

FCC PART 15 SUBPART C TEST REPORT**FCC PART 15.247****Report Reference No.....:** MWR151225105**FCC ID.....:** 2AAJDX5

Compiled by

(position+printed name+signature)....: File administrators Martin Ao

Supervised by

(position+printed name+signature)....: Test Engineer Yuchao Wang

Approved by

(position+printed name+signature)....: Manager Dixon Hao

Date of issue.....: Jan. 14, 2016

Representative Laboratory Name : Maxwell International Co., Ltd.

Address: Room 509, Hongfa center building, Baoan District, Shenzhen, Guangdong, China

Testing Laboratory Name Shenzhen CTL Testing Technology Co., Ltd.

Address: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

Applicant's name.....: ETOWAY TECHNOLOGY CO.,LTD.

Address: Room 1005, Building A, Stars Plaza, #38 Hongli Road, Futian, Shenzhen, China

Test specification

Standard: FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

TRF Originator.....: Maxwell International Co., Ltd.

Maxwell International Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Maxwell International Co., Ltd. as copyright owner and source of the material. Maxwell International Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description Mobile Phone

Trade Mark: MOVILSER

Manufacturer.....: ETOWAY TECHNOLOGY CO.,LTD.

Model/Type reference.....: X5

Listed Models: X51, X52, X53, X54, X55, X56, X57, X58, X59

Modulation Type: DSSS(CCK,DQPSK,DBPSK),OFDM(64QAM,16QAM,QPSK, BPSK)

Operation Frequency.....: From 2412MHz to 2462MHz

Rating: DC 3.70V

Hardware version: A825_324_AX_LJ_A9_MOVILSER_B2B5_V1.01_20151219

Software version: T825-A-V1.1

Result.....: **PASS**

TEST REPORT

Test Report No. :	MWR151225105	Jan. 14, 2016
		Date of issue

Equipment under Test : Mobile Phone

Model /Type : X5

Listed Models : X51, X52, X53, X54, X55, X56, X57, X58, X59

Applicant : **ETOWAY TECHNOLOGY CO.,LTD.**

Address : Room 1005, Building A, Stars Plaza, #38 Hongli Road, Futian, Shenzhen, China

Manufacturer : **ETOWAY TECHNOLOGY CO.,LTD.**

Address : Room 1005, Building A, Stars Plaza, #38 Hongli Road, Futian, Shenzhen, China

Test Result:	PASS
---------------------	-------------

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

<u>1</u>	<u>TEST STANDARDS</u>	4
<u>2</u>	<u>SUMMARY</u>	5
2.1	General Remarks	5
2.2	Product Description	5
2.3	Equipment Under Test	6
2.4	Description of the test mode	6
2.5	Short description of the Equipment under Test (EUT)	6
2.6	EUT operation mode	7
2.7	EUT configuration	8
2.8	Internal Identification of AE used during the test	8
2.9	Related Submittal(s) / Grant (s)	8
2.10	Modifications	8
2.11	Test Environments	8
<u>3</u>	<u>TEST ENVIRONMENT</u>	9
3.1	Address of the test laboratory	9
3.2	Test Facility	9
3.3	Environmental conditions	9
3.4	Test Description	9
3.5	Summary of measurement results	10
3.6	Equipments Used during the Test	11
<u>4</u>	<u>TEST CONDITIONS AND RESULTS</u>	12
4.1	AC Power Conducted Emission	12
4.2	Radiated Emission	15
4.3	Maximum Output Power	21
4.4	Power Spectral Density	23
4.5	Band Edge Compliance of RF Emission	错
误!未定义书签。		
4.6	Spurious RF Conducted Emission	32
4.7	6dB Bandwidth	74
4.8	Antenna Requirement	84
<u>5</u>	<u>TEST SETUP PHOTOS OF THE EUT</u>	85
<u>6</u>	<u>EXTERNAL PHOTOS OF THE EUT</u>	85
<u>7</u>	<u>INTERNAL PHOTOS OF THE EUT</u>	85

1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10:2009](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB558074 D01 V03](#): Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Dec. 25, 2015
Testing commenced on	:	Jan. 12, 2016
Testing concluded on	:	Jan. 13, 2016

2.2 Product Description

The **ETOWAY TECHNOLOGY CO.,LTD.**'s Model: X5 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Mobile Phone
Model Number	X5
Modulation Type	GMSK for GSM/GPRS, 8-PSK for EDGE, QPSK for UMTS
Antenna Type	Internal
UMTS Operation Frequency Band	Device supported UMTS FDD Band II/V
WLAN FCC Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11n HT40:2422-2452MHz
BT FCC Operation frequency	2402MHz-2480MHz
HSDPA Release Version	Release 10
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
WCDMA Release Version	R99
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
BT Modulation Type	GFSK,8DPSK,π/4DQPSK(BT 3.0+EDR)
Hardware version	A825_324_AX_LJ_A9_MOVILSER_B2B5_V1.01_20151219
Software version	T825-A-V1.1
Android version	Android 4.4.2
GPS function	Supported
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Supported BT 4.0/BT 3.0+EDR
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GSM/EDGE/GPRS Operation Frequency	GSM850 :824.2MHz-848.8MHz/PCS1900:1850.2MHz-1909.8MHz
GSM/EDGE/GPRS Operation Frequency Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
GSM Release Version	R99
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.15VDC to 4.25VDC (nominal: 3.70VDC)
GPRS operation mode	Class B

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/>	120V / 60 Hz	<input type="radio"/>	115V / 60Hz
		<input type="radio"/>	12 V DC	<input type="radio"/>	24 V DC
		<input checked="" type="radio"/>	Other (specified in blank below)		

DC 3.70V

2.4 Description of the test mode

IEEE 802.11b/g/n: The product support Third channels but only use Eleventh channels in USA.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

2.5 Short description of the Equipment under Test (EUT)

2.5.1 General Description

X5 is subscriber equipment in the WCDMA/GSM system. The HSPA/UMTS frequency band is Band I,Band II , Band Vand Band VIII; The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only Band II and Band V and GSM850 and PCS1900 bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and SIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

2.5.2 Test Modes

Test Case	Test Conditions	
	Configuration	Description
DTS (6 dB) Bandwidth	Measurement Method	FCC KDB 558074 §8.2 Option 2
	Test Environment	NTNV
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H
	Measurement Method	FCC KDB 558074§9.1.2
Maximum Peak Conducted Output Power	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H
	Measurement Method	FCC KDB 558074 §10.2 (peak PSD).
Maximum Power Spectral Density Level	Test Environment	NTNV
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H
	Measurement Method	FCC KDB 558074§11.0.
Unwanted Emissions into Non-	Measurement Method	FCC KDB 558074§11.0.

Restricted Frequency Bands	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H
Unwanted Emissions into Restricted Frequency Bands (Conducted)	Measurement Method	FCC KDB 558074§12.2, Conducted (antenna-port).
	Test Environment	NTNV
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H
Unwanted Emissions into Restricted	Measurement Method	FCC KDB 558074§12.1, Radiated(cabinet/case emissions with Impedance matching for antenna-port).
	Test Environment	NTNV
	EUT Configuration	11b_L,11b_M,11b_H 11g_L,11g_M,11g_H 11n HT20_L, 11n HT20_M, 11n HT20_H 11n HT40_L, 11n HT40_M, 11n HT40_H

Test Case	Test Conditions	
	Configuration	Description
AC Power Line Conducted Emissions	Measurement Method	AC mains conducted.
	Test Environment	NTNV
	EUT Configuration	11g_M (Worst Conf.).

Note: 1. For Radiated Emissions, By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

2. Typical working modes for each IEEE 802.11 mode are selected to perform tests. The manufacturer provide special test software to control TX duty cycle >98% for TX test; recorded worst case at difference data rate as follows:

Test Mode	Test Modes Description
11b	IEEE 802.11b with data rate of 1 Mbps using SISO mode.
11g	IEEE 802.11g with data rate of 6 Mbps using SISO mode.
11n HT20	IEEE 802.11n with data rate of MCS0 and bandwidth of 20MHz using SISO mode.
11n HT40	IEEE 802.11n with data rate of MCS7 and bandwidth of 40MHz using SISO mode.

2.6 EUT operation mode

Test Mode	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]
11b	L	Ch No. 1 / 2412MHz	---	20
	M	Ch No. 6 / 2437 MHz	---	20
	H	Ch No. 11/ 2462MHz	---	20
11g	L	Ch No. 1 / 2412MHz	---	20
	M	Ch No. 6 / 2437 MHz	---	20
	H	Ch No. 11/ 2462MHz	---	20
11n HT20	L	Ch No. 1 / 2412MHz	---	20
	M	Ch No. 6 / 2437 MHz	---	20
	H	Ch No. 11/ 2462MHz	---	20
11n HT40	L	Ch No. 3/ 2422MHz	---	40
	M	Ch No. 6 / 2437 MHz	---	40
	H	Ch No. 9/ 2452 MHz	---	40

2.7 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
<input type="radio"/>	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Internal Identification of AE used during the test

AE ID*	Description
AE1	Charger

AE1
 Model: X5
 INPUT: AC180-240V~ 50/60Hz 0.12A
 OUTPUT: DC 5.0V 1000mA

*AE ID: is used to identify the test sample in the lab internally.

2.9 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: FCC ID: 2AAJDX5** filing to comply with FCC Part 15.247 Rules

2.10 Modifications

No modifications were implemented to meet testing criteria.

2.11 Test Environments

NOTE: The values used in the test report maybe stringent than the declared.

Environment Parameter	Selected Values During Tests		
NTNV	Temperature	Voltage	Relative Humidity
	Ambient	3.8VDC	Ambient

1. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	✓	—	—	—
802.11g	✓	—	—	—
802.11n HT20	✓	—	—	—
802.11n HT40	✓	—	—	—

2. The EUT incorporates a SISO function, Physically, the EUT provides one completed transmitter and one completed receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n HT20	1TX
802.11n HT40	1TX

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

Test Item	FCC Part No.	Requirements	Verdict
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz.	PASS
Maximum Peak Conducted Output Power	15.247(b)(3)	For directional gain:< 30dBm – (G[dBi] –6 [dB]),peak; Otherwise :< 30dBm, peak.	PASS
Maximum Power Spectral Density Level	15.247(e)	For directional gain :< 8dBm/3 kHz – (G[dBi] –6[dB]), peak. Otherwise :< 8dBm/3 kHz, peak.	PASS
Band Edges Compliance	15.247(d)	< -20dB/100 kHz if total peak power \leq power limit.	PASS
Unwanted Emissions into Non-Restricted Frequency Bands	15.247(d)	< -20dB/100 kHz if total peak power \leq power limit.	PASS
Unwanted Emissions into Restricted Frequency Bands (Conducted)	15.247(d) 15.209	< -20dB/100 kHz if total peak power \leq power limit.	PASS
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209	FCC Part 15.209 field strength limit;	PASS
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	PASS

Remark: The measurement uncertainty is not included in the test result.

3.5 Summary of measurement results

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Pass	Fail	NA	NP	Remark
§15.247(b)(4)	Antenna gain	802.11b	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(e)	Power spectral density	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(a)(1)	Spectrum bandwidth – 6 dB bandwidth	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(b)(1)	Maximum output power	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d)	Band edge compliance conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.205	Band edge compliance radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d)	TX spurious emissions conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d)	TX spurious emissions radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	802.11b	<input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11b	-/-	802.11b	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11b	-/-	802.11b	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

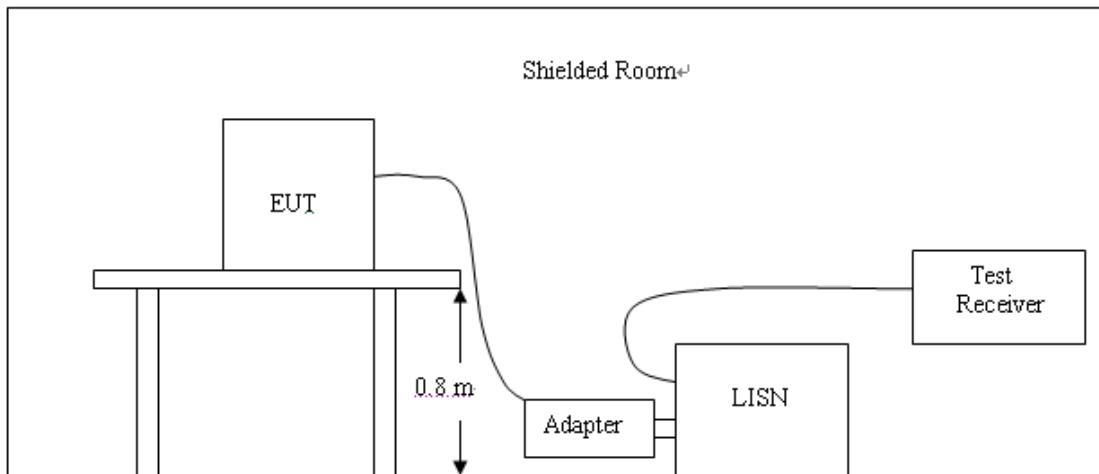
3.6 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	N9030A	MY49430428	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Temperature/ Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2015/06/02	2016/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2015/06/02	2016/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2015/06/02	2016/06/01
RF Cable	Megalon	RF-A303	N/A	2015/06/02	2016/06/01
Power Sensor	R&S	NRP-Z4	823.3618.03	2015.06.02	2016.06.01
Power Meter	R&S	NRVS	1020.1809.02	2015.06.02	2016.06.01

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2. Support equipment, if needed, was placed as per ANSI C63.10-2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4. The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following:

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

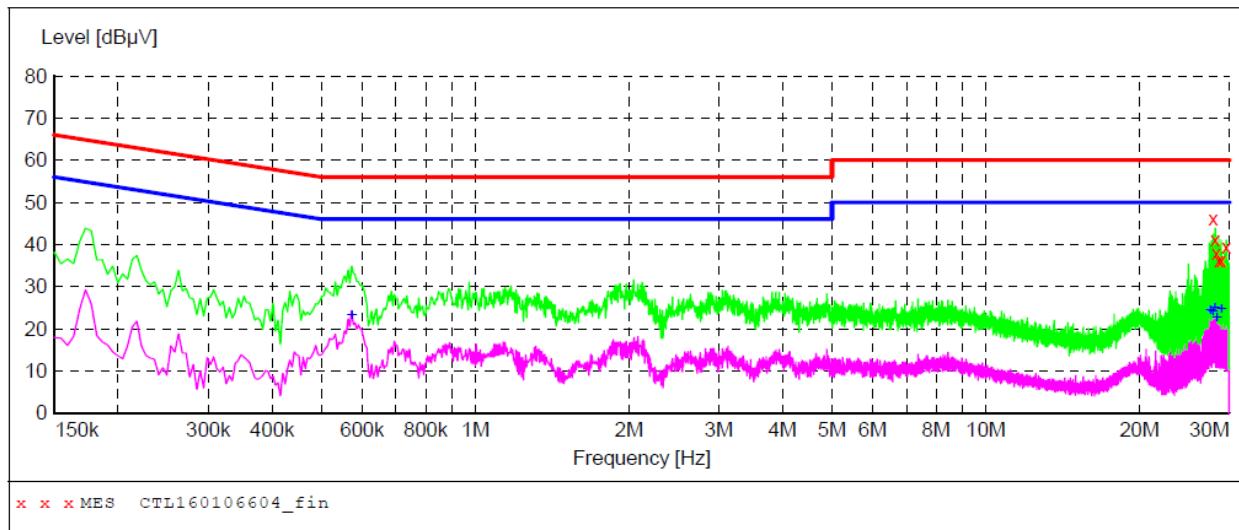
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

The AC Power Conducted Emission measurement is performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode, the middle channel) is the worst case for all the test modes and channels.

L:

SCAN TABLE: "Voltage (9K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160106604_fin"

1/6/2016 9:10AM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
27.915001	46.10	11.2	60	13.9	QP	L1	GND
28.158001	41.10	11.2	60	18.9	QP	L1	GND
28.275001	37.90	11.2	60	22.1	QP	L1	GND
28.639501	36.10	11.2	60	23.9	QP	L1	GND
28.936501	36.10	11.2	60	23.9	QP	L1	GND
29.598001	39.40	11.3	60	20.6	QP	L1	GND

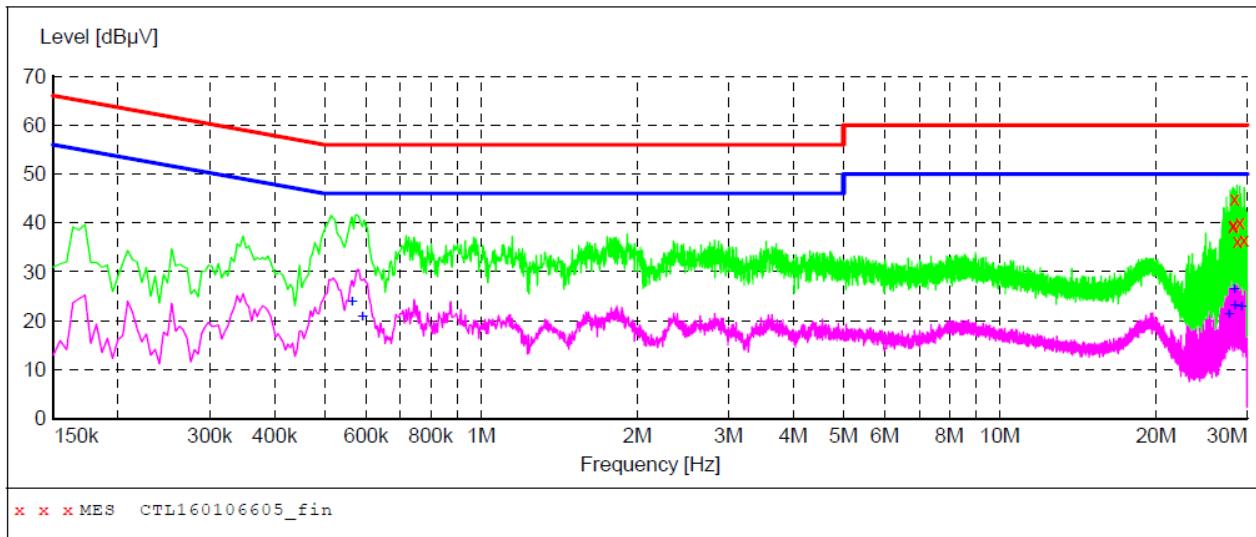
MEASUREMENT RESULT: "CTL160106604_fin2"

1/6/2016 9:10AM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.573001	23.20	10.2	46	22.8	AV	L1	GND
27.555001	24.20	11.2	50	25.8	AV	L1	GND
27.856501	24.10	11.2	50	25.9	AV	L1	GND
28.099501	24.80	11.2	50	25.2	AV	L1	GND
28.396501	22.50	11.2	50	27.5	AV	L1	GND
28.999501	24.40	11.2	50	25.6	AV	L1	GND

N:

SCAN TABLE: "Voltage (9K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL160106605_fin"

1/6/2016 9:20AM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
28.158001	39.30	11.2	60	20.7	QP	N	GND
28.216501	39.70	11.2	60	20.3	QP	N	GND
28.338001	45.00	11.2	60	15.0	QP	N	GND
28.702501	36.20	11.2	60	23.8	QP	N	GND
29.062501	40.00	11.2	60	20.0	QP	N	GND
29.598001	36.60	11.3	60	23.4	QP	N	GND

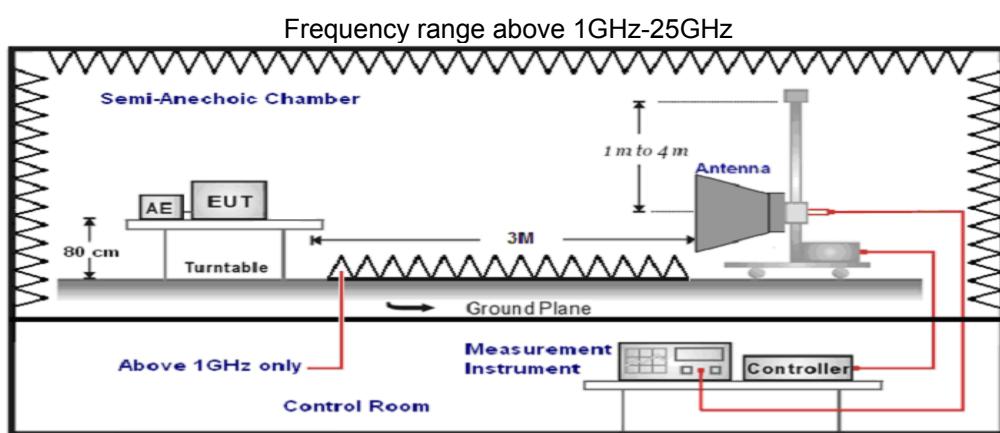
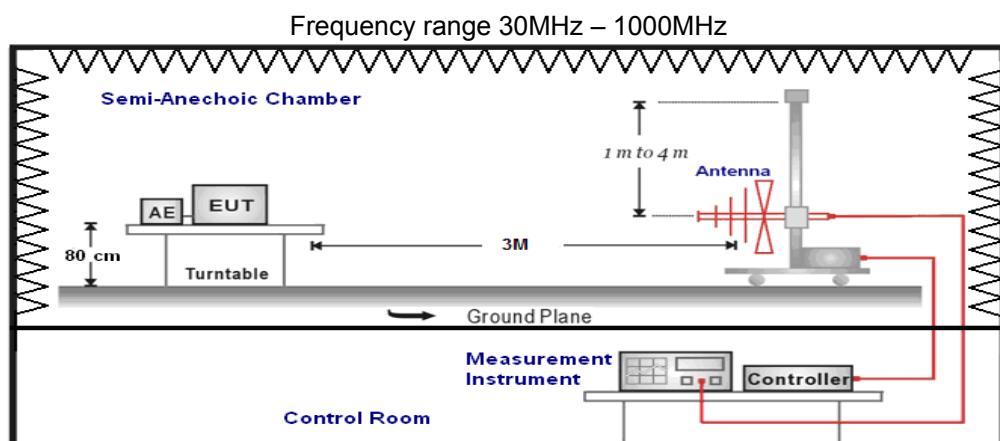
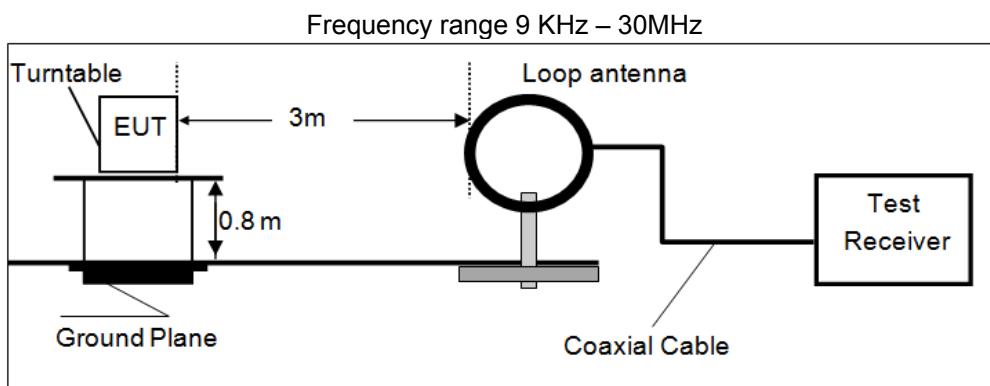
MEASUREMENT RESULT: "CTL160106605_fin2"

1/6/2016 9:20AM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.564001	23.80	10.2	46	22.2	AV	N	GND
0.591001	20.80	10.2	46	25.2	AV	N	GND
27.676501	21.10	11.2	50	28.9	AV	N	GND
28.338001	26.40	11.2	50	23.6	AV	N	GND
28.401001	23.10	11.2	50	26.9	AV	N	GND
29.238001	22.80	11.2	50	27.2	AV	N	GND

4.2 Radiated Emission and Band Edge

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768 KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9 KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Peak (Receiver)
	Average Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Average (Receiver)

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dB μ V/m)	RA (dB μ V/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance. 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)

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	300	20log(2400/F(KHz))+80	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))+40	24000/F(KHz)
1.705-30	30	20log(30)+40	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

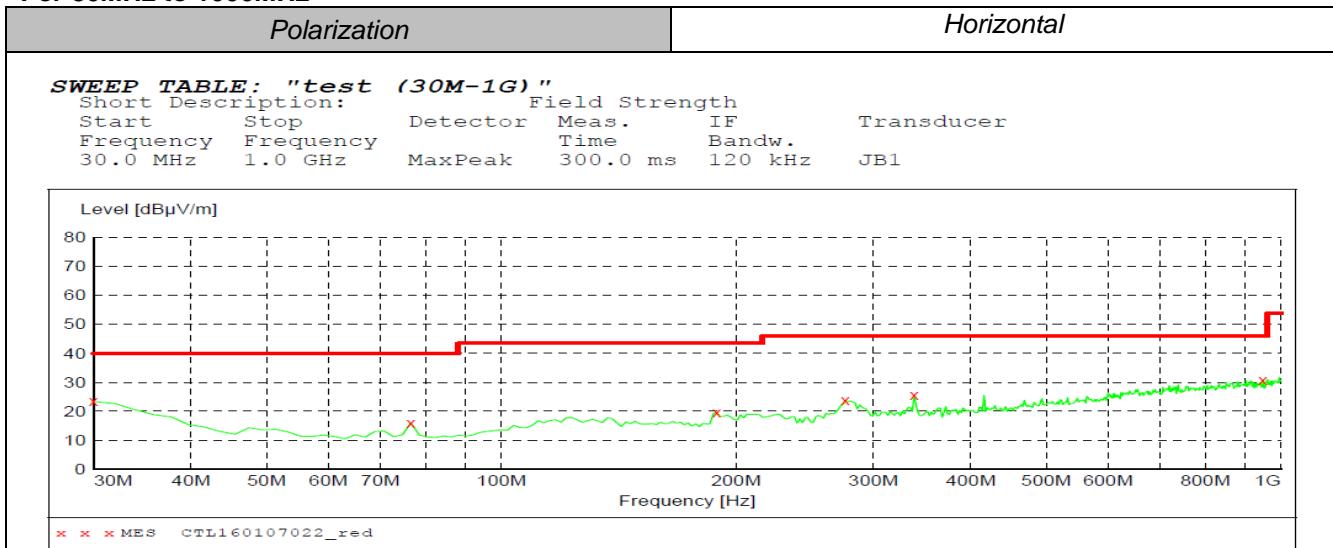
Remark:

1. The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode, the middle channel) is the worst case for all the test mode and channel.
2. ULTRA-BROADBAND ANTENNA for the radiation emission test below 1G.
3. HORN ANTENNA for the radiation emission test above 1G.
4. We tested both battery powered and powered by adapter charging mode at three orientate ons, recorded worst case at powered by adapter charging mode.
5. “--” means not recorded as emission levels lower than limit.
6. Margin= Limit - Level

For 9KHz to 30MHz

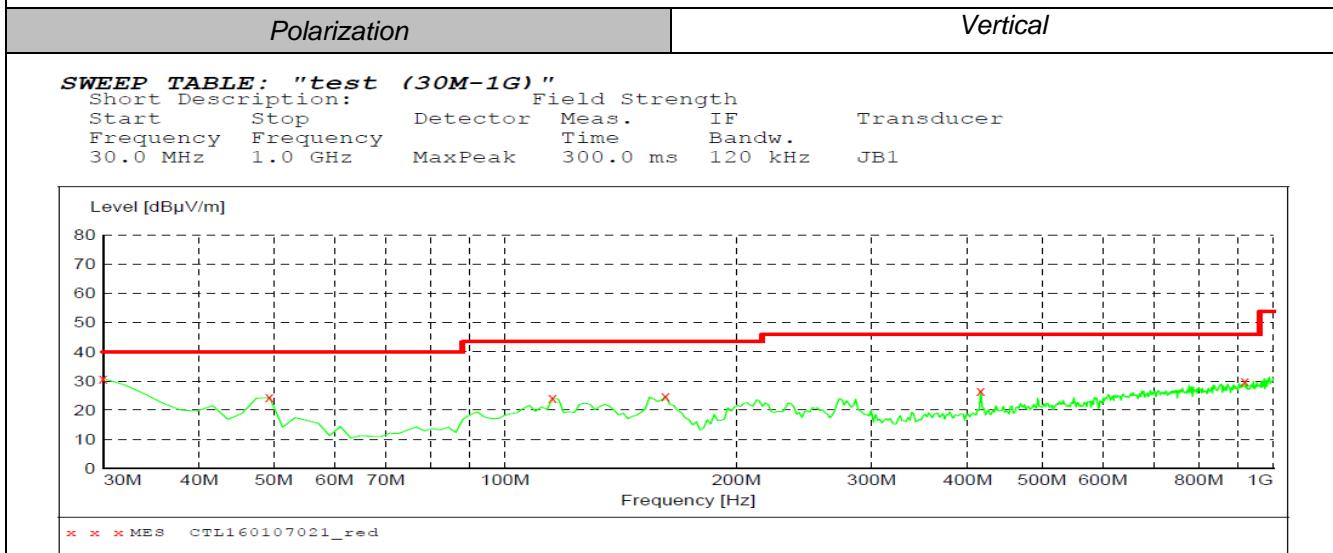
Frequency (MHz)	Corrected Reading (dB μ V/m)@3m	FCC Limit (dB μ V/m) @3m	Margin (dB)	Detector	Result
11.41	46.69	69.54	22.85	QP	PASS
22.36	43.87	69.54	25.67	QP	PASS

For 30MHz to 1000MHz



MEASUREMENT RESULT: "CTL160107022_red"

1/7/2016 1:51PM	Frequency	Level	Transd	Limit	Margin	Det.	Height	Azimuth	Polarization
	MHz	dB μ V/m	dB	dB μ V/m	dB		cm	deg	
	30.000000	23.40	20.8	40.0	16.6	---	0.0	0.00	HORIZONTAL
	76.560000	16.00	8.3	40.0	24.0	---	0.0	0.00	HORIZONTAL
	189.080000	19.60	13.1	43.5	23.9	---	0.0	0.00	HORIZONTAL
	276.380000	23.70	15.1	46.0	22.3	---	0.0	0.00	HORIZONTAL
	338.460000	25.50	16.4	46.0	20.5	---	0.0	0.00	HORIZONTAL
	947.620000	30.80	26.5	46.0	15.2	---	0.0	0.00	HORIZONTAL



MEASUREMENT RESULT: "CTL160107021_red"

1/7/2016 1:50PM	Frequency	Level	Transd	Limit	Margin	Det.	Height	Azimuth	Polarization
	MHz	dB μ V/m	dB	dB μ V/m	dB		cm	deg	
	30.000000	30.80	20.8	40.0	9.2	---	0.0	0.00	VERTICAL
	49.400000	24.30	8.0	40.0	15.7	---	0.0	0.00	VERTICAL
	115.360000	24.10	14.3	43.5	19.4	---	0.0	0.00	VERTICAL
	161.920000	24.80	13.6	43.5	18.7	---	0.0	0.00	VERTICAL
	416.060000	26.70	18.5	46.0	19.3	---	0.0	0.00	VERTICAL
	918.520000	29.90	26.2	46.0	16.1	---	0.0	0.00	VERTICAL

For 1GHz to 25GHz

Note: We tested 11b, 11g, 11n HT20, 11n HT40 and recorded the worst case at the 11b Mode.

802.11b Mode (above 1GHz)

Frequency(MHz):			2412		Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2402.00	103.25	PK	--	--	69.85	28.78	4.61	0.00	33.40
1	2402.00	94.58	AV	--	--	61.18	28.78	4.61	0.00	33.40
2	2390.00	40.25	PK	74	33.75	6.93	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	45.26	PK	74	28.74	11.87	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	64.52	PK	74	9.48	59.97	33.52	6.92	35.89	4.55
4	4824.00	49.99	AV	54	4.01	45.44	33.52	6.92	35.89	4.55
5	5175.50	50.26	PK	74	23.74	42.94	34.49	7.13	34.29	7.32
5	5175.50	--	AV	54	--	--	--	--	--	--
6	7236.00	49.33	PK	74	24.67	38.06	37.10	9.19	35.02	11.27
6	7236.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2412		Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2402.00	104.58	PK	--	--	71.18	28.78	4.61	0.00	33.40
1	2402.00	95.32	AV	--	--	61.92	28.78	4.61	0.00	33.40
2	2390.00	40.87	PK	74	33.13	7.55	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	45.98	PK	74	28.02	12.59	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4824.00	65.77	PK	74	8.23	61.22	33.52	6.92	35.89	4.55
4	4824.00	50.21	AV	54	3.79	45.66	33.52	6.92	35.89	4.55
5	5233.50	50.44	PK	74	23.56	43.02	34.57	7.16	34.31	7.42
5	5233.50	--	AV	54	--	--	--	--	--	--
6	7236.00	49.42	PK	74	24.58	38.15	37.10	9.19	35.02	11.27
6	7236.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Frequency(MHz):			2437		Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2437.00	104.55	PK	--	--	71.05	28.85	4.65	0.00	33.50
1	2437.00	95.69	AV	--	--	62.19	28.85	4.65	0.00	33.50
2	3158.75	46.58	PK	74	27.42	45.39	31.14	5.43	35.38	1.19
2	3158.75	--	AV	54	--	--	--	--	--	--
3	4874.00	64.87	PK	74	9.13	58.53	33.59	6.95	34.20	6.34
3	4874.00	50.14	AV	54	3.86	43.80	33.59	6.95	34.20	6.34
4	5250.75	42.26	PK	74	31.74	34.59	34.59	7.17	34.09	7.67
4	5250.75	--	AV	54	--	--	--	--	--	--
5	7311.00	51.12	PK	74	22.88	39.46	37.44	9.22	35.00	11.66
5	7311.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):			2437		Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2437.00	103.87	PK	--	--	70.37	28.85	4.65	0.00	33.50
1	2437.00	95.22	AV	--	--	61.72	28.85	4.65	0.00	33.50
2	3678.50	49.66	PK	74	24.34	46.14	32.51	6.03	35.02	3.52
2	3678.50	--	AV	54	--	--	--	--	--	--
3	4874.00	66.78	PK	74	7.22	60.44	33.59	6.95	34.20	6.34
3	4874.00	50.62	AV	54	3.38	44.28	33.59	6.95	34.20	6.34
4	5005.15	43.41	PK	74	30.59	36.61	34.00	7.03	34.23	6.80
4	5005.15	--	AV	54	--	--	--	--	--	--
5	7311.00	52.32	PK	74	21.68	40.66	37.44	9.22	35.00	11.66
5	7311.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW=1MHz VBW=3MHz Peak detector is for PK value; RBW=1MHz VBW=10Hz Peak detector is for AV value.

Frequency(MHz):			2462		Polarity:			HORIZONTAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2480.00	104.14	PK	--	--	70.52	28.92	4.70	0.00	33.62
1	2480.00	94.26	AV	--	--	60.64	28.92	4.70	0.00	33.62
2	2483.50	53.52	PK	74	20.48	19.89	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	44.65	PK	74	29.35	10.97	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	65.41	PK	74	8.59	60.63	33.71	6.98	35.91	4.78
4	4924.00	51.20	AV	54	2.8	46.42	33.71	6.98	35.91	4.78
5	5215.70	49.66	PK	74	24.34	42.26	34.56	7.15	34.31	7.40
5	5215.70	--	AV	54	--	--	--	--	--	--
6	7386.00	50.54	PK	74	23.46	38.66	37.61	9.25	34.98	11.88
6	7386.00	--	AV	54	--	--	--	--	--	--

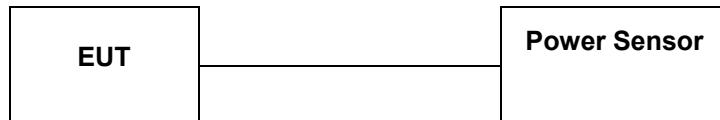
Frequency(MHz):			2462		Polarity:			VERTICAL		
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)	
1	2480.00	104.11	PK	--	--	70.49	28.92	4.70	0.00	33.62
1	2480.00	94.52	AV	--	--	60.90	28.92	4.70	0.00	33.62
2	2483.50	53.66	PK	74	20.34	20.03	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	43.58	PK	74	30.42	9.90	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4924.00	65.41	PK	74	8.59	60.63	33.71	6.98	35.91	4.78
4	4924.00	50.10	AV	54	3.9	45.32	33.71	6.98	35.91	4.78
5	5155.75	48.68	PK	74	25.32	41.40	34.45	7.12	34.29	7.28
5	5155.75	--	AV	54	--	--	--	--	--	--
6	7386.00	51.47	PK	74	22.53	39.59	37.61	9.25	34.98	11.88
6	7386.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW=1MHz VBW=3MHz Peak detector is for PK value; RBW =1MHz VBW=10Hz Peak detector is for AV value.

4.3 Maximum Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Meas Guidance v03:

PKPM1 Peak power meter method: The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

Maximum conducted (average) output power: As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

1. The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
2. At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
3. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.

Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

Adjust the measurement in dBm by adding $10\log(1/x)$, where x is the duty cycle to the measurement result.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

Remark: We measured output power at difference data rate for each mode and recorded worst case for each mode.

4.3.1 802.11b Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	15.87	30	PASS
6	2437	15.70	30	PASS
11	2462	15.66	30	PASS

Note:

1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable lose.

4.3.2 802.11g Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	16.02	30	PASS
6	2437	15.76	30	PASS
11	2462	15.78	30	PASS

Note:

1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable lose.

4.3.3 802.11n HT20 Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	16.00	30	PASS
6	2437	15.76	30	PASS
11	2462	15.71	30	PASS

Note:

1. For 802.11n HT20 mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.

4.3.4 802.11n HT40 Test Mode

A. Test Verdict

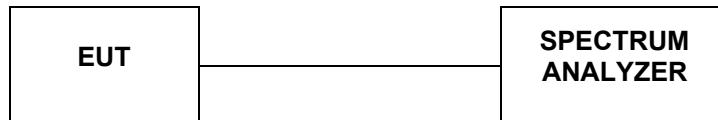
Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
1	2412	15.94	30	PASS
6	2437	15.76	30	PASS
11	2462	16.00	30	PASS

Note:

1. For 802.11n HT40 mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.

4.4 Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

According to KDB 558074 D01 V03 Method PKPSD (peak PSD) this procedure shall be used if maximum peak conducted output power was used to demonstrate compliance, and is optional if the maximum conducted (average) output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \text{ RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

4.4.1 802.11b Test Mode

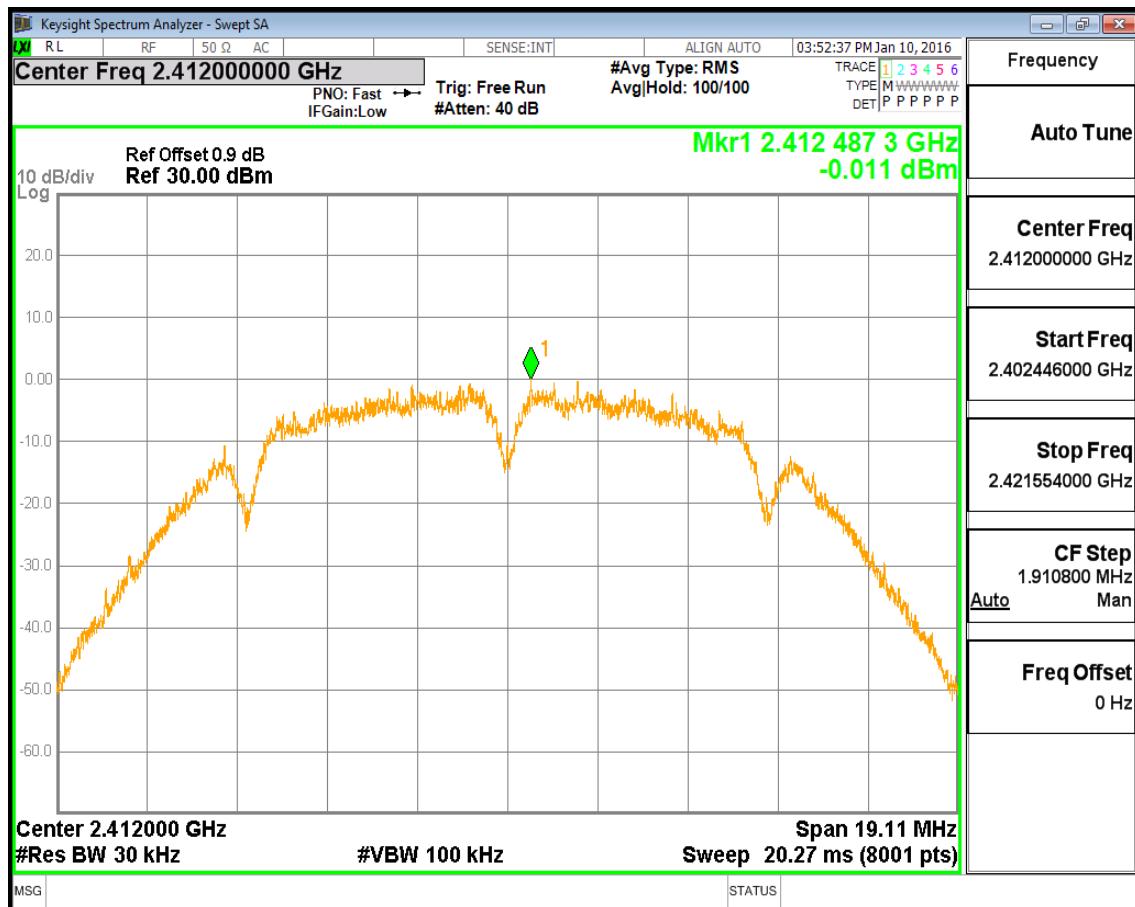
A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-0.011	Plot 4.4.1 A	8	PASS
6	2437	-0.849	Plot 4.4.1 B	8	PASS
11	2462	2.641	Plot 4.4.1 C	8	PASS

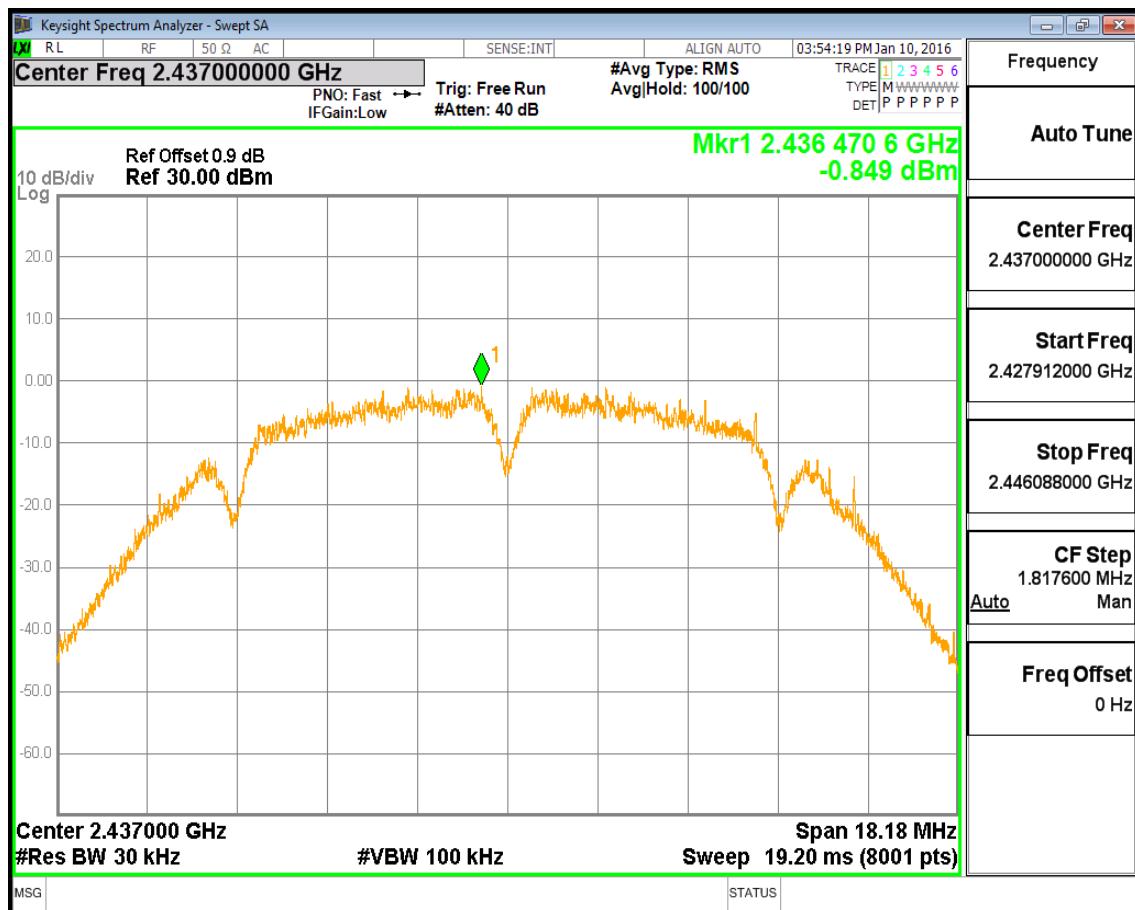
Note:

1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

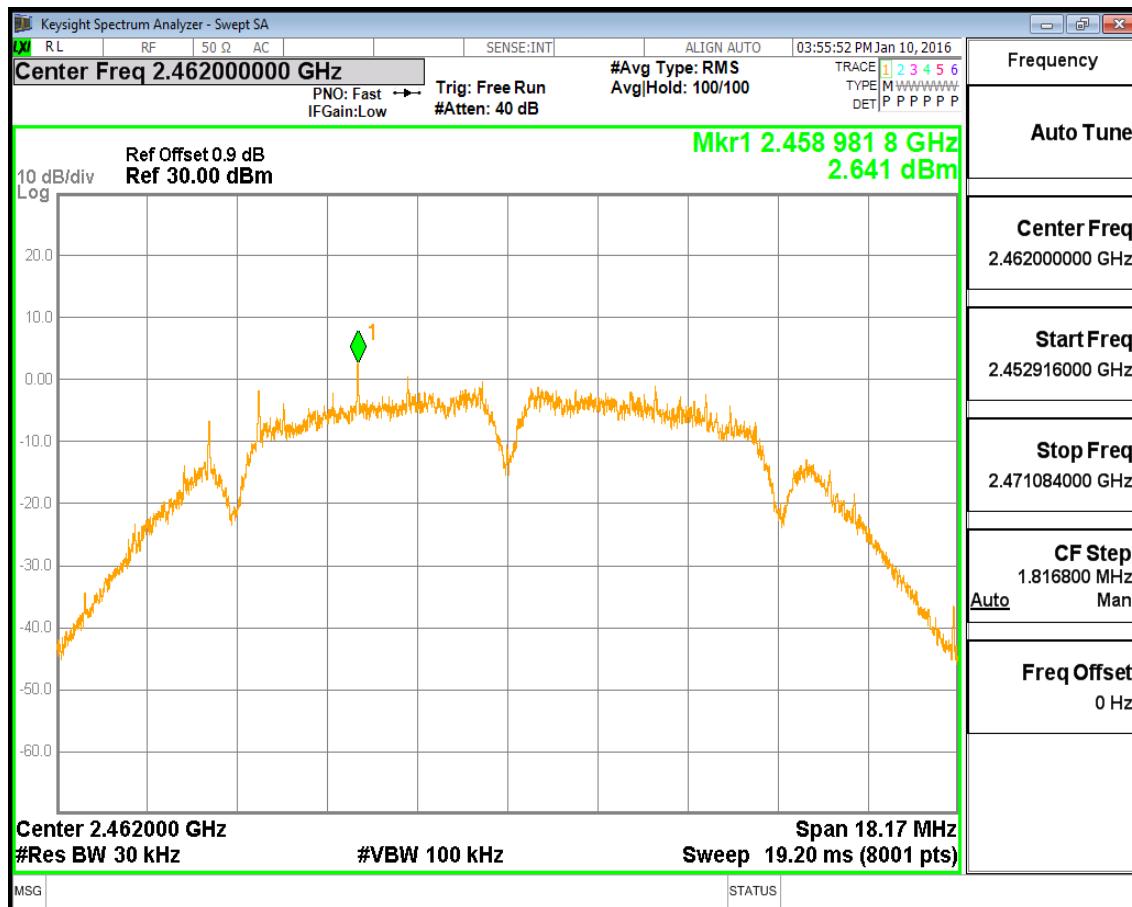
B. Test Plots



(Plot 4.4.1 A: Channel 1: 2412MHz @ 802.11b)



(Plot 4.4.1 B: Channel 6: 2437MHz @ 802.11b)



(Plot 4.4.1 C: Channel 11: 2462MHz @ 802.11b)

4.4.2 802.11g Test Mode

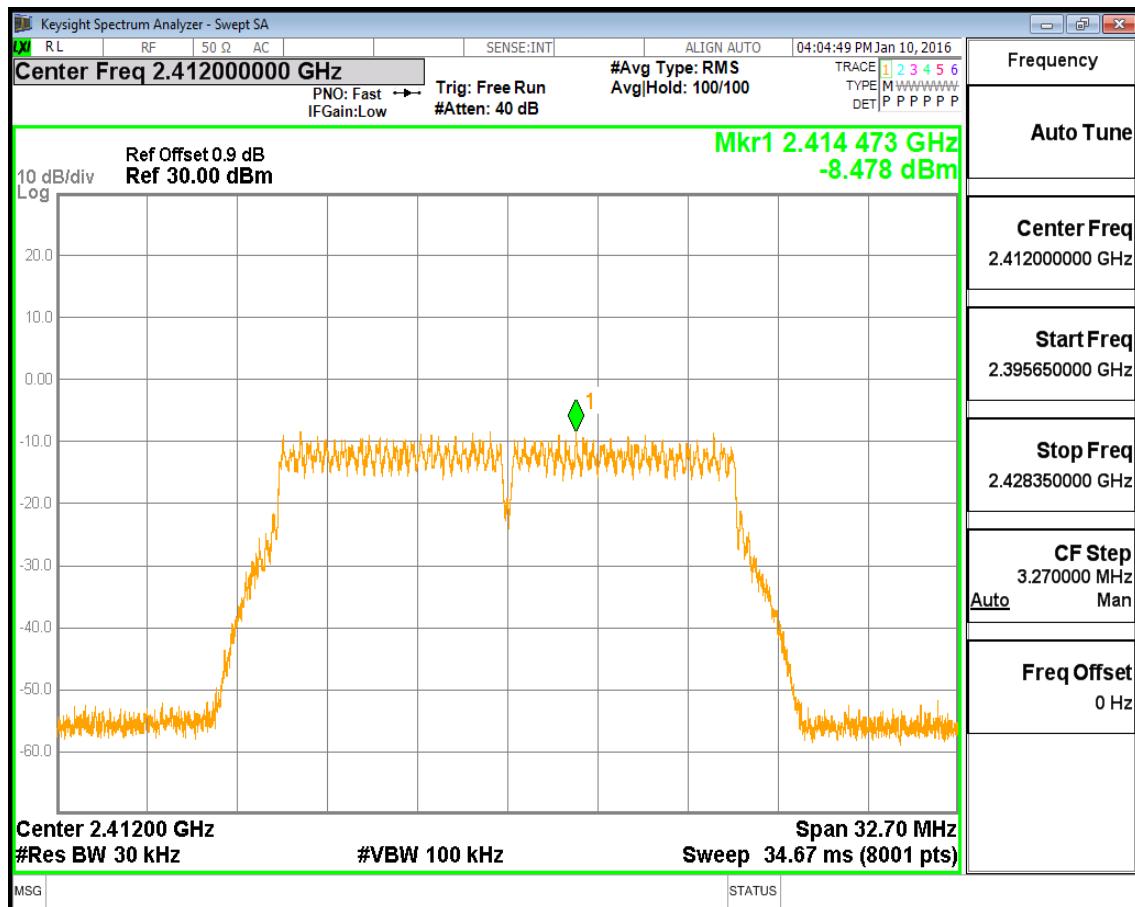
A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-8.478	Plot 4.4.2 A	8	PASS
6	2437	-8.547	Plot 4.4.2 B	8	PASS
11	2462	-7.932	Plot 4.4.2 C	8	PASS

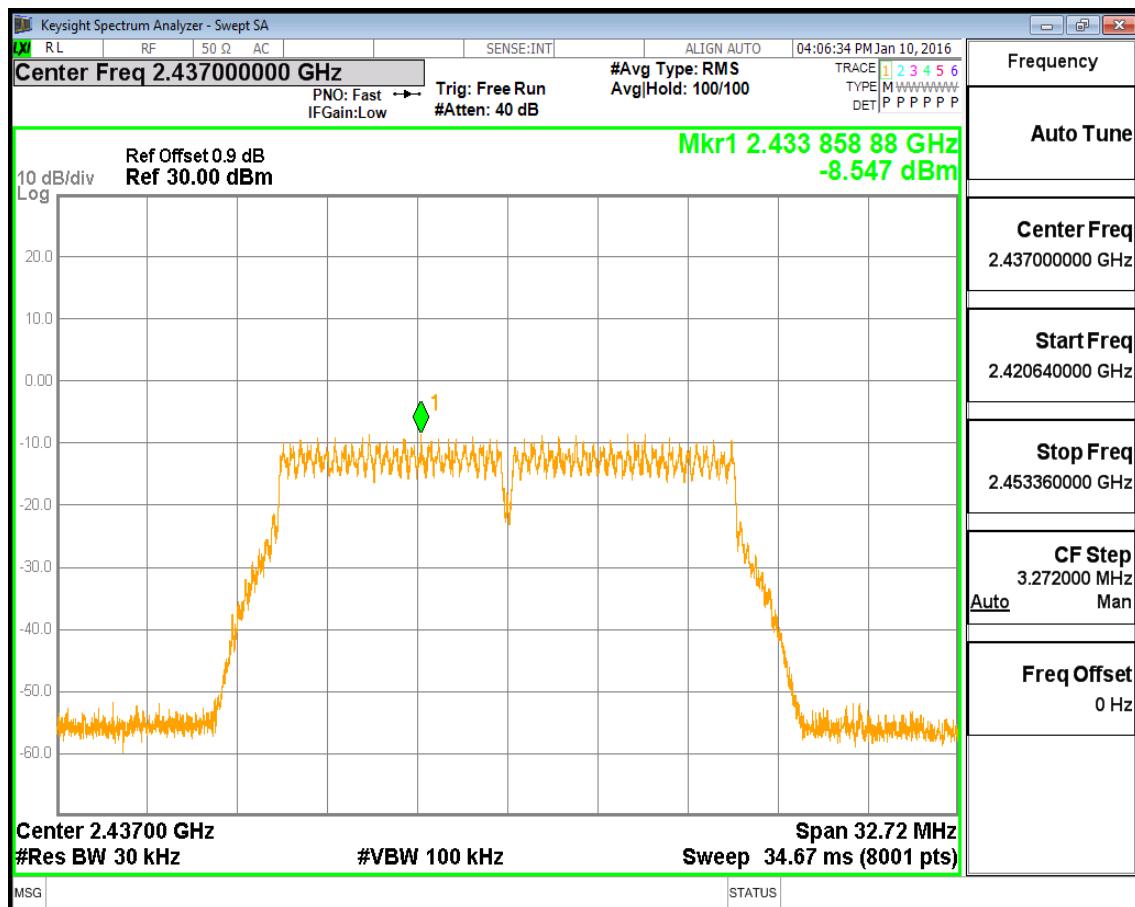
Note:

1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.

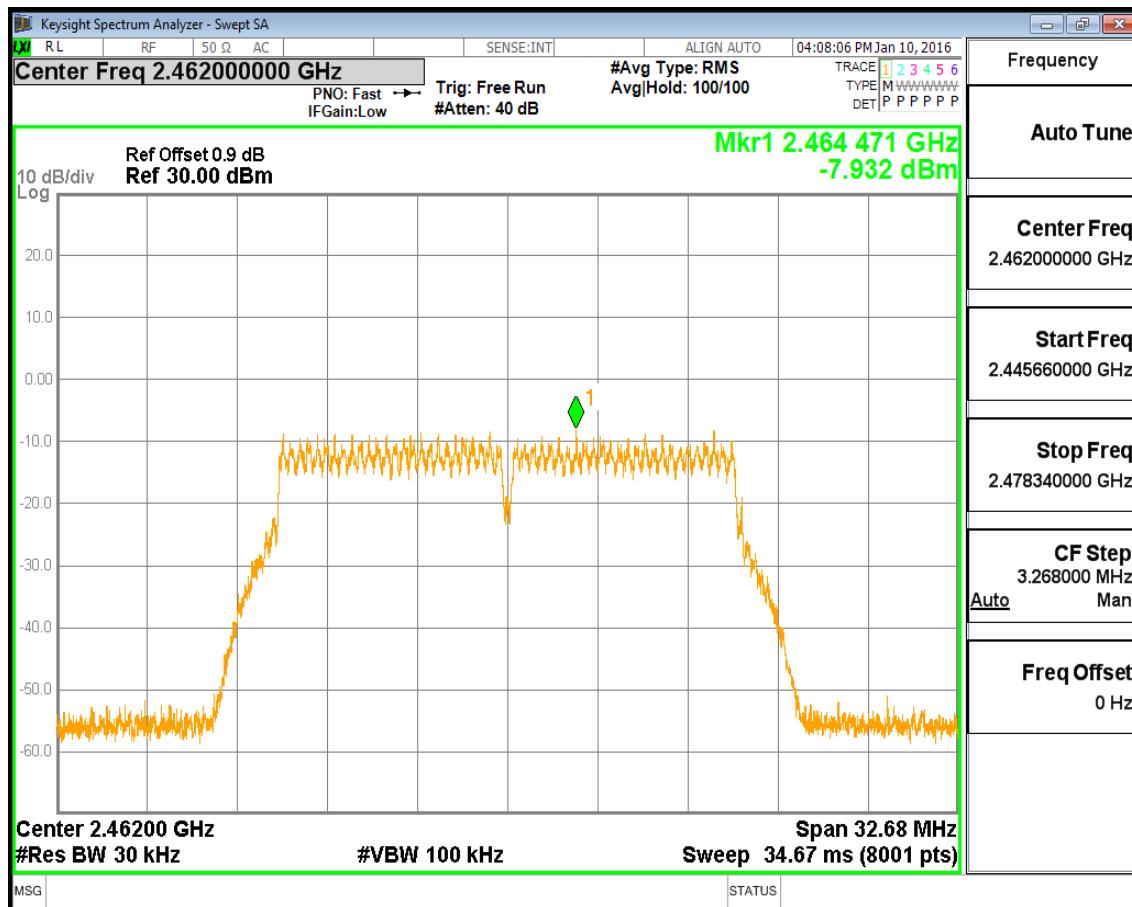
B. Test Plots



(Plot 4.4.2 A: Channel 1: 2412MHz @ 802.11g)



(Plot 4.4.2 B: Channel 6: 2437MHz @ 802.11g)



(Plot 4.4.2 C: Channel 11: 2462MHz @ 802.11g)

4.4.3 802.11n HT20 Test Mode

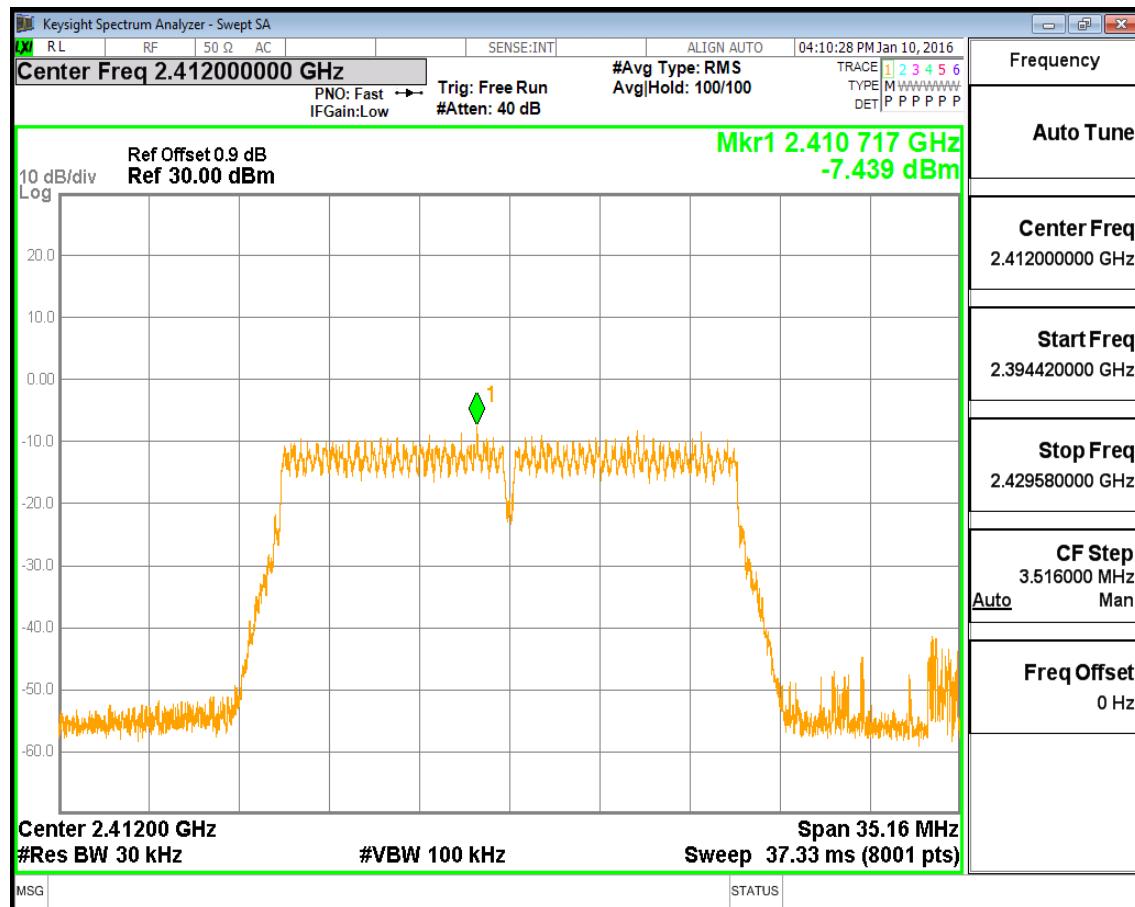
A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-7.439	Plot 4.4.3 A	8	PASS
6	2437	-8.006	Plot 4.4.3 B	8	PASS
11	2462	-7.486	Plot 4.4.3 C	8	PASS

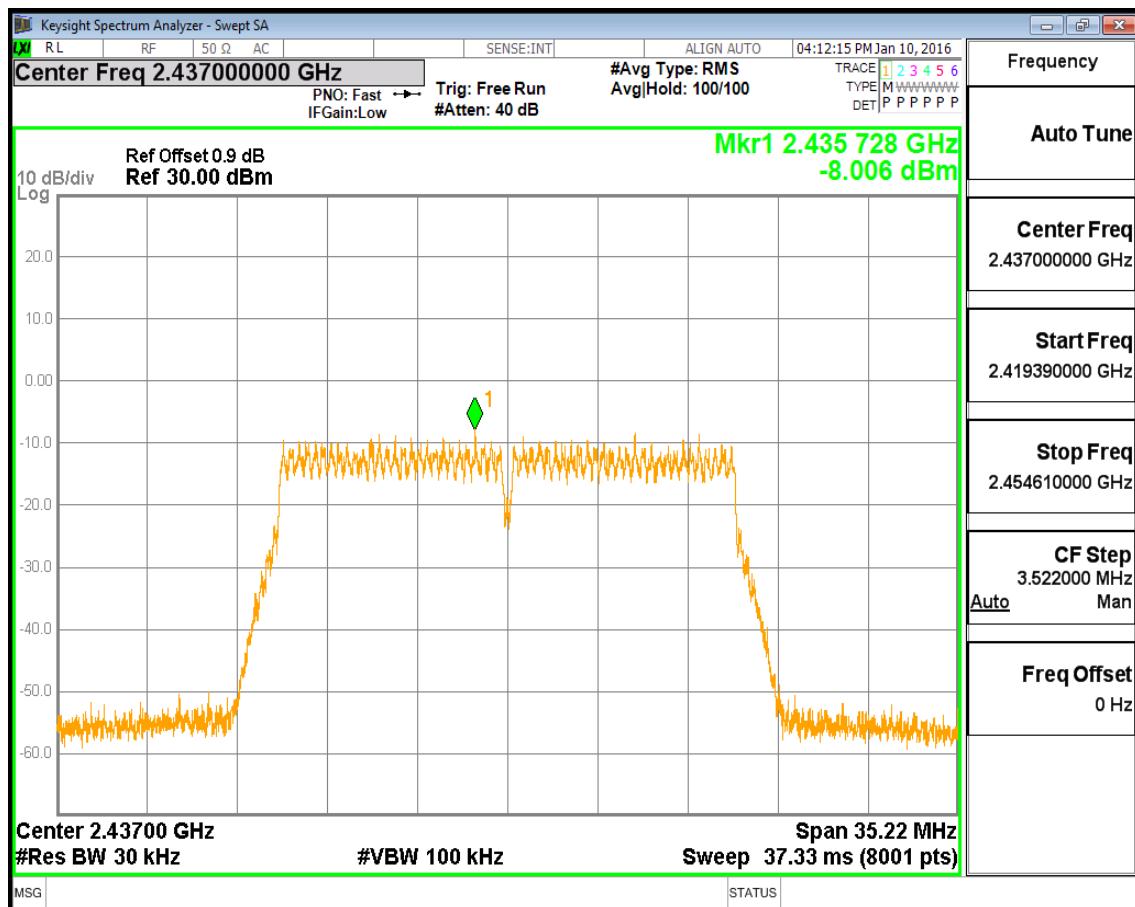
Note:

1. For 802.11n HT20 mode at finial test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable lose.

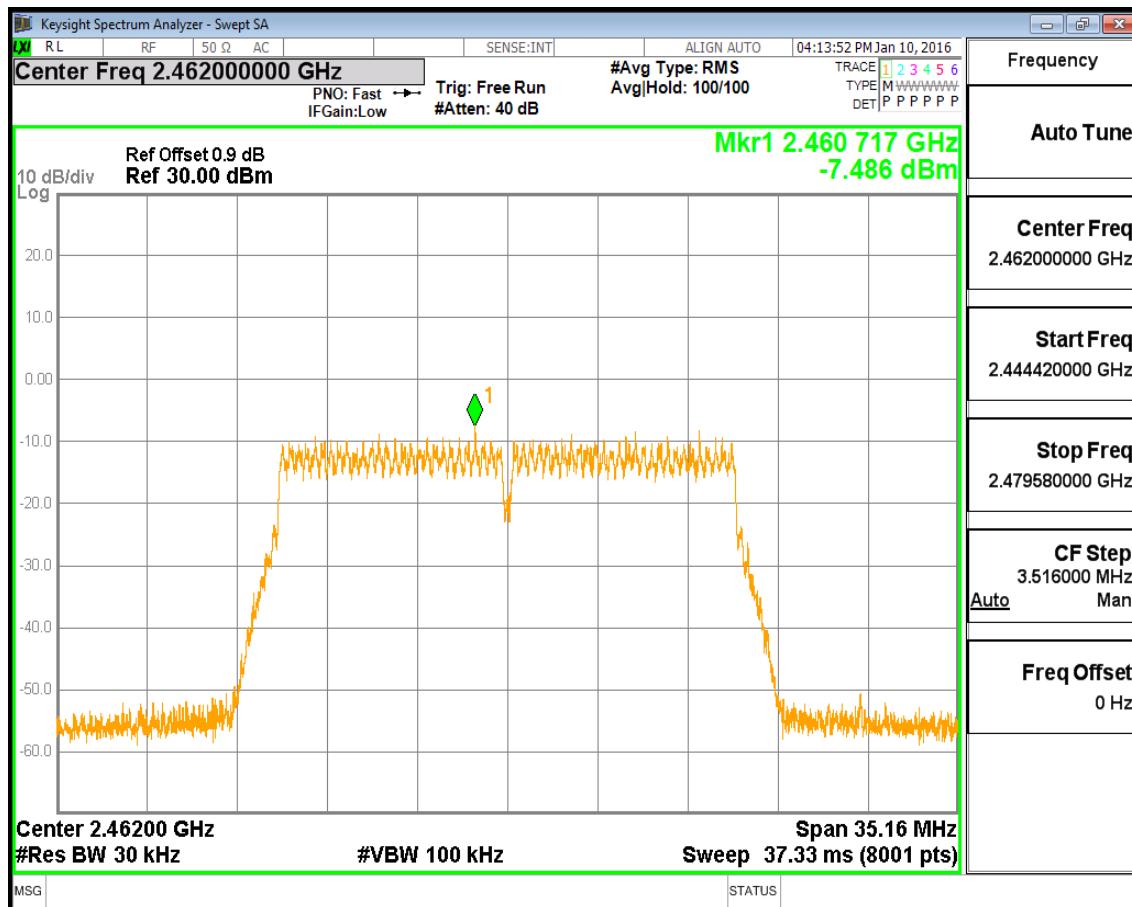
B. Test Plot



(Plot 4.4.3 A: Channel 1: 2412MHz @ 802.11n HT20)



(Plot 4.4.3 B: Channel 6: 2437MHz @ 802.11n HT20)



(Plot 4.4.3 C: Channel 11: 2462MHz @ 802.11n HT20)

4.4.4 802.11n HT40 Test Mode

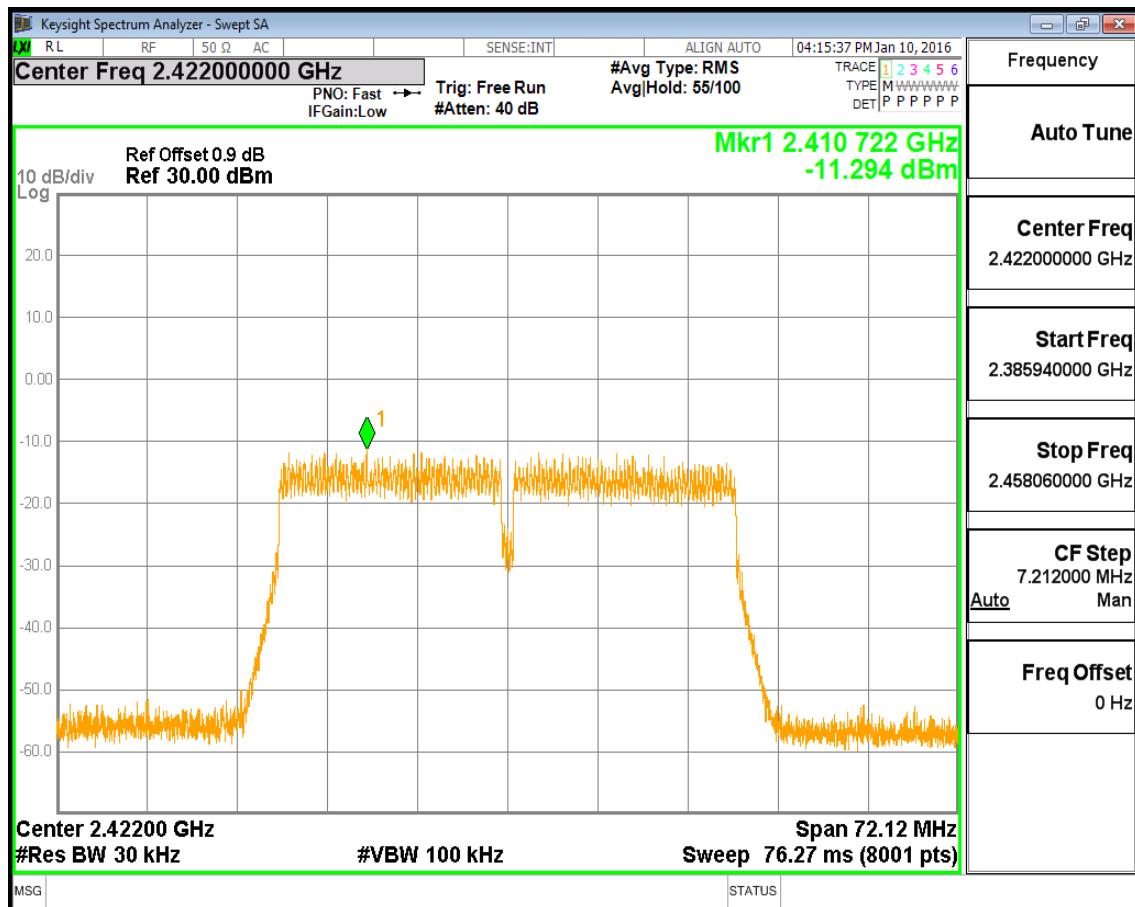
A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/100kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
3	2422	-11.294	Plot 4.4.4 A	8	PASS
6	2437	-11.684	Plot 4.4.4 B	8	PASS
9	2452	-11.121	Plot 4.4.4 C	8	PASS

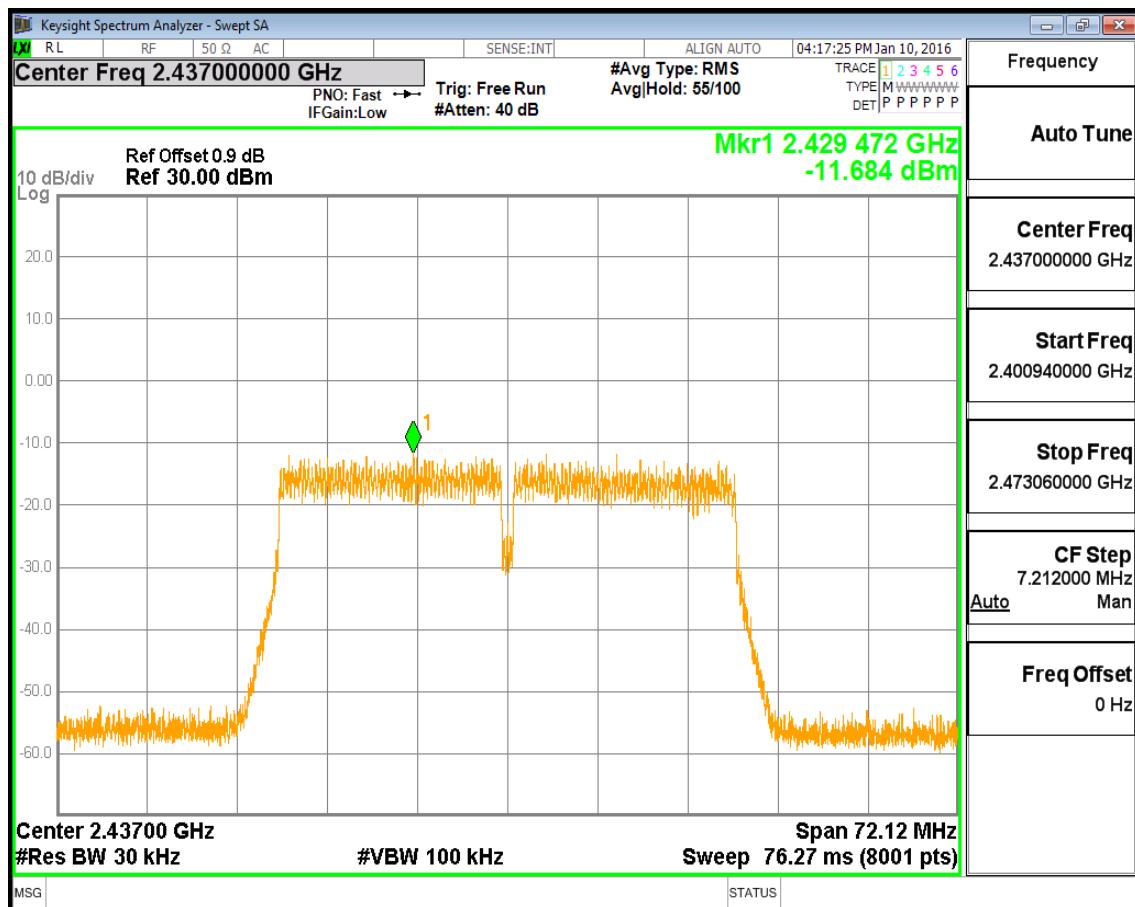
Note:

1. For 802.11n HT40 mode at finial test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable lose.

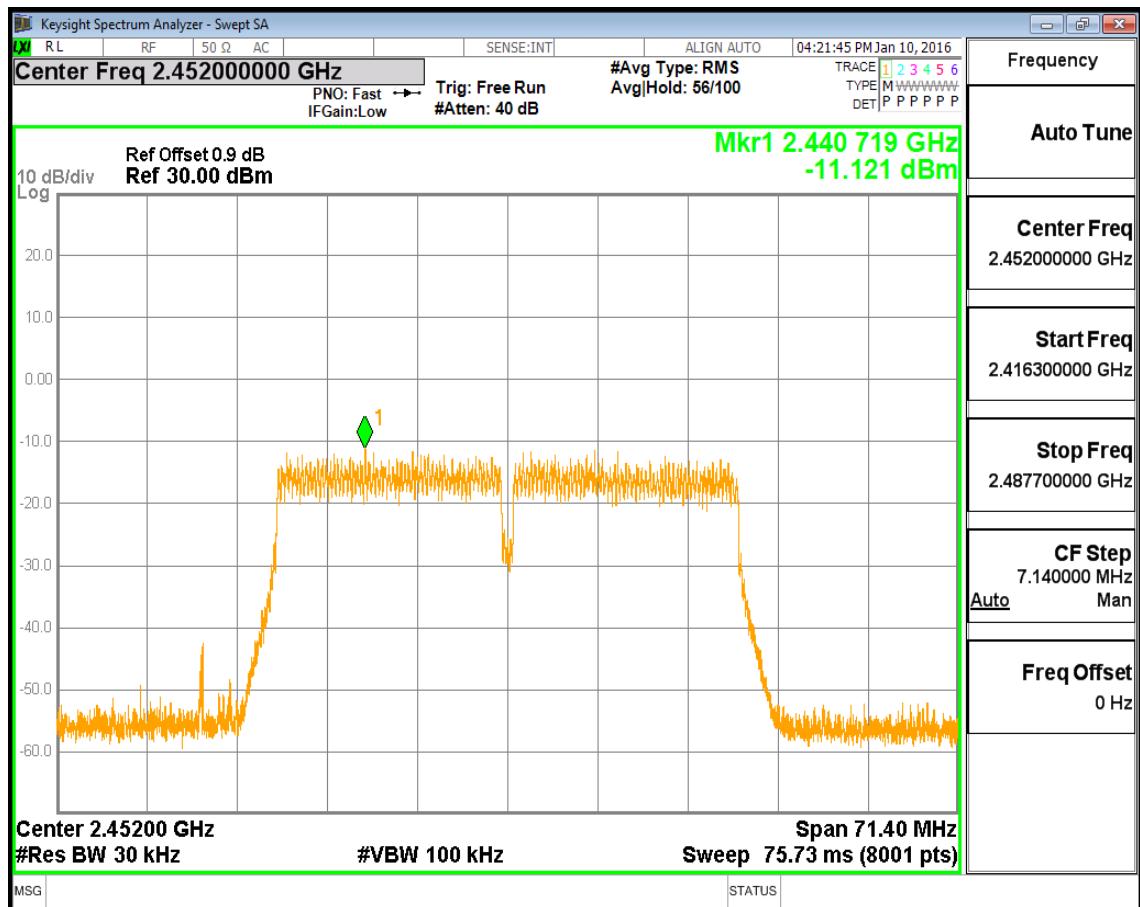
B. Test Plots



(Plot 4.4.4 A: Channel 3: 2422MHz @ 802.11n HT40))



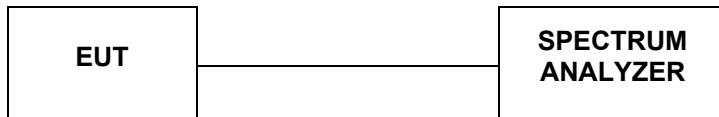
(Plot 4.4.4 B: Channel 6: 2437MHz @ 802.11n HT40))



(Plot 4.4.4 C: Channel 9: 2452MHz @ 802.11n HT40)

4.5 Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100 kHz and VBW= 300 KHz to measure the peak field strength, and measure frequency range from 9 KHz to 26.5GHz.

LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

Remark: The measurement frequency range is from 9 KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

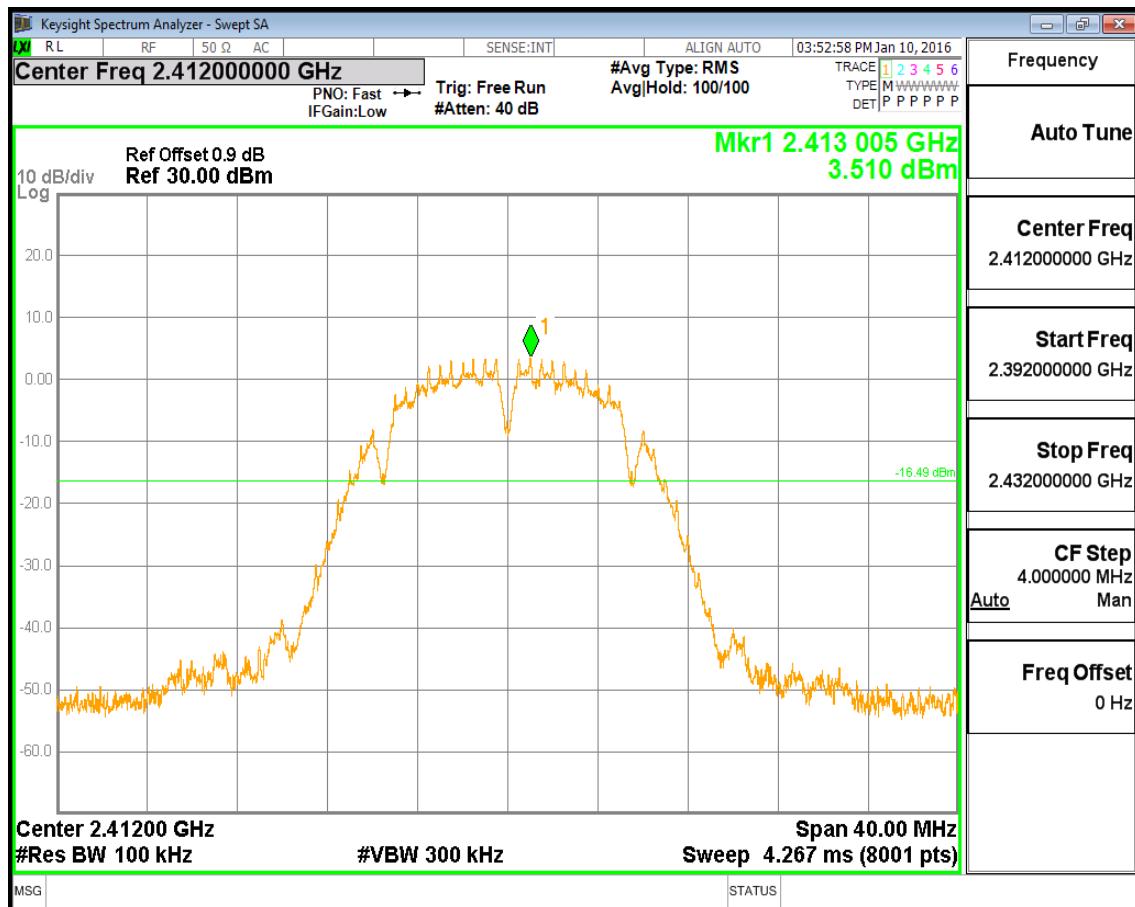
4.5.1 802.11b Test Mode

A. Test Verdict

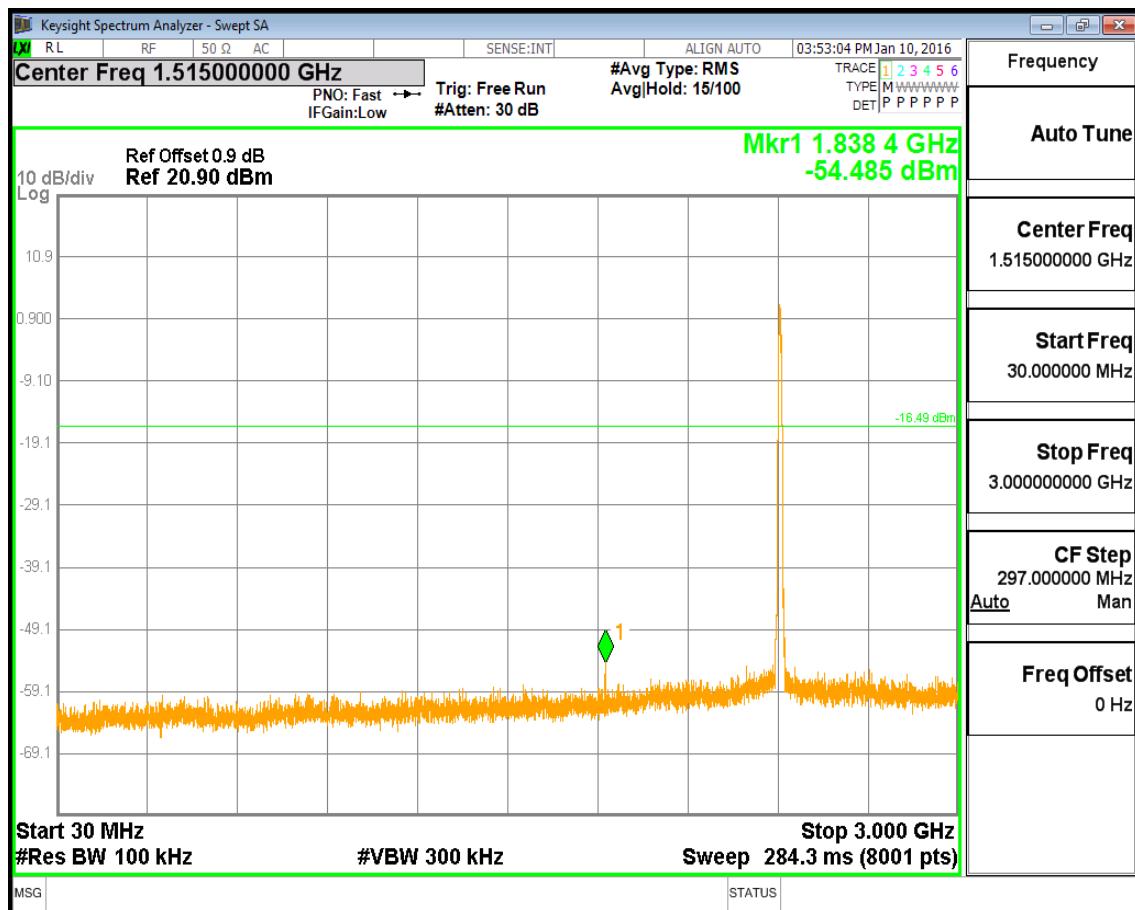
Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict	
1	2412	2.412 GHz	Plot 4.5.1 A1	---	PASS	
		30MHz -3GHz	Plot 4.5.1 A2	-20	PASS	
		3GHz-.5 GHz	Plot 4.5.1 A3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.1 A4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.1 A5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.1 A6	-20	PASS	
6	2437	2.437 GHz	Plot 4.5.1 B1	---	PASS	
		30MHz -26GHz	Plot 4.5.1 B2	-20	PASS	
		3GHz-26.5 GHz	Plot 4.5.1 B3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.1 B4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.1 B5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.1 B6	-20	PASS	
11	2462	2.462 GHz	Plot 4.5.1 C1	---	PASS	
		30MHz -26GHz	Plot 4.5.1 C2	-20	PASS	
		3GHz-26.5 GHz	Plot 4.5.1 C3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.1 C4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.1 C5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.1 C6	-20	PASS	
Conducted bandedge		Left Band edge	Plot 4.5.1 D1	-20	PASS	
		Right Band edge	Plot 4.5.1 D2	-20	PASS	

Note:

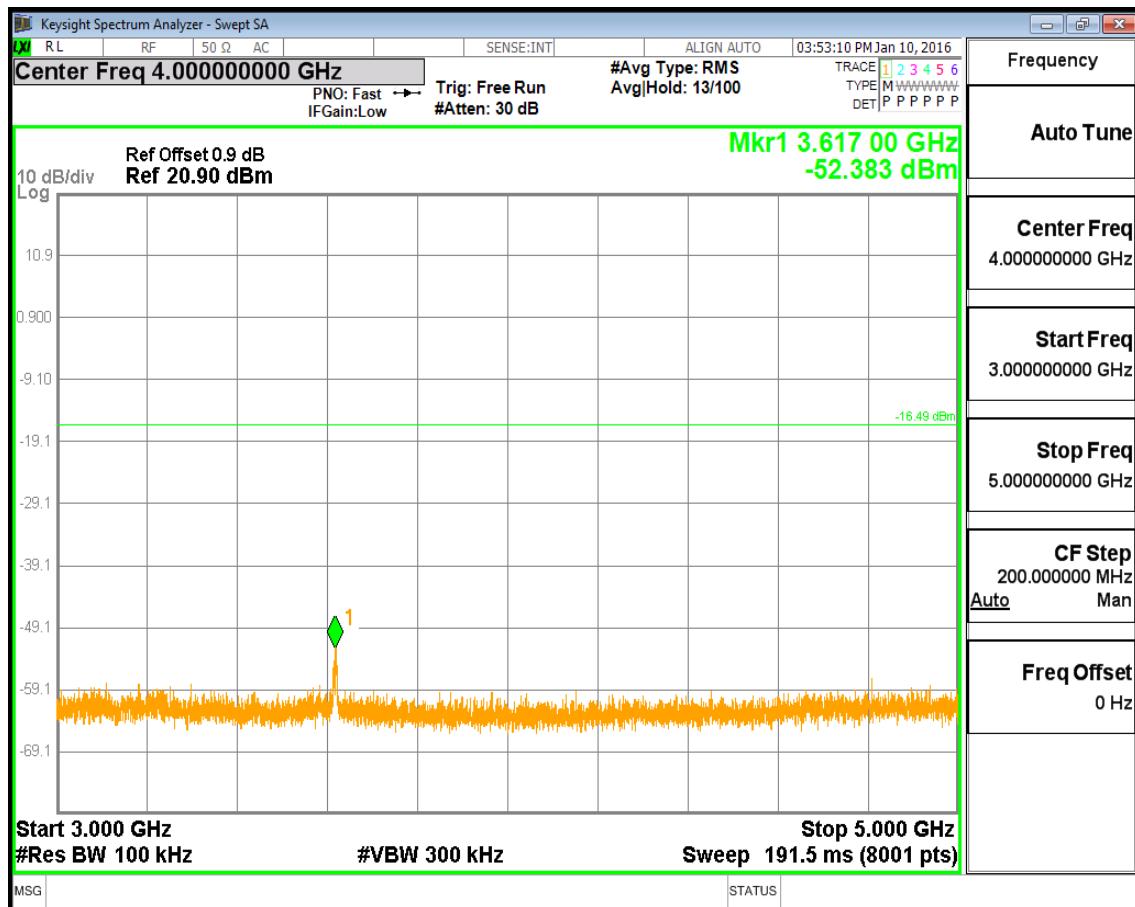
1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable lose.
3. For 9KHz -30MHz,Because there was only background, So We did not recorded data.



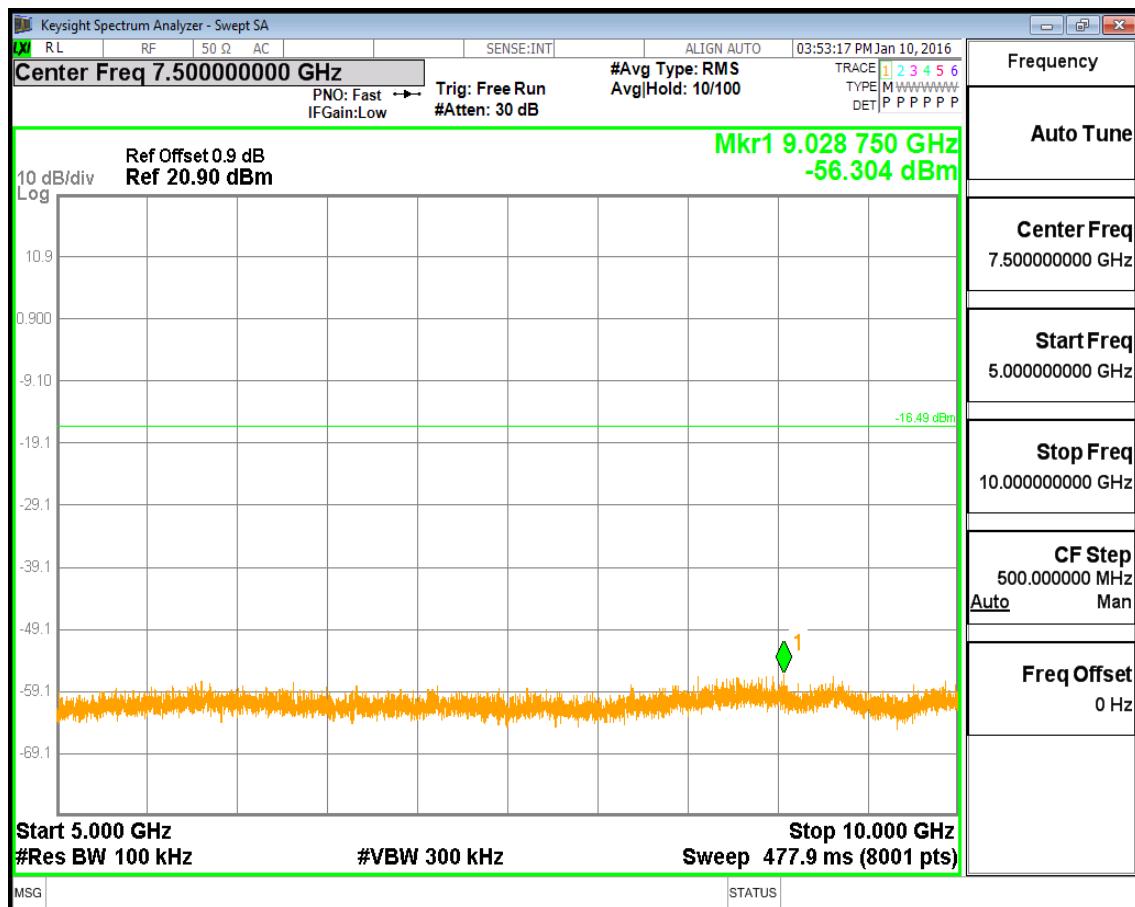
(Plot 4.5.1 A1: Channel 1: 2412MHz @ 802.11b)



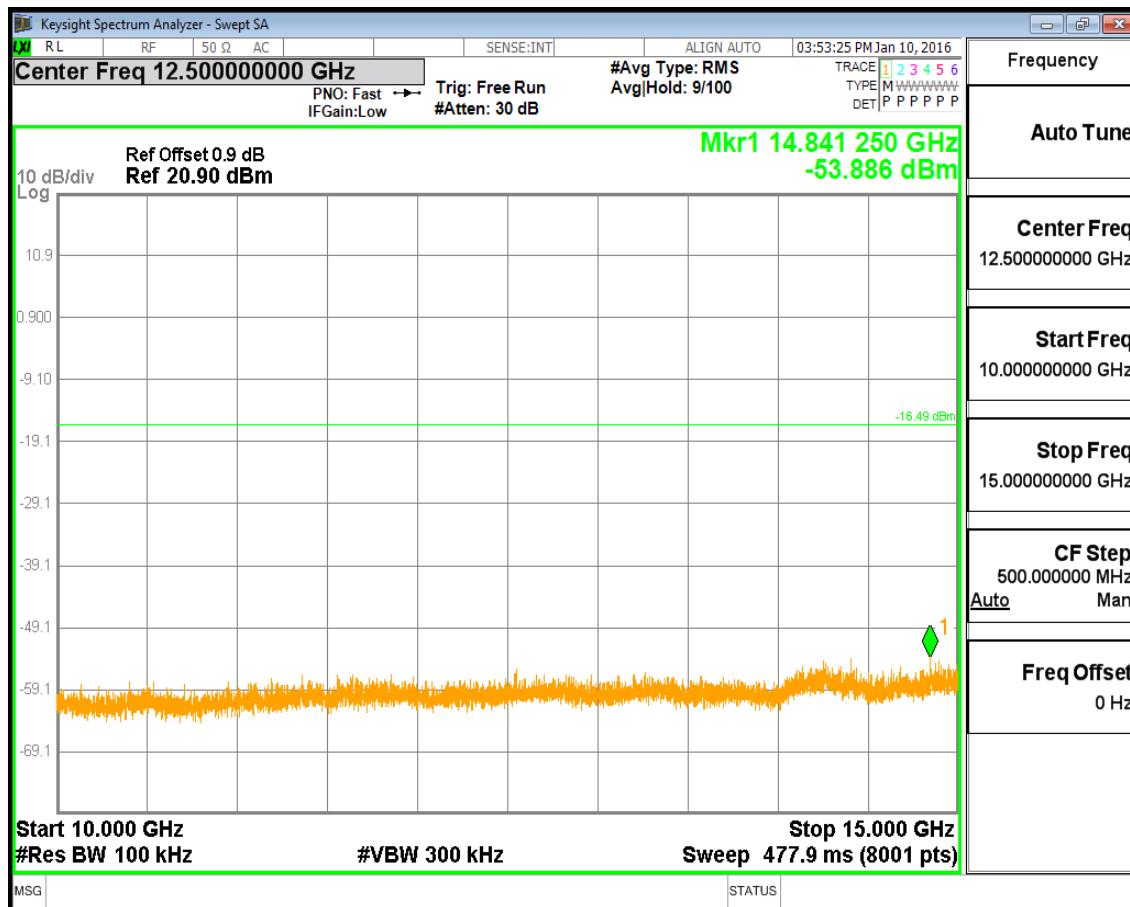
(Plot 4.5.1 A2: Channel 1: 2412MHz @ 802.11b)



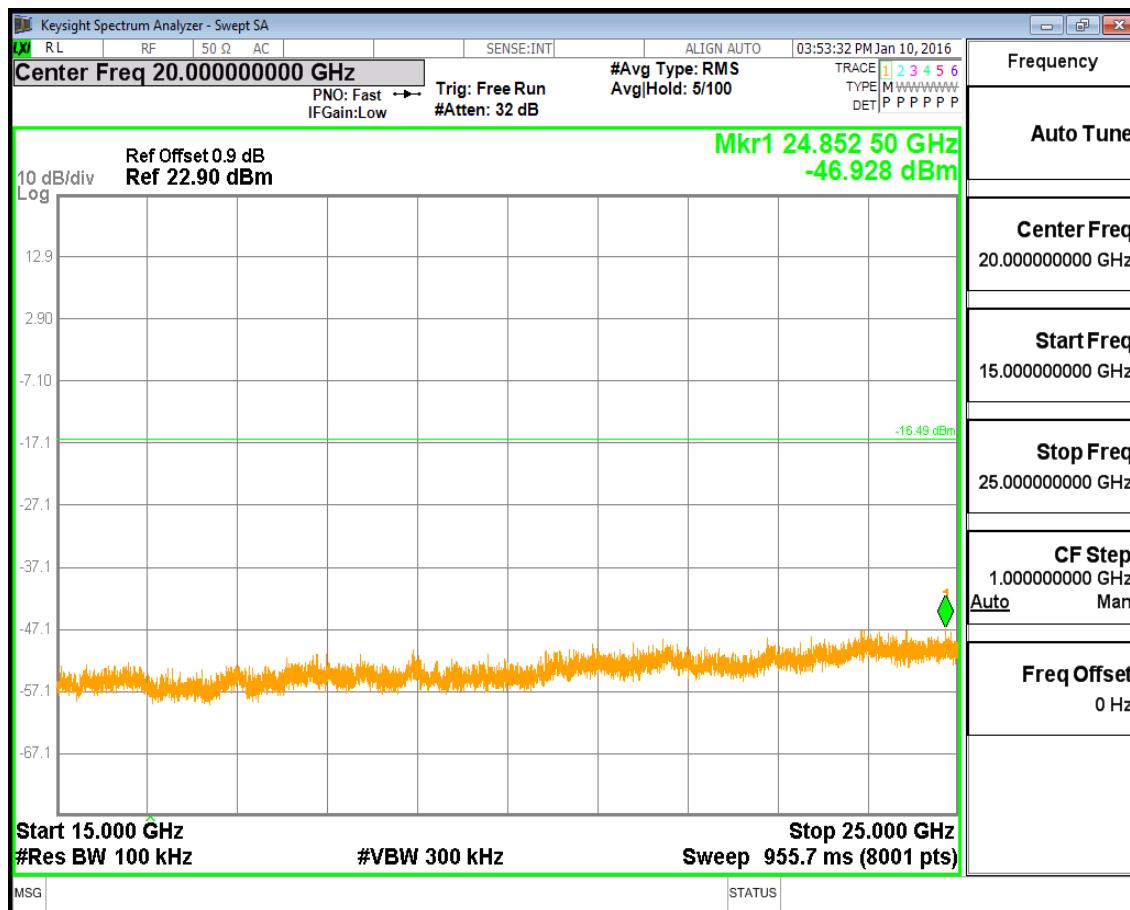
(Plot 4.5.1 A3: Channel 1: 2412MHz @ 802.11b)



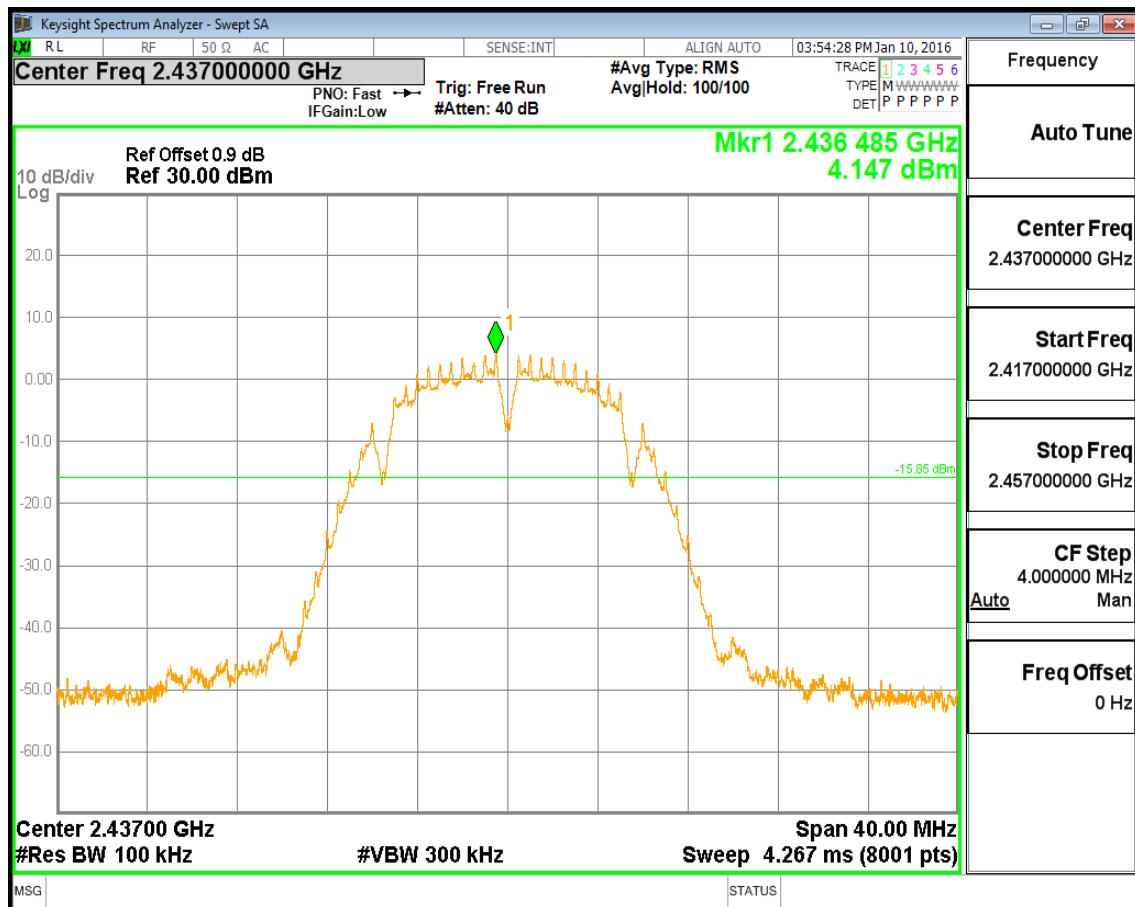
(Plot 4.5.1 A:4 Channel 1: 2412MHz @ 802.11b)



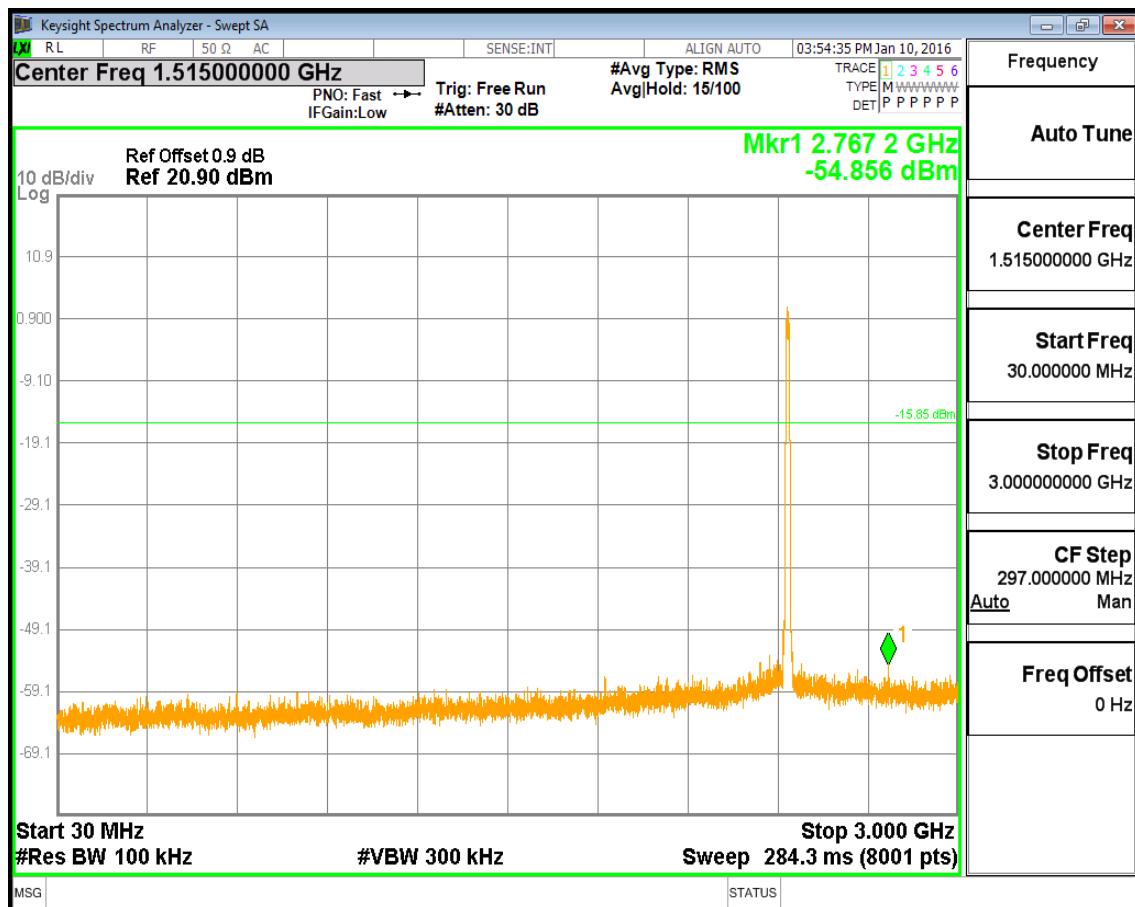
(Plot 4.5.1 A5: Channel 1: 2412MHz @ 802.11b)



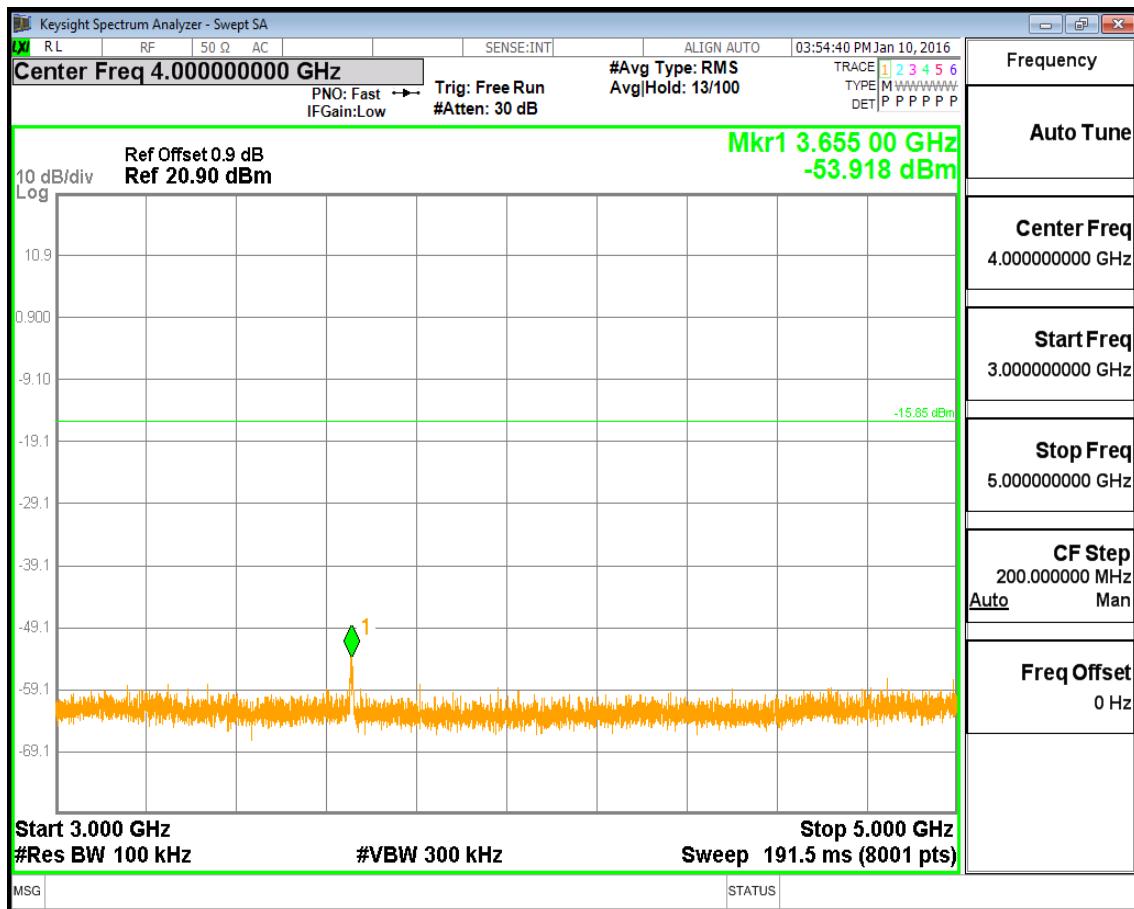
(Plot 4.5.1 A6: Channel 1: 2412MHz @ 802.11b)



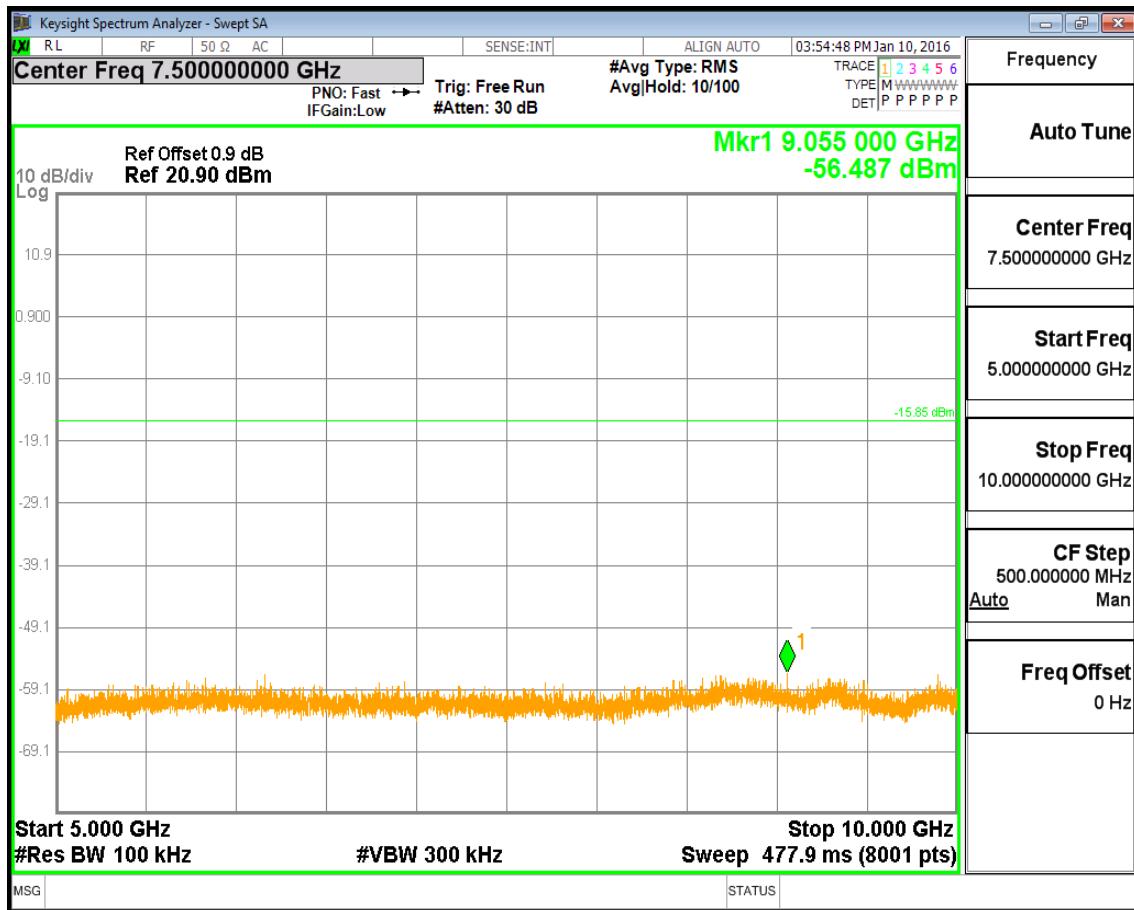
(Plot 4.5.1 B1: Channel 6: 2437MHz @ 802.11b)



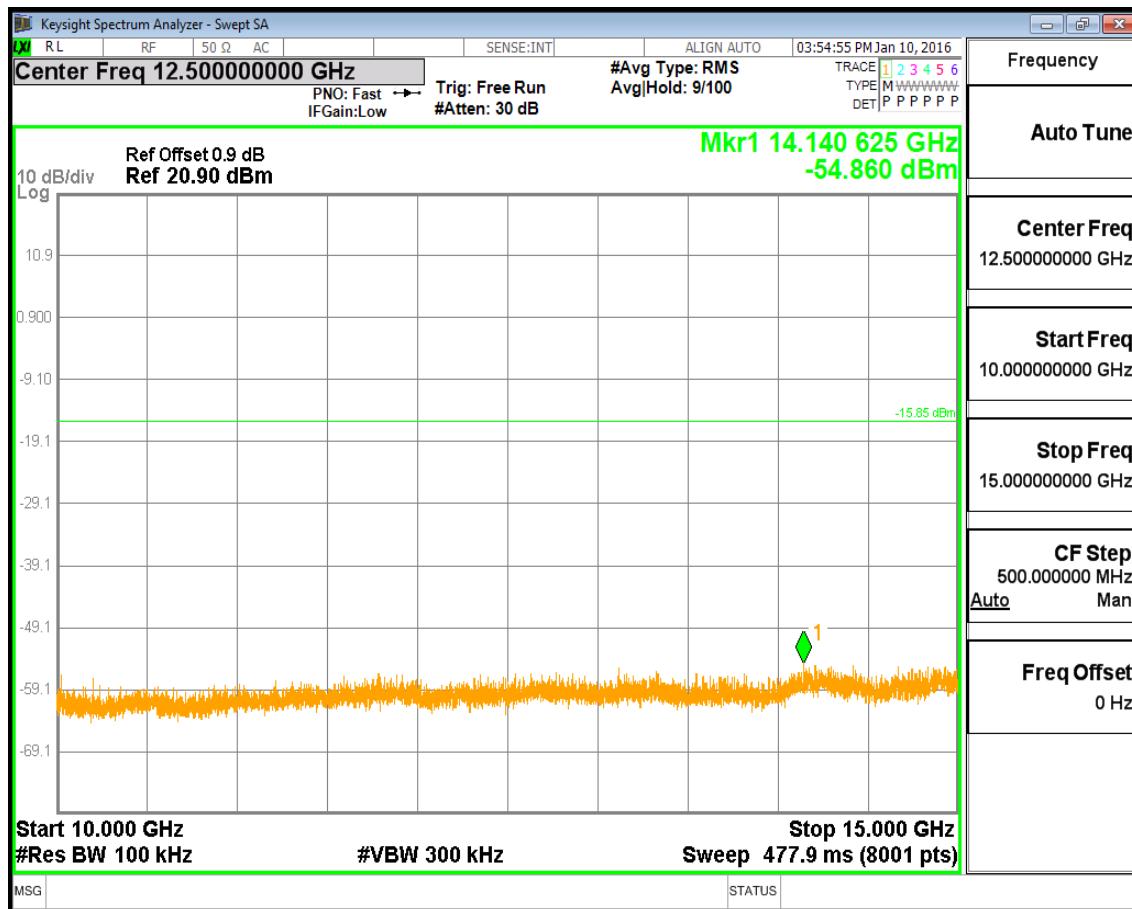
(Plot 4.5.1 B2: Channel 6: 2437MHz @ 802.11b)



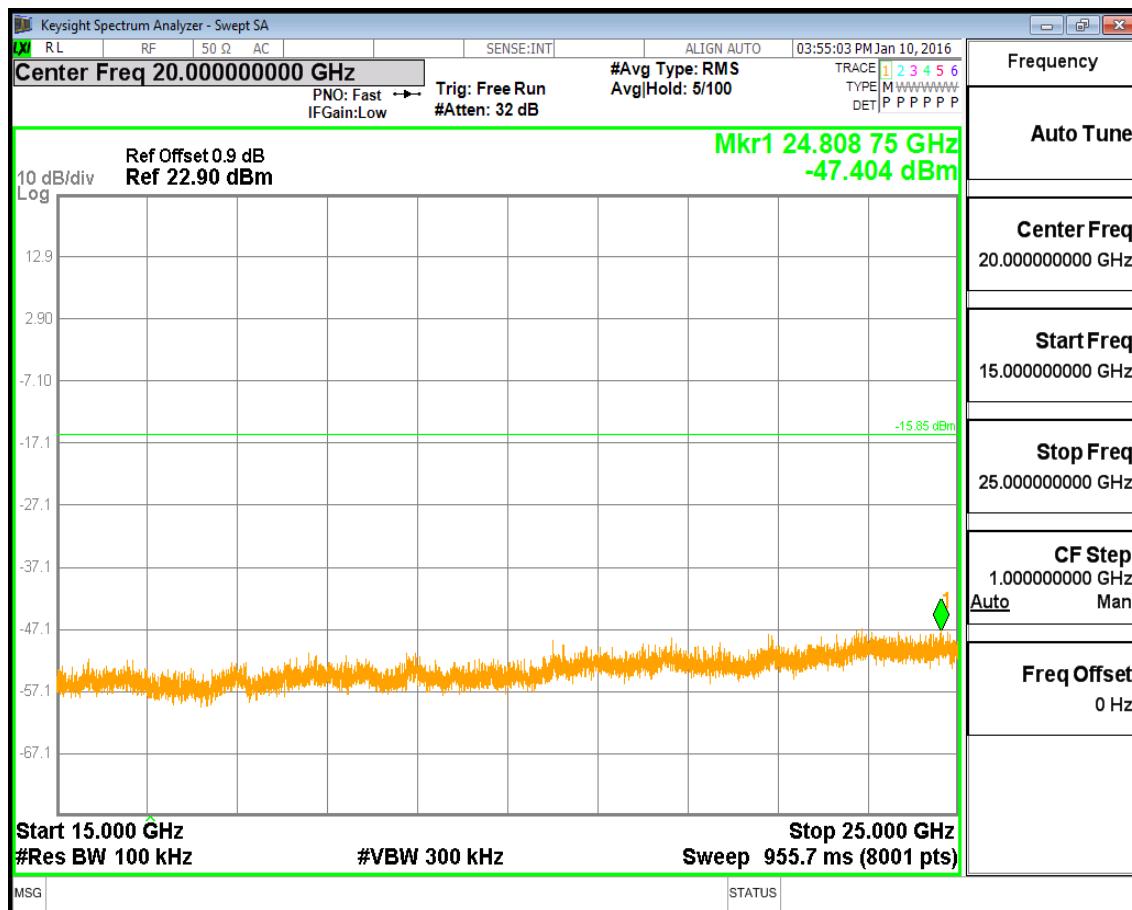
(Plot 4.5.1 B3: Channel 6: 2437MHz @ 802.11b)



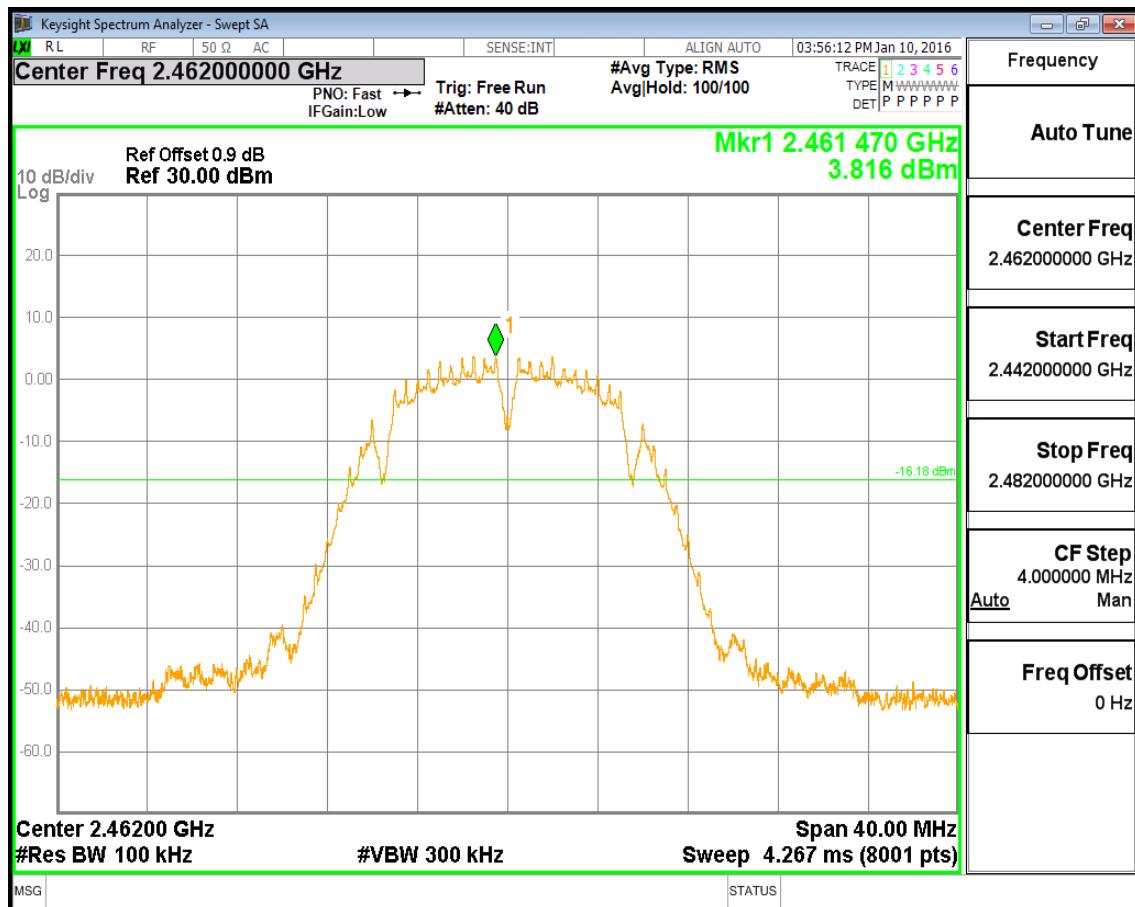
(Plot 4.5.1 B4: Channel 6: 2437MHz @ 802.11b)



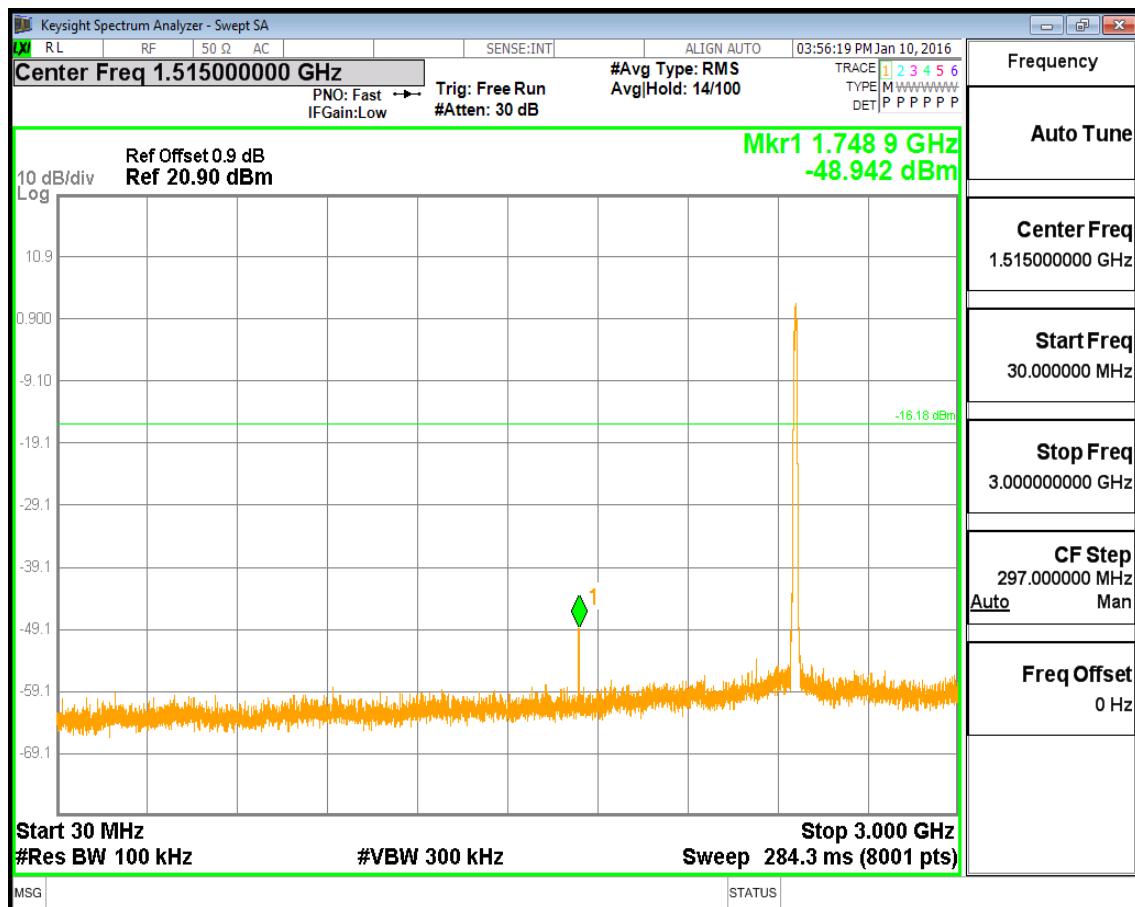
(Plot 4.5.1 B5: Channel 6: 2437MHz @ 802.11b)



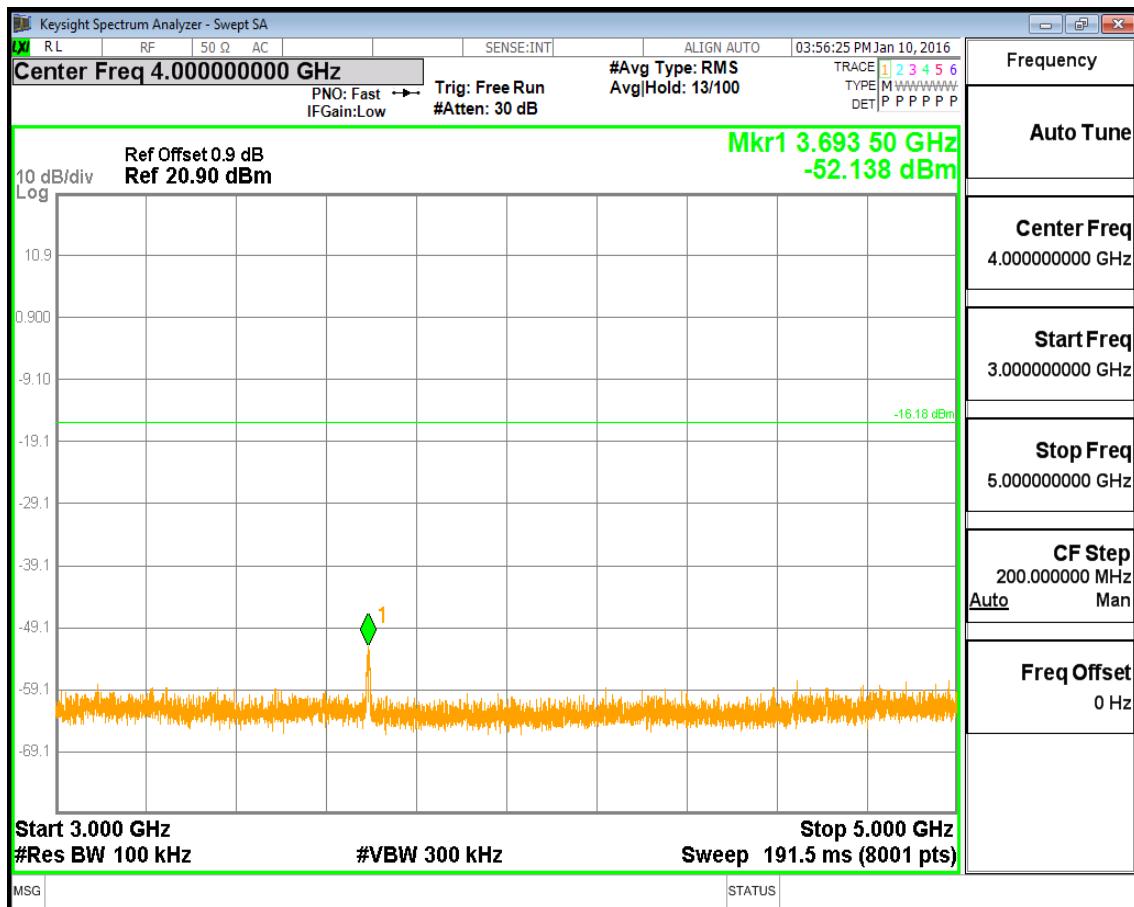
(Plot 4.5.1 B6: Channel 6: 2437MHz @ 802.11b)



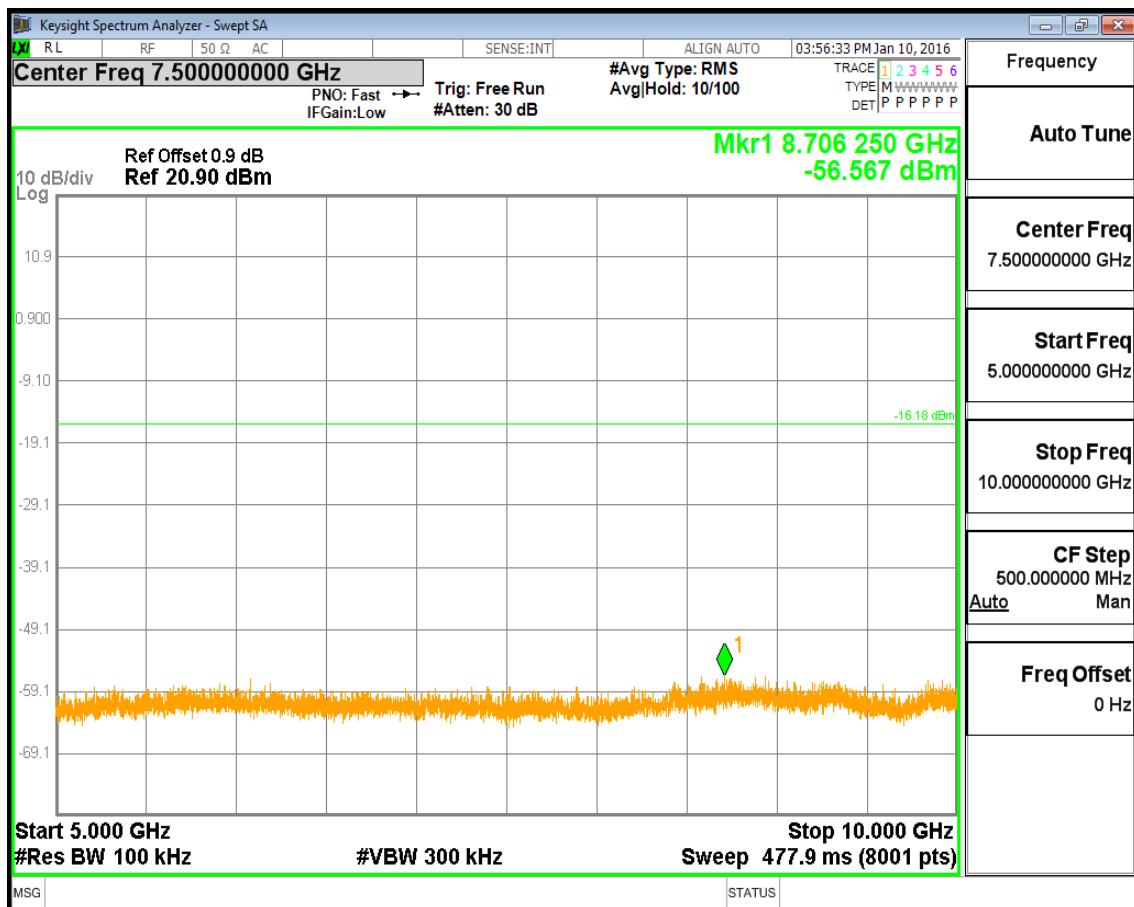
(Plot 4.5.1 C1: Channel 11: 2462MHz @ 802.11b)



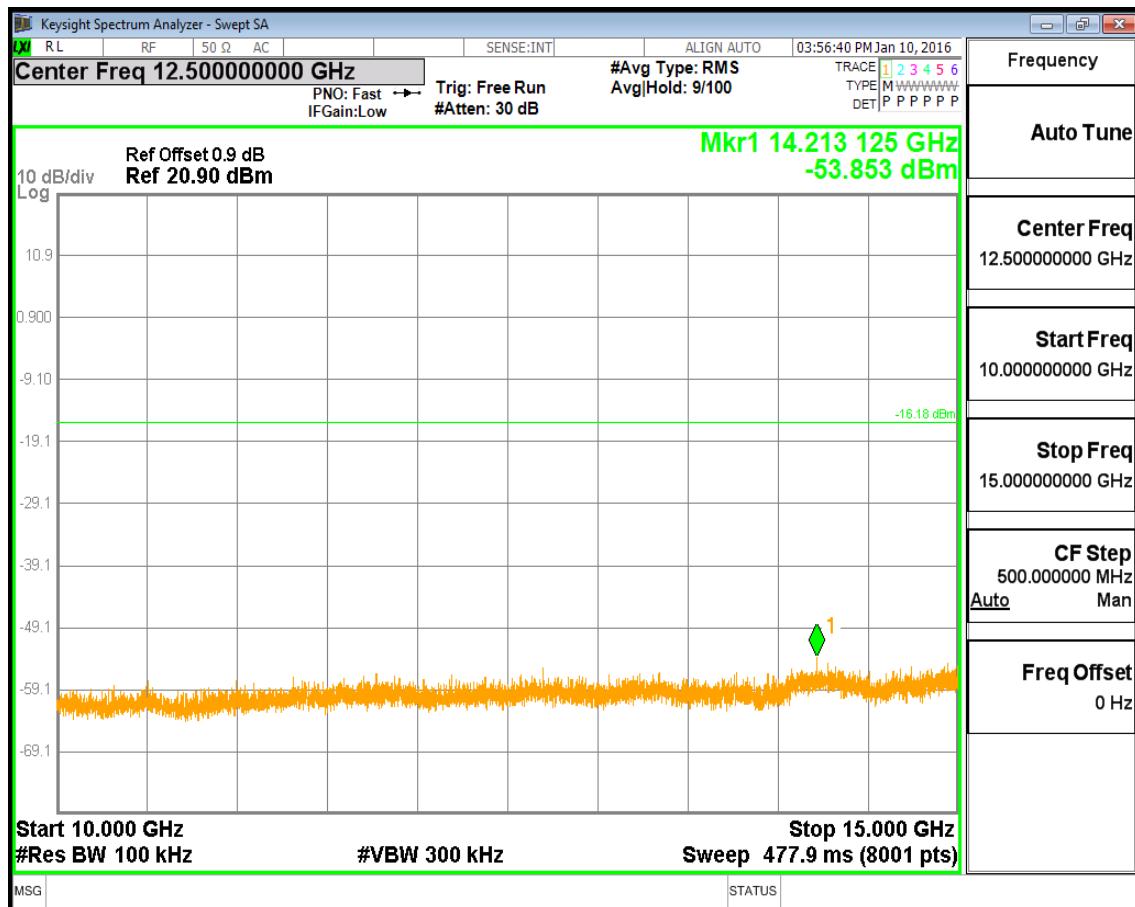
(Plot 4.5.1 C2: Channel 11: 2462MHz @ 802.11b)



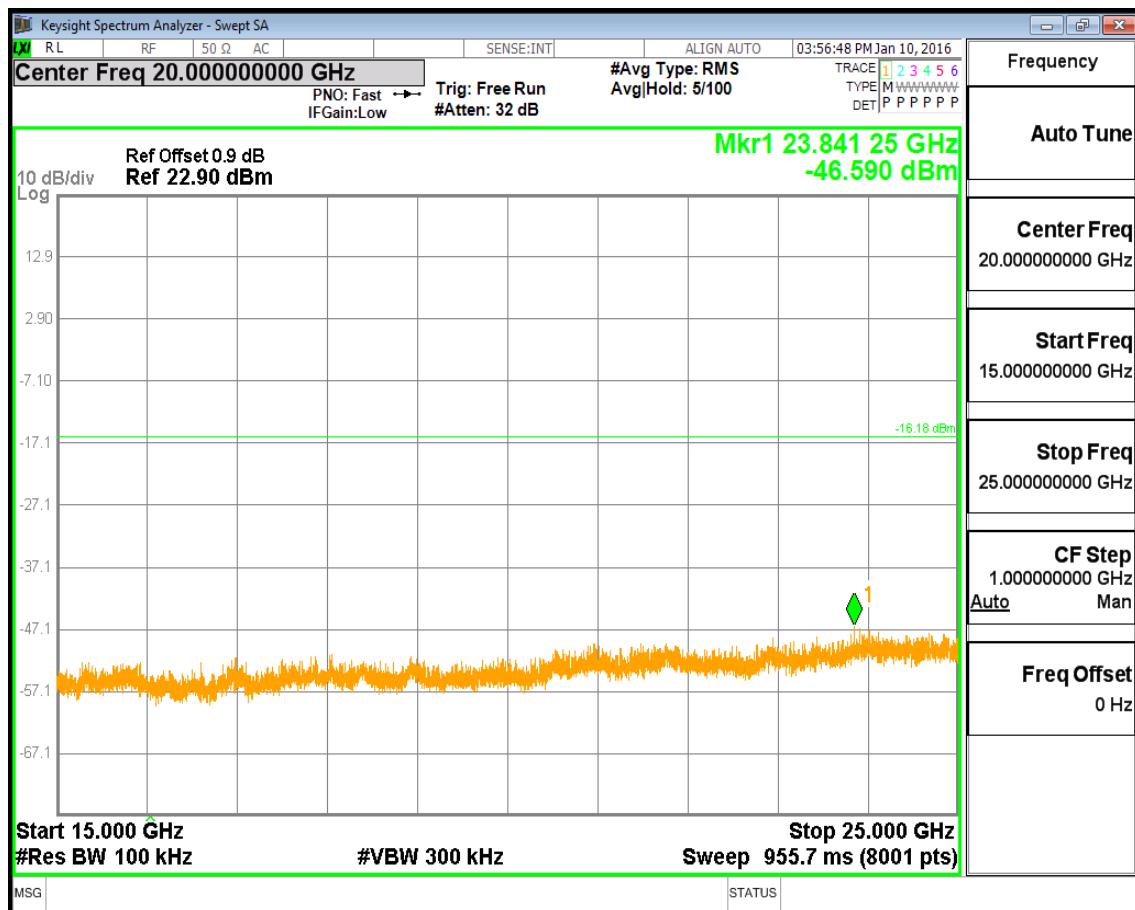
(Plot 4.5.1 C3: Channel 11: 2462MHz @ 802.11b)



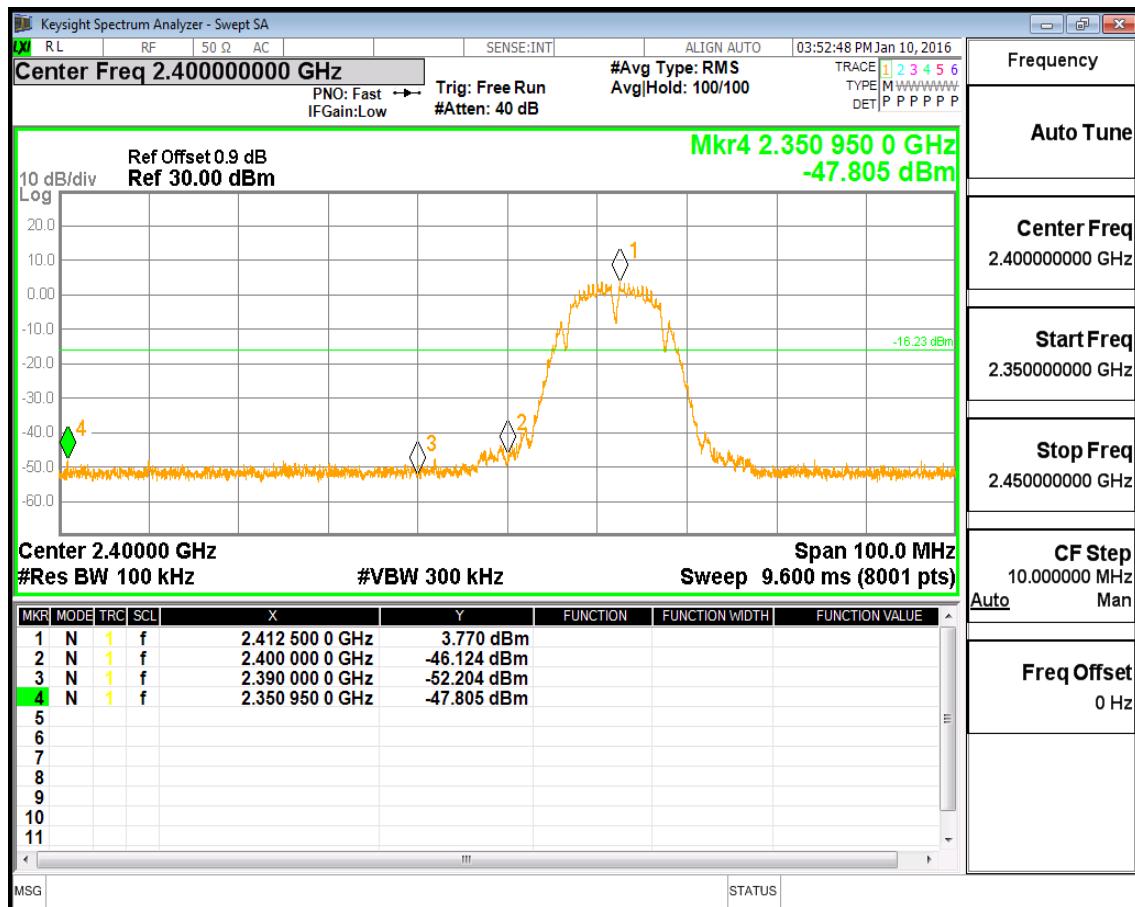
(Plot 4.5.1 C4: Channel 11: 2462MHz @ 802.11b)



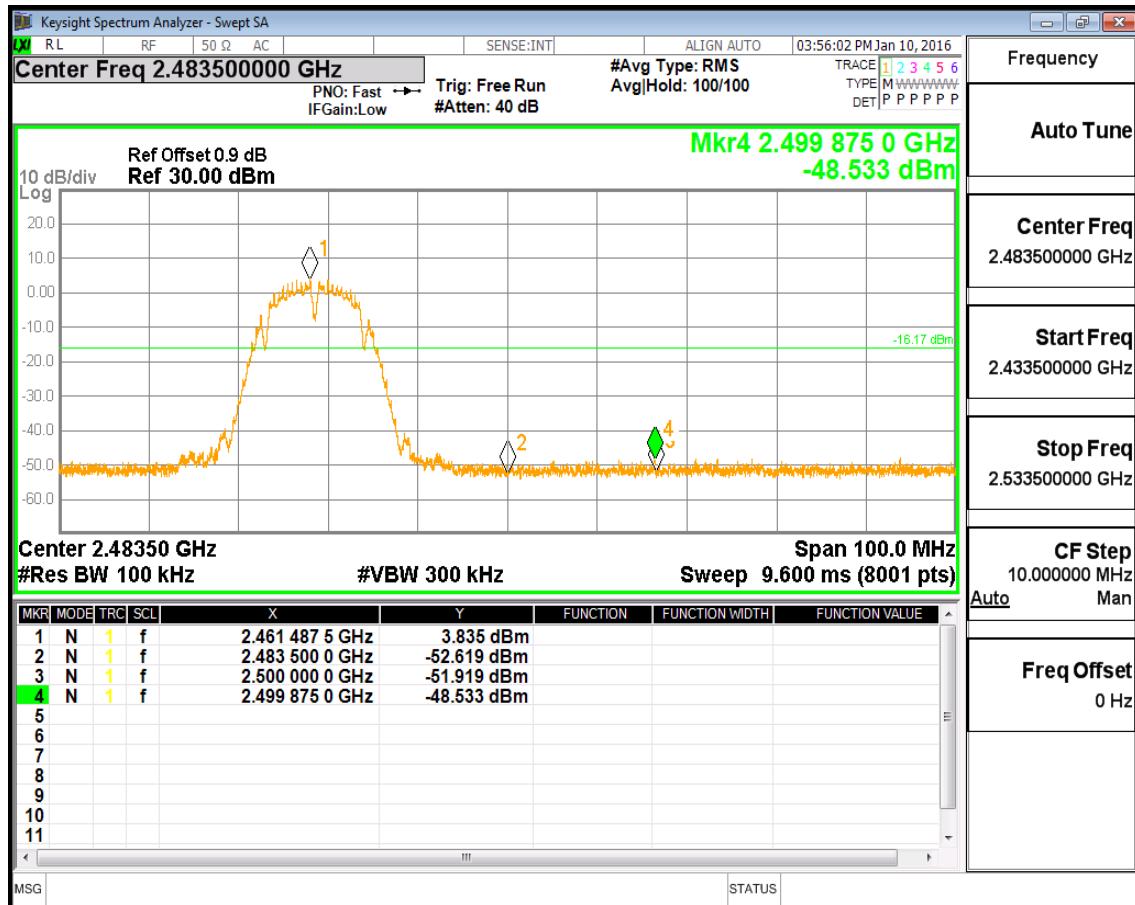
(Plot 4.5.1 C5: Channel 11: 2462MHz @ 802.11b)



(Plot 4.5.1 C6: Channel 11: 2462MHz @ 802.11b)



(Plot 4.5.1 D1: Left Band edge @ 802.11b)



(Plot 4.5.1 D2: Right Band edge @ 802.11b)

4.5.2 802.11g Test Mode

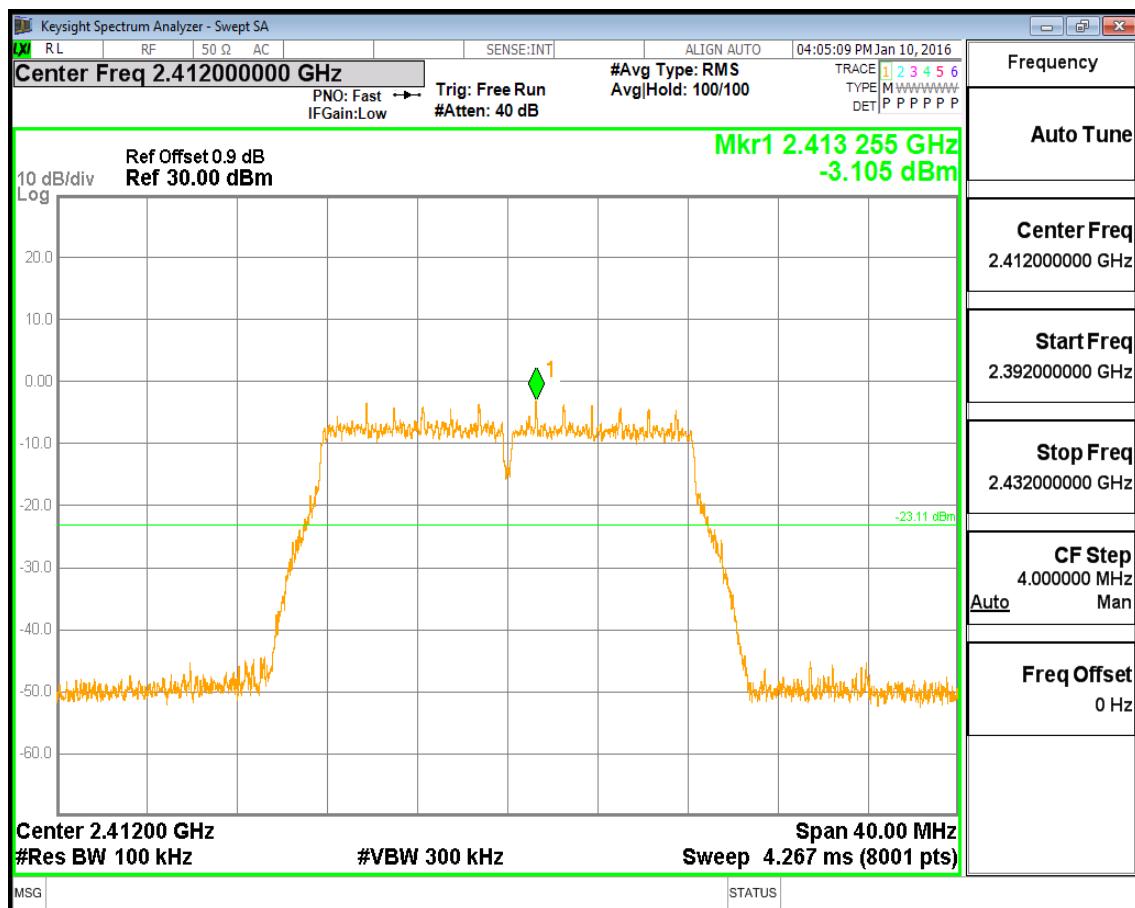
A. Test Verdict

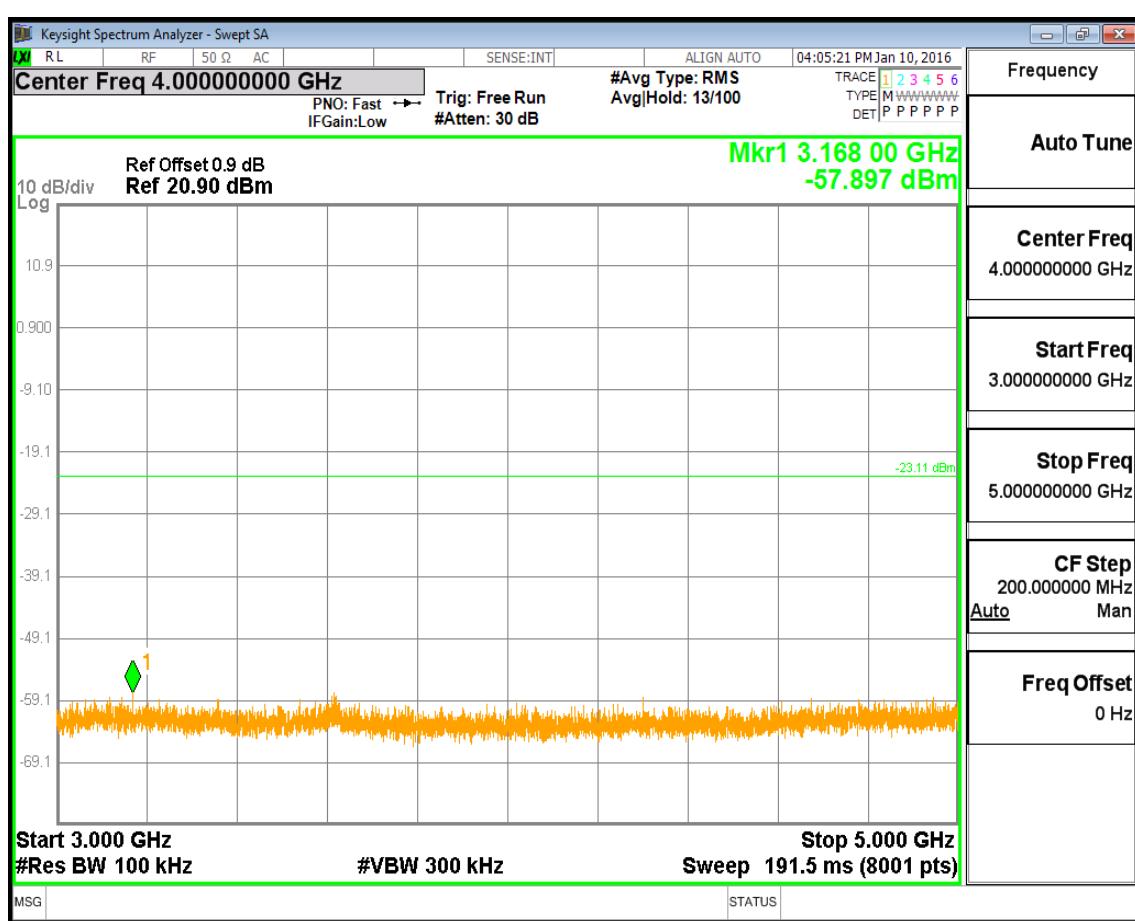
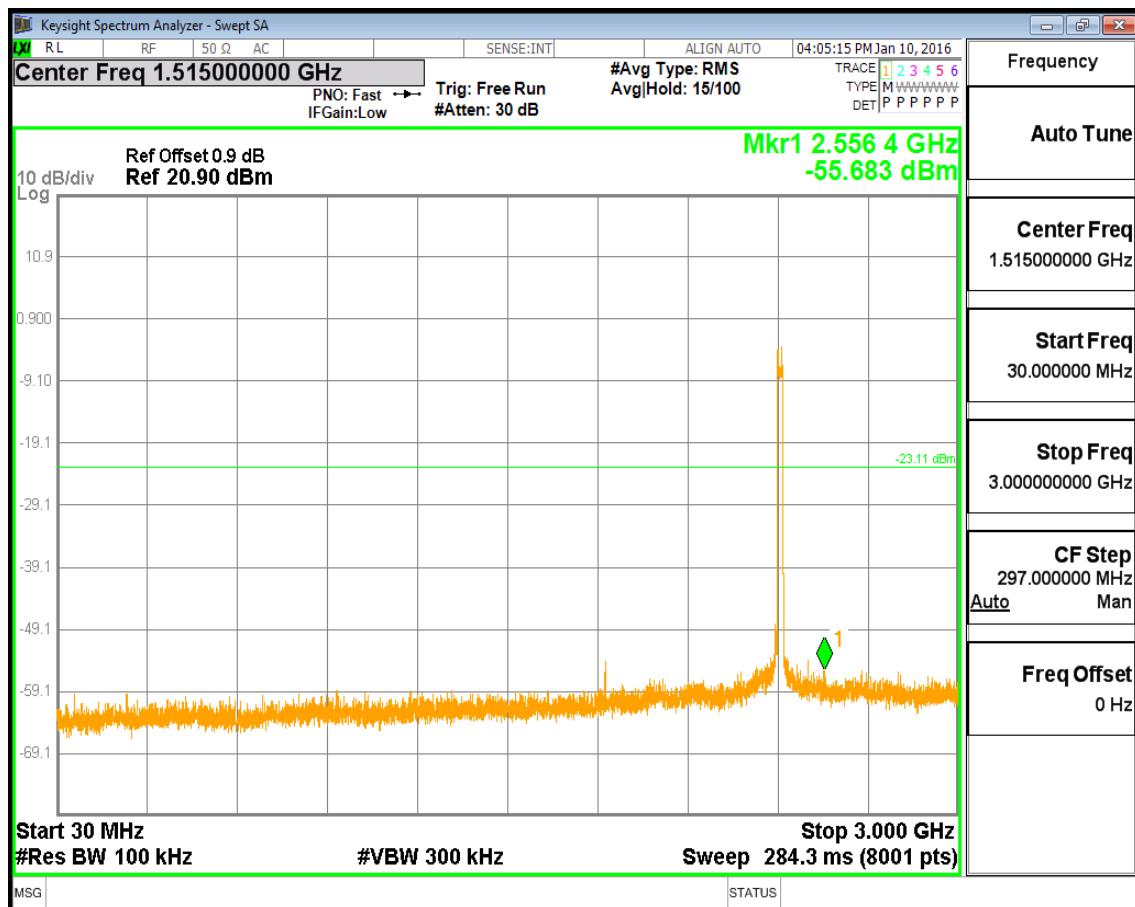
Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict	
1	2412	2.412 GHz	Plot 4.5.2 A1	---	PASS	
		30MHz -3GHz	Plot 4.5.2 A2	-20	PASS	
		3GHz-.5 GHz	Plot 4.5.2 A3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.2 A4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.2 A5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.2 A6	-20	PASS	
6	2437	2.437 GHz	Plot 4.5.2 B1	---	PASS	
		30MHz -3GHz	Plot 4.5.2 B2	-20	PASS	
		3GHz-.5 GHz	Plot 4.5.2 B3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.2 B4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.2 B5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.2 B6	-20	PASS	
11	2462	2.462 GHz	Plot 4.5.2 C1	---	PASS	
		30MHz -3GHz	Plot 4.5.2 C2	-20	PASS	
		3GHz-.5 GHz	Plot 4.5.2 C3	-20	PASS	
		3GHz-.10 GHz	Plot 4.5.2 C4	-20	PASS	
		10GHz-.15 GHz	Plot 4.5.2 C5	-20	PASS	
		15GHz-.25 GHz	Plot 4.5.2 C6	-20	PASS	
Conducted bandedge		Left Band edge	Plot 4.5.2 D1	-20	PASS	
		Right Band edge	Plot 4.5.2 D2	-20	PASS	

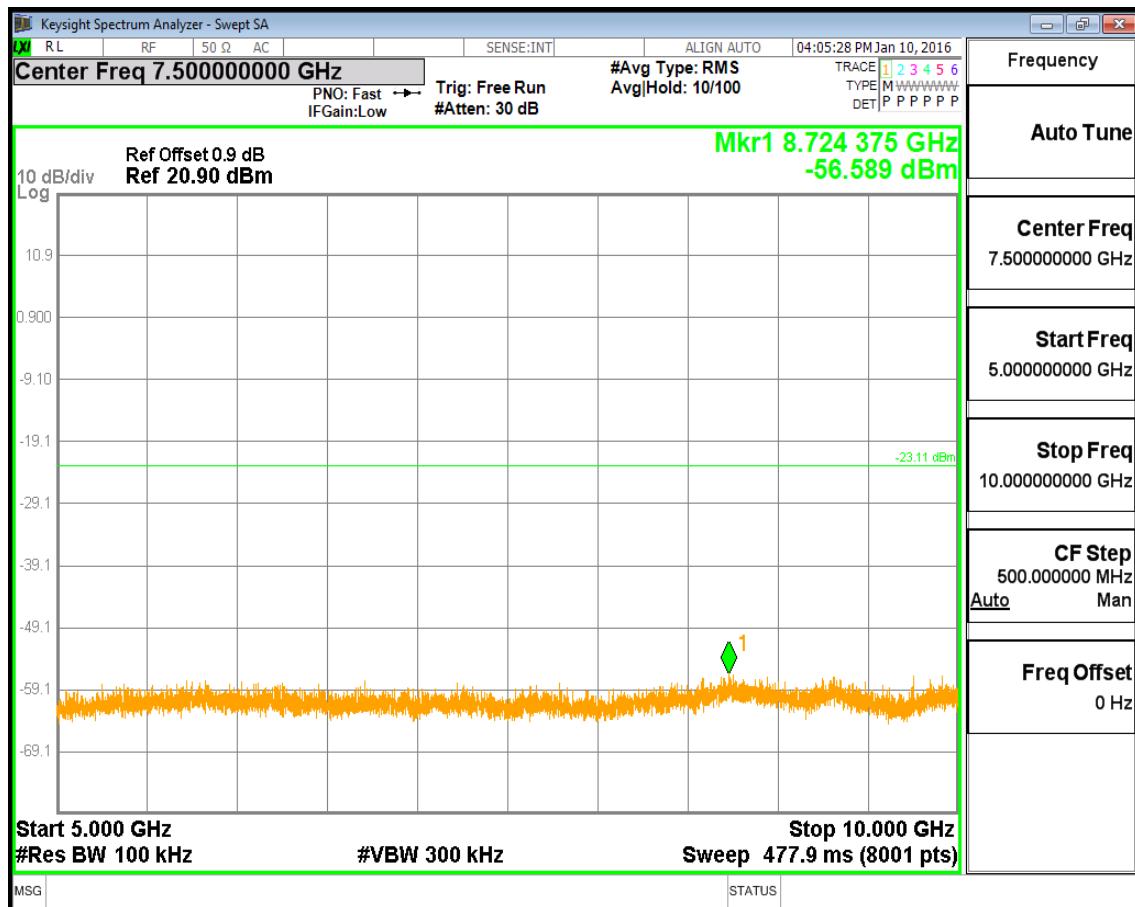
Note:

1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.
3. For 9KHz -30MHz, Because there was only background, So We did not recorded data.

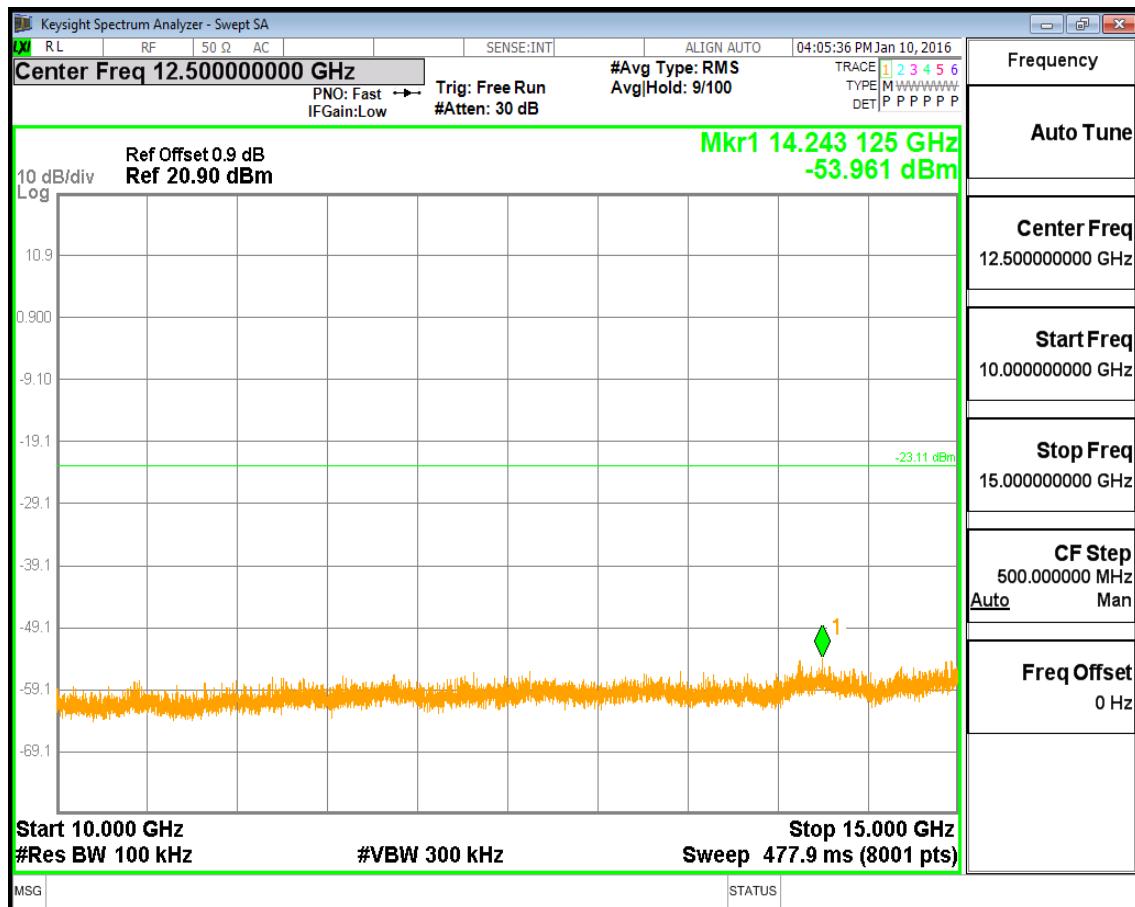
B. Test Plots



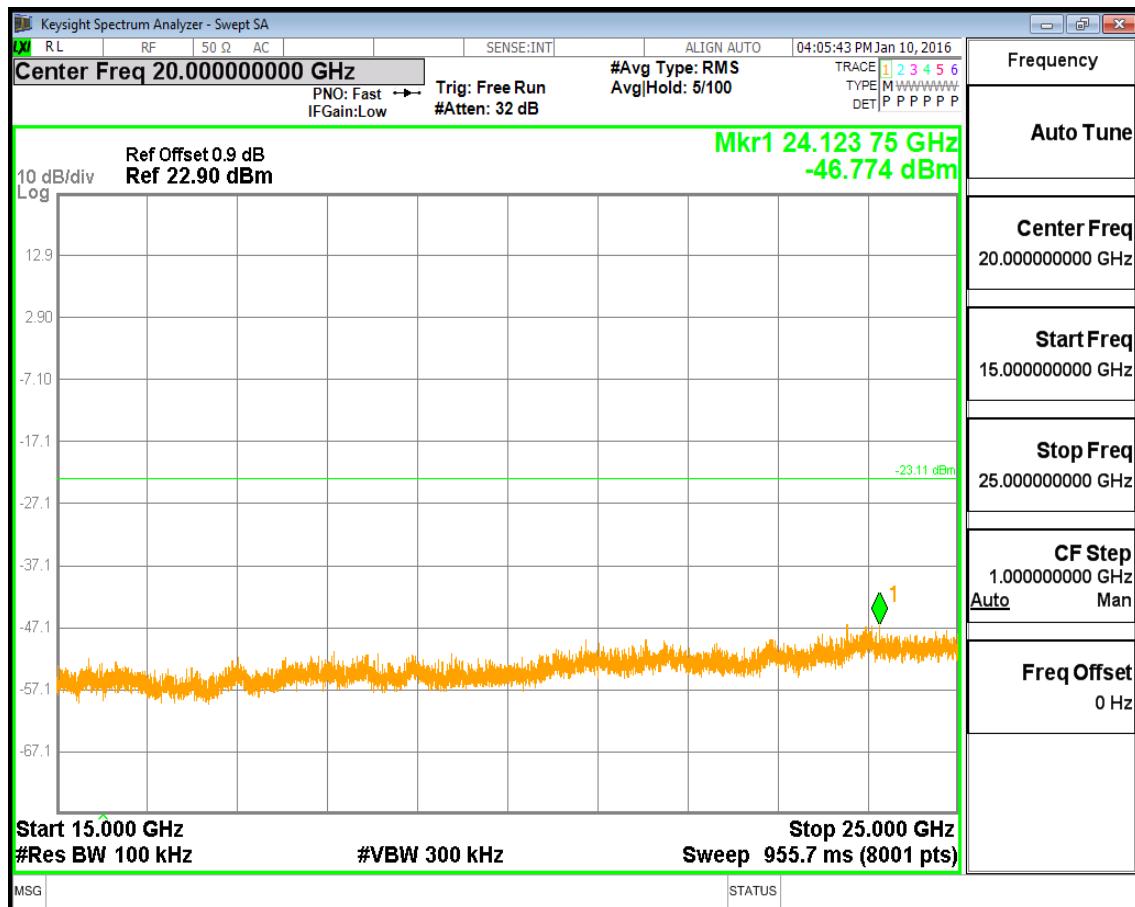




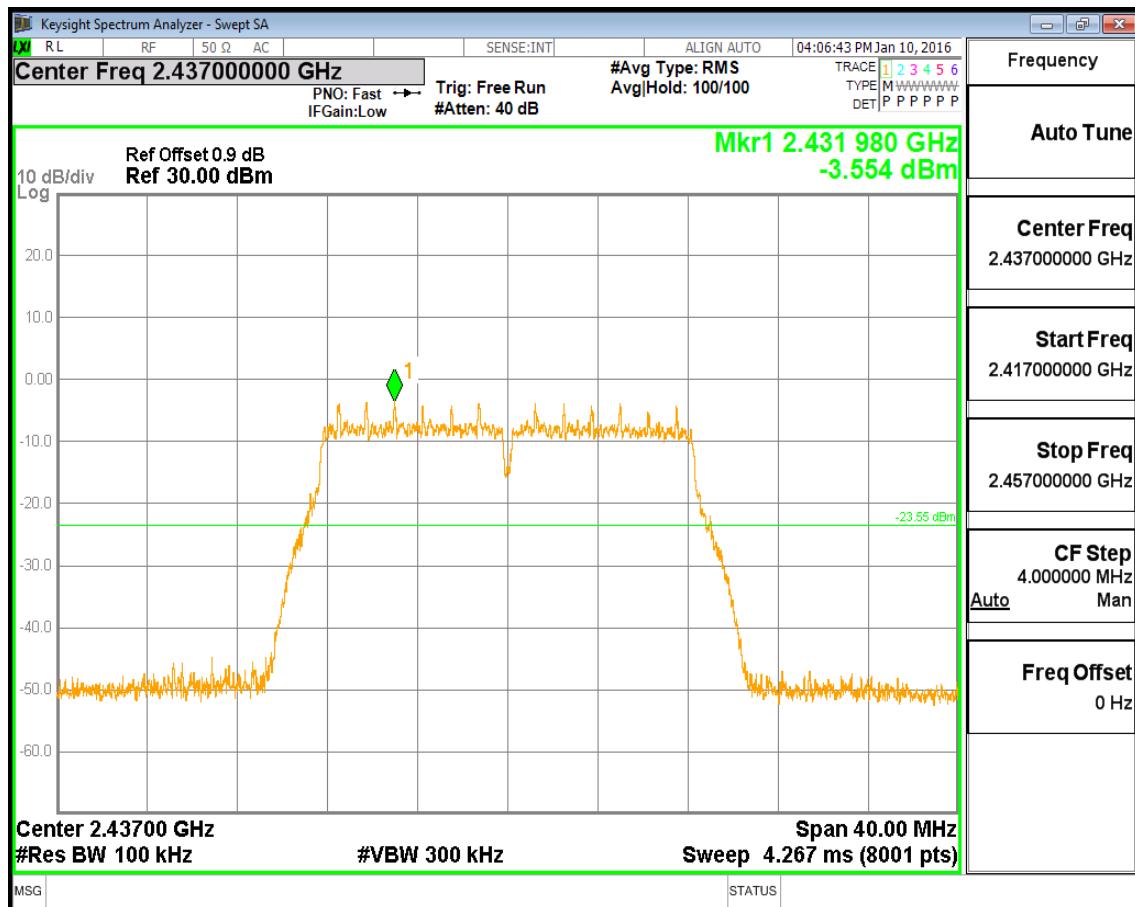
(Plot 4.5.2 A4: Channel 1: 2412MHz @ 802.11g)



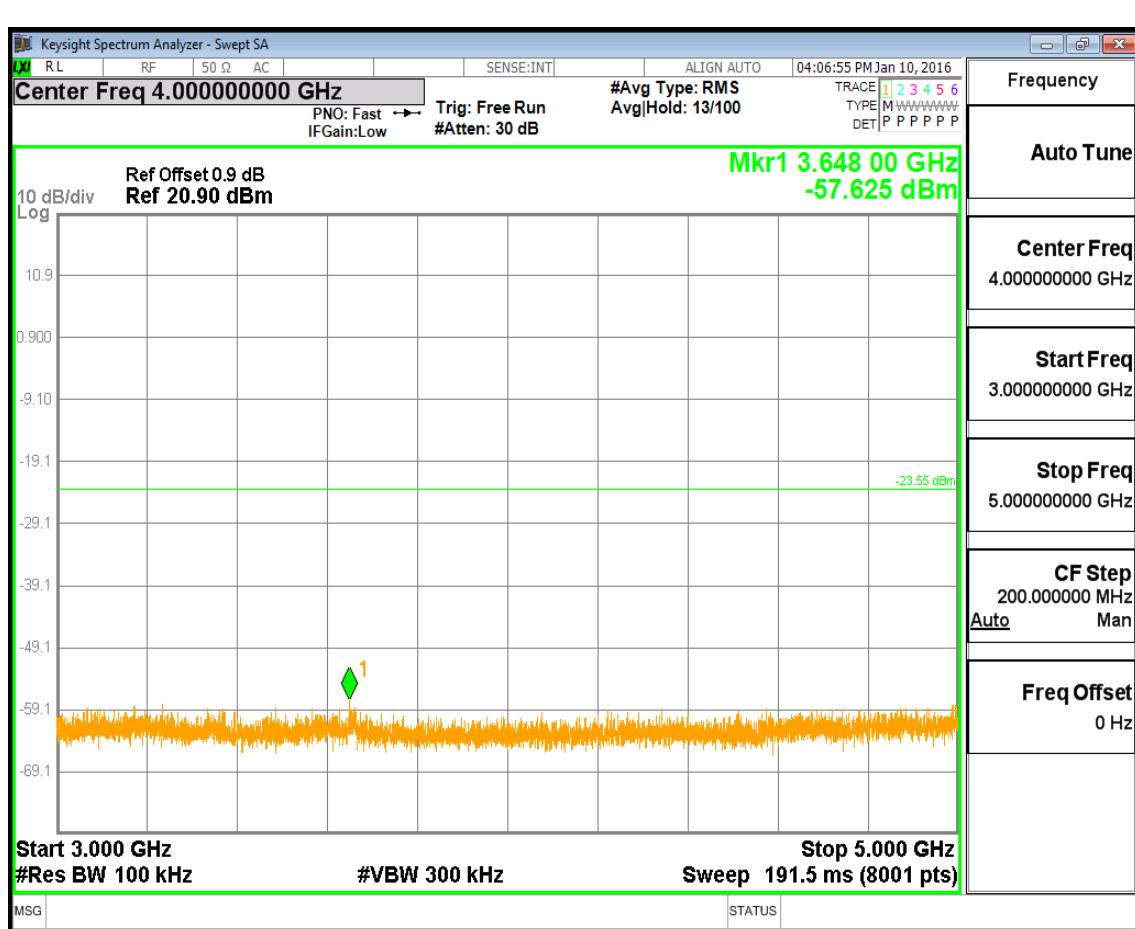
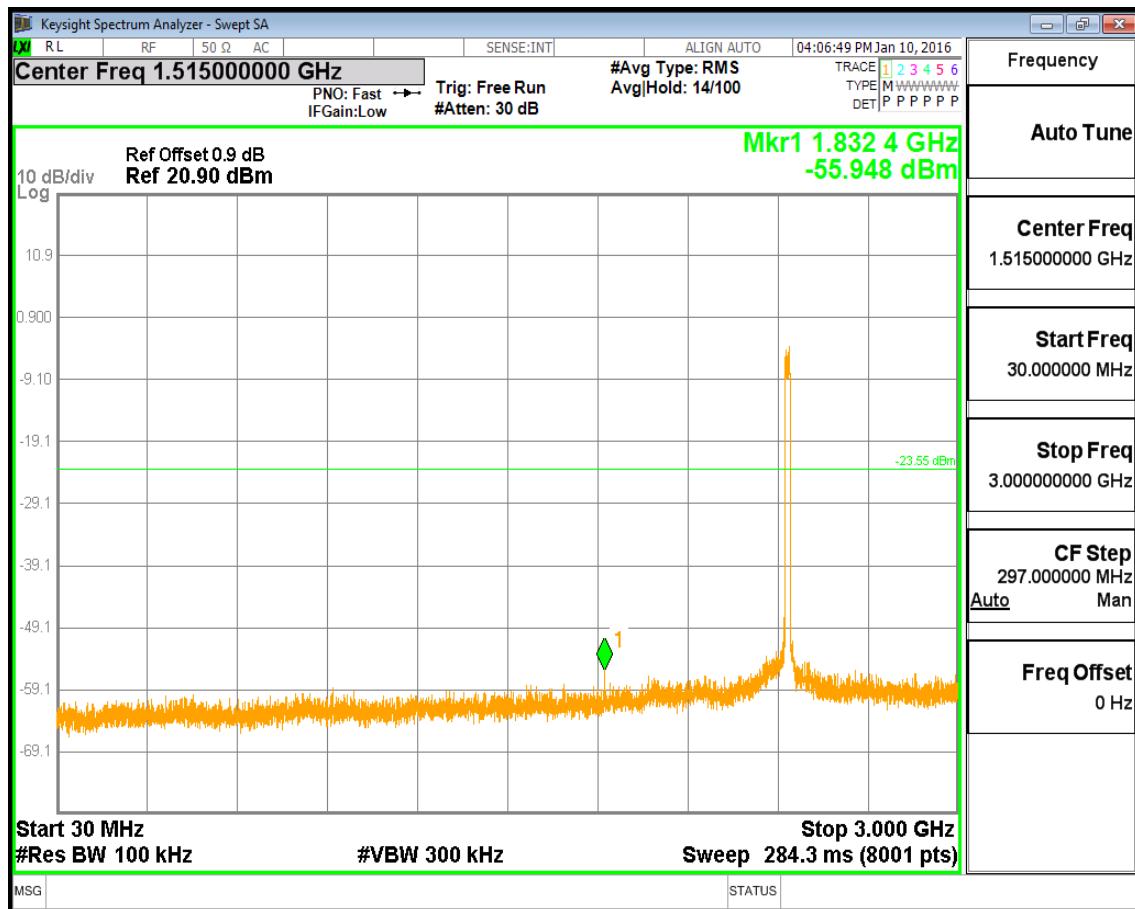
(Plot 4.5.2 A5: Channel 1: 2412MHz @ 802.11g)

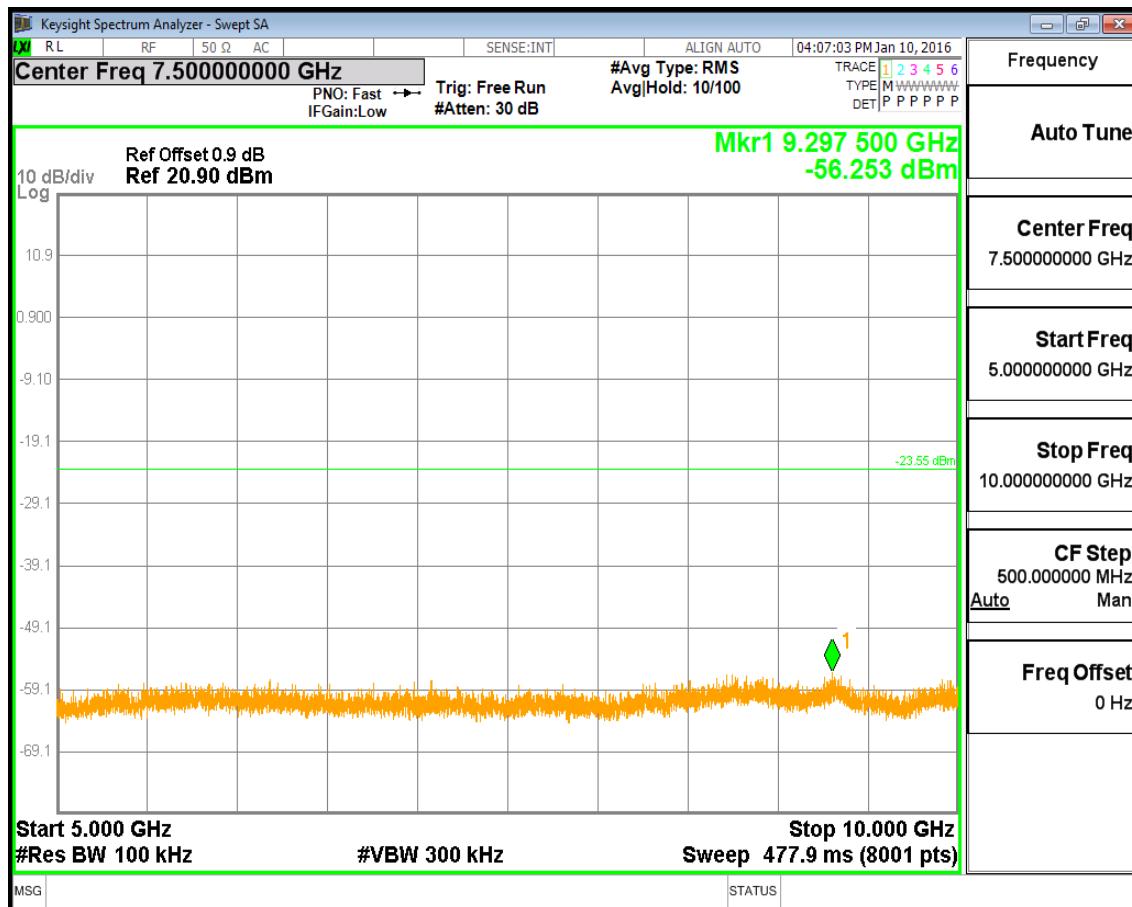


(Plot 4.5.2 A6: Channel 1: 2412MHz @ 802.11g)

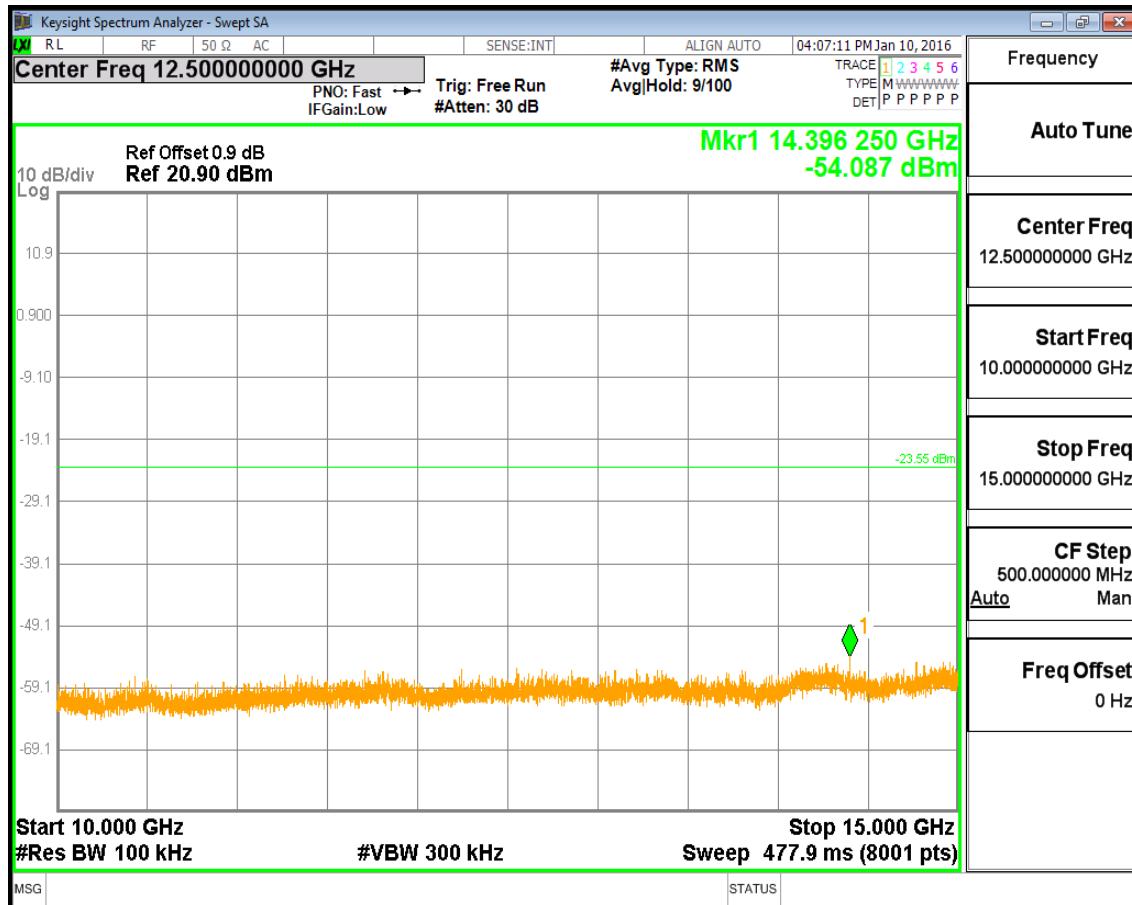


(Plot 4.5.2 B1: Channel 6: 2437MHz @ 802.11g)

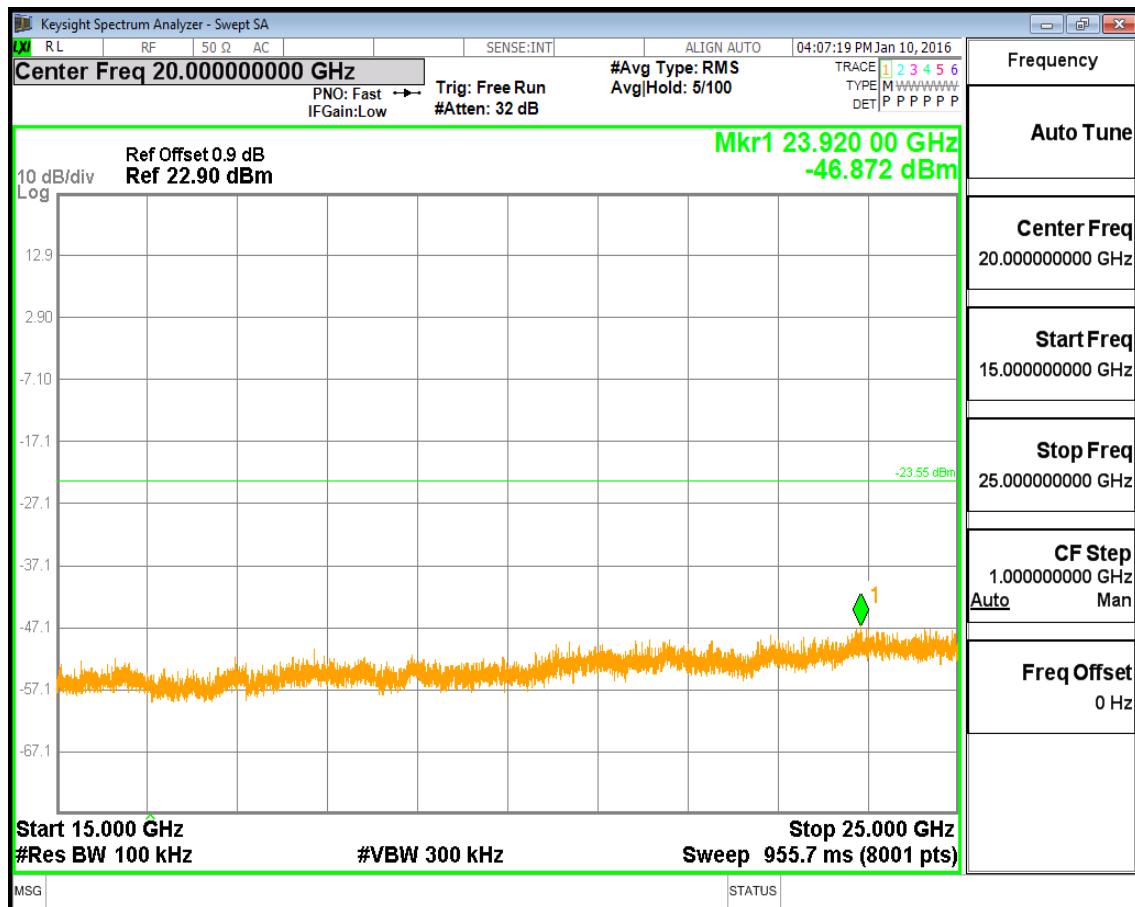




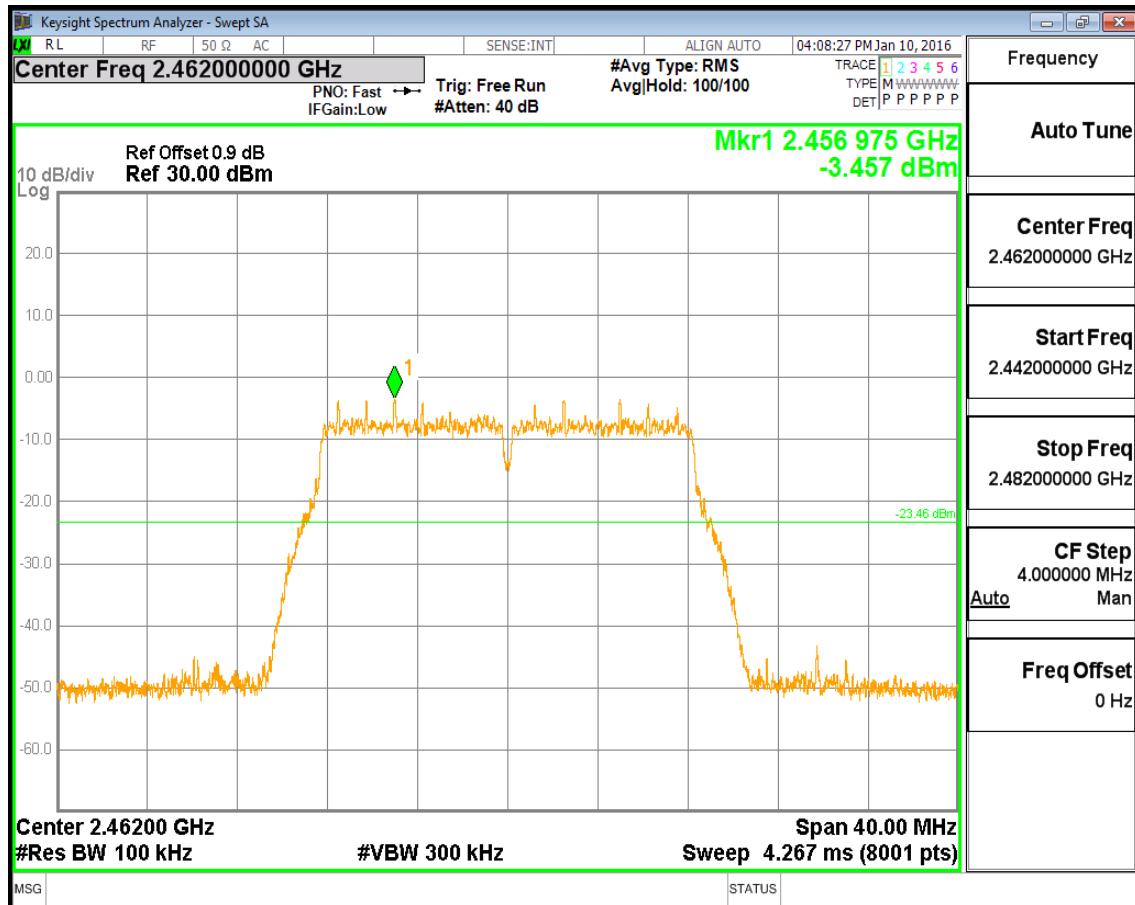
(Plot 4.5.2 B4: Channel 6: 2437MHz @ 802.11g)



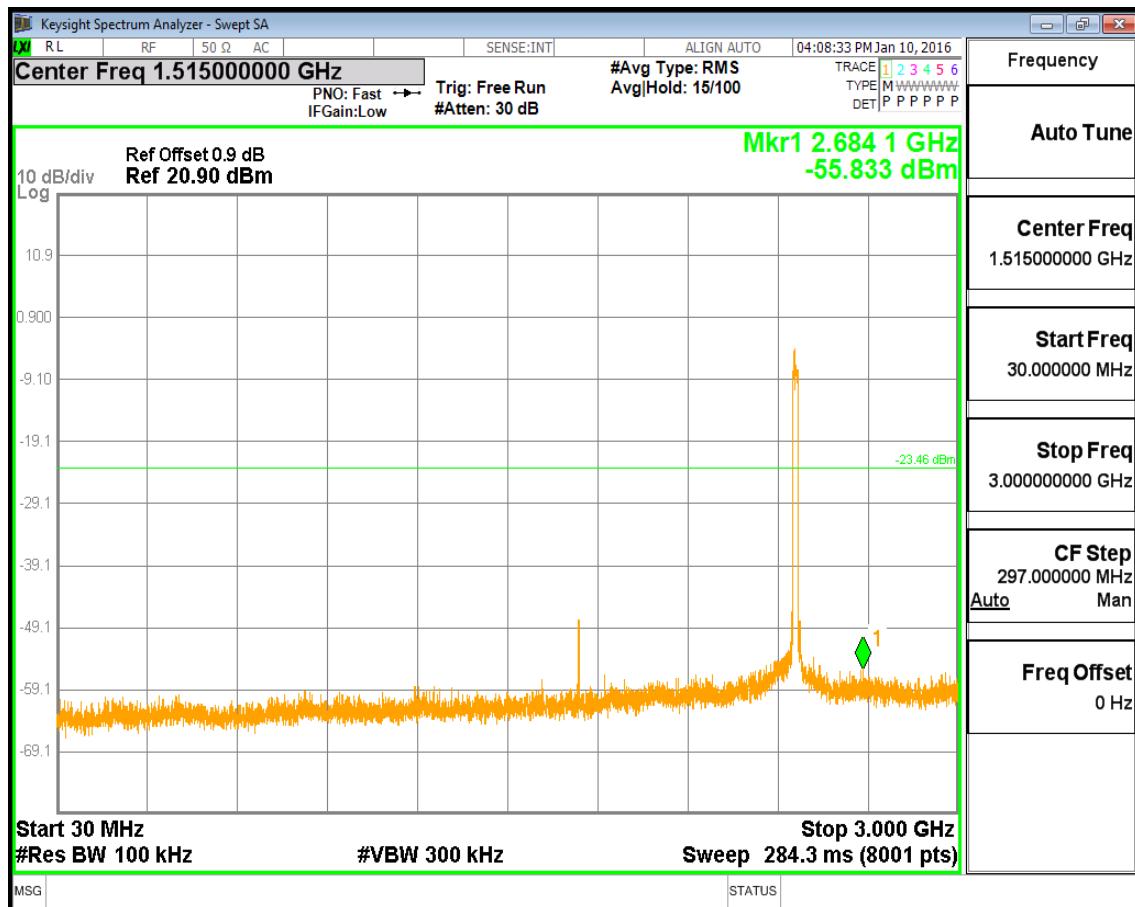
(Plot 4.5.2 B5: Channel 6: 2437MHz @ 802.11g)



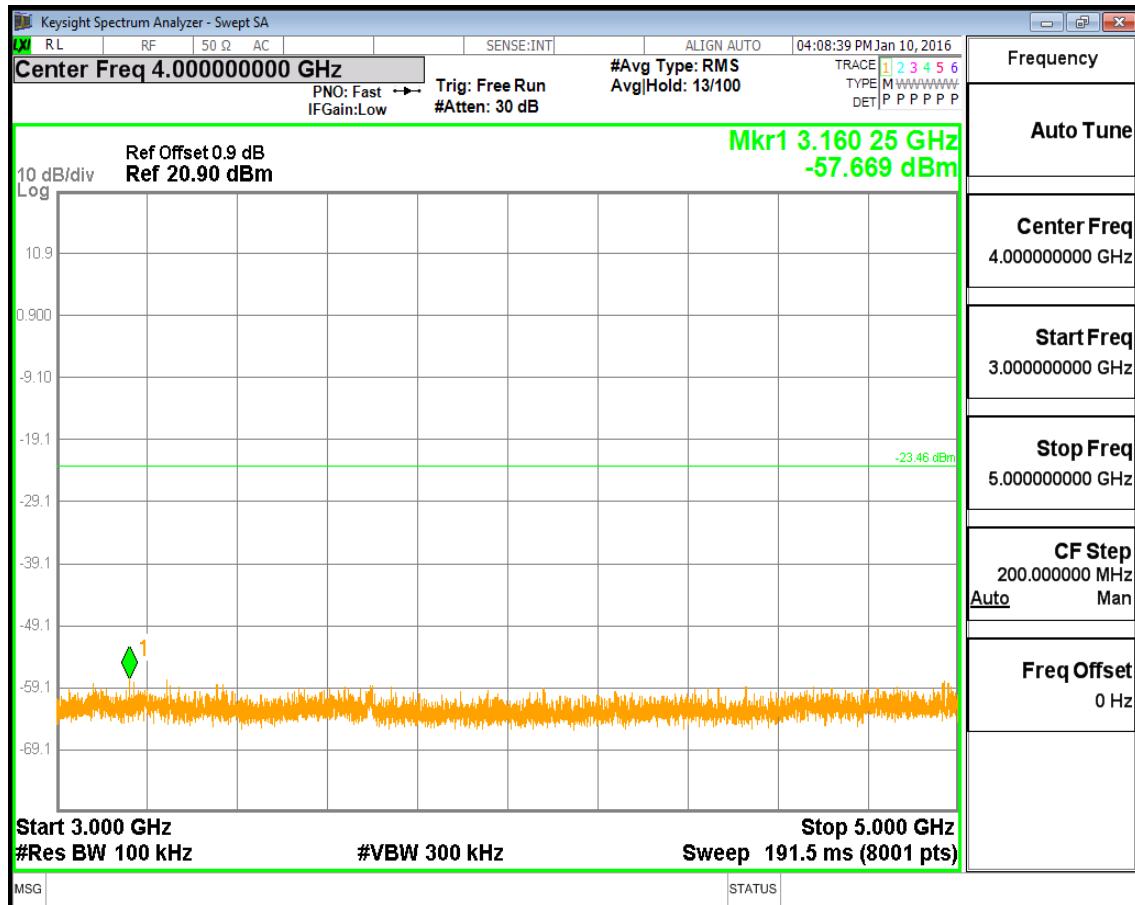
(Plot 4.5.2 B6: Channel 6: 2437MHz @ 802.11g)



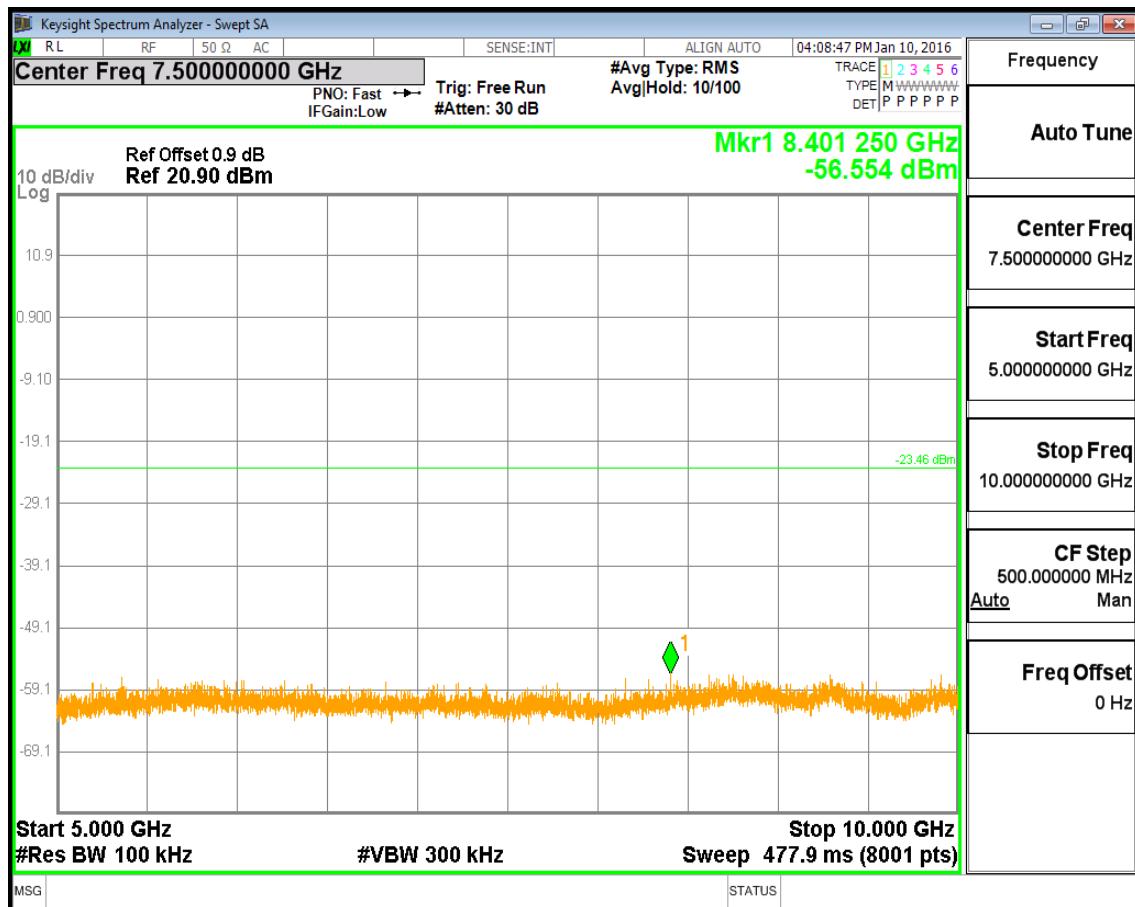
(Plot 4.5.2 C1: Channel 11: 2462MHz @ 802.11g)



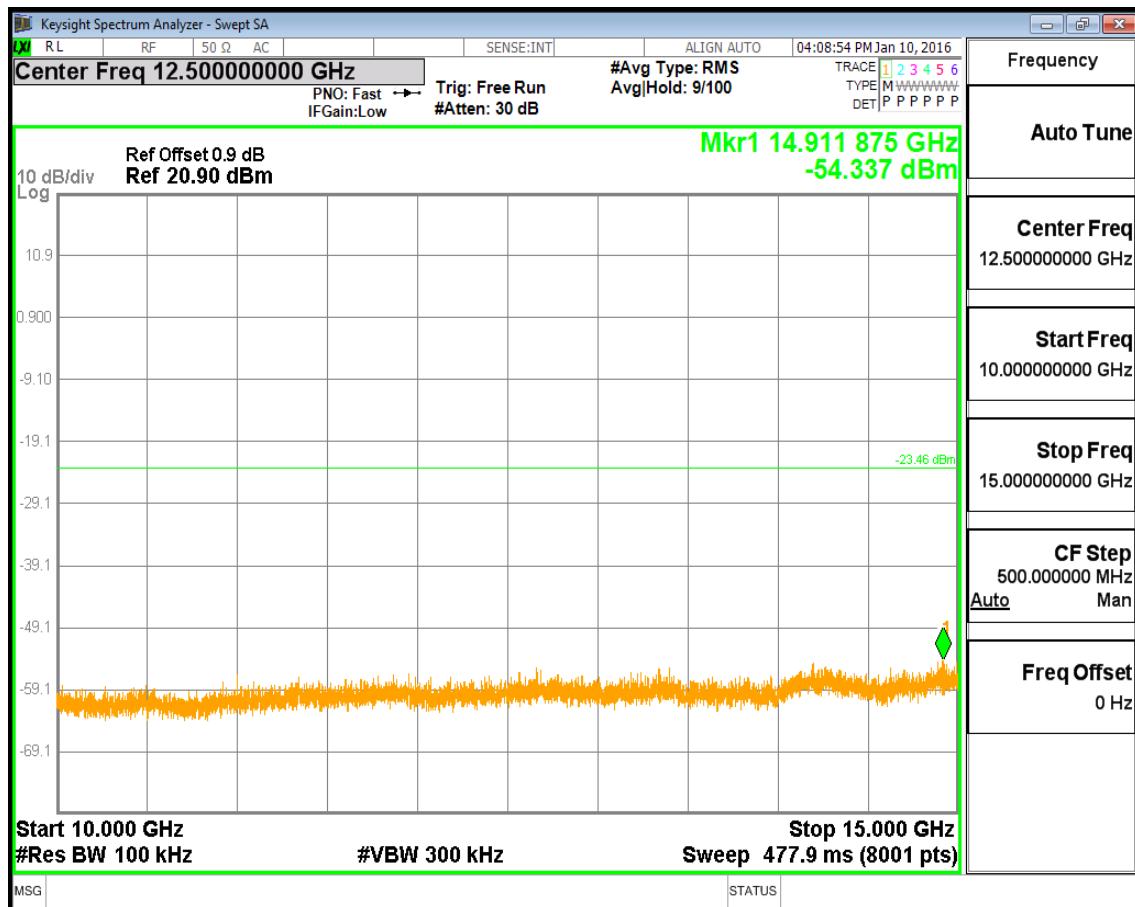
(Plot 4.5.2 C2: Channel 11: 2462MHz @ 802.11g)



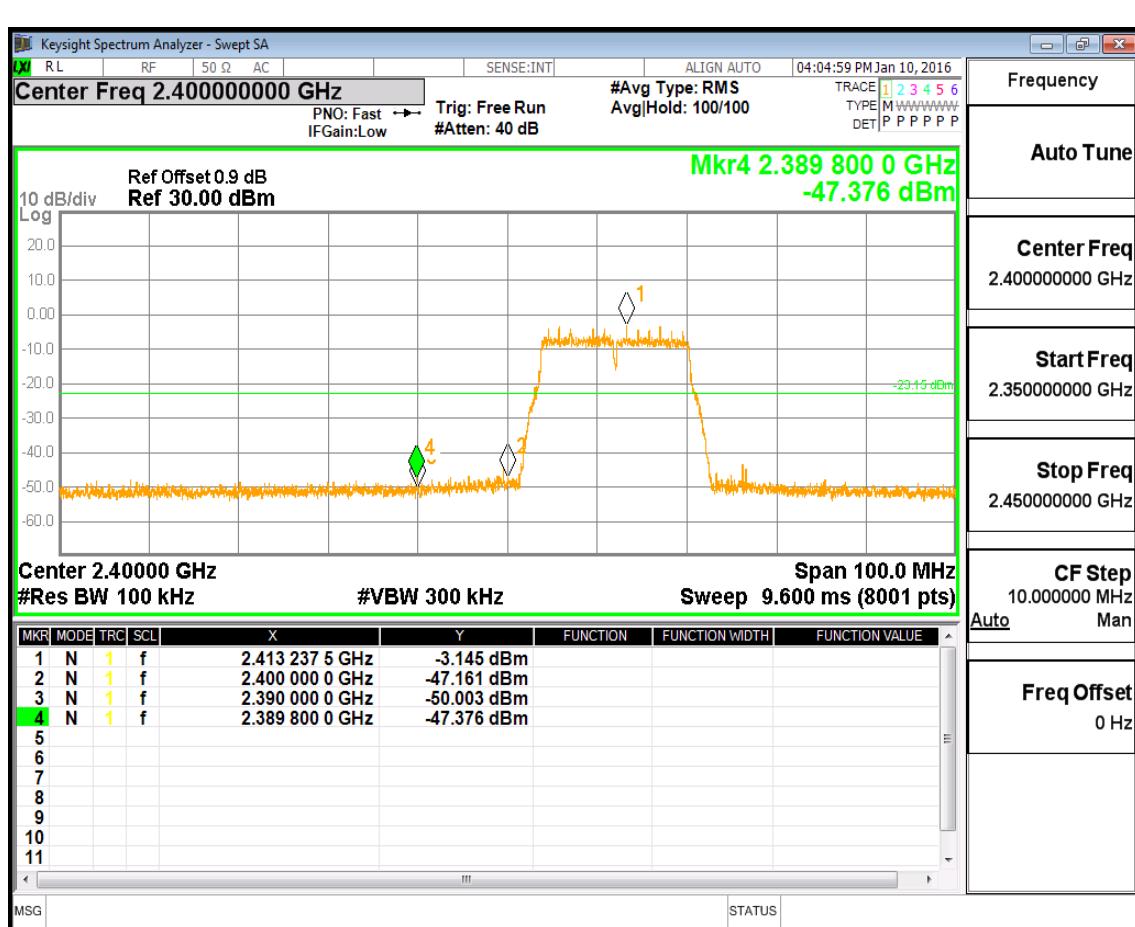
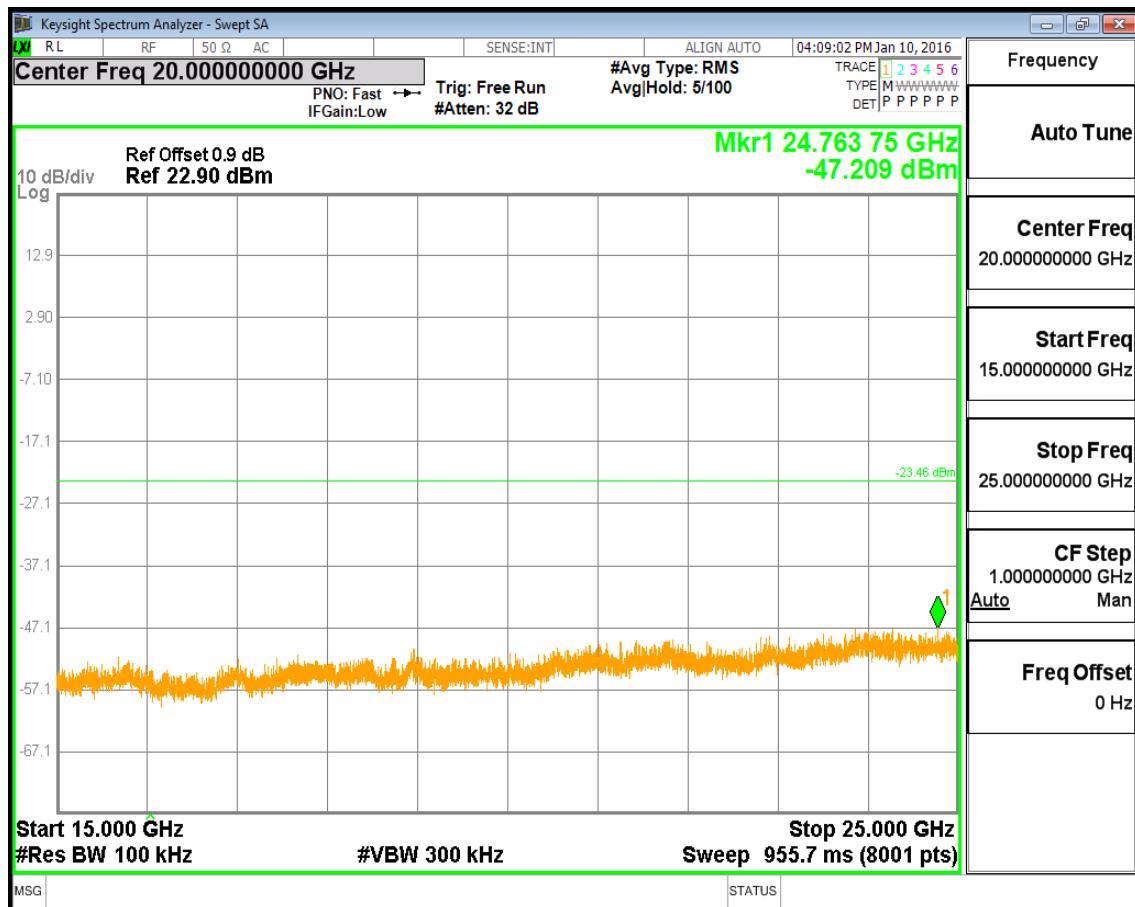
(Plot 4.5.2 C3: Channel 11: 2462MHz @ 802.11g)

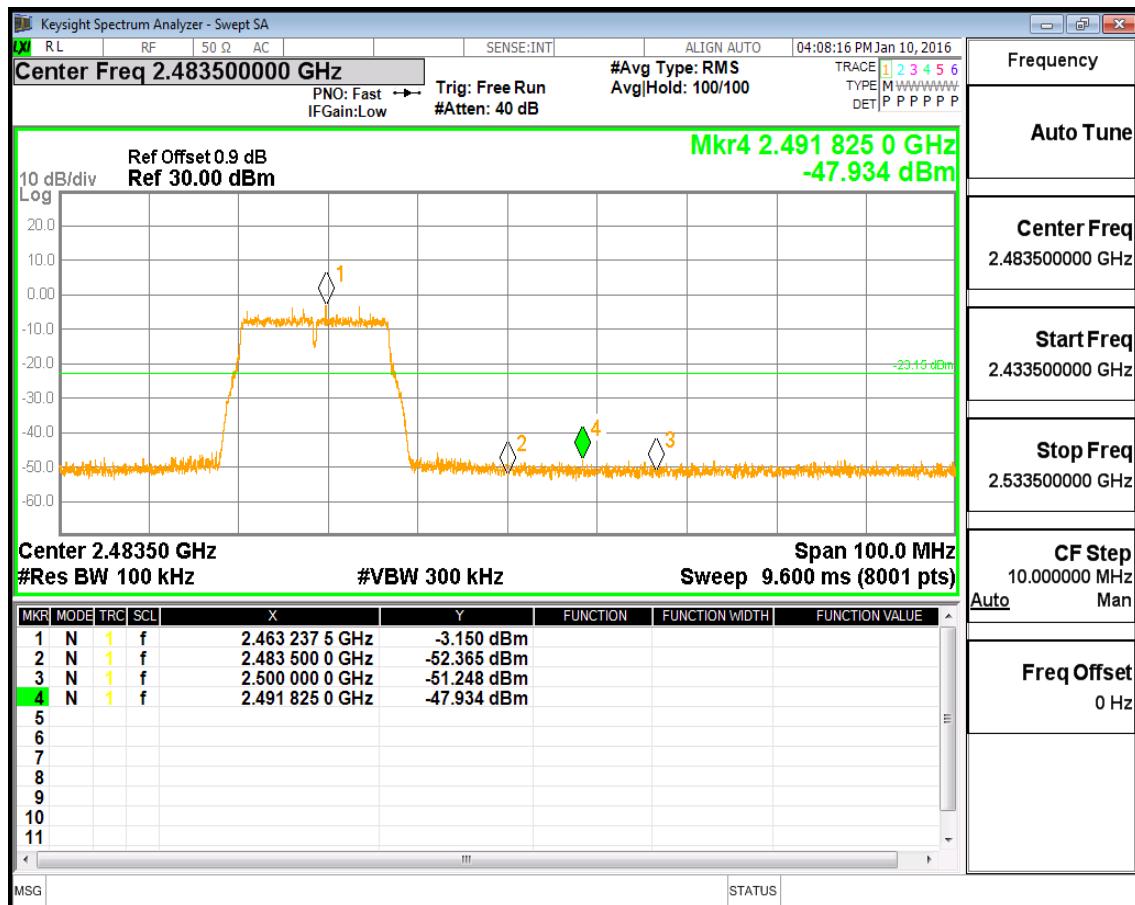


(Plot 4.5.2 C4: Channel 11: 2462MHz @ 802.11g)



(Plot 4.5.2 C5: Channel 11: 2462MHz @ 802.11g)





(Plot 4.5.2 D2: Right Band edge @ 802.11g)

4.5.3 802.11n HT20MHz Test Mode

A. Test Verdict

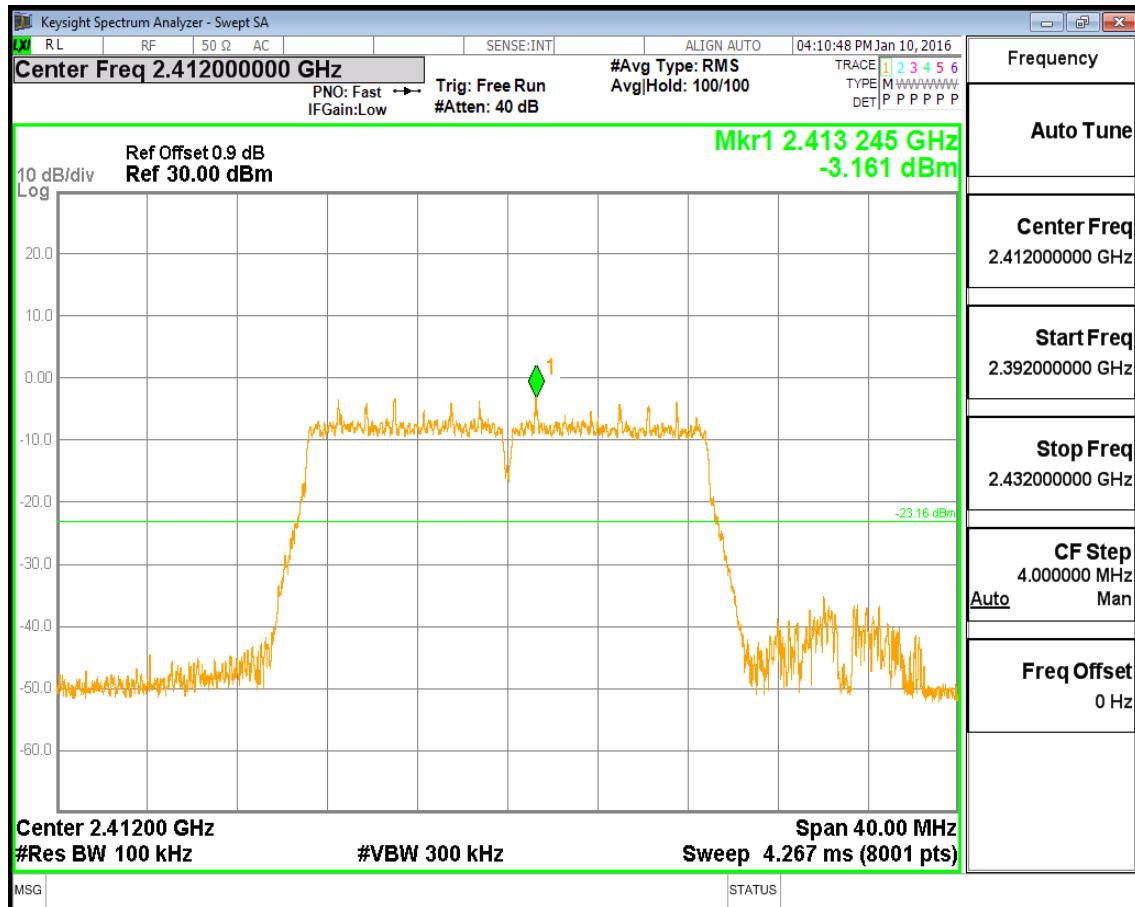
Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
1	2412	2.412 GHz	Plot 4.5.3 A1	---	PASS
		30MHz -3GHz	Plot 4.5.3 A2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.3 A3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.3 A4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.3 A5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.3 A6	-20	PASS
6	2437	2.437 GHz	Plot 4.5.3 B1	---	PASS
		30MHz -3GHz	Plot 4.5.3 B2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.3 B3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.3 B4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.3 B5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.3 B6	-20	PASS
11	2462	2.462 GHz	Plot 4.5.3 C1	---	PASS
		30MHz -3GHz	Plot 4.5.3 C2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.3 C3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.3 C4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.3 C5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.3 C6	-20	PASS

Conducted bandedge	Left Band edge	Plot 4.5.3 D1	-20	PASS
	Right Band edge	Plot 4.5.3 D2	-20	PASS

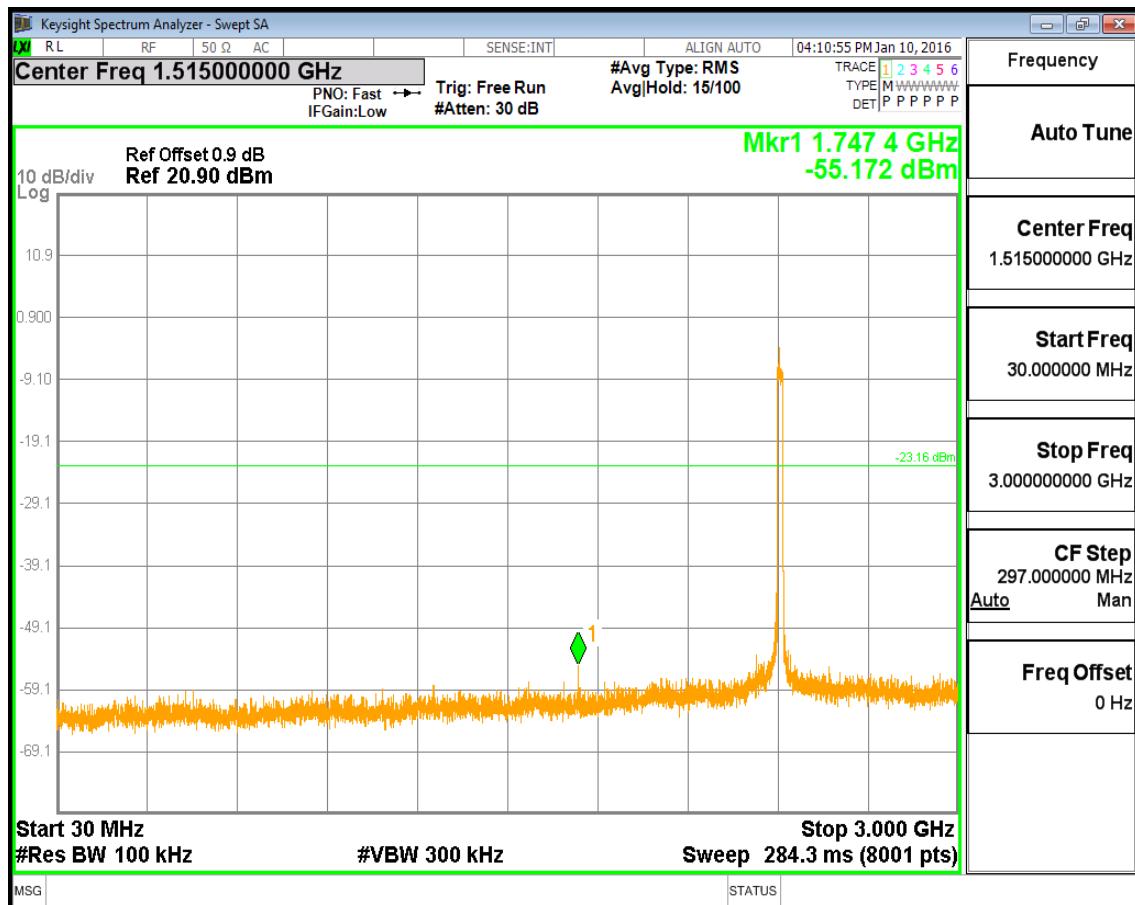
Note:

1. For 802.11n HT20MHz mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.
3. For 9KHz -30MHz, Because there was only background, So We did not recorded data.

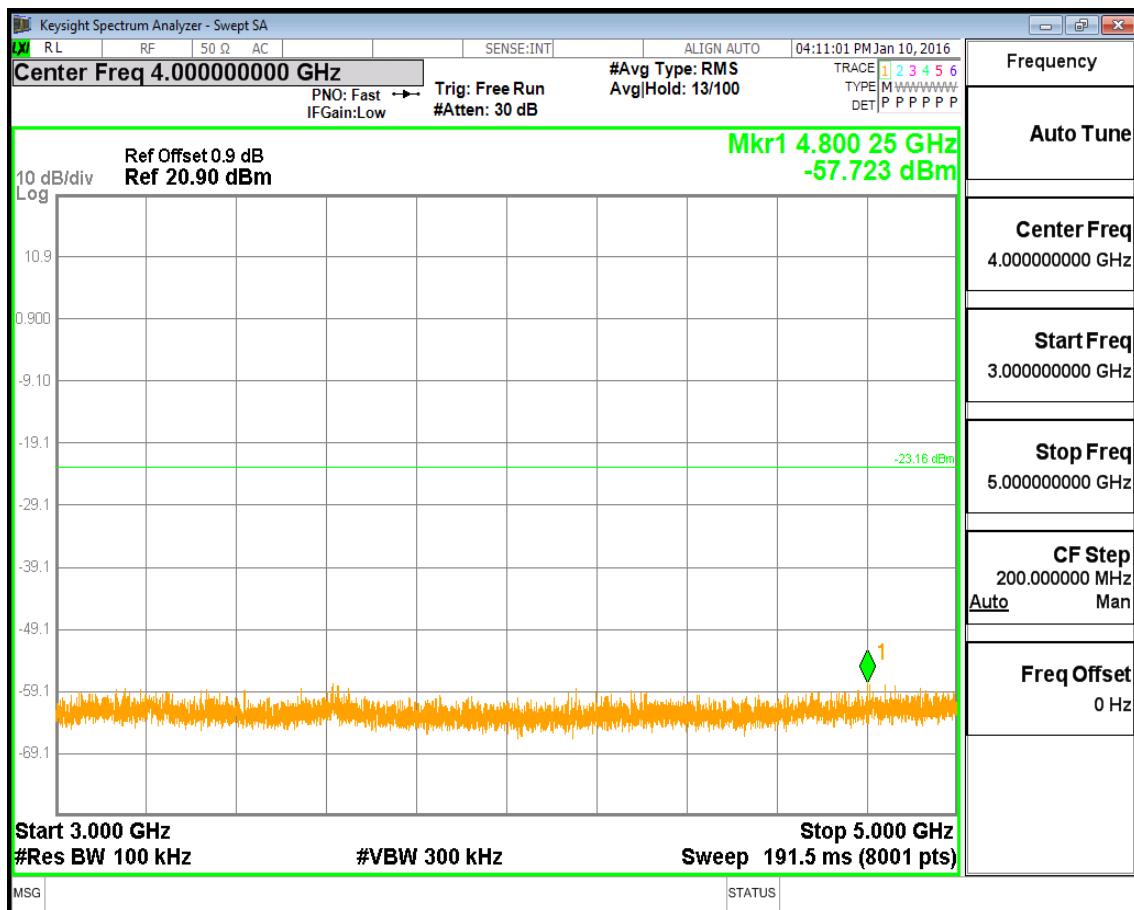
B. Test Plots



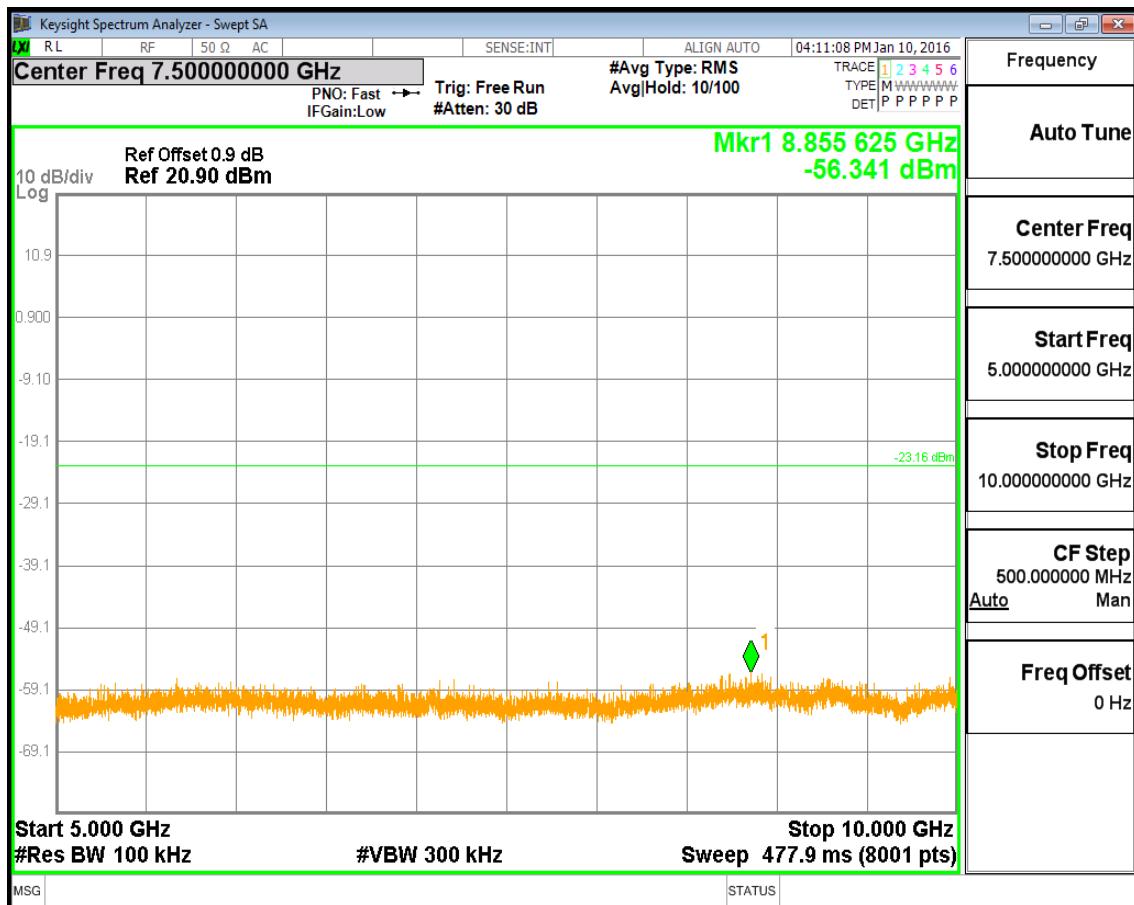
(Plot 4.5.3 A1: Channel 1: 2412MHz @ 802.11n HT20)



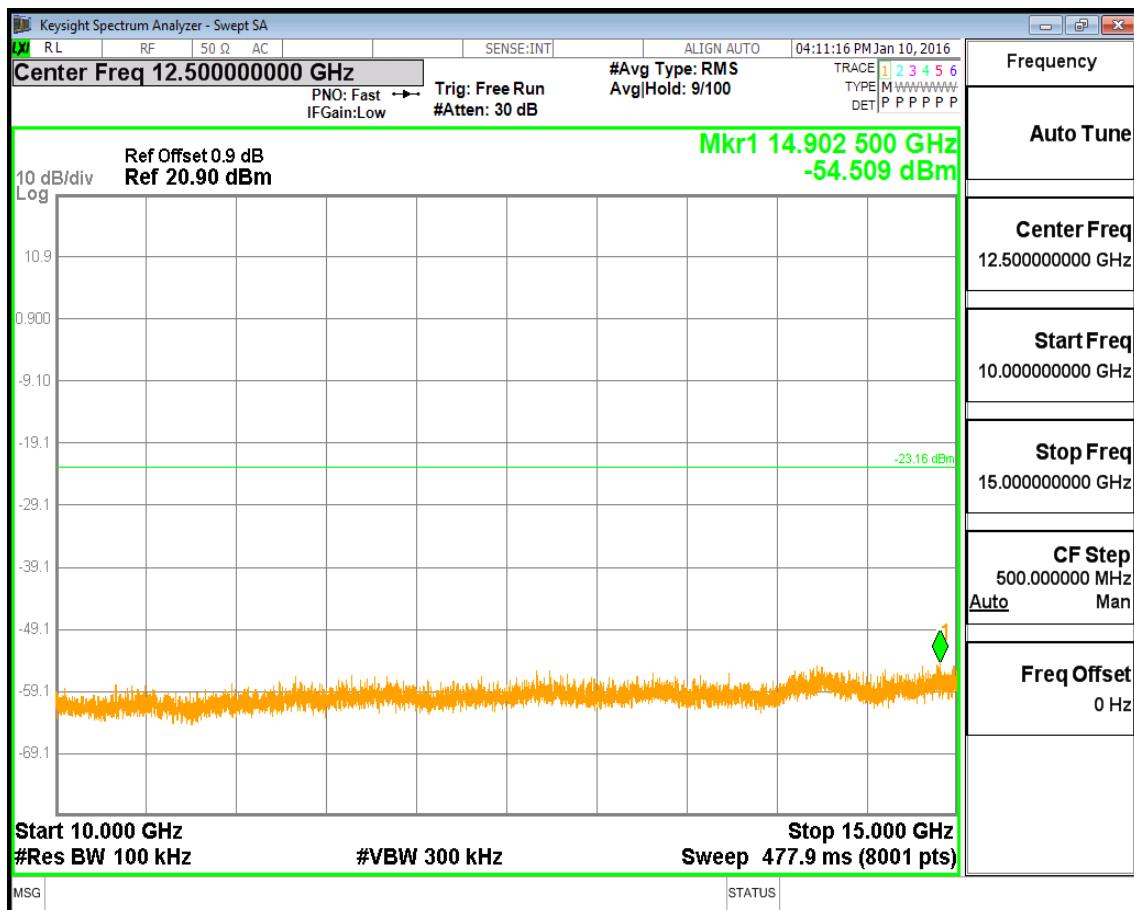
(Plot 4.5.3 A2: Channel 1: 2412MHz @ 802.11n HT20)



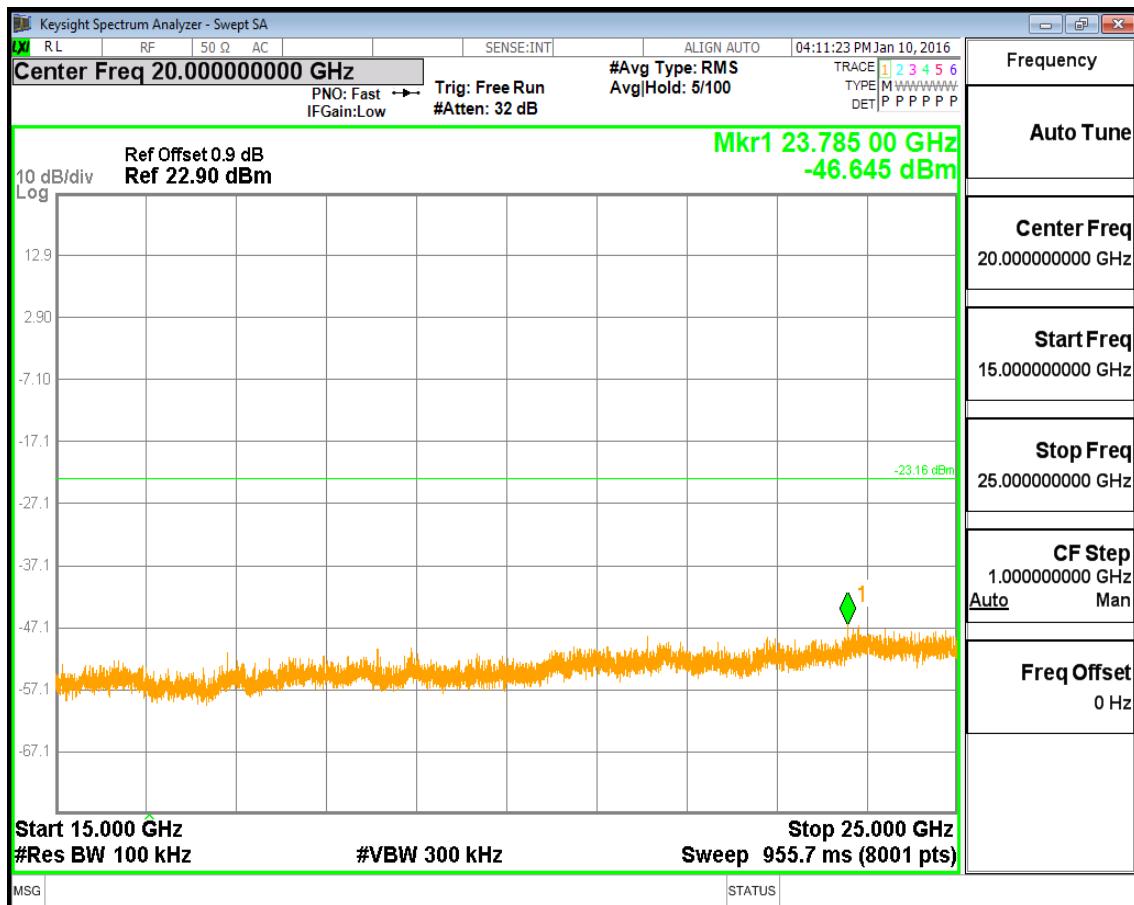
(Plot 4.5.3 A3: Channel 1: 2412MHz @ 802.11n HT20)



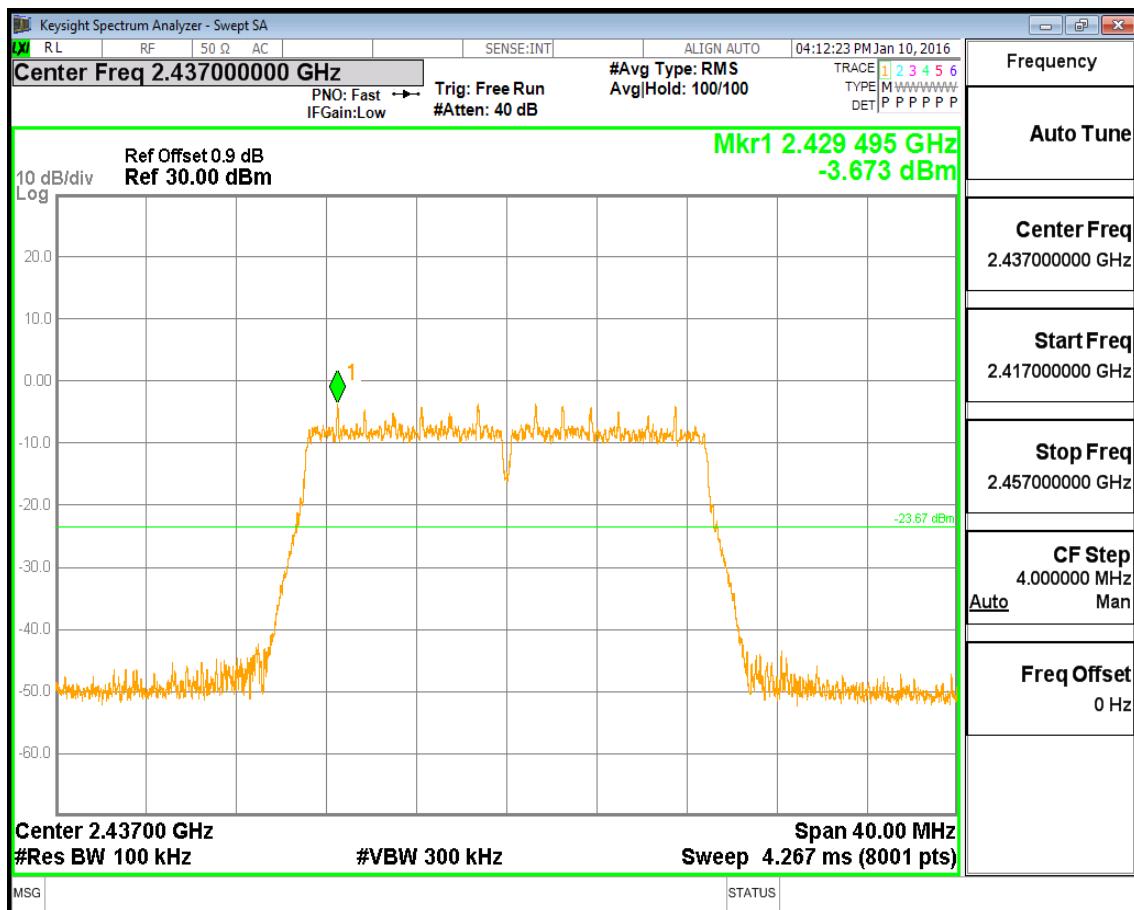
(Plot 4.5.3 A4: Channel 1: 2412MHz @ 802.11n HT20)



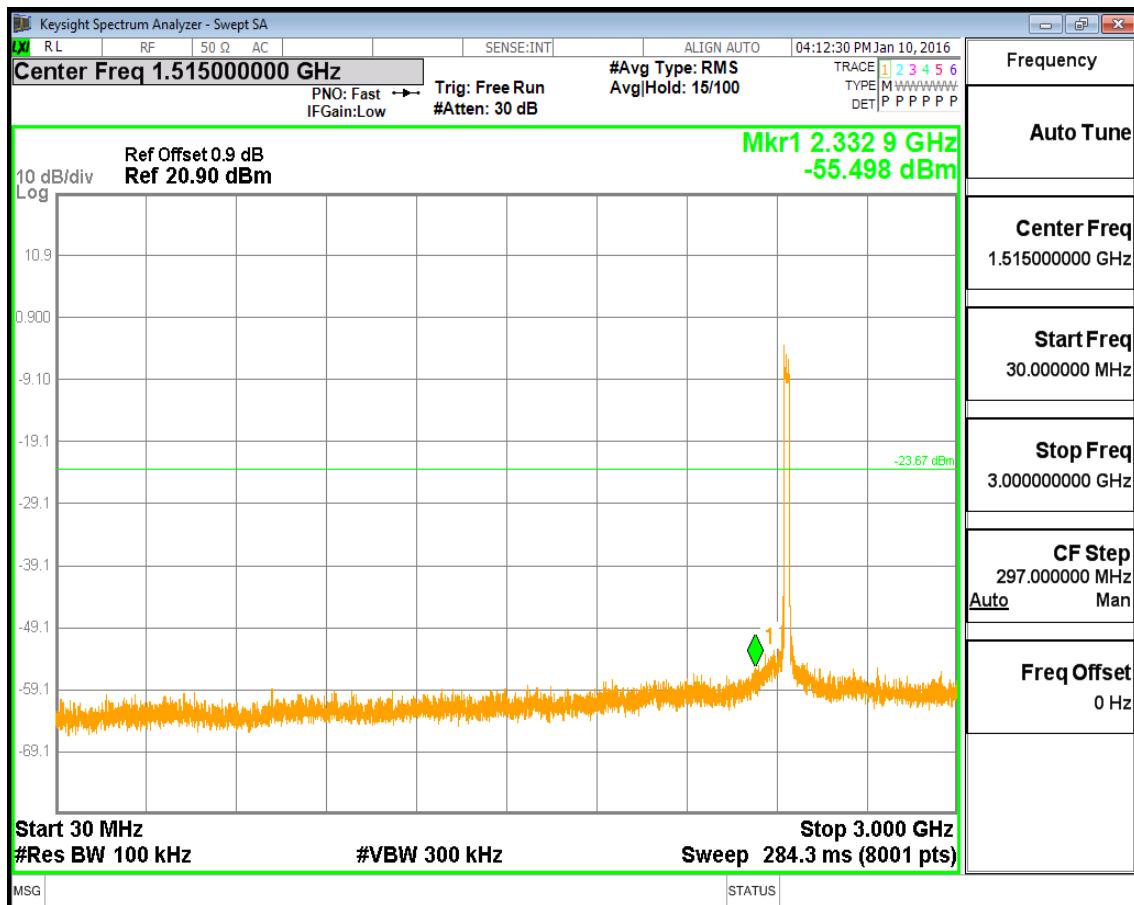
(Plot 4.5.3 A5: Channel 1: 2412MHz @ 802.11n HT20)



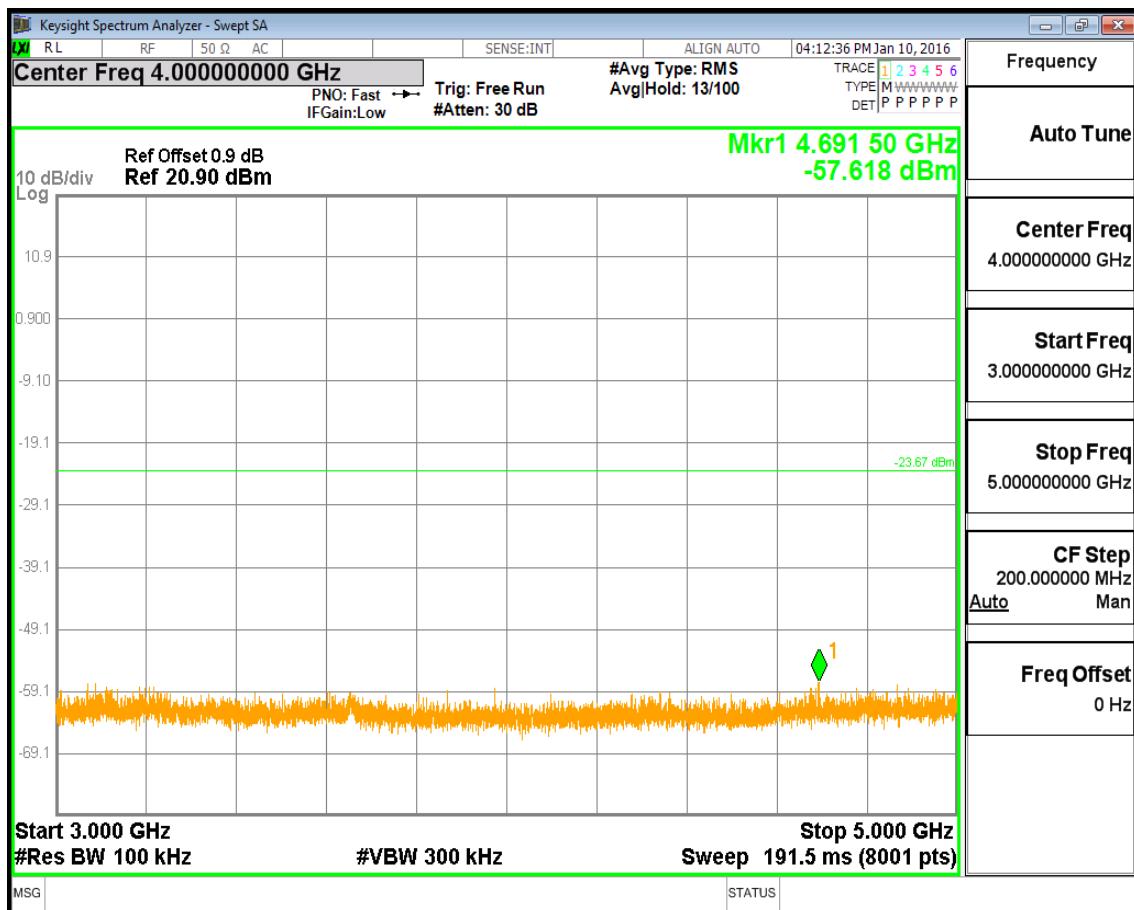
(Plot 4.5.3 A6: Channel 1: 2412MHz @ 802.11n HT20)



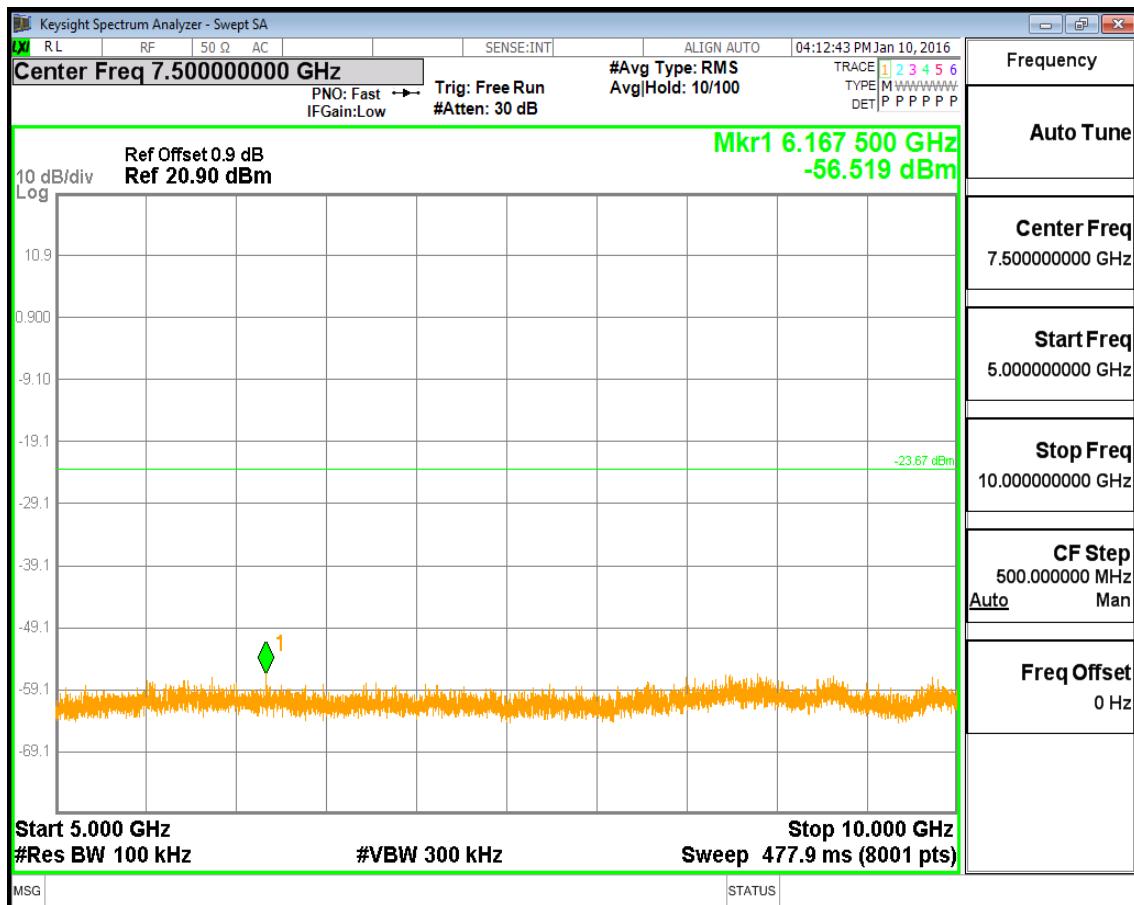
(Plot 4.5.3 B1: Channel 6: 2437MHz @ 802.11n HT20)



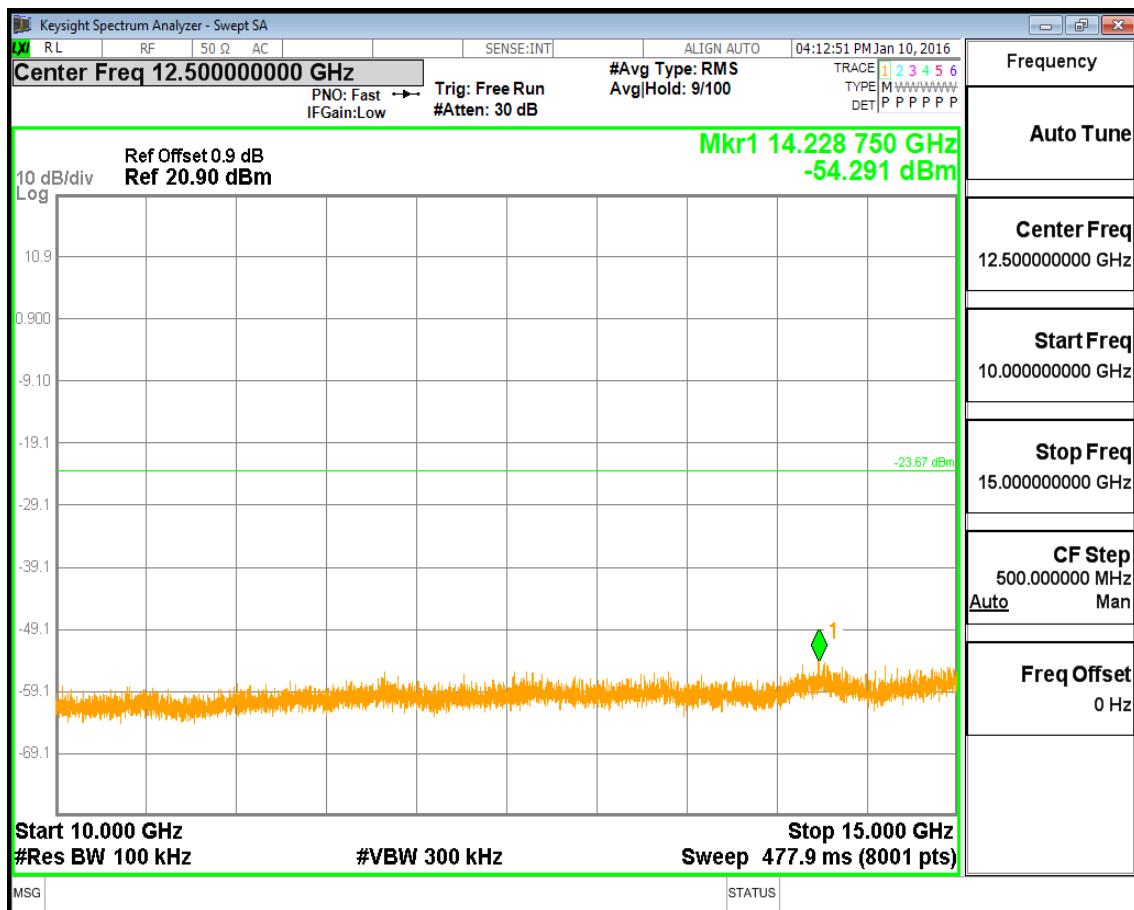
(Plot 4.5.3 B2: Channel 6: 2437MHz @ 802.11n HT20)



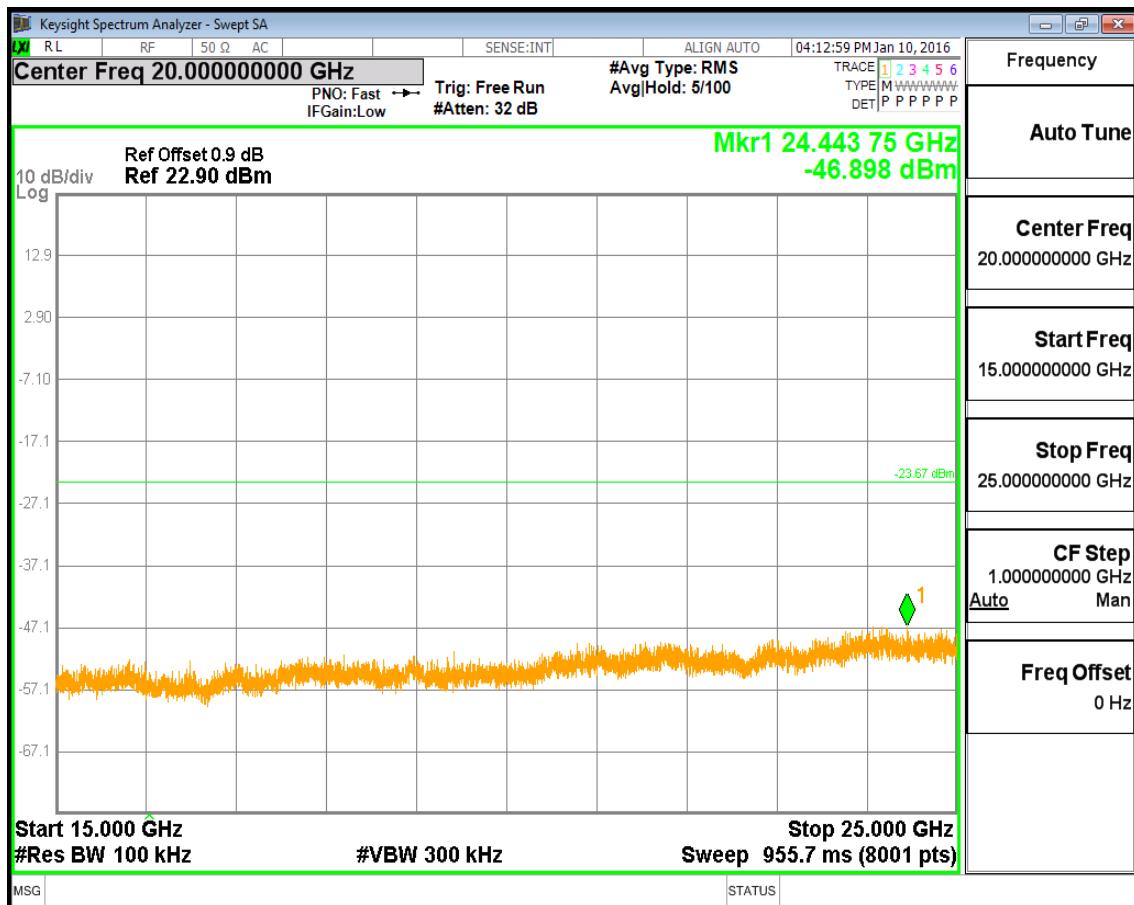
(Plot 4.5.3 B3: Channel 6: 2437MHz @ 802.11n HT20)



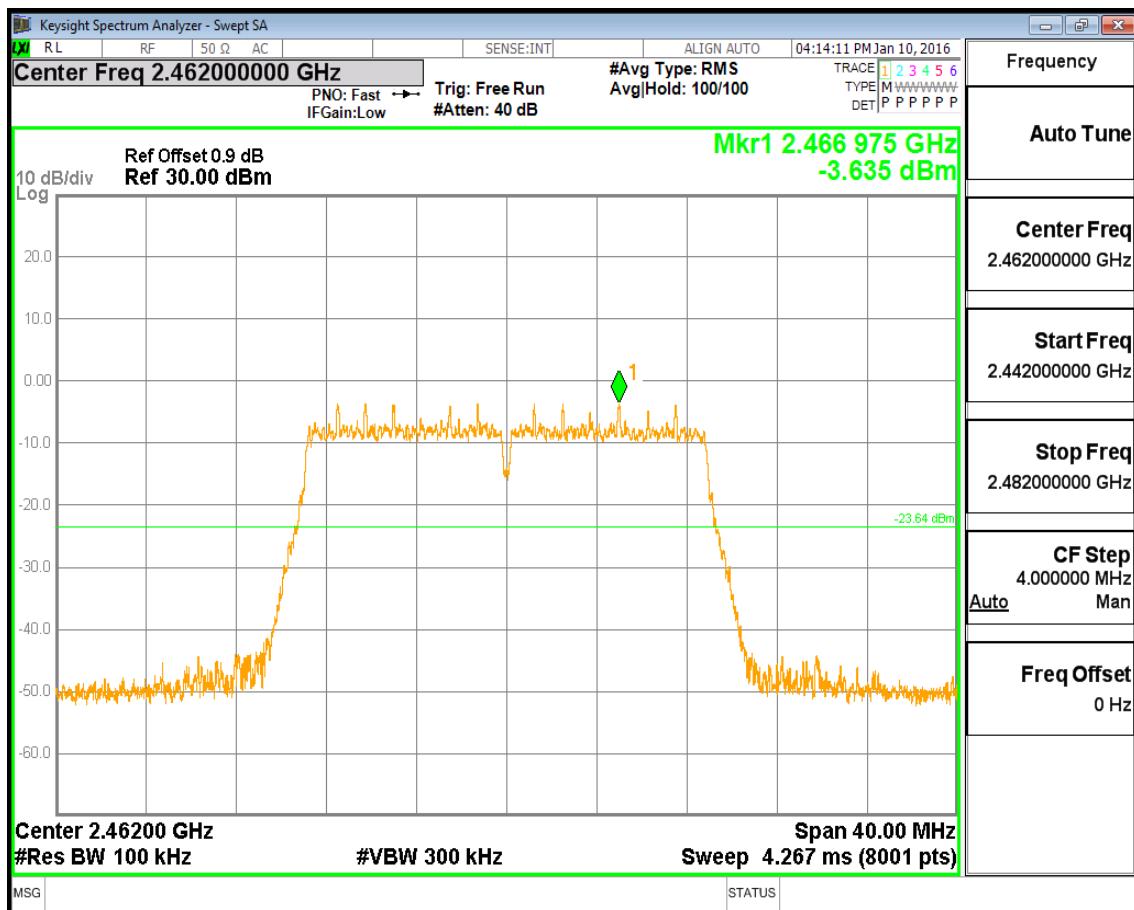
(Plot 4.5.3 B4: Channel 6: 2437MHz @ 802.11n HT20)



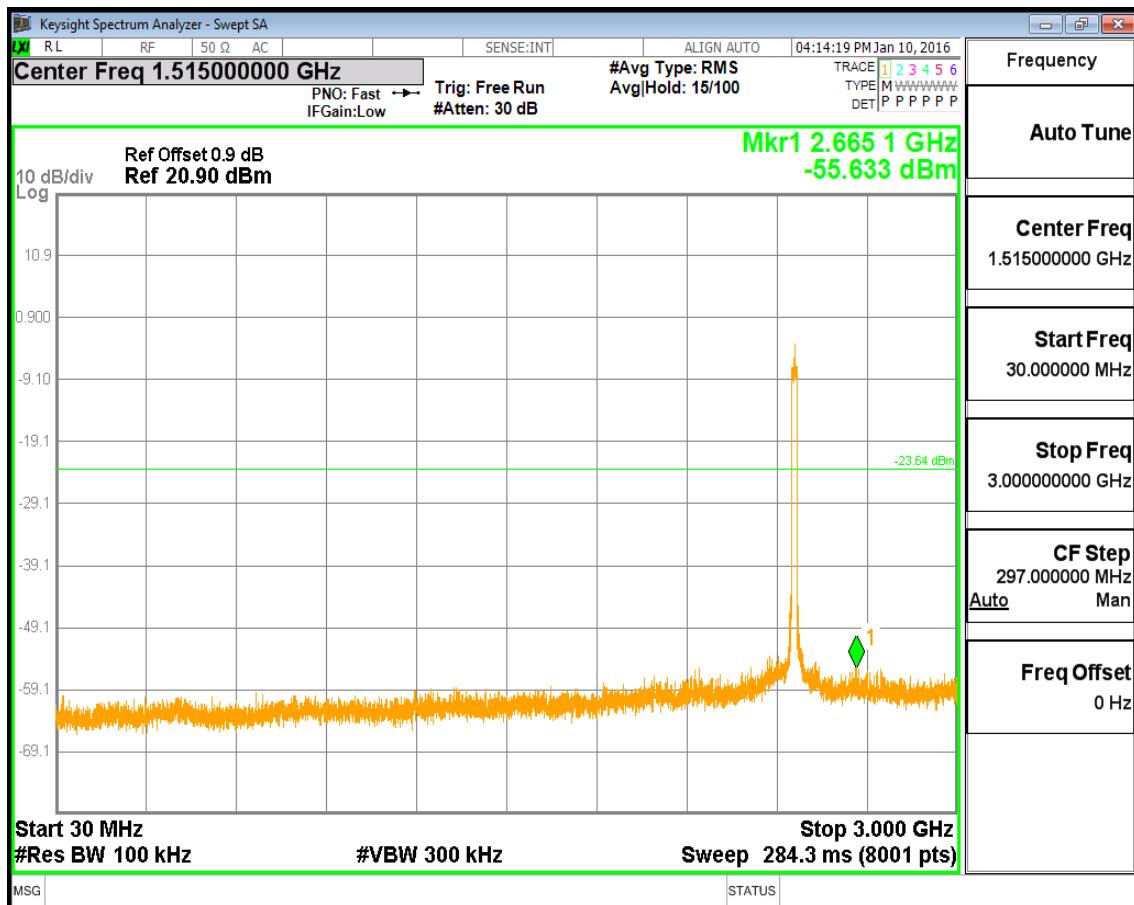
(Plot 4.5.3 B5: Channel 6: 2437MHz @ 802.11n HT20)



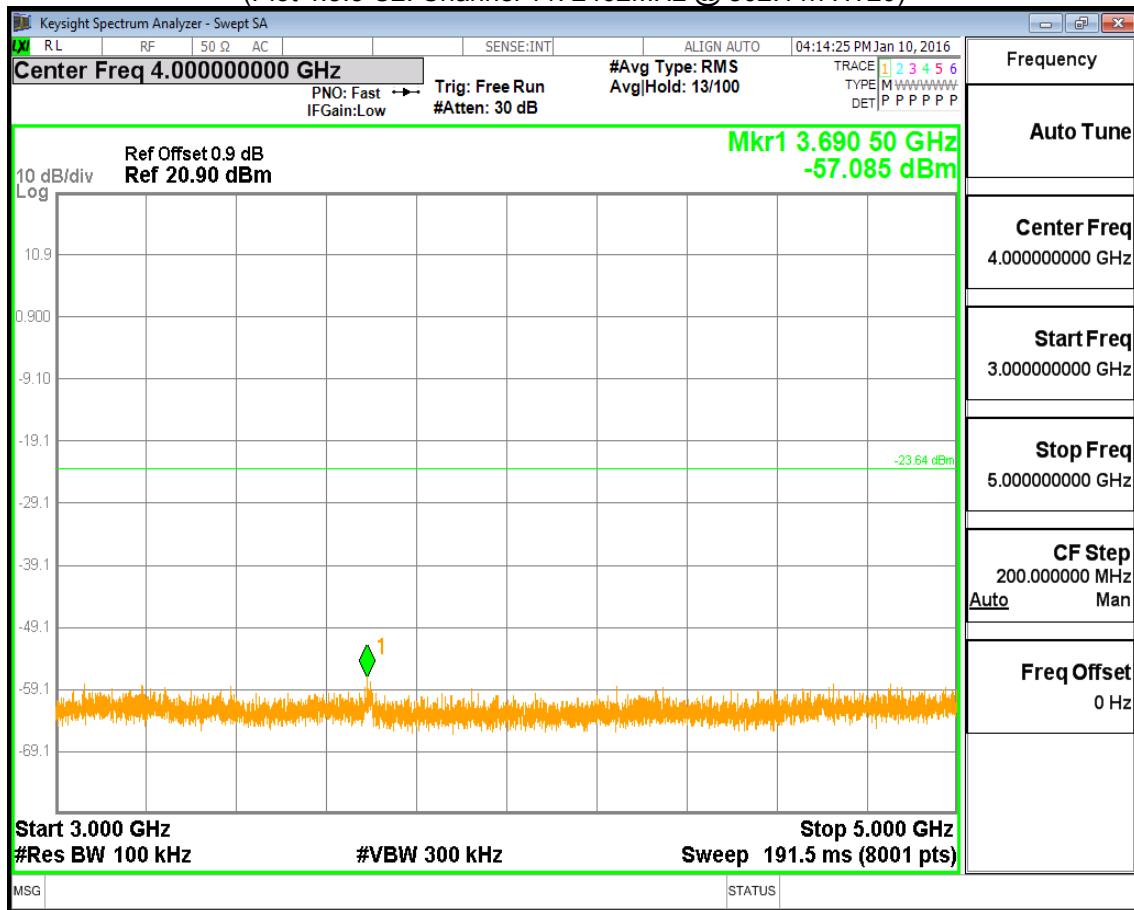
(Plot 4.5.3 B6: Channel 6: 2437MHz @ 802.11n HT20)



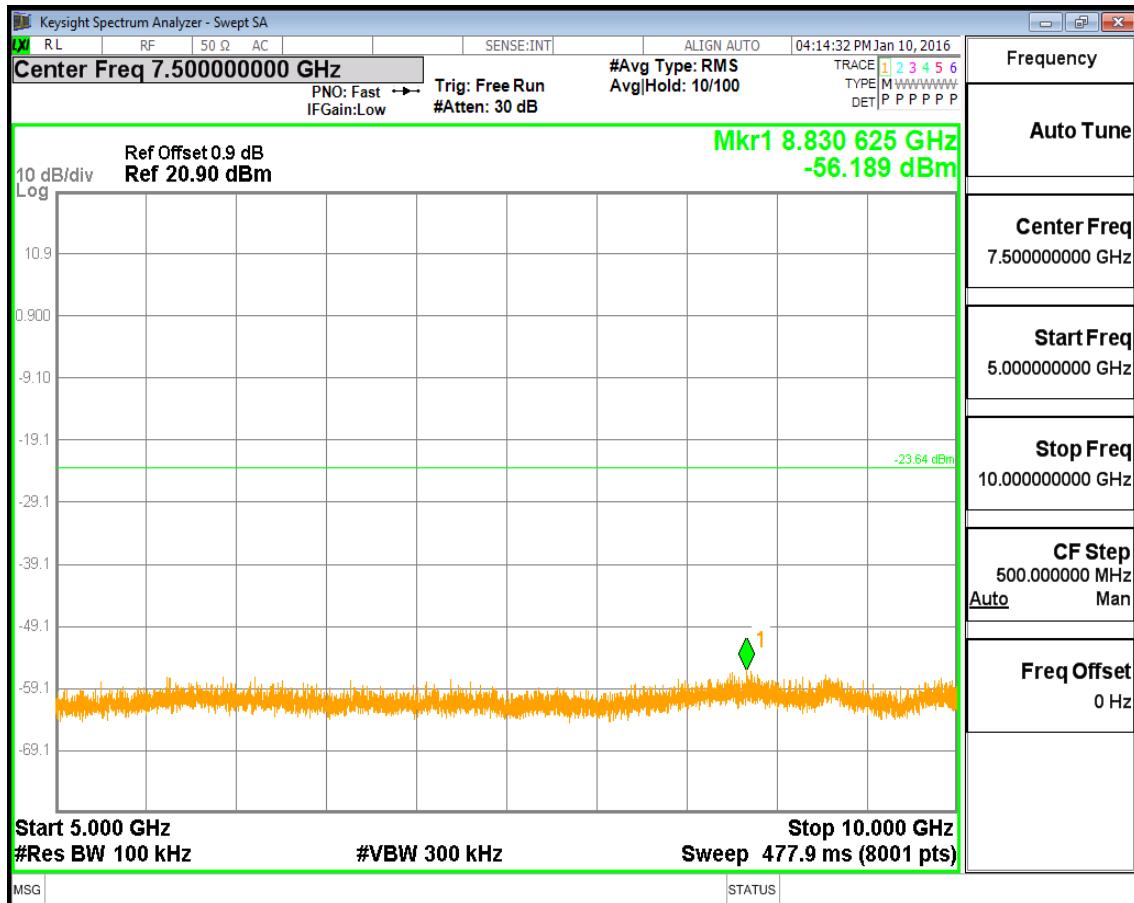
(Plot 4.5.3 C1: Channel 11: 2462MHz @ 802.11n HT20)



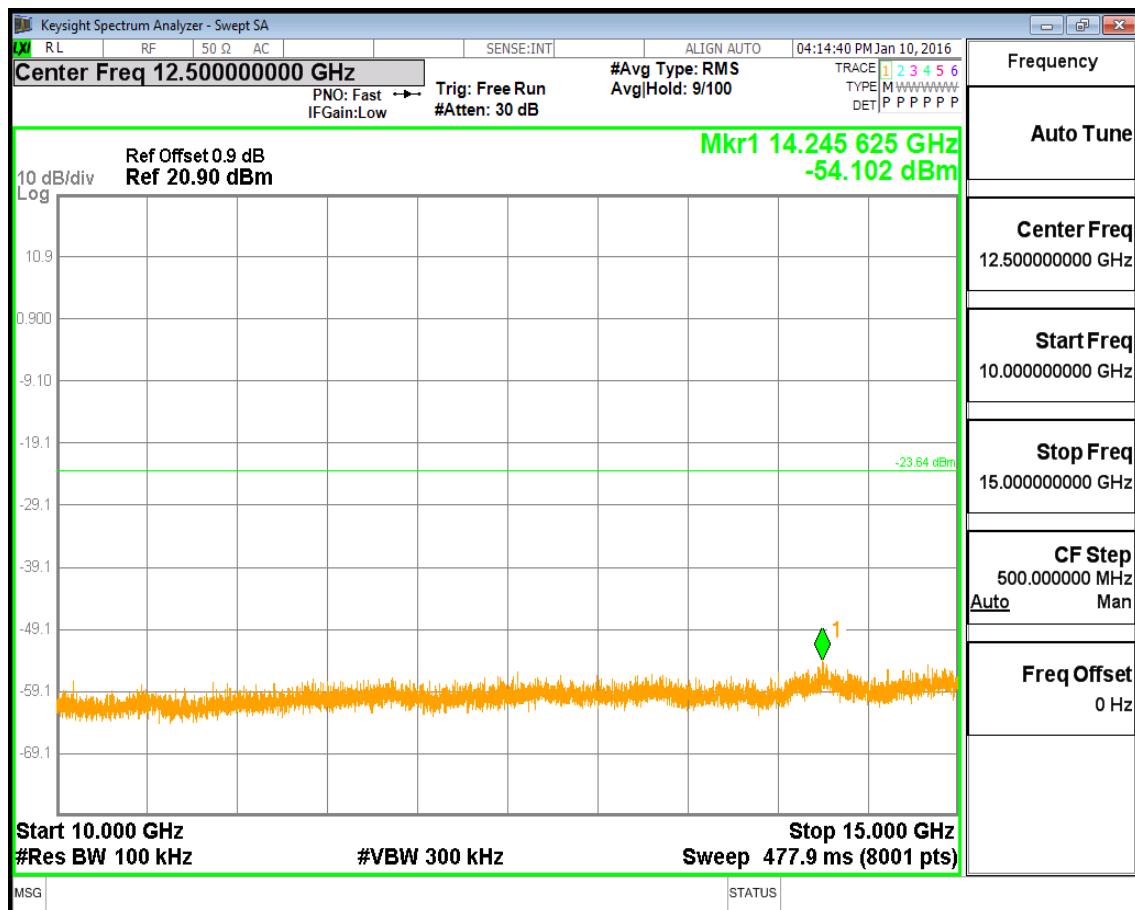
(Plot 4.5.3 C2: Channel 11: 2462MHz @ 802.11n HT20)



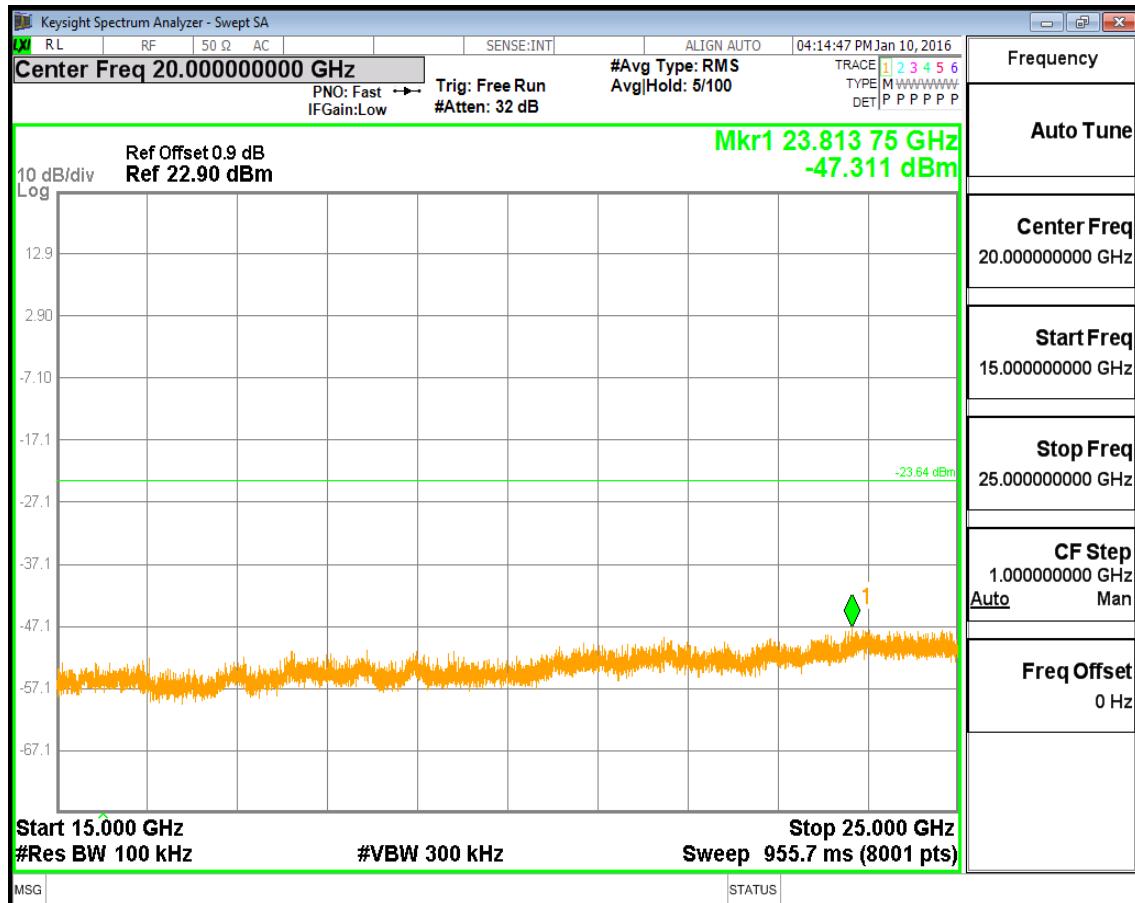
(Plot 4.5.3 C3: Channel 11: 2462MHz @ 802.11n HT20)



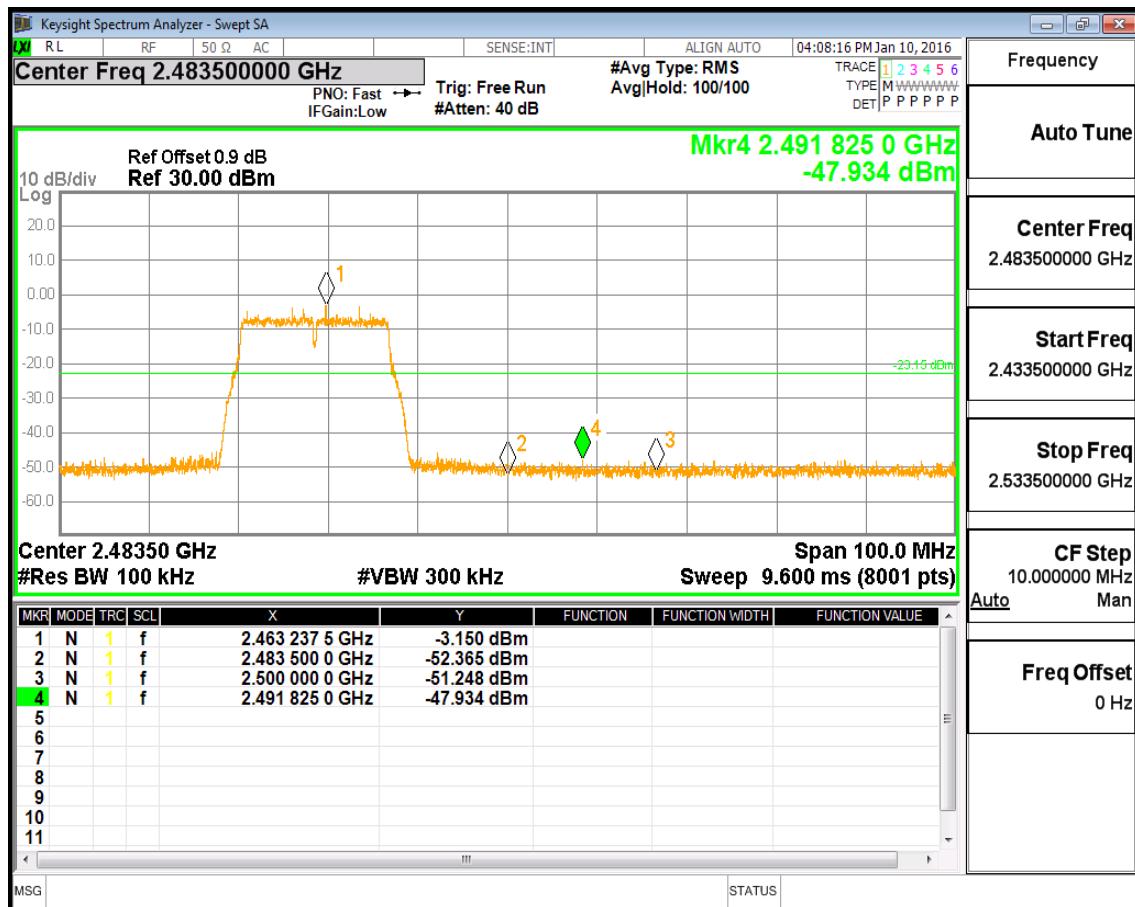
(Plot 4.5.3 C4: Channel 11: 2462MHz @ 802.11n HT20)



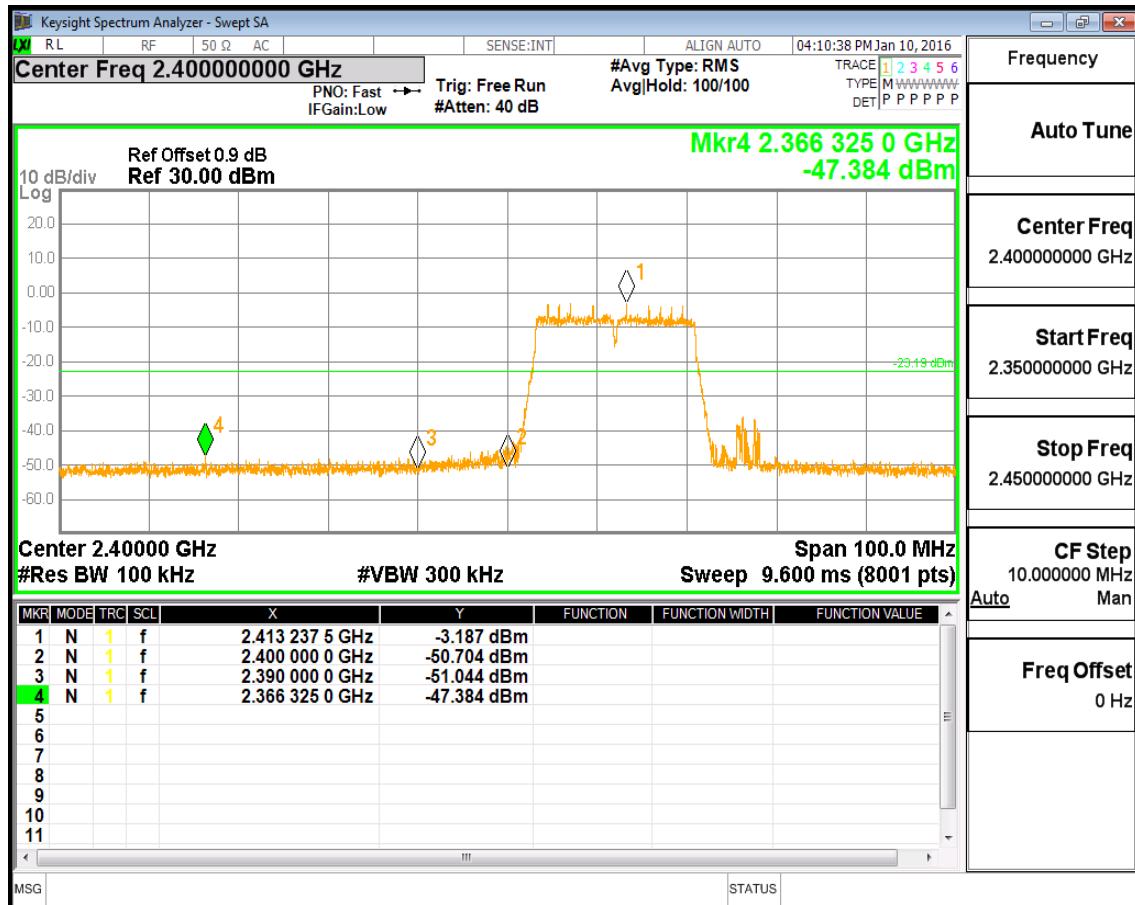
(Plot 4.5.3 C5: Channel 11: 2462MHz @ 802.11n HT20)



(Plot 4.5.3 C6: Channel 11: 2462MHz @ 802.11n HT20)



(Plot 4.5.3 D1: Left Band edge @ 802.11n HT20)



(Plot 4.5.3 D2: Right Band edge@ 802.11n HT20)

4.5.4 802.11n HT40MHz Test Mode

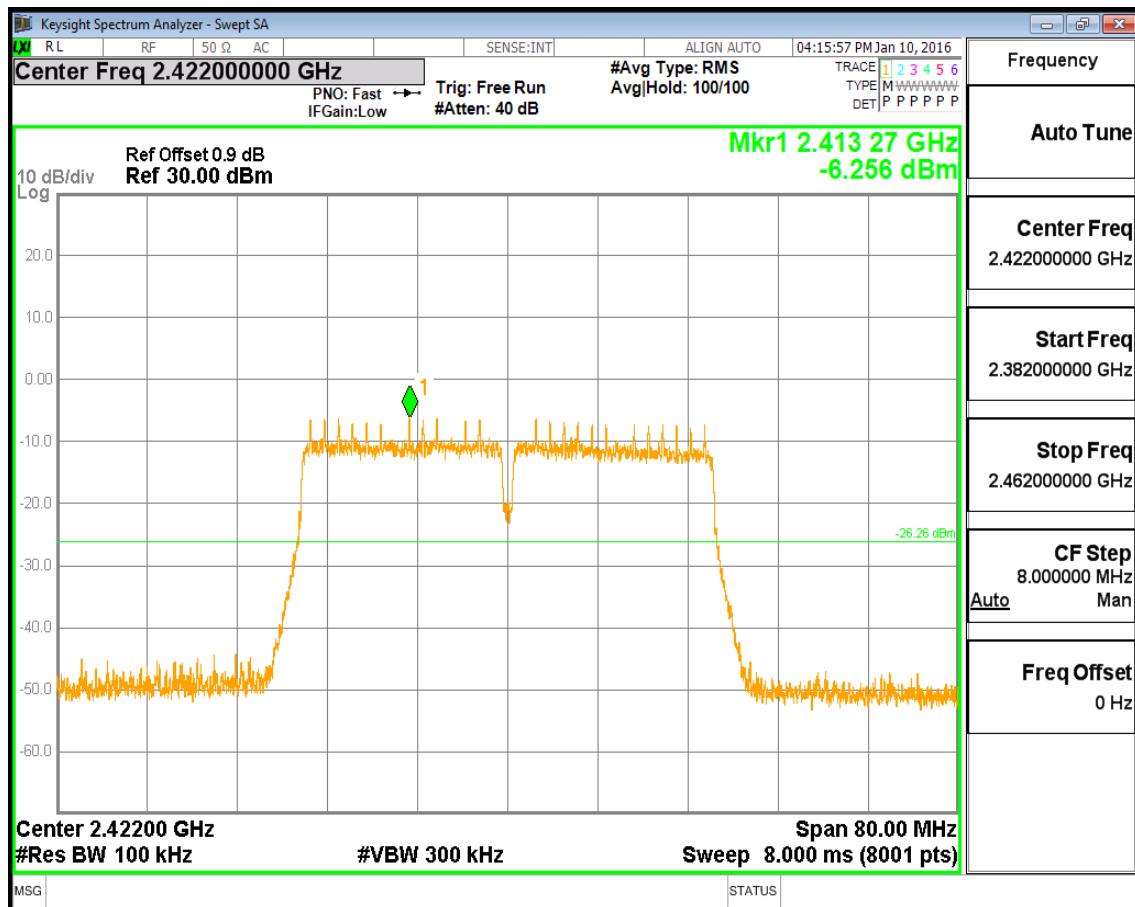
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
3	2422	2.422 GHz	Plot 4.5.4 A1	---	PASS
		30MHz -3GHz	Plot 4.5.4 A2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.4 A3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.4 A4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.4 A5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.4 A6	-20	PASS
6	2437	2.437 GHz	Plot 4.5.4 B1	---	PASS
		30MHz -3GHz	Plot 4.5.4 B2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.4 B3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.4 B4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.4 B5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.4 B6	-20	PASS
9	2452	2.452 GHz	Plot 4.5.4 C1	---	PASS
		30MHz -3GHz	Plot 4.5.4 C2	-20	PASS
		3GHz-.5 GHz	Plot 4.5.4 C3	-20	PASS
		3GHz-.10 GHz	Plot 4.5.4 C4	-20	PASS
		10GHz-.15 GHz	Plot 4.5.4 C5	-20	PASS
		15GHz-.25 GHz	Plot 4.5.4 C6	-20	PASS

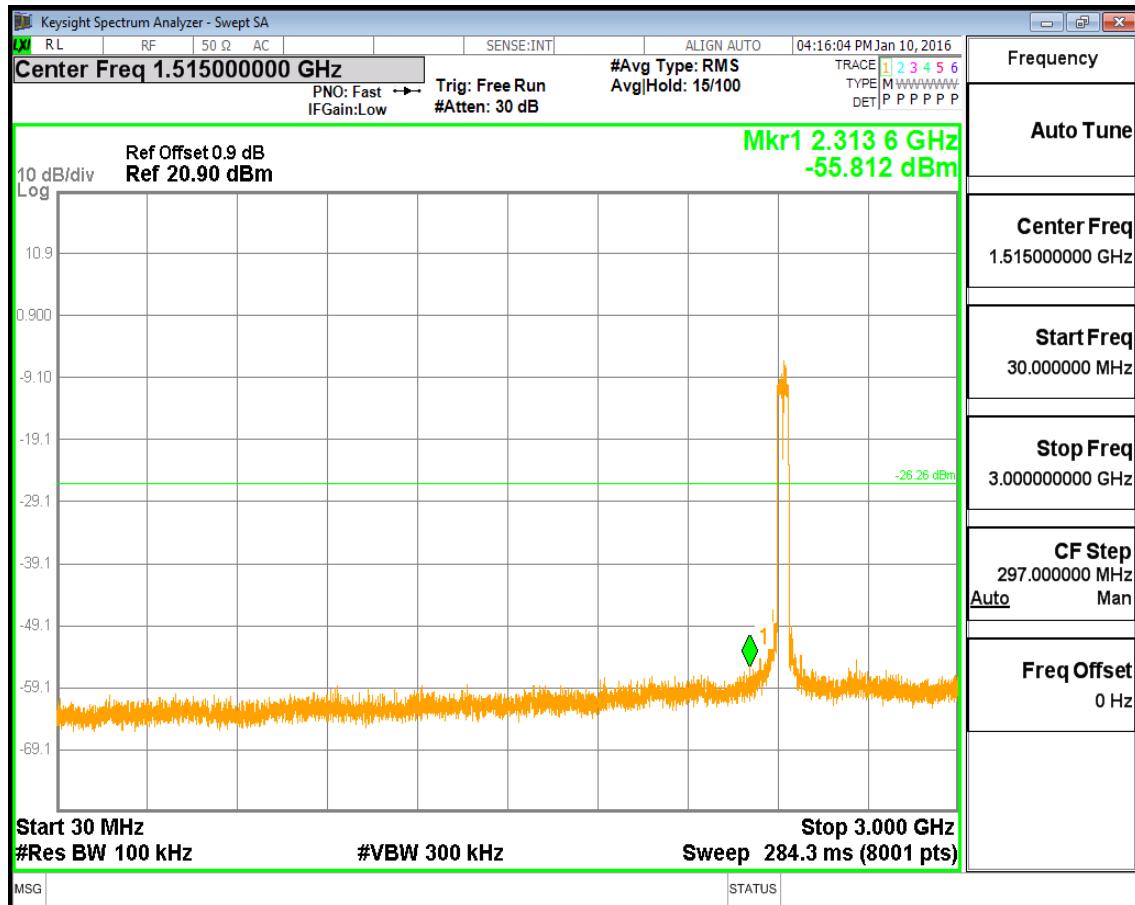
Note:

1. For 802.11n HT40MHz mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.
3. For 9KHz -30MHz, Because there was only background, So We did not record data.

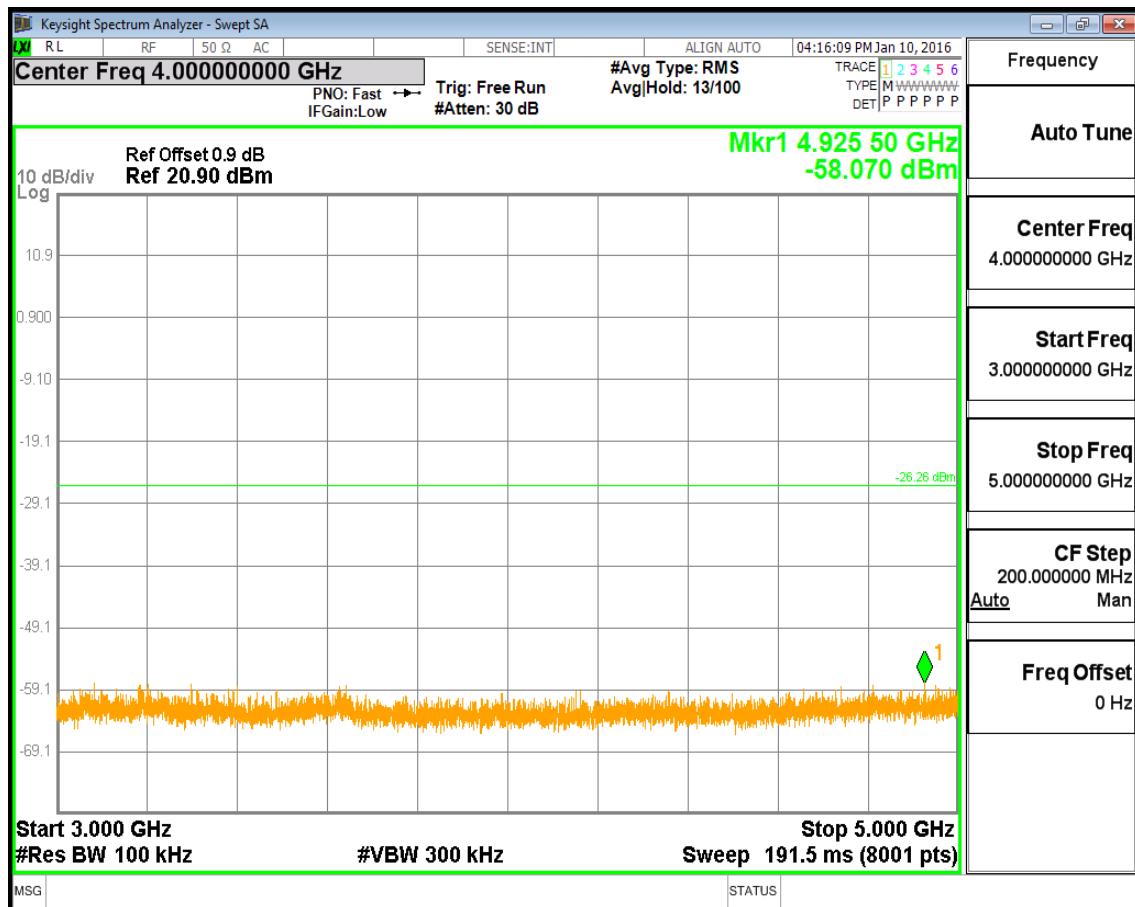
B. Test Plots



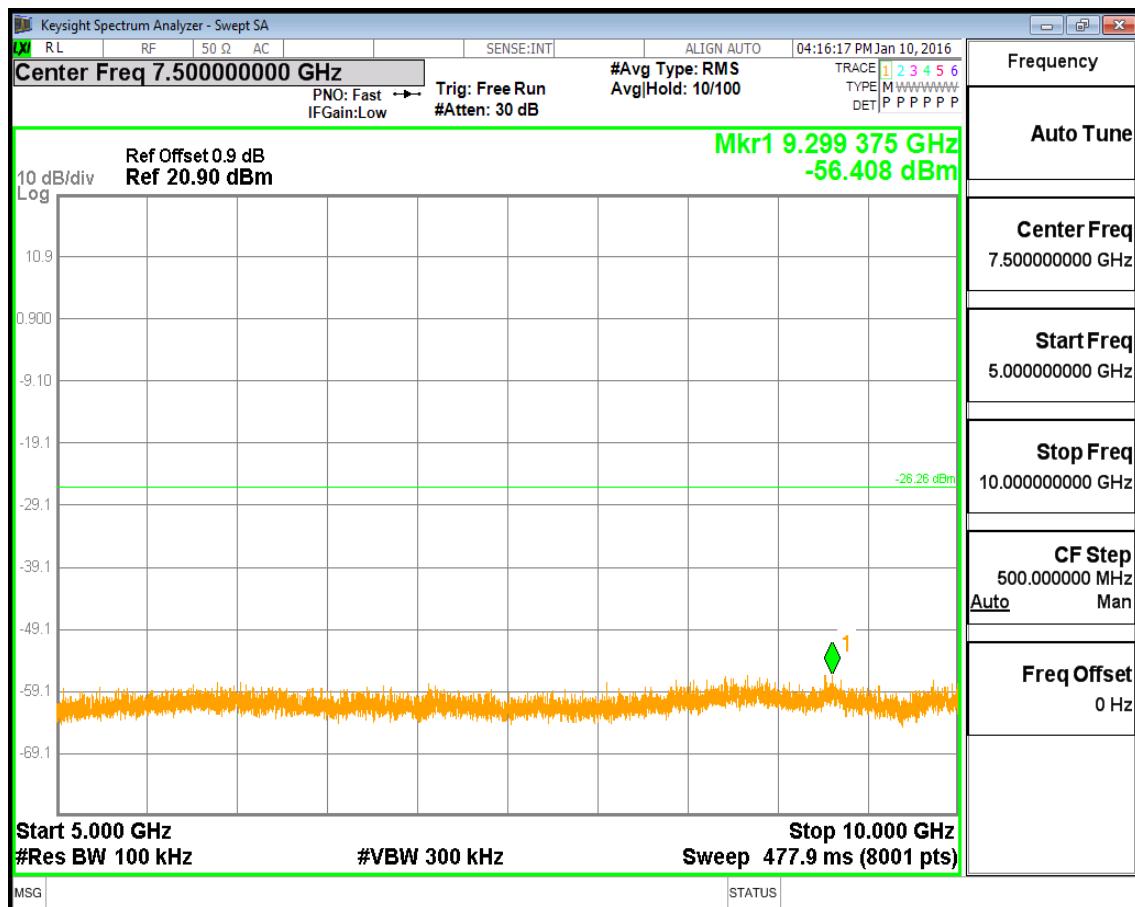
(Plot 4.5.4 A1: Channel 3: 2422MHz @ 802.11n HT40)



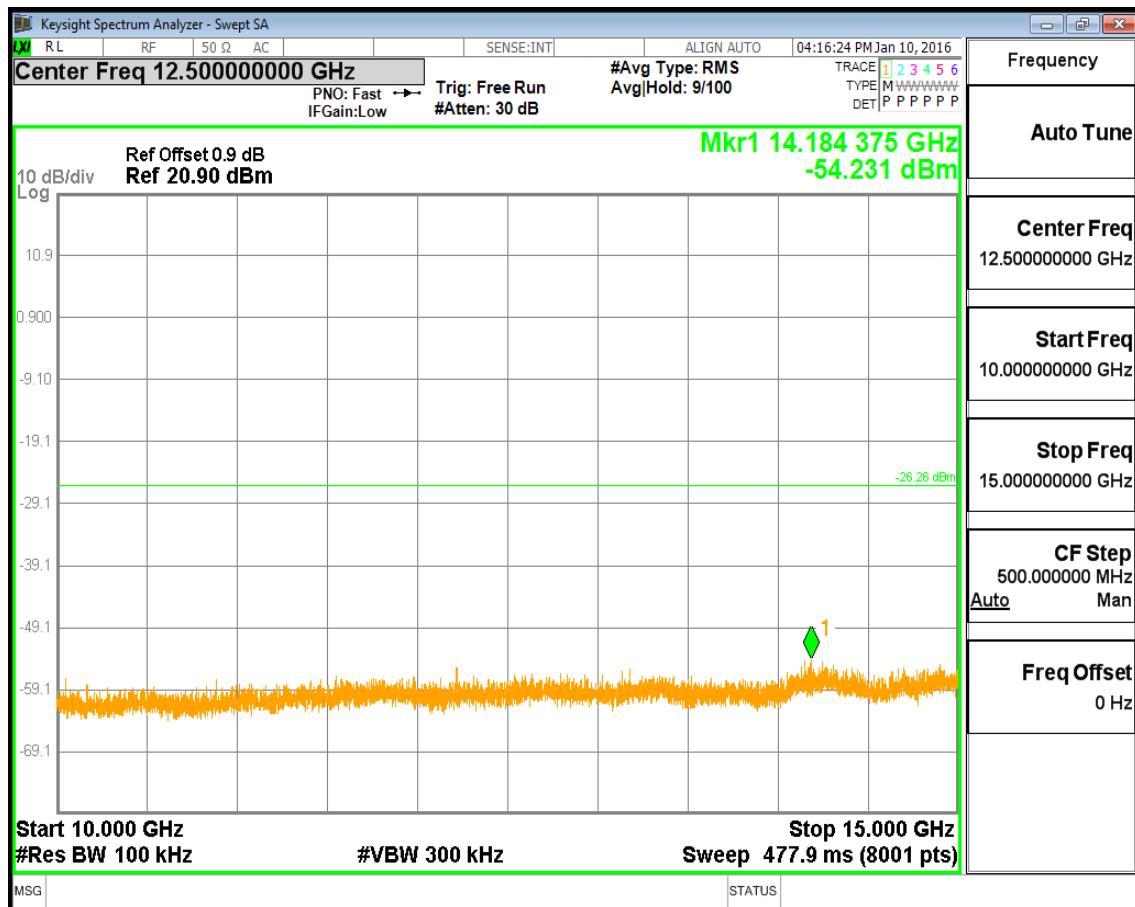
(Plot 4.5.4 A2: Channel 3: 2422MHz @ 802.11n HT40)



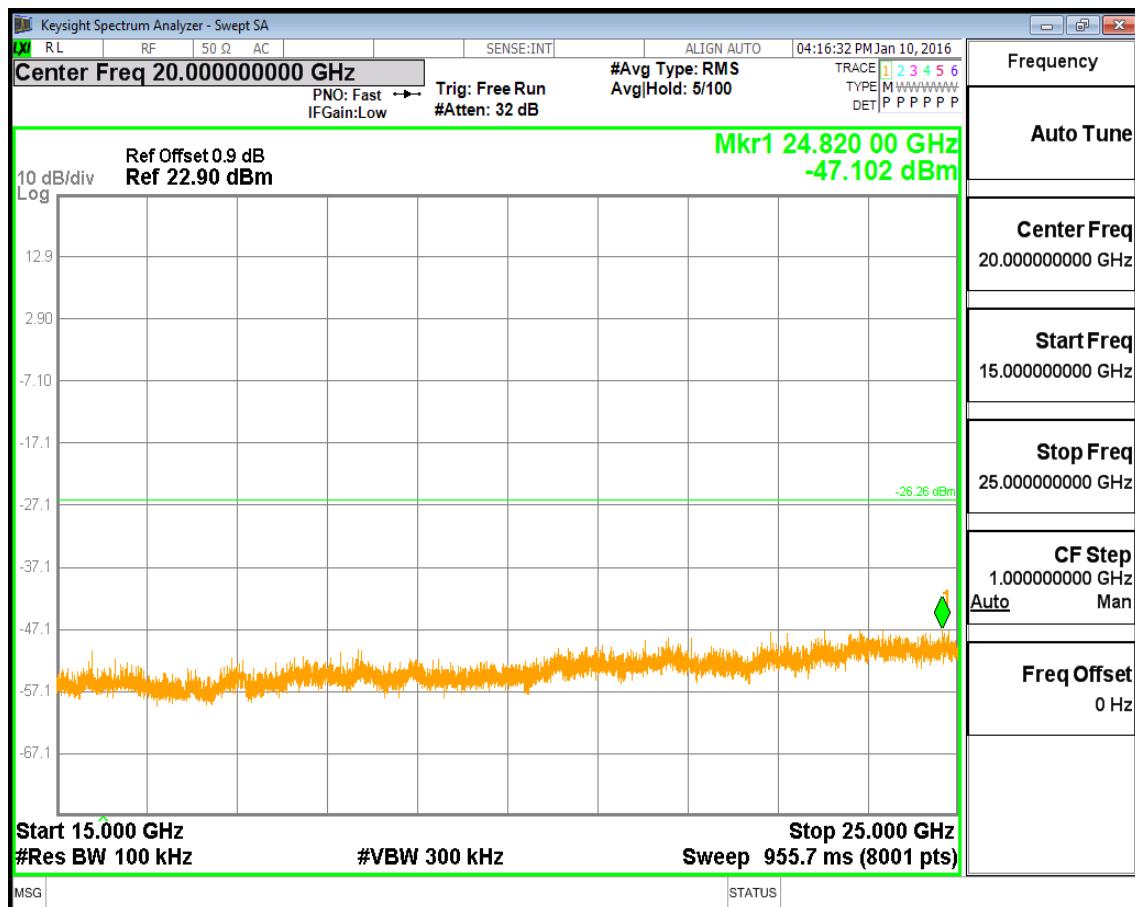
(Plot 4.5.4 A3: Channel 3: 2422MHz @ 802.11n HT40)



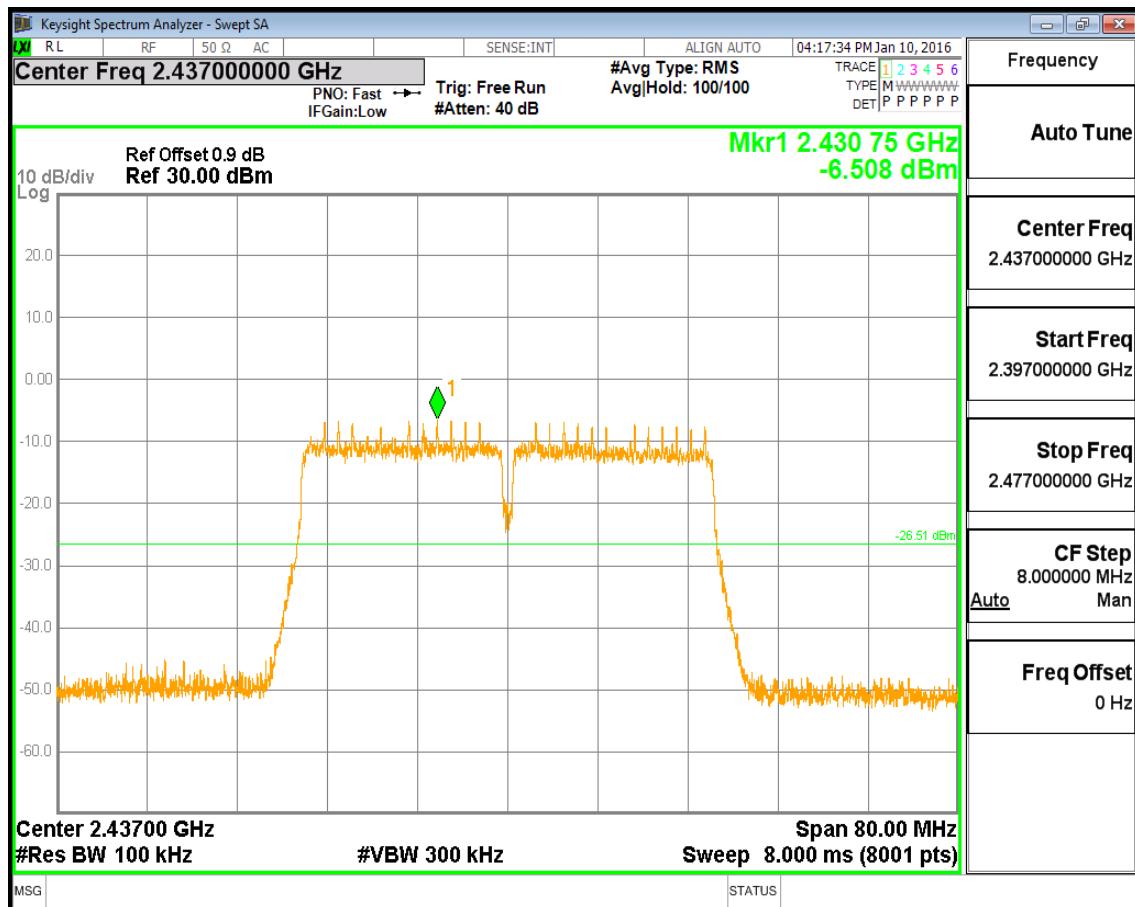
(Plot 4.5.4 A4: Channel 3: 2422MHz @ 802.11n HT40)



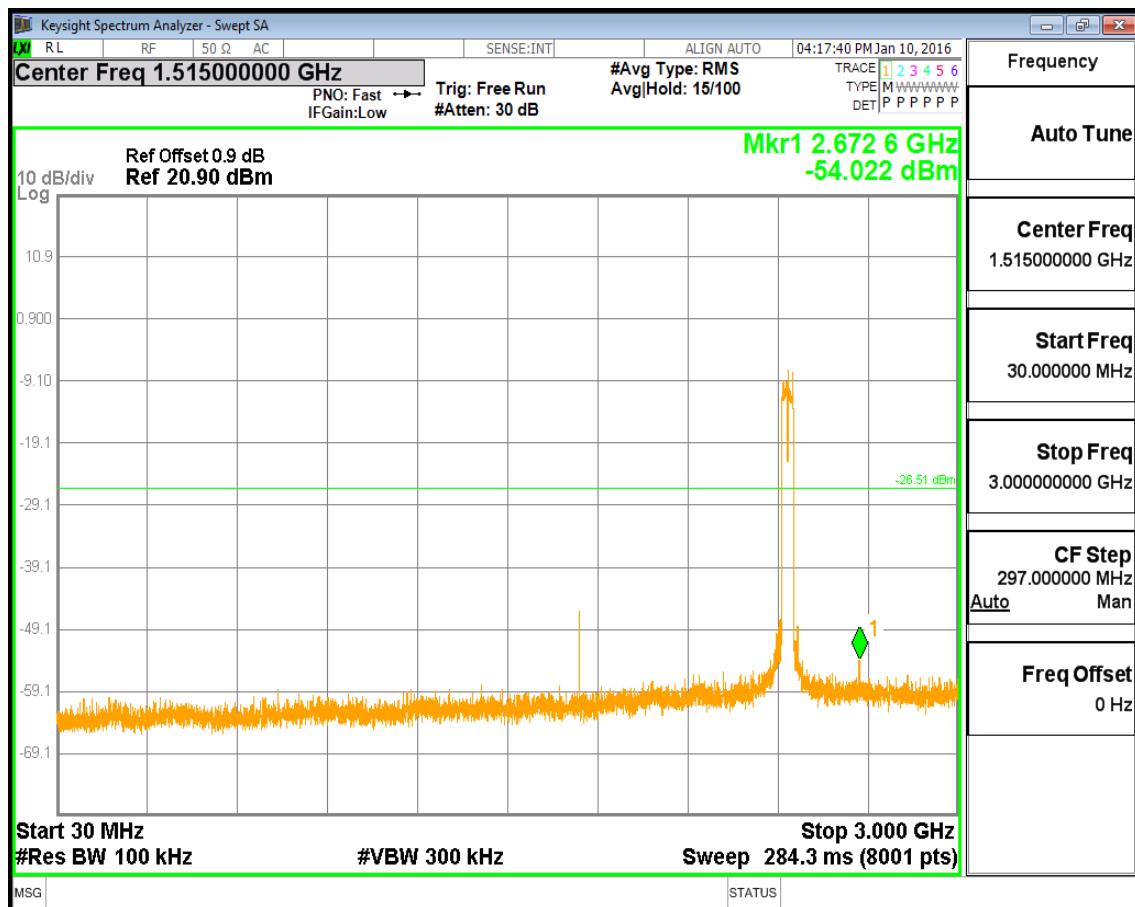
(Plot 4.5.4 A5: Channel 3: 2422MHz @ 802.11n HT40)



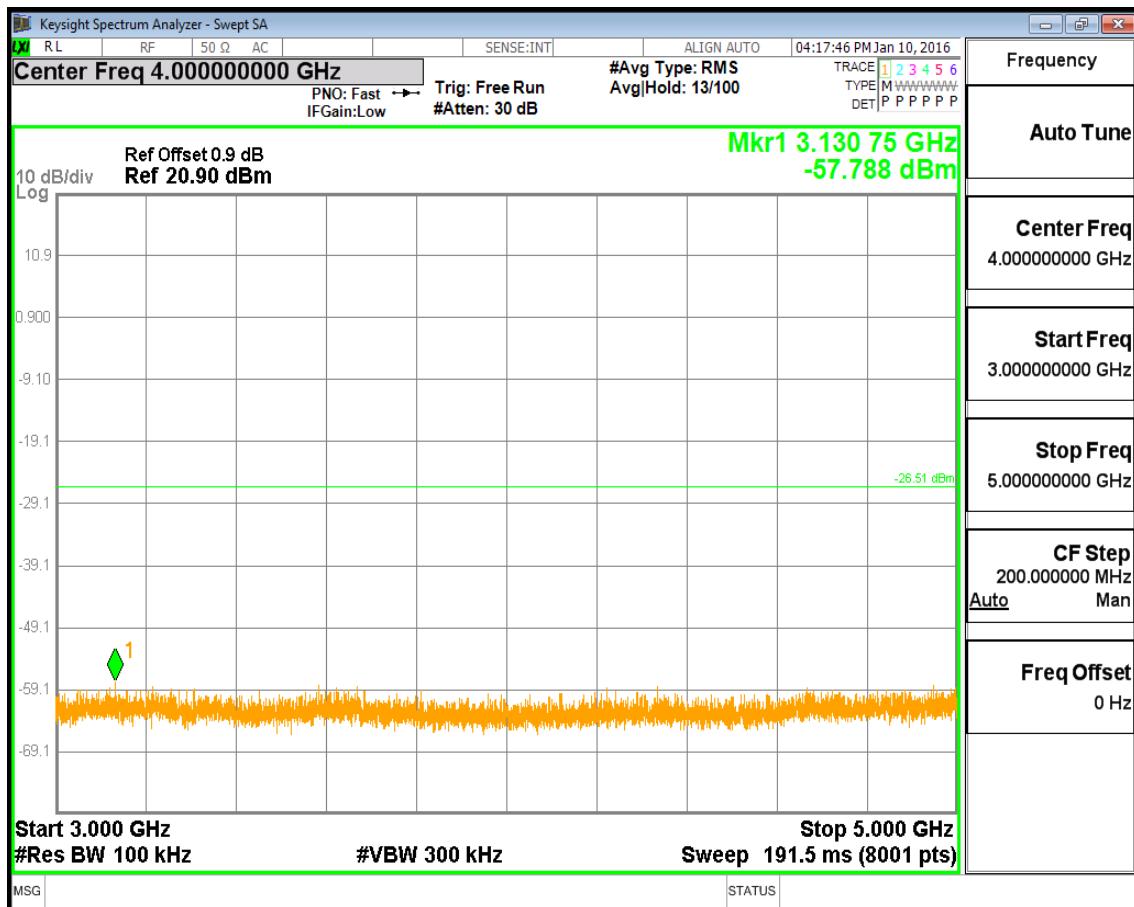
(Plot 4.5.4 A6: Channel 3: 2422MHz @ 802.11n HT40)



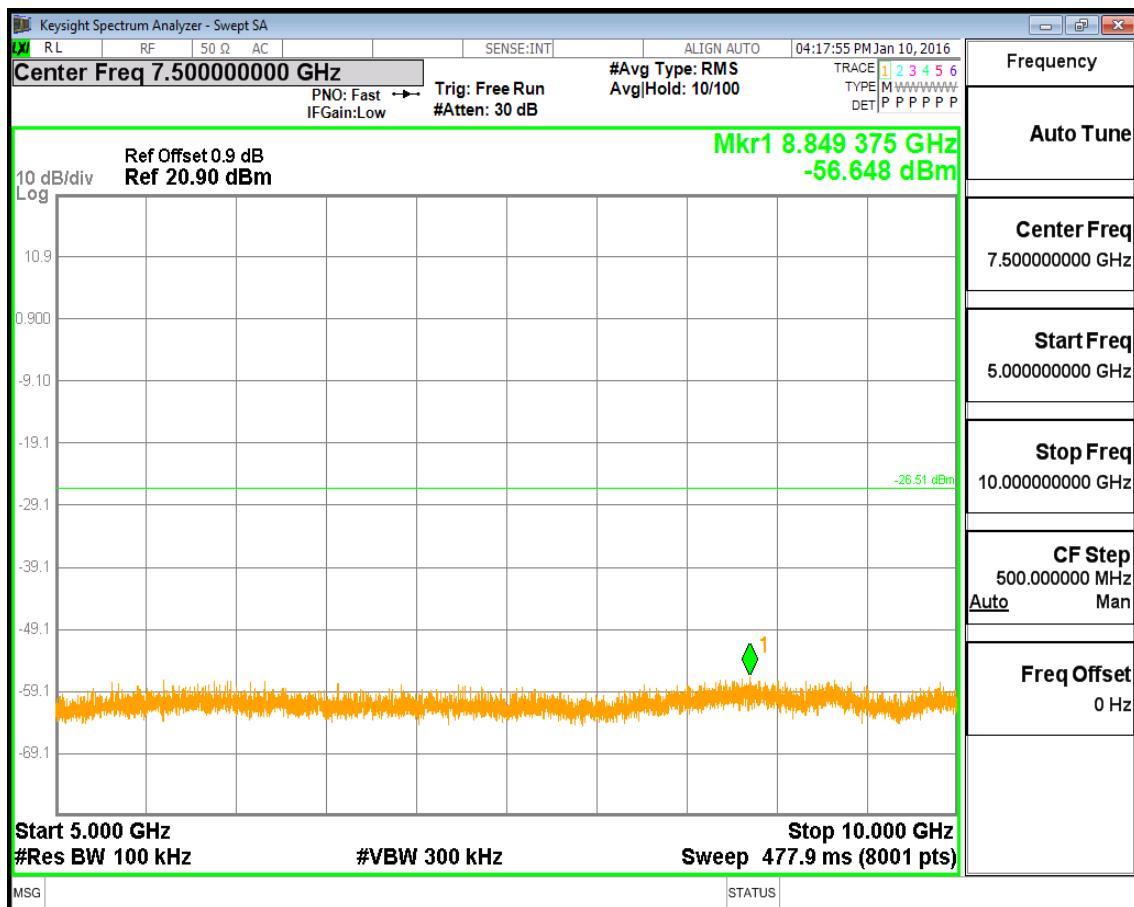
(Plot 4.5.4 B1: Channel 6: 2437MHz @ 802.11n HT40)



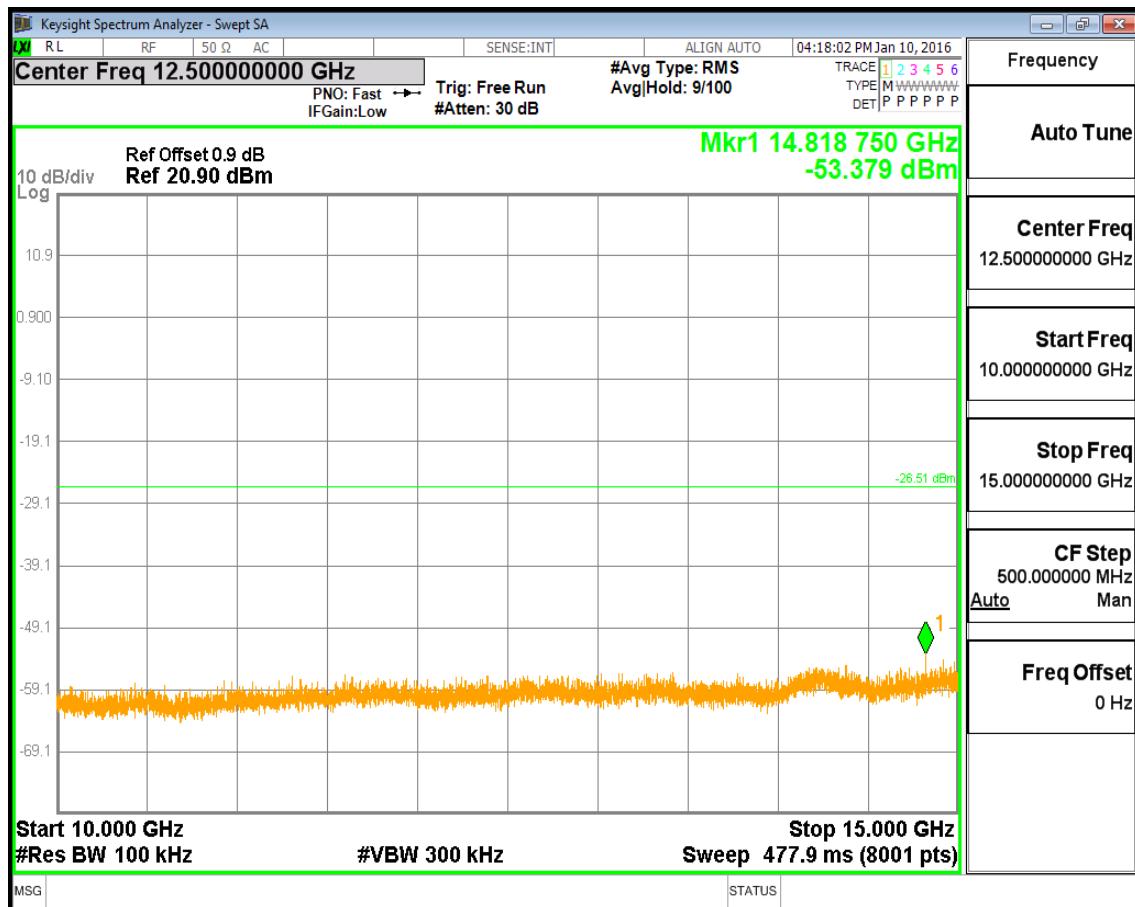
(Plot 4.5.4 B2: Channel 6: 2437MHz @ 802.11n HT40)



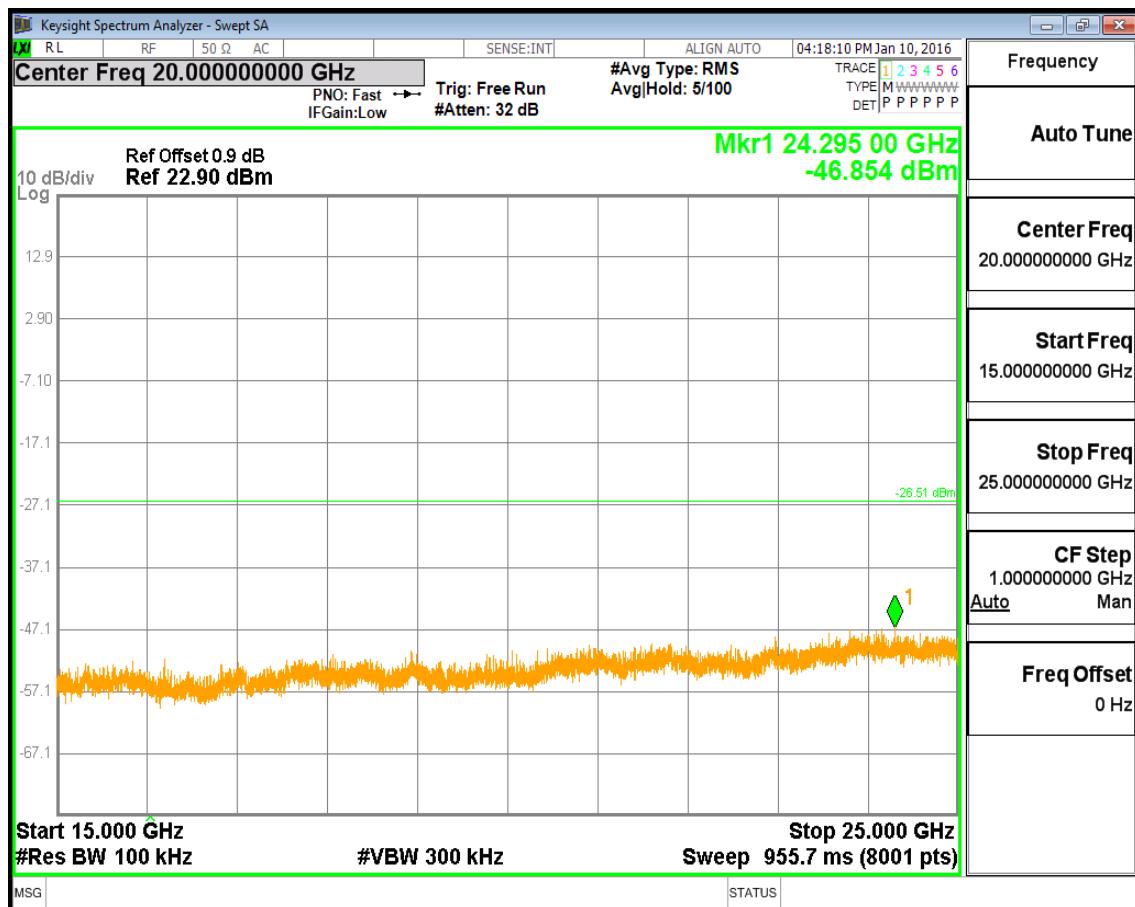
(Plot 4.5.4 B3: Channel 6: 2437MHz @ 802.11n HT40)



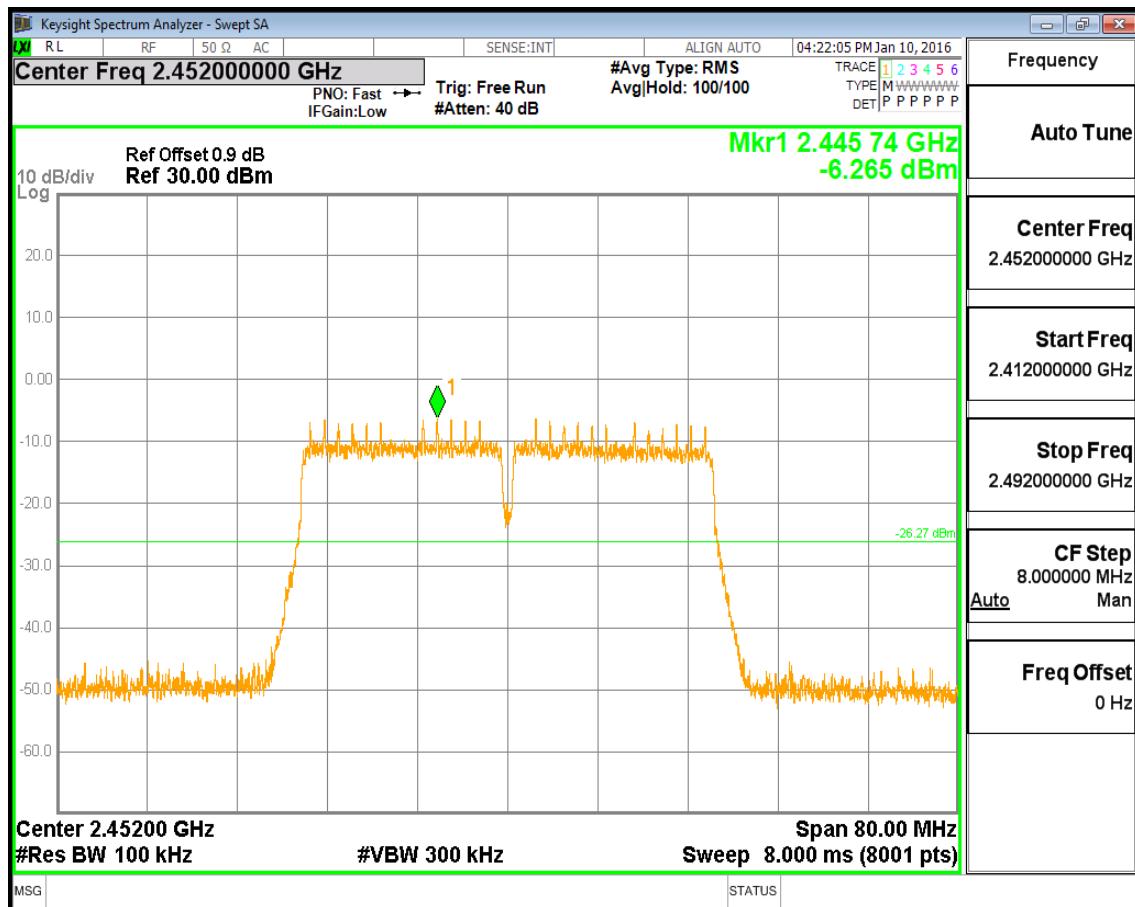
(Plot 4.5.4 B4: Channel 6: 2437MHz @ 802.11n HT40)



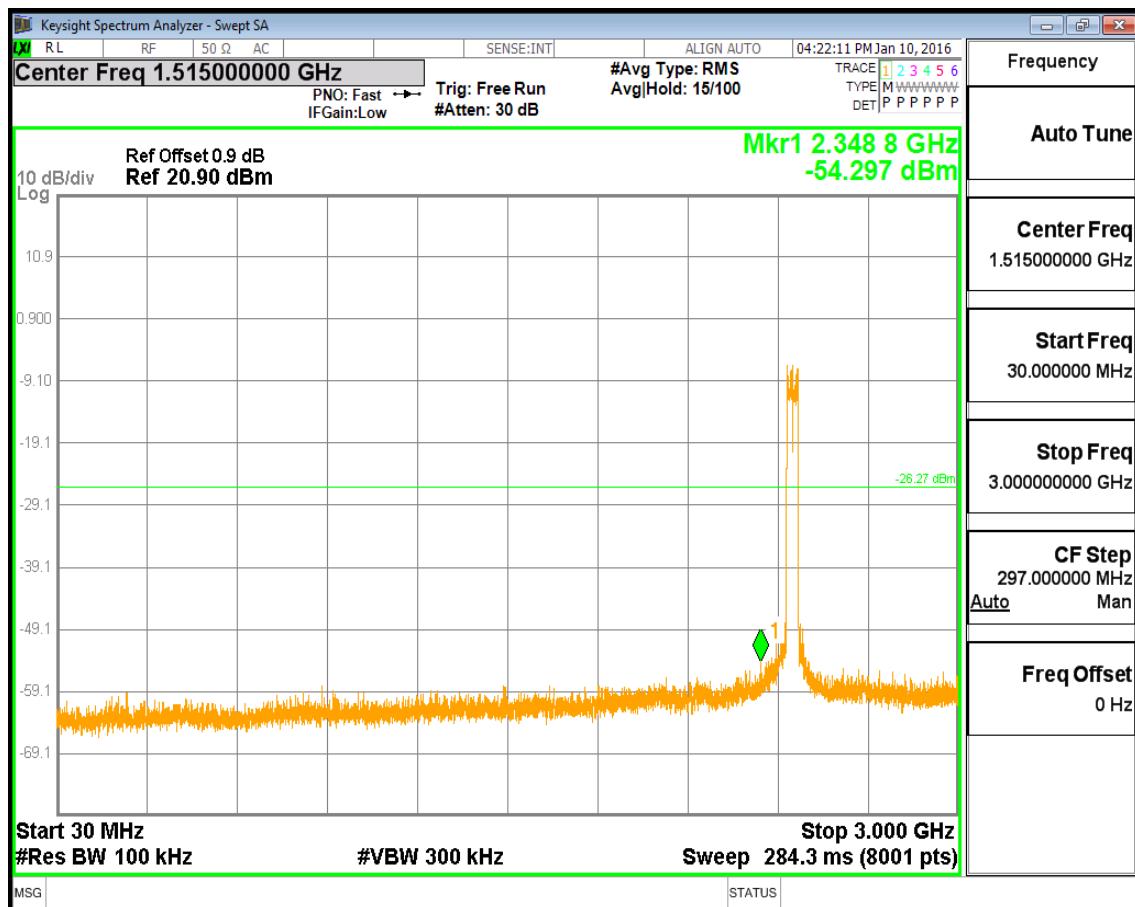
(Plot 4.5.4 B5: Channel 6: 2437MHz @ 802.11n HT40)



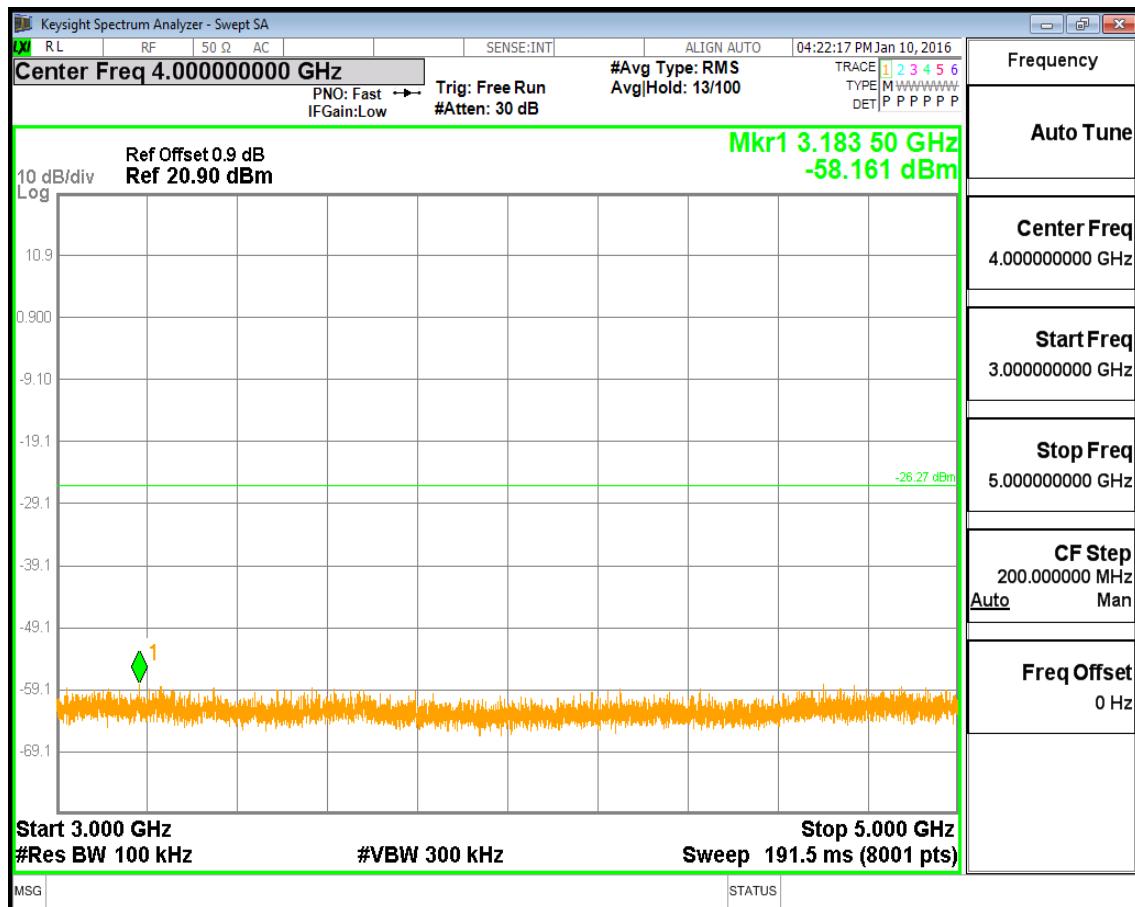
(Plot 4.5.4 B6: Channel 6: 2437MHz @ 802.11n HT40)



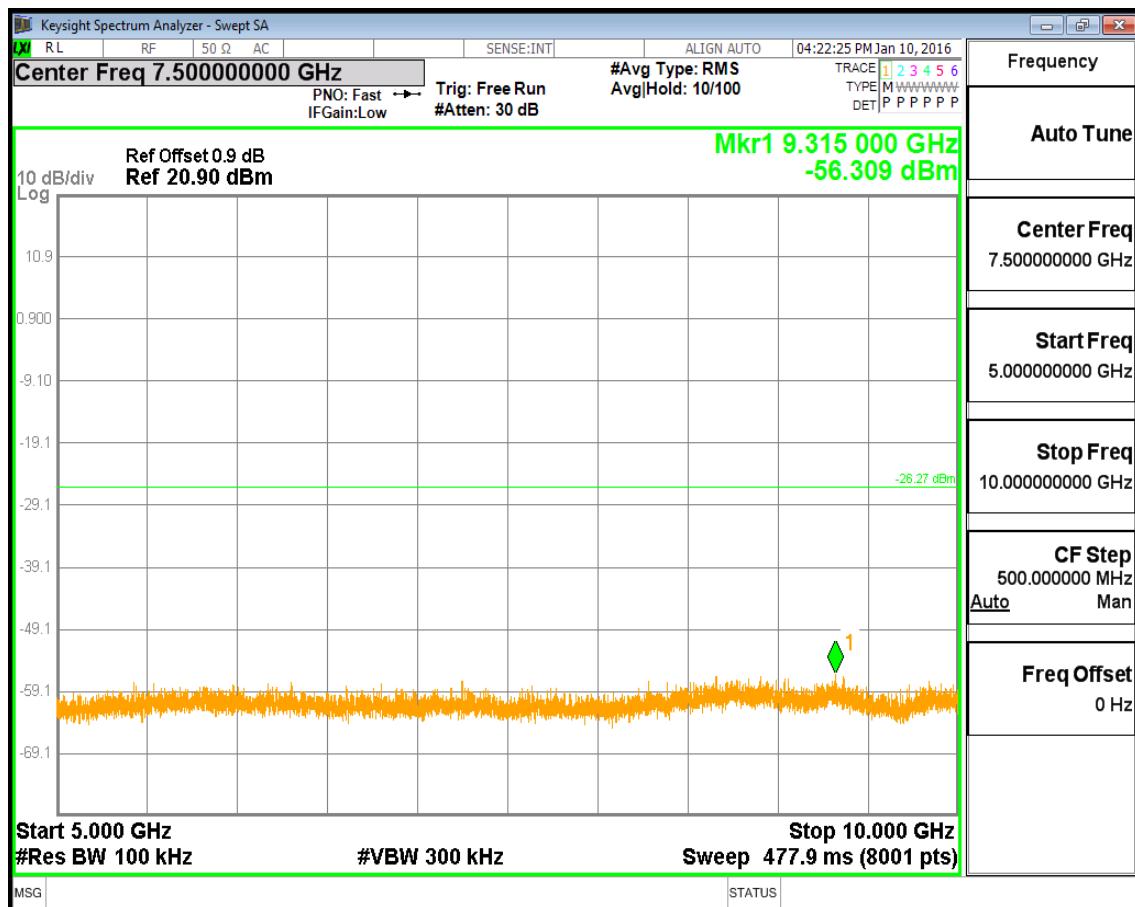
(Plot 4.5.4 C1: Channel 9 : 2452MHz @ 802.11n HT40)



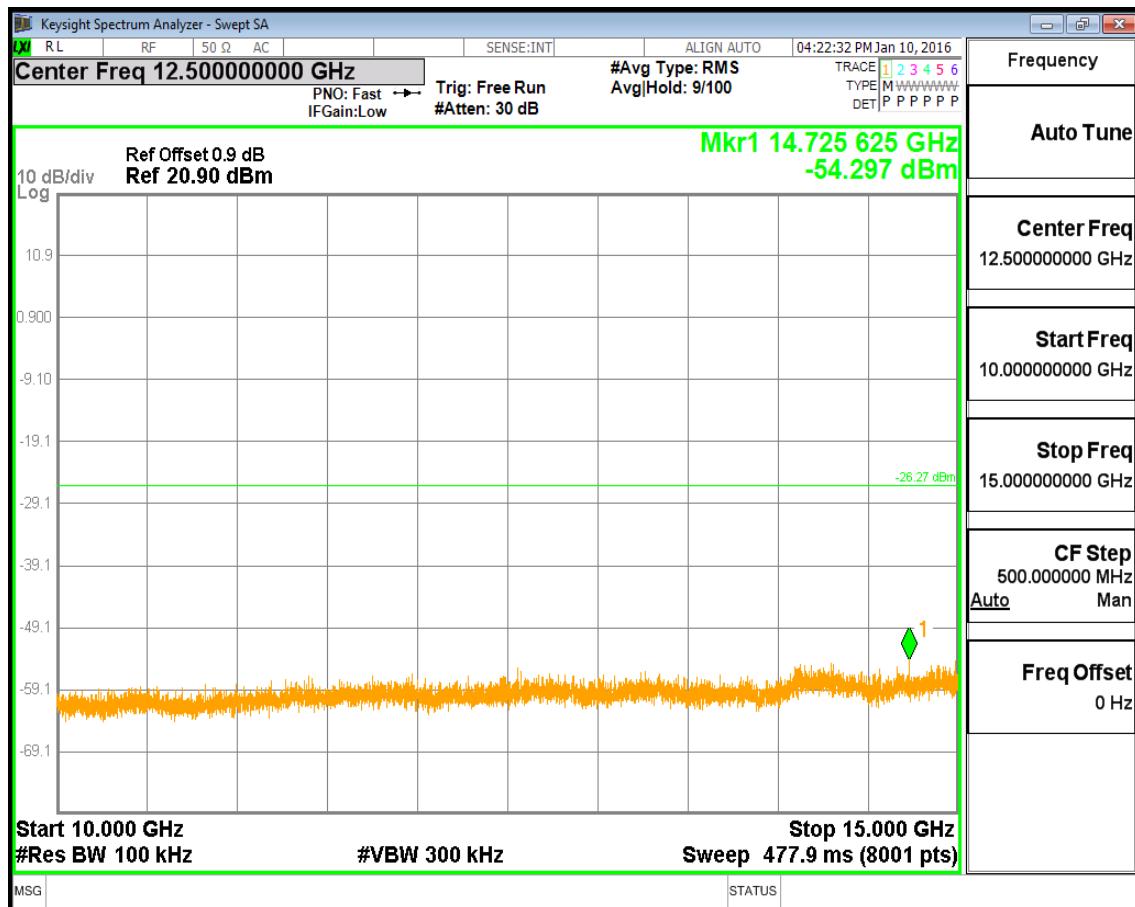
(Plot 4.5.4 C2: Channel 9: 2452MHz @ 802.11n HT40)



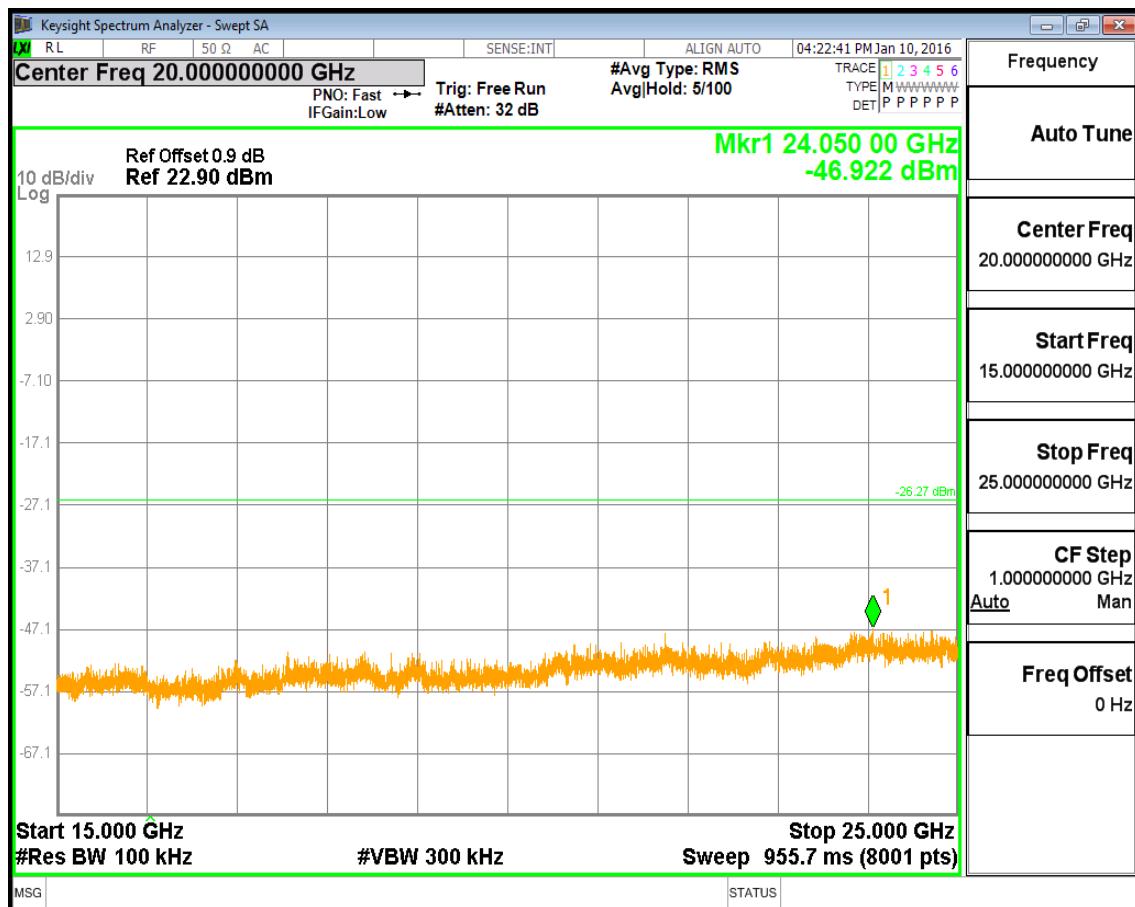
(Plot 4.5.4 C3: Channel 9: 2452MHz @ 802.11n HT40)



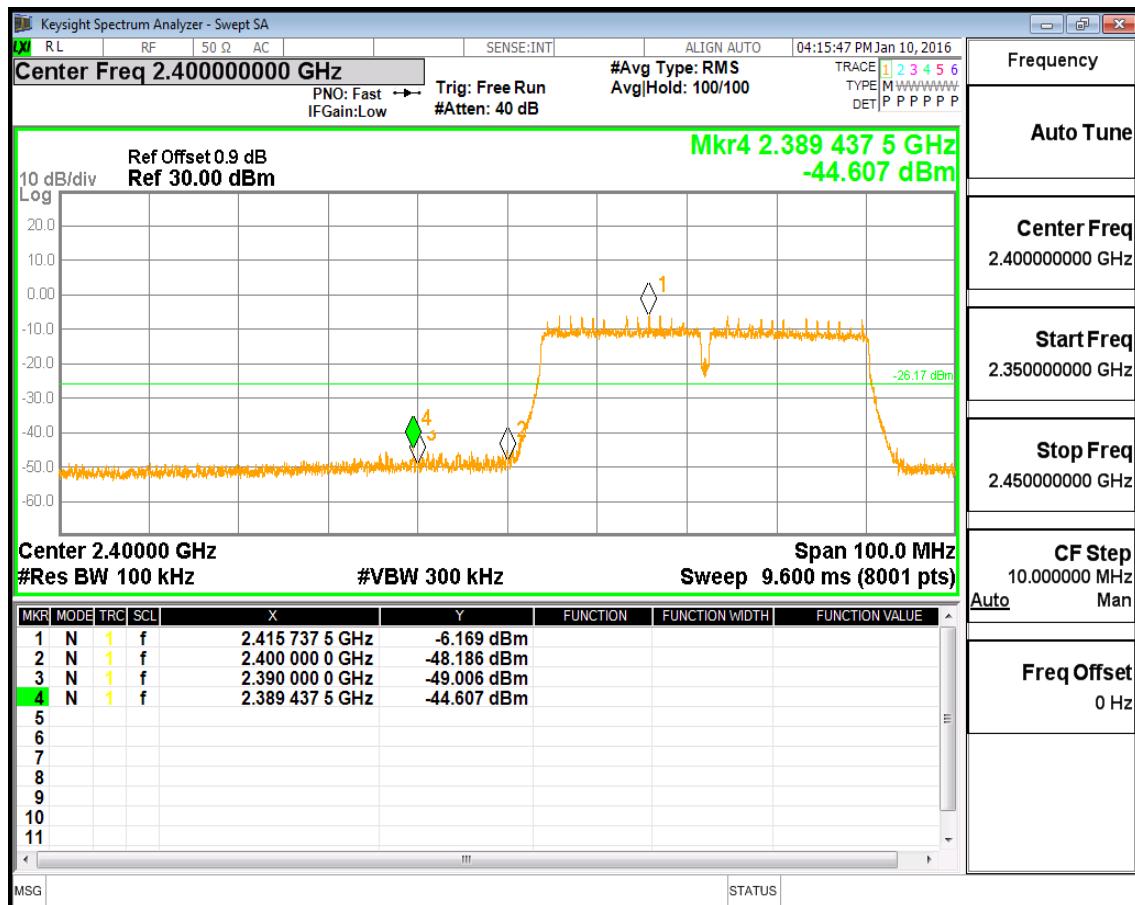
(Plot 4.5.4 C4: Channel 9: 2452MHz @ 802.11n HT40)



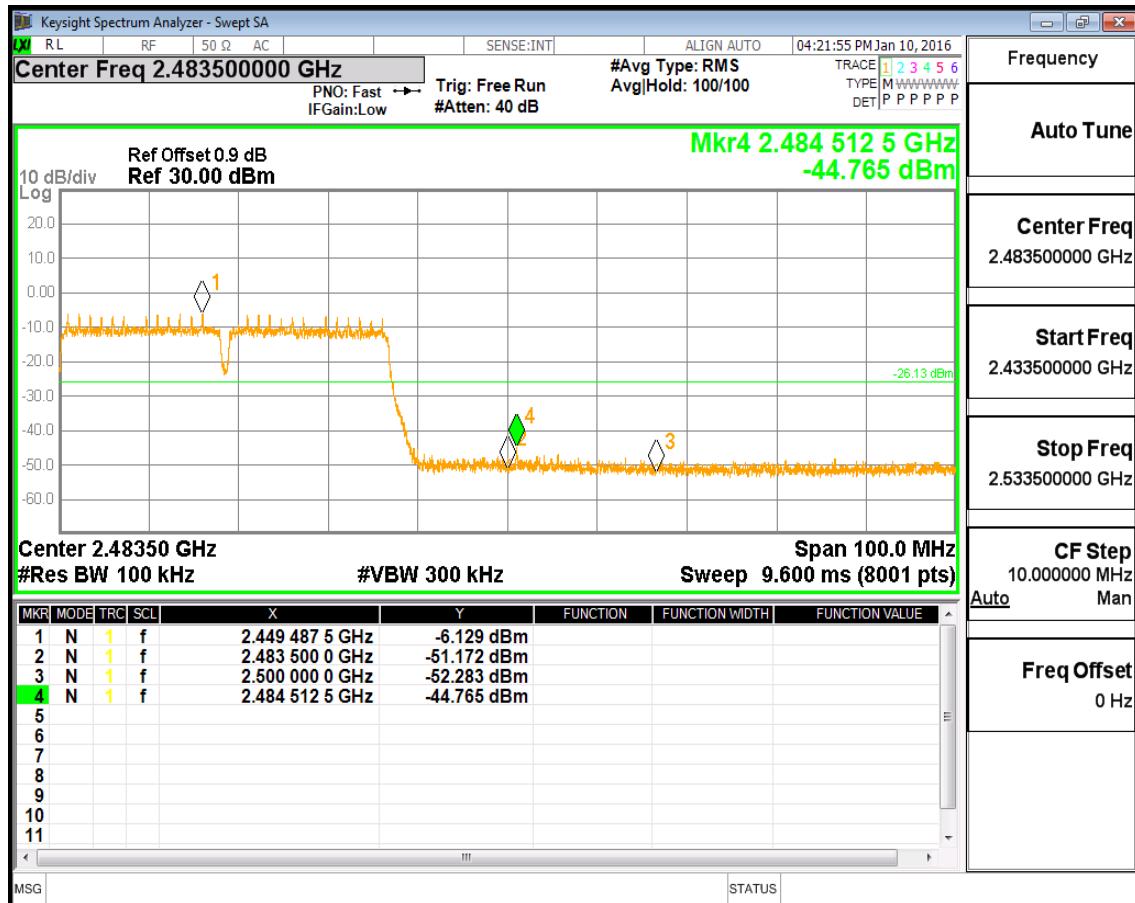
(Plot 4.5.4 C5: Channel 9: 2452MHz @ 802.11n HT40)



(Plot 4.5.4 C6: Channel 9: 2452MHz @ 802.11n HT40)



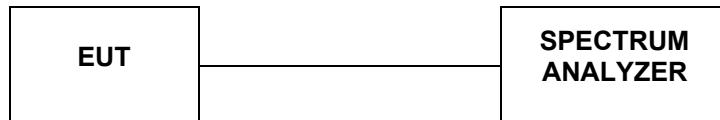
(Plot 4.5.4 D1: Left Band edge @ 802.11n HT40)



(Plot 4.5.4 D2: Right Band edge @ 802.11n HT40)

4.6 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with $RBW=100$ KHz and $VBW=300$ KHz. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. According to KDB558074 D01 V03 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.

1. Set $RBW = 100$ kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW .
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

4.6.1 801.11b Test Mode

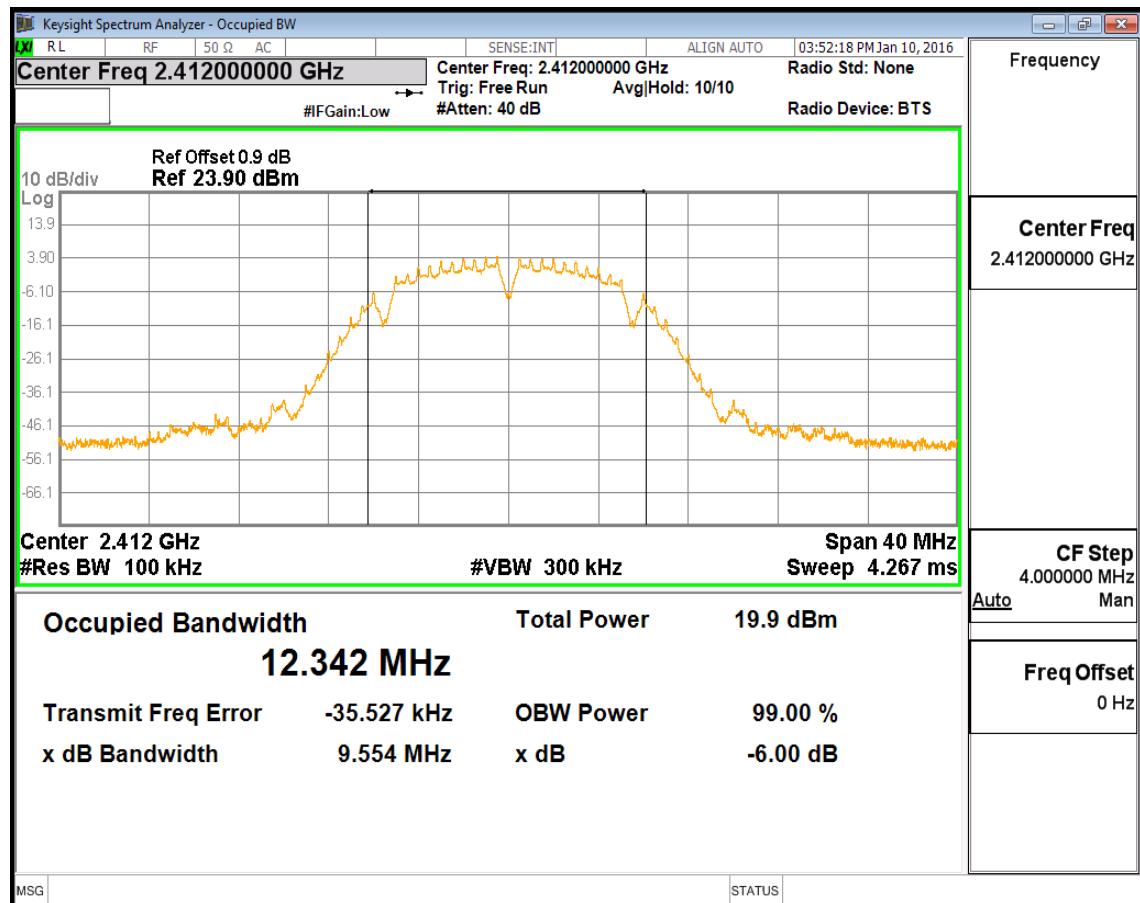
A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	9.554	Plot 4.6.1 A	≥ 500	PASS
6	2437	9.088	Plot 4.6.1 B	≥ 500	PASS
11	2462	9.084	Plot 4.6.1 C	≥ 500	PASS

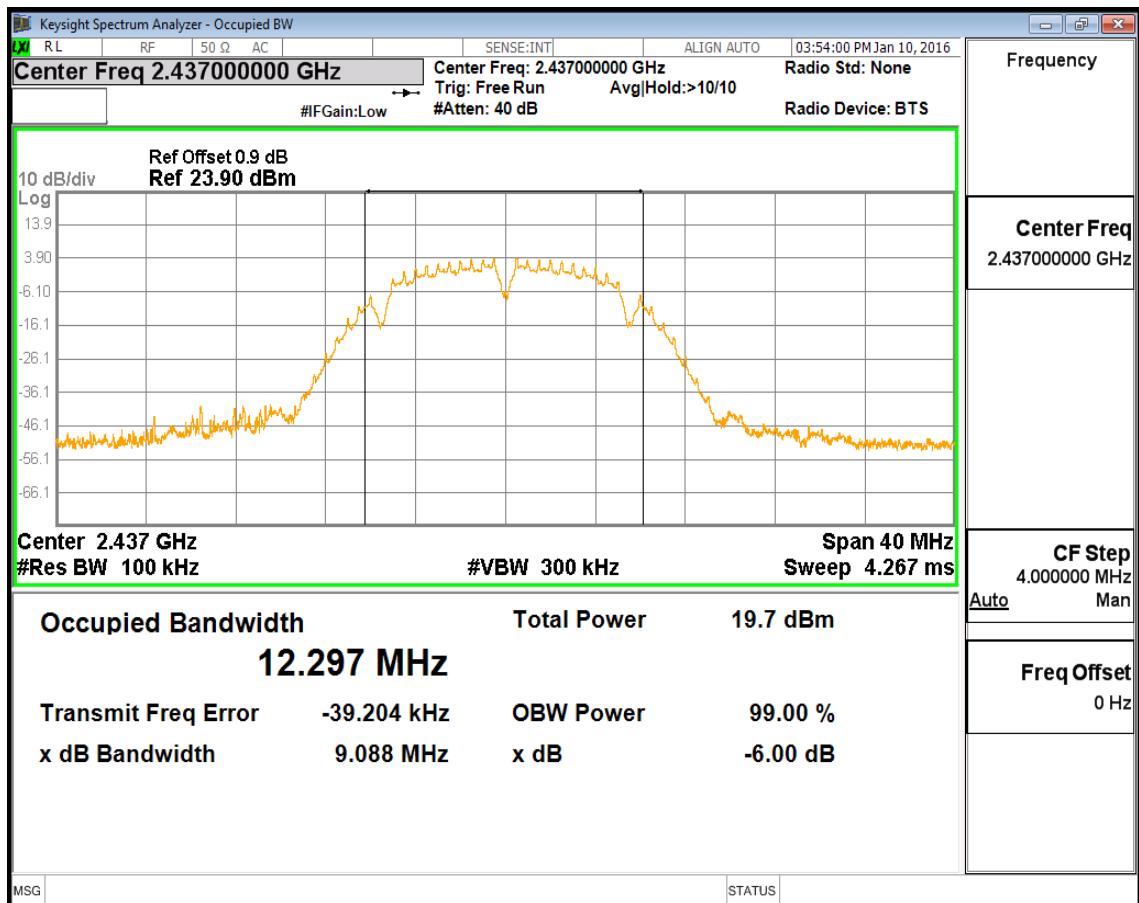
Note:

1. For 802.11b mode at final test to get the worst-case emission at 1Mbps.
2. The test results including the cable loss.

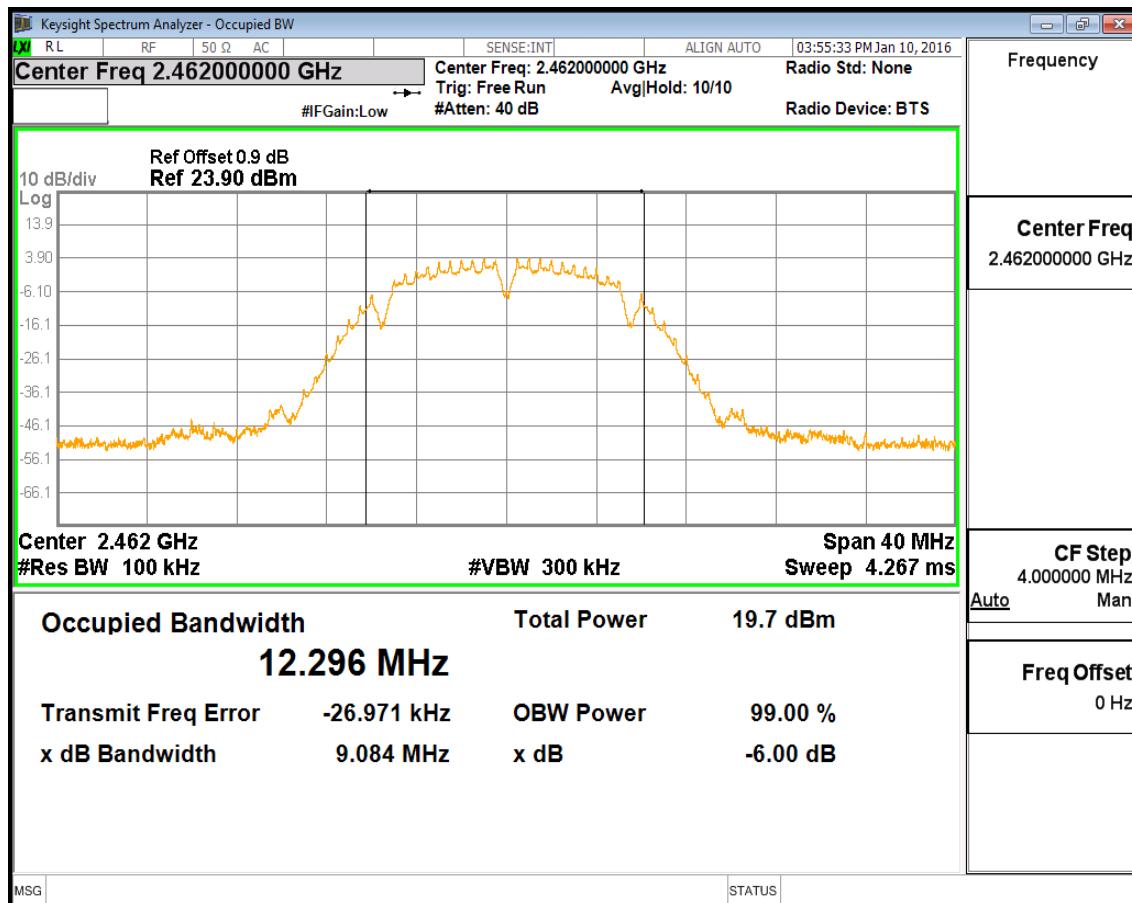
B. Test Plots



(Plot 4.6.1 A: Channel 1: 2412MHz @ 802.11b)



(Plot 4.6.1 B: Channel 6: 2437MHz @ 802.11b)



(Plot 4.6.1 C: Channel 11: 2462MHz @ 802.11b)

4.6.2 801.11g Test Mode

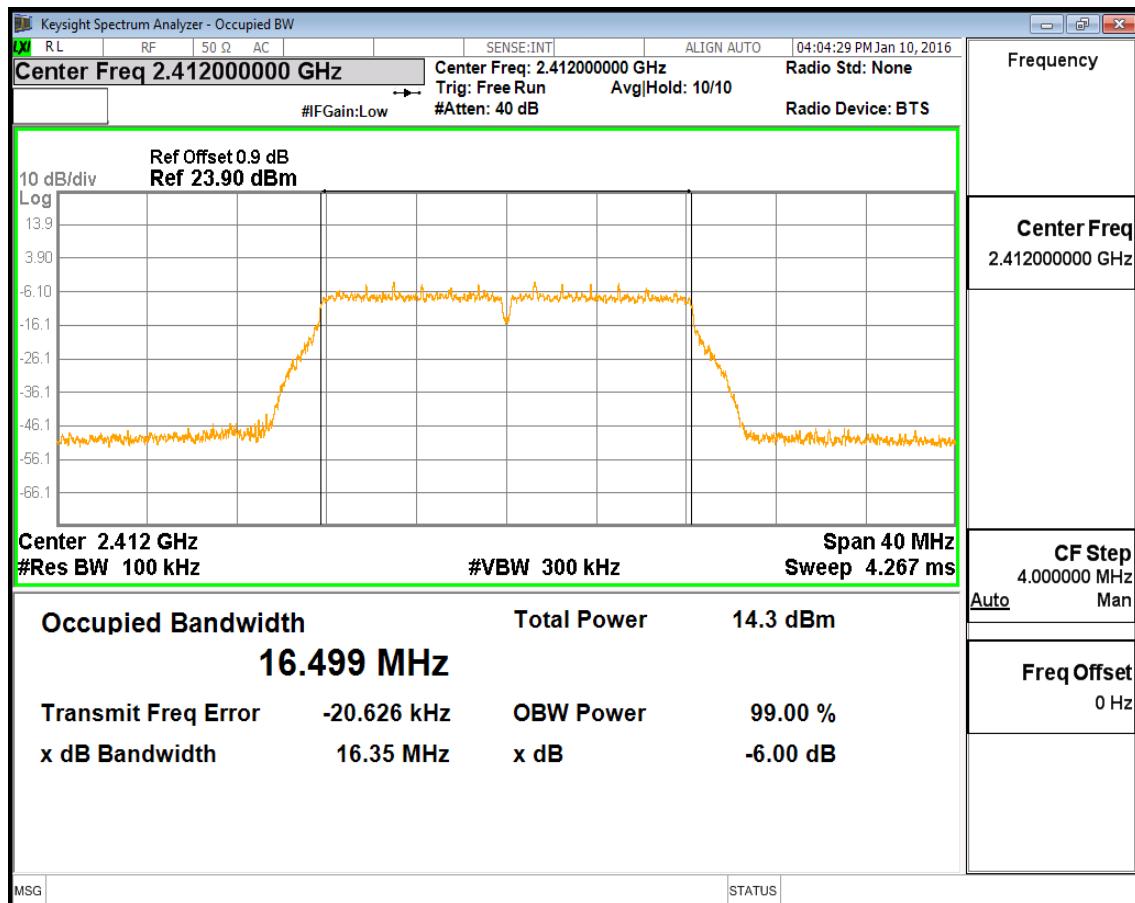
A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	16.35	Plot 4.6.2 A	≥500	PASS
6	2437	16.36	Plot 4.6.2 B	≥500	PASS
11	2462	16.34	Plot 4.6.2 C	≥500	PASS

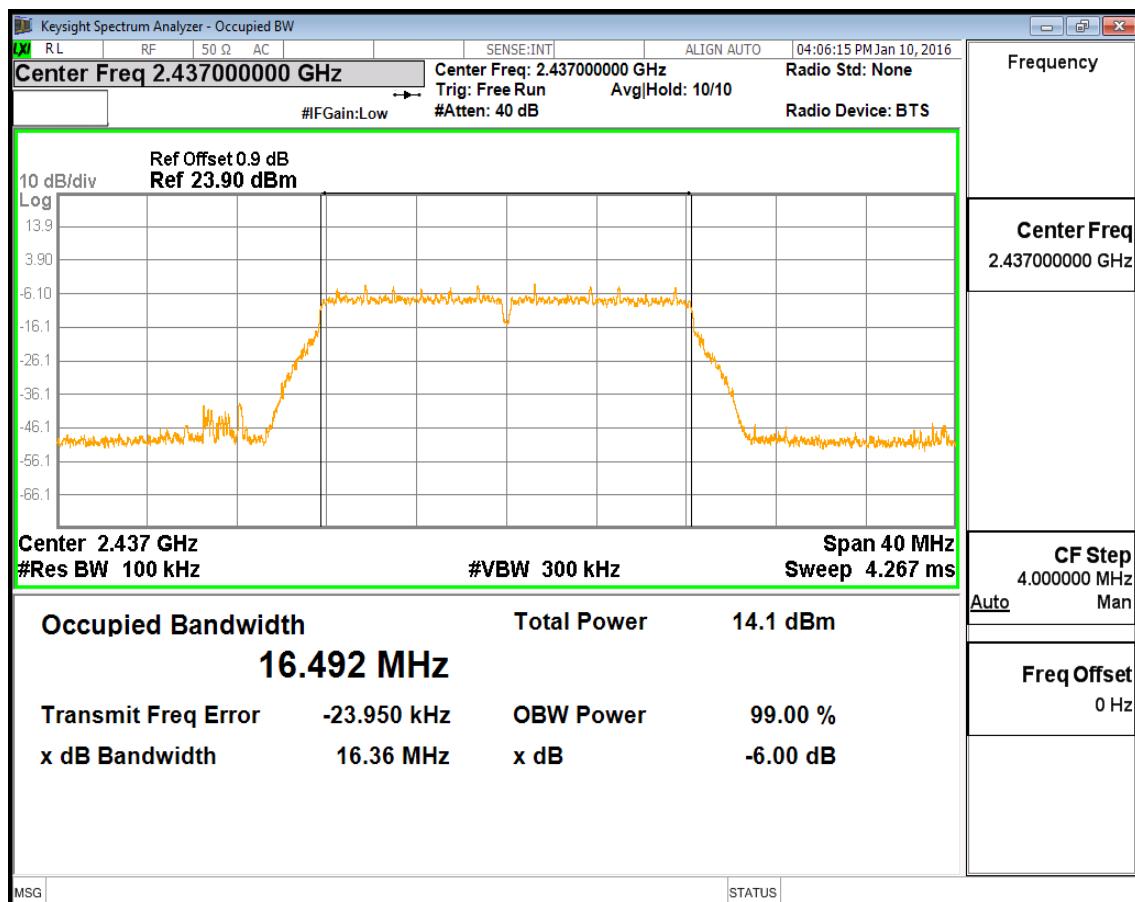
Note:

1. For 802.11g mode at final test to get the worst-case emission at 6Mbps.
2. The test results including the cable loss.

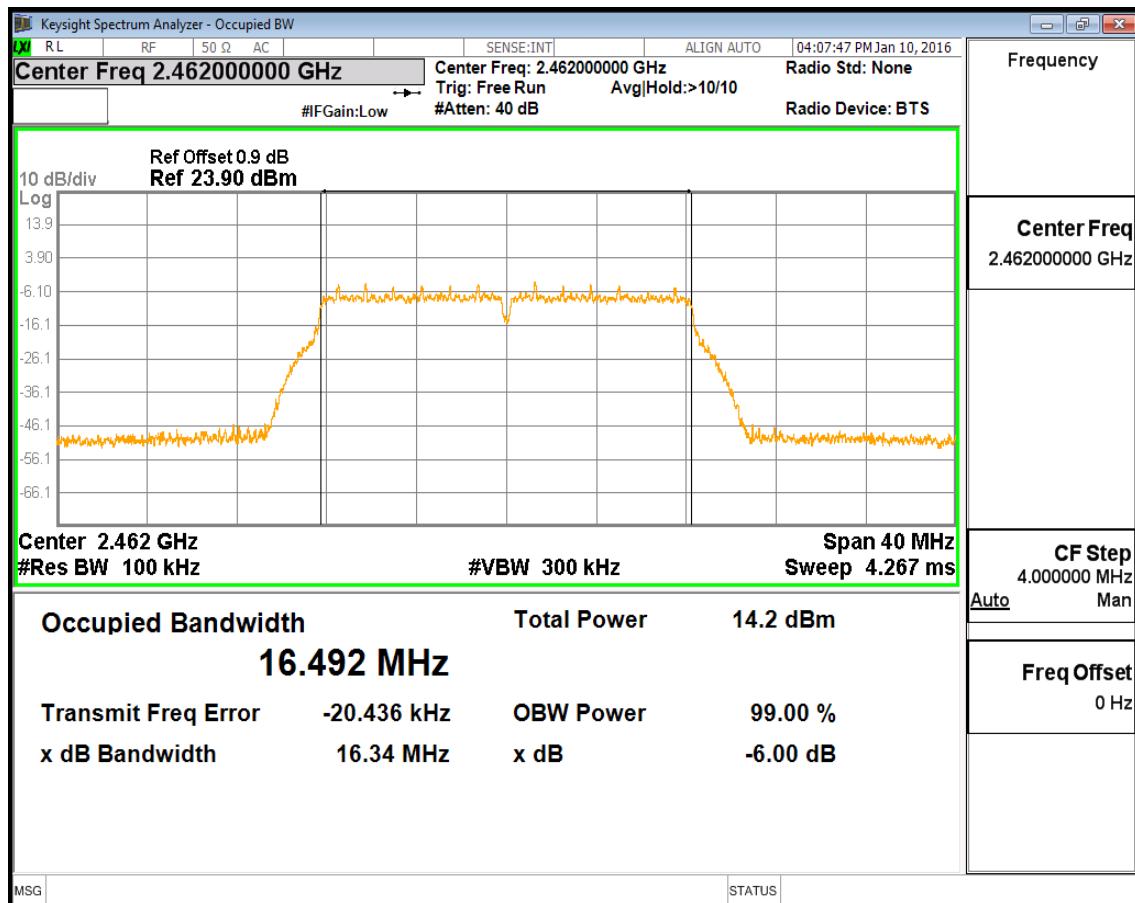
B. Test Plots



(Plot 4.6.2 A: Channel 1: 2412MHz @ 802.11g)



(Plot 4.6.2 B: Channel 6: 2437MHz @ 802.11g)



(Plot 4.6.2 C: Channel 11: 2462MHz @ 802.11g)

4.6.3 801.11n HT20 Test Mode

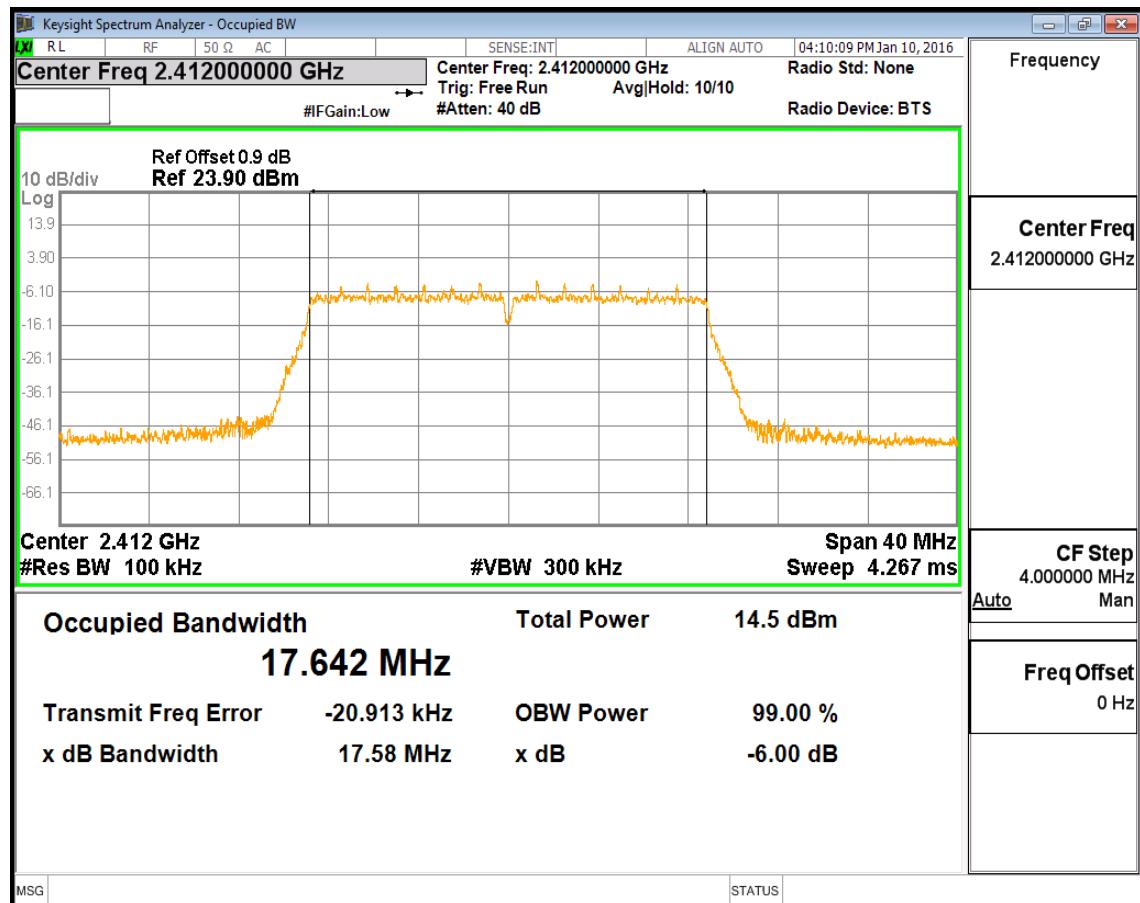
A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
1	2412	17.58	Plot 4.6.3 A	≥500	PASS
6	2437	17.61	Plot 4.6.3 B	≥500	PASS
11	2462	17.58	Plot 4.6.3 C	≥500	PASS

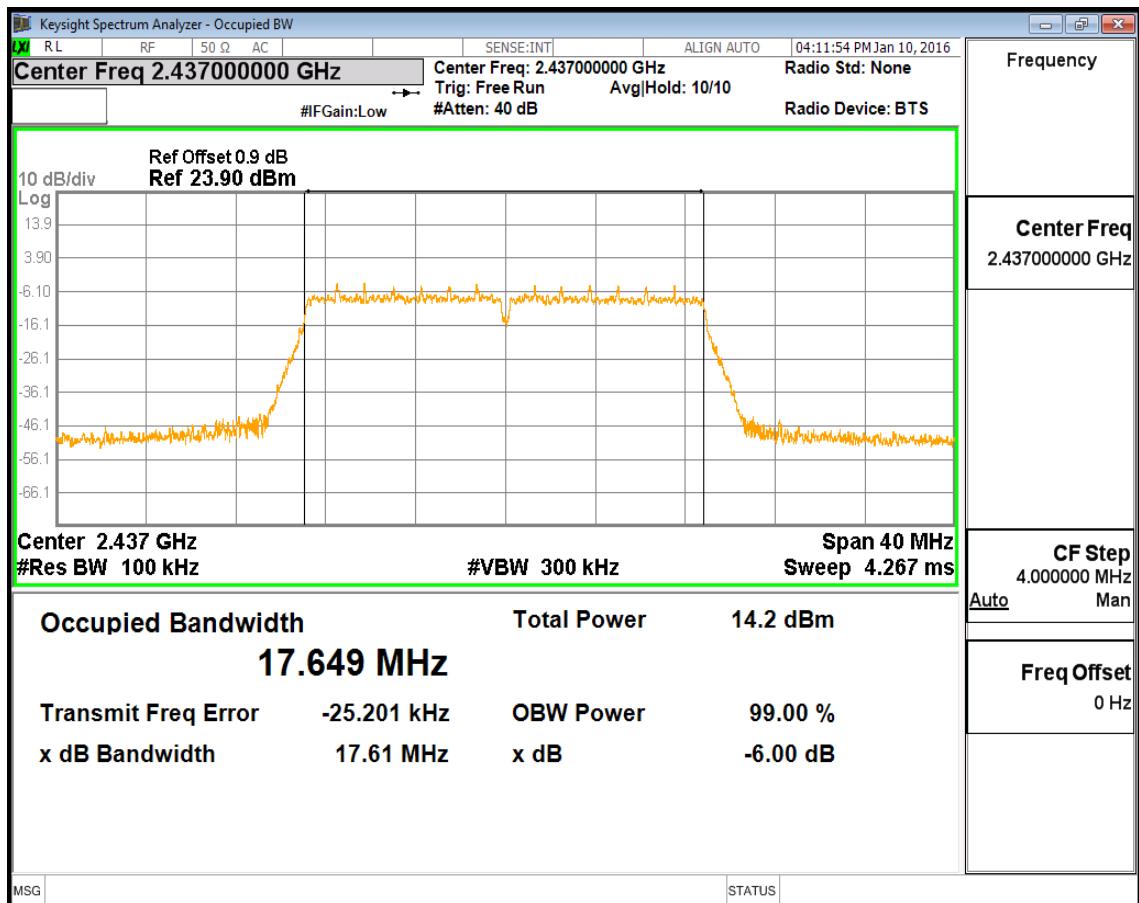
Note:

1. For 802.11n HT20 mode at final test to get the worst-case emission at 6.5Mbps.
2. The test results including the cable loss.

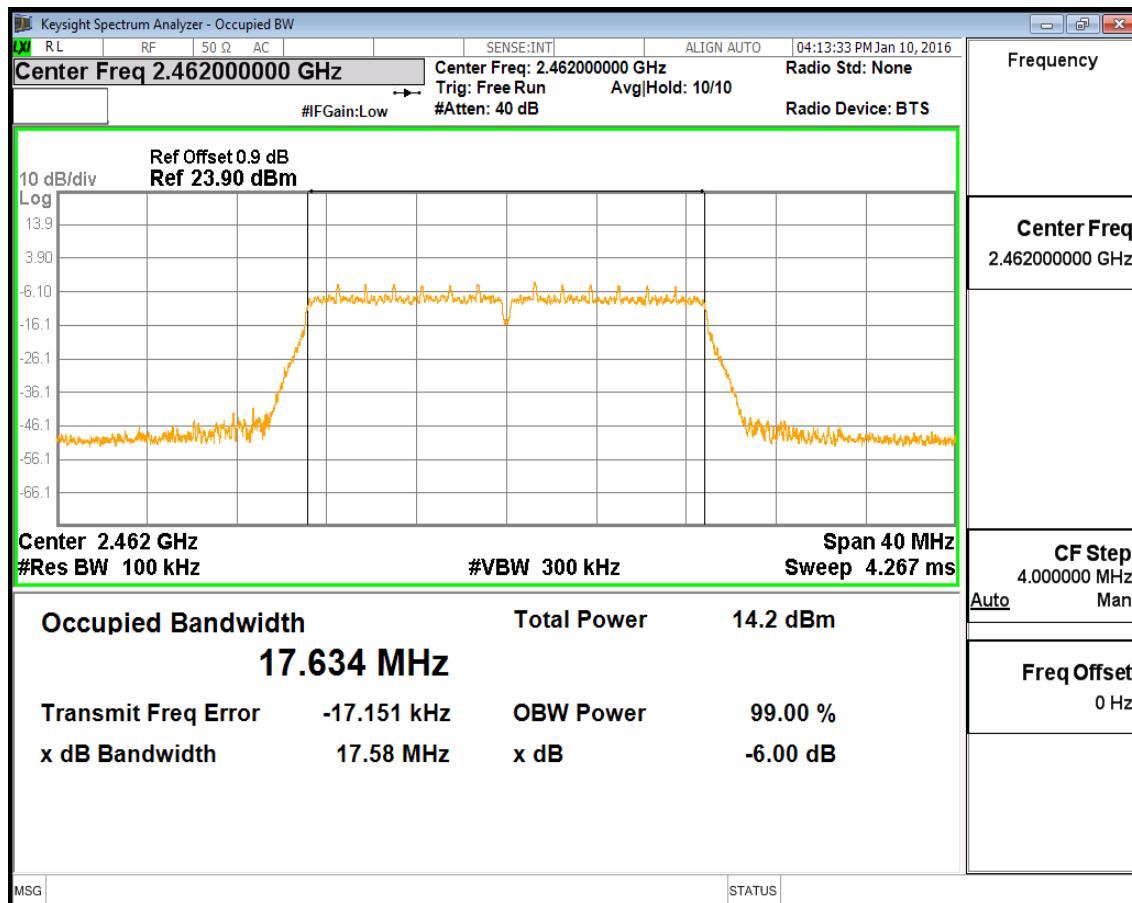
B. Test Plots



(Plot 4.6.3 A: Channel 1: 2412MHz @ 802.11n HT20)



(Plot 4.6.3 B: Channel 6: 2437MHz @ 802.11n HT20)



(Plot 4.6.3 C: Channel 11: 2462MHz @ 802.11n HT20)

4.6.4 801.11n HT40 Test Mode

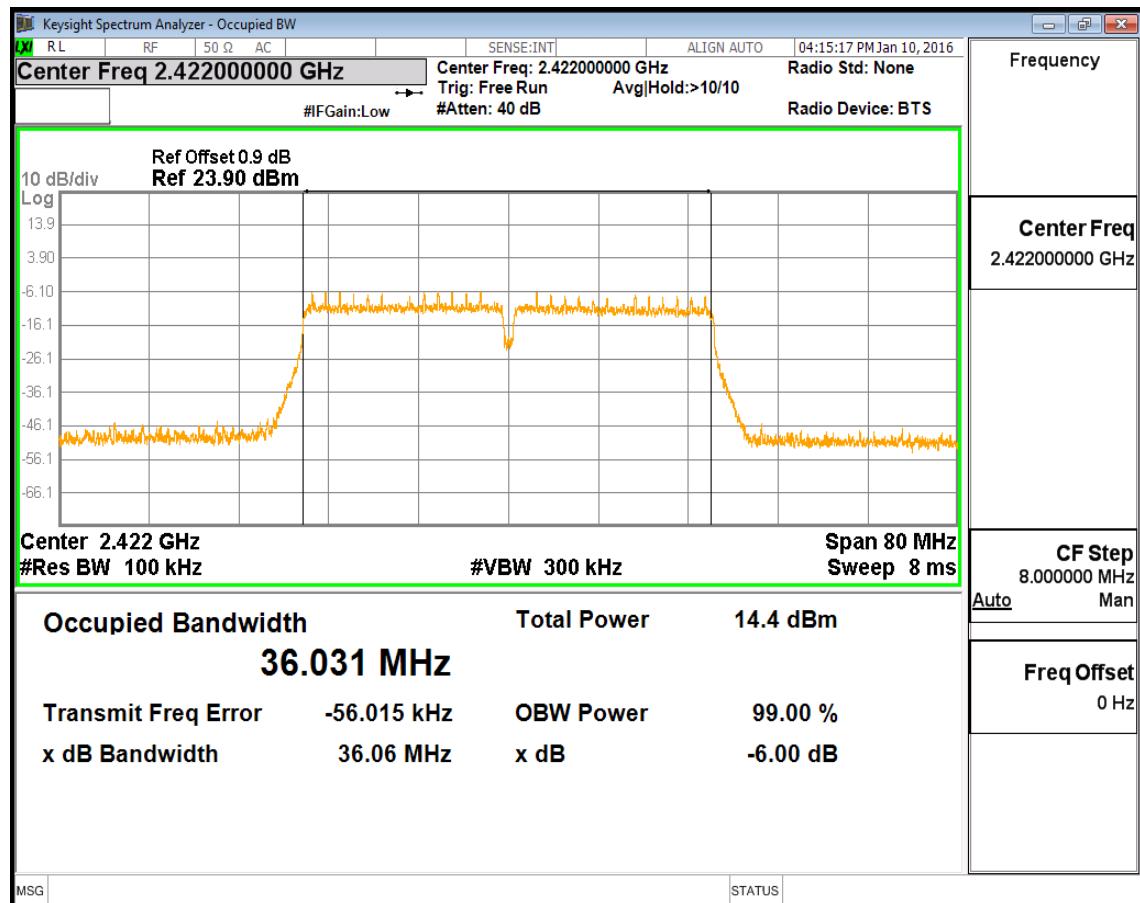
A. Test Verdict

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Refer to Plot	Limits (kHz)	Verdict
3	2422	36.06	Plot 4.6.4 A	≥500	PASS
6	2437	36.06	Plot 4.6.4 B	≥500	PASS
9	2452	35.70	Plot 4.6.4 C	≥500	PASS

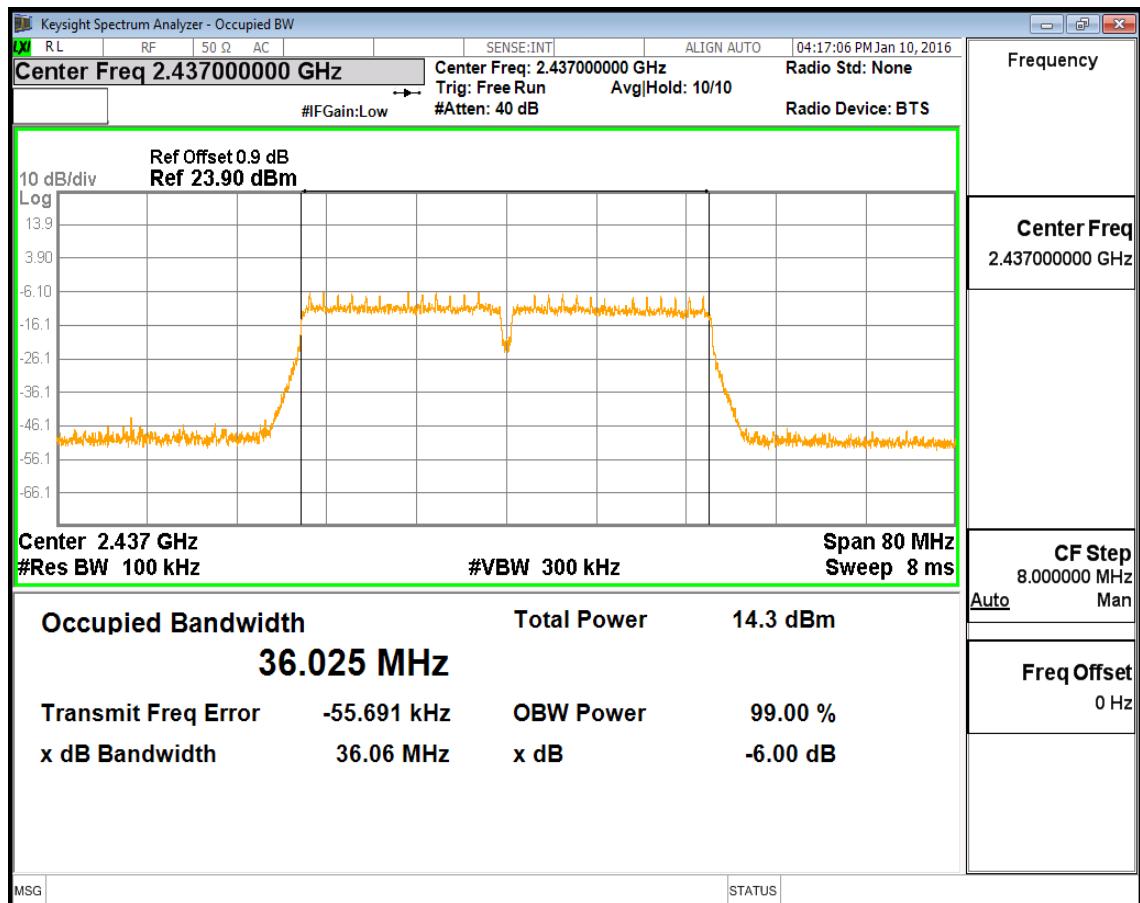
Note:

1. For 802.11n HT40 mode at final test to get the worst-case emission at 13.5Mbps.
2. The test results including the cable loss.

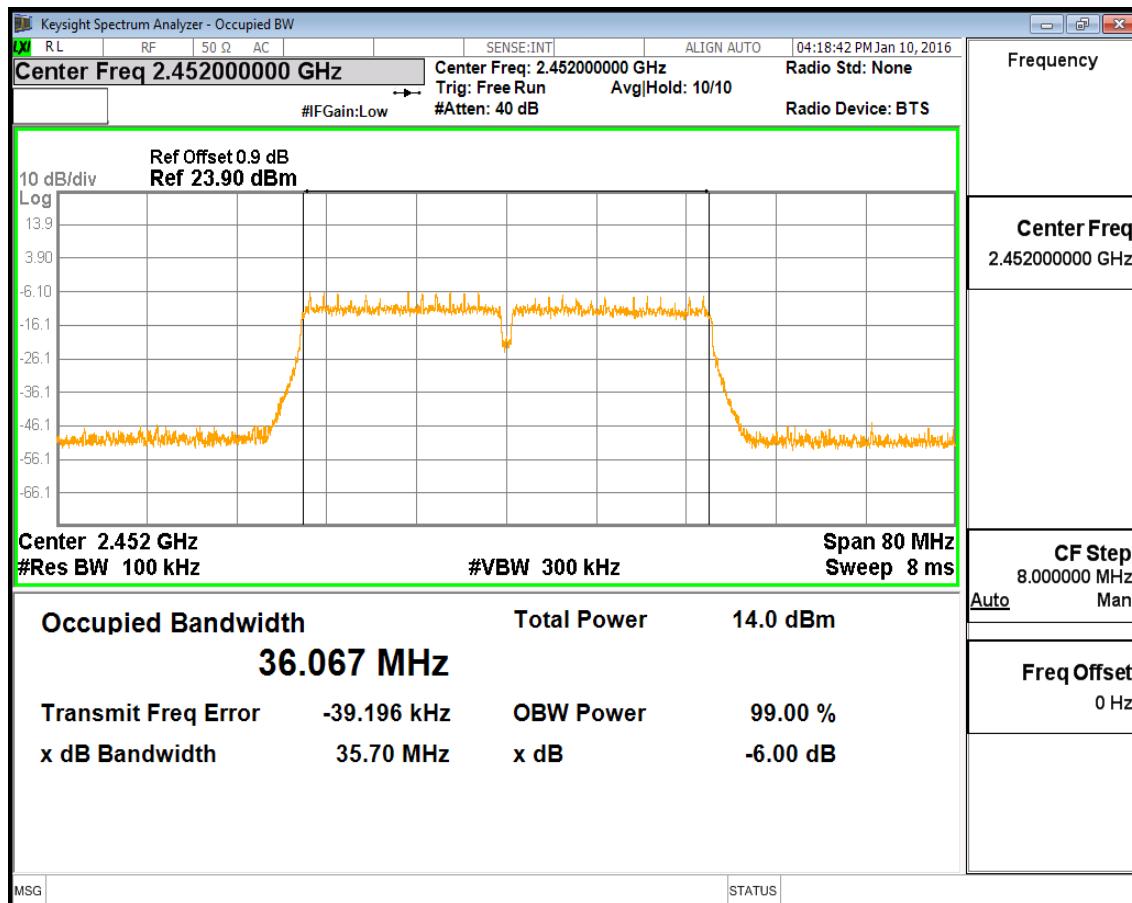
B. Test Plots



(Plot 4.6.4 A: Channel 3: 2422MHz @ 802.11n HT40)



(Plot 4.6.4 B: Channel 6: 2437MHz @ 802.11n HT40)



(Plot 4.6.4 C: Channel 9: 2452MHz @ 802.11n HT40)

4.7 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Measurement

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

Conducted power refer ANSI C63.10 :2009 Section 11.9 Output power test procedure for DTS devices
Radiated power refer to ANSI C63.10 :2009 Section 6.6.4 Radiated emissions tests.

Measurement parameters

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1MHz
Video bandwidth:	3MHz
Trace-Mode:	Max hold

Limits

FCC	IC
Antenna Gain	
6 dBi	

Results

T_{nom}	V_{nom}	Lowest Channel 2412 MHz	Middle Channel 2437 MHz	Highest Channel 2462 MHz
Conducted power [dBm] Measured with DSSS modulation		10.87	10.70	10.66
Conducted power [dBm] Measured with DSSS modulation		12.07	12.21	11.10
Gain [dBi] Calculated		1.20	1.51	0.56
Measurement uncertainty	± 0.6 dB (cond.) / ± 2.56 dB (rad.)			

5 Test Setup Photos of the EUT

Please refer to separated files for Test Setup Photos of the EUT.

6 External Photos of the EUT

Please refer to separated files for External Photos of the EUT.

7 Internal Photos of the EUT

Please refer to separated files for Internal Photos of the EUT.

.....**End of Report**.....