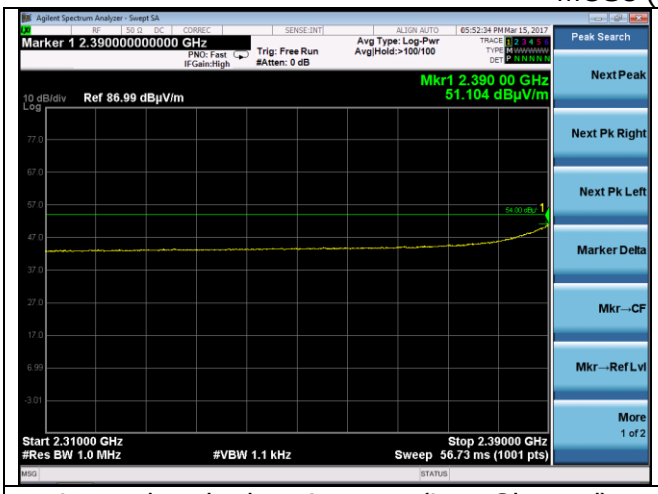
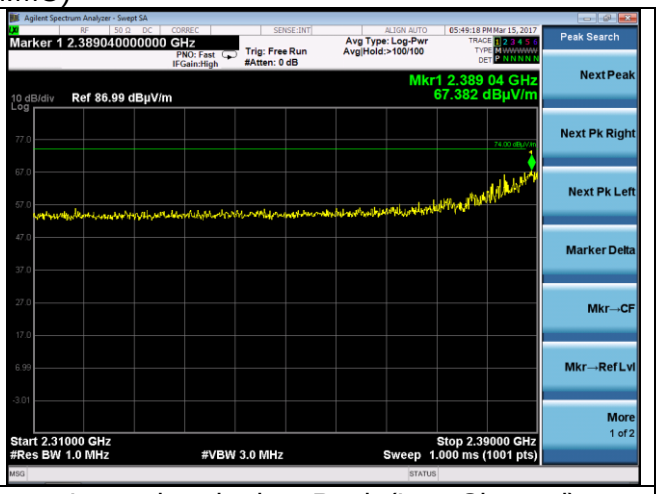
2310 to 2390 MHz, 3m distance
MCS8 (MIMO)

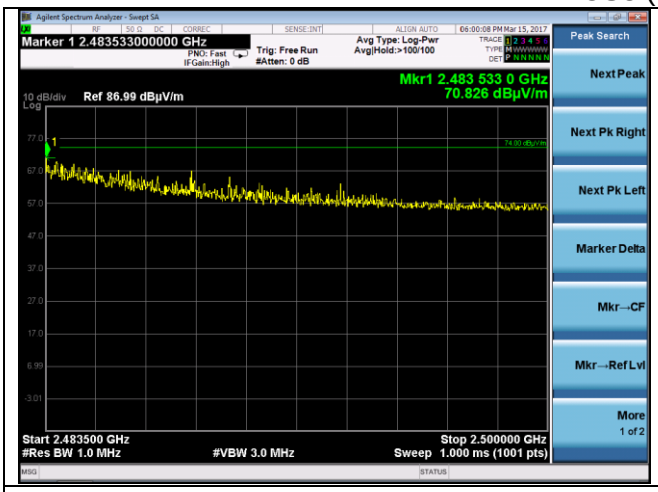


Lower band edge, Average (Low Channel)

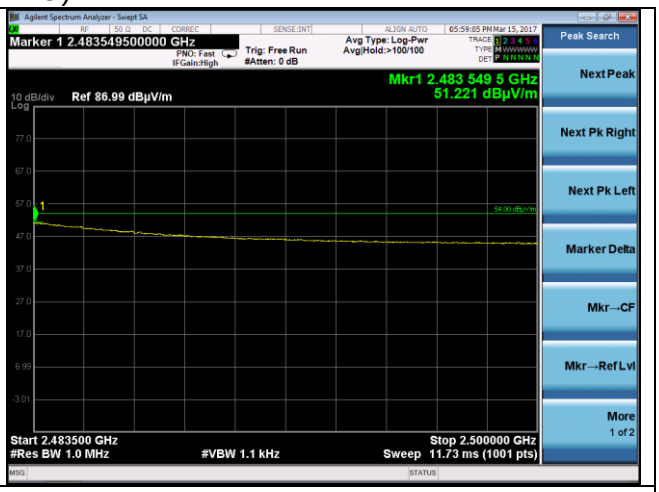


Lower band edge, Peak (Low Channel)

2483.5 to 2500 MHz Restricted band
MCS8 (MIMO)



Upper band edge, Peak (High Channel)



Upper band edge, Average (High Channel)

Data Tables

Lower Band-Edge

Data Rate (Mbps)	Peak Frequency (MHz)	Peak Measurement (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Average Frequency (MHz)	Average Measurement (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
1	2385.68	54.94	74.00	19.06	2386.56	44.37	54.00	9.64
6	2388.16	66.54	74.00	7.46	2390.00	47.58	54.00	6.42
11	2388.72	56.46	74.00	17.54	2387.84	44.93	54.00	9.07
54	2390.00	64.70	74.00	9.30	2388.96	48.50	54.00	5.50
6.5	2389.60	67.39	74.00	6.61	2389.92	49.01	54.00	4.99
65	2389.60	63.95	74.00	10.05	2389.68	46.91	54.00	7.09
78	2389.04	67.38	74.00	6.62	2390.00	51.10	54.00	2.90

Upper Band-Edge

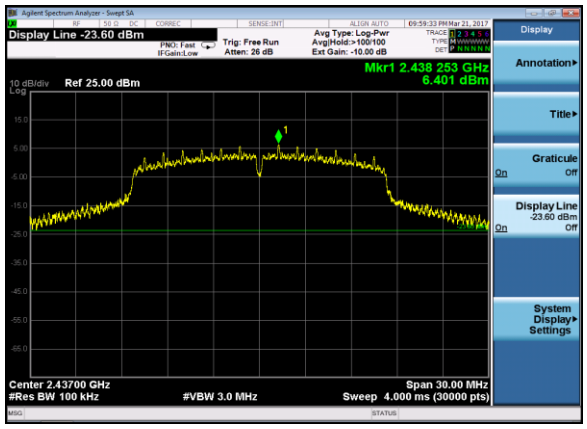
Data Rate (Mbps)	Peak Frequency (MHz)	Peak Measurement (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Average Frequency (MHz)	Average Measurement (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
1	2495.93	56.66	74.00	17.34	2393.84	47.15	54.00	6.85
6	2483.50	64.76	74.00	9.24	2483.58	47.69	54.00	6.32
11	2487.46	57.15	74.00	16.85	2485.94	46.02	54.00	7.99
54	2483.90	64.20	74.00	9.80	2483.60	48.26	54.00	5.74
6.5	2483.85	66.48	74.00	7.52	2483.50	49.28	54.00	4.72
65	2483.88	64.73	74.00	9.27	2483.55	47.08	54.00	6.92
78	2483.53	70.83	74.00	3.17	2483.55	51.22	54.00	2.78

Conducted Band Edge Reference Pictures

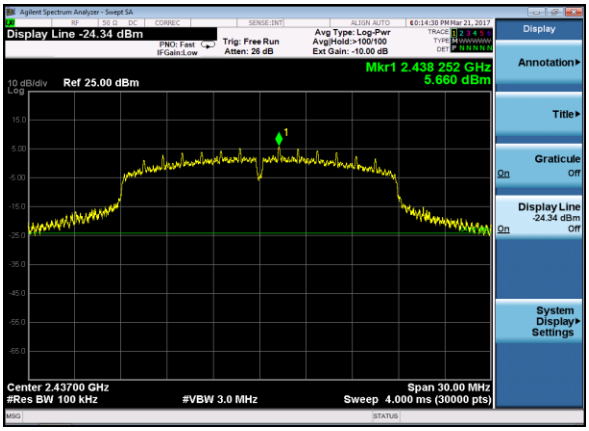
Refer to pictures below for reference point for emissions. Display lines on spurious pictures do not represent limit line.

