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

For

Smart Home Outdoor Camera

Model : SVO-1601-220 ; SVO-1601-110

Trade Name: BOSCH

Issued for

Robert Bosch Taiwan Co., Ltd.

6F, No. 90,Jian Guo N. Road, Sec.1 Taipei 10491,Taiwan

Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	11/15/2016	Initial Issue	All Page 79	Dola Hsieh

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1. TEST REPORT CERTIFICATION

Applicant	：	Robert Bosch Taiwan Co., Ltd**.**
Address	：	6F, No. 90,Jian Guo N. Road, Sec.1 Taipei 10491,Taiwan
Equipment Under Test	：	Smart Home Outdoor Camera
Model	：	SVO-1601-220 ; SVO-1601-110
Trade Name	：	BOSCH
Tested Date	：	March 01 ~ November 14, 2016

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	Smart Home Outdoor Camera
Model Number	SVO-1601-220 ; SVO-1601-110
Identify Number	T160301D06
Received Date	March 01, 2016
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 Mode: 2412MHz ~ 2462MHz
Transmit Power	IEEE 802.11b Mode: 11.71 dBm (0.0148 W) IEEE 802.11g Mode: 21.29 dBm (0.1346 W) IEEE 802.11gn HT20 MCS0 Mode: 21.01 dBm (0.1262 W)
Channel Spacing	5MHz
Channel Number	IEEE 802.11b/g, 802.11gn HT20 Mode: 11 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 65.00 Mbps IEEE 802.11gn HT20 Mode (400ns GI): up to 72.20 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 Mode: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type	PIFA Antenna × 1, Antenna Gain: 2.41 dBi
Power Rating	100-240Vac, 50/60Hz, 15W
Test Voltage	120Vac, 60Hz
AC Power Cord Type	Non-shielded cable, 0.9 m × 1 (Non-detachable)

The difference of the series model

Model Number	Power Rating	Difference	
		Wall bracket	Label
SVO-1601-220	100-240Vac, 50/60Hz, 15W	NO	240Vac, 50Hz, 15W
SVO-1601-110		YES	110Vac, 60Hz, 15W

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: ZTM-SVO-1601-XX0 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*
4. *The model SVO-1601-220 was considered the main model for testing.*

3. DESCRIPTION OF TEST MODES

The EUT (Smart Home Outdoor Camera) is an 802.11b/g/n transceiver.

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	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.

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 stand-up position(Y axis) and the worst case was recorded.*

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2013 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_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

No.	Signal Cable Description
1	Non-shielded RJ-45 cable, 12m × 1

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. 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)
   ⇨ **Power control**

Mode	Channel	Frequency (MHz)	Power Set
IEEE 802.11b	Low	2412	15
	Middle	2437	15
	High	2462	17
IEEE 802.11g	Low	2412	29
	Middle	2437	33
	High	2462	30
IEEE 802.11gn HT20 MCS0	Low	2412	27
	Middle	2437	33
	High	2462	29

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

7. FCC PART 15.247 REQUIREMENTS

7.1 DUTY CYCLE CORRECTION FACTOR

Product Name	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/25
Test Mode	TX Mode	Temp. & Humidity	28°C, 52%

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	1.000	1.000	100.00%	0.00	0.010
IEEE 802.11gn HT20	1.000	1.000	100.00%	0.00	0.010

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
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/15/2017
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	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/08/29
Test Mode	TX Mode	Temp. & Humidity	25°C, 58%

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Result
Low	2412	10.02	500	PASS
Middle	2437	9.94	500	PASS
High	2462	9.98	500	PASS

IEEE 802.11g Mode

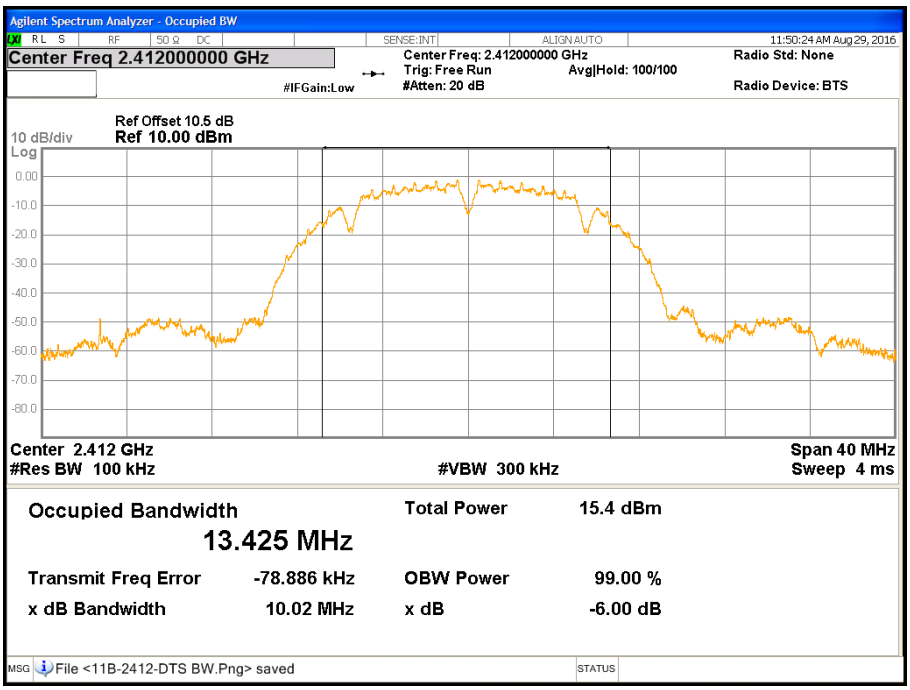
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Result
Low	2412	16.53	500	PASS
Middle	2437	16.54	500	PASS
High	2462	16.56	500	PASS

IEEE 802.11gn HT20 MCS0 Mode

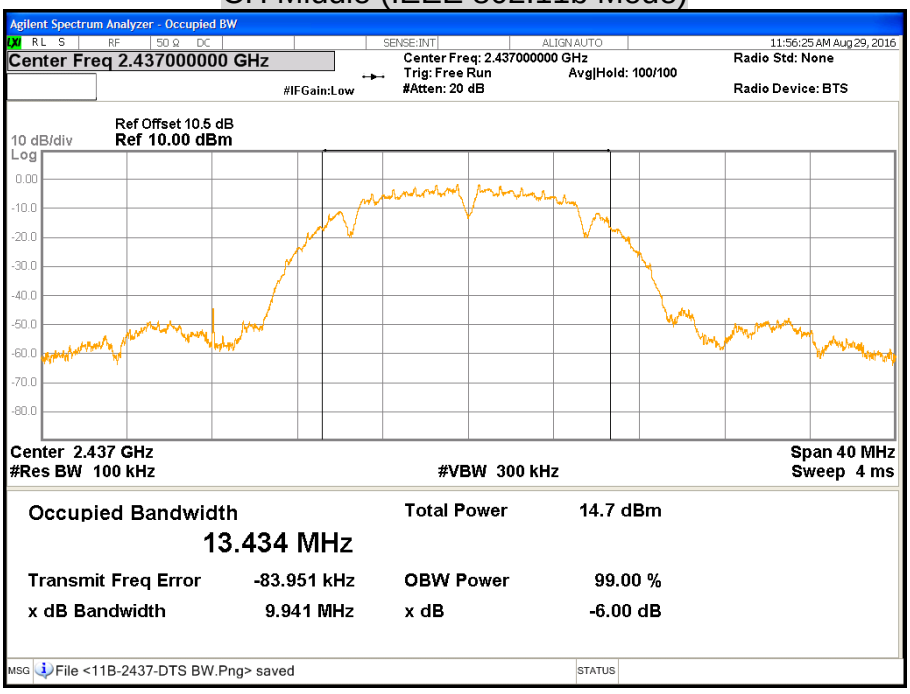
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Result
Low	2412	17.80	500	PASS
Middle	2437	17.77	500	PASS
High	2462	17.79	500	PASS

6dB BANDWIDTH

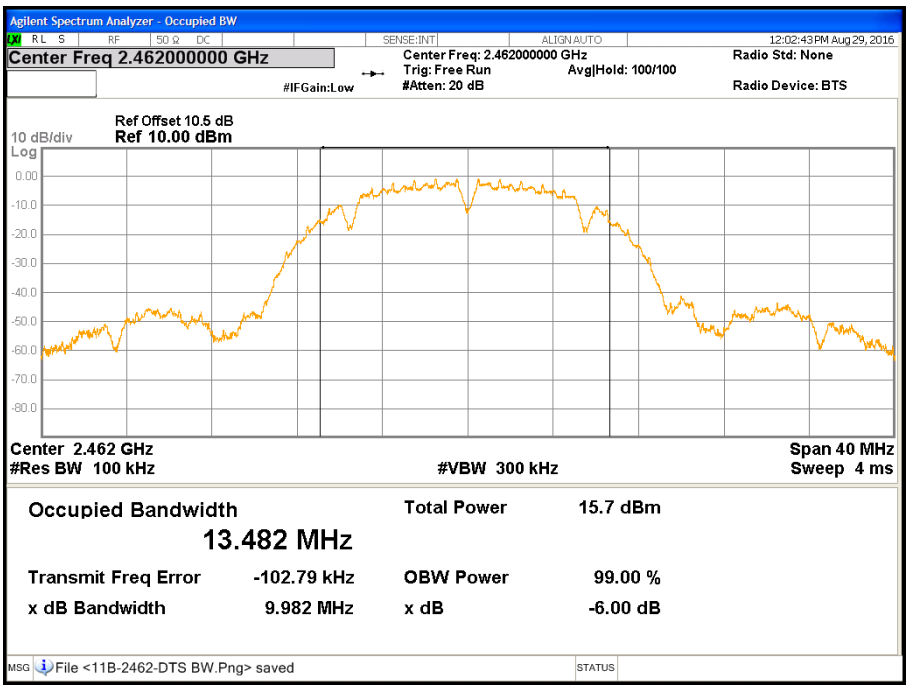
CH Low (IEEE 802.11b Mode)



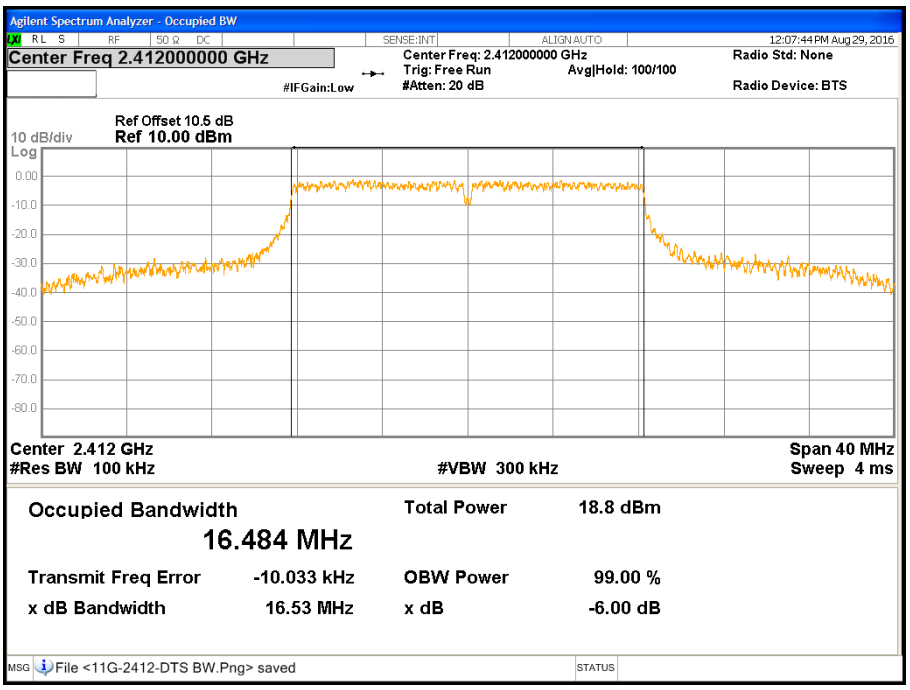
CH Middle (IEEE 802.11b Mode)



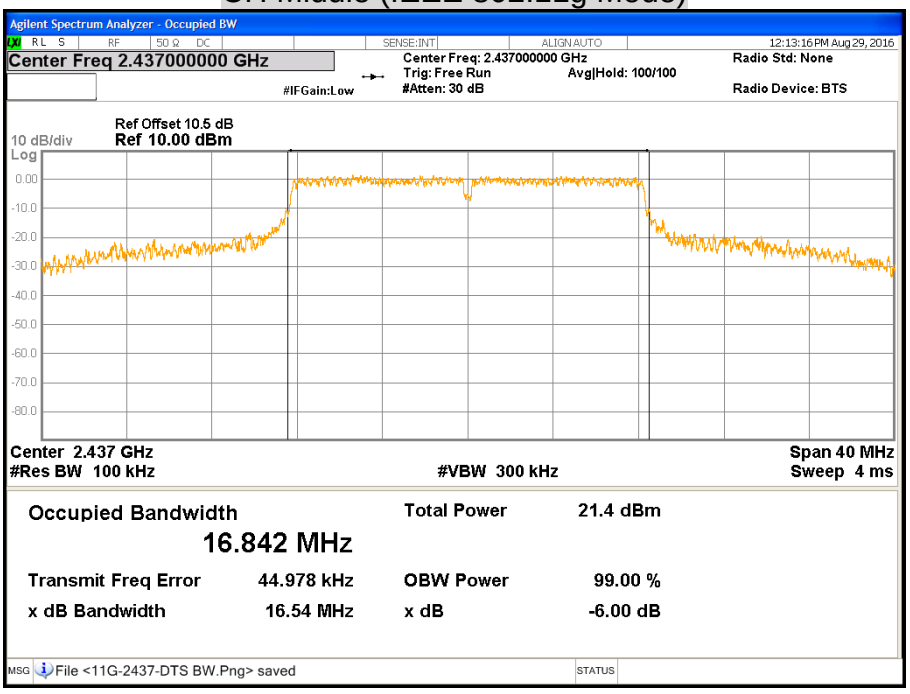
CH High (IEEE 802.11b Mode)



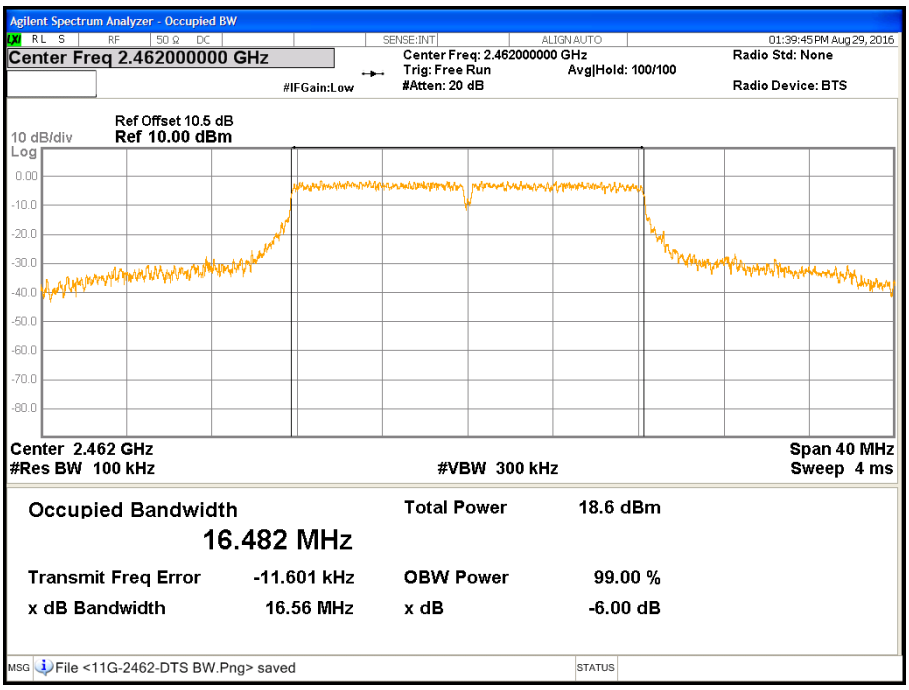
CH Low (IEEE 802.11g Mode)



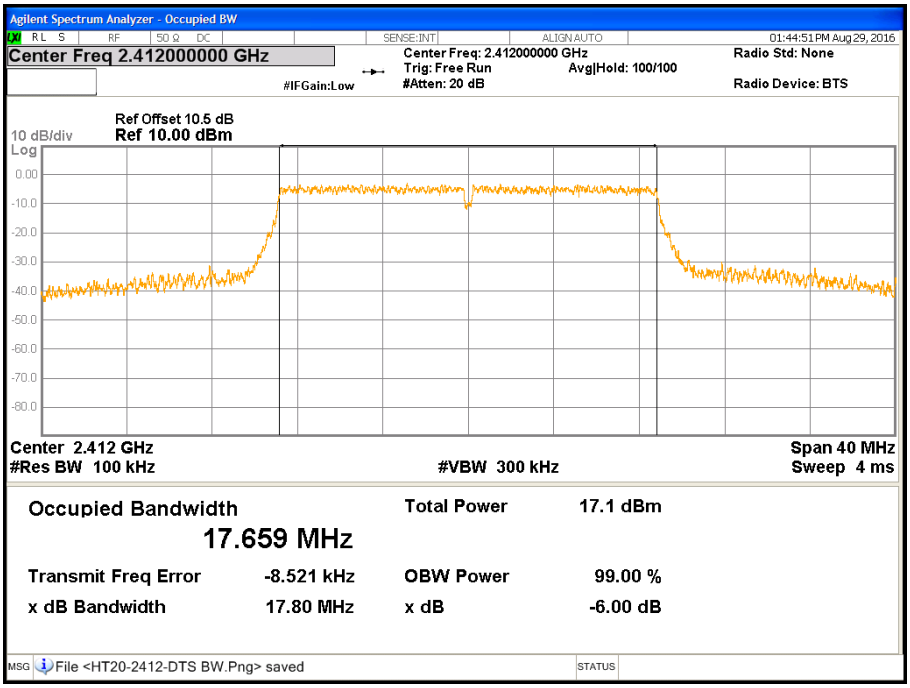
CH Middle (IEEE 802.11g Mode)



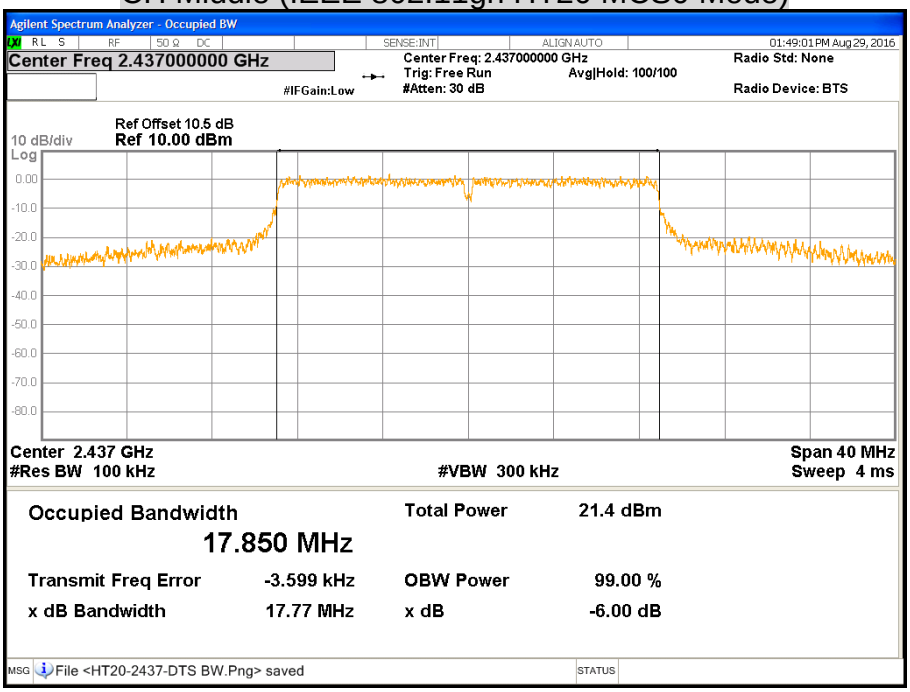
CH High (IEEE 802.11g Mode)



