Test Mode: TX / IEEE 802.11g (CH High) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1369.000	46.95	-7.17	39.78	74.00	-34.22	V	Peak
2242.000	45.07	-3.67	41.40	74.00	-32.60	V	Peak
2881.000	44.29	-1.57	42.72	74.00	-31.28	V	Peak
3727.000	42.39	0.44	42.83	74.00	-31.17	V	Peak
4213.000	42.50	2.34	44.84	74.00	-29.16	V	Peak
4870.000	41.75	4.56	46.31	74.00	-27.69	V	Peak
1486.000	46.46	-6.91	39.55	74.00	-34.45	H	Peak
2197.000	45.08	-3.92	41.16	74.00	-32.84	H	Peak
2665.000	45.41	-1.96	43.45	74.00	-30.55	H	Peak
3394.000	42.85	-0.70	42.15	74.00	-31.85	H	Peak
3655.000	42.36	0.13	42.49	74.00	-31.51	H	Peak
4177.000	42.67	2.21	44.88	74.00	-29.12	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / IEEE 802.11n HT20 MHz (CH Low) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1369.000	46.84	-7.17	39.67	74.00	-34.33	V	Peak
2818.000	43.40	-1.69	41.71	74.00	-32.29	V	Peak
3619.000	42.44	-0.02	42.42	74.00	-31.58	V	Peak
4168.000	42.21	2.18	44.39	74.00	-29.61	V	Peak
4555.000	41.45	3.53	44.98	74.00	-29.02	V	Peak
5518.000	40.89	5.88	46.77	74.00	-27.23	V	Peak
1315.000	46.60	-7.37	39.23	74.00	-34.77	H	Peak
2188.000	44.23	-3.97	40.26	74.00	-33.74	H	Peak
2656.000	44.10	-1.98	42.12	74.00	-31.88	H	Peak
3691.000	41.30	0.29	41.59	74.00	-32.41	H	Peak
4312.000	41.47	2.69	44.16	74.00	-29.84	H	Peak
4843.000	39.91	4.47	44.38	74.00	-29.62	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / IEEE 802.11n HT20 MHz (CH Mid) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1333.000	46.58	-7.30	39.28	74.00	-34.72	V	Peak
2242.000	44.86	-3.67	41.19	74.00	-32.81	V	Peak
2665.000	45.23	-1.96	43.27	74.00	-30.73	V	Peak
3781.000	42.40	0.67	43.07	74.00	-30.93	V	Peak
4384.000	41.00	2.94	43.94	74.00	-30.06	V	Peak
4870.000	41.96	4.56	46.52	74.00	-27.48	V	Peak
1351.000	48.00	-7.24	40.76	74.00	-33.24	H	Peak
2197.000	44.91	-3.92	40.99	74.00	-33.01	H	Peak
2665.000	45.24	-1.96	43.28	74.00	-30.72	H	Peak
3754.000	42.09	0.55	42.64	74.00	-31.36	H	Peak
4195.000	41.65	2.28	43.93	74.00	-30.07	H	Peak
5158.000	41.36	5.26	46.62	74.00	-27.38	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / EEE 802.11n HT20 MHz (CH High) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1900.000	47.82	-5.63	42.19	74.00	-31.81	V	Peak
2656.000	45.34	-1.98	43.36	74.00	-30.64	V	Peak
3727.000	41.45	0.44	41.89	74.00	-32.11	V	Peak
4186.000	41.71	2.24	43.95	74.00	-30.05	V	Peak
4294.000	42.01	2.62	44.63	74.00	-29.37	V	Peak
4987.000	42.13	4.94	47.07	74.00	-26.93	V	Peak
1459.000	45.82	-6.95	38.87	74.00	-35.13	H	Peak
2179.000	44.91	-4.02	40.89	74.00	-33.11	H	Peak
2836.000	43.34	-1.66	41.68	74.00	-32.32	H	Peak
3619.000	42.36	-0.02	42.34	74.00	-31.66	H	Peak
4240.000	41.71	2.43	44.14	74.00	-29.86	H	Peak
5068.000	41.56	5.10	46.66	74.00	-27.34	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / IEEE 802.11n HT40 MHz (CH Low) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1333.000	47.09	-7.30	39.79	74.00	-34.21	V	Peak
1900.000	52.51	-5.63	46.88	74.00	-27.12	V	Peak
2827.000	42.91	-1.67	41.24	74.00	-32.76	V	Peak
4231.000	41.69	2.40	44.09	74.00	-29.91	V	Peak
5014.000	41.09	5.00	46.09	74.00	-27.91	V	Peak
5626.000	41.73	5.92	47.65	74.00	-26.35	V	Peak
1342.000	47.24	-7.27	39.97	74.00	-34.03	H	Peak
3394.000	41.91	-0.70	41.21	74.00	-32.79	H	Peak
3943.000	40.85	1.35	42.20	74.00	-31.80	H	Peak
4591.000	42.11	3.65	45.76	74.00	-28.24	H	Peak
5077.000	41.16	5.12	46.28	74.00	-27.72	H	Peak
5743.000	40.45	5.97	46.42	74.00	-27.58	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / IEEE 802.11n HT40 MHz (CH Mid) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1324.000	47.19	-7.34	39.85	74.00	-34.15	V	Peak
2233.000	44.63	-3.72	40.91	74.00	-33.09	V	Peak
3655.000	42.08	0.13	42.21	74.00	-31.79	V	Peak
3898.000	42.56	1.16	43.72	74.00	-30.28	V	Peak
4366.000	41.68	2.88	44.56	74.00	-29.44	V	Peak
4987.000	41.80	4.94	46.74	74.00	-27.26	V	Peak
1369.000	46.26	-7.17	39.09	74.00	-34.91	H	Peak
2143.000	44.40	-4.22	40.18	74.00	-33.82	H	Peak
3376.000	41.91	-0.73	41.18	74.00	-32.82	H	Peak
4222.000	41.58	2.37	43.95	74.00	-30.05	H	Peak
4789.000	40.69	4.29	44.98	74.00	-29.02	H	Peak
4933.000	41.77	4.76	46.53	74.00	-27.47	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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Test Mode: TX / EEE 802.11n HT40 MHz (CH High) **Tested by:** Saber Huang

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 28, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1468.000	46.79	-6.94	39.85	74.00	-34.15	V	Peak
2062.000	46.20	-4.66	41.54	74.00	-32.46	V	Peak
2665.000	45.28	-1.96	43.32	74.00	-30.68	V	Peak
3241.000	42.51	-0.96	41.55	74.00	-32.45	V	Peak
3898.000	41.60	1.16	42.76	74.00	-31.24	V	Peak
4222.000	42.04	2.37	44.41	74.00	-29.59	V	Peak
1324.000	47.85	-7.34	40.51	74.00	-33.49	H	Peak
2242.000	45.19	-3.67	41.52	74.00	-32.48	H	Peak
2629.000	45.34	-2.03	43.31	74.00	-30.69	H	Peak
3367.000	43.34	-0.74	42.60	74.00	-31.40	H	Peak
4195.000	41.46	2.28	43.74	74.00	-30.26	H	Peak
4969.000	41.32	4.88	46.20	74.00	-27.80	H	Peak

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

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7.3. 6dB BANDWIDTH MEASUREMENT

7.3.1. LIMITS

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.3.2. TEST INSTRUMENTS

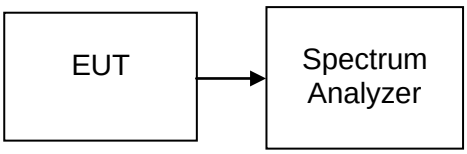
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	01/27/2018	01/26/2019

7.3.3. TEST PROCEDURES (please refer to measurement standard)

8.2 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

7.3.4. TEST SETUP



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7.3.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	9052.00	>500	PASS
Mid	2437	9018.00		PASS
High	2462	8565.00		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16320.00	>500	PASS
Mid	2437	16300.00		PASS
High	2462	16310.00		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17190.00	>500	PASS
Mid	2437	16920.00		PASS
High	2462	16920.00		PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	35740.00	>500	PASS
Mid	2437	35750.00		PASS
High	2452	35730.00		PASS

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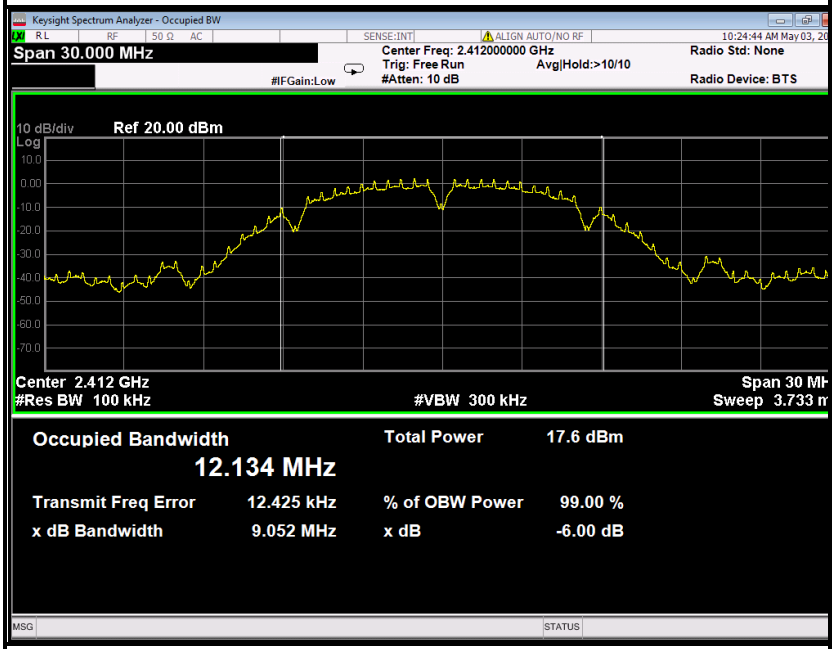
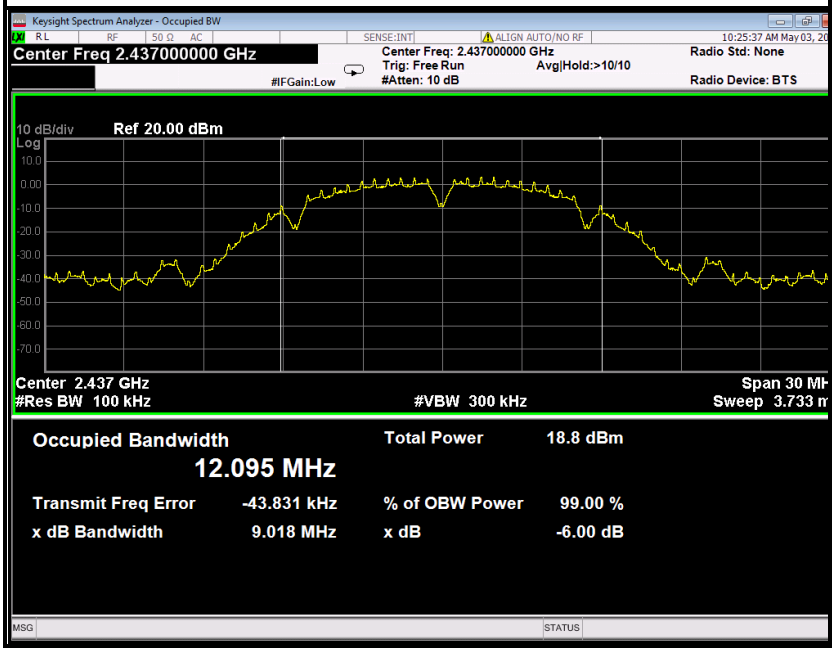
Test Plot

IEEE 802.11b mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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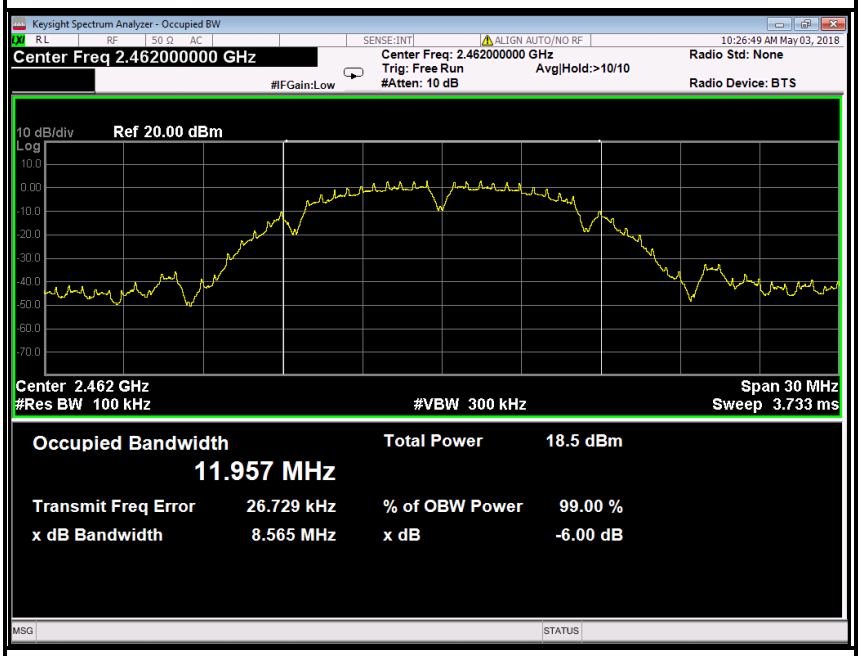
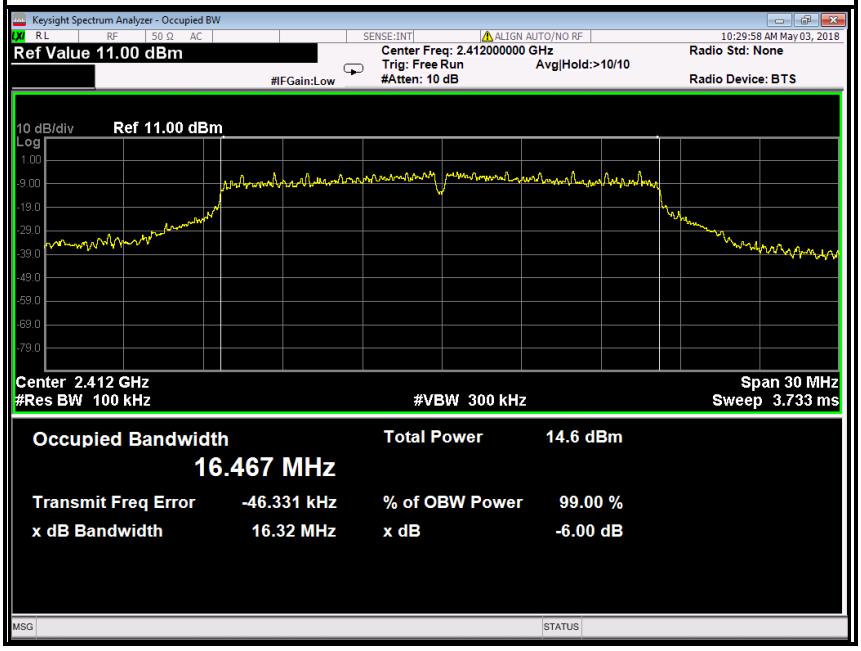
6dB Bandwidth (CH High)



IEEE 802.11g mode

6dB Bandwidth (CH Low)



