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

For

IoT Gateway System

Model : SYS-E100-8QE-AWE3

Data Applies To : SYS-E100-8Q-AWE3 ; SYS-E100-8Q-E3 ; SYS-E100-8QE-E3 ; SYS-E100-8Q-AW ; SYS-E100-8QE-AW

Trade Name : Supermicro

Issued for

Super Micro Computer, Inc.

980 Rock Avenue, San Jose, CA 95131, USA

Issued by

Compliance Certification Services Inc.
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Issued Date: June 30, 2015

Testing Laboratory
0240

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	06/30/2015	Initial Issue	All Page 143	Dola Hsieh

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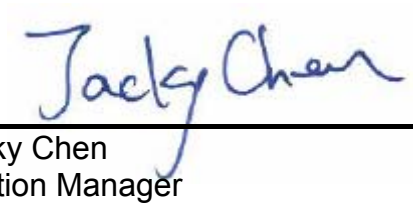
1. TEST REPORT CERTIFICATION

Applicant	:	Super Micro Computer, Inc.
Address	:	980 Rock Avenue, San Jose, CA 95131, USA
Equipment Under Test	:	IoT Gateway System
Model	:	SYS-E100-8QE-AWE3
Data Applies To	:	SYS-E100-8Q-AWE3 ; SYS-E100-8Q-E3 ; SYS-E100-8QE-E3 ; SYS-E100-8Q-AW ; SYS-E100-8QE-AW
Trade Name	:	Supermicro
Tested Date	:	May 04 ~ June 17, 2015

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: ***Reviewed by:***



Jacky Chen
Section Manager

Sb. Lu
Sr. Engineer

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2. EUT DESCRIPTION

Product Name	IoT Gateway System
Model Number	SYS-E100-8QE-AWE3
Data Applies To	SYS-E100-8Q-AWE3 ; SYS-E100-8Q-E3 ; SYS-E100-8QE-E3 ; SYS-E100-8Q-AW ; SYS-E100-8QE-AW
Identify Number	T150504D11
Received Date	May 04, 2015
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 : 2412MHz ~ 2462MHz IEEE 802.11gn HT40 : 2422MHz ~ 2452MHz Bluetooth 4.0 : 2402MHz ~ 2480MHz Zigbee : 2405MHz ~ 2480MHz
Transmit Power	IEEE 802.11b : 20.75 dBm (0.1189 W) IEEE 802.11g : 23.67 dBm (0.2328 W) IEEE 802.11gn HT20 : 23.38 dBm (0.2178 W) IEEE 802.11gn HT40 : 22.65 dBm (0.1841 W) Bluetooth 4.0 : 5.96 dBm (0.0039W) Zigbee 1 : 18.39 dBm (0.0690W) Zigbee 2 : 19.26 dBm (0.0843W)
Channel Spacing	IEEE 802.11b/g, 802.11gn HT20/HT40 : 5MHz Bluetooth 4.0: 2MHz Zigbee : 5MHz
Channel Number	IEEE 802.11b/g, 802.11gn HT20 : 11 Channels IEEE 802.11gn HT40 : 7 Channels Bluetooth 4.0 : 40 Channels Zigbee : 16 Channels
Transmit Data Rate	IEEE 802.11b : up to 11 Mbps IEEE 802.11g : up to 54 Mbps IEEE 802.11gn (HT20,800ns GI) : up to 65.00 Mbps IEEE 802.11gn (HT20,400ns GI) : up to 72.20 Mbps IEEE 802.11gn (HT40,800ns GI) : up to 135.00 Mbps IEEE 802.11gn (HT40,400ns GI) : up to 150.00 Mbps Bluetooth 4.0 : 1Mbps Zigbee : 250kbps
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11gn HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK) Bluetooth 4.0 : GFSK Zigbee : OQPSK

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Antenna Type	WiFi & Bluetooth 4.0: Dipole Antenna × 2 (Diversity) Antenna 1(Main) Gain : 2.6 dBi Antenna 2(Aux) Gain : 2.6 dBi Zigbee 1 : Dipole Antenna × 1, Antenna Gain : 3.1 dBi Zigbee 2 : Dipole Antenna × 1, Antenna Gain : 3.1 dBi
Power Rating	12Vdc
Test Voltage	120Vac, 60Hz
DC Power Cable Type	Non-shielded cable, 1.3m × 1 (Detachable), with two ferrite core
I/O Port	RJ-45 Port × 2, USB Port × 2, Power Port × 1, RS232 Port × 3 , Signal Port × 1

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	SINPRO	IPU15-105	100-240Vac, 47-63Hz, 0.4A	12Vdc, 1.25A max.

The difference of the model :

Model Number	Difference		
	Fuction	Motherboard	Operating Temperature
SYS-E100-8QE-AWE3	WIFI+Zigbee	A1SQN-E	-20°C to 50°C
SYS-E100-8Q-AWE3	WIFI+Zigbee	A1SQN	0°C to 50°C
SYS-E100-8Q-E3	Zigbee	A1SQN	0°C to 50°C
SYS-E100-8QE-E3	Zigbee	A1SQN-E	-20°C to 50°C
SYS-E100-8Q-AW	WIFI	A1SQN	0°C to 50°C
SYS-E100-8QE-AW	WIFI	A1SQN-E	-20°C to 50°C

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 models SYS-E100-8QE-AWE3 was considered the main model for testing.*
4. *This submittal(s) (test report) is intended for FCC ID: 2AEVX-E100AWE3 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*

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3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n transceiver in IoT Gateway System form factor.
For IEEE 802.11b/g, 802.11gn HT20/HT40 mode (1TX / 1RX diversity) :
Ant. 1 or Ant. 2 transmit/receive, Ant. 1/Main (worst case) were chosen for full testing.
For Bluetooth 4.0 mode (1TX / 1RX diversity) :
Ant. 1 or Ant. 2 transmit/receive, Ant. 1/Main (worst case) were chosen for full testing.
For Zigbee 1 & 2 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	TX Mode

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.

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IEEE 802.11gn HT40 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

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

Bluetooth 4.0 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2402
Middle	2440
High	2480

Zigbee Mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2405
Middle	2440
High	2480

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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, 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.*

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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.

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	Notebook PC	HP	ProBook 4421s	CNF03242PJ

No.	Signal Cable Description
1	Shielded RS232 cable 1.5 m × 1
2	Non-Shielded USB cable 0.2 m × 1

SETUP DIAGRAM FOR TESTS

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

EUT OPERATING CONDITION

WiFi

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run Test software. “artqui”

TX Mode:

⇨ **Tx Data Rate:** 1Mbps Bandwidth 20 (IEEE 802.11b mode)
6Mbps Bandwidth 20 (IEEE 802.11g mode)
6.5Mbps Bandwidth 20 (IEEE 802.11gn HT20 mode)
13.5Mbps Bandwidth 40 (IEEE 802.11gn HT40 mode)

⇨ **Power control**

IEEE 802.11b Channel Low (2412MHz) Power set 59
IEEE 802.11b Channel Mid (2437MHz) Power set 63
IEEE 802.11b Channel High (2462MHz) Power set 59
IEEE 802.11g Channel Low (2412MHz) Power set 60
IEEE 802.11g Channel Mid (2437MHz) Power set 63
IEEE 802.11g Channel High (2462MHz) Power set 58
IEEE 802.11gn HT20 Channel Low (2412MHz) Power set 60
IEEE 802.11gn HT20 Channel Mid (2437MHz) Power set 63
IEEE 802.11gn HT20 Channel High (2462MHz) Power set 58
IEEE 802.11gn HT40 Channel Low (2422MHz) Power set 52
IEEE 802.11gn HT40 Channel Mid (2437MHz) Power set 62
IEEE 802.11gn HT40 Channel High (2452MHz) Power set 57

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

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Bluetooth 4.0

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run “REALTEK 11n 8723BE PCIE WLAN NIC” to test
3. PACKET TRANSMIT (TX Mode)
   Freq: 2402, 2440, 2480 (Channel 0 ,19 ,39)
   DataRate =LE
4. All of the functions are under run.
5. Start test

Zigbee 1

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run Test software “Command”
3. Channel Low (2405MHz)
4. Channel Mid (2440MHz)
5. Channel High (2480MHz)
6. All of the functions are under run.
7. Start test.

Zigbee 2

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run Test software “Command”
3. Channel Low (2405MHz)
4. Channel Mid (2440MHz)
5. Channel High (2480MHz)
6. All of the functions are under run.
7. Start test.

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7. FCC PART 15.247 REQUIREMENTS

7.1 6dB BANDWIDTH

LIMITS

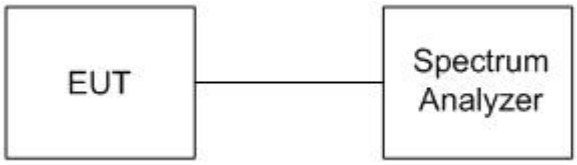
§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/19/2016
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/04/2016

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.

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TEST RESULTS

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	10.0800	500	PASS
Middle	2437	10.0800	500	PASS
High	2462	10.0800	500	PASS

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.5800	500	PASS
Middle	2437	16.5700	500	PASS
High	2462	16.5700	500	PASS

IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	17.8400	500	PASS
Middle	2437	17.8200	500	PASS
High	2462	17.8200	500	PASS

IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2422	36.4200	500	PASS
Middle	2437	36.4300	500	PASS
High	2452	36.4300	500	PASS

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Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2402	796.8	500	PASS
Middle	2440	796.8	500	PASS
High	2480	786.6	500	PASS

Zigbee 1 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2405	1.5770	500	PASS
Middle	2440	1.5630	500	PASS
High	2480	1.6120	500	PASS

Zigbee 2 Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2405	1.6080	500	PASS
Middle	2440	1.6180	500	PASS
High	2480	1.6200	500	PASS

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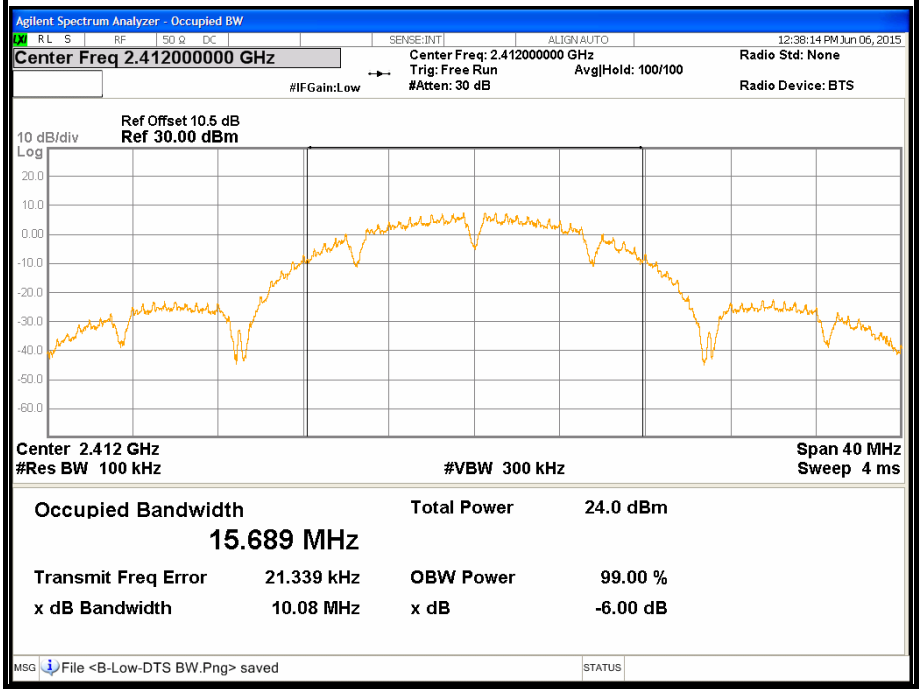
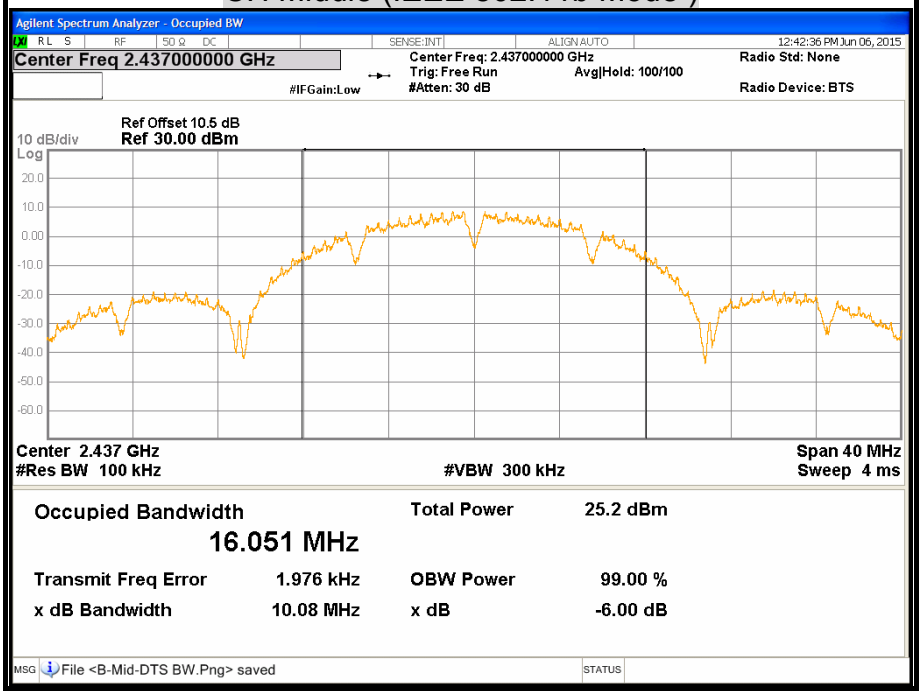
6dB BANDWIDTH

CH Low (IEEE 802.11b Mode)



CH Middle (IEEE 802.11b Mode)



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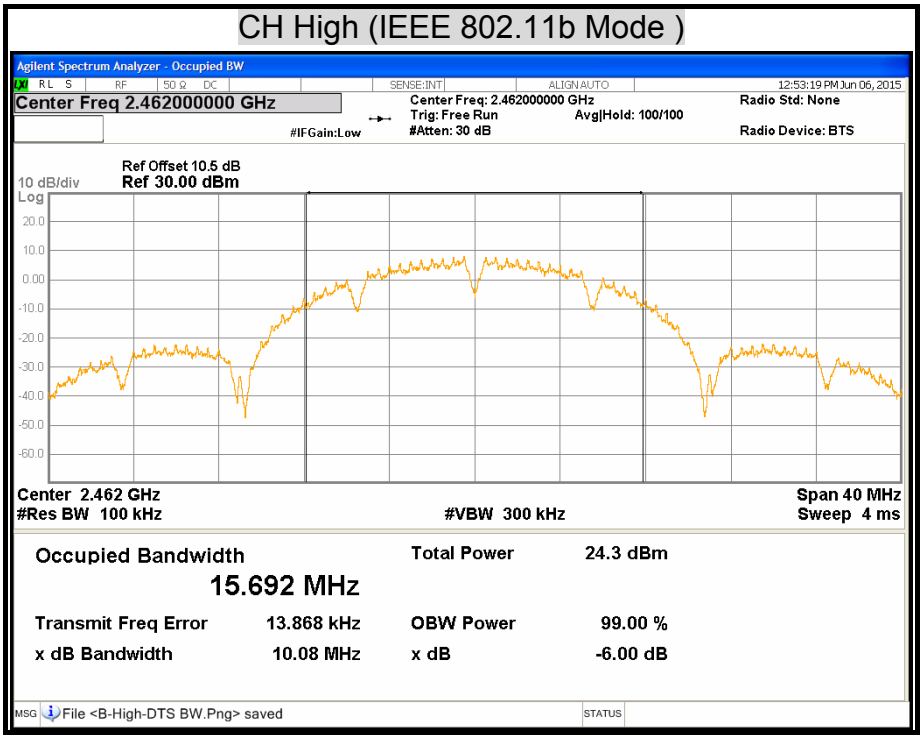
CH High (IEEE 802.11b Mode)



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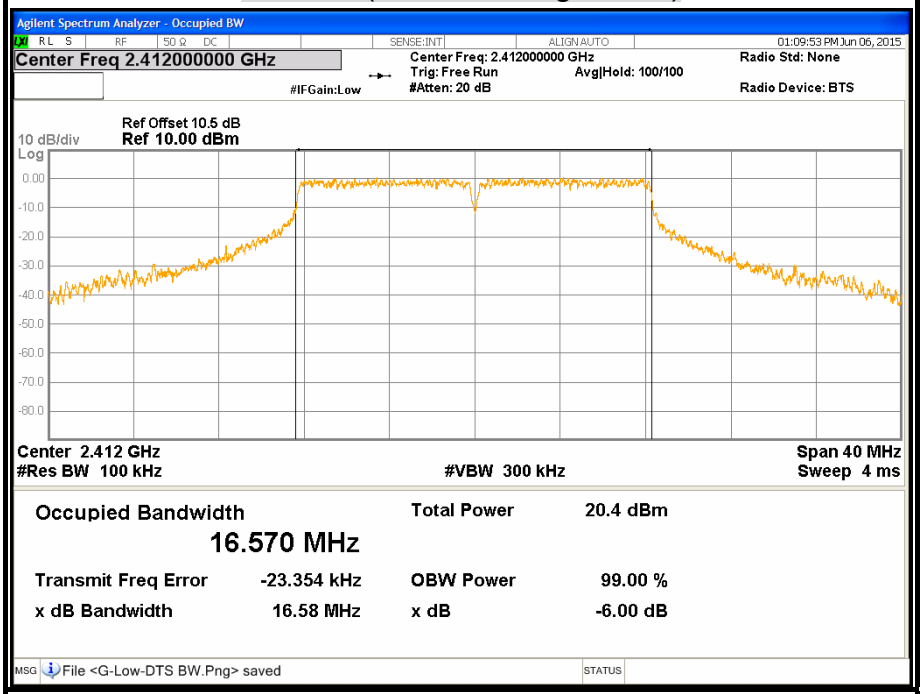
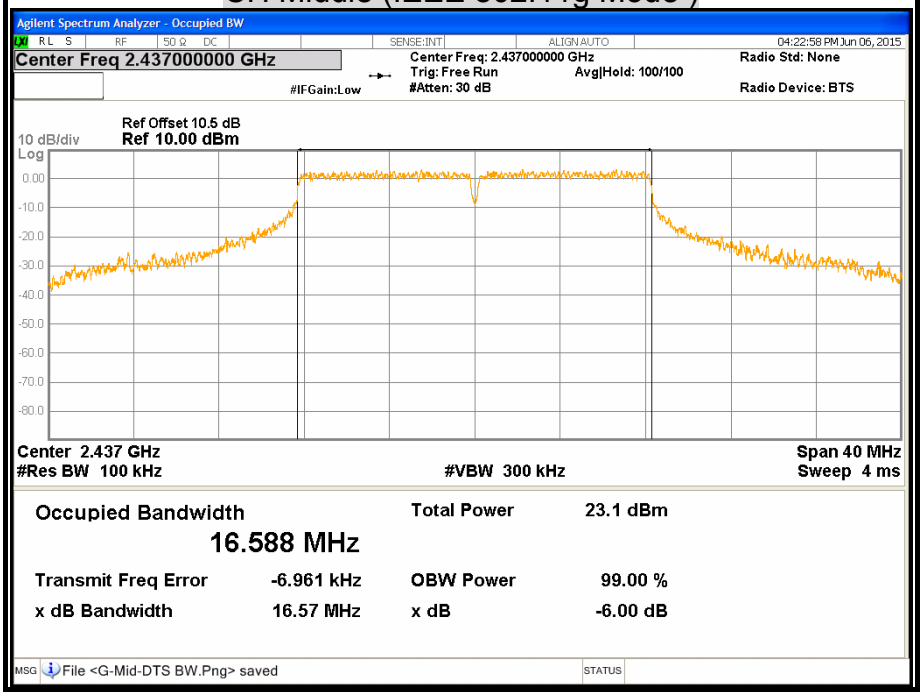
CH Low (IEEE 802.11g Mode)



CH Middle (IEEE 802.11g Mode)



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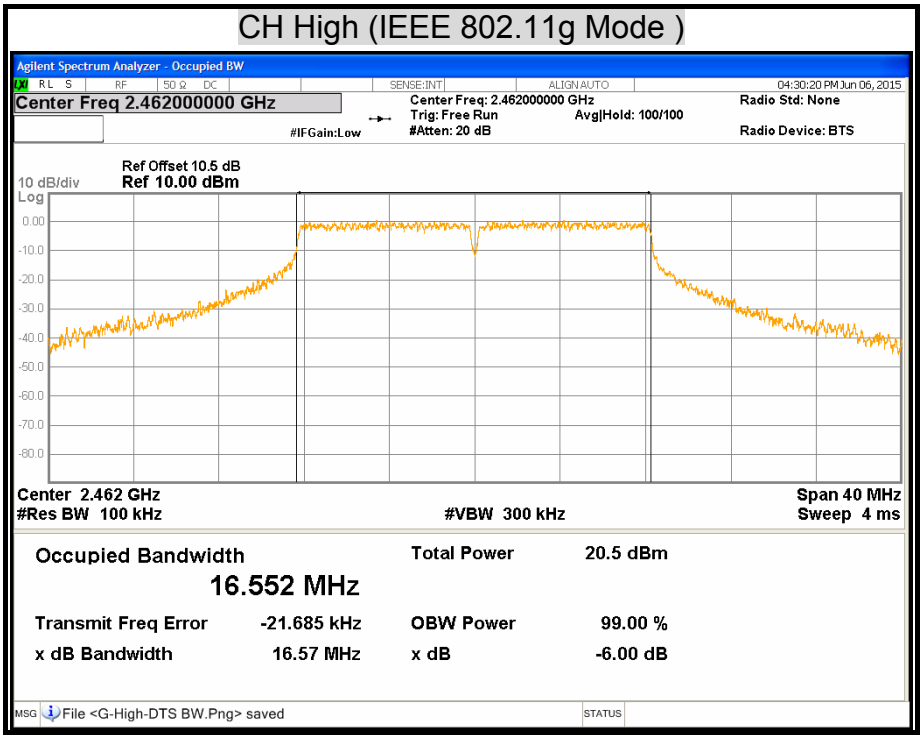
CH High (IEEE 802.11g Mode)



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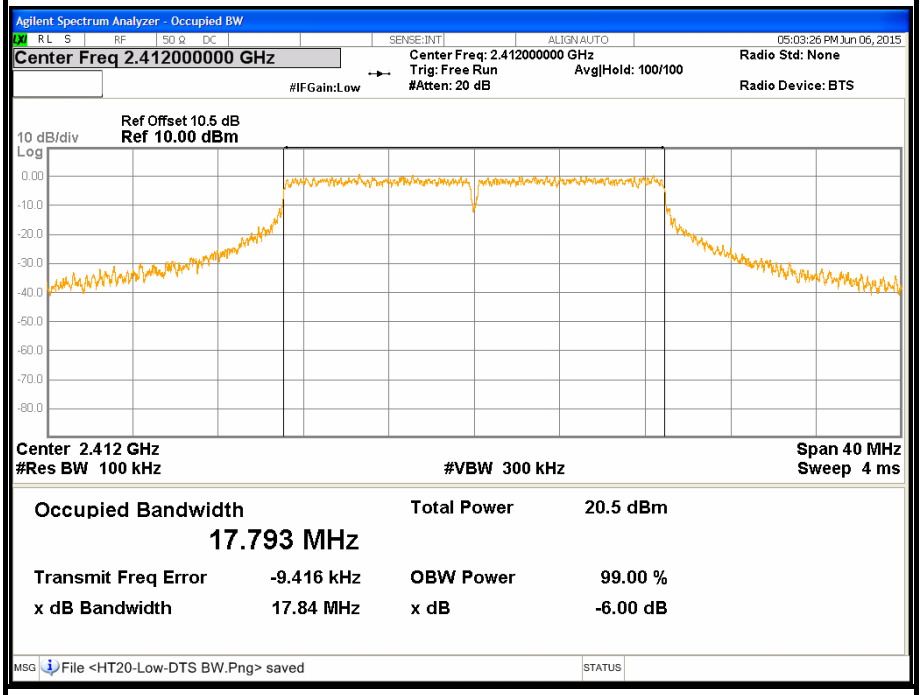
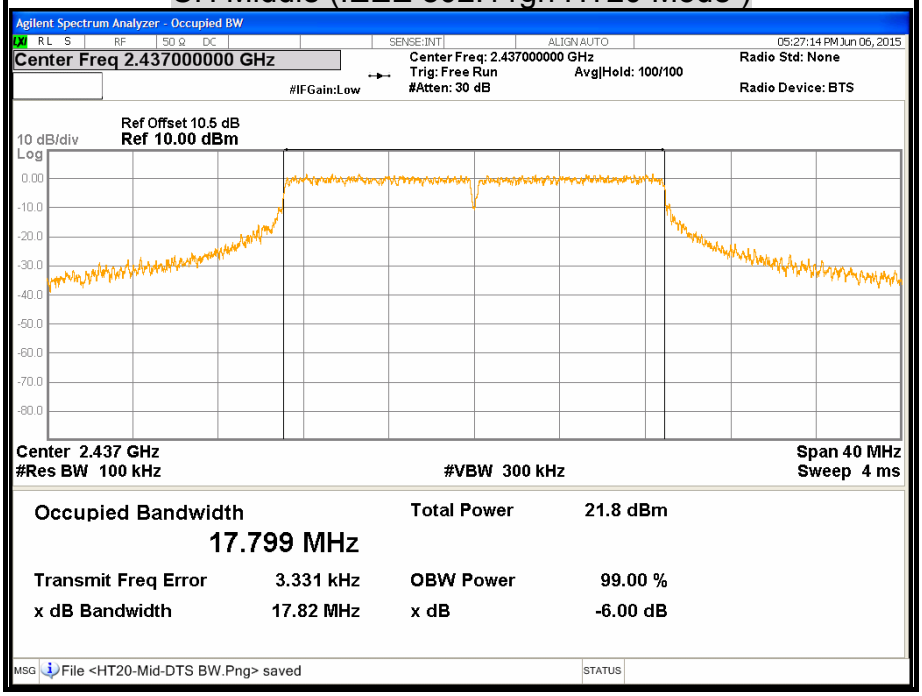
CH Low (IEEE 802.11gn HT20 Mode)



CH Middle (IEEE 802.11gn HT20 Mode)



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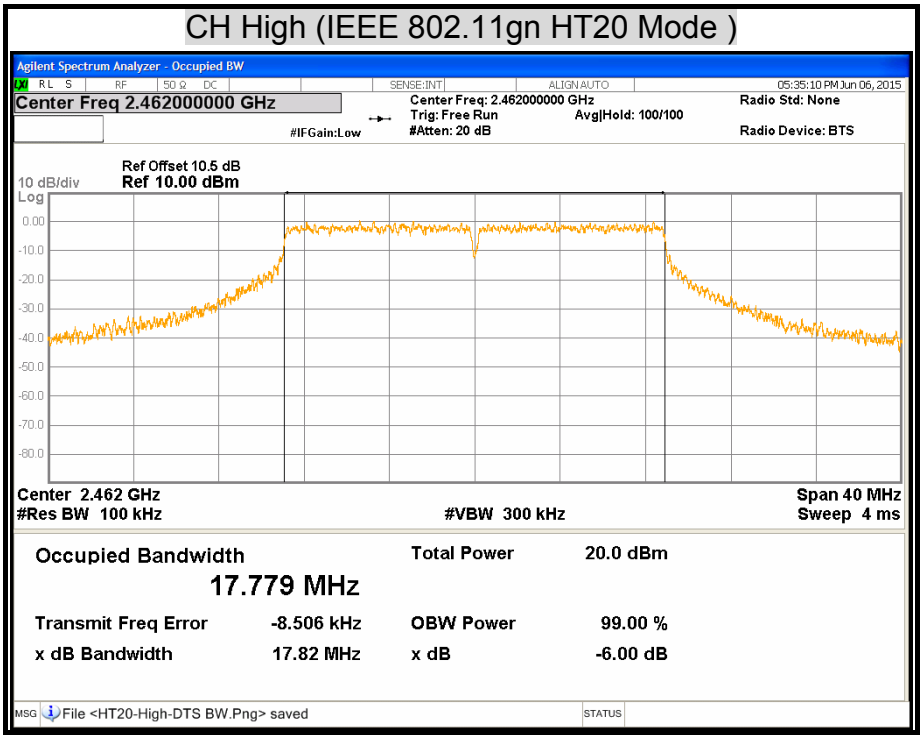
CH High (IEEE 802.11gn HT20 Mode)



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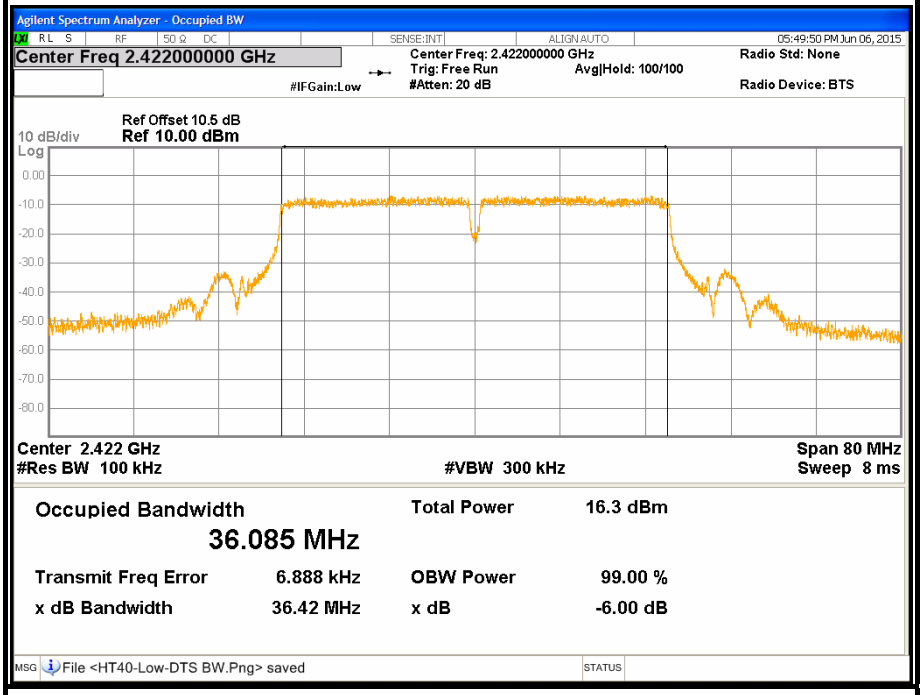
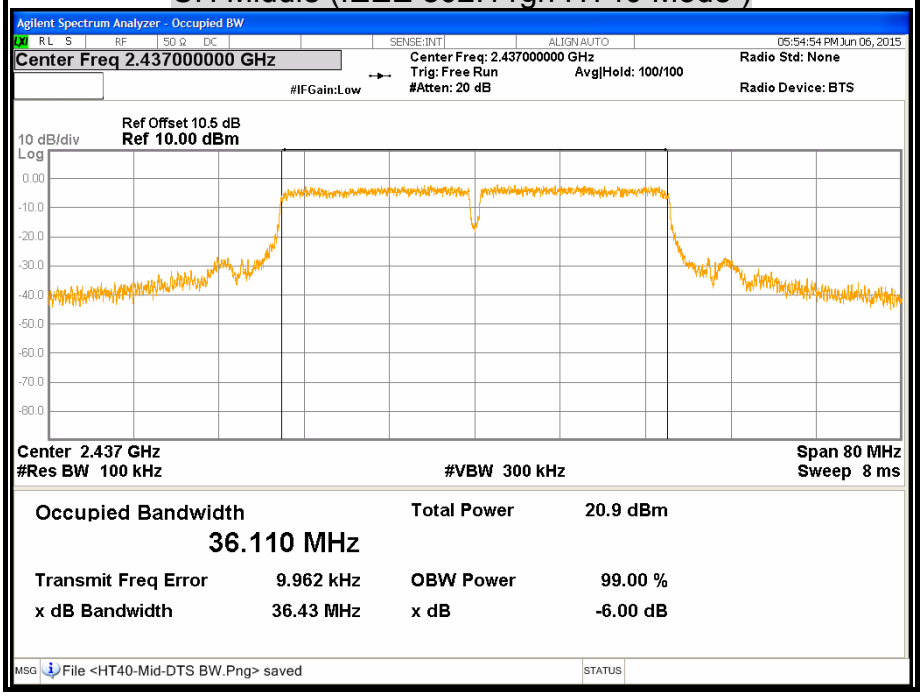
CH Low (IEEE 802.11gn HT40 Mode)



CH Middle (IEEE 802.11gn HT40 Mode)



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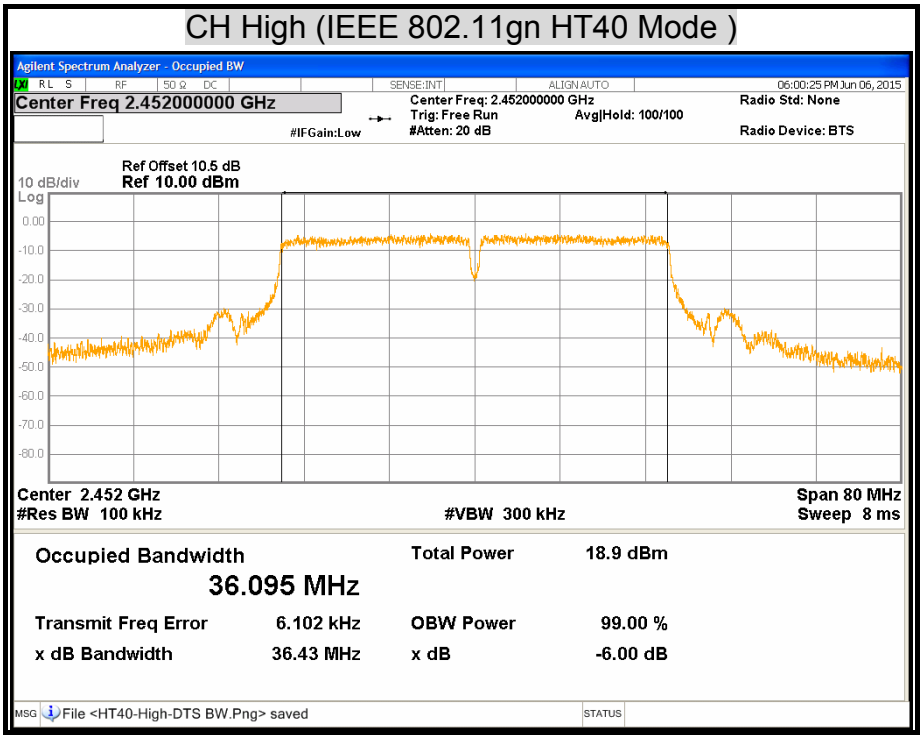
CH High (IEEE 802.11gn HT40 Mode)



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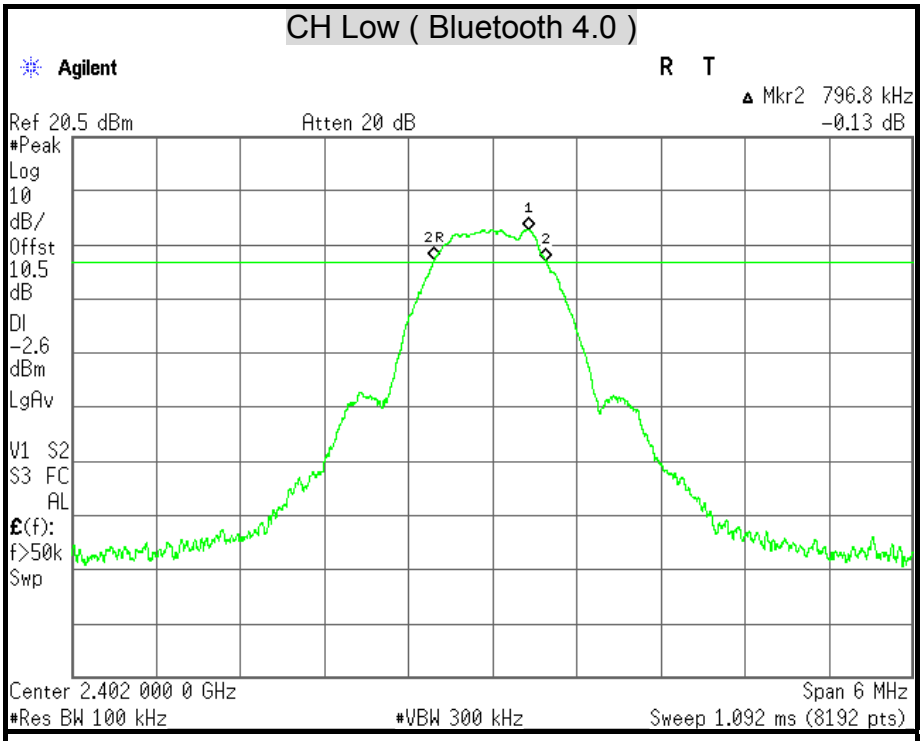
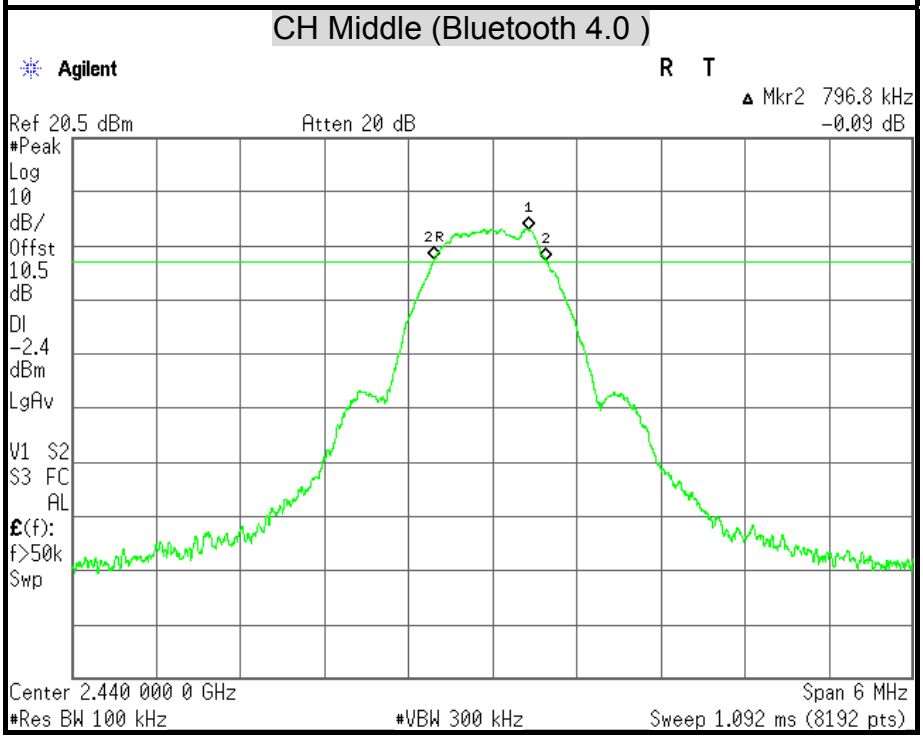
CH Low (Bluetooth 4.0)



CH Middle (Bluetooth 4.0)



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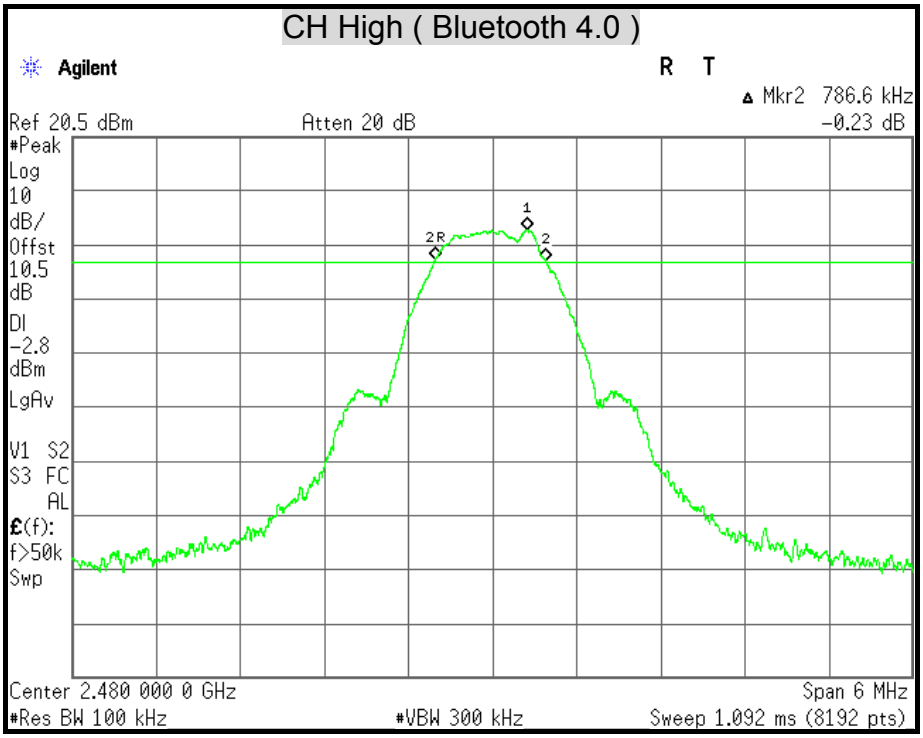
CH High (Bluetooth 4.0)



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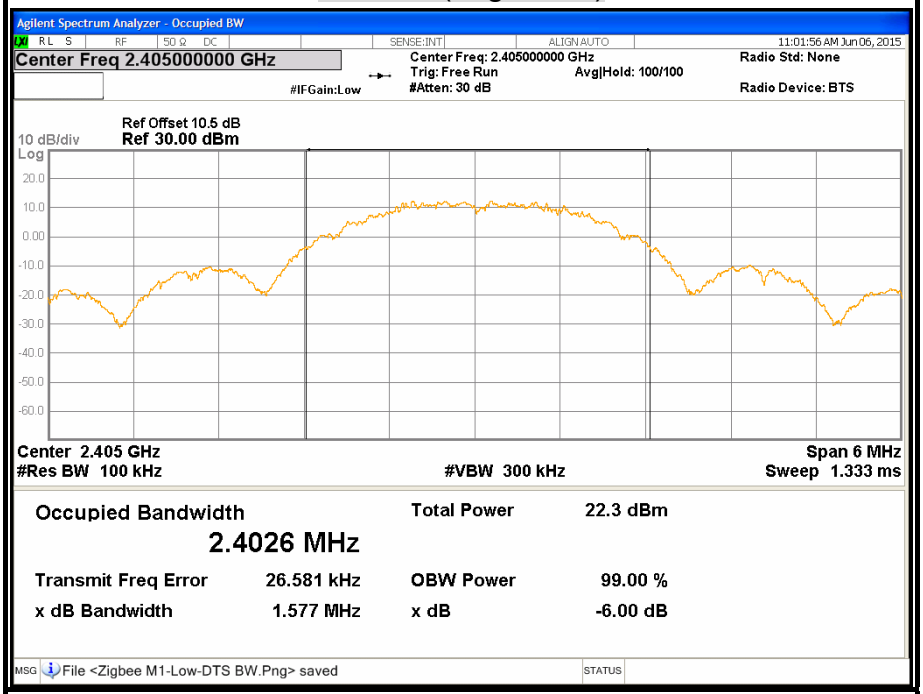
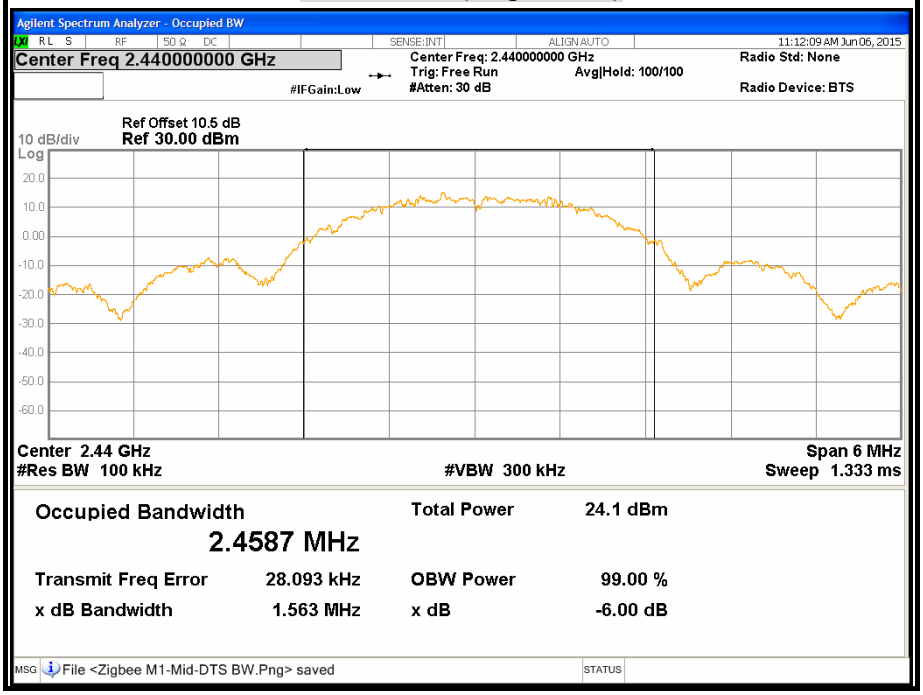
CH Low (Zigbee 1)



