FCC 47 CFR PART 15 SUBPART C

for

Wireless Router
Model: AC1220GW,AC1200GW,AC1500GW, AC1750GW,AC1900GW

Brand: UTT

Test Report Number:
C160415Z11-RP1-1
Issued Date: June 7, 2016

Issued for

SHANGHAI UTT TECHNOLOGIES CO., LTD.
Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China

Issued by:

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TESTING CERT #2861.01

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 7, 2016	Initial Issue	ALL	Sinphy Xie

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1 TEST CERTIFICATION

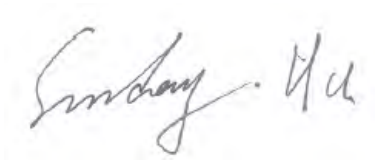
Product	Wireless Router
Model	AC1220GW,AC1200GW, AC1500GW, AC1750GW,AC1900GW
Brand	UTT
Tested	April 15~June 6, 2016
Applicant	**SHANGHAI UTT TECHNOLOGIES CO., LTD.** Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China
Manufacturer	**SHANGHAI UTT TECHNOLOGIES CO., LTD.** Room 301, Building 9, No.518 Xinzhuan Road, Caohejing Songjiang Hi-Tech Park, shanghai, P.R.China

APPLICABLE STANDARDS			
Standard	**Test Type**	**Standard**	**Test Type**
15.207(a)	Power Line Conducted Emissions	15.247(d) 15.209(a)	● Spurious Emissions ● Conducted Measurement ● Radiated Emissions
15.247(a)(2)	6dB Bandwidth Measurement	15.247(b)(3) 15.247(b)(4)	Peak Power Measurement
15.247(d)	Band Edges Measurement	15.247(e)	Peak Power Spectral Density

We hereby certify that:

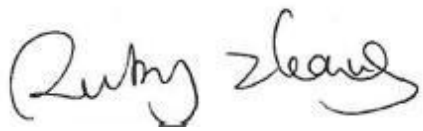
The above equipment was tested by Compliance Certification Services (Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.
The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:



Sunday Hu
Supervisor of EMC Dept.
Compliance Certification Services (Shenzhen) Inc.

Reviewed by:



Ruby Zhang
Supervisor of Report Dept.
Compliance Certification Services (Shenzhen) Inc.

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2 TEST RESULT SUMMARY

APPLICABLE STANDARDS			
Standard	**Test Type**	**Result**	**Remark**
15.247(a)(2)	6dB Bandwidth Measurement	Pass	Meet the requirement of limit.
15.247(b)(3) 15.247(b)(4)	Peak Power Measurement	Pass	Meet the requirement of limit.
15.247(d)	Band Edges Measurement	Pass	Meet the requirement of limit.
15.247(e)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.247(d) 15.209(a)	● Spurious Emissions ● Conducted Measurement ● Radiated Emissions	Pass	Meet the requirement of limit.
15.207(a)	Power line Conducted Emissions	Pass	Meet the requirement of limit.

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
2. The information of measurement uncertainty is available upon the customer's request.

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3 EUT DESCRIPTION

Product	Wireless Router
Model Number	AC1220GW,AC1200GW,AC1500GW, AC1750GW,AC1900GW
Brand	UTT
Model Discrepancy	They are identical to each other except for market designation for marketing purpose.
Identify Number	C160415Z11-RP1-1
Received Date	April 15, 2016
Power Supply	DC12V supplied by the adapter
Adapter Manufacturer /Model No.	SHENZHEN FUJIA APPLIANCE CO., LTD. / FJ-SW1202000N I/P: 100-240Vac, 50/60Hz, 0.6A max O/P: 12Vdc, 2000mA DC Cable: Unshielded, 1.50m
Transmit Power	IEEE 802.11b mode: 10.49dBm (Antenna 1) IEEE 802.11b mode: 10.45dBm (Antenna 2) IEEE 802.11g mode: 13.39dBm (Antenna 1) IEEE 802.11g mode: 17.64dBm (Antenna 2) IEEE 802.11n HT20 MHz mode: 17.95dBm(Combine with Antenna 1 and Antenna 2) IEEE 802.11n HT40 MHz mode: 18.14dBm(Combine with Antenna 1 and Antenna 2)
Modulation Technique	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM)
Transmit Data Rate	IEEE 802.11b: 11Mbps(CCK) with fall back rates of 5.5/2/1Mbps IEEE 802.11g: 54Mbps with fall back rates of 48/36/24/18/12/9 /6Mbps IEEE 802.11n HT20: 130Mbps with fall back rates of 130/117/104/ 78/52/39/26/13Mbps IEEE 802.11n HT40: 270Mbps with fall back rates of 270/243/216/ 162/108/81/54/27Mbps
Number of Channels	IEEE 802.11b mode: 11 Channels IEEE 802.11g mode: 11 Channels IEEE 802.11n HT20 MHz mode: 11 Channels IEEE 802.11n HT40 MHz mode: 7 Channels
Antenna Specification	External antenna with 5dBi gain (Max)
Channels Spacing	IEEE 802.11b/g ,802.11n HT20/HT40 : 5MHz
Temperature Range	-10°C ~ +50°C
Hardware Version	MT7621-F
Software Version	AC1220GWv1.7.5-160201.bin

Note: *1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*

*2. This submittal(s) (test report) is intended for FCC ID: **XPF-REG07-UTT** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

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4 TEST METHODOLOGY

4.1. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Test Item	Test mode	Worse mode
Conducted Emission	**Mode 1:** TX	☒
Radiated Emission	**Mode 1:** TX	☒

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only, and power line conducted emission below 30MHz, which worst case was in normal link mode.

IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT20 MHz mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT40 MHz mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 27Mbps data rate were chosen for full testing.

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5 SETUP OF EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook	E335	N/A	DOC	Thinkpad	Shielded 1.50m	Unshielded 2.00m

Note:

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5.2. CONFIGURATION OF SYSTEM UNDER TEST

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

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6 FACILITIES AND ACCREDITATIONS

6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at **No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.10, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	**A2LA**
China	**CNAS**

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	**FCC**
Japan	**VCCI(C-4815,R-4320,T-2317, G-10624)**
Canada	**INDUSTRY CANADA**

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccssz.com

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Parameter	Uncertainty
Radiated Emission, 30 to 200 MHz Test Site : 966(2)	+/-3.6880dB
Radiated Emission, 200 to 1000 MHz Test Site : 966(2)	+/-3.6695dB
Radiated Emission, 1 to 8 GHz	+/-5.1782dB
Radiated Emission, 8 to 18 GHz	+/-5.2173dB
Conducted Emissions	+/-3.6836dB
Band Width	178kHz
Peak Output Power MU	+/-1.906dB
Band Edge MU	+/-0.182dB
Channel Separation MU	416.178Hz
Duty Cycle MU	0.054ms
Frequency Stability MU	226Hz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.

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7 FCC PART 15.247 REQUIREMENTS

7.1. POWER LINE CONDUCTED EMISSIONS MEASUREMENT

7.1.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that 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 the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

NOTE:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

7.1.2. TEST INSTRUMENTS

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2016	02/20/2017
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	02/21/2016	02/20/2017
LISN	EMCO	3825/2	8901-1459	02/21/2016	02/20/2017
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	02/21/2016	02/20/2017
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

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. N.C.R = No Calibration Request.

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7.1.3. TEST PROCEDURES (please refer to measurement standard)

- The EUT and Support equipment, if needed, was placed on a non-conducted table, which is 0.8m above the ground plane and 0.4m away from the conducted wall.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane. All support equipment power received from a second LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The frequency range from 150 kHz to 30 MHz was searched. The test data of the worst-case condition(s) was recorded. Emission levels under limit 20dB were not recorded.

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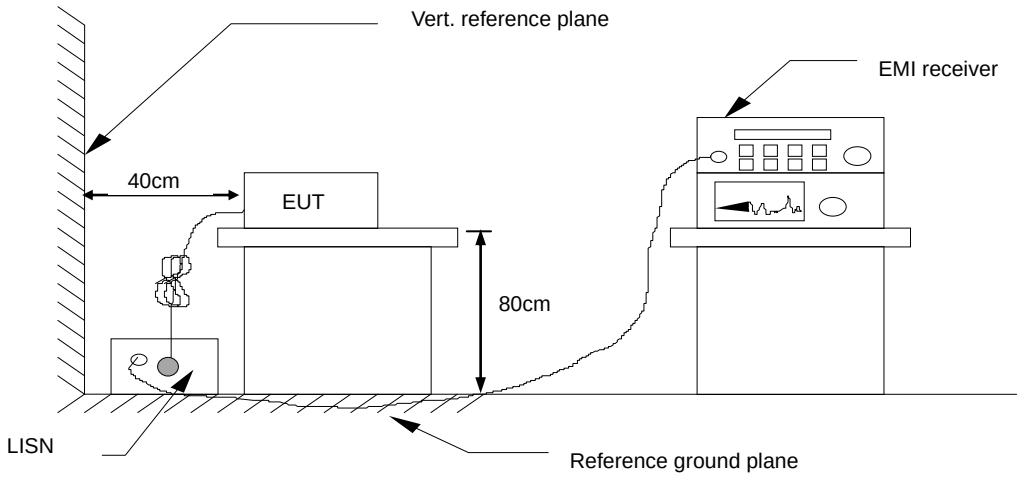
7.1.4. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.5. DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)

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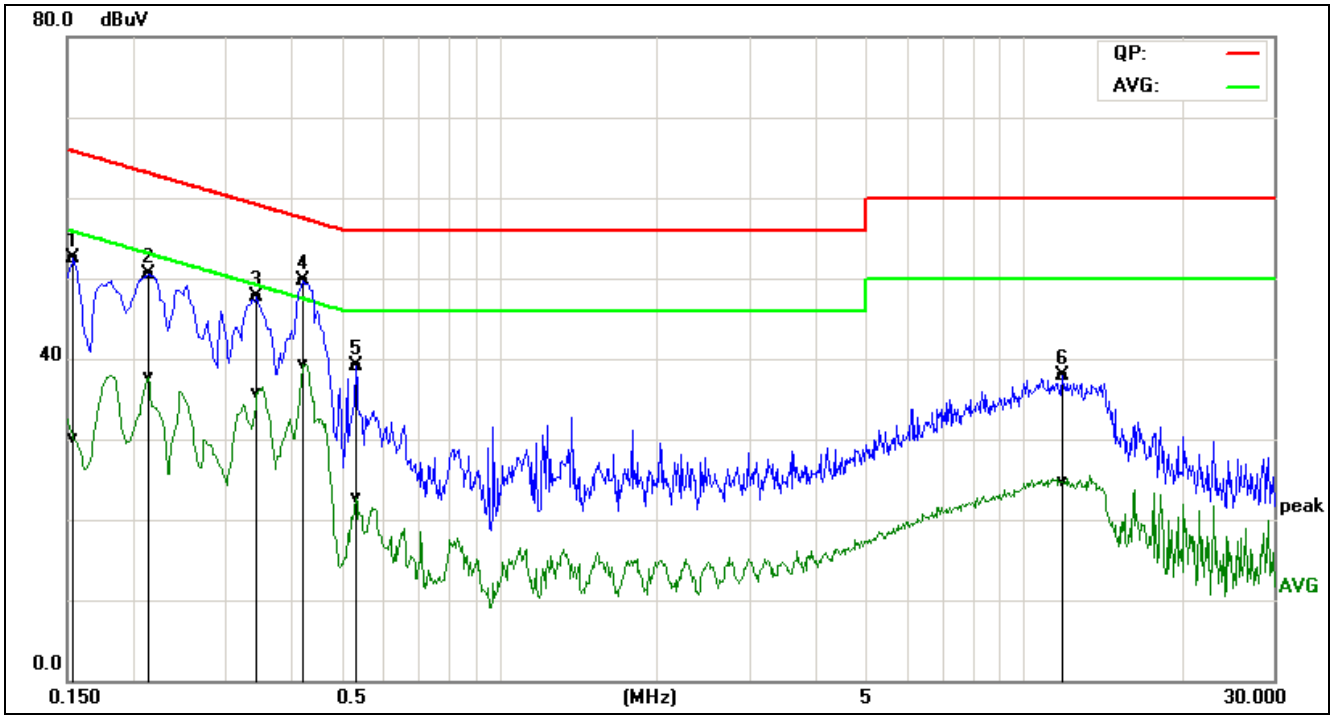
7.1.6. TEST RESULTS

Model No.	AC1220GW	**RBW,VBW**	9 kHz
Environmental Conditions	26°C, 60% RH	**Test Mode**	Mode 1
Tested by	Jack Chen	**Line**	L1
Test Date	April 20, 2016		



Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)	**Line (L1/L2)**
0.1539	42.71	20.32	9.78	52.49	30.10	65.78	55.79	-13.29	-25.69	Pass	L1
0.2140	40.72	27.98	9.79	50.51	37.77	63.04	53.05	-12.53	-15.28	Pass	L1
0.3460	37.78	25.79	9.84	47.62	35.63	59.06	49.06	-11.44	-13.43	Pass	L1
0.4220	39.88	29.42	9.85	49.73	39.27	57.41	47.41	-7.68	-8.14	Pass	L1
0.5340	29.23	12.88	9.88	39.11	22.76	56.00	46.00	-16.89	-23.24	Pass	L1
11.8100	27.84	14.57	10.08	37.92	24.65	60.00	50.00	-22.08	-25.35	Pass	L1

REMARKS: *L1 = Line One (Live Line)*

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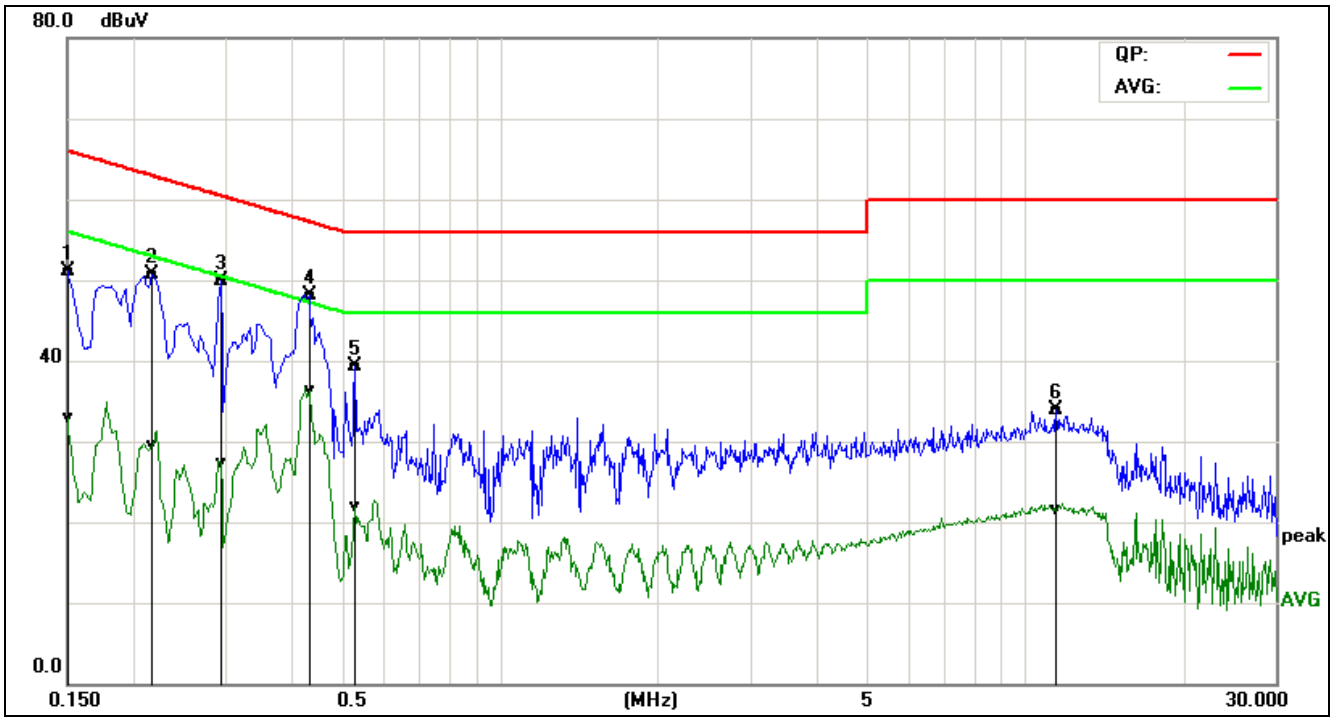
Model No.	AC1220GW	**RBW,VBW**	9 kHz
Environmental Conditions	26°C, 60% RH	**Test Mode**	Mode 1
Tested by	Jack Chen	**Line**	L2
Test Date	April 20, 2016		



Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)	**Line (L1/L2)**
0.1500	41.19	23.02	9.88	51.07	32.90	65.99	56.00	-14.92	-23.10	Pass	L2
0.2180	40.87	19.57	9.89	50.76	29.46	62.89	52.89	-12.13	-23.43	Pass	L2
0.2940	39.95	17.45	9.89	49.84	27.34	60.41	50.41	-10.57	-23.07	Pass	L2
0.4340	38.29	26.45	9.88	48.17	36.33	57.18	47.18	-9.01	-10.85	Pass	L2
0.5299	29.48	12.09	9.88	39.36	21.97	56.00	46.00	-16.64	-24.03	Pass	L2
11.4660	23.91	11.47	10.08	33.99	21.55	60.00	50.00	-26.01	-28.45	Pass	L2

REMARKS: *L2 = Line Two (Neutral Line)*

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7.2. SPURIOUS EMISSIONS MEASUREMENT

7.2.1. CONDUCTED EMISSIONS MEASUREMENT

7.2.1.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:
If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3)requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.
If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3)requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.
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)).

7.2.1.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	N9010A	MY55370330	02/21/2016	02/20/2017

7.2.1.3. TEST PROCEDURE (please refer to measurement standard)

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
Measurements are made over the 10MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels. No emission found between lowest internal used/generated frequency to 10MHz，it is only recorded 10MHz to 26GHz.

