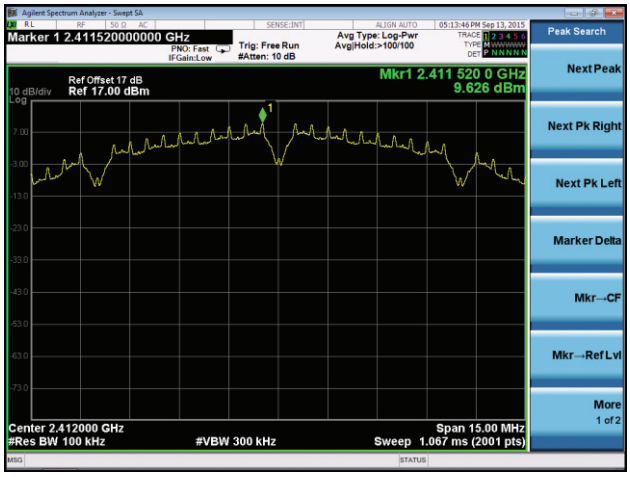
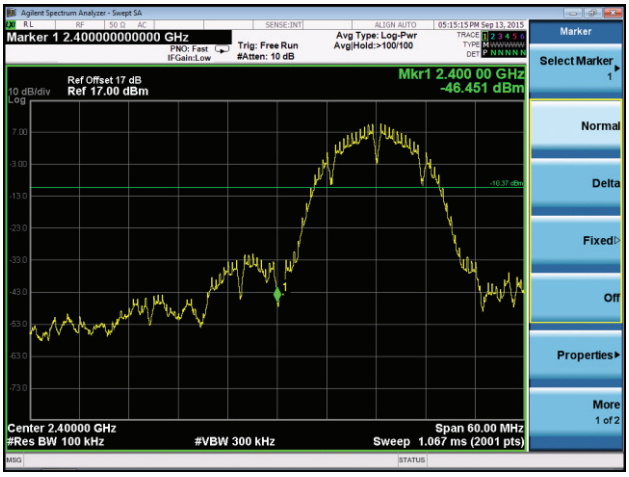
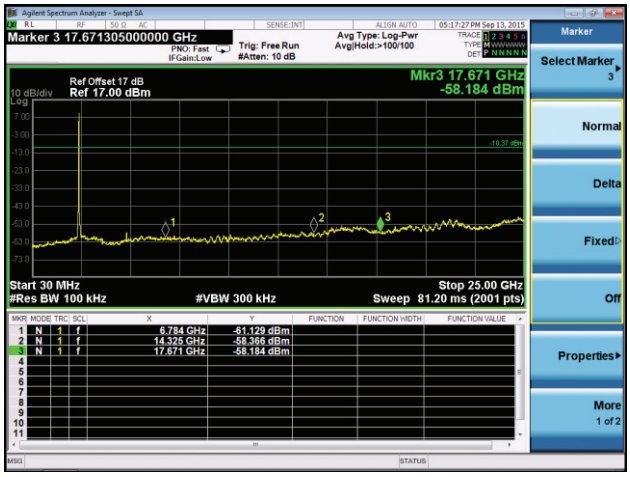
802.11b Out-of-Band Emissions

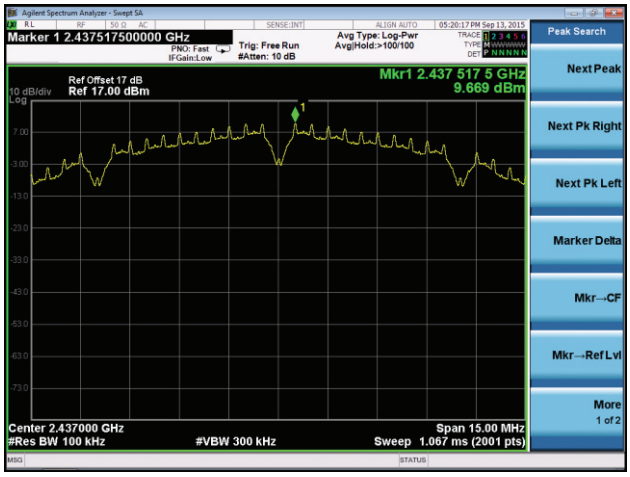
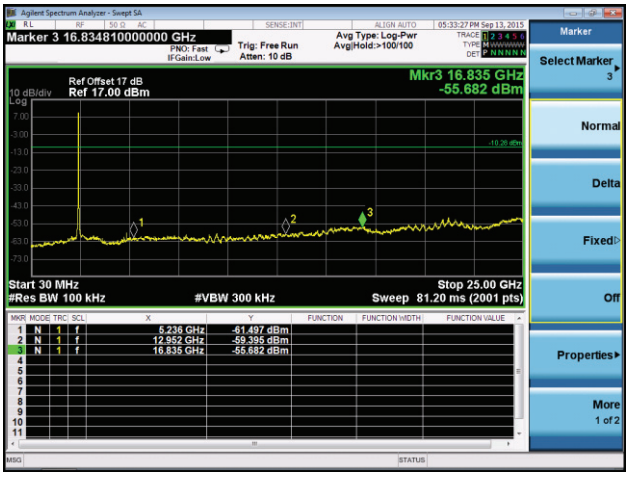
Channel 01 (2412MHz)