1MBPS

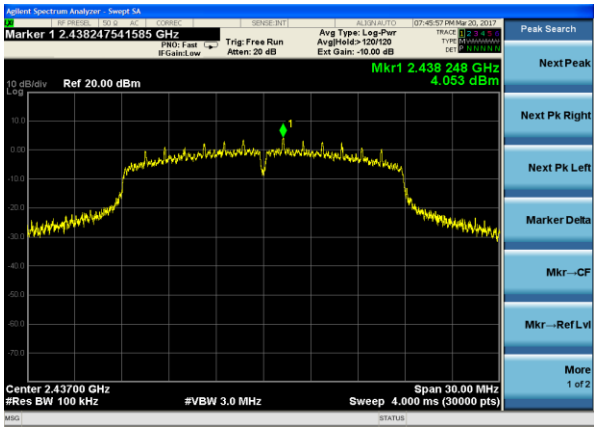
6MBPS



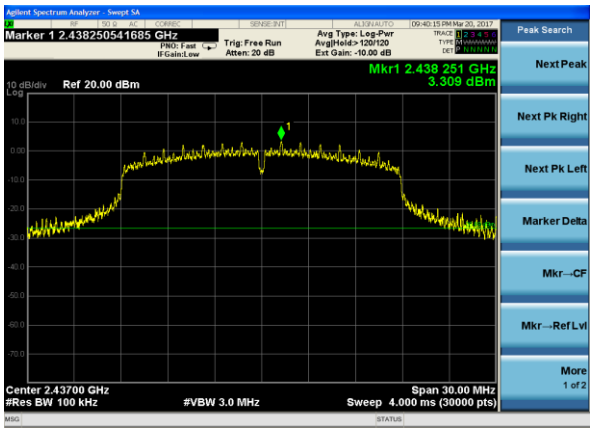
MCS0



MCS8

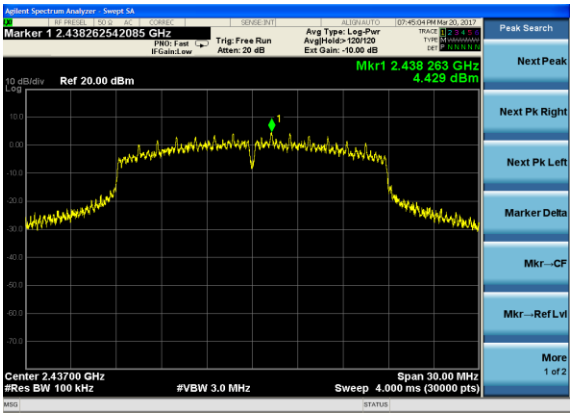


Ant. Port 1

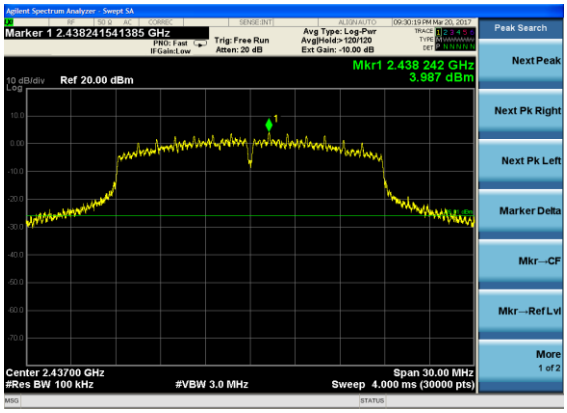


Ant. Port 2

MCS11

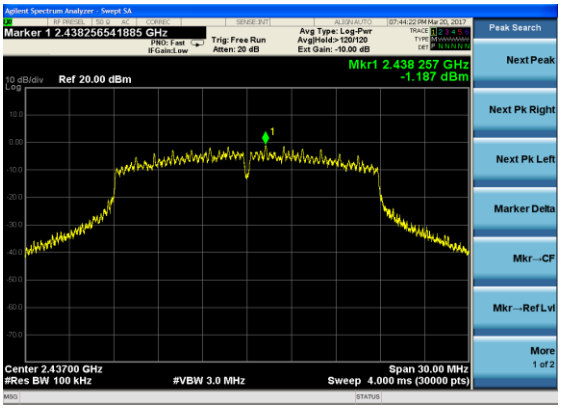


Ant. Port 1

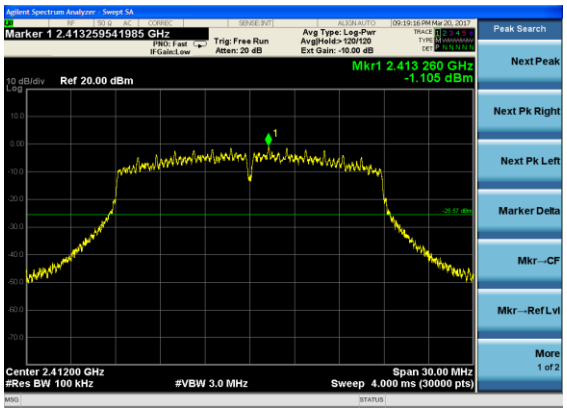


Ant. Port 2

MCS15



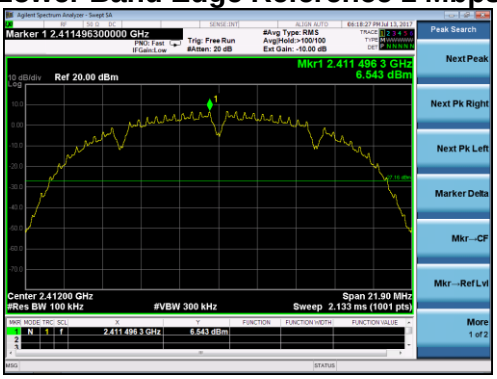
Ant. Port 1



Ant. Port 2

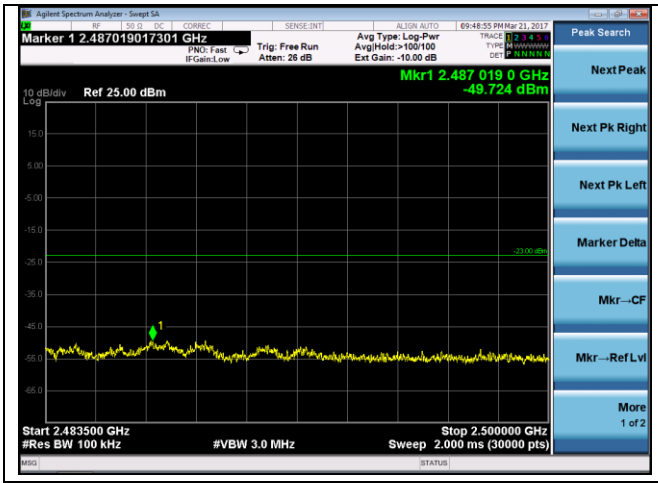
Band-edge in 100 kHz bandwidth (Conducted Band Edge)
Note: Limits shown are not Conducted Spurious limits.

Lower Band Edge Reference 1 Mbps



Limit for lower band edge to be less than: 6.543 dBm (shown in above plot) – 30 dBc = -23.45 dB, as long as the lower band edge is less than the limit line the 30 dBc or greater criteria for spurious emissions in 100 kHz BW is met.

WLAN
1MBPS



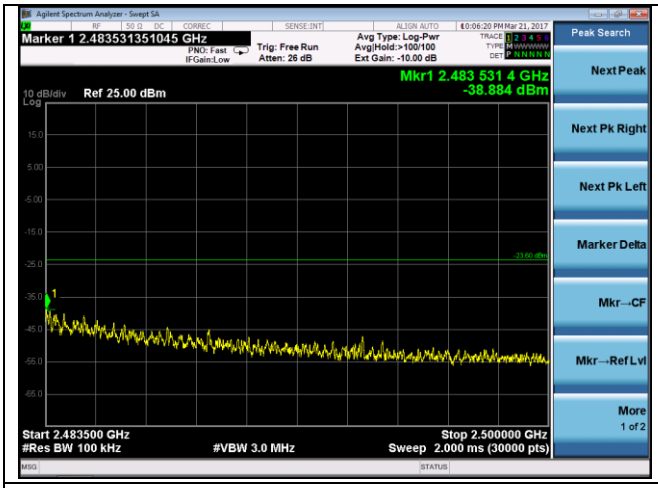
Upper band-edge (High)

Lower band-edge (Low)

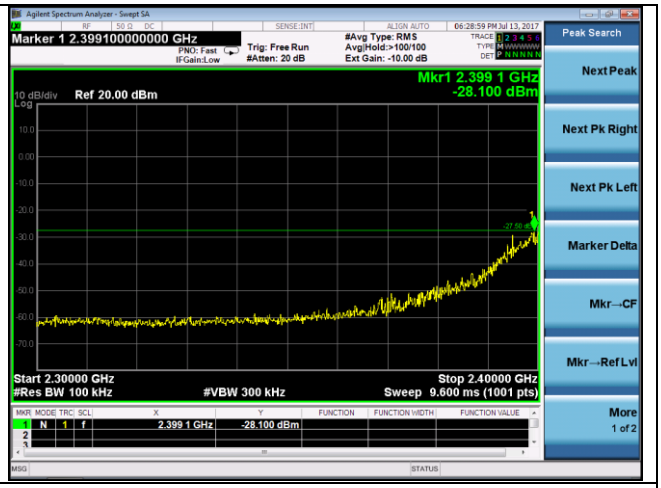
Lower Band Edge Reference 6 Mbps

Limit for lower band edge to be less than: 2.499 dBm (shown in above plot) – 30 dBc = -27.50 dB, as long as the lower band edge is less than the limit line the 30 d23Bc or greater criteria for spurious emissions in 100 kHz BW is met.

6MBPS

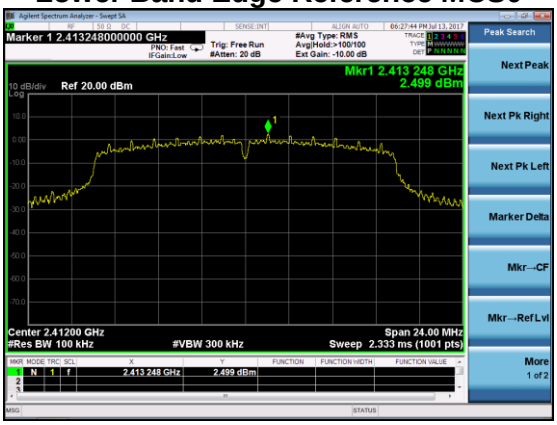


Upper band-edge (High)



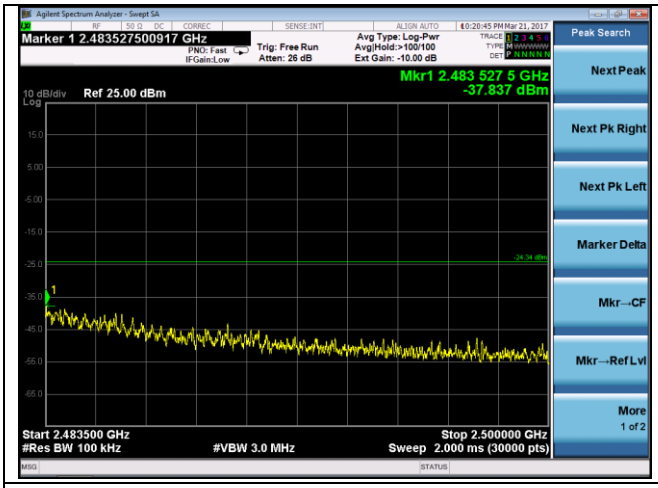
Lower band-edge (Low)

Lower Band Edge Reference MCS0

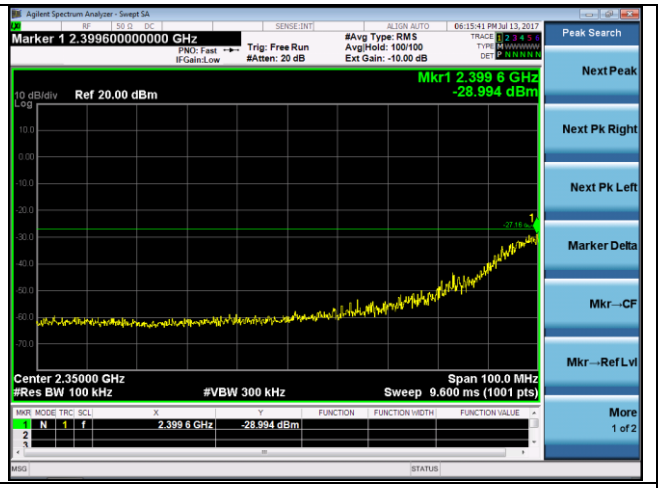


Limit for lower band edge to be less than: 2.832 dBm (shown in above plot) – 30 dBc = -27.16 dB, as long as the lower band edge is less than the limit line the 30 dBc or greater criteria for spurious emissions in 100 kHz BW is met.

