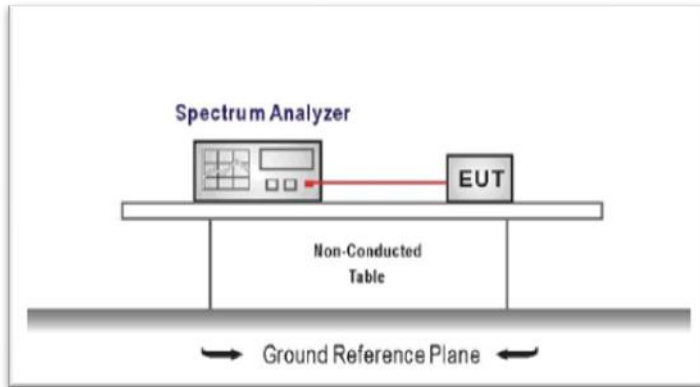


5.7. Band edge and Spurious Emissions (conducted)

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

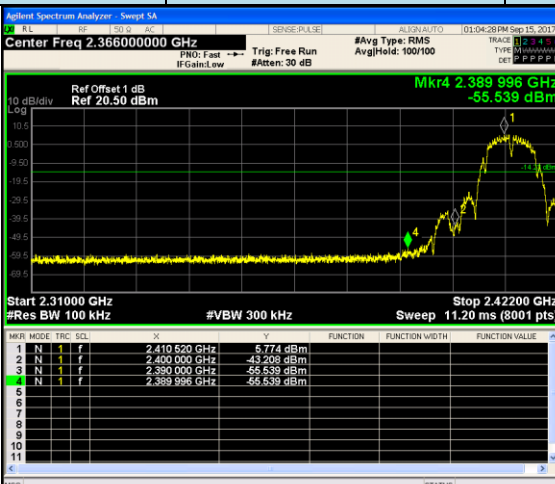
Note: the channel found to contain the maximum PSD level can be used to establish the reference level.
3. Emission level measurement
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = 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.

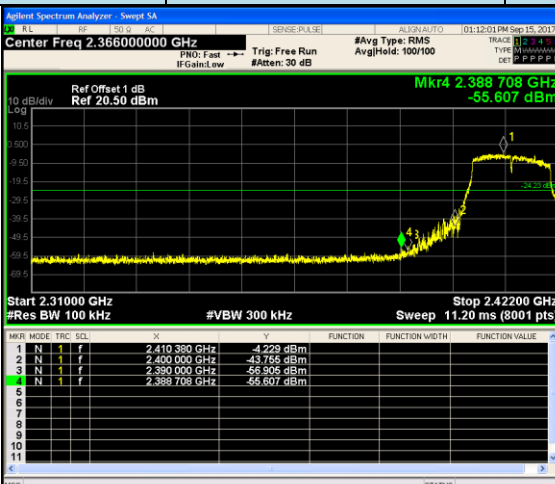
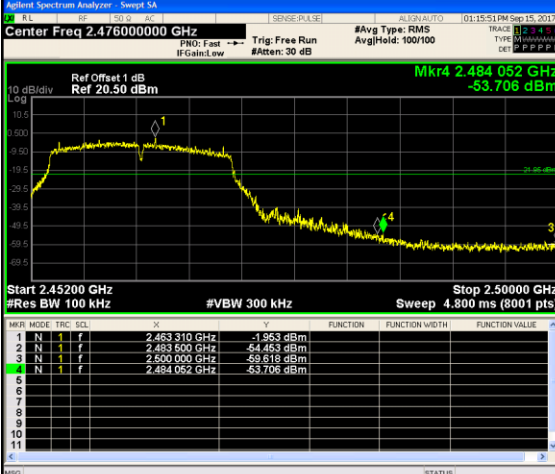
TEST MODE:

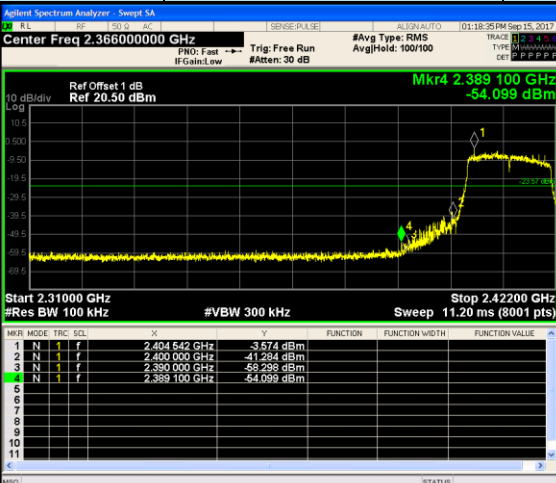
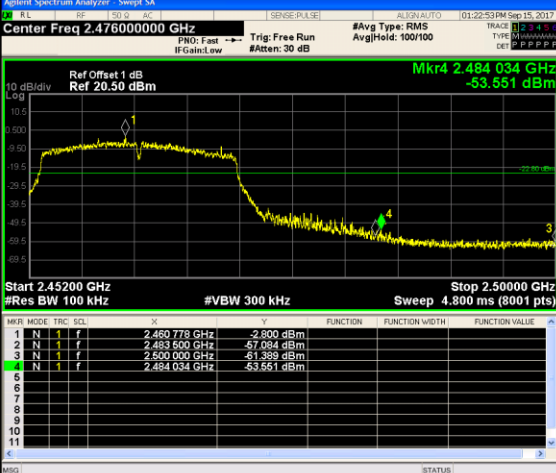
Please refer to the clause 3.3

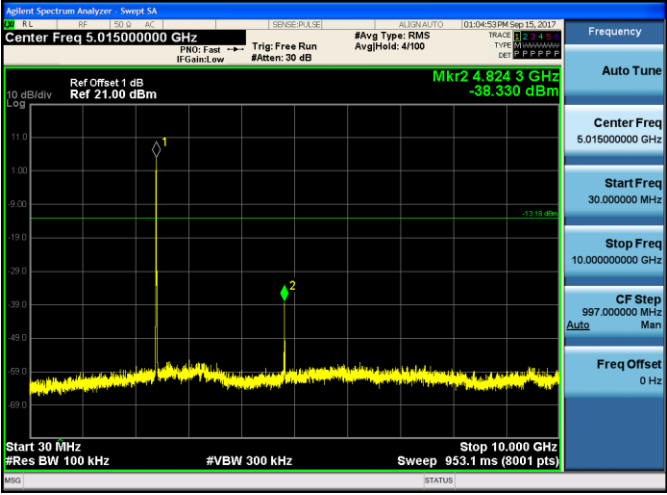
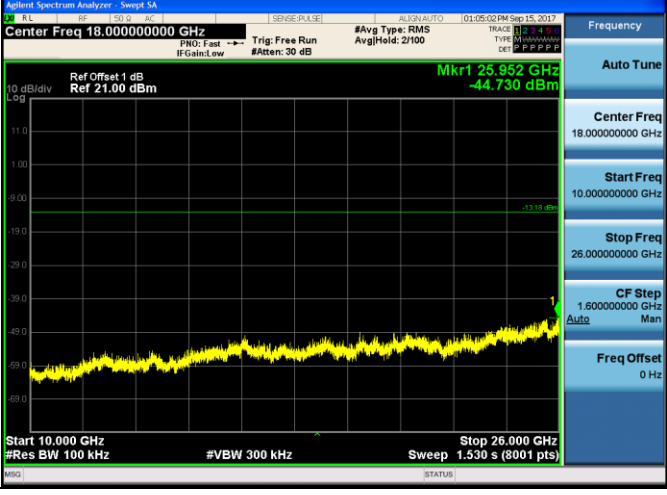
TEST RESULTS

