FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4: 2009

TEST REPORT

For

Powerline AV Wireless N150 Mini Extender/Powerline AV Wireless N150 Mini Router

Model: DHP-W220AV/DHP-1220AV

Brand: D-Link

Issued for

D-LINK Corporation

No.289,Sinhu 3rd Rd., Neihu District Taipei City 114, Taiwan, R.O.C

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

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Date of Issue: November 18, 2014

REVISION HISTORY

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 03, 2014	Initial Issue	ALL	Sunny Chang
01	November 18, 2014	Update Con test data	Page 88-91	Sunny Chang

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1. TEST REPORT CERTIFICATION

Applicant	**：D-LINK Corporation**
Address	：No.289,Sinhu 3rd Rd., Neihu District Taipei City 114, Taiwan, R.O.C
Manufacturer	**：D-LINK Corporation**
Address	：No.289,Sinhu 3rd Rd., Neihu District Taipei City 114, Taiwan, R.O.C
Equipment Under Test	：Powerline AV Wireless N150 Mini Extender/Powerline AV Wireless N150 Mini Router
Model	：DHP-W220AV/DHP-1220AV
Brand	：D-Link
Date of Test	：September 24, 2014 ~ October 21, 2014

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C: 2012 AND ANSI C63.4 : 2009	No non-compliance noted

Approved by:

Jeter Wu
Assistant Manager

Reviewed by:

Eric Huang
Assistant Section Manager

2. EUT DESCRIPTION

Product Name	Powerline AV Wireless N150 Mini Extender/Powerline AV Wireless N150 Mini Router
Model	DHP-W220AV/DHP-1220AV
Brand	D-Link
Model Discrepancy	Those models are the same product except difference between shell's silk-screen model and the product's name. The DHP-W220AV product name is Powerline AV Wireless N150 Mini Extender, the DHP-1220AV product name is Powerline AV Wireless N150 Mini Router.
Received Date	September 24, 2014
Frequency Range	IEEE 802.11b/g, 802.11n HT20 (DTS Band):2412MHz~2462MHz IEEE 802.11n HT40 (DTS Band):2422MHz~2452MHz
Transmit Power	IEEE 802.11b Mode : 18.27dBm IEEE 802.11g Mode : 22.75dBm IEEE 802.11n HT20 Mode : 22.41dBm IEEE 802.11n HT40 Mode : 22.07dBm
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40: 5MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20:11 Channels IEEE 802.11n HT40 :7 Channels
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: 65.0Mbps with fall back rates of 65.0/58.5/52.0/ 39.0/26.0/19.5/13.0/6.5 Mbps IEEE 802.11n HT40: 135.0Mbps with fall back rates of 121.5/ 108.0/ 81.0/54.0/40.5/27.0/13.5 Mbps
Type of Modulation	IEEE 802.11b：DSSS (CCK, DQPSK, DBPSK)
	IEEE 802.11g：OFDM (64QAM, 16QAM, QPSK, BPSK)
	IEEE 802.11n HT20/40：OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	By software / firmware
Antenna Type	Built-in antenna with 2.0dBi gain (Max)
Power Source	I/P: AC 100-240Vac, 50/60Hz, 150mA
Temperature Range	0 ~ +40°C

REMARK:

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: **KA2HPW220AVA1** filing to comply with Section 15.207,15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*
3. *For more details, please refer to the User's manual of the EUT.*

3. DESCRIPTION OF TEST MODES

The EUT is a Powerline AV Wireless N150 Mini Extender/Powerline AV Wireless N150 Mini Router. It has one transmitter chains and one receive chains (1x1 configurations). The 1x1 configuration is implemented with one outside chains (Chain 0).

The RF chipset is manufactured by ATHEROS

The antenna peak gain 2.0 dBi (highest gain) were chosen for full testing.

IEEE 802.11 b ,802.11g ,802.11n HT20 mode (DTS Band)

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps long data rate (worst case) were chosen for full testing.

IEEE 802.11g mode: 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode: 6.5Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode (DTS Band)

The EUT had been tested under operating condition.

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n HT40 mode: 13.5 Mbps data rate (worst case) were chosen for full testing.

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD, peak power and average power across all the data rates, bandwidths, modulations and spatial stream modes.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1037 and 455173).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

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

Taiwan	TAF

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

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

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

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz Test Site : OATS-6	±3.59dB
Radiated Emission, 200 to 1000 MHz Test Site : OATS-6	±3.27dB
Radiated Emission, 1 to 26.5 GHz	± 3.20dB
Power Line Conducted Emission	± 2.90dB

Uncertainty figures are valid to a confidence level of 95%, K=2

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

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

7.2 SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook#1	E335	R9-WN1EF	DoC	LENOVO	Unshielded 1.70m	Unshielded 1.80m
2	Notebook#2	E335	R9-WN0KH	DoC	LENOVO	Unshielded 1.70m	Unshielded 1.80m
3	Powerline AV Wireless N150 Mini Extende	DHP-W220AV	N/A	DoC	D-Link	N/A	N/A

Note:

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

7.3 SETUP DIAGRAM FOR TESTS

The AR9331 project need the following steps:

1、 computer IP set to 192.168.0.XXX network.

Open the art, run tftpd32.exe.

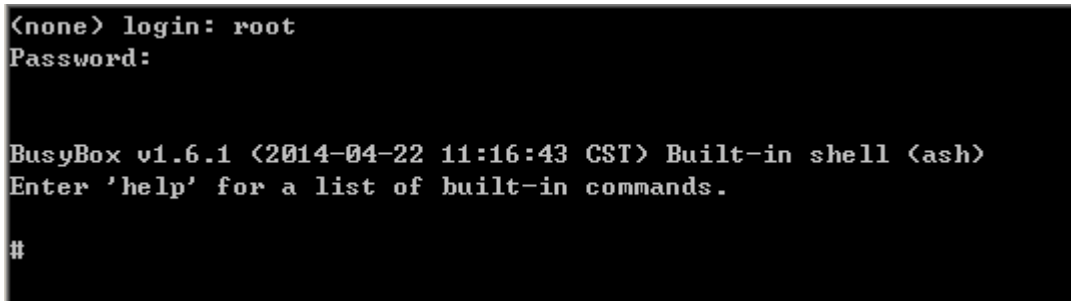
IP address switching value 192.168.0.XXX.

Minimization of tftpd32.exe.

2.Command in the telnet in order to control the equipment:

The Windows system the "Start Menu" ->command prompt(cmd)

Enter the user name and password: root/root

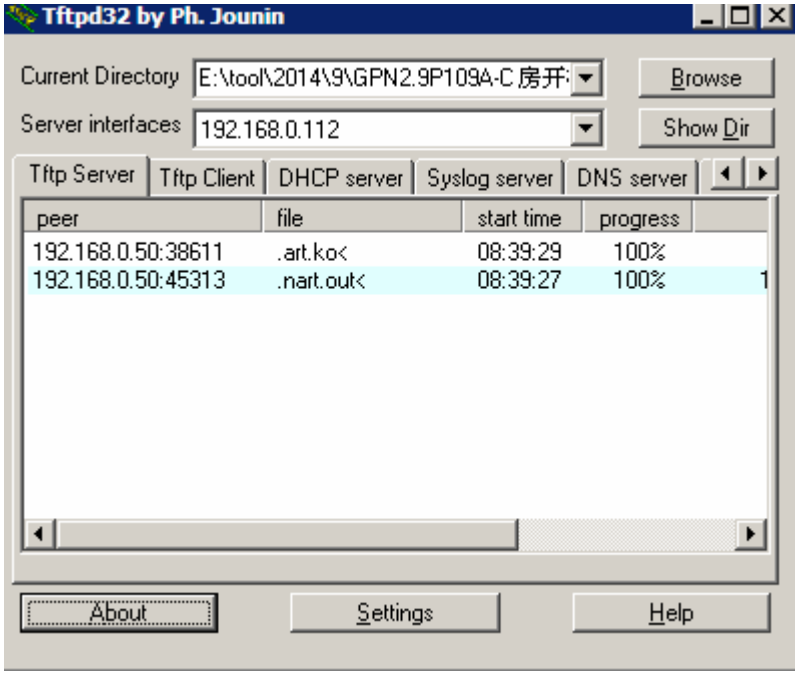


Input:

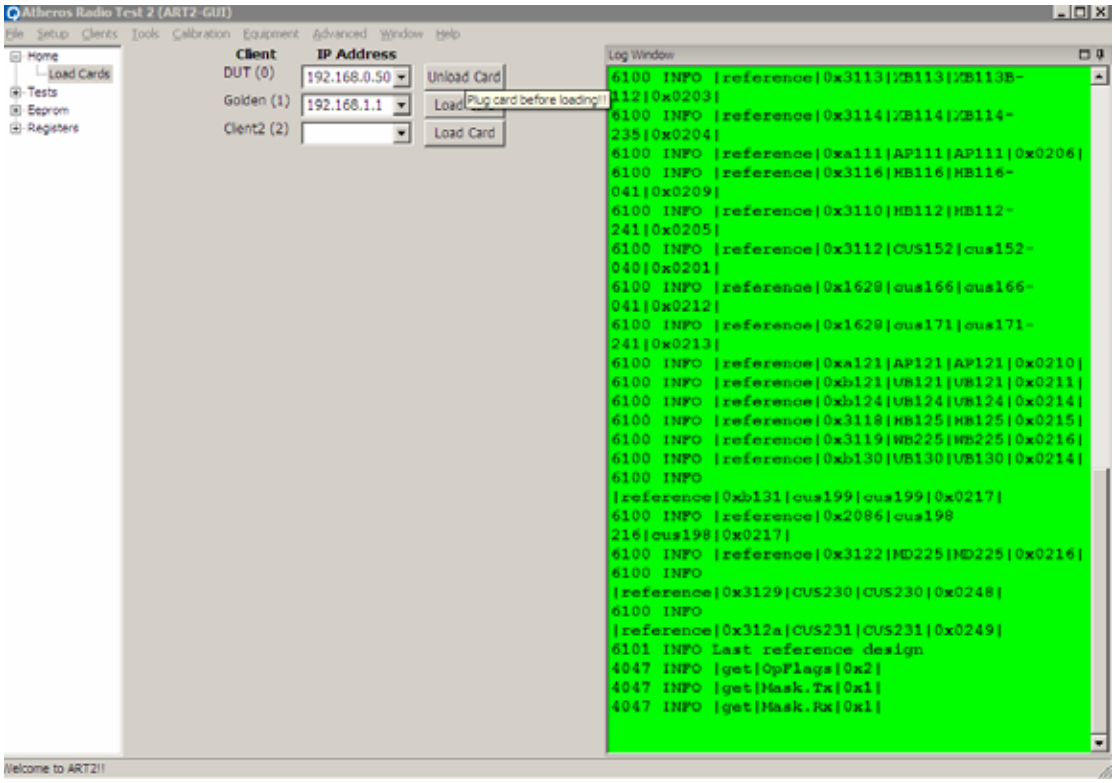
/etc/init.d/wlan.rc down
cd /tmp
tftp -gr nart.out 192.168.0.xxx
tftp -gr art.ko 192.168.0.xxx
insmod art.ko
chmod 777 nart.out
./nart.out&

After completion, click a few times enter (above the IP address for the computer IP address).

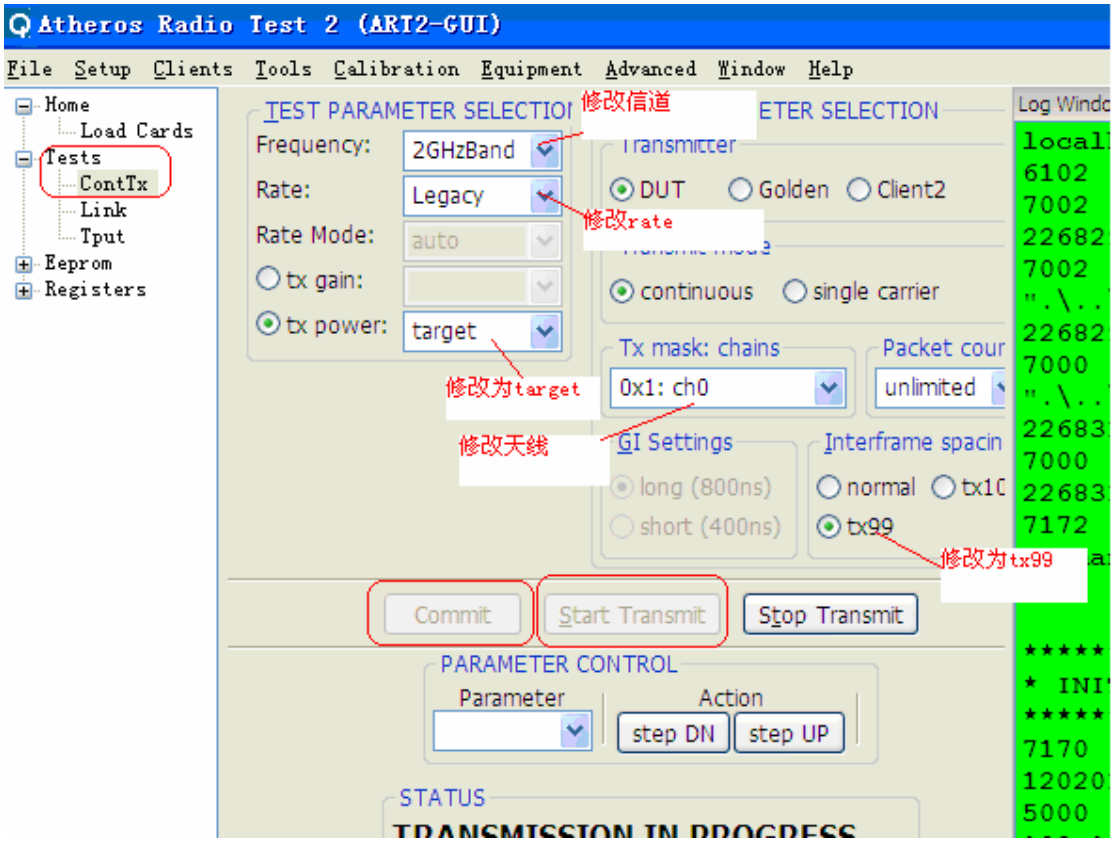
The completion of the loading, the following display:



Enter Into the menu “ART2\bin” and run the “artgui.exe” file, in the DUT (0) type 192.168.0.5 and press the “load card” icon on the right side.



Select the “tests/contTx” on the left side after load success, according to the following tips and choosing the needed rate、channel and antenna, then click “Start transmit” to start sending test, when the channel, antenna (only a selected 0x1: CH0) or rate need to test finish, Renew the factor needed to change first and click “commit” second .



NOTE: Interframe spacing must use the tx99!

The “tx power ” should set as below:

	Low	Middle	High
B MODE	14	14	15
G MODE	13	14	14
N20 MODE	12	13	13
N40 MODE	12	12	11

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6DB BANDWIDTH

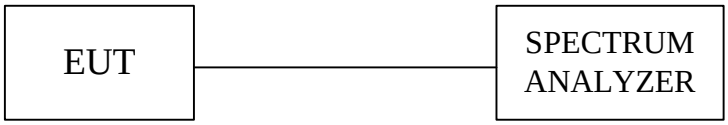
LIMIT

§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 8.1 & 8.2.

Option 1:

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 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.

Option 2:

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

TEST RESULTS

No non-compliance noted.

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	10150	>500	PASS
Mid	2437	10137		PASS
High	2462	10151		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16416	>500	PASS
Mid	2437	16412		PASS
High	2462	16393		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17636	>500	PASS
Mid	2437	17603		PASS
High	2462	17594		PASS

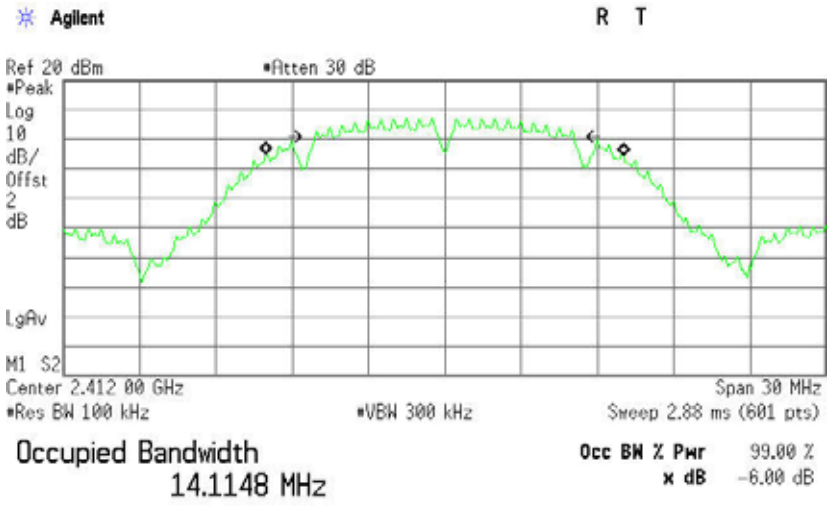
Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	36481	>500	PASS
Mid	2437	36464		PASS
High	2452	36403		PASS

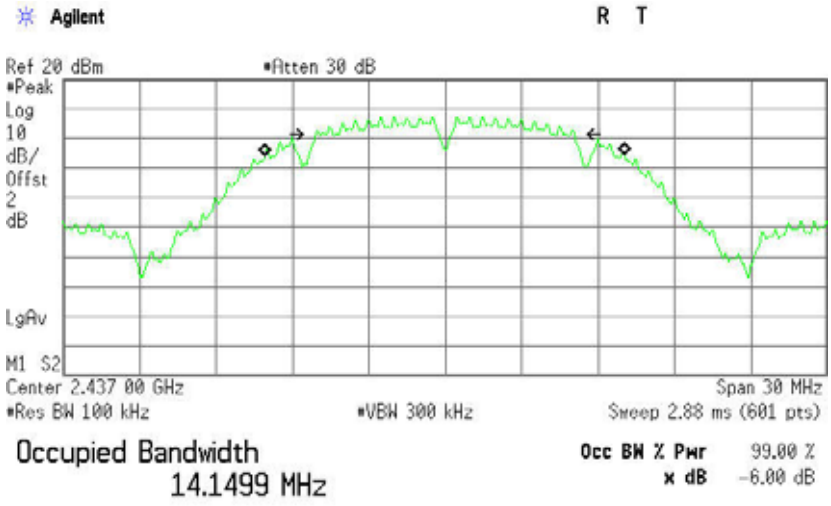
Test Plot

IEEE 802.11b mode

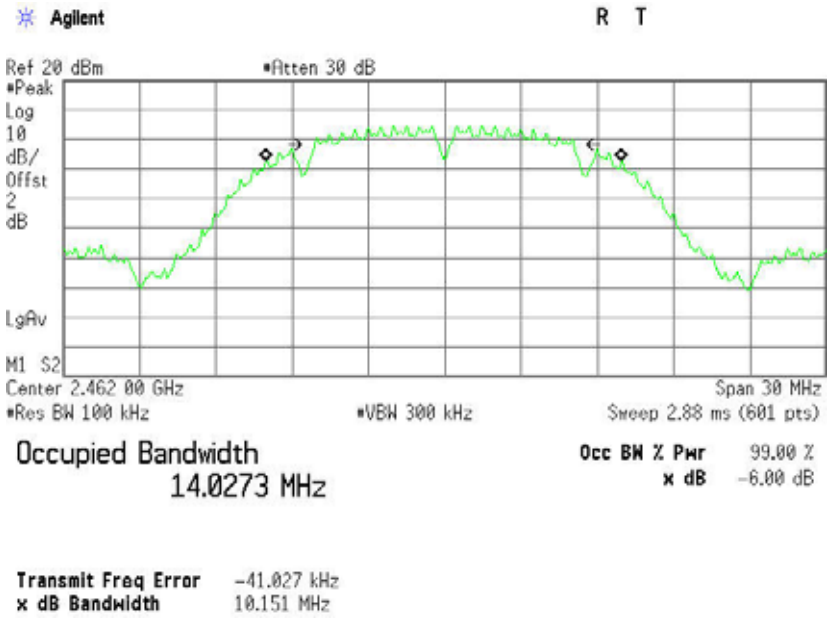
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

