Test Mode: TX / IEEE 802.11g (CH High) **Tested by:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1378.000	46.93	-7.14	39.79	74.00	-34.21	V	Peak
2557.000	45.35	-2.16	43.19	74.00	-30.81	V	Peak
3394.000	43.02	-0.70	42.32	74.00	-31.68	V	Peak
3925.000	41.87	1.27	43.14	74.00	-30.86	V	Peak
5185.000	41.04	5.31	46.35	74.00	-27.65	V	Peak
5716.000	40.71	5.96	46.67	74.00	-27.33	V	Peak
1288.000	47.94	-7.47	40.47	74.00	-33.53	H	Peak
2557.000	45.22	-2.16	43.06	74.00	-30.94	H	Peak
3403.000	42.78	-0.68	42.10	74.00	-31.90	H	Peak
4546.000	41.07	3.50	44.57	74.00	-29.43	H	Peak
5032.000	40.75	5.04	45.79	74.00	-28.21	H	Peak
5554.000	40.17	5.89	46.06	74.00	-27.94	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1297.000	47.36	-7.44	39.92	74.00	-34.08	V	Peak
2566.000	45.36	-2.14	43.22	74.00	-30.78	V	Peak
3385.000	43.17	-0.71	42.46	74.00	-31.54	V	Peak
4069.000	41.31	1.83	43.14	74.00	-30.86	V	Peak
4951.000	40.49	4.82	45.31	74.00	-28.69	V	Peak
5626.000	41.36	5.92	47.28	74.00	-26.72	V	Peak
1342.000	46.82	-7.27	39.55	74.00	-34.45	H	Peak
2098.000	47.34	-4.46	42.88	74.00	-31.12	H	Peak
3250.000	43.77	-0.94	42.83	74.00	-31.17	H	Peak
4258.000	41.09	2.50	43.59	74.00	-30.41	H	Peak
4861.000	40.80	4.53	45.33	74.00	-28.67	H	Peak
5590.000	40.18	5.91	46.09	74.00	-27.91	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1342.000	46.24	-7.27	38.97	74.00	-35.03	V	Peak
2566.000	44.88	-2.14	42.74	74.00	-31.26	V	Peak
3403.000	43.97	-0.68	43.29	74.00	-30.71	V	Peak
4006.000	40.86	1.61	42.47	74.00	-31.53	V	Peak
4807.000	41.63	4.35	45.98	74.00	-28.02	V	Peak
5392.000	41.54	5.68	47.22	74.00	-26.78	V	Peak
1306.000	46.94	-7.40	39.54	74.00	-34.46	H	Peak
2512.000	45.15	-2.24	42.91	74.00	-31.09	H	Peak
3340.000	42.78	-0.79	41.99	74.00	-32.01	H	Peak
4348.000	41.47	2.81	44.28	74.00	-29.72	H	Peak
5167.000	40.75	5.28	46.03	74.00	-27.97	H	Peak
5959.000	40.81	6.06	46.87	74.00	-27.13	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1297.000	47.13	-7.44	39.69	74.00	-34.31	V	Peak
2467.000	45.86	-2.44	43.42	74.00	-30.58	V	Peak
3088.000	43.52	-1.21	42.31	74.00	-31.69	V	Peak
4105.000	41.29	1.96	43.25	74.00	-30.75	V	Peak
5014.000	40.19	5.00	45.19	74.00	-28.81	V	Peak
5860.000	40.94	6.02	46.96	74.00	-27.04	V	Peak
1189.000	46.91	-7.83	39.08	74.00	-34.92	H	Peak
2467.000	46.40	-2.44	43.96	74.00	-30.04	H	Peak
3304.000	43.33	-0.85	42.48	74.00	-31.52	H	Peak
4627.000	40.84	3.76	44.60	74.00	-29.40	H	Peak
5293.000	40.92	5.50	46.42	74.00	-27.58	H	Peak
5671.000	40.51	5.94	46.45	74.00	-27.55	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1576.000	46.78	-6.74	40.04	74.00	-33.96	V	Peak
2566.000	45.43	-2.14	43.29	74.00	-30.71	V	Peak
3196.000	43.79	-1.03	42.76	74.00	-31.24	V	Peak
4159.000	41.75	2.15	43.90	74.00	-30.10	V	Peak
4501.000	41.84	3.35	45.19	74.00	-28.81	V	Peak
4978.000	41.48	4.91	46.39	74.00	-27.61	V	Peak
1342.000	46.45	-7.27	39.18	74.00	-34.82	H	Peak
2494.000	46.27	-2.29	43.98	74.00	-30.02	H	Peak
3259.000	43.86	-0.92	42.94	74.00	-31.06	H	Peak
4456.000	40.83	3.20	44.03	74.00	-29.97	H	Peak
4960.000	41.31	4.85	46.16	74.00	-27.84	H	Peak
5671.000	40.76	5.94	46.70	74.00	-27.30	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1243.000	46.93	-7.63	39.30	74.00	-34.70	V	Peak
2566.000	45.45	-2.14	43.31	74.00	-30.69	V	Peak
3133.000	43.59	-1.14	42.45	74.00	-31.55	V	Peak
4132.000	40.57	2.05	42.62	74.00	-31.38	V	Peak
4609.000	40.71	3.71	44.42	74.00	-29.58	V	Peak
5311.000	40.11	5.53	45.64	74.00	-28.36	V	Peak
1486.000	46.50	-6.91	39.59	74.00	-34.41	H	Peak
1936.000	45.08	-5.41	39.67	74.00	-34.33	H	Peak
2494.000	45.22	-2.29	42.93	74.00	-31.07	H	Peak
3394.000	43.87	-0.70	43.17	74.00	-30.83	H	Peak
3952.000	41.25	1.39	42.64	74.00	-31.36	H	Peak
5122.000	40.63	5.20	45.83	74.00	-28.17	H	Peak

REMARKS:

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:** Jacksan Luo

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** November 3, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1342.000	46.97	-7.27	39.70	74.00	-34.30	V	Peak
2539.000	45.77	-2.19	43.58	74.00	-30.42	V	Peak
3160.000	43.70	-1.09	42.61	74.00	-31.39	V	Peak
3799.000	41.79	0.74	42.53	74.00	-31.47	V	Peak
4402.000	42.27	3.01	45.28	74.00	-28.72	V	Peak
4942.000	40.98	4.79	45.77	74.00	-28.23	V	Peak
1306.000	46.81	-7.40	39.41	74.00	-34.59	H	Peak
1693.000	45.21	-6.50	38.71	74.00	-35.29	H	Peak
2557.000	45.87	-2.16	43.71	74.00	-30.29	H	Peak
3970.000	40.98	1.46	42.44	74.00	-31.56	H	Peak
4861.000	40.26	4.53	44.79	74.00	-29.21	H	Peak
5446.000	40.37	5.77	46.14	74.00	-27.86	H	Peak

REMARKS:

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

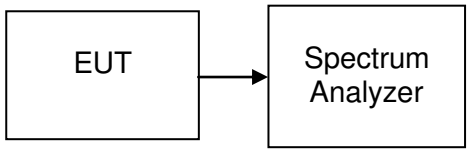
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2016	02/20/2017

7.3.3. TEST PROCEDURES (please refer to measurement standard KDB 558074 8.2)

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	9144	>500	PASS
Mid	2437	9145		PASS
High	2462	9145		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16380	>500	PASS
Mid	2437	16370		PASS
High	2462	16370		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17620	>500	PASS
Mid	2437	17610		PASS
High	2462	17620		PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	36340	>500	PASS
Mid	2437	36340		PASS
High	2452	36360		PASS

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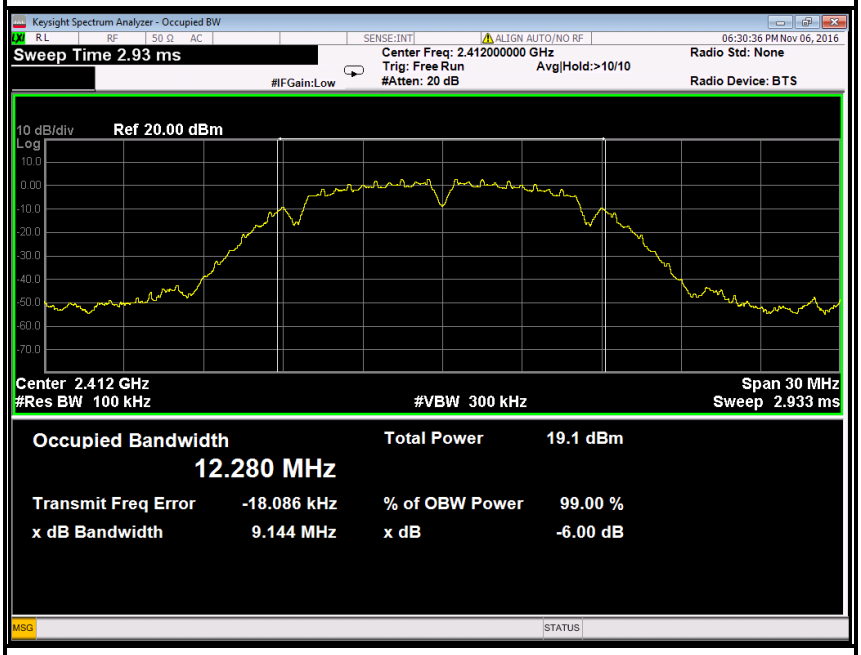
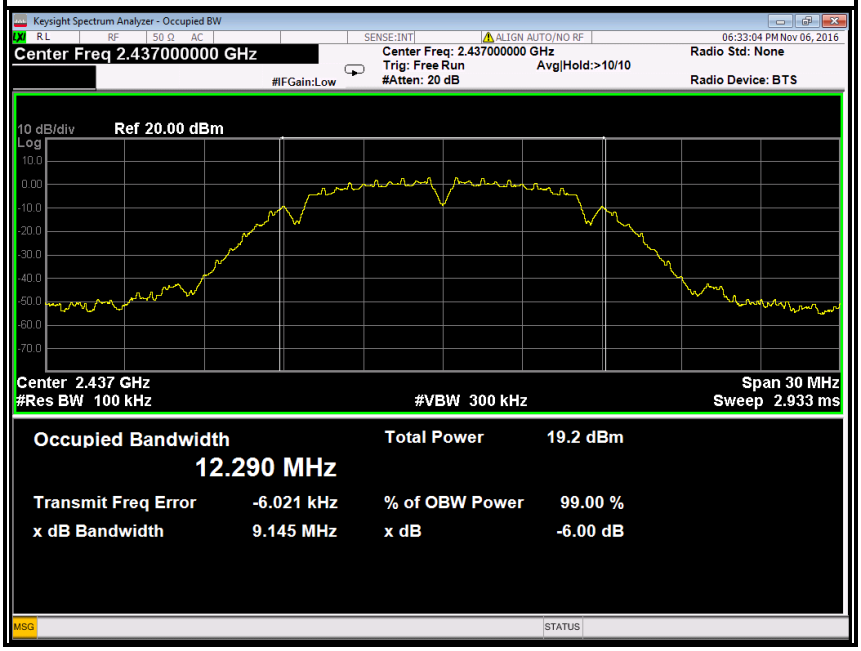
Test Plot

IEEE 802.11b mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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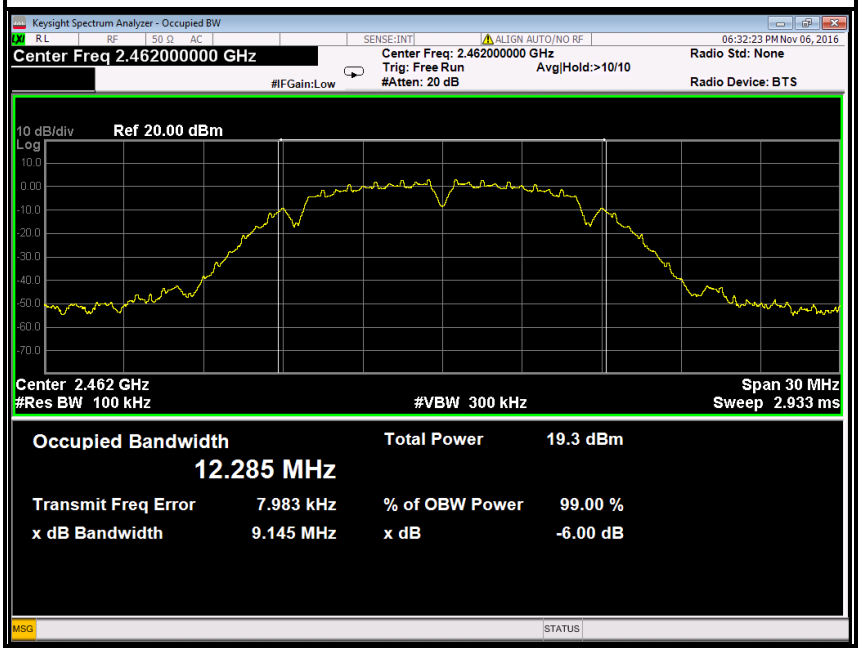
6dB Bandwidth (CH High)