CH Middle (Zigbee 1)



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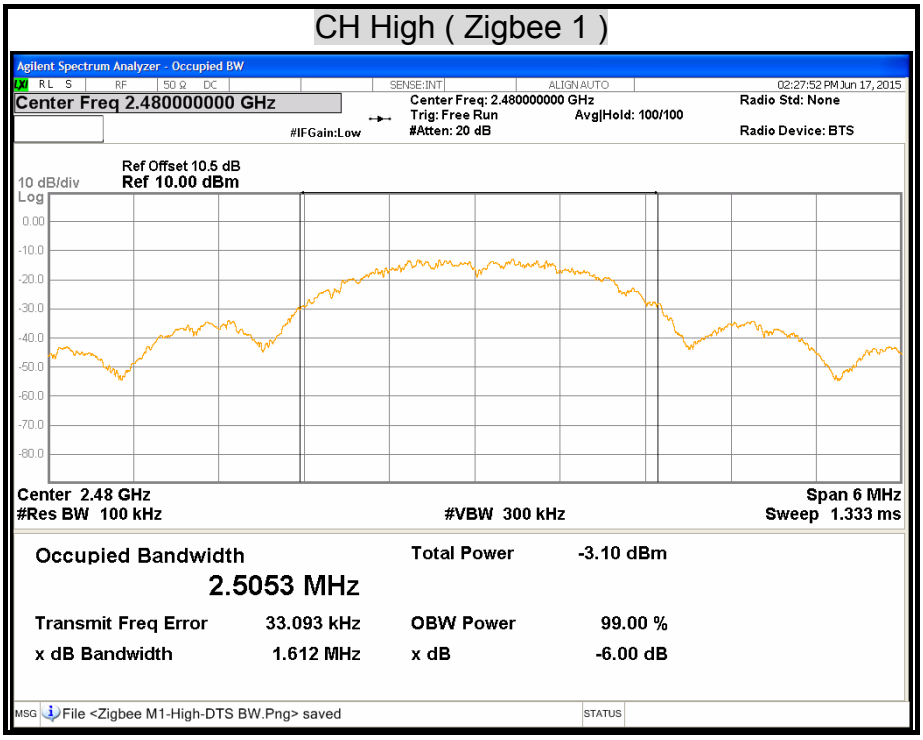
CH High (Zigbee 1)



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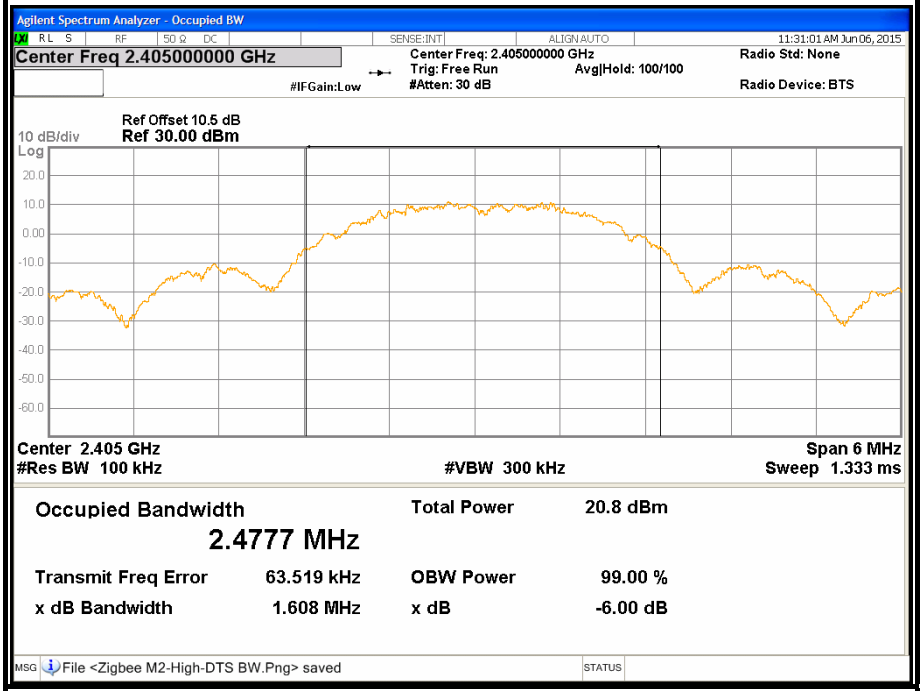
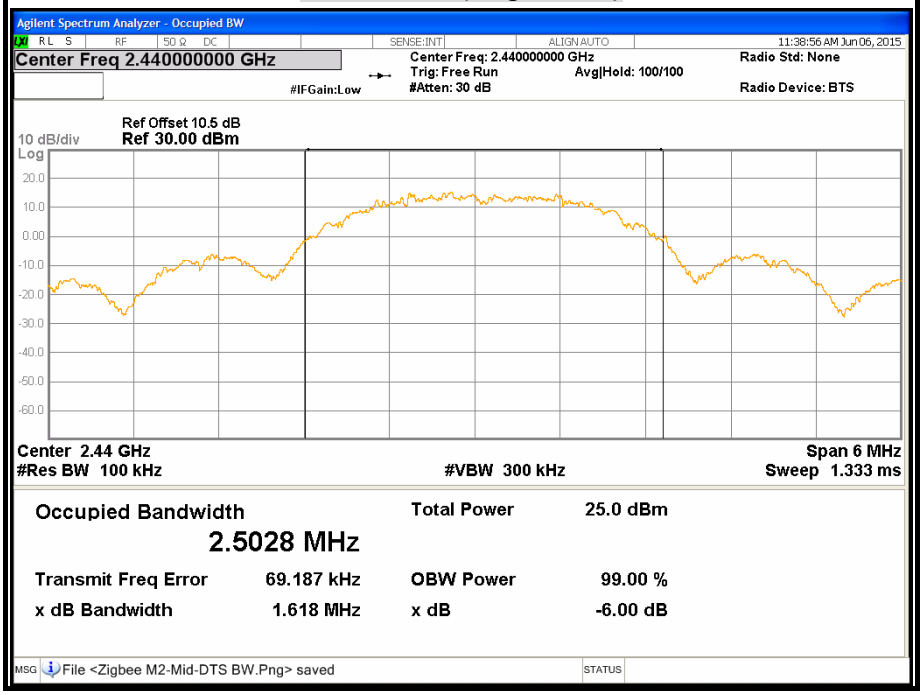
CH Low (Zigbee 2)



CH Middle (Zigbee 2)



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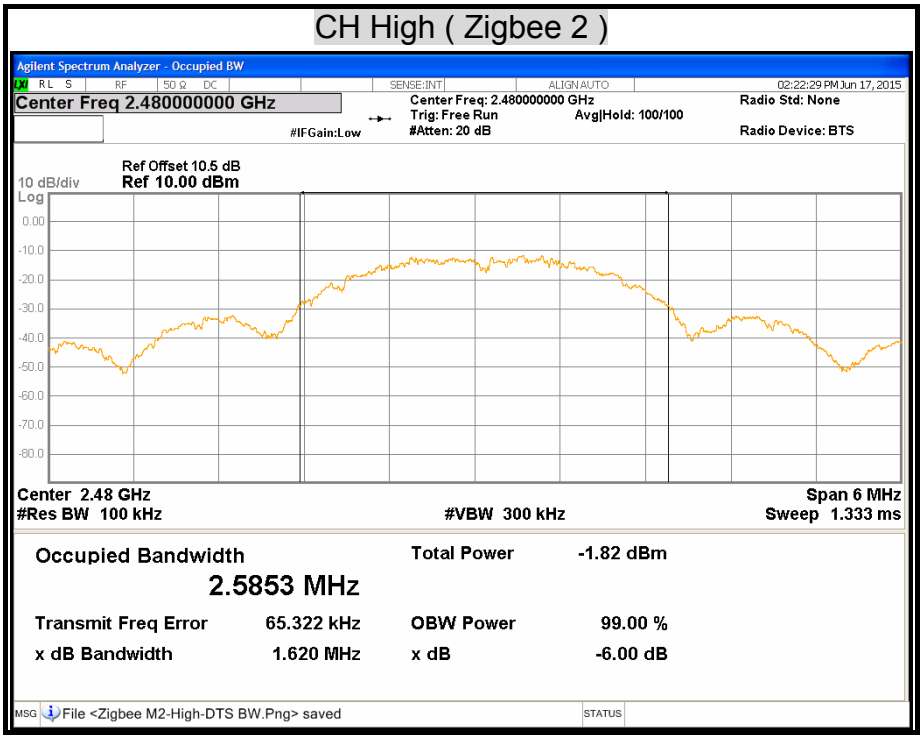
CH High (Zigbee 2)



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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.

§ KDB 662911 : For power measurements on IEEE 802.11 devices

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} ;

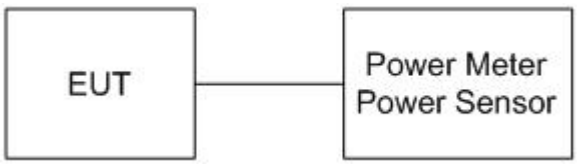
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1149001	12/11/2015
Power Sensor	Anritsu	MA2411B	1126148	12/11/2015

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.

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TEST RESULTS

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	19.62	0.0916	30	1	PASS
Middle	2437	20.75	0.1189	30	1	PASS
High	2462	19.64	0.0920	30	1	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.

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	22.93	0.1963	30	1	PASS
Middle	2437	23.67	0.2328	30	1	PASS
High	2462	22.69	0.1858	30	1	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.

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IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	22.36	0.1722	30	1	PASS
Middle	2437	23.38	0.2178	30	1	PASS
High	2462	22.12	0.1629	30	1	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.*

IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2422	18.70	0.0741	30	1	PASS
Middle	2437	22.65	0.1841	30	1	PASS
High	2452	21.34	0.1361	30	1	PASS

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

Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2402	5.86	0.0039	30	1	PASS
Middle	2440	5.96	0.0039	30	1	PASS
High	2480	5.55	0.0036	30	1	PASS

Remark: *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.*

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Zigbee 1 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2405	16.67	0.0465	30	1	PASS
Middle	2440	18.39	0.0690	30	1	PASS
High	2480	-12.17	0.0001	30	1	PASS

Remark: *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.*

Zigbee 2 Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2405	15.28	0.0337	30	1	PASS
Middle	2440	19.26	0.0843	30	1	PASS
High	2480	-12.57	0.0001	30	1	PASS

Remark: *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.*

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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	12/11/2015
Power Sensor	ANRITSU	MA2411B	1126148	12/11/2015

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.

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TEST RESULTS

IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	17.92
Middle	2437	19.19
High	2462	17.97

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.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	14.74
Middle	2437	16.19
High	2462	14.36

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.*

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IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	14.63
Middle	2437	16.13
High	2462	14.30

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.*

IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2422	10.46
Middle	2437	15.13
High	2452	13.20

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

Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2402	5.05
Middle	2440	5.08
High	2480	4.63

Remark: *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.*

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Zigbee 1 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2405	16.63
Middle	2440	18.35
High	2480	-12.52

Remark: *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.*

Zigbee 2 Mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2405	15.24
Middle	2440	19.22
High	2480	-12.68

Remark: *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.*

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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
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/19/2016
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/04/2016

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.

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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	-2.83	8	PASS
Middle	2437	-1.56	8	PASS
High	2462	-2.46	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.*

IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-7.45	8	PASS
Middle	2437	-4.91	8	PASS
High	2462	-7.36	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.*

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IEEE 802.11gn HT20 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-6.43	8	PASS
Middle	2437	-5.14	8	PASS
High	2462	-7.20	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.*

IEEE 802.11gn HT40 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2422	-13.28	8	PASS
Middle	2437	-8.68	8	PASS
High	2452	-9.86	8	PASS

Remark:

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

Bluetooth 4.0 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2402	-11.20	8	PASS
Middle	2440	-10.99	8	PASS
High	2480	-11.47	8	PASS

Remark: *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.*

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Zigbee 1 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2405	4.91	8	PASS
Middle	2440	6.77	8	PASS
High	2480	-19.99	8	PASS

Remark: *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.*

Zigbee 2 Mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2405	3.99	8	PASS
Middle	2440	7.55	8	PASS
High	2480	-18.75	8	PASS

Remark: *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.*

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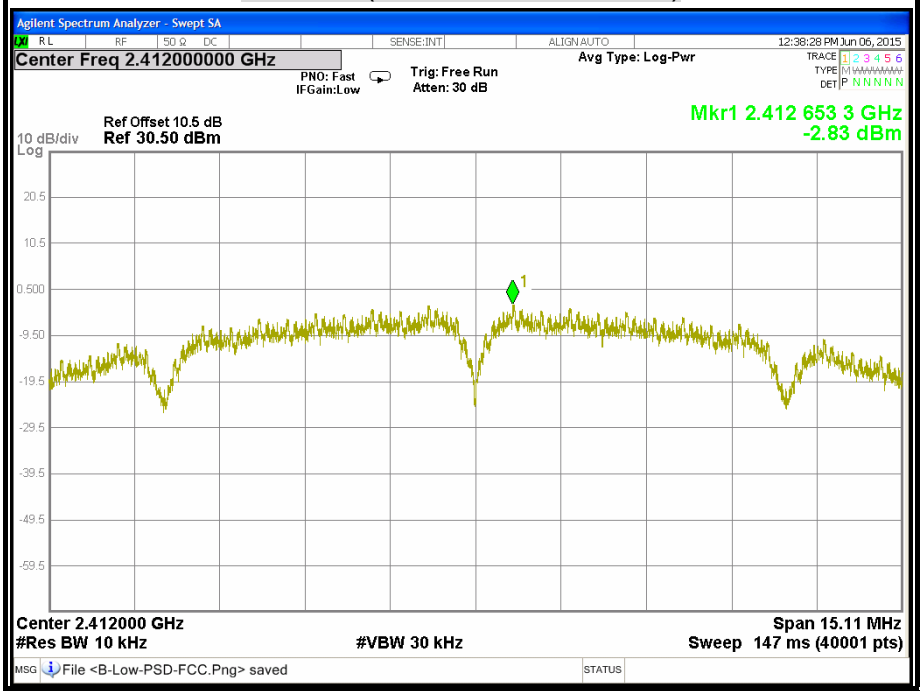
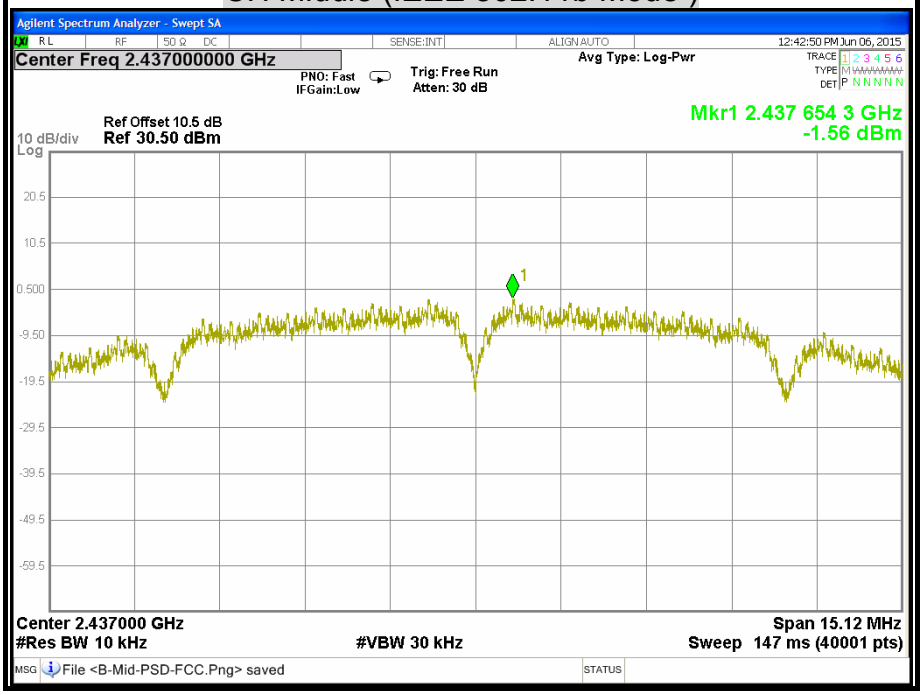
POWER SPECTRAL DENSITY

CH Low (IEEE 802.11b Mode)



CH Middle (IEEE 802.11b Mode)



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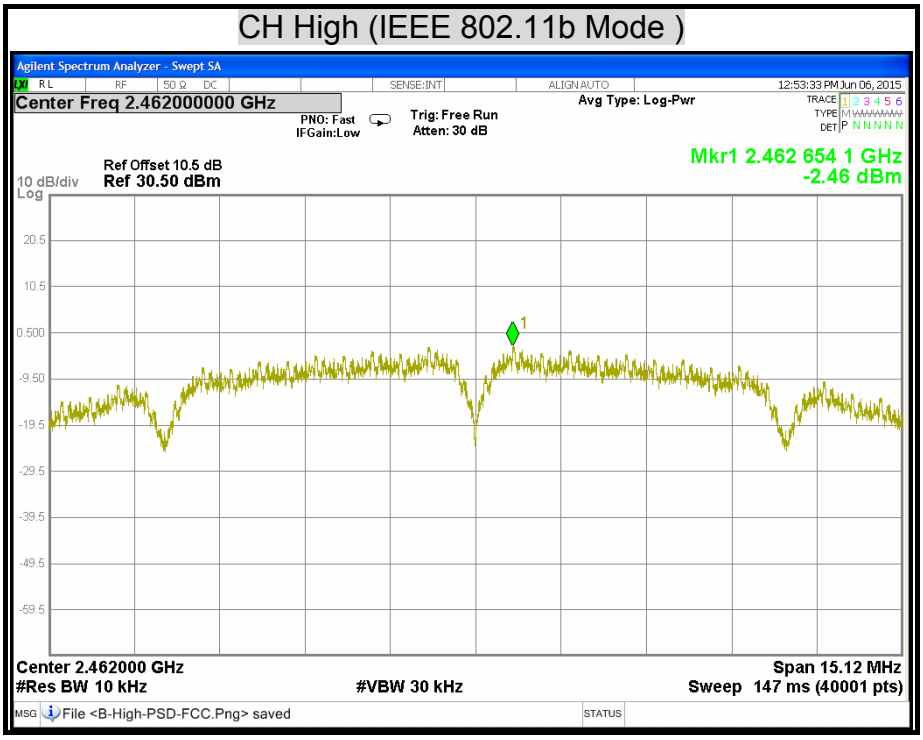
CH High (IEEE 802.11b Mode)



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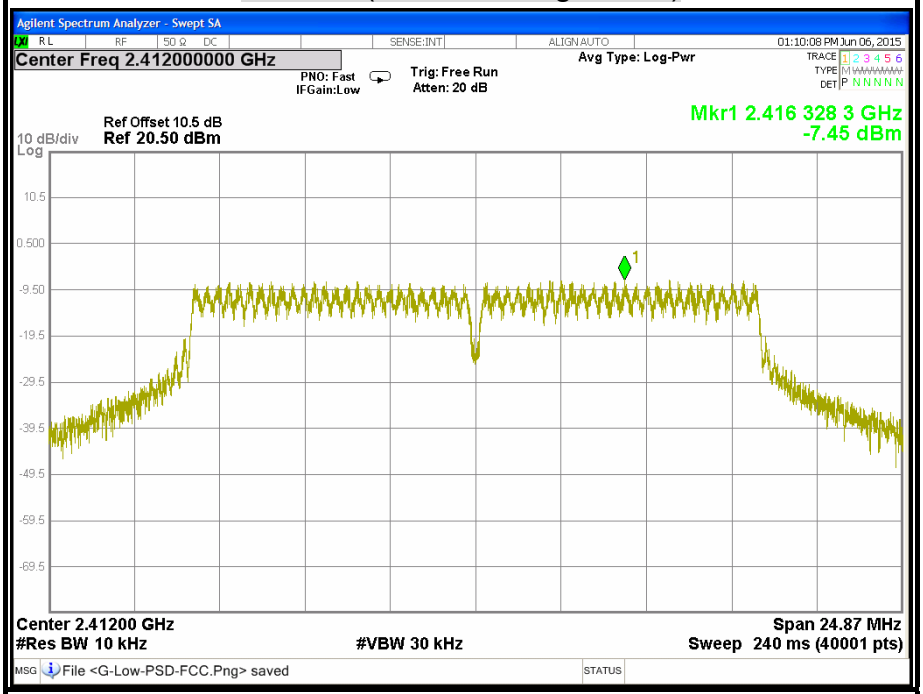
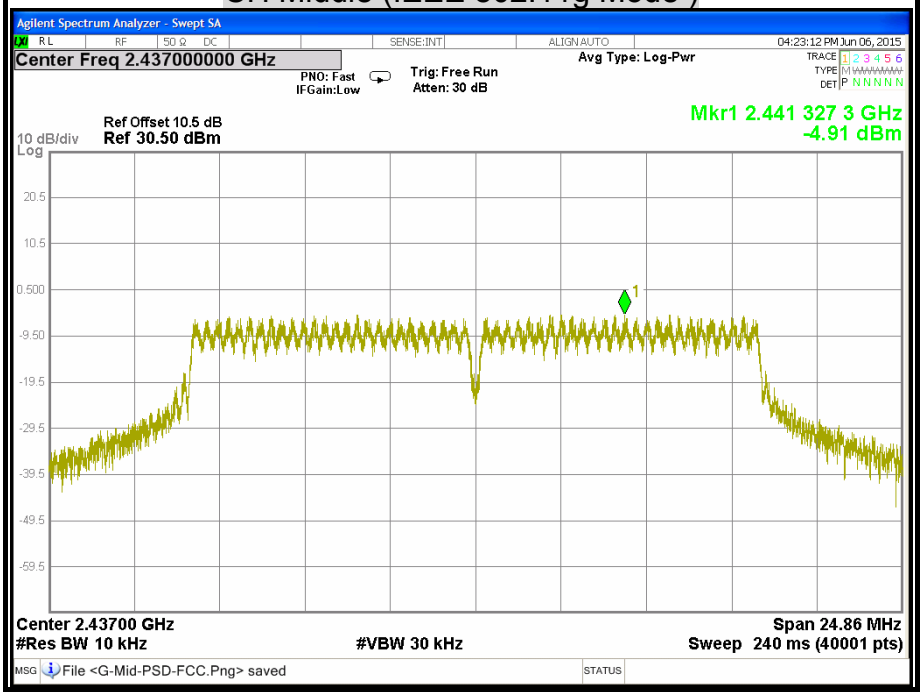
CH Low (IEEE 802.11g Mode)



CH Middle (IEEE 802.11g Mode)



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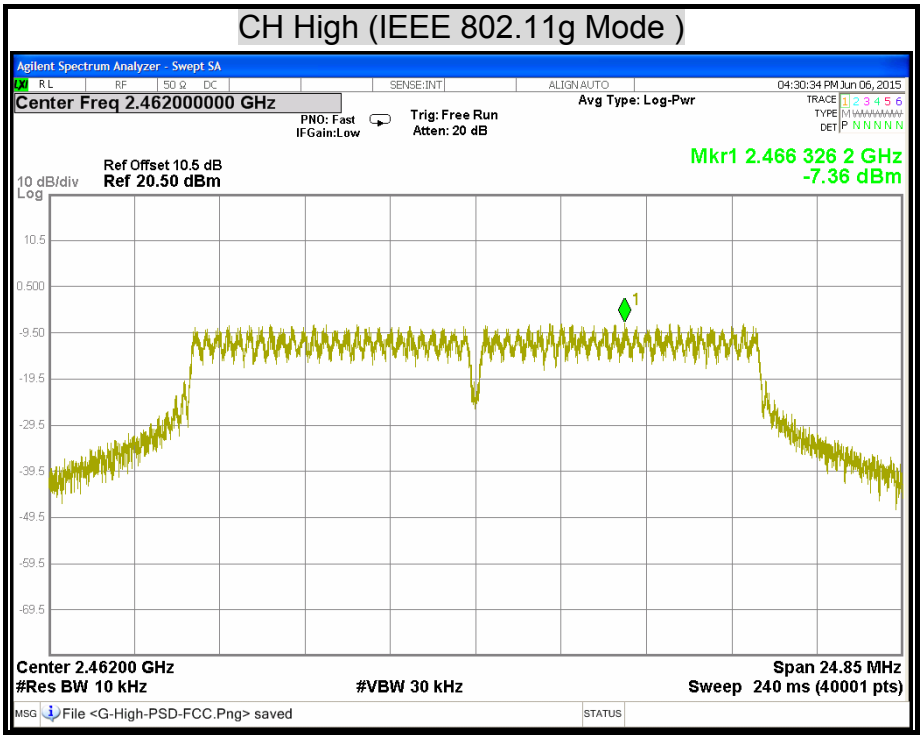
CH High (IEEE 802.11g Mode)



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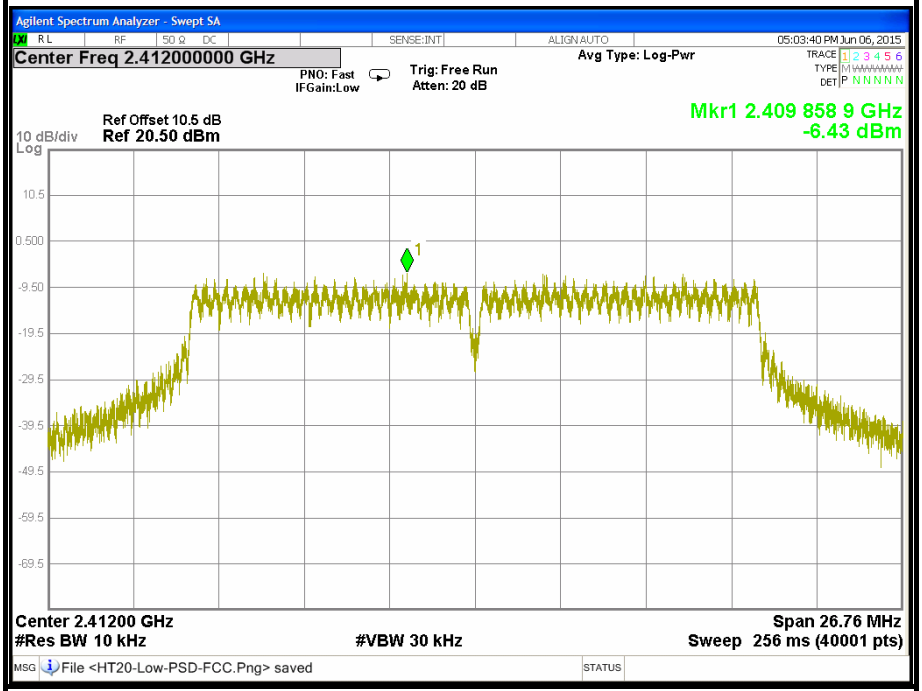
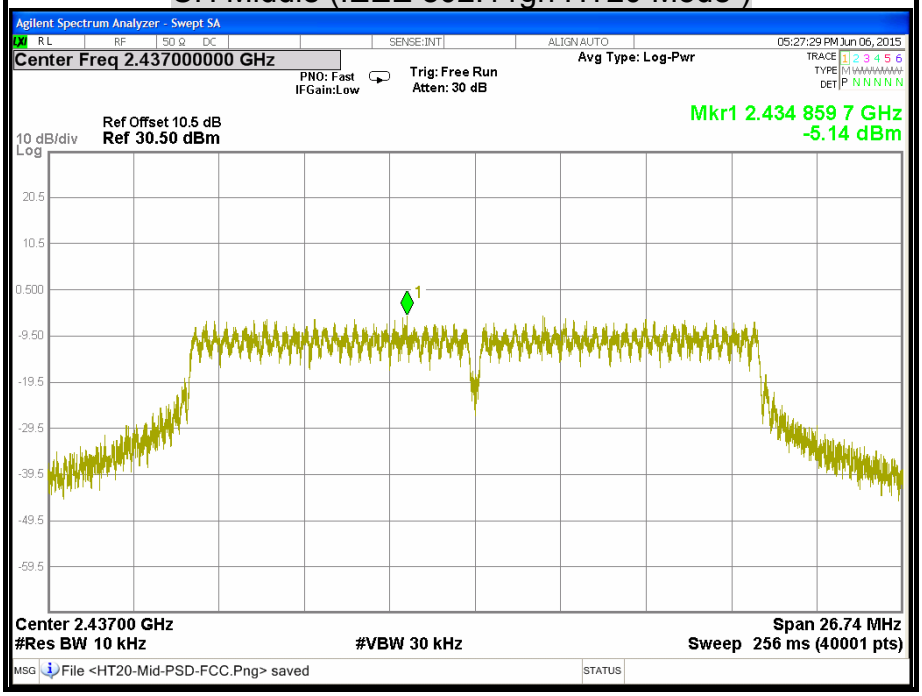
CH Low (IEEE 802.11gn HT20 Mode)



CH Middle (IEEE 802.11gn HT20 Mode)



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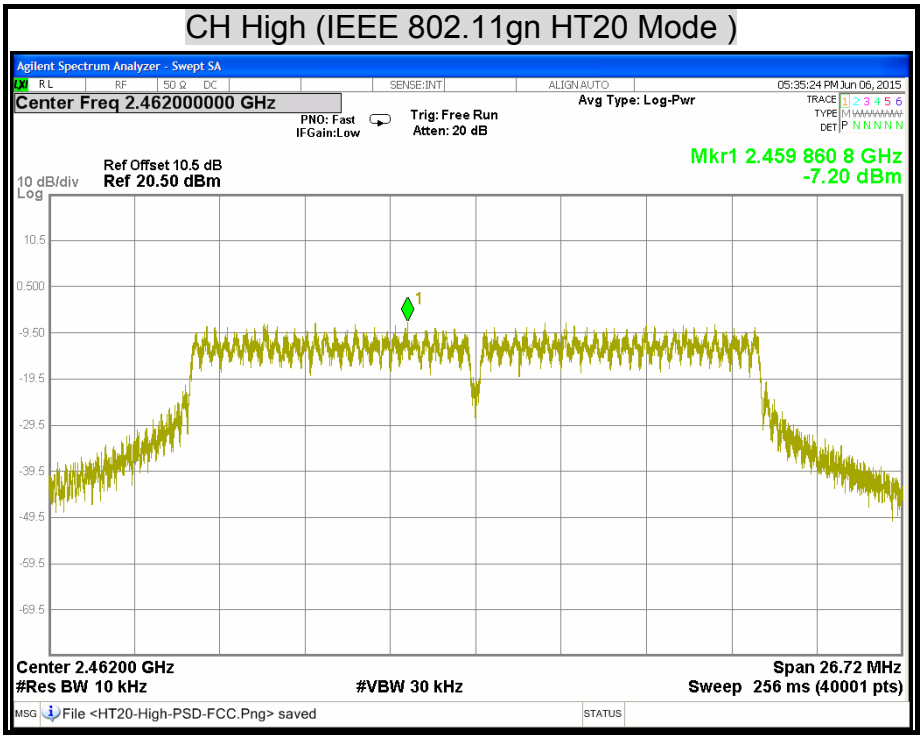
CH High (IEEE 802.11gn HT20 Mode)



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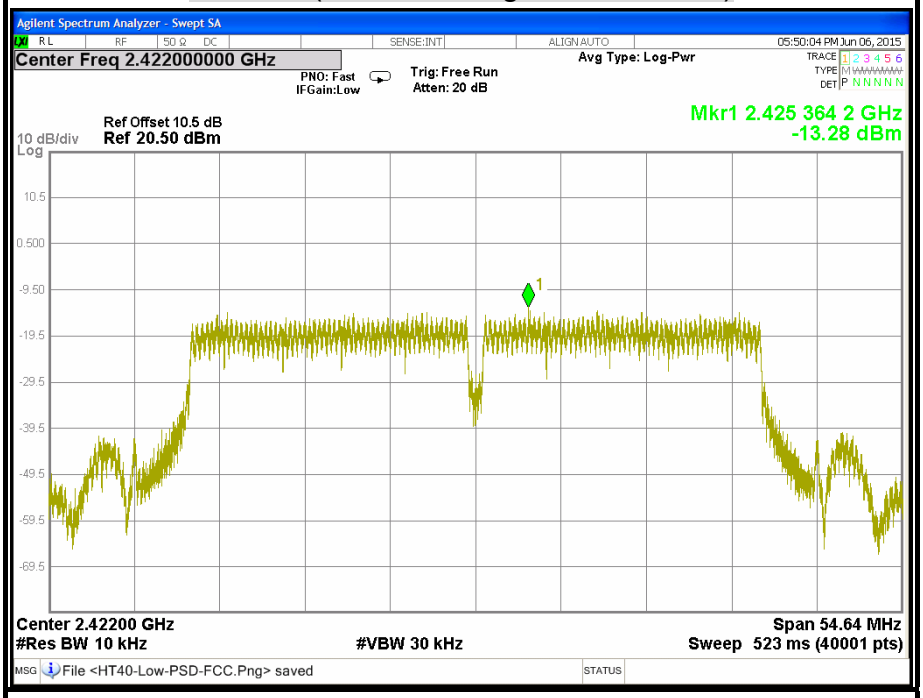
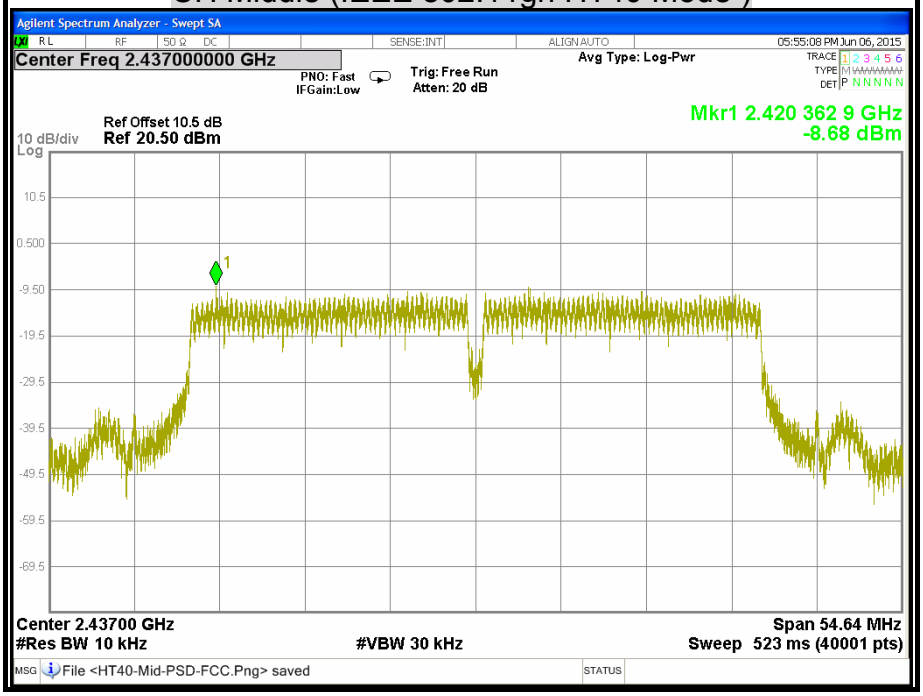
CH Low (IEEE 802.11gn HT40 Mode)



CH Middle (IEEE 802.11gn HT40 Mode)



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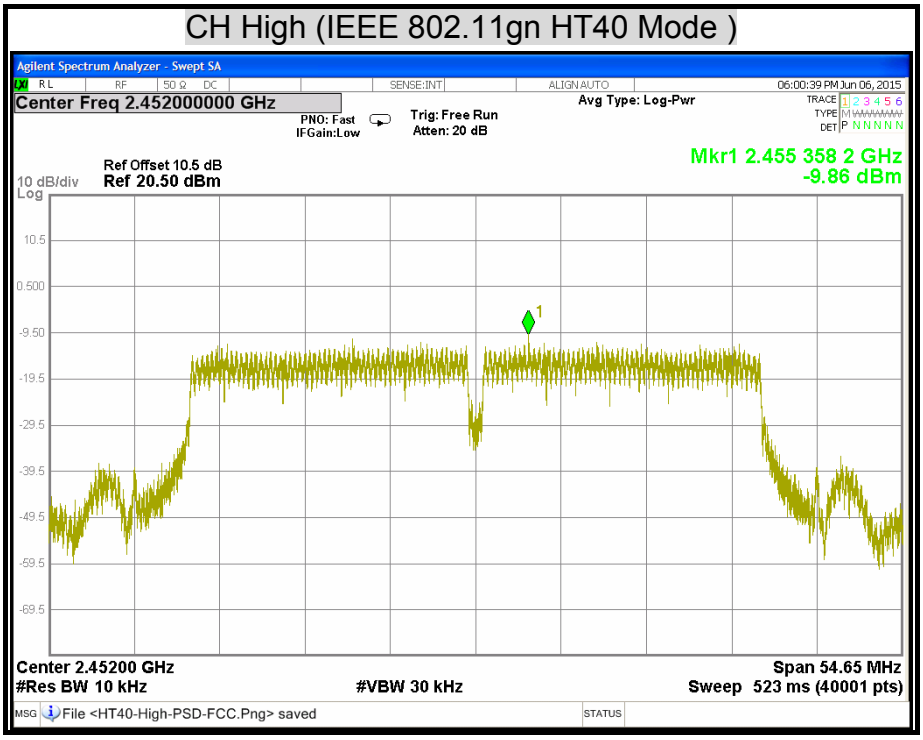
CH High (IEEE 802.11gn HT40 Mode)



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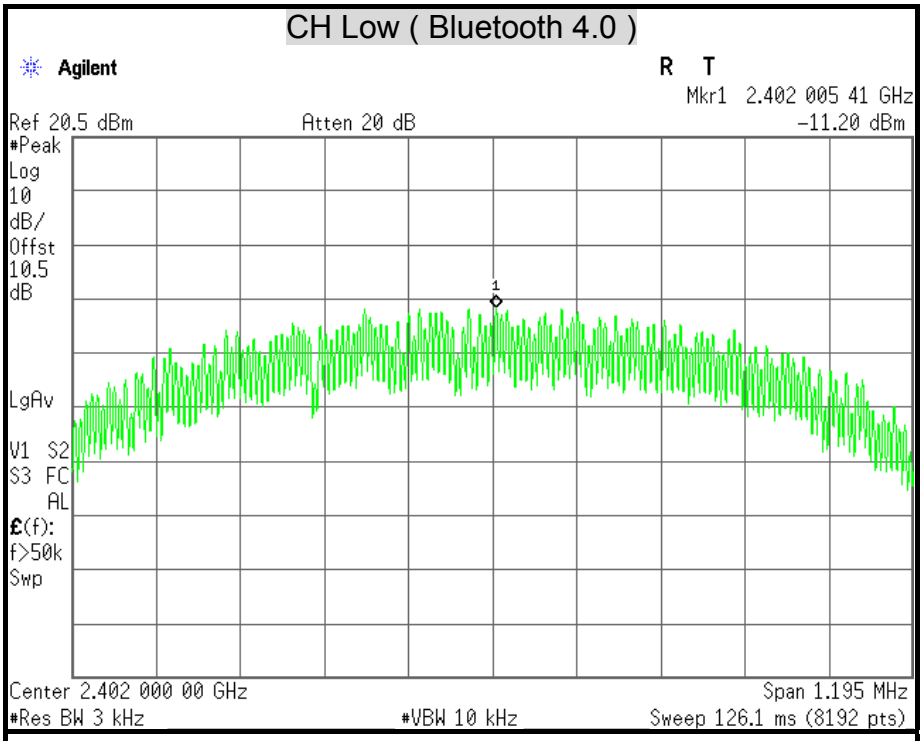
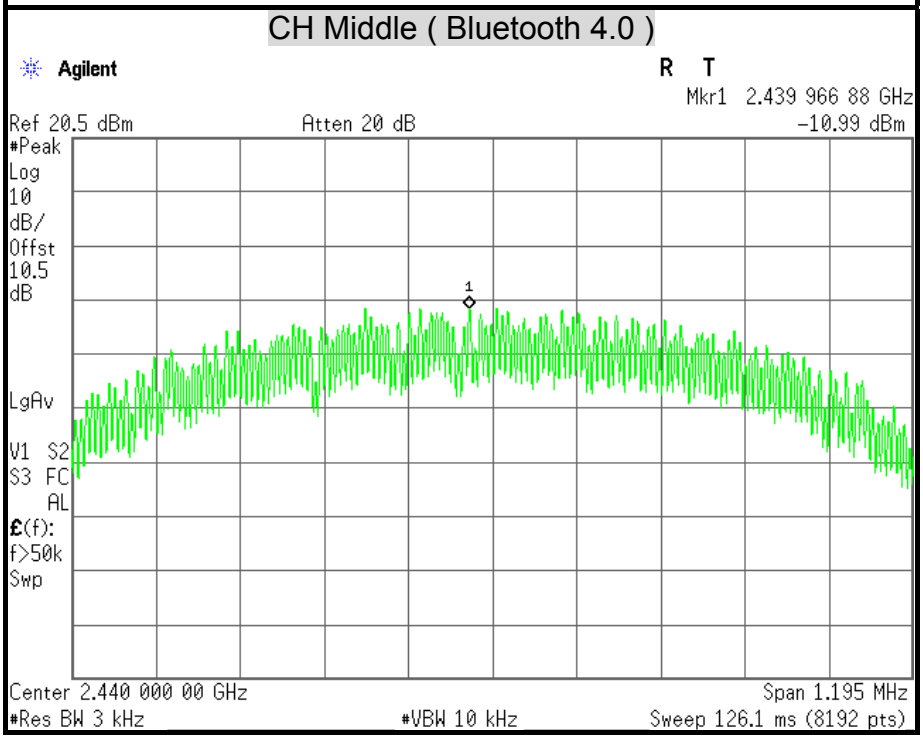
CH Low (Bluetooth 4.0)



CH Middle (Bluetooth 4.0)



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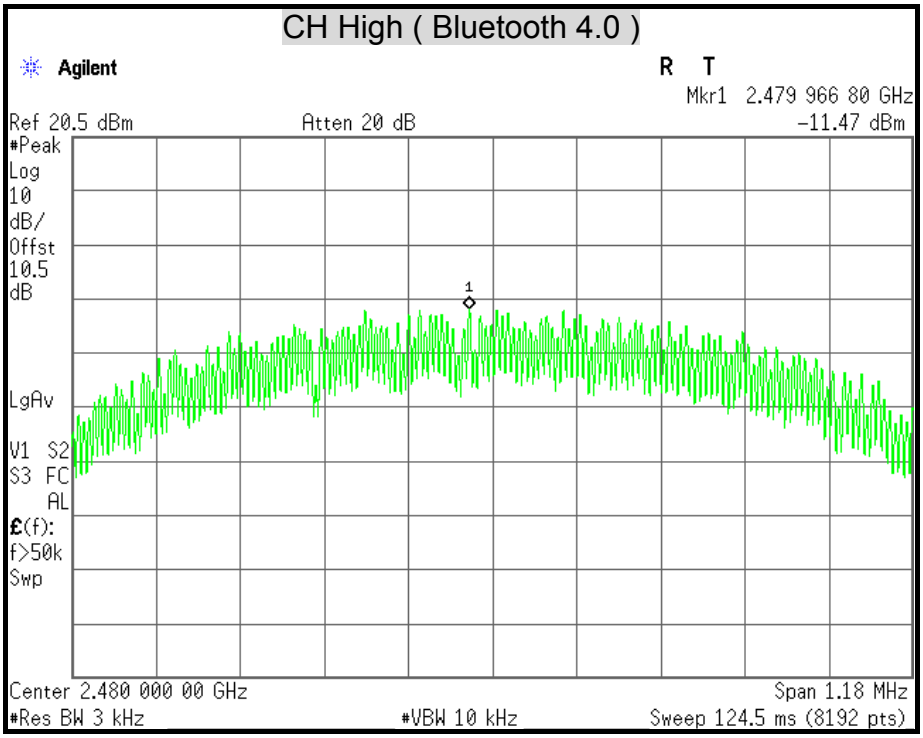
CH High (Bluetooth 4.0)