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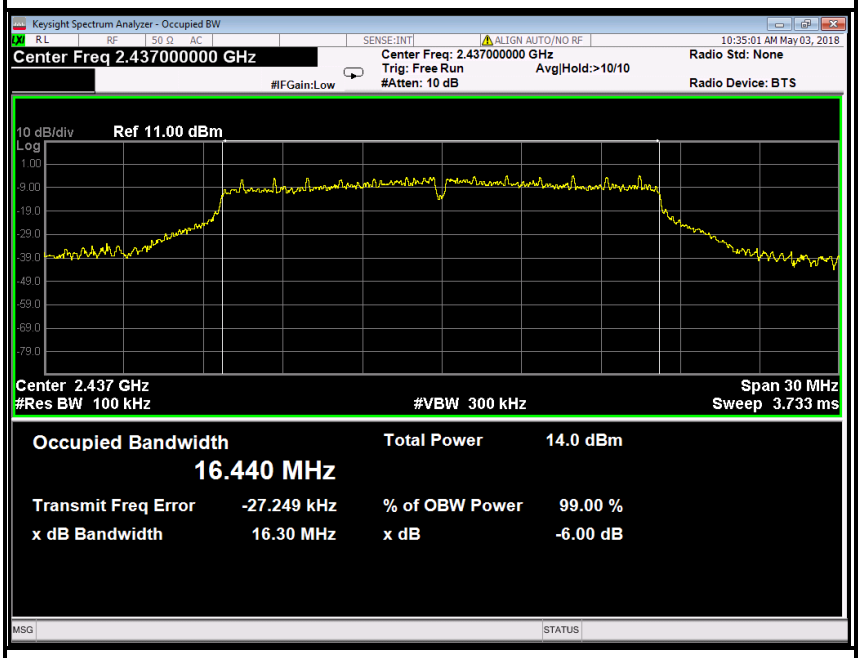
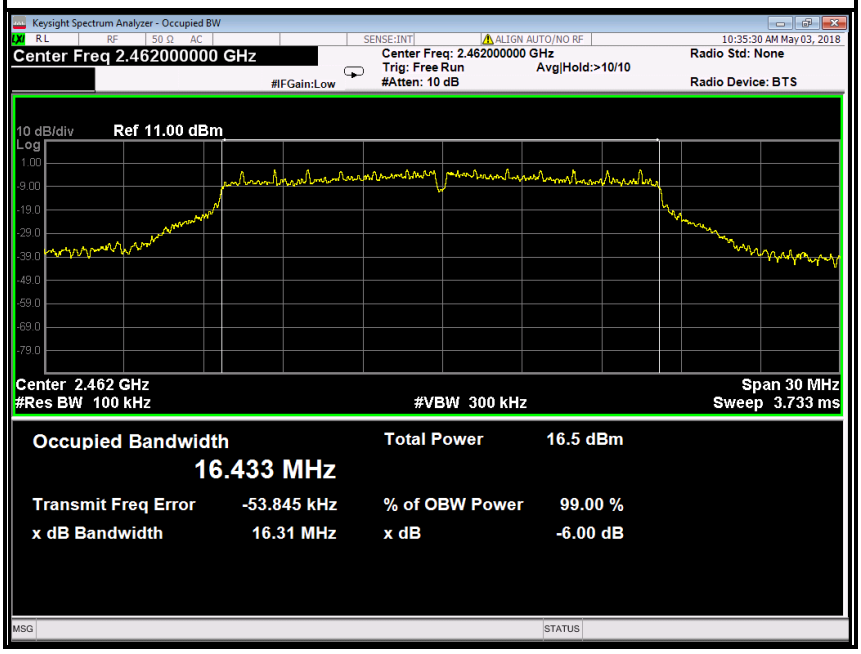
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



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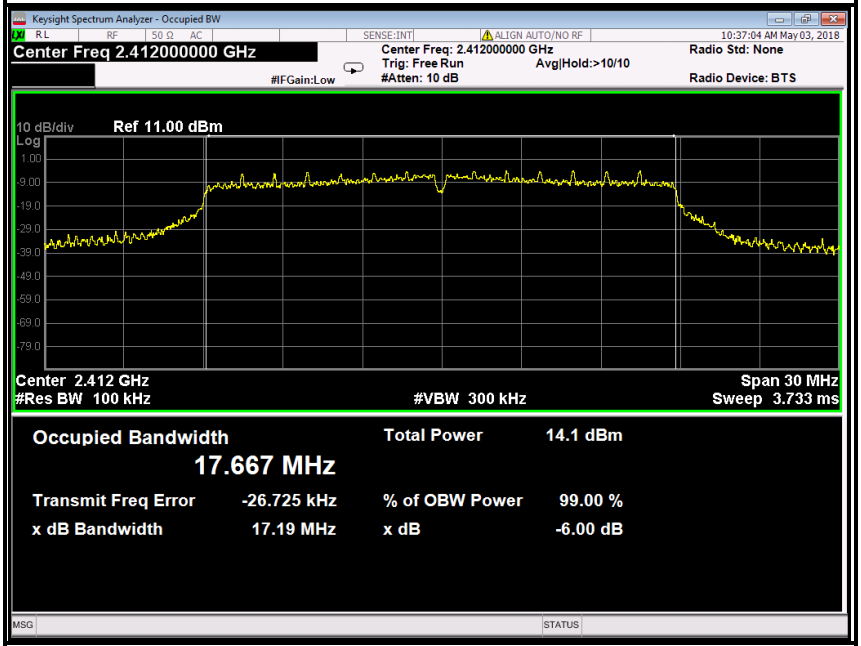
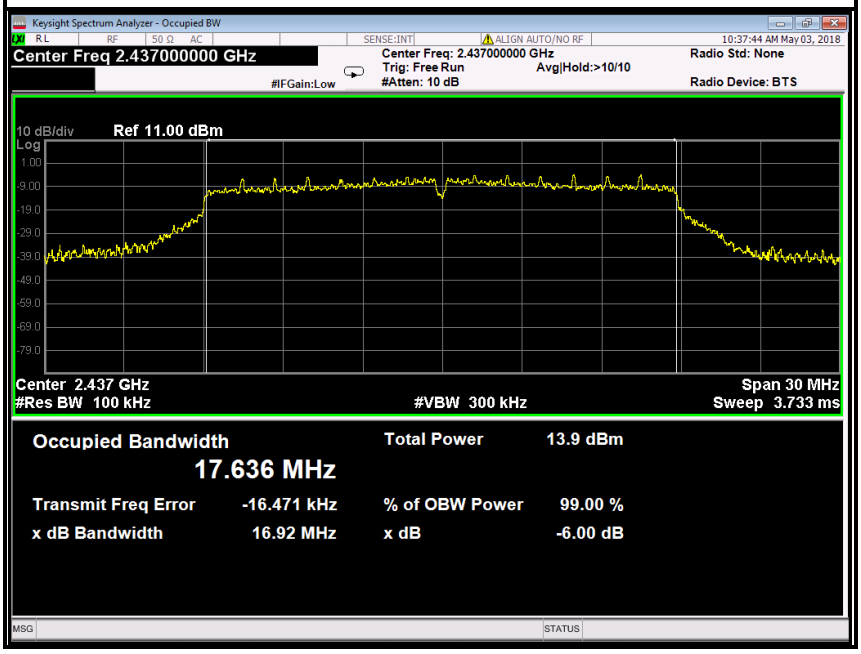
IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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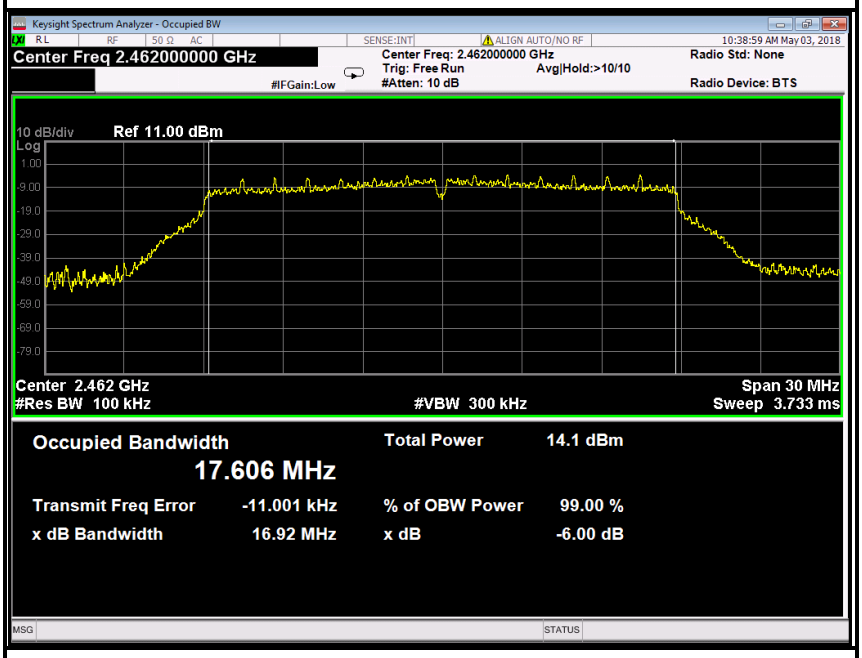
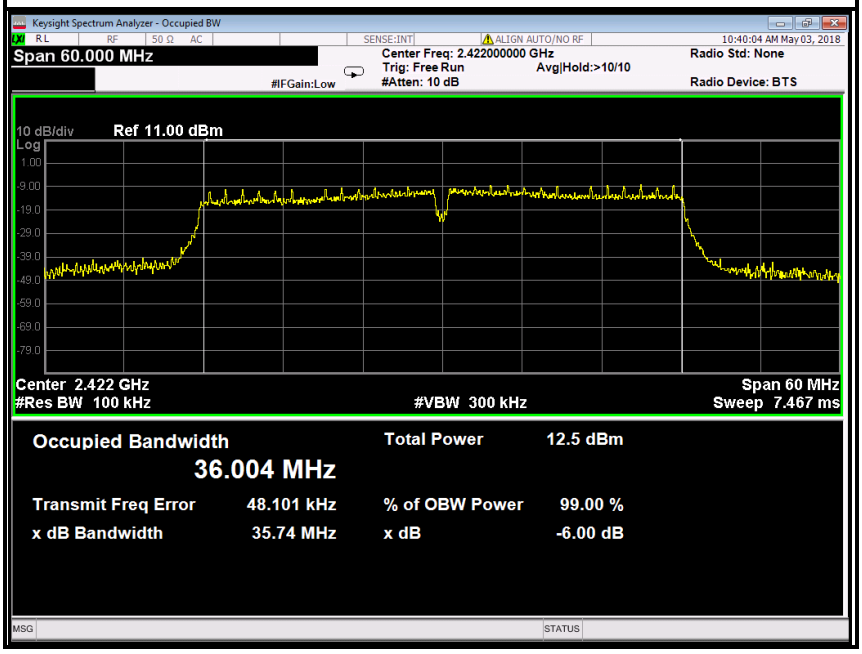
6dB Bandwidth (CH High)



IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)



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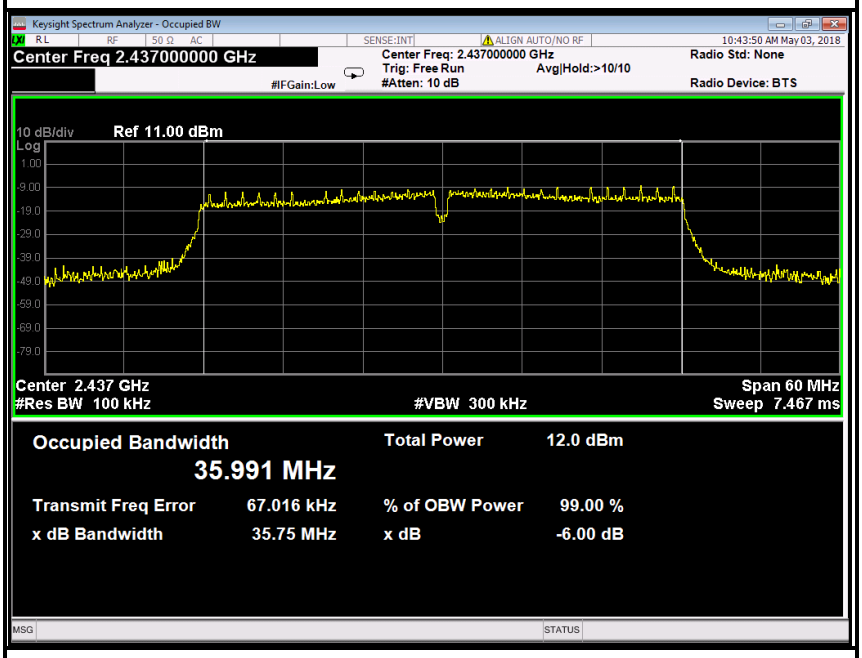
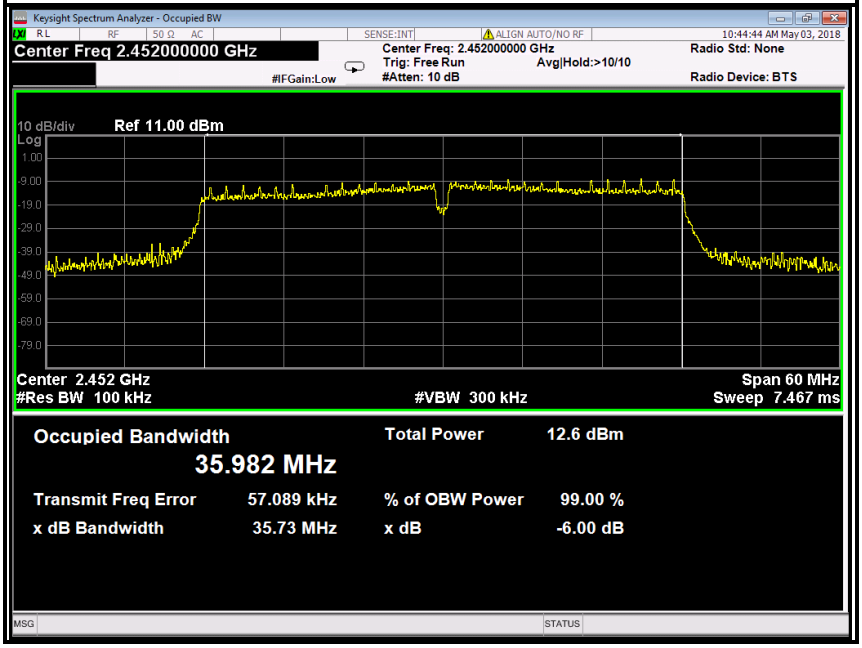
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



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7.4. ANTENNA GAIN

MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

LIMITS

FCC	IC
Antenna Gain	
6 dBi	

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TEST RESULTS

IEEE 802.11b

T_{nom}	V_{nom}	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		4.61	5.31	5.25
Radiated power [dBm/MHz] Measured with DSSS modulation		7.58	8.29	8.18
Gain [dBi] Calculated		2.97	2.98	2.93
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		

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7.5. PEAK OUTPUT POWER

7.5.1. LIMITS

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.5.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	01/27/2018	01/26/2019
Power Sensor	Anritsu	MA2411B	1126150	01/27/2018	01/26/2019

7.5.3. TEST PROCEDURES (please refer to measurement standard)

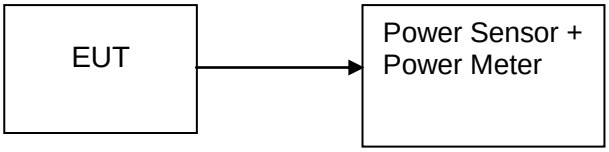
9.1.1 RBW ≥ *DTS bandwidth*

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.
a) Set the RBW ≥ *DTS bandwidth*.
b) Set VBW ≥ 3 RBW.
c) Set span ≥ 3 x RBW
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

9.1.3 PKPM1 Peak power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

7.5.4. TEST SETUP



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7.5.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	16.69	0.04667	Peak	1	PASS
Mid	2437	17.25	0.05309			PASS
High	2462	17.19	0.05236			PASS
Low	2412	14.18	0.02618	AVG	1	PASS
Mid	2437	14.86	0.03062			PASS
High	2462	14.58	0.02871			PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	21.77	0.15031	Peak	1	PASS
Mid	2437	21.54	0.14256			PASS
High	2462	21.02	0.12647			PASS
Low	2412	11.44	0.01393	AVG	1	PASS
Mid	2437	11.61	0.01449			PASS
High	2462	11.88	0.01542			PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	21.17	0.13092	Peak	1	PASS
Mid	2437	21.03	0.12677			PASS
High	2462	21.19	0.13152			PASS
Low	2412	10.98	0.01253	AVG	1	PASS
Mid	2437	11.60	0.01445			PASS
High	2462	11.81	0.01517			PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2422	19.46	0.08831	Peak	1	PASS
Mid	2437	19.49	0.08892			PASS
High	2452	20.29	0.10691			PASS
Low	2422	10.61	0.01151	AVG	1	PASS
Mid	2437	10.66	0.01164			PASS
High	2452	10.76	0.01191			PASS

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7.6. BAND EDGES MEASUREMENT

7.6.1. LIMITS

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

7.6.2. TEST INSTRUMENTS

Radiated Emission Test Site 966（2）					
Name of Equipment	**Manufacturer**	**Model Number**	**Serial Number**	**Last Calibration**	**Due Calibration**
PSA Series Spectrum Analyzer	Agilent	N9010A	MY55370330	01/27/2018	01/26/2019
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100786	01/27/2018	01/26/2019
Amplifier	EMEC	EM330	060661	01/27/2018	01/26/2019
High Noise Amplifier	Agilent	8449B	3008A01838	01/27/2018	01/26/2019
Antenna	SCHAFFNER	CBL6143	5063	01/27/2018	01/26/2019
Horn Antenna	SCHWARZBECK	BBHA9120	D286	01/27/2018	01/26/2019
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	01/24/2018	01/23/2019
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	01/29/2018	01/28/2019
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The FCC Site Registration number is 101879.

