2.7 SPURIOUS RADIATED EMISSIONS

2.7.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.7.2 Standard Applicable

See previous test.

2.7.3 Equipment Under Test and Modification State

Serial No: 900F4108 / Test Configuration B

2.7.4 Date of Test/Initial of test personnel who performed the test

December 20-23, 2016/NS

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.8-24.3 °C
Relative Humidity	40.8-42.6 %
ATM Pressure	99.1-99.5 kPa

2.7.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic.
- There are no emissions found that do not comply to the restricted bands limits defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Only the worst case channel and data rate/MCS presented.
- Only noise floor measurements observed above 18GHz.

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.7.8 for sample computation.

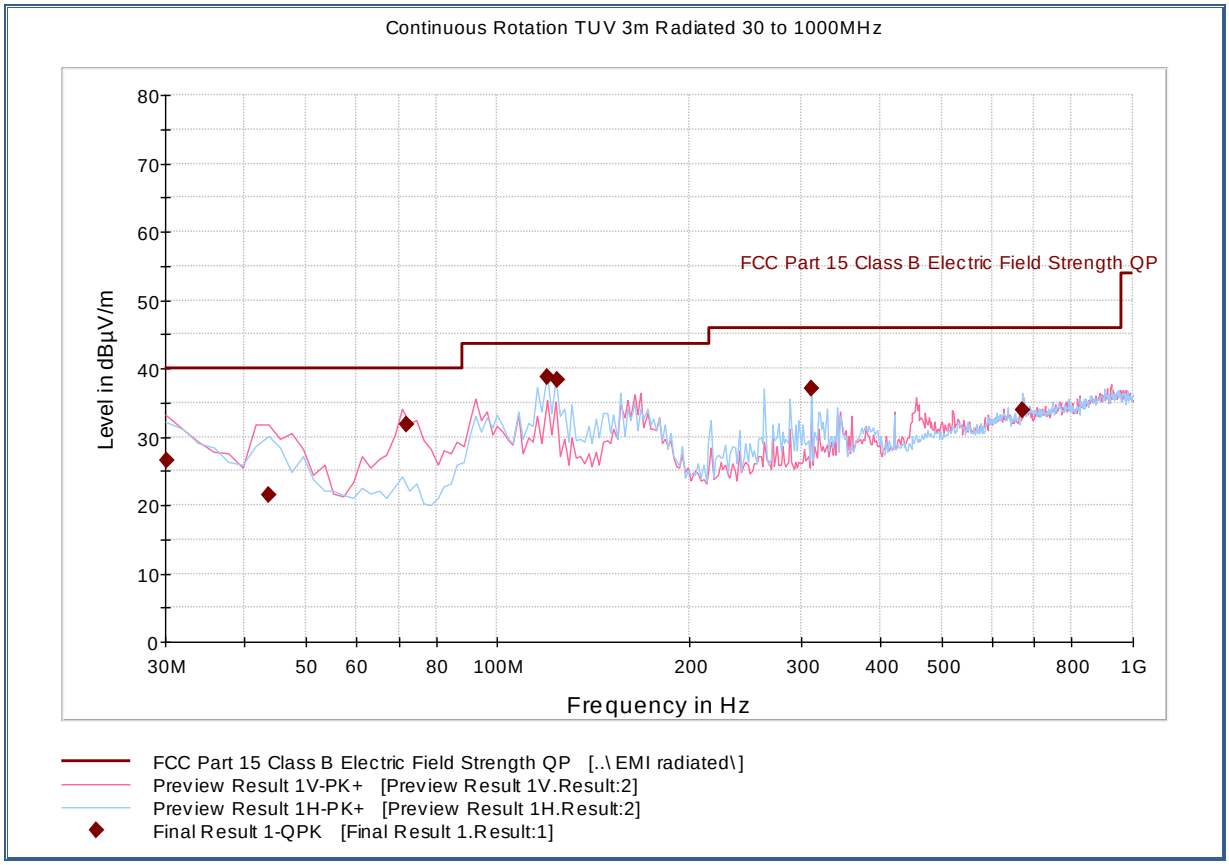
2.7.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dbµV) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbµV/m) @ 30MHz			**11.8**

2.7.9 Test Results

See attached plots.

2.7.10 Test Results Below 1GHz (Low channel – 802.11b)

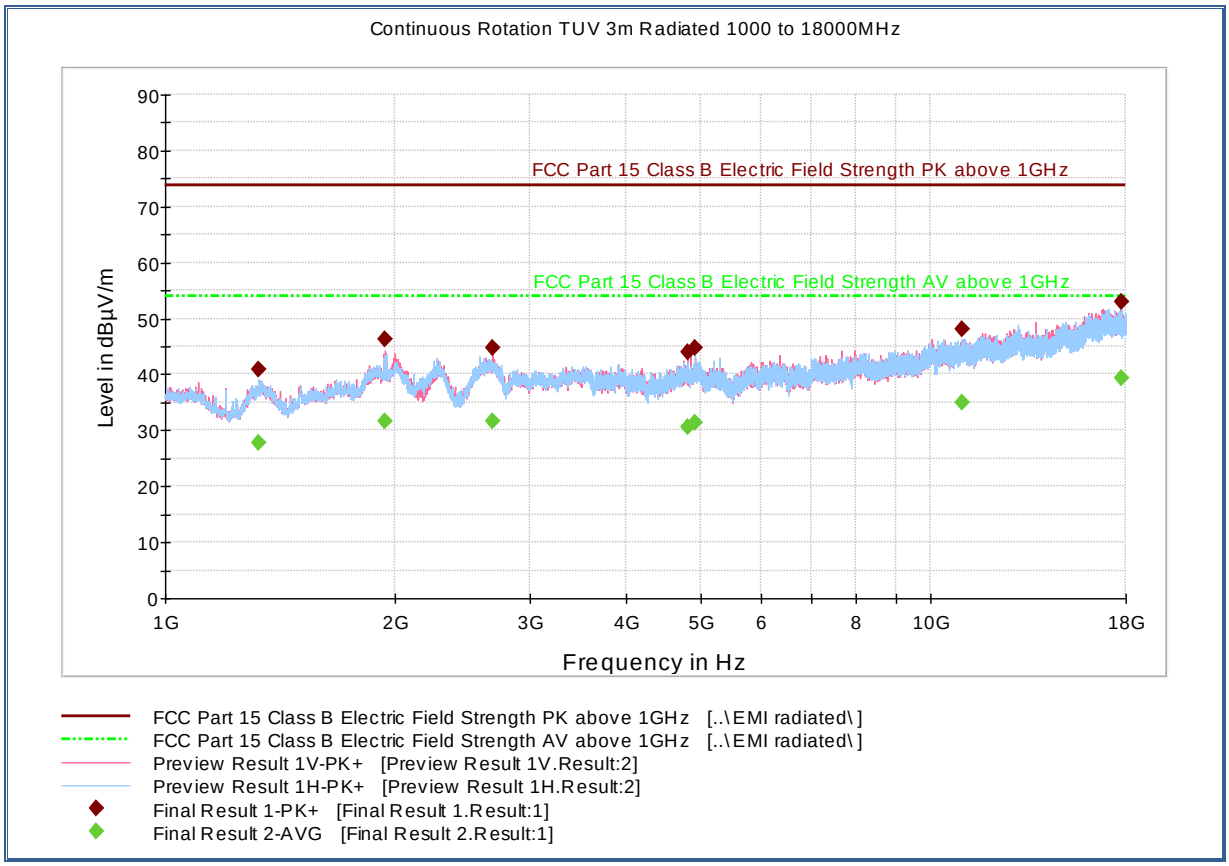


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.200000	26.6	1000.0	120.000	250.0	V	326.0	-4.7	13.4	40.0
43.527214	21.4	1000.0	120.000	100.0	V	-15.0	-11.9	18.6	40.0
72.021643	31.8	1000.0	120.000	150.0	V	84.0	-15.5	8.2	40.0
119.978838	38.7	1000.0	120.000	155.0	H	279.0	-14.3	4.8	43.5
123.986613	38.4	1000.0	120.000	160.0	H	272.0	-14.5	5.1	43.5
311.983727	37.1	1000.0	120.000	100.0	H	91.0	-5.7	8.9	46.0
668.699078	33.9	1000.0	120.000	100.0	H	151.0	4.0	12.1	46.0

Test Notes: Only worst case channel presented.

2.7.11 Test Results Above 1GHz (Worst Case Configuration – 802.11b)



Peak Data

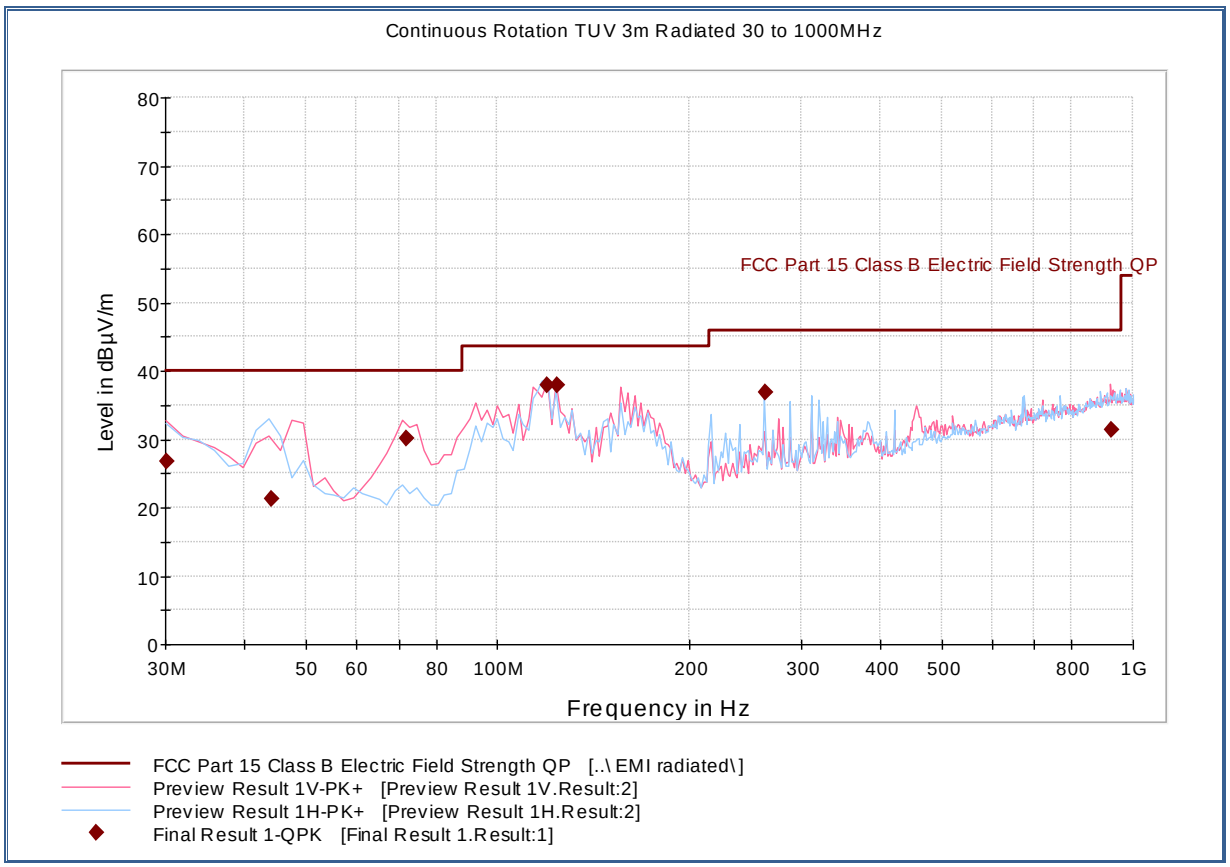
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1324.900000	40.8	1000.0	1000.000	116.7	H	81.0	-4.9	33.1	73.9
1940.866667	46.2	1000.0	1000.000	194.5	V	49.0	-0.6	27.7	73.9
2677.133333	44.8	1000.0	1000.000	385.0	V	299.0	-0.7	29.1	73.9
4821.433333	44.0	1000.0	1000.000	242.4	V	321.0	3.3	29.9	73.9
4927.000000	44.6	1000.0	1000.000	232.4	H	18.0	3.6	29.3	73.9
11008.833333	48.1	1000.0	1000.000	188.5	H	70.0	12.7	25.8	73.9
17780.900000	52.9	1000.0	1000.000	155.6	H	275.0	20.2	21.0	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1324.900000	27.8	1000.0	1000.000	116.7	H	81.0	-4.9	26.1	53.9
1940.866667	31.6	1000.0	1000.000	194.5	V	49.0	-0.6	22.3	53.9
2677.133333	31.6	1000.0	1000.000	385.0	V	299.0	-0.7	22.3	53.9
4821.433333	30.6	1000.0	1000.000	242.4	V	321.0	3.3	23.3	53.9
4927.000000	31.4	1000.0	1000.000	232.4	H	18.0	3.6	22.5	53.9
11008.833333	35.0	1000.0	1000.000	188.5	H	70.0	12.7	18.9	53.9
17780.900000	39.3	1000.0	1000.000	155.6	H	275.0	20.2	14.6	53.9