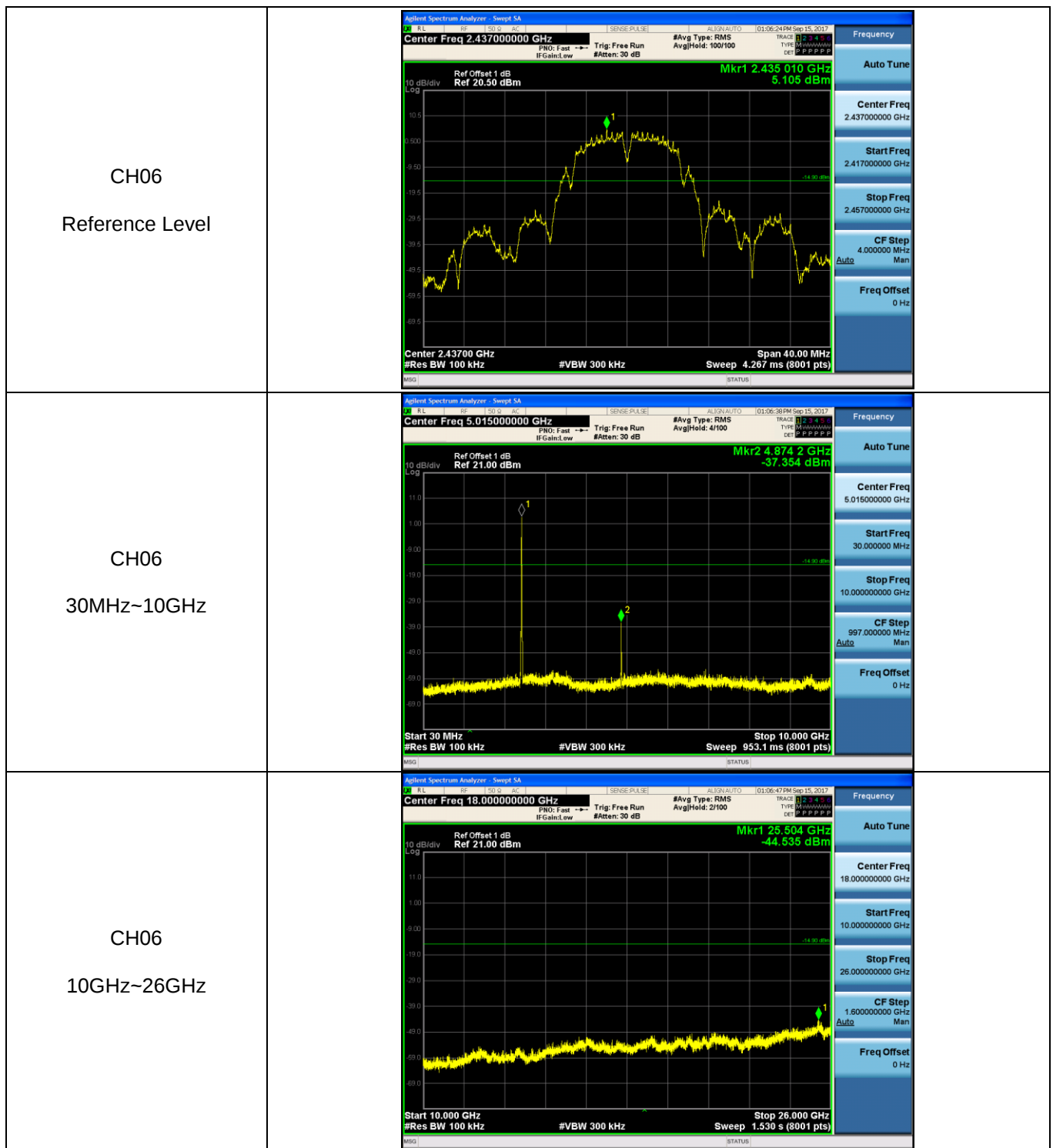
☒ Passed ☐ Not Applicable

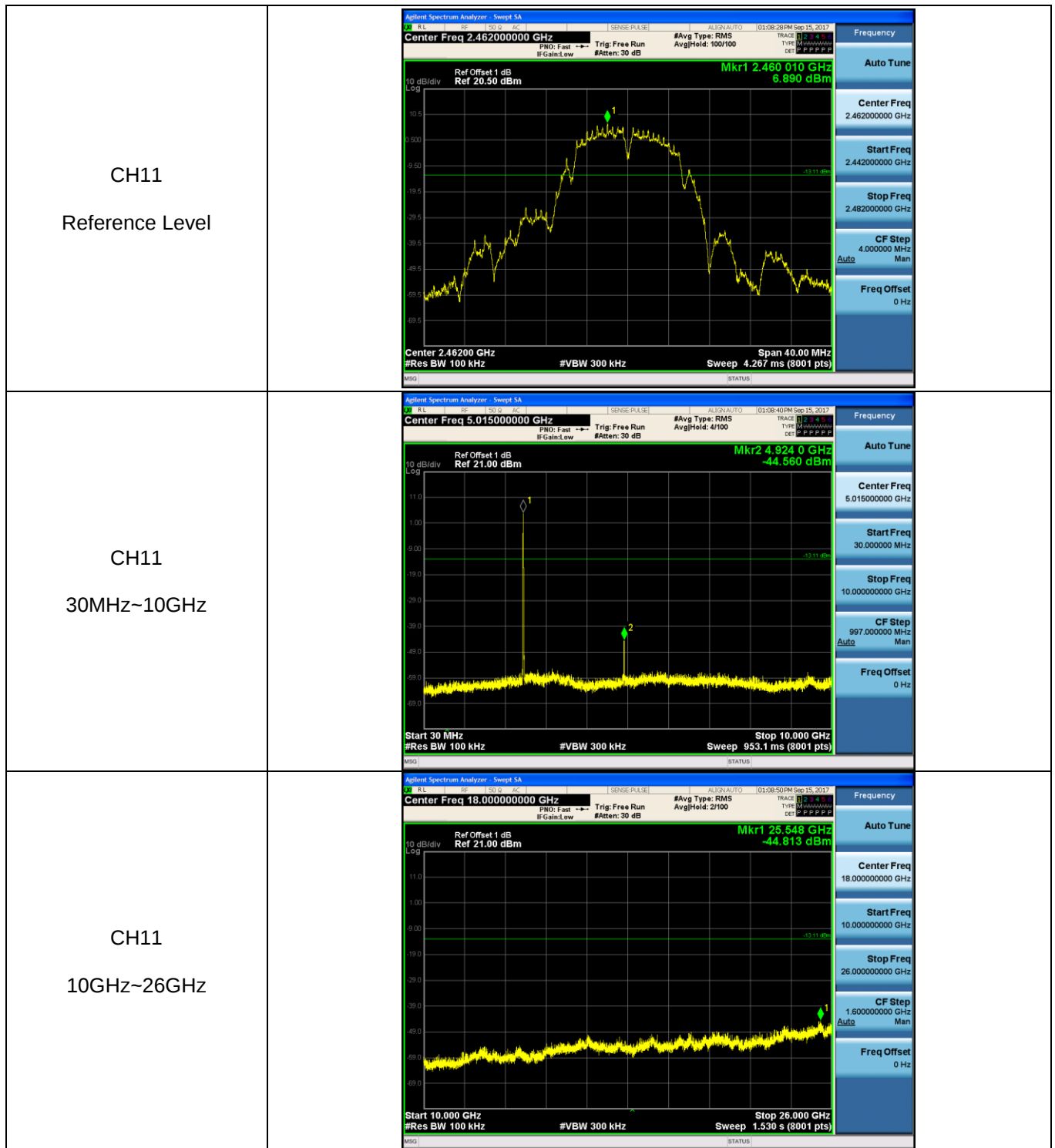
Test Item:	Bandedge	Type:	802.11 b							
CH01		<table><tr><td>Frequency</td></tr><tr><td>Auto Tune</td></tr><tr><td>Center Freq 2.366000000 GHz</td></tr><tr><td>Start Freq 2.310000000 GHz</td></tr><tr><td>Stop Freq 2.422000000 GHz</td></tr><tr><td>CF Step 11.200000 MHz</td></tr><tr><td>Auto</td></tr><tr><td>Freq Offset 0 Hz</td></tr></table>	Frequency	Auto Tune	Center Freq 2.366000000 GHz	Start Freq 2.310000000 GHz	Stop Freq 2.422000000 GHz	CF Step 11.200000 MHz	Auto	Freq Offset 0 Hz
Frequency										
Auto Tune										
Center Freq 2.366000000 GHz										
Start Freq 2.310000000 GHz										
Stop Freq 2.422000000 GHz										
CF Step 11.200000 MHz										
Auto										
Freq Offset 0 Hz										
CH11		<table><tr><td>Frequency</td></tr><tr><td>Auto Tune</td></tr><tr><td>Center Freq 2.476000000 GHz</td></tr><tr><td>Start Freq 2.452000000 GHz</td></tr><tr><td>Stop Freq 2.500000000 GHz</td></tr><tr><td>CF Step 4.800000 MHz</td></tr><tr><td>Auto</td></tr><tr><td>Freq Offset 0 Hz</td></tr></table>	Frequency	Auto Tune	Center Freq 2.476000000 GHz	Start Freq 2.452000000 GHz	Stop Freq 2.500000000 GHz	CF Step 4.800000 MHz	Auto	Freq Offset 0 Hz
Frequency										
Auto Tune										
Center Freq 2.476000000 GHz										
Start Freq 2.452000000 GHz										
Stop Freq 2.500000000 GHz										
CF Step 4.800000 MHz										
Auto										
Freq Offset 0 Hz										

