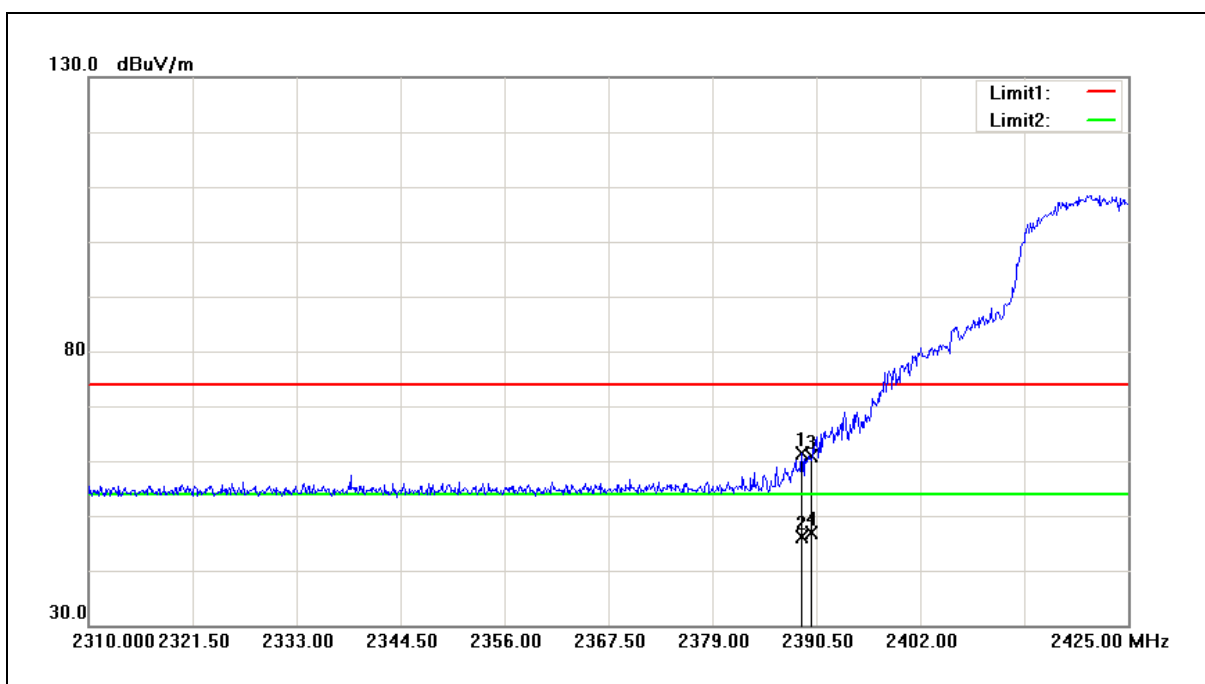


Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2422MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.890	61.55	-0.26	61.29	74.00	-12.71	peak
2	2388.890	46.38	-0.26	46.12	54.00	-7.88	AVG
3	2390.000	61.10	-0.26	60.84	74.00	-13.16	peak
4	2390.000	47.22	-0.26	46.96	54.00	-7.04	AVG

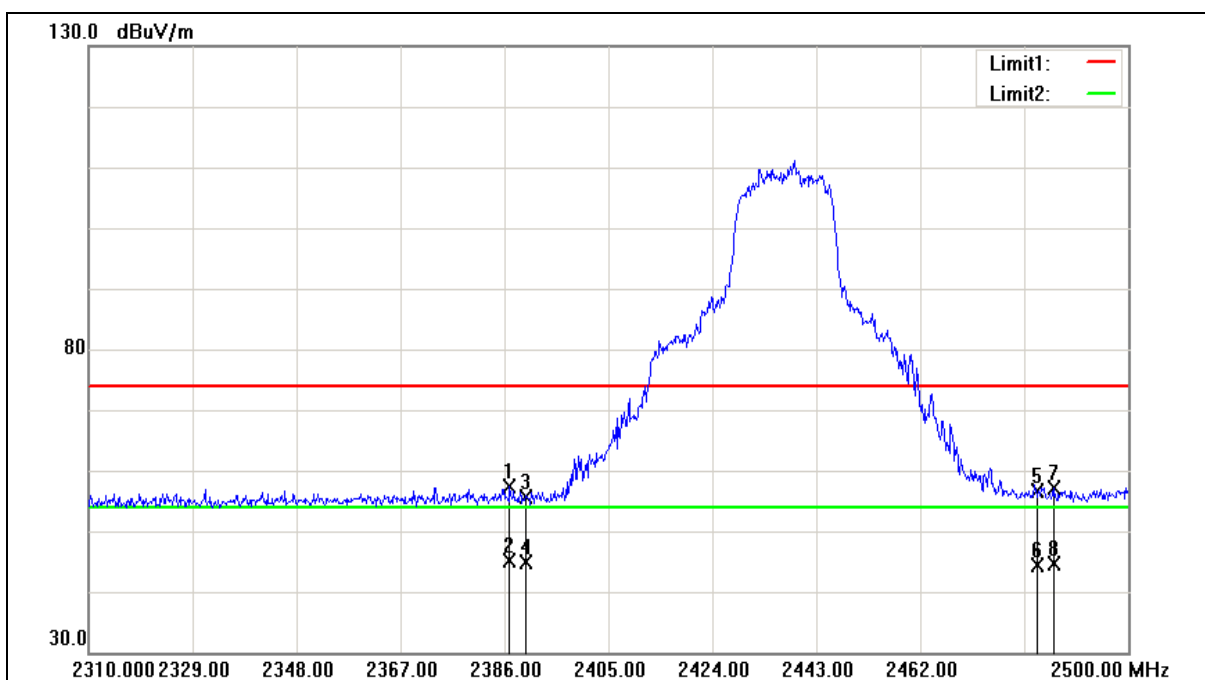
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2437MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.950	57.68	-0.27	57.41	74.00	-16.59	peak
2	2386.950	45.52	-0.27	45.25	54.00	-8.75	AVG
3	2390.000	55.99	-0.26	55.73	74.00	-18.27	peak
4	2390.000	45.24	-0.26	44.98	54.00	-9.02	AVG
5	2483.500	56.53	0.11	56.64	74.00	-17.36	peak
6	2483.500	44.31	0.11	44.42	54.00	-9.58	AVG
7	2486.320	56.90	0.12	57.02	74.00	-16.98	peak
8	2486.320	44.58	0.12	44.70	54.00	-9.30	AVG

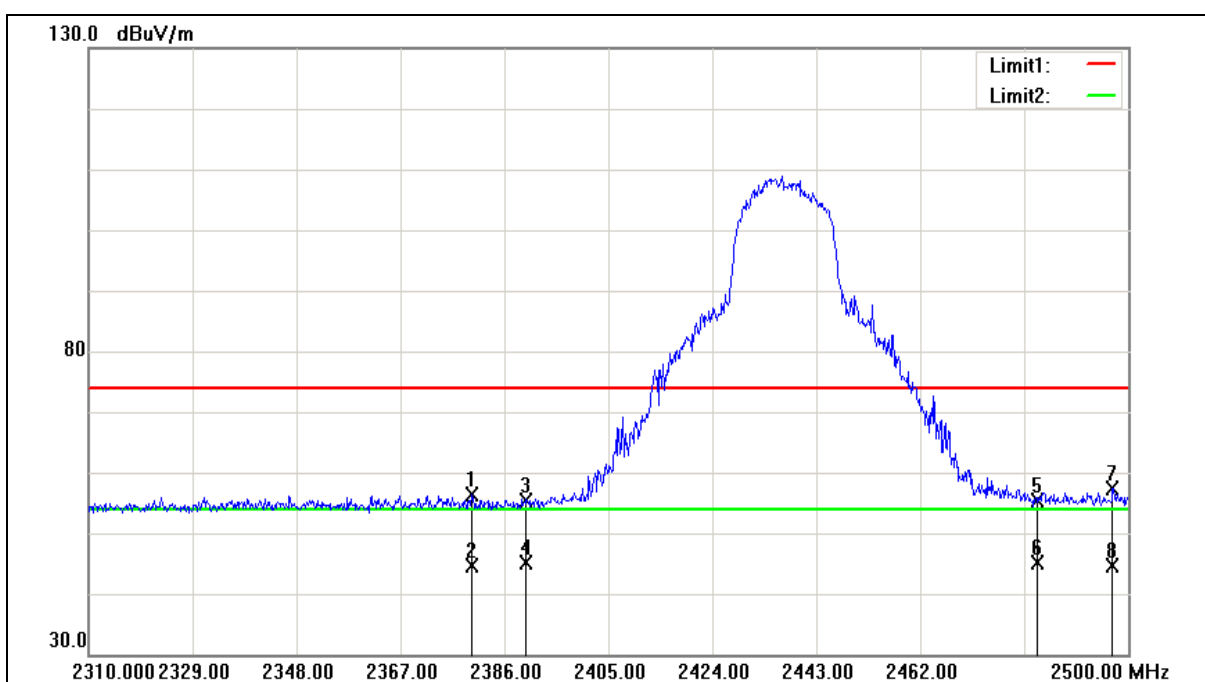
Note:1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2437MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Vertical		



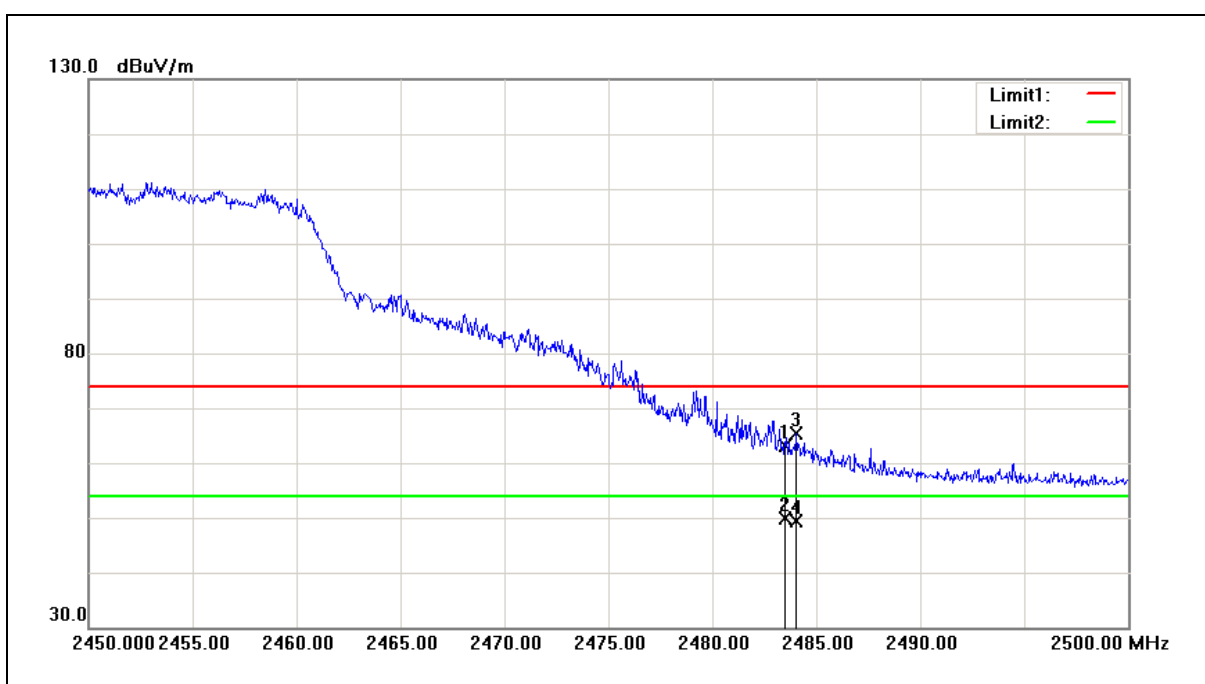
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2379.920	56.60	-0.30	56.30	74.00	-17.70	peak
2	2379.920	45.04	-0.30	44.74	54.00	-9.26	AVG
3	2390.000	55.60	-0.26	55.34	74.00	-18.66	peak
4	2390.000	45.48	-0.26	45.22	54.00	-8.78	AVG
5	2483.500	55.36	0.11	55.47	74.00	-18.53	peak
6	2483.500	45.06	0.11	45.17	54.00	-8.83	AVG
7	2497.150	57.25	0.17	57.42	74.00	-16.58	peak
8	2497.150	44.49	0.17	44.66	54.00	-9.34	AVG

Note:1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2452MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	63.13	0.11	63.24	74.00	-10.76	peak
2	2483.500	49.85	0.11	49.96	54.00	-4.04	AVG
3	2484.050	65.15	0.12	65.27	74.00	-8.73	peak
4	2484.050	49.38	0.12	49.50	54.00	-4.50	AVG

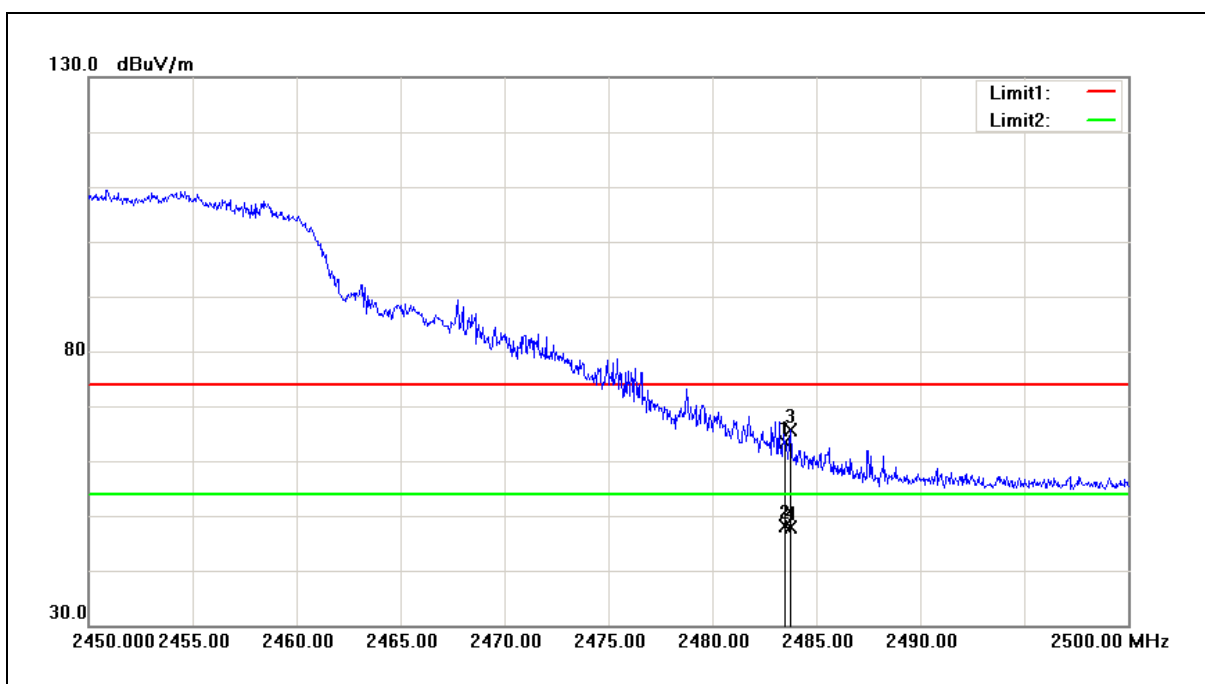
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2452MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	63.29	0.11	63.40	74.00	-10.60	peak
2	2483.500	47.92	0.11	48.03	54.00	-5.97	AVG
3	2483.750	65.48	0.11	65.59	74.00	-8.41	peak
4	2483.750	47.72	0.11	47.83	54.00	-6.17	AVG

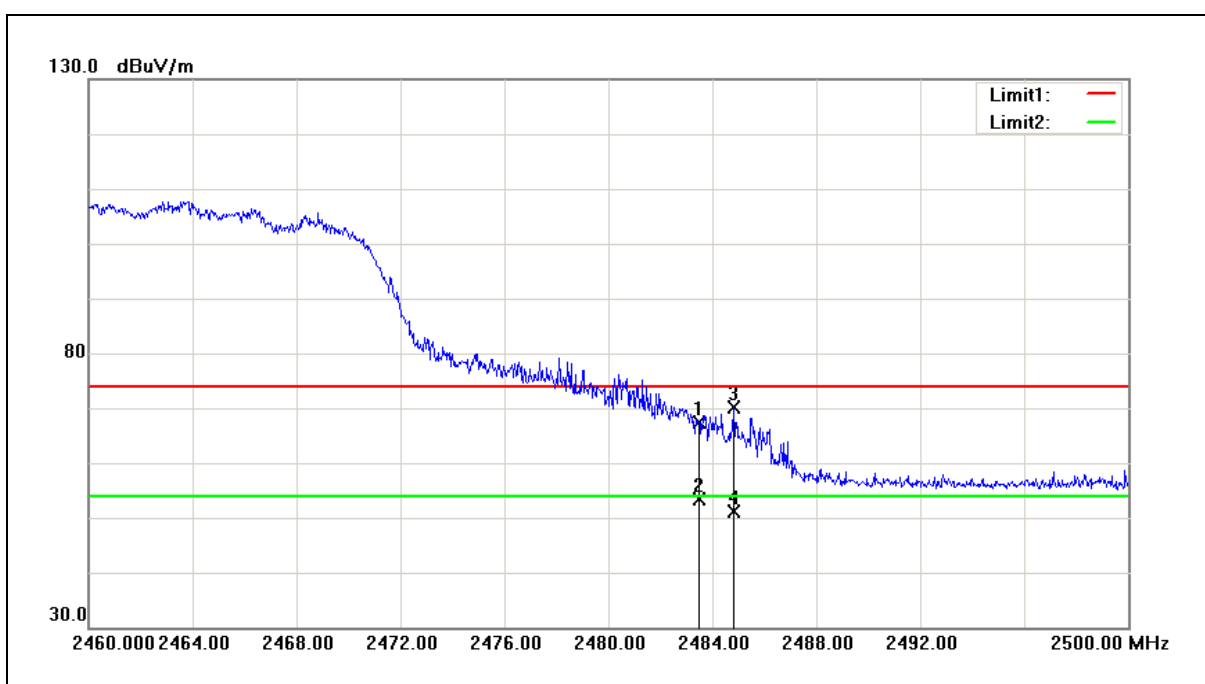
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2462MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Horizontal		



