FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2009 TEST REPORT

For

Handheld Terminal (WIFI & BT)

Model : Z-2170 Plus

Data Applies To : Z-2171 Plus ; Z-2172 Plus

Trade Name : ZEBEX

Issued for

ZEBEX INDUSTRIES INC.

B1F.-1, No. 207, Sec. 3, Beixin Rd, Xindian Dist, New Taipei City 23143, Taiwan

Issued by

Compliance Certification Services Inc.
Hsinchu Lab.
NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C
TEL: +886-3-5921698
FAX: +886-3-5921108

http://www.ccsrf.com
E-Mail : service@ccsrf.com

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	09/23/2014	Initial Issue	All Page 75	Dola Hsieh

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1. TEST REPORT CERTIFICATION

Applicant	：	ZEBEX INDUSTRIES INC.
Address	：	B1F.-1, No. 207, Sec. 3, Beixin Rd, Xindian Dist, New Taipei City 23143, Taiwan
Equipment Under Test	：	Handheld Terminal (WIFI & BT)
Model	：	Z-2170 Plus
Data Applies To	：	Z-2171 Plus ; Z-2172 Plus
Trade Name	：	ZEBEX
Tested Date	：	May 20 ~ August 22, 2014

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.10:2009	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	Handheld Terminal (WIFI & BT)
Model Number	Z-2170 Plus
Data Applies To	Z-2171 Plus ; Z-2172 Plus
Identify Number	T140520D01
Received Date	May 20, 2014
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 : 2412MHz～2462MHz
Transmit Power	IEEE 802.11b : 17.66 dBm (0.0583W) IEEE 802.11g : 23.41 dBm (0.2193W) IEEE 802.11gn HT20 : 23.45 dBm (0.2213W)
Channel Spacing	IEEE 802.11b/g, 802.11gn HT20 : 5MHz
Channel Number	IEEE 802.11b/g, 802.11gn HT20 : 11 Channels
Transmit Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11a/g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11gn HT20 : 72.2, 65, 58.5, 57.8, 52, 43.3, 39, 28.9, 26, 21.7, 19.5, 14.4, 13, 7.2, 6.5 Mbps
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11gn HT20 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	PCB Antenna, Antenna Gain 3.1 dBi
Power Rating	3.7Vdc, 2200mAh (8.1Wh) (For Battery) 5Vdc, 3A (For Charging)
DC Power Cord Type	Non-shielded cable 1.5 m (Non-detachable)
Test Voltage	120Vac, 60Hz
I/O Port	EUT : Charge Port × 1 Docking : Power Port × 1, RJ-45 Port × 1, USB Port × 1, Charge Port × 2
Signal Cable	Shielded USB cable, 1.5m (Detachable), with a ferrite core Non-shielded RJ-45 to RS232 cable, 1.5m (Detachable), with a ferrite core

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	Powertron Electronics Corp.	PA1045-120HI B300	100-240Vac, 50-60Hz, 1.0A	12Vdc, 3.0A, 36W Max

Docking Cradle :

No.	Model No.	Power Rating
1	CRD-7X	12Vdc, 3A

The difference of the series model :

Model Number	Difference
Z-2170 Plus	CCD Scan Engine
Z-2171 Plus	Laser Scan Engine
Z-2172 Plus	2D Scan Engine

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. The model Z-2170 Plus was considered the main model for testing.
4. This submittal(s) (test report) is intended for FCC ID: JNF-Z-217XP filing to comply with Section15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n transceiver in Handheld Terminal (WIFI & BT) form factor.

For IEEE 802.11b/g, 802.11gn HT20 mode (1TX / 1RX).

Conducted Emission / Radiated Emission Test (Below 1 GHz)

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

No.	Pre-Test Mode
1	TX Mode

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

Final Test Mode		
Emission	Radiated Emission	TX Mode
	Conducted Emission	

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, 802.11g, 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) were chosen for full testing.

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

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

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

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2009 and FCC CFR 47, 15.207, 15.209, 15.247.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

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

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.10:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, 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
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	DELL	Latitude D610 PP01L	CN-0XD762-48643-637-1743

SETUP DIAGRAM FOR TESTS

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

EUT OPERATING CONDITION

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Copy Command File into EUT [My Device]
3. Select the following settings.
   Start -> Programs ->Command Prompt (Copy into [Dos Mode])
4. TX Mode
   - ⇨ Tx Data Rate: 1Mbps Bandwidth 20 (IEEE 802.11b mode)
     6Mbps Bandwidth 20 (IEEE 802.11g mode)
     6.5Mbps Bandwidth 20 (IEEE 802.11n HT20 mode)
   - ⇨ Power control
     IEEE 802.11b Channel Low (2412MHz) TX Power 20
     Key In: ticon –b –s txr1c1.cmd
     (txc1r1.cmd is the command file of Copy into [My Device])
     IEEE 802.11b Channel Mid (2437MHz) TX Power 20
     Key In: ticon –b –s txr1c6.cmd
     IEEE 802.11b Channel High (2462MHz) TX Power 20
     Key In: ticon –b –s txr1c11.cmd
     IEEE 802.11g Channel Low (2412MHz) TX Power 20
     Key In: ticon –b –s txr6c1.cmd
     IEEE 802.11g Channel Mid (2437MHz) TX Power 20
     Key In: ticon –b –s txr6c6.cmd
     IEEE 802.11g Channel High (2462MHz) TX Power 20
     Key In: ticon –b –s txr6c11.cmd
     IEEE 802.11n HT20 Channel Low (2412MHz) TX Power 20
     Key In: ticon –b –s txm0c1.cmd
     IEEE 802.11n HT20 Channel Mid (2437MHz) TX Power 20
     Key In: ticon –b –s txm0c6.cmd
     IEEE 802.11n HT20 Channel High (2462MHz) TX Power 20
     Key In: ticon –b –s txm0c11.cmd
5. All of the functions are under run.
6. Start test.

7. FCC PART 15.247 REQUIREMENTS

7.1 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	06/10/2015

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

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	8.570	500	PASS
Middle	2437	9.070	500	PASS
High	2462	9.050	500	PASS

IEEE 802.11g Mode

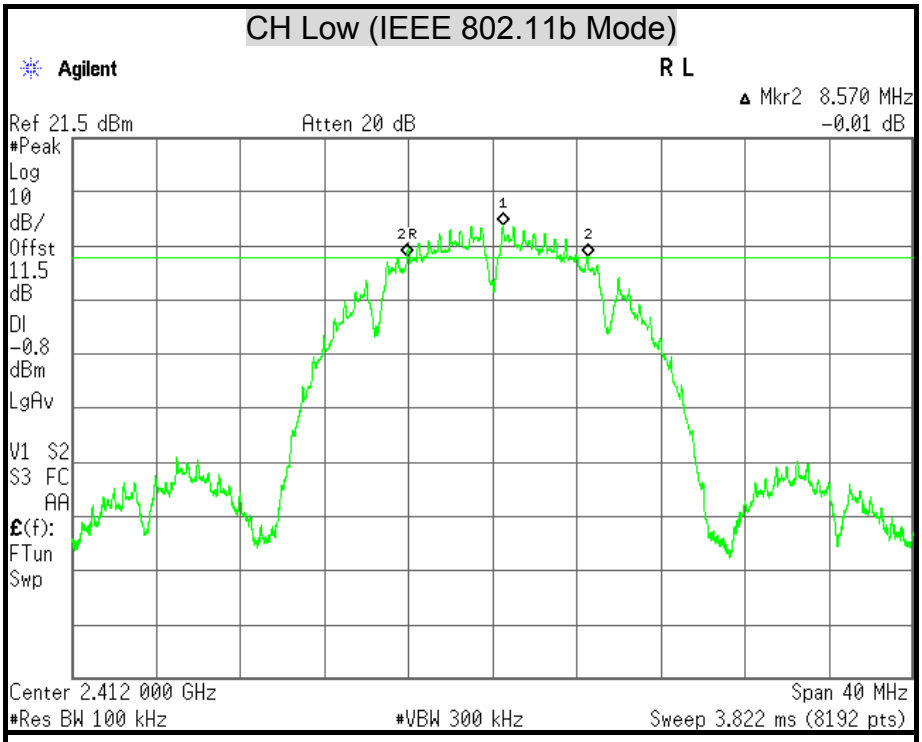
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	15.200	500	PASS
Middle	2437	15.260	500	PASS
High	2462	15.270	500	PASS

IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	15.070	500	PASS
Middle	2437	15.240	500	PASS
High	2462	15.300	500	PASS

6dB BANDWIDTH

CH Low (IEEE 802.11b Mode)



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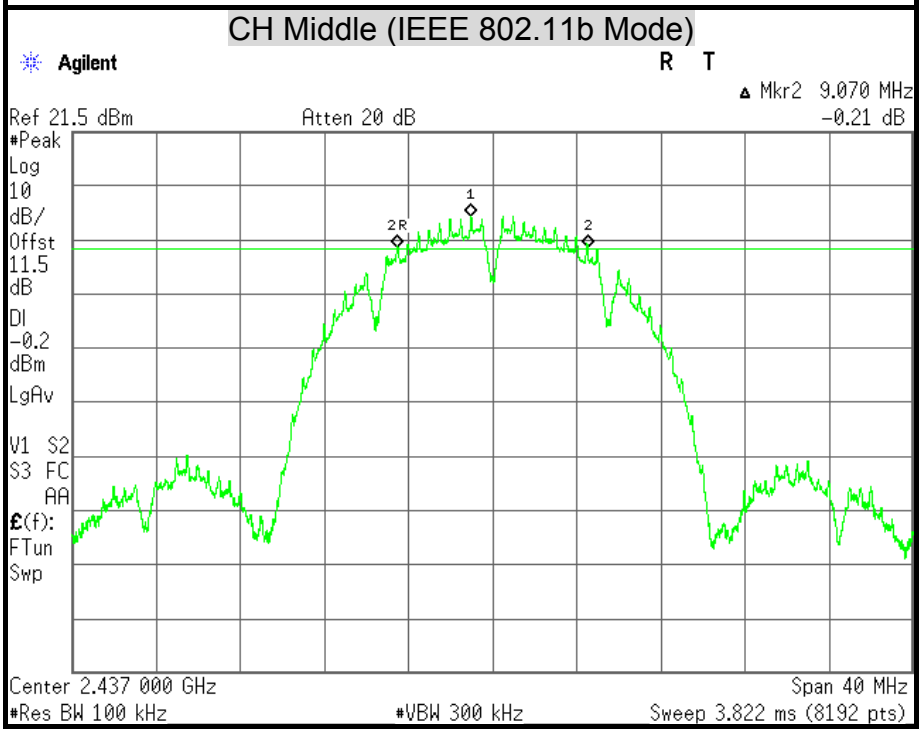

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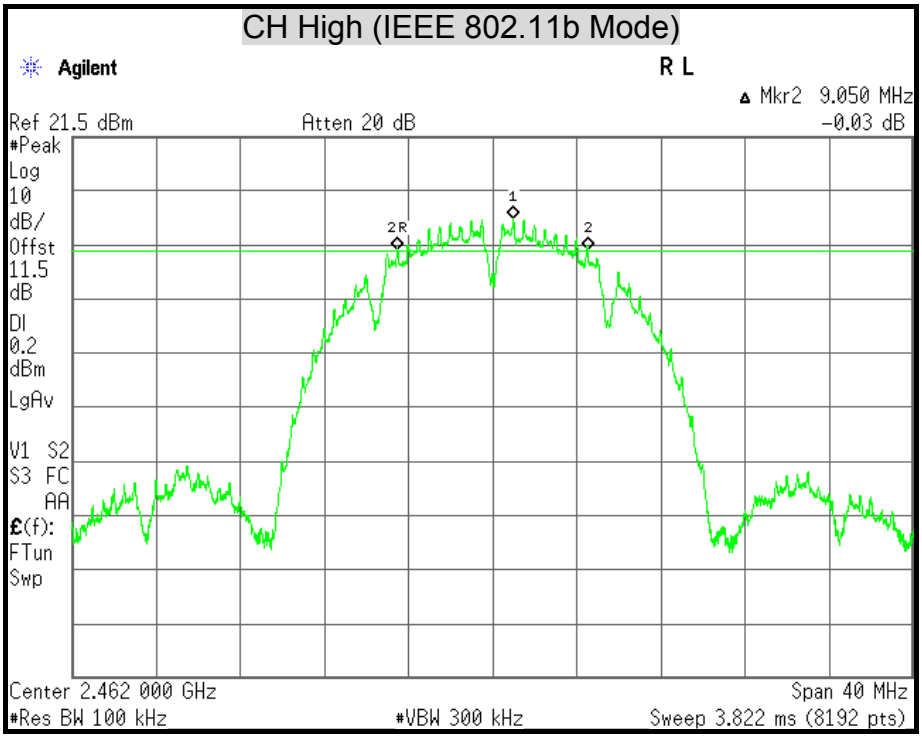

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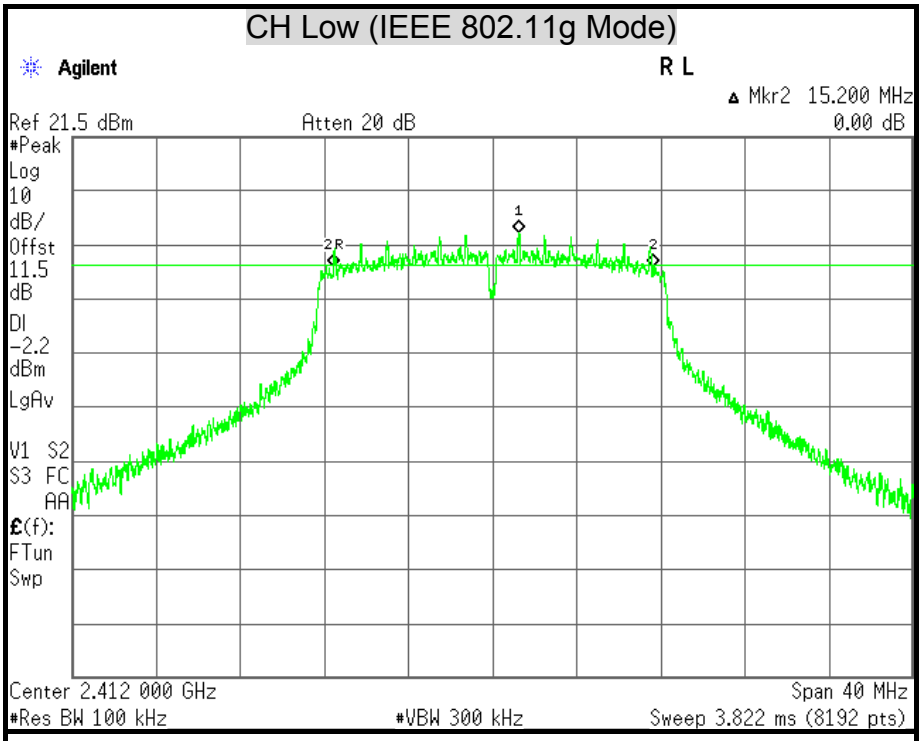

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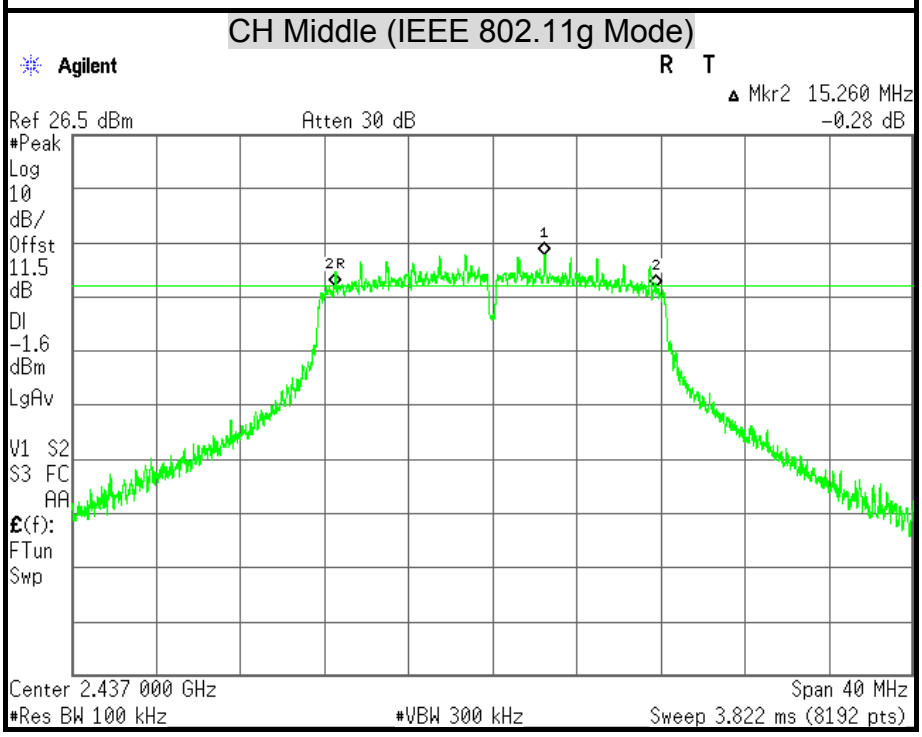

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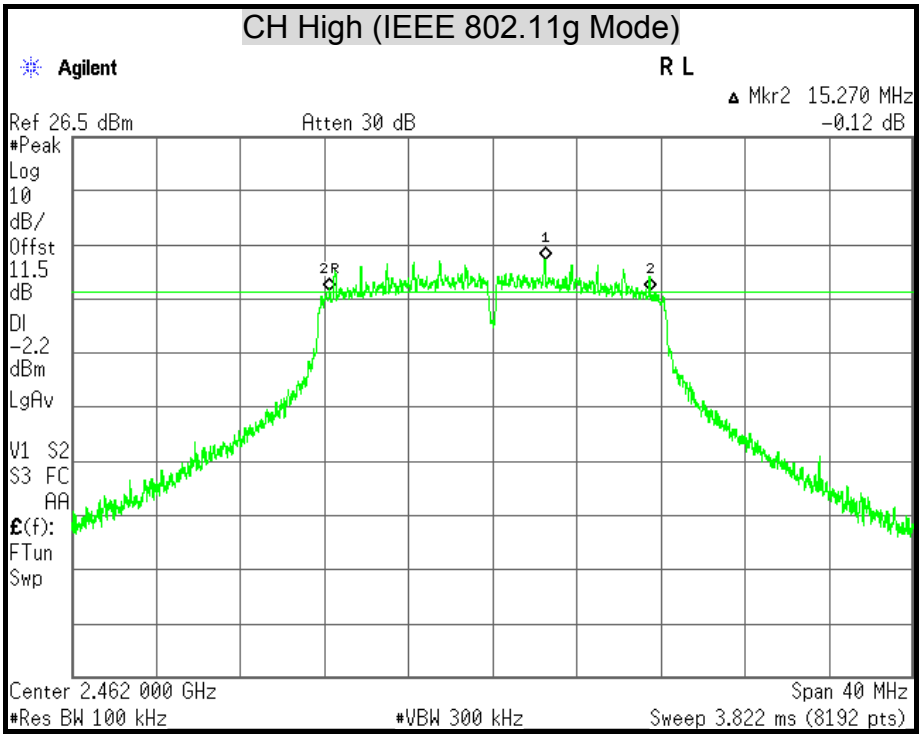

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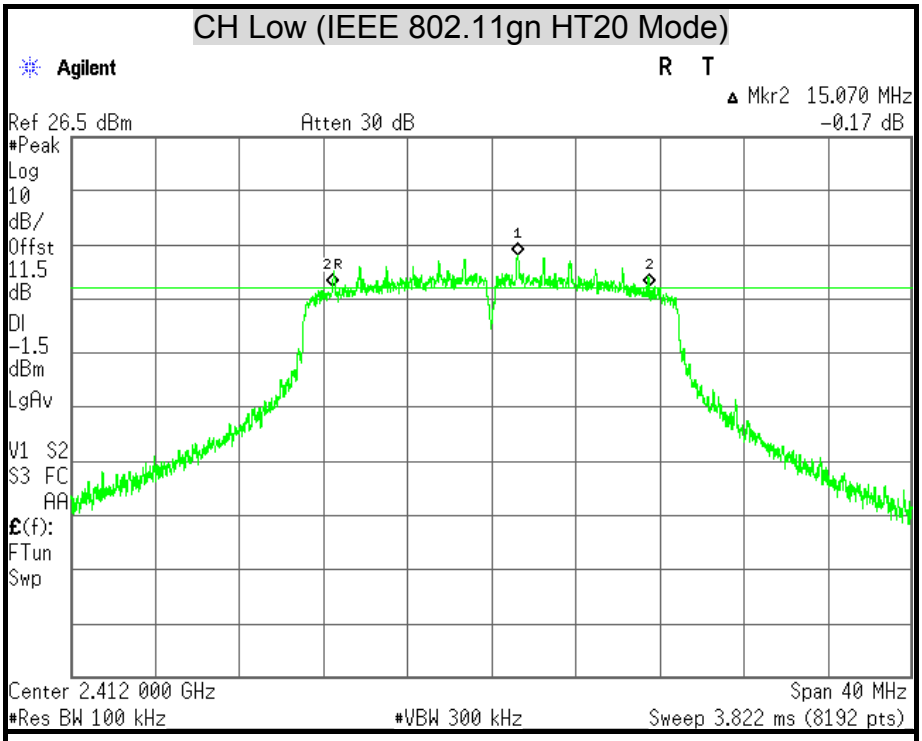