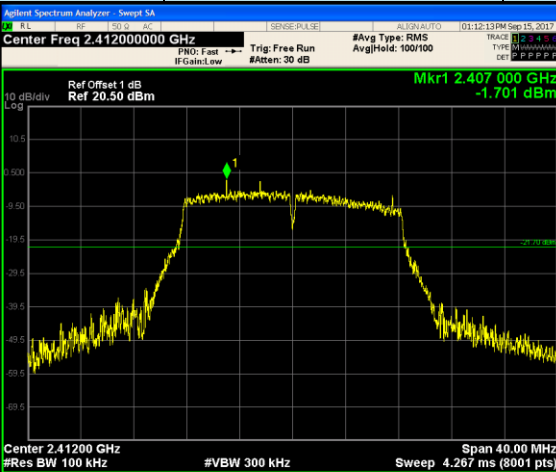
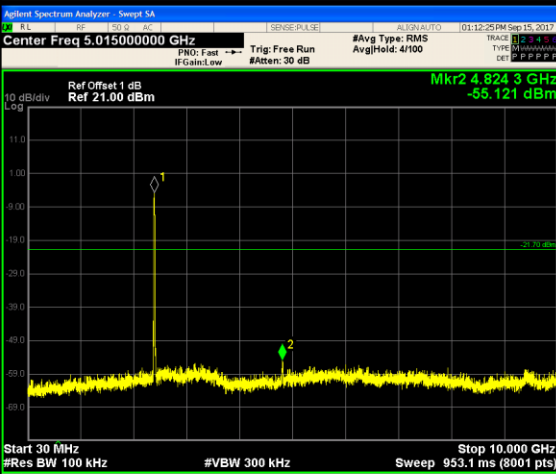
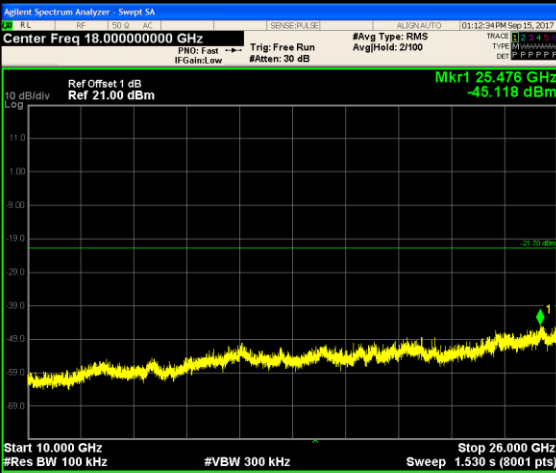
Test Item:	Bandedge	Type:	802.11 g
CH01			
CH11			

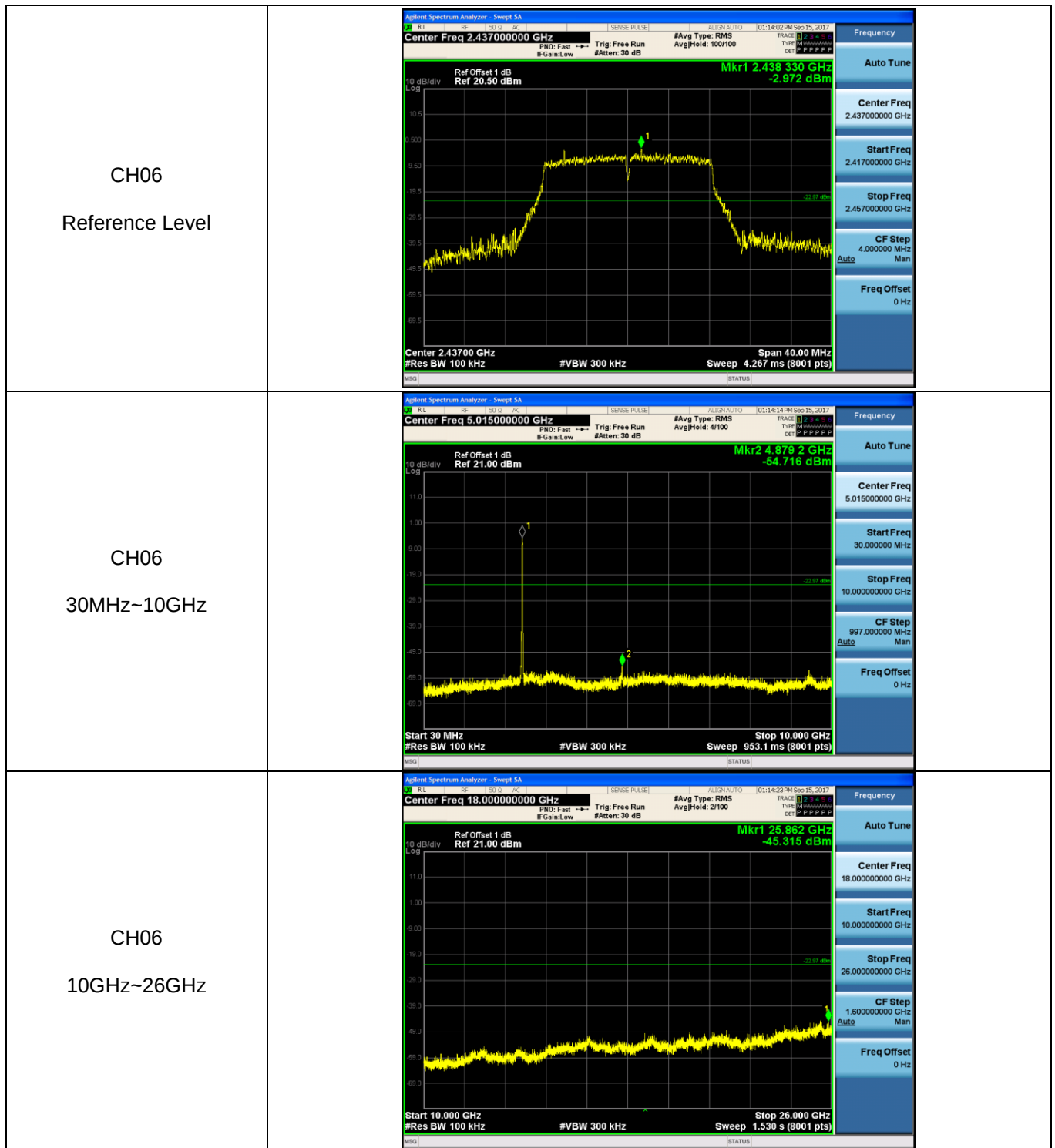
Test Item:	Bandedge	Type:	802.11 n(HT20)
CH01			
CH11			