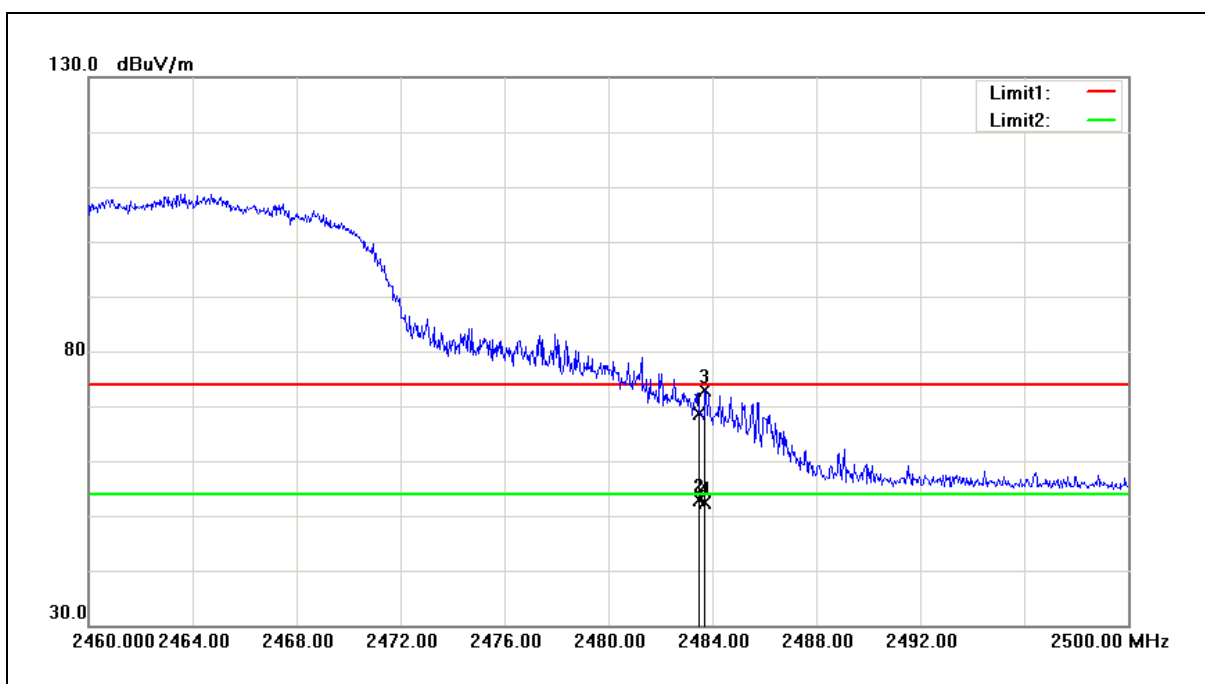
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	67.39	0.11	67.50	74.00	-6.50	peak
2	2483.500	53.16	0.11	53.27	54.00	-0.73	AVG
3	2484.840	69.98	0.12	70.10	74.00	-3.90	peak
4	2484.840	50.99	0.12	51.11	54.00	-2.89	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2462MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 4	Date:	04/22/2017
Ant.Polar.:	Vertical		



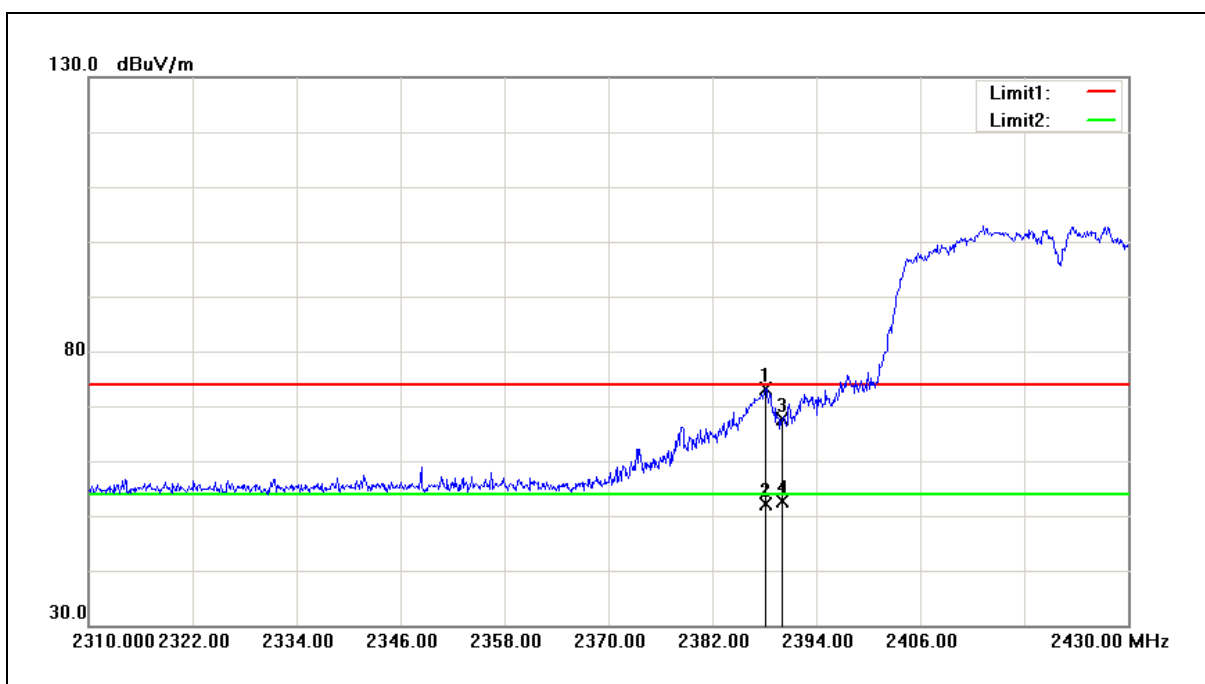
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	68.46	0.11	68.57	74.00	-5.43	peak
2	2483.500	52.79	0.11	52.90	54.00	-1.10	AVG
3	2483.720	72.83	0.11	72.94	74.00	-1.06	peak
4	2483.720	52.15	0.11	52.26	54.00	-1.74	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2422MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Horizontal		



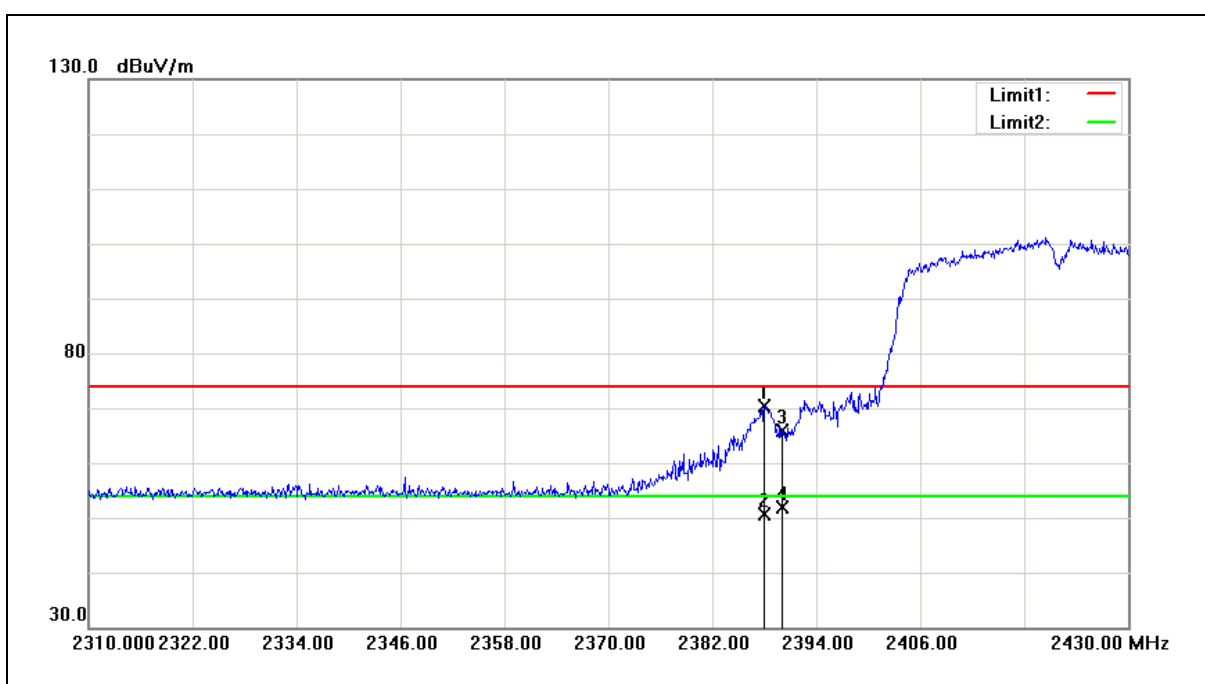
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.120	73.31	-0.26	73.05	74.00	-0.95	peak
2	2388.120	52.40	-0.26	52.14	54.00	-1.86	AVG
3	2390.000	67.90	-0.26	67.64	74.00	-6.36	peak
4	2390.000	52.99	-0.26	52.73	54.00	-1.27	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2422MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Vertical		



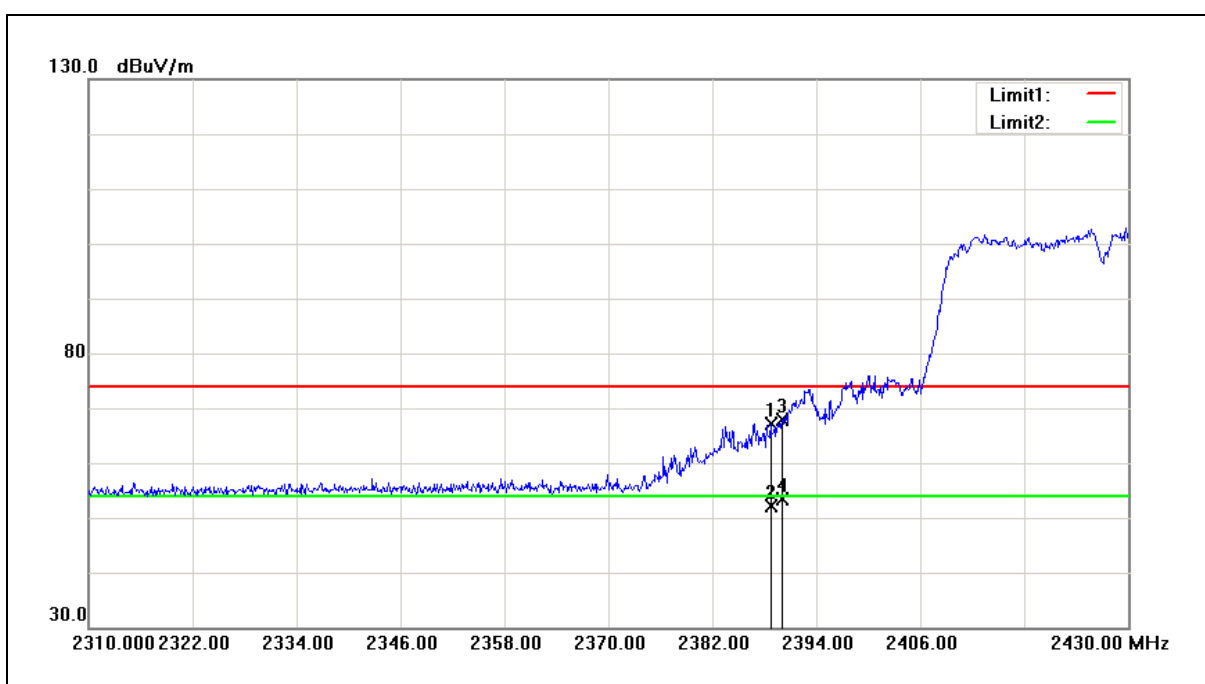
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.000	70.52	-0.26	70.26	74.00	-3.74	peak
2	2388.000	50.99	-0.26	50.73	54.00	-3.27	AVG
3	2390.000	66.06	-0.26	65.80	74.00	-8.20	peak
4	2390.000	52.21	-0.26	51.95	54.00	-2.05	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2427MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Horizontal		



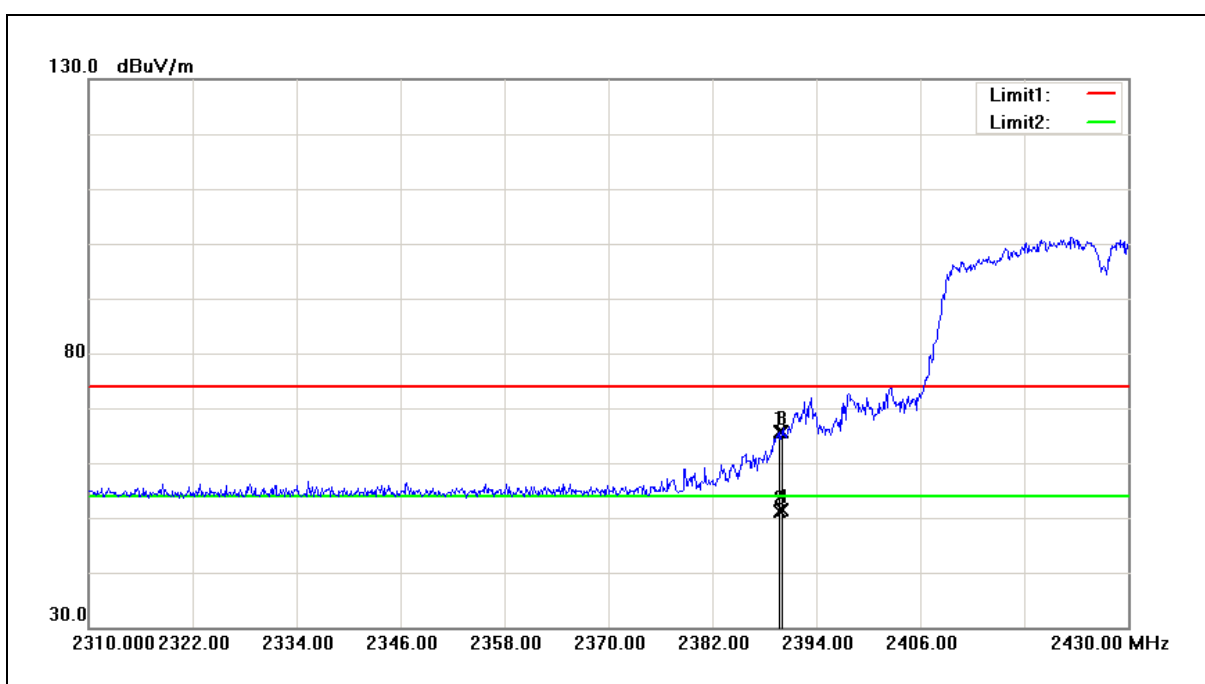
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.720	67.47	-0.26	67.21	74.00	-6.79	peak
2	2388.720	52.50	-0.26	52.24	54.00	-1.76	AVG
3	2390.000	68.13	-0.26	67.87	74.00	-6.13	peak
4	2390.000	53.64	-0.26	53.38	54.00	-0.62	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2427MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Vertical		



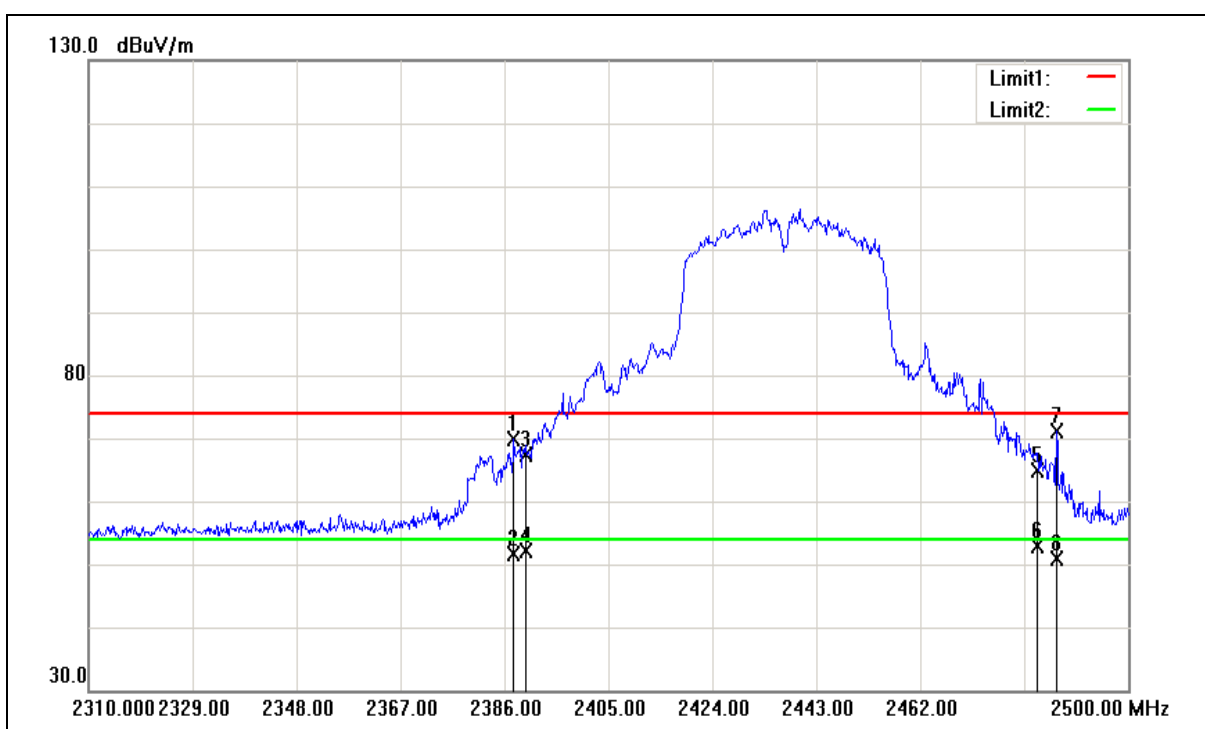
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.800	65.80	-0.26	65.54	74.00	-8.46	peak
2	2389.800	51.47	-0.26	51.21	54.00	-2.79	AVG
3	2390.000	65.95	-0.26	65.69	74.00	-8.31	peak
4	2390.000	51.54	-0.26	51.28	54.00	-2.72	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2437MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2387.710	70.15	-0.26	69.89	74.00	-4.11	peak
2	2387.710	51.95	-0.26	51.69	54.00	-2.31	AVG
3	2390.000	67.72	-0.26	67.46	74.00	-6.54	peak
4	2390.000	52.43	-0.26	52.17	54.00	-1.83	AVG
5	2483.500	64.86	0.11	64.97	74.00	-9.03	peak
6	2483.500	52.76	0.11	52.87	54.00	-1.13	AVG
7	2486.890	71.02	0.12	71.14	74.00	-2.86	peak
8	2486.890	50.71	0.12	50.83	54.00	-3.17	AVG