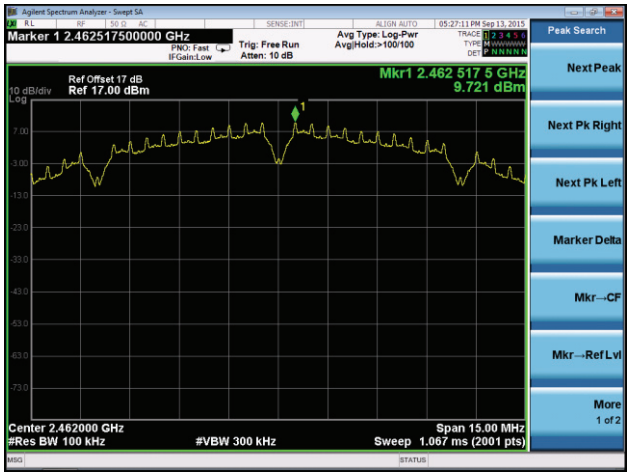
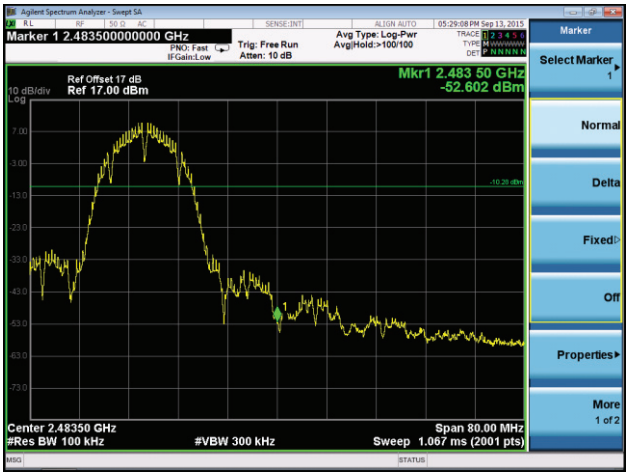
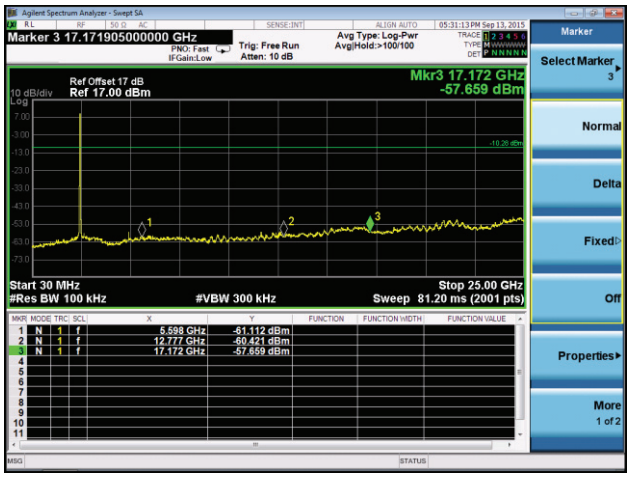
100kHz PSD reference Level	Low Band Edge
	

Spurious Emission 30MHz ~ 25GHz



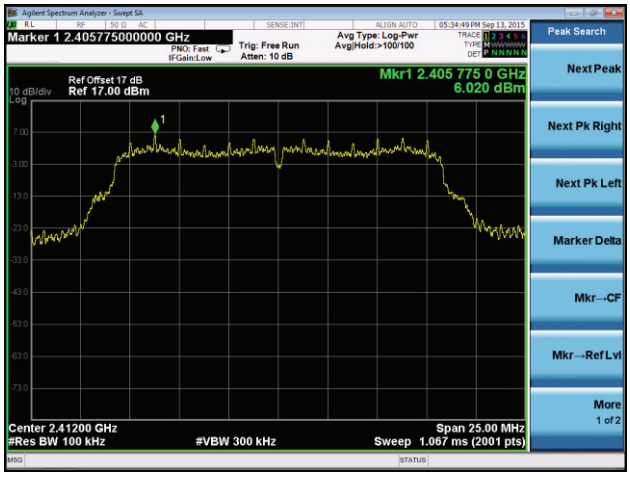
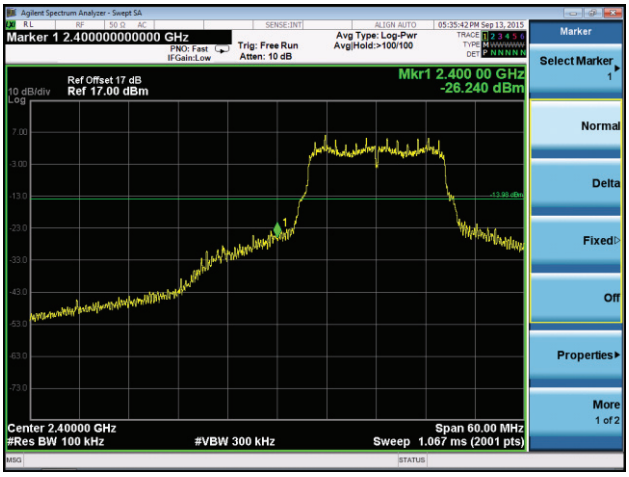
Channel 06 (2437MHz)

100kHz PSD reference Level	Spurious Emission 30MHz ~ 25GHz
	

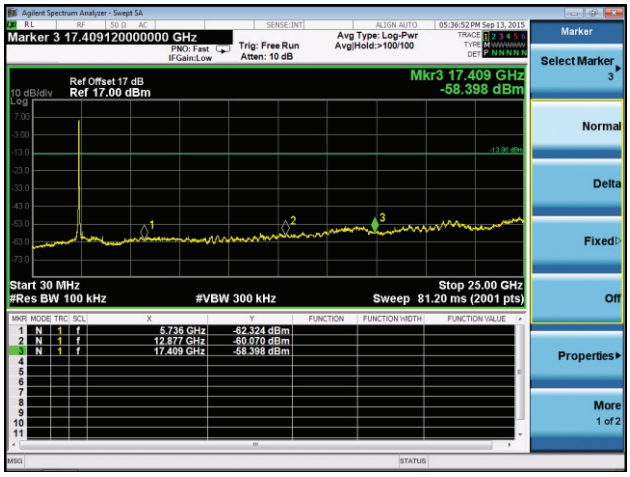
Channel 11 (2462MHz)	
100kHz PSD reference Level	**High Band Edge**
	
