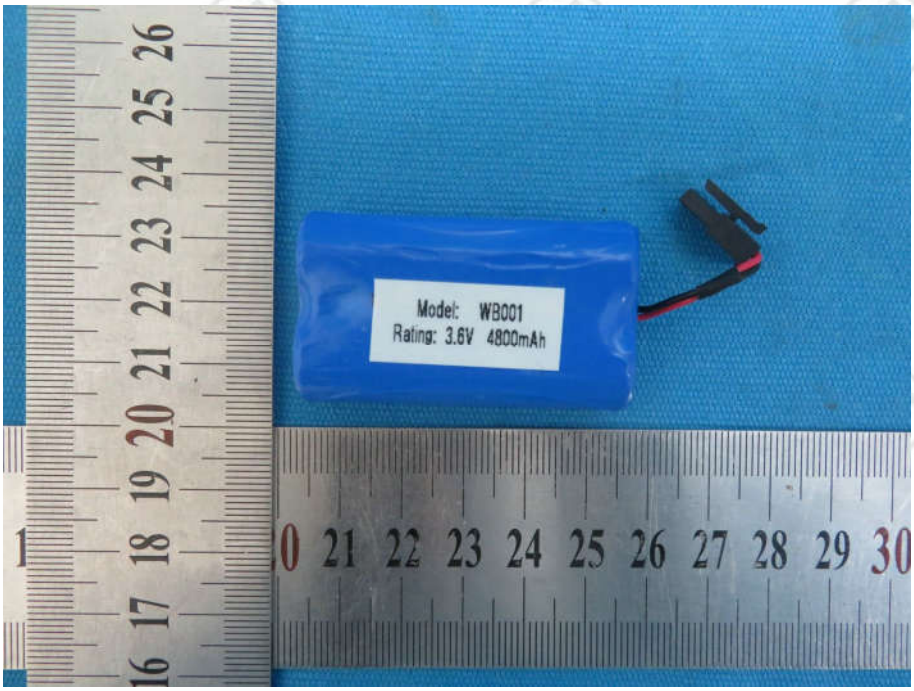
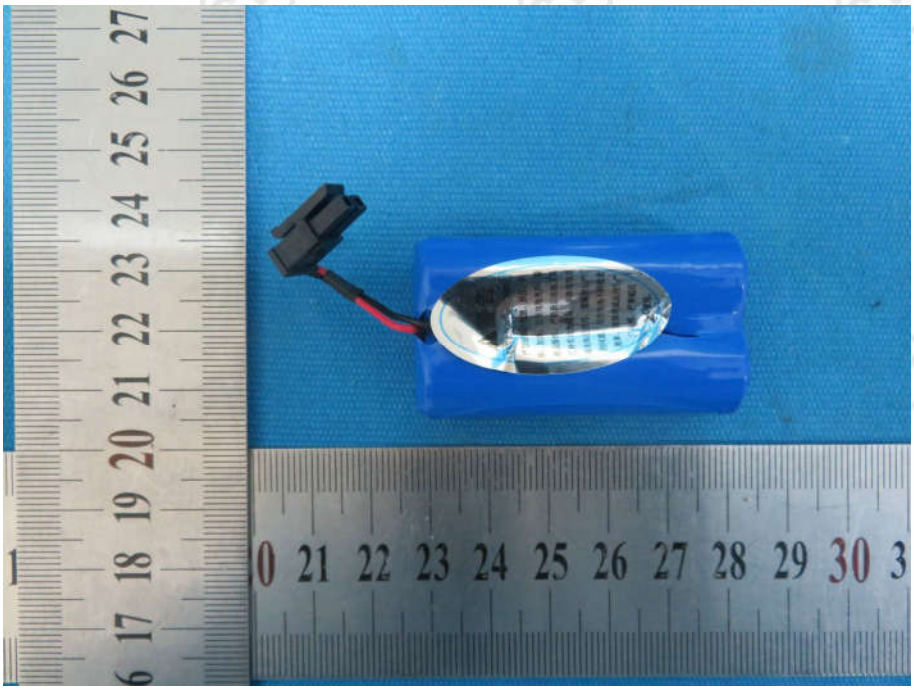


