

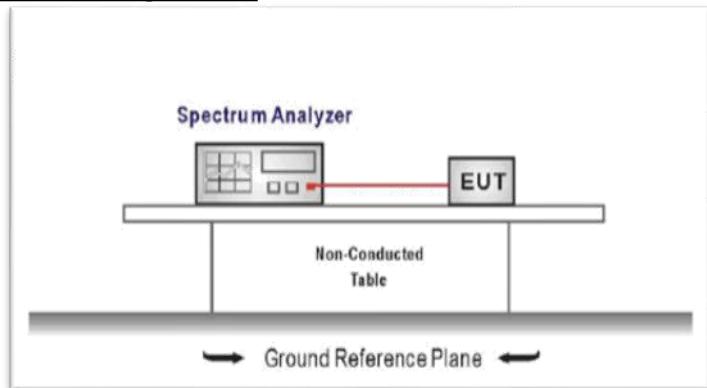
3.5. Band edge and Spurious Emission (Conducted)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Test Configuration



Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.

2. Spectrum Setting:

RBW=100KHz

VBW=300KHz.

Detector function: Peak.

Trace: Max hold.

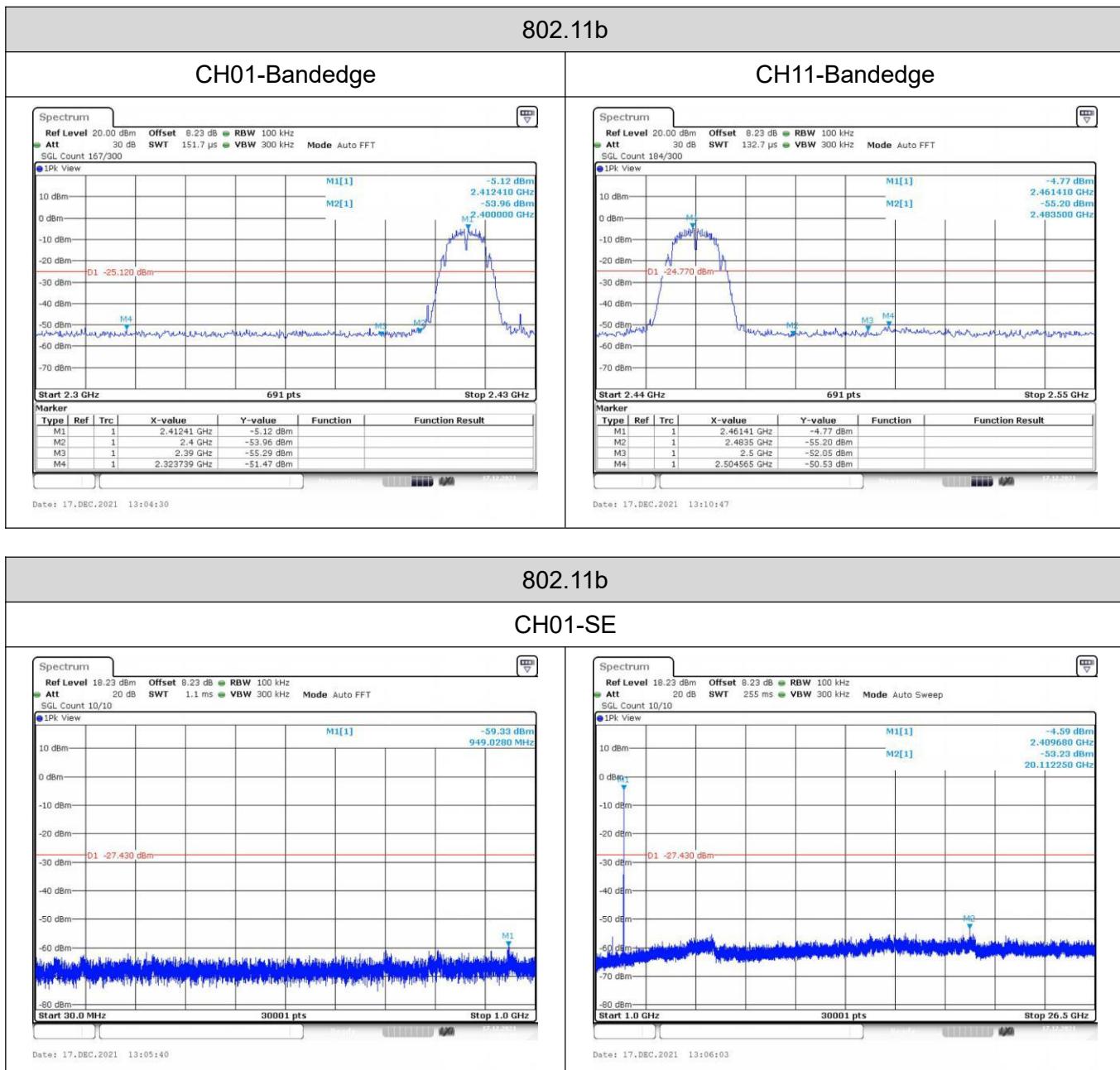
Sweep = Auto couple.

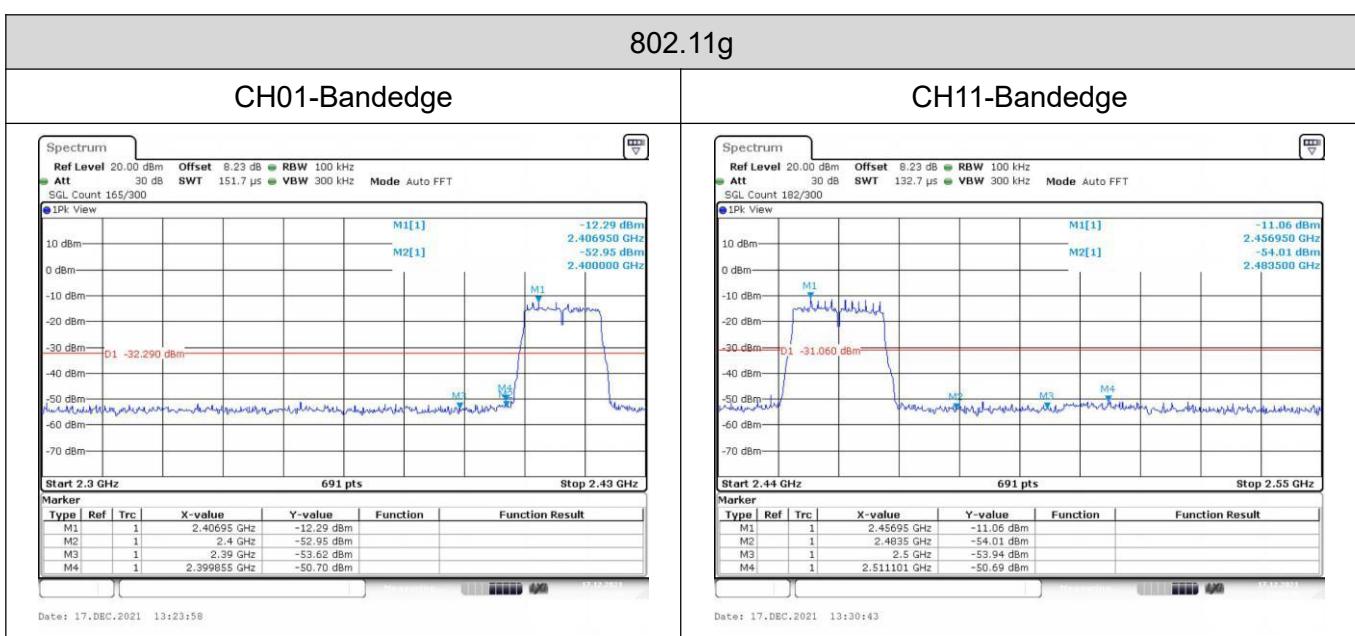
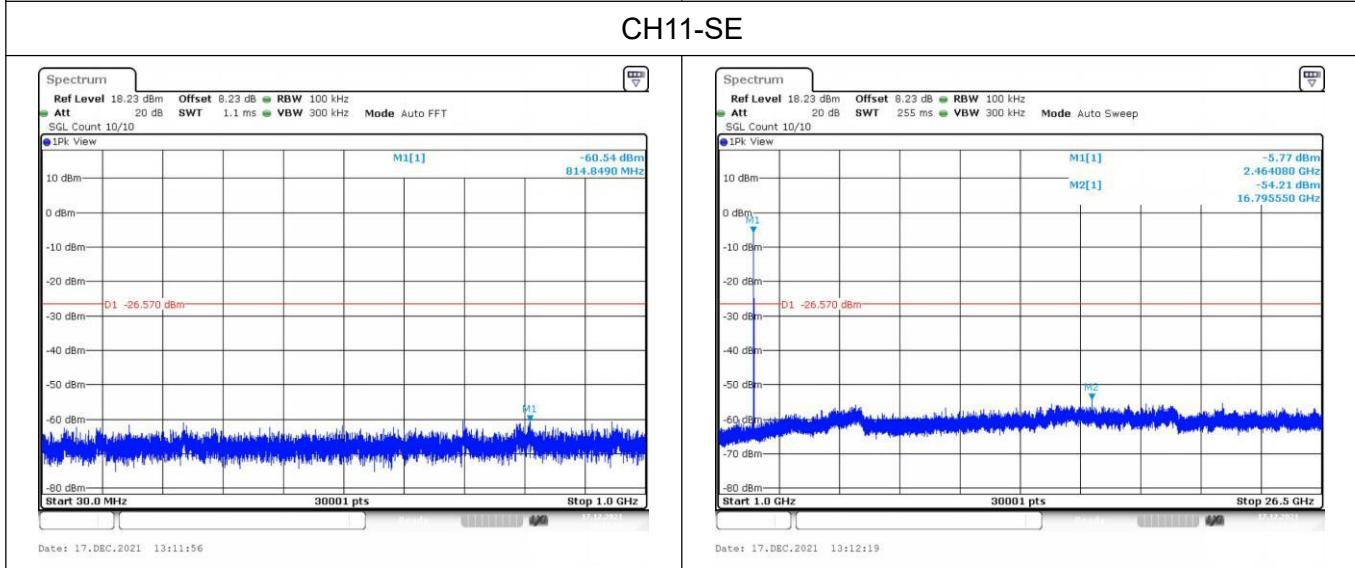
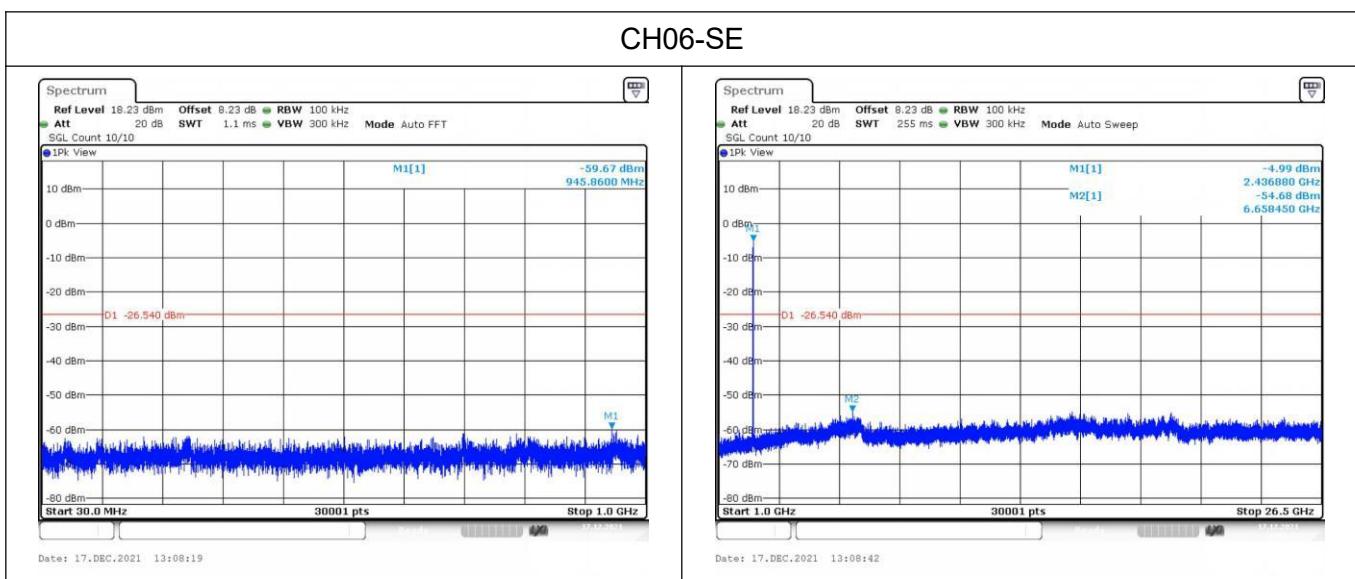
Allow the trace to stabilize.

Test Mode

Please refer to the clause 2.2.