Test Notes: No significant emissions observed above 18GHz. Measurements above 18GHz were noise floor figures. 2.4GHz notch filter was used for this test.

2.7.12 Test Results Below 1GHz (Worst Case Configuration – 802.11g)

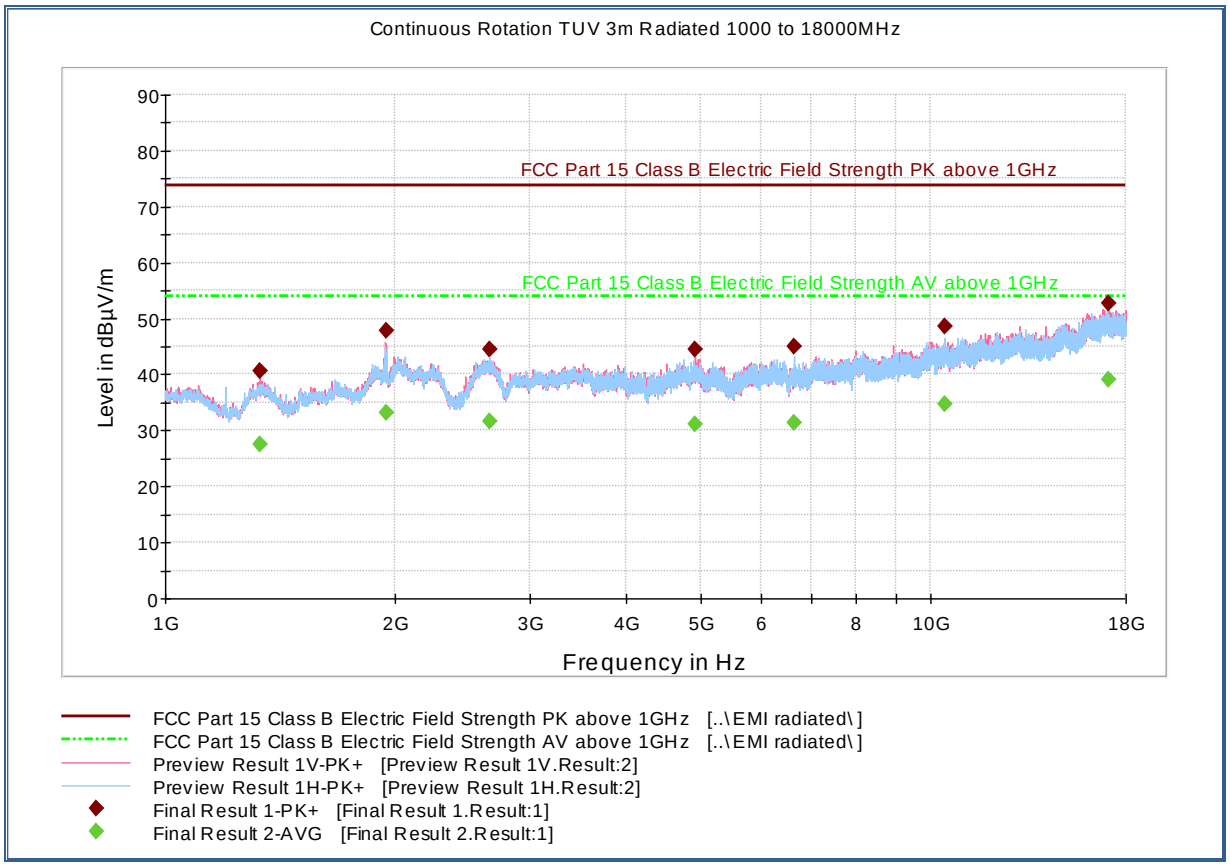


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.120000	26.7	1000.0	120.000	150.0	V	11.0	-4.7	13.3	40.0
44.007214	21.3	1000.0	120.000	400.0	H	15.0	-12.0	18.7	40.0
71.981643	30.1	1000.0	120.000	106.0	V	70.0	-15.5	9.9	40.0
119.978838	38.0	1000.0	120.000	160.0	H	261.0	-14.3	5.5	43.5
123.986613	37.9	1000.0	120.000	100.0	V	322.0	-14.5	5.6	43.5
263.986533	36.9	1000.0	120.000	100.0	H	278.0	-7.1	9.1	46.0
924.324489	31.4	1000.0	120.000	291.0	V	35.0	8.5	14.6	46.0

Test Notes: Only worst case channel presented.

2.7.13 Test Results Above 1GHz (Worst Case Configuration – 802.11g)



Peak Data

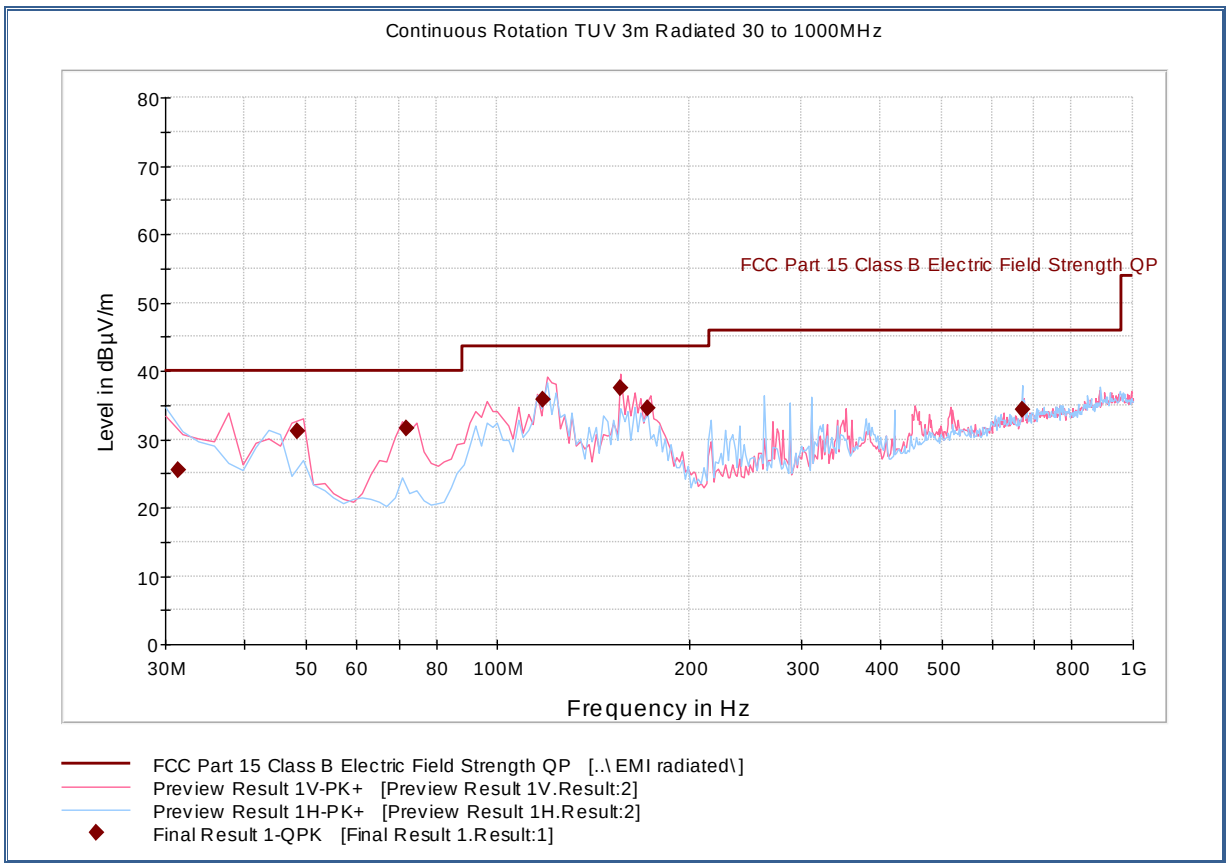
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1330.600000	40.7	1000.0	1000.000	182.6	V	305.0	-5.0	33.2	73.9
1941.066667	47.9	1000.0	1000.000	244.4	V	62.0	-0.6	26.0	73.9
2652.933333	44.6	1000.0	1000.000	396.1	H	5.0	-0.9	29.3	73.9
4922.666667	44.5	1000.0	1000.000	270.3	V	83.0	3.6	29.4	73.9
6639.266667	44.9	1000.0	1000.000	155.6	H	274.0	5.7	29.0	73.9
10427.100000	48.6	1000.0	1000.000	201.5	H	251.0	12.0	25.3	73.9
17108.766667	52.8	1000.0	1000.000	155.6	V	319.0	19.8	21.1	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1330.600000	27.5	1000.0	1000.000	182.6	V	305.0	-5.0	26.4	53.9
1941.066667	33.3	1000.0	1000.000	244.4	V	62.0	-0.6	20.6	53.9
2652.933333	31.6	1000.0	1000.000	396.1	H	5.0	-0.9	22.3	53.9
4922.666667	31.1	1000.0	1000.000	270.3	V	83.0	3.6	22.8	53.9
6639.266667	31.5	1000.0	1000.000	155.6	H	274.0	5.7	22.4	53.9
10427.100000	34.8	1000.0	1000.000	201.5	H	251.0	12.0	19.1	53.9
17108.766667	39.2	1000.0	1000.000	155.6	V	319.0	19.8	14.7	53.9

Test Notes: No significant emissions observed above 18GHz. Measurements above 18GHz were noise floor figures. 2.4GHz notch filter was used for this test.