Spurious Emission 30MHz ~ 25GHz	
	

802.11g Out-of-Band Emissions

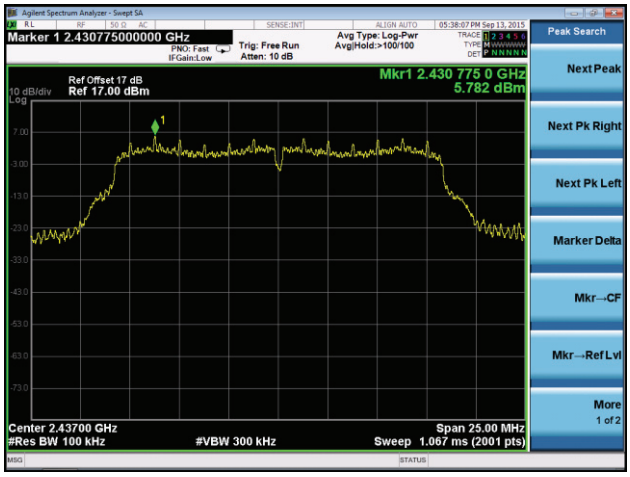
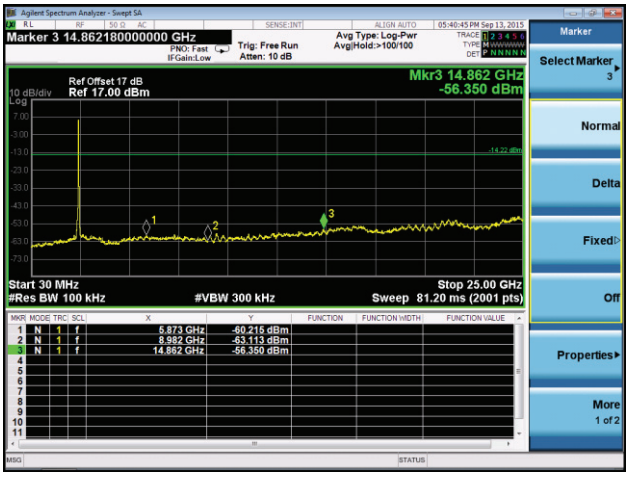
Channel 01 (2412MHz)

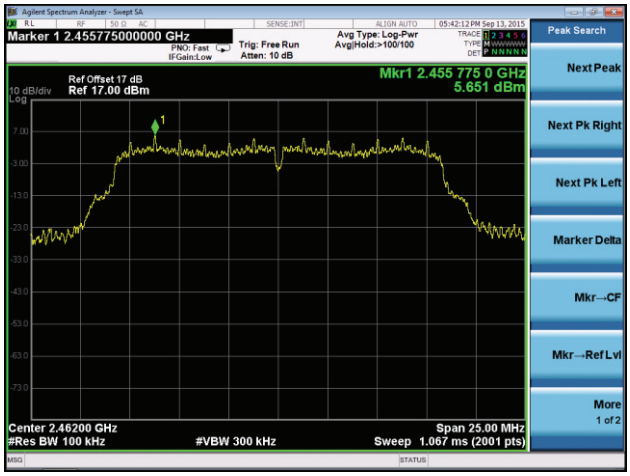
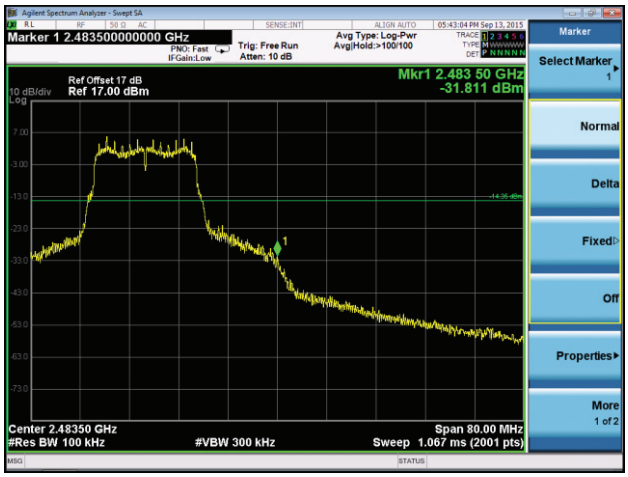
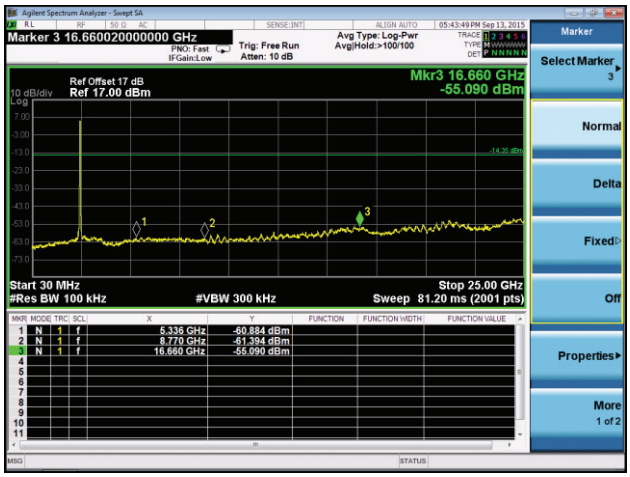
100kHz PSD reference Level	Low Band Edge
	

