FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2013 TEST REPORT

For

3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router

Model: BiPAC 8920NZ

Data Applies To: BiPAC 8920NZL, BEC 8920NZ, BEC 8920NZL, BiPAC 8900NZ, BiPAC 8900NZL, BEC 8900NZ, BEC 8900NZL

Trade Name: Billion ; BEC

Issued for

Billion Electric Co., Ltd.

8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	03/31/2017	Initial Issue	All Page 143	Dola Hsieh
01	05/16/2017	Added Operation Mode	P.6	Dola Hsieh
02	05/24/2017	Added Average Total Power	P.39	Dola Hsieh

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1. TEST REPORT CERTIFICATION

Applicant	：	Billion Electric Co., Ltd.
Address	：	8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
Equipment Under Test	：	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router
Model	：	BiPAC 8920NZ
Data Applies To	：	BiPAC 8920NZL, BEC 8920NZ, BEC 8920NZL, BiPAC 8900NZ, BiPAC 8900NZL, BEC 8900NZ, BEC 8900NZL
Trade Name	：	Billion ; BEC
Tested Date	：	December 19, 2016 ~ January 13, 2017

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.10:2013	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb. Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer

2. EUT DESCRIPTION

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router
Model Number	BiPAC 8920NZ
Data Applies To	BiPAC 8920NZL, BEC 8920NZ, BEC 8920NZL, BiPAC 8900NZ, BiPAC 8900NZL, BEC 8900NZ, BEC 8900NZL
Identify Number	T161219S08
Received Date	December 19, 2016
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 Mode: 2412MHz ~ 2462MHz IEEE 802.11gn HT40 Mode: 2422MHz ~ 2452MHz
Transmit Power	IEEE 802.11b Mode (Diversity) : Chain 0 : 20.14 dBm (0.1032 W) Chain 1 : 20.42 dBm (0.1102 W) IEEE 802.11g Mode (Diversity) : Chain 0 : 25.37 dBm (0.3440 W) Chain 1 : 25.96 dBm (0.3945 W) IEEE 802.11gn HT20 MCS0 Mode: 27.61 dBm (0.5768 W) IEEE 802.11gn HT40 MCS0 Mode: 24.82 dBm (0.3034 W)
Channel Spacing	5MHz
Channel Number	IEEE 802.11b/g, 802.11gn HT20 Mode: 11 Channels IEEE 802.11gn HT40 Mode: 7 Channels
Transmit Data Rate	IEEE 802.11b Mode: up to 11 Mbps IEEE 802.11g Mode: up to 54 Mbps IEEE 802.11gn HT20 Mode (800ns GI): up to 130.00 Mbps IEEE 802.11gn HT20 Mode (400ns GI): up to 144.40 Mbps IEEE 802.11gn HT40 Mode (800ns GI): up to 270.00 Mbps IEEE 802.11gn HT40 Mode (400ns GI): up to 300.00 Mbps
Type of Modulation	IEEE 802.11b Mode: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g Mode: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11gn HT20/40 Mode: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type	PCB Antenna × 2 , Ant. 0 (Chain 0), Antenna Gain: 4.8 dBi Ant. 1 (Chain 1), Antenna Gain: 3.6 dBi
Power Rating	15Vdc
Test Voltage	120Vac, 60Hz

DC Power Cable Type	Non-shielded cable, 1.5 m × 1 (Non-detachable), with one ferrite core
I/O Port	DSL Port × 1, LAN(RJ-45) Port × 4, EWAN(RJ-45) Port × 1, USB Port × 1, SIM Card Port × 2, Power Port × 1
Operation Mode	☒CDD Mode ☐Beamforming Mode ☐Other

Power Adapter:

No.	Manufacturer	Model No.	Power Input	Power Output
1	Ktec	KSASB0241500160HU	100-240Vac, 50/60Hz, 0.6A	15Vdc, 1.6A

The difference of the series model

Model Number	BiPAC 8920NZ	BiPAC 8920NZL	BiPAC 8900NZ	BiPAC 8900NZL
Trand Name	Billion	Billion	Billion	Billion
External Feature	Wide-band Antenna	Wide-band Antenna	Wide-band Antenna	Wide-band Antenna
External color	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver
Housing Drawing	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand
VDSL / ADSL	O	O	O	O
Dual-Sim slot	O	O	X	X
VPN	O	X	O	X
Power Adapter	DC 15V/ 1.6A	DC 15V/ 1.6A	DC 15V/ 1.6A	DC 15V/ 1.6A
Note: "O" means all the same, and "X" means the difference				

Model Number	BEC 8920NZ	BEC 8920NZL	BEC 8900NZ	BEC 8900NZL
Trand Name	BEC	BEC	BEC	BEC
External Feature	Wide-band Antenna	Wide-band Antenna	Wide-band Antenna	Wide-band Antenna
External color	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver	Upper/Lower Casing: Gray/ Silver
Housing Drawing	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand	D3-R w/ Vertical Stand
VDSL / ADSL	O	O	O	O
Dual-Sim slot	O	O	X	X
VPN	O	X	O	X
Power Adapter	DC 15V/ 1.6A	DC 15V/ 1.6A	DC 15V/ 1.6A	DC 15V/ 1.6A
Note: "O" means all the same, and "X" means the difference				

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: QI3BIL-8920NZ filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*
4. *The model BiPAC 8920NZ was considered the main model for testing.*

3. DESCRIPTION OF TEST MODES

The EUT (3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router) is an 802.11b/g/n transceiver.

For IEEE 802.11b/g Mode (1TX/1RX Diversity) :

Ant. 0 / Chain 0 or Ant. 1 / Chain 1 transmit/receive.

For IEEE 802.11gn HT20/HT40 Mode (2TX / 2RX) :

Ant. 0 / Chain 0 & Ant. 1 / Chain 1 transmit/receive.

Conducted Emission / Radiated Emission Test (Below 1 GHz)

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test mode
1	Normal Operating (Full Function) / ADSL Mode / EUT Upright / LTE
2	Normal Operating (Full Function) / VDSL Mode / EUT Upright / LTE

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test mode		
Emission	Radiated Emission	Mode 1
	Conducted Emission	Mode 1

Remark: *Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.*

Conducted / Radiated Emission Test (Above 1 GHz)

IEEE 802.11b/g, 802.11gn HT20 Mode:

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 data rate (worst case) was chosen for full testing.
IEEE 802.11g Mode: 6Mbps data rate (worst case) was chosen for full testing.
IEEE 802.11gn HT20 MCS0 Mode: 6.5Mbps data rate (worst case) was chosen for full testing.

IEEE 802.11gn HT40 Mode:

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 802.11gn HT40 MCS0 Mode: 13.5Mbps data rate (worst case) was chosen for full testing.

Remark：*The field strength of spurious emission was measured in the following position: EUT stand-up position(Y axis), lie-down position(X, Z axis). The worst emission was found in lie-down position(X axis) and the worst case was recorded.*

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC CFR 47, 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

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

No.989-1, Wenshan Rd., Shangshan Village,
Qionglin Township, Hsinchu County 30741, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.10:2013 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies 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
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

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

Remark: *FCC Designation Number TW1027.*

5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	Notebook PC	TOSHIBA	PORTEGE R30-A	7F097011H
2	Notebook PC	TOSHIBA	PORTEGE R30-A	7F097009H
3	Notebook PC	TOSHIBA	PORTEGE R30-A	7F096978H
4	Notebook PC	TOSHIBA	M840	9C104267C
5	USB2.0 Flash Disk	Kingston	DTSE9H/8GB	-----
6	VDSL iDSLAM	Billion	BE6200GR5	-----
7	ADSL iDSLAM	ZyXEL	IES-1000	S2Z3322195
8	Communication System	Anritsu	MT8820C	6201465349

No.	Signal Cable Description
1	Non-shielded RJ-45 cable, 10m × 2
2	Non-shielded RJ-45 cable, 1.5m × 3
3	Non-shielded RJ-11cable, 10m × 1

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

RF Mode:

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. TX mode:
   ⇨ **Data Rate:** 1Mbps Bandwidth 20 (IEEE 802.11b Mode)
   6Mbps Bandwidth 20 (IEEE 802.11g Mode)
   6.5Mbps Bandwidth 20 (IEEE 802.11gn HT20 MCS0 Mode)
   13.5Mbps Bandwidth 40 (IEEE 802.11gn HT40 MCS0 Mode)
   ⇨ **Power control**

Mode	Channel	Frequency (MHz)	Chain	Power Set
IEEE 802.11b	Low	2412	0/1	60/64
	Middle	2437	0/1	62/62
	High	2462	0/1	62/60
IEEE 802.11g	Low	2412	0/1	62/64
	Middle	2437	0/1	68/76
	High	2462	0/1	60/64
IEEE 802.11gn HT20 MCS0	Low	2412	0/1	58
	Middle	2437	0/1	68
	High	2462	0/1	54
IEEE 802.11gn HT40 MCS0	Low	2422	0/1	46
	Middle	2437	0/1	50
	High	2452	0/1	48

3. All of the functions are under run.
4. Start test.

Noemal Mode:

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Turn on the power of all equipments.
3. EUT WAN port link to Notebook PC.
4. EUT LAN port link to Notebook PC.
5. EUT RJ-11 port link to ADSL/XDSL.
6. EUT 2.4G WiFi link to Notebook PC.
7. EUT LTE link to Communication System.
8. All of the functions are under run.
9. Start test.

7. FCC PART 15.247 REQUIREMENTS

7.1 DUTY CYCLE CORRECTION FACTOR

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	TX Mode	Temp. & Humidity	25°C, 50%

Mode	TX on (ms)	TX on + off (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
IEEE 802.11b	1.000	1.000	100.00%	0.00	0.010
IEEE 802.11g	2.068	2.092	98.85%	0.05	0.010
IEEE 802.11gn HT20	1.912	1.937	98.71%	0.06	0.010
IEEE 802.11gn HT40	0.934	0.960	97.23%	0.12	1.071

7.2 6dB BANDWIDTH

LIMITS

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

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	05/31/2017
Test S/W	N/A			

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

TEST SETUP

TEST PROCEDURE

1. The transmitter output was connected to a spectrum analyzer.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW) ≥ 3 x RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

TEST RESULTS

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Crystal Wu
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	TX Mode	Temp. & Humidity	22°C, 58%

IEEE 802.11b Mode (Diversity)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	8.06	8.07	500	PASS
Middle	2437	8.06	8.06	500	PASS
High	2462	8.03	8.08	500	PASS

IEEE 802.11g Mode (Diversity)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	13.45	14.20	500	PASS
Middle	2437	15.05	15.04	500	PASS
High	2462	15.06	14.14	500	PASS

IEEE 802.11gn HT20 MCS0 Mode (2TX)

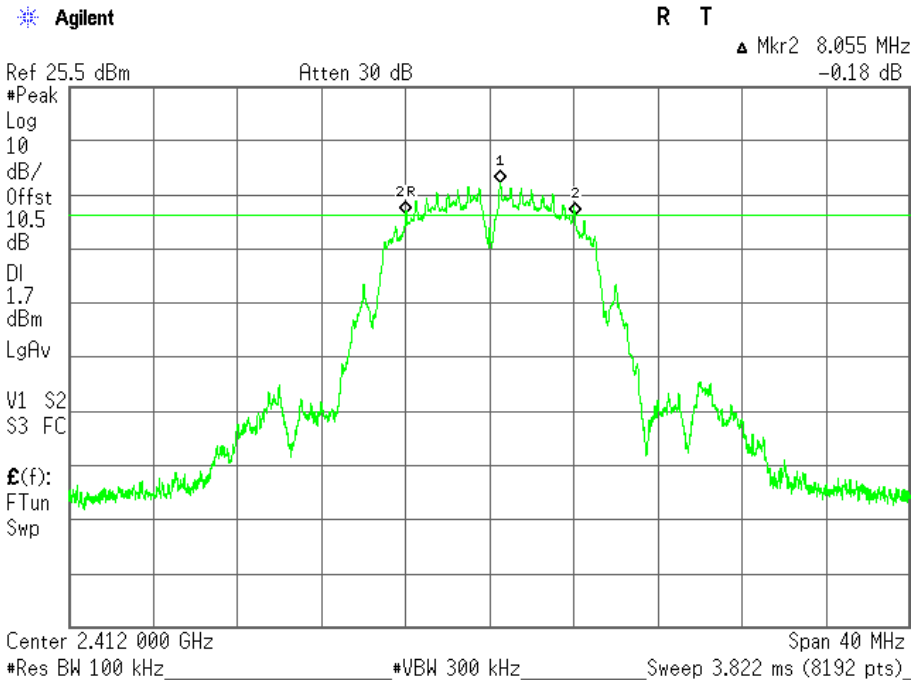
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	14.21	14.20	500	PASS
Middle	2437	16.09	15.70	500	PASS
High	2462	15.05	15.03	500	PASS

IEEE 802.11gn HT40 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	35.76	37.79	500	PASS
Middle	2437	36.74	35.74	500	PASS
High	2452	35.73	36.31	500	PASS

6dB BANDWIDTH

CH Low (IEEE 802.11b Mode / Chain 0)



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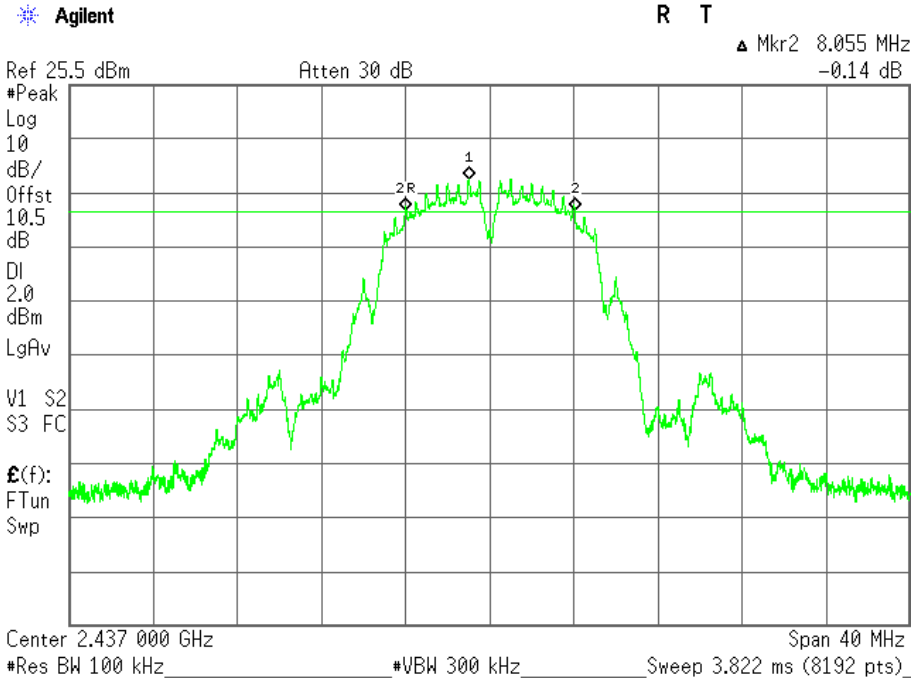

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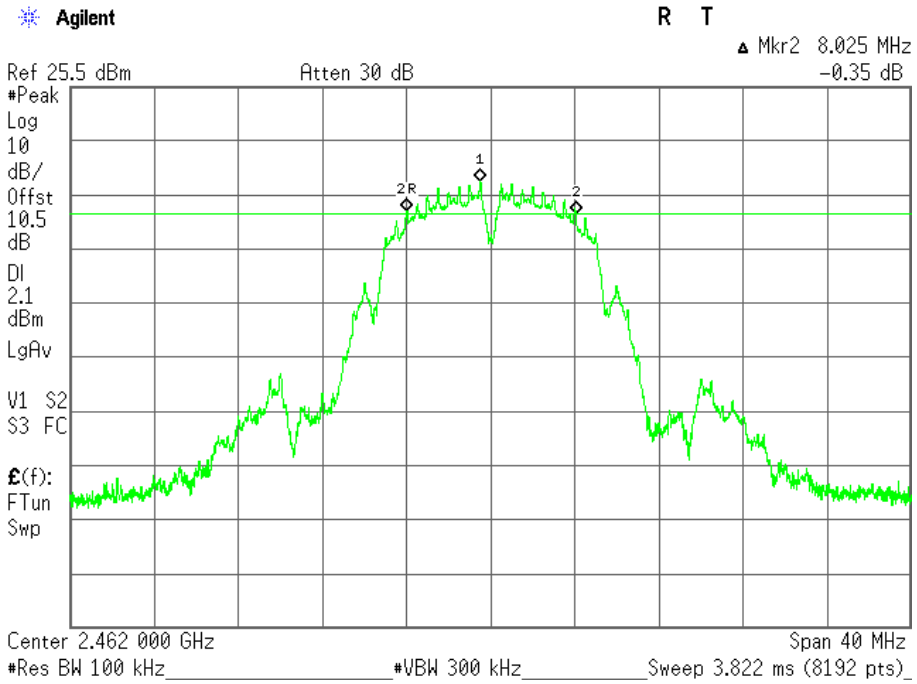

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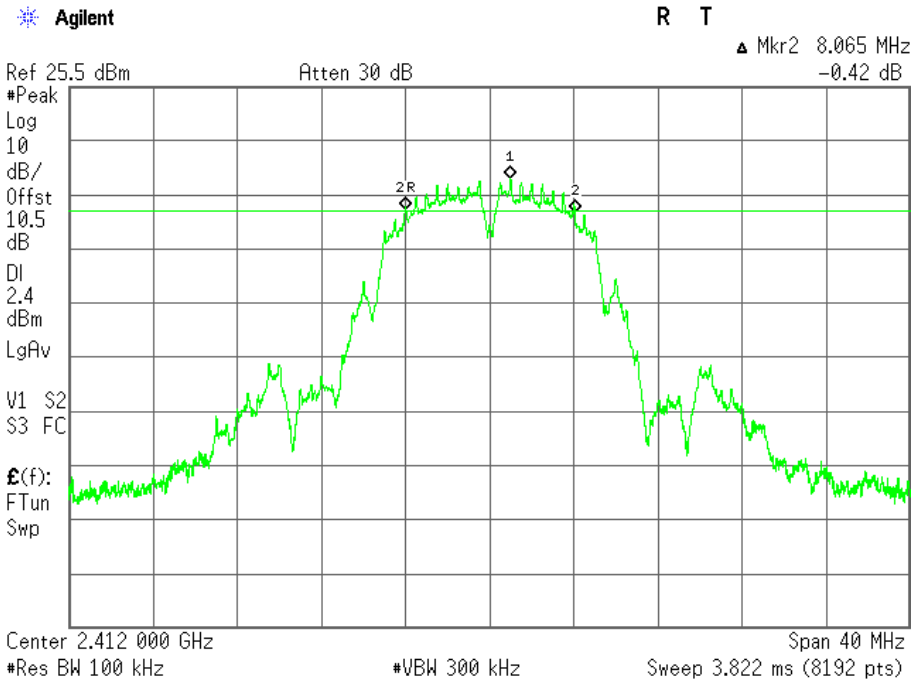

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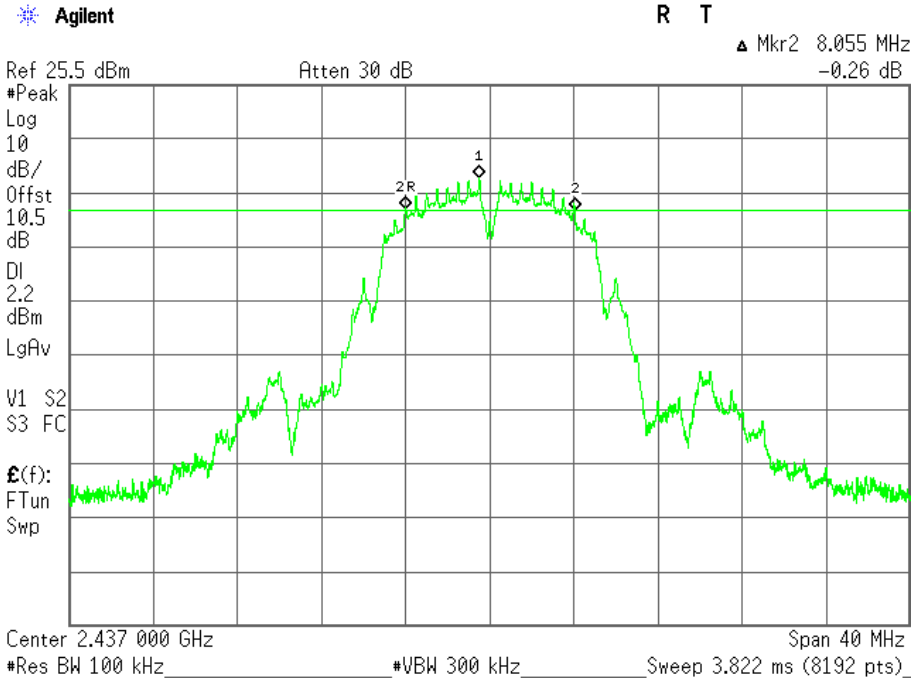

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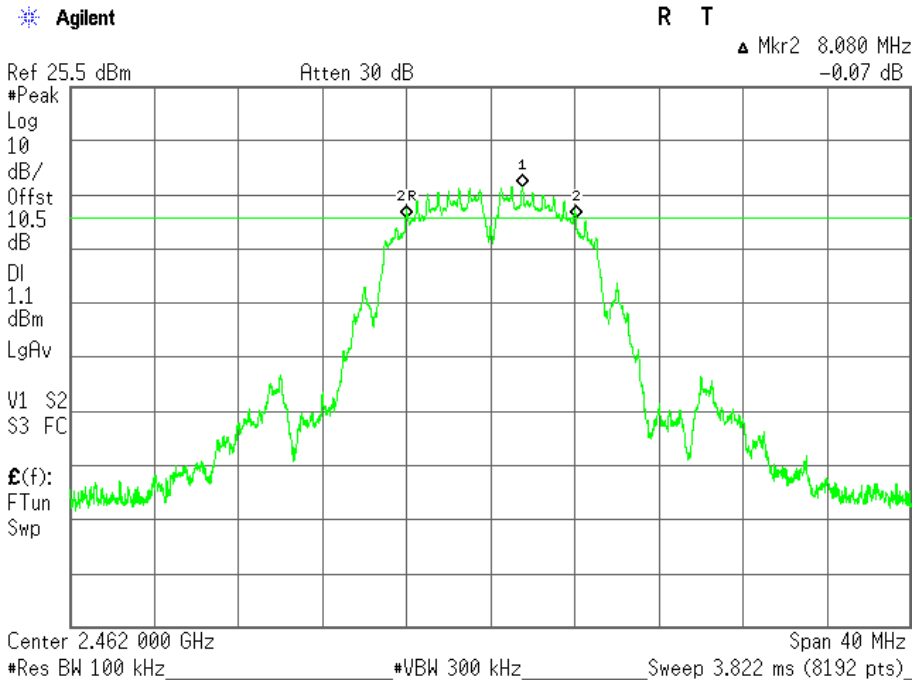

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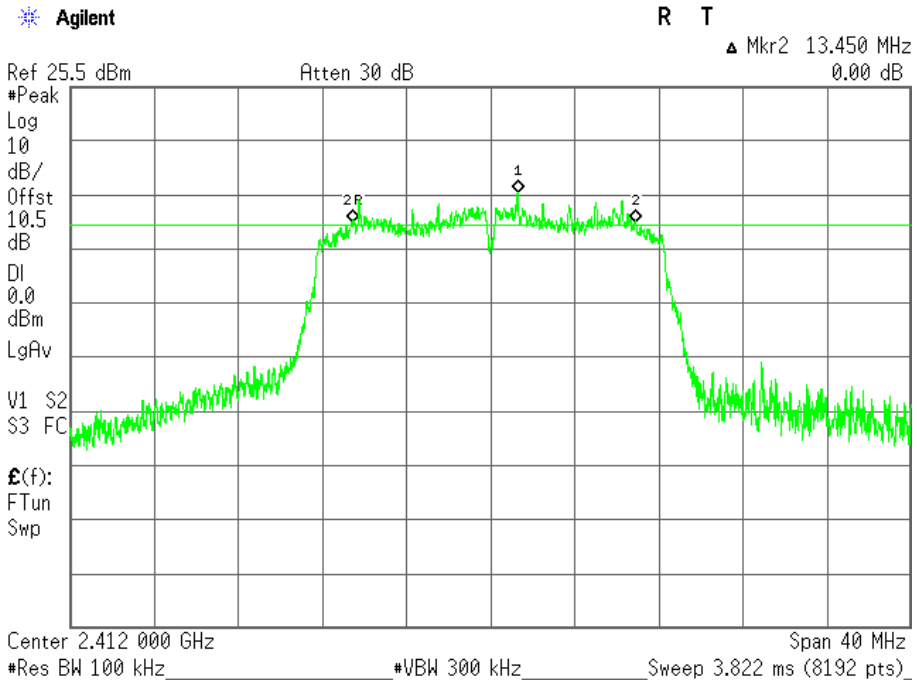

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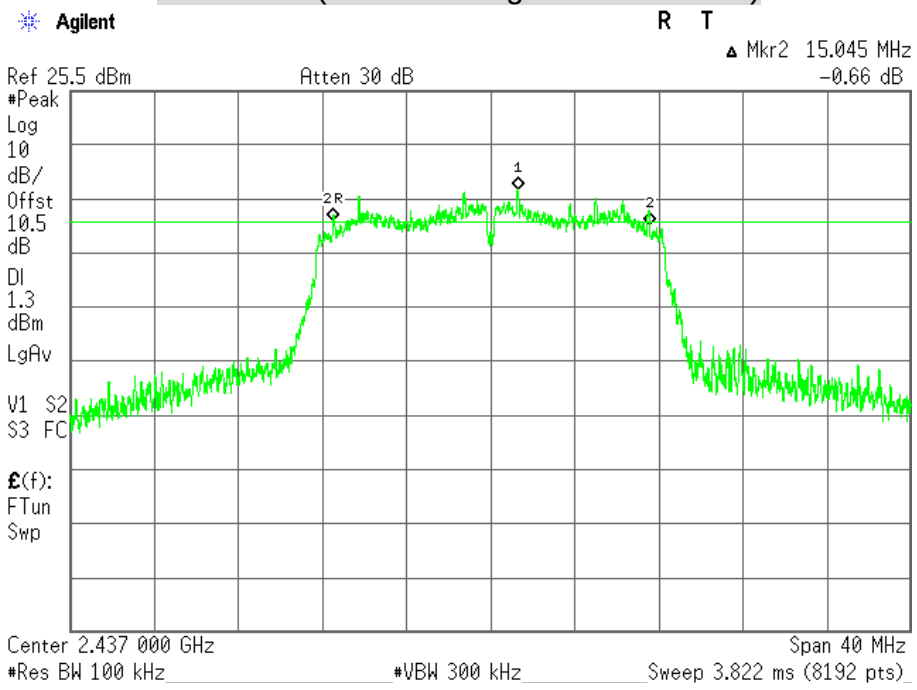

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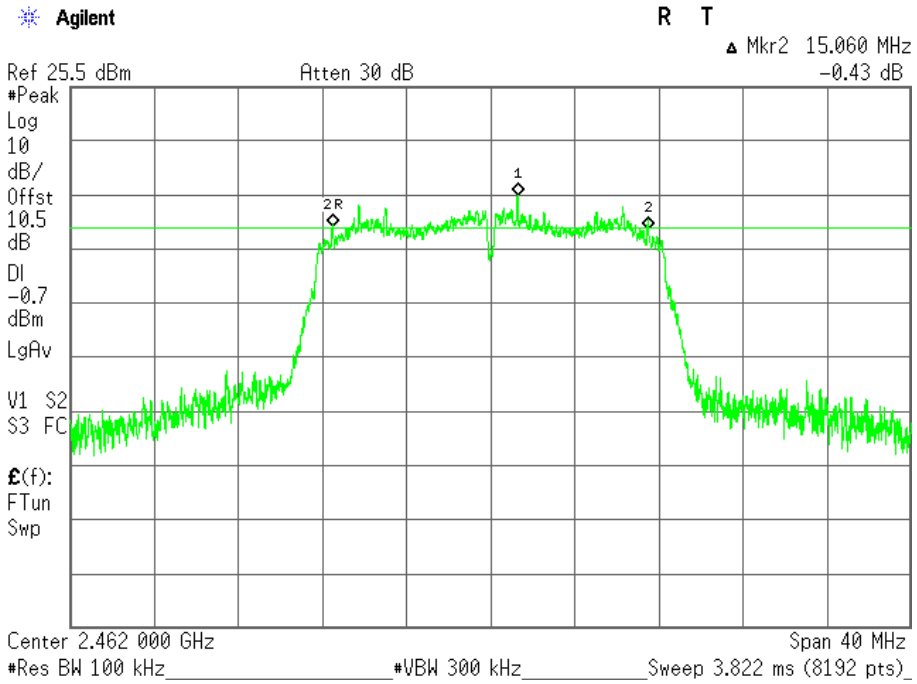

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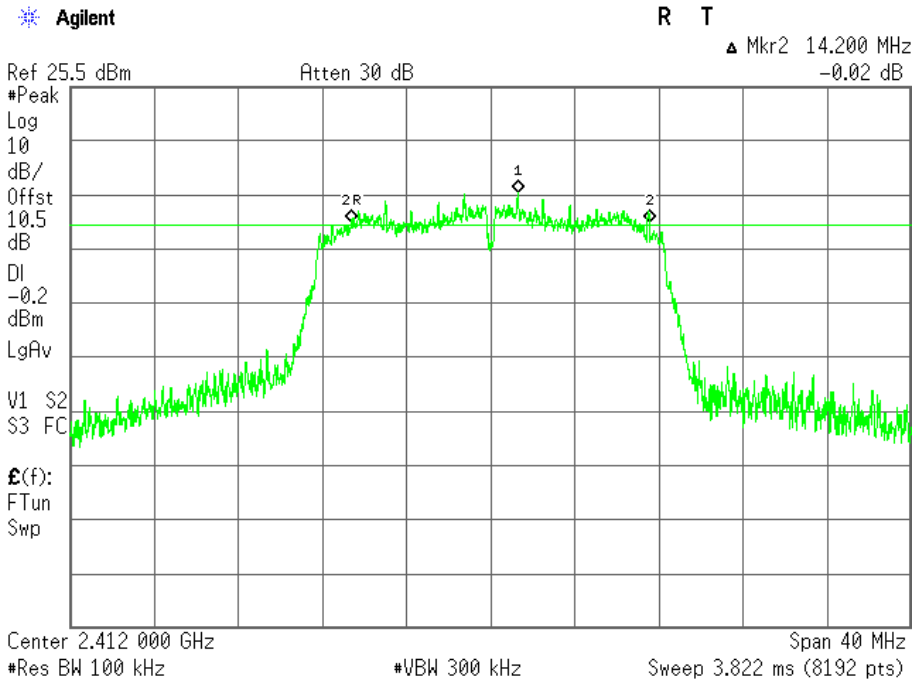

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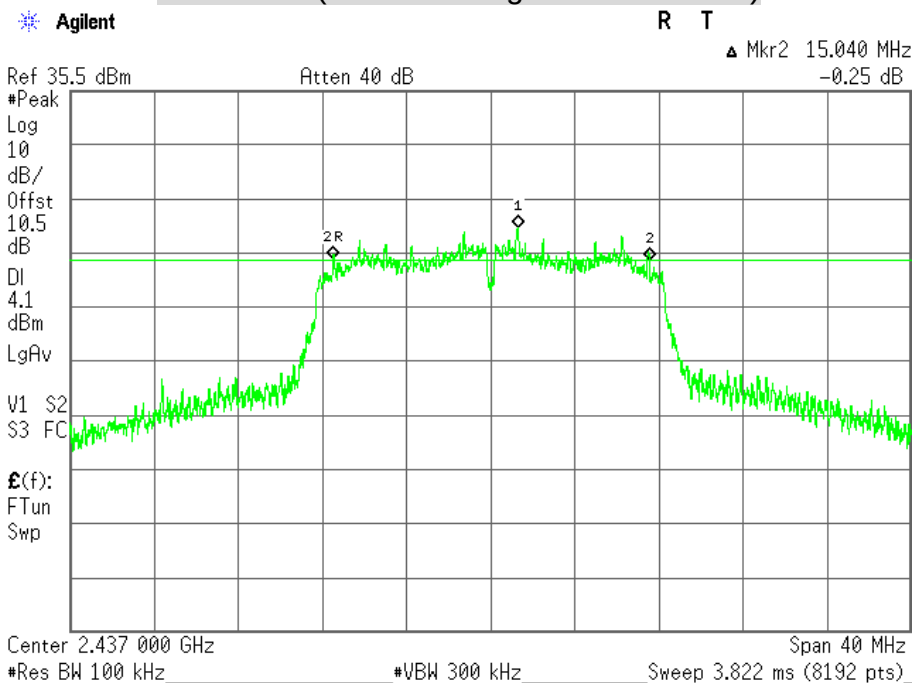

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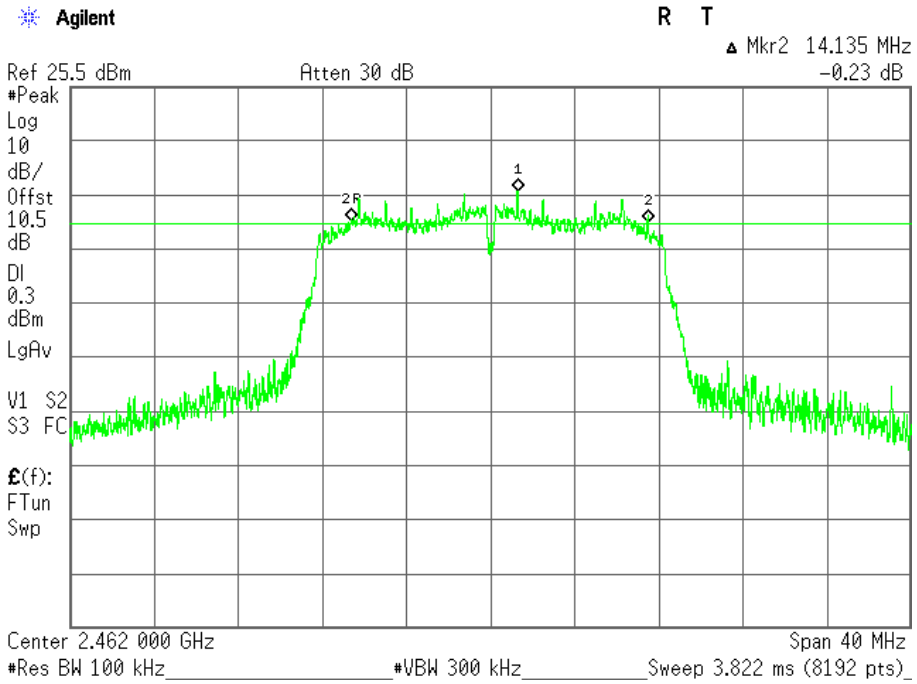

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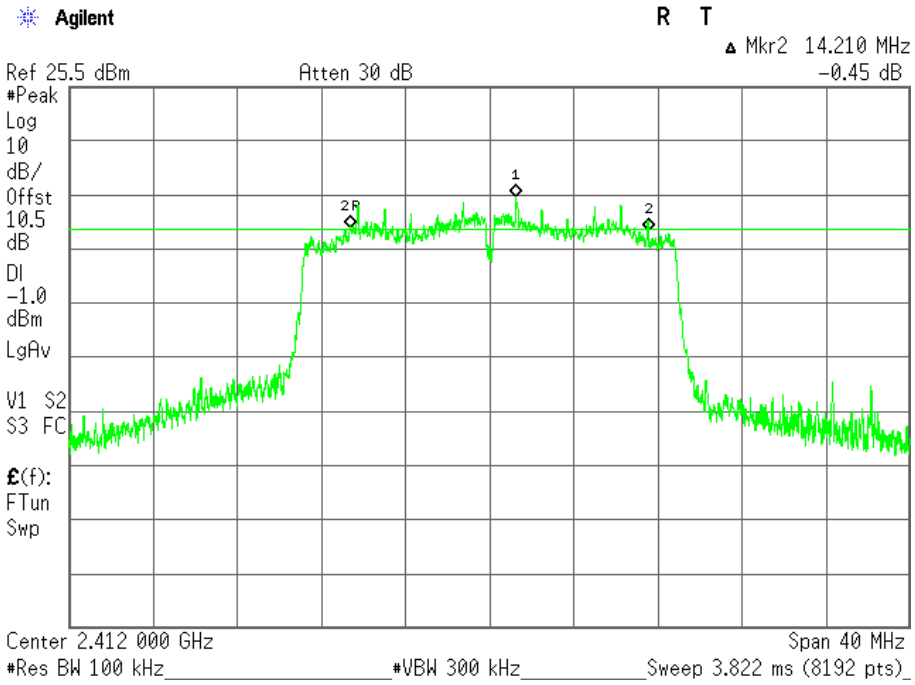

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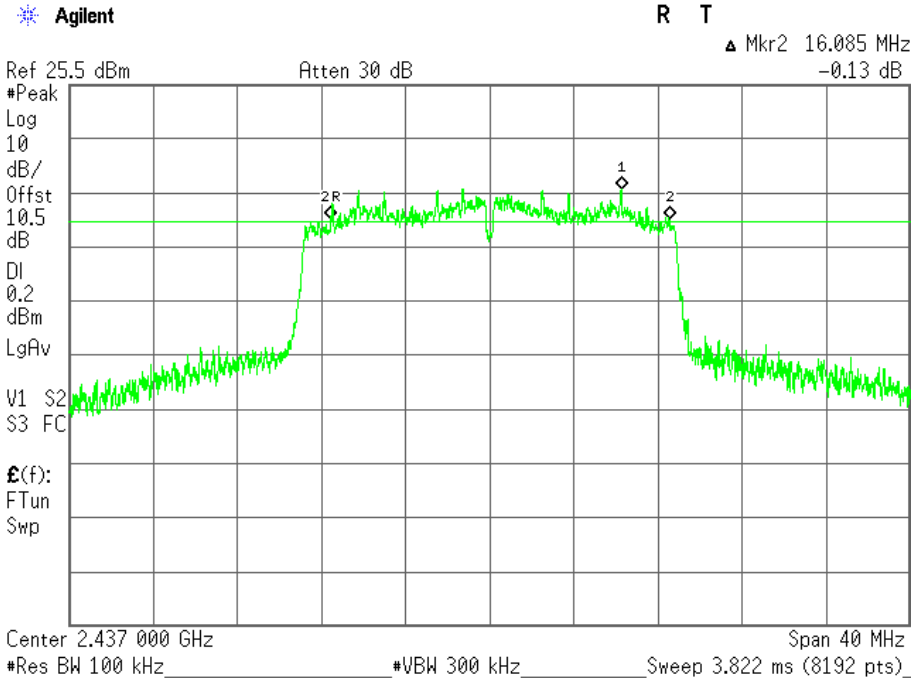

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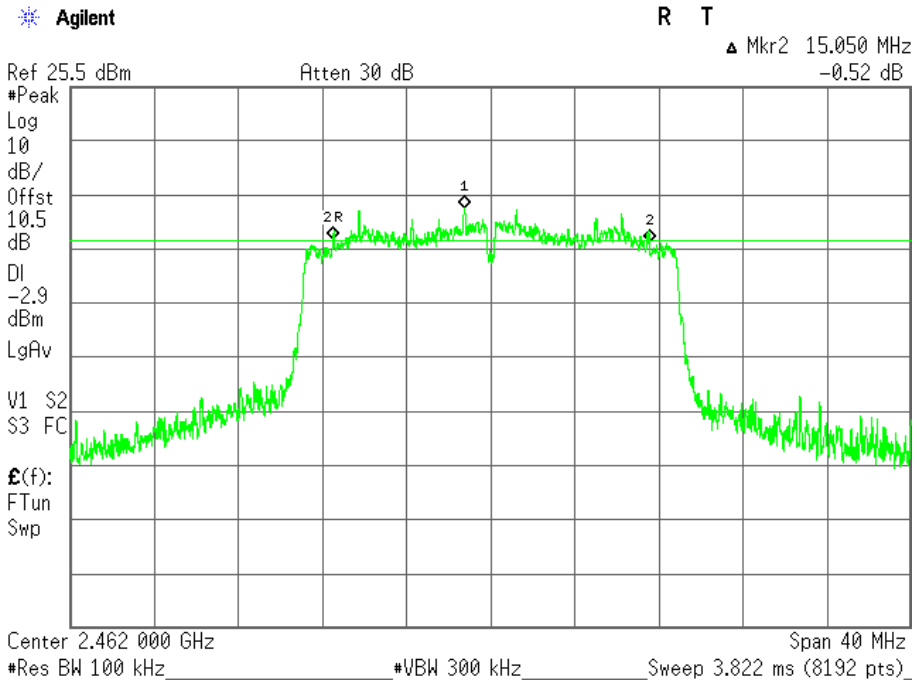

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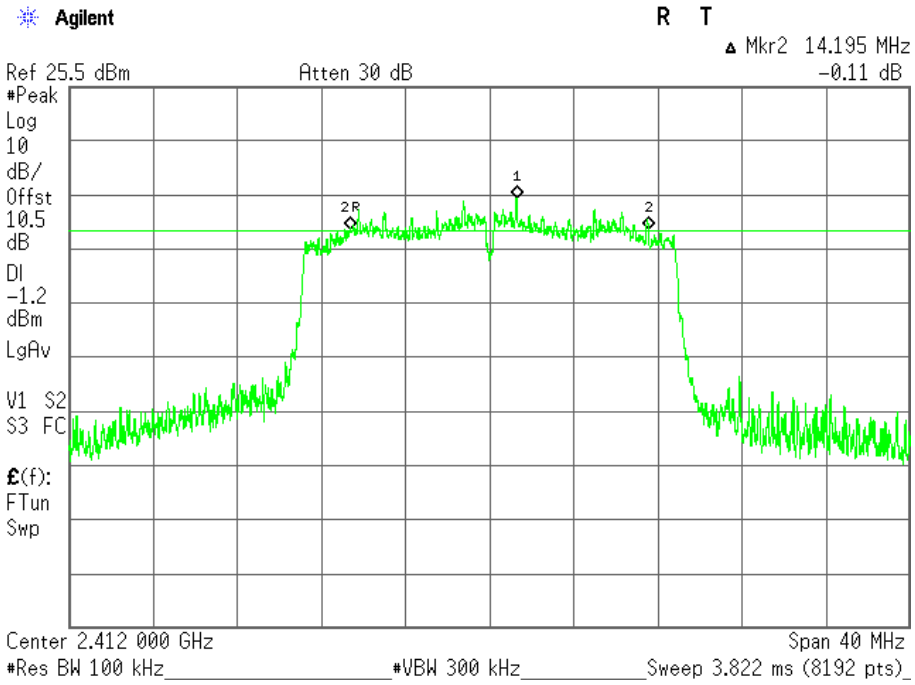