3. N.C.R = No Calibration Required.

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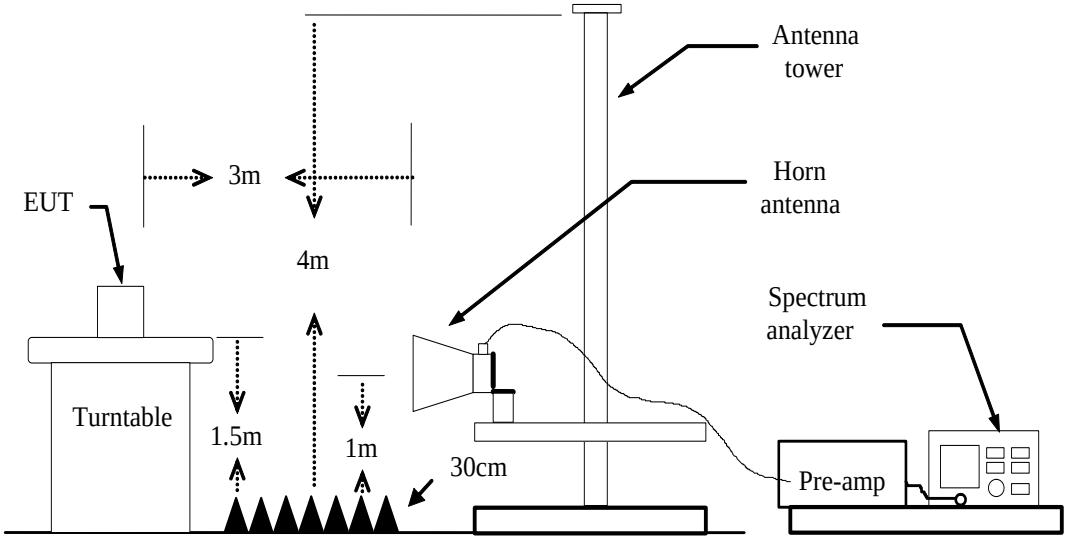
7.6.3. TEST PROCEDURES (please refer to measurement standard)

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO / Detector=PEAK
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

7.6.4. TEST SETUP



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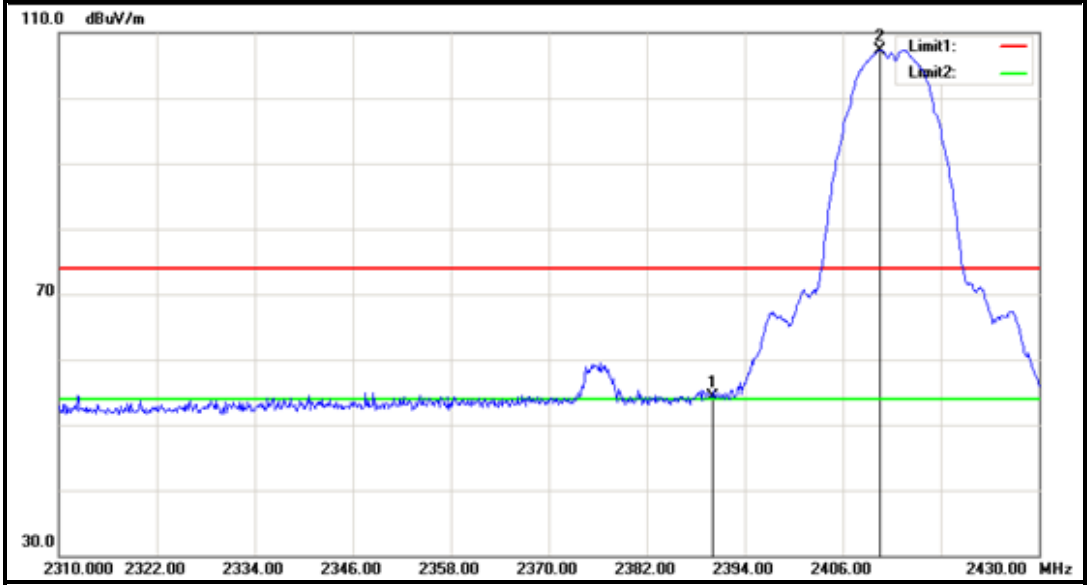
7.6.5. TEST RESULTS

Test Plot

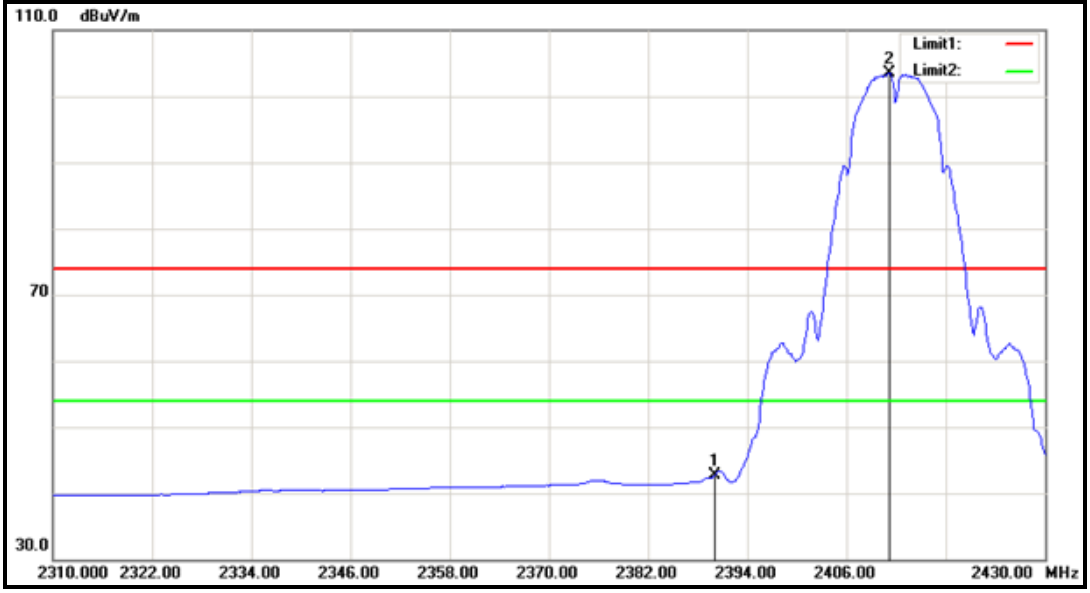
IEEE 802.11b mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	57.23	-2.86	54.37	74.00	-19.63	Peak	Vertical
2.	2410.560	110.09	-2.75	107.34	---	---	Peak	Vertical
1.	2390.000	45.61	-2.86	42.75	54.00	-11.25	Average	Vertical
2.	2411.160	106.27	-2.75	103.52	---	---	Average	Vertical

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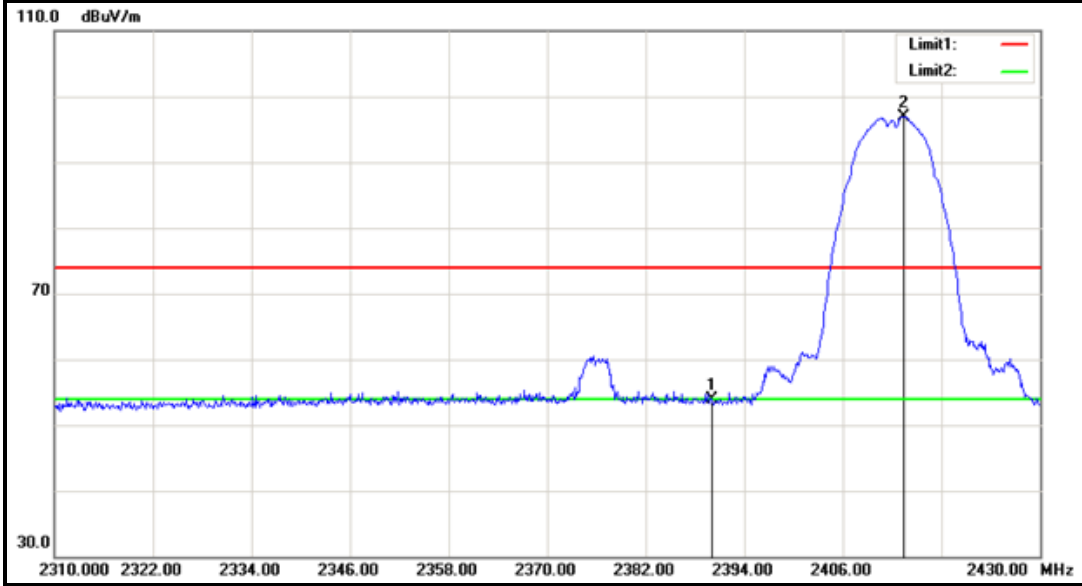
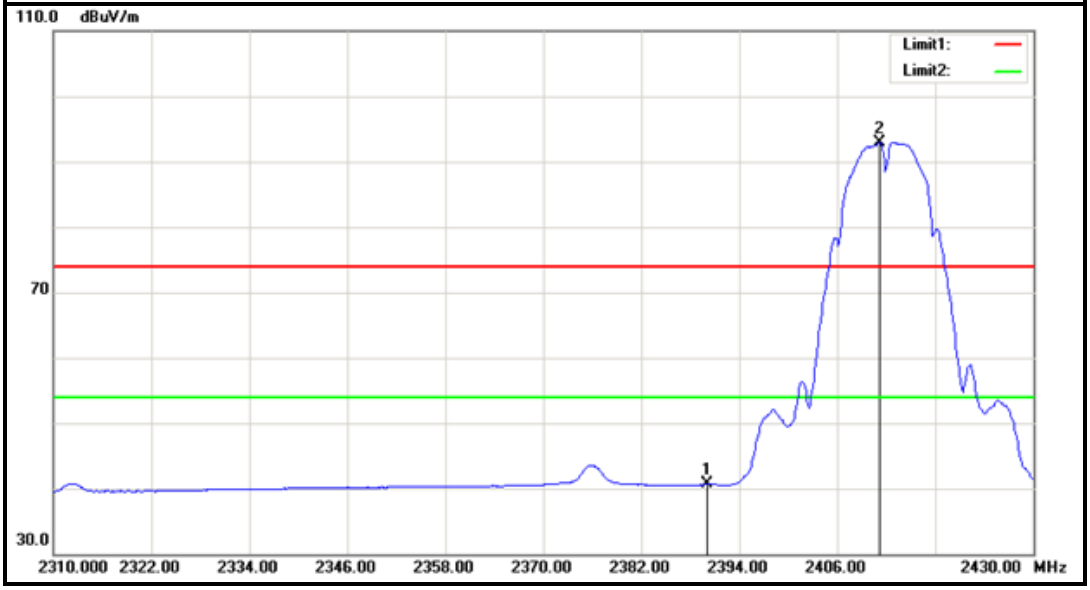
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	56.75	-2.86	53.89	74.00	-20.11	Peak	Horizontal
2.	2413.440	99.63	-2.73	96.90	---	---	Peak	Horizontal
1.	2390.000	43.48	-2.86	40.62	54.00	-13.38	Average	Horizontal
2.	2411.160	95.70	-2.75	92.95	---	---	Average	Horizontal

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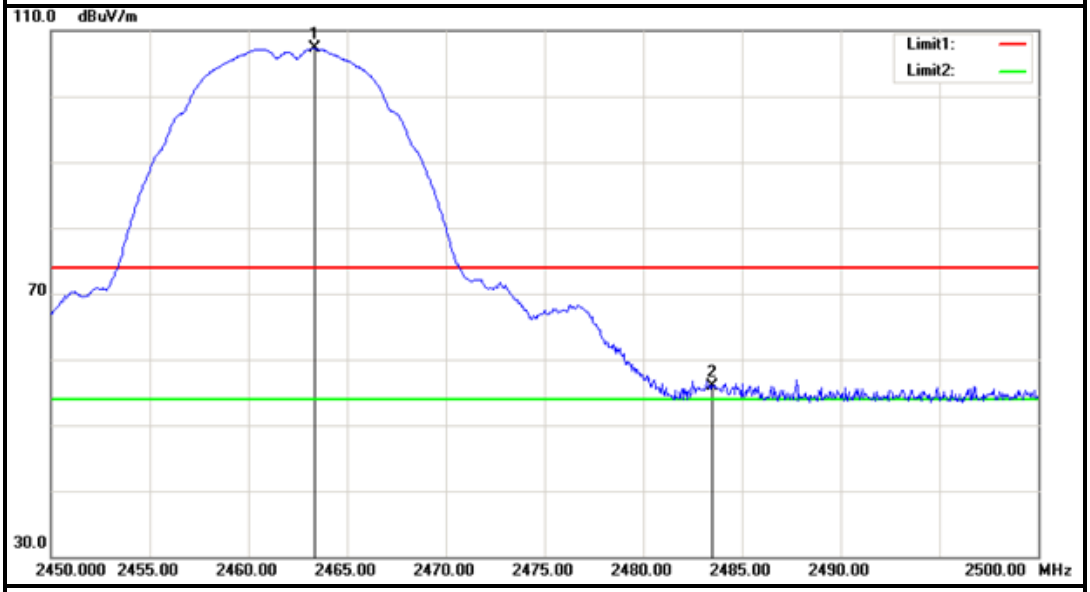
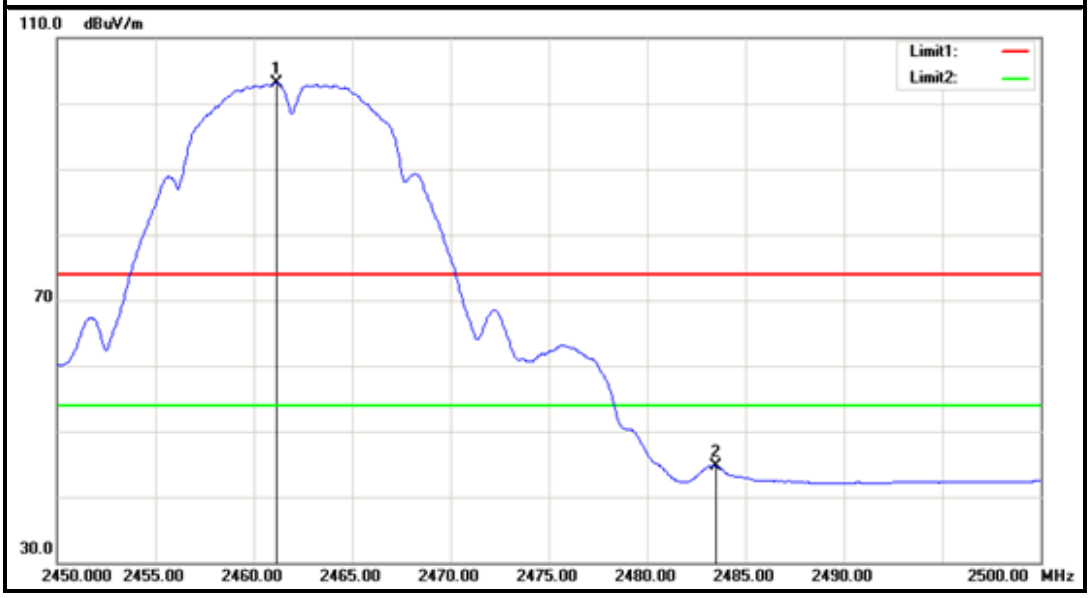
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2463.350	109.70	-2.46	107.24	---	---	Peak	Vertical
2.	2483.500	58.20	-2.35	55.85	74.00	-18.15	Peak	Vertical
1.	2461.150	105.66	-2.47	103.19	---	---	Average	Vertical
2.	2483.500	47.00	-2.35	44.65	54.00	-9.35	Average	Vertical