MCS0



Upper band-edge (High)

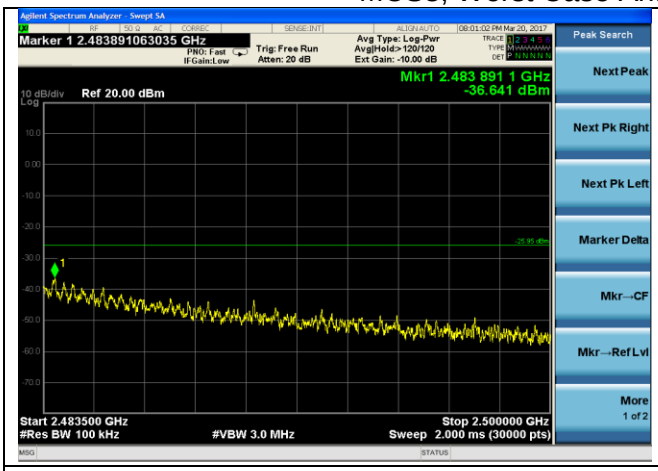
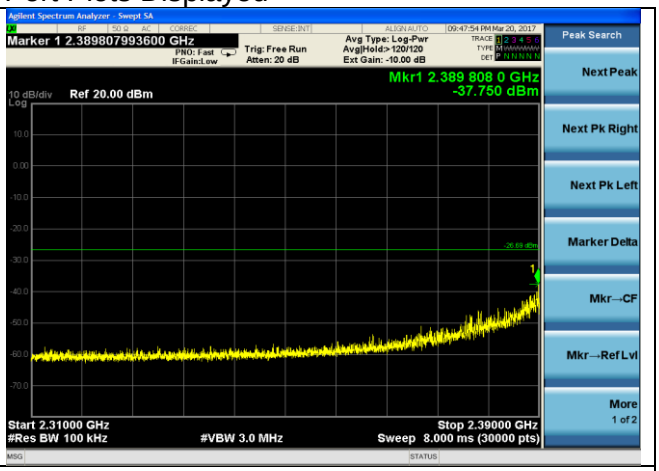


Lower band-edge (Low)

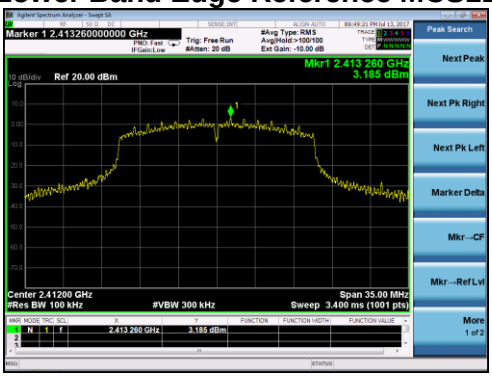
Lower Band Edge Reference MCS8

Limit for lower band edge to be less than: 2.729 dBm (shown in above plot) – 30 dBc = -27.27 dB, as long as the lower band edge is less than the limit line the 30 dBc or greater criteria for spurious emissions in 100 kHz BW is met.

MCS8, Worst Case Ant. Port Plots Displayed

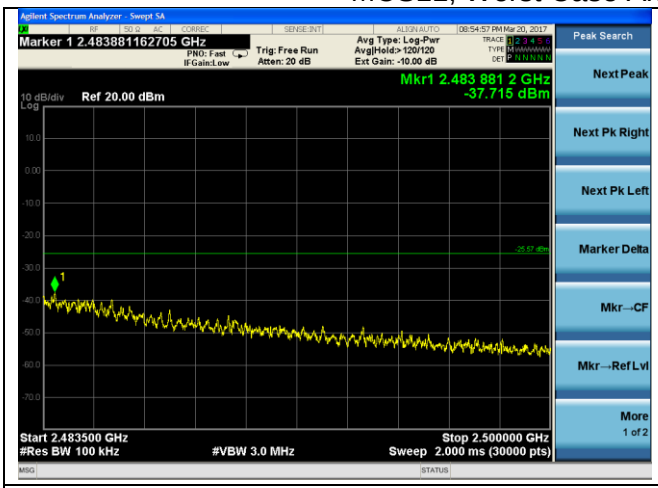
	
Upper band-edge (High)	Lower band-edge (Low)

Lower Band Edge Reference MCS11

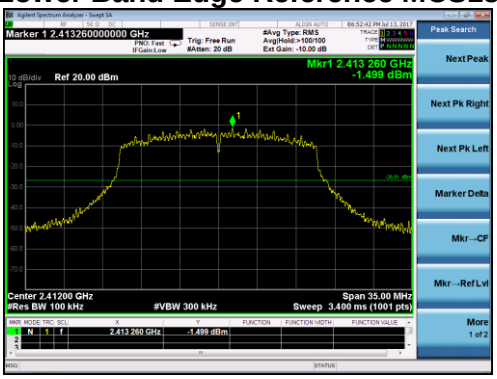


Limit for lower band edge to be less than: 3.185 dBm (shown in above plot) – 30 dBc = -26.84 dB, as long as the lower band edge is less than the limit line the 30 dBc or greater criteria for spurious emissions in 100 kHz BW is met.

MCS11, Worst Case Ant. Port Plots Displayed

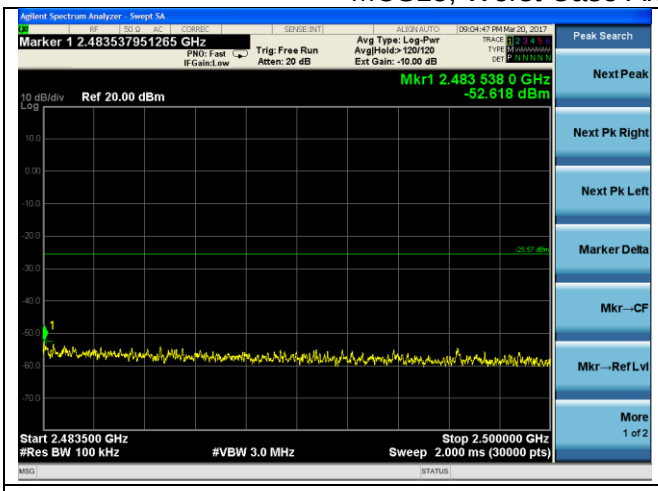
	
Upper band-edge (High)	Lower band-edge (Low)

Lower Band Edge Reference MCS15



Limit for lower band edge to be less than: -1.499 dBm (shown in above plot) – 30 dBc = -31.50 dB, as long as the lower band edge is less than the limit line the 30 dBc or greater criteria for spurious emissions in 100 kHz BW is met.

MCS15, Worst Case Ant. Port Plots Displayed



Upper band-edge (High)

Lower band-edge (Low)

The Range 2300 – 2400 MHz for the complete lower band edge is now represented by the following table:

Data Rate	Frequency (MHz)	Measurement (dBm)	30 dBc Limit (dBm)	Margin (dB)
1 Mbps	2397.00	-36.22	-23.46	12.76
6 Mbps	2399.10	-28.10	-27.50	0.60
MCS0	2399.60	-28.99	-27.16	1.83
MCS8	2389.81	-37.75	-26.69	11.06
MCS11	2398.90	-29.78	-26.89	2.89
MCS15	2399.90	-40.39	-31.50	8.89

Note: The positive margins in the table above verifies that all peak emissions outside the authorized frequency band are at least 30 dB below the in-band peak PSD level in 100kHz BW.

EXHIBIT 9. POWER OUTPUT (CONDUCTED): 15.247(b)

Test Engineer(s): Shane Dock

9.1 - Method of Measurements

The conducted RF output power of the EUT was measured at the antenna port using a short RF cable along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings there by allowing direct measurements without the need for any further corrections. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source.

Measurement procedure used was FCC OET KDB 558074 D01 Measurement Guidance v04 section 9.2.2.4 for 1 Mbps and 9.2.2.6 for the other data rates.

9.2 - Test Data

The data reported includes all necessary correction factors. These correction factors are loaded onto the EMI receiver when measurements are performed.

Reported Measurement data = Raw receiver measurement (dBm) + Cable factor (dB) + Miscellaneous factors when applicable (dB).

Generic example of reported data at 2440 MHz:

Reported Measurement data = 8.55 (raw receiver measurement in dBm) + 0.85 (cable factor in dB) = 9.4 (dBm).

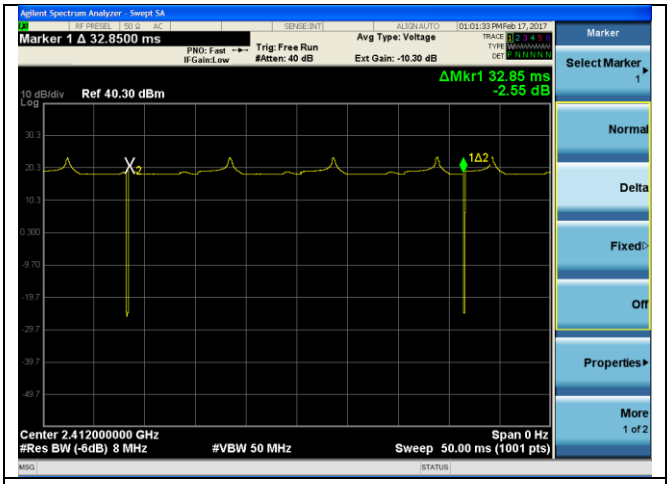
Peak Conducted Output Power Limit = 1 Watt (30 dBm).