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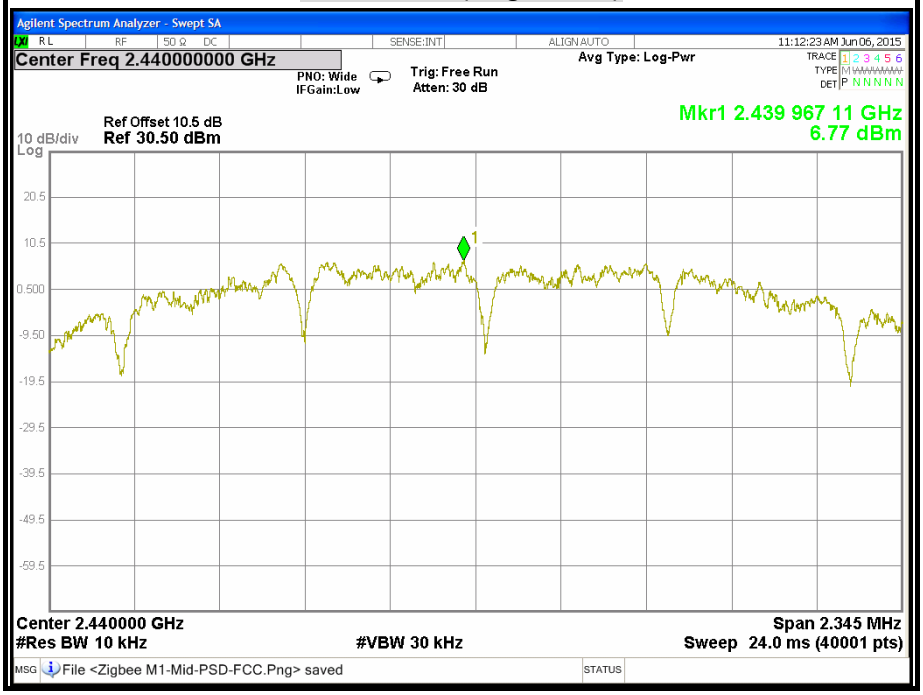
CH Low (Zigbee 1)

CH Middle (Zigbee 1)



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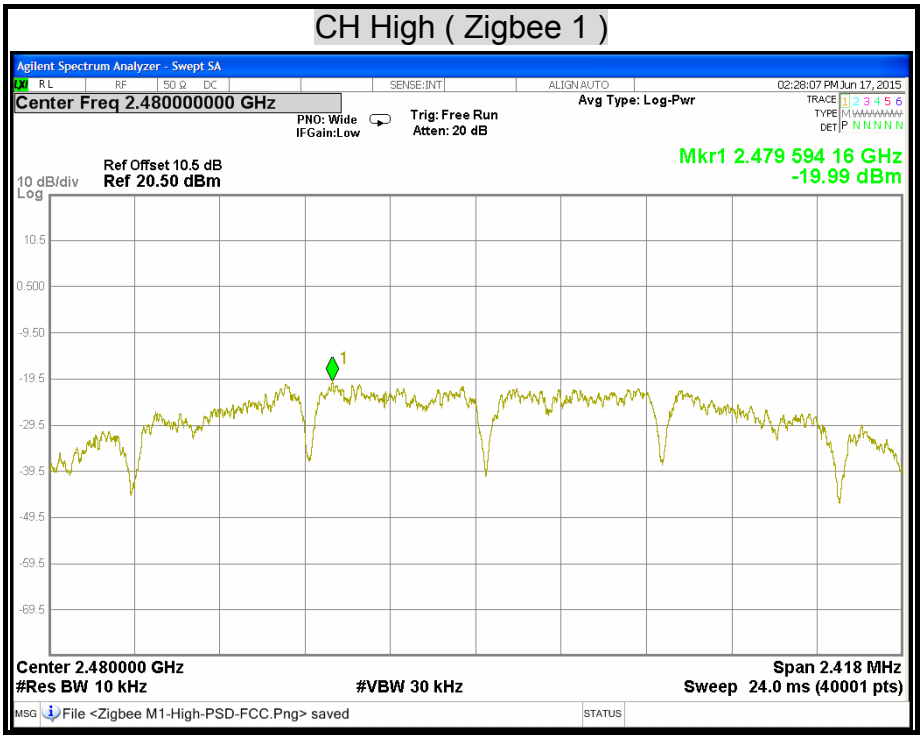
CH High (Zigbee 1)



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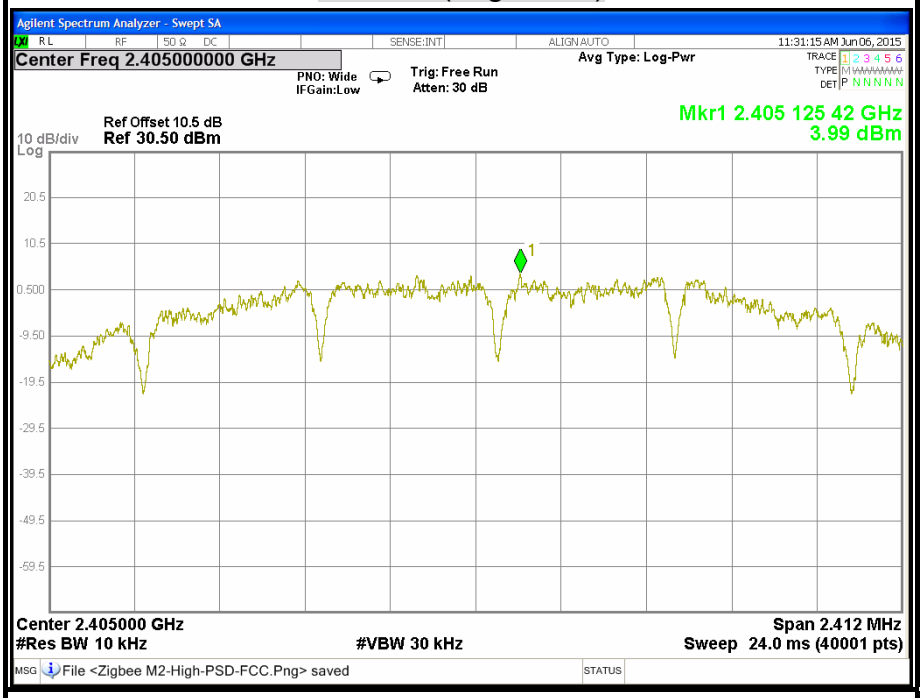
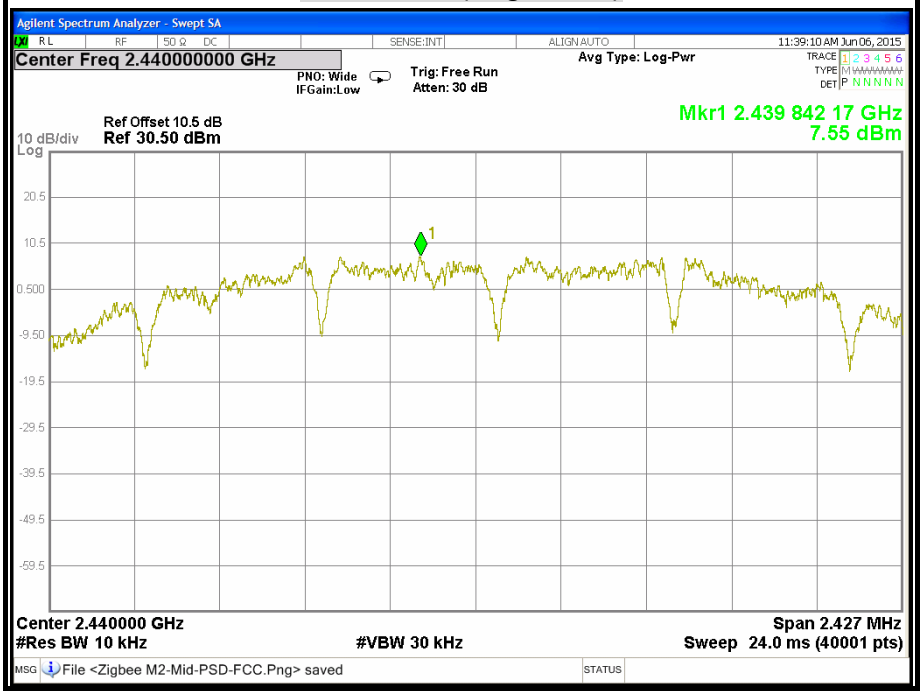
CH Low (Zigbee 2)



CH Middle (Zigbee 2)



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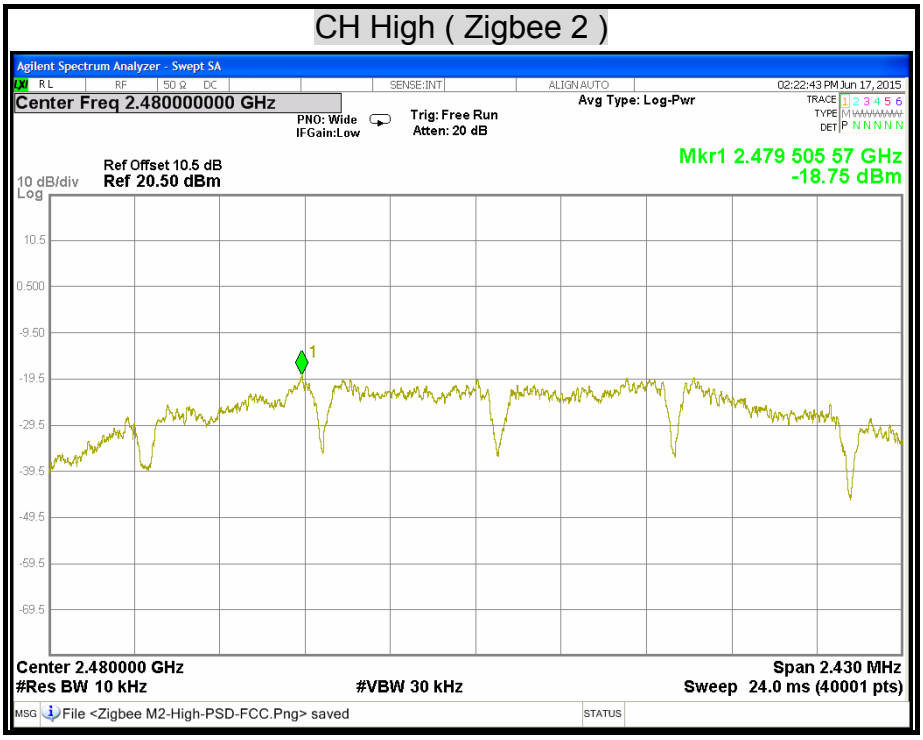
CH High (Zigbee 2)



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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
EXA Signal Analyzer	Agilent	N9010A	MY52220817	03/19/2016
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/04/2016

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.

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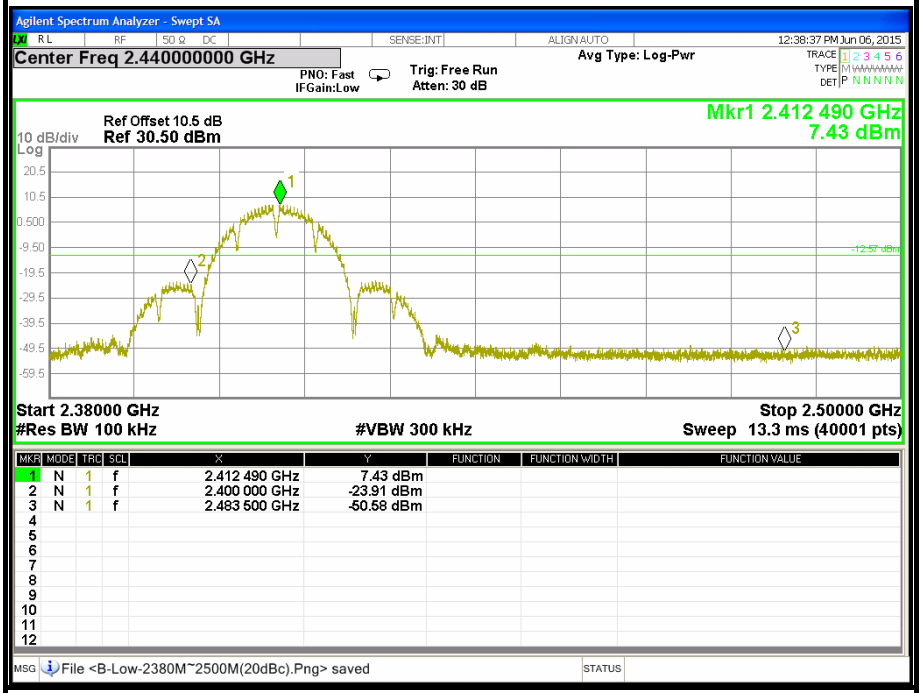
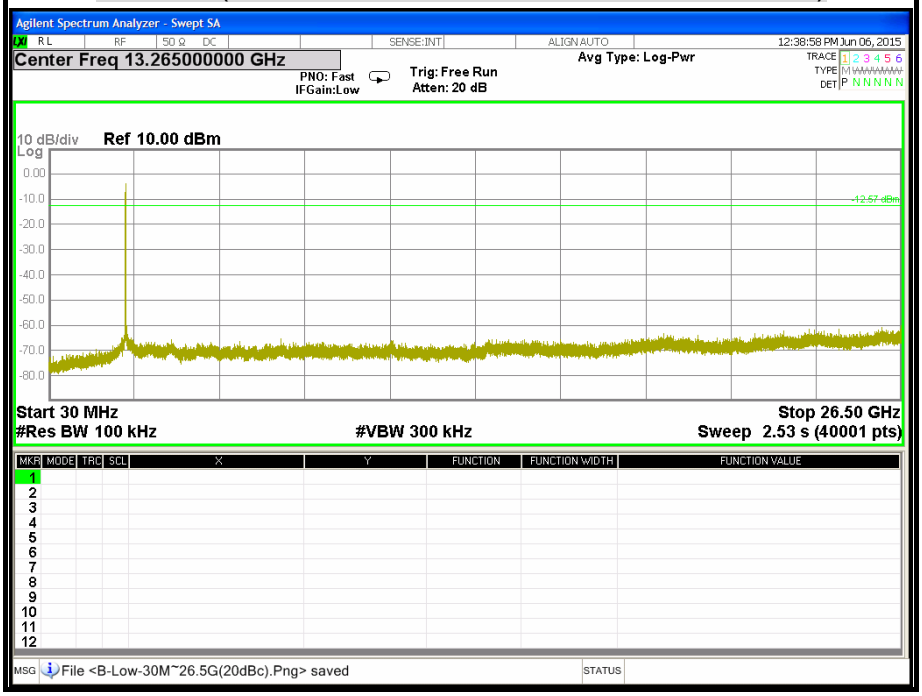
TEST RESULTS

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)



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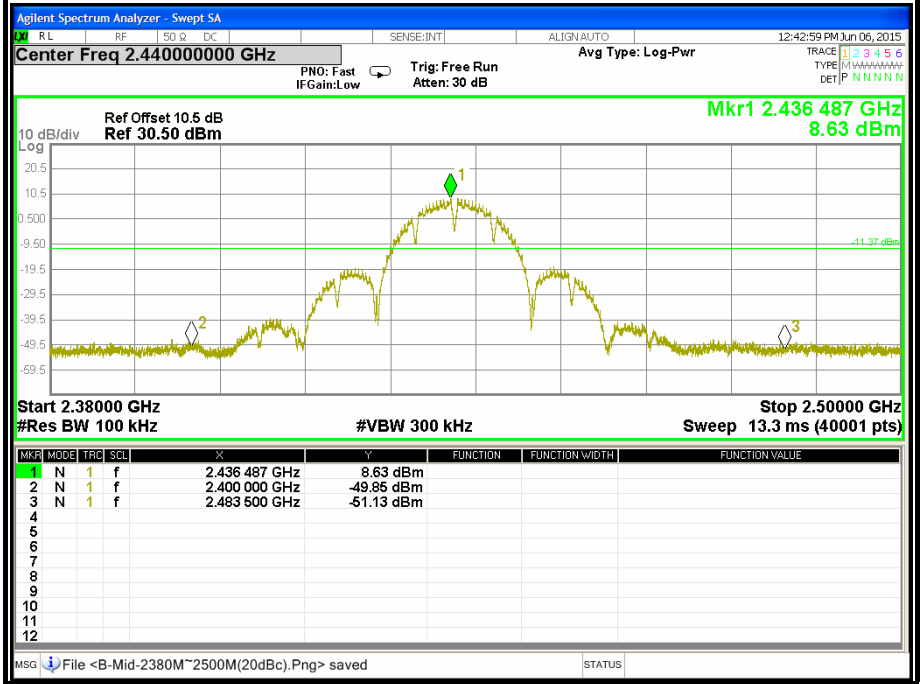
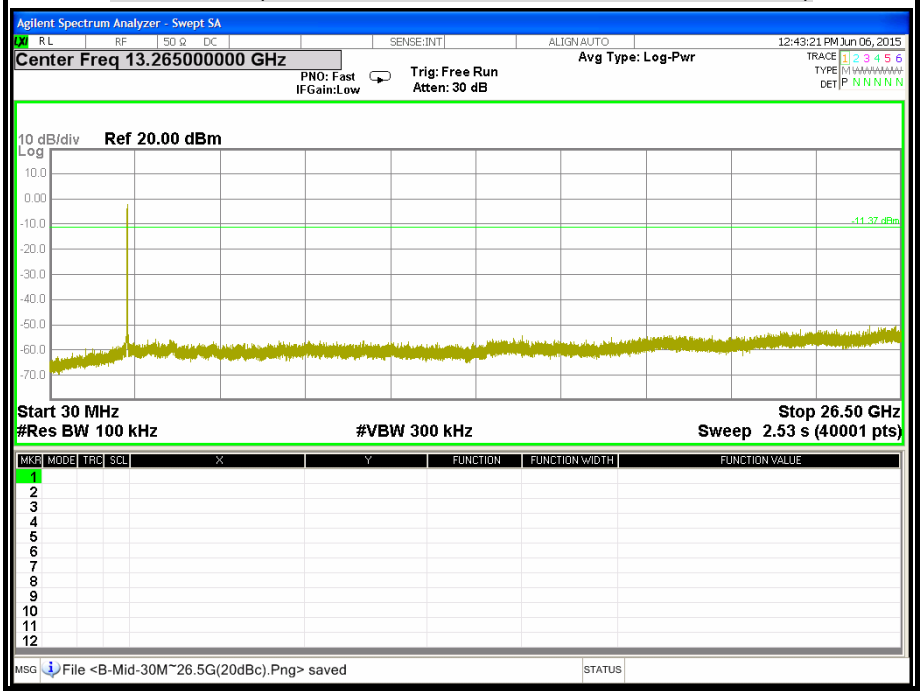
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



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



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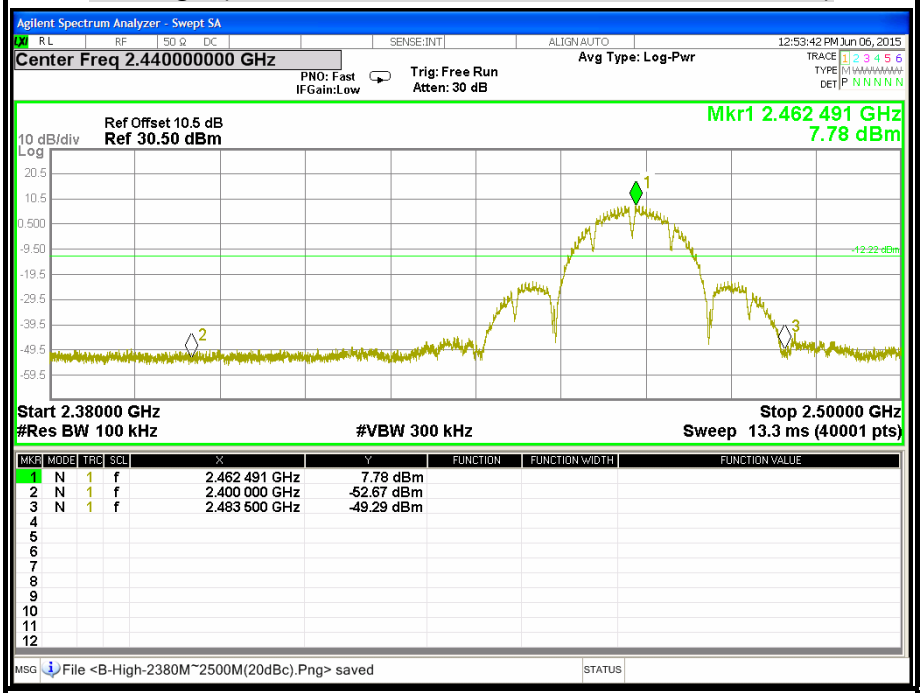
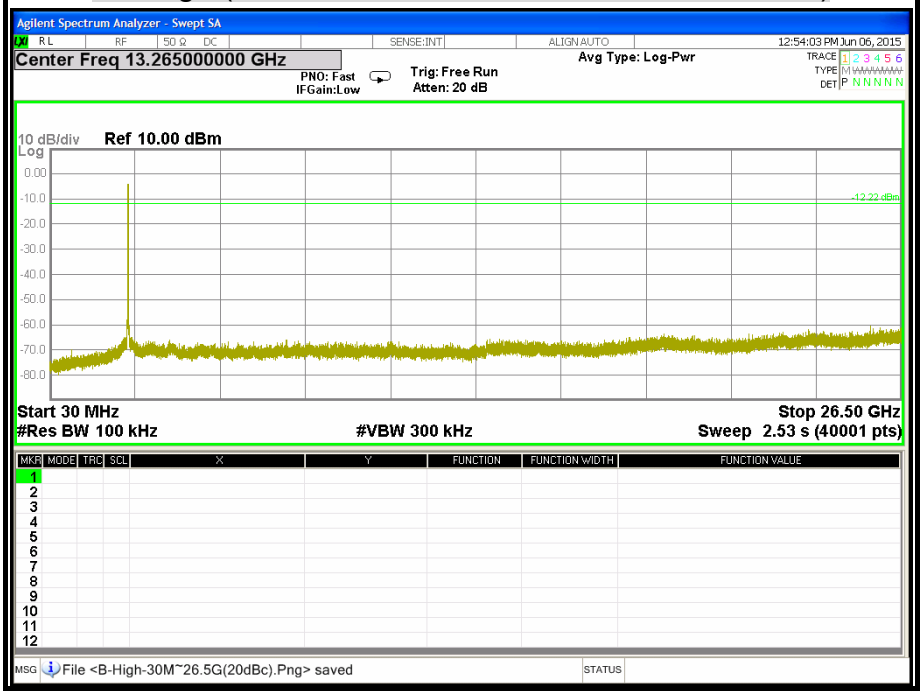
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11b Mode)



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



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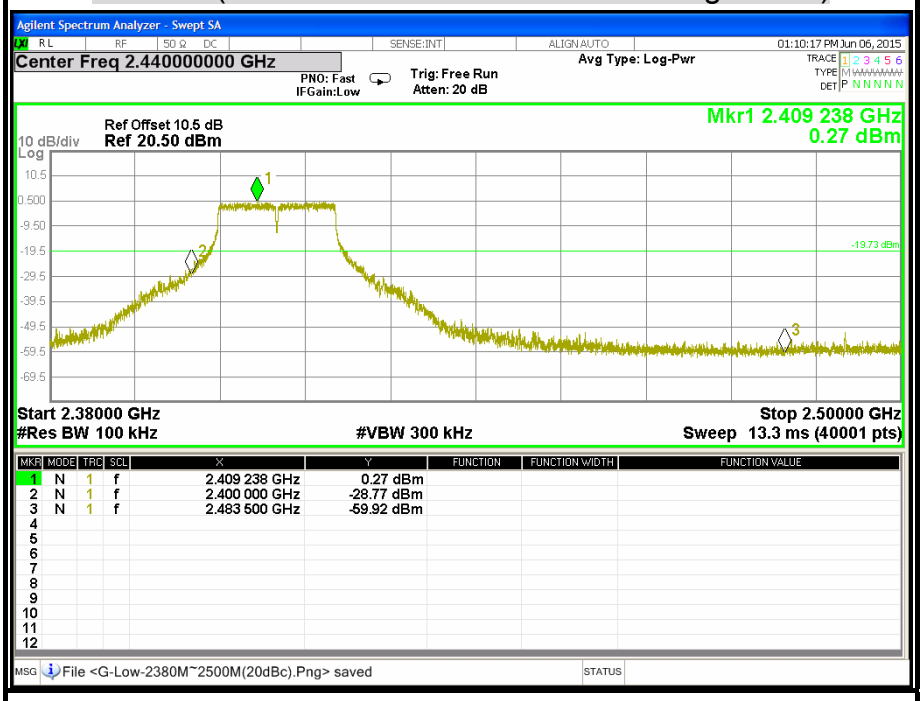
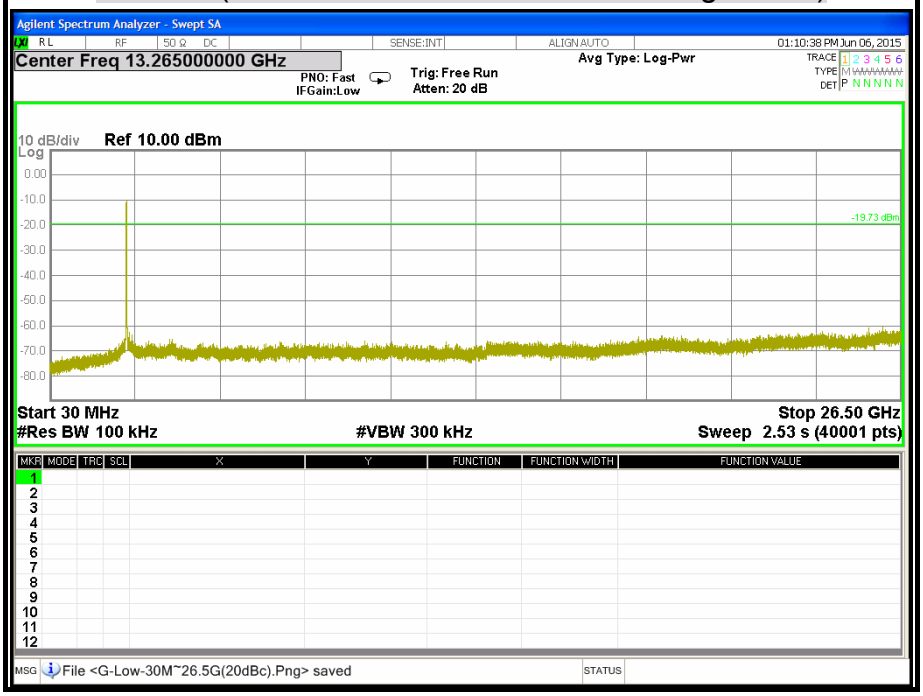
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



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



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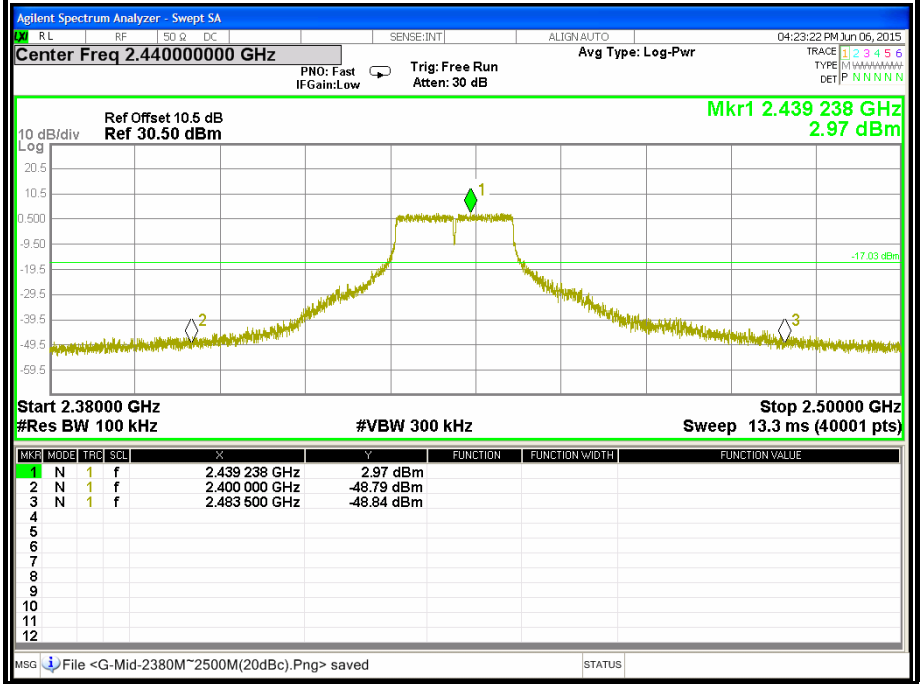
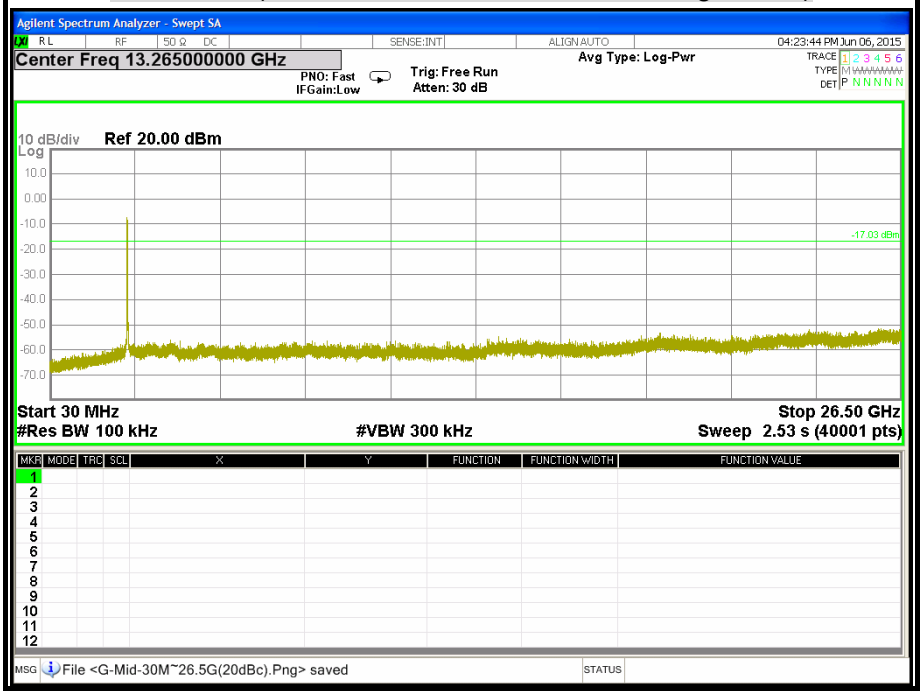
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



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



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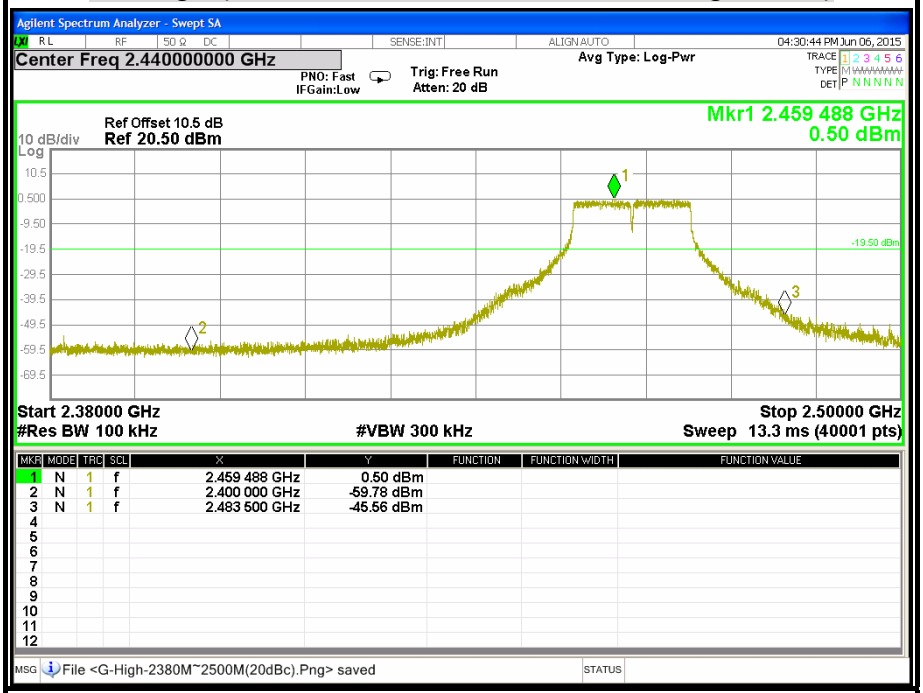
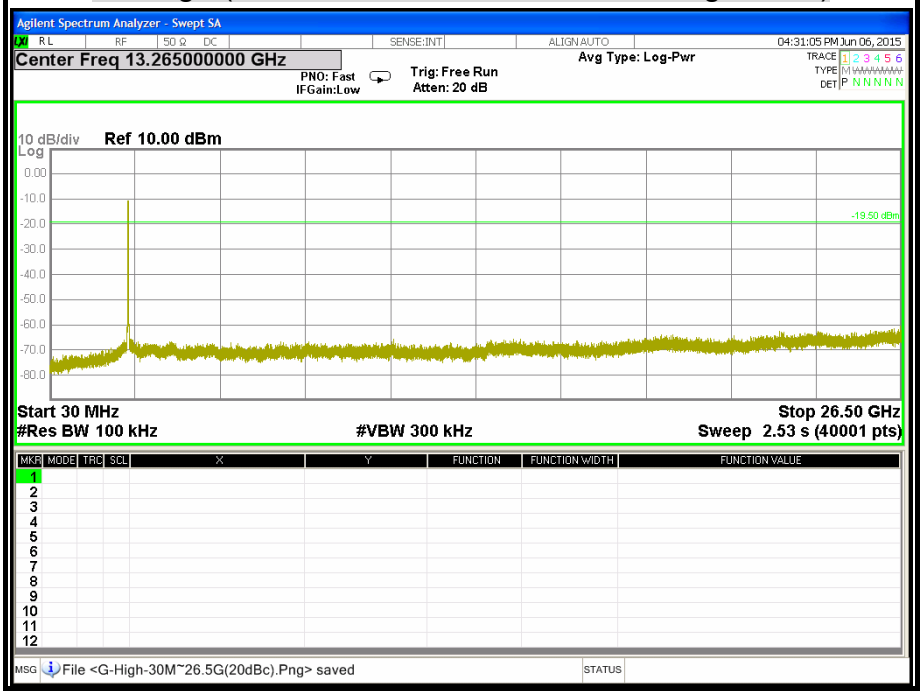
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11g Mode)



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



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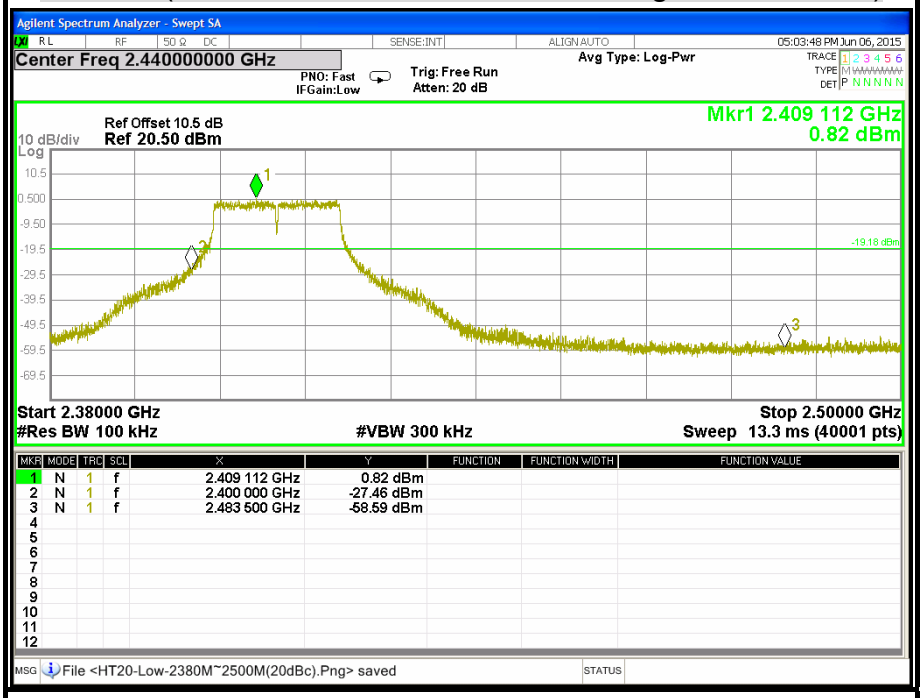
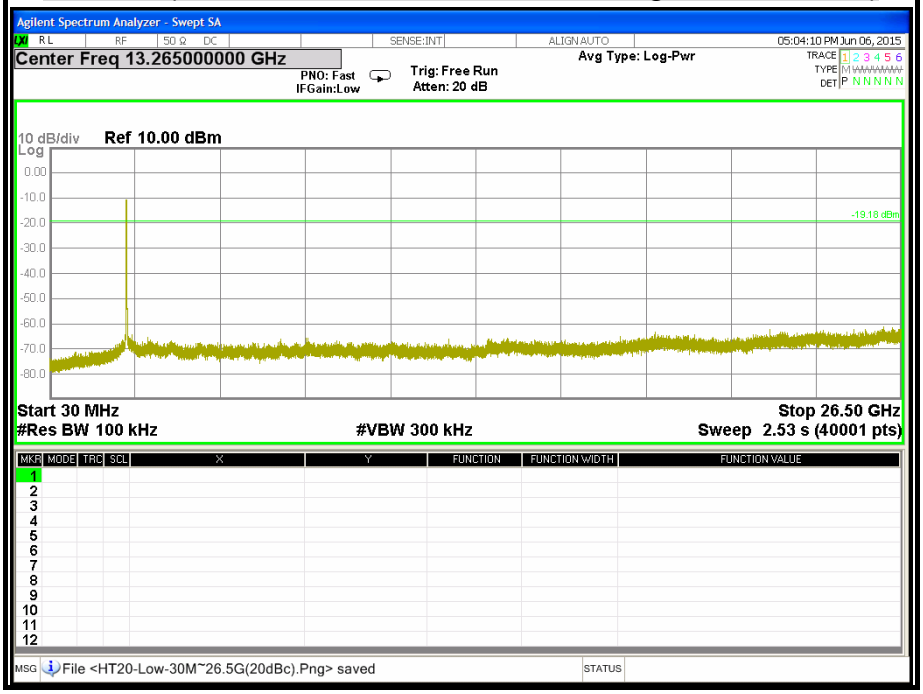
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 Mode)



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



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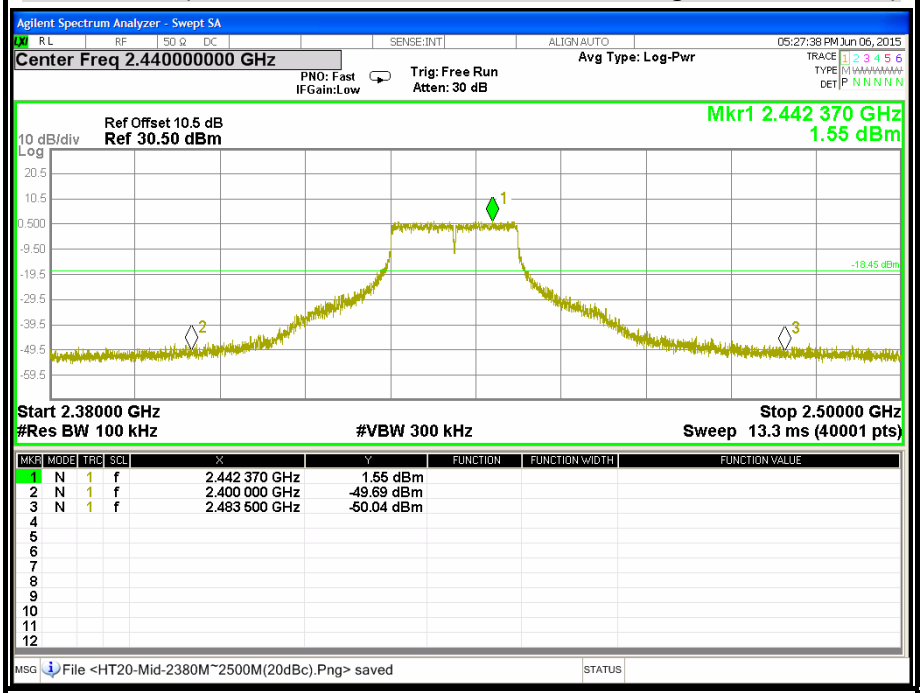
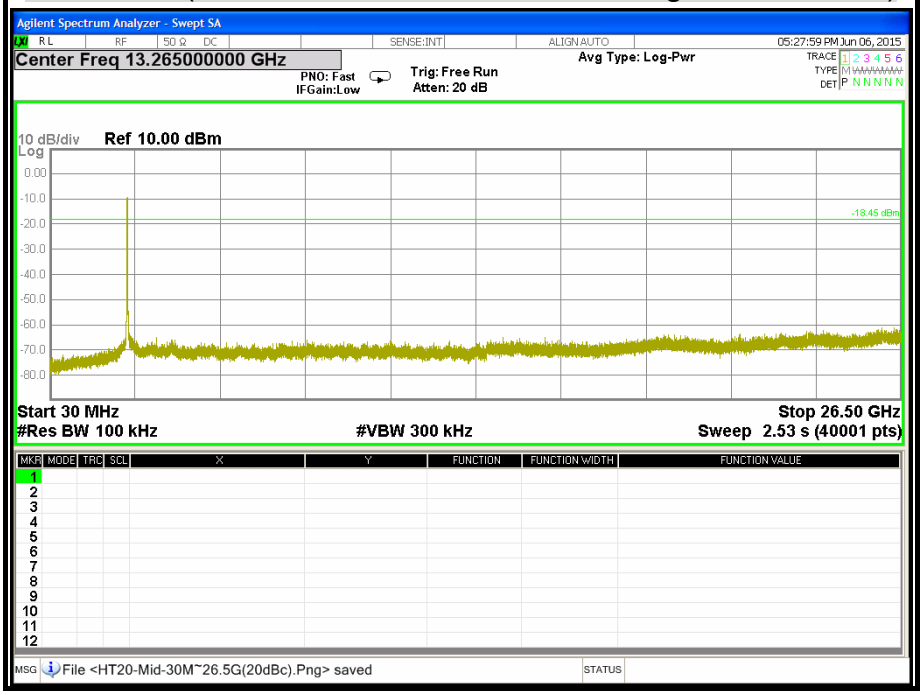
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 Mode)