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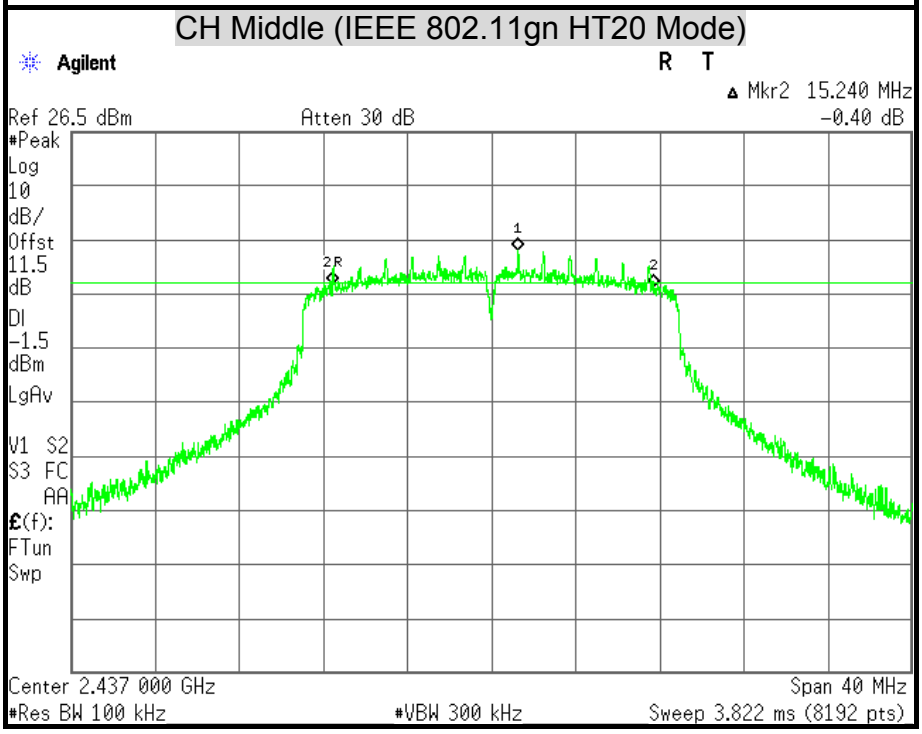

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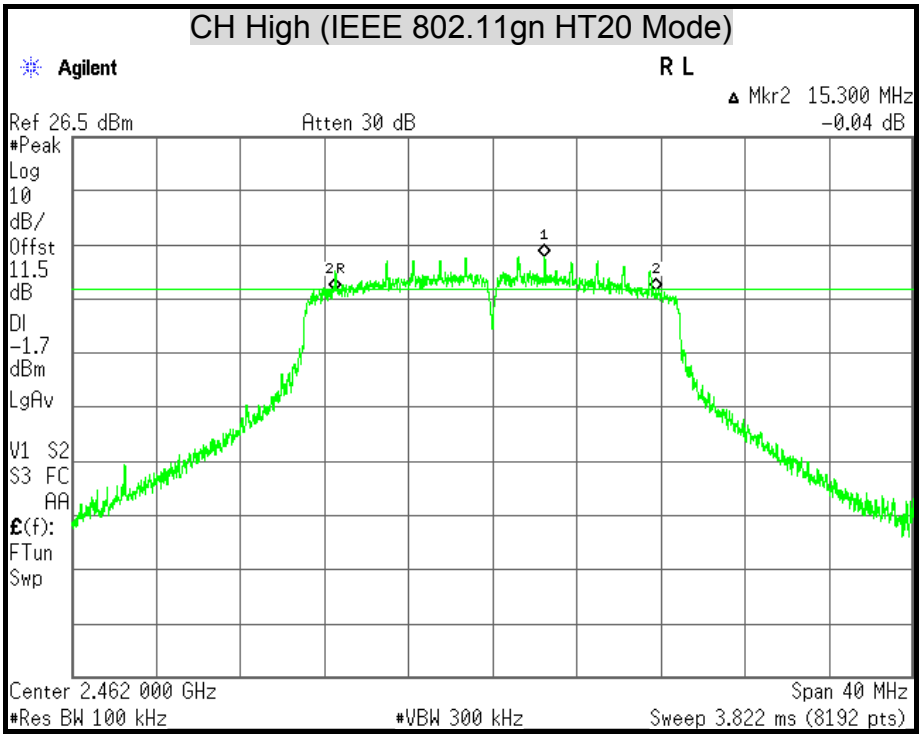


7.2 MAXIMUM PEAK OUTPUT POWER

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.

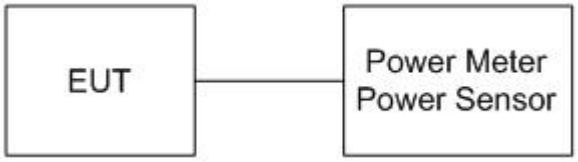
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section, as appropriate,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

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/06/2014
Power Sensor	ANRITSU	MA2411B	1126148	12/06/2014

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

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	17.38	0.0547	30	1	PASS
Middle	2437	17.54	0.0568	30	1	PASS
High	2462	17.66	0.0583	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	23.22	0.2099	30	1	PASS
Middle	2437	23.39	0.2183	30	1	PASS
High	2462	23.41	0.2193	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*

IEEE 802.11gn HT20 mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	23.24	0.2109	30	1	PASS
Middle	2437	23.44	0.2208	30	1	PASS
High	2462	23.45	0.2213	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.

2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

7.3 AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/06/2014
Power Sensor	ANRITSU	MA2411B	1126148	12/06/2014

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

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	15.35
Middle	2437	15.64
High	2462	15.69

Remark:
1. At finial test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	15.33
Middle	2437	15.67
High	2462	15.64

Remark:
1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

IEEE 802.11gn HT20 mode

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2412	15.38
Middle	2437	15.69
High	2462	15.66

Remark:
1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

7.4 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.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015

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

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-9.22	8	PASS
Middle	2437	-8.09	8	PASS
High	2462	-8.33	8	PASS

Remark:

1. At finial test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-10.21	8	PASS
Middle	2437	-9.57	8	PASS
High	2462	-9.69	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11gn HT20 mode

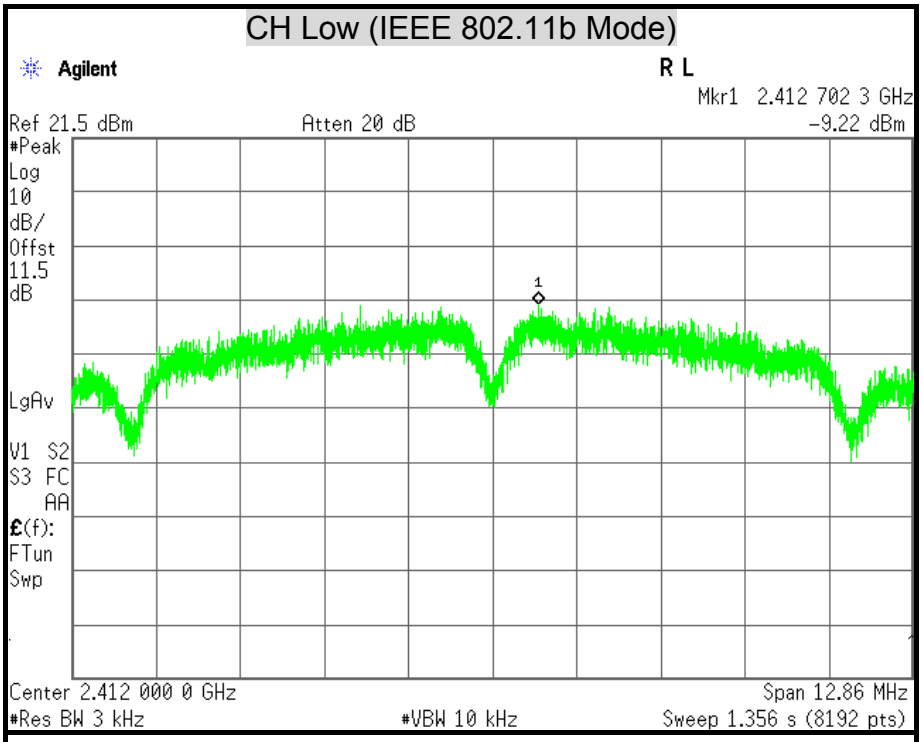
Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-11.70	8	PASS
Middle	2437	-10.38	8	PASS
High	2462	-10.84	8	PASS

Remark:

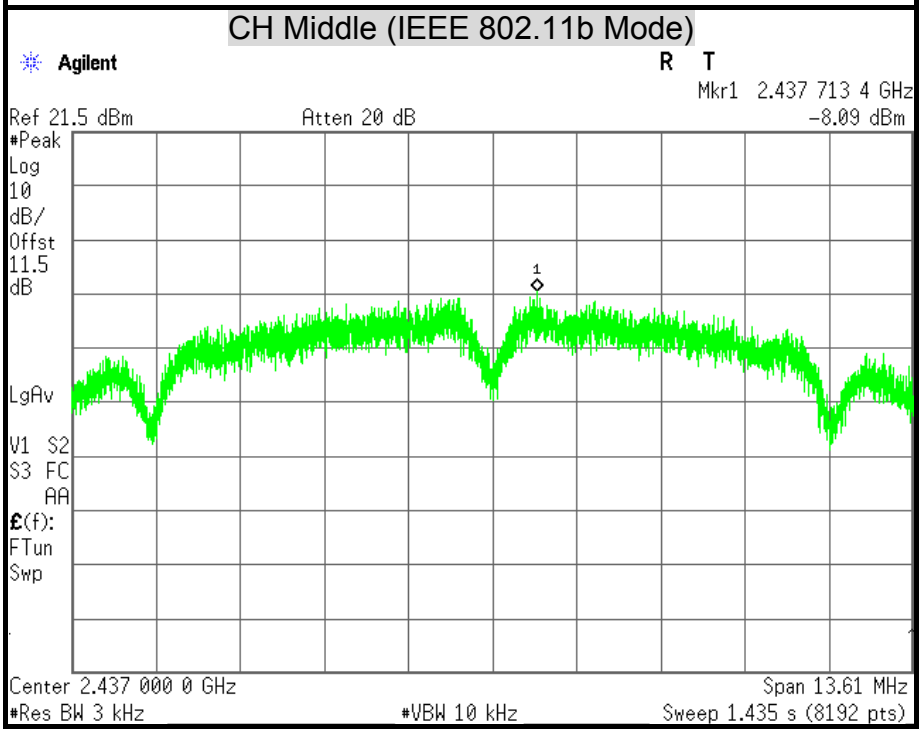
1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

POWER SPECTRAL DENSITY

CH Low (IEEE 802.11b Mode)



CH Middle (IEEE 802.11b Mode)



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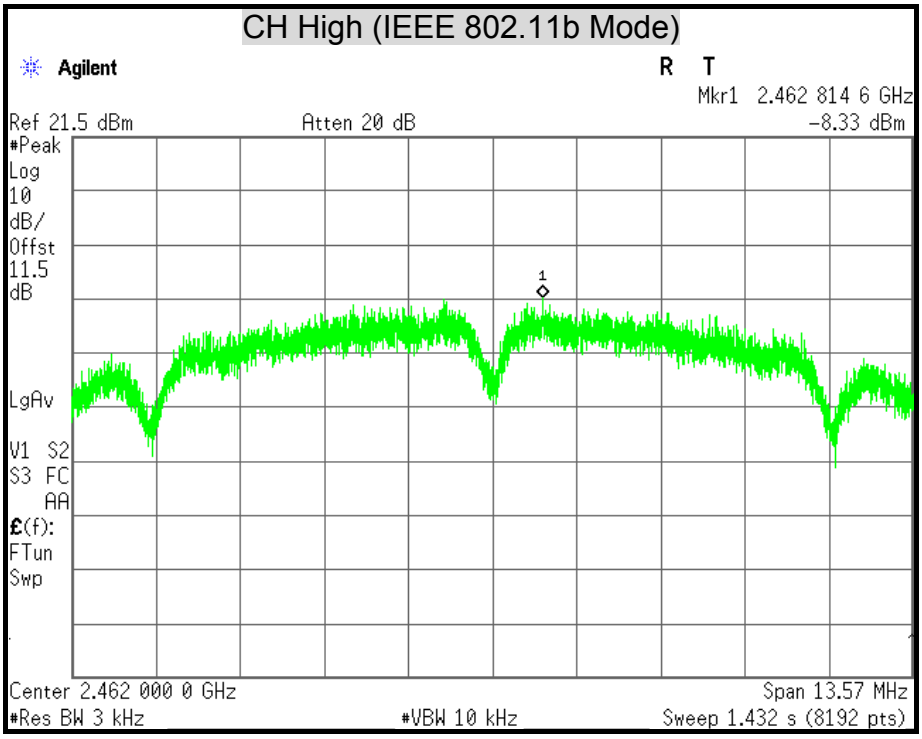

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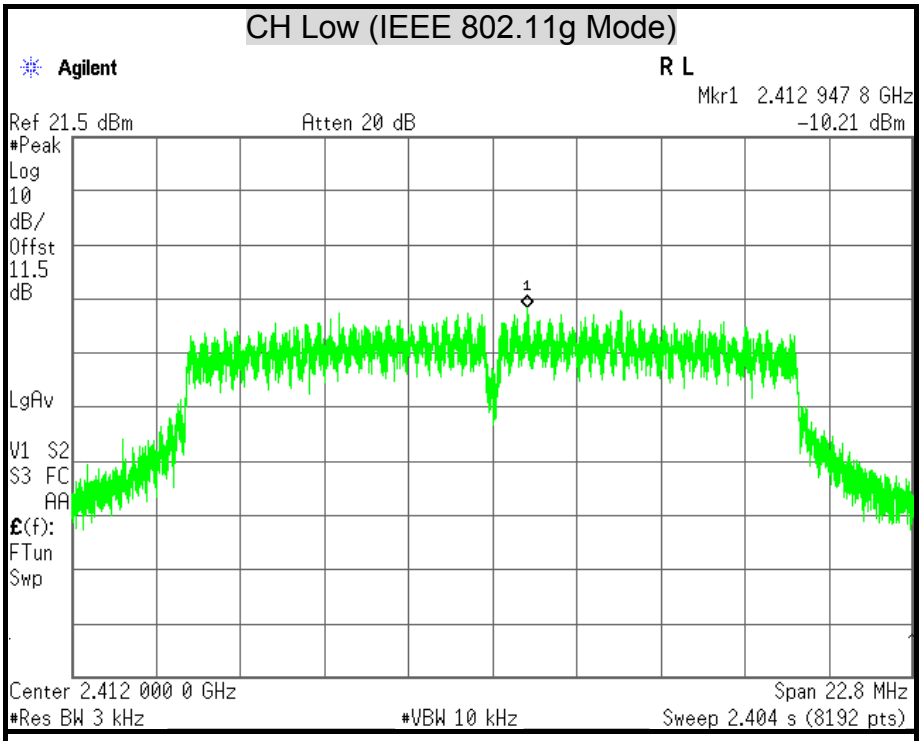

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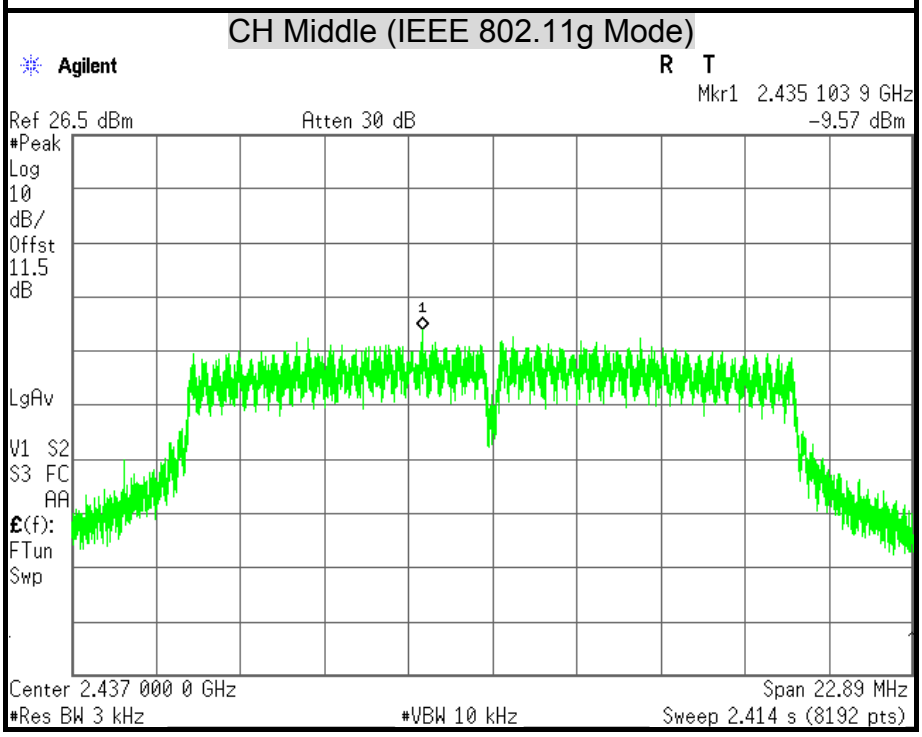
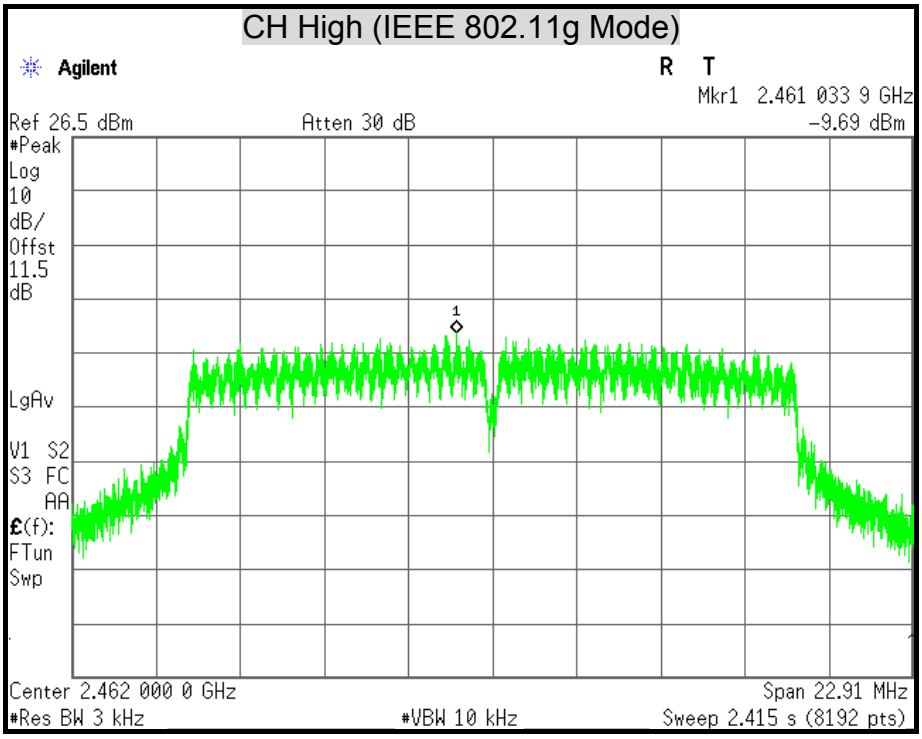
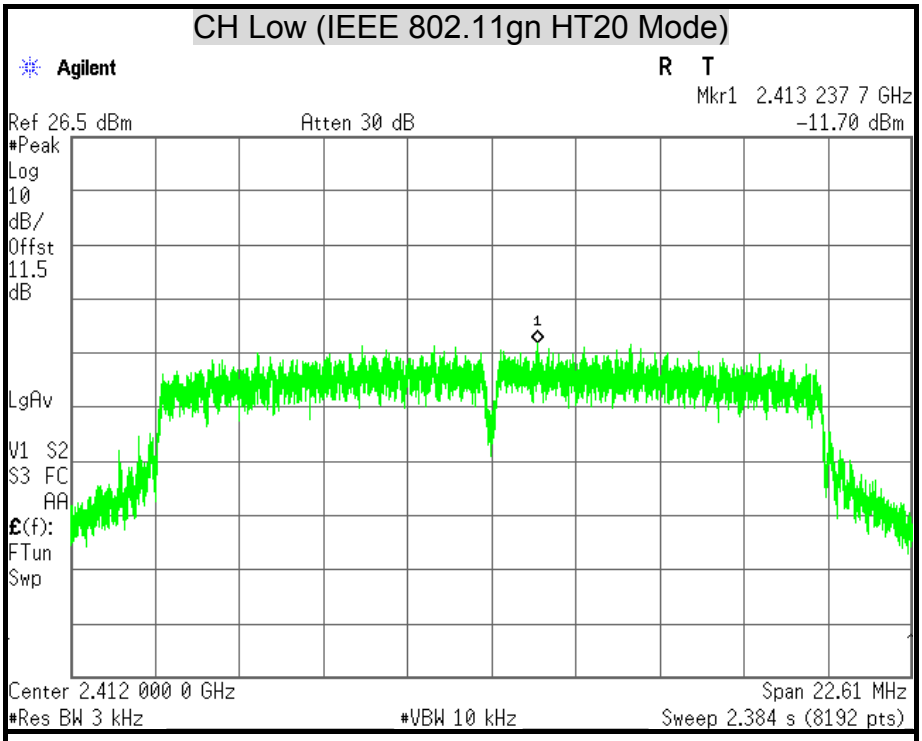