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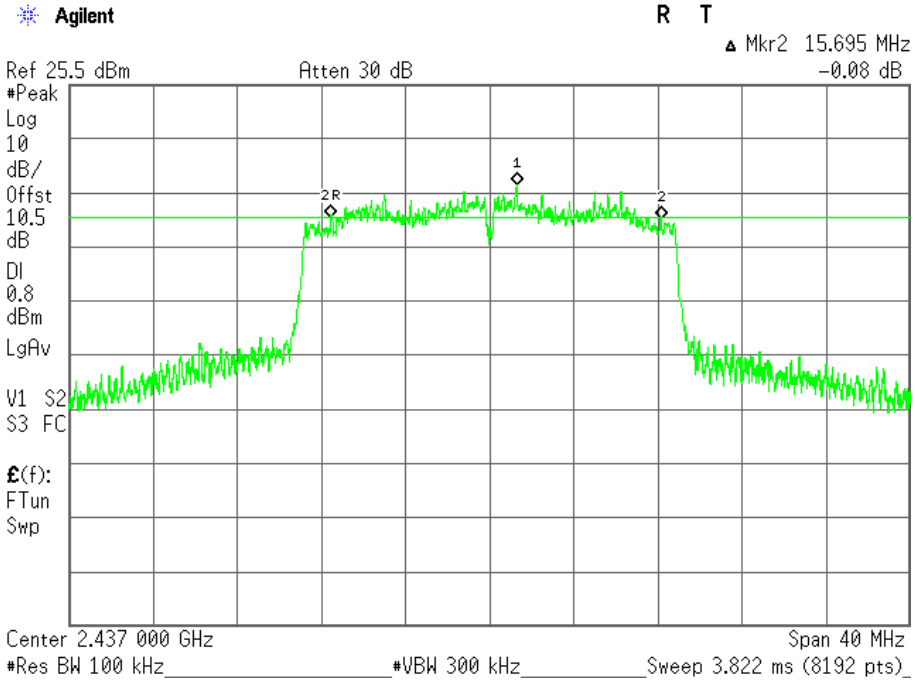
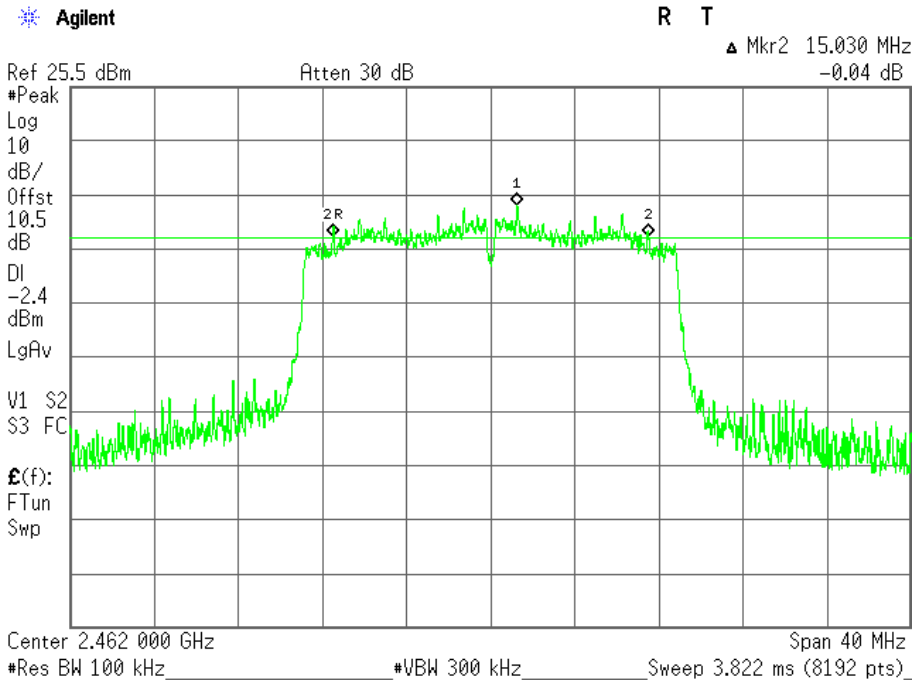
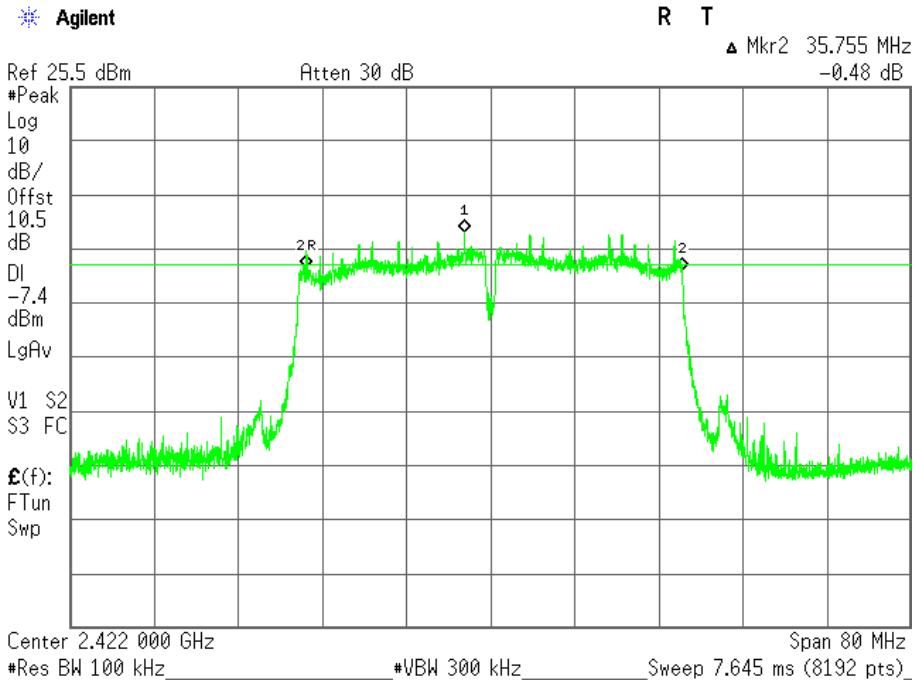


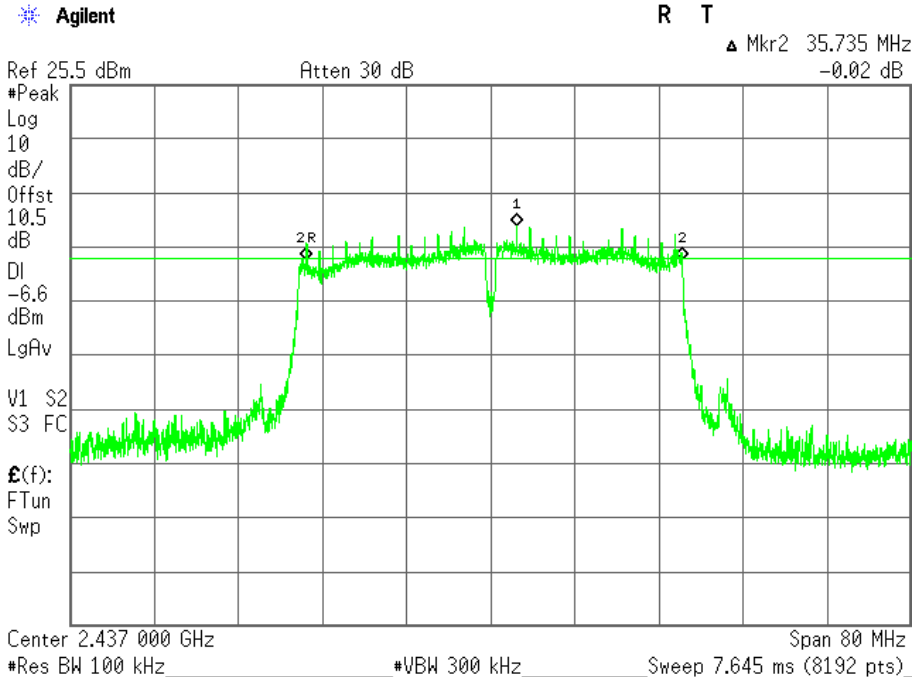
CH High (IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



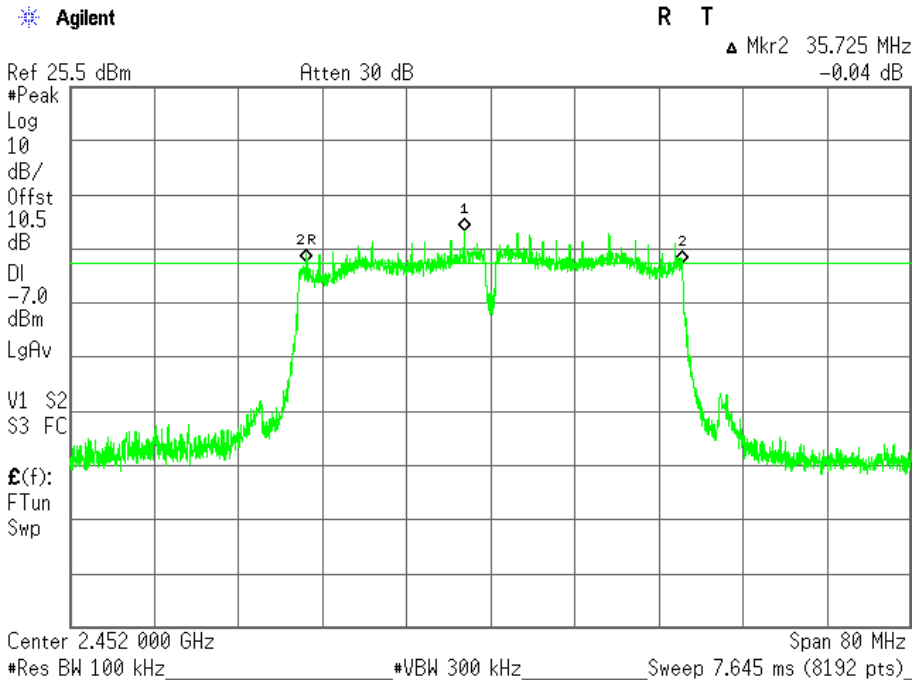
CH Low (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



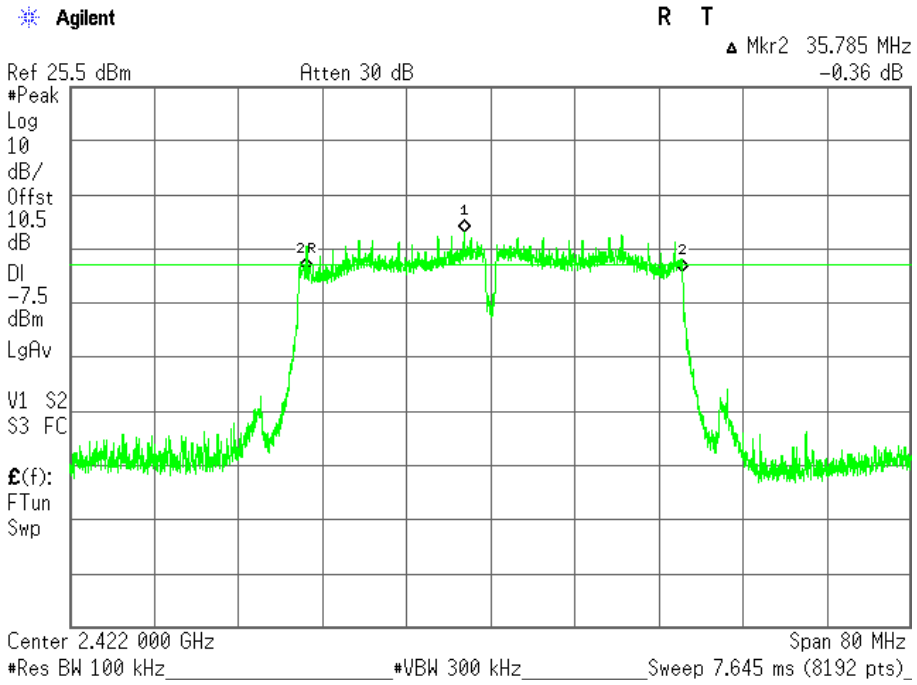
CH Middle (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



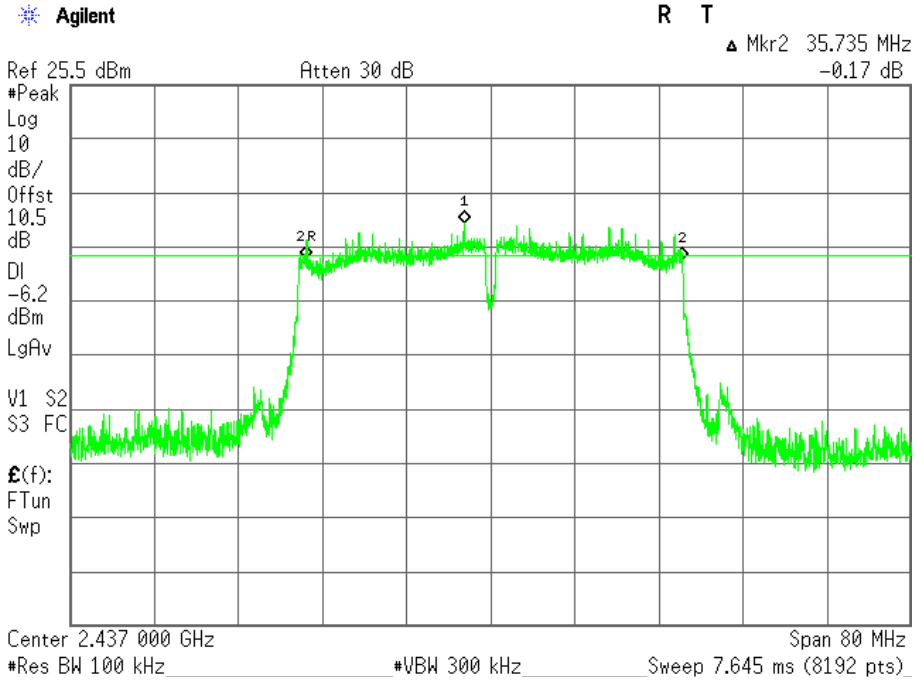
CH High (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



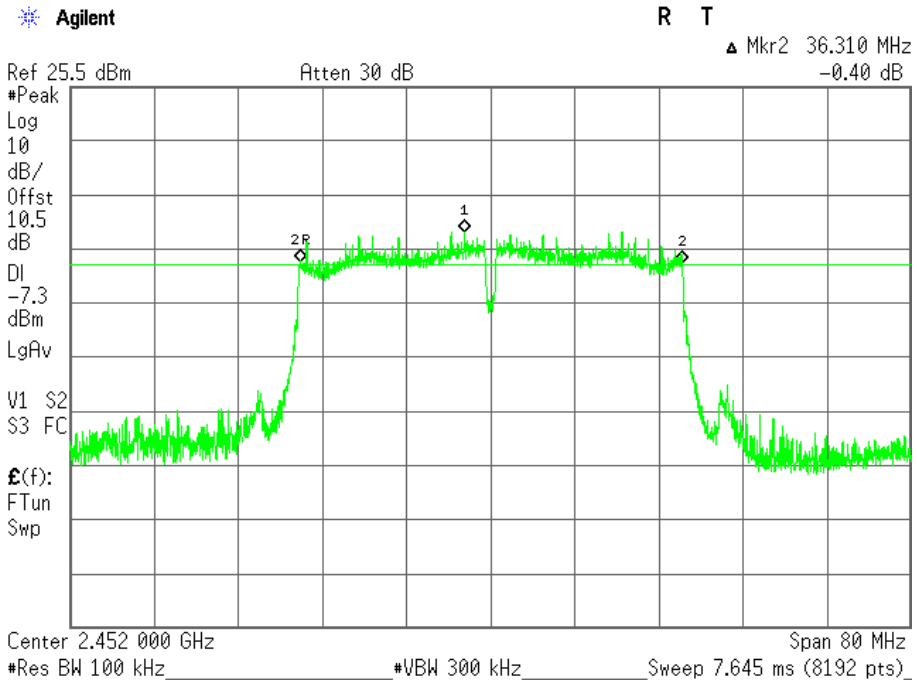
CH Low (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH Middle (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH High (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



7.3 MAXIMUM PEAK OUTPUT POWER

LIMITS

§ 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, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 watt.
§ 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.

§ KDB 662911:
If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.
If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:
Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain; or,

$$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1149001	12/05/2017
Power Sensor	Anritsu	MA2411B	1126148	12/05/2017
Test S/W	N/A			

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

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the peak power detection.

TEST RESULTS

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Crystal Wu
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	TX Mode	Temp. & Humidity	22°C, 58%

IEEE 802.11b Mode (Diversity)

Channel	Channel Frequency (MHz)	Maximum Peak Output Power						Result
		Chain 0		Chain 1		Limit		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
Low	2412	19.40	0.0870	20.42	0.1102	30	1.000	PASS
Middle	2437	20.14	0.1032	20.09	0.1021	30	1.000	PASS
High	2462	19.93	0.0983	19.48	0.0886	30	1.000	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*
3. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 30 dBm.*

IEEE 802.11g Mode (Diversity)

Channel	Channel Frequency (MHz)	Maximum Peak Output Power						Result
		Chain 0		Chain 1		Limit		
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
Low	2412	24.93	0.3110	23.18	0.2079	30	1.000	PASS
Middle	2437	25.37	0.3440	25.96	0.3945	30	1.000	PASS
High	2462	24.13	0.2587	24.52	0.2833	30	1.000	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*
3. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 30 dBm.*

IEEE 802.11gn HT20 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	Maximum Peak Output Power						Result
		Chain 0	Chain 1	Total		Limit		
		(dBm)	(dBm)	(dBm)	(W)	(dBm)	(W)	
Low	2412	23.50	22.22	25.92	0.3908	30	1.000	PASS
Middle	2437	24.01	25.13	27.61	0.5768	30	1.000	PASS
High	2462	23.11	22.57	25.86	0.3855	30	1.000	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*
3. *Total peak power = Chain 0 + Chain 1.*
4. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 30 dBm.*

IEEE 802.11gn HT40 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	Maximum Peak Output Power						Result
		Chain 0	Chain 1	Total		Limit		
		(dBm)	(dBm)	(dBm)	(W)	(dBm)	(W)	
Low	2422	20.37	21.01	23.71	0.2350	30	1.000	PASS
Middle	2437	22.32	21.22	24.82	0.3034	30	1.000	PASS
High	2452	21.21	21.18	24.21	0.2636	30	1.000	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.*
3. *Total peak power = Chain 0 + Chain 1.*
4. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 30 dBm.*

7.4 AVERAGE POWER

LIMITS

None: For reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1149001	12/05/2017
Power Sensor	Anritsu	MA2411B	1126148	12/05/2017
Test S/W	N/A			

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

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the average power detection.

TEST RESULTS

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Crystal Wu
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	TX Mode	Temp. & Humidity	22°C, 58%

IEEE 802.11b Mode (Diversity)

Channel	Channel Frequency (MHz)	Average Power (dBm)	
		Chain 0	Chain 1
Low	2412	15.63	16.68
Middle	2437	16.34	16.31
High	2462	16.04	15.61

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11g Mode (Diversity)

Channel	Channel Frequency (MHz)	Average Power (dBm)	
		Chain 0	Chain 1
Low	2412	15.89	14.00
Middle	2437	17.62	19.77
High	2462	15.35	16.25

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11gn HT20 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)		
		Chain 0	Chain 1	Total
Low	2412	14.72	14.30	17.52
Middle	2437	17.16	17.22	20.20
High	2462	13.83	13.45	16.65

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11gn HT40 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	Average Power (dBm)		
		Chain 0	Chain 1	Total
Low	2422	11.72	11.89	14.83
Middle	2437	12.61	12.61	15.62
High	2452	12.11	12.90	15.53

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*

7.5 POWER SPECTRAL DENSITY

LIMITS

§ 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.

§ KDB 662911:

If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain; or,

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	05/31/2017
Test S/W	N/A			

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

TEST SETUP

TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
5. Set the VBW ≥ 3 x RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level within the RBW.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Crystal Wu
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	TX Mode	Temp. & Humidity	22°C, 58%

IEEE 802.11b Mode (Diversity)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			Result
		Chain 0	Chain 1	Limit	
Low	2412	-6.54	-5.66	8	PASS
Middle	2437	-5.22	-5.80	8	PASS
High	2462	-5.23	-7.00	8	PASS

Remark:
1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 8 dBm.*

IEEE 802.11g Mode (Diversity)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)			Result
		Chain 0	Chain 1	Limit	
Low	2412	-8.76	-7.35	8	PASS
Middle	2437	-7.03	-5.04	8	PASS
High	2462	-8.87	-7.55	8	PASS

Remark:
1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain is 4.8 dBi which is less than 6dBi, the limit should be 8 dBm.*

IEEE 802.11gn HT20 MCS0 Mode (2TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)				Result
		Chain 0	Chain 1	Total	Limit	
Low	2412	-9.56	-9.02	-6.27	6.77	PASS
Middle	2437	-6.34	-5.30	-2.78	6.77	PASS
High	2462	-10.55	-9.70	-7.09	6.77	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *Total power spectral density = Chain 0 + Chain 1.*
4. *The directional gain is 4.8 dBi which is less than 6dBi, the limit should be 6.77 dBm.*

IEEE 802.11gn HT40 MCS0 Mode (2TX)

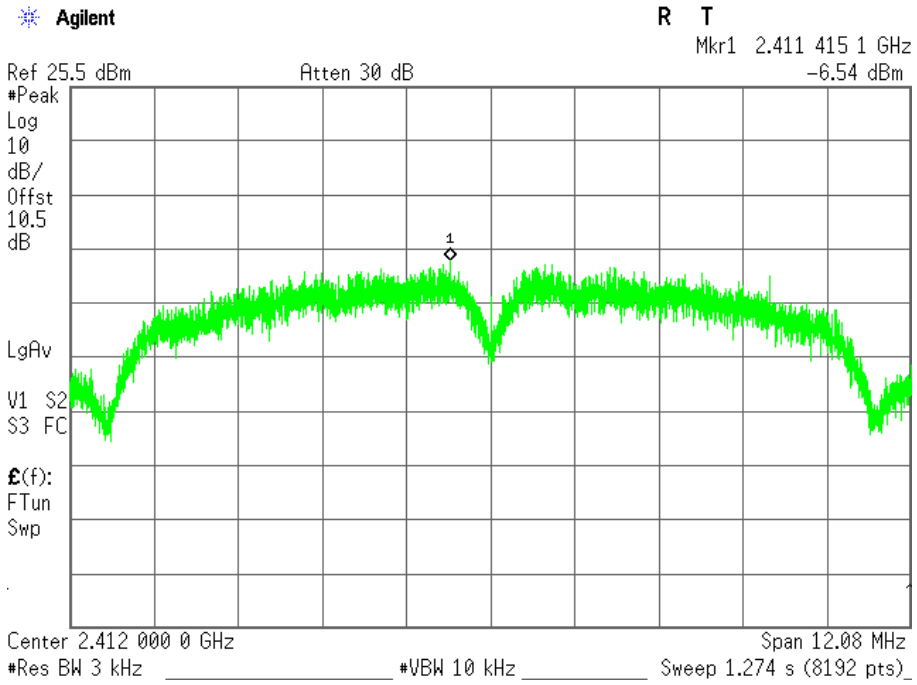
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)				Result
		Chain 0	Chain 1	Total	Limit	
Low	2422	-15.64	-15.98	-12.80	6.77	PASS
Middle	2437	-15.63	-14.51	-12.02	6.77	PASS
High	2452	-15.96	-15.44	-12.68	6.77	PASS

Remark:

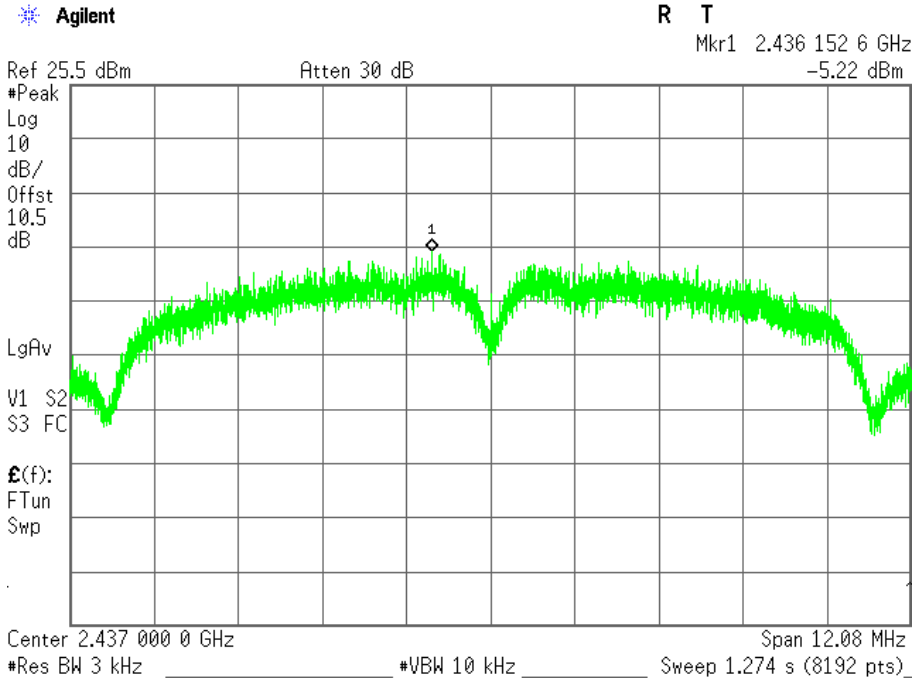
1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *Total power spectral density = Chain 0 + Chain 1.*
4. *The directional gain is 4.8 dBi which is less than 6dBi, the limit should be 6.77 dBm.*

POWER SPECTRAL DENSITY

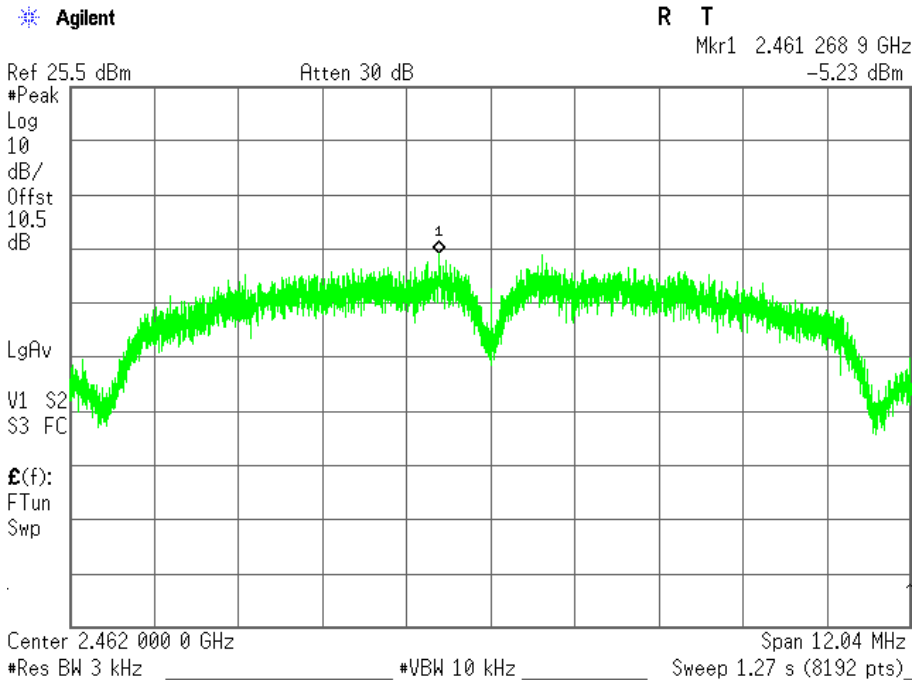
CH Low (IEEE 802.11b Mode / Chain 0)



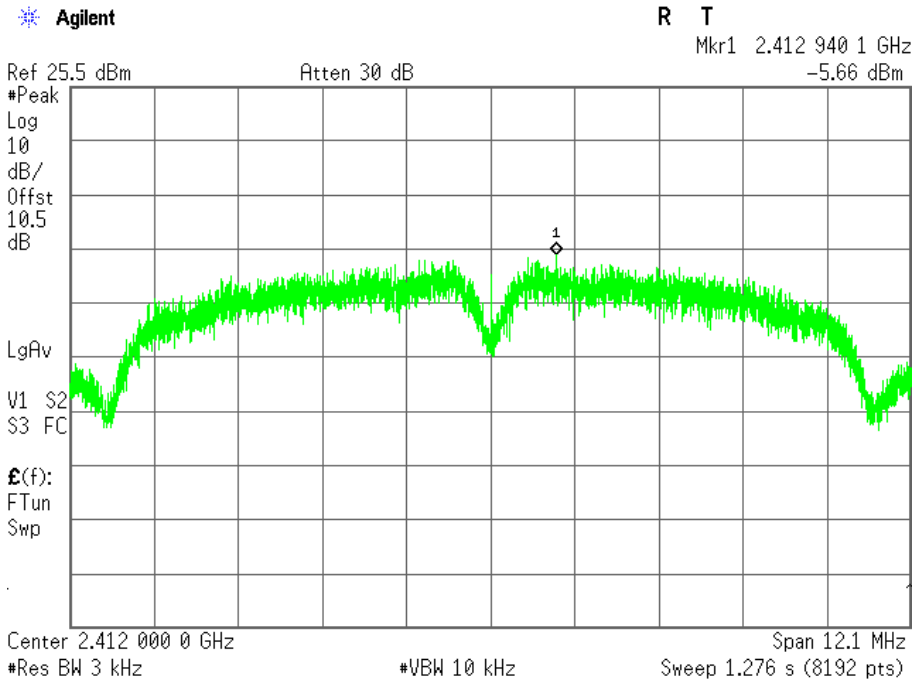
CH Middle (IEEE 802.11b Mode / Chain 0)



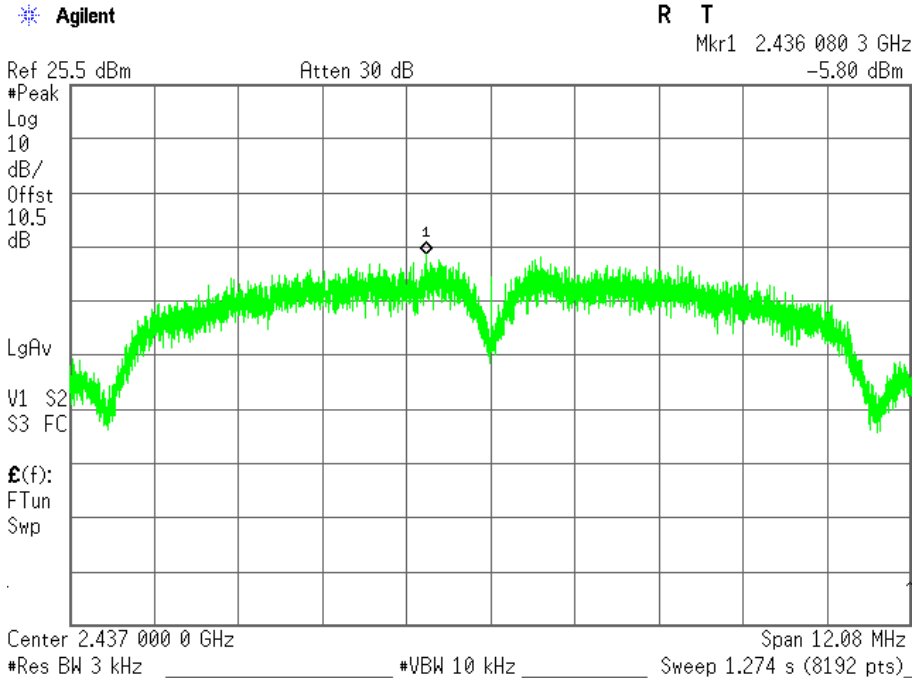
CH High (IEEE 802.11b Mode / Chain 0)



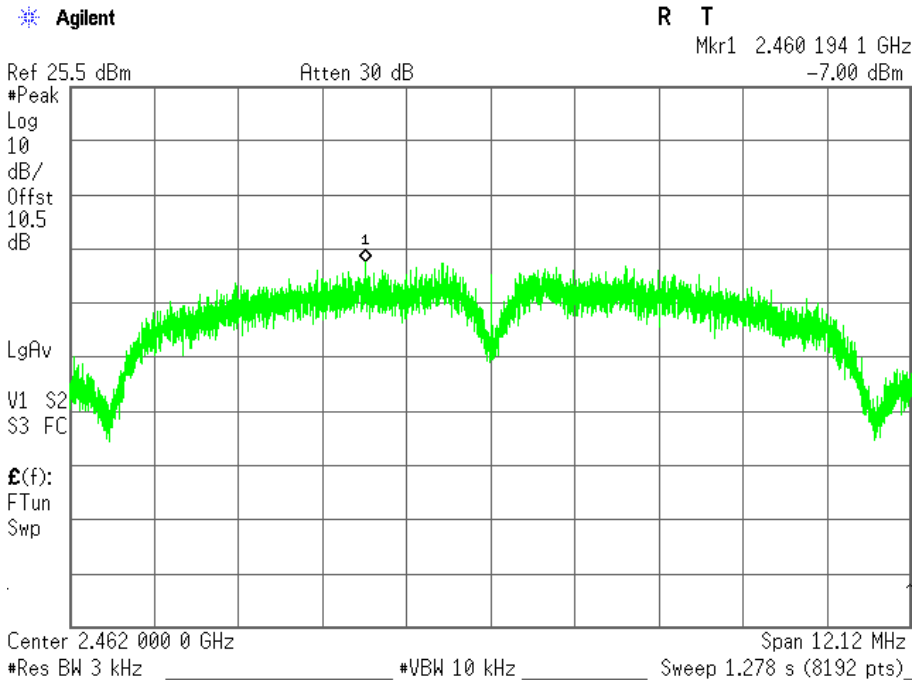
CH Low (IEEE 802.11b Mode / Chain 1)



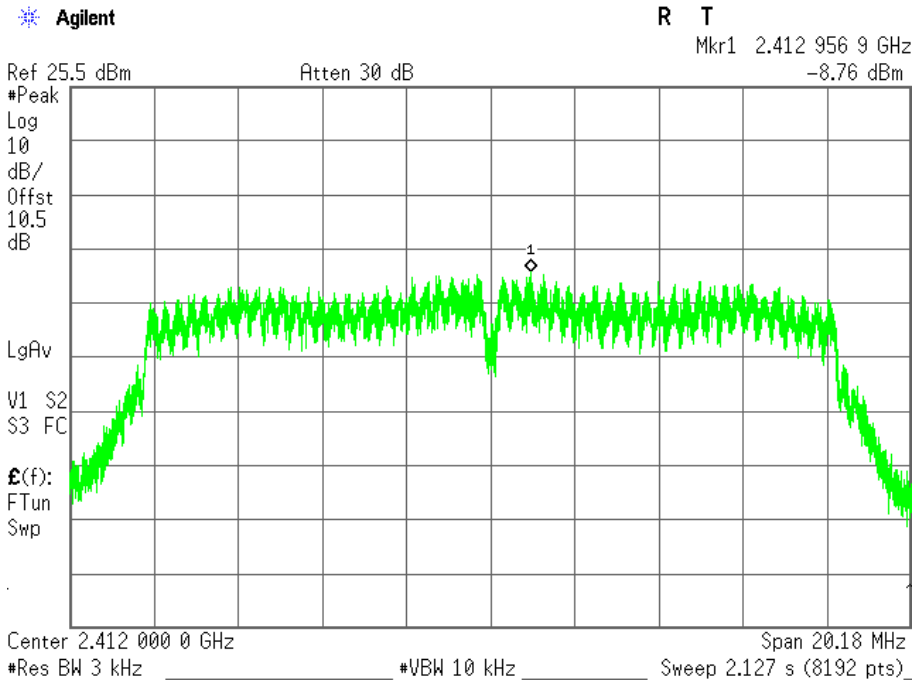
CH Middle (IEEE 802.11b Mode / Chain 1)



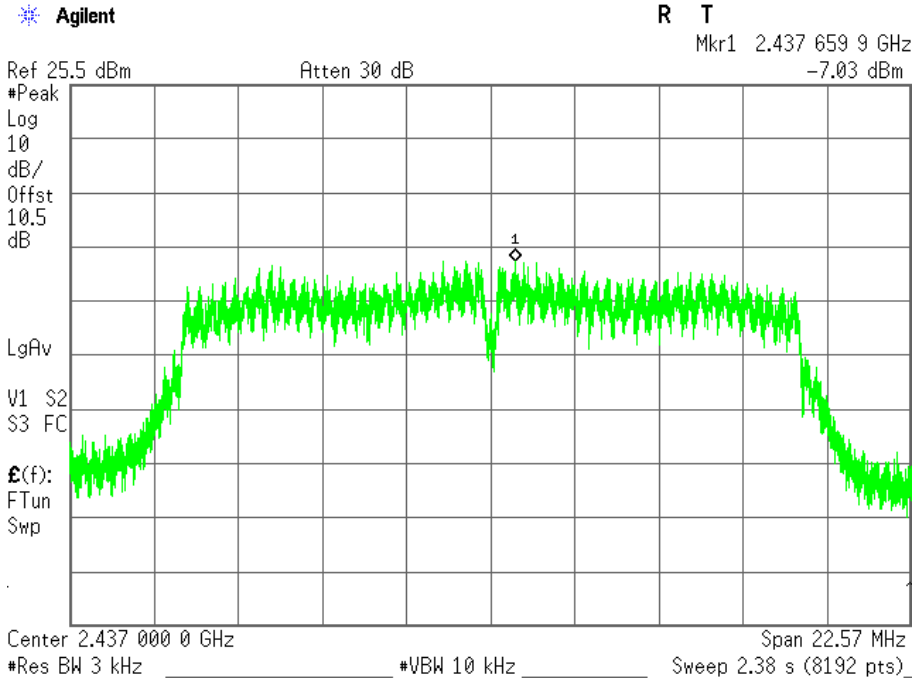
CH High (IEEE 802.11b Mode / Chain 1)



CH Low (IEEE 802.11g Mode / Chain 0)



CH Middle (IEEE 802.11g Mode / Chain 0)



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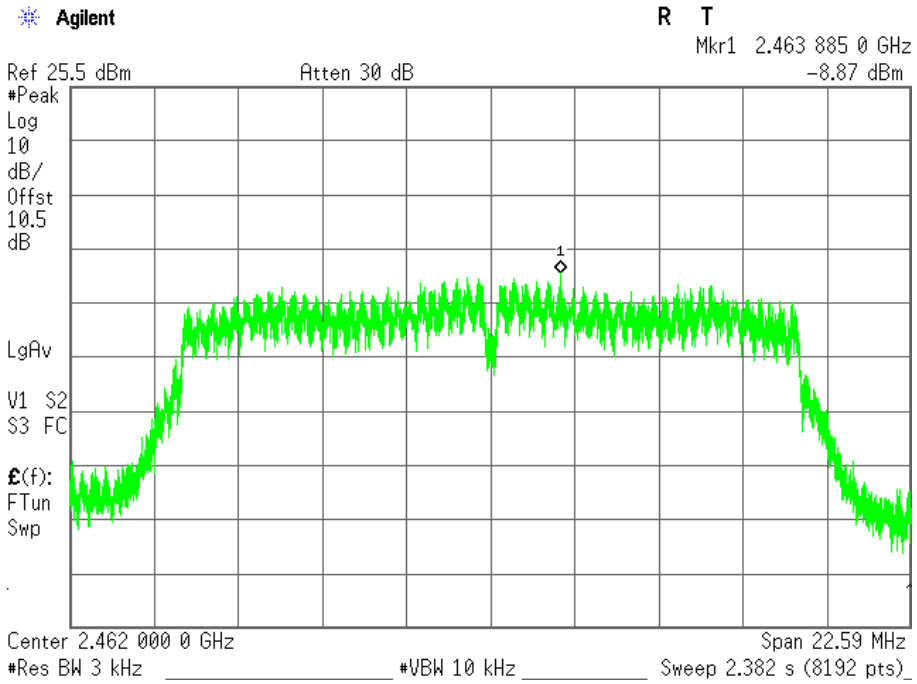
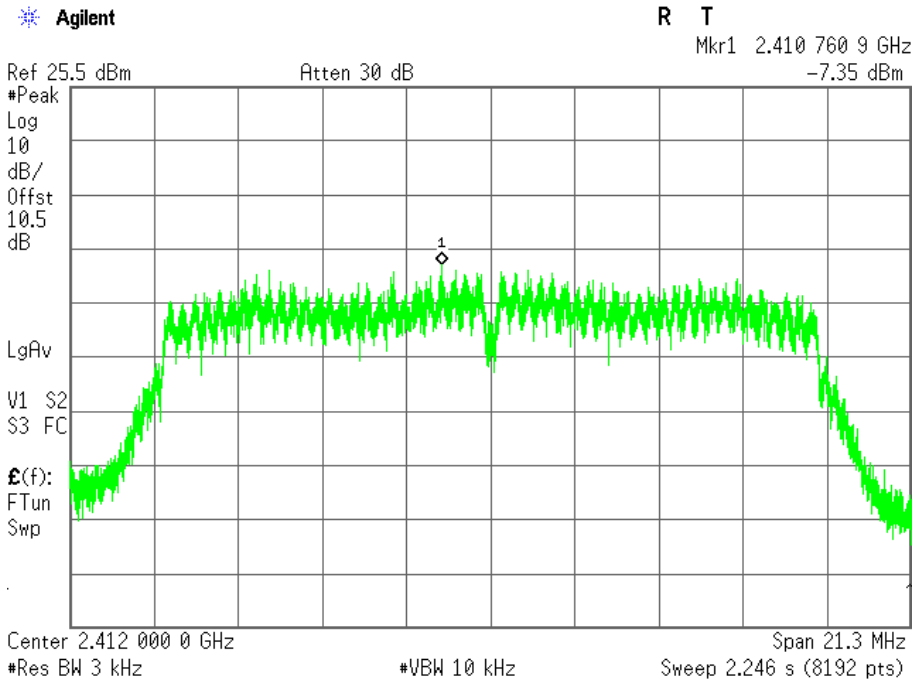
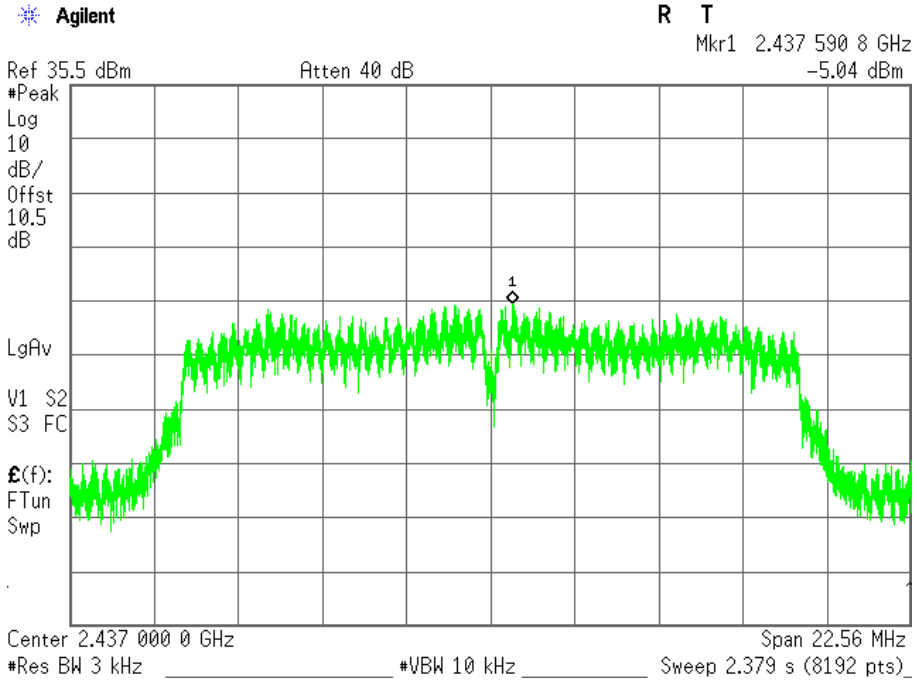