2.7.14 Test Results Below 1GHz (Worst Case Configuration – 802.11n)

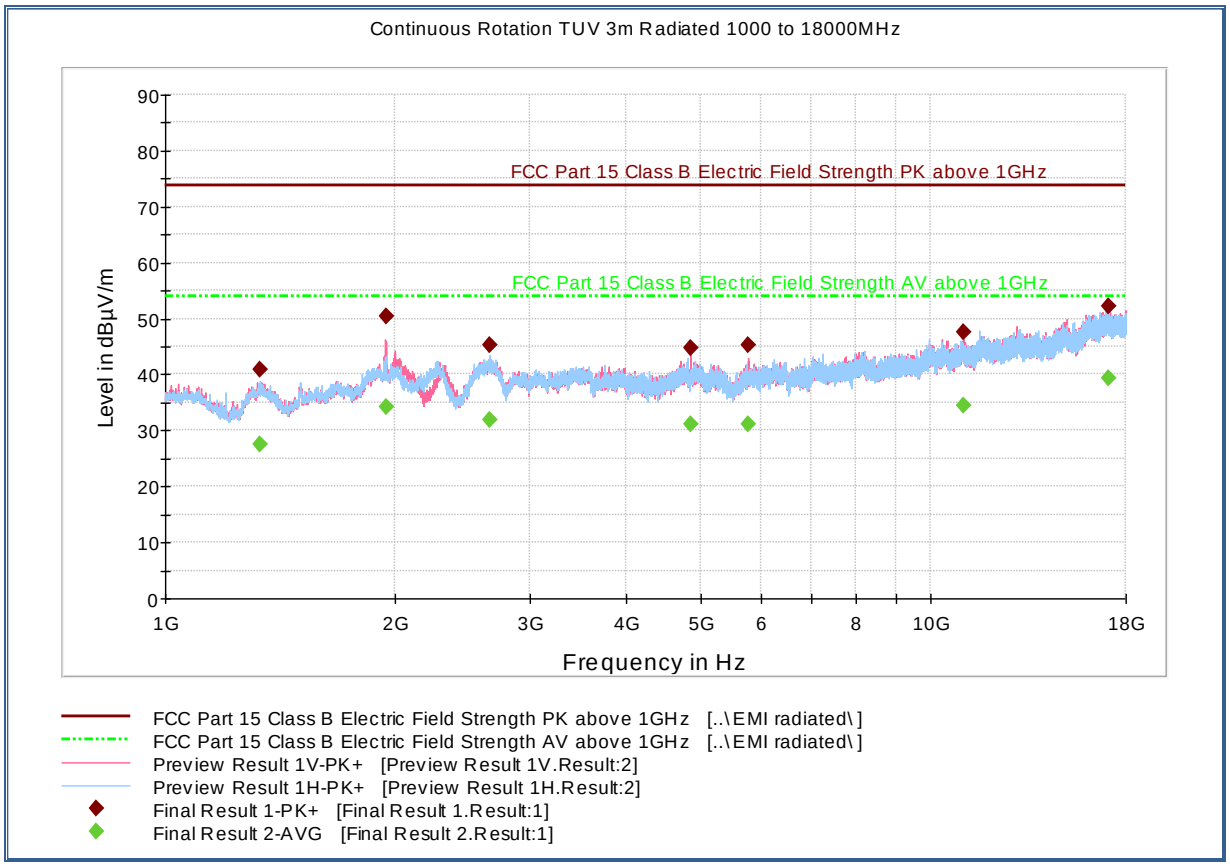


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
31.360000	25.5	1000.0	120.000	144.0	H	349.0	-5.7	14.5	40.0
48.318878	31.3	1000.0	120.000	100.0	V	110.0	-12.8	8.7	40.0
71.981643	31.5	1000.0	120.000	109.0	V	120.0	-15.5	8.5	40.0
117.978838	35.7	1000.0	120.000	105.0	V	208.0	-14.3	7.8	43.5
155.992705	37.5	1000.0	120.000	100.0	V	291.0	-11.4	6.0	43.5
172.007695	34.5	1000.0	120.000	100.0	V	345.0	-10.7	9.0	43.5
668.819078	34.2	1000.0	120.000	100.0	H	150.0	4.0	11.8	46.0

Test Notes: Only worst case channel presented.

2.7.15 Test Results Above 1GHz (Worst Case Configuration – 802.11n)



Peak Data

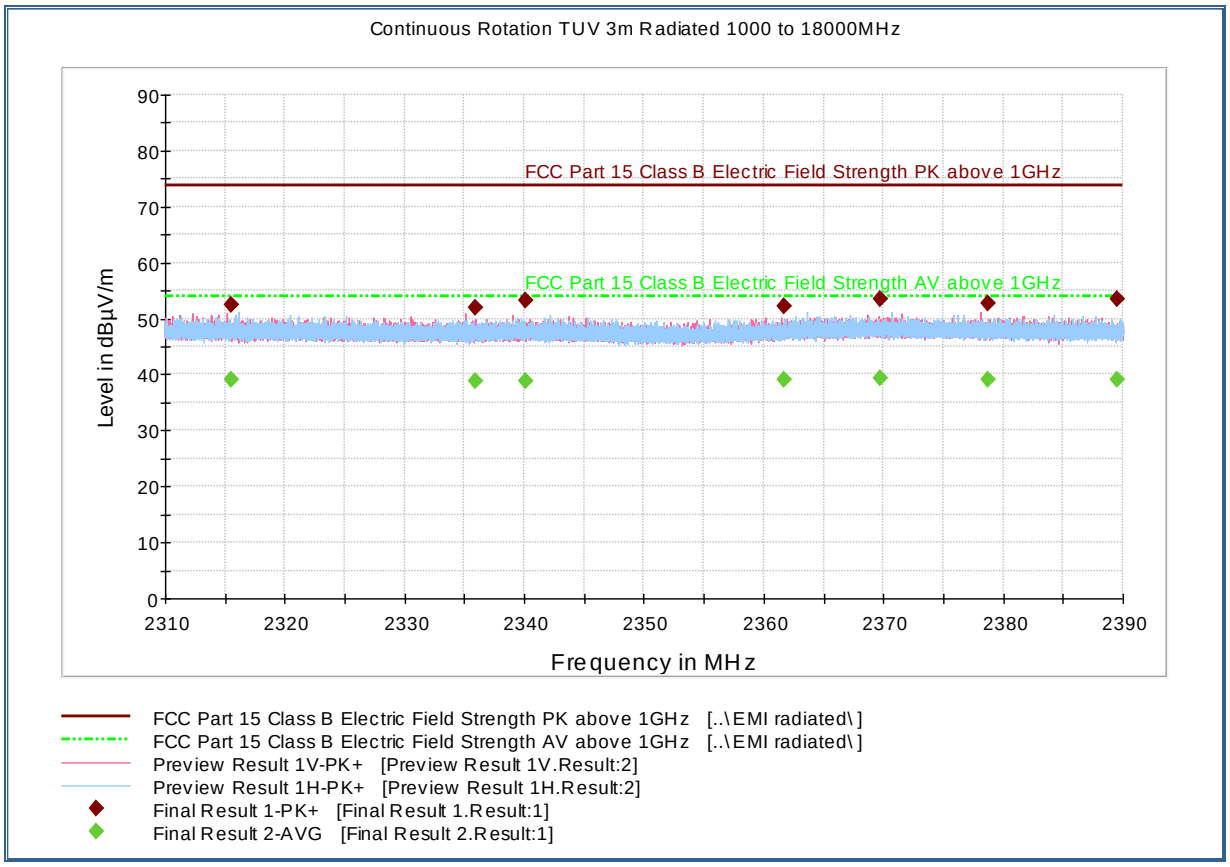
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1328.633333	41.0	1000.0	1000.000	123.7	H	145.0	-5.0	32.9	73.9
1941.066667	50.4	1000.0	1000.000	298.2	V	307.0	-0.6	23.5	73.9
2649.533333	45.2	1000.0	1000.000	293.2	H	168.0	-0.9	28.7	73.9
4865.633333	44.7	1000.0	1000.000	266.3	V	10.0	3.4	29.2	73.9
5790.433333	45.2	1000.0	1000.000	193.5	V	166.0	4.7	28.7	73.9
11058.133333	47.7	1000.0	1000.000	132.7	V	341.0	12.8	26.2	73.9
17095.033333	52.3	1000.0	1000.000	397.1	H	303.0	19.8	21.6	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1328.633333	27.6	1000.0	1000.000	123.7	H	145.0	-5.0	26.3	53.9
1941.066667	34.3	1000.0	1000.000	298.2	V	307.0	-0.6	19.6	53.9
2649.533333	31.8	1000.0	1000.000	293.2	H	168.0	-0.9	22.1	53.9
4865.633333	31.2	1000.0	1000.000	266.3	V	10.0	3.4	22.7	53.9
5790.433333	31.2	1000.0	1000.000	193.5	V	166.0	4.7	22.7	53.9
11058.133333	34.5	1000.0	1000.000	132.7	V	341.0	12.8	19.4	53.9
17095.033333	39.3	1000.0	1000.000	397.1	H	303.0	19.8	14.6	53.9

Test Notes: No significant emissions observed above 18GHz. Measurements above 18GHz were noise floor figures. 2.4GHz notch filter used for this test.

2.7.16 Lower Restricted Band (Worst Case Configuration – 802.11b)



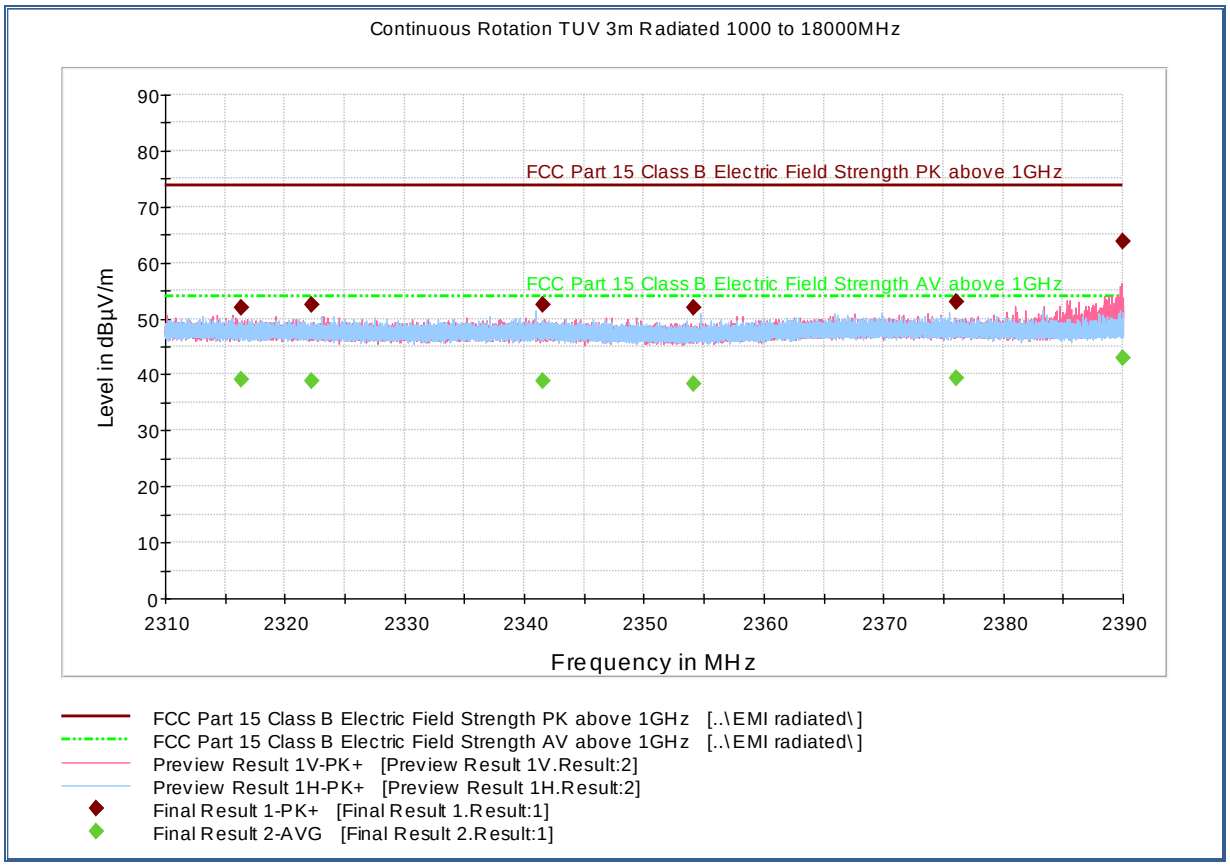
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2315.544000	52.6	1000.0	1000.000	266.3	H	305.0	8.7	21.3	73.9
2335.874667	52.1	1000.0	1000.000	323.2	V	190.0	8.7	21.8	73.9
2340.050667	53.2	1000.0	1000.000	402.7	V	292.0	8.7	20.7	73.9
2361.664000	52.2	1000.0	1000.000	381.1	H	-13.0	8.8	21.7	73.9
2369.682667	53.5	1000.0	1000.000	233.4	H	188.0	8.8	20.4	73.9
2378.717333	52.7	1000.0	1000.000	325.1	V	265.0	8.8	21.2	73.9
2389.500000	53.4	1000.0	1000.000	101.7	H	225.0	8.9	20.5	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2315.544000	39.0	1000.0	1000.000	266.3	H	305.0	8.7	14.9	53.9
2335.874667	38.7	1000.0	1000.000	323.2	V	190.0	8.7	15.2	53.9
2340.050667	38.9	1000.0	1000.000	402.7	V	292.0	8.7	15.0	53.9
2361.664000	39.1	1000.0	1000.000	381.1	H	-13.0	8.8	14.8	53.9
2369.682667	39.4	1000.0	1000.000	233.4	H	188.0	8.8	14.5	53.9
2378.717333	39.2	1000.0	1000.000	325.1	V	265.0	8.8	14.7	53.9
2389.500000	39.0	1000.0	1000.000	101.7	H	225.0	8.9	14.9	53.9

