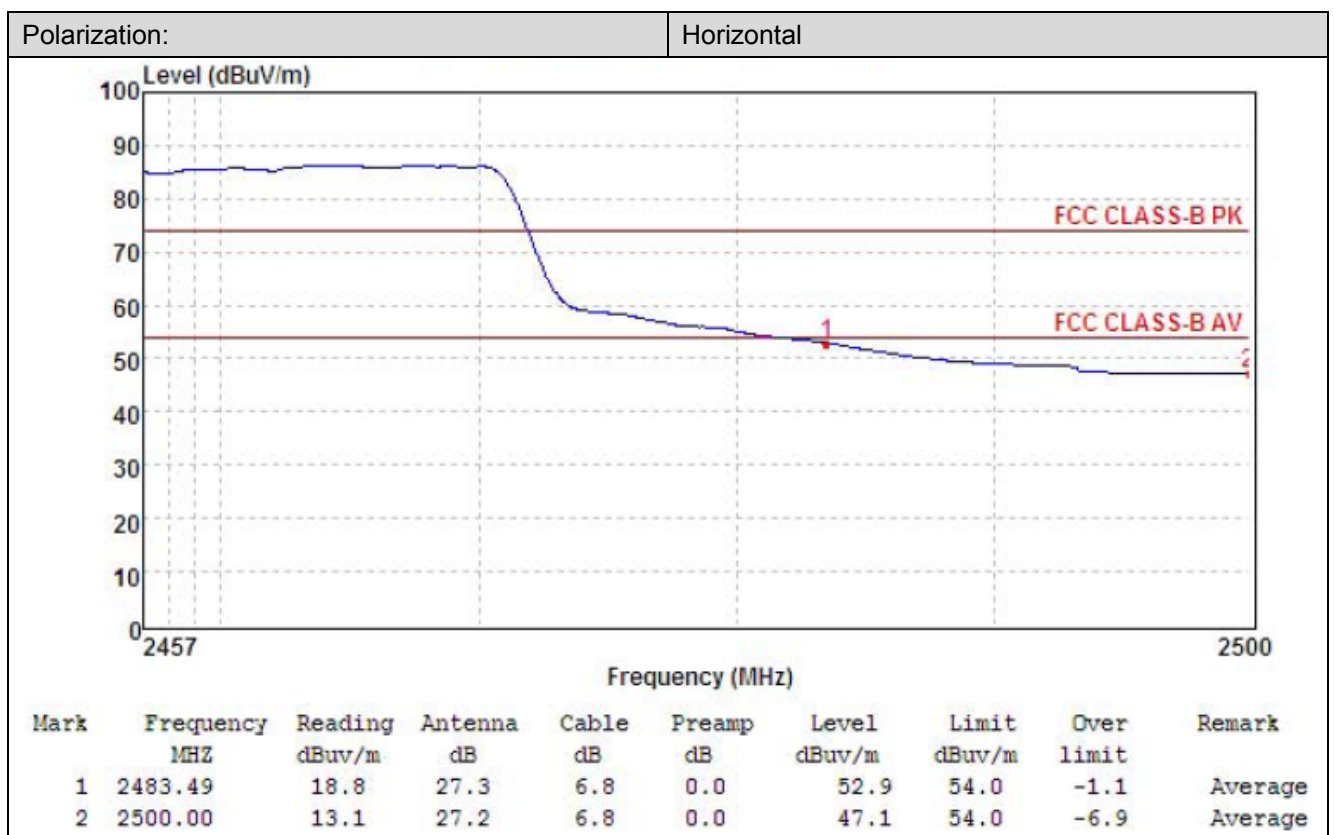
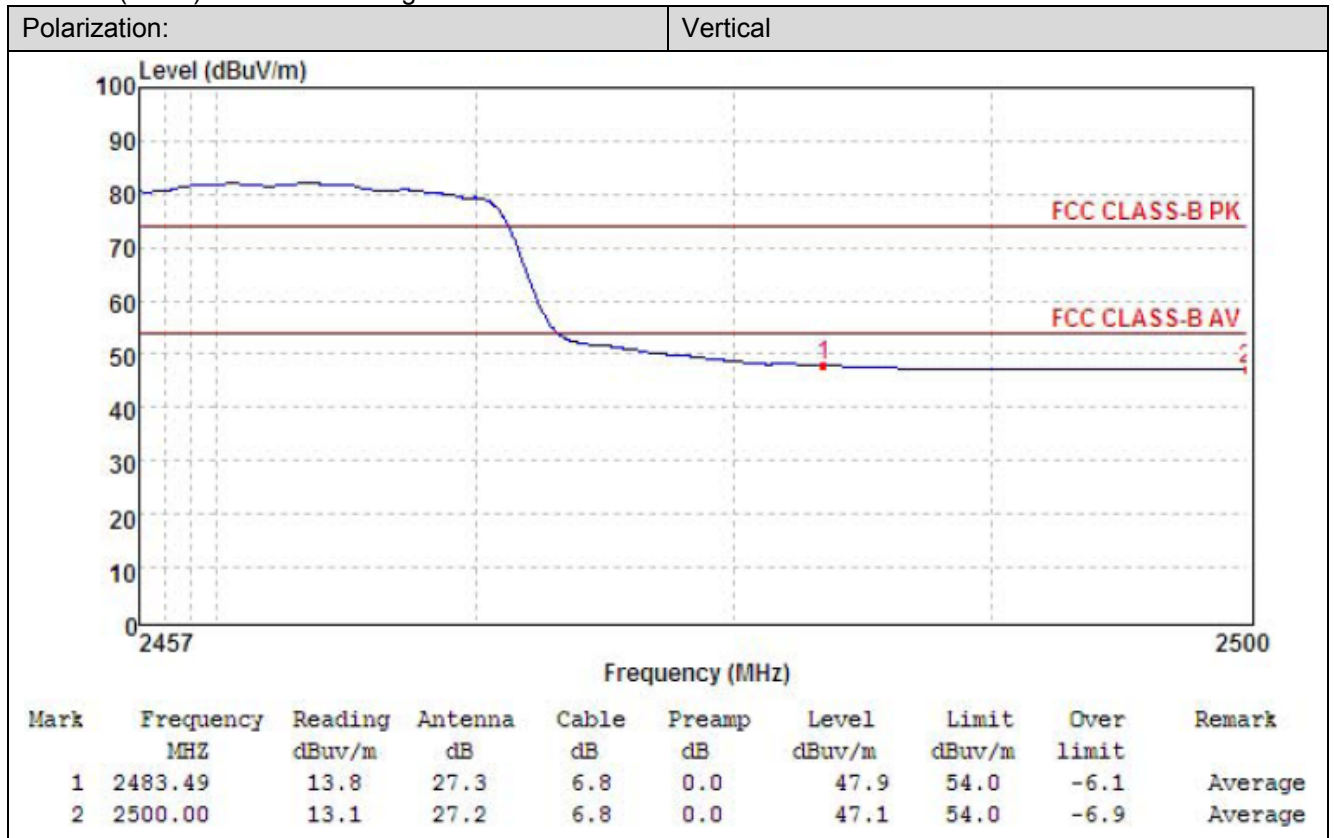


802.11n(HT20)-2462MHz Average:



