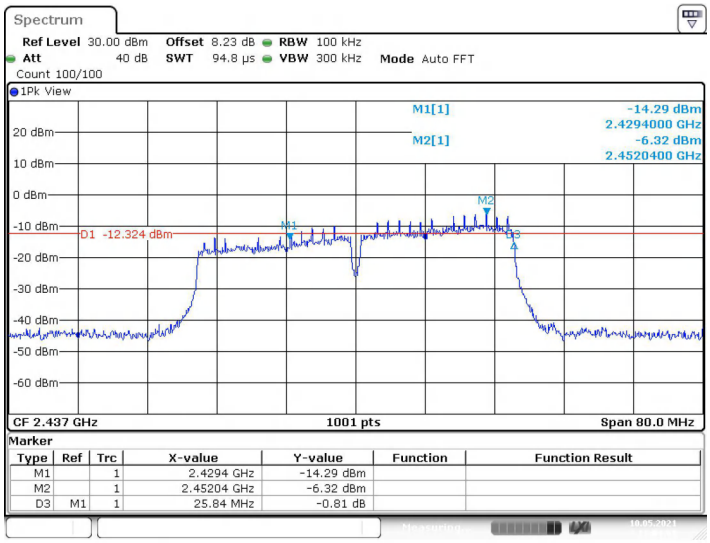
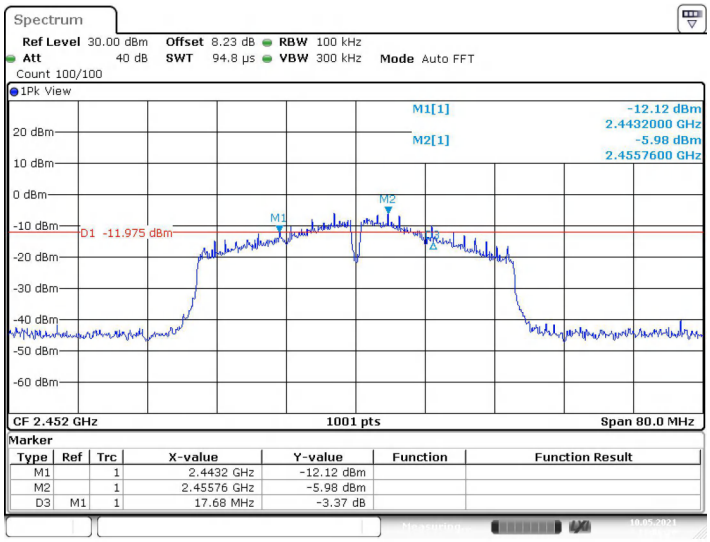
2437 MHz



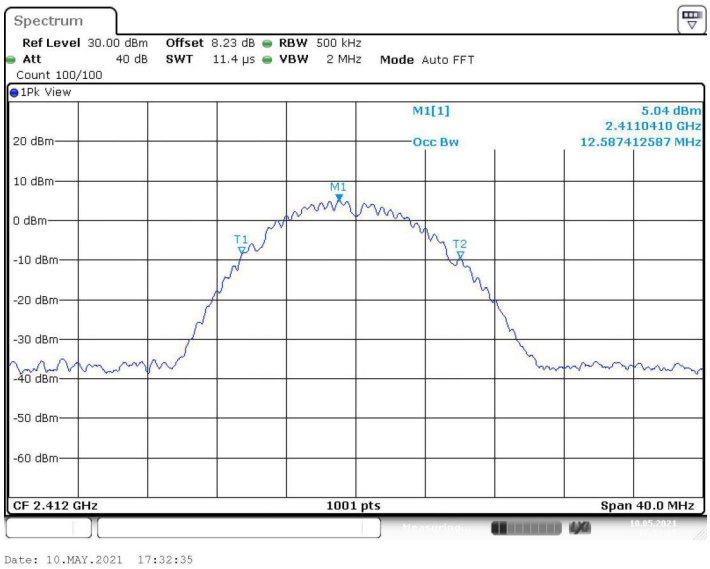
Date: 10.MAY.2021 18:04:01

2452 MHz

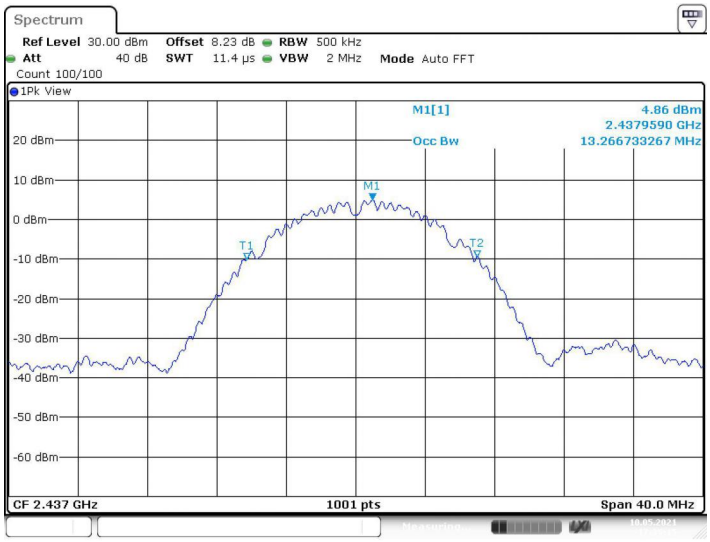


Date: 10.MAY.2021 18:06:26

Test Mode:	802.11b Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	12.587	>=0.5
2437	13.267	
2462	13.147	
2412 MHz		

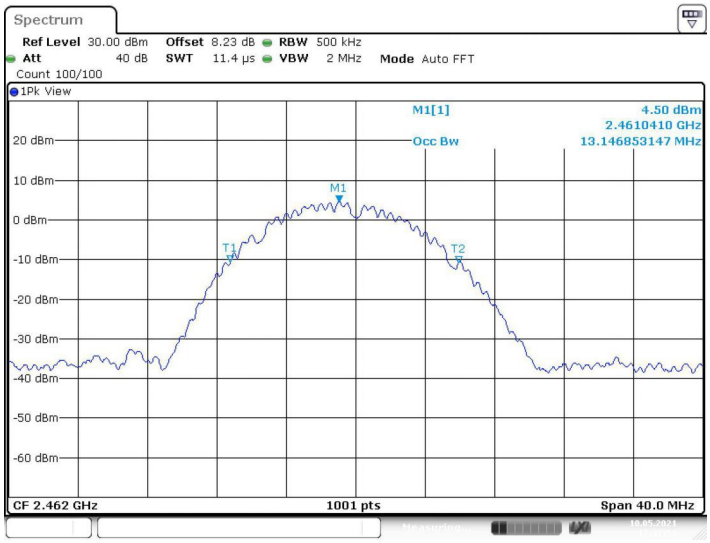


2437 MHz



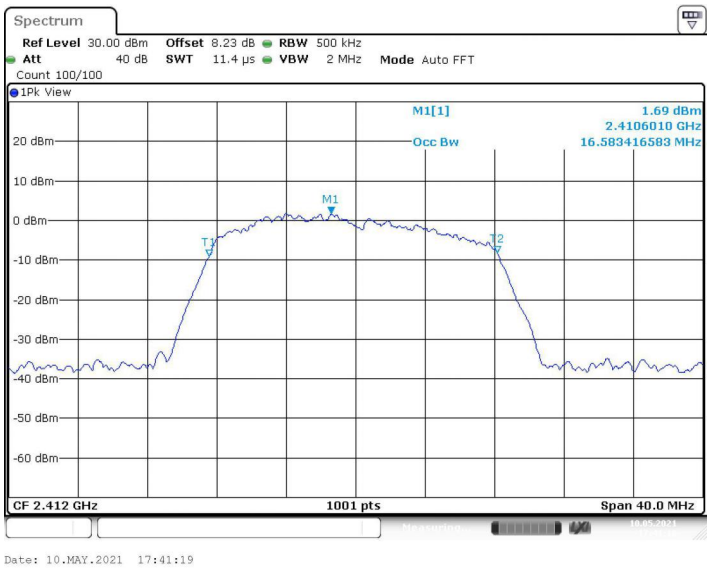
Date: 10.MAY.2021 17:35:15

2462 MHz

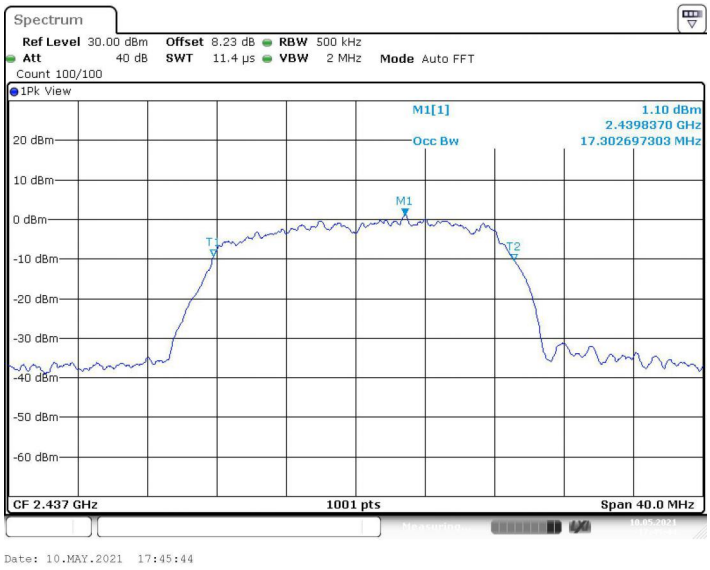


Date: 10.MAY.2021 17:37:54

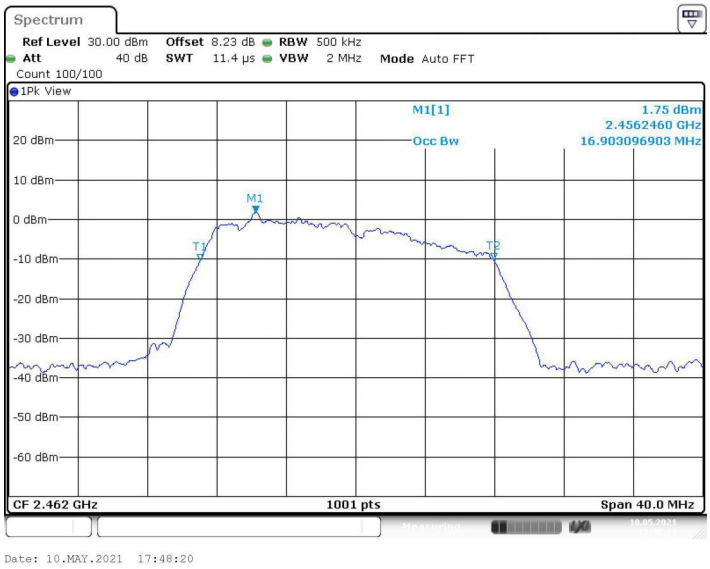
Test Mode:	802.11g Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	16.583	>=0.5
2437	17.303	
2462	16.903	
2412 MHz		



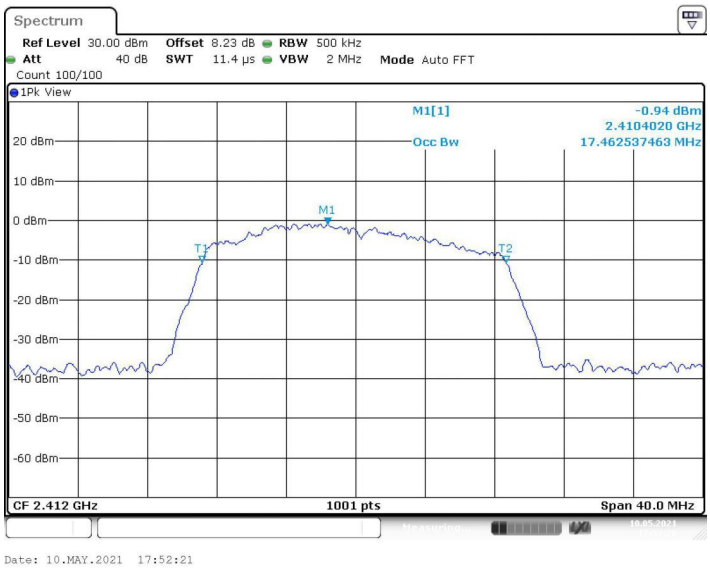
2437 MHz



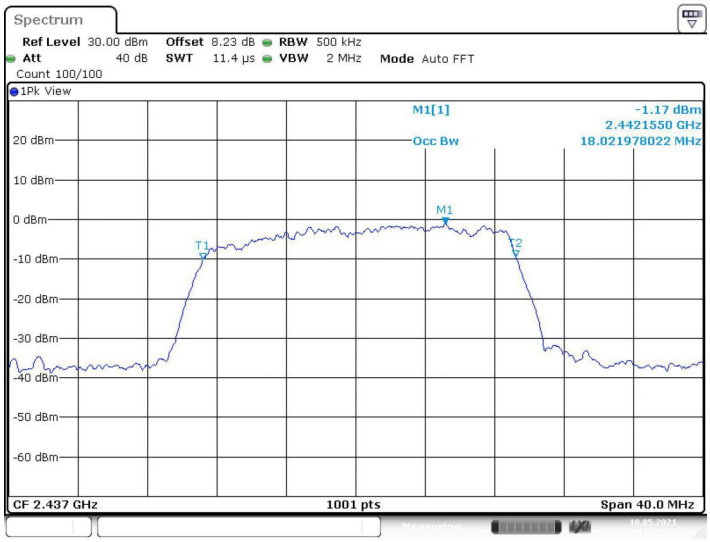
2462 MHz



Test Mode:	802.11n(HT20) Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	17.463	>=0.5
2437	18.022	
2462	17.942	
2412 MHz		