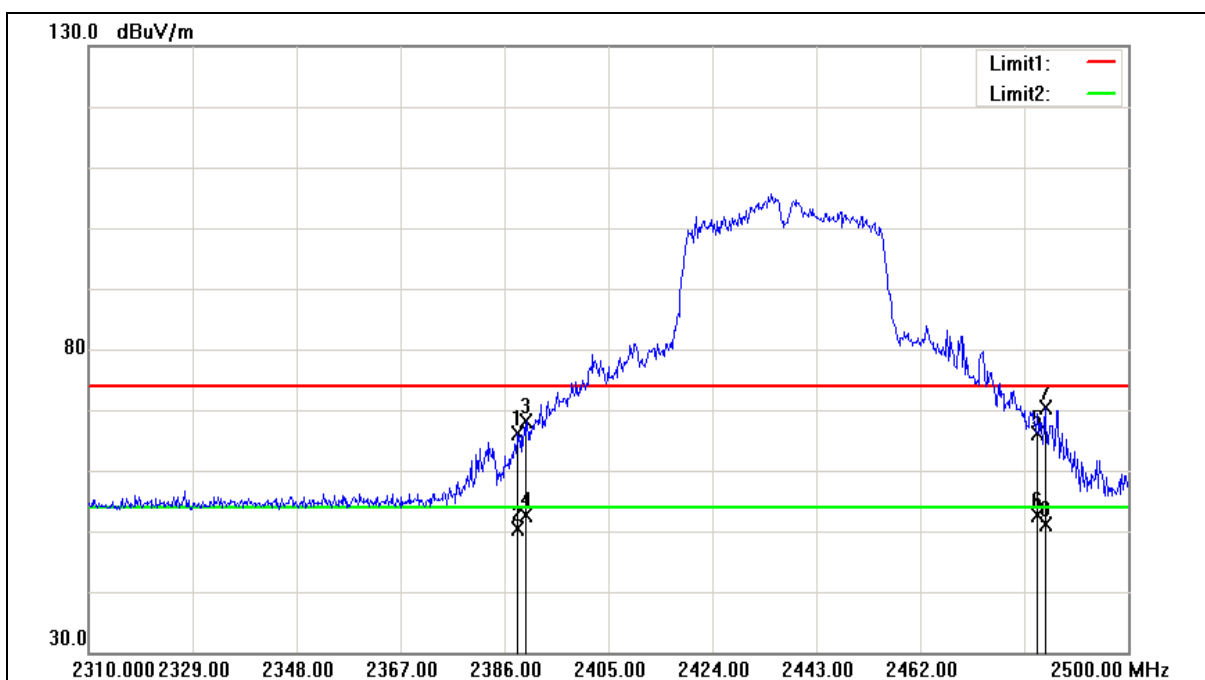
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2437MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Vertical		



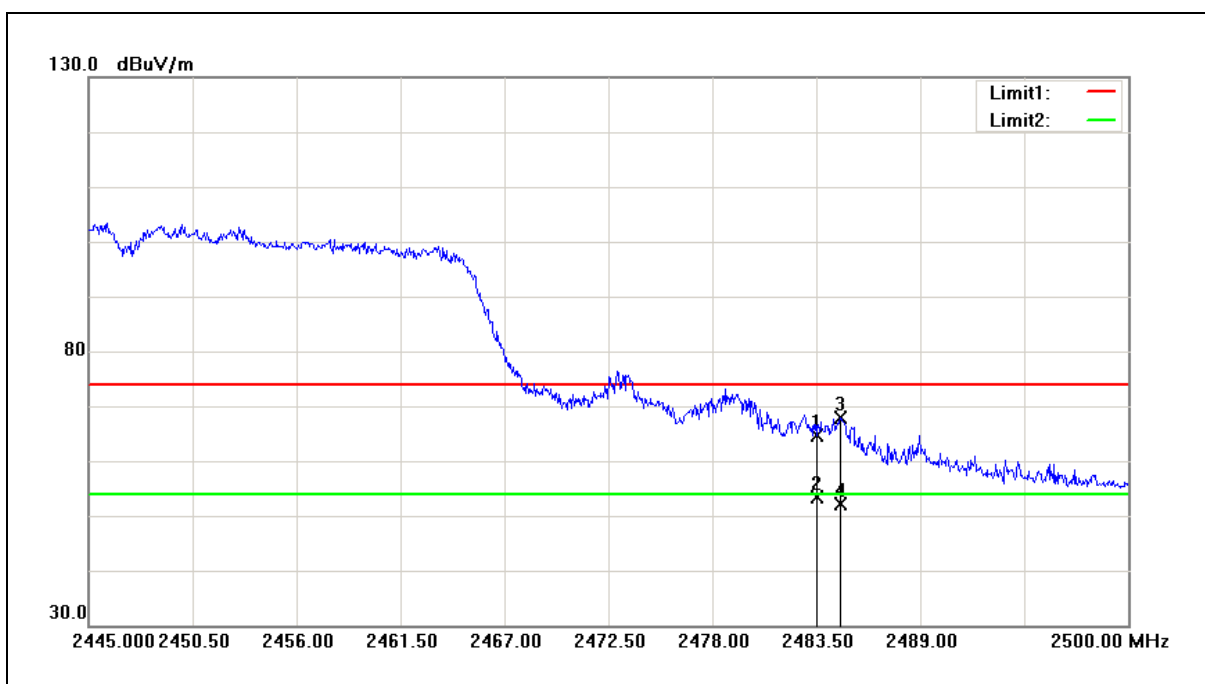
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.470	66.44	-0.26	66.18	74.00	-7.82	peak
2	2388.470	50.67	-0.26	50.41	54.00	-3.59	AVG
3	2390.000	68.38	-0.26	68.12	74.00	-5.88	peak
4	2390.000	52.85	-0.26	52.59	54.00	-1.41	AVG
5	2483.500	66.01	0.11	66.12	74.00	-7.88	peak
6	2483.500	52.41	0.11	52.52	54.00	-1.48	AVG
7	2484.800	70.30	0.12	70.42	74.00	-3.58	peak
8	2484.800	51.05	0.12	51.17	54.00	-2.83	AVG

Note:1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2447MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	64.42	0.11	64.53	74.00	-9.47	peak
2	2483.500	53.27	0.11	53.38	54.00	-0.62	AVG
3	2484.765	67.78	0.12	67.90	74.00	-6.10	peak
4	2484.765	52.08	0.12	52.20	54.00	-1.80	AVG

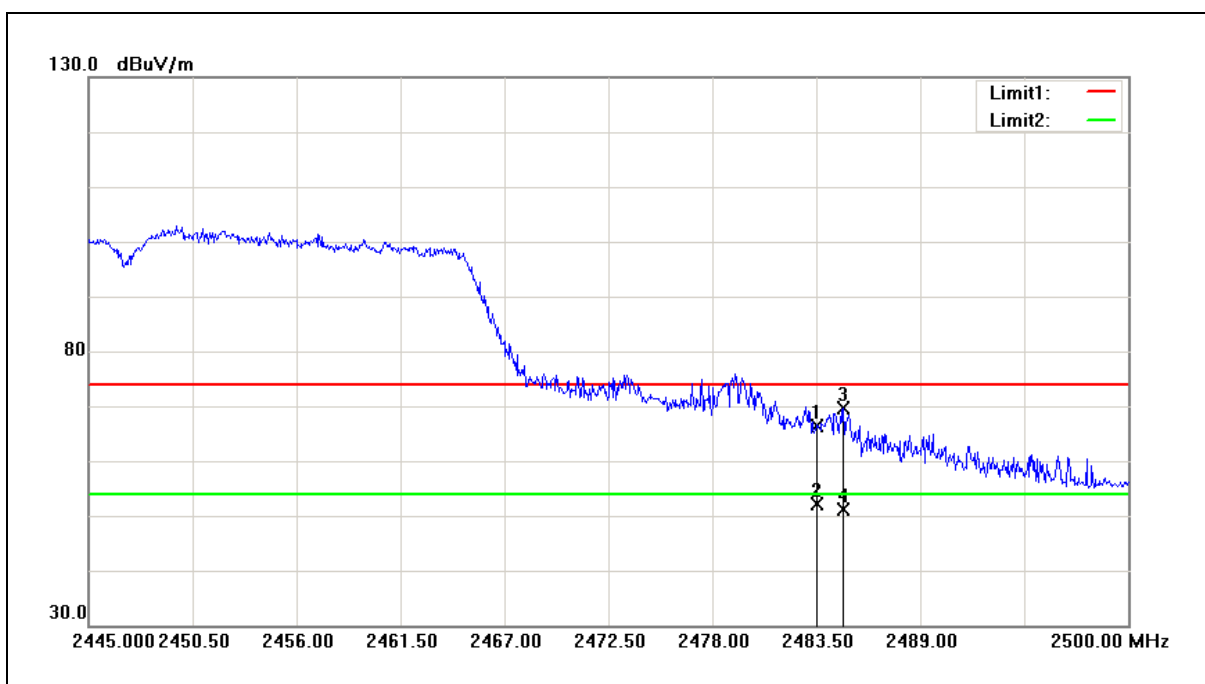
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2447MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Vertical		



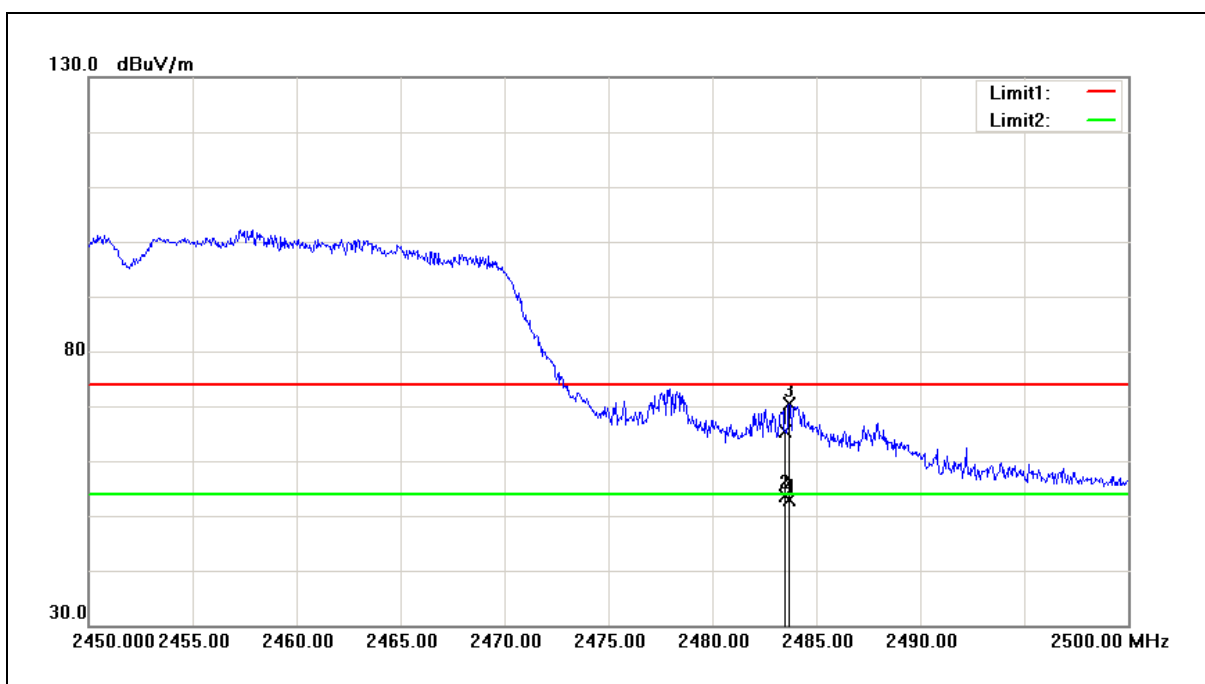
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	66.33	0.11	66.44	74.00	-7.56	peak
2	2483.500	51.98	0.11	52.09	54.00	-1.91	AVG
3	2484.930	69.52	0.12	69.64	74.00	-4.36	peak
4	2484.930	51.11	0.12	51.23	54.00	-2.77	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2452MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	65.39	0.11	65.50	74.00	-8.50	peak
2	2483.500	52.46	0.11	52.57	54.00	-1.43	AVG
3	2483.700	70.31	0.11	70.42	74.00	-3.58	peak
4	2483.700	51.79	0.11	51.90	54.00	-2.1	AVG

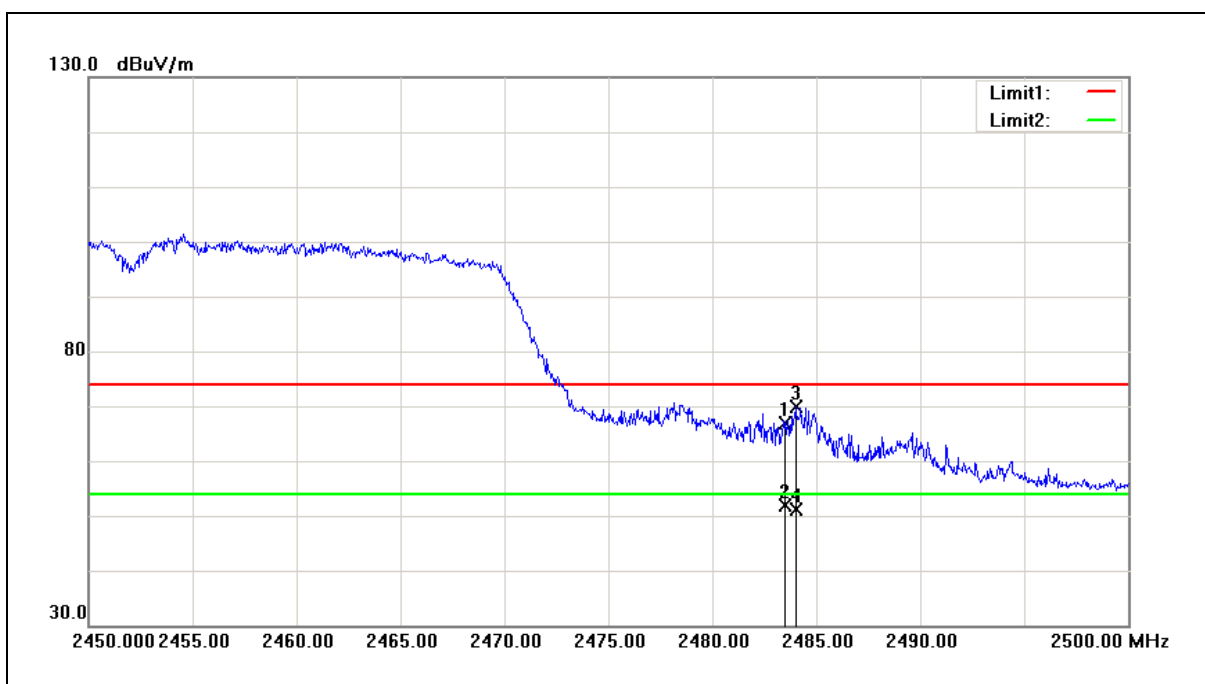
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	2452MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60%RH
Mode:	Mode 5	Date:	04/22/2017
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	66.85	0.11	66.96	74.00	-7.04	peak
2	2483.500	51.68	0.11	51.79	54.00	-2.21	AVG
3	2484.000	69.84	0.12	69.96	74.00	-4.04	peak
4	2484.000	50.99	0.12	51.11	54.00	-2.89	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.



6 Maximum Conducted Output Power Measurement

6.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for maximum output power is 30dBm.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

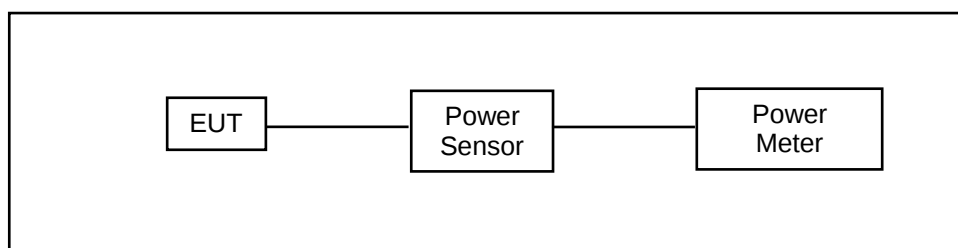
IEEE 802.11b/g

- * CDD mode: Directional Gain = $10 \cdot \log\{[10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}]/NANT\} = 3.96 \text{ dBi} < 6 \text{ dBi}$
- * CDD mode: Power limit=30dBm

IEEE 802.11n 2.4GHz 20MHz/40MHz

- * MIMO mode : Directional Gain = $10 \cdot \log\{[10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}]/NANT\} = 3.96 \text{ dBi} < 6 \text{ dBi}$
- * MIMO mode power limit shall be reduced = $30 - 0 = 30 \text{ dBm}$.

6.2. Test Setup



6.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Power Sensor	Anritsu	MA2411B	1126022	08/29/2016	1 year
Power Meter	Anritsu	ML2495A	1135009	08/29/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

6.4. Test Procedure

The testing follows the Measurement Procedure of ANSI C63.10-2013 section 11.9.2.3 Method AVGPM.

The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor.



6.5. Test Result

Date of Test	04/22/2017				
Antenna	ANT-0				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412.0	1M	20.16	0.104	<30
	2417.0		20.55	0.114	<30
	2422.0		20.56	0.114	<30
	2437.0		20.52	0.113	<30
	2452.0		21.03	0.127	<30
	2457.0		20.97	0.125	<30
	2462.0		20.98	0.125	<30
	2437.0	2M	20.49	0.112	<30
	2437.0	5.5M	20.46	0.111	<30
	2437.0	11M	20.42	0.110	<30
Mode 3	2412.0	6M	18.55	0.072	<30
	2417.0		19.99	0.100	<30
	2422.0		19.90	0.098	<30
	2437.0		20.05	0.101	<30
	2452.0		19.93	0.098	<30
	2457.0		19.95	0.099	<30
	2462.0		16.74	0.047	<30
	2437.0	9M	20.03	0.101	<30
	2437.0	12M	20.02	0.100	<30
	2437.0	18M	19.96	0.099	<30
	2437.0	24M	20.01	0.100	<30
	2437.0	36M	19.98	0.100	<30
	2437.0	48M	19.99	0.100	<30
	2437.0	54M	19.94	0.099	<30

Note: The relevant measured result has the offset with cable loss already.



Date of Test	04/22/2017				
Antenna	ANT-0				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 4	2412.0	13M	17.21	0.053	<30
	2417.0		20.20	0.105	<30
	2422.0		20.27	0.106	<30
	2437.0		20.36	0.109	<30
	2452.0		20.23	0.105	<30
	2457.0		19.81	0.096	<30
	2462.0		16.23	0.042	<30
	2437.0	28.8M	20.35	0.108	<30
	2437.0	43.4M	20.33	0.108	<30
	2437.0	57.8M	20.30	0.107	<30
	2437.0	86.6M	20.32	0.108	<30
	2437.0	115.6M	20.28	0.107	<30
	2437.0	130M	20.26	0.106	<30
	2437.0	144.4M	20.24	0.106	<30
	2422.0	27M	14.48	0.028	<30
Mode 5	2427.0		15.60	0.036	<30
	2437.0		18.35	0.068	<30
	2447.0		15.45	0.035	<30
	2452.0		13.88	0.024	<30
	2437.0	60M	18.33	0.068	<30
	2437.0	90M	18.31	0.068	<30
	2437.0	120M	18.22	0.066	<30
	2437.0	180M	18.28	0.067	<30
	2437.0	240M	18.23	0.067	<30
	2437.0	270M	18.25	0.067	<30
	2437.0	300M	18.20	0.066	<30

Note: The relevant measured result has the offset with cable loss already.