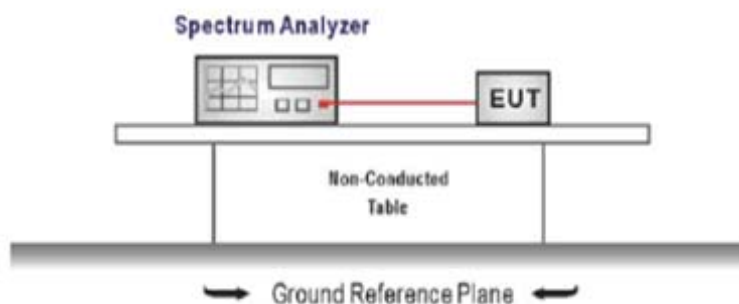
5.7. Band edge and Spurious Emissions (conducted)

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 the antenna port(s) to the spectrum analyzer input.
2. Establish a reference level by using the following procedure
Center frequency=DTS channel center frequency
The span = 1.5 times the DTS bandwidth.
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum PSD level

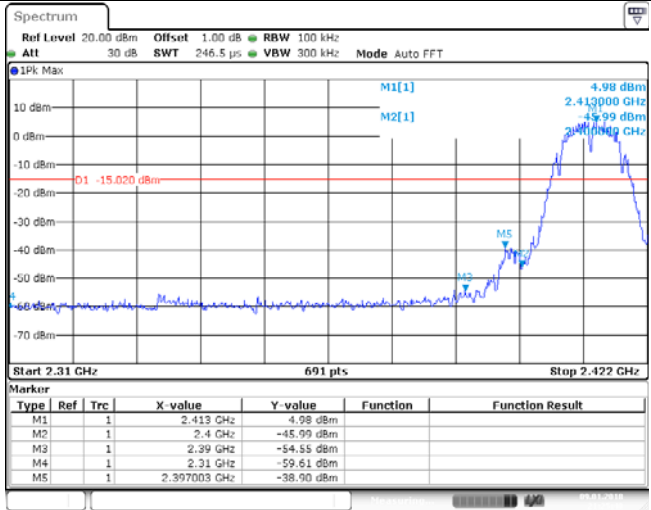
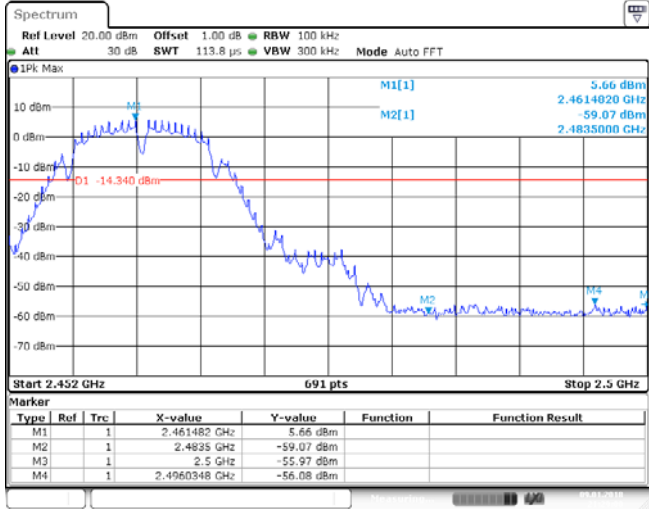
Note: the channel found to contain the maximum PSD level can be used to establish the reference level.
3. Emission level measurement
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum amplitude level.
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
5. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

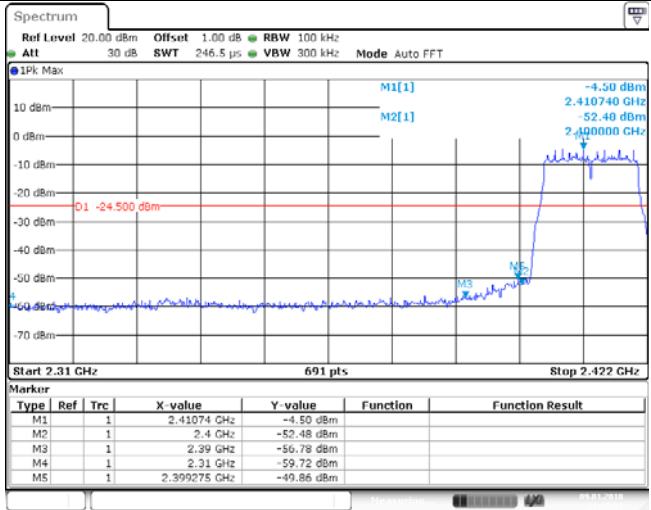
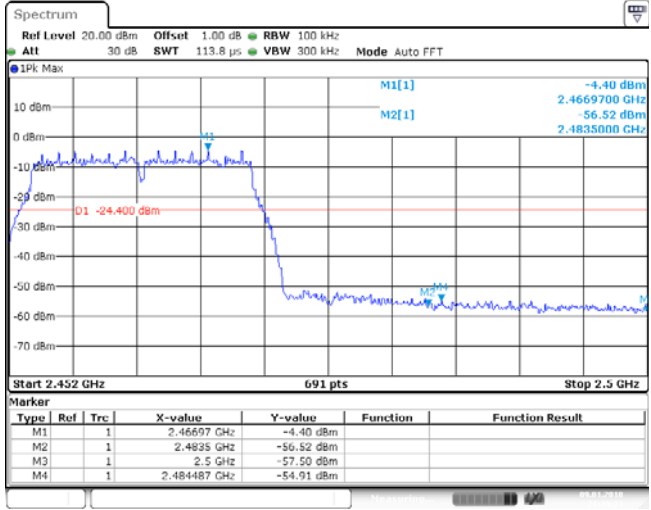
TEST MODE:

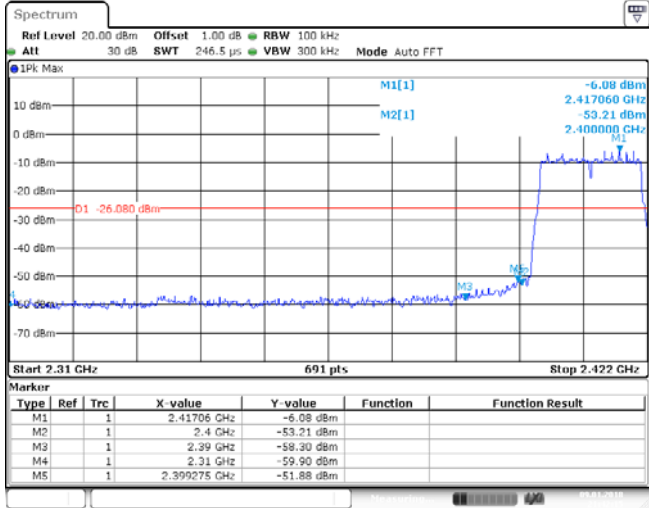
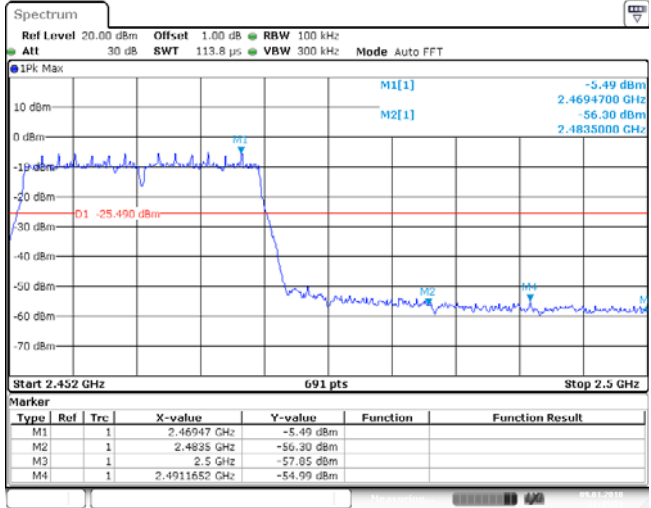
Please refer to the clause 3.3