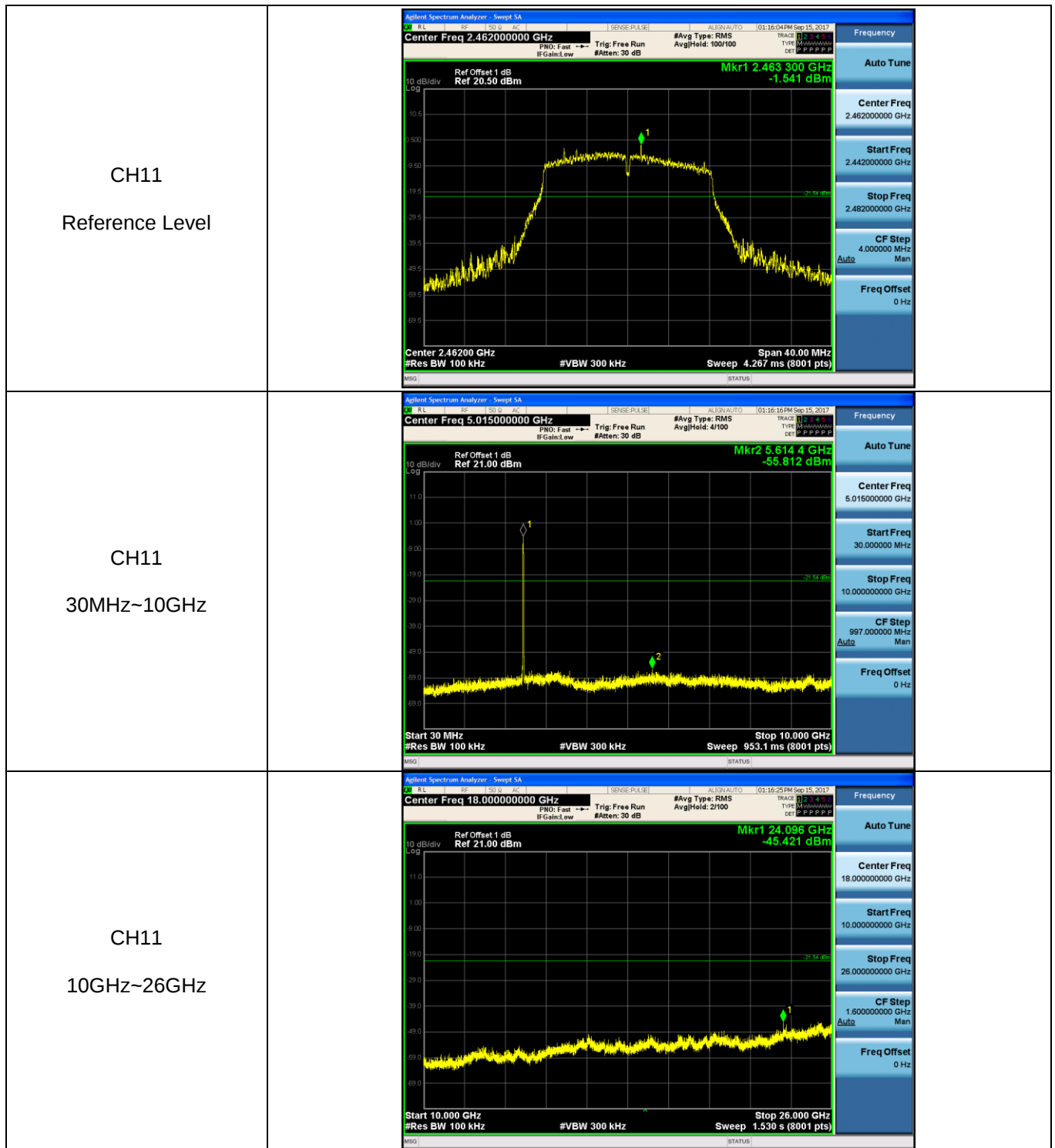
Test Item:	SE	Type:	802.11 b
CH01 Reference Level			
CH01 30MHz~10GHz			
CH01 10GHz~26GHz			

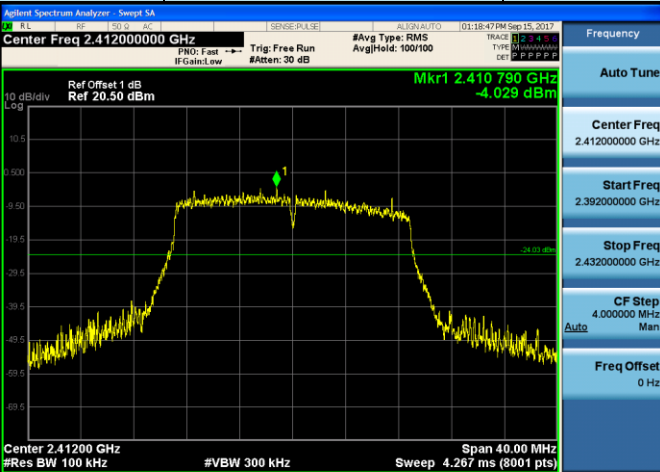
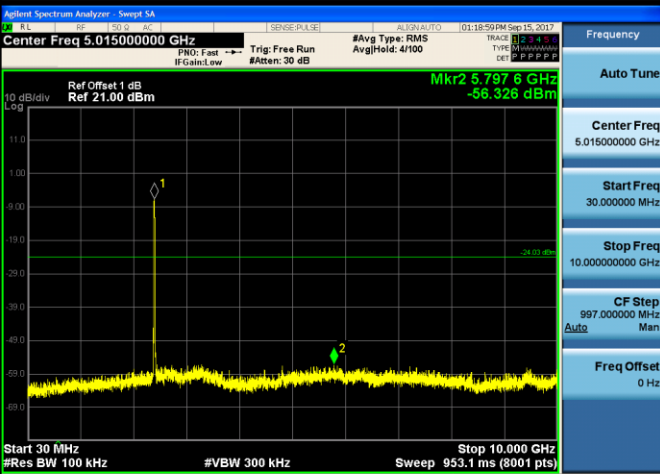
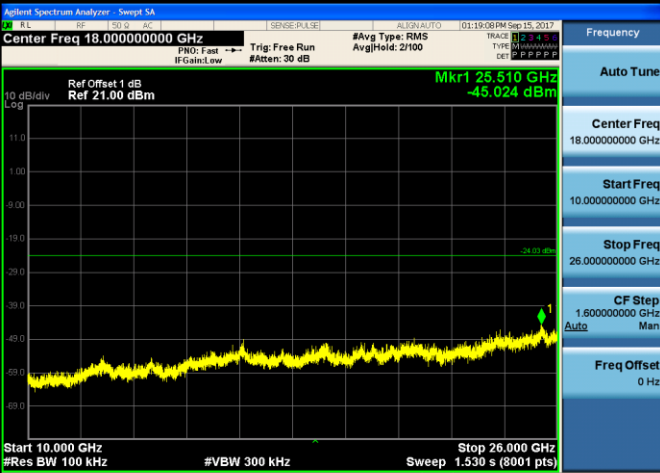