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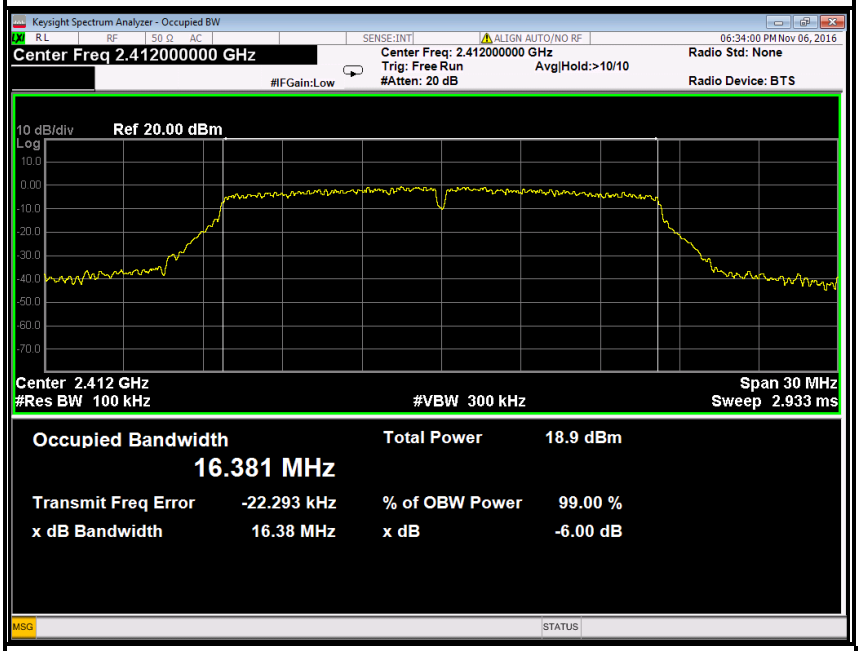
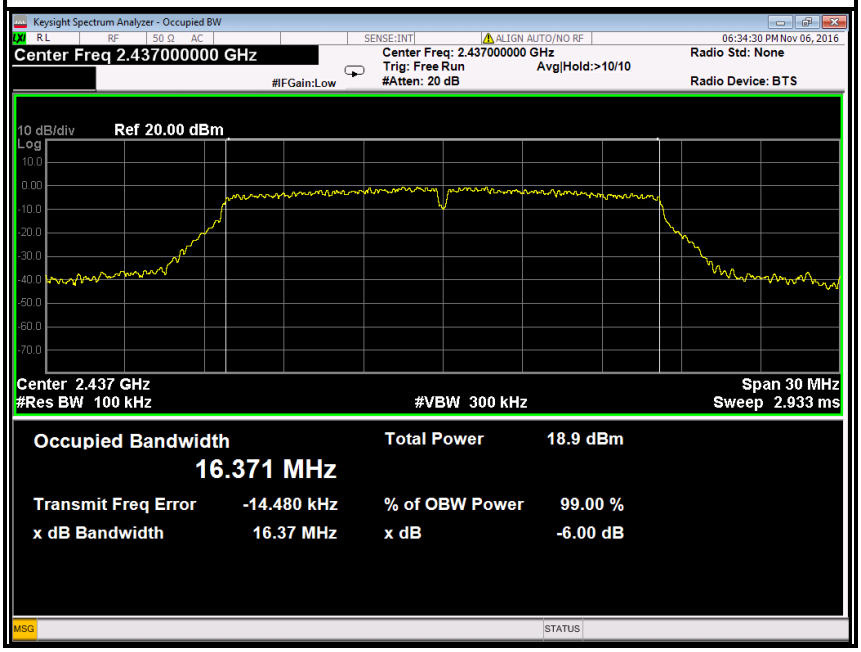
IEEE 802.11g mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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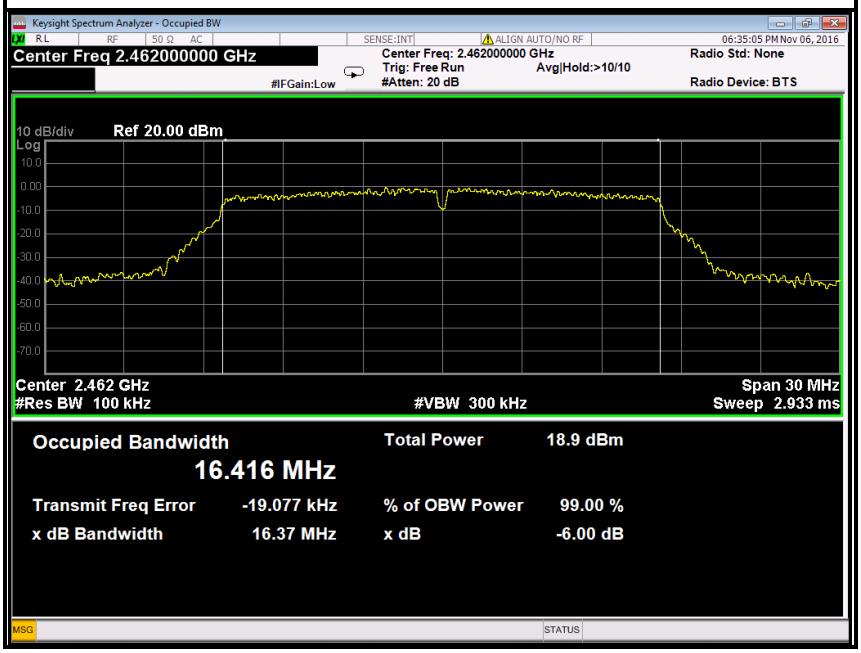
6dB Bandwidth (CH High)



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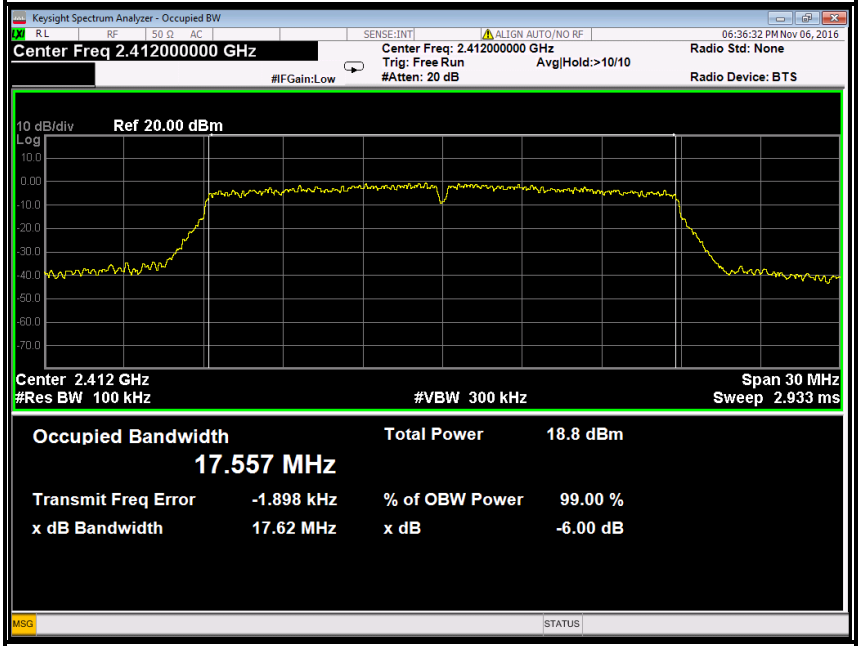
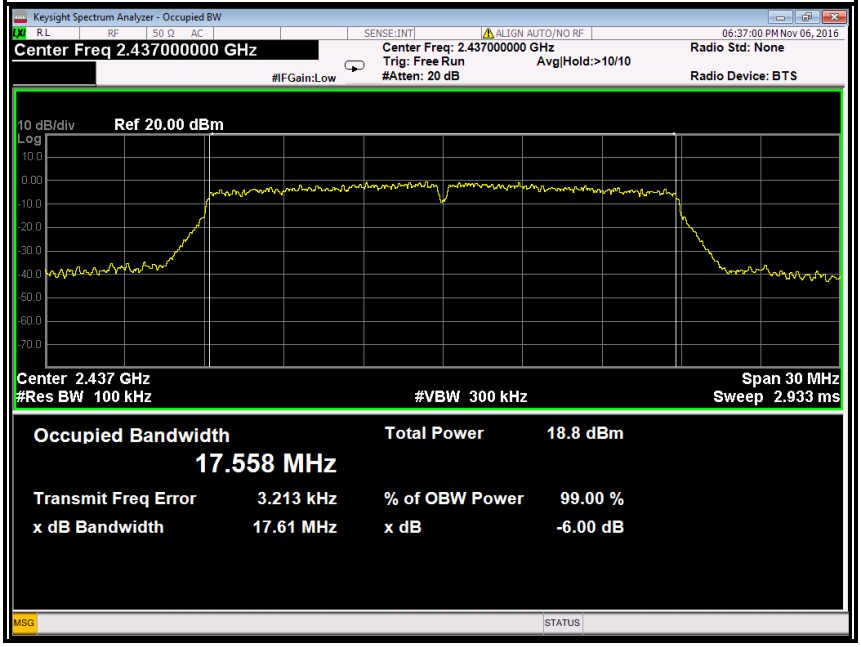
IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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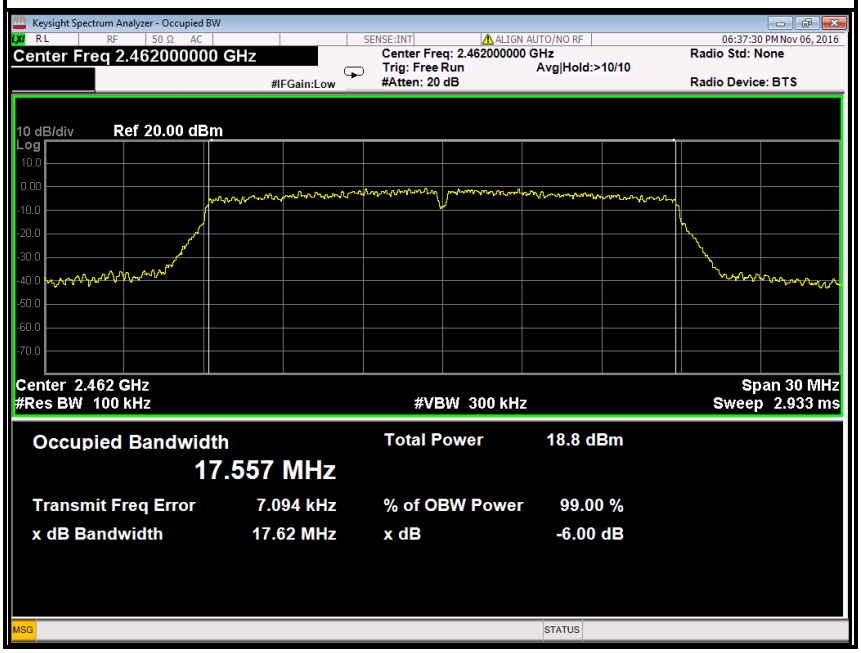
6dB Bandwidth (CH High)



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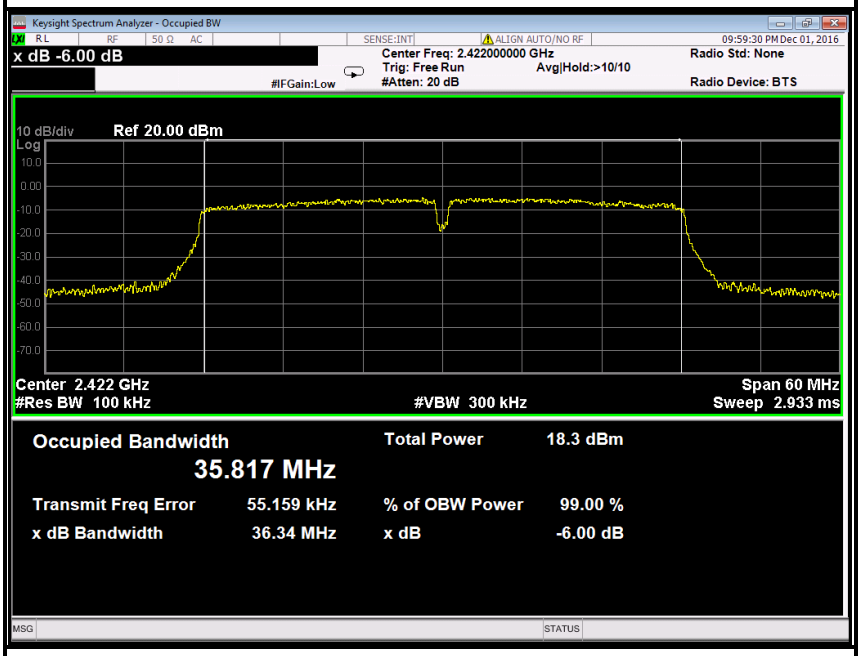
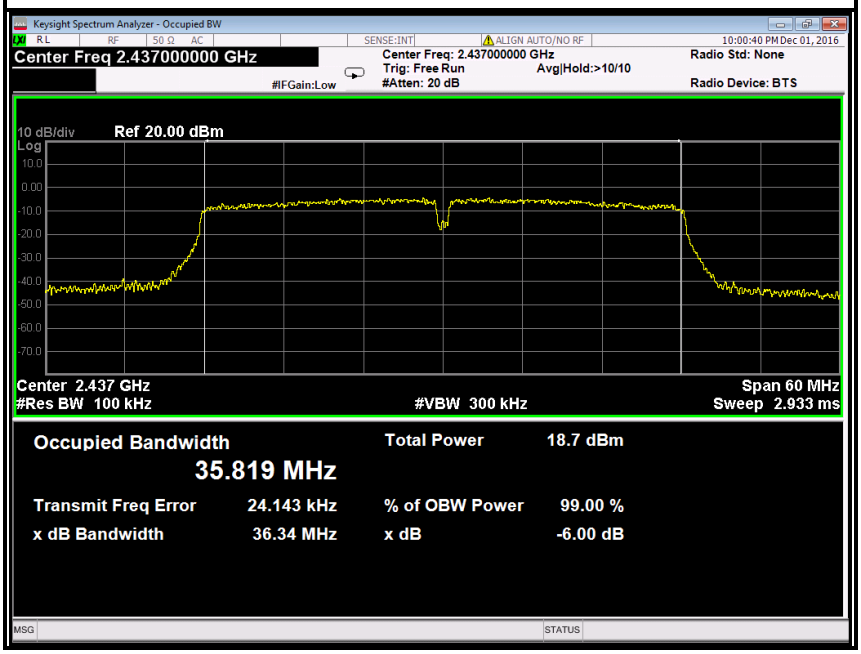
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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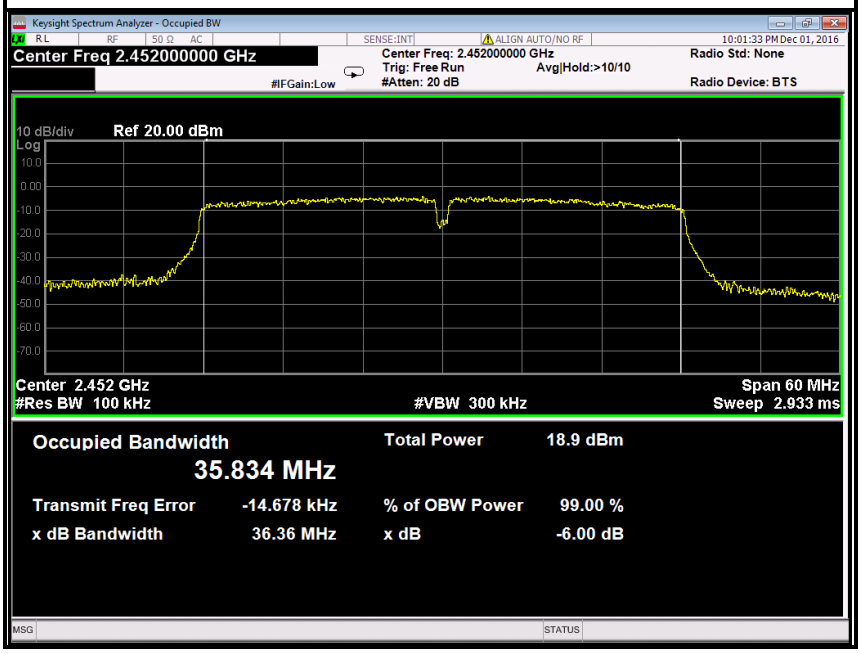
6dB Bandwidth (CH High)



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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	

TEST RESULTS

IEEE 802.11b mode

T_{nom}	V_{nom}	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		4.93	4.97	4.77
Radiated power [dBm/MHz] Measured with DSSS modulation		5.95	6.12	6.35
Gain [dBi] Calculated		1.02	1.15	1.58
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	02/21/2016	02/20/2017
Power Sensor	Anritsu	MA2411B	1126150	02/21/2016	02/20/2017

7.5.3. TEST PROCEDURES (please refer to measurement standard KDB 558074 9.1)

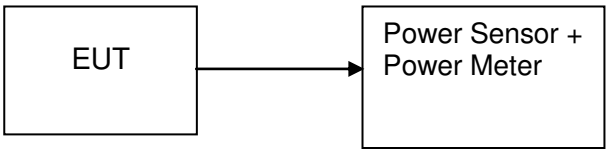
9.1.1 RBW ≥ *DTS bandwidth*

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.