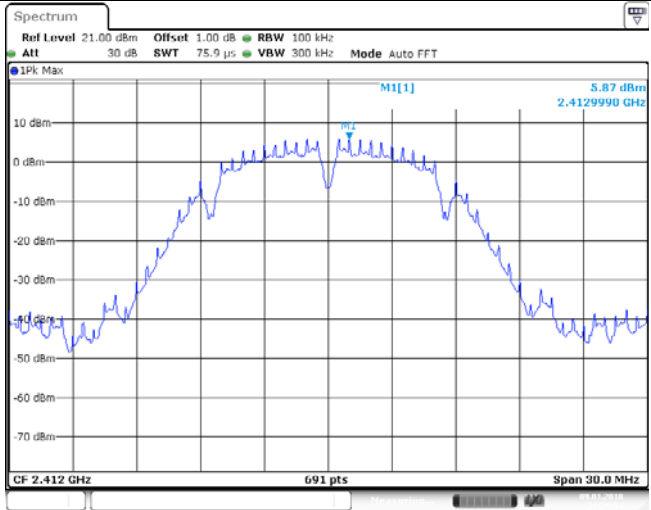
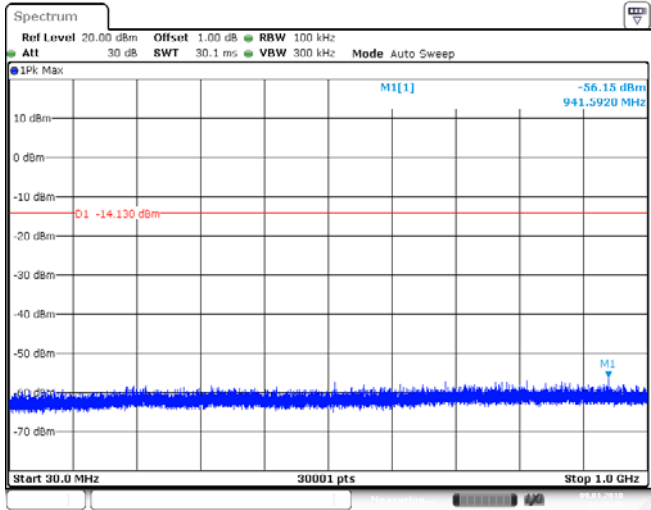
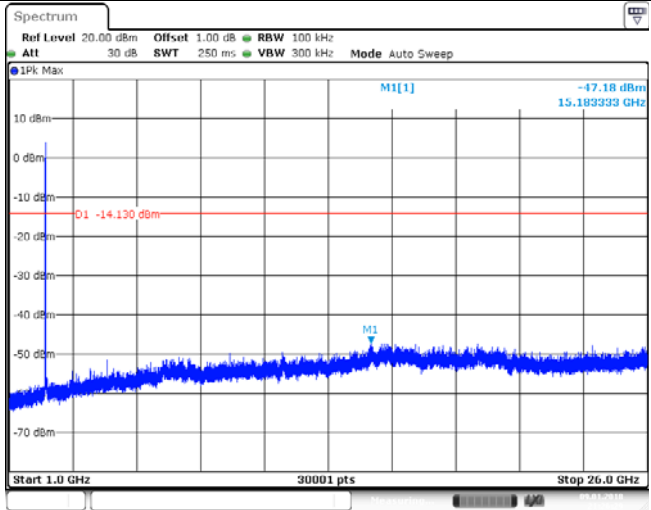
TEST RESULTS

☒ Passed ☐ Not Applicable

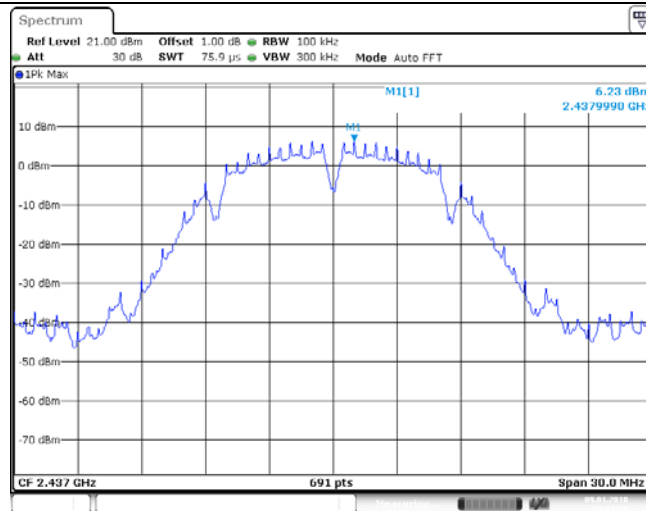
Test Item:	Bandedge	Type:	802.11 b
CH01			
CH11			

Test Item:	Bandedge	Type:	802.11 g
CH01			
CH11			

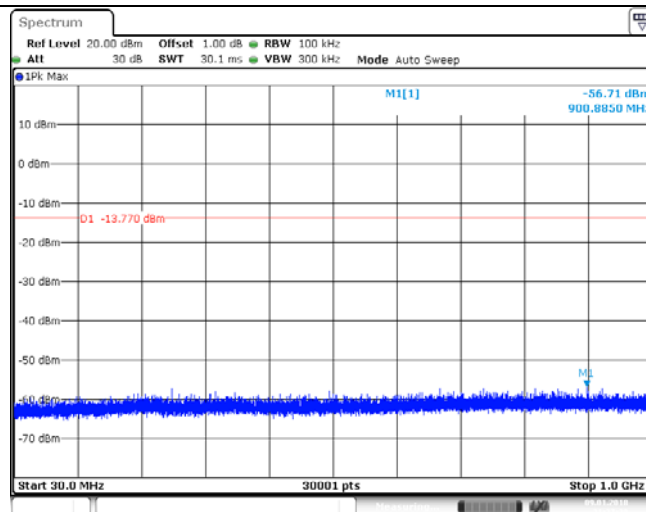
Test Item:	Bandedge	Type:	802.11 n(HT20)
CH01			
CH11			

Test Item:	SE	Type:	802.11 b
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