9.2.1. Maximum Conducted Average Power:

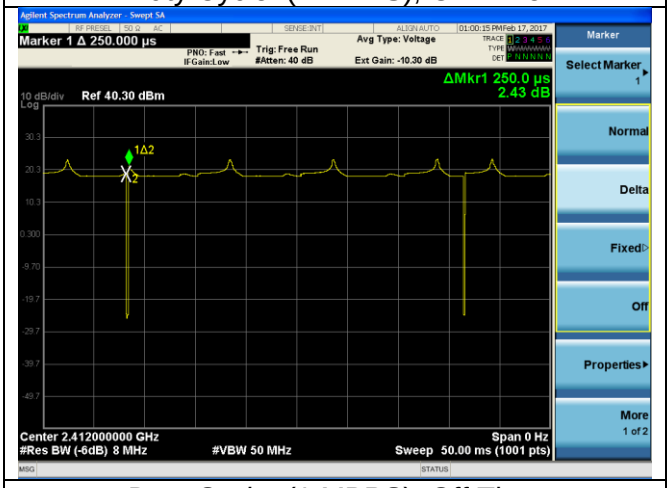
9.2.1.1 Duty cycle:

Measurement procedure: **FCC OET KDB 558074 D01 Measurement Guidance v04.**

Example scree captures:



Duty Cycle: (1 MBPS), On Time



Duty Cycle: (1 MBPS). Off Time

Duty Cycle Data for All Data Rates

Data Rate	Duty Cycle %
1 Mbps	99.24
6 Mbps	96.00
11 Mbps	93.50
54 Mbps	74.41
MCS0	95.60
MCS7	69.70
MCS8	76.38
MCS11	48.37
MCS15	31.52

9.2.1.2 Maximum conducted average output power:

Data

Data Rate (Mbps)	Channel (MHz)	Raw Average Power Measurement (dBm)	D.C. Correction (dB)	Final Average Power (dBm)
1	2412	15.02	0.00	15.02
1	2437	15.68	0.00	15.68
1	2462	15.87	0.00	15.87
6	2412	12.02	0.18	12.20
6	2437	15.36	0.18	15.54
6	2462	12.76	0.18	12.94
11	2412	14.90	0.29	15.19
11	2437	15.48	0.29	15.77
11	2462	15.65	0.29	15.94
54	2412	10.33	1.28	11.61
54	2437	10.93	1.28	12.21
54	2462	11.10	1.28	12.38
6.5	2412	12.11	0.20	12.31
6.5	2437	14.66	0.20	14.86
6.5	2462	12.99	0.20	13.19
65	2412	9.10	1.57	10.67
65	2437	9.64	1.57	11.21
65	2462	9.86	1.57	11.43

Measurement procedure for MIMO Output Power: **FCC OET KDB 662911 D01 Measurement Guidance v02r01.**

MCS8	Channel		
	Low	Mid	High
Port 1 (dBm)	10.642	12.286	11.489
Port 2 (dBm)	11.637	12.370	11.447
DC Correction (dBm)	1.170	1.170	1.170
Corrected Port 1 (dBm)	11.812	13.456	12.659
Corrected Port 2 (dBm)	12.807	13.540	12.617
Port 1 (mW)	15.177	22.162	18.446
Port 2 (mW)	19.085	22.594	18.268
Sum (mW)	34.263	44.756	36.714
Sum (dBm)	15.348	16.509	15.648

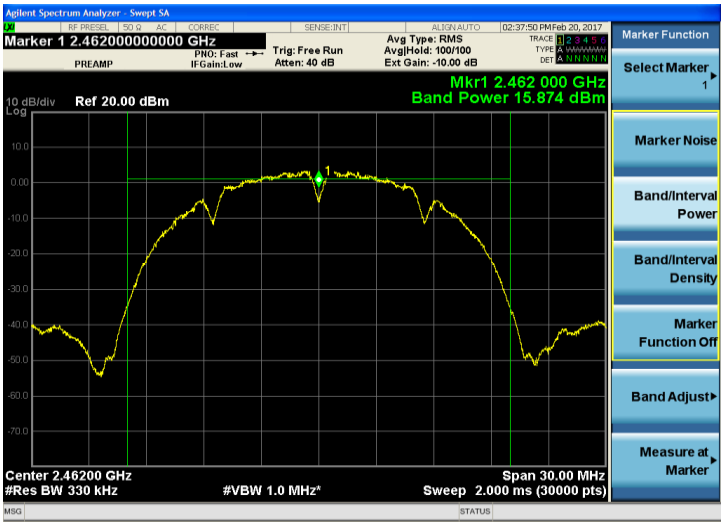
MCS11	Channel		
	Low	Mid	High
Port 1 (dBm)	9.469	10.797	10.237
Port 2 (dBm)	10.003	10.758	9.676
DC Correction (dBm)	3.161	3.161	3.161
Corrected Port 1 (dBm)	12.630	13.958	13.398
Corrected Port 2 (dBm)	13.164	13.919	12.837
Port 1 (mW)	18.323	24.877	21.868
Port 2 (mW)	20.720	24.655	19.218
Sum (mW)	39.044	49.532	41.085
Sum (dBm)	15.916	16.949	16.137

MCS15	Channel		
	Low	Mid	High
Port 1 (dBm)	3.271	3.632	3.922
Port 2 (dBm)	4.014	3.686	3.225
DC Correction (dBm)	5.015	5.015	5.015
Corrected Port 1 (dBm)	8.286	8.647	8.937
Corrected Port 2 (dBm)	9.029	8.701	8.240
Port 1 (mW)	6.739	7.323	7.829
Port 2 (mW)	7.997	7.415	6.668
Sum (mW)	14.736	14.738	14.497
Sum (dBm)	11.684	11.684	11.613

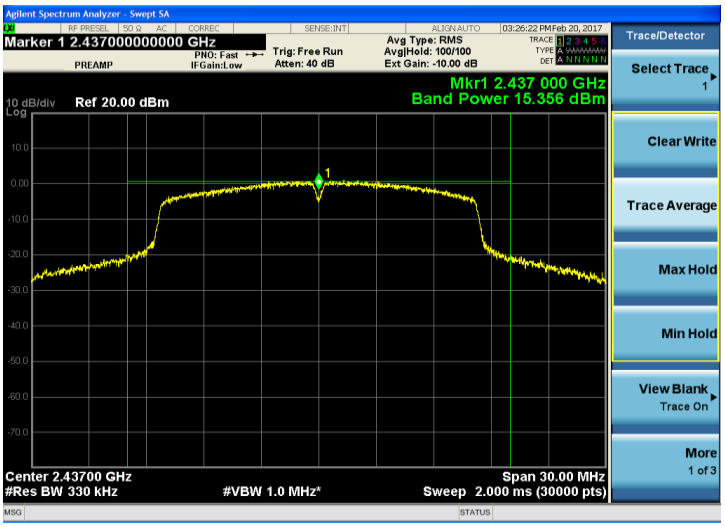
Example Screenshots

Note: Worst case channel shown, worst case port and channel shown for MIMO.

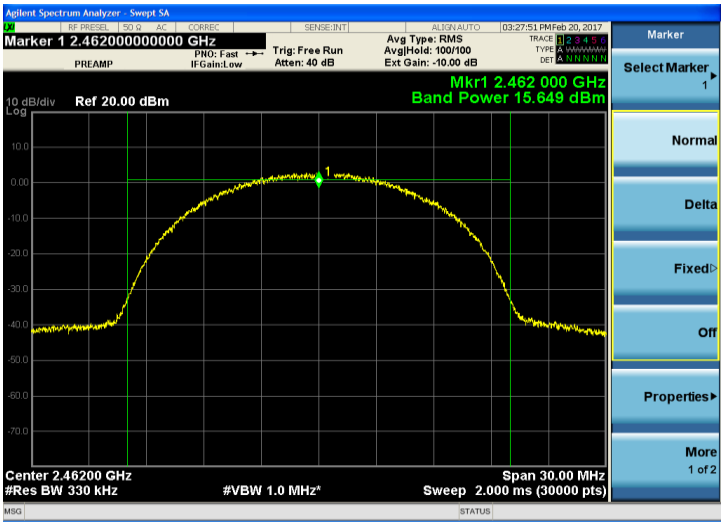
1MBPS



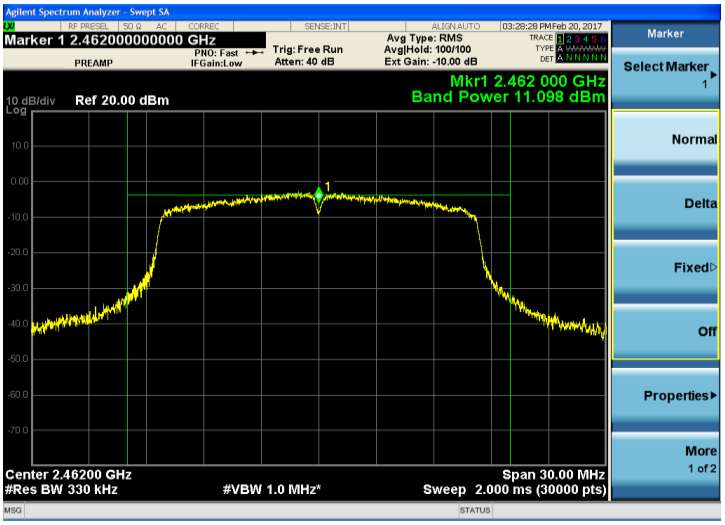
6 MBPS



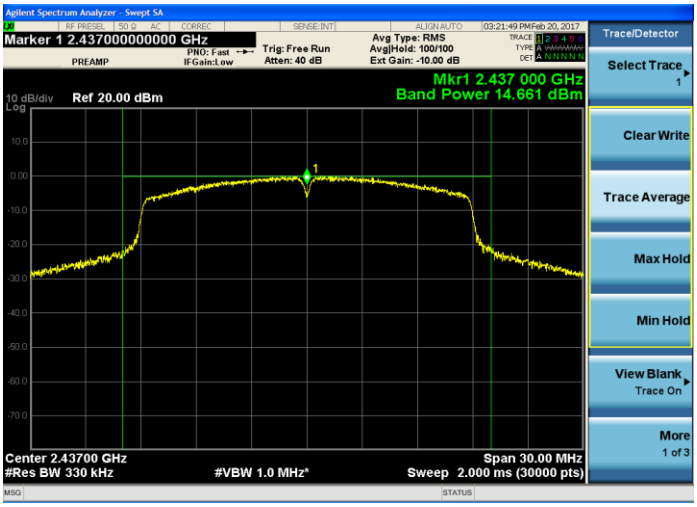
11 MBPS


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.462000000000 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
03:27:51 PM Feb 20, 2017
Mkr1 2.462 000 GHz
Band Power 15.649 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.46200 GHz
#Res BW 330 kHz
#VBW 1.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

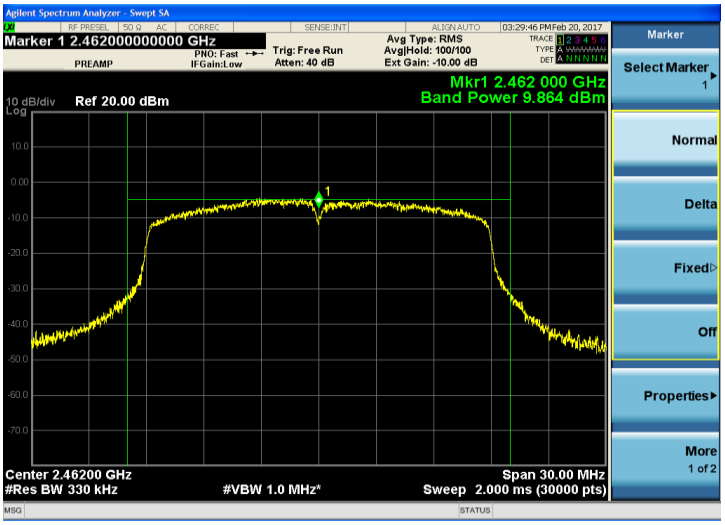
54 MBPS


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.462000000000 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
03:28:28 PM Feb 20, 2017
Mkr1 2.462 000 GHz
Band Power 11.098 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.46200 GHz
#Res BW 330 kHz
#VBW 1.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