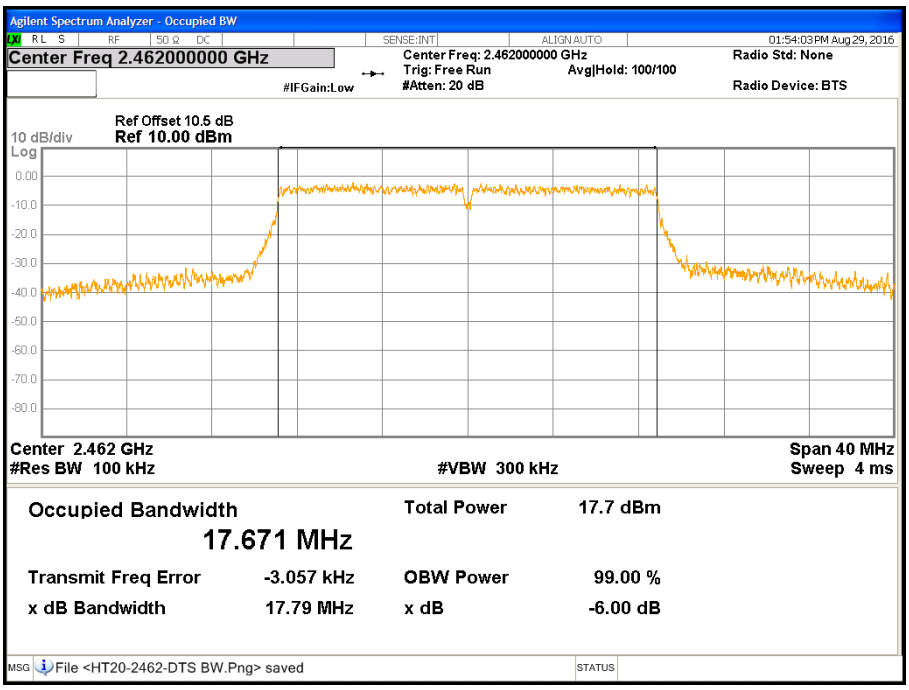
CH Low (IEEE 802.11gn HT20 MCS0 Mode)



CH Middle (IEEE 802.11gn HT20 MCS0 Mode)



CH High (IEEE 802.11gn HT20 MCS0 Mode)



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	12/08/2016
Power Sensor	Anritsu	MA2411B	1126148	12/08/2016
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	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/08/29
Test Mode	TX Mode	Temp. & Humidity	25°C, 58%

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Maximum Peak Output Power		Limit		Result
		(dBm)	(W)	(dBm)	(W)	
Low	2412	11.28	0.0134	30	1.000	PASS
Middle	2437	10.63	0.0116	30	1.000	PASS
High	2462	11.71	0.0148	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 2.41 dBi which is less than 6dBi, the limit should be 1 W.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Maximum Peak Output Power		Limit		Result
		(dBm)	(W)	(dBm)	(W)	
Low	2412	20.69	0.1172	30	1.000	PASS
Middle	2437	21.29	0.1346	30	1.000	PASS
High	2462	20.20	0.1047	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 2.41 dBi which is less than 6dBi, the limit should be 1 W.*

IEEE 802.11gn HT20 MCS0 Mode

Channel	Channel Frequency (MHz)	Maximum Peak Output Power		Limit		Result
		(dBm)	(W)	(dBm)	(W)	
Low	2412	19.36	0.0863	30	1.000	PASS
Middle	2437	21.01	0.1262	30	1.000	PASS
High	2462	19.60	0.0912	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. *The maximum antenna gain is 2.41 dBi which is less than 6dBi, the limit should be 1 W.*

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	12/08/2016
Power Sensor	Anritsu	MA2411B	1126148	12/08/2016
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	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/08/29
Test Mode	TX Mode	Temp. & Humidity	25°C, 58%

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	8.58
Middle	2437	7.98
High	2462	9.06

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

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	12.94
Middle	2437	15.44
High	2462	12.45

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

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	11.22
Middle	2437	15.44
High	2462	11.58

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.*

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
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/15/2017
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	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/08/29
Test Mode	TX Mode	Temp. & Humidity	25°C, 58%

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		Result
		Measured Value	Limit	
Low	2412	-12.66	8	PASS
Middle	2437	-14.50	8	PASS
High	2462	-13.26	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 2.41 dBi which is less than 6dBi, the limit should be 8 dBm.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		Result
		Measured Value	Limit	
Low	2412	-8.98	8	PASS
Middle	2437	-6.34	8	PASS
High	2462	-9.16	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 2.41 dBi which is less than 6dBi, the limit should be 8 dBm.*

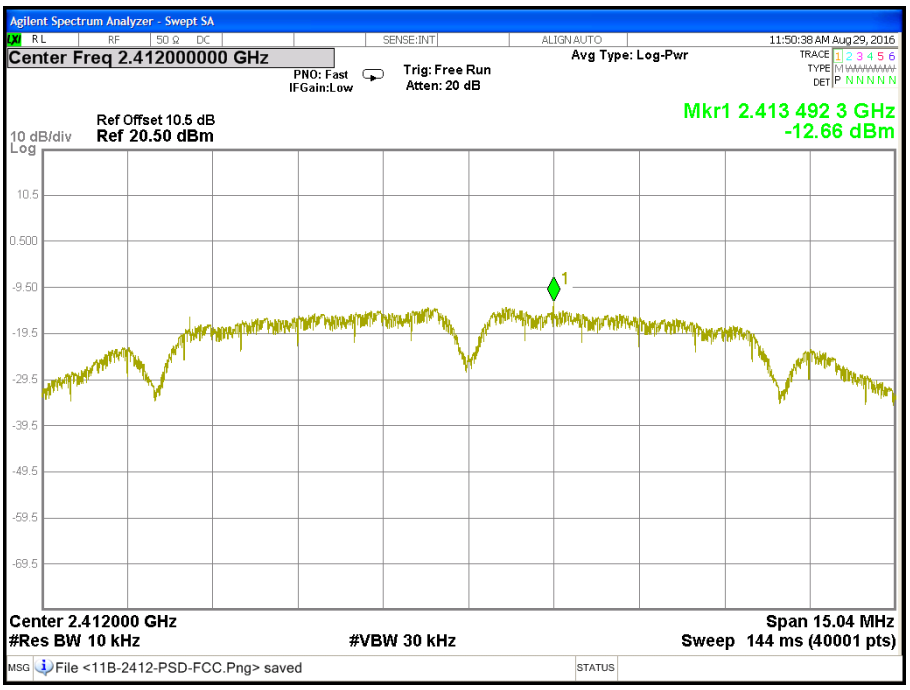
IEEE 802.11gn HT20 MCS0 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		Result
		Measured Value	Limit	
Low	2412	-9.57	8	PASS
Middle	2437	-4.65	8	PASS
High	2462	-8.95	8	PASS

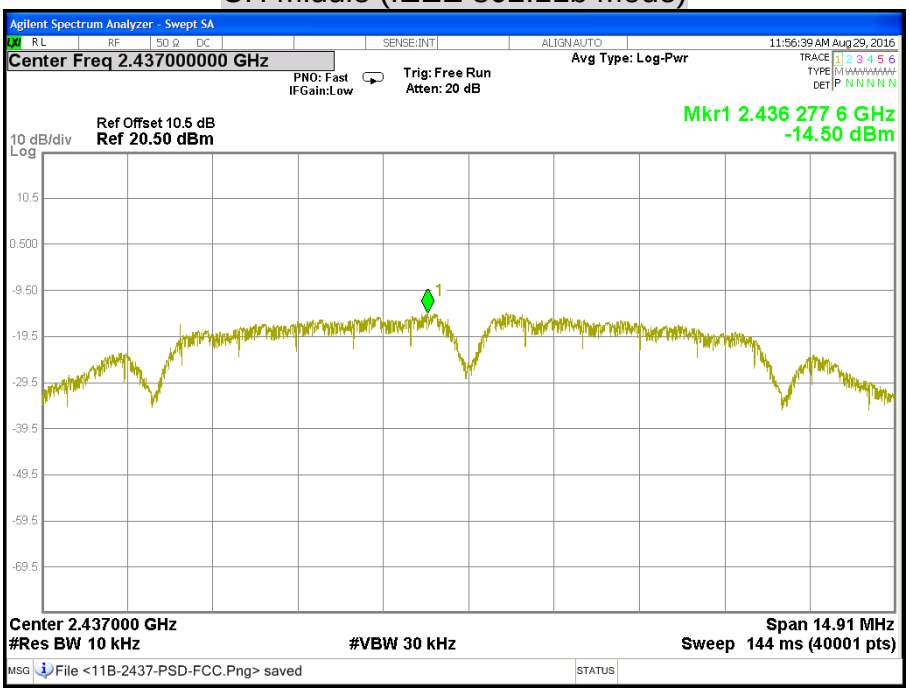
Remark:
1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain is 2.41 dBi which is less than 6dBi, the limit should be 8 dBm.*

POWER SPECTRAL DENSITY

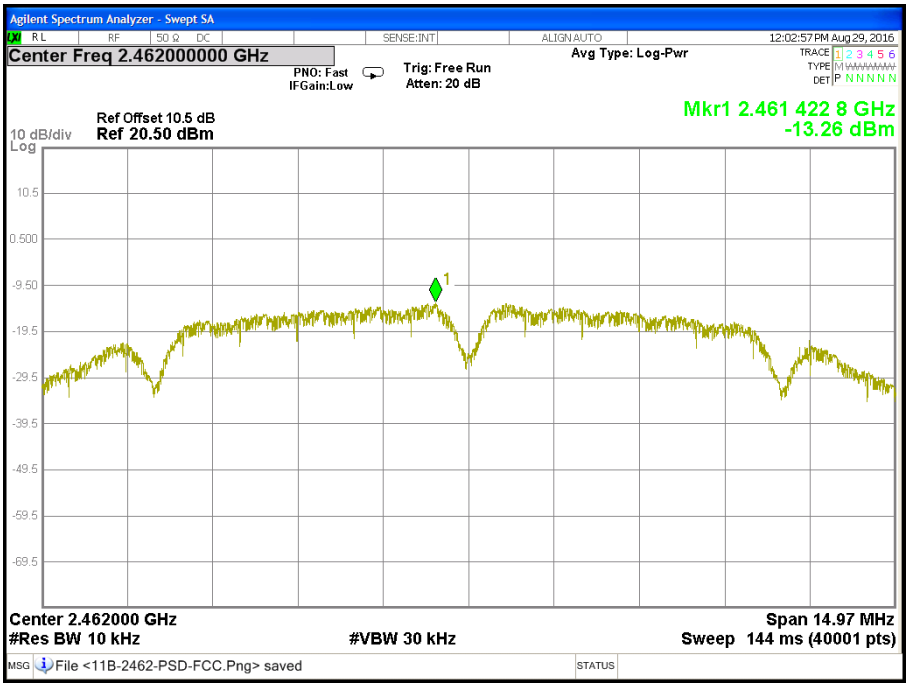
CH Low (IEEE 802.11b Mode)



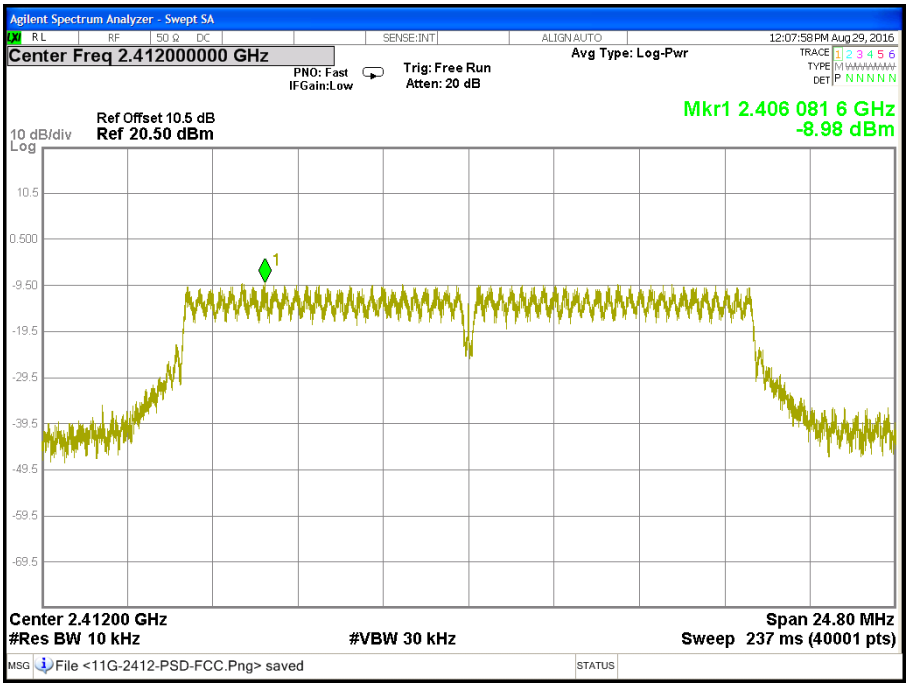
CH Middle (IEEE 802.11b Mode)



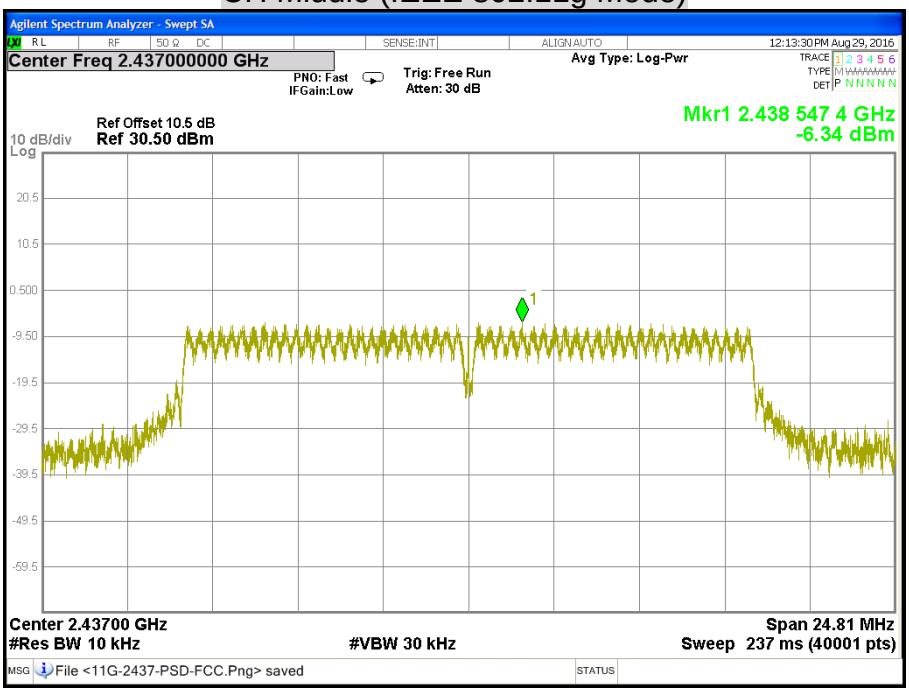
CH High (IEEE 802.11b Mode)



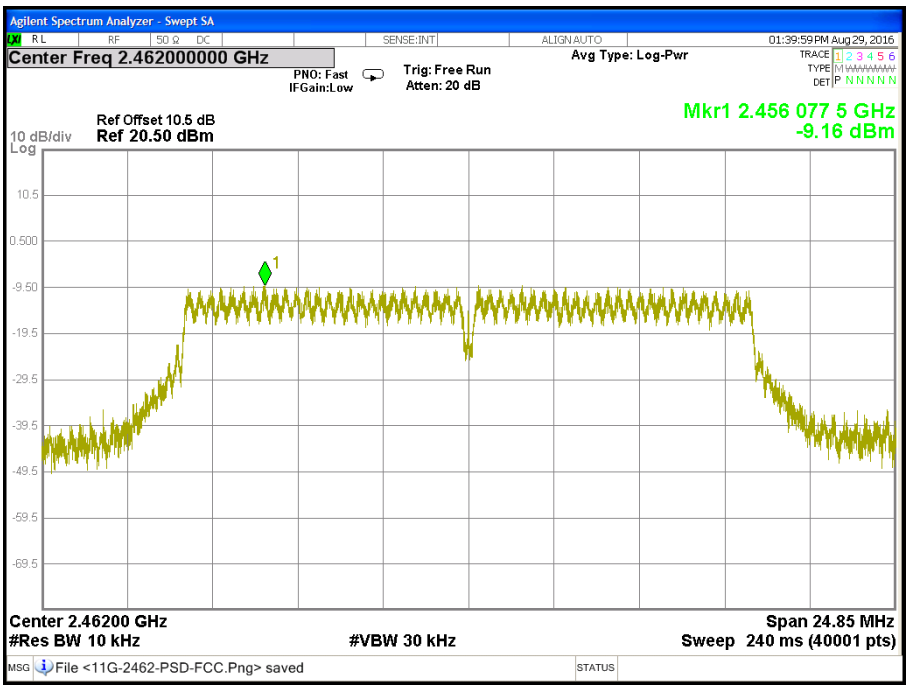
CH Low (IEEE 802.11g Mode)



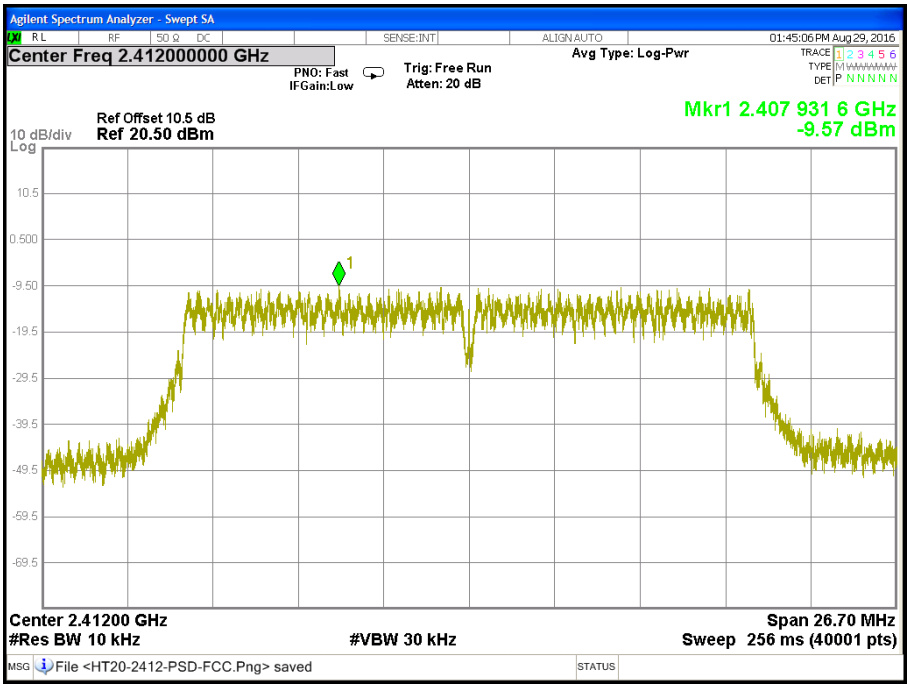
CH Middle (IEEE 802.11g Mode)



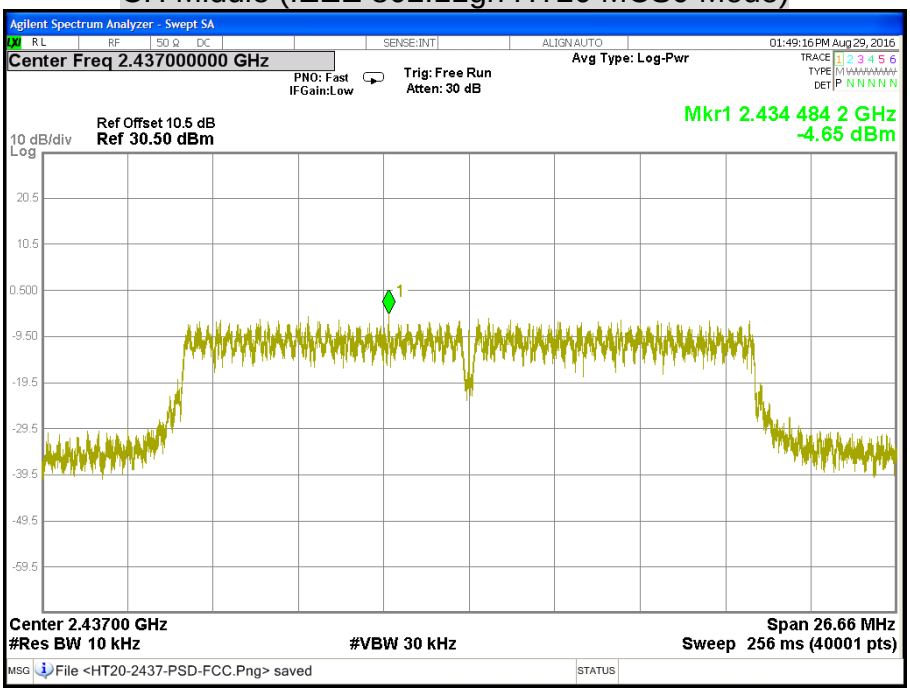
CH High (IEEE 802.11g Mode)