Spurious Emission 30MHz ~ 25GHz



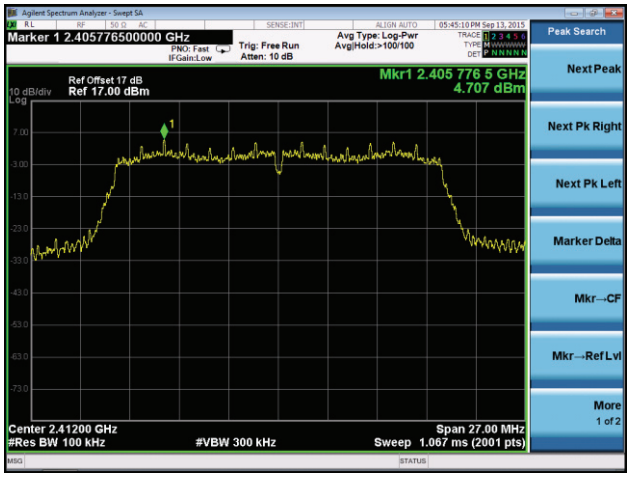
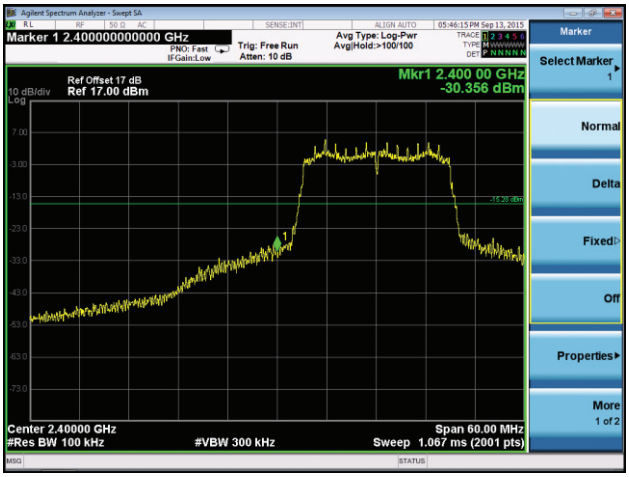
Channel 06 (2437MHz)

100kHz PSD reference Level	Spurious Emission 30MHz ~ 25GHz
	

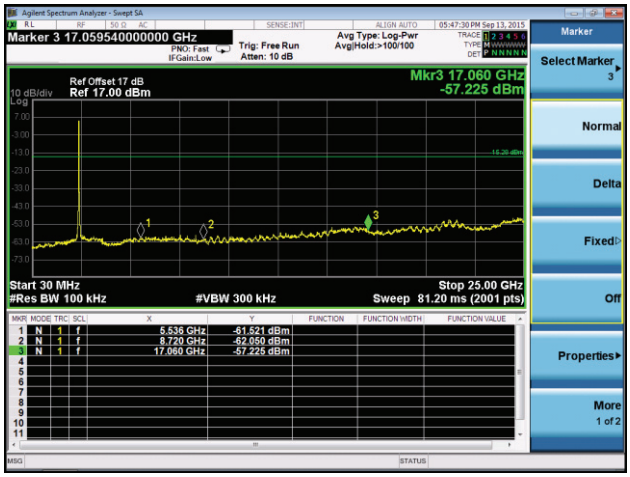
Channel 11 (2462MHz)	
100kHz PSD reference Level	**High Band Edge**
	
Spurious Emission 30MHz ~ 25GHz	
	

802.11n-HT20 Out-of-Band Emissions

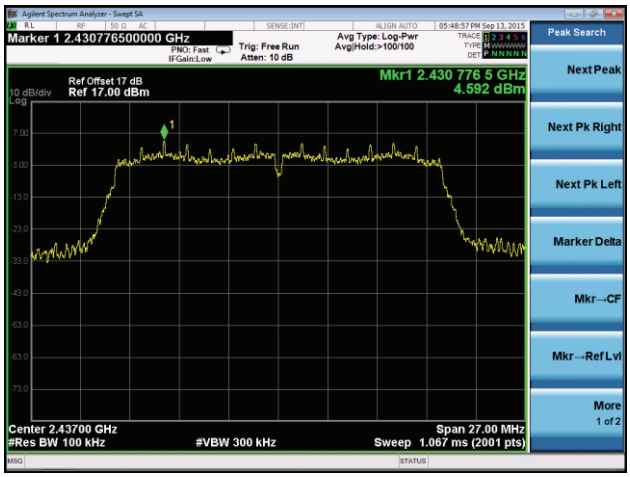
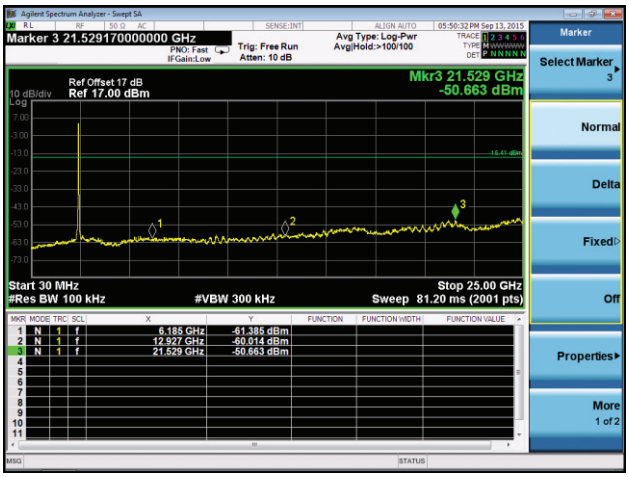
Channel 01 (2412MHz)

