

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: SX-PCEAC-DB
Marketing Name: SX-PCEAC-DB
Brand Name: SX-PCEAC-DB
Model No.: SX-PCEAC-DB
Model Difference: N/A
FCC ID: N6C-SXPCEACDB
Report No.: ER/2016/20013
Issue Date: Mar. 28, 2016
FCC Rule Part: §15.247, Cat: DTS
Silex Technology, Inc.
Prepared for: Hikaridai 2-3-1, Seika-cho, Kyoto 619-0237,
Japan
SGS Taiwan Ltd.
Electronics & Communication Laboratory
Prepared by: No.134, Wu Kung Road, New Taipei Industrial
Park, Wuku District, New Taipei City, Taiwan
24803



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VERIFICATION OF COMPLIANCE

Applicant: Silex Technology, Inc.
Hikaridai 2-3-1, Seika-cho, Kyoto 619-0237, Japan

Product Name: SX-PCEAC-DB

Brand Name: SX-PCEAC-DB

Model No.: SX-PCEAC-DB

Model Difference: N/A

FCC ID: N6C-SXPCEACDB

File Number: ER/2016/20013

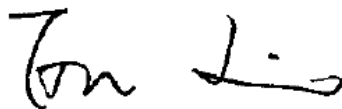
Date of Test: Feb. 15, 2016 ~ Mar. 21, 2016

Date of EUT Received: Feb. 15, 2016

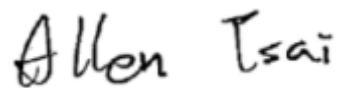
We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:**Date:**

Mar. 28, 2016

Tin Lin / Engineer**Prepared By:****Date:**

Mar. 28, 2016

Allen Tsai / Engineer**Approved By:****Date:**

Mar. 28, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
ER/2016/20013	Rev.00	Initial creation of document	Mar. 28, 2016

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1 GENERAL INFORMATION

1.1 Product description

General:

Product Name:	SX-PCEAC-DB
Marketing Name:	SX-PCEAC-DB
Brand Name:	SX-PCEAC-DB
Model No.:	SX-PCEAC-DB
Model Difference:	N/A
Product SW/HW version:	N/A / Ver.1
Radio SW/HW version:	10.2.00084-2 / BR4A
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	3.3V from DC Power Supply

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power / (EIRP)	Type of Emission	Modulation Technology
11b/g	2412-2462	11	b: 15.96dBm b: 20.8dBm (EIRP) g: 25.47dBm g: 28.27dBm (EIRP)	b: 12M4G1D g: 16M6D1D	DSSS, OFDM
11n	HT/VHT20 2412-2462	11	HT20: 24.38dBm (MIMO Chain 0+1) HT20: 26.35dBm (MIMO Chain 0+1) (EIRP)	HT20: 17M8D1D	OFDM
11n	HT/VHT40 2422-2452	7	HT40: 24.94dBm (MIMO Chain 0+1) HT40: 26.77dBm (MIMO Chain 0+1) (EIRP)	HT40: 36M5D1D	OFDM
Antenna Designation		PCB Antenna (Dipole Antenna) 1. Part No.: 146153, Supplier: Molex 2.4GHz Gain: 3.25 dBi 2. Part No.: H2B1PD1A1C (AA222), Supplier: Unictron 2.4GHz Gain: 2.8 dBi 3. Part No.: H2B1PC1A1C (AA258), Supplier: Unictron 2.4GHz Gain: 2.9 dBi			
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:		802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 216.7Mbps 802.11 n_40MHz: 13.5 – 450.0Mbps 802.11 VHT_20MHz: 6.5 – 288.9Mbps 802.11 VHT_40MHz: 13.5 – 600.0Mbps			

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1.2 Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting, Wi-Fi 802.11 a/b/g/n & ac features, and below is details of information.

Product Feature	
Product Name:	SX-PCEAC-DB
Brand Name:	SX-PCEAC-DB
Model No.:	SX-PCEAC-DB
Model Difference:	N/A
FCC ID:	N6C-SXPCEACDB
Wi-Fi Specification	802.11a/b/g/n/ac

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

FCC KDB 662911 D01 Multiple Transmitter Output

ANSI C63.10:2013

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under a DoC procedure.

1.4 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

(TAF code 0513)

FCC Registration Numbers are: 990257

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example with cable loss 5.9dB and 10dB attenuator.

Offset:

= RF cable loss (dB) + attenuation factor (dB) dB = 15.9dB

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission configuration

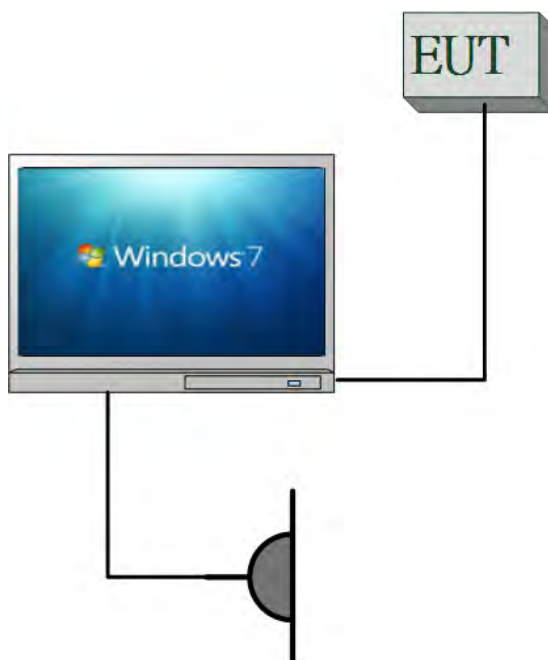


Fig. 2-2 Conducted (Antenna Port) Configuration Emission

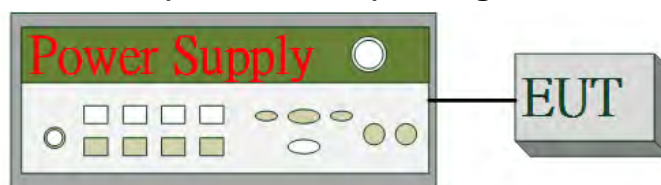


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L420	LR-7HXZA	N/A	Un-shielded
3.	DC Power Supply	HP	E3640A	KR93300208	N/A	Un-shielded

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3 SUMMARY OF TEST RESULTS

FCC Rules / IC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	1 to 11	1,6,11	OFDM	54	MIMO

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RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	11	MIMO
802.11g	1 to 11	1, 6, 11	OFDM	54	MIMO
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	11	MIMO
802.11g	1 to 11	1, 6, 11	OFDM	54	MIMO
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO

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Directional gain (MIMO)

The Tx transmission to construct MIMO operation is cyclic delay diversity, and the following deduction to obtain the array gain of MIMO operation is based on the approach given by KDB 662911 D01.

Array gain = 4.77dBi (peak spectral density, conducted spurious emission)

Gain that is combined with different magnitude of two antennas:

- (ii) If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:
- Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain; or,

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k/20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;

G_k is the gain in dBi of the k th antenna.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016
LISN	SCHWARZ BECK	NSLK 8127	8127-649	05/15/2015	05/14/2016
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2015	11/25/2016

6.3 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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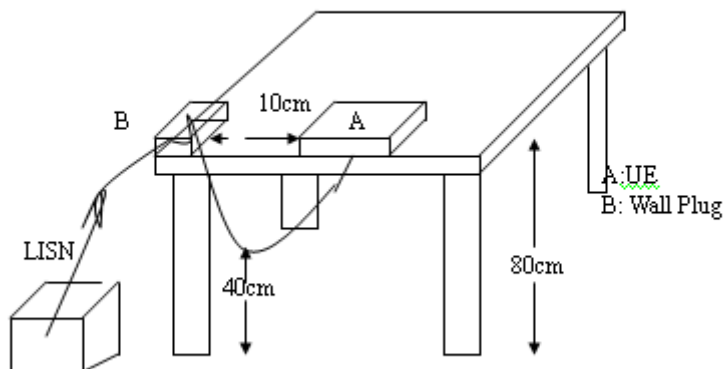
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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

6.6 Measurement Result

N/A, the device is powered by 3.3V DC Power Supply.

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7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)
802.11b	98.90	0.05
802.11g	94.68	0.24
802.11n_20	90.12	0.45
802.11n_40	82.35	0.84

$$b = 98.9\%, g = 94.68\%, n_{ht\ 20} = 90.12\%, n_{ht40} = 82.35\%$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.989) = 0.05$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.9468) = 0.24$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.9012) = 0.45$$

$$\text{Duty Cycle Factor: } 10 * \log(1/0.8235) = 0.84$$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g



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802.11 n_20 MHz



802.11 n_40 MHz



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8 PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

Note:

Antenna Gain:	3.25 dBi
Number Antenna:	3 pcs
Limit:	30 dBm

The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 3.25+4.77=8.02dBi

Limit: 30dBm – (8.02– 6dBi)=27.98dBm

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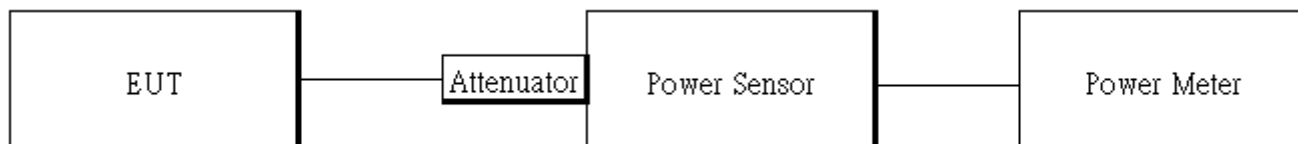
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8.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016
Spectrum Analyzer	Agilent	N9010A	MY50420195	12/21/2015	12/20/2016
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017
DC Power Supply	Agilent	E3640A	MY52410006	11/05/2015	11/04/2016
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016

8.3 Test Set-up

Power Meter:



8.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.

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8.5 Measurement Result

802.11b_MIMO									
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	1	11.07	11.12	11.34	15.95	39.35	1 Watt = 27.98 dBm	PASS
6	2437	1	10.88	10.93	10.73	15.62	36.46	1 Watt = 27.98 dBm	PASS
11	2462	1	11.1	11.61	10.81	15.96	39.42	1 Watt = 27.98 dBm	PASS

802.11b_MIMO									
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	1	7.84	7.84	8.33	12.78	18.97	1 Watt = 27.98 dBm	PASS
6	2437	1	7.85	7.84	7.91	12.64	18.36	1 Watt = 27.98 dBm	PASS
11	2462	1	7.87	8.29	7.86	12.78	18.98	1 Watt = 27.98 dBm	PASS

802.11g_MIMO									
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	6	13.31	13.44	13.33	18.13	65.04	1 Watt = 27.98 dBm	PASS
6	2437	6	21.35	21.1	19.38	25.47	351.98	1 Watt = 27.98 dBm	PASS
11	2462	6	15.47	15.69	14.63	20.06	101.35	1 Watt = 27.98 dBm	PASS

802.11g_MIMO									
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	6	6.55	6.62	7.19	11.57	14.35	1 Watt = 27.98 dBm	PASS
6	2437	6	15.97	15.83	14.47	20.25	105.81	1 Watt = 27.98 dBm	PASS
11	2462	6	9.12	9.34	8.93	13.90	24.57	1 Watt = 27.98 dBm	PASS

802.11n_HT20M MIMO									
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	MCS16	10.73	10.90	11.14	15.70	37.13	1 Watt = 27.98 dBm	PASS
6	2437	MCS16	20.22	19.92	18.50	24.38	274.17	1 Watt = 27.98 dBm	PASS
11	2462	MCS16	15.90	16.11	15.03	20.48	111.58	1 Watt = 27.98 dBm	PASS

802.11n_HT20M MIMO									
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
1	2412	MCS16	3.99	3.9	4.84	9.04	8.01	1 Watt = 27.98 dBm	PASS
6	2437	MCS16	13.8	13.82	13.01	18.33	68.09	1 Watt = 27.98 dBm	PASS
11	2462	MCS16	9.25	9.41	8.95	13.98	25.00	1 Watt = 27.98 dBm	PASS

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802.11n_HT40M MIMO									
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
3	2422	MCS16	10.96	11.09	11.13	15.83	38.30	1 Watt = 27.98 dBm	PASS
6	2437	MCS16	20.80	20.49	19.01	24.94	311.79	1 Watt = 27.98 dBm	PASS
9	2452	MCS16	13.41	13.45	12.85	18.02	63.33	1 Watt = 27.98 dBm	PASS
802.11n_HT40M MIMO									
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
			CH 0	CH 1	CH 2				
3	2422	MCS16	3.69	3.67	4.41	8.71	7.43	1 Watt = 27.98 dBm	PASS
6	2437	MCS16	14.28	14.24	13.37	18.75	75.06	1 Watt = 27.98 dBm	PASS
9	2452	MCS16	6.19	6.2	6.24	10.98	12.54	1 Watt = 27.98 dBm	PASS

*** Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.**

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9 6DB & 99% BANDWIDTH MEASUREMENT

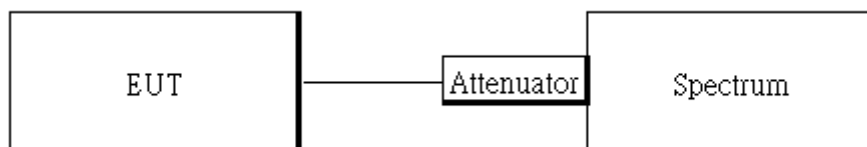
9.1 Standard Applicable

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016

9.3 Test Set-up



9.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. For 6dB Bandwidth:
Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.
5. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth:
Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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9.5 Measurement Result

6dB Bandwidth

802.11b Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	7117	> 500	PASS
2437	7090	> 500	PASS
2462	7109	> 500	PASS

802.11b Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	7098	> 500	PASS
2437	7102	> 500	PASS
2462	7097	> 500	PASS

802.11b Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	7112	> 500	PASS
2437	7114	> 500	PASS
2462	7109	> 500	PASS

802.11g Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16360	> 500	PASS
2437	16310	> 500	PASS
2462	16350	> 500	PASS

802.11g Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16330	> 500	PASS
2437	16340	> 500	PASS
2462	16350	> 500	PASS

802.11g Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16330	> 500	PASS
2437	16330	> 500	PASS
2462	16340	> 500	PASS

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802.11_n_HT20 Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	17620	> 500	PASS
2437	17600	> 500	PASS
2462	17610	> 500	PASS

802.11_n_HT20 Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	17620	> 500	PASS
2437	17600	> 500	PASS
2462	17590	> 500	PASS

802.11_n_HT20 Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	17580	> 500	PASS
2437	17570	> 500	PASS
2462	17590	> 500	PASS

802.11_n_HT40 Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	35890	> 500	PASS
2437	35840	> 500	PASS
2452	36070	> 500	PASS

802.11_n_HT40 Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	36370	> 500	PASS
2437	36390	> 500	PASS
2452	36380	> 500	PASS

802.11_n_HT40 Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	36360	> 500	PASS
2437	36370	> 500	PASS
2452	36400	> 500	PASS

*Refer to next page for plots

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802.11b (Main)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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802.11b (AUX1) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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802.11b (AUX2)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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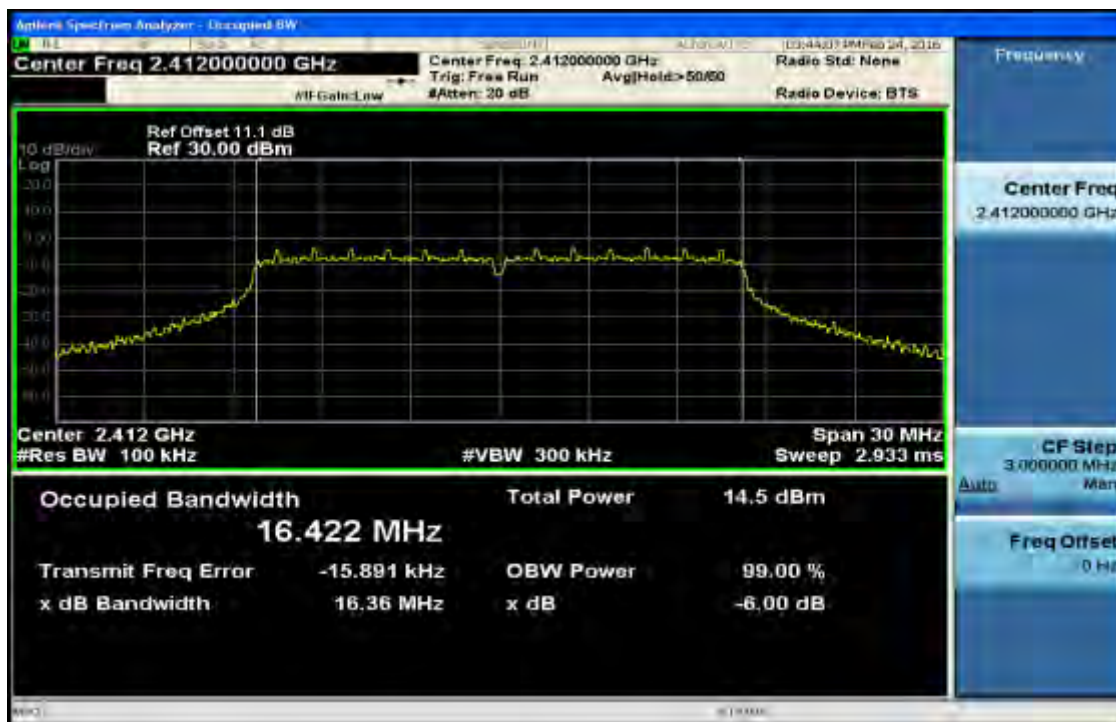
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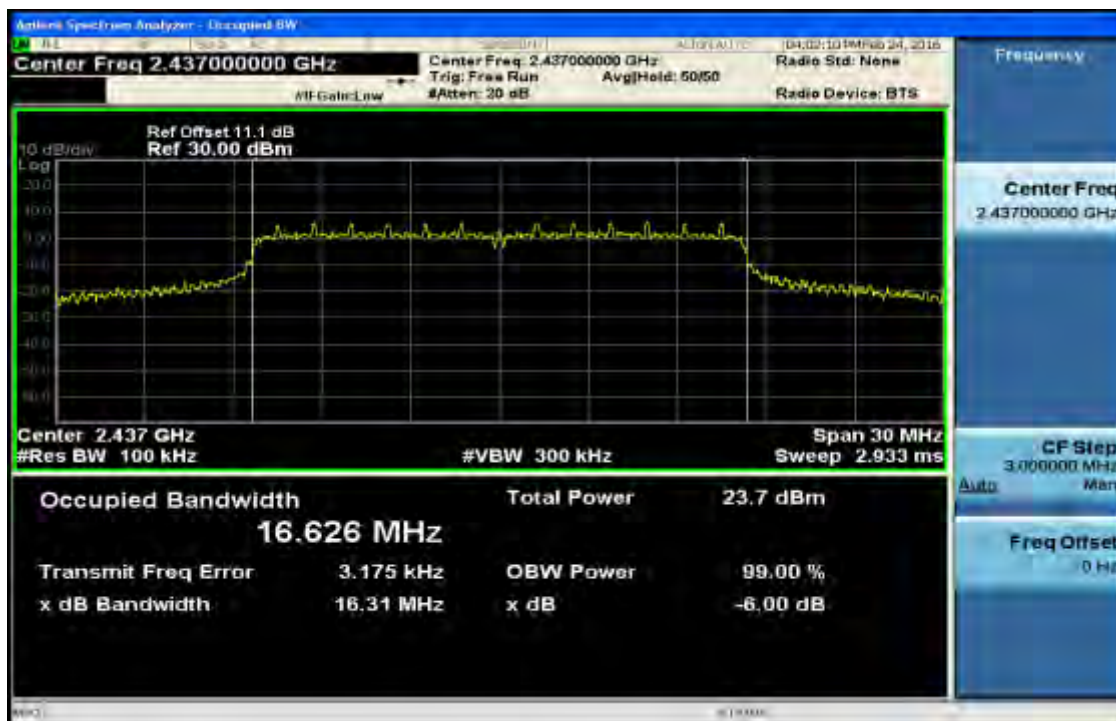
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802.11g (Main)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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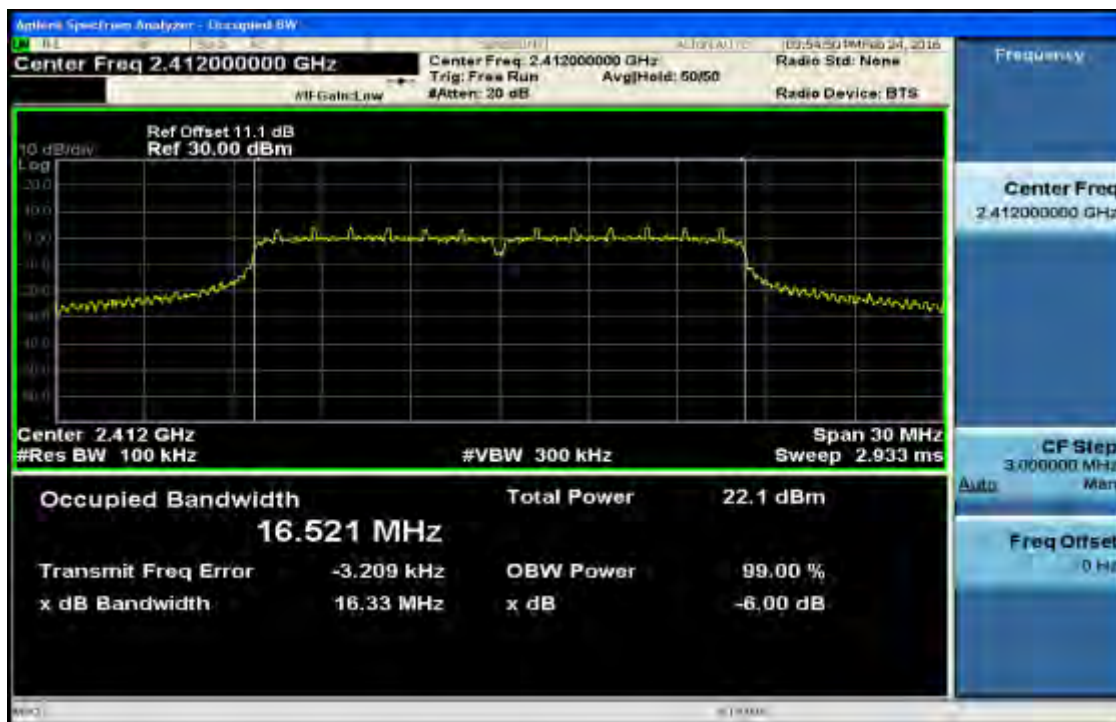
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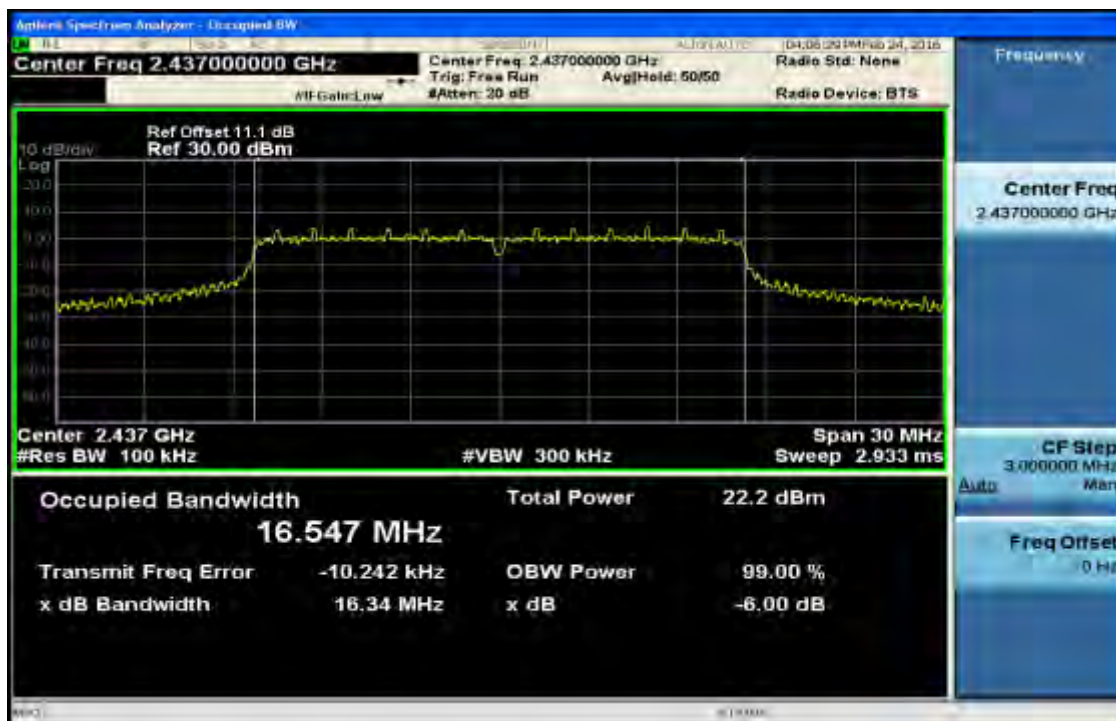
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802.11g (AUX1)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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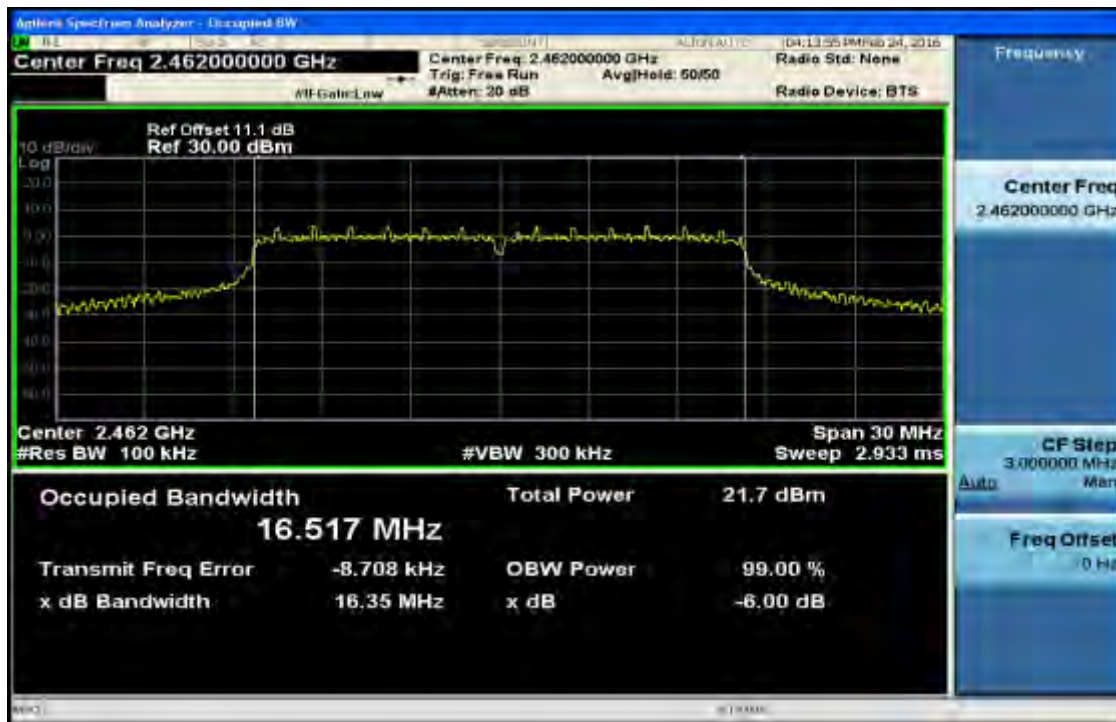
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6dB Band Width Test Data CH-High



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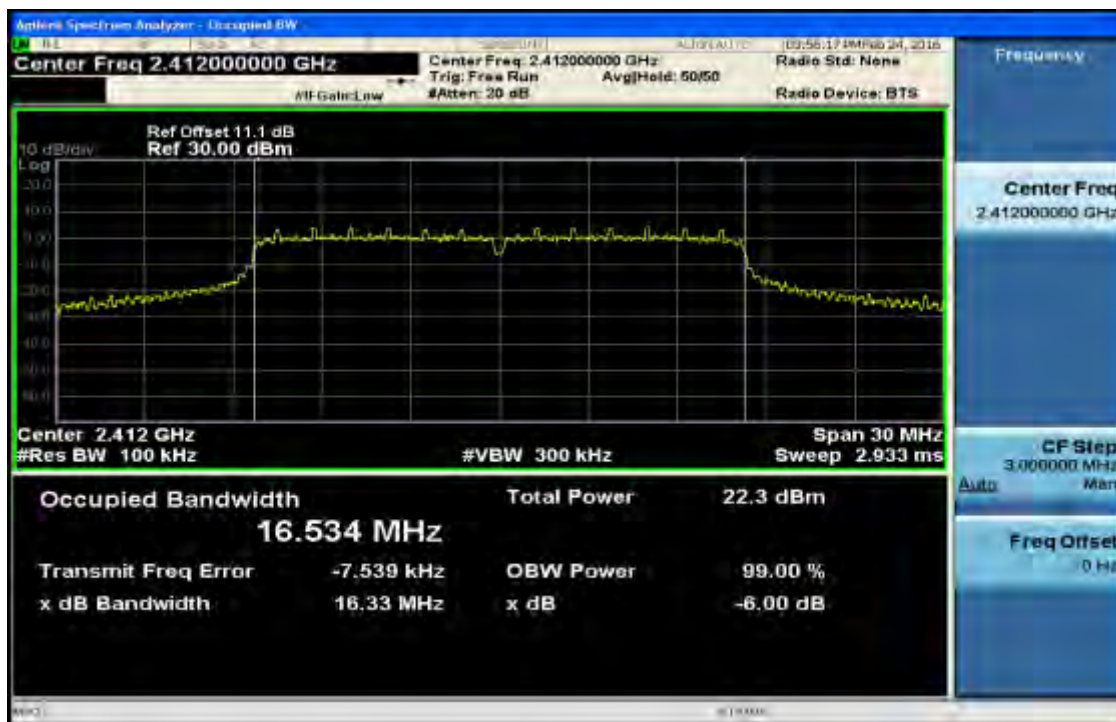
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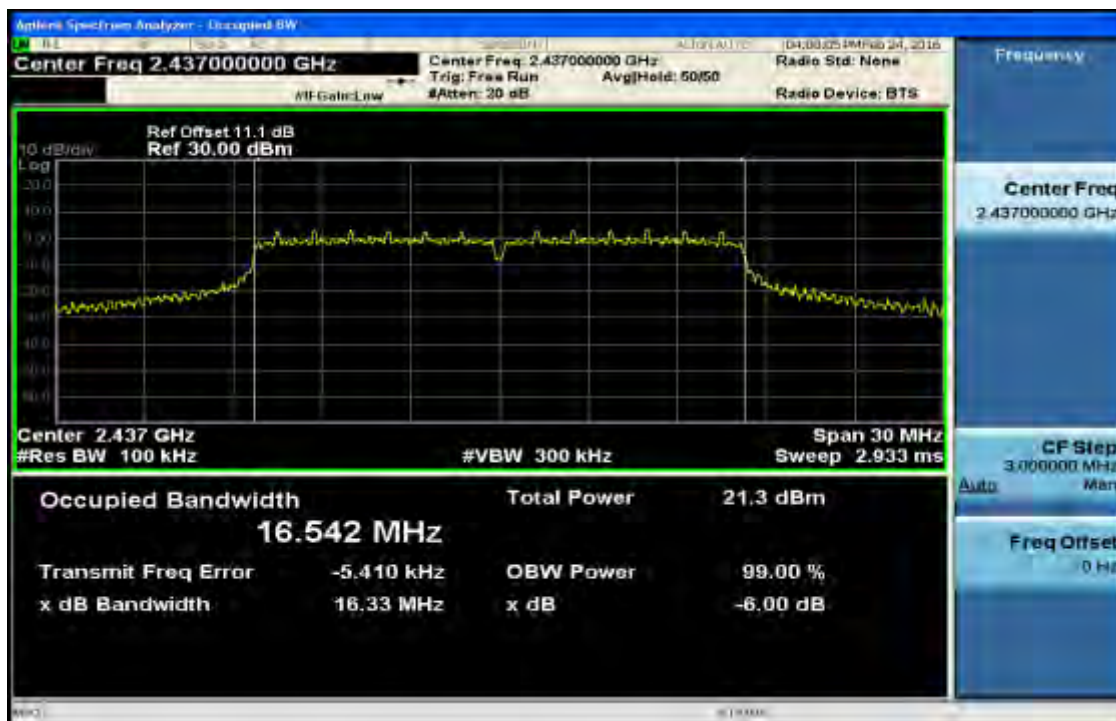
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802.11g (AUX2)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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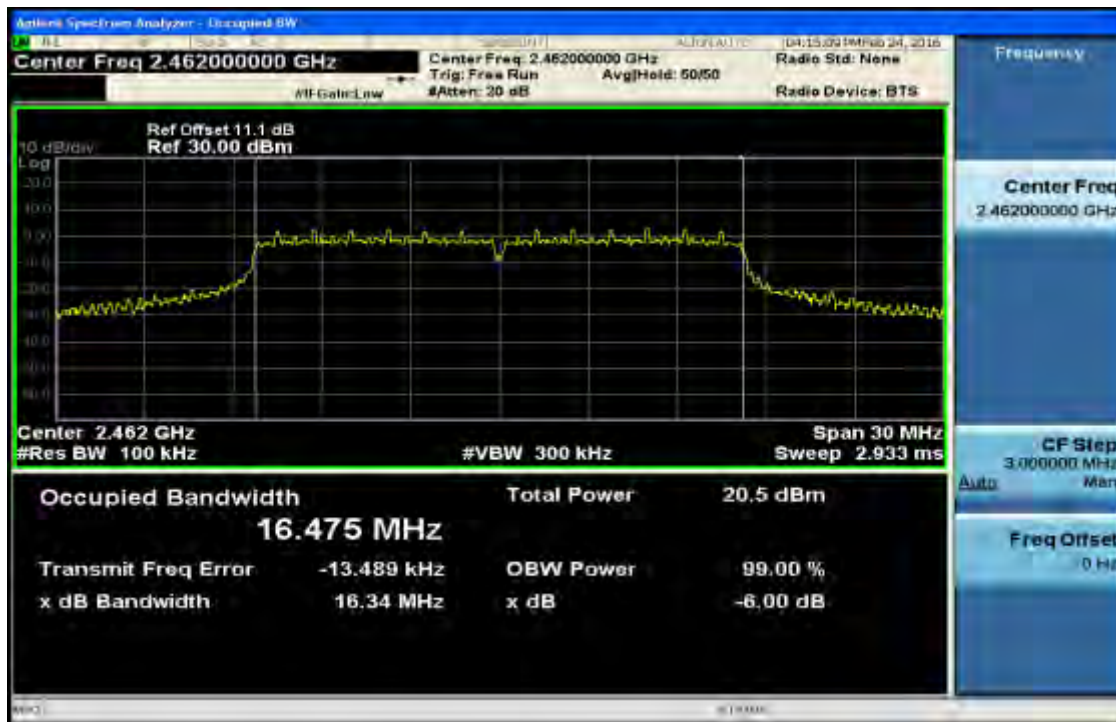
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6dB Band Width Test Data CH-High



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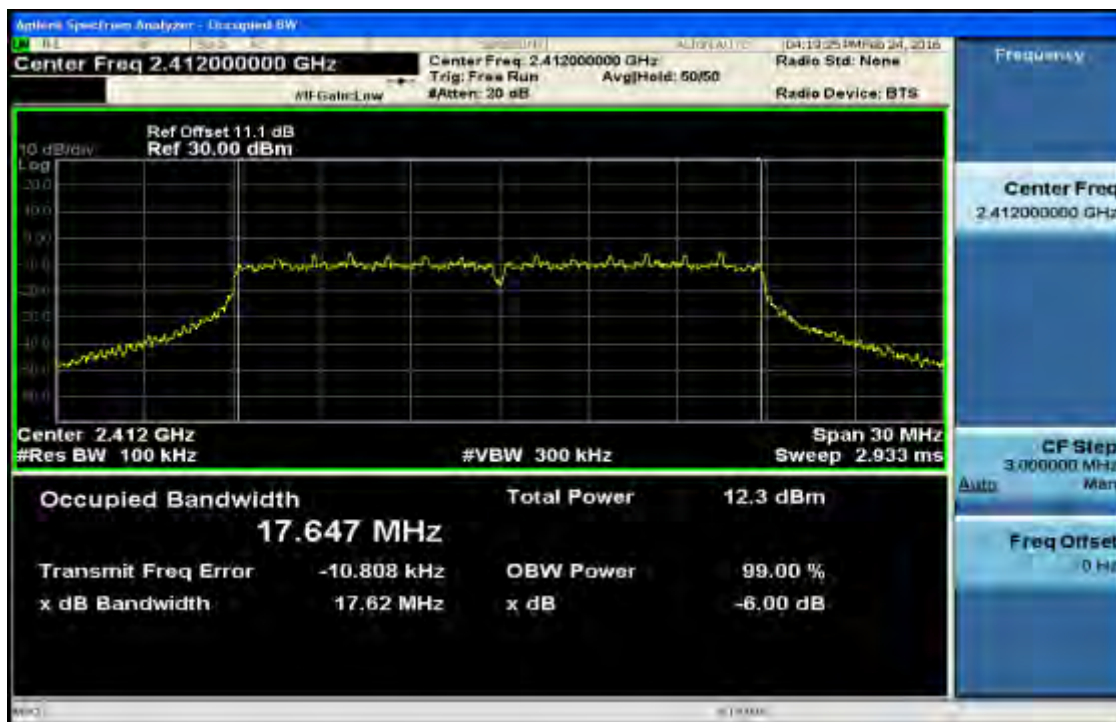
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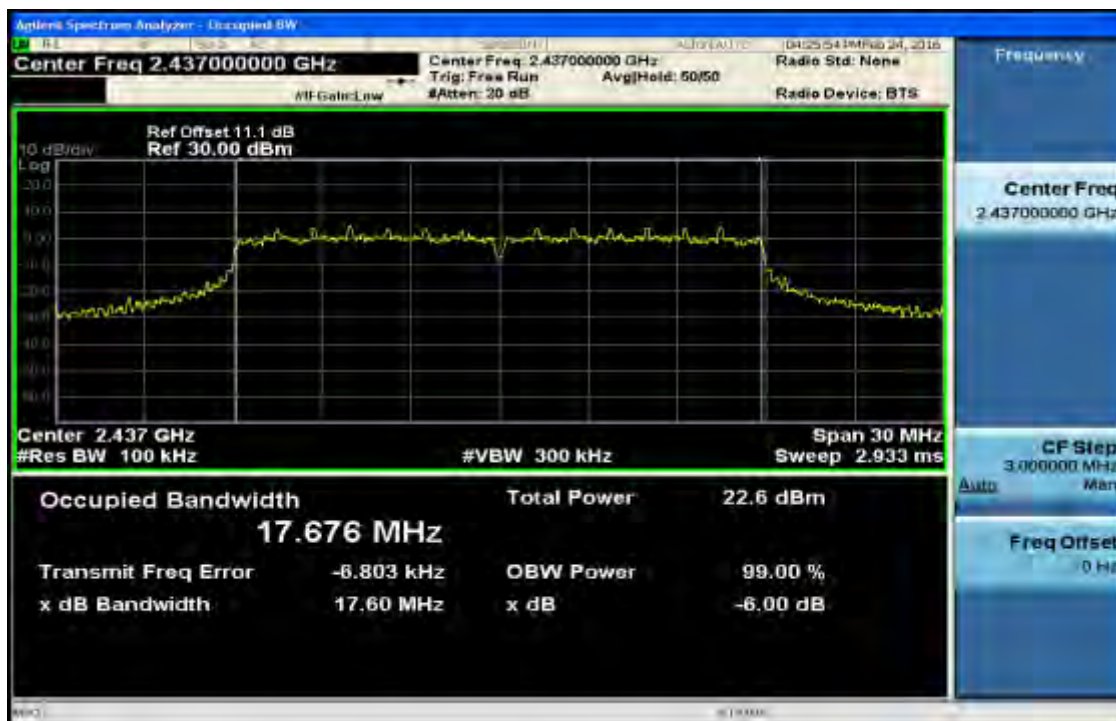
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802.11n_20M (Main)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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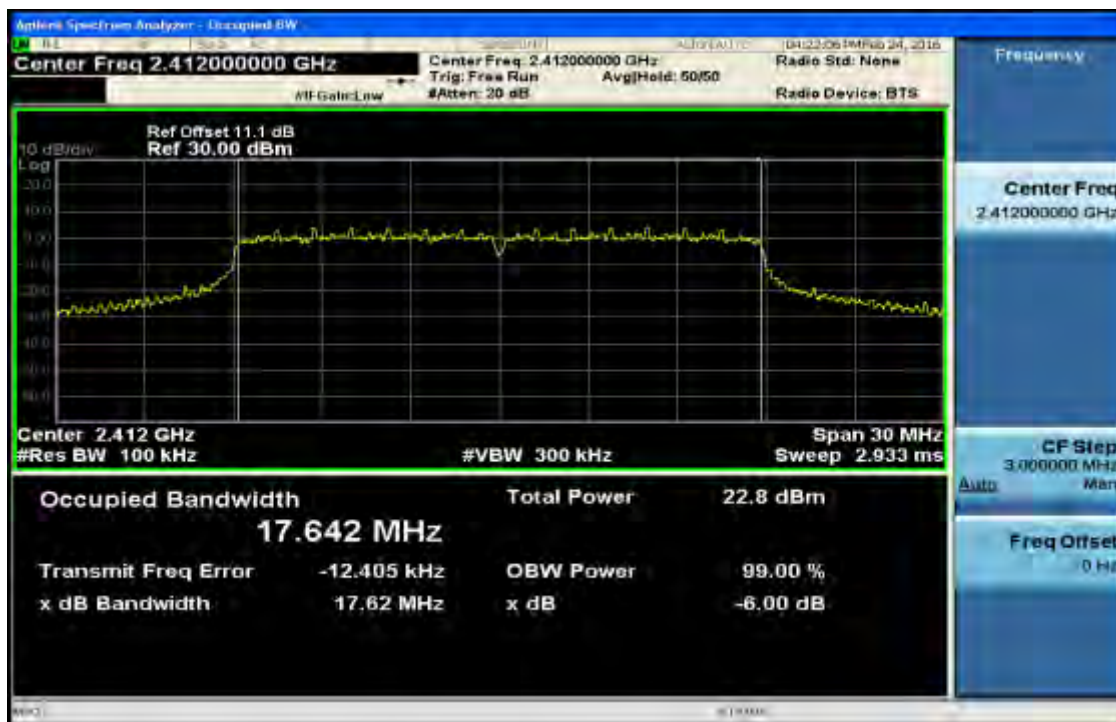
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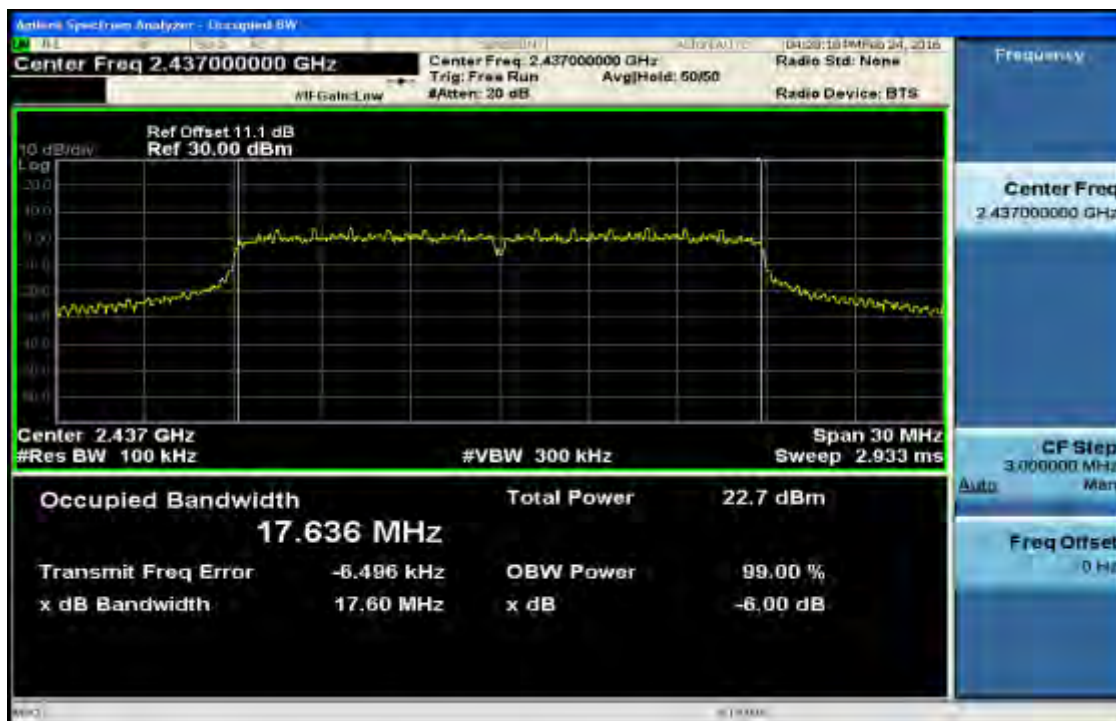
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802.11n_20M (AUX1)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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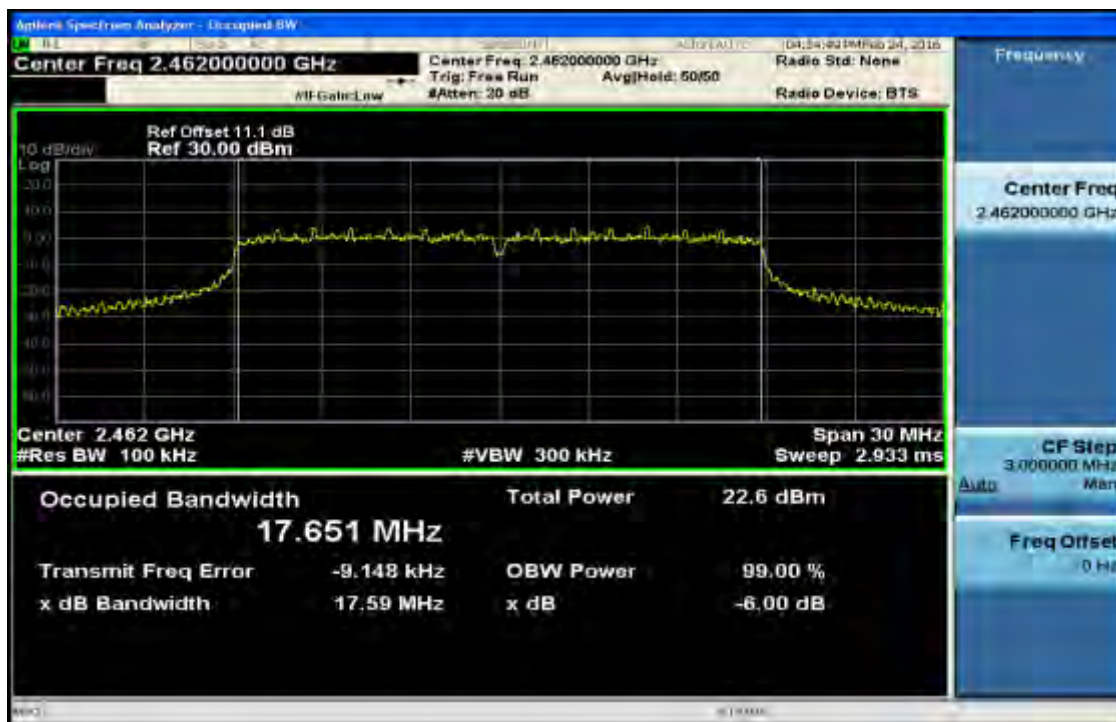
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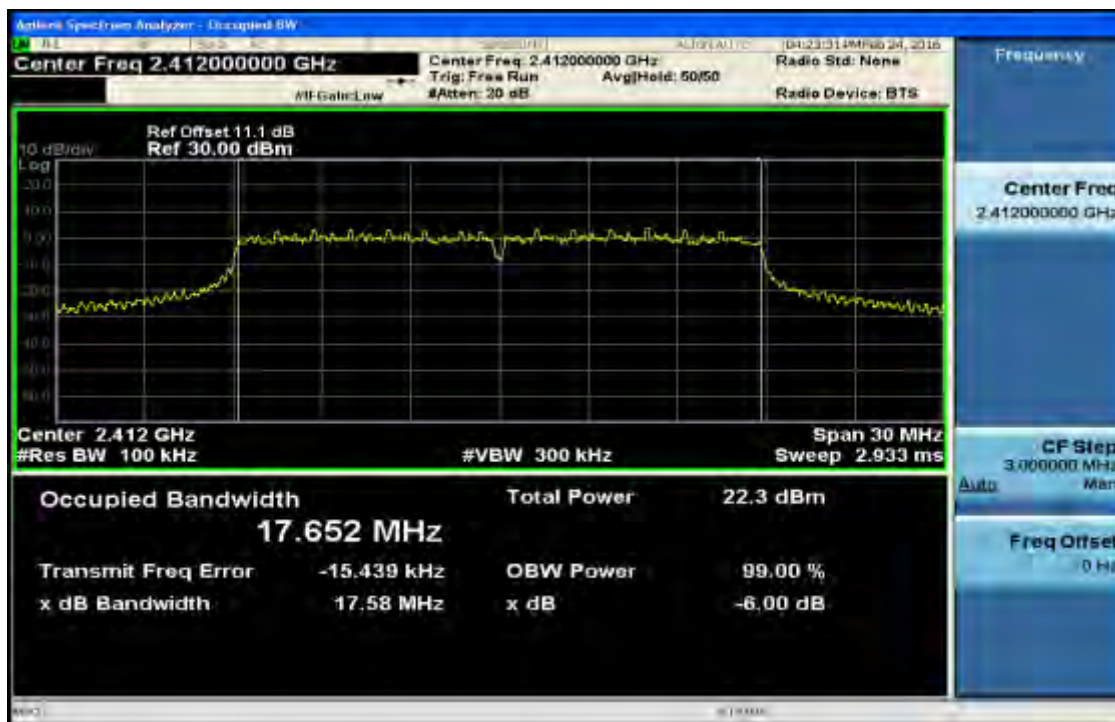
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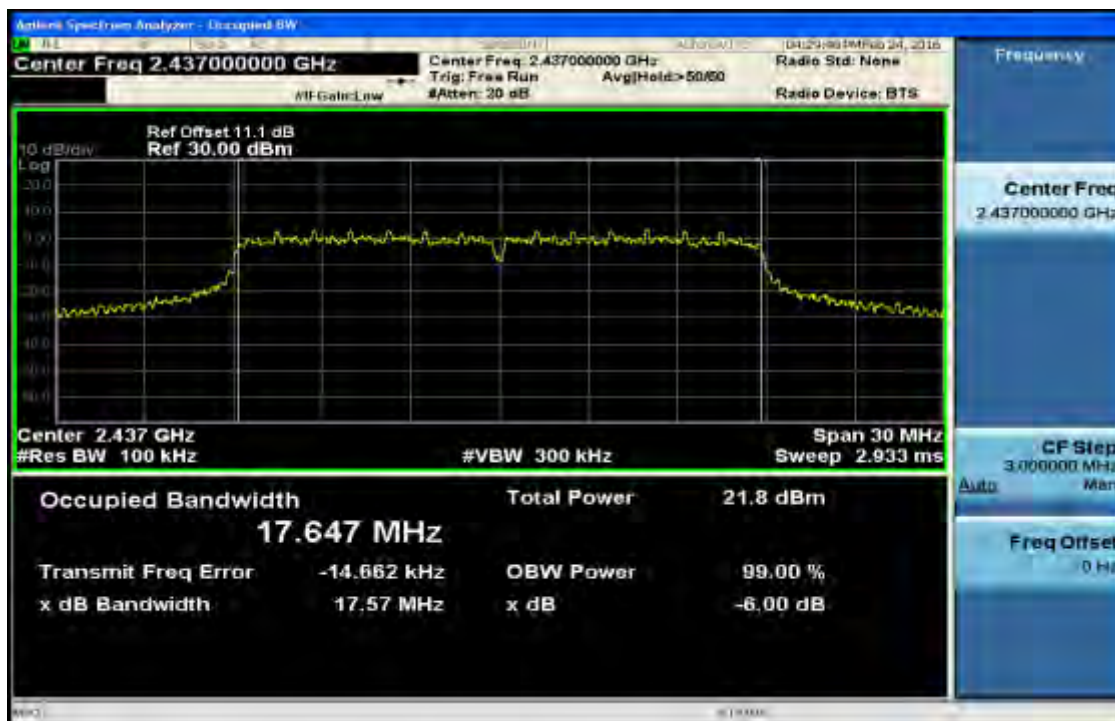
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802.11n_20M (AUX2)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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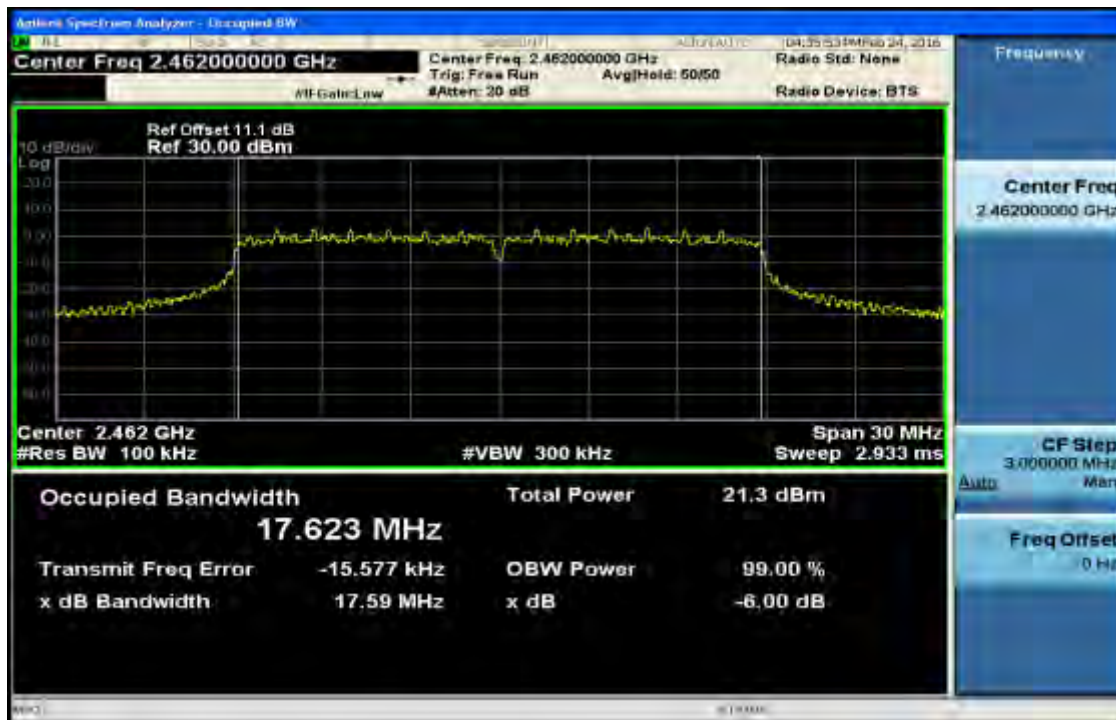
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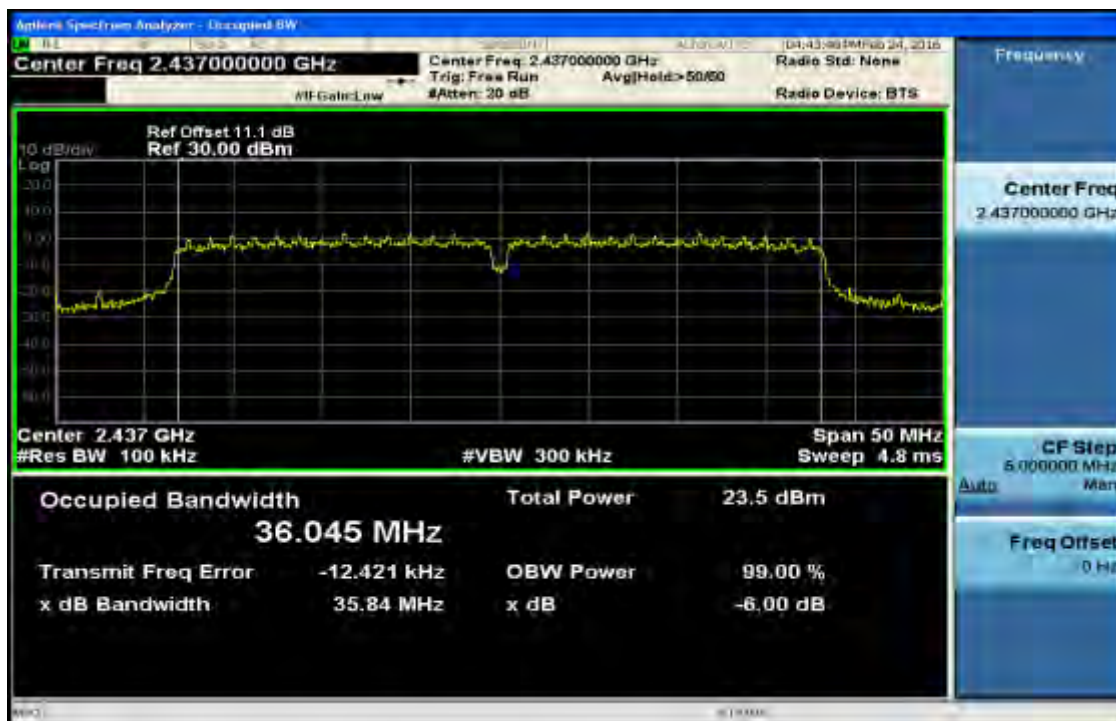
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802.11n_40M (Main)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



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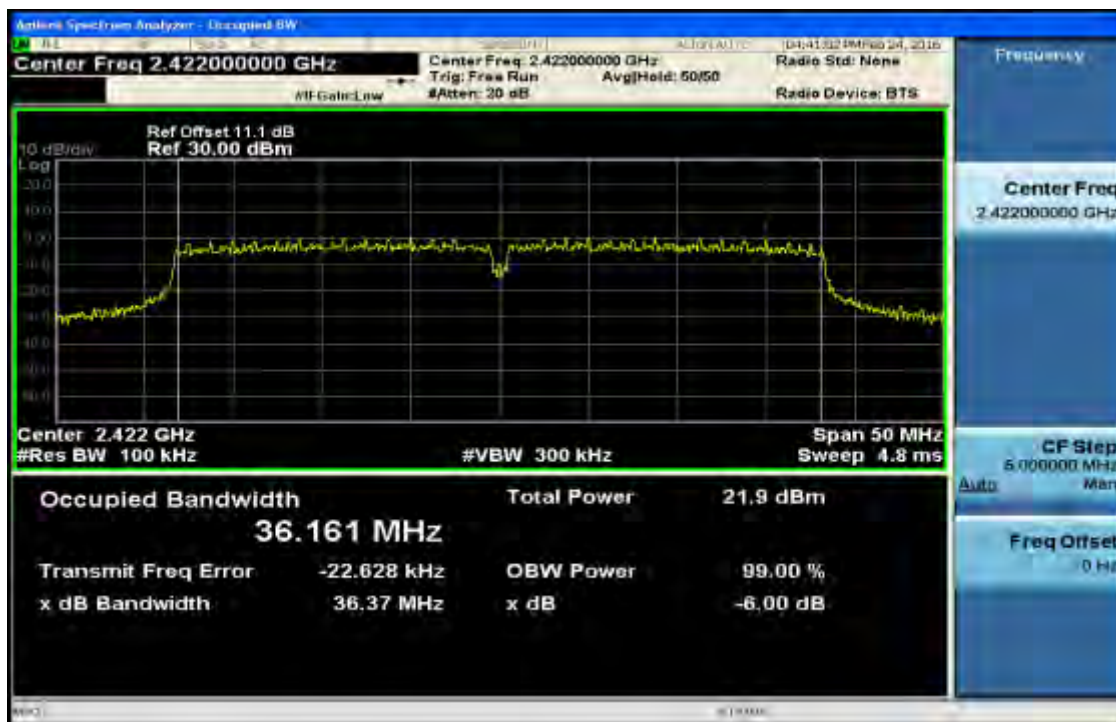
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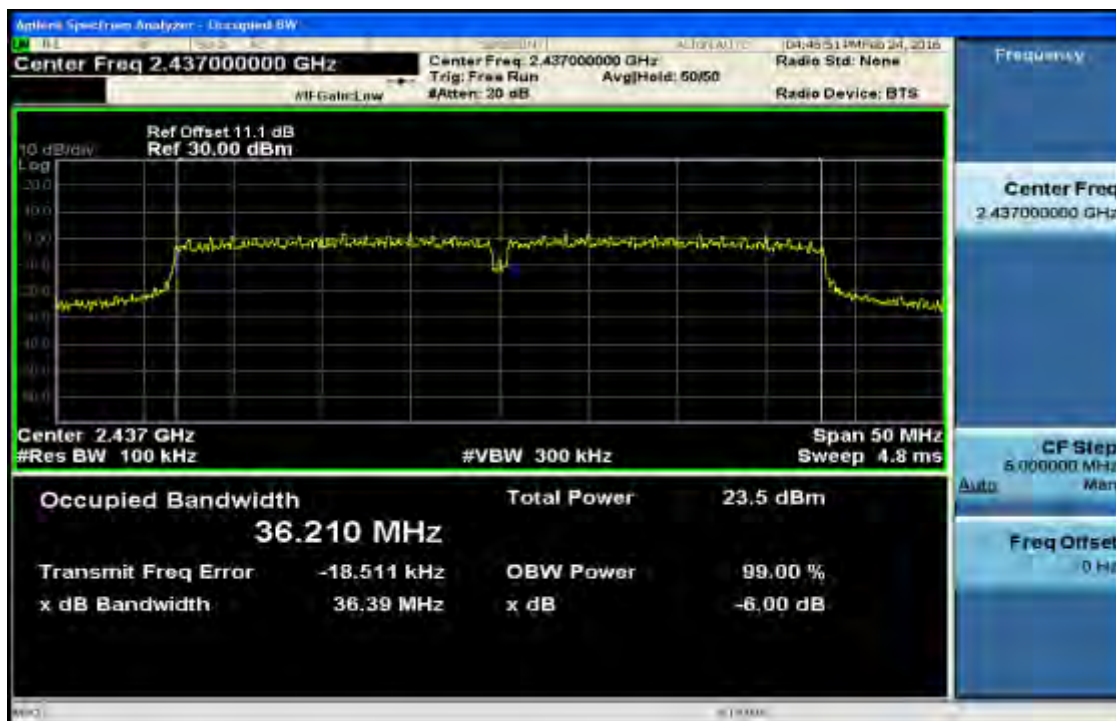
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802.11n_40M (AUX1)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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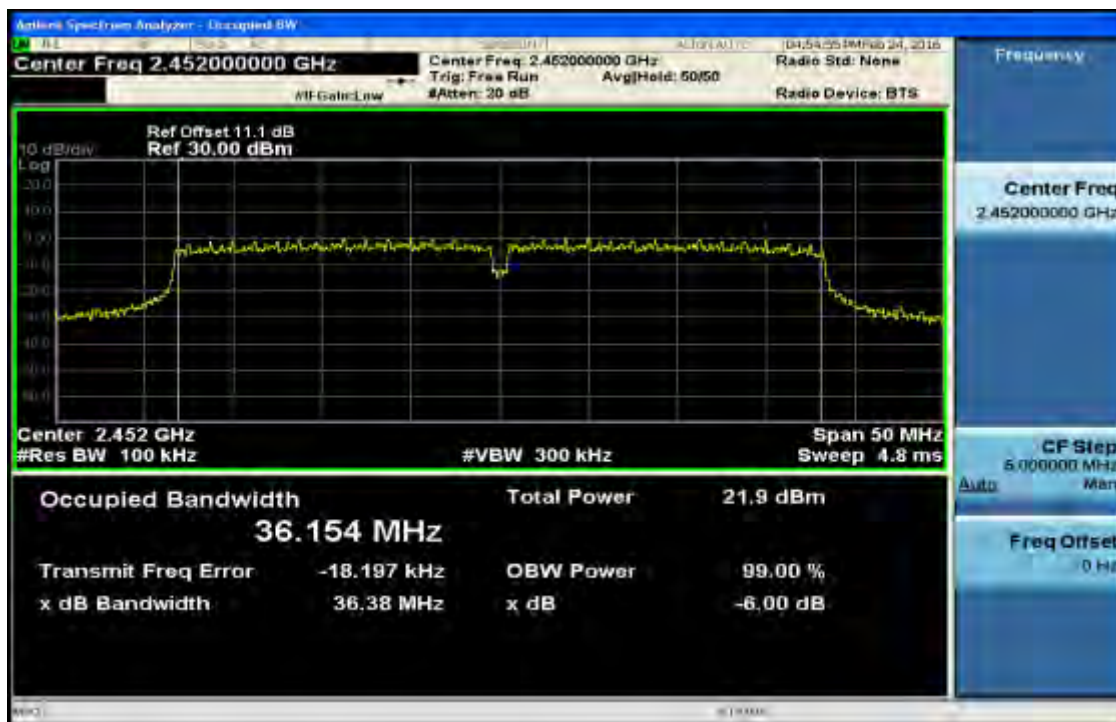
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6dB Band Width Test Data CH-High



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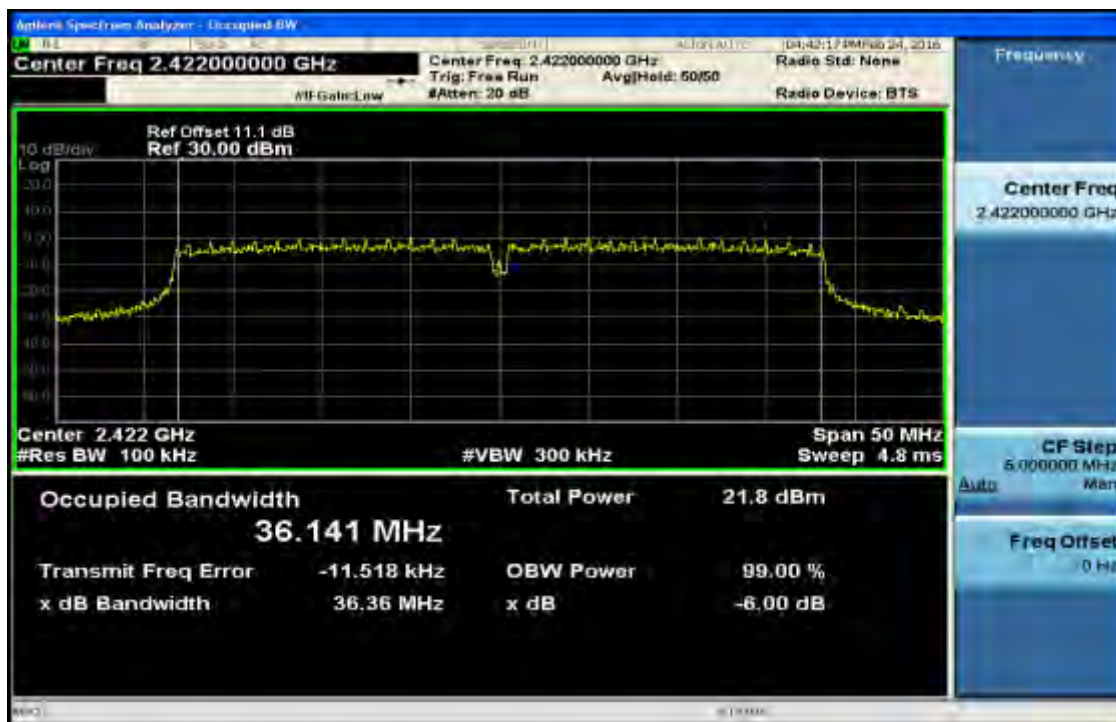
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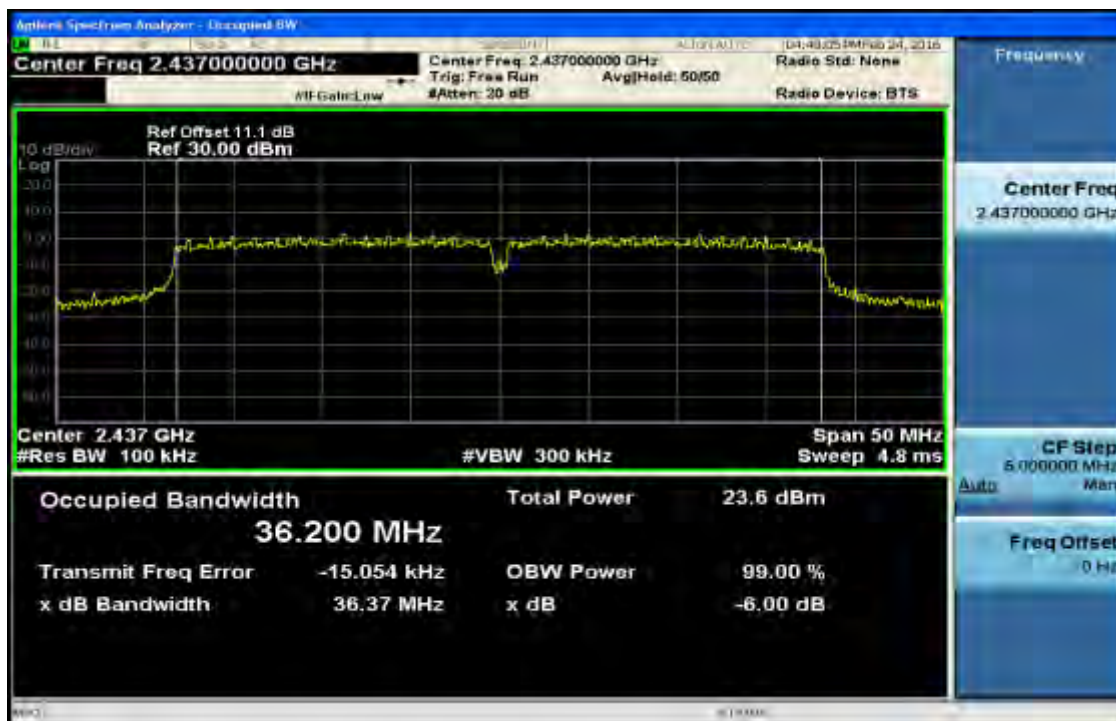
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802.11n_40M (AUX2)

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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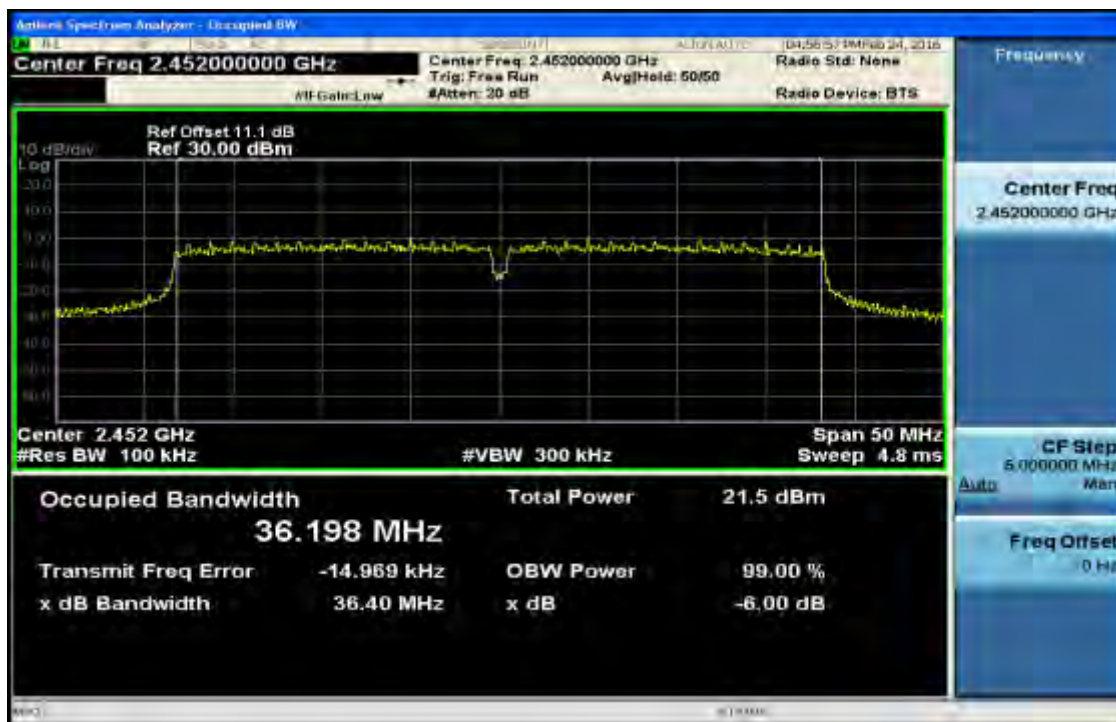
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6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

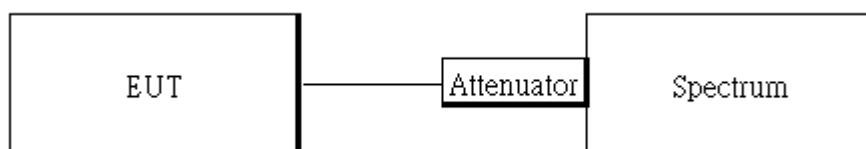
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

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).

10.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016

10.3 Test SET-UP



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10.4 Measurement Procedure

Conducted Band Edge:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
6. Mark the highest reading of the emission as the reference level measurement.
7. Set DL as the limit = reading on marker 1 – 20dBm
8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

10.5 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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802.11b

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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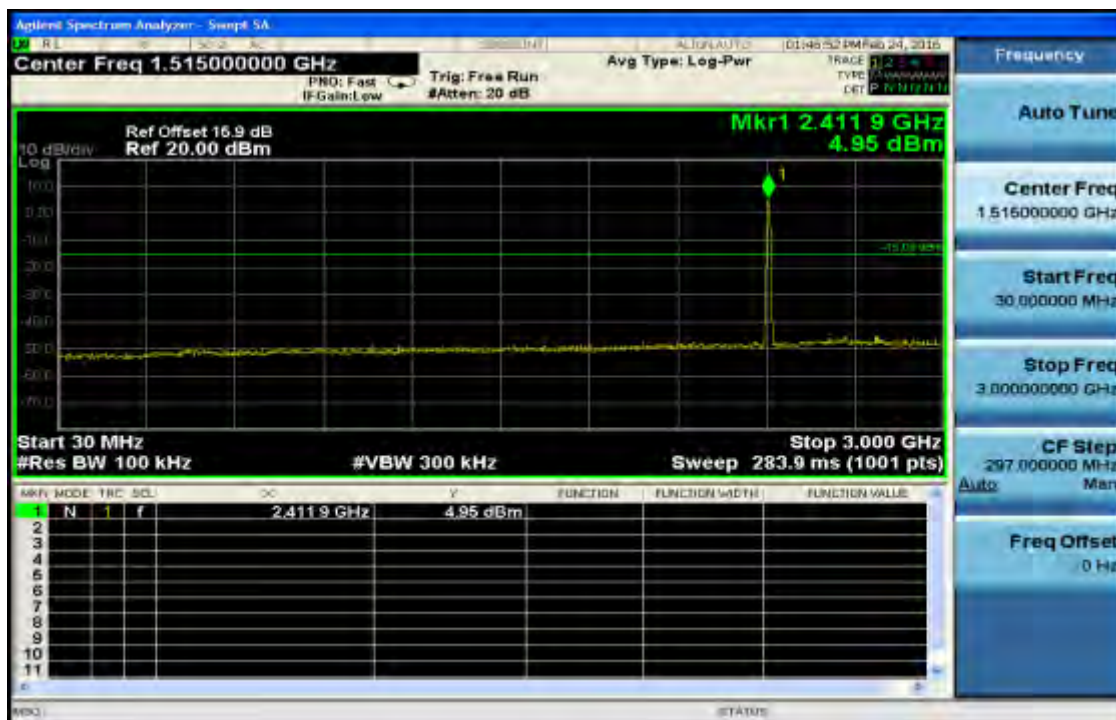
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802.11b

Spurious Emission Test Data CH-Low



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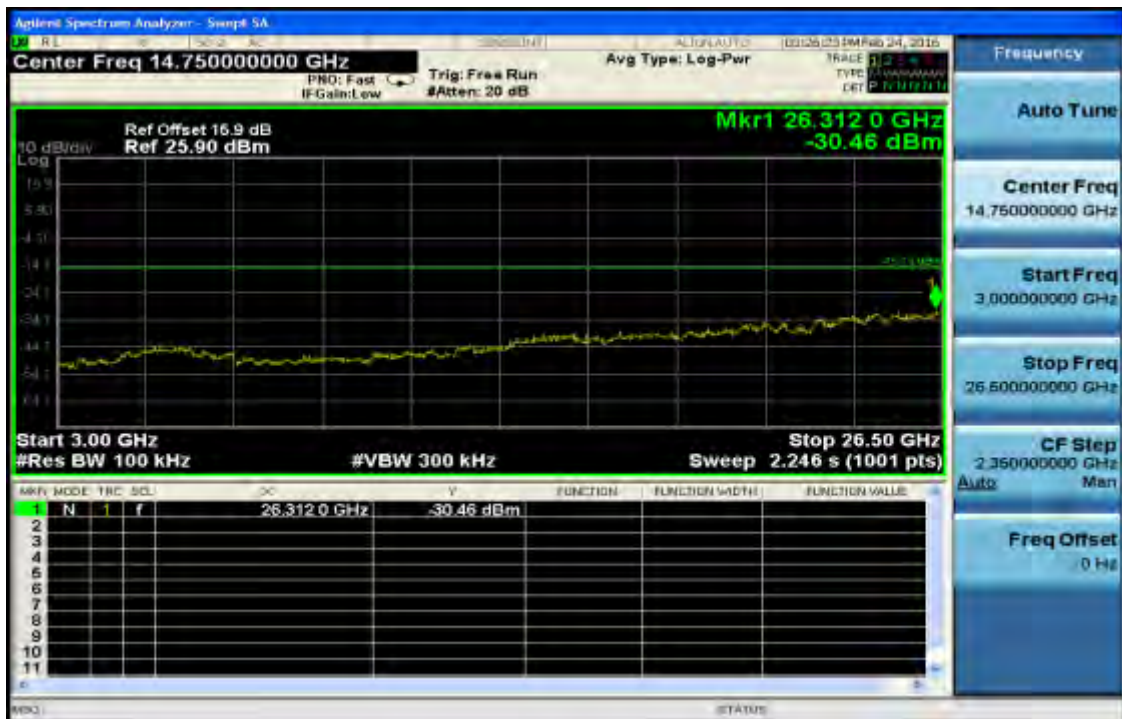
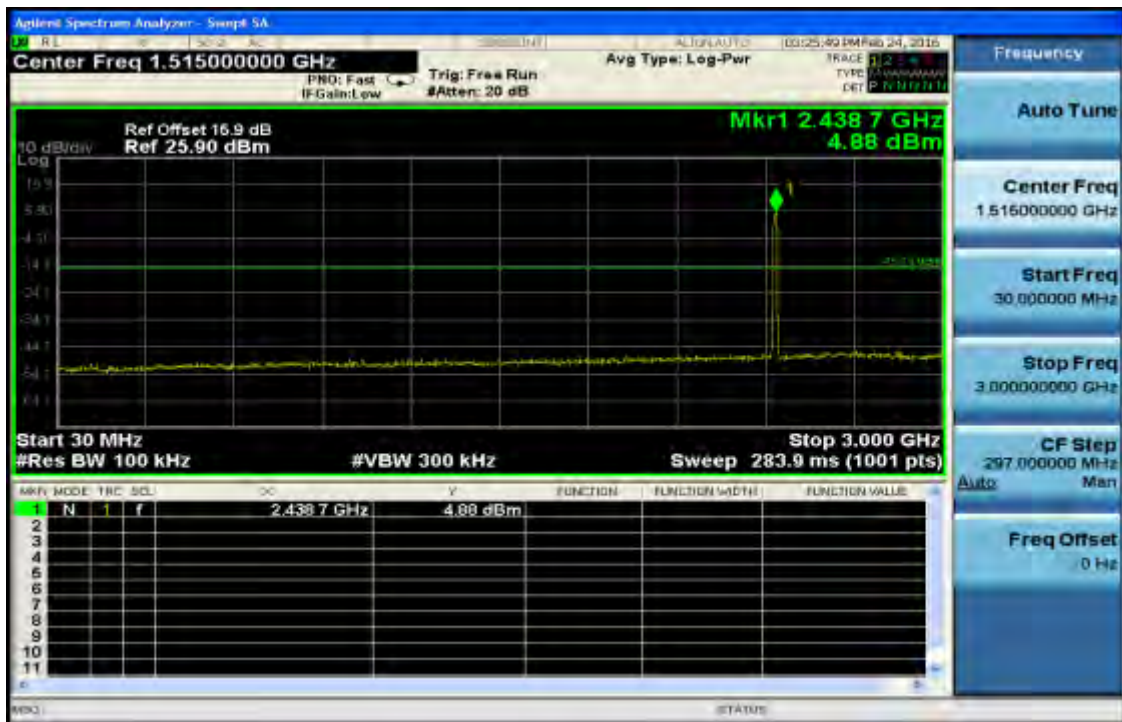
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Spurious Emission Test Data CH-Mid



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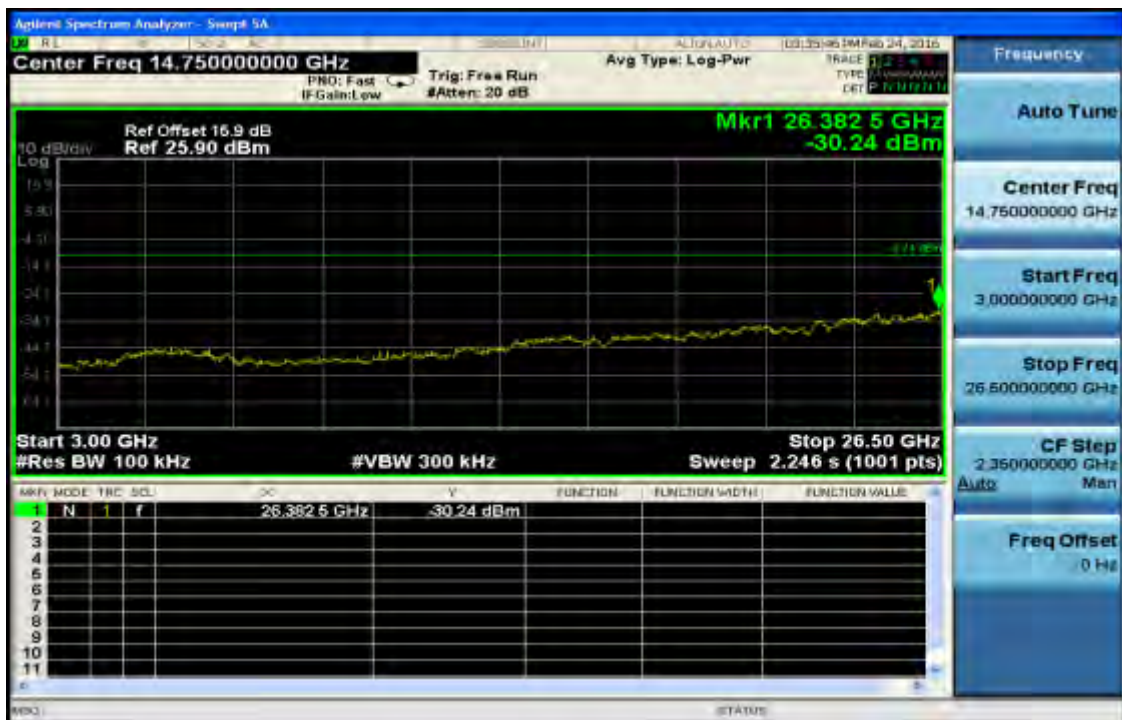
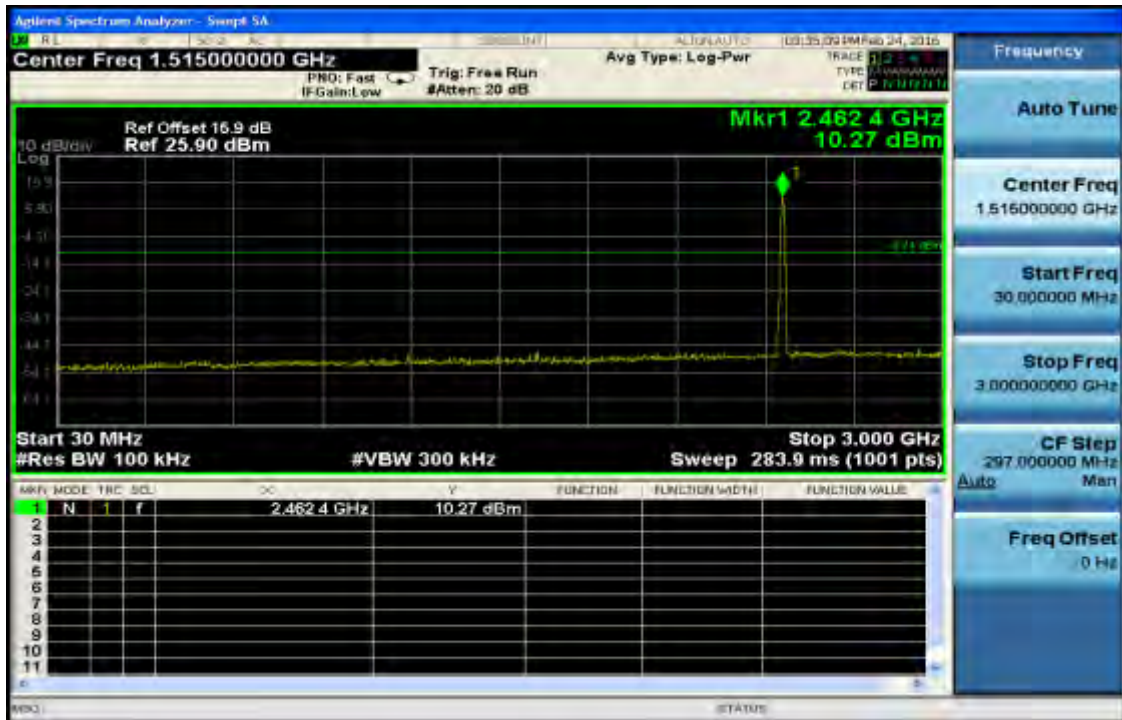
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Spurious Emission Test Data CH-High



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802.11g

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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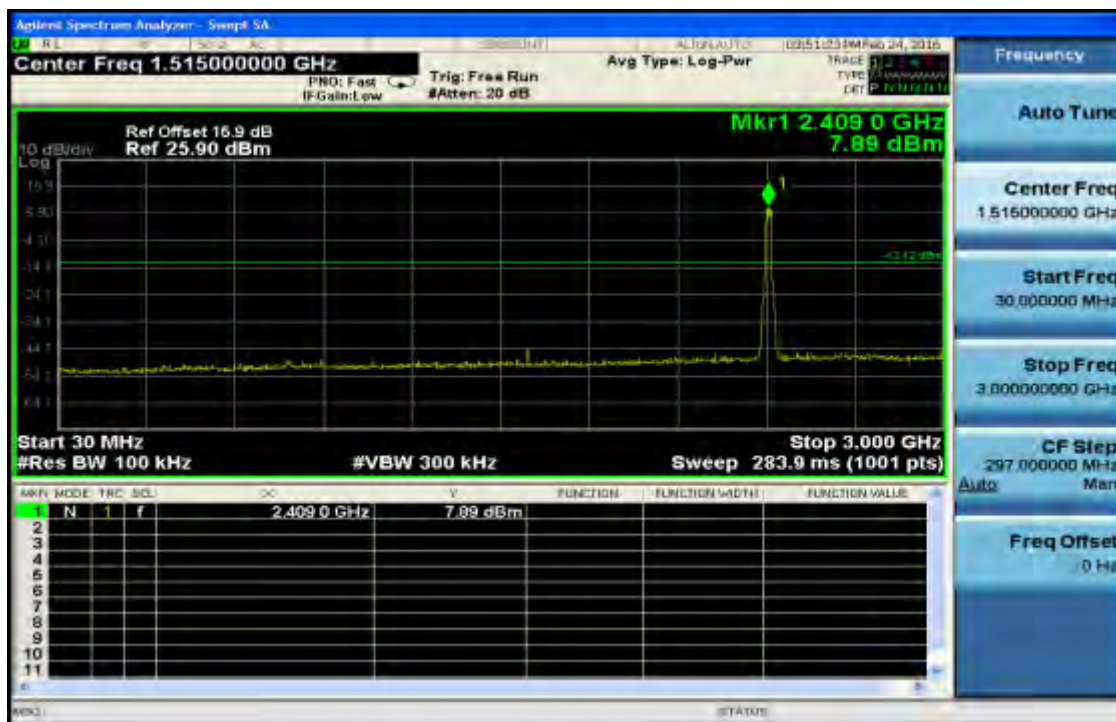
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802.11g

Spurious Emission Test Data CH-Low



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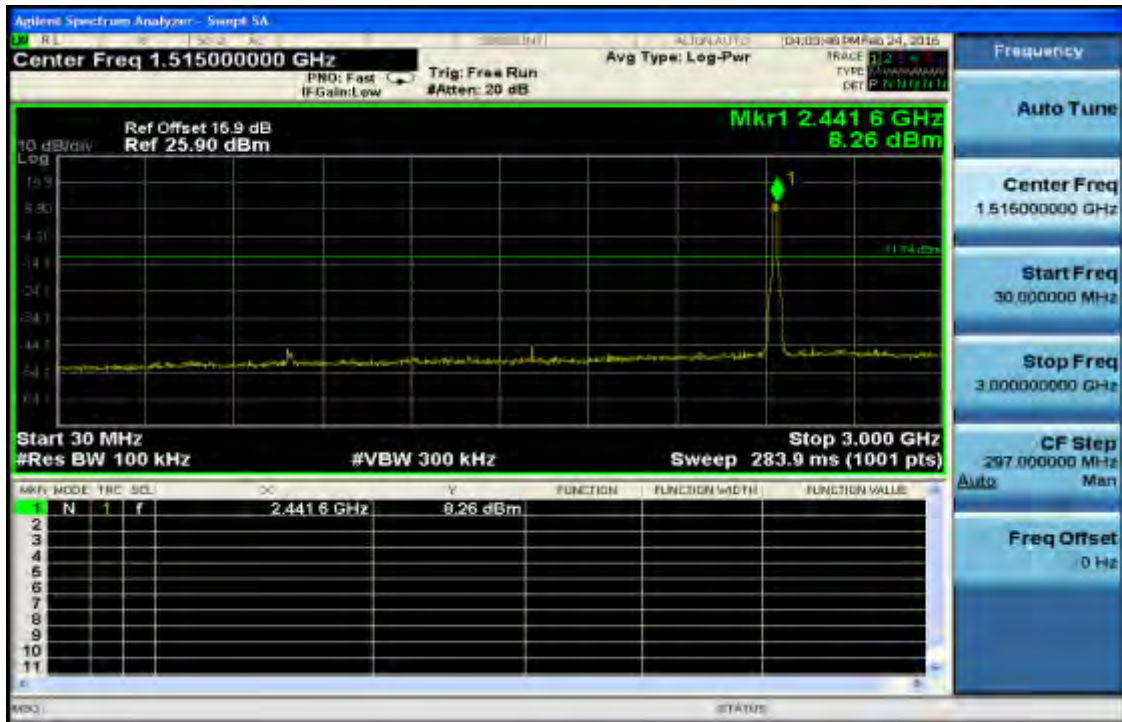
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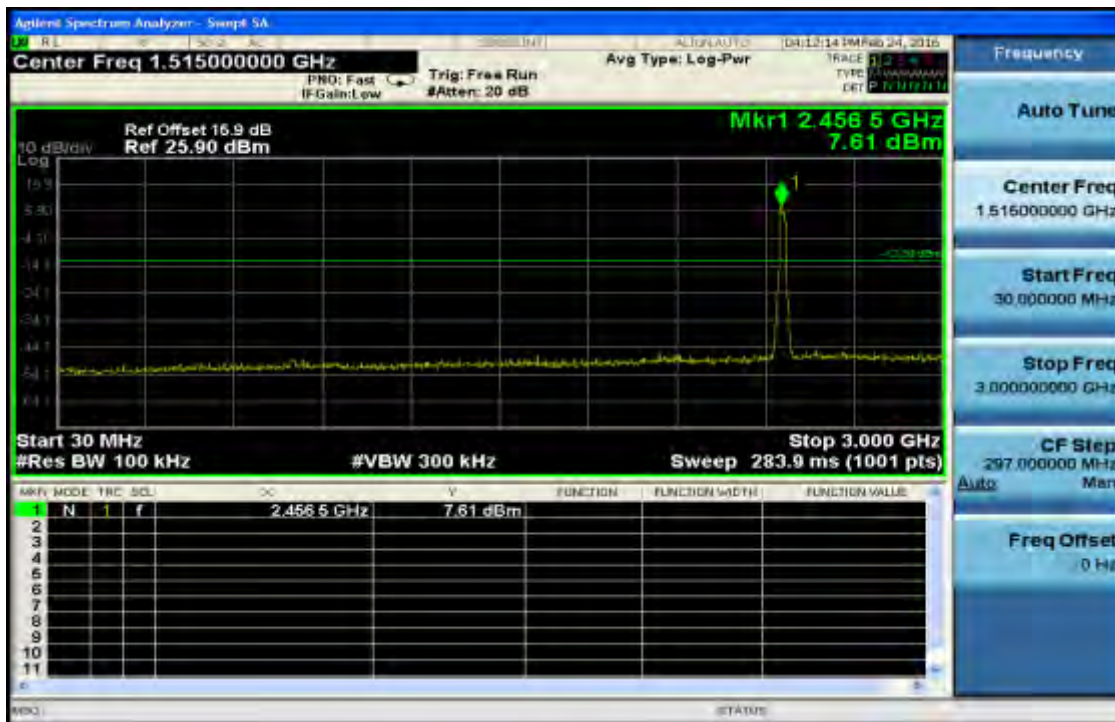
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802.11n_HT20

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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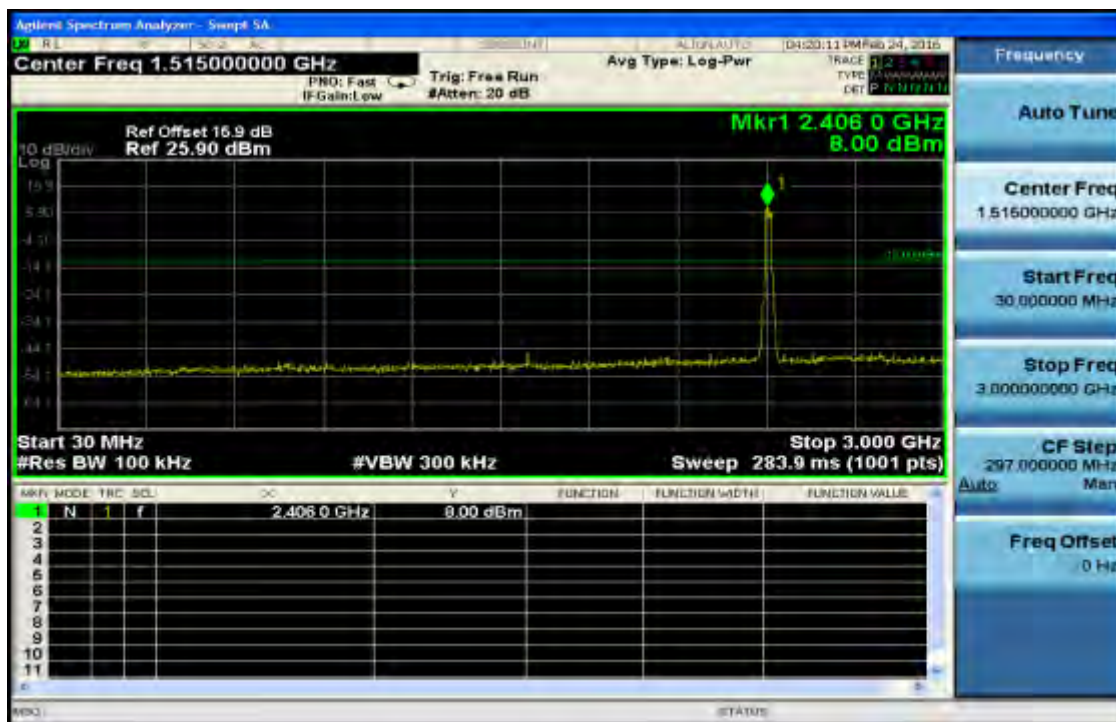
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Spurious Emission Test Data CH-Low



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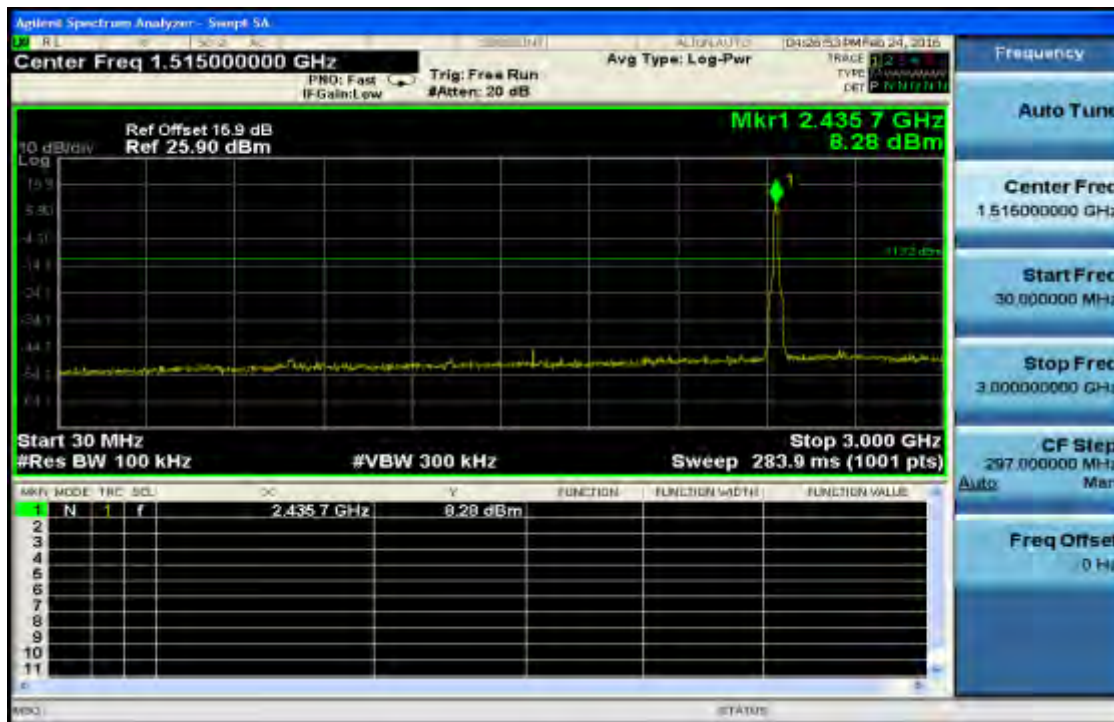
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Spurious Emission Test Data CH-Mid



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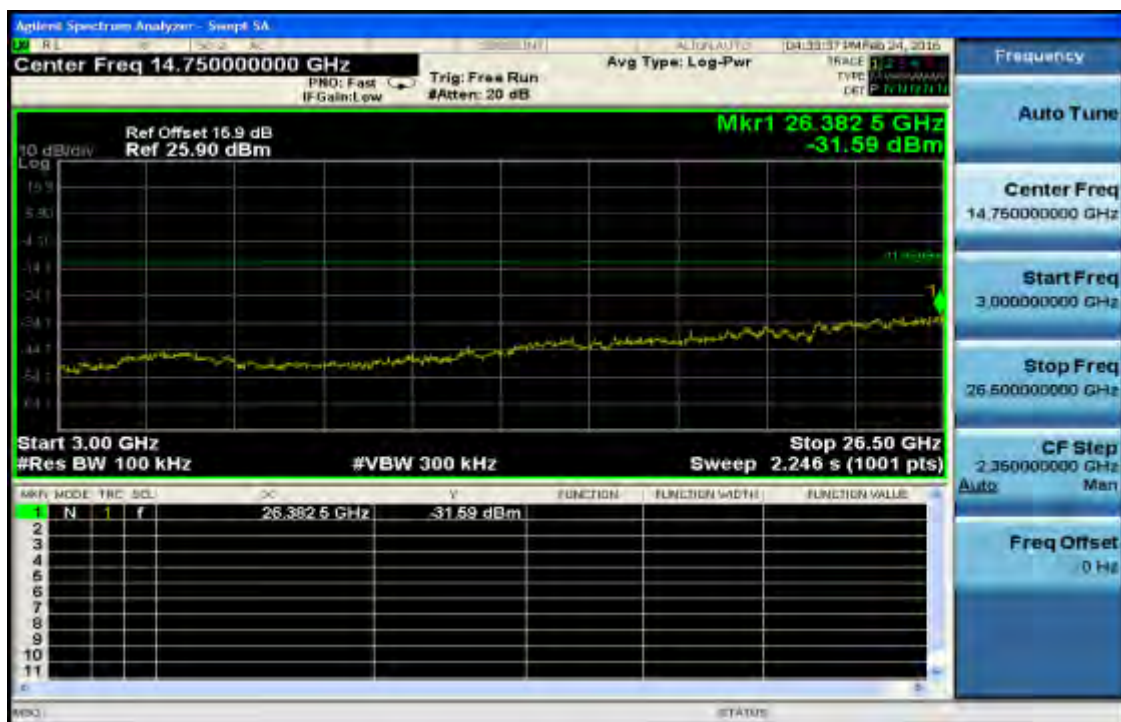
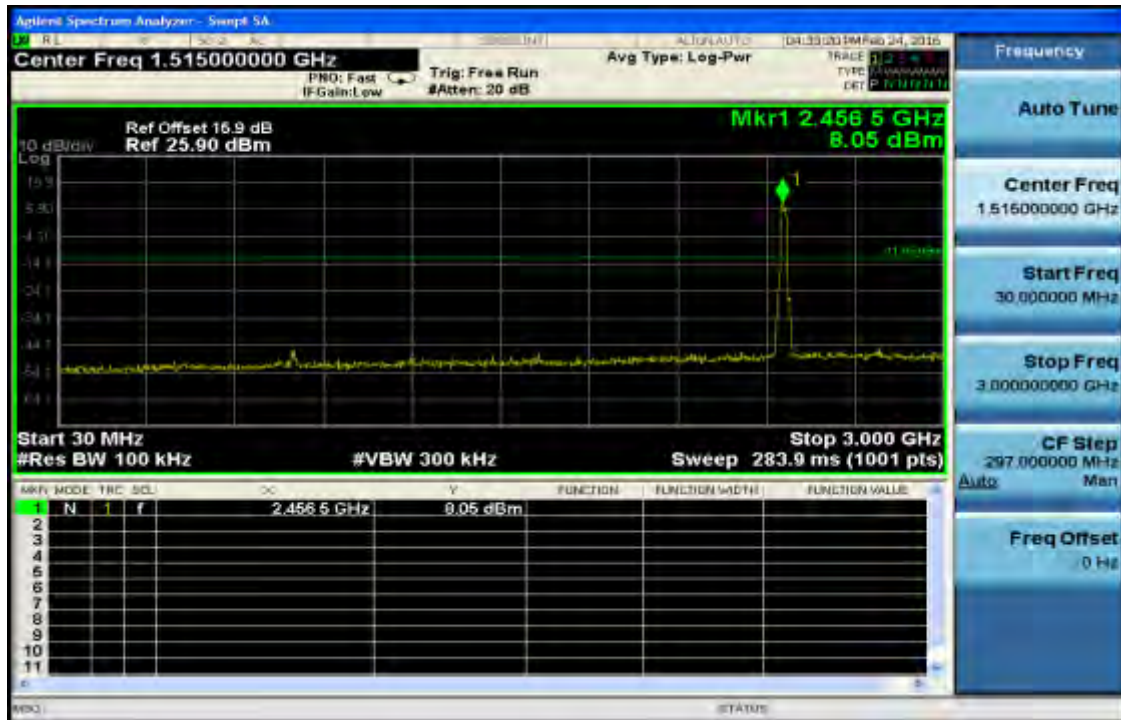
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Spurious Emission Test Data CH-High



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802.11n_HT40

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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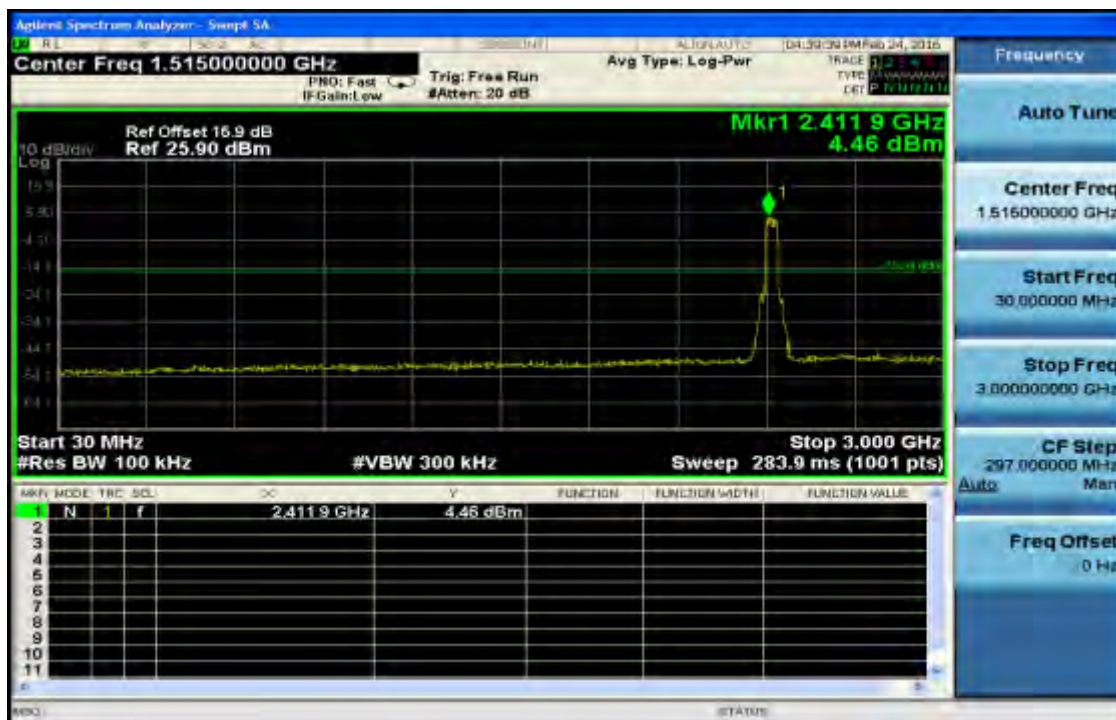
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Spurious Emission Test Data CH-Low



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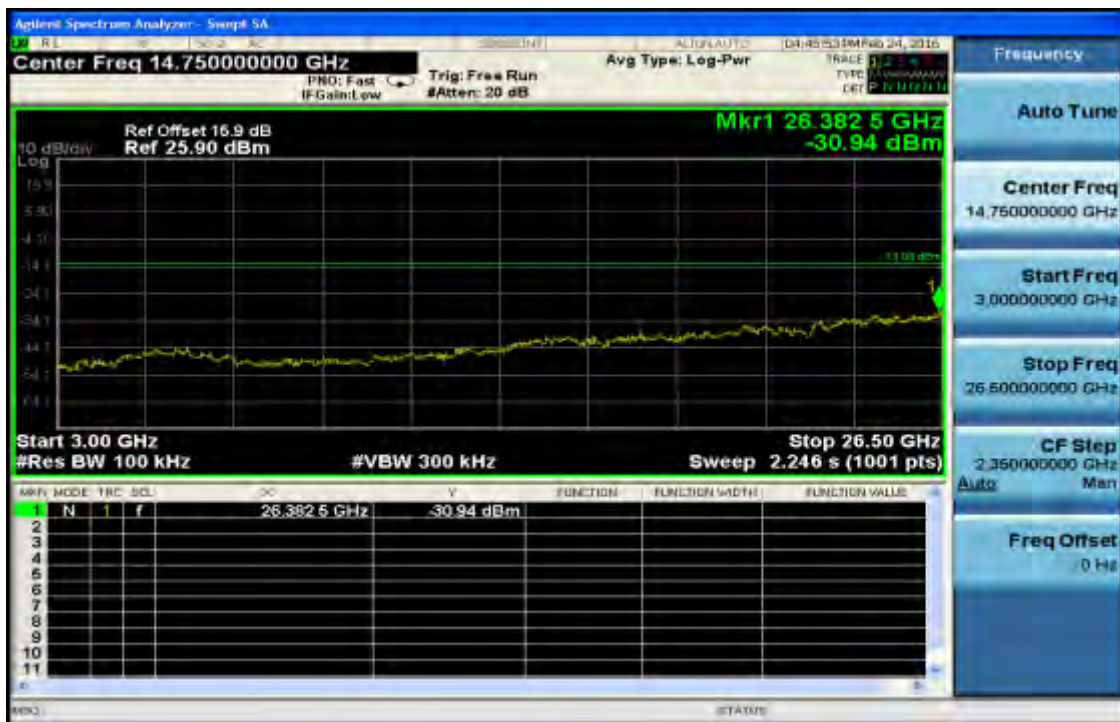
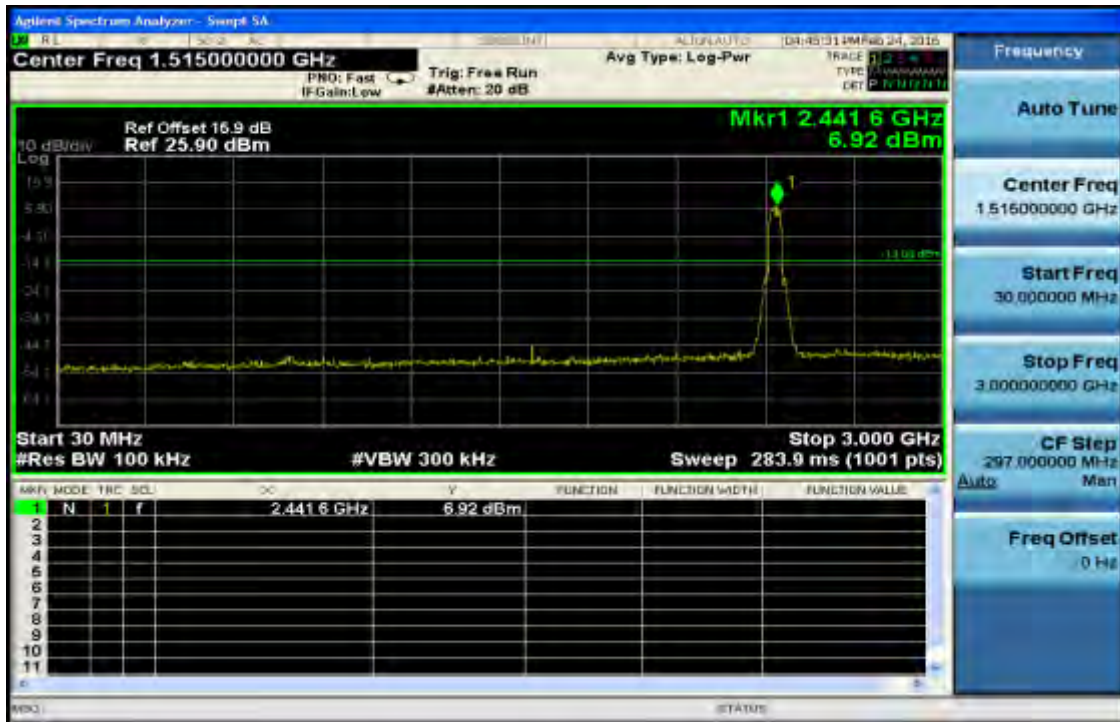
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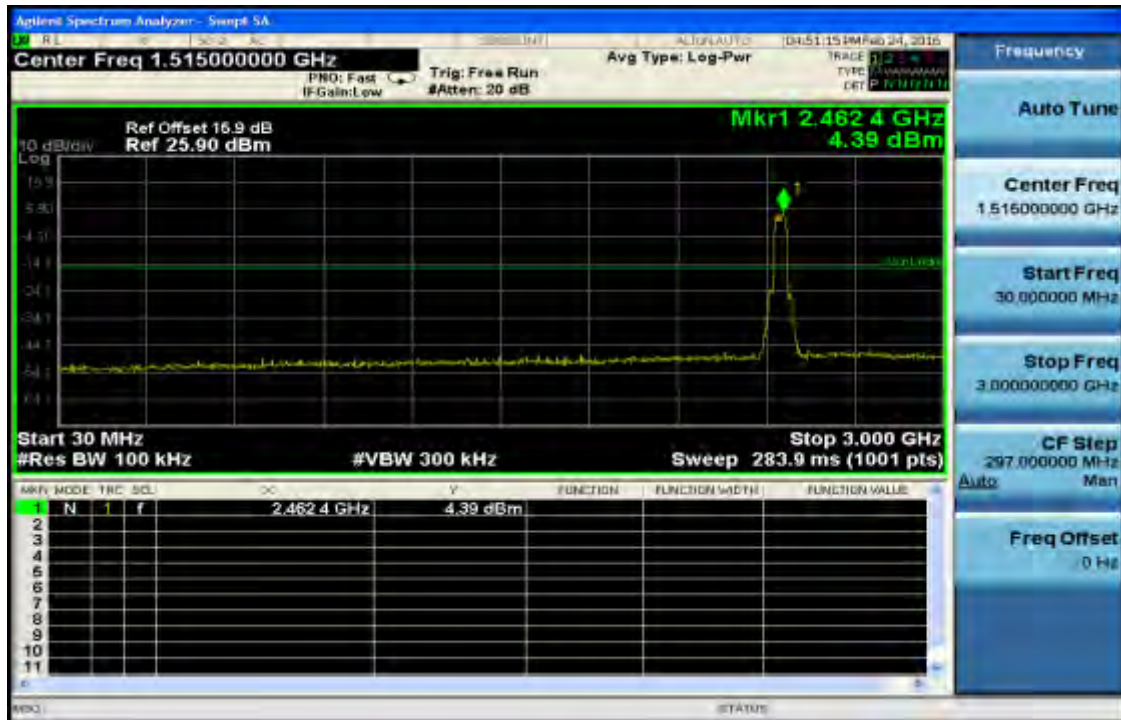
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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

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. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

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11.2 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/28/2016	01/27/2017
Loop Antenna	ETS.LINDGREN	6502	148045	09/07/2015	09/06/2016
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/14/2015	12/13/2016
Horn antenna	ETS.LINDGREN	3117	123995	05/05/2015	05/04/2016
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2016	01/01/2017
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/02/2016	01/01/2017
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2016	01/01/2017
3m Site NSA	SGS	966 chamber	N/A	07/02/2015	07/01/2016
Low Loss Cable	Huber Suhner	966 TX	1	01/02/2016	01/01/2017

NOTE: N.C.R refers to Not Calibrated Required.

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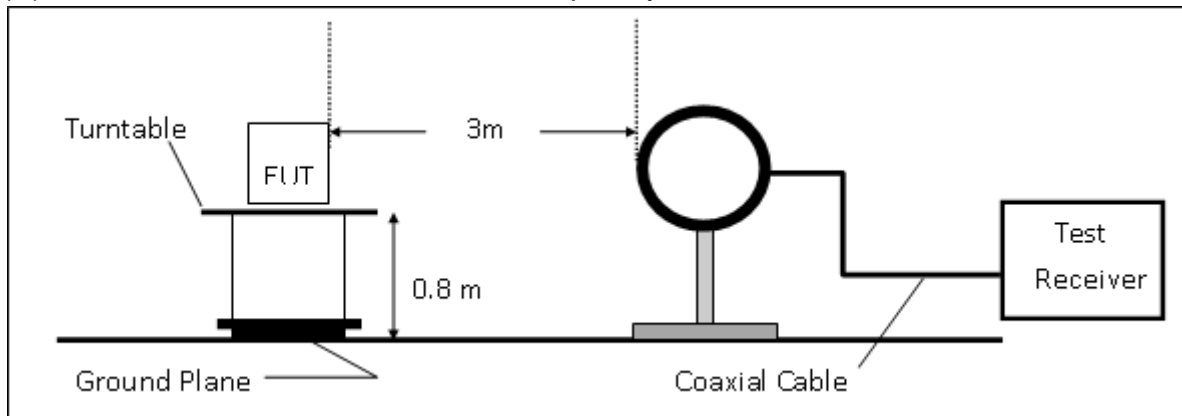
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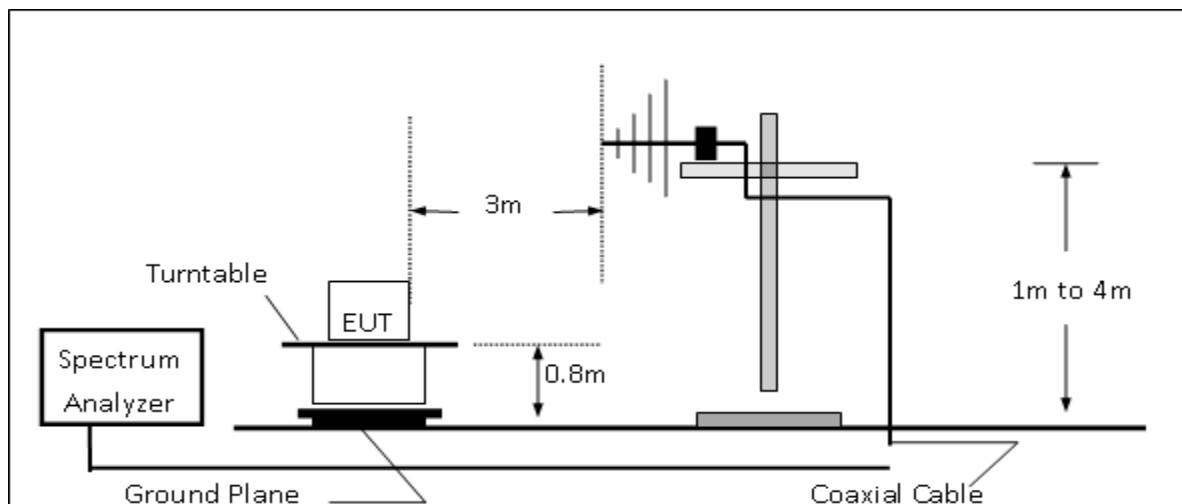
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11.3 Test SET-UP

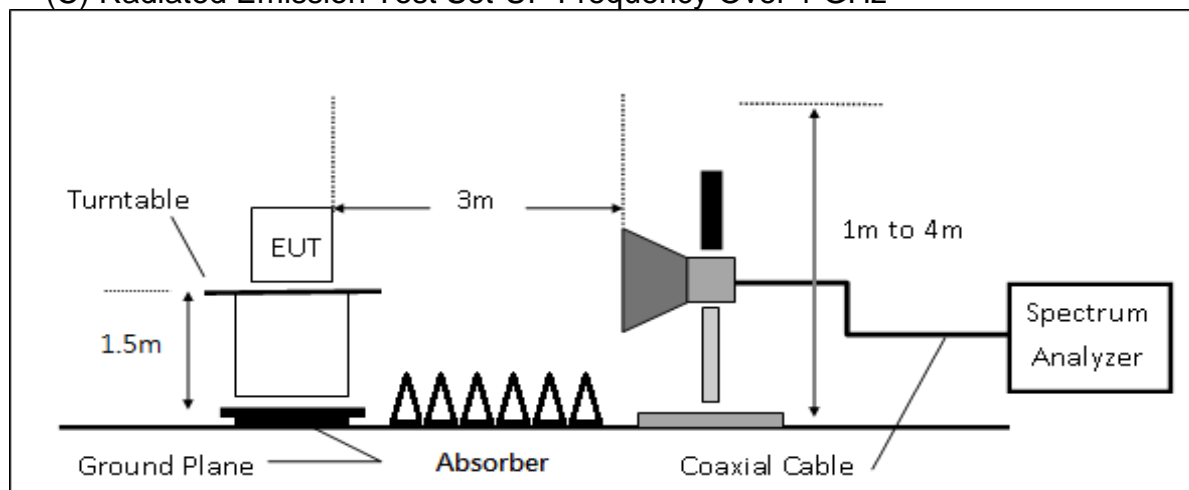
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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11.4 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
12. Repeat above procedures until all default test channel measured were complete.

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11.5 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	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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Radiated Band Edge Measurement Result (802.11b)

Operation Mode : 802.11b Test Date : 03/01/2016 11:13:16
Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH LOW Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	39.81	41.55	-1.74	54.00	-14.19
2390.00	E	58.66	60.41	-1.74	74.00	-15.34

Operation Mode : 802.11b Test Date : 03/01/2016 11:15:48
Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH LOW Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	36.99	38.73	-1.74	54.00	-17.01
2390.00	E	55.24	56.98	-1.74	74.00	-18.76

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Operation Mode : 802.11b Test Date : 03/01/2016 11:19:39
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	37.69	39.31	-1.62	54.00	-16.31
2483.50	E	55.80	57.42	-1.62	74.00	-18.20

Operation Mode : 802.11b Test Date : 03/01/2016 11:22:09
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	36.46	38.08	-1.62	54.00	-17.54
2483.50	E	55.98	57.59	-1.62	74.00	-18.02

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Radiated Band Edge Measurement Result (802.11g)

Operation Mode :	802.11g	Test Date :	03/01/2016 15:59:03
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Bandedge CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	41.57	43.32	-1.74	54.00	-12.43
2390.00	E	60.35	62.09	-1.74	74.00	-13.65

Operation Mode :	802.11g	Test Date :	03/01/2016 16:04:26
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Bandedge CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	37.01	38.76	-1.74	54.00	-16.99
2390.00	E	55.18	56.93	-1.74	74.00	-18.82

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Operation Mode : 802.11g Test Date : 03/01/2016 11:34:17
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	46.42	48.04	-1.62	54.00	-7.58
2483.50	E	65.91	67.52	-1.62	74.00	-8.09

Operation Mode : 802.11g Test Date : 03/01/2016 11:41:32
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	40.27	41.88	-1.62	54.00	-13.73
2483.50	E	58.76	60.38	-1.62	74.00	-15.24

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Radiated Band Edge Measurement Result (802.11_HT20)

Operation Mode :	802.11n20	Test Date :	03/01/2016 16:24:47
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Bandedge CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	40.25	42.00	-1.74	54.00	-13.75
2390.00	E	57.18	58.93	-1.74	74.00	-16.82

Operation Mode :	802.11n20	Test Date :	03/01/2016 16:30:00
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Bandedge CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	36.82	38.56	-1.74	54.00	-17.18
2390.00	E	54.56	56.30	-1.74	74.00	-19.44

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Operation Mode : 802.11n20 Test Date : 03/01/2016 13:30:20
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	48.30	49.92	-1.62	54.00	-5.70
2483.50	E	65.51	67.13	-1.62	74.00	-8.49

Operation Mode : 802.11n20 Test Date : 03/01/2016 13:35:12
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	40.59	42.21	-1.62	54.00	-13.41
2483.50	E	56.86	58.48	-1.62	74.00	-17.14

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Radiated Band Edge Measurement Result (802.11_HT40)

Operation Mode : 802.11n40 Test Date : 03/01/2016 14:17:04
Fundamental Frequency : 2422 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH LOW Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	44.66	46.40	-1.74	54.00	-9.34
2390.00	E	62.23	63.98	-1.74	74.00	-11.77

Operation Mode : 802.11n40 Test Date : 03/01/2016 14:20:51
Fundamental Frequency : 2422 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Bandedge CH LOW Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2390.00	E	39.44	41.18	-1.74	54.00	-14.56
2390.00	E	55.87	57.61	-1.74	74.00	-18.13

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Operation Mode : 802.11n40 Test Date : 03/01/2016 13:58:20
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Edward
 EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	48.83	50.45	-1.62	54.00	-5.17
2483.50	E	67.24	68.85	-1.62	74.00	-6.76

Operation Mode : 802.11n40 Test Date : 03/01/2016 14:03:38
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Edward
 EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL

Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
2483.50	E	43.45	45.06	-1.62	54.00	-10.55
2483.50	E	60.43	62.04	-1.62	74.00	-13.57

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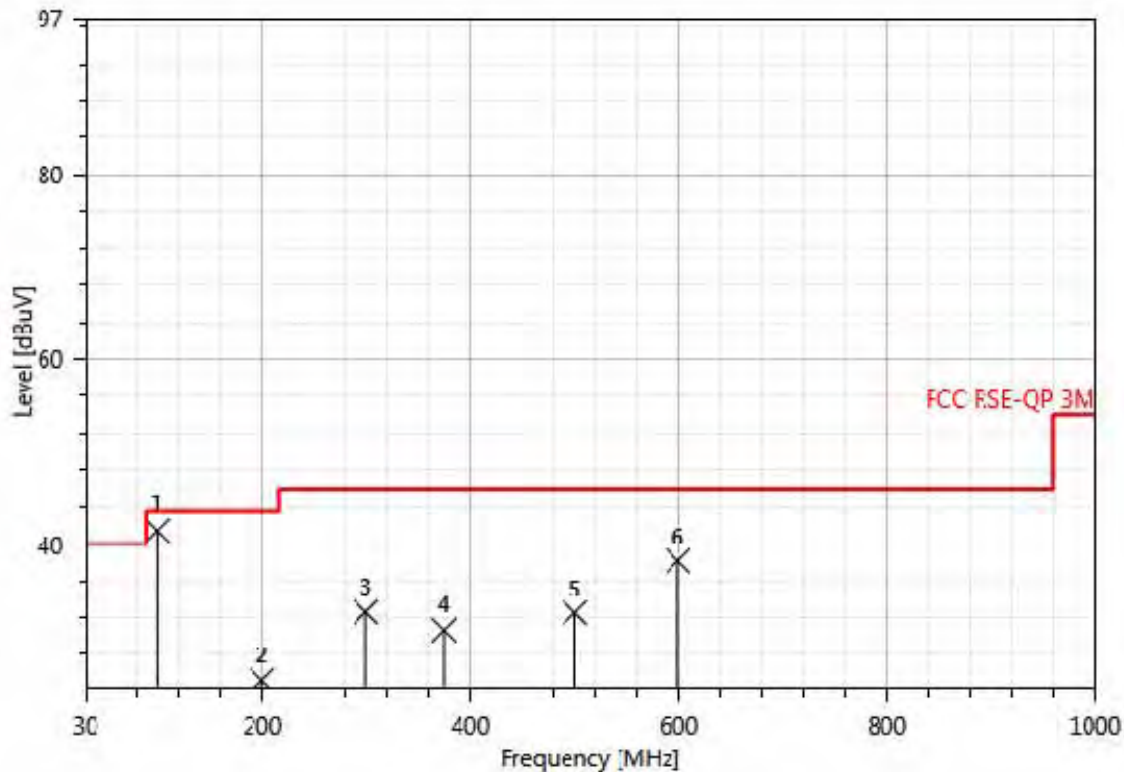
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Below 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	03/01/2016 22:37:23
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
99.84	S	41.44	54.11	-12.67	43.50	-2.06
199.75	S	25.22	34.82	-9.60	43.50	-18.28
299.66	S	32.59	38.52	-5.93	46.00	-13.41
374.35	S	30.64	35.17	-4.53	46.00	-15.36
500.45	S	32.52	35.20	-2.69	46.00	-13.48
599.39	S	38.14	38.41	-0.28	46.00	-7.86

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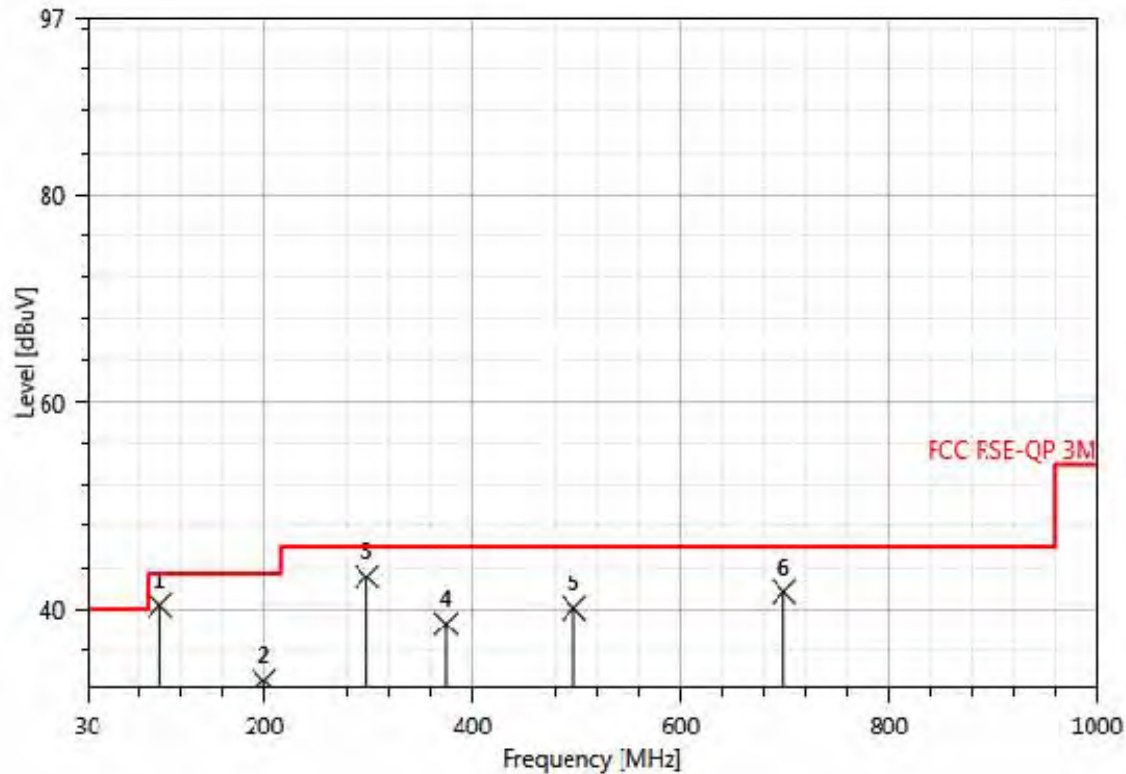
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Operation Mode :	802.11g	Test Date :	03/01/2016 23:02:45
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
99.84	S	40.39	53.06	-12.67	43.50	-3.11
199.75	S	33.14	42.74	-9.60	43.50	-10.36
298.69	S	43.14	49.09	-5.95	46.00	-2.86
374.35	S	38.57	43.11	-4.53	46.00	-7.43
497.54	S	40.10	42.49	-2.39	46.00	-5.90
699.30	S	41.65	40.21	1.44	46.00	-4.35

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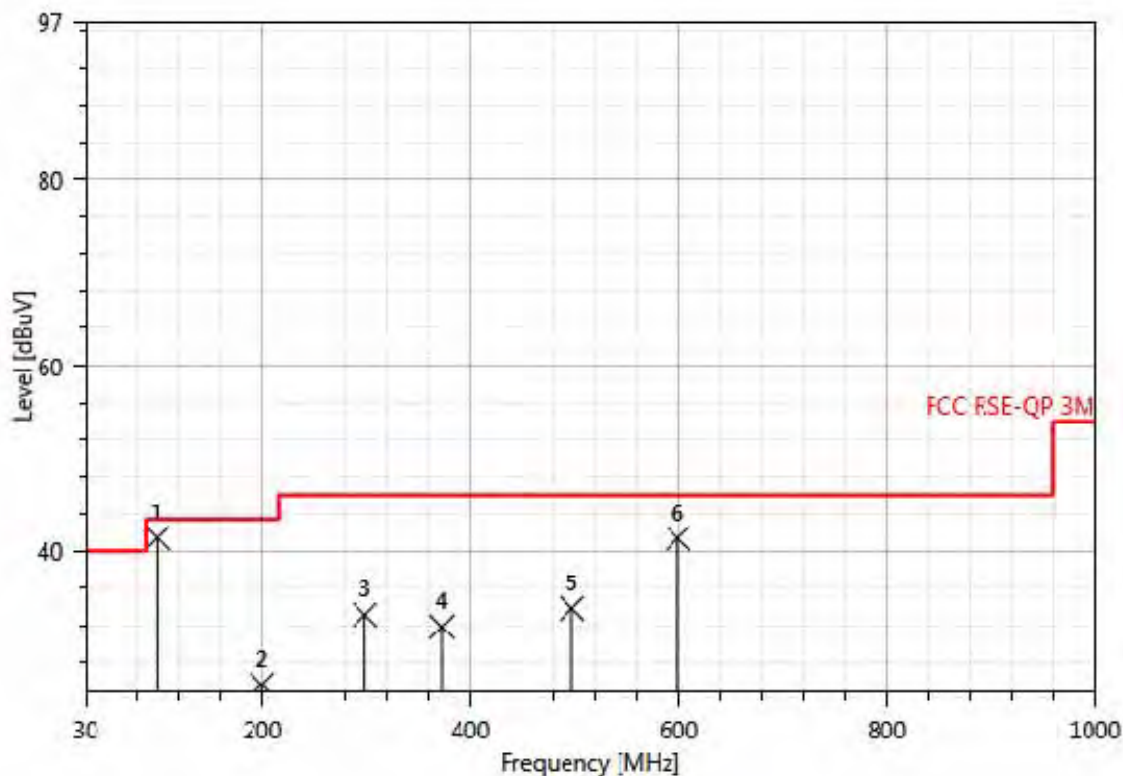
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Operation Mode : 802.11g Test Date : 03/01/2016 22:37:25
Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Tx CH MID Test Engineer : Tin
EUT Pol. : H Plane Measurement Antenna Pol. : VERTICAL



Freq. MHz	Note F/H/E/S	Emission Level dBuV/m	Spectrum Reading Level dBuV	Factor dB	Limit @ 3m dBuV/m	Margin dB
99.84	S	41.43	54.10	-12.67	43.50	-2.07
199.75	S	25.67	35.27	-9.60	43.50	-17.83
298.69	S	33.16	39.11	-5.95	46.00	-12.84
372.41	S	31.87	36.41	-4.53	46.00	-14.13
497.54	S	33.86	36.24	-2.39	46.00	-12.14
599.39	S	41.40	41.68	-0.28	46.00	-4.60

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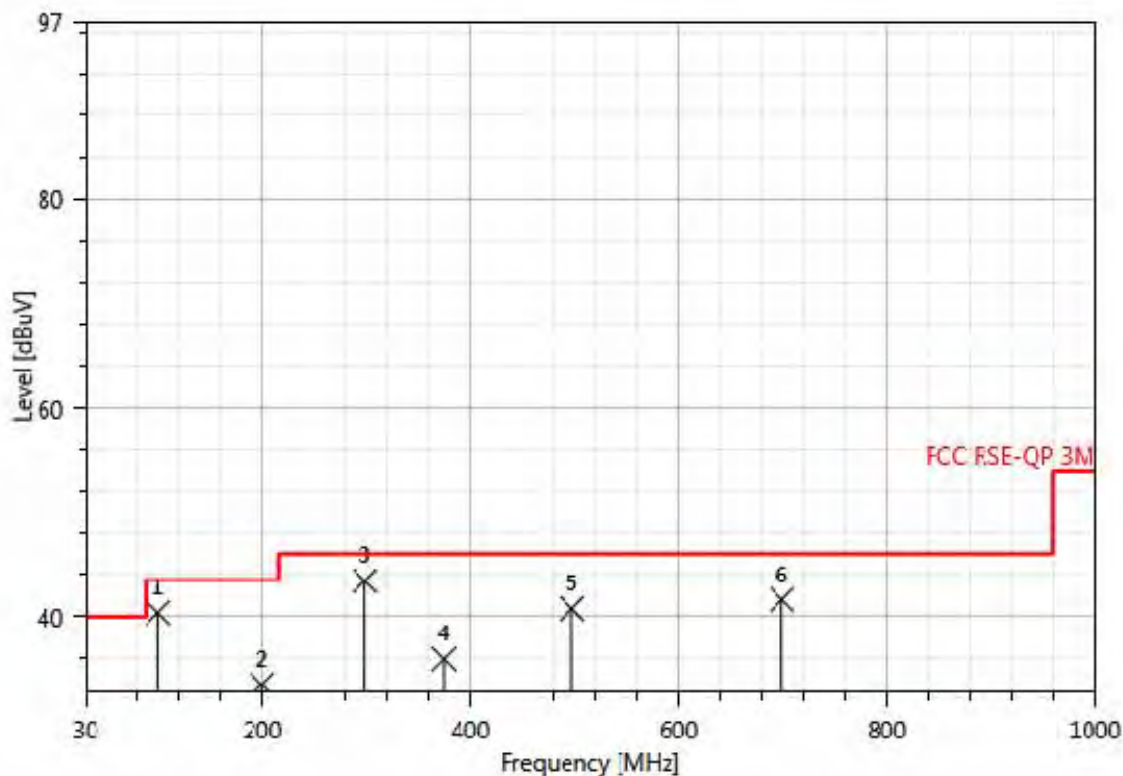
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Operation Mode : 802.11g Test Date : 03/01/2016 23:02:48
Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Tx CH MID Test Engineer : Tin
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL



Freq. MHz	Note F/H/E/S	Emission Level dBuV/m	Spectrum Reading Level dBuV	Factor dB	Limit @ 3m dBuV/m	Margin dB
99.84	S	40.36	53.03	-12.67	43.50	-3.14
199.75	S	33.49	43.09	-9.60	43.50	-10.01
298.69	S	43.42	49.37	-5.95	46.00	-2.58
374.35	S	35.93	40.46	-4.53	46.00	-10.07
497.54	S	40.75	43.14	-2.39	46.00	-5.25
699.30	S	41.61	40.17	1.44	46.00	-4.39

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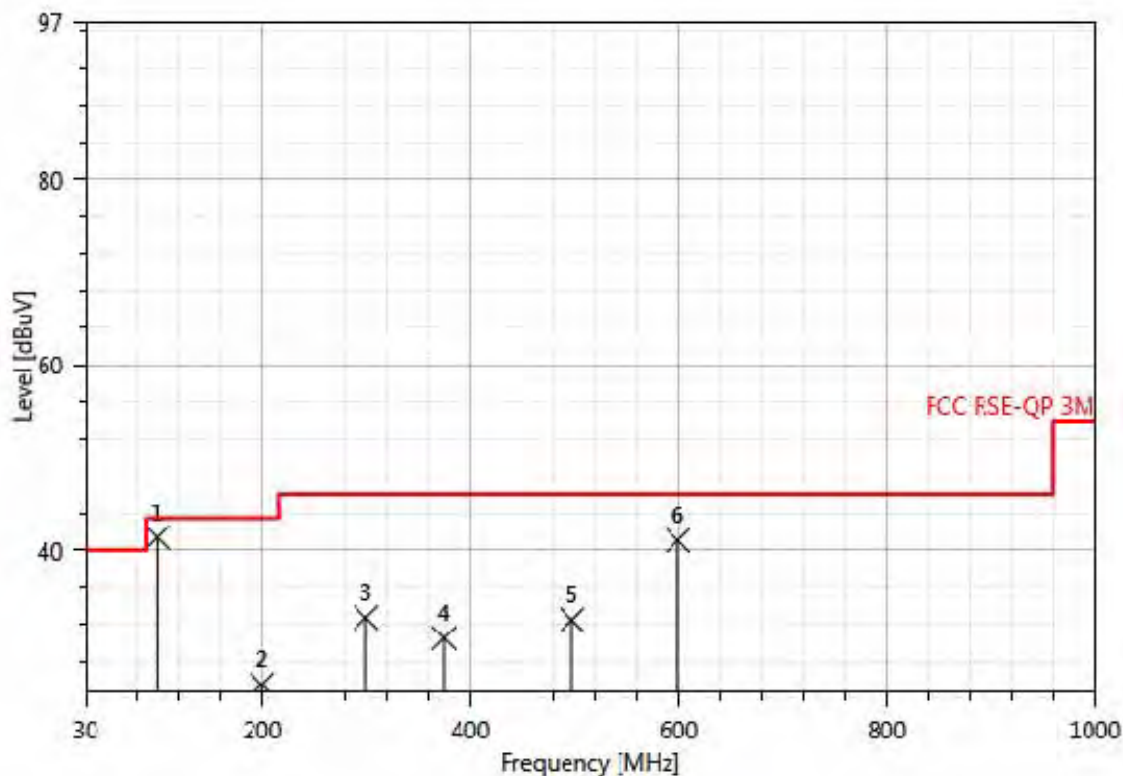
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Operation Mode :	802.11g	Test Date :	03/01/2016 22:37:27
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
99.84	S	41.38	54.05	-12.67	43.50	-2.12
199.75	S	25.54	35.14	-9.60	43.50	-17.96
299.66	S	32.75	38.68	-5.93	46.00	-13.25
374.35	S	30.53	35.06	-4.53	46.00	-15.47
497.54	S	32.49	34.88	-2.39	46.00	-13.51
599.39	S	41.04	41.32	-0.28	46.00	-4.96

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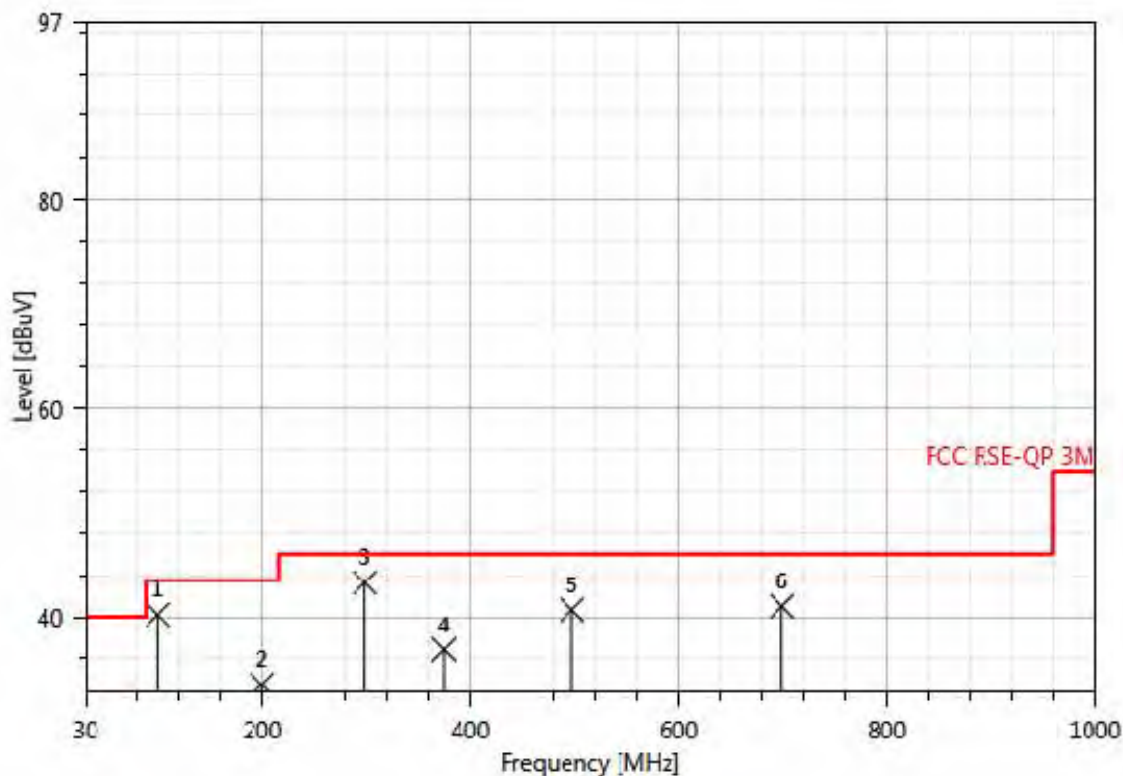
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Operation Mode :	802.11g	Test Date :	03/01/2016 23:02:51
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq. MHz	Note F/H/E/S	Emission Level dBuV/m	Spectrum Reading Level dBuV	Factor dB	Limit @ 3m dBuV/m	Margin dB
99.84	S	40.22	52.89	-12.67	43.50	-3.28
199.75	S	33.54	43.14	-9.60	43.50	-9.96
298.69	S	43.29	49.24	-5.95	46.00	-2.71
374.35	S	36.85	41.38	-4.53	46.00	-9.15
497.54	S	40.68	43.07	-2.39	46.00	-5.32
699.30	S	41.02	39.58	1.44	46.00	-4.98

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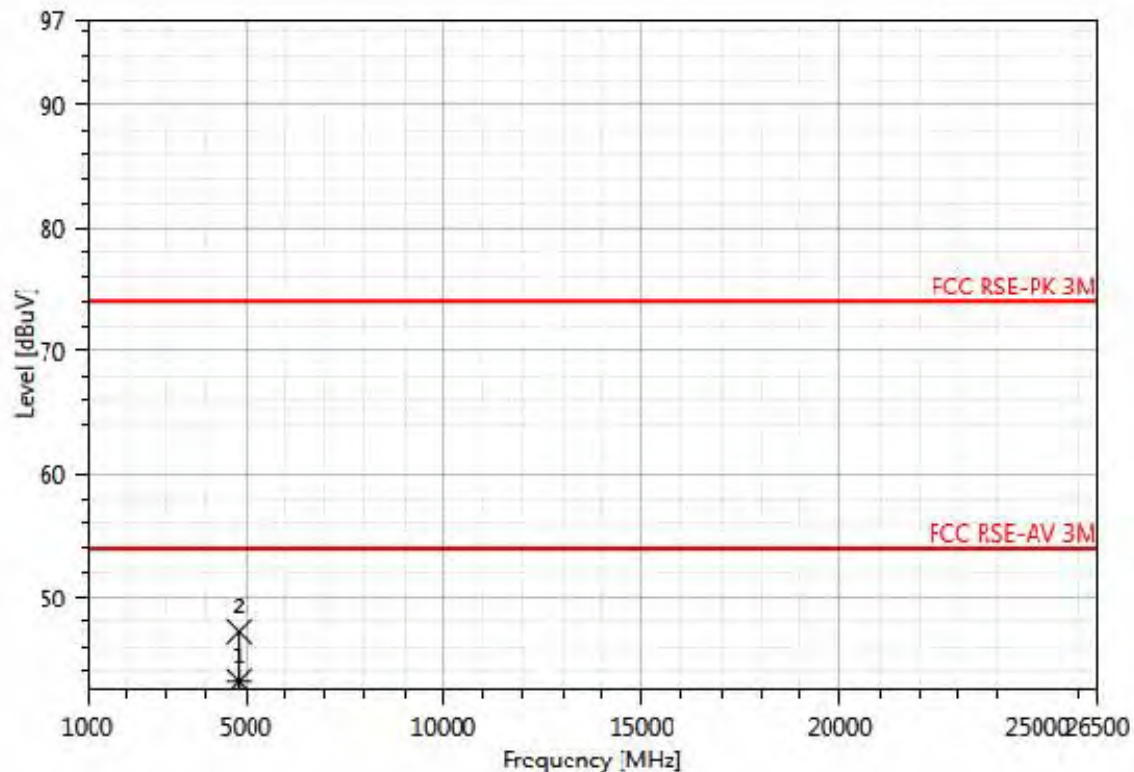
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Above 1GHz Data:

Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode :	802.11b	Test Date :	03/01/2016 09:59:19
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4824.00	H	43.13	38.19	4.94	54.00	-10.87
4824.00	H	47.18	42.24	4.94	74.00	-26.82

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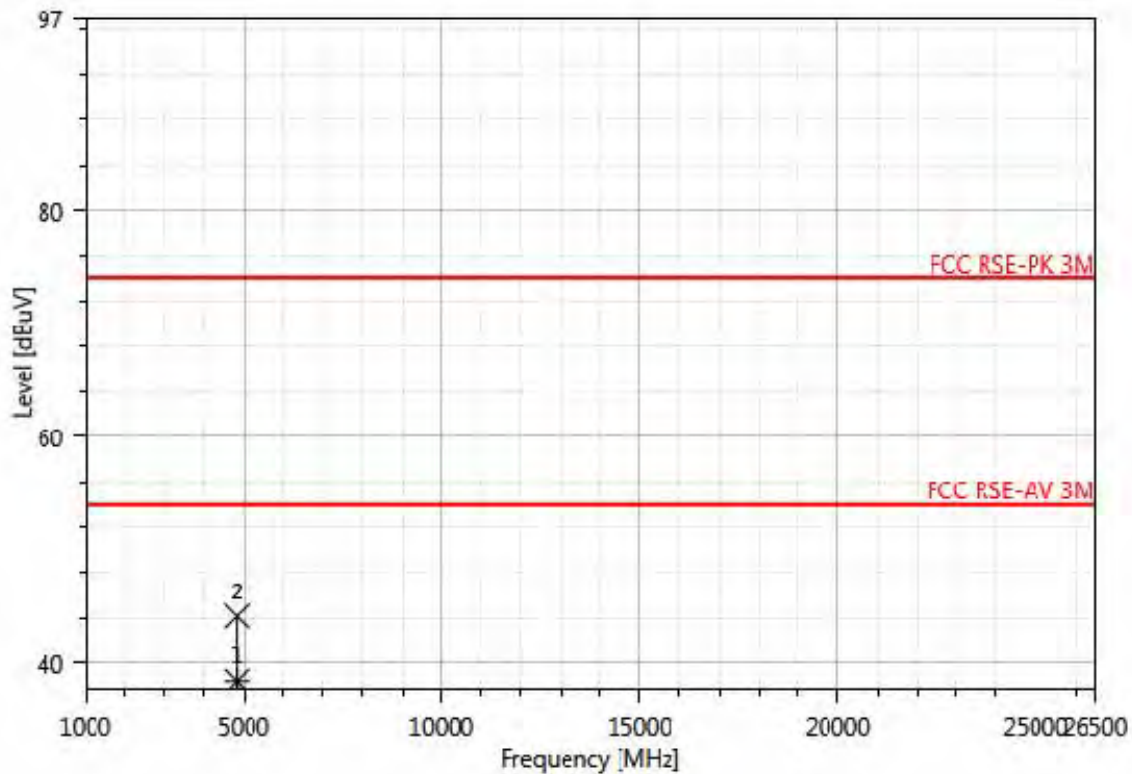
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Operation Mode :	802.11b	Test Date :	03/01/2016 10:03:56
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4824.00	H	38.41	33.47	4.94	54.00	-15.59
4824.00	H	44.15	39.21	4.94	74.00	-29.85

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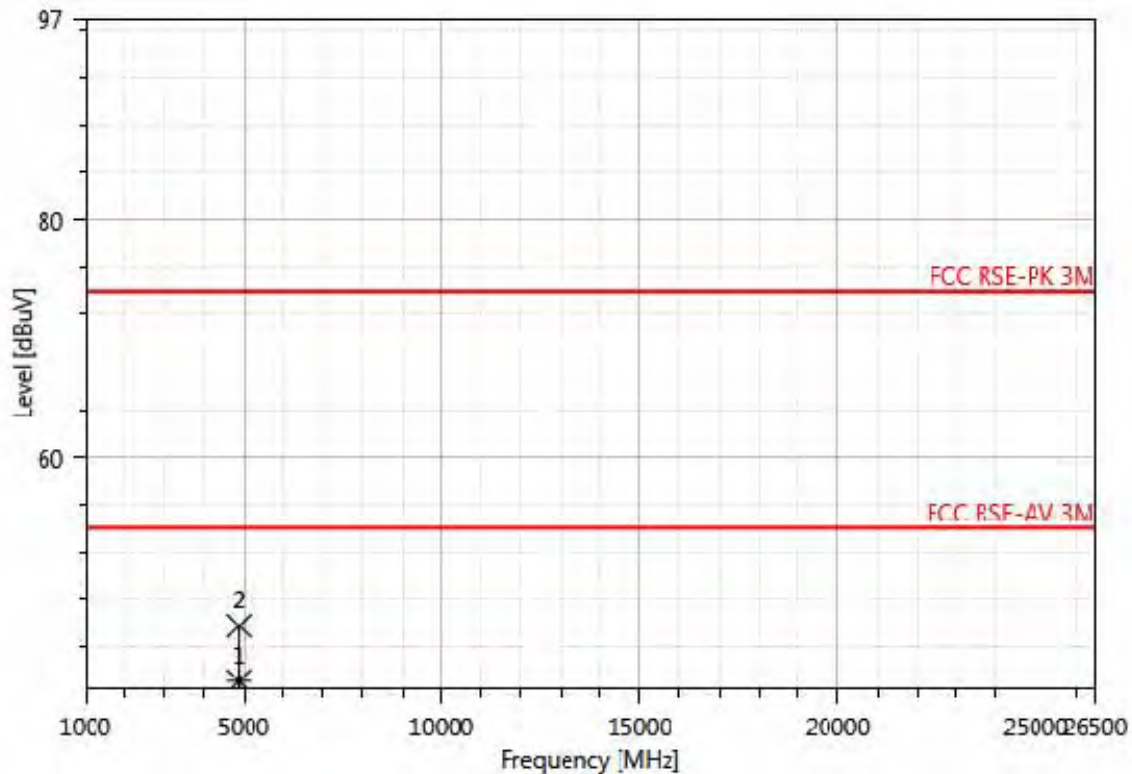
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Operation Mode :	802.11b	Test Date :	03/01/2016 10:11:34
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4874.00	H	41.10	35.97	5.13	54.00	-12.90
4874.00	H	45.78	40.65	5.13	74.00	-28.22

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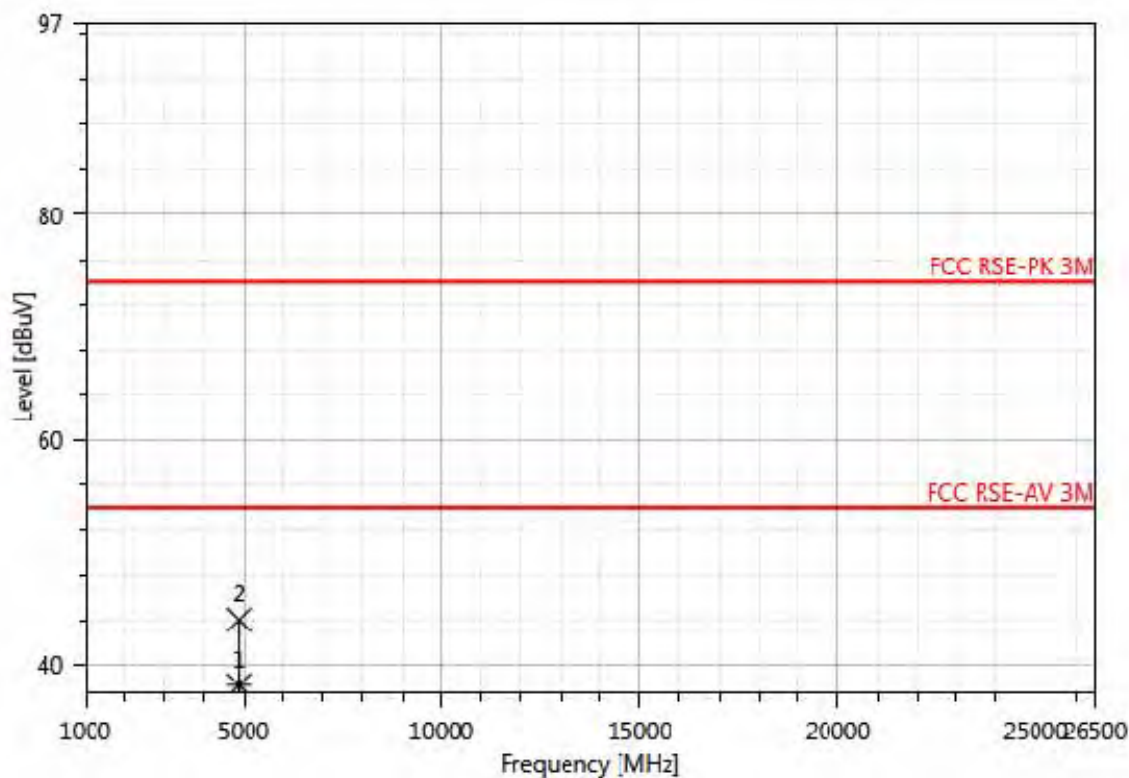
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Operation Mode : 802.11b Test Date : 03/01/2016 10:15:54
Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Tx CH MID Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4874.00	H	38.19	33.05	5.13	54.00	-15.81
4874.00	H	44.01	38.87	5.13	74.00	-29.99

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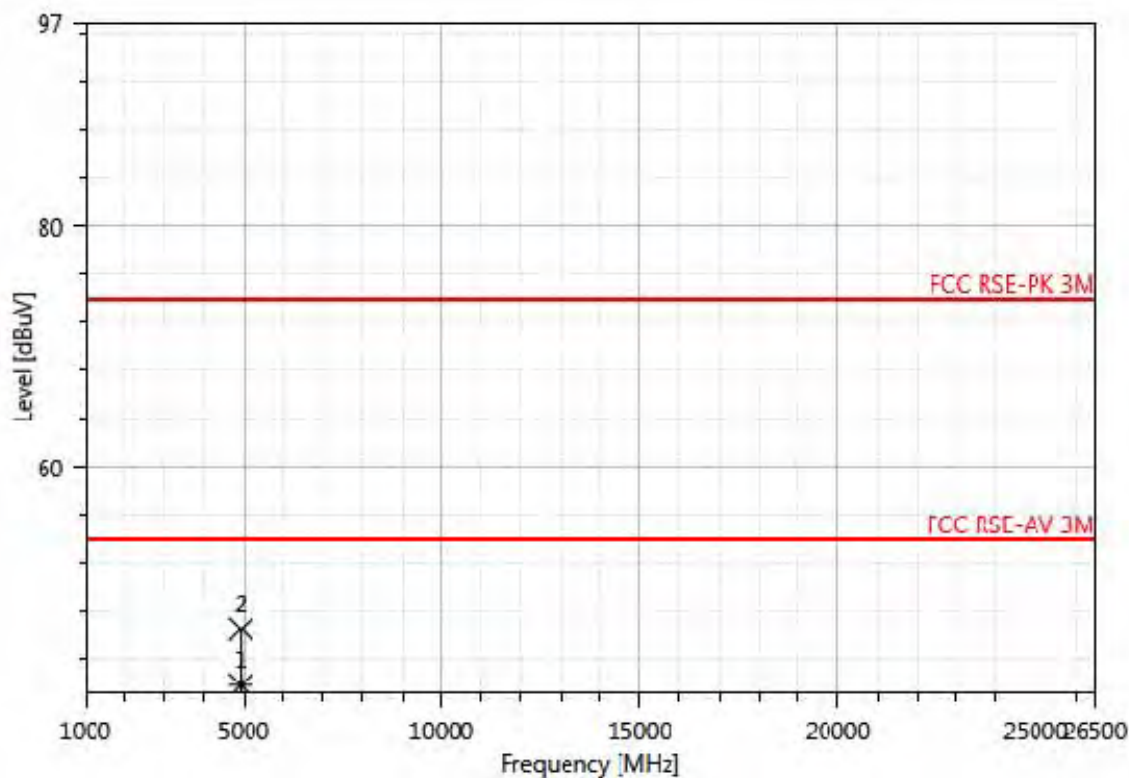
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Operation Mode :	802.11b	Test Date :	03/01/2016 10:23:28
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4924.00	H	41.88	36.63	5.25	54.00	-12.12
4924.00	H	46.56	41.31	5.25	74.00	-27.44

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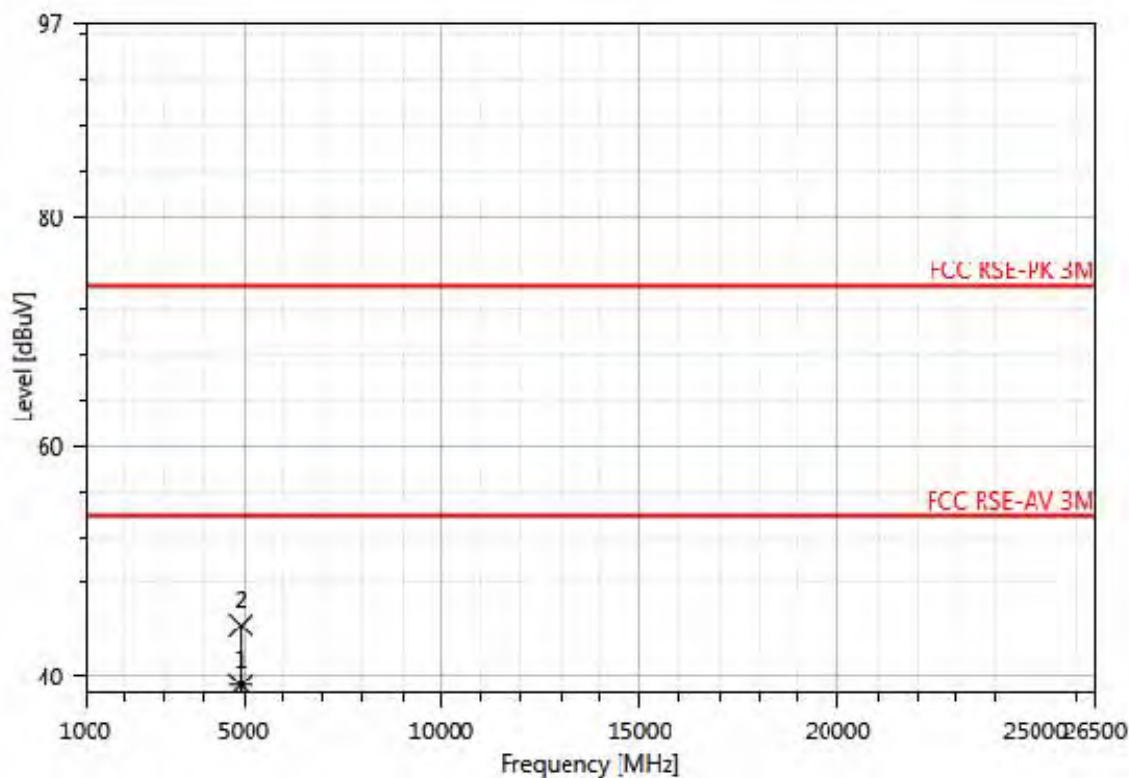
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Operation Mode : 802.11b Test Date : 03/01/2016 10:27:15
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Tx CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4924.00	H	39.13	33.88	5.25	54.00	-14.87
4924.00	H	44.36	39.11	5.25	74.00	-29.64

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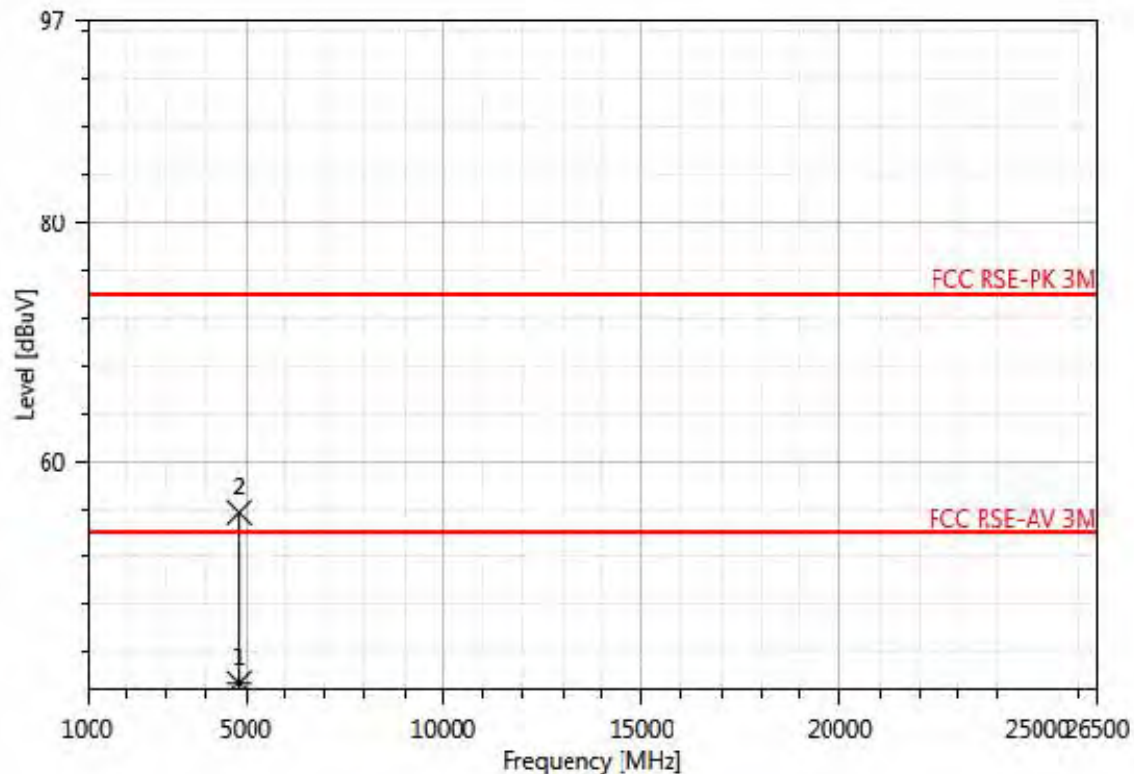
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Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	03/01/2016 10:35:18
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4824.00	H	41.47	36.53	4.94	54.00	-12.53
4824.00	H	55.75	50.80	4.94	74.00	-18.25

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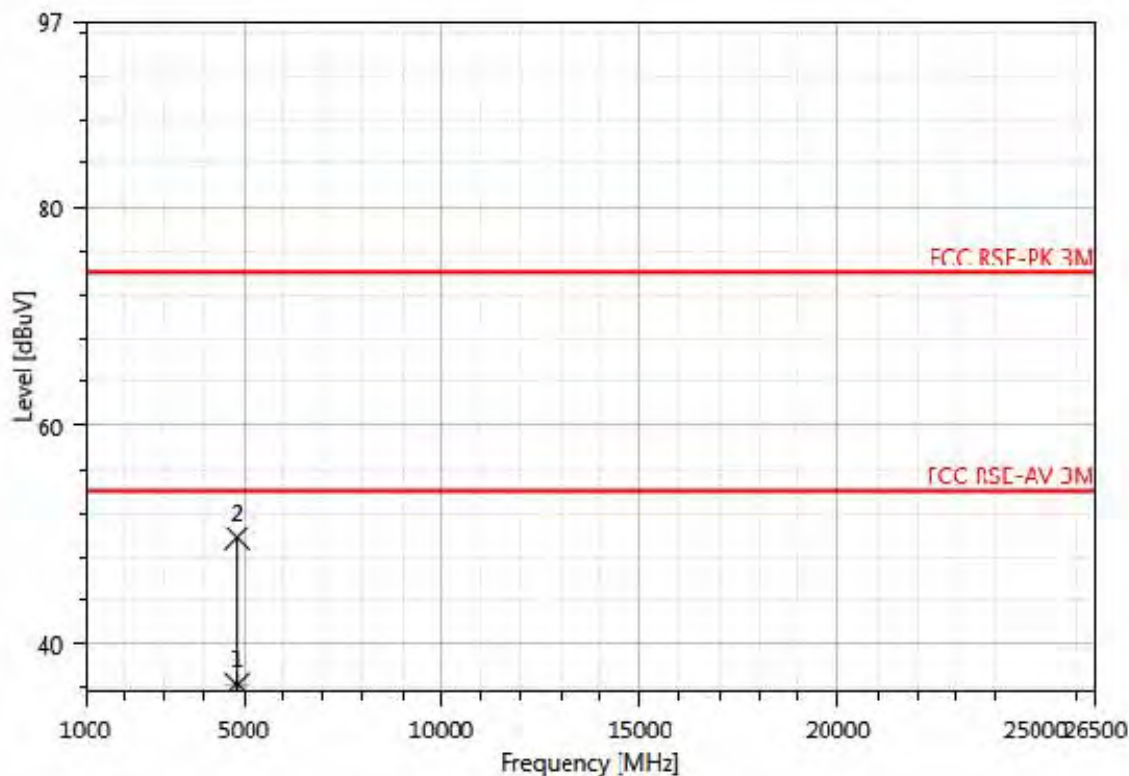
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Operation Mode :	802.11g	Test Date :	03/01/2016 10:40:44
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4824.00	H	36.33	31.39	4.94	54.00	-17.67
4824.00	H	49.71	44.77	4.94	74.00	-24.29

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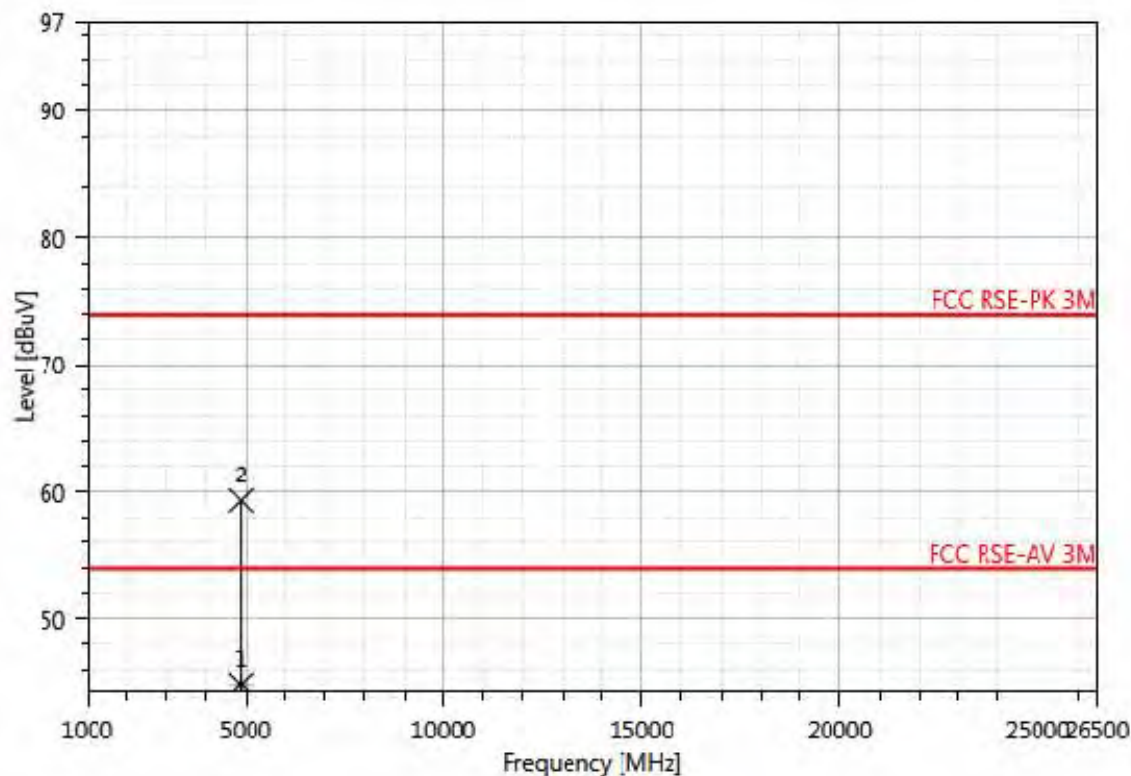
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Operation Mode :	802.11g	Test Date :	03/01/2016 10:57:39
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4874.00	H	44.83	39.70	5.13	54.00	-9.17
4874.00	H	59.31	54.18	5.13	74.00	-14.69

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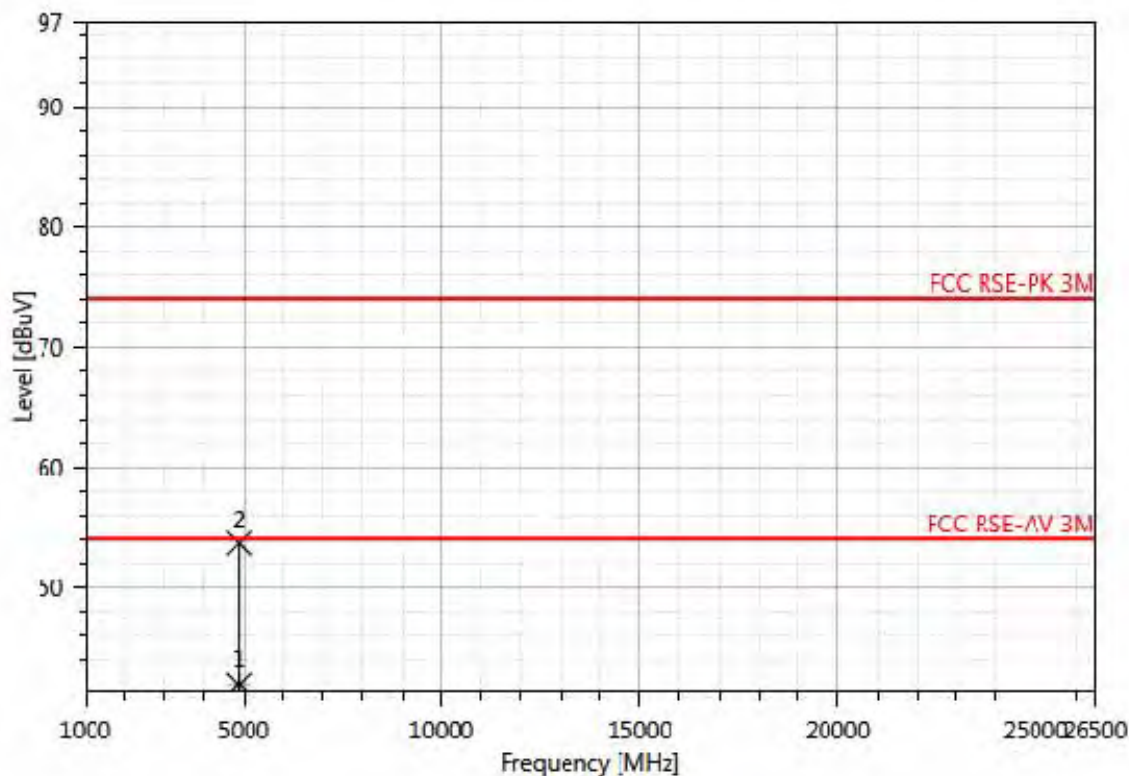
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Operation Mode :	802.11g	Test Date :	03/01/2016 10:53:53
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4874.00	H	41.94	36.81	5.13	54.00	-12.06
4874.00	H	53.66	48.52	5.13	74.00	-20.34

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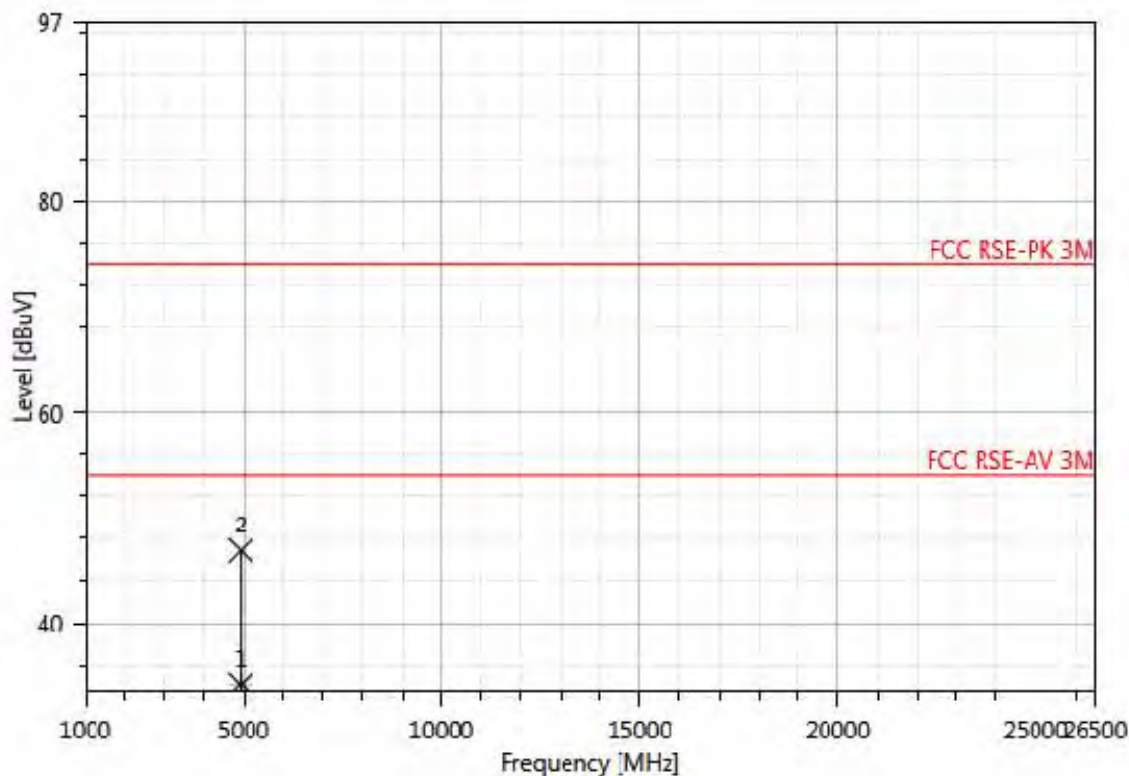
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Operation Mode :	802.11g	Test Date :	03/01/2016 11:06:41
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4924.00	H	34.19	28.94	5.25	54.00	-19.81
4924.00	H	46.88	41.63	5.25	74.00	-27.12

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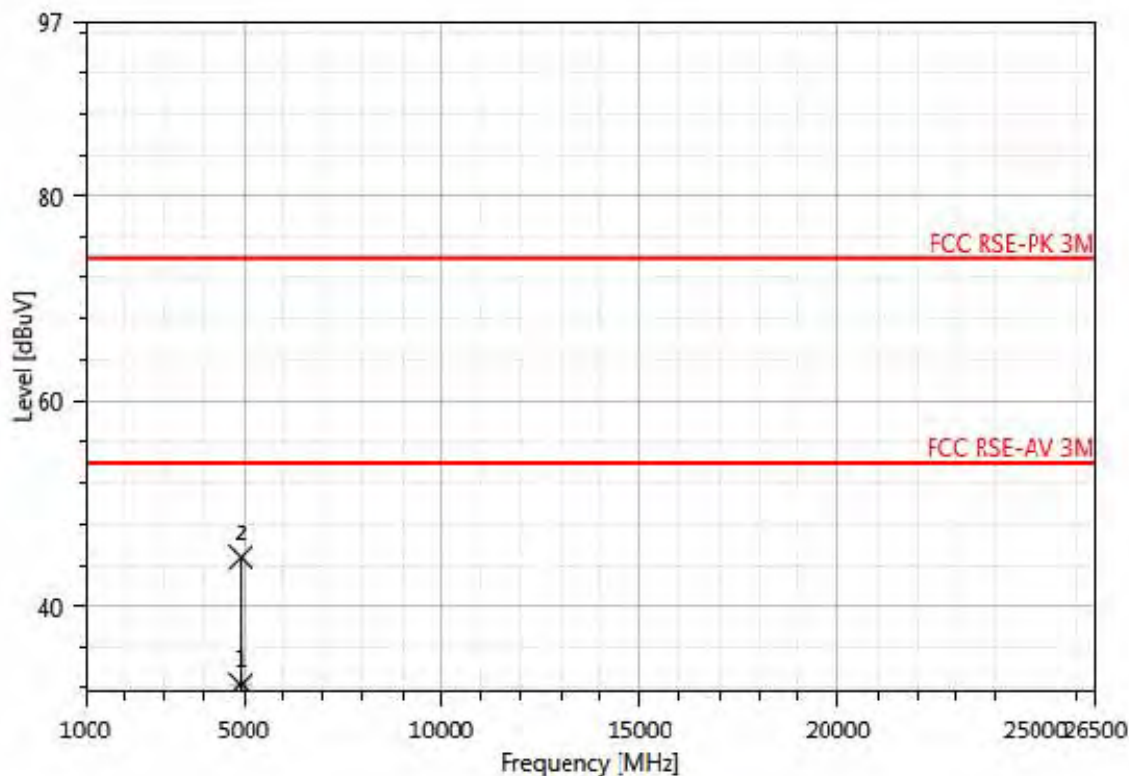
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Operation Mode :	802.11g	Test Date :	03/01/2016 11:16:19
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4924.00	H	32.35	27.10	5.25	54.00	-21.65
4924.00	H	44.76	39.51	5.25	74.00	-29.24

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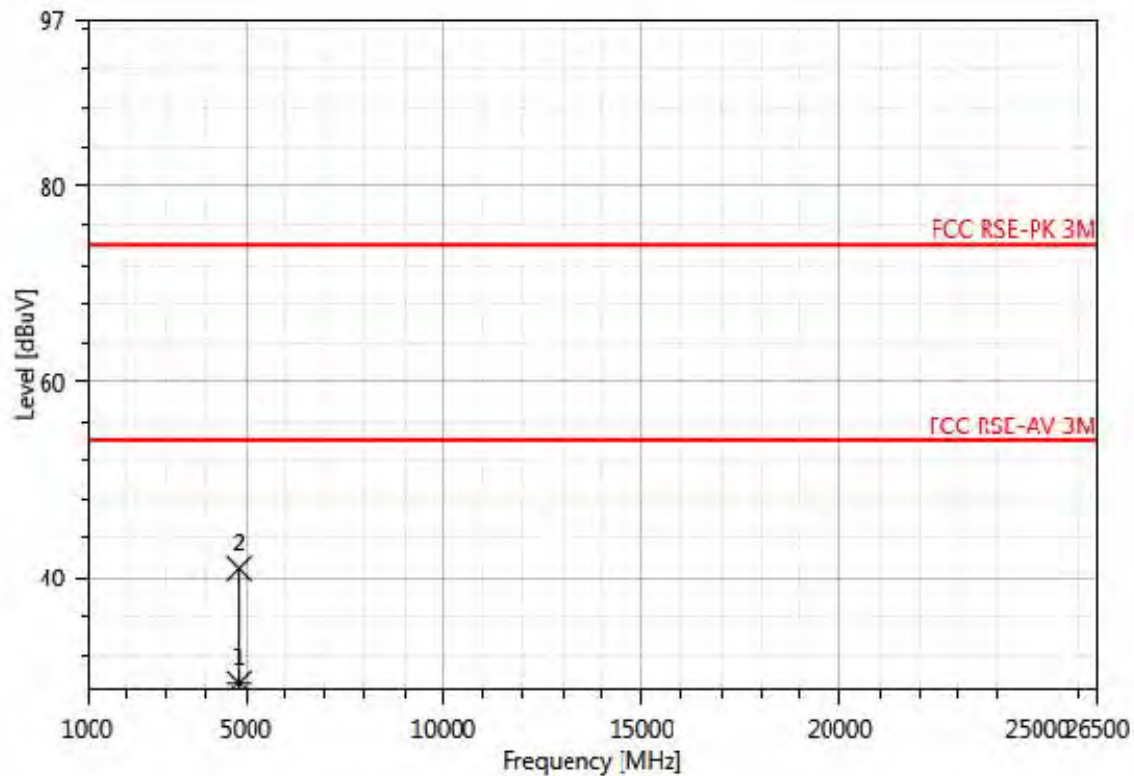
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Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Mode :	802.11n20	Test Date :	03/01/2016 11:24:55
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4824.00	H	29.24	24.30	4.94	54.00	-24.76
4824.00	H	40.95	36.01	4.94	74.00	-33.05

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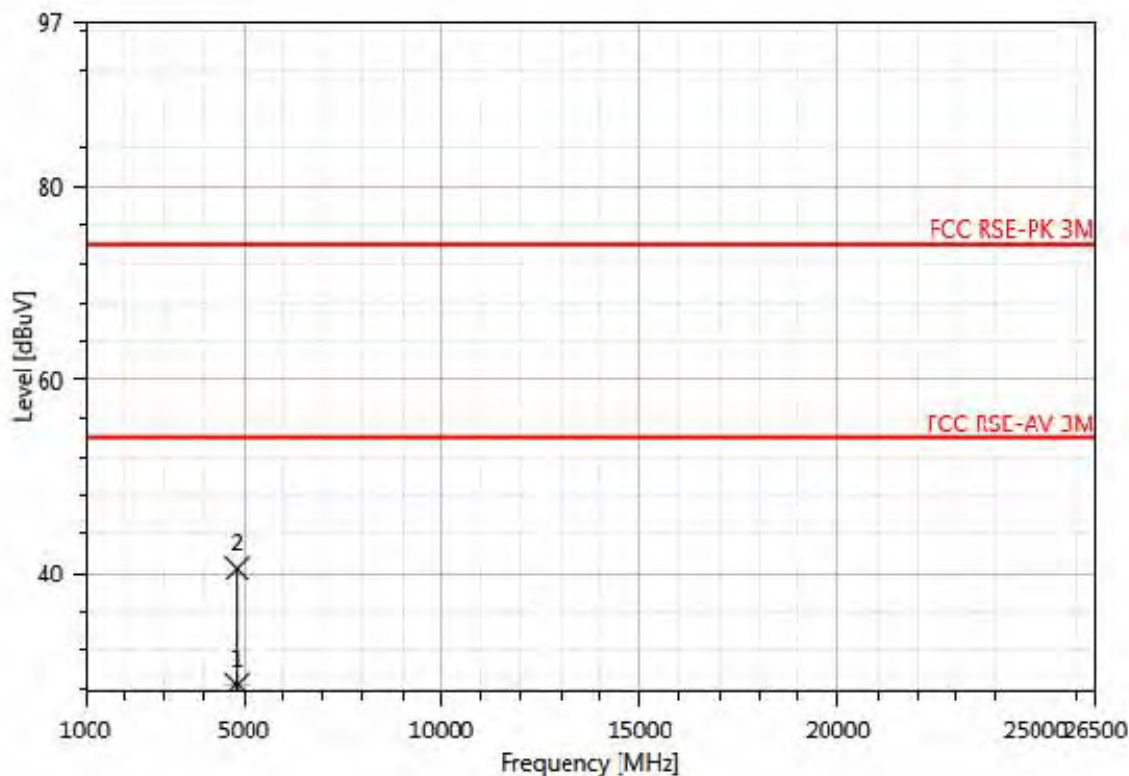
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Operation Mode : 802.11n20
 Fundamental Frequency : 2412 MHz
 Operation Band : Tx CH LOW
 EUT Pol. : H Plane

Test Date : 03/01/2016 11:29:45
 Temp. / Humi. : 21 deg_C / 61 RH
 Test Engineer : Edward
 Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4824.00	H	28.50	23.56	4.94	54.00	-25.50
4824.00	H	40.52	35.58	4.94	74.00	-33.48

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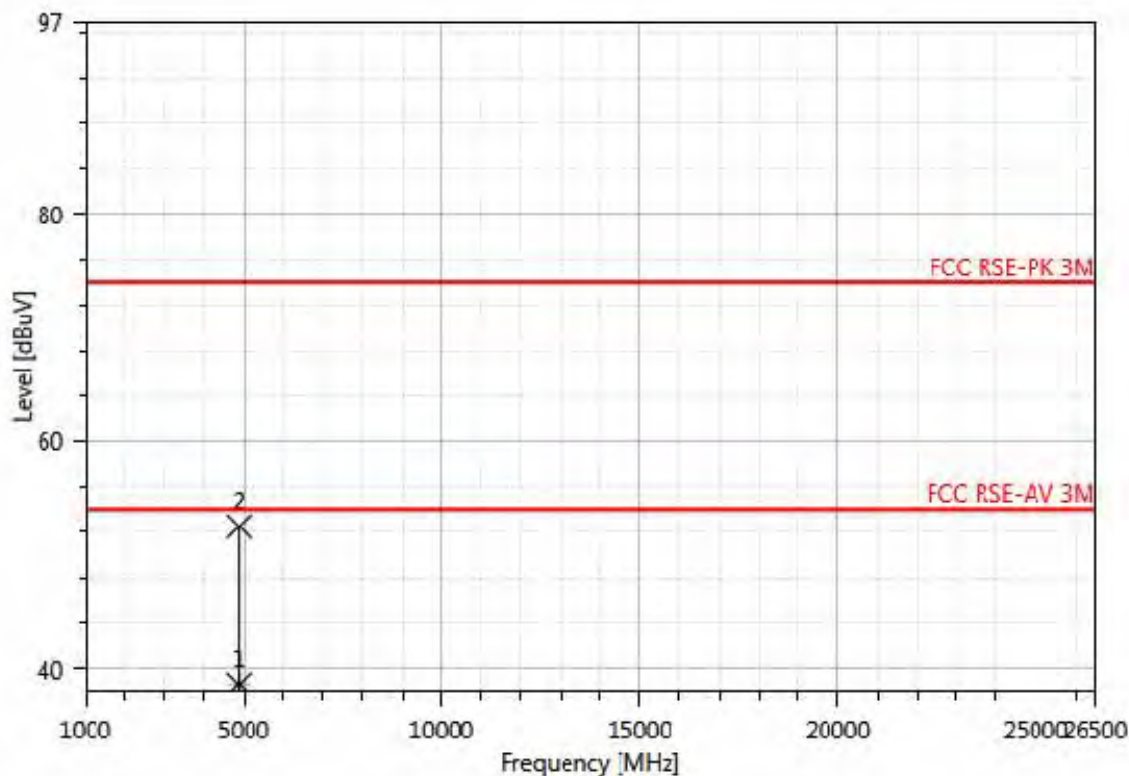
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Operation Mode :	802.11n20	Test Date :	03/01/2016 11:38:22
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4874.00	H	38.56	33.42	5.13	54.00	-15.44
4874.00	H	52.49	47.35	5.13	74.00	-21.51

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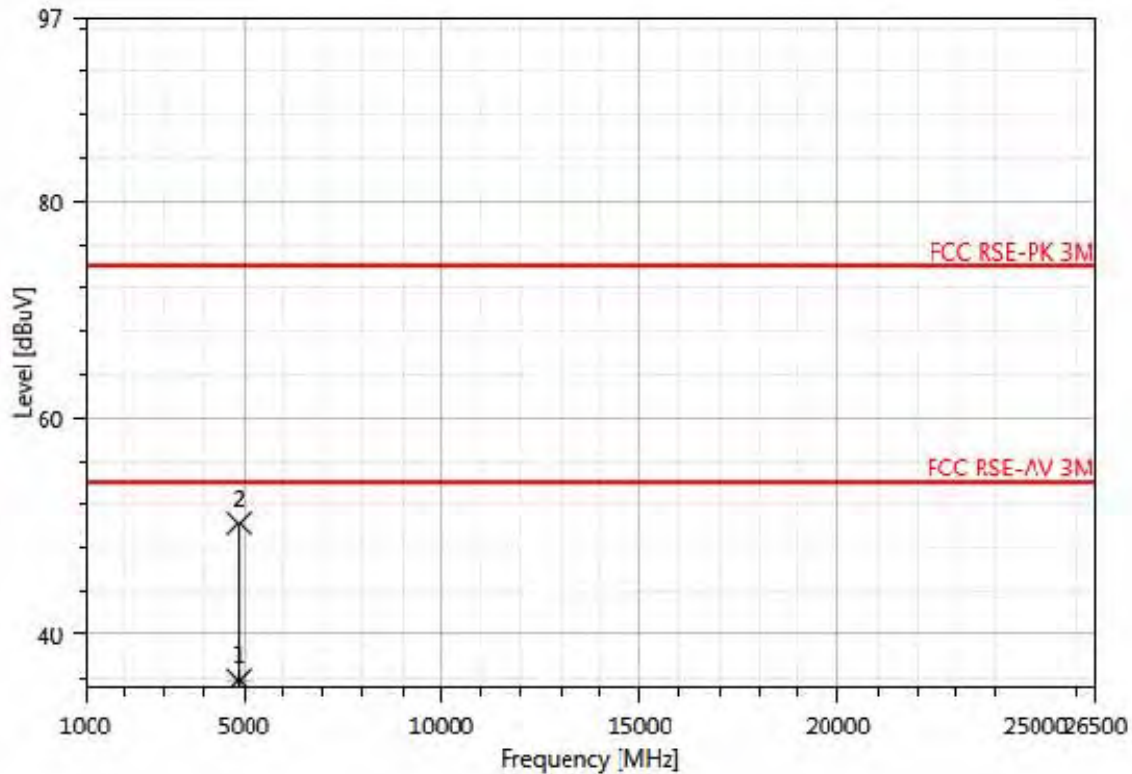
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Operation Mode :	802.11n20	Test Date :	03/01/2016 11:43:07
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4874.00	H	35.72	30.59	5.13	54.00	-18.28
4874.00	H	50.25	45.12	5.13	74.00	-23.75

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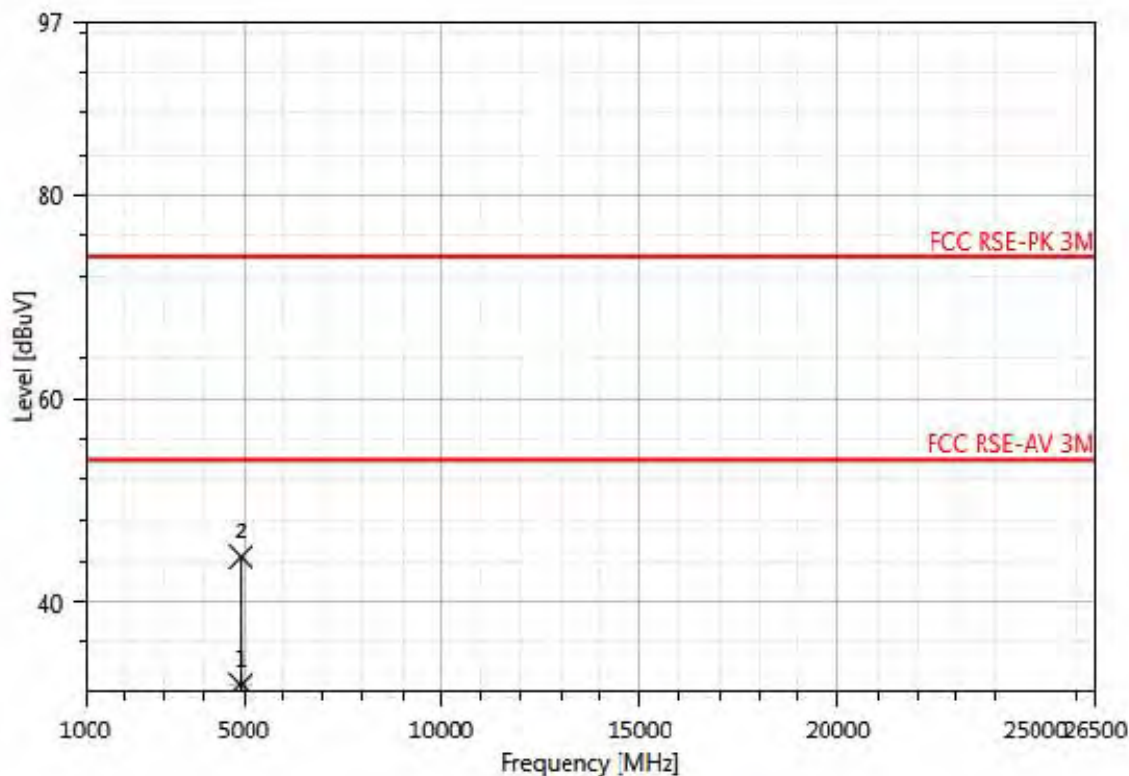
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Operation Mode :	802.11n20	Test Date :	03/01/2016 16:53:41
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4924.00	H	31.92	26.67	5.25	54.00	-22.08
4924.00	H	44.46	39.21	5.25	74.00	-29.54

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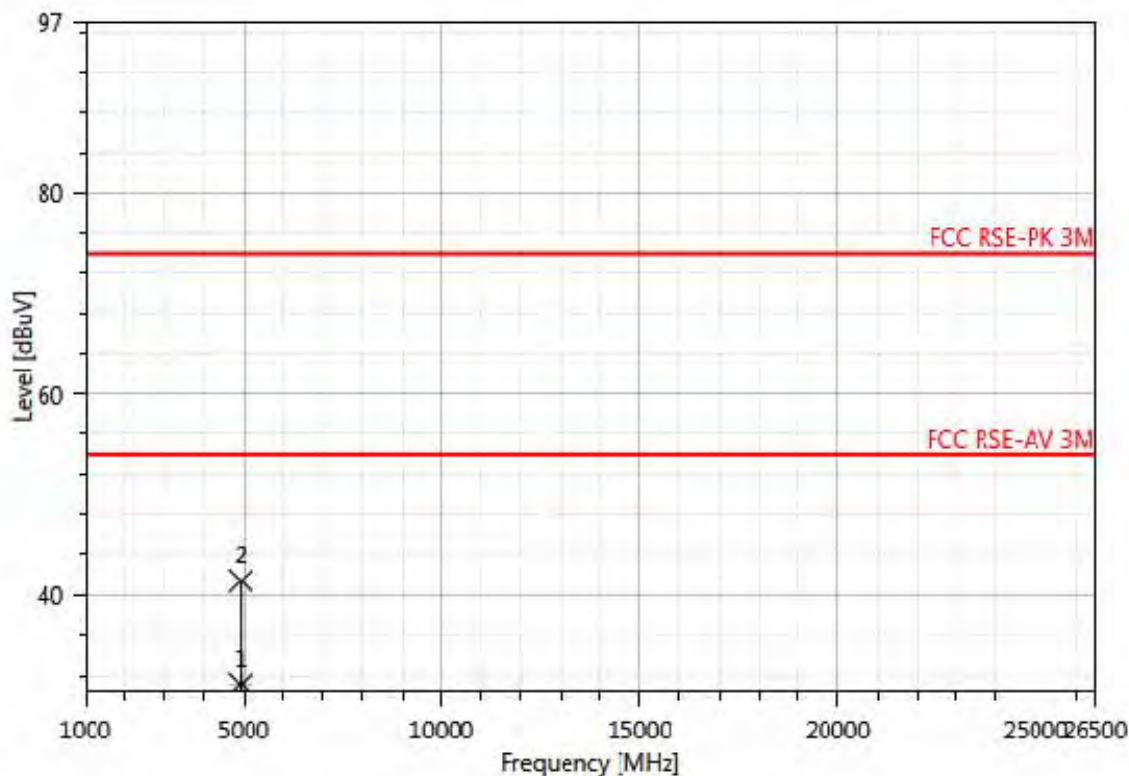
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Operation Mode : 802.11n20 Test Date : 03/01/2016 16:56:30
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 61 RH
Operation Band : Tx CH HIGH Test Engineer : Edward
EUT Pol. : H Plane Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4924.00	H	31.10	25.85	5.25	54.00	-22.90
4924.00	H	41.41	36.16	5.25	74.00	-32.59

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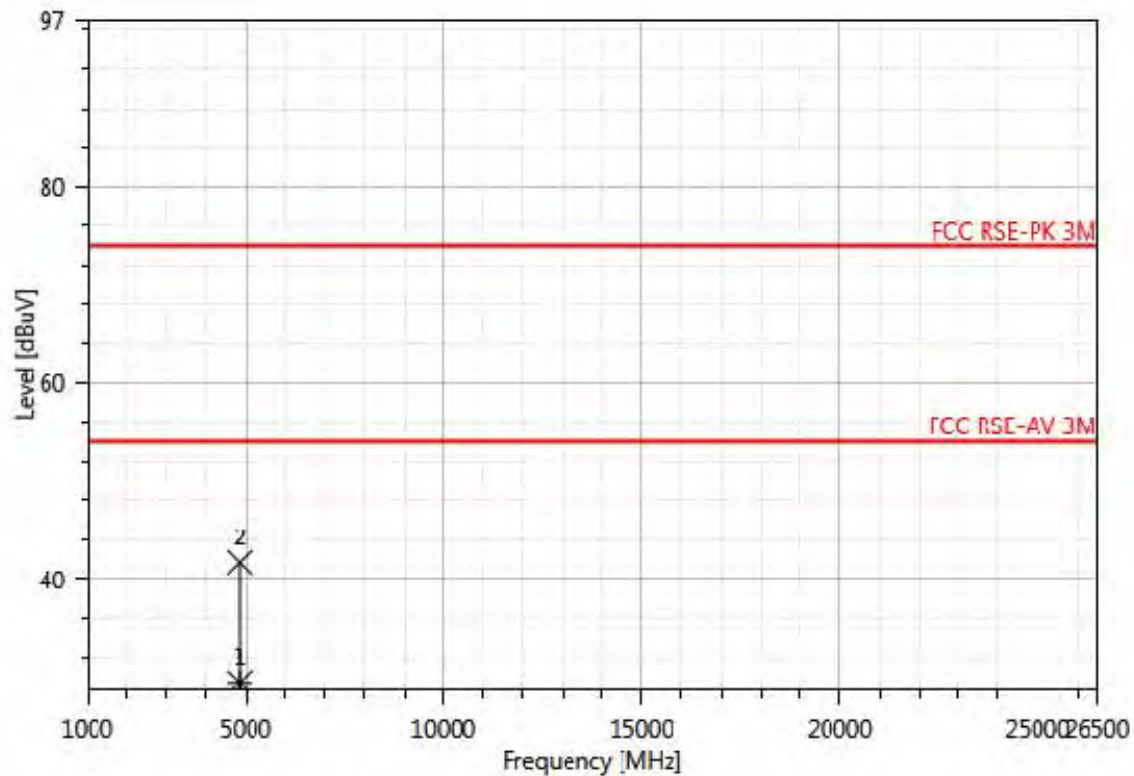
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Radiated Spurious Emission Measurement Result (802.11_HT40)

Operation Mode :	802.11n40	Test Date :	03/01/2016 17:01:41
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission Level	Spectrum Reading Level	Factor	Limit @ 3m	Margin
MHz	F/H/E/S	dBuV/m	dBuV	dB	dBuV/m	dB
4844.00	H	29.43	24.46	4.97	54.00	-24.57
4844.00	H	41.69	36.72	4.97	74.00	-32.31

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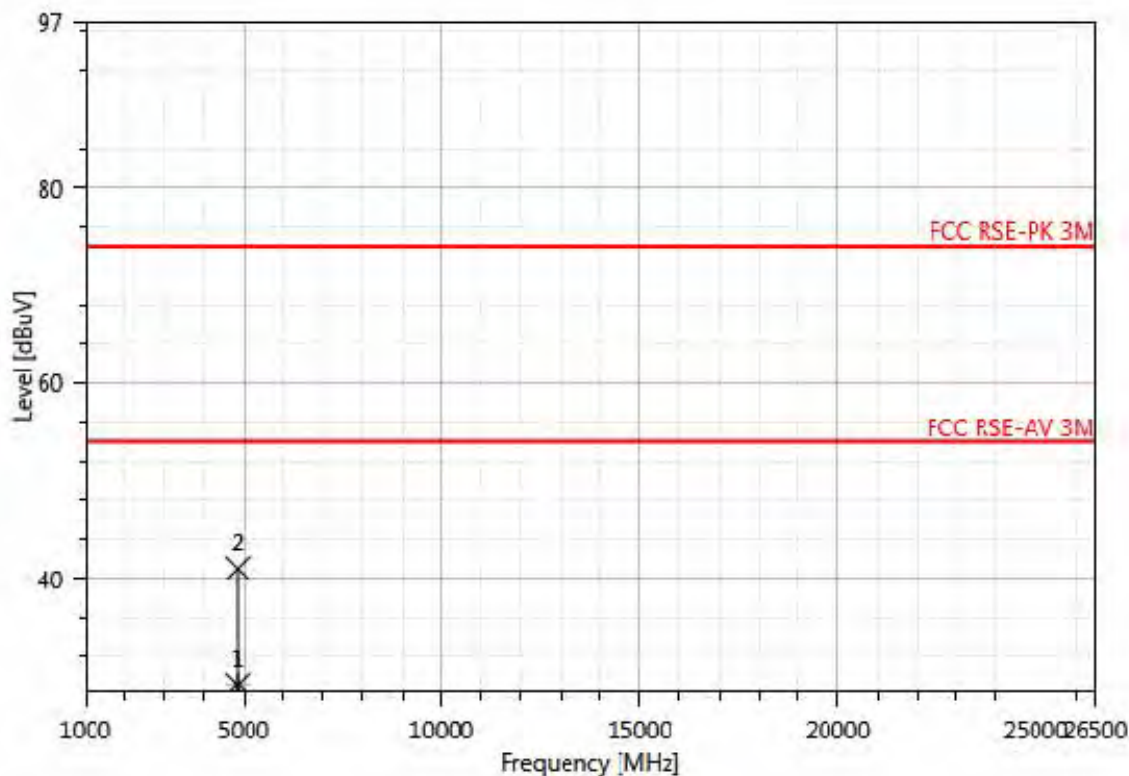
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Operation Mode :	802.11n40	Test Date :	03/01/2016 17:04:19
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH LOW	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4844.00	H	29.13	24.16	4.97	54.00	-24.87
4844.00	H	41.01	36.04	4.97	74.00	-32.99

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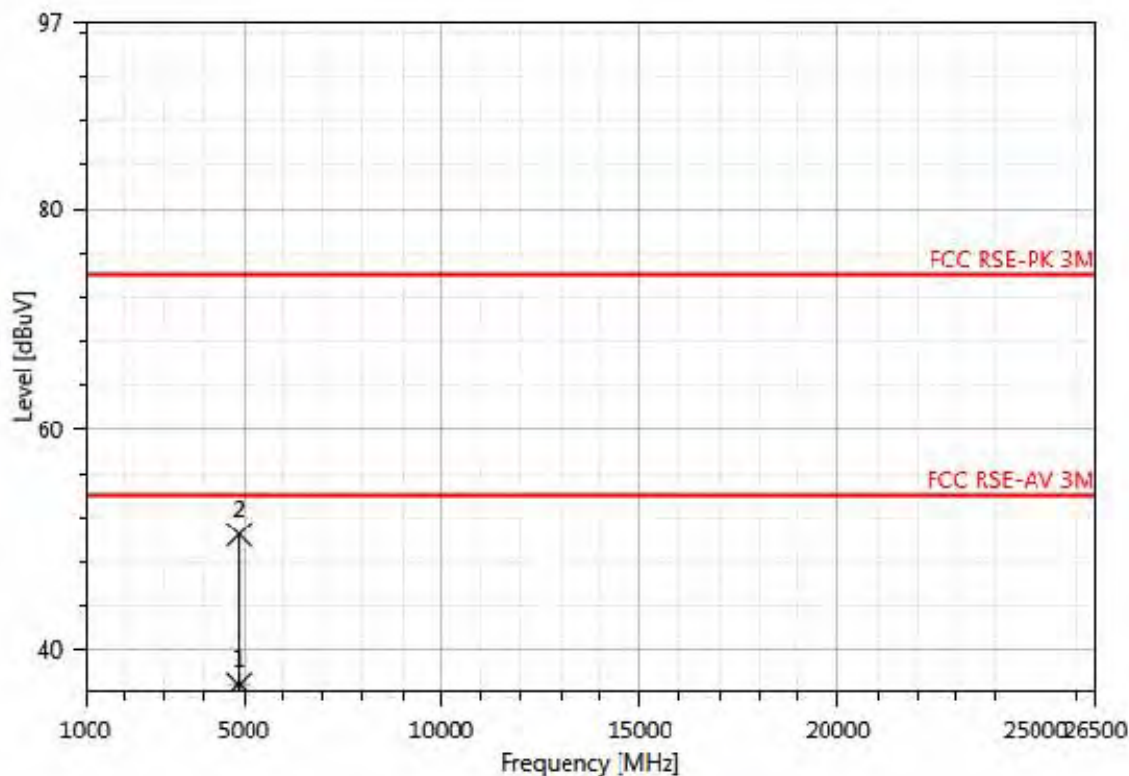
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Operation Mode :	802.11n40	Test Date :	03/01/2016 17:10:13
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4874.00	H	36.85	31.72	5.13	54.00	-17.15
4874.00	H	50.45	45.32	5.13	74.00	-23.55

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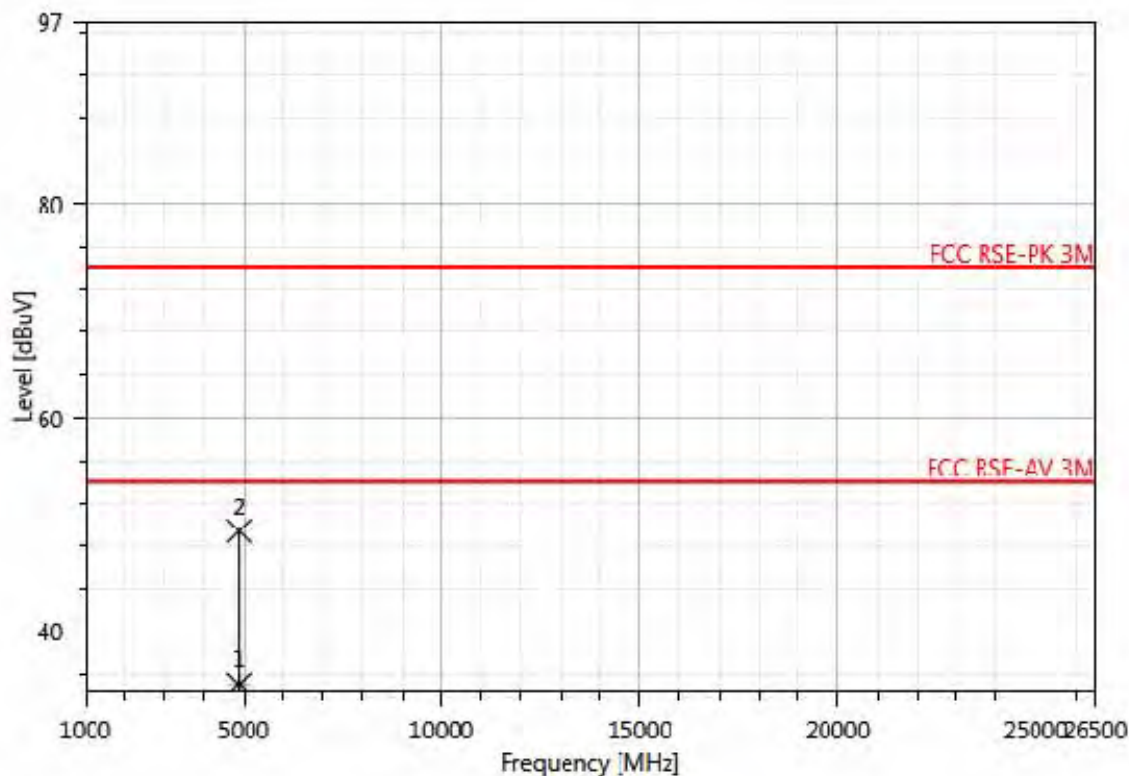
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Operation Mode :	802.11n40	Test Date :	03/01/2016 17:13:15
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH MID	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@ 3m dBuV/m	dB
4874.00	H	35.09	29.96	5.13	54.00	-18.91
4874.00	H	49.42	44.29	5.13	74.00	-24.58

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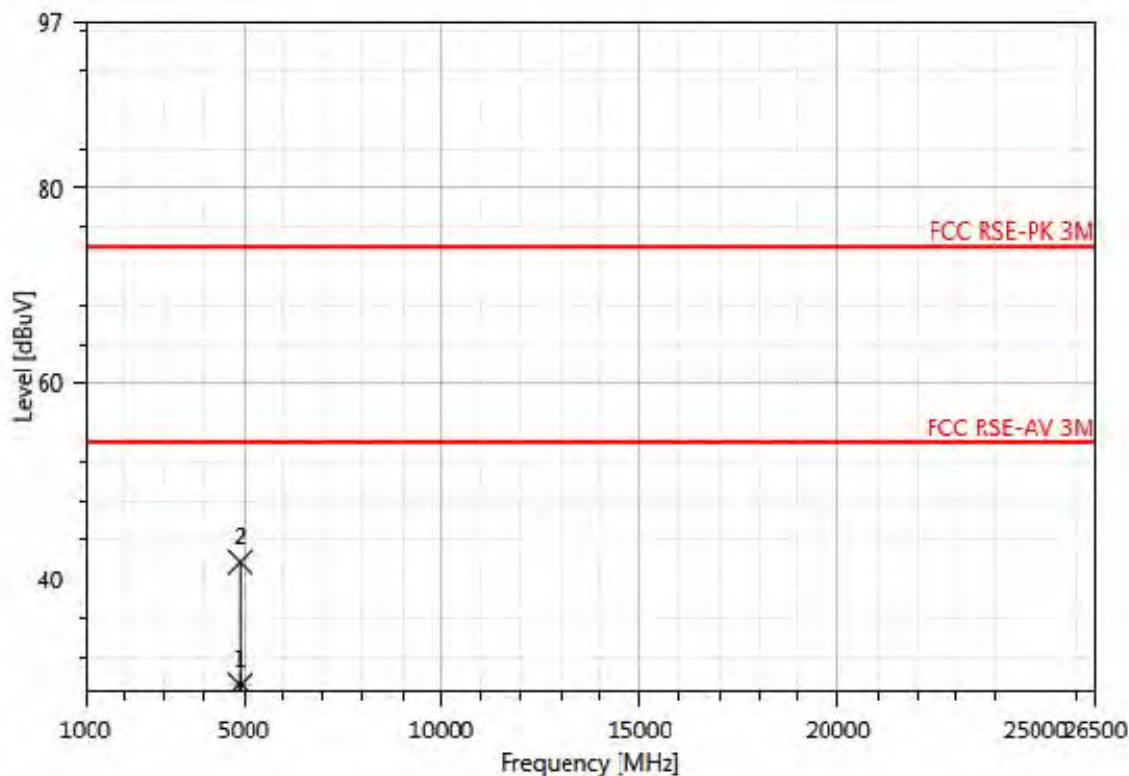
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Operation Mode :	802.11n40	Test Date :	03/01/2016 17:17:43
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4904.00	H	29.22	23.99	5.23	54.00	-24.78
4904.00	H	41.77	36.53	5.23	74.00	-32.23

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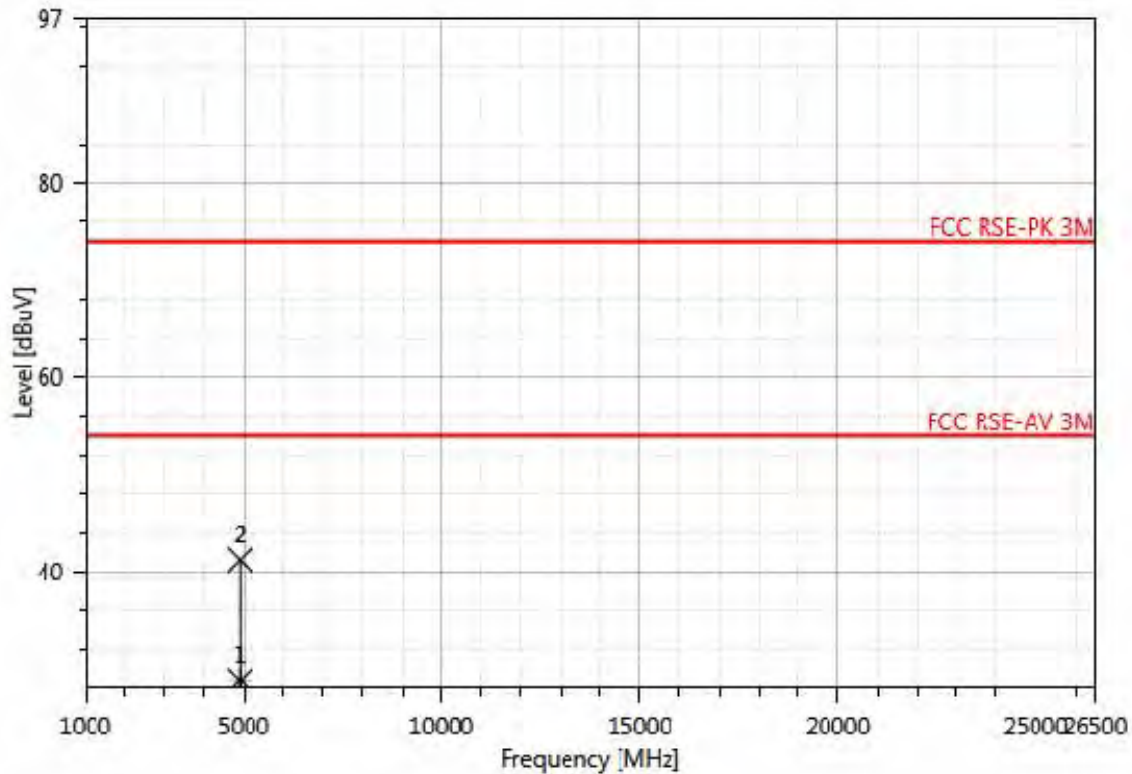
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Operation Mode :	802.11n40	Test Date :	03/01/2016 17:22:43
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	21 deg_C / 61 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Edward
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@ 3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
4904.00	H	28.81	23.58	5.23	54.00	-25.19
4904.00	H	41.24	36.01	5.23	74.00	-32.76

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12 PEAK POWER SPECTRAL DENSITY

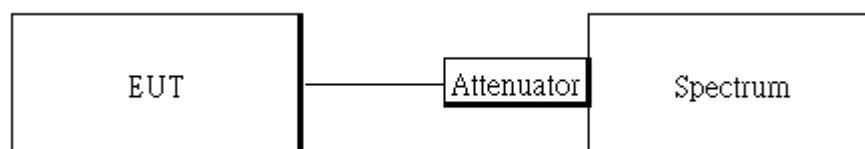
12.1 Standard Applicable

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

12.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNAK	PE8210	RF29	12/12/2015	12/11/2016
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016

12.3 Test Set-up



12.4 Measurement Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 3 kHz.
5. Set the VBW = 10 kHz.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. 802.11n MIMO mode: offset is set following “measure and add 10 Log (N)” on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

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Note:

Antenna Gain: 3.25 dBi
Number Antenna: 3 pcs
Limit: 8 dBm

The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below:
Directional gain = gain of antenna element + 10 log (# of TX antenna elements)
Effective Legacy Gain (dBi) = 3.25+4.77=8.02dBi
Limit: 8dBm – (8.02– 6dBi)=5.98dBm

12.5 Measurement Result

POWER DENSITY 802.11b MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-8.50	5.98	PASS
2437	-8.50	5.98	PASS
2462	-2.22	5.98	PASS

POWER DENSITY 802.11g MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-13.45	5.98	PASS
2437	-5.68	5.98	PASS
2462	-6.66	5.98	PASS

POWER DENSITY 802.11n HT20 MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-16.59	5.98	PASS
2437	-7.14	5.98	PASS
2462	-7.40	5.98	PASS

POWER DENSITY 802.11n HT40 MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2422	-19.49	5.98	PASS
2437	-8.74	5.98	PASS
2452	-11.05	5.98	PASS

*Refer to next page for plots

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802.11b

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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Power Spectral Density Test Plot (CH-High)



802.11g

Power Spectral Density Test Plot (CH-Low)



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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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802.11n_HT20 (MIMO)

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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Power Spectral Density Test Plot (CH-High)



802.11n_HT40 (MIMO)

Power Spectral Density Test Plot (CH-Low)



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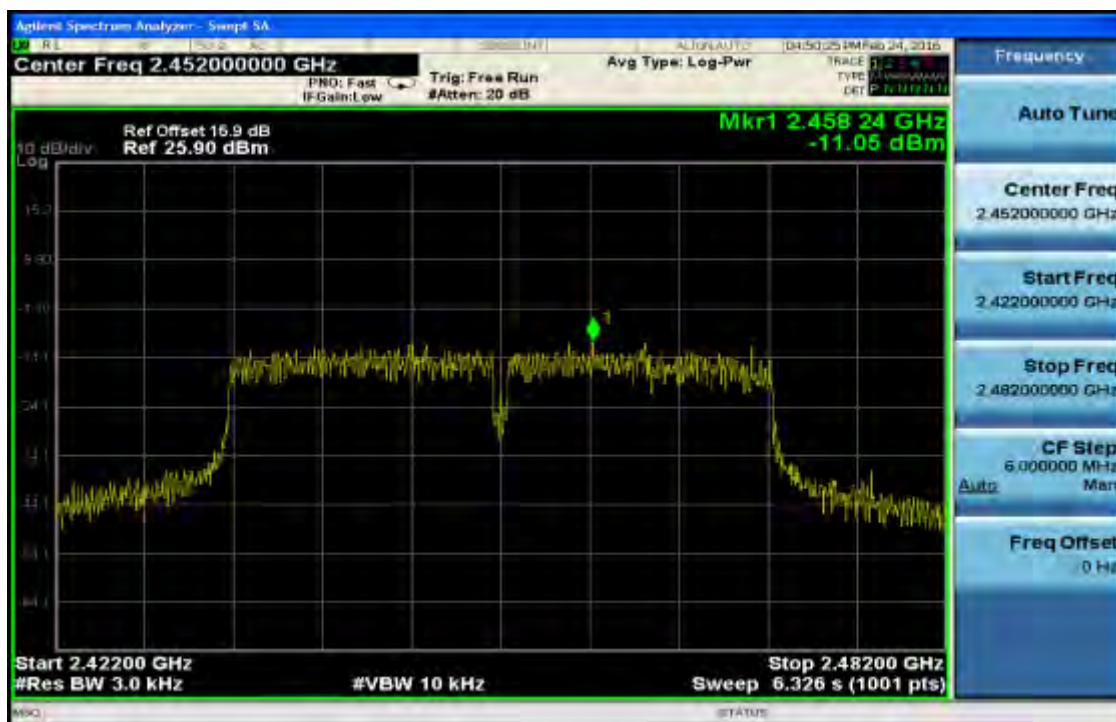
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

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

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

According to RSS-GEN 8.3

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.⁹ When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

13.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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