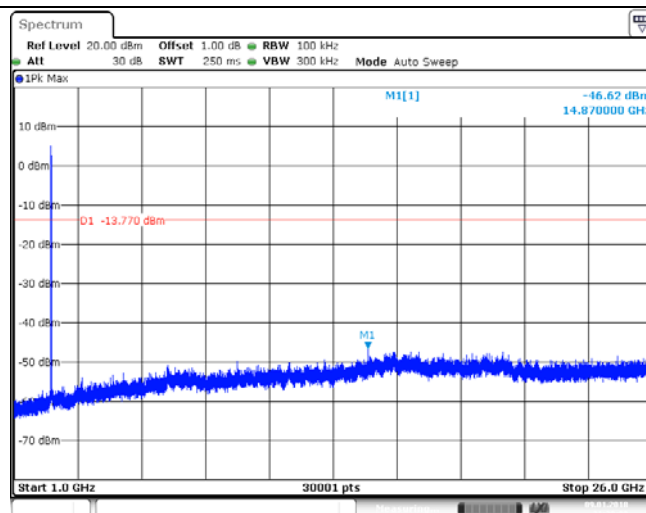
CH06
Reference level



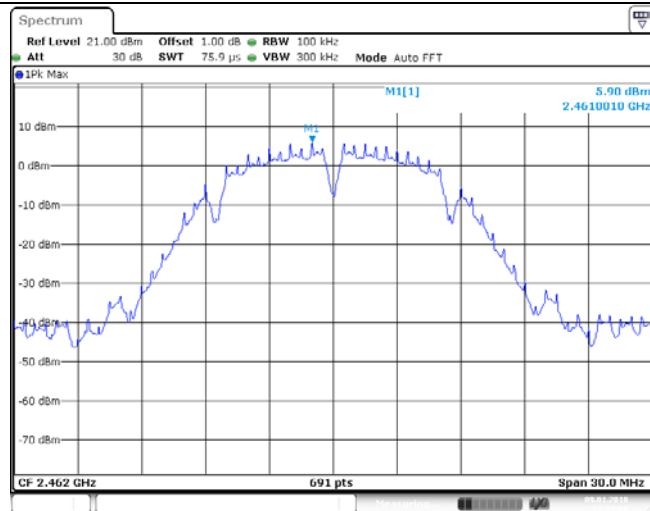
CH06
30MHz~1000MHz



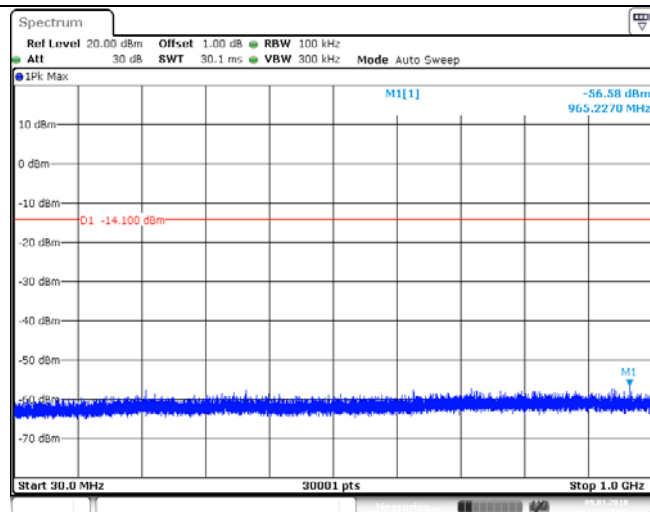
CH06
1GHz~26GHz



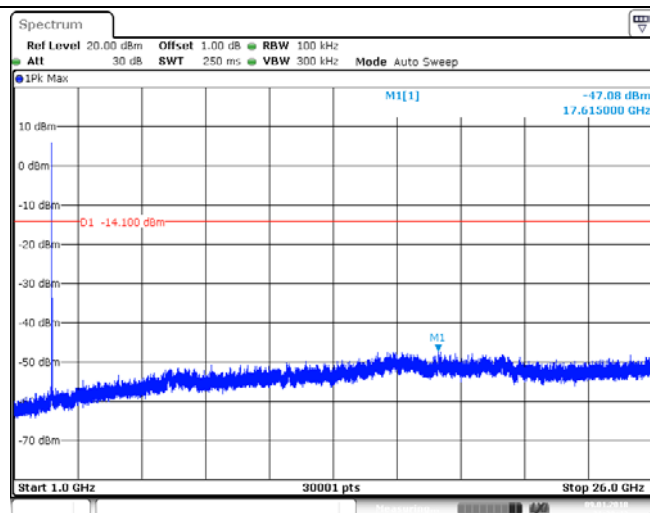
CH11
Reference level



CH11
30MHz~1000MHz

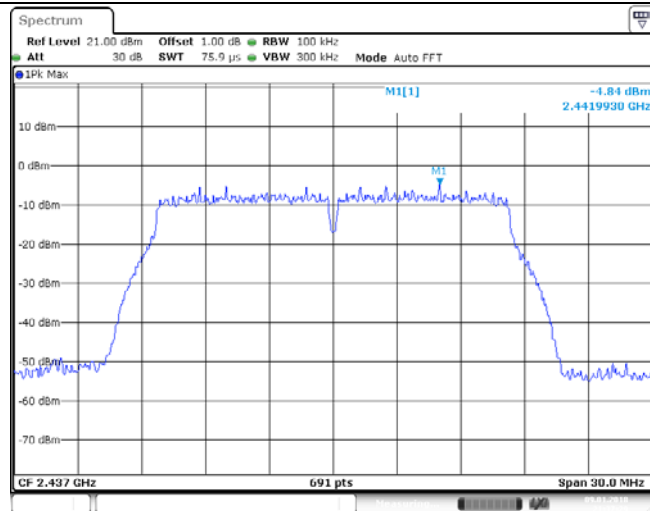


CH11
1GHz~26GHz

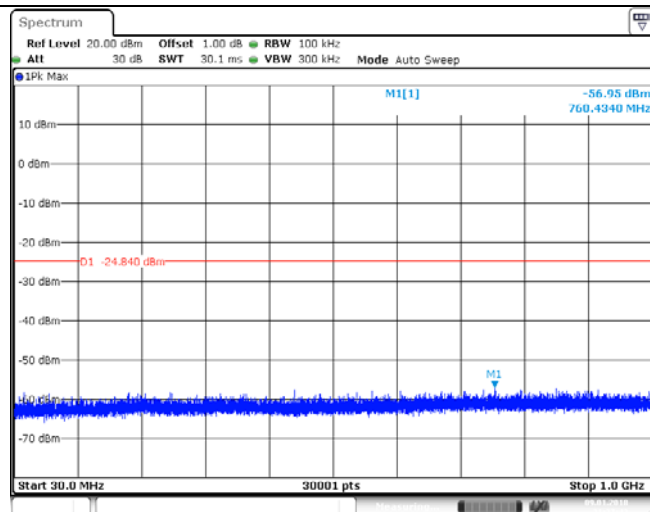


Test Item:	SE	Type:	802.11 g
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