View of Product-9



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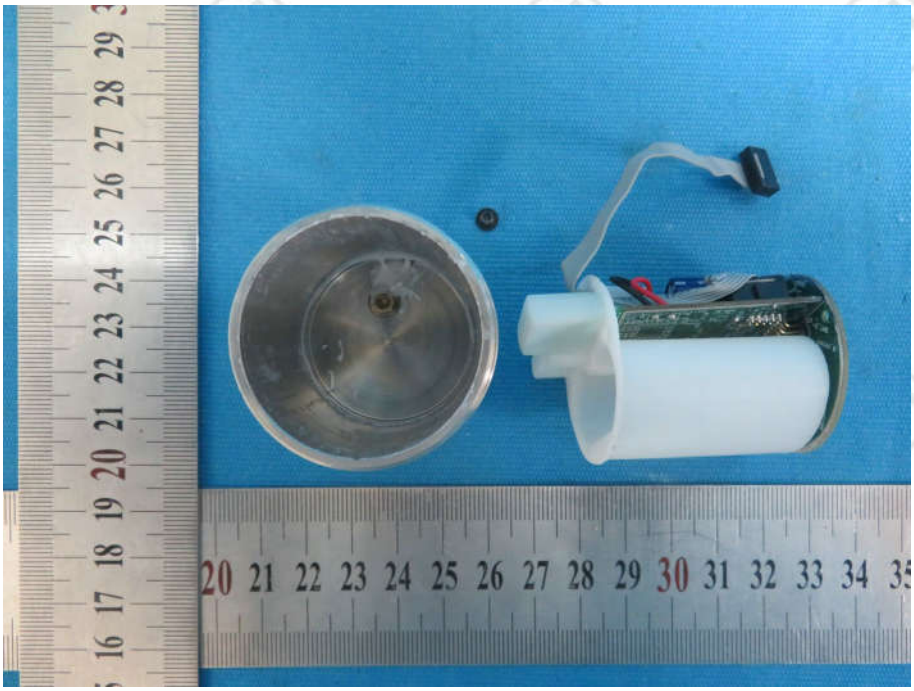

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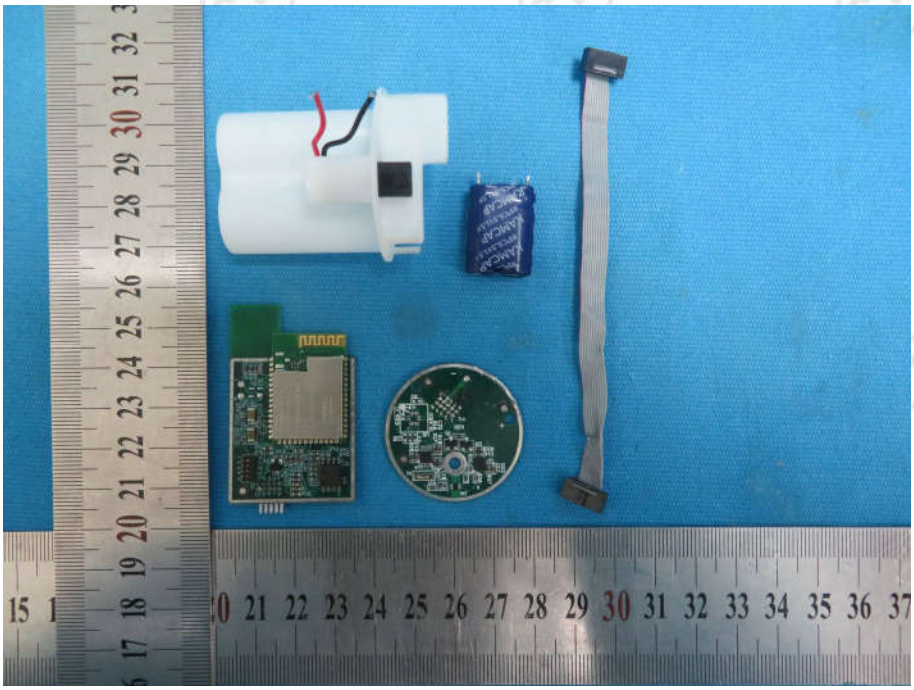