Date of Test	04/22/2017				
Antenna	ANT-1				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412.0	1M	19.98	0.100	<30
	2417.0		20.38	0.109	<30
	2422.0		20.34	0.108	<30
	2437.0		20.36	0.109	<30
	2452.0		20.62	0.115	<30
	2457.0		20.72	0.118	<30
	2462.0		20.29	0.107	<30
	2437.0	2M	20.33	0.108	<30
	2437.0	5.5M	20.31	0.107	<30
	2437.0	11M	20.27	0.106	<30
Mode 3	2412.0	6M	18.46	0.070	<30
	2417.0		19.90	0.098	<30
	2422.0		19.85	0.097	<30
	2437.0		19.66	0.092	<30
	2452.0		19.47	0.089	<30
	2457.0		19.27	0.085	<30
	2462.0		16.14	0.041	<30
	2437.0	9M	19.65	0.092	<30
	2437.0	12M	19.63	0.092	<30
	2437.0	18M	19.54	0.090	<30
	2437.0	24M	19.62	0.092	<30
	2437.0	36M	19.56	0.090	<30
	2437.0	48M	19.58	0.091	<30
	2437.0	54M	19.53	0.090	<30

Note: The relevant measured result has the offset with cable loss already.



Date of Test	04/22/2017				
Antenna	ANT-1				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 4	2412.0	13M	17.13	0.052	<30
	2417.0		20.14	0.103	<30
	2422.0		20.00	0.100	<30
	2437.0		19.97	0.099	<30
	2452.0		19.76	0.095	<30
	2457.0		19.37	0.086	<30
	2462.0		15.54	0.036	<30
	2437.0	28.8M	19.96	0.099	<30
	2437.0	43.4M	19.93	0.098	<30
	2437.0	57.8M	19.88	0.097	<30
	2437.0	86.6M	19.90	0.098	<30
	2437.0	115.6M	19.86	0.097	<30
	2437.0	130M	19.83	0.096	<30
	2437.0	144.4M	19.80	0.095	<30
Mode 5	2422.0	27M	14.45	0.028	<30
	2427.0		15.51	0.036	<30
	2437.0		18.18	0.066	<30
	2447.0		15.30	0.034	<30
	2452.0		13.81	0.024	<30
	2437.0	60M	18.15	0.065	<30
	2437.0	90M	18.12	0.065	<30
	2437.0	120M	18.01	0.063	<30
	2437.0	180M	18.10	0.065	<30
	2437.0	240M	18.04	0.064	<30
	2437.0	270M	18.07	0.064	<30
	2437.0	300M	17.99	0.063	<30

Note: The relevant measured result has the offset with cable loss already.



Date of Test	04/22/2017				
Antenna	ANT-0+1				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412.0	1M	23.08	0.203	<30
	2417.0		23.48	0.223	<30
	2422.0		23.46	0.222	<30
	2437.0		23.45	0.221	<30
	2452.0		23.84	0.242	<30
	2457.0		23.86	0.243	<30
	2462.0		23.66	0.232	<30
	2437.0	2M	23.42	0.220	<30
	2437.0	5.5M	23.40	0.219	<30
	2437.0	11M	23.36	0.217	<30
Mode 3	2412.0	6M	21.52	0.142	<30
	2417.0		22.96	0.197	<30
	2422.0		22.89	0.194	<30
	2437.0		22.87	0.194	<30
	2452.0		22.72	0.187	<30
	2457.0		22.63	0.183	<30
	2462.0		19.46	0.088	<30
	2437.0	9M	22.85	0.193	<30
	2437.0	12M	22.84	0.192	<30
	2437.0	18M	22.77	0.189	<30
	2437.0	24M	22.83	0.192	<30
	2437.0	36M	22.79	0.190	<30
	2437.0	48M	22.80	0.191	<30
	2437.0	54M	22.75	0.188	<30

Note: The relevant measured result has the offset with cable loss already.



Date of Test	04/22/2017				
Antenna	ANT-0+1				
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 4	2412.0	13M	20.18	0.104	<30
	2417.0		23.18	0.208	<30
	2422.0		23.15	0.206	<30
	2437.0		23.18	0.208	<30
	2452.0		23.01	0.200	<30
	2457.0		22.61	0.182	<30
	2462.0		18.91	0.078	<30
	2437.0	28.8M	23.17	0.207	<30
	2437.0	43.4M	23.14	0.206	<30
	2437.0	57.8M	23.11	0.204	<30
	2437.0	86.6M	23.13	0.205	<30
	2437.0	115.6M	23.09	0.203	<30
	2437.0	130M	23.06	0.202	<30
	2437.0	144.4M	23.04	0.201	<30
Mode 5	2422.0	27M	17.48	0.056	<30
	2427.0		18.57	0.072	<30
	2437.0		21.28	0.134	<30
	2447.0		18.39	0.069	<30
	2452.0		16.86	0.048	<30
	2437.0	60M	21.25	0.133	<30
	2437.0	90M	21.23	0.133	<30
	2437.0	120M	21.13	0.130	<30
	2437.0	180M	21.20	0.132	<30
	2437.0	240M	21.15	0.130	<30
	2437.0	270M	21.17	0.131	<30
	2437.0	300M	21.11	0.129	<30

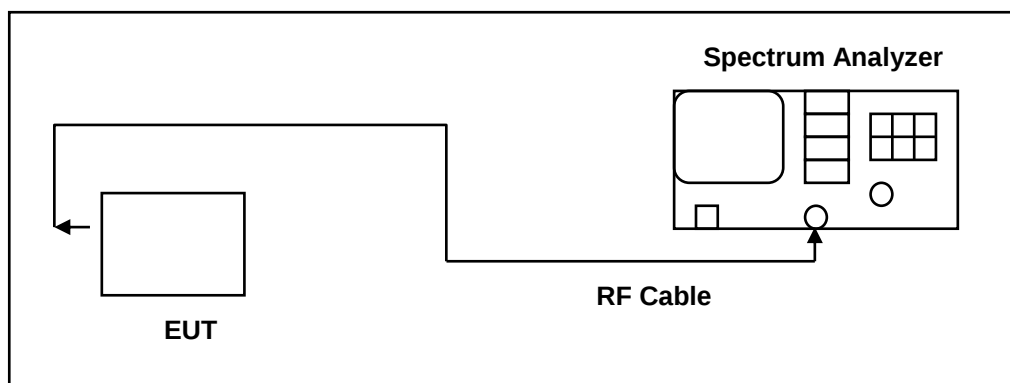
Note: The relevant measured result has the offset with cable loss already.

7 6dB RF Bandwidth Measurement

7.1. Limit

6dB RF Bandwidth: Systems using digital modulation techniques may operate in the 2400–2483.5 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

7.2. Test Setup



7.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

7.4. Test Procedure

The EUT tested to DTS test procedure of KDB558074D01 for compliance to FCC 47CFR 15.247 requirements.

6dB RF Bandwidth: The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels (Channel low, middle, high)

7.5. Test Result

Date of Test	05/04/2017			
Test Mode	Frequency (MHz)	Measurement (kHz)		Limit (kHz)
		ANT-0	ANT-1	
Mode 2	2412	10080	10080	> 500
	2437	10050	10080	> 500
	2462	10100	10090	> 500
Mode 3	2412	15140	15140	> 500
	2437	15130	15140	> 500
	2462	15130	15130	> 500
Mode 4	2412	15110	15130	> 500
	2437	15140	15130	> 500
	2462	15130	15140	> 500
Mode 5	2422	35090	35120	> 500
	2437	35080	35090	> 500
	2452	35080	35090	> 500



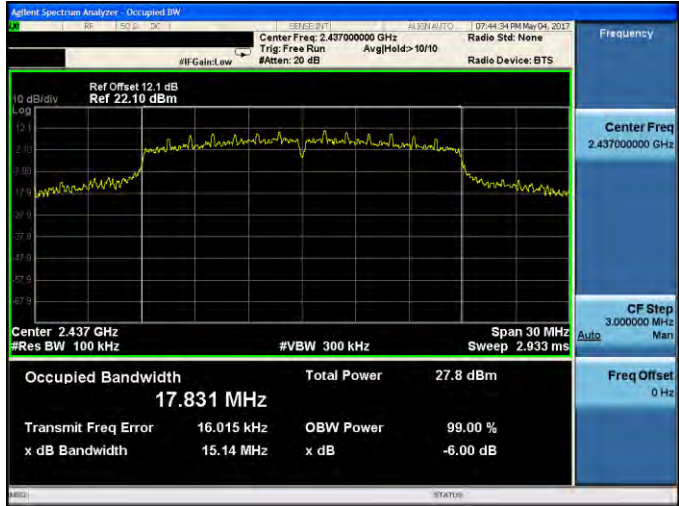
7.6. Test Graphs

Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	



Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-0
2412 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 16.523 MHz Total Power: 25.6 dBm Transmit Freq Error: 25.965 kHz x dB Bandwidth: 15.14 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.41200000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 17.344 MHz Total Power: 27.5 dBm Transmit Freq Error: 86.193 kHz x dB Bandwidth: 15.13 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.43700000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz
2462 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 16.365 MHz Total Power: 23.9 dBm Transmit Freq Error: -15.623 kHz x dB Bandwidth: 15.13 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.46200000 GHz CF Step: 3.000000 MHz Freq Offset: 0 Hz



Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-0
2412 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.537 MHz Total Power 24.3 dBm Transmit Freq Error 23.493 kHz OBW Power 99.00 % x dB Bandwidth 15.11 MHz x dB -6.00 dB Frequency Center Freq 2.41200000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.831 MHz Total Power 27.8 dBm Transmit Freq Error 16.015 kHz OBW Power 99.00 % x dB Bandwidth 15.14 MHz x dB -6.00 dB Frequency Center Freq 2.43700000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
2462 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.516 MHz Total Power 23.7 dBm Transmit Freq Error -5.489 kHz OBW Power 99.00 % x dB Bandwidth 15.13 MHz x dB -6.00 dB Frequency Center Freq 2.46200000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz

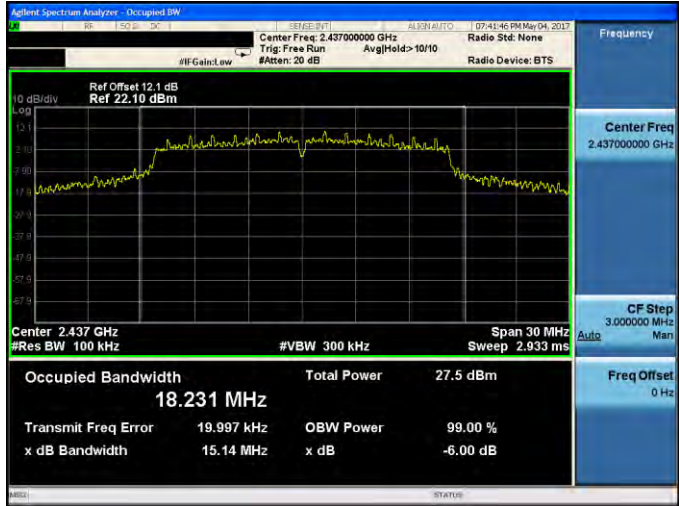


Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-0
2422 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.42200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.422 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 4.8 ms Occupied Bandwidth: 35.718 MHz Total Power: 21.7 dBm Transmit Freq Error: 56.348 kHz x dB Bandwidth: 35.09 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.42200000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 4.8 ms Occupied Bandwidth: 35.766 MHz Total Power: 25.7 dBm Transmit Freq Error: 9.951 kHz x dB Bandwidth: 35.08 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.43700000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz
2452 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.45200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.452 GHz #Res BW 100 kHz #VBW 300 kHz Span 50 MHz Sweep 4.8 ms Occupied Bandwidth: 35.701 MHz Total Power: 21.2 dBm Transmit Freq Error: -37.722 kHz x dB Bandwidth: 35.08 MHz OBW Power: 99.00 % x dB: -6.00 dB Frequency: Center Freq 2.45200000 GHz CF Step 5.000000 MHz Freq Offset 0 Hz



Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	



Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-1
2412 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.412000000 GHz Trig: Free Run #Atten: 20 dB Avg/Hold: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 16.576 MHz Total Power: 25.6 dBm Transmit Freq Error: -27.855 kHz OBW Power: 99.00 % x dB Bandwidth: 15.14 MHz x dB: -6.00 dB Frequency: Center Freq 2.412000000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.437000000 GHz Trig: Free Run #Atten: 20 dB Avg/Hold: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 18.231 MHz Total Power: 27.5 dBm Transmit Freq Error: 19.997 kHz OBW Power: 99.00 % x dB Bandwidth: 15.14 MHz x dB: -6.00 dB Frequency: Center Freq 2.437000000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz
2462 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.462000000 GHz Trig: Free Run #Atten: 20 dB Avg/Hold: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth: 16.352 MHz Total Power: 23.2 dBm Transmit Freq Error: 1.545 kHz OBW Power: 99.00 % x dB Bandwidth: 15.13 MHz x dB: -6.00 dB Frequency: Center Freq 2.462000000 GHz CF Step 3.000000 MHz Freq Offset 0 Hz



Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-1
2412 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.41200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.412 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.562 MHz Total Power 24.1 dBm Transmit Freq Error -10.127 kHz OBW Power 99.00 % x dB Bandwidth 15.13 MHz x dB -6.00 dB Frequency Center Freq 2.41200000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 18.636 MHz Total Power 27.7 dBm Transmit Freq Error -41.134 kHz OBW Power 99.00 % x dB Bandwidth 15.13 MHz x dB -6.00 dB Frequency Center Freq 2.43700000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz
2462 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.46200000 GHz Trig: Free Run #Atten: 20 dB AvgHld: 10/10 Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center 2.462 GHz #Res BW 100 kHz #VBW 300 kHz Span 30 MHz Sweep 2.933 ms Occupied Bandwidth 17.506 MHz Total Power 22.9 dBm Transmit Freq Error -4.702 kHz OBW Power 99.00 % x dB Bandwidth 15.14 MHz x dB -6.00 dB Frequency Center Freq 2.46200000 GHz CF Step 3.000000 MHz Auto Man Freq Offset 0 Hz



Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-1
2422 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.42200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center Freq: 2.422 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 50 MHz Sweep: 4.8 ms Occupied Bandwidth: 35.775 MHz Total Power: 21.7 dBm Transmit Freq Error: -19.701 kHz OBW Power: 99.00 % x dB Bandwidth: 35.12 MHz x dB: -6.00 dB Frequency: Center Freq 2.42200000 GHz CF Step: 5.000000 MHz Freq Offset: 0 Hz
2437 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.43700000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center Freq: 2.437 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 50 MHz Sweep: 4.8 ms Occupied Bandwidth: 35.911 MHz Total Power: 25.6 dBm Transmit Freq Error: 29.808 kHz OBW Power: 99.00 % x dB Bandwidth: 35.09 MHz x dB: -6.00 dB Frequency: Center Freq 2.43700000 GHz CF Step: 5.000000 MHz Freq Offset: 0 Hz
2452 MHz	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.45200000 GHz Trig: Free Run #Atten: 20 dB Radio Device: BTS Ref Offset: 12.1 dB Ref: 22.10 dBm Center Freq: 2.452 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 50 MHz Sweep: 4.8 ms Occupied Bandwidth: 35.706 MHz Total Power: 21.1 dBm Transmit Freq Error: 2.702 kHz OBW Power: 99.00 % x dB Bandwidth: 35.09 MHz x dB: -6.00 dB Frequency: Center Freq 2.45200000 GHz CF Step: 5.000000 MHz Freq Offset: 0 Hz

8 Maximum Power Density Measurement

8.1. Limit

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.

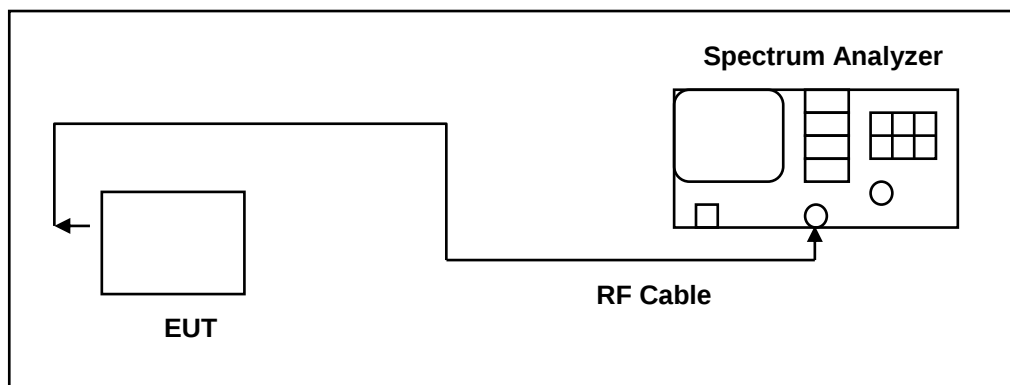
IEEE 802.11b/g

- * CDD mode : Directional Gain = $10 \cdot \log \left[\left(10^{G1/20} + 10^{G2/20} + 10^{G3/20} \right)^2 / N_{ANT} \right] = 6.96 \text{ dBi} > 6 \text{ dBi}$
- * CDD mode power limit shall be reduced = $8 - 0.96 = 7.04 \text{ dBm}$.

IEEE 802.11n 2.4GHz 20MHz/40MHz

- * MIMO mode : Directional Gain = $10 \cdot \log \{ [10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}] / N_{ANT} \} = 3.96 \text{ dBi} < 6 \text{ dBi}$
- * MIMO mode power limit shall be reduced = $8 - 0 = 8 \text{ dBm}$.

8.2. Test Setup



8.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.



8.4. Test Procedure

The EUT tested to DTS test procedure of KDB558074D01 section 10.2 Method PKPSD for compliance to FCC 47CFR 15.247 requirements.