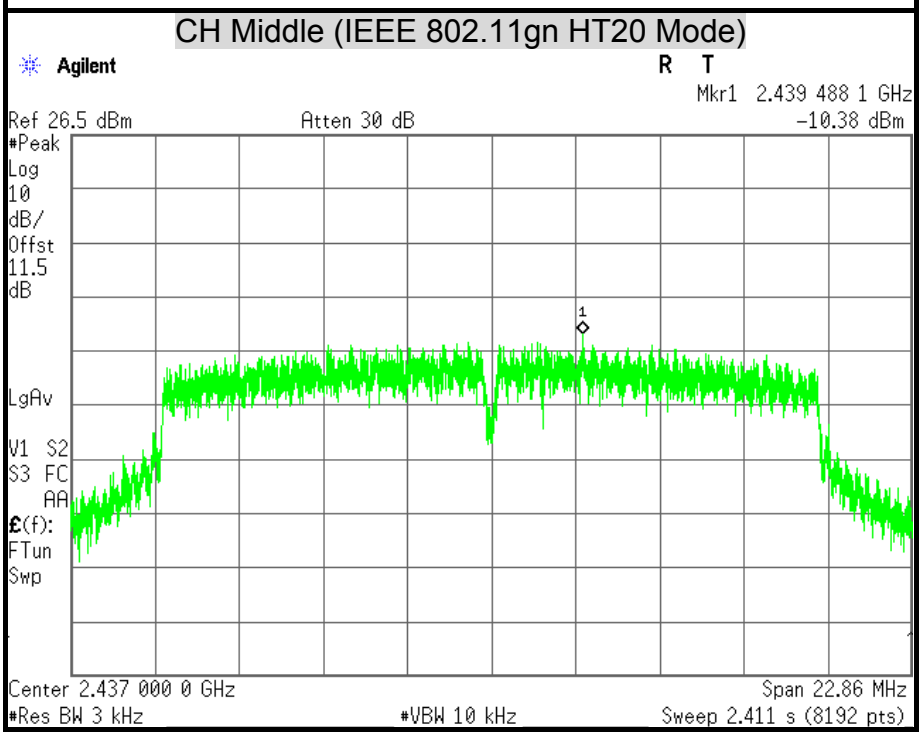
CH High (IEEE 802.11g Mode)



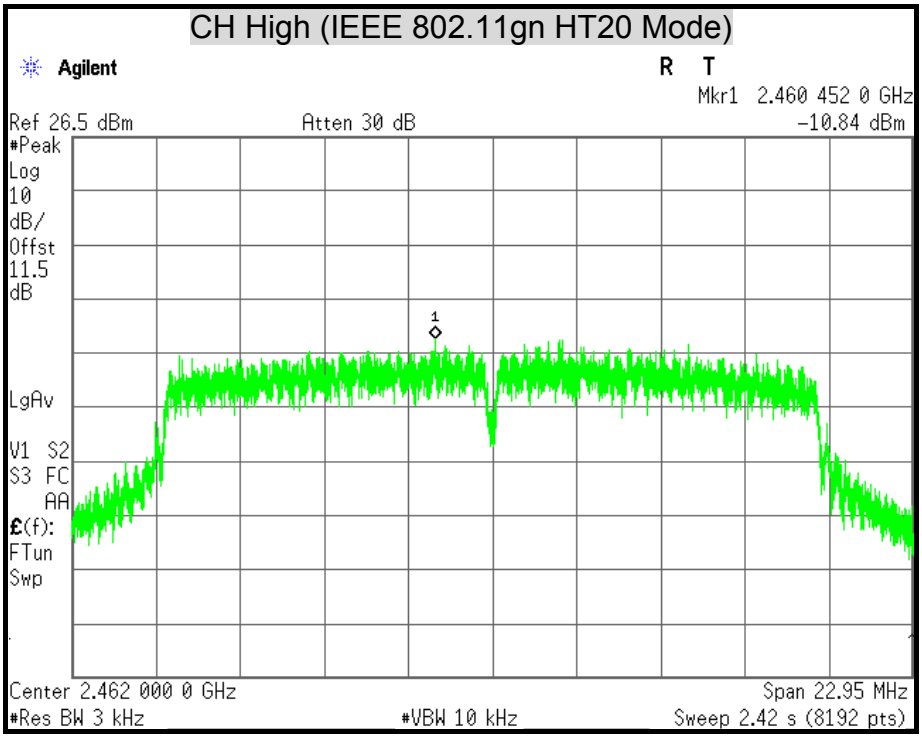
CH Low (IEEE 802.11gn HT20 Mode)



CH Middle (IEEE 802.11gn HT20 Mode)



CH High (IEEE 802.11gn HT20 Mode)



7.5 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	06/10/2015

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

TEST SETUP

TEST PROCEDURE

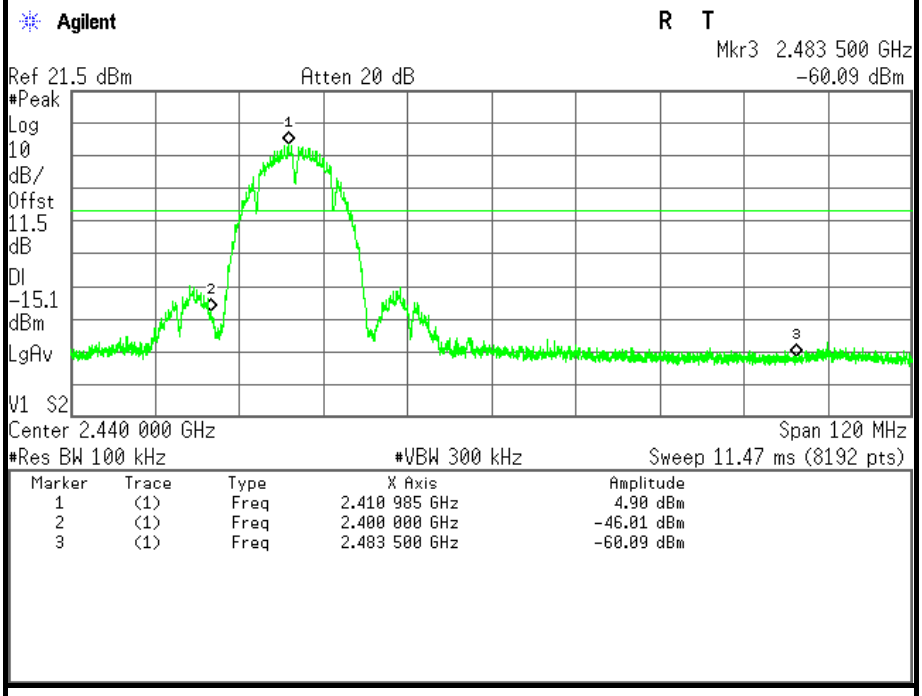
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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.

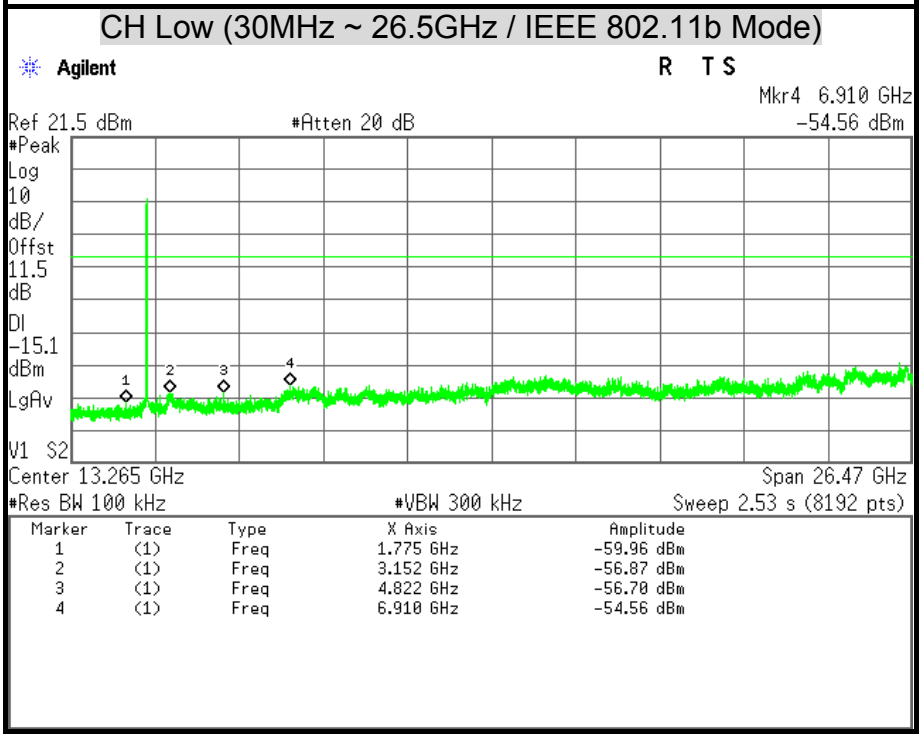
TEST RESULTS

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

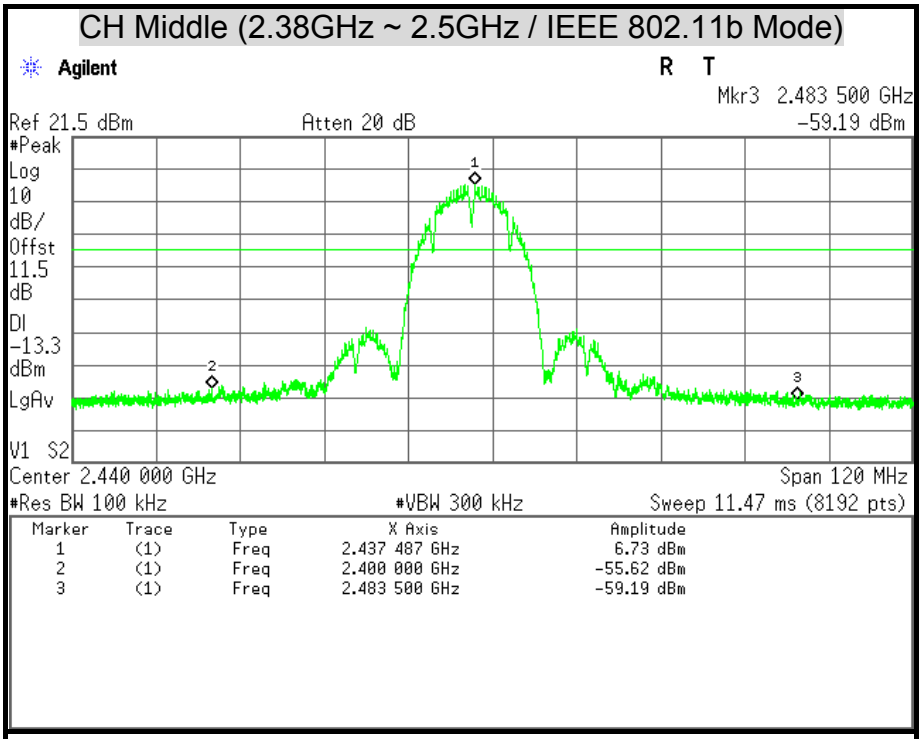
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



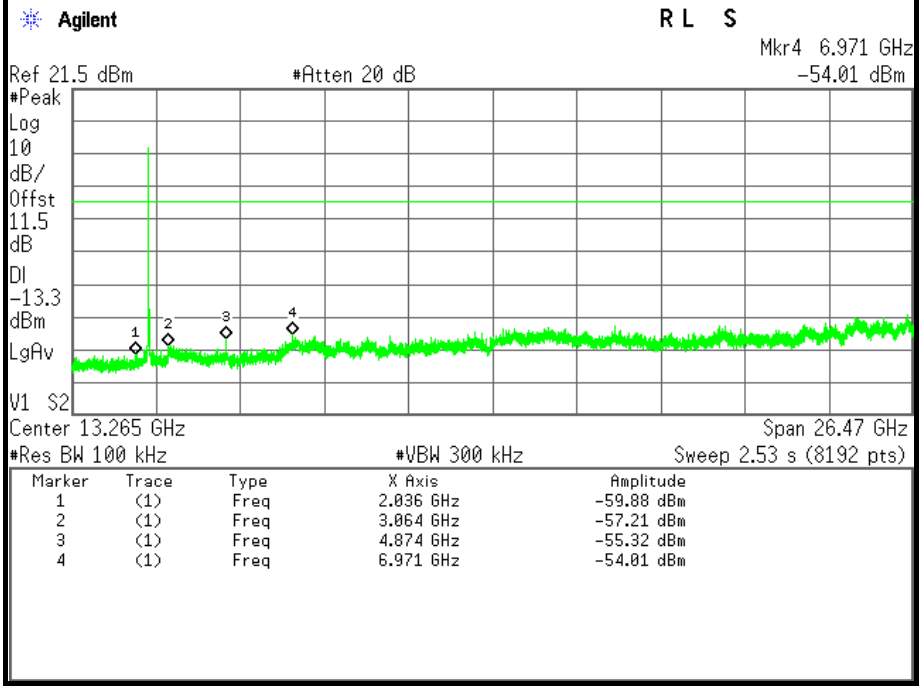
CH Low (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



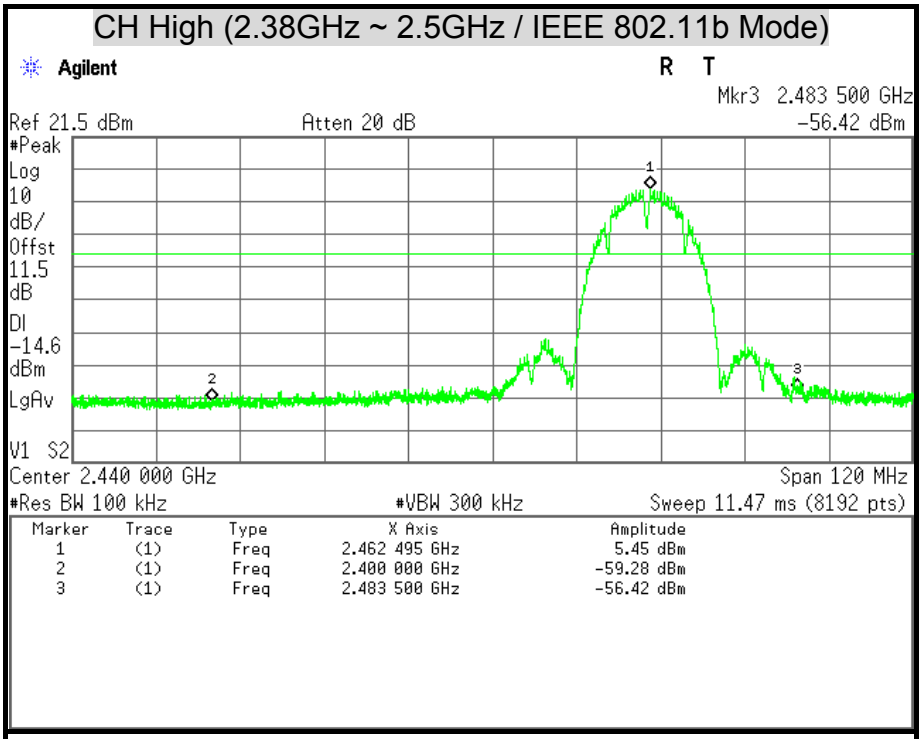
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



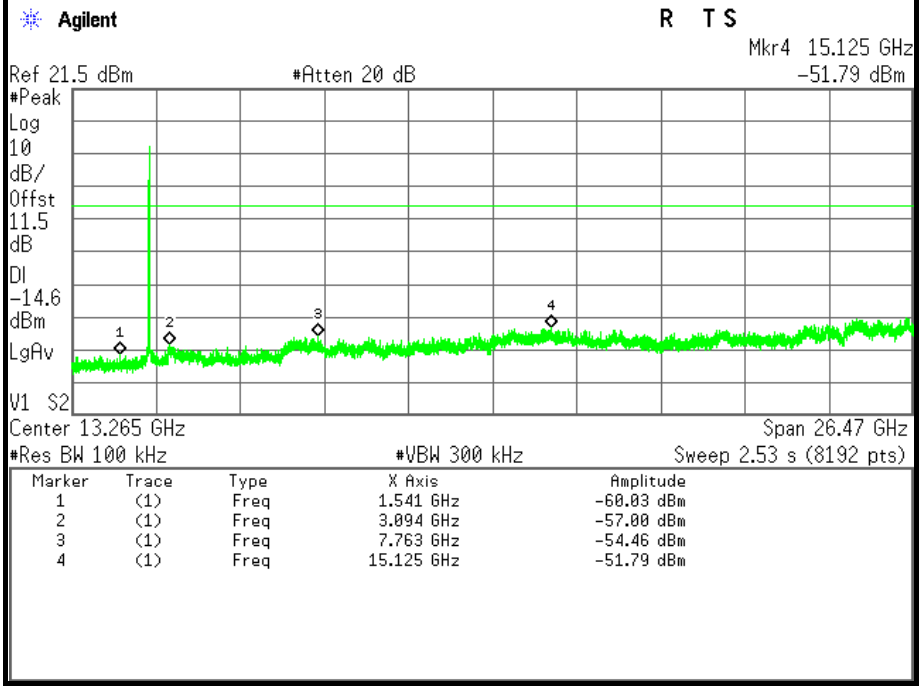
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



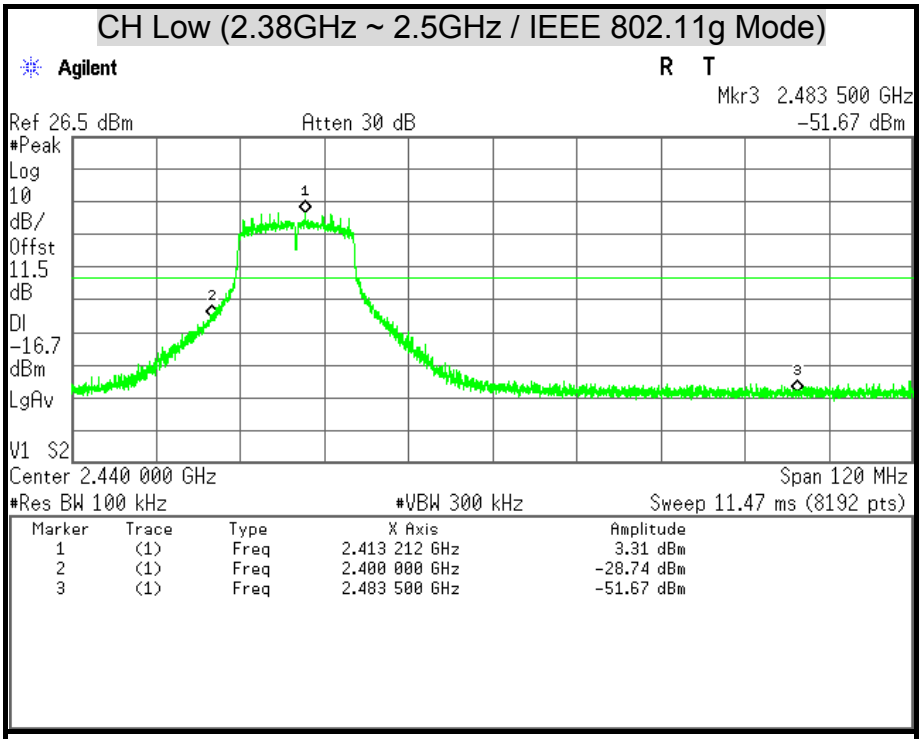
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



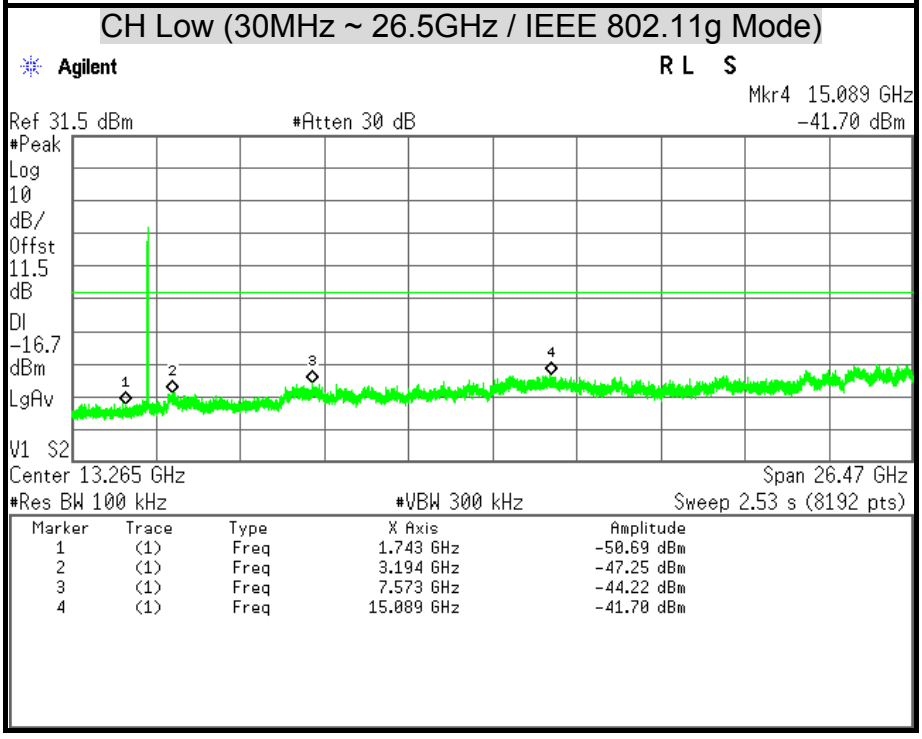
CH High (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