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



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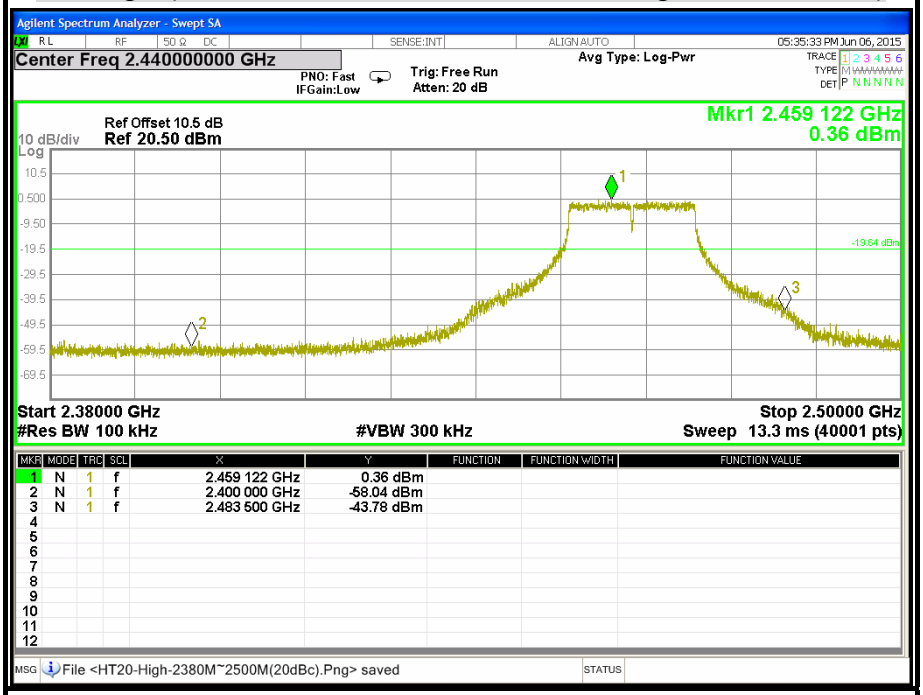
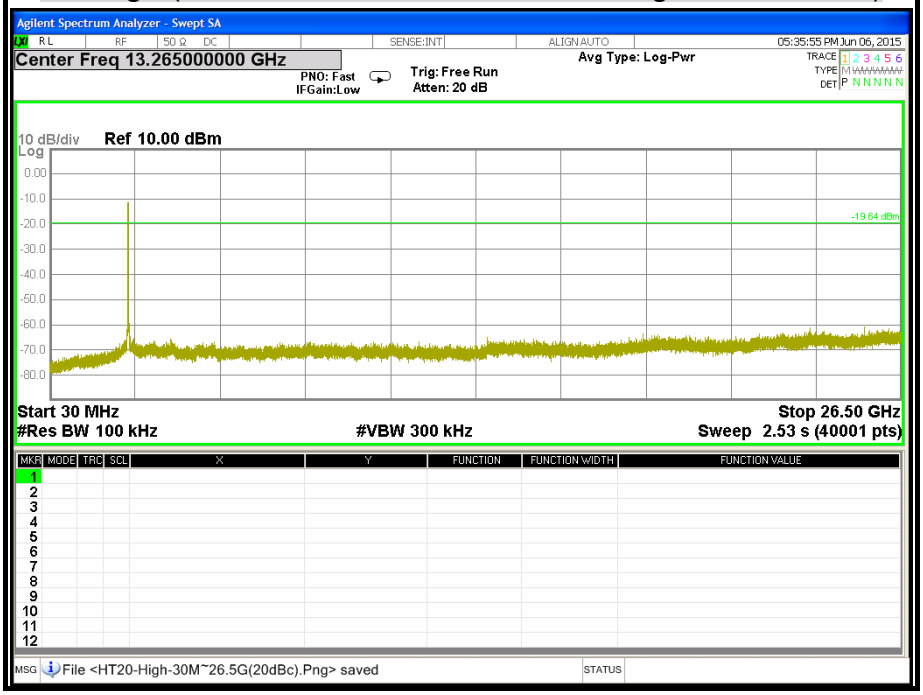
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT20 Mode)



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



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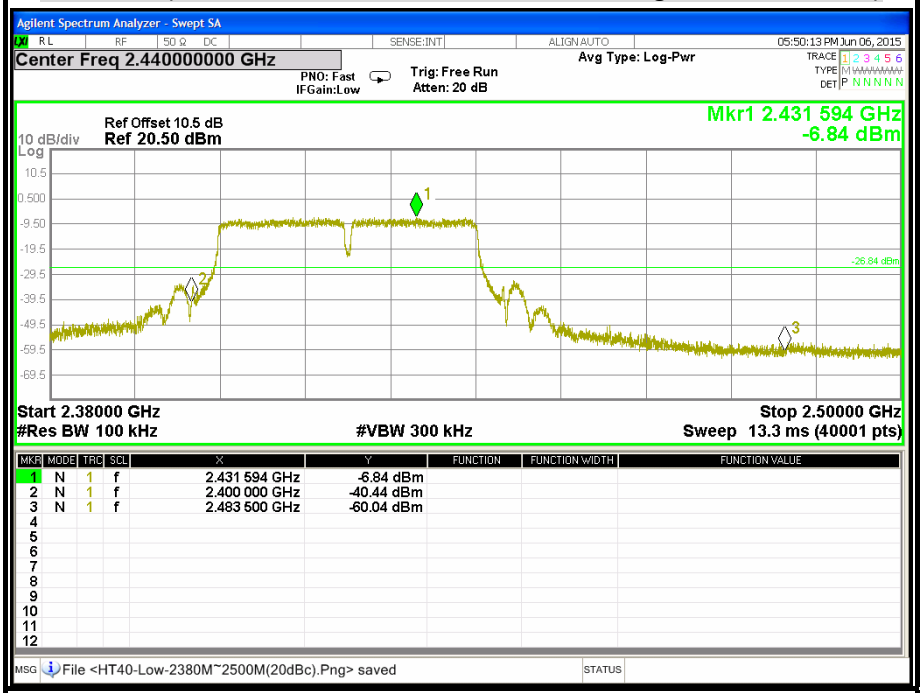
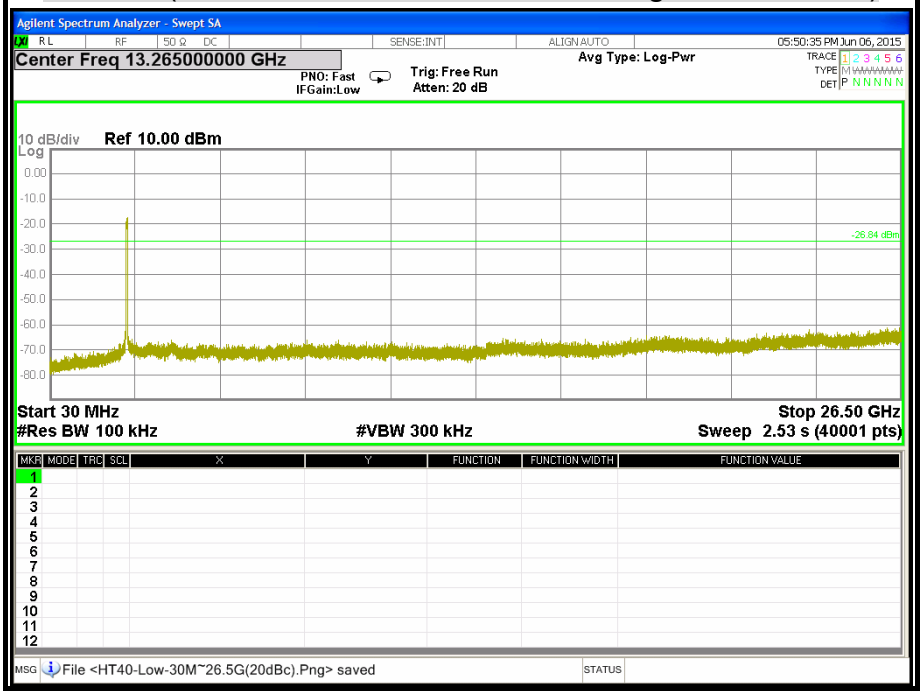
CH Low (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 Mode)



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



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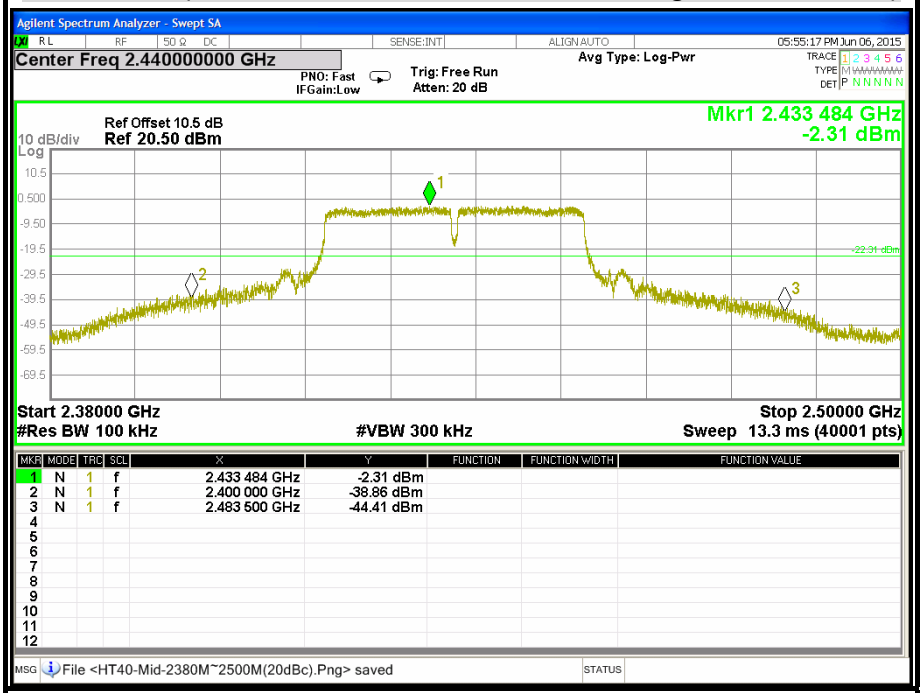
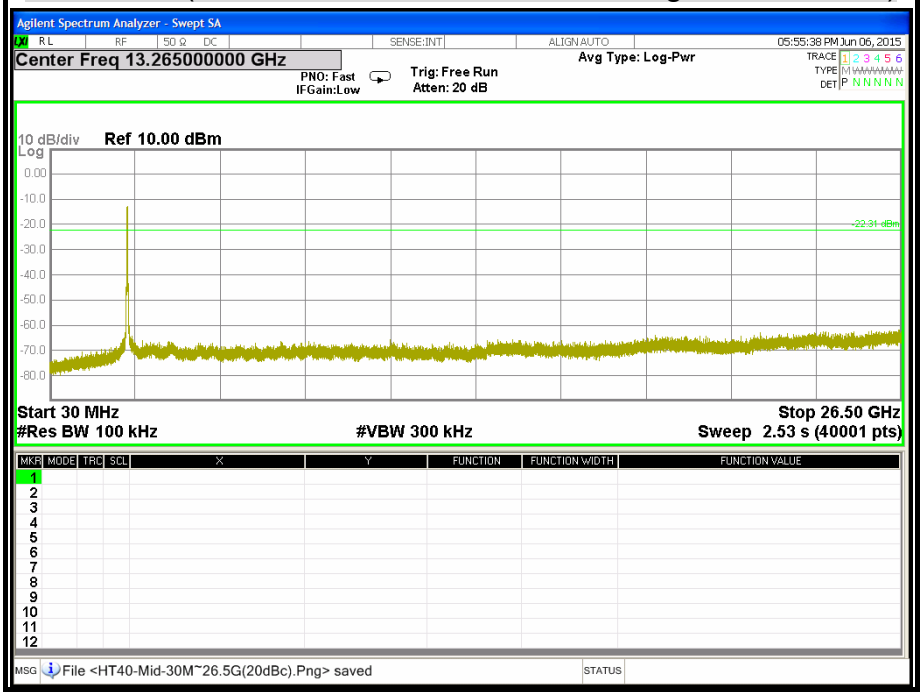
CH Middle (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 Mode)



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



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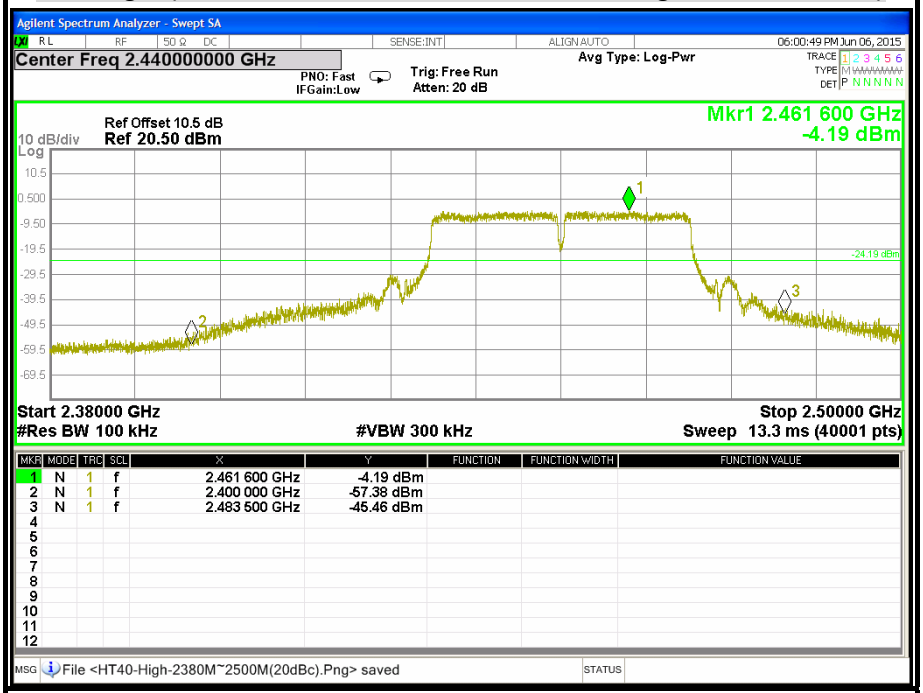
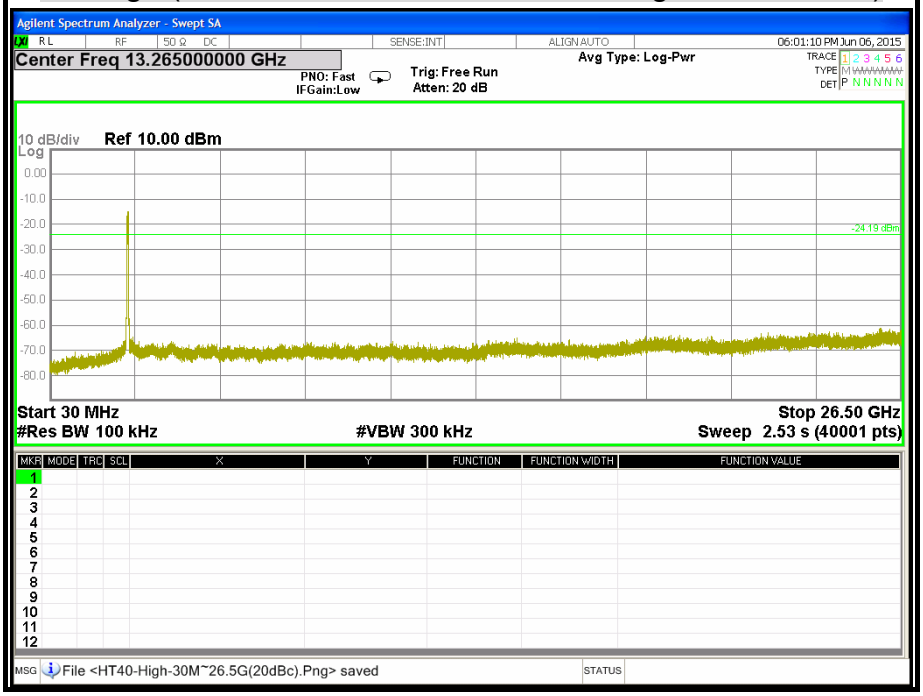
CH High (2.38GHz ~ 2.5GHz / IEEE 802.11gn HT40 Mode)



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



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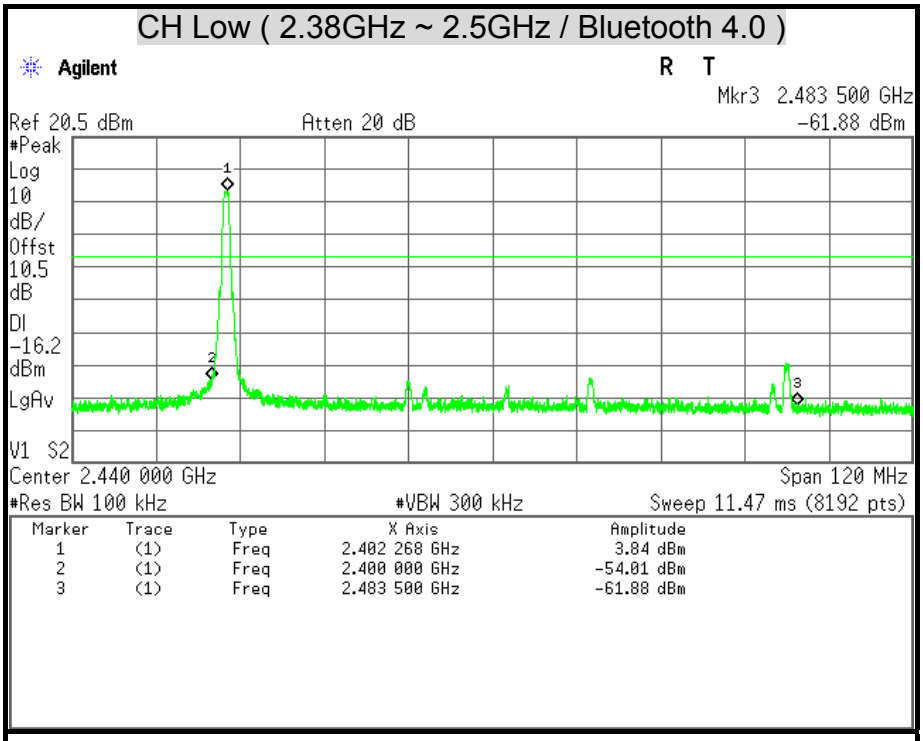
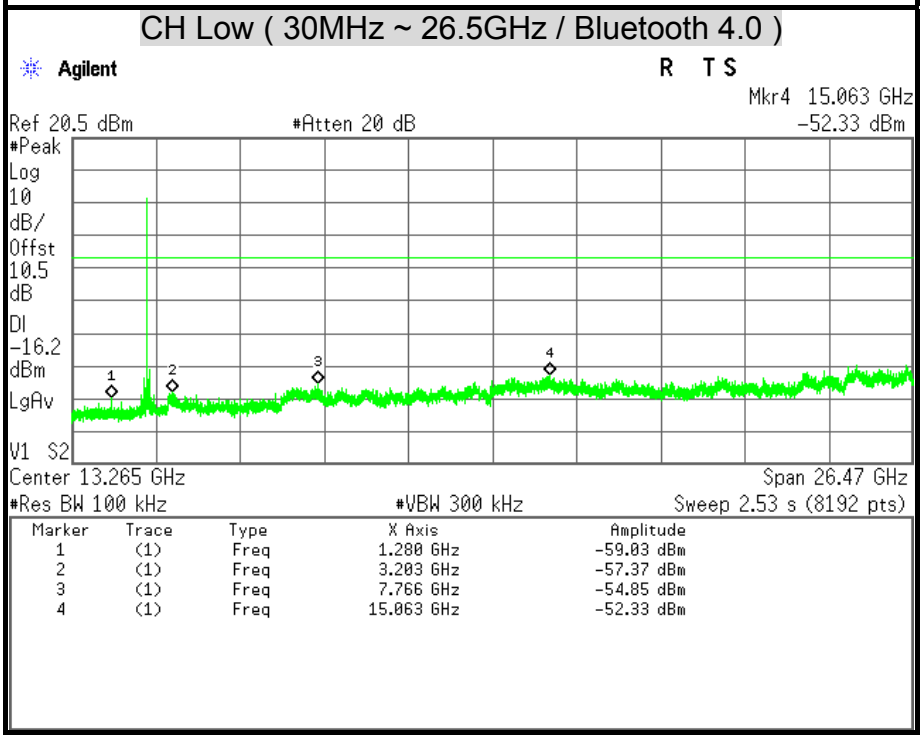
CH Low (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



CH Low (30MHz ~ 26.5GHz / Bluetooth 4.0)



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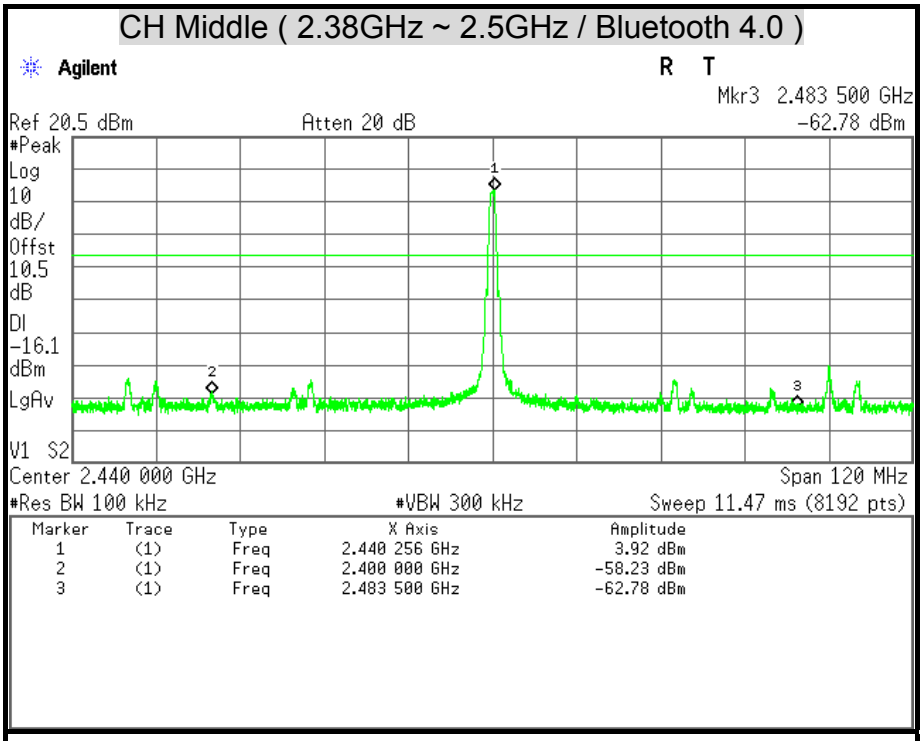
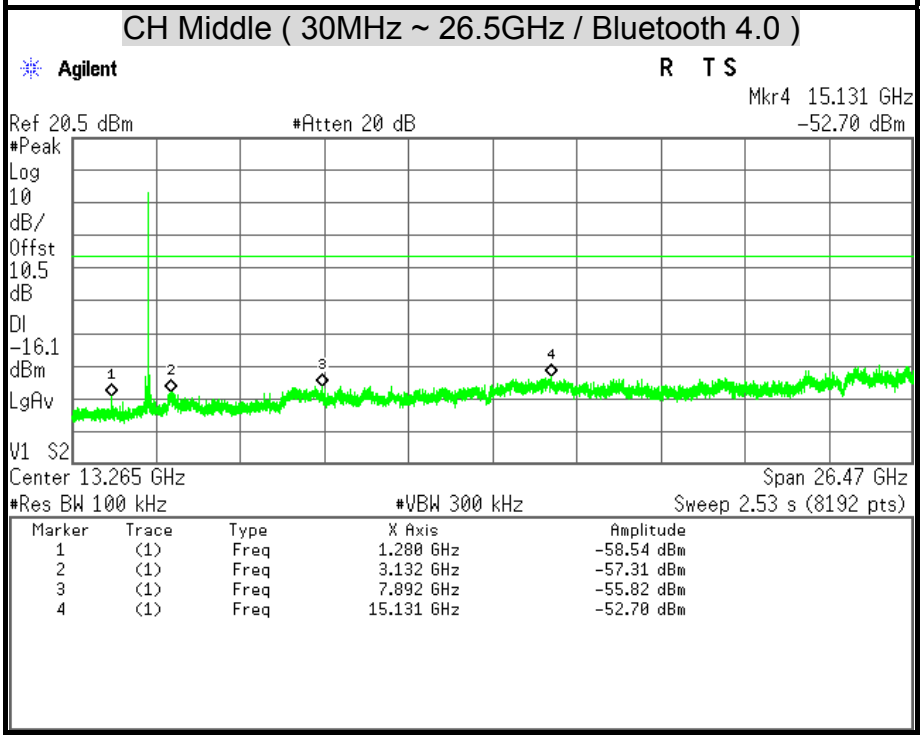
CH Middle (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



CH Middle (30MHz ~ 26.5GHz / Bluetooth 4.0)



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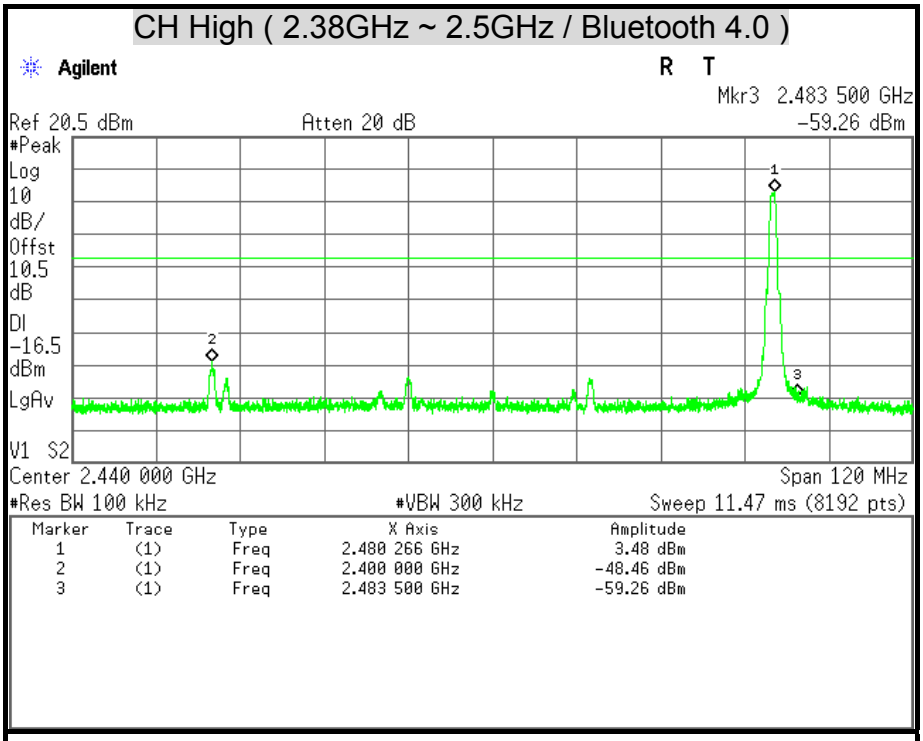
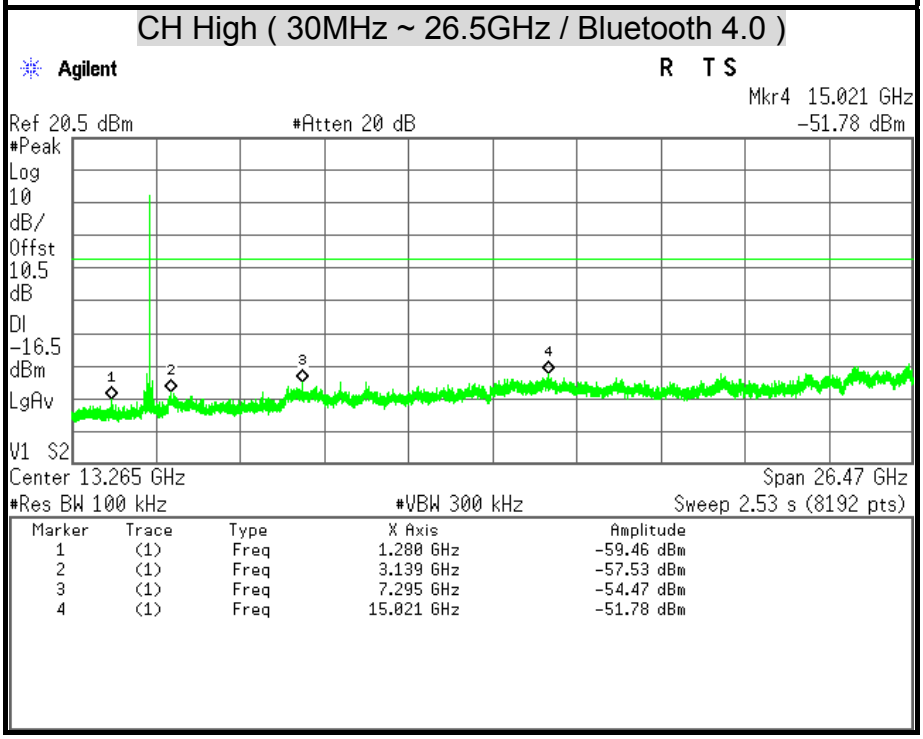
CH High (2.38GHz ~ 2.5GHz / Bluetooth 4.0)



CH High (30MHz ~ 26.5GHz / Bluetooth 4.0)



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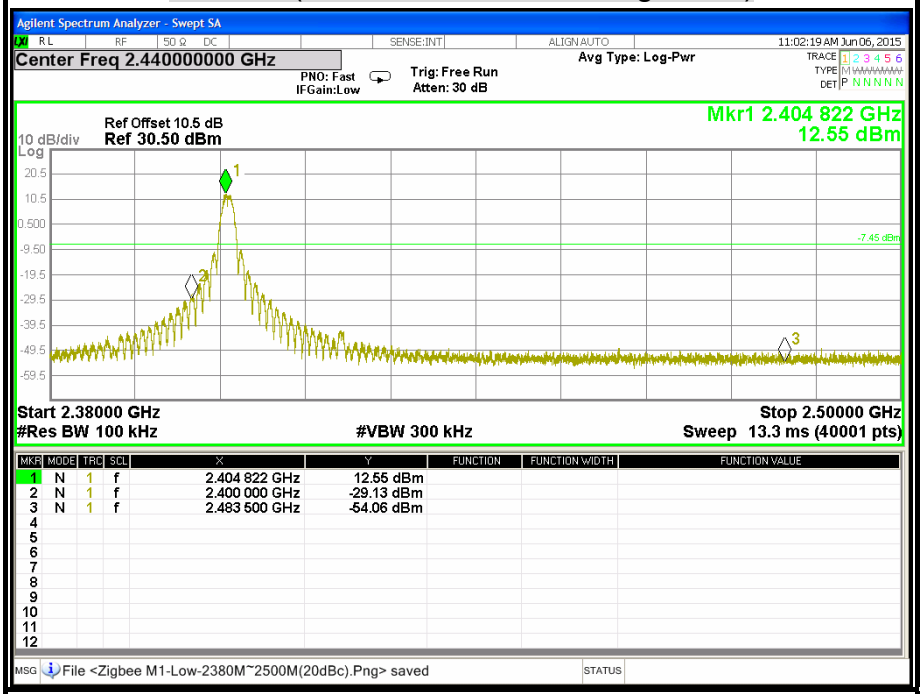
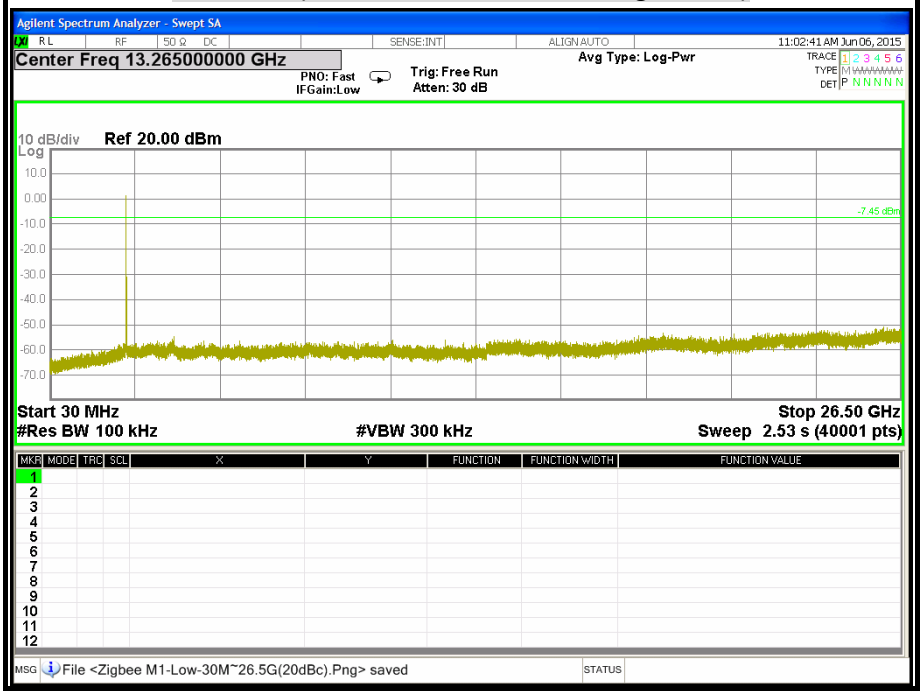
CH Low (2.38GHz ~ 2.5GHz / Zigbee 1)



CH Low (30MHz ~ 26.5GHz / Zigbee 1)



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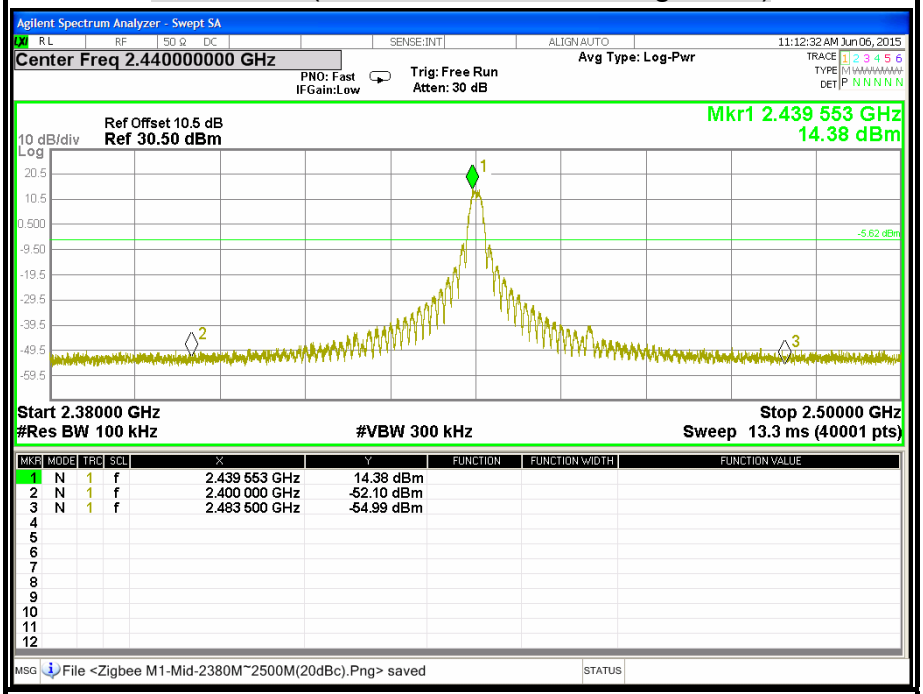
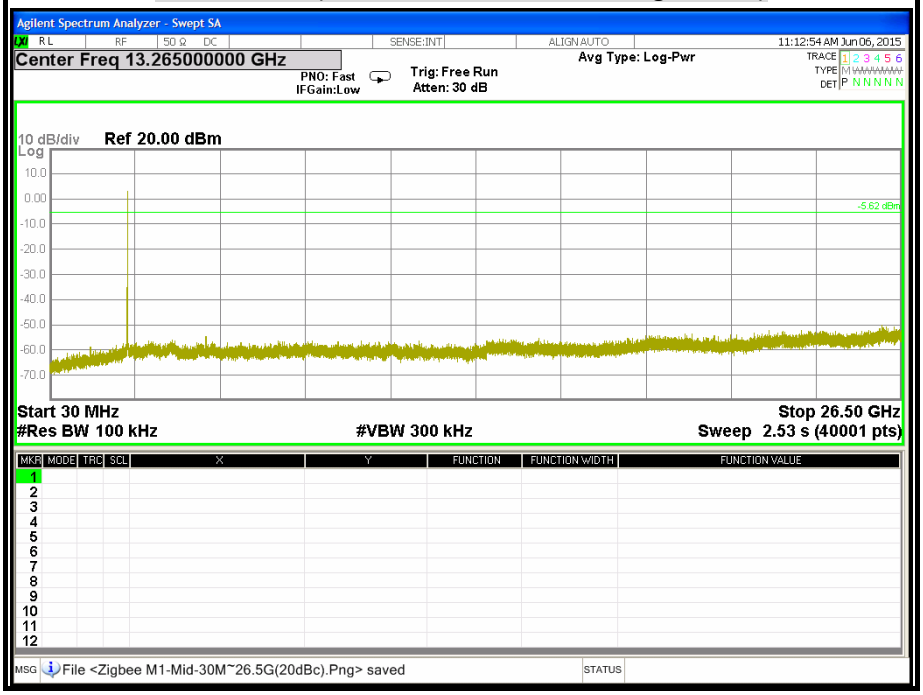
CH Middle (2.38GHz ~ 2.5GHz / Zigbee 1)



CH Middle (30MHz ~ 26.5GHz / Zigbee 1)



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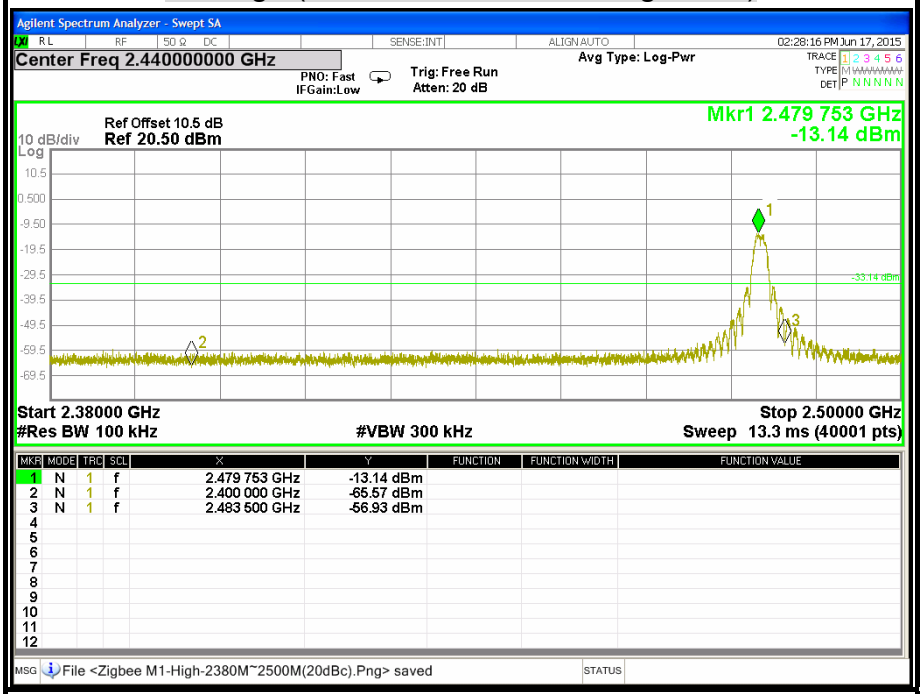
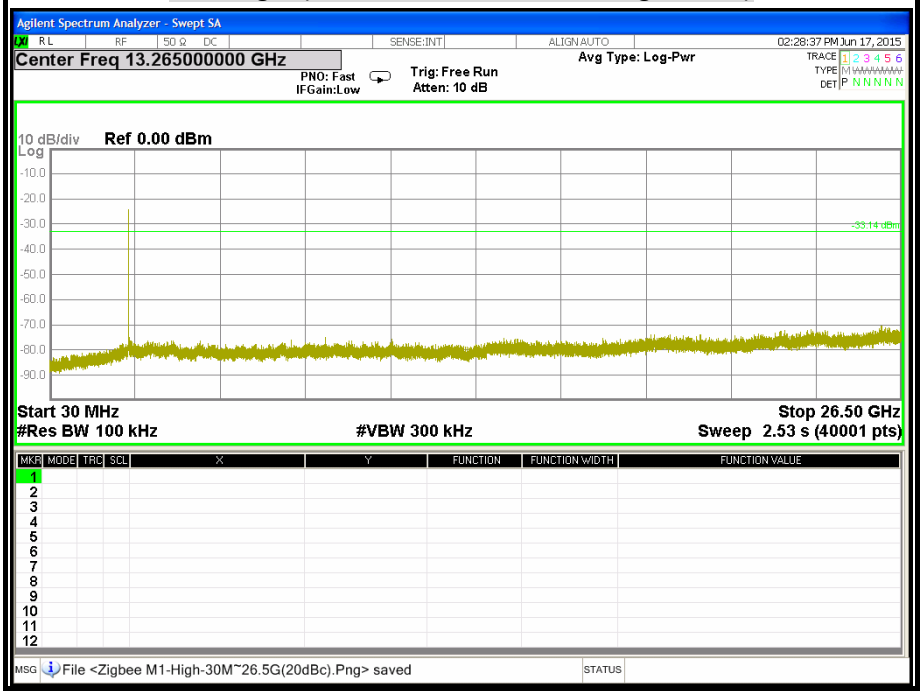
CH High (2.38GHz ~ 2.5GHz / Zigbee 1)



CH High (30MHz ~ 26.5GHz / Zigbee 1)



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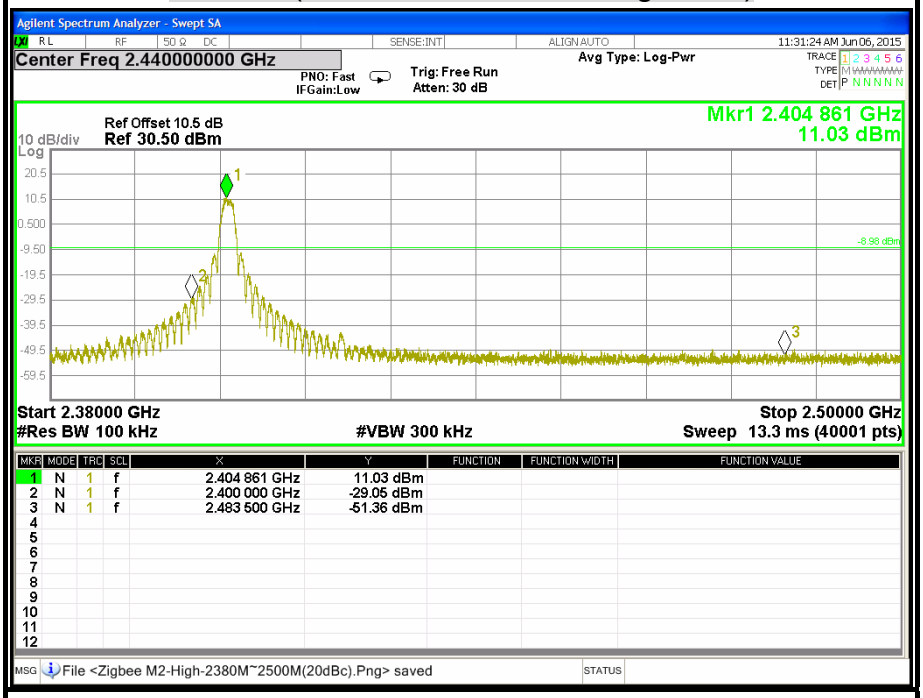
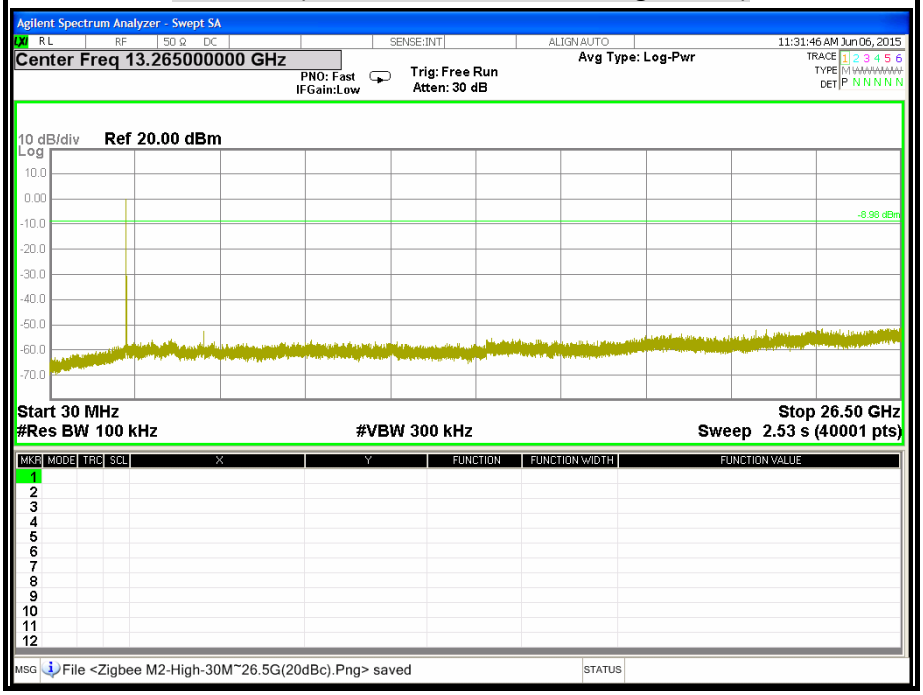
CH Low (2.38GHz ~ 2.5GHz / Zigbee 2)



CH Low (30MHz ~ 26.5GHz / Zigbee 2)