2.7.17 Lower Restricted Band (Worst Case Configuration – 802.11g)



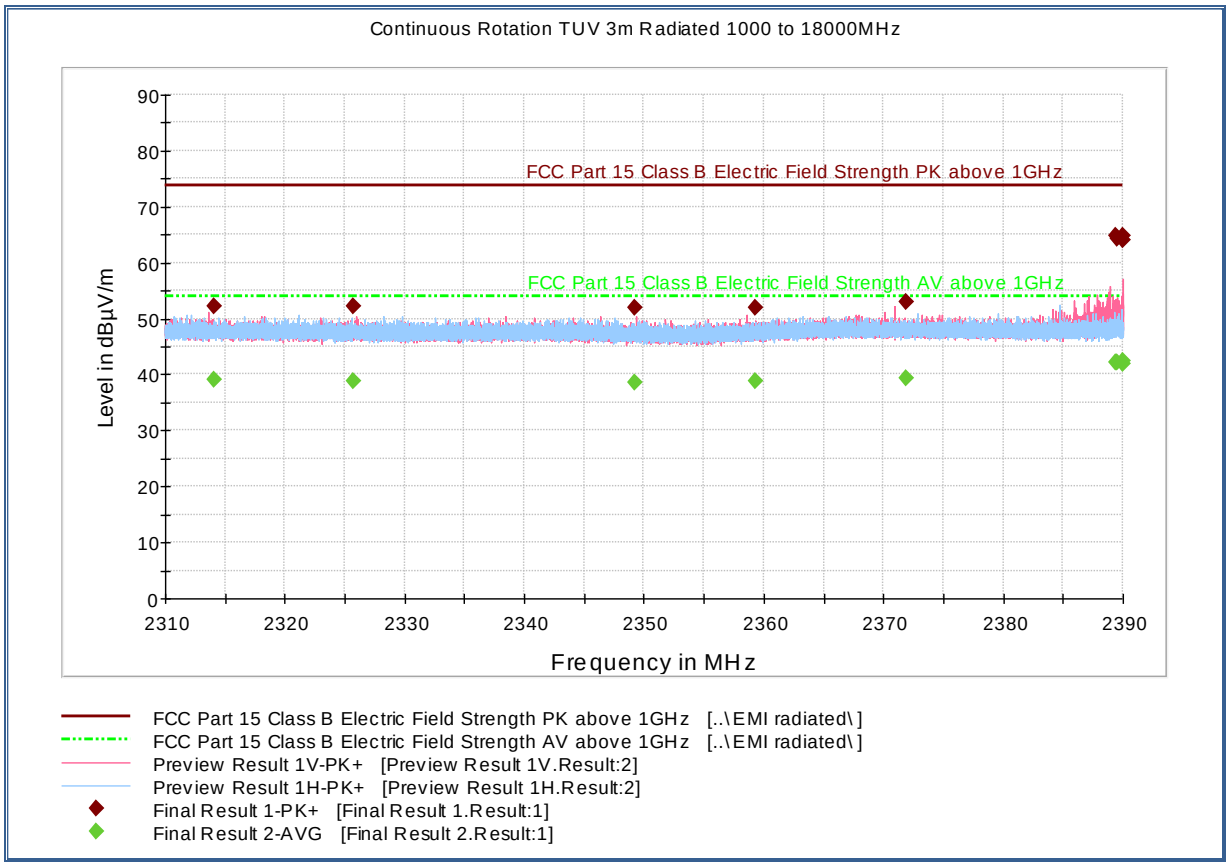
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2316.397333	51.9	1000.0	1000.000	208.5	V	156.0	8.7	22.0	73.9
2322.250667	52.3	1000.0	1000.000	367.1	V	288.0	8.7	21.6	73.9
2341.570667	52.4	1000.0	1000.000	298.2	H	311.0	8.7	21.5	73.9
2354.184000	51.9	1000.0	1000.000	111.7	H	9.0	8.8	22.0	73.9
2376.032000	52.9	1000.0	1000.000	201.3	H	311.0	8.8	21.0	73.9
2390.000000	63.6	1000.0	1000.000	114.7	V	-20.0	8.9	10.3	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2316.397333	39.0	1000.0	1000.000	208.5	V	156.0	8.7	14.9	53.9
2322.250667	38.9	1000.0	1000.000	367.1	V	288.0	8.7	15.0	53.9
2341.570667	38.8	1000.0	1000.000	298.2	H	311.0	8.7	15.1	53.9
2354.184000	38.4	1000.0	1000.000	111.7	H	9.0	8.8	15.5	53.9
2376.032000	39.3	1000.0	1000.000	201.3	H	311.0	8.8	14.6	53.9
2390.000000	43.0	1000.0	1000.000	114.7	V	-20.0	8.9	10.9	53.9

2.7.18 Lower Restricted Band (Worst Case Configuration – 802.11n)



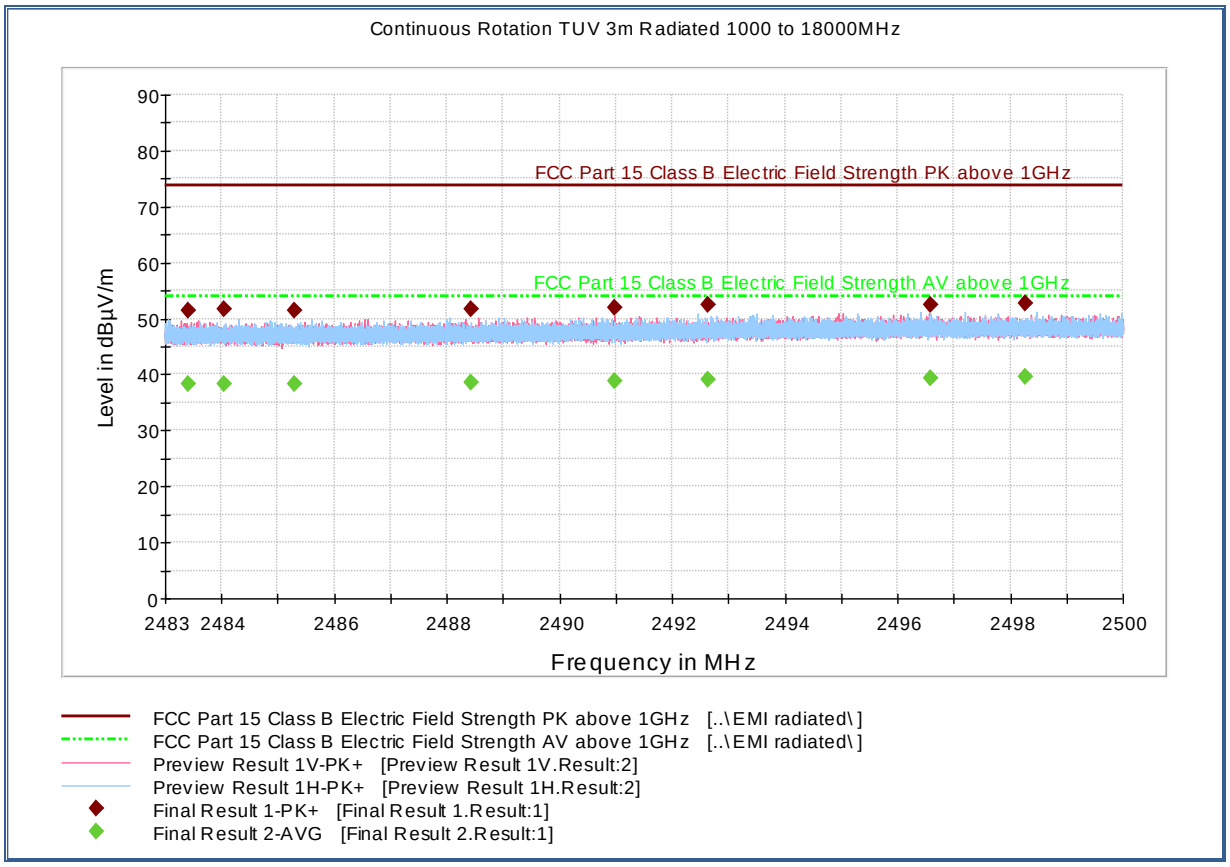
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2314.050667	52.1	1000.0	1000.000	131.7	V	312.0	8.7	21.8	73.9
2325.712000	52.1	1000.0	1000.000	103.7	V	16.0	8.7	21.8	73.9
2349.184000	52.0	1000.0	1000.000	116.7	V	343.0	8.8	21.9	73.9
2359.322667	52.0	1000.0	1000.000	202.3	V	279.0	8.8	21.9	73.9
2371.944000	52.9	1000.0	1000.000	286.3	V	19.0	8.8	21.0	73.9
2389.397333	64.8	1000.0	1000.000	116.7	V	344.0	8.9	9.1	73.9
2389.500000	64.4	1000.0	1000.000	116.7	V	347.0	8.9	9.5	73.9
2389.954667	63.9	1000.0	1000.000	141.7	V	338.0	8.9	10.0	73.9
2390.000000	64.9	1000.0	1000.000	118.7	V	343.0	8.9	9.0	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2314.050667	39.0	1000.0	1000.000	131.7	V	312.0	8.7	14.9	53.9
2325.712000	38.8	1000.0	1000.000	103.7	V	16.0	8.7	15.1	53.9
2349.184000	38.4	1000.0	1000.000	116.7	V	343.0	8.8	15.5	53.9
2359.322667	38.7	1000.0	1000.000	202.3	V	279.0	8.8	15.2	53.9
2371.944000	39.3	1000.0	1000.000	286.3	V	19.0	8.8	14.6	53.9
2389.397333	42.2	1000.0	1000.000	116.7	V	344.0	8.9	11.7	53.9
2389.500000	42.1	1000.0	1000.000	116.7	V	347.0	8.9	11.8	53.9
2389.954667	42.0	1000.0	1000.000	141.7	V	338.0	8.9	11.9	53.9
2390.000000	42.3	1000.0	1000.000	118.7	V	343.0	8.9	11.6	53.9