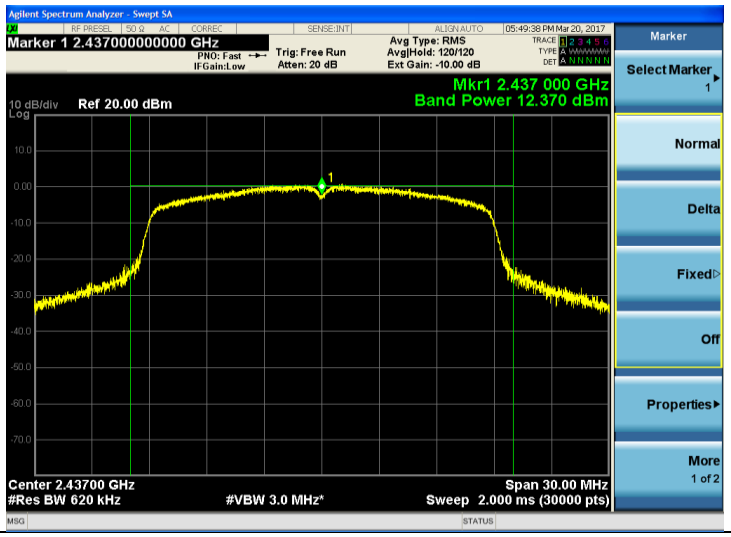
MCS0


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.437000000000 GHz
PNO: Fast
IFGain:Low
PREAMP
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
03:21:49 PM Feb 20, 2017
Mkr1 2.437 000 GHz
Band Power 14.661 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.43700 GHz
#Res BW 330 kHz
#VBW 1.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Trace/Detector
Select Trace 1
Clear Write
Trace Average
Max Hold
Min Hold
View Blank
Trace On
More
1 of 3

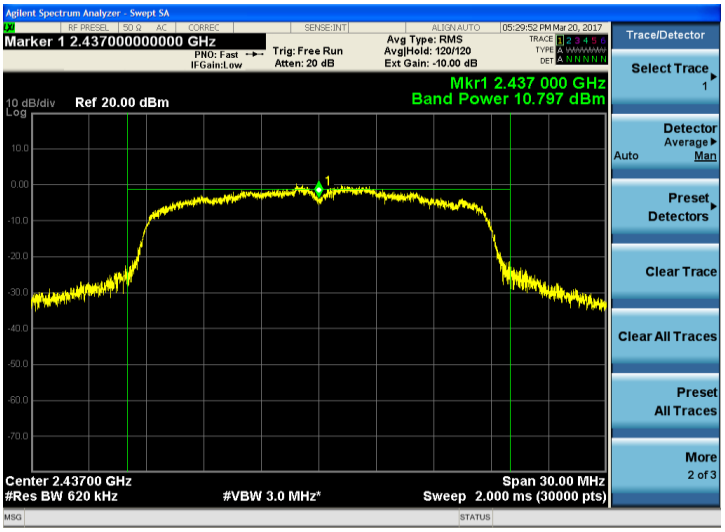
MCS7


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.462000000000 GHz
PNO: Fast
IFGain:Low
PREAMP
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
03:29:46 PM Feb 20, 2017
Mkr1 2.462 000 GHz
Band Power 9.864 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.46200 GHz
#Res BW 330 kHz
#VBW 1.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Marker
Select Marker 1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

MCS8


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.437000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: RMS
Avg|Hold: 120/120
Ext Gain: -10.00 dB
05:49:38 PM Mar 20, 2017
Mkr1 2.437 000 GHz
Band Power 12.370 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.43700 GHz
#Res BW 620 kHz
#VBW 3.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Marker
Select Marker 1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

MCS11


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.437000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: RMS
Avg|Hold: 120/120
Ext Gain: -10.00 dB
05:29:52 PM Mar 20, 2017
Mkr1 2.437 000 GHz
Band Power 10.797 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.43700 GHz
#Res BW 620 kHz
#VBW 3.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Trace/Detector
Select Trace 1
Detector Average
Auto
Man
Preset Detectors
Clear Trace
Clear All Traces
Preset All Traces
More 2 of 3

MCS15

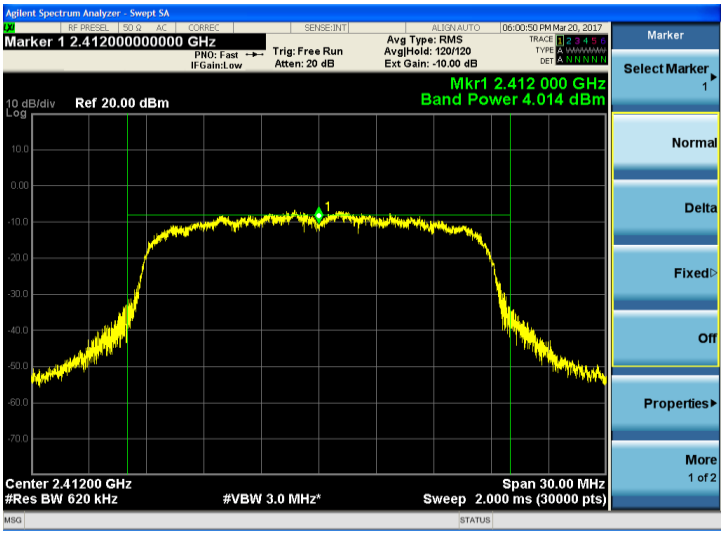

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.412000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: RMS
Avg|Hold: 120/120
Ext Gain: -10.00 dB
06:00:50 PM Mar 20, 2017
Mkr1 2.412 000 GHz
Band Power 4.014 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.41200 GHz
#Res BW 620 kHz
#VBW 3.0 MHz*
Span 30.00 MHz
Sweep 2.000 ms (30000 pts)
Marker
Select Marker 1
Normal
Delta
Fixed
Off
Properties
More 1 of 2

EXHIBIT 10. CONDUCTED SPURIOUS EMISSIONS: 15.247(d)

Test Engineer(s): Shane Dock

10.1 - Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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.

10.2 – Conducted Harmonic And Spurious RF Measurements

FCC Part 15.247(d) and IC RSS 247 both require a measurement of conducted harmonic and spurious RF emission levels, as reference to the carrier level when measured in a 100 kHz bandwidth. For this test, the spurious and harmonic RF emissions from the EUT were measured at the EUT antenna port using a short RF cable along with an attenuator as protection for the spectrum analyzer. The loss from the cable and the attenuator were added on the analyzer as gain offset settings, thereby allowing direct readings of the measurements made without the need for any further corrections. A spectrum analyzer was used with the resolution bandwidth set to 100 kHz for this portion of the tests. The unit was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. The spectrum analyzer was used with measurements from a peak detector presented in the chart below. Screen captures were acquired and any noticeable spurious and harmonic signals were identified and measured.

Measurement procedure used was FCC OET KDB 558074 D01 Measurement Guidance v04 section 11.

The data reported includes all necessary correction factors. These correction factors are loaded onto the EMI receiver when measurements are performed.

Reported Measurement data = Raw receiver measurement (dBm) + Cable factor (dB) + Miscellaneous factors when applicable (dB).

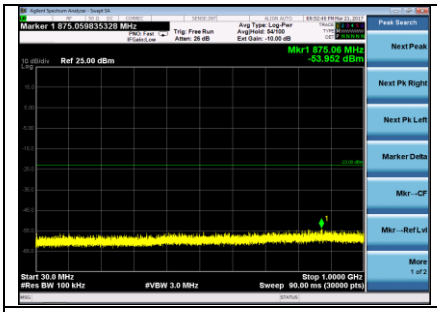
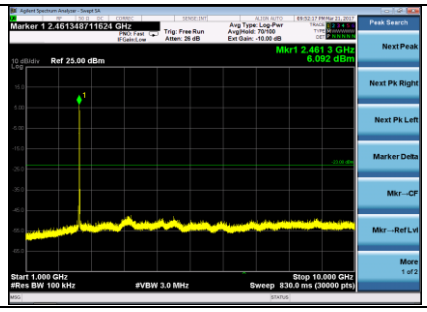
Generic example of reported data at 2440 MHz:

Reported Measurement data = 8.55 (raw receiver measurement in dBm) + 0.85 (cable factor in dB) = 9.4 (dBm).

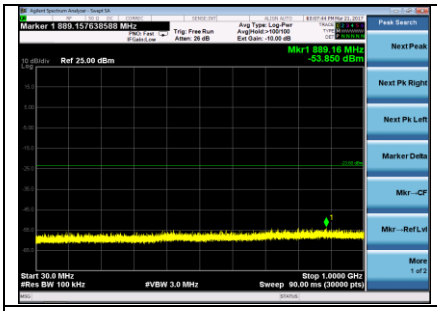
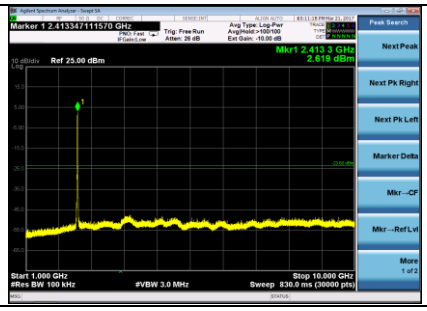
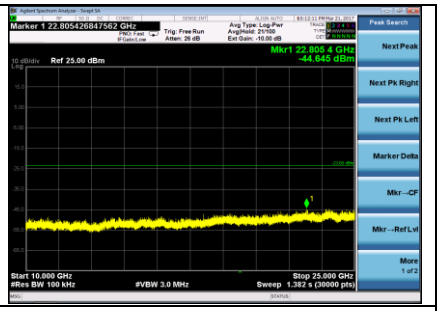
10.3 - Test Data

The data presented below are samples selected from the various data rates and channels tested (worst case emissions chosen). Display lines on captures do not represent limit lines, so refer to the fundamental picture for limits. Pictures below are samples.

