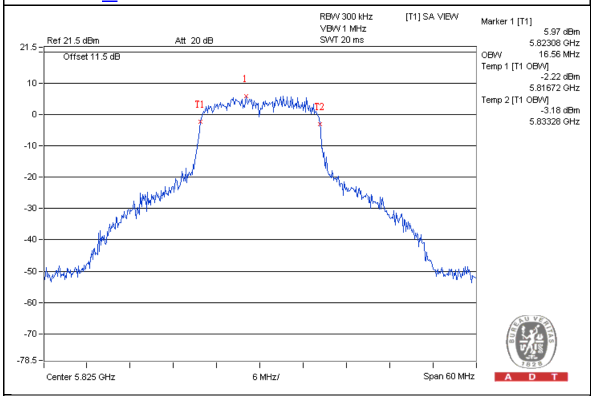
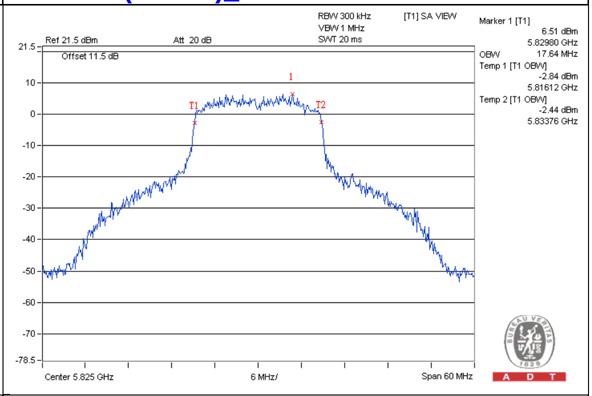
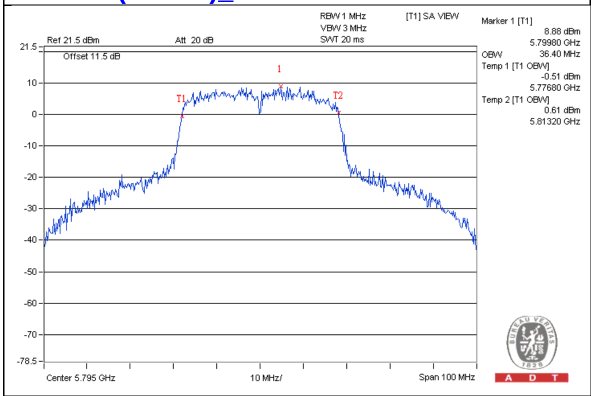
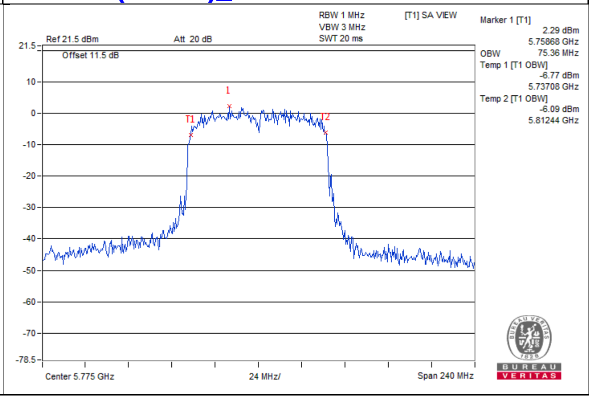
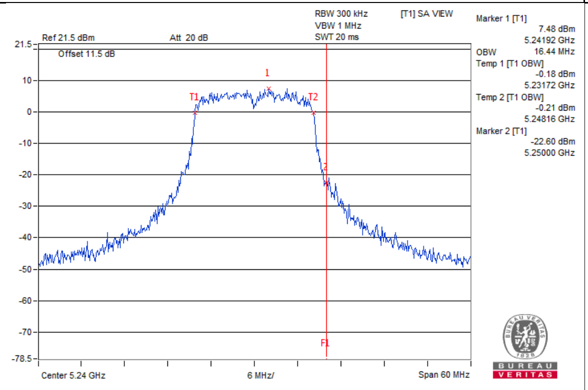
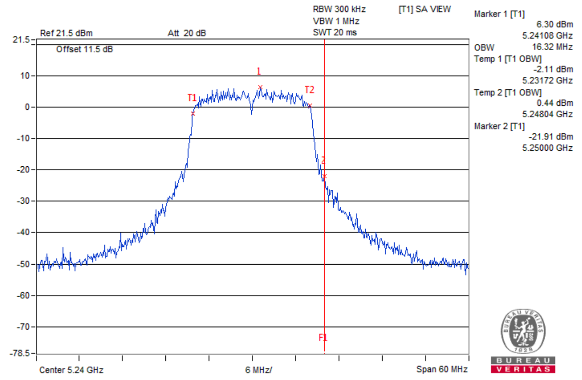
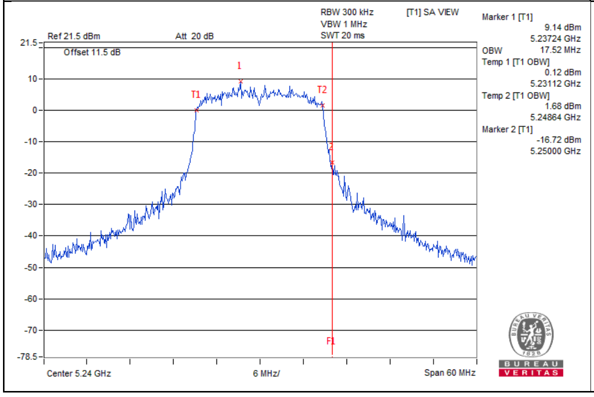
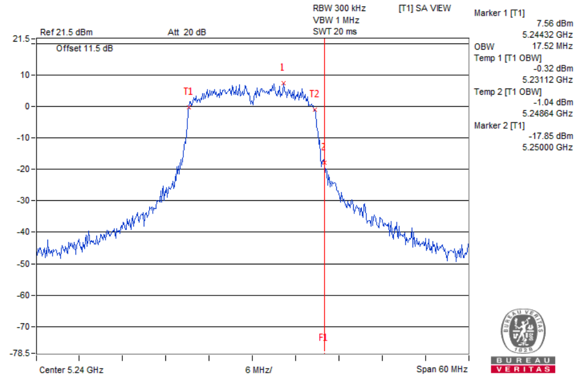