9.1.2 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	15.82	0.03819	Peak	1	PASS
Mid	2437	15.87	0.03864			PASS
High	2462	15.67	0.03690			PASS
Low	2412	14.24	0.02655	AVG	1	PASS
Mid	2437	14.25	0.02661			PASS
High	2462	14.12	0.02582			PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	22.30	0.16982	Peak	1	PASS
Mid	2437	22.48	0.17701			PASS
High	2462	22.65	0.18408			PASS
Low	2412	13.88	0.02443	AVG	1	PASS
Mid	2437	13.85	0.02427			PASS
High	2462	13.64	0.02312			PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak / AVG	Result
Low	2412	22.75	0.18836	1	Peak	PASS
Mid	2437	21.59	0.14421			PASS
High	2462	21.33	0.13583			PASS
Low	2412	14.37	0.02735	1	AVG	PASS
Mid	2437	14.00	0.02512			PASS
High	2462	13.84	0.02421			PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Peak / AVG	Result
Low	2422	21.48	0.14060	1	Peak	PASS
Mid	2437	21.60	0.14454			PASS
High	2452	22.12	0.16293			PASS
Low	2422	14.09	0.02564	1	AVG	PASS
Mid	2437	14.17	0.02612			PASS
High	2452	14.33	0.02710			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	02/21/2016	02/20/2017
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
Amplifier	EMEC	EM330	060661	03/18/2016	03/17/2017
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2016	02/20/2017
Loop Antenna	COM-POWER	AL-130	121044	09/25/2016	09/24/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2016	02/20/2017
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/28/2016	02/27/2017
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2016	02/27/2017
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	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
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2016	02/20/2017
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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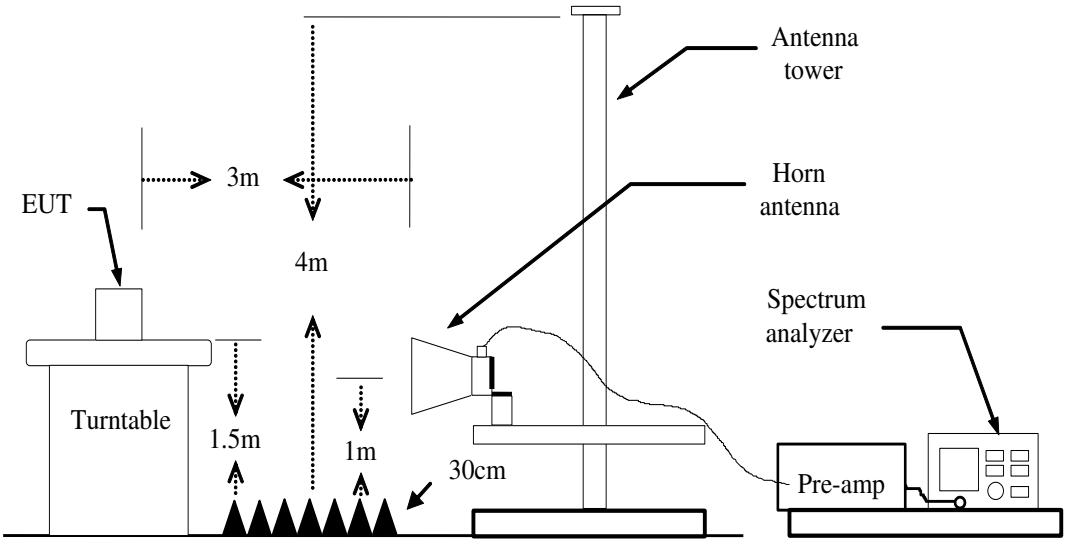
7.6.3. TEST PROCEDURES (please refer to measurement standard)

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=10Hz / 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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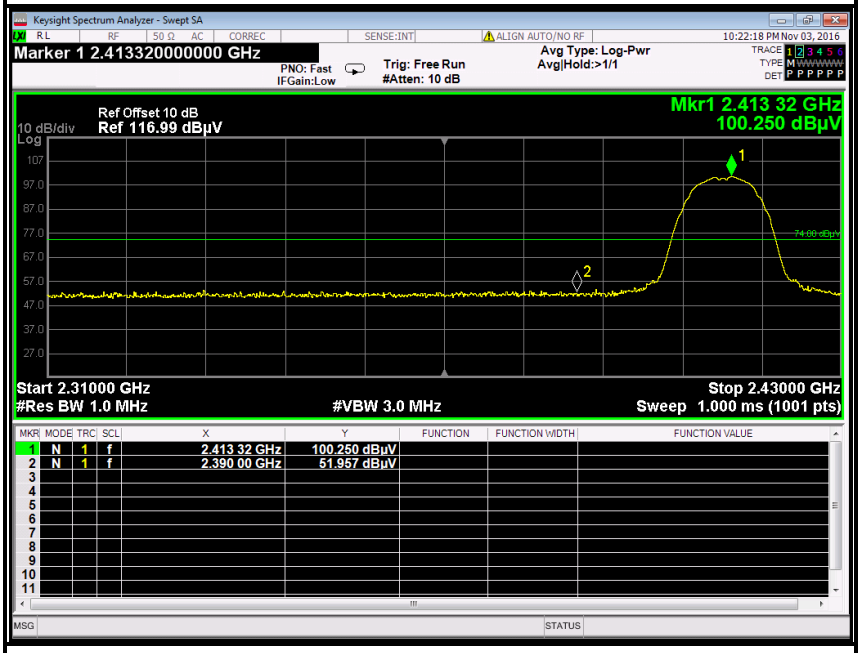
7.6.5. TEST RESULTS

Test Plot

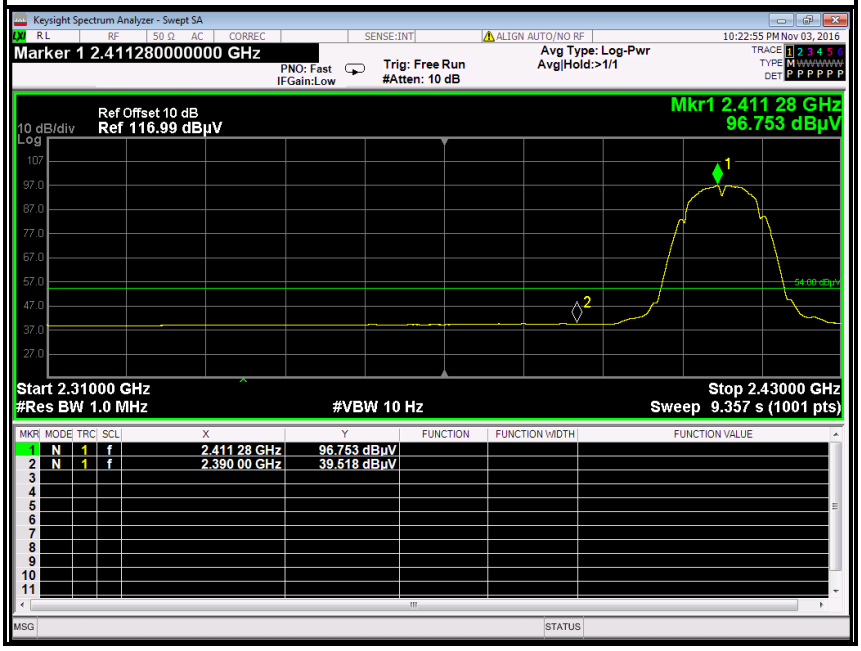
IEEE 802.11b mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	45.36	-6.60	51.96	74.00	-22.04	Peak	Vertical
2	2390.0000	32.92	-6.60	39.52	54.00	-14.48	Average	Vertical

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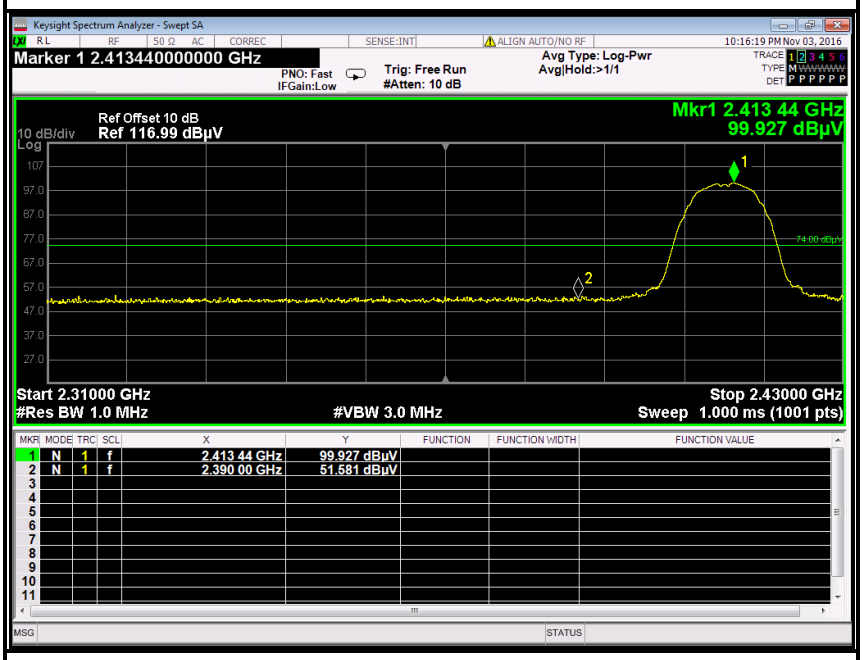
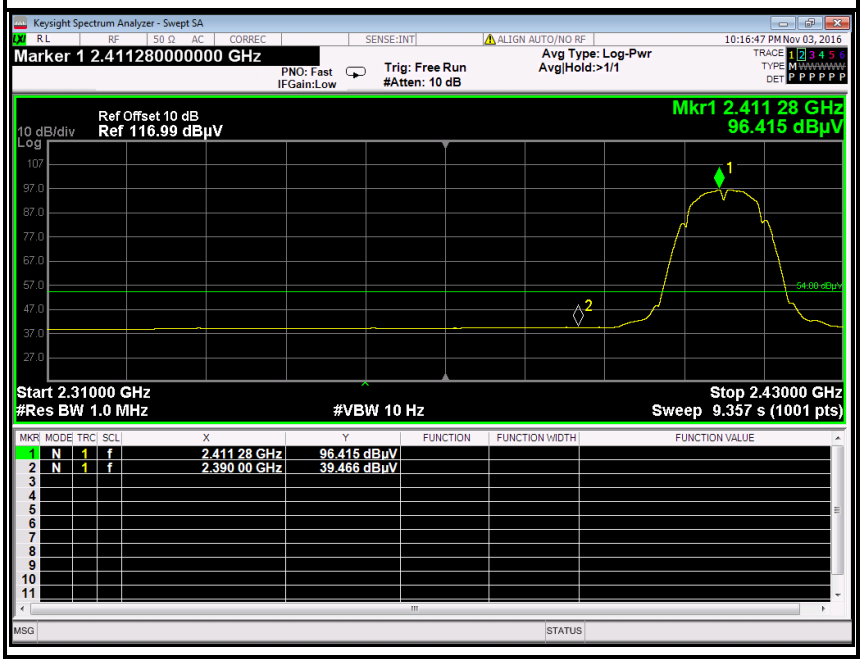
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	51.98	-6.60	58.58	74.00	-15.42	Peak	Horizontal
2	2390.0000	32.87	-6.60	39.47	54.00	-14.53	Average	Horizontal

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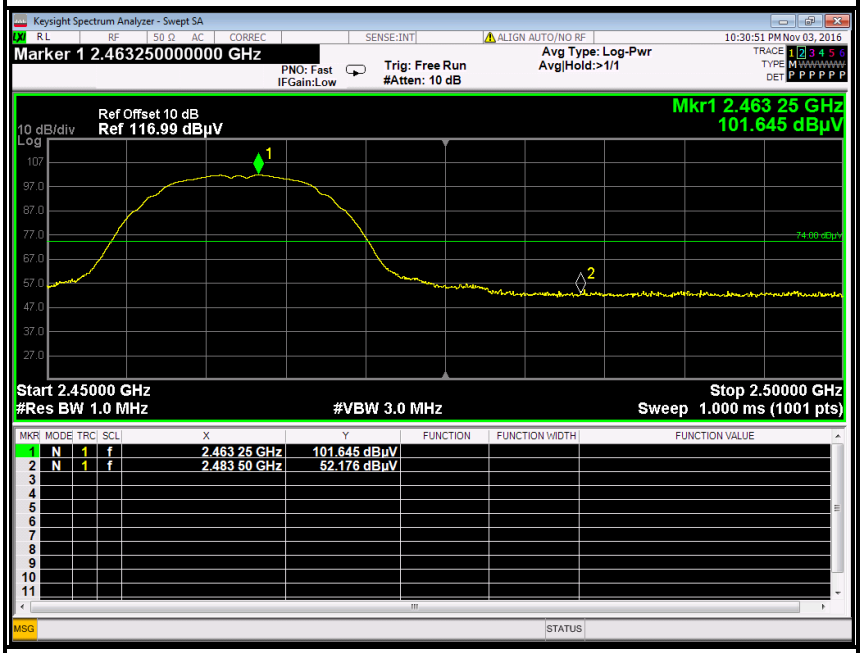
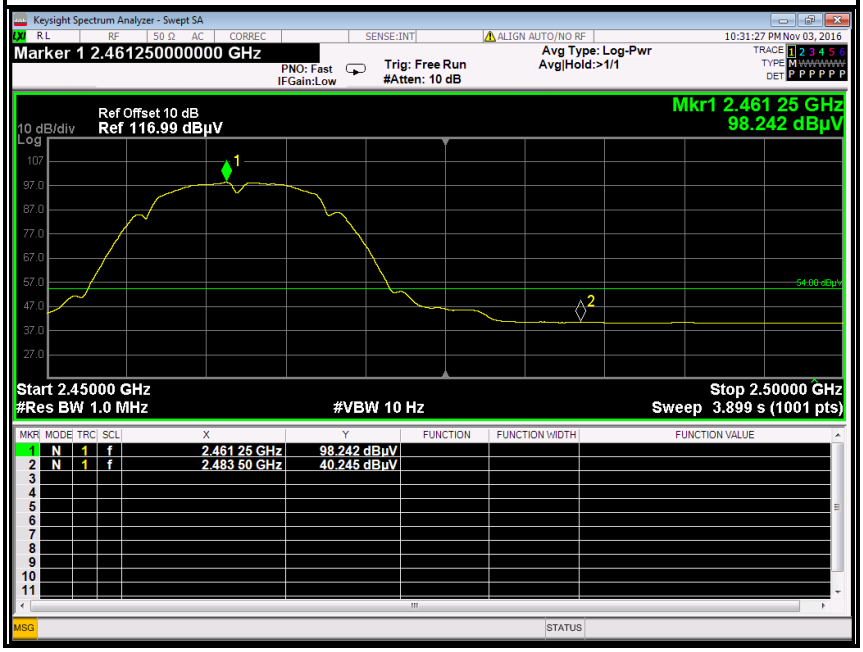
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	45.94	-6.24	52.18	74.00	-21.82	Peak	Vertical
2	2483.5000	34.01	-6.24	40.25	54.00	-13.76	Average	Vertical