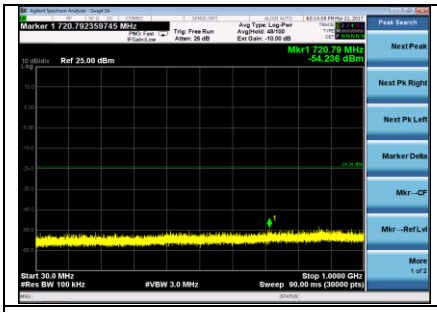
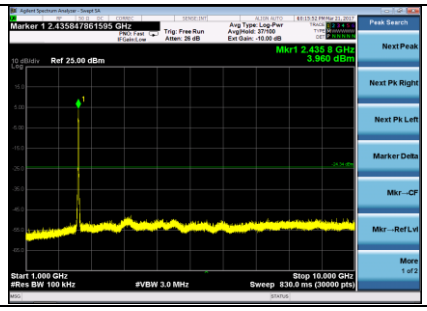
1 MBPS

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

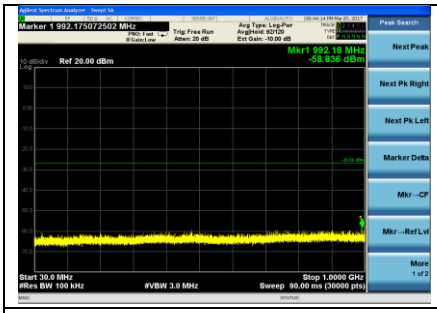
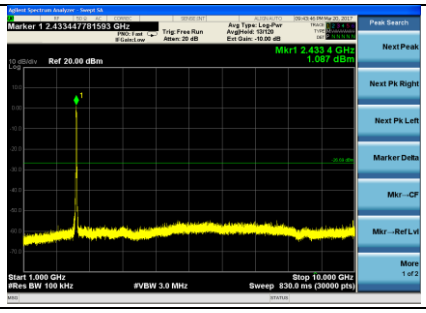
6 MBPS

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

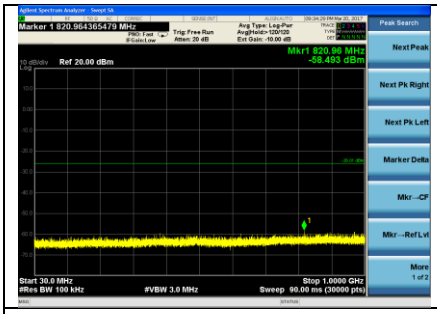
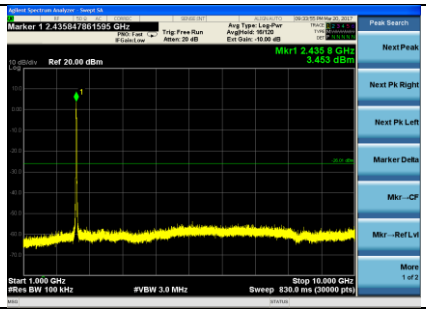
MCS0

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

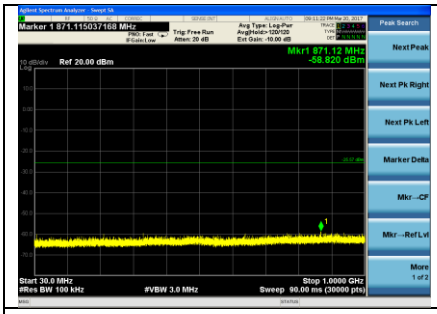
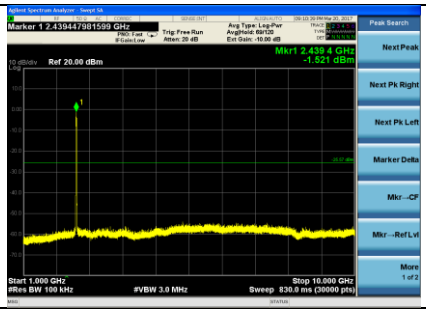
MCS8

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

MCS11

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

MCS15

		
30 to 1000 MHz	1000 to 10000 MHz	10000 to 25000 MHz

Note: All emissions are at least 15-20 dB below the limit.

EXHIBIT 11. POWER SPECTRAL DENSITIES: 15.247(e)

11.1 Limits

For digitally modulate 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.

In accordance with FCC Part 15.247(e) and RSS 247, the peak power spectral density should not exceed +8 dBm in any 3 kHz band. This measurement was performed along with the conducted power output readings as described in previous sections. The peak output frequency for each representative frequency was scanned, with a narrow bandwidth, and reduced sweep, and a power density measurement was performed.

Measurement procedure used was FCC OET KDB 558074 D01 Measurement Guidance v04 section 10.5 for 1 and 11 MBPS, 10.7 for other data rates.

The data reported includes all necessary correction factors. These correction factors are loaded onto the EMI receiver when measurements are performed.

Reported Measurement data = Raw receiver measurement (dBm) + Cable factor (dB) + Miscellaneous factors when applicable (dB).

Generic example of reported data at 2440 MHz:

Reported Measurement data = 8.55 (raw receiver measurement in dBm) + 0.85 (cable factor in dB) = 9.4 (dBm).

11.2 Test Data

Data Rate (Mbps)	Channel (MHz)	Raw PSD Measurement (dBm)	D.C. Correction (dB)	Final PSD Level (dBm)	PSD Limit (dBm)	PSD Margin (dB)
1	2412	-1.79	0.00	-1.79	8.00	9.79
1	2437	-1.19	0.00	-1.19	8.00	9.19
1	2462	-0.94	0.00	-0.94	8.00	8.94
6	2412	-6.85	0.18	-6.68	8.00	14.68
6	2437	-3.49	0.18	-3.31	8.00	11.31
6	2462	-6.23	0.18	-6.05	8.00	14.05
11	2412	-2.81	0.29	-2.52	8.00	10.52
11	2437	-2.45	0.29	-2.16	8.00	10.16
11	2462	-2.46	0.29	-2.17	8.00	10.17
54	2412	-8.38	1.28	-7.10	8.00	15.10
54	2437	-7.64	1.28	-6.36	8.00	14.36
54	2462	-7.59	1.28	-6.31	8.00	14.31
6.5	2412	-6.98	0.20	-6.78	8.00	14.78
6.5	2437	-4.61	0.20	-4.41	8.00	12.41
6.5	2462	-6.52	0.20	-6.32	8.00	14.32
65	2412	-9.09	1.57	-7.52	8.00	15.52
65	2437	-9.39	1.57	-7.82	8.00	15.82
65	2462	-8.65	1.57	-7.08	8.00	15.08

Measurement procedure for MIMO PSD: **FCC OET KDB 662911 D01 Measurement Guidance v02r01.**

MCS8	Channel		
	Low	Mid	High
Port 1 (dBm)	-7.671	-6.160	-6.583
Port 2 (dBm)	-6.700	-6.157	-7.395
DC Correction (dBm)	1.170	1.170	1.170
Corrected Port 1 (dBm)	-6.501	-4.990	-5.413
Corrected Port 2 (dBm)	-5.530	-4.987	-6.225
Port 1 (mW)	0.224	0.317	0.288
Port 2 (mW)	0.280	0.317	0.239
Sum (mW)	0.504	0.634	0.526
Sum (dBm)	-2.978	-1.978	-2.790

MCS11	Channel		
	Low	Mid	High
Port 1 (dBm)	-8.184	-6.126	-8.101
Port 2 (dBm)	-7.142	-6.59	-8.455
DC Correction (dBm)	3.161	3.161	3.161
Corrected Port 1 (dBm)	-5.023	-2.965	-4.940
Corrected Port 2 (dBm)	-3.981	-3.429	-5.294
Port 1 (mW)	0.315	0.505	0.321
Port 2 (mW)	0.400	0.454	0.296
Sum (mW)	0.714	0.959	0.616
Sum (dBm)	-1.461	-0.181	-2.103

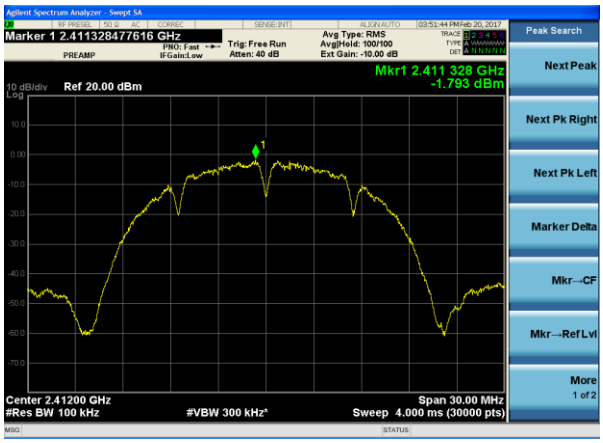
MCS15	Channel		
	Low	Mid	High
Port 1 (dBm)	-14.355	-13.389	-13.218
Port 2 (dBm)	-12.119	-12.150	-13.360
DC Correction (dBm)	5.014	5.014	5.014
Corrected Port 1 (dBm)	-9.341	-8.375	-8.204
Corrected Port 2 (dBm)	-7.105	-7.136	-8.346
Port 1 (mW)	0.116	0.145	0.151
Port 2 (mW)	0.195	0.193	0.146
Sum (mW)	0.311	0.339	0.298
Sum (dBm)	-5.070	-4.701	-5.264

11.3 Screen Captures – Power Spectral Density

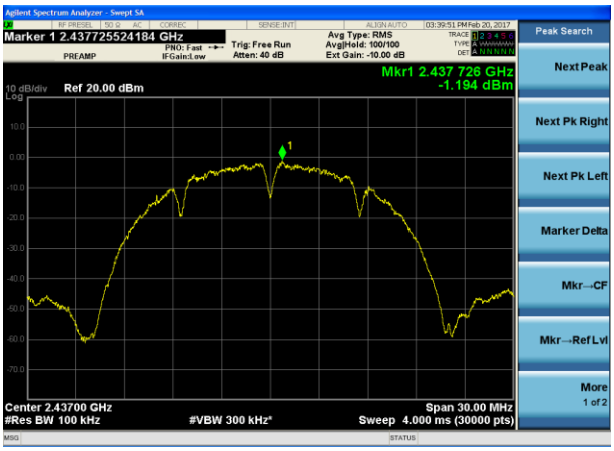
Example Screen Captures:

WLAN Channel (1 MBPS)