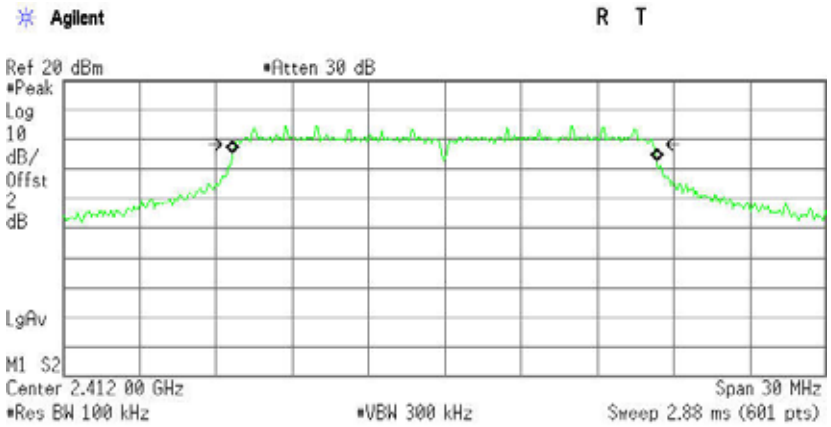


6dB Bandwidth (CH High)



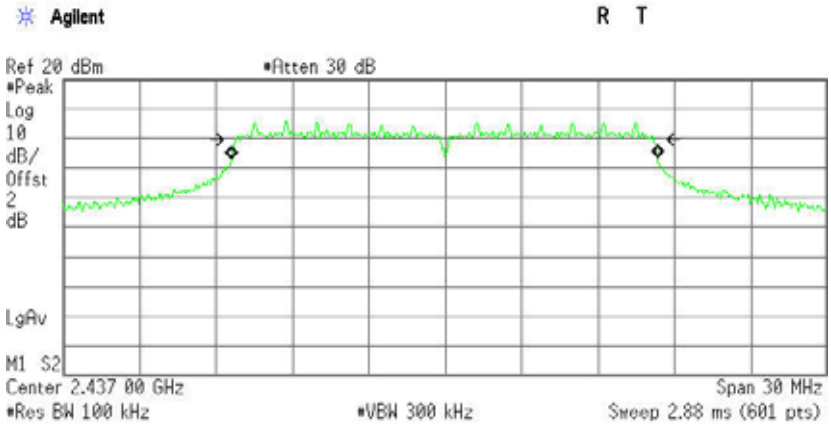
IEEE 802.11g mode

6dB Bandwidth (CH Low)



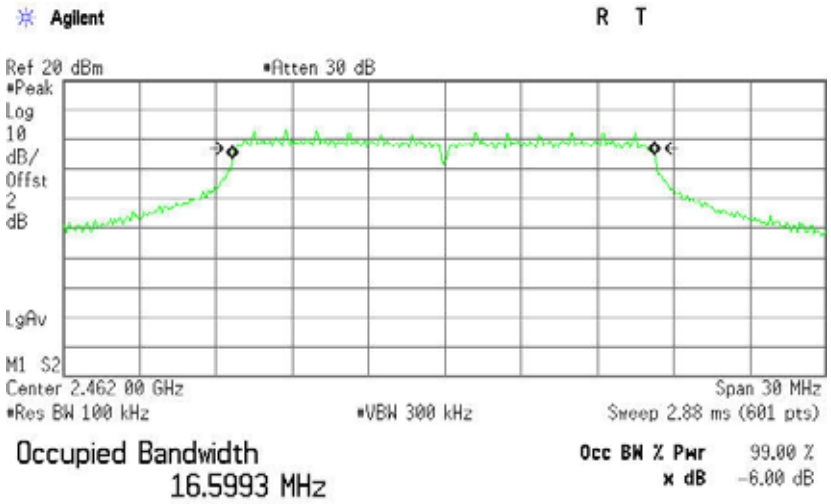
Transmit Freq Error -752.478 Hz
x dB Bandwidth 16.416 MHz

6dB Bandwidth (CH Mid)



Transmit Freq Error -23.119 kHz
x dB Bandwidth 16.412 MHz

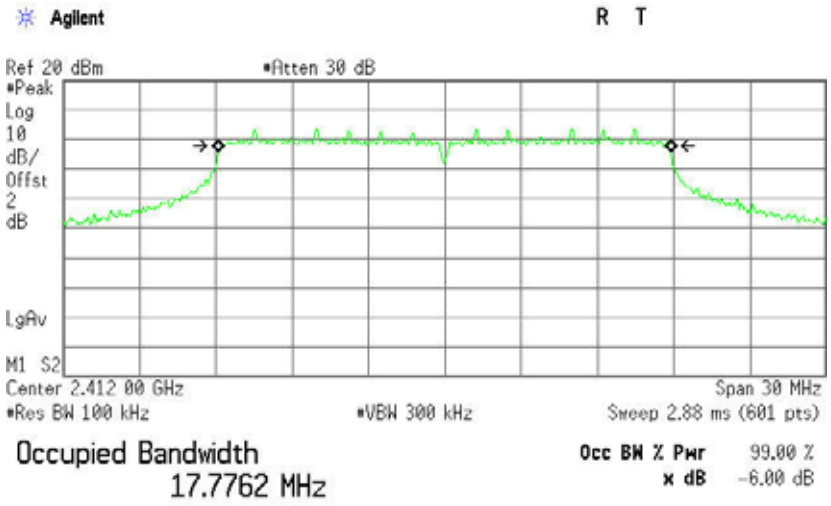
6dB Bandwidth (CH High)



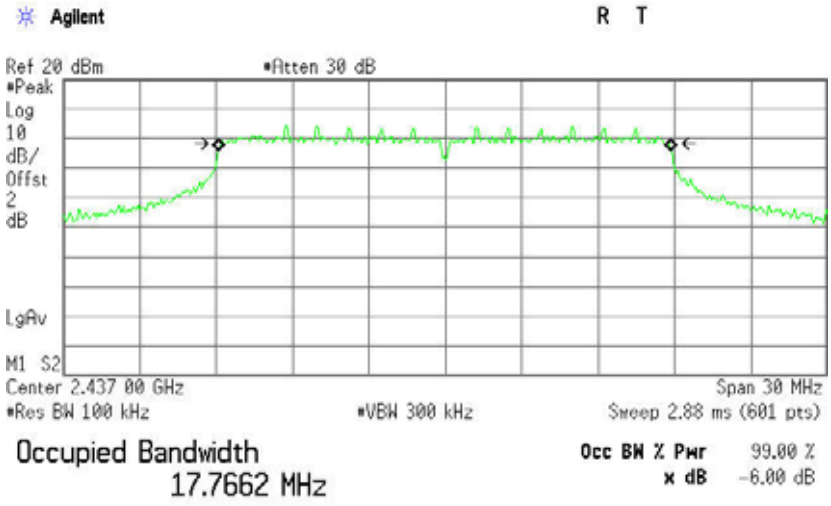
Transmit Freq Error −39.572 kHz
x dB Bandwidth 16.393 MHz

IEEE 802.11n HT20 MHz mode

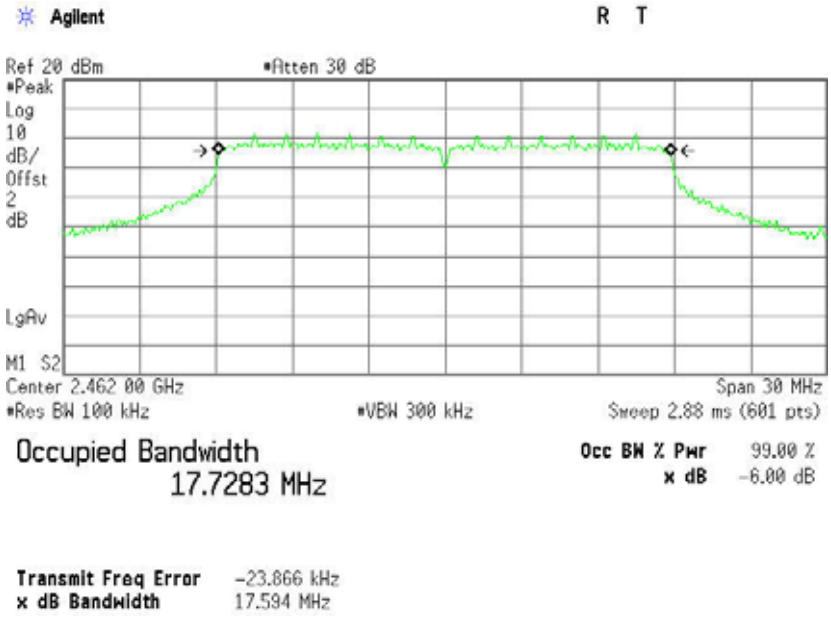
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

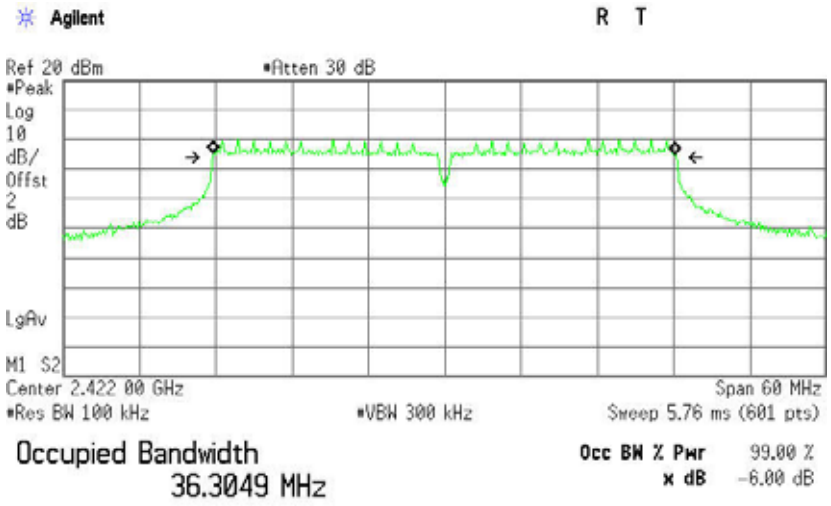


6dB Bandwidth (CH High)

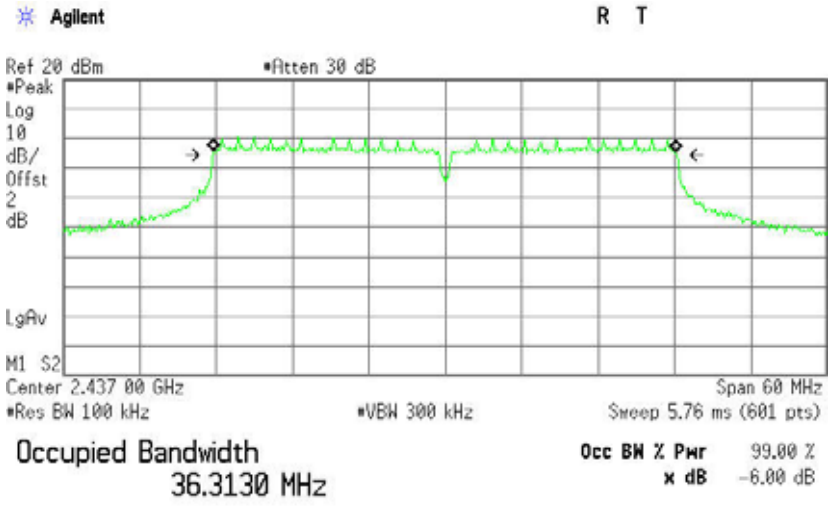


IEEE 802.11n HT40 MHz mode

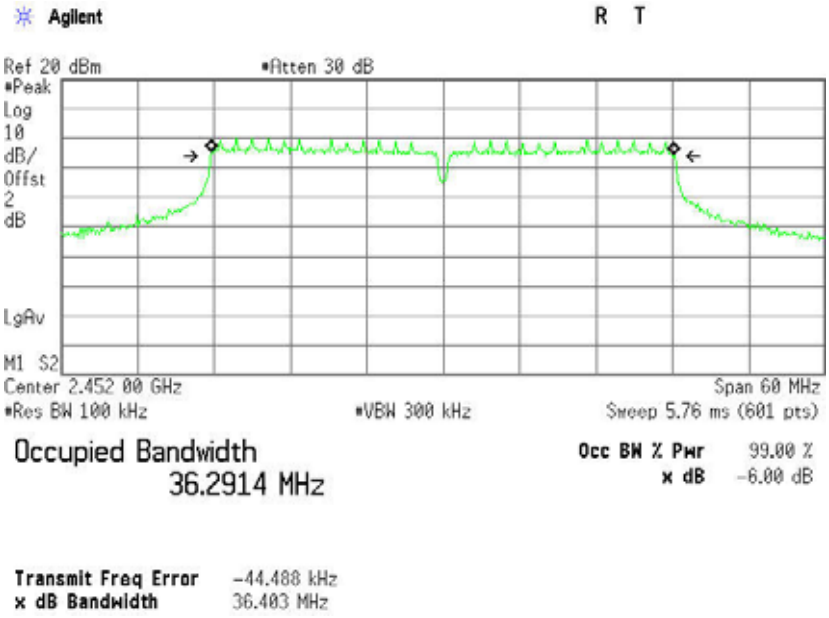
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



8.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz and 2400-2483.5 MHz.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	03/08/2015
Power Sensor	Anritsu	MA2411B	1126150	03/08/2015
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015

TEST SETUP

TEST PROCEDURE

The tests were performed in accordance with KDB 558074 9.1.3 & 9.2.3.2 .

9.1.3 PKPM1 Peak power meter method

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

9.2.3.2 Method AVGPM-G (Measurement using a gated RF average power meter)

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

TEST RESULTS

No non-compliance noted

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	17.67	0.05848	1	PASS
Mid	2437	18.27	0.06714		PASS
High	2462	17.23	0.05284		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.91	0.15524	1	PASS
Mid	2437	22.75	0.18836		PASS
High	2462	21.67	0.14689		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	21.49	0.14093	1	PASS
Mid	2437	22.41	0.17418		PASS
High	2462	21.35	0.13646		PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	21.87	0.15382	1	PASS
Mid	2437	22.07	0.16106		PASS
High	2452	21.14	0.13002		PASS

Mode	Frequency	PEAK	AVG	SET
B	2412	17.67	15.34	14
	2437	18.27	16.21	14
	2462	17.23	14.19	15
G	2412	21.91	14.04	13
	2437	22.75	15.79	14
	2462	21.67	13.68	14
N20	2412	21.49	13.16	12
	2437	22.41	14.92	13
	2462	21.35	13.03	13
N40	2422	21.87	13.53	12
	2437	22.07	14.15	12
	2452	21.14	12.47	11

8.3 POWER SPECTRAL DENSITY

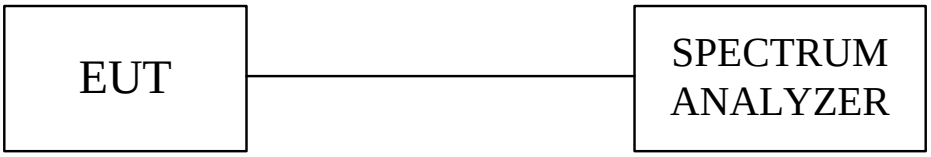
LIMIT

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

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 10.2.

Method PKPSD (peak PSD)

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-7.54	8	PASS
Mid	2437	-7.68		PASS
High	2462	-9.59		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-8.68	8	PASS
Mid	2437	-9.65		PASS
High	2462	-11.47		PASS

Test mode: IEEE 802.11n HT20 MHz

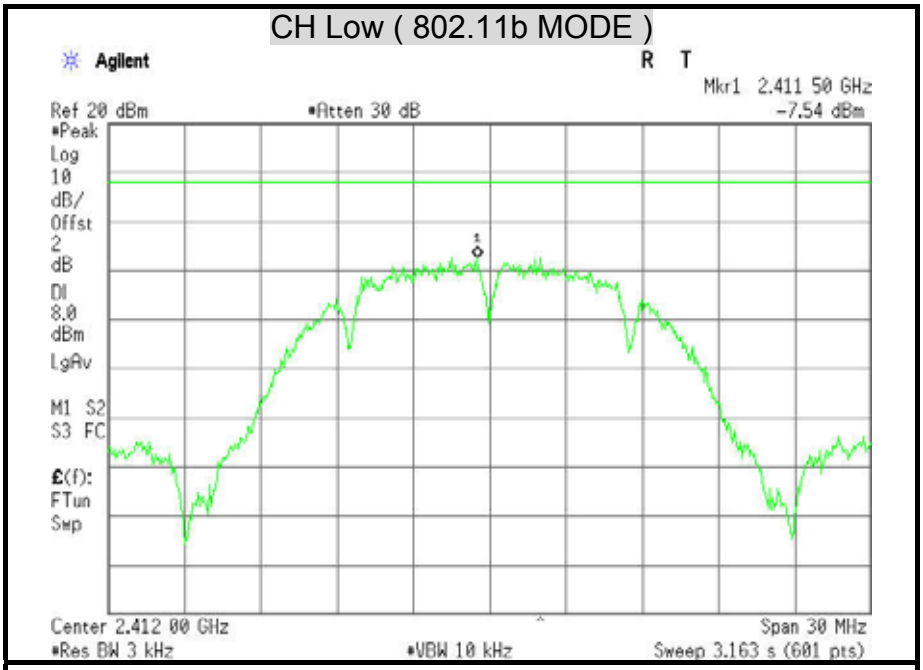
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-11.48	8	PASS
Mid	2437	-11.32		PASS
High	2462	-13.25		PASS

Test mode: IEEE 802.11n HT40 MHz

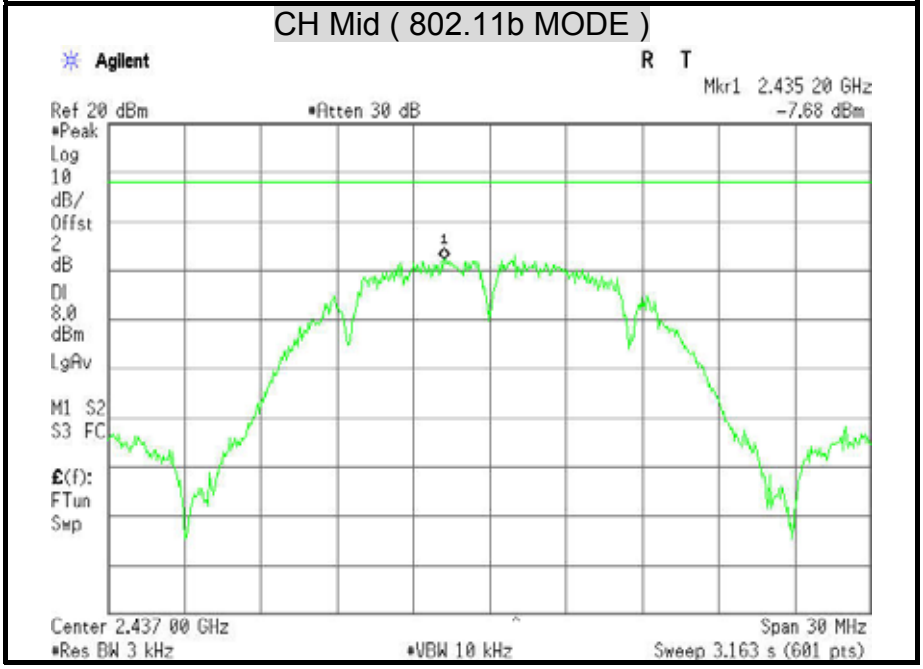
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2422	-14.06	8	PASS
Mid	2437	-14.08		PASS
High	2452	-14.36		PASS

POWER SPECTRAL DENSITY (IEEE 802.11b MODE)