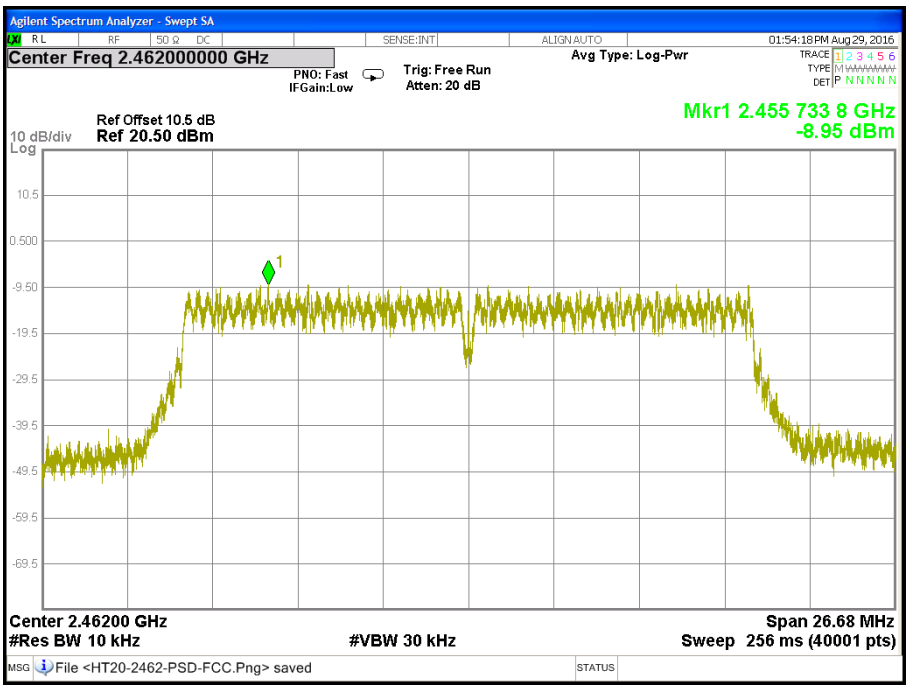
CH Low (IEEE 802.11gn HT20 MCS0 Mode)



CH Middle (IEEE 802.11gn HT20 MCS0 Mode)



CH High (IEEE 802.11gn HT20 MCS0 Mode)



7.6 CONDUCTED SPURIOUS EMISSION

LIMITS

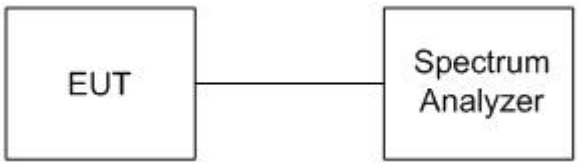
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level 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
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/15/2017
Test S/W	N/A			

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

TEST SETUP



TEST PROCEDURE

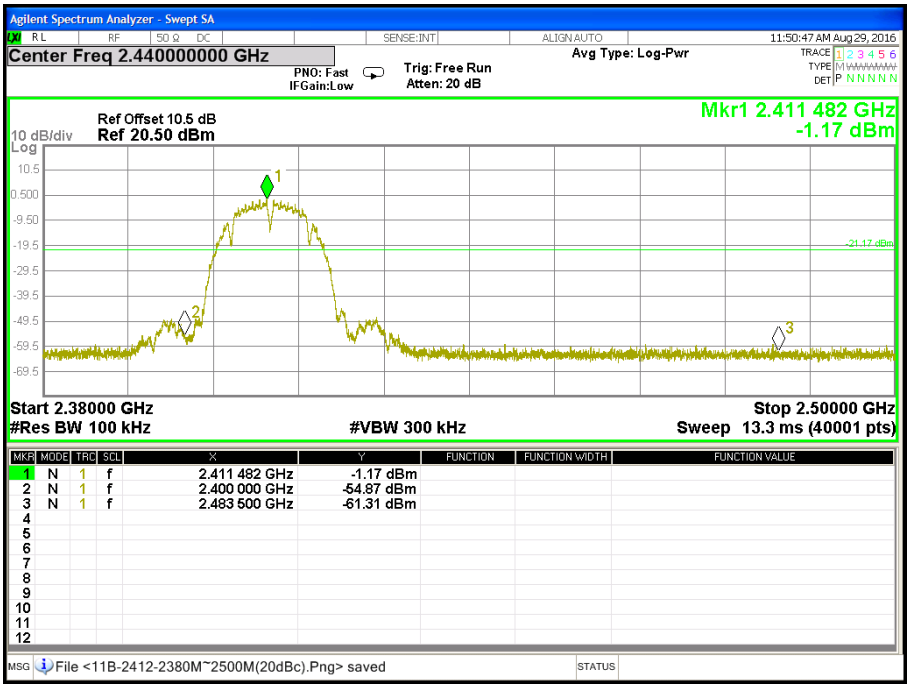
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST RESULTS

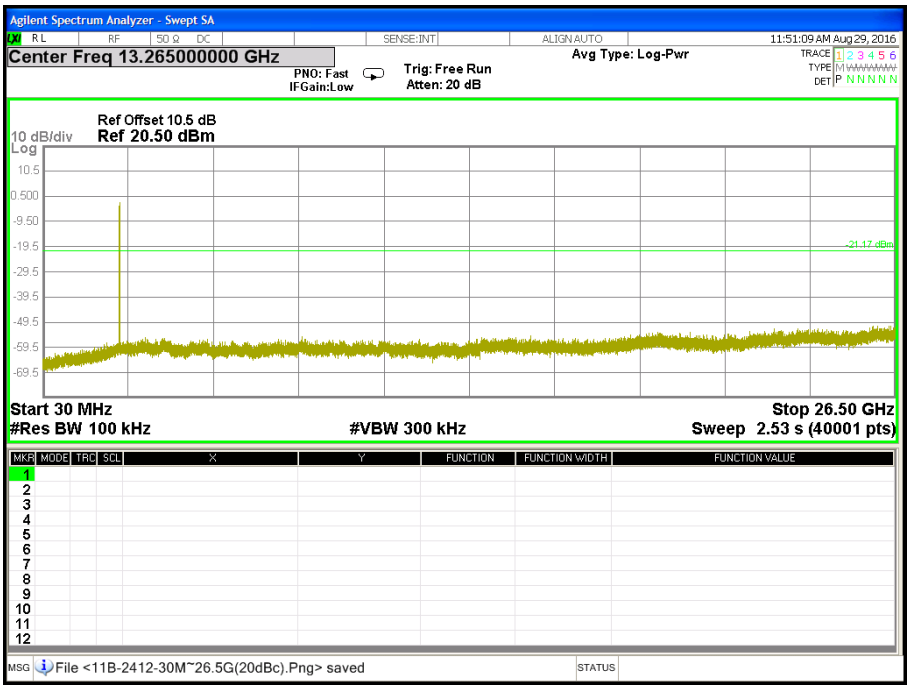
Product Name	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/08/29
Test Mode	TX Mode	Temp. & Humidity	25°C, 58%

OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

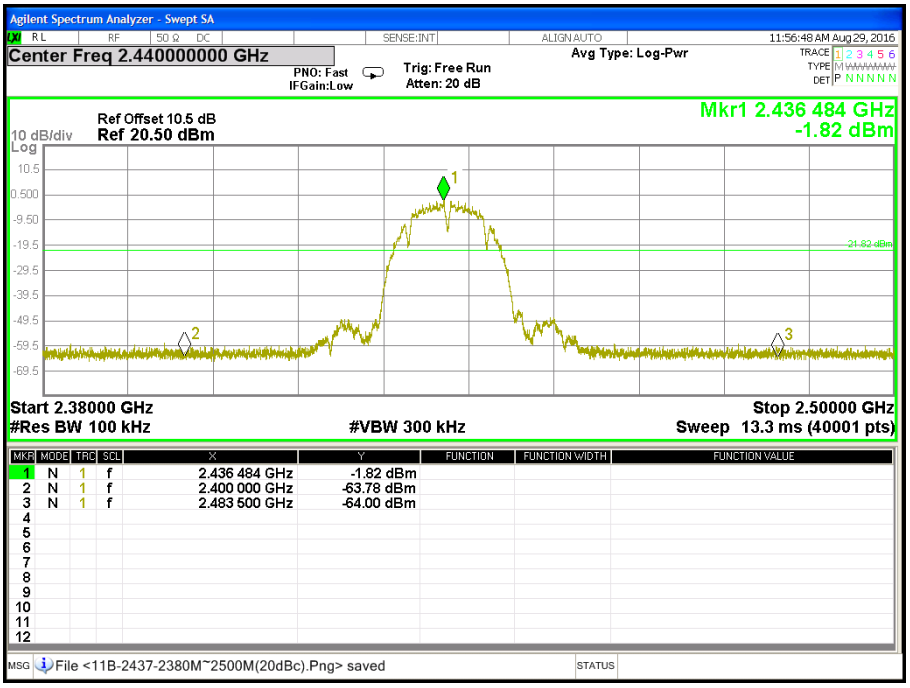
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



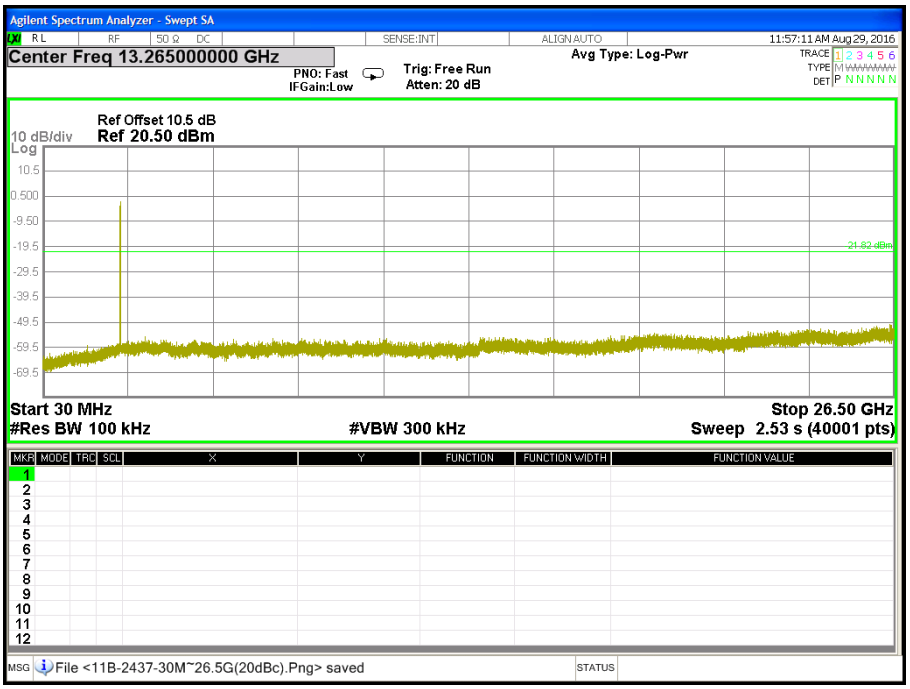
CH Low (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



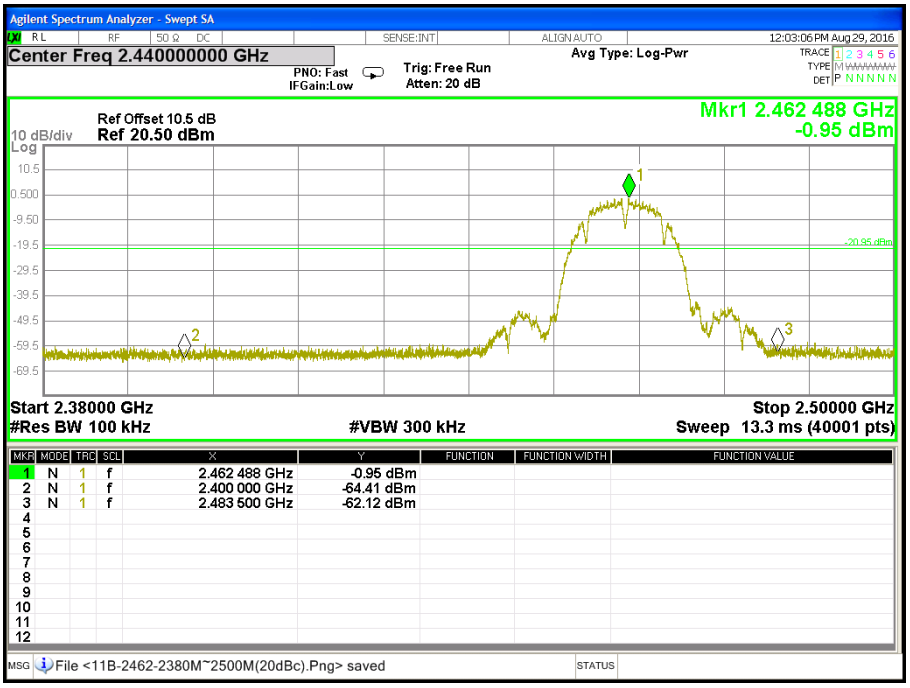
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



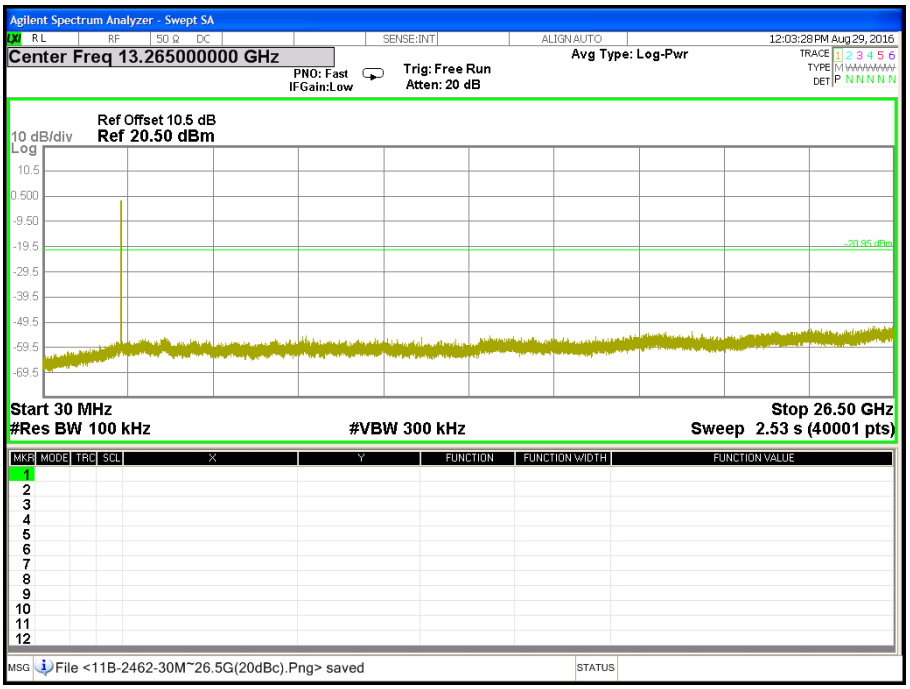
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



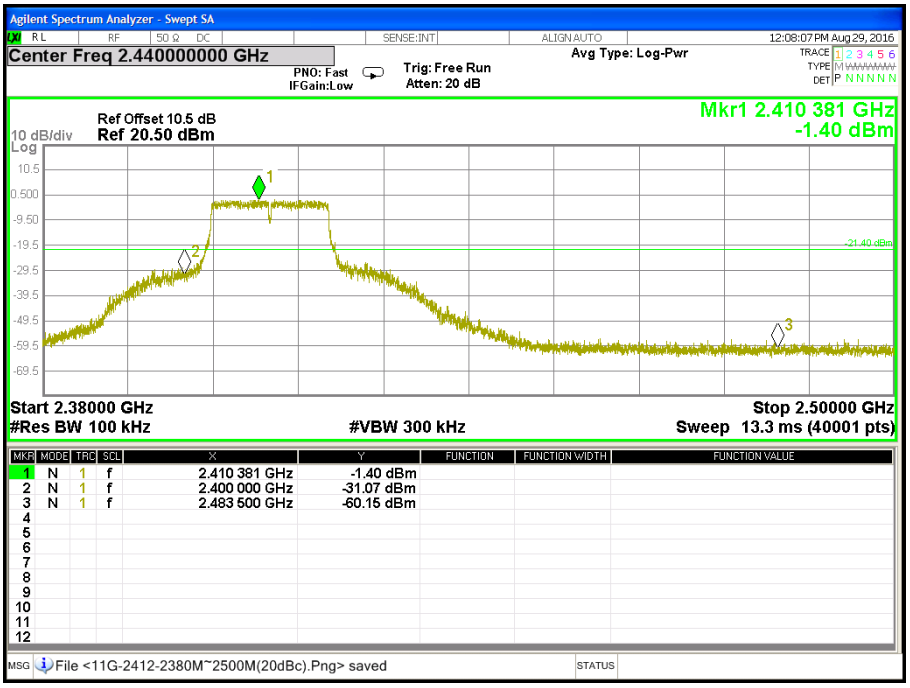
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



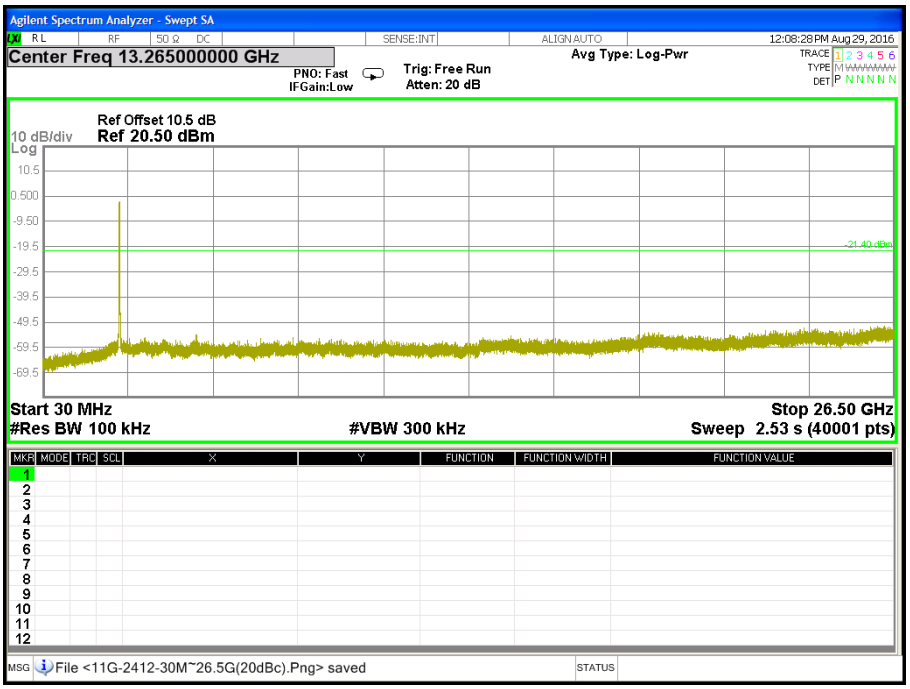
CH High (30MHz ~ 26.5GHz / IEEE 802.11b Mode)



