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

For

MoCA to WiFi extender

Model : HT-EMN2

Trade Name : hitron

Issued for

Hitron Technologies,Inc.

No. 1-8,Lihsin 1st Rd.,HsinChu Science Park,HisnChu,Taiwan 300,R.O.C.

Issued by

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Issued Date: June 16, 2015

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	06/16/2015	Initial Issue	All Page 127	Gloria Chang

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1. TEST REPORT CERTIFICATION

Applicant	：	Hitron Technologies,Inc.
Address	：	No. 1-8,Lihsin 1st Rd.,HsinChu Science Park, HisnChu, Taiwan 300,R.O.C.
Equipment Under Test	：	MoCA to WiFi extender
Model	：	HT-EMN2
Trade Name	：	hitron
Tested Date	：	May 29 ~ June 05, 2015

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart C AND ANSI C63.10:2013 and ANSI C63.4:2014	PASS

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

Approved by:

Sb. Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer

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2. EUT DESCRIPTION

Product Name	MoCA to WiFi extender
Model Number	HT-EMN2
Identify Number	T150529S02
Received Date	May 29, 2015
Frequency Range	IEEE 802.11b/g, 802.11gn HT20 : 2412MHz ~ 2462MHz IEEE 802.11gn HT40 : 2422MHz ~ 2452MHz
Transmit Power	IEEE 802.11b : 19.06 dBm (0.0805W) IEEE 802.11g : 26.16 dBm (0.4130W) IEEE 802.11gn HT20 : 25.82 dBm (0.3819W) IEEE 802.11gn HT40 : 25.74 dBm (0.3750W)
Channel Spacing	IEEE 802.11b/g, 802.11gn HT20/HT40 : 5MHz
Channel Number	IEEE 802.11b/g, 802.11gn HT20: 11 Channels IEEE 802.11gn HT40 : 7 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 130 Mbps IEEE 802.11gn (HT20,400ns GI) : up to 144.4 Mbps IEEE 802.11gn (HT40,800ns GI) : up to 270 Mbps IEEE 802.11gn (HT40,400ns GI) : up to 300 Mbps
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)
Antenna Type	Airgain Embedded Antenna × 2 : Antenna 0 (Chain 0), Antenna Gain 1.9dBi Antenna 1 (Chain 1), Antenna Gain 1.2dBi
Power Rating	12Vdc
Test Voltage	120Vac, 60Hz
DC Power Cable Type	Non-shielded cable 1.5m × 1 (Non-detachable)
I/O Port	RJ-45 Port × 1, Coaxial Port × 2, Power Port × 1,
Signal Cable	Non-shielded RJ-45 Cable 1.4m × 1 (Detachable)

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Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	AOEM	ADS012PM-W 120100	100-240Vac, 50-60Hz, 0.5A	12Vdc, 1.0A

Remark :

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: U4P-HTEMN2 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 802.11gn MIMO transceiver in MoCA to WiFi extender form factor.

IEEE 802.11b/g, IEEE 802.11gn HT20/HT40 (2TX / 2RX) :

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

Conducted Emission / Radiated Emission Test (Below 1 GHz)

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

No.	Pre-Test Mode
1	Normal Operating

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

Final Test Mode		
Emission	Radiated Emission	Normal Operating
	Conducted Emission	Normal Operating

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.

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.

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4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and ANSI C63.4: 2014 and FCC CFR 47, 15.207, 15.209, 15.247.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

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

No.989-1, 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 ANSI C63.4: 2014 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
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_C) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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

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

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

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	Notebook PC	TOSHIBA	M840	9C104267C
2	Notebook PC	TOSHIBA	PORTEGE R30-A	1E101235H
3	Notebook PC	HP	ProBook 4421s	CNF03242PJ
4	Notebook PC	HP	Latitude D610 pp01L	CN-0XD762-48643-637-1743
5	Monitor	Sony	KDL-22Ex420	3711394
6	TV Generator	DEKTEC	DTA2115	---
7	Moca	Hitron	HT-EM2	24214B003808

No.	Power & Signal Cable Description
1	Non-shielded RJ-45 cable, 10m × 1
2	Shielded coaxial cable, 1m × 1
3	Shielded coaxial cable, 10m × 1

SETUP DIAGRAM FOR TESTS

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

EUT OPERATING CONDITION

RF Mode :

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

⇨ **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) Chain0/Chain1 Power set 02/05
IEEE 802.11b Channel Mid (2437MHz) Chain0/Chain1 Power set 02/05
IEEE 802.11b Channel High (2462MHz) Chain0/Chain1 Power set 01/04
IEEE 802.11g Channel Low (2412MHz) Chain0/Chain1 Power set 06/09
IEEE 802.11g Channel Mid (2437MHz) Chain0/Chain1 Power set 0C/0F
IEEE 802.11g Channel High (2462MHz) Chain0/Chain1 Power set 09/0C

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IEEE 802.11gn HT20 Channel Low (2412MHz) Chain0/Chain1 Power set 04/07
IEEE 802.11gn HT20 Channel Mid (2437MHz) Chain0/Chain1 Power set 0C/0F
IEEE 802.11gn HT20 Channel High (2462MHz) Chain0/Chain1 Power set 06/09

IEEE 802.11gn HT40 Channel Low (2422MHz) Chain0/Chain1 Power set 00/03
IEEE 802.11gn HT40 Channel Mid (2437MHz) Chain0/Chain1 Power set 0C/0F
IEEE 802.11gn HT40 Channel High (2452MHz) Chain0/Chain1 Power set 03/06

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

Normal Mode :

All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. EUT RJ-45 port link to Notebook PC 4.
3. EUT coaxial port Link to DTV Generator and Moca.
4. EUT VHF/UHF port Link to TV.
5. Moca RJ-45 port Link to Notebook PC 3
6. Notebook PC 1, 2 with WiFi (192.168.0.80, 192.168.0.33).
7. Notebook PC 1, 2, 3 ping Notebook PC 4 (192.168.0.163).
8. All of the functions are under run.
9. 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

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 (Two TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2412	10.0800	10.0700	500	PASS
Middle	2437	10.0700	10.0700	500	PASS
High	2462	10.0800	10.0700	500	PASS

IEEE 802.11g Mode (Two TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2412	16.5500	16.5500	500	PASS
Middle	2437	16.5600	16.5800	500	PASS
High	2462	16.5900	16.5800	500	PASS

IEEE 802.11ggn HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2412	17.7100	17.7200	500	PASS
Middle	2437	17.7100	17.7000	500	PASS
High	2462	17.6700	17.6900	500	PASS

IEEE 802.11gn HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2422	36.4900	36.5200	500	PASS
Middle	2437	36.4900	36.5100	500	PASS
High	2452	36.4700	36.5200	500	PASS

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6dB BANDWIDTH

CH Low (IEEE 802.11b Mode / Chain 0)

CH Middle (IEEE 802.11b Mode / Chain 0)

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CH High (IEEE 802.11b Mode / Chain 0)

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CH Low (IEEE 802.11b Mode / Chain 1)

CH Middle (IEEE 802.11b Mode / Chain 1)

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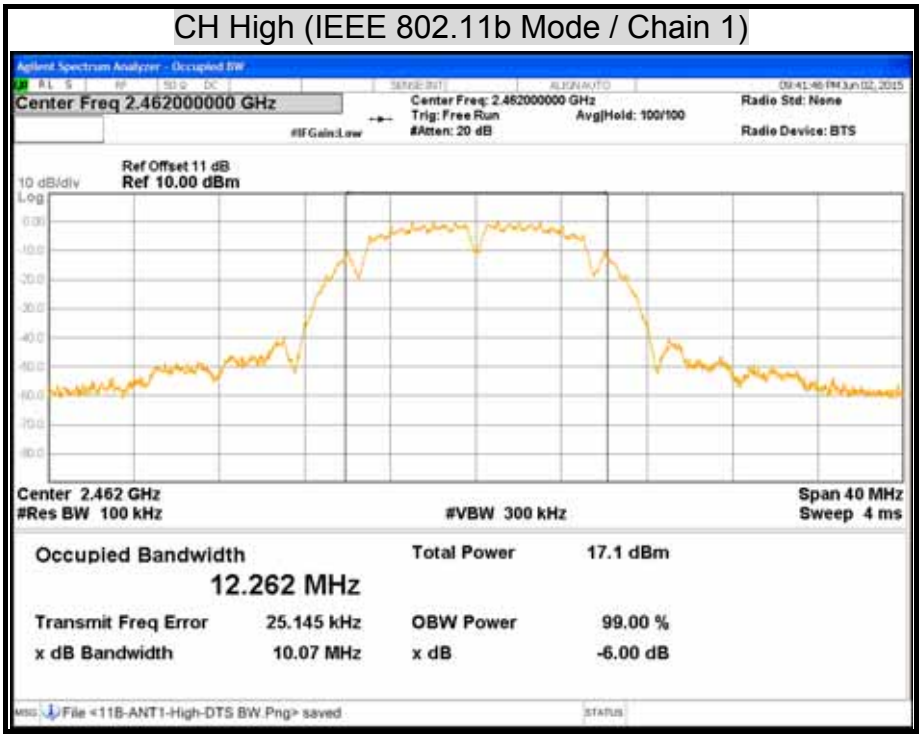
CH High (IEEE 802.11b Mode / Chain 1)



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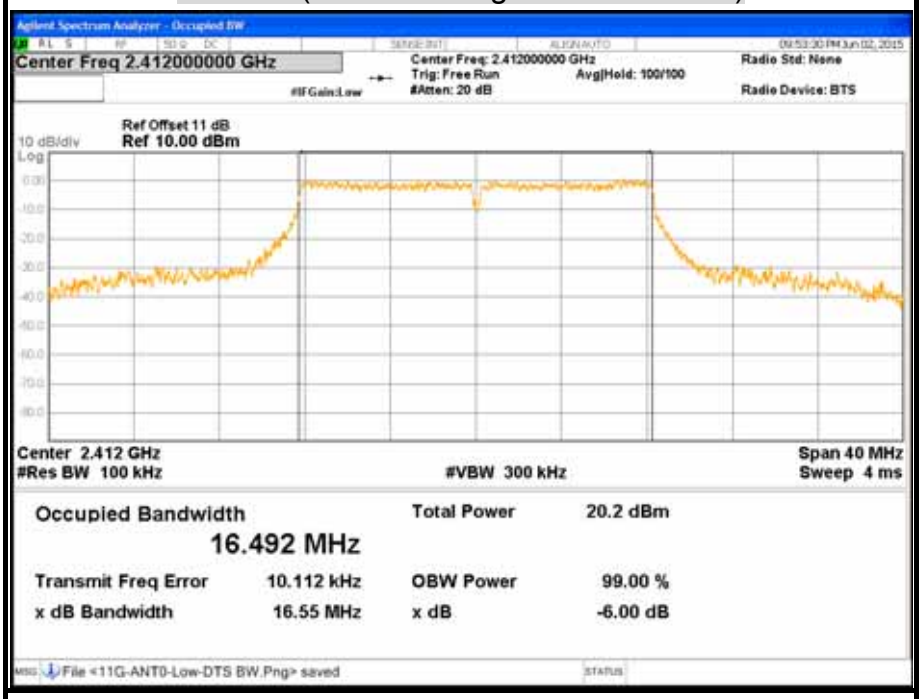