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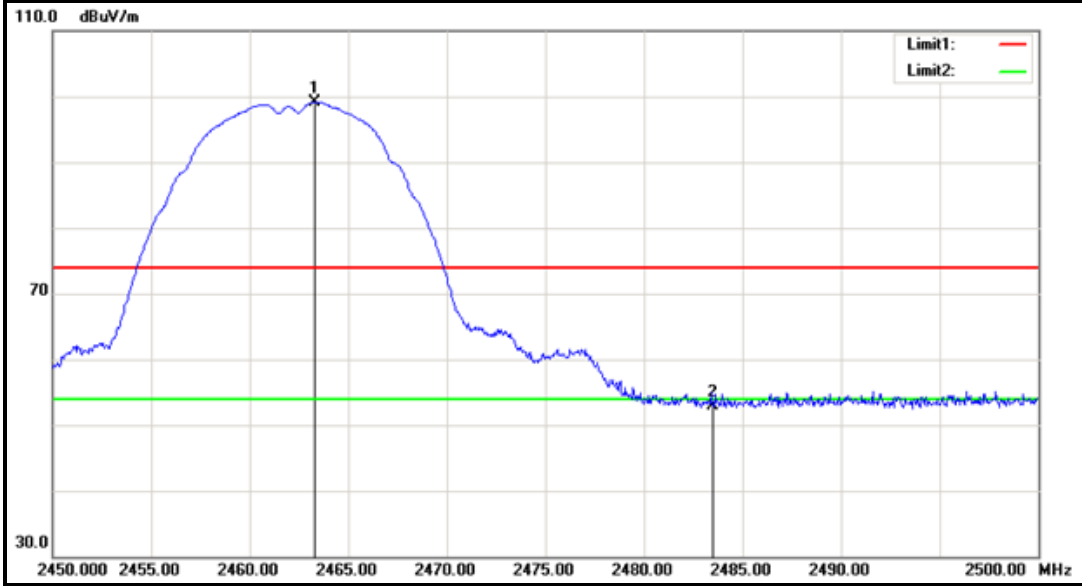
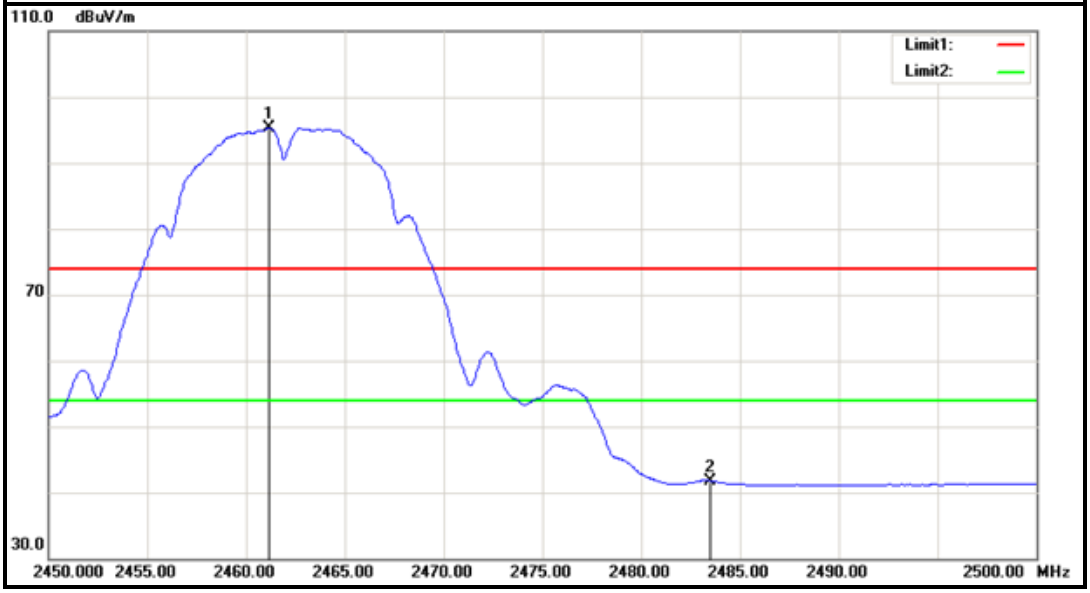
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2463.300	101.57	-2.46	99.11	---	---	Peak	Horizontal
2.	2483.500	55.21	-2.35	52.86	74.00	-21.14	Peak	Horizontal
1.	2461.150	97.79	-2.47	95.32	---	---	Average	Horizontal
2.	2483.500	44.15	-2.35	41.80	54.00	-12.20	Average	Horizontal

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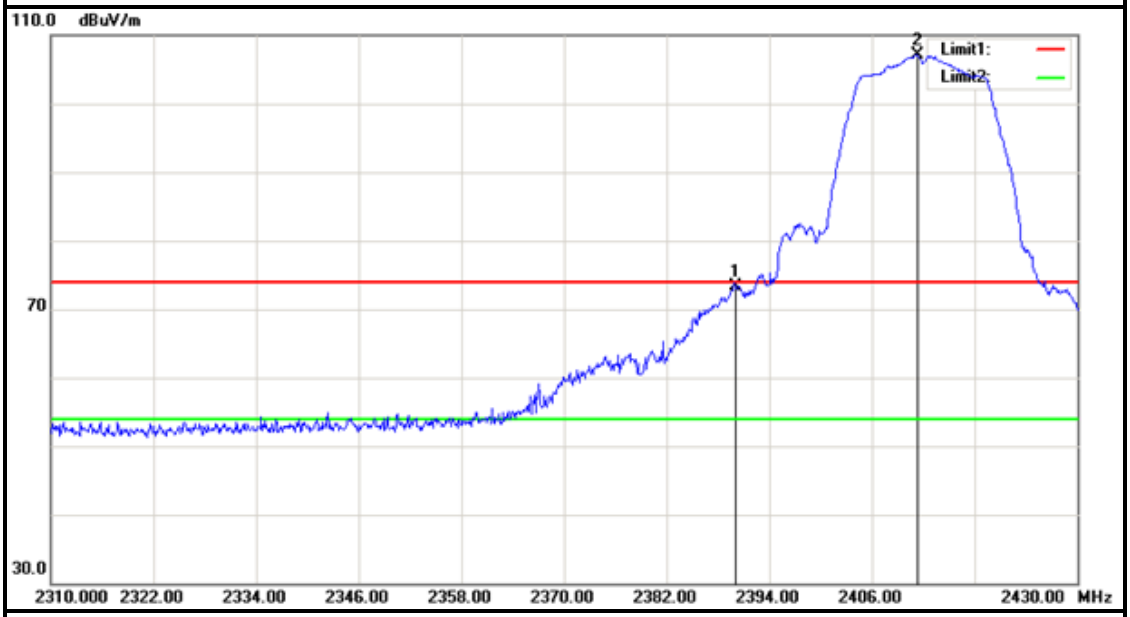
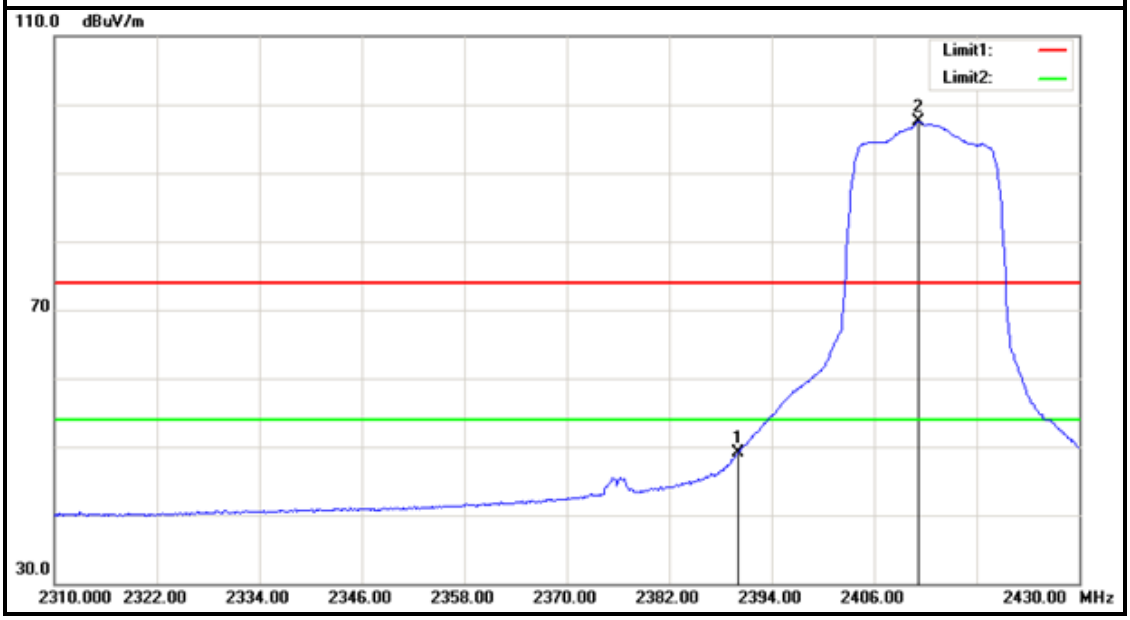
IEEE 802.11g mode
Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	76.14	-2.86	73.28	74.00	-0.72	Peak	Vertical
2.	2411.280	109.93	-2.75	107.18	---	---	Peak	Vertical
1.	2390.000	51.87	-2.86	49.01	54.00	-4.99	Average	Vertical
2.	2411.160	100.28	-2.75	97.53	---	---	Average	Vertical

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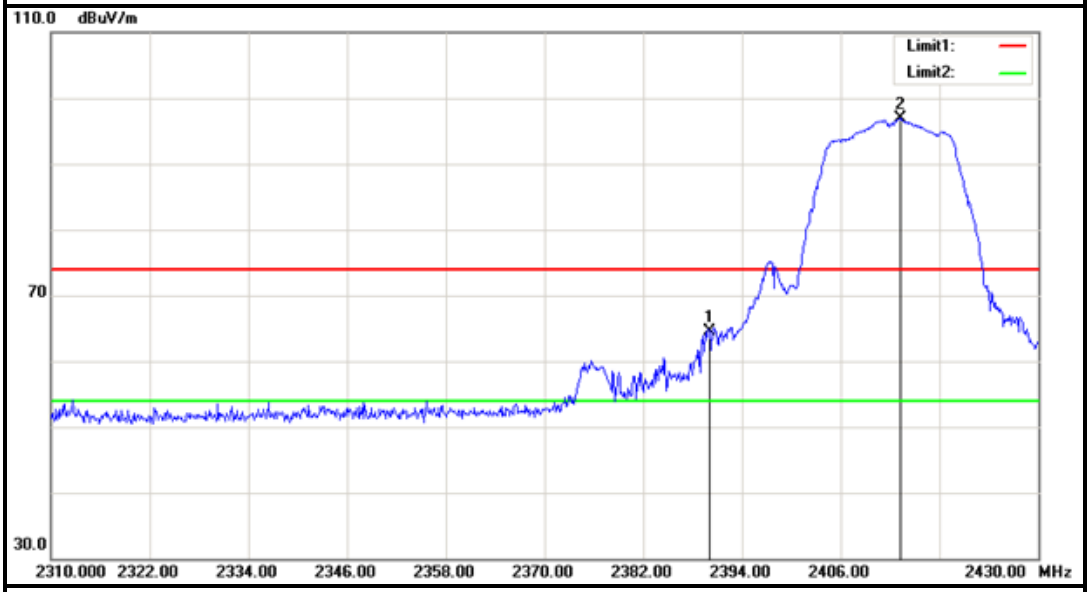
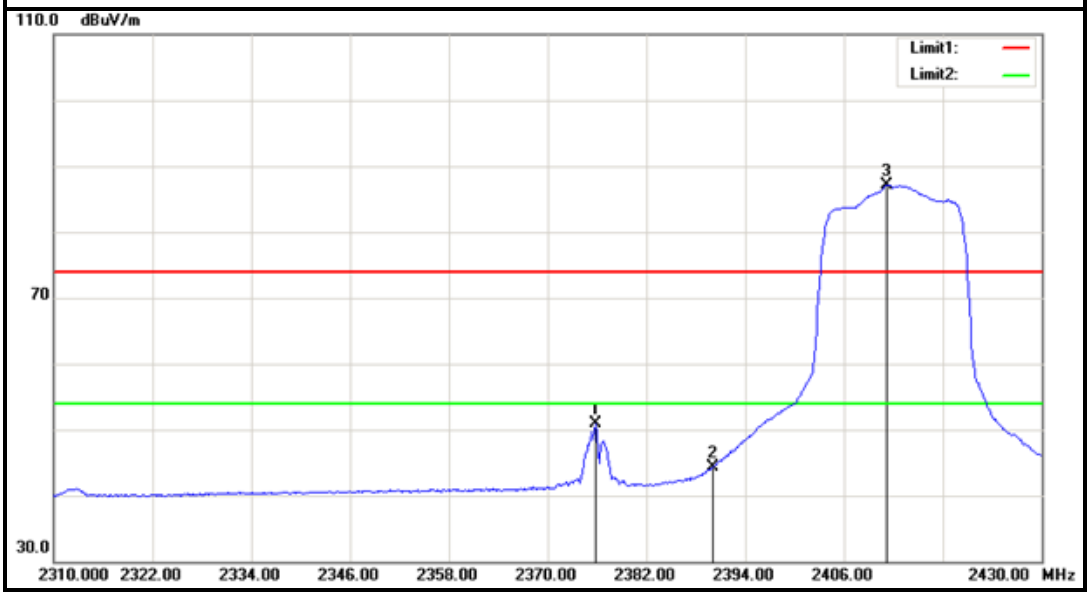
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	67.46	-2.86	64.60	74.00	-9.40	Peak	Horizontal
2.	2413.320	99.61	-2.73	96.88	---	---	Peak	Horizontal
1.	2375.880	53.81	-2.94	50.87	54.00	-3.13	Average	Horizontal
2.	2390.000	47.17	-2.86	44.31	54.00	-9.69	Average	Horizontal
3.	2411.160	89.95	-2.75	87.20	---	---	Average	Horizontal

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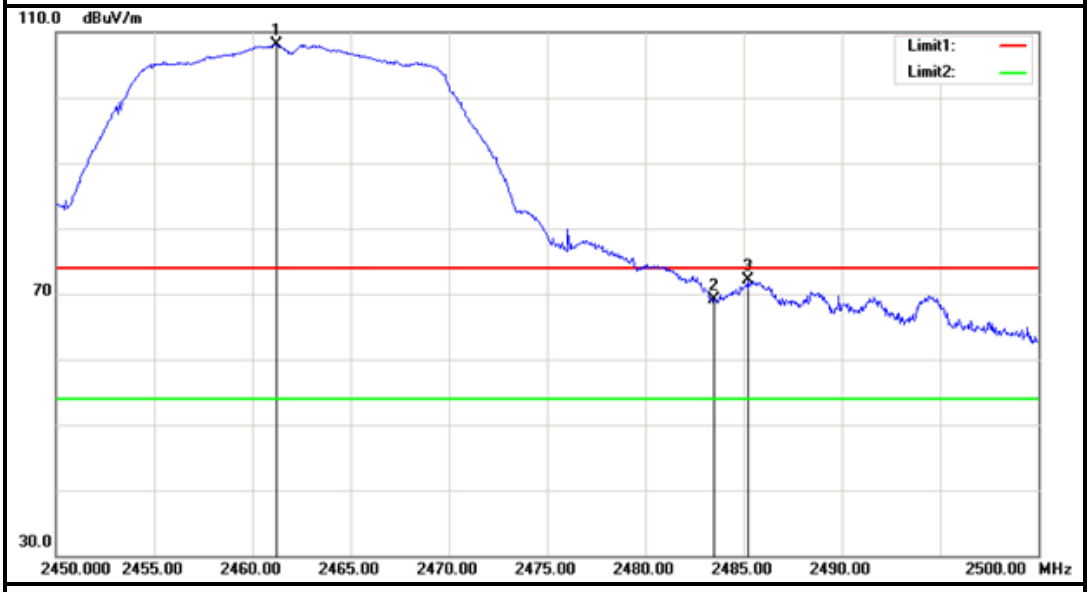
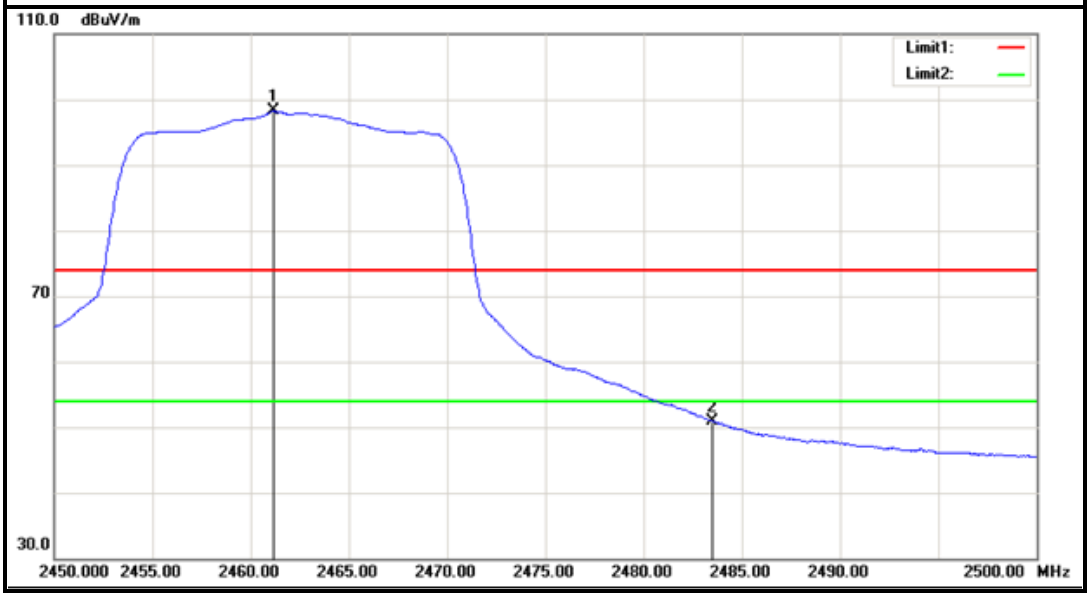
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2461.200	110.52	-2.47	108.05	---	---	Peak	Vertical
2.	2483.500	71.46	-2.35	69.11	74.00	-4.89	Peak	Vertical
3.	2485.250	74.48	-2.34	72.14	74.00	-1.86	Peak	Vertical
1.	2461.150	100.70	-2.47	98.23	---	---	Average	Vertical
2.	2483.500	53.35	-2.35	51.00	54.00	-3.00	Average	Vertical