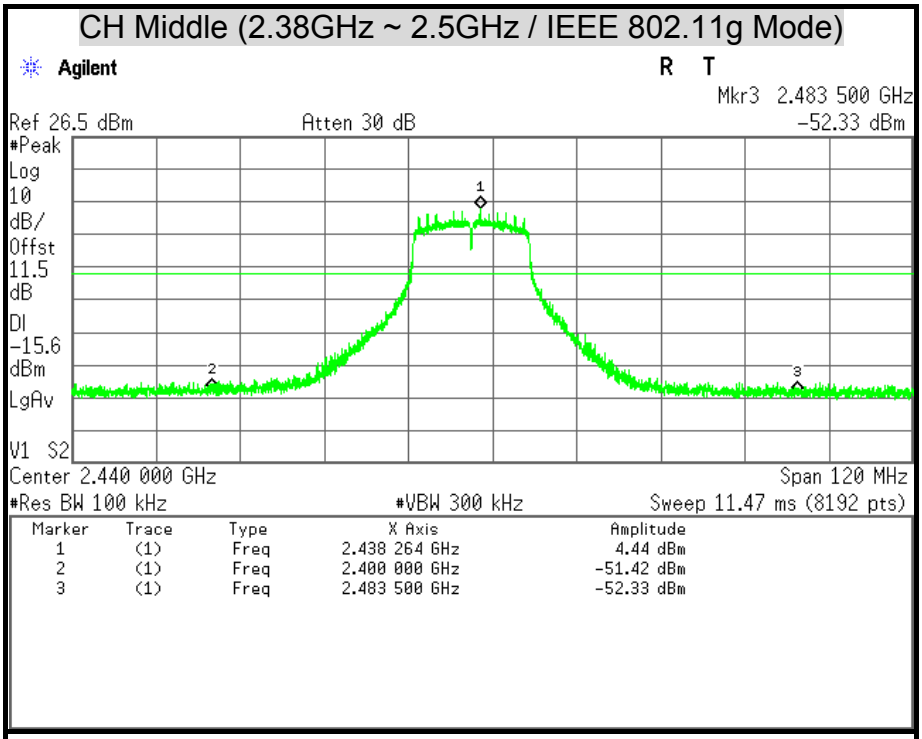
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



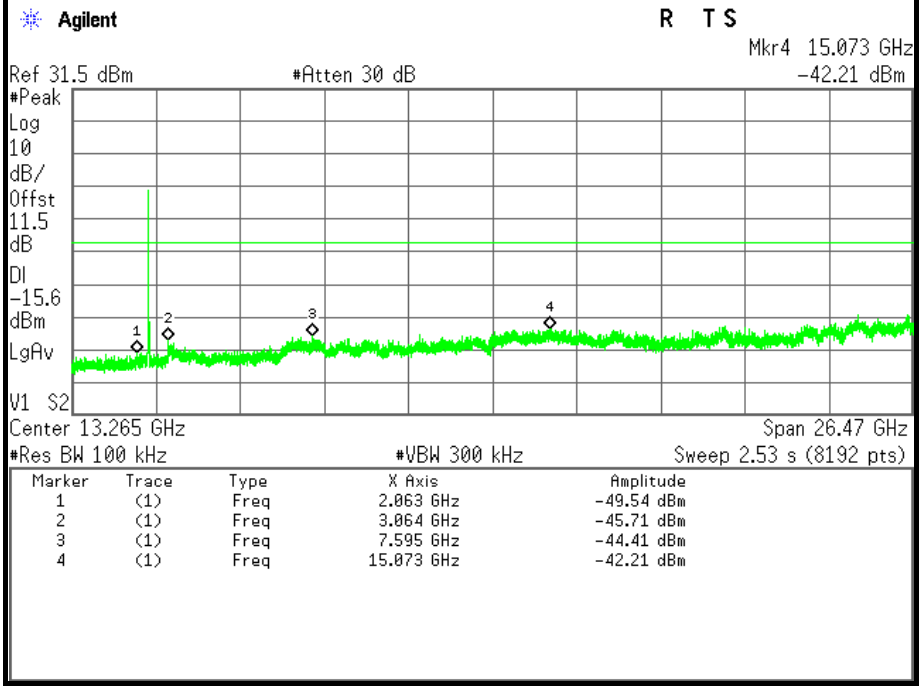
CH Low (30MHz ~ 26.5GHz / IEEE 802.11g Mode)



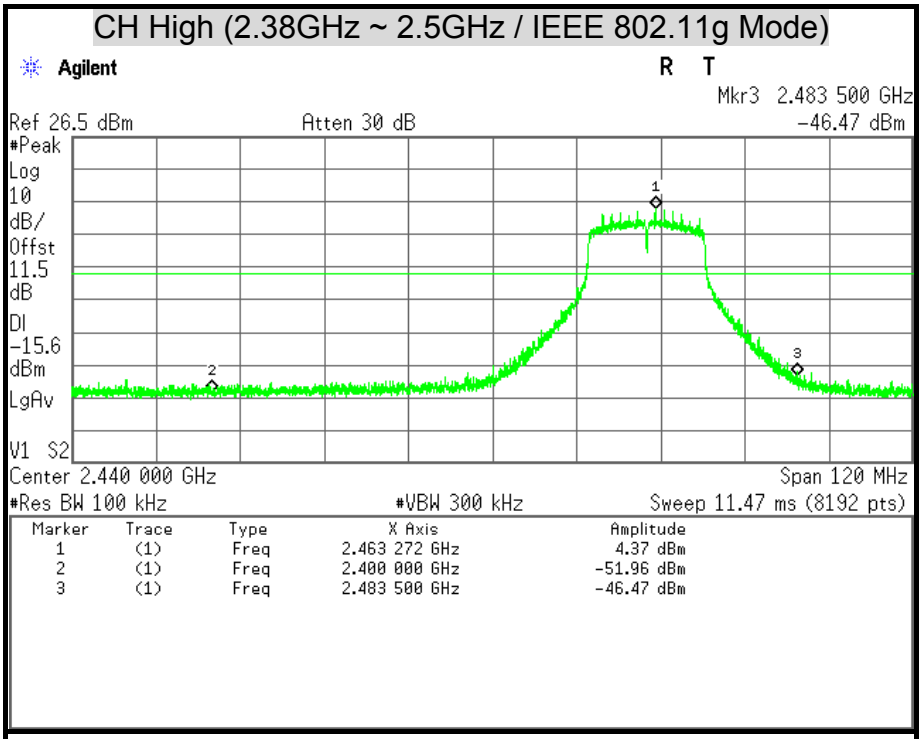
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



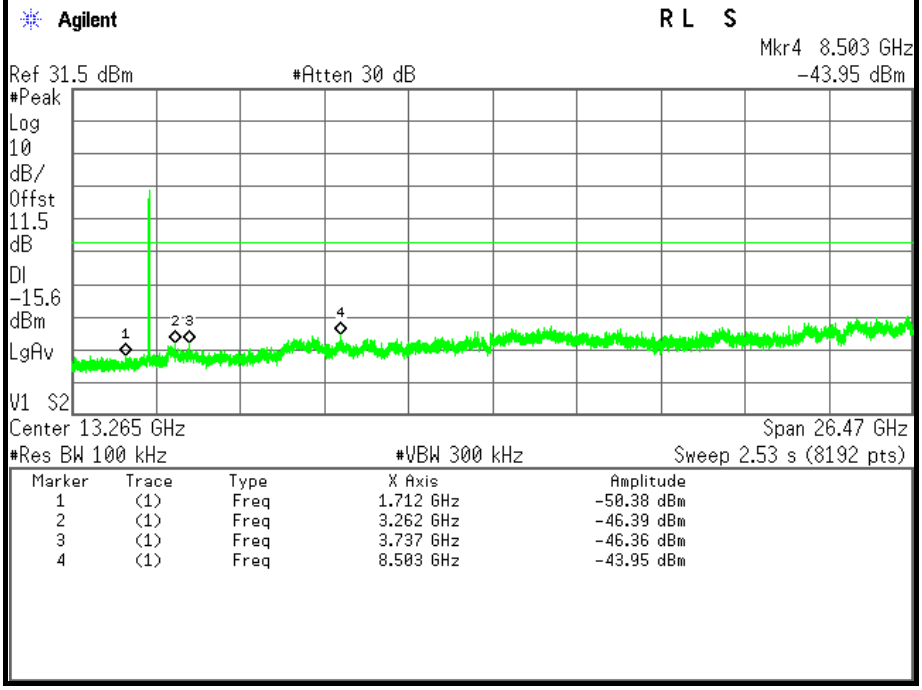
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11g Mode)



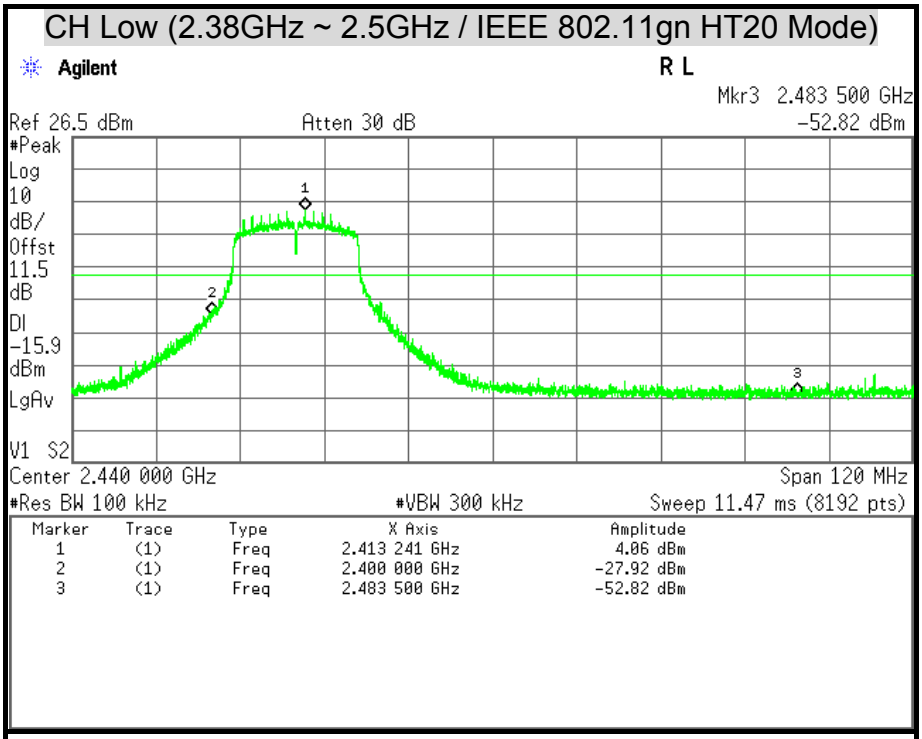
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



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

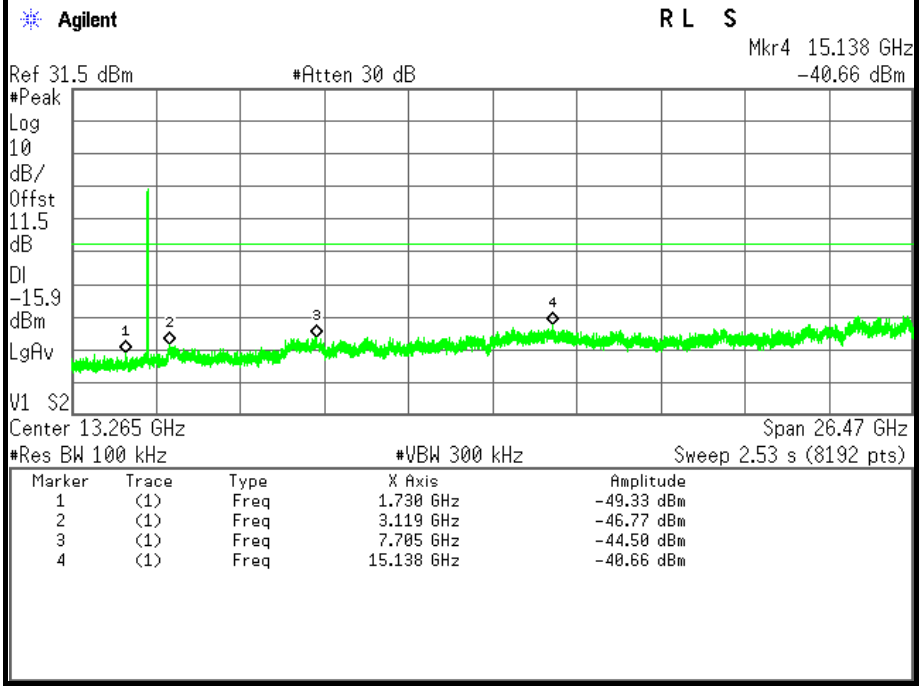


CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 Mode)



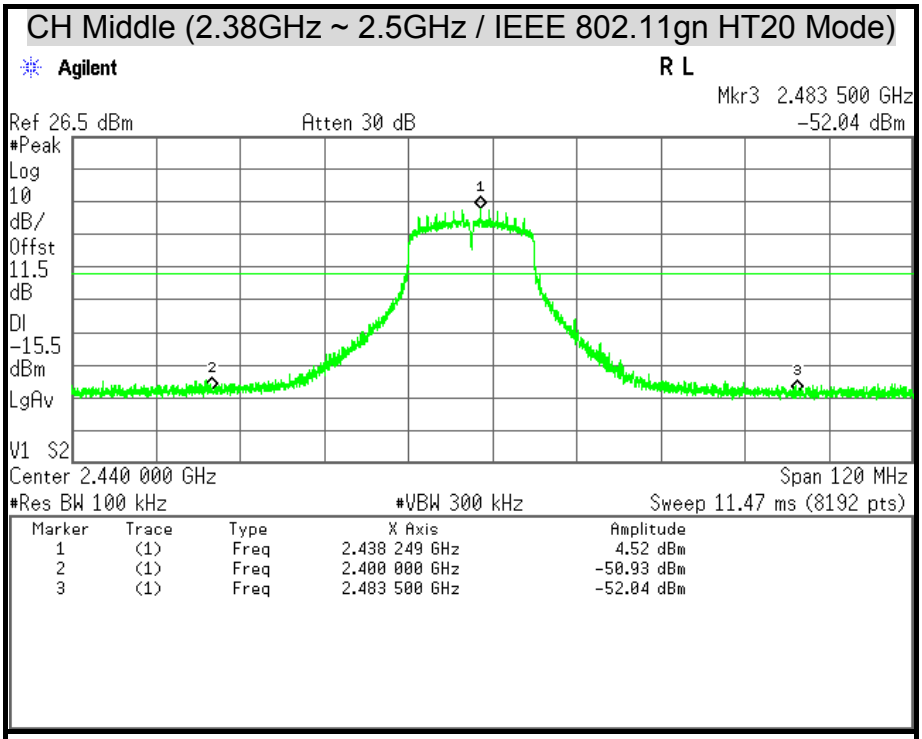
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.413 241 GHz	4.06 dBm
2	(1)	Freq	2.400 000 GHz	-27.92 dBm
3	(1)	Freq	2.483 500 GHz	-52.82 dBm

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

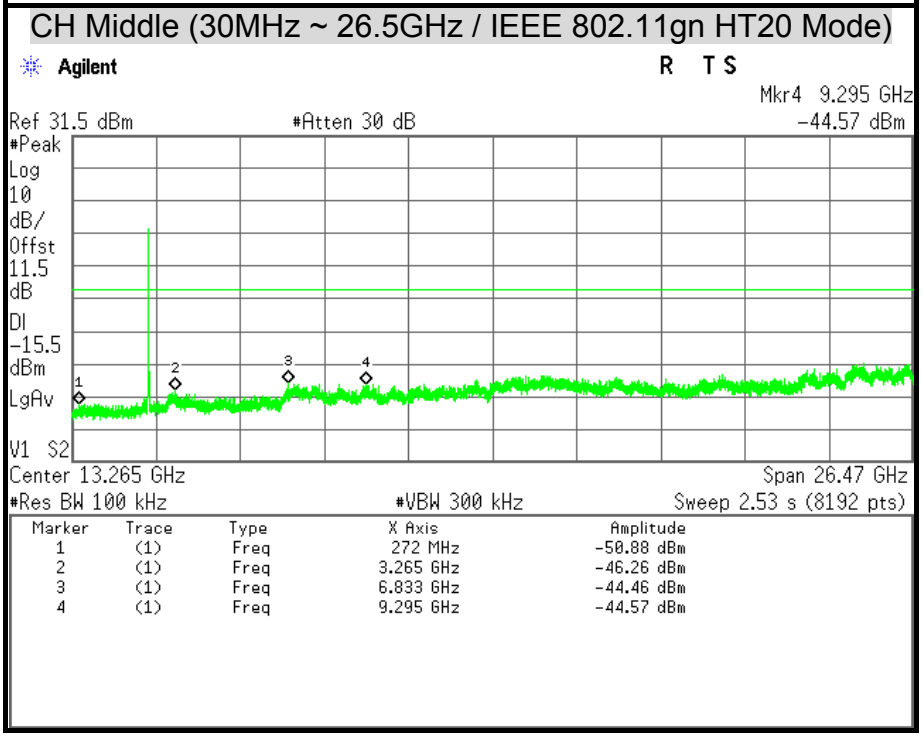


Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.730 GHz	-49.33 dBm
2	(1)	Freq	3.119 GHz	-46.77 dBm
3	(1)	Freq	7.705 GHz	-44.50 dBm
4	(1)	Freq	15.138 GHz	-40.66 dBm

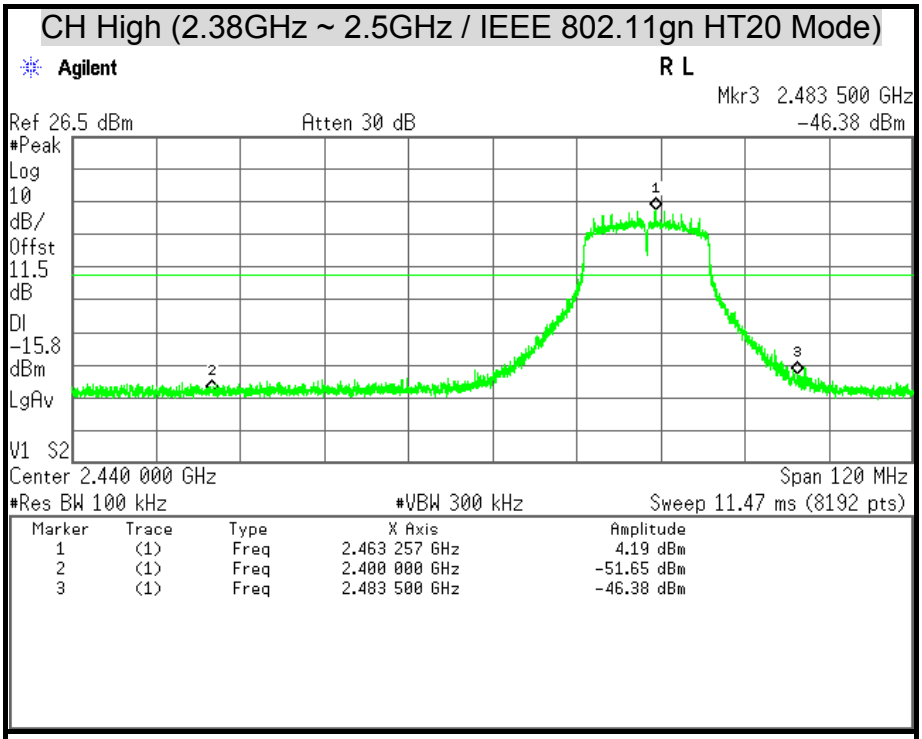
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 Mode)



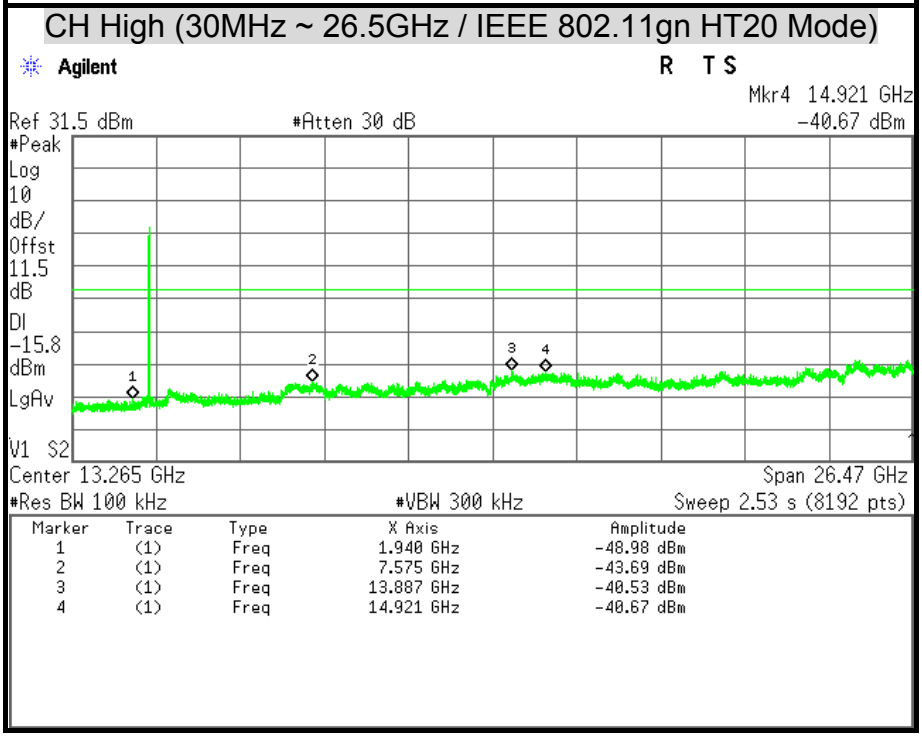
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 Mode)