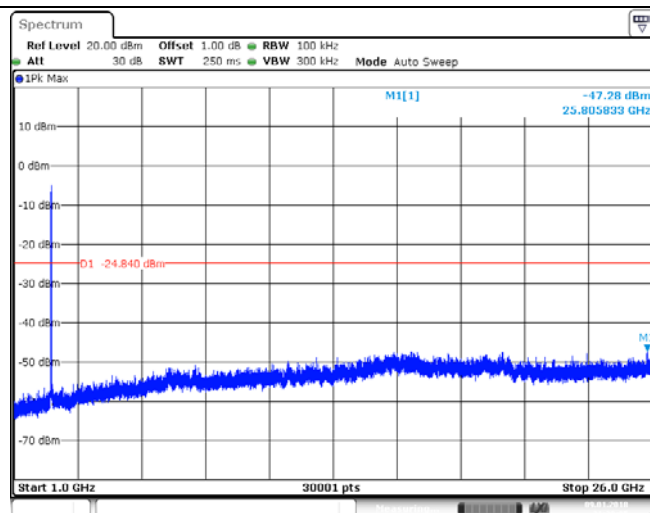
CH06
Reference level



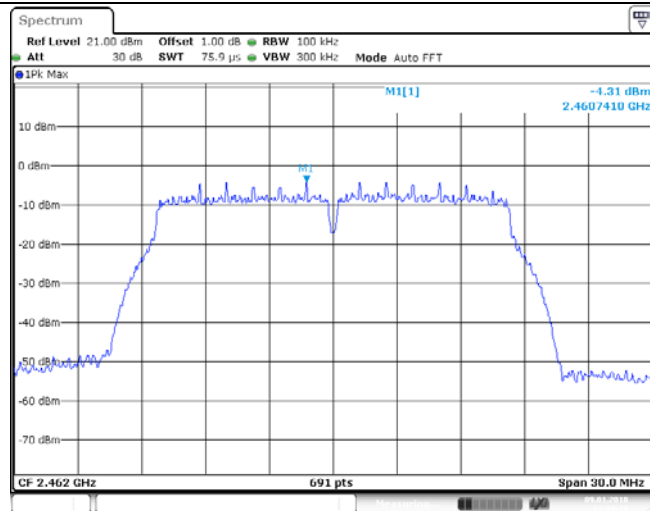
CH06
30MHz~1000MHz



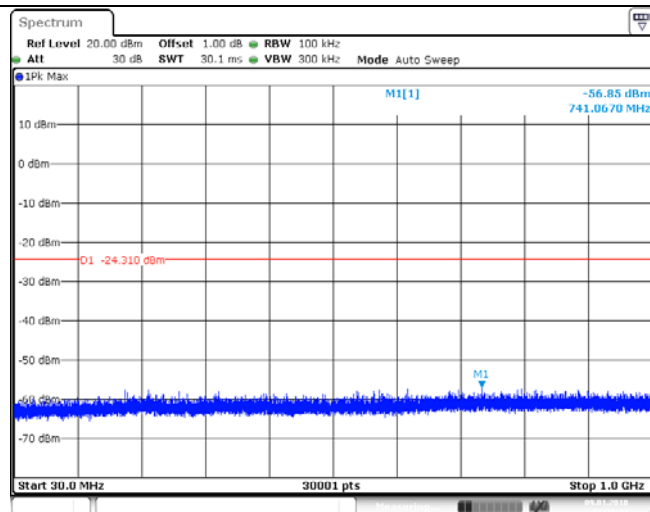
CH06
1GHz~26GHz



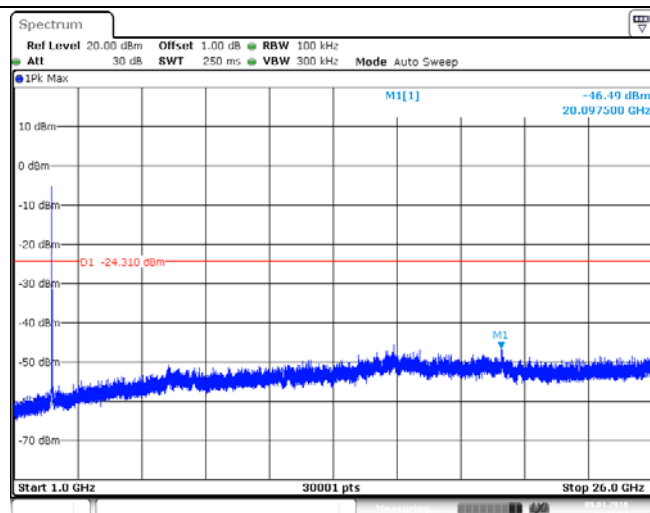
CH11
Reference level



CH11
30MHz~1000MHz

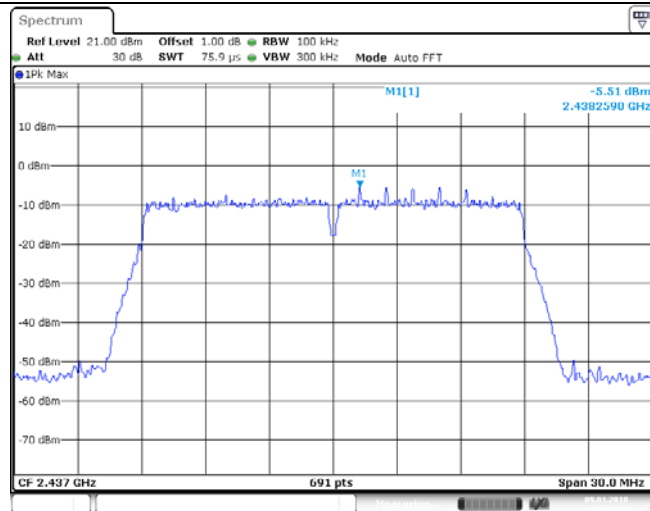


CH11
1GHz~26GHz

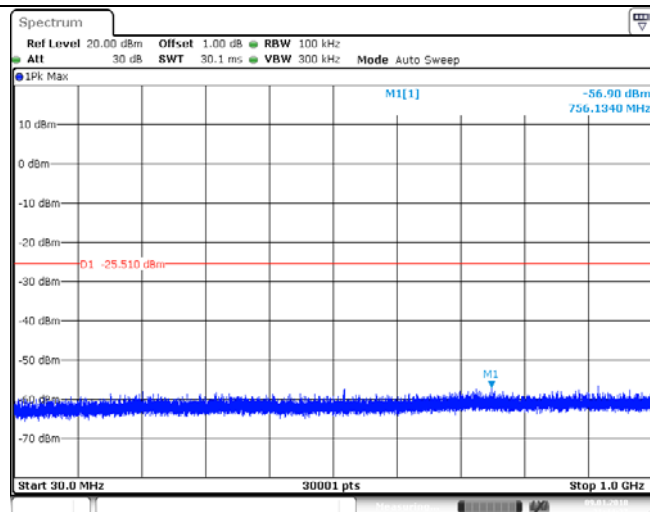


Test Item:	SE	Type:	802.11 n(HT20)
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