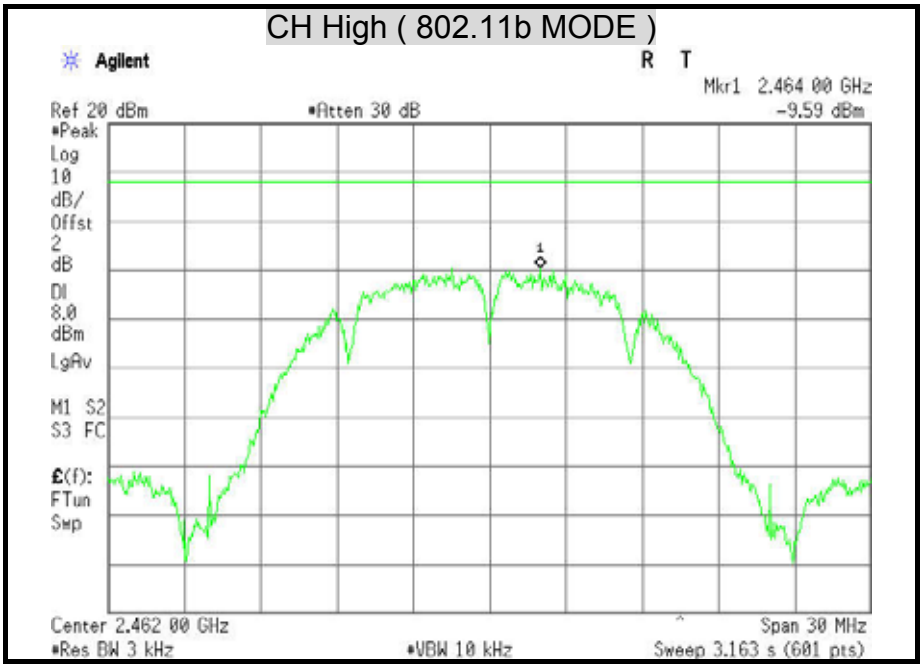
CH Low (802.11b MODE)



CH Mid (802.11b MODE)

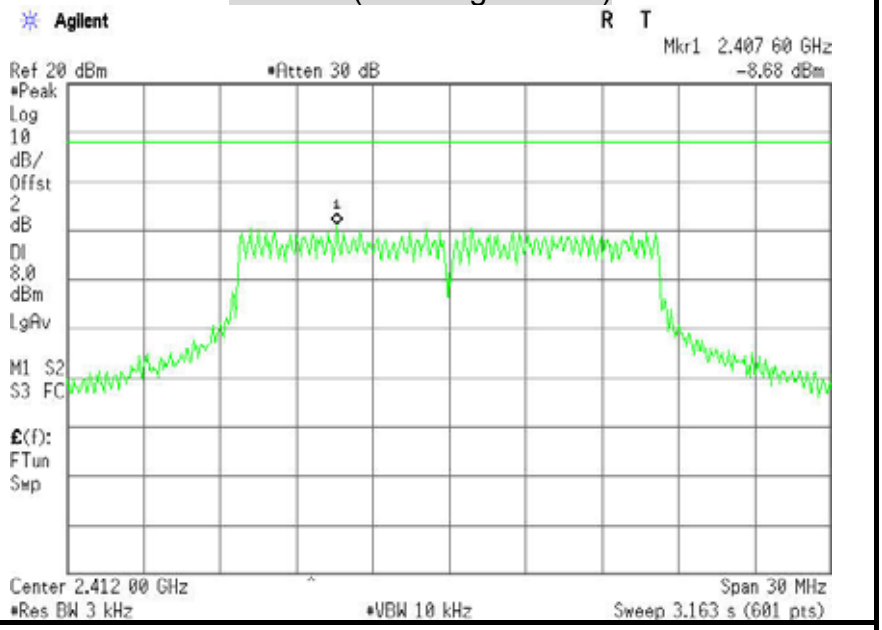


CH High (802.11b MODE)

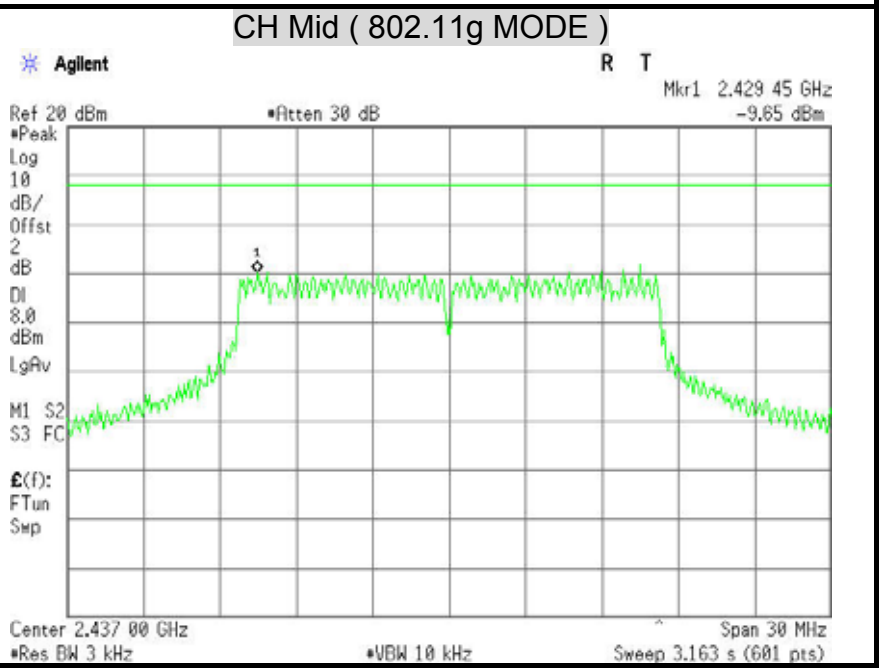


POWER SPECTRAL DENSITY (IEEE 802.11g MODE)

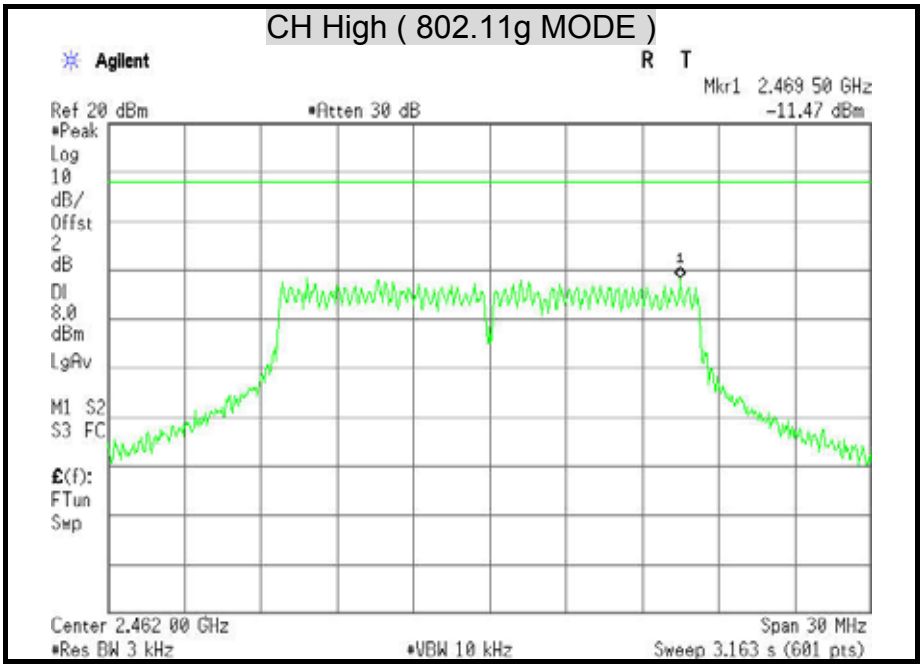
CH Low (802.11g MODE)



CH Mid (802.11g MODE)

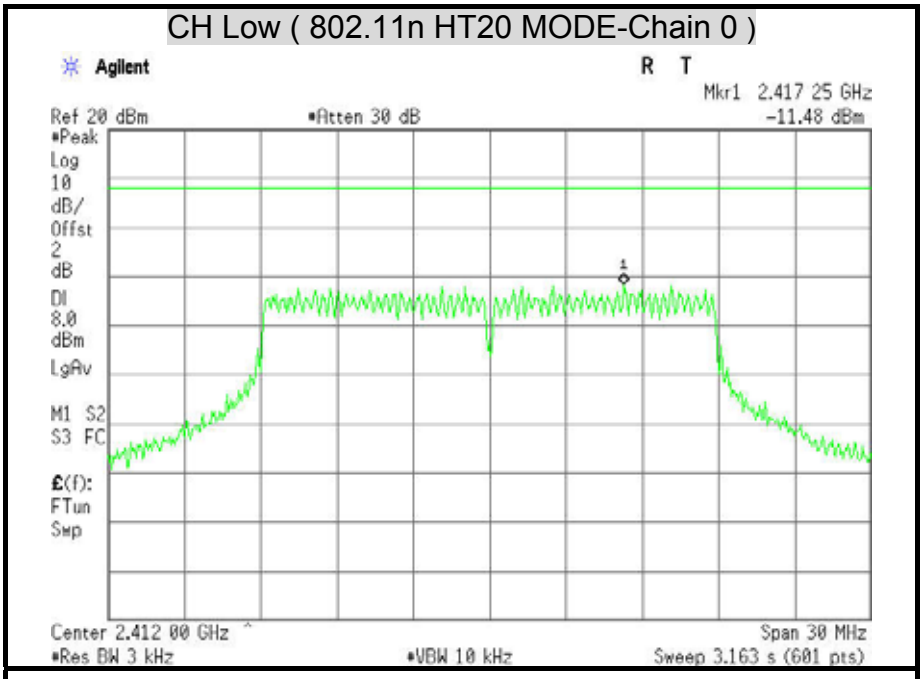


CH High (802.11g MODE)

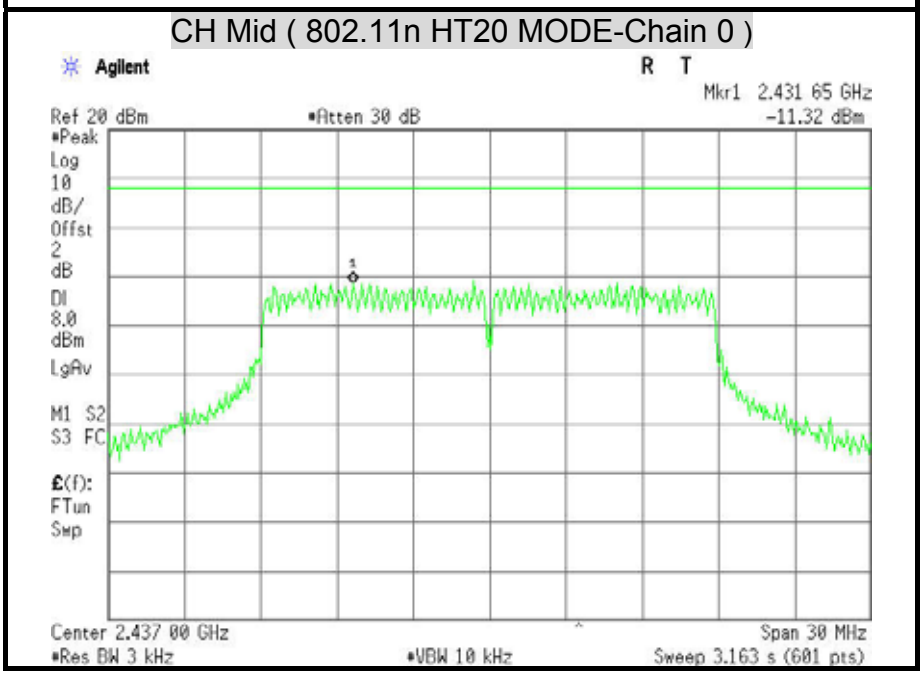


POWER SPECTRAL DENSITY (802.11n HT20 MODE)

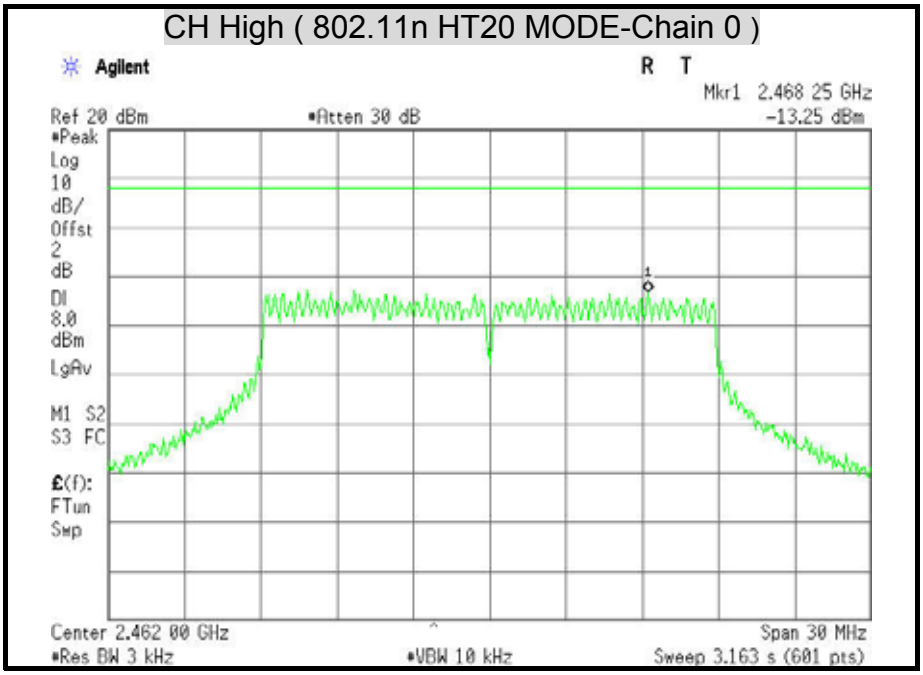
CH Low (802.11n HT20 MODE-Chain 0)



CH Mid (802.11n HT20 MODE-Chain 0)

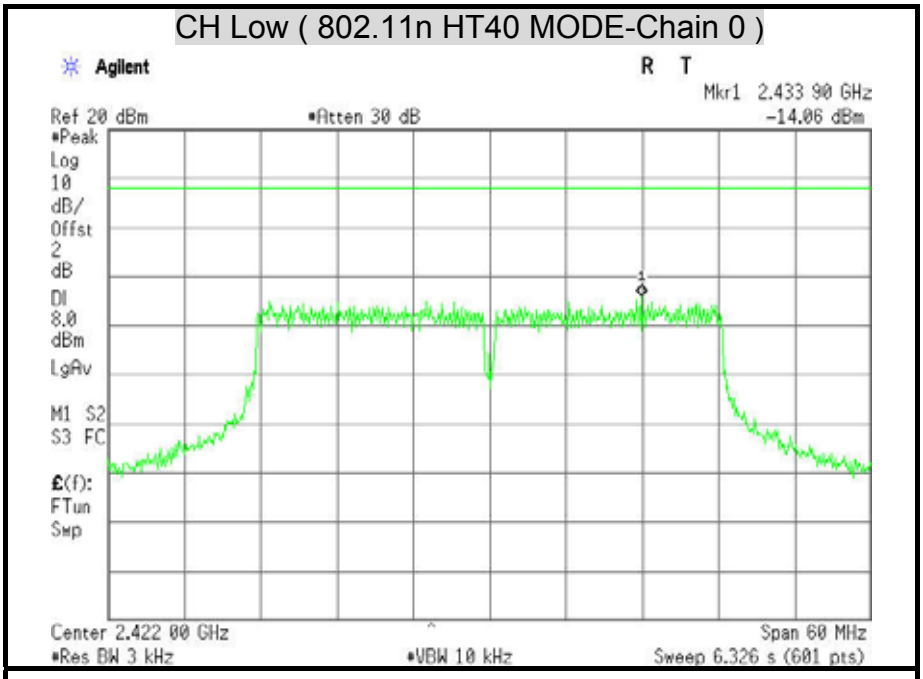


CH High (802.11n HT20 MODE-Chain 0)

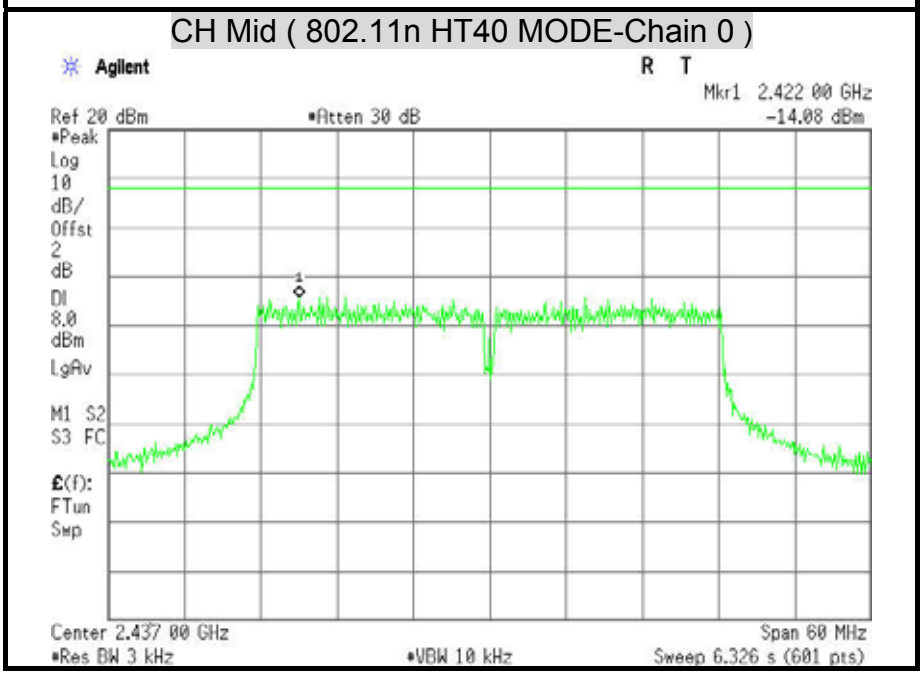


POWER SPECTRAL DENSITY (802.11n HT40 MODE)

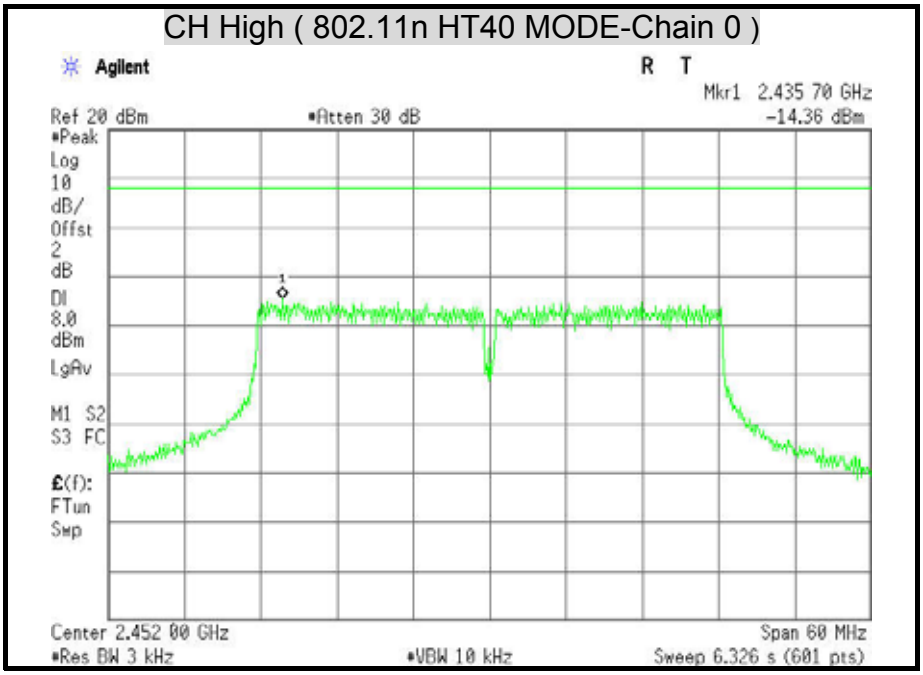
CH Low (802.11n HT40 MODE-Chain 0)



CH Mid (802.11n HT40 MODE-Chain 0)



CH High (802.11n HT40 MODE-Chain 0)



8.4 CONDUCTED SPURIOUS EMISSION

LIMITS

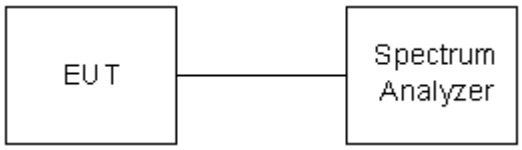
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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)).

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015

Remark: *Each piece of equipment is scheduled for calibration once a year*

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 11.2 & 11.3 .