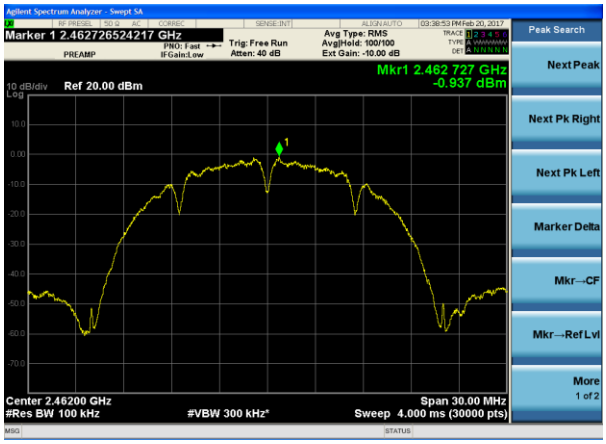
Low



Mid

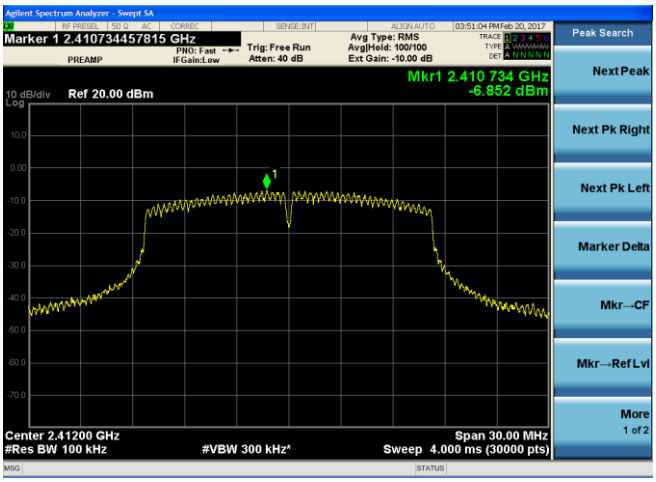


High

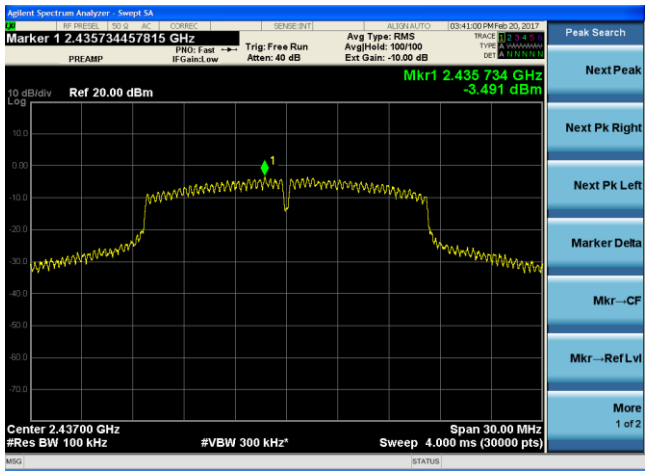

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.462726524217 GHz
PREAMP
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
Mkr1 2.462 727 GHz
-0.937 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.46200 GHz
#Res BW 100 kHz
#VBW 300 kHz*
Span 30.00 MHz
Sweep 4.000 ms (30000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

WLAN Channel (6 MBPS)

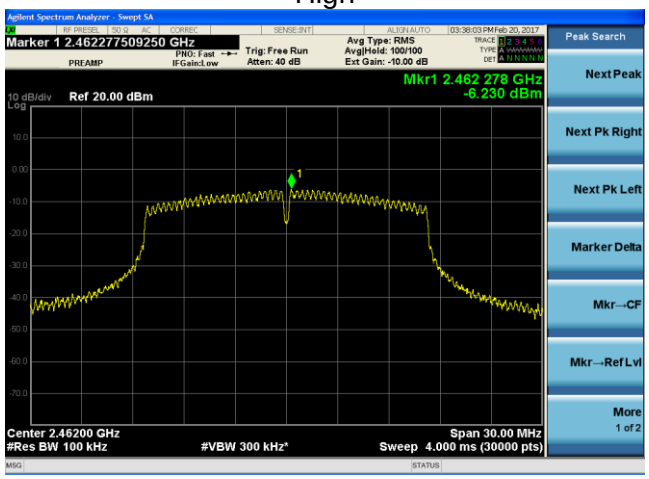
Low



Mid

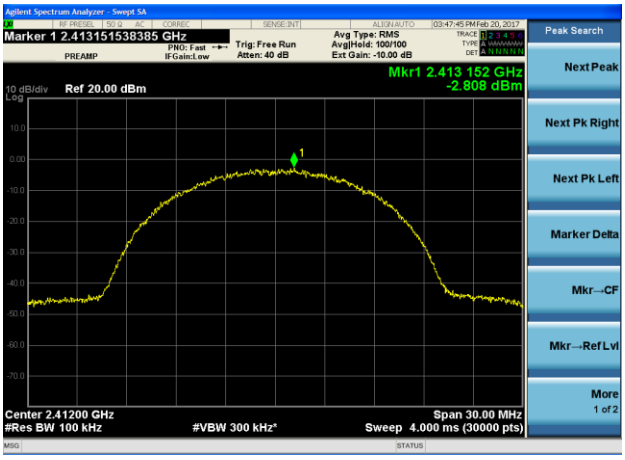


High

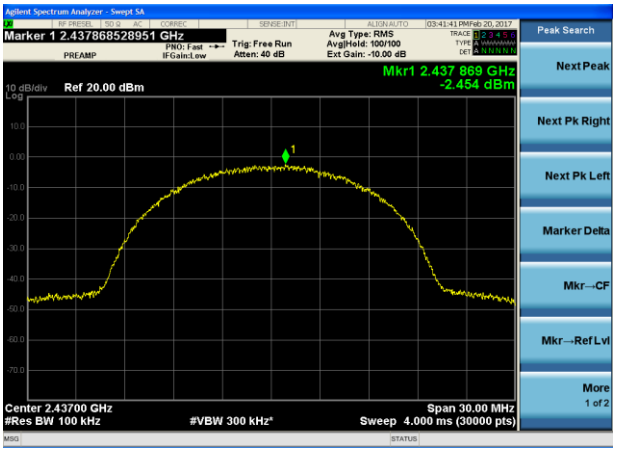


WLAN Channel (11 MBPS)

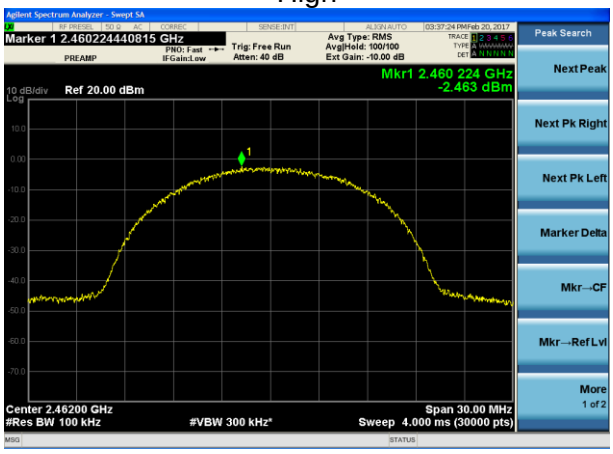
Low



Mid

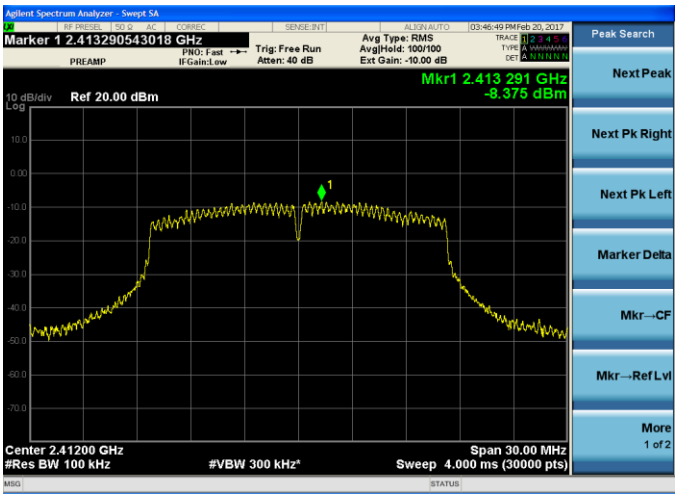


High

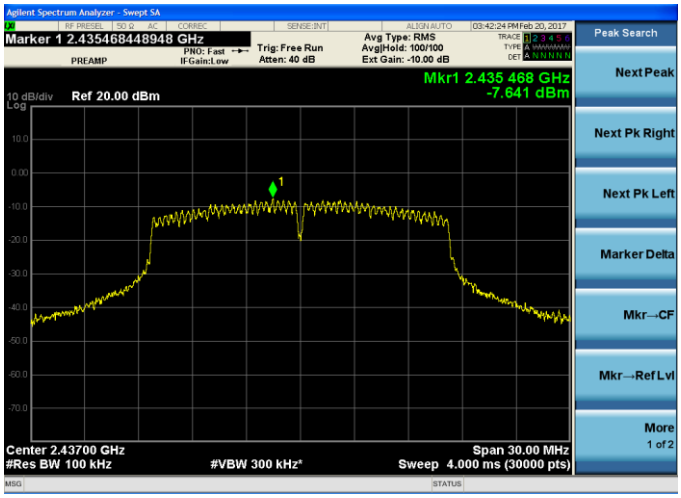


WLAN Channel (54 MBPS)