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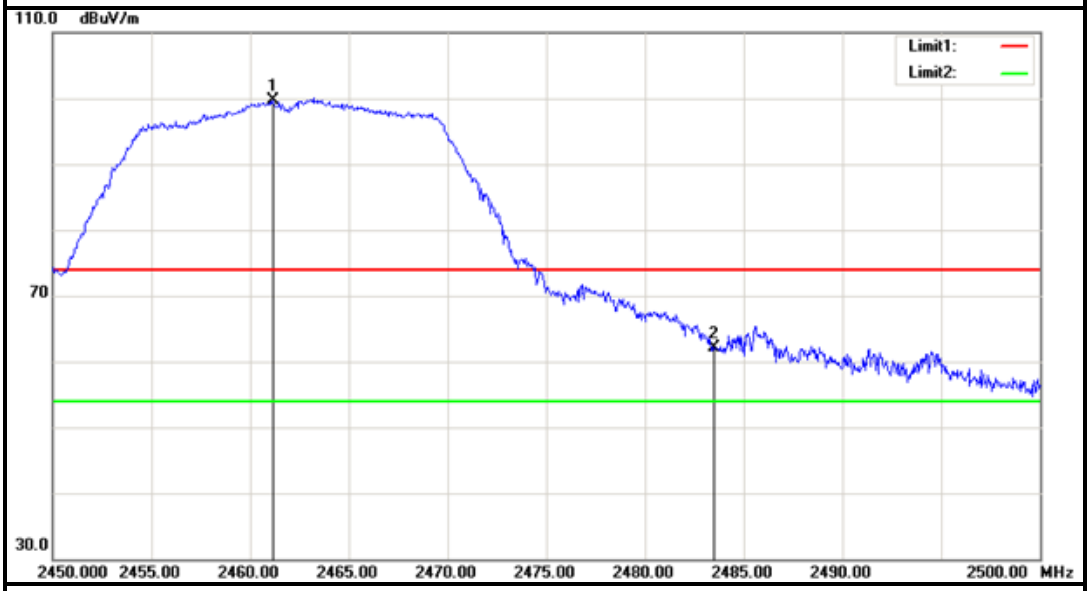
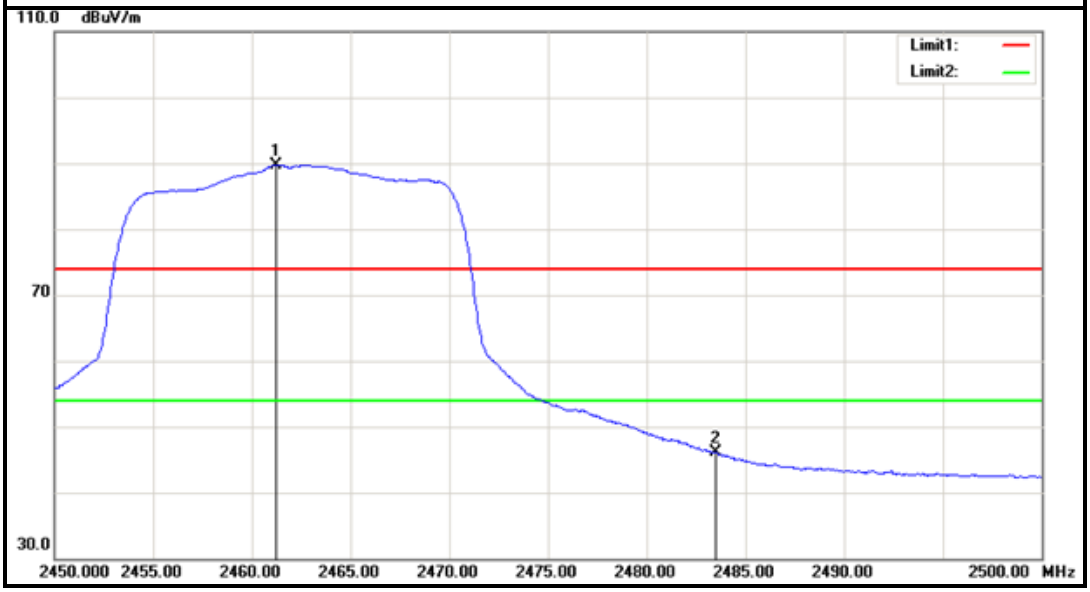
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2461.150	102.13	-2.47	99.66	---	---	Peak	Horizontal
2.	2483.500	64.37	-2.35	62.02	74.00	-11.98	Peak	Horizontal
1.	2461.250	92.26	-2.47	89.79	---	---	Average	Horizontal
2.	2483.500	48.37	-2.35	46.02	54.00	-7.98	Average	Horizontal

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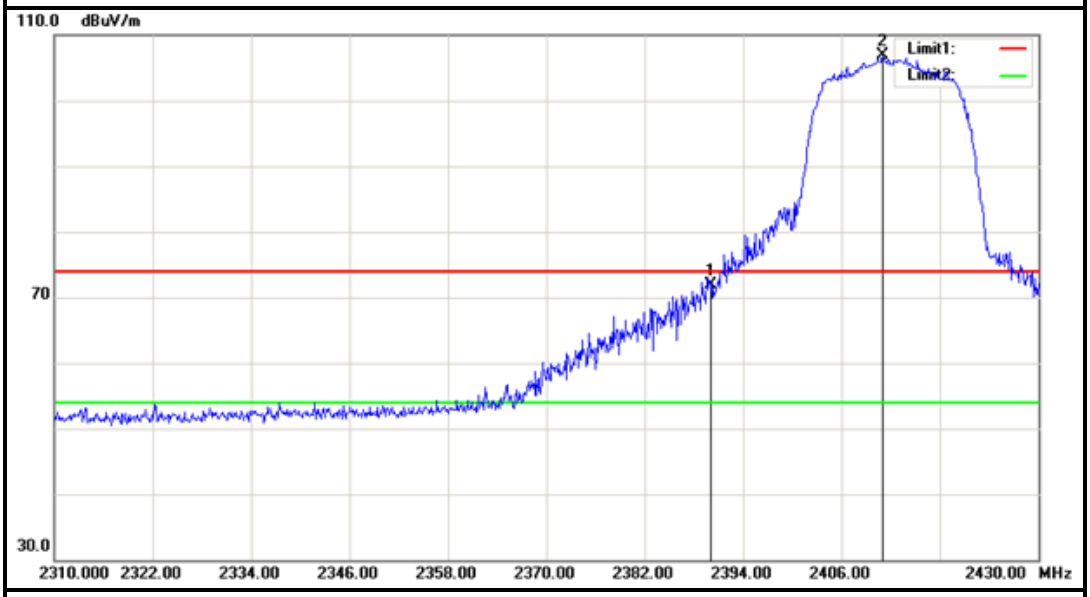
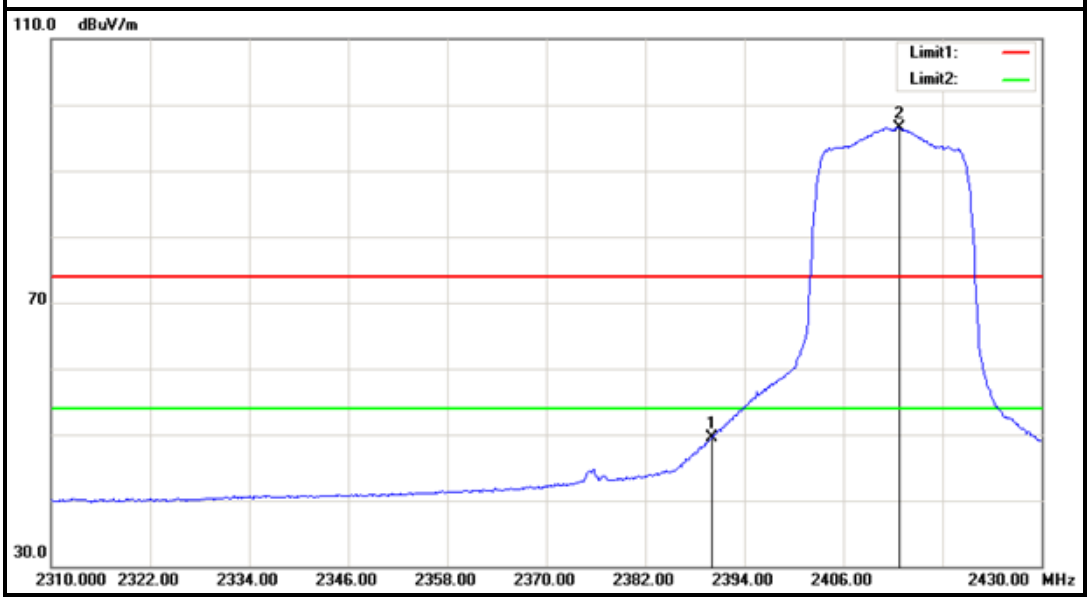
IEEE 802.11n HT20 MHz mode
Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	74.83	-2.86	71.97	74.00	-2.03	Peak	Vertical
2.	2411.040	109.65	-2.75	106.90	---	---	Peak	Vertical
1.	2390.000	52.28	-2.86	49.42	54.00	-4.58	Average	Vertical
2.	2412.720	99.32	-2.74	96.58	---	---	Average	Vertical

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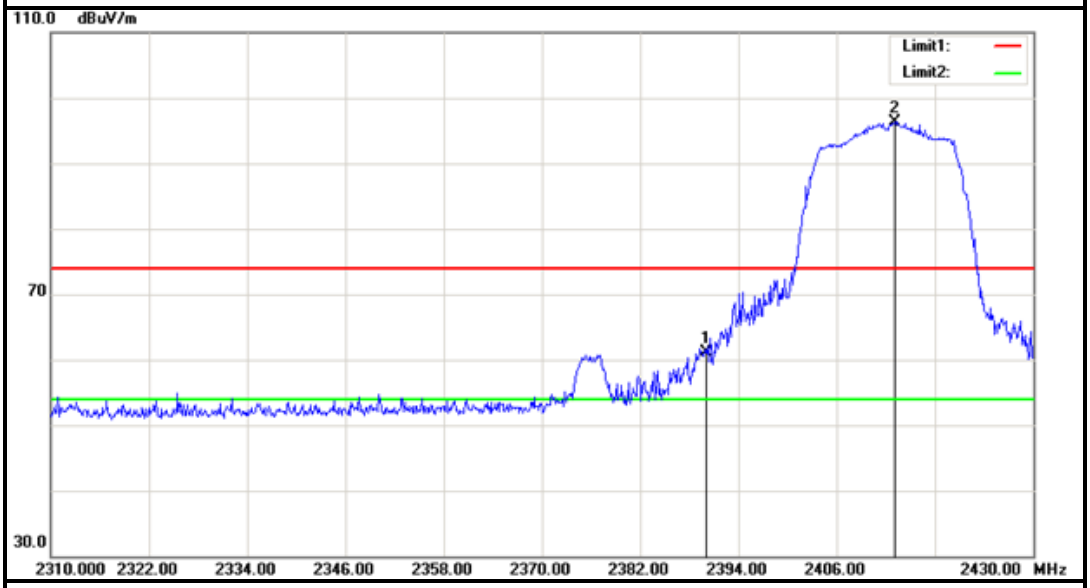
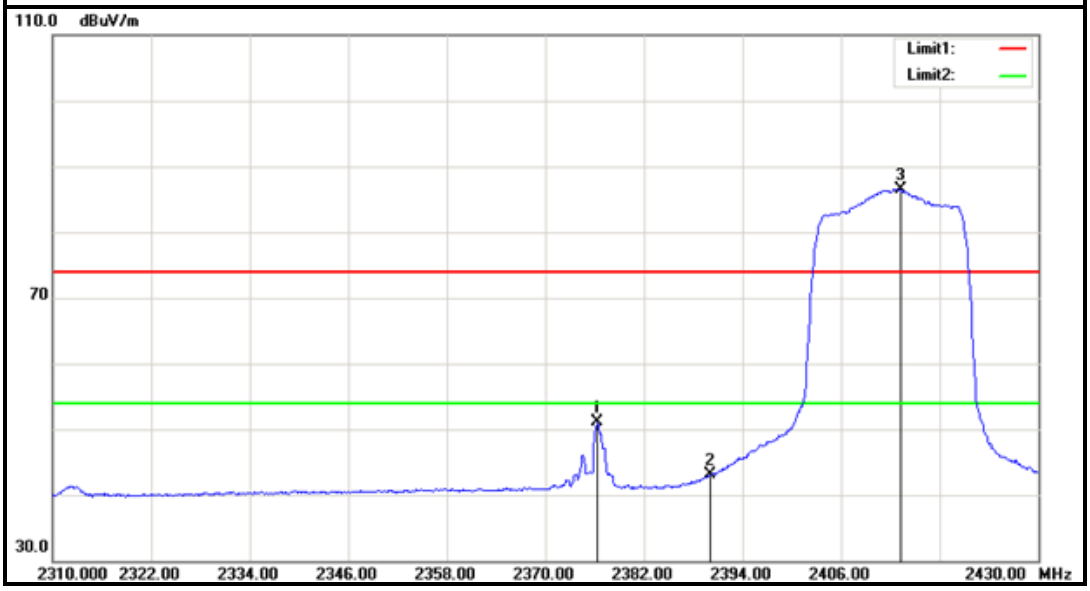
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	64.02	-2.86	61.16	74.00	-12.84	Peak	Horizontal
2.	2413.080	99.01	-2.74	96.27	---	---	Peak	Horizontal
1.	2376.360	53.95	-2.94	51.01	54.00	-2.99	Average	Horizontal
2.	2390.000	46.00	-2.86	43.14	54.00	-10.86	Average	Horizontal
3.	2413.200	89.31	-2.74	86.57	---	---	Average	Horizontal