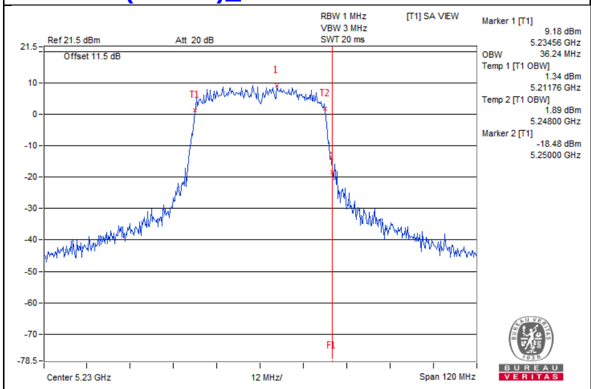
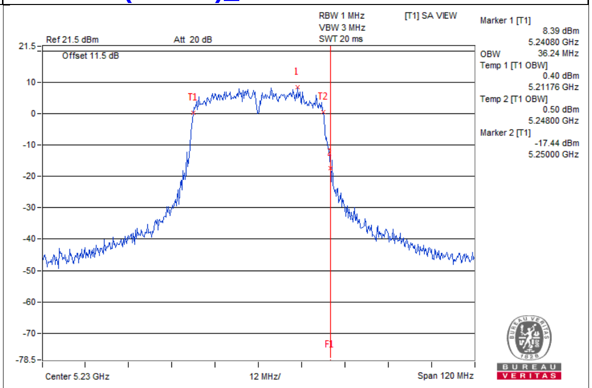
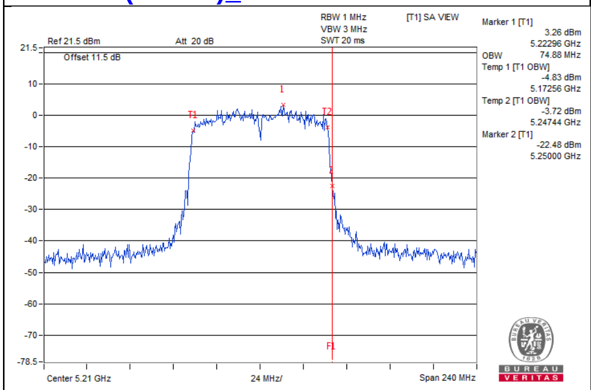
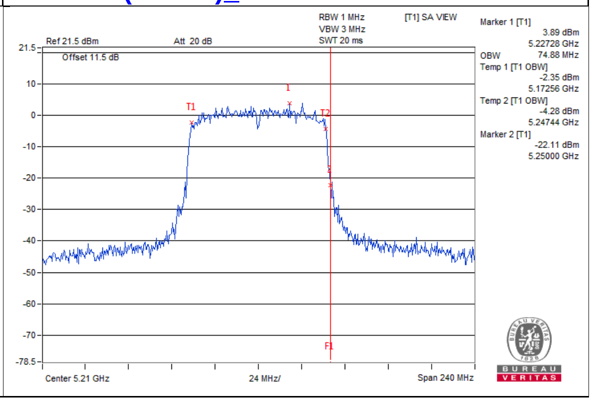
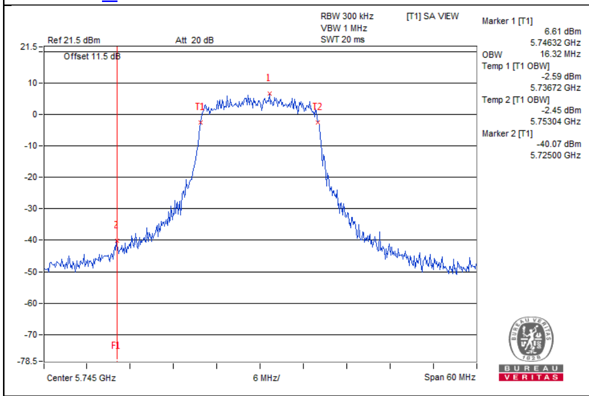
Spectrum Plot of Max Value	
802.11a_Chain0 / CH165	**802.11ac (VHT20)_Chain0 / CH165**
	