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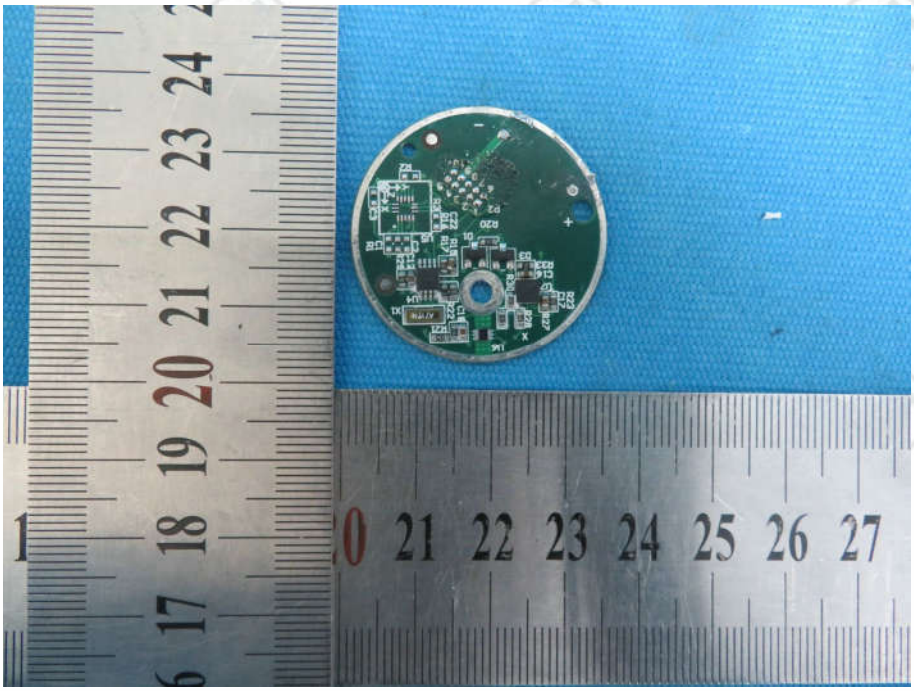

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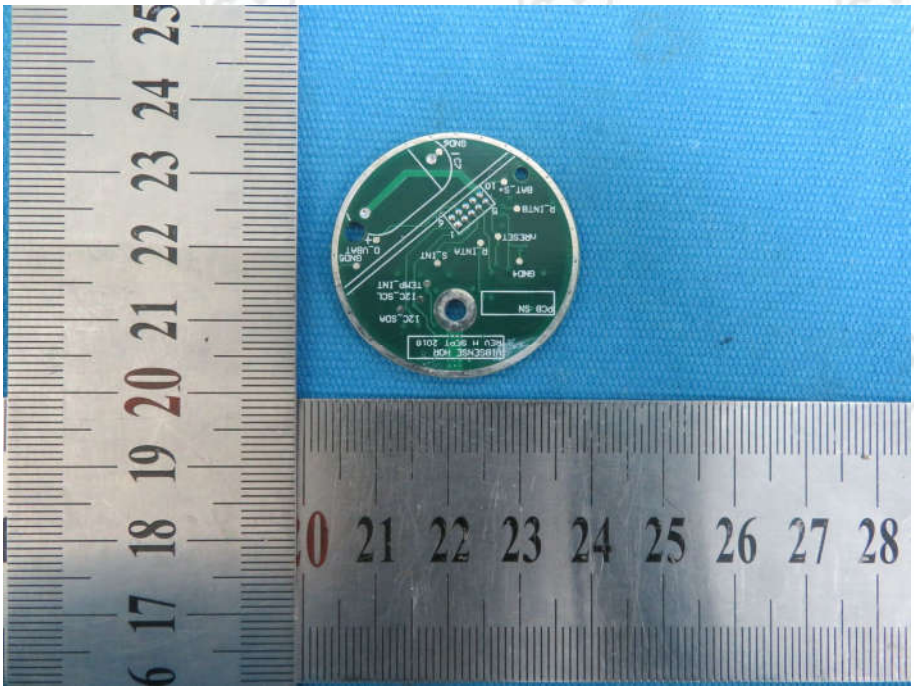