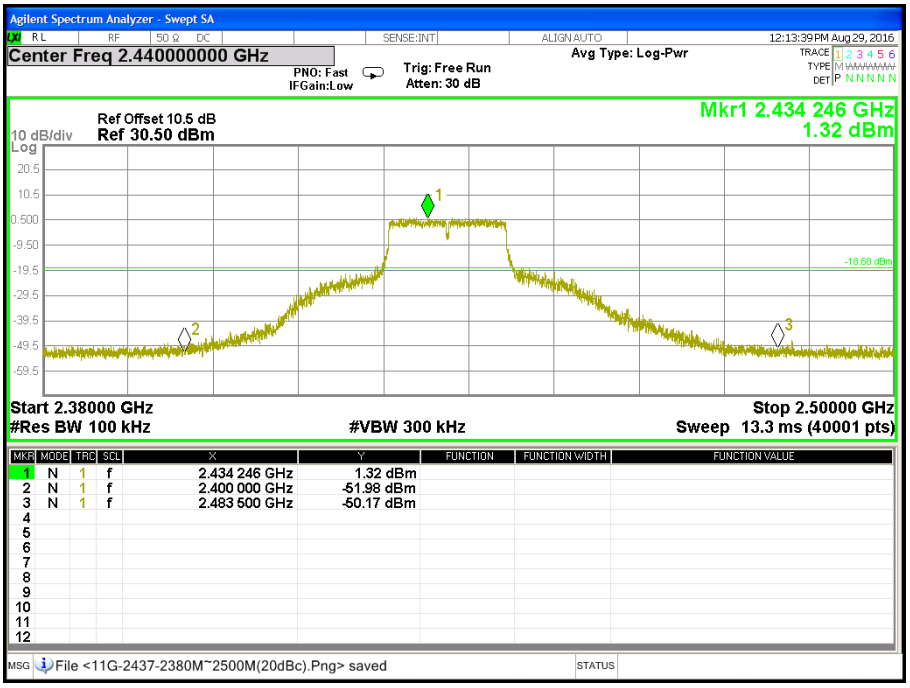
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



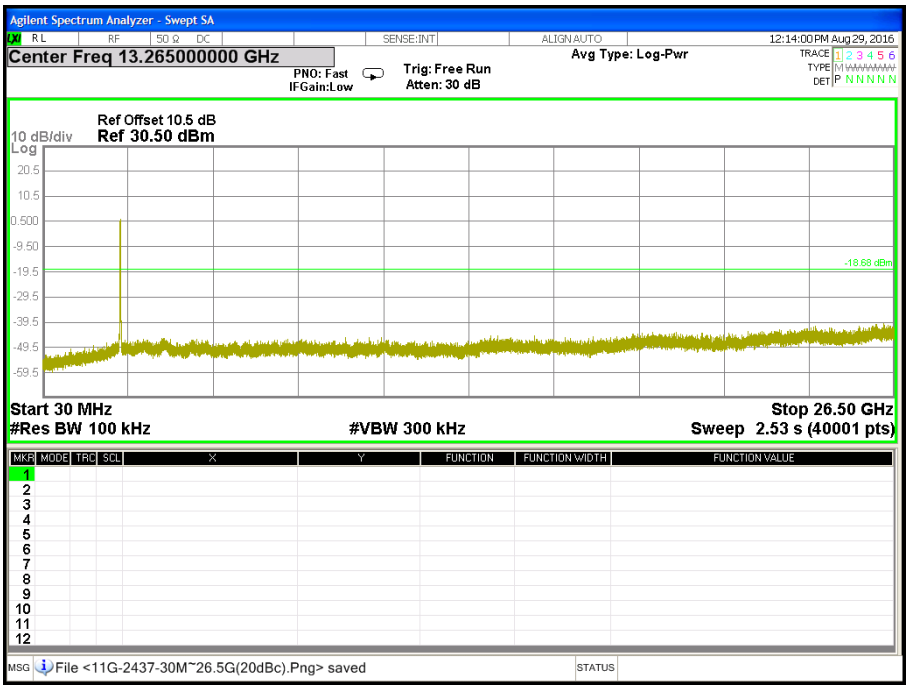
CH Low (30MHz ~ 26.5GHz / IEEE 802.11g Mode)



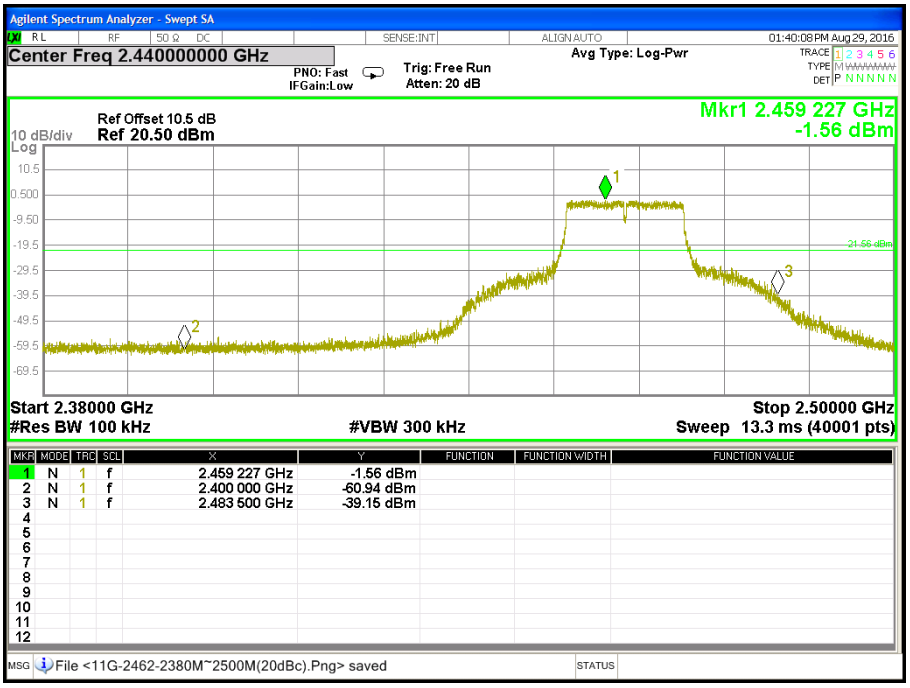
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



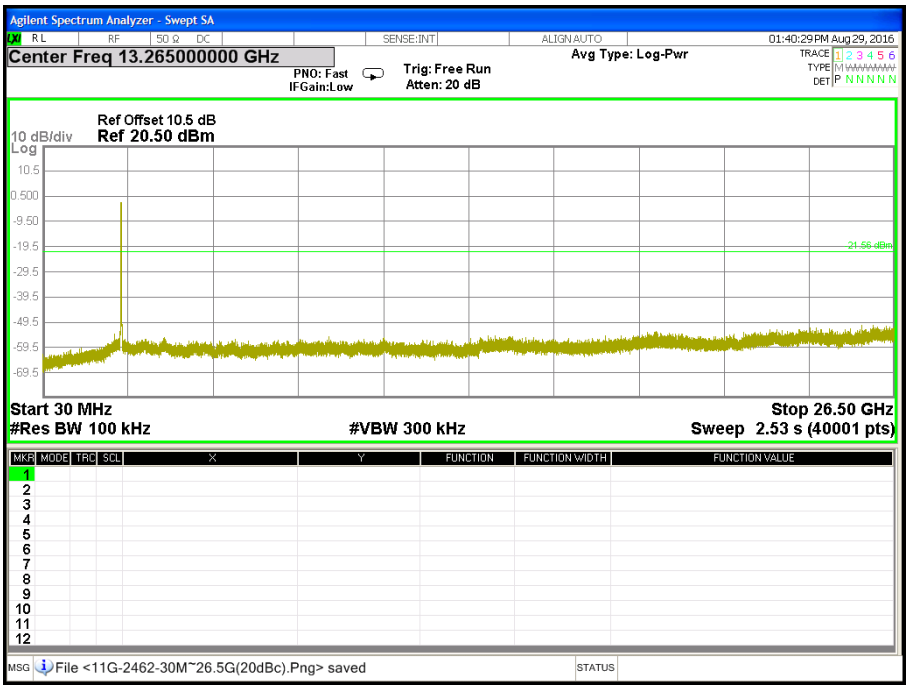
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11g Mode)



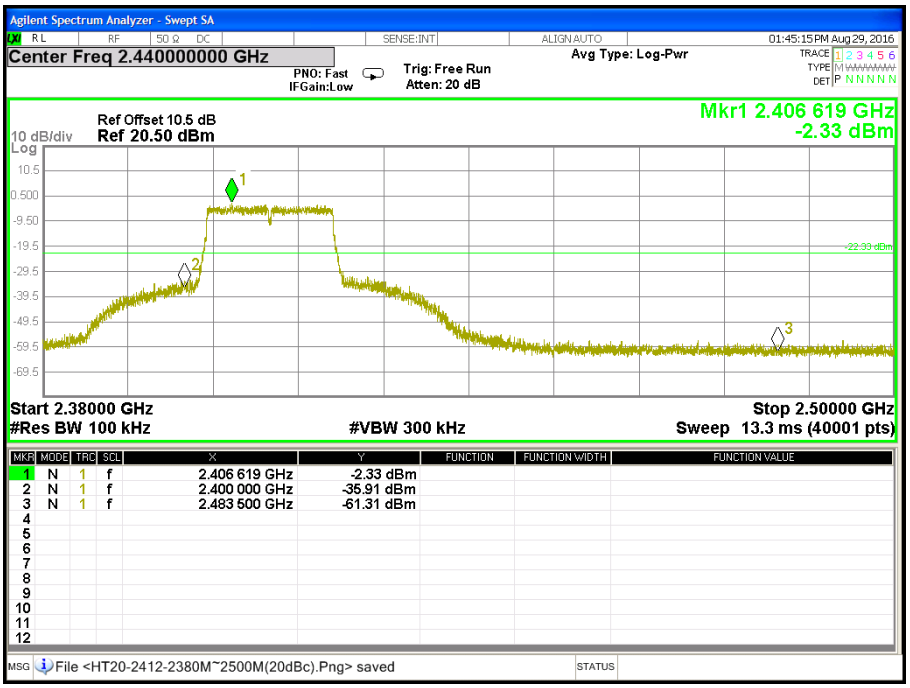
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



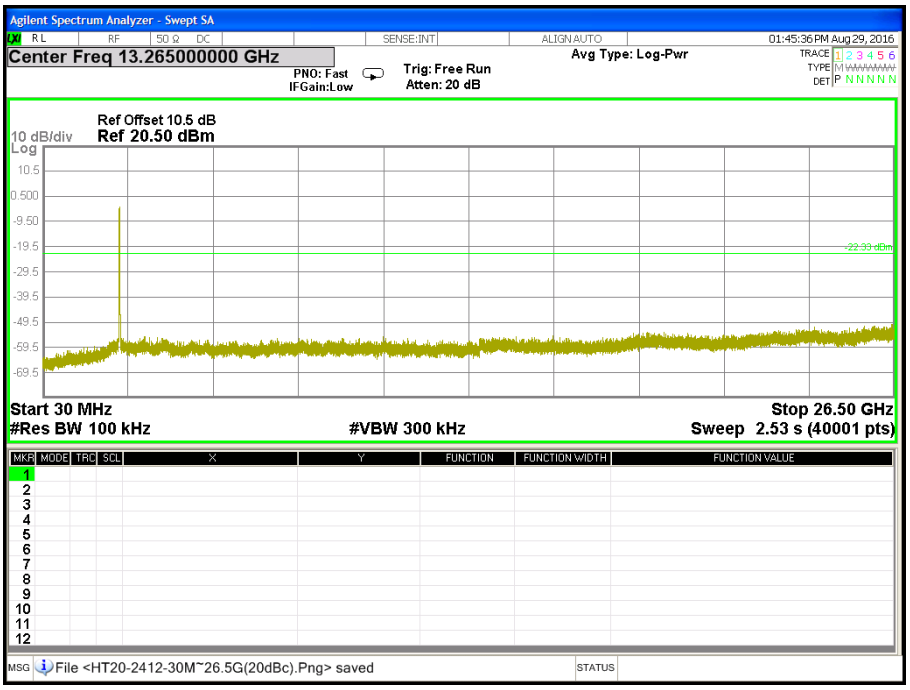
CH High (30MHz ~ 26.5GHz / IEEE 802.11g Mode)



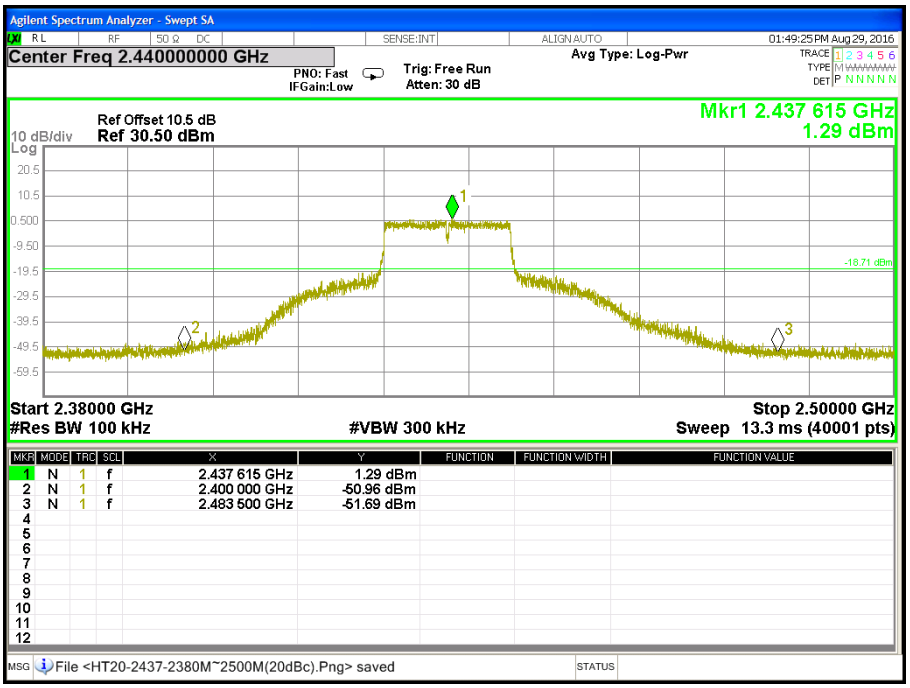
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode)



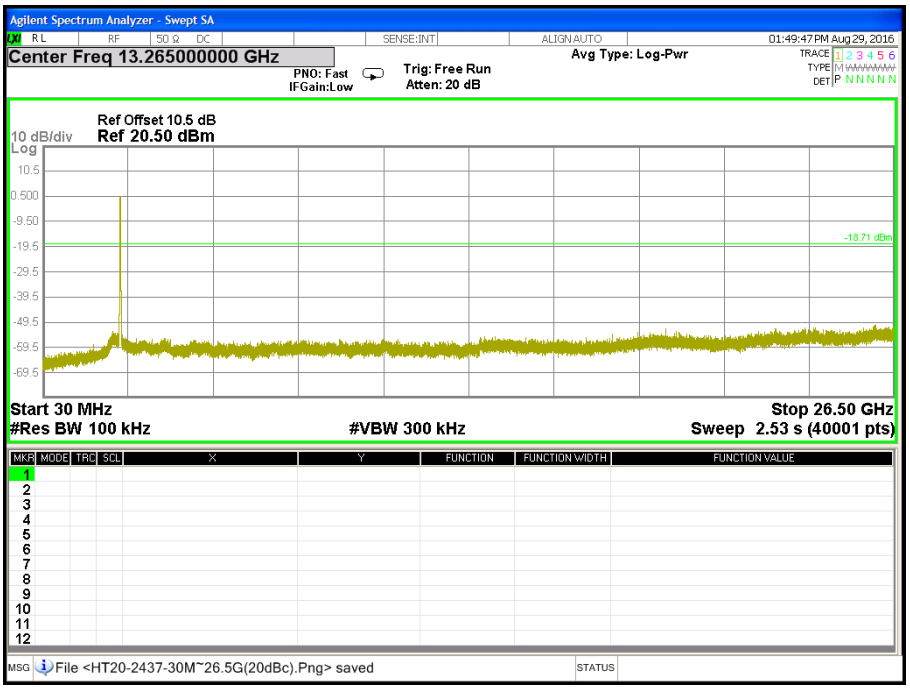
CH Low (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode)



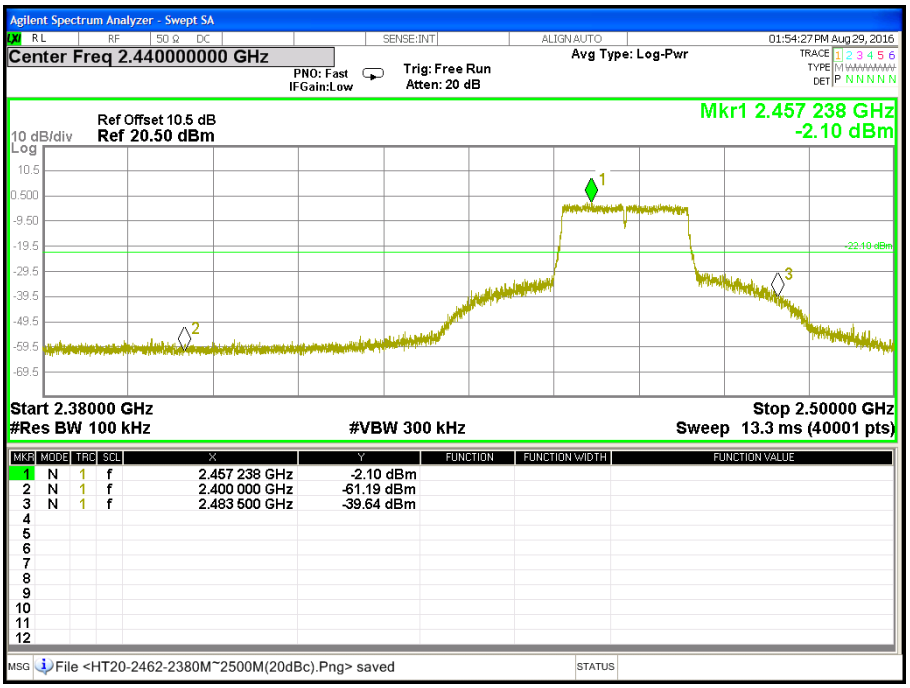
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 MCS0 Mode)



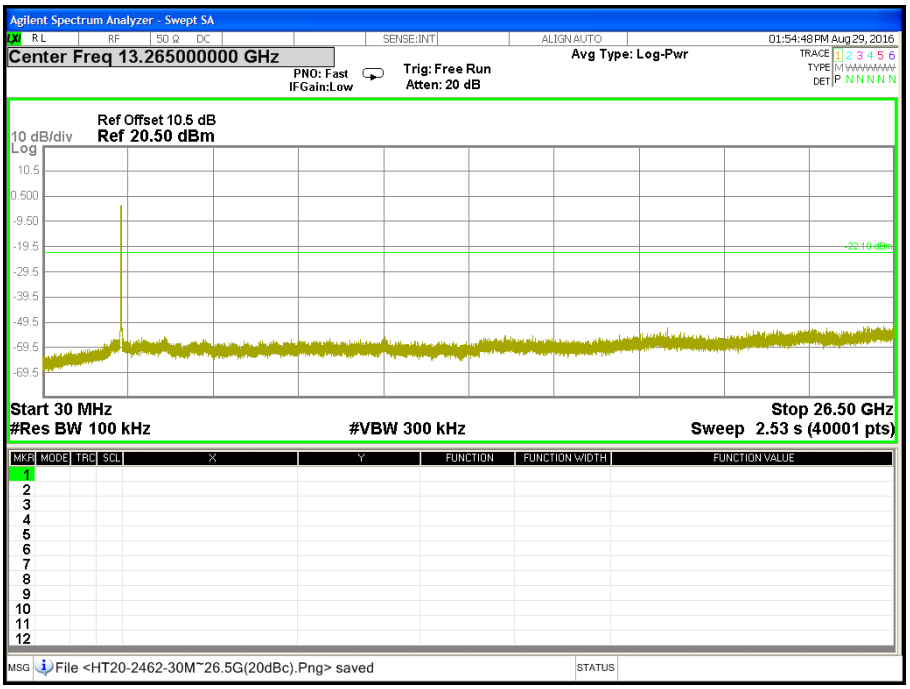
CH Middle (30MHz ~ 26.5GHz / IEEE 802.11gn HT20 MCS0 Mode)