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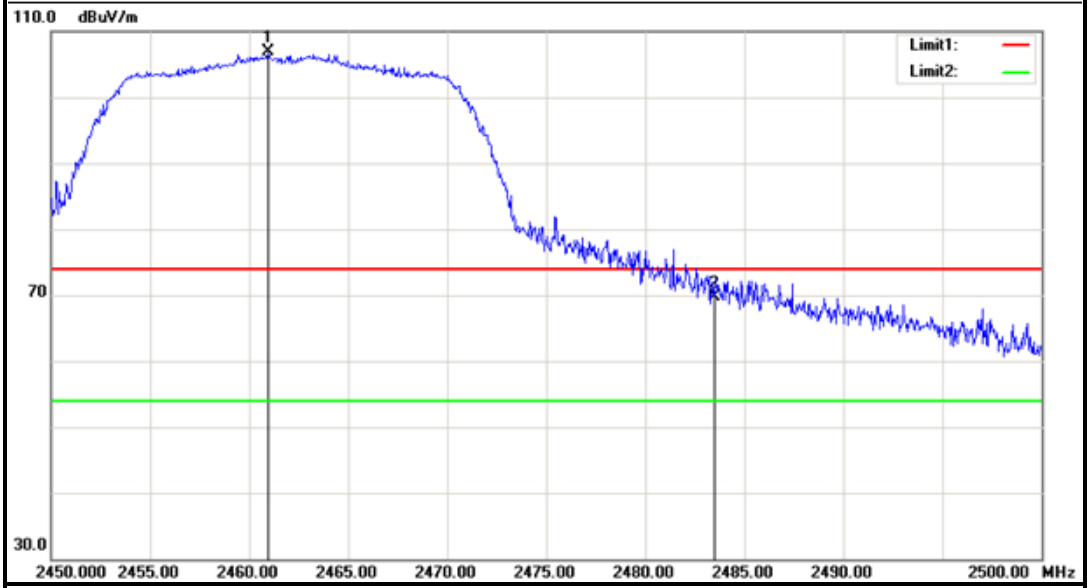
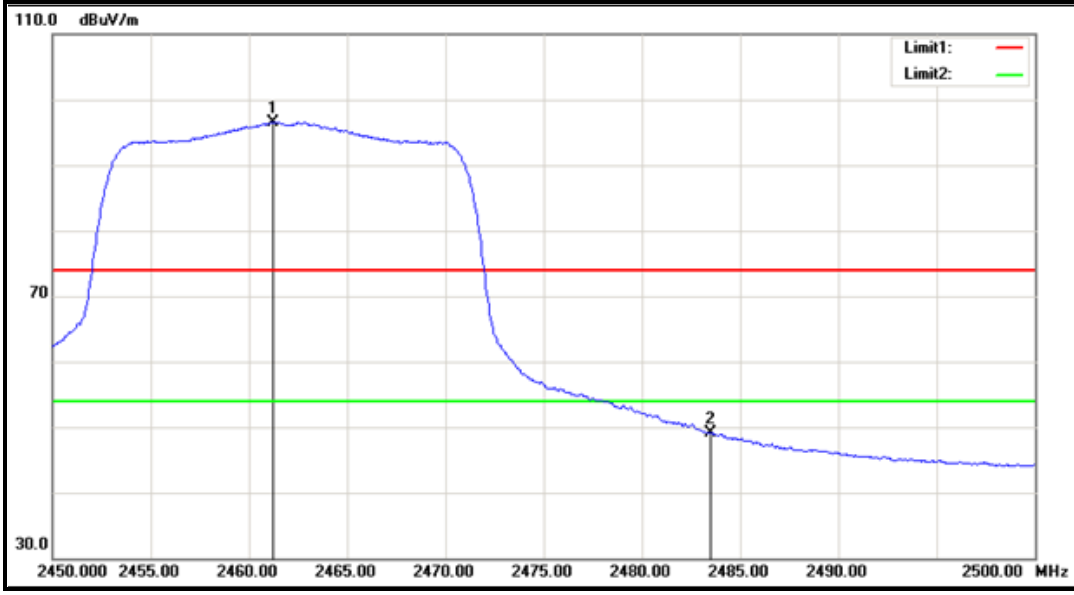
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2460.950	109.47	-2.47	107.00	---	---	Peak	Vertical
2.	2483.500	72.04	-2.35	69.69	74.00	-4.31	Peak	Vertical
1.	2461.250	99.06	-2.47	96.59	---	---	Average	Vertical
2.	2483.500	51.42	-2.35	49.07	54.00	-4.93	Average	Vertical

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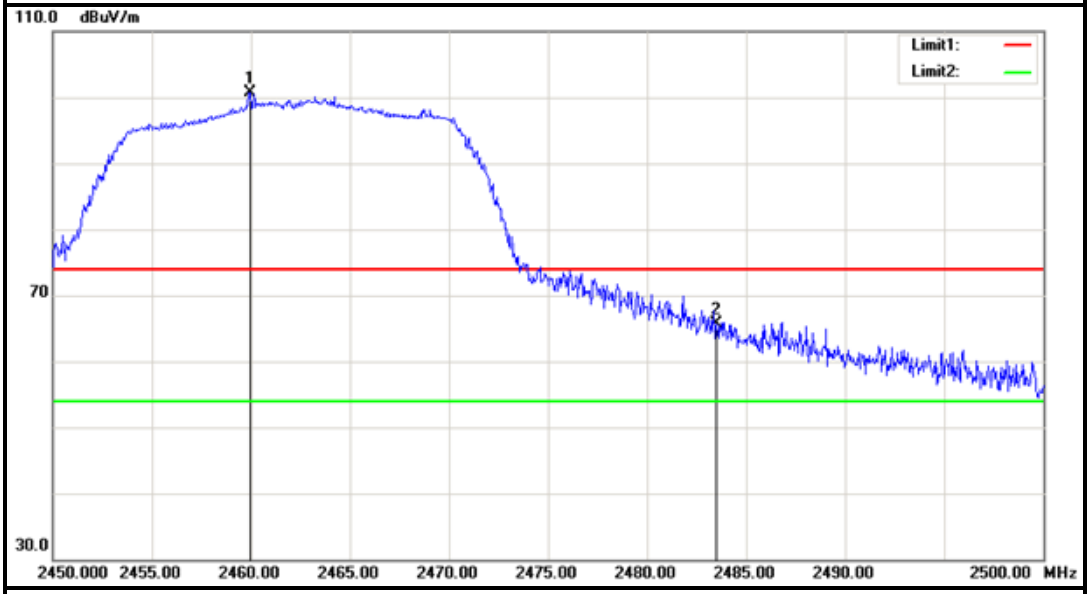
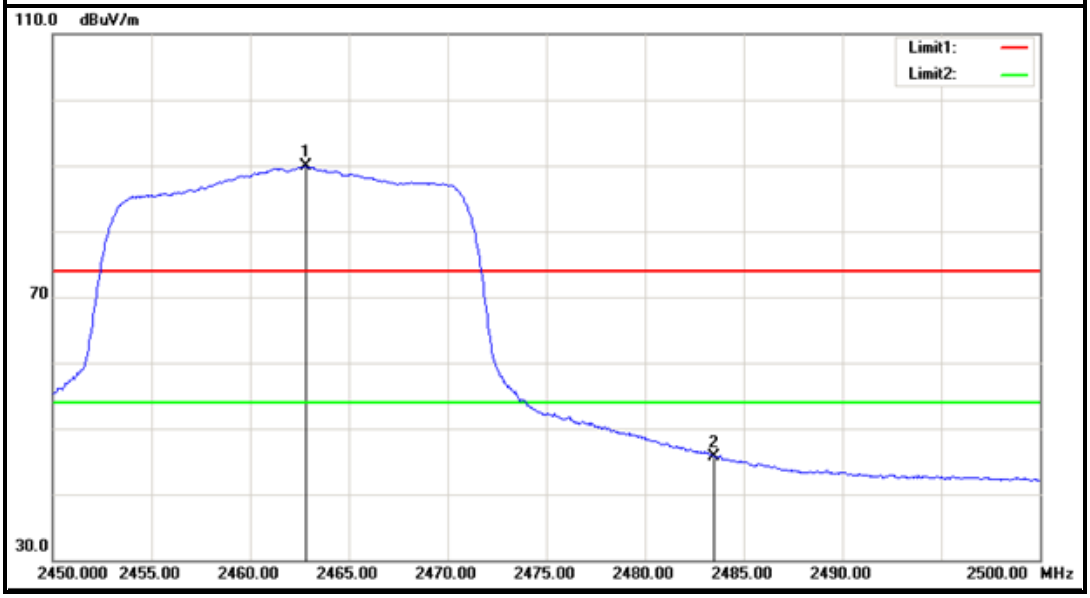
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2459.950	103.18	-2.48	100.70	---	---	Peak	Horizontal
2.	2483.500	68.01	-2.35	65.66	74.00	-8.34	Peak	Horizontal
1.	2462.800	92.35	-2.46	89.89	---	---	Average	Horizontal
2.	2483.500	48.13	-2.35	45.78	54.00	-8.22	Average	Horizontal

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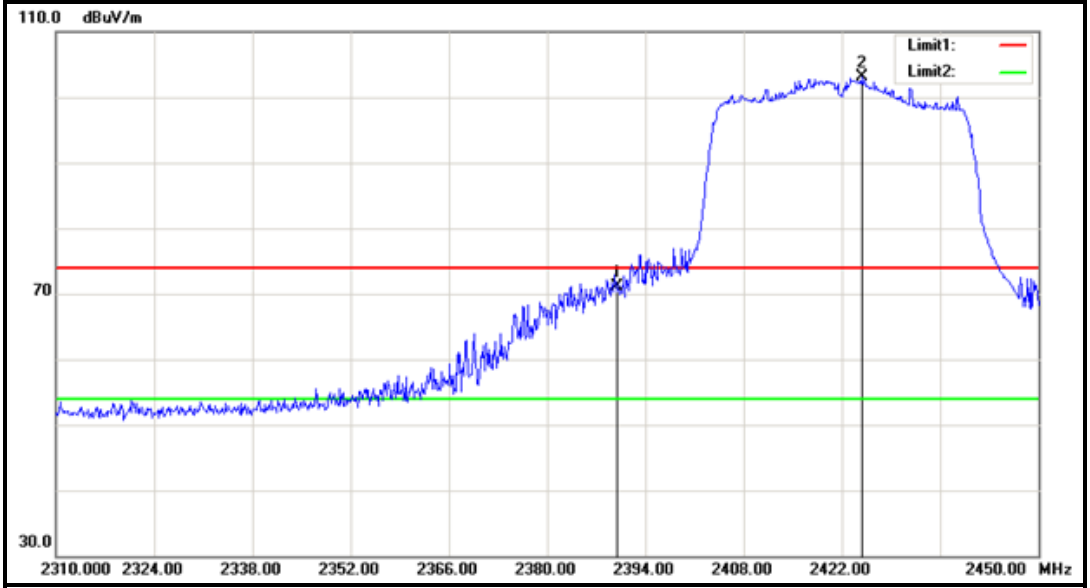
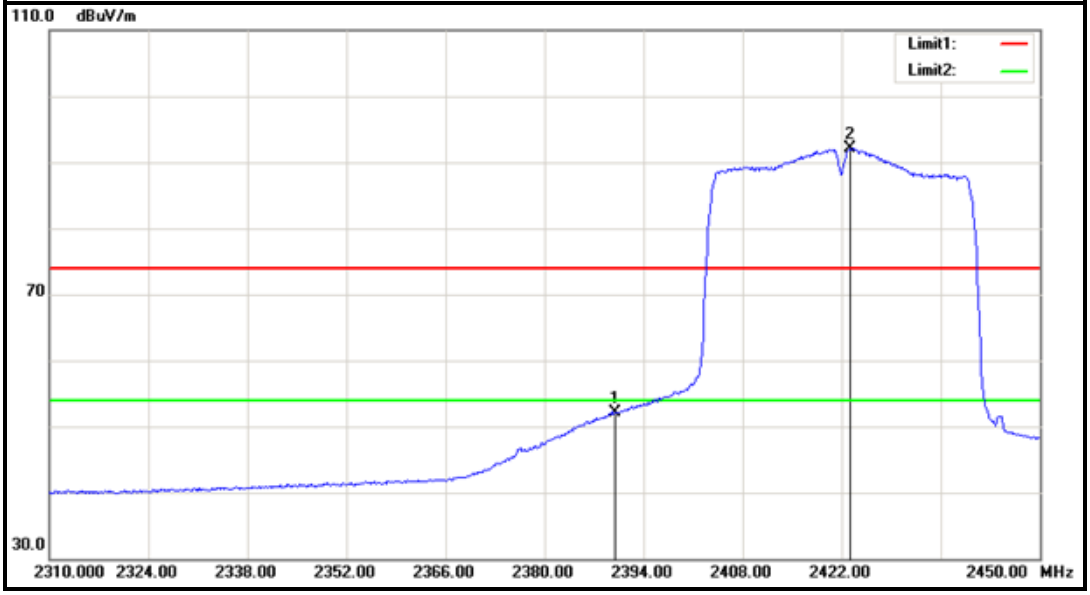
IEEE 802.11n HT40 MHz mode
Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	73.96	-2.86	71.10	74.00	-2.90	Peak	Vertical
2.	2424.800	105.74	-2.67	103.07	---	---	Peak	Vertical
1.	2390.000	54.98	-2.86	52.12	54.00	-1.88	Average	Vertical
2.	2423.260	94.82	-2.68	92.14	---	---	Average	Vertical

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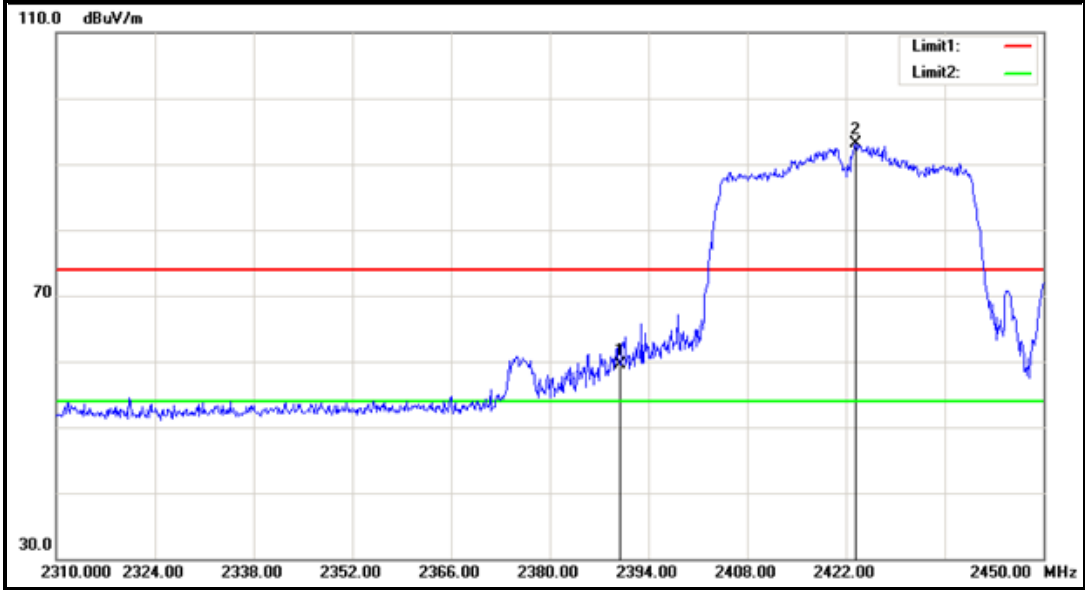
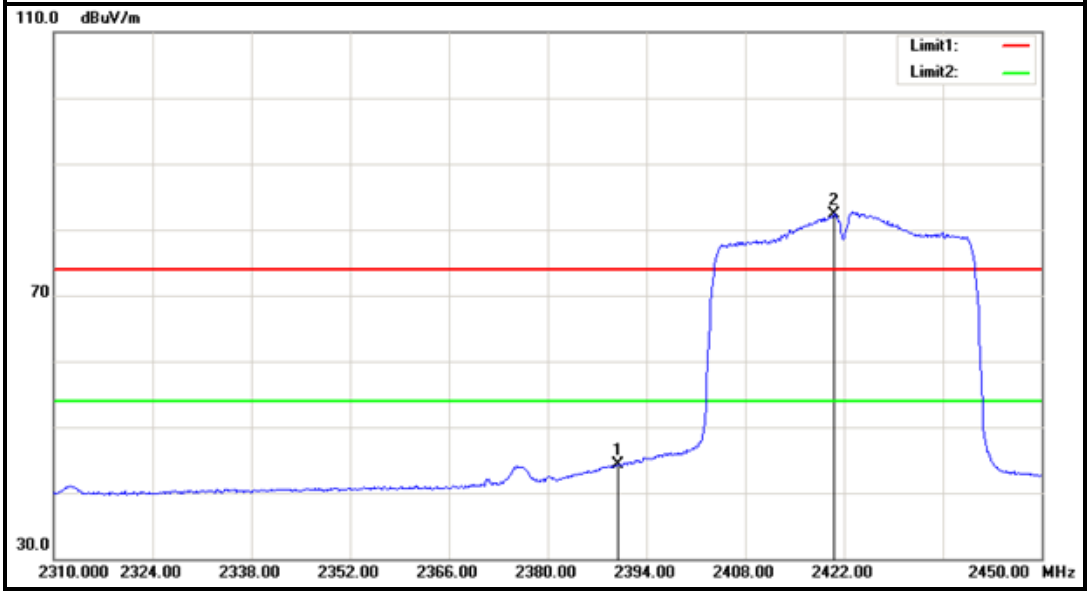
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	62.32	-2.86	59.46	74.00	-14.54	Peak	Horizontal
2.	2423.400	95.69	-2.68	93.01	---	---	Peak	Horizontal
1.	2390.000	47.21	-2.86	44.35	54.00	-9.65	Average	Horizontal
2.	2420.600	85.10	-2.70	82.40	---	---	Average	Horizontal