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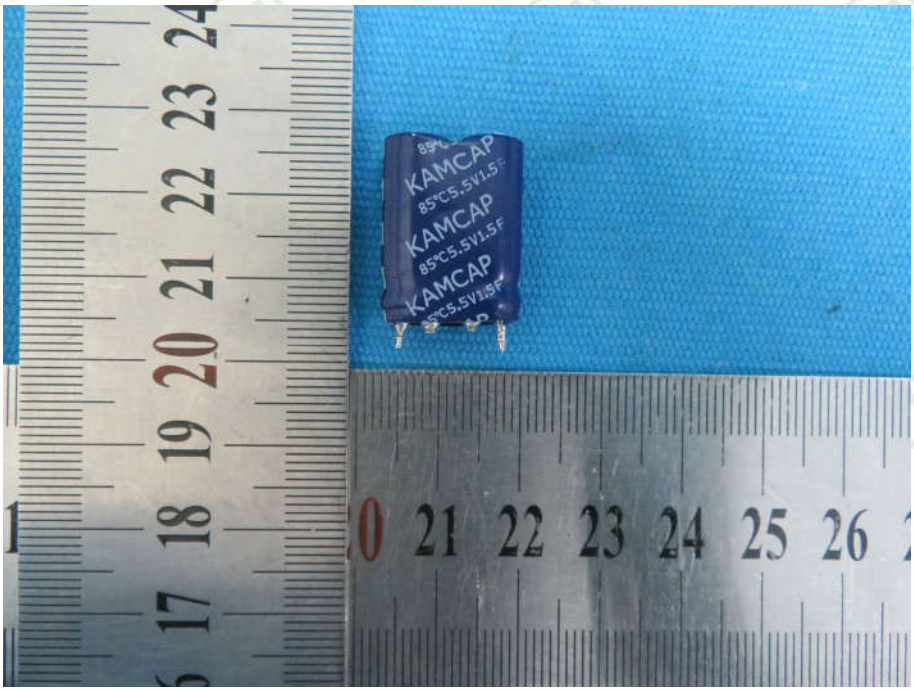