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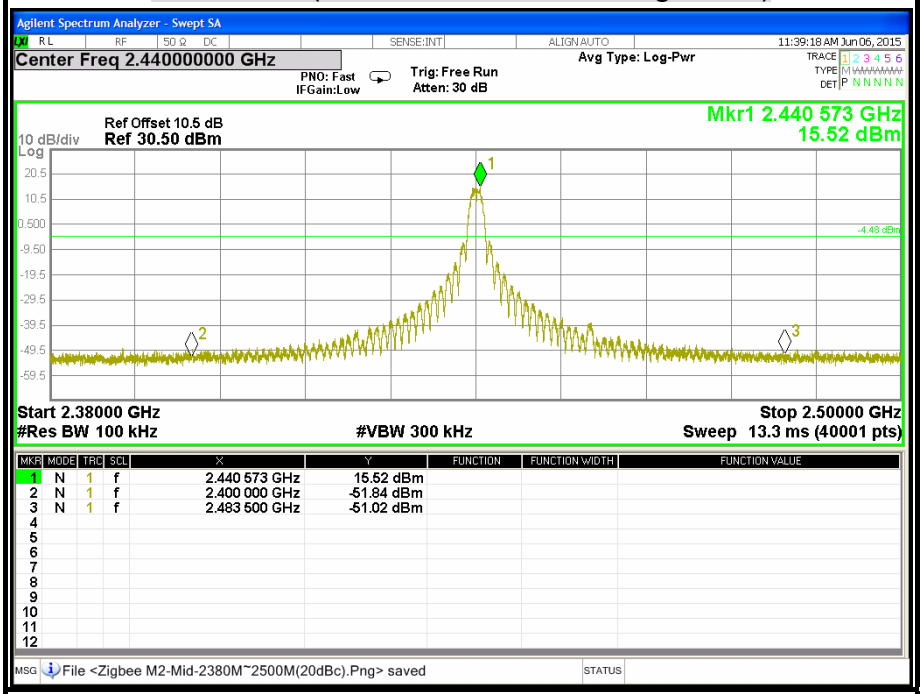
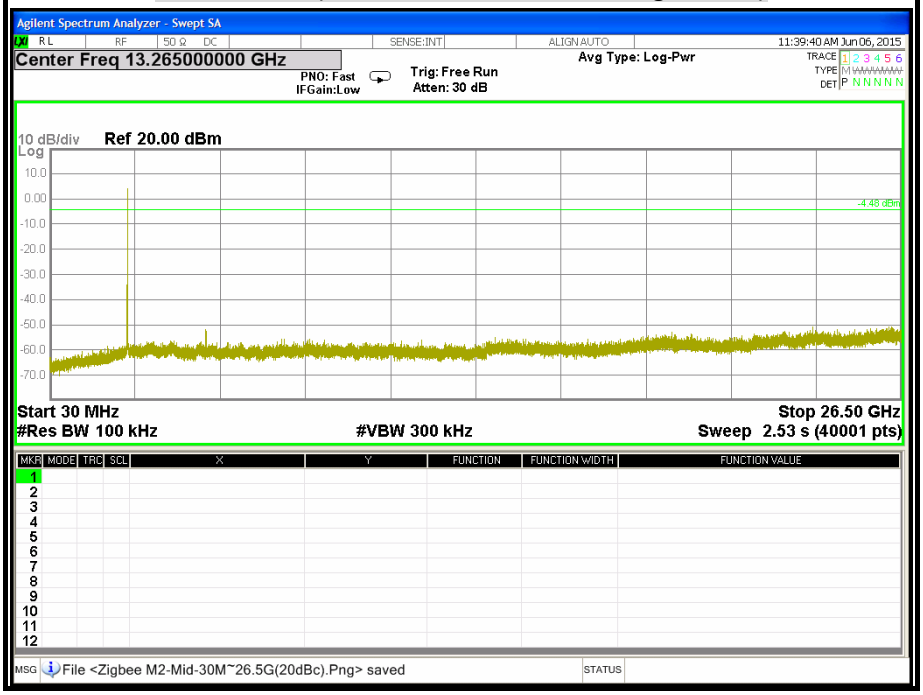
CH Middle (2.38GHz ~ 2.5GHz / Zigbee 2)



CH Middle (30MHz ~ 26.5GHz / Zigbee 2)



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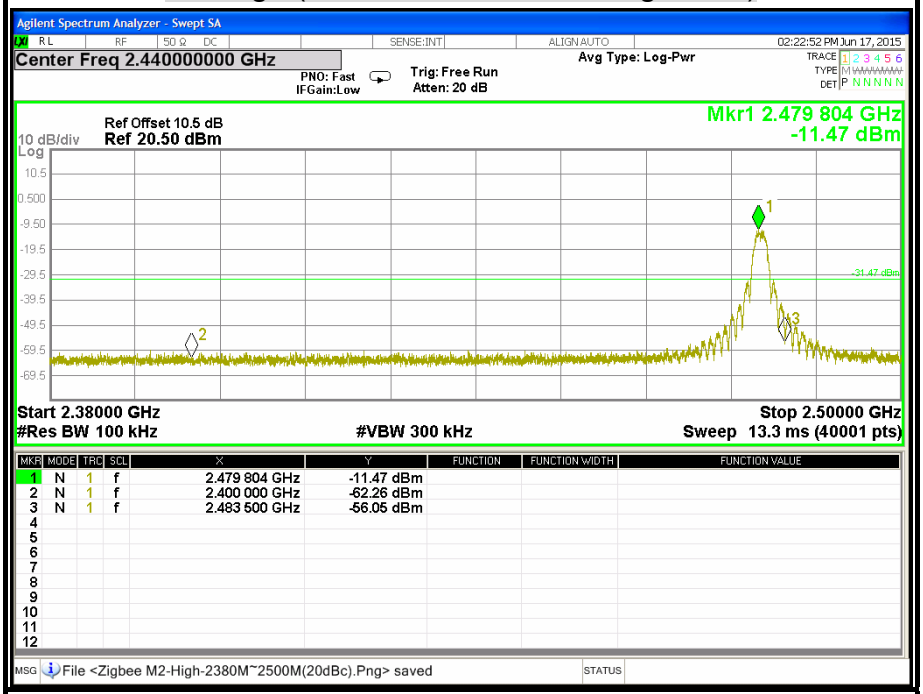
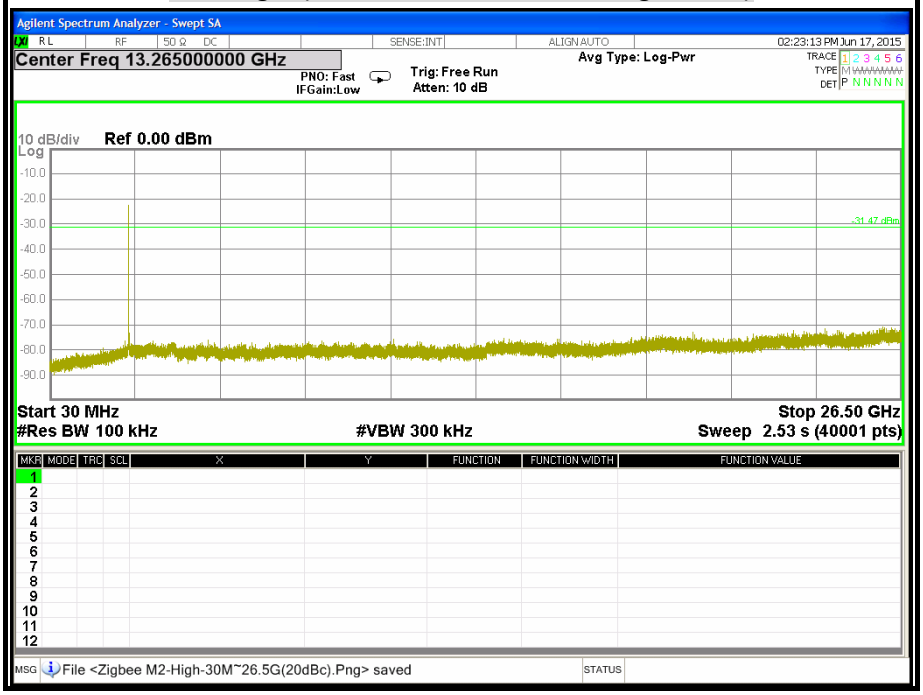
CH High (2.38GHz ~ 2.5GHz / Zigbee 2)



CH High (30MHz ~ 26.5GHz / Zigbee 2)



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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.

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(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	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/14/2016
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/14/2015
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	08/21/2015
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-285	04/19/2016
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/02/2015
Horn Antenna	COM-POWER	AH-840	03077	12/17/2015
Pre-Amplifier	Agilent	8447D	2944A10052	07/15/2015
Pre-Amplifier	Agilent	8449B	3008A01916	07/15/2015
LOOP Antenna	EMCO	6502	8905-2356	09/23/2015
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.

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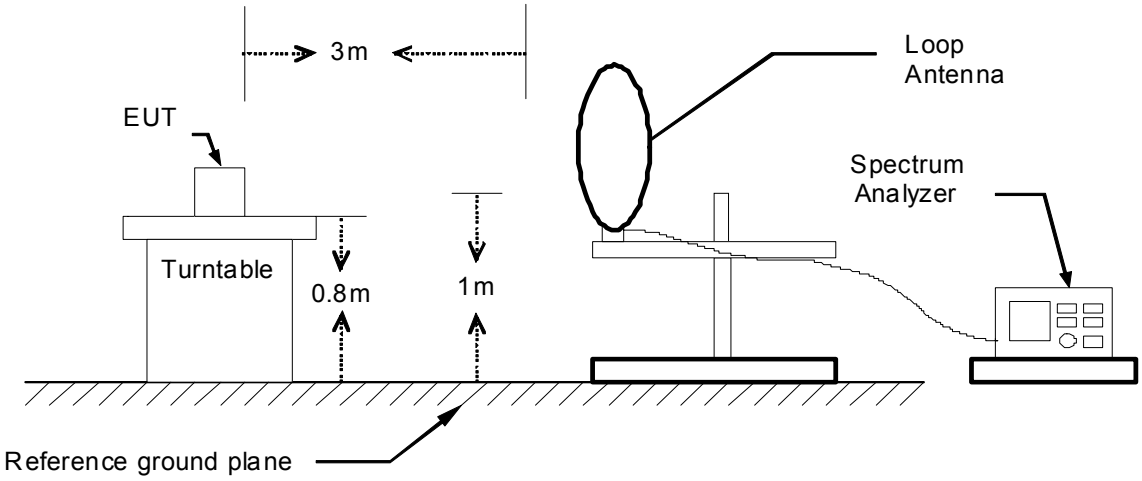
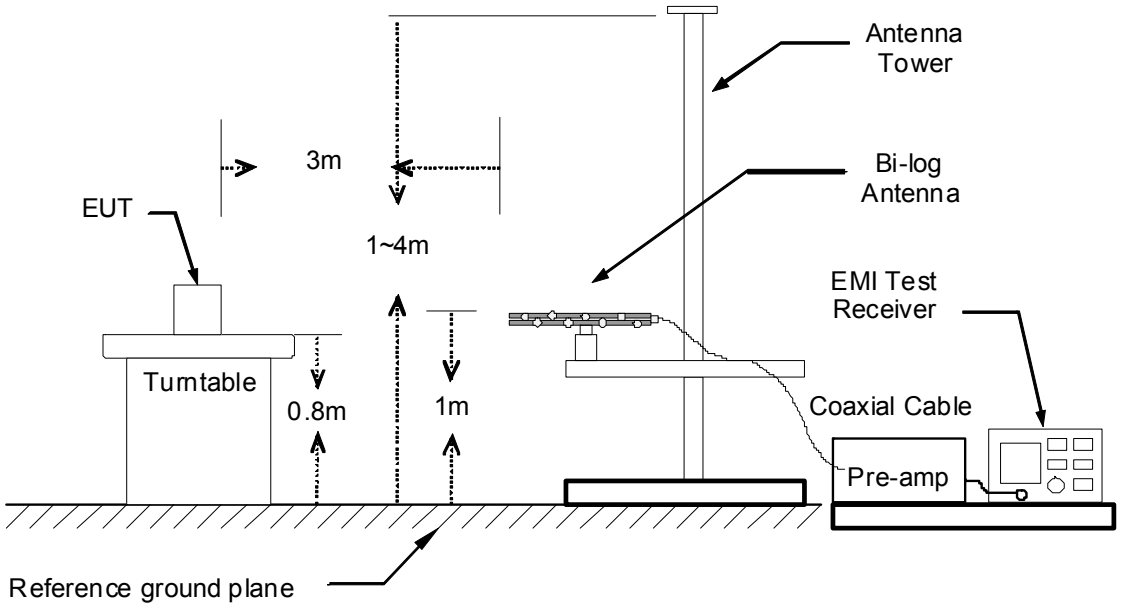
TEST SETUP

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

9kHz ~ 30MHz



30MHz ~ 1GHz



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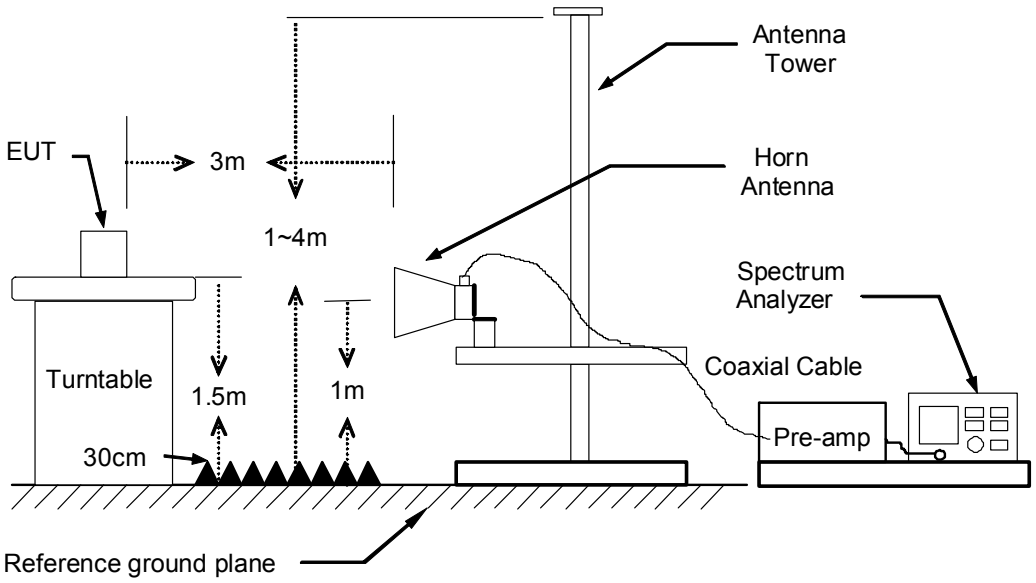
The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



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.

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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	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/05
Test Mode	WiFi / TX Mode	Temp. & Humidity	25°C, 56%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
105.66	51.16	-17.87	33.29	43.50	-10.21	Peak
271.53	46.15	-12.73	33.43	46.00	-12.57	Peak
384.05	46.17	-10.30	35.87	46.00	-10.13	Peak
549.92	45.14	-7.65	37.49	46.00	-8.51	Peak
900.09	38.02	-1.45	36.57	46.00	-9.43	Peak
949.56	38.13	-0.75	37.38	46.00	-8.62	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
49.40	49.40	-13.66	35.74	40.00	-4.26	QP
101.78	57.26	-18.35	38.91	43.50	-4.59	Peak
114.39	53.60	-16.79	36.81	43.50	-6.69	Peak
262.80	47.88	-13.15	34.73	46.00	-11.27	Peak
549.92	44.68	-7.65	37.03	46.00	-8.97	Peak
949.56	38.61	-0.75	37.87	46.00	-8.13	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).*

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/05
Test Mode	Bluetooth 4.0 / TX Mode	Temp. & Humidity	25°C, 56%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
109.54	56.22	-17.43	38.79	43.50	-4.71	Peak
203.63	51.40	-15.95	35.45	43.50	-8.05	QP
335.55	44.90	-11.18	33.72	46.00	-12.28	QP
384.05	50.67	-10.24	40.43	46.00	-5.57	Peak
480.08	50.14	-8.46	41.68	46.00	-4.32	Peak
719.67	47.10	-4.28	42.82	46.00	-3.18	QP

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
48.43	40.80	-13.90	26.90	40.00	-13.10	QP
156.10	52.94	-13.50	39.44	43.50	-4.06	Peak
240.49	56.80	-14.07	42.73	46.00	-3.27	Peak
252.13	44.90	-13.64	31.26	46.00	-14.74	QP
312.27	50.30	-11.66	38.64	46.00	-7.36	QP
384.05	52.99	-10.24	42.75	46.00	-3.25	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).*

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/05
Test Mode	Zigbee 1 / TX Mode	Temp. & Humidity	25°C, 56%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
49.40	41.39	-13.66	27.73	40.00	-12.27	Peak
103.72	52.95	-18.11	34.84	43.50	-8.66	Peak
249.22	46.46	-13.78	32.68	46.00	-13.32	Peak
384.05	45.80	-10.30	35.50	46.00	-10.50	Peak
549.92	44.11	-7.65	36.46	46.00	-9.54	Peak
949.56	38.25	-0.75	37.51	46.00	-8.49	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBµV)	Correction Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
48.43	49.86	-13.73	36.13	40.00	-3.87	QP
104.69	56.59	-17.99	38.60	43.50	-4.90	Peak
124.09	51.16	-15.66	35.50	43.50	-8.00	Peak
384.05	44.43	-10.30	34.12	46.00	-11.88	Peak
549.92	44.28	-7.65	36.63	46.00	-9.37	Peak
949.56	37.06	-0.75	36.32	46.00	-9.68	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).*

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/05
Test Mode	Zigbee 2 / TX Mode	Temp. & Humidity	25°C, 56%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
107.60	51.47	-17.63	33.83	43.50	-9.67	Peak
311.30	48.27	-11.66	36.61	46.00	-9.39	Peak
384.05	44.96	-10.30	34.65	46.00	-11.35	Peak
549.92	44.78	-7.65	37.12	46.00	-8.88	Peak
896.21	38.01	-1.52	36.49	46.00	-9.51	Peak
949.56	37.53	-0.75	36.79	46.00	-9.21	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
51.34	51.08	-13.73	37.35	40.00	-2.65	QP
108.57	55.08	-17.51	37.57	43.50	-5.93	Peak
288.02	45.81	-12.14	33.67	46.00	-12.33	Peak
549.92	44.25	-7.65	36.60	46.00	-9.40	Peak
896.21	34.72	-1.52	33.20	46.00	-12.80	Peak
949.56	35.88	-0.75	35.14	46.00	-10.86	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).*

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Above 1 GHz

Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11b TX / CH Low	Temp. & Humidity	25°C, 58%

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
1794.00	49.80	---	-0.13	49.67	---	74.00	54.00	-4.33	Peak
2268.00	51.90	36.81	2.44	54.34	39.25	74.00	54.00	-14.75	AVG
2512.00	50.90	35.75	3.03	53.94	38.78	74.00	54.00	-15.22	AVG
3150.00	42.30	---	4.33	46.63	---	74.00	54.00	-7.37	Peak
4890.00	41.29	---	8.05	49.34	---	74.00	54.00	-4.66	Peak
7185.00	39.36	---	11.88	51.24	---	74.00	54.00	-2.76	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
1462.00	51.51	---	-2.90	48.61	---	74.00	54.00	-5.39	Peak
2142.00	49.57	---	2.13	51.70	---	74.00	54.00	-2.30	Peak
2522.00	49.13	---	3.05	52.19	---	74.00	54.00	-1.81	Peak
3195.00	42.45	---	4.42	46.87	---	74.00	54.00	-7.13	Peak
4485.00	41.91	---	7.69	49.59	---	74.00	54.00	-4.41	Peak
7215.00	39.80	---	11.82	51.62	---	74.00	54.00	-2.38	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11b TX / CH Middle	Temp. & Humidity	25°C, 58%

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
1600.00	51.29	---	-1.93	49.36	---	74.00	54.00	-4.64	Peak
2386.00	53.25	38.42	2.73	55.98	41.15	74.00	54.00	-12.85	AVG
2486.00	50.72	35.69	2.98	53.70	38.67	74.00	54.00	-15.33	AVG
3285.00	42.19	---	4.60	46.79	---	74.00	54.00	-7.21	Peak
4785.00	40.55	---	7.97	48.52	---	74.00	54.00	-5.48	Peak
6945.00	39.89	---	12.24	52.13	---	74.00	54.00	-1.87	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
1604.00	50.50	---	-1.89	48.60	---	74.00	54.00	-5.40	Peak
2318.00	48.71	---	2.56	51.27	---	74.00	54.00	-2.73	Peak
2540.00	48.69	---	3.09	51.78	---	74.00	54.00	-2.22	Peak
3285.00	42.28	---	4.60	46.88	---	74.00	54.00	-7.12	Peak
4485.00	41.73	---	7.69	49.42	---	74.00	54.00	-4.58	Peak
7155.00	40.03	---	11.95	51.99	---	74.00	54.00	-2.01	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11b TX / CH High	Temp. & Humidity	25°C, 58%

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
2096.00	49.83	---	2.02	51.84	---	74.00	54.00	-2.16	Peak
2384.00	52.34	37.57	2.72	55.06	40.29	74.00	54.00	-13.71	AVG
2502.00	51.42	36.63	3.01	54.44	39.64	74.00	54.00	-14.36	AVG
3300.00	42.20	---	4.63	46.83	---	74.00	54.00	-7.17	Peak
4710.00	39.97	---	7.91	47.88	---	74.00	54.00	-6.12	Peak
7035.00	39.42	---	12.23	51.65	---	74.00	54.00	-2.35	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
1888.00	49.56	---	0.74	50.30	---	74.00	54.00	-3.70	Peak
2292.00	49.07	---	2.50	51.56	---	74.00	54.00	-2.44	Peak
2616.00	49.15	---	3.25	52.40	---	74.00	54.00	-1.60	Peak
3450.00	42.25	---	4.93	47.18	---	74.00	54.00	-6.82	Peak
4560.00	40.56	---	7.79	48.34	---	74.00	54.00	-5.66	Peak
8010.00	39.54	---	12.45	51.98	---	74.00	54.00	-2.02	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11g TX / CH Low	Temp. & Humidity	25°C, 58%

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
1764.00	50.25	---	-0.41	49.84	---	74.00	54.00	-4.16	Peak
2292.00	51.10	35.96	2.50	53.60	38.46	74.00	54.00	-15.54	AVG
2528.00	50.88	35.52	3.07	53.95	38.59	74.00	54.00	-15.41	AVG
3255.00	42.70	---	4.54	47.24	---	74.00	54.00	-6.76	Peak
4785.00	40.75	---	7.97	48.72	---	74.00	54.00	-5.28	Peak
7095.00	39.15	---	12.09	51.24	---	74.00	54.00	-2.76	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
1930.00	48.10	---	1.13	49.23	---	74.00	54.00	-4.77	Peak
2208.00	48.84	---	2.29	51.14	---	74.00	54.00	-2.86	Peak
2518.00	48.44	---	3.05	51.48	---	74.00	54.00	-2.52	Peak
3195.00	43.34	---	4.42	47.76	---	74.00	54.00	-6.24	Peak
4770.00	40.36	---	7.96	48.32	---	74.00	54.00	-5.68	Peak
7185.00	39.89	---	11.88	51.78	---	74.00	54.00	-2.22	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11g TX / CH Middle	Temp. & Humidity	25°C, 58%

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
1604.00	51.11	---	-1.89	49.21	---	74.00	54.00	-4.79	Peak
2388.00	55.13	40.01	2.73	57.87	42.74	74.00	54.00	-11.26	AVG
2484.00	55.91	40.89	2.97	58.88	43.86	74.00	54.00	-10.14	AVG
3210.00	42.56	---	4.45	47.01	---	74.00	54.00	-6.99	Peak
4950.00	40.57	---	8.10	48.67	---	74.00	54.00	-5.33	Peak
6390.00	39.88	---	11.63	51.51	---	74.00	54.00	-2.49	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
2148.00	49.55	---	2.14	51.69	---	74.00	54.00	-2.31	Peak
2390.00	49.04	---	2.74	51.78	---	74.00	54.00	-2.22	Peak
2484.00	52.32	37.47	2.97	55.29	40.44	74.00	54.00	-13.56	AVG
3210.00	41.87	---	4.45	46.32	---	74.00	54.00	-7.68	Peak
4500.00	40.95	---	7.74	48.69	---	74.00	54.00	-5.31	Peak
7110.00	39.72	---	12.06	51.78	---	74.00	54.00	-2.22	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11g TX / CH High	Temp. & Humidity	25°C, 58%

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
1600.00	51.10	---	-1.93	49.16	---	74.00	54.00	-4.84	Peak
2380.00	50.74	35.96	2.71	53.45	38.67	74.00	54.00	-15.33	AVG
2506.00	51.18	36.41	3.02	54.20	39.43	74.00	54.00	-14.57	AVG
3345.00	42.36	---	4.72	47.08	---	74.00	54.00	-6.92	Peak
4755.00	40.79	---	7.94	48.73	---	74.00	54.00	-5.27	Peak
7185.00	39.92	---	11.88	51.80	---	74.00	54.00	-2.20	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
1900.00	49.86	---	0.85	50.72	---	74.00	54.00	-3.28	Peak
2368.00	48.22	---	2.69	50.91	---	74.00	54.00	-3.09	Peak
2572.00	48.14	---	3.16	51.30	---	74.00	54.00	-2.70	Peak
3390.00	42.30	---	4.81	47.11	---	74.00	54.00	-6.89	Peak
4485.00	40.73	---	7.69	48.42	---	74.00	54.00	-5.58	Peak
7005.00	39.00	---	12.30	51.30	---	74.00	54.00	-2.70	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT20 TX / CH Low	Temp. & Humidity	25°C, 58%

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
2018.00	49.12	---	1.82	50.94	---	74.00	54.00	-3.06	Peak
2254.00	50.41	35.68	2.40	52.81	38.08	74.00	54.00	-15.92	AVG
2484.00	50.73	36.57	2.97	53.70	39.54	74.00	54.00	-14.46	AVG
3210.00	42.23	---	4.45	46.68	---	74.00	54.00	-7.32	Peak
4650.00	40.53	---	7.86	48.39	---	74.00	54.00	-5.61	Peak
7020.00	39.92	---	12.26	52.18	---	74.00	54.00	-1.82	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
1850.00	50.38	---	0.39	50.77	---	74.00	54.00	-3.23	Peak
2156.00	48.58	---	2.16	50.75	---	74.00	54.00	-3.25	Peak
2572.00	48.35	---	3.16	51.51	---	74.00	54.00	-2.49	Peak
3210.00	41.91	---	4.45	46.36	---	74.00	54.00	-7.64	Peak
4800.00	40.82	---	7.98	48.80	---	74.00	54.00	-5.20	Peak
6960.00	39.45	---	12.26	51.70	---	74.00	54.00	-2.30	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT20 TX / CH Middle	Temp. & Humidity	25°C, 58%

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
1960.00	49.64	---	1.41	51.05	---	74.00	54.00	-2.95	Peak
2390.00	59.61	40.80	2.74	62.35	43.54	74.00	54.00	-10.46	AVG
2484.00	57.13	40.01	2.97	60.10	42.98	74.00	54.00	-11.02	AVG
3210.00	43.13	---	4.45	47.58	---	74.00	54.00	-6.42	Peak
4860.00	40.55	---	8.03	48.58	---	74.00	54.00	-5.42	Peak
7035.00	39.04	---	12.23	51.27	---	74.00	54.00	-2.73	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
1598.00	50.32	---	-1.95	48.37	---	74.00	54.00	-5.63	Peak
2390.00	50.67	33.41	2.74	53.41	36.15	74.00	54.00	-17.85	AVG
2484.00	51.61	34.92	2.97	54.58	37.89	74.00	54.00	-16.11	AVG
3450.00	42.27	---	4.93	47.20	---	74.00	54.00	-6.80	Peak
4560.00	41.39	---	7.79	49.18	---	74.00	54.00	-4.82	Peak
6915.00	39.84	---	12.20	52.04	---	74.00	54.00	-1.96	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT20 TX / CH High	Temp. & Humidity	25°C, 58%

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
2038.00	49.87	---	1.87	51.74	---	74.00	54.00	-2.26	Peak
2380.00	50.39	34.79	2.71	53.11	37.50	74.00	54.00	-16.50	AVG
2510.00	50.55	34.59	3.03	53.58	37.62	74.00	54.00	-16.38	AVG
3225.00	42.54	---	4.48	47.02	---	74.00	54.00	-6.98	Peak
4860.00	40.70	---	8.03	48.73	---	74.00	54.00	-5.27	Peak
6990.00	39.77	---	12.30	52.07	---	74.00	54.00	-1.93	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
2066.00	49.32	---	1.94	51.27	---	74.00	54.00	-2.73	Peak
2314.00	48.59	---	2.55	51.14	---	74.00	54.00	-2.86	Peak
2558.00	48.39	---	3.13	51.52	---	74.00	54.00	-2.48	Peak
3270.00	42.35	---	4.57	46.92	---	74.00	54.00	-7.08	Peak
4485.00	42.67	---	7.69	50.35	---	74.00	54.00	-3.65	Peak
7080.00	39.80	---	12.13	51.92	---	74.00	54.00	-2.08	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT40 TX / CH Low	Temp. & Humidity	25°C, 58%

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
1602.00	50.31	---	-1.91	48.40	---	74.00	54.00	-5.60	Peak
2164.00	48.74	---	2.18	50.92	---	74.00	54.00	-3.08	Peak
2548.00	48.93	---	3.11	52.03	---	74.00	54.00	-1.97	Peak
3180.00	42.42	---	4.39	46.81	---	74.00	54.00	-7.19	Peak
4695.00	40.04	---	7.90	47.94	---	74.00	54.00	-6.06	Peak
7020.00	39.86	---	12.26	52.12	---	74.00	54.00	-1.88	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
1680.00	50.28	---	-1.19	49.10	---	74.00	54.00	-4.90	Peak
2082.00	48.38	---	1.98	50.37	---	74.00	54.00	-3.63	Peak
2484.00	48.64	---	2.97	51.61	---	74.00	54.00	-2.39	Peak
3195.00	42.10	---	4.42	46.52	---	74.00	54.00	-7.48	Peak
4500.00	41.61	---	7.74	49.35	---	74.00	54.00	-4.65	Peak
7125.00	39.34	---	12.02	51.36	---	74.00	54.00	-2.64	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT40 TX / CH Middle	Temp. & Humidity	25°C, 58%

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
1598.00	51.93	---	-1.95	49.98	---	74.00	54.00	-4.02	Peak
2388.00	64.12	49.30	2.73	66.85	52.03	74.00	54.00	-1.97	AVG
2484.00	67.68	50.25	2.97	70.65	53.22	74.00	54.00	-0.78	AVG
3240.00	42.32	---	4.51	46.83	---	74.00	54.00	-7.17	Peak
5055.00	39.95	---	8.35	48.31	---	74.00	54.00	-5.69	Peak
7035.00	39.50	---	12.23	51.73	---	74.00	54.00	-2.27	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
1466.00	51.08	---	-2.90	48.18	---	74.00	54.00	-5.82	Peak
2390.00	55.24	40.36	2.74	57.98	43.10	74.00	54.00	-10.90	AVG
2484.00	58.38	41.46	2.97	61.35	44.43	74.00	54.00	-9.57	AVG
3690.00	42.90	---	5.39	48.29	---	74.00	54.00	-5.71	Peak
4725.00	40.49	---	7.92	48.41	---	74.00	54.00	-5.59	Peak
7110.00	40.05	---	12.06	52.11	---	74.00	54.00	-1.89	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	IEEE 802.11gn HT40 TX / CH High	Temp. & Humidity	25°C, 58%

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
1602.00	51.69	---	-1.91	49.77	---	74.00	54.00	-4.23	Peak
2390.00	52.27	37.45	2.74	55.01	40.19	74.00	54.00	-13.81	AVG
2590.00	48.51	---	3.19	51.70	---	74.00	54.00	-2.30	Peak
3300.00	42.50	---	4.63	47.13	---	74.00	54.00	-6.87	Peak
5595.00	40.10	---	10.37	50.47	---	74.00	54.00	-3.53	Peak
7110.00	38.84	---	12.06	50.90	---	74.00	54.00	-3.10	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
1470.00	51.29	---	-2.89	48.39	---	74.00	54.00	-5.61	Peak
2314.00	48.54	---	2.55	51.09	---	74.00	54.00	-2.91	Peak
2502.00	48.28	---	3.01	51.29	---	74.00	54.00	-2.71	Peak
3105.00	43.02	---	4.24	47.26	---	74.00	54.00	-6.74	Peak
4785.00	40.45	---	7.97	48.42	---	74.00	54.00	-5.58	Peak
7020.00	39.29	---	12.26	51.55	---	74.00	54.00	-2.45	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	Bluetooth 4.0 / TX Mode / CH Low	Temp. & Humidity	25°C, 58%

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
1334.00	45.59	---	-2.89	42.70	---	74.00	54.00	-11.30	Peak
2000.00	45.77	---	1.82	47.59	---	74.00	54.00	-6.41	Peak
2666.00	49.23	---	3.23	52.46	---	74.00	54.00	-1.54	Peak
5340.00	43.82	27.98	9.03	52.85	37.01	74.00	54.00	-16.99	AVG
6675.00	39.09	---	12.22	51.31	---	74.00	54.00	-2.69	Peak
7320.00	38.74	---	13.12	51.86	---	74.00	54.00	-2.14	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
1992.00	43.67	---	1.74	45.41	---	74.00	54.00	-8.59	Peak
2142.00	42.97	---	2.10	45.07	---	74.00	54.00	-8.93	Peak
2636.00	42.87	---	3.16	46.03	---	74.00	54.00	-7.97	Peak
4950.00	39.33	---	8.34	47.67	---	74.00	54.00	-6.33	Peak
6660.00	39.30	---	12.23	51.53	---	74.00	54.00	-2.47	Peak
7785.00	38.29	---	13.45	51.74	---	74.00	54.00	-2.26	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	Bluetooth 4.0 / TX Mode / CH Middle	Temp. & Humidity	25°C, 58%

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
2328.00	48.21	---	2.47	50.68	---	74.00	54.00	-3.32	Peak
2520.00	47.20	---	2.86	50.06	---	74.00	54.00	-3.94	Peak
2666.00	49.65	36.75	3.23	52.88	39.98	74.00	54.00	-14.02	AVG
4665.00	40.36	---	7.75	48.11	---	74.00	54.00	-5.89	Peak
5340.00	43.84	27.94	9.03	52.87	36.97	74.00	54.00	-17.03	AVG
7425.00	38.65	---	13.45	52.10	---	74.00	54.00	-1.90	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
2388.00	44.62	---	2.59	47.21	---	74.00	54.00	-6.79	Peak
2520.00	45.61	---	2.86	48.47	---	74.00	54.00	-5.53	Peak
2770.00	43.22	---	3.50	46.71	---	74.00	54.00	-7.29	Peak
4005.00	43.07	---	5.88	48.95	---	74.00	54.00	-5.05	Peak
6660.00	39.61	---	12.23	51.84	---	74.00	54.00	-2.16	Peak
7440.00	38.09	---	13.49	51.58	---	74.00	54.00	-2.42	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/28
Test Mode	Bluetooth 4.0 / TX Mode / CH High	Temp. & Humidity	25°C, 58%

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
2000.00	46.04	---	1.82	47.86	---	74.00	54.00	-6.14	Peak
2560.00	45.97	---	2.96	48.93	---	74.00	54.00	-5.07	Peak
2666.00	48.34	---	3.23	51.57	---	74.00	54.00	-2.43	Peak
5340.00	41.95	---	9.03	50.98	---	74.00	54.00	-3.02	Peak
6675.00	40.23	---	12.22	52.45	---	74.00	54.00	-1.55	Peak
7515.00	38.26	---	13.67	51.92	---	74.00	54.00	-2.08	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
1984.00	44.16	---	1.67	45.83	---	74.00	54.00	-8.17	Peak
2332.00	43.52	---	2.48	46.00	---	74.00	54.00	-8.00	Peak
2560.00	44.59	---	2.96	47.56	---	74.00	54.00	-6.44	Peak
4860.00	39.44	---	8.15	47.59	---	74.00	54.00	-6.41	Peak
6480.00	38.33	---	12.21	50.55	---	74.00	54.00	-3.45	Peak
7650.00	38.60	---	13.56	52.15	---	74.00	54.00	-1.85	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/29
Test Mode	Zigbee 1 / TX / CH Low	TEMP & Humidity	25°C, 58%

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
1842.00	60.02	47.20	0.31	60.34	47.51	74.00	54.00	-6.49	AVG
2190.00	59.54	46.91	2.25	61.79	49.16	74.00	54.00	-4.84	AVG
2510.00	58.75	46.73	3.03	61.78	49.76	74.00	54.00	-4.24	AVG
3210.00	42.47	---	4.45	46.92	---	74.00	54.00	-7.08	Peak
4815.00	41.70	---	7.99	49.69	---	74.00	54.00	-4.31	Peak
6975.00	39.84	---	12.28	52.12	---	74.00	54.00	-1.88	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
1518.00	59.85	47.85	-2.69	57.16	45.16	74.00	54.00	-8.85	AVG
2252.00	59.31	46.85	2.40	61.71	49.25	74.00	54.00	-4.75	AVG
2492.00	58.96	46.89	2.99	61.95	49.88	74.00	54.00	-4.12	AVG
3270.00	42.71	---	4.57	47.28	---	74.00	54.00	-6.72	Peak
4815.00	46.82	38.31	7.99	54.81	46.30	74.00	54.00	-7.70	AVG
7215.00	40.44	---	11.82	52.25	---	74.00	54.00	-1.75	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/29
Test Mode	Zigbee 1 / TX / CH Middle	TEMP & Humidity	25°C, 58%

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
1938.00	60.49	47.21	1.20	61.69	48.41	74.00	54.00	-5.58	AVG
2380.00	60.31	47.02	2.71	63.02	49.73	74.00	54.00	-4.26	AVG
2522.00	59.05	46.58	3.05	62.10	49.63	74.00	54.00	-4.36	AVG
3240.00	43.24	---	4.51	47.75	---	74.00	54.00	-6.25	Peak
4785.00	40.49	---	7.97	48.45	---	74.00	54.00	-5.55	Peak
7320.00	40.07	---	11.57	51.65	---	74.00	54.00	-2.35	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
2028.00	59.64	46.95	1.85	61.49	48.80	74.00	54.00	-5.20	AVG
2344.00	58.96	46.77	2.63	61.59	49.40	74.00	54.00	-4.60	AVG
2496.00	59.67	46.78	3.00	62.67	49.78	74.00	54.00	-4.22	AVG
3345.00	41.96	---	4.72	46.68	---	74.00	54.00	-7.32	Peak
4875.00	48.51	40.16	8.04	56.55	48.20	74.00	54.00	-5.80	AVG
7320.00	42.35	33.19	11.57	53.93	44.76	74.00	54.00	-9.24	AVG

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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/05/29
Test Mode	Zigbee 1 / TX / CH High	TEMP & Humidity	25°C, 58%

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
1974.00	60.14	47.09	1.54	61.68	48.63	74.00	54.00	-5.37	AVG
2360.00	58.94	46.78	2.67	61.60	49.45	74.00	54.00	-4.55	AVG
2520.00	58.91	46.79	3.05	61.97	49.84	74.00	54.00	-4.16	AVG
3285.00	41.43	---	4.60	46.03	---	74.00	54.00	-7.97	Peak
4875.00	39.77	---	8.04	47.81	---	74.00	54.00	-6.19	Peak
7125.00	39.02	---	12.02	51.04	---	74.00	54.00	-2.96	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
2040.00	59.66	47.00	1.88	61.54	48.88	74.00	54.00	-5.12	AVG
2272.00	59.57	46.90	2.45	62.02	49.35	74.00	54.00	-4.65	AVG
2556.00	59.27	46.56	3.12	62.39	49.68	74.00	54.00	-4.32	AVG
3210.00	41.70	---	4.45	46.15	---	74.00	54.00	-7.85	Peak
4950.00	44.37	---	8.10	52.47	---	74.00	54.00	-1.53	Peak
7155.00	38.89	---	11.95	50.84	---	74.00	54.00	-3.16	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/04
Test Mode	Zigbee 2 / TX / CH Low	TEMP & Humidity	25°C, 56%

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
1950.00	59.65	46.50	1.32	60.96	47.82	74.00	54.00	-6.18	AVG
2038.00	59.49	46.38	1.87	61.36	48.25	74.00	54.00	-5.75	AVG
2558.00	58.88	45.91	3.13	62.01	49.04	74.00	54.00	-4.96	AVG
3315.00	41.82	---	4.66	46.48	---	74.00	54.00	-7.52	Peak
4815.00	40.73	---	7.99	48.72	---	74.00	54.00	-5.28	Peak
7215.00	40.55	---	11.82	52.37	---	74.00	54.00	-1.63	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
1770.00	59.79	46.68	-0.35	59.44	46.33	74.00	54.00	-7.68	AVG
2100.00	59.38	46.26	2.03	61.40	48.29	74.00	54.00	-5.71	AVG
2496.00	58.64	46.05	3.00	61.64	49.05	74.00	54.00	-4.95	AVG
3345.00	41.82	---	4.72	46.54	---	74.00	54.00	-7.46	Peak
4815.00	47.21	38.82	7.99	55.20	46.81	74.00	54.00	-7.19	AVG
7320.00	40.40	---	11.57	51.98	---	74.00	54.00	-2.02	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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/04
Test Mode	Zigbee 2 / TX / CH Middle	TEMP & Humidity	25°C, 56%

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
2114.00	59.68	46.11	2.06	61.74	48.17	74.00	54.00	-5.83	AVG
2298.00	58.45	46.45	2.51	60.96	48.96	74.00	54.00	-5.04	AVG
2514.00	58.91	46.05	3.04	61.94	49.09	74.00	54.00	-4.91	AVG
3225.00	41.87	---	4.48	46.35	---	74.00	54.00	-7.65	Peak
4875.00	42.12	---	8.04	50.16	---	74.00	54.00	-3.84	Peak
7320.00	41.95	32.08	11.57	53.52	43.65	74.00	54.00	-10.35	AVG

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
1946.00	59.78	46.52	1.28	61.05	47.80	74.00	54.00	-6.21	AVG
2294.00	58.88	46.25	2.50	61.39	48.75	74.00	54.00	-5.25	AVG
2490.00	58.44	46.16	2.99	61.43	49.15	74.00	54.00	-4.86	AVG
3135.00	41.96	---	4.30	46.26	---	74.00	54.00	-7.74	Peak
4875.00	50.19	41.90	8.04	58.23	49.94	74.00	54.00	-4.06	AVG
7320.00	44.19	34.94	11.57	55.76	46.51	74.00	54.00	-7.49	AVG

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)

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Product Name	IoT Gateway System	Test By	Rex Chiu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/04
Test Mode	Zigbee 2 / TX / CH High	TEMP & Humidity	25°C, 56%

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
1922.00	60.03	46.46	1.06	61.09	47.52	74.00	54.00	-6.48	AVG
2382.00	58.20	46.25	2.72	60.92	48.97	74.00	54.00	-5.03	AVG
2534.00	58.82	46.11	3.08	61.90	49.19	74.00	54.00	-4.81	AVG
3300.00	42.08	---	4.63	46.71	---	74.00	54.00	-7.29	Peak
4965.00	40.36	---	8.11	48.47	---	74.00	54.00	-5.53	Peak
7020.00	38.63	---	12.26	50.89	---	74.00	54.00	-3.11	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
1994.00	59.06	46.27	1.72	60.79	47.99	74.00	54.00	-6.01	AVG
2350.00	58.28	45.95	2.64	60.92	48.59	74.00	54.00	-5.41	AVG
2510.00	59.57	46.20	3.03	62.61	49.23	74.00	54.00	-4.77	AVG
3195.00	42.03	---	4.42	46.45	---	74.00	54.00	-7.55	Peak
4950.00	44.31	---	8.10	52.41	---	74.00	54.00	-1.59	Peak
7080.00	39.42	---	12.13	51.55	---	74.00	54.00	-2.45	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)