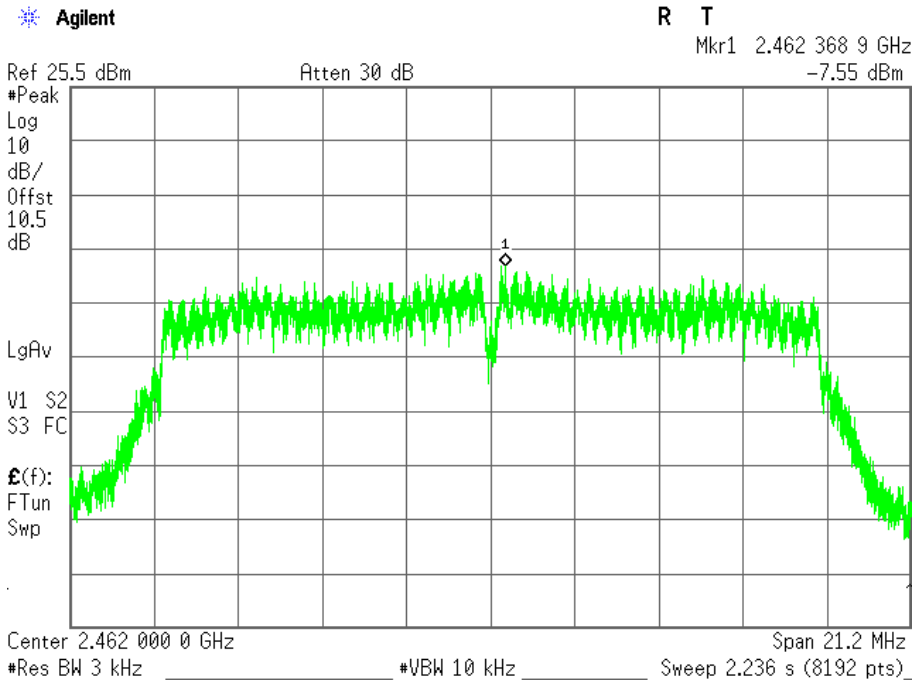
CH Low (IEEE 802.11g Mode / Chain 1)



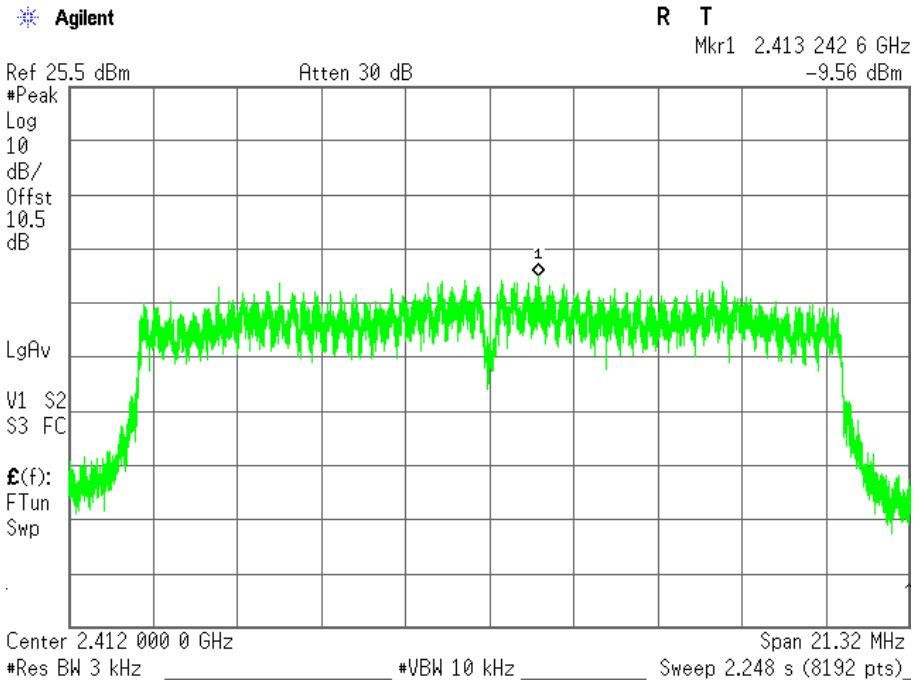
CH Middle (IEEE 802.11g Mode / Chain 1)



CH High (IEEE 802.11g Mode / Chain 1)



CH Low (IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



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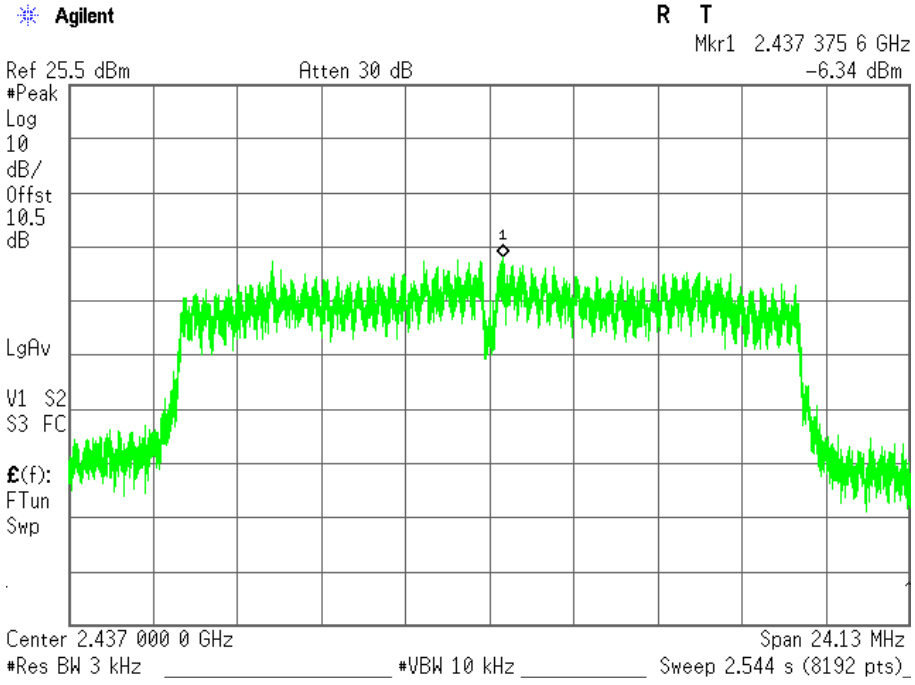
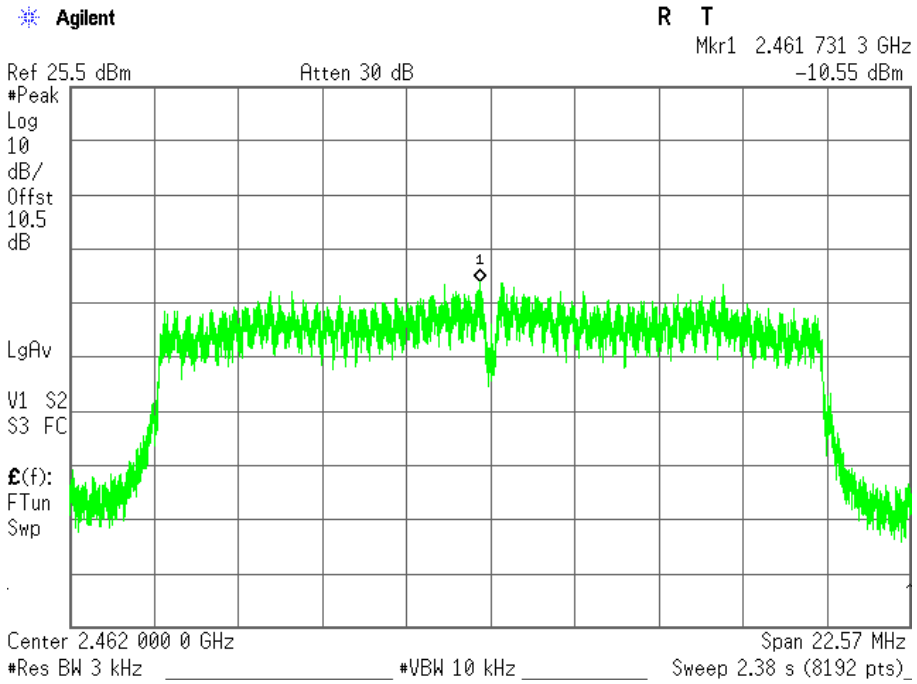
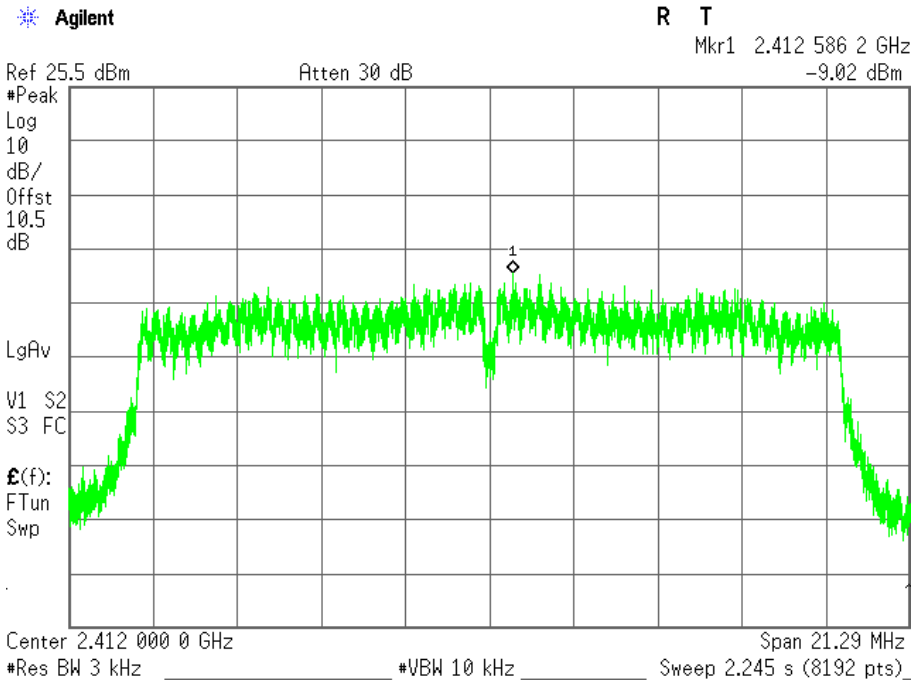


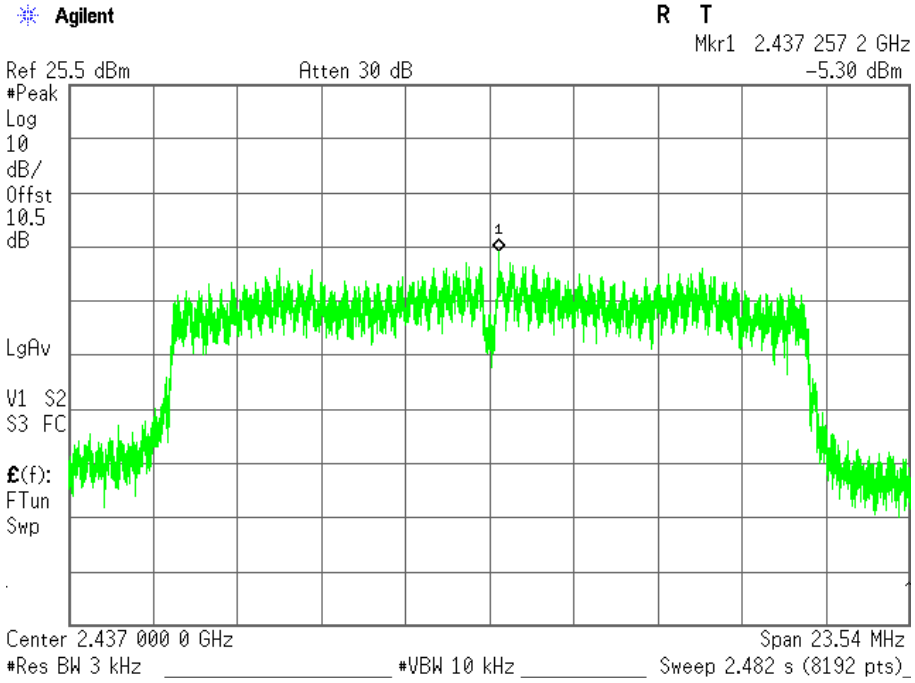
CH High (IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



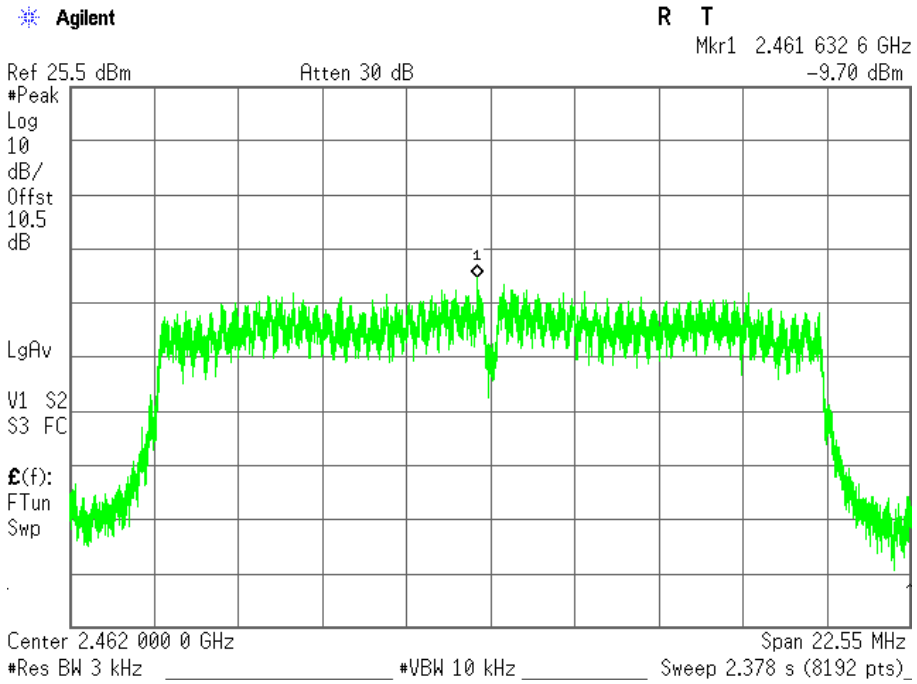
CH Low (IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



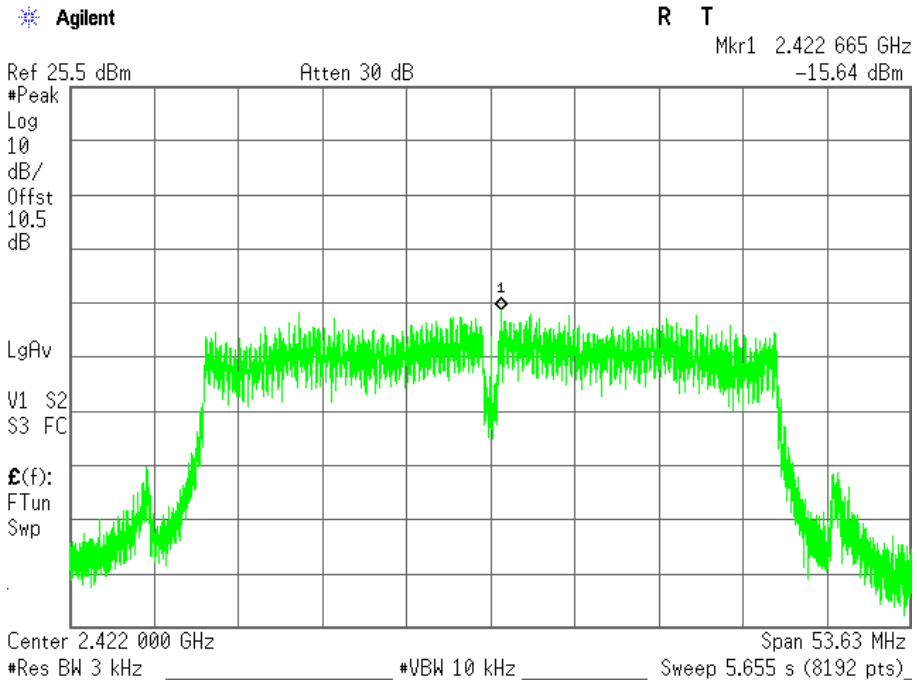
CH Middle (IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



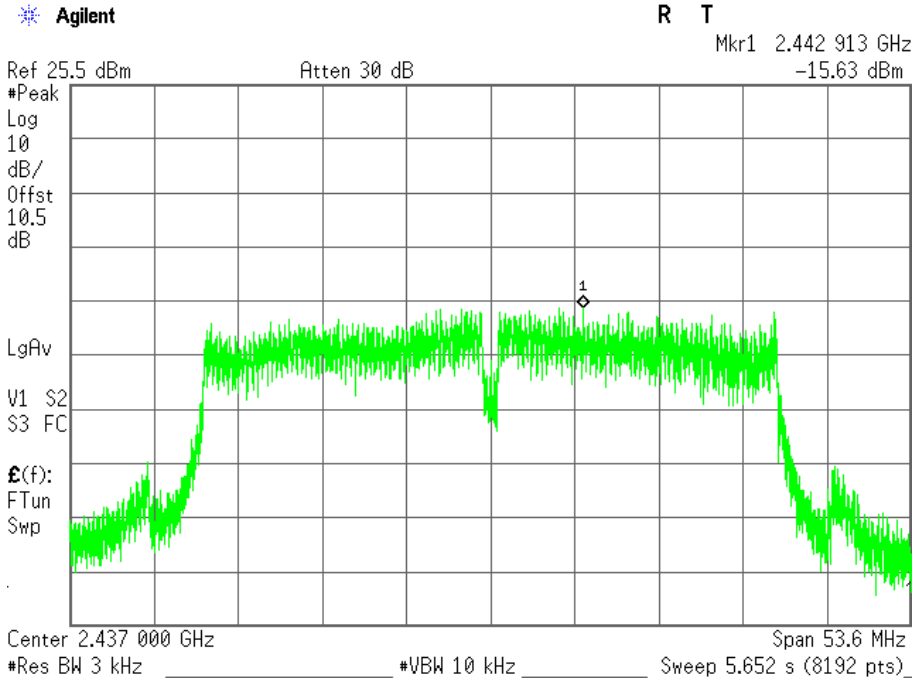
CH High (IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



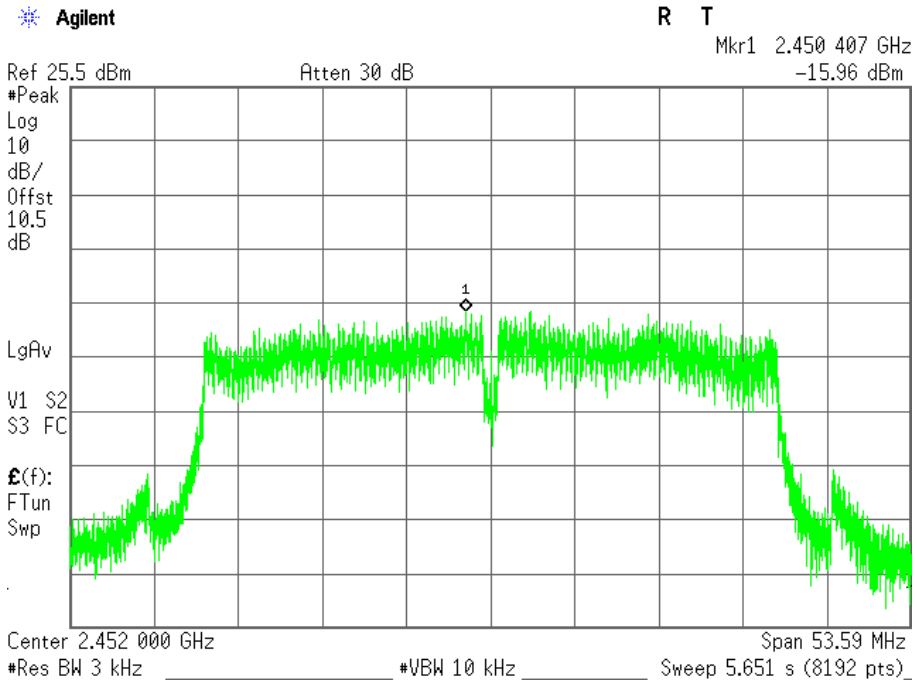
CH Low (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



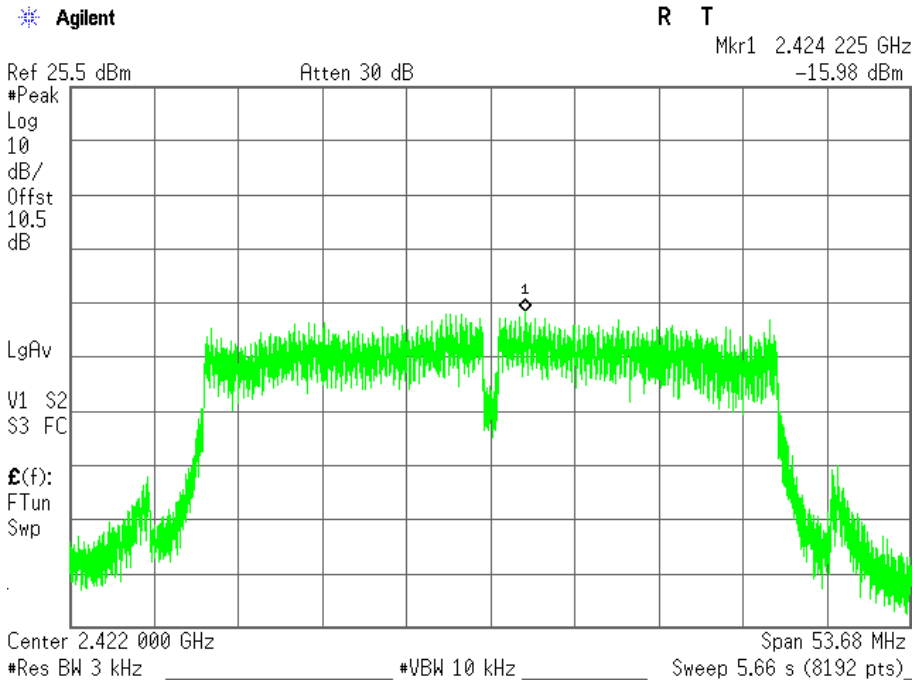
CH Middle (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



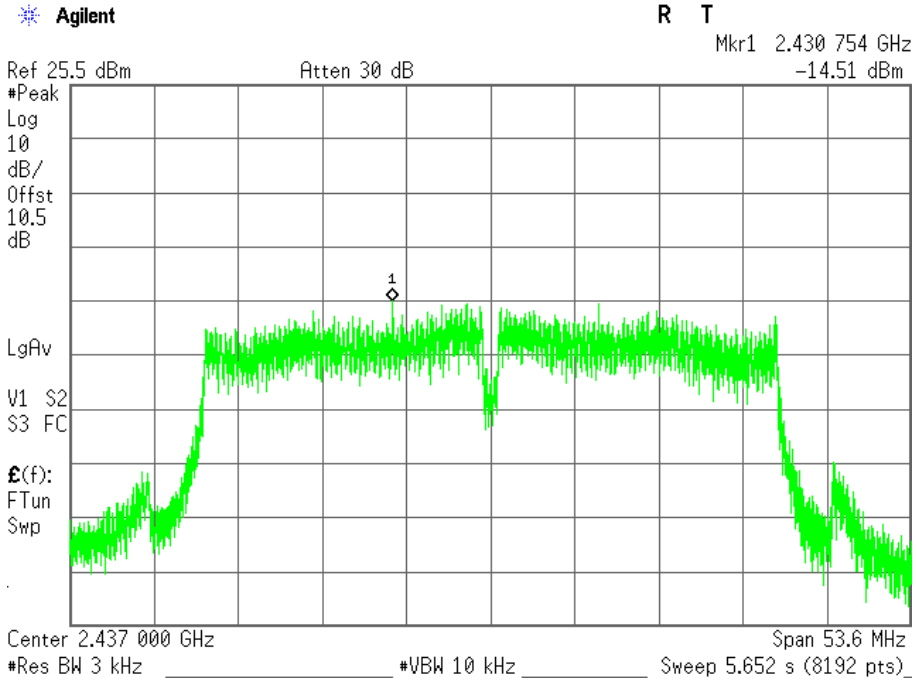
CH High (IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



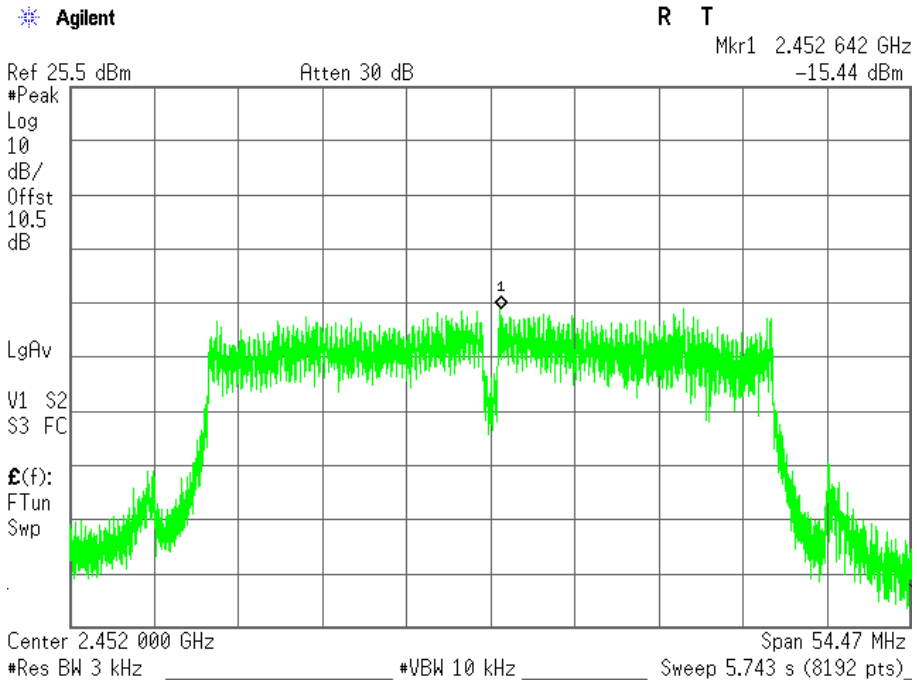
CH Low (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH Middle (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH High (IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



7.6 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	MY43360132	05/31/2017
Test S/W	N/A			

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

TEST SETUP

TEST PROCEDURE

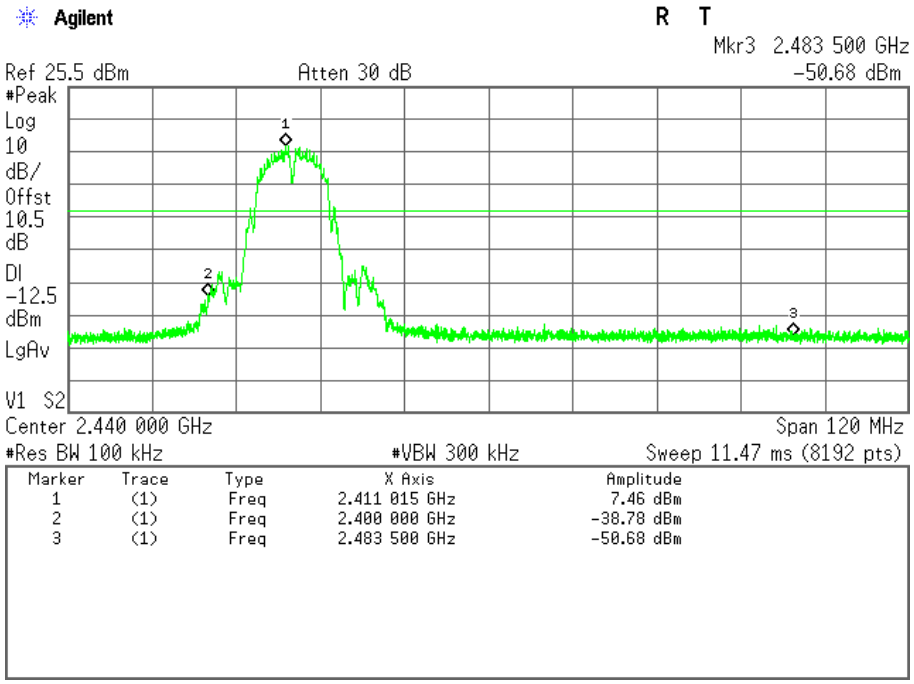
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST RESULTS

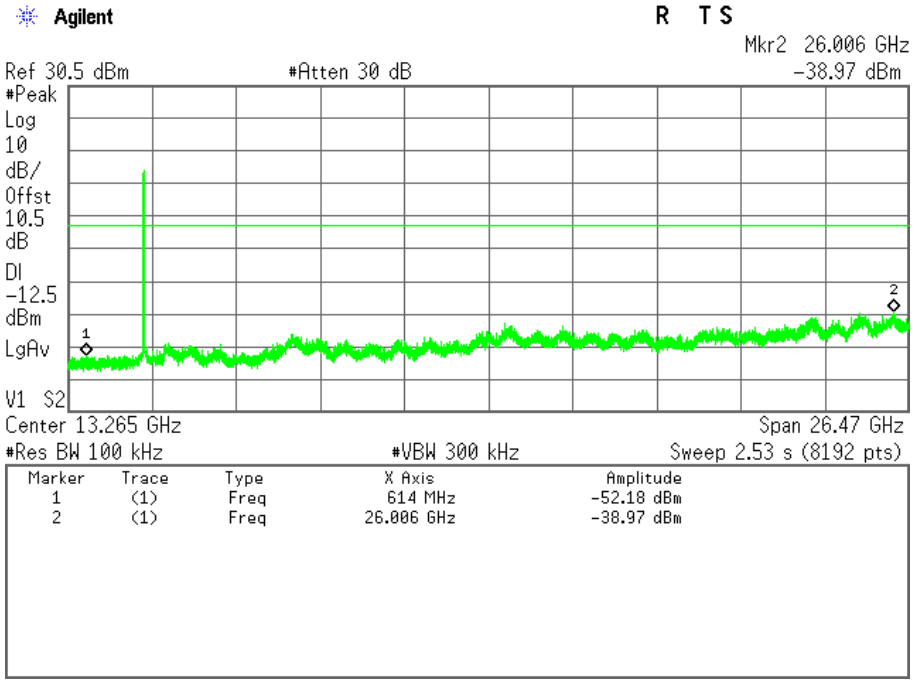
Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Crystal Wu
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	TX Mode	Temp. & Humidity	22°C, 58%

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

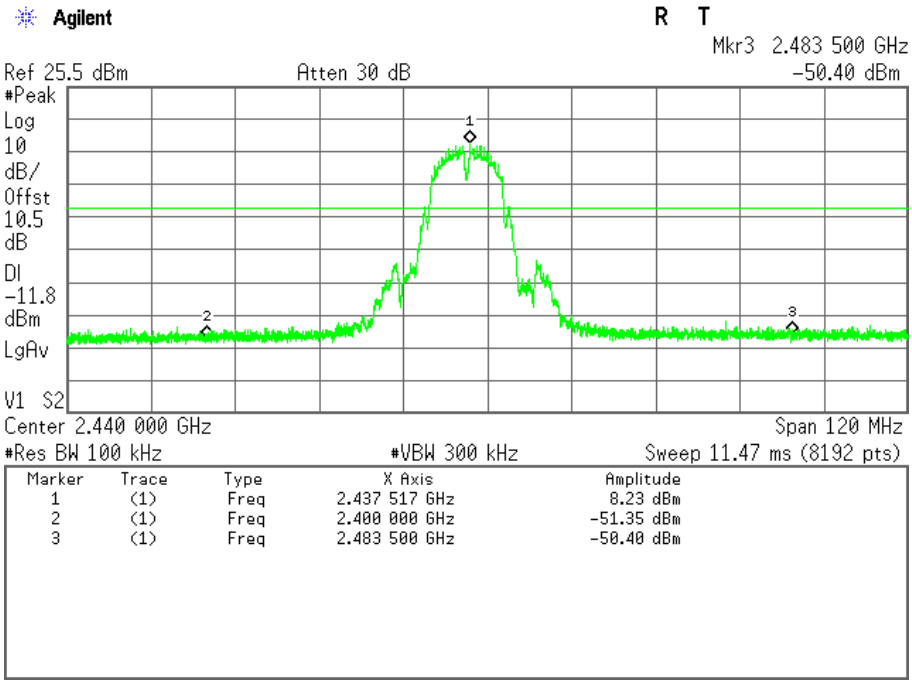
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 0)



CH Low (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 0)

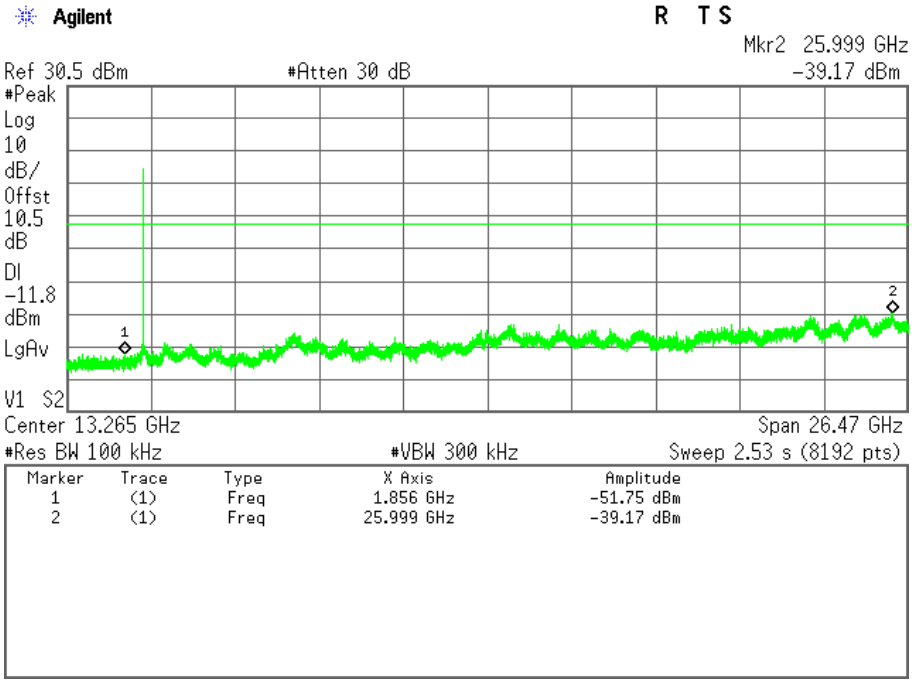


CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 0)



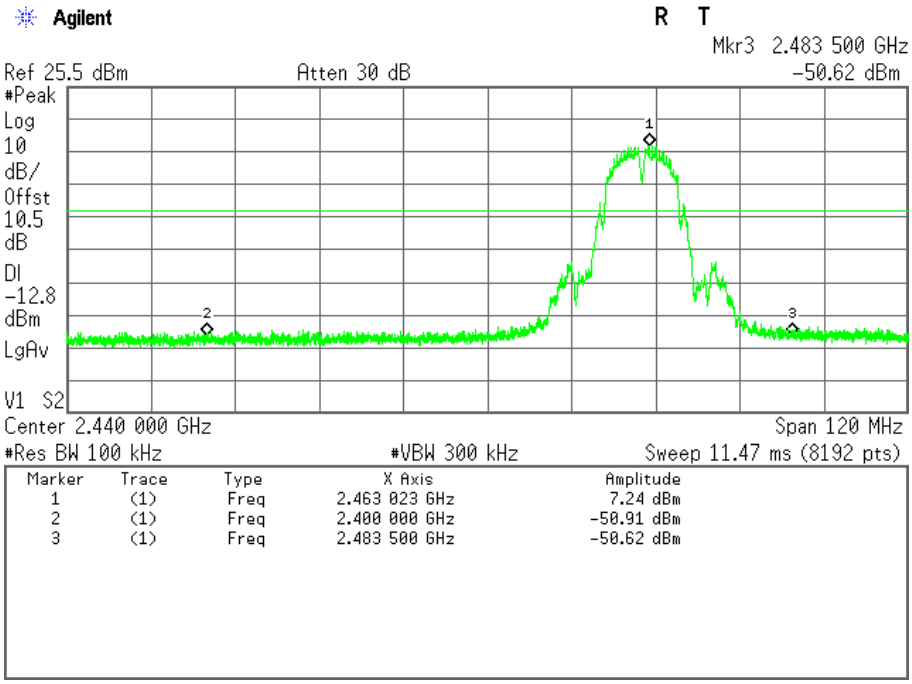
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.437 517 GHz	8.23 dBm
2	(1)	Freq	2.400 000 GHz	-51.35 dBm
3	(1)	Freq	2.483 500 GHz	-50.40 dBm

CH Middle (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 0)

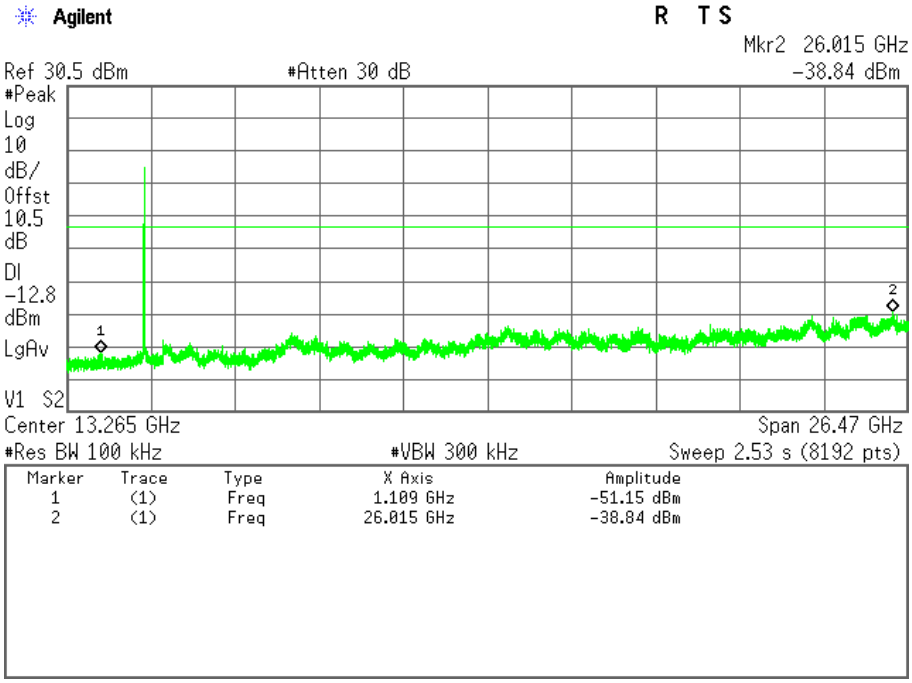


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.856 GHz	-51.75 dBm
2	(1)	Freq	25.999 GHz	-39.17 dBm

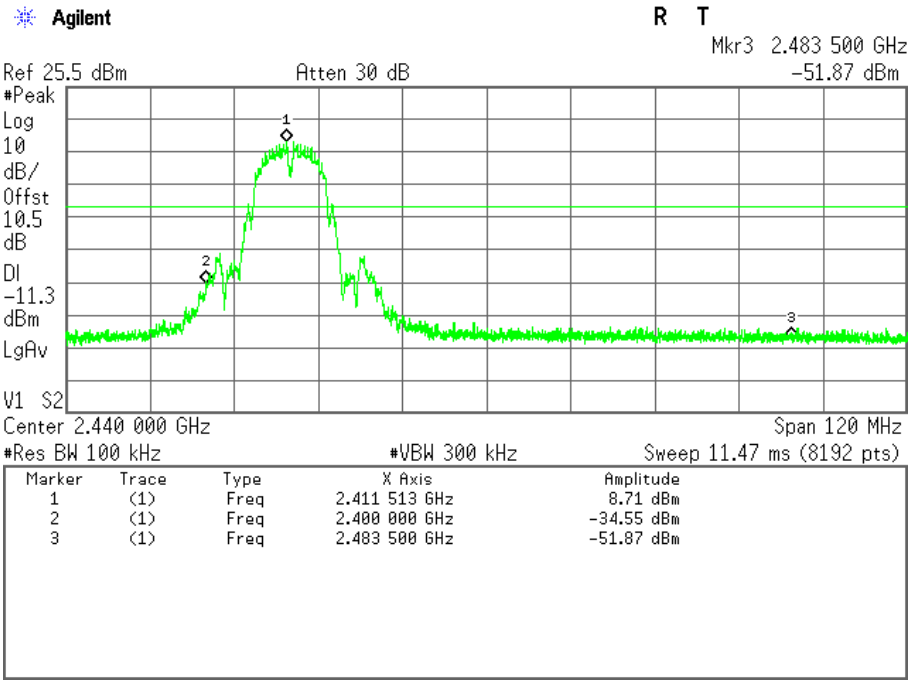
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 0)