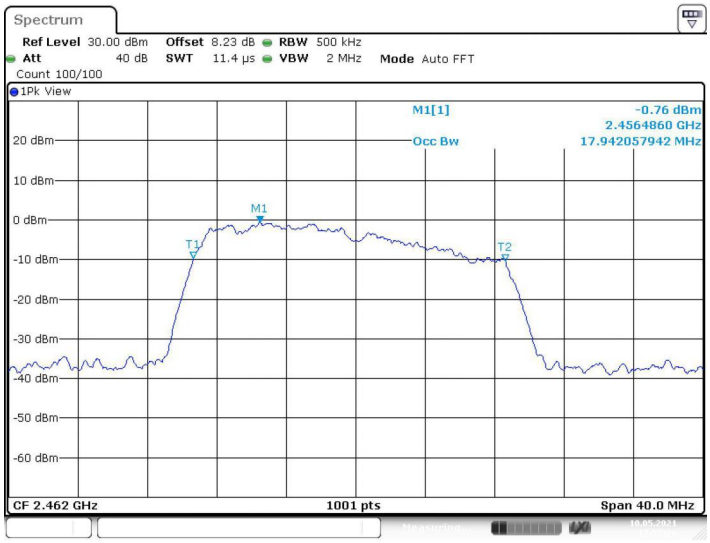


2437 MHz



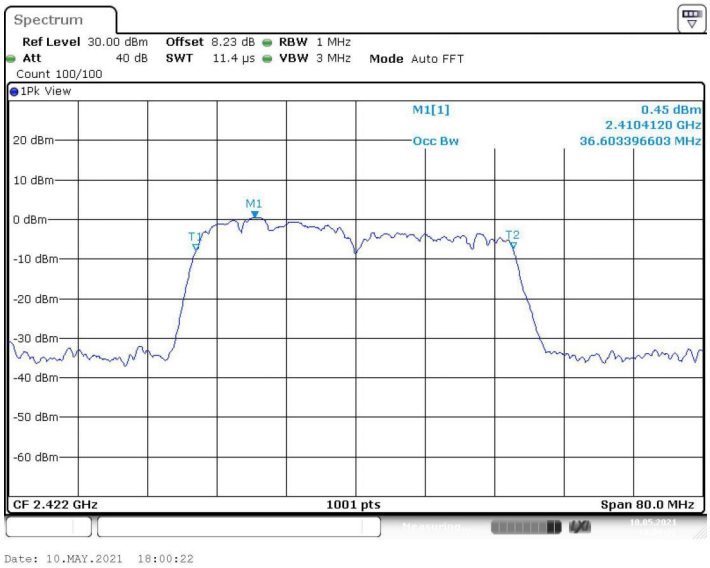
Date: 10.MAY.2021 17:55:27

2462 MHz

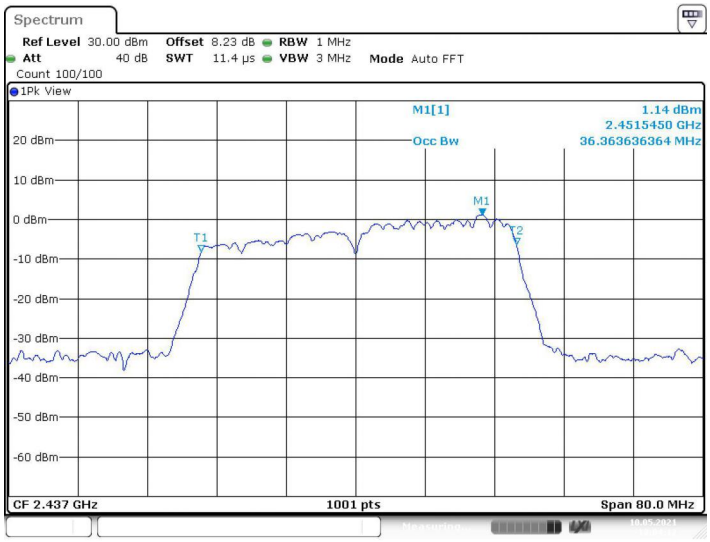


Date: 10.MAY.2021 17:57:26

Test Mode:	802.11n(HT40) Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2422	36.603	>=0.5
2437	36.364	
2452	34.765	
2422 MHz		

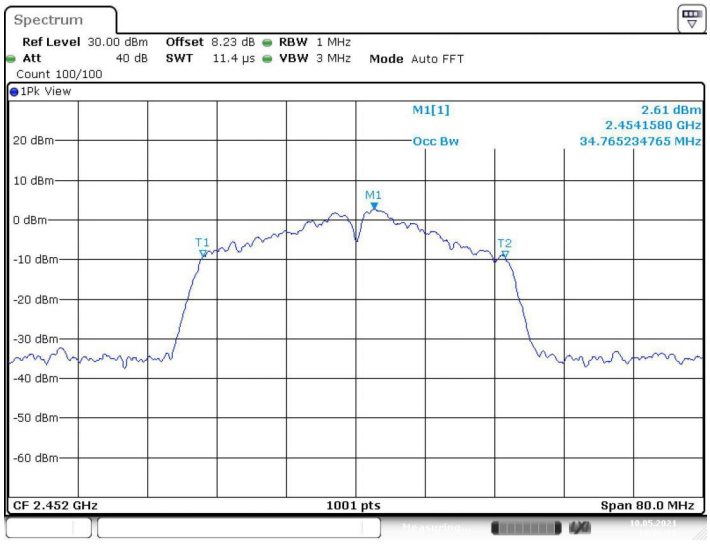


2437 MHz



Date: 10.MAY.2021 18:04:12

2452 MHz



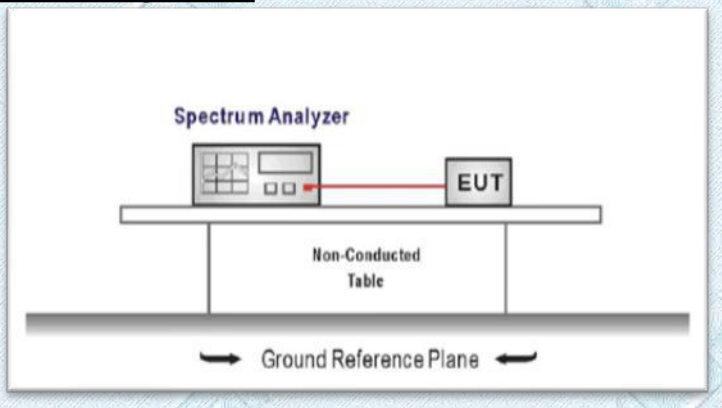
Date: 10.MAY.2021 18:06:37

3.5. Band edge and Spurious Emission (Conducted)

Limit

FCC CFR Title 47 Part 15 Subpart C Section15.247 (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.

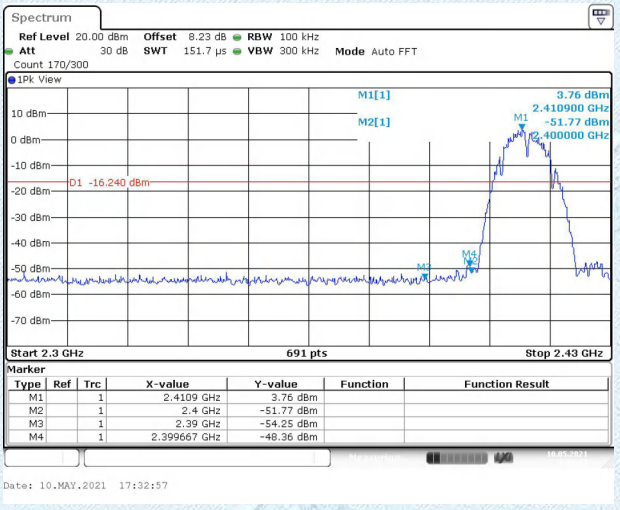
Test Mode

Please refer to the clause 2.2.