802.11ac(VHT40)_Chain0 / CH159	**802.11ac(VHT80)_Chain0 / CH155**
	

Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	**802.11a_Chain1 / CH48**
	
802.11ac (VHT20)_Chain0 / CH48	**802.11ac (VHT20)_Chain1 / CH48**
	

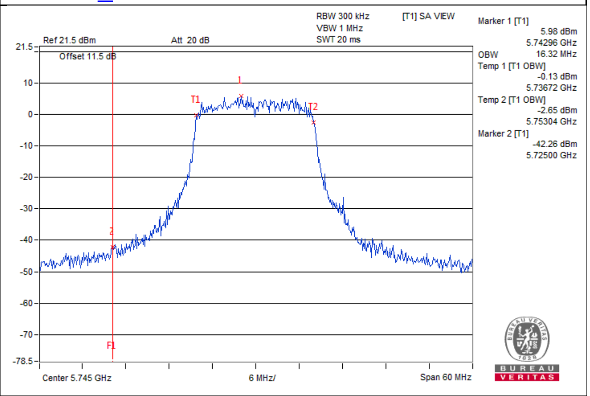
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11ac (VHT40)_Chain0 / CH46	**802.11ac (VHT40)_Chain1 / CH46**
	
802.11ac (VHT80)_Chain0 / CH42	**802.11ac (VHT80)_Chain1 / CH42**
	

Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

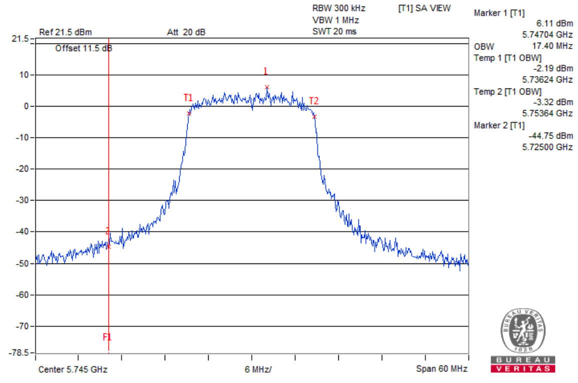
802.11a_Chain0 / CH149



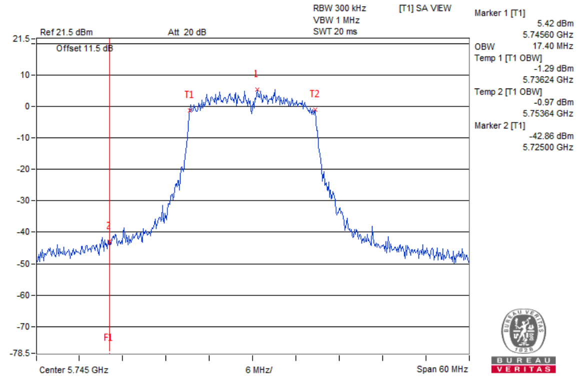
802.11a_Chain1 / CH149

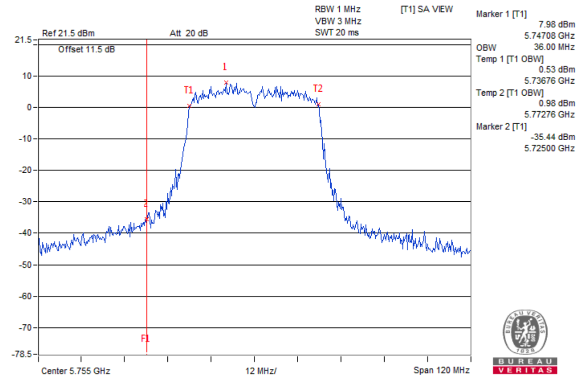
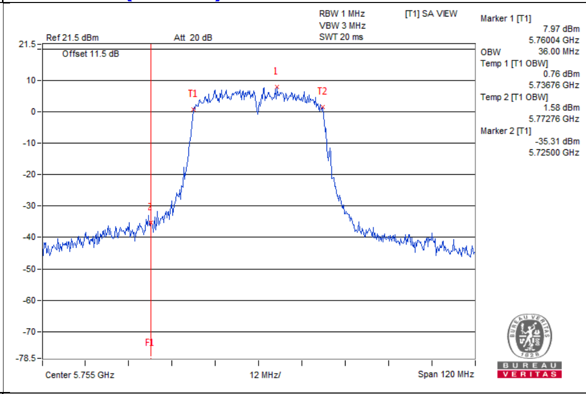
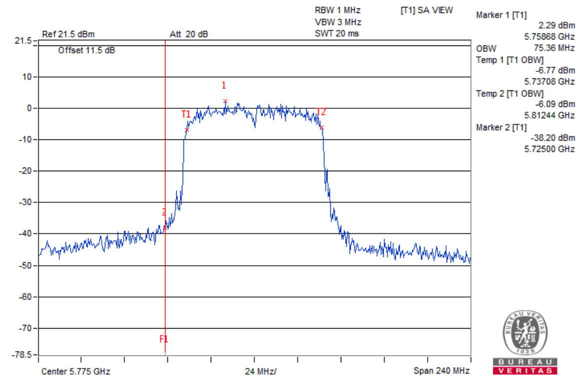
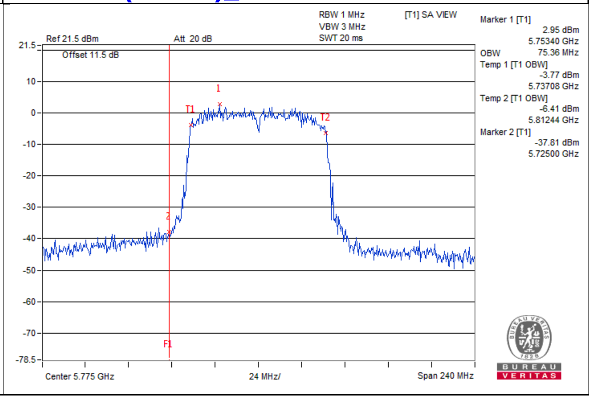


802.11ac (VHT20)_Chain0 / CH149



802.11ac (VHT20)_Chain1 / CH149



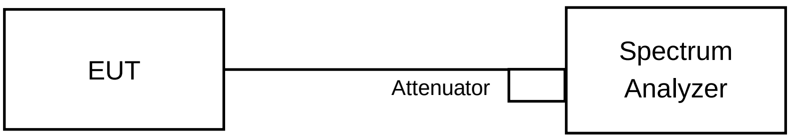
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2C band)	
802.11ac (VHT40)_Chain0 / CH151	**802.11ac (VHT40)_Chain1 / CH151**
	
802.11ac (VHT80)_Chain0 / CH155	**802.11ac (VHT80)_Chain1 / CH155**
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

For 802.11ac (VHT80)

Using method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

For 802.11ac (VHT80)

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300kHz)
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1, U-NII-2A & U-NII-2C:

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.62	1.69	5.19	10.91	Pass
40	5200	2.80	1.85	5.36	10.91	Pass
48	5240	2.65	1.80	5.26	10.91	Pass
52	5260	2.70	1.47	5.14	10.91	Pass
60	5300	2.49	1.70	5.12	10.91	Pass
64	5320	0.95	0.05	3.53	10.91	Pass
100	5500	0.83	-0.46	3.24	9.23	Pass
116	5580	2.95	1.96	5.49	9.23	Pass
140	5700	-0.01	-0.73	2.66	9.23	Pass
144 (UNII-2c Band)	5720	3.30	2.99	6.16	9.23	Pass

NOTE:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.19	1.23	4.75	10.91	Pass
40	5200	3.23	2.35	5.82	10.91	Pass
48	5240	3.21	2.30	5.79	10.91	Pass
52	5260	2.89	2.15	5.55	10.91	Pass
60	5300	2.93	2.23	5.60	10.91	Pass
64	5320	0.53	-0.34	3.13	10.91	Pass
100	5500	1.30	0.38	3.87	9.23	Pass
116	5580	2.54	1.68	5.14	9.23	Pass
140	5700	-0.37	-1.02	2.33	9.23	Pass
144 (UNII-2c Band)	5720	2.94	2.72	5.84	9.23	Pass

NOTE:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total Power Density (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
38	5190	-3.59	-4.86	-1.17	10.91	Pass
46	5230	-0.80	-1.74	1.77	10.91	Pass
54	5270	-0.93	-2.00	1.58	10.91	Pass
62	5310	-2.83	-3.81	-0.28	10.91	Pass
102	5510	-2.72	-3.82	-0.22	9.23	Pass
110	5550	-0.32	-1.30	2.23	9.23	Pass
134	5670	-1.21	-1.61	1.60	9.23	Pass
142 (UNII-2c Band)	5710	-0.23	-0.59	2.60	9.23	Pass

NOTE:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.
4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

802.11ac (VHT80):

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-7.72	-8.71	0.14	-5.04	10.91	Pass
58	5290	-8.63	-9.93	0.14	-6.09	10.91	Pass
106	5530	-8.15	-9.11	0.14	-5.46	9.23	Pass
122	5610	-4.60	-5.81	0.14	-2.02	9.23	Pass
138 (UNII-2c Band)	5690	-5.16	-5.73	0.14	-2.29	9.23	Pass

NOTE: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. 5150~5250MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi , so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.

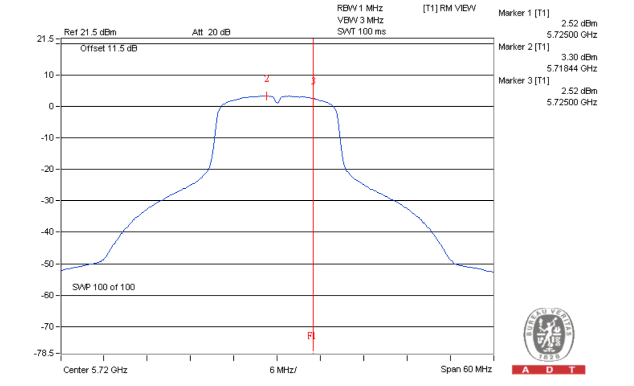
3. 5250~5350MHz: Directional gain = 3.08dBi + 10log(2) = 6.09dBi > 6dBi, so the power density limit shall be reduced to 11-(6.09-6) = 10.91dBm.

4. 5470~5725MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 11-(7.77-6) = 9.23dBm.