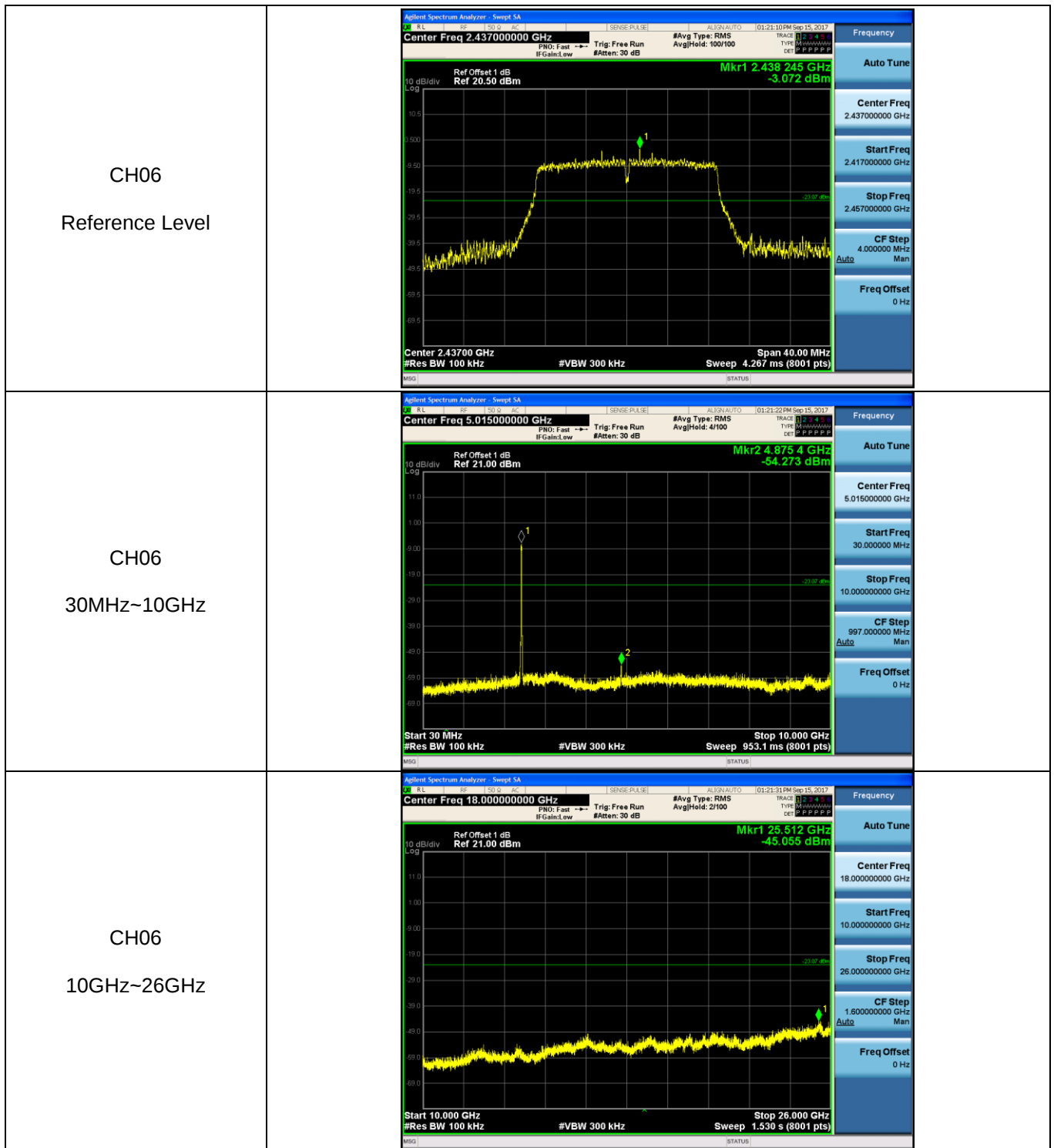


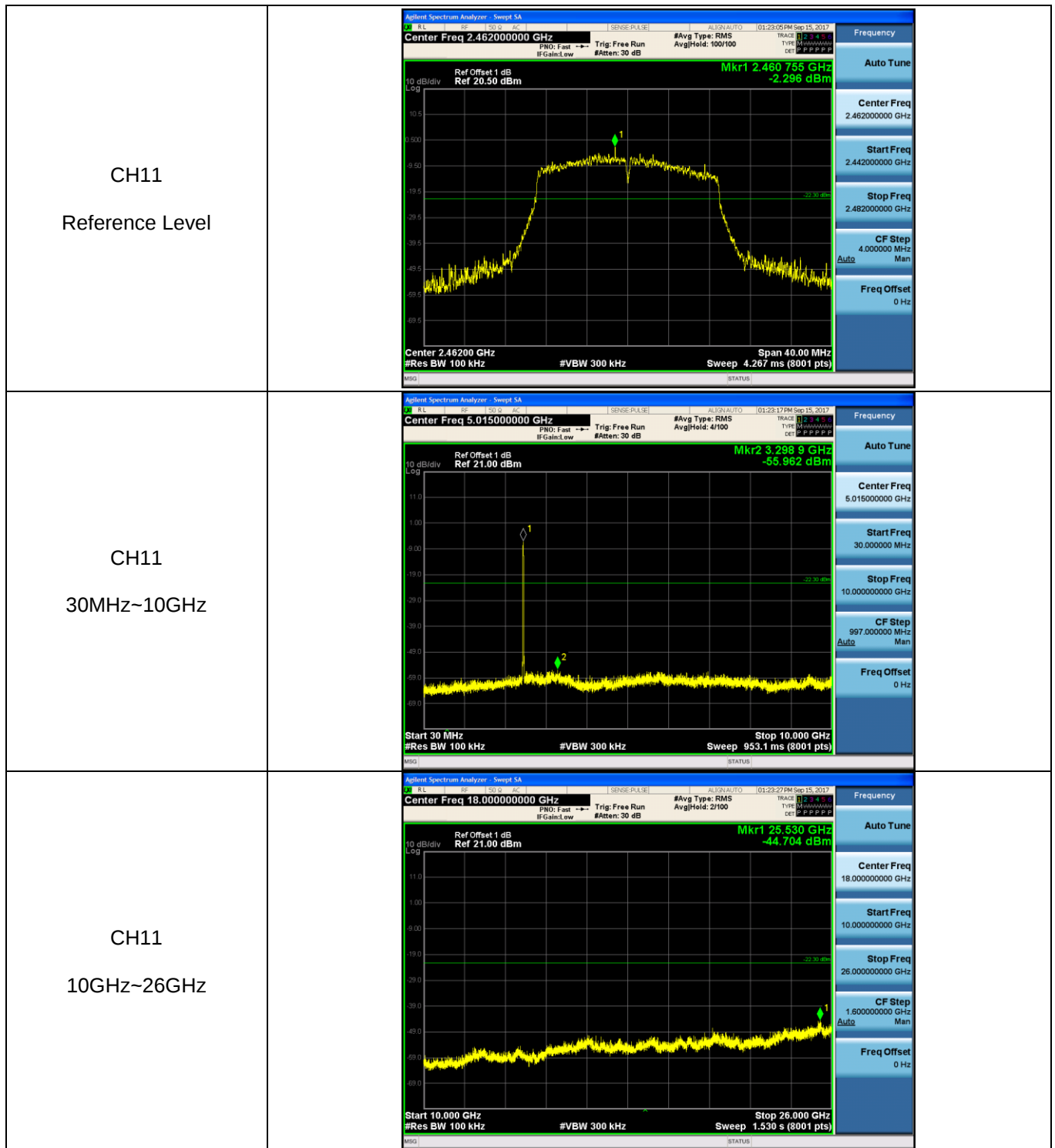
Test Item:	SE	Type:	802.11 g
CH01 Reference Level			Frequency Auto Tune Center Freq 2.412000000 GHz Start Freq 2.392000000 GHz Stop Freq 2.432000000 GHz CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz
CH01 30MHz~10GHz			Frequency Auto Tune Center Freq 5.015000000 GHz Start Freq 30.000000 MHz Stop Freq 10.000000000 GHz CF Step 997.000000 MHz Auto Man Freq Offset 0 Hz
CH01 10GHz~26GHz			Frequency Auto Tune Center Freq 18.000000000 GHz Start Freq 10.000000000 GHz Stop Freq 26.000000000 GHz CF Step 1.600000000 GHz Auto Man Freq Offset 0 Hz





Test Item:	SE	Type:	802.11 n(HT20)
CH01 Reference Level			