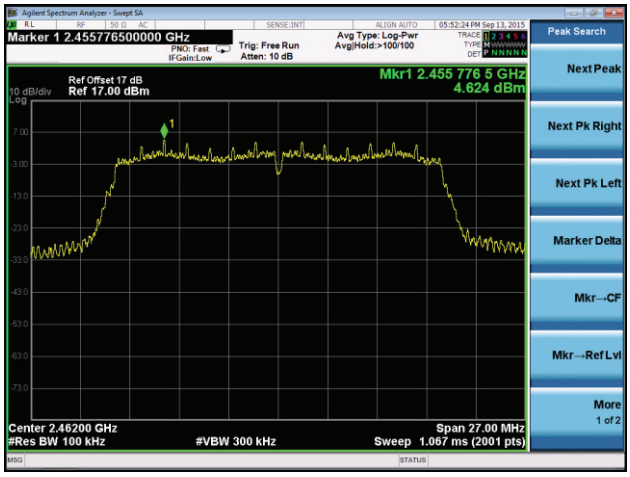
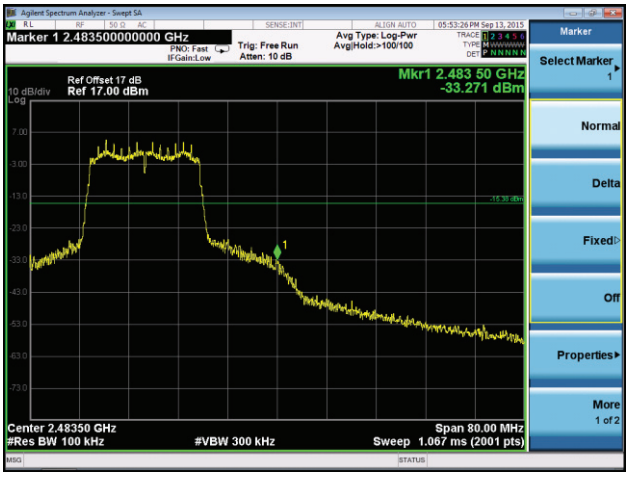
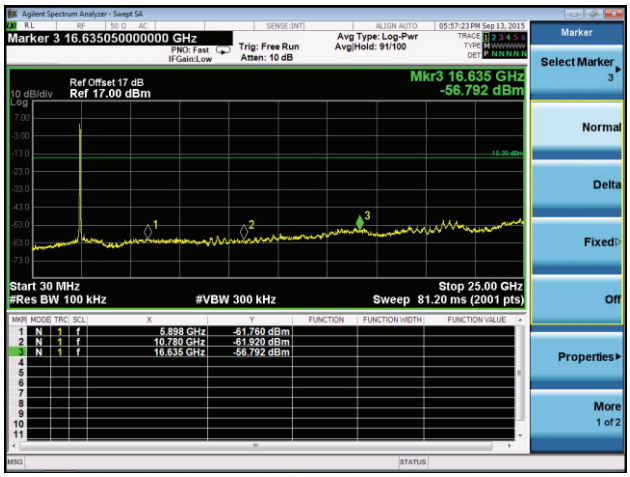
100kHz PSD reference Level	Low Band Edge
	

Spurious Emission 30MHz ~ 25GHz



Channel 06 (2437MHz)

100kHz PSD reference Level	Spurious Emission 30MHz ~ 25GHz
	

Channel 11 (2462MHz)	
100kHz PSD reference Level	**High Band Edge**
	
Spurious Emission 30MHz ~ 25GHz	
	

7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [V/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

KDB 558074 D01v03r03 - Section 12.2.3 (quasi-peak measurements)

KDB 558074 D01v03r03 - Section 12.2.4 (peak power measurements)

KDB 558074 D01v03r03 - Section 12.2.5 (average power measurements) & ANSI C63.10 - 2013

7.6.3. Test Setting

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 D01v03r03

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple

6. Trace mode = max hold

7. Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.1 of KDB 558074 D01v03r03

1. RBW = 1MHz.

2. VBW ≥ 3 x RBW.

3. Detector = RMS, if span/(# of points in sweep) ≤ (RBW/2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

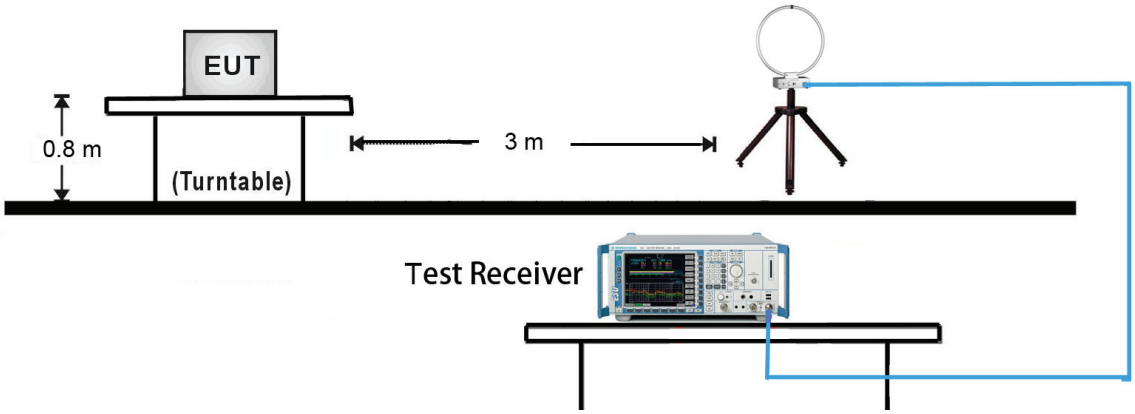
4. Averaging type = power (*i.e.*, RMS).
   - As an alternative, the detector and averaging type may be set for linear voltage averaging.
   - Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