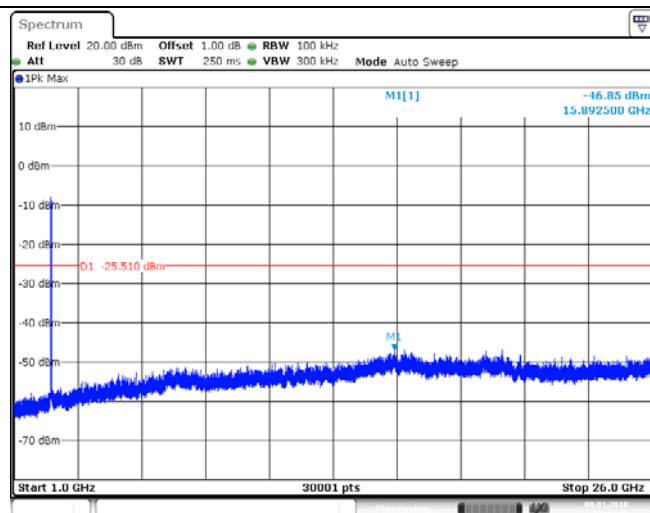
CH06
Reference level



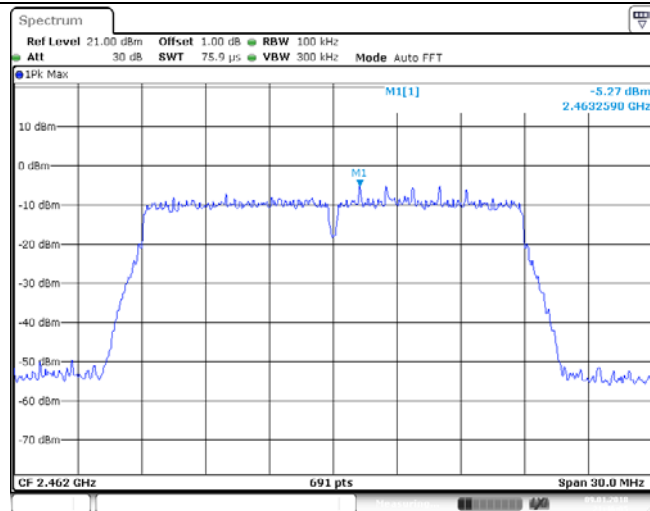
CH06
30MHz~1000MHz



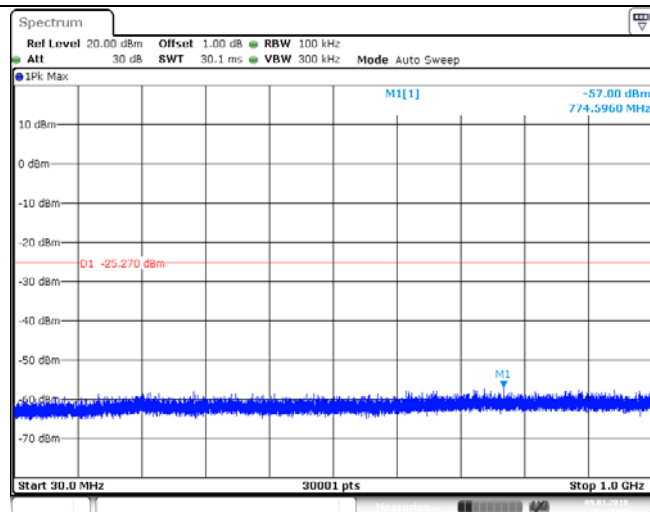
CH06
1GHz~26GHz



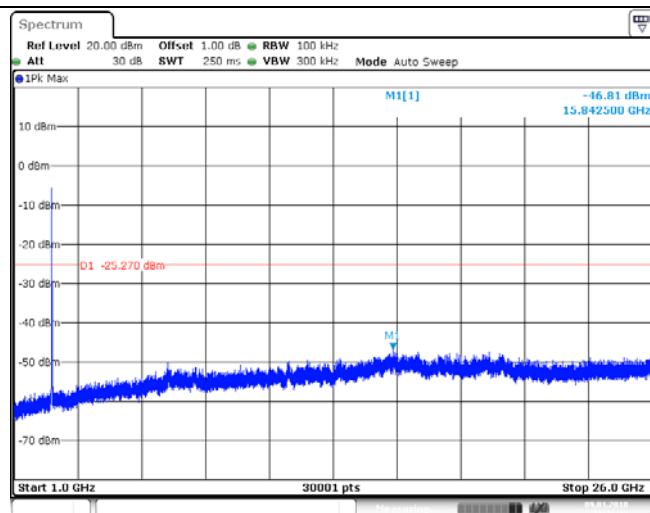
CH11
Reference level



CH11
30MHz~1000MHz



CH11
1GHz~26GHz



5.8. Spurious Emissions (radiated)

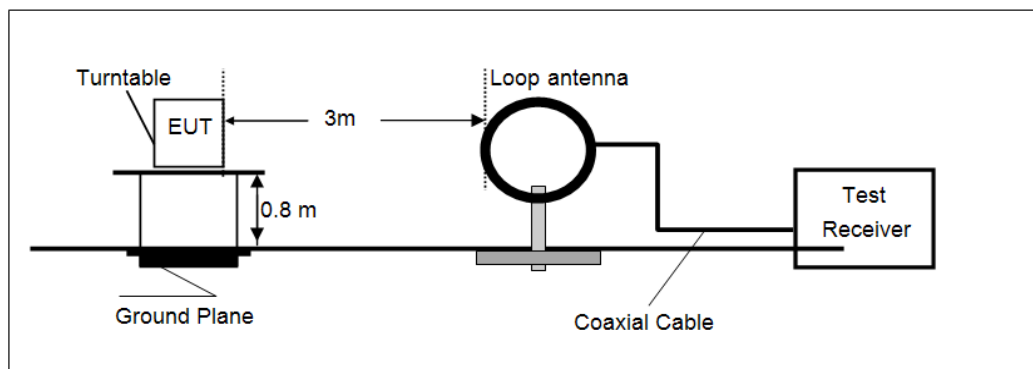
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

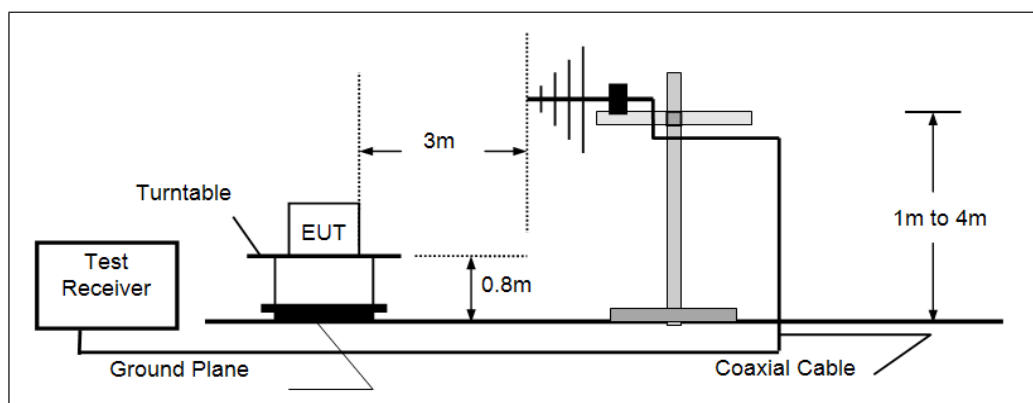
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

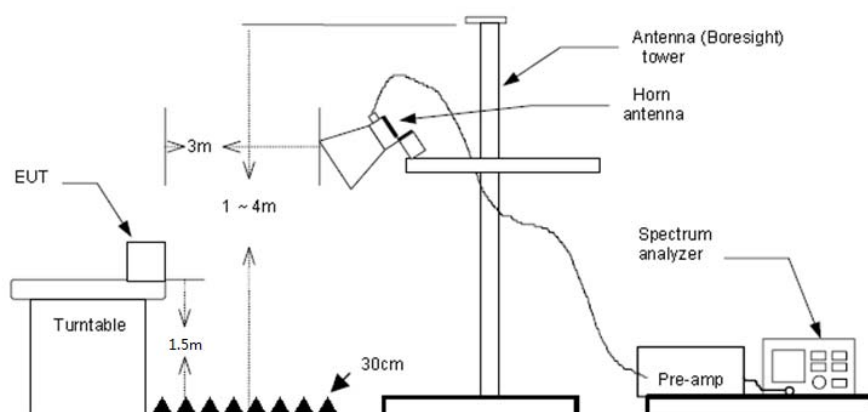
➤ 9kHz ~30MHz



➤ 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
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=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:

- 1) Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

➤ **9kHz ~ 30MHz**

The EUT was pre-scanned the frequency band (9kHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

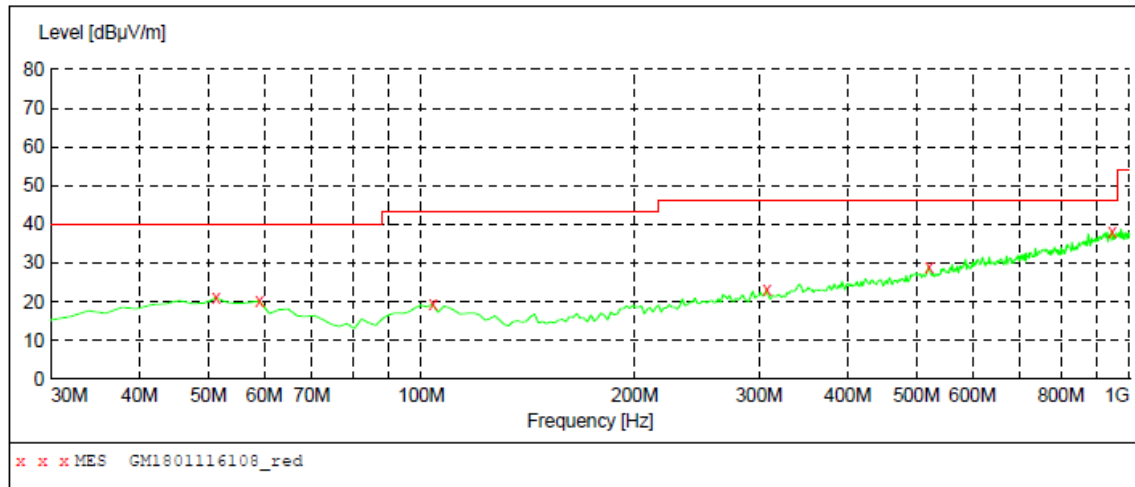
➤ **30MHz ~1000MHz**

Have pre-scan all modulation mode, found the 802.11b mode CH01 which it was worst case, so only the worst case's data on the test report.

➤ 30MHz ~ 1GHz

Polarization:

Vertical

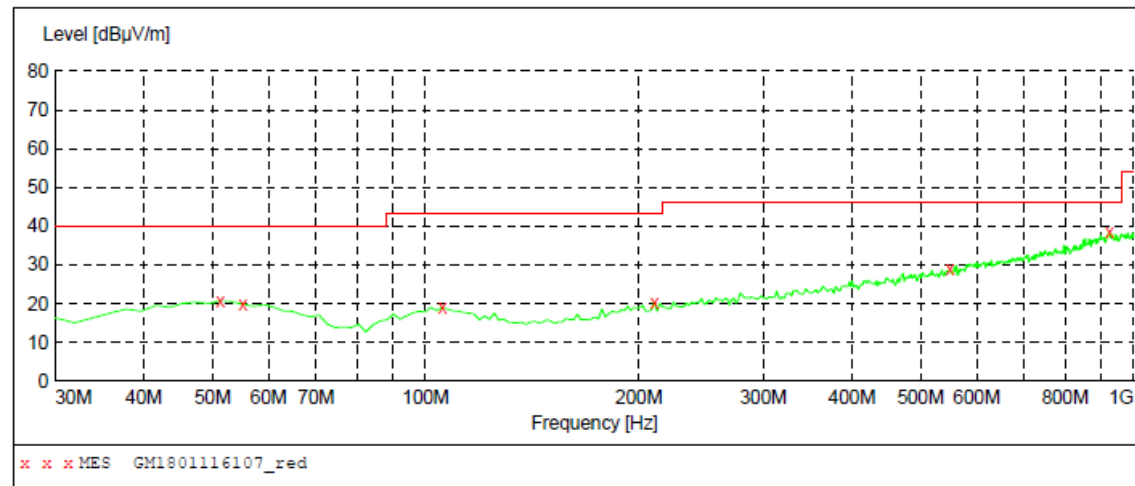
**MEASUREMENT RESULT: "GM1801116108_red"**

1/12/2018 12:01AM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	21.00	-8.8	40.0	19.0	QP	100.0	215.00	VERTICAL
59.100000	20.20	-9.8	40.0	19.8	QP	100.0	297.00	VERTICAL
103.720000	19.40	-10.5	43.5	24.1	QP	100.0	24.00	VERTICAL
307.420000	23.10	-7.1	46.0	22.9	QP	100.0	285.00	VERTICAL
520.820000	28.90	-1.3	46.0	17.1	QP	100.0	119.00	VERTICAL
945.680000	38.10	7.2	46.0	7.9	QP	100.0	91.00	VERTICAL

Polarization:

Horizontal

**MEASUREMENT RESULT: "GM1801116107_red"**

1/11/2018 11:59PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
51.340000	20.80	-8.8	40.0	19.2	QP	100.0	315.00	HORIZONTAL
55.220000	19.90	-9.2	40.0	20.1	QP	300.0	0.00	HORIZONTAL
105.660000	19.10	-10.5	43.5	24.4	QP	100.0	360.00	HORIZONTAL
210.420000	20.30	-10.5	43.5	23.2	QP	100.0	173.00	HORIZONTAL
549.920000	28.80	-0.8	46.0	17.2	QP	100.0	161.00	HORIZONTAL
924.340000	38.30	7.0	46.0	7.7	QP	100.0	0.00	HORIZONTAL

➤ 1 GHz ~ 25 GHz

802.11b					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1651.15	36.11	25.06	5.67	36.83	30.01	74.00	-43.99	Vertical	Peak
4605.81	33.39	30.92	9.46	37.22	36.55	74.00	-37.45	Vertical	Peak
6577.75	32.35	34.16	11.32	35.35	42.48	74.00	-31.52	Vertical	Peak
7245.81	35.11	36.25	11.91	35.02	48.25	74.00	-25.75	Vertical	Peak
1219.64	36.46	26.28	4.69	36.56	30.87	74.00	-43.13	Horizontal	Peak
3653.46	34.84	29.30	8.33	38.26	34.21	74.00	-39.79	Horizontal	Peak
4996.69	33.19	31.50	9.67	36.41	37.95	74.00	-36.05	Horizontal	Peak
6662.01	32.21	34.20	11.43	35.25	42.59	74.00	-31.41	Horizontal	Peak

802.11b					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1814.22	34.93	25.39	5.98	37.15	29.15	74.00	-44.85	Vertical	Peak
3719.15	35.43	29.36	8.41	38.25	34.95	74.00	-39.05	Vertical	Peak
5086.52	33.77	31.85	9.74	36.31	39.05	74.00	-34.95	Vertical	Peak
7394.88	32.70	36.30	12.06	34.83	46.23	74.00	-27.77	Vertical	Peak
1502.73	34.49	25.77	5.29	36.59	28.96	74.00	-45.04	Horizontal	Peak
3489.84	35.86	28.92	8.10	38.42	34.46	74.00	-39.54	Horizontal	Peak
4920.96	34.01	31.42	9.62	36.62	38.43	74.00	-35.57	Horizontal	Peak
7319.96	34.22	36.30	11.99	34.92	47.59	74.00	-26.41	Horizontal	Peak