2.7.19 Upper Restricted Band (Worst Case Configuration – 802.11b)



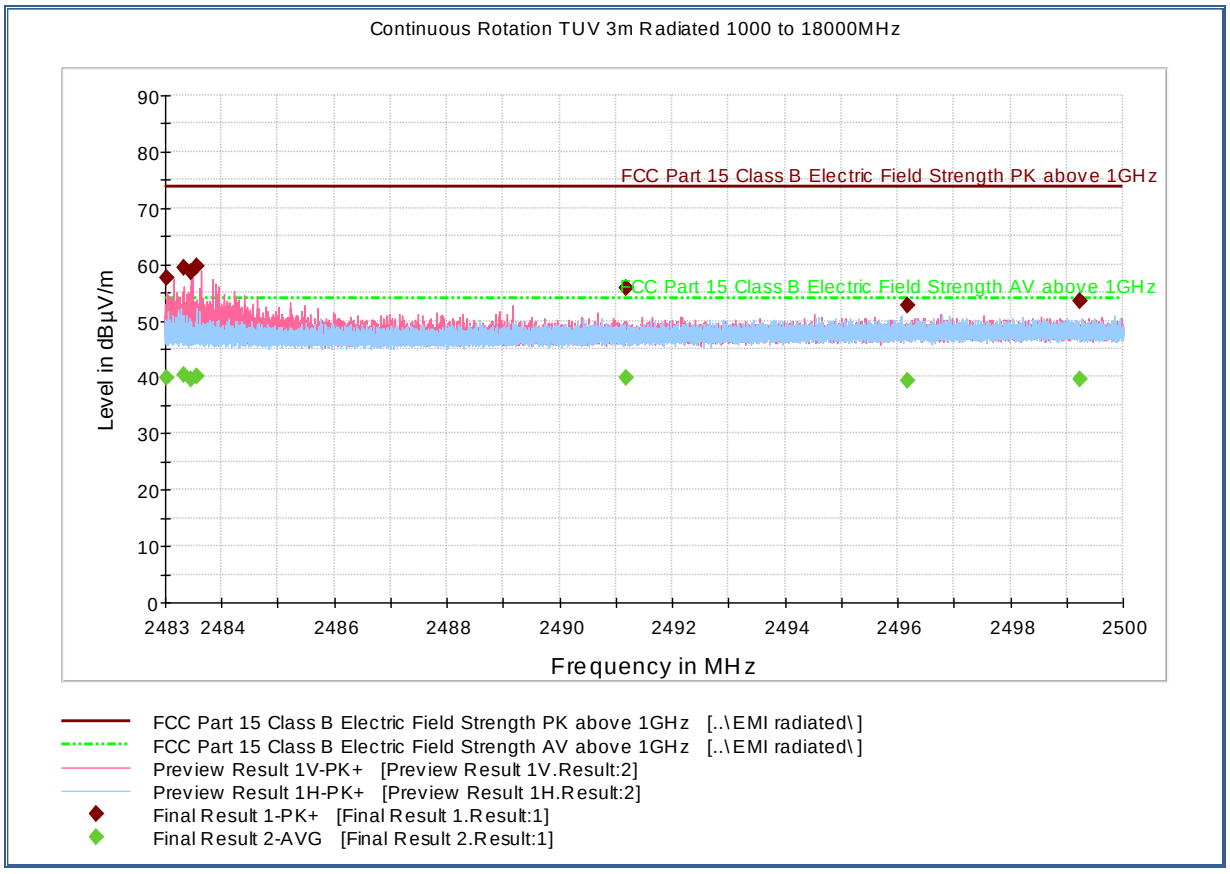
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.400000	51.5	1000.0	1000.000	301.6	V	88.0	9.2	22.4	73.9
2484.048733	51.7	1000.0	1000.000	134.7	H	60.0	9.2	22.2	73.9
2485.293133	51.5	1000.0	1000.000	265.3	H	337.0	9.2	22.4	73.9
2488.437100	51.7	1000.0	1000.000	134.7	H	247.0	9.3	22.2	73.9
2490.985467	51.9	1000.0	1000.000	282.2	V	76.0	9.3	22.0	73.9
2492.644633	52.5	1000.0	1000.000	153.7	H	-20.0	9.3	21.4	73.9
2496.594867	52.6	1000.0	1000.000	142.7	H	58.0	9.3	21.3	73.9
2498.258667	52.6	1000.0	1000.000	142.7	H	265.0	9.3	21.3	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.400000	38.3	1000.0	1000.000	301.6	V	88.0	9.2	15.6	53.9
2484.048733	38.3	1000.0	1000.000	134.7	H	60.0	9.2	15.6	53.9
2485.293133	38.3	1000.0	1000.000	265.3	H	337.0	9.2	15.6	53.9
2488.437100	38.5	1000.0	1000.000	134.7	H	247.0	9.3	15.4	53.9
2490.985467	38.8	1000.0	1000.000	282.2	V	76.0	9.3	15.1	53.9
2492.644633	39.1	1000.0	1000.000	153.7	H	-20.0	9.3	14.8	53.9
2496.594867	39.4	1000.0	1000.000	142.7	H	58.0	9.3	14.5	53.9
2498.258667	39.7	1000.0	1000.000	142.7	H	265.0	9.3	14.2	53.9

2.7.20 Upper Restricted Band (Worst Case Configuration – 802.11g)



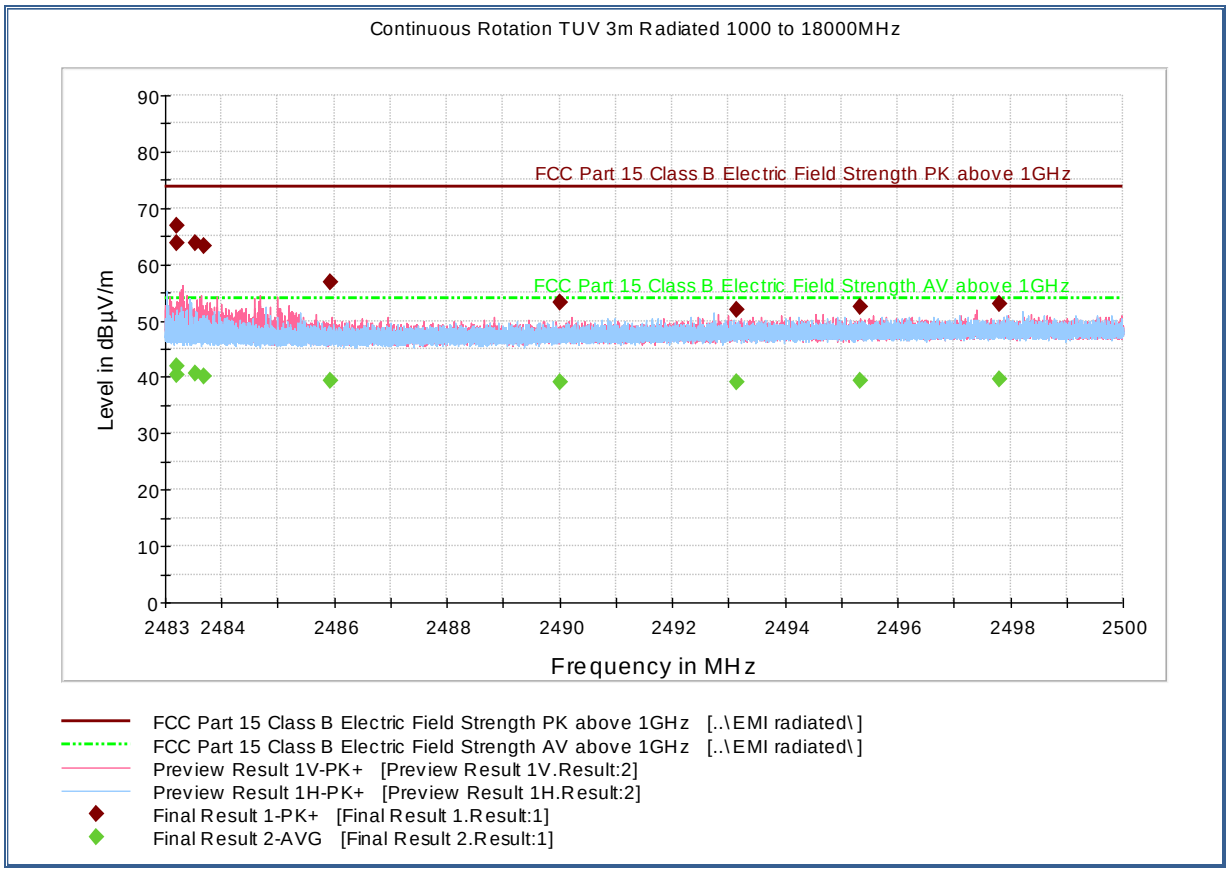
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.026300	57.6	1000.0	1000.000	127.7	V	-1.0	9.3	16.3	73.9
2483.326300	59.4	1000.0	1000.000	112.7	V	-7.0	9.3	14.5	73.9
2483.469300	58.7	1000.0	1000.000	103.7	V	347.0	9.3	15.2	73.9
2483.569300	59.7	1000.0	1000.000	112.7	V	356.0	9.3	14.2	73.9
2491.171500	55.8	1000.0	1000.000	103.7	V	-4.0	9.3	18.1	73.9
2496.167167	52.6	1000.0	1000.000	122.7	V	306.0	9.3	21.3	73.9
2499.245867	53.4	1000.0	1000.000	282.2	H	53.0	9.3	20.5	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.026300	40.0	1000.0	1000.000	127.7	V	-1.0	9.3	13.9	53.9
2483.326300	40.3	1000.0	1000.000	112.7	V	-7.0	9.3	13.6	53.9
2483.469300	39.7	1000.0	1000.000	103.7	V	347.0	9.3	14.2	53.9
2483.569300	40.1	1000.0	1000.000	112.7	V	356.0	9.3	13.8	53.9
2491.171500	39.7	1000.0	1000.000	103.7	V	-4.0	9.3	14.2	53.9
2496.167167	39.4	1000.0	1000.000	122.7	V	306.0	9.3	14.5	53.9
2499.245867	39.5	1000.0	1000.000	282.2	H	53.0	9.3	14.4	53.9

2.7.21 Upper Restricted Band (Worst Case Configuration – 802.11n)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.200000	67.0	1000.0	1000.000	112.7	V	332.0	9.2	6.9	73.9
2483.200000	63.7	1000.0	1000.000	223.4	V	346.0	9.2	10.2	73.9
2483.531833	63.7	1000.0	1000.000	219.4	V	4.0	9.2	10.2	73.9
2483.700000	63.3	1000.0	1000.000	223.4	V	344.0	9.2	10.6	73.9
2485.942300	56.9	1000.0	1000.000	219.4	V	5.0	9.2	17.0	73.9
2490.000633	53.2	1000.0	1000.000	130.7	V	23.0	9.3	20.7	73.9
2493.142700	51.9	1000.0	1000.000	257.3	H	245.0	9.3	22.0	73.9
2495.336200	52.5	1000.0	1000.000	146.7	V	71.0	9.3	21.4	73.9
2497.808067	53.0	1000.0	1000.000	130.7	V	77.0	9.3	20.9	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.200000	41.8	1000.0	1000.000	112.7	V	332.0	9.2	12.1	53.9
2483.200000	40.4	1000.0	1000.000	223.4	V	346.0	9.2	13.5	53.9
2483.531833	40.6	1000.0	1000.000	219.4	V	4.0	9.2	13.3	53.9
2483.700000	40.2	1000.0	1000.000	223.4	V	344.0	9.2	13.7	53.9
2485.942300	39.3	1000.0	1000.000	219.4	V	5.0	9.2	14.6	53.9
2490.000633	39.2	1000.0	1000.000	130.7	V	23.0	9.3	14.7	53.9
2493.142700	39.1	1000.0	1000.000	257.3	H	245.0	9.3	14.8	53.9
2495.336200	39.4	1000.0	1000.000	146.7	V	71.0	9.3	14.5	53.9
2497.808067	39.5	1000.0	1000.000	130.7	V	77.0	9.3	14.4	53.9