CH01 30MHz~10GHz			
CH01 10GHz~26GHz			





5.8. Spurious Emissions (radiated)

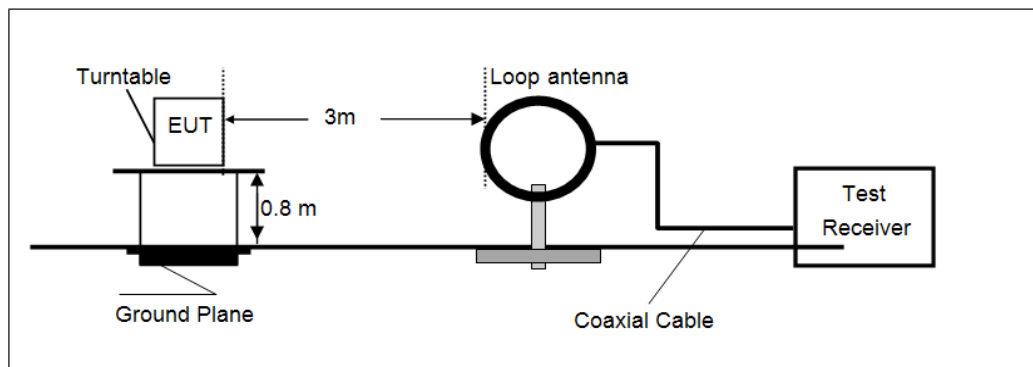
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

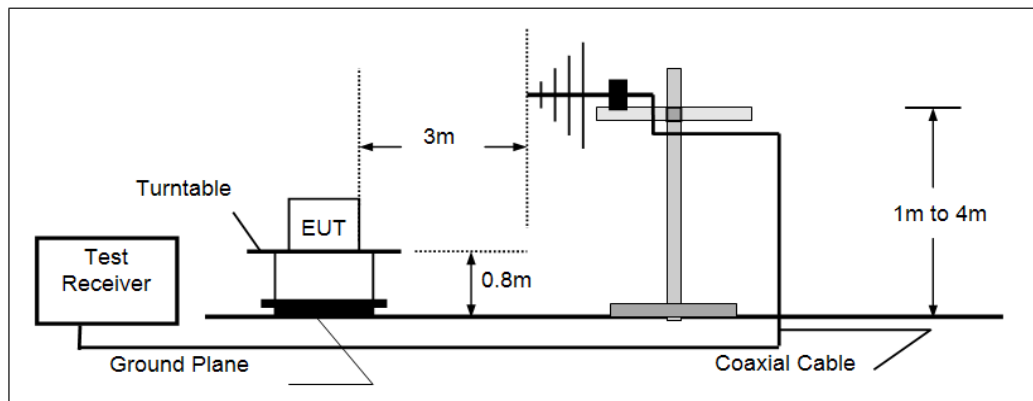
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

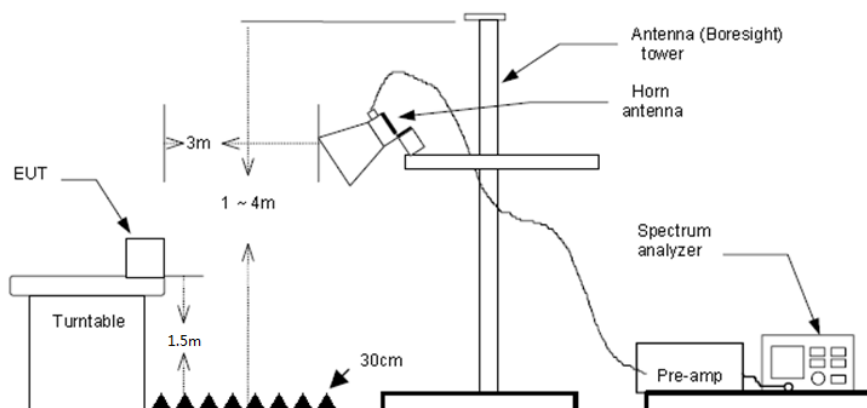
➤ 9kHz ~30MHz



➤ 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was 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. 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.
5. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1GHz, RBW=120kHz, VBW=300kHz, 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) Above 1GHz, 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.