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



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



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_C

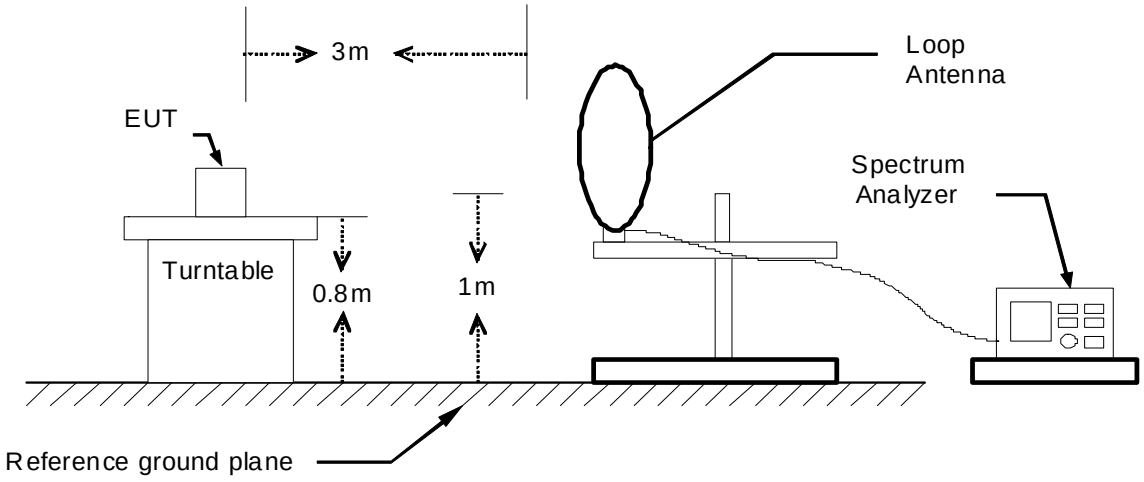
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	04/21/2017
EMI Test Receiver	Rohde & Schwarz	ESCI	101387	10/04/2017
Bi-log Antenna	TESEQ	CBL 6112D	35404	07/22/2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-778	07/14/2017
Pre-Amplifier	EMCI	EMC001625	980243	04/11/2017
Pre-Amplifier	COM-POWER	PAM-118A	551043	04/11/2017
Double Ridged Guide Horn Antenna	ETS・LINDGREN	3117	00078732	07/10/2017
Horn Antenna	COM-POWER	AH-840	03077	12/08/2016
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.*

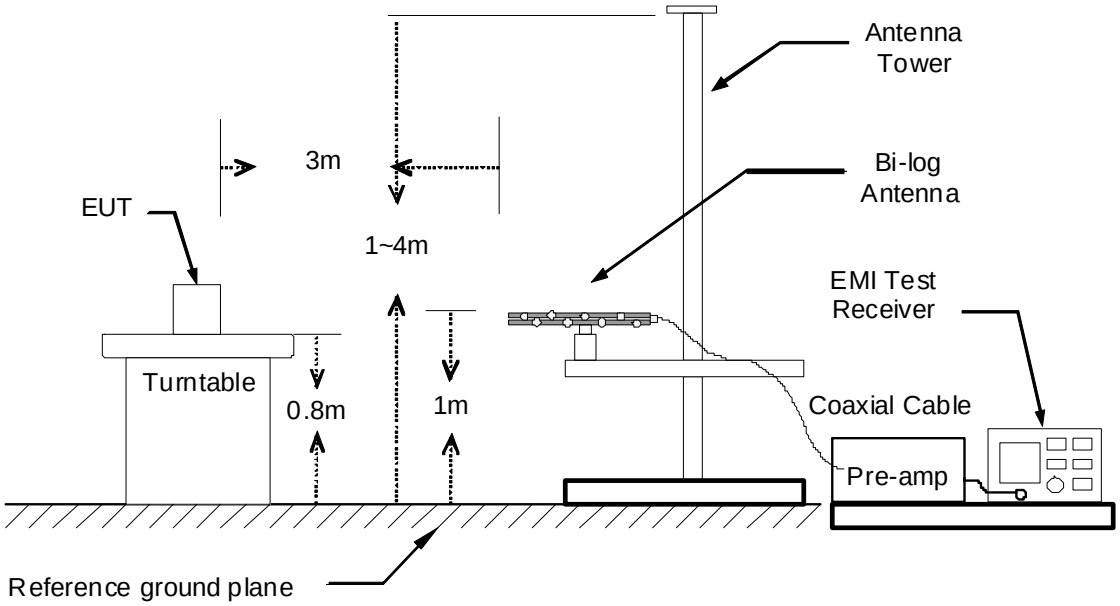
TEST SETUP

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

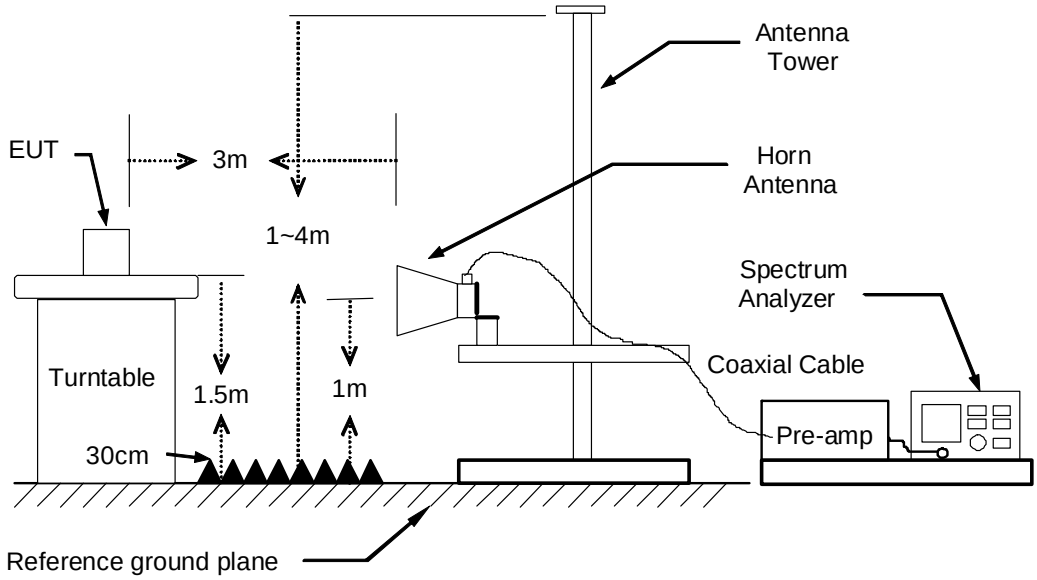
9kHz ~ 30MHz



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	Smart Home Outdoor Camera	Test By	Davis Tesng
Test Model	SVO-1601-220	Test Date	2016/09/21
Test Mode	Mode 1	Temp. & Humidity	28°C, 52%

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
154.16	46.48	-19.61	26.87	43.50	-16.63	69	200	Peak
334.58	44.67	-15.09	29.58	46.00	-16.42	120	100	Peak
530.52	39.77	-11.21	28.56	46.00	-17.44	268	200	Peak
705.12	44.12	-9.35	34.77	46.00	-11.23	124	100	Peak
816.67	41.23	-8.15	33.08	46.00	-12.92	242	100	Peak
853.53	40.22	-7.87	32.35	46.00	-13.65	278	100	Peak
928.22	41.15	-7.04	34.11	46.00	-11.89	214	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
39.70	48.54	-16.78	31.76	40.00	-8.24	149	100	Peak
79.47	55.33	-23.34	31.99	40.00	-8.01	0	100	Peak
334.58	51.42	-15.09	36.33	46.00	-9.67	234	200	Peak
527.61	48.56	-11.25	37.31	46.00	-8.69	268	200	Peak
705.12	46.58	-9.35	37.23	46.00	-8.77	295	100	Peak
764.29	44.68	-8.61	36.07	46.00	-9.93	356	200	Peak
853.53	43.97	-7.87	36.10	46.00	-9.90	344	200	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11b Mode / TX / CH Low	Temp. & Humidity	28°C, 52%

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
2484.00	47.82	-0.10	47.72	74.00	-26.28	187	200	Peak
2510.00	50.23	-0.01	50.22	74.00	-23.78	300	200	Peak
4824.00	44.55	6.04	50.59	74.00	-23.41	135	200	Peak
5028.00	39.47	6.71	46.18	74.00	-27.82	173	100	Peak
7248.00	41.59	3.12	44.71	74.00	-29.29	349	100	Peak
11976.00	44.38	8.33	52.71	74.00	-21.29	3	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
2230.00	49.40	-1.03	48.37	74.00	-25.63	142	100	Peak
2484.00	46.33	-0.10	46.23	74.00	-27.77	232	100	Peak
4824.00	40.20	6.04	46.24	74.00	-27.76	7	200	Peak
5085.00	40.00	6.82	46.82	74.00	-27.18	296	100	Peak
7248.00	42.48	3.12	45.60	74.00	-28.40	223	200	Peak
10800.00	44.27	6.83	51.10	74.00	-22.90	96	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11b Mode / TX / CH Middle	Temp. & Humidity	28°C, 52%

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
2390.00	46.28	-0.44	45.84	74.00	-28.16	220	100	Peak
2484.00	48.17	-0.10	48.07	74.00	-25.93	125	100	Peak
4875.00	44.27	6.22	50.49	74.00	-23.51	128	200	Peak
5088.00	39.68	6.83	46.51	74.00	-27.49	14	100	Peak
7308.00	42.21	3.16	45.37	74.00	-28.63	90	200	Peak
10128.00	44.80	5.39	50.19	74.00	-23.81	36	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
2390.00	45.75	-0.44	45.31	74.00	-28.69	90	100	Peak
2484.00	47.13	-0.10	47.03	74.00	-26.97	354	200	Peak
4875.00	41.75	6.22	47.97	74.00	-26.03	353	200	Peak
5115.00	39.09	6.88	45.97	74.00	-28.03	359	200	Peak
7368.00	44.28	3.19	47.47	74.00	-26.53	203	100	Peak
9732.00	44.61	4.90	49.51	74.00	-24.49	104	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11b Mode / TX / CH High	Temp. & Humidity	28°C, 52%

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
2334.00	49.18	-0.65	48.53	74.00	-25.47	360	100	Peak
2390.00	46.56	-0.44	46.12	74.00	-27.88	272	100	Peak
4923.00	43.75	6.38	50.13	74.00	-23.87	143	200	Peak
5088.00	39.34	6.83	46.17	74.00	-27.83	181	200	Peak
7356.00	43.76	3.18	46.94	74.00	-27.06	125	100	Peak
9528.00	44.52	4.73	49.25	74.00	-24.75	80	100	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
2324.00	49.32	-0.69	48.63	74.00	-25.37	220	100	Peak
2390.00	46.35	-0.44	45.91	74.00	-28.09	269	200	Peak
4923.00	42.39	6.38	48.77	74.00	-25.23	295	200	Peak
5190.00	38.65	7.03	45.68	74.00	-28.32	332	200	Peak
7356.00	44.53	3.18	47.71	74.00	-26.29	289	100	Peak
9336.00	45.13	4.60	49.73	74.00	-24.27	114	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11g Mode / TX / CH Low	Temp. & Humidity	28°C, 52%

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
2134.00	49.60	-1.39	48.21	74.00	-25.79	304	200	Peak
2484.00	47.68	-0.10	47.58	74.00	-26.42	242	100	Peak
3696.00	40.77	2.67	43.44	74.00	-30.56	239	200	Peak
4827.00	39.65	6.05	45.70	54.00	-8.30	205	200	Average
4827.00	50.28	6.05	56.33	74.00	-17.67	205	200	Peak
7236.00	42.26	3.12	45.38	74.00	-28.62	99	200	Peak
10716.00	44.25	6.66	50.91	74.00	-23.09	253	100	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
2146.00	48.89	-1.34	47.55	74.00	-26.45	20	200	Peak
2484.00	47.06	-0.10	46.96	74.00	-27.04	49	100	Peak
3696.00	39.52	2.67	42.19	74.00	-31.81	181	200	Peak
4827.00	42.81	6.05	48.86	74.00	-25.14	360	200	Peak
7236.00	44.21	3.12	47.33	74.00	-26.67	118	100	Peak
10116.00	44.30	5.37	49.67	74.00	-24.33	191	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11g Mode / TX / CH Middle	Temp. & Humidity	28°C, 52%

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
2390.00	50.01	-0.44	49.57	74.00	-24.43	120	200	Peak
2484.00	47.60	-0.10	47.50	74.00	-26.50	99	200	Peak
4761.00	39.20	5.82	45.02	74.00	-28.98	191	100	Peak
4872.00	42.55	6.20	48.75	54.00	-5.25	143	200	Average
4872.00	53.89	6.20	60.09	74.00	-13.91	143	200	Peak
7320.00	45.00	3.16	48.16	74.00	-25.84	327	200	Peak
9276.00	44.94	4.56	49.50	74.00	-24.50	289	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
2326.00	50.41	-0.68	49.73	74.00	-24.27	189	100	Peak
2390.00	47.48	-0.44	47.04	74.00	-26.96	194	100	Peak
2484.00	47.06	-0.10	46.96	74.00	-27.04	163	200	Peak
3696.00	39.29	2.67	41.96	74.00	-32.04	297	200	Peak
4878.00	38.24	6.23	44.47	54.00	-9.53	128	200	Average
4878.00	49.98	6.23	56.21	74.00	-17.79	128	200	Peak
7308.00	45.91	3.16	49.07	74.00	-24.93	12	200	Peak
9828.00	45.46	4.97	50.43	74.00	-23.57	77	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11g Mode / TX / CH High	Temp. & Humidity	28°C, 52%

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
2254.00	49.91	-0.95	48.96	74.00	-25.04	68	200	Peak
2390.00	47.20	-0.44	46.76	74.00	-27.24	68	200	Peak
4248.00	39.27	4.24	43.51	74.00	-30.49	123	200	Peak
4926.00	46.09	6.39	52.48	74.00	-21.52	137	200	Peak
7392.00	44.11	3.20	47.31	74.00	-26.69	358	100	Peak
10020.00	46.33	5.15	51.48	74.00	-22.52	340	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
2244.00	51.09	-0.98	50.11	74.00	-23.89	194	200	Peak
2390.00	46.44	-0.44	46.00	74.00	-28.00	253	100	Peak
4371.00	39.32	4.57	43.89	74.00	-30.11	50	200	Peak
4929.00	45.09	6.40	51.49	74.00	-22.51	117	200	Peak
7392.00	44.35	3.20	47.55	74.00	-26.45	99	200	Peak
9240.00	44.89	4.53	49.42	74.00	-24.58	169	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH Low	Temp. & Humidity	28°C, 52%

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
2208.00	49.25	-1.11	48.14	74.00	-25.86	182	100	Peak
2484.00	47.98	-0.10	47.88	74.00	-26.12	337	200	Peak
4293.00	38.89	4.36	43.25	74.00	-30.75	198	200	Peak
4824.00	36.47	6.04	42.51	54.00	-11.49	155	200	Average
4824.00	49.00	6.04	55.04	74.00	-18.96	155	200	Peak
7248.00	42.64	3.12	45.76	74.00	-28.24	312	200	Peak
10020.00	45.36	5.15	50.51	74.00	-23.49	145	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
2214.00	50.09	-1.09	49.00	74.00	-25.00	282	100	Peak
2484.00	47.42	-0.10	47.32	74.00	-26.68	73	100	Peak
4464.00	38.04	4.81	42.85	74.00	-31.15	129	200	Peak
4821.00	40.28	6.03	46.31	74.00	-27.69	7	200	Peak
7236.00	43.07	3.12	46.19	74.00	-27.81	80	200	Peak
9372.00	45.18	4.62	49.80	74.00	-24.20	344	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH Middle	Temp. & Humidity	28°C, 52%

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
2390.00	51.11	-0.44	50.67	74.00	-23.33	139	200	Peak
2484.00	50.06	-0.10	49.96	74.00	-24.04	111	200	Peak
4596.00	38.57	5.24	43.81	74.00	-30.19	52	100	Peak
4866.00	41.52	6.18	47.70	54.00	-6.30	148	200	Average
4866.00	54.60	6.18	60.78	74.00	-13.22	148	200	Peak
7308.00	45.00	3.16	48.16	74.00	-25.84	122	200	Peak
10824.00	44.22	6.88	51.10	74.00	-22.90	354	100	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
2390.00	47.68	-0.44	47.24	74.00	-26.76	346	200	Peak
2484.00	48.79	-0.10	48.69	74.00	-25.31	299	200	Peak
4191.00	39.02	4.09	43.11	74.00	-30.89	291	200	Peak
4869.00	37.90	6.19	44.09	54.00	-9.91	5	200	Average
4869.00	49.14	6.19	55.33	74.00	-18.67	5	200	Peak
7308.00	46.21	3.16	49.37	74.00	-24.63	114	200	Peak
10824.00	43.83	6.88	50.71	74.00	-23.29	292	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	Smart Home Outdoor Camera	Test By	Waternil Guan
Test Model	SVO-1601-220	Test Date	2016/08/27
Test Mode	IEEE 802.11gn HT20 MCS0 Mode / TX / CH High	Temp. & Humidity	28°C, 52%

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
2278.00	49.24	-0.86	48.38	74.00	-25.62	243	200	Peak
2390.00	47.69	-0.44	47.25	74.00	-26.75	113	200	Peak
4398.00	38.59	4.64	43.23	74.00	-30.77	311	100	Peak
4923.00	44.39	6.38	50.77	74.00	-23.23	200	200	Peak
7380.00	43.54	3.20	46.74	74.00	-27.26	138	100	Peak
9984.00	45.05	5.10	50.15	74.00	-23.85	114	200	Peak

966Chamber_C at 3Meter / Vertical

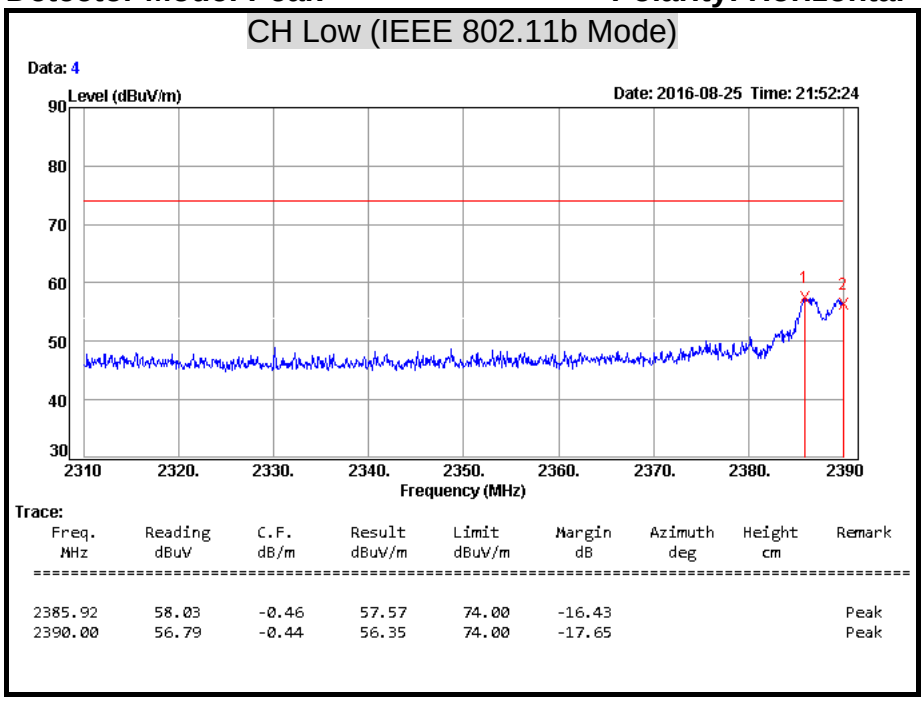
Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2236.00	49.87	-1.01	48.86	74.00	-25.14	110	200	Peak
2390.00	46.59	-0.44	46.15	74.00	-27.85	151	100	Peak
4341.00	39.06	4.49	43.55	74.00	-30.45	96	100	Peak
4923.00	43.98	6.38	50.36	74.00	-23.64	301	200	Peak
7392.00	43.97	3.20	47.17	74.00	-26.83	62	200	Peak
10668.00	44.50	6.56	51.06	74.00	-22.94	16	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**