2.8 POWER SPECTRAL DENSITY

2.8.1 Specification Reference

Part 15 Subpart C §15.247(e)

2.8.2 Standard Applicable

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

2.8.3 Equipment Under Test and Modification State

Serial No: 900F4108 / Test Configuration A

2.8.4 Date of Test/Initial of test personnel who performed the test

December 08, 12, 21-22 and 27, 2016/NS

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.8-24.7 °C
Relative Humidity	40.8-48.8 %
ATM Pressure	99.1-99.5 kPa

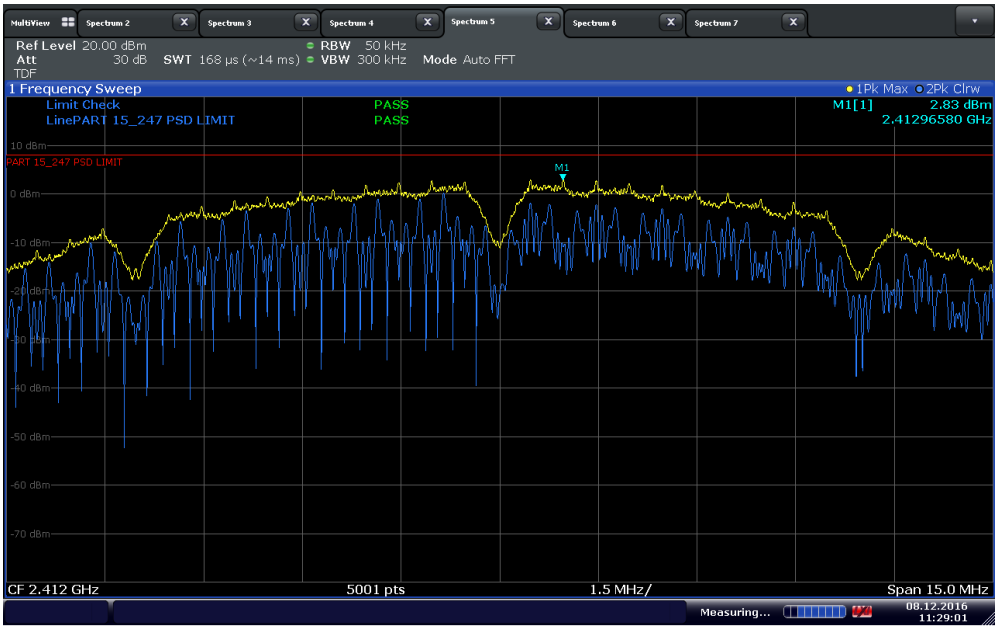
2.8.7 Additional Observations

- This is a conducted test.
- Test procedure is per Section 10.2 of KDB 558074 (April 08, 2016).
- Span is 1.5 times the DTS bandwidth.
- TDF (Transducer Factor) was used to compensate for the external attenuator and cable used.
- Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz
- Set the VBW ≥ 3 x RBW
- Detector is Peak
- Sweep time is Auto Couple.
- Trace mode is max hold
- Trace allowed to fully stabilize.
- The RBW used during testing shall be reported.

2.8.8 Test Results Summary

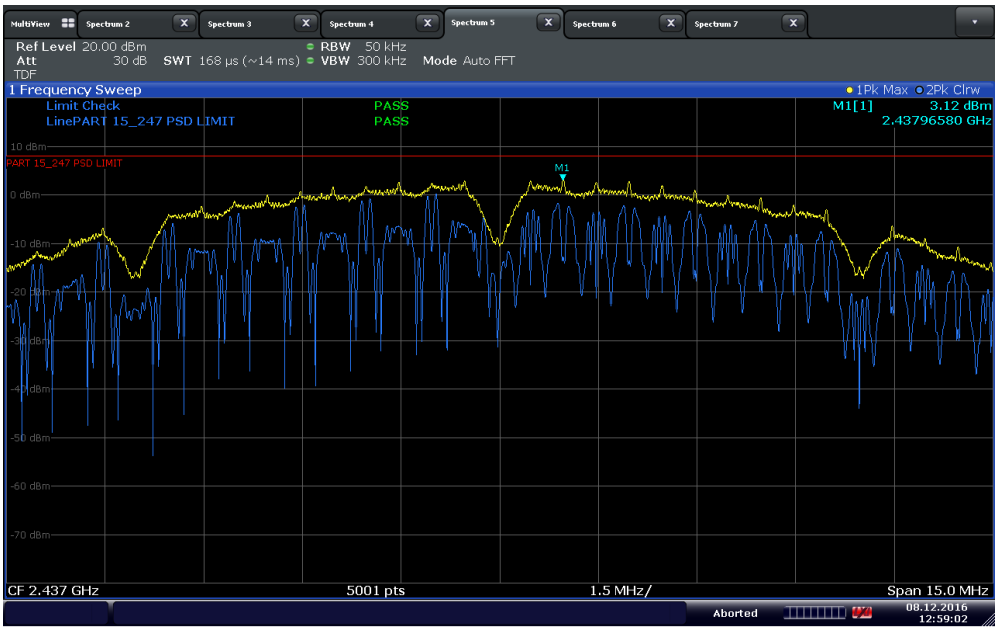
Mode	Channel	RBW	Marker Reading (dBm)	PSD Limit (dBm)	Margin (dB)	Compliance
802.11b	1 (2412 MHz)	50 kHz	2.83	8	5.17	Complies
	6 (2437 MHz)		3.12	8	4.88	Complies
	11 (2462 MHz)		4.02	8	3.98	Complies
802.11g	1 (2412 MHz)		-0.26	8	8.26	Complies
	6 (2437 MHz)		-0.16	8	8.16	Complies
	11 (2462 MHz)		0.25	8	7.75	Complies
802.11n	1 (2412 MHz)		-0.77	8	8.77	Complies
	6 (2437 MHz)		-0.41	8	8.41	Complies
	11 (2462 MHz)		-0.42	8	8.42	Complies