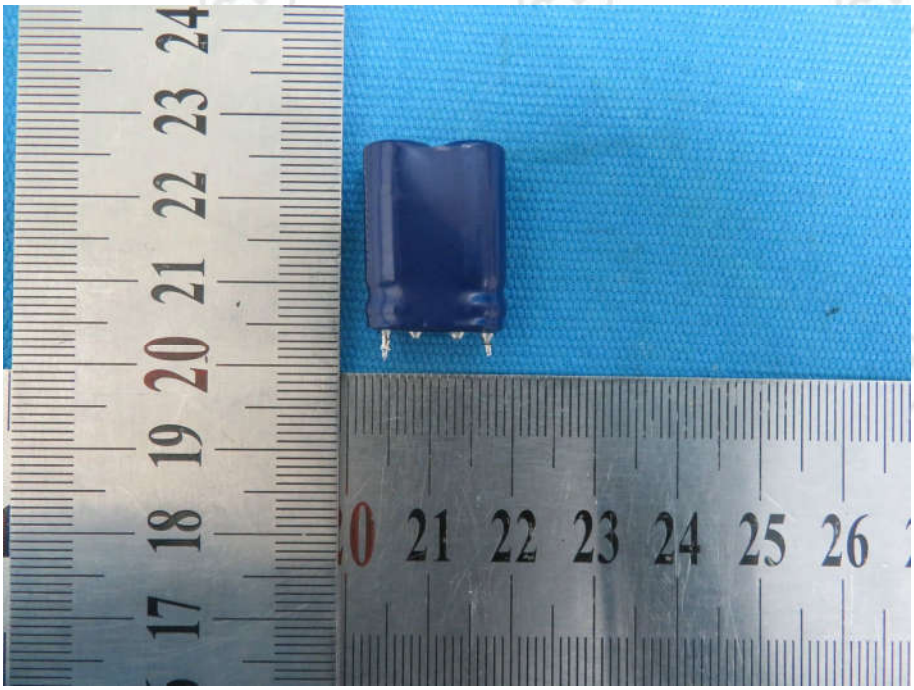
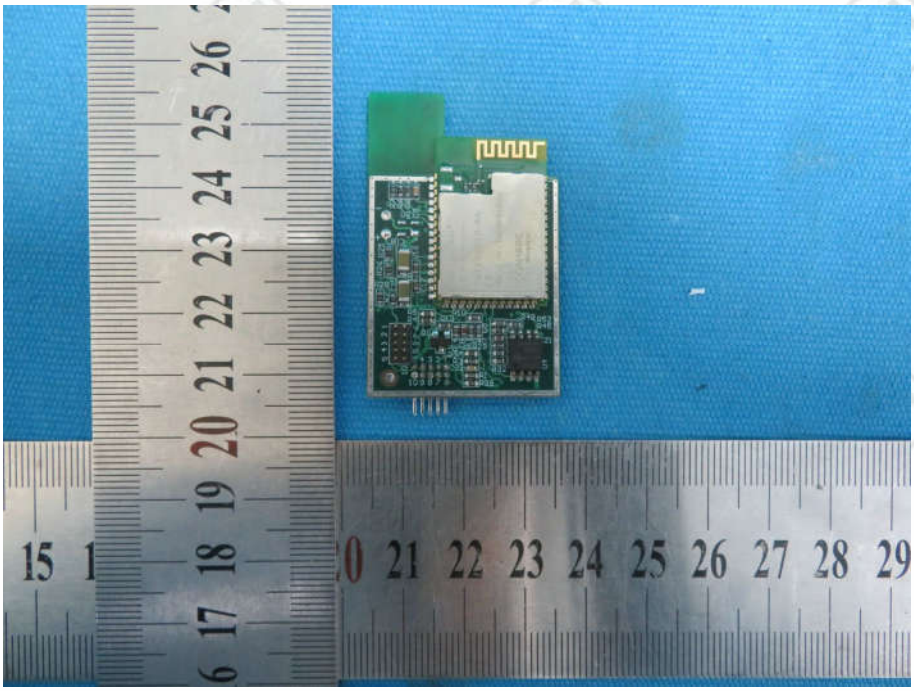