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



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



7.6 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

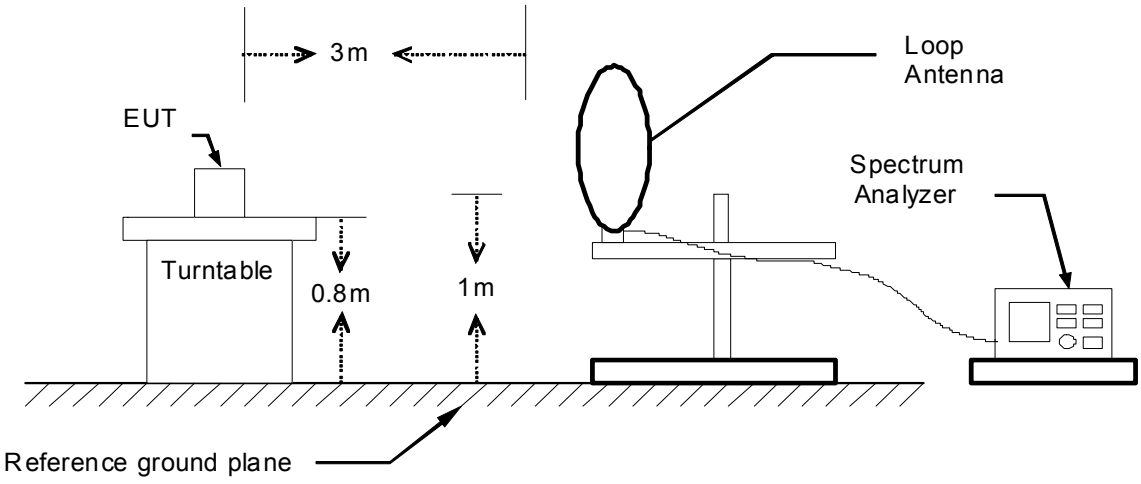
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/16/2014
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	09/12/2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	08/19/2015
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/05/2014
Horn Antenna	COM-POWER	AH-840	03077	12/18/2014
Pre-Amplifier	Agilent	8447D	2944A10052	07/15/2015
Pre-Amplifier	Agilent	8449B	3008A01916	07/15/2015
LOOP Antenna	COM-POWER	AL-130	121051	01/12/2015
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

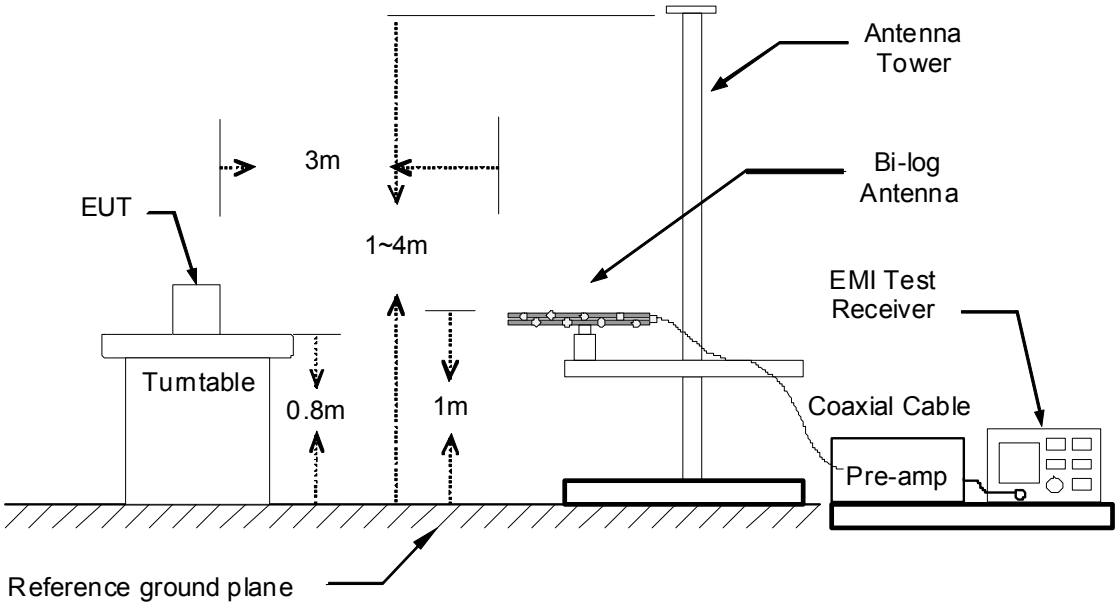
TEST SETUP

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

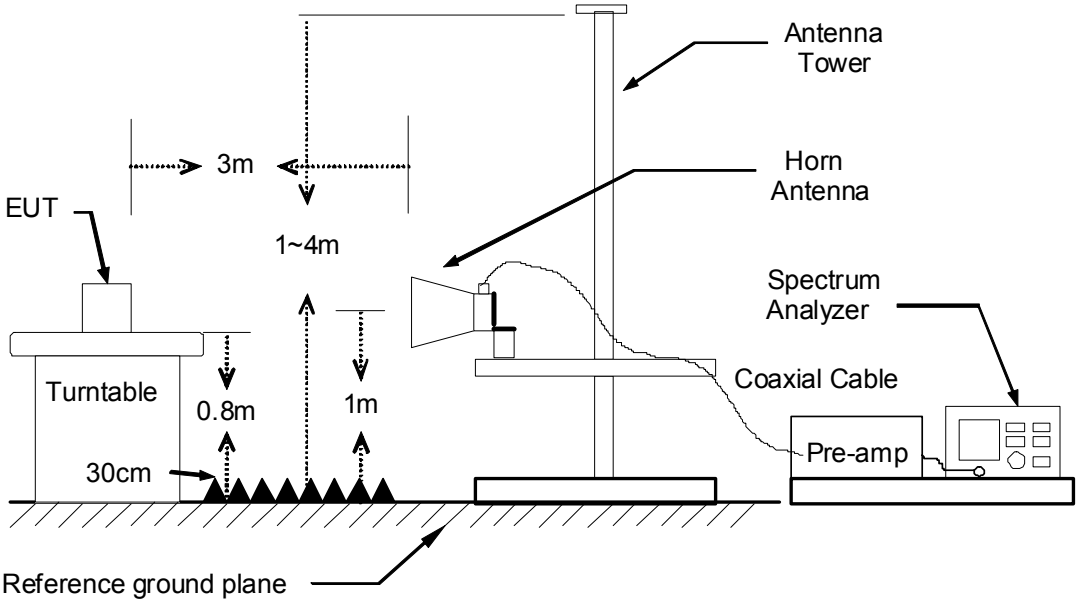
9kHz ~ 30MHz



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 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	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	TX Mode	Temp. & Humidity	27°C, 45%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
389.87	34.02	-10.12	23.90	46.00	-22.10	Peak
753.62	29.83	-3.54	26.29	46.00	-19.71	Peak
779.81	32.36	-3.28	29.07	46.00	-16.93	Peak
858.38	28.21	-1.96	26.25	46.00	-19.75	Peak
883.60	31.35	-1.47	29.89	46.00	-16.11	Peak
954.41	29.29	-0.51	28.77	46.00	-17.23	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
31.94	33.20	-15.30	17.90	40.00	-22.10	Peak
142.52	33.47	-13.86	19.61	43.50	-23.89	Peak
239.52	38.26	-14.12	24.13	46.00	-21.87	Peak
353.98	32.14	-10.81	21.32	46.00	-24.68	Peak
393.75	30.68	-10.05	20.63	46.00	-25.37	Peak
954.41	32.99	-0.51	32.47	46.00	-13.53	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m)*

Above 1 GHz

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/21
Test Mode	IEEE 802.11b TX / CH Low	Temp. & Humidity	30°C, 52%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2098.00	44.06	---	2.01	46.07	---	74.00	54.00	-7.93	Peak
2248.00	43.66	---	2.31	45.97	---	74.00	54.00	-8.03	Peak
2754.00	43.41	---	3.46	46.87	---	74.00	54.00	-7.13	Peak
4005.00	41.72	---	5.88	47.60	---	74.00	54.00	-6.40	Peak
4830.00	40.26	---	8.09	48.35	---	74.00	54.00	-5.65	Peak
5820.00	39.59	---	10.26	49.85	---	74.00	54.00	-4.15	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2128.00	43.95	---	2.07	46.02	---	74.00	54.00	-7.98	Peak
2614.00	45.39	---	3.10	48.49	---	74.00	54.00	-5.51	Peak
2814.00	44.10	---	3.61	47.71	---	74.00	54.00	-6.29	Peak
3855.00	41.64	---	5.46	47.11	---	74.00	54.00	-6.89	Peak
4830.00	39.90	---	8.09	47.99	---	74.00	54.00	-6.01	Peak
5895.00	38.94	---	10.49	49.42	---	74.00	54.00	-4.58	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/21
Test Mode	IEEE 802.11b TX / CH Middle	Temp. & Humidity	30°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1872.00	44.31	---	0.61	44.93	---	74.00	54.00	-9.07	Peak
2236.00	43.37	---	2.29	45.65	---	74.00	54.00	-8.35	Peak
2510.00	43.47	---	2.84	46.31	---	74.00	54.00	-7.69	Peak
3225.00	42.49	---	4.26	46.75	---	74.00	54.00	-7.25	Peak
4875.00	40.20	---	8.18	48.38	---	74.00	54.00	-5.62	Peak
6210.00	39.39	---	11.42	50.81	---	74.00	54.00	-3.19	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1084.00	46.02	---	-2.88	43.13	---	74.00	54.00	-10.87	Peak
2380.00	46.20	---	2.57	48.78	---	74.00	54.00	-5.22	Peak
2602.00	47.91	---	3.07	50.98	---	74.00	54.00	-3.02	Peak
3810.00	42.07	---	5.34	47.41	---	74.00	54.00	-6.59	Peak
4920.00	39.12	---	8.28	47.39	---	74.00	54.00	-6.61	Peak
5940.00	39.02	---	10.62	49.64	---	74.00	54.00	-4.36	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/21
Test Mode	IEEE 802.11b TX / CH High	Temp. & Humidity	30°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2374.00	43.49	---	2.56	46.05	---	74.00	54.00	-7.95	Peak
2496.00	43.20	---	2.80	46.01	---	74.00	54.00	-7.99	Peak
2782.00	43.61	---	3.53	47.13	---	74.00	54.00	-6.87	Peak
4185.00	41.72	---	6.43	48.15	---	74.00	54.00	-5.85	Peak
4920.00	39.57	---	8.28	47.84	---	74.00	54.00	-6.16	Peak
5985.00	39.81	---	10.76	50.57	---	74.00	54.00	-3.43	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2096.00	43.24	---	2.01	45.25	---	74.00	54.00	-8.75	Peak
2384.00	45.36	---	2.58	47.94	---	74.00	54.00	-6.06	Peak
2620.00	45.22	---	3.11	48.34	---	74.00	54.00	-5.66	Peak
4410.00	40.75	---	7.13	47.88	---	74.00	54.00	-6.12	Peak
4920.00	40.81	---	8.28	49.08	---	74.00	54.00	-4.92	Peak
5610.00	40.28	---	9.64	49.92	---	74.00	54.00	-4.08	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11g TX / CH Low	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2334.00	43.47	---	2.48	45.96	---	74.00	54.00	-8.04	Peak
2650.00	43.66	---	3.19	46.85	---	74.00	54.00	-7.15	Peak
2950.00	42.85	---	3.95	46.80	---	74.00	54.00	-7.20	Peak
4005.00	41.64	---	5.88	47.51	---	74.00	54.00	-6.49	Peak
4830.00	38.88	---	8.09	46.97	---	74.00	54.00	-7.03	Peak
7230.00	37.78	---	12.84	50.62	---	74.00	54.00	-3.38	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2328.00	45.44	---	2.47	47.91	---	74.00	54.00	-6.09	Peak
2492.00	53.74	46.35	2.79	56.53	49.14	74.00	54.00	-4.86	AVG
2536.00	48.06	---	2.90	50.96	---	74.00	54.00	-3.04	Peak
4830.00	39.42	---	8.09	47.51	---	74.00	54.00	-6.49	Peak
5610.00	39.56	---	9.64	49.19	---	74.00	54.00	-4.81	Peak
6540.00	38.73	---	12.26	50.99	---	74.00	54.00	-3.01	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11g TX / CH Middle	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2094.00	44.04	---	2.01	46.04	---	74.00	54.00	-7.96	Peak
2352.00	44.67	---	2.52	47.18	---	74.00	54.00	-6.82	Peak
2588.00	43.29	---	3.03	46.32	---	74.00	54.00	-7.68	Peak
4875.00	39.13	---	8.18	47.31	---	74.00	54.00	-6.69	Peak
6285.00	39.44	---	11.64	51.08	---	74.00	54.00	-2.92	Peak
7320.00	37.73	---	13.12	50.85	---	74.00	54.00	-3.15	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2094.00	43.41	---	2.01	45.42	---	74.00	54.00	-8.58	Peak
2356.00	48.18	---	2.52	50.71	---	74.00	54.00	-3.29	Peak
2552.00	46.85	---	2.94	49.79	---	74.00	54.00	-4.21	Peak
4050.00	41.61	---	6.02	47.62	---	74.00	54.00	-6.38	Peak
4875.00	38.50	---	8.18	46.68	---	74.00	54.00	-7.32	Peak
6345.00	37.75	---	11.81	49.57	---	74.00	54.00	-4.43	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11g TX / CH High	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1018.00	45.94	---	-2.88	43.06	---	74.00	54.00	-10.94	Peak
2294.00	43.50	---	2.40	45.90	---	74.00	54.00	-8.10	Peak
2754.00	43.61	---	3.46	47.06	---	74.00	54.00	-6.94	Peak
4920.00	38.88	---	8.28	47.16	---	74.00	54.00	-6.84	Peak
5520.00	40.13	---	9.37	49.50	---	74.00	54.00	-4.50	Peak
5970.00	39.05	---	10.71	49.77	---	74.00	54.00	-4.23	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2376.00	45.97	---	2.56	48.53	---	74.00	54.00	-5.47	Peak
2544.00	48.01	---	2.92	50.93	---	74.00	54.00	-3.07	Peak
2590.00	47.69	---	3.04	50.73	---	74.00	54.00	-3.27	Peak
3285.00	41.62	---	4.31	45.94	---	74.00	54.00	-8.06	Peak
4920.00	39.10	---	8.28	47.37	---	74.00	54.00	-6.63	Peak
5625.00	39.12	---	9.68	48.80	---	74.00	54.00	-5.20	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11gn HT20 TX / CH Low	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1668.00	50.39	---	-1.31	49.07	---	74.00	54.00	-4.93	Peak
2092.00	46.44	---	2.00	48.45	---	74.00	54.00	-5.55	Peak
2578.00	47.54	---	3.01	50.55	---	74.00	54.00	-3.45	Peak
3315.00	43.60	---	4.34	47.94	---	74.00	54.00	-6.06	Peak
4830.00	38.52	---	8.09	46.61	---	74.00	54.00	-7.39	Peak
7230.00	37.83	---	12.84	50.67	---	74.00	54.00	-3.33	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2094.00	42.85	---	2.01	44.85	---	74.00	54.00	-9.15	Peak
2490.00	52.37	47.20	2.79	55.16	49.99	74.00	54.00	-4.01	AVG
2574.00	50.78	45.50	3.00	53.78	48.50	74.00	54.00	-0.22	AVG
4830.00	39.72	---	8.09	47.81	---	74.00	54.00	-6.19	Peak
5640.00	39.83	---	9.73	49.56	---	74.00	54.00	-4.44	Peak
7230.00	37.80	---	12.84	50.64	---	74.00	54.00	-3.36	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11gn HT20 TX / CH Middle	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2286.00	43.92	---	2.39	46.31	---	74.00	54.00	-7.69	Peak
2606.00	43.34	---	3.08	46.42	---	74.00	54.00	-7.58	Peak
2732.00	43.75	---	3.40	47.15	---	74.00	54.00	-6.85	Peak
3135.00	42.30	---	4.19	46.49	---	74.00	54.00	-7.51	Peak
4875.00	38.64	---	8.18	46.83	---	74.00	54.00	-7.17	Peak
5580.00	39.29	---	9.55	48.84	---	74.00	54.00	-5.16	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2352.00	51.92	47.85	2.52	54.44	50.37	74.00	54.00	-3.63	AVG
2514.00	47.05	---	2.85	49.90	---	74.00	54.00	-4.10	Peak
2946.00	42.79	---	3.94	46.74	---	74.00	54.00	-7.26	Peak
3240.00	42.02	---	4.28	46.29	---	74.00	54.00	-7.71	Peak
4875.00	39.03	---	8.18	47.21	---	74.00	54.00	-6.79	Peak
6030.00	39.02	---	10.89	49.91	---	74.00	54.00	-4.09	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. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Product Name	Handheld Terminal (WIFI & BT)	Test By	Rex Chiu
Test Model	Z-2170 Plus	Test Date	2014/07/22
Test Mode	IEEE 802.11gn HT20 TX / CH High	Temp. & Humidity	29°C, 52%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1982.00	43.93	---	1.65	45.58	---	74.00	54.00	-8.42	Peak
2304.00	43.85	---	2.42	46.27	---	74.00	54.00	-7.73	Peak
2538.00	44.48	---	2.91	47.39	---	74.00	54.00	-6.61	Peak
3930.00	41.05	---	5.67	46.72	---	74.00	54.00	-7.28	Peak
4920.00	37.89	---	8.28	46.16	---	74.00	54.00	-7.84	Peak
7380.00	37.67	---	13.31	50.98	---	74.00	54.00	-3.02	Peak

966 Chamber_B at 3Meter / Vertical

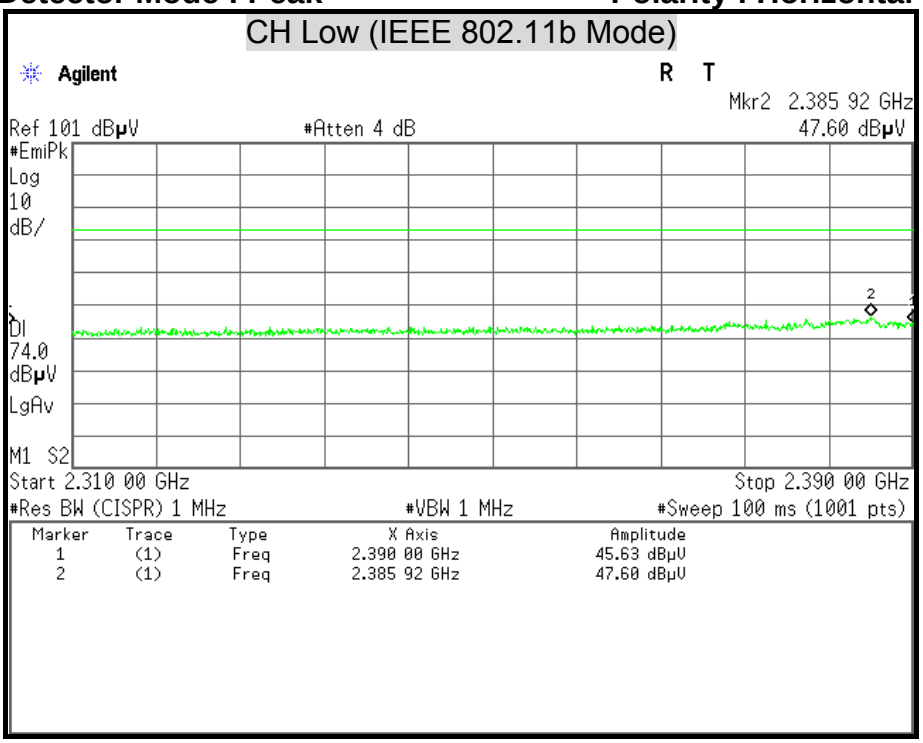
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2378.00	47.10	---	2.57	49.67	---	74.00	54.00	-4.33	Peak
2546.00	50.51	48.30	2.93	53.44	51.23	74.00	54.00	-2.77	AVG
2582.00	51.70	47.00	3.02	54.42	50.32	74.00	54.00	-3.98	AVG
3135.00	42.26	---	4.19	46.45	---	74.00	54.00	-7.55	Peak
4920.00	38.22	---	8.28	46.49	---	74.00	54.00	-7.51	Peak
5505.00	39.58	---	9.32	48.90	---	74.00	54.00	-5.10	Peak

Remark:

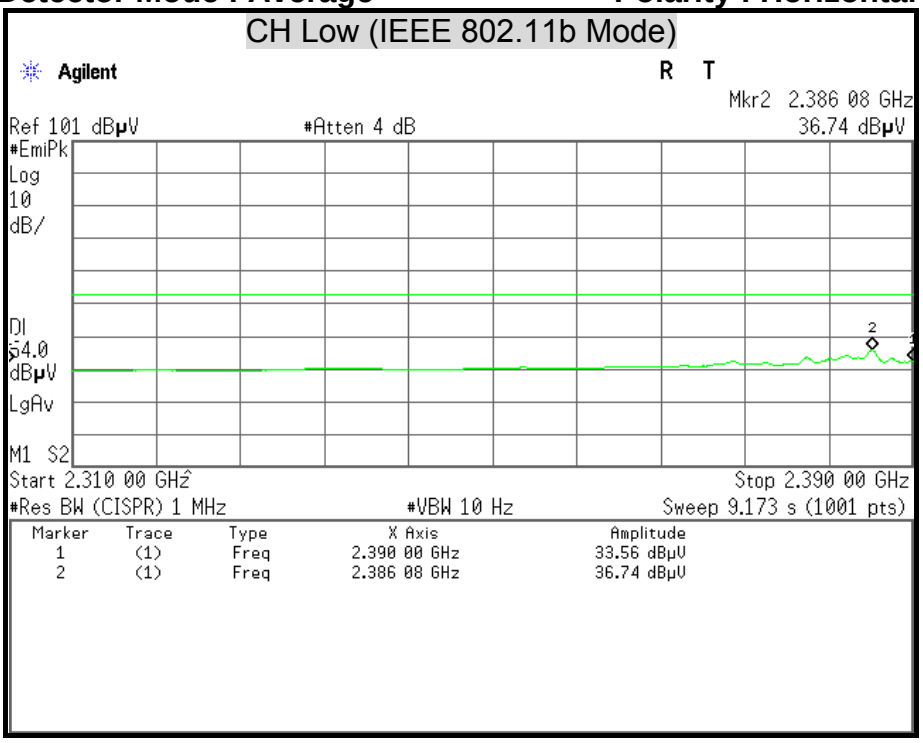
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *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.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

Restricted Band Edges

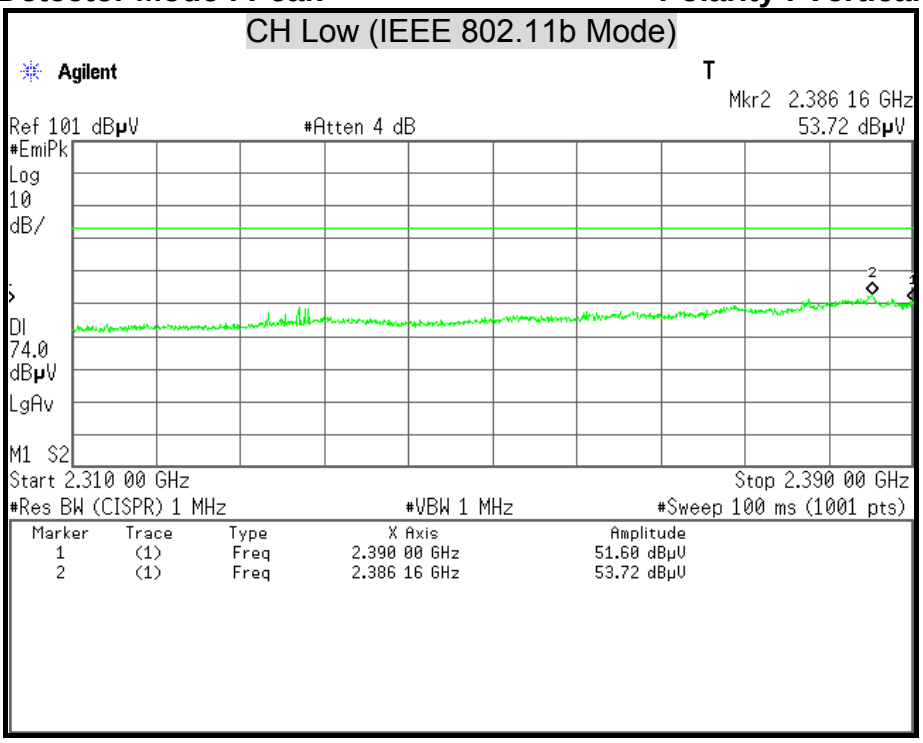
Detector Mode : Peak **Polarity : Horizontal**



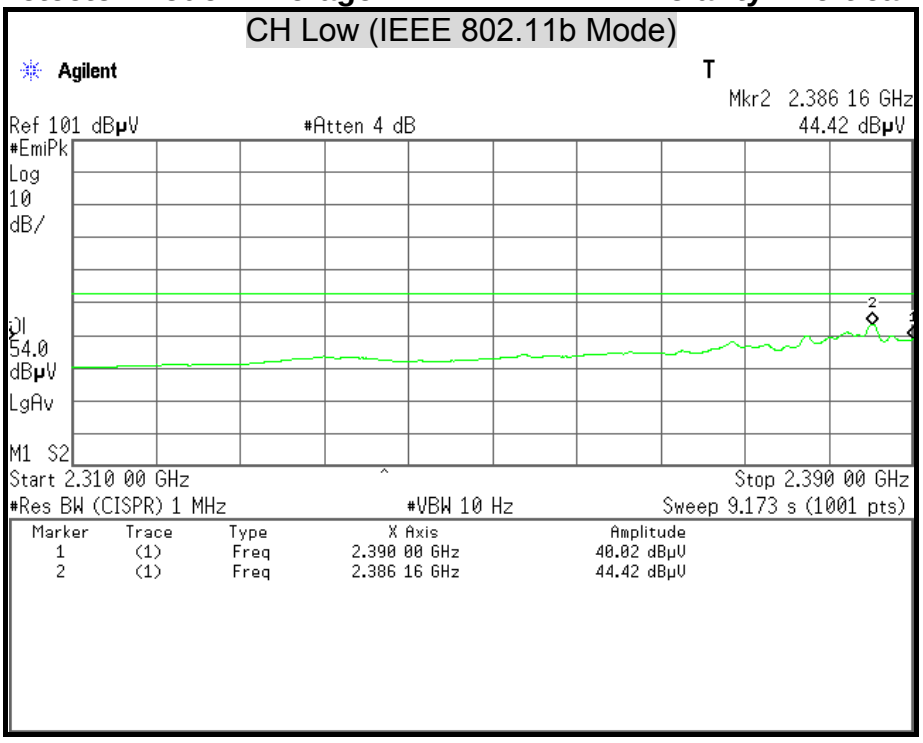
Detector Mode : Average **Polarity : Horizontal**



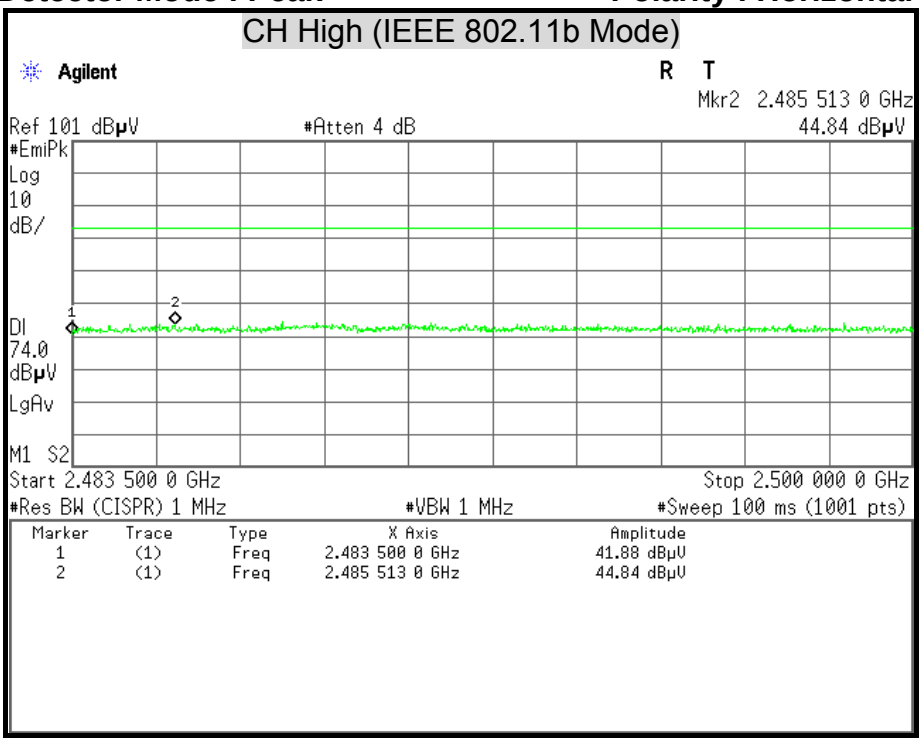
Detector Mode : Peak **Polarity : Vertical**



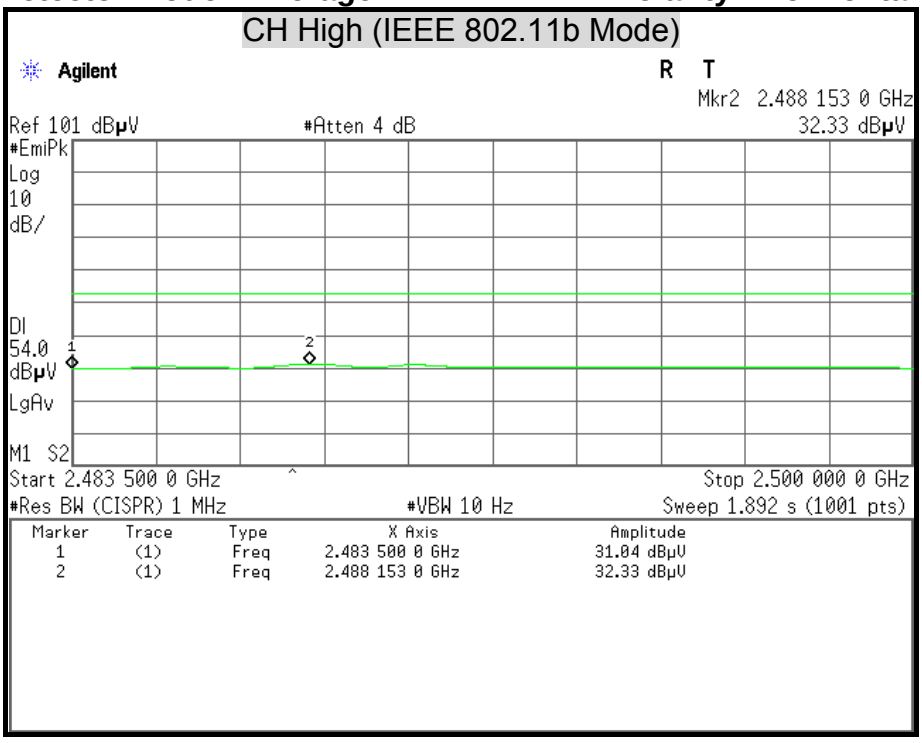
Detector Mode : Average **Polarity : Vertical**



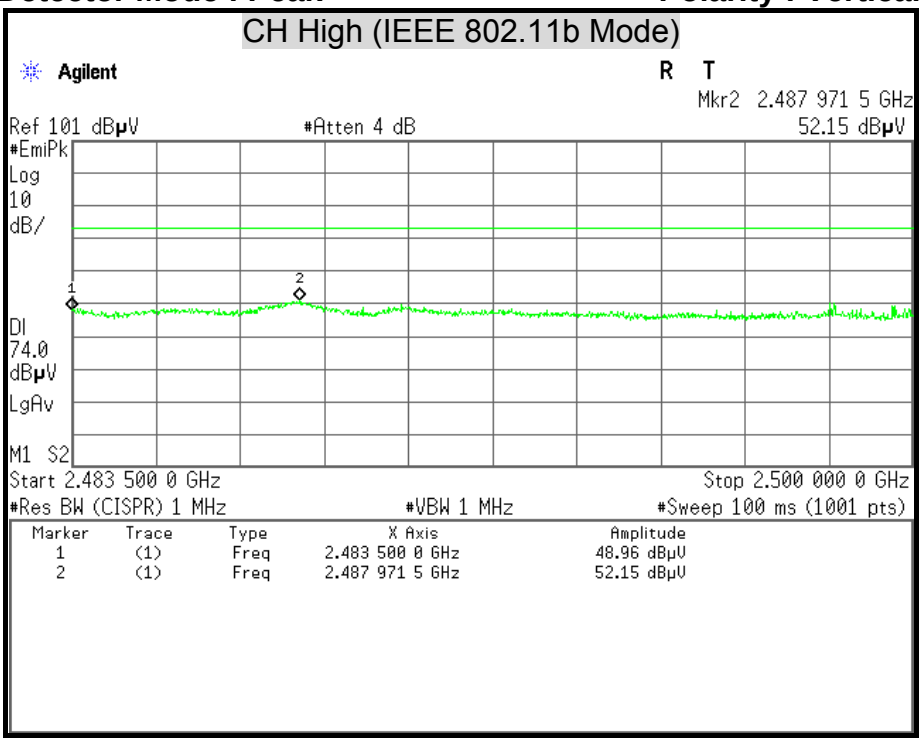
Detector Mode : Peak **Polarity : Horizontal**



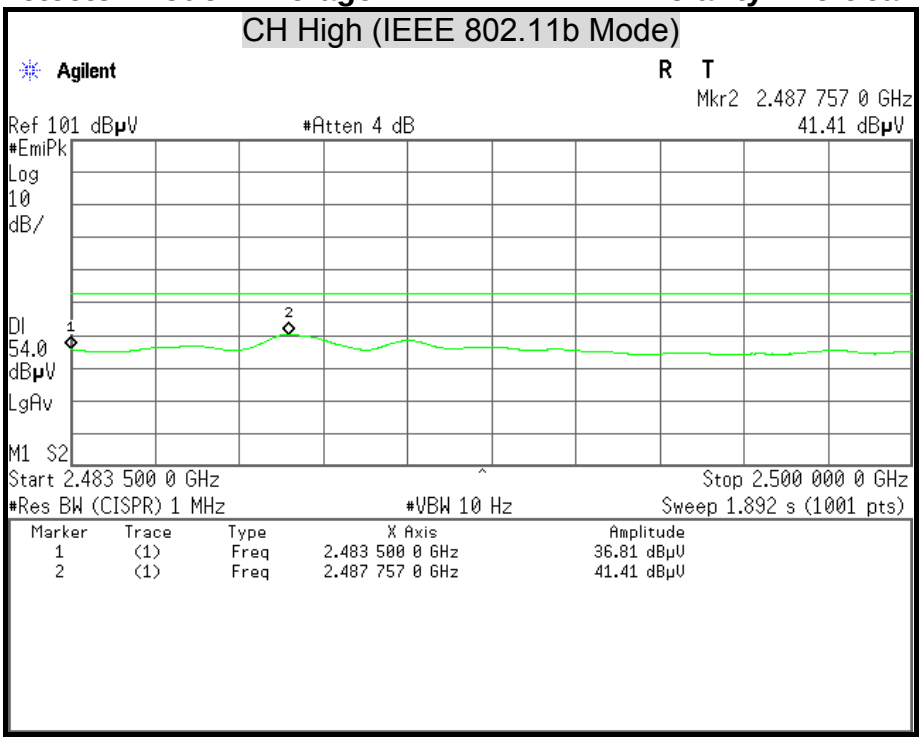
Detector Mode : Average **Polarity : Horizontal**



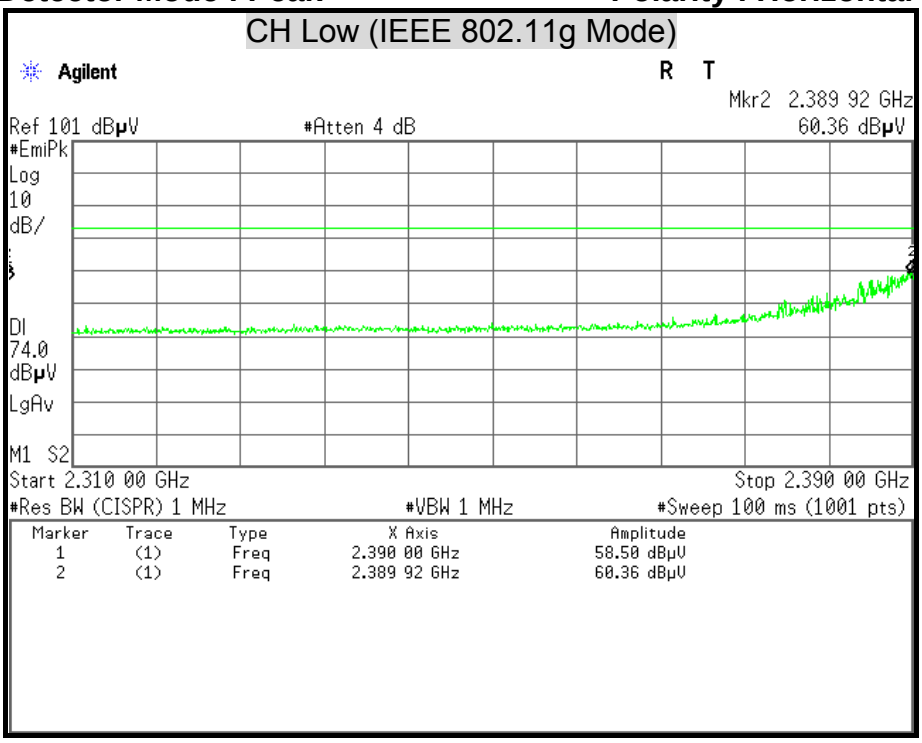
Detector Mode : Peak **Polarity : Vertical**



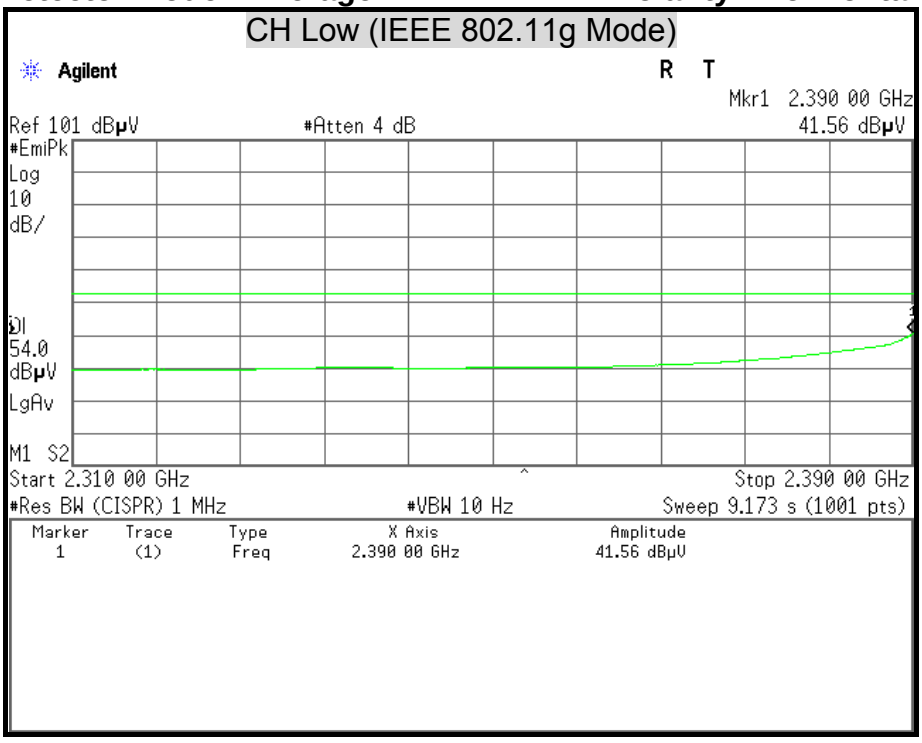
Detector Mode : Average **Polarity : Vertical**



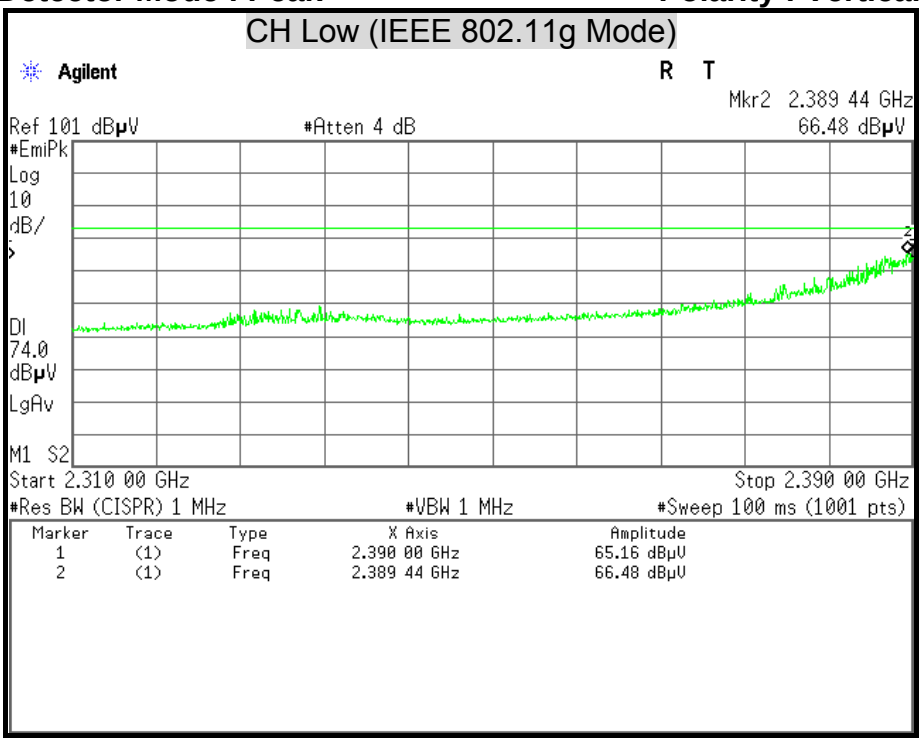
Detector Mode : Peak **Polarity : Horizontal**