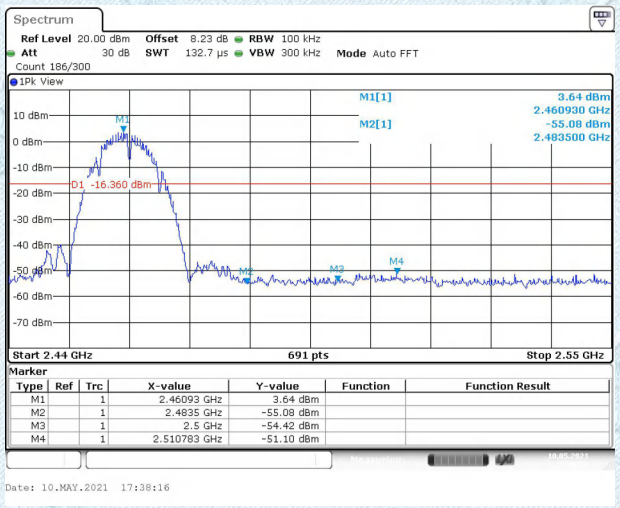
Test Results

802.11b

CH01-Bandedge

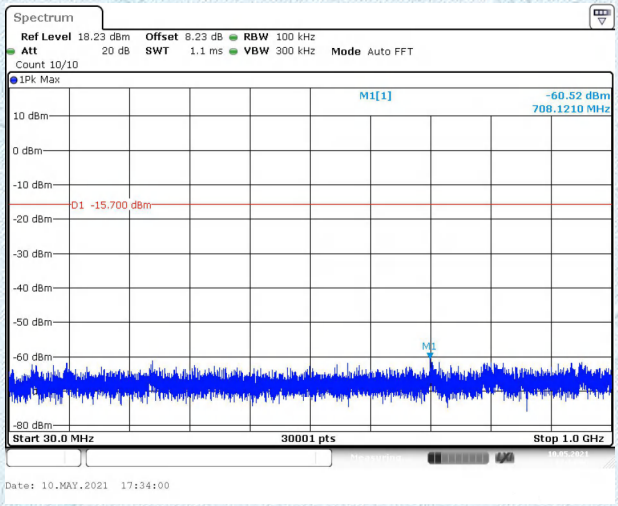


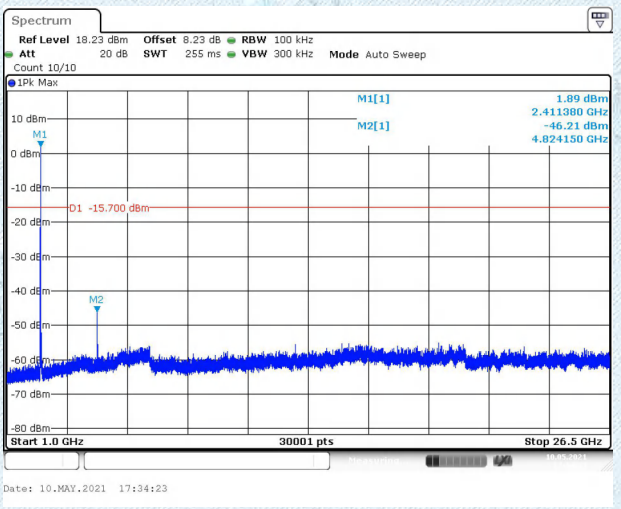
CH11-Bandedge



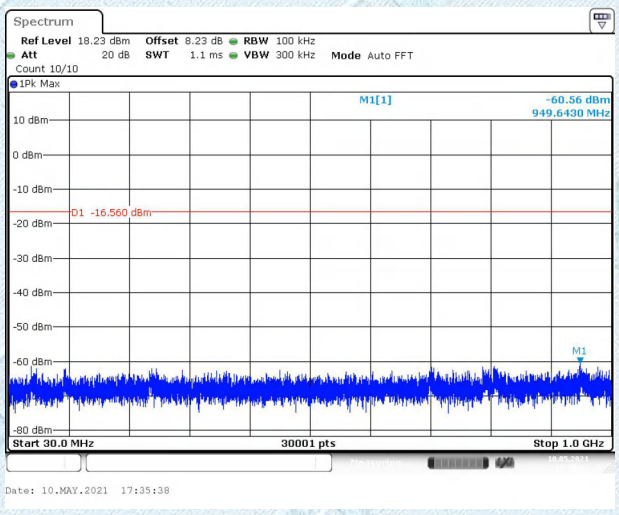
802.11b

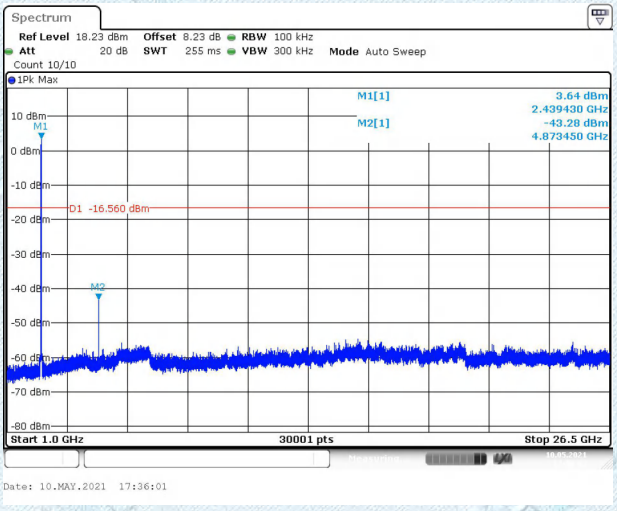
CH01-SE



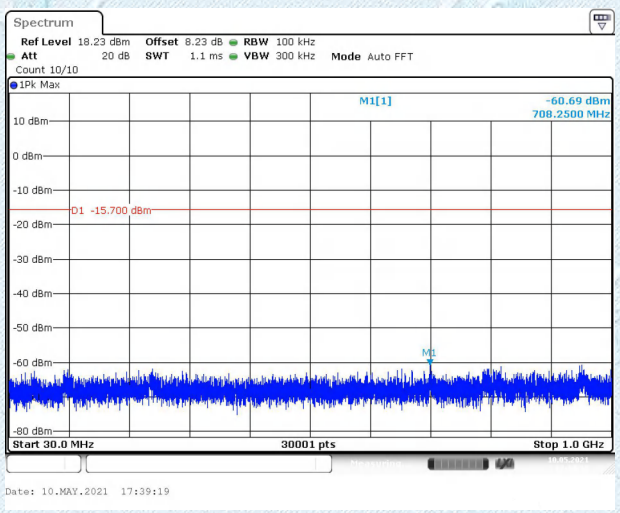


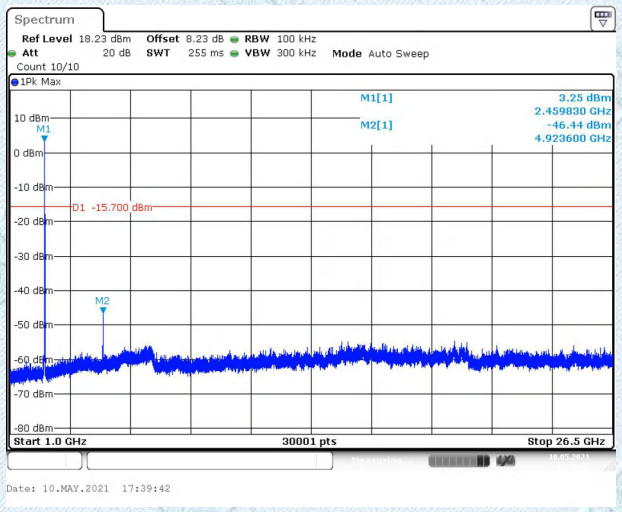
CH06-SE





CH11-SE





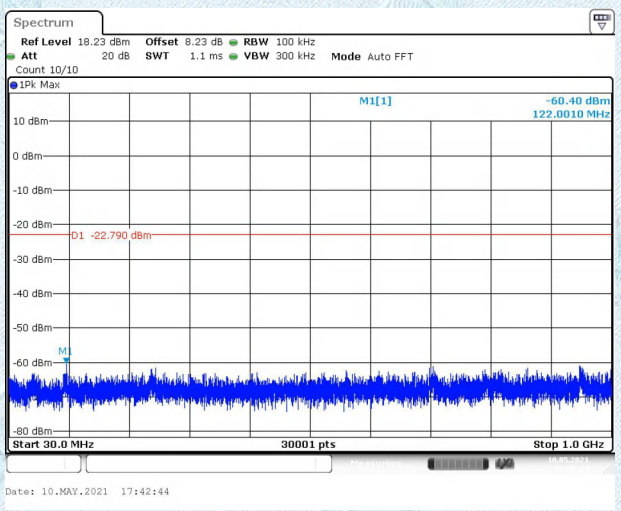
802.11g

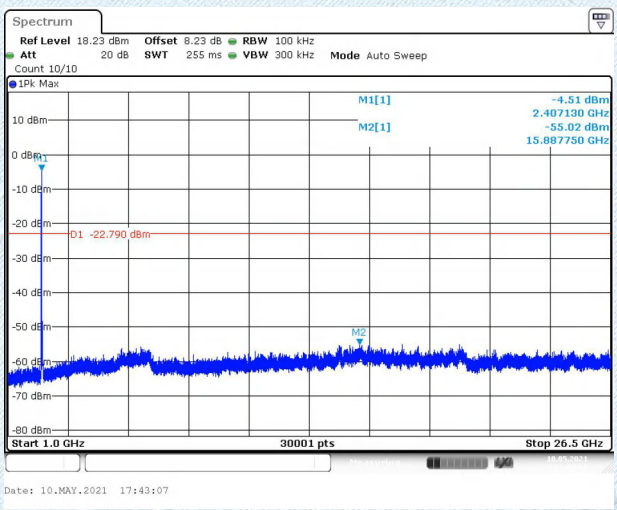
CH01-Bandedge

CH11-Bandedge

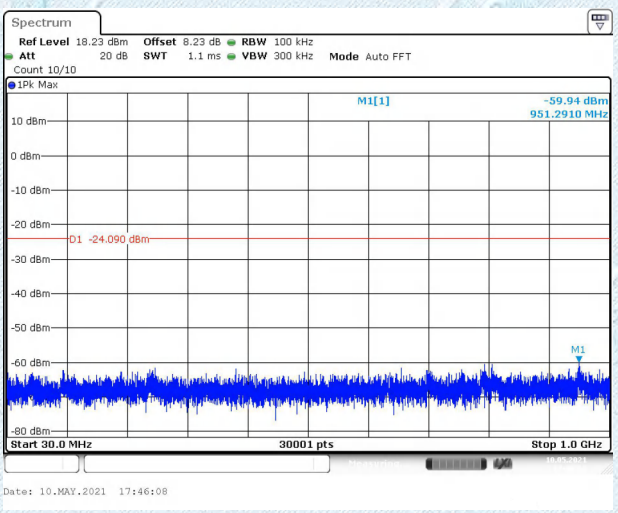
802.11g

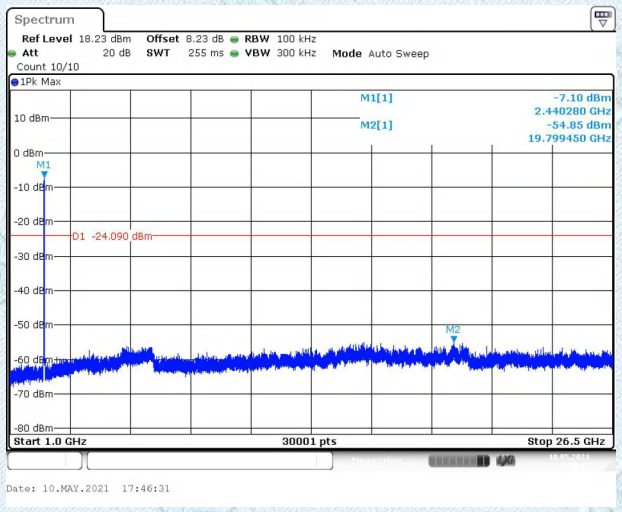
CH01-SE



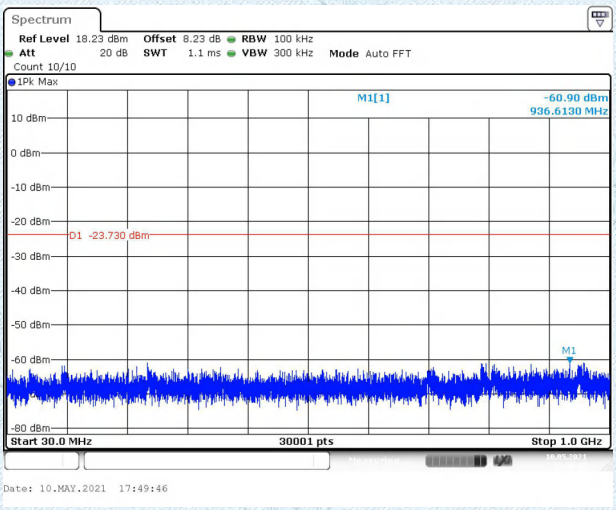


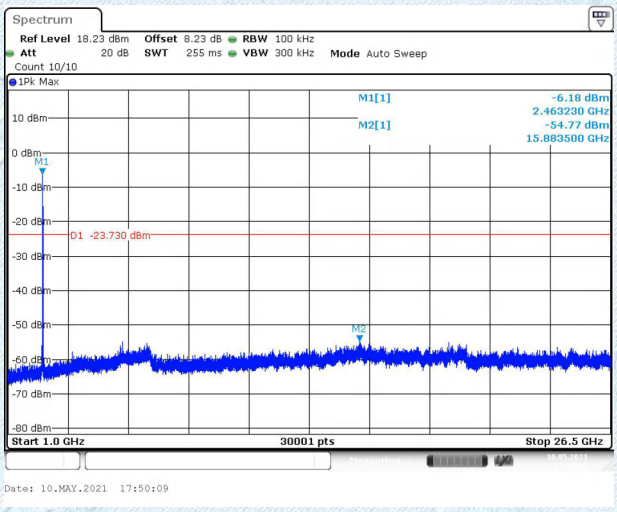
CH06-SE





CH11-SE





802.11n(HT20)

CH01-Bandedge

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41072 GHz	-4.48 dBm		
M2		1	2.4 GHz	-51.49 dBm		
M3		1	2.39 GHz	-53.31 dBm		
M4		1	2.399855 GHz	-51.06 dBm		

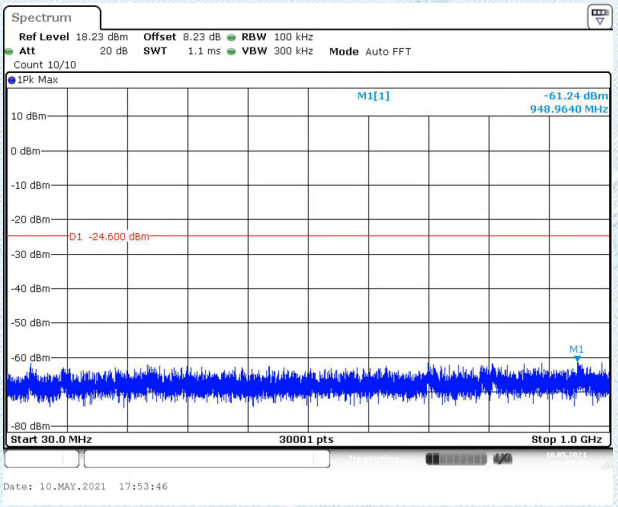
CH11-Bandedge

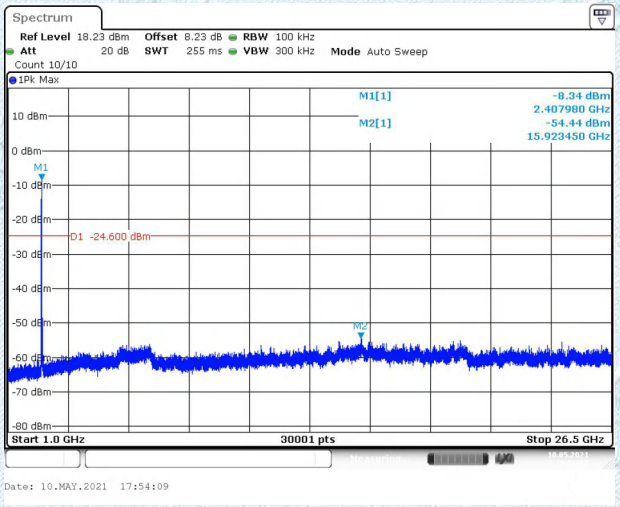
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4595 GHz	-7.41 dBm		
M2		1	2.4835 GHz	-54.20 dBm		
M3		1	2.5 GHz	-54.86 dBm		
M4		1	2.506 GHz	-51.43 dBm		