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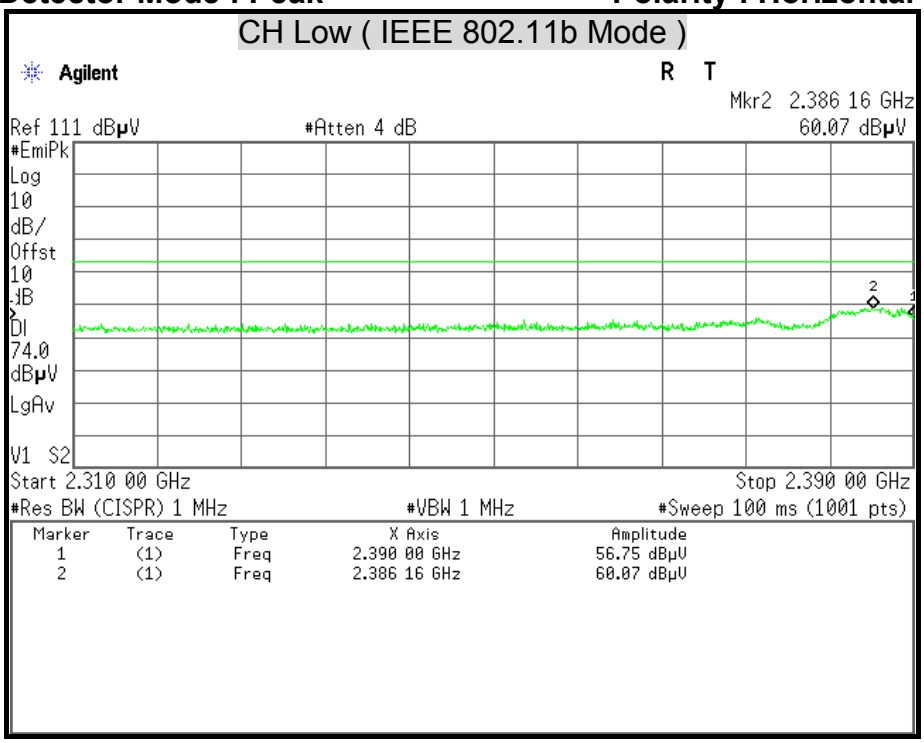
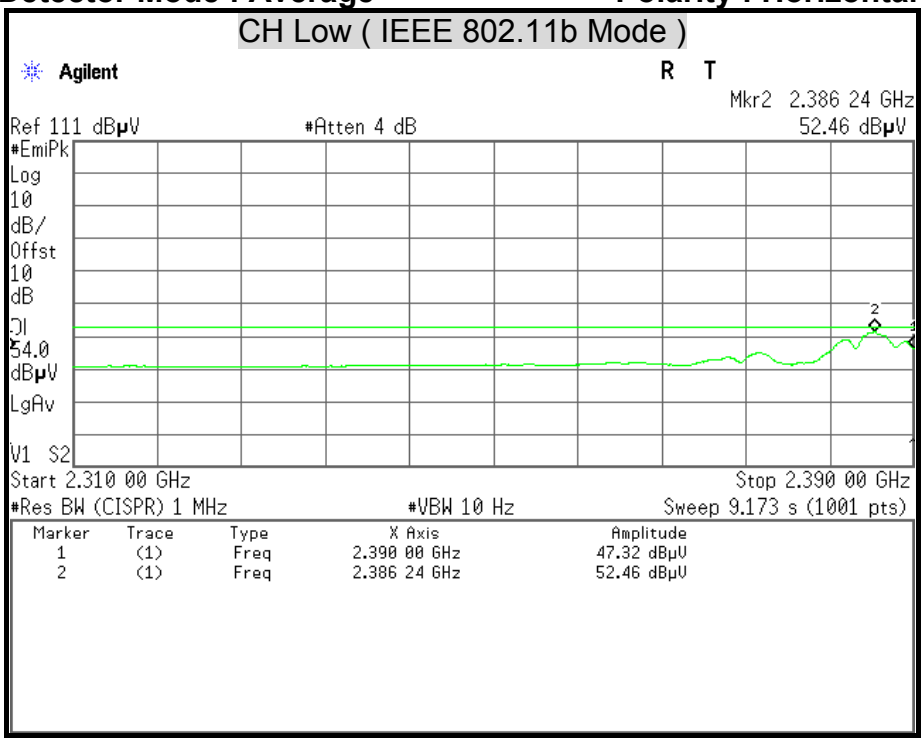
Restricted Band Edges

Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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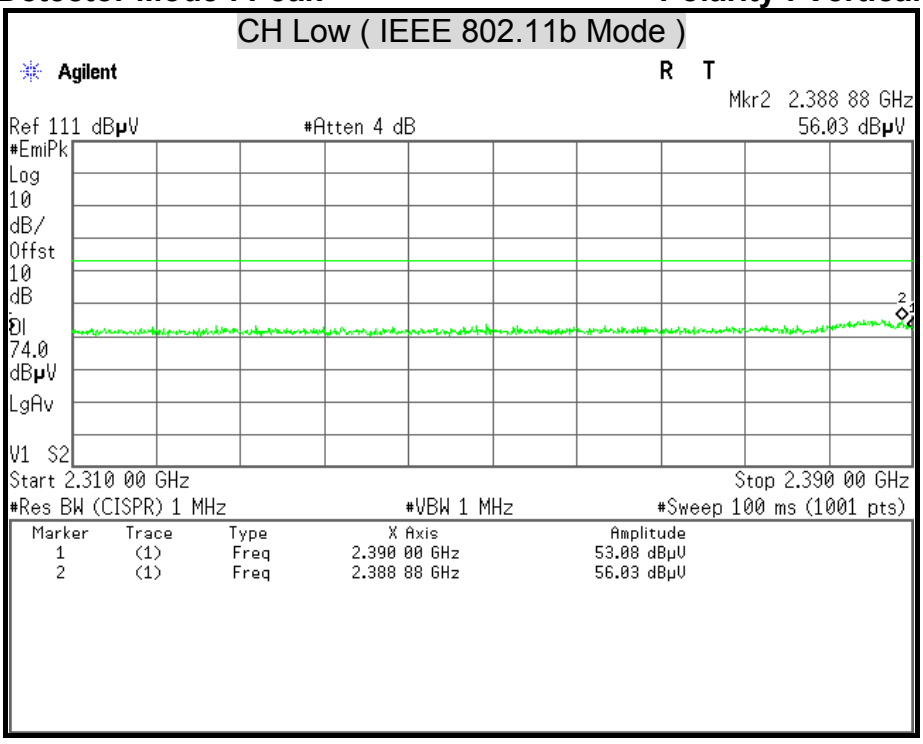
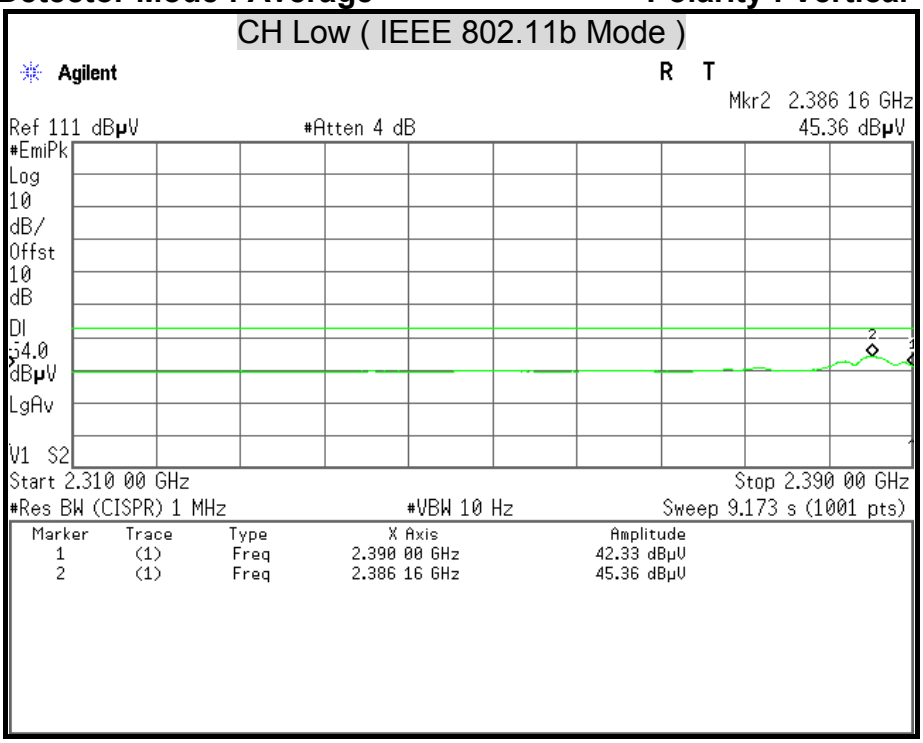
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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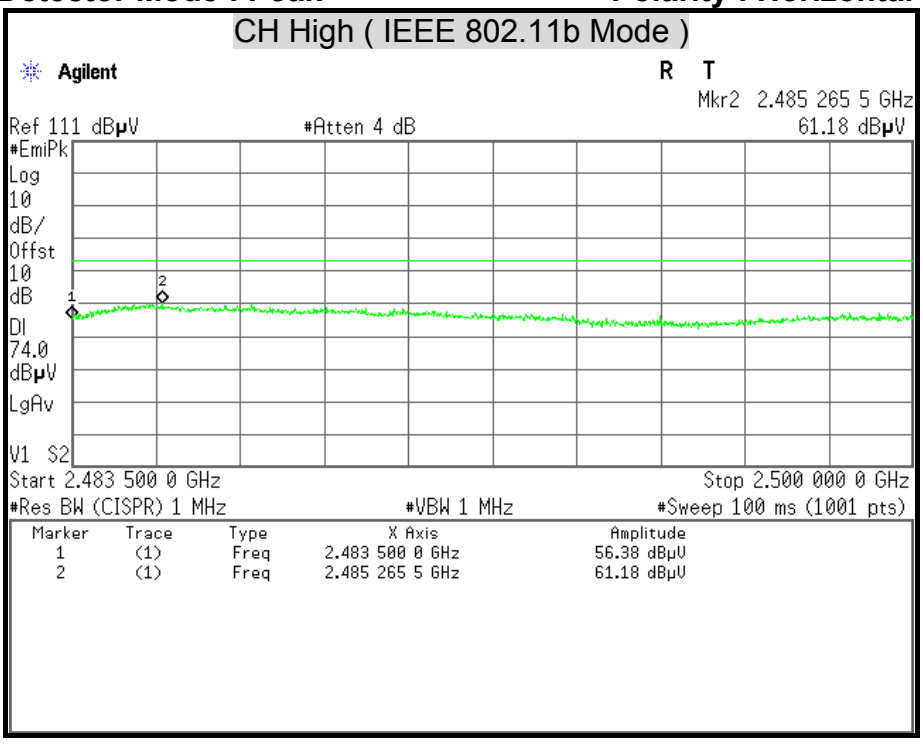
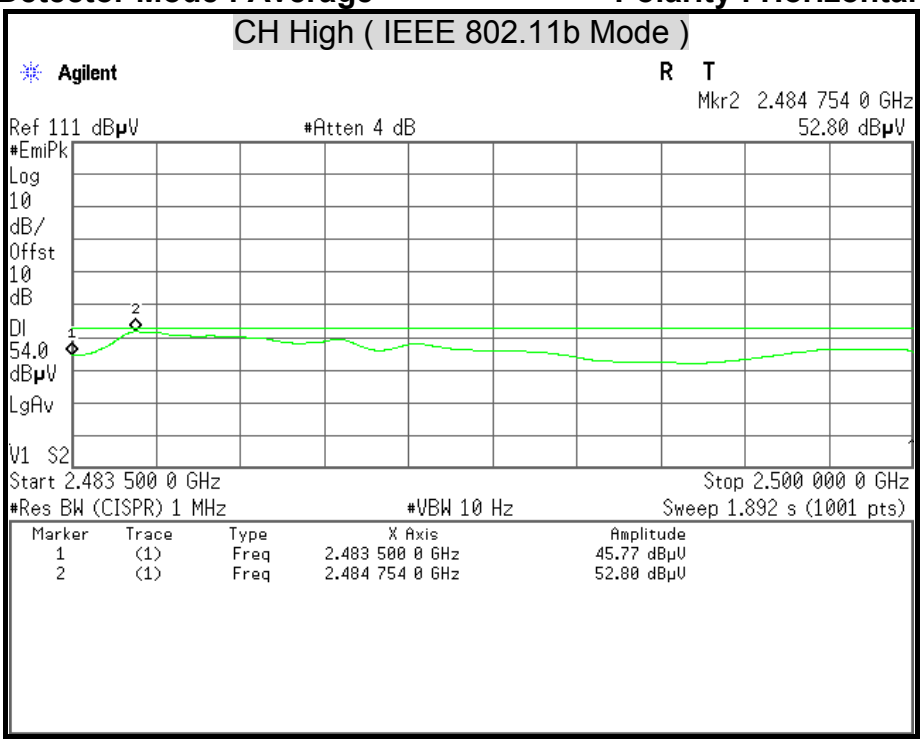
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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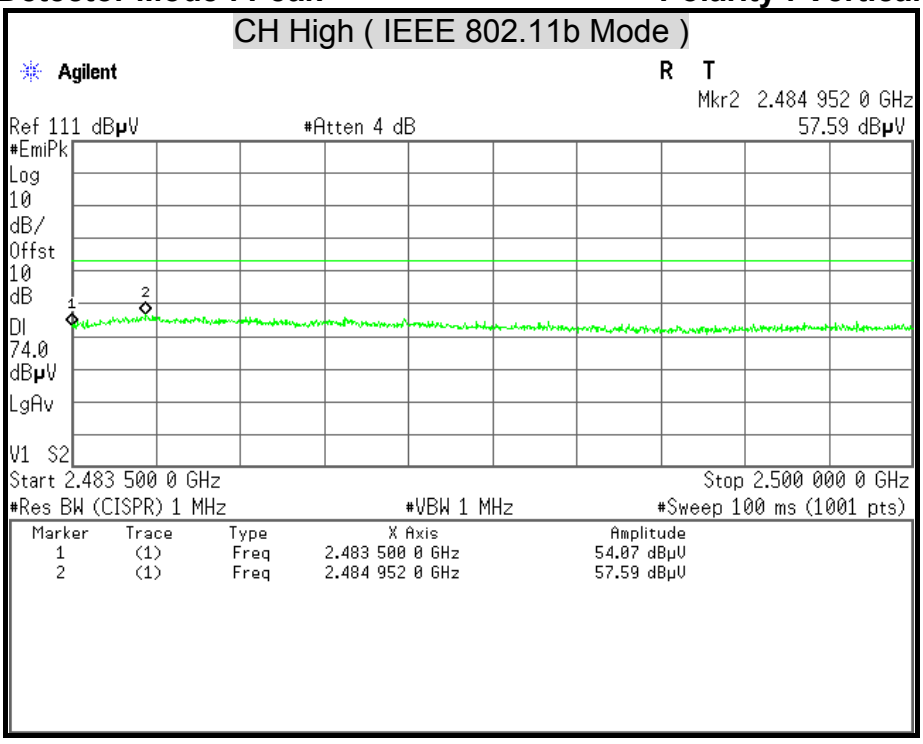
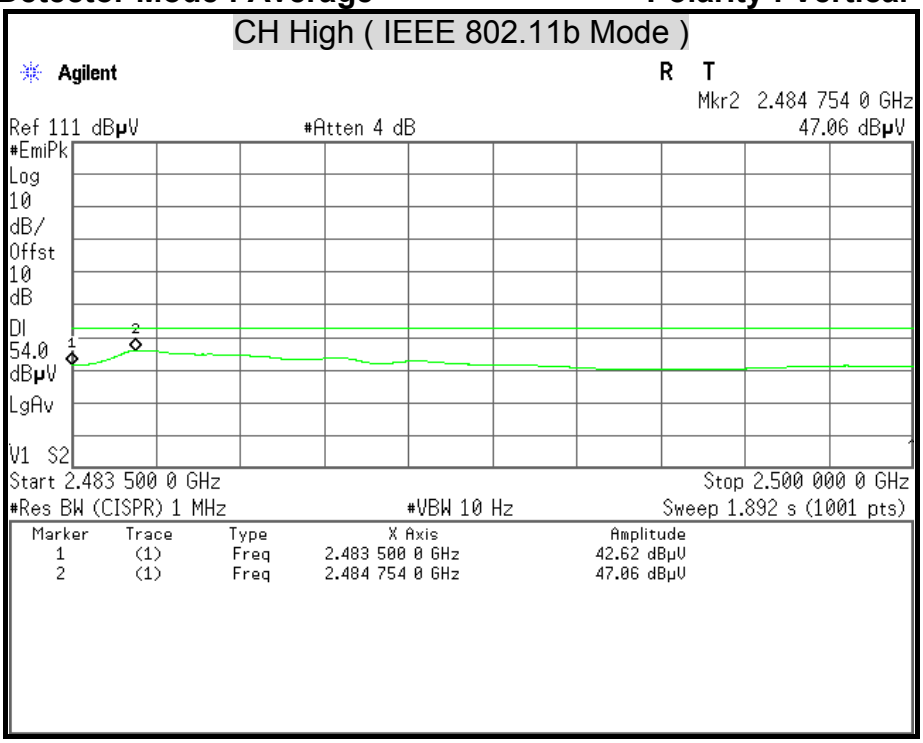
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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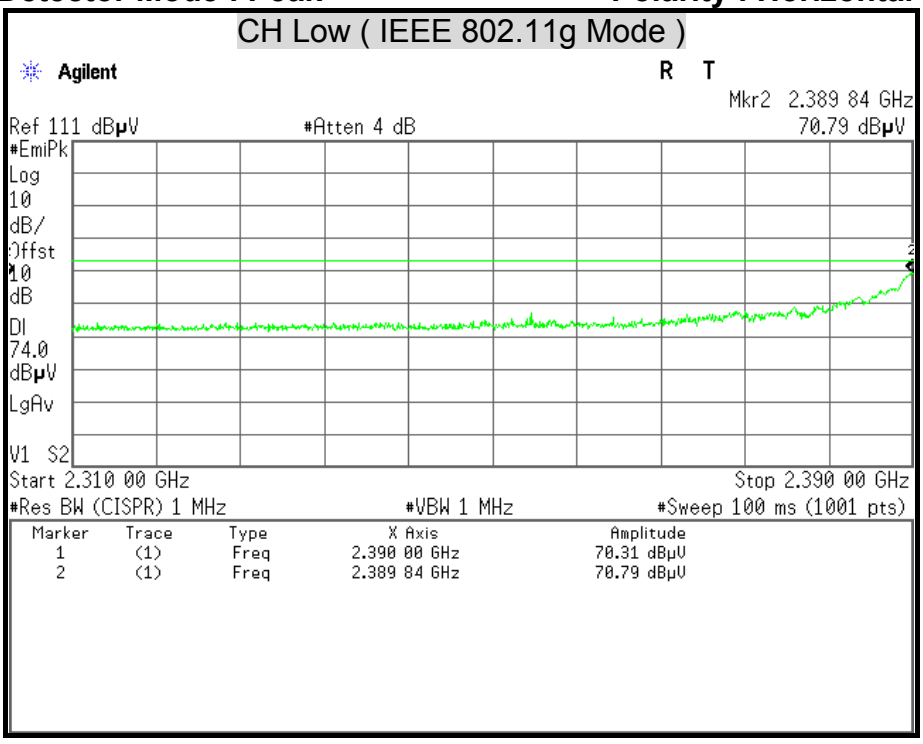
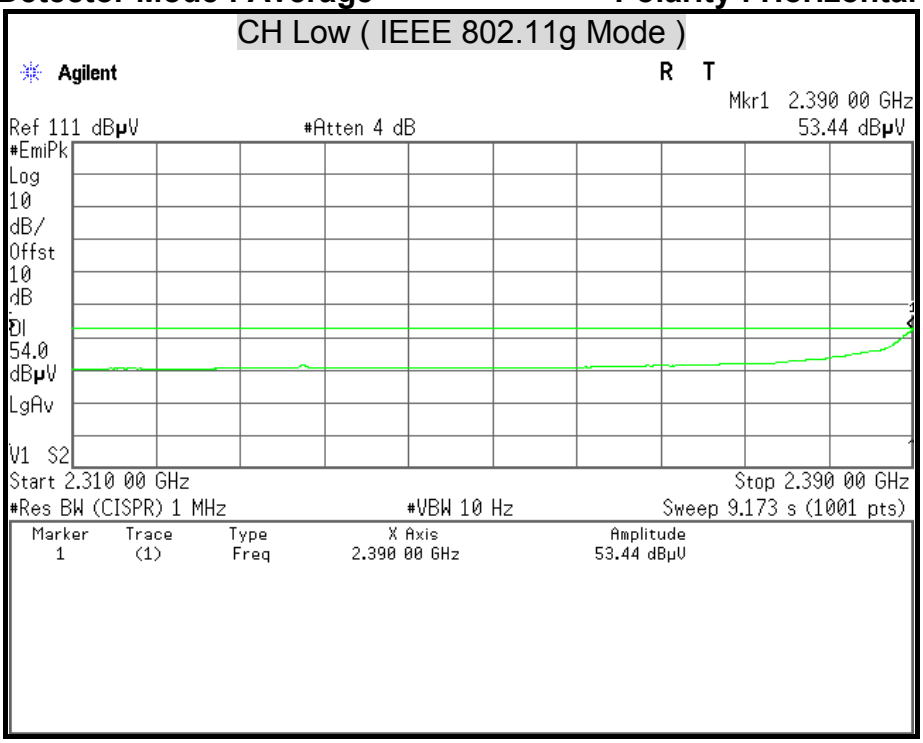
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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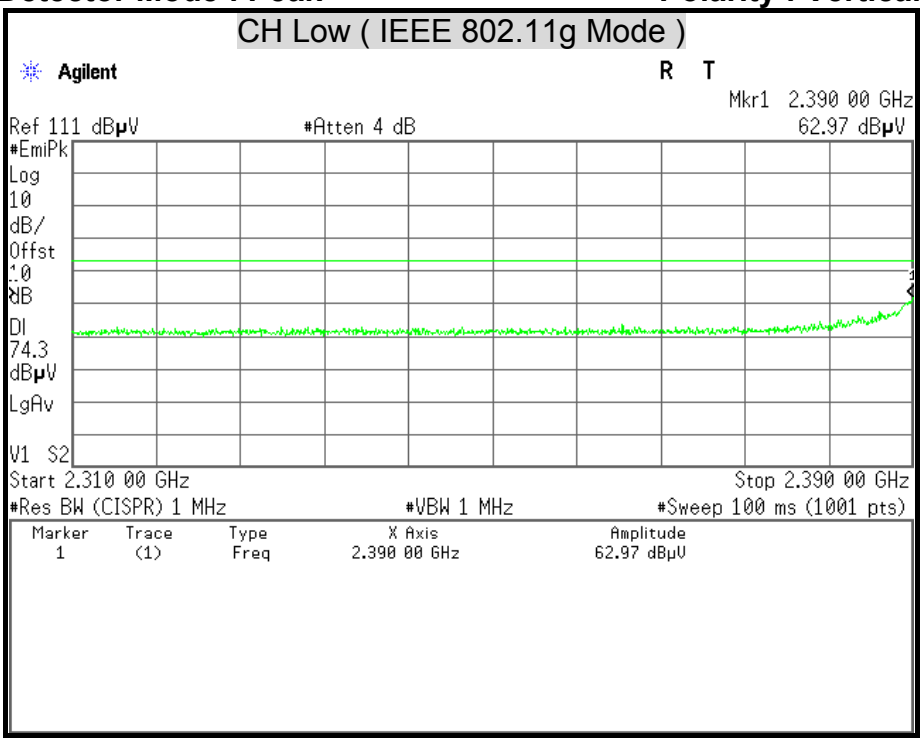
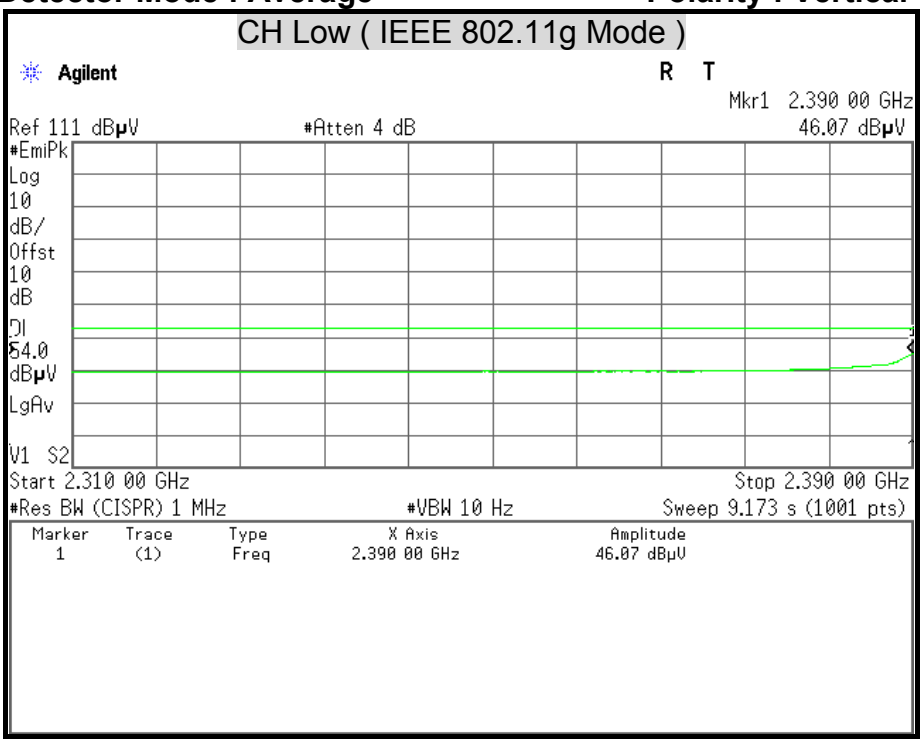
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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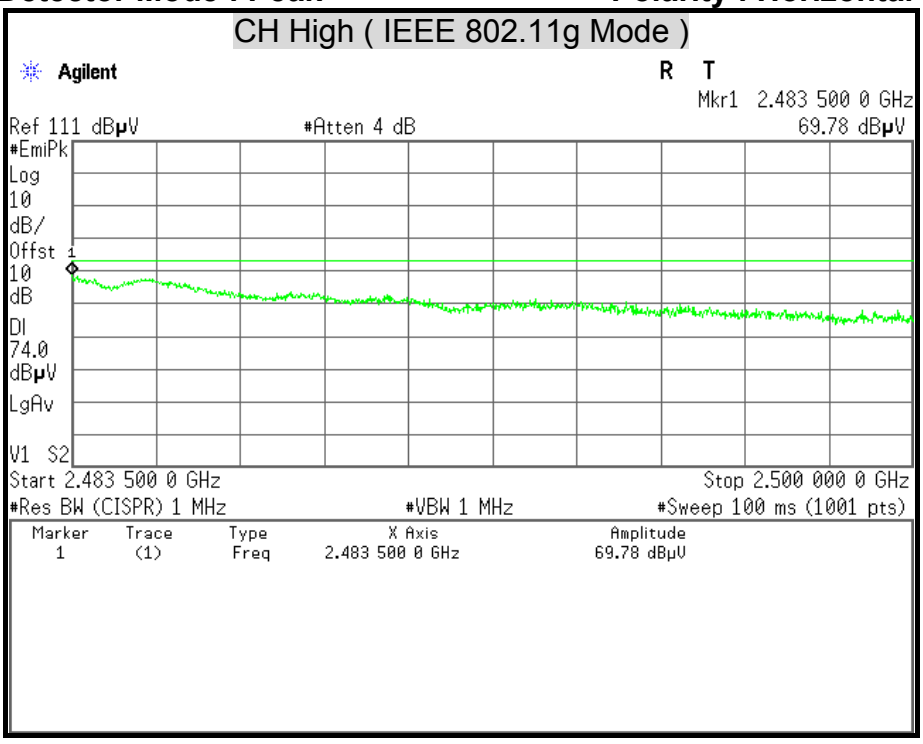
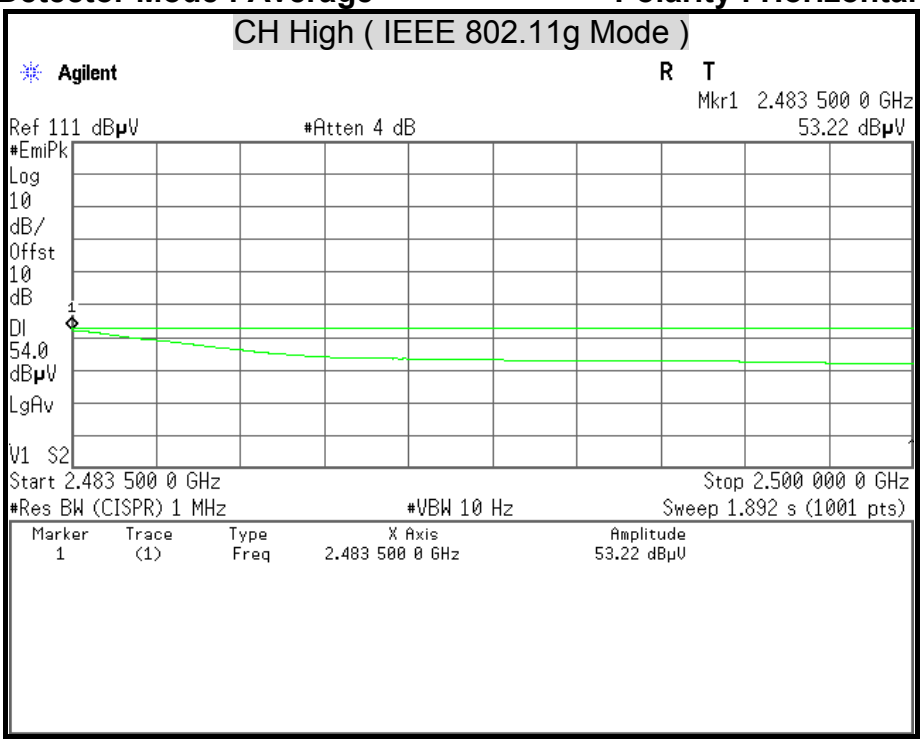
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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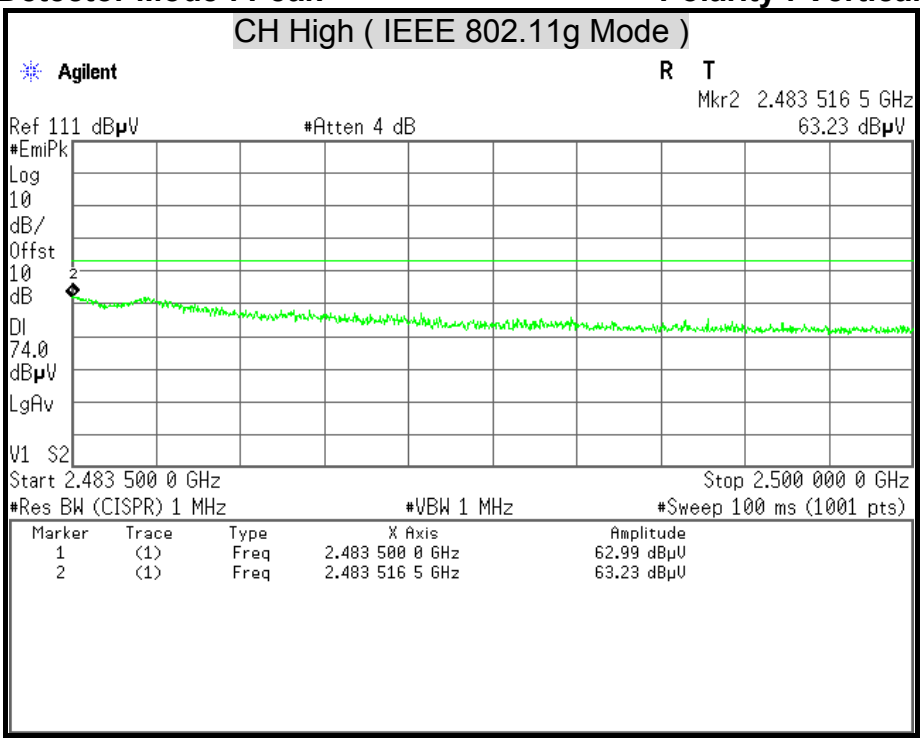
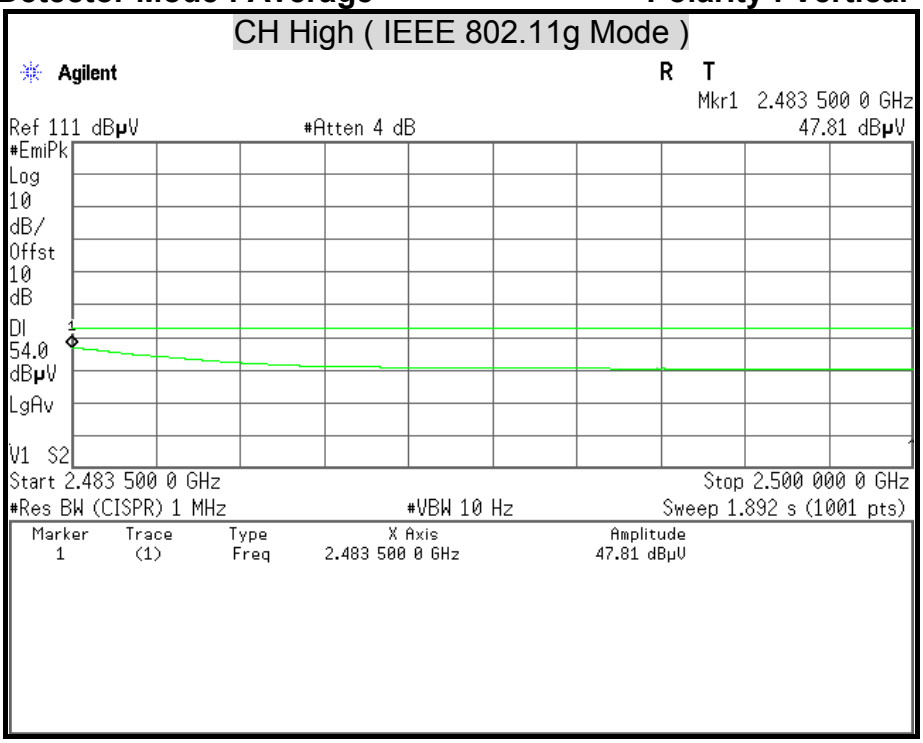
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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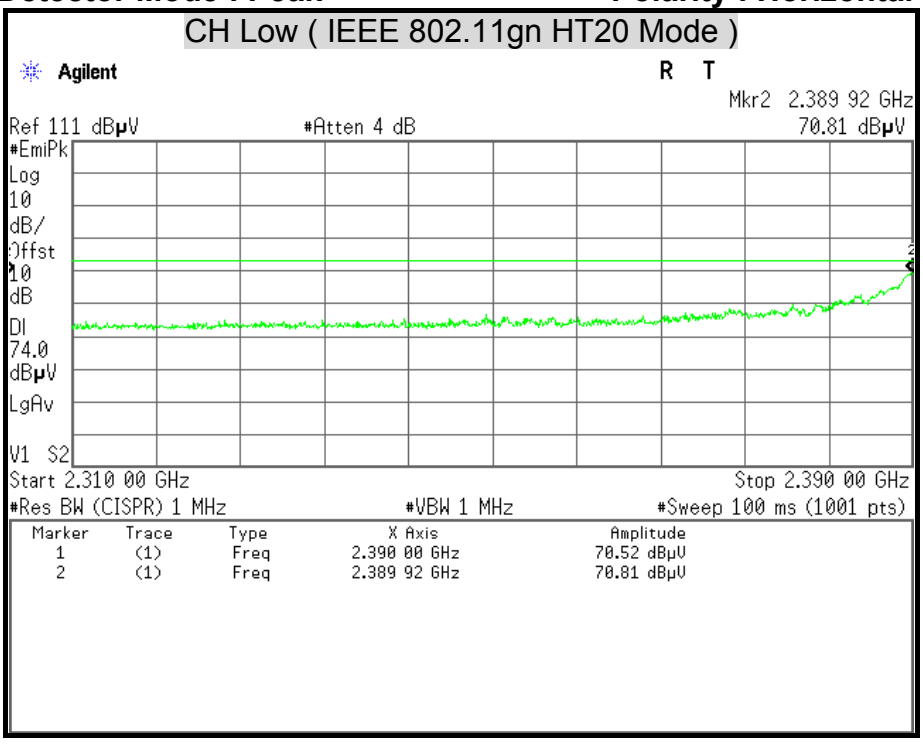
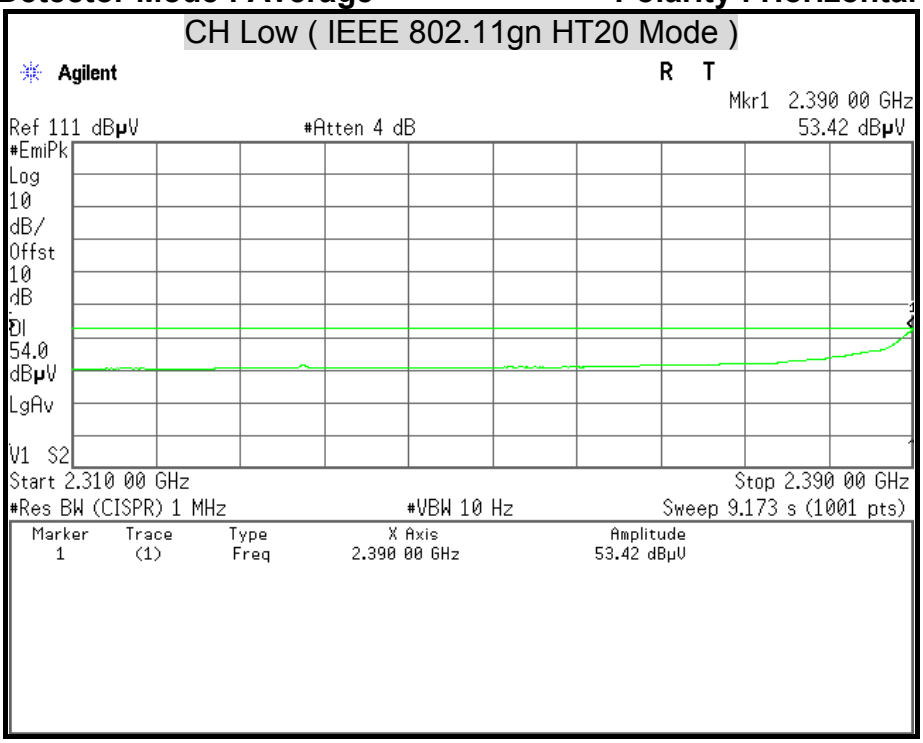
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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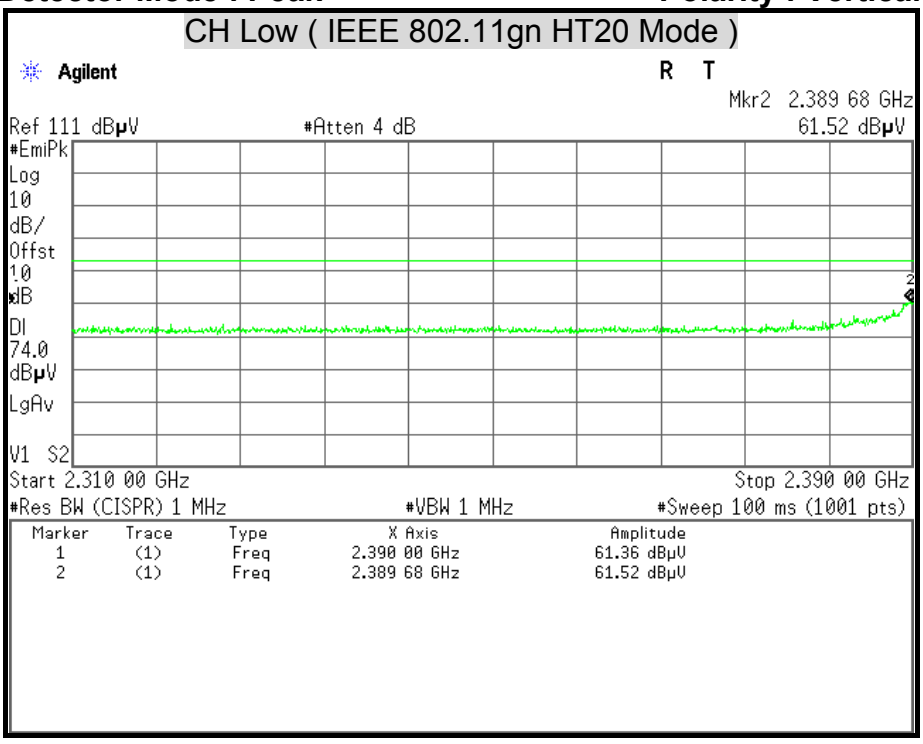
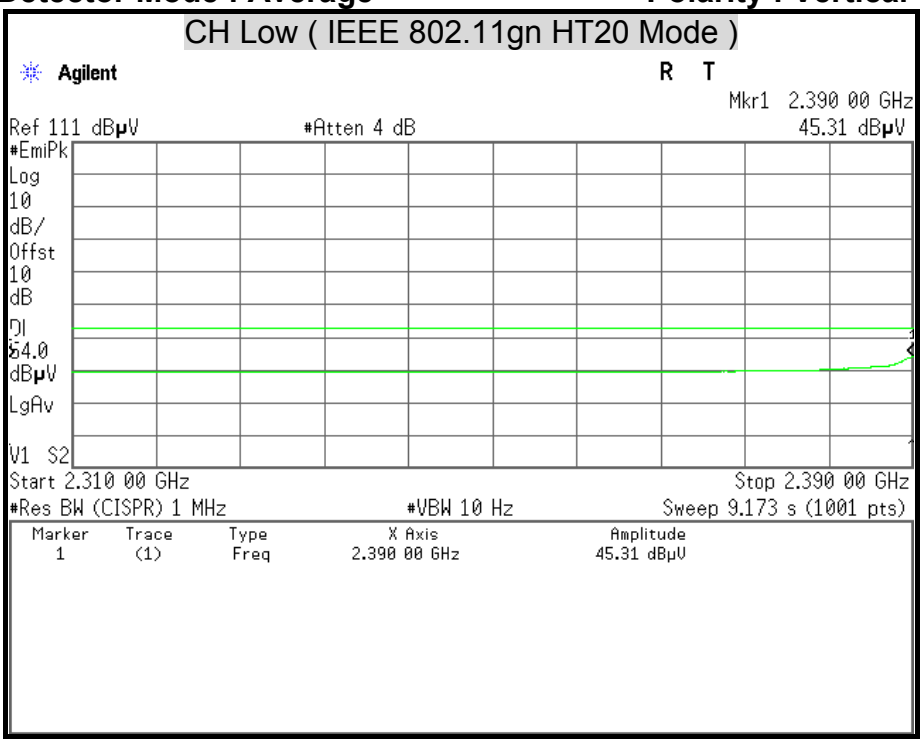
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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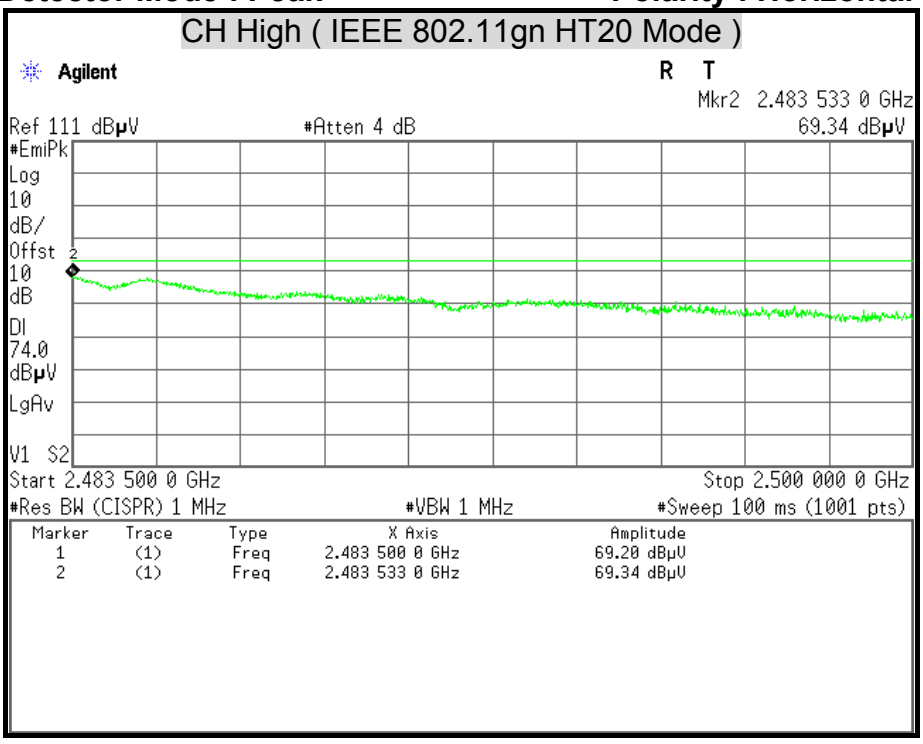
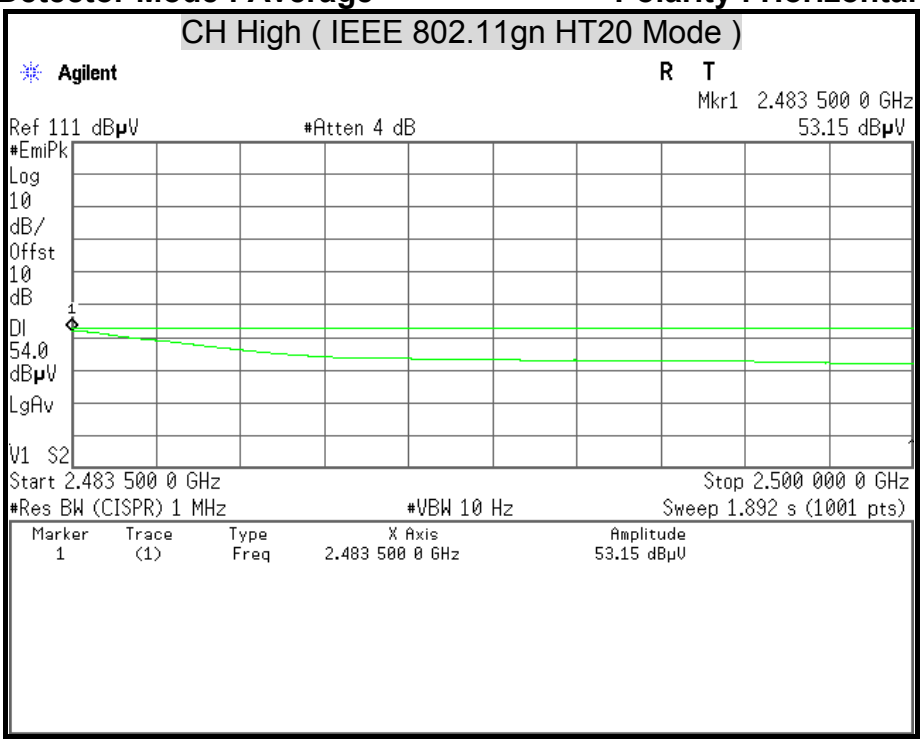
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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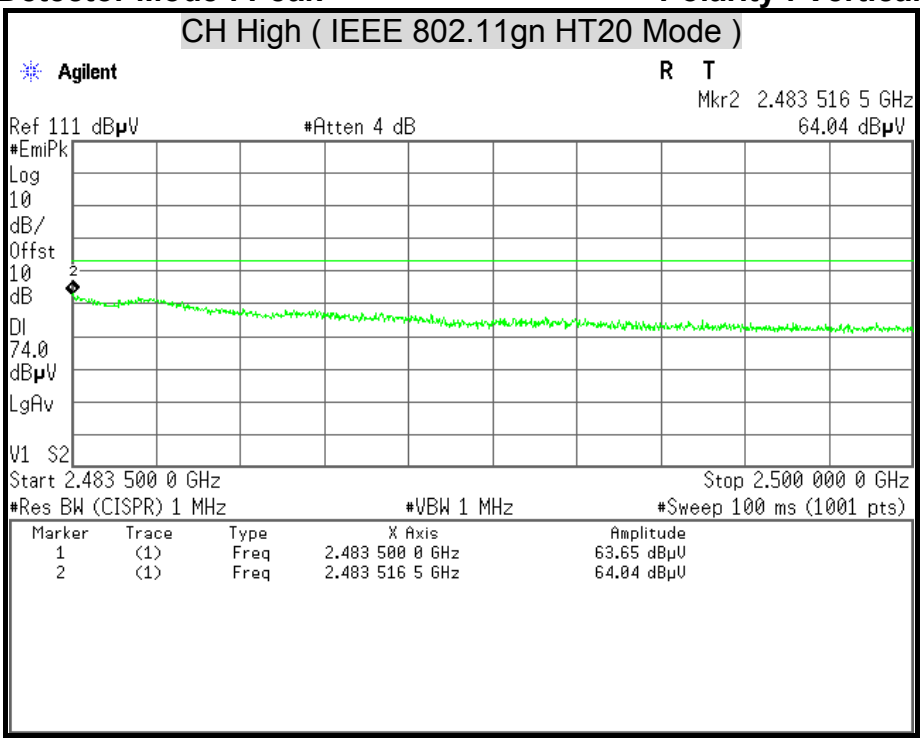
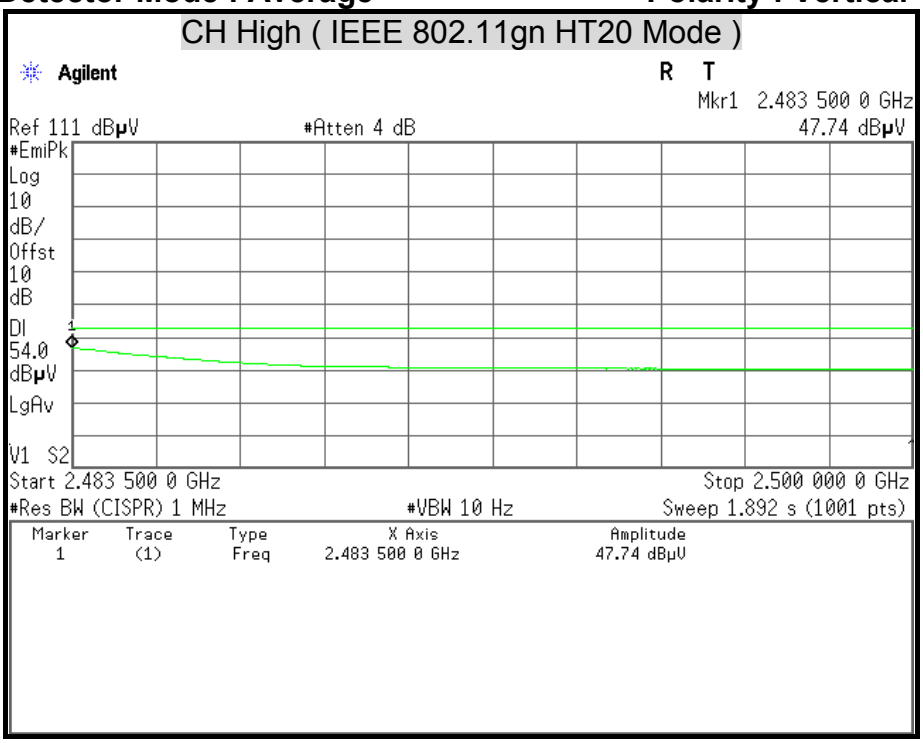
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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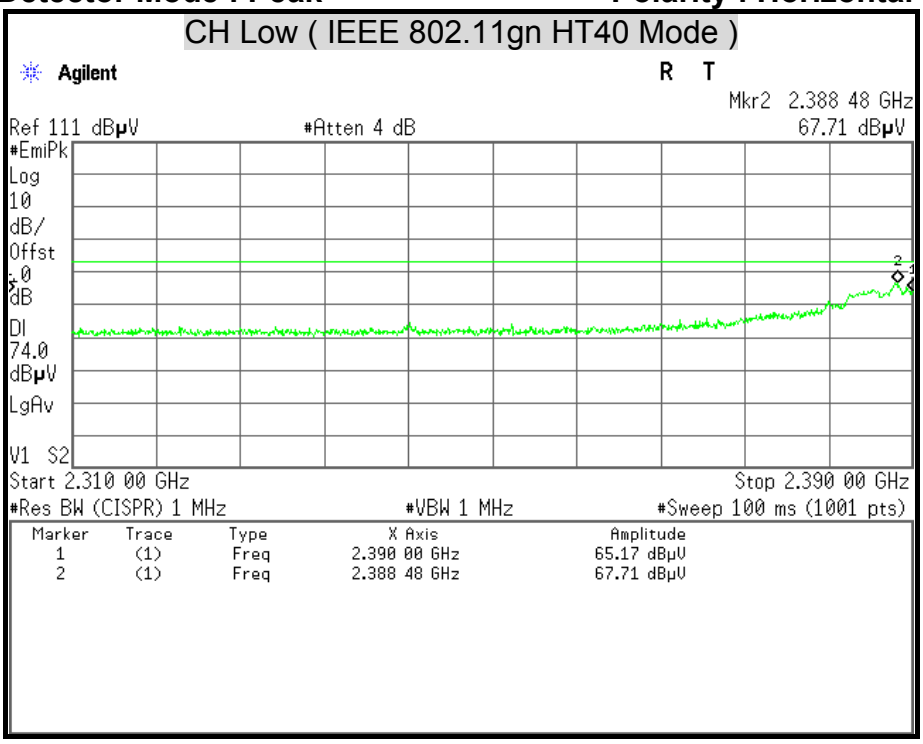
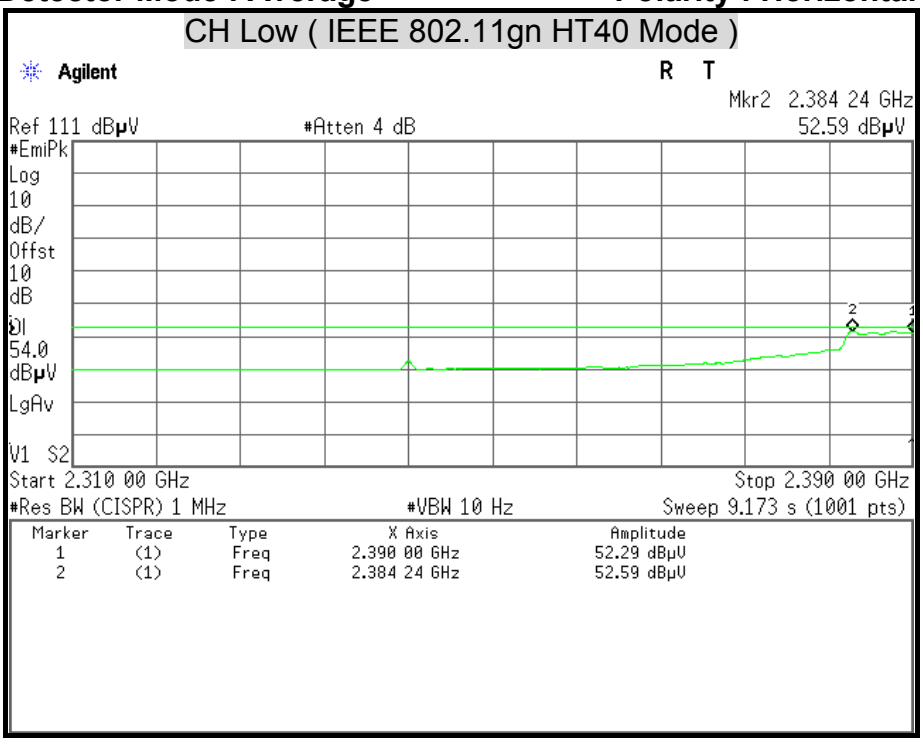
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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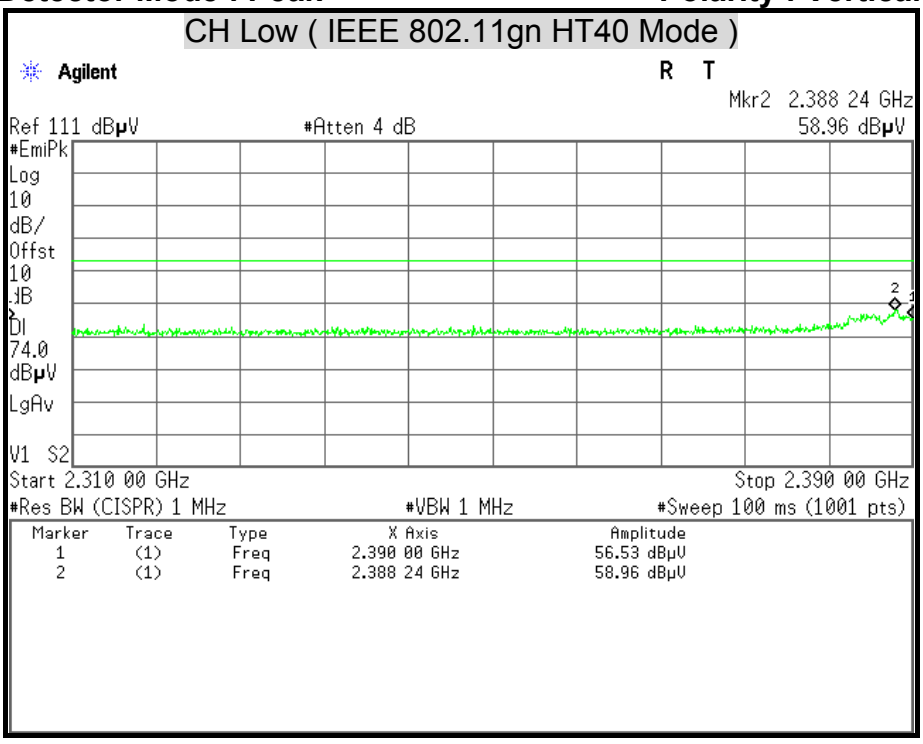
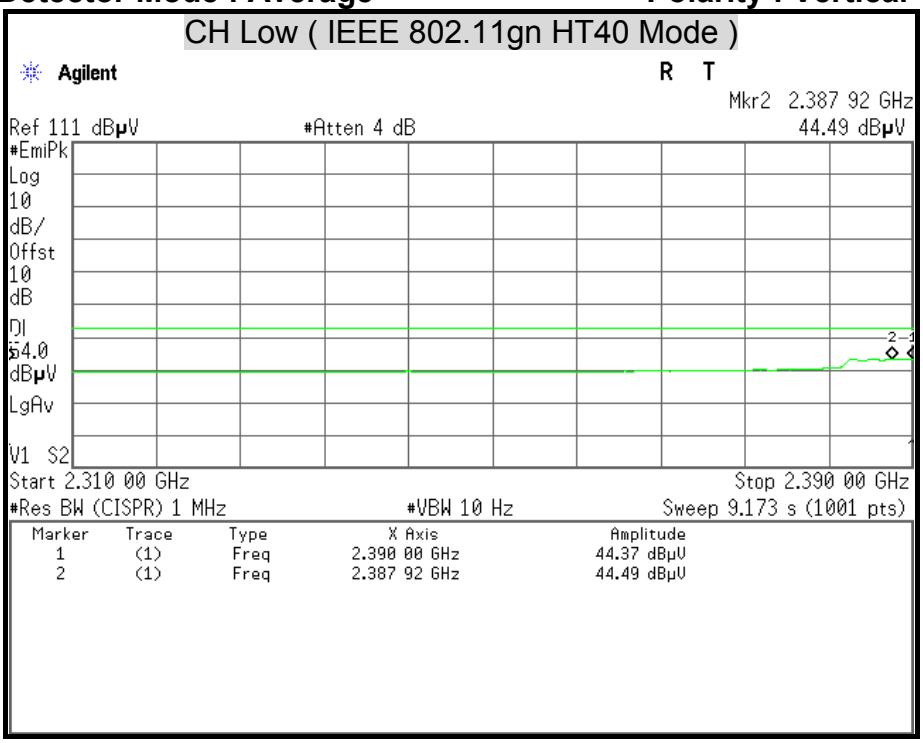
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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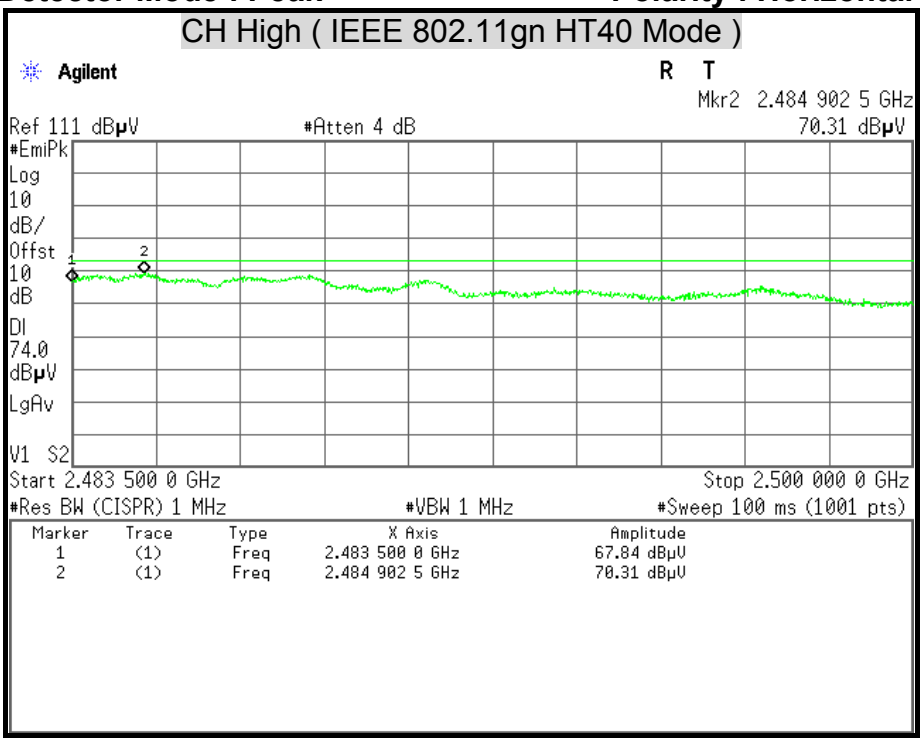
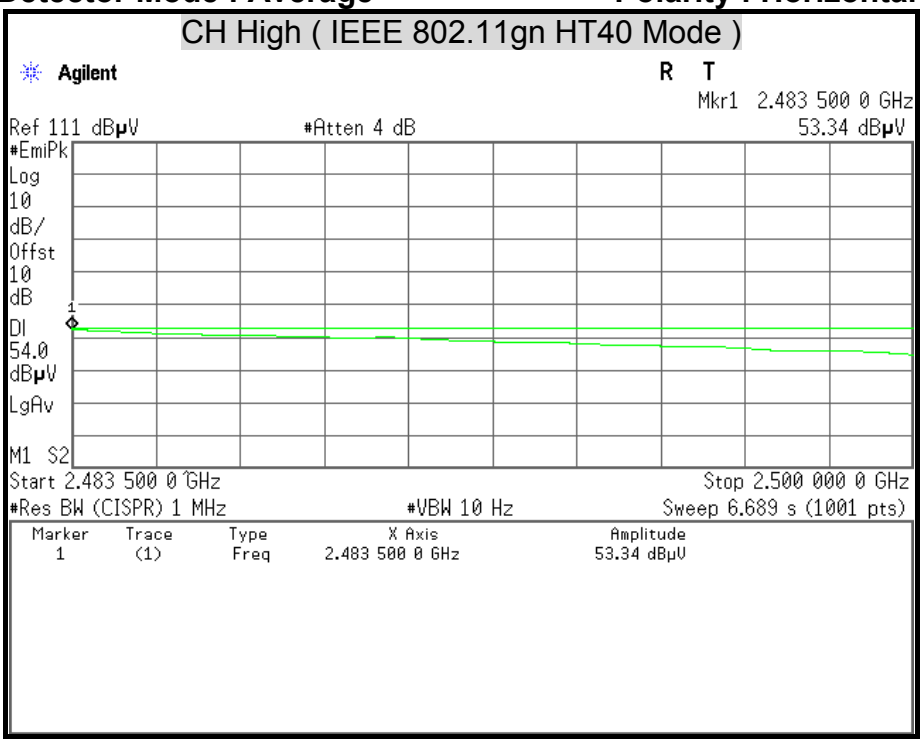
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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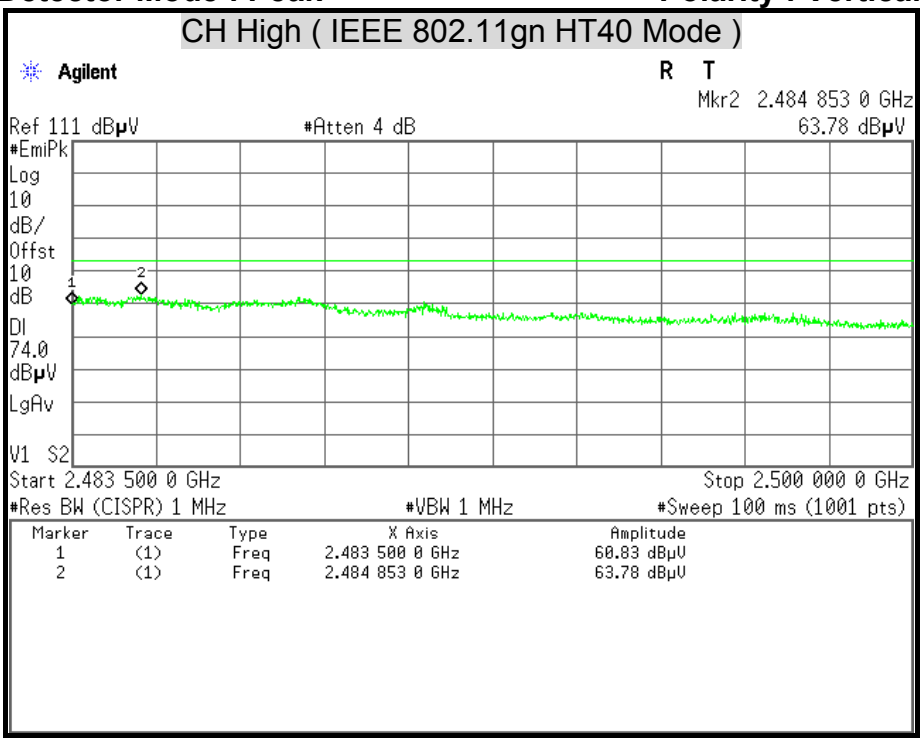
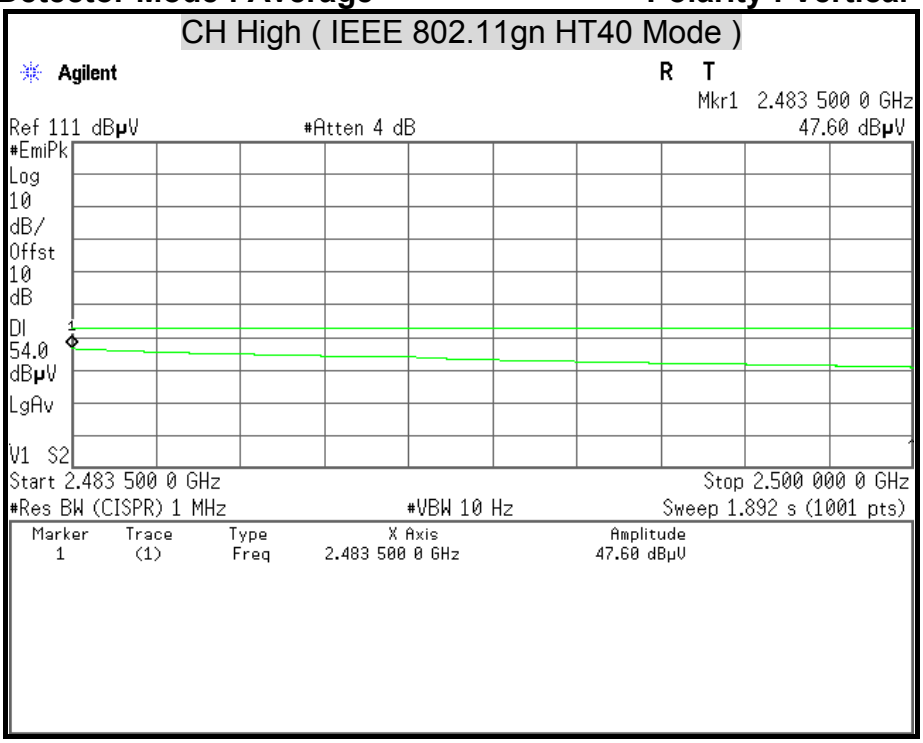
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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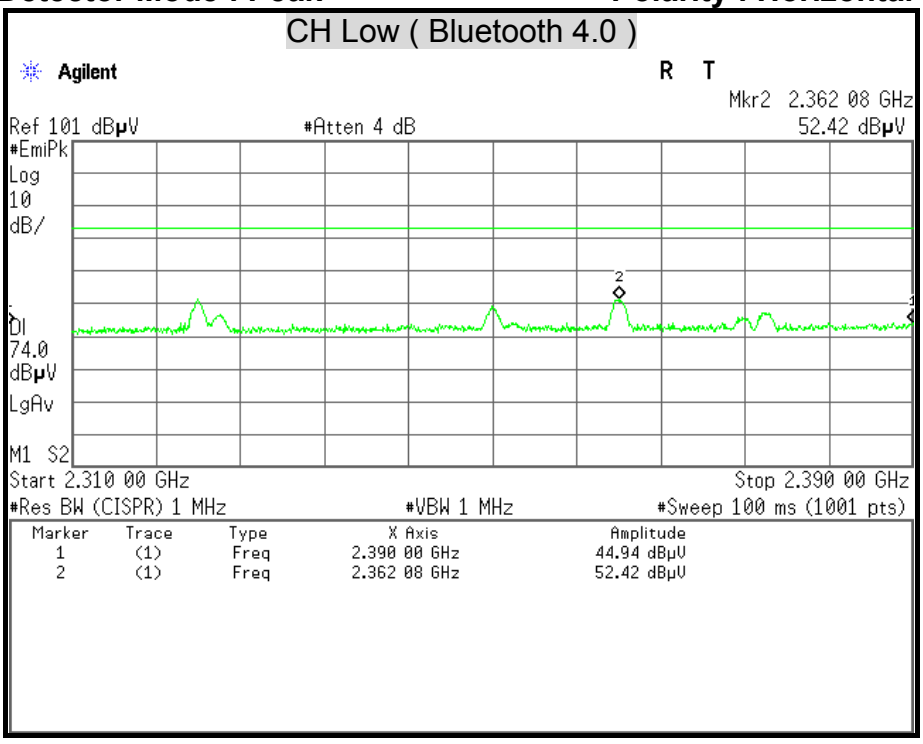
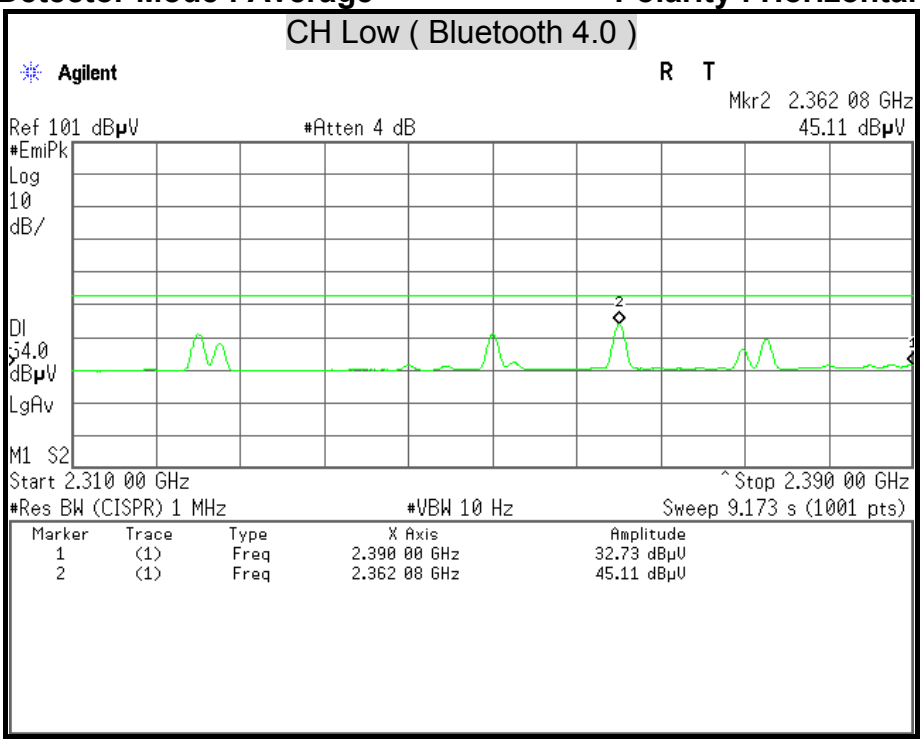
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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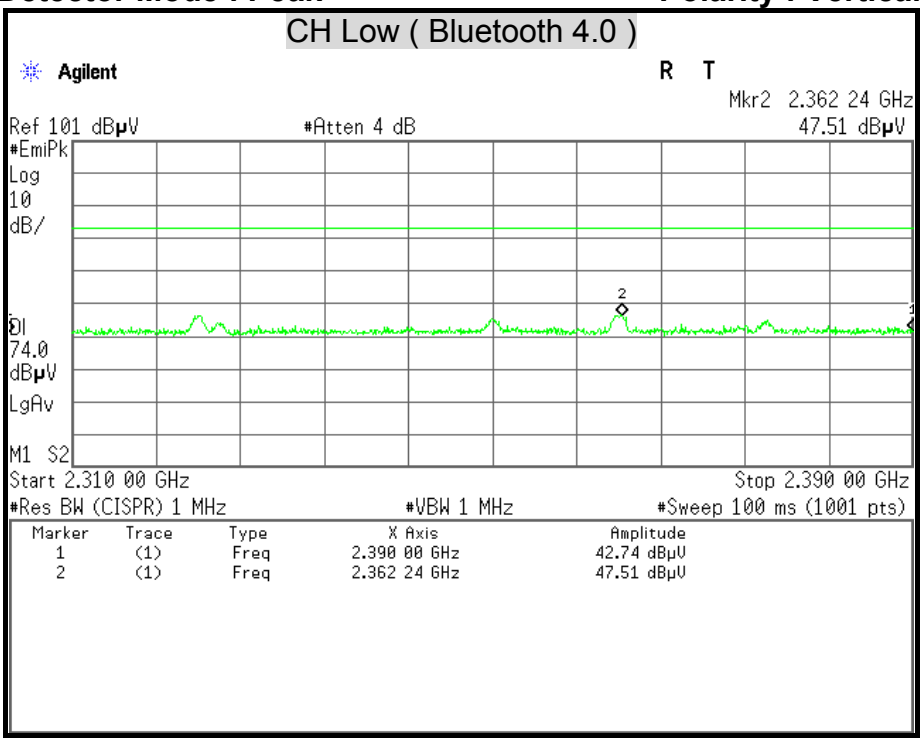
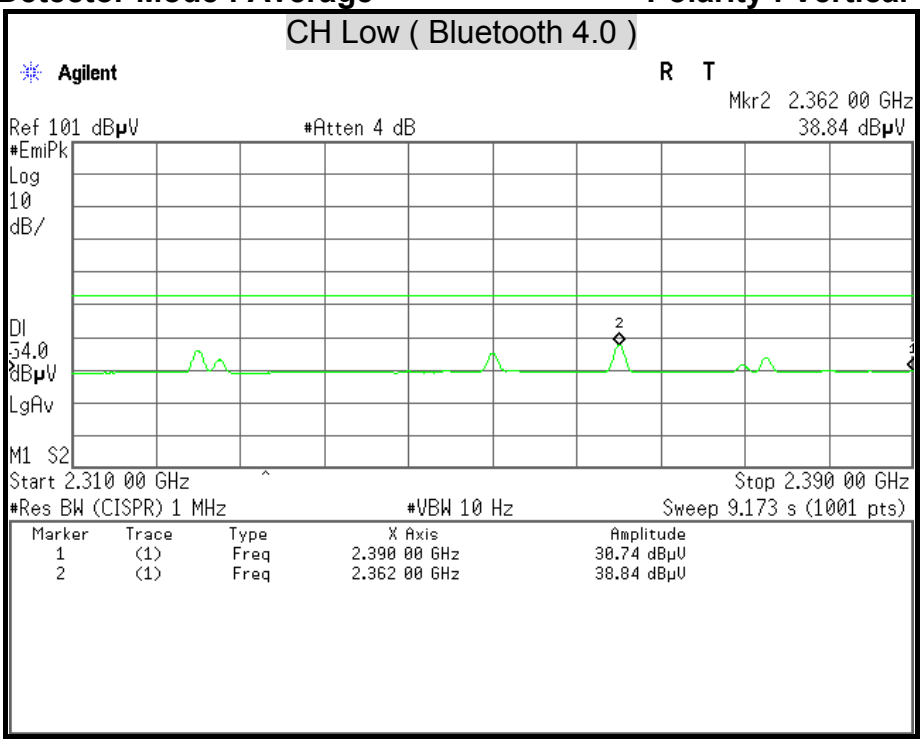
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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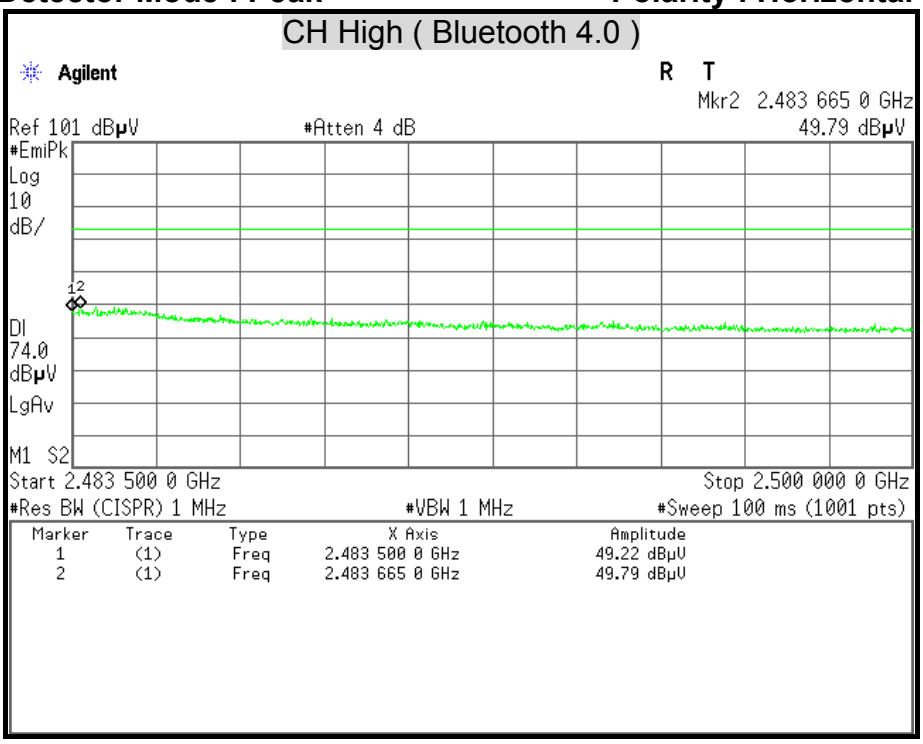
Detector Mode : Peak **Polarity : Horizontal**