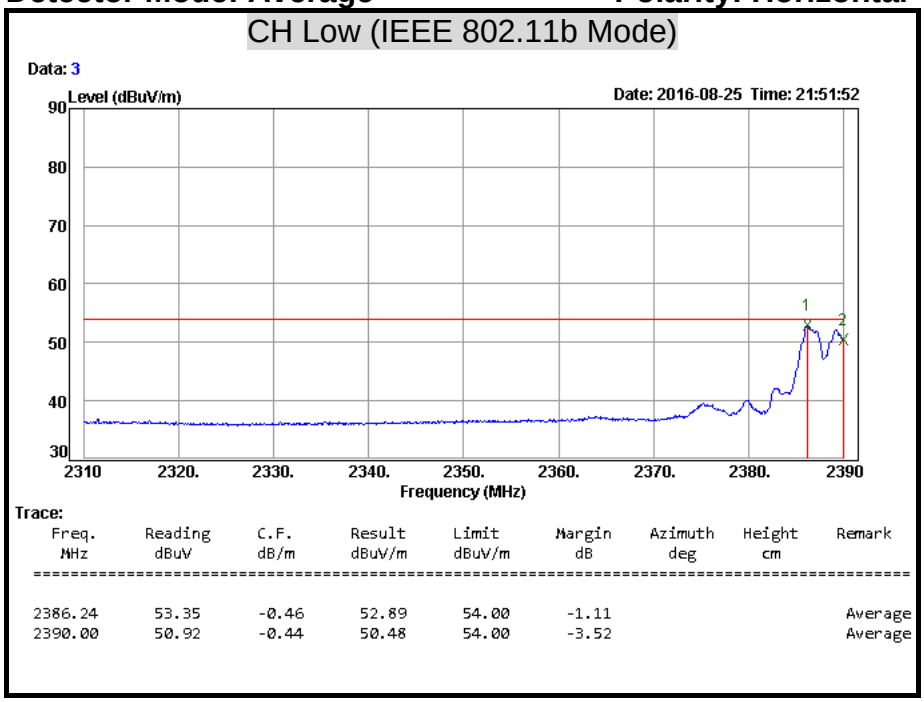


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2385.92	58.03	-0.46	57.57	74.00	-16.43			Peak
2390.00	56.79	-0.44	56.35	74.00	-17.65			Peak

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

Detector Mode: Average **Polarity: Horizontal**

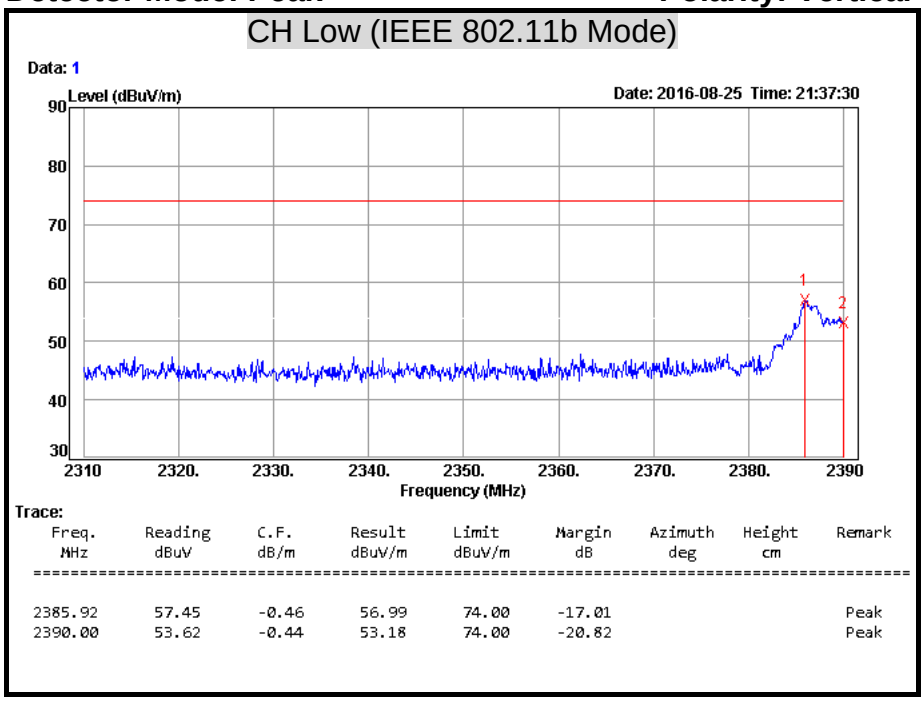


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2386.24	53.35	-0.46	52.89	54.00	-1.11			Average
2390.00	50.92	-0.44	50.48	54.00	-3.52			Average

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

Detector Mode: Peak **Polarity: Vertical**

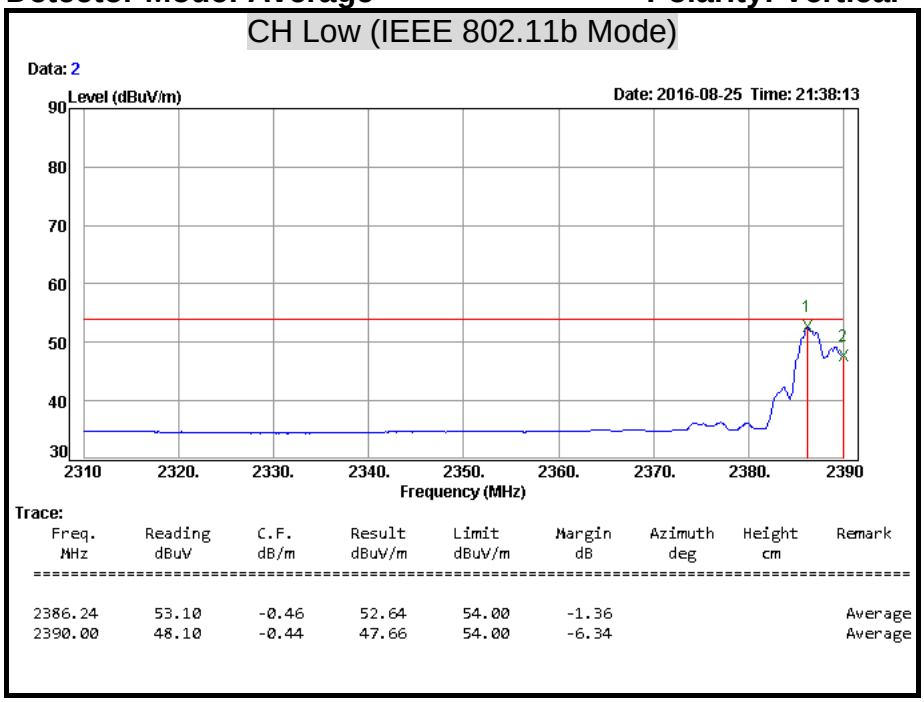


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2385.92	57.45	-0.46	56.99	74.00	-17.01			Peak
2390.00	53.62	-0.44	53.18	74.00	-20.82			Peak

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

Detector Mode: Average **Polarity: Vertical**

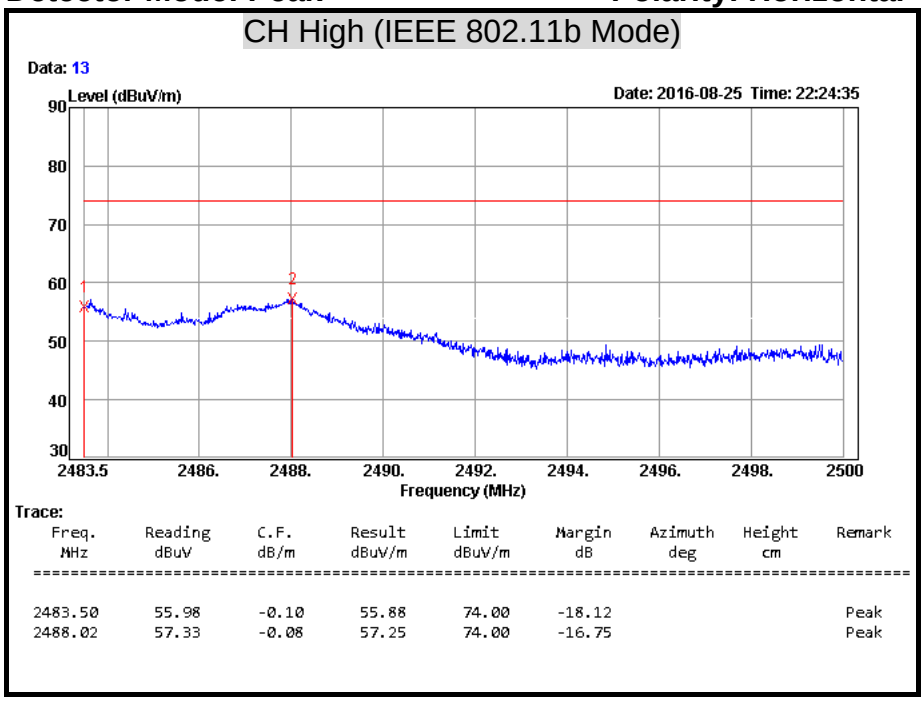


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2386.24	53.10	-0.46	52.64	54.00	-1.36			Average
2390.00	48.10	-0.44	47.66	54.00	-6.34			Average

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

Detector Mode: Peak **Polarity: Horizontal**

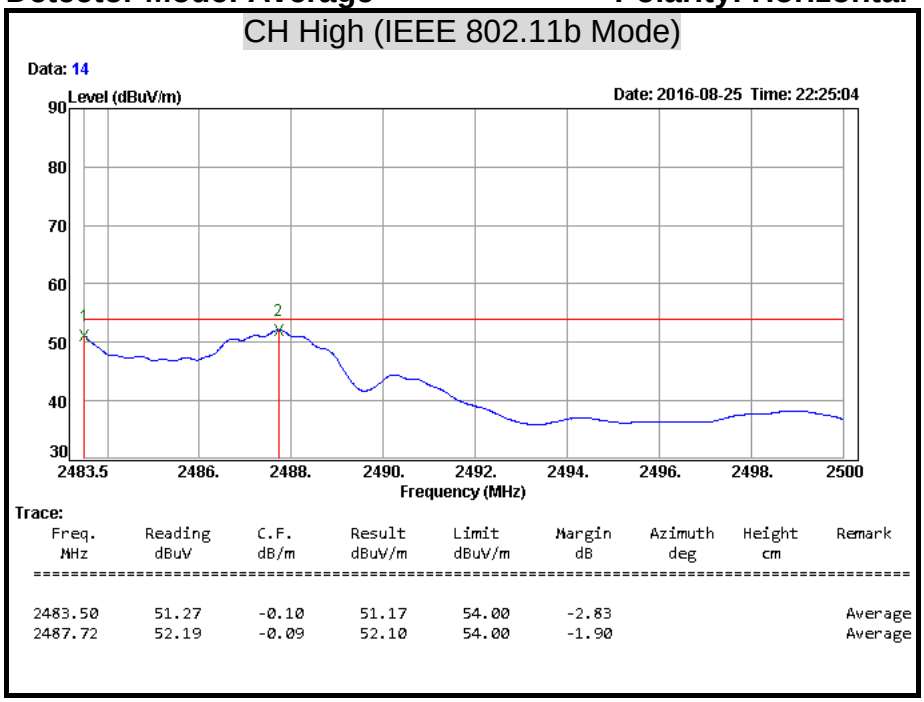


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	55.98	-0.10	55.88	74.00	-18.12			Peak
2488.02	57.33	-0.08	57.25	74.00	-16.75			Peak

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

Detector Mode: Average **Polarity: Horizontal**

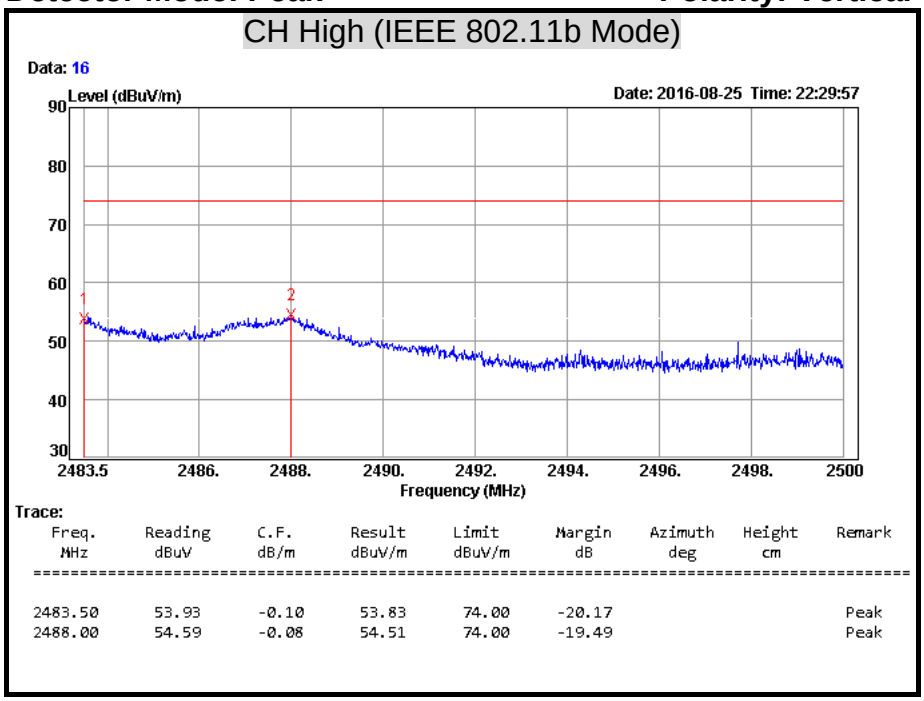


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	51.27	-0.10	51.17	54.00	-2.83			Average
2487.72	52.19	-0.09	52.10	54.00	-1.90			Average

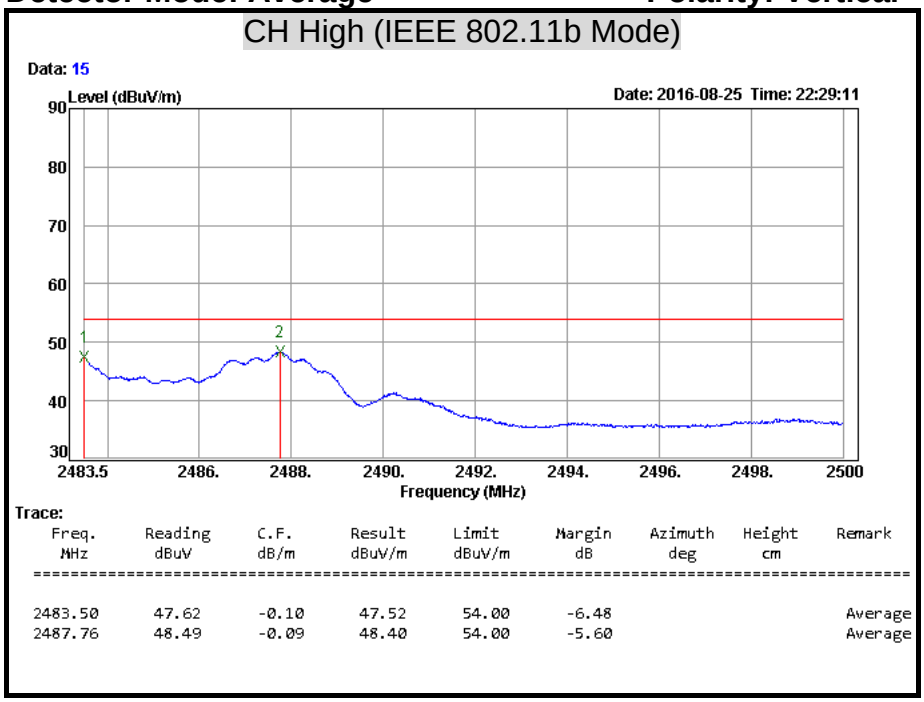
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**



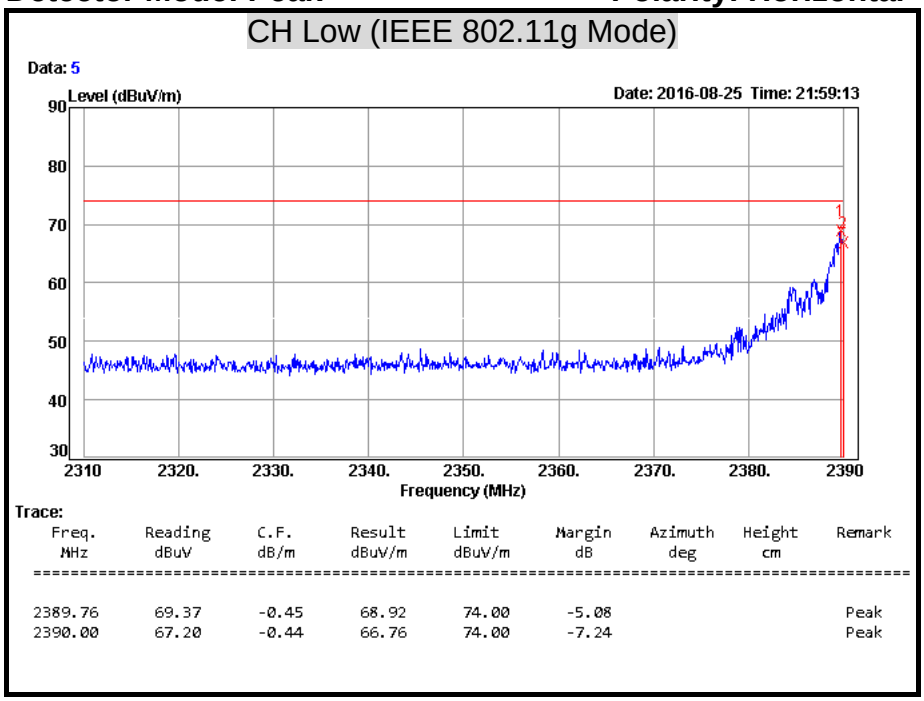
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



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

Detector Mode: Peak **Polarity: Horizontal**

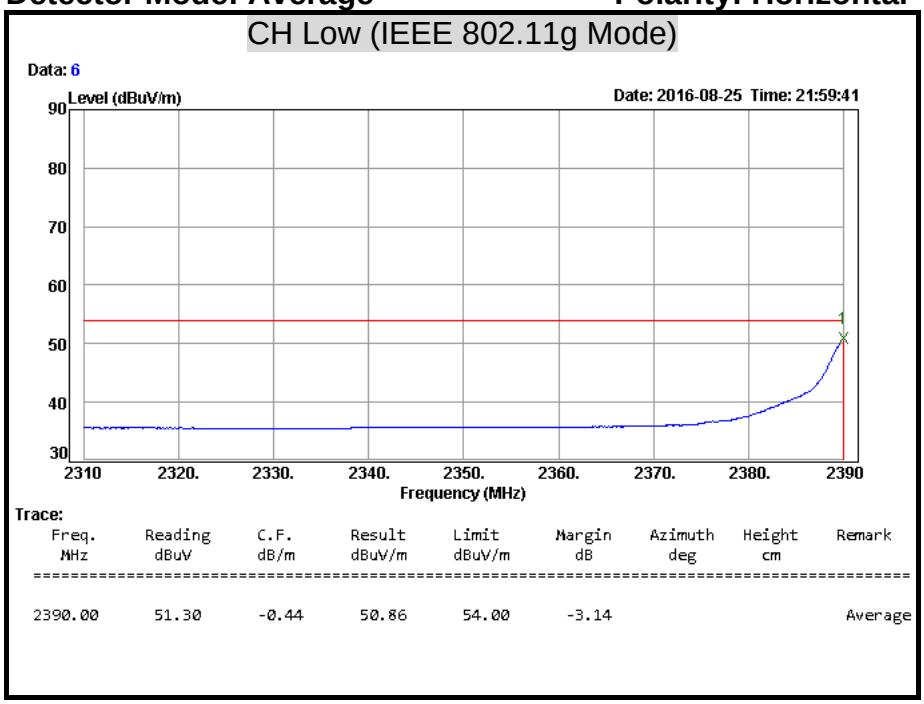


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.76	69.37	-0.45	68.92	74.00	-5.08			Peak
2390.00	67.20	-0.44	66.76	74.00	-7.24			Peak