5. Sweep time = auto.

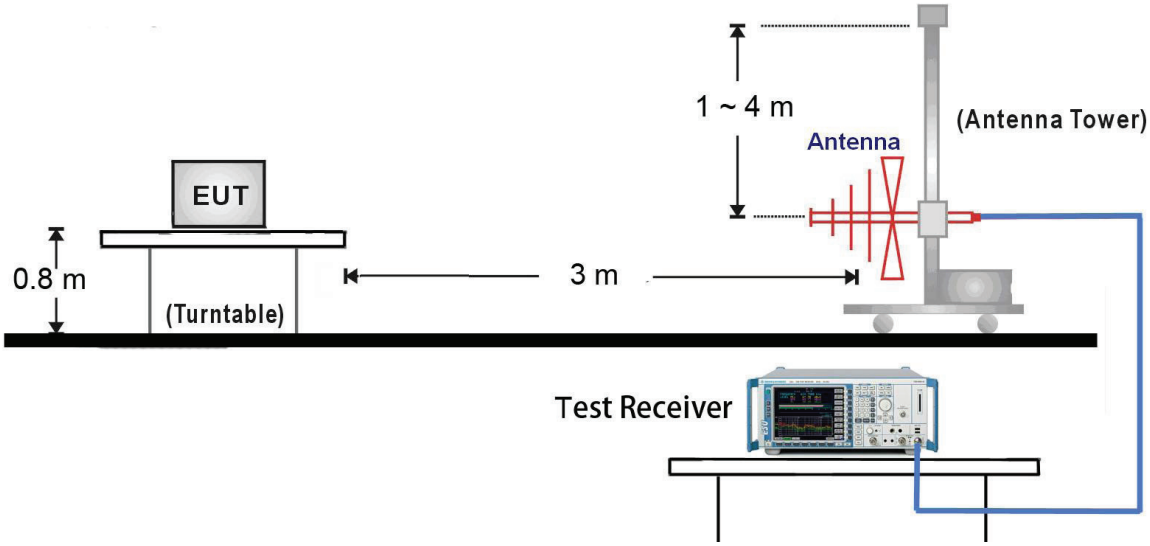
6. Perform a trace average of at least 100 traces.

7.6.4. Test Setup

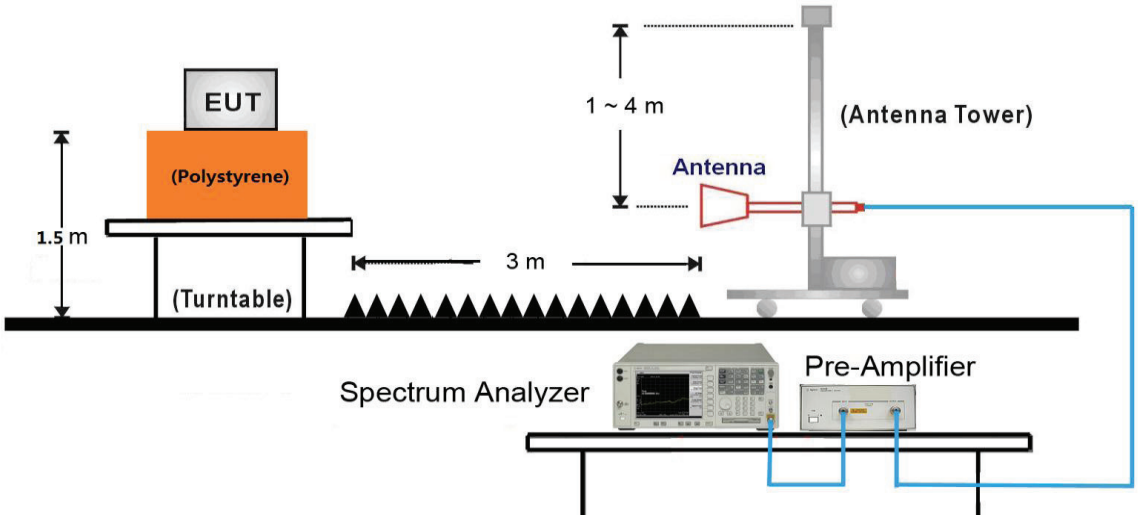
9kHz ~ 30MHz Test Setup:



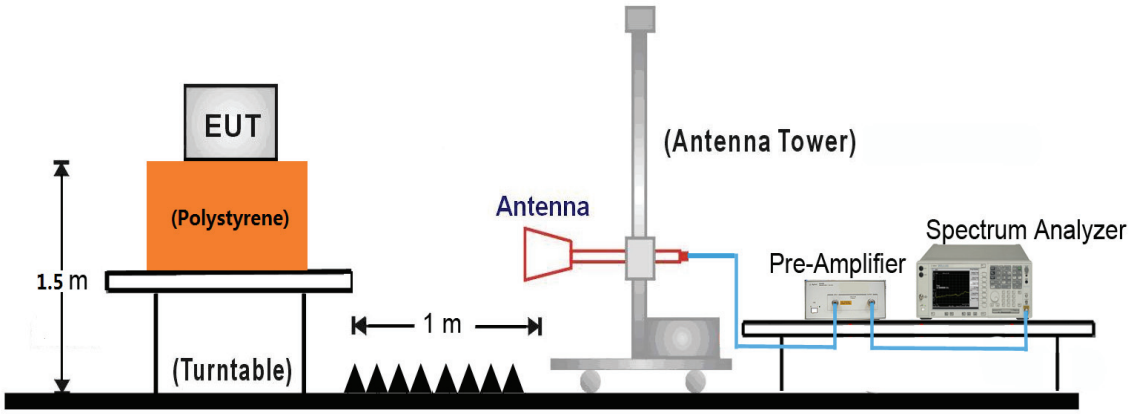
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~25GHz Test Setup:



7.6.5. Test Result

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	01	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	2447.0	38.0	-3.8	34.2	82.5	-48.3	Peak	Horizontal
*	4412.0	36.6	1.4	38.0	82.5	-44.5	Peak	Horizontal
	4965.0	35.7	2.9	38.7	74.0	-35.3	Peak	Horizontal
	5377.0	35.6	3.0	38.6	74.0	-35.4	Peak	Horizontal
*	2552.0	36.8	-3.5	33.3	82.5	-49.2	Peak	Vertical
*	4488.0	35.7	1.6	37.3	82.5	-45.2	Peak	Vertical
	4775.0	35.7	2.6	38.3	74.0	-35.7	Peak	Vertical
	5388.0	34.1	3.1	37.2	74.0	-36.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.5dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	06	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3525.0	37.0	-1.0	36.0	82.3	-46.3	Peak	Horizontal
*	4495.0	35.0	1.6	36.6	82.3	-45.7	Peak	Horizontal
	4777.0	35.3	2.7	38.0	74.0	-36.0	Peak	Horizontal
	5422.0	34.5	3.3	37.8	74.0	-36.2	Peak	Horizontal
*	3529.0	37.6	-1.0	36.6	82.3	-45.7	Peak	Vertical
*	4462.0	36.1	1.5	37.6	82.3	-44.7	Peak	Vertical
	4889.0	35.4	2.7	38.1	74.0	-35.9	Peak	Vertical
	5429.0	34.5	3.3	37.8	74.0	-36.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.3dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11b	Test Site:	AC1
Test Channel:	11	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3546.0	36.5	-0.9	35.6	82.1	-46.5	Peak	Horizontal
*	4474.0	34.8	1.6	36.4	82.1	-45.7	Peak	Horizontal
	4815.0	33.6	2.7	36.3	74.0	-37.7	Peak	Horizontal
	5400.0	33.7	3.1	36.8	74.0	-37.2	Peak	Horizontal
*	3496.0	36.0	-1.1	34.9	82.1	-47.2	Peak	Vertical
*	4477.0	35.4	1.6	37.0	82.1	-45.1	Peak	Vertical
	4926.0	33.8	2.8	36.6	74.0	-37.4	Peak	Vertical
	5451.0	33.8	3.4	37.2	74.0	-36.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.1dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	01	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3529.0	38.5	-1.0	37.5	86.5	-49.0	Peak	Horizontal
*	4415.0	35.2	1.4	36.6	86.5	-49.9	Peak	Horizontal
	4646.0	35.3	2.1	37.4	74.0	-36.6	Peak	Horizontal
	5442.0	34.6	3.4	38.0	74.0	-36.0	Peak	Horizontal
*	3462.0	37.9	-1.4	36.5	86.5	-50.0	Peak	Vertical
*	4458.0	34.8	1.5	36.3	86.5	-50.2	Peak	Vertical
	4928.0	34.9	2.8	37.7	74.0	-36.3	Peak	Vertical
	5441.0	34.6	3.4	38.0	74.0	-36.0	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (106.5dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	06	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3518.0	37.0	-1.0	36.0	85.6	-49.6	Peak	Horizontal
*	4425.0	34.0	1.4	35.4	85.6	-50.2	Peak	Horizontal
	4814.0	34.8	2.7	37.5	74.0	-36.5	Peak	Horizontal
	5358.0	34.1	3.0	37.1	74.0	-36.9	Peak	Horizontal
*	3529.0	37.9	-1.0	36.9	85.6	-48.7	Peak	Vertical
*	4469.0	34.8	1.6	36.4	85.6	-49.2	Peak	Vertical
	4824.0	35.8	2.7	38.5	74.0	-35.5	Peak	Vertical
	5399.0	34.7	3.1	37.8	74.0	-36.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.6dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11g	Test Site:	AC1
Test Channel:	11	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3526.0	36.8	-1.0	35.8	84.7	-48.9	Peak	Horizontal
*	4419.0	34.5	1.4	35.9	84.7	-48.8	Peak	Horizontal
	4925.0	34.7	2.8	37.5	74.0	-36.5	Peak	Horizontal
	5377.0	36.0	3.0	39.0	74.0	-35.0	Peak	Horizontal
*	3529.0	36.3	-1.0	35.3	84.7	-49.4	Peak	Vertical
*	4421.0	34.8	1.4	36.2	84.7	-48.5	Peak	Vertical
	4958.0	33.8	2.9	36.7	74.0	-37.3	Peak	Vertical
	5392.0	34.2	3.1	37.3	74.0	-36.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (104.7dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	01	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3515.0	37.1	-1.1	36.0	83.5	-47.5	Peak	Horizontal
*	4416.0	34.7	1.4	36.1	83.5	-47.4	Peak	Horizontal
	4718.0	34.8	2.4	37.2	74.0	-36.8	Peak	Horizontal
	5395.0	34.8	3.1	37.9	74.0	-36.1	Peak	Horizontal
*	3526.0	36.9	-1.0	35.9	83.5	-47.6	Peak	Vertical
*	4419.0	33.9	1.4	35.3	83.5	-48.2	Peak	Vertical
	4952.0	33.7	2.9	36.6	74.0	-37.4	Peak	Vertical
	5359.0	33.3	3.0	36.3	74.0	-37.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.5dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	06	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3529.0	37.5	-1.0	36.5	83.0	-46.5	Peak	Horizontal
*	4419.0	35.5	1.4	36.9	83.0	-46.1	Peak	Horizontal
	4952.0	34.7	2.9	37.6	74.0	-36.4	Peak	Horizontal
	5386.0	33.9	3.0	36.9	74.0	-37.1	Peak	Horizontal
*	3529.0	38.6	-1.0	37.6	83.0	-45.4	Peak	Vertical
*	4429.0	34.6	1.5	36.1	83.0	-45.9	Peak	Vertical
	4935.0	36.0	2.8	38.8	74.0	-35.2	Peak	Vertical
	5392.0	34.2	3.1	37.3	74.0	-36.7	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.0dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	11	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3419.0	37.3	-1.6	35.7	82.6	-46.9	Peak	Horizontal
*	4416.0	35.0	1.4	36.4	82.6	-46.2	Peak	Horizontal
	4828.0	36.8	2.7	39.5	74.0	-34.5	Peak	Horizontal
	5362.0	33.6	3.0	36.6	74.0	-37.4	Peak	Horizontal
*	3515.0	37.6	-1.1	36.5	82.6	-46.1	Peak	Vertical
*	4415.0	34.0	1.4	35.4	82.6	-47.2	Peak	Vertical
	4925.0	33.7	2.8	36.5	74.0	-37.5	Peak	Vertical
	5362.0	34.6	3.0	37.6	74.0	-36.4	Peak	Vertical