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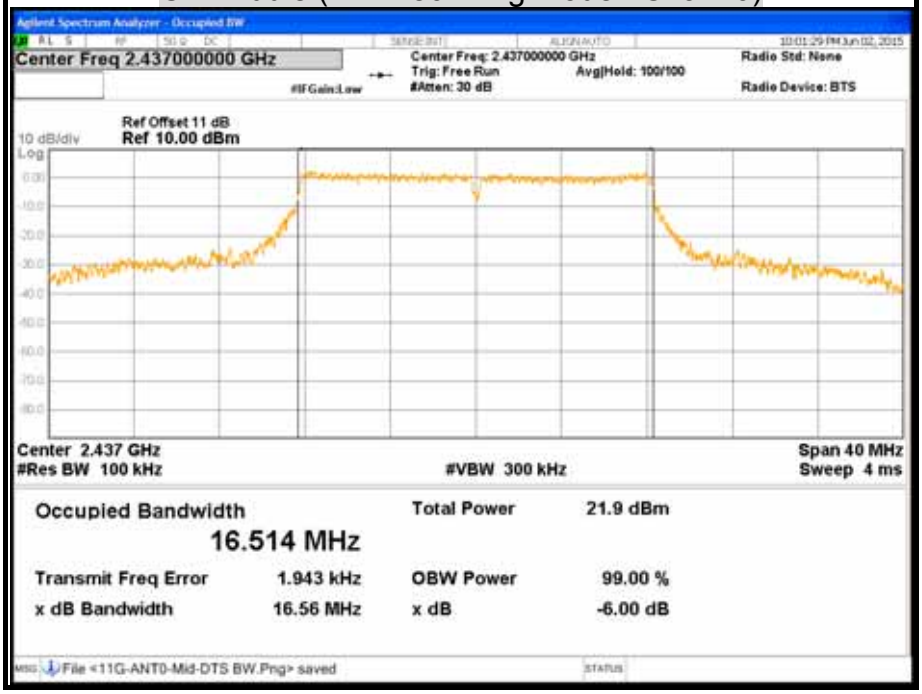

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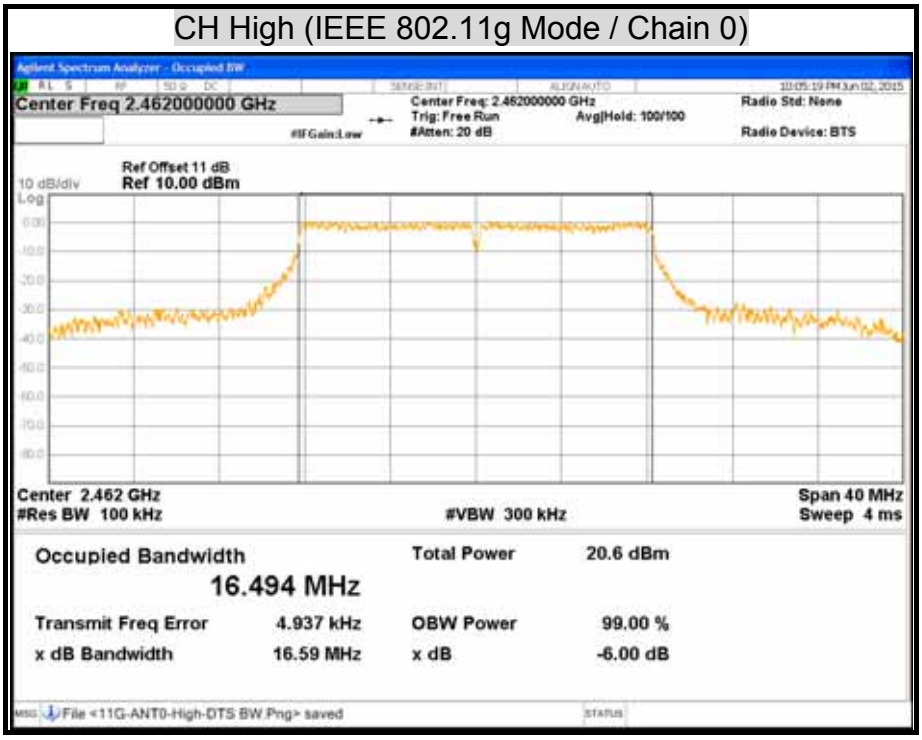

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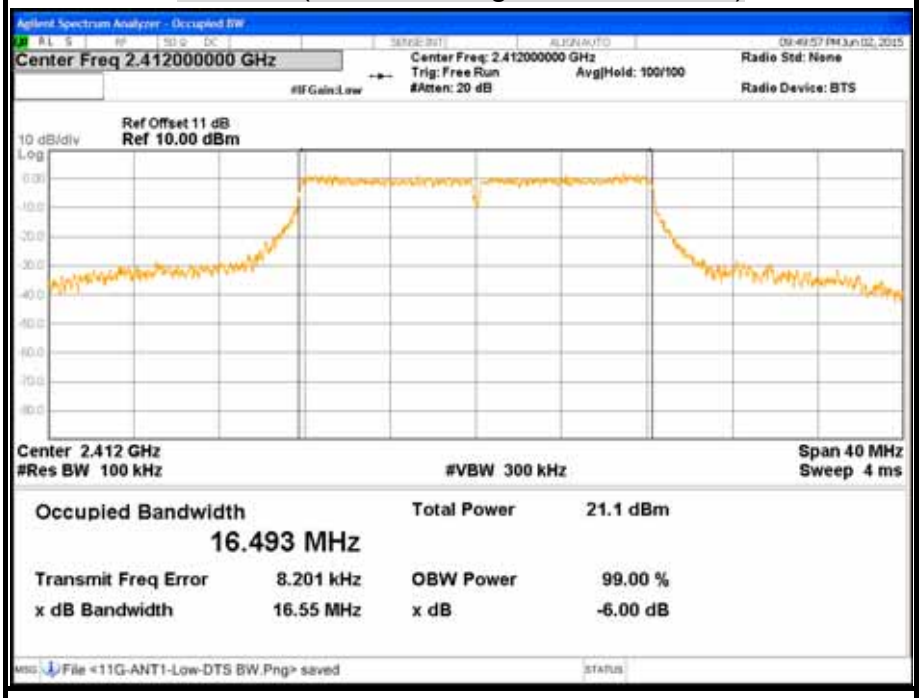

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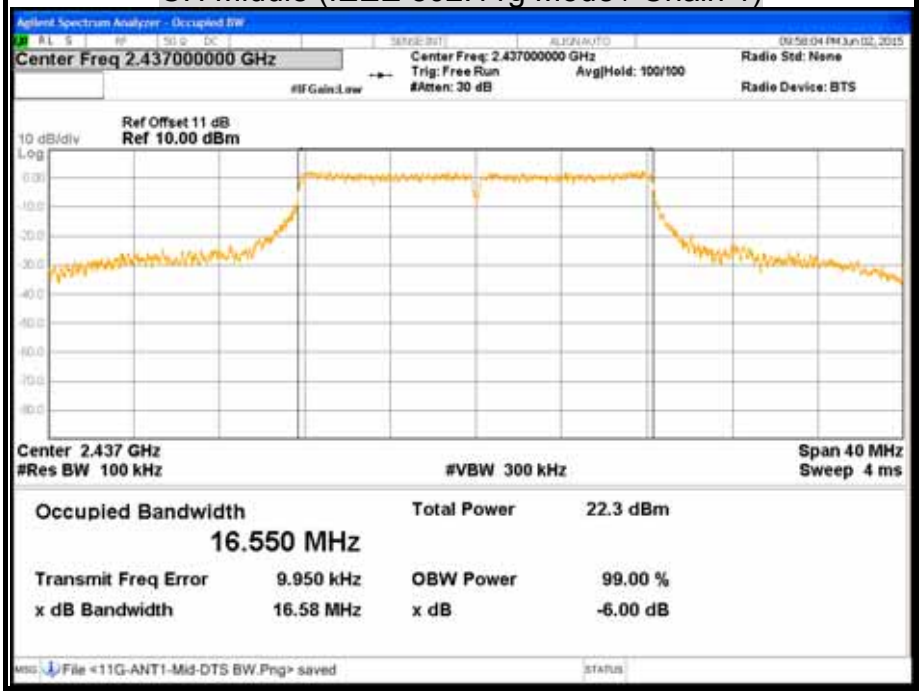

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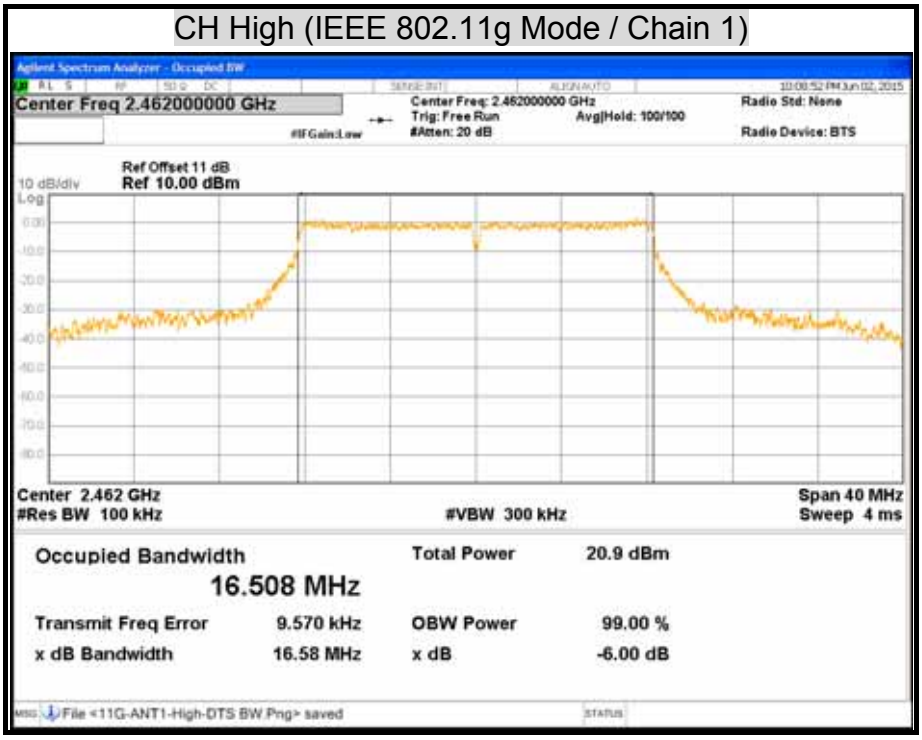

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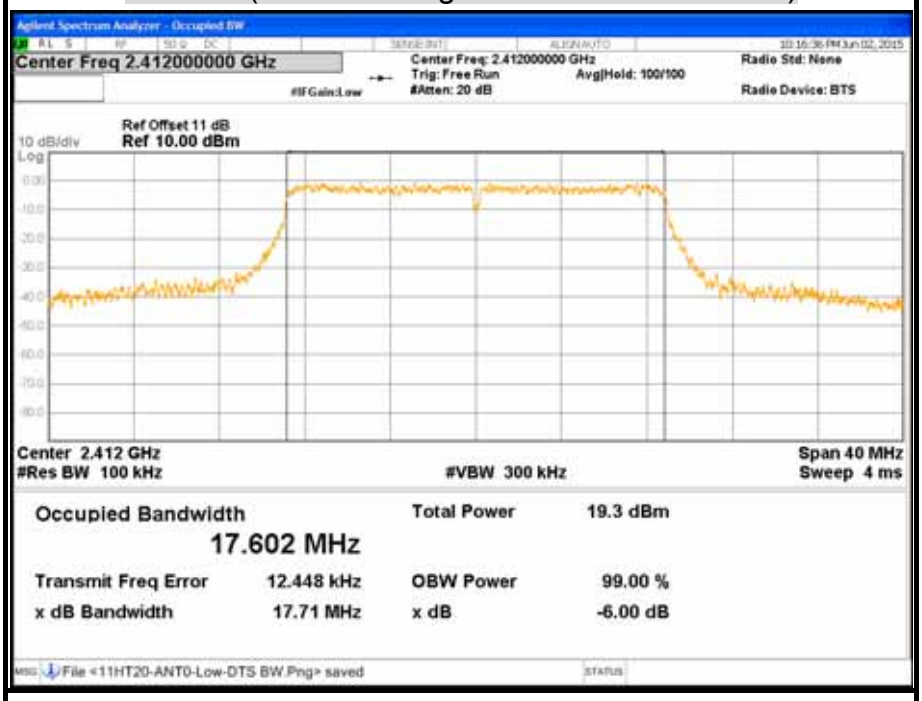

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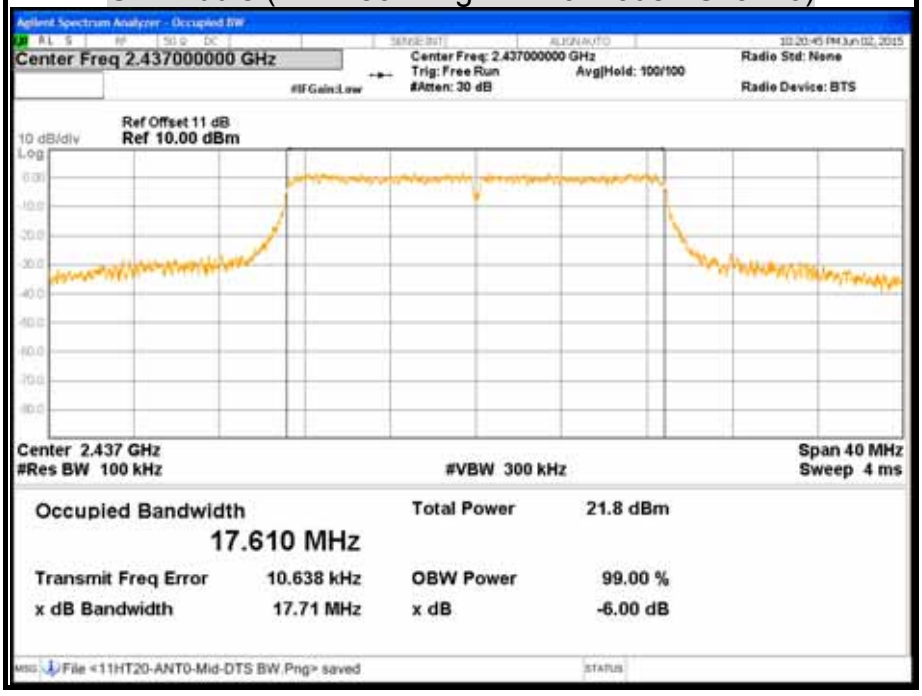

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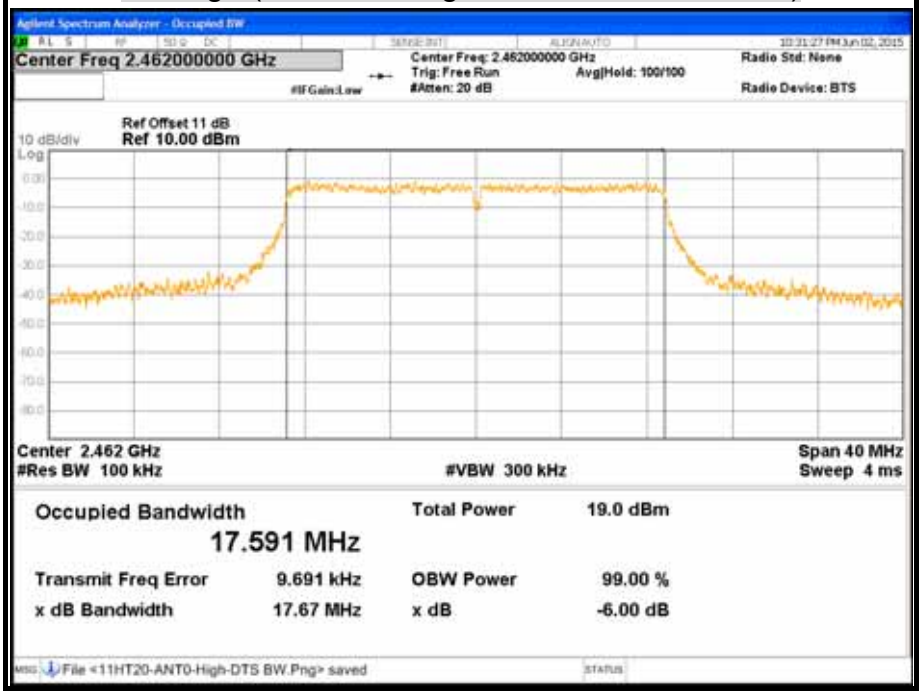

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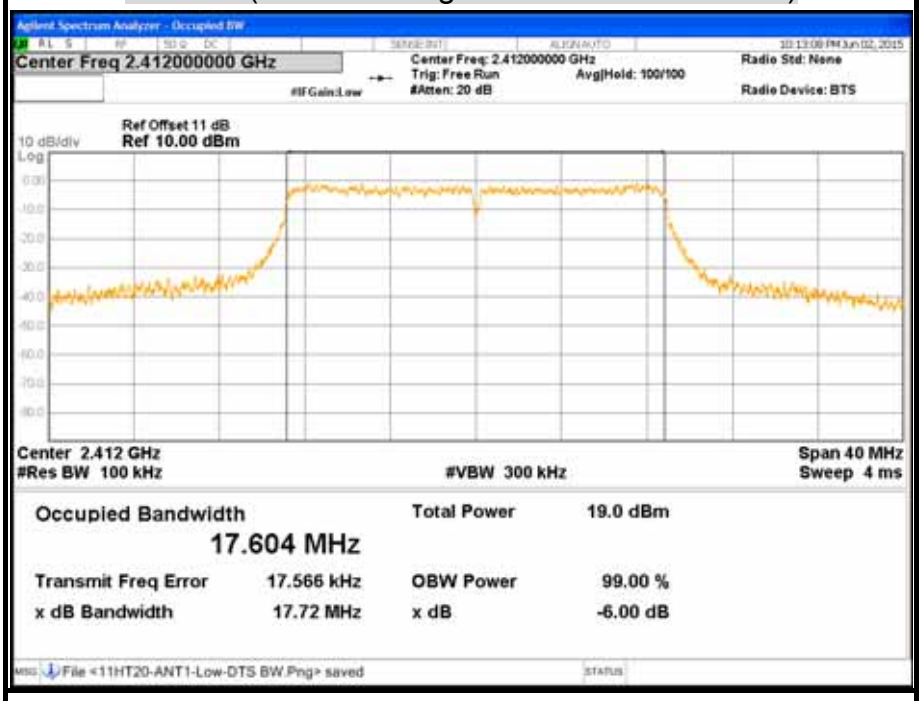

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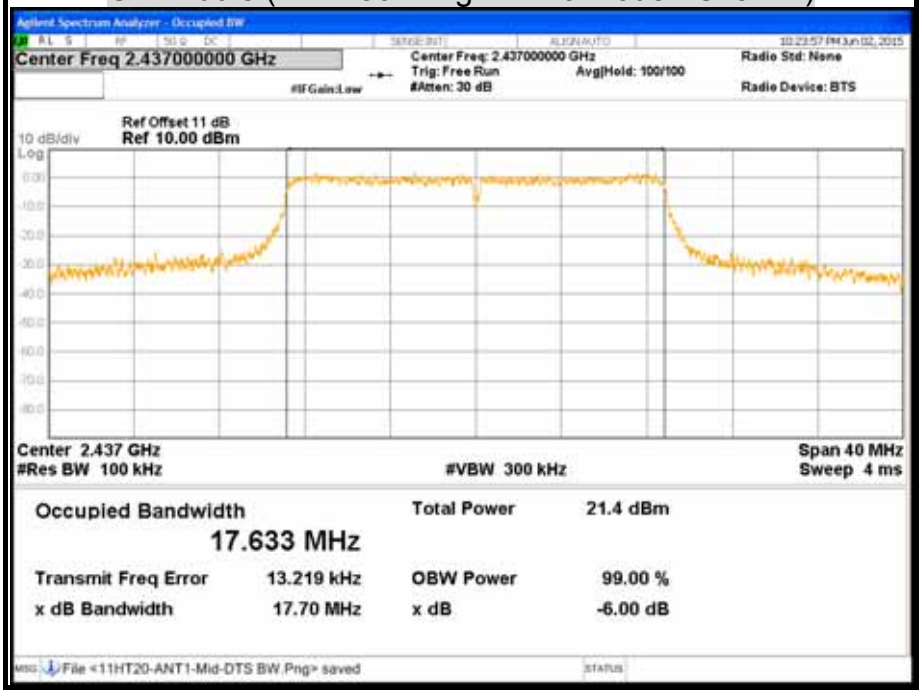

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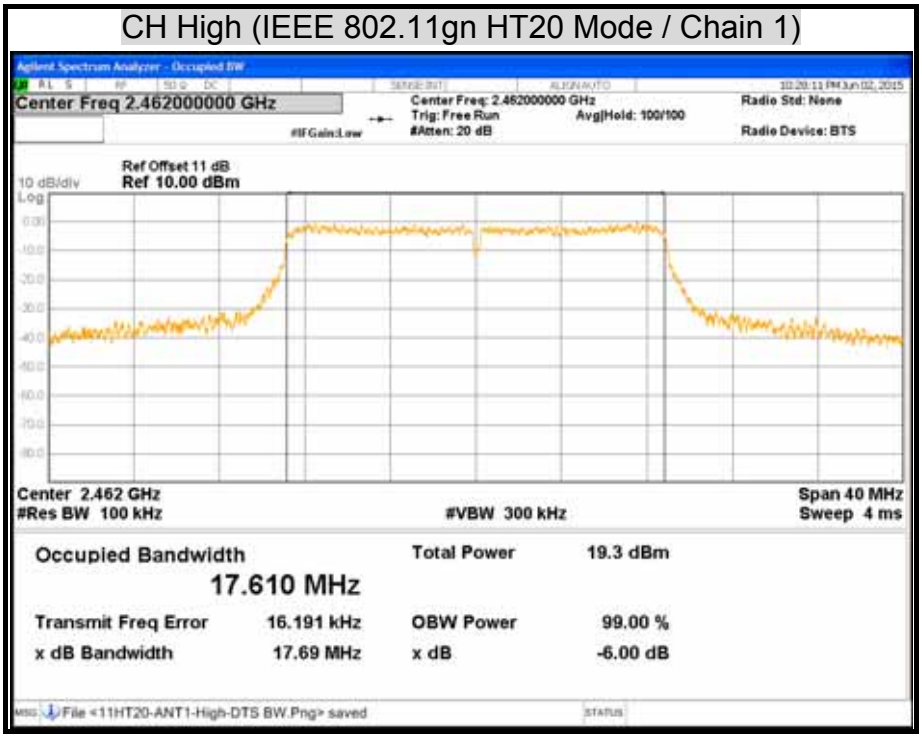

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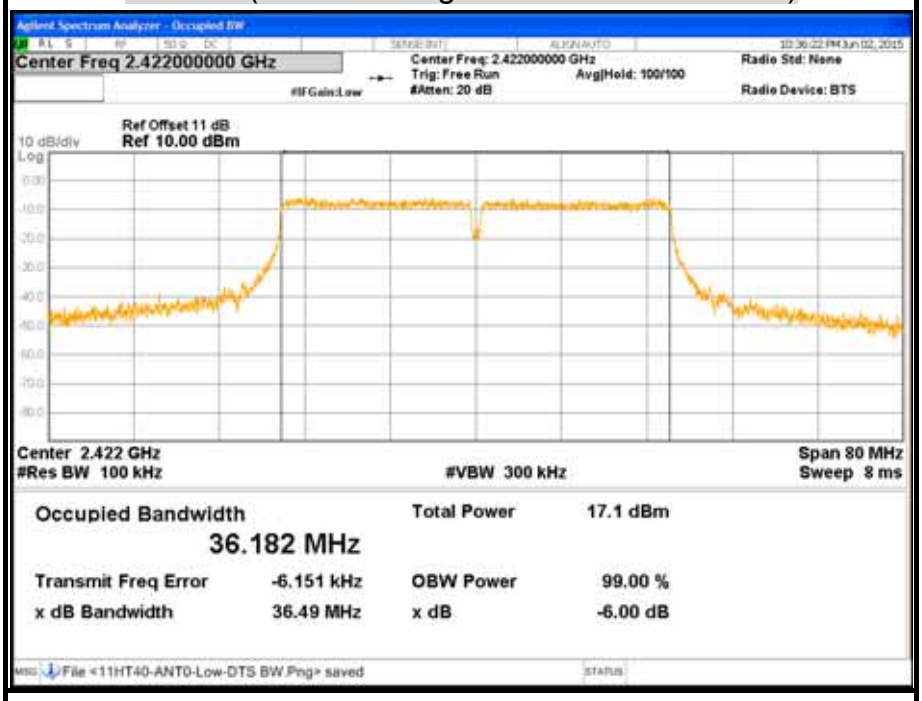
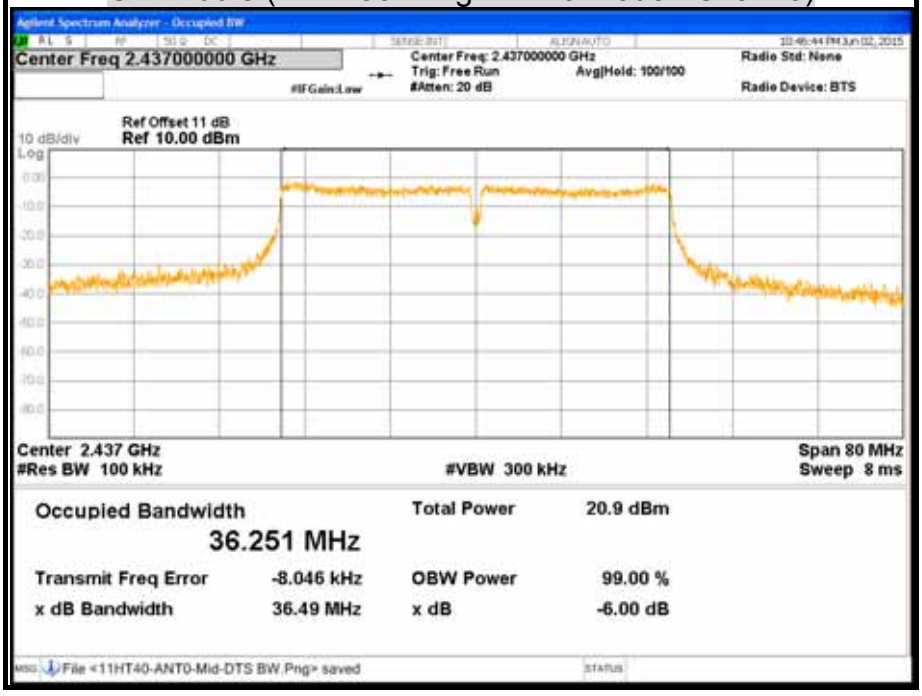
CH Low (IEEE 802.11gn HT40 Mode / Chain 0)



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



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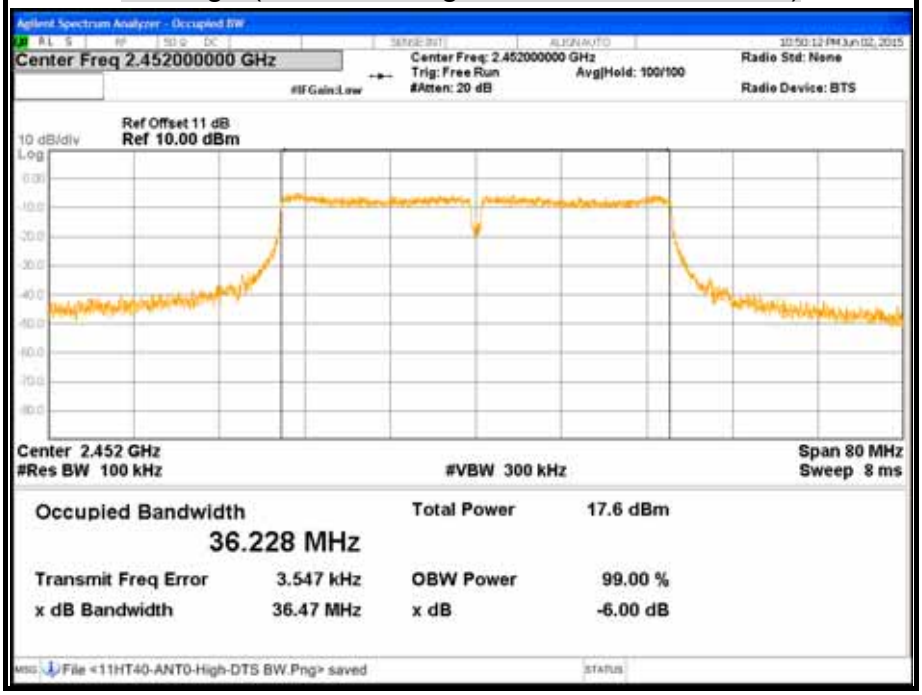
CH High (IEEE 802.11gn HT40 Mode / Chain 0)



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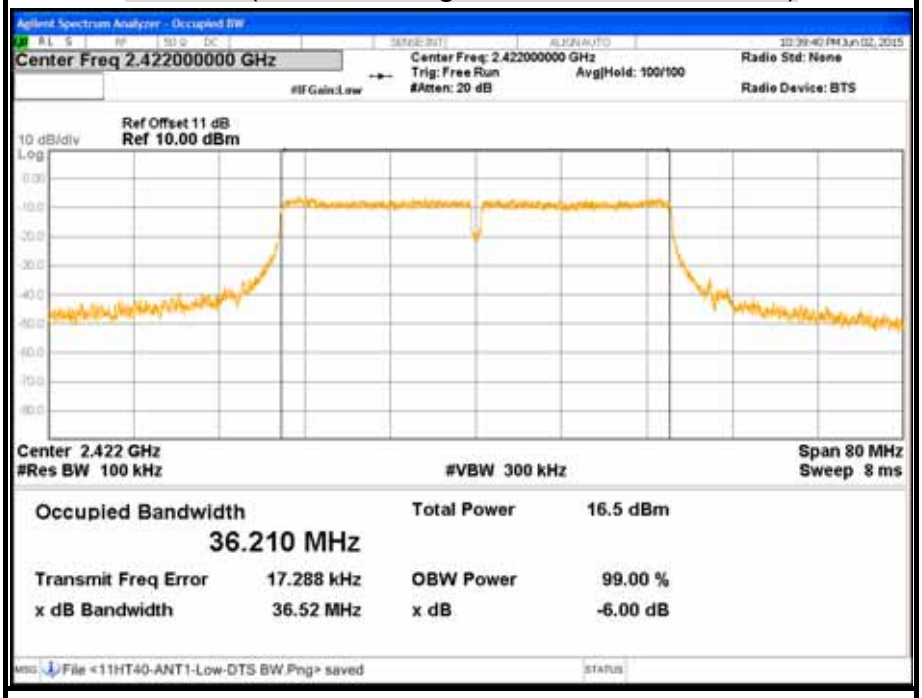
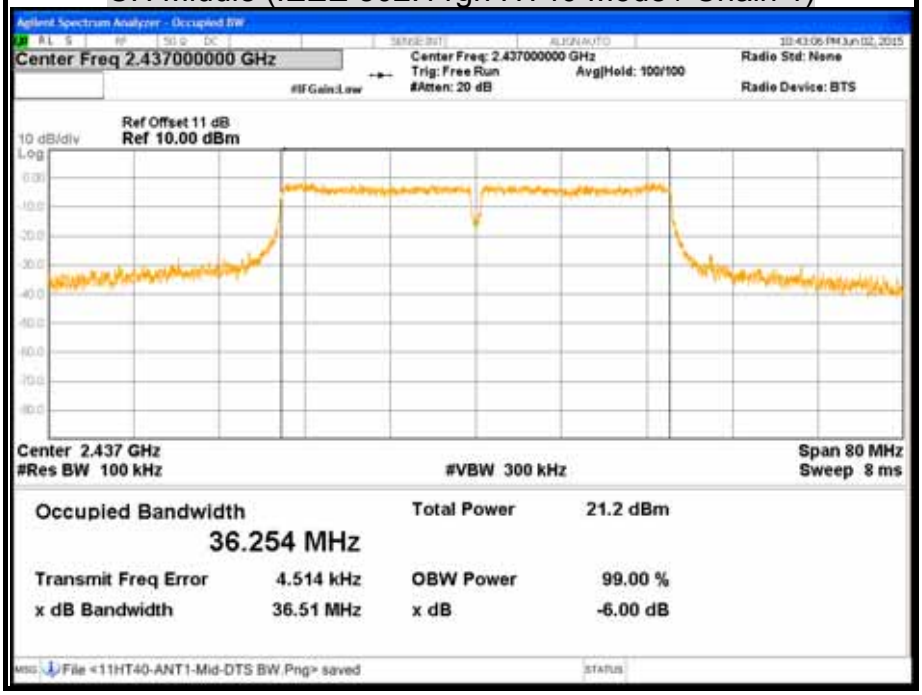
CH Low (IEEE 802.11gn HT40 Mode / Chain 1)



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



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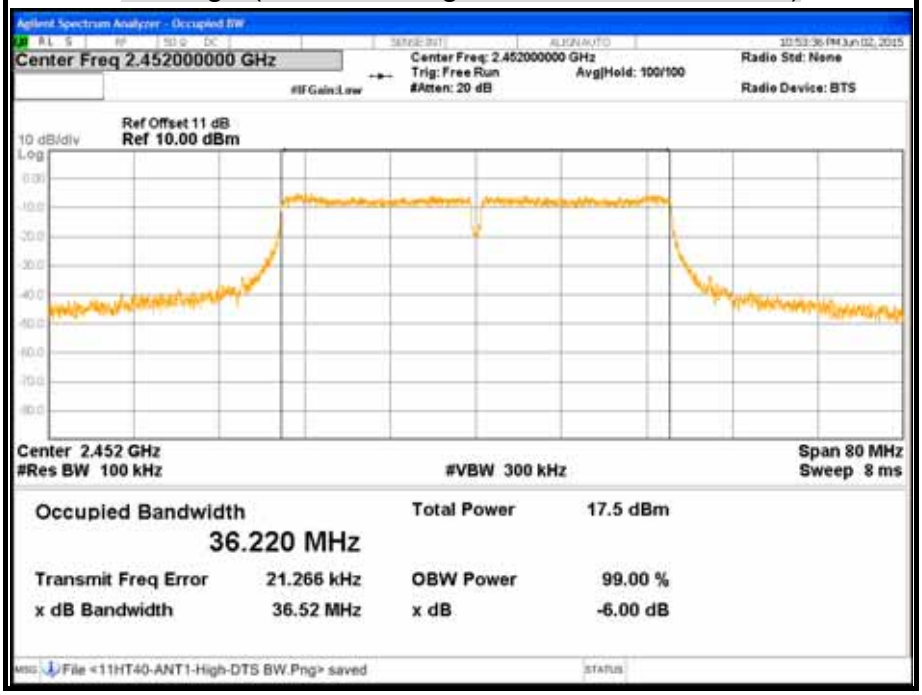
CH High (IEEE 802.11gn HT40 Mode / Chain 1)



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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} ;

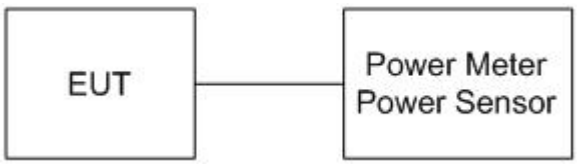
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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 (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2412	16.51	15.53	19.06	0.0805	30	1	PASS
Middle	2437	15.62	15.18	18.42	0.0695	30	1	PASS
High	2462	14.62	14.43	17.54	0.0568	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for NANT ≤ 4, power limit do not reduce.*
4. *Total peak power = Chain 0 + Chain 1.*

IEEE 802.11g Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2412	23.51	22.13	25.88	0.3873	30	1	PASS
Middle	2437	23.49	22.79	26.16	0.4130	30	1	PASS
High	2462	22.94	22.94	25.95	0.3936	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for NANT ≤ 4, power limit do not reduce.*
4. *Total peak power = Chain 0 + Chain 1.*

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IEEE 802.11gn HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2412	22.71	21.36	25.10	0.3236	30	1	PASS
Middle	2437	23.25	22.31	25.82	0.3819	30	1	PASS
High	2462	21.95	21.44	24.71	0.2958	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.
3. Array gain = 0 dB for NANT ≤ 4, power limit do not reduce.
4. Total peak power = Chain 0 + Chain 1.

IEEE 802.11gn HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2422	21.03	19.71	23.43	0.2203	30	1	PASS
Middle	2437	23.02	22.42	25.74	0.3750	30	1	PASS
High	2452	21.06	20.53	23.81	0.2404	30	1	PASS

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.
3. Array gain = 0 dB for NANT ≤ 4, power limit do not reduce.
4. Total peak power = Chain 0 + Chain 1.

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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 (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Average Power Total (dBm)
		Chain 0	Chain 1	
Low	2412	13.02	12.09	15.59
Middle	2437	12.11	11.77	14.95
High	2462	11.08	10.97	14.04

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

IEEE 802.11g Mode (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Average Power Total (dBm)
		Chain 0	Chain 1	
Low	2412	16.00	14.72	18.42
Middle	2437	16.42	16.24	19.34
High	2462	15.85	15.22	18.56

Remark:
1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 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 (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Average Power Total (dBm)
		Chain 0	Chain 1	
Low	2412	14.62	13.45	17.08
Middle	2437	16.14	15.58	18.88
High	2462	13.98	13.60	16.80

Remark:

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

IEEE 802.11gn HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Average Power Total (dBm)
		Chain 0	Chain 1	
Low	2422	12.09	11.23	14.69
Middle	2437	15.49	15.52	18.52
High	2452	12.58	12.10	15.36

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 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

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 (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2412	-11.38	-10.74	-8.04	8	PASS
Middle	2437	-11.34	-11.35	-8.33	8	PASS
High	2462	-11.70	-12.53	-9.08	8	PASS

Remark:

1. *At finial test to get the worst-case emission at 1Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The Directional gain = 4.57dBi which is less than 6dBi, the limit should be 8dBm.*
4. *Total power spectral density = Chain 0 + Chain 1*

.

IEEE 802.11g Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2412	-7.31	-6.71	-3.99	8	PASS
Middle	2437	-5.17	-5.13	-2.14	8	PASS
High	2462	-7.26	-6.64	-3.93	8	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The Directional gain = 4.57dBi which is less than 6dBi, the limit should be 8dBm.*
4. *Total power spectral density = Chain 0 + Chain 1.*

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IEEE 802.11gn HT20 Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2412	-7.06	-7.13	-4.08	8	PASS
Middle	2437	-4.67	-5.13	-1.88	8	PASS
High	2462	-6.67	-6.12	-3.38	8	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.
3. The Directional gain = 4.57dBi which is less than 6dBi, the limit should be 8dBm.
4. Total power spectral density = Chain 0 + Chain 1.

IEEE 802.11gn HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2422	-12.76	-11.85	-9.27	8	PASS
Middle	2437	-8.64	-7.92	-5.26	8	PASS
High	2452	-12.35	-11.23	-8.74	8	PASS

Remark:

1. At finial test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 11dB (including 10 dB pad and 1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.
3. The Directional gain = 4.57dBi which is less than 6dBi, the limit should be 8dBm.
4. Total power spectral density = Chain 0 + Chain 1.

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POWER SPECTRAL DENSITY

CH Low (IEEE 802.11b Mode / Chain 0)

CH Middle (IEEE 802.11b Mode / Chain 0)

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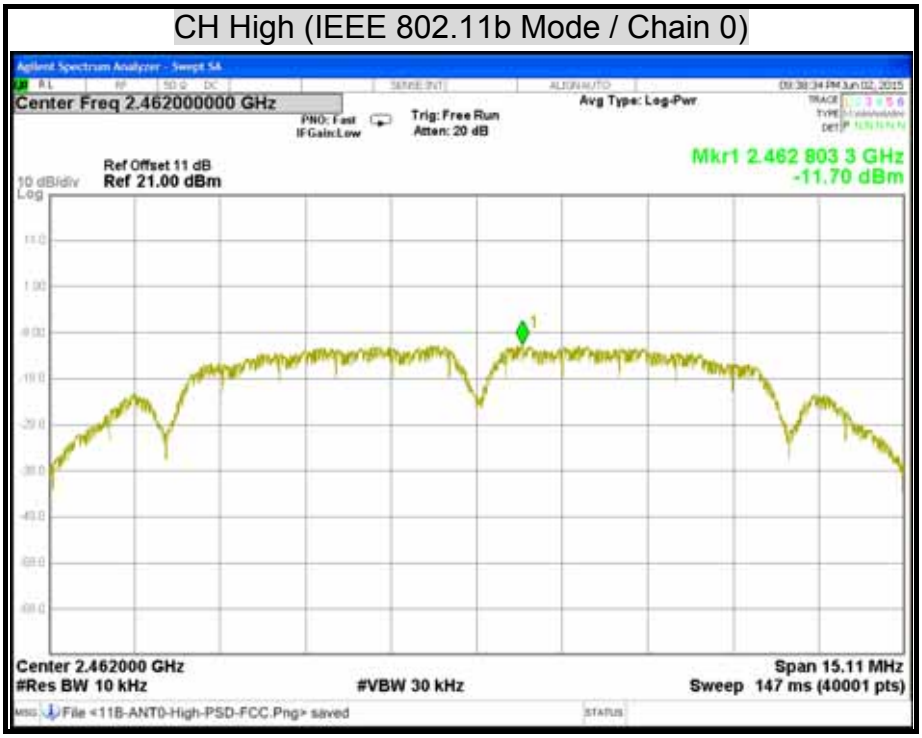
CH High (IEEE 802.11b Mode / Chain 0)



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CH Low (IEEE 802.11b Mode / Chain 1)

CH Middle (IEEE 802.11b Mode / Chain 1)

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CH High (IEEE 802.11b Mode / Chain 1)

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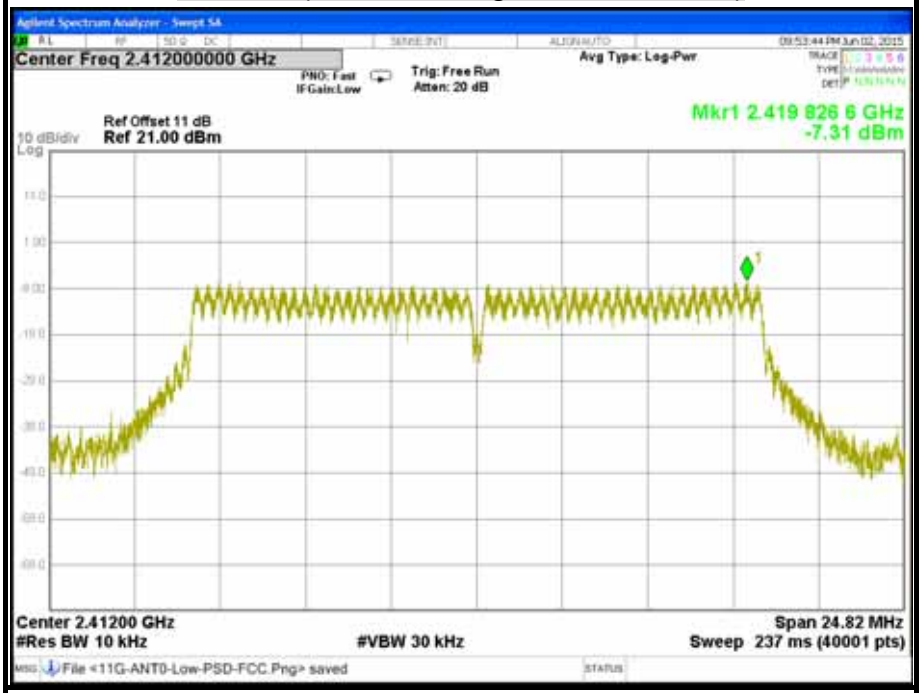
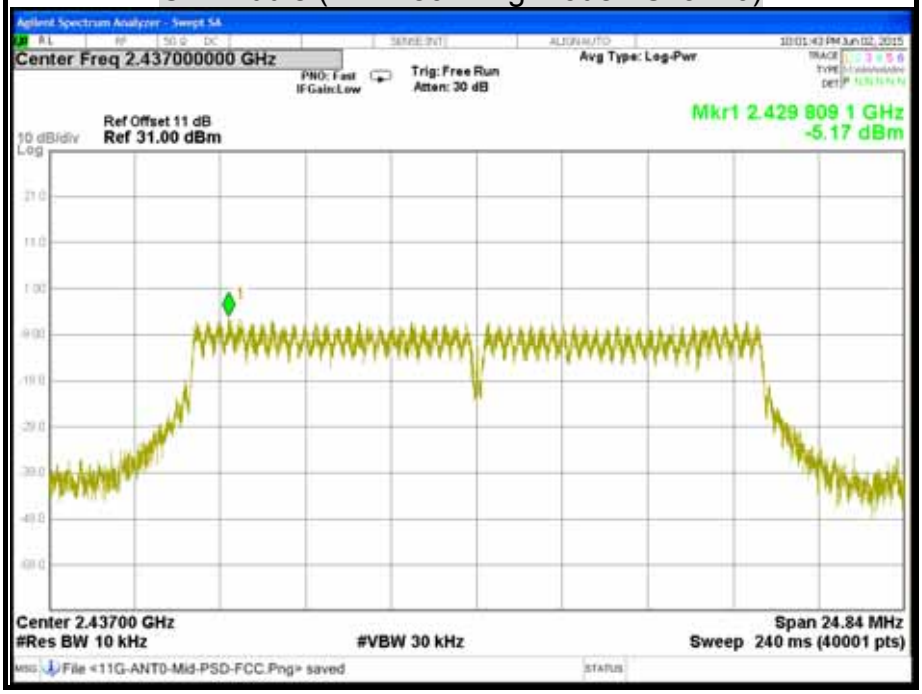
CH Low (IEEE 802.11g Mode / Chain 0)



CH Middle (IEEE 802.11g Mode / Chain 0)



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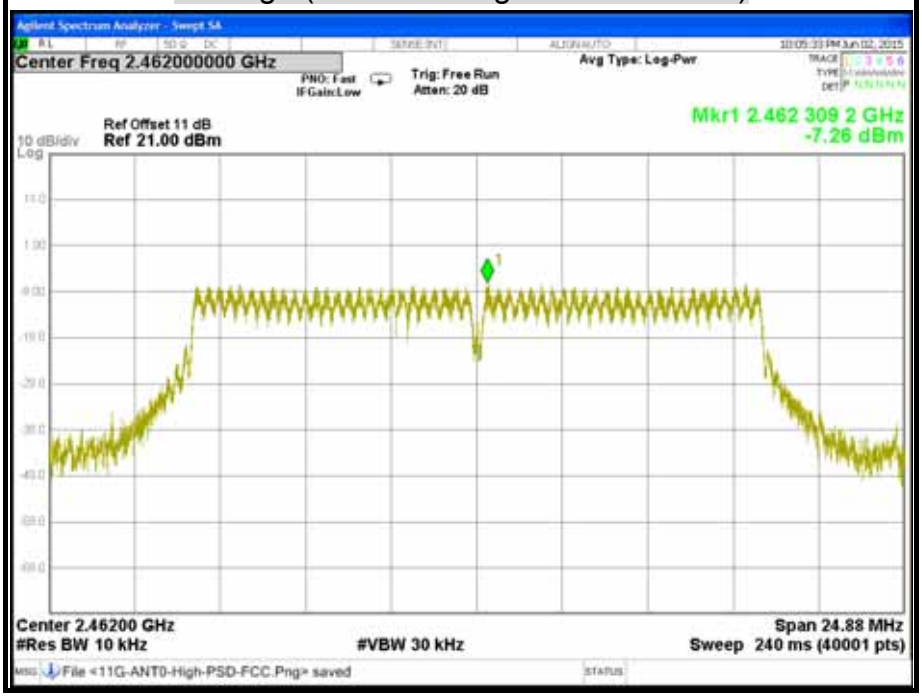
CH High (IEEE 802.11g Mode / Chain 0)



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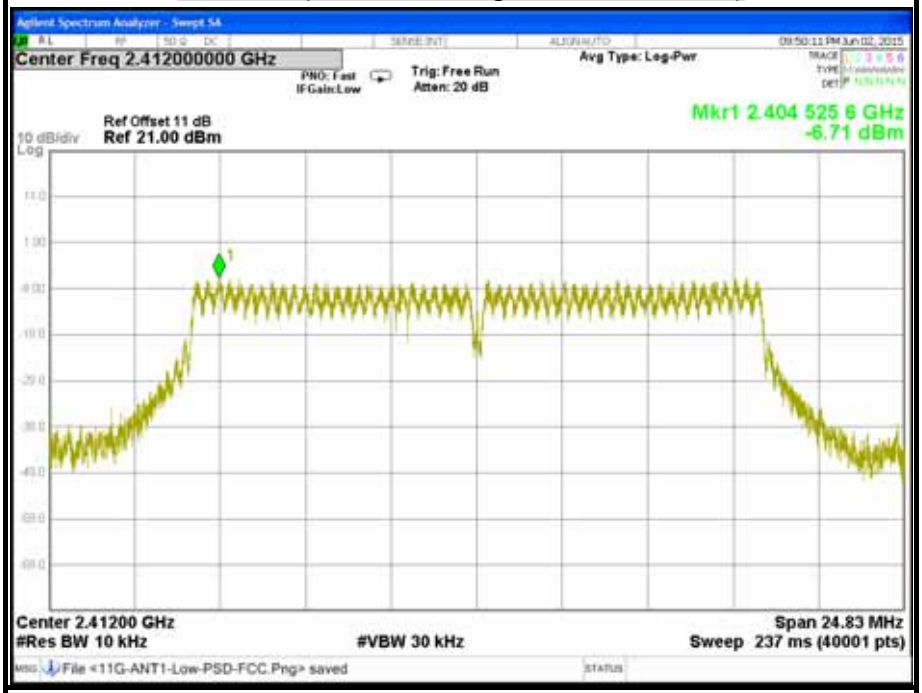
CH Low (IEEE 802.11g Mode / Chain 1)



CH Middle (IEEE 802.11g Mode / Chain 1)

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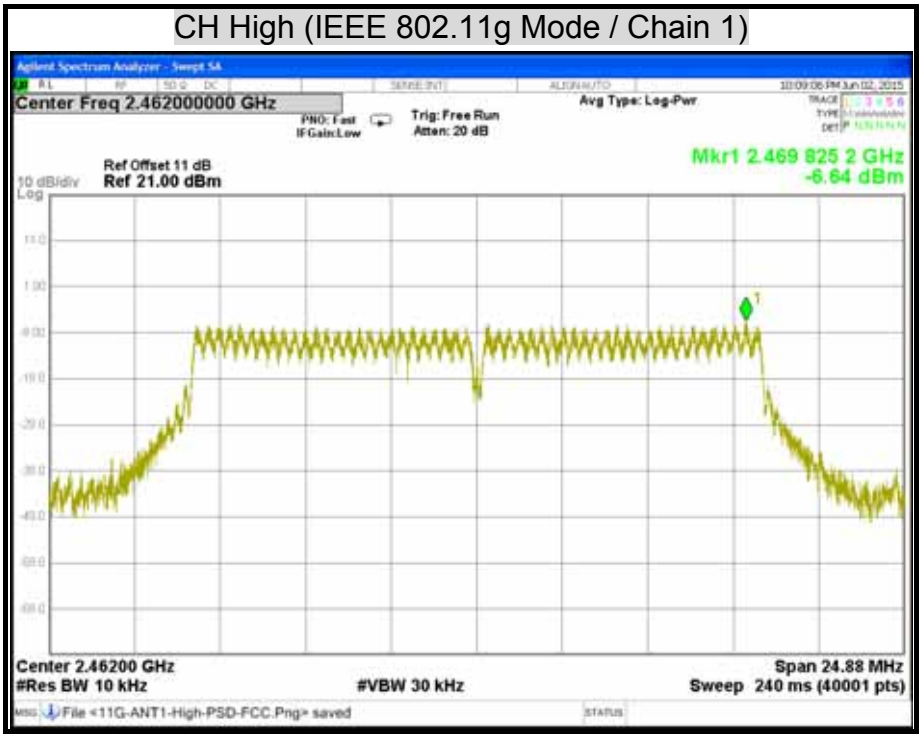
CH High (IEEE 802.11g Mode / Chain 1)



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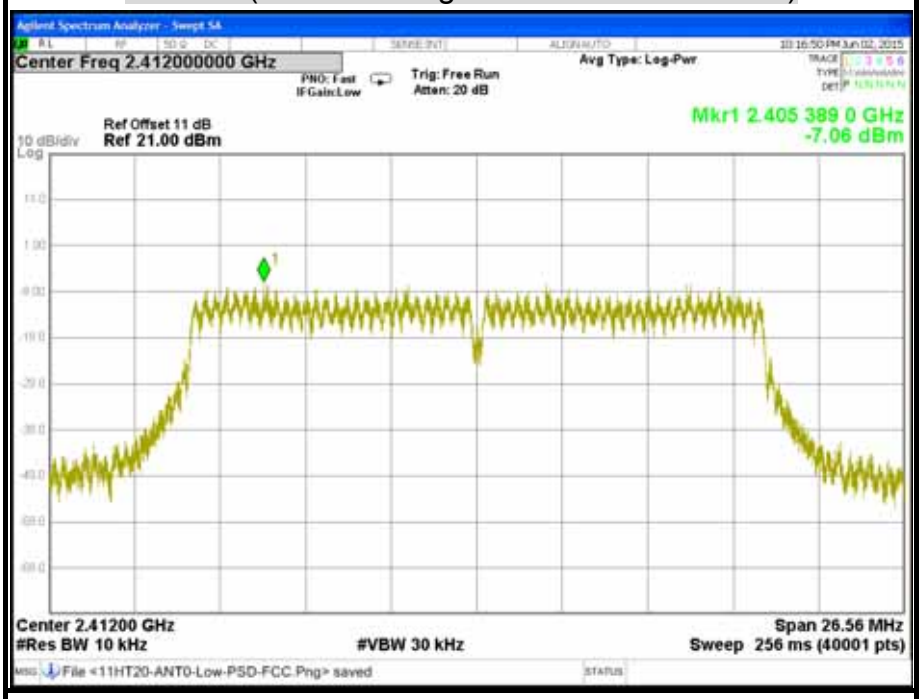
CH Low (IEEE 802.11gn HT20 Mode / Chain 0)



CH Middle (IEEE 802.11gn HT20 Mode / Chain 0)

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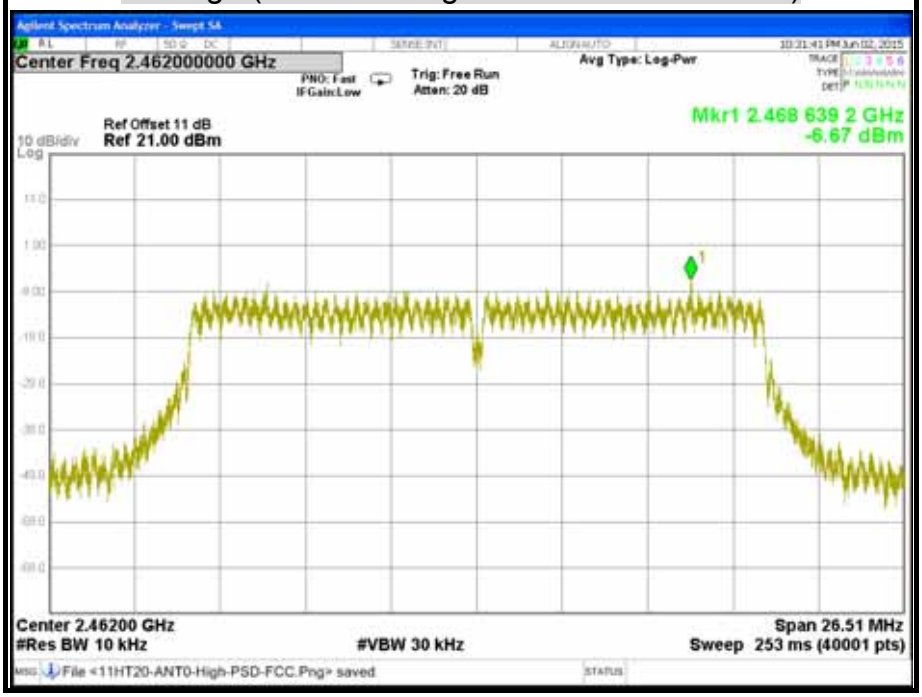
CH High (IEEE 802.11gn HT20 Mode / Chain 0)



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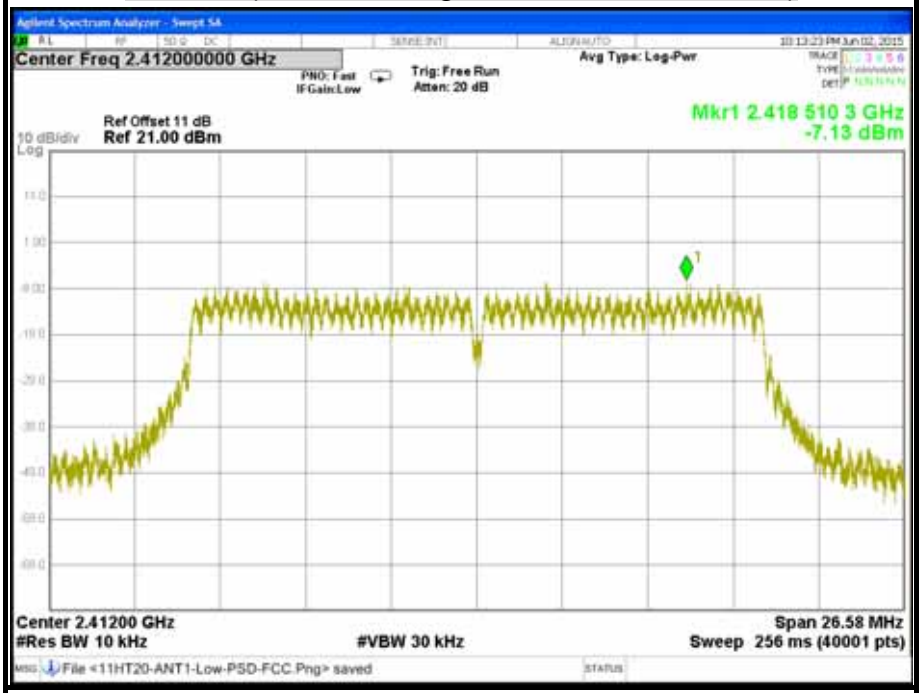
CH Low (IEEE 802.11gn HT20 Mode / Chain 1)



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

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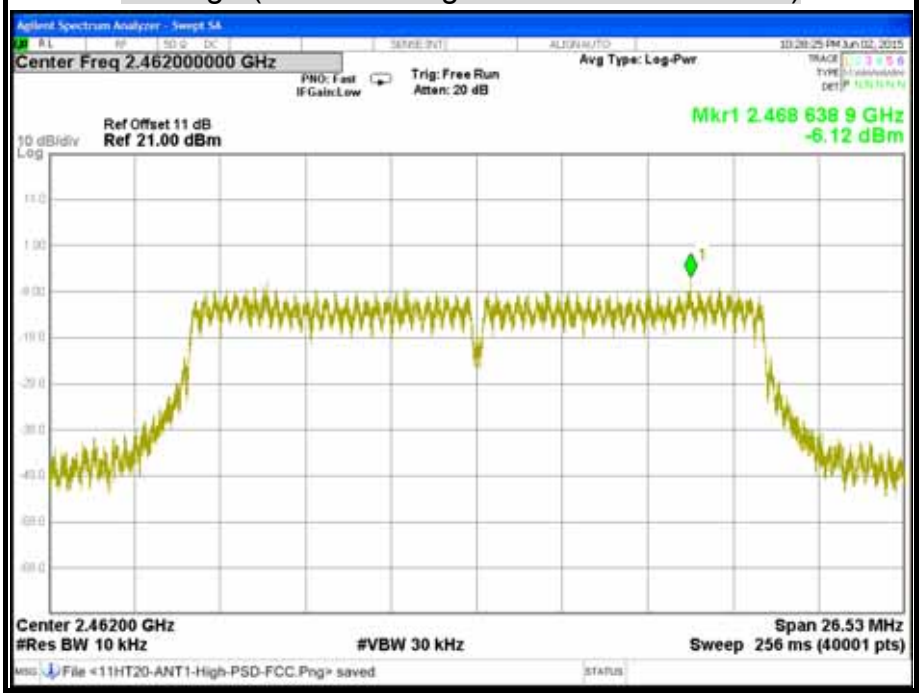
CH High (IEEE 802.11gn HT20 Mode / Chain 1)



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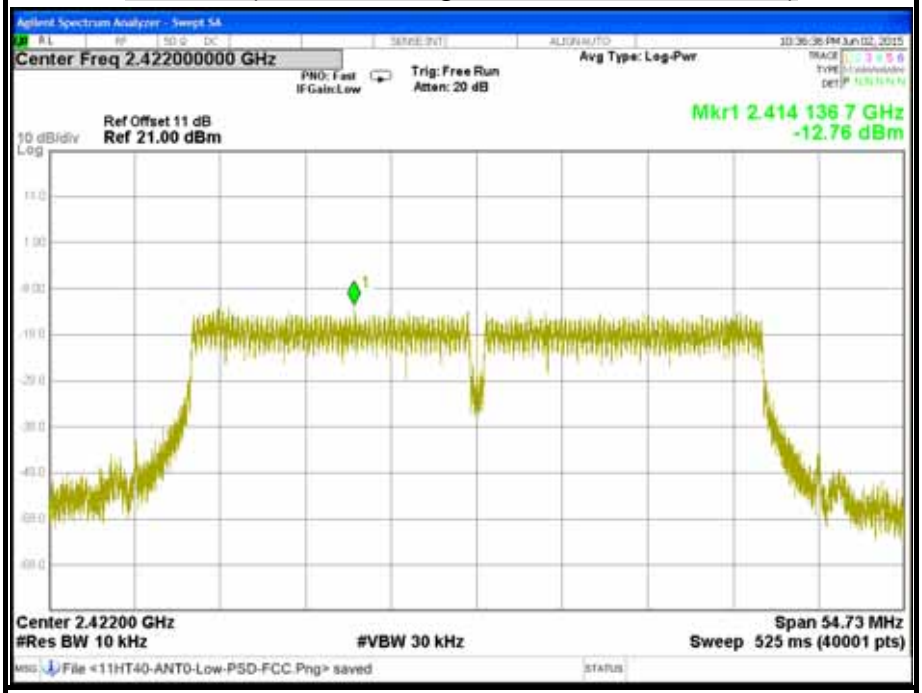
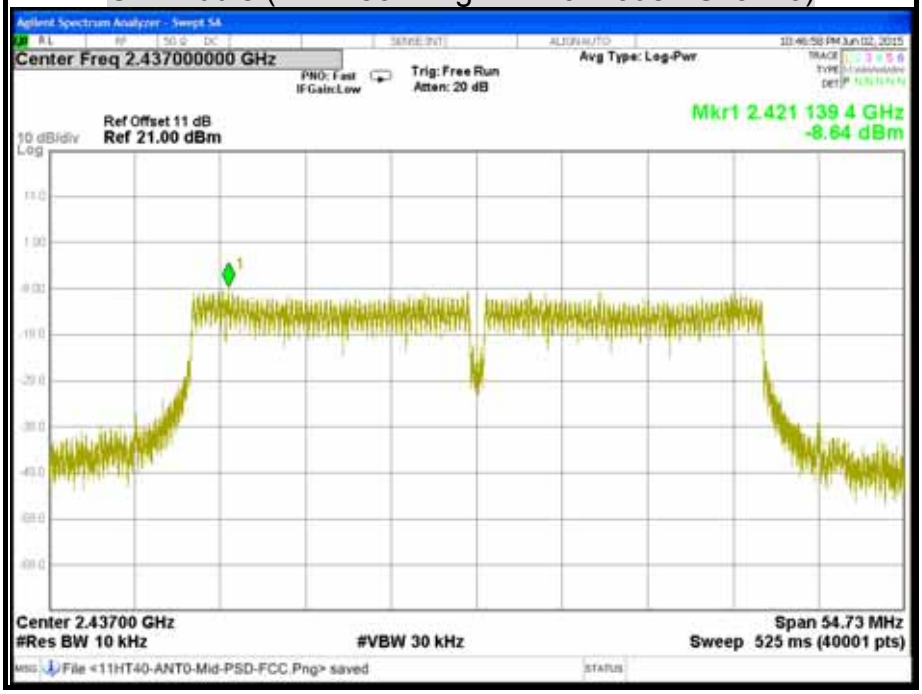
CH Low (IEEE 802.11gn HT40 Mode / Chain 0)



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



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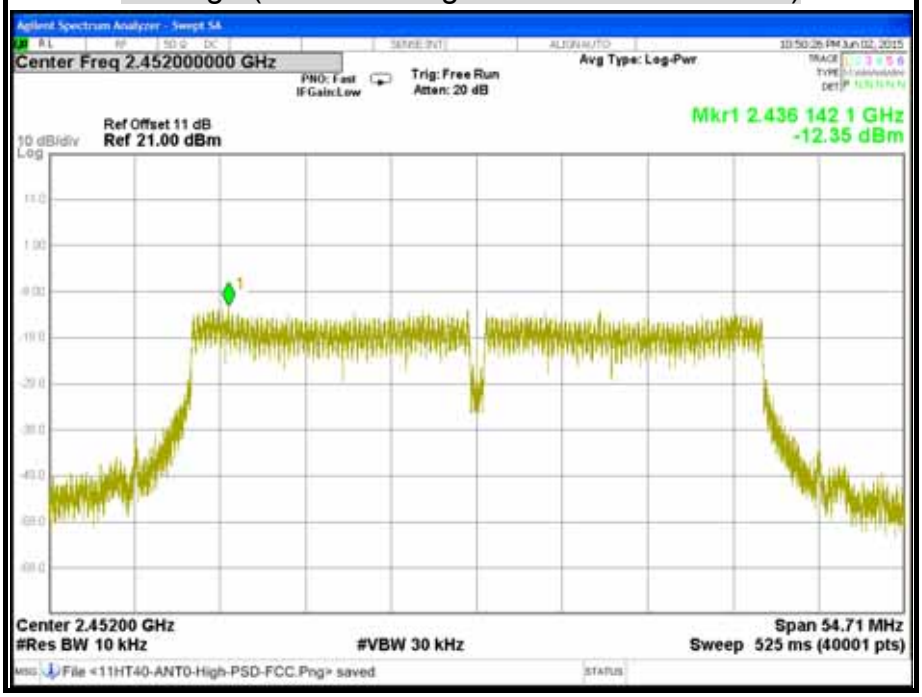
CH High (IEEE 802.11gn HT40 Mode / Chain 0)



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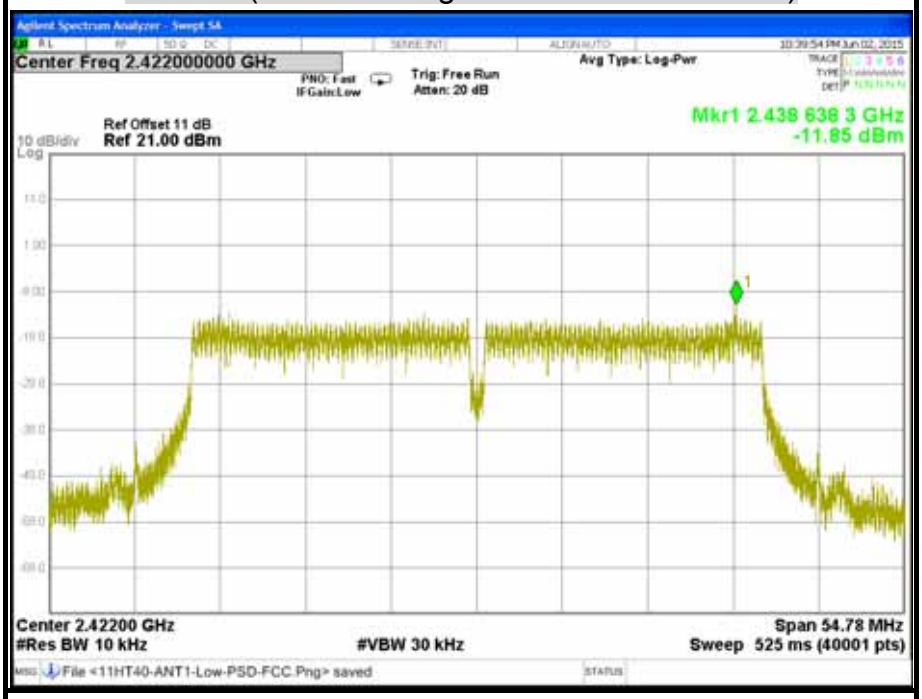
CH Low (IEEE 802.11gn HT40 Mode / Chain 1)



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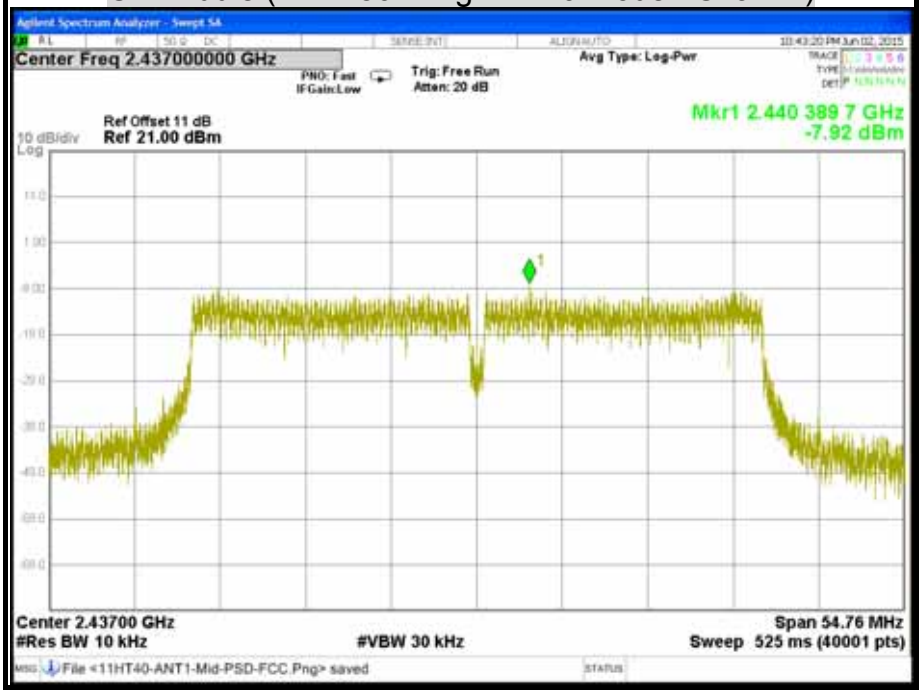

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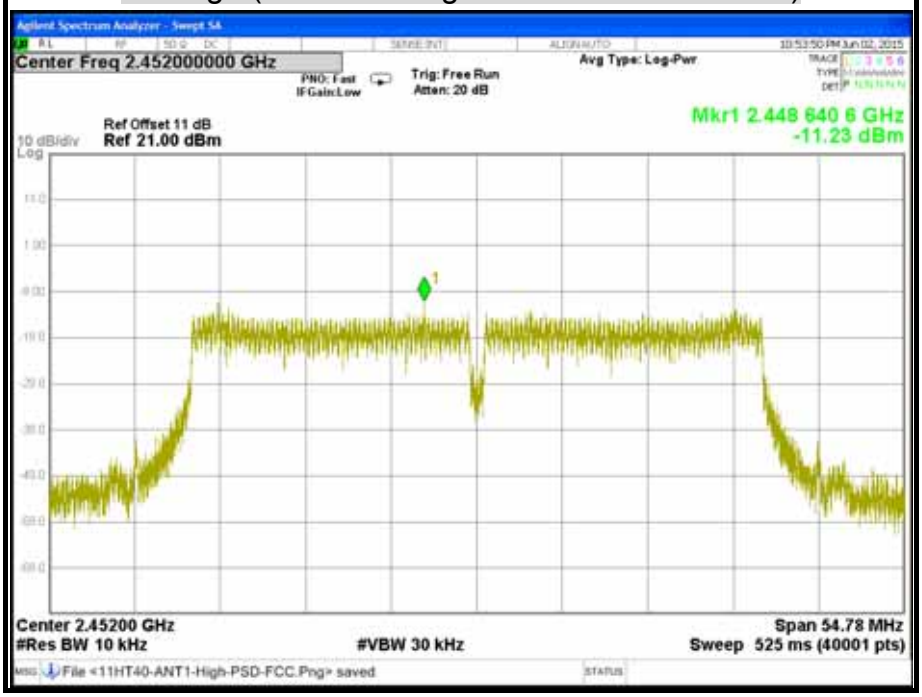
CH High (IEEE 802.11gn HT40 Mode / Chain 1)



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