11.2 Reference level measurement

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.

b) Set the span to ≥ 1.5 times the *DTS bandwidth*.

c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

11.3 Emission level measurement

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Ensure that the number of measurement points ≥ span/RBW
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

TEST RESULTS

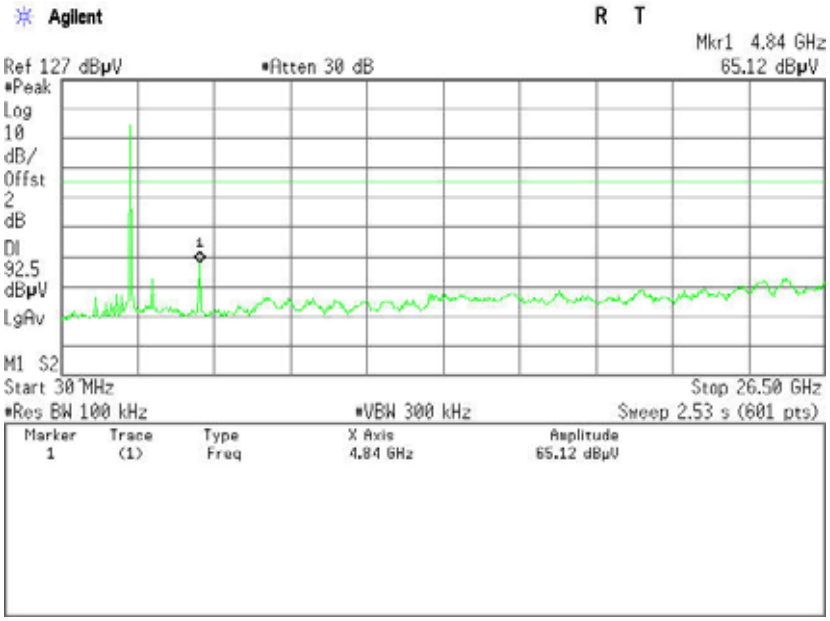
No non-compliance noted.

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

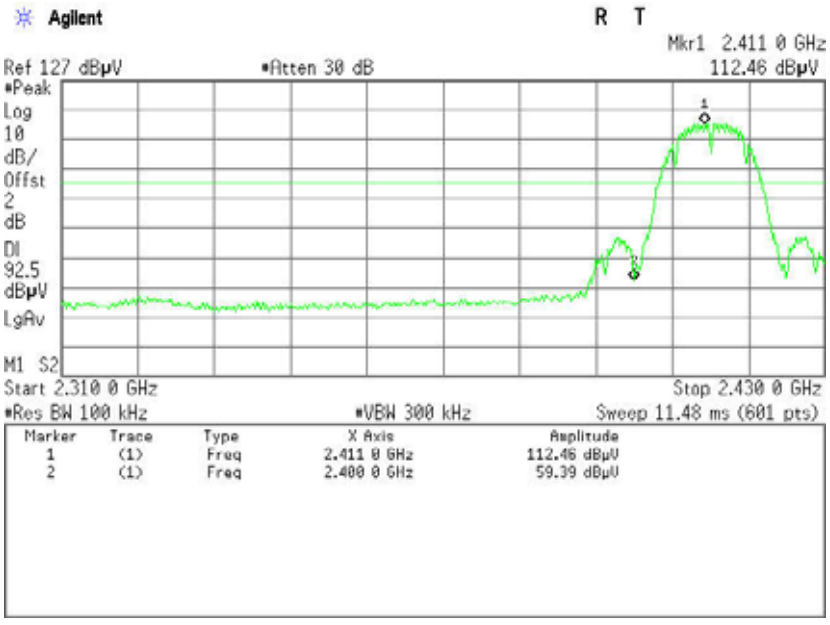
Test Plot

IEEE 802.11b mode

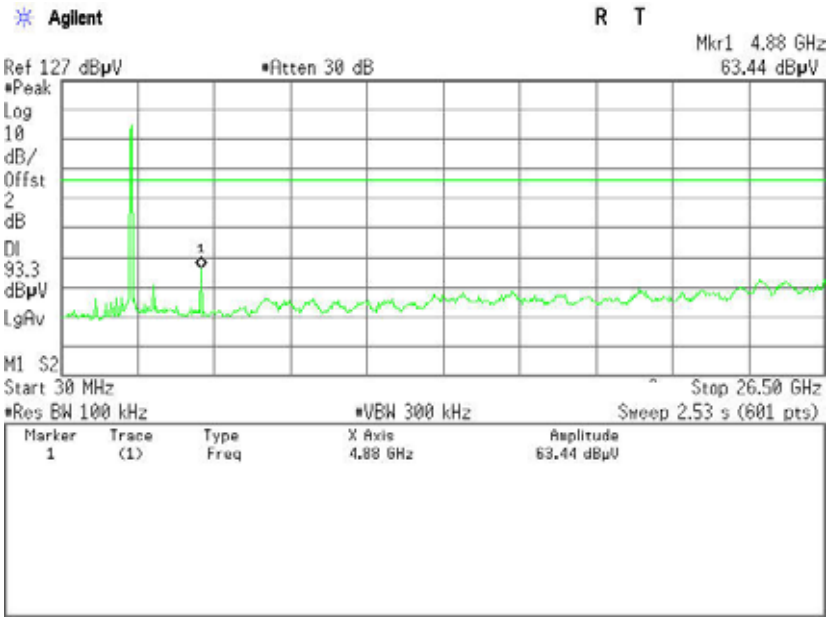
CH Low (30MHz ~26.5GHz)



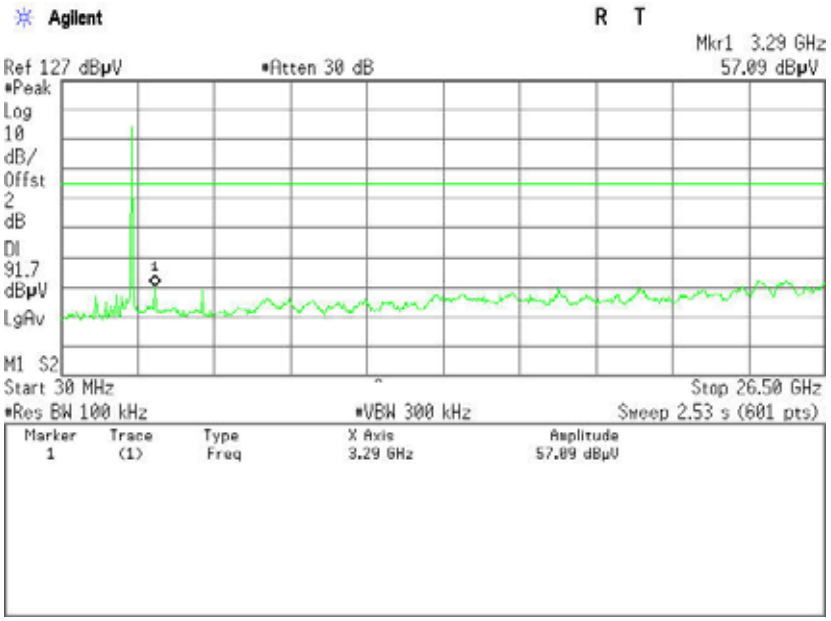
CH Low (2.31GHz ~2.43GHz)



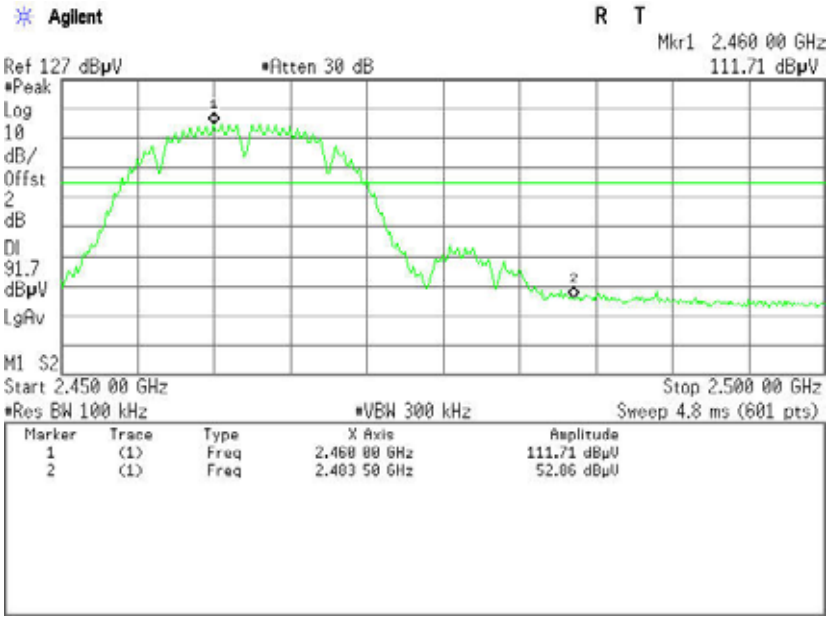
CH Mid (30MHz ~26.5GHz)



CH High (30MHz ~26.5GHz)



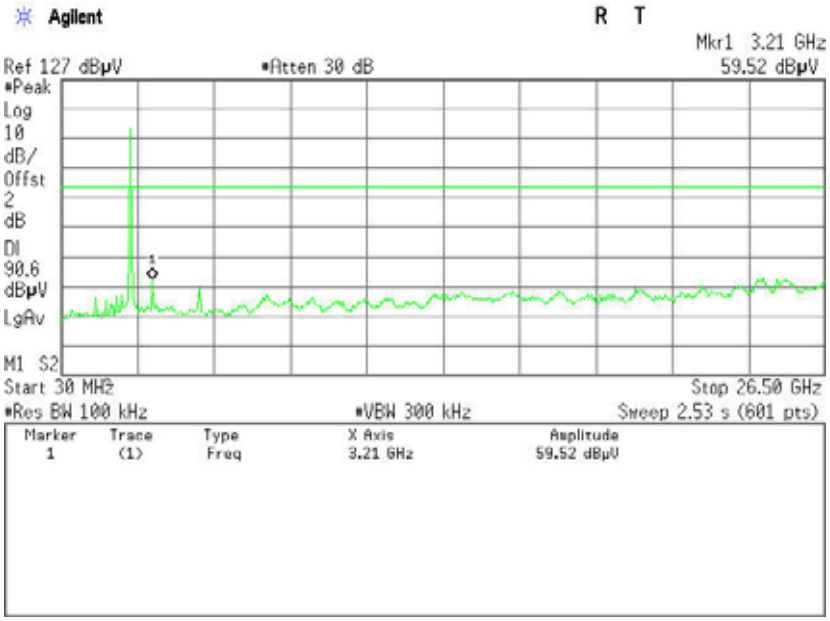
CH High (2.45GHz ~2.5GHz)



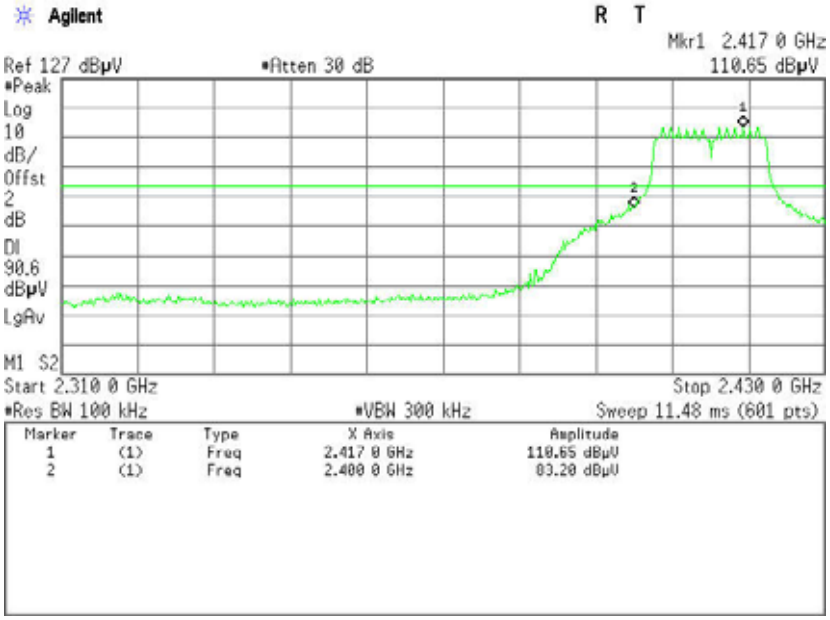
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

IEEE 802.11g mode

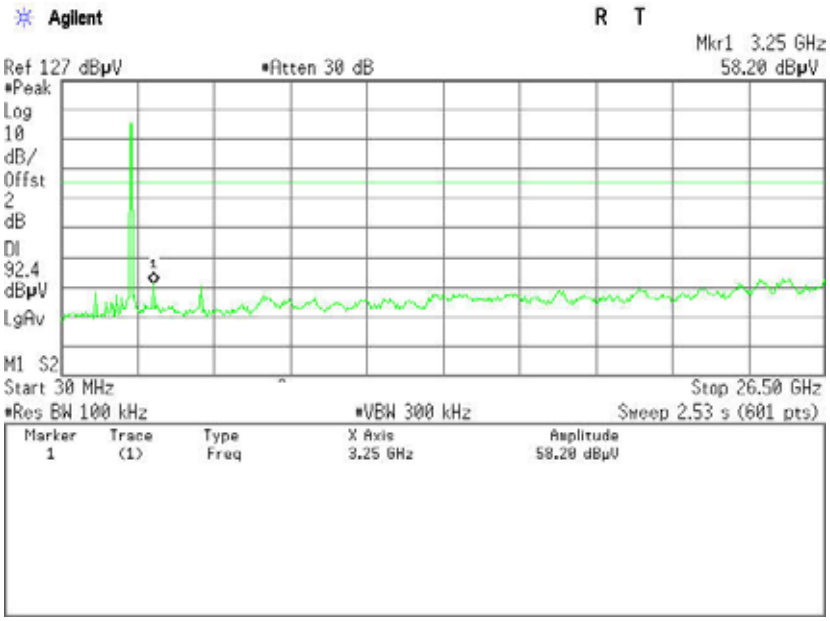
CH Low (30MHz ~26.5GHz)



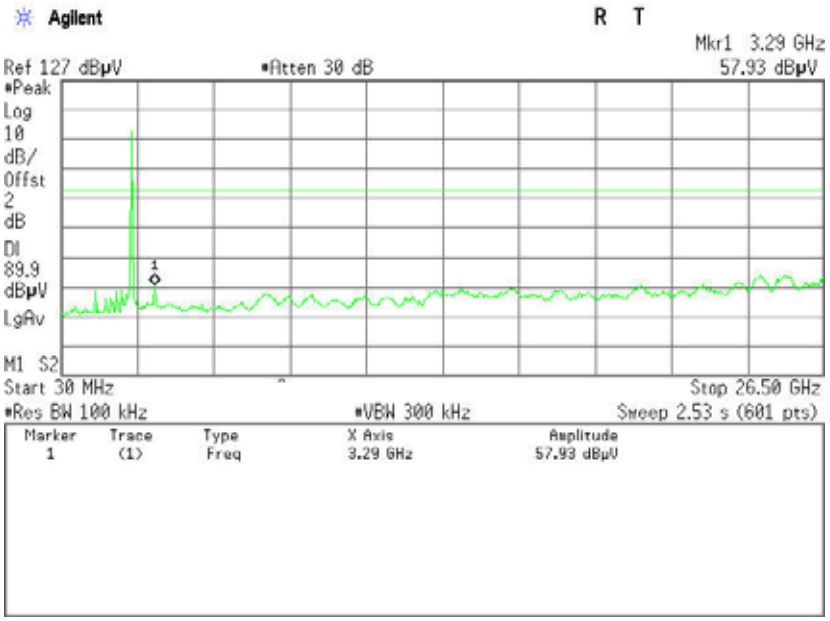
CH Low (2.31GHz ~2.43GHz)



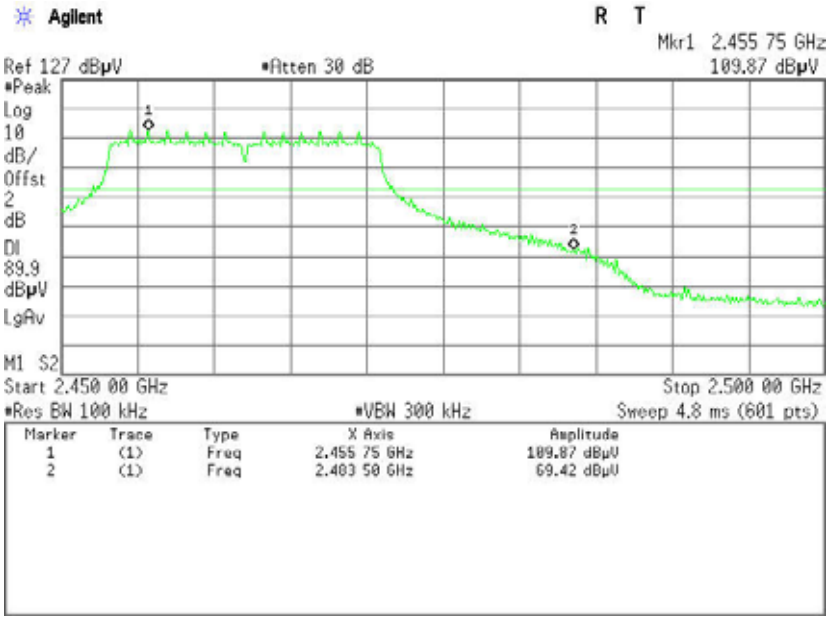
CH Mid (30MHz ~26.5GHz)



CH High (30MHz ~26.5GHz)



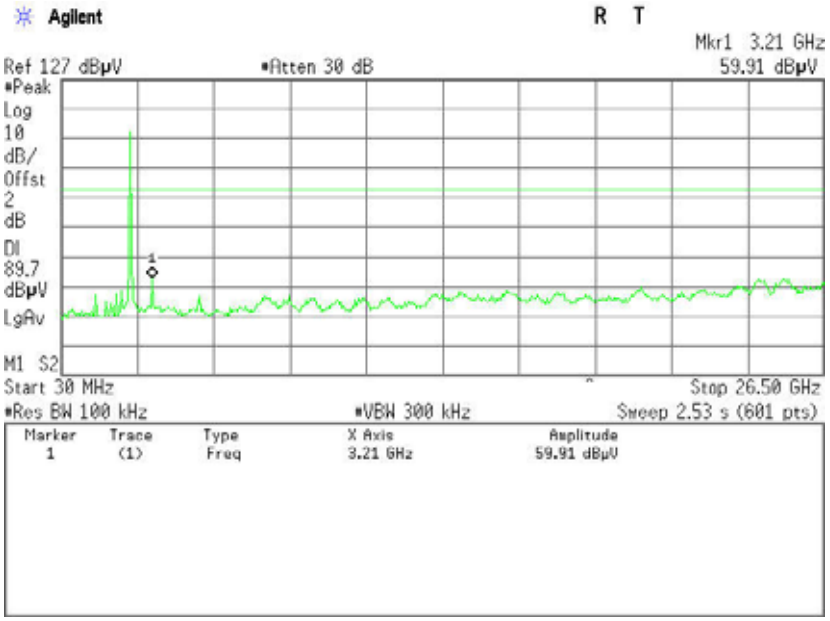
CH High (2.45GHz ~2.5GHz)



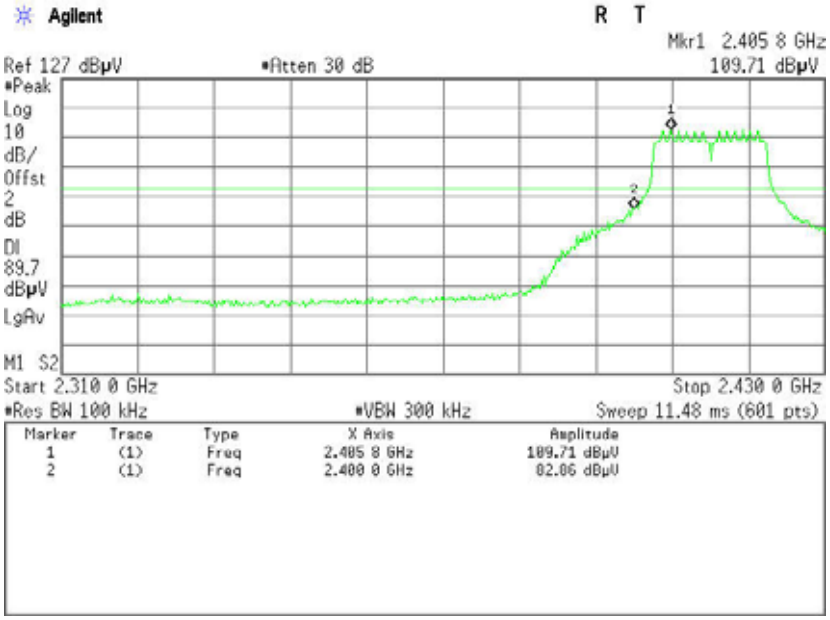
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

