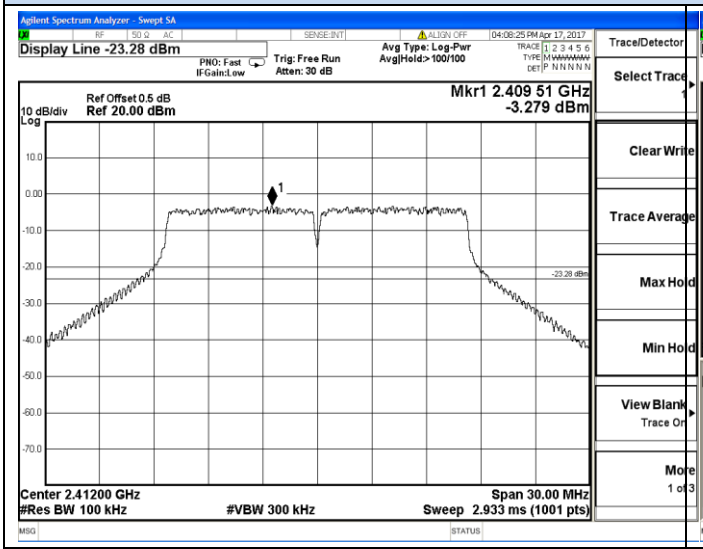
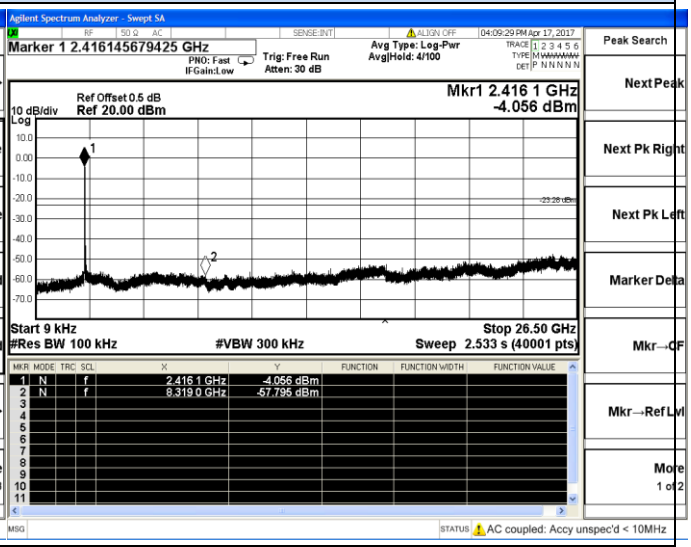
RF Conducted Spurious Emission

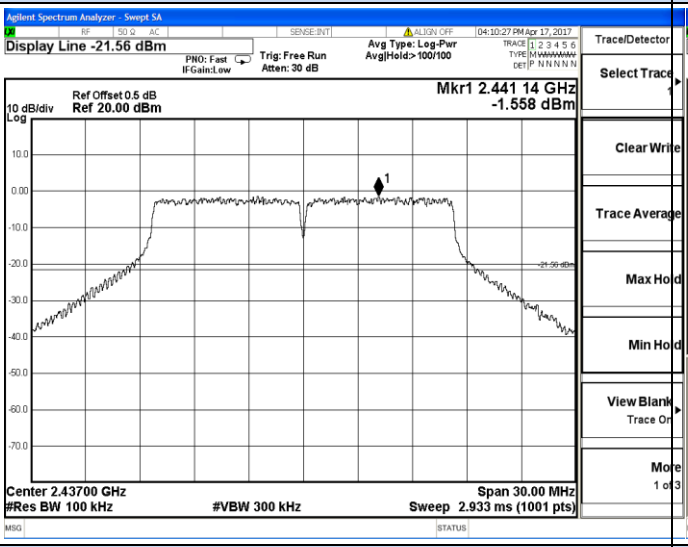
IEEE 802.11g



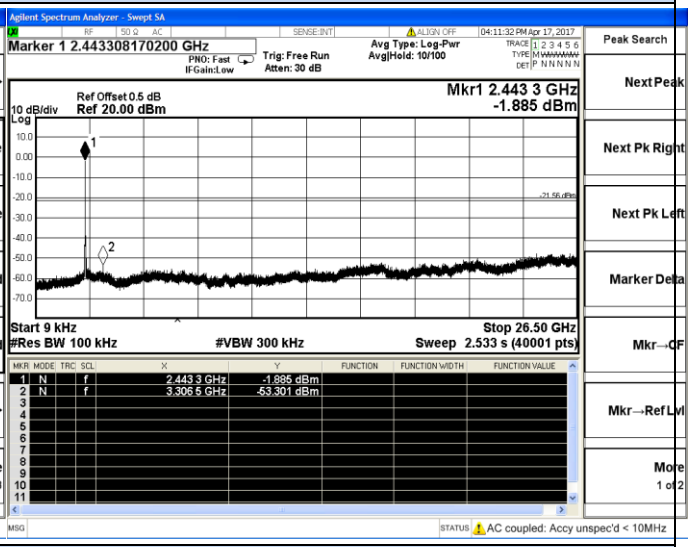
2397 MHz – 2427 MHz



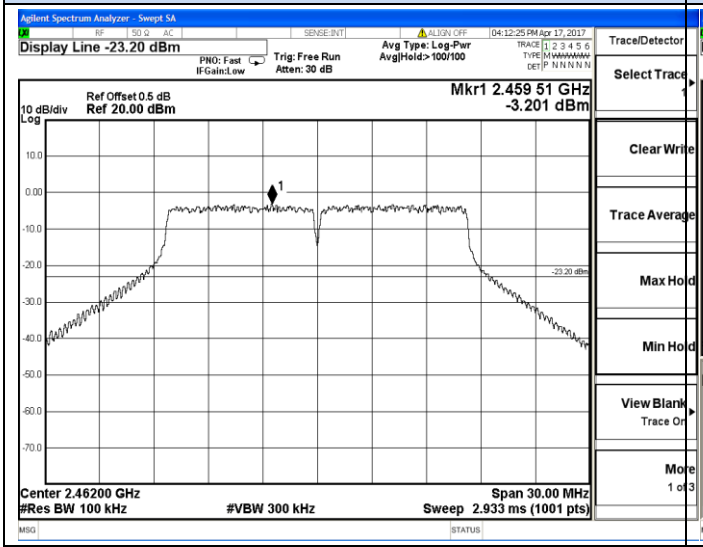
9 KHz – 26.5 GHz



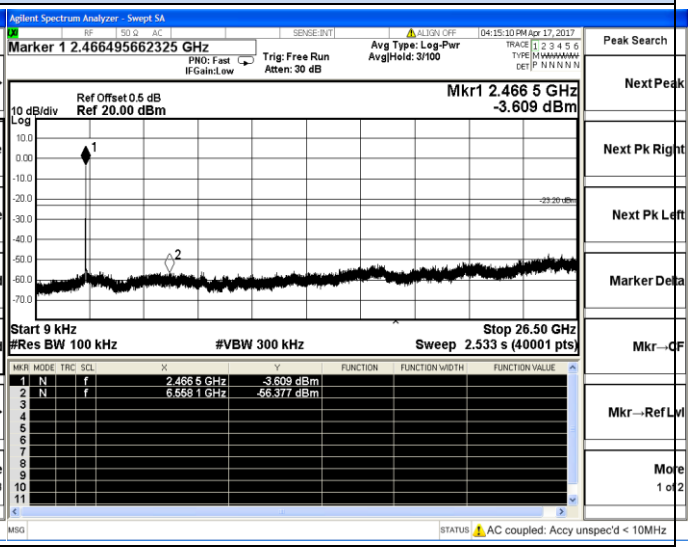
2422 MHz – 2452 MHz



9 KHz – 26.5 GHz



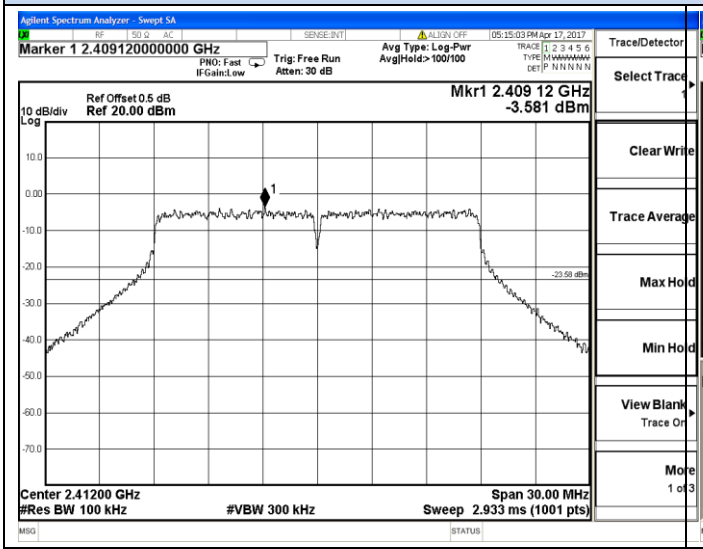
2447 MHz – 2477 MHz



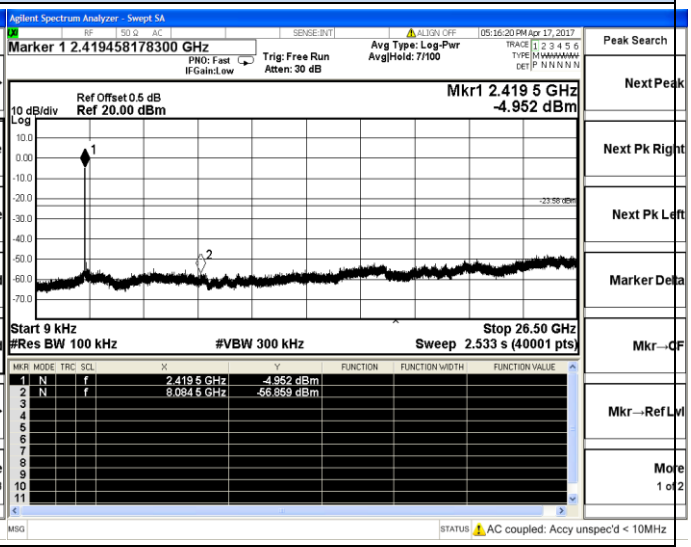
9 KHz – 26.5 GHz

RF Conducted Spurious Emission

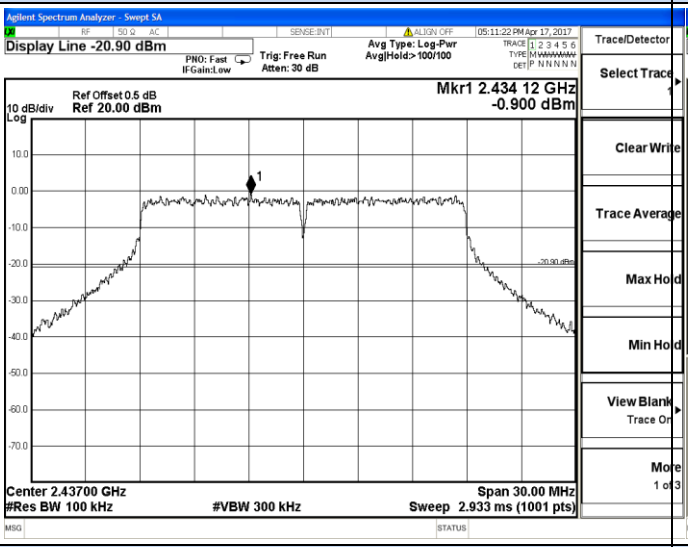
IEEE 802.11n HT20



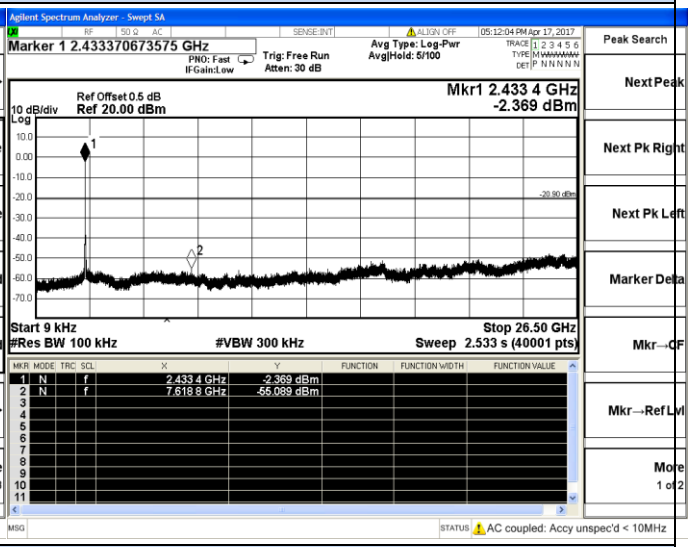
2397 MHz – 2427 MHz



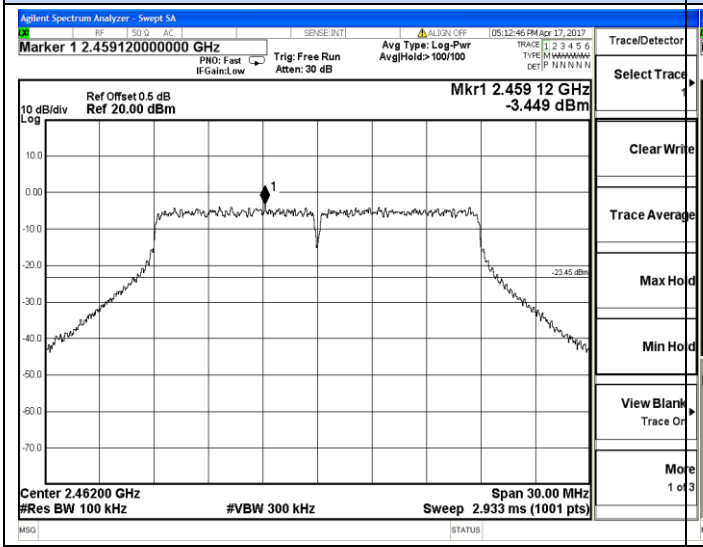
9 KHz – 26.5 GHz



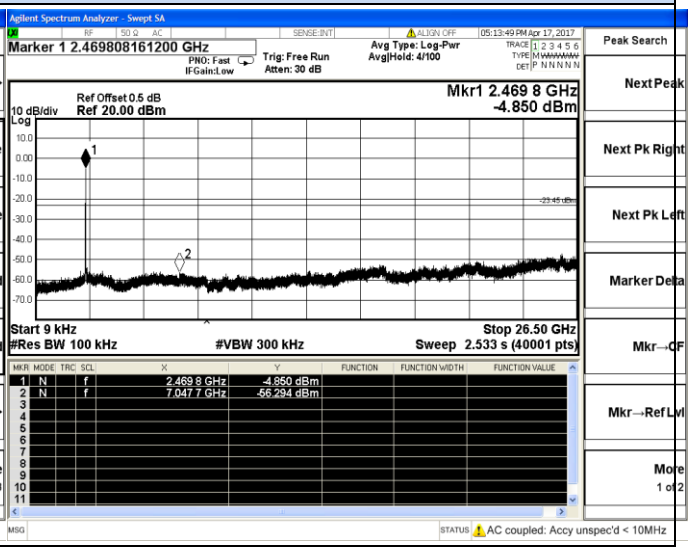
2422 MHz – 2452 MHz



9 KHz – 26.5 GHz



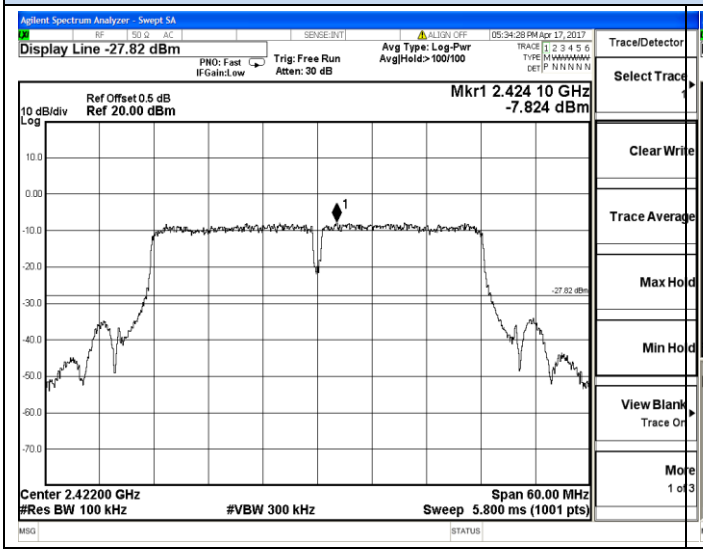
2447 MHz – 2477 MHz



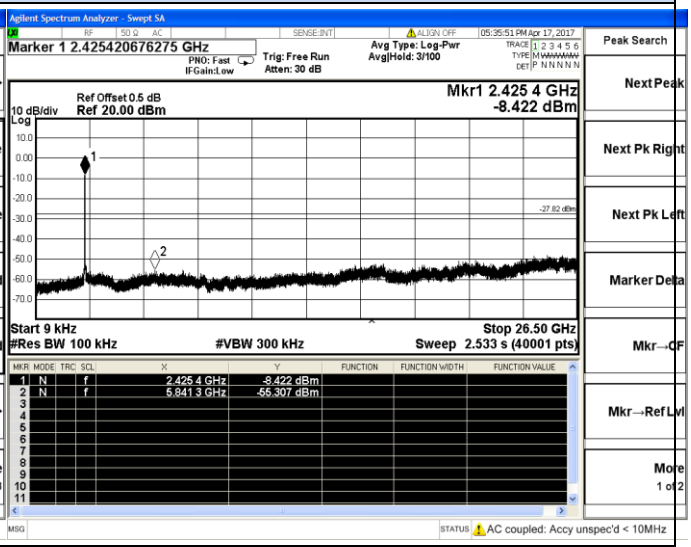
9 KHz – 26.5 GHz

RF Conducted Spurious Emission

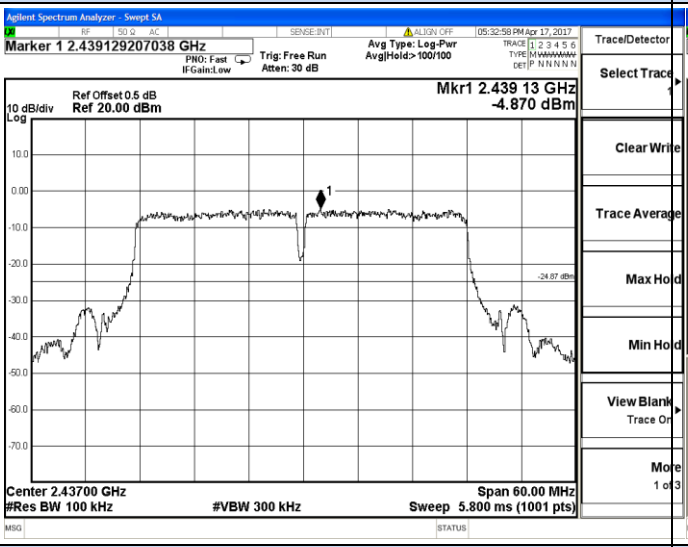
IEEE 802.11n HT40



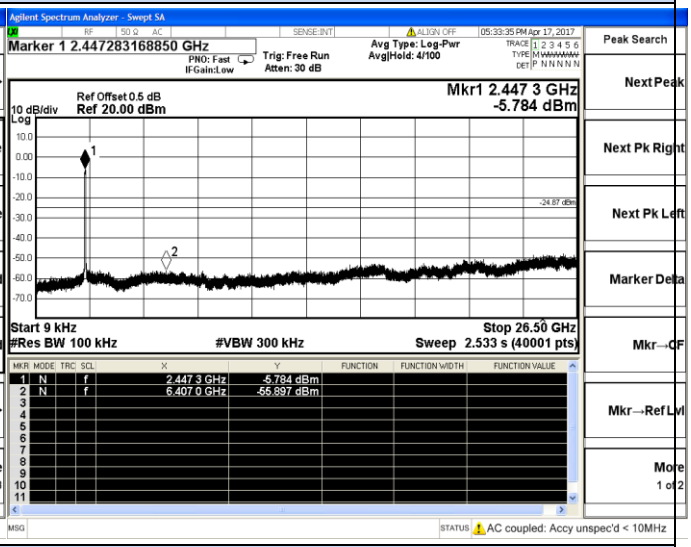
2392 MHz – 2452 MHz



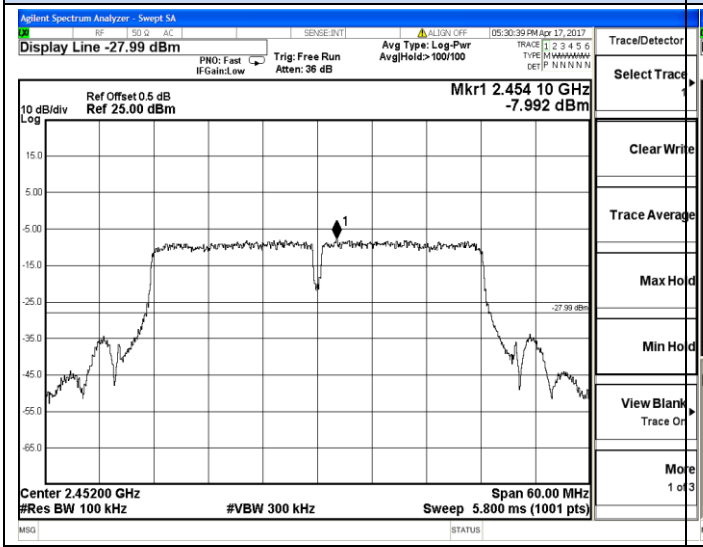
9 KHz – 26.5 GHz



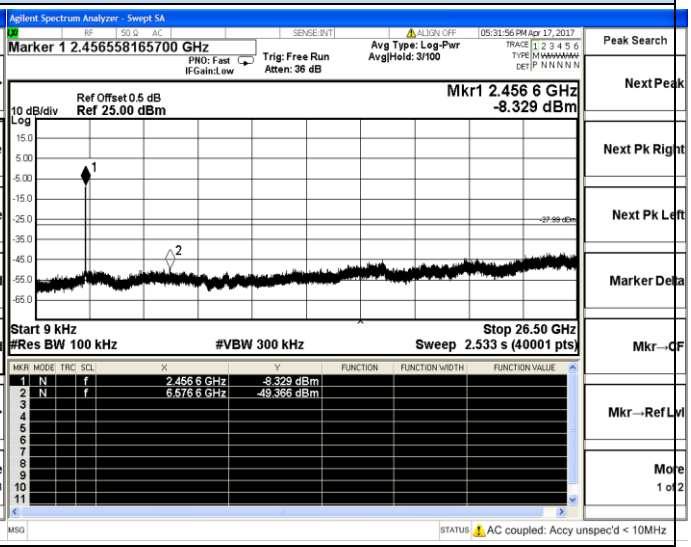
2407 MHz – 2467 MHz



9 KHz – 26.5 GHz



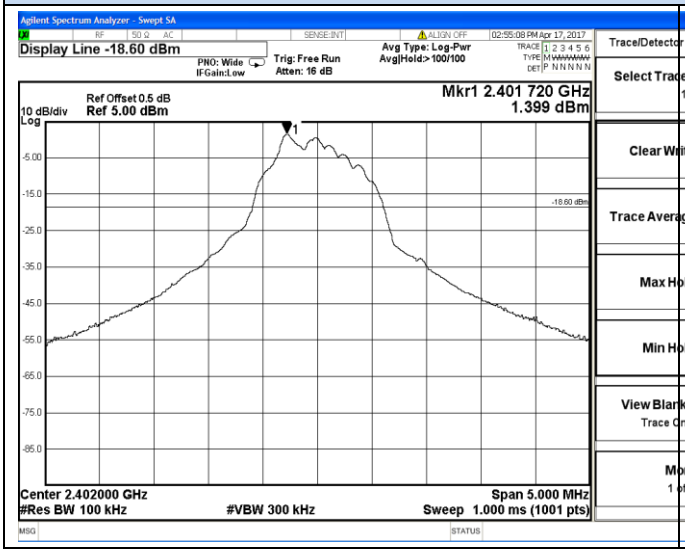
2422 MHz – 2482 MHz



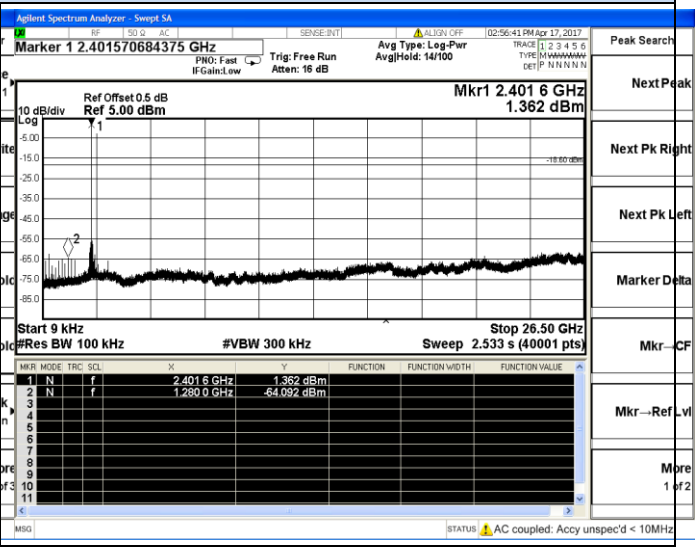
9 KHz – 26.5 GHz

RF Conducted Spurious Emission

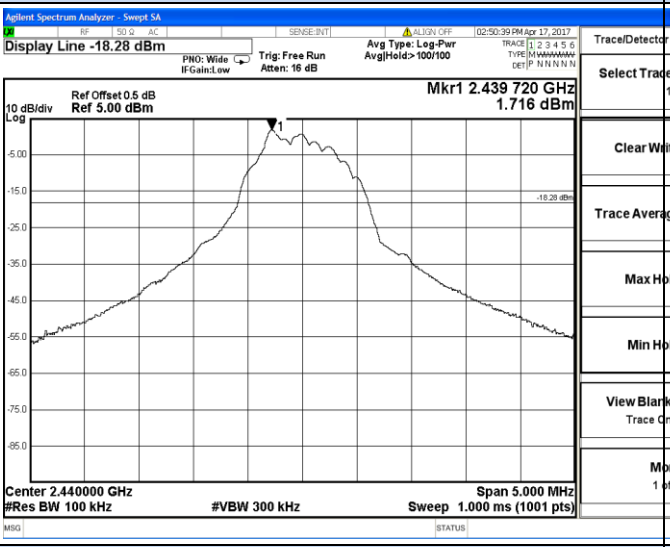
BT LE



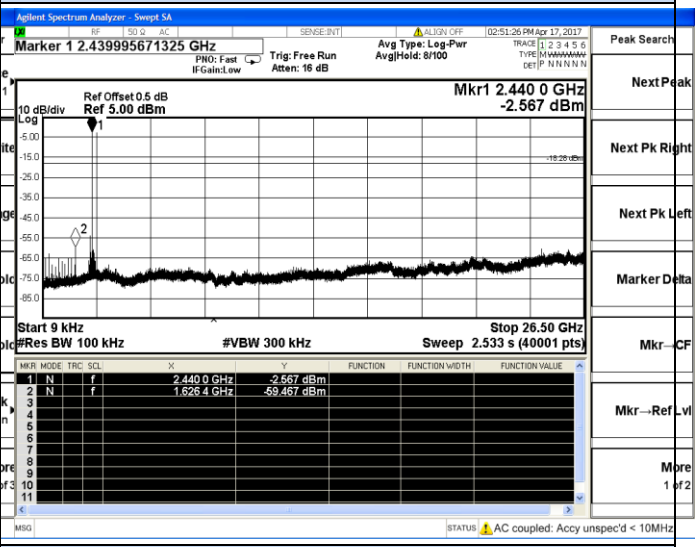
2399.5 MHz – 2404.5 MHz



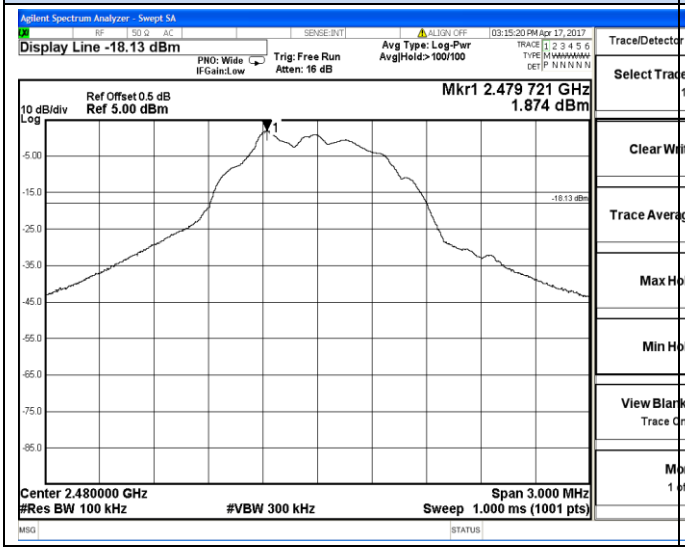
9 KHz – 26.5 GHz



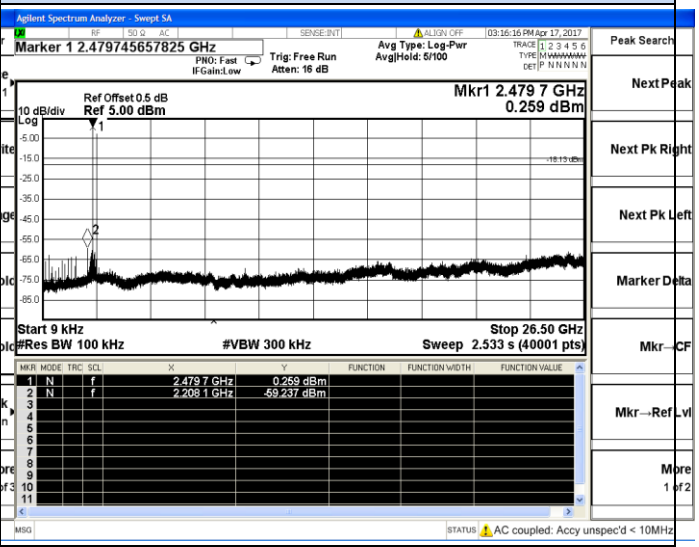
2437.5 MHz - 2442.5 MHz



9 KHz – 26.5 GHz



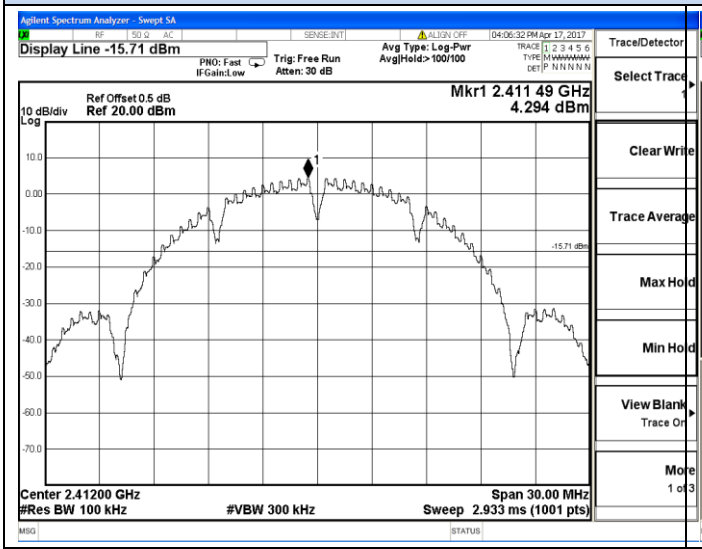
2477.5 MHz - 2482.5 MHz



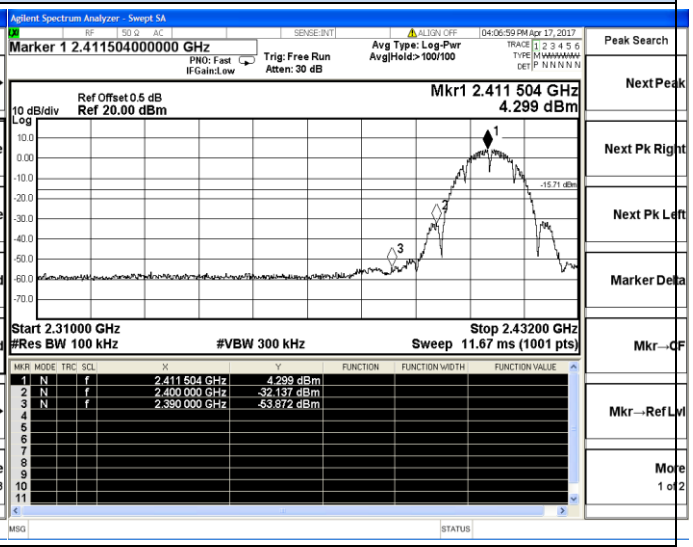
9 KHz – 26.5 GHz

Band-edge measurements for conducted emissions

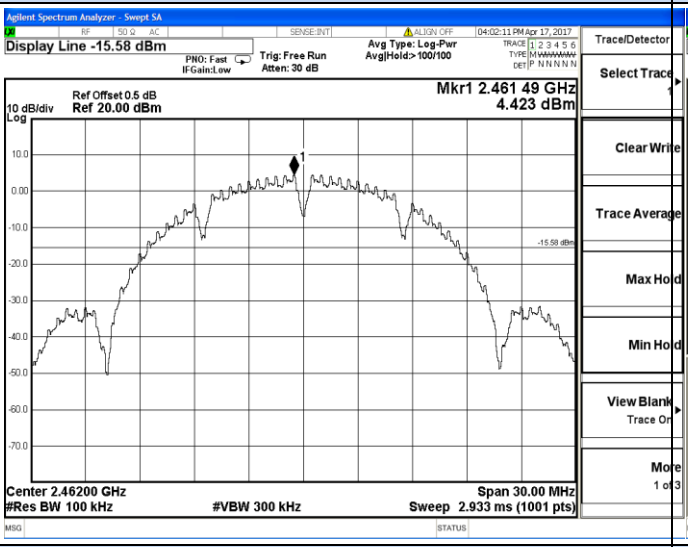
IEEE 802.11b



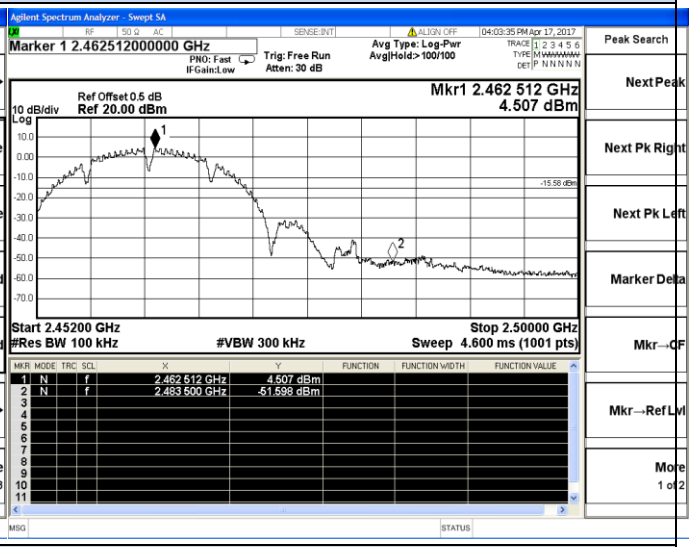
2397 MHz – 2427 MHz



Channel 1 / 2412 MHz

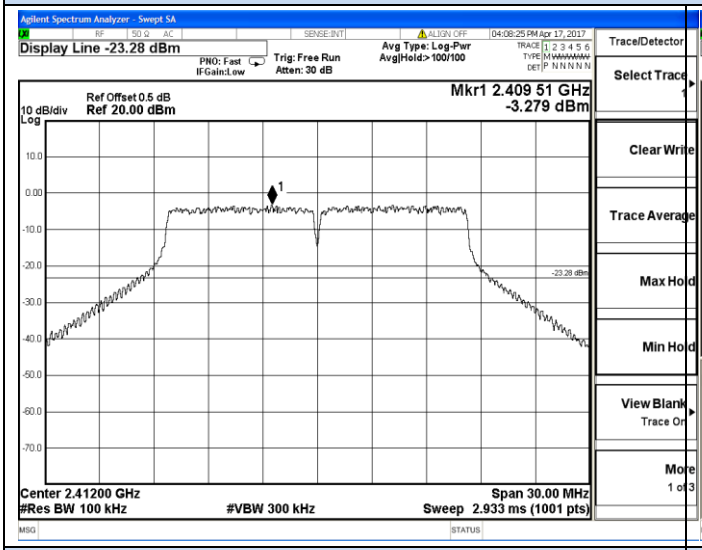


2447 MHz – 2477 MHz

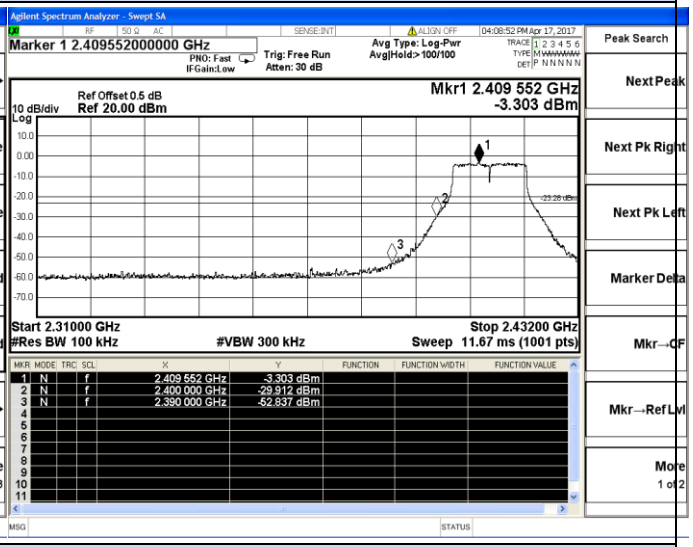


Channel 11 / 2462 MHz

IEEE 802.11g



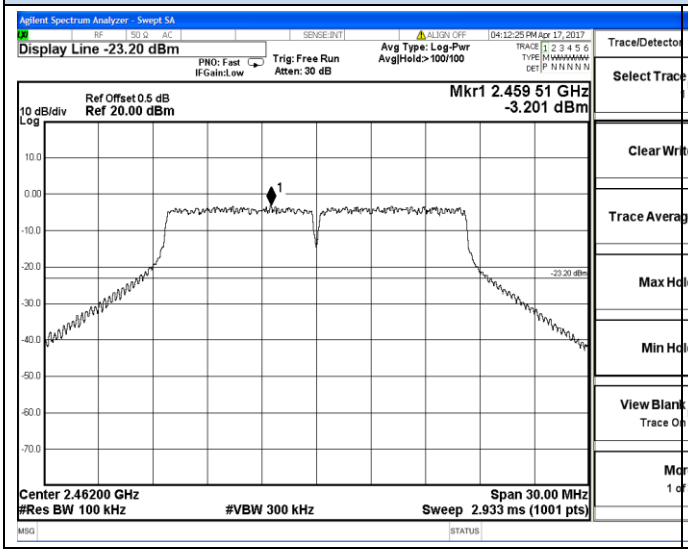
2397 MHz – 2427 MHz



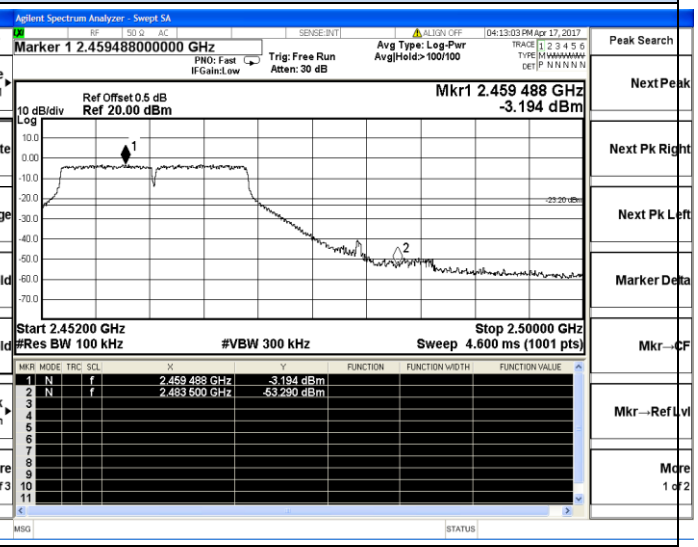
Channel 1 / 2412 MHz

Band-edge measurements for conducted emissions

IEEE 802.11g

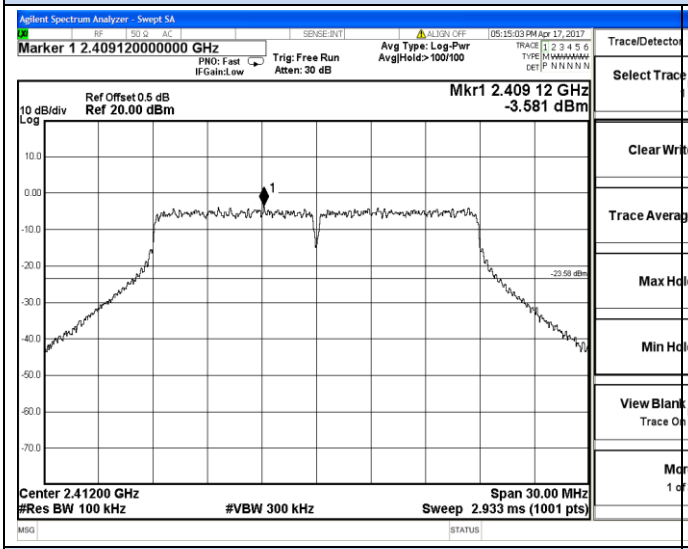


2447 MHz – 2477 MHz

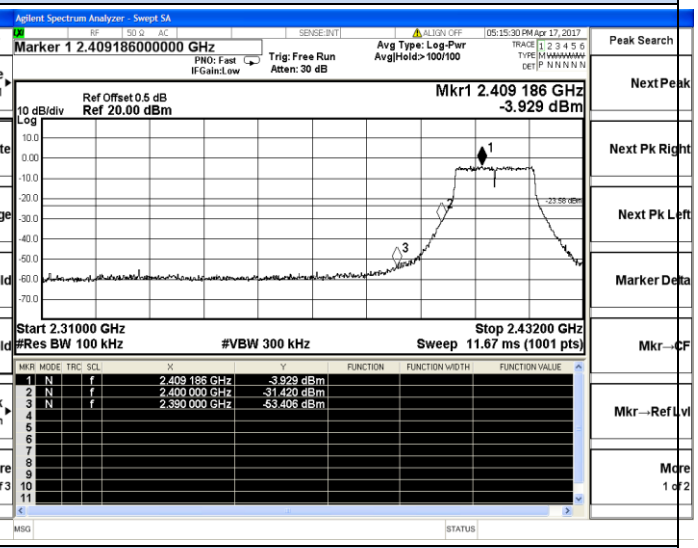


Channel 11 / 2462 MHz

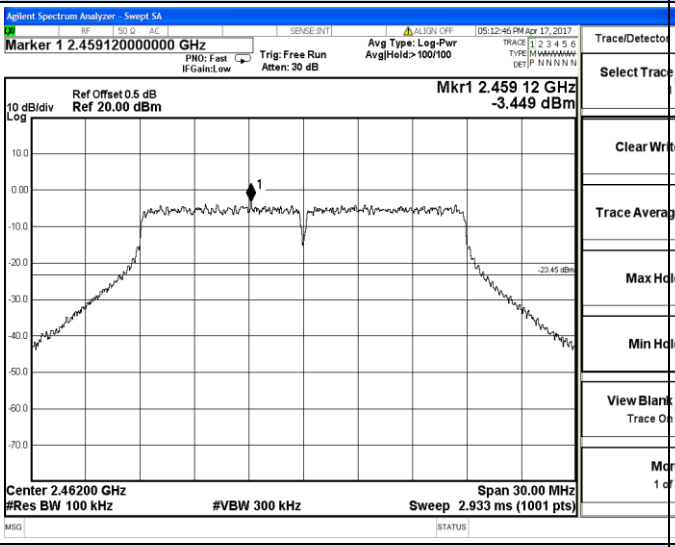
IEEE 802.11n HT20



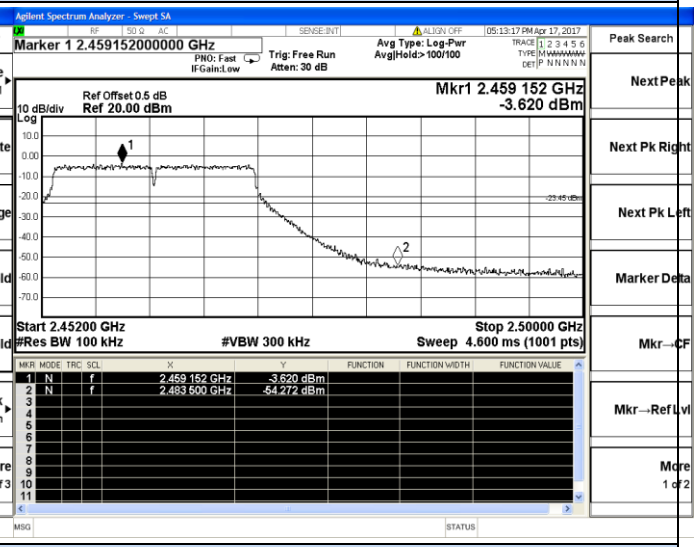
2397 MHz – 2427 MHz



Channel 1 / 2412 MHz



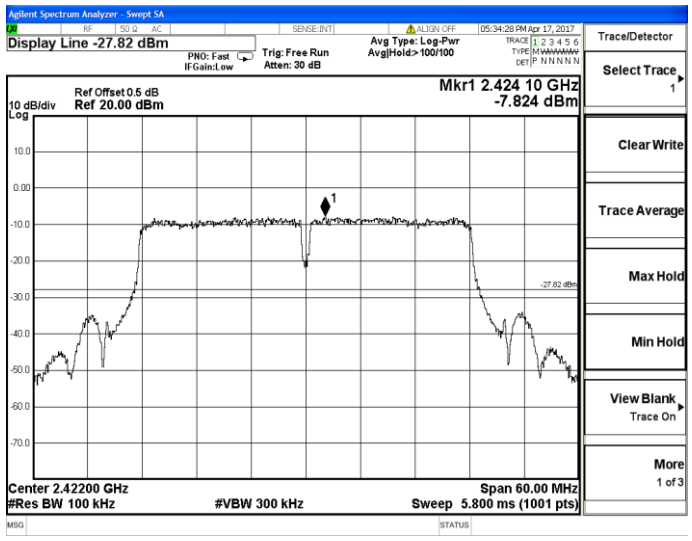
2447 MHz – 2477 MHz



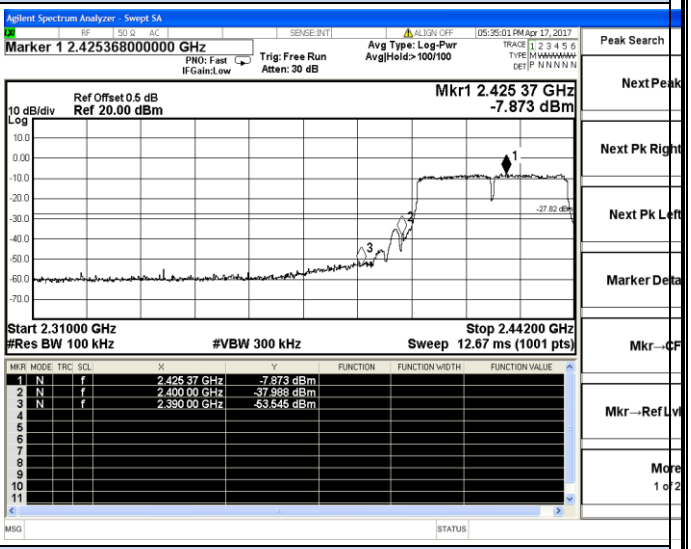
Channel 11 / 2462 MHz

Band-edge measurements for conducted emissions

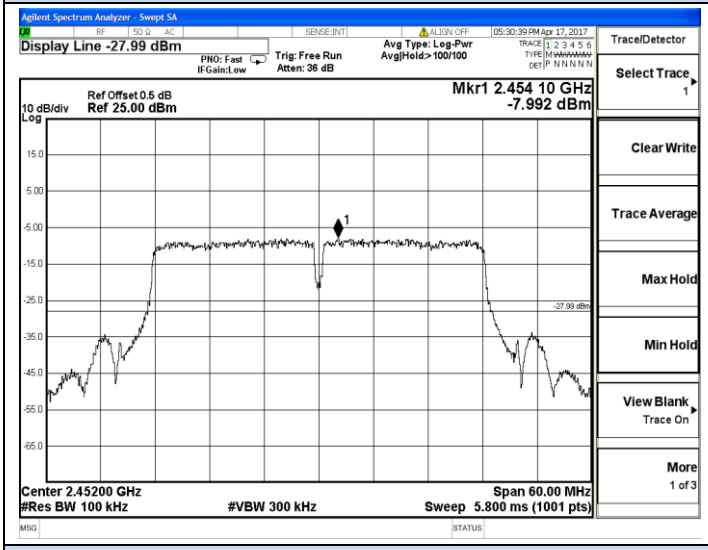
IEEE 802.11n HT40



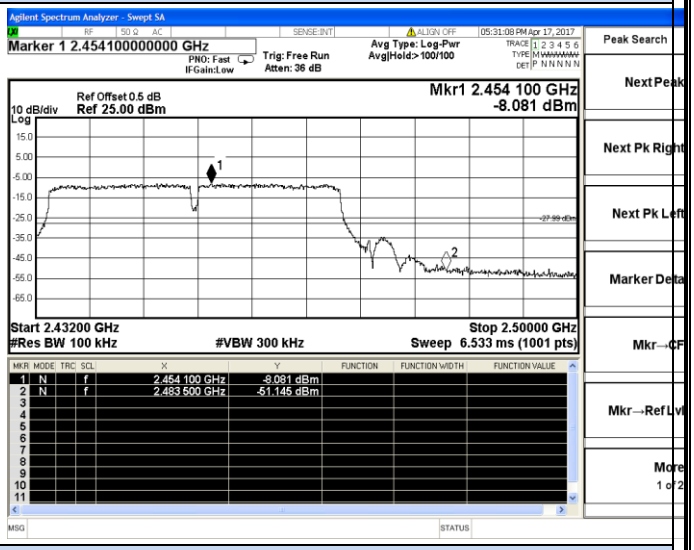
2392 MHz – 2452 MHz



Channel 3 / 2422 MHz

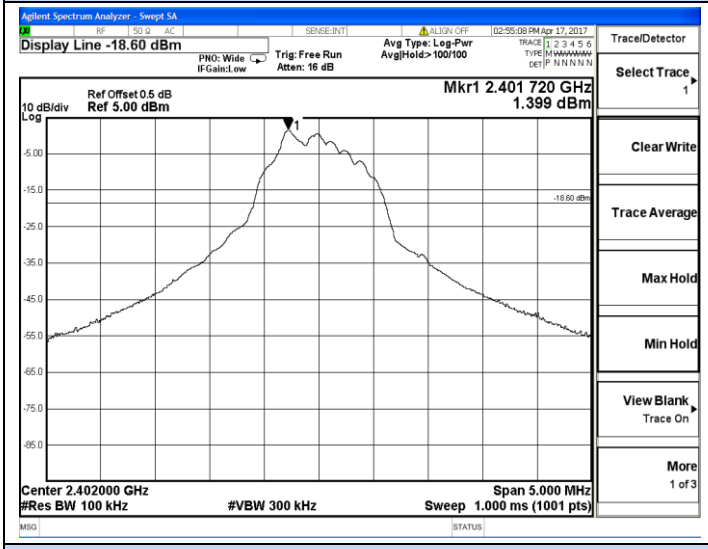


2422-2482

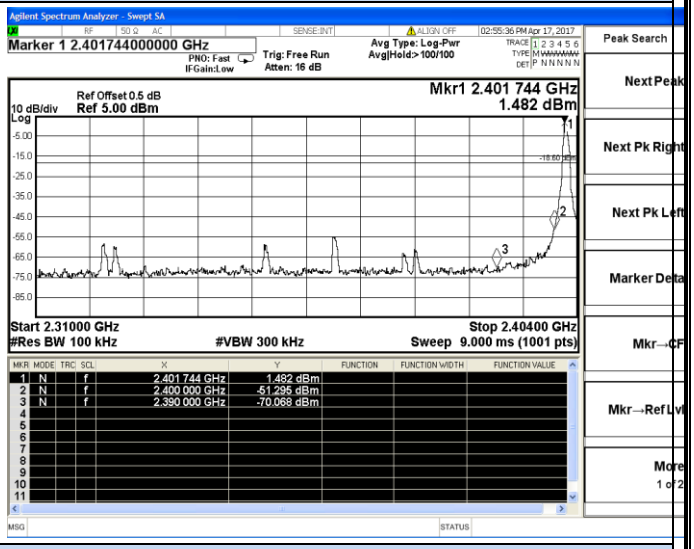


Channel 9 / 2452 MHz

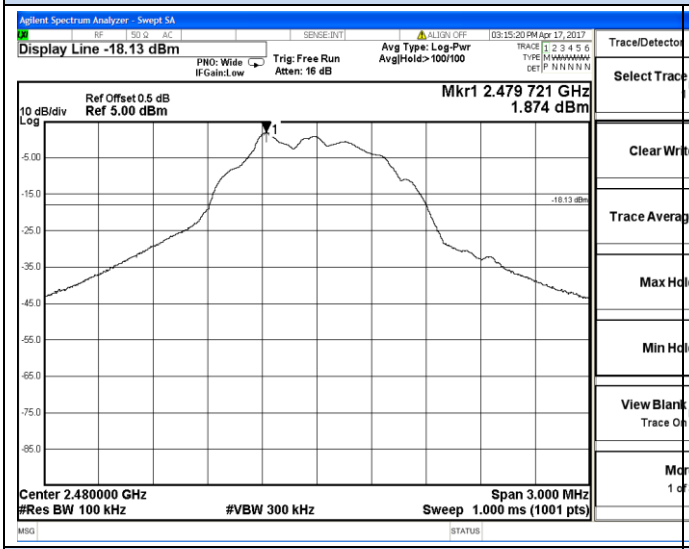
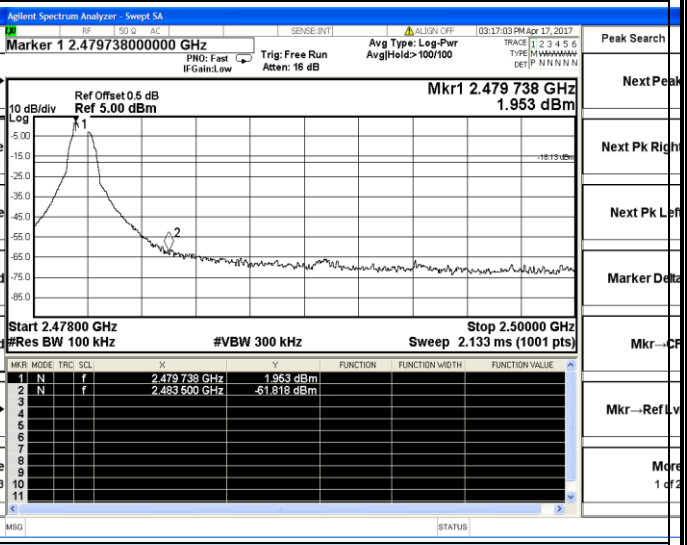
BT – LE



2399.5 MHz – 2404.5 MHz



Channel 0 / 2402 MHz

Band-edge measurements for conducted emissions	
BT – LE	
	
2477.5 MHz - 2482.5 MHz	Channel 39 / 2480 MHz

5.7. Power line conducted emissions

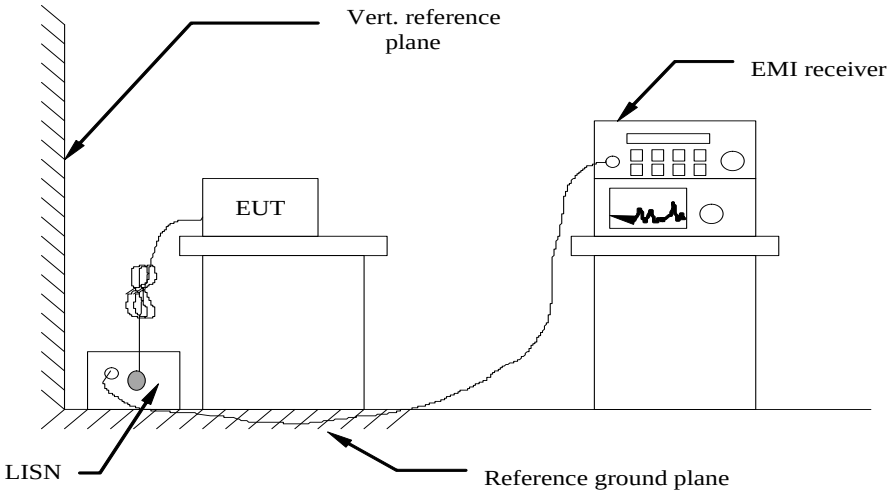
5.7.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.7.2 Block Diagram of Test Setup

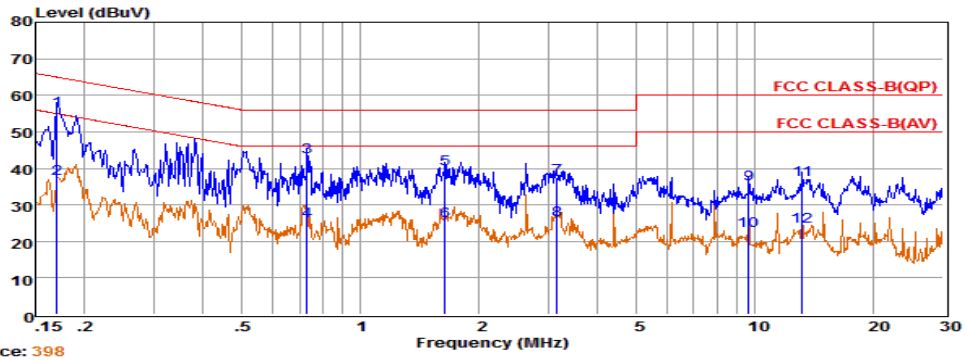


5.7.3 Test Results

PASS.

The test data please refer to following page.

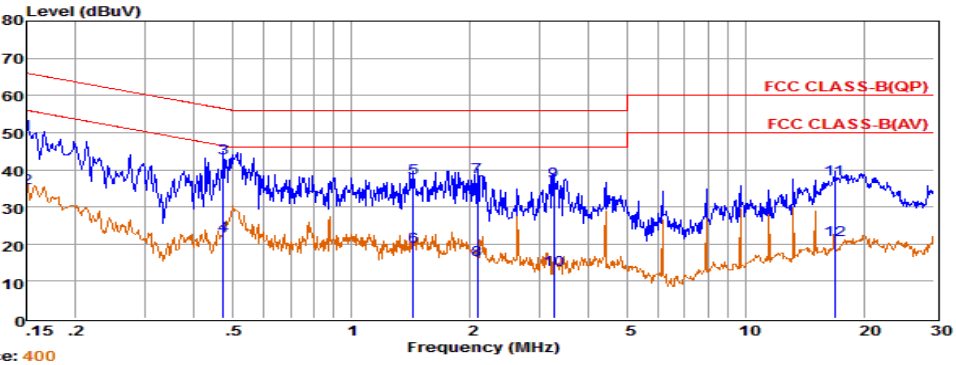
AC Conducted Emission of power adapter @ AC 120V/60Hz @ IEEE 802.11b (worst case)



Trace: 398
Env. Ins: 24*/56%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.17	36.36	9.60	0.02	10.00	55.98	64.94	-8.96	QP
2	0.17	17.46	9.60	0.02	10.00	37.08	54.94	-17.86	Average
3	0.73	23.46	9.64	0.04	10.00	43.14	56.00	-12.86	QP
4	0.73	6.03	9.64	0.04	10.00	25.71	46.00	-20.29	Average
5	1.64	20.09	9.64	0.05	10.00	39.78	56.00	-16.22	QP
6	1.64	5.86	9.64	0.05	10.00	25.55	46.00	-20.45	Average
7	3.16	17.91	9.64	0.06	10.00	37.61	56.00	-18.39	QP
8	3.16	6.15	9.64	0.06	10.00	25.85	46.00	-20.15	Average
9	9.65	16.00	9.69	0.08	10.00	35.77	60.00	-24.23	QP
10	9.65	2.99	9.69	0.08	10.00	22.76	50.00	-27.24	Average
11	13.20	17.13	9.70	0.10	10.00	36.93	60.00	-23.07	QP
12	13.20	4.25	9.70	0.10	10.00	24.05	50.00	-25.95	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

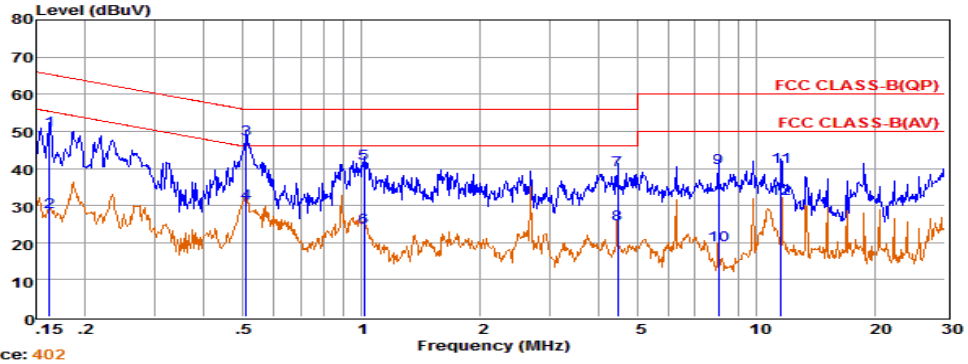


Trace: 400
Env. Ins: 24*/56%
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.15	29.86	9.70	0.02	10.00	49.58	66.00	-16.42	QP
2	0.15	15.37	9.70	0.02	10.00	35.09	55.99	-20.90	Average
3	0.47	23.36	9.62	0.04	10.00	43.02	56.45	-13.43	QP
4	0.47	2.56	9.62	0.04	10.00	22.22	46.45	-24.23	Average
5	1.43	17.97	9.63	0.05	10.00	37.65	56.00	-18.35	QP
6	1.43	-0.45	9.63	0.05	10.00	19.23	46.00	-26.77	Average
7	2.09	18.37	9.63	0.05	10.00	38.05	56.00	-17.95	QP
8	2.09	-4.03	9.63	0.05	10.00	15.65	46.00	-30.35	Average
9	3.26	17.05	9.65	0.06	10.00	36.76	56.00	-19.24	QP
10	3.26	-6.67	9.65	0.06	10.00	13.04	46.00	-32.96	Average
11	16.75	17.58	9.76	0.11	10.00	37.45	60.00	-22.55	QP
12	16.75	1.13	9.76	0.11	10.00	21.00	50.00	-29.00	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

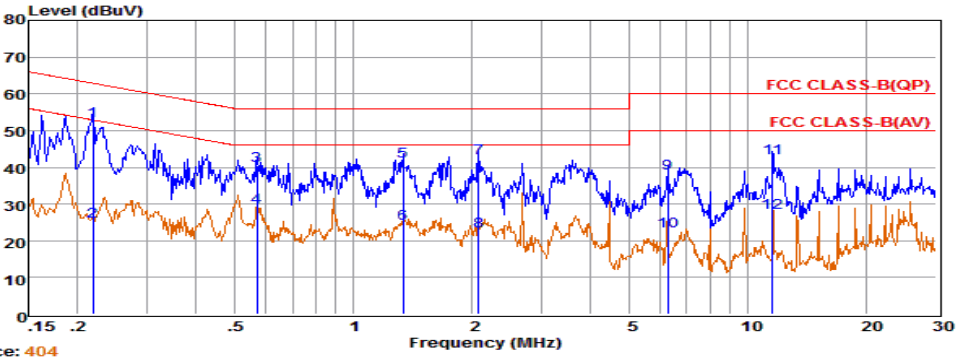
AC Conducted Emission of power adapter @ AC 240V/50Hz @ IEEE 802.11b (worst case)



Trace: 402
Env. Ins: 24*/56%
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	30.61	9.67	0.02	10.00	50.30	65.34	-15.04	QP
2	0.16	8.49	9.67	0.02	10.00	28.18	55.33	-27.15	Average
3	0.51	28.23	9.62	0.04	10.00	47.89	56.00	-8.11	QP
4	0.51	10.84	9.62	0.04	10.00	30.50	46.00	-15.50	Average
5	1.02	21.57	9.63	0.05	10.00	41.25	56.00	-14.75	QP
6	1.02	4.42	9.63	0.05	10.00	24.10	46.00	-21.90	Average
7	4.45	19.69	9.66	0.06	10.00	39.41	56.00	-16.59	QP
8	4.46	5.12	9.66	0.06	10.00	24.84	46.00	-21.16	Average
9	8.02	20.52	9.70	0.07	10.00	40.29	60.00	-19.71	QP
10	8.02	-0.48	9.70	0.07	10.00	19.29	50.00	-30.71	Average
11	11.56	20.63	9.73	0.09	10.00	40.45	60.00	-19.55	QP
12	11.56	11.97	9.73	0.09	10.00	31.79	50.00	-18.21	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.



Trace: 404
Env. Ins: 24*/56%
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.22	33.04	9.63	0.03	10.00	52.70	62.88	-10.18	QP
2	0.22	5.72	9.63	0.03	10.00	25.38	52.87	-27.49	Average
3	0.57	20.72	9.63	0.04	10.00	40.39	56.00	-15.61	QP
4	0.57	9.35	9.63	0.04	10.00	29.02	46.00	-16.98	Average
5	1.34	21.90	9.63	0.05	10.00	41.58	56.00	-14.42	QP
6	1.34	4.87	9.63	0.05	10.00	24.55	46.00	-21.45	Average
7	2.08	22.88	9.64	0.05	10.00	42.57	56.00	-13.43	QP
8	2.08	2.79	9.64	0.05	10.00	22.48	46.00	-23.52	Average
9	6.25	18.59	9.67	0.07	10.00	38.33	60.00	-21.67	QP
10	6.25	2.80	9.67	0.07	10.00	22.54	50.00	-27.46	Average
11	11.56	22.63	9.70	0.09	10.00	42.42	60.00	-17.58	QP
12	11.56	7.97	9.70	0.09	10.00	27.76	50.00	-22.24	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

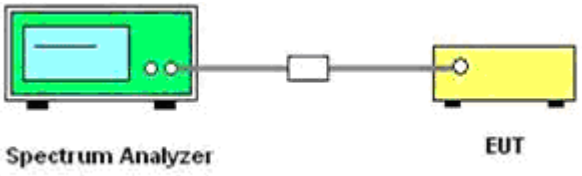
****Note: Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11b).*

5.8. Band-edge measurements for radiated emissions

5.8.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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 §15.205(c)).

5.8.2. Test Setup Layout



5.8.3. Measuring Instruments and Setting

Please refer to section 6 of equipment list in this report. The following table is the setting of Spectrum Analyzer.

5.8.4. Test Procedures

According to KDB 558074 D01 V03 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=1/B for Peak detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30

MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).

10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

    E = EIRP – 20log D + 104.8

    Where:
    E = electric field strength in dBμV/m,
    EIRP = equivalent isotropic radiated power in dBm
    D = specified measurement distance in meters.

11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

12. Compare the resultant electric field strength level to the applicable regulatory limit.

13. Perform radiated spurious emission test duress until all measured frequencies were complete.

5.8.5 Test Results

IEEE 802.11b							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
2310.000	-48.879	2.0	0.00	48.381	Peak	74.00	PASS
2310.000	-59.045	2.0	0.00	38.215	AV	54.00	PASS
2386.067	-44.709	2.0	0.00	52.551	Peak	74.00	PASS
2386.067	-54.555	2.0	0.00	42.705	AV	54.00	PASS
2390.000	-46.097	2.0	0.00	51.163	Peak	74.00	PASS
2390.000	-55.794	2.0	0.00	41.466	AV	54.00	PASS
2483.500	-46.398	2.0	0.00	50.862	Peak	74.00	PASS
2483.500	-54.177	2.0	0.00	43.083	AV	54.00	PASS
2500.000	-50.121	2.0	0.00	47.139	Peak	74.00	PASS
2500.000	-57.283	2.0	0.00	39.977	AV	54.00	PASS

IEEE 802.11g							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
2310.000	-49.949	2.0	0.00	47.311	Peak	74.00	PASS
2310.000	-59.148	2.0	0.00	38.112	AV	54.00	PASS
2390.000	-40.951	2.0	0.00	56.309	Peak	74.00	PASS
2390.000	-52.988	2.0	0.00	44.272	AV	54.00	PASS
2483.500	-43.136	2.0	0.00	54.124	Peak	74.00	PASS
2483.500	-53.051	2.0	0.00	44.209	AV	54.00	PASS
2486.435	-40.222	2.0	0.00	57.038	Peak	74.00	PASS
2486.435	-53.767	2.0	0.00	43.493	AV	54.00	PASS
2500.000	-50.014	2.0	0.00	47.246	Peak	74.00	PASS
2500.000	-57.945	2.0	0.00	39.315	AV	54.00	PASS

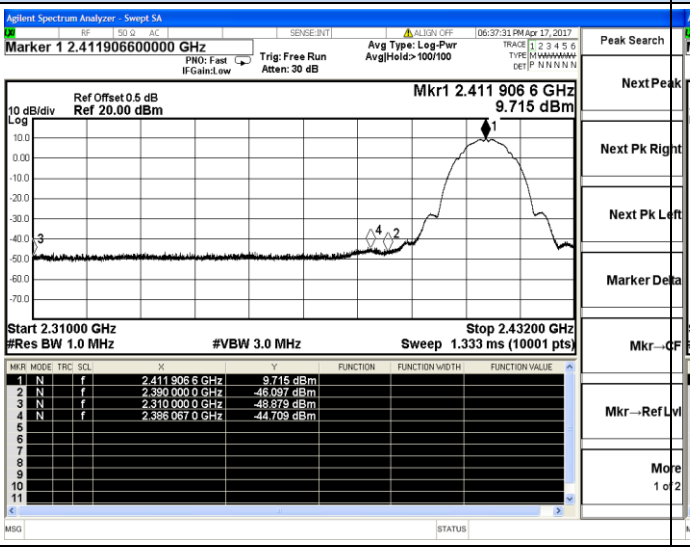
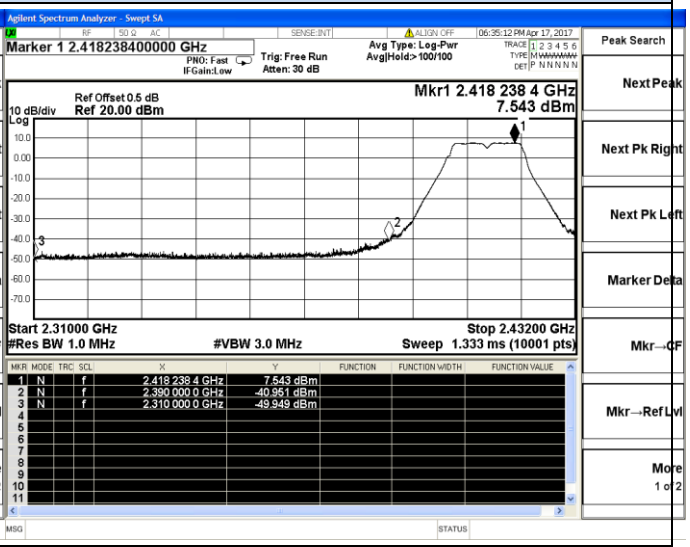
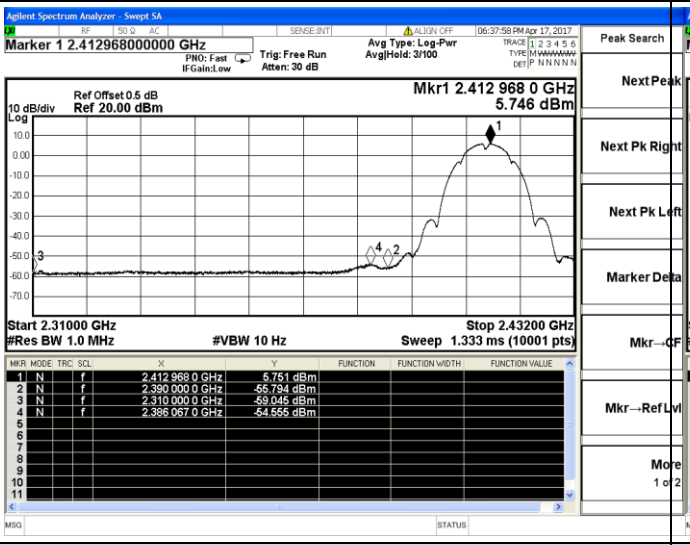
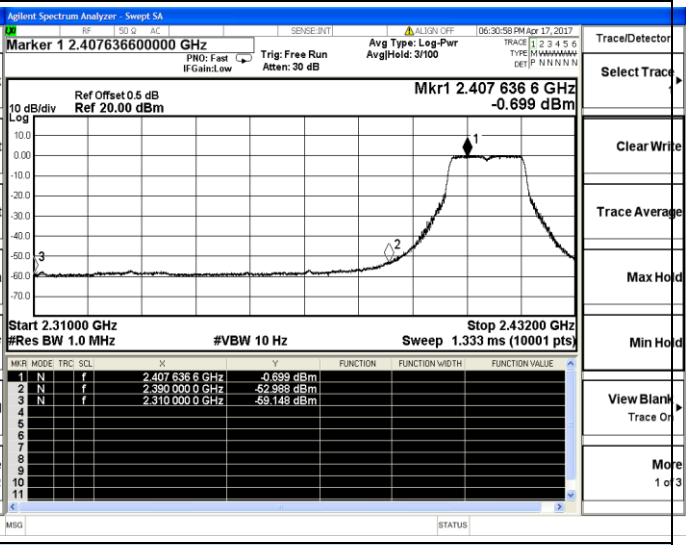
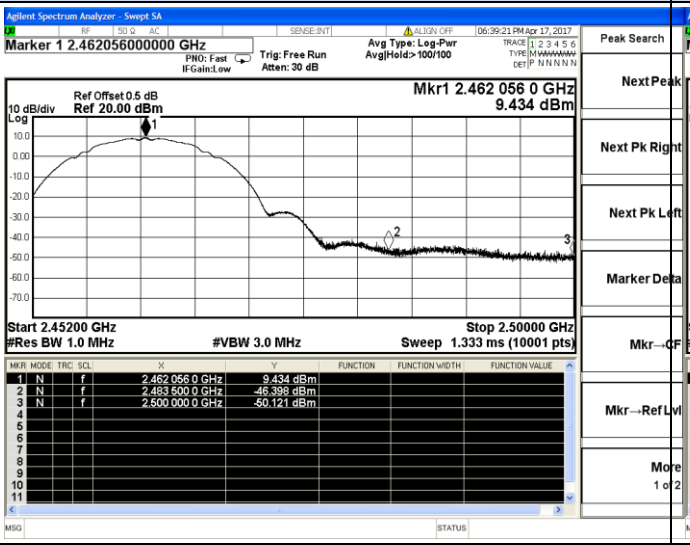
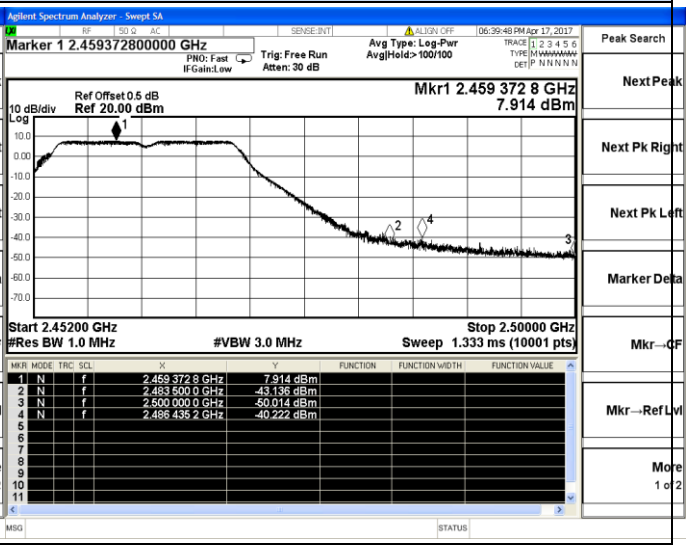
IEEE 802.11n HT20							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
2310.000	-52.139	2.0	0.00	45.121	Peak	74.00	PASS
2310.000	-59.067	2.0	0.00	38.193	AV	54.00	PASS
2390.000	-43.050	2.0	0.00	54.210	Peak	74.00	PASS
2390.000	-54.212	2.0	0.00	43.048	AV	54.00	PASS
2483.500	-42.850	2.0	0.00	54.410	Peak	74.00	PASS
2483.500	-51.801	2.0	0.00	45.459	AV	54.00	PASS
2486.666	-42.293	2.0	0.00	54.967	Peak	74.00	PASS
2500.000	-49.127	2.0	0.00	48.133	Peak	74.00	PASS
2500.000	-56.737	2.0	0.00	40.523	AV	54.00	PASS

IEEE 802.11n HT40							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
2310.000	-41.257	2.0	0.00	56.003	Peak	74.00	PASS
2310.000	-54.343	2.0	0.00	42.917	AV	54.00	PASS
2390.000	-45.113	2.0	0.00	52.147	Peak	74.00	PASS
2390.000	-51.000	2.0	0.00	46.260	AV	54.00	PASS
2483.500	-43.839	2.0	0.00	53.421	Peak	74.00	PASS
2483.500	-51.801	2.0	0.00	45.459	AV	54.00	PASS
2500.000	-48.774	2.0	0.00	48.486	Peak	74.00	PASS
2500.000	-56.737	2.0	0.00	40.523	AV	54.00	PASS

BT – LE							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Ground Reflection Factor (dB)	Covert Radiated E Level At 3m (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
2310.000	-63.476	2.0	0.00	33.784	Peak	74.00	PASS
2310.000	-73.712	2.0	0.00	23.548	AV	54.00	PASS
2361.766	-51.383	2.0	0.00	45.877	Peak	74.00	PASS
2361.813	-64.752	2.0	0.00	32.508	AV	54.00	PASS
2390.000	-60.777	2.0	0.00	36.483	Peak	74.00	PASS
2390.000	-73.129	2.0	0.00	24.131	AV	54.00	PASS
2483.500	-43.677	2.0	0.00	53.583	Peak	74.00	PASS
2483.500	-67.412	2.0	0.00	29.848	AV	54.00	PASS
2500.000	-63.639	2.0	0.00	33.621	Peak	74.00	PASS
2500.000	-73.351	2.0	0.00	23.909	AV	54.00	PASS

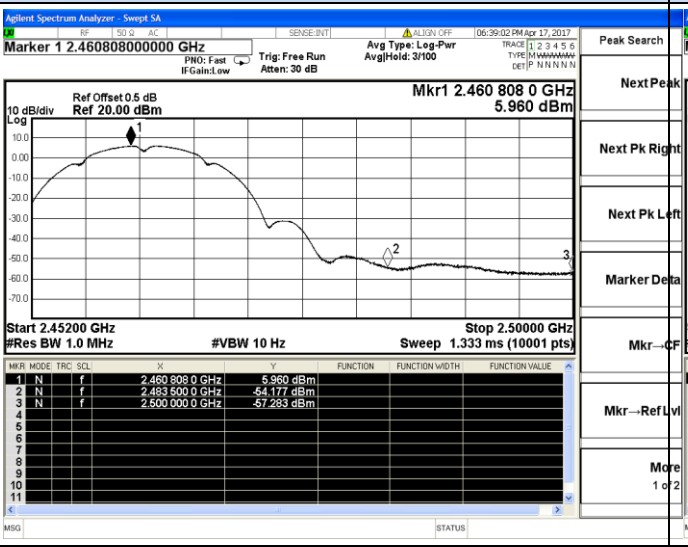
Remark:

1. *Measured Band edge measurement for radiated emission at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 1Mbps at IEEE 802.11b; 6Mbps at IEEE 802.11g; 6.5Mbps at IEEE 802.11n HT20 13.5Mbps at IEEE 802.11n HT20;*
4. *"---"means that the fundamental frequency not for 15.209 limits requirement.*
5. *Please refer to following plots;*

Band-edge measurements for radiated emissions	
IEEE 802.11b	IEEE 802.11g
	
Channel 1 / 2412 MHz – Peak	Channel 1 / 2412 MHz – Peak
	
Channel 1 / 2412 MHz – Average	Channel 1 / 2412 MHz – Average
	
Channel 11 / 2462 MHz – Peak	Channel 11 / 2462 MHz – Peak

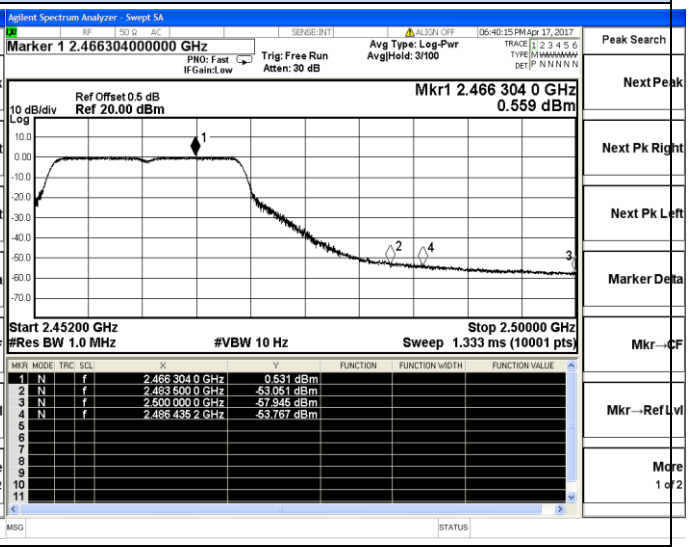
Band-edge measurements for radiated emissions

IEEE 802.11b



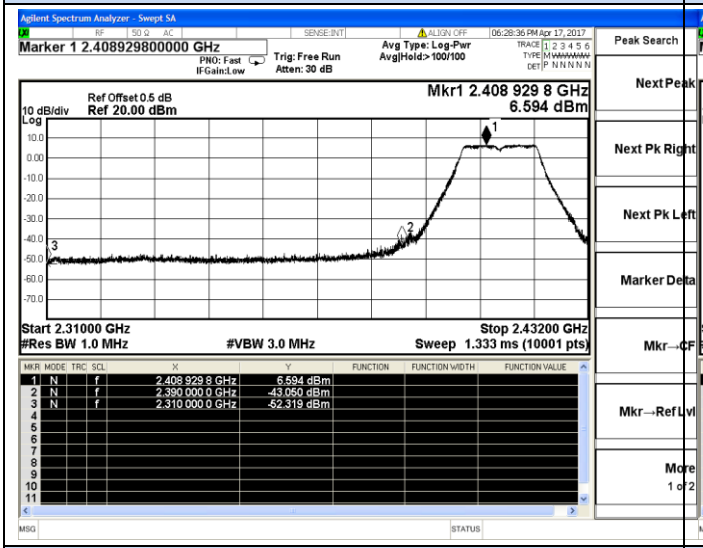
Channel 11 / 2462 MHz – Average

IEEE 802.11g



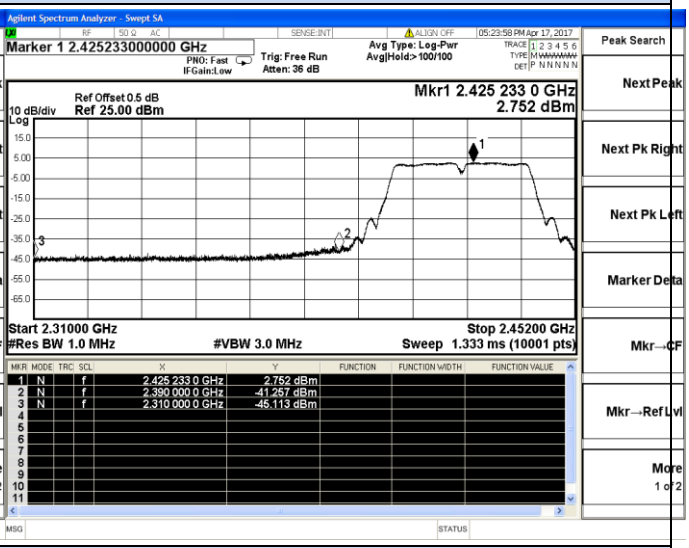
Channel 11 / 2462 MHz – Average

IEEE 802.11n HT20

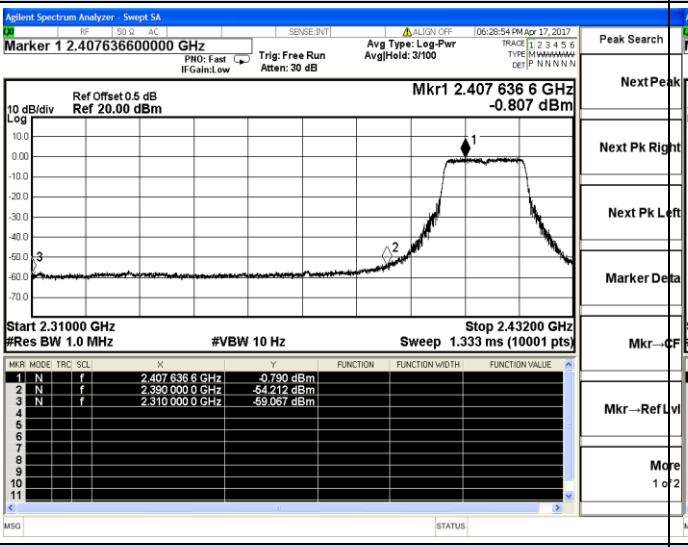


Channel 1 / 2412 MHz – Peak

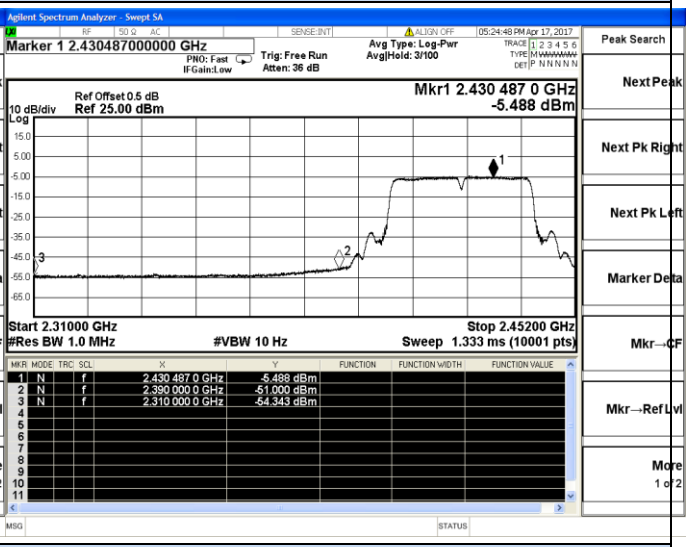
IEEE 802.11n HT40



Channel 3 / 2422 MHz – Peak



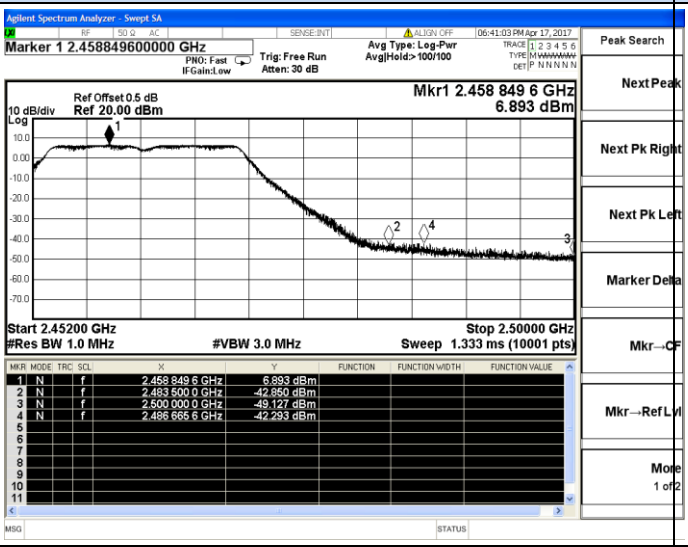
Channel 1 / 2412 MHz – Average



Channel 3 / 2422 MHz – Average

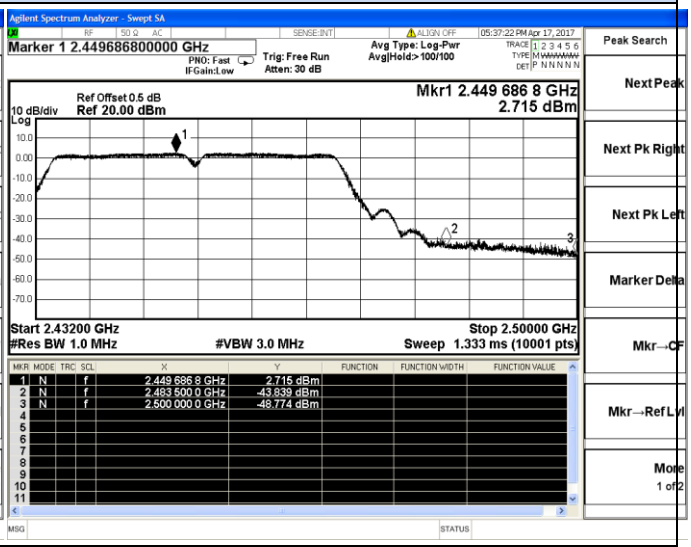
Band-edge measurements for radiated emissions

IEEE 802.11n HT20

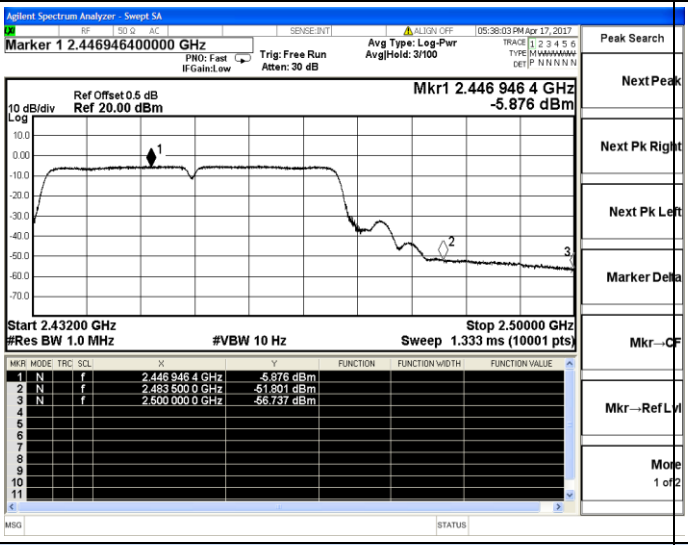


Channel 11 / 2462 MHz – Peak

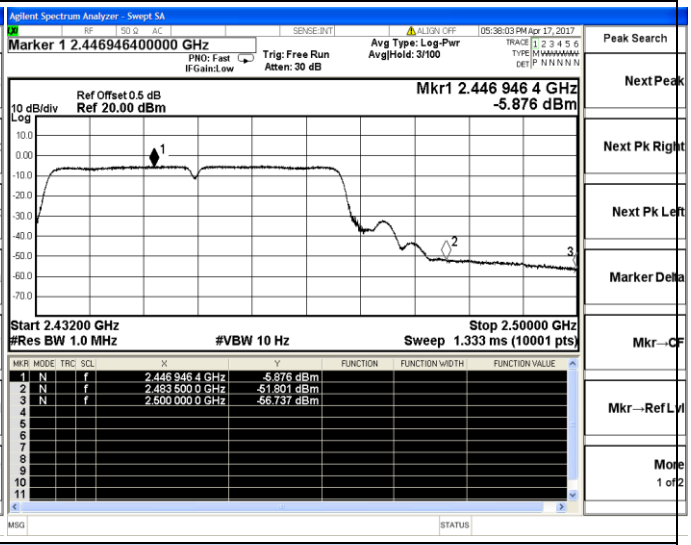
IEEE 802.11n HT40



Channel 9 / 2452 MHz – Peak

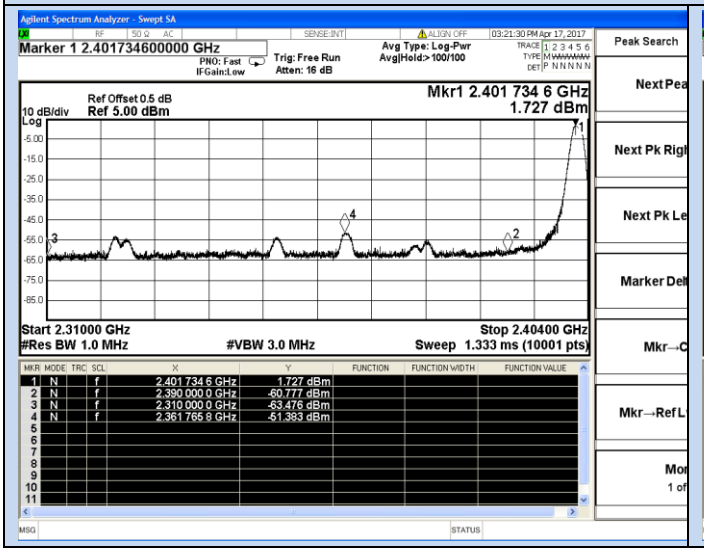


Channel 11 / 2462 MHz – Average

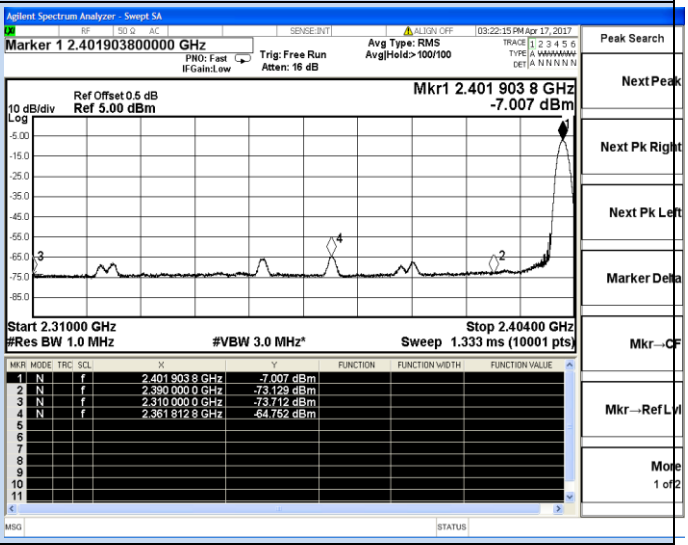


Channel 9 / 2452 MHz – Average

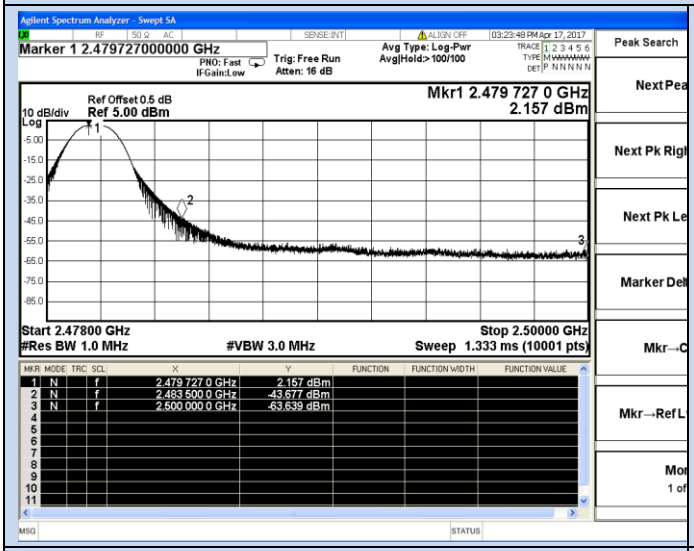
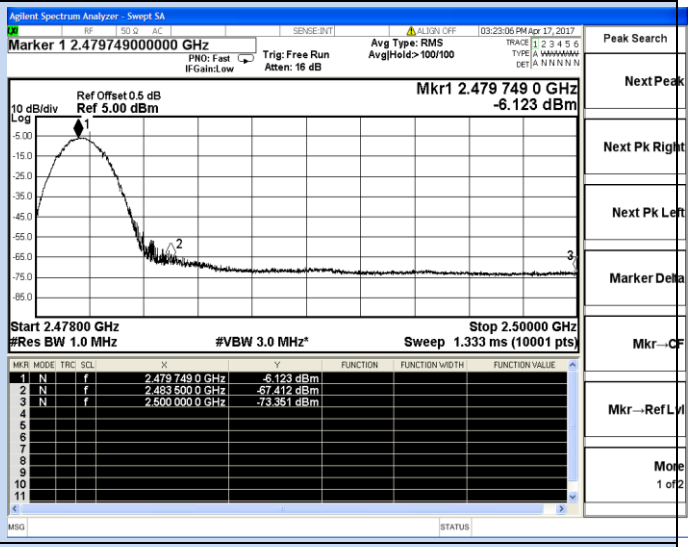
B-LE



Channel 0 / 2402 MHz – Peak



Channel 0 / 2402 MHz –Average

Band-edge measurements for radiated emissions	
B-LE	
	
Channel 39 / 2480 MHz – Peak	Channel 39 / 2480 MHz –Average

5.9. Antenna Requirements

5.9.1 Standard Applicable

According to antenna requirement of §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

According to RSS-Gen

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device’s antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

5.9.2 Antenna Connected Construction

5.9.2.1. Standard Applicable

According to § 15.203 and RSS-Gen, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

5.9.2.2. Antenna Connector Construction

The directional gains of antenna used for transmitting is 2.0dBi, and the antenna is an Internal antenna connect to PCB board and no consideration of replacement. Please see EUT photo for details.
The WLAN and BT share same antenna;

5.9.2.3. Results: Compliance.

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.
Conducted power refers ANSI C63.10:2013 Output power test procedure for DTS devices.
Radiated power refers to ANSI C63.10:2013 Radiated emissions tests.

Measurement parameters

Measurement parameter	
Detector:	Peak
Sweep Time:	Auto
Resolution bandwidth:	1MHz
Video bandwidth:	3MHz
Trace-Mode:	Max hold

Limits

FCC	ISED
Antenna Gain	
6 dBi	

Note: 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 WLAN devices, the DSSS mode is used;

T_{nom}	V_{nom}	Lowest Channel 2412 MHz	Middle Channel 2437 MHz	Highest Channel 2462 MHz
Conducted power [dBm] Measured with DSSS modulation		11.782	11.854	11.657
Radiated power [dBm] Measured with DSSS modulation		13.666	13.749	13.562
Gain [dBi] Calculated		1.884	1.895	1.905
Measurement uncertainty			± 1.6 dB (cond.) / ± 3.8 dB (rad.)	

6. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal Date	Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	June 18, 2016	June 17, 2017
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	July 16, 2016	July 15, 2017
Signal analyzer	Agilent	N9020A	MY50510140	9kHz~26.5GHz	October 27, 2016	October 27, 2017
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	June 18, 2016	June 17, 2017
LISN (Support Unit)	EMCO	3819/2NM	9703-1839	9KHz-30MHz	June 18, 2016	June 17, 2017
RF	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	June 18, 2016	June 17, 2017
ISN	SCHAFFNER	ISN ST08	21653	9KHz-30MHz	June 18, 2016	June 17, 2017
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30M-18GHz 3m	June 18, 2016	June 17, 2017
Amplifier	SCHAFFNER	COA9231A	18667	9kHz-2GHzz	June 18, 2016	June 17, 2017
Amplifier	Agilent	8449B	3008A02120	1GHz-26.5GHz	July 16, 2016	July 15, 2017
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	July 16, 2016	July 15, 2017
Loop Antenna	R&S	HFH2-Z2	860004/001	9k-30MHz	June 18, 2016	June 17, 2017
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	30MHz-1GHz	June 10, 2016	June 09, 2017
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	June 10, 2016	June 09, 2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz-40GHz	June 10, 2016	June 09, 2017
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	June 18, 2016	June 17, 2017
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz-40GHz	June 18, 2016	June 17, 2017
Power Meter	R&S	NRVS	100444	DC-40GHz	June 18, 2016	June 17, 2017
Power Sensor	R&S	NRV-Z51	100458	DC-30GHz	June 18, 2016	June 17, 2017
Power Sensor	R&S	NRV-Z32	10057	30MHz-6GHz	June 18, 2016	June 17, 2017
AC Power Source	HPC	HPA-500E	HPA-9100024	AC 0~300V	June 18, 2016	June 17, 2017
DC power source	GW	GPC-6030D	C671845	DC 1V-60V	June 18, 2016	June 17, 2017
Temp. and Humidify Chamber	Giant Force	GTH-225-20-S	MAB0103-00	N/A	June 18, 2016	June 17, 2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18, 2016	June 17, 2017
RF CABLE-2m	JYE Bao	RG142	CB)35-2m	20MHz-1GHz	June 18, 2016	June 17, 2017
EMC Test Software	Audix	E3	N/A	N/A	N/A	N/A
Note: All equipment through GRGT EST calibration						

7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

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