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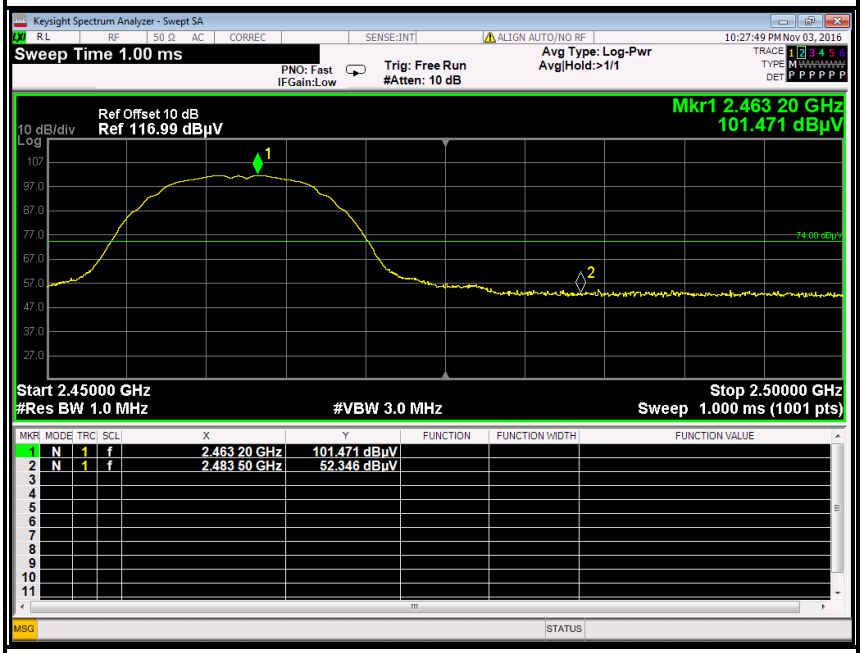
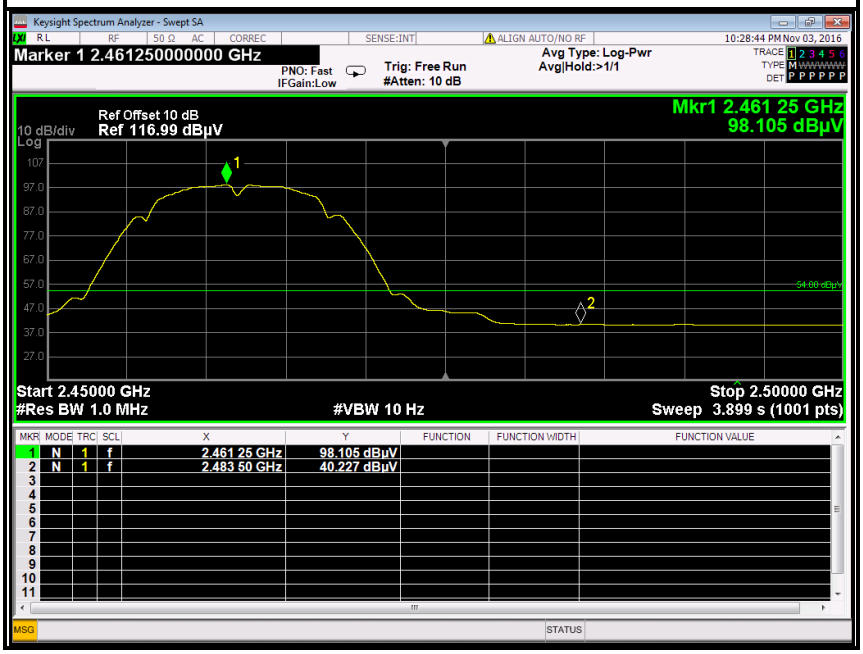
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	46.11	-6.24	52.35	74.00	-21.65	Peak	Horizontal
2	2483.5000	33.99	-6.24	40.23	54.00	-13.77	Average	Horizontal

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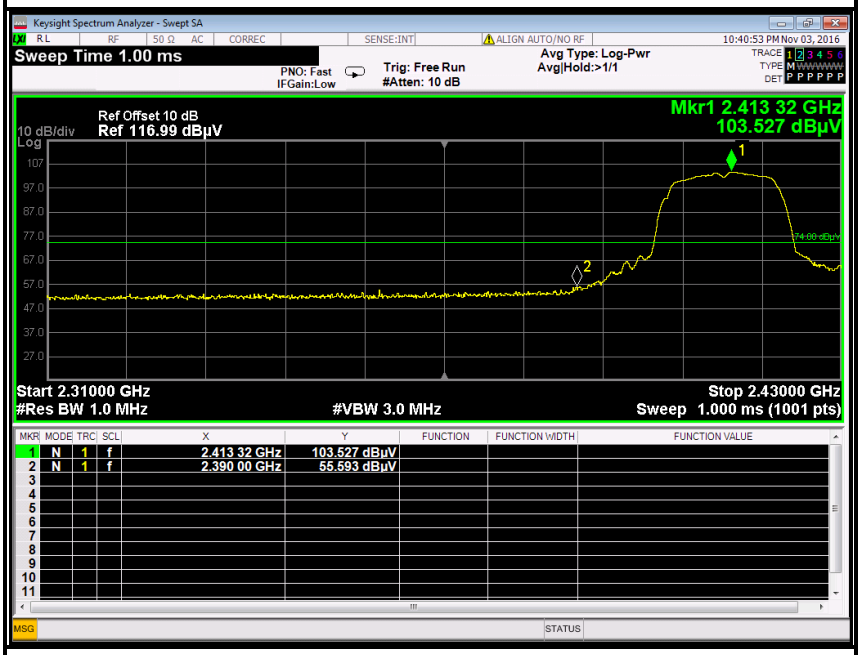
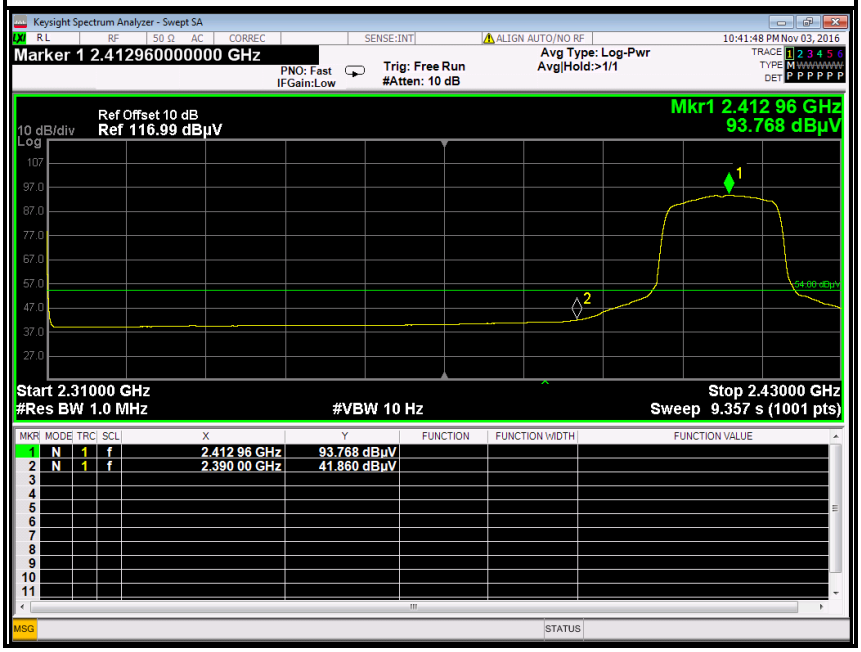
IEEE 802.11g mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	48.99	-6.60	55.59	74.00	-18.41	Peak	Vertical
2	2390.0000	35.26	-6.60	41.86	54.00	-12.14	Average	Vertical

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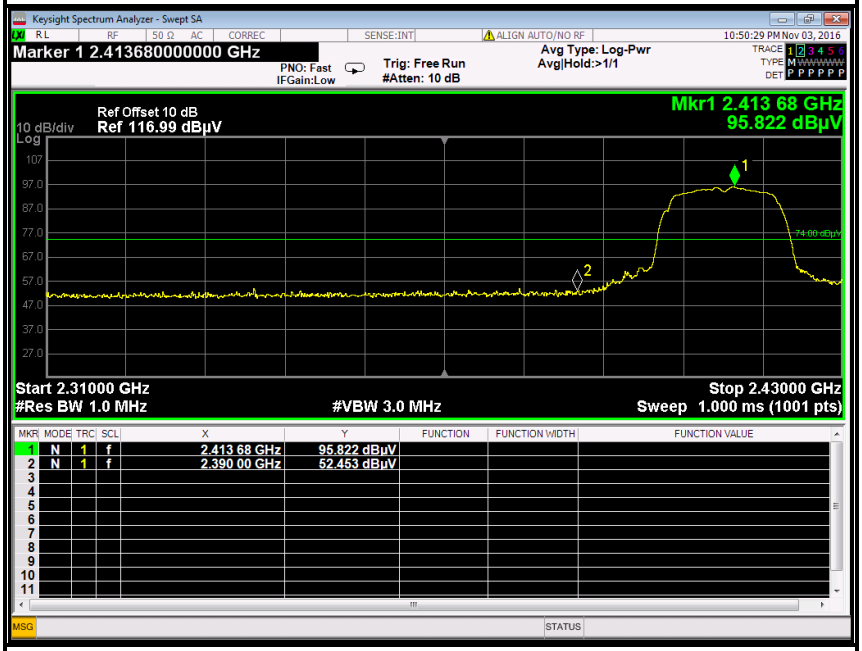
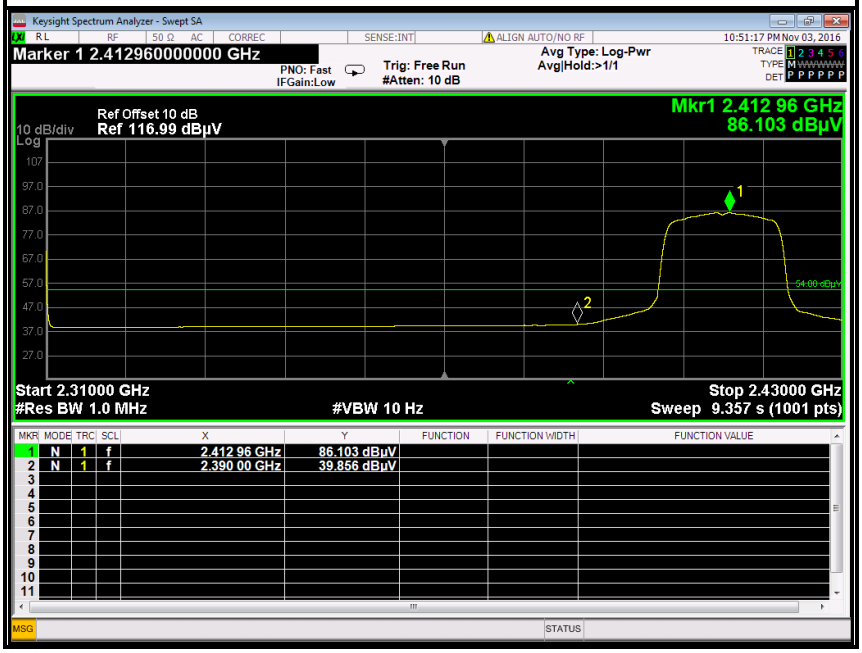
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	45.85	-6.60	52.45	74.00	-21.55	Peak	Horizontal
2	2390.0000	33.26	-6.60	39.86	54.00	-14.14	Average	Horizontal

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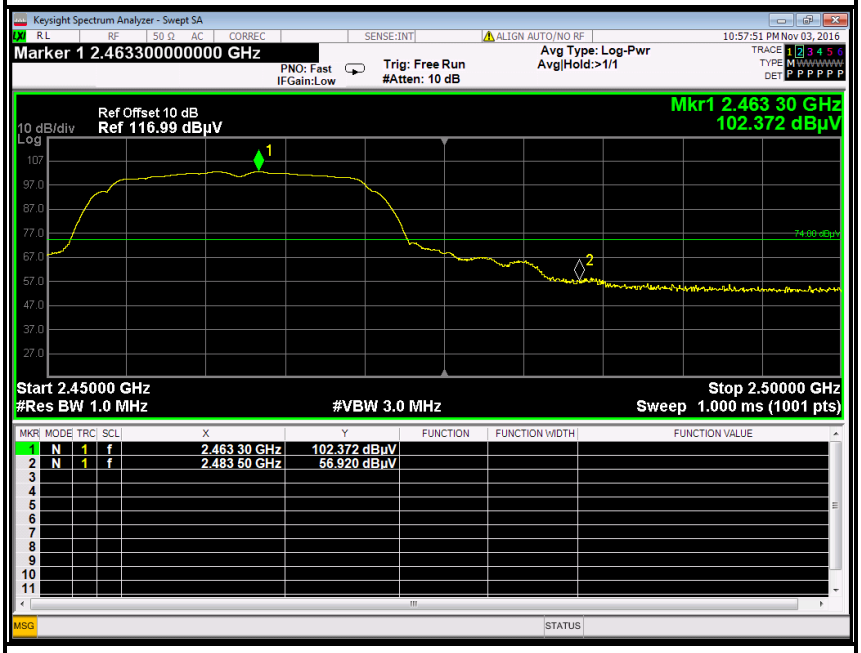
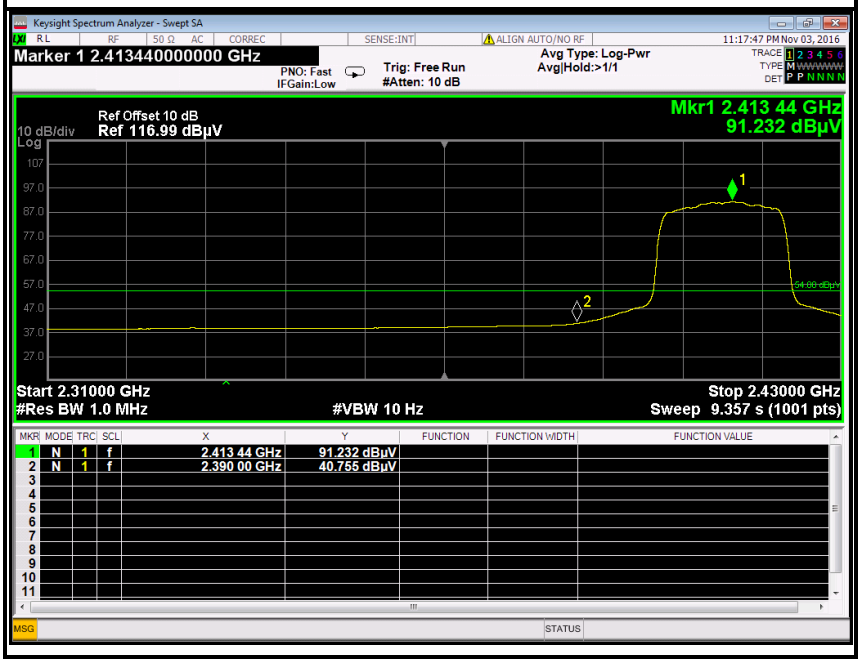
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	50.68	-6.24	56.92	74.00	-17.08	Peak	Vertical
2	2483.5000	34.52	-6.24	40.76	54.00	-13.25	Average	Vertical