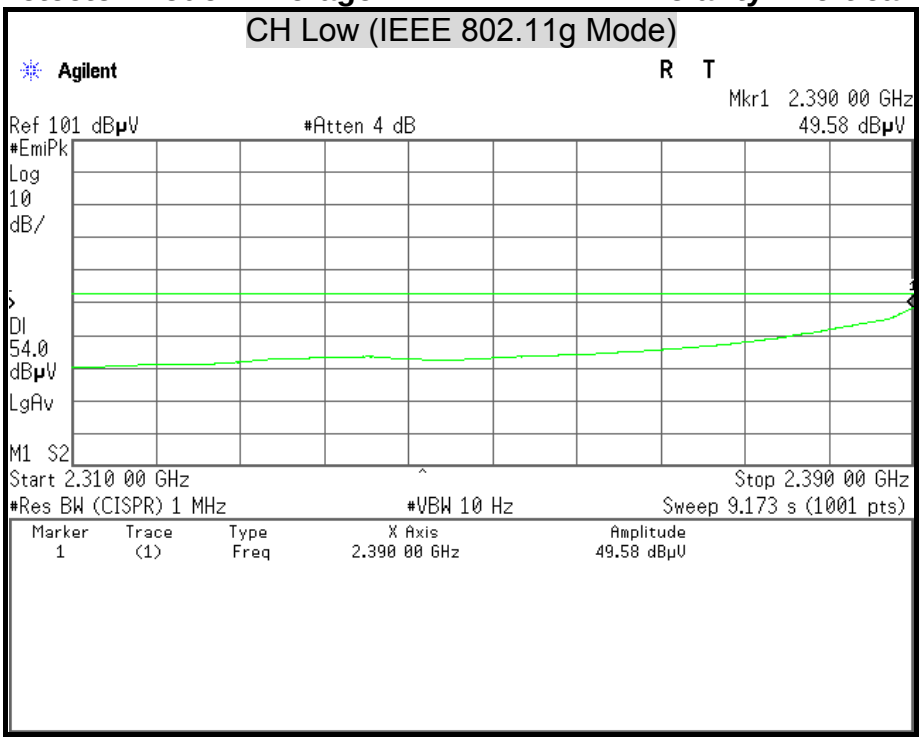
Detector Mode : Average **Polarity : Horizontal**



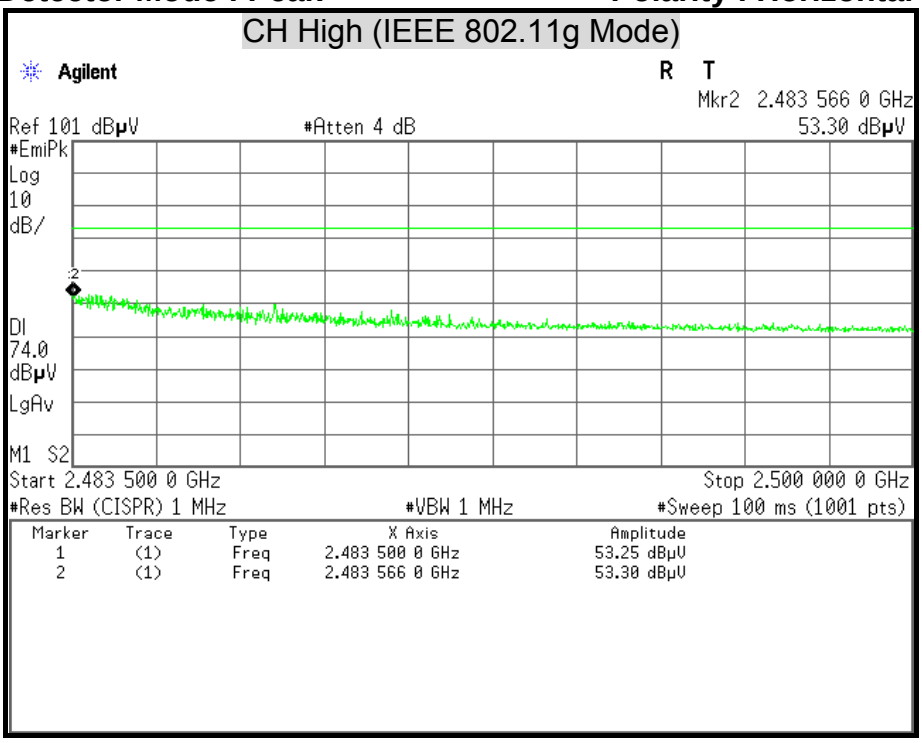
Detector Mode : Peak **Polarity : Vertical**



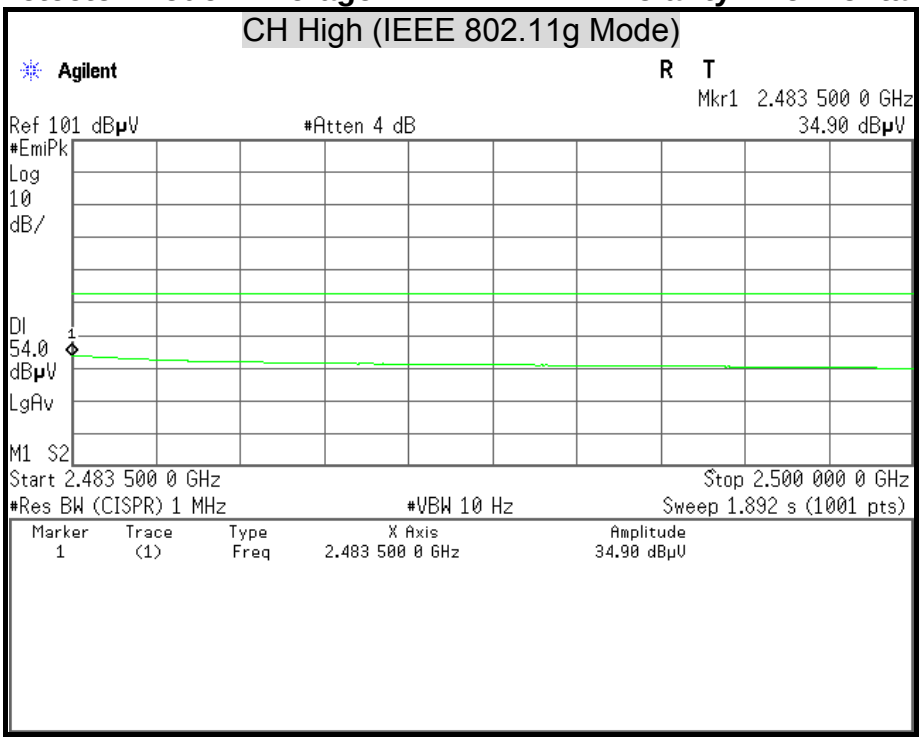
Detector Mode : Average **Polarity : Vertical**



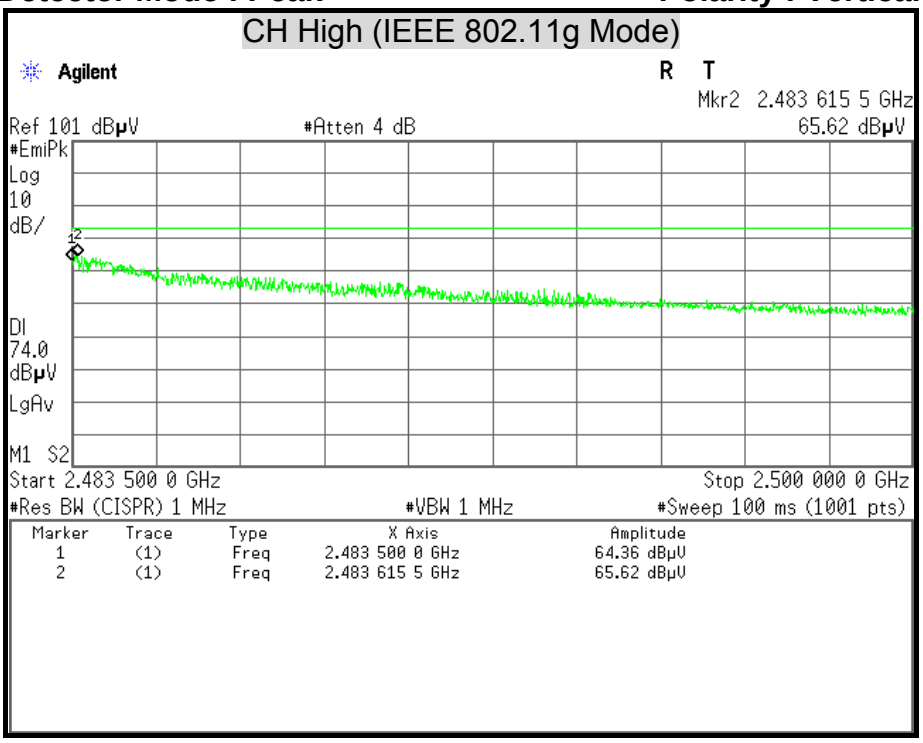
Detector Mode : Peak **Polarity : Horizontal**



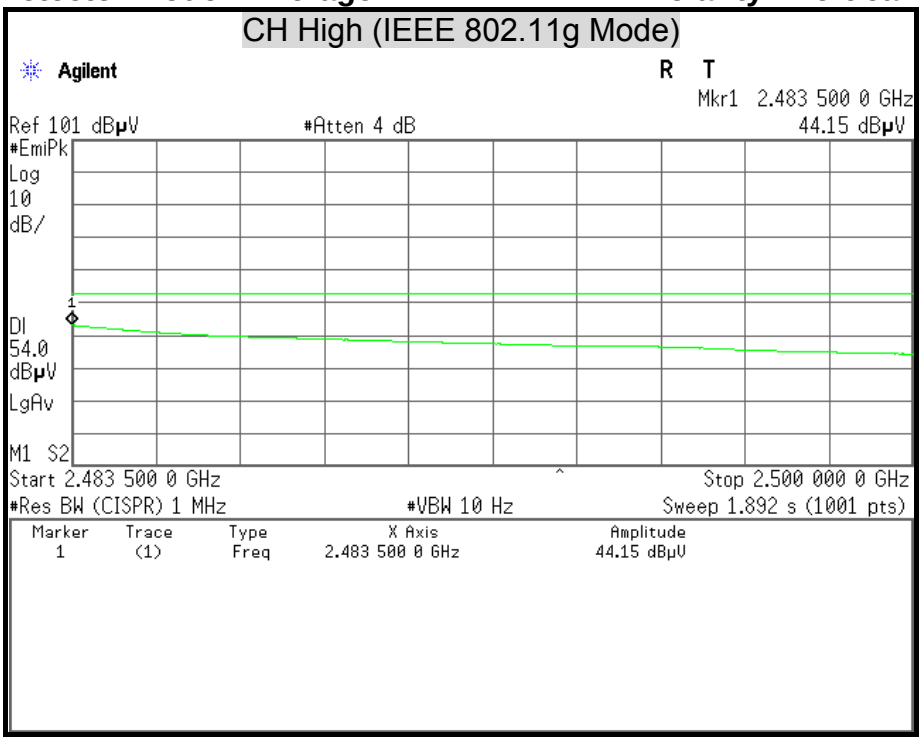
Detector Mode : Average **Polarity : Horizontal**



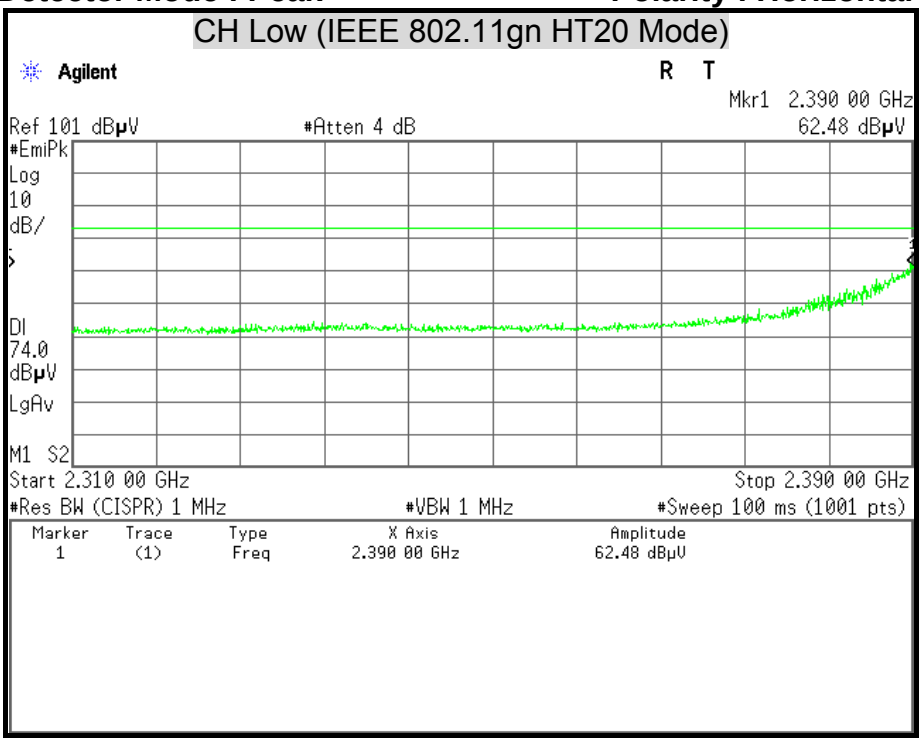
Detector Mode : Peak **Polarity : Vertical**



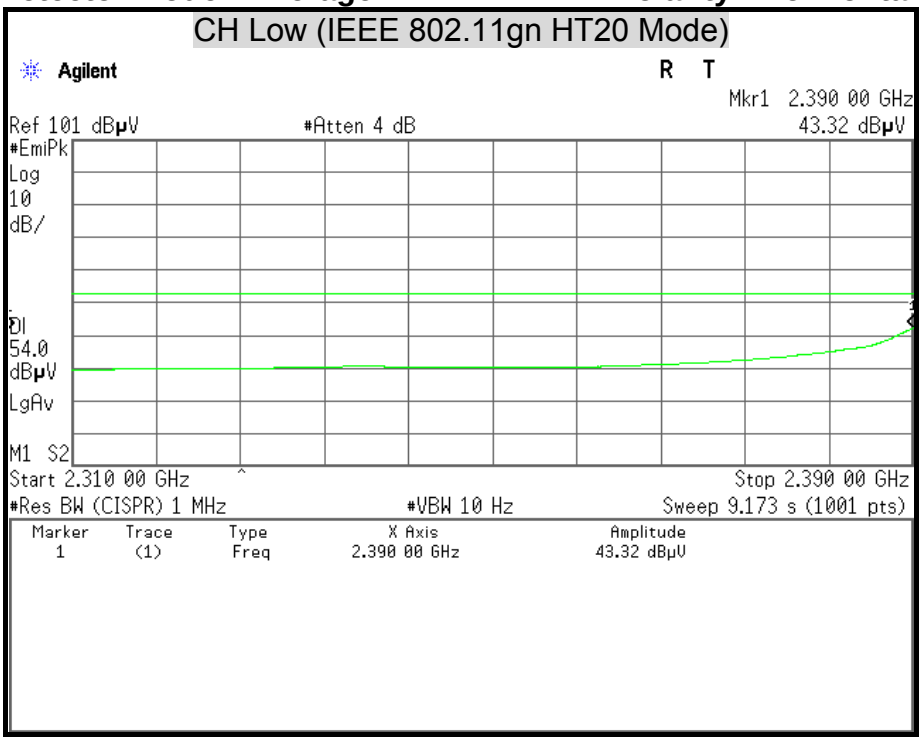
Detector Mode : Average **Polarity : Vertical**



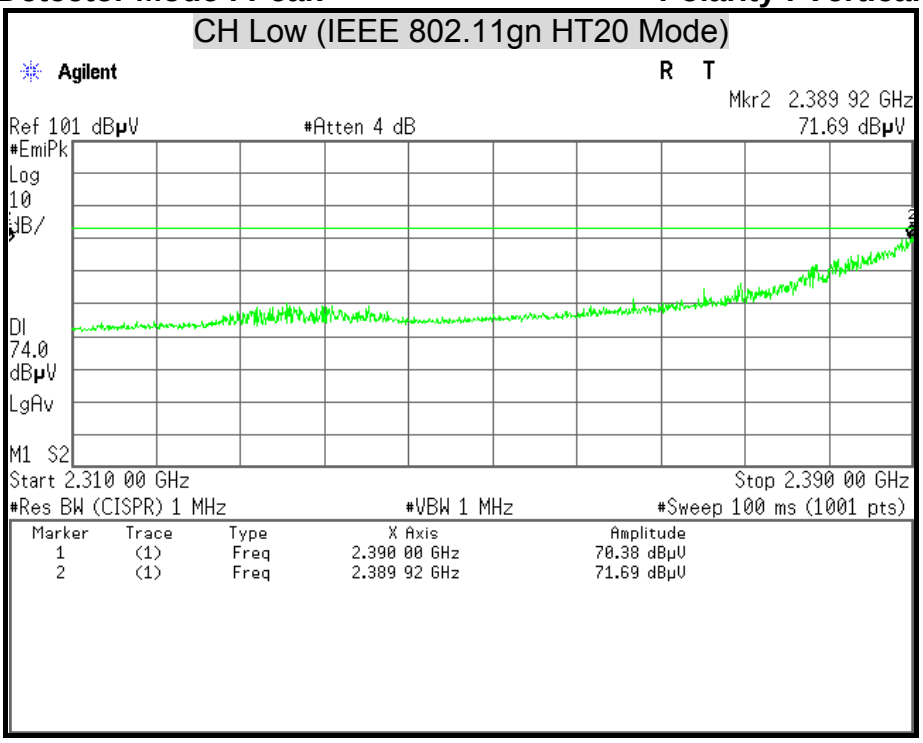
Detector Mode : Peak **Polarity : Horizontal**



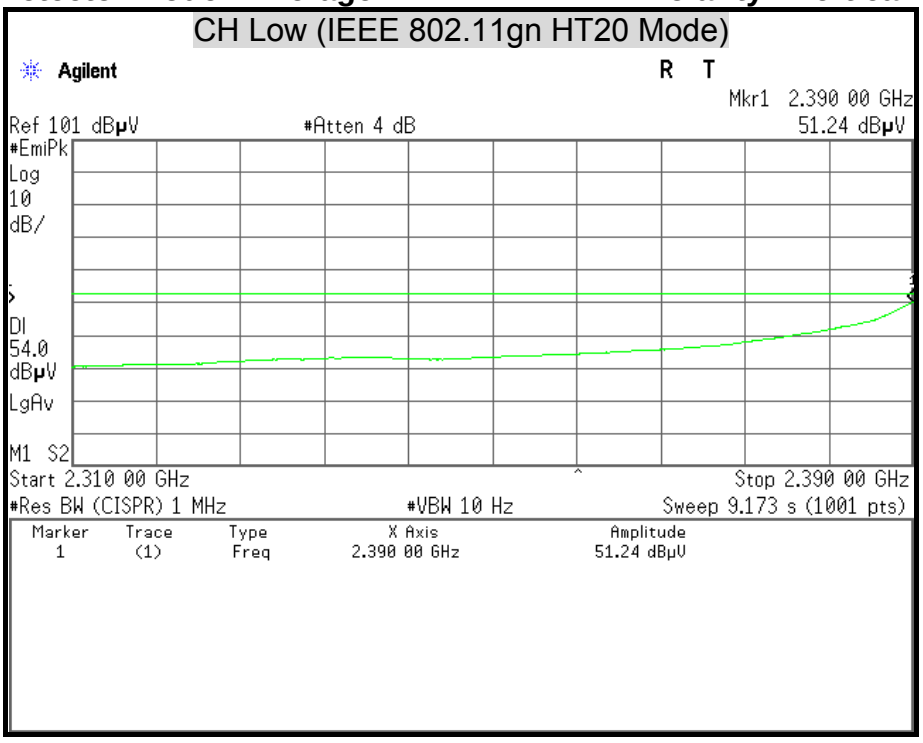
Detector Mode : Average **Polarity : Horizontal**