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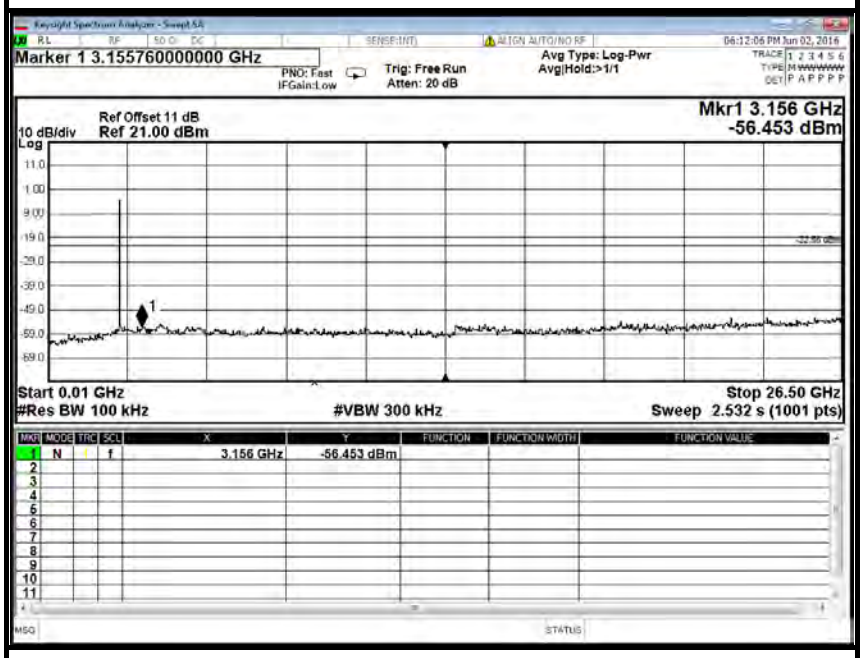
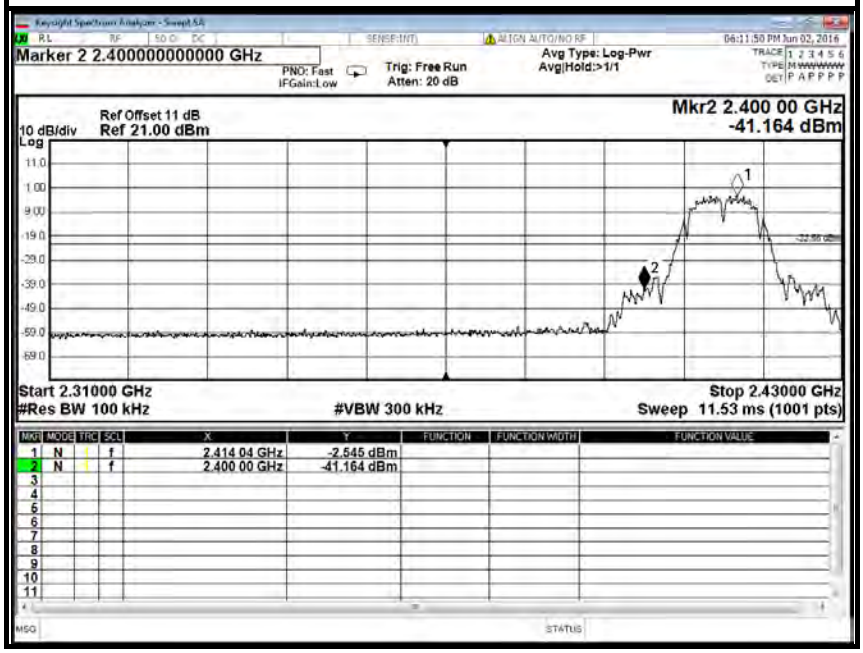
7.2.1.4. TEST RESULTS

Test Plot
IEEE 802.11b mode (Antenna 1)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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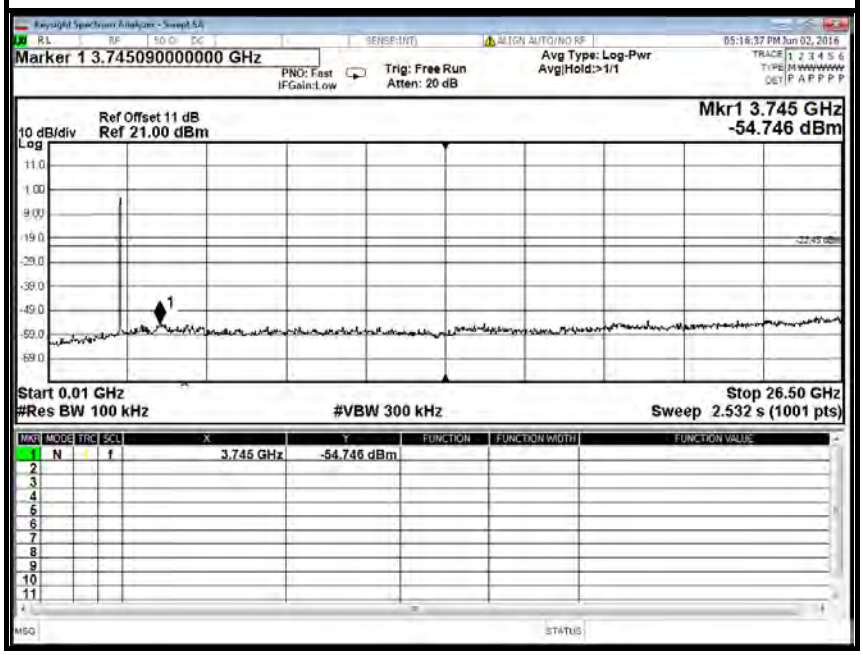
CH Mid (10MHz ~26.5GHz)



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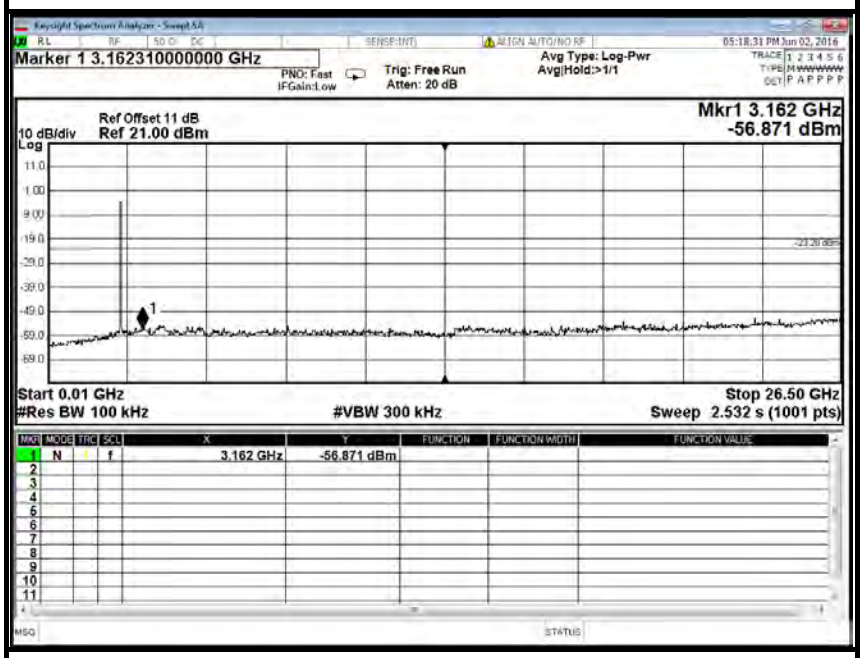
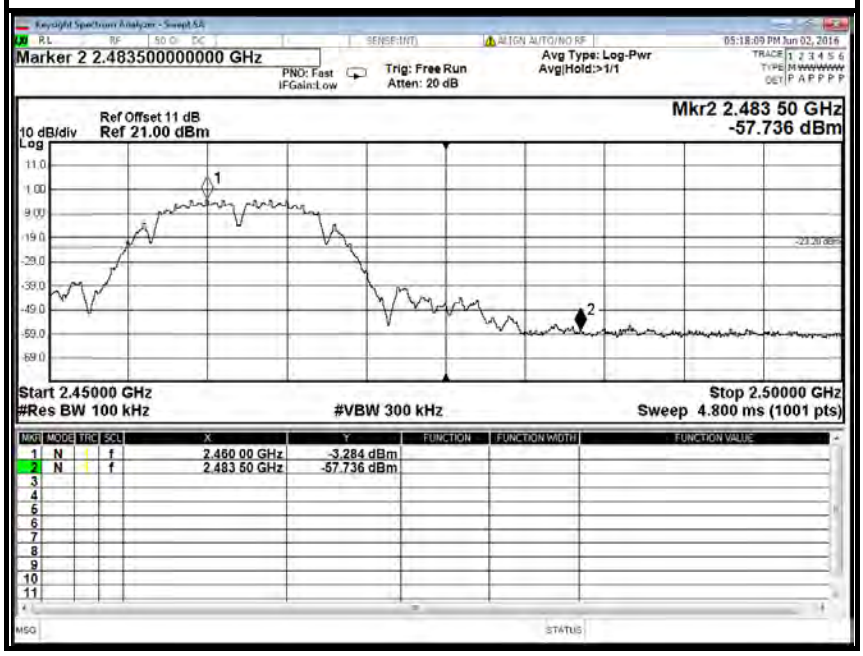
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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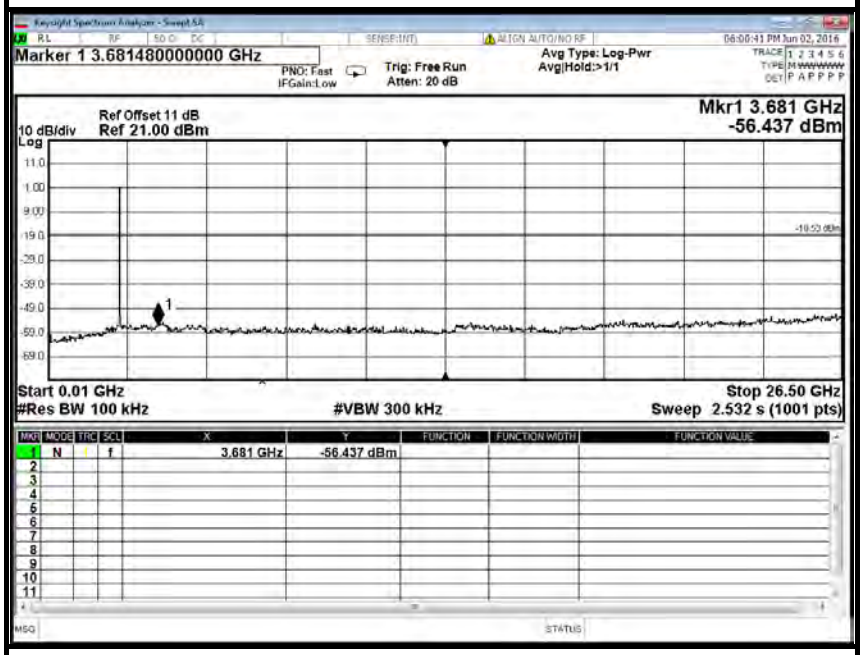
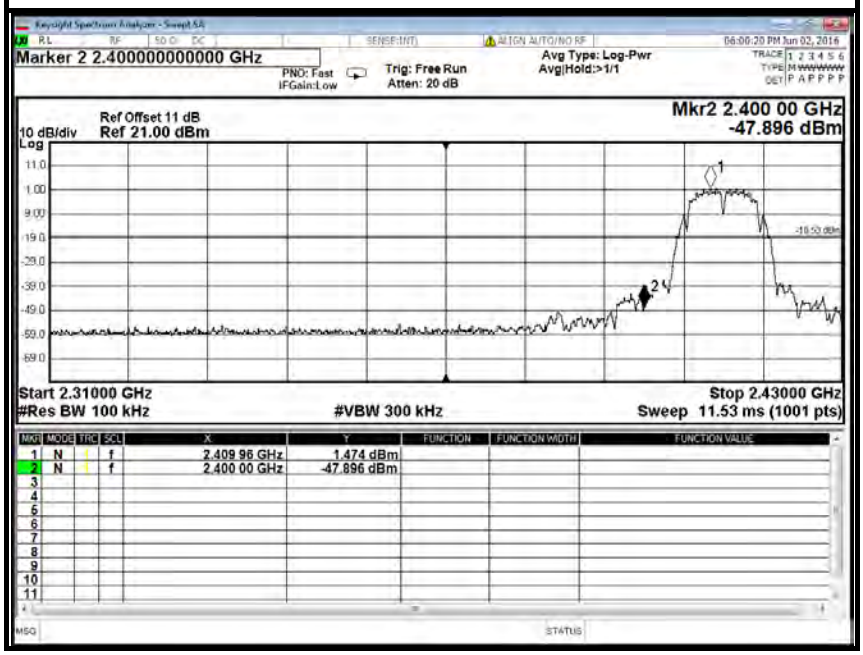
IEEE 802.11b mode (Antenna 2)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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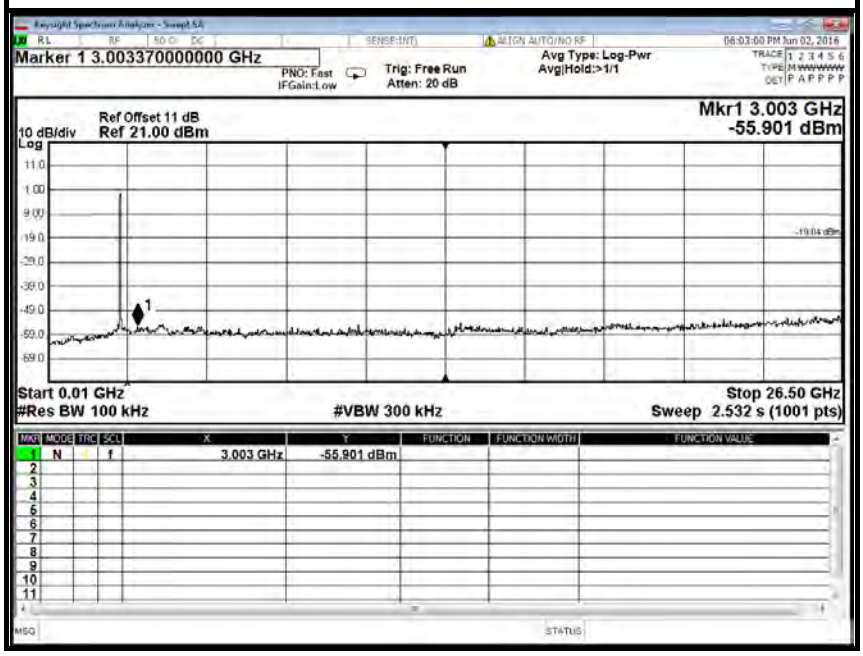
CH Mid (10MHz ~26.5GHz)



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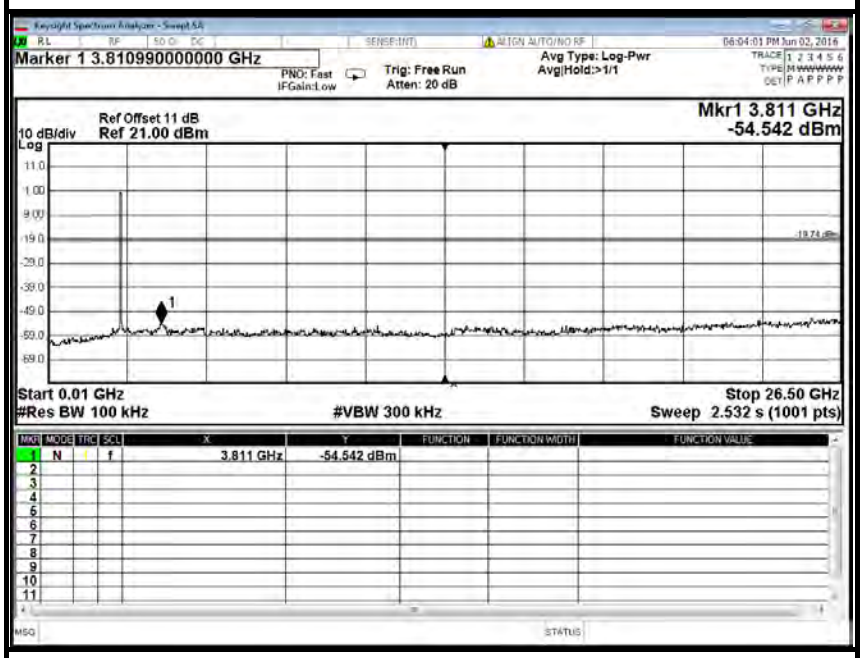
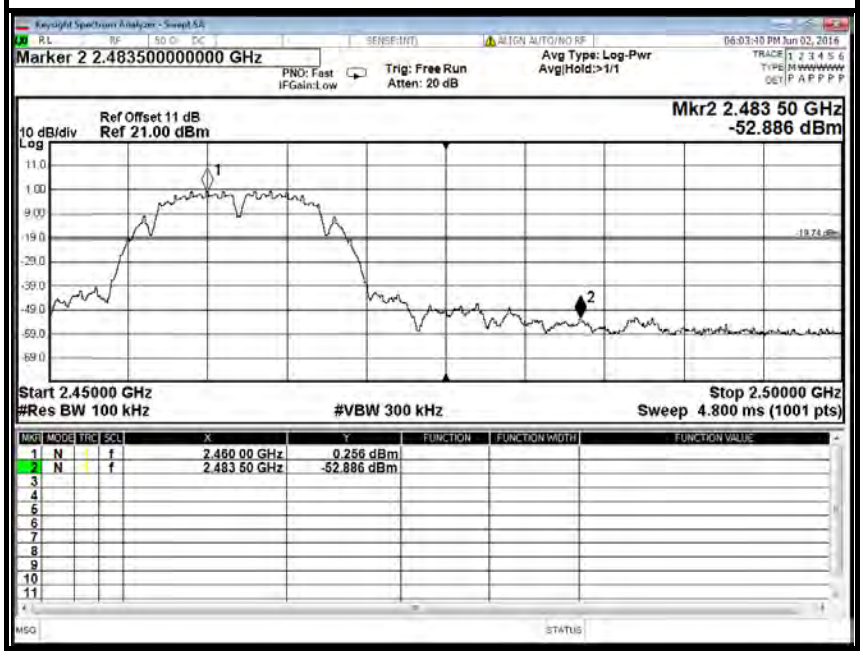
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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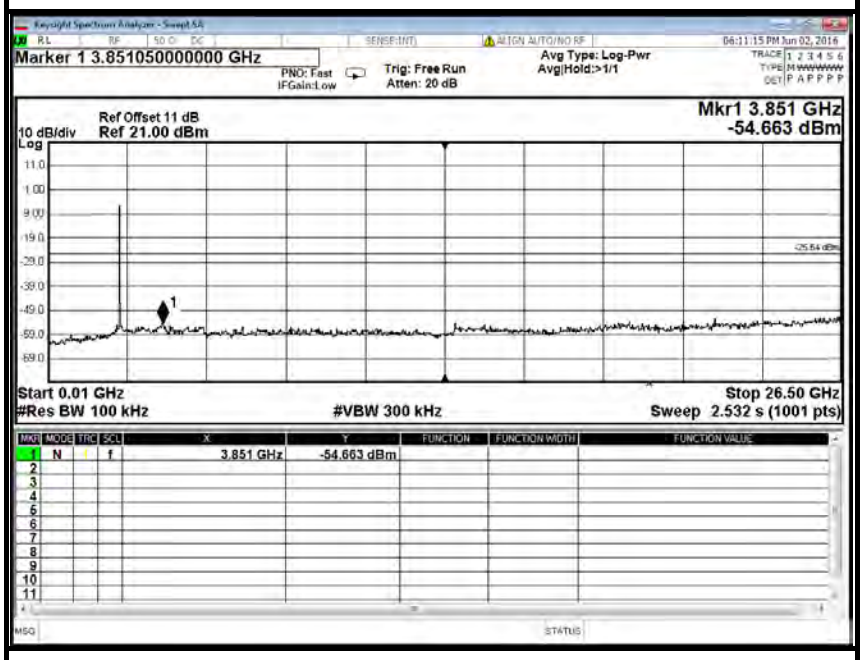
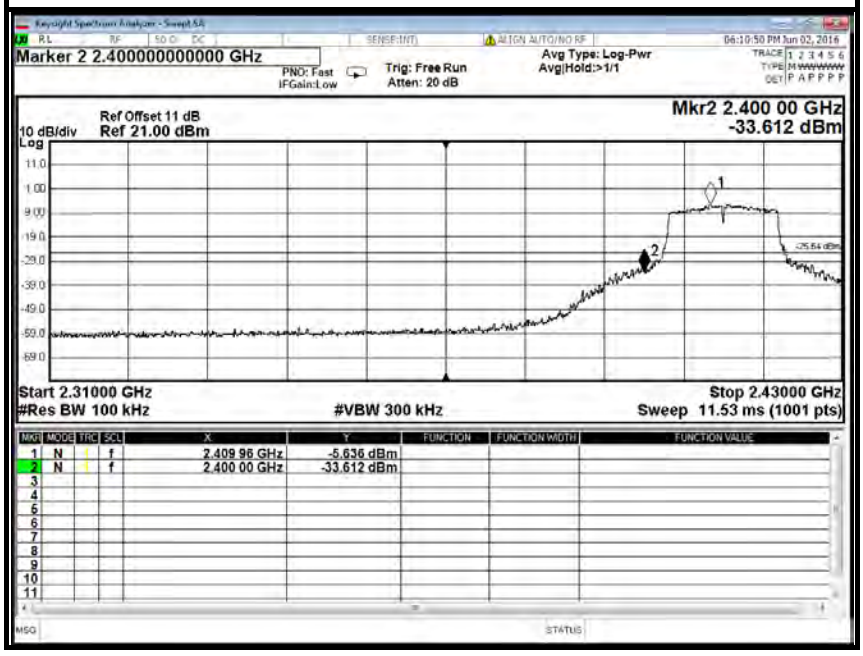
IEEE 802.11g mode (Antenna 1)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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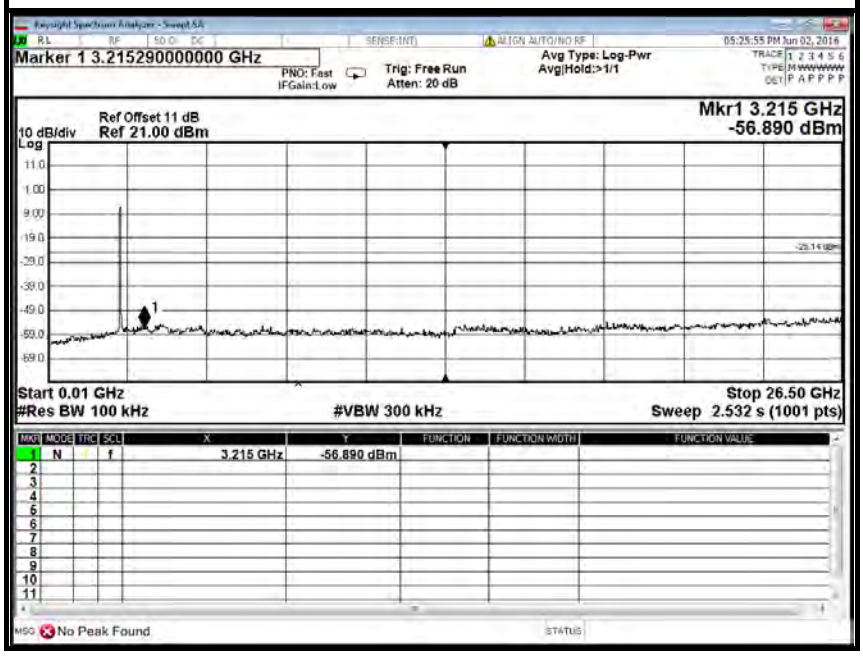
CH Mid (10MHz ~26.5GHz)