IEEE 802.11n HT20 mode

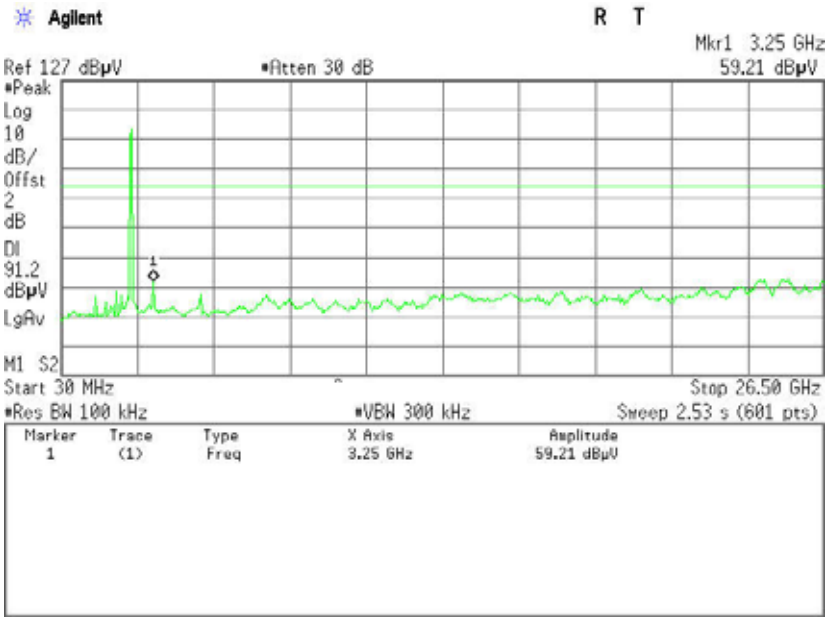
CH Low (30MHz ~26.5GHz)



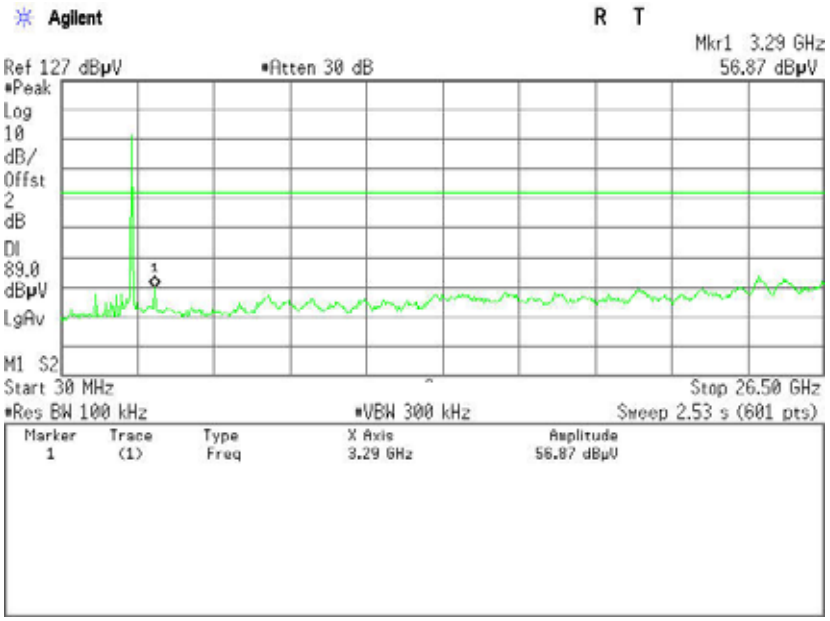
CH Low (2.31GHz ~2.43GHz)



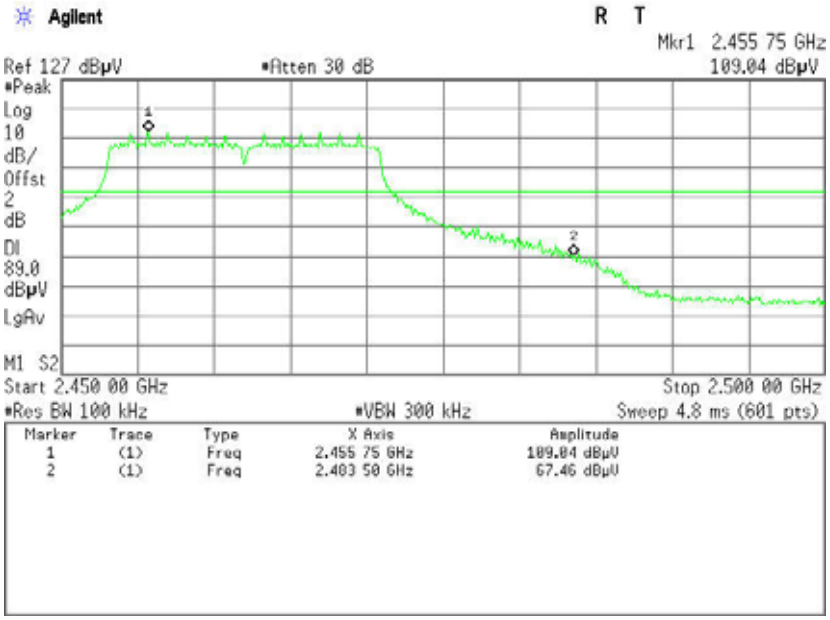
CH Mid (30MHz ~26.5GHz)



CH High (30MHz ~26.5GHz)



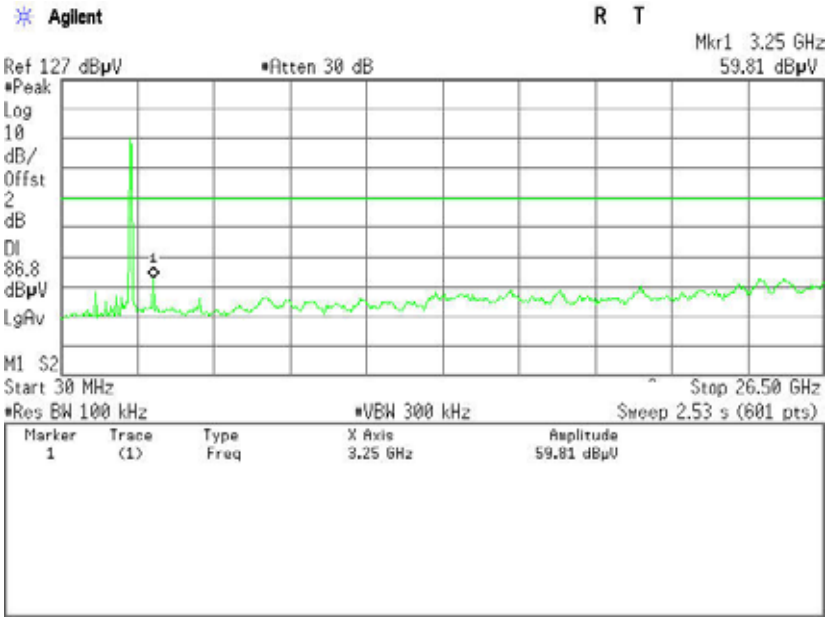
CH High (2.45GHz ~2.5GHz)



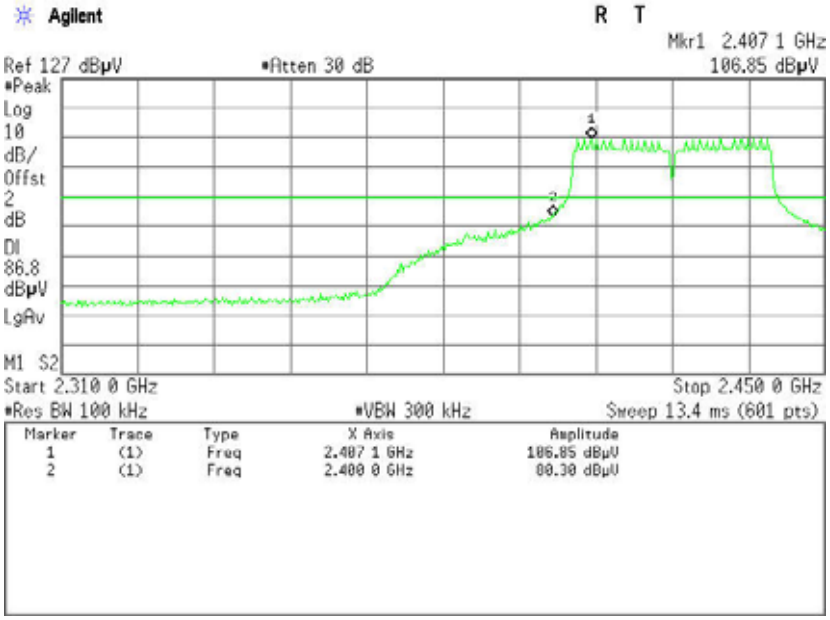
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

IEEE 802.11n HT40 mode

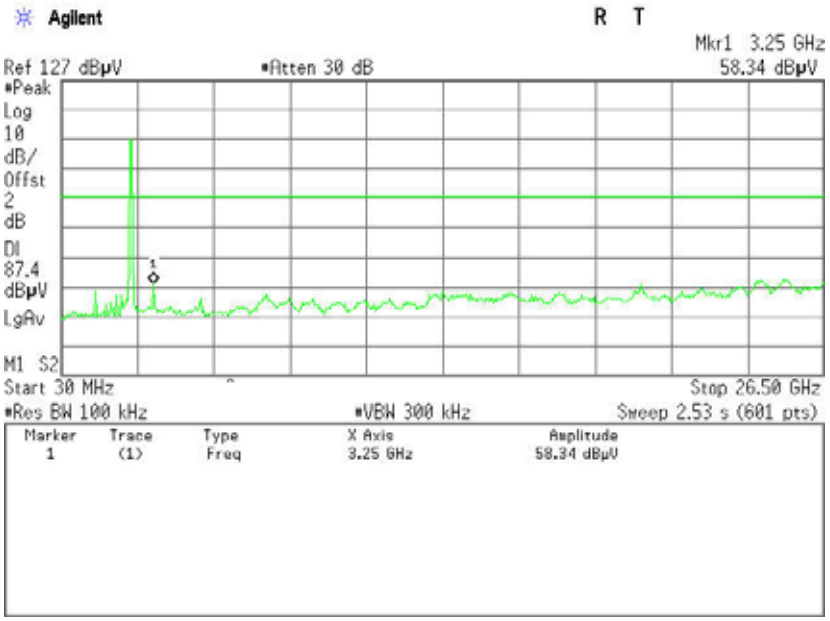
CH Low (30MHz ~26.5GHz)



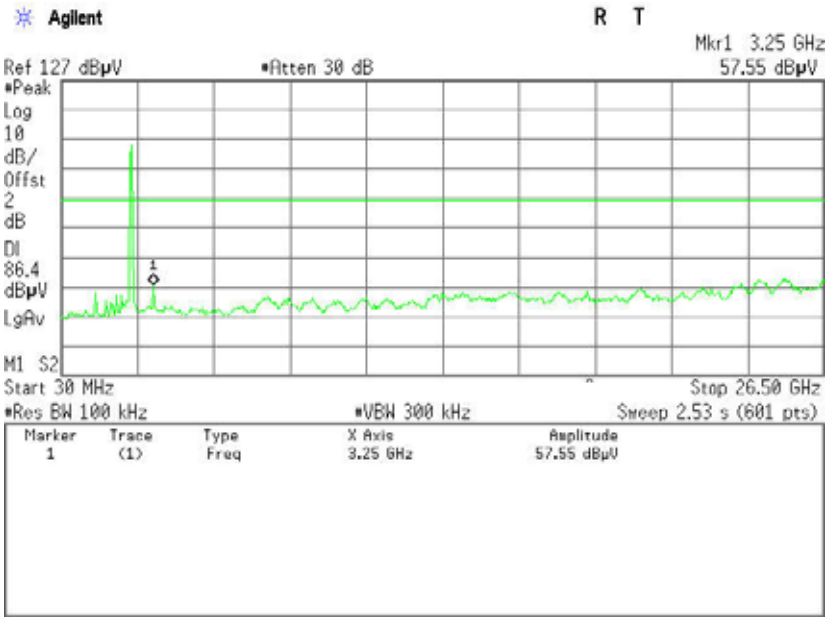
CH Low (2.31GHz ~2.43GHz)



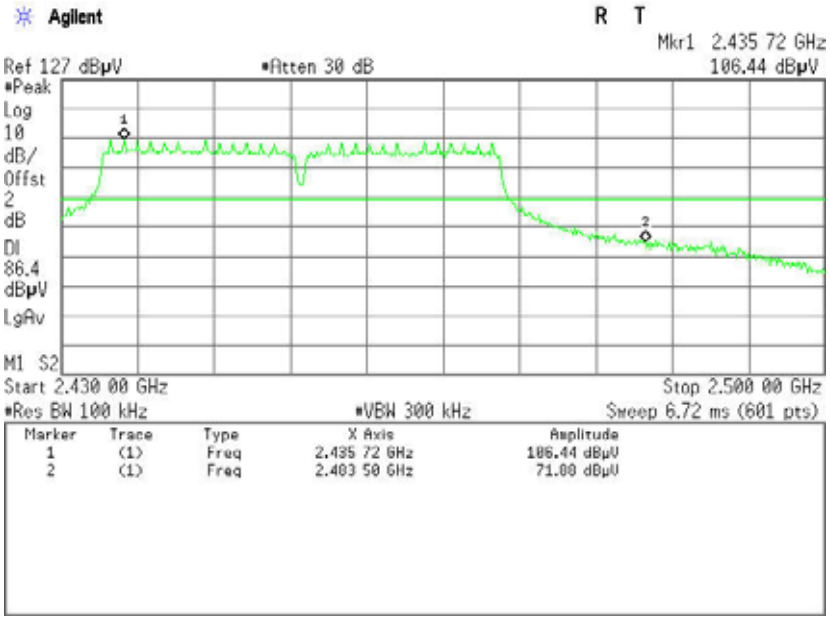
CH Mid (30MHz ~26.5GHz)



CH High (30MHz ~26.5GHz)



CH High (2.45GHz ~2.5GHz)



8.5 RADIATED EMISSIONS

8.5.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§ 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 (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** 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.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

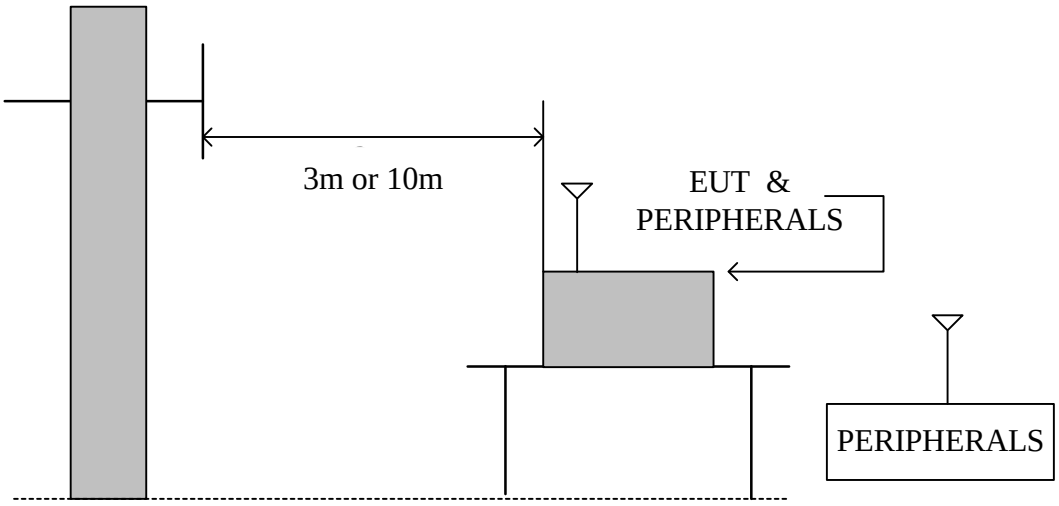
TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/08/2015
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2015
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	07/09/2015
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/01/2015
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/01/2015
Loop Antenna	A、R、A	PLA-1030/B	1029	09/26/2015
Turn Table	N/A	N/A	N/A	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R
Controller	CT	N/A	N/A	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/28/2015
Antenna Tower	SUNOL	TLT2	N/A	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2		

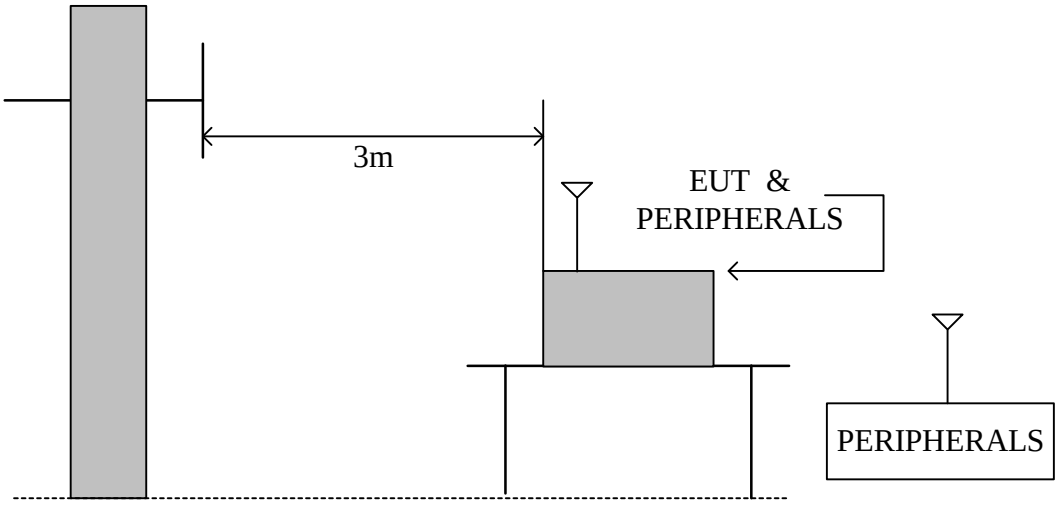
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. White measuring the radiated emission below 1GHz, the EUT was set 3/10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. The tests were performed in accordance with KDB 558074 5.4 .

NOTE：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

TEST RESULTS

No non-compliance noted.