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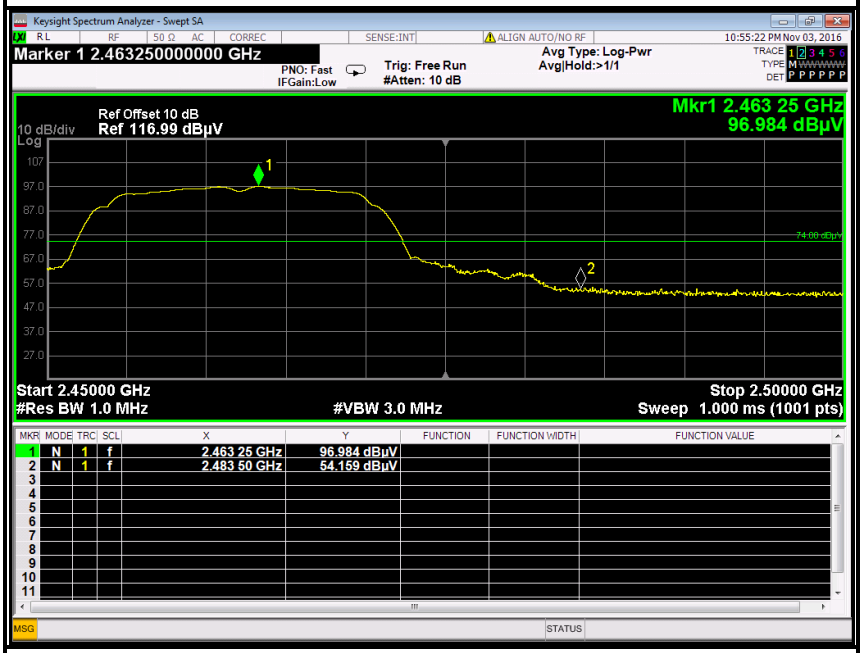
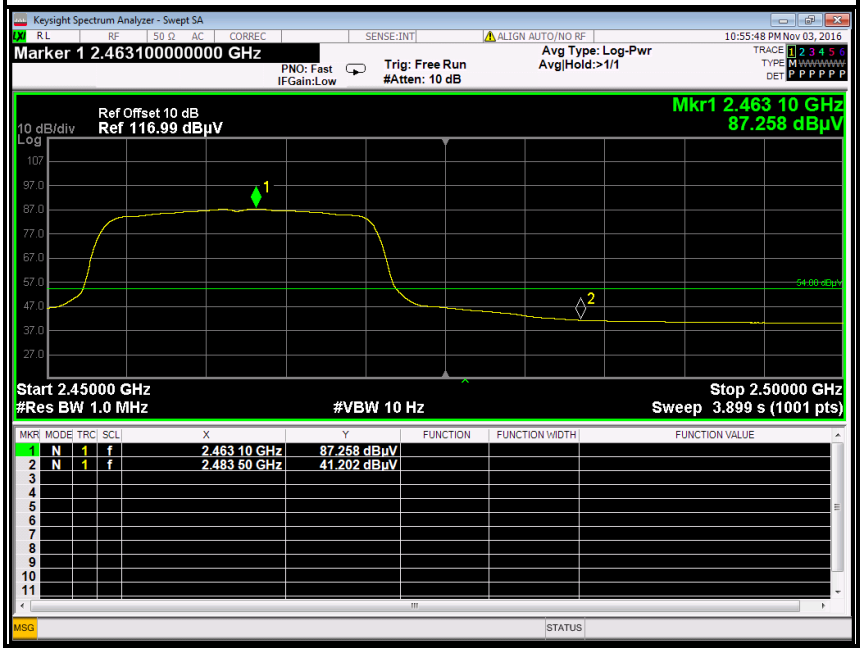
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	47.92	-6.24	54.16	74.00	-19.84	Peak	Horizontal
2	2483.5000	34.96	-6.24	41.20	54.00	-12.80	Average	Horizontal

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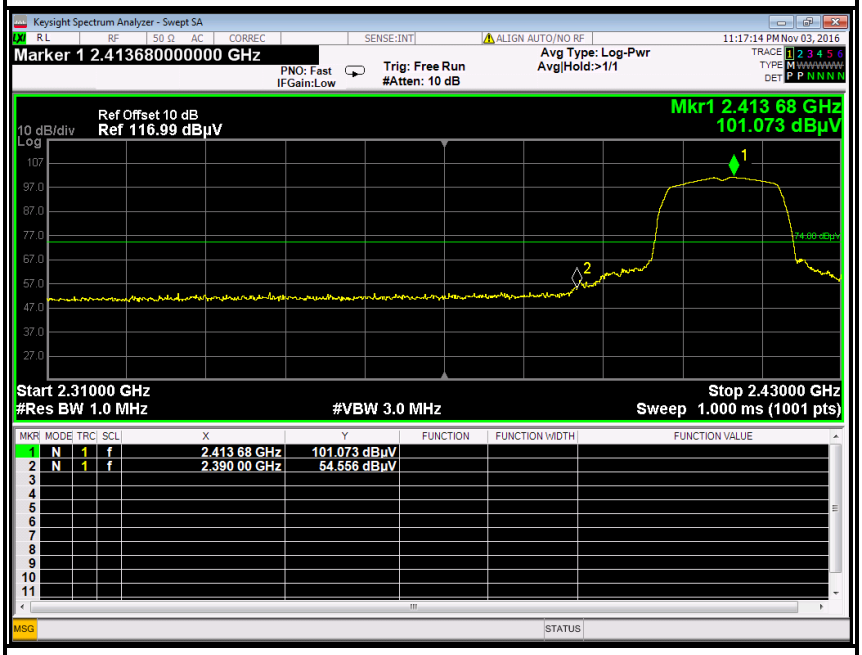
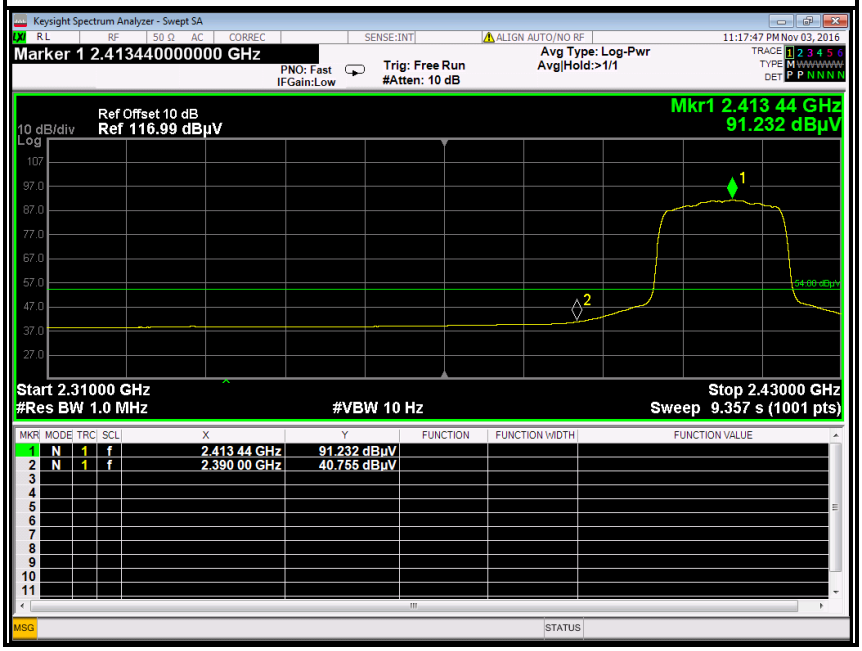
IEEE 802.11n HT20 MHz mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.96	-6.60	54.56	74.00	-19.44	Peak	Vertical
2	2390.0000	34.16	-6.60	40.76	54.00	-13.25	Average	Vertical

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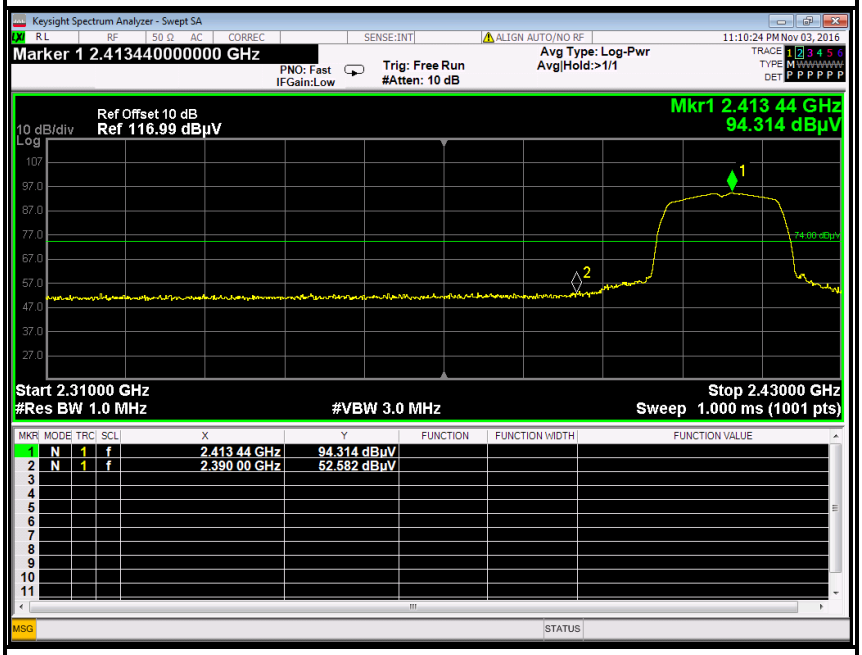
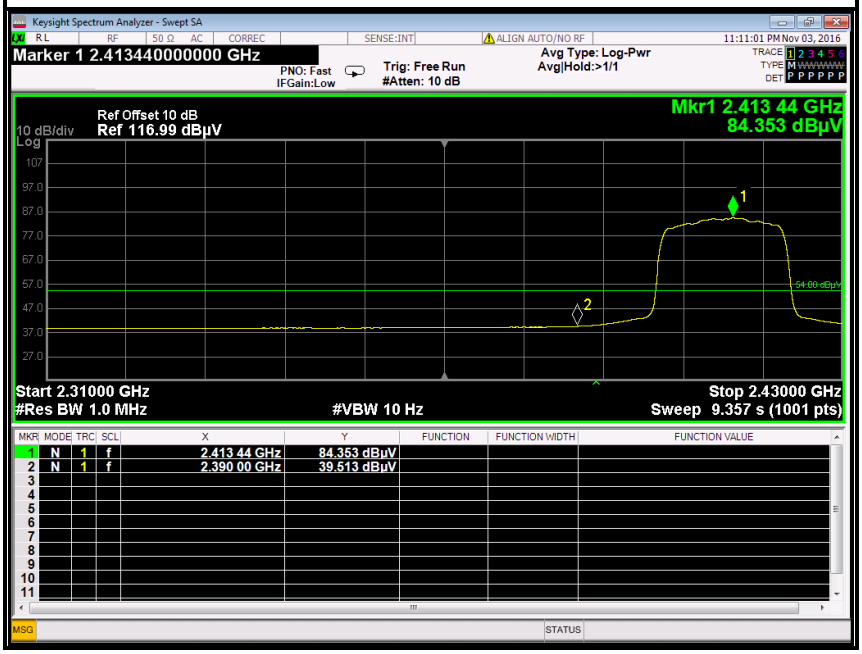
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	45.98	-6.60	52.58	74.00	-21.42	Peak	Horizontal
2	2390.0000	32.91	-6.60	39.51	54.00	-14.49	Average	Horizontal