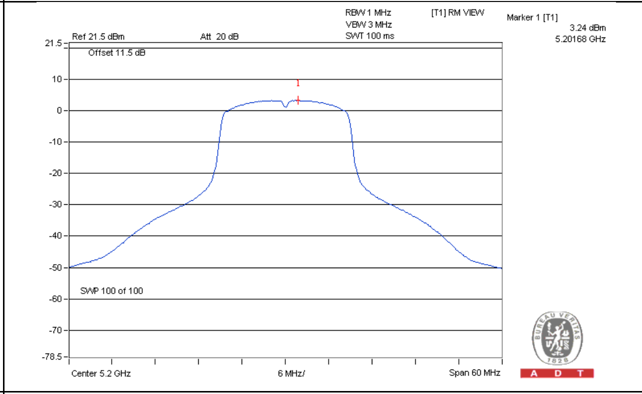
5. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

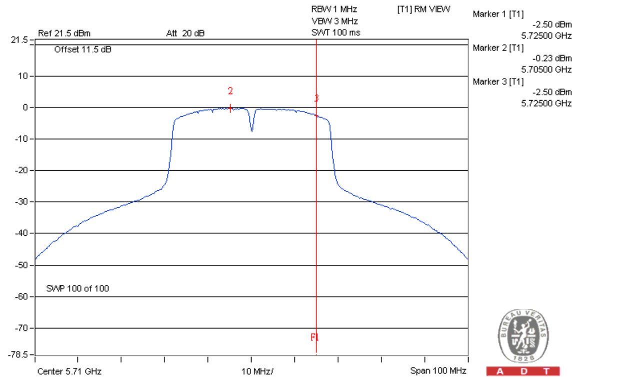
802.11a_Chain 0 / CH144 (UNII-2c Band)



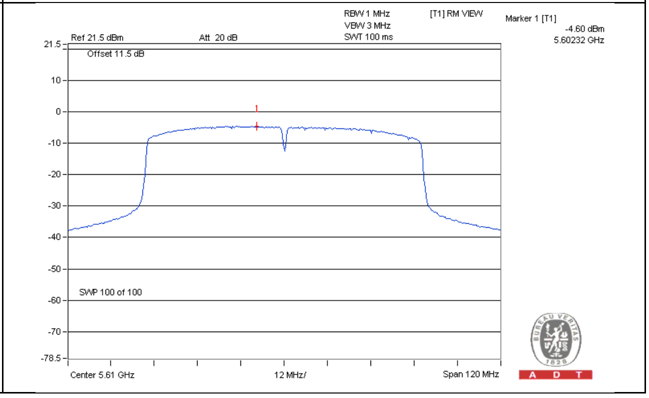
802.11ac (VHT20)_Chain 0 / CH40



802.11ac (VHT40)_Chain 0 / CH142 (UNII-2c Band)



802.11ac (VHT80)_Chain 0 / CH122



For U-NII-3:

802.11a

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	144 (UNII-3 Band)	5720	-5.50	-3.28	3.01	-0.27	28.23	Pass
	149	5745	-6.12	-3.90	3.01	-0.89	28.23	Pass
	157	5785	-3.37	-1.15	3.01	1.86	28.23	Pass
	165	5825	-3.96	-1.74	3.01	1.27	28.23	Pass
1	144 (UNII-3 Band)	5720	-5.86	-3.64	3.01	-0.63	28.23	Pass
	149	5745	-5.79	-3.57	3.01	-0.56	28.23	Pass
	157	5785	-3.32	-1.10	3.01	1.91	28.23	Pass
	165	5825	-3.26	-1.04	3.01	1.97	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

802.11ac (VHT20)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	144 (UNII-3 Band)	5720	-5.78	-3.56	3.01	-0.55	28.23	Pass
	149	5745	-6.15	-3.93	3.01	-0.92	28.23	Pass
	157	5785	-3.76	-1.54	3.01	1.47	28.23	Pass
	165	5825	-4.85	-2.63	3.01	0.38	28.23	Pass
1	144 (UNII-3 Band)	5720	-5.85	-3.63	3.01	-0.62	28.23	Pass
	149	5745	-6.06	-3.84	3.01	-0.83	28.23	Pass
	157	5785	-3.70	-1.48	3.01	1.53	28.23	Pass
	165	5825	-4.14	-1.92	3.01	1.09	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

802.11ac (VHT40)

TX chain	Chan.	Chan. Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	142 (UNII-3 Band)	5710	-10.25	-8.03	3.01	-5.02	28.23	Pass
	151	5755	-12.30	-10.08	3.01	-7.07	28.23	Pass
	159	5795	-6.91	-4.69	3.01	-1.68	28.23	Pass
1	142 (UNII-3 Band)	5710	-10.65	-8.43	3.01	-5.42	28.23	Pass
	151	5755	-12.16	-9.94	3.01	-6.93	28.23	Pass
	159	5795	-6.73	-4.51	3.01	-1.50	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

802.11ac (VHT80)

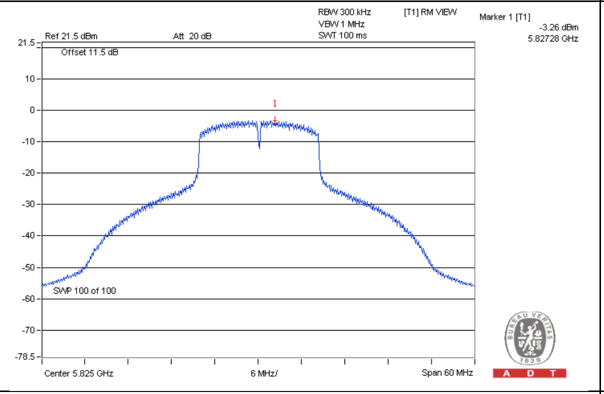
TX chain	Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	138 (UNII-3 Band)	5690	-16.79	-14.57	3.01	0.14	-11.42	28.23	Pass
	155	5775	-16.52	-14.30	3.01	0.14	-11.15	28.23	Pass
1	138 (UNII-3 Band)	5690	-17.33	-15.11	3.01	0.14	-11.96	28.23	Pass
	155	5775	-16.34	-14.12	3.01	0.14	-10.97	28.23	Pass

NOTE: 1. 5725~5850MHz: Directional gain = 4.76dBi + 10log(2) = 7.77dBi > 6dB, so the power density limit shall be reduced to 30-(7.77-6) = 28.23dBm.

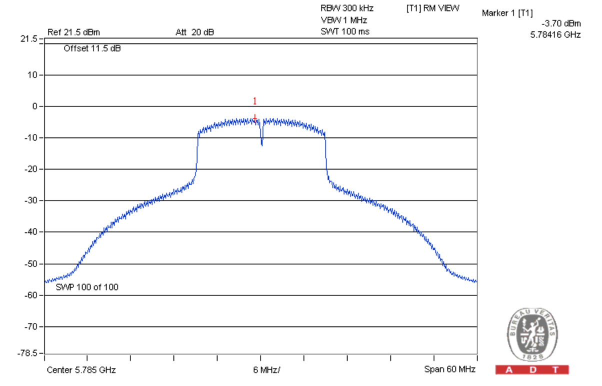
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