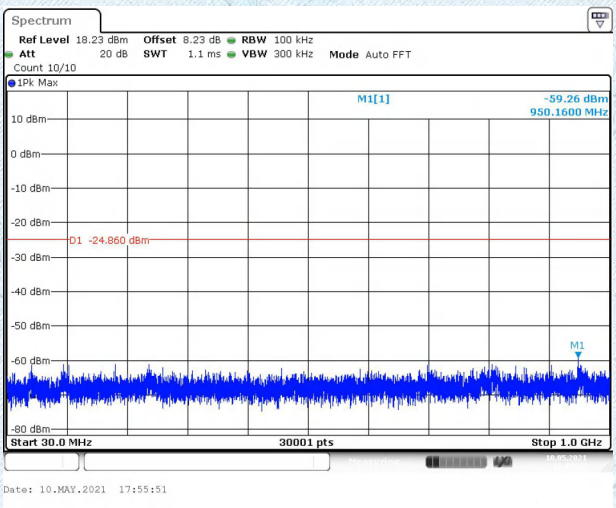
802.11n(HT20)

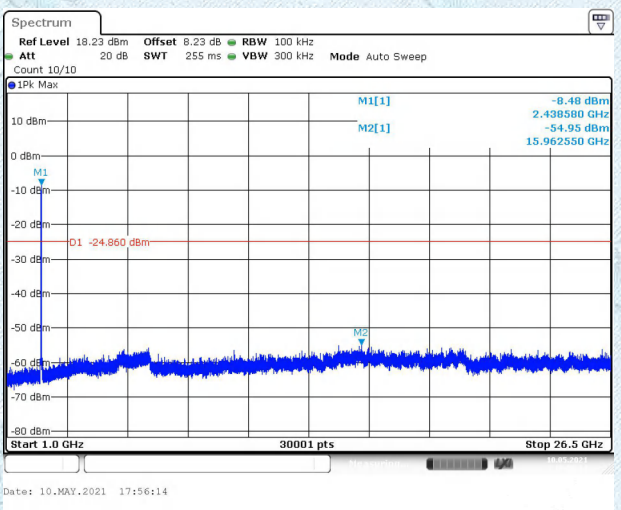
CH01-SE



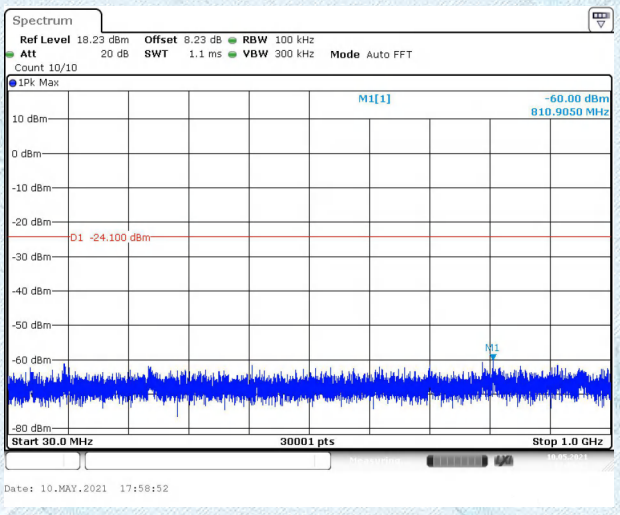


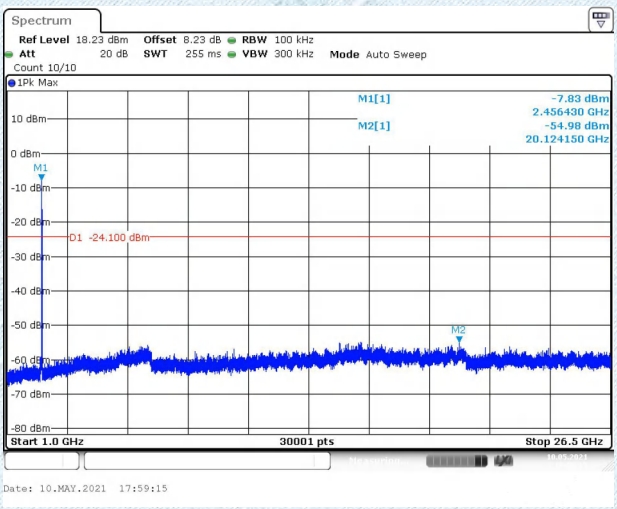
CH06-SE





CH11-SE





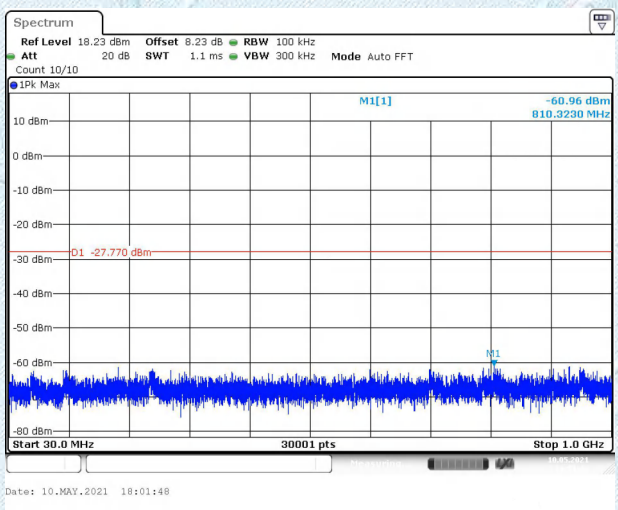
802.11n(HT40)

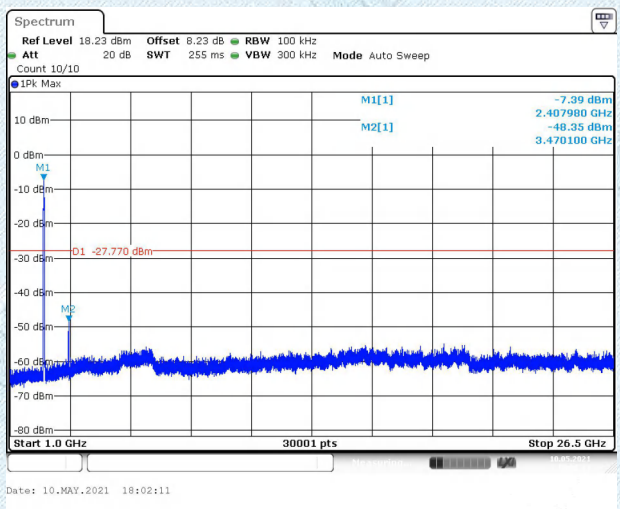
CH03-Bandedge

CH09-Bandedge

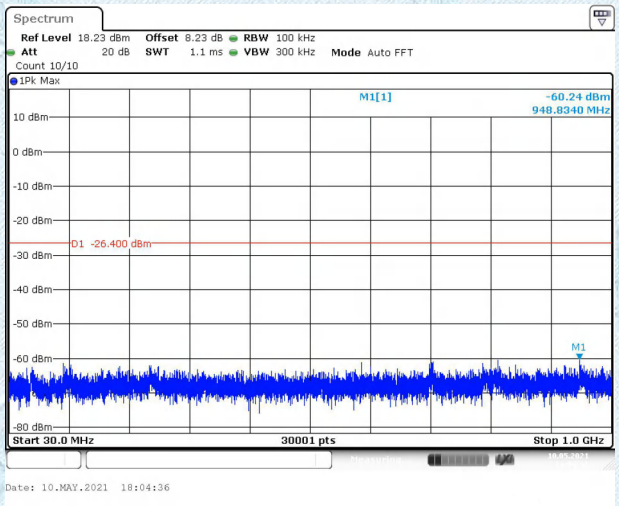
802.11n(HT40)

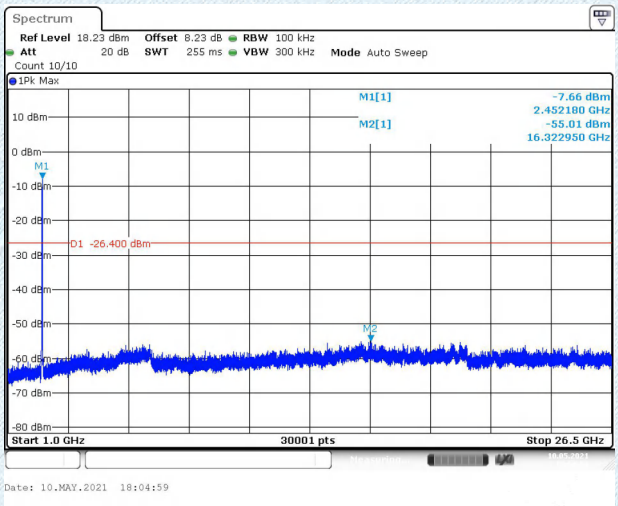
CH03-SE



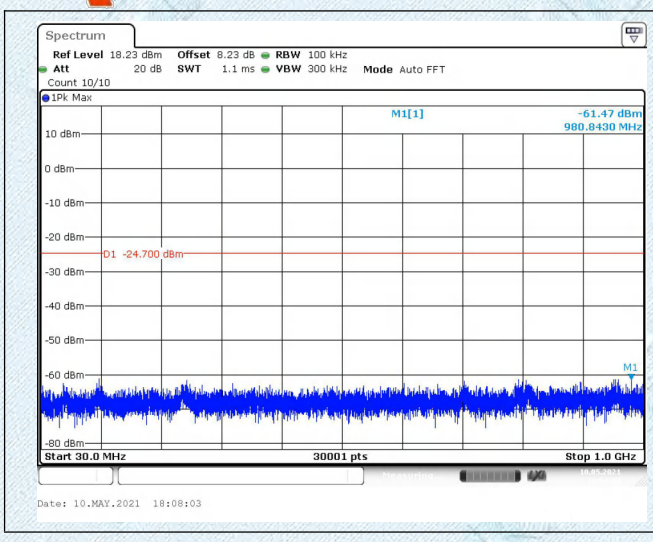


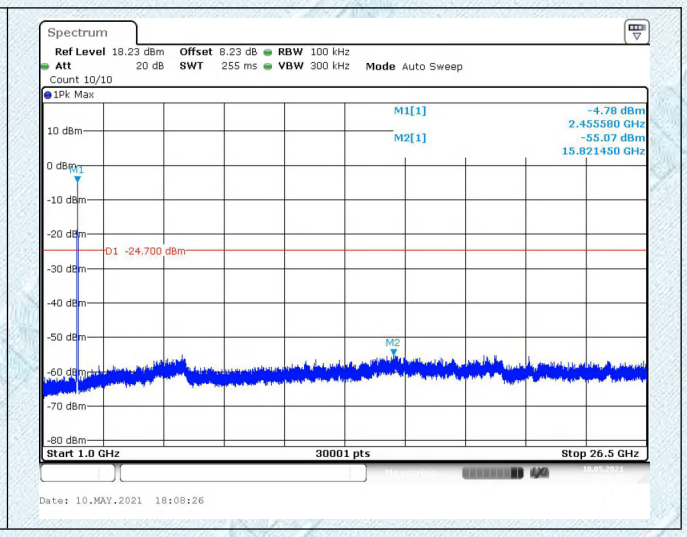
CH06-SE





CH09-SE


Spectrum
Ref Level 18.23 dBm Offset 8.23 dB RBW 100 kHz
Att 20 dB SWT 1.1 ms VBW 300 kHz Mode Auto FFT
Count 10/10
1Pk Max
M1[1] -61.47 dBm
980.8430 MHz
D1 -24.700 dBm
M1
Start 30.0 MHz 30001 pts Stop 1.0 GHz
Date: 10.MAY.2021 18:08:03

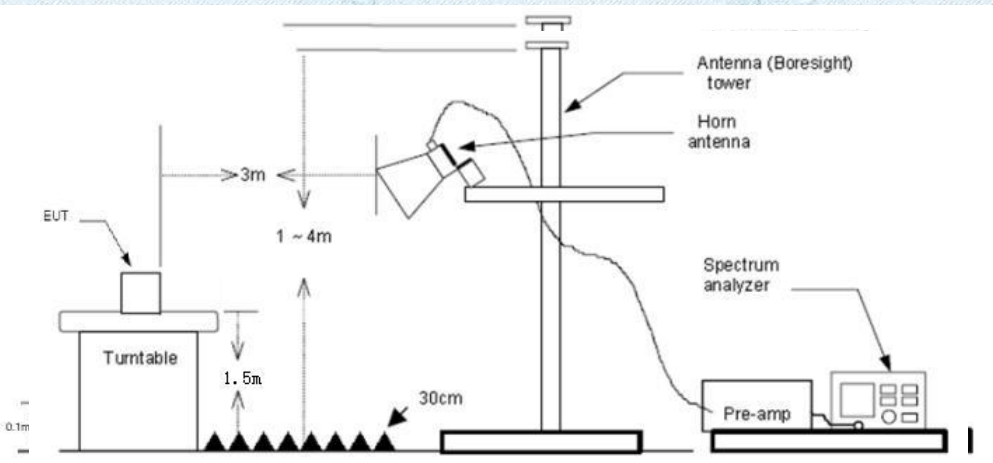

Spectrum
Ref Level 18.23 dBm Offset 8.23 dB RBW 100 kHz
Att 20 dB SWT 255 ms VBW 300 kHz Mode Auto Sweep
Count 10/10
1Pk Max
M1[1] -4.78 dBm
2.455580 GHz
M2[1] -55.07 dBm
15.821450 GHz
D1 -24.700 dBm
M1
M2
Start 1.0 GHz 30001 pts Stop 26.5 GHz
Date: 10.MAY.2021 18:08:26