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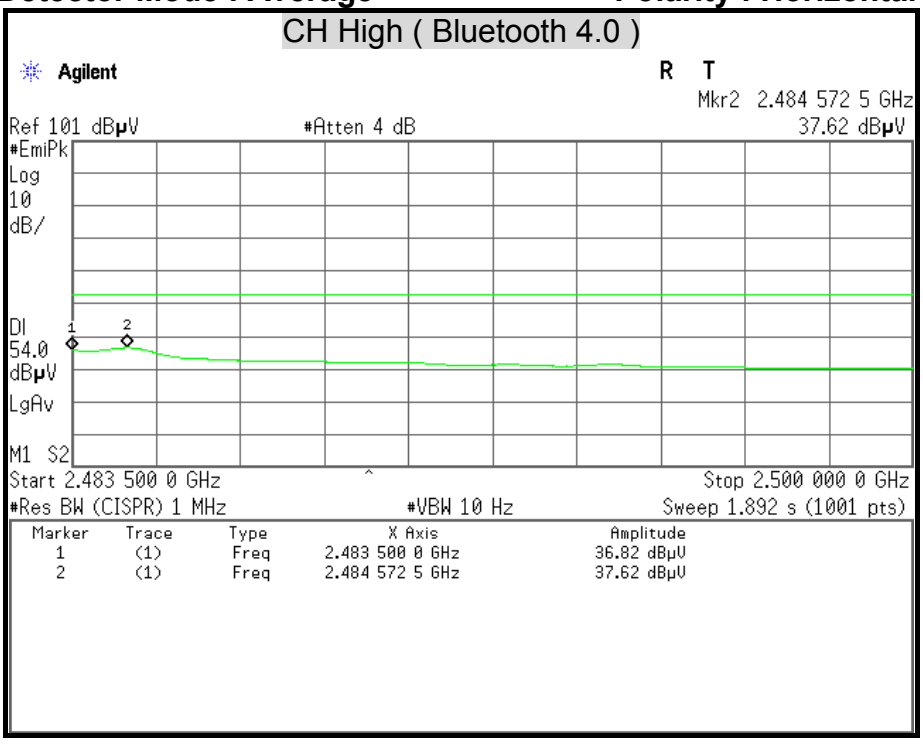