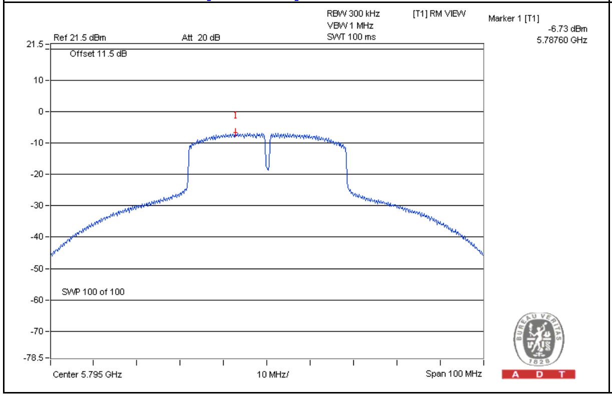
802.11a_Chain 1 / CH 165



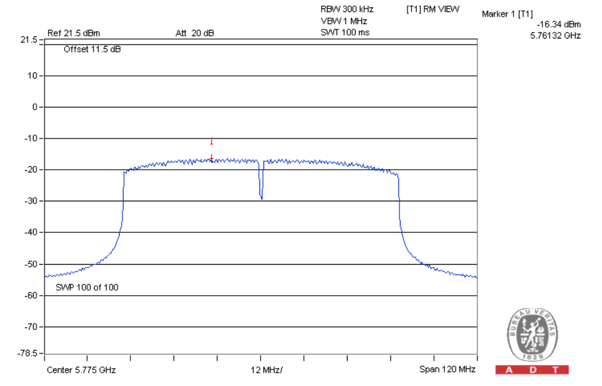
802.11ac (VHT20)_Chain 1 / CH 157



802.11ac (VHT40)_Chain 1 / CH 159



802.11ac (VHT80)_Chain 1 / CH 155

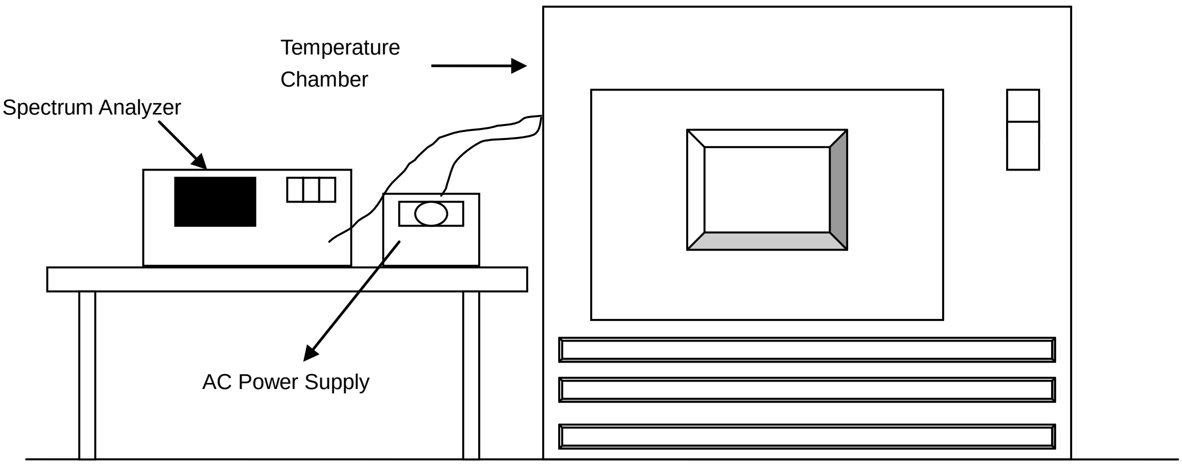


4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5745 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5745.0267	0.00046	5745.0239	0.00042	5745.029	0.00050	5745.0276	0.00048
40	120	5744.9738	-0.00046	5744.9759	-0.00042	5744.9731	-0.00047	5744.9708	-0.00051
30	120	5744.9789	-0.00037	5744.9746	-0.00044	5744.978	-0.00038	5744.9746	-0.00044
20	120	5745.0241	0.00042	5745.0249	0.00043	5745.0241	0.00042	5745.0244	0.00042
10	120	5744.9977	-0.00004	5744.9959	-0.00007	5744.9954	-0.00008	5744.9958	-0.00007
0	120	5744.9976	-0.00004	5745.001	0.00002	5745.0022	0.00004	5744.9981	-0.00003
-10	120	5745.0171	0.00030	5745.0209	0.00036	5745.0195	0.00034	5745.0176	0.00031
-20	120	5744.9739	-0.00045	5744.9699	-0.00052	5744.9699	-0.00052	5744.9737	-0.00046
-30	120	5745.0055	0.00010	5745.0049	0.00009	5745.0005	0.00001	5745.0017	0.00003

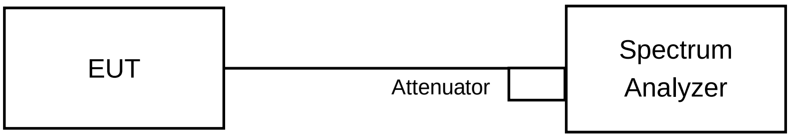
Frequency Stability Versus Voltage									
Operating Frequency: 5745 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5745.0251	0.00044	5745.0243	0.00042	5745.0241	0.00042	5745.0253	0.00044
	120	5745.0241	0.00042	5745.0249	0.00043	5745.0241	0.00042	5745.0244	0.00042
	102	5745.0239	0.00042	5745.0254	0.00044	5745.0242	0.00042	5745.024	0.00042

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (UNII-3 Band)	5720	2.75	2.58	0.5	Pass
149	5745	15.34	15.19	0.5	Pass
157	5785	16.41	16.36	0.5	Pass
165	5825	15.09	16.07	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (UNII-3 Band)	5720	2.55	2.56	0.5	Pass
149	5745	15.12	15.45	0.5	Pass
157	5785	16.32	15.74	0.5	Pass
165	5825	13.46	15.06	0.5	Pass

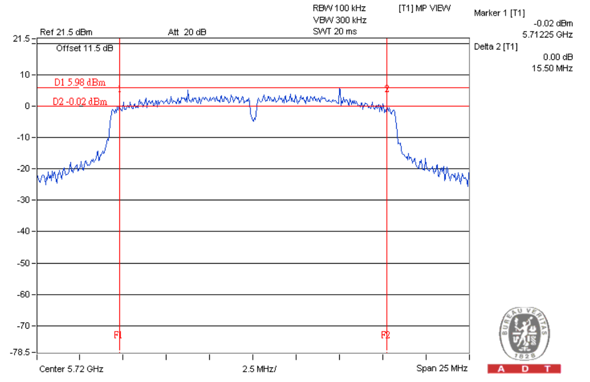
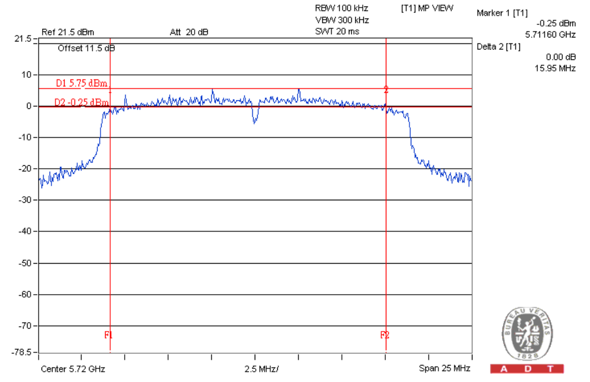
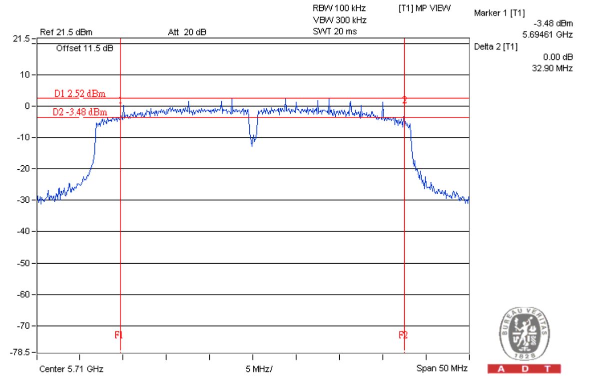
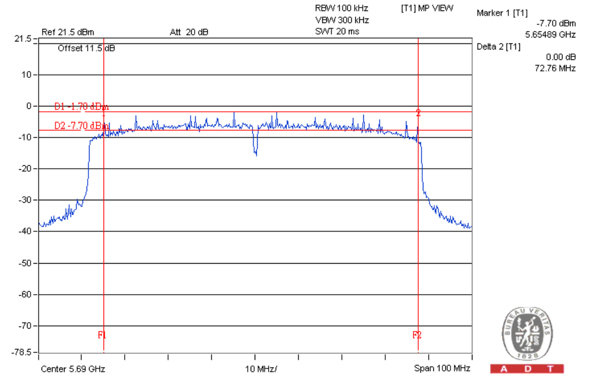
802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142 (UNII-3 Band)	5710	2.65	2.51	0.5	Pass
151	5755	35.10	33.80	0.5	Pass
159	5795	32.02	33.92	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138 (UNII-3 Band)	5690	2.68	2.65	0.5	Pass
155	5775	74.37	72.94	0.5	Pass