Test Results

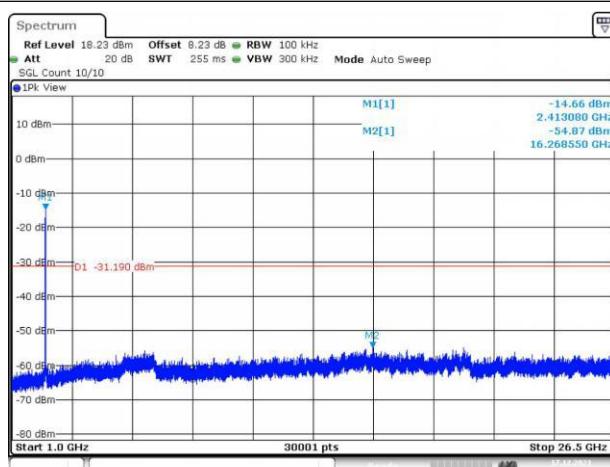
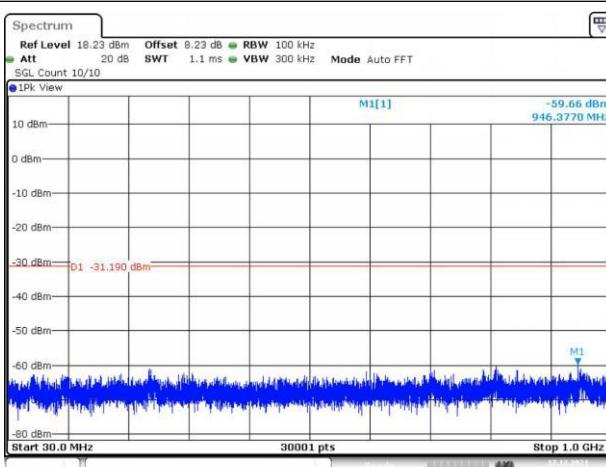
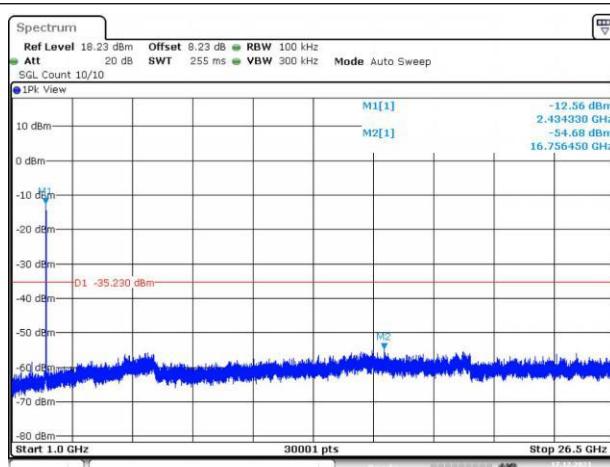
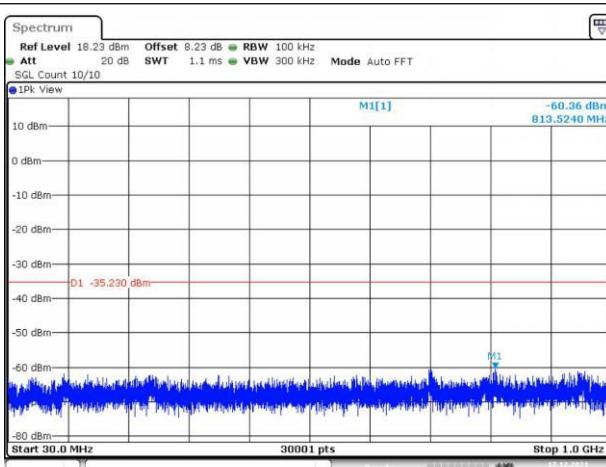
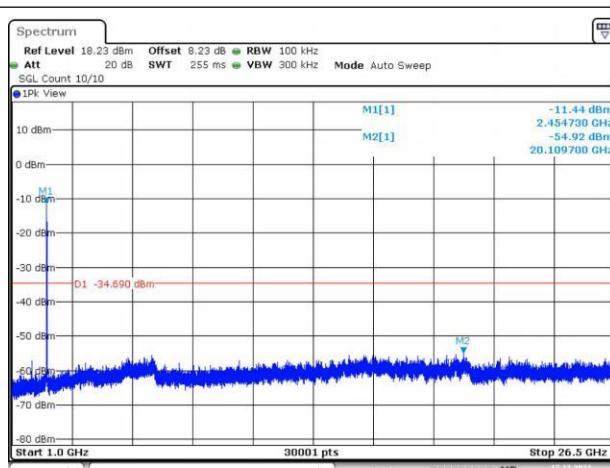
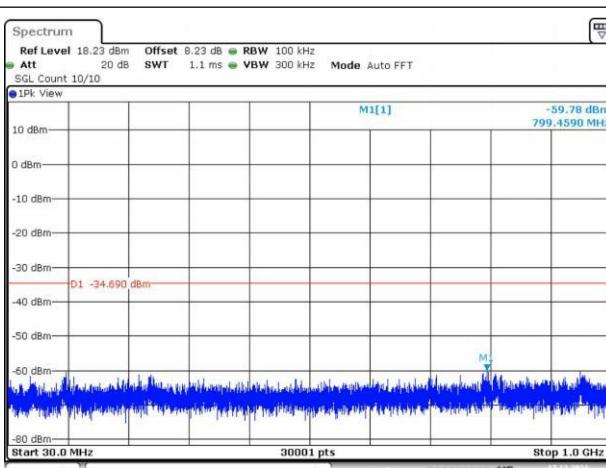




TRF No. FCC Part 15.247_R1

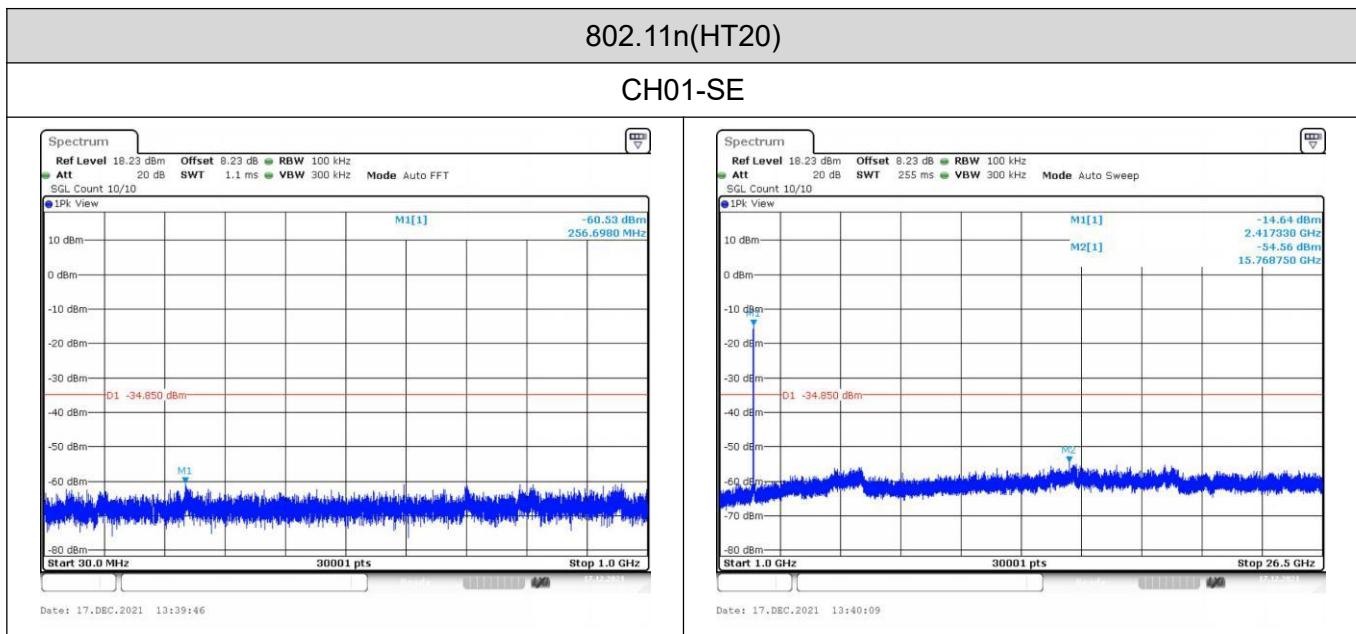
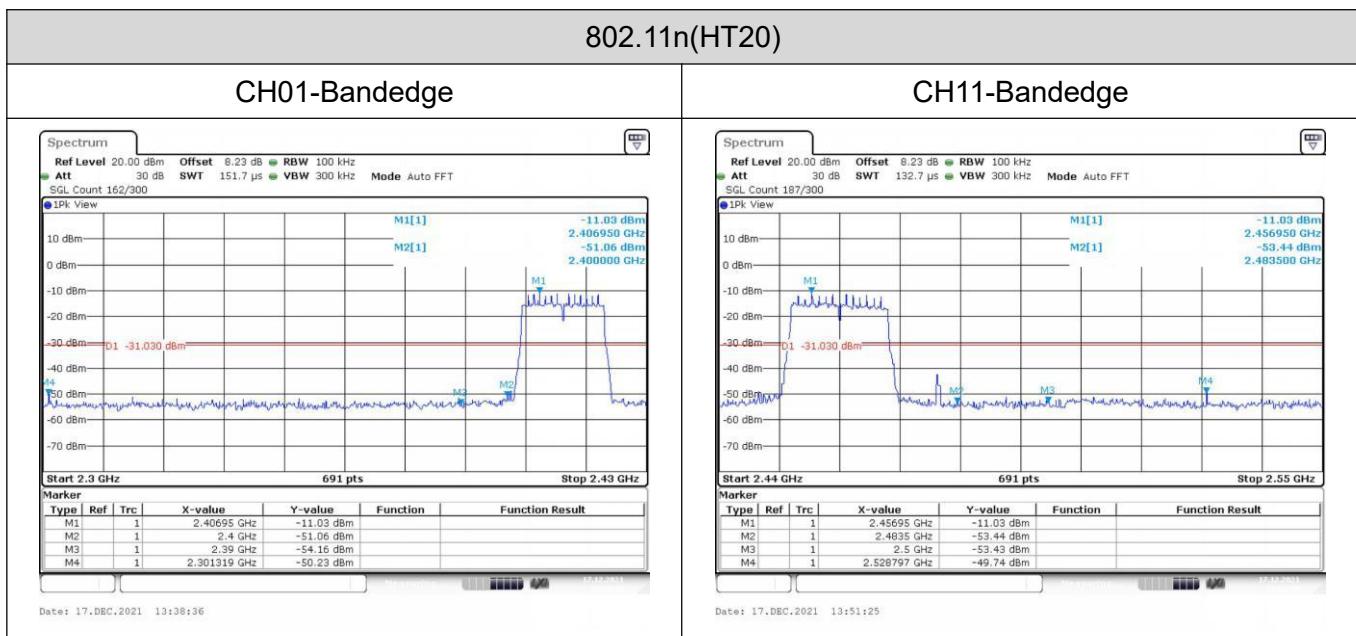
Add : Building 5, No. 316, Jianghong South Road Binjiang District, Hangzhou 310052, China