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

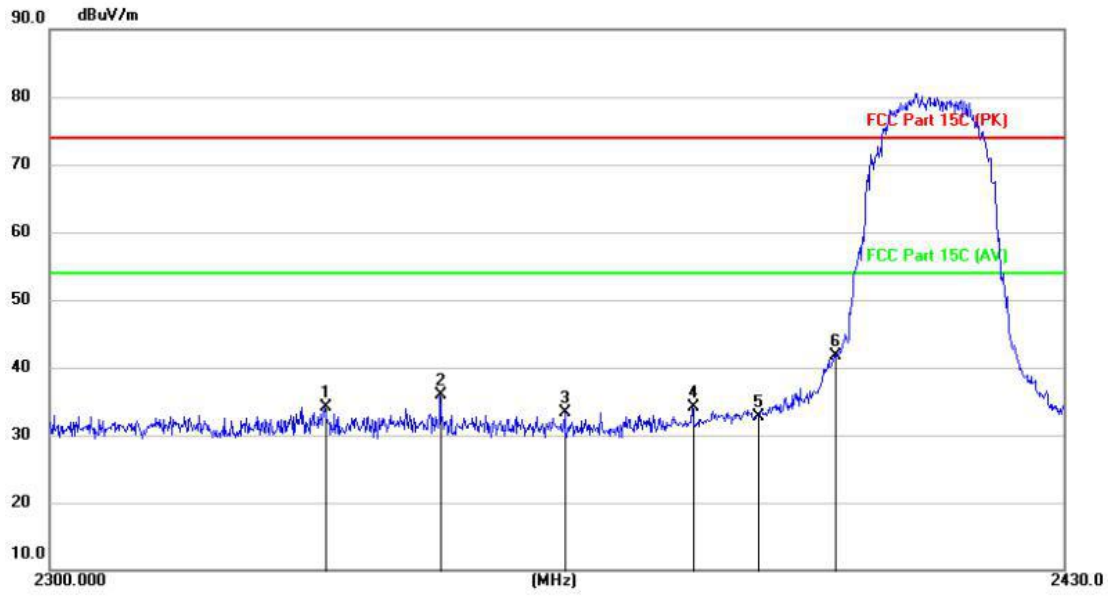
Note:

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 802.11b mode which it is worse case, so only show the test data for worse case.

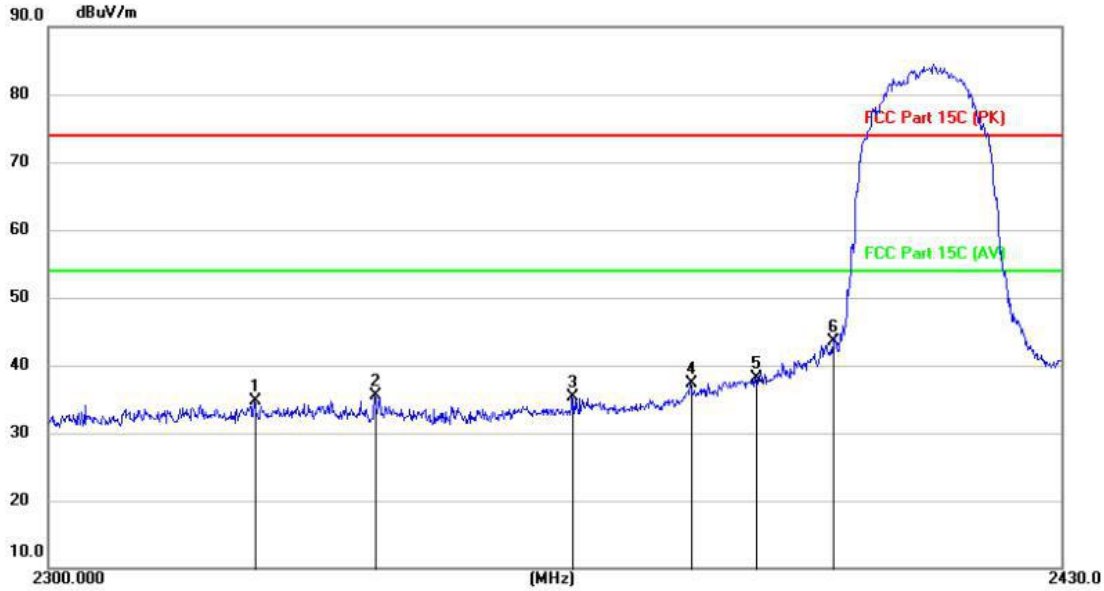
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2334.567	45.07	-10.93	34.14	74.00	-39.86	peak
2		2349.257	46.76	-10.93	35.83	74.00	-38.17	peak
3		2365.234	44.21	-10.93	33.28	74.00	-40.72	peak
4		2381.705	45.04	-10.92	34.12	74.00	-39.88	peak
5		2390.000	43.65	-10.92	32.73	74.00	-41.27	peak
6	*	2400.000	52.57	-10.92	41.65	74.00	-32.35	peak

Measurement = Reading level + Correct Factor

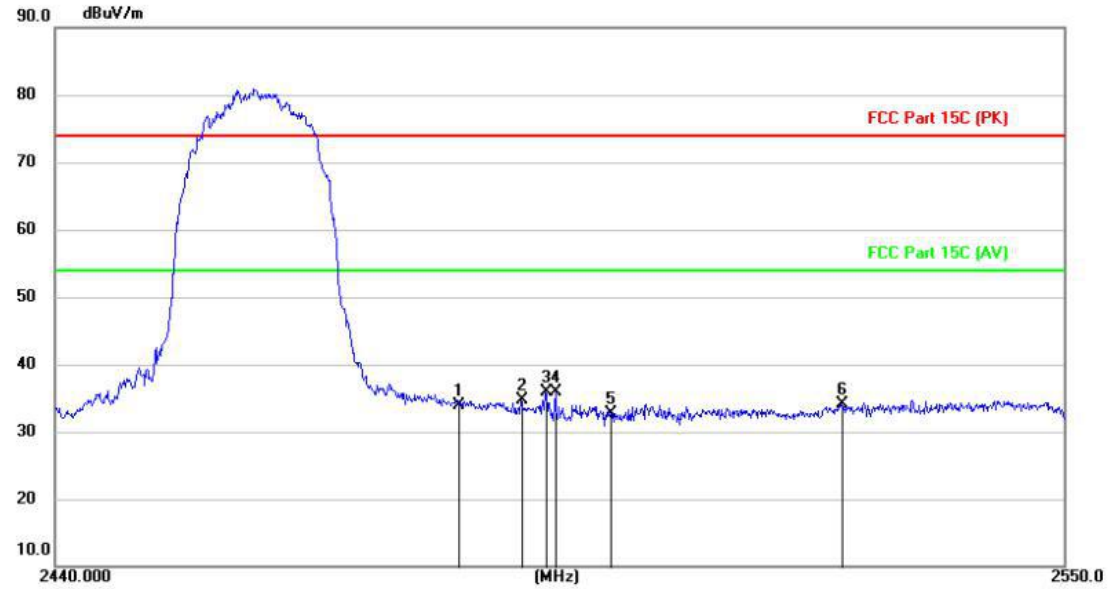
Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2412 MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2325.818	45.66	-10.94	34.72	74.00	-39.28	peak
2		2341.106	46.42	-10.94	35.48	74.00	-38.52	peak
3		2366.391	46.23	-10.93	35.30	74.00	-38.70	peak
4		2381.718	48.17	-10.92	37.25	74.00	-36.75	peak
5		2390.000	48.95	-10.92	38.03	74.00	-35.97	peak
6	*	2400.000	54.34	-10.92	43.42	74.00	-30.58	peak

Measurement = Reading level + Correct Factor

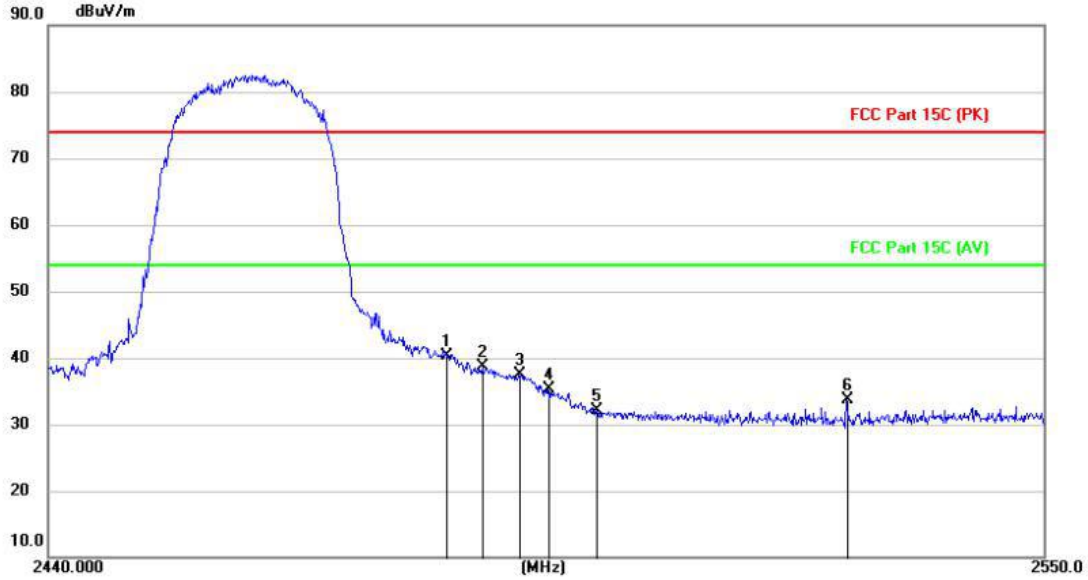
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	44.76	-10.88	33.88	74.00	-40.12	peak
2		2490.226	45.58	-10.89	34.69	74.00	-39.31	peak
3	*	2492.899	46.87	-10.89	35.98	74.00	-38.02	peak
4		2493.955	46.76	-10.89	35.87	74.00	-38.13	peak
5		2500.000	43.62	-10.88	32.74	74.00	-41.26	peak
6		2525.360	44.97	-10.87	34.10	74.00	-39.90	peak

Measurement = Reading level + Correct Factor

Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2483.500	51.21	-10.88	40.33	74.00	-33.67	peak
2		2487.399	49.65	-10.88	38.77	74.00	-35.23	peak
3		2491.524	48.42	-10.89	37.53	74.00	-36.47	peak
4		2494.714	46.14	-10.87	35.27	74.00	-38.73	peak
5		2500.000	42.89	-10.88	32.01	74.00	-41.99	peak
6		2527.868	44.61	-10.87	33.74	74.00	-40.26	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)

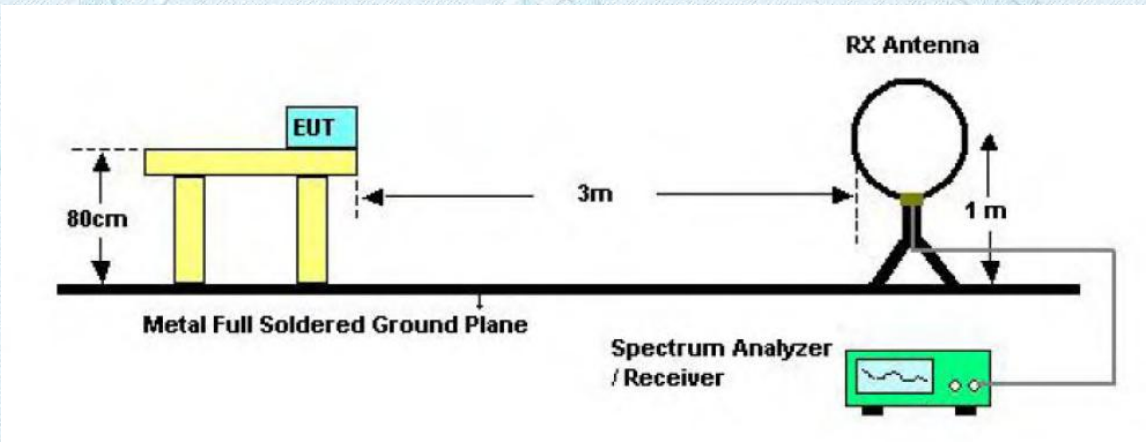
Frequency (MHz)	Distance Meters(at 3m)	
	Peak	Average
Above 1000	74	54

Note:

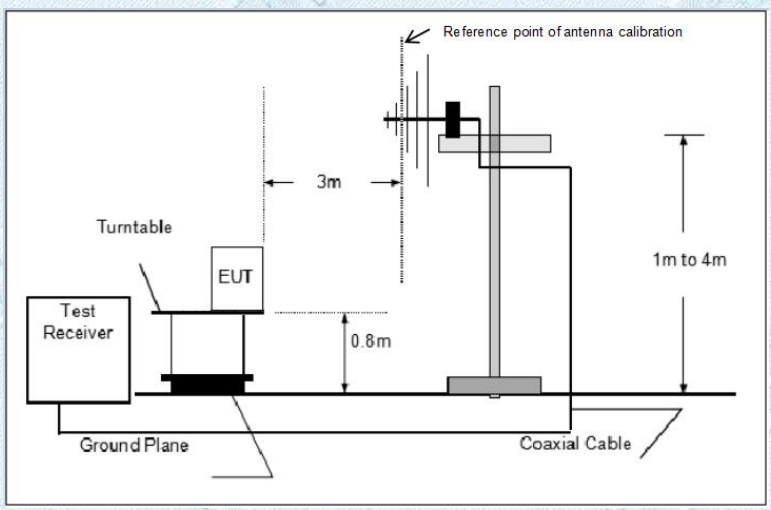
(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

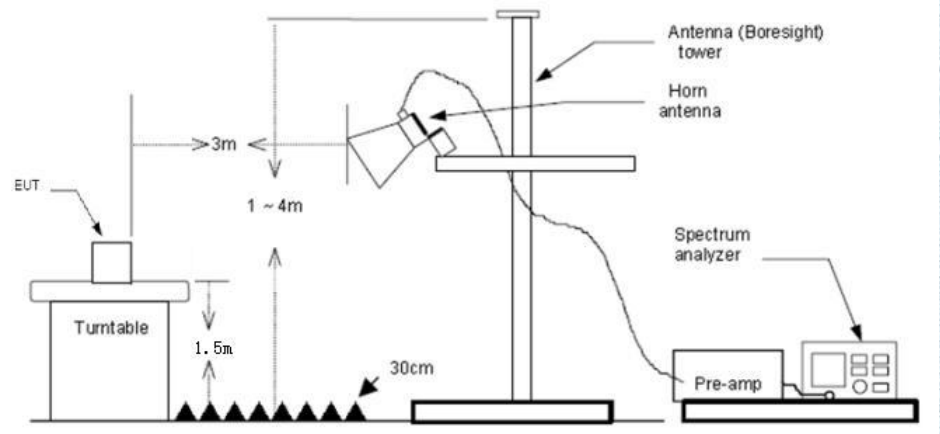
Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz 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 Peak 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:

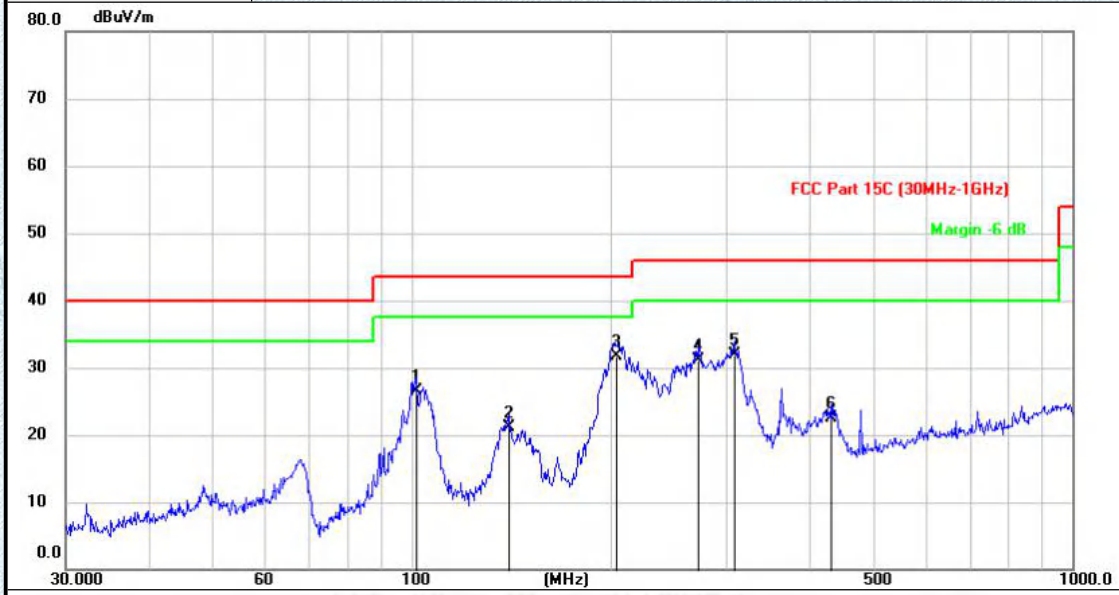
1) Measurement = Reading level + Correct Factor
   Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3) The emission levels of other frequencies are very lower than 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 the 802.11b 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

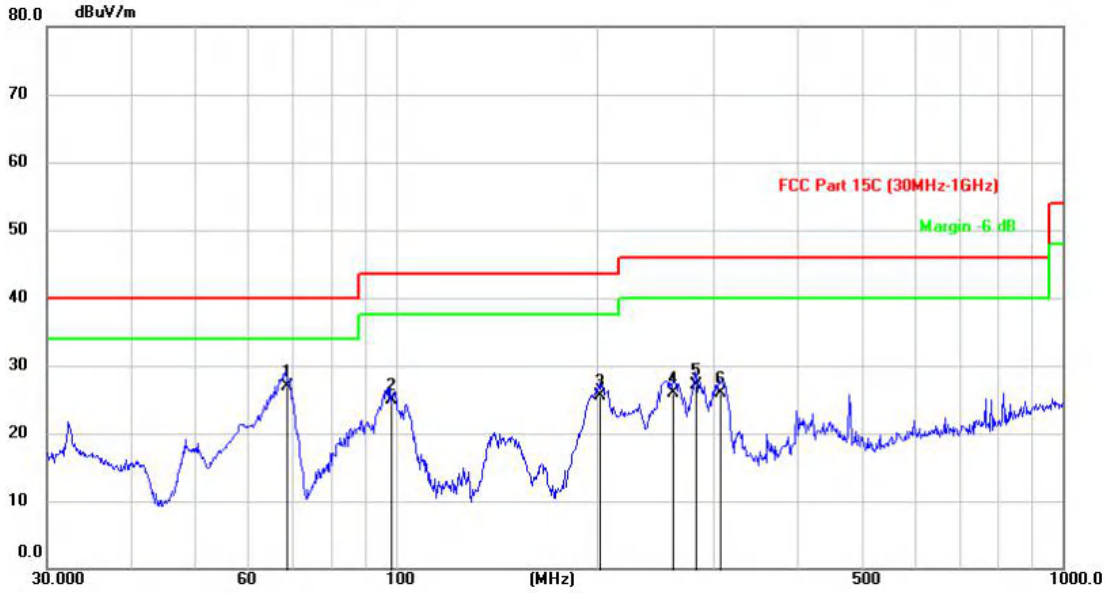
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		101.7156	44.30	-17.77	26.53	43.50	-16.97	QP
2		140.5884	42.29	-21.28	21.01	43.50	-22.49	QP
3	*	204.1661	49.50	-17.82	31.68	43.50	-11.82	QP
4		271.6101	46.51	-15.31	31.20	46.00	-14.80	QP
5		308.3715	46.22	-14.31	31.91	46.00	-14.09	QP
6		431.0316	32.96	-10.54	22.42	46.00	-23.58	QP

Measurement = Reading Level+ Correct Factor

Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2412MHz

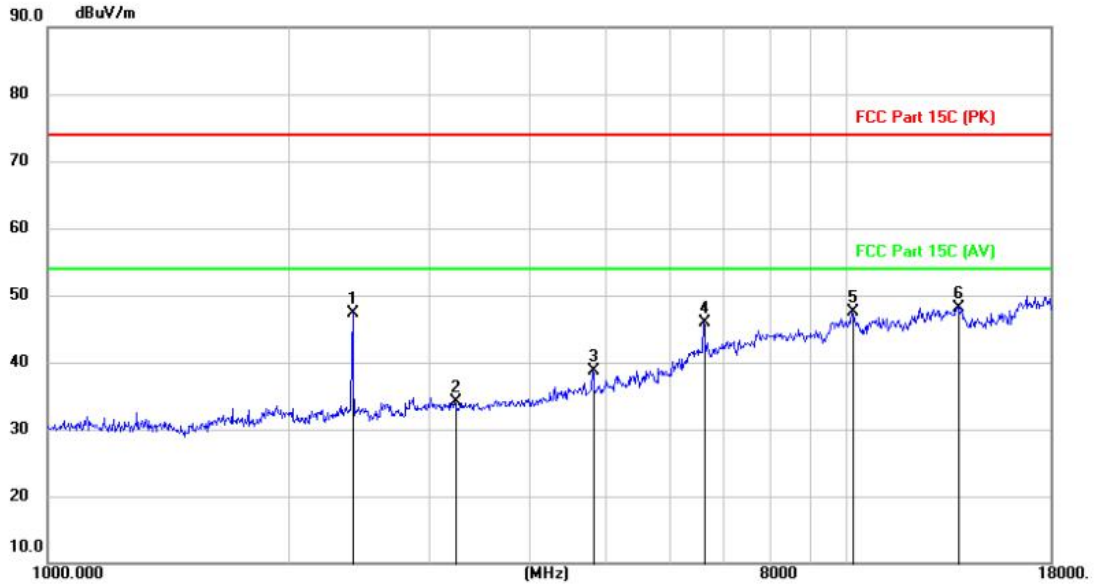


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	68.4628	46.40	-19.40	27.00	40.00	-13.00	QP
2		98.1419	42.90	-17.95	24.95	43.50	-18.55	QP
3		202.4551	43.35	-17.90	25.45	43.50	-18.05	QP
4		260.7838	41.46	-15.55	25.91	46.00	-20.09	QP
5		281.3032	42.24	-15.11	27.13	46.00	-18.87	QP
6		306.5387	40.28	-14.39	25.89	46.00	-20.11	QP

Measurement = Reading Level+ Correct Factor

Adobe 1GHz

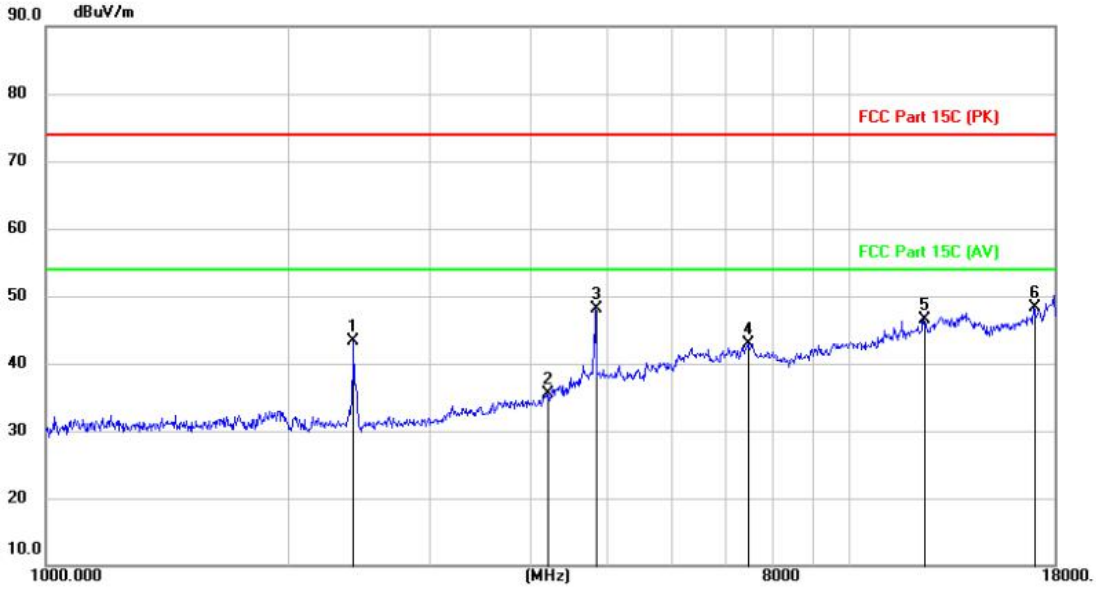
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2411.000	58.24	-10.91	47.33	74.00	-26.67	peak
2		3233.800	44.26	-10.16	34.10	74.00	-39.90	peak
3		4814.800	44.54	-5.89	38.65	74.00	-35.35	peak
4		6633.800	47.63	-1.74	45.89	74.00	-28.11	peak
5		10164.700	43.06	4.35	47.41	74.00	-26.59	peak
6	*	13797.600	37.22	10.98	48.20	74.00	-25.80	peak