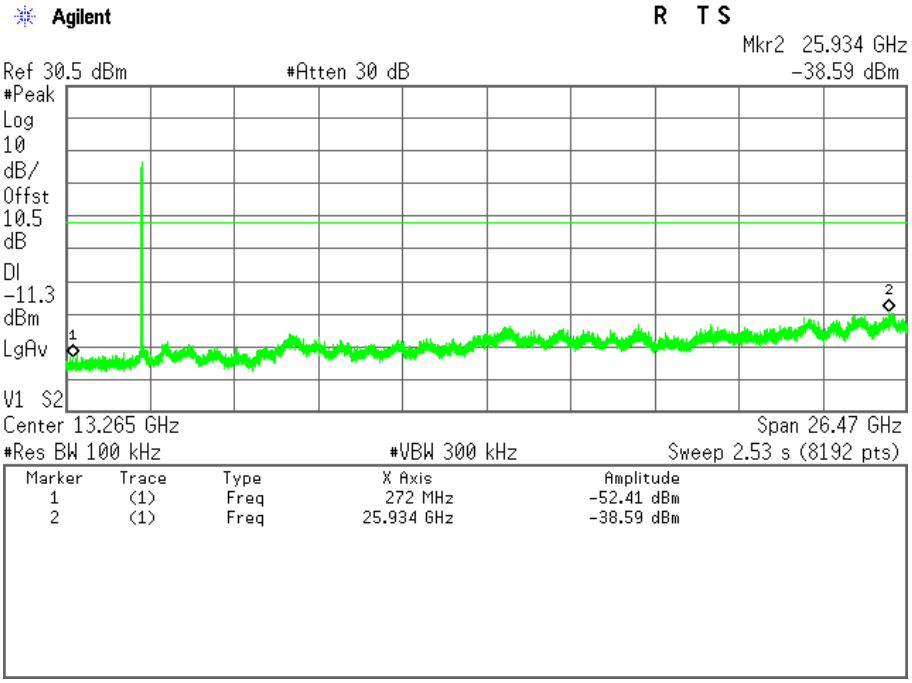
CH High (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 0)



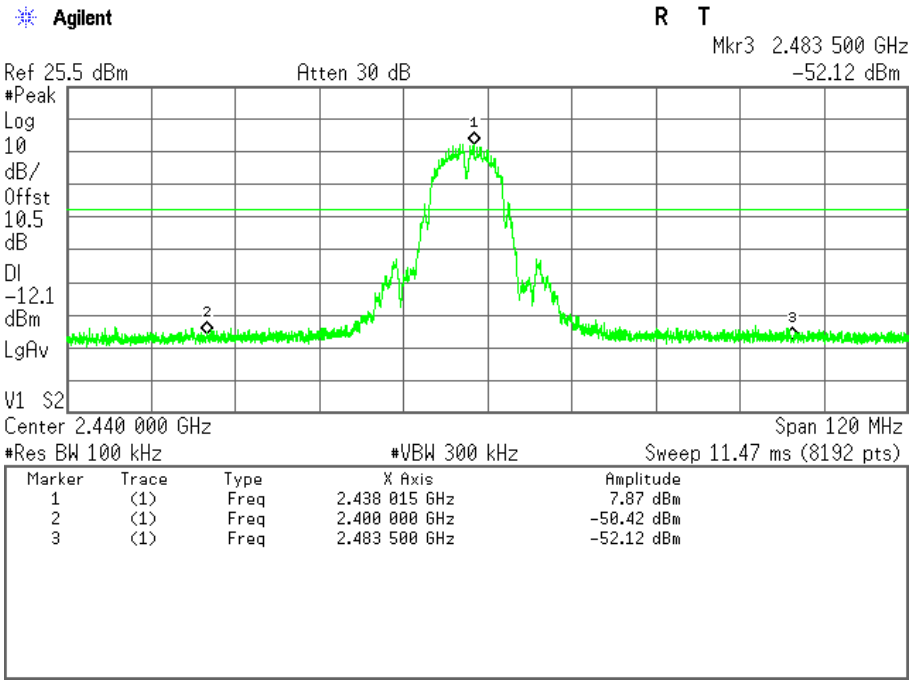
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 1)



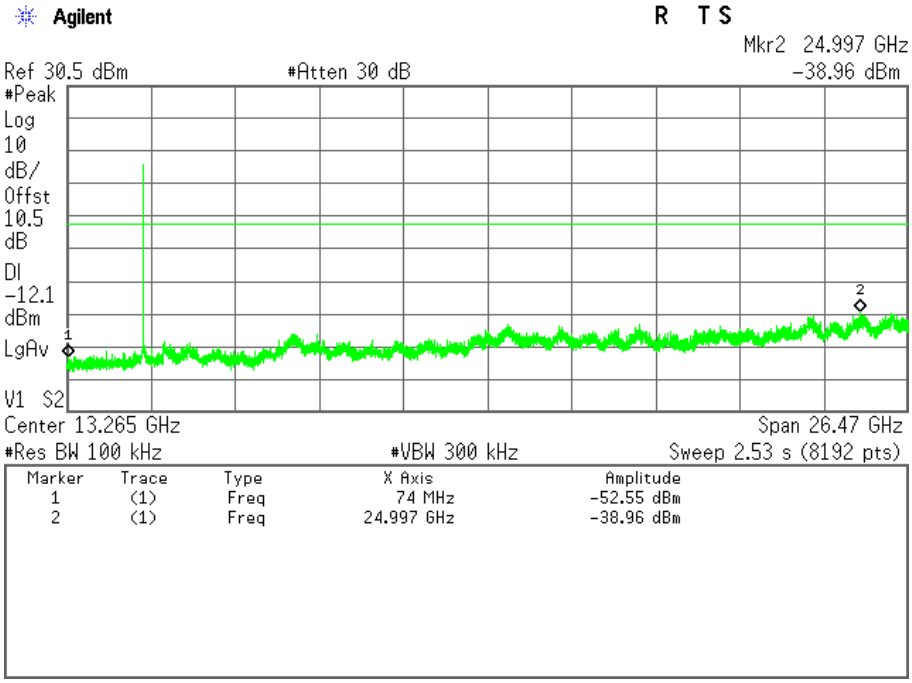
CH Low (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 1)



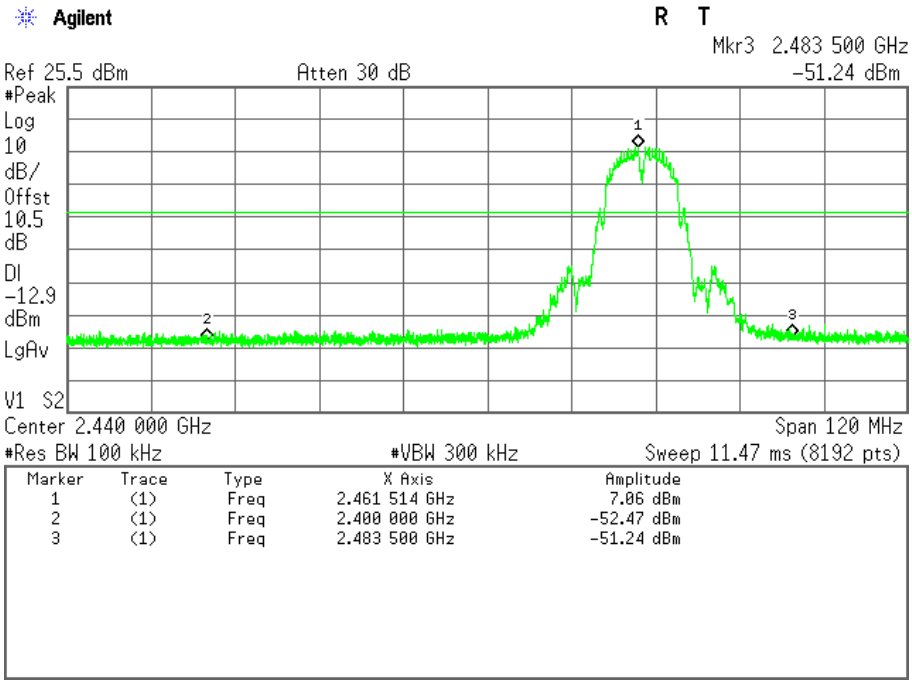
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 1)



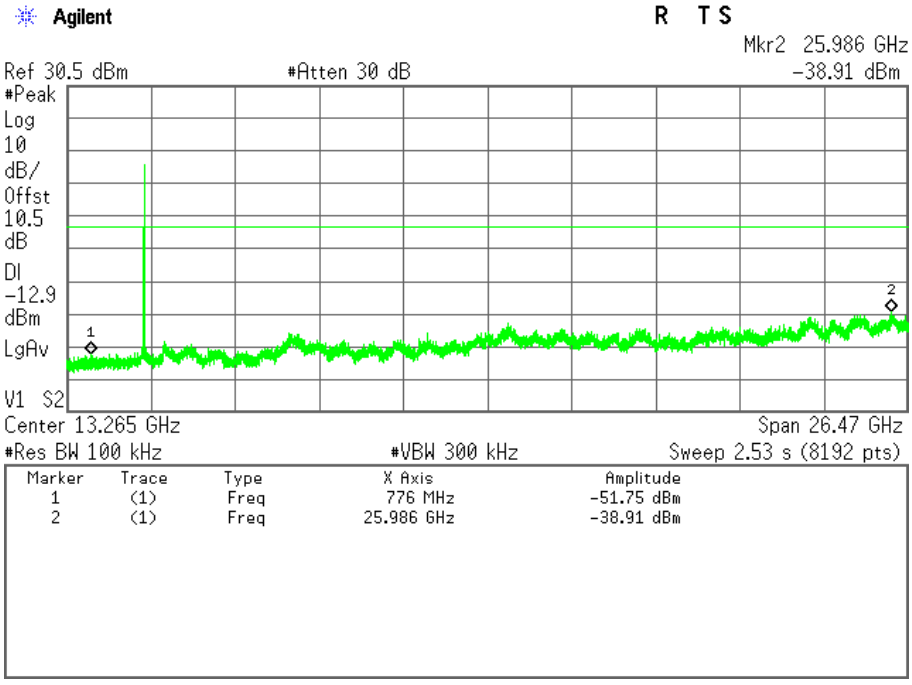
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 1)



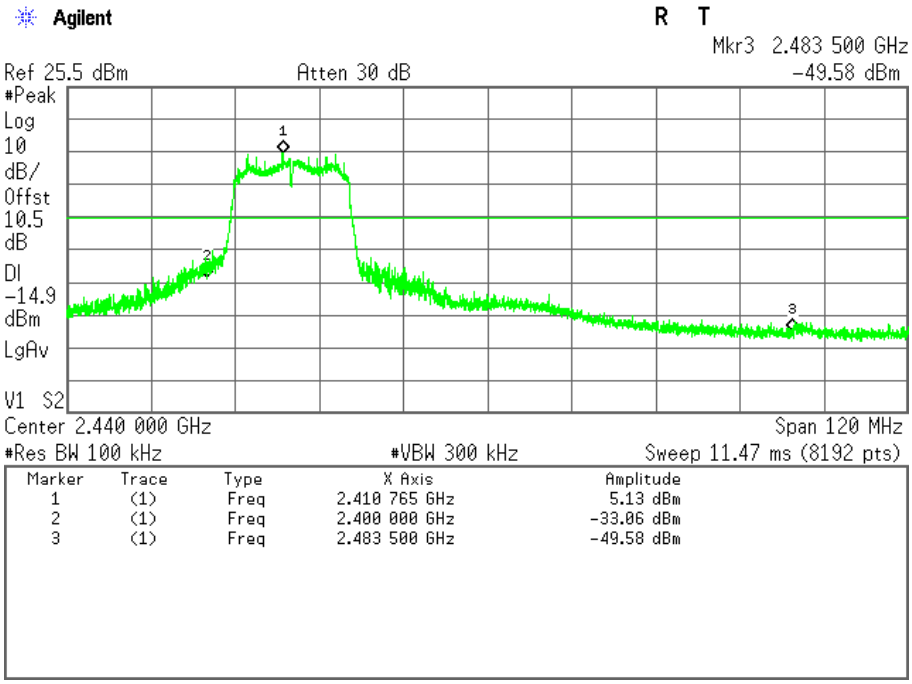
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode / Chain 1)



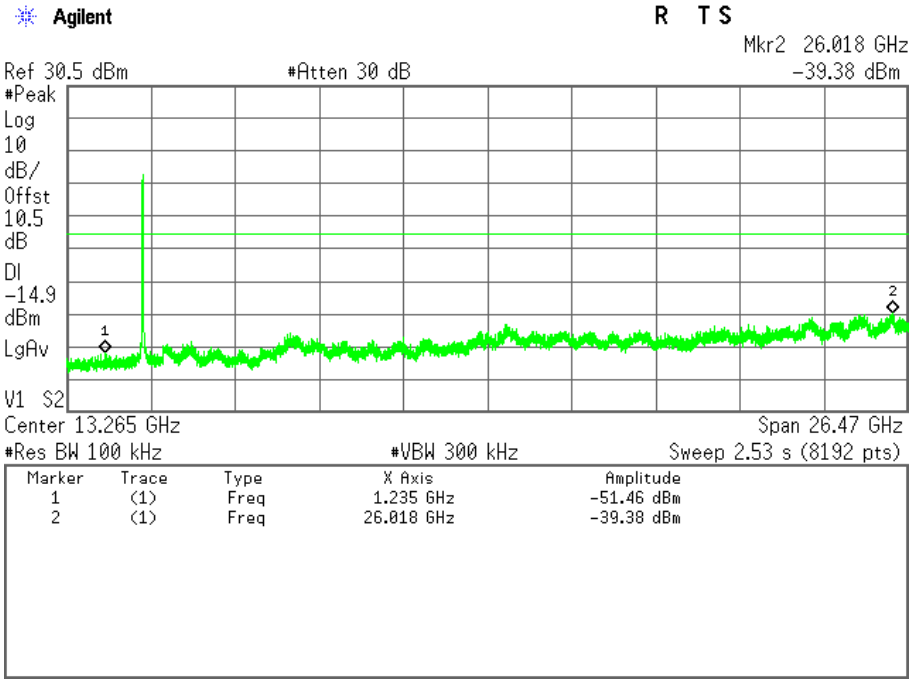
CH High (30MHz ~ 26.5GHz / IEEE 802.11b Mode / Chain 1)



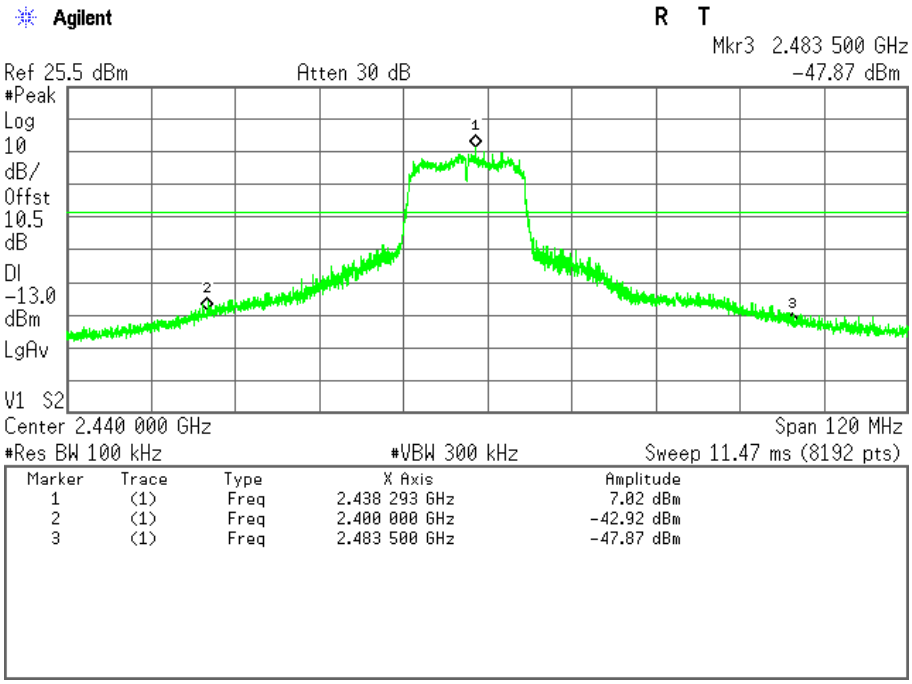
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 0)



CH Low (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 0)

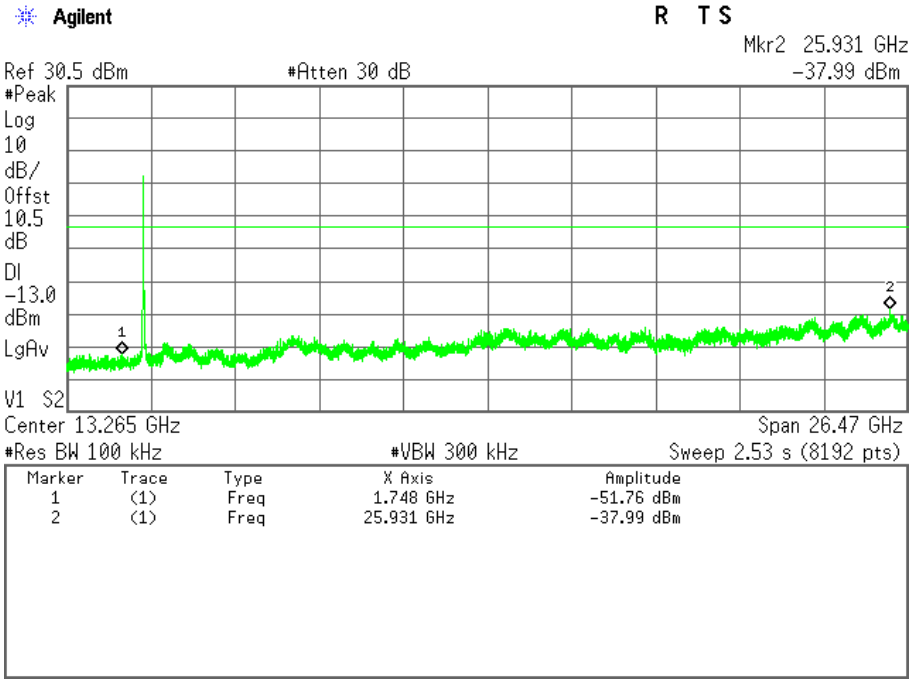


CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 0)



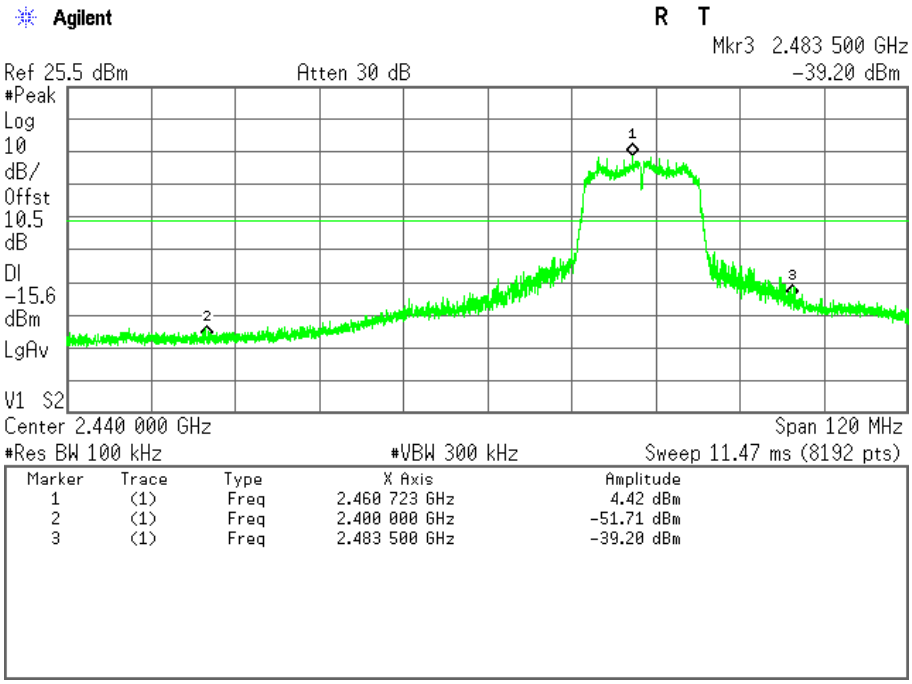
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.438 293 GHz	7.02 dBm
2	(1)	Freq	2.400 000 GHz	-42.92 dBm
3	(1)	Freq	2.483 500 GHz	-47.87 dBm

CH Middle (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 0)

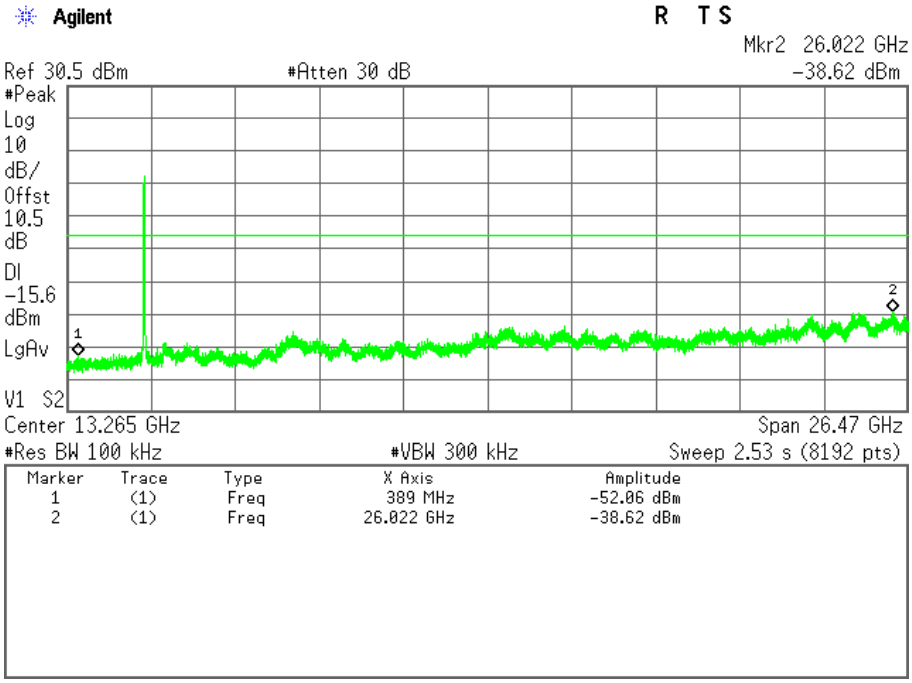


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.748 GHz	-51.76 dBm
2	(1)	Freq	25.931 GHz	-37.99 dBm

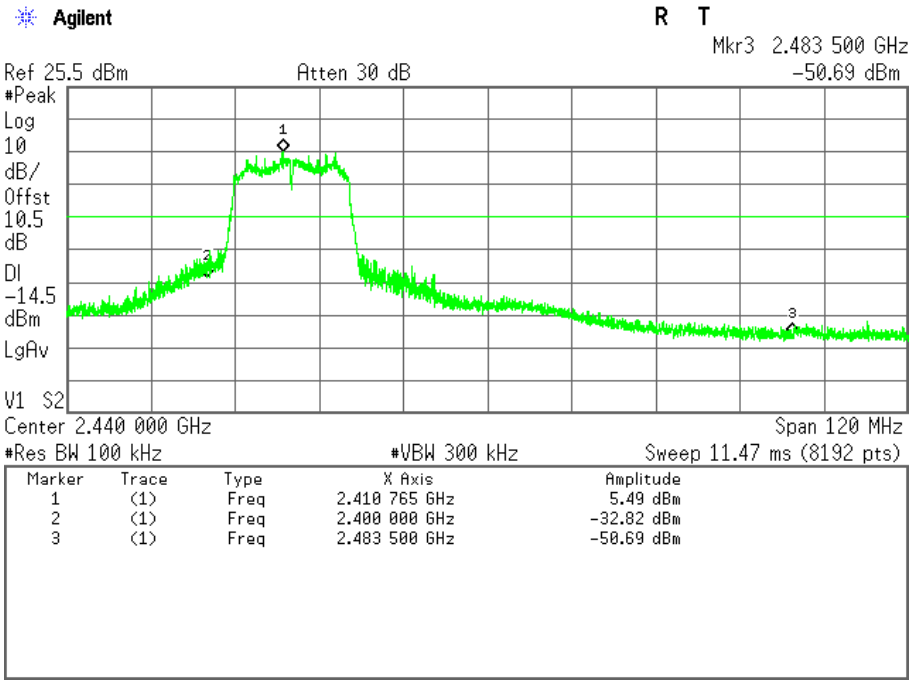
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 0)



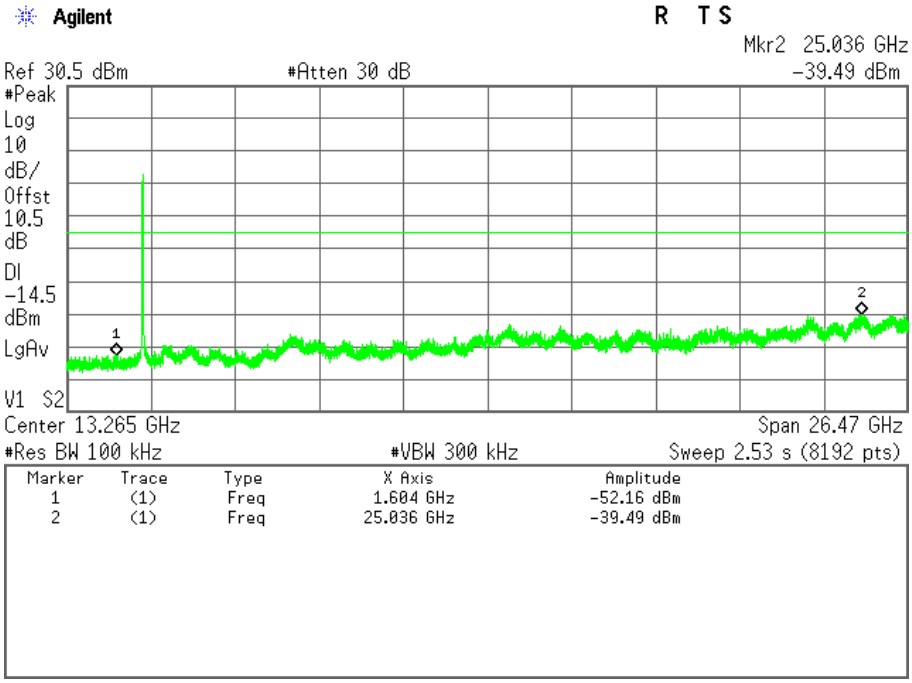
CH High (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 0)



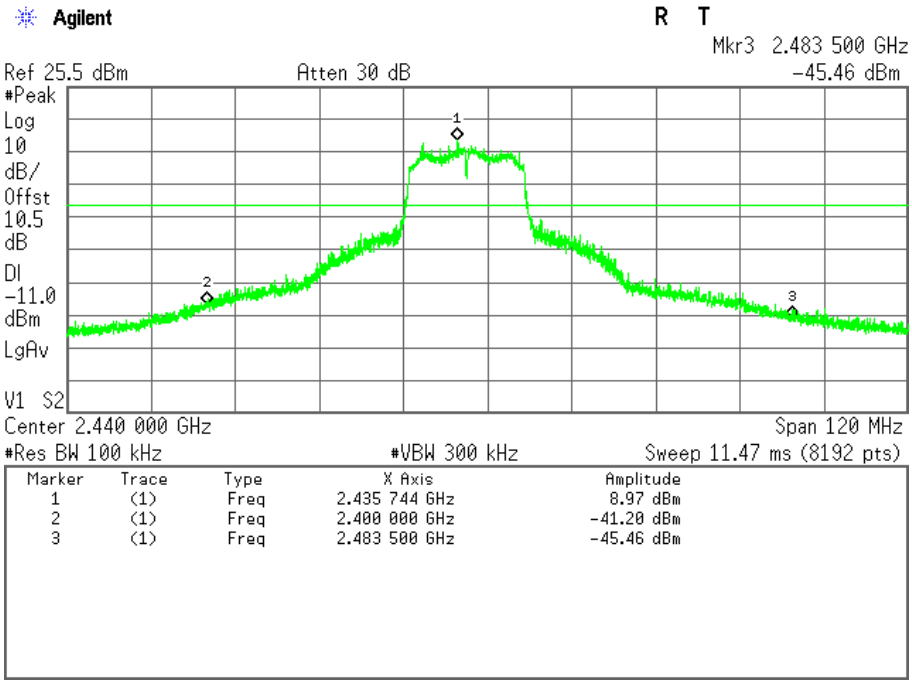
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 1)



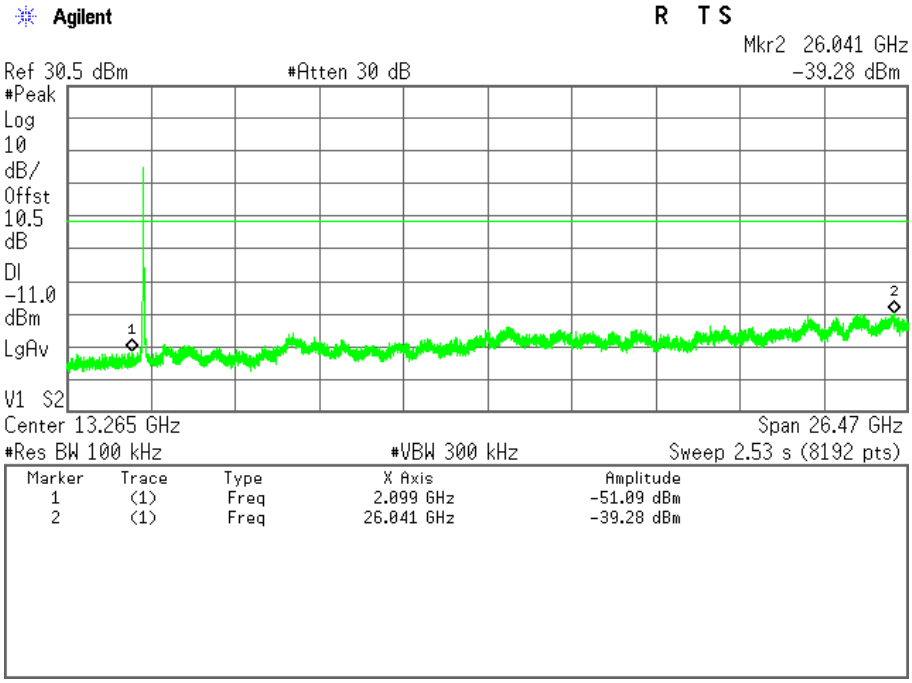
CH Low (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 1)



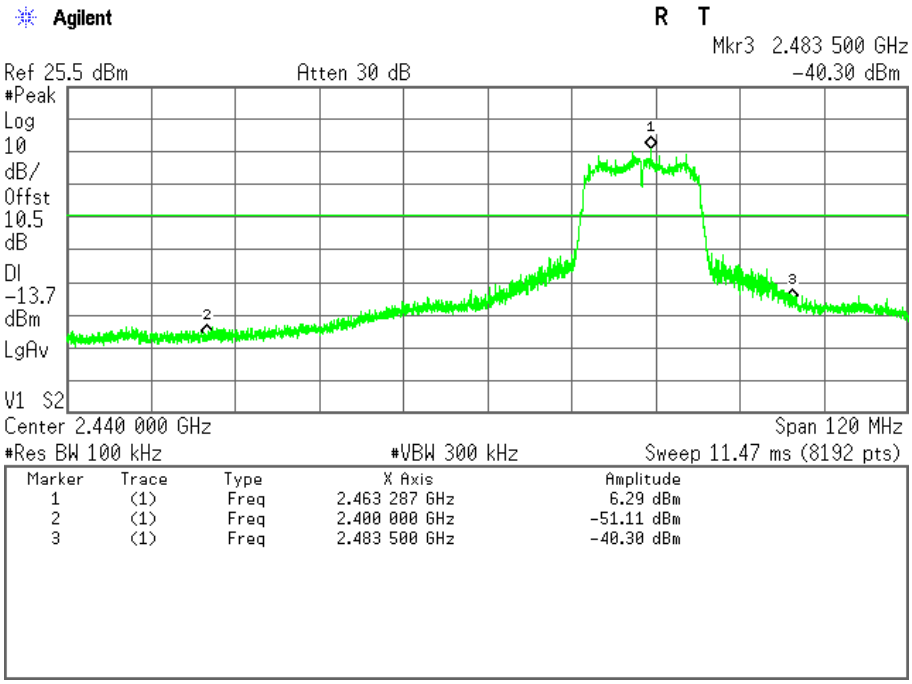
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 1)



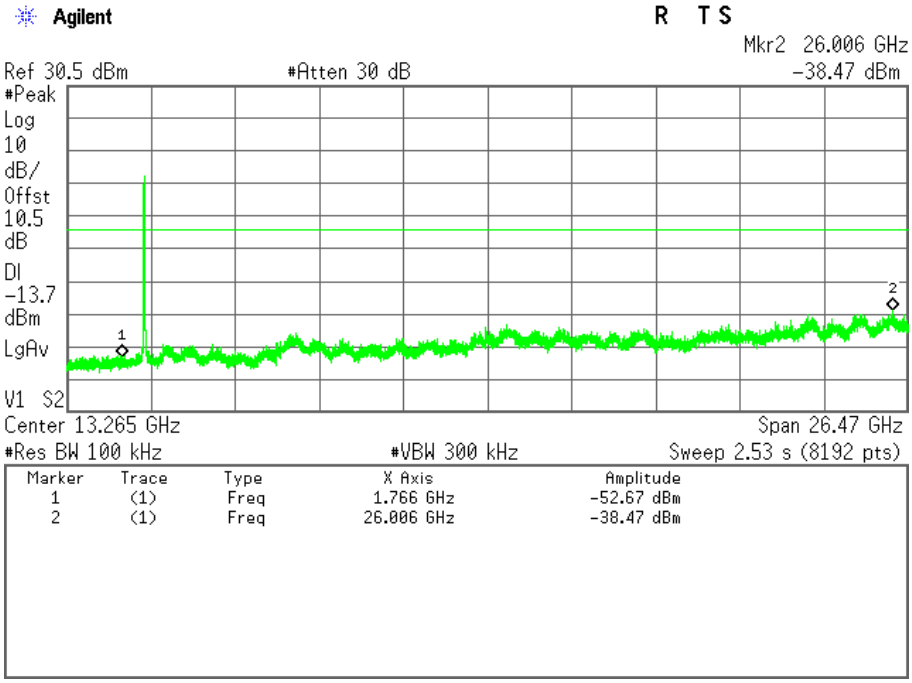
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 1)



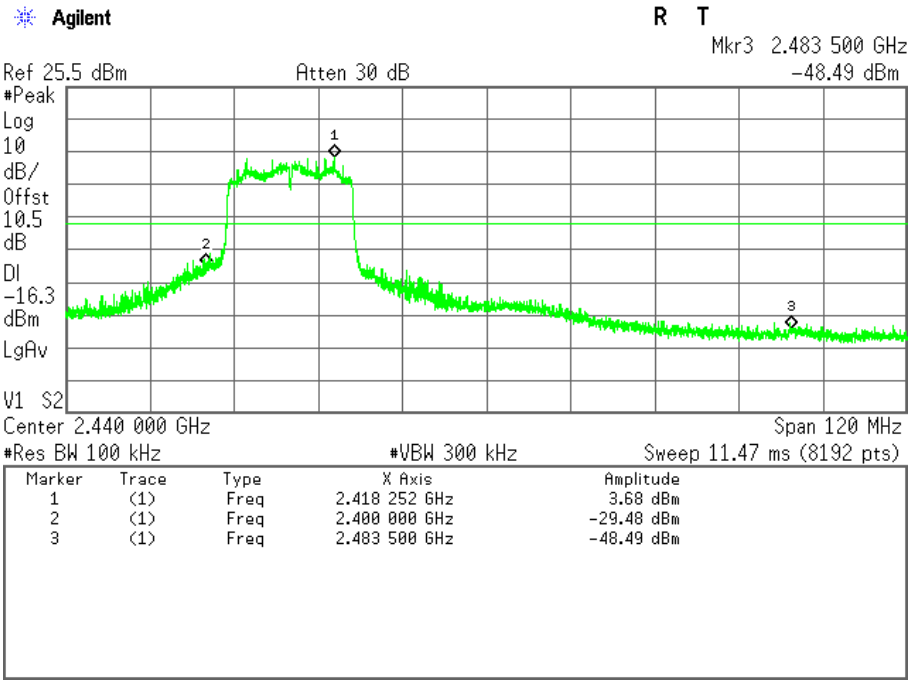
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode / Chain 1)



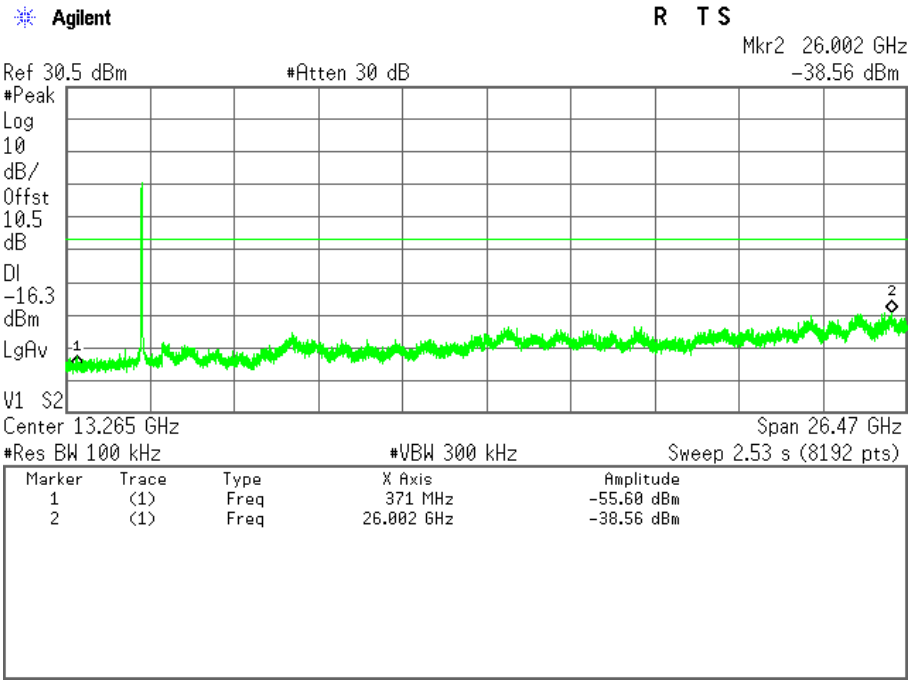
CH High (30MHz ~ 26.5GHz / IEEE 802.11g Mode / Chain 1)



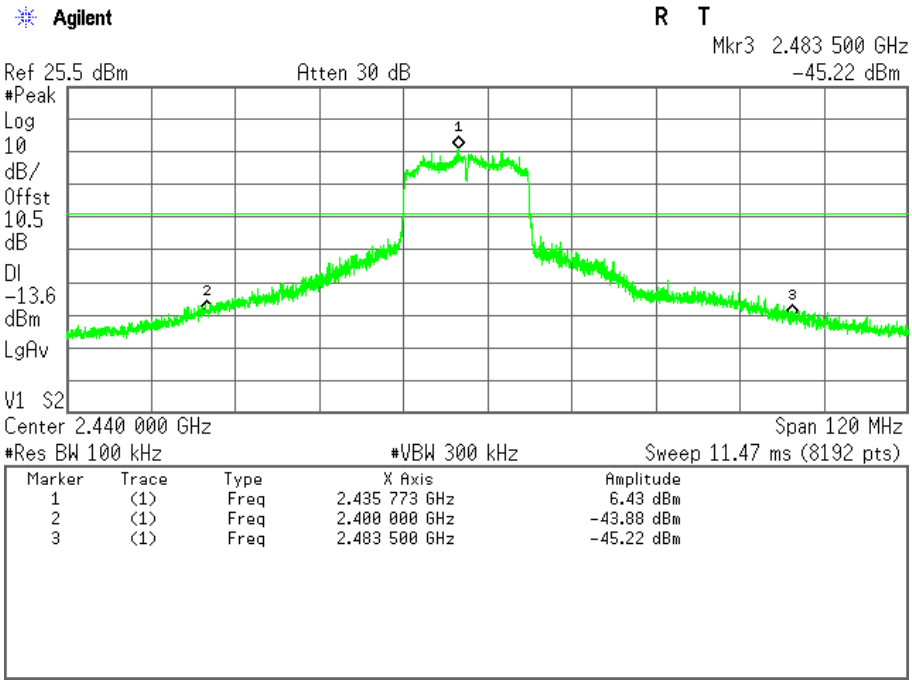
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



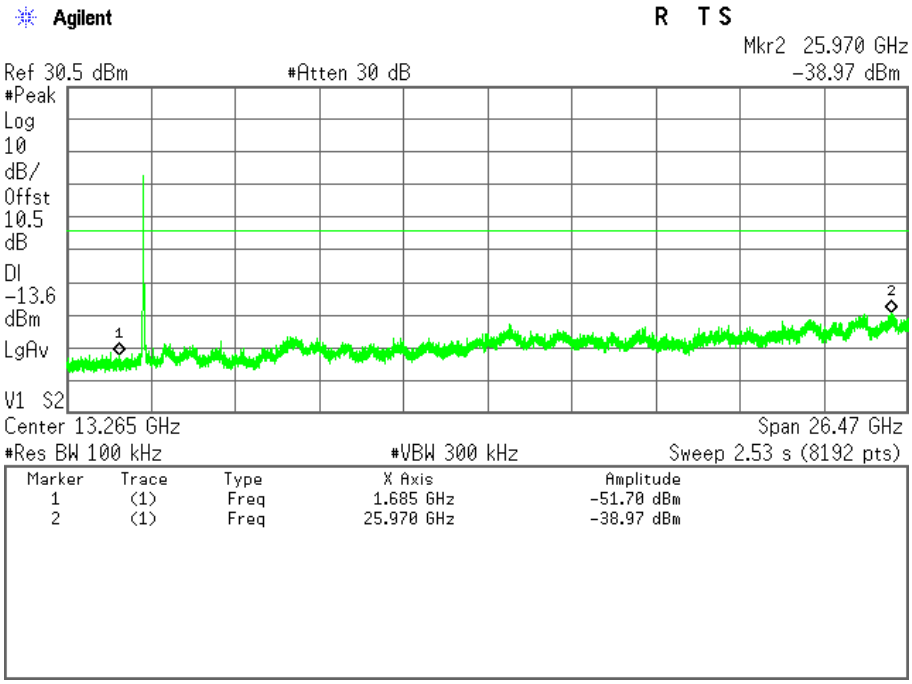
CH Low (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



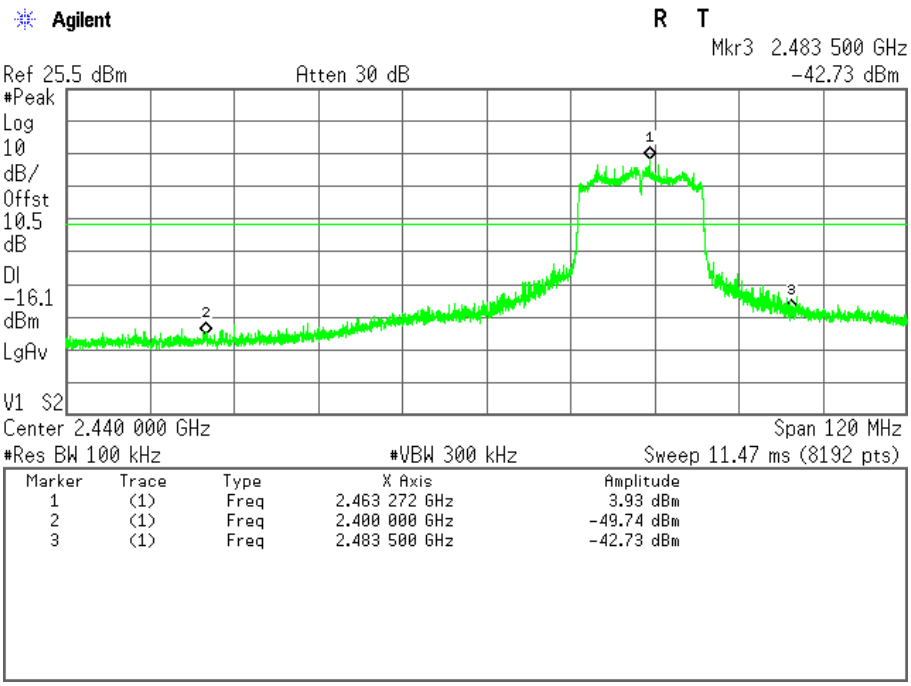
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