Spectrum Plot of Worst Value

<table>
<tr><td>802.11a_Chain 0 / CH144 (UNII-3 Band)</td><td>802.11ac (VHT20)_Chain 0 / CH144 (UNII-3 Band)</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>802.11ac (VHT40)_Chain 1 / CH142</td><td>802.11ac (VHT80)_Chain 1 / CH38</td></tr>
<tr><td>
</td><td>
</td></tr>
</table>

Note: The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

5 Pictures of Test Arrangements

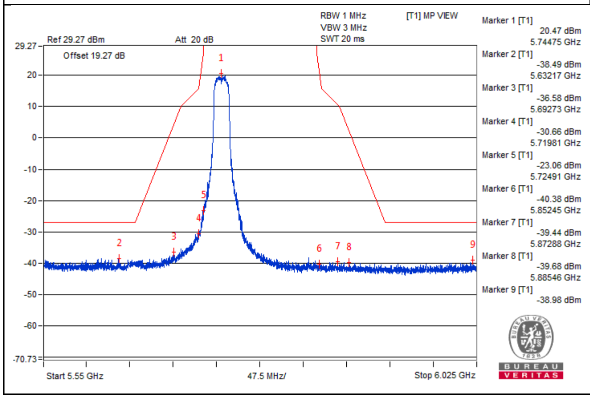
Please refer to the attached file (Test Setup Photo).

6 Annex A - Conducted Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

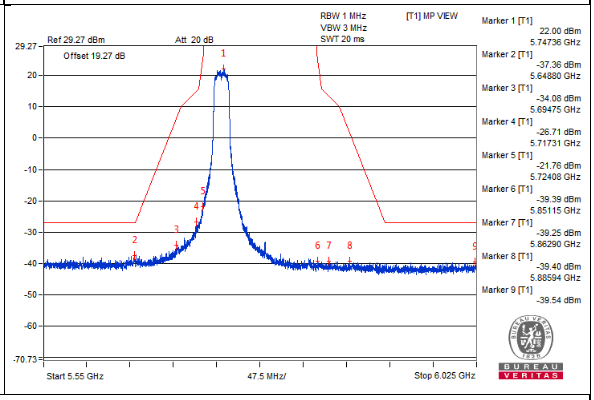
802.11a

CH149

Chain 0

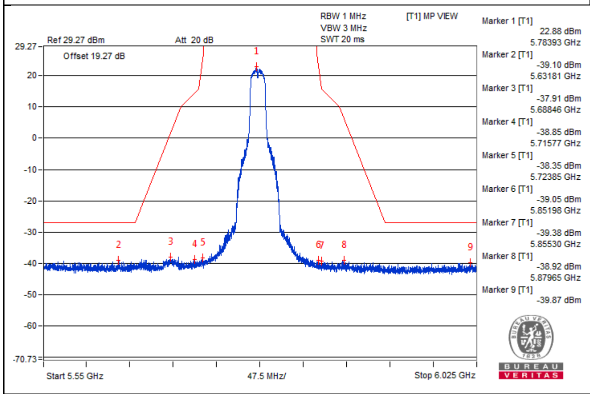


Chain 1

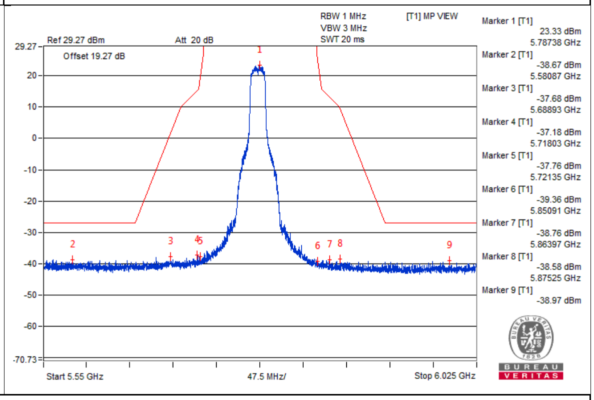


CH157

Chain 0

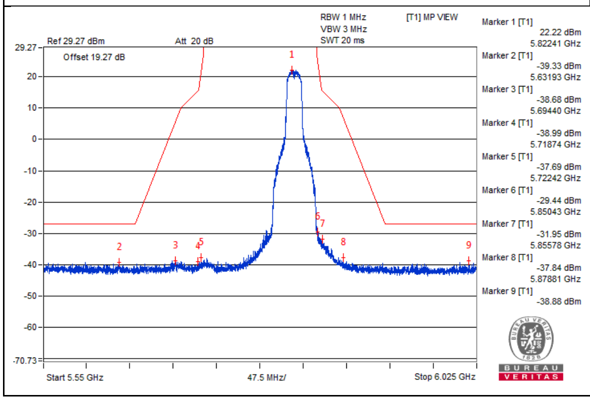


Chain 1

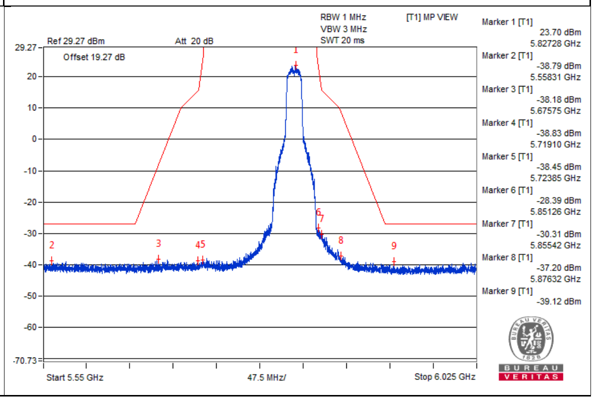


CH165

Chain 0

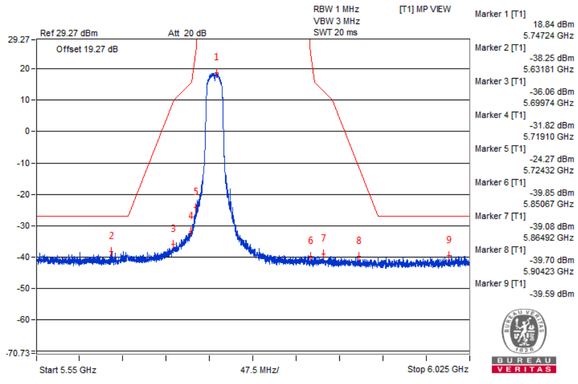
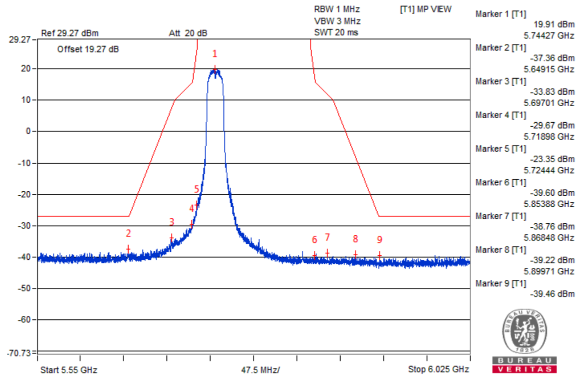