Measurement = Reading level + Correct Factor

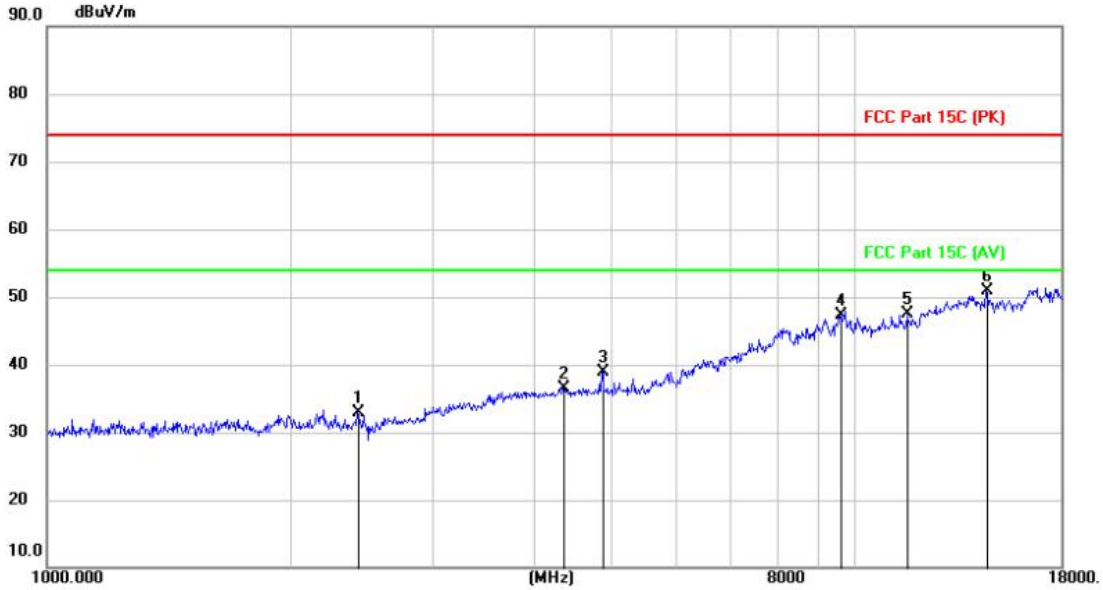
Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2412MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2411.920	54.22	-10.92	43.30	74.00	-30.70	peak
2		4211.300	43.27	-7.72	35.55	74.00	-38.45	peak
3		4833.500	53.94	-5.84	48.10	74.00	-25.90	peak
4		7483.800	42.17	0.77	42.94	74.00	-31.06	peak
5		12378.100	37.84	8.69	46.53	74.00	-27.47	peak
6	*	16946.000	35.12	13.11	48.23	74.00	-25.77	peak

Measurement = Reading level + Correct Factor

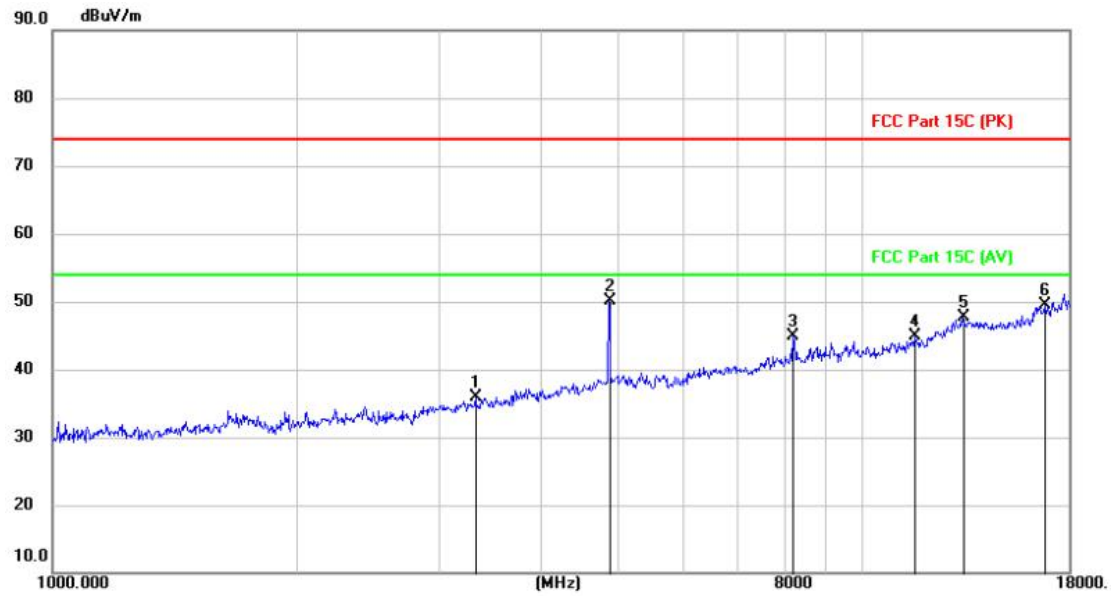
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2437MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2422.900	43.74	-10.91	32.83	74.00	-41.17	peak
2		4366.000	43.67	-7.21	36.46	74.00	-37.54	peak
3		4874.300	44.70	-5.74	38.96	74.00	-35.04	peak
4		9603.700	44.14	3.20	47.34	74.00	-26.66	peak
5		11616.500	40.34	7.10	47.44	74.00	-26.56	peak
6	*	14543.900	40.23	10.65	50.88	74.00	-23.12	peak

Measurement = Reading level + Correct Factor

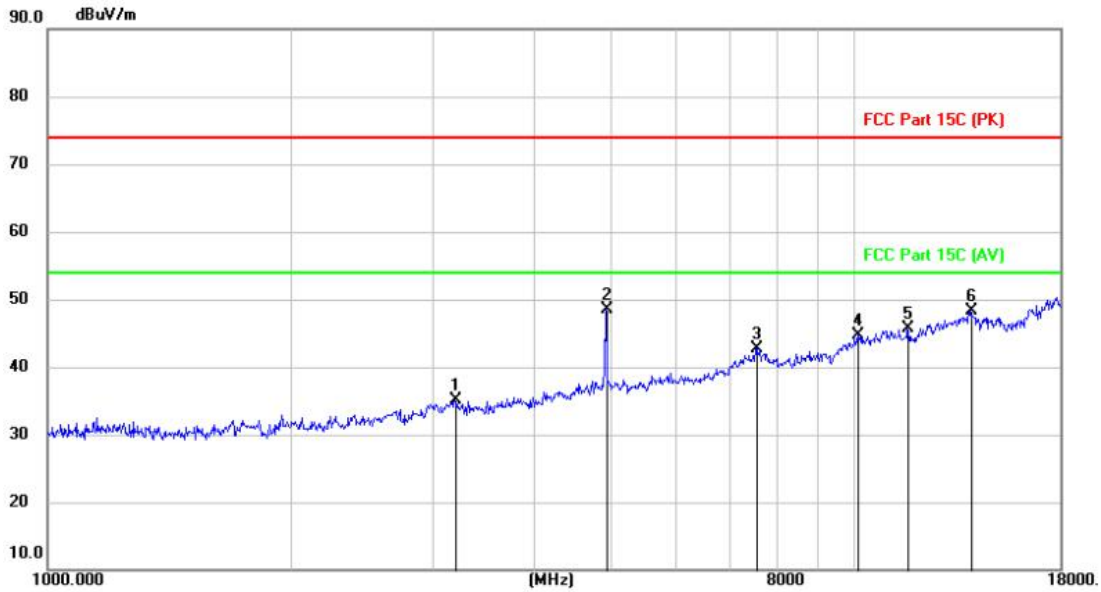
Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2437MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3337.500	45.81	-9.98	35.83	74.00	-38.17	peak
2	*	4870.900	55.78	-5.74	50.04	74.00	-23.96	peak
3		8216.500	42.79	2.02	44.81	74.00	-29.19	peak
4		11616.500	37.89	7.10	44.99	74.00	-29.01	peak
5		13301.200	37.46	10.34	47.80	74.00	-26.20	peak
6		16827.000	36.17	13.30	49.47	74.00	-24.53	peak

Measurement = Reading level + Correct Factor

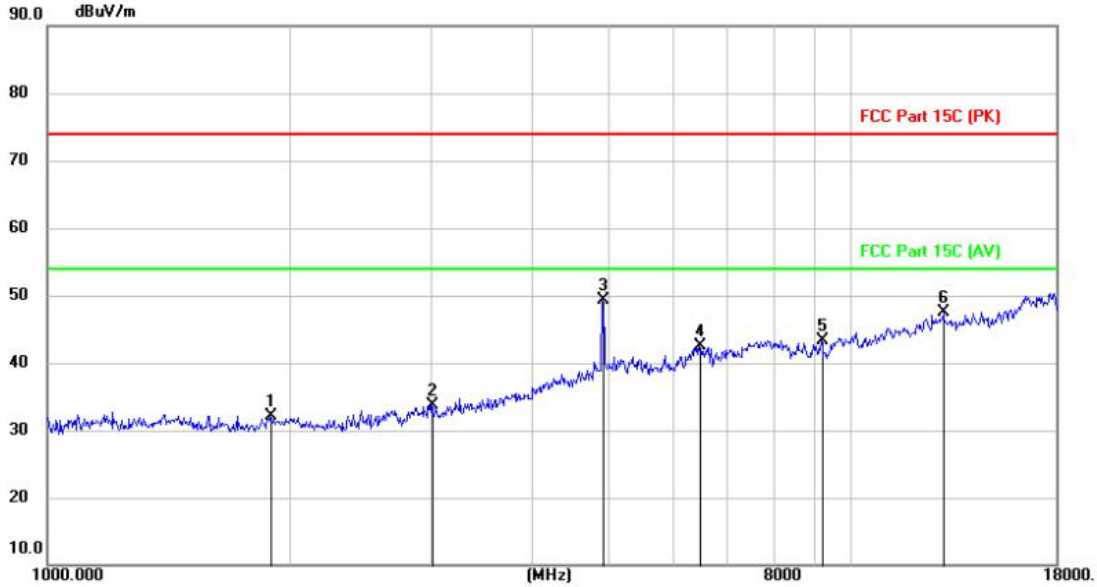
Test Voltage:	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3199.800	45.27	-10.23	35.04	74.00	-38.96	peak
2	*	4921.900	54.19	-5.60	48.59	74.00	-25.41	peak
3		7577.300	41.62	1.02	42.64	74.00	-31.36	peak
4		10113.700	40.54	4.26	44.80	74.00	-29.20	peak
5		11660.700	38.48	7.18	45.66	74.00	-28.34	peak
6		13918.300	37.16	11.12	48.28	74.00	-25.72	peak

Measurement = Reading level + Correct Factor

Test Voltage:	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	TX 802.11b Mode 2462MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		1897.600	43.16	-11.15	32.01	74.00	-41.99	peak
2		3012.800	44.22	-10.56	33.66	74.00	-40.34	peak
3	*	4915.100	55.01	-5.62	49.39	74.00	-24.61	peak
4		6477.400	44.60	-2.19	42.41	74.00	-31.59	peak
5		9202.500	41.09	2.28	43.37	74.00	-30.63	peak
6		13022.400	37.59	9.96	47.55	74.00	-26.45	peak

Measurement = Reading level + Correct Factor

3.8. Conducted Emission

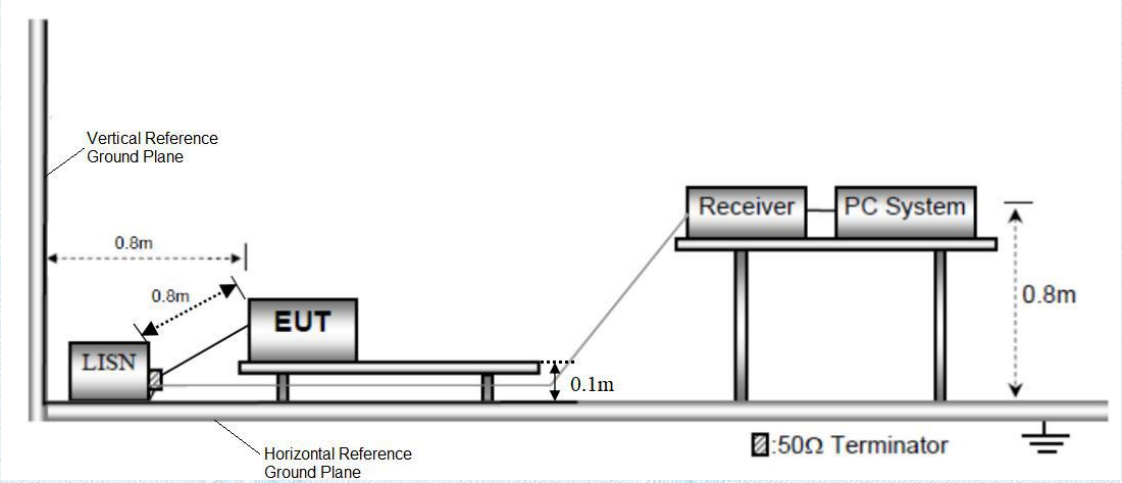
Limit

Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	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.