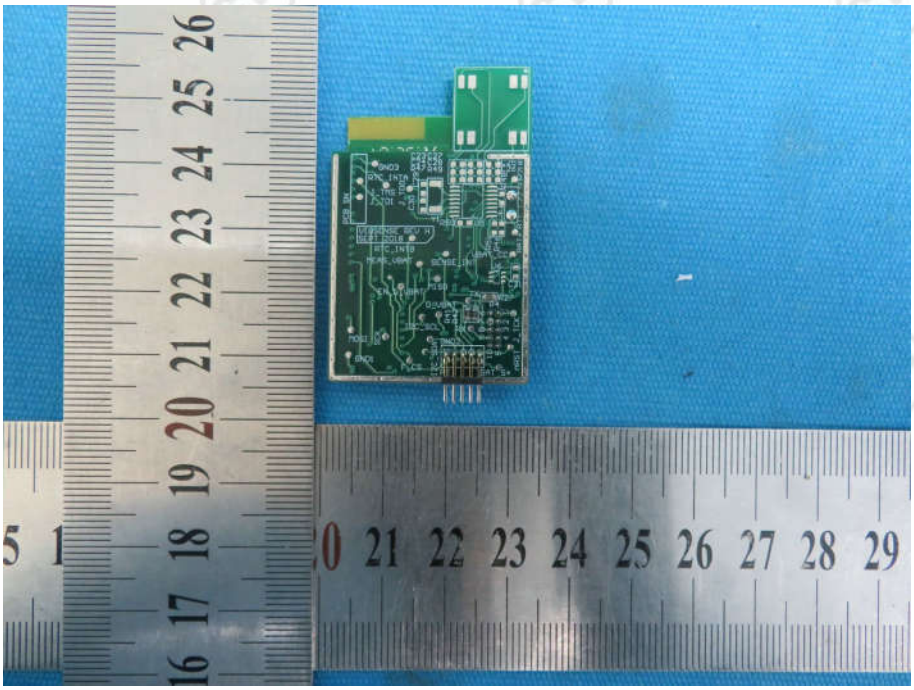
View of Product-15



View of Product-16



View of Product-17



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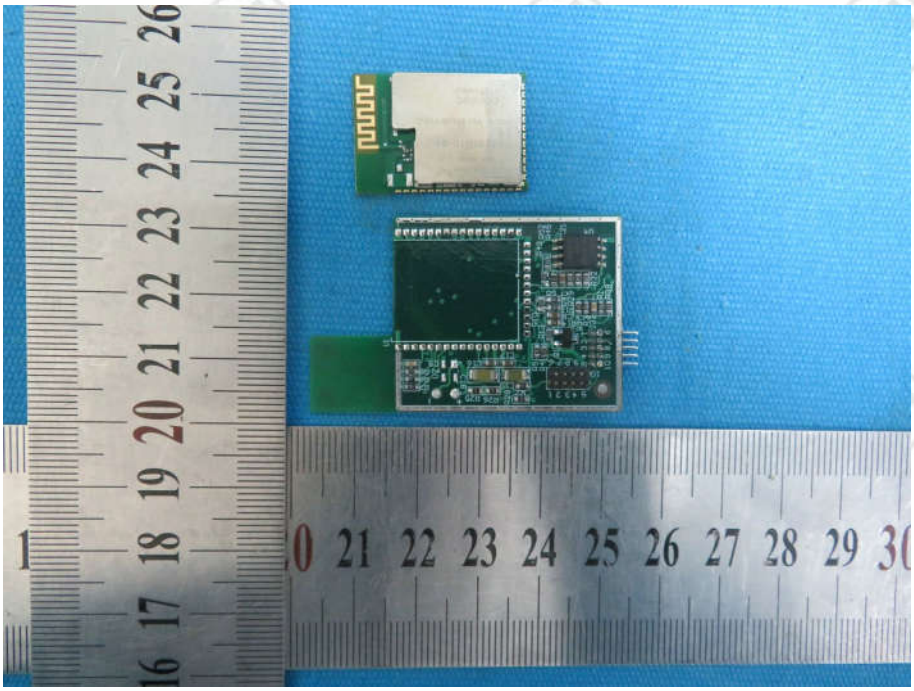