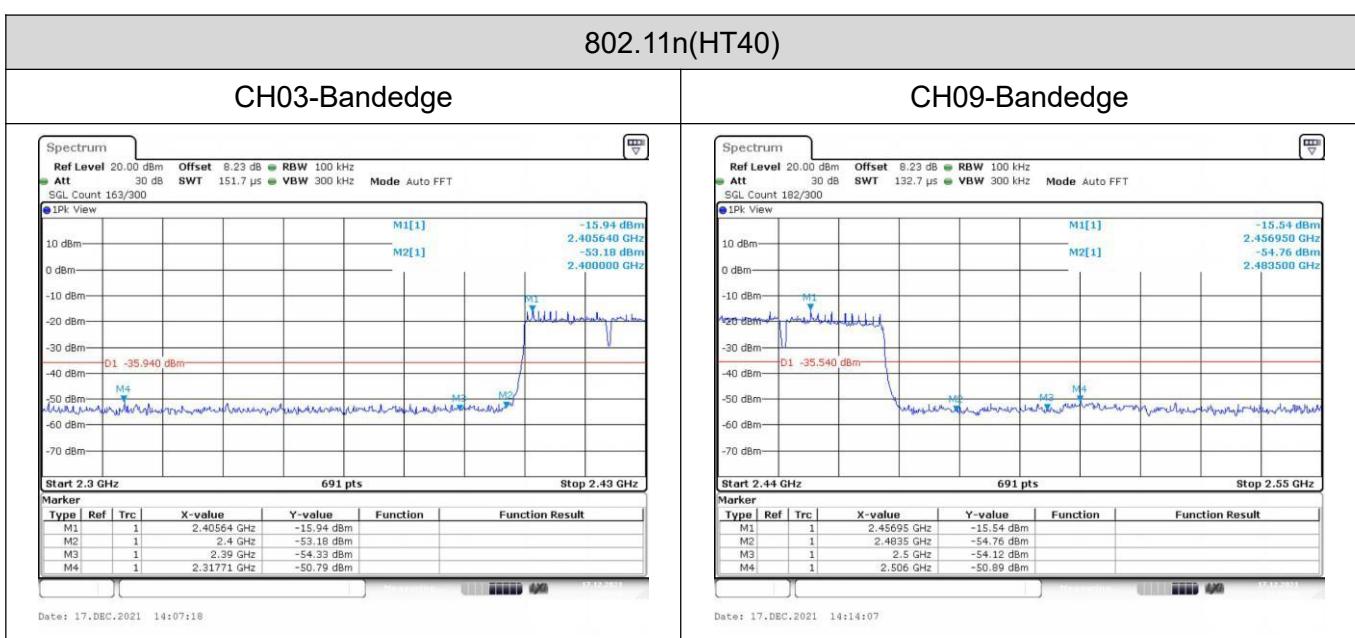
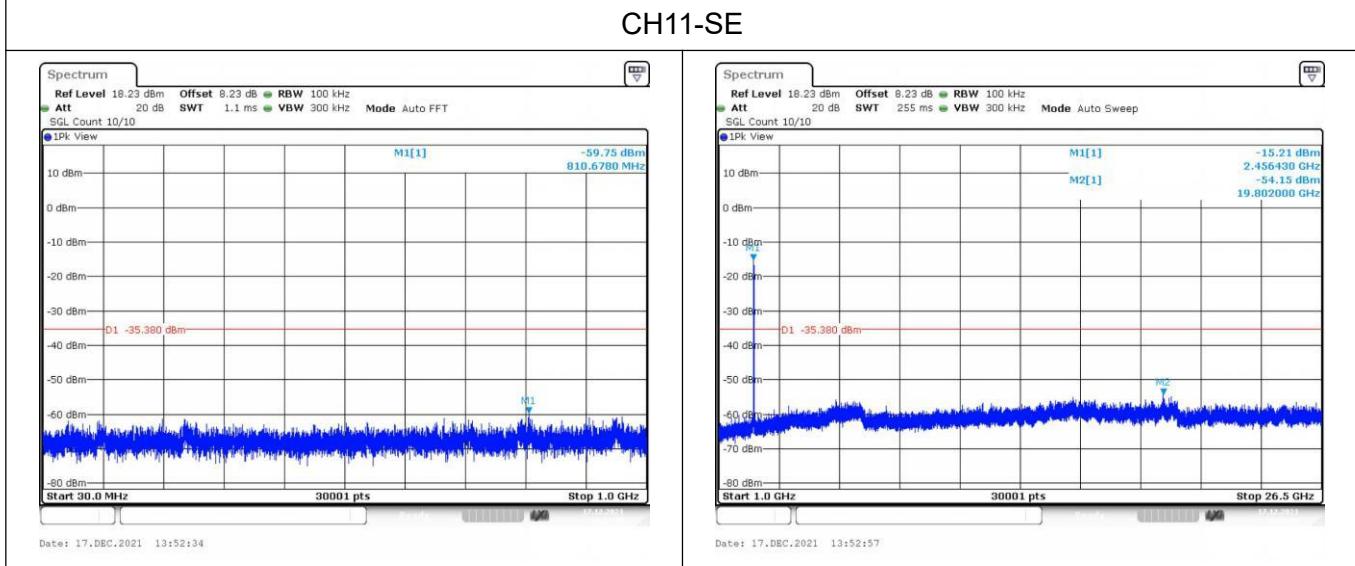
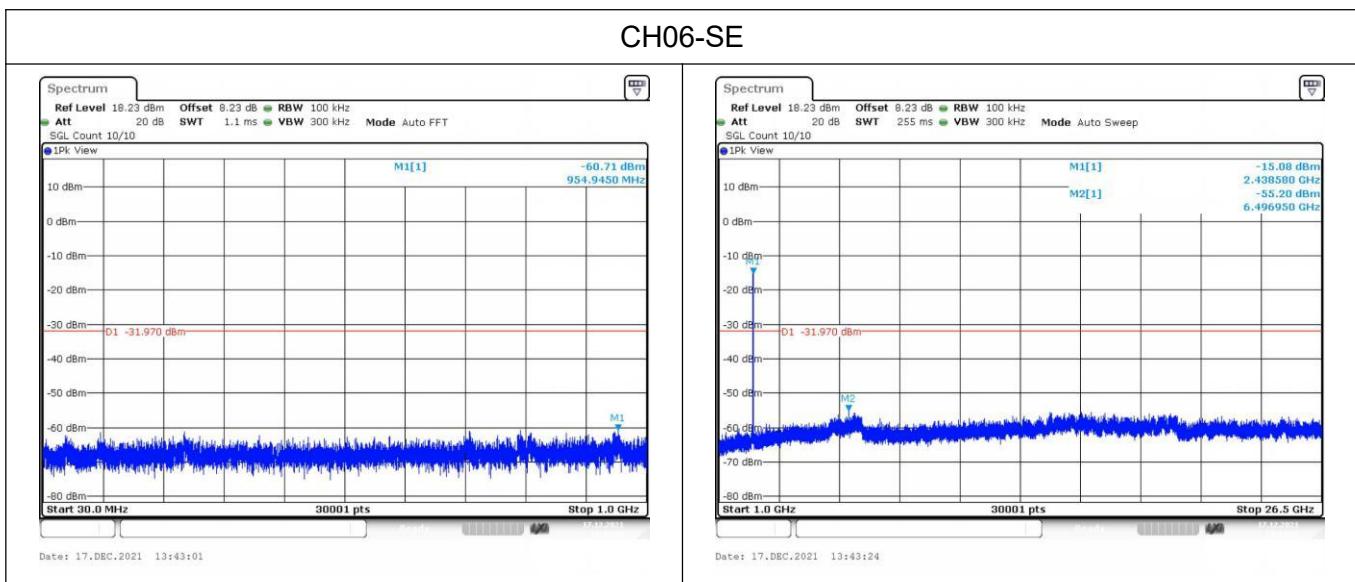
Tel : +(86) 0571-8836 6861 Fax: +(86) 0571-8836 6821 E-mail : server@ksign.cn Web: www.ksign.cn

802.11g
CH01-SE

CH06-SE

CH11-SE

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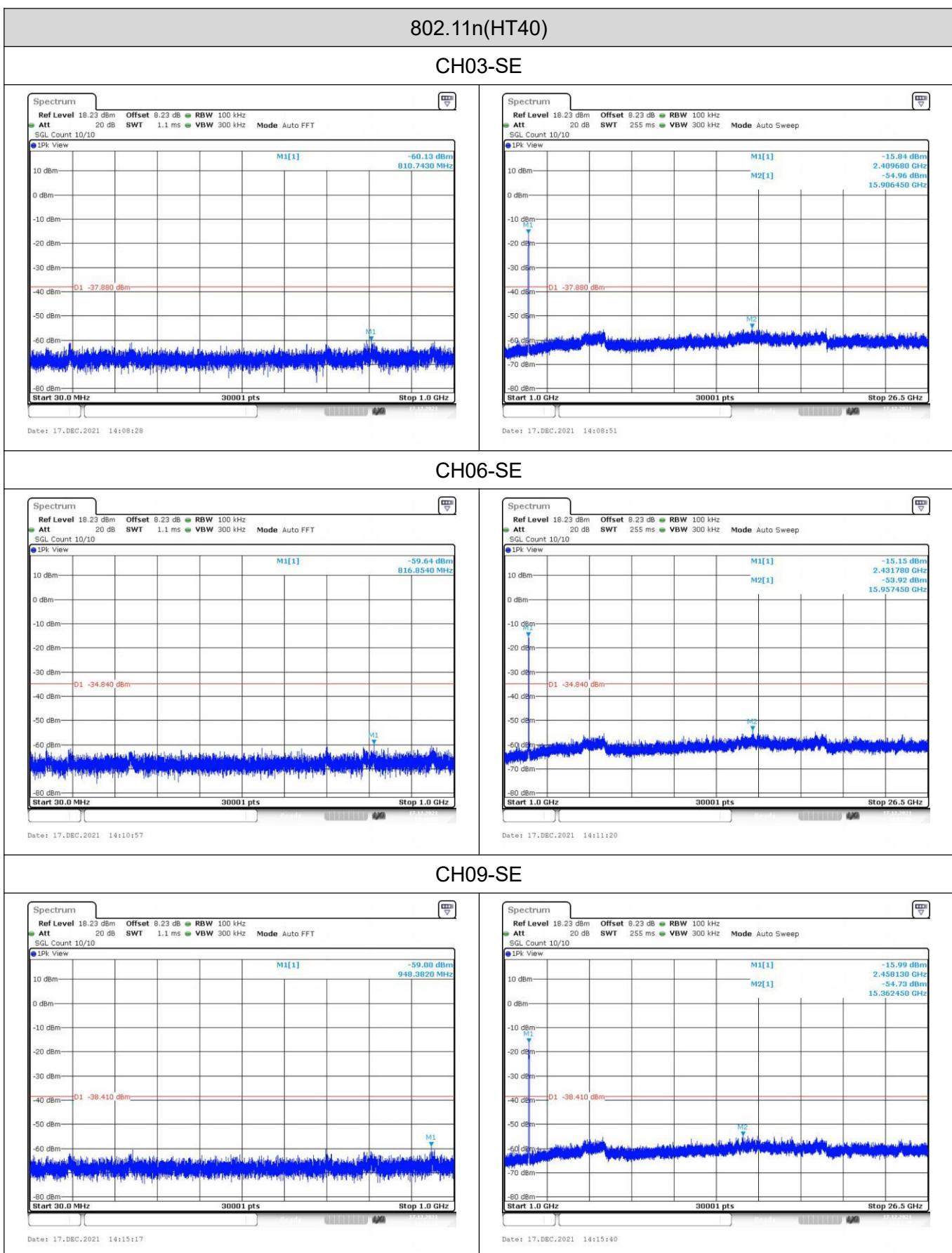




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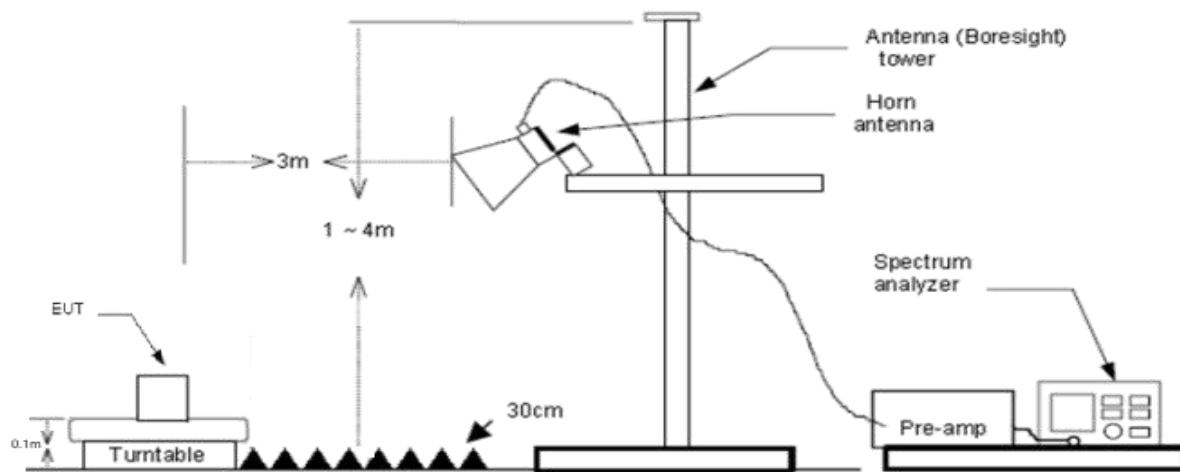
3.6. Band Edge Emissions(Radiated)

Limit

Restricted Frequency Band (MHz)	(dBuV/m)(at 3m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

Note: All restriction bands have been tested, only the worst case is reported.

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
 RBW=1MHz, VBW=3MHz PEAK detector for Peak value.
 RBW=1MHz, VBW=10Hz with PEAK detector for Average Value.

Test Mode

Please refer to the clause 2.2.