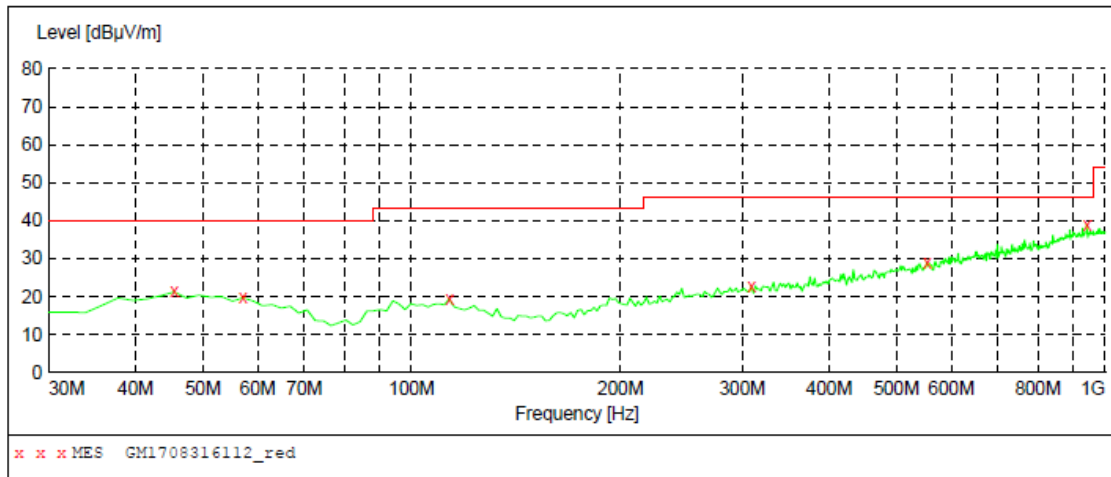
➤ **30MHz ~1000MHz**

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

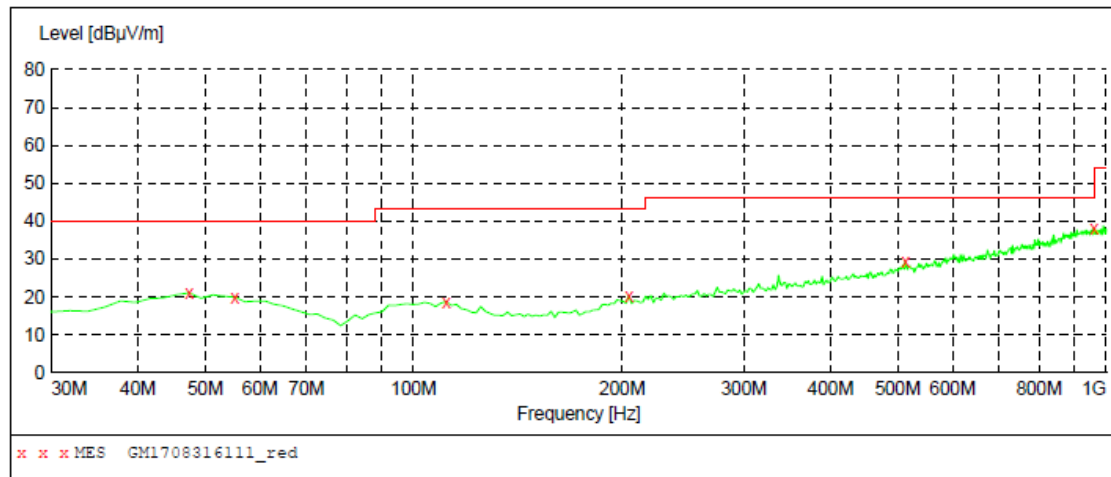
**MEASUREMENT RESULT: "GM1708316112_red"**

8/31/2017 9:34PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	21.30	-8.8	40.0	18.7	QP	100.0	51.00	VERTICAL
57.160000	19.70	-9.4	40.0	20.3	QP	100.0	226.00	VERTICAL
113.420000	19.40	-11.3	43.5	24.1	QP	100.0	91.00	VERTICAL
309.360000	22.60	-7.1	46.0	23.4	QP	100.0	27.00	VERTICAL
553.800000	28.80	-0.7	46.0	17.2	QP	100.0	318.00	VERTICAL
941.800000	39.00	7.2	46.0	7.0	QP	100.0	0.00	VERTICAL

Polarization:

Horizontal

**MEASUREMENT RESULT: "GM1708316111_red"**

8/31/2017 9:31PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	21.10	-8.8	40.0	18.9	QP	100.0	31.00	HORIZONTAL
55.220000	20.00	-9.2	40.0	20.0	QP	300.0	247.00	HORIZONTAL
111.480000	18.80	-11.0	43.5	24.7	QP	100.0	75.00	HORIZONTAL
204.600000	20.20	-10.4	43.5	23.3	QP	300.0	298.00	HORIZONTAL
513.060000	29.40	-1.4	46.0	16.6	QP	100.0	167.00	HORIZONTAL
959.260000	38.00	7.3	46.0	8.0	QP	100.0	184.00	HORIZONTAL

Above 1 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
1768.62	36.37	25.34	5.90	37.07	30.54	74.00	-43.46	Vertical	Peak
3672.11	35.97	29.30	8.35	38.26	35.36	74.00	-38.64	Vertical	Peak
4821.76	61.35	31.56	9.55	36.90	65.56	74.00	-8.44	Vertical	Peak
7245.81	48.22	36.25	11.91	35.02	61.36	74.00	-12.64	Vertical	Peak
4821.76	44.69	31.56	9.55	36.90	48.90	54.00	-5.10	Vertical	Average
7245.81	27.63	36.25	11.91	35.02	40.77	54.00	-13.23	Vertical	Average
1741.81	52.97	25.29	5.85	37.02	47.09	74.00	-26.91	Horizontal	Peak
3216.84	36.30	28.70	7.74	38.23	34.51	74.00	-39.49	Horizontal	Peak
4821.76	56.74	31.56	9.55	36.90	60.95	74.00	-13.05	Horizontal	Peak
7245.81	44.72	36.25	11.91	35.02	57.86	74.00	-16.14	Horizontal	Peak
4821.76	39.37	31.56	9.55	36.90	43.58	54.00	-10.42	Horizontal	Average
7245.81	23.72	36.25	11.91	35.02	36.86	54.00	-17.14	Horizontal	Average