Chain 1

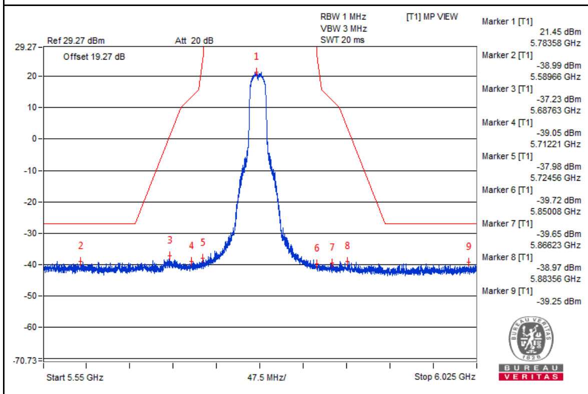
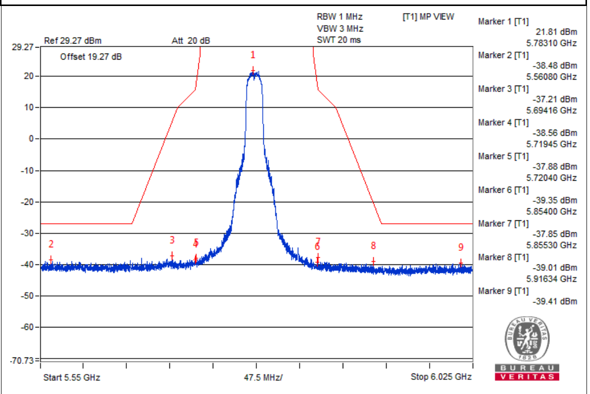


802.11ac (VHT20)

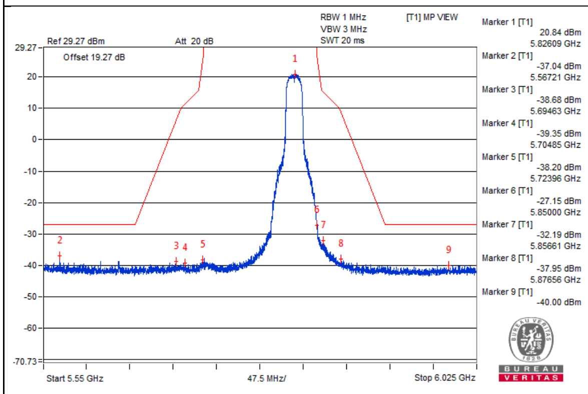
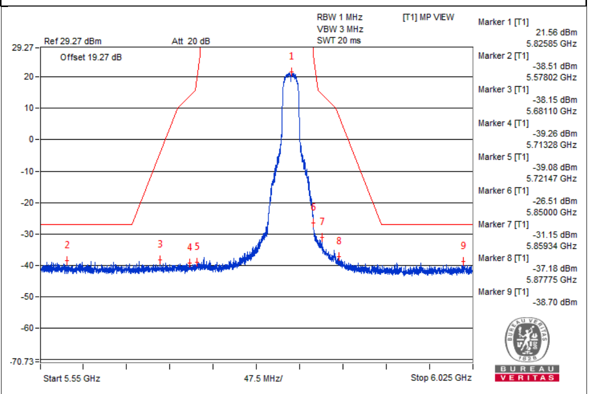
CH149

Chain 0	Chain 1
	

CH157

Chain 0	Chain 1
	

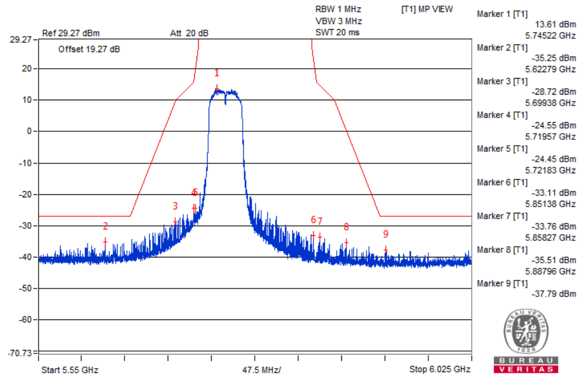
CH165

Chain 0	Chain 1
	

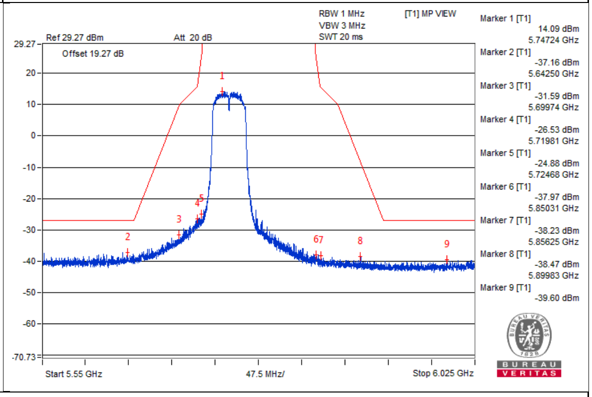
802.11ac (VHT40)