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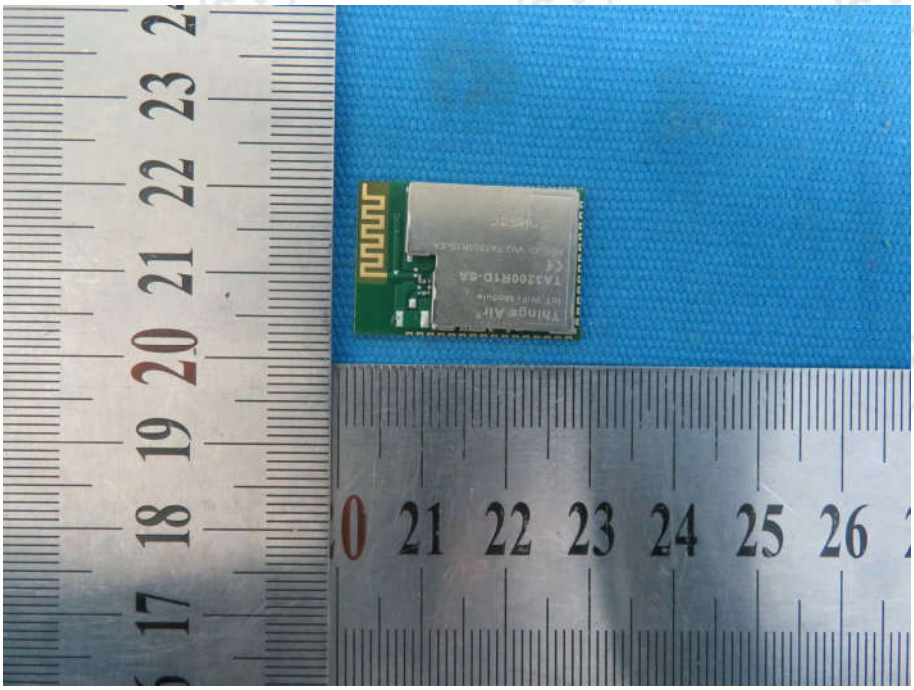
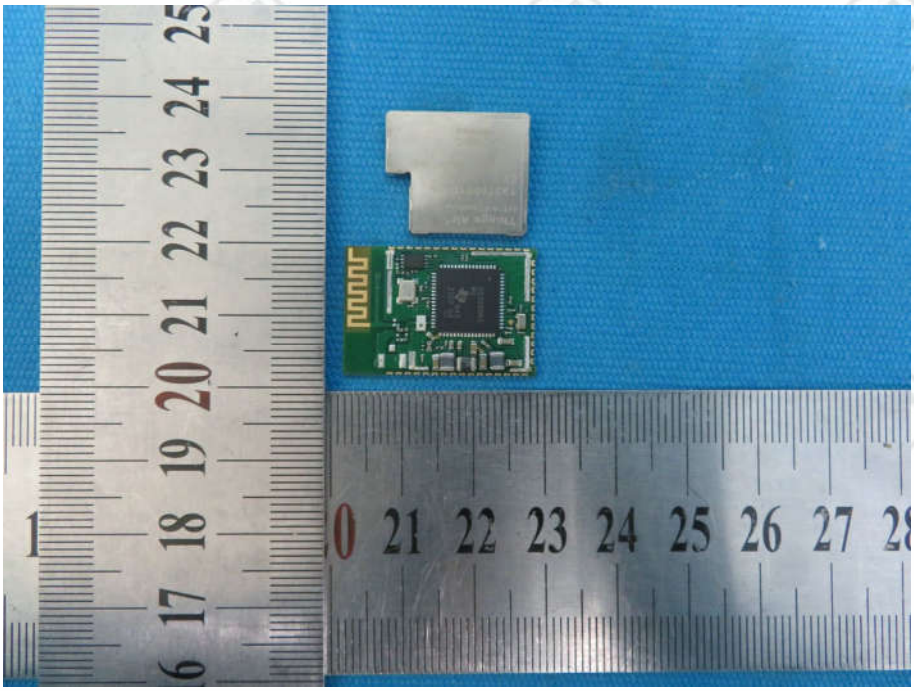
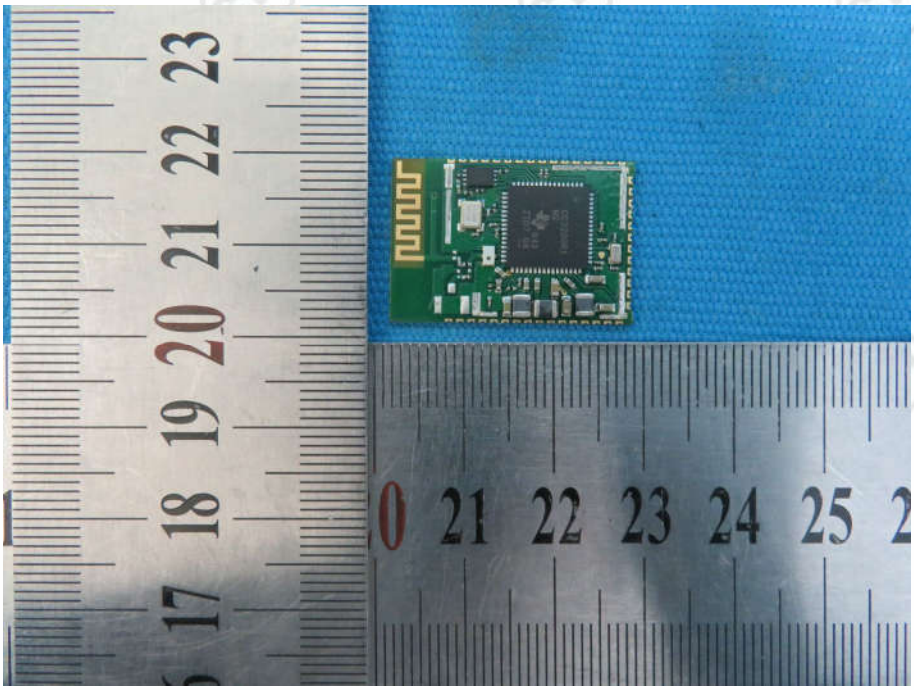


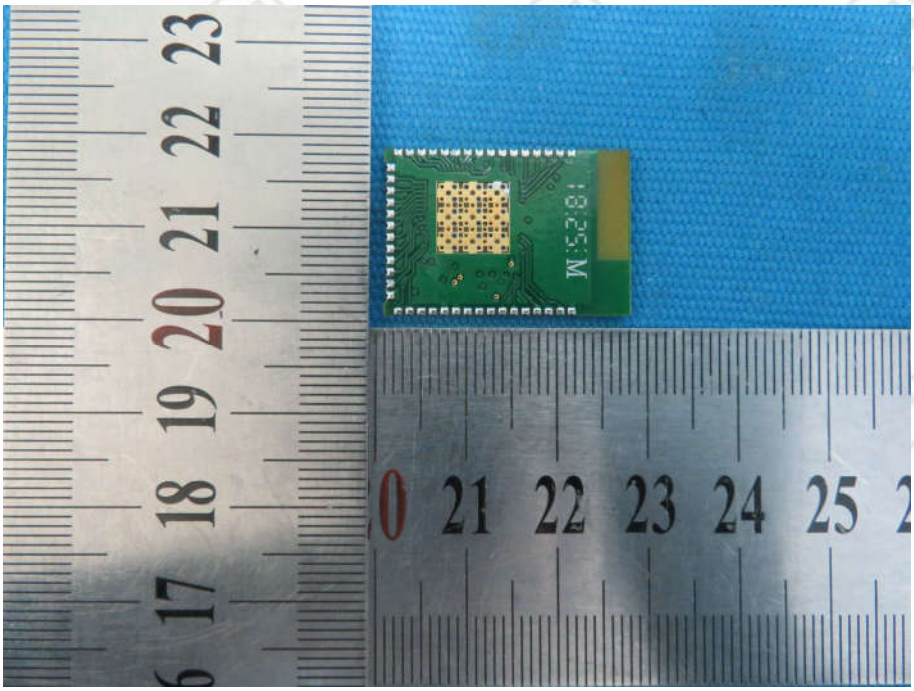
View of Product-20



View of Product-21



View of Product-22



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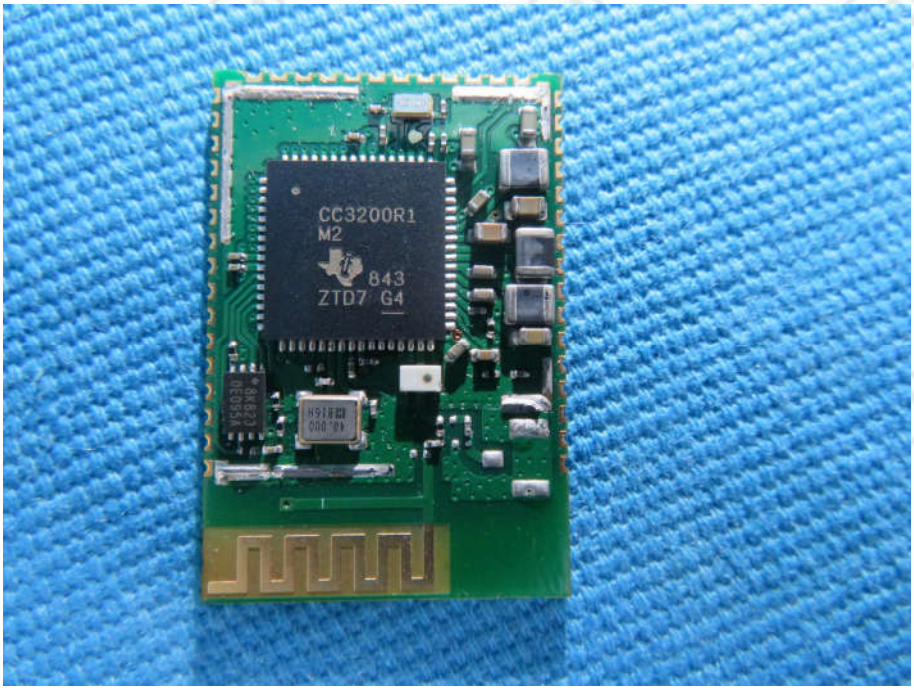

View of Product-24

*** End of Report ***

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