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

Detector Mode: Average **Polarity: Horizontal**

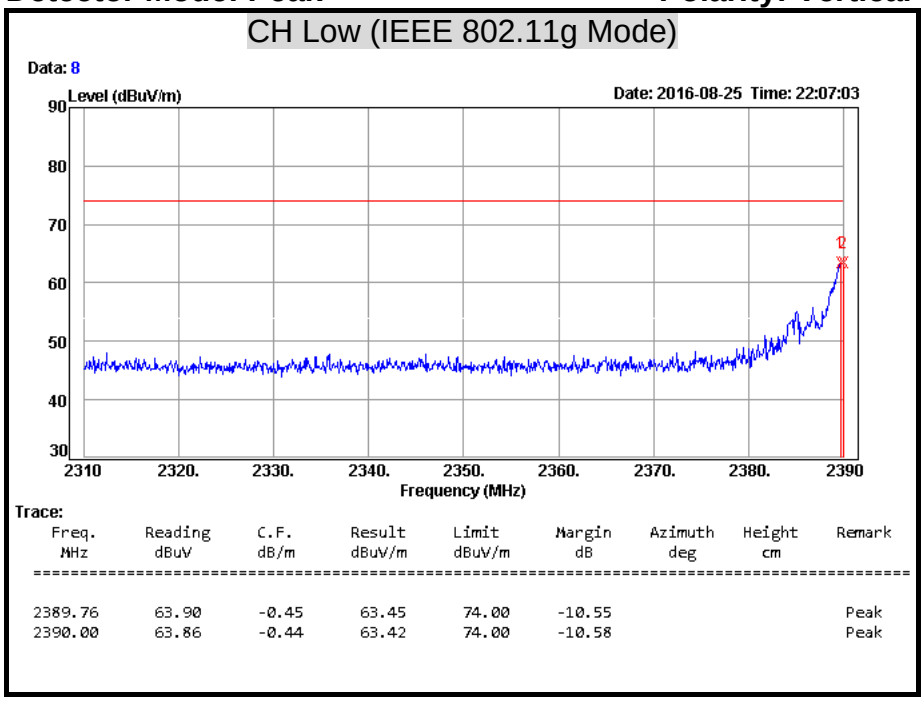


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	51.30	-0.44	50.86	54.00	-3.14			Average

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

Detector Mode: Peak **Polarity: Vertical**

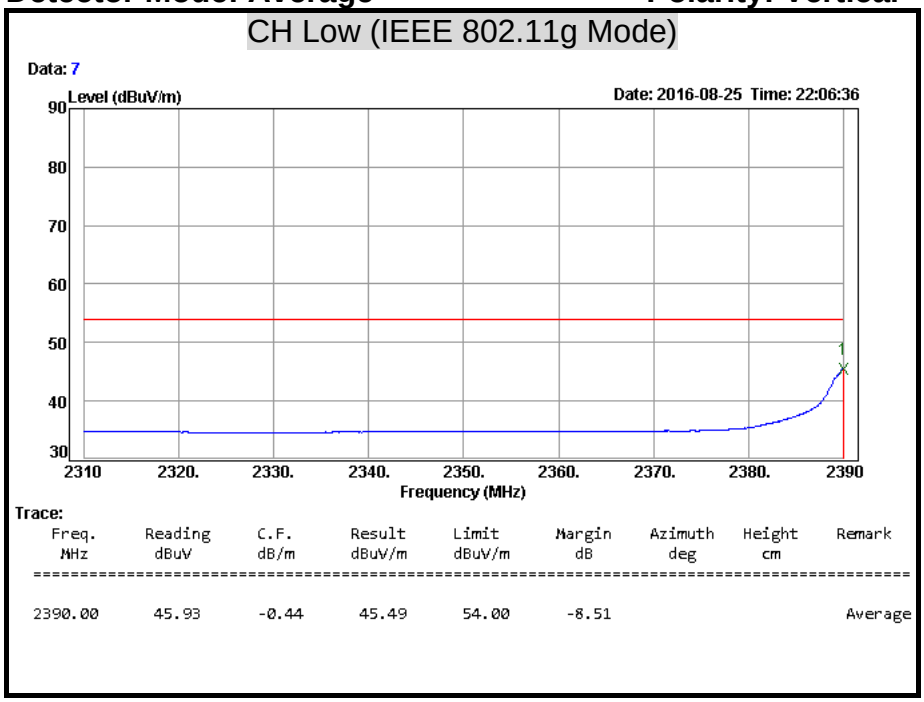


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2389.76	63.90	-0.45	63.45	74.00	-10.55			Peak
2390.00	63.86	-0.44	63.42	74.00	-10.58			Peak

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

Detector Mode: Average **Polarity: Vertical**

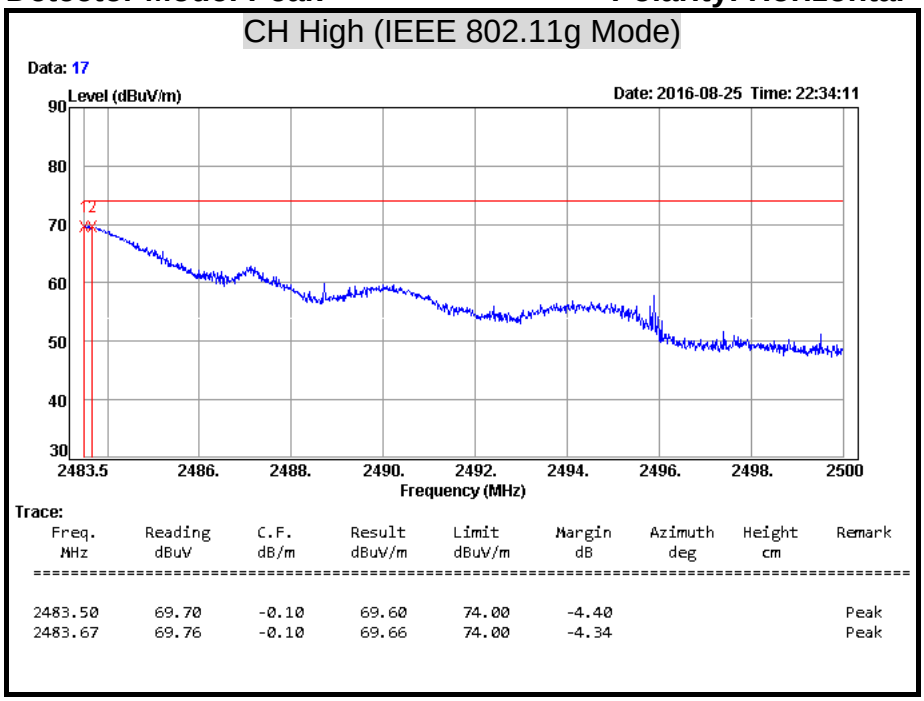


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	45.93	-0.44	45.49	54.00	-8.51			Average

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

Detector Mode: Peak **Polarity: Horizontal**

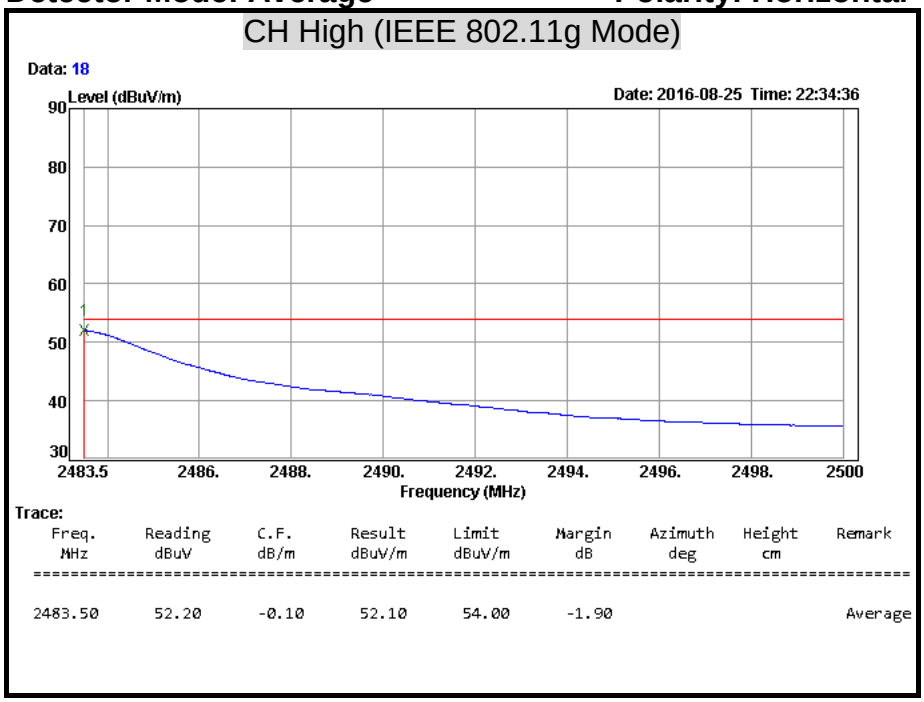


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	69.70	-0.10	69.60	74.00	-4.40			Peak
2483.67	69.76	-0.10	69.66	74.00	-4.34			Peak

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

Detector Mode: Average **Polarity: Horizontal**

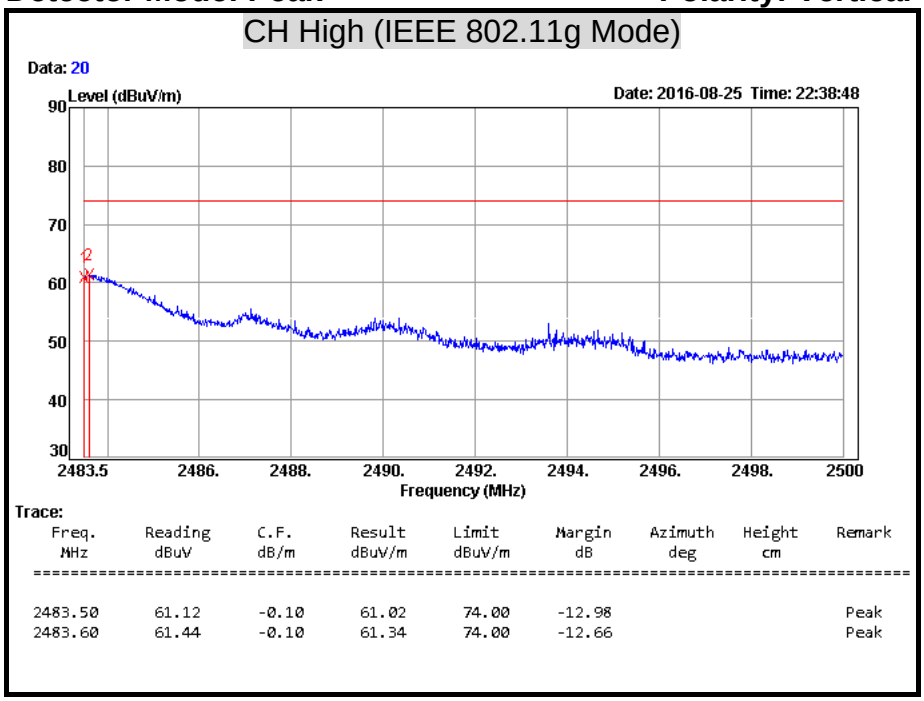


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	52.20	-0.10	52.10	54.00	-1.90			Average

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

Detector Mode: Peak **Polarity: Vertical**

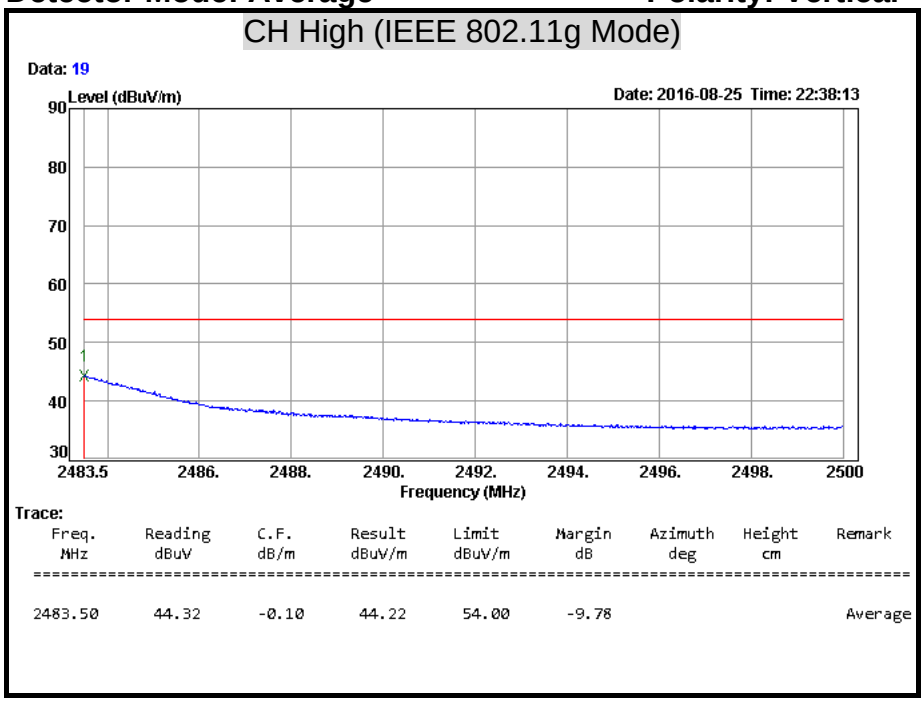


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	61.12	-0.10	61.02	74.00	-12.98			Peak
2483.60	61.44	-0.10	61.34	74.00	-12.66			Peak

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

Detector Mode: Average **Polarity: Vertical**



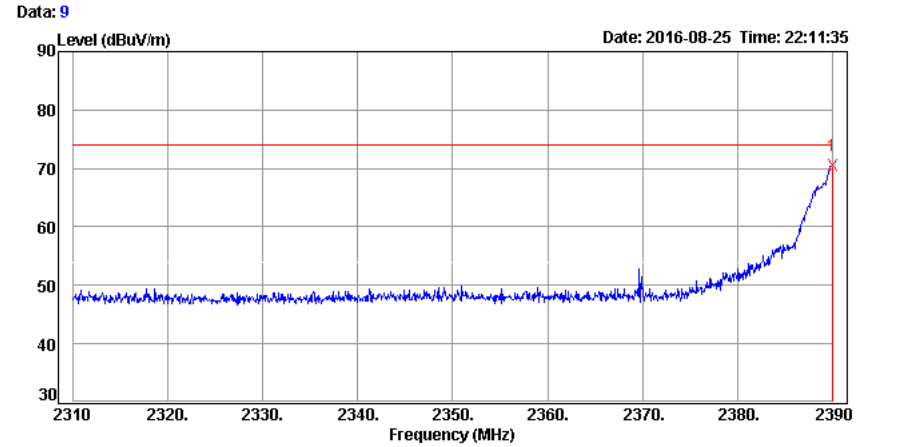
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	44.32	-0.10	44.22	54.00	-9.78			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)



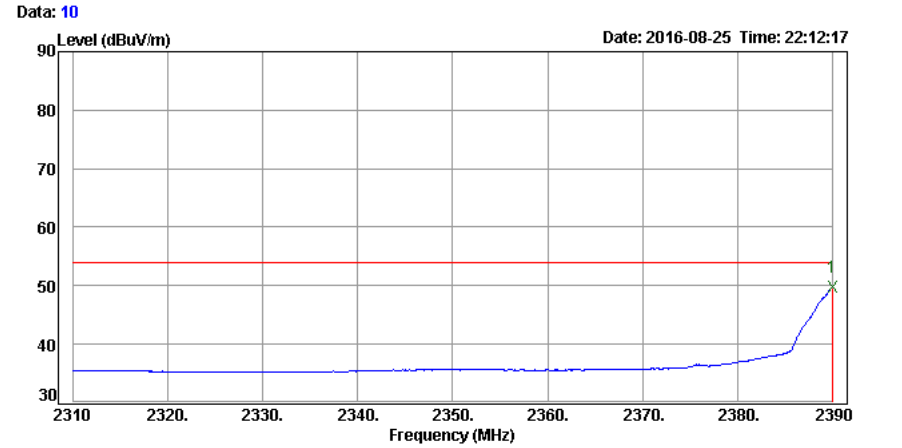
Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	70.89	-0.44	70.45	74.00	-3.55			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)

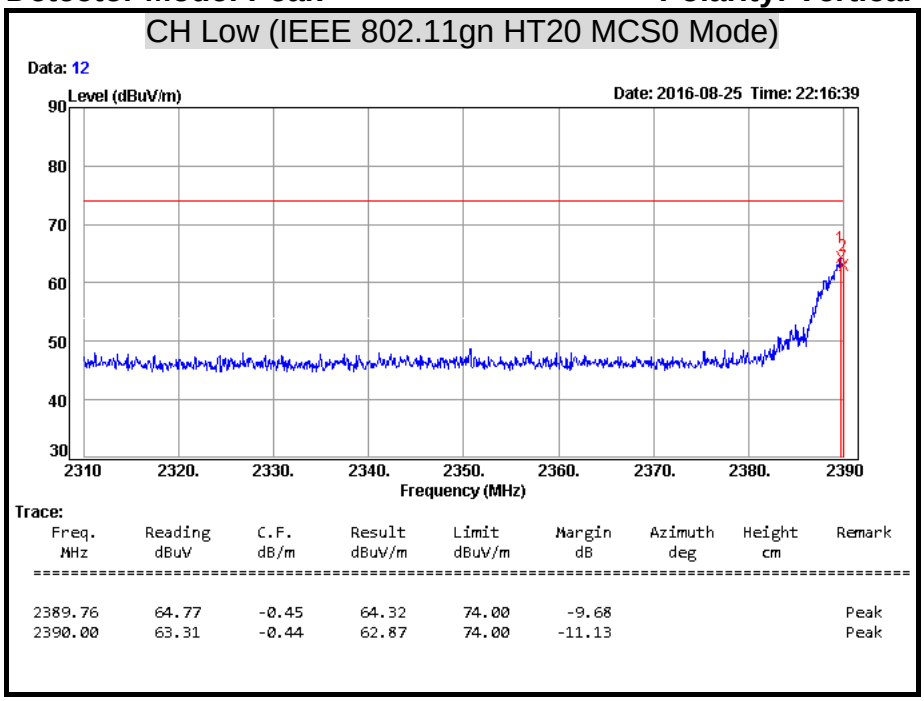


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2390.00	50.07	-0.44	49.63	54.00	-4.37			Average

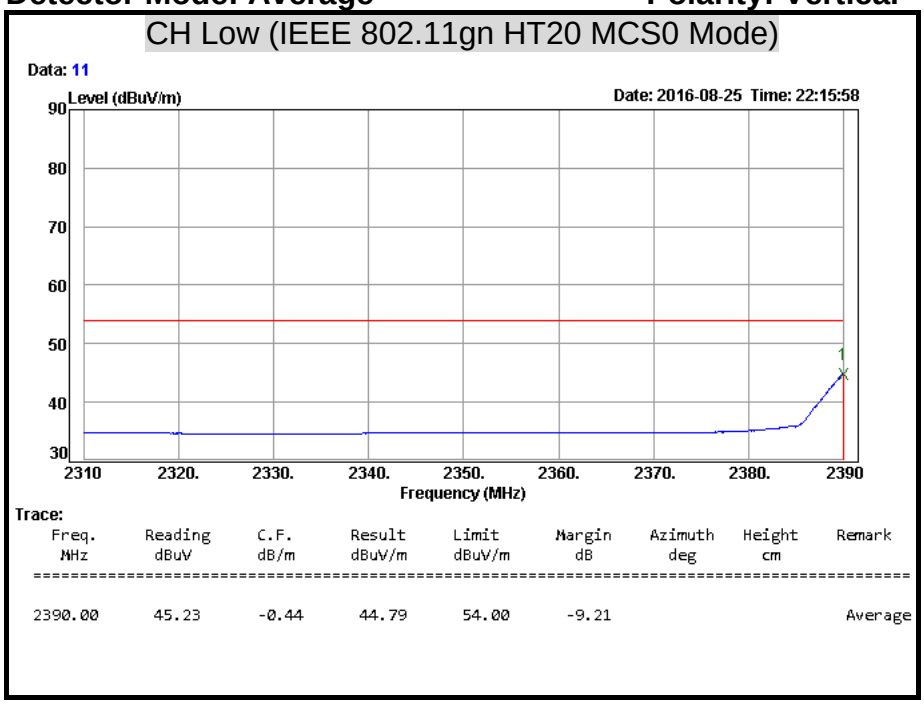
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