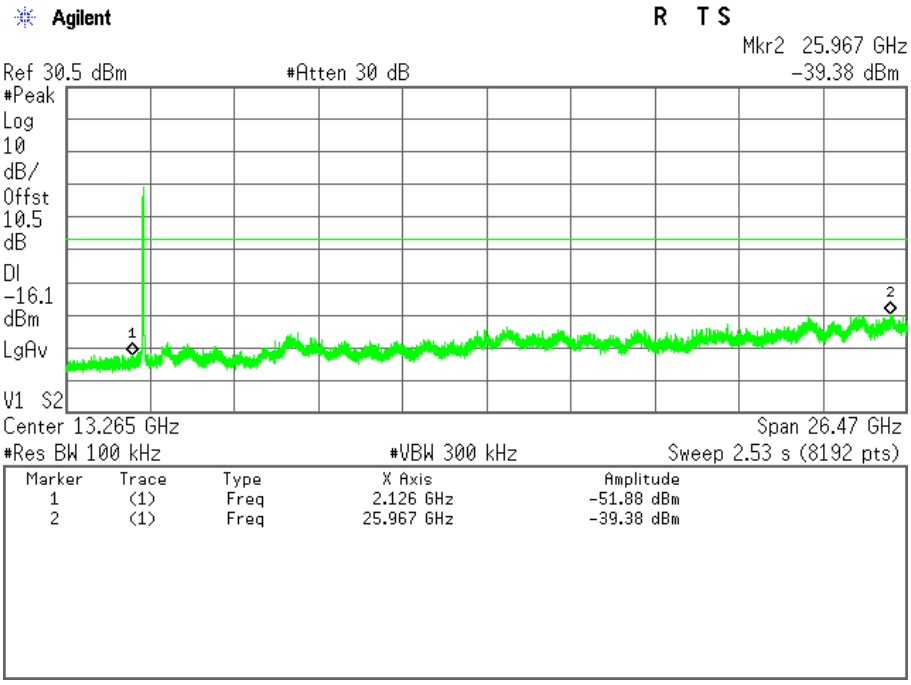
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



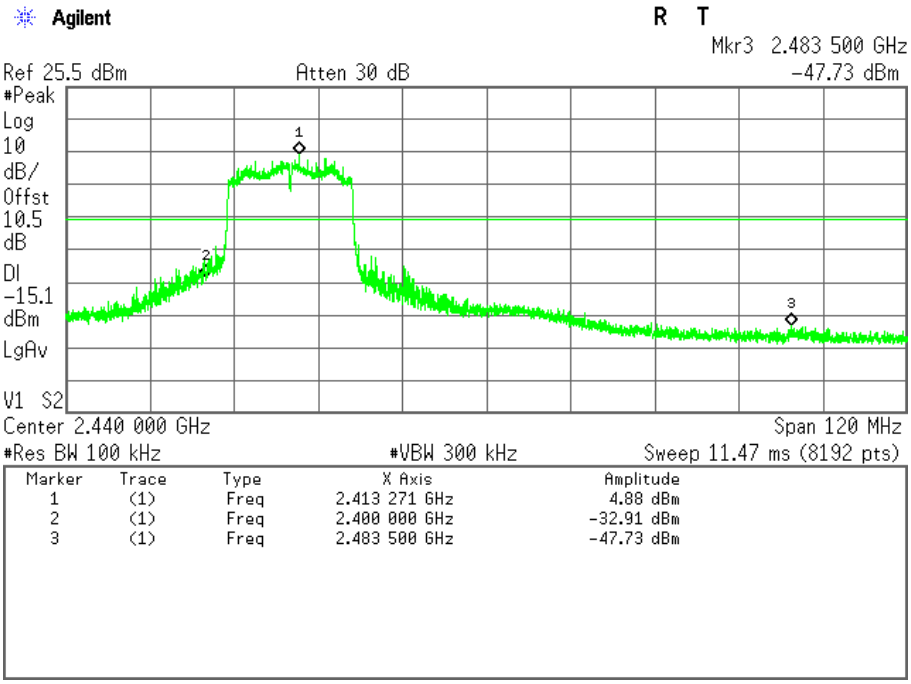
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



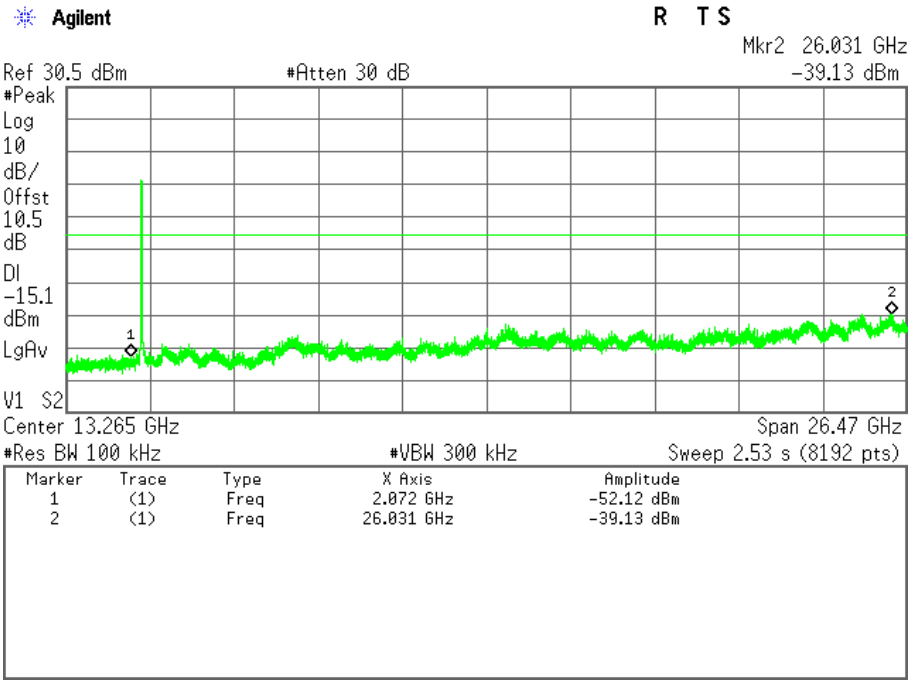
CH High (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 0)



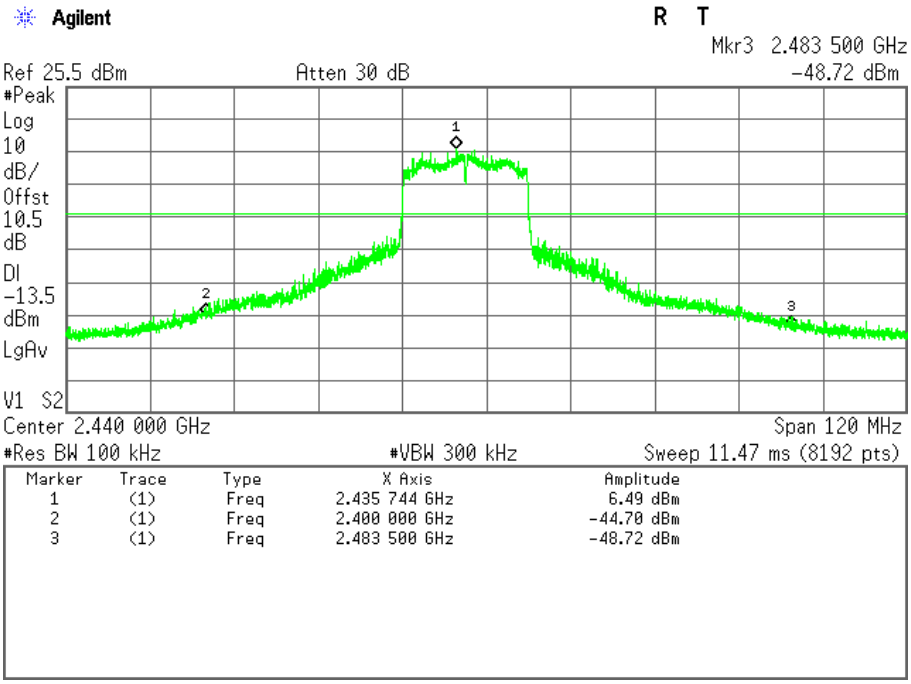
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



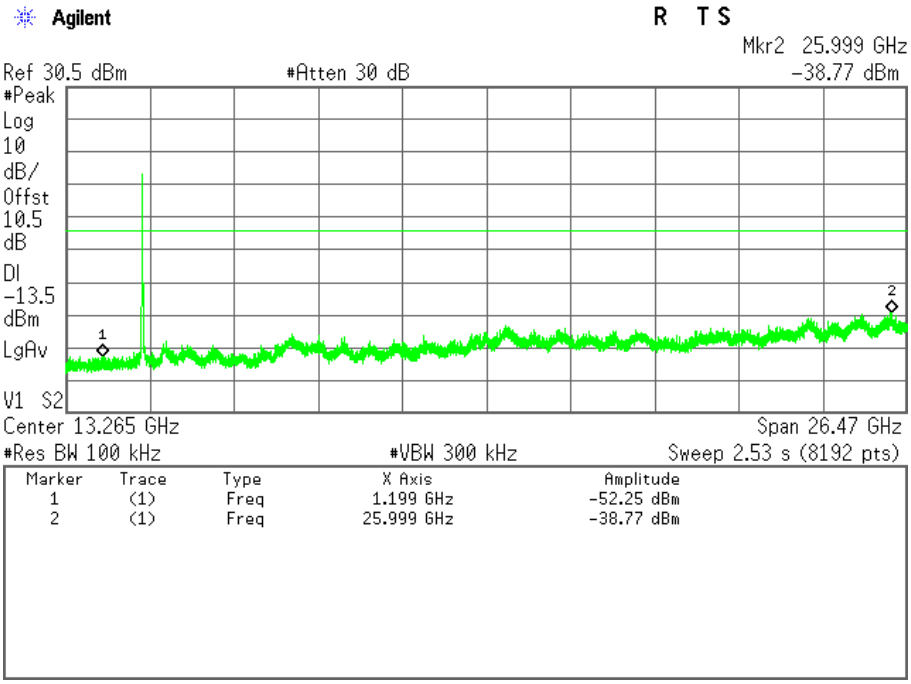
CH Low (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



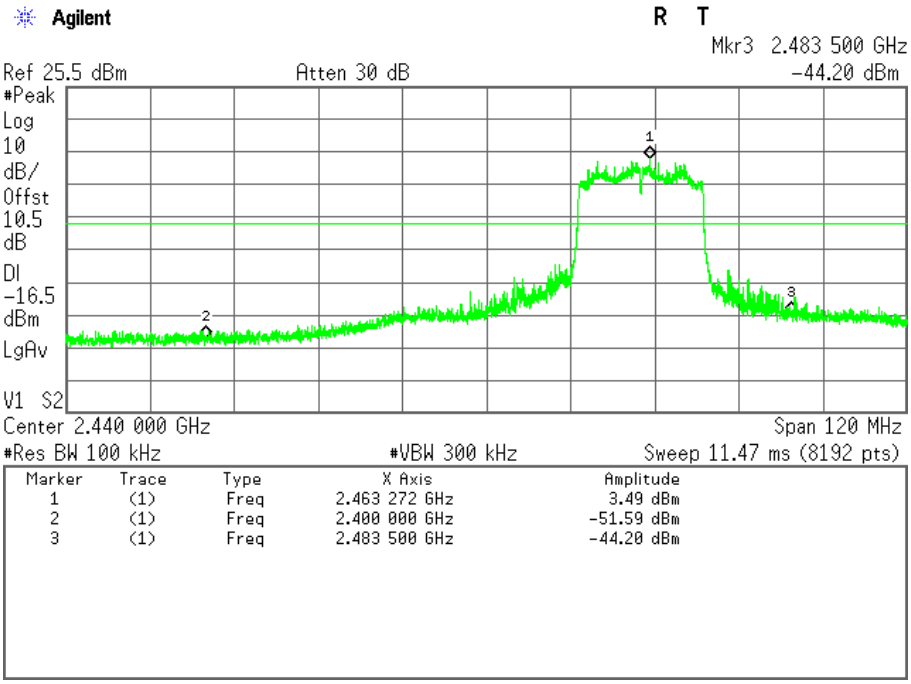
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



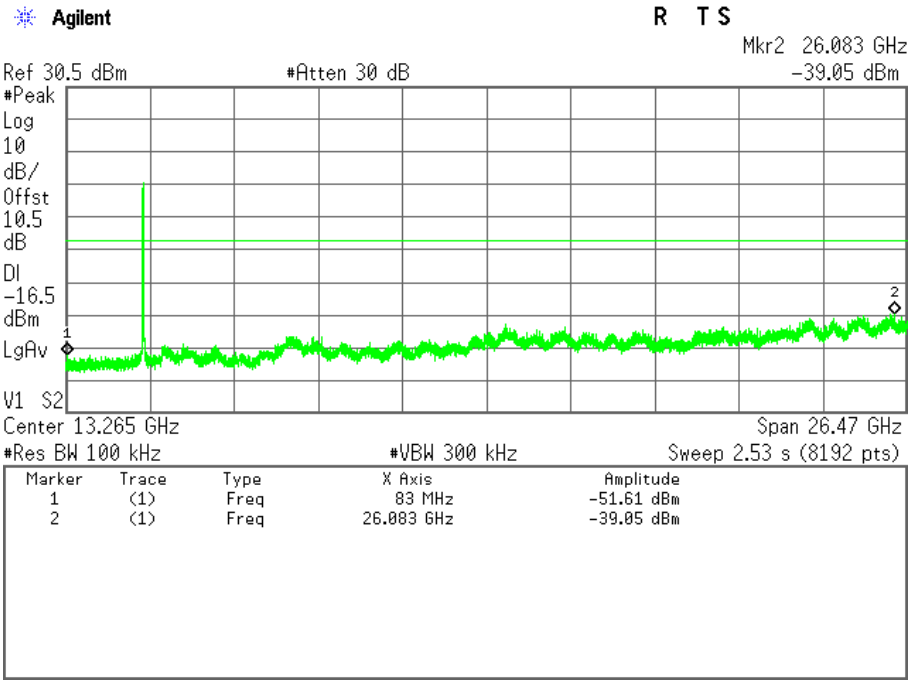
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



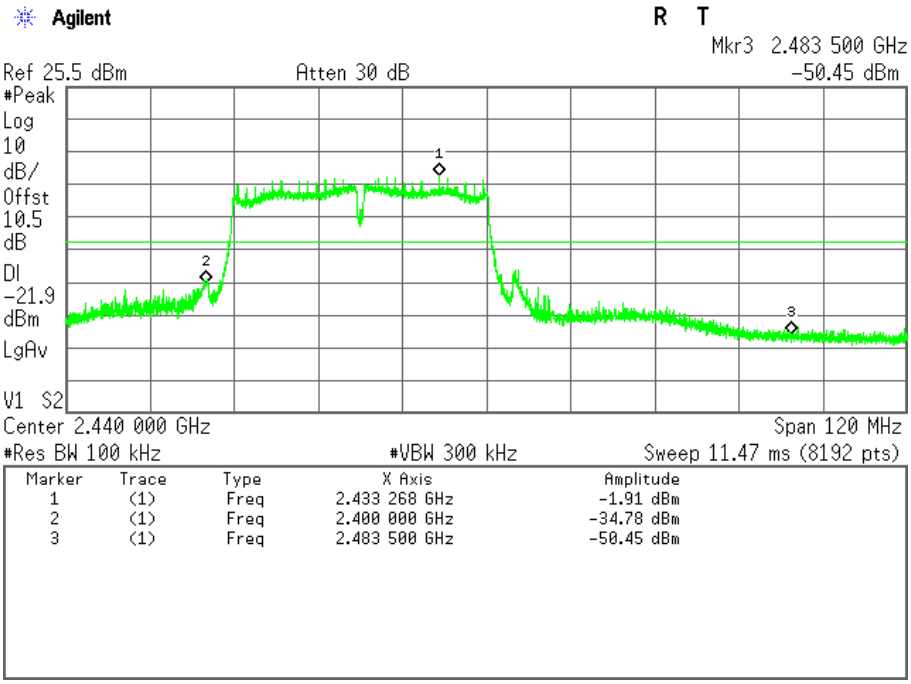
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



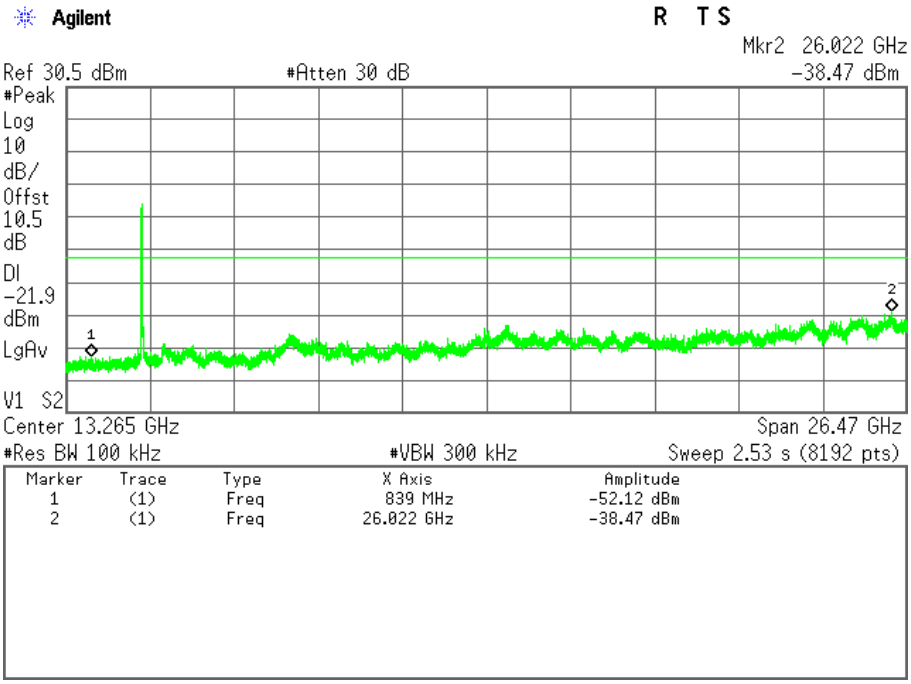
CH High (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode / Chain 1)



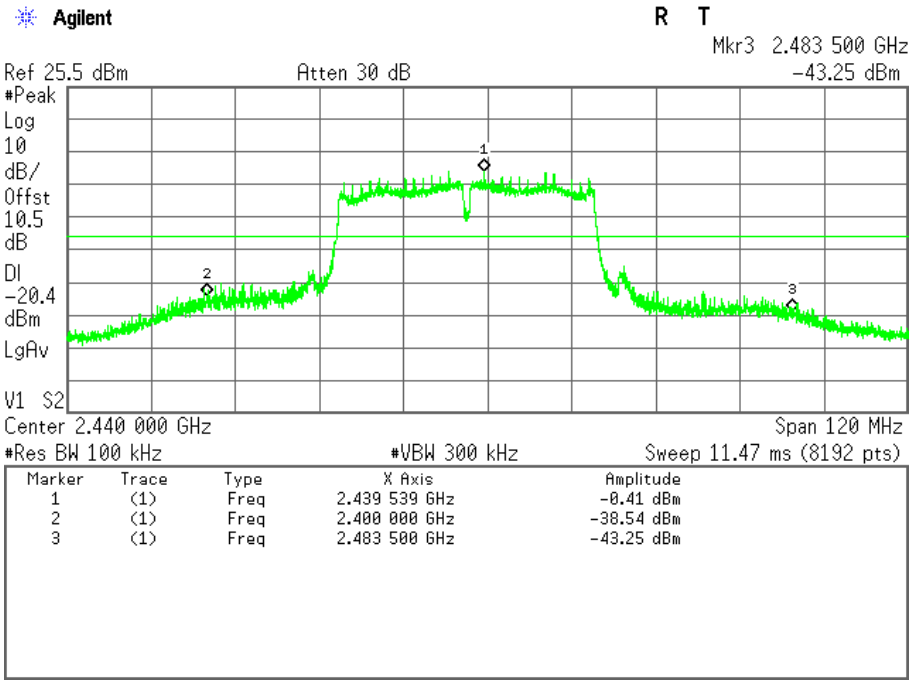
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



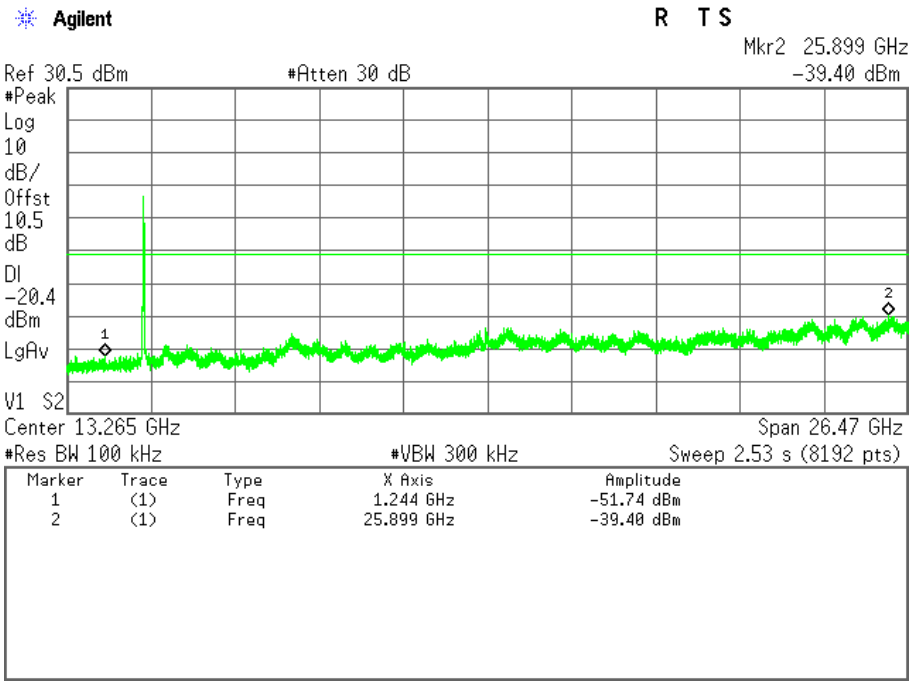
CH Low (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



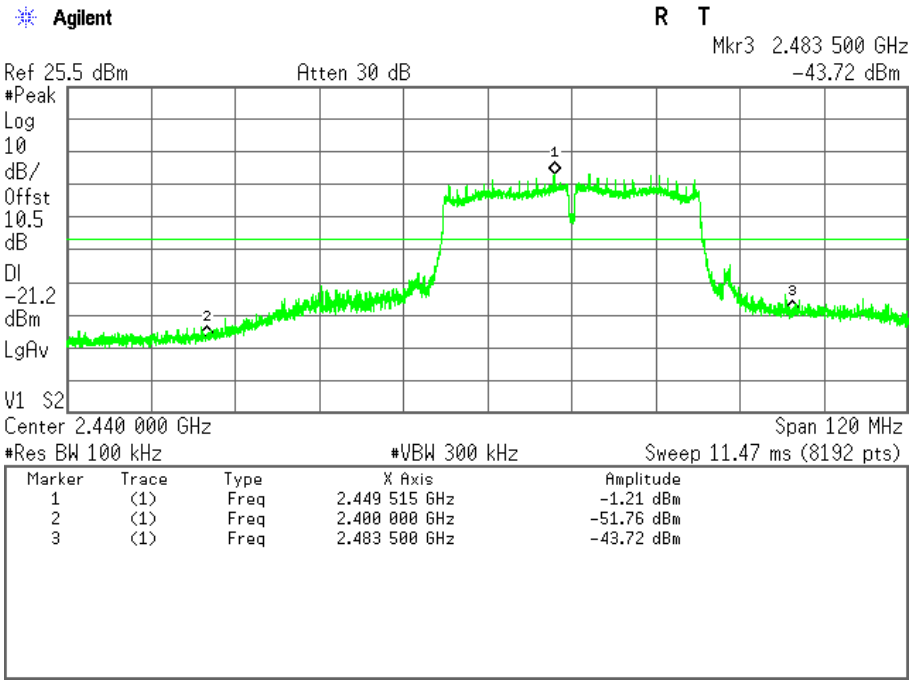
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



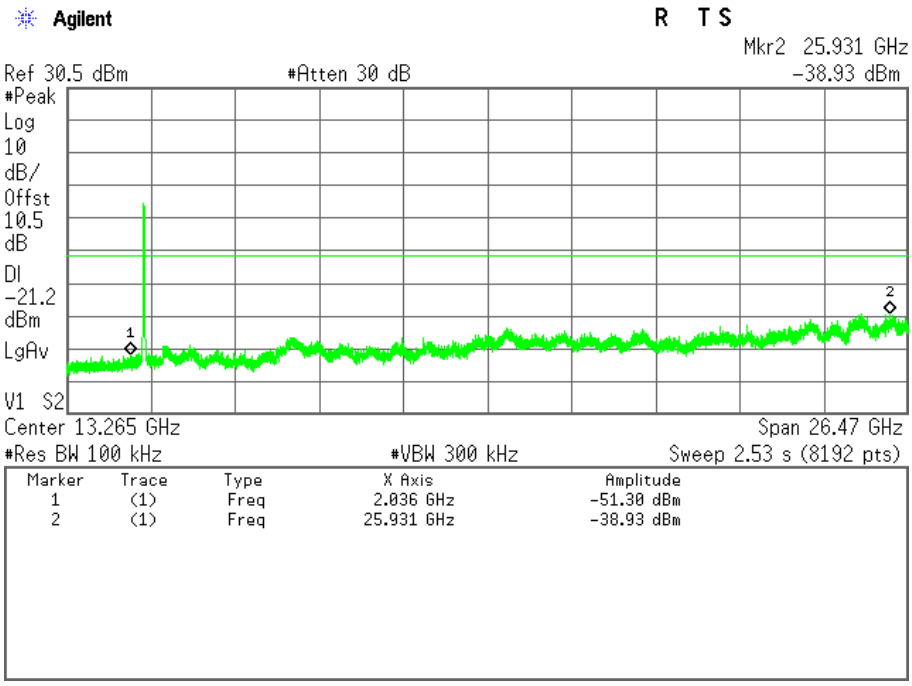
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



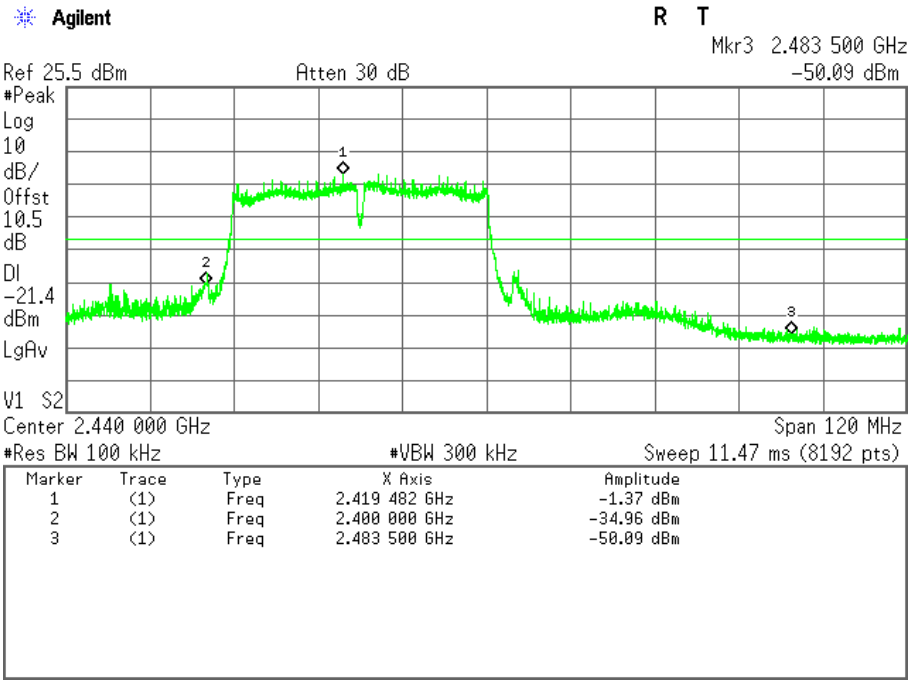
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



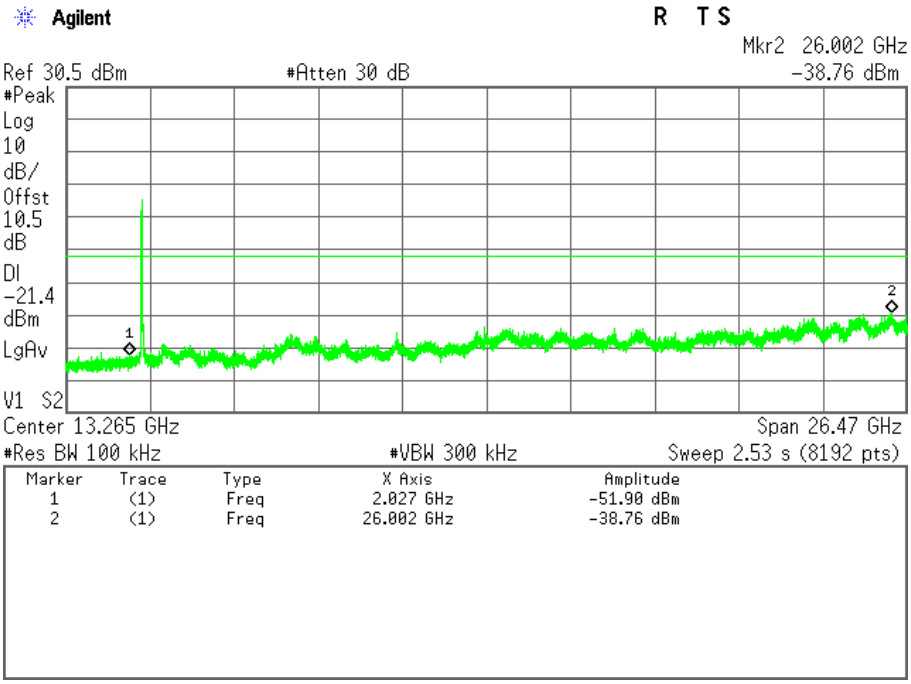
CH High (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 0)



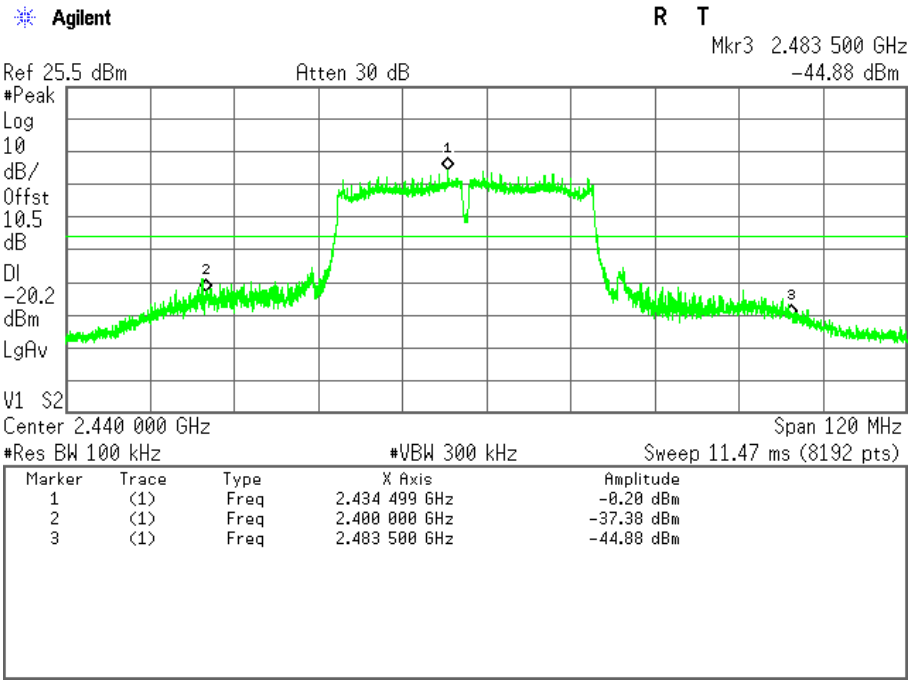
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



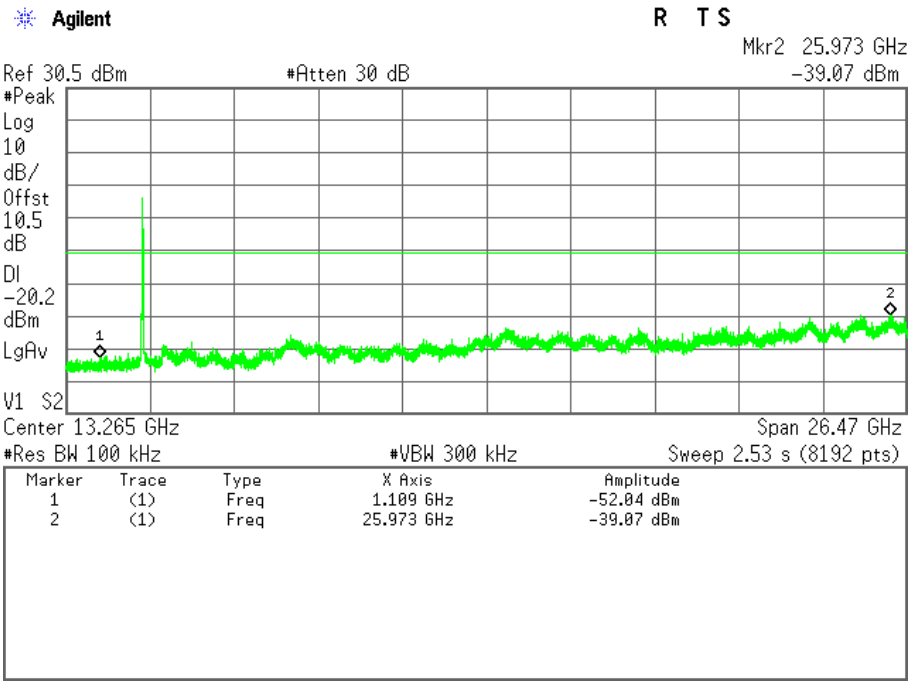
CH Low (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



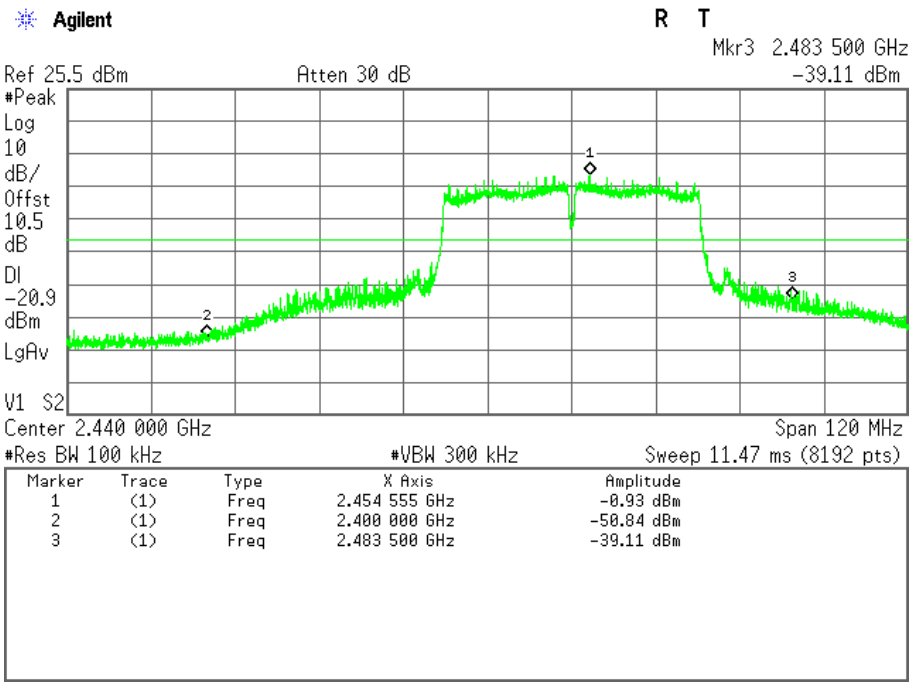
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



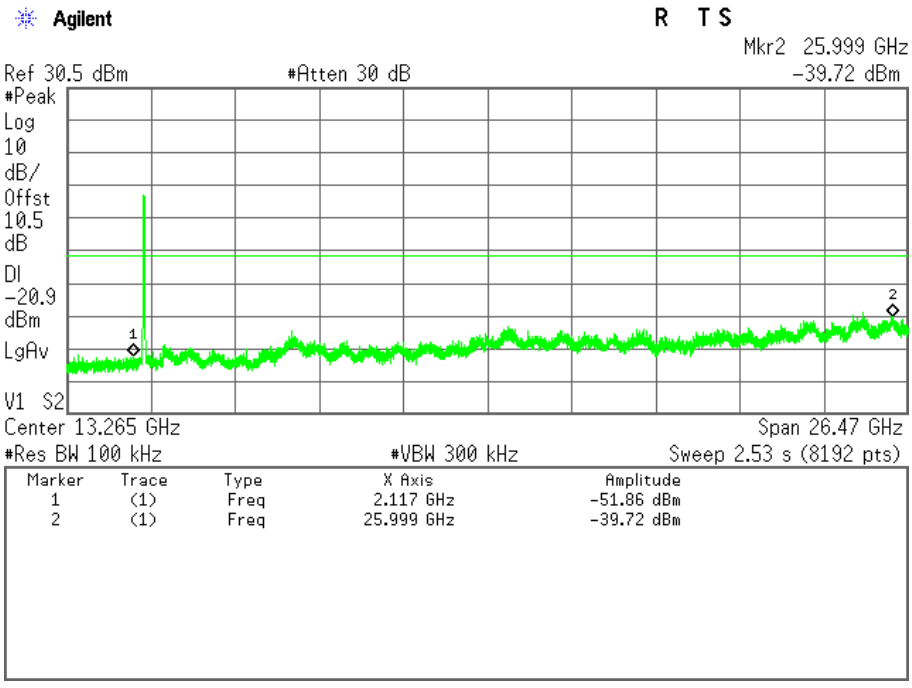
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



CH High (30MHz ~ 26.5GHz / IEEE 802.11gn HT40 MCS0 Mode / Chain 1)



7.7 RADIATED EMISSION

LIMITS

(1) According to § 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			

Remark:
1. [1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. [2] Above 38.6

(2) According to § 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.

(3) 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 (microvolts/meter)	Measurement Distance (meters)
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.*

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

TEST EQUIPMENT

Radiated Emission / 966Chamber_B

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/12/2017
EMI Test Receiver	Rohde & Schwarz	ESCI	100221	04/26/2017
Bi-log Antenna	TESEQ	CBL 6112D	35403	07/02/2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-778	07/14/2017
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	11/16/2017
Horn Antenna	COM-POWER	AH-840	03077	12/01/2017
Pre-Amplifier	Agilent	8447D	2944A10052	07/12/2017
Pre-Amplifier	Agilent	8449B	3008A01916	07/12/2017
LOOP Antenna	COM-POWER	AL-130	121060	05/23/2017
Test S/W	E3.815206a			

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

Radiated Emission / 966Chamber_C

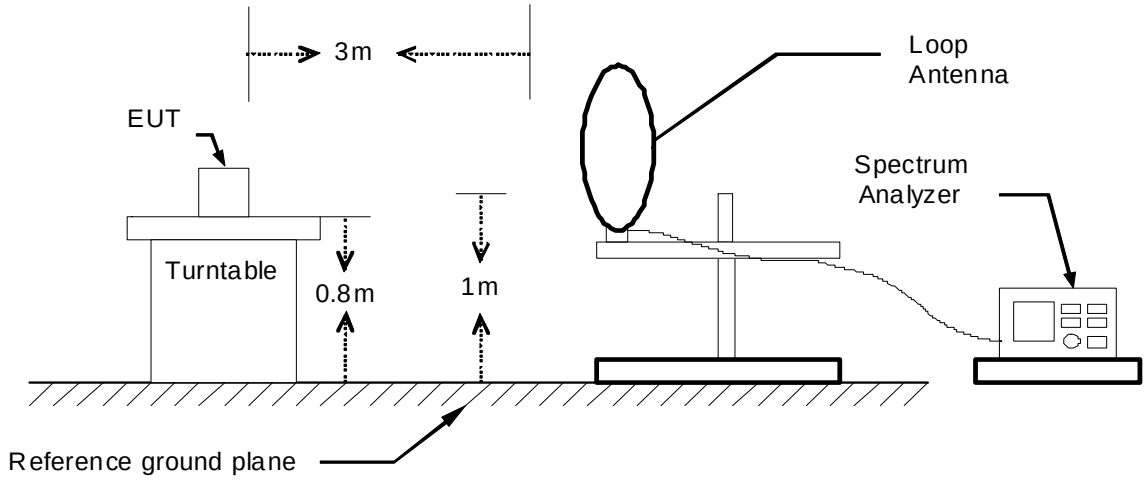
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	04/21/2017
EMI Test Receiver	Rohde & Schwarz	ESCI	101387	10/04/2017
Bi-log Antenna	TESEQ	CBL 6112D	35404	07/22/2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-285	04/17/2017
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078732	07/10/2017
Horn Antenna	COM-POWER	AH-840	03077	12/01/2017
Pre-Amplifier	EMCI	EMC001625	980243	04/11/2017
Pre-Amplifier	COM-POWER	PAM-118A	551043	04/11/2017
LOOP Antenna	COM-POWER	AL-130	121060	05/23/2017
Test S/W	E3.815206a			

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

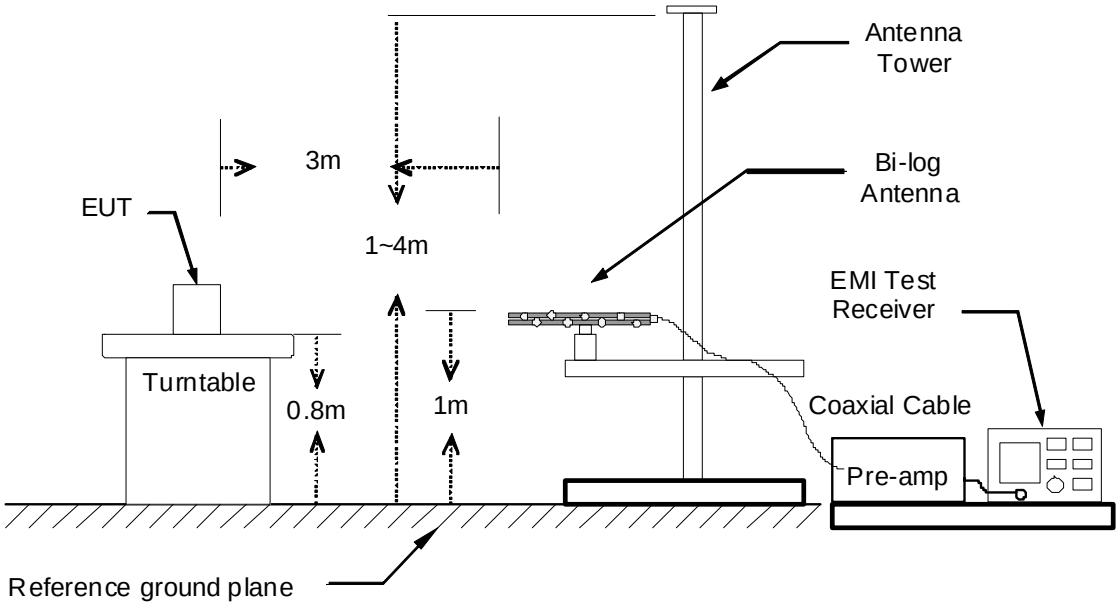
TEST SETUP

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

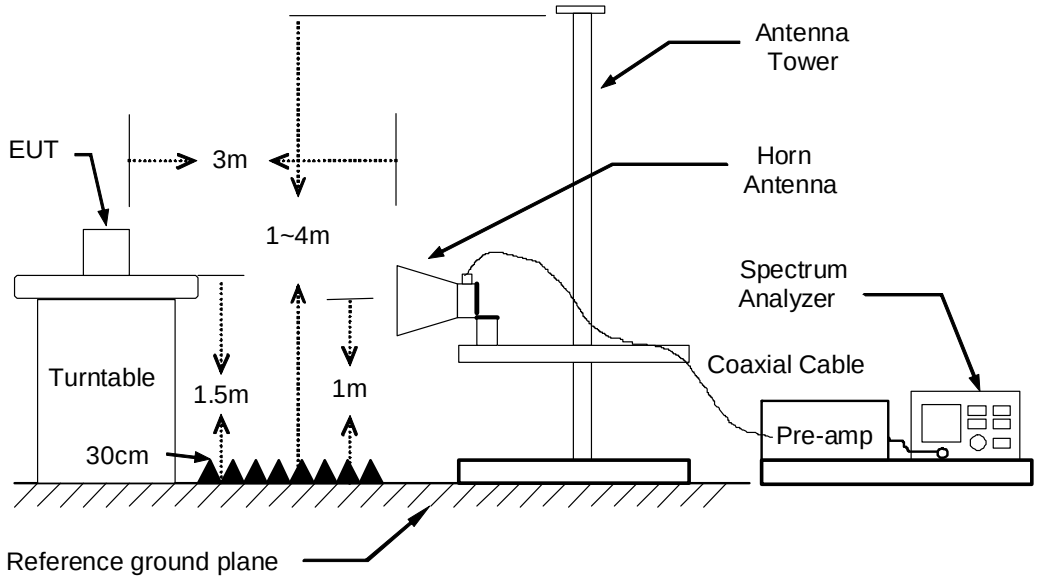
9kHz ~ 30MHz



30MHz ~ 1GHz



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



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. 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.
4. 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.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold mode.
6. 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.

Remark:

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.*

TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

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

Below 1 GHz (30MHz ~ 1GHz)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Jey Li
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	Mode 1	Temp. & Humidity	17°C, 50%

966Chamber_C at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
625.58	44.72	-5.65	39.07	46.00	-6.93	47	100	Peak
649.83	41.43	-5.31	36.12	46.00	-9.88	193	100	Peak
700.27	45.34	-5.22	40.12	46.00	-5.88	195	100	Peak
720.64	40.97	-4.98	35.99	46.00	-10.01	205	100	Peak
800.18	40.85	-4.06	36.79	46.00	-9.21	352	100	Peak
875.84	43.52	-3.51	40.01	46.00	-5.99	173	200	Peak

966Chamber_C at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
35.82	47.10	-10.44	36.66	40.00	-3.34	114	100	Peak
50.37	52.42	-18.06	34.36	40.00	-5.64	323	100	Peak
68.80	53.10	-19.65	33.45	40.00	-6.55	216	200	Peak
625.58	46.15	-5.65	40.50	46.00	-5.50	321	100	Peak
750.71	40.48	-4.50	35.98	46.00	-10.02	339	100	Peak
875.84	43.27	-3.51	39.76	46.00	-6.24	185	100	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
3. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
4. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

Above 1 GHz

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH Low / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2300.00	50.81	-3.00	47.81	74.00	-26.19	68	100	Peak
2486.00	52.50	-2.25	50.25	54.00	-3.75	0	200	Average
2486.00	59.50	-2.25	57.25	74.00	-16.75	0	200	Peak
3216.00	44.83	-0.18	44.65	74.00	-29.35	300	100	Peak
4824.00	46.47	5.24	51.71	74.00	-22.29	197	200	Peak
7020.00	36.90	12.25	49.15	74.00	-24.85	135	100	Peak
9336.00	35.68	14.10	49.78	74.00	-24.22	266	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2108.00	51.71	-3.77	47.94	74.00	-26.06	294	200	Peak
2484.00	53.05	-2.25	50.80	74.00	-23.20	63	200	Peak
2486.00	54.43	-2.25	52.18	74.00	-21.82	281	100	Peak
3216.00	43.80	-0.18	43.62	74.00	-30.38	320	200	Peak
4824.00	47.96	5.24	53.20	54.00	-0.80	352	182	Average
4824.00	48.53	5.24	53.77	74.00	-20.23	352	200	Peak
7020.00	37.24	12.25	49.49	74.00	-24.51	298	100	Peak
9288.00	35.73	14.04	49.77	74.00	-24.23	98	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH Middle / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2348.00	53.50	-2.80	50.70	74.00	-23.30	359	200	Peak
2484.00	51.60	-2.25	49.35	54.00	-4.65	1	200	Average
2484.00	59.41	-2.25	57.16	74.00	-16.84	1	200	Peak
3255.00	43.28	-0.07	43.21	74.00	-30.79	360	100	Peak
4875.00	46.29	5.38	51.67	54.00	-2.33	59	100	Average
4875.00	46.96	5.38	52.34	74.00	-21.66	59	100	Peak
6996.00	37.24	12.23	49.47	74.00	-24.53	273	200	Peak
9372.00	36.07	14.14	50.21	74.00	-23.79	250	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2384.00	50.43	-2.66	47.77	74.00	-26.23	355	100	Peak
2484.00	52.73	-2.25	50.48	74.00	-23.52	0	200	Peak
3255.00	42.59	-0.07	42.52	74.00	-31.48	360	100	Peak
4875.00	47.50	5.38	52.88	54.00	-1.12	220	100	Average
4875.00	47.66	5.38	53.04	74.00	-20.96	220	100	Peak
6996.00	37.46	12.23	49.69	74.00	-24.31	295	100	Peak
9348.00	35.84	14.11	49.95	74.00	-24.05	142	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH High / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2368.00	51.67	-2.72	48.95	74.00	-25.05	3	100	Peak
2942.00	49.88	-0.92	48.96	74.00	-25.04	252	100	Peak
3282.00	43.79	0.00	43.79	74.00	-30.21	279	100	Peak
4923.00	46.81	5.50	52.31	74.00	-21.69	123	100	Peak
6984.00	37.26	12.21	49.47	74.00	-24.53	286	200	Peak
9228.00	35.99	13.97	49.96	74.00	-24.04	360	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2336.00	51.31	-2.85	48.46	74.00	-25.54	266	100	Peak
2952.00	50.31	-0.89	49.42	74.00	-24.58	155	100	Peak
3282.00	44.74	0.00	44.74	74.00	-29.26	360	100	Peak
4923.00	47.02	5.50	52.52	54.00	-1.48	352	186	Average
4923.00	48.73	5.50	54.23	74.00	-19.77	352	200	Peak
6924.00	37.12	12.08	49.20	74.00	-24.80	9	100	Peak
9240.00	35.78	13.99	49.77	74.00	-24.23	25	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH Low / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2190.00	50.97	-3.44	47.53	74.00	-26.47	195	200	Peak
2484.00	53.47	-2.25	51.22	74.00	-22.78	245	100	Peak
3216.00	43.88	-0.18	43.70	74.00	-30.30	13	100	Peak
4824.00	45.49	5.24	50.73	74.00	-23.27	310	100	Peak
7236.00	38.90	12.39	51.29	54.00	-2.71	29	200	Average
7236.00	41.98	12.39	54.37	74.00	-19.63	29	200	Peak
9312.00	35.28	14.07	49.35	74.00	-24.65	63	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2296.00	50.38	-3.01	47.37	74.00	-26.63	43	200	Peak
2484.00	53.83	-2.25	51.58	74.00	-22.42	47	100	Peak
3216.00	43.25	-0.18	43.07	74.00	-30.93	358	100	Peak
4824.00	47.20	5.24	52.44	54.00	-1.56	193	180	Average
4824.00	47.09	5.24	52.33	74.00	-21.67	193	200	Peak
7236.00	40.02	12.39	52.41	74.00	-21.59	23	200	Peak
9360.00	35.85	14.13	49.98	74.00	-24.02	285	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH Middle / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	53.54	-2.63	50.91	74.00	-23.09	273	200	Peak
2484.00	51.10	-2.25	48.85	54.00	-5.15	284	100	Average
2484.00	57.97	-2.25	55.72	74.00	-18.28	284	100	Peak
3255.00	43.48	-0.07	43.41	74.00	-30.59	62	200	Peak
3999.00	42.20	2.58	44.78	74.00	-29.22	309	100	Peak
4875.00	42.05	5.38	47.43	74.00	-26.57	302	100	Peak
7308.00	37.41	12.44	49.85	74.00	-24.15	25	200	Peak
9348.00	35.86	14.11	49.97	74.00	-24.03	30	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2346.00	51.27	-2.81	48.46	74.00	-25.54	193	100	Peak
2484.00	54.73	-2.25	52.48	74.00	-21.52	189	100	Peak
3255.00	44.78	-0.07	44.71	74.00	-29.29	349	100	Peak
4875.00	48.04	5.38	53.42	54.00	-0.58	0	200	Average
4875.00	48.79	5.38	54.17	74.00	-19.83	0	200	Peak
7308.00	37.83	12.44	50.27	74.00	-23.73	322	200	Peak
9288.00	36.00	14.04	50.04	74.00	-23.96	8	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/04
Test Mode	IEEE 802.11b Mode / TX / CH High / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	53.08	-2.63	50.45	74.00	-23.55	283	200	Peak
2986.00	50.67	-0.79	49.88	74.00	-24.12	132	100	Peak
3282.00	42.87	0.00	42.87	74.00	-31.13	212	200	Peak
3999.00	41.90	2.58	44.48	74.00	-29.52	322	200	Peak
4923.00	42.30	5.50	47.80	74.00	-26.20	336	200	Peak
7392.00	37.72	12.49	50.21	74.00	-23.79	29	200	Peak
9156.00	35.99	13.89	49.88	74.00	-24.12	67	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2380.00	50.90	-2.67	48.23	74.00	-25.77	332	100	Peak
2954.00	49.40	-0.88	48.52	74.00	-25.48	4	200	Peak
3282.00	43.78	0.00	43.78	74.00	-30.22	356	100	Peak
4923.00	47.15	5.50	52.65	54.00	-1.35	199	175	Average
4923.00	47.08	5.50	52.58	74.00	-21.42	199	200	Peak
7020.00	36.60	12.25	48.85	74.00	-25.15	50	100	Peak
9540.00	35.68	14.36	50.04	74.00	-23.96	120	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH Low / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2292.00	51.60	-3.03	48.57	74.00	-25.43	339	200	Peak
2486.00	51.20	-2.25	48.95	54.00	-5.05	0	100	Average
2486.00	60.93	-2.25	58.68	74.00	-15.32	0	100	Peak
3216.00	44.20	-0.18	44.02	74.00	-29.98	292	100	Peak
3999.00	43.21	2.58	45.79	74.00	-28.21	300	100	Peak
4824.00	47.02	5.24	52.26	74.00	-21.74	200	100	Peak
7236.00	38.16	12.39	50.55	74.00	-23.45	15	200	Peak
9792.00	35.34	14.80	50.14	74.00	-23.86	101	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2290.00	50.41	-3.04	47.37	74.00	-26.63	262	200	Peak
2484.00	54.16	-2.25	51.91	74.00	-22.09	64	200	Peak
3216.00	43.22	-0.18	43.04	74.00	-30.96	360	100	Peak
4824.00	46.35	5.24	51.59	74.00	-22.41	360	200	Peak
7092.00	36.51	12.30	48.81	74.00	-25.19	278	200	Peak
9300.00	35.94	14.06	50.00	74.00	-24.00	20	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH Middle / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	53.85	-2.63	51.22	74.00	-22.78	0	100	Peak
2484.00	55.20	-2.25	52.95	54.00	-1.05	334	100	Average
2484.00	67.51	-2.25	65.26	74.00	-8.74	334	100	Peak
3255.00	43.19	-0.07	43.12	74.00	-30.88	298	100	Peak
3999.00	42.04	2.58	44.62	74.00	-29.38	321	200	Peak
4875.00	39.70	5.38	45.08	54.00	-8.92	193	200	Average
4875.00	48.82	5.38	54.20	74.00	-19.80	193	200	Peak
7320.00	30.60	12.44	43.04	54.00	-10.96	16	200	Average
7320.00	40.63	12.44	53.07	74.00	-20.93	16	200	Peak
9252.00	35.82	14.00	49.82	74.00	-24.18	360	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.00	50.85	-2.64	48.21	74.00	-25.79	0	200	Peak
2484.00	50.10	-2.25	47.85	54.00	-6.15	96	200	Average
2484.00	61.51	-2.25	59.26	74.00	-14.74	96	200	Peak
3255.00	42.84	-0.07	42.77	74.00	-31.23	336	100	Peak
4878.00	41.70	5.38	47.08	54.00	-6.92	1	200	Average
4878.00	50.12	5.38	55.50	74.00	-18.50	1	200	Peak
7212.00	36.61	12.38	48.99	74.00	-25.01	176	200	Peak
9288.00	36.06	14.04	50.10	74.00	-23.90	247	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH High / Ant. 0	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2376.00	51.92	-2.69	49.23	74.00	-24.77	3	100	Peak
2986.00	49.47	-0.79	48.68	74.00	-25.32	273	100	Peak
3282.00	43.92	0.00	43.92	74.00	-30.08	79	200	Peak
4923.00	39.90	5.50	45.40	54.00	-8.60	207	100	Average
4923.00	48.60	5.50	54.10	74.00	-19.90	207	100	Peak
7020.00	37.08	12.25	49.33	74.00	-24.67	252	200	Peak
9528.00	35.39	14.34	49.73	74.00	-24.27	121	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2372.00	50.13	-2.71	47.42	74.00	-26.58	82	200	Peak
2970.00	49.50	-0.84	48.66	74.00	-25.34	96	200	Peak
3282.00	42.75	0.00	42.75	74.00	-31.25	360	100	Peak
4923.00	45.94	5.50	51.44	74.00	-22.56	341	200	Peak
6960.00	37.17	12.16	49.33	74.00	-24.67	325	100	Peak
9324.00	35.94	14.09	50.03	74.00	-23.97	350	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH Low / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2268.00	51.58	-3.13	48.45	74.00	-25.55	270	100	Peak
2486.00	43.90	-2.25	41.65	54.00	-12.35	254	100	Average
2486.00	55.90	-2.25	53.65	74.00	-20.35	254	100	Peak
3216.00	43.22	-0.18	43.04	74.00	-30.96	18	100	Peak
3999.00	41.75	2.58	44.33	74.00	-29.67	304	100	Peak
4830.00	39.99	5.26	45.25	74.00	-28.75	306	100	Peak
7236.00	33.30	12.39	45.69	54.00	-8.31	15	200	Average
7236.00	43.16	12.39	55.55	74.00	-18.45	15	200	Peak
9276.00	35.71	14.03	49.74	74.00	-24.26	98	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2276.00	50.93	-3.09	47.84	74.00	-26.16	145	200	Peak
2490.00	52.61	-2.23	50.38	74.00	-23.62	53	100	Peak
3216.00	43.01	-0.18	42.83	74.00	-31.17	344	100	Peak
4830.00	44.73	5.26	49.99	74.00	-24.01	199	200	Peak
7224.00	30.60	12.38	42.98	54.00	-11.02	24	200	Average
7224.00	40.27	12.38	52.65	74.00	-21.35	24	200	Peak
9456.00	35.82	14.24	50.06	74.00	-23.94	69	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH Middle / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	46.10	-2.63	43.47	54.00	-10.53	255	200	Average
2390.00	55.59	-2.63	52.96	74.00	-21.04	255	200	Peak
2484.00	55.40	-2.25	53.15	54.00	-0.85	262	200	Average
2484.00	64.68	-2.25	62.43	74.00	-11.57	262	200	Peak
3255.00	43.10	-0.07	43.03	74.00	-30.97	212	200	Peak
3999.00	41.65	2.58	44.23	74.00	-29.77	308	100	Peak
4869.00	45.46	5.36	50.82	74.00	-23.18	75	200	Peak
7320.00	39.20	12.44	51.64	54.00	-2.36	9	200	Average
7320.00	48.68	12.44	61.12	74.00	-12.88	9	200	Peak
9360.00	35.53	14.13	49.66	74.00	-24.34	261	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	52.16	-2.63	49.53	74.00	-24.47	40	100	Peak
2484.00	50.20	-2.25	47.95	54.00	-6.05	40	100	Average
2484.00	59.56	-2.25	57.31	74.00	-16.69	40	100	Peak
3255.00	42.31	-0.07	42.24	74.00	-31.76	303	100	Peak
4875.00	45.59	5.38	50.97	54.00	-3.03	202	200	Average
4875.00	54.44	5.38	59.82	74.00	-14.18	202	200	Peak
7320.00	34.50	12.44	46.94	54.00	-7.06	51	200	Average
7320.00	44.19	12.44	56.63	74.00	-17.37	51	200	Peak
9240.00	35.93	13.99	49.92	74.00	-24.08	360	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11g Mode / TX / CH High / Ant. 1	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.00	53.46	-2.64	50.82	74.00	-23.18	275	200	Peak
2974.00	50.15	-0.82	49.33	74.00	-24.67	80	200	Peak
3282.00	43.16	0.00	43.16	74.00	-30.84	351	200	Peak
4926.00	40.81	5.51	46.32	74.00	-27.68	337	200	Peak
7392.00	31.80	12.49	44.29	54.00	-9.71	18	100	Average
7392.00	42.30	12.49	54.79	74.00	-19.21	18	100	Peak
9336.00	35.92	14.10	50.02	74.00	-23.98	358	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2362.00	51.48	-2.75	48.73	74.00	-25.27	242	200	Peak
2970.00	50.00	-0.84	49.16	74.00	-24.84	266	200	Peak
3282.00	43.39	0.00	43.39	74.00	-30.61	350	100	Peak
4923.00	39.40	5.50	44.90	54.00	-9.10	194	200	Average
4923.00	48.02	5.50	53.52	74.00	-20.48	194	200	Peak
7392.00	38.54	12.49	51.03	74.00	-22.97	329	200	Peak
9216.00	35.73	13.96	49.69	74.00	-24.31	84	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH Low	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2298.00	52.18	-3.01	49.17	74.00	-24.83	359	200	Peak
2484.00	50.60	-2.25	48.35	54.00	-5.65	360	100	Average
2484.00	59.19	-2.25	56.94	74.00	-17.06	360	100	Peak
3216.00	44.29	-0.18	44.11	74.00	-29.89	318	100	Peak
4821.00	45.08	5.23	50.31	74.00	-23.69	163	200	Peak
7236.00	34.90	12.39	47.29	54.00	-6.71	19	200	Average
7236.00	44.71	12.39	57.10	74.00	-16.90	19	200	Peak
9216.00	36.12	13.96	50.08	74.00	-23.92	76	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2270.00	50.69	-3.12	47.57	74.00	-26.43	10	200	Peak
2484.00	54.43	-2.25	52.18	74.00	-21.82	66	200	Peak
3216.00	42.41	-0.18	42.23	74.00	-31.77	341	100	Peak
4827.00	47.26	5.25	52.51	74.00	-21.49	354	200	Peak
7224.00	37.92	12.38	50.30	74.00	-23.70	334	200	Peak
9276.00	36.00	14.03	50.03	74.00	-23.97	284	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH Middle	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	54.02	-2.63	51.39	74.00	-22.61	7	200	Peak
2484.00	55.60	-2.25	53.35	54.00	-0.65	307	100	Average
2484.00	65.98	-2.25	63.73	74.00	-10.27	307	100	Peak
3255.00	43.77	-0.07	43.70	74.00	-30.30	358	100	Peak
4878.00	40.50	5.38	45.88	54.00	-8.12	193	200	Average
4878.00	49.13	5.38	54.51	74.00	-19.49	193	200	Peak
7320.00	34.70	12.44	47.14	54.00	-6.86	17	200	Average
7320.00	44.19	12.44	56.63	74.00	-17.37	17	200	Peak
9204.00	36.19	13.95	50.14	74.00	-23.86	121	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	51.73	-2.63	49.10	74.00	-24.90	0	100	Peak
2484.00	59.63	-2.25	57.38	74.00	-16.62	255	100	Peak
3255.00	42.88	-0.07	42.81	74.00	-31.19	349	100	Peak
4875.00	41.70	5.38	47.08	54.00	-6.92	293	200	Average
4875.00	51.17	5.38	56.55	74.00	-17.45	293	200	Peak
7320.00	32.50	12.44	44.94	54.00	-9.06	334	200	Average
7320.00	42.25	12.44	54.69	74.00	-19.31	334	200	Peak
9240.00	36.73	13.99	50.72	74.00	-23.28	150	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH High	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	51.29	-2.63	48.66	74.00	-25.34	299	200	Peak
2928.00	51.08	-0.96	50.12	74.00	-23.88	336	100	Peak
3282.00	43.30	0.00	43.30	74.00	-30.70	360	100	Peak
4917.00	44.57	5.48	50.05	74.00	-23.95	215	100	Peak
7380.00	39.12	12.48	51.60	74.00	-22.40	19	100	Peak
9312.00	36.44	14.07	50.51	74.00	-23.49	44	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2300.00	51.30	-3.00	48.30	74.00	-25.70	57	100	Peak
2958.00	50.09	-0.87	49.22	74.00	-24.78	195	200	Peak
3282.00	43.18	0.00	43.18	74.00	-30.82	353	100	Peak
4923.00	44.05	5.50	49.55	74.00	-24.45	1	200	Peak
7092.00	37.33	12.30	49.63	74.00	-24.37	234	100	Peak
9288.00	37.38	14.04	51.42	74.00	-22.58	63	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT40 MCS0 Mode / TX / CH Low	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2306.00	51.27	-2.97	48.30	74.00	-25.70	345	100	Peak
2484.00	47.30	-2.25	45.05	54.00	-8.95	359	200	Average
2484.00	55.26	-2.25	53.01	74.00	-20.99	359	200	Peak
3228.00	43.60	-0.14	43.46	74.00	-30.54	10	200	Peak
3999.00	42.89	2.58	45.47	74.00	-28.53	201	100	Peak
7164.00	36.88	12.34	49.22	74.00	-24.78	344	100	Peak
9300.00	35.65	14.06	49.71	74.00	-24.29	195	100	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2260.00	50.32	-3.16	47.16	74.00	-26.84	289	100	Peak
2484.00	51.75	-2.25	49.50	74.00	-24.50	65	200	Peak
3228.00	42.30	-0.14	42.16	74.00	-31.84	348	100	Peak
4839.00	38.79	5.28	44.07	74.00	-29.93	350	200	Peak
7116.00	36.27	12.31	48.58	74.00	-25.42	224	200	Peak
9384.00	35.81	14.16	49.97	74.00	-24.03	224	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT40 MCS0 Mode / TX / CH Middle	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	53.10	-2.63	50.47	54.00	-3.53	82	200	Average
2390.00	61.29	-2.63	58.66	74.00	-15.34	82	200	Peak
2484.00	54.80	-2.25	52.55	54.00	-1.45	19	200	Average
2484.00	65.84	-2.25	63.59	74.00	-10.41	19	200	Peak
3249.00	44.16	-0.09	44.07	74.00	-29.93	354	100	Peak
4875.00	38.13	5.38	43.51	74.00	-30.49	120	100	Peak
7104.00	36.77	12.31	49.08	74.00	-24.92	355	100	Peak
9324.00	37.51	14.09	51.60	74.00	-22.40	66	200	Peak

966Chamber_B at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	48.80	-2.63	46.17	54.00	-7.83	246	100	Average
2390.00	56.71	-2.63	54.08	74.00	-19.92	246	100	Peak
2484.00	52.60	-2.25	50.35	54.00	-3.65	338	200	Average
2484.00	61.45	-2.25	59.20	74.00	-14.80	338	200	Peak
3249.00	43.22	-0.09	43.13	74.00	-30.87	347	100	Peak
4869.00	39.63	5.36	44.99	74.00	-29.01	354	200	Peak
6960.00	37.08	12.16	49.24	74.00	-24.76	144	200	Peak
9348.00	36.06	14.11	50.17	74.00	-23.83	44	100	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Rex Chiu
Test Model	BiPAC 8920NZ	Test Date	2017/01/06
Test Mode	IEEE 802.11gn HT40 MCS0 Mode / TX / CH High	Temp. & Humidity	25°C, 50%

966Chamber_B at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2386.00	52.71	-2.65	50.06	74.00	-23.94	249	100	Peak
2990.00	49.35	-0.78	48.57	74.00	-25.43	11	100	Peak
3270.00	43.26	-0.03	43.23	74.00	-30.77	57	100	Peak
4896.00	37.80	5.43	43.23	74.00	-30.77	81	200	Peak
6972.00	37.91	12.18	50.09	74.00	-23.91	18	200	Peak
9336.00	35.45	14.10	49.55	74.00	-24.45	45	100	Peak

966Chamber_B at 3Meter / Vertical

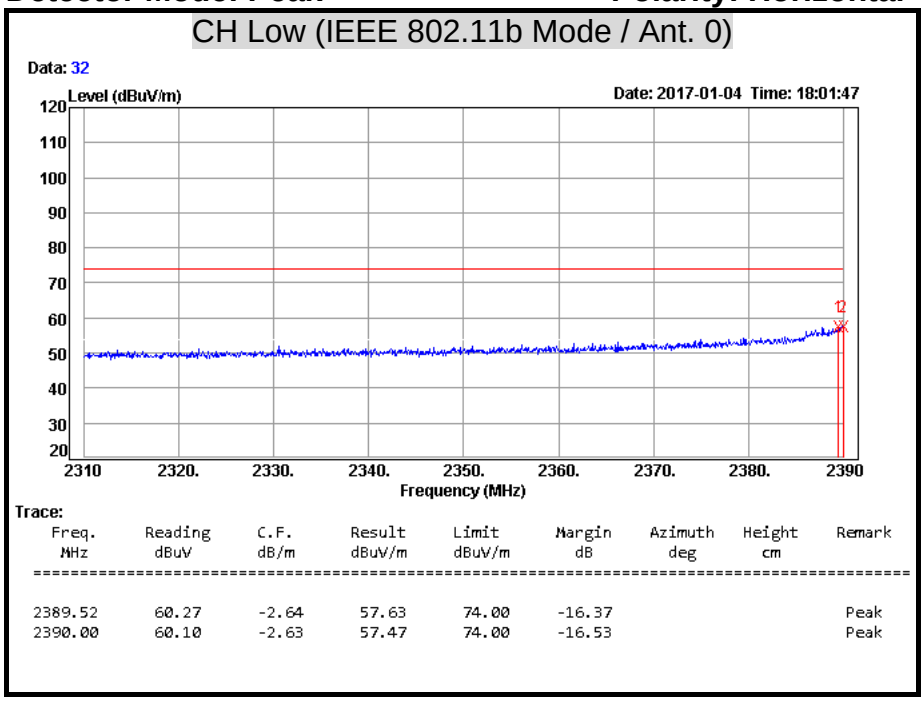
Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	51.46	-2.63	48.83	74.00	-25.17	343	100	Peak
2996.00	49.76	-0.76	49.00	74.00	-25.00	186	200	Peak
3270.00	42.53	-0.03	42.50	74.00	-31.50	333	100	Peak
4905.00	39.52	5.45	44.97	74.00	-29.03	0	200	Peak
6960.00	37.61	12.16	49.77	74.00	-24.23	118	100	Peak
9228.00	35.71	13.97	49.68	74.00	-24.32	286	200	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *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.*
4. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)

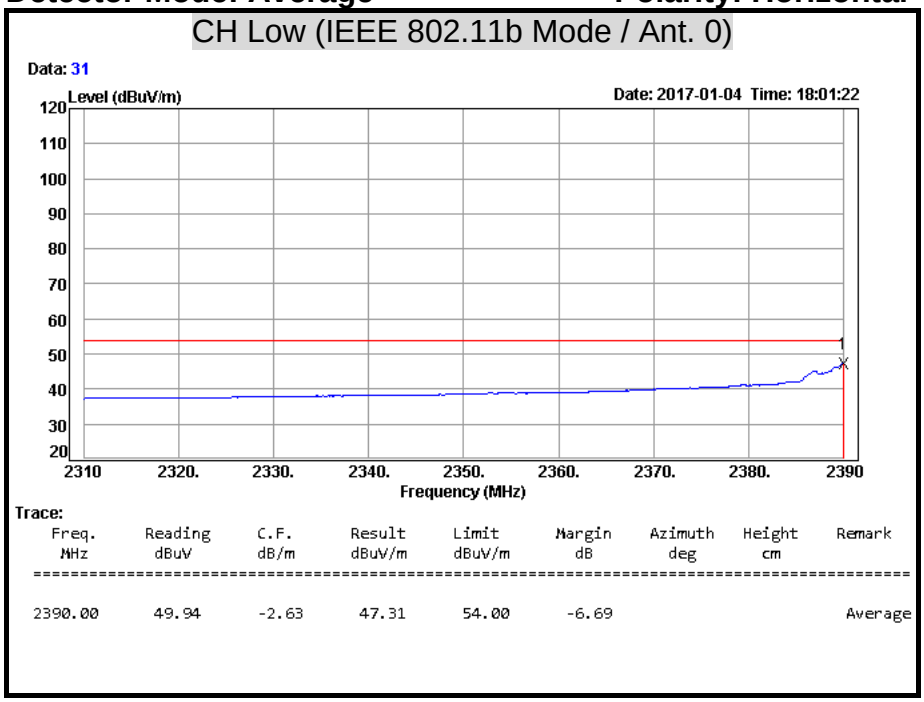
Restricted Band Edges

Detector Mode: Peak **Polarity: Horizontal**



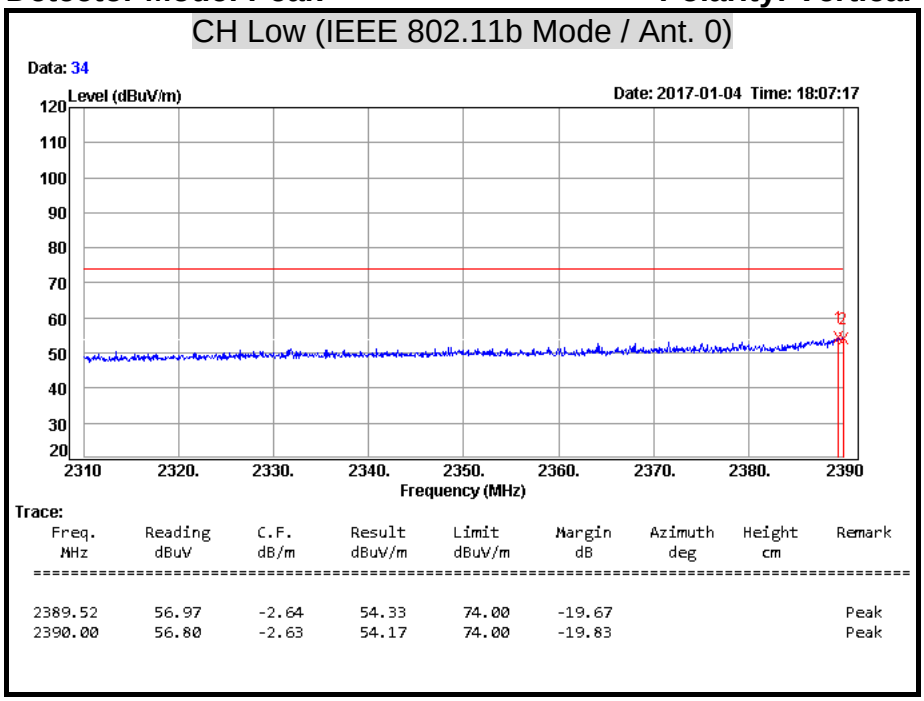
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**



Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

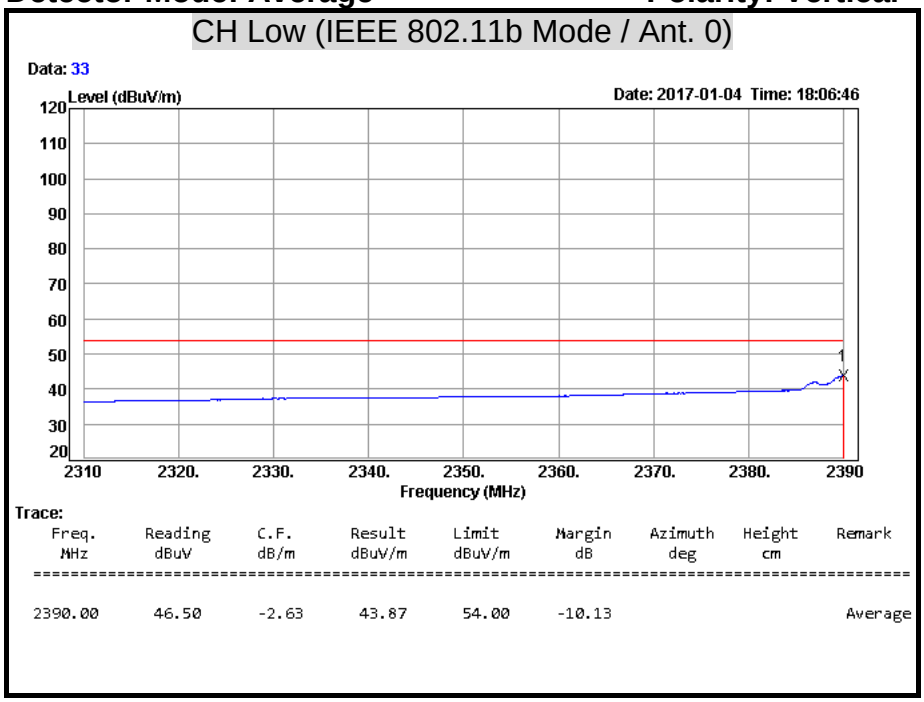


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.52	56.97	-2.64	54.33	74.00	-19.67			Peak
2390.00	56.80	-2.63	54.17	74.00	-19.83			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



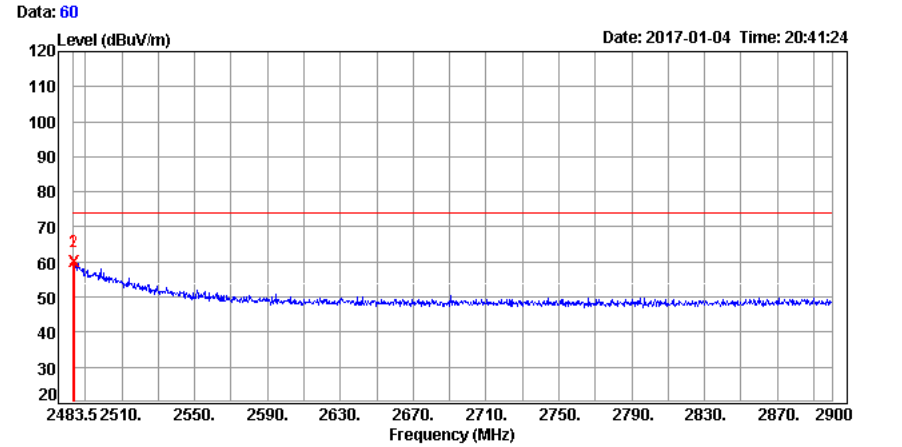
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	46.50	-2.63	43.87	54.00	-10.13			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH High (IEEE 802.11b Mode / Ant. 0)



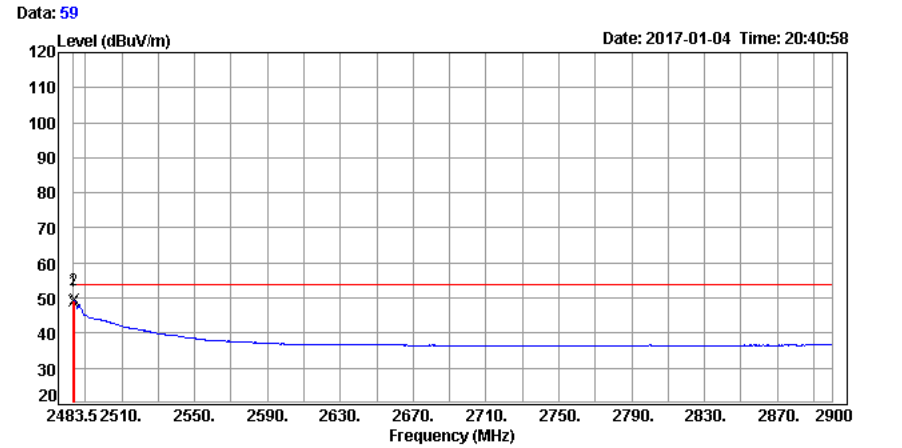
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	62.21	-2.26	59.95	74.00	-14.05			Peak
2483.92	62.49	-2.25	60.24	74.00	-13.76			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH High (IEEE 802.11b Mode / Ant. 0)



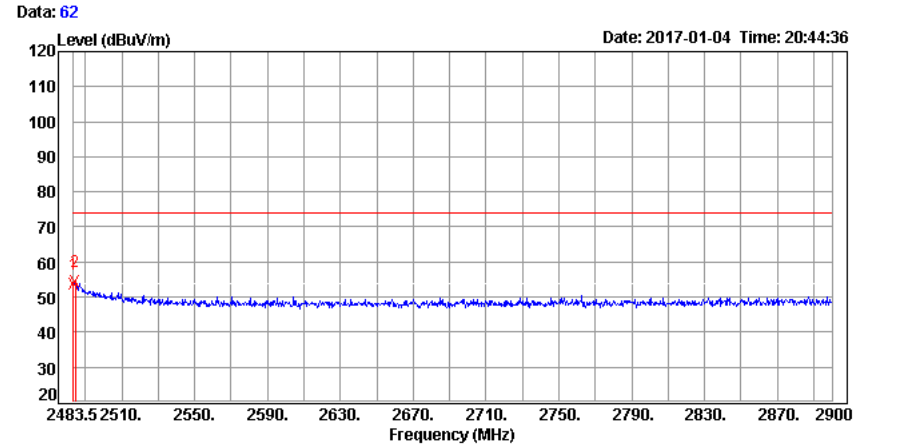
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	51.53	-2.26	49.27	54.00	-4.73			Average
2483.92	51.58	-2.25	49.33	54.00	-4.67			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11b Mode / Ant. 0)



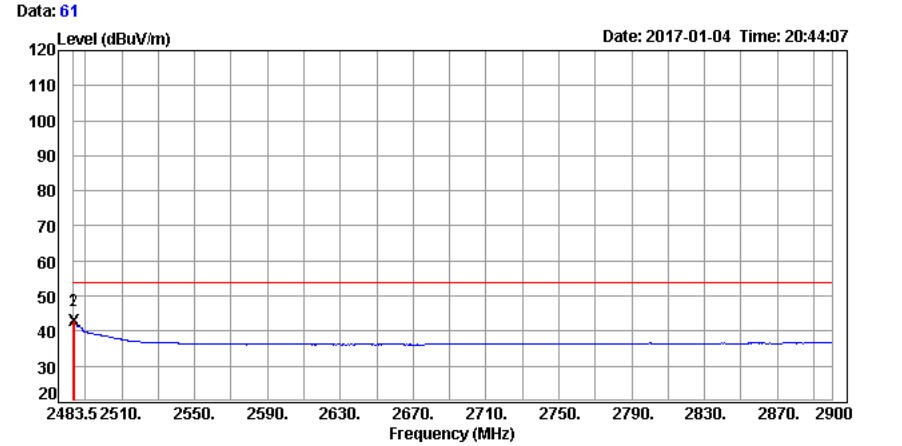
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	56.02	-2.26	53.76	74.00	-20.24			Peak
2484.33	56.71	-2.25	54.46	74.00	-19.54			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11b Mode / Ant. 0)

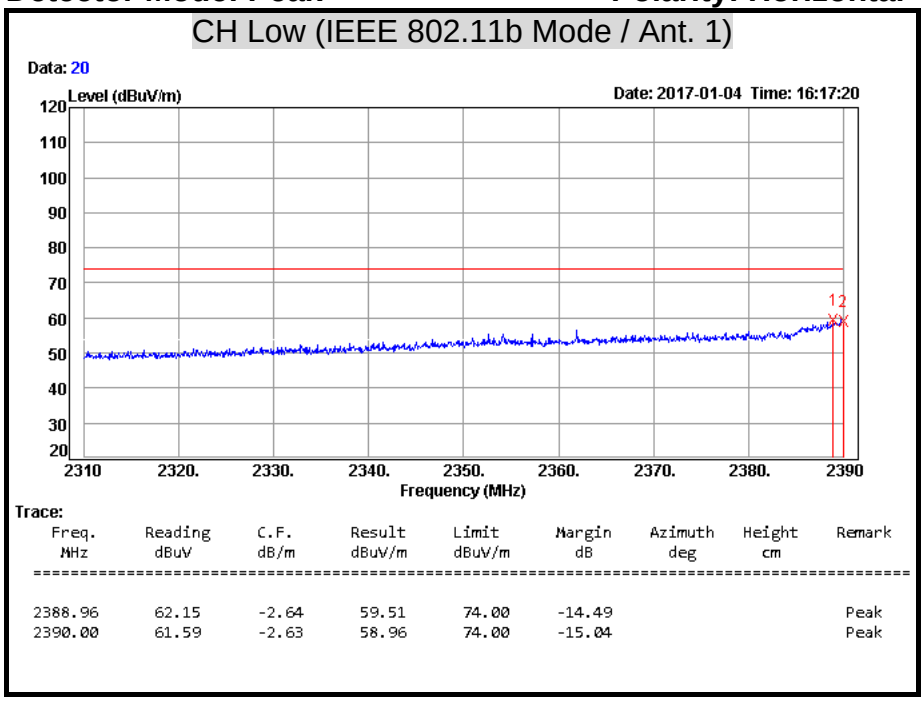


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	45.35	-2.26	43.09	54.00	-10.91			Average
2483.92	45.34	-2.25	43.09	54.00	-10.91			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

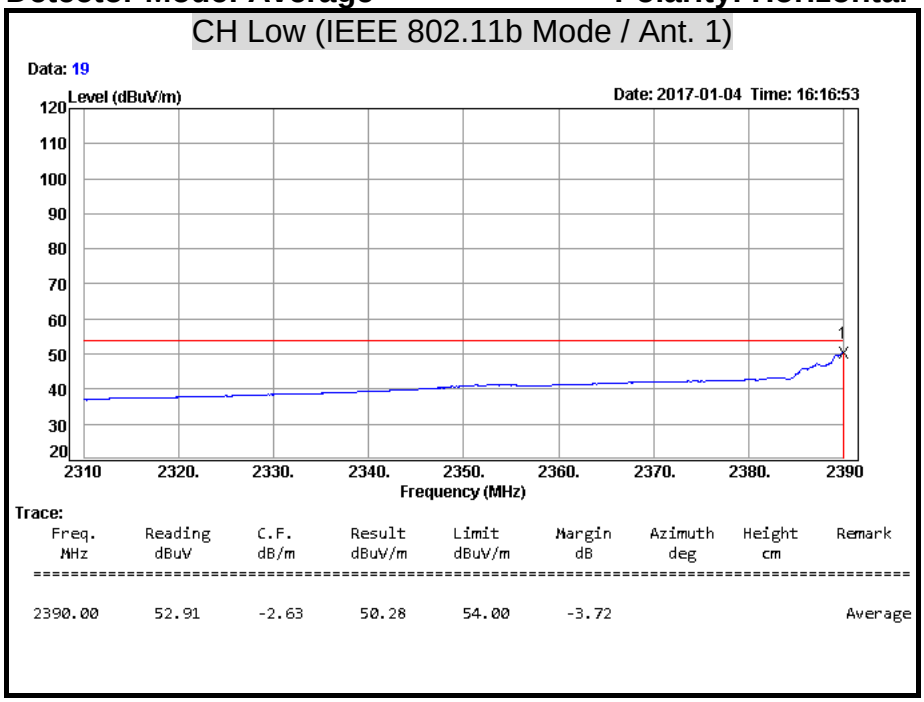


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.96	62.15	-2.64	59.51	74.00	-14.49			Peak
2390.00	61.59	-2.63	58.96	74.00	-15.04			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

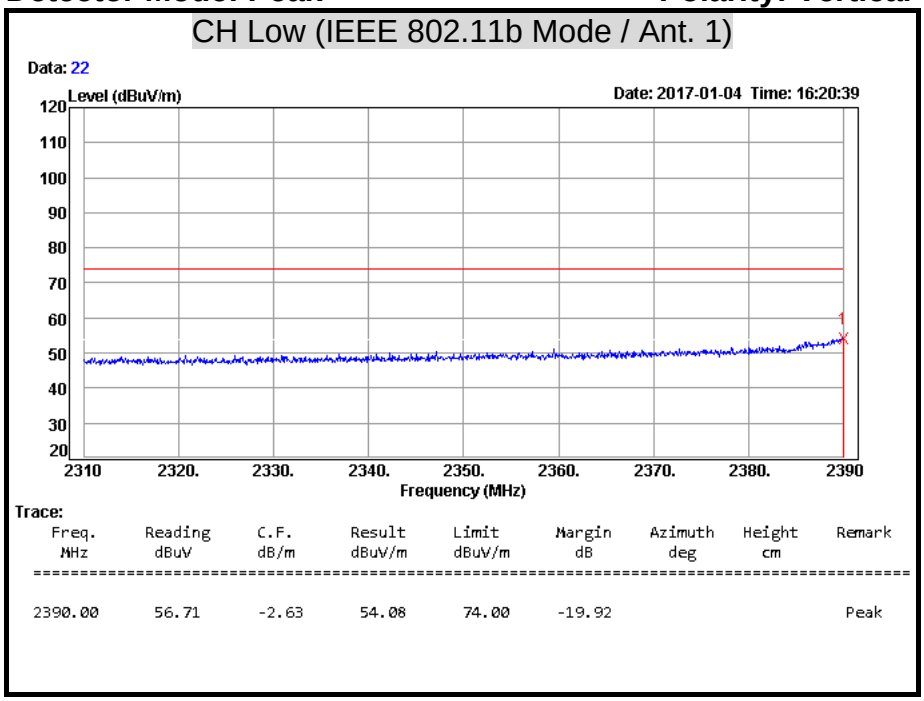


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	52.91	-2.63	50.28	54.00	-3.72			Average

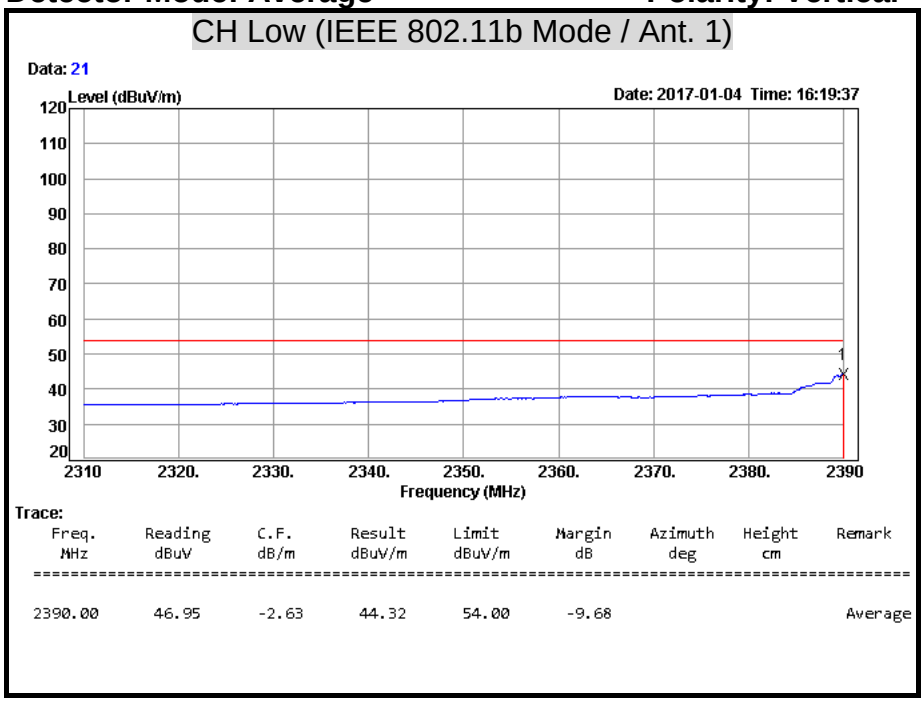
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**



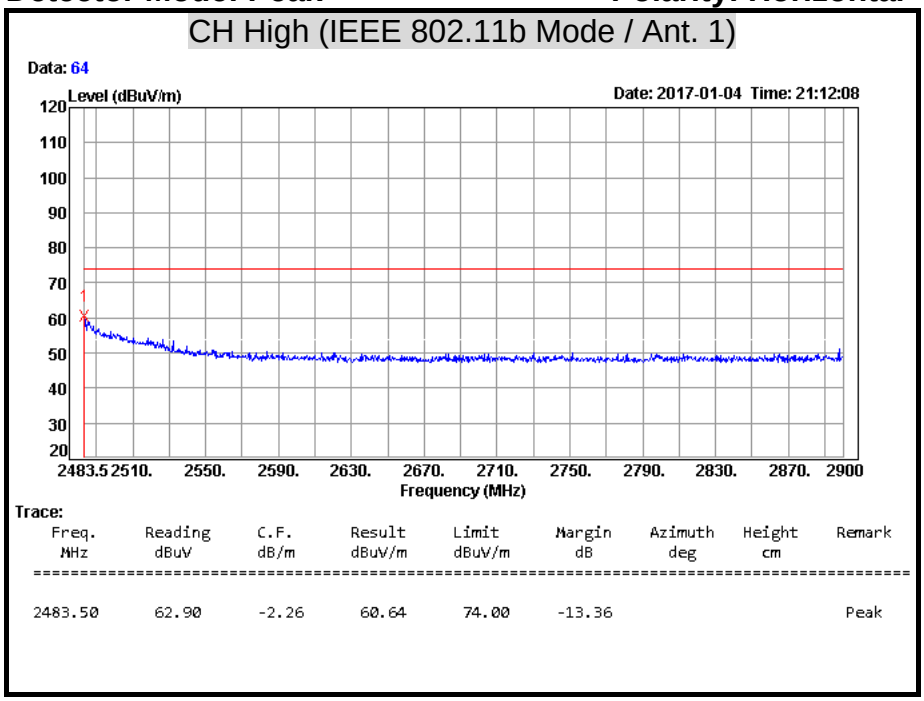
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



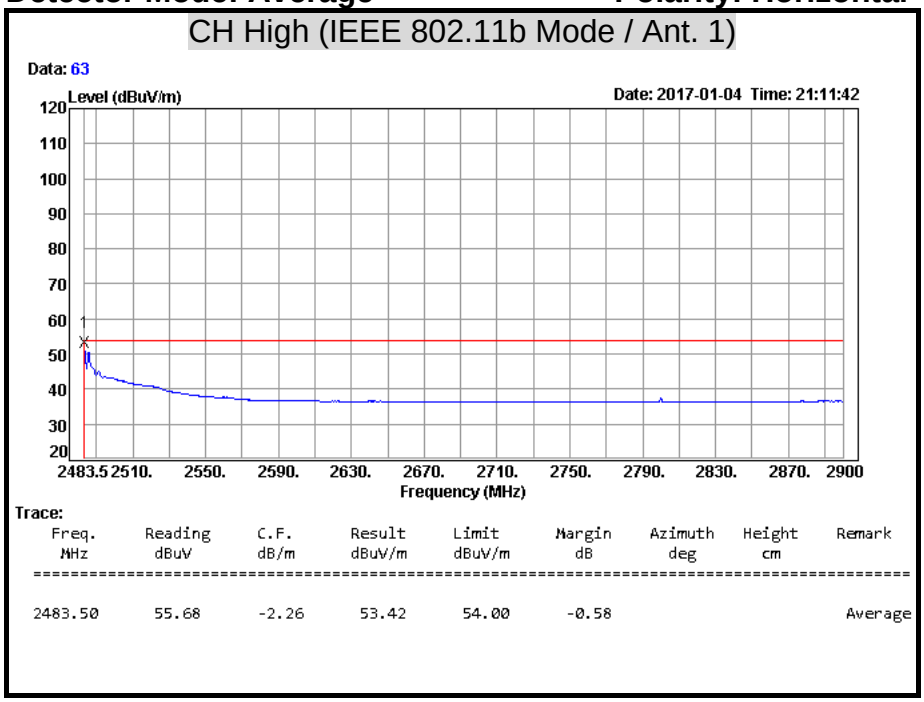
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**



Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

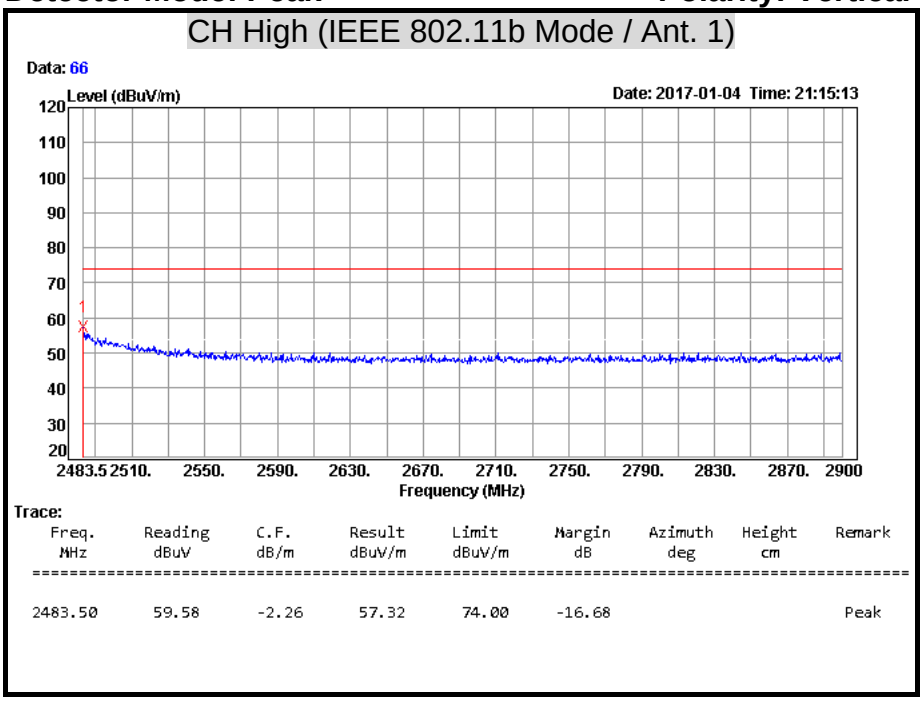
Detector Mode: Average **Polarity: Horizontal**



Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11b Mode / Ant. 1)



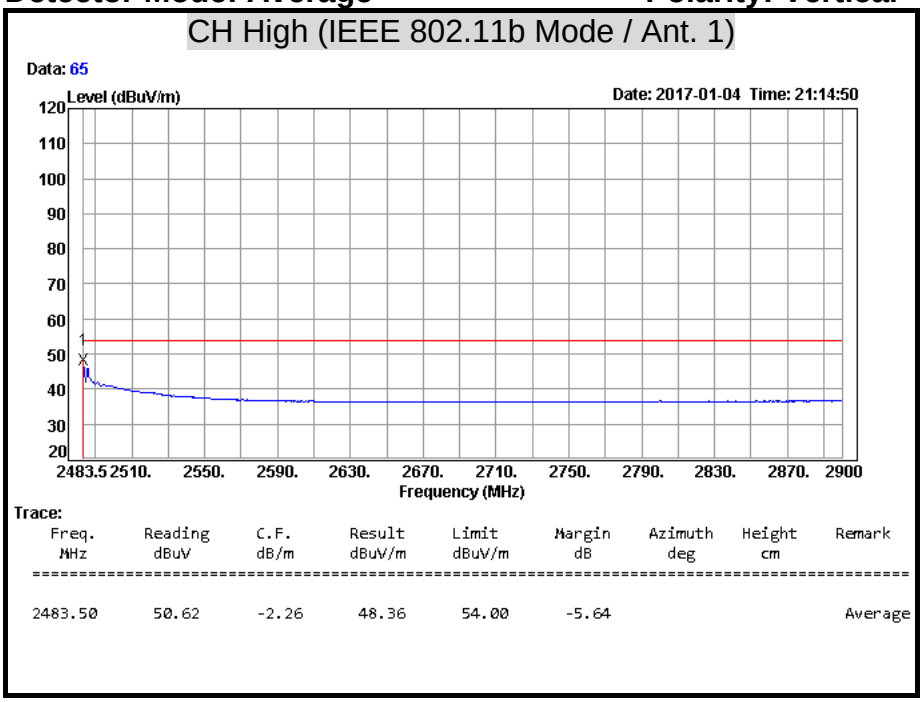
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	59.58	-2.26	57.32	74.00	-16.68			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11b Mode / Ant. 1)

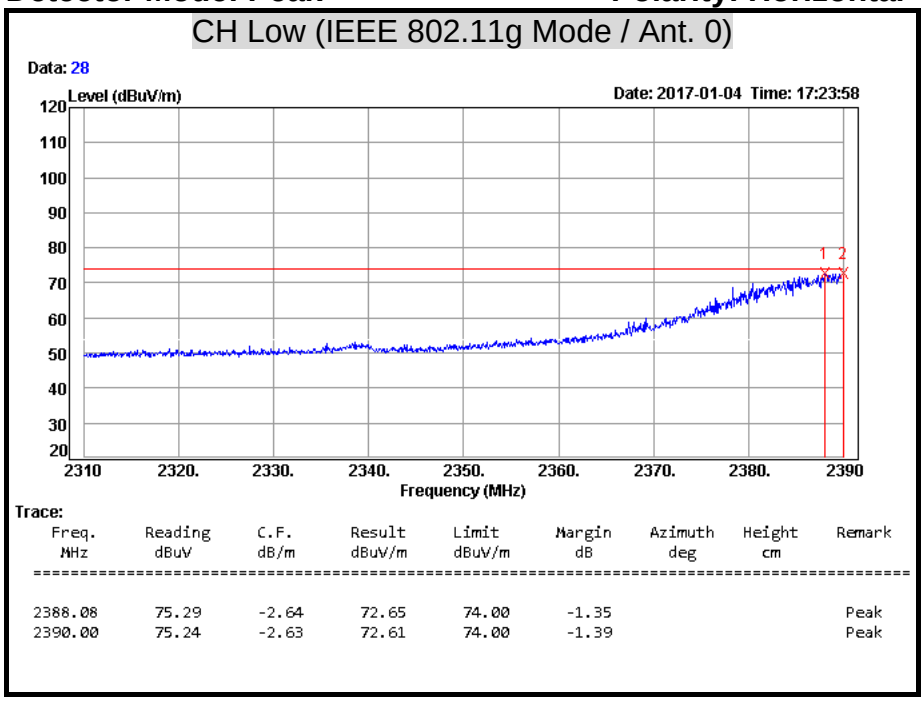


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	50.62	-2.26	48.36	54.00	-5.64			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

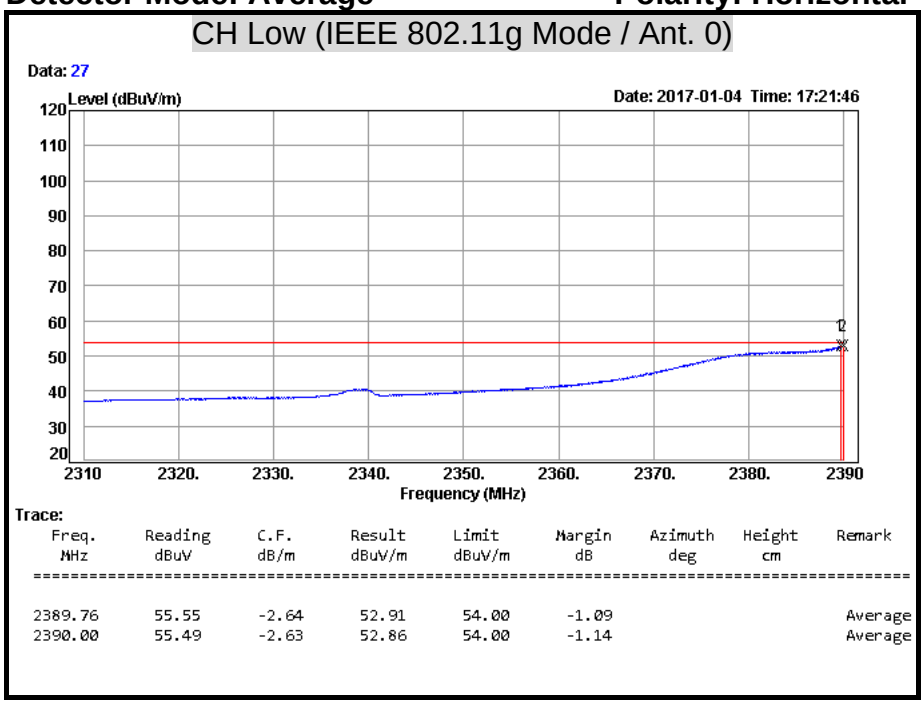


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.08	75.29	-2.64	72.65	74.00	-1.35			Peak
2390.00	75.24	-2.63	72.61	74.00	-1.39			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

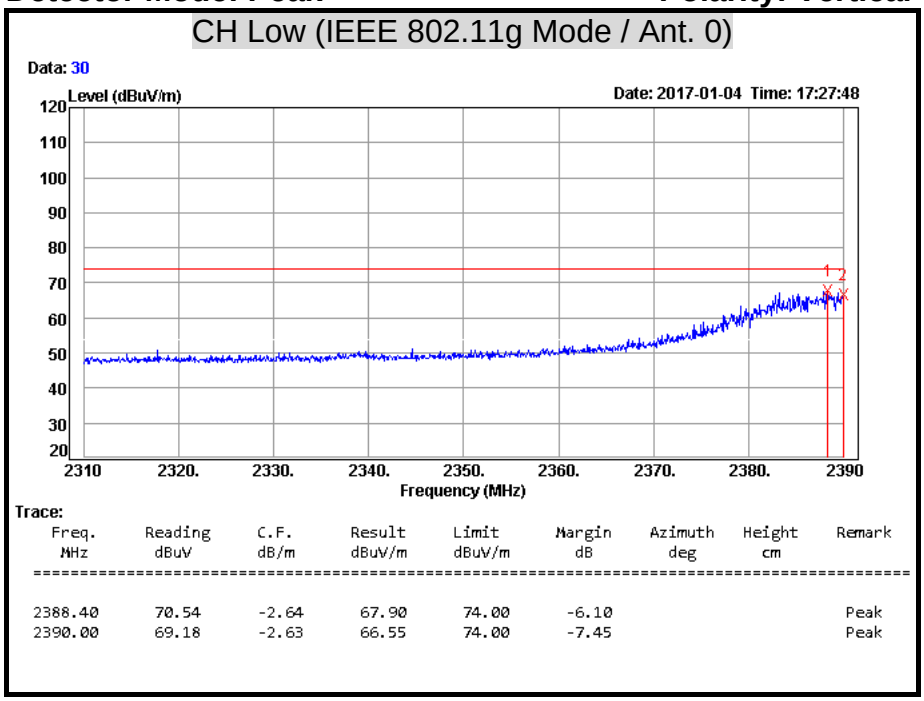


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.76	55.55	-2.64	52.91	54.00	-1.09			Average
2390.00	55.49	-2.63	52.86	54.00	-1.14			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

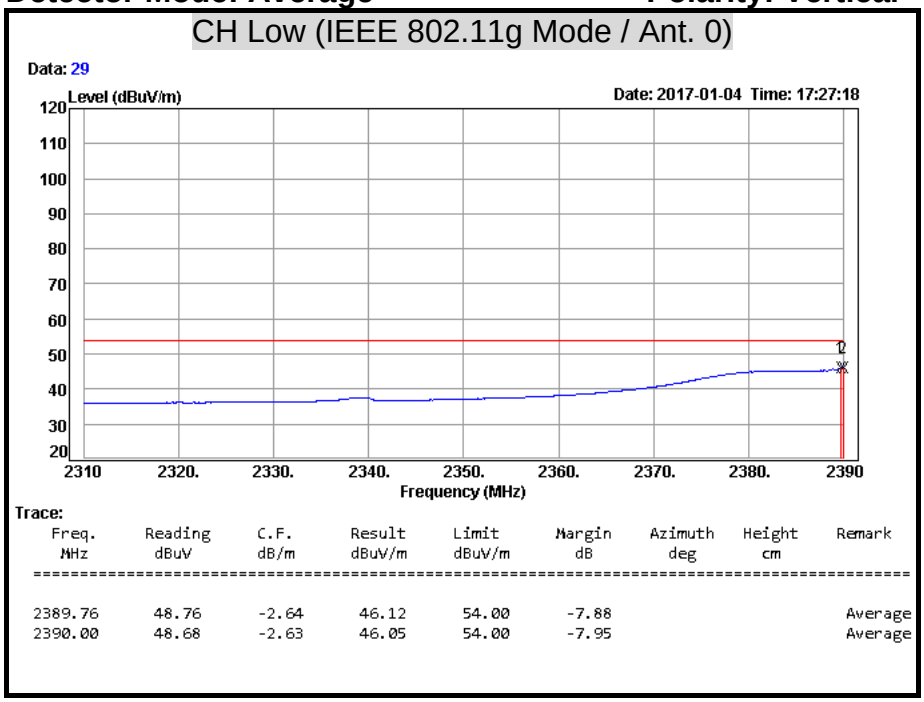


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.40	70.54	-2.64	67.90	74.00	-6.10			Peak
2390.00	69.18	-2.63	66.55	74.00	-7.45			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



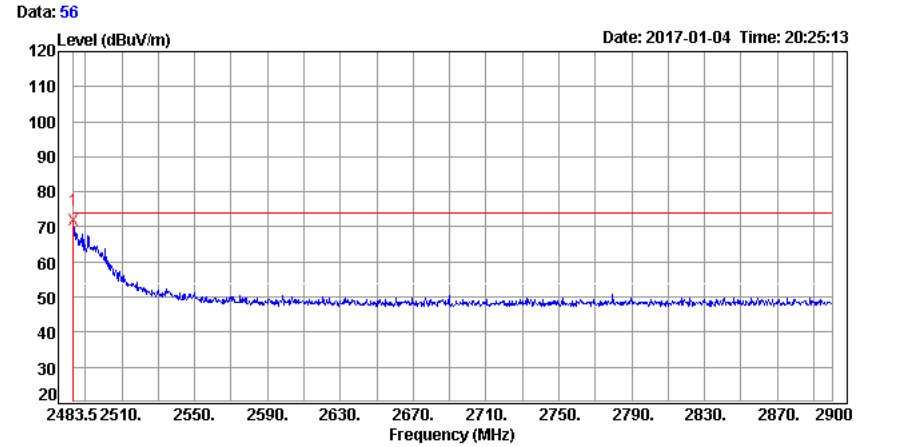
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.76	48.76	-2.64	46.12	54.00	-7.88			Average
2390.00	48.68	-2.63	46.05	54.00	-7.95			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH High (IEEE 802.11g Mode / Ant. 0)



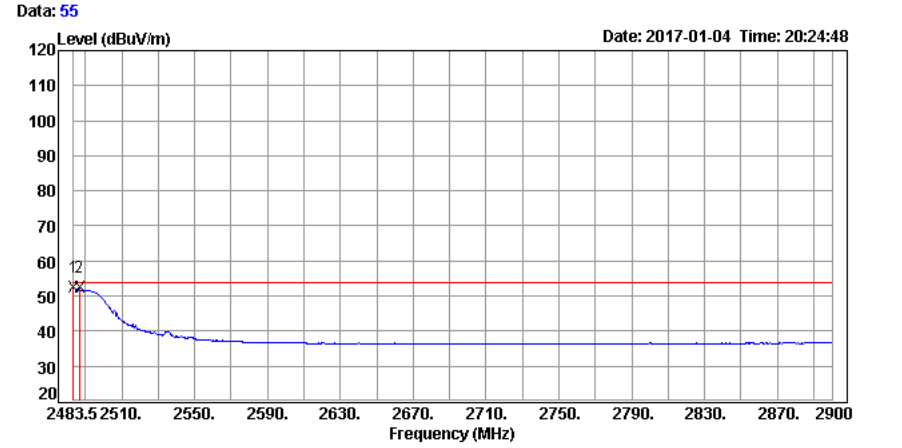
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	74.21	-2.26	71.95	74.00	-2.05			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH High (IEEE 802.11g Mode / Ant. 0)



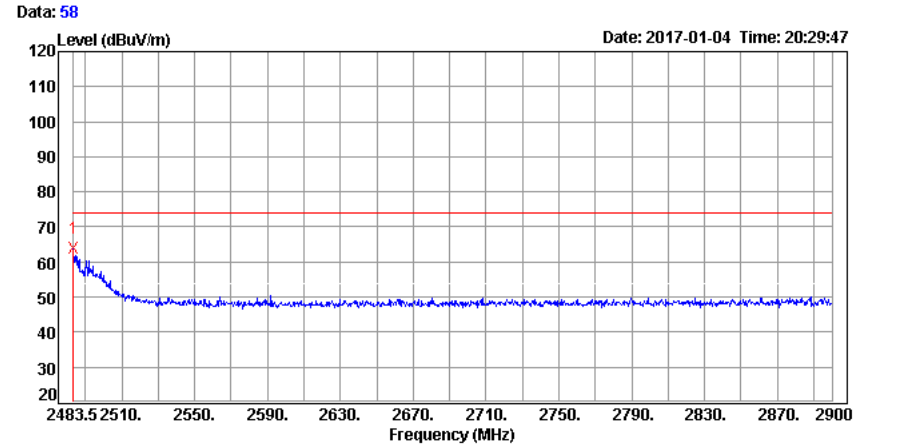
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	54.66	-2.26	52.40	54.00	-1.60			Average
2486.83	54.69	-2.24	52.45	54.00	-1.55			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11g Mode / Ant. 0)



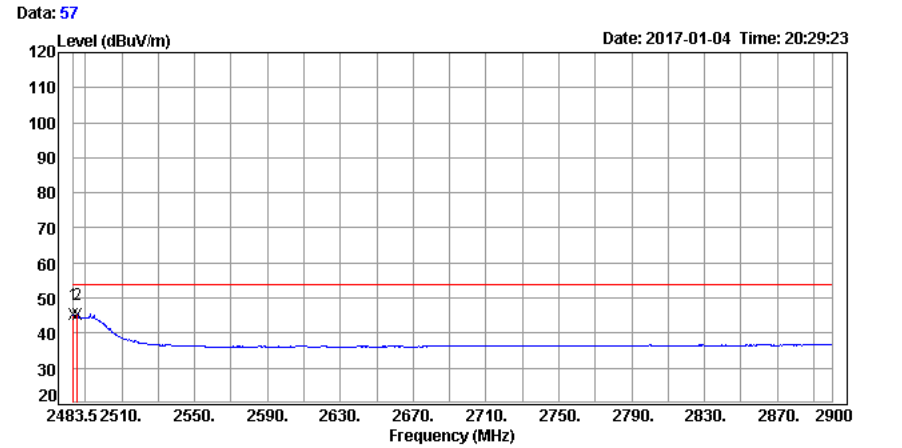
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	66.13	-2.26	63.87	74.00	-10.13			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11g Mode / Ant. 0)

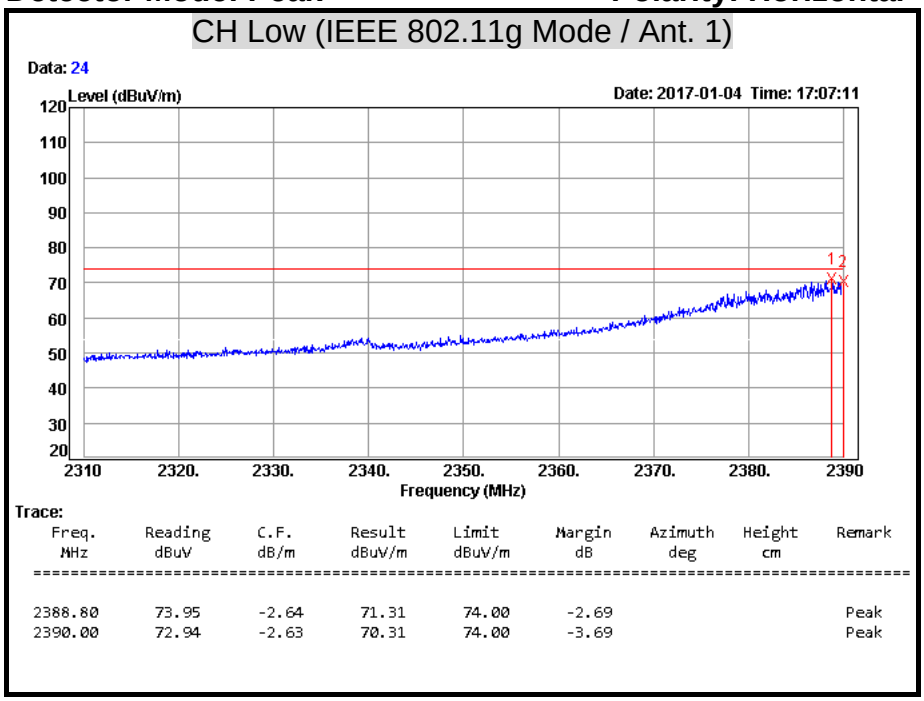


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	47.39	-2.26	45.13	54.00	-8.87			Average
2485.58	47.64	-2.25	45.39	54.00	-8.61			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

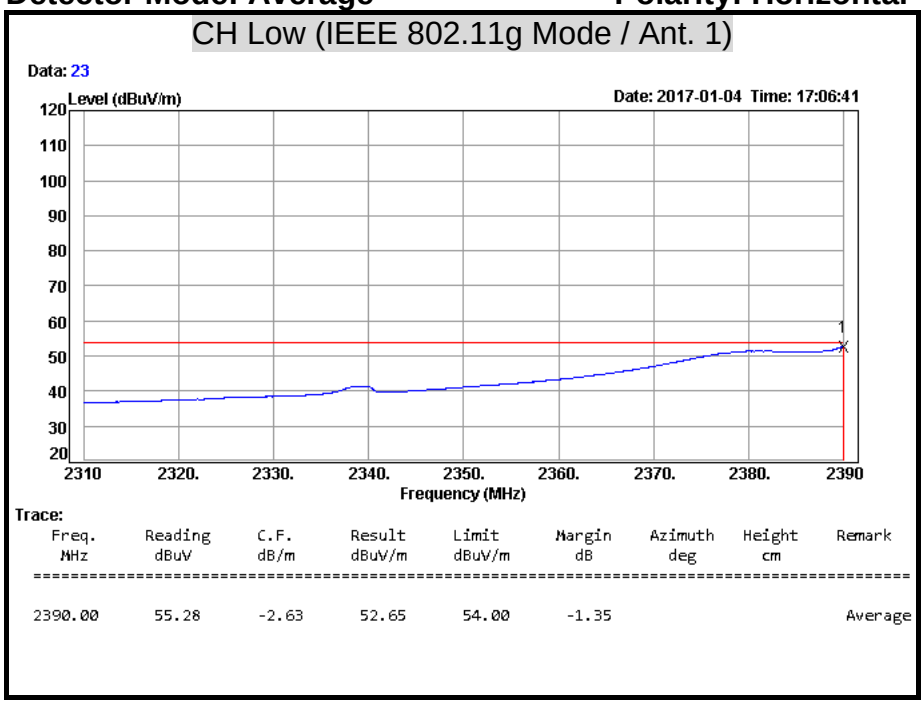


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.80	73.95	-2.64	71.31	74.00	-2.69			Peak
2390.00	72.94	-2.63	70.31	74.00	-3.69			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

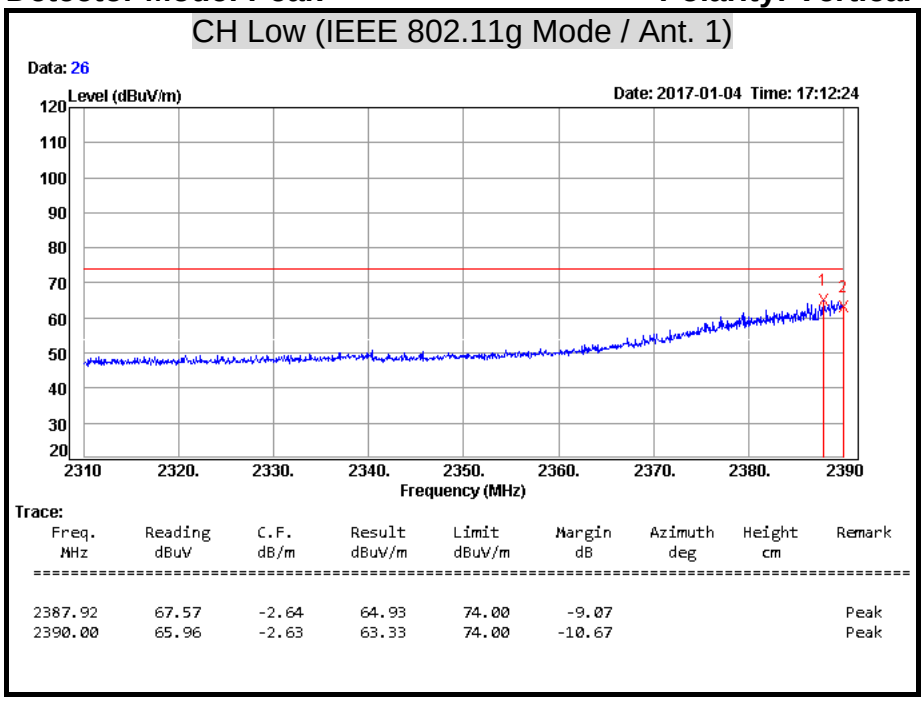


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	55.28	-2.63	52.65	54.00	-1.35			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

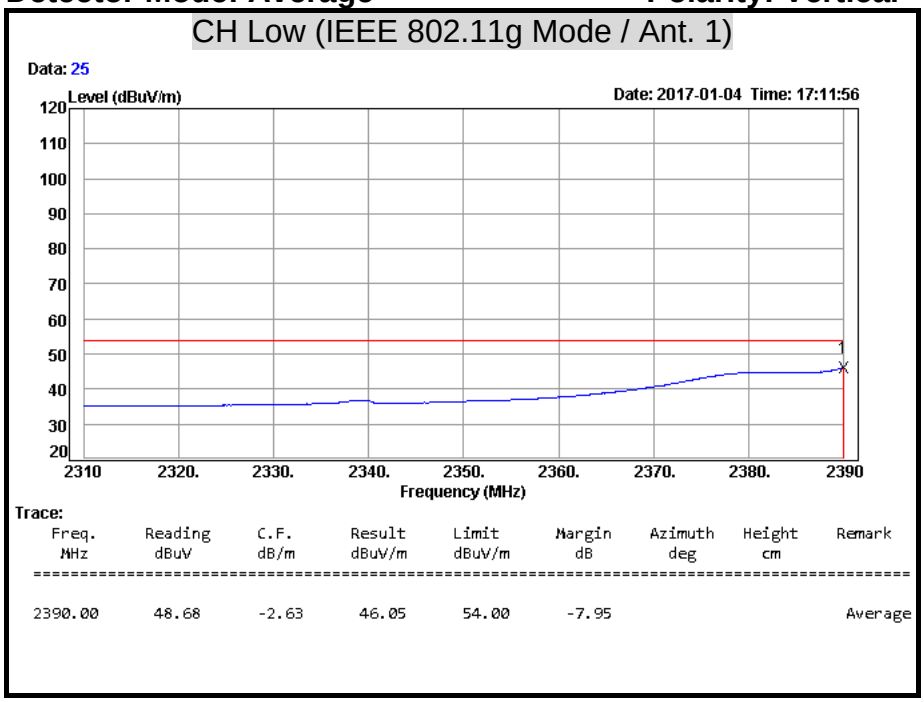


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2387.92	67.57	-2.64	64.93	74.00	-9.07			Peak
2390.00	65.96	-2.63	63.33	74.00	-10.67			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

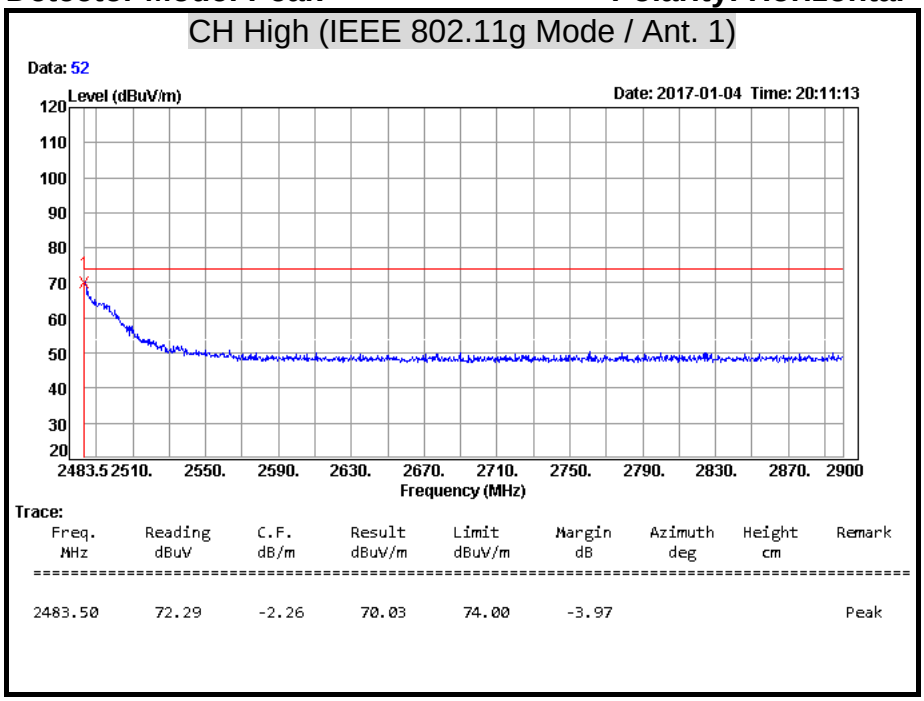


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	48.68	-2.63	46.05	54.00	-7.95			Average

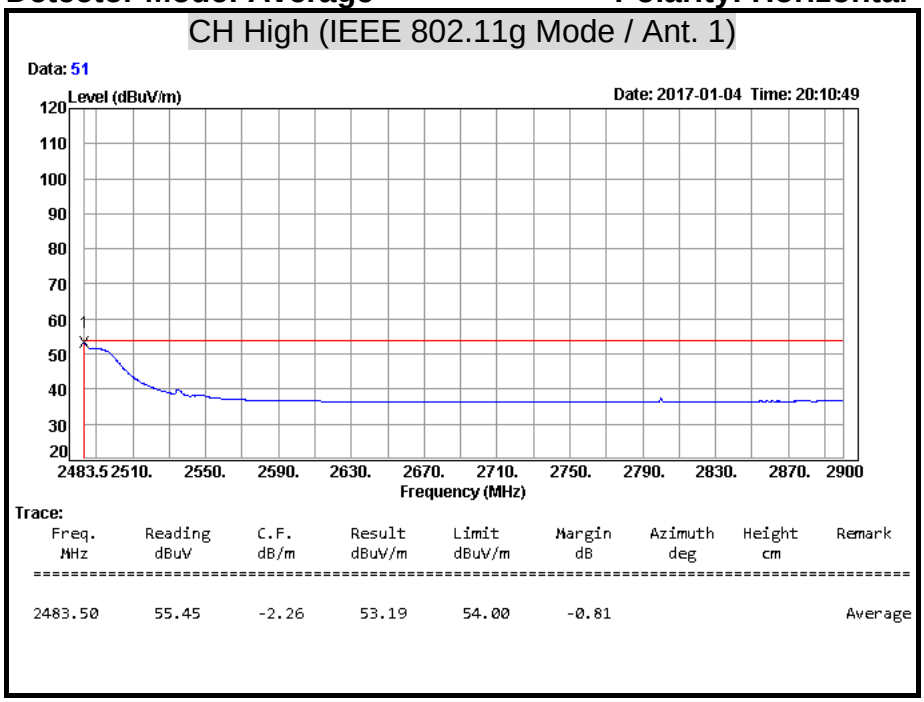
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**



Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

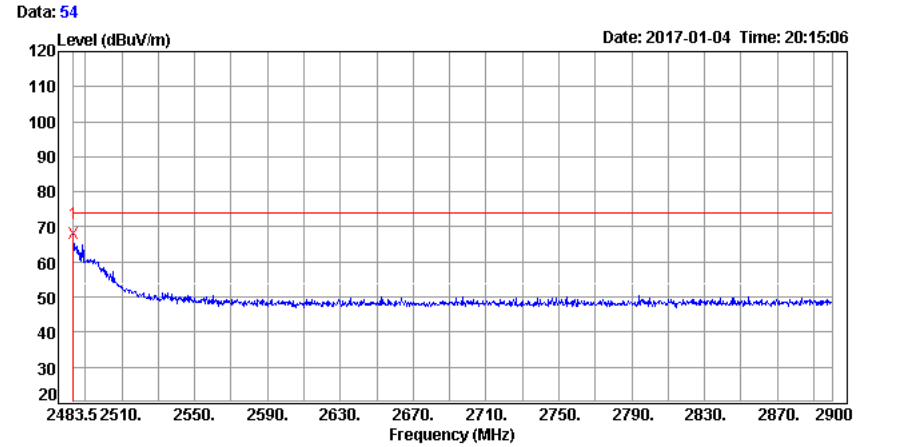
Detector Mode: Average **Polarity: Horizontal**



Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11g Mode / Ant. 1)



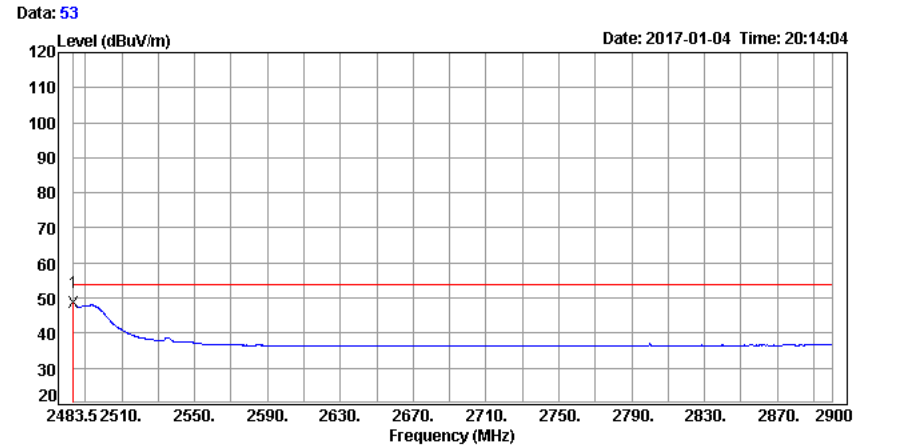
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	70.33	-2.26	68.07	74.00	-5.93			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11g Mode / Ant. 1)



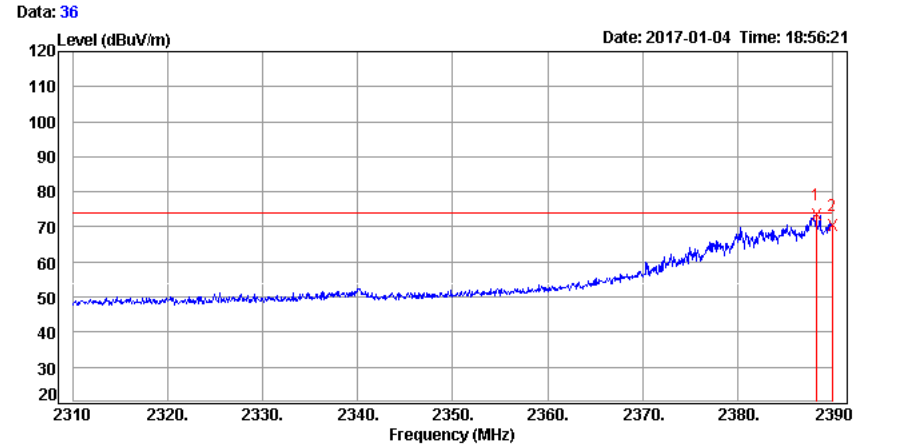
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	51.15	-2.26	48.89	54.00	-5.11			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH Low (IEEE 802.11gn HT20 MCS0 Mode)



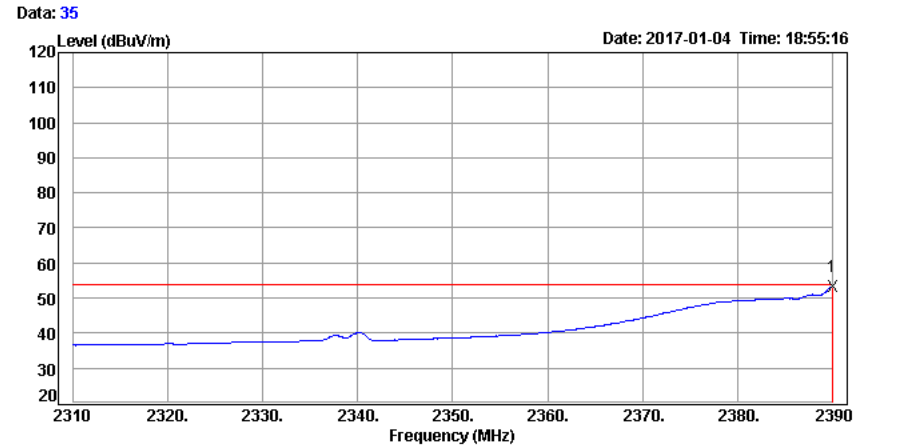
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2388.32	76.16	-2.64	73.52	74.00	-0.48			Peak
2390.00	73.15	-2.63	70.52	74.00	-3.48			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH Low (IEEE 802.11gn HT20 MCS0 Mode)



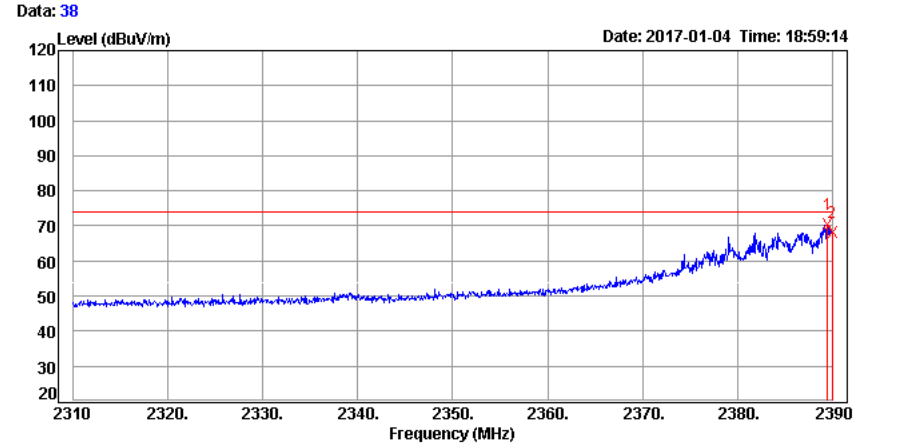
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	55.84	-2.63	53.21	54.00	-0.79			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH Low (IEEE 802.11gn HT20 MCS0 Mode)



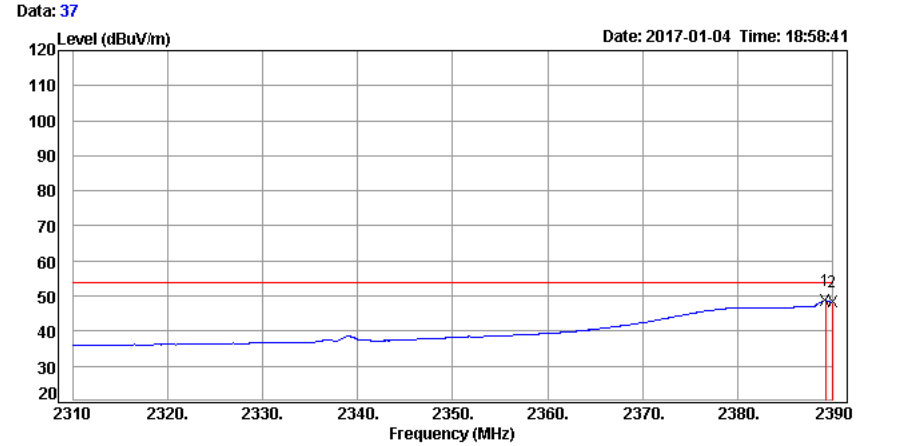
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.52	73.07	-2.64	70.43	74.00	-3.57			Peak
2390.00	70.79	-2.63	68.16	74.00	-5.84			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH Low (IEEE 802.11gn HT20 MCS0 Mode)



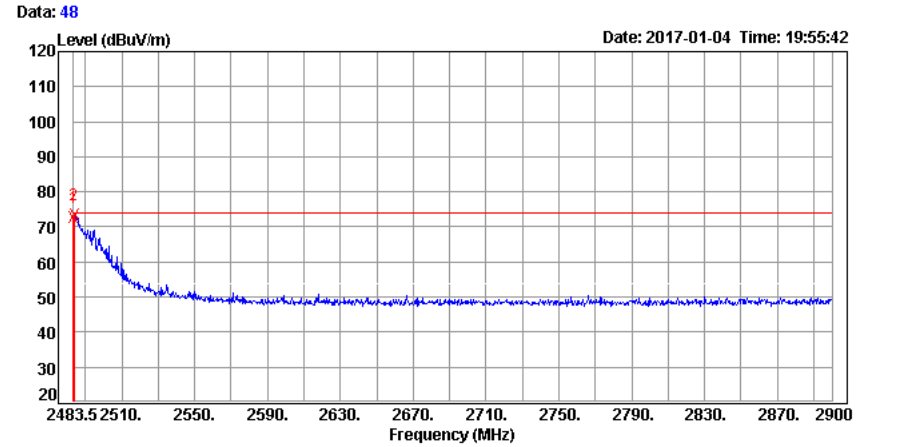
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.28	51.37	-2.64	48.73	54.00	-5.27			Average
2390.00	50.80	-2.63	48.17	54.00	-5.83			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH High (IEEE 802.11gn HT20 MCS0 Mode)



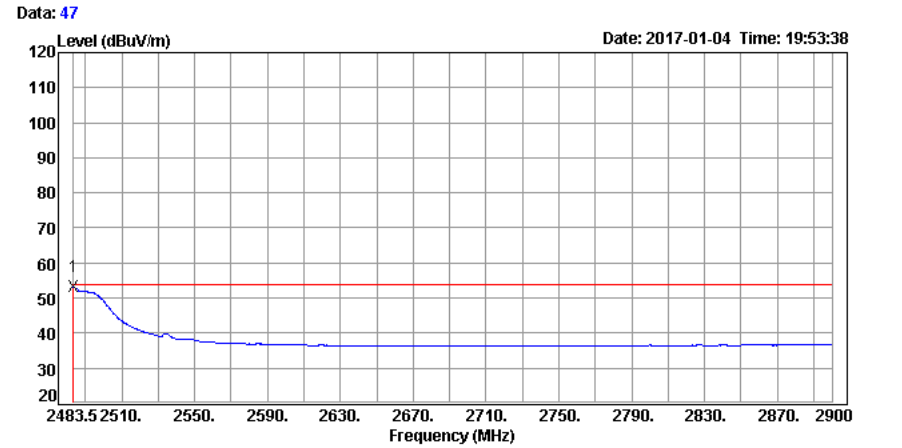
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	75.02	-2.26	72.76	74.00	-1.24			Peak
2483.92	75.69	-2.25	73.44	74.00	-0.56			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH High (IEEE 802.11gn HT20 MCS0 Mode)



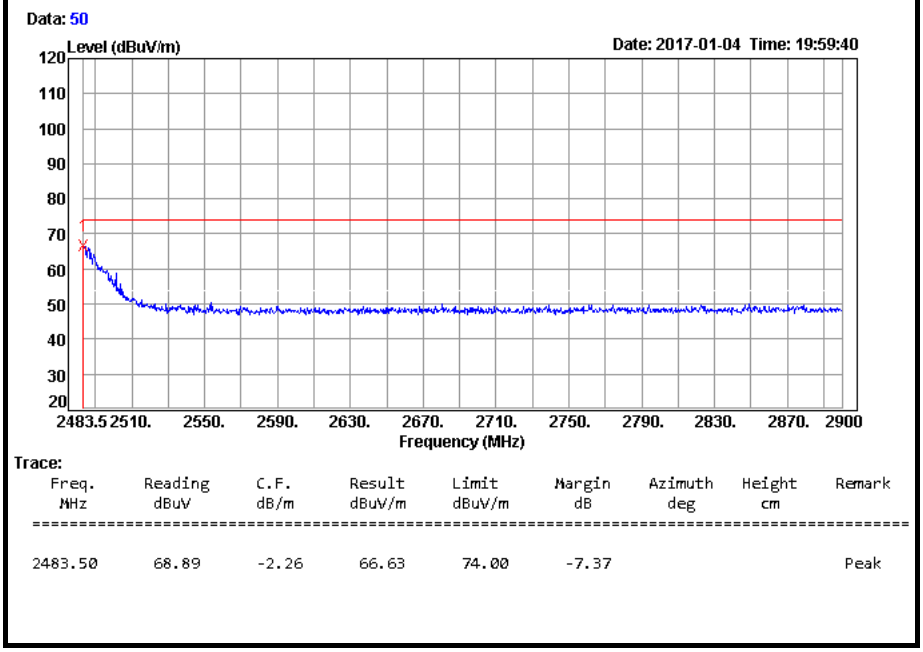
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	55.52	-2.26	53.26	54.00	-0.74			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11gn HT20 MCS0 Mode)



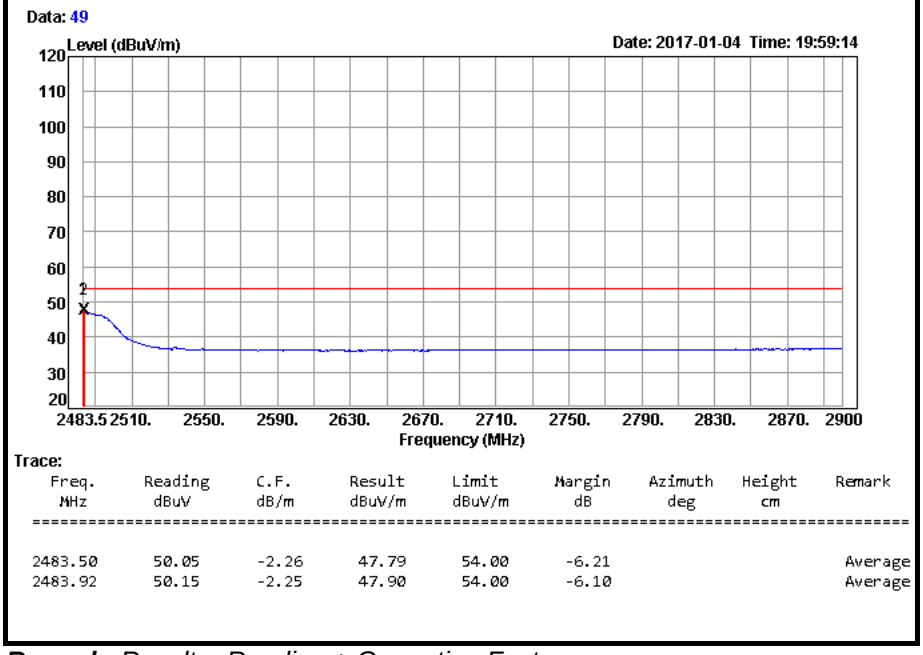
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	68.89	-2.26	66.63	74.00	-7.37			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11gn HT20 MCS0 Mode)



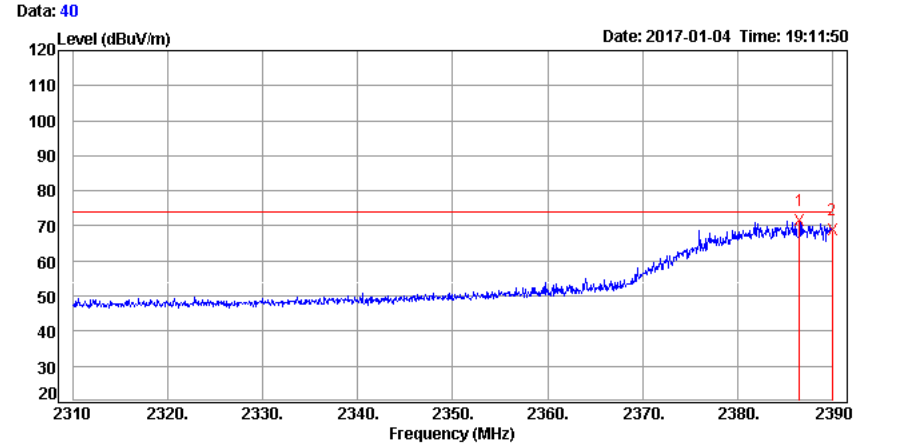
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	50.05	-2.26	47.79	54.00	-6.21			Average
2483.92	50.15	-2.25	47.90	54.00	-6.10			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH Low (IEEE 802.11gn HT40 MCS0 Mode)



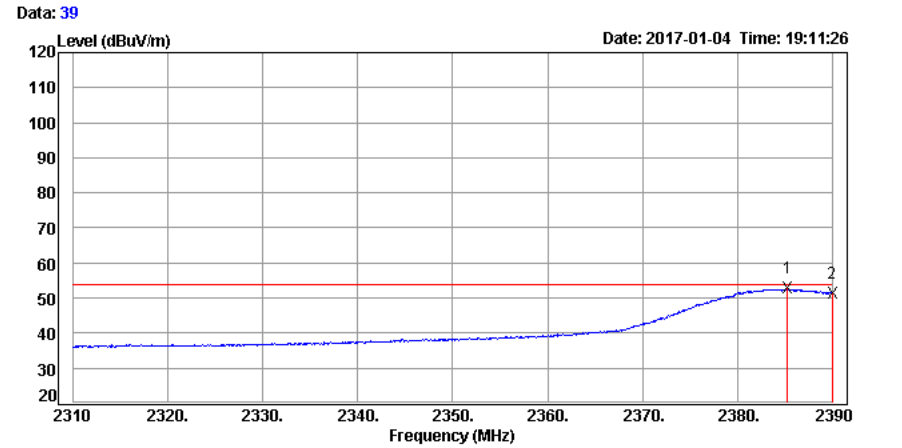
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2386.56	74.31	-2.65	71.66	74.00	-2.34			Peak
2390.00	71.46	-2.63	68.83	74.00	-5.17			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH Low (IEEE 802.11gn HT40 MCS0 Mode)

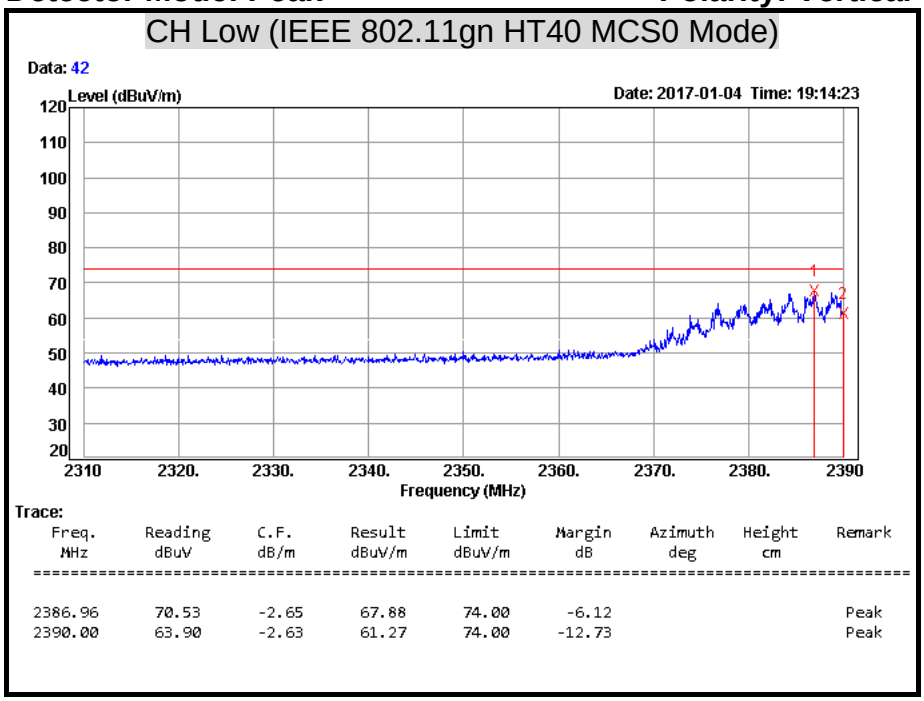


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2385.28	55.58	-2.65	52.93	54.00	-1.07			Average
2390.00	54.10	-2.63	51.47	54.00	-2.53			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

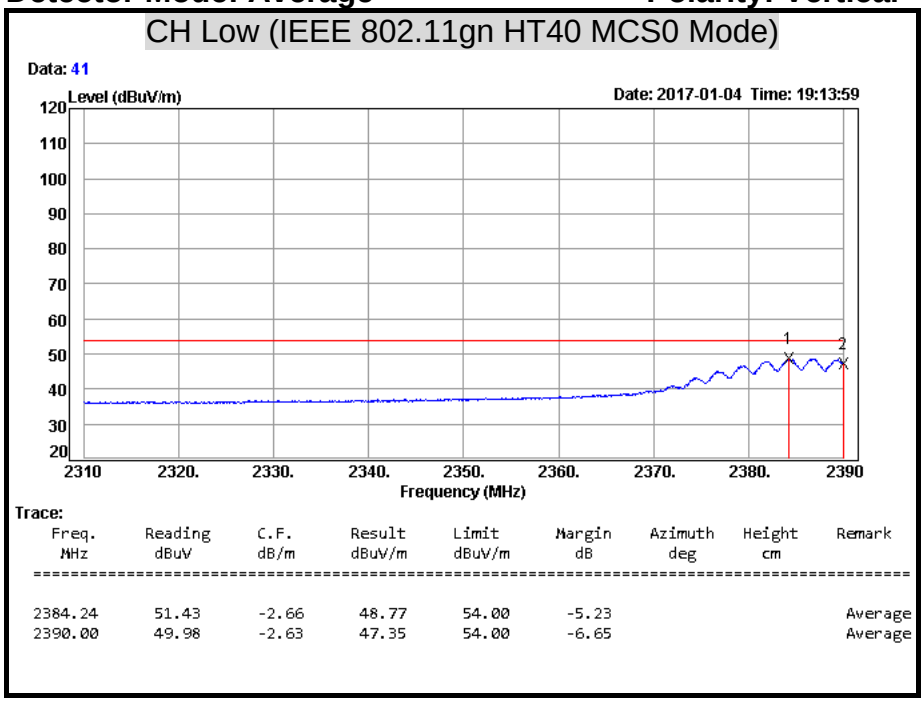


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2386.96	70.53	-2.65	67.88	74.00	-6.12			Peak
2390.00	63.90	-2.63	61.27	74.00	-12.73			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



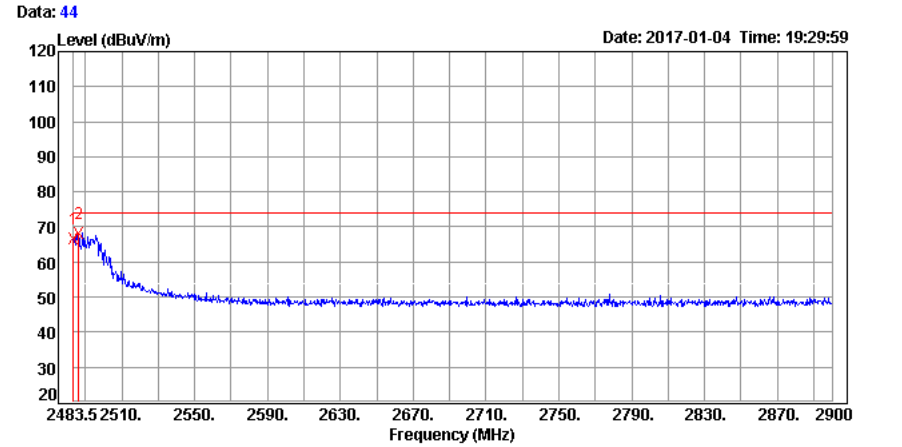
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2384.24	51.43	-2.66	48.77	54.00	-5.23			Average
2390.00	49.98	-2.63	47.35	54.00	-6.65			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Horizontal**

CH High (IEEE 802.11gn HT40 MCS0 Mode)



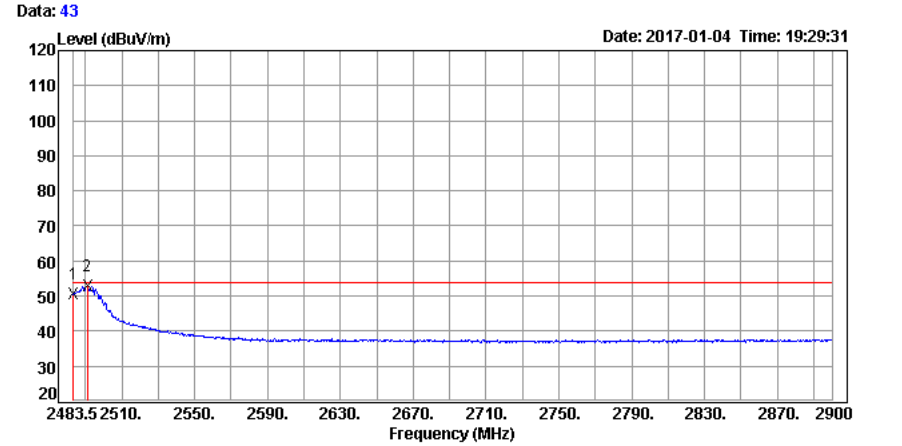
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	68.72	-2.26	66.46	74.00	-7.54			Peak
2486.42	70.51	-2.24	68.27	74.00	-5.73			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Horizontal**

CH High (IEEE 802.11gn HT40 MCS0 Mode)



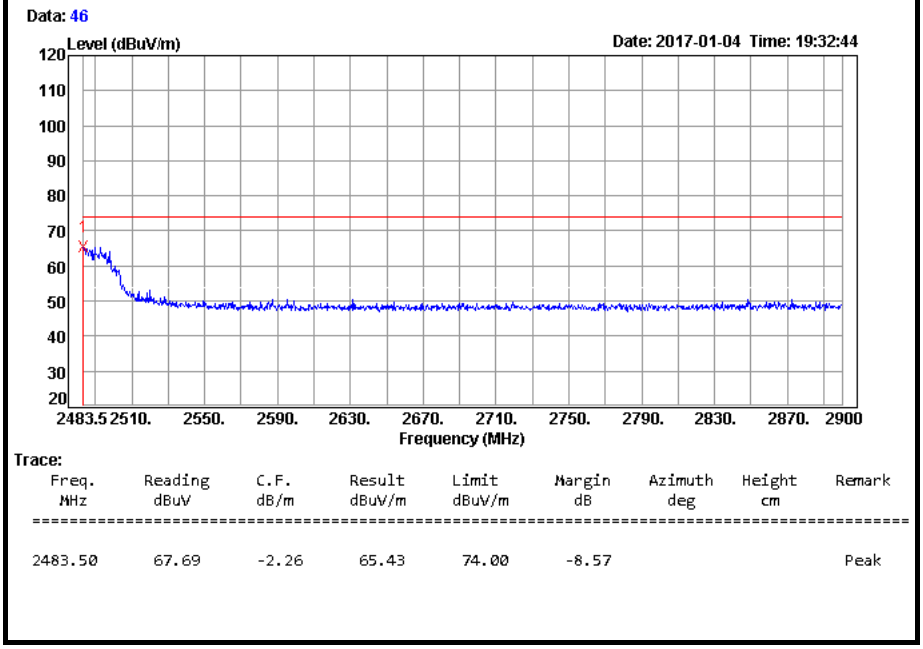
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	52.70	-2.26	50.44	54.00	-3.56			Average
2491.00	55.23	-2.23	53.00	54.00	-1.00			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**

CH High (IEEE 802.11gn HT40 MCS0 Mode)



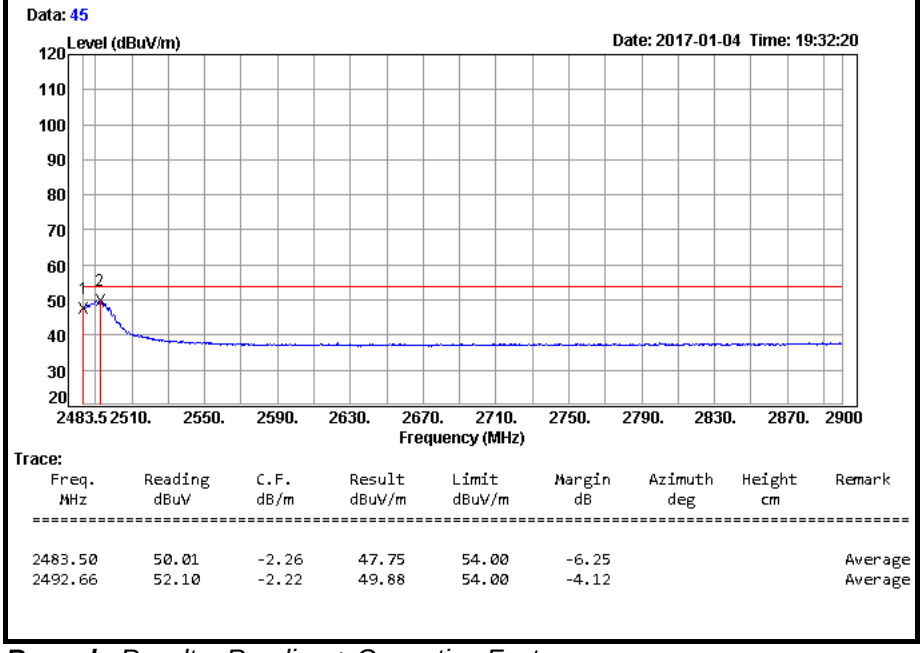
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	67.69	-2.26	65.43	74.00	-8.57			Peak

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**

CH High (IEEE 802.11gn HT40 MCS0 Mode)



Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	50.01	-2.26	47.75	54.00	-6.25			Average
2492.66	52.10	-2.22	49.88	54.00	-4.12			Average

Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

7.8 CONDUCTED EMISSION

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.

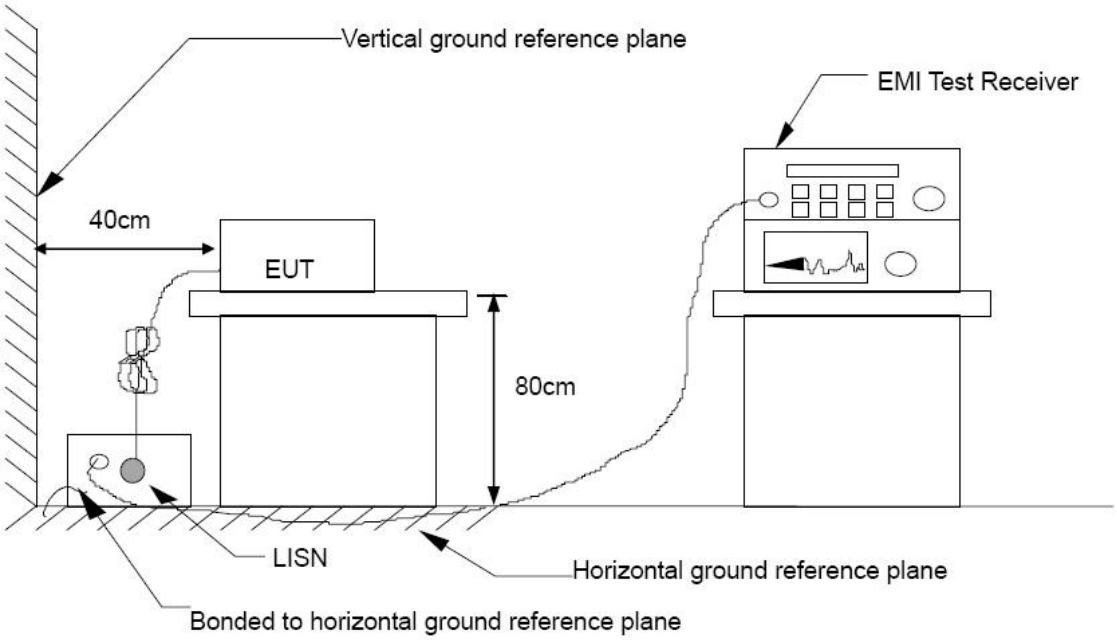
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

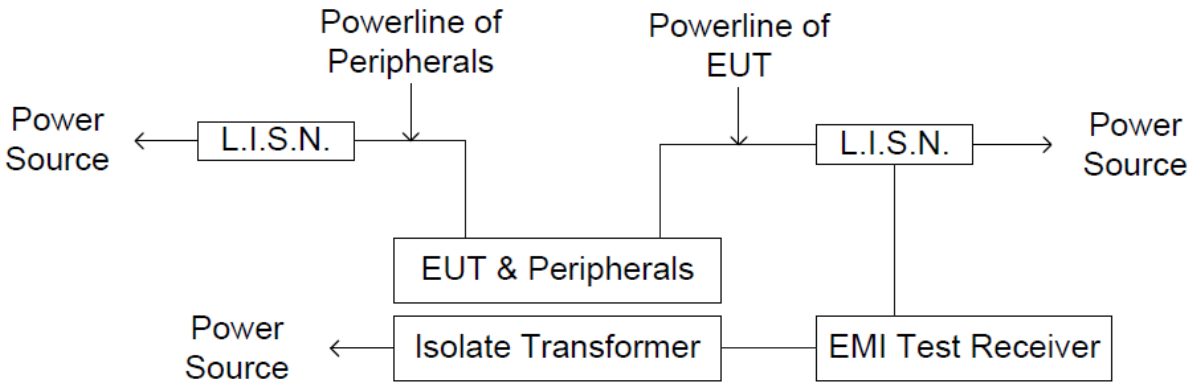
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	Schwarzbeck	NSLK 8127	8127465	07/28/2017
L.I.S.N	Schwarzbeck	NSLK 8127	8127473	03/10/2017
EMI Test Receiver	Rohde & Schwarz	ESHS 30	838550/003	10/25/2017
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100111	06/27/2017
Test S/W	E3.815206a			

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

TEST SETUP





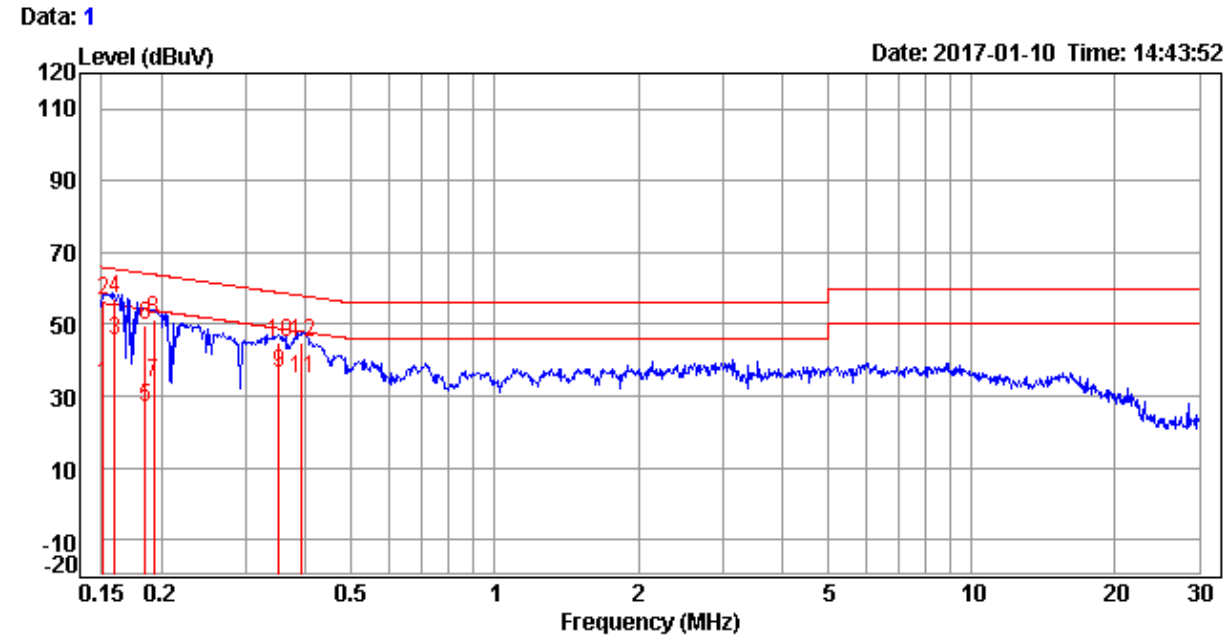
TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.10:2013.
The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.
The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Jey Li
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	Mode 1	Temp. & Humidity	26°C, 41%

LINE



Trace:

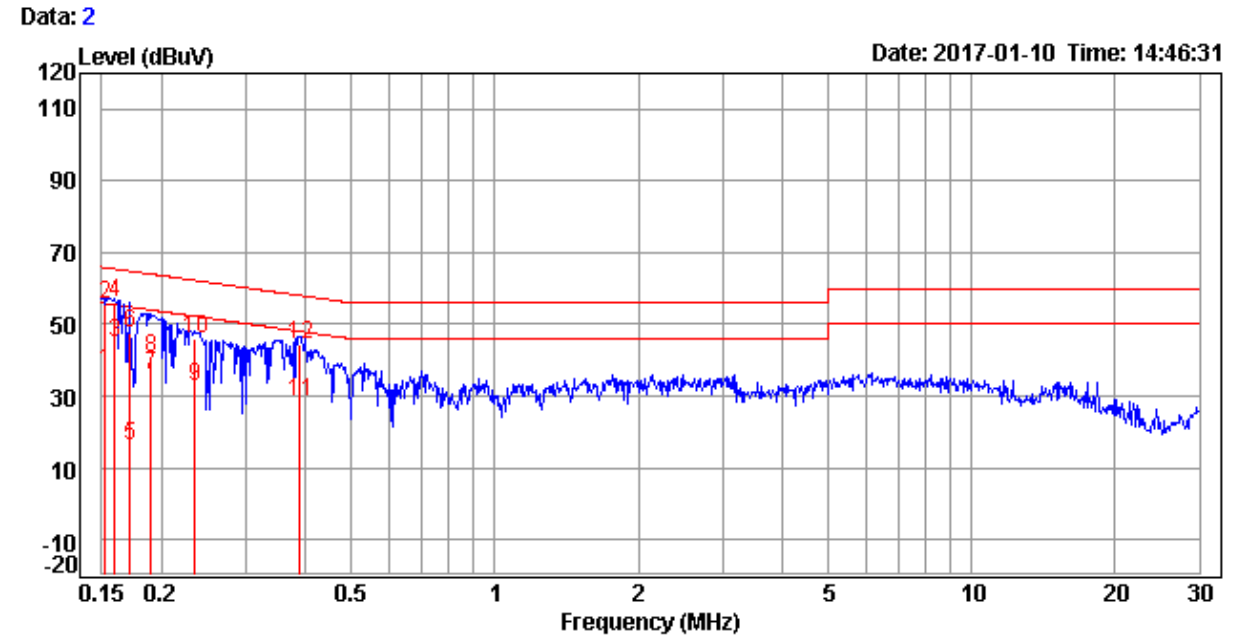
Freq. MHz	Reading dBuV Q.P.	Reading dBuV AV.	C.F. dB	Result dBuV Q.P.	Result dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.151	46.51	23.41	10.00	56.51	33.41	65.96	55.96	-9.45	-22.55
0.160	47.03	35.72	9.99	57.02	45.71	65.47	55.47	-8.45	-9.76
0.184	39.99	17.13	9.98	49.97	27.11	64.28	54.28	-14.31	-27.17
0.192	41.62	23.70	9.97	51.59	33.67	63.93	53.93	-12.34	-20.26
0.352	35.03	26.58	9.86	44.89	36.44	58.91	48.91	-14.02	-12.47
0.393	35.37	25.20	9.82	45.19	35.02	57.99	47.99	-12.80	-12.97

Remark:

1. *Correction Factor = Insertion loss + Cable loss*
2. *Result level = Reading Value + Correction factor*
3. *Margin value = Result level – Limit value*

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Jey Li
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	Mode 1	Temp. & Humidity	26°C, 41%

NEUTRAL



Trace:

Freq. MHz	Reading dBuV Q.P.	Reading dBuV AV.	C.F. dB	Result dBuV Q.P.	Result dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.152	45.65	27.08	9.99	55.64	37.07	65.91	55.91	-10.27	-18.84
0.160	45.87	34.75	9.99	55.86	44.74	65.47	55.47	-9.61	-10.73
0.171	37.70	5.94	9.99	47.69	15.93	64.90	54.90	-17.21	-38.97
0.189	30.45	26.03	10.00	40.45	36.03	64.06	54.06	-23.61	-18.03
0.234	36.17	22.55	9.97	46.14	32.52	62.30	52.30	-16.16	-19.78
0.389	34.75	18.74	9.81	44.56	28.55	58.08	48.08	-13.52	-19.53

Remark:

1. *Correction Factor = Insertion loss + Cable loss*
2. *Result level = Reading Value + Correction factor*
3. *Margin value = Result level – Limit value*

8. APPENDIX I CO-LOCATION

Product Name	3G/4G LTE Embedded VDSL2/ADSL2+ Wireless-N VPN Firewall Router	Test By	Jey Li
Test Model	BiPAC 8920NZ	Test Date	2017/01/10
Test Mode	Mode 1	Temp. & Humidity	17°C, 50%

966Chamber_C at 3Meter / Horizontal

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
1125.00	47.19	-12.61	34.58	74.00	-39.42	199	100	Peak
1445.00	48.75	-11.75	37.00	74.00	-37.00	208	100	Peak
1625.00	52.21	-11.38	40.83	74.00	-33.17	170	100	Peak
3230.00	50.98	-7.64	43.34	74.00	-30.66	66	100	Peak
4000.00	48.01	-6.31	41.70	74.00	-32.30	140	100	Peak
4850.00	34.58	-3.42	31.16	54.00	-22.84	103	200	Average
4850.00	56.56	-3.42	53.14	74.00	-20.86	103	200	Peak

966Chamber_C at 3Meter / Vertical

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
1125.00	52.25	-12.61	39.64	74.00	-34.36	12	100	Peak
1375.00	49.35	-11.94	37.41	74.00	-36.59	179	100	Peak
1600.00	48.72	-11.42	37.30	74.00	-36.70	171	100	Peak
2000.00	47.72	-10.70	37.02	74.00	-36.98	20	200	Peak
3230.00	49.33	-7.64	41.69	74.00	-32.31	357	200	Peak
4850.00	34.20	-3.42	30.78	54.00	-23.22	353	200	Average
4850.00	59.00	-3.42	55.58	74.00	-18.42	353	200	Peak

Remark:

1. *Average test would be performed if the peak result were greater than the average limit.*
2. *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.*
3. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(PK)
   Remark AVG = Result(AV) – Limit(AV)