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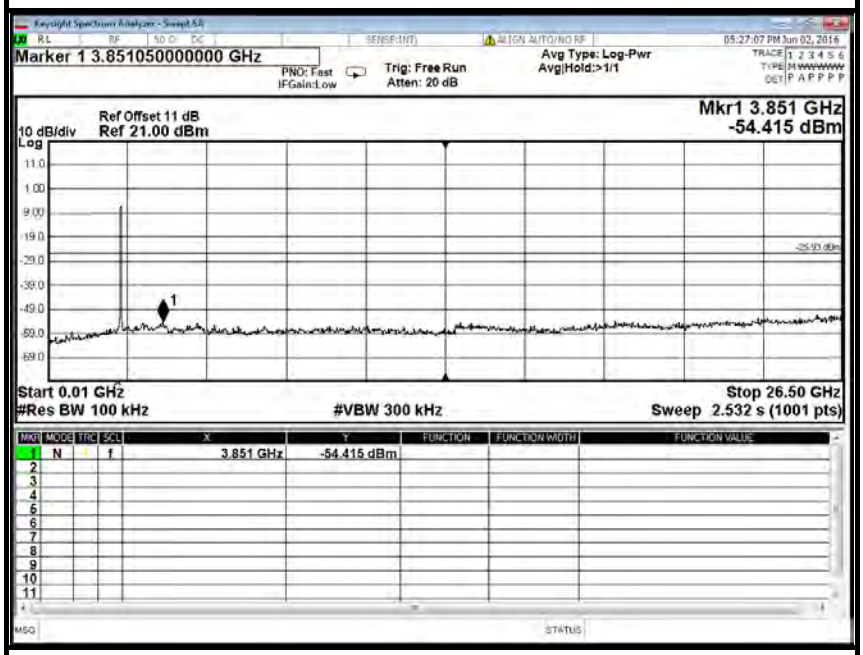
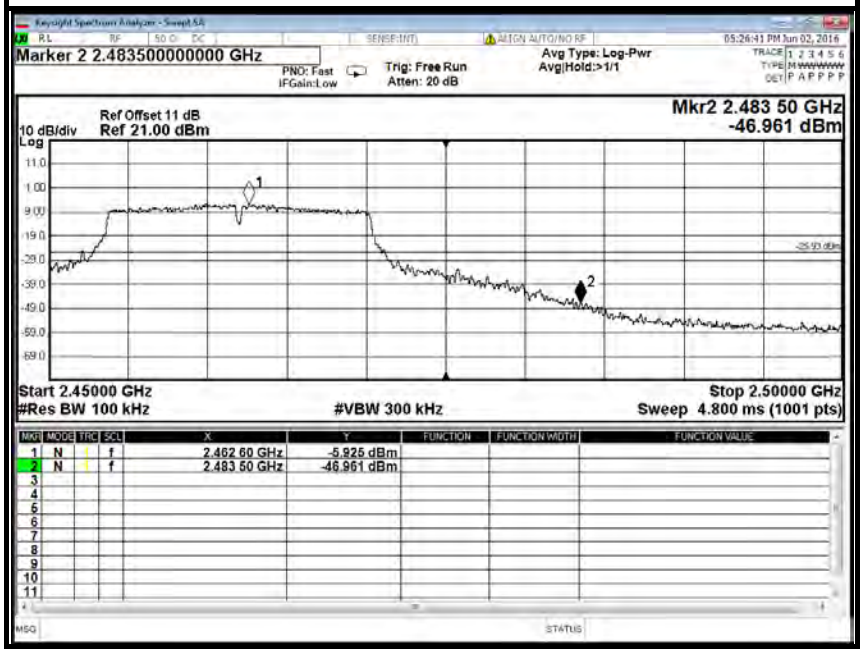
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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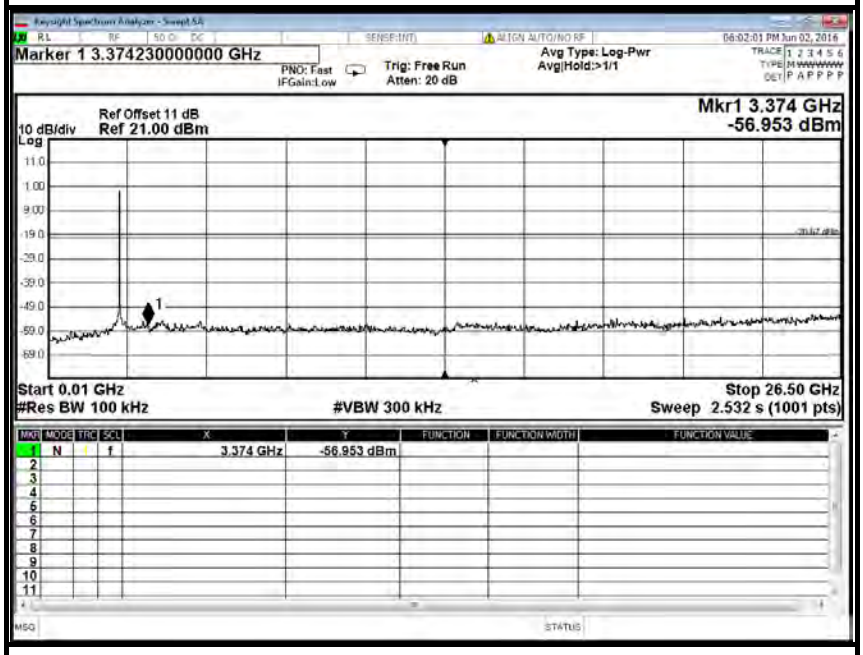
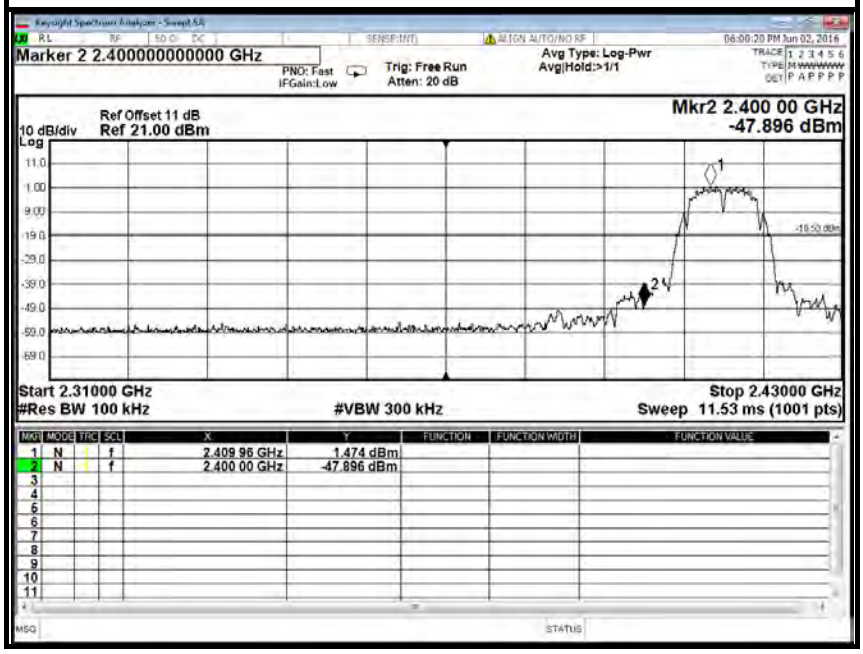
IEEE 802.11g mode (Antenna 2)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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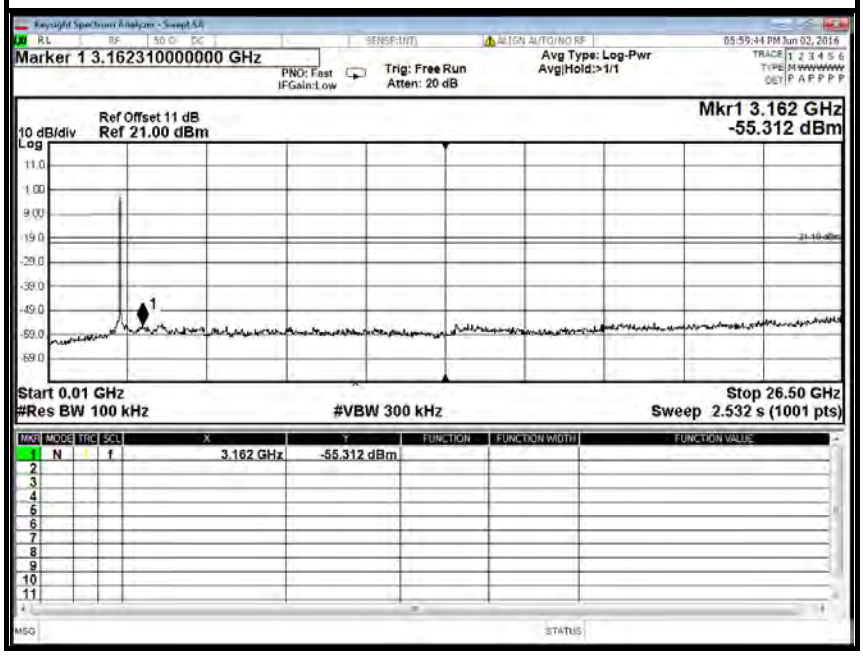
CH Mid (10MHz ~26.5GHz)



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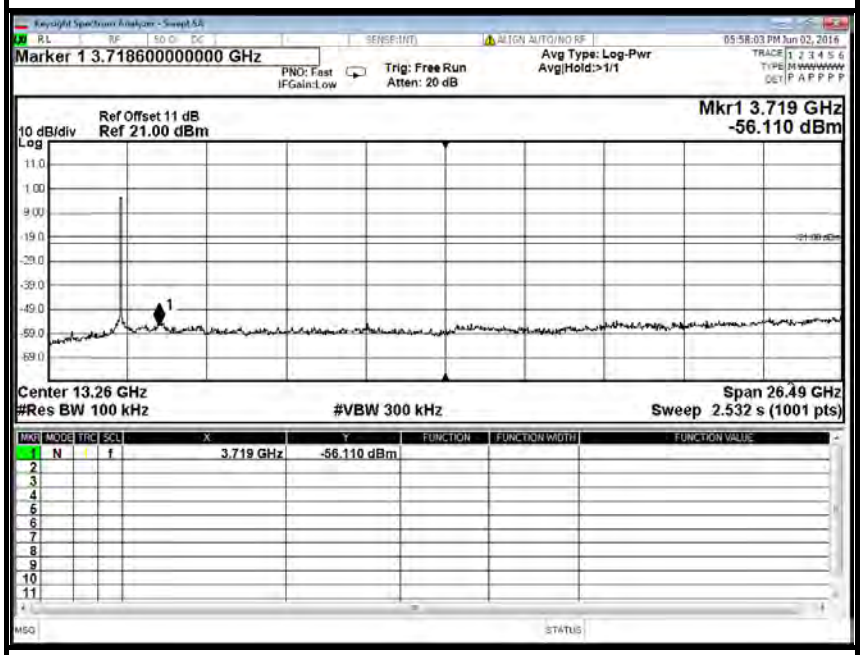
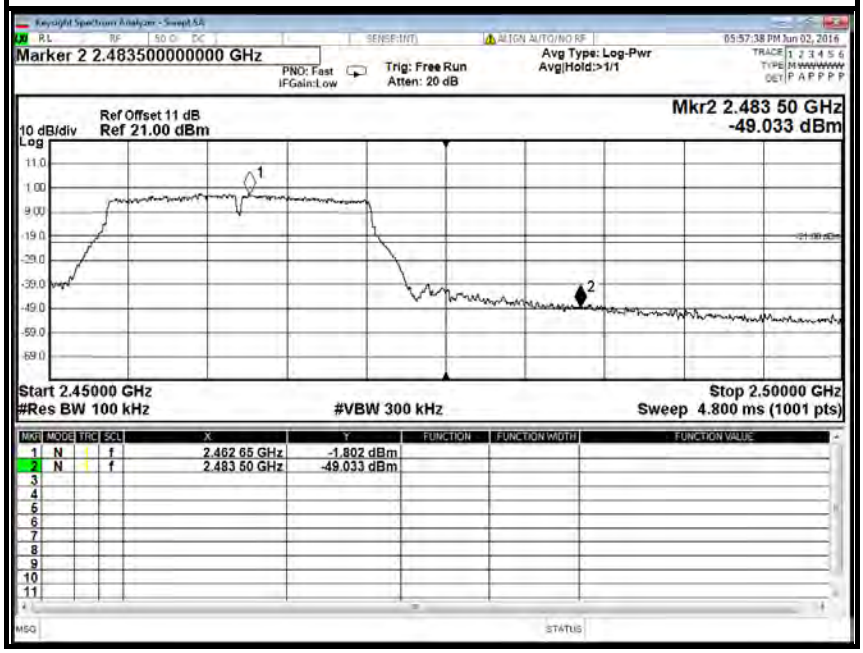
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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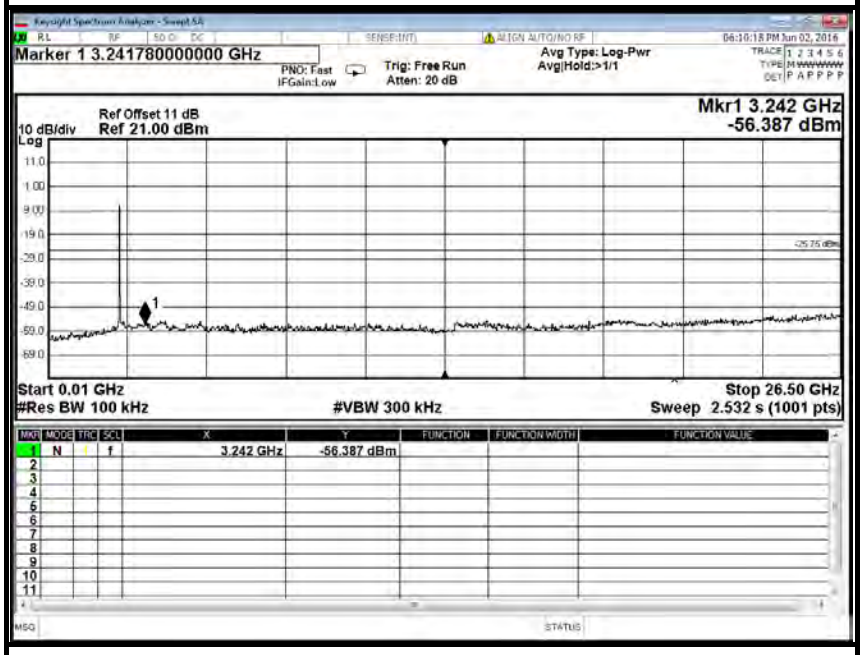
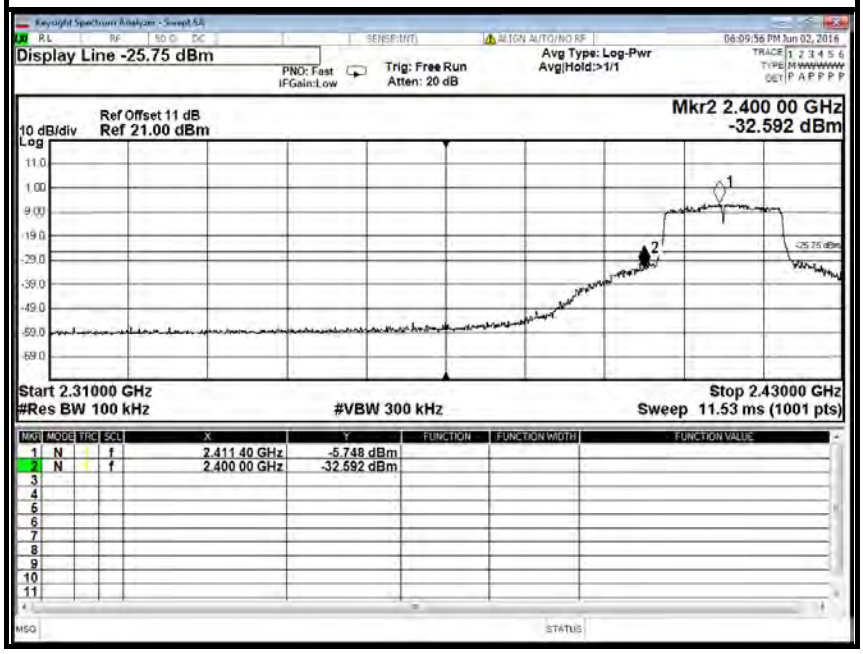
IEEE 802.11n HT20 MHz mode (Antenna 1)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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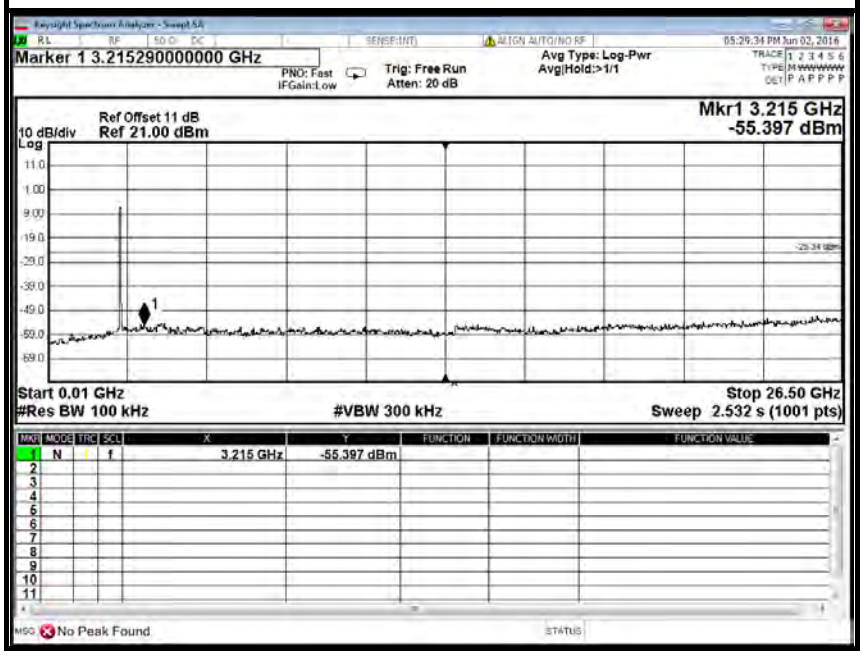
CH Mid (10MHz ~26.5GHz)



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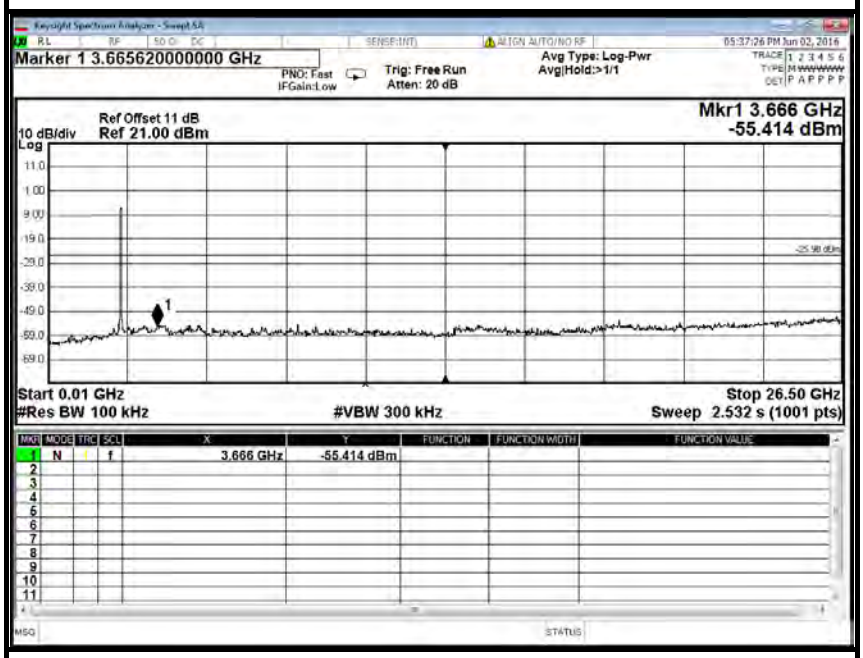
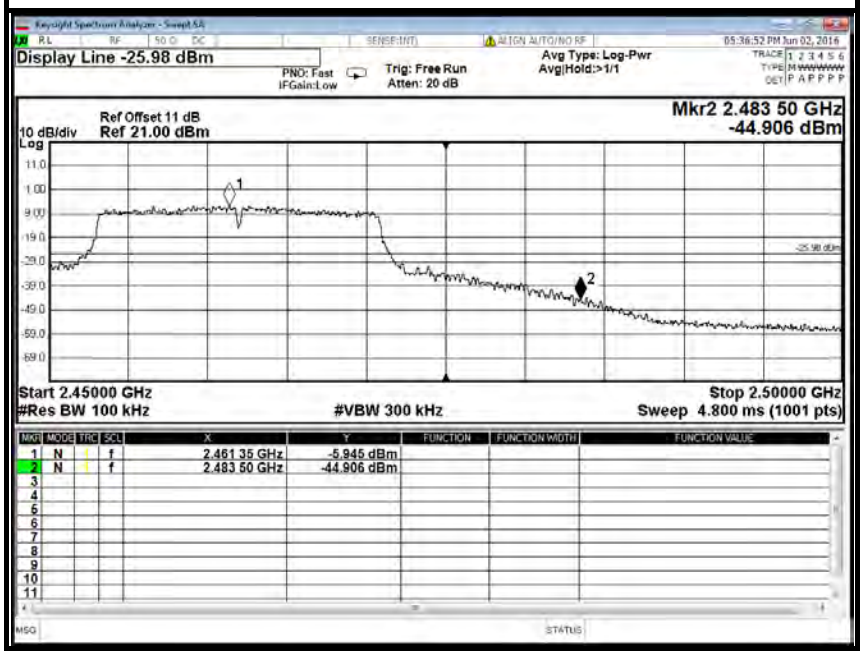
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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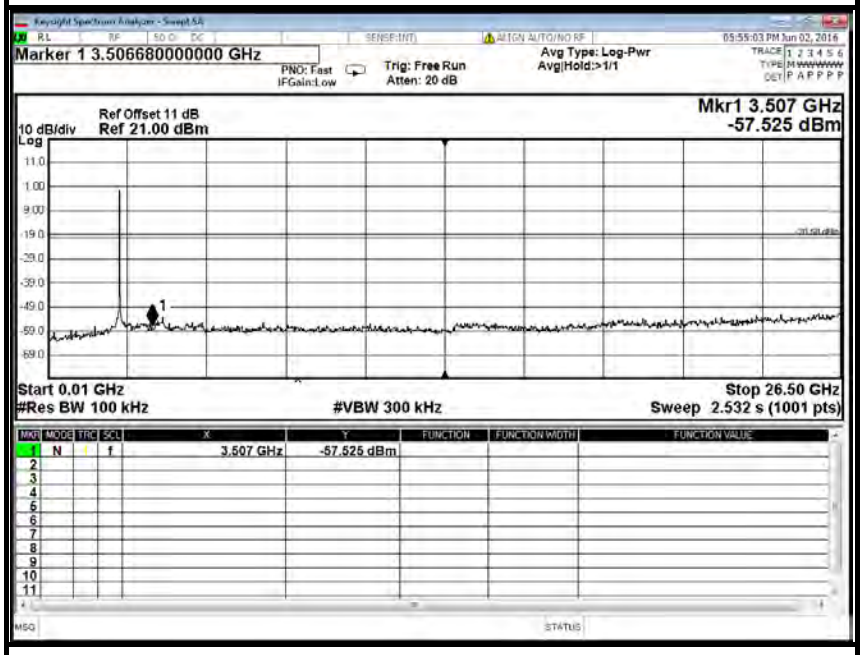
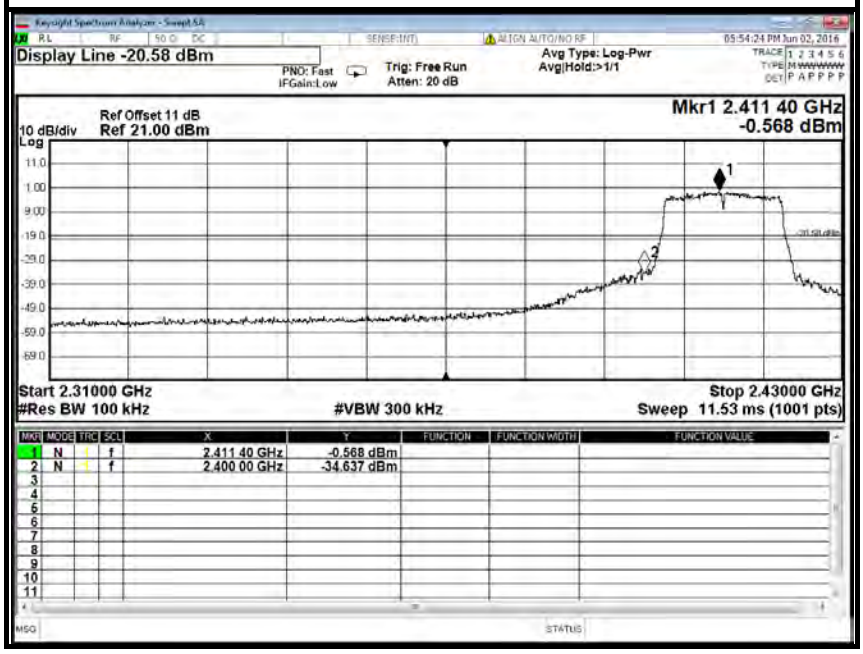
IEEE 802.11n HT20 MHz mode (Antenna 2)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.43GHz)



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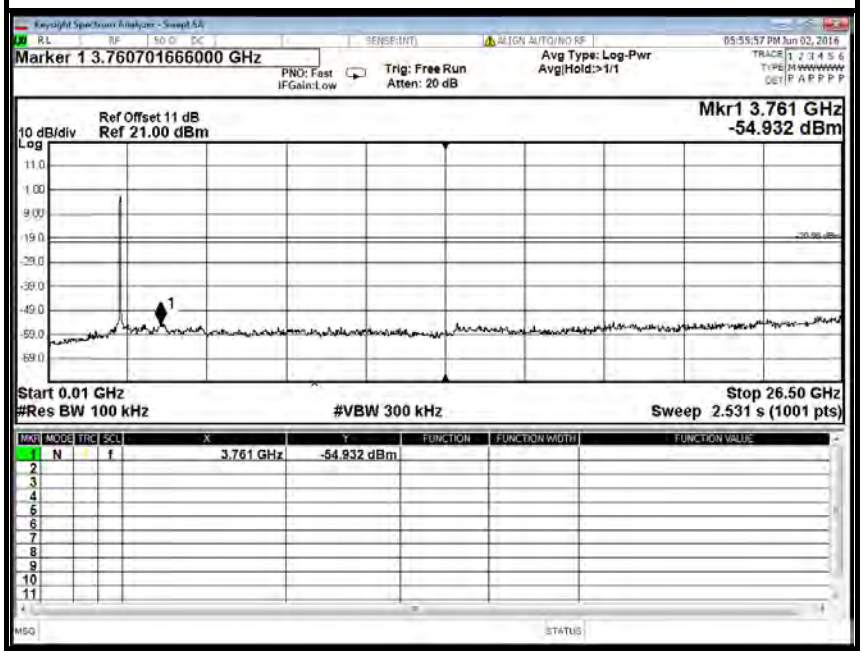
CH Mid (10MHz ~26.5GHz)



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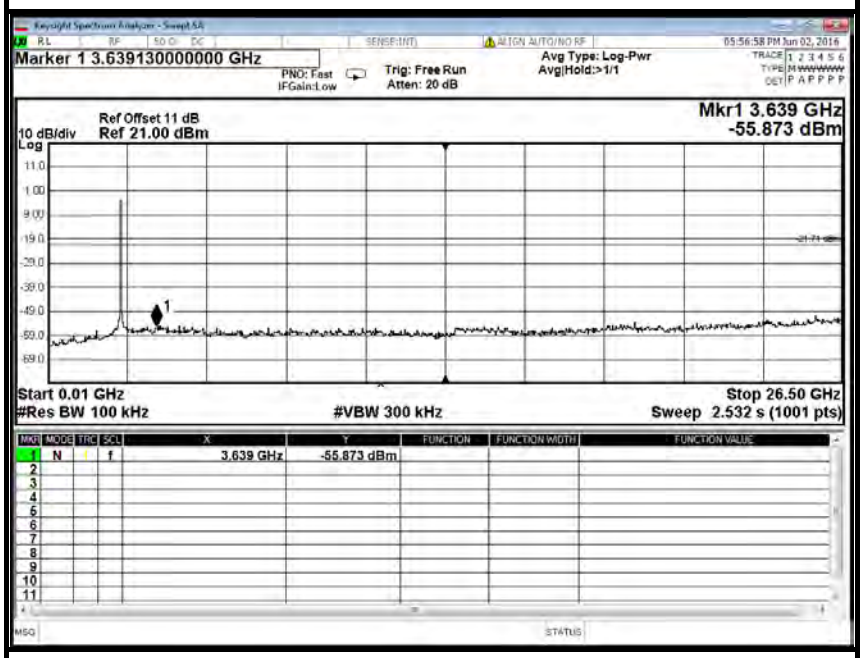
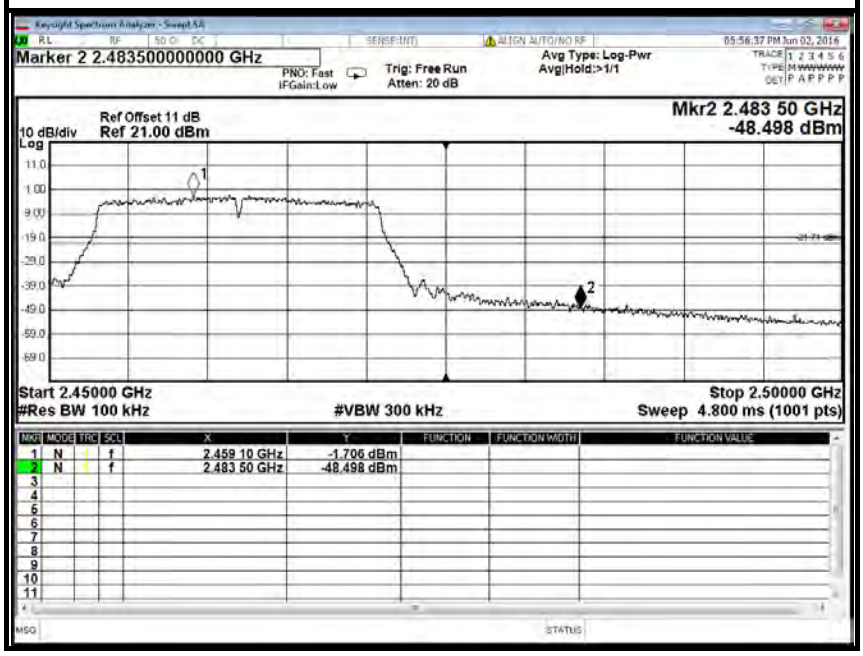
CH High (10MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



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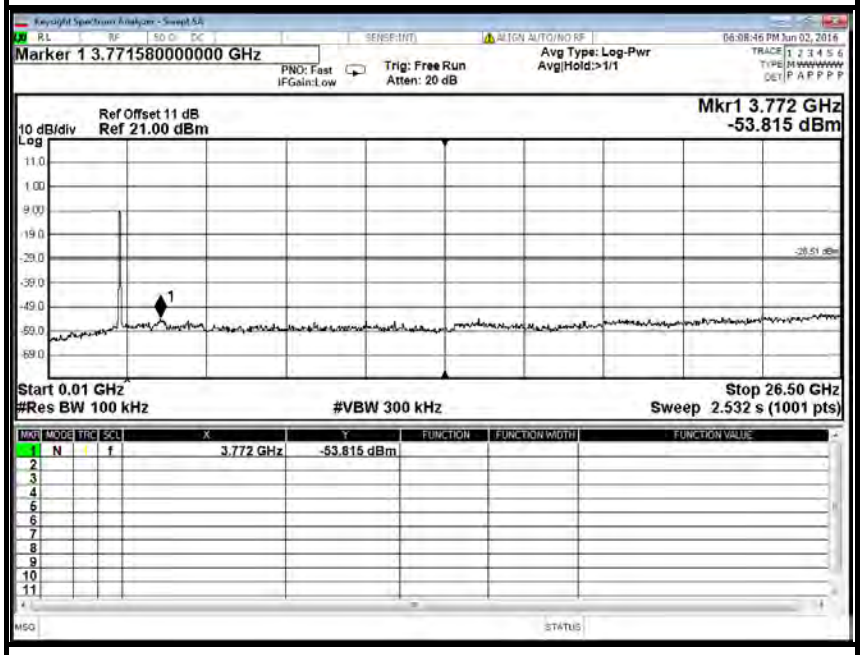
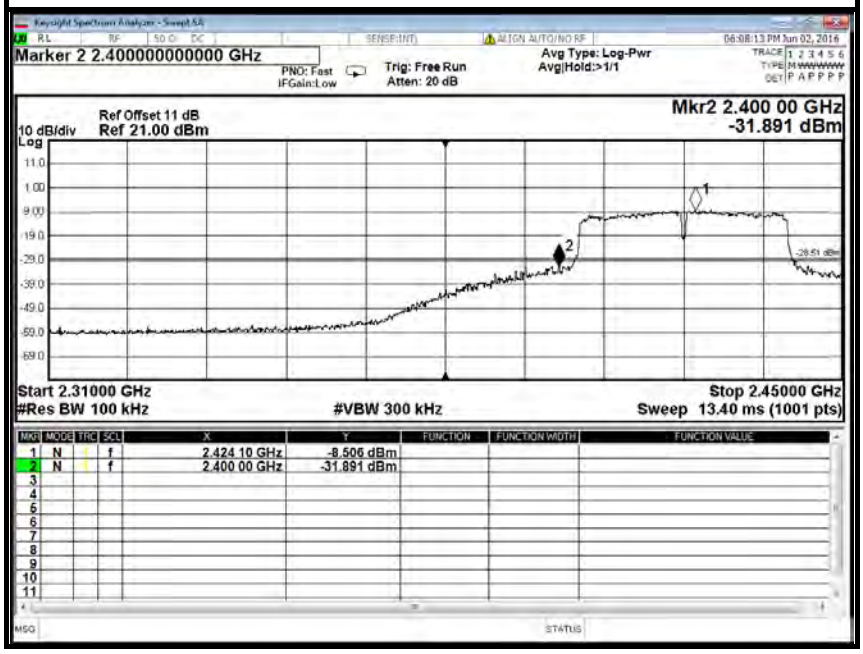
IEEE 802.11n HT40 MHz mode (Antenna 1)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.45GHz)



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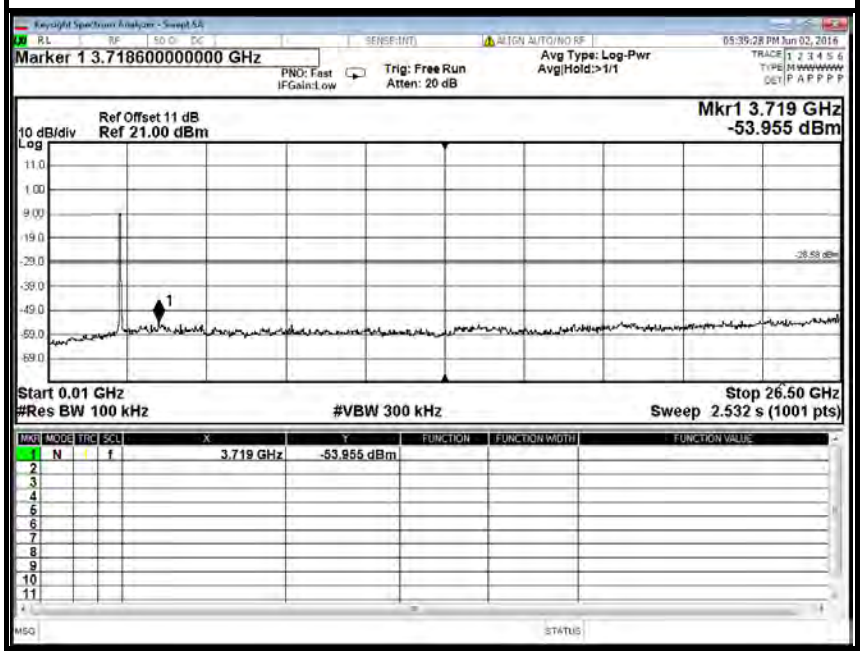
CH Mid (10MHz ~26.5GHz)



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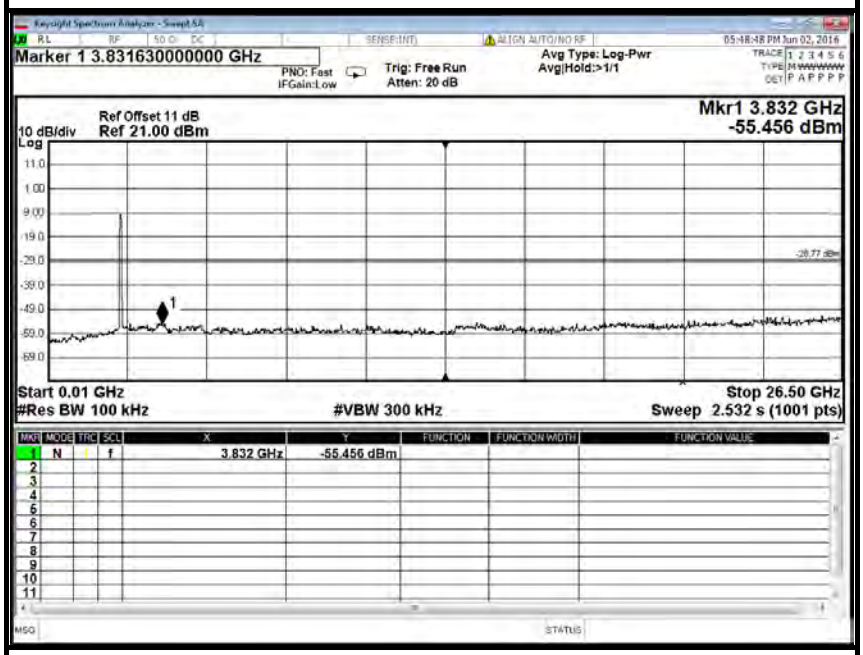
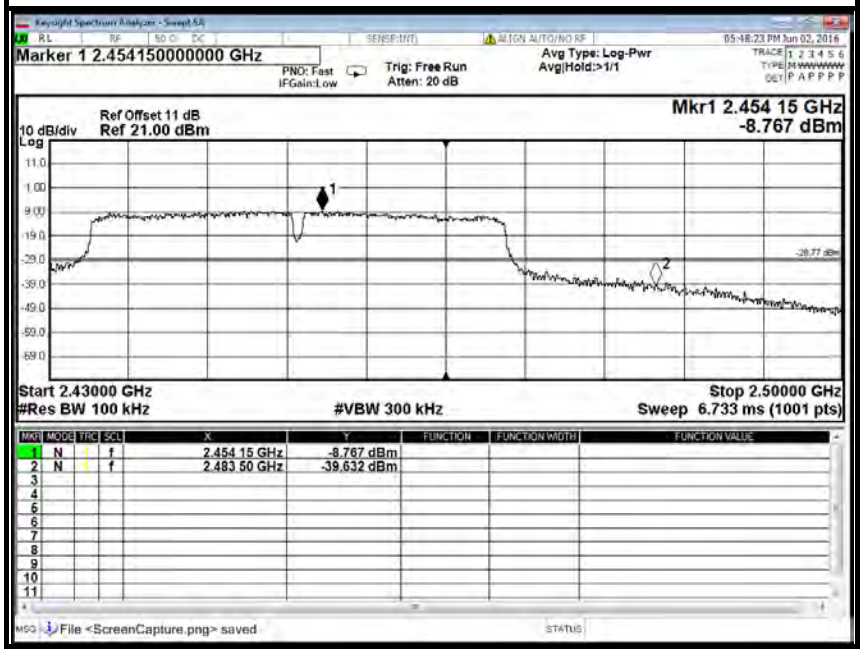
CH High (10MHz ~26.5GHz)



CH High (2.43GHz ~2.5GHz)



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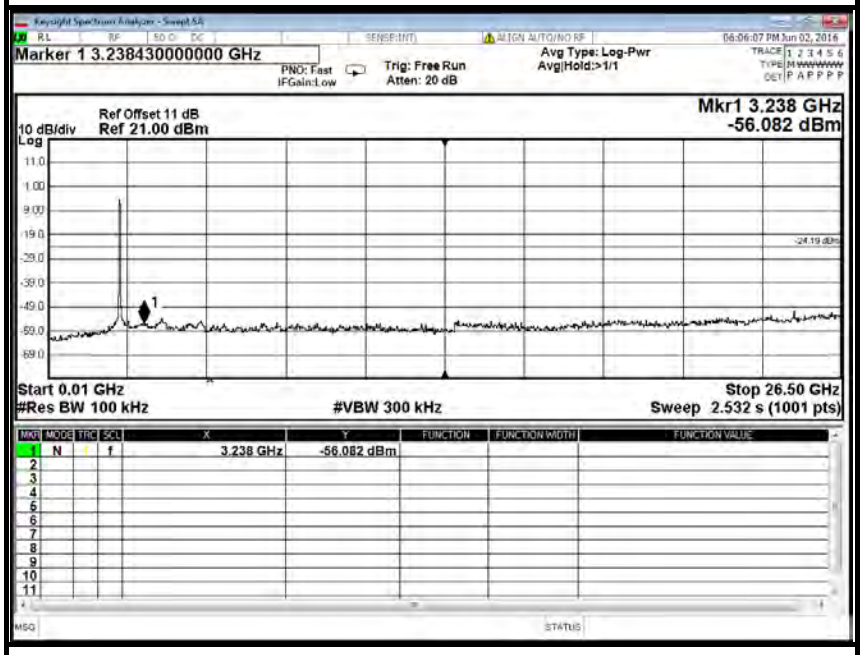
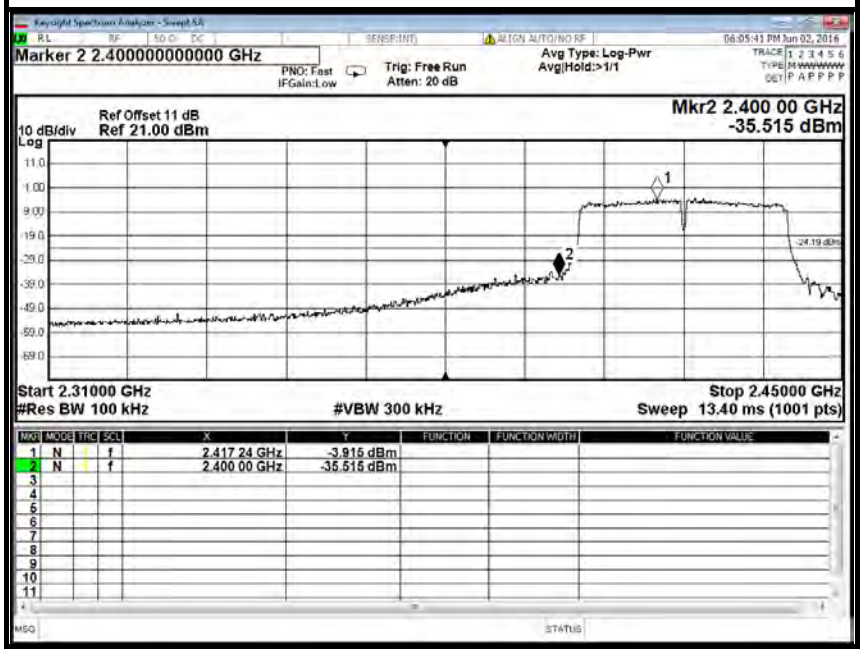
IEEE 802.11n HT40 MHz mode (Antenna 2)

CH Low (10MHz ~26.5GHz)



CH Low (2.31GHz ~2.45GHz)



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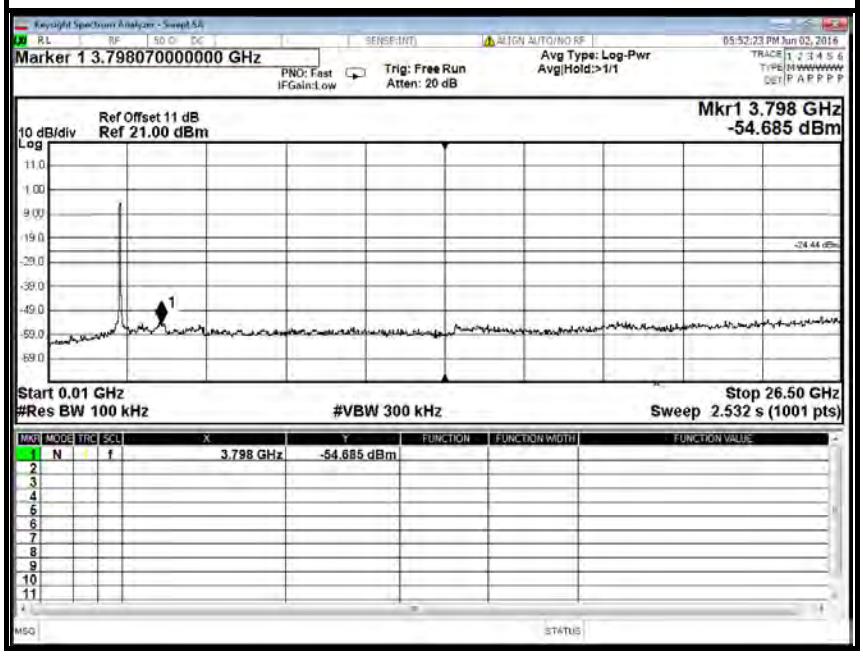
CH Mid (10MHz ~26.5GHz)



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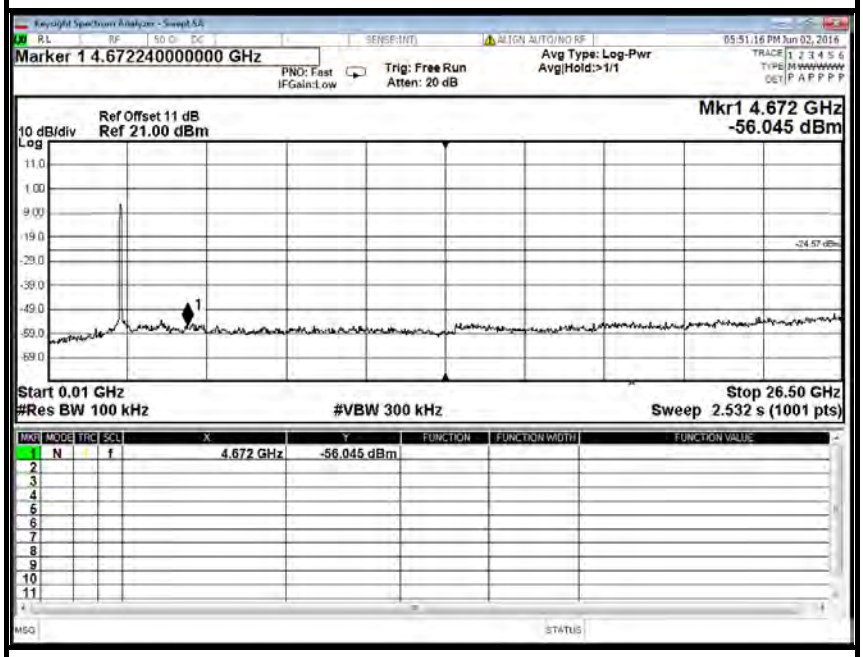
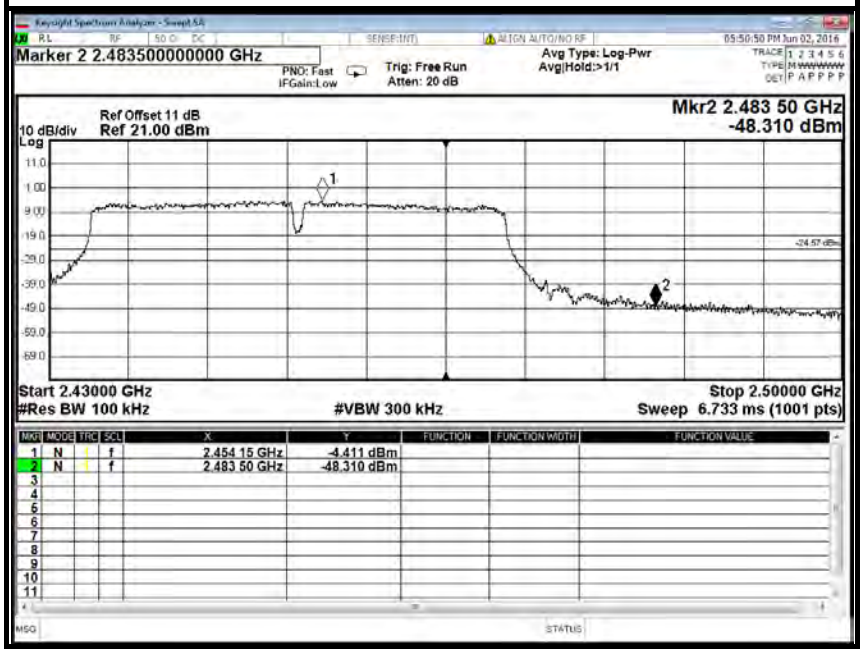
CH High (10MHz ~26.5GHz)



CH High (2.43GHz ~2.5GHz)



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7.2.2. RADIATED EMISSIONS MEASUREMENT

7.2.2.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT

According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

1. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

NOTE:(1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

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7.2.2.2. 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	E4446A	US44300399	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	09/25/2015	09/24/2016
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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7.2.2.3. TEST PROCEDURE (please refer to measurement standard)

1. The EUT is placed on a turntable, which is 0.8m or 1.5m above 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 emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=1MHz,VBW=3MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

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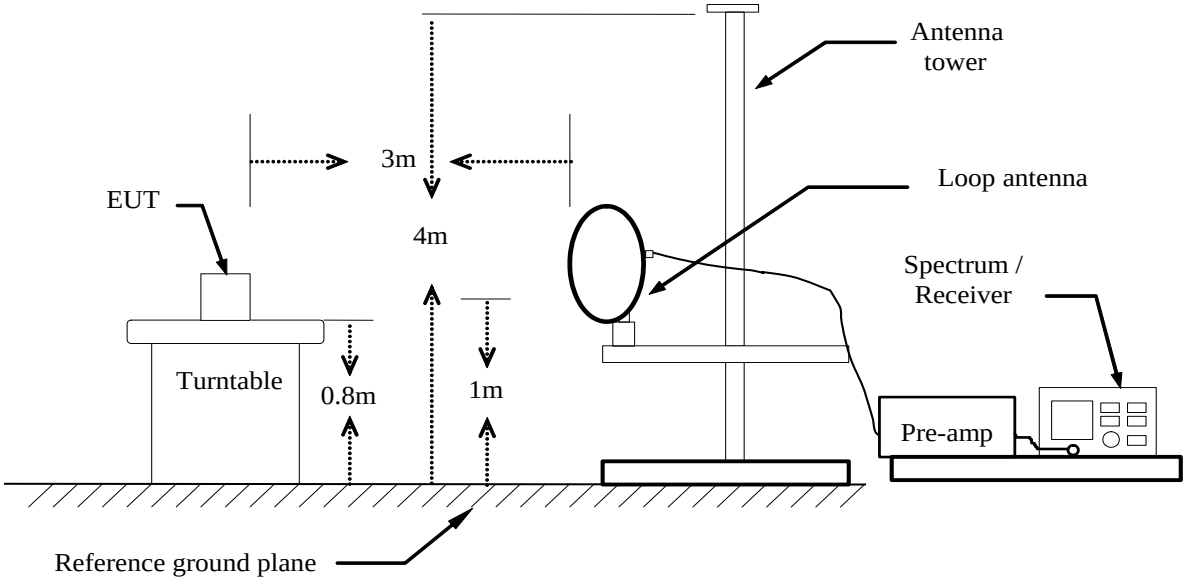
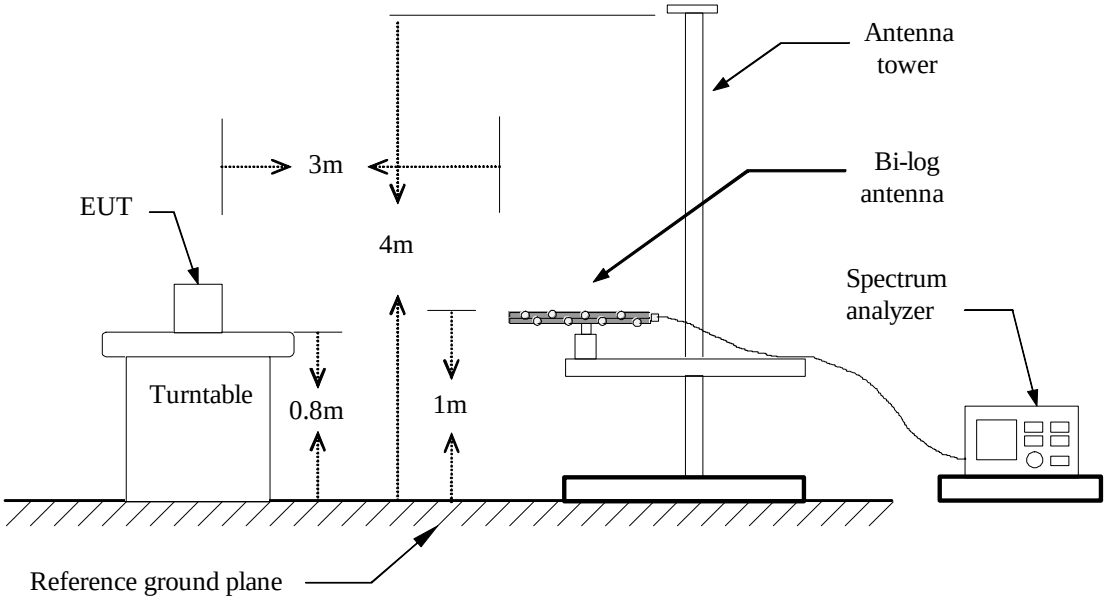
7.2.2.4. TEST SETUP

Below 30MHz



Below 1 GHz



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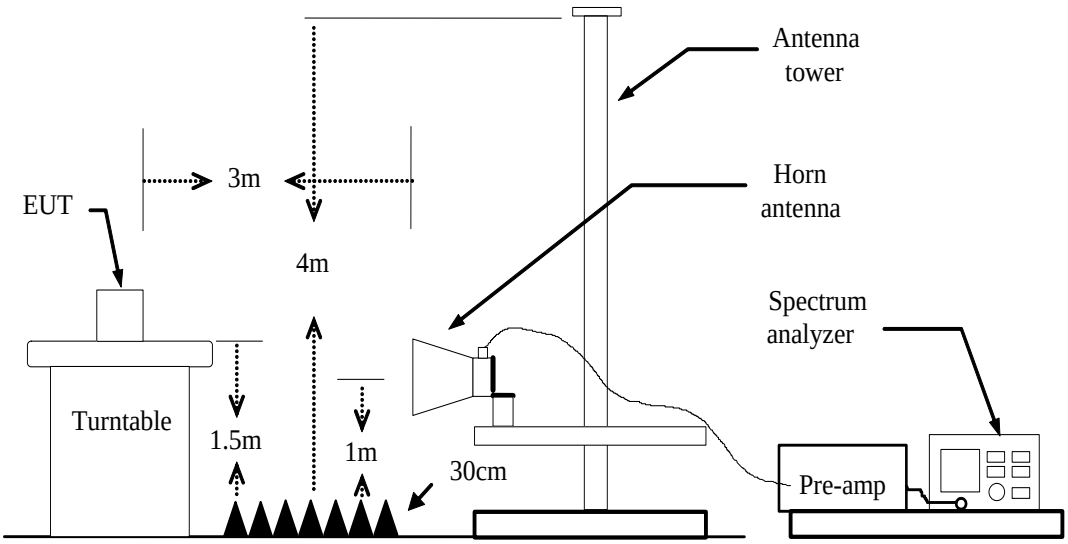
Above 1 GHz



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

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7.2.2.5. DATA SAPLE

Below 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXX.XXXX	36.37	-12.20	24.17	40.00	-15.83	V	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-peak Reading

Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXXX.XXXX	62.09	-11.42	50.67	74.00	-23.33	V	Peak
XXXX.XXXX	49.78	-11.42	38.36	54.00	-15.64	V	AVG

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Peak = Peak Reading
AVG = Average Reading

Calculation Formula

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
Result (dBuV/m) = Reading (dBuV) + Correction Factor

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7.2.2.6. TEST RESULTS

Below 1 GHz

Test Mode: TX **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 13, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
199.7500	57.38	-22.73	34.65	43.50	-8.85	V	QP
312.2700	55.10	-19.12	35.98	46.00	-10.02	V	QP
408.3000	54.60	-15.69	38.91	46.00	-7.09	V	QP
543.1300	50.91	-13.22	37.69	46.00	-8.31	V	QP
887.4800	45.16	-9.92	35.24	46.00	-10.76	V	QP
919.4900	45.42	-9.36	36.06	46.00	-9.94	V	QP
68.8000	59.95	-25.49	34.46	40.00	-5.54	H	QP
274.4400	53.88	-20.45	33.43	46.00	-12.57	H	QP
402.4800	53.27	-15.97	37.30	46.00	-8.70	H	QP
427.7000	52.58	-15.55	37.03	46.00	-8.97	H	QP
600.3600	55.22	-12.86	42.36	46.00	-3.64	H	QP
836.0700	50.61	-10.68	39.93	46.00	-6.07	H	QP

*****Remark:*** *No emission found between lowest internal used/generated frequency to 30MHz.*

Notes:

1. *Radiated emissions measured in frequency range from 9kHz to 1GHz were made with an instrument using Quasi-peak detector mode.*
2. *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.*
3. *The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.*
4. *Frequency (MHz). = Emission frequency in MHz*
   Reading (dBμV/m) = Receiver reading
   Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
   Limit (dBμV/m) = Limit stated in standard
   Margin (dB) = Measured (dBμV/m) – Limits (dBμV/m)
   Antenna Pol e(H/V) = Current carrying line of reading

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Above 1 GHz
Antenna 1
Test Mode: TX / IEEE 802.11b(CH Low) **Tested by:** Jack Chen
Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1750.000	55.61	-6.38	49.23	74.00	-24.77	V	peak
2410.000	56.59	-2.75	53.84	74.00	-20.16	V	peak
2410.000	47.70	-2.75	44.95	54.00	-9.05	V	AVG
4975.000	42.80	4.90	47.70	74.00	-26.30	V	peak
5380.000	41.12	5.66	46.78	74.00	-27.22	V	peak
7225.000	43.69	8.14	51.83	74.00	-22.17	V	peak
8620.000	40.79	9.31	50.10	74.00	-23.90	V	peak
2422.000	46.91	-2.69	44.22	74.00	-29.78	H	Peak
3781.000	41.98	0.67	42.65	74.00	-31.35	H	peak
4933.000	42.07	4.76	46.83	74.00	-27.17	H	peak
7237.000	42.96	8.16	51.12	74.00	-22.88	H	peak
8146.000	40.45	9.57	50.02	74.00	-23.98	H	peak
9631.000	41.51	10.92	52.43	74.00	-21.57	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 802.11b (CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4267.000	41.20	2.53	43.73	74.00	-30.27	V	Peak
5086.000	40.92	5.13	46.05	74.00	-27.95	V	Peak
6166.000	40.79	6.35	47.14	74.00	-26.86	V	Peak
6571.000	40.17	7.01	47.18	74.00	-26.82	V	Peak
7309.000	41.08	8.30	49.38	74.00	-24.62	V	Peak
7795.000	40.65	9.25	49.90	74.00	-24.10	V	Peak
2431.000	52.16	-2.64	49.52	74.00	-24.48	H	Peak
4258.000	41.90	2.50	44.40	74.00	-29.60	H	Peak
5509.000	40.62	5.87	46.49	74.00	-27.51	H	Peak
6562.000	39.82	6.99	46.81	74.00	-27.19	H	Peak
7300.000	44.13	8.29	52.42	74.00	-21.58	H	Peak
9289.000	41.43	9.93	51.36	74.00	-22.64	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 802.11b (CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4321.000	41.77	2.72	44.49	74.00	-29.51	V	Peak
4645.000	40.67	3.82	44.49	74.00	-29.51	V	Peak
4978.000	40.62	4.91	45.53	74.00	-28.47	V	Peak
6913.000	40.57	7.56	48.13	74.00	-25.87	V	Peak
8074.000	40.03	9.61	49.64	74.00	-24.36	V	Peak
9181.000	40.46	9.62	50.08	74.00	-23.92	V	Peak
1747.000	56.24	-6.38	49.86	74.00	-24.14	H	Peak
2467.000	52.62	-2.44	50.18	74.00	-23.82	H	Peak
4888.000	41.63	4.61	46.24	74.00	-27.76	H	Peak
5635.000	41.00	5.93	46.93	74.00	-27.07	H	Peak
7714.000	40.68	9.09	49.77	74.00	-24.23	H	Peak
8272.000	40.52	9.50	50.02	74.00	-23.98	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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Antenna 2

Test Mode: TX / IEEE 802.11b(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4276.000	42.33	2.56	44.89	74.00	-29.11	V	peak
4924.000	41.29	4.73	46.02	74.00	-27.98	V	peak
5455.000	41.05	5.79	46.84	74.00	-27.16	V	peak
6013.000	41.17	6.10	47.27	74.00	-26.73	V	peak
7246.000	46.38	8.18	54.56	74.00	-19.44	V	peak
7246.000	34.92	8.18	43.10	54.00	-10.90	V	AVG
8371.000	40.97	9.45	50.42	74.00	-23.58	V	peak
4033.000	41.94	1.71	43.65	74.00	-30.35	H	Peak
4402.000	41.15	3.01	44.16	74.00	-29.84	H	Peak
5293.000	41.01	5.50	46.51	74.00	-27.49	H	Peak
6229.000	40.47	6.45	46.92	74.00	-27.08	H	peak
7246.000	45.61	8.18	53.79	74.00	-20.21	H	peak
7246.000	34.93	8.18	43.11	54.00	-10.89	H	AVG
7750.000	41.18	9.16	50.34	74.00	-23.66	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 802.11b (CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4204.000	41.39	2.31	43.70	74.00	-30.30	V	Peak
4870.000	41.31	4.56	45.87	74.00	-28.13	V	Peak
5113.000	41.23	5.18	46.41	74.00	-27.59	V	Peak
6724.000	40.54	7.25	47.79	74.00	-26.21	V	Peak
7300.000	45.20	8.29	53.49	74.00	-20.51	V	Peak
7300.000	37.91	8.29	46.20	54.00	-7.80	V	AVG
8479.000	41.53	9.39	50.92	74.00	-23.08	V	Peak
3844.000	42.65	0.93	43.58	74.00	-30.42	H	Peak
4474.000	41.54	3.26	44.80	74.00	-29.20	H	Peak
5392.000	40.61	5.68	46.29	74.00	-27.71	H	Peak
5887.000	40.46	6.03	46.49	74.00	-27.51	H	Peak
6922.000	41.23	7.57	48.80	74.00	-25.20	H	Peak
7309.000	46.79	8.30	55.09	74.00	-18.91	H	Peak
7309.000	37.91	8.30	46.21	54.00	-7.79	H	AVG

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 802.11b (CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3988.000	42.56	1.54	44.10	74.00	-29.90	V	Peak
4987.000	41.11	4.94	46.05	74.00	-27.95	V	Peak
5311.000	41.01	5.53	46.54	74.00	-27.46	V	Peak
6922.000	40.86	7.57	48.43	74.00	-25.57	V	Peak
7660.000	40.33	8.99	49.32	74.00	-24.68	V	Peak
8335.000	40.84	9.47	50.31	74.00	-23.69	V	Peak
4069.000	43.40	1.83	45.23	74.00	-28.77	H	Peak
5608.000	40.33	5.92	46.25	74.00	-27.75	H	Peak
6760.000	40.85	7.31	48.16	74.00	-25.84	H	Peak
7129.000	40.28	7.95	48.23	74.00	-25.77	H	Peak
7759.000	40.33	9.18	49.51	74.00	-24.49	H	Peak
8551.000	41.28	9.35	50.63	74.00	-23.37	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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Antenna 1

Test Mode: TX / IEEE 802.11g(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2242.000	66.44	-3.67	62.77	74.00	-11.23	V	Peak
2242.000	54.96	-3.67	51.29	54.00	-2.71	V	AVG
4105.000	42.17	1.96	44.13	74.00	-29.87	V	Peak
5293.000	40.36	5.50	45.86	74.00	-28.14	V	Peak
6472.000	39.97	6.84	46.81	74.00	-27.19	V	Peak
7246.000	44.66	8.18	52.84	74.00	-21.16	V	Peak
7246.000	31.77	8.18	39.95	54.00	-14.05	V	AVG
8407.000	41.84	9.43	51.27	74.00	-22.73	V	Peak
1720.000	57.33	-6.44	50.89	74.00	-23.11	H	Peak
2206.000	63.44	-3.87	59.57	74.00	-14.43	H	Peak
2206.000	54.66	-3.87	50.79	54.00	-3.21	H	AVG
4861.000	42.70	4.53	47.23	74.00	-26.77	H	Peak
6328.000	40.48	6.61	47.09	74.00	-26.91	H	Peak
7246.000	43.02	8.18	51.20	74.00	-22.80	H	Peak
8182.000	40.30	9.55	49.85	74.00	-24.15	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 802.11g (CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4717.000	42.15	4.06	46.21	74.00	-27.79	V	Peak
5608.000	41.28	5.92	47.20	74.00	-26.80	V	Peak
7075.000	40.82	7.85	48.67	74.00	-25.33	V	Peak
7570.000	41.61	8.81	50.42	74.00	-23.58	V	Peak
7759.000	41.13	9.18	50.31	74.00	-23.69	V	Peak
9154.000	41.01	9.54	50.55	74.00	-23.45	V	Peak
4708.000	40.58	4.03	44.61	74.00	-29.39	H	Peak
5500.000	40.52	5.87	46.39	74.00	-27.61	H	Peak
6472.000	40.18	6.84	47.02	74.00	-26.98	H	Peak
6742.000	41.15	7.28	48.43	74.00	-25.57	H	Peak
7417.000	40.42	8.51	48.93	74.00	-25.07	H	Peak
8146.000	41.03	9.57	50.60	74.00	-23.40	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 802.11g (CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2458.000	58.69	-2.49	56.20	74.00	-17.80	V	Peak
2458.000	49.66	-2.49	47.17	54.00	-6.83	V	AVG
3871.000	42.09	1.05	43.14	74.00	-30.86	V	Peak
4924.000	42.39	4.73	47.12	74.00	-26.88	V	Peak
5446.000	40.84	5.77	46.61	74.00	-27.39	V	Peak
6274.000	39.91	6.52	46.43	74.00	-27.57	V	Peak
7759.000	41.24	9.18	50.42	74.00	-23.58	V	Peak
1756.000	51.65	-6.36	45.29	74.00	-28.71	H	Peak
5401.000	40.67	5.69	46.36	74.00	-27.64	H	Peak
6427.000	39.83	6.77	46.60	74.00	-27.40	H	Peak
7048.000	40.16	7.79	47.95	74.00	-26.05	H	Peak
7543.000	40.98	8.76	49.74	74.00	-24.26	H	Peak
8398.000	40.23	9.43	49.66	74.00	-24.34	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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Antenna 2

Test Mode: TX / IEEE 802.11g(CH Low) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4438.000	41.36	3.13	44.49	74.00	-29.51	V	Peak
4816.000	42.58	4.38	46.96	74.00	-27.04	V	Peak
5455.000	41.73	5.79	47.52	74.00	-26.48	V	Peak
6949.000	40.84	7.62	48.46	74.00	-25.54	V	Peak
7246.000	45.97	8.18	54.15	74.00	-19.85	V	Peak
7246.000	38.04	8.18	46.22	54.00	-7.78	V	AVG
7651.000	41.49	8.97	50.46	74.00	-23.54	V	Peak
3412.000	43.70	-0.67	43.03	74.00	-30.97	H	Peak
4915.000	41.71	4.70	46.41	74.00	-27.59	H	Peak
5482.000	40.87	5.84	46.71	74.00	-27.29	H	Peak
5995.000	40.36	6.08	46.44	74.00	-27.56	H	Peak
6958.000	41.18	7.63	48.81	74.00	-25.19	H	Peak
7255.000	45.71	8.20	53.91	74.00	-20.09	H	Peak
7255.000	39.02	8.20	47.22	74.00	-26.78	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 802.11g (CH Mid) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3943.000	42.25	1.35	43.60	74.00	-30.40	V	Peak
4807.000	40.78	4.35	45.13	74.00	-28.87	V	Peak
5356.000	40.79	5.61	46.40	74.00	-27.60	V	Peak
5851.000	40.33	6.02	46.35	74.00	-27.65	V	Peak
7309.000	42.43	8.30	50.73	74.00	-23.27	V	Peak
7732.000	41.01	9.13	50.14	74.00	-23.86	V	Peak
4699.000	41.27	4.00	45.27	74.00	-28.73	H	Peak
5023.000	41.11	5.02	46.13	74.00	-27.87	H	Peak
6121.000	41.39	6.28	47.67	74.00	-26.33	H	Peak
7300.000	45.16	8.29	53.45	74.00	-20.55	H	Peak
7300.000	37.91	8.29	46.20	54.00	-7.80	H	AVG
7912.000	40.89	9.48	50.37	74.00	-23.63	H	Peak
9154.000	41.99	9.54	51.53	74.00	-22.47	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 802.11g (CH High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4663.000	40.43	3.88	44.31	74.00	-29.69	V	Peak
5617.000	41.32	5.92	47.24	74.00	-26.76	V	Peak
6481.000	40.63	6.86	47.49	74.00	-26.51	V	Peak
7111.000	40.52	7.92	48.44	74.00	-25.56	V	Peak
7921.000	40.84	9.50	50.34	74.00	-23.66	V	Peak
8389.000	40.99	9.44	50.43	74.00	-23.57	V	Peak
4411.000	42.01	3.04	45.05	74.00	-28.95	H	Peak
4726.000	40.97	4.09	45.06	74.00	-28.94	H	Peak
5680.000	41.12	5.95	47.07	74.00	-26.93	H	Peak
7597.000	40.41	8.86	49.27	74.00	-24.73	H	Peak
7768.000	40.95	9.20	50.15	74.00	-23.85	H	Peak
9010.000	41.55	9.13	50.68	74.00	-23.32	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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Combine with Antenna 1 and Antenna 2

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

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2206.000	66.15	-3.87	62.28	74.00	-11.72	V	Peak
2206.000	55.14	-3.87	51.27	54.00	-2.73	V	Peak
5077.000	41.55	5.12	46.67	74.00	-27.33	V	Peak
6490.000	41.24	6.87	48.11	74.00	-25.89	V	Peak
7237.000	45.80	8.16	53.96	74.00	-20.04	V	Peak
7237.000	34.17	8.16	42.33	54.00	-11.67	V	AVG
7714.000	41.36	9.09	50.45	74.00	-23.55	V	Peak
8614.000	41.19	9.31	50.50	74.00	-23.50	V	Peak
4762.000	41.05	4.20	45.25	74.00	-28.75	H	Peak
5311.000	41.23	5.53	46.76	74.00	-27.24	H	Peak
5689.000	40.75	5.95	46.70	74.00	-27.30	H	Peak
6301.000	40.78	6.57	47.35	74.00	-26.65	H	Peak
7246.000	46.15	8.18	54.33	74.00	-19.67	H	Peak
7246.000	36.05	8.18	44.23	54.00	-9.77	H	AVG
8416.000	40.94	9.42	50.36	74.00	-23.64	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:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
5104.000	41.67	5.17	46.84	74.00	-27.16	V	Peak
6013.000	40.58	6.10	46.68	74.00	-27.32	V	Peak
6886.000	41.28	7.52	48.80	74.00	-25.20	V	Peak
7309.000	41.55	8.30	49.85	74.00	-24.15	V	Peak
7912.000	40.75	9.48	50.23	74.00	-23.77	V	Peak
8335.000	40.76	9.47	50.23	74.00	-23.77	V	Peak
4141.000	42.53	2.09	44.62	74.00	-29.38	H	Peak
4933.000	41.89	4.76	46.65	74.00	-27.35	H	Peak
5392.000	41.23	5.68	46.91	74.00	-27.09	H	Peak
5878.000	40.89	6.03	46.92	74.00	-27.08	H	Peak
6751.000	40.98	7.30	48.28	74.00	-25.72	H	Peak
7309.000	44.03	8.30	52.33	74.00	-21.67	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:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4042.000	43.09	1.74	44.83	74.00	-29.17	V	Peak
4879.000	41.20	4.59	45.79	74.00	-28.21	V	Peak
4996.000	41.57	4.97	46.54	74.00	-27.46	V	Peak
6067.000	40.39	6.19	46.58	74.00	-27.42	V	Peak
6922.000	41.14	7.57	48.71	74.00	-25.29	V	Peak
7579.000	41.08	8.83	49.91	74.00	-24.09	V	Peak
4321.000	42.13	2.72	44.85	74.00	-29.15	H	Peak
5464.000	40.89	5.81	46.70	74.00	-27.30	H	Peak
6472.000	40.01	6.84	46.85	74.00	-27.15	H	Peak
7210.000	40.89	8.11	49.00	74.00	-25.00	H	Peak
7687.000	40.76	9.04	49.80	74.00	-24.20	H	Peak
8443.000	41.46	9.41	50.87	74.00	-23.13	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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Combine with Antenna 1 and Antenna 2

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

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2818.000	45.22	-1.69	43.53	74.00	-30.47	V	Peak
3232.000	44.40	-0.97	43.43	74.00	-30.57	V	Peak
4483.000	41.12	3.29	44.41	74.00	-29.59	V	Peak
5617.000	40.68	5.92	46.60	74.00	-27.40	V	Peak
6274.000	40.18	6.52	46.70	74.00	-27.30	V	Peak
7264.000	47.59	8.21	55.80	74.00	-18.20	V	Peak
7264.000	38.01	8.21	46.22	54.00	-7.78	V	Peak
4888.000	41.50	4.61	46.11	74.00	-27.89	H	Peak
5527.000	40.30	5.88	46.18	74.00	-27.82	H	Peak
5752.000	41.31	5.98	47.29	74.00	-26.71	H	Peak
6319.000	40.24	6.60	46.84	74.00	-27.16	H	Peak
7273.000	49.77	8.23	58.00	74.00	-16.00	H	Peak
7273.000	39.42	8.23	47.65	54.00	-6.35	H	AVG
7750.000	40.77	9.16	49.93	74.00	-24.07	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:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4528.000	41.26	3.44	44.70	74.00	-29.30	V	Peak
4987.000	40.89	4.94	45.83	74.00	-28.17	V	Peak
6814.000	40.13	7.40	47.53	74.00	-26.47	V	Peak
7786.000	41.62	9.23	50.85	74.00	-23.15	V	Peak
8461.000	40.59	9.40	49.99	74.00	-24.01	V	Peak
9082.000	40.68	9.34	50.02	74.00	-23.98	V	Peak
4879.000	42.04	4.59	46.63	74.00	-27.37	H	Peak
5392.000	41.03	5.68	46.71	74.00	-27.29	H	Peak
6949.000	41.29	7.62	48.91	74.00	-25.09	H	Peak
7912.000	40.43	9.48	49.91	74.00	-24.09	H	Peak
8371.000	41.77	9.45	51.22	74.00	-22.78	H	Peak
8902.000	41.88	9.15	51.03	74.00	-22.97	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 High) **Tested by:** Jack Chen

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** May 14, 2016

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4132.000	41.63	2.05	43.68	74.00	-30.32	V	Peak
4870.000	41.03	4.56	45.59	74.00	-28.41	V	Peak
5626.000	41.25	5.92	47.17	74.00	-26.83	V	Peak
7201.000	40.43	8.09	48.52	74.00	-25.48	V	Peak
7741.000	40.64	9.14	49.78	74.00	-24.22	V	Peak
8371.000	41.07	9.45	50.52	74.00	-23.48	V	Peak
4897.000	42.30	4.64	46.94	74.00	-27.06	H	Peak
5482.000	41.02	5.84	46.86	74.00	-27.14	H	Peak
6778.000	40.83	7.34	48.17	74.00	-25.83	H	Peak
6958.000	40.80	7.63	48.43	74.00	-25.57	H	Peak
7750.000	41.07	9.16	50.23	74.00	-23.77	H	Peak
8362.000	42.08	9.45	51.53	74.00	-22.47	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

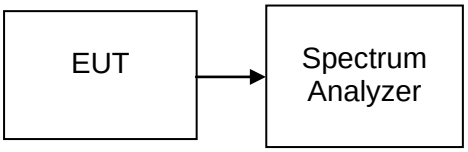
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY55370330	02/21/2016	02/20/2017

7.3.3. TEST PROCEDURES (please refer to measurement standard)

8.1 Option 1:

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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 (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	15300	>500	PASS
Mid	2437	15330		PASS
High	2462	15260		PASS

Test mode: IEEE 802.11b (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	14570	>500	PASS
Mid	2437	14600		PASS
High	2462	14630		PASS

Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	24880	>500	PASS
Mid	2437	27580		PASS
High	2462	27530		PASS

Test mode: IEEE 802.11g (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	19880	>500	PASS
Mid	2437	19760		PASS
High	2462	19440		PASS

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Test mode: IEEE 802.11n HT20 MHz (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	26980	>500	PASS
Mid	2437	26920		PASS
High	2462	26910		PASS

Test mode: IEEE 802.11n HT20 MHz (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	20060	>500	PASS
Mid	2437	20040		PASS
High	2462	20070		PASS

Test mode: IEEE 802.11n HT40 MHz (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	55960	>500	PASS
Mid	2437	56080		PASS
High	2452	53240		PASS

Test mode: IEEE 802.11n HT40 MHz (Antenna 2)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	39110	>500	PASS
Mid	2437	39240		PASS
High	2452	39140		PASS

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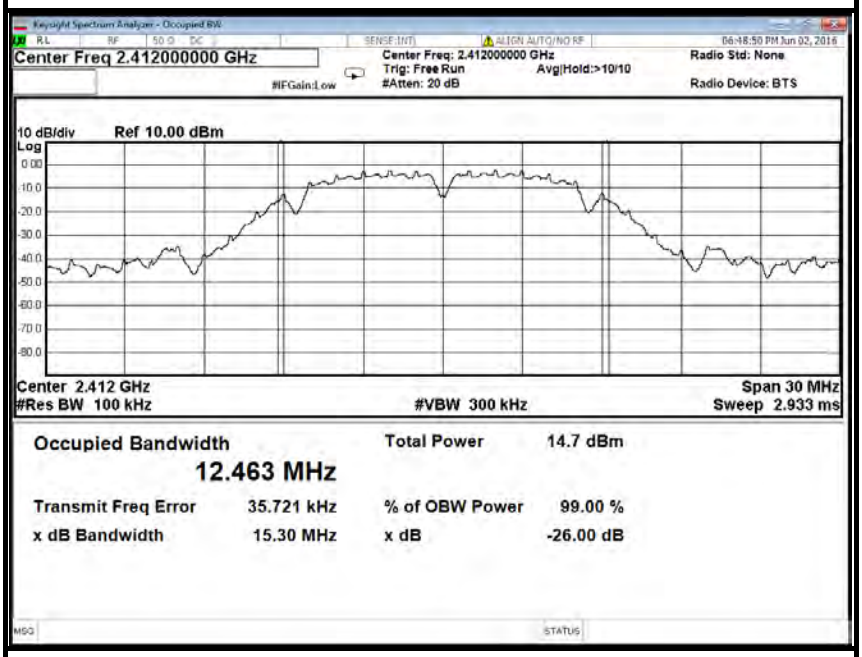
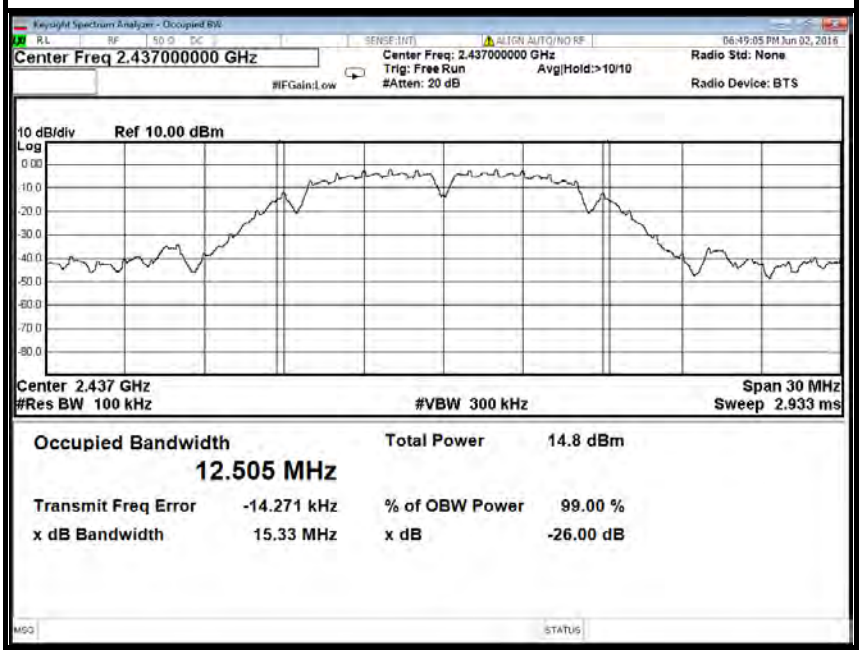
Test Plot

IEEE 802.11b mode (Antenna 1)

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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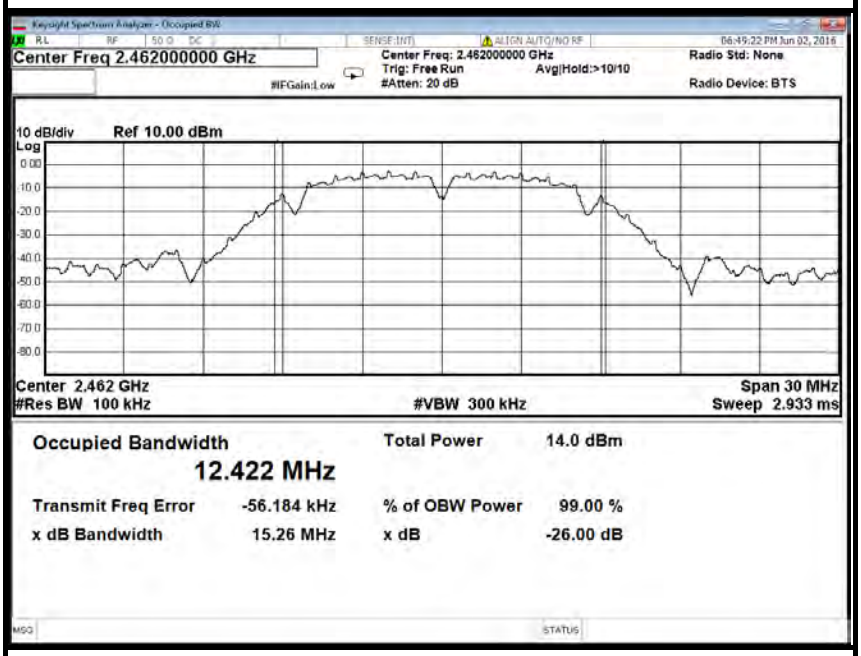
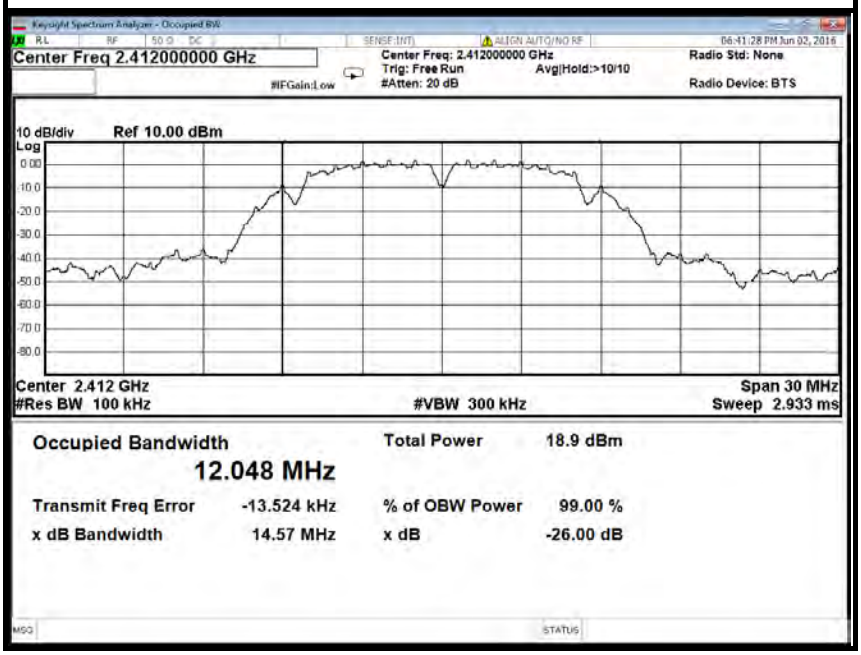
6dB Bandwidth (CH High)



IEEE 802.11b mode (Antenna 2)

6dB Bandwidth (CH Low)



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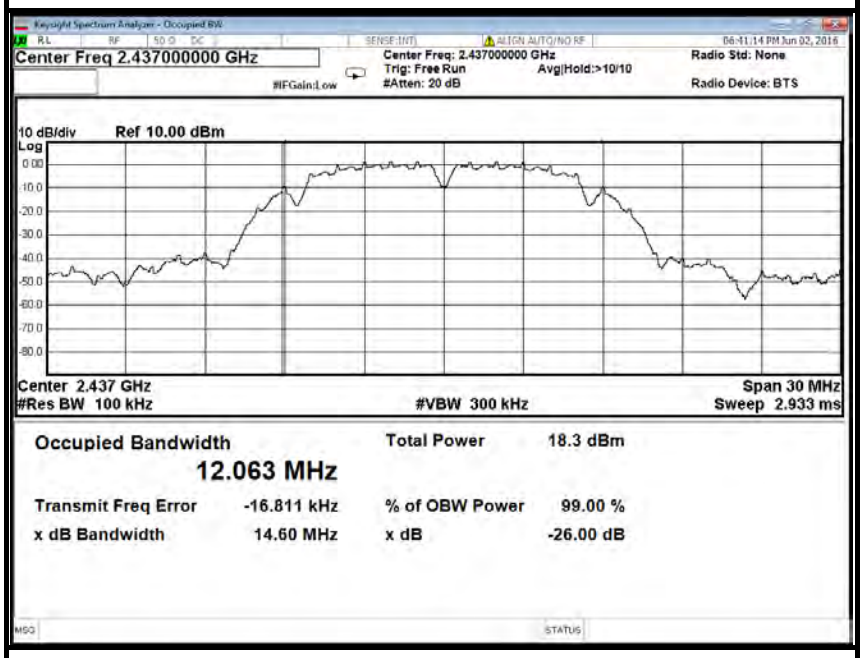
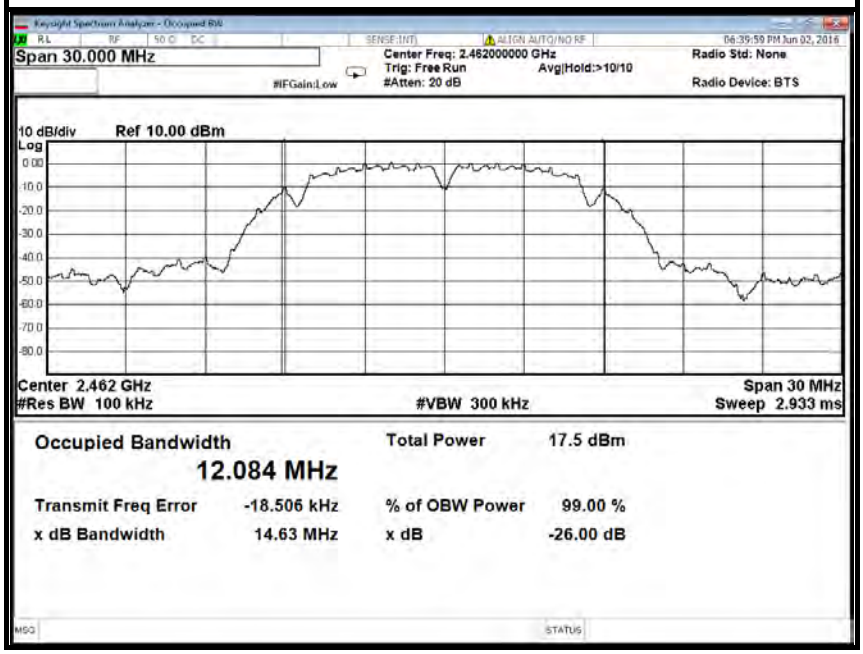
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



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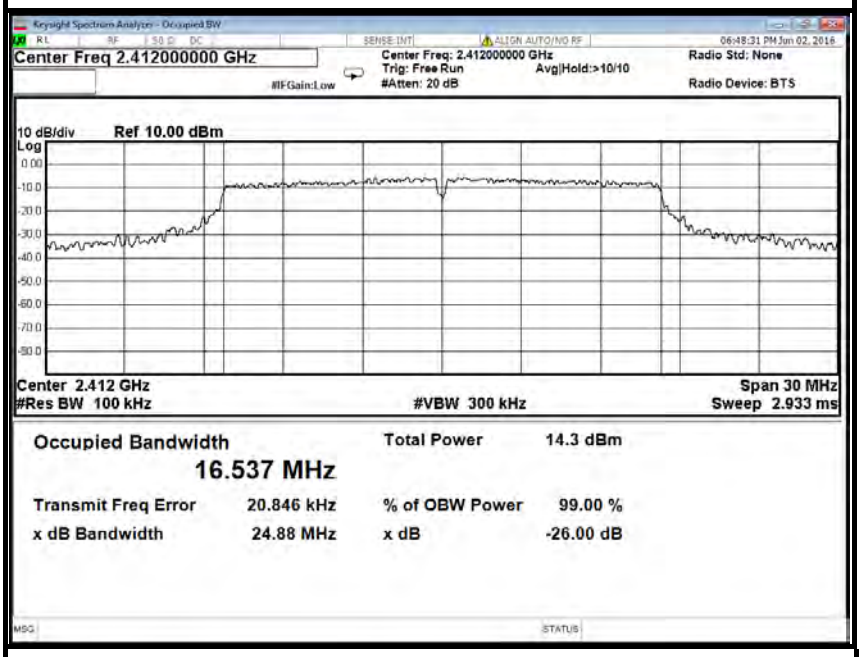
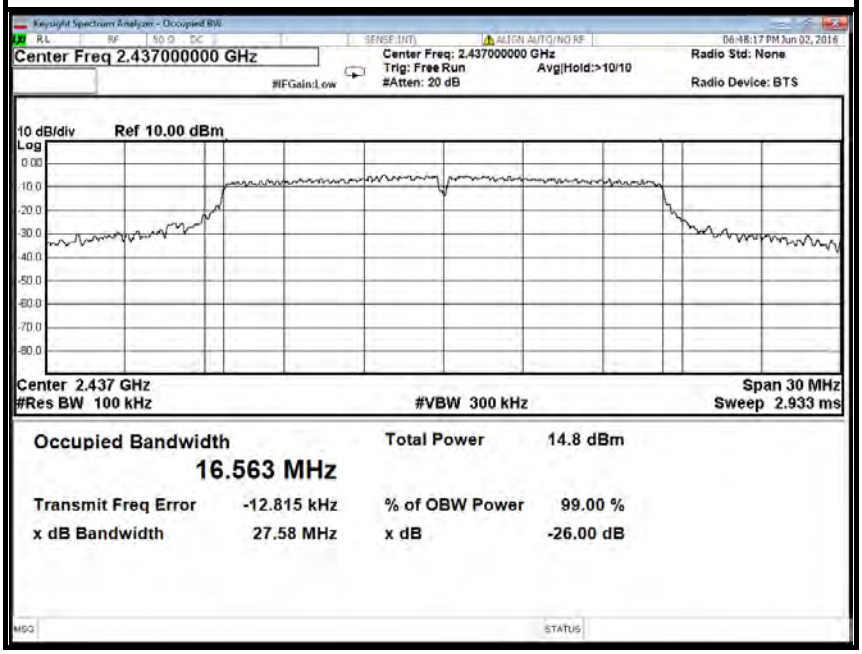
IEEE 802.11g mode (Antenna 1)

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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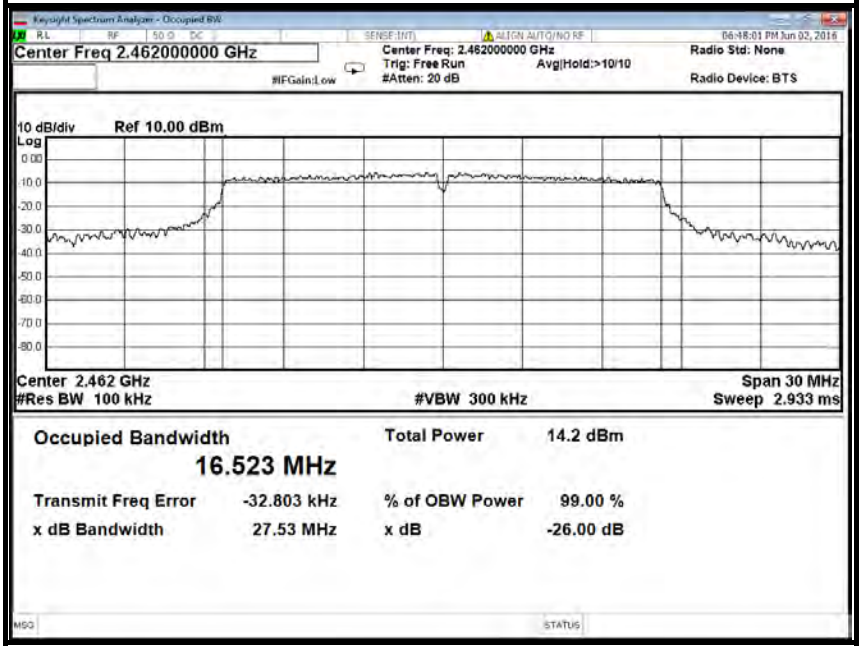
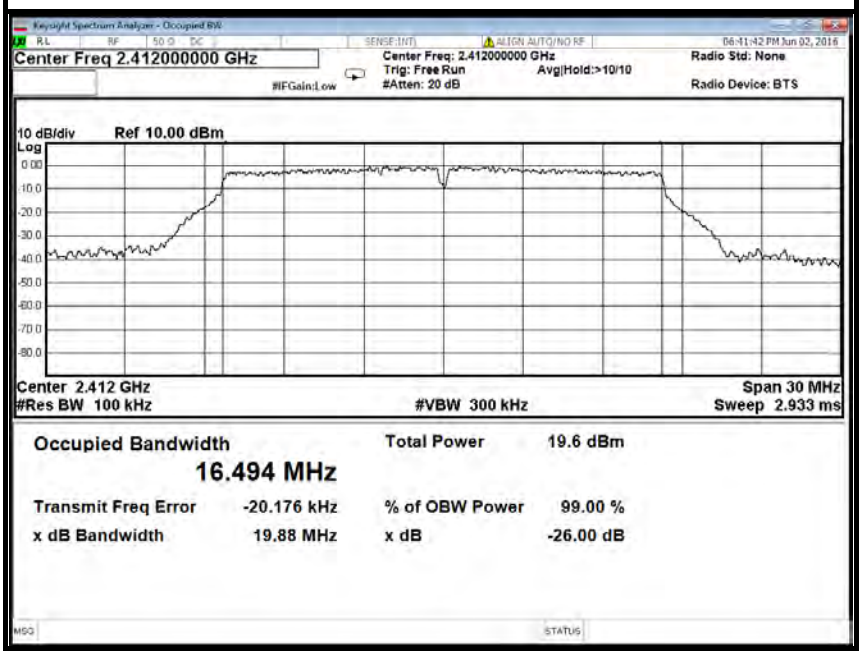
6dB Bandwidth (CH High)



IEEE 802.11g mode (Antenna 2)

6dB Bandwidth (CH Low)



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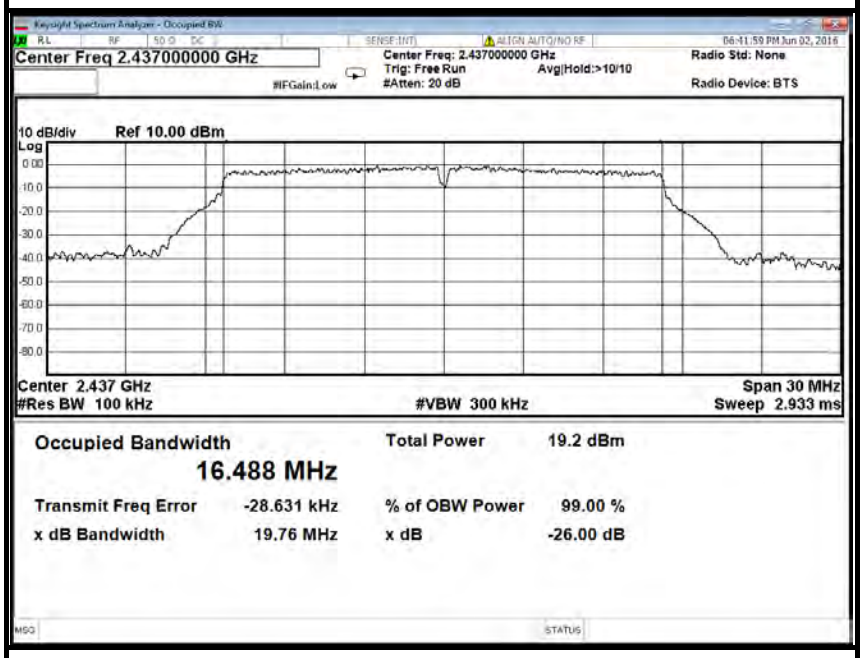
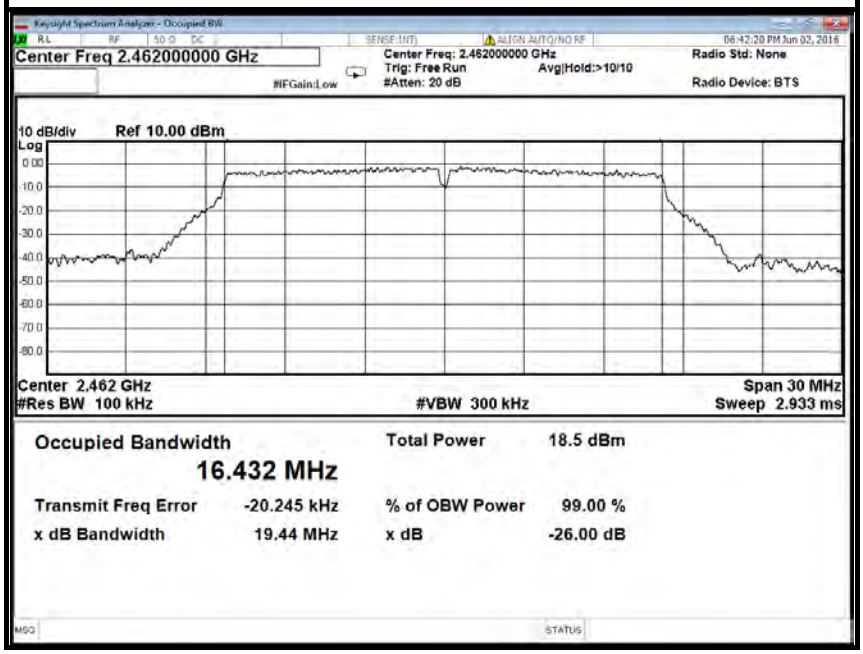
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High



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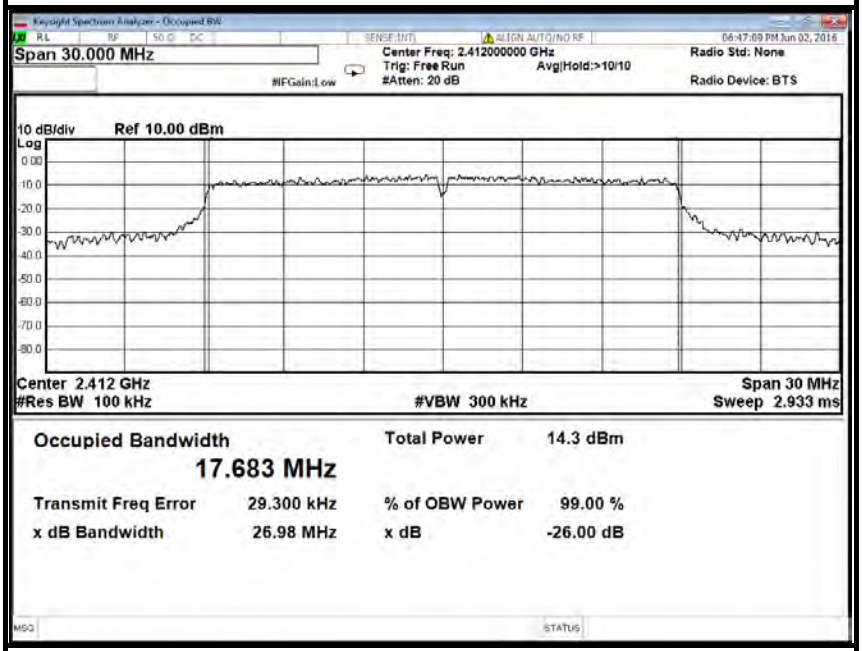
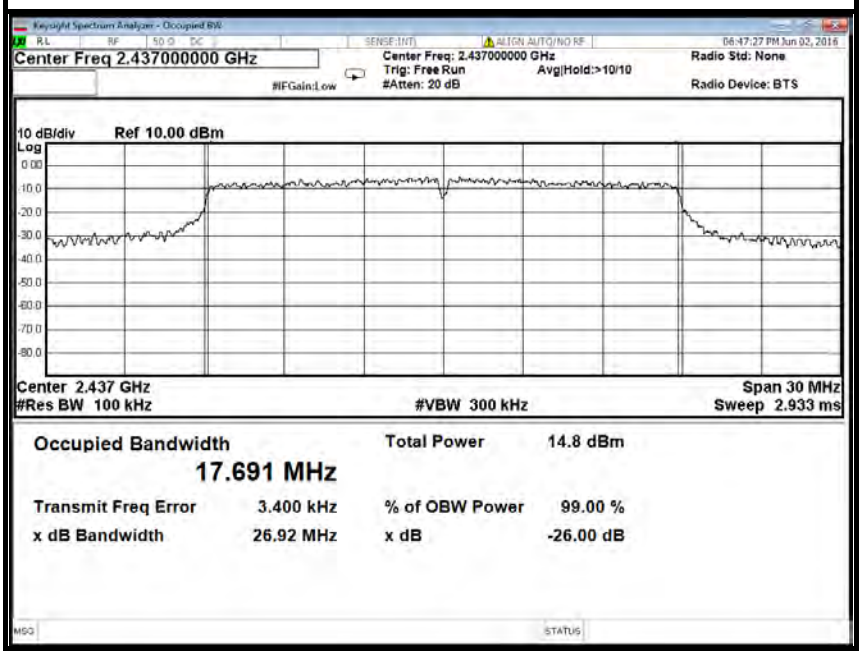
IEEE 802.11n HT20 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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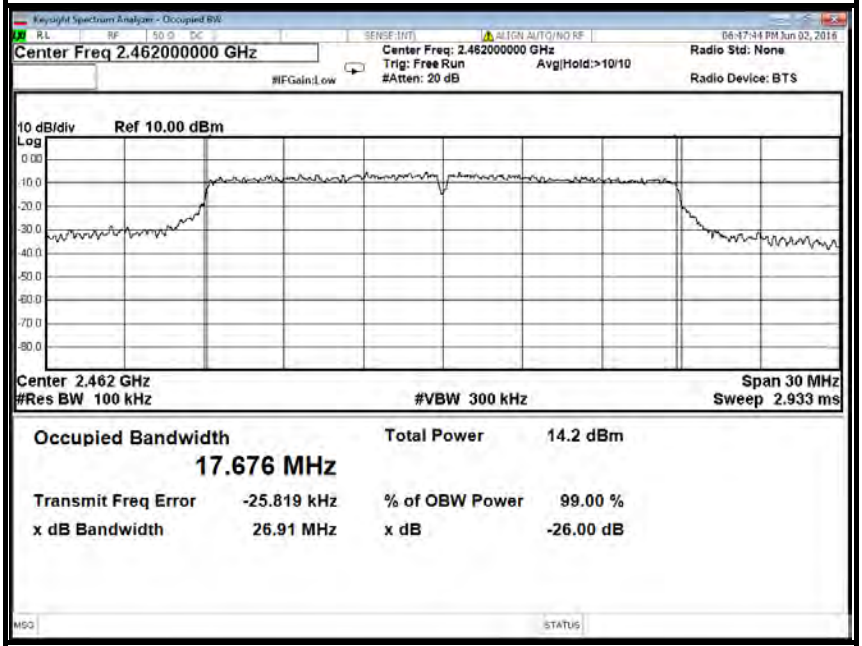
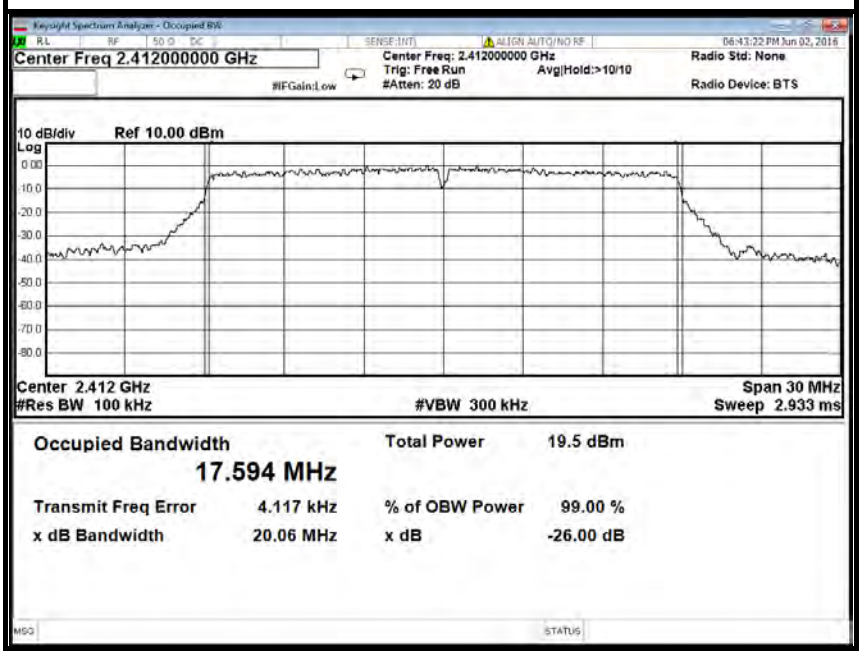
6dB Bandwidth (CH High)



IEEE 802.11n HT20 MHz mode (Antenna 2)

6dB Bandwidth (CH Low)



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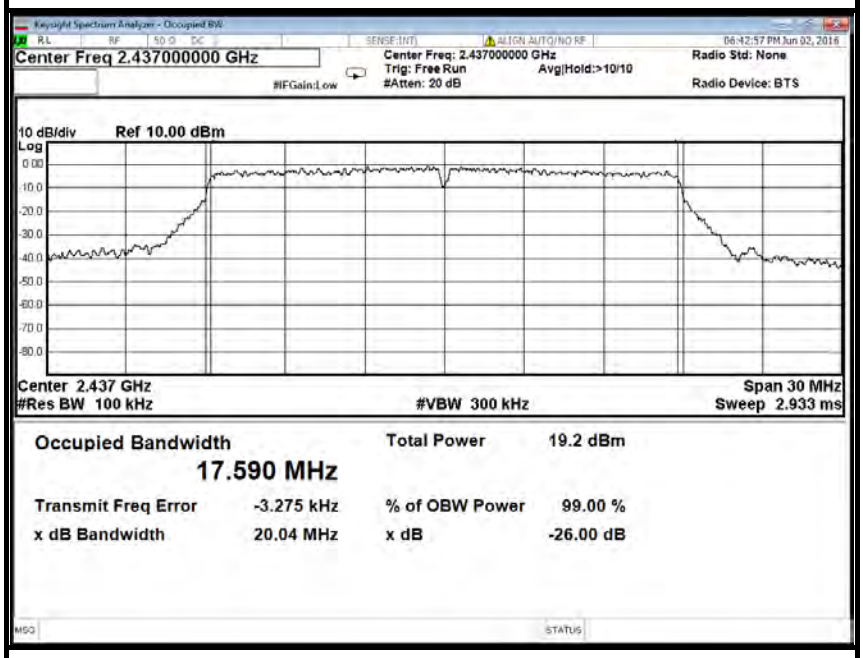
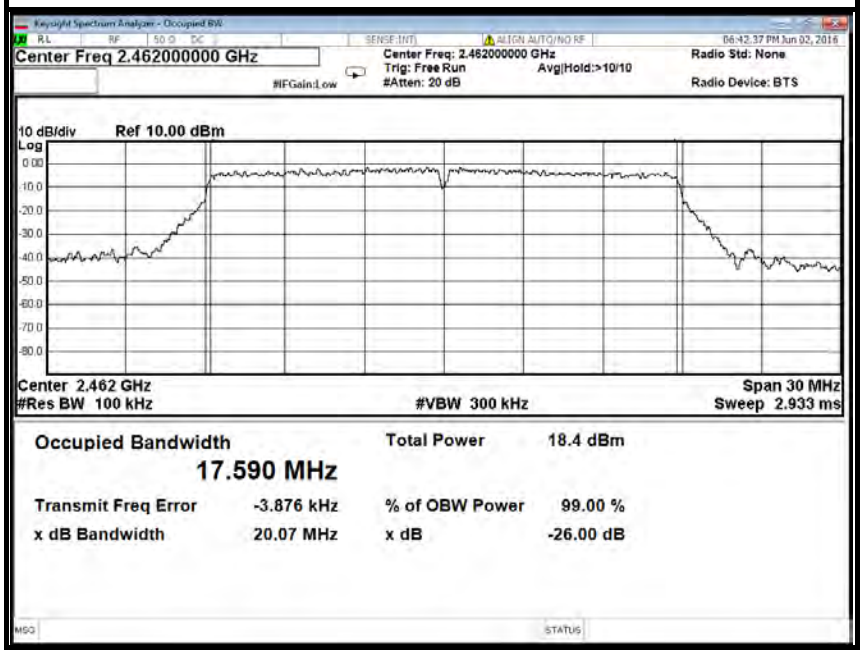
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



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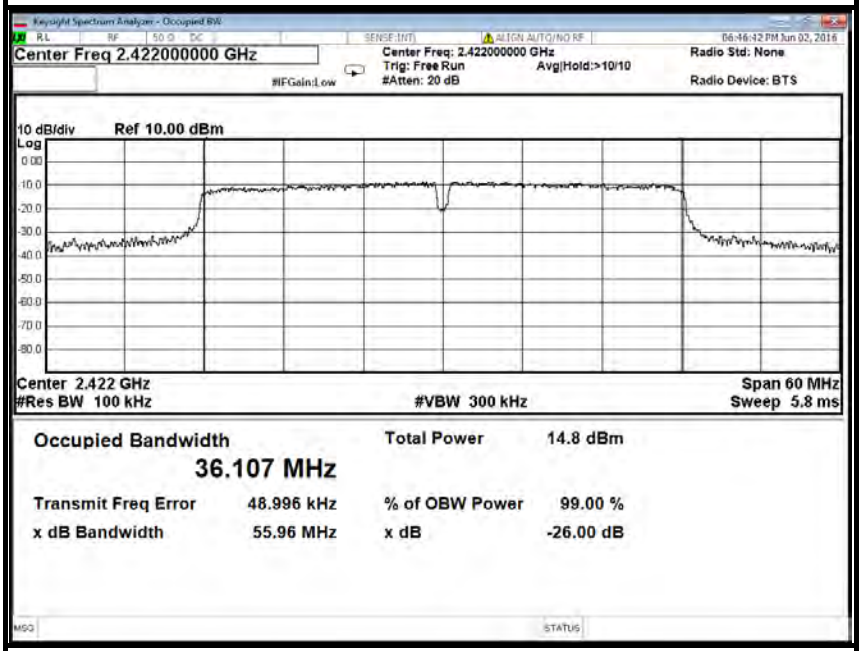
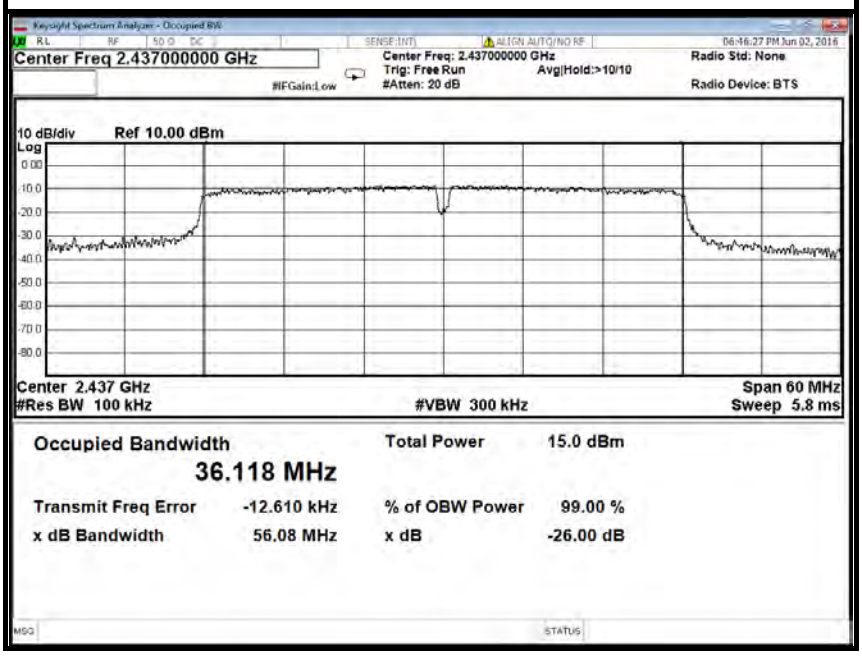
IEEE 802.11n HT40 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



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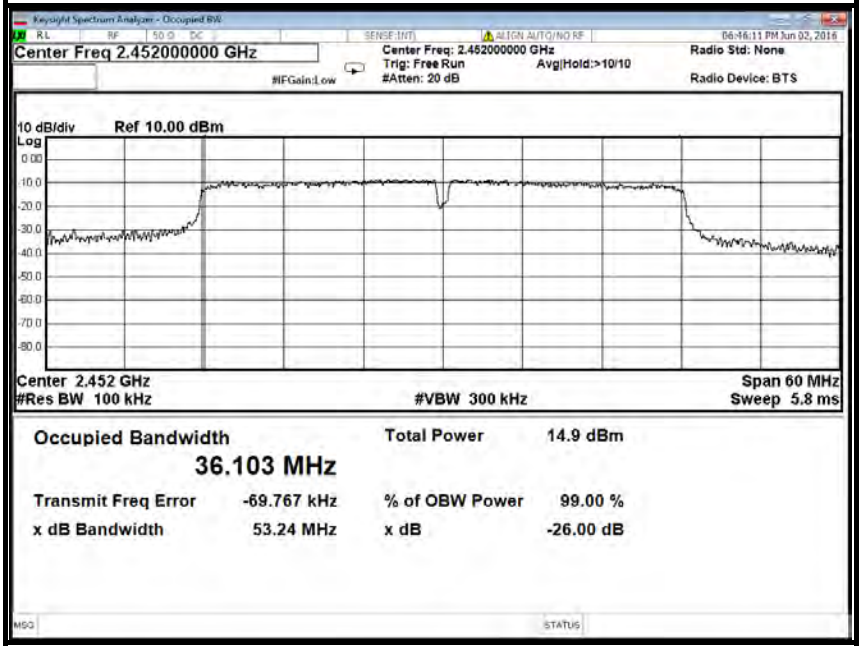
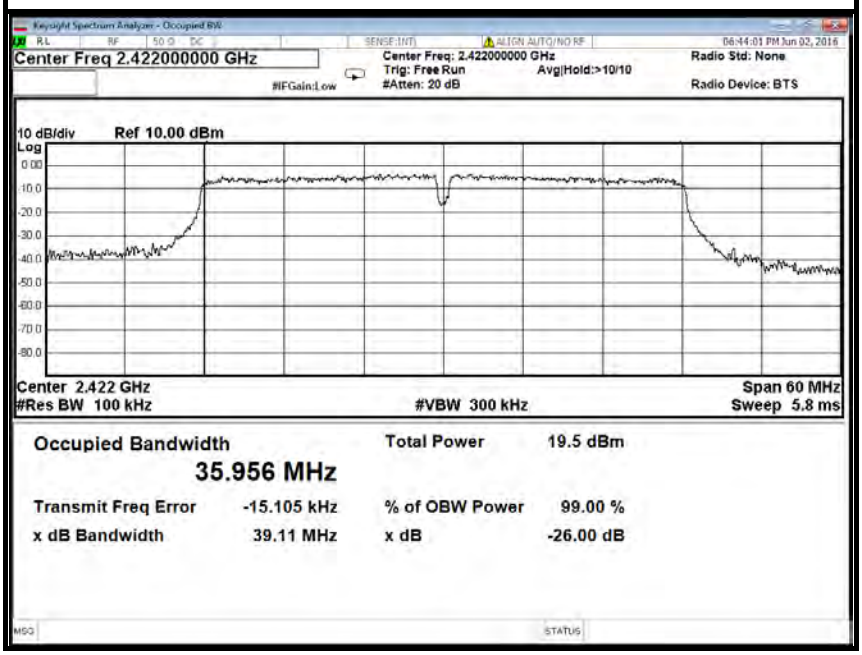
6dB Bandwidth (CH High)



IEEE 802.11n HT40 MHz mode (Antenna 2)

6dB Bandwidth (CH Low)



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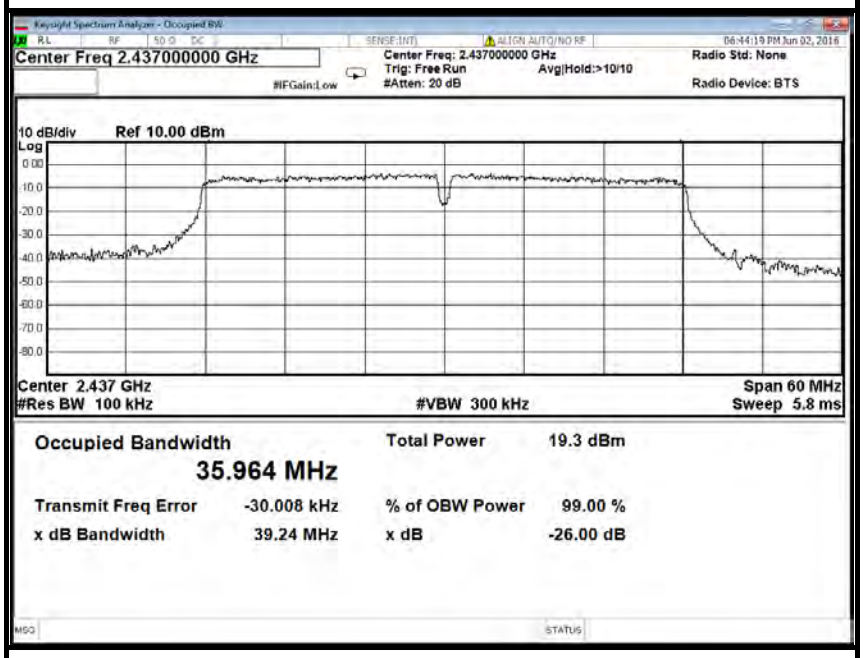
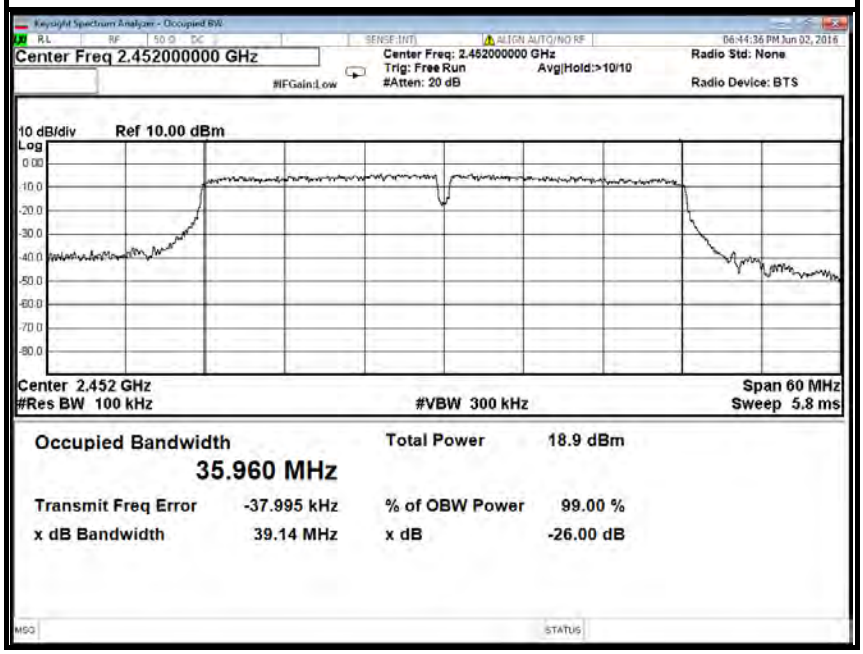
6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



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