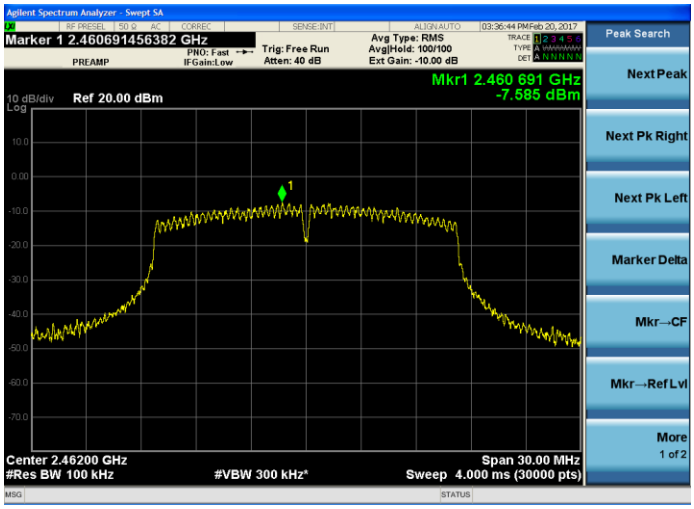
Low



Mid

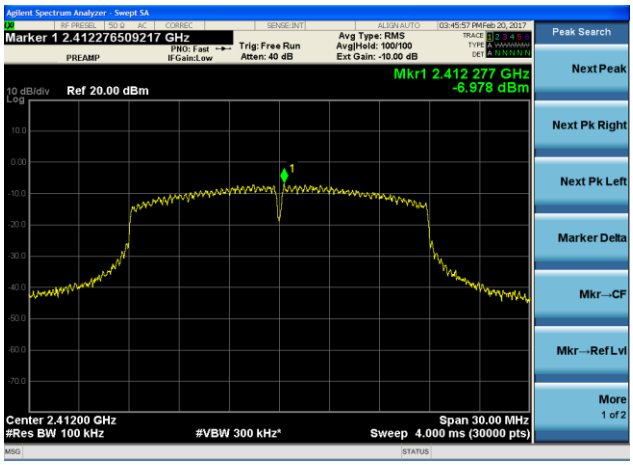


High

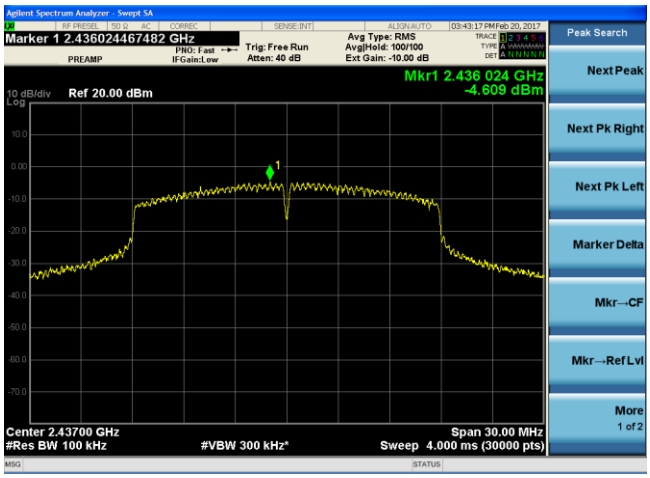


WLAN Channel (MCS0)

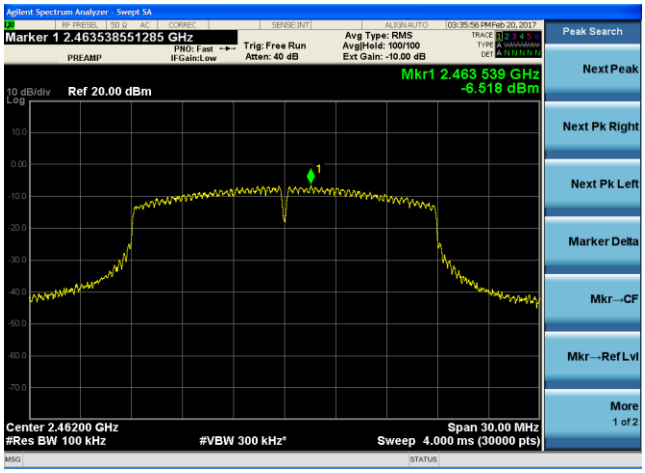
Low



Mid

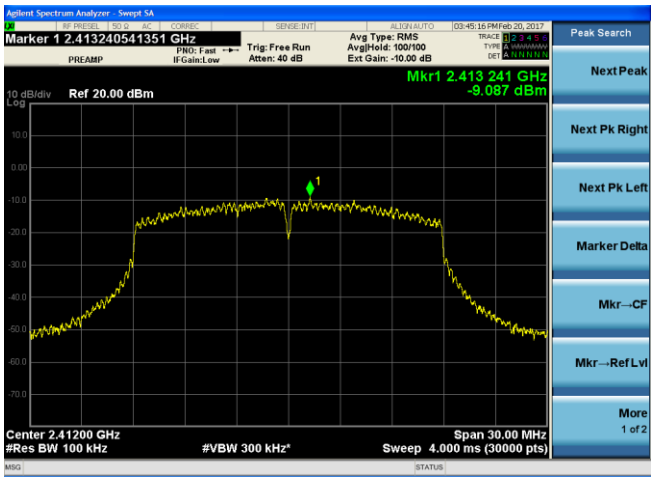


High

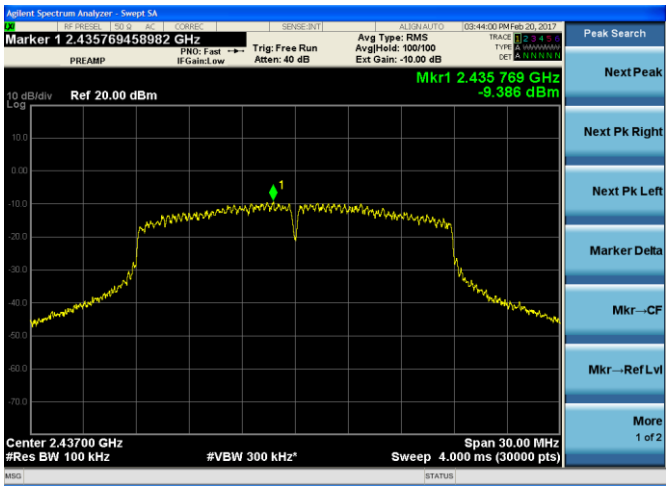

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.463538551285 GHz
PREAMP
Trig: Free Run
Atten: 40 dB
Avg Type: RMS
Avg|Hold: 100/100
Ext Gain: -10.00 dB
Mkr1 2.463 539 GHz
-6.518 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.46200 GHz
#Res BW 100 kHz
#VBW 300 kHz*
Span 30.00 MHz
Sweep 4.000 ms (30000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

WLAN Channel (MCS7)

Low



Mid



High

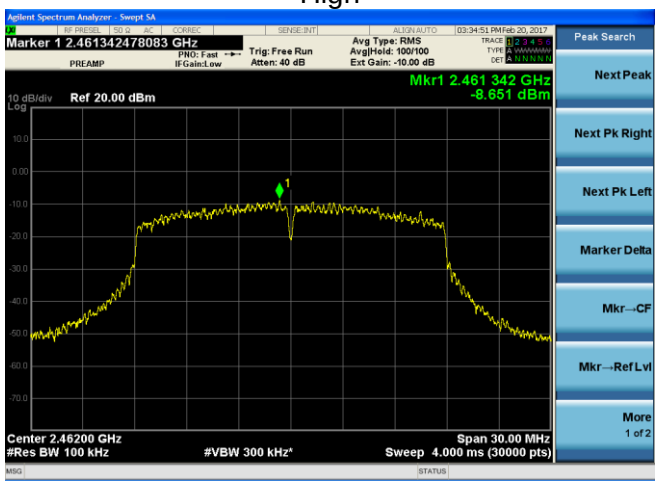


EXHIBIT 12. FREQUENCY STABILITY OVER VOLTAGE VARIATIONS

Test Engineer(s): Shane Dock

The frequency stability of the device was examined as a function of the input voltage available to the EUT. A Spectrum Analyzer was used to measure the RF output power and frequency at the appropriate frequency markers. Power was supplied by a variable voltage supply. The nominal test voltage was varied ±15% from the nominal value. If the unit could not be changed by ±15% it was instead changed to its minimum or maximum value.

The power was then cycled On/Off to observe system response. No unusual response was observed, the emission characteristics were well behaved, and the system returned to the same state of operation as before the power cycle. The EUT was found to be better than 100 ppm.

Data

	21.4VAC	24VAC	27.6VAC	
Channel (MHz)	Frequency (Hz)	Frequency (Hz)	Frequency (Hz)	Frequency Drift (Hz)
2412	2411984241	2411984708	2411983974	734
2437	2436982924	2436983108	2436983641	717
2462	2461983208	2461982841	2461982658	550

APPENDIX A – Test Equipment List

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Date : 8-Feb-2017 Test : Radiated Measurements Job # : C-2664

PE: Coty Hammerer Customer : United Technology Electronic Controls Quote #: 316398

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960171	Cable - low loss 6m	A.H. Systems, Inc.	SAC-26G-6	386	3/31/2016	9/13/2017	Active Verification
2	EE 960085	EMI Receiver	Agilent	N9038A	MY51210148	5/12/2017	5/12/2018	Active Calibration
3	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	7/22/2016	7/22/2017	Active Calibration
4	AA 960154	High Pass Filter 2.4 GHz	KWM	HPF-L-14186	7272-02	7/25/2016	7/25/2017	Active Calibration
5	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	10/13/2016	10/13/2017	Active Calibration
6	EE 960159	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	462101702	4/12/2017	4/12/2018	Active Calibration
7	AA 960174	Small Horn Antenna	ETS Lindgren	3116C-PA	00206880	5/1/2017	5/1/2018	Active Calibration
8	AA 960176	Cable - low loss 6m	A.H. Systems, Inc.	SAC-26G-6	395	5/15/2017	5/15/2018	Active Verification
9	AA 960128	Biconical Antenna	ETS Lindgren	3110B	00062899	4/13/2017	4/13/2018	Active Calibration
10	AA 960078	Log Periodic Antenna	EMCO	93146	9701-4855	4/17/2017	4/17/2018	Active Calibration
11	AA 960153	High Pass Filter 2.4 GHz	KWM	HPF-L-14186	7272-04	5/2/2017	5/2/2018	Active Calibration
12	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
13	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration

Tested By: Coty Hammerer Quality Assurance: Khairul Aidi Zainal

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Date : 16-Feb-2017 Test : Conducted Measurements Job # : C-2664

PE: Coty Hammerer Customer : United Technology Electronic Controls Quote #: 316398

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960001	Multimeter	HP	971A	JP36004055	5/2/2017	5/2/2018	Active Calibration
2	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration
3	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration

Tested By: Shane Dock Quality Assurance: Coty Hammerer

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Smart Technology. Delivered.

Date : 22-Mar-2017 Test : AC mains Emissions Job # : C-2664

PE: Coty Hammerer Customer : United Technology Electronic Controls Quote #: 316398

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration
2	EE 960089	LISN	COM-POWER	LI-215A	191943	3/13/2017	3/13/2018	Active Calibration

Tested By: Khairul Aidi Zainal Quality Assurance: Adam Alger

APPENDIX B – Test Standards: CURRENT PUBLICATION DATES RADIO

STANDARD #	DATE	Am. 1	Am. 2
ANSI C63.4	2014		
ANSI C63.10	2013		
FCC 47 CFR, Parts 0-15, 18, 90, 95	2017		
RSS GEN	2014		
RSS 247	2017		

APPENDIX C - Uncertainty Summary

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %