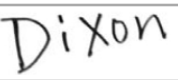
FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No.....:	**MWR151101105**	
FCC ID.....:	**RQQHLT-L50SCM**	
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.....:	Nov. 01, 2015	
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.....:	**HYUNDAI CORPORATION**	
Address .....:	140-2, Kye-dong, Chongro-ku, Seoul, South Korea	
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.	

Test item description .....:	Mobile Phone
Trade Mark .....:	HYUNDAI
Manufacturer.....:	**Skycom Telecommunications Co., Limited**
Model/Type reference.....:	L505
Listed Models .....:	N/A
Modulation Type .....:	DSSS(CCK,DQPSK,DBPSK),OFDM(64QAM,16QAM,QPSK, BPSK)
Operation Frequency.....:	From 2412MHz to 2462MHz
Rating .....:	DC 3.80V
Hardware version .....:	WW818-MB-V0.5
Software version .....:	HYUNDAI_L505_V4.0.3
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. :	MWR151101105	Nov. 01, 2015 Date of issue

Equipment under Test	:	Mobile Phone
Model /Type	:	L505
Listed Models	:	N/A
Applicant	:	**HYUNDAI CORPORATION**
Address	:	140-2, Kye-dong, Chongro-ku, Seoul, South Korea
Manufacturer	:	**Skycom Telecommunications Co., Limited**
Address	:	Rm604, East Block, Shengtang Bldg., No.1, Tairan 9 Rd., Chegongmiao, Futian District, 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

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	:	Oct. 10, 2015
Testing commenced on	:	Oct. 11, 2015
Testing concluded on	:	Nov. 01, 2015

2.2 Product Description

The **HYUNDAI CORPORATION**'s Model: L505 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	L505
Modilation Type	GMSK for GSM/GPRS, 8-PSK for EDGE,QPSK for UMTS, QPSK, 16QAM for LTE
Antenna Type	Internal
UMTS Operation Frequency Band	Device supported UMTS FDD Band II/IV/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
LTE Release Version	R8
LTE Operation Frequency Band	Device supported FDD band 2, FDD band 4, FDD band 7, FDD band 17
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	WW818-MB-V0.5
Software version	HYUNDAI_L505_V4.0.3
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	3.40VDC to 4.20VDC (nominal: 3.80VDC)
GPRS operation mode	Class B

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.80V

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

L505 is subscriber equipment in the WCDMA/GSM /LTE system. The HSPA/UMTS frequency band is Band II, Band IV and Band V, LTE frequency band is band 2, band 4, band 7,band 17; 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 ,LTE 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
Maximum Peak Conducted Output Power	Measurement Method	FCC KDB 558074§9.1.2
	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
Maximum Power Spectral Density Level	Measurement Method	FCC KDB 558074 §10.2 (peak PSD).
	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 Non-Restricted Frequency Bands	Measurement Method	FCC KDB 558074§11.0.
	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 802.11mode 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 date of MCS0 and bandwidth of 20MHz using SISO mode.
11n HT40	IEEE 802.11n with data date 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

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.8 Internal Identification of AE used during the test

AE ID*	Description
AE1	Charger

AE1
Model: TPA-5950100UU
INPUT: 100-240V~ 50/60Hz 0.2A
OUTPUT: DC 5.0V 1.0A
*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: RQQHLT-L50SCM** 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)	< -20dBr/100 kHz if total peak power ≤power limit.	PASS
Unwanted Emissions into Non-Restricted Frequency Bands	15.247(d)	< -20dBr/100 kHz if total peak power ≤power limit.	PASS
Unwanted Emissions into Restricted Frequency Bands (Conducted)	15.247(d) 15.209	< -20dBr/100 kHz if total peak power ≤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	☒ Lowest ☒ Middle ☒ Highest	802.11b	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(e)	Power spectral density	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.247(a)(1)	Spectrum bandwidth – 6 dB bandwidth	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(b)(1)	Maximum output power	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒ ☒	☐	☐	☐	complies
§15.247(d)	Band edge compliance conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.205	Band edge compliance radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Highest	☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions conducted	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	☒ ☒	☐	☐	☐	complies
§15.247(d)	TX spurious emissions radiated	802.11b 802.11g 802.11n HT20 802.11n HT40	☒ Lowest ☒ Middle ☒ Highest	802.11b	☒ Lowest ☒ Middle ☒ Highest	☒	☐	☐	☐	complies
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	☒	☐	☐	☐	complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	802.11b	-/-	802.11b	-/-	☒	☐	☐	☐	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	802.11b	-/-	802.11b	-/-	☒	☐	☐	☐	complies

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

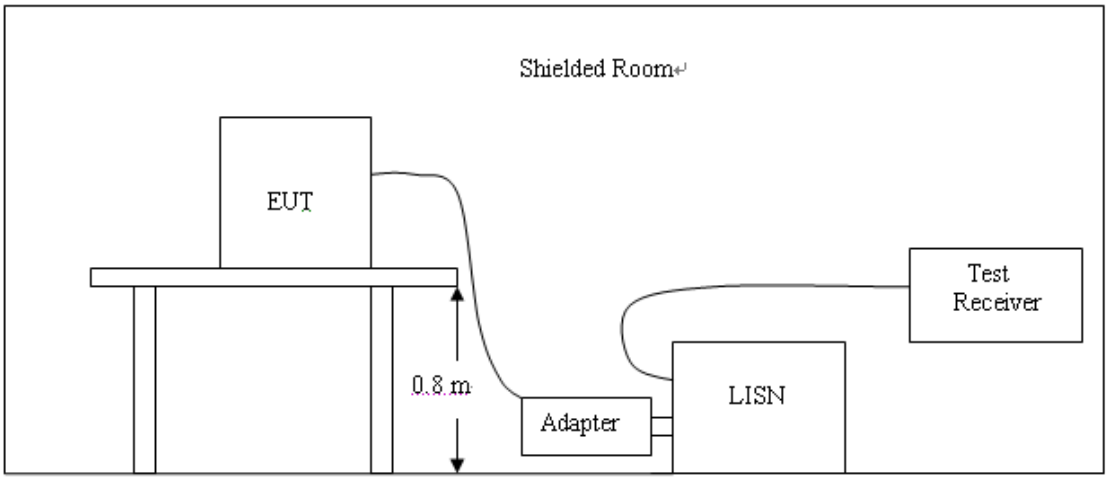
3.6 Equipments Used during the Test

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 (dBμV)			
	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

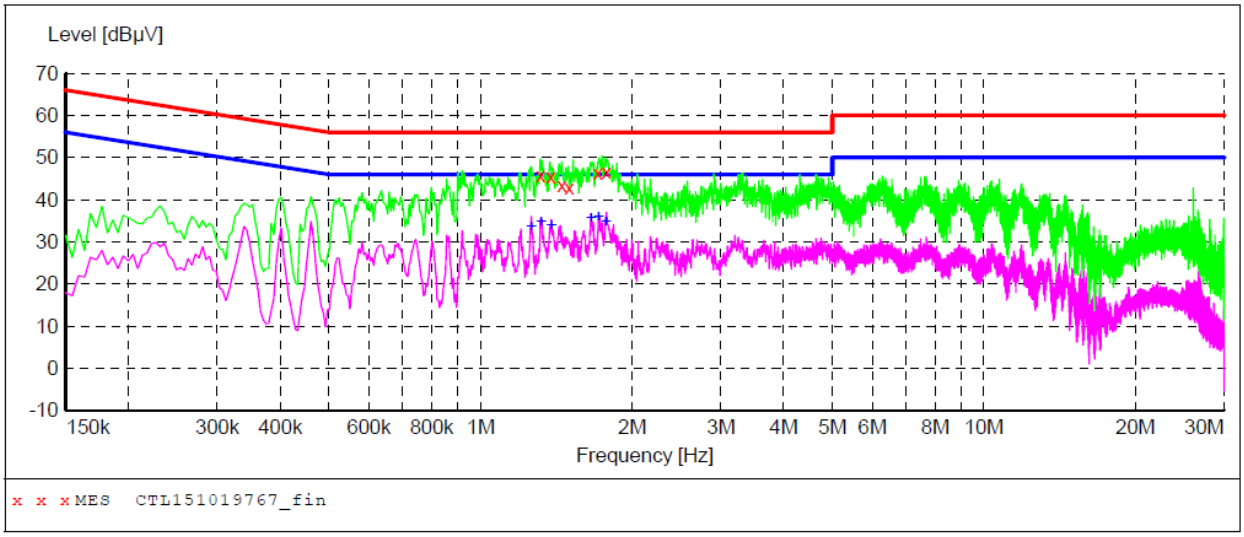
TEST RESULTS

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: "CTL151019767_fin"

10/19/2015 8:12PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.315501	45.80	10.3	56	10.2	QP	L1	GND
1.378501	45.30	10.3	56	10.7	QP	L1	GND
1.450501	43.40	10.3	56	12.6	QP	L1	GND
1.500001	42.80	10.3	56	13.2	QP	L1	GND
1.711501	46.30	10.3	56	9.7	QP	L1	GND
1.779001	46.50	10.3	56	9.5	QP	L1	GND

MEASUREMENT RESULT: "CTL151019767_fin2"

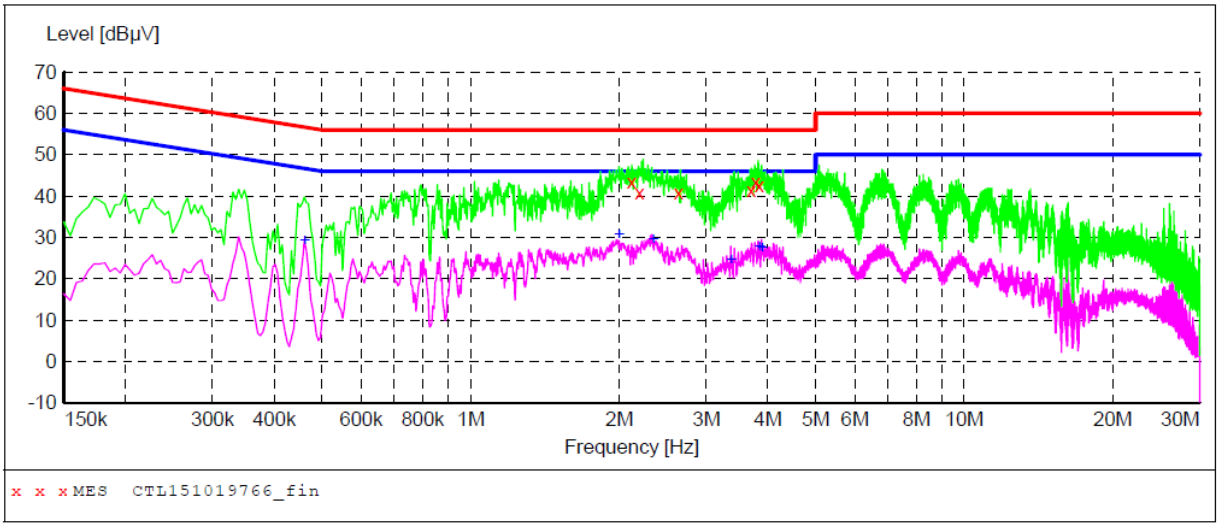
10/19/2015 8:12PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
1.261501	33.50	10.3	46	12.5	AV	L1	GND
1.320001	34.70	10.3	46	11.3	AV	L1	GND
1.383001	33.90	10.3	46	12.1	AV	L1	GND
1.657501	35.50	10.3	46	10.5	AV	L1	GND
1.716001	35.90	10.3	46	10.1	AV	L1	GND
1.774501	34.80	10.3	46	11.2	AV	L1	GND

N:

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL151019766_fin"

10/19/2015 8:09PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
2.116501	43.30	10.4	56	12.7	QP	N	GND
2.197501	40.80	10.4	56	15.2	QP	N	GND
2.638501	40.80	10.4	56	15.2	QP	N	GND
3.700501	41.50	10.4	56	14.5	QP	N	GND
3.781501	43.40	10.4	56	12.6	QP	N	GND
3.844501	42.60	10.4	56	13.4	QP	N	GND

MEASUREMENT RESULT: "CTL151019766_fin2"

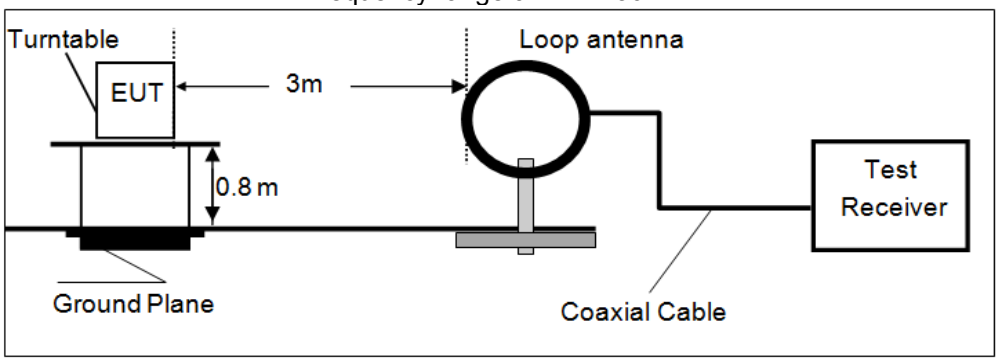
10/19/2015 8:09PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.460501	29.10	10.2	47	17.6	AV	N	GND
1.999501	30.50	10.3	46	15.5	AV	N	GND
2.346001	29.50	10.4	46	16.5	AV	N	GND
3.372001	24.60	10.4	46	21.4	AV	N	GND
3.840001	27.70	10.4	46	18.3	AV	N	GND
3.894001	27.30	10.4	46	18.7	AV	N	GND

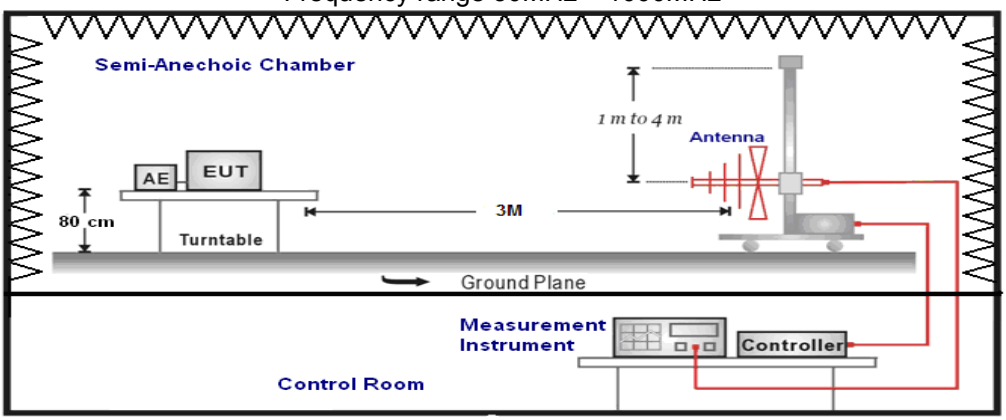
4.2 Radiated Emission

TEST CONFIGURATION

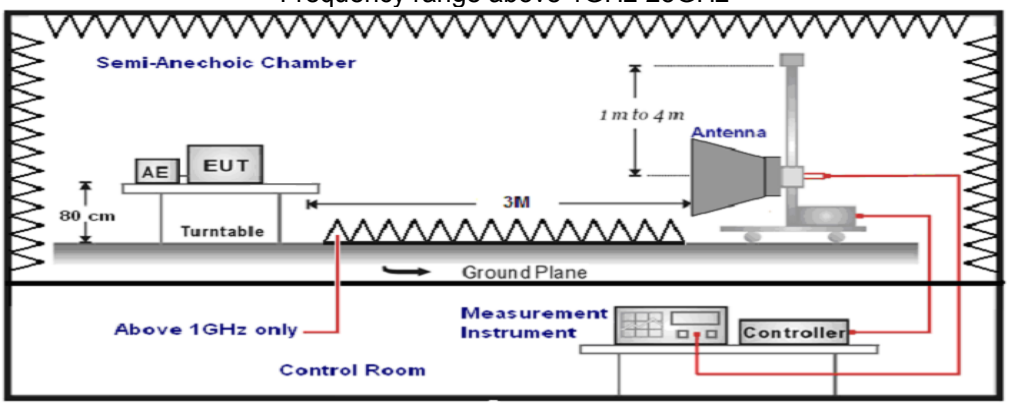
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



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℃ to 360℃ 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 Anternna	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 (dBμV/m)	RA (dBμV/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 from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.
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 (dBμV/m)	Radiated (μV/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

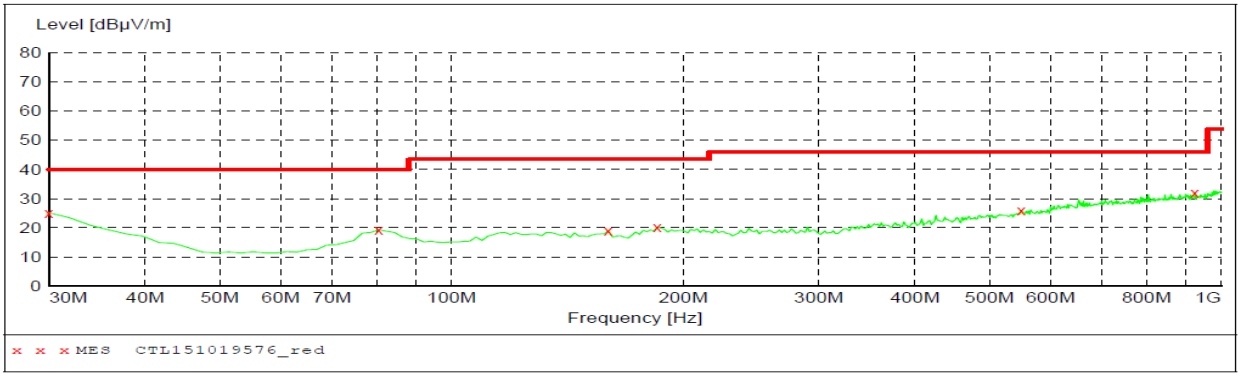
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
11.69	46.59	69.54	22.95	QP	PASS
22.54	42.18	69.54	27.36	QP	PASS

For 30MHz to 1000MHz

Polarization	*Horizontal*

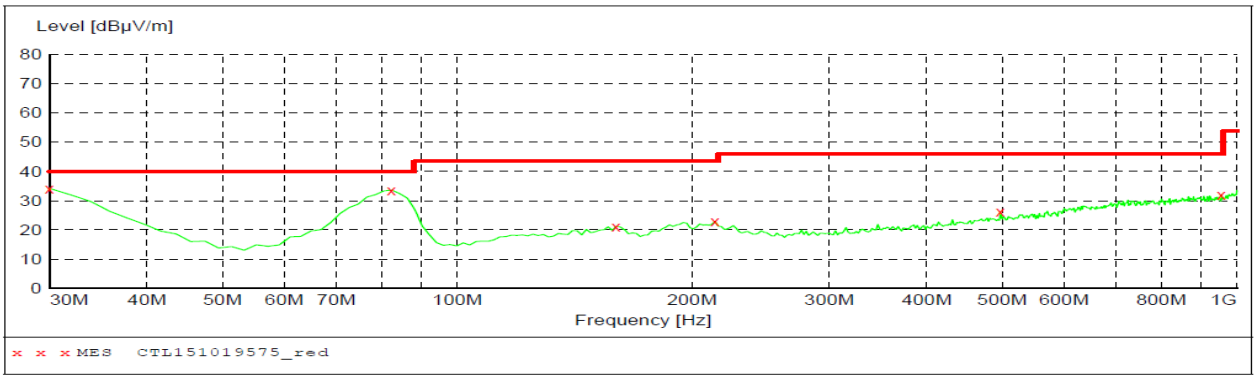
```
SWEEP TABLE: "test (30M-1G)"
  Short Description:            Field Strength
  Start       Stop        Detector  Meas.      IF          Transducer
  Frequency   Frequency             Time       Bandw.
  30.0 MHz    1.0 GHz     MaxPeak   300.0 ms   120 kHz     JB1
```




```
MEASUREMENT RESULT: "CTL151019576_red"
10/19/2015  9:15PM
   Frequency     Level   Transd    Limit   Margin   Det.   Height   Azimuth   Polarization
         MHz    dBµV/m       dB  dBµV/m       dB             cm       deg
   30.000000     25.10     20.8    40.0     14.9   ---       0.0      0.00   HORIZONTAL
   80.440000     19.30      8.5    40.0     20.7   ---       0.0      0.00   HORIZONTAL
  159.980000     19.00     13.6    43.5     24.5   ---       0.0      0.00   HORIZONTAL
  185.200000     20.30     13.1    43.5     23.2   ---       0.0      0.00   HORIZONTAL
  549.920000     25.90     21.0    46.0     20.1   ---       0.0      0.00   HORIZONTAL
  924.340000     32.00     26.2    46.0     14.0   ---       0.0      0.00   HORIZONTAL
```

Polarization	*Vertical*

```
SWEEP TABLE: "test (30M-1G)"
  Short Description:            Field Strength
  Start       Stop        Detector  Meas.      IF          Transducer
  Frequency   Frequency             Time       Bandw.
  30.0 MHz    1.0 GHz     MaxPeak   300.0 ms   120 kHz     JB1
```




```
MEASUREMENT RESULT: "CTL151019575_red"
10/19/2015  9:13PM
   Frequency     Level   Transd    Limit   Margin   Det.   Height   Azimuth   Polarization
         MHz    dBµV/m       dB  dBµV/m       dB             cm       deg
   30.000000     34.20     20.8    40.0      5.8   ---       0.0      0.00   VERTICAL
   82.380000     33.60      8.7    40.0      6.4   ---       0.0      0.00   VERTICAL
  159.980000     21.20     13.6    43.5     22.3   ---       0.0      0.00   VERTICAL
  214.300000     22.90     14.0    43.5     20.6   ---       0.0      0.00   VERTICAL
  497.540000     26.10     20.2    46.0     19.9   ---       0.0      0.00   VERTICAL
  955.380000     32.00     26.6    46.0     14.0   ---       0.0      0.00   VERTICAL
```

For 1GHz to 25GHz

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

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	4824.00	60.25	PK	74	13.75	55.70	33.52	6.92	35.89	4.55
1	4824.00	47.45	AV	54	6.55	42.90	33.52	6.92	35.89	4.55
2	5252.75	48.89	PK	74	25.11	41.45	34.59	7.17	34.32	7.44
2	5252.75	--	AV	54	--	--	--	--	--	--
3	7236.00	52.51	PK	74	21.49	41.24	37.10	9.19	35.02	11.27
3	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.

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	4824.00	57.58	PK	74	16.42	53.03	33.52	6.92	35.89	4.55
1	4824.00	49.64	AV	54	4.36	45.09	33.52	6.92	35.89	4.55
2	5150.75	48.55	PK	74	25.45	41.28	34.44	7.12	34.28	7.27
2	5150.75	--	AV	54	--	--	--	--	--	--
3	7236.00	50.41	PK	74	23.59	39.14	37.10	9.19	35.02	11.27
3	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.

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	4258.75	43.25	PK	74	30.75	38.52	32.83	6.56	34.65	4.73
1	4258.75	--	AV	54	--	--	--	--	--	--
2	4874.00	57.30	PK	74	16.7	51.06	33.59	6.95	34.30	6.24
2	4874.00	49.55	AV	54	4.45	43.31	33.59	6.95	34.30	6.24
3	5178.50	47.54	PK	74	26.46	40.04	34.49	7.13	34.13	7.50
3	5178.50	--	AV	54	--	--	--	--	--	--
4	7311.00	48.41	PK	74	25.59	36.75	37.44	9.22	35.00	11.66
4	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.

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	3950.35	43.54	PK	74	30.46	38.83	33.20	6.34	34.83	4.71
1	3950.35	--	AV	54	--	--	--	--	--	--
2	4874.00	56.98	PK	74	17.02	50.64	33.59	6.95	34.20	6.34
2	4874.00	49.22	AV	54	4.78	42.88	33.59	6.95	34.20	6.34
3	5265.25	46.47	PK	74	27.53	38.76	34.61	7.18	34.08	7.71
3	5265.25	--	AV	54	--	--	--	--	--	--
4	7311.00	48.69	PK	74	25.31	37.03	37.44	9.22	35.00	11.66
4	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.

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	4924.00	59.98	PK	74	14.02	55.20	33.71	6.98	35.91	4.78
1	4924.00	46.44	AV	54	7.56	41.66	33.71	6.98	35.91	4.78
2	5125.75	47.20	PK	74	26.8	39.99	34.38	7.10	34.28	7.21
2	5125.75	--	AV	54	--	--	--	--	--	--
3	7386.00	50.98	PK	74	23.02	39.10	37.61	9.25	34.98	11.88
3	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.

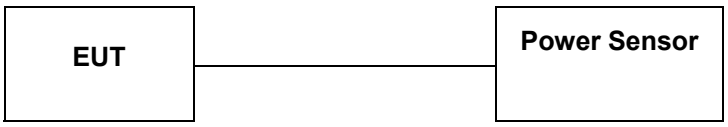
Frequency(MHz):				2462		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4924.00	56.48	PK	74	17.52	51.70	33.71	6.98	35.91	4.78
1	4924.00	47.21	AV	54	6.79	42.43	33.71	6.98	35.91	4.78
2	5825.25	45.87	PK	74	28.13	38.10	34.81	7.49	34.53	7.77
2	5825.25	--	AV	54	--	--	--	--	--	--
3	7386.00	50.44	PK	74	23.56	38.56	37.61	9.25	34.98	11.88
3	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.

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 10log (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)	Measured Output Average Power (dBm)	Limits (dBm)	Verdict
1	2412	15.87	12.06	30	PASS
6	2437	15.85	13.14	30	PASS
11	2462	15.82	13.44	30	PASS

Note:
1. For 802.11b mode at finial 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)	Measured Output Average Power (dBm)	Limits (dBm)	Verdict
1	2412	17.56	11.55	30	PASS
6	2437	17.21	10.90	30	PASS
11	2462	17.62	11.28	30	PASS

Note:
1. For 802.11g mode at finial 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)	Measured Output Average Power (dBm)	Limits (dBm)	Verdict
1	2412	17.40	11.25	30	PASS
6	2437	17.55	11.31	30	PASS
11	2462	17.33	11.13	30	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.

4.3.4 802.11n HT40 Test Mode

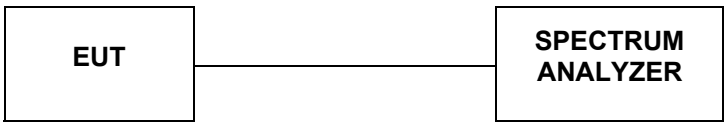
A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Measured Output Average Power (dBm)	Limits (dBm)	Verdict
1	2412	14.87	9.99	30	PASS
6	2437	14.85	9.75	30	PASS
11	2462	14.82	9.82	30	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.

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 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 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

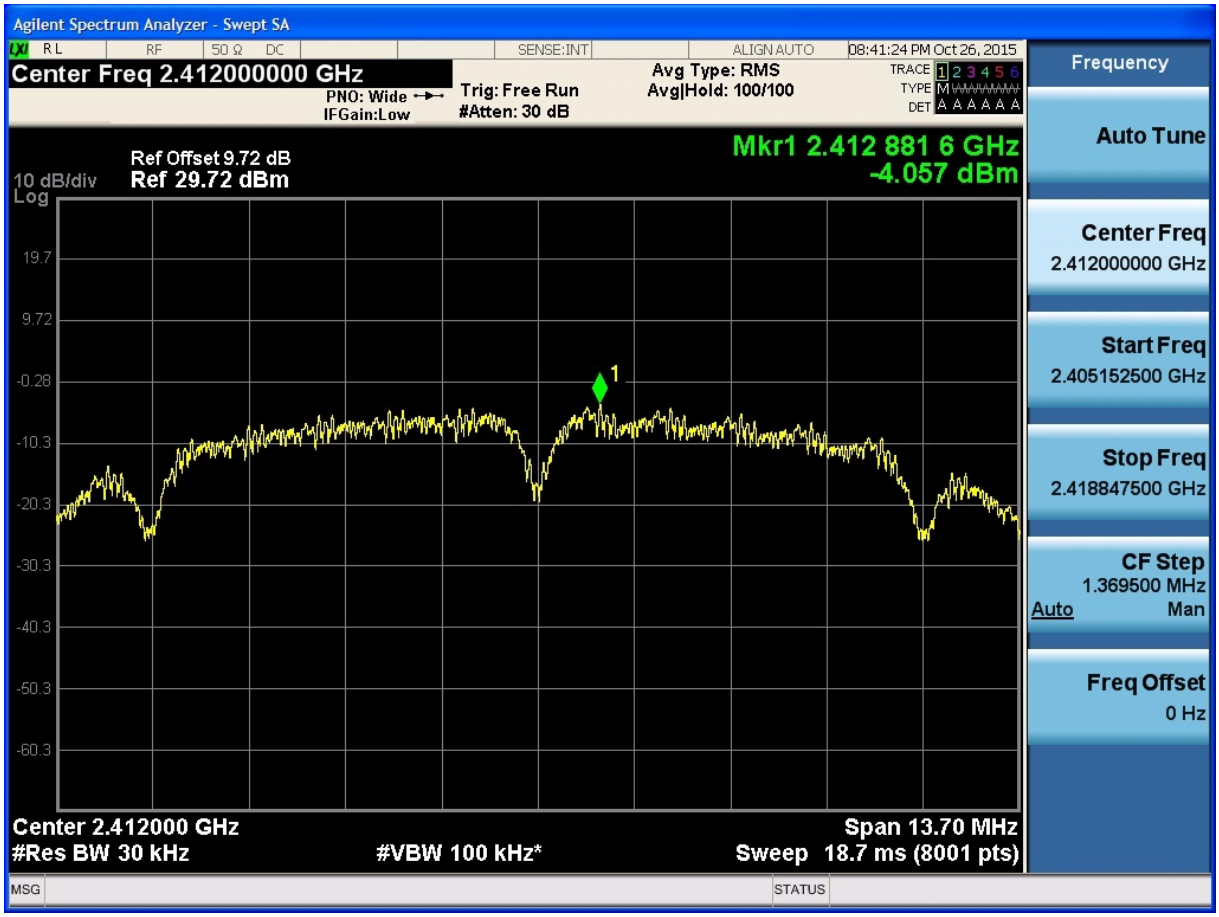
4.4.1 802.11b Test Mode

A. Test Verdict

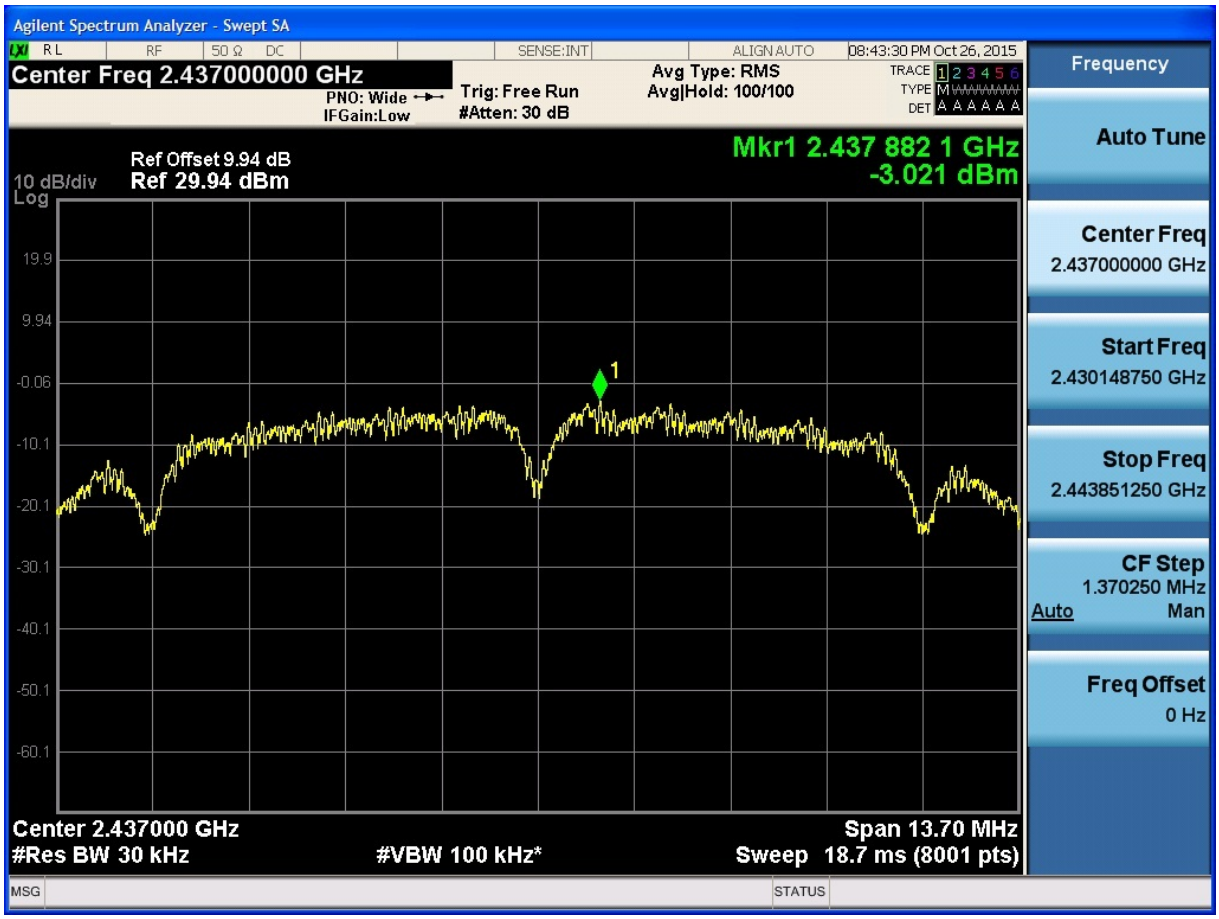
Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-4.057	Plot 4.4.1 A	8	PASS
6	2437	-3.021	Plot 4.4.1 B	8	PASS
11	2462	-2.833	Plot 4.4.1 C	8	PASS

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

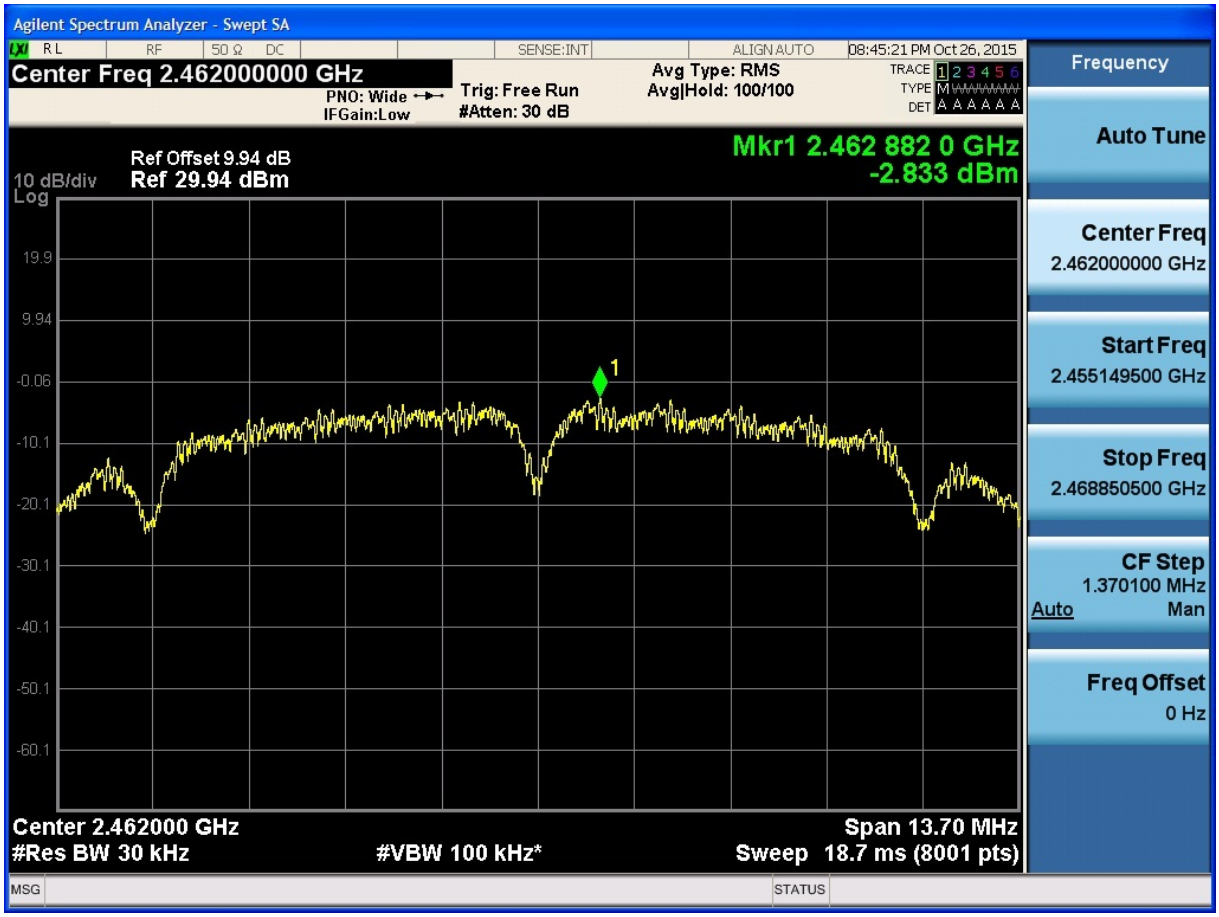
B. Test Plots



(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)

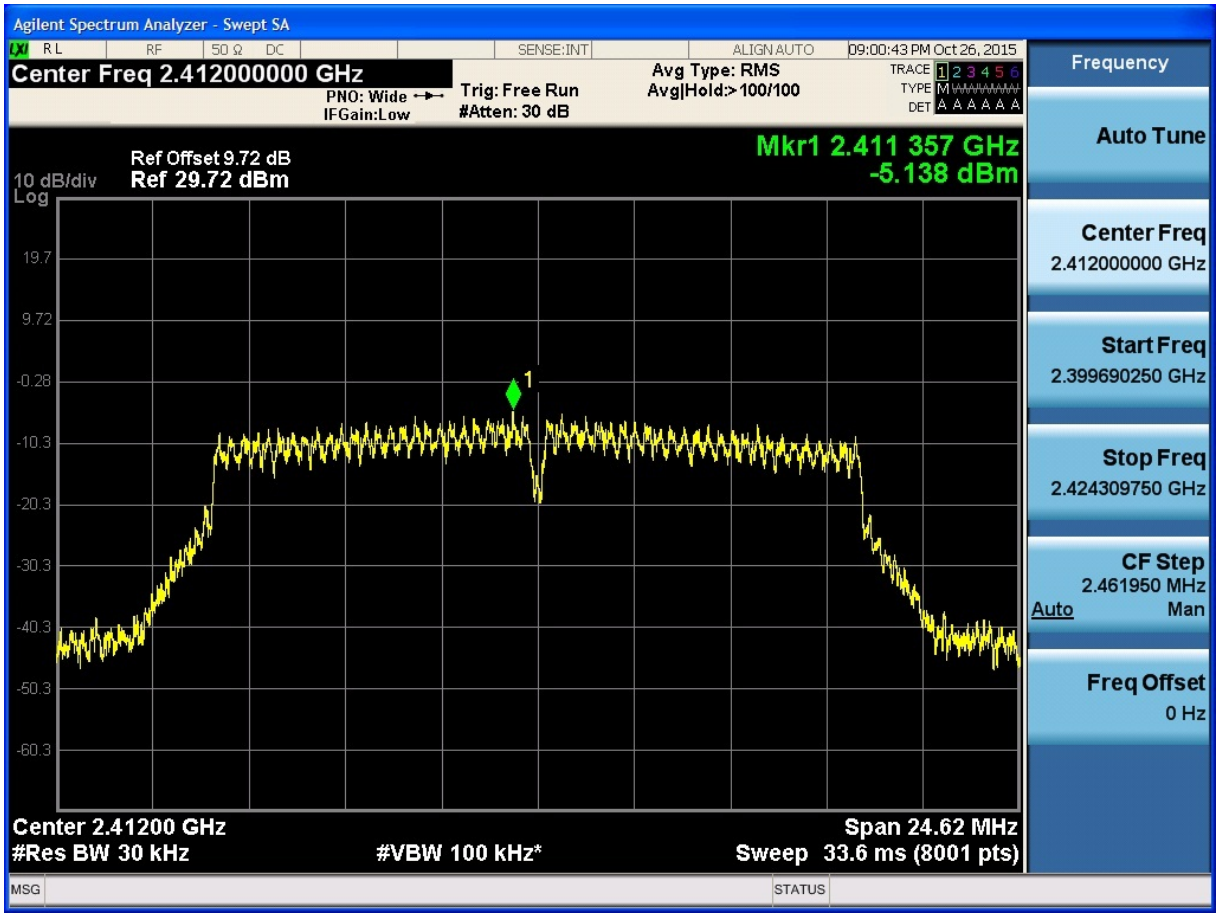
4.4.2 802.11g Test Mode

A. Test Verdict

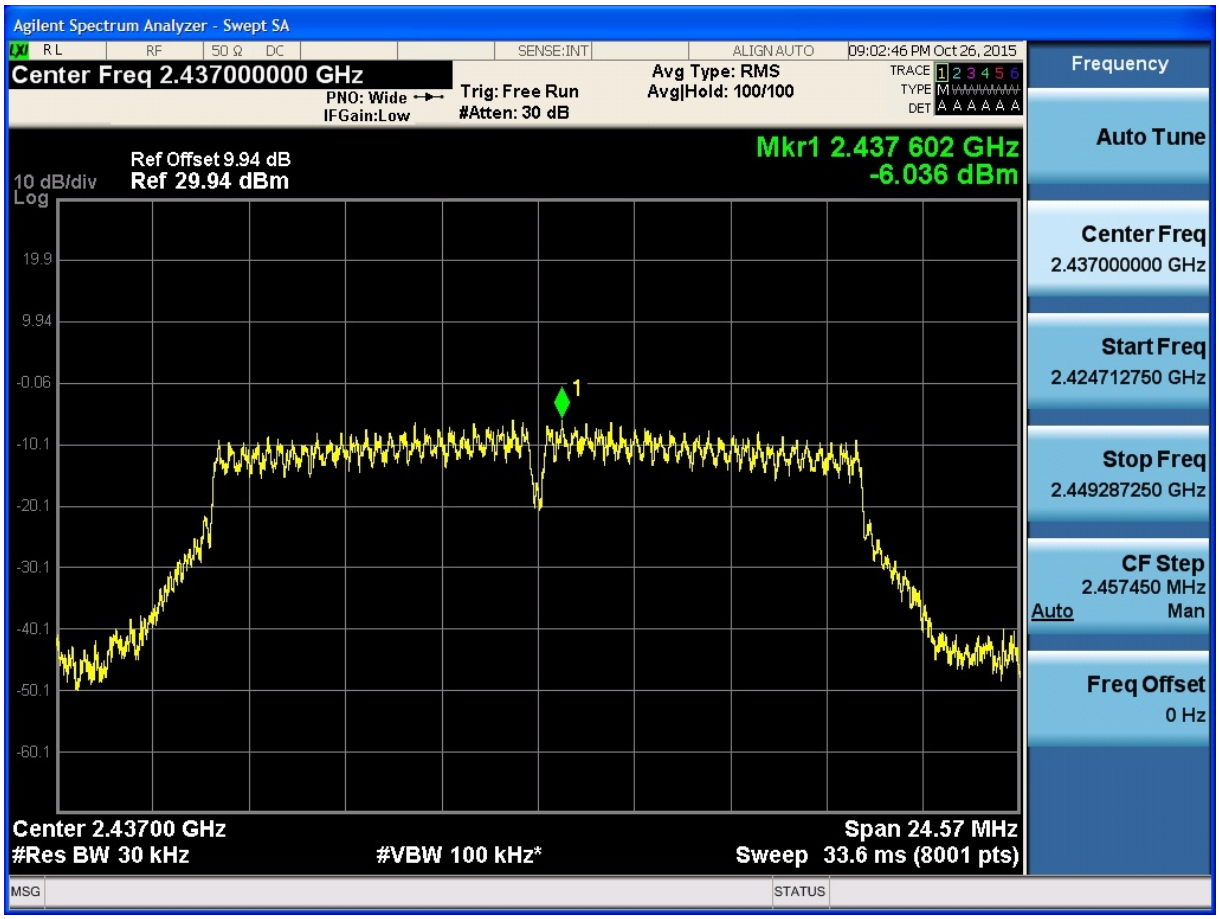
Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-5.138	Plot 4.4.2 A	8	PASS
6	2437	-6.036	Plot 4.4.2 B	8	PASS
11	2462	-5.661	Plot 4.4.2 C	8	PASS

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

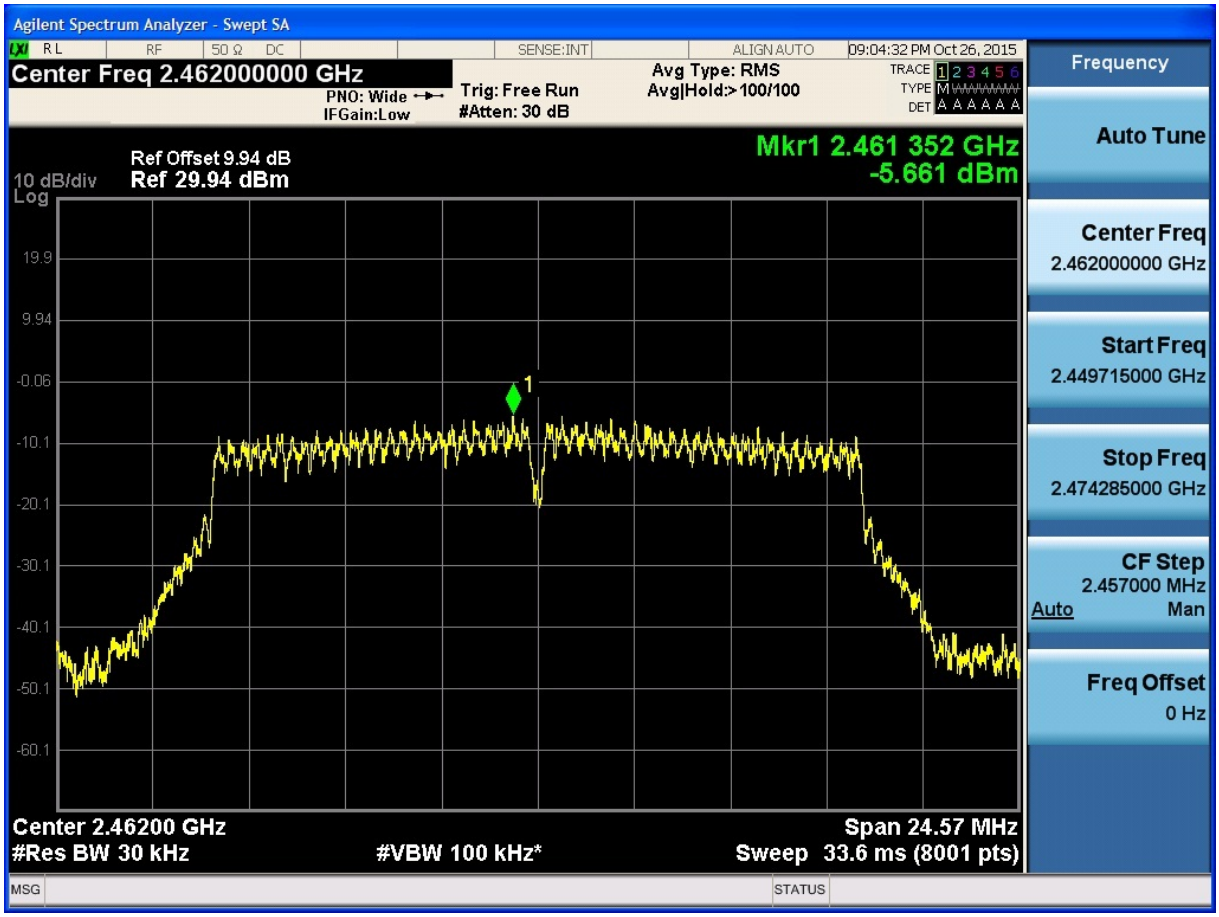
B. Test Plots



(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)

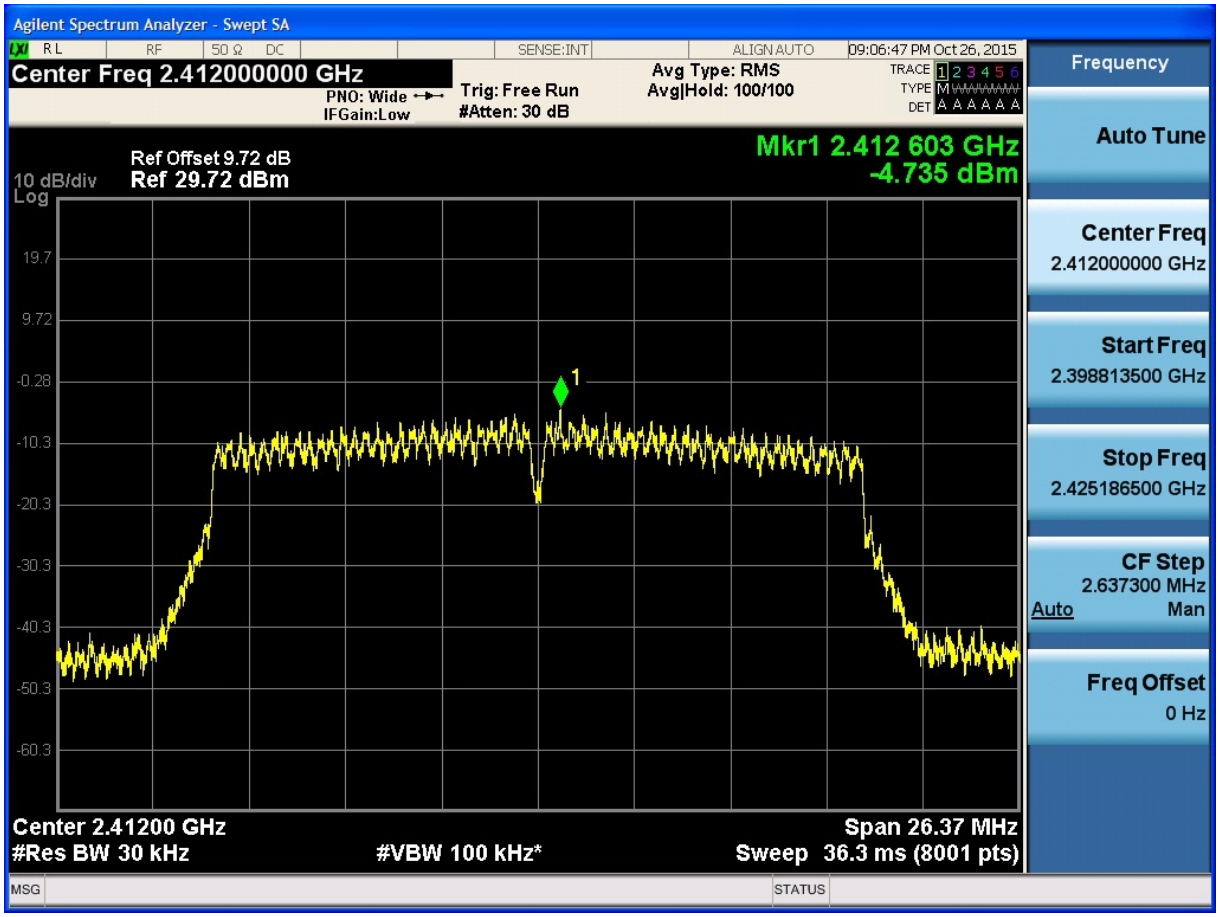
4.4.3 802.11n HT20 Test Mode

A. Test Verdict

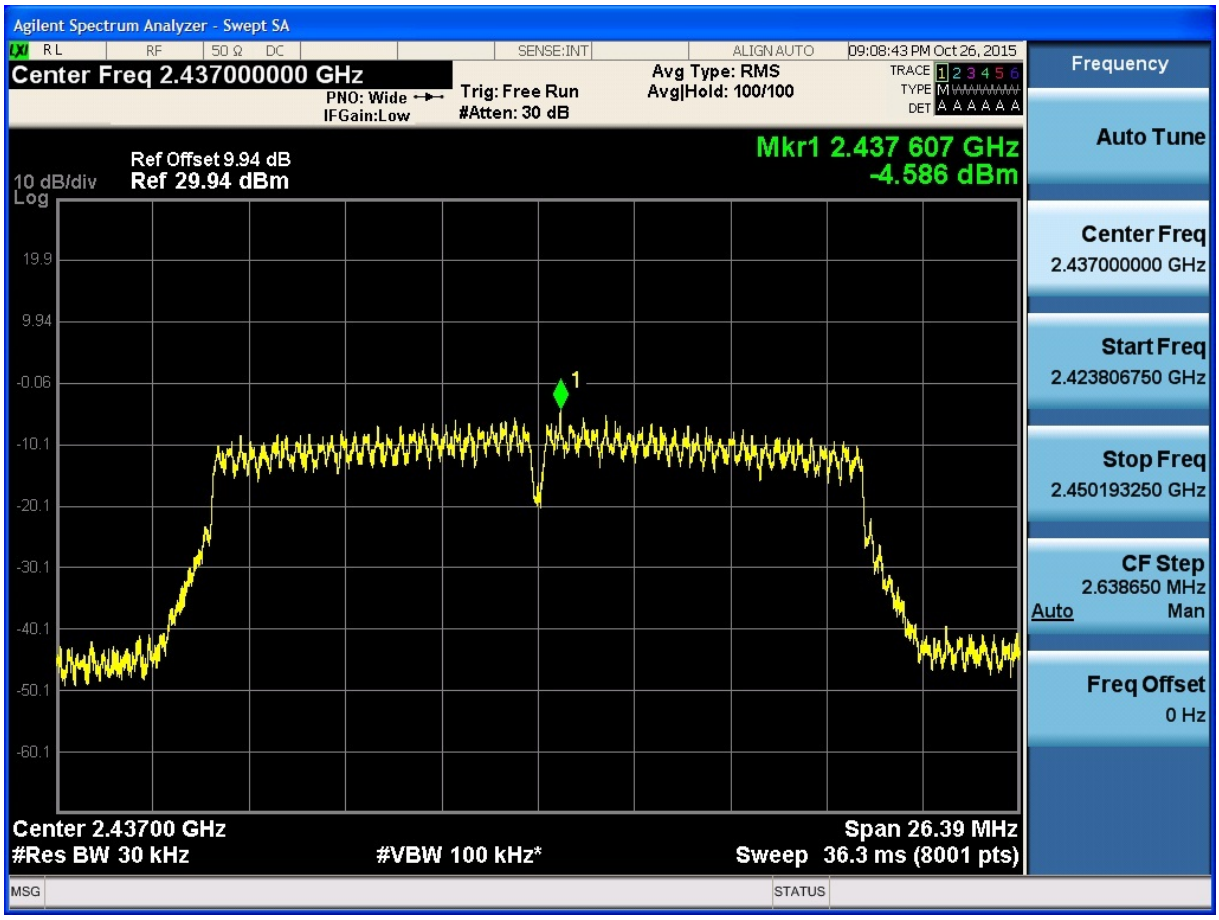
Channel	Frequency (MHz)	Report PSD (dBm/100KHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
1	2412	-4.735	Plot 4.4.3 A	8	**PASS**
6	2437	-4.586	Plot 4.4.3 B	8	PASS
11	2462	-4.815	Plot 4.4.3 C	8	PASS

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.

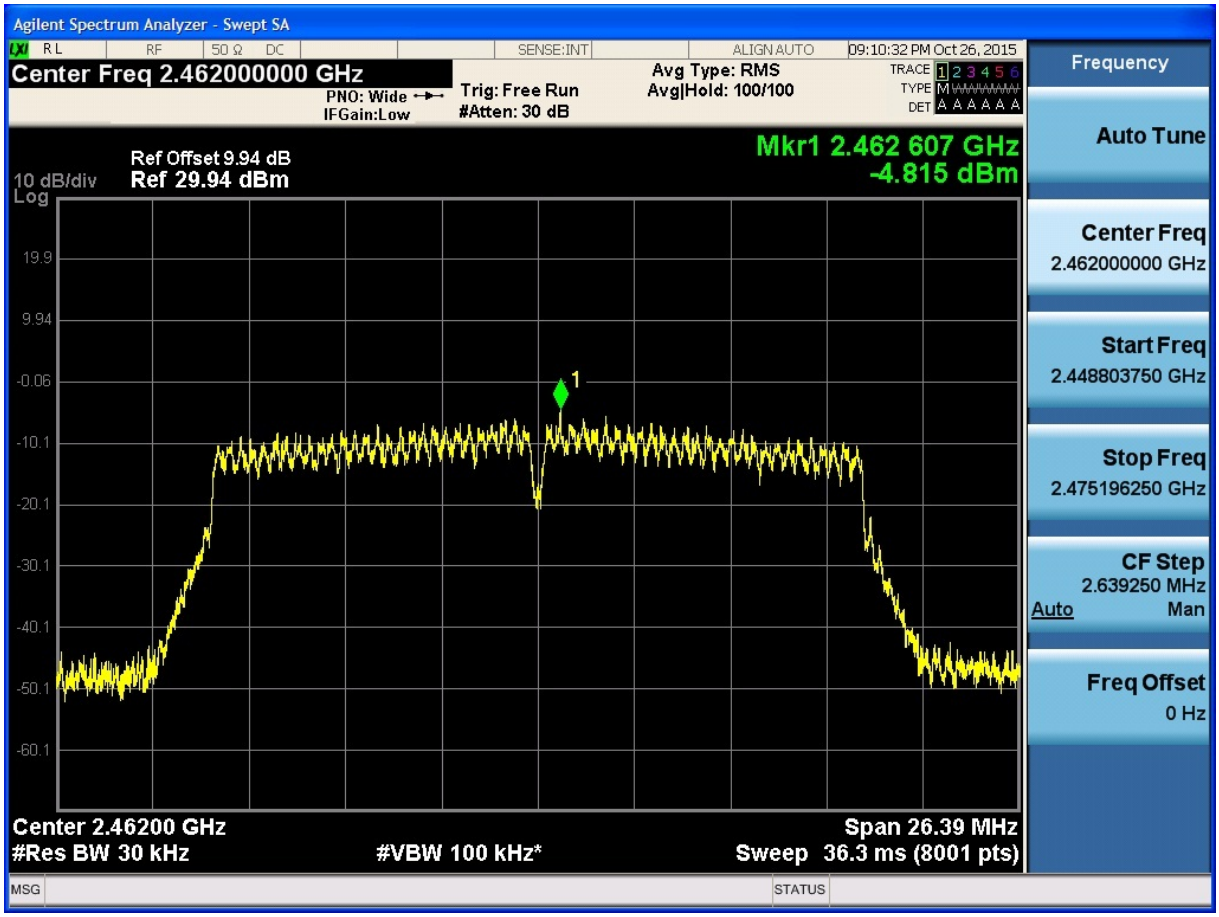
B. Test Plot



(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)

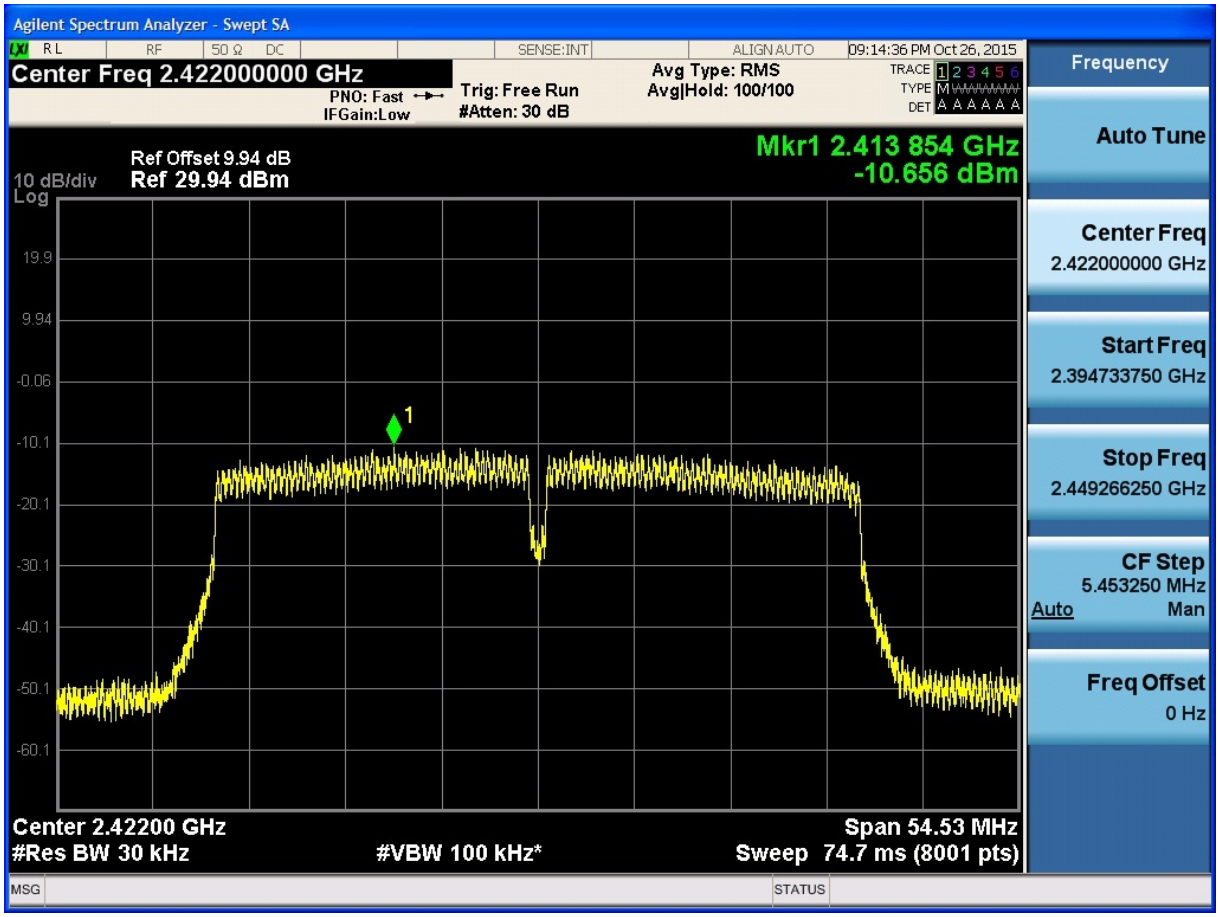
4.4.4 802.11n HT40 Test Mode

A. Test Verdict

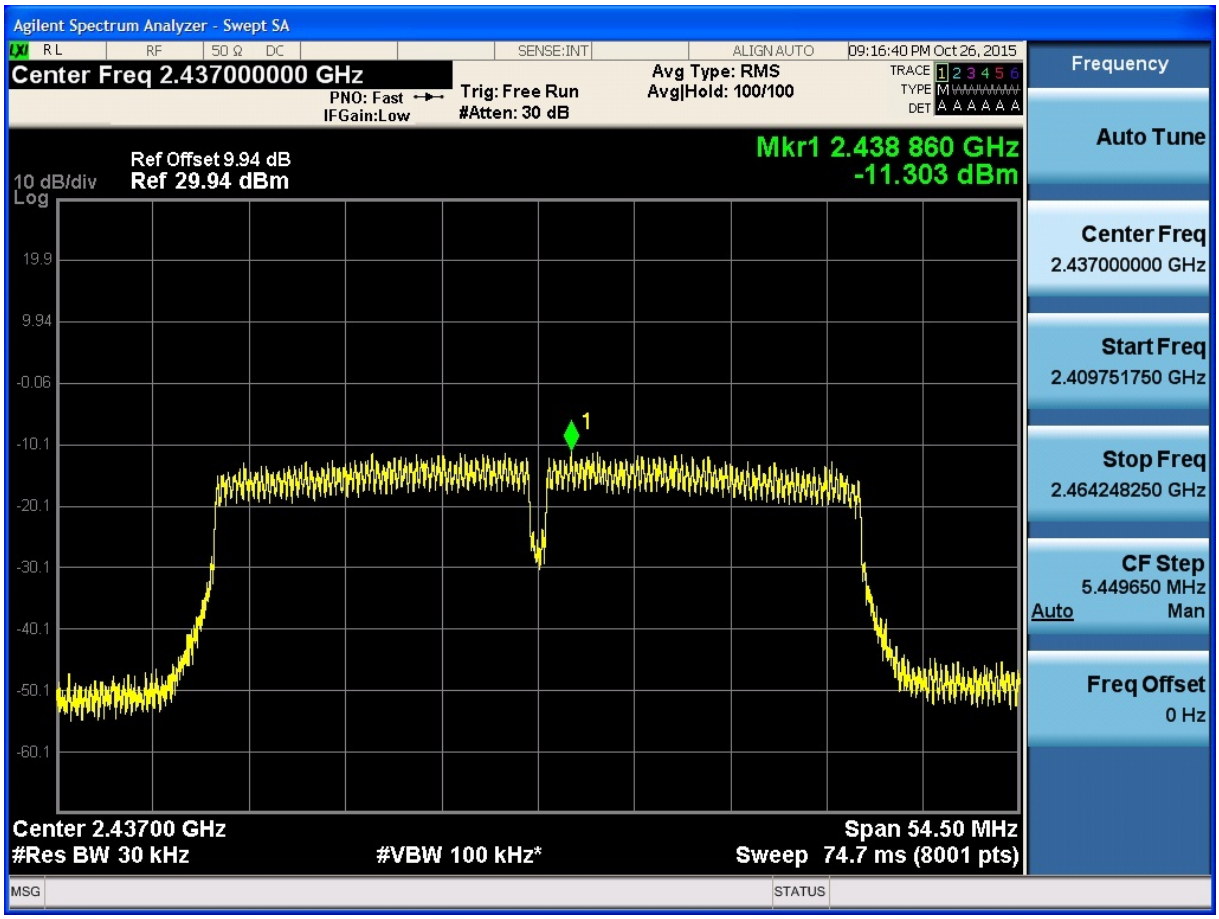
Channel	Frequency (MHz)	Report PSD (dBm/100kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
3	2422	-10.656	Plot 4.4.4 A	8	PASS
6	2437	-11.303	Plot 4.4.4 B	8	PASS
9	2452	-11.063	Plot 4.4.4 C	8	PASS

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.

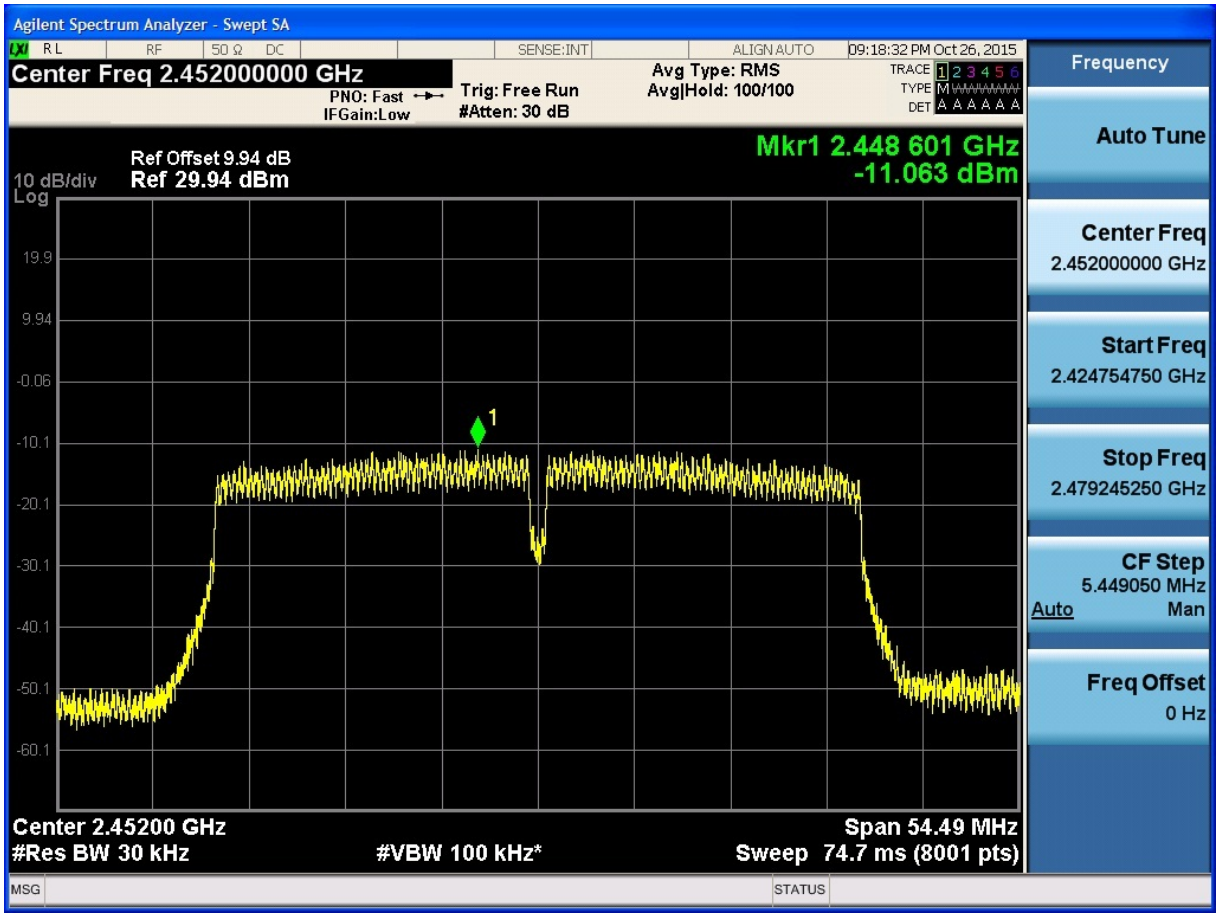
B. Test Plots



(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 Band Edge Compliance of RF Emission

TEST REQUIREMENT

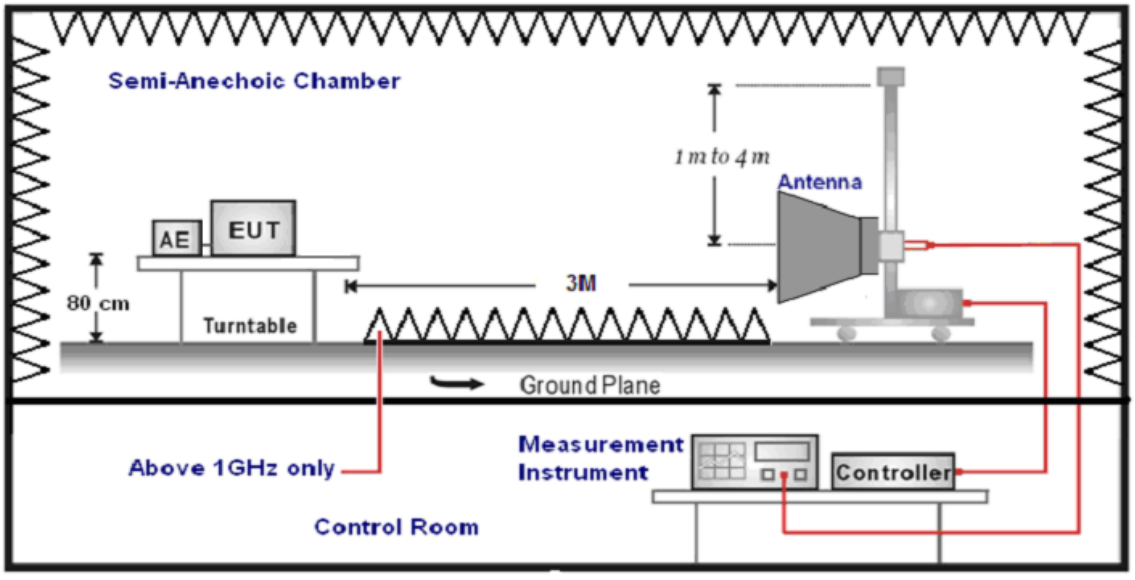
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

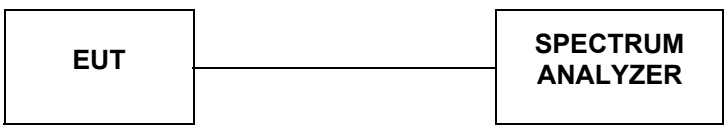
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

TEST CONFIGURATION

For Radiated



For Conducted



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℃ to 360℃ 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 distance between test antenna and EUT was 3 meter:
6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Peak (Receiver)
1GHz-40GHz	Average Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto	Average (Receiver)

LIMIT

Below -20dB of the highest emission level in operating band.
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)

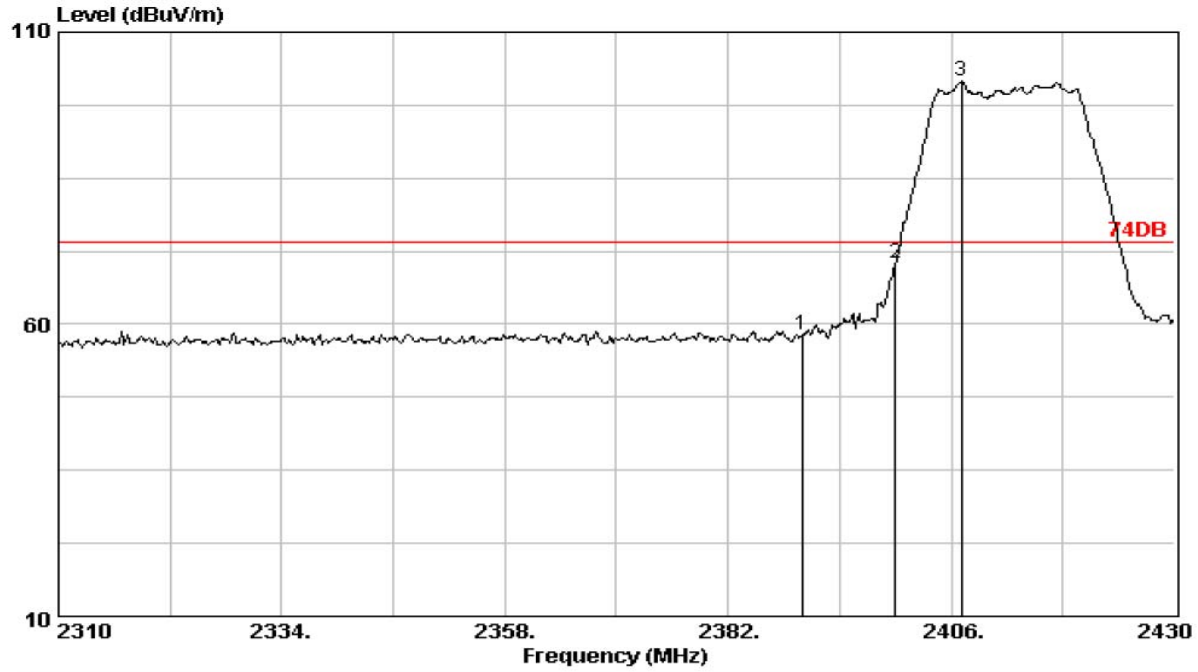
TEST RESULTS

4.5.1 For Radiated Bandedge Measurement

Remark:
1. The Bandedge was measured at difference data rate for each mode and recorded worst case for 11G.

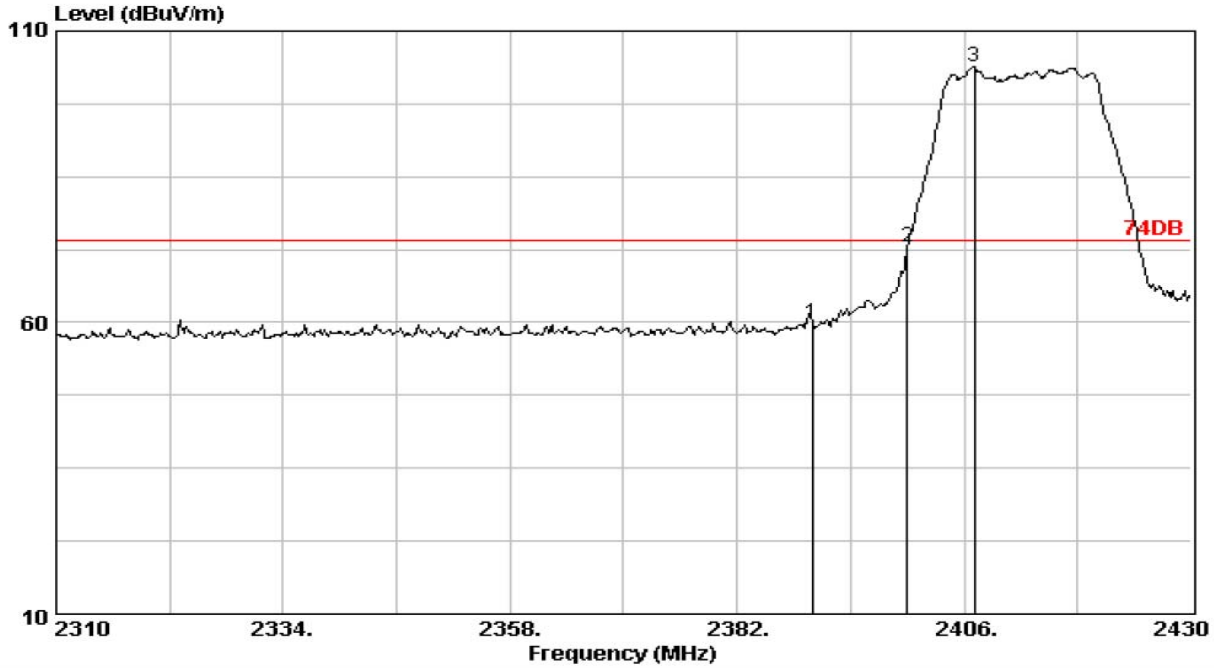
802.11G:

Test mode:	Low Channel (Peak)	Polarization	Horizontal



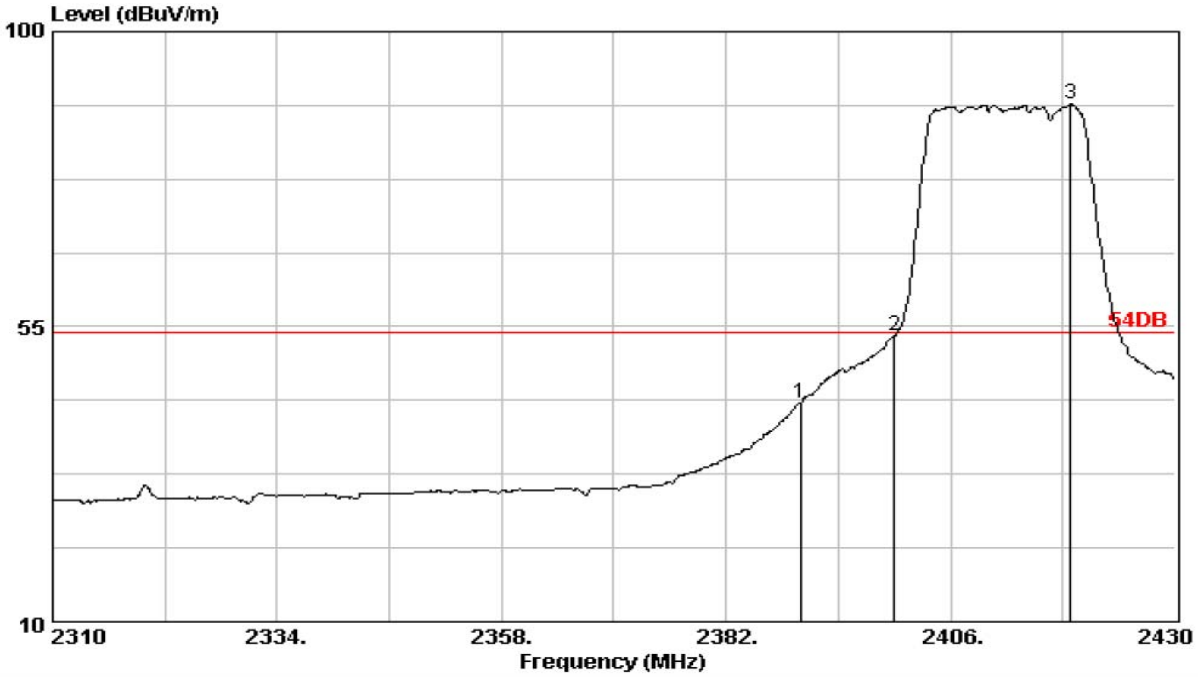
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	60.23	58.26	74.00	15.74	Peak
2	2400.00	28.78	4.61	72.38	70.41	74.00	3.59	Peak
3	2407.08	28.81	4.63	103.45	101.53	74.00	-27.53	Peak

Test mode:	Low Channel (Peak)	Polarization	Vertical



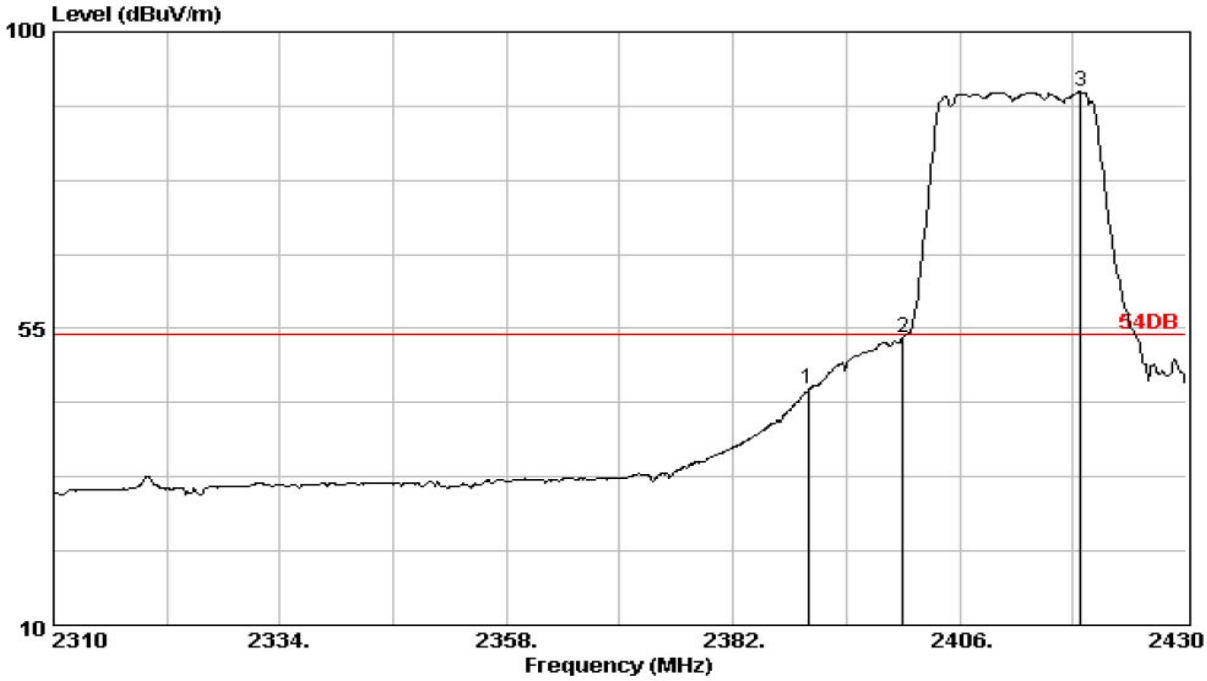
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	61.78	59.81	74.00	14.19	Peak
2	2400.00	28.78	4.61	74.91	72.94	74.00	1.06	Peak
3	2407.08	28.81	4.63	105.81	103.89	74.00	-29.89	Peak

Test mode:	Low Channel (AV)	Polarization	Horizontal



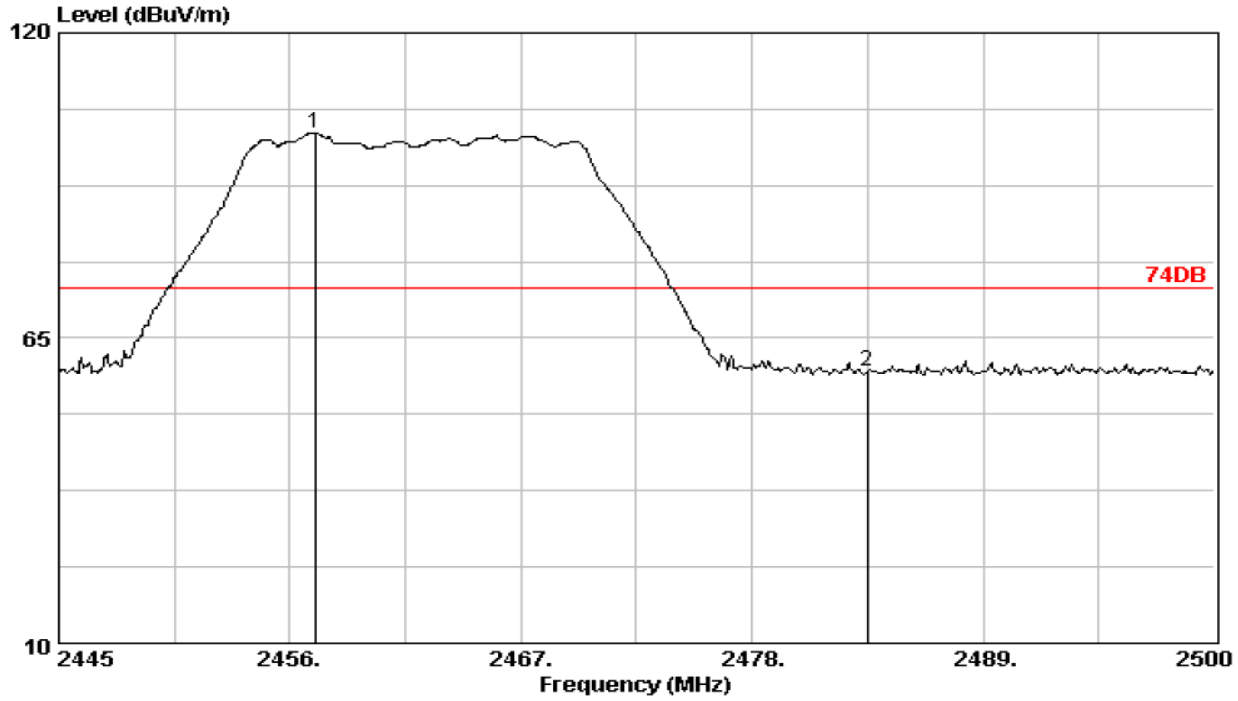
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	45.42	43.45	54.00	10.55	Average
2	2400.00	28.78	4.61	55.53	53.56	54.00	0.44	Average
3	2418.84	28.81	4.63	90.94	89.02	54.00	-35.02	Average

Test mode:	Low Channel (AV)	Polarization	Vertical



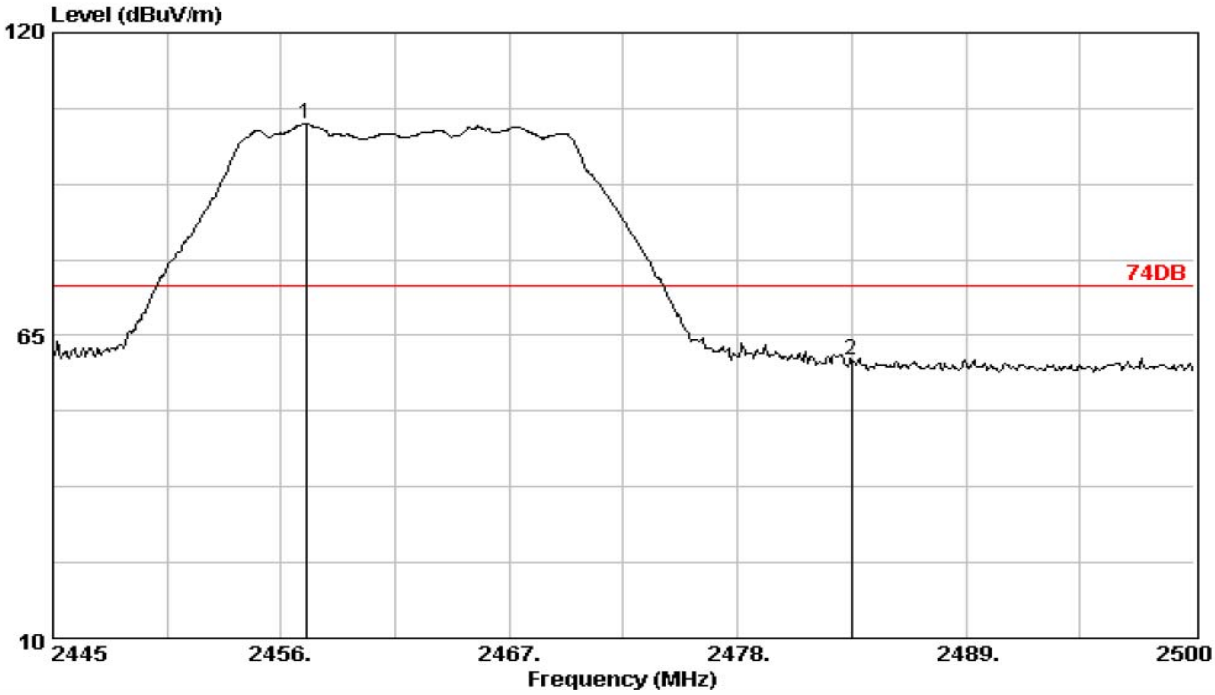
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.00	28.78	4.61	47.72	45.75	54.00	8.25	Average
2	2400.00	28.78	4.61	55.66	53.69	54.00	0.31	Average
3	2418.84	28.81	4.63	92.96	91.04	54.00	-37.04	Average

Test mode:	High Channel (Peak)	Polarization	Horizontal



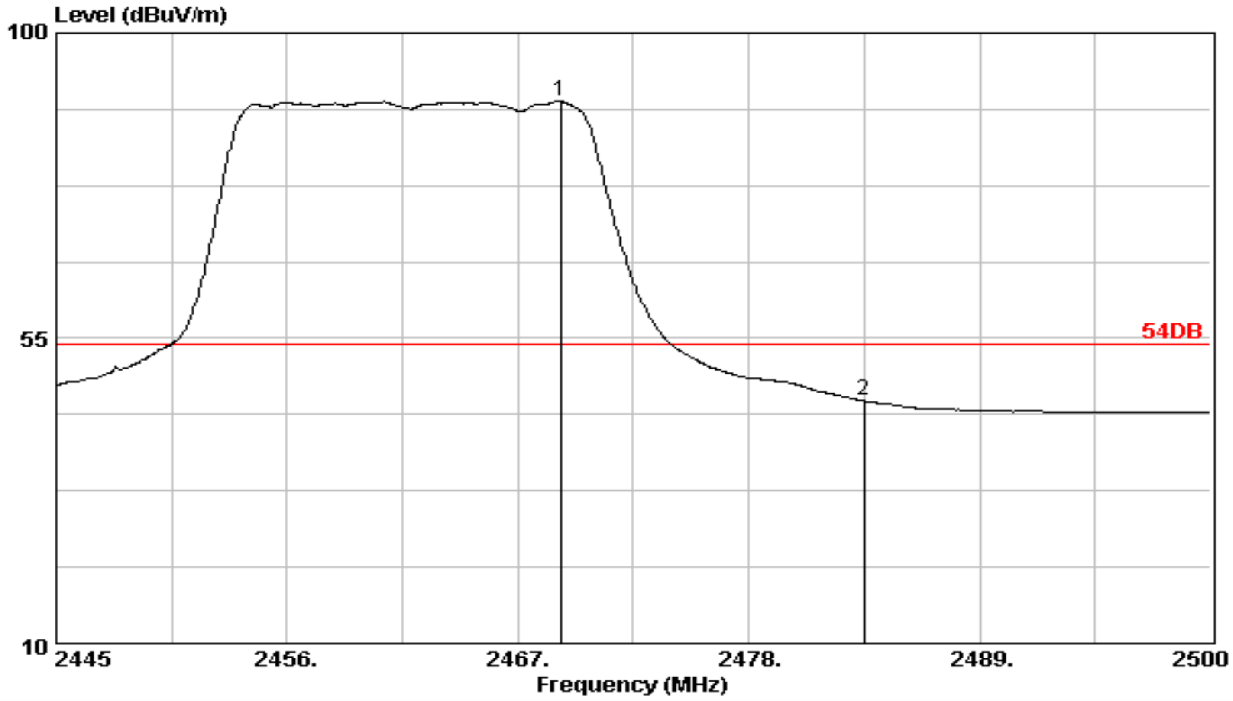
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2457.21	28.90	4.68	103.73	101.94	74.00	-27.94	Peak
2	2483.50	28.93	4.70	60.74	58.99	74.00	15.01	Peak

Test mode:	High Channel (Peak)	Polarization	Vertical



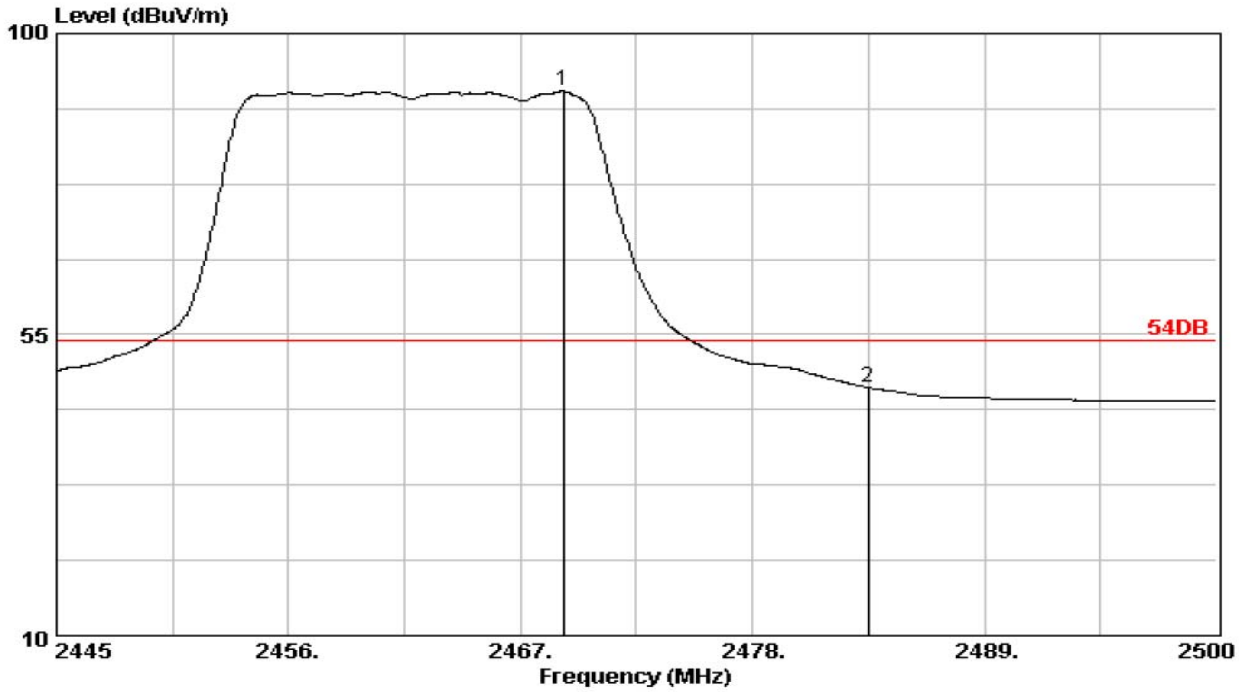
	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2457.21	28.90	4.68	105.17	103.38	74.00	-29.38	Peak
2	2483.50	28.93	4.70	62.36	60.61	74.00	13.39	Peak

Test mode:	High Channel (AV)	Polarization	Horizontal



	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2469.04	28.90	4.68	91.77	89.98	54.00	-35.98	Average
2	2483.50	28.93	4.70	47.52	45.77	54.00	8.23	Average

Test mode:	High Channel (AV)	Polarization	Vertical

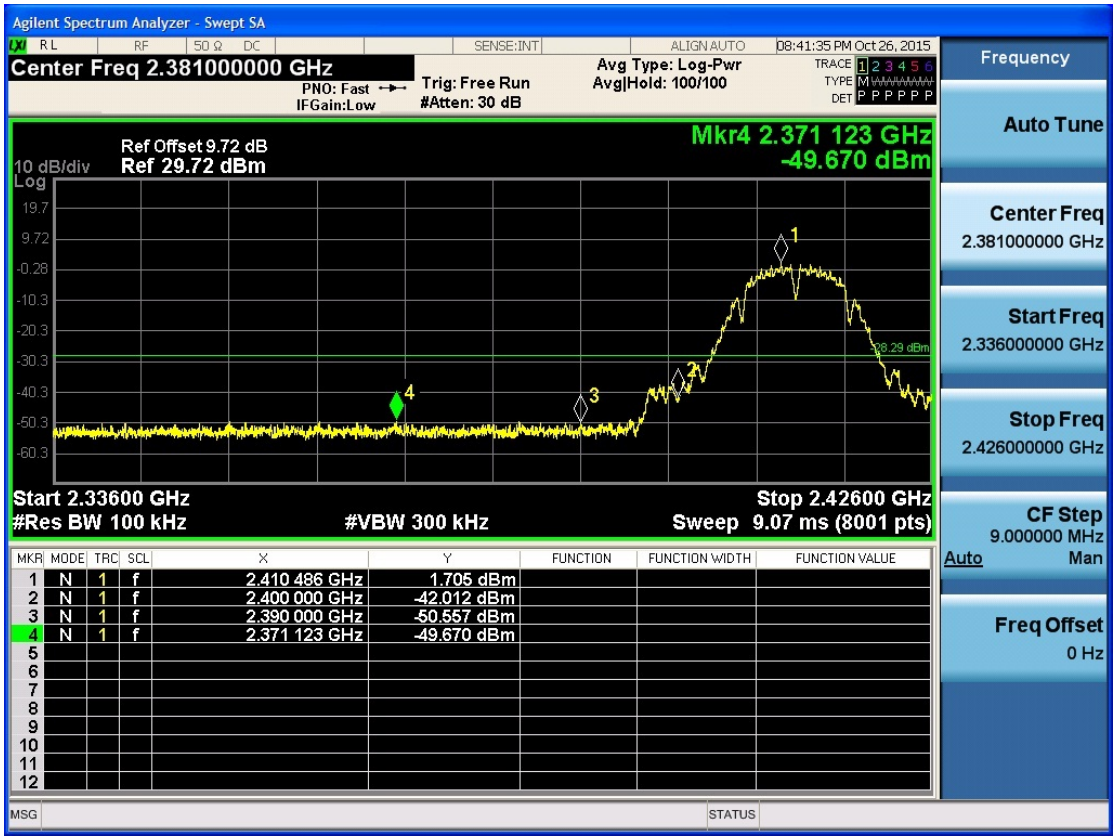


	Freq. (MHz)	Ant. Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2469.04	28.90	4.68	93.21	91.42	54.00	-37.42	Average
2	2483.50	28.93	4.70	48.82	47.07	54.00	6.93	Average

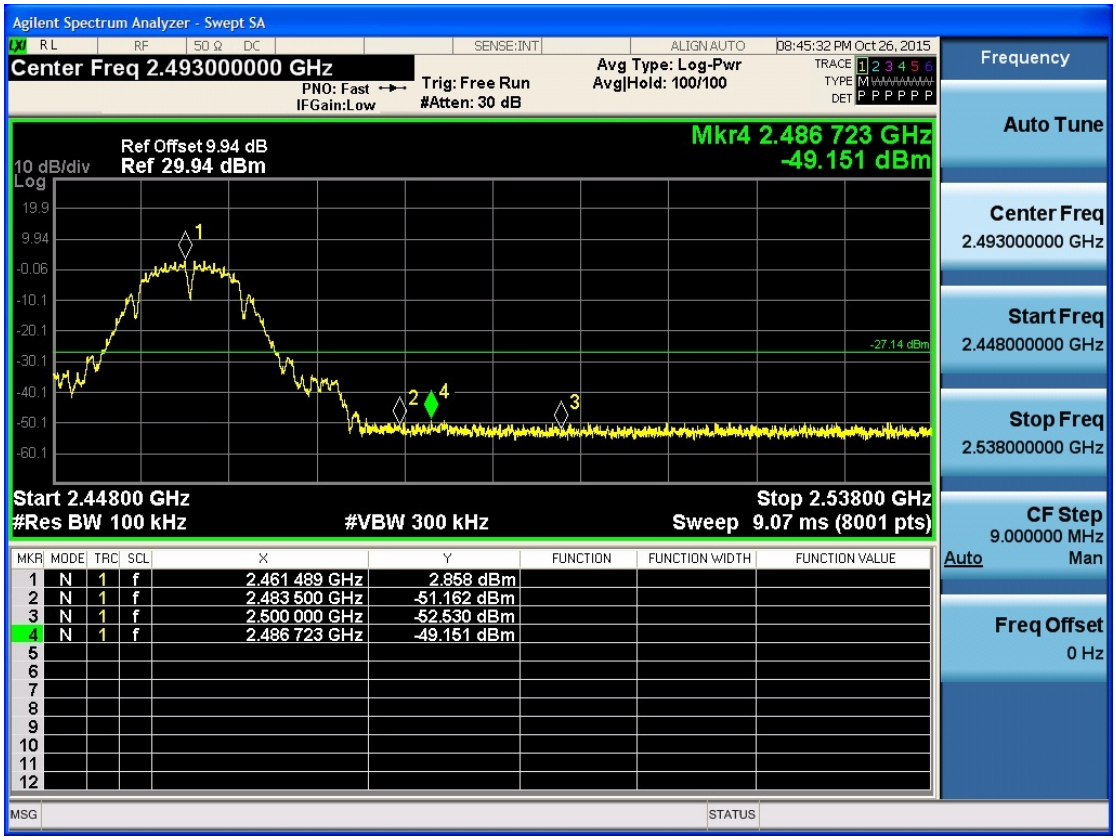
4.5.2 For Conducted Bandedge Measurement

802.11b

A. Test Plots



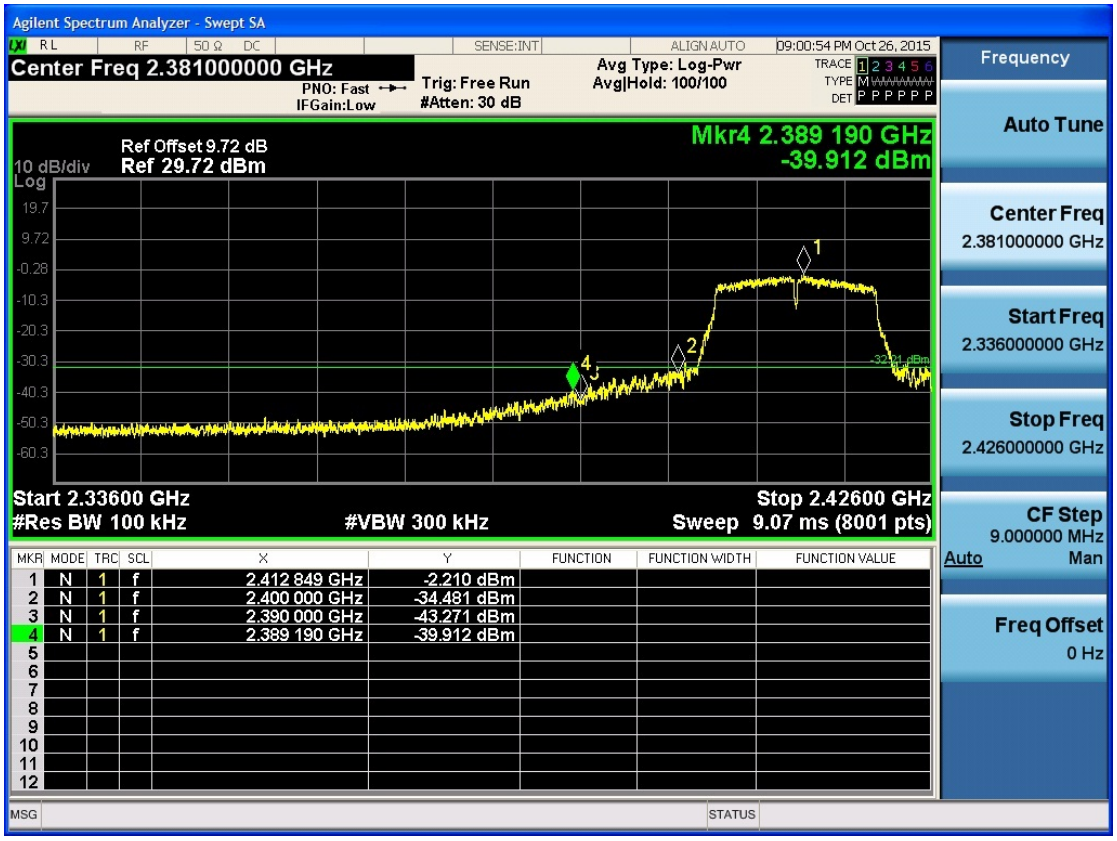
(Plot 4.5.2.1 A: Channel 01: 2412MHz @ 802.11 b)



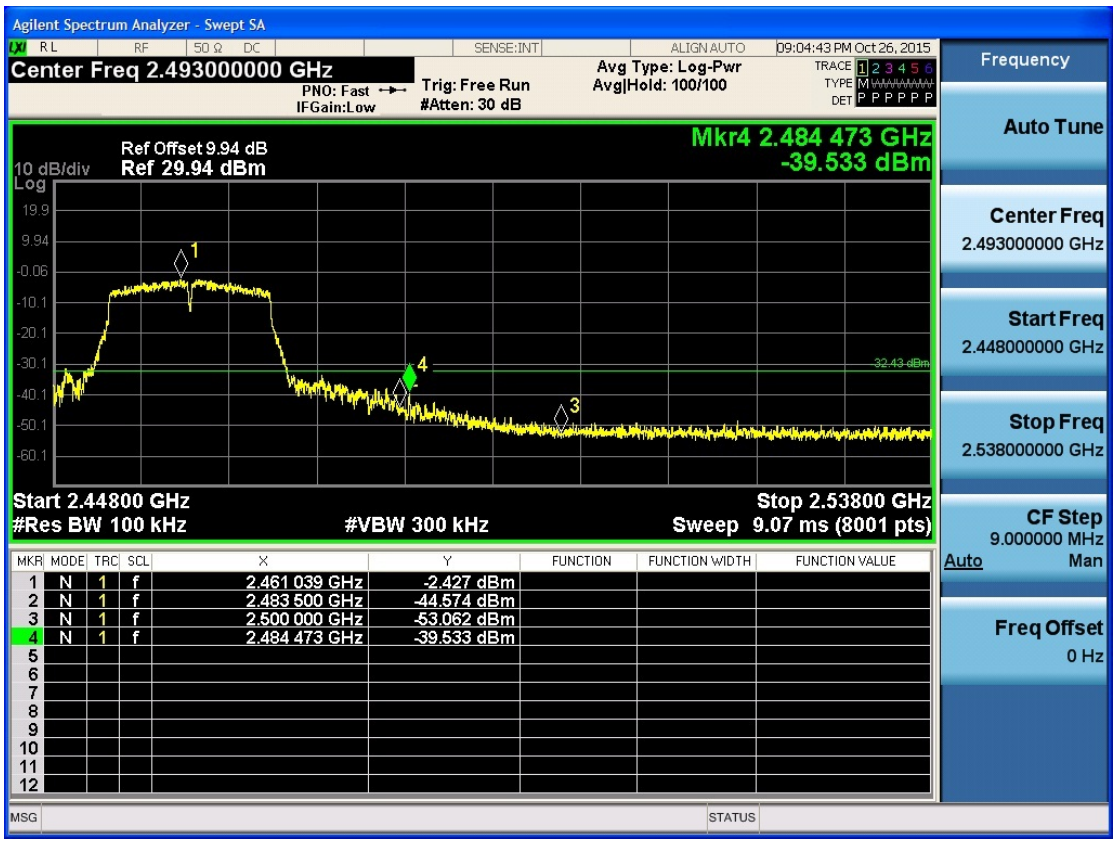
(Plot 4.5.2.1 B: Channel 11: 2462MHz @ 802.11 b)

802.11g

A. Test Plots



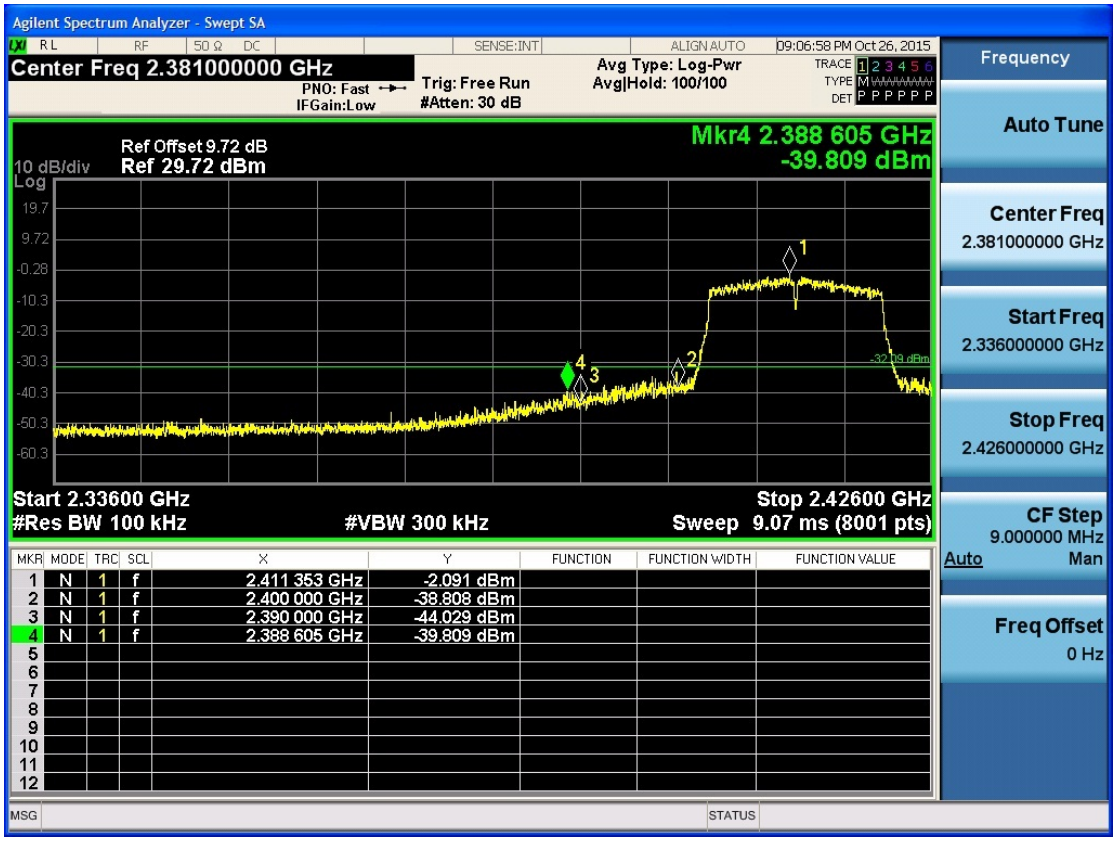
(Plot 4.5.2.2 A: Channel 01: 2412MHz @ 802.11 g)



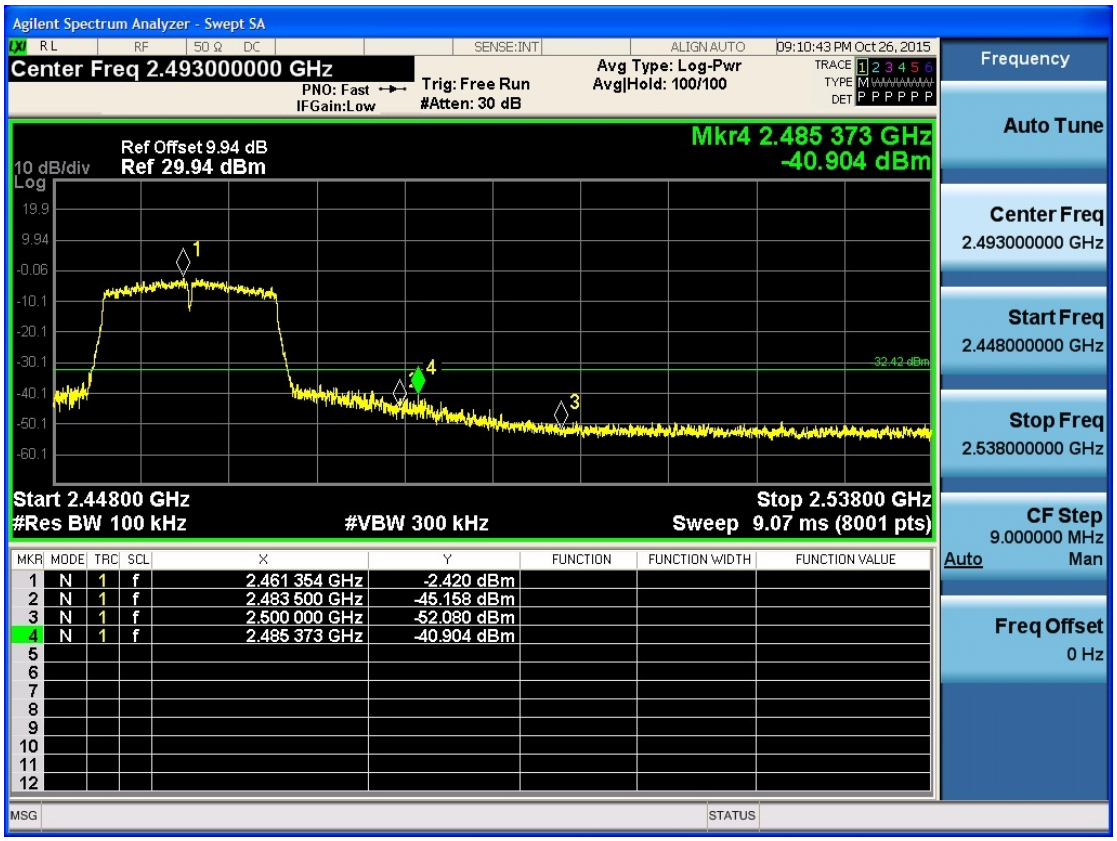
(Plot 4.5.2.2 B: Channel 11: 2462MHz @ 802.11 g)

802.11n HT20

A. Test Plots



Plot 4.5.2.3 A: Channel 01: 2412MHz @ 802.11n HT20)



(Plot 4.5.2.3 B: Channel 11: 2412MHz @ 802.11n HT20)