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1764.12	35.10	25.33	5.89	37.06	29.26	74.00	-44.74	Vertical	Peak
3516.59	35.92	29.05	8.14	38.39	34.72	74.00	-39.28	Vertical	Peak
4983.99	34.92	31.48	9.66	36.44	39.62	74.00	-34.38	Vertical	Peak
7394.88	35.01	36.30	12.06	34.83	48.54	74.00	-25.46	Vertical	Peak
1219.64	36.51	26.28	4.69	36.56	30.92	74.00	-43.08	Horizontal	Peak
3662.78	34.21	29.30	8.34	38.26	33.59	74.00	-40.41	Horizontal	Peak
5284.50	34.13	31.33	9.96	36.45	38.97	74.00	-35.03	Horizontal	Peak
7547.01	32.92	36.15	12.55	34.94	46.68	74.00	-27.32	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + 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(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

802.11g					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1346.93	34.65	26.06	4.91	36.49	29.13	74.00	-44.87	Vertical	Peak
4310.85	34.40	30.23	9.05	37.60	36.08	74.00	-37.92	Vertical	Peak
5940.97	32.80	32.38	10.65	35.41	40.42	74.00	-33.58	Vertical	Peak
7245.81	35.69	36.25	11.91	35.02	48.83	74.00	-25.17	Vertical	Peak
1228.98	36.59	26.27	4.71	36.55	31.02	74.00	-42.98	Horizontal	Peak
4096.88	35.19	29.89	8.86	37.89	36.05	74.00	-37.95	Horizontal	Peak
5806.41	33.27	32.11	10.59	35.32	40.65	74.00	-33.35	Horizontal	Peak
7245.81	35.38	36.25	11.91	35.02	48.52	74.00	-25.48	Horizontal	Peak

802.11g					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1777.65	45.61	25.36	5.92	37.09	39.80	74.00	-34.20	Vertical	Peak
3607.26	36.52	29.30	8.28	38.27	35.83	74.00	-38.17	Vertical	Peak
5112.49	34.06	31.85	9.76	36.29	39.38	74.00	-34.62	Vertical	Peak
7319.96	36.54	36.30	11.99	34.92	49.91	74.00	-24.09	Vertical	Peak
1182.94	36.21	26.17	4.62	36.58	30.42	74.00	-43.58	Horizontal	Peak
4055.37	34.58	29.81	8.82	37.98	35.23	74.00	-38.77	Horizontal	Peak
4871.10	33.52	31.46	9.59	36.76	37.81	74.00	-36.19	Horizontal	Peak
7319.96	34.22	36.30	11.99	34.92	47.59	74.00	-26.41	Horizontal	Peak

802.11g					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1296.47	35.03	26.20	4.82	36.52	29.53	74.00	-44.47	Vertical	Peak
3844.28	36.44	29.64	8.56	38.20	36.44	74.00	-37.56	Vertical	Peak
5177.97	33.20	31.59	9.81	36.22	38.38	74.00	-35.62	Vertical	Peak
7045.74	33.27	35.44	11.85	34.86	45.70	74.00	-28.30	Vertical	Peak
1617.86	36.68	24.95	5.60	36.76	30.47	74.00	-43.53	Horizontal	Peak
3072.77	34.96	28.75	7.57	38.22	33.06	74.00	-40.94	Horizontal	Peak
4920.96	35.88	31.42	9.62	36.62	40.30	74.00	-33.70	Horizontal	Peak
7009.96	31.08	35.33	11.85	34.80	43.46	74.00	-30.54	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + 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(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

802.11n(HT20)					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1340.09	35.42	26.08	4.90	36.49	29.91	74.00	-44.09	Vertical	Peak
4096.88	34.88	29.89	8.86	37.89	35.74	74.00	-38.26	Vertical	Peak
5895.77	32.86	32.29	10.63	35.38	40.40	74.00	-33.60	Vertical	Peak
7245.81	36.40	36.25	11.91	35.02	49.54	74.00	-24.46	Vertical	Peak
1247.90	35.70	26.25	4.74	36.54	30.15	74.00	-43.85	Horizontal	Peak
3873.75	35.49	29.67	8.60	38.19	35.57	74.00	-38.43	Horizontal	Peak
5747.59	32.89	31.84	10.51	35.46	39.78	74.00	-34.22	Horizontal	Peak
7245.81	34.91	36.25	11.91	35.02	48.05	74.00	-25.95	Horizontal	Peak

802.11n(HT20)					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1609.65	35.43	24.93	5.59	36.74	29.21	74.00	-44.79	Vertical	Peak
3662.78	34.43	29.30	8.34	38.26	33.81	74.00	-40.19	Vertical	Peak
5009.43	32.67	31.54	9.68	36.39	37.50	74.00	-36.50	Vertical	Peak
6974.36	31.12	35.15	11.82	34.82	43.27	74.00	-30.73	Vertical	Peak
1680.83	35.64	25.14	5.73	36.89	29.62	74.00	-44.38	Horizontal	Peak
3653.46	36.16	29.30	8.33	38.26	35.53	74.00	-38.47	Horizontal	Peak
5125.52	34.26	31.80	9.77	36.27	39.56	74.00	-34.44	Horizontal	Peak
7301.36	33.80	36.30	11.97	34.95	47.12	74.00	-26.88	Horizontal	Peak

802.11n(HT20)					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1676.56	35.62	25.13	5.72	36.88	29.59	74.00	-44.41	Vertical	Peak
3057.17	35.34	28.72	7.55	38.22	33.39	74.00	-40.61	Vertical	Peak
4920.96	36.08	31.42	9.62	36.62	40.50	74.00	-33.50	Vertical	Peak
7413.73	33.61	36.27	12.11	34.83	47.16	74.00	-26.84	Vertical	Peak
1260.67	35.33	26.24	4.76	36.54	29.79	74.00	-44.21	Horizontal	Peak
3653.46	35.09	29.30	8.33	38.26	34.46	74.00	-39.54	Horizontal	Peak
4883.52	33.45	31.43	9.59	36.73	37.74	74.00	-36.26	Horizontal	Peak
7376.08	32.88	36.30	12.04	34.85	46.37	74.00	-27.63	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + 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(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

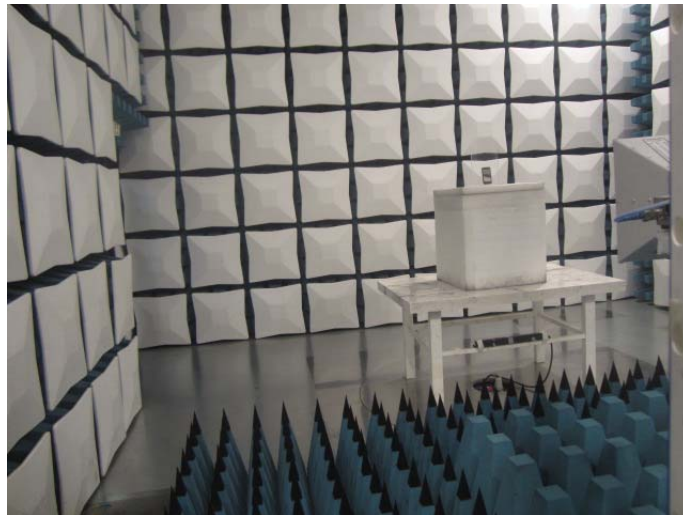
6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions





7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No.: TRE1801002601.

-----End of Report-----