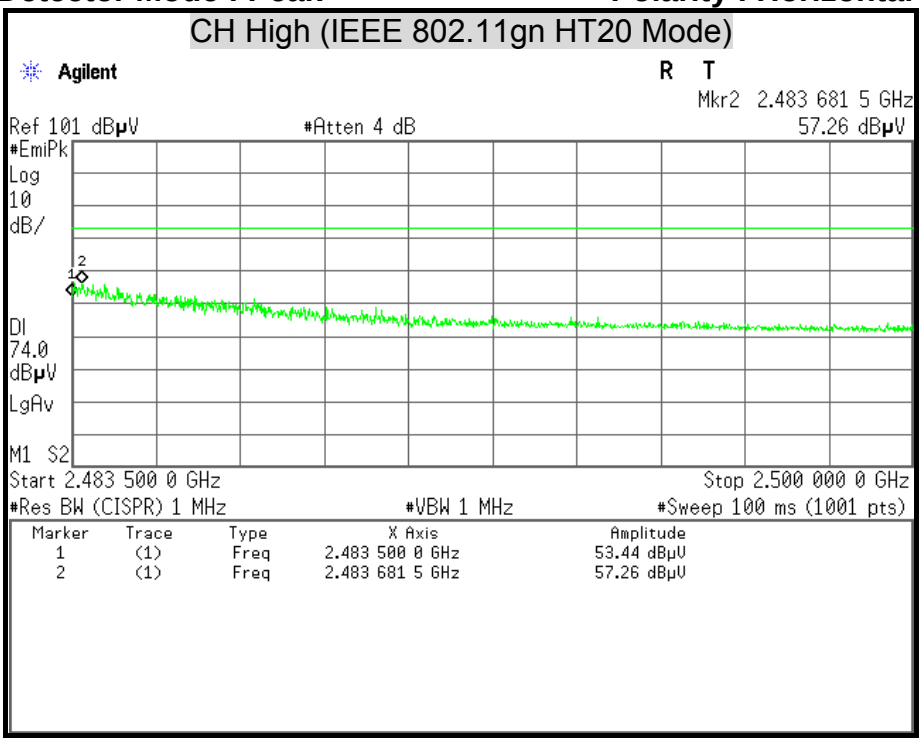
Detector Mode : Peak **Polarity : Vertical**



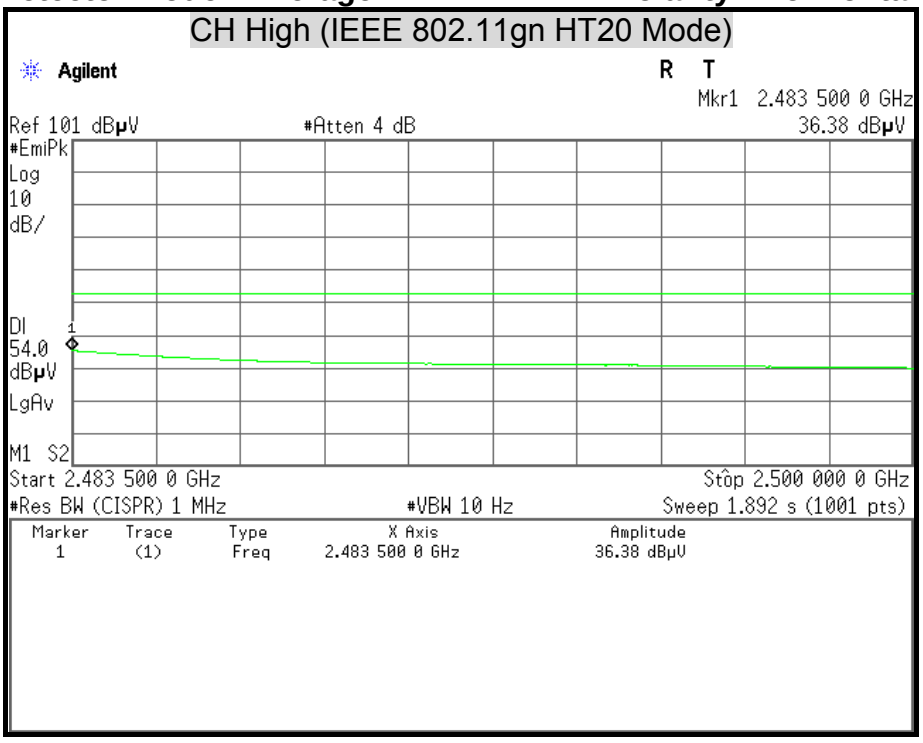
Detector Mode : Average **Polarity : Vertical**



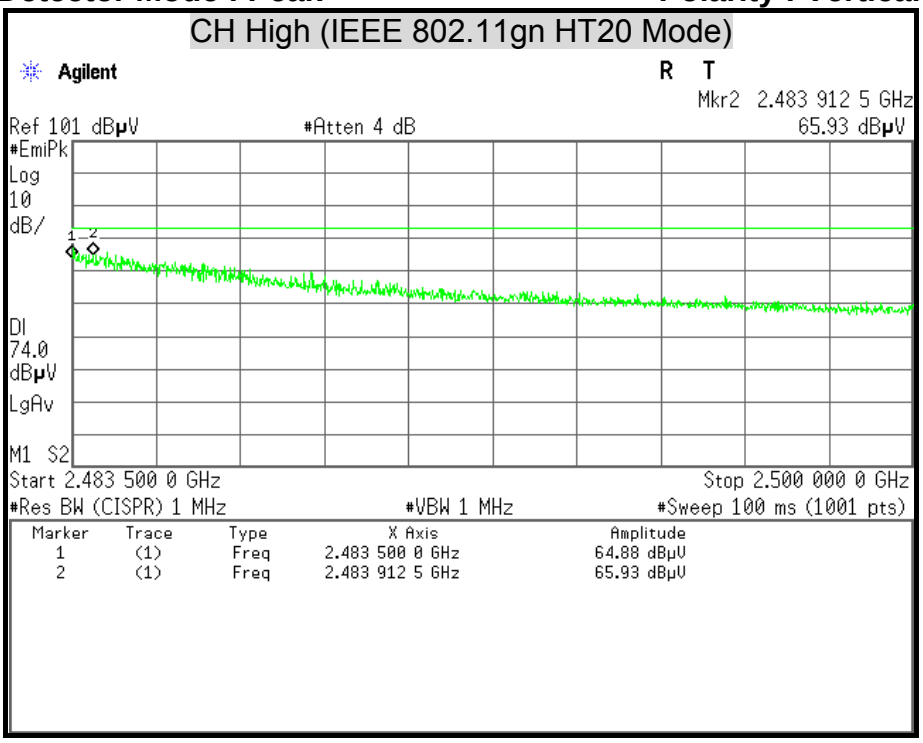
Detector Mode : Peak **Polarity : Horizontal**



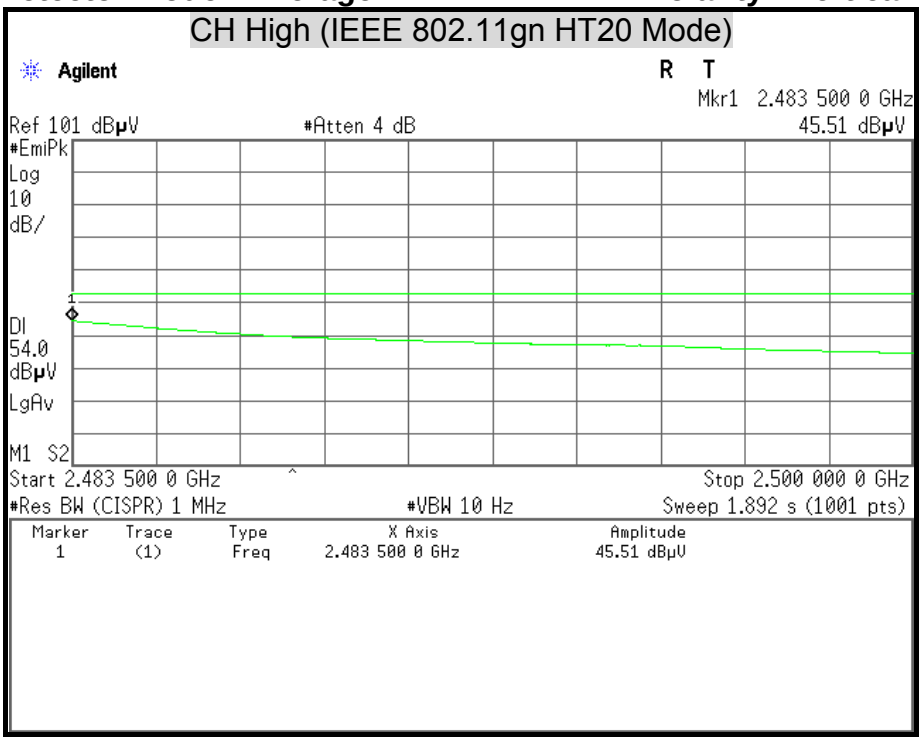
Detector Mode : Average **Polarity : Horizontal**



Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



7.7 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 - 56*	56 - 46*
0.50 - 5.00	56	46
5.00 - 30.0	60	50

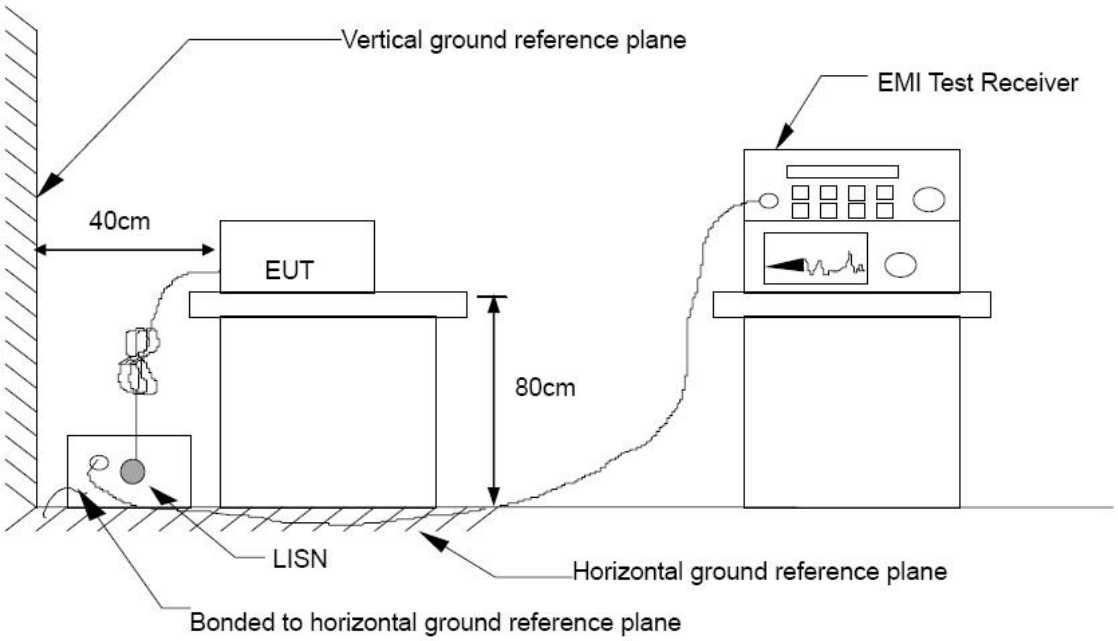
Remark: ** Decreasing linearly with the logarithm of the frequency.*

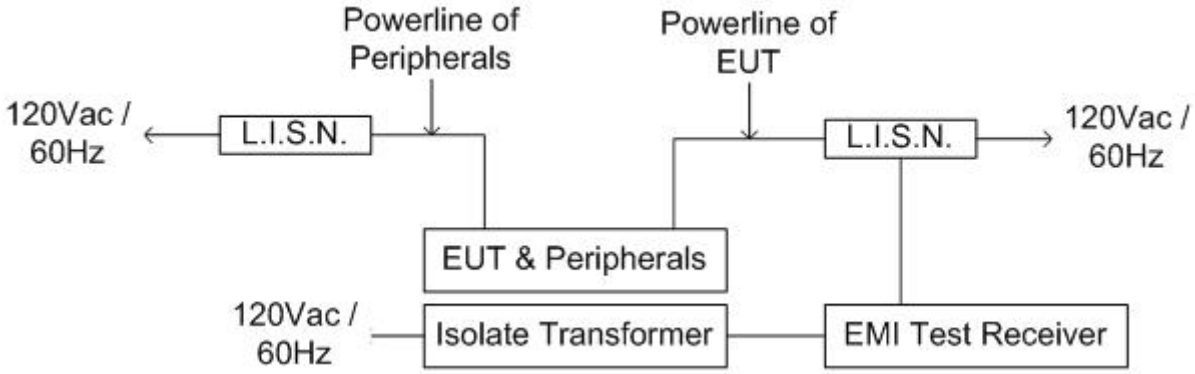
TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/06/2015
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/10/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESHS 30	838550/003	11/07/2014
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100111	06/30/2015

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 C63.10:2009.

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.

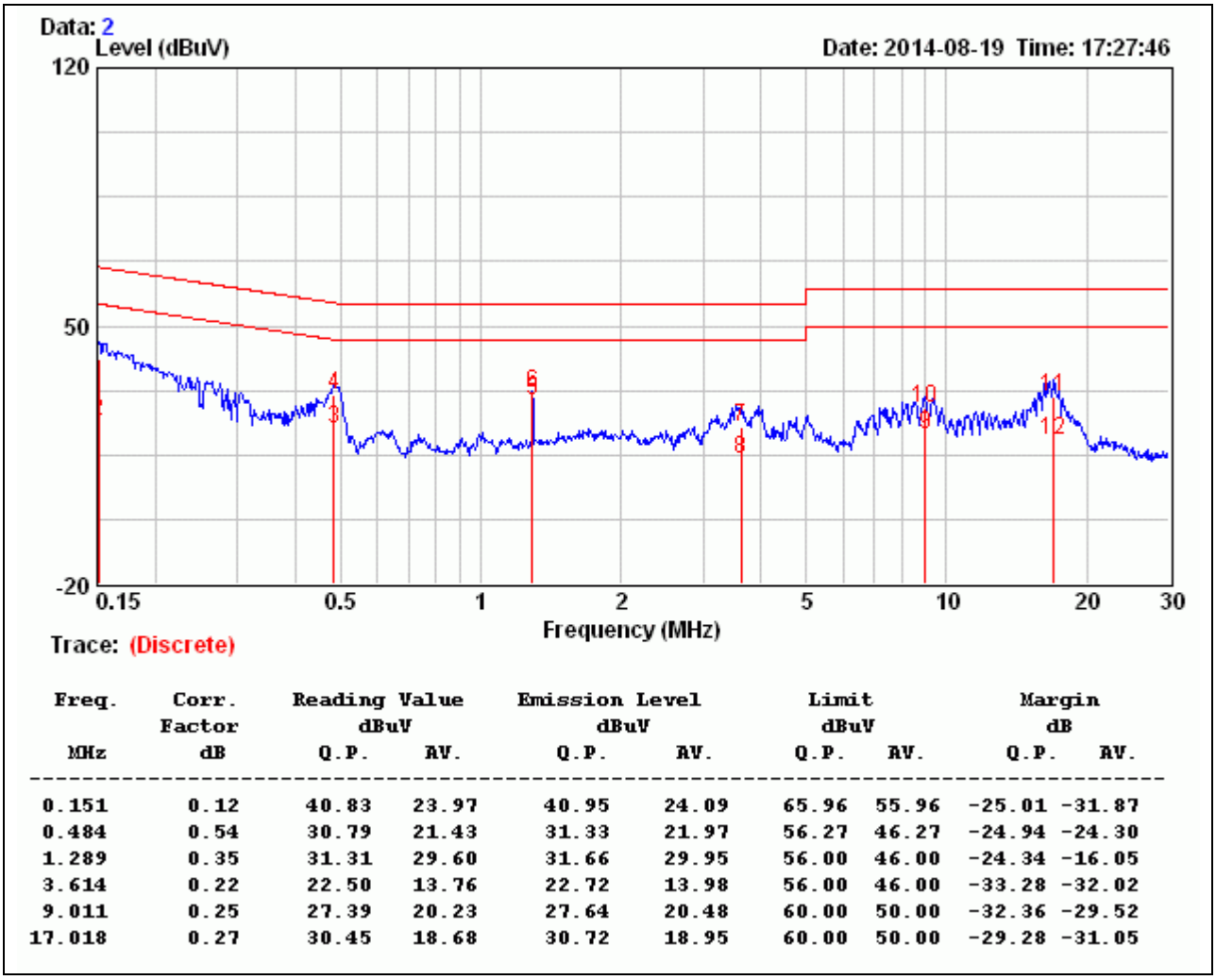
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis 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	Handheld Terminal (WIFI & BT)	Test By	Ted Wu
Test Model	Z-2170 Plus	Test Date	2014/08/19
Test Mode	TX Mode	Temp. & Humidity	23°C, 53%

LINE



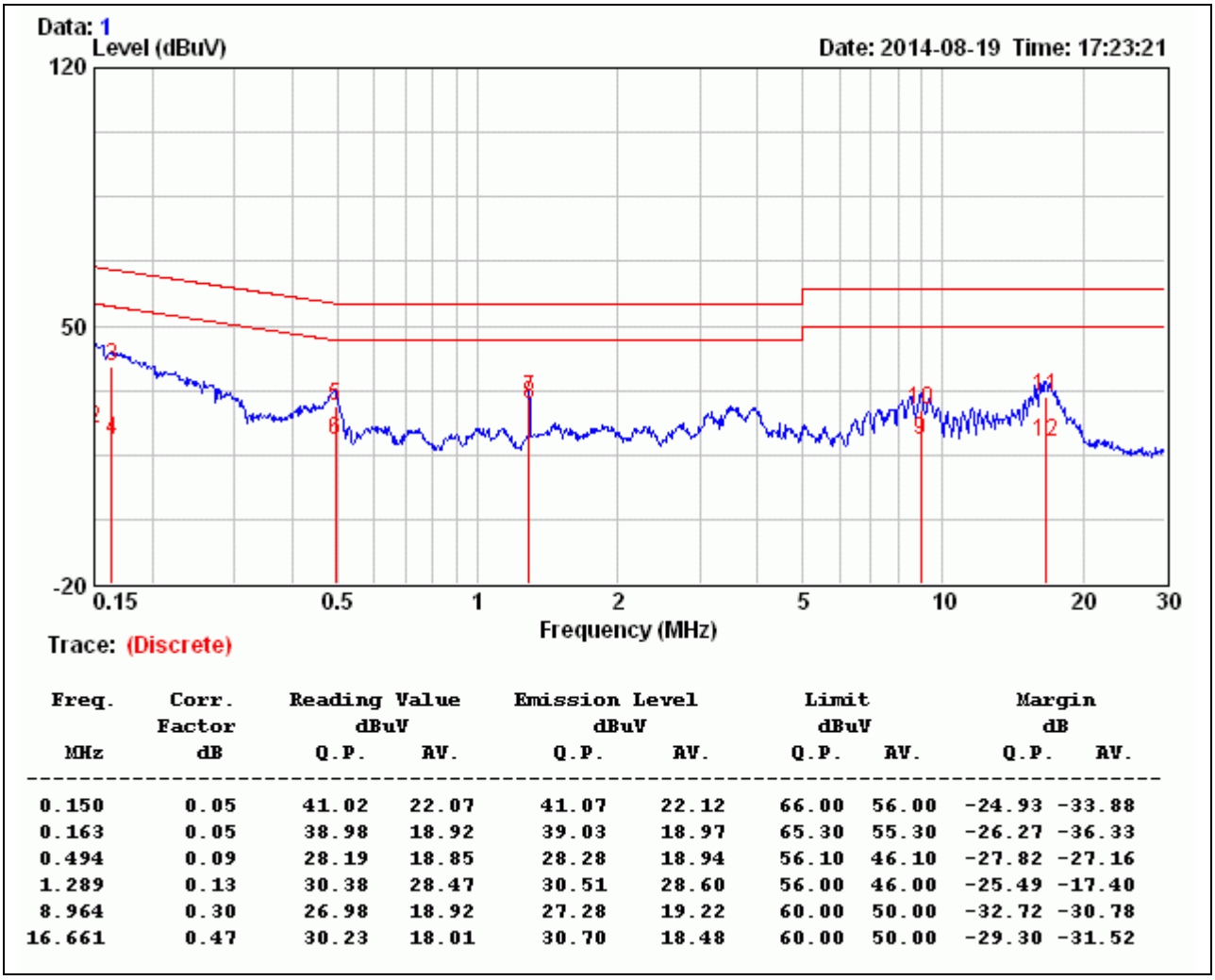
Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.151	0.12	40.83	23.97	40.95	24.09	65.96	55.96	-25.01	-31.87
0.484	0.54	30.79	21.43	31.33	21.97	56.27	46.27	-24.94	-24.30
1.289	0.35	31.31	29.60	31.66	29.95	56.00	46.00	-24.34	-16.05
3.614	0.22	22.50	13.76	22.72	13.98	56.00	46.00	-33.28	-32.02
9.011	0.25	27.39	20.23	27.64	20.48	60.00	50.00	-32.36	-29.52
17.018	0.27	30.45	18.68	30.72	18.95	60.00	50.00	-29.28	-31.05

Remark:

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

Product Name	Handheld Terminal (WIFI & BT)	Test By	Ted Wu
Test Model	Z-2170 Plus	Test Date	2014/08/19
Test Mode	TX Mode	Temp. & Humidity	23°C, 53%

NEUTRAL



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.150	0.05	41.02	22.07	41.07	22.12	66.00	56.00	-24.93	-33.88
0.163	0.05	38.98	18.92	39.03	18.97	65.30	55.30	-26.27	-36.33
0.494	0.09	28.19	18.85	28.28	18.94	56.10	46.10	-27.82	-27.16
1.289	0.13	30.38	28.47	30.51	28.60	56.00	46.00	-25.49	-17.40
8.964	0.30	26.98	18.92	27.28	19.22	60.00	50.00	-32.72	-30.78
16.661	0.47	30.23	18.01	30.70	18.48	60.00	50.00	-29.30	-31.52

Remark:

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