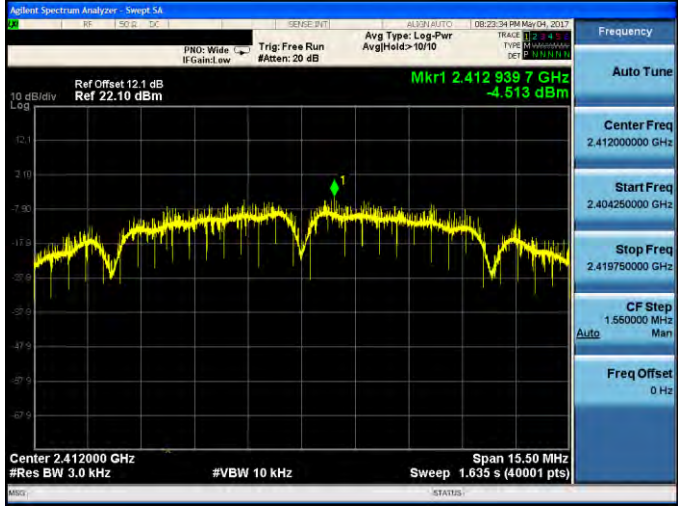
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

8.5. Test Result

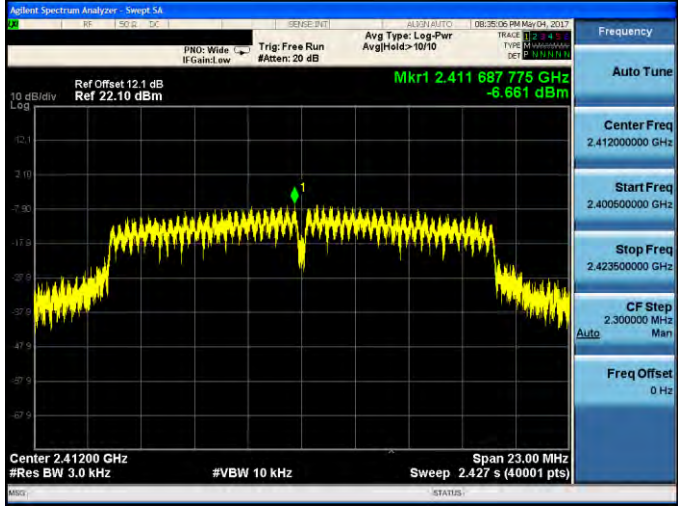
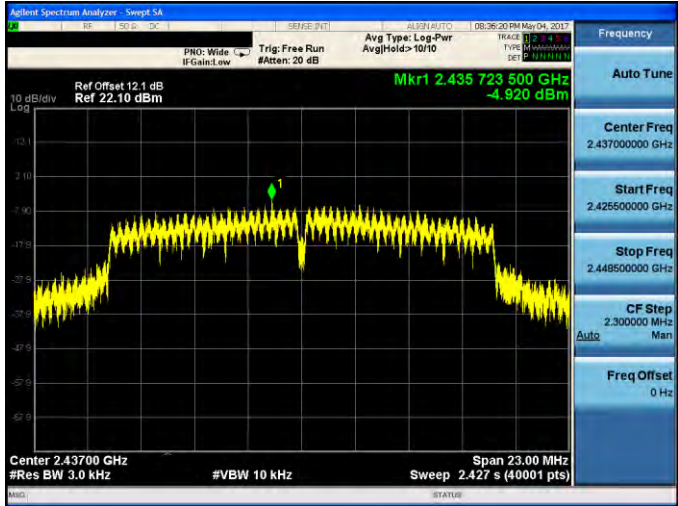
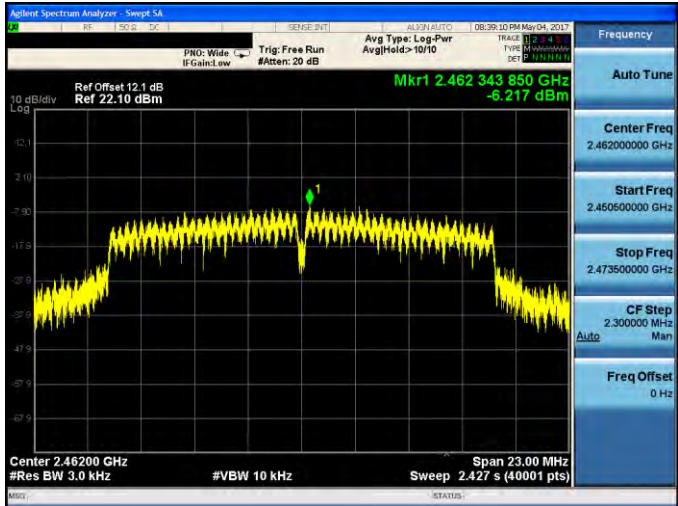
Date of Test	05/04/2017				
Test Mode	Frequency (MHz)	Measurement (dBm/3KHz)			Limit (dBm/3KHz)
		ANT-0	ANT-1	ANT-0+1	
Mode 2	2412	-4.513	-3.253	-0.827	< 7.04
	2437	-3.318	-3.552	-0.423	< 7.04
	2462	-3.649	-6.307	-1.767	< 7.04
Mode 3	2412	-6.661	-5.819	-3.209	< 7.04
	2437	-4.920	-4.550	-1.721	< 7.04
	2462	-6.217	-6.254	-3.225	< 7.04
Mode 4	2412	-8.399	-8.270	-5.324	< 8
	2437	-8.346	-7.866	-5.089	< 8
	2462	-8.203	-8.963	-5.556	< 8
Mode 5	2422	-10.935	-10.181	-7.531	< 8
	2437	-10.645	-10.435	-7.528	< 8
	2452	-10.552	-10.122	-7.321	< 8



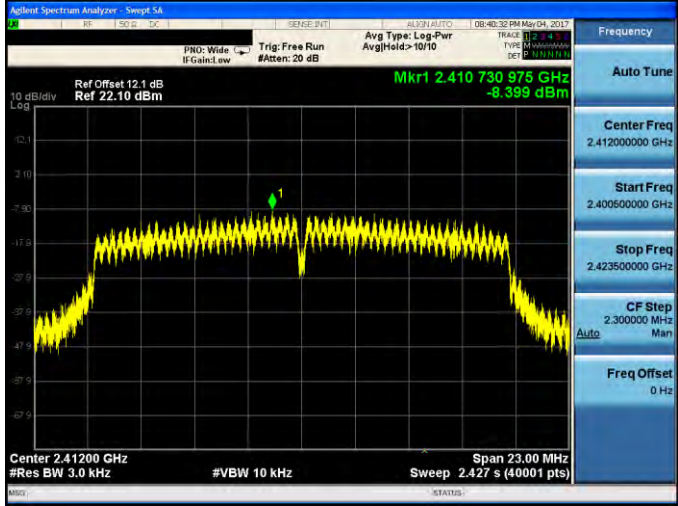
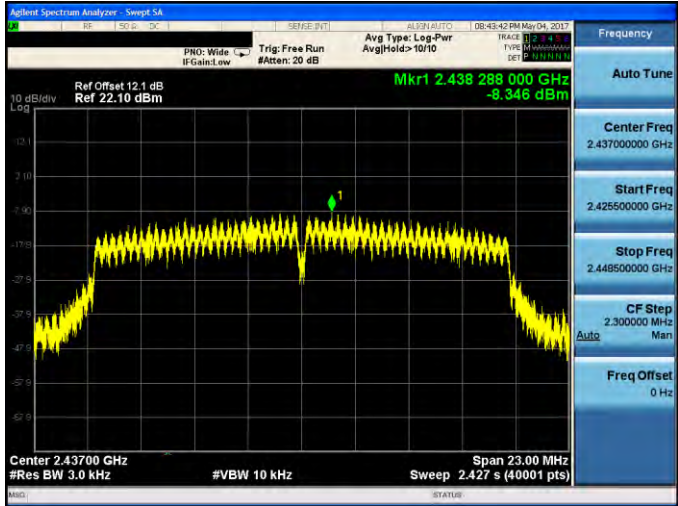
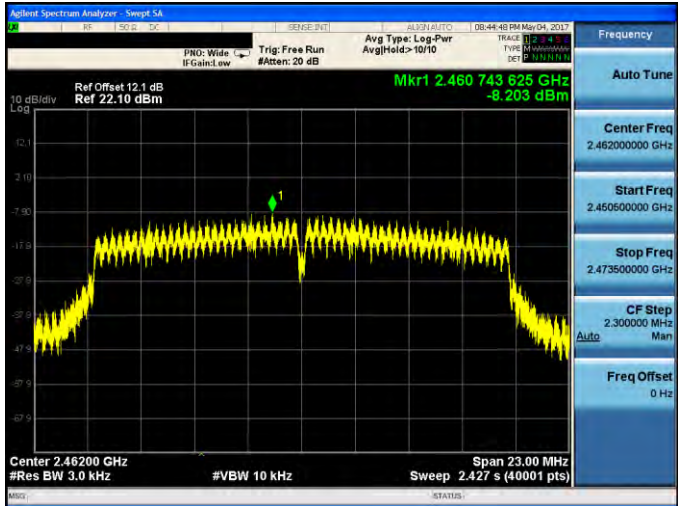
8.6. Test Graphs

Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

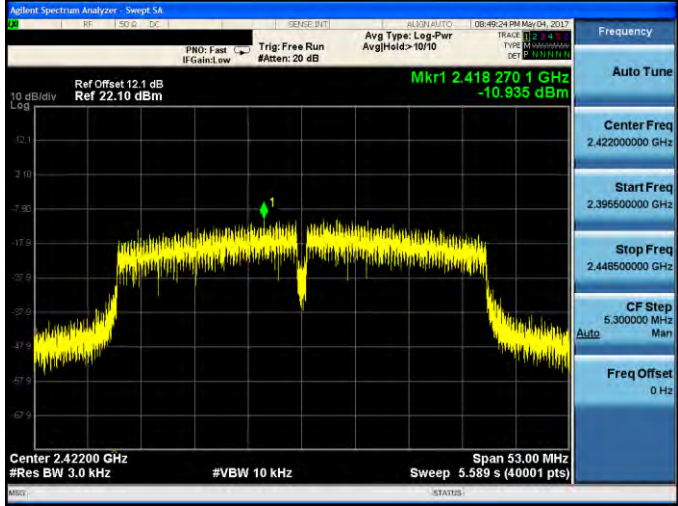
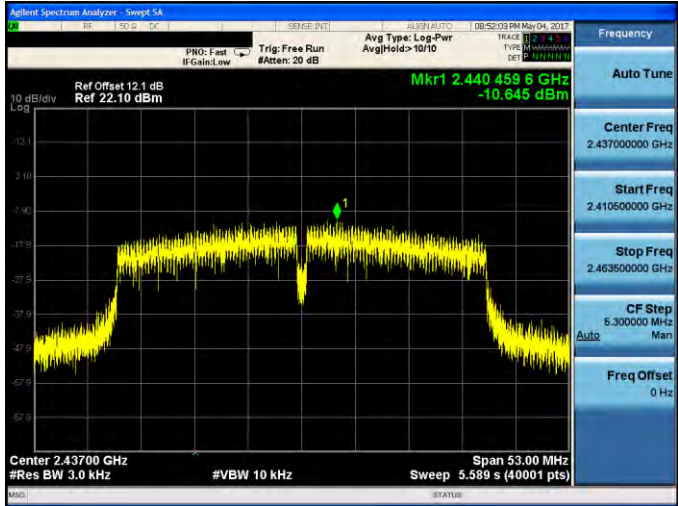
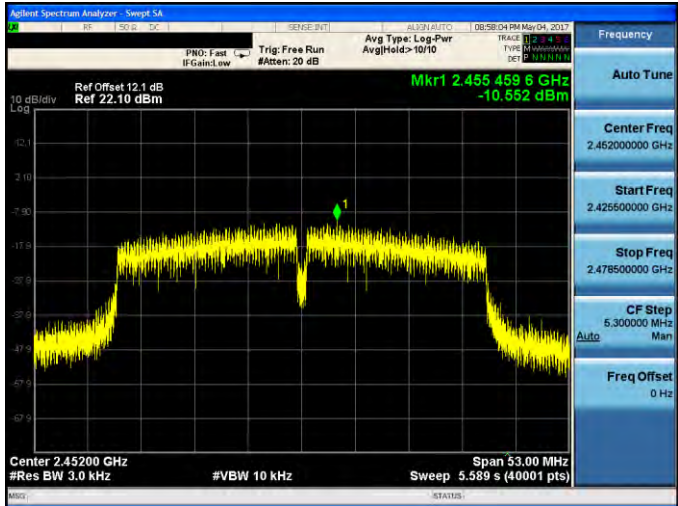


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

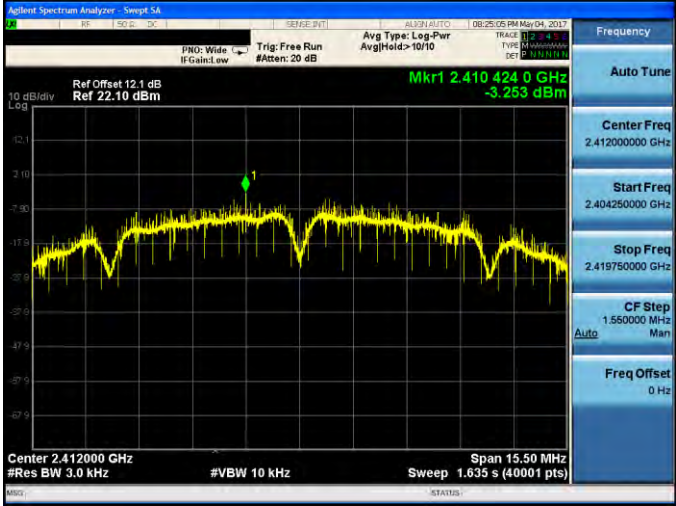
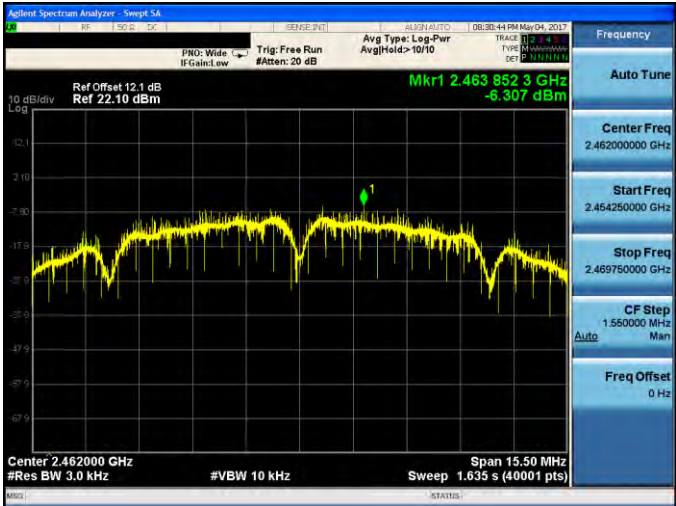


Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

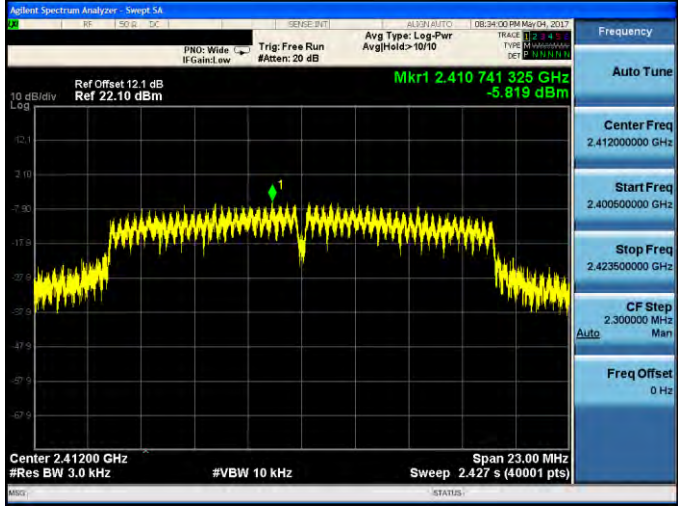
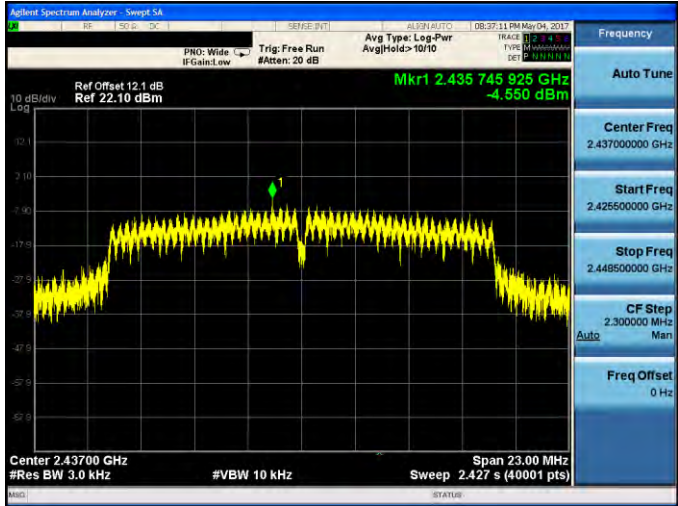
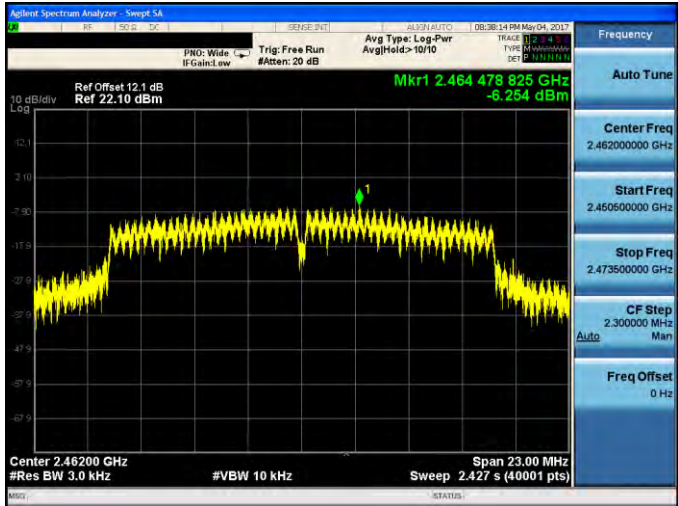


Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-0
2422 MHz	
2437 MHz	
2452 MHz	

