

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT CLASS II PC REPORT

OF

Product Name: Vehicle Mount Terminal

Brand Name: Honeywell

Marketing Name: Thor VM2

Model No.: VM2WG

Model Difference: N/A

FCC ID KDZVM2W02

Report No.: EH/2012/A0033A-01

Issue Date: Mar. 04, 2016

FCC Rule Part: §15.407

Prepared for: Honeywell International Inc.,
9680 Old Bailes Road, Fort Mill, SC
29707, USA

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
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VERIFICATION OF COMPLIANCE

Applicant: Honeywell International Inc.,
9680 Old Bailes Road, Fort Mill, SC 29707, USA

Product Name: Vehicle Mount Terminal

Brand Name: Honeywell

Marketing Name: Thor VM2

Model No.: VM2WG

Model Difference: N/A

FCC ID KDZVM2W02

File Number: EH/2012/A0033A-01

Date of test: Jan. 18, 2016 ~ Feb. 26, 2016

Date of EUT Received: Jan. 18, 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:

Cooper Hsu

Date:

Mar. 04, 2016

Cooper Hsu / Engineer

Prepared By:

Allen Tsai

Date:

Mar. 04, 2016

Allen Tsai / Engineer

Approved By:

Jim Chang

Date:

Mar. 04, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
EH/2012/A0033A-01	Rev.00	Initial creation of document	Mar. 04, 2016

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Vehicle Mount Terminal	
Brand Name:	Honeywell	
Marketing Name:	Thor VM2	
Model No.:	VM2WG	
Model Difference:	N/A	
Hardware Version:	N/A	
WLAN Driver Version:	3.4.0.50	
Power Supply:	10.8Vdc Li-ion battery or 100-240Vdc from AC/DC adapter	
	Battery:	Model No.: OVT310L1R00 Supplier: TOTEX International Limited
	Adapter:	Model No.:GT-81081-6015-T3, Supplier: GlobTek, Inc.
Class II Permissive change:	For the requirement that certain National Information Infrastructure (U-NII) devices must comply with revised Section 15.407 rules in order to be certified.	

WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology
11a	5725-5850	5	11.02 dBm	OFDM
11n_20M	HT20 5725-5850	5	13.61 dBm	OFDM
11n_40M	HT40 5725-5850	2	12.18 dBm	OFDM

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Antenna Designation:	Internal: PIFA Antenna Model No.: 40120512 5GHz: 4.97dBi (5725-5850MHz) External: Dipole Antenna Model No.: WTS 2450 5GHz: 0.77dBi (5725-5850MHz) Model No.: R380500314 5GHz: 4.85dBi (5725-5850MHz)
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300Mbps

1.2 Product Feature of Equipment Under Test

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

Product Feature	
Product Name:	Vehicle Mount Terminal
Brand Name:	Honeywell
Marketing Name:	Thor VM2
Model No.:	VM2WG
Model Difference:	N/A
FCC ID	KDZVM2W02
Wi-Fi Specification	802.11a/b/g/n

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 E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r01

FCC KDB 662911 D01 Multiple Transmitter Output

FCC KDB 644545 D03 Guidance for IEEE 802.11ac v01

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 the certification 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. (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 §15.107. 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.

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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.

Single mode offset

$$= \text{RF cable loss (dB)} + \text{attenuation factor (dB)} = 11(\text{dB})$$

n20 MIMO mode offset

$$= \text{RF cable loss (dB)} + \text{attenuation factor (dB)} + 10 \log(N_{\text{ANT}}) \text{ dB} + \text{duty factor} = 14(\text{dB})$$

n40 MIMO mode offset

$$= \text{RF cable loss (dB)} + \text{attenuation factor (dB)} + 10 \log(N_{\text{ANT}}) \text{ dB} + \text{duty factor} = 14(\text{dB})$$

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2.5 Configuration of Tested System

Fig. 2-1 Radiated & 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	SCU	v3.03.08	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	6dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5725 MHz ~5850 MHz:

5 channels are provided for 802.11a, 802.11n_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 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 mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.
4. The given UE is pre-scanned among External Dipole Antenna Model No. R380500314 and WTS 2450, and R380500314 yields the highest reading that generates the highest emission. Therefore, R380500314 as the antenna of test configuration is chosen to carry out the relevantly mandatory test items.

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5745~5825	149 to 165	157	OFDM	6	AUX
802.11n_HT40	5755~5795	151 to 159	151	OFDM	MCS0	MIMO
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0	MIMO

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Note:

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

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	AUX
802.11n_HT20				OFDM	MCS0	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0	MIMO

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	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)	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 DUTY CYCLE 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:

Mode	Duty Cycle (%)	Duty Factor (dB) = $10 * \log (1/\text{Duty Cycle})$
802.11a	92.17	0.35
802.11n_20	85.41	0.68
802.11n_40	75.00	1.25

Duty Cycle Factor: $10 * \log(1/0.9217) = 0.35$

Duty Cycle Factor: $10 * \log(1/0.8541) = 0.68$

Duty Cycle Factor: $10 * \log(1/0.75) = 1.25$

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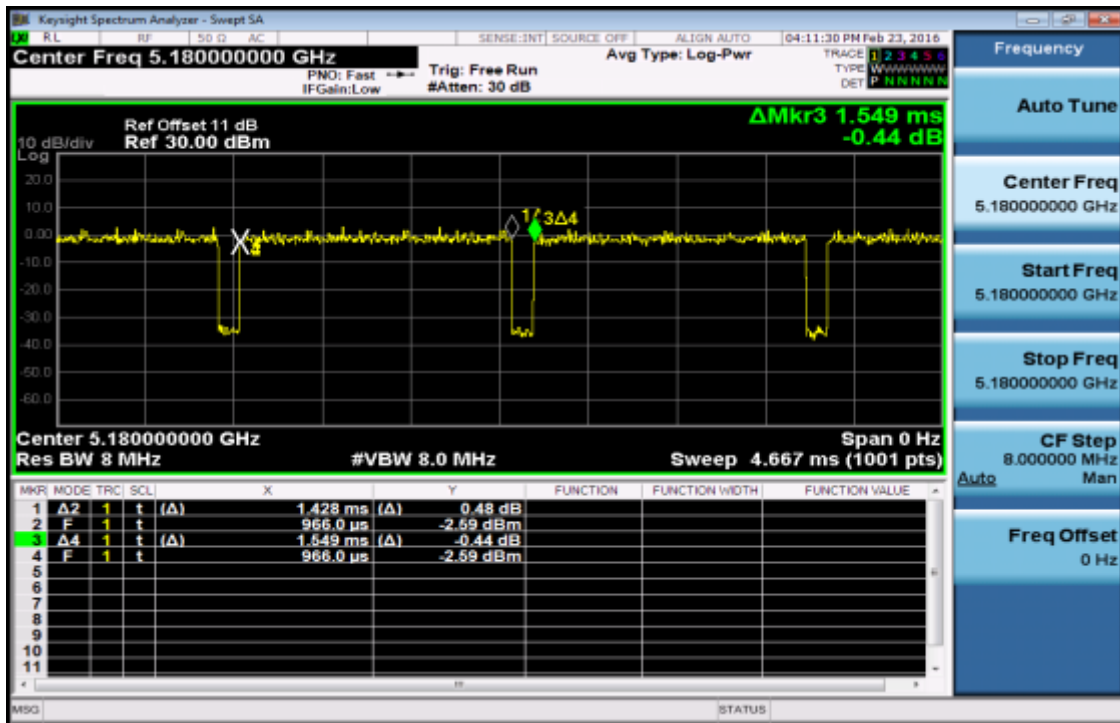
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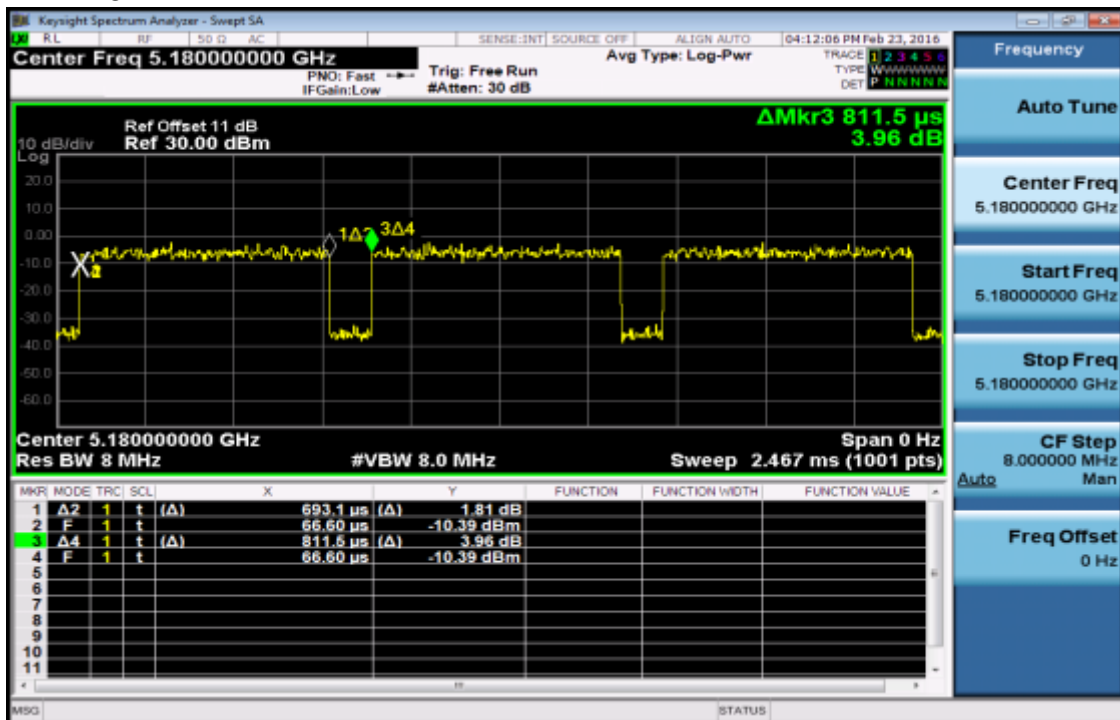
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DUTY CYCLE TEST SIGNAL Measurement Result

802.11a



802.11n HT20



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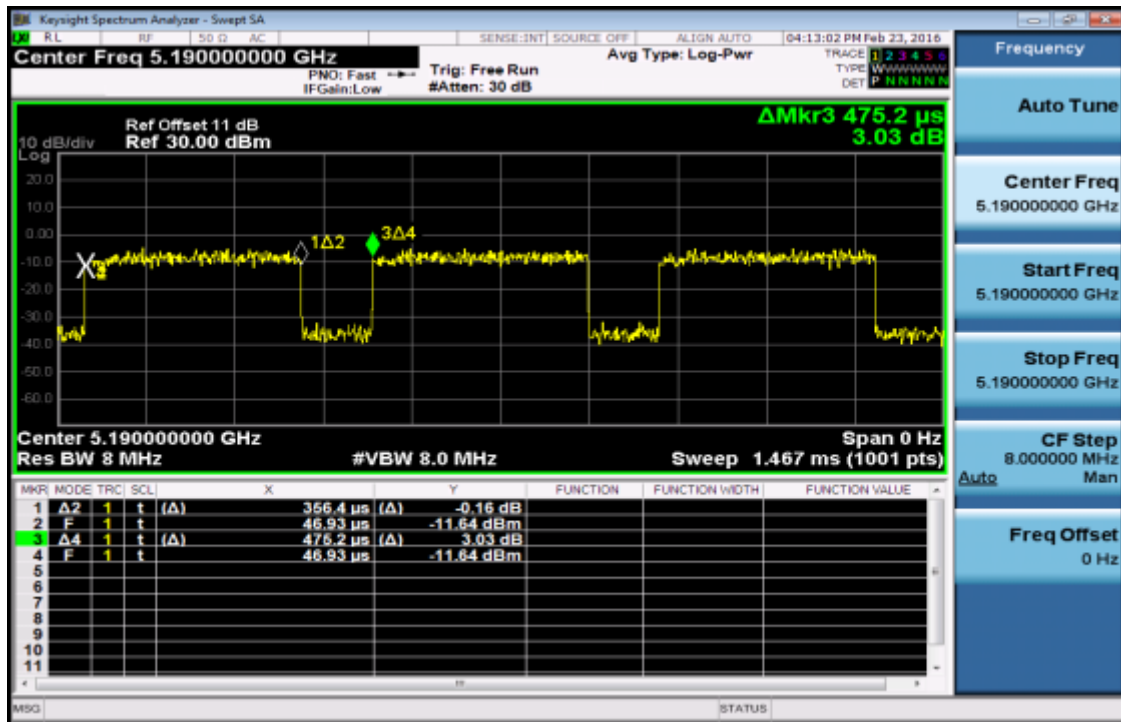
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802.11 n HT 40



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7 26dB & 6dB EMISSION BANDWIDTH MEASUREMENT

7.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

7.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 r01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
 - b. Mark the peak frequency and -26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
 - a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto
 - b. Mark the peak frequency and -6dB (upper and lower) frequency.
6. Repeat above procedures until all test default channel measured were complete.

7.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY5042019 5	12/21/2015	12/20/2016
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
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017

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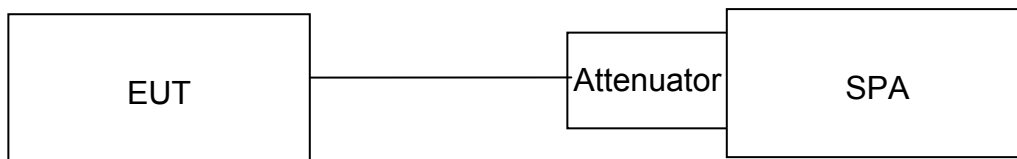
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7.4 Test Set-up



7.5 Measurement Result

6dB Bandwidth (5725 MHz~ 5850 MHz)

802.11a_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	16.38	12.144
5785	16.38	12.144
5825	16.37	12.141

802.11n_HT20_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.59	12.451
5785	17.58	12.451
5825	17.57	12.446

802.11n_HT20_Aux

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.34	12.390
5785	17.21	12.358
5825	17.32	12.385

802.11n_HT40_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5755	35.67	15.523
5795	36.33	15.603

802.11n_HT40_Aux

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5755	36.06	15.571
5795	35.76	15.534

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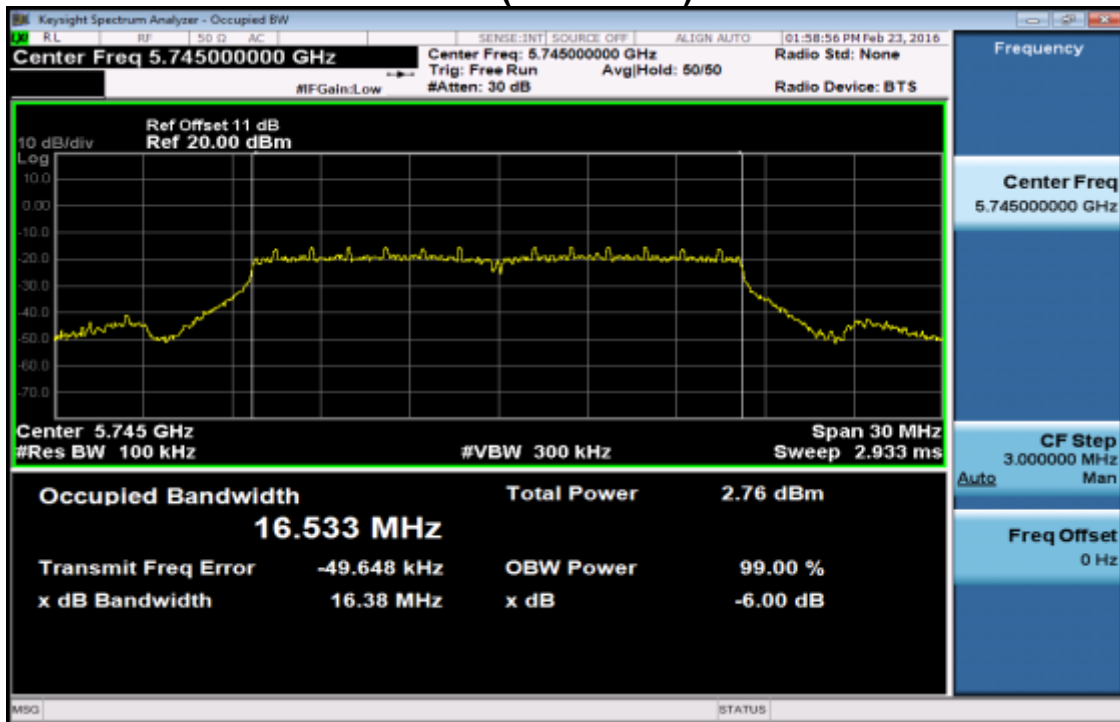
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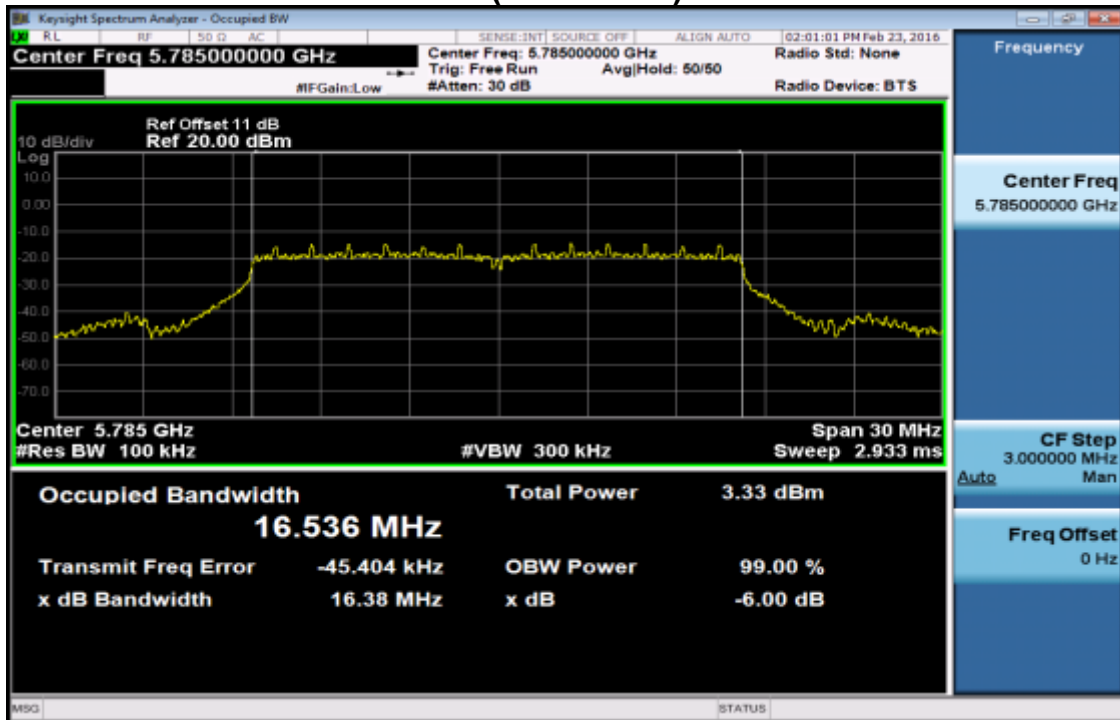
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802.11a, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



6dB Band Width Test Data CH-Mid (5785 MHz)



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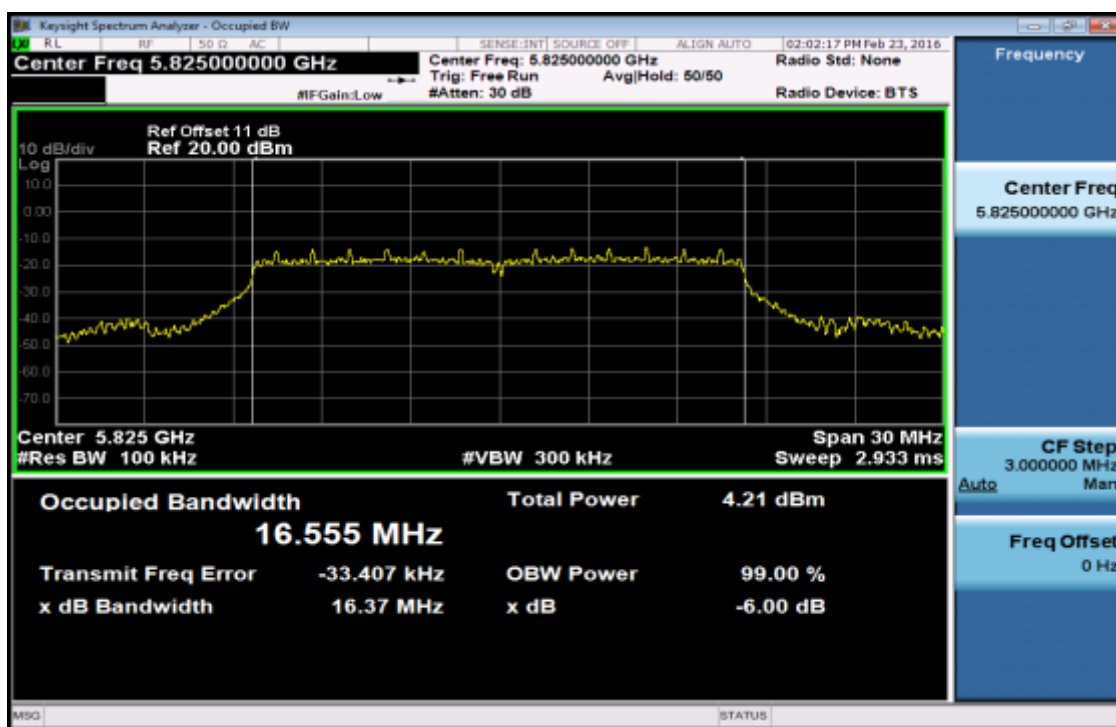
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6dB Band Width Test Data CH-High (5825 MHz)



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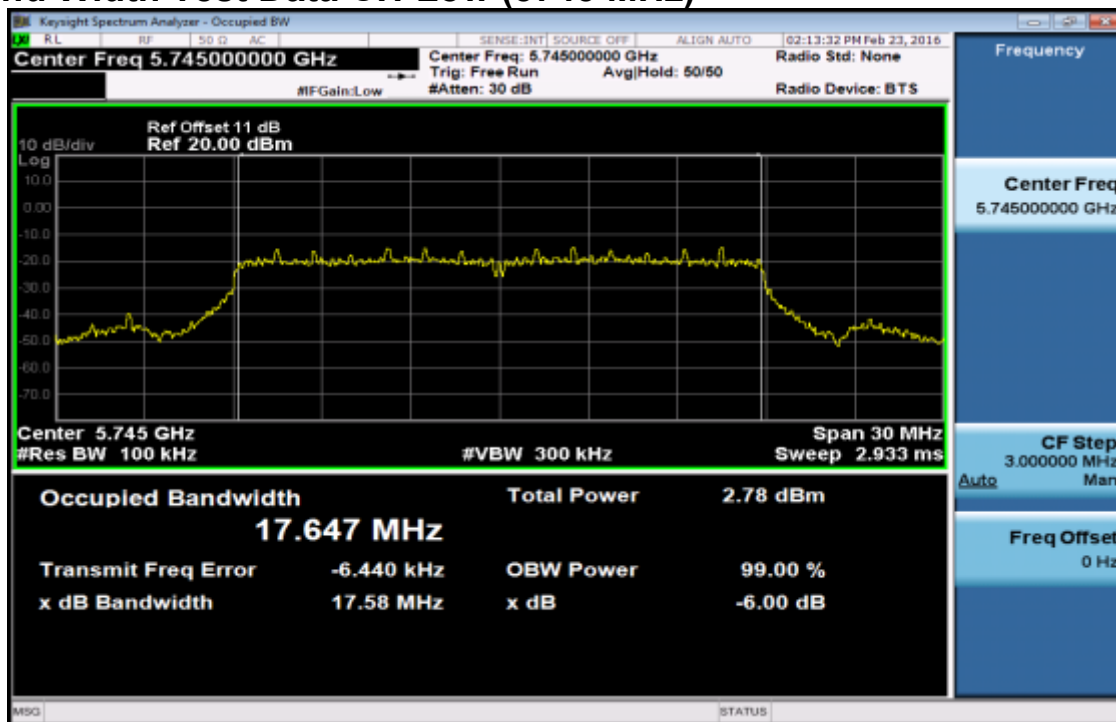
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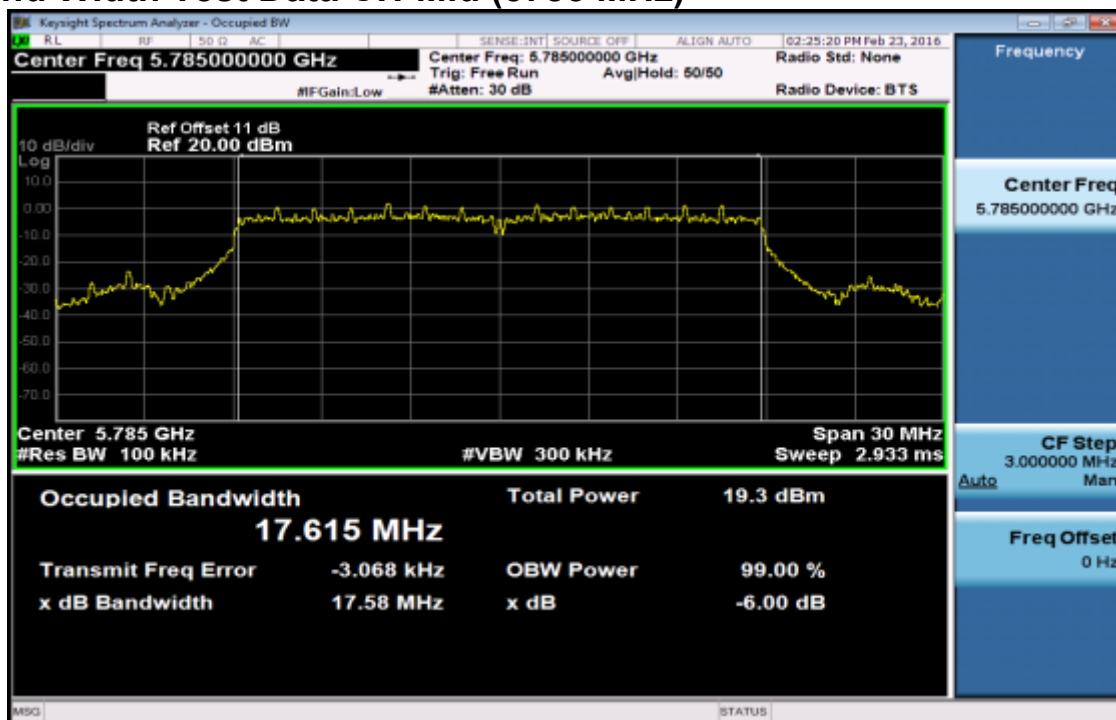
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802.11n HT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



6dB Band Width Test Data CH-Mid (5785 MHz)



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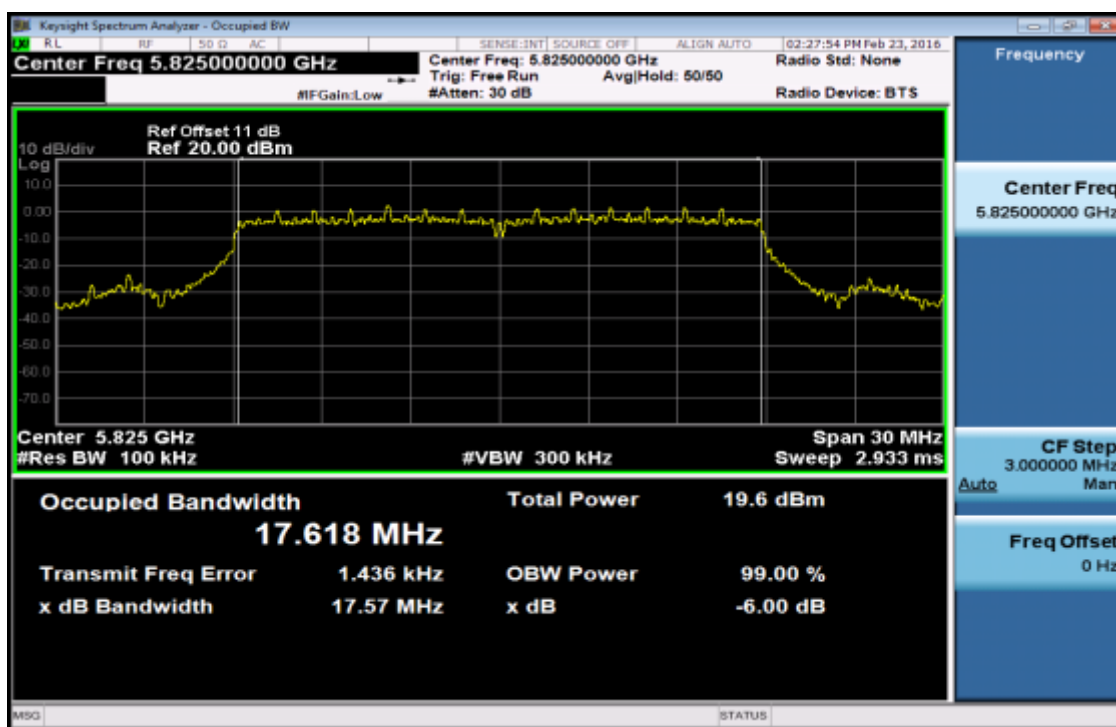
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6dB Band Width Test Data CH-High (5825 MHz)



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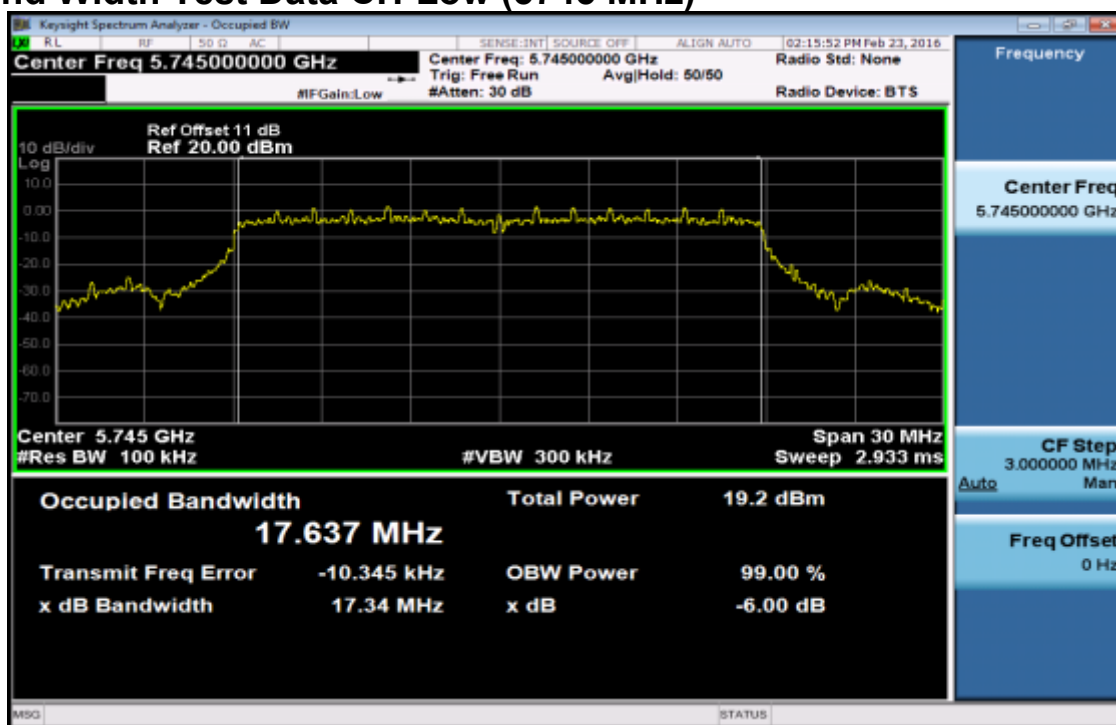
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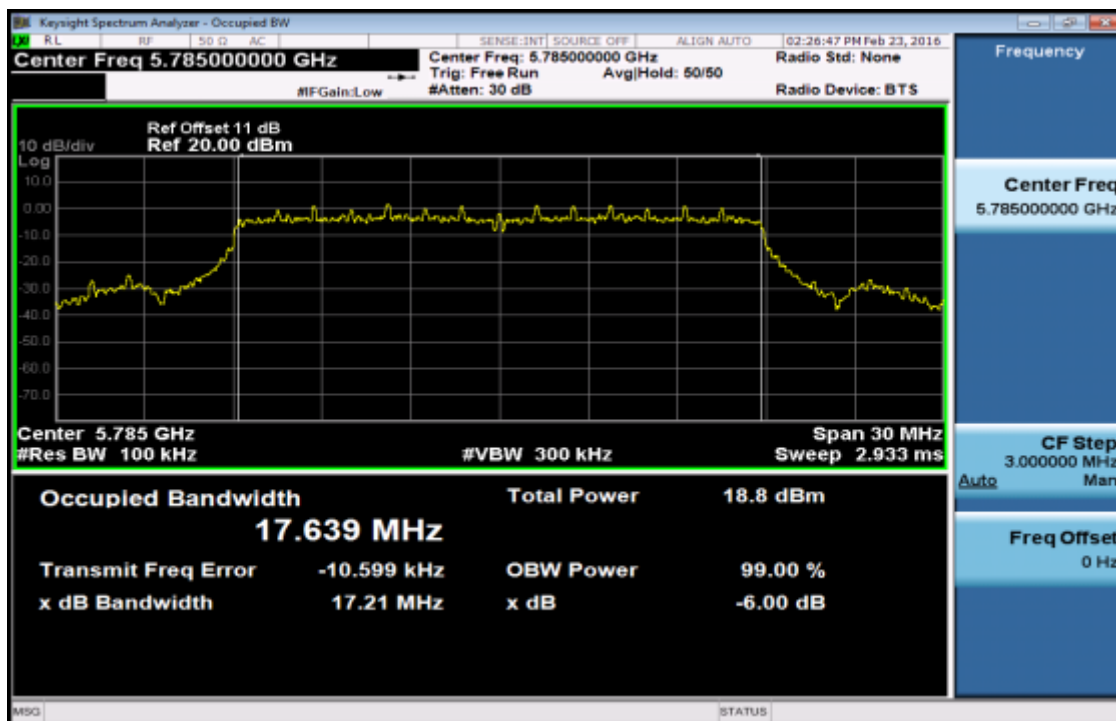
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802.11n HT20, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5745 MHz)



6dB Band Width Test Data CH-Mid (5785 MHz)



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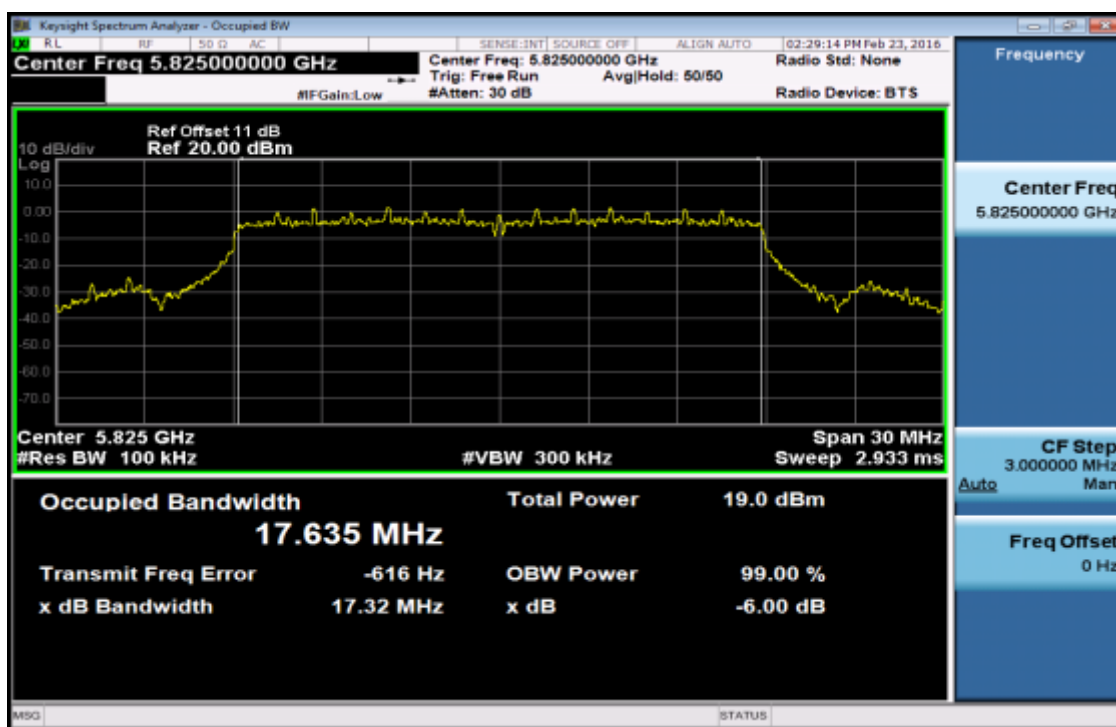
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6dB Band Width Test Data CH-High (5825 MHz)



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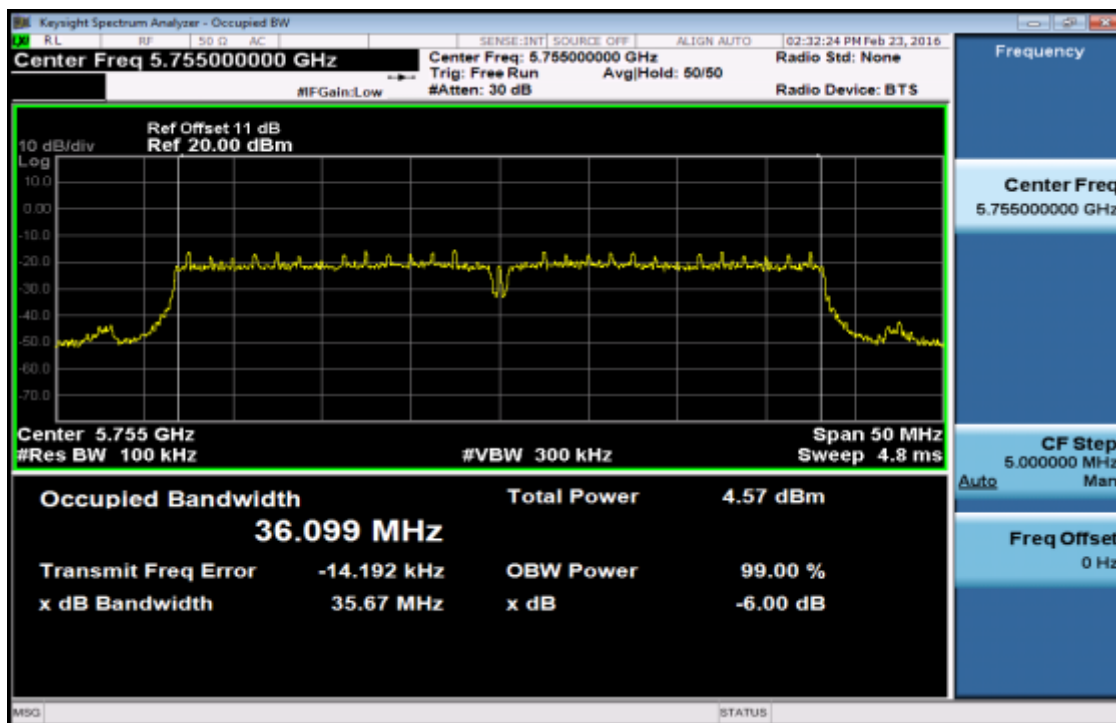
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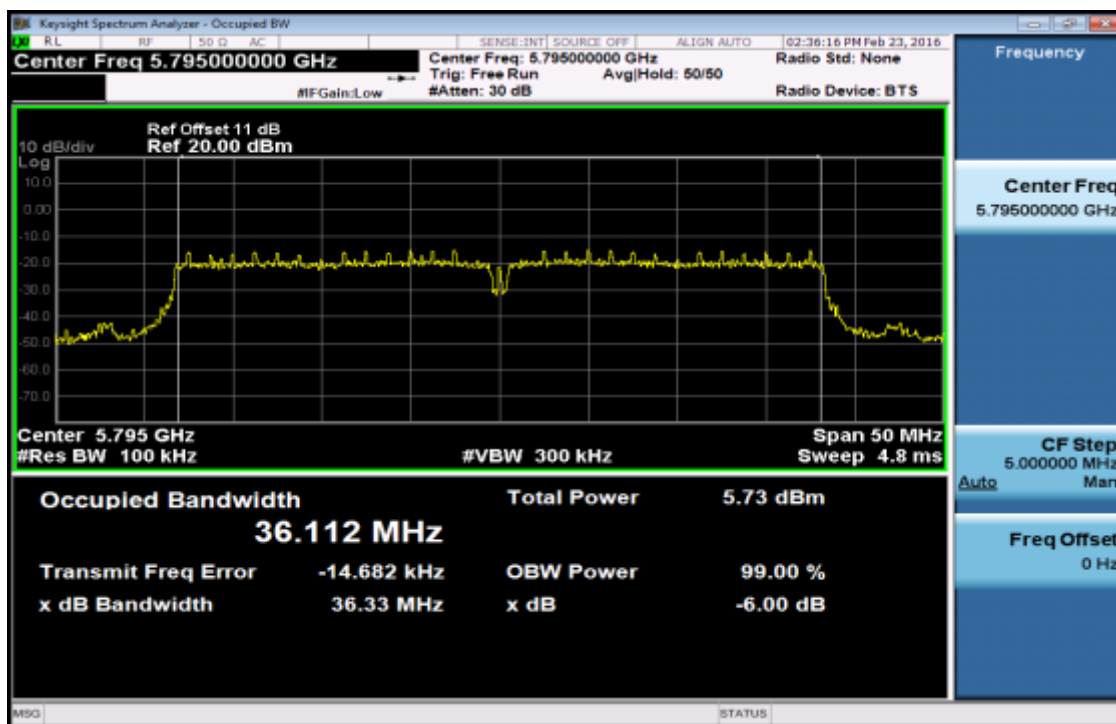
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802.11n HT40, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5755 MHz)



6dB Band Width Test Data CH-High (5795 MHz)



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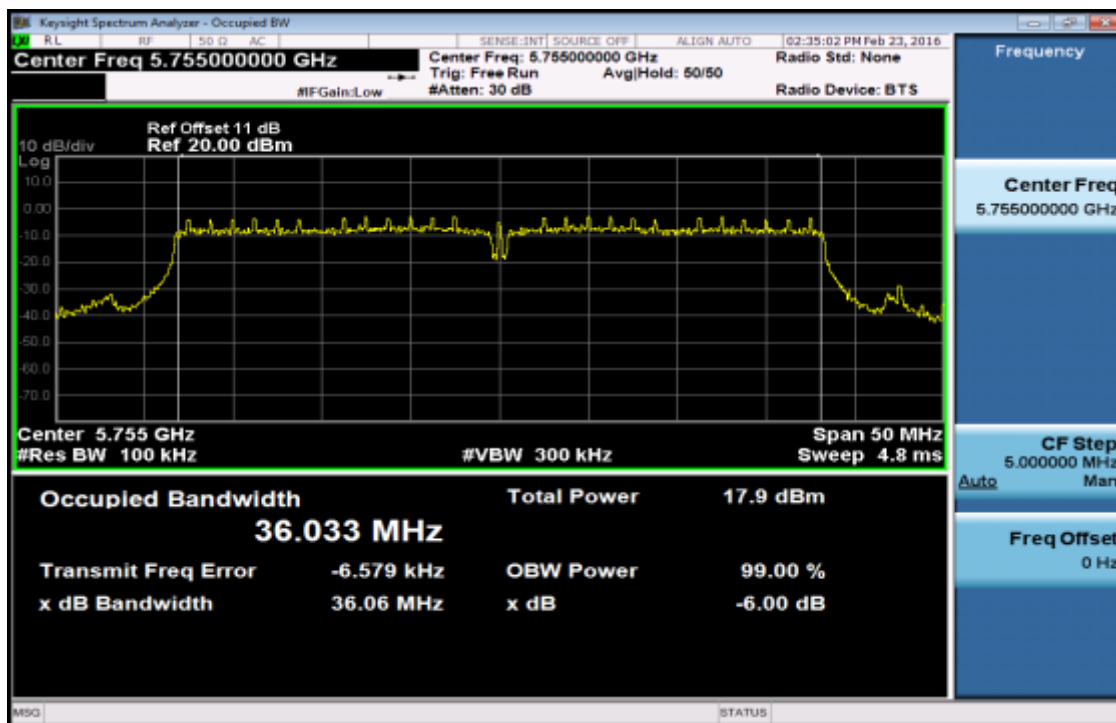
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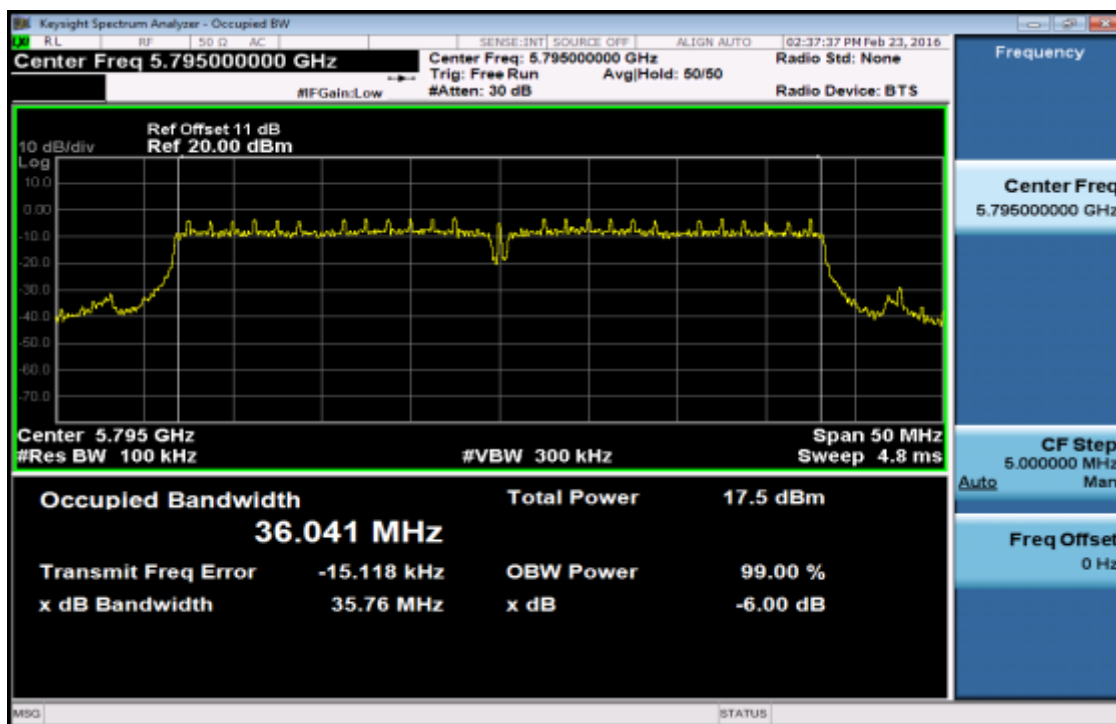
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802.11n HT40, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5755 MHz)



6dB Band Width Test Data CH-High (5795 MHz)



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8 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater device)	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
		Mobile and portable clinet device	250mW(23.98dBm)
U-NII-2A			250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C			250mW(23.98dBm) or 11dBm+10 log B
U-NII-3	√		1 Watt(30dBm)

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

	Effective Legacy Gain (dBi)	Limit
U-NII-3	$4.97+3.01=7.98\text{dBi}$	$23.98\text{dBm} - (7.98 - 6 \text{ dBi}) = 28.02\text{dBm}$

Therefore the limit needs to reduce for the U-NII-3 band.

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8.2 Measurement Procedure

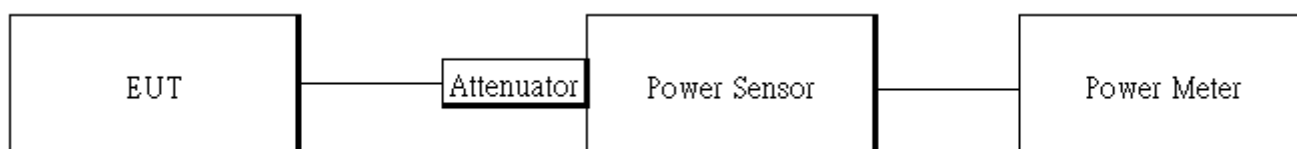
1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 r01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
5. Record the max. reading and add $10 \log(1/\text{duty cycle})$.
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

8.3 Measurement Equipment Used

Refer to section 8.3 for details.

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

8.4 Test Set-up



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8.5 Measurement Result

802.11a_Aux

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
149	5745	10.68	11.695	30	PASS
157	5785	10.52	11.272	30	PASS
165	5825	11.02	12.647	30	PASS

802.11n_HT20_MIMO

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
149	5745	10.26	10.19	13.24	21.064	28.02	PASS
157	5785	10.74	10.46	13.61	22.975	28.02	PASS
165	5825	10.42	10.37	13.41	21.905	28.02	PASS

802.11n_HT40_MIMO

CH	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1				
151	5755	9.34	8.99	12.18	16.515	28.02	PASS
159	5795	9.28	8.6	11.96	15.717	28.02	PASS

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9 PEAK POWER SPECTRAL DENSITY

9.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater device)	17dBm/ MHz
		Fixed point-to-point Acess Ponit	
		Mobile and portable clinet device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

	Effective Legacy Gain (dBi)	Limit
U-NII-3	$4.97+3.01=7.98\text{dBi}$	$30\text{dBm} - (7.98 - 6 \text{ dBi}) = 28.02\text{dBm}$

Therefore the limit needs to reduce for the U-NII-3 band.

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9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 r01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.

4. For U-NII1, U-NII-2A, U-NII-2C Band:

Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

For U-NII-3 Band:

Set RBW=500 kHz, VBW \geq 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome

9.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY5042019 5	12/21/2015	12/20/2016
Coaxial Cable	HUBER+SUHNE R	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017

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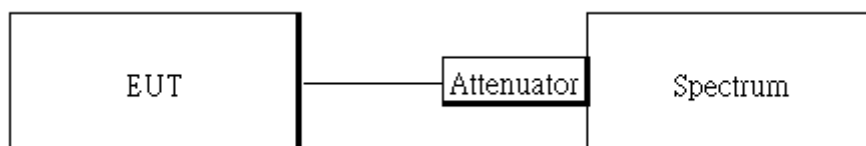
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9.4 Test Set-up



9.5 Measurement Result

POWER DENSITY 802.11a MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5745	-10.28	30	-40.28
5785	-10.17	30	-40.17
5825	-9.05	30	-39.05

POWER DENSITY 802.11n HT20 MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5745	-6.23	28.02	-34.25
5785	9.39	28.02	-18.63
5825	10.63	28.02	-17.39

POWER DENSITY 802.11n HT40 MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5755	-7.90	28.02	-35.92
5795	-7.55	28.02	-35.57

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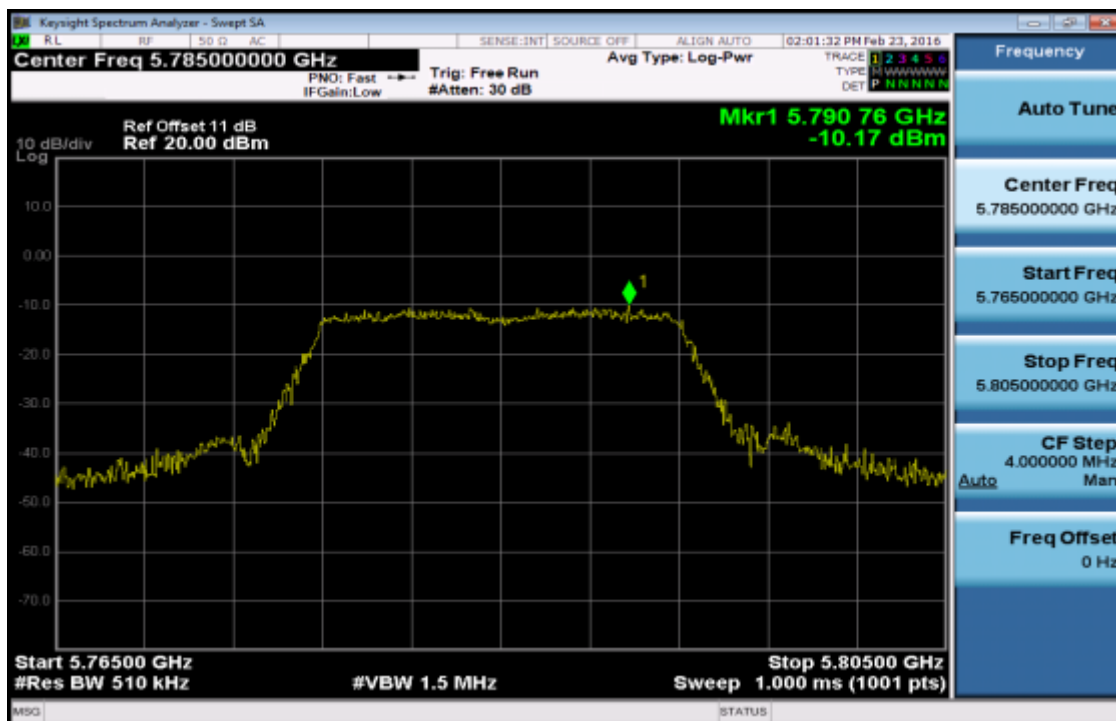
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802.11a 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5785 MHz)



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Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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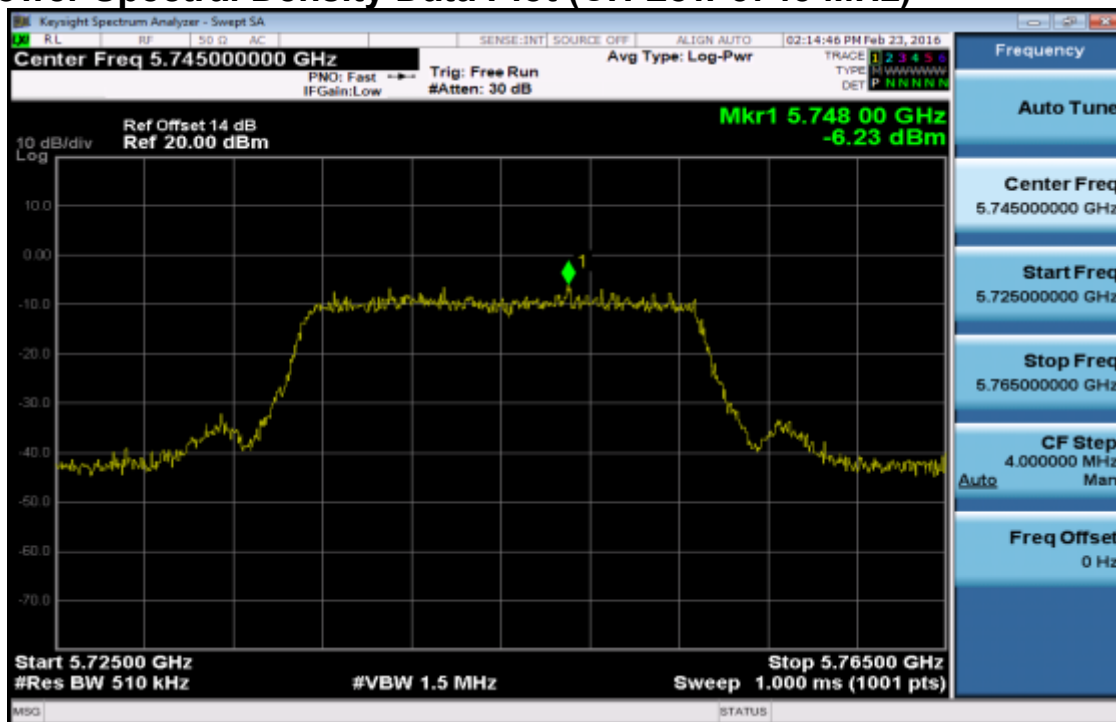
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802.11n HT20, 5725~5850 MHz

Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5785 MHz)



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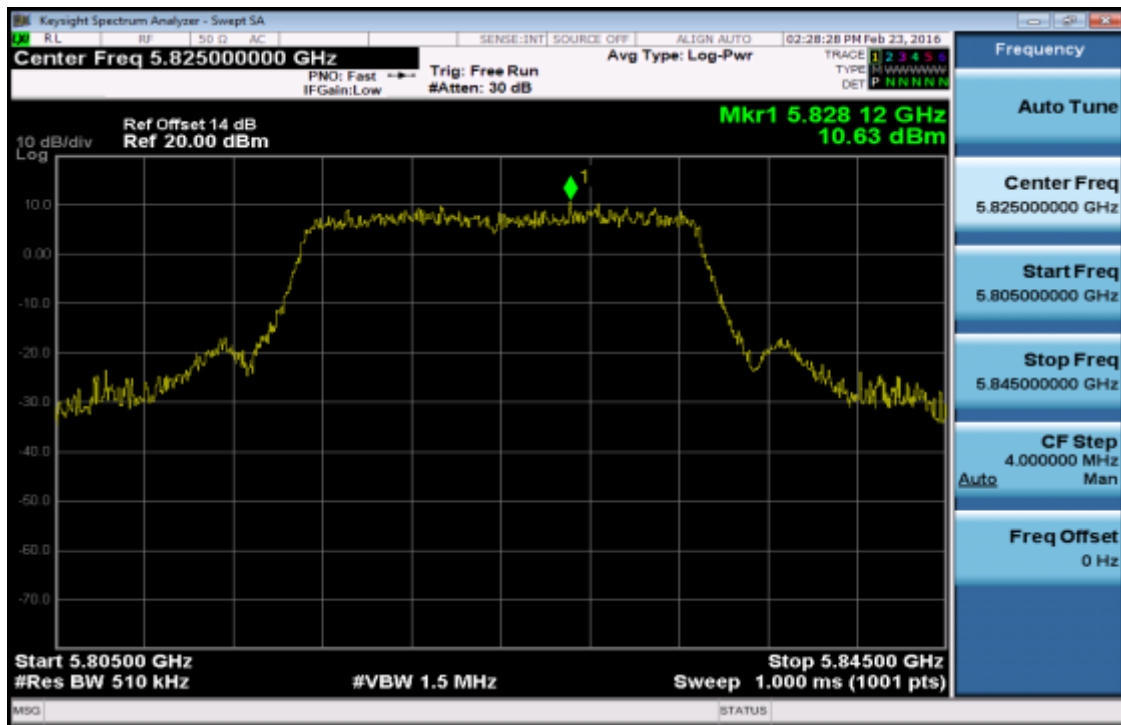
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Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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