8.5.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

Below 1 GHz

Operation Mode:	TX	**Test Date:**	October 21, 2014
Temperature:	24°C	**Tested by:**	Mack Li
Humidity:	52% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
104.6900	55.77	-22.81	32.96	43.50	-10.54	V	QP
250.1900	51.94	-21.06	30.88	46.00	-15.12	V	QP
399.5700	53.05	-16.10	36.95	46.00	-9.05	V	QP
600.3600	54.89	-12.86	42.03	46.00	-3.97	V	QP
800.1800	42.78	-11.11	31.67	46.00	-14.33	V	QP
874.8700	41.19	-10.14	31.05	46.00	-14.95	V	QP
151.2500	53.42	-21.86	31.56	43.50	-11.94	H	QP
250.1900	55.15	-21.06	34.09	46.00	-11.91	H	QP
399.5700	56.49	-16.10	40.39	46.00	-5.61	H	QP
600.3600	54.22	-12.86	41.36	46.00	-4.64	H	QP
749.7400	41.86	-11.19	30.67	46.00	-15.33	H	QP
874.8700	44.80	-10.14	34.66	46.00	-11.34	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

8.5.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Test Mode: TX / IEEE 802.11b (CH Low) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1000.0000	49.22	-8.82	40.40	74.00	-33.60	V	Peak
1999.000	49.38	-8.31	41.07	74.00	-32.93	V	Peak
2224.000	48.19	-7.36	40.83	74.00	-33.17	V	Peak
3178.000	44.36	-3.48	40.88	74.00	-33.12	V	Peak
4825.000	51.54	1.78	53.32	74.00	-20.68	V	Peak
4825.000	48.64	1.78	50.42	54.00	-3.58	V	AVG
5482.000	41.06	2.55	43.61	74.00	-30.39	V	Peak
1000.0000	47.98	-8.82	39.16	74.00	-34.84	H	Peak
1648.000	49.91	-9.92	39.99	74.00	-34.01	H	Peak
1999.000	49.22	-8.31	40.91	74.00	-33.09	H	Peak
3196.000	43.49	-3.44	40.05	74.00	-33.95	H	Peak
3970.000	42.58	-1.15	41.43	74.00	-32.57	H	Peak
4825.000	50.87	1.78	52.65	74.00	-21.35	H	Peak
4825.000	49.36	1.78	51.14	54.00	-2.86	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).*

Test Mode: TX / IEEE 802.11b (CH Mid) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1162.000	51.69	-12.56	39.13	74.00	-34.87	V	peak
1495.000	50.00	-11.12	38.88	74.00	-35.12	V	peak
1999.000	49.76	-8.31	41.45	74.00	-32.55	V	peak
3115.000	44.33	-3.59	40.74	74.00	-33.26	V	peak
4051.000	42.00	-0.89	41.11	74.00	-32.89	V	peak
4870.000	50.23	1.97	52.20	74.00	-21.80	V	peak
4870.000	48.88	1.97	50.85	54.00	-3.15	V	AVG
1000.0000	47.33	-8.82	38.51	74.00	-35.49	H	Peak
1495.000	53.94	-11.12	42.82	74.00	-31.18	H	Peak
1999.000	49.01	-8.31	40.70	74.00	-33.30	H	Peak
3142.000	44.38	-3.54	40.84	74.00	-33.16	H	Peak
3934.000	43.50	-1.28	42.22	74.00	-31.78	H	Peak
4870.000	51.77	1.97	53.74	74.00	-20.26	H	Peak
4870.000	49.99	1.97	51.96	54.00	-2.04	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).*

Test Mode: TX / IEEE 802.11b (CH High) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1000.0000	49.85	-8.82	41.03	74.00	-32.97	V	peak
1495.000	51.97	-11.12	40.85	74.00	-33.15	V	peak
1999.000	50.00	-8.31	41.69	74.00	-32.31	V	peak
3142.000	43.89	-3.54	40.35	74.00	-33.65	V	peak
4240.000	42.37	-0.33	42.04	74.00	-31.96	V	peak
4924.000	47.09	2.19	49.28	74.00	-24.72	V	peak
1000.0000	47.74	-8.82	38.92	74.00	-35.08	H	Peak
1162.000	50.29	-12.56	37.73	74.00	-36.27	H	Peak
1999.000	49.82	-8.31	41.51	74.00	-32.49	H	Peak
2800.000	44.30	-4.76	39.54	74.00	-34.46	H	Peak
3709.000	42.98	-2.12	40.86	74.00	-33.14	H	Peak
4924.000	47.55	2.19	49.74	74.00	-24.26	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).*

Test Mode: TX / IEEE 802.11g (CH Low) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1000.0000	50.35	-8.82	41.53	74.00	-32.47	V	Peak
1495.000	50.03	-11.12	38.91	74.00	-35.09	V	Peak
1999.000	49.51	-8.31	41.20	74.00	-32.80	V	Peak
2215.000	48.87	-7.40	41.47	74.00	-32.53	V	Peak
3772.000	43.30	-1.88	41.42	74.00	-32.58	V	Peak
4816.000	48.94	1.74	50.68	74.00	-23.32	V	Peak
1666.000	54.12	-9.76	44.36	74.00	-29.64	H	Peak
1999.000	49.02	-8.31	40.71	74.00	-33.29	H	Peak
2215.000	48.27	-7.40	40.87	74.00	-33.13	H	Peak
4033.000	42.34	-0.94	41.40	74.00	-32.60	H	Peak
4825.000	46.23	1.78	48.01	74.00	-25.99	H	Peak
6418.000	41.18	5.19	46.37	74.00	-27.63	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).*

Test Mode: TX / IEEE 802.11g (CH Mid) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1000.0000	55.99	-8.82	47.17	74.00	-26.83	V	Peak
1252.000	51.98	-13.02	38.96	74.00	-35.04	V	Peak
1999.000	50.80	-8.31	42.49	74.00	-31.51	V	Peak
2584.000	46.72	-5.80	40.92	74.00	-33.08	V	Peak
3817.000	42.68	-1.72	40.96	74.00	-33.04	V	Peak
4870.000	51.92	1.97	53.89	74.00	-20.11	V	Peak
4870.000	39.32	1.97	41.29	54.00	-12.71	V	AVG
1000.0000	49.59	-8.82	40.77	74.00	-33.23	H	Peak
1495.000	48.54	-11.12	37.42	74.00	-36.58	H	Peak
1999.000	48.63	-8.31	40.32	74.00	-33.68	H	Peak
2224.000	49.06	-7.36	41.70	74.00	-32.30	H	Peak
3907.000	43.28	-1.38	41.90	74.00	-32.10	H	Peak
4879.000	51.76	2.01	53.77	74.00	-20.23	H	Peak
4879.000	39.19	2.01	41.20	54.00	-12.80	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).*

Test Mode: TX / IEEE 802.11g (CH High) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1000.0000	47.70	-8.82	38.88	74.00	-35.12	V	Peak
1666.000	49.14	-9.76	39.38	74.00	-34.62	V	Peak
1990.000	53.65	-8.32	45.33	74.00	-28.67	V	Peak
2863.000	44.05	-4.46	39.59	74.00	-34.41	V	Peak
3214.000	43.87	-3.41	40.46	74.00	-33.54	V	Peak
4924.000	46.68	2.19	48.87	74.00	-25.13	V	Peak
1000.0000	50.94	-8.82	42.12	74.00	-31.88	H	Peak
1666.000	50.49	-9.76	40.73	74.00	-33.27	H	Peak
2233.000	47.67	-7.33	40.34	74.00	-33.66	H	Peak
2827.000	44.92	-4.63	40.29	74.00	-33.71	H	Peak
4213.000	41.59	-0.41	41.18	74.00	-32.82	H	Peak
4924.000	47.67	2.19	49.86	74.00	-24.14	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).*

Test Mode: TX / IEEE 802.11n HT20 MHz(CH Low) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3313.000	42.59	-3.23	39.36	74.00	-34.64	V	Peak
4042.000	40.87	-0.92	39.95	74.00	-34.05	V	Peak
4825.000	47.55	1.78	49.33	74.00	-24.67	V	Peak
5842.000	39.03	3.12	42.15	74.00	-31.85	V	Peak
6877.000	40.41	7.17	47.58	74.00	-26.42	V	Peak
7768.000	40.48	9.20	49.68	74.00	-24.32	V	Peak
2224.000	49.69	-7.36	42.33	74.00	-31.67	H	Peak
3862.000	40.61	-1.55	39.06	74.00	-34.94	H	Peak
4816.000	44.84	1.74	46.58	74.00	-27.42	H	Peak
5788.000	39.80	3.03	42.83	74.00	-31.17	H	Peak
6958.000	40.07	7.52	47.59	74.00	-26.41	H	Peak
7669.000	40.36	9.00	49.36	74.00	-24.64	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).*

Test Mode: TX / IEEE 802.11n HT20 MHz(CH Mid) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4105.000	40.74	-0.73	40.01	74.00	-33.99	V	Peak
4879.000	48.96	2.01	50.97	74.00	-23.03	V	Peak
5986.000	39.86	3.37	43.23	74.00	-30.77	V	Peak
6886.000	41.44	7.21	48.65	74.00	-25.35	V	Peak
7669.000	40.85	9.00	49.85	74.00	-24.15	V	Peak
8434.000	40.15	9.41	49.56	74.00	-24.44	V	Peak
2224.000	47.46	-7.36	40.10	74.00	-33.90	H	Peak
4042.000	41.17	-0.92	40.25	74.00	-33.75	H	Peak
4870.000	47.52	1.97	49.49	74.00	-24.51	H	Peak
6112.000	40.69	3.87	44.56	74.00	-29.44	H	Peak
7624.000	41.04	8.92	49.96	74.00	-24.04	H	Peak
8425.000	40.66	9.42	50.08	74.00	-23.92	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).*

Test Mode: TX / IEEE 802.11n HT20 MHz(CH High) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4033.000	40.66	-0.94	39.72	74.00	-34.28	V	Peak
4924.000	43.90	2.19	46.09	74.00	-27.91	V	Peak
5716.000	40.07	2.91	42.98	74.00	-31.02	V	Peak
6994.000	39.85	7.67	47.52	74.00	-26.48	V	Peak
7651.000	40.33	8.97	49.30	74.00	-24.70	V	Peak
8461.000	40.48	9.40	49.88	74.00	-24.12	V	Peak
2215.000	47.27	-7.40	39.87	74.00	-34.13	H	Peak
3961.000	40.98	-1.18	39.80	74.00	-34.20	H	Peak
4924.000	43.90	2.19	46.09	74.00	-27.91	H	Peak
6094.000	40.73	3.80	44.53	74.00	-29.47	H	Peak
7543.000	39.08	8.76	47.84	74.00	-26.16	H	Peak
8362.000	40.19	9.45	49.64	74.00	-24.36	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).*

Test Mode: TX / IEEE 802.11n HT40 MHz(CH Low) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3844.000	41.67	-1.62	40.05	74.00	-33.95	V	Peak
4816.000	41.71	1.74	43.45	74.00	-30.55	V	Peak
5815.000	40.26	3.08	43.34	74.00	-30.66	V	Peak
6526.000	39.95	5.66	45.61	74.00	-28.39	V	Peak
7201.000	39.57	8.09	47.66	74.00	-26.34	V	Peak
8407.000	40.04	9.43	49.47	74.00	-24.53	V	Peak
3736.000	42.85	-2.02	40.83	74.00	-33.17	H	Peak
4870.000	41.14	1.97	43.11	74.00	-30.89	H	Peak
5338.000	41.33	2.54	43.87	74.00	-30.13	H	Peak
6562.000	39.43	5.81	45.24	74.00	-28.76	H	Peak
7192.000	39.34	8.07	47.41	74.00	-26.59	H	Peak
7741.000	40.54	9.14	49.68	74.00	-24.32	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).*

Test Mode: TX / IEEE 802.11n HT40 MHz(CH Mid) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3736.000	41.82	-2.02	39.80	74.00	-34.20	V	Peak
4870.000	43.71	1.97	45.68	74.00	-28.32	V	Peak
5995.000	40.43	3.38	43.81	74.00	-30.19	V	Peak
6985.000	40.03	7.64	47.67	74.00	-26.33	V	Peak
7678.000	39.67	9.02	48.69	74.00	-25.31	V	Peak
8425.000	40.25	9.42	49.67	74.00	-24.33	V	Peak
3718.000	41.99	-2.08	39.91	74.00	-34.09	H	Peak
4879.000	44.79	2.01	46.80	74.00	-27.20	H	Peak
5878.000	39.61	3.19	42.80	74.00	-31.20	H	Peak
6850.000	40.29	7.05	47.34	74.00	-26.66	H	Peak
7777.000	39.65	9.22	48.87	74.00	-25.13	H	Peak
8470.000	40.23	9.39	49.62	74.00	-24.38	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).*

Test Mode: TX / IEEE 802.11n HT40 MHz(CH High) **Tested by:** Mack Li
Ambient temperature: 24°C **Relative humidity:** 52 % RH **Date:** October 12, 2014

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
4069.000	41.51	-0.84	40.67	74.00	-33.33	V	Peak
4906.000	44.09	2.12	46.21	74.00	-27.79	V	Peak
6238.000	39.89	4.42	44.31	74.00	-29.69	V	Peak
7003.000	39.85	7.71	47.56	74.00	-26.44	V	Peak
7813.000	39.56	9.29	48.85	74.00	-25.15	V	Peak
8596.000	39.41	9.32	48.73	74.00	-25.27	V	Peak
3745.000	42.67	-1.98	40.69	74.00	-33.31	H	Peak
4906.000	43.08	2.12	45.20	74.00	-28.80	H	Peak
5779.000	40.70	3.02	43.72	74.00	-30.28	H	Peak
6877.000	40.77	7.17	47.94	74.00	-26.06	H	Peak
7741.000	40.54	9.14	49.68	74.00	-24.32	H	Peak
8362.000	40.24	9.45	49.69	74.00	-24.31	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).*

8.5.4 RESTRICTED BAND EDGES

Test Plot

IEEE 802.11b mode

Band Edges (CH Low)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	51.91	-6.60	58.51	74.00	-15.49	Peak	Vertical
2	2390.0000	41.79	-6.60	48.39	54.00	-5.61	Average	Vertical
3	2386.2000	46.23	-6.60	52.83	54.00	-1.17	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

Detector mode: Average **Polarity: Horizontal**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	50.64	-6.60	57.24	74.00	-16.76	Peak	Horizontal
2	2390.0000	41.39	-6.60	47.99	54.00	-6.01	Average	Horizontal
3	2386.2000	45.59	-6.60	52.19	54.00	-1.81	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	48.81	-6.24	55.05	74.00	-18.95	Peak	Vertical
2	2483.5000	40.45	-6.24	46.69	54.00	-7.31	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

Detector mode: Average **Polarity: Horizontal**

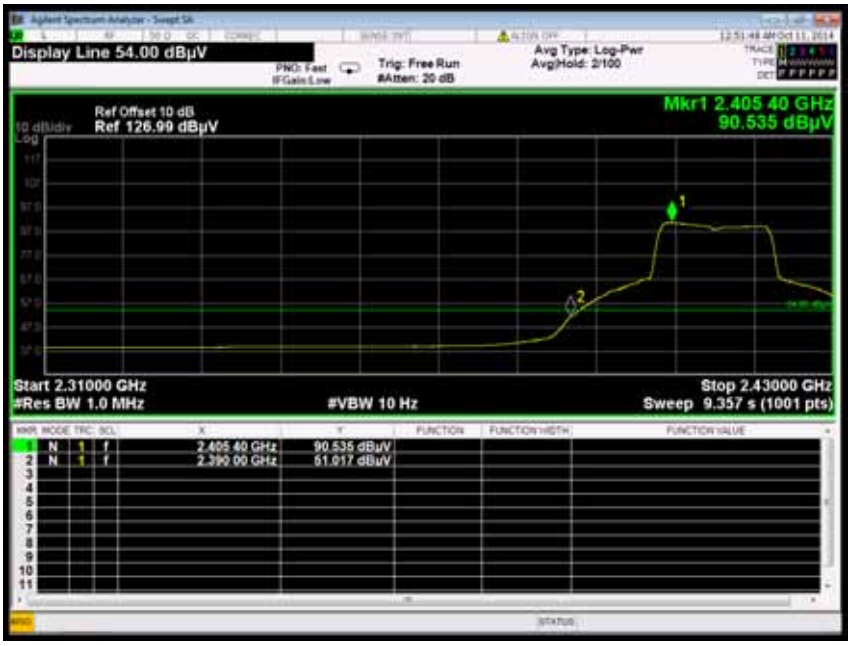
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	49.00	-6.24	55.24	74.00	-18.76	Peak	Vertical
2	2483.5000	39.93	-6.24	46.17	54.00	-7.83	Average	Vertical

IEEE 802.11g mode

Band Edges (CH Low)

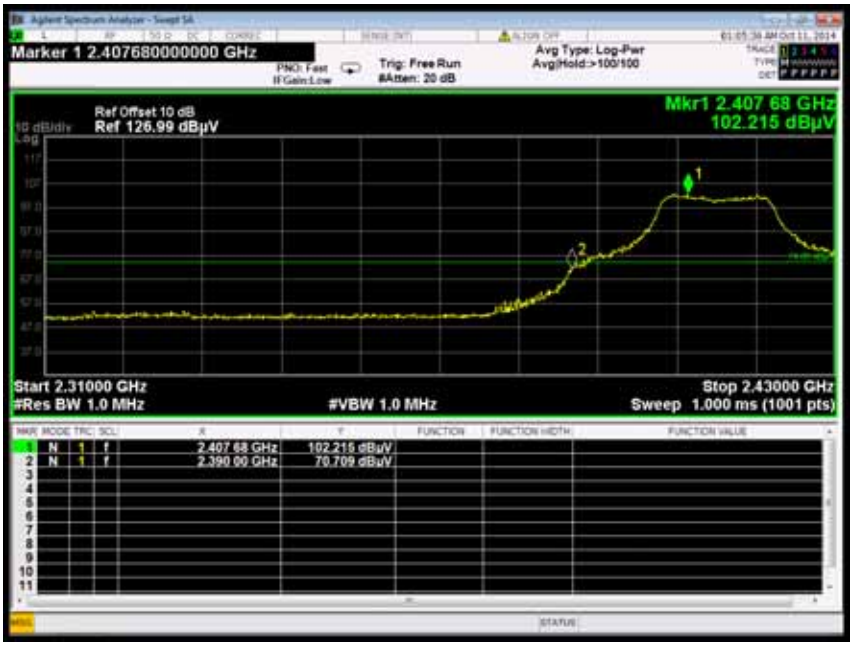
Detector mode: Peak Polarity: Vertical

Detector mode: Average Polarity: Vertical

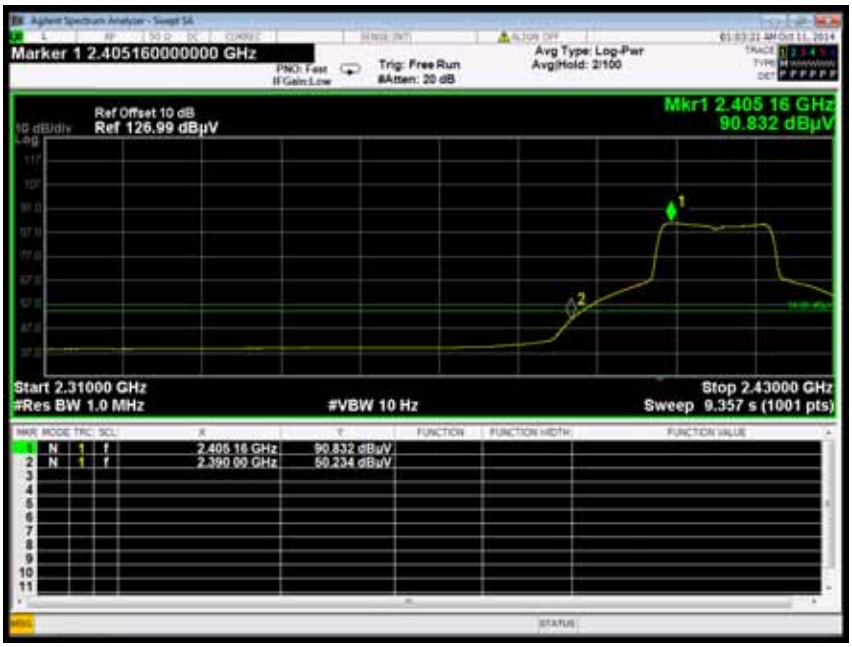


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	65.12	-6.60	71.72	74.00	-2.28	Peak	Vertical
2	2390.0000	44.42	-6.60	51.02	54.00	-2.98	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



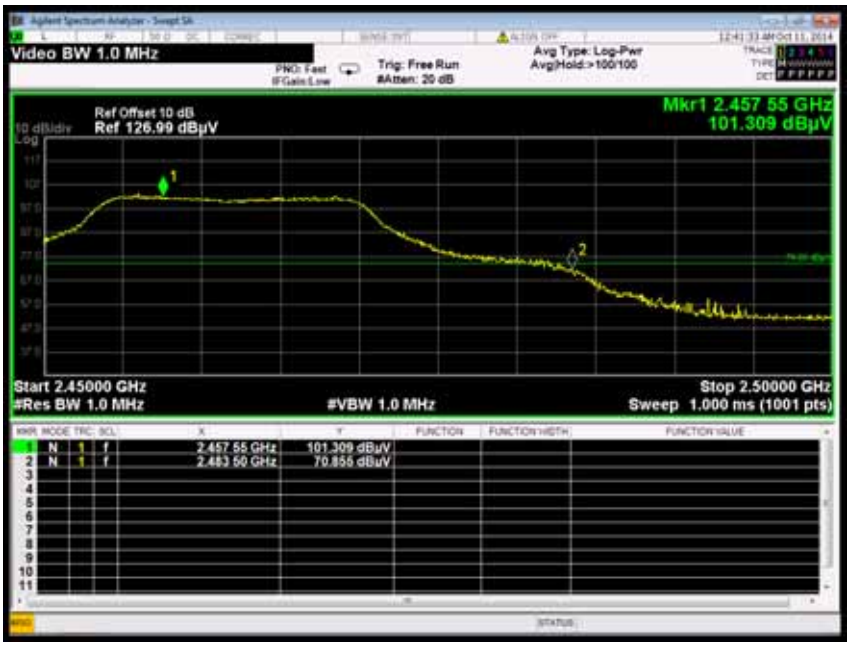
Detector mode: Average **Polarity: Horizontal**