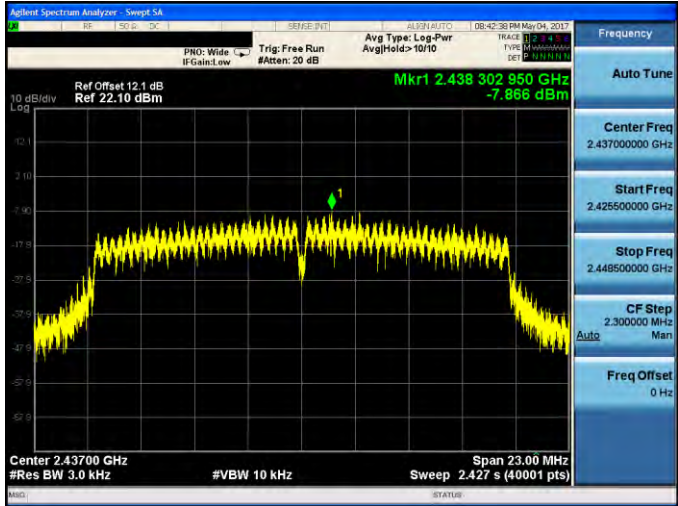
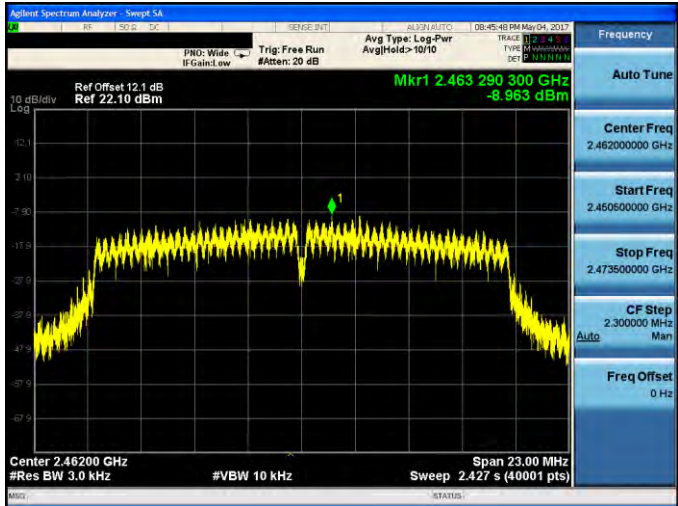


Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	

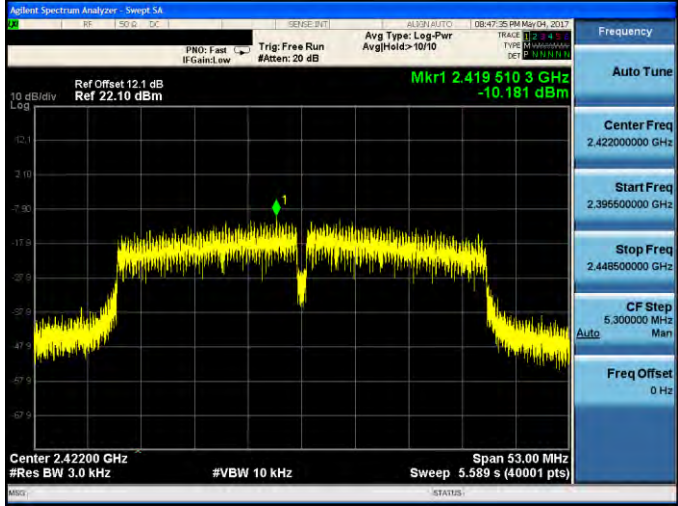
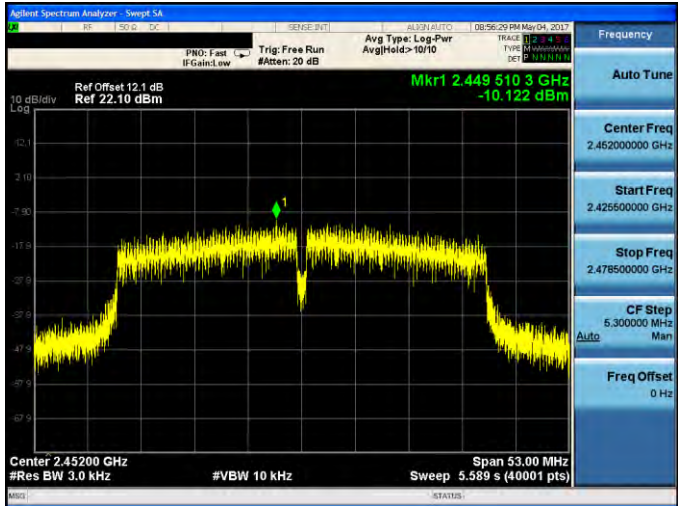


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	



Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	



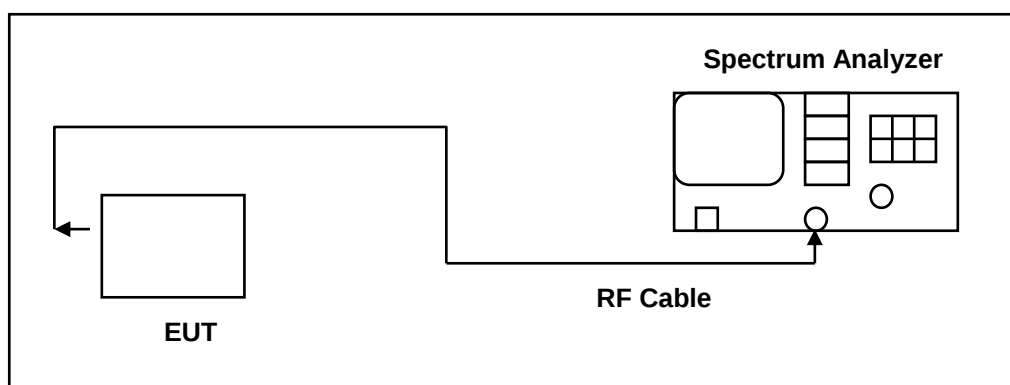
Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-1
2422 MHz	
2437 MHz	
2452 MHz	

9 Out of Band Conducted Emissions Measurement

9.1. Limit

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 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

9.2. Test Setup



9.3. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Spectrum Analyzer	Agilent	E4408B	MY45107753	08/08/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

9.4. Test Procedure

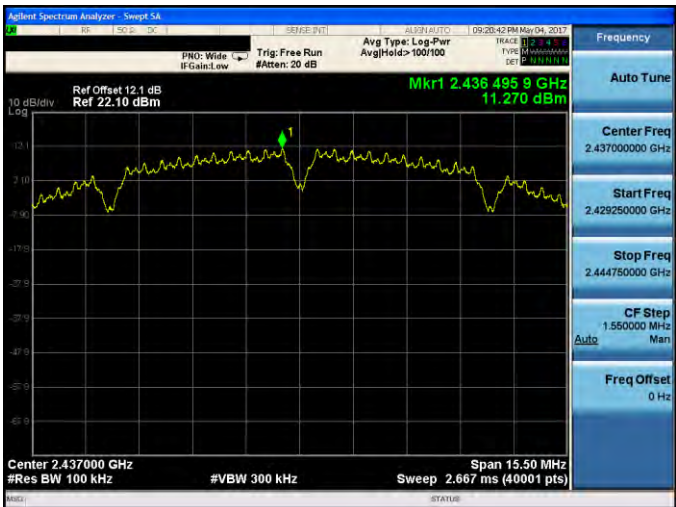
In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 30 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels.

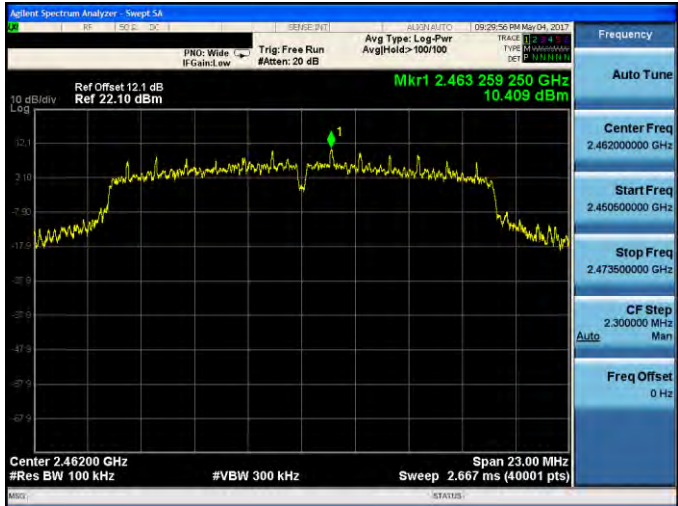


9.5. Test Graphs

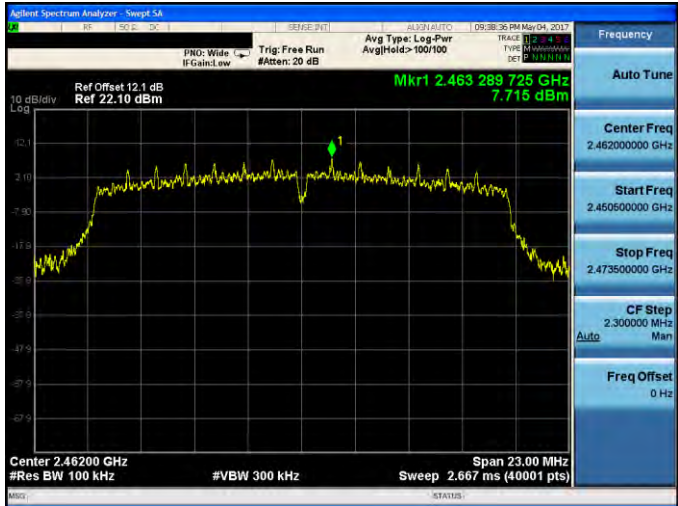
Reference level

Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

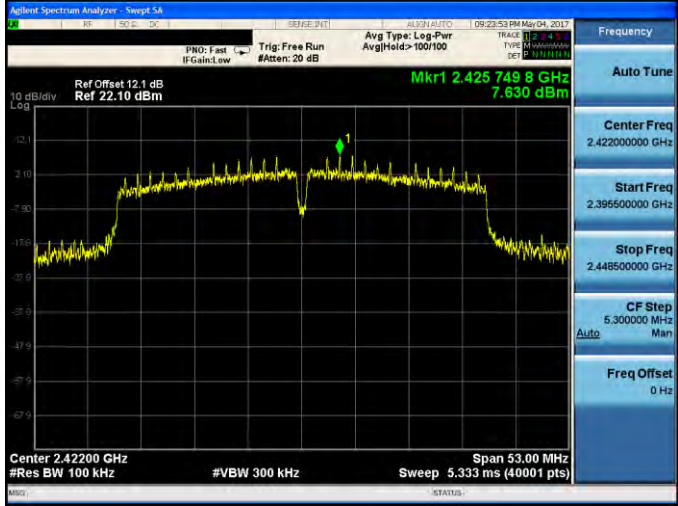
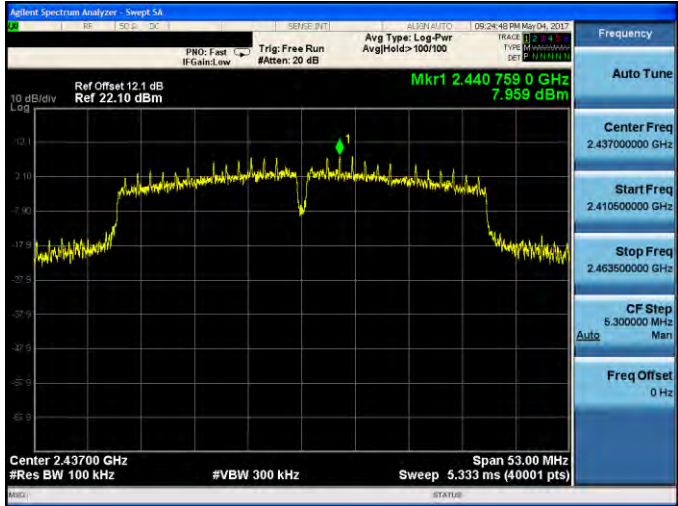
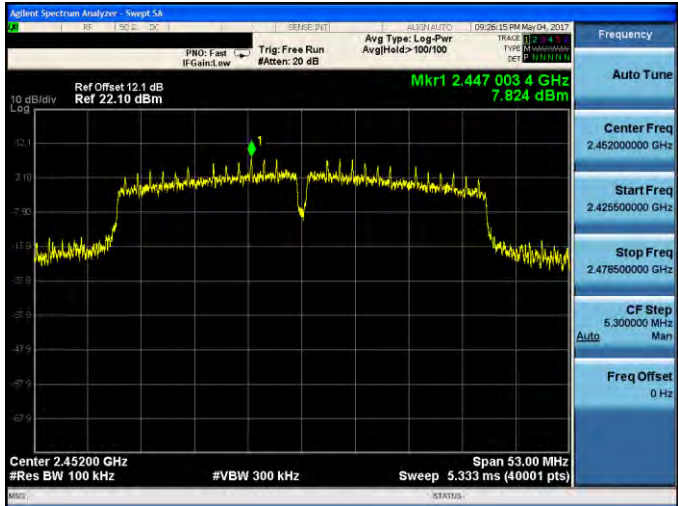


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	



Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

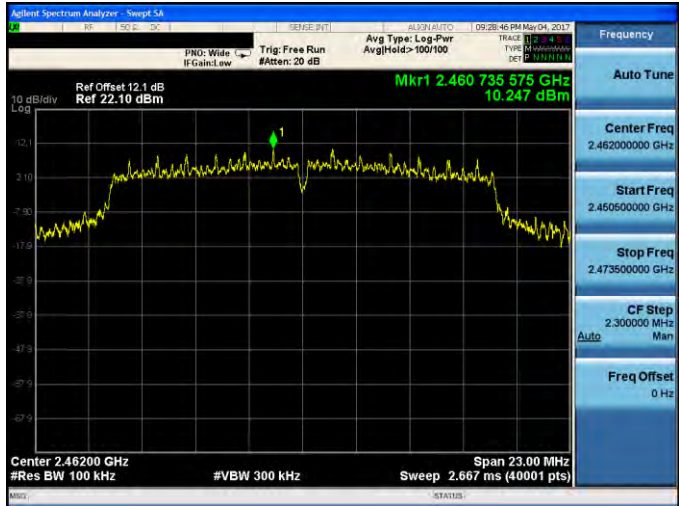


Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-0
2422 MHz	
2437 MHz	
2452 MHz	

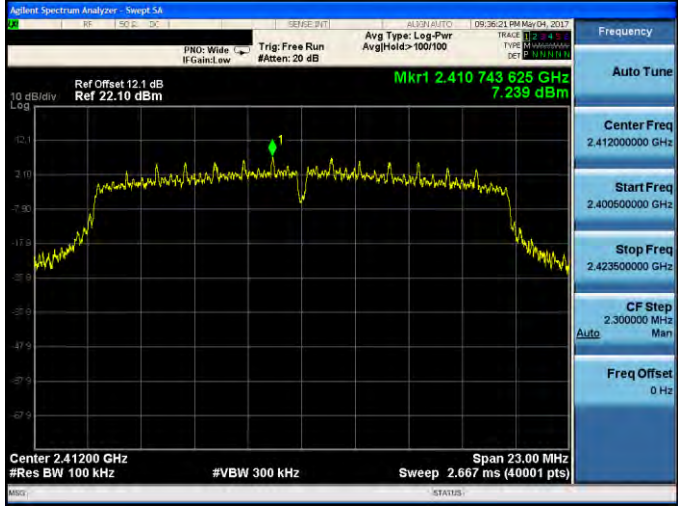
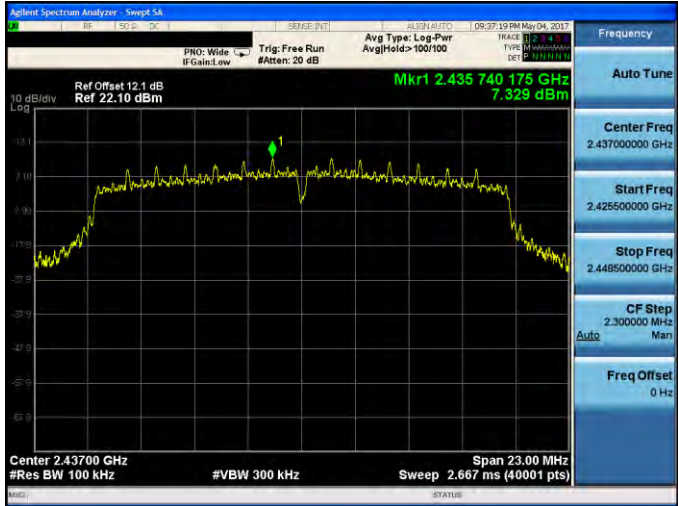
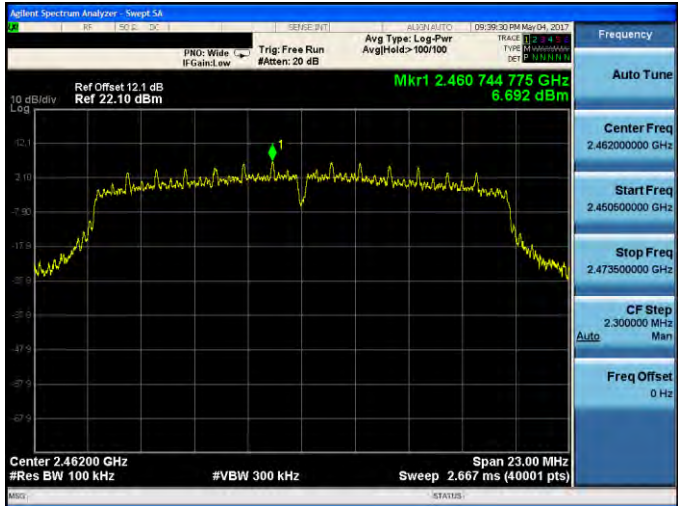


Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	

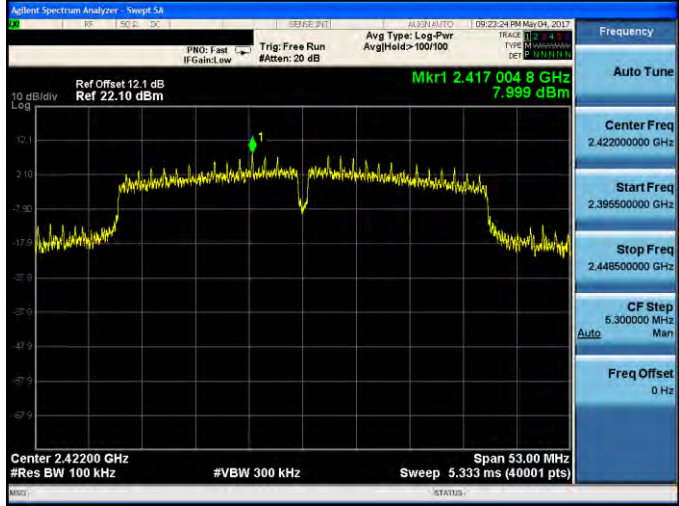
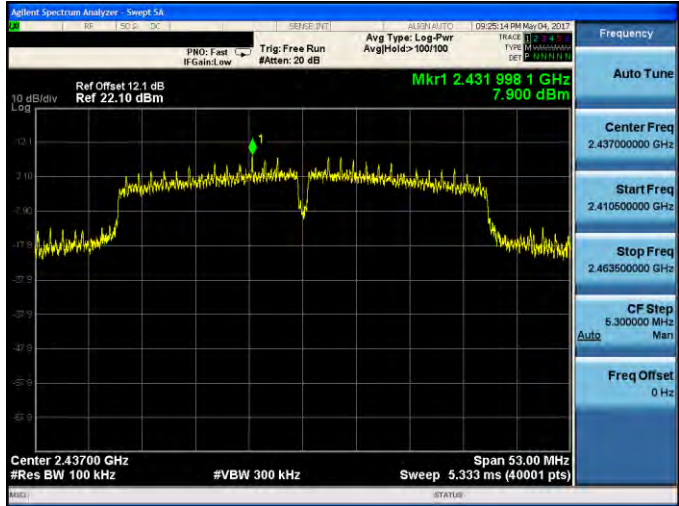
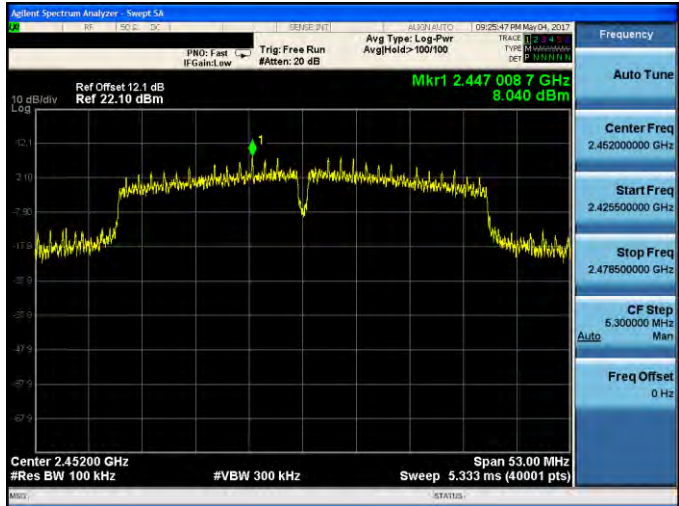