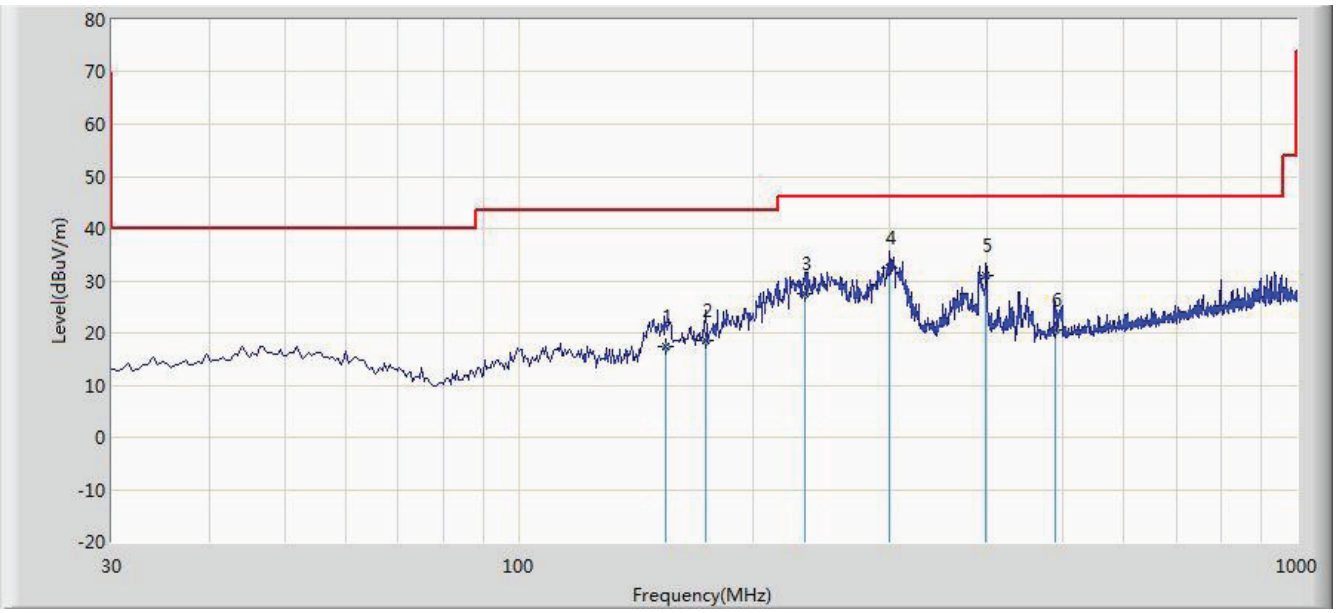
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (102.6dBμV/m).

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The worst case of Radiated Emission below 1GHz:

Site: AC 1	Time: 2015/09/30 - 16:13
Limit: FCC_Part15.209_RE(3m)	Engineer: Peak Wang
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Audio Conference Phone	Power: AC 120V/60Hz
Worse Case Mode: Transmit at Channel 2437MHz by 802.11b	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			154.250	17.499	7.900	-26.001	43.500	9.598	QP
2			174.200	18.533	8.090	-24.967	43.500	10.443	QP
3			233.240	27.496	14.360	-18.504	46.000	13.136	QP
4		*	299.845	32.418	17.910	-13.582	46.000	14.508	QP
5			398.203	30.919	14.300	-15.081	46.000	16.619	QP
6			490.310	20.701	2.630	-25.299	46.000	18.072	QP

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)