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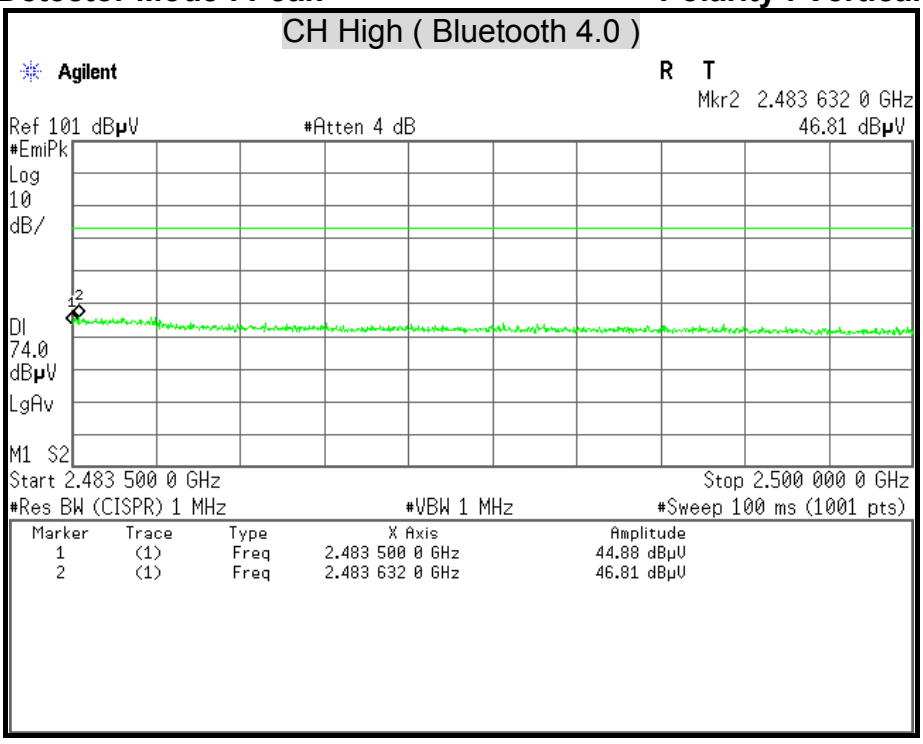
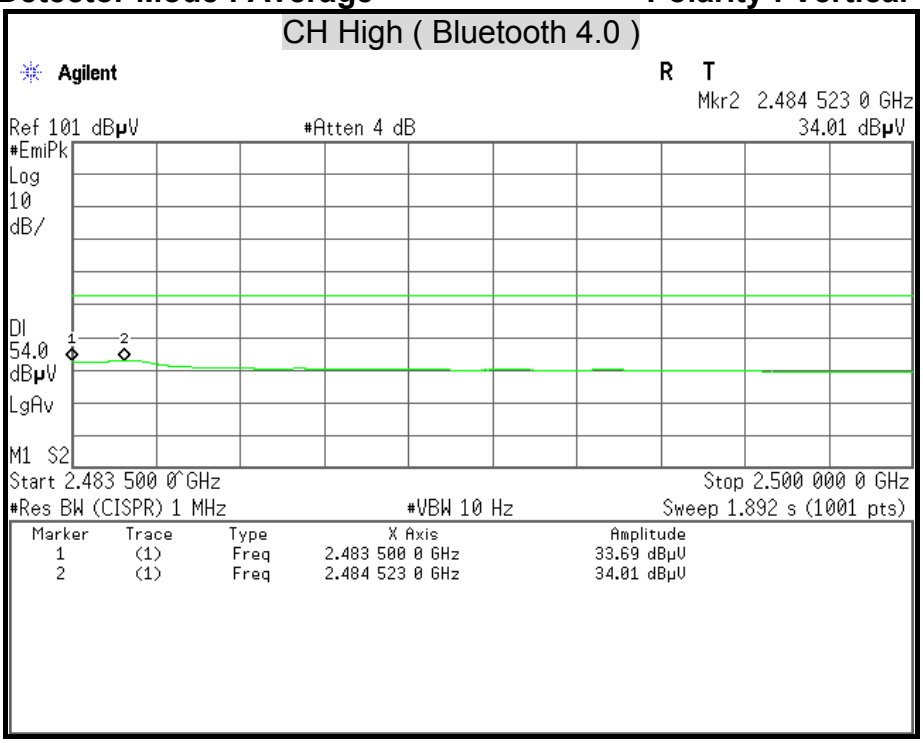
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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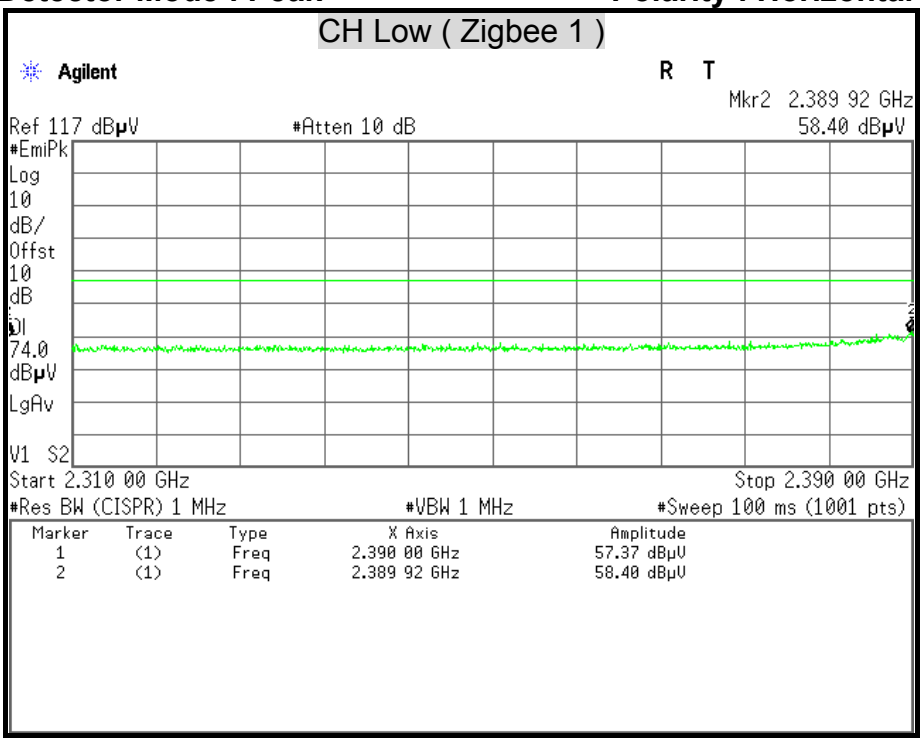
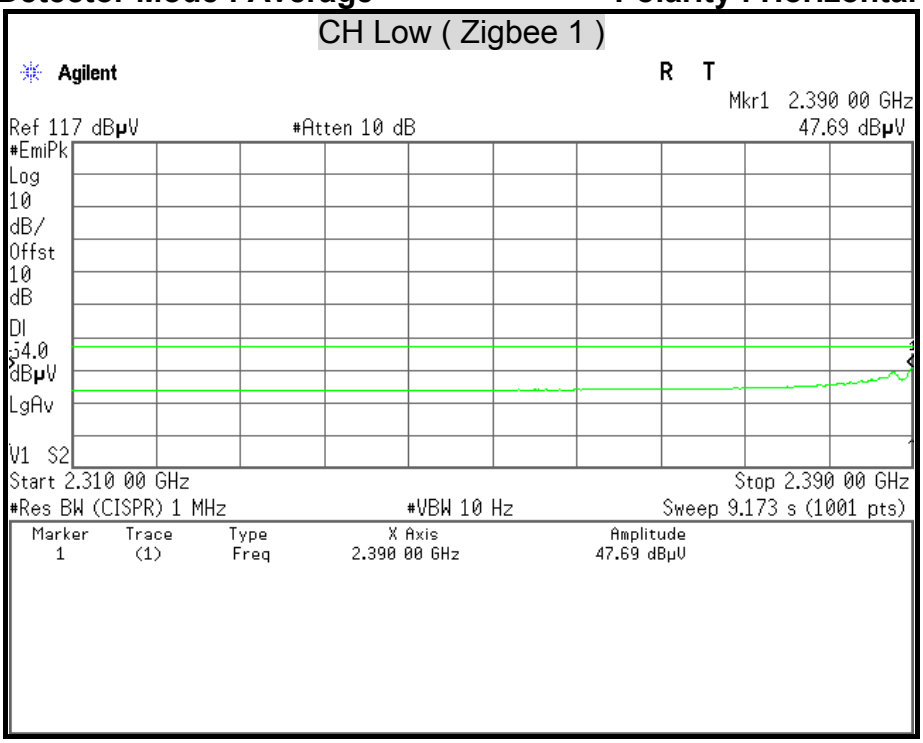
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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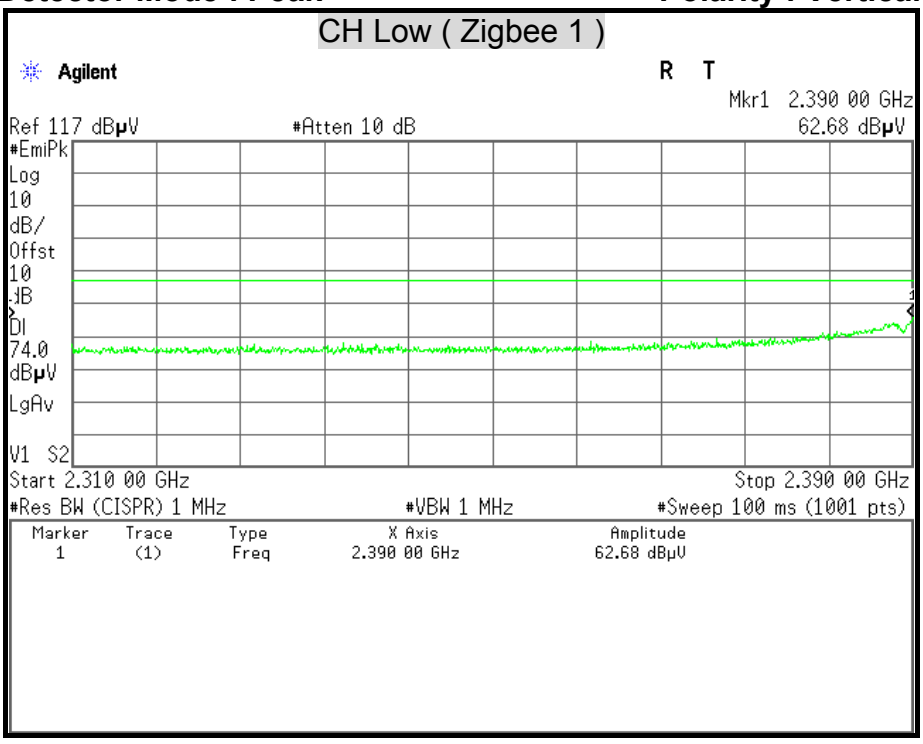
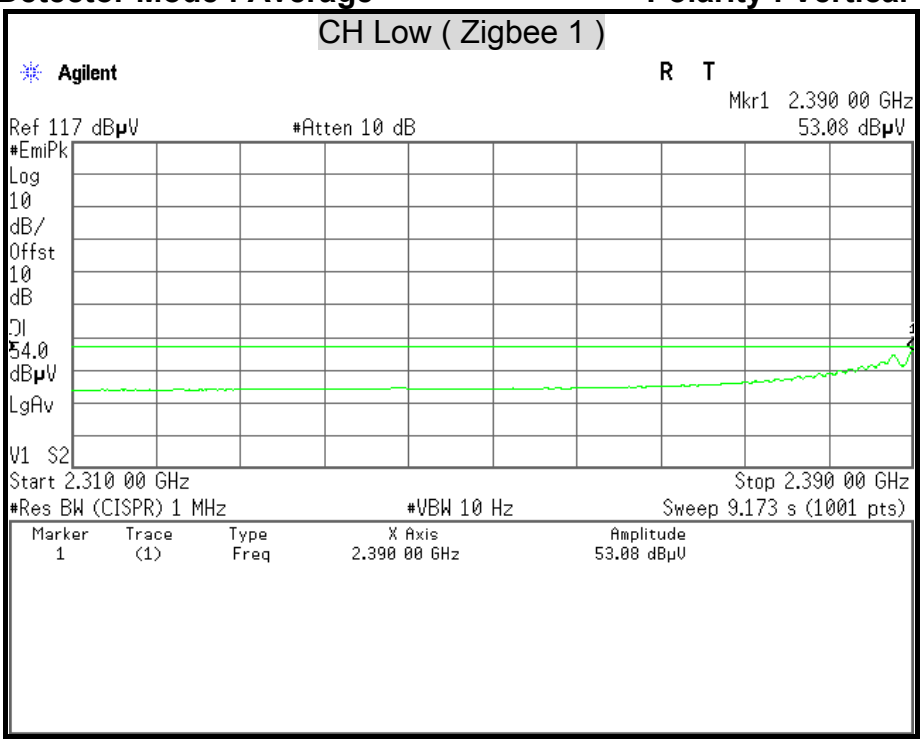
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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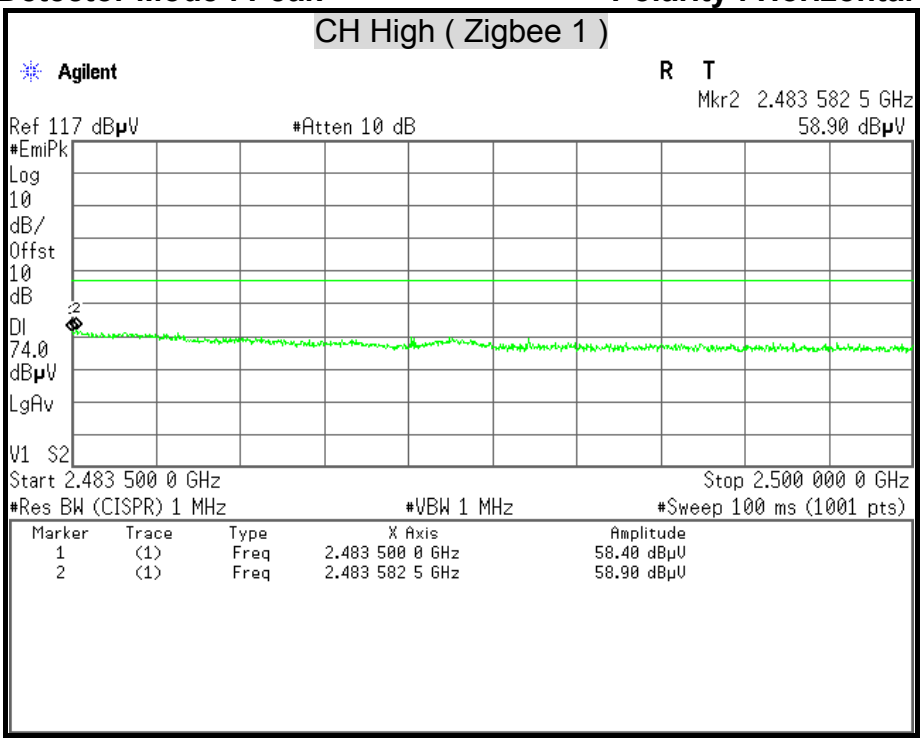
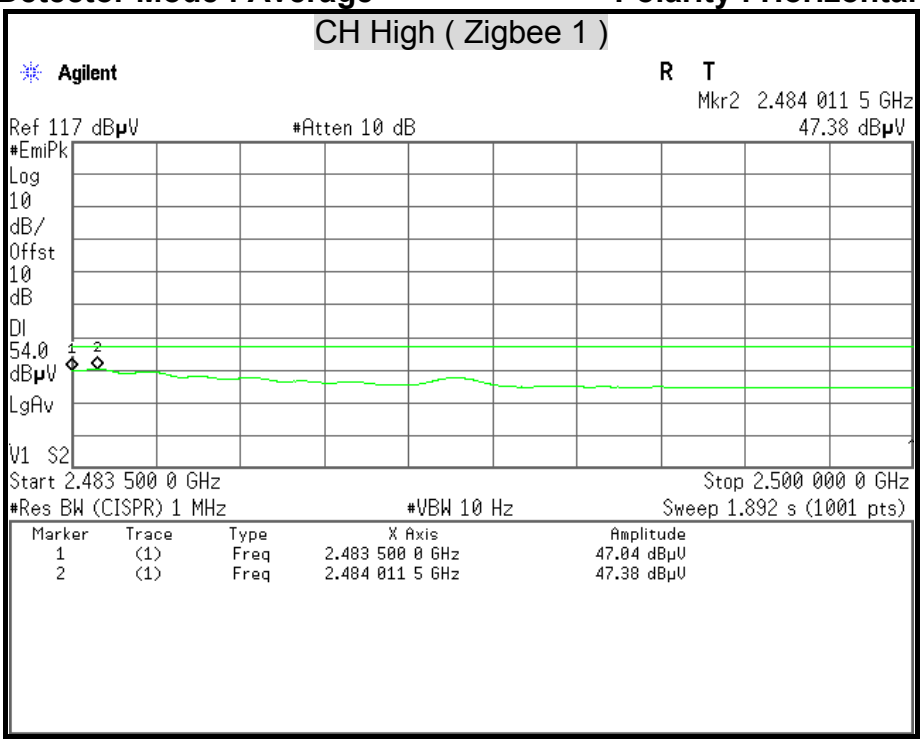
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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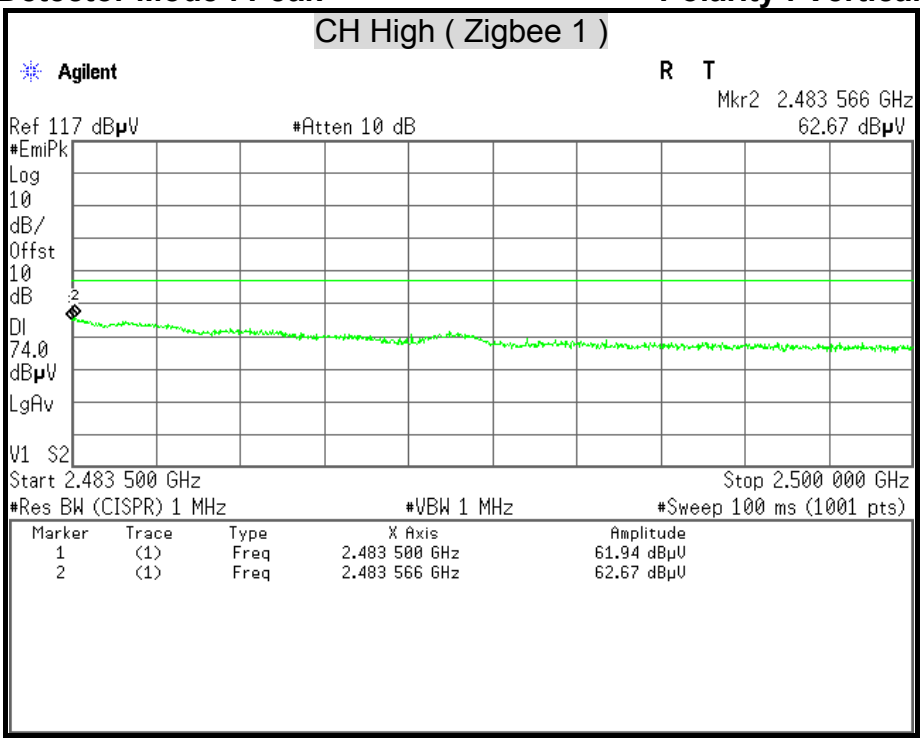
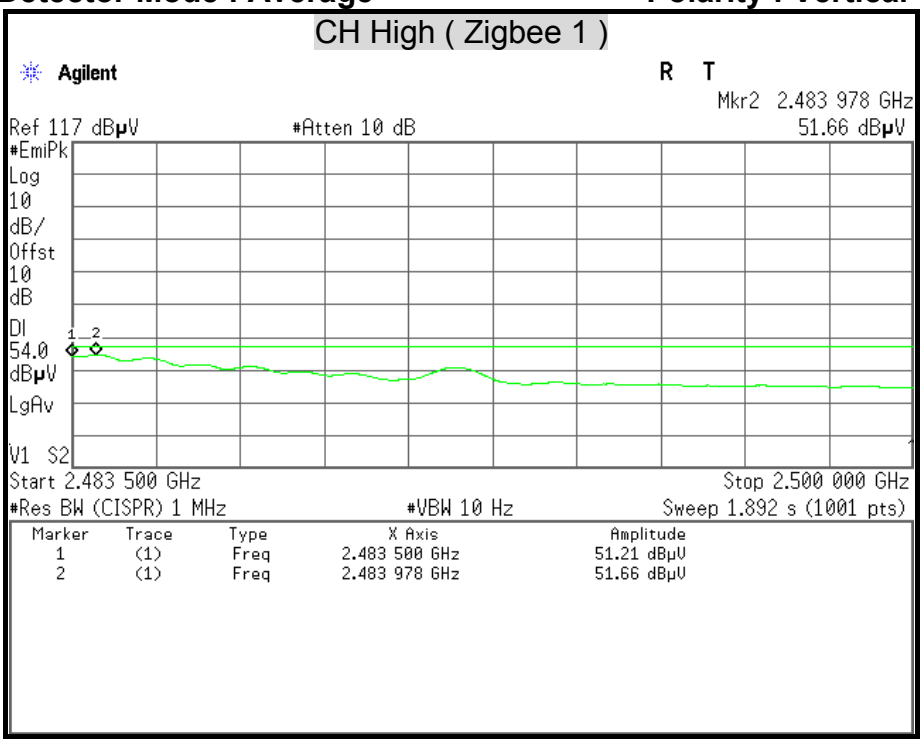
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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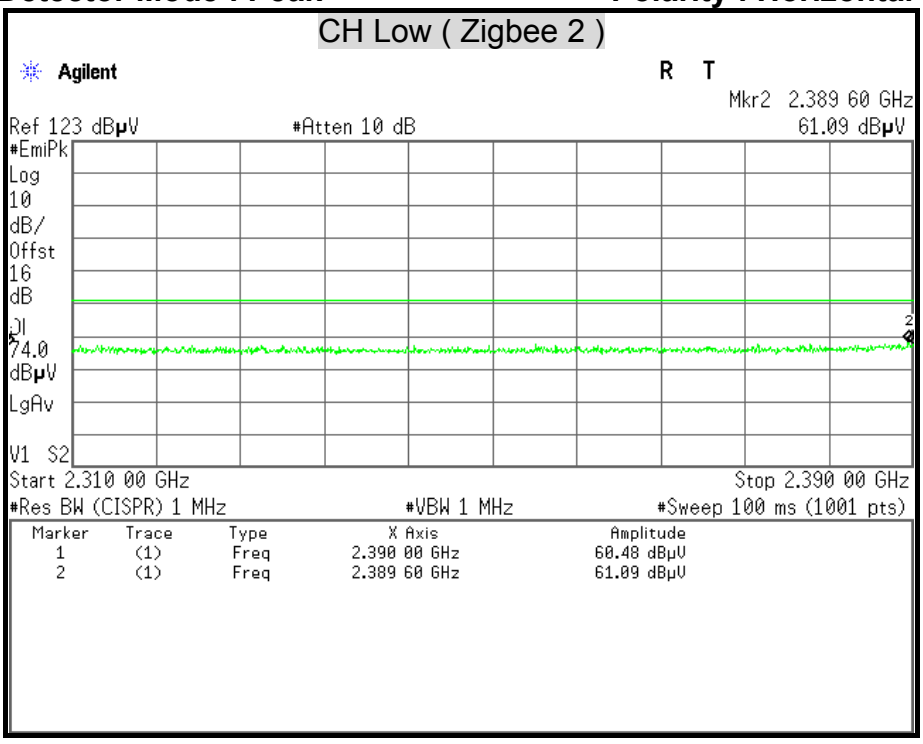
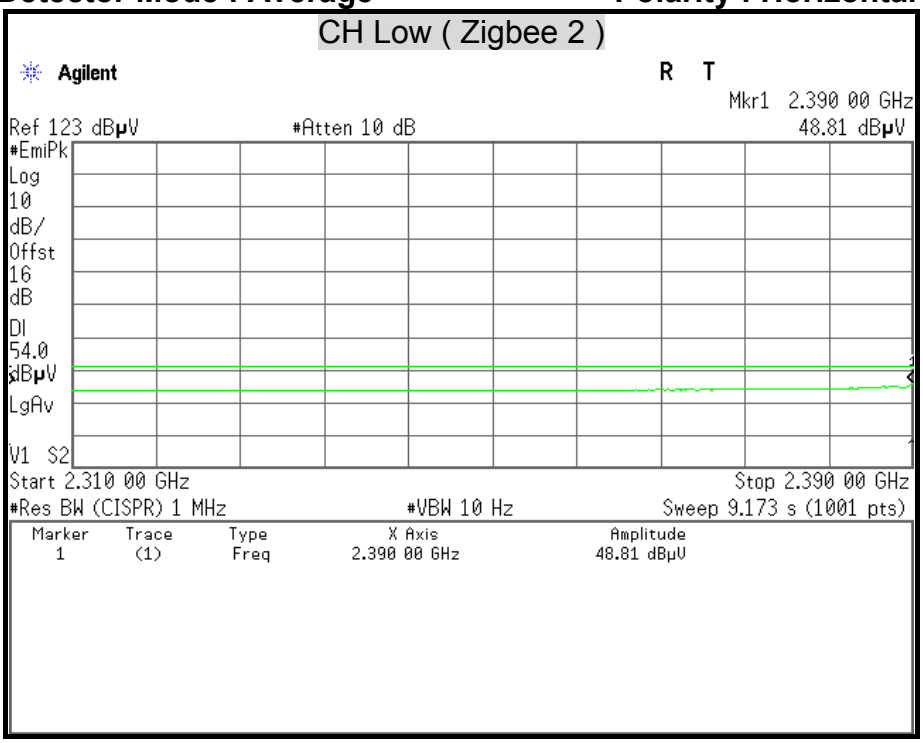
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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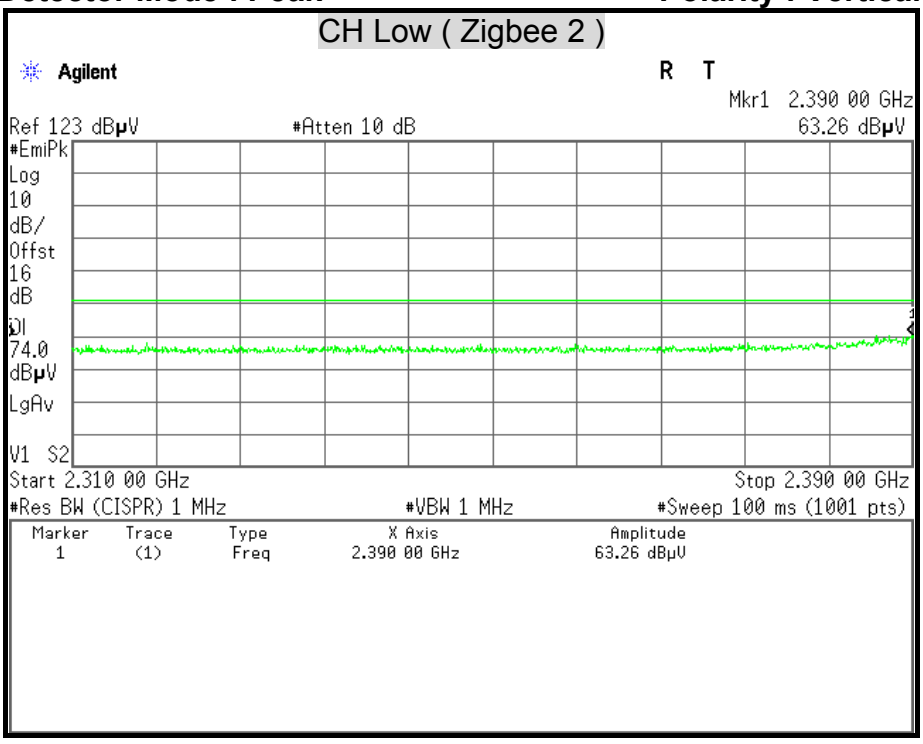
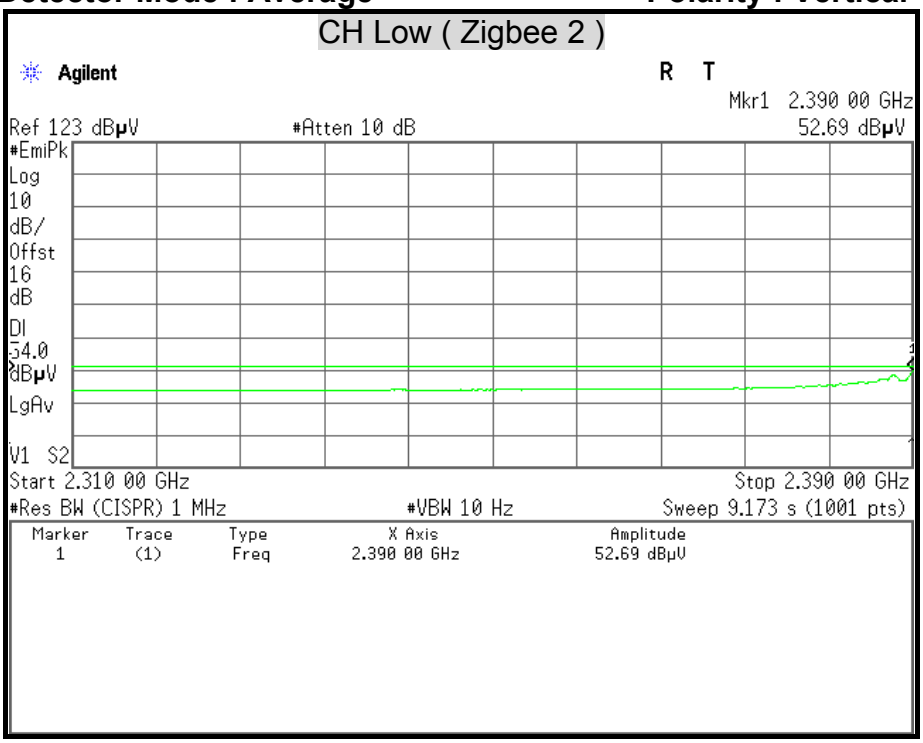


Detector Mode : Average **Polarity : Vertical**



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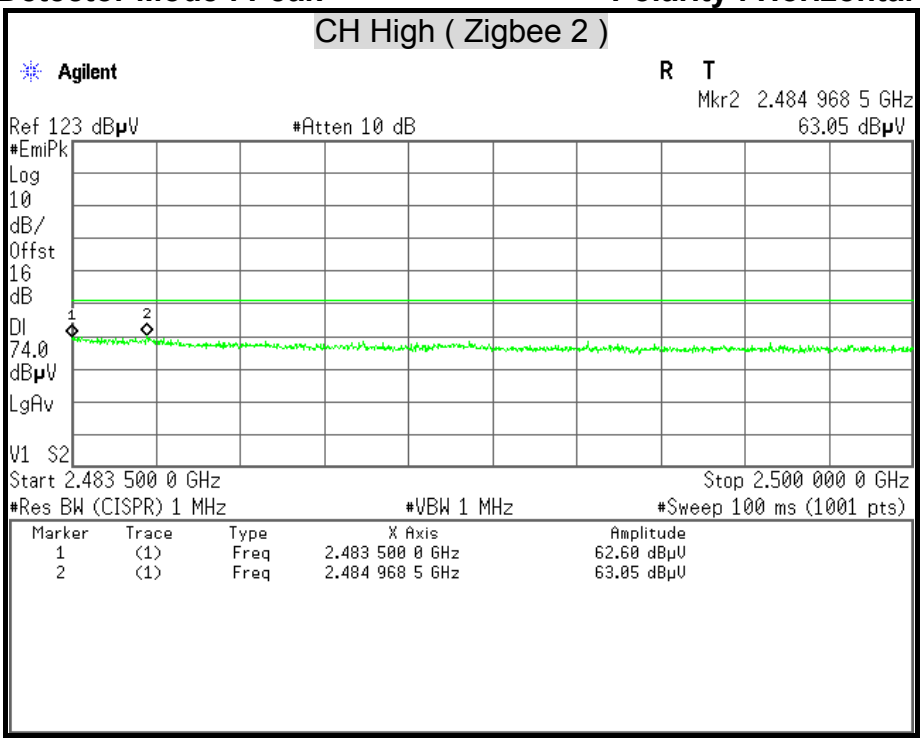
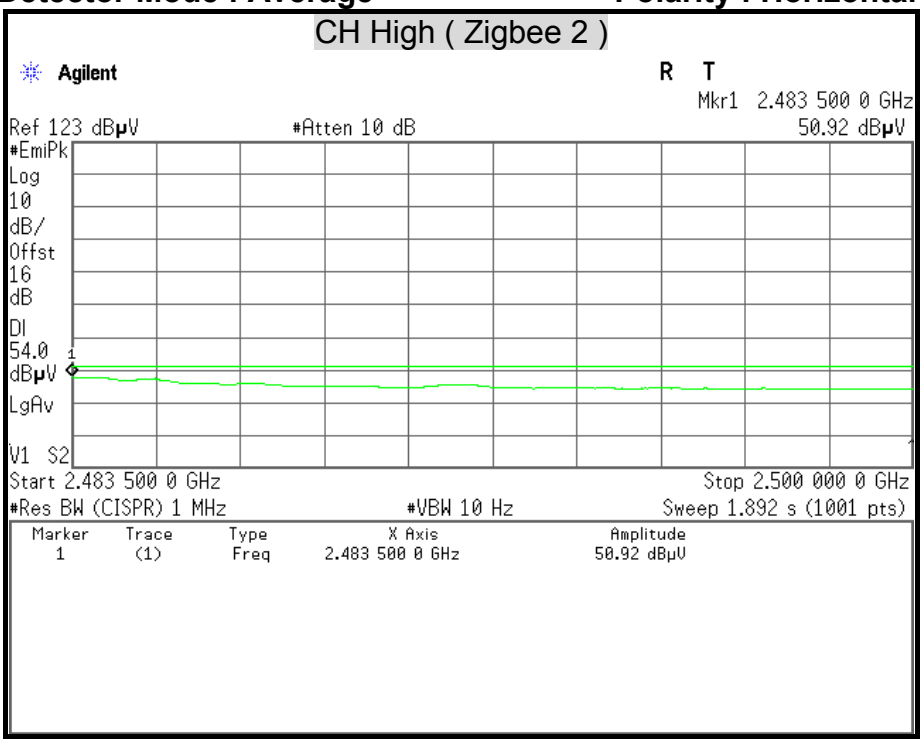
Detector Mode : Peak **Polarity : Horizontal**



Detector Mode : Average **Polarity : Horizontal**



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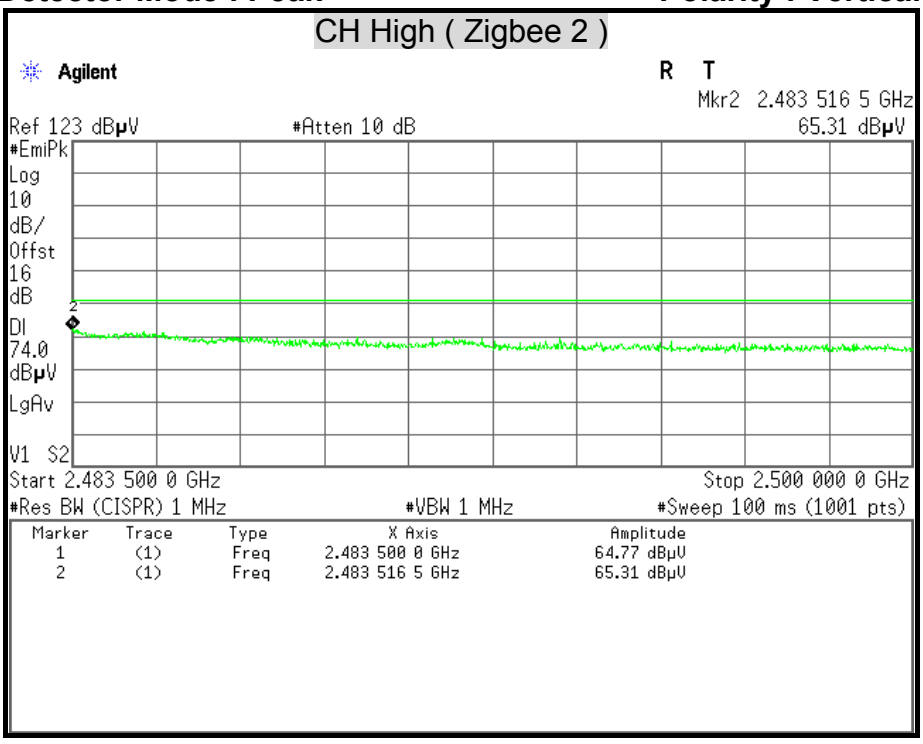
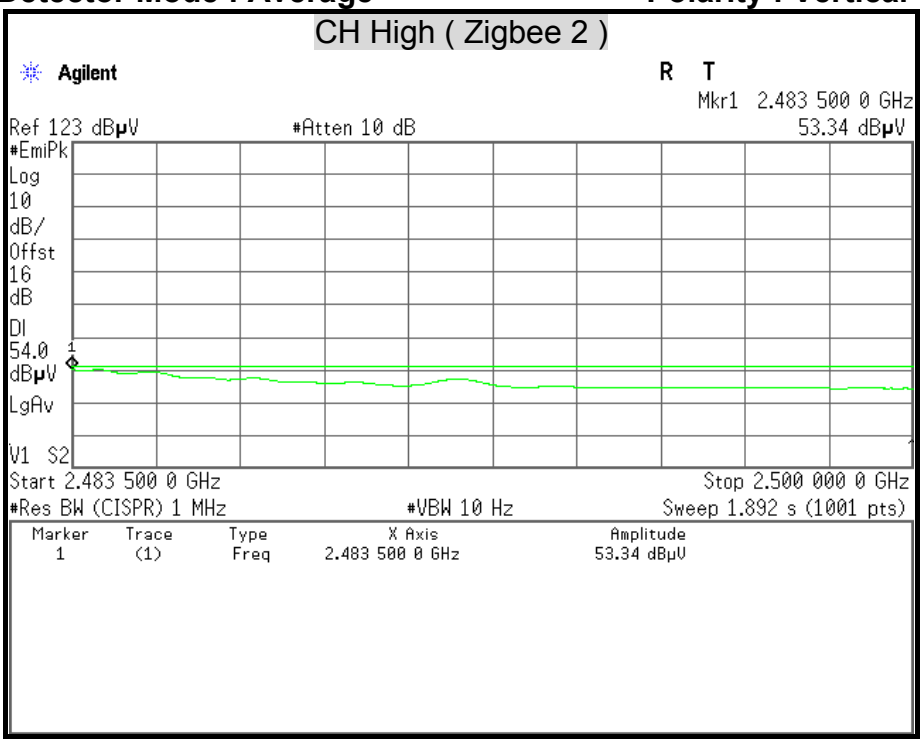
Detector Mode : Peak **Polarity : Vertical**



Detector Mode : Average **Polarity : Vertical**



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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 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	08/06/2015
L.I.S.N	SCHWARZBECK	NSLK 8127	8127473	03/09/2016
EMI Receiver	ROHDE & SCHWARZ	ESHS 30	838550/003	11/02/2015
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100111	06/30/2015

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

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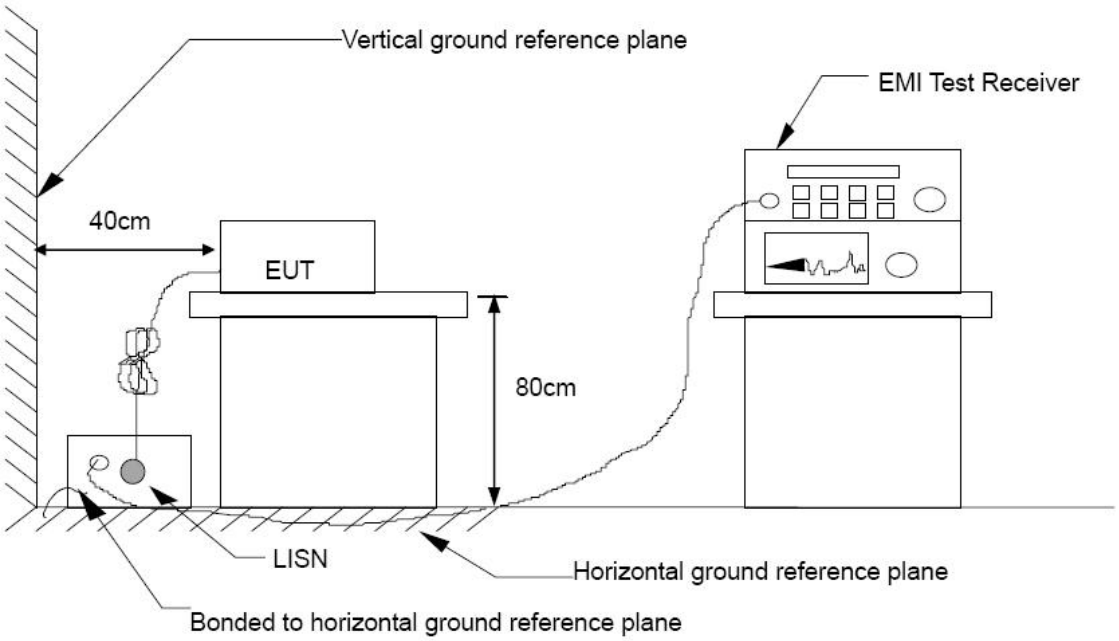
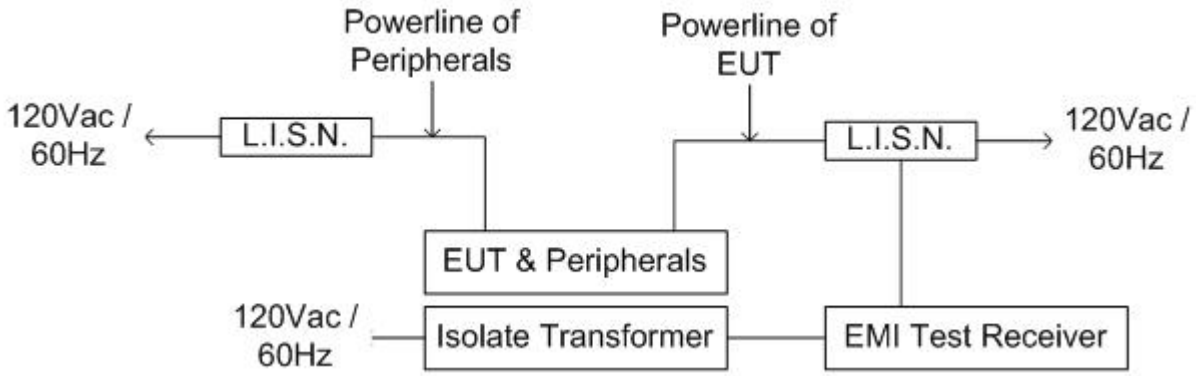
TEST SETUP





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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.

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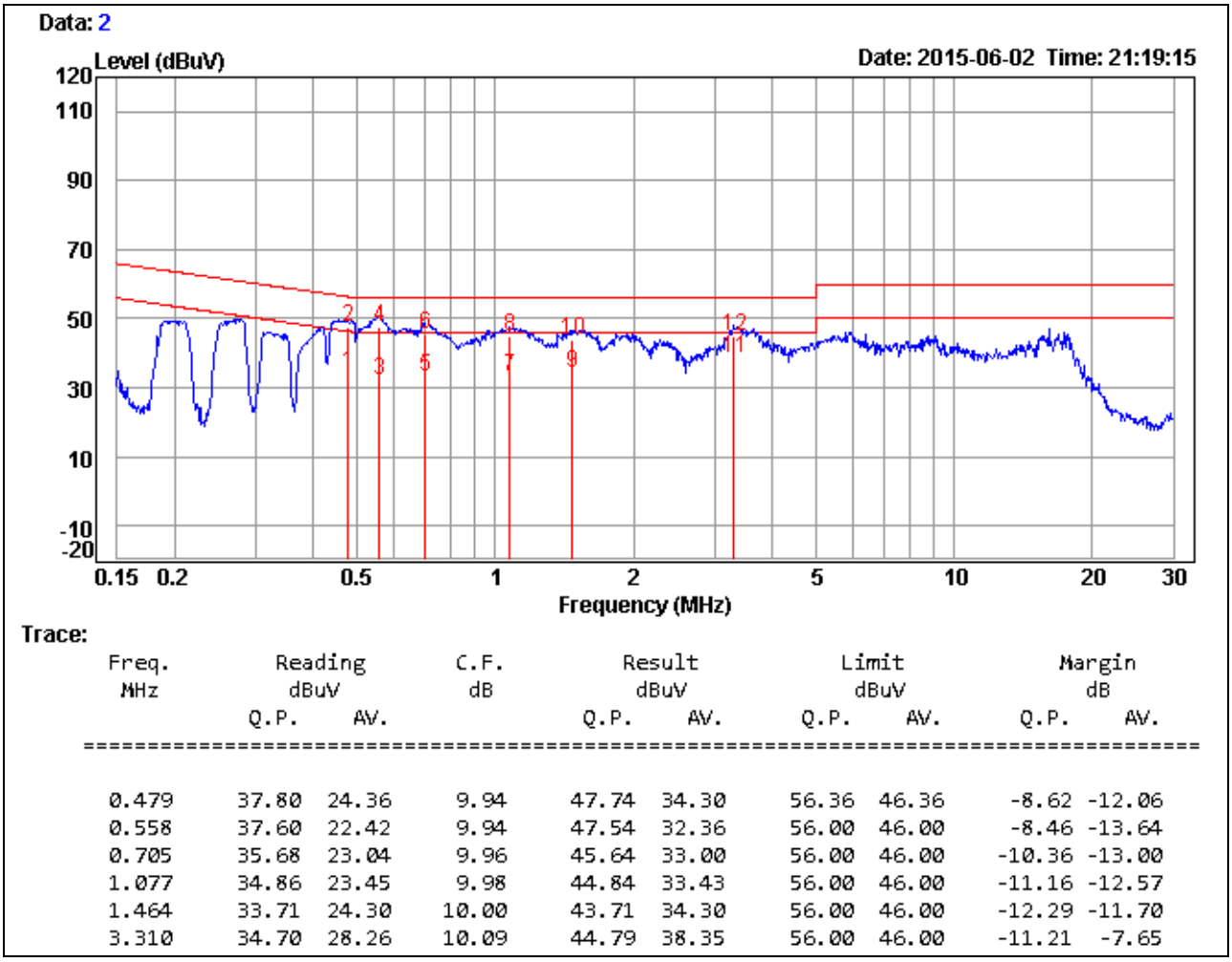
TEST RESULTS

Product Name	IoT Gateway System	Test By	Crystal Wu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/02
Test Mode	TX Mode	Temp. & Humidity	27.1°C, 54%

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.
0.479	37.80	24.36	9.94	47.74	34.30	56.36	46.36	-8.62	-12.06
0.558	37.60	22.42	9.94	47.54	32.36	56.00	46.00	-8.46	-13.64
0.705	35.68	23.04	9.96	45.64	33.00	56.00	46.00	-10.36	-13.00
1.077	34.86	23.45	9.98	44.84	33.43	56.00	46.00	-11.16	-12.57
1.464	33.71	24.30	10.00	43.71	34.30	56.00	46.00	-12.29	-11.70
3.310	34.70	28.26	10.09	44.79	38.35	56.00	46.00	-11.21	-7.65

Remark:

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

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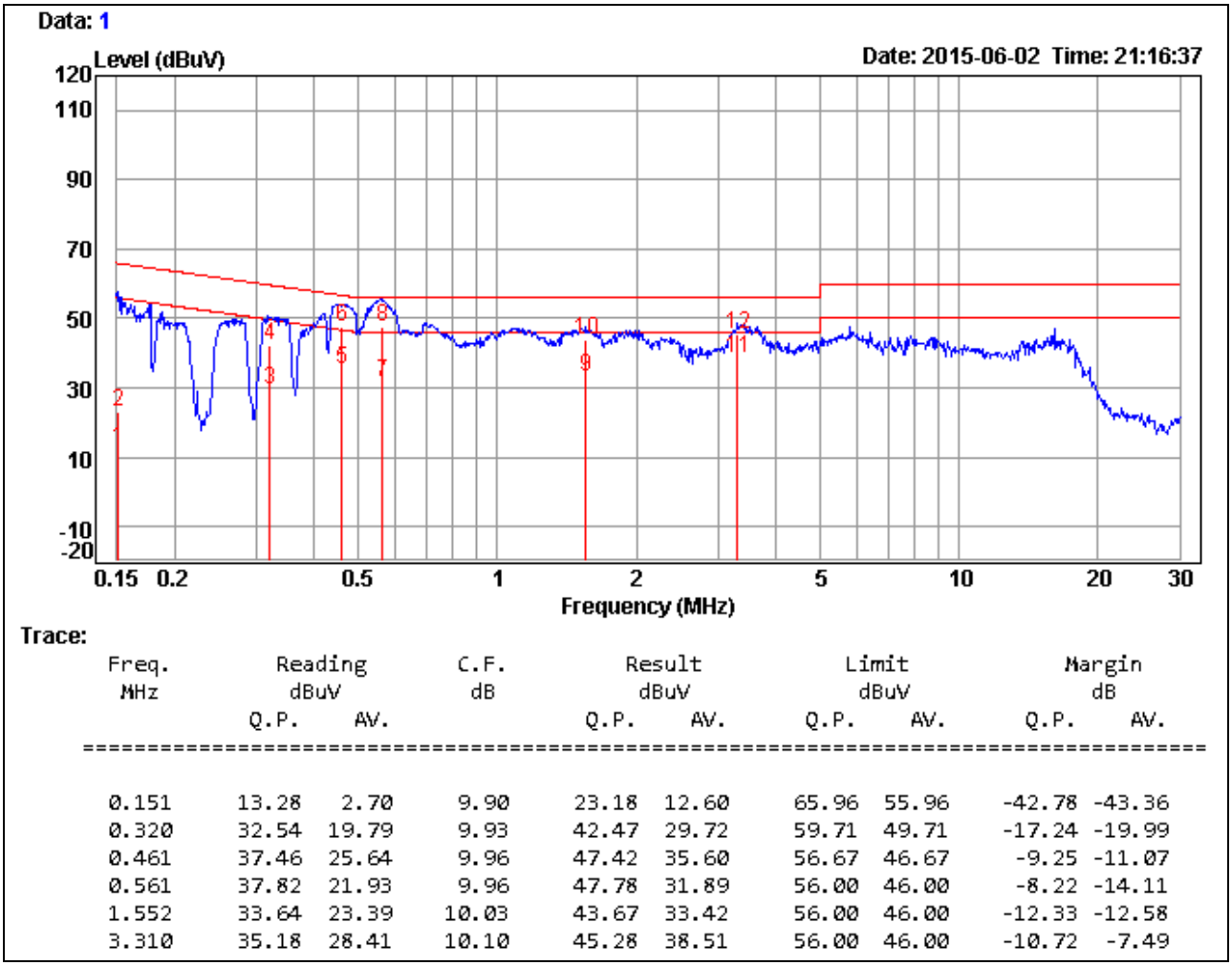
Product Name	IoT Gateway System	Test By	Crystal Wu
Test Model	SYS-E100-8QE-AWE3	Test Date	2015/06/02
Test Mode	TX Mode	Temp. & Humidity	27.1°C, 54%

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.
0.151	13.28	2.70	9.90	23.18	12.60	65.96	55.96	-42.78	-43.36
0.320	32.54	19.79	9.93	42.47	29.72	59.71	49.71	-17.24	-19.99
0.461	37.46	25.64	9.96	47.42	35.60	56.67	46.67	-9.25	-11.07
0.561	37.82	21.93	9.96	47.78	31.89	56.00	46.00	-8.22	-14.11
1.552	33.64	23.39	10.03	43.67	33.42	56.00	46.00	-12.33	-12.58
3.310	35.18	28.41	10.10	45.28	38.51	56.00	46.00	-10.72	-7.49

Remark:

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

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