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	



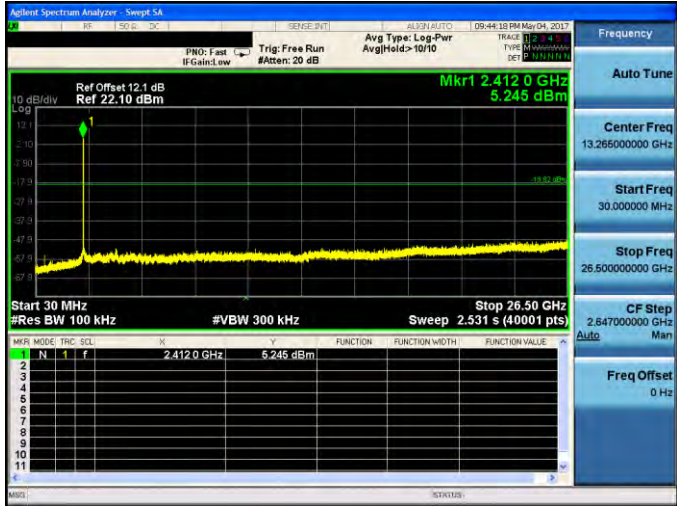
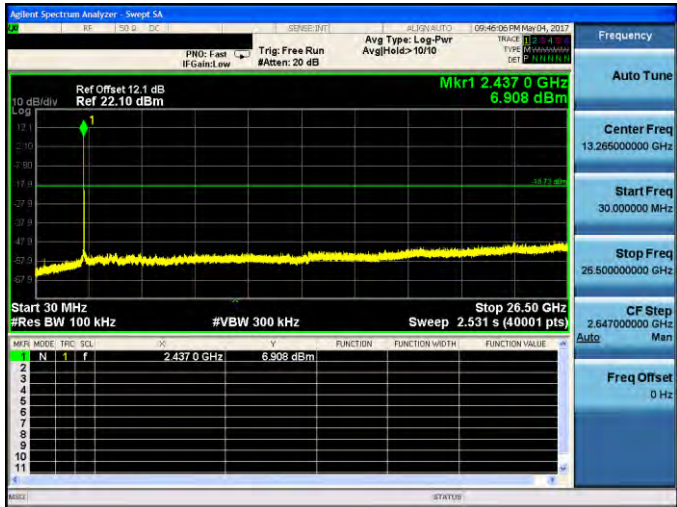
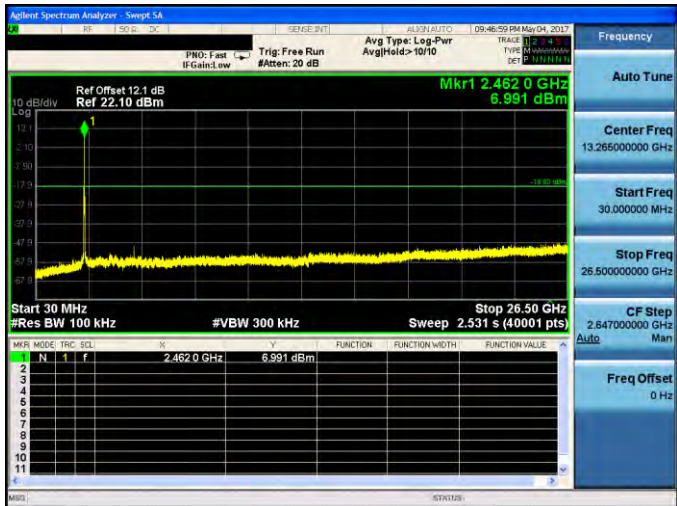
Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	



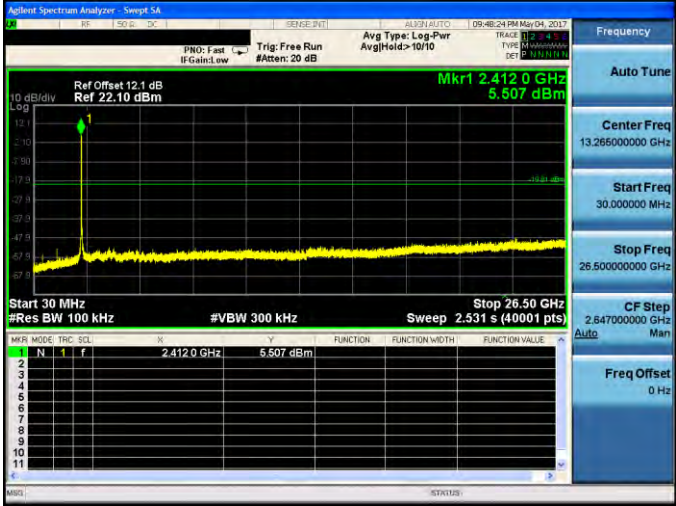
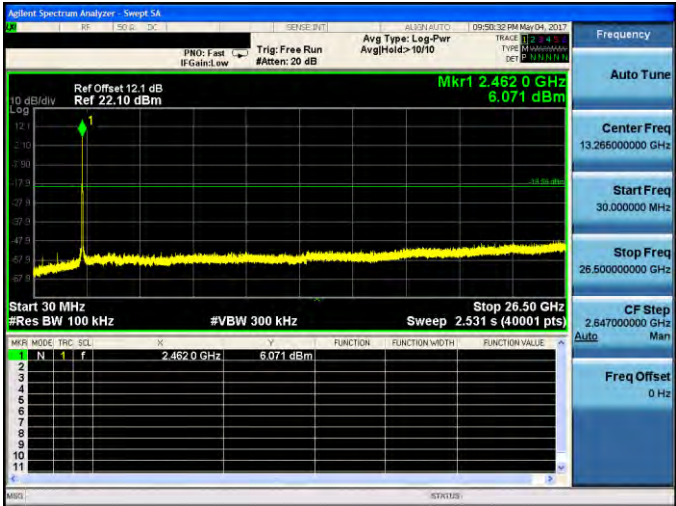
Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-1
2422 MHz	
2437 MHz	
2452 MHz	



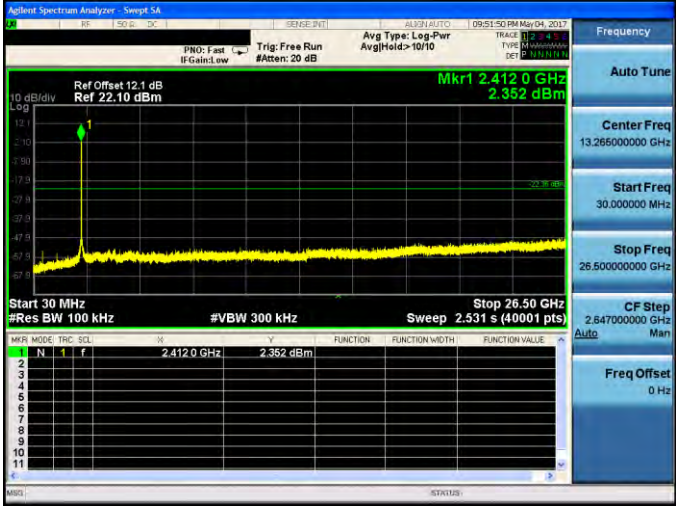
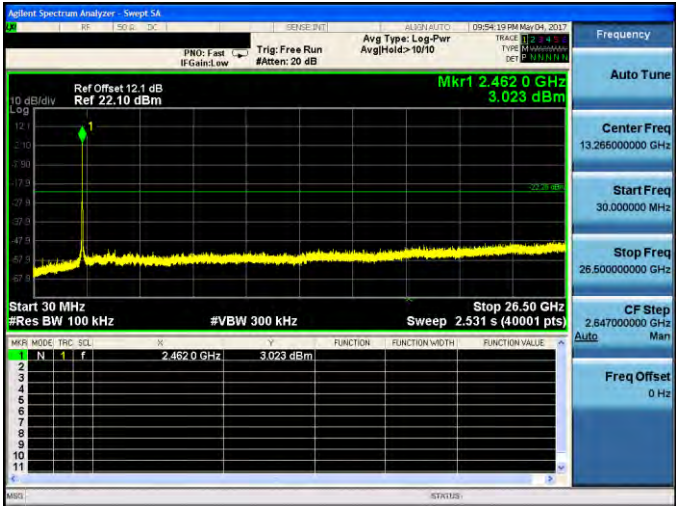
Out of Band Conducted Emissions

Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

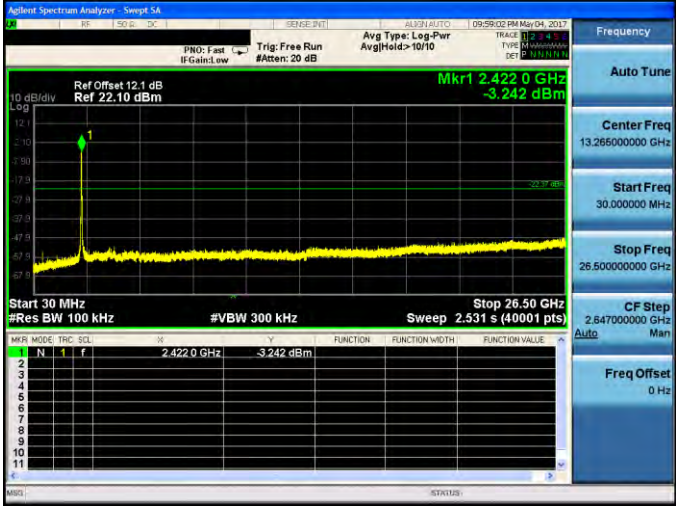
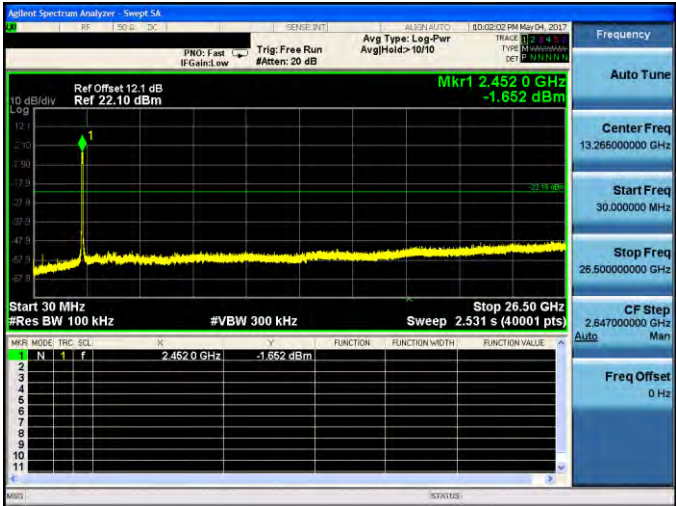


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	

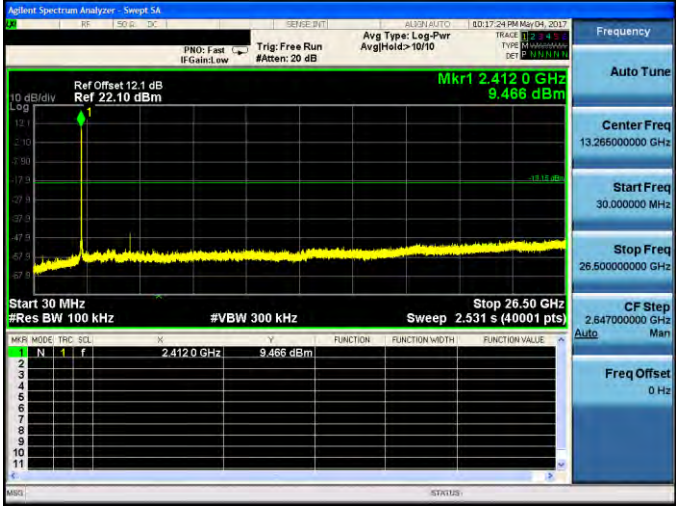
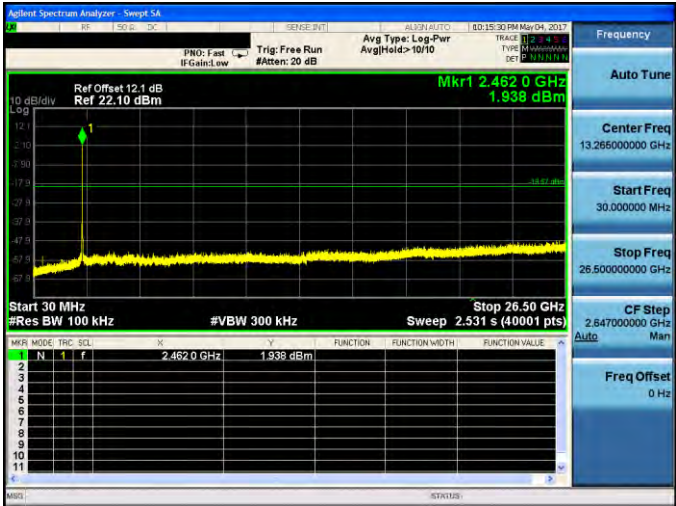


Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2437 MHz	
2462 MHz	



Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-0
2422 MHz	
2437 MHz	
2452 MHz	

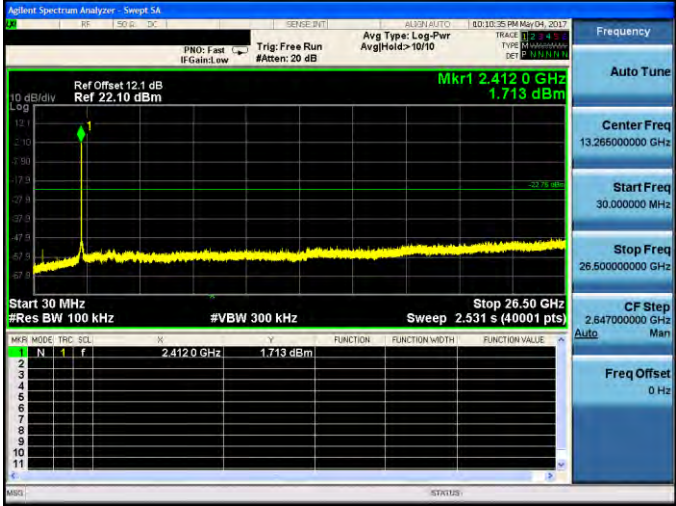
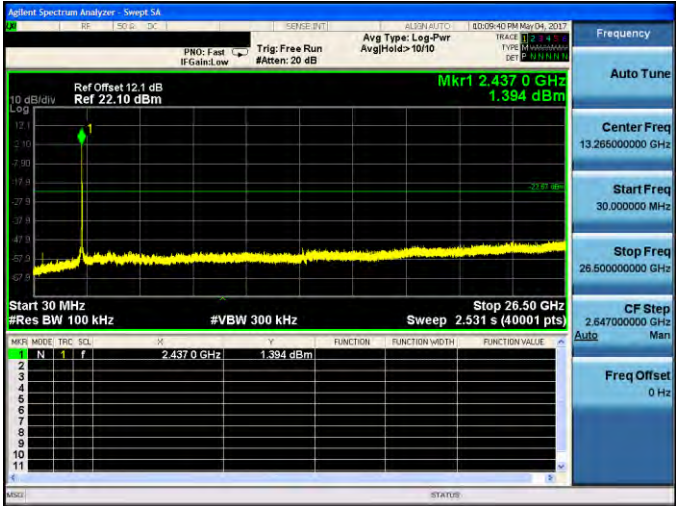
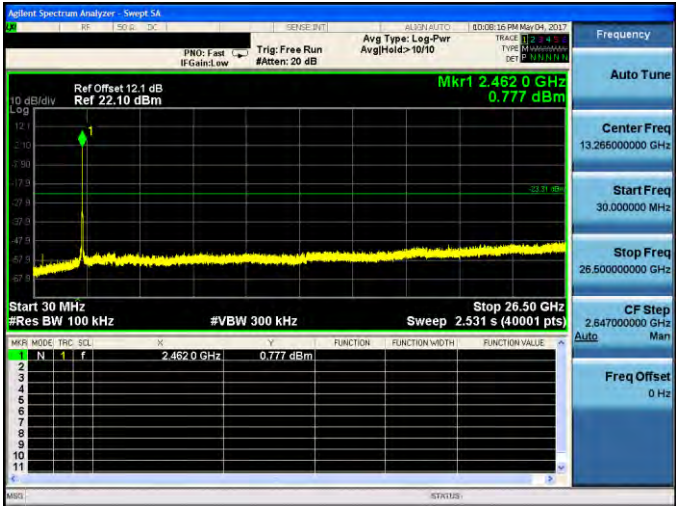


Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	

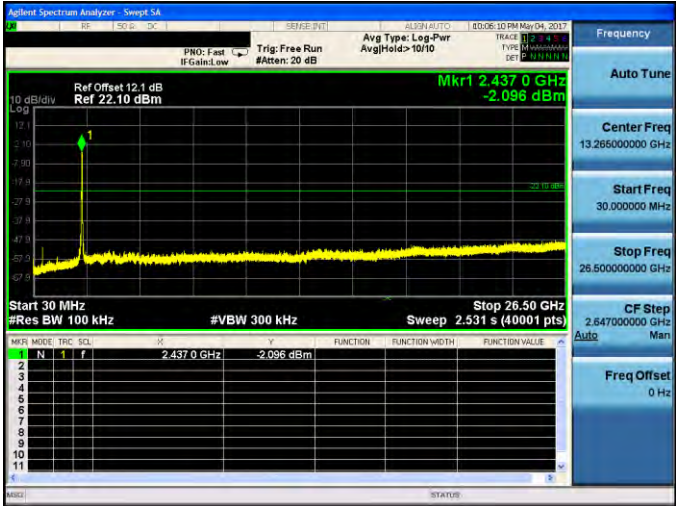
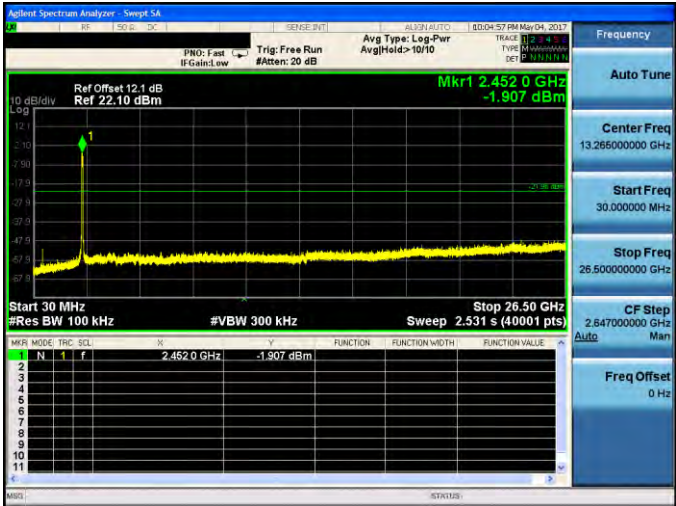


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	

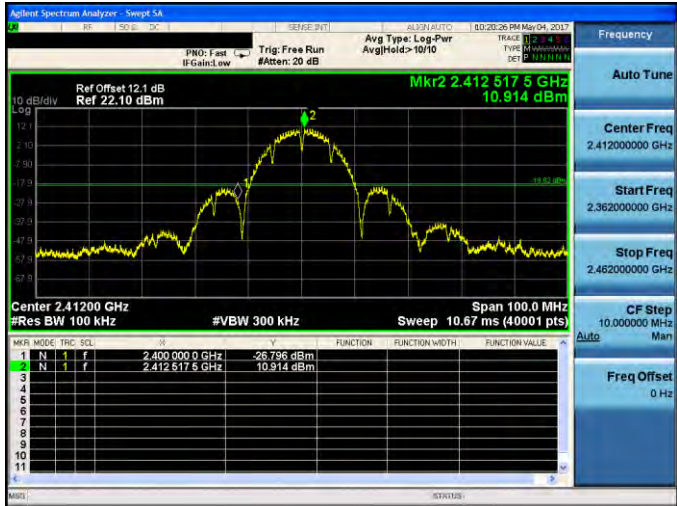
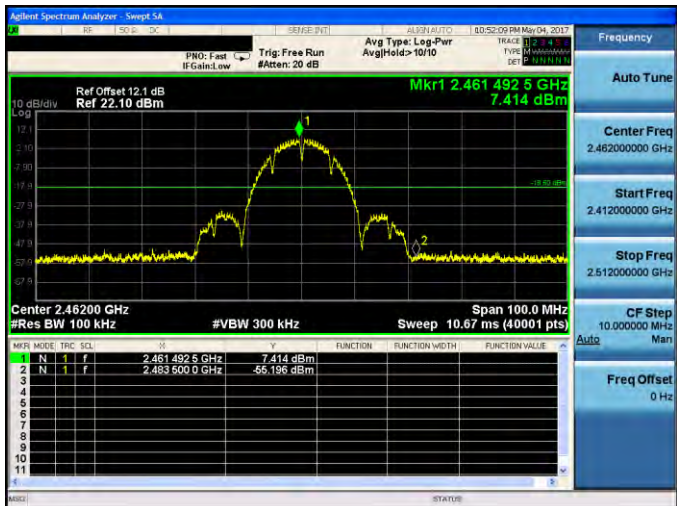


Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2437 MHz	
2462 MHz	

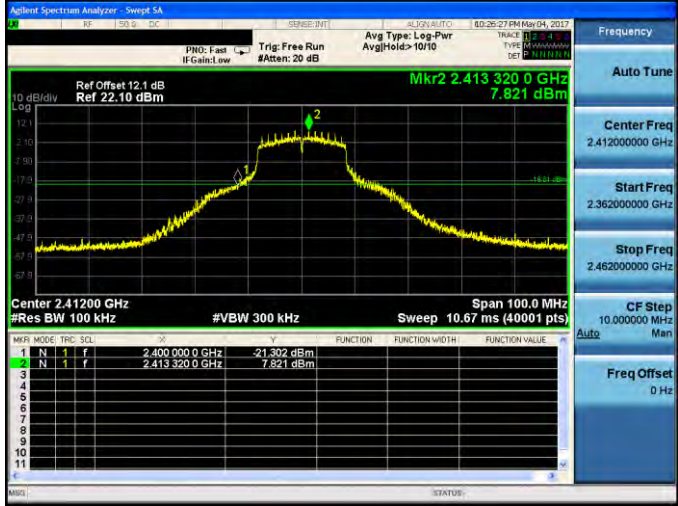
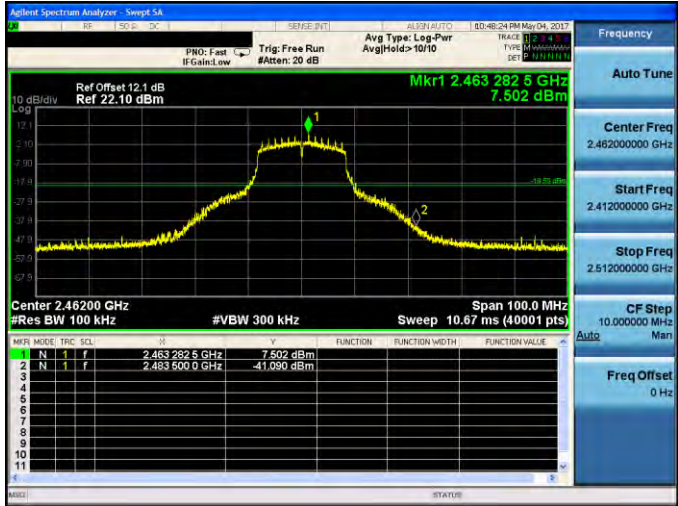


Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-1
2422 MHz	
2437 MHz	
2452 MHz	

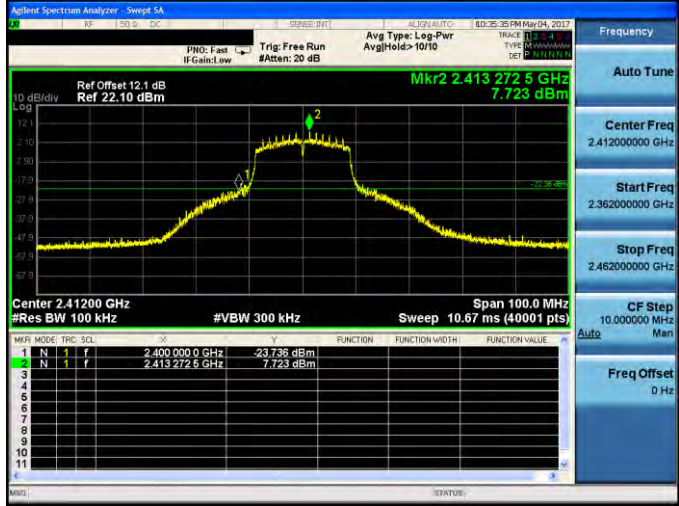
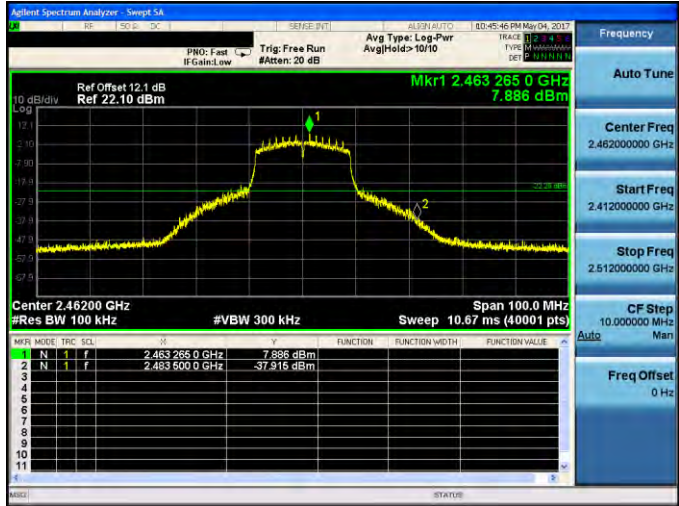
**Conducted Band Edge**

Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2462 MHz	

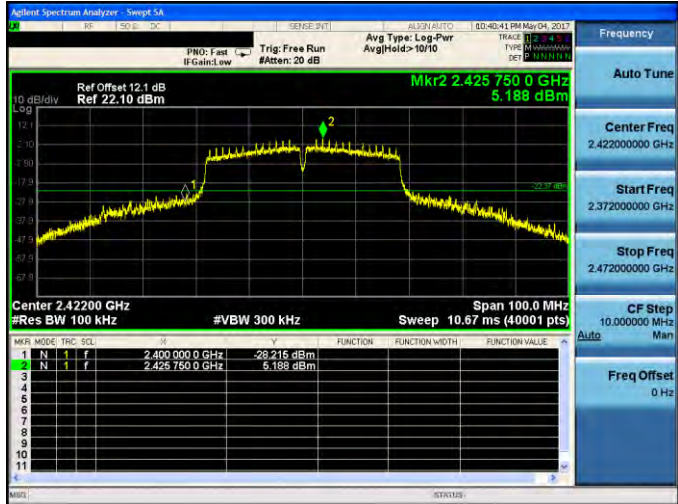


Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2462 MHz	

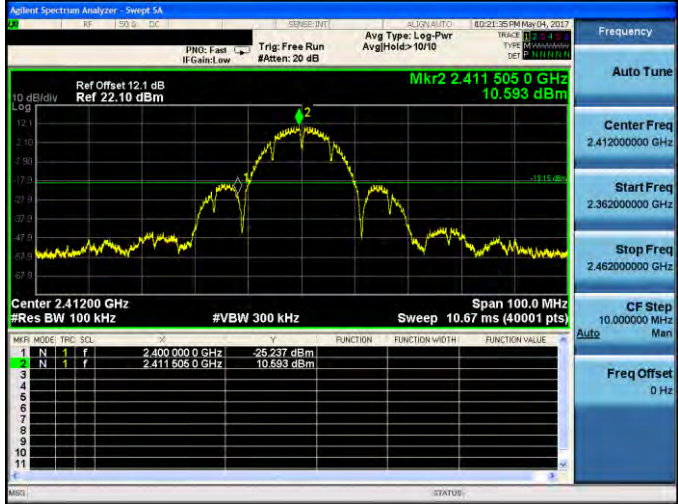
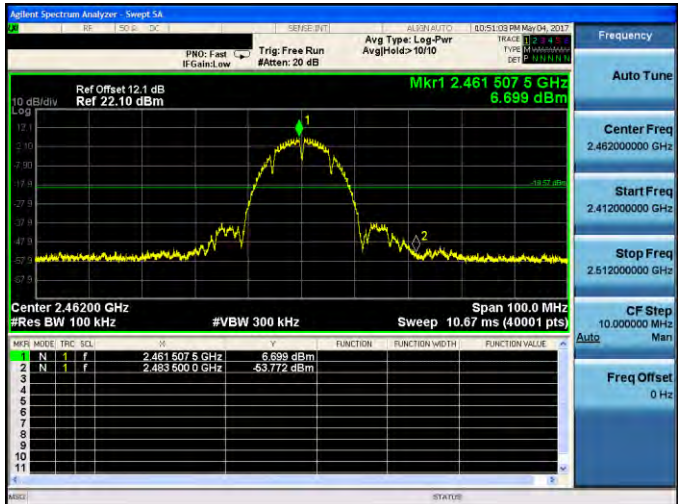


Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode
Antenna:	ANT-0
2412 MHz	
2462 MHz	



Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode																											
Antenna:	ANT-0																											
2422 MHz	<table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SQL</th><th>F</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.400000 GHz</td><td>-28.215 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.426750 GHz</td><td>-32.97 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.400000 GHz	-28.215 dBm				2	N	1	f	2.426750 GHz	-32.97 dBm			
MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	2.400000 GHz	-28.215 dBm																							
2	N	1	f	2.426750 GHz	-32.97 dBm																							
2452 MHz	<table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SQL</th><th>F</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.446992 GHz</td><td>-32.785 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.448500 GHz</td><td>-32.785 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.446992 GHz	-32.785 dBm				2	N	1	f	2.448500 GHz	-32.785 dBm			
MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	2.446992 GHz	-32.785 dBm																							
2	N	1	f	2.448500 GHz	-32.785 dBm																							

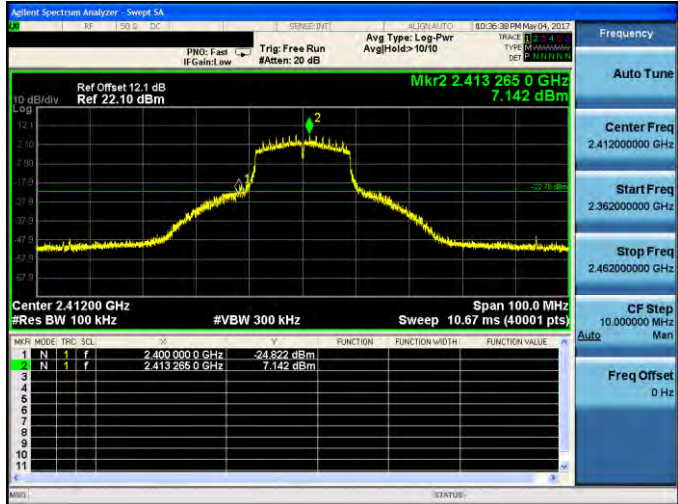
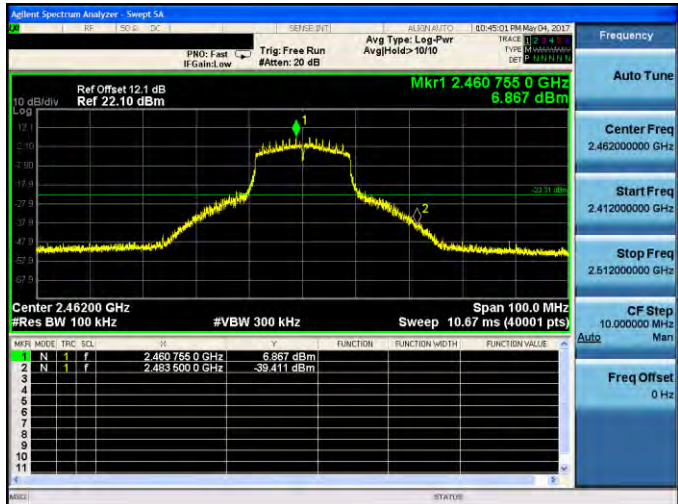


Test Mode:	Mode 2: IEEE 802.11b Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2462 MHz	



Test Mode:	Mode 3: IEEE 802.11g Continuous TX mode
Antenna:	ANT-1
2412 MHz	
2462 MHz	



Test Mode:	Mode 4: IEEE 802.11n 2.4GHz 20MHz Continuous TX mode																											
Antenna:	ANT-1																											
2412 MHz	 Agilent Spectrum Analyzer - Swept SA PRG: Fast Trig: Free Run Avg Type: Leg-Pwr AvgHold: 10/10 Ref Offset 12.1 dB Ref 22.10 dBm Mkr2 2.413 265 0 GHz 7.142 dBm Center 2.41200 GHz #Res BW 100 kHz #VBW 300 kHz Span 100.0 MHz Sweep 10.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SQL</th><th>F</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.400 000 0 GHz</td><td>-24.822 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.413 265 0 GHz</td><td>7.142 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.400 000 0 GHz	-24.822 dBm				2	N	1	f	2.413 265 0 GHz	7.142 dBm			
MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	2.400 000 0 GHz	-24.822 dBm																							
2	N	1	f	2.413 265 0 GHz	7.142 dBm																							
2462 MHz	 Agilent Spectrum Analyzer - Swept SA PRG: Fast Trig: Free Run Avg Type: Leg-Pwr AvgHold: 10/10 Ref Offset 12.1 dB Ref 22.10 dBm Mkr1 2.460 755 0 GHz 6.887 dBm Center 2.46200 GHz #Res BW 100 kHz #VBW 300 kHz Span 100.0 MHz Sweep 10.67 ms (40001 pts) <table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SQL</th><th>F</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.460 755 0 GHz</td><td>6.887 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483 500 0 GHz</td><td>-39.411 dBm</td><td></td><td></td><td></td></tr></table>	MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.460 755 0 GHz	6.887 dBm				2	N	1	f	2.483 500 0 GHz	-39.411 dBm			
MKR	MODE	TRC	SQL	F	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	N	1	f	2.460 755 0 GHz	6.887 dBm																							
2	N	1	f	2.483 500 0 GHz	-39.411 dBm																							



Test Mode:	Mode 5: IEEE 802.11n 2.4GHz 40MHz Continuous TX mode
Antenna:	ANT-1
2422 MHz	
2452 MHz	

10 Antenna Measurement

10.1.Limit

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2.Antenna Description

See section 2 – antenna information.

10.3.DirectionaI Gain Calculated

For Maximum Conducted Output Power

* CDD mode: Directional Gain = $10 \cdot \log\{[10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}] / N_{ANT}\} = 3.96 \text{ dBi} < 6 \text{ dBi}$

* MIMO mode : Directional Gain = $10 \cdot \log\{[10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}] / N_{ANT}\} = 3.96 \text{ dBi} < 6 \text{ dBi}$

Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11b	3.96
IEEE 802.11g	3.96
IEEE 802.11n 2.4GHz 20MHz	3.96
IEEE 802.11n 2.4GHz 40MHz	3.96

For Maximum Power Density

* CDD mode : Directional Gain = $10 \cdot \log\{[10^{G1/20} + 10^{G2/20} + 10^{G3/20}]^2 / N_{ANT}\} = 6.96 \text{ dBi} > 6 \text{ dBi}$

* MIMO mode : Directional Gain = $10 \cdot \log\{[10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}] / N_{ANT}\} = 3.96 \text{ dBi} < 6 \text{ dBi}$

Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11b	6.96
IEEE 802.11g	6.96
IEEE 802.11n 2.4GHz 20MHz	3.96
IEEE 802.11n 2.4GHz 40MHz	3.96