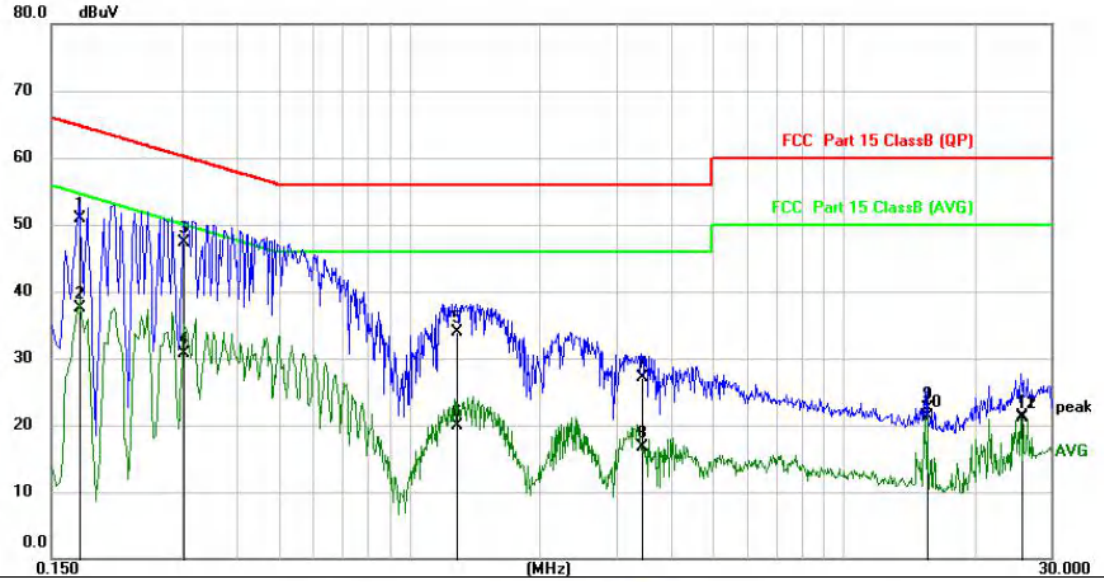
Test Mode:

Please refer to the clause 2.2.

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.

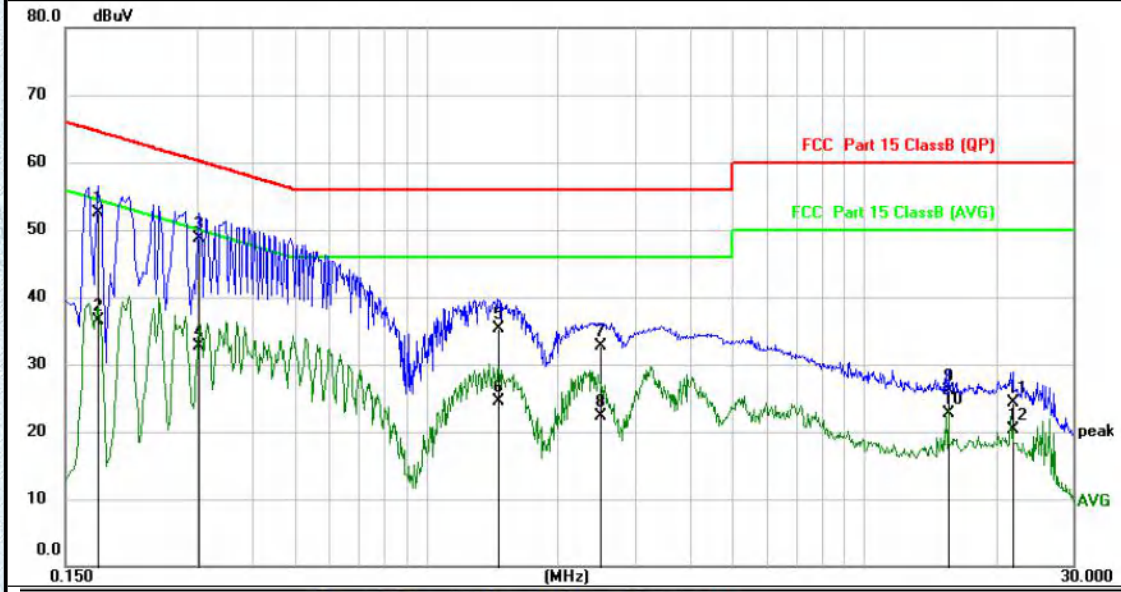
Test Voltage:	AC 120V/60Hz
Terminal:	Line
Test Mode:	Charging +802.11b



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1740	40.01	10.85	50.86	64.77	-13.91	QP
2		0.1740	26.64	10.85	37.49	54.77	-17.28	AVG
3	*	0.3020	36.50	10.89	47.39	60.19	-12.80	QP
4		0.3020	19.81	10.89	30.70	50.19	-19.49	AVG
5		1.2860	23.05	10.88	33.93	56.00	-22.07	QP
6		1.2860	9.07	10.88	19.95	46.00	-26.05	AVG
7		3.4180	16.10	10.93	27.03	56.00	-28.97	QP
8		3.4180	5.86	10.93	16.79	46.00	-29.21	AVG
9		15.6180	11.57	11.03	22.60	60.00	-37.40	QP
10		15.6180	10.30	11.03	21.33	50.00	-28.67	AVG
11		25.6940	10.08	11.25	21.33	60.00	-38.67	QP
12		25.6940	9.85	11.25	21.10	50.00	-28.90	AVG

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

Test Voltage:	AC 120V/60Hz
Terminal:	Neutral
Test Mode:	Charging+802.11b

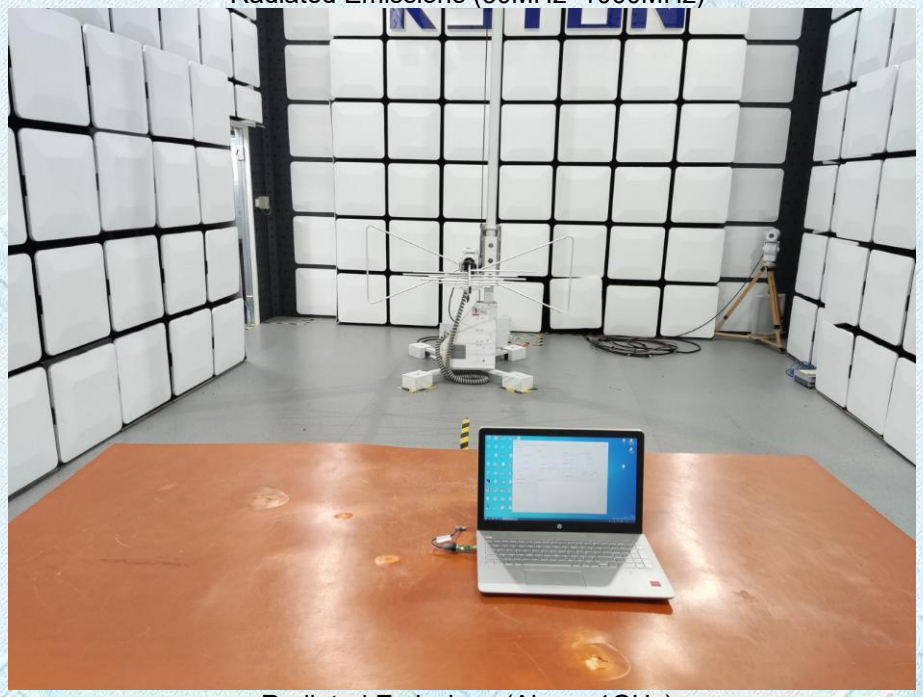


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1780	41.57	10.86	52.43	64.58	-12.15	QP
2		0.1780	25.67	10.86	36.53	54.58	-18.05	AVG
3	*	0.3020	37.80	10.85	48.65	60.19	-11.54	QP
4		0.3020	21.89	10.85	32.74	50.19	-17.45	AVG
5		1.4580	24.41	10.88	35.29	56.00	-20.71	QP
6		1.4580	13.60	10.88	24.48	46.00	-21.52	AVG
7		2.4980	21.78	10.90	32.68	56.00	-23.32	QP
8		2.4980	11.32	10.90	22.22	46.00	-23.78	AVG
9		15.6180	15.08	10.95	26.03	60.00	-33.97	QP
10		15.6180	11.71	10.95	22.66	50.00	-27.34	AVG
11		21.9060	13.14	11.15	24.29	60.00	-35.71	QP
12		21.9060	9.13	11.15	20.28	50.00	-29.72	AVG

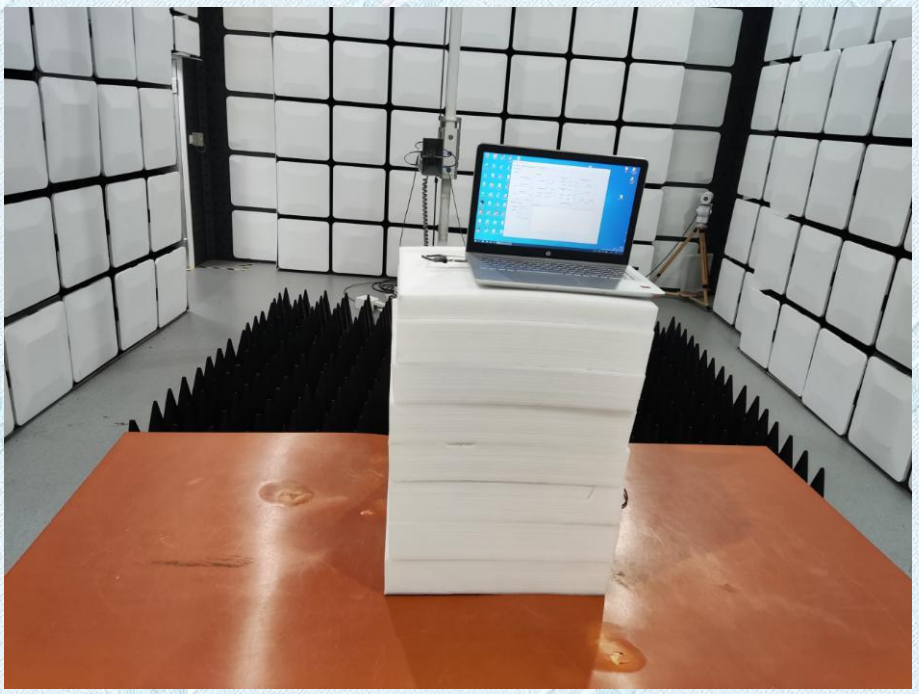
Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

4.EUT TEST PHOTOS

Radiated Emissions (30MHz~1000MHz)

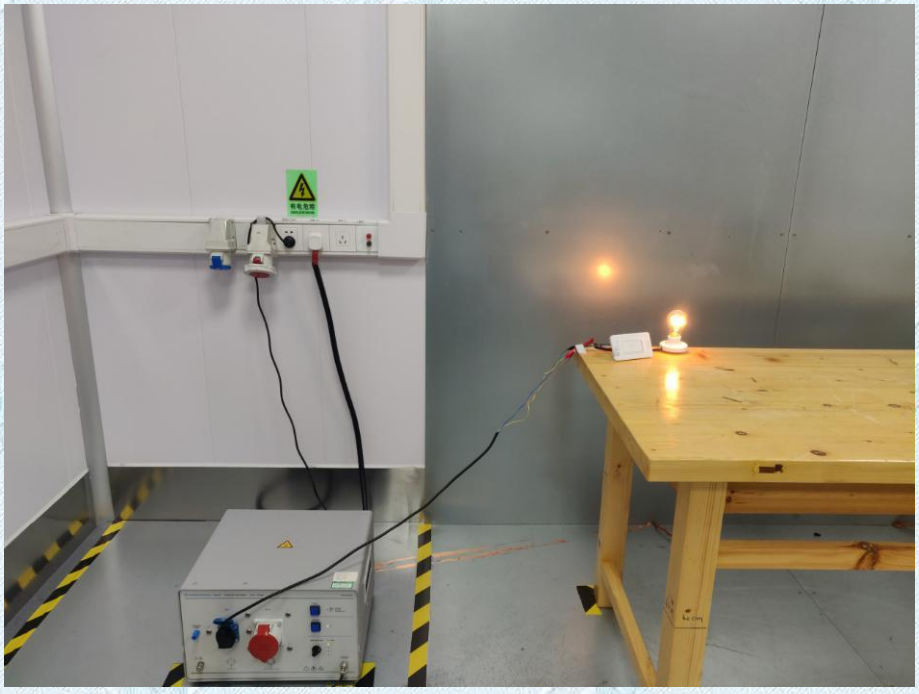


Radiated Emissions (Above 1GHz)



RF Conducted

Conducted Emission



5.PHOTOGRAPHS OF EUT CONSTRUCTIONAL

Please refer to External Photographs and Internal Photographs

**********THE END**********