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
1943.29	47.53	25.74	6.18	37.25	42.20	74.00	-31.80	Vertical	Peak
3507.65	34.58	29.02	8.13	38.40	33.33	74.00	-40.67	Vertical	Peak
4871.10	44.91	31.46	9.59	36.76	49.20	74.00	-24.80	Vertical	Peak
7682.70	32.19	36.12	12.94	35.02	46.23	74.00	-27.77	Vertical	Peak
1953.21	40.55	25.84	6.20	37.26	35.33	74.00	-38.67	Horizontal	Peak
3607.26	35.76	29.30	8.28	38.27	35.07	74.00	-38.93	Horizontal	Peak
4871.10	45.08	31.46	9.59	36.76	49.37	74.00	-24.63	Horizontal	Peak
7319.96	33.81	36.30	11.99	34.92	47.18	74.00	-26.82	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
1706.70	36.06	25.21	5.78	36.94	30.11	74.00	-43.89	Vertical	Peak
3653.46	34.91	29.30	8.33	38.26	34.28	74.00	-39.72	Vertical	Peak
4933.50	44.58	31.43	9.63	36.59	49.05	74.00	-24.95	Vertical	Peak
7394.88	35.16	36.30	12.06	34.83	48.69	74.00	-25.31	Vertical	Peak
1759.64	34.45	25.32	5.88	37.06	28.59	74.00	-45.41	Horizontal	Peak
3507.65	35.30	29.02	8.13	38.40	34.05	74.00	-39.95	Horizontal	Peak
4920.96	45.35	31.42	9.62	36.62	49.77	74.00	-24.23	Horizontal	Peak
9065.08	32.16	38.10	13.37	34.88	48.75	74.00	-25.25	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 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
1943.29	44.95	25.74	6.18	37.25	39.62	74.00	-34.38	Vertical	Peak
3815.03	34.45	29.62	8.52	38.22	34.37	74.00	-39.63	Vertical	Peak
4821.76	44.53	31.56	9.55	36.90	48.74	74.00	-25.26	Vertical	Peak
6428.77	32.50	33.50	11.04	35.32	41.72	74.00	-32.28	Vertical	Peak
1948.25	46.43	25.79	6.19	37.26	41.15	74.00	-32.85	Horizontal	Peak
3507.65	35.28	29.02	8.13	38.40	34.03	74.00	-39.97	Horizontal	Peak
4821.76	44.08	31.56	9.55	36.90	48.29	74.00	-25.71	Horizontal	Peak
7245.81	33.51	36.25	11.91	35.02	46.65	74.00	-27.35	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
1764.12	35.69	25.33	5.89	37.06	29.85	74.00	-44.15	Vertical	Peak
3128.01	35.29	28.80	7.63	38.21	33.51	74.00	-40.49	Vertical	Peak
4883.52	37.70	31.43	9.59	36.73	41.99	74.00	-32.01	Vertical	Peak
7319.96	35.92	36.30	11.99	34.92	49.29	74.00	-24.71	Vertical	Peak
1768.62	35.25	25.34	5.90	37.07	29.42	74.00	-44.58	Horizontal	Peak
3151.99	36.98	28.80	7.66	38.21	35.23	74.00	-38.77	Horizontal	Peak
4871.10	45.37	31.46	9.59	36.76	49.66	74.00	-24.34	Horizontal	Peak
7451.57	32.09	36.20	12.24	34.86	45.67	74.00	-28.33	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
1182.94	37.45	26.17	4.62	36.58	31.66	74.00	-42.34	Vertical	Peak
1948.25	47.10	25.79	6.19	37.26	41.82	74.00	-32.18	Vertical	Peak
3873.75	34.42	29.67	8.60	38.19	34.50	74.00	-39.50	Vertical	Peak
4920.96	43.50	31.42	9.62	36.62	47.92	74.00	-26.08	Vertical	Peak
1953.21	54.53	25.84	6.20	37.26	49.31	74.00	-24.69	Horizontal	Peak
3625.67	35.42	29.30	8.30	38.26	34.76	74.00	-39.24	Horizontal	Peak
4920.96	47.45	31.42	9.62	36.62	51.87	74.00	-22.13	Horizontal	Peak
7394.88	35.64	36.30	12.06	34.83	49.17	74.00	-24.83	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 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
1953.21	40.17	25.84	6.20	37.26	34.95	74.00	-39.05	Vertical	Peak
3249.76	35.99	28.50	7.78	38.29	33.98	74.00	-40.02	Vertical	Peak
4821.76	42.79	31.56	9.55	36.90	47.00	74.00	-27.00	Vertical	Peak
7045.74	33.04	35.44	11.85	34.86	45.47	74.00	-28.53	Vertical	Peak
1948.25	46.67	25.79	6.19	37.26	41.39	74.00	-32.61	Horizontal	Peak
3208.66	36.16	28.75	7.73	38.22	34.42	74.00	-39.58	Horizontal	Peak
4821.76	43.74	31.56	9.55	36.90	47.95	74.00	-26.05	Horizontal	Peak
7245.81	36.32	36.25	11.91	35.02	49.46	74.00	-24.54	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
1715.41	35.85	25.23	5.80	36.96	29.92	74.00	-44.08	Vertical	Peak
3625.67	35.84	29.30	8.30	38.26	35.18	74.00	-38.82	Vertical	Peak
4871.10	43.06	31.46	9.59	36.76	47.35	74.00	-26.65	Vertical	Peak
7319.96	35.88	36.30	11.99	34.92	49.25	74.00	-24.75	Vertical	Peak
1685.12	35.94	25.16	5.74	36.90	29.94	74.00	-44.06	Horizontal	Peak
3854.08	34.26	29.65	8.58	38.20	34.29	74.00	-39.71	Horizontal	Peak
4871.10	44.08	31.46	9.59	36.76	48.37	74.00	-25.63	Horizontal	Peak
7319.96	36.06	36.30	11.99	34.92	49.43	74.00	-24.57	Horizontal	Peak

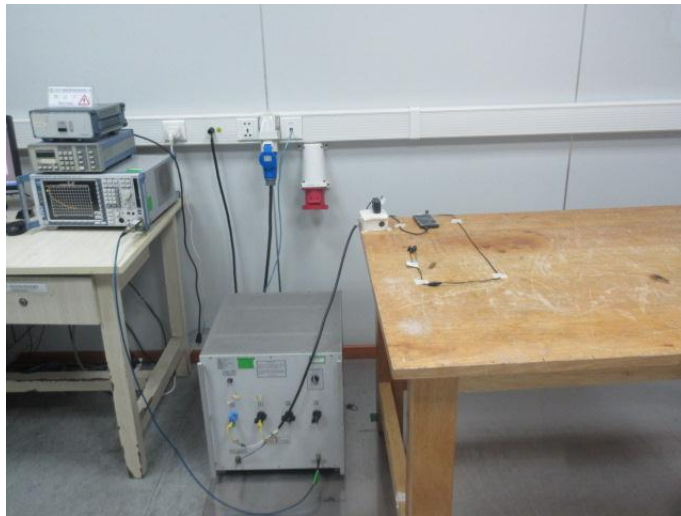
802.11n(HT20)					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1773.13	46.80	25.35	5.91	37.08	40.98	74.00	-33.02	Vertical	Peak
1948.25	46.81	25.79	6.19	37.26	41.53	74.00	-32.47	Vertical	Peak
4933.50	44.91	31.43	9.63	36.59	49.38	74.00	-24.62	Vertical	Peak
7027.82	32.06	35.38	11.85	34.83	44.46	74.00	-29.54	Vertical	Peak
1651.15	36.10	25.06	5.67	36.83	30.00	74.00	-44.00	Horizontal	Peak
3893.52	34.13	29.69	8.63	38.17	34.28	74.00	-39.72	Horizontal	Peak
4920.96	45.93	31.42	9.62	36.62	50.35	74.00	-23.65	Horizontal	Peak
7394.88	32.32	36.30	12.06	34.83	45.85	74.00	-28.15	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 are very lower than the limit and not show in test report.

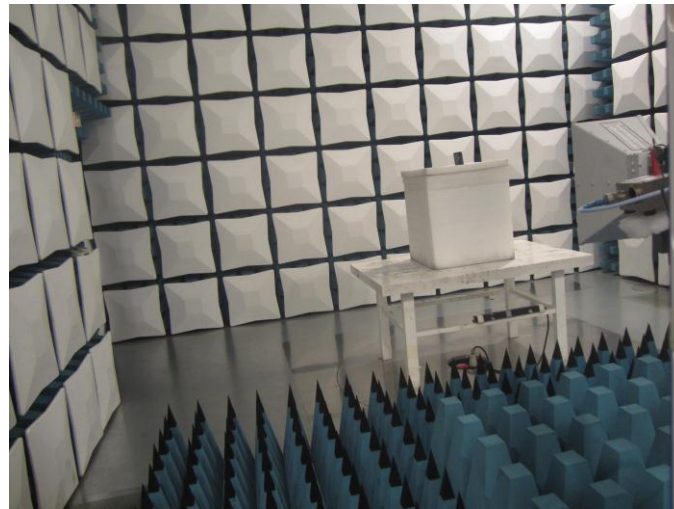
6. TEST SETUP PHOTOS

Conducted Emissions



Radiated Emissions





7. EXTERANAL AND INTERNAL PHOTOS

Reference to Test Report No.: TRE1708020601.

.....End of Report.....