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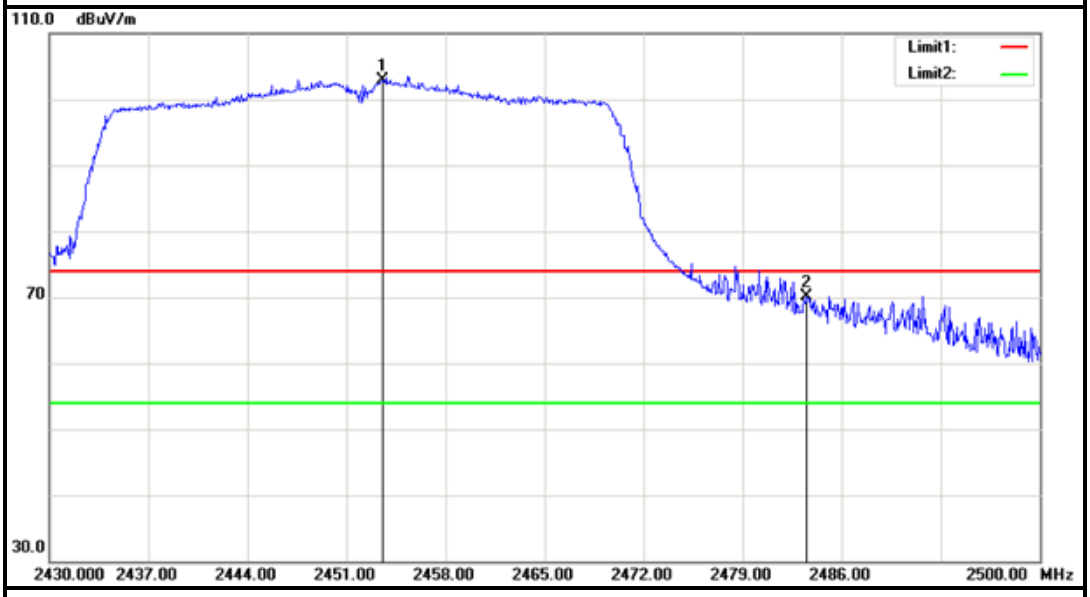
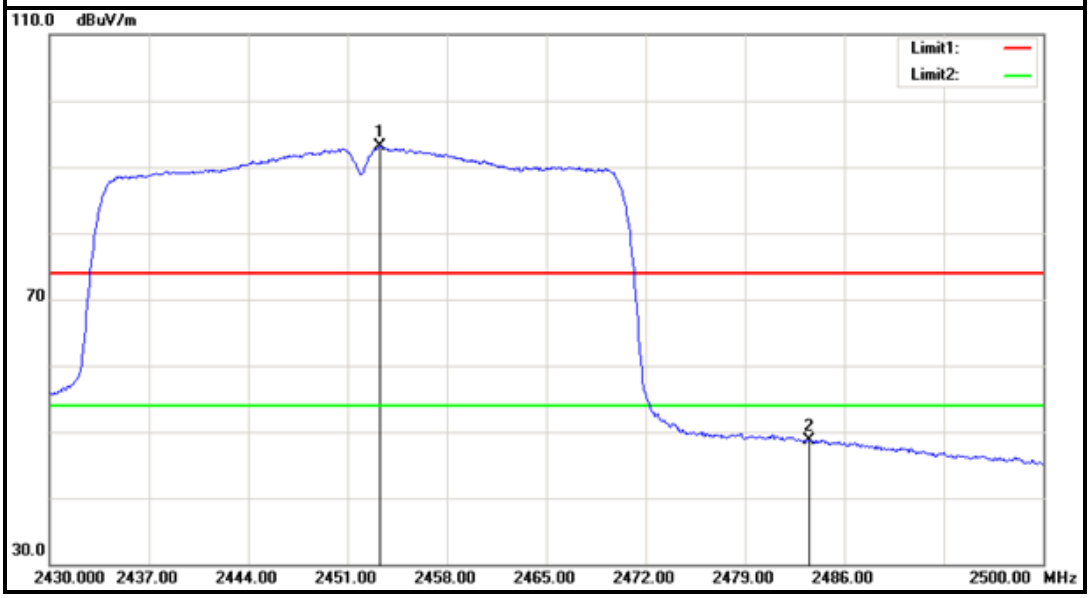
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2453.590	105.34	-2.51	102.83	---	---	Peak	Vertical
2.	2483.500	72.44	-2.35	70.09	74.00	-3.91	Peak	Vertical
1.	2453.310	95.66	-2.52	93.14	---	---	Average	Vertical
2.	2483.500	51.01	-2.35	48.66	54.00	-5.34	Average	Vertical

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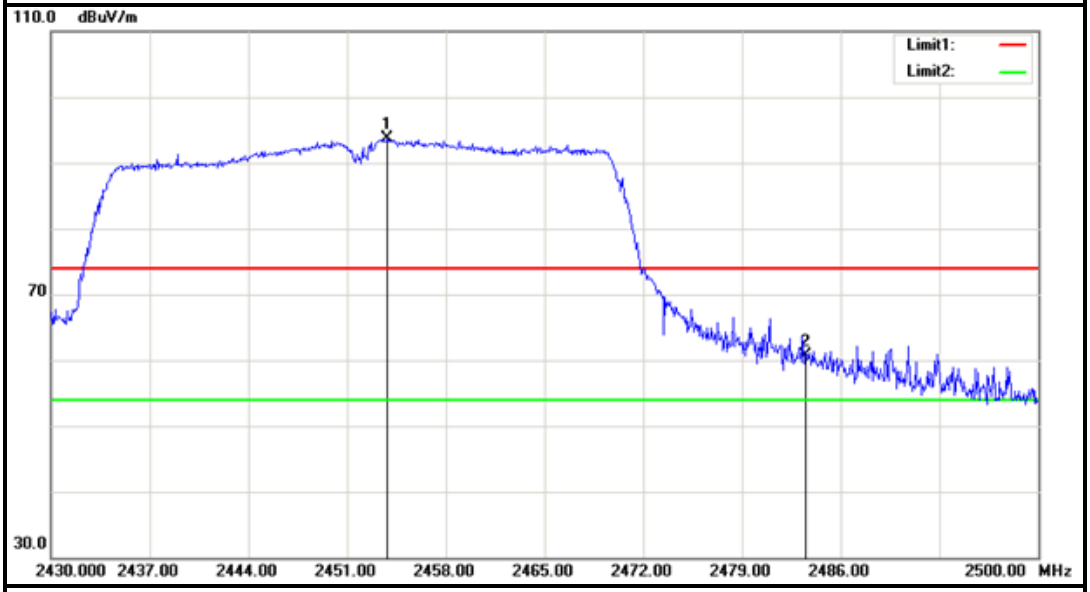
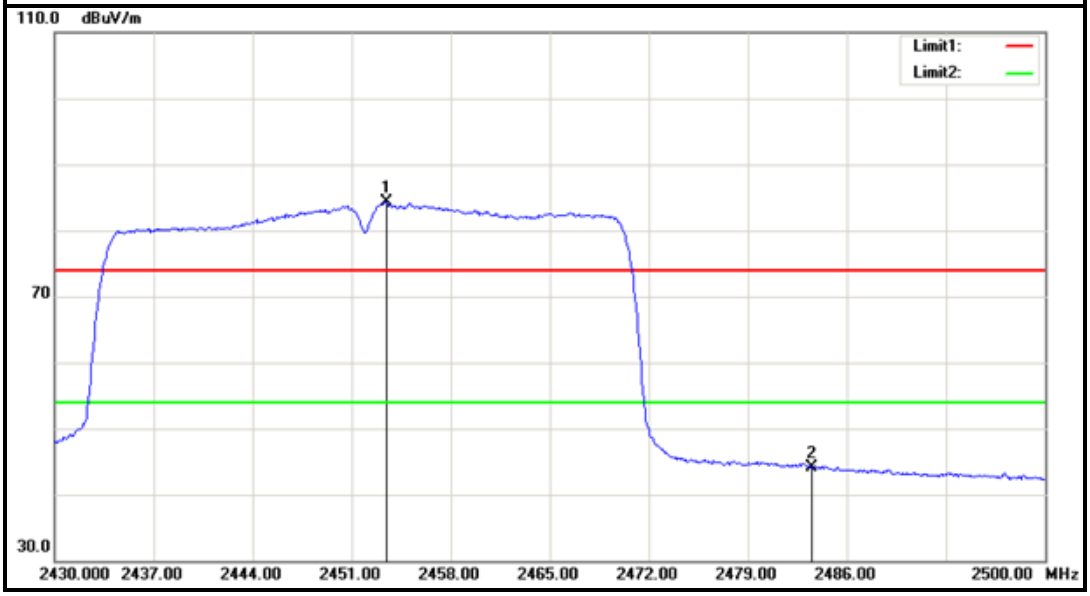
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Antenna Polar
1.	2453.870	96.31	-2.51	93.80	---	---	Peak	Horizontal
2.	2483.500	63.07	-2.35	60.72	74.00	-13.28	Peak	Horizontal
1.	2453.450	86.78	-2.52	84.26	---	---	Average	Horizontal
2.	2483.500	46.36	-2.35	44.01	54.00	-9.99	Average	Horizontal

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7.7. PEAK POWER SPECTRAL DENSITY MEASUREMENT

7.7.1. LIMITS

According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

7.7.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	01/27/2018	01/26/2019

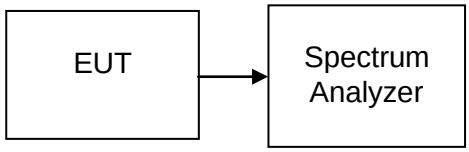
7.7.3. TEST PROCEDURES (please refer to measurement standard)

§15.247(e)specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission. The same method as used to determine the conducted output power shall be used to determine the power spectral density (i.e.,if peak-detected fundamental power was measured then use the peak PSD procedure and if average fundamental power was measured then use the average PSD procedure).

10.2 Method PKPSD (peak PSD)

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 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x 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.

7.7.4. TEST SETUP



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7.7.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.406	8	PASS
Mid	2437	-10.395		PASS
High	2462	-8.263		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-14.325	8	PASS
Mid	2437	-14.776		PASS
High	2462	-14.625		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-14.940	8	PASS
Mid	2437	-15.441		PASS
High	2462	-14.882		PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2422	-18.996	8	PASS
Mid	2437	-19.412		PASS
High	2452	-19.104		PASS

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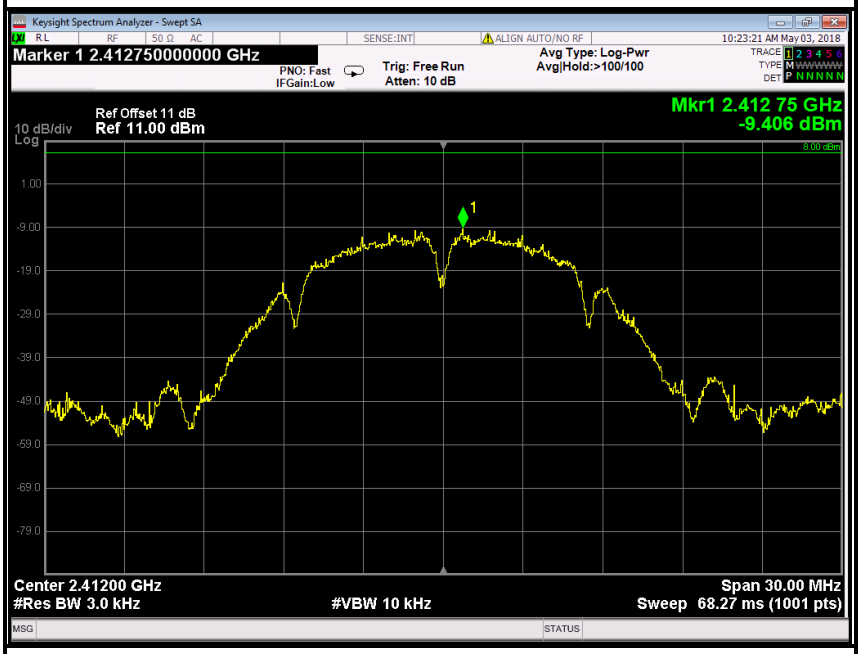
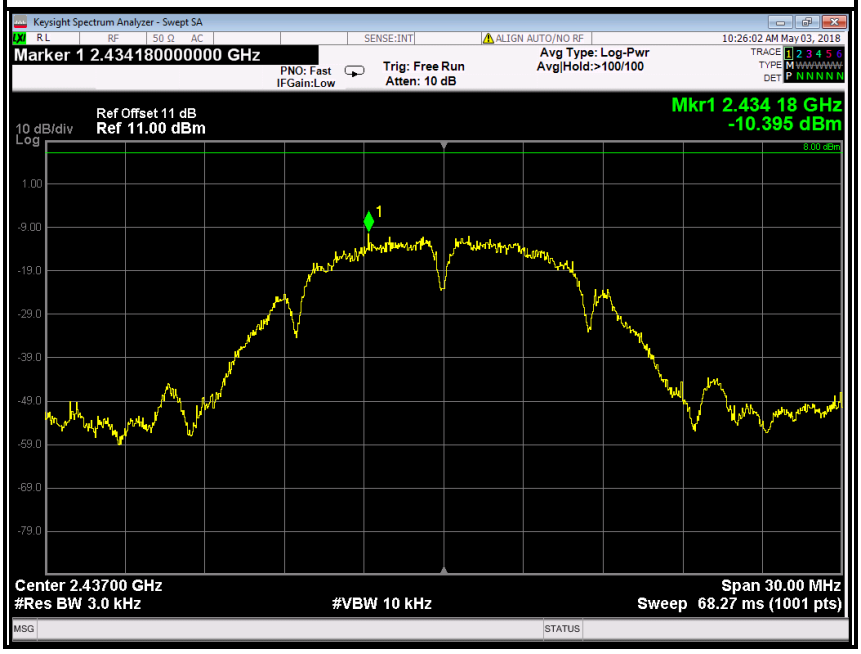
Test Plot

IEEE 802.11b mode

PPSD (CH Low)



PPSD (CH Mid)



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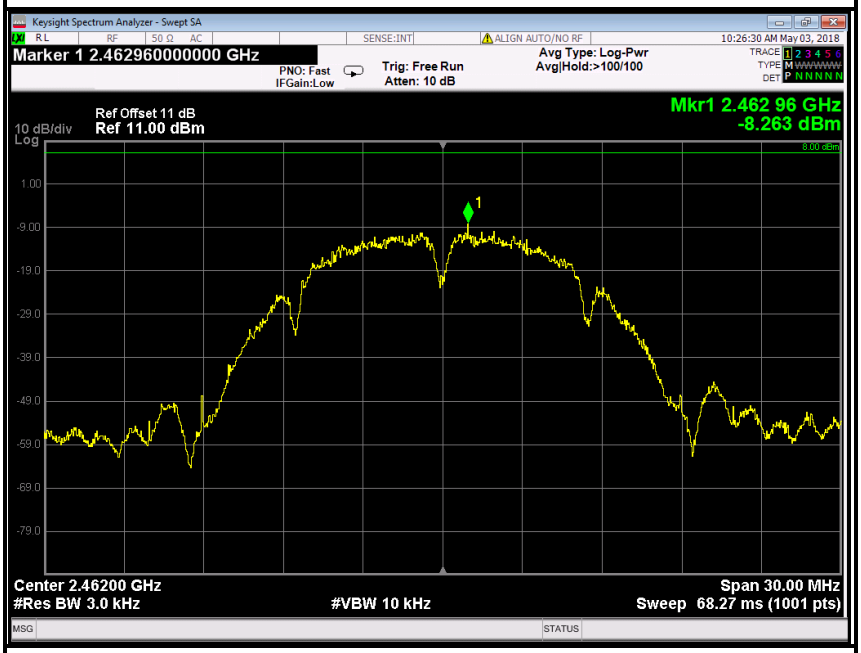
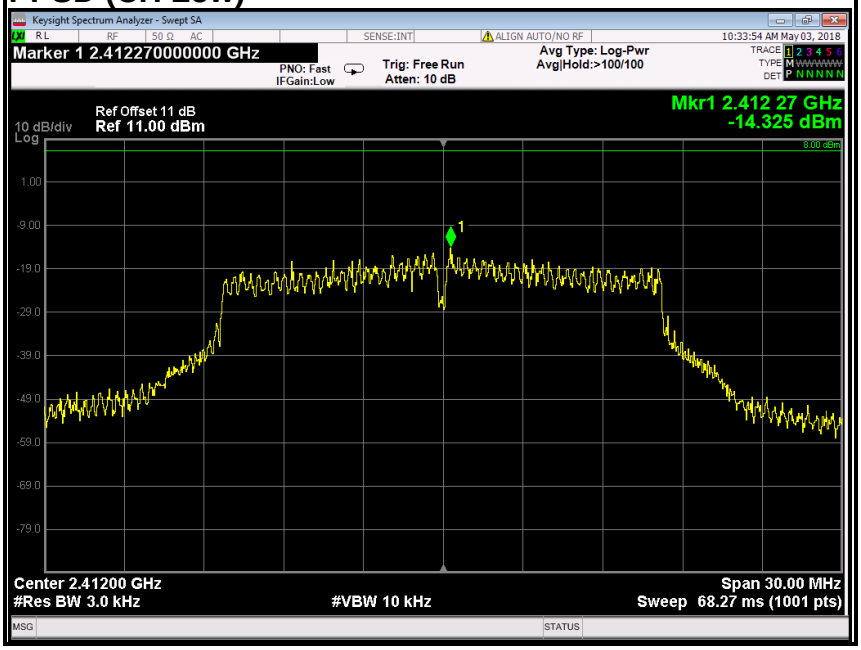
PPSD (CH High)