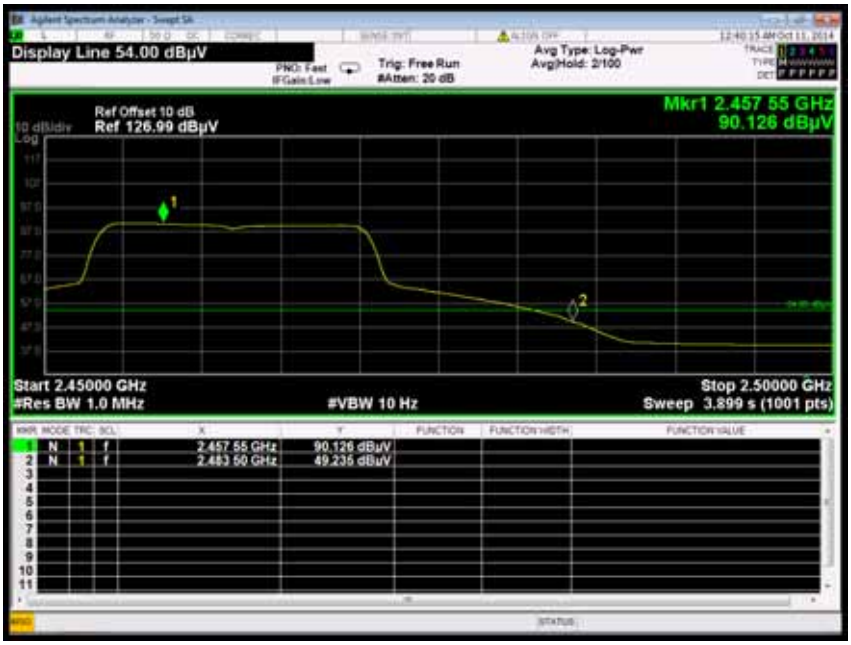
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	64.11	-6.60	70.71	74.00	-3.29	Peak	Horizontal
2	2390.0000	43.63	-6.60	50.23	54.00	-3.77	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak Polarity: Vertical



Detector mode: Average Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	64.62	-6.24	70.86	74.00	-3.15	Peak	Vertical
2	2483.5000	43.00	-6.24	49.24	54.00	-4.77	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

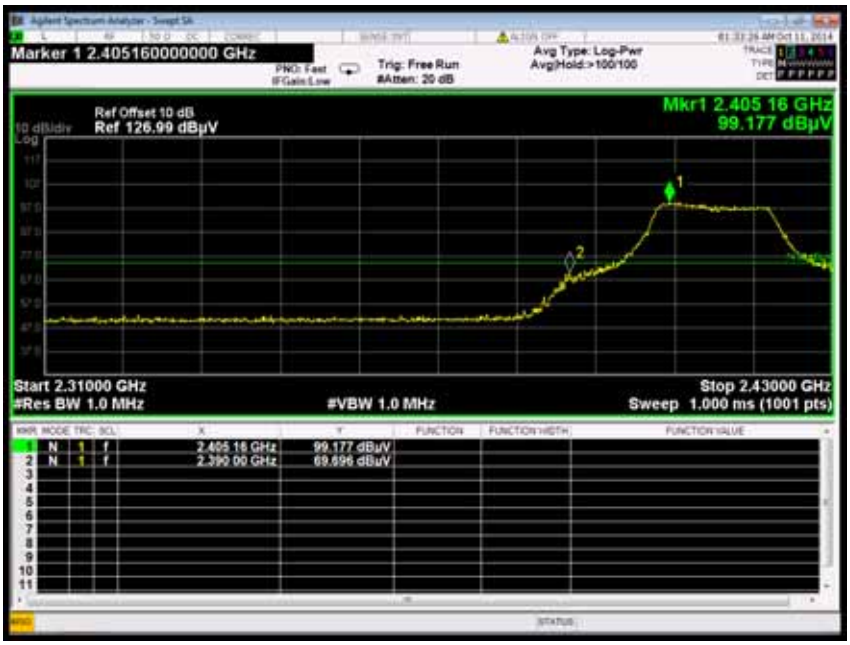
Detector mode: Average **Polarity: Horizontal**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	63.26	-6.24	69.50	74.00	-4.50	Peak	Horizontal
2	2483.5000	42.04	-6.24	48.28	54.00	-5.72	Average	Horizontal

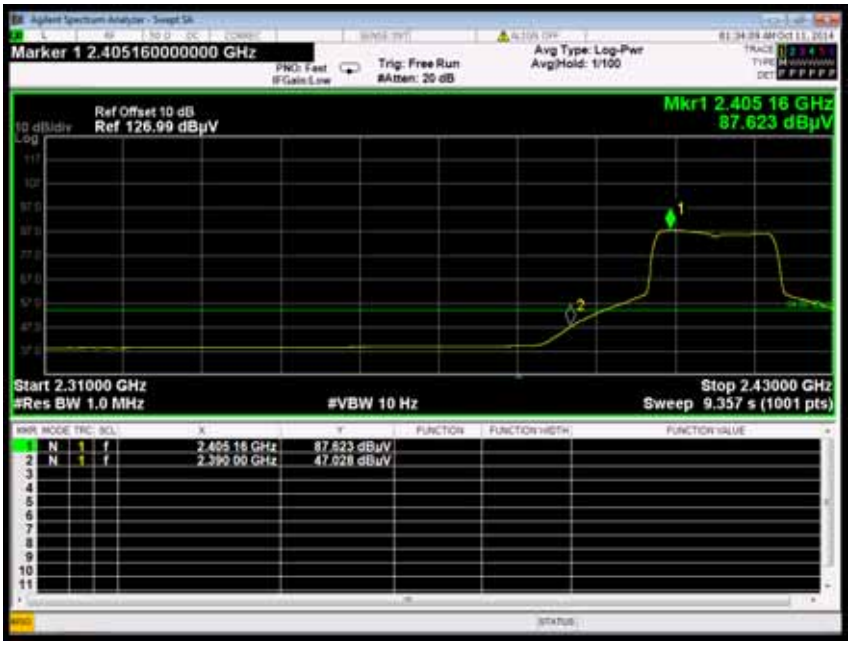
IEEE 802.11n HT20 MHz mode

Band Edges (CH Low)

Detector mode: Peak Polarity: Vertical

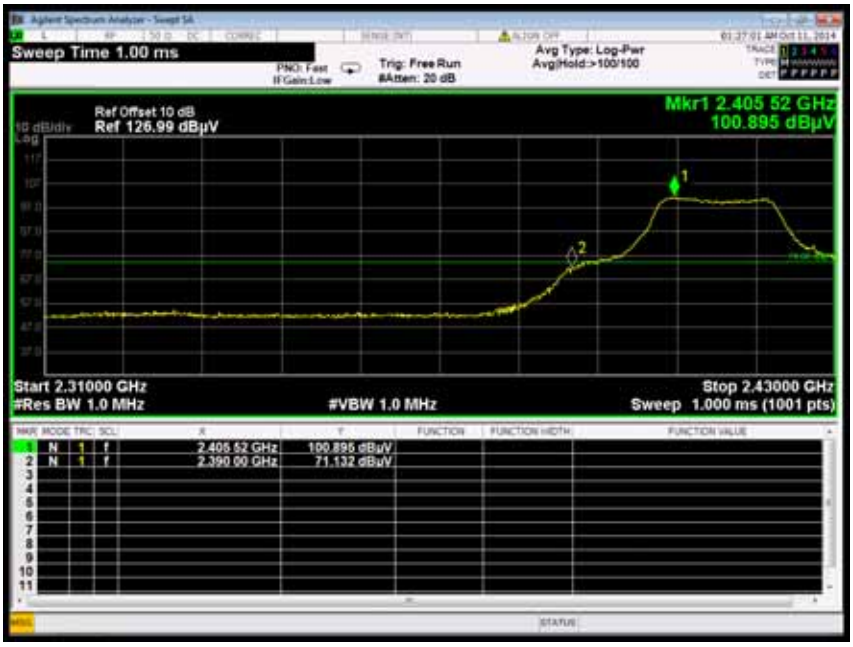


Detector mode: Average Polarity: Vertical

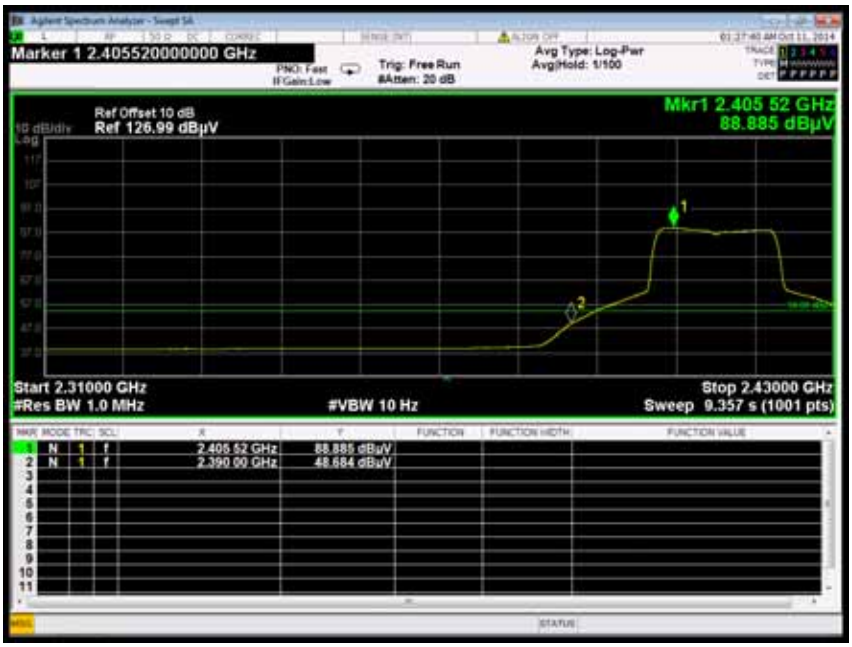


No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	63.10	-6.60	69.70	74.00	-4.30	Peak	Vertical
2	2390.0000	40.43	-6.60	47.03	54.00	-6.97	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**



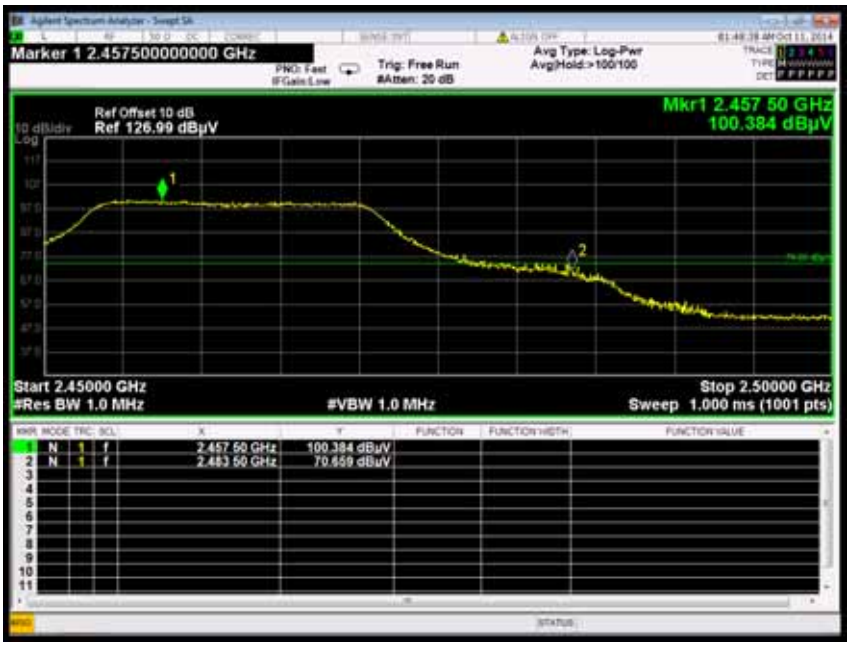
Detector mode: Average **Polarity: Horizontal**



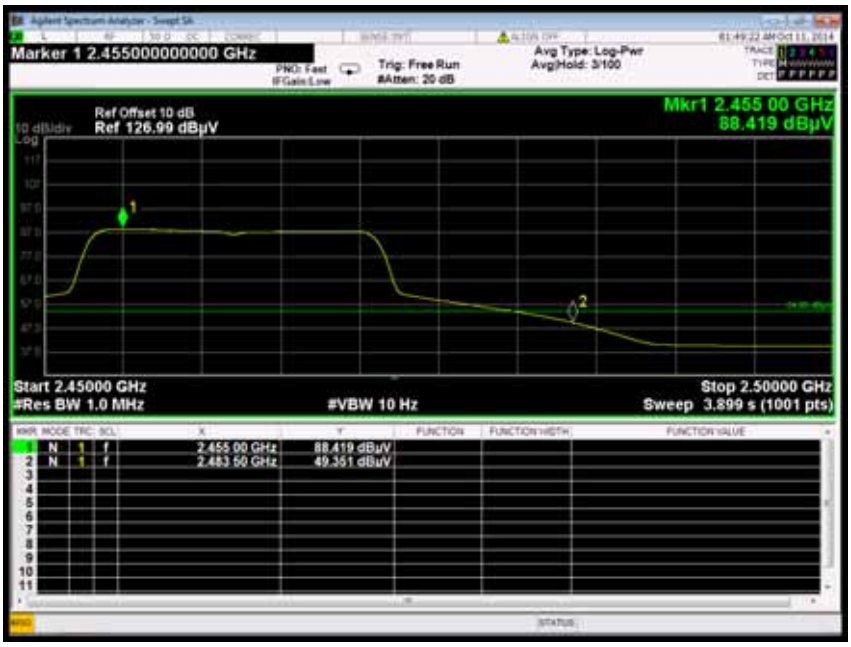
No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	64.53	-6.60	71.13	74.00	-2.87	Peak	Horizontal
2	2390.0000	42.08	-6.60	48.68	54.00	-5.32	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



Detector mode: Average **Polarity: Vertical**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	64.42	-6.24	70.66	74.00	-3.34	Peak	Vertical
2	2483.5000	43.11	-6.24	49.35	54.00	-4.65	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

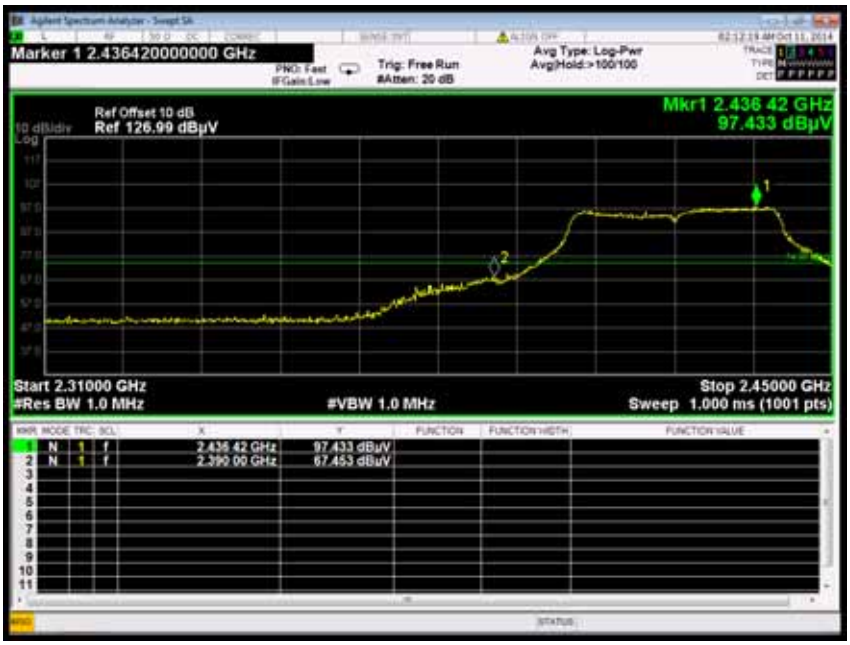
Detector mode: Average **Polarity: Horizontal**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	65.06	-6.24	71.30	74.00	-2.70	Peak	Horizontal
2	2483.5000	41.61	-6.24	47.85	54.00	-6.15	Average	Horizontal

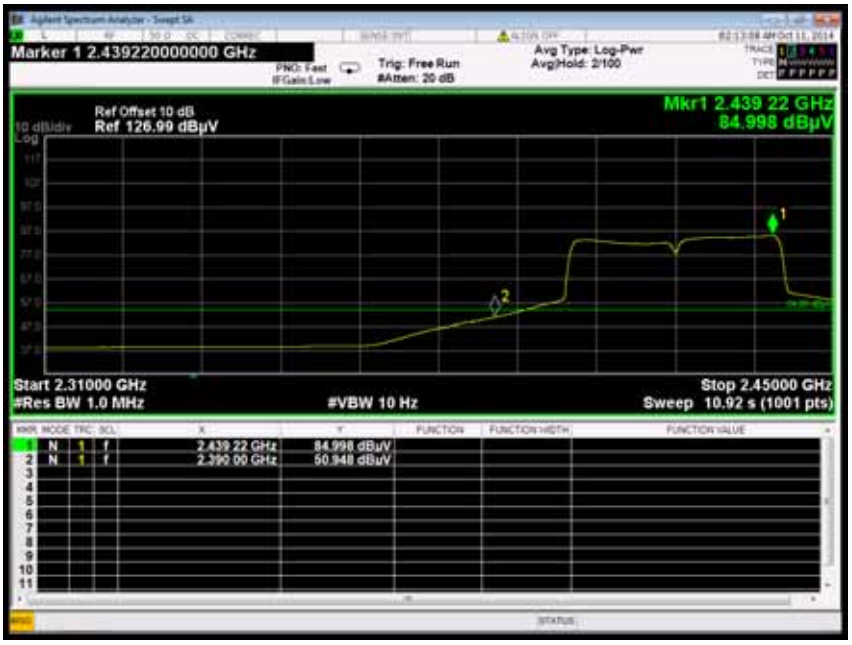
IEEE 802.11n HT20 MHz mode

Band Edges (CH Low)

Detector mode: Peak Polarity: Vertical



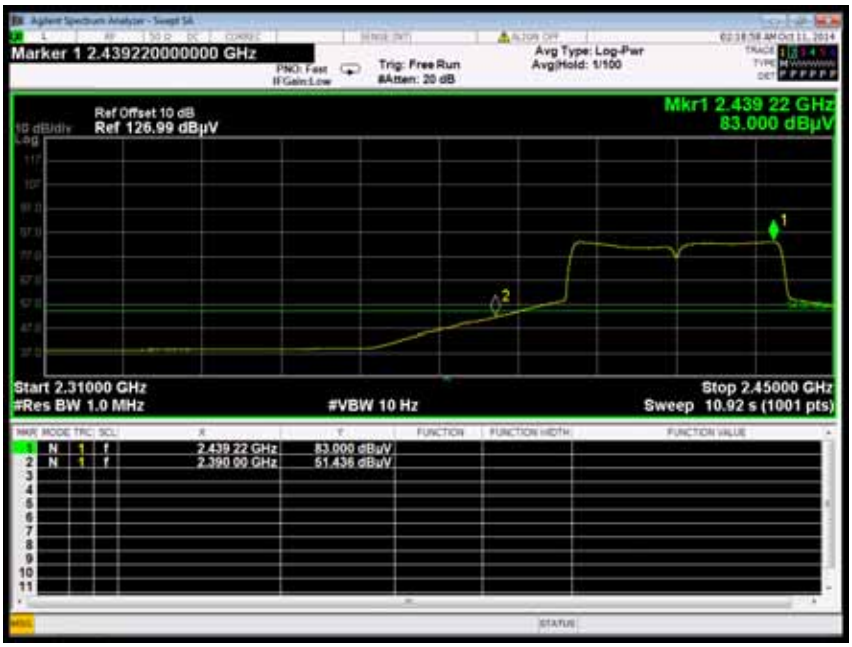
Detector mode: Average Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	60.85	-6.60	67.45	74.00	-6.55	Peak	Vertical
2	2390.0000	44.35	-6.60	50.95	54.00	-3.05	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

Detector mode: Average **Polarity: Horizontal**



No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2390.0000	61.62	-6.60	68.22	74.00	-5.78	Peak	Horizontal
2	2390.0000	44.84	-6.60	51.44	54.00	-2.56	Average	Horizontal

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**

Detector mode: Average **Polarity: Vertical**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	64.08	-6.24	70.32	74.00	-3.68	Peak	Vertical
2	2483.5000	46.44	-6.24	52.68	54.00	-1.32	Average	Vertical

Detector mode: Peak **Polarity: Horizontal**

Detector mode: Average **Polarity: Horizontal**

No.	Frequency (MHz)	Reading (dBuV)	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Antenna Pole
1	2483.5000	61.30	-6.24	67.54	74.00	-6.46	Peak	Horizontal
2	2483.5000	44.40	-6.24	50.64	54.00	-3.36	Average	Horizontal

8.6 POWERLINE CONDUCTED EMISSIONS

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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.