2.8.9 Test Results Plots



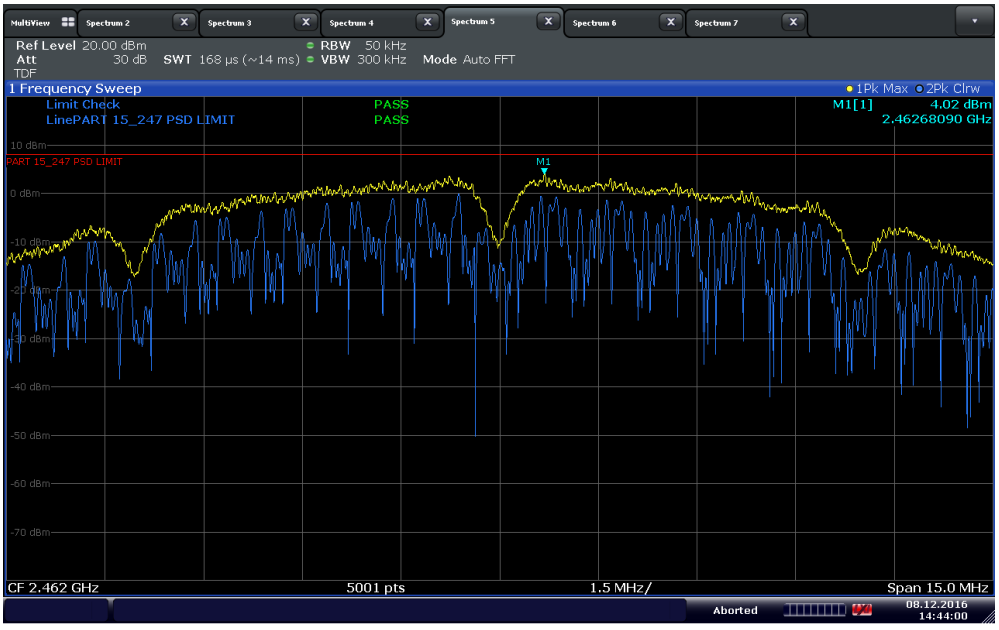
11:29:01 08.12.2016

802.11b Low Channel



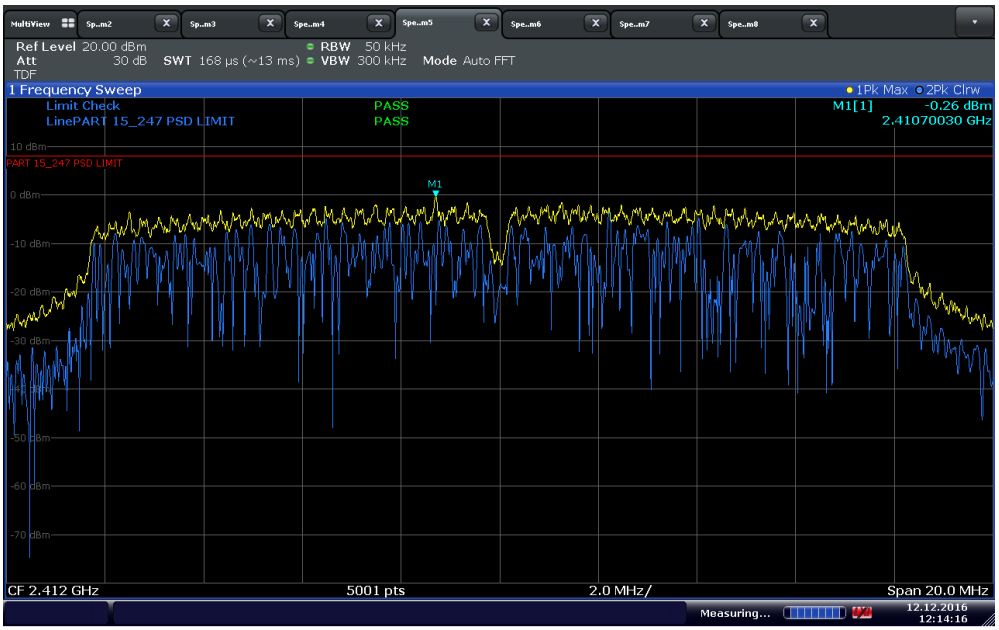
12:59:03 08.12.2016

802.11b Mid Channel



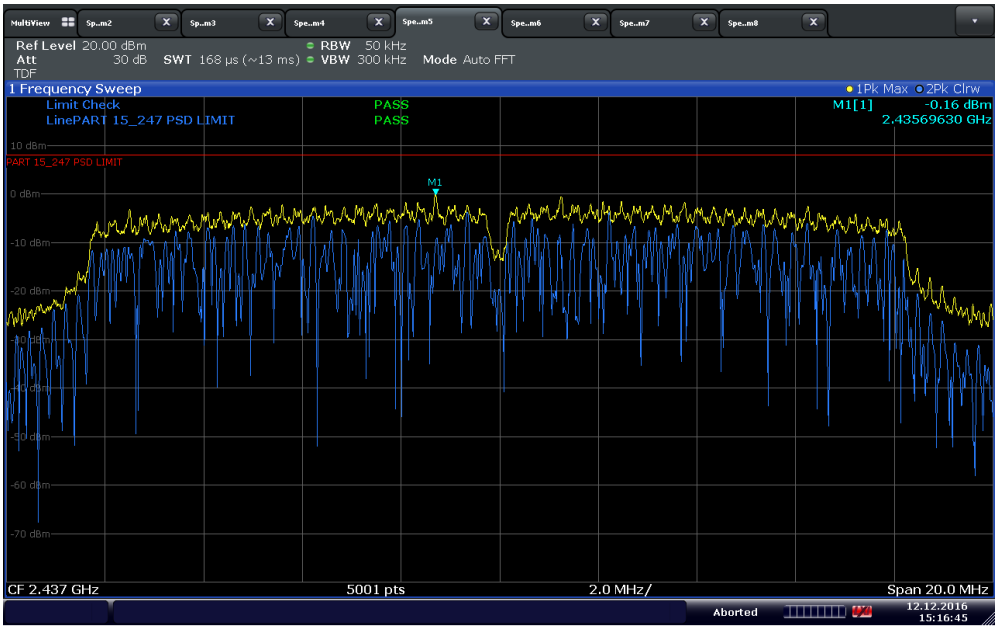
14:44:01 08.12.2016

802.11b High Channel



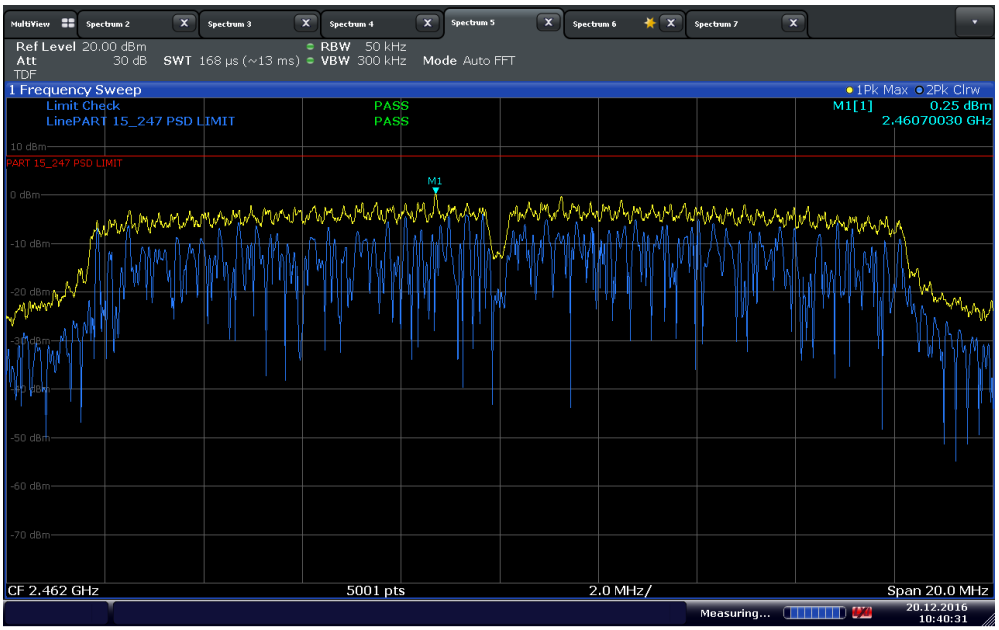
12:14:16 12.12.2016

802.11g Low Channel



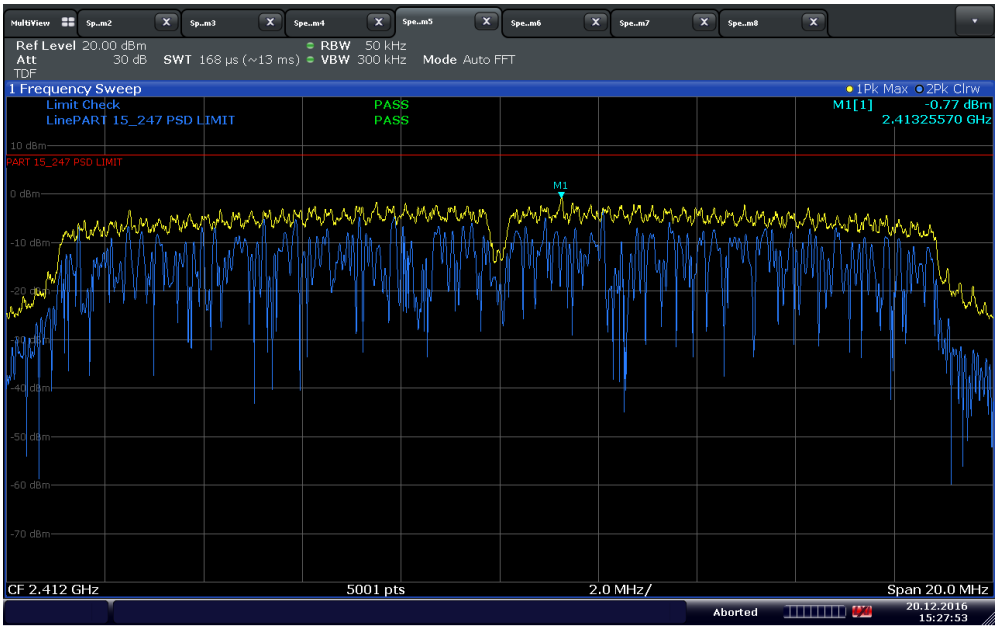
15:16:45 12.12.2016

802.11g Mid Channel



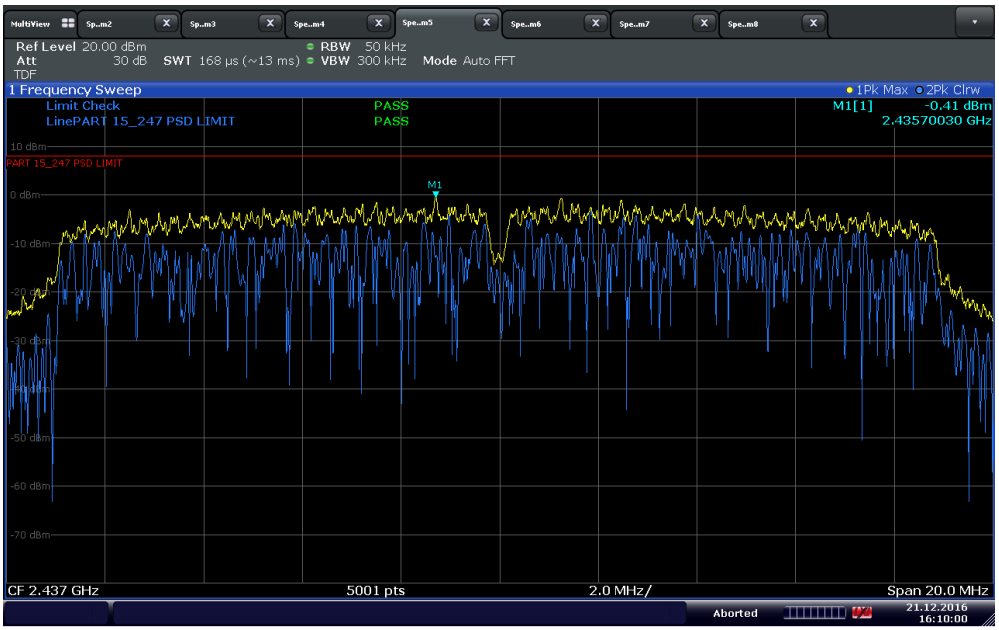
10:40:32 20.12.2016

802.11g High Channel



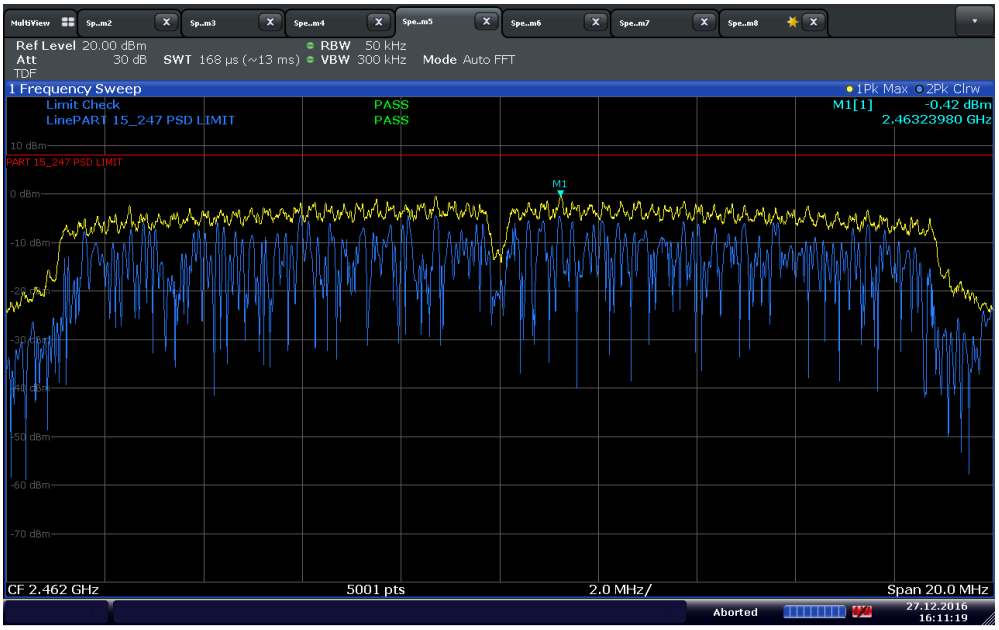
15:27:54 20.12.2016

802.11n Low Channel



16:10:01 21.12.2016

802.11n Mid Channel



16:11:19 27.12.2016

802.11n High Channel

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Antenna Conducted Port Setup						
7611	Signal/Spectrum Analyzer	FSW26	102017	Rhode & Schwarz	02/01/16	02/01/17
1003	Signal Generator	SMR-40	1104.0002.40	Rhode & Schwarz	05/16/16	05/16/17
8832	20dB Attenuator	34-20-34	BP4150	MCE/Weinschel	Verified by 1003 and 7611	
AC Conducted Emissions Test Setup						
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/17/16	03/17/17
7568	LISN	FCC-LISN-50-25-2-10	120305	Fischer Custom Comm.	11/05/16	11/05/17
8822	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/29/16	02/28/17
8824	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/29/16	02/28/17
Radiated Test Setup						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	11/06/15	11/06/17
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	10/07/16	10/07/17
1016	Pre-amplifier	PAM-0202	187	PAM	10/17/16	10/17/17
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	05/12/16	05/12/17
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/17/16	03/17/17
6815	2.4GHz Band Notch Filter	BRM50702	008	Micro-Tronics	Verified by 1003 and 7611	
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	01/11/16	01/11/17
1153	High-frequency cable	SucoFlex 100 SX	N/A	Suhner	Verified by 1003 and 7611	
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	Verified by 1003 and 7611	
Miscellaneous						
11312	Mini Environmental Quality Meter	850027	CF099-56010-340	Sper Scientific	08/22/16	08/22/17
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Measurements (Below 1GHz)

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyser	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.78
				Coverage Factor (k):	2
				Expanded Uncertainty:	3.57

3.2.2 Radiated Emission Measurements (Above 1GHz)

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	1.78
				Coverage Factor (k):	2
				Expanded Uncertainty:	3.56