CH151

Chain 0

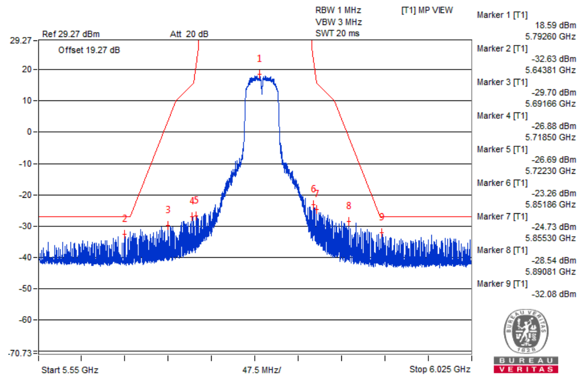


Chain 1

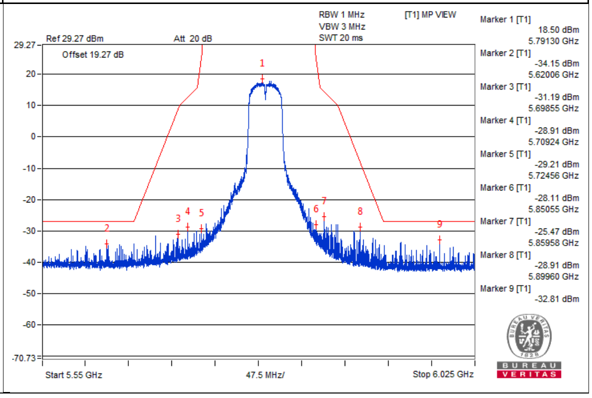


CH159

Chain 0



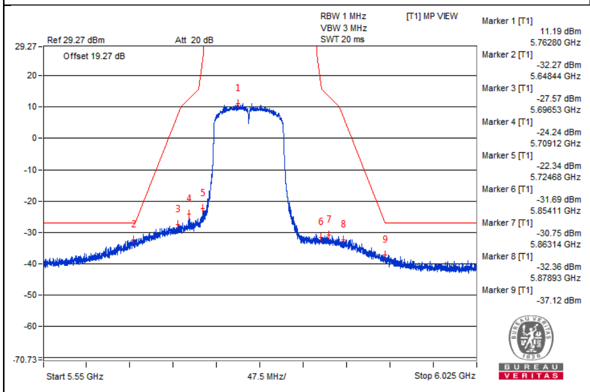
Chain 1



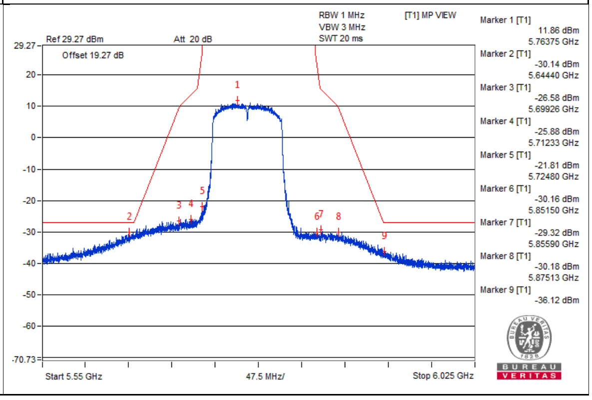
802.11ac (VHT80)

CH155

Chain 0



Chain 1



7 Appendix A – Radiated Emission Measurement

7.1 Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

<table>
<tr><th colspan="3">Applicable To</th><th colspan="2">Limit</th></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK:74 (dBμV/m)</td><td>AV:54 (dBμV/m)</td></tr>
<tr><th>Frequency Band</th><th colspan="2">Applicable To</th><th>EIRP Limit</th><th>Equivalent Field Strength at 3m</th></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK:-27 (dBm/MHz)</td><td rowspan="3">PK:68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK:-27 (dBm/MHz) [*1]
PK:10 (dBm/MHz) [*2]
PK:15.6 (dBm/MHz) [*3]
PK:27 (dBm/MHz) [*4]</td><td>PK: 68.2(dBμV/m) [*1]
PK:105.2 (dBμV/m) [*2]
PK: 110.8(dBμV/m) [*3]
PK:122.2 (dBμV/m) [*4]</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="3">[*1] beyond 75 MHz or more above of the band edge.
[*3] below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.</td><td colspan="2">[*2] below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
[*4] from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

7.2 Test Instruments

For PIFA Antenna:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21,2014	July 20,2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 16, 2015	Jan. 15, 2016
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. G.
3 The CANADA Site Registration No. is IC 7450H-2.
4. Tested Date: Feb. 06, 2015

For Dipole Antenna:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Tested Date: May 16 to 17, 2018

7.3 Test Procedures

a. The EUT was placed on the top of a rotating table 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

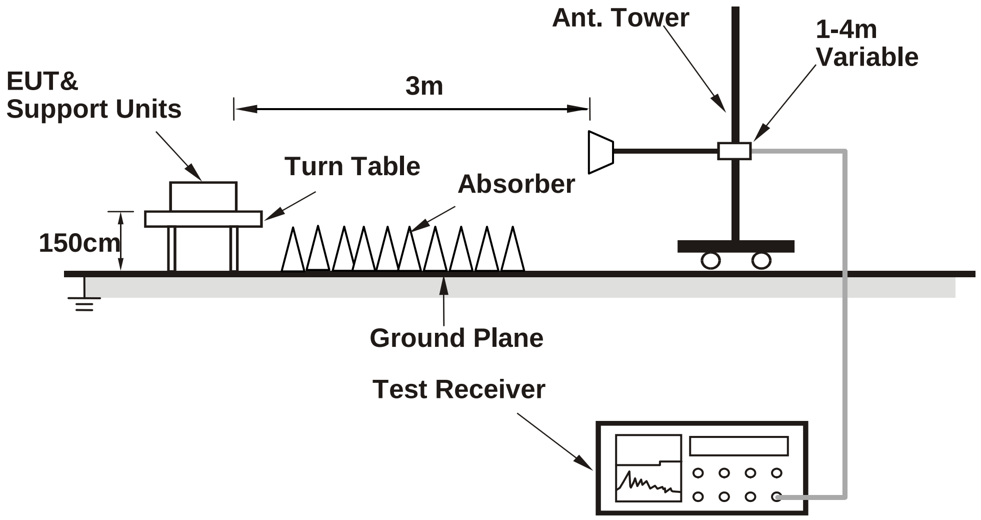
Note:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

7.4 Deviation from Test Standard

No deviation.

7.5 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

7.6 EUT Operating Conditions

Same as 4.1.6.

7.7 Test Results (PIFA Antenna)

The EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane.**

802.11ac (VHT40)

CHANNEL	TX Channel 102	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5470.00	63.2 PK	74.0	-10.8	1.02 H	311	55.27	7.93
2	#5470.00	48.4 AV	54.0	-5.6	1.02 H	311	40.47	7.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5470.00	64.9 PK	74.0	-9.1	1.05 V	85	56.97	7.93
2	#5470.00	51.0 AV	54.0	-3.0	1.05 V	85	43.07	7.93

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 106	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	59.3 PK	74.0	-14.7	1.02 H	300	51.37	7.93
2	#5470.00	46.5 AV	54.0	-7.5	1.02 H	300	38.57	7.93
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	60.7 PK	74.0	-13.3	1.05 V	84	52.77	7.93
2	#5470.00	47.7 AV	54.0	-6.3	1.05 V	84	39.77	7.93

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. " # ": The radiated frequency is out of the restricted band.

7.8 Test Results (Dipole Antenna)

802.11ac (VHT40)

CHANNEL	TX Channel 102	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5470.00	61.7 PK	74.0	-12.3	1.10 H	91	58.8	2.9
2	#5470.00	47.1 AV	54.0	-6.9	1.10 H	91	44.2	2.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	#5470.00	66.0 PK	74.0	-8.0	1.76 V	199	63.1	2.9
2	#5470.00	51.6 AV	54.0	-2.4	1.76 V	199	48.7	2.9

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

CHANNEL	TX Channel 106	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	59.1 PK	74.0	-14.9	1.07 H	100	56.2	2.9
2	#5470.00	46.8 AV	54.0	-7.2	1.07 H	100	43.9	2.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5470.00	65.4 PK	74.0	-8.6	1.07 V	113	62.5	2.9
2	**#5470.00**	**52.1 AV**	**54.0**	**-1.9**	**1.07 V**	**113**	**49.2**	**2.9**

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. " # ": The radiated frequency is out of the restricted band.

8 Appendix B – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linkou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---