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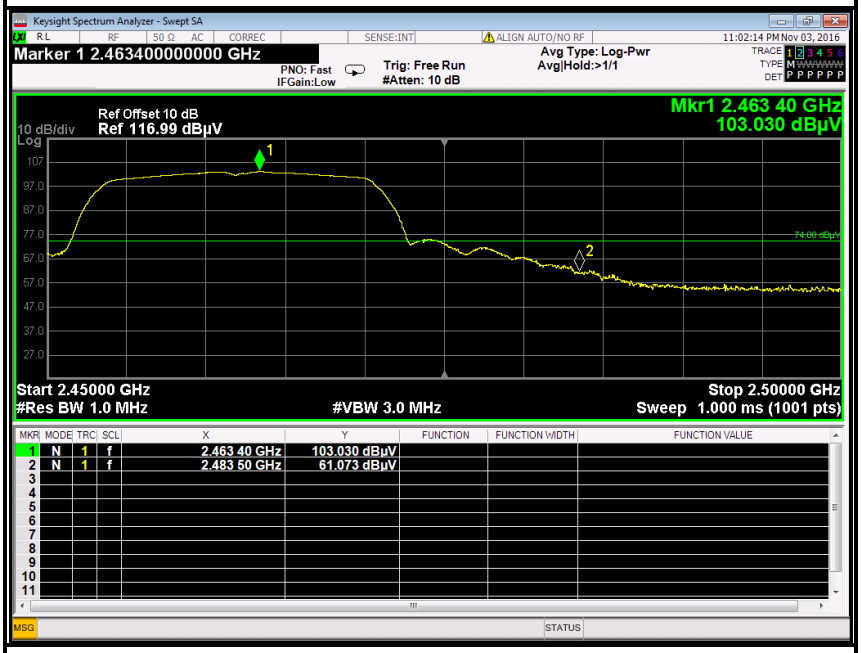
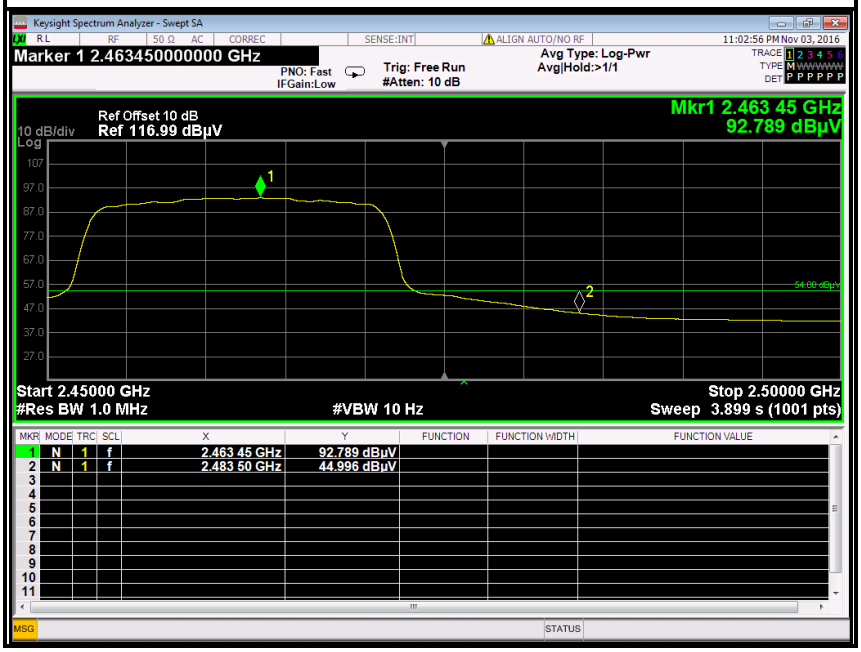
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	54.83	-6.24	61.07	74.00	-12.93	Peak	Vertical
2	2483.5000	38.76	-6.24	45.00	54.00	-9.00	Average	Vertical

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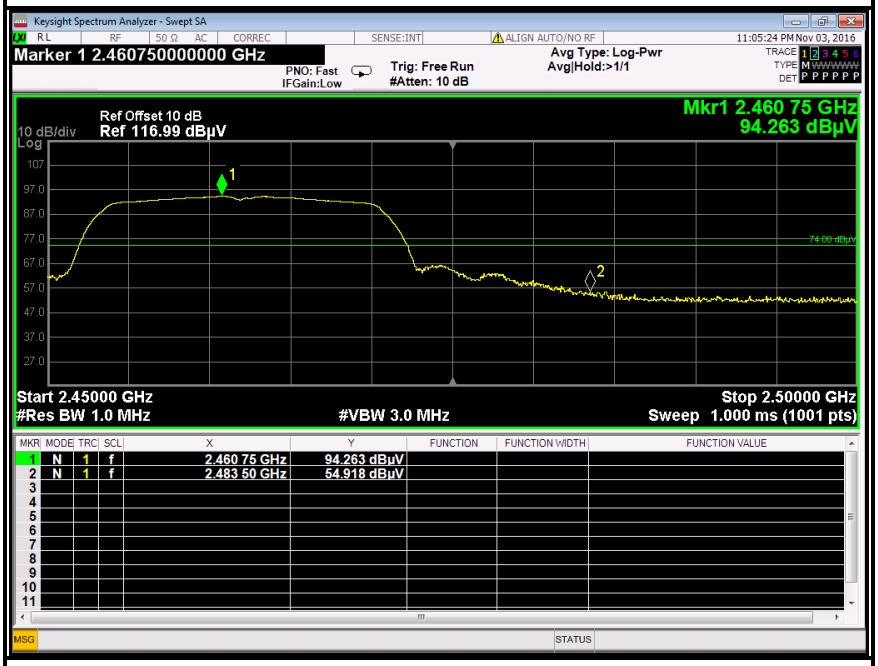
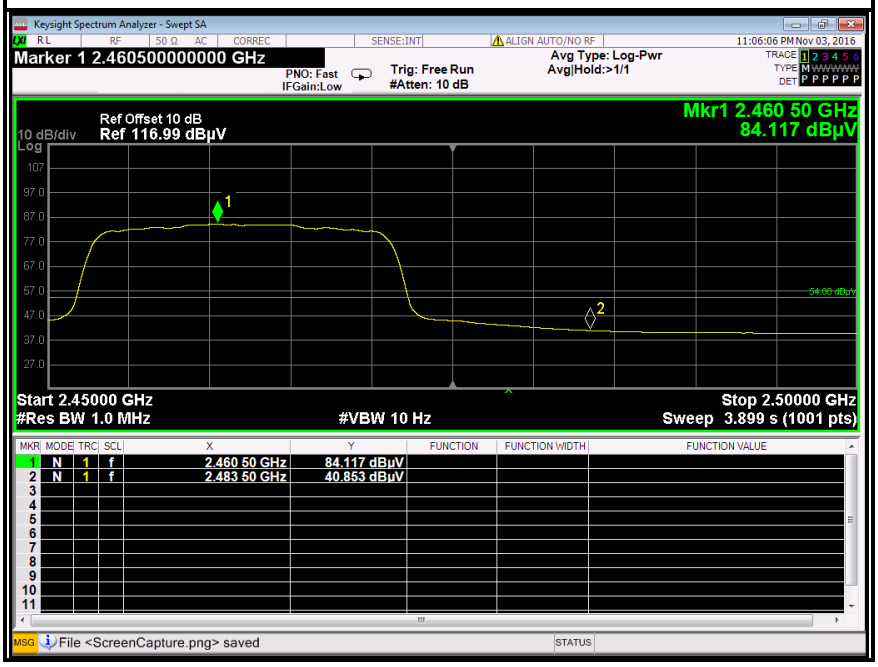
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	48.68	-6.24	54.92	74.00	-19.08	Peak	Horizontal
2	2483.5000	34.61	-6.24	40.85	54.00	-13.15	Average	Horizontal

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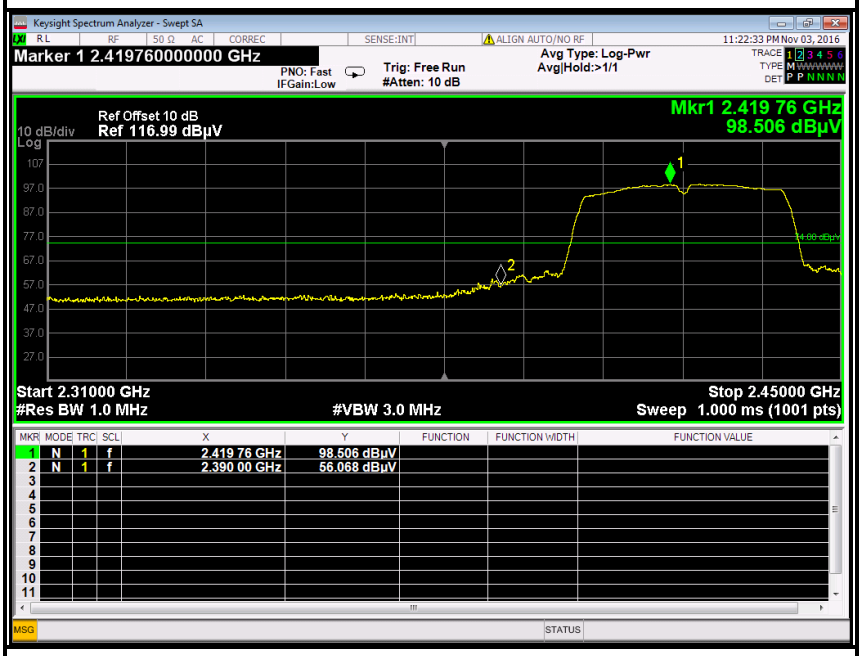
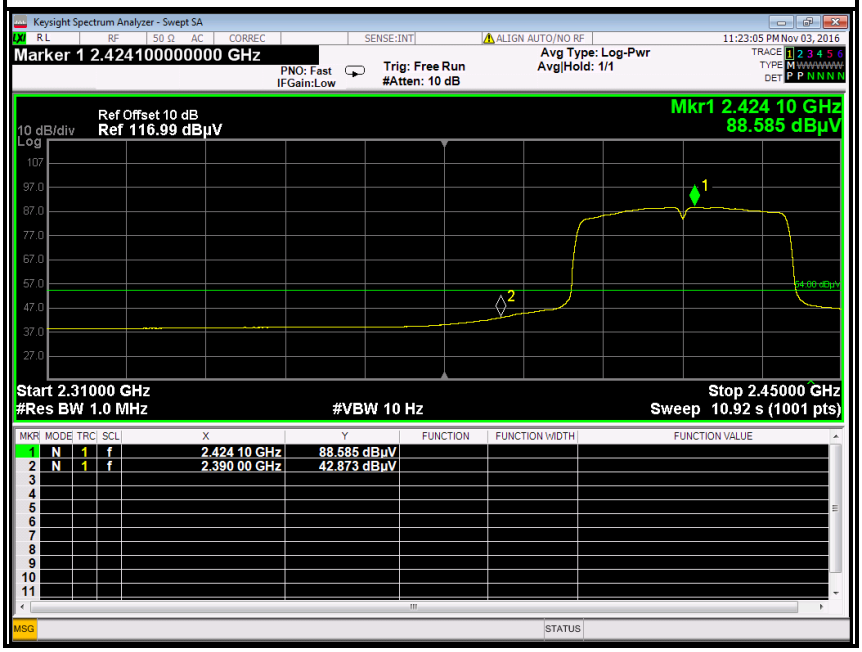
IEEE 802.11n HT40 MHz mode
Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	49.47	-6.60	56.07	74.00	-17.93	Peak	Vertical
2	2390.0000	36.27	-6.60	42.87	54.00	-11.13	Average	Vertical

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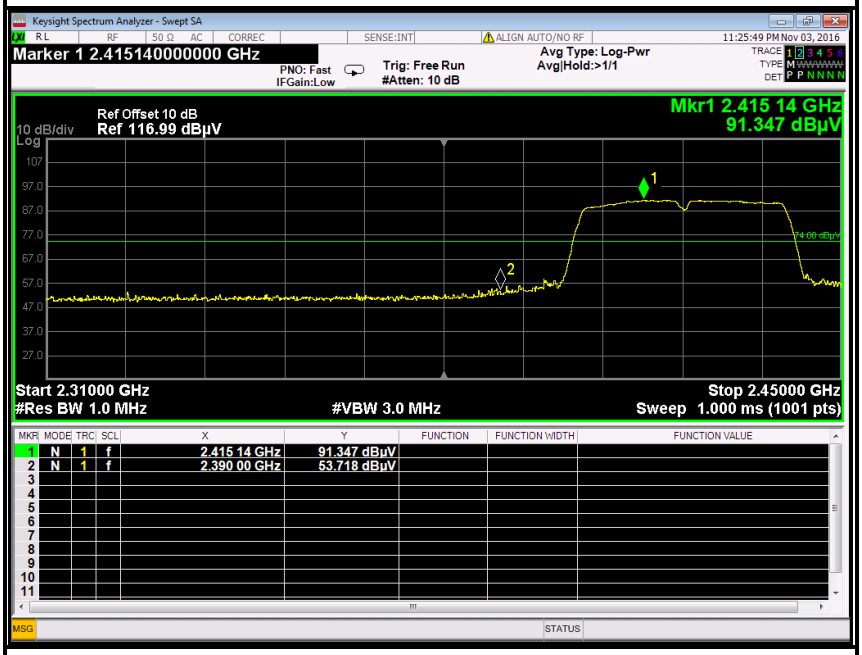
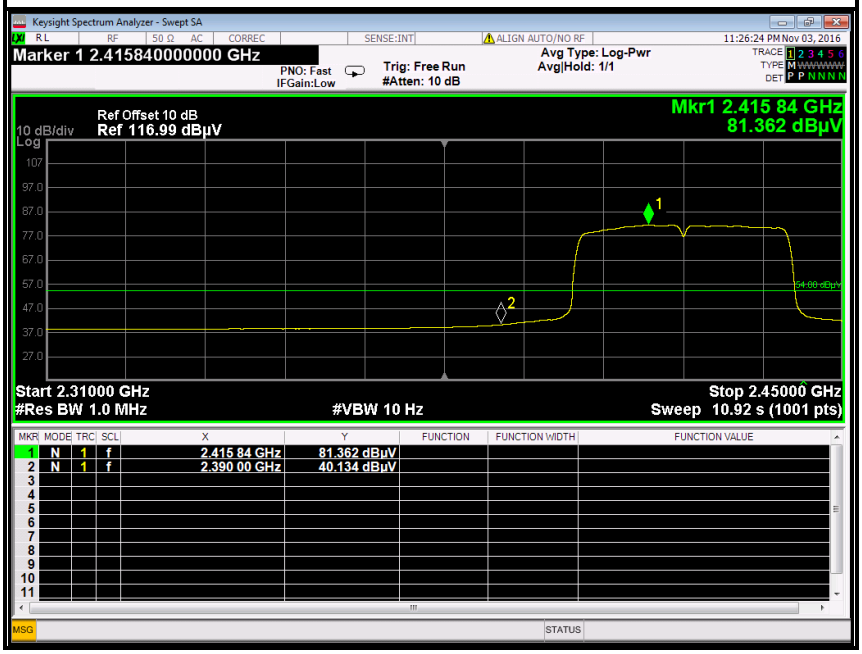
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	47.12	-6.60	53.72	74.00	-20.28	Peak	Horizontal
2	2390.0000	33.53	-6.60	40.13	54.00	-13.87	Average	Horizontal

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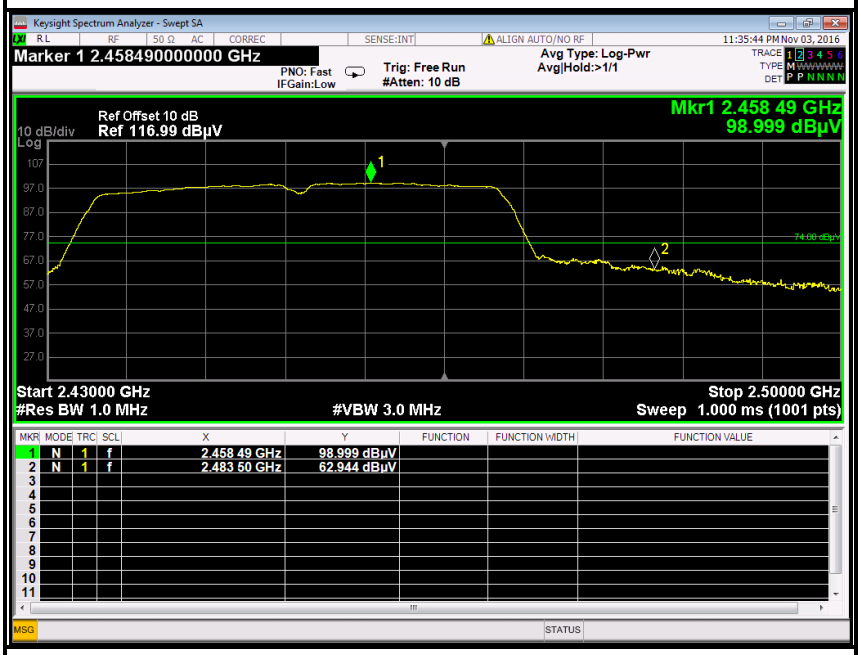
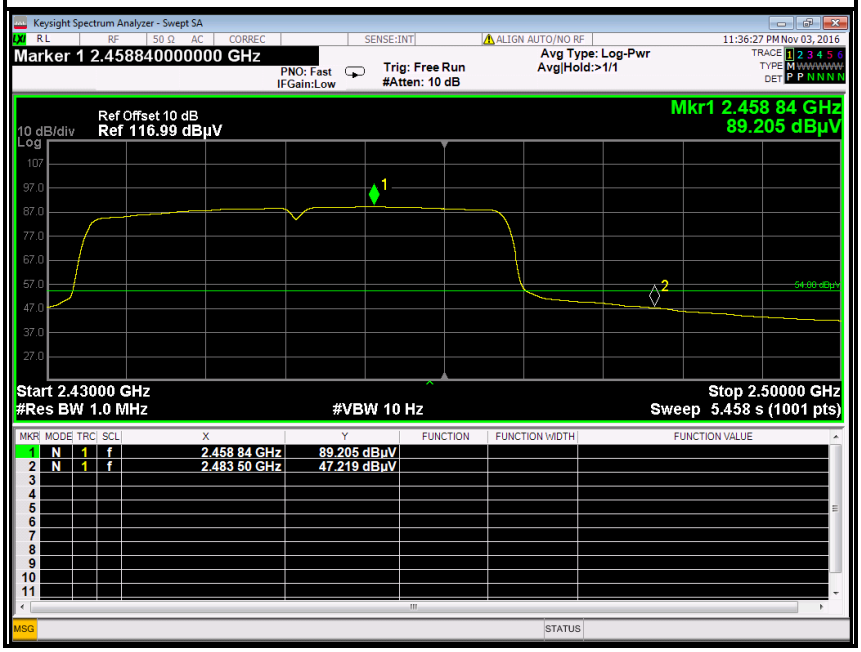
Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	56.70	-6.24	62.94	74.00	-11.06	Peak	Vertical
2	2483.5000	40.98	-6.24	47.22	54.00	-6.78	Average	Vertical

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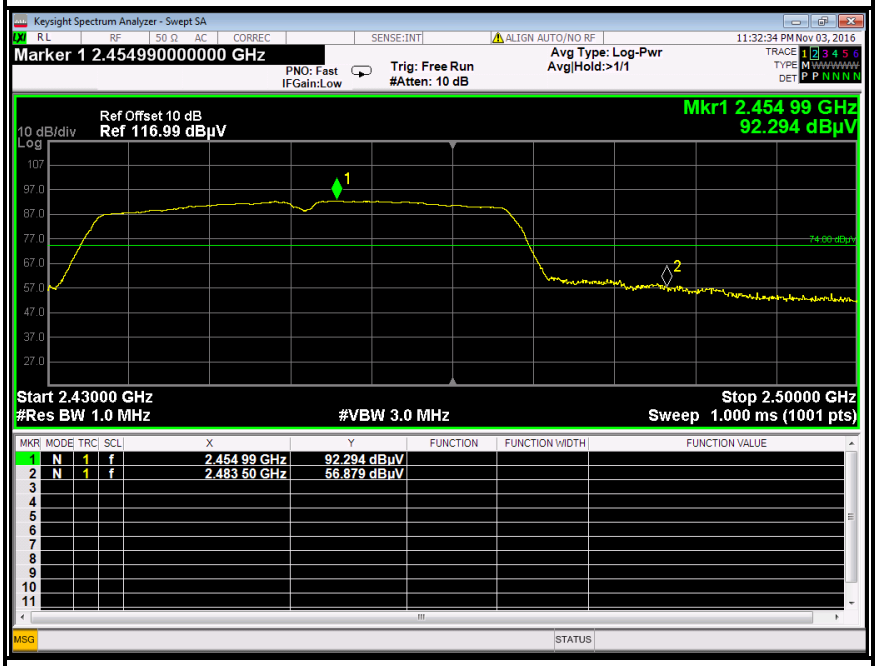
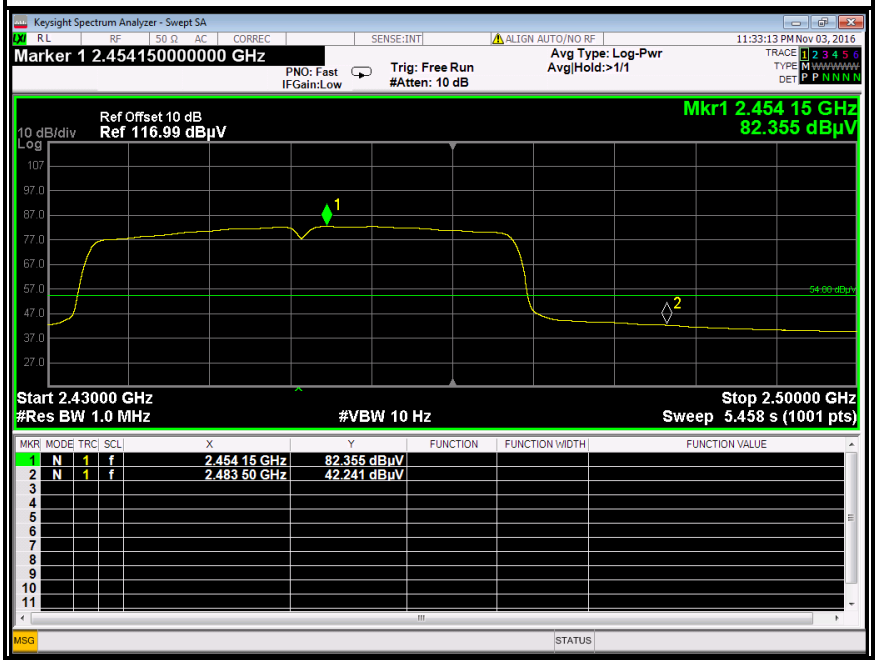
Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	50.64	-6.24	56.88	74.00	-17.12	Peak	Horizontal
2	2483.5000	36.00	-6.24	42.24	54.00	-11.76	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	02/21/2016	02/20/2017

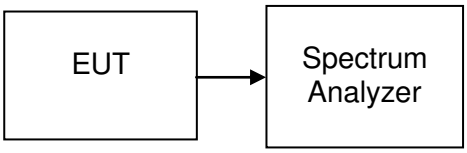
7.7.3. TEST PROCEDURES (please refer to measurement standard KDB 558074 10.2)

§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	-14.639	8	PASS
Mid	2437	-14.623		PASS
High	2462	-15.234		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-12.772	8	PASS
Mid	2437	13.590		PASS
High	2462	-13.666		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-13.321	8	PASS
Mid	2437	-13.755		PASS
High	2462	-13.618		PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2422	-13.919	8	PASS
Mid	2437	-15.189		PASS
High	2452	-14.516		PASS

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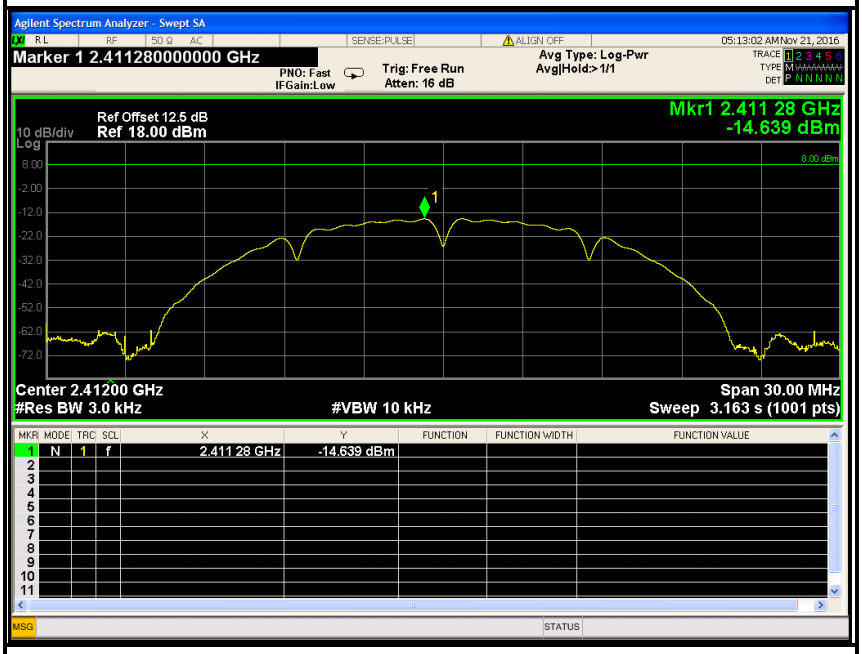
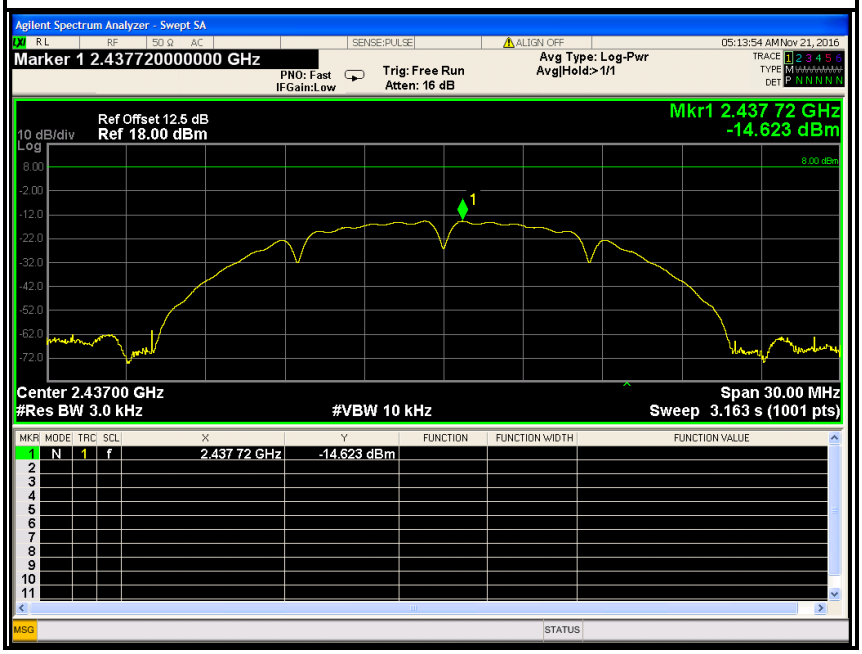
Test Plot

IEEE 802.11b mode

PPSD (CH Low)



PPSD (CH Mid)



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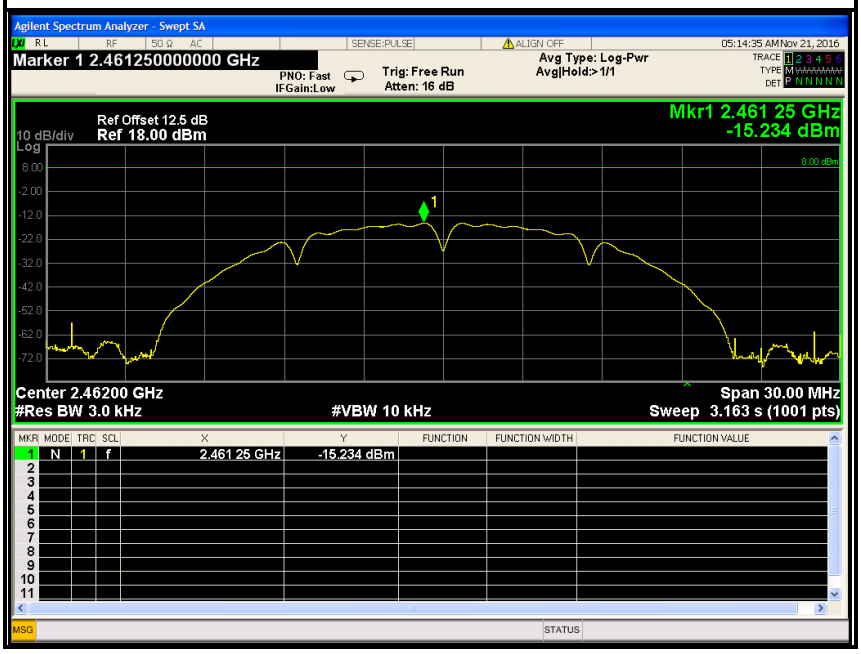
PPSD (CH High)



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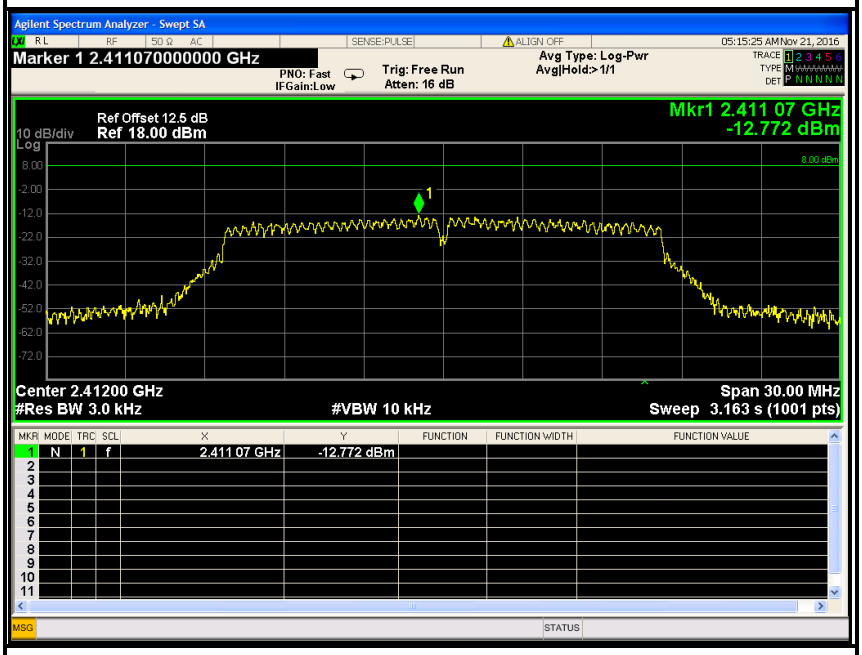
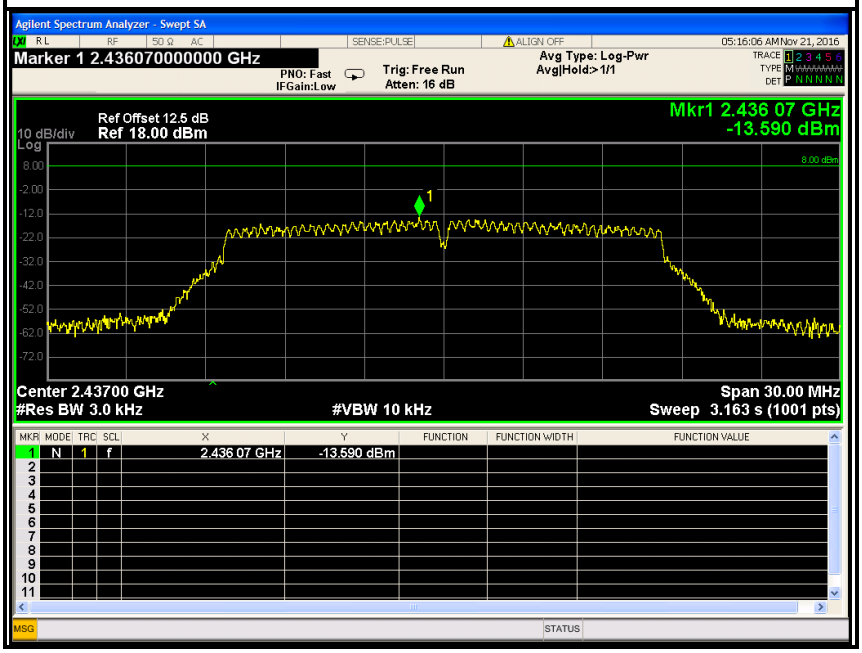
IEEE 802.11g mode

PPSD (CH Low)



PPSD (CH Mid)



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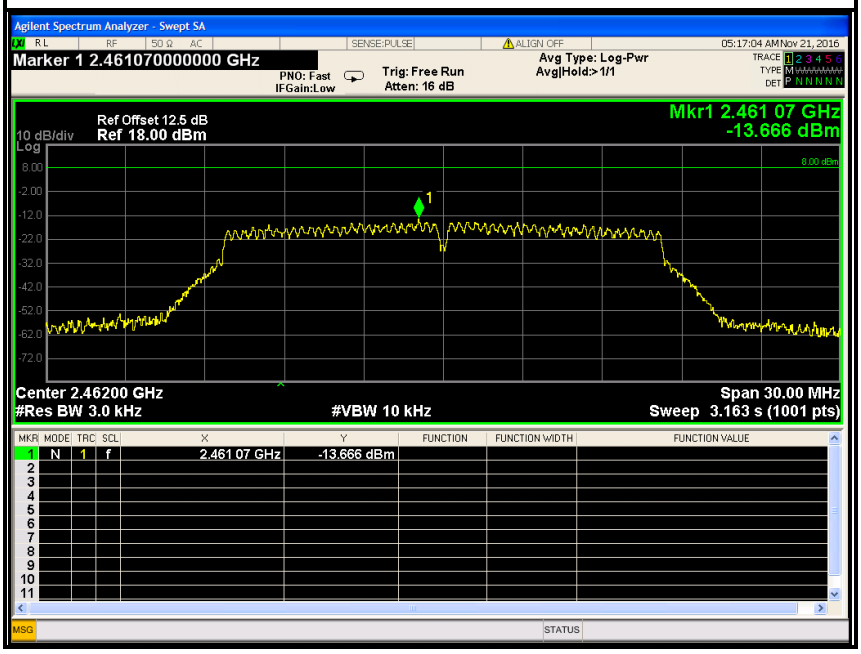
PPSD (CH High)



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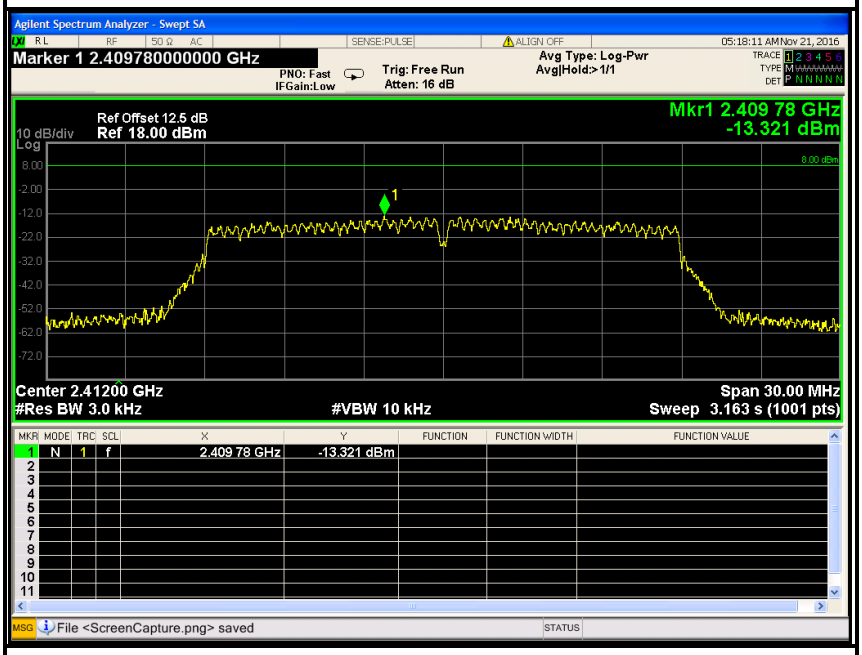
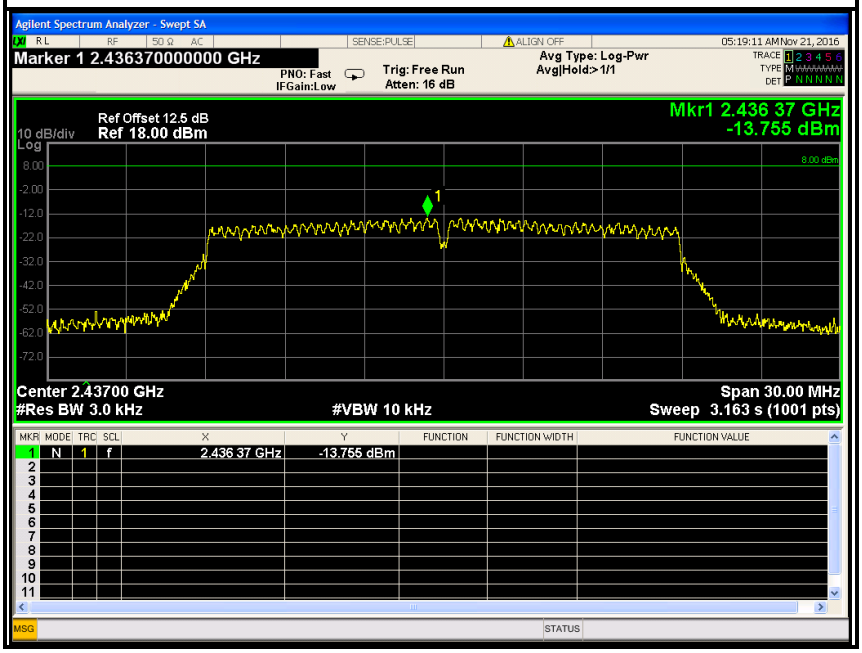
IEEE 802.11n HT20 MHz mode

PPSD (CH Low)



PPSD (CH Mid)



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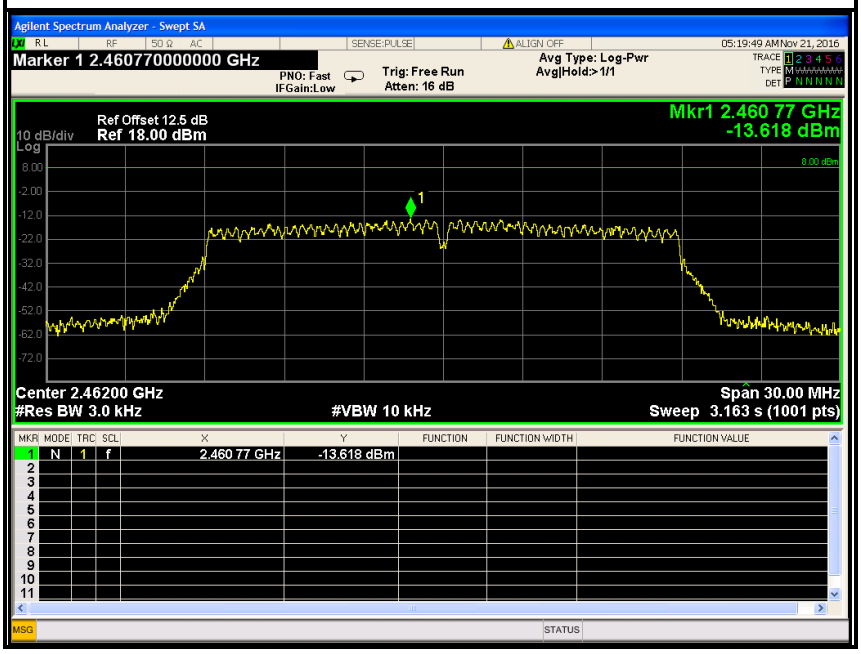
PPSD (CH High)



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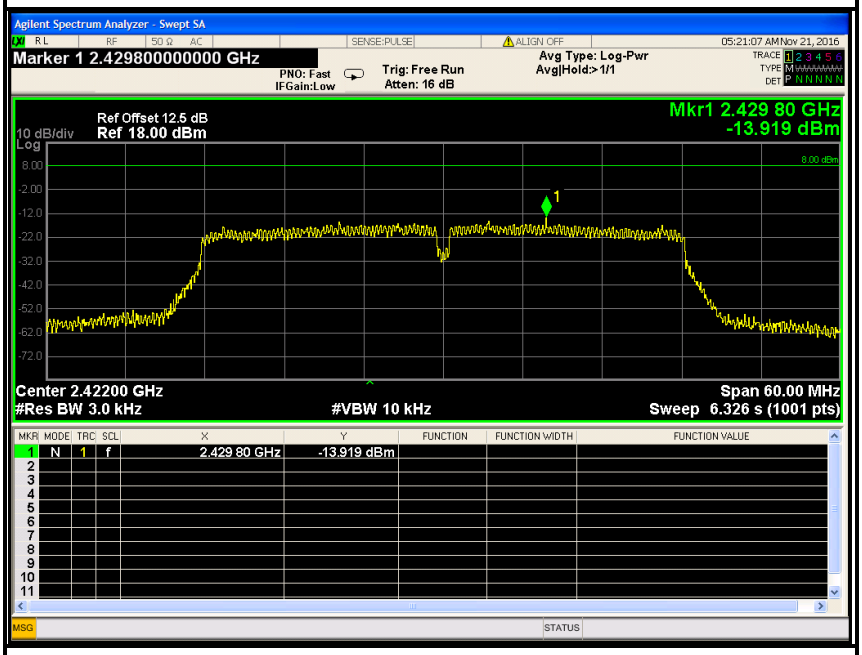
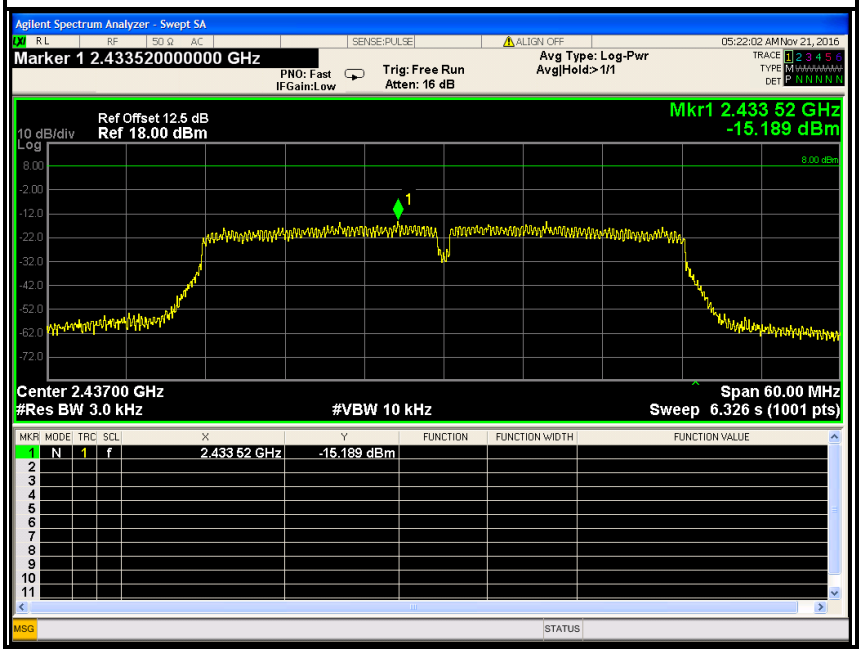
IEEE 802.11n HT40 MHz mode

PPSD (CH Low)



PPSD (CH Mid)



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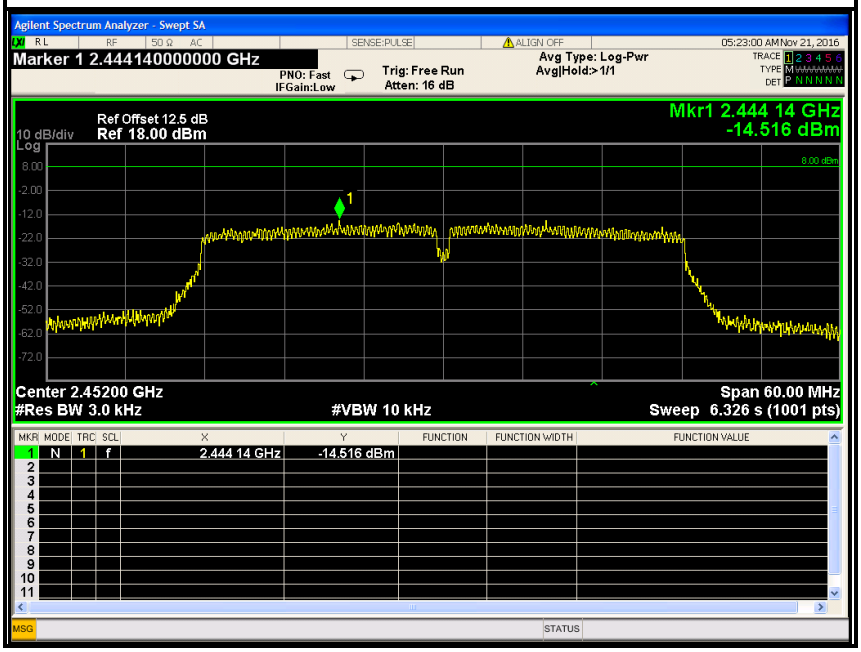
PPSD (CH High)



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