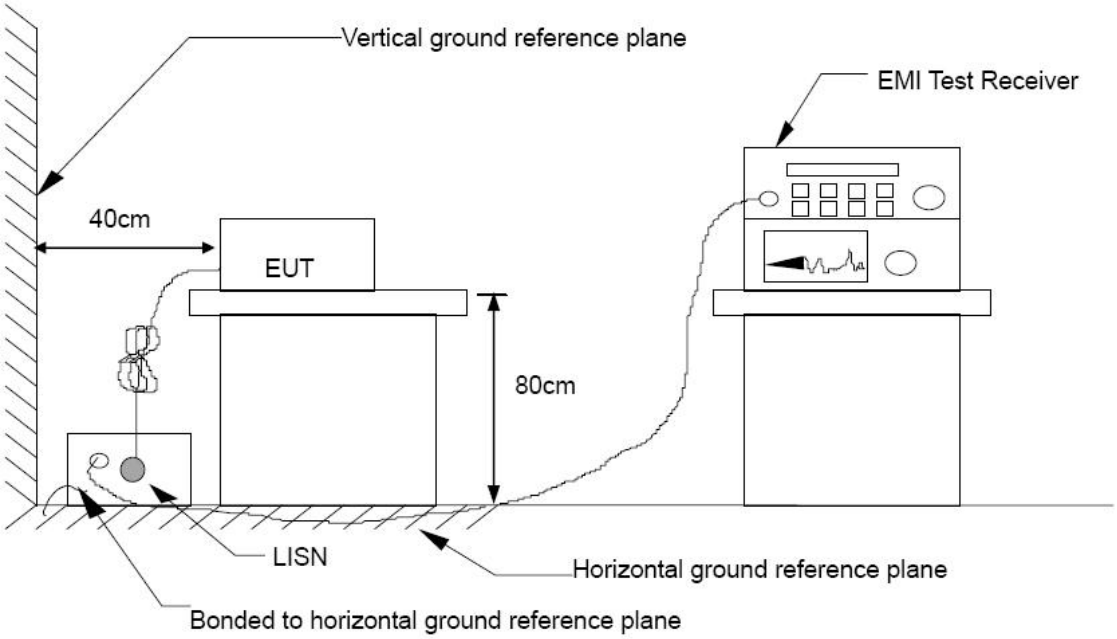
Frequency of Emission (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

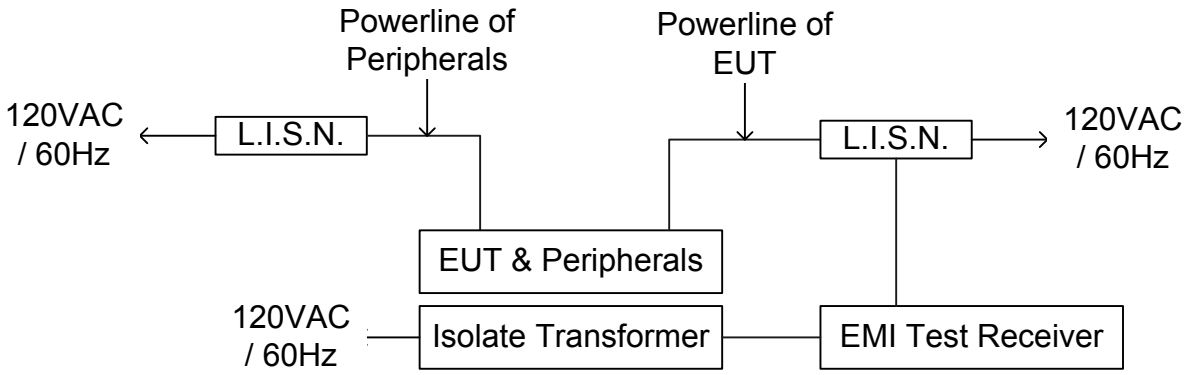
TEST EQUIPMENTS

The following test equipments are used during the conducted power line tests：

Conducted Emission room #1				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI TEST RECEIVER		ESCI	100783	03/08/2015
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	04/19/2015
LISN	EMCO	3825/2	8901-1459	03/08/2015
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/03/2015
Test S/W	e-3 (5.04211c) R&S (2.27)			

TEST SETUP





TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

TEST RESULTS

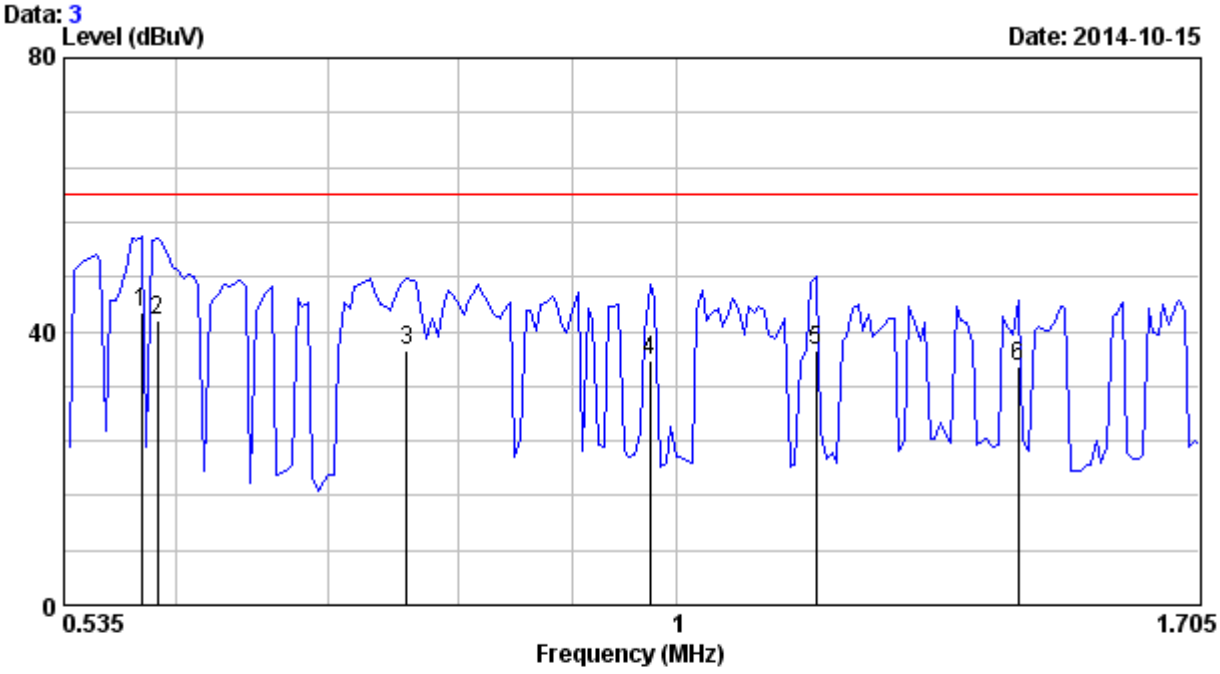
No non-compliance noted.

CONDUCTED RF VOLTAGE MEASUREMENT

Model No.	DHP-W220AV	**Test Mode**	Carrier on
Environmental Conditions	24.5℃, 55% RH	**Resolution Bandwidth**	9 KHz
Tested by	Vis Liang		

Line

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.58	8.00	0.24	34.41	42.65	60.00	-17.35	QP
0.59	7.99	0.25	33.48	41.72	60.00	-18.28	QP
0.76	7.93	0.29	28.96	37.17	60.00	-22.83	QP
0.97	7.87	0.24	27.67	35.78	60.00	-24.22	QP
1.15	7.86	0.24	29.18	37.29	60.00	-22.71	QP
1.42	7.87	0.25	26.68	34.80	60.00	-25.20	QP

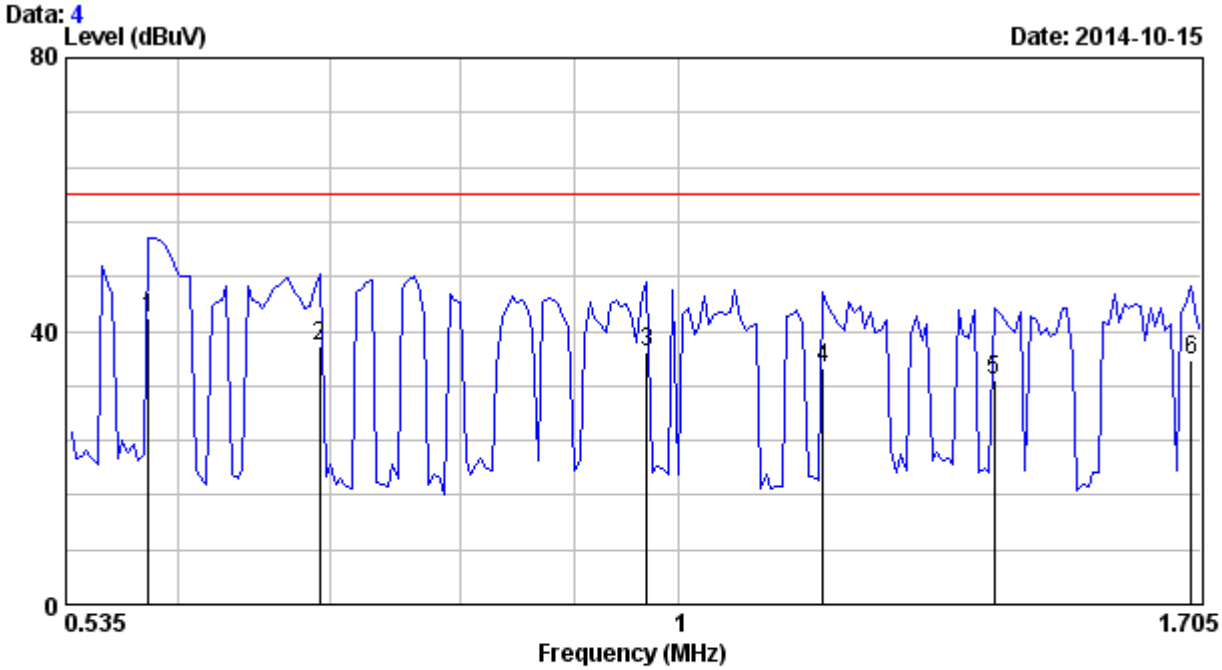
NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

Model No.	DHP-W220AV	Test Mode	Carrier on
Environmental Conditions	24.5℃, 55% RH	Resolution Bandwidth	9 KHz
Tested by	Vis Liang		

Neutral

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.58	8.04	0.24	33.60	41.89	60.00	-18.11	QP
0.69	8.00	0.26	29.67	37.93	60.00	-22.07	QP
0.97	7.93	0.24	28.67	36.83	60.00	-23.17	QP
1.16	7.92	0.24	26.37	34.53	60.00	-25.47	QP
1.38	7.92	0.24	24.78	32.94	60.00	-27.06	QP
1.69	7.92	0.25	27.44	35.61	60.00	-24.39	QP

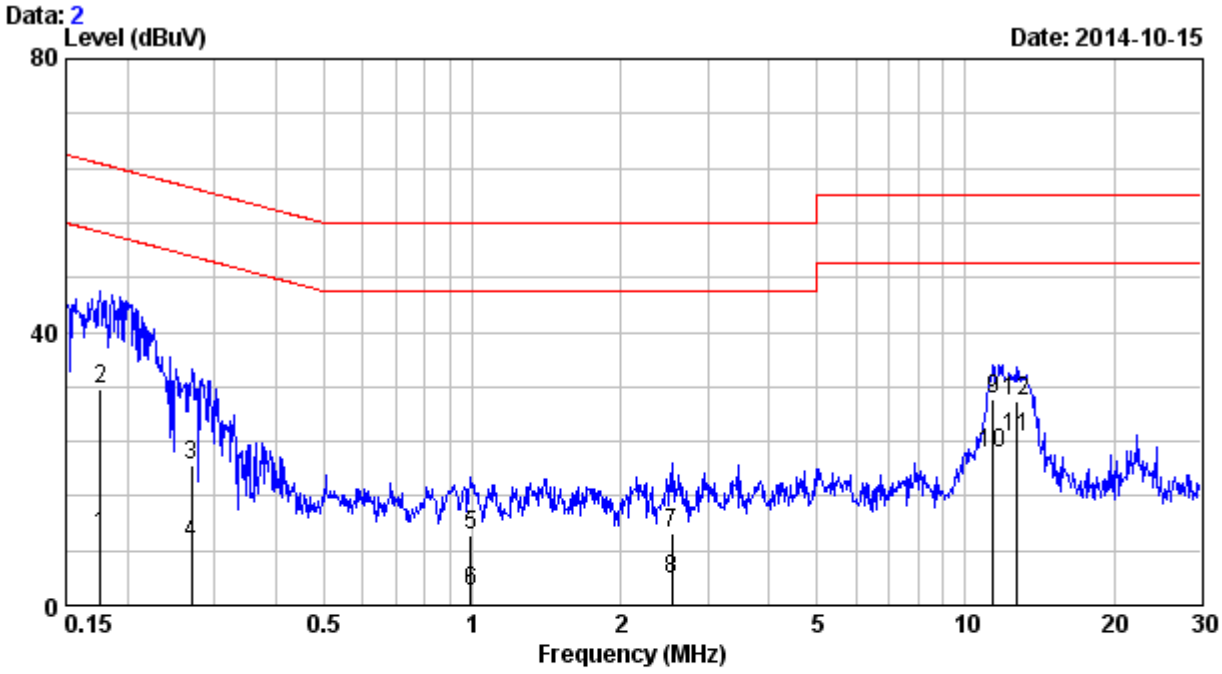
NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

Model No.	DHP-W220AV	Test Mode	Carrier off
Environmental Conditions	24.5℃, 55% RH	Resolution Bandwidth	9 KHz
Tested by	Vis Liang		

Line

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.18	7.60	0.11	2.51	10.22	54.68	-44.46	AVERAGE
0.18	7.60	0.11	23.95	31.66	64.68	-33.02	QP
0.27	7.88	0.14	12.43	20.45	61.12	-40.66	QP
0.27	7.88	0.14	1.13	9.15	51.12	-41.96	AVERAGE
0.99	7.86	0.24	2.14	10.24	56.00	-45.76	QP
0.99	7.86	0.24	-6.01	2.09	46.00	-43.91	AVERAGE
2.54	8.20	0.26	2.09	10.54	56.00	-45.46	QP
2.54	8.20	0.26	-4.79	3.66	46.00	-42.34	AVERAGE
11.38	8.87	0.32	21.07	30.26	60.00	-29.74	QP
11.38	8.87	0.32	13.18	22.37	50.00	-27.63	AVERAGE
12.65	8.93	0.33	15.29	24.55	50.00	-25.45	AVERAGE
12.65	8.93	0.33	20.60	29.86	60.00	-30.14	QP

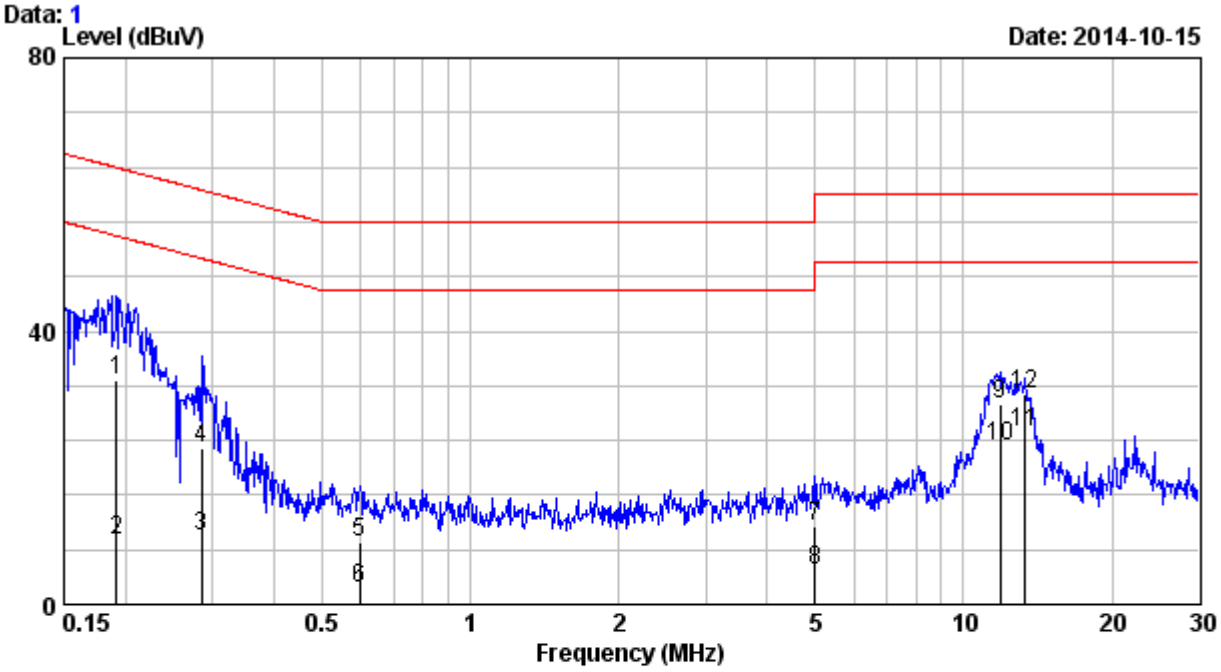
NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

Model No.	DHP-W220AV	Test Mode	Carrier off
Environmental Conditions	24.5℃, 55% RH	Resolution Bandwidth	9 KHz
Tested by	Vis Liang		

Neutral

(The chart below shows the highest readings taken from the final data.)



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.19	7.72	0.12	25.00	32.85	63.98	-31.13	QP
0.19	7.72	0.12	1.67	9.52	53.98	-44.46	AVERAGE
0.28	7.95	0.15	1.82	9.92	50.68	-40.76	AVERAGE
0.28	7.95	0.15	14.81	22.91	60.68	-37.77	QP
0.60	8.04	0.25	0.69	8.98	56.00	-47.02	QP
0.60	8.04	0.25	-6.01	2.28	46.00	-43.72	AVERAGE
5.00	8.83	0.29	2.33	11.45	60.00	-48.55	QP
5.00	8.83	0.29	-4.09	5.03	50.00	-44.97	AVERAGE
11.87	8.93	0.32	20.17	29.42	60.00	-30.58	QP
11.87	8.93	0.32	13.90	23.15	50.00	-26.85	AVERAGE
13.27	8.98	0.33	15.90	25.21	50.00	-24.79	AVERAGE
13.27	8.98	0.33	21.40	30.71	60.00	-29.29	QP

NOTE:

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

8.7 DUTY CYCLE

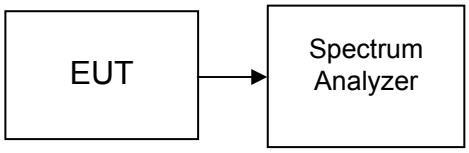
LIMIT

Nil (No dedicated limit specified in the Rules)

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEK 30	835253/002	SEP. 29, 2014

Remark: Each piece of equipment is scheduled for calibration once a year.



TEST CONFIGURATION

TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW=1MHz , VBW=3MHz, Span = 0Hz, a suitable Sweep Time.
5. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

No non-compliance noted.

TEST DATA

	us	Times	Ton	Total Ton times(ms)
Ton1	100000.000	1	100000.000	100.000
Ton2		0	0.000	
Ton3		0	0.000	
Tp				100.000

Ton	100.000
Tp(Ton+Toff)	100.000
Duty Cycle	1.000
Duty Factor	0.000

100 %

9. ANTENNA REQUIREMENT

9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna spec. As below:

Built-in antenna with 2.0dBi gain (Max)

RADIATED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

CONDUCTED EMISSION SETUP