Test Results

Note:

1. Measurement = Reading level + Correct Factor

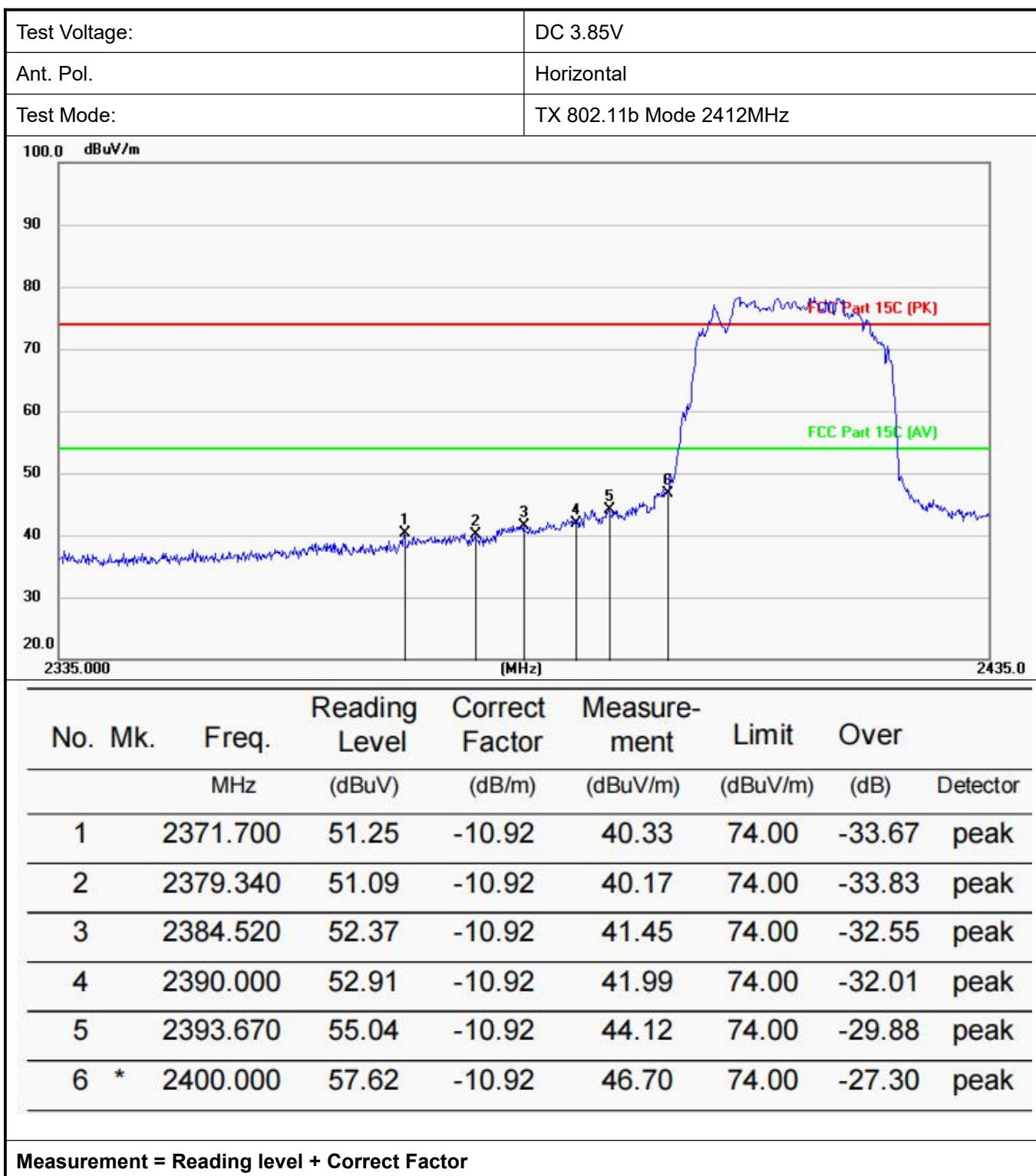
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

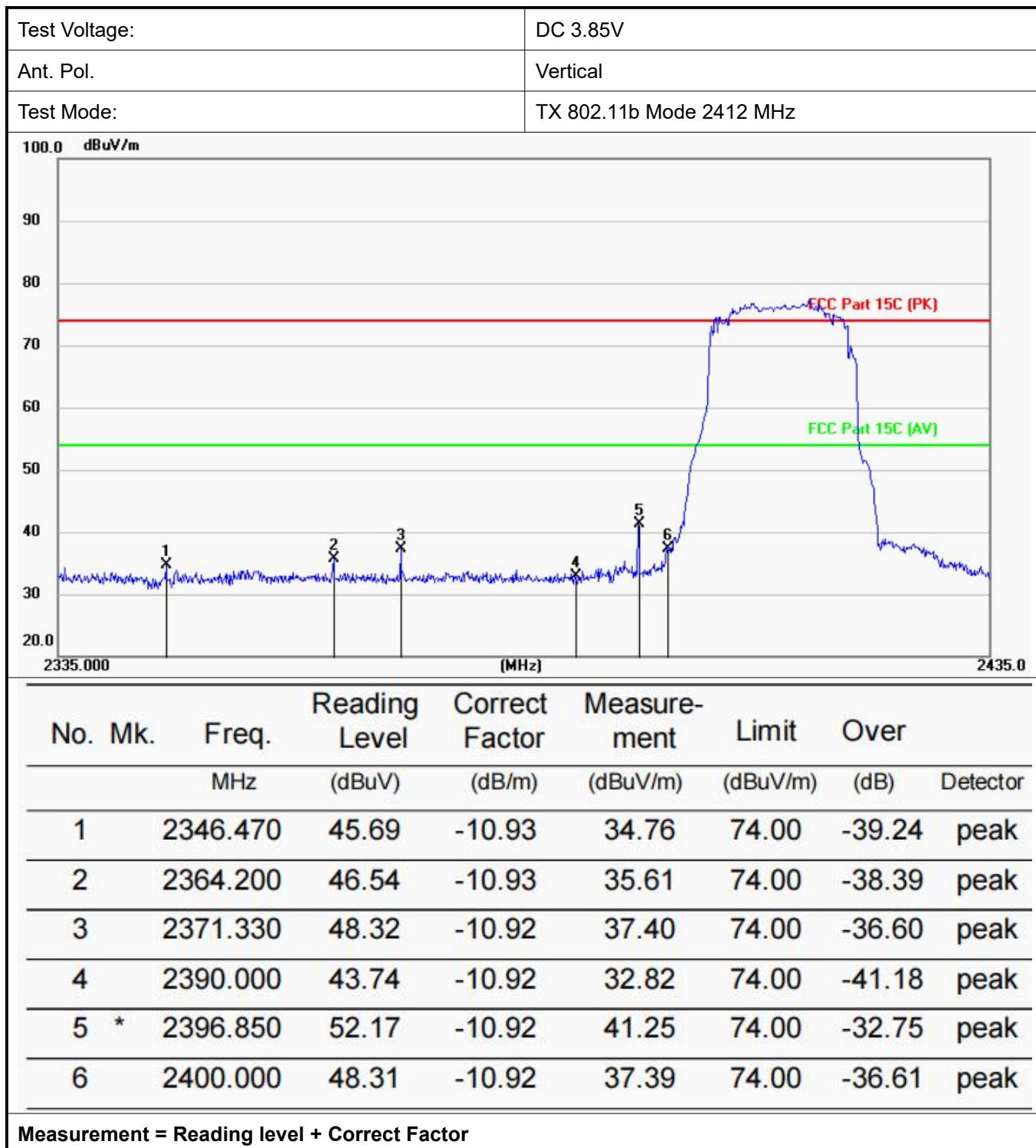
2. Pre-scan 802.11b, 802.11g, 802.11n(HT20) and 802.11n(HT40) mode, and found the 802.11n20 mode which is worse case, so only show the test data for worse case.

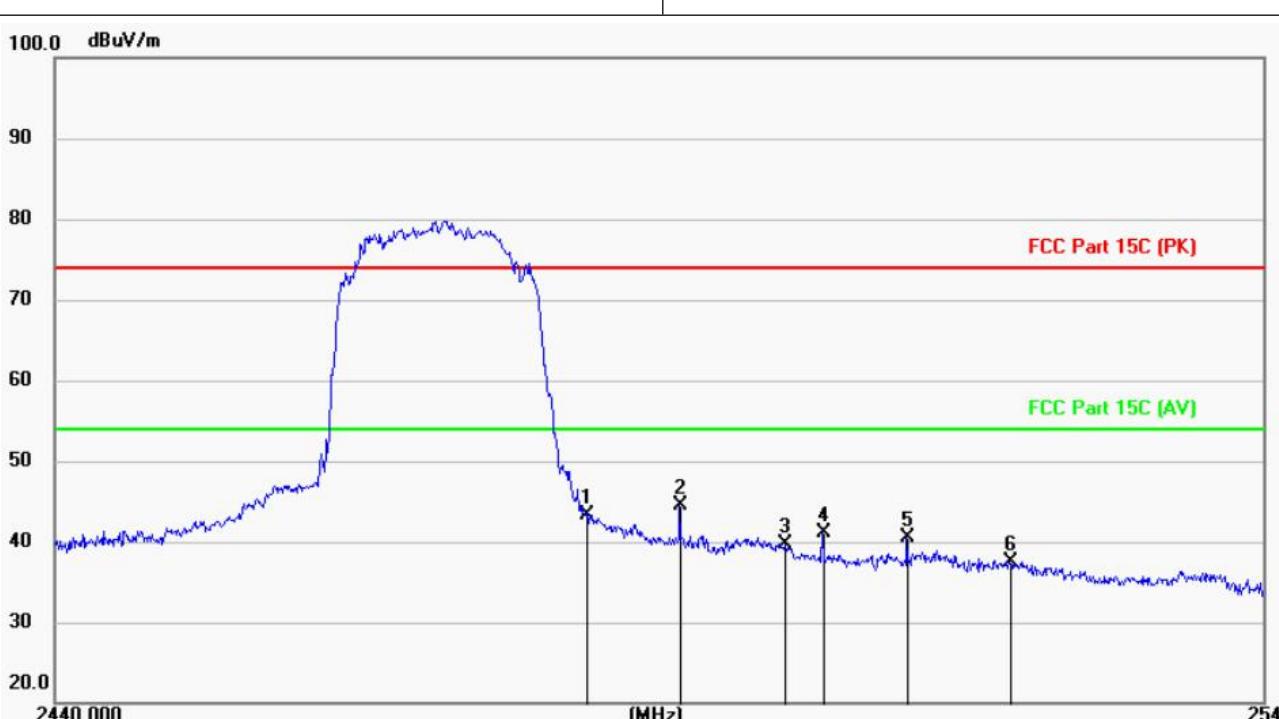
TRF No. FCC Part 15.247_R1

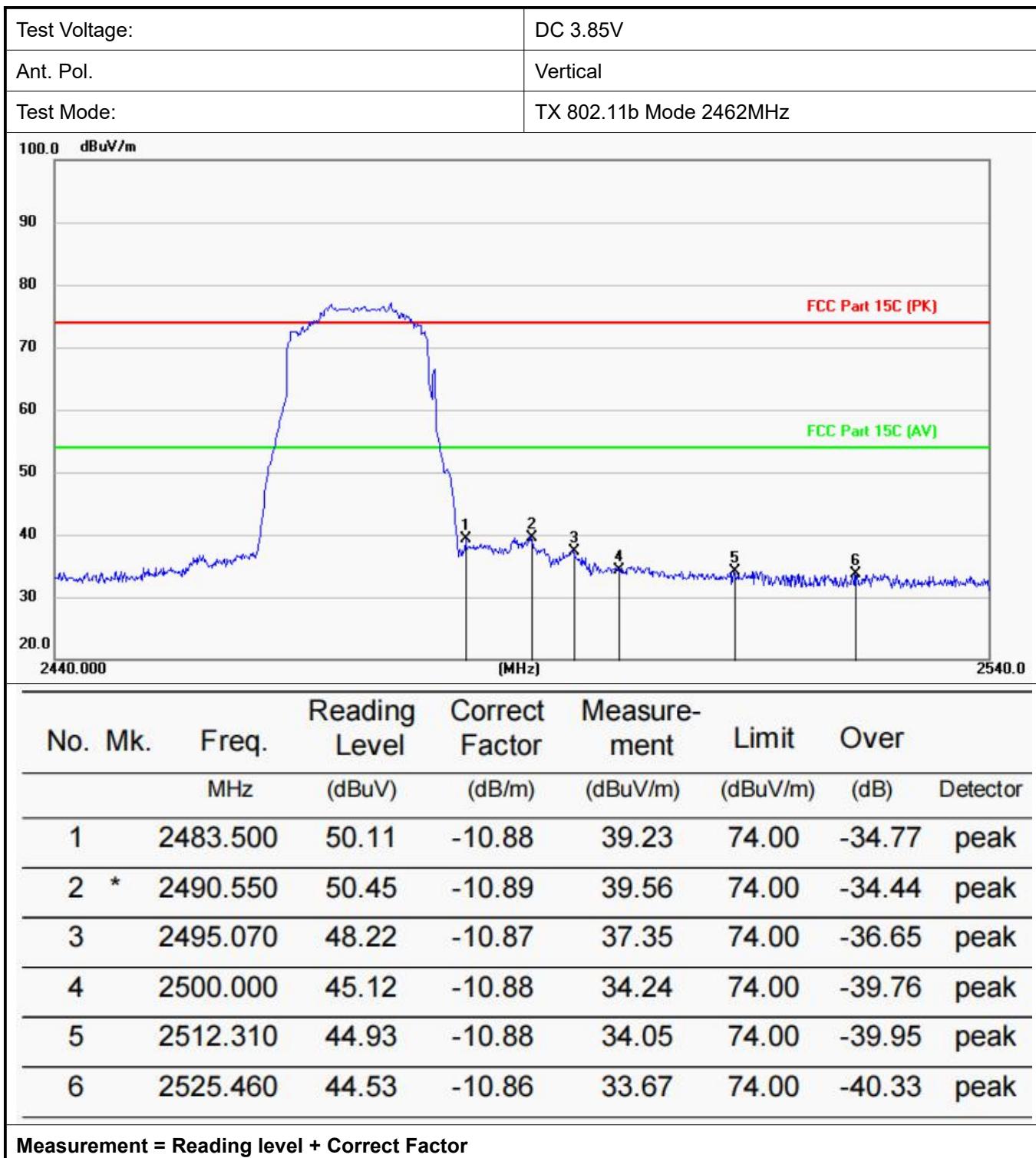
Add : Building 5, No. 316, Jianghong South Road Binjiang District, Hangzhou 310052, China

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Test Voltage:	DC 3.85V							
Ant. Pol.	Horizontal							
Test Mode:	TX 802.11b Mode 2462MHz							
								
No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	54.08	-10.88	43.20	74.00	-30.80	peak
2	*	2491.200	55.34	-10.89	44.45	74.00	-29.55	peak
3		2500.000	50.55	-10.88	39.67	74.00	-34.33	peak
4		2503.070	51.92	-10.88	41.04	74.00	-32.96	peak
5		2510.120	51.39	-10.87	40.52	74.00	-33.48	peak
6		2518.740	48.30	-10.86	37.44	74.00	-36.56	peak
Measurement = Reading level + Correct Factor								



3.7. Spurious Emission (Radiated)

Limit

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

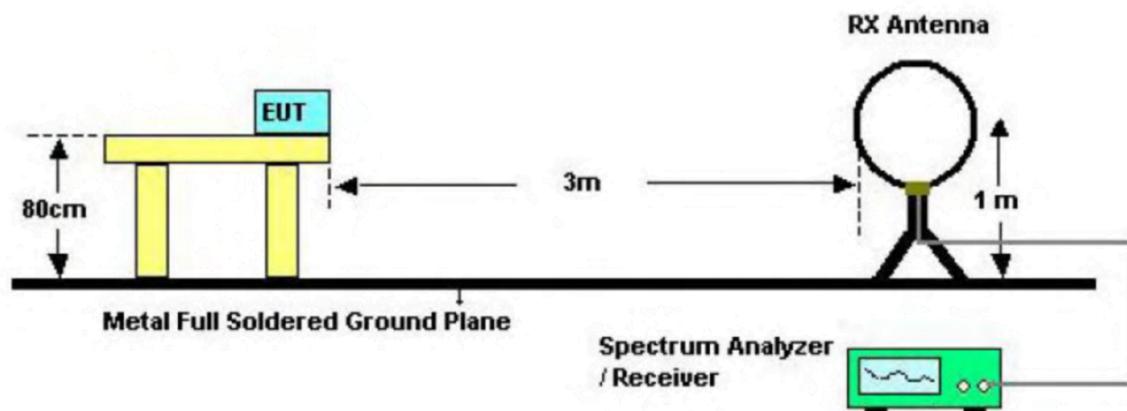
Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Distance Meters(at 3m)	
	Peak	Average
Above 1000	74	54

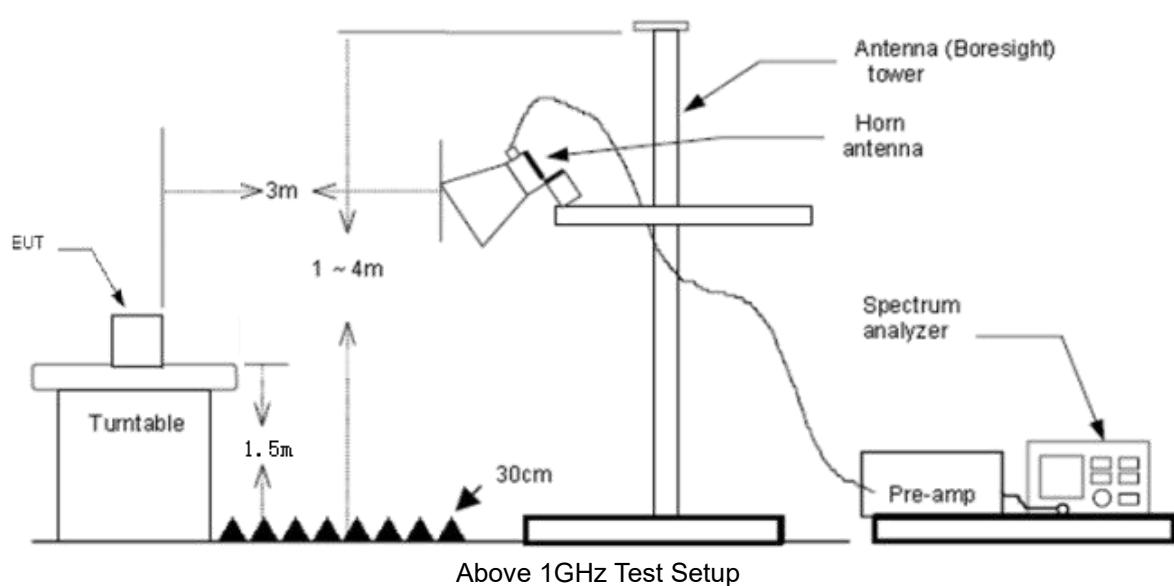
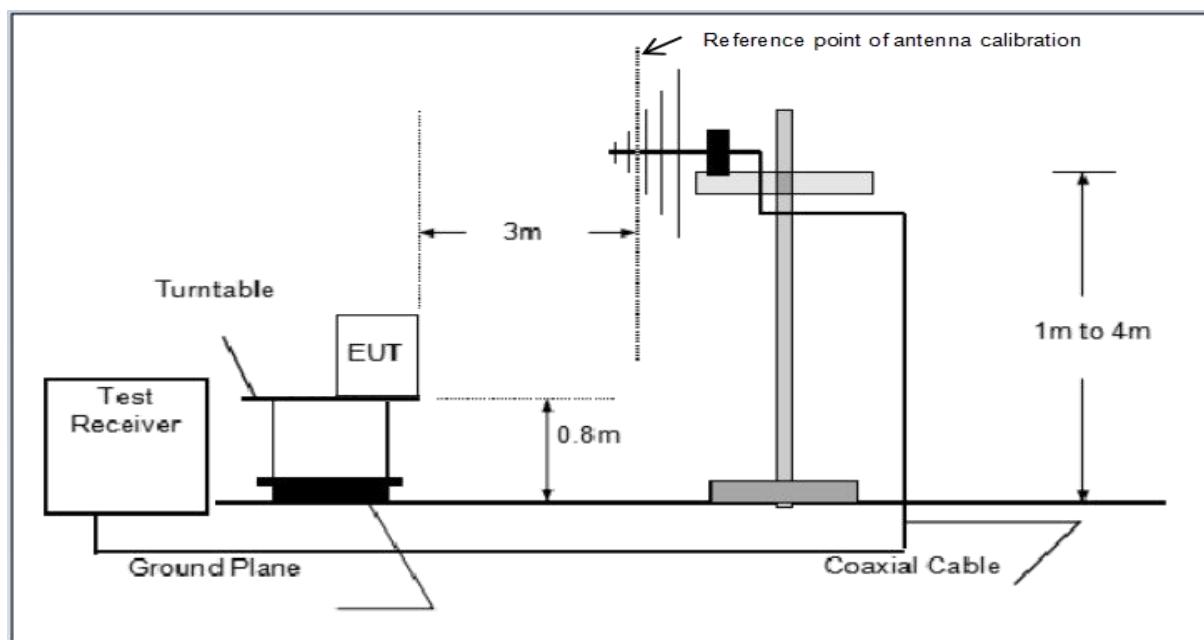
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

Test Configuration



Below 30MHz Test Setup



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=1MHz Peak detector for Peak value.
RBW=1MHz, VBW=10Hz Peak detector for Average value.

Test Mode

Please refer to the clause 2.2

Test Result

9 KHz~30 MHz and 18GHz~25GHz

From 9 KHz~30 MHz and 18GHz~25GHz: Conclusion: PASS

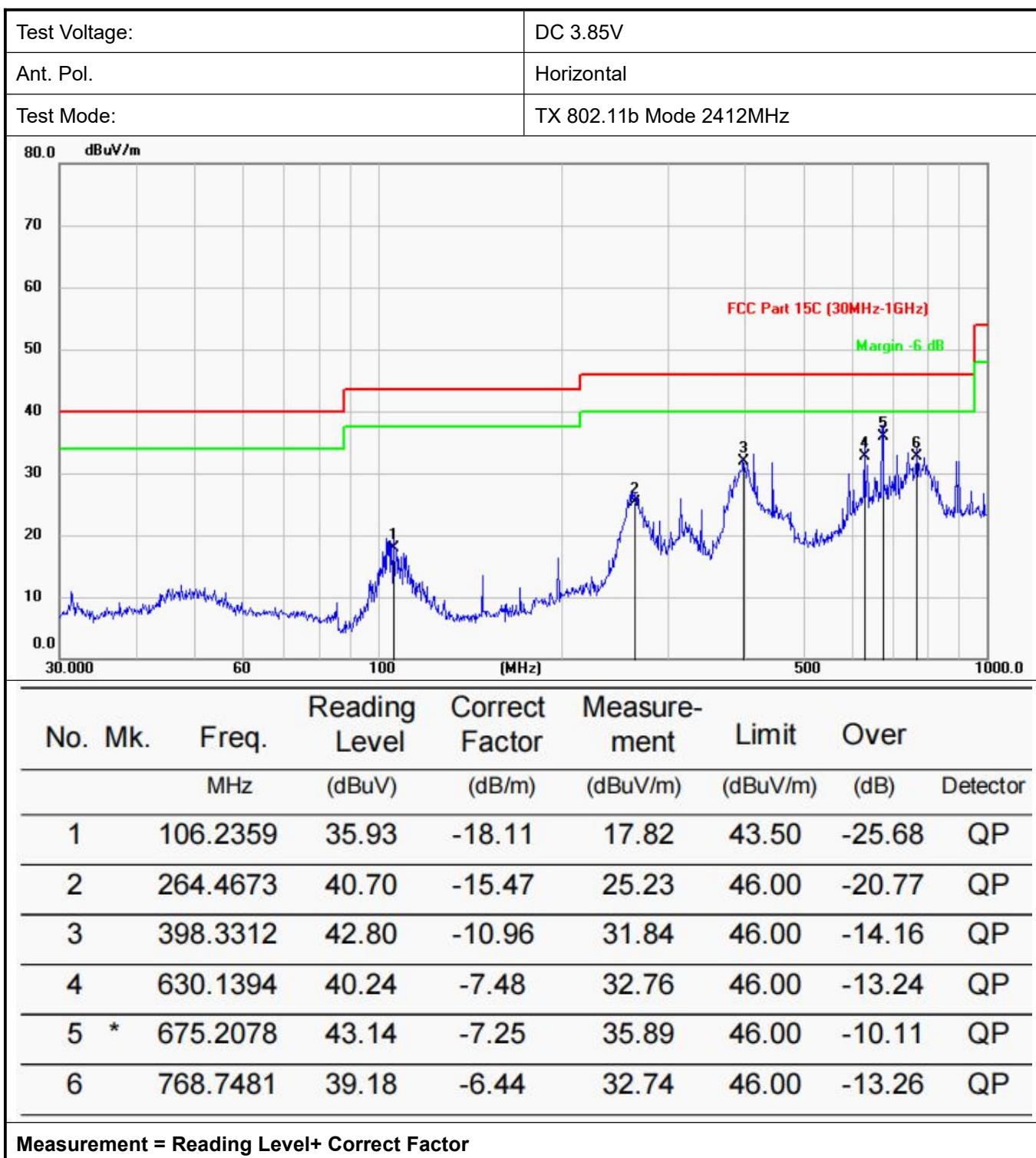
Note:

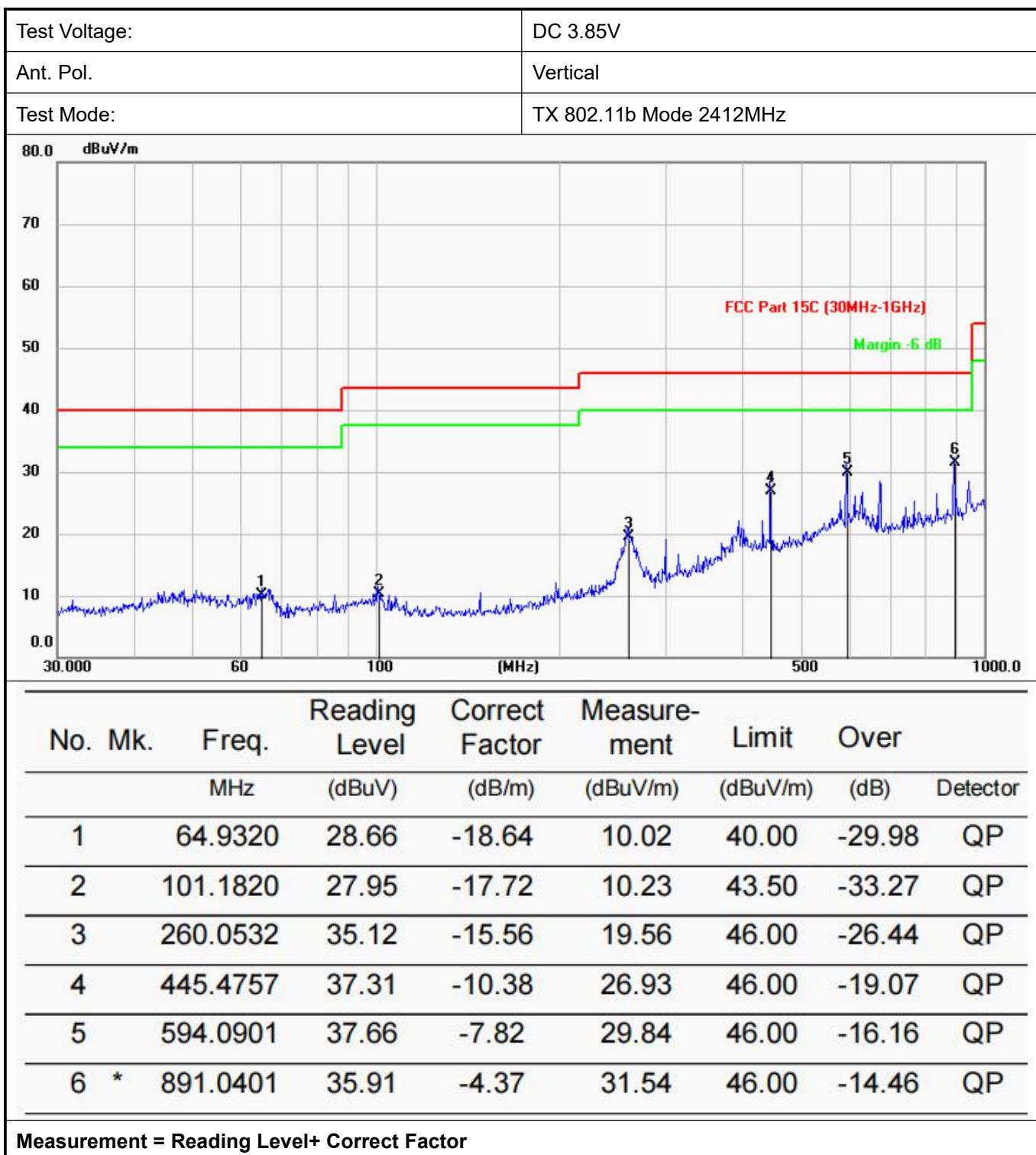
- 1) Measurement = Reading level + Correct Factor
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- 2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5) Pre-scan 802.11b/g/n(HT20/HT40) modulation, found 802.11n20_2412MHz which it is worse case for 30MHz-1GHz , the 802.11n20 modulation which it is worse case for above 1GHz, so only show the test data for worse case.

BELOW 30MHz

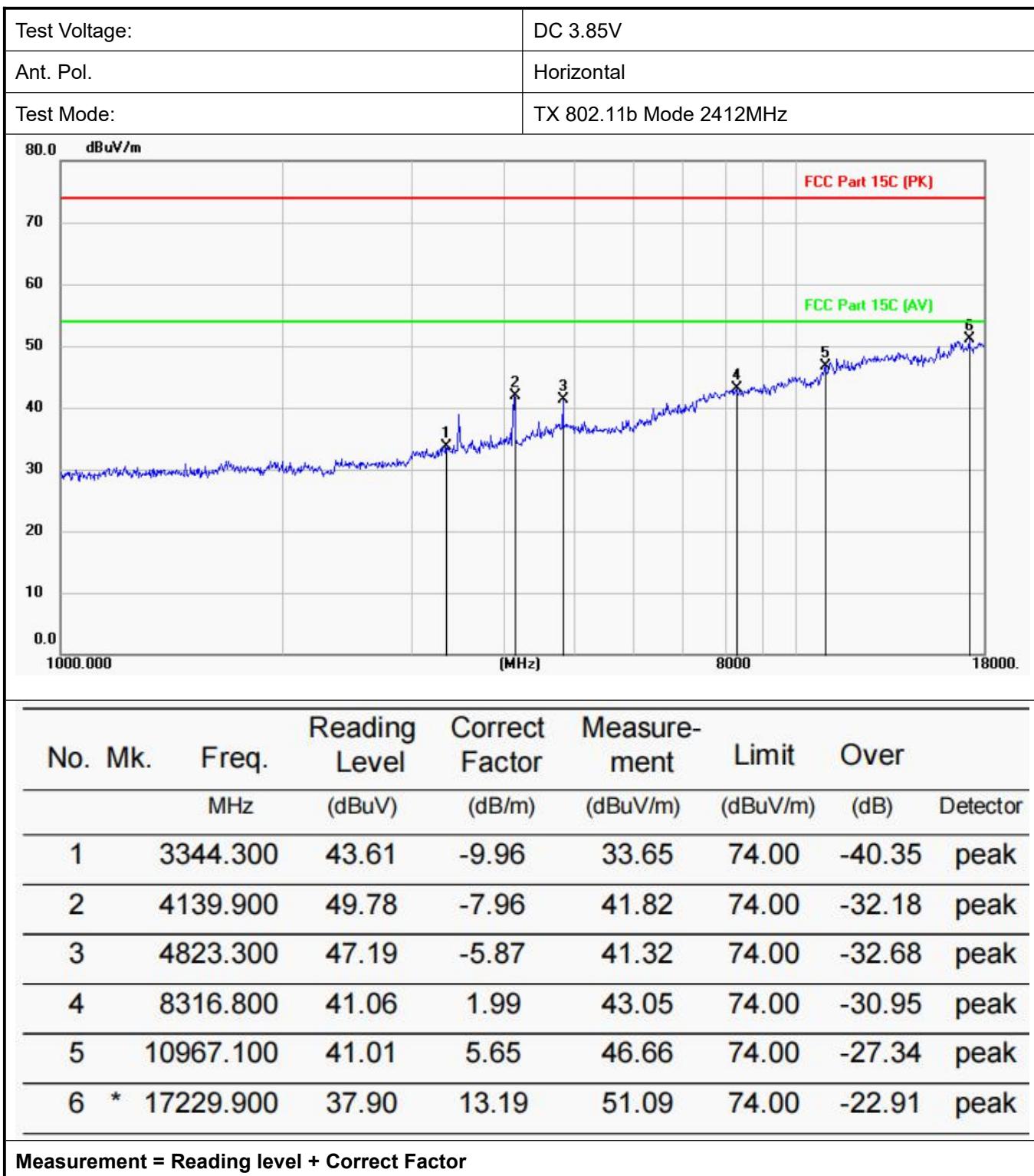
No emission found between lowest internal used/generated frequencies to 30MHz.

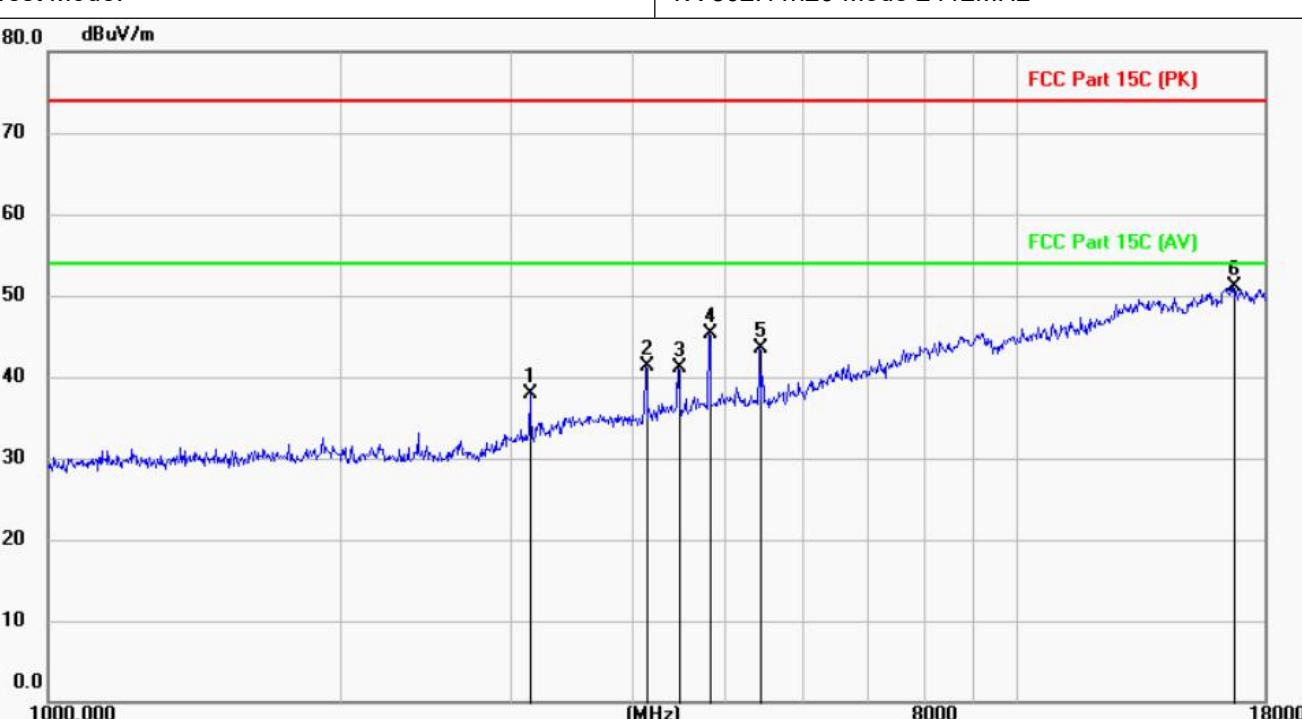
30MHz-1GHz





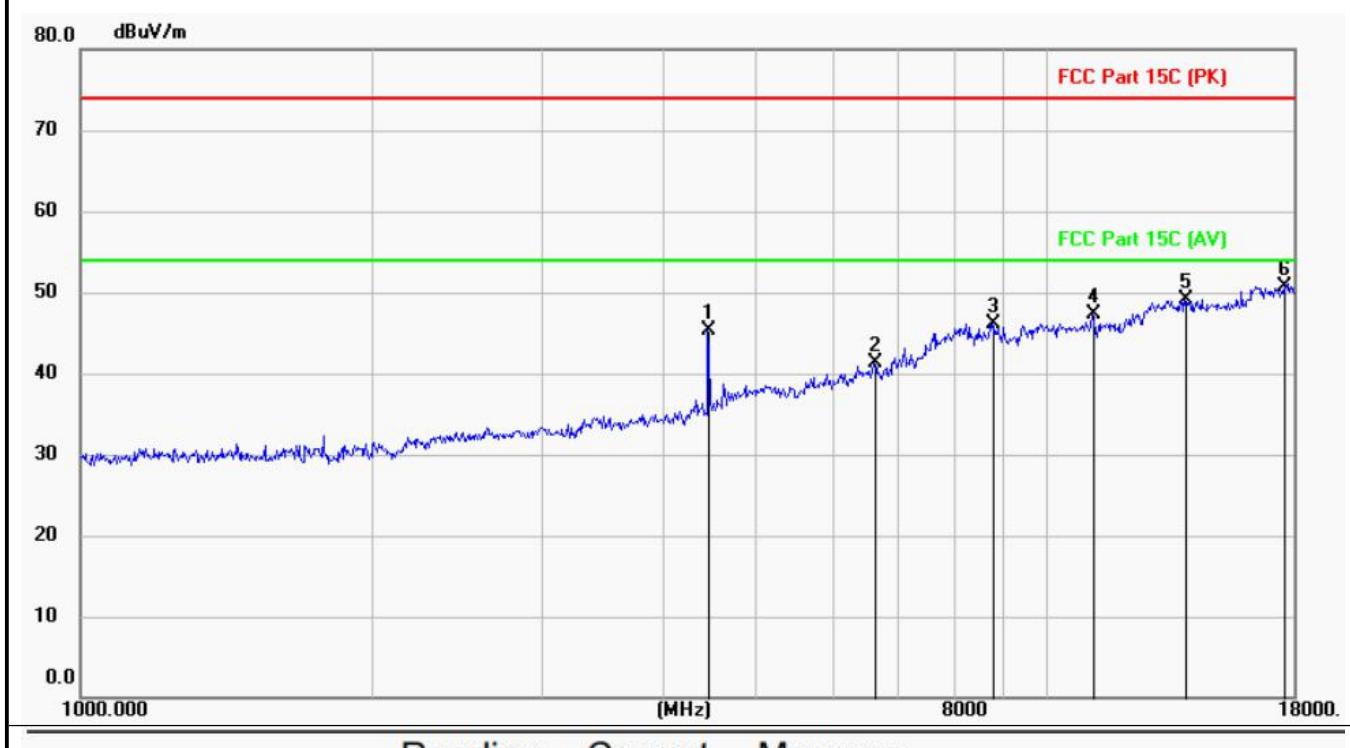
Adobe 1GHz



Test Voltage:	DC 3.85V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11n20 Mode 2412MHz						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)
1		3148.800	48.28	-10.32	37.96	74.00	-36.04
2		4141.600	49.28	-7.95	41.33	74.00	-32.67
3		4474.800	47.86	-6.84	41.02	74.00	-32.98
4		4806.300	51.32	-5.92	45.40	74.00	-28.60
5		5430.200	48.49	-4.99	43.50	74.00	-30.50
6	*	16697.800	37.54	13.50	51.04	74.00	-22.96

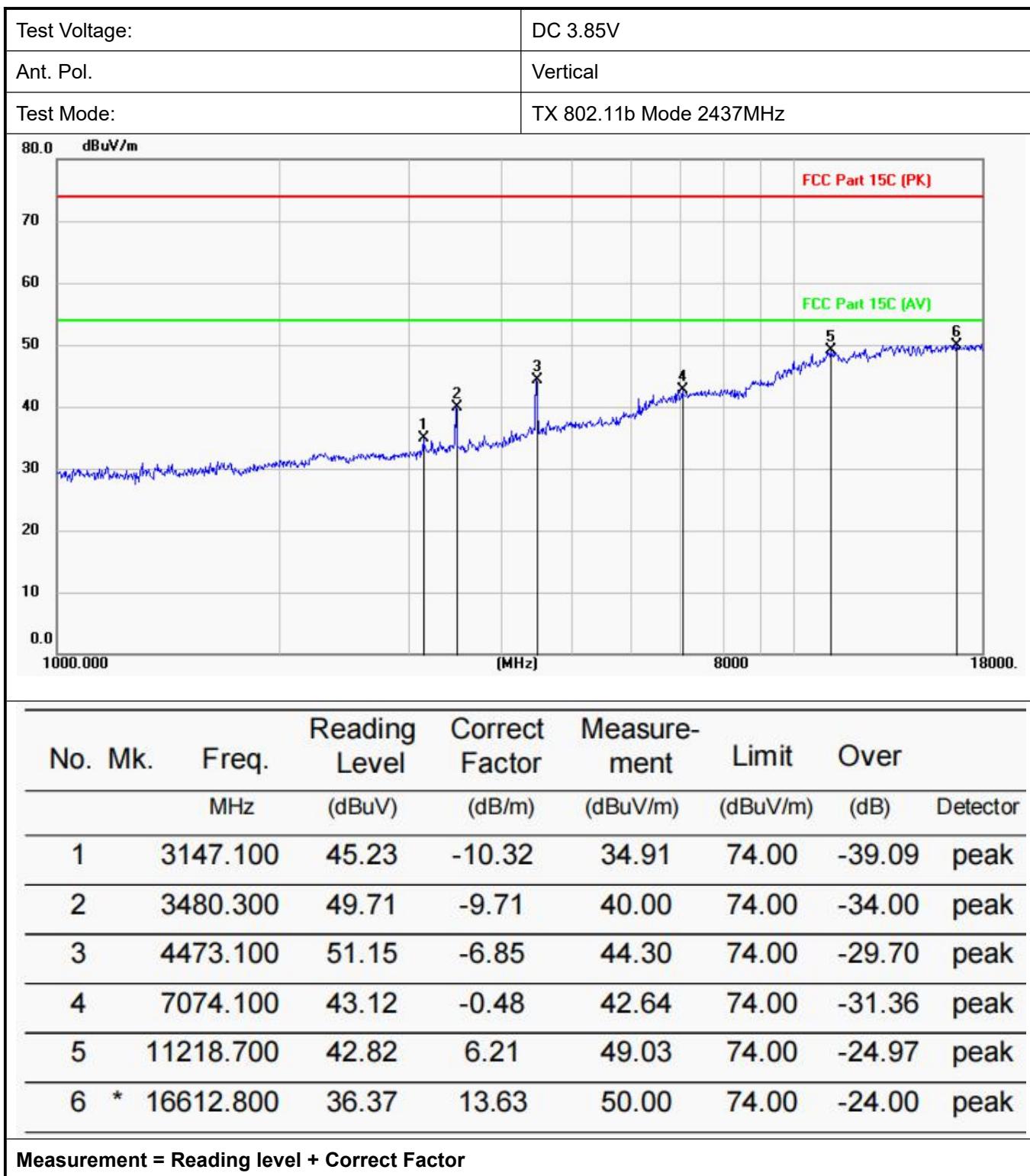
Measurement = Reading level + Correct Factor

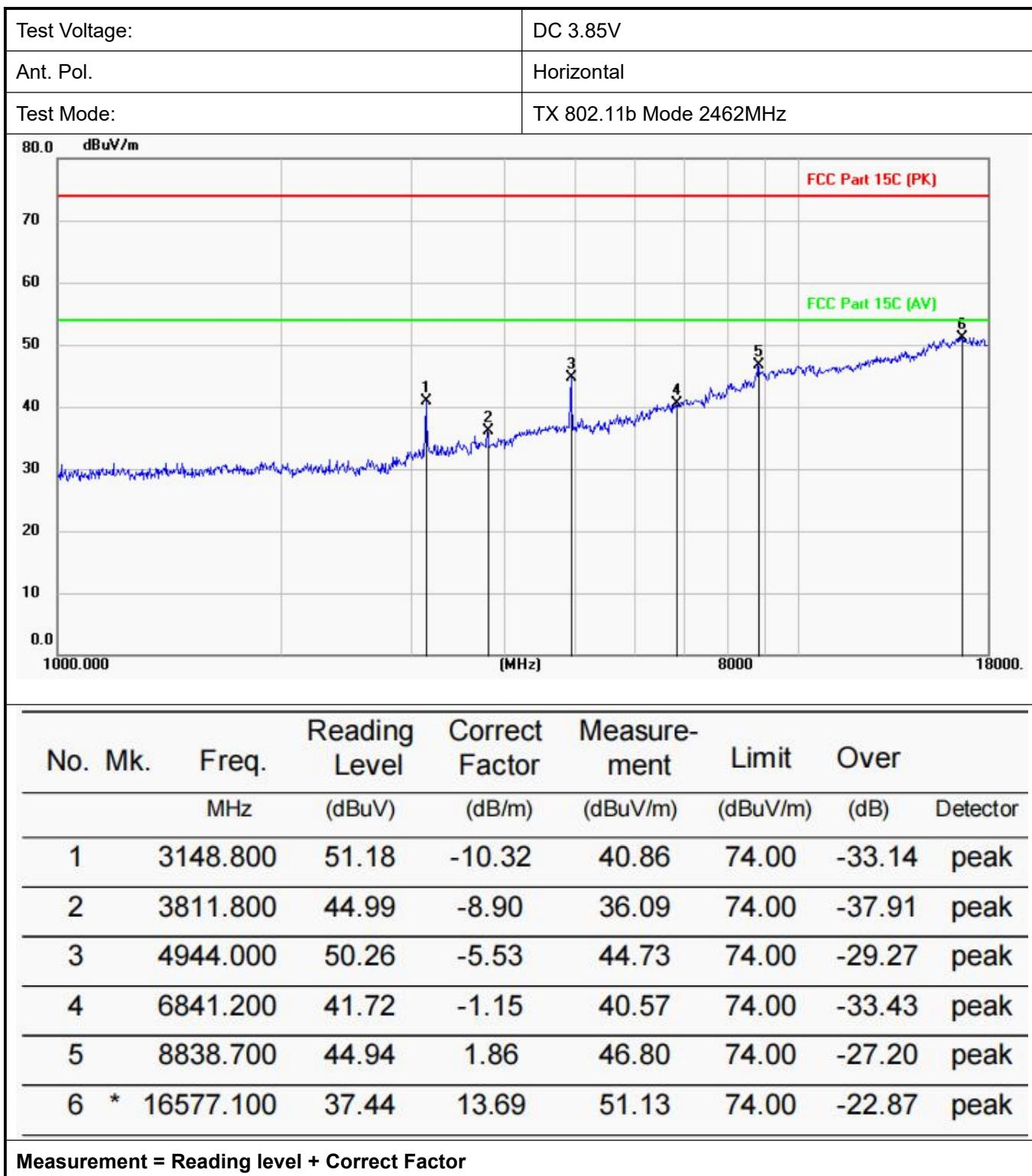
Test Voltage:	DC 3.85V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2437MHz

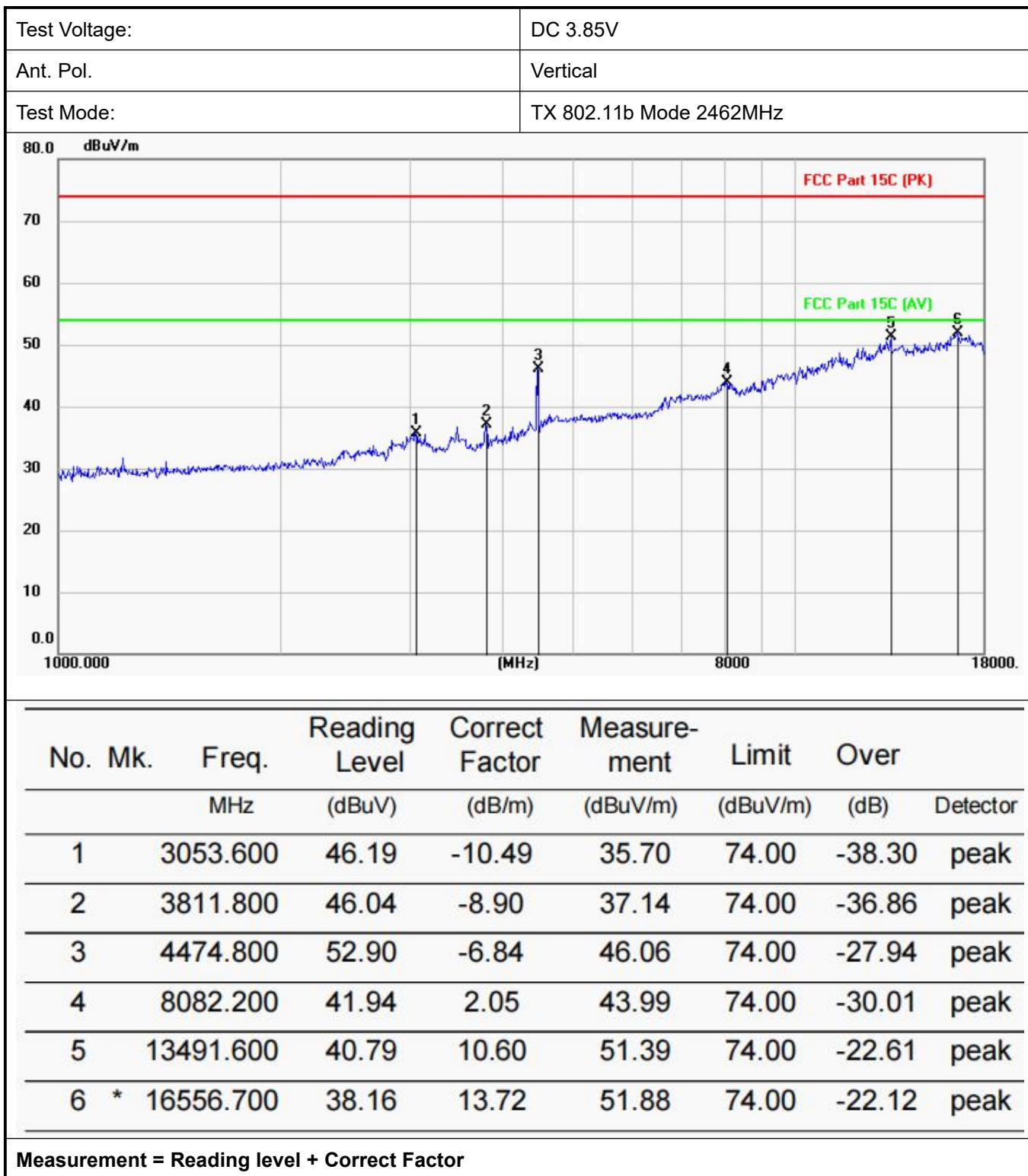


No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	Over (dB)	Over Detector
1	4459.500	52.11	-6.89	45.22	74.00	-28.78	peak	
2	6638.900	42.95	-1.72	41.23	74.00	-32.77	peak	
3	8774.100	44.25	1.87	46.12	74.00	-27.88	peak	
4	11147.300	41.19	6.04	47.23	74.00	-26.77	peak	
5	13880.900	38.03	11.08	49.11	74.00	-24.89	peak	
6	* 17592.000	37.36	13.44	50.80	74.00	-23.20	peak	

Measurement = Reading level + Correct Factor







Note:

1. All test modes had been tested. The 802.11b modulation is the worst case and recorded in the report.
2. 18GHz-26.5GHz is the background of the site, there is no radiated spurious.

3.8. Conducted Emission

Limit

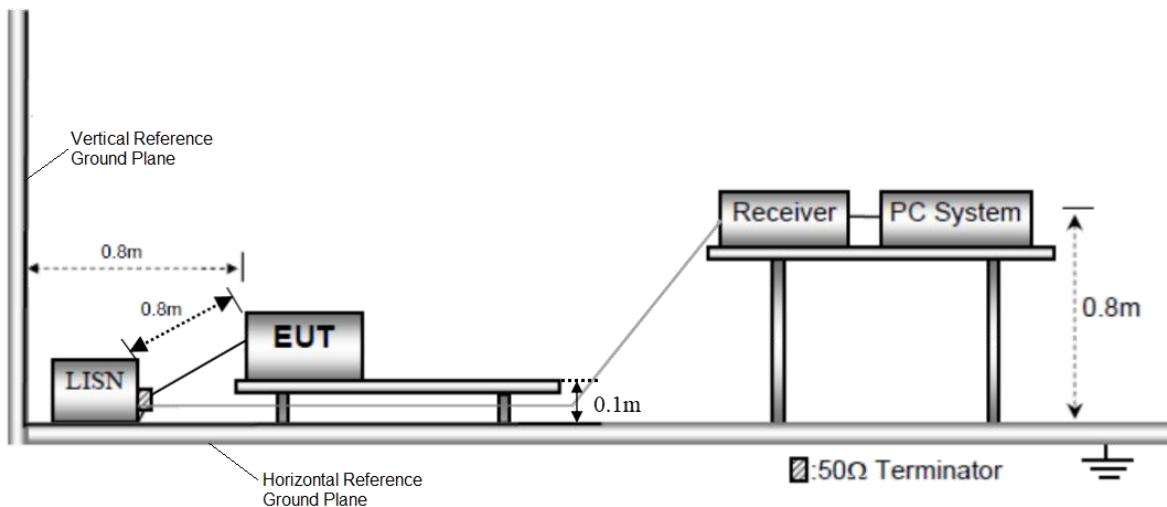
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Configuration



Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 0.1m above the conducting ground plane. The vertical conducting plane was located 80 cm to the rear of the EUT. All other surfaces of EUT were at least 0.8m from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

Test Mode:

Please refer to the clause 2.2.

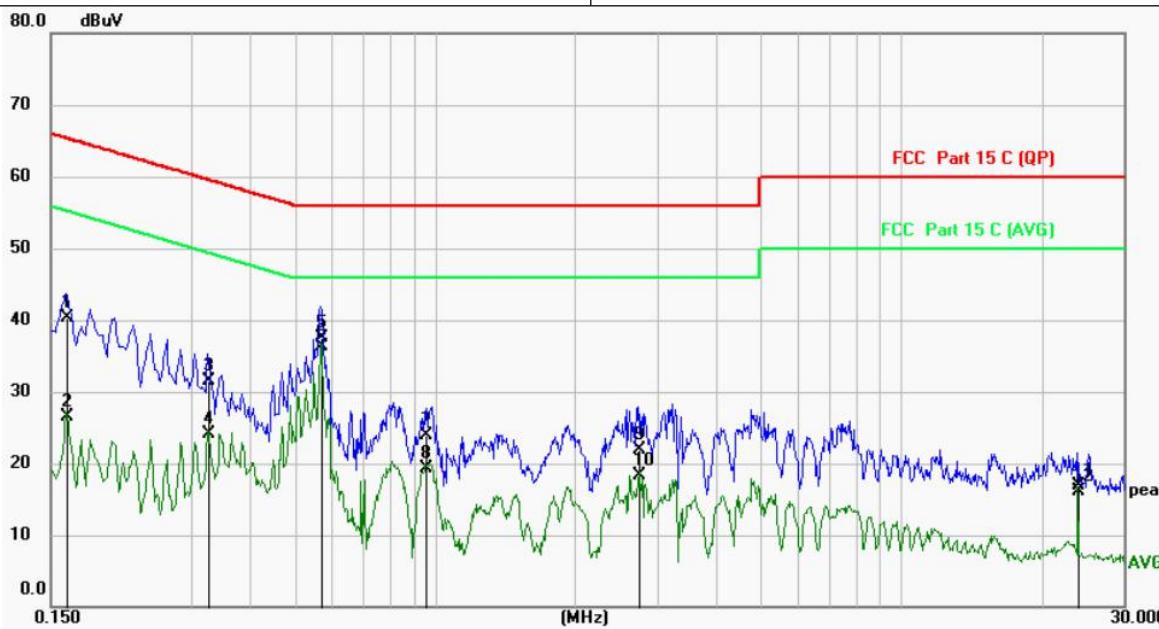
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Test Results

Pre-scan 802.11b/g/n(HT20/HT40) modulation, and found the 802.11b modulation 2412MHz which it is worse case, so only show the test data for worse case.

Test Voltage:	AC 120V/60Hz						
Terminal:	Line						
Test Mode:	Charging+2.4G WIFI						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV	dBuV	dB
1		0.1620	29.51	10.72	40.23	65.36	-25.13
2		0.1620	15.82	10.72	26.54	55.36	-28.82
3		0.3260	20.94	10.54	31.48	59.55	-28.07
4		0.3260	13.61	10.54	24.15	49.55	-25.40
5		0.5700	27.09	10.45	37.54	56.00	-18.46
6	*	0.5700	25.79	10.45	36.24	46.00	-9.76
7		0.9577	13.34	10.50	23.84	56.00	-32.16
8		0.9577	8.71	10.50	19.21	46.00	-26.79
9		2.7500	11.37	10.59	21.96	56.00	-34.04
10		2.7500	7.63	10.59	18.22	46.00	-27.78
11		23.9257	6.15	10.73	16.88	60.00	-43.12
12		23.9257	5.29	10.73	16.02	50.00	-33.98

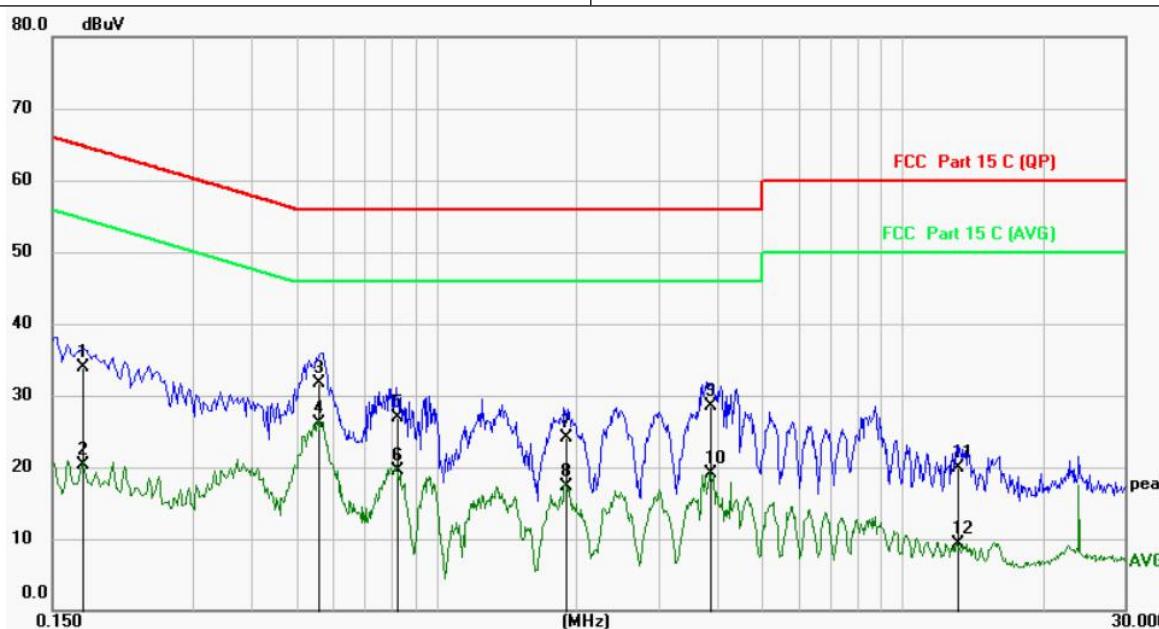
Remarks:

1. Measurement = Reading Level + Correct Factor
2. Over = Measurement - Limit

TRF No. FCC Part 15.247_R1

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Test Voltage:	AC 120V/60Hz						
Terminal:	Neutral						
Test Mode:	Charging+WIFI						
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB	dBuV	dBuV	dB
1		0.1737	23.10	10.74	33.84	64.78	-30.94
2		0.1737	9.59	10.74	20.33	54.78	-34.45
3		0.5580	21.27	10.49	31.76	56.00	-24.24
4	*	0.5580	15.52	10.49	26.01	46.00	-19.99
5		0.8257	16.40	10.44	26.84	56.00	-29.16
6		0.8257	9.02	10.44	19.46	46.00	-26.54
7		1.8900	13.57	10.54	24.11	56.00	-31.89
8		1.8900	6.74	10.54	17.28	46.00	-28.72
9		3.8780	17.86	10.60	28.46	56.00	-27.54
10		3.8780	8.42	10.60	19.02	46.00	-26.98
11		13.0739	9.14	10.70	19.84	60.00	-40.16
12		13.0739	-1.47	10.70	9.23	50.00	-40.77

Remarks:

1. Measurement = Reading Level + Correct Factor

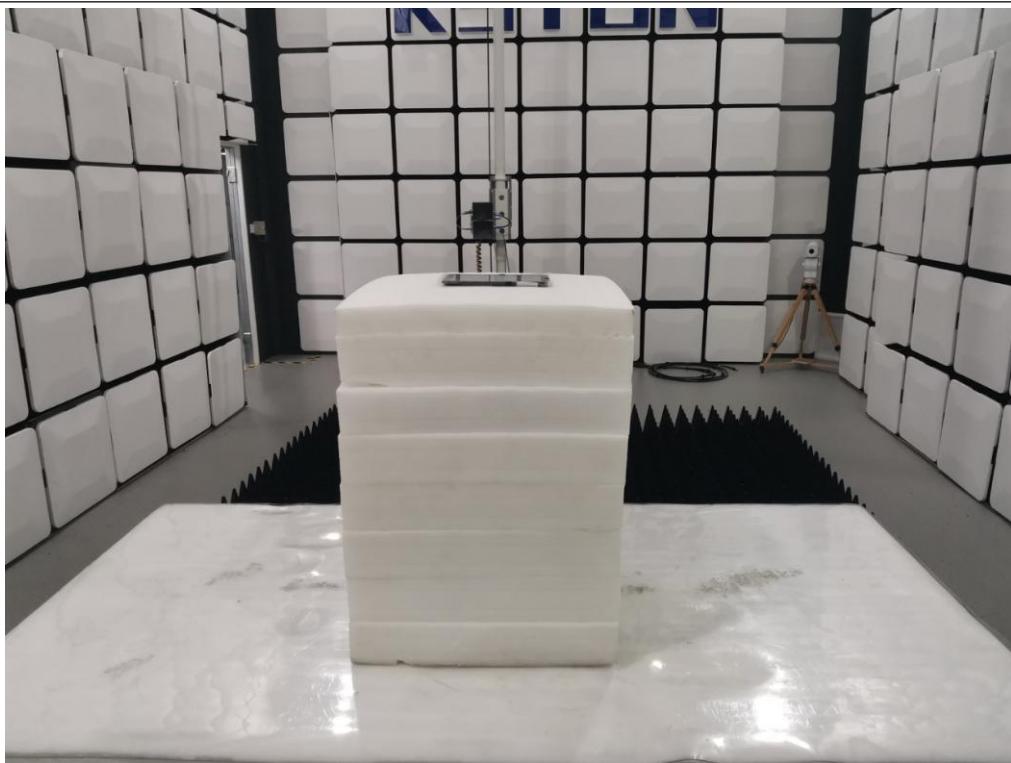
2. Over = Measurement - Limit

4. EUT TEST PHOTOS

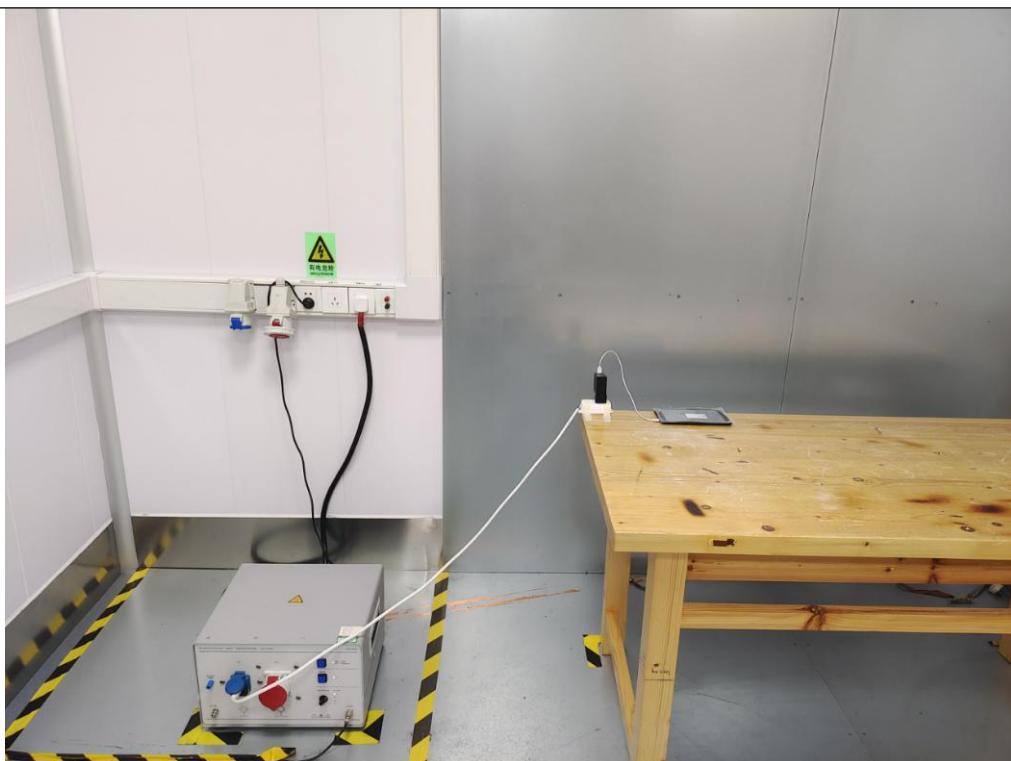
Radiated Measurement (Below 1GHz)



Radiated Measurement (Above 1GHz)



Conducted Emission



RF Conducted



5. PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please refer to the report Report No.: 2021-90030-1

--THE END--