IEEE 802.11g mode

PPSD (CH Low)



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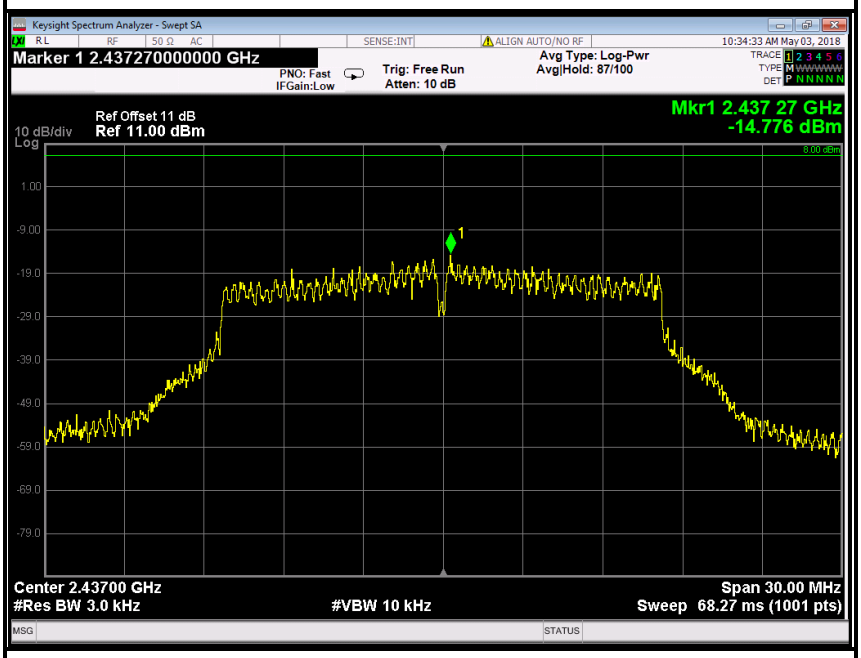
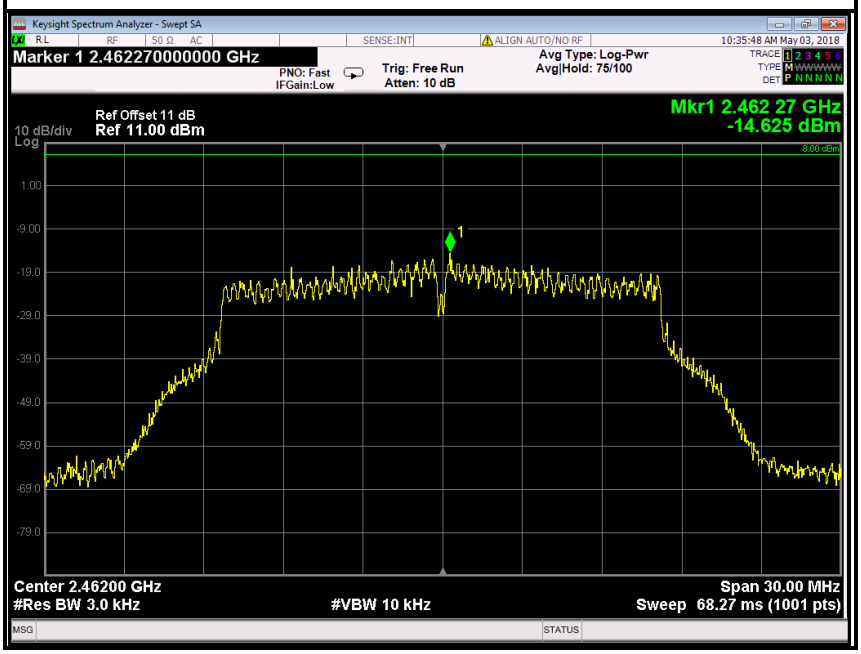
PPSD (CH Mid)



PPSD (CH High)



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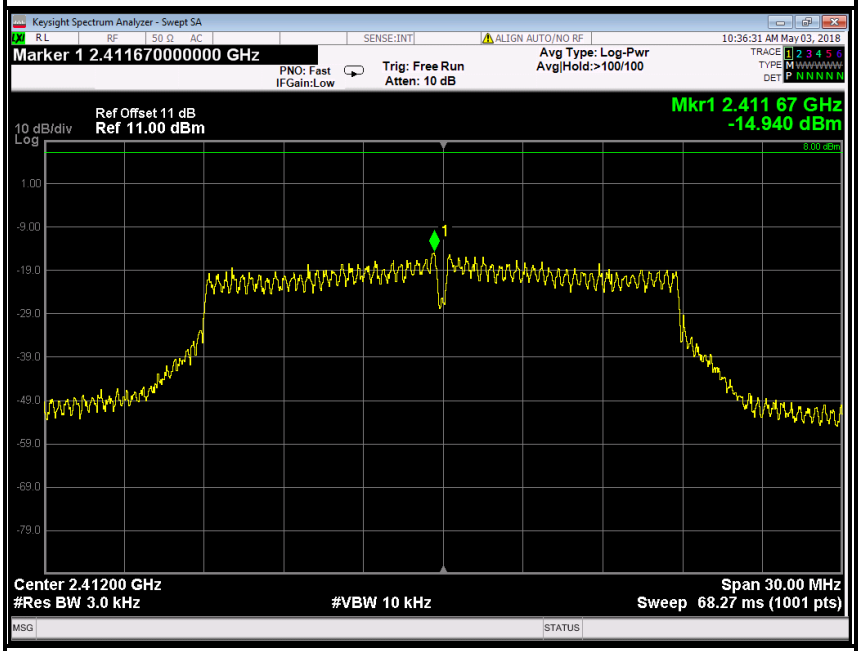
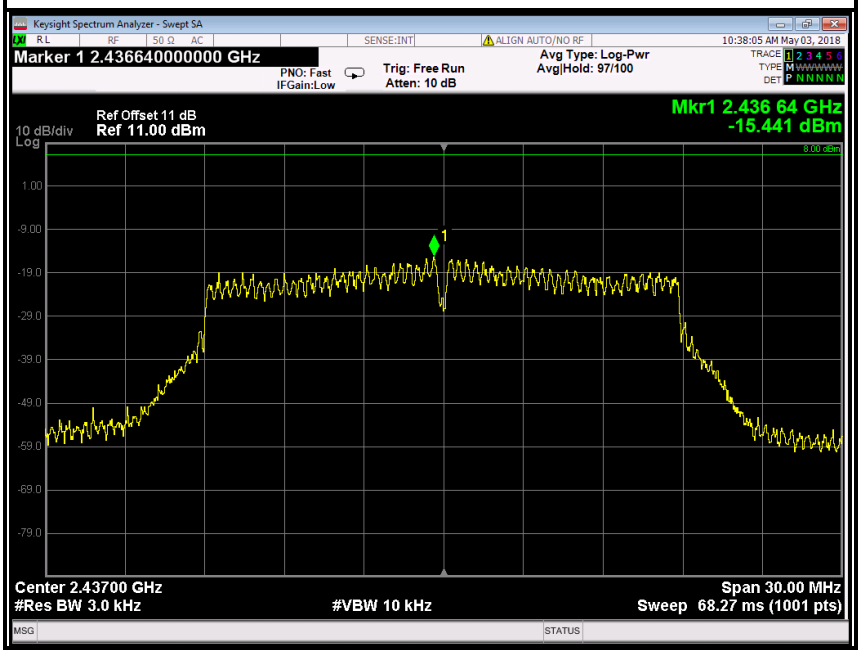
IEEE 802.11n HT20 MHz mode

PPSD (CH Low)



PPSD (CH Mid)



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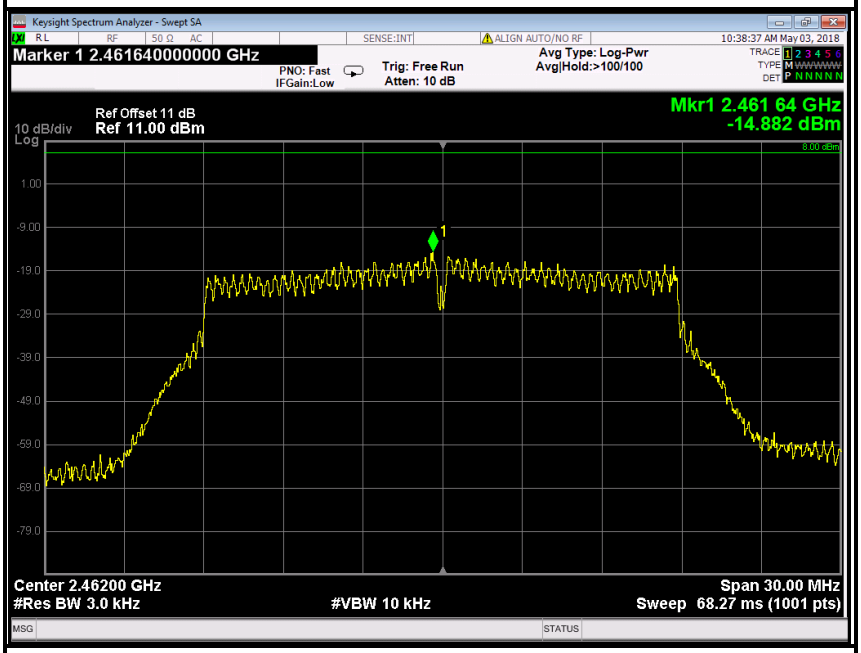
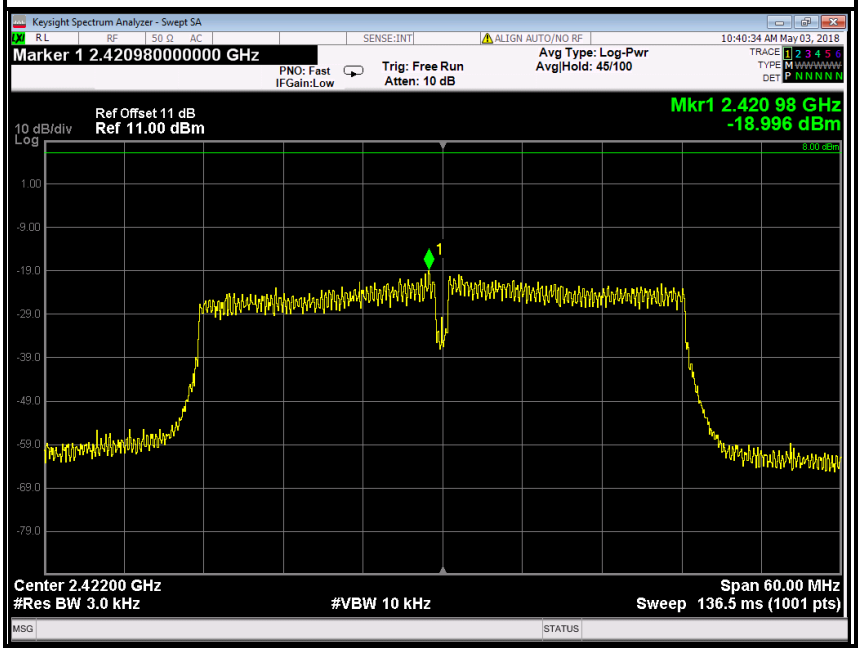
PPSD (CH High)



IEEE 802.11n HT40 MHz mode

PPSD (CH Low)



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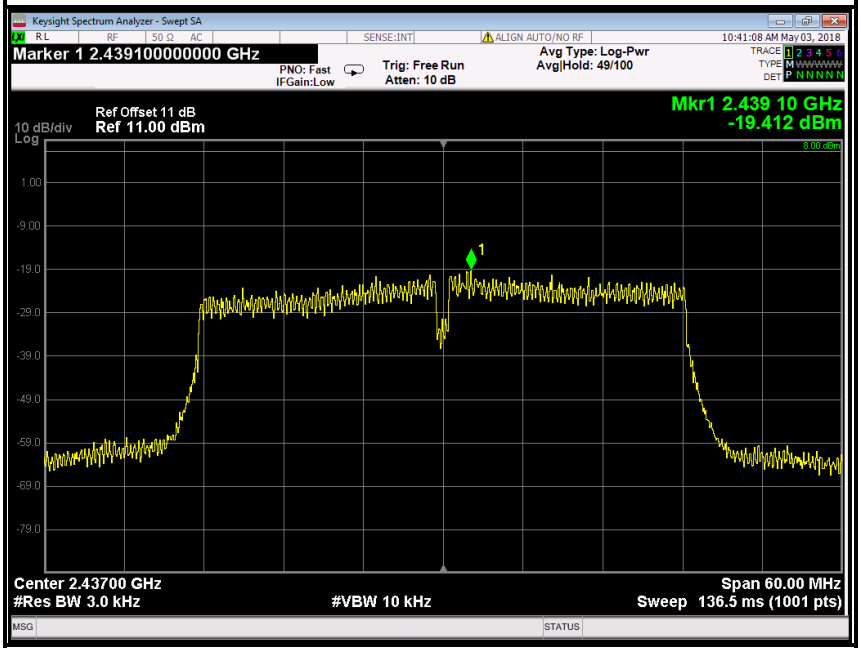
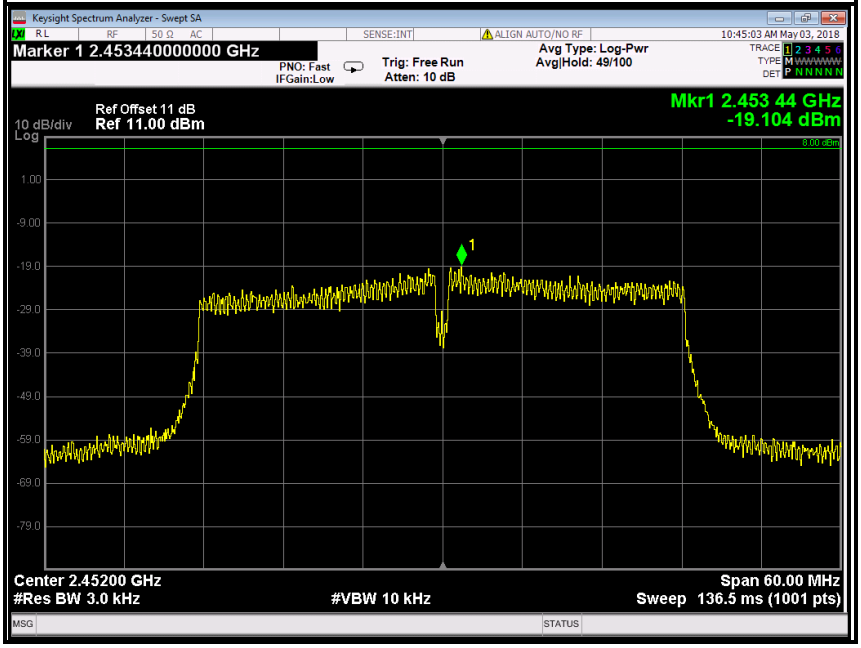
PPSD (CH Mid)



PPSD (CH High)



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