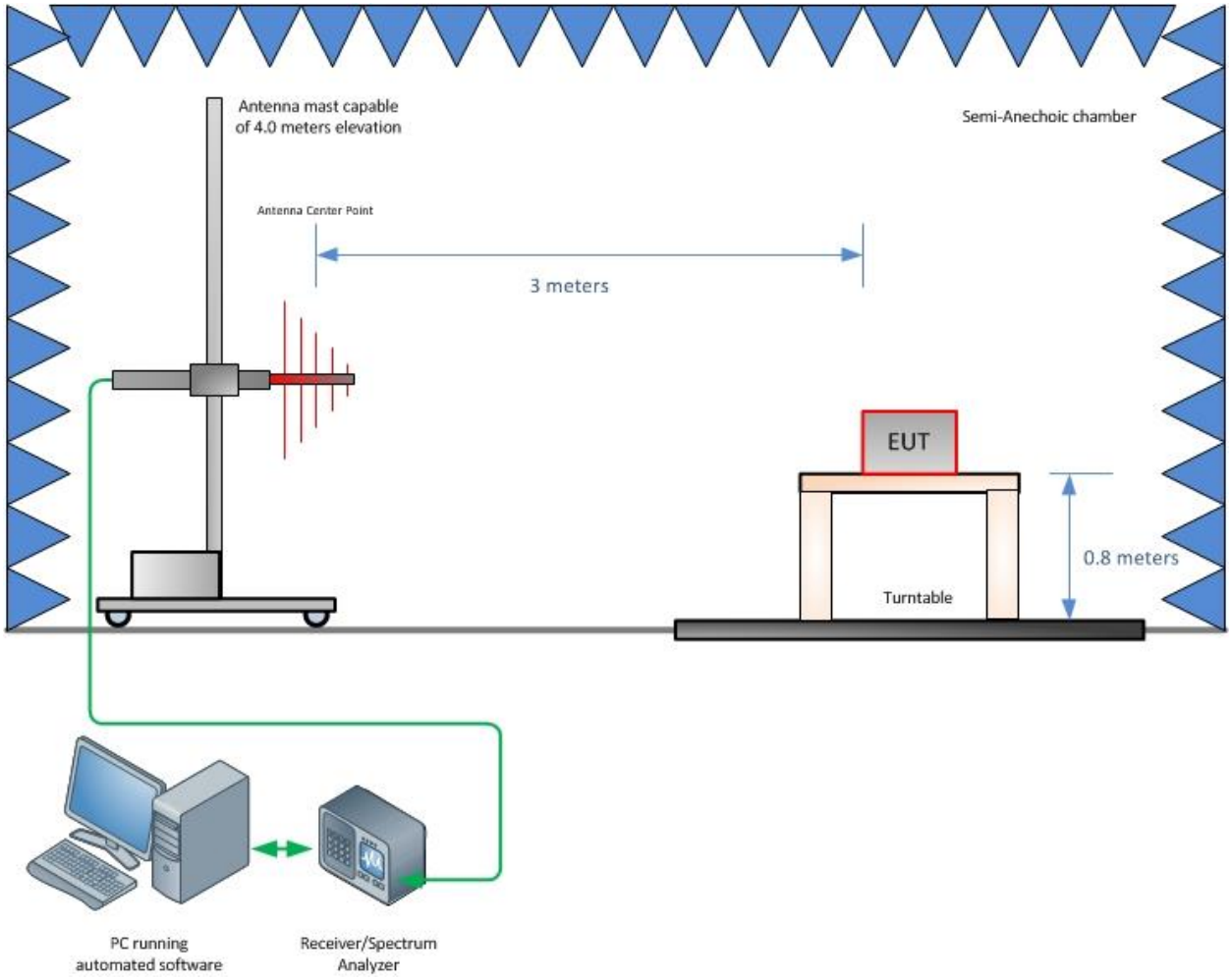
3.2.3 Conducted Antenna Port Measurement

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.50	0.29	0.08
3	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	0.72
				Coverage Factor (k):	2
				Expanded Uncertainty:	1.45

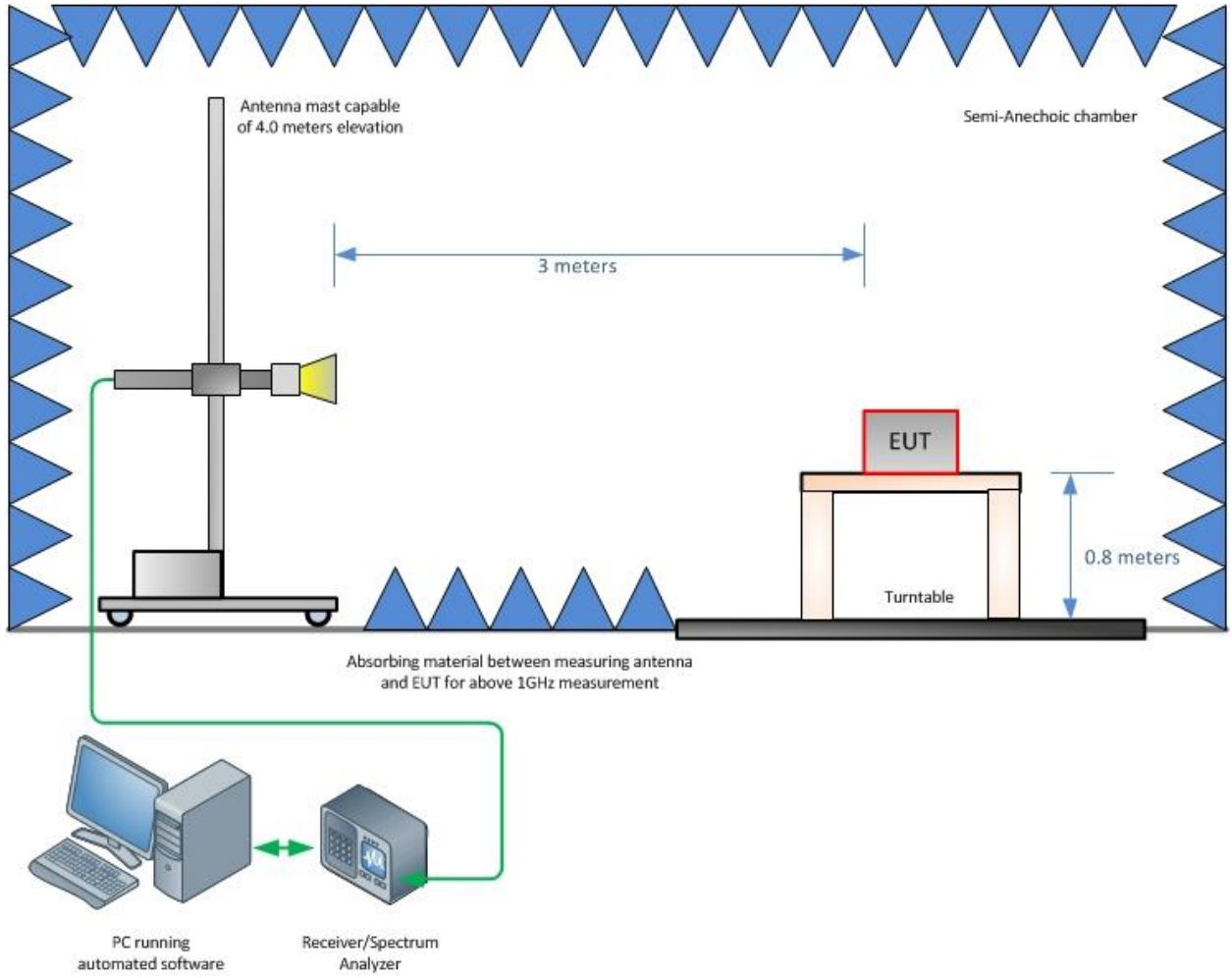
SECTION 4

DIAGRAM OF TEST SETUP

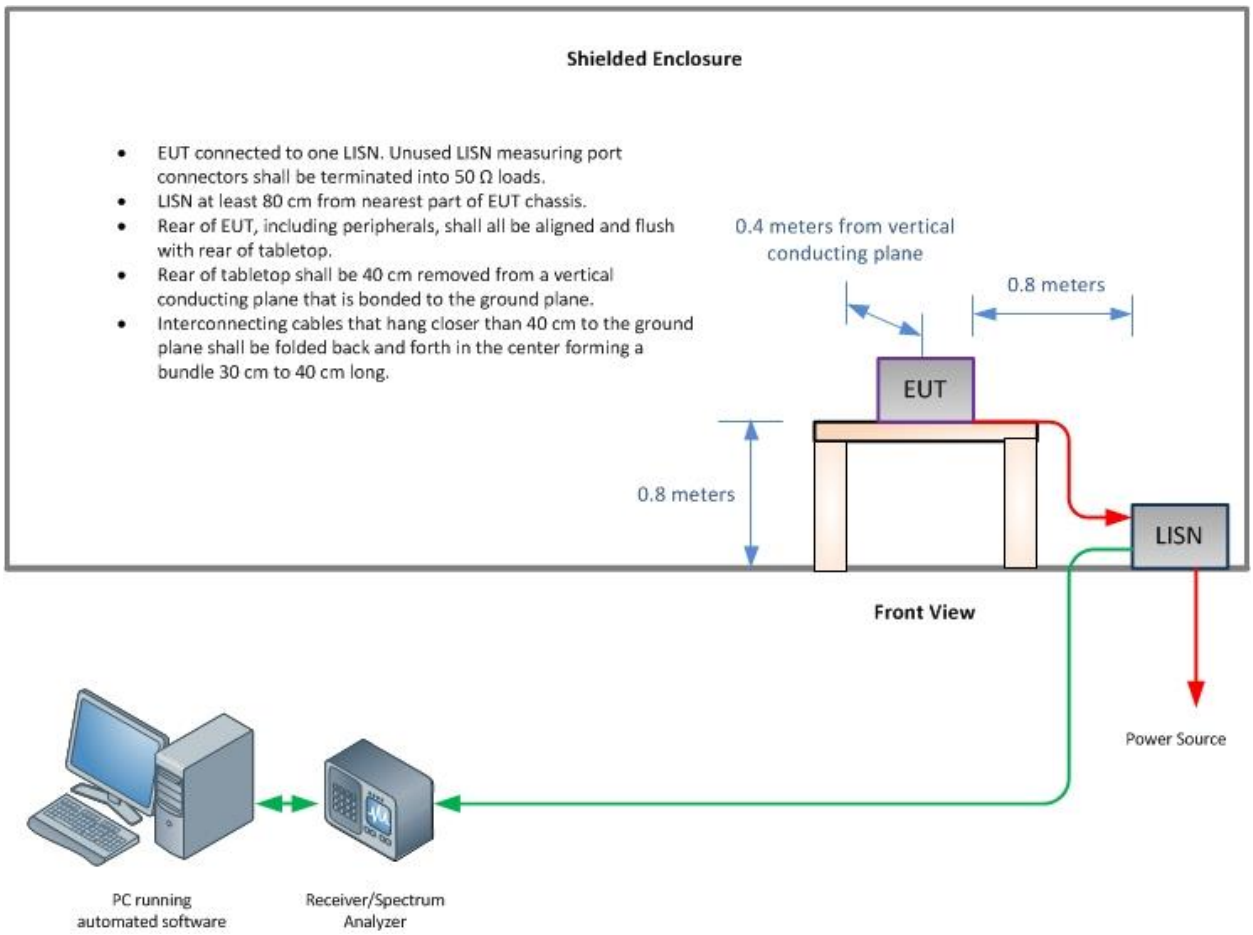
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Conducted Emission Test Setup

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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