Detector Mode: Peak **Polarity: Vertical**



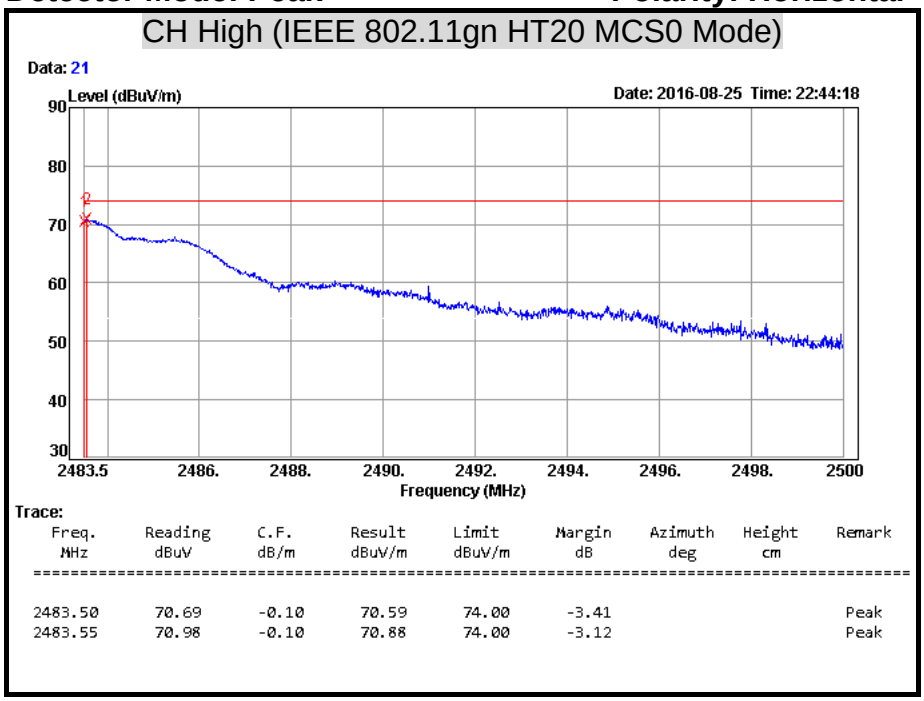
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark Peak = Result(PK) – Limit(PK)

Detector Mode: Average **Polarity: Vertical**



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

Detector Mode: Peak **Polarity: Horizontal**

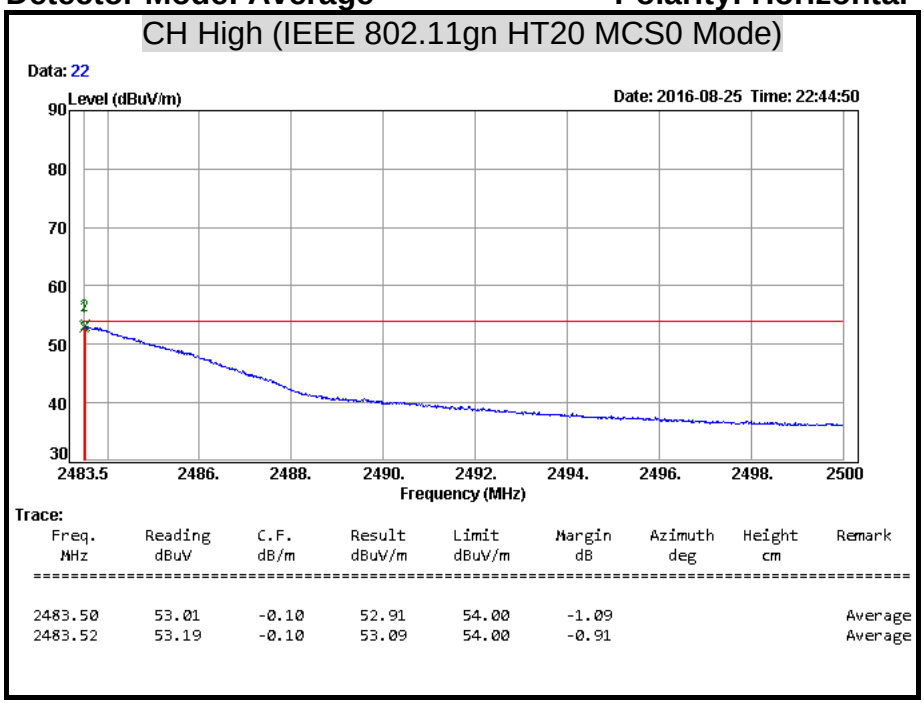


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	70.69	-0.10	70.59	74.00	-3.41			Peak
2483.55	70.98	-0.10	70.88	74.00	-3.12			Peak

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

Detector Mode: Average **Polarity: Horizontal**

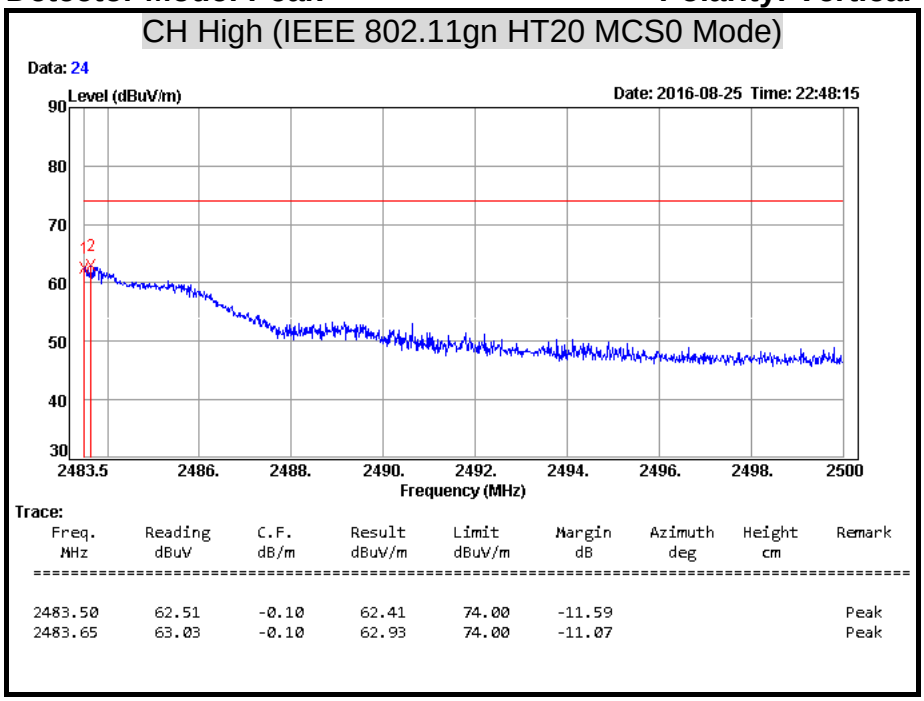


Trace:

Freq. MHz	Reading dBuV	C.F. dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Azimuth deg	Height cm	Remark
2483.50	53.01	-0.10	52.91	54.00	-1.09			Average
2483.52	53.19	-0.10	53.09	54.00	-0.91			Average

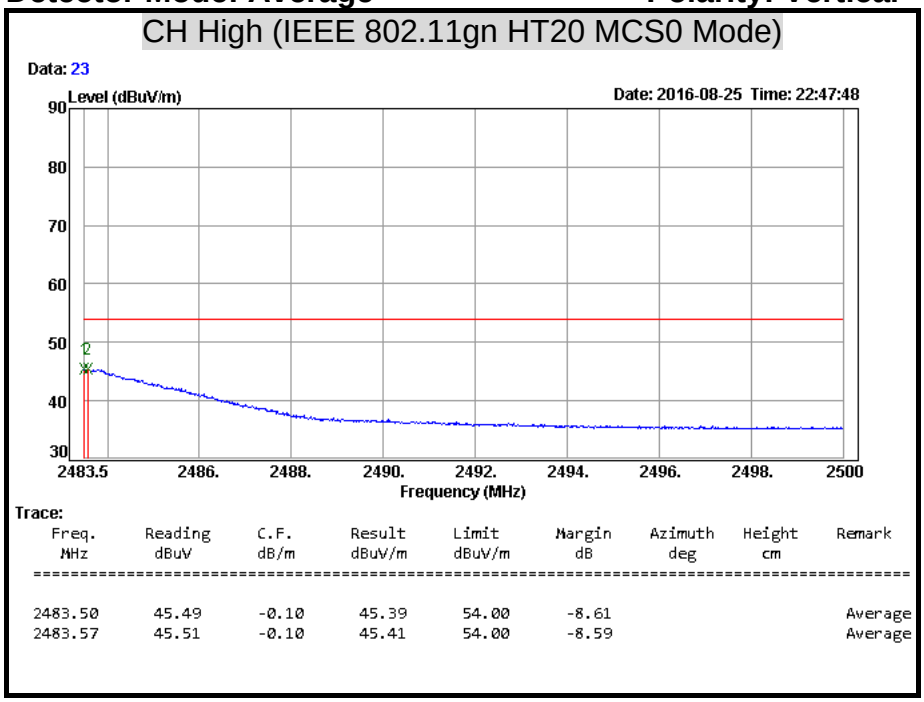
Remark: *Result = Reading + Correction Factor*
Margin = Result – Limit
Remark AVG = Result(AV) – Limit(AV)

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)

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.

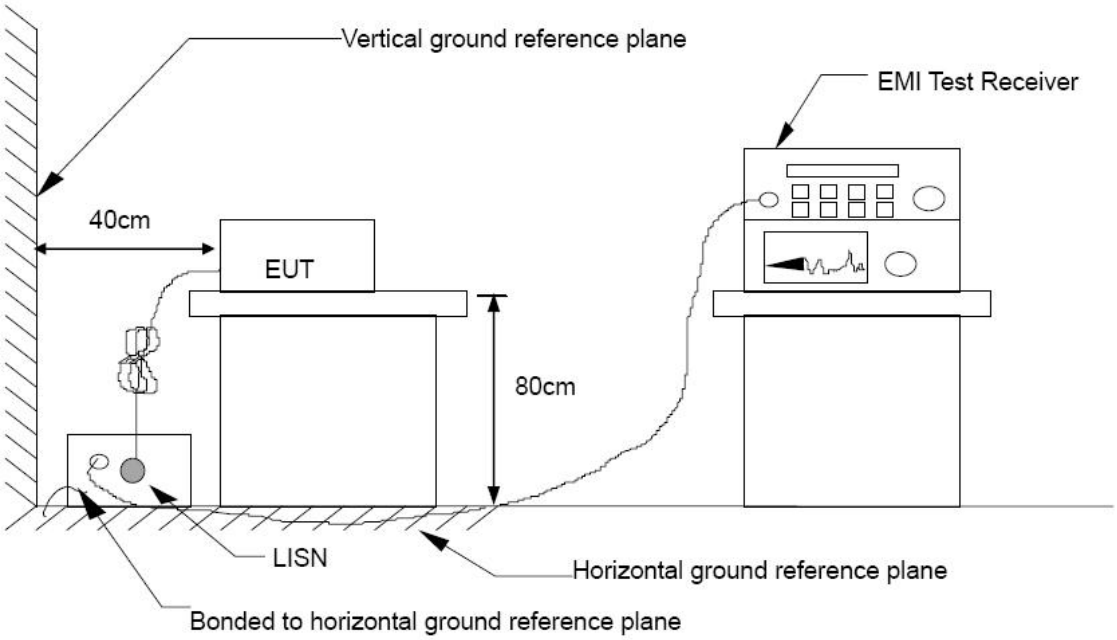
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

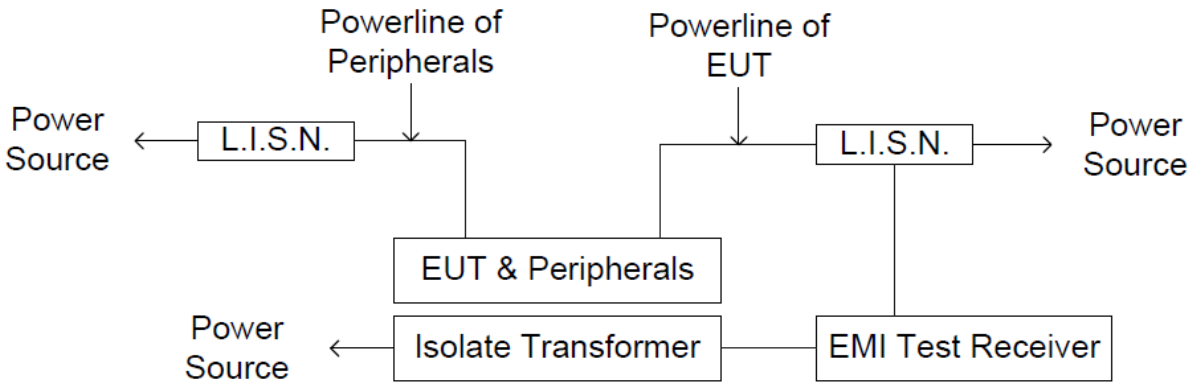
TEST EQUIPMENT

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	10/31/2016
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





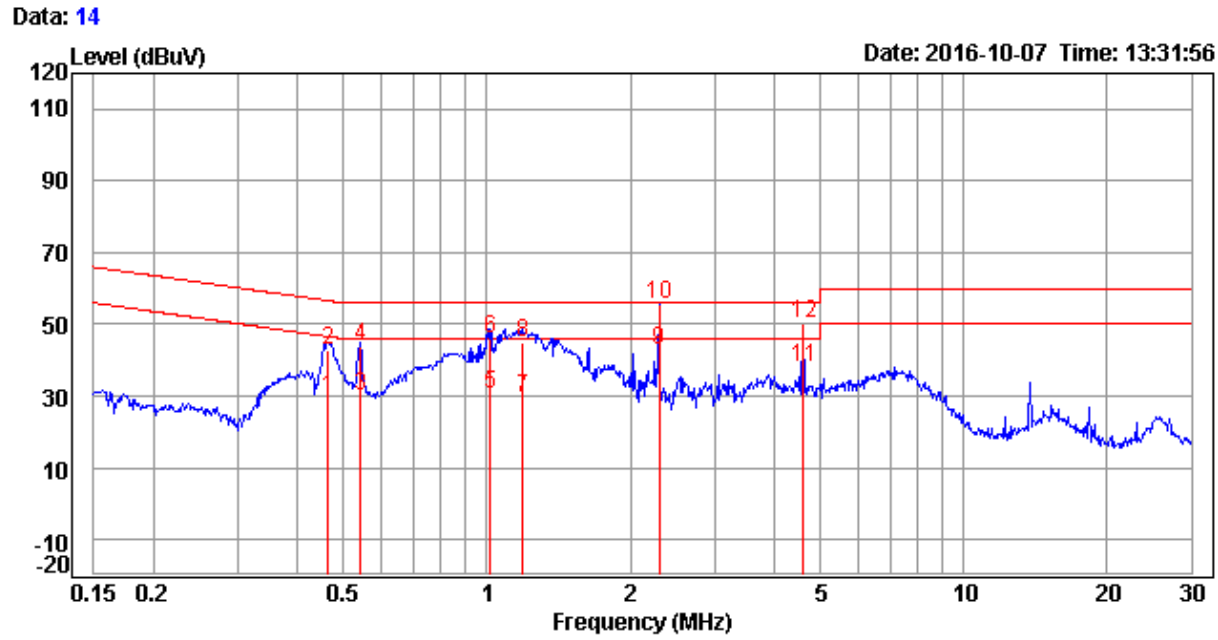
TEST PROCEDURE

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	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/10/07
Test Mode	Mode 1	Temp. & Humidity	28°C, 50%

LINE



Trace:

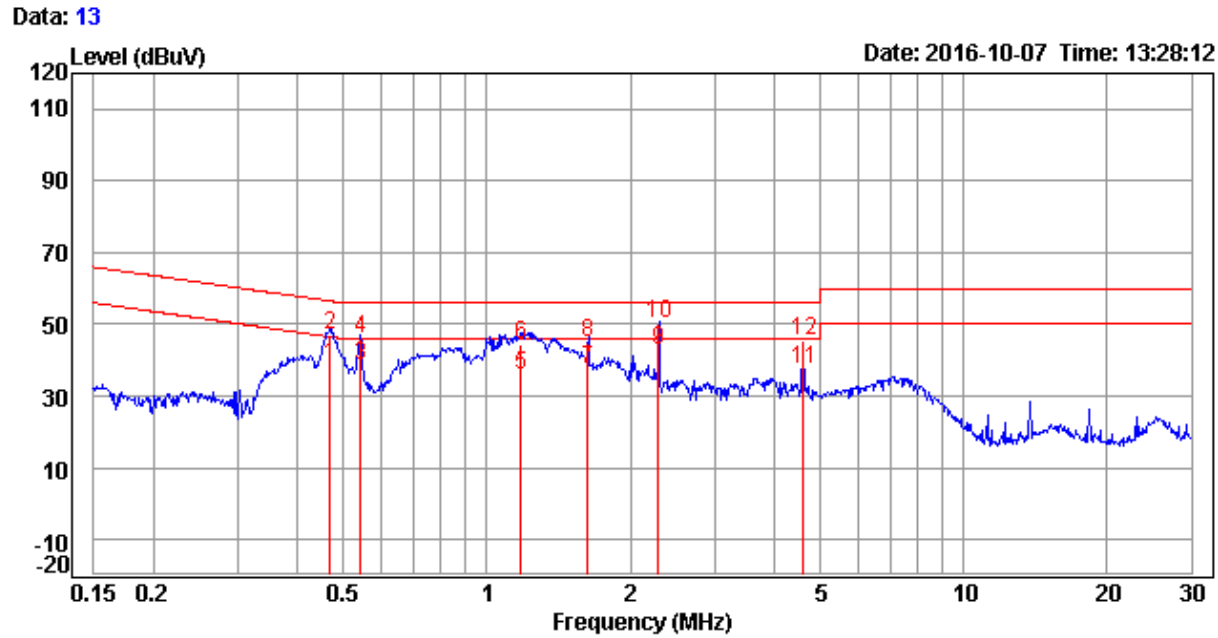
Freq. MHz	Reading dBuV Q.P.	Reading dBuV AV.	C.F. dB	Result dBuV Q.P.	Result dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.466	32.80	19.83	9.82	42.62	29.65	56.59	46.59	-13.97	-16.94
0.541	33.94	20.06	9.84	43.78	29.90	56.00	46.00	-12.22	-16.10
1.018	35.79	20.66	9.97	45.76	30.63	56.00	46.00	-10.24	-15.37
1.184	35.15	19.31	9.98	45.13	29.29	56.00	46.00	-10.87	-16.71
2.295	45.46	32.65	10.05	55.51	42.70	56.00	46.00	-0.49	-3.30
4.588	40.29	27.99	10.18	50.47	38.17	56.00	46.00	-5.53	-7.83

Remark:

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

Product Name	Smart Home Outdoor Camera	Test By	Crystal Wu
Test Model	SVO-1601-220	Test Date	2016/10/07
Test Mode	Mode 1	Temp. & Humidity	28°C, 50%

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.
0.470	37.13	28.94	9.84	46.97	38.78	56.51	46.51	-9.54	-7.73
0.544	36.11	28.84	9.85	45.96	38.69	56.00	46.00	-10.04	-7.31
1.172	34.37	25.86	9.97	44.34	35.83	56.00	46.00	-11.66	-10.17
1.630	34.89	27.57	10.01	44.90	37.58	56.00	46.00	-11.10	-8.42
2.294	40.46	32.76	10.07	50.53	42.83	56.00	46.00	-5.47	-3.17
4.588	35.50	27.34	10.19	45.69	37.53	56.00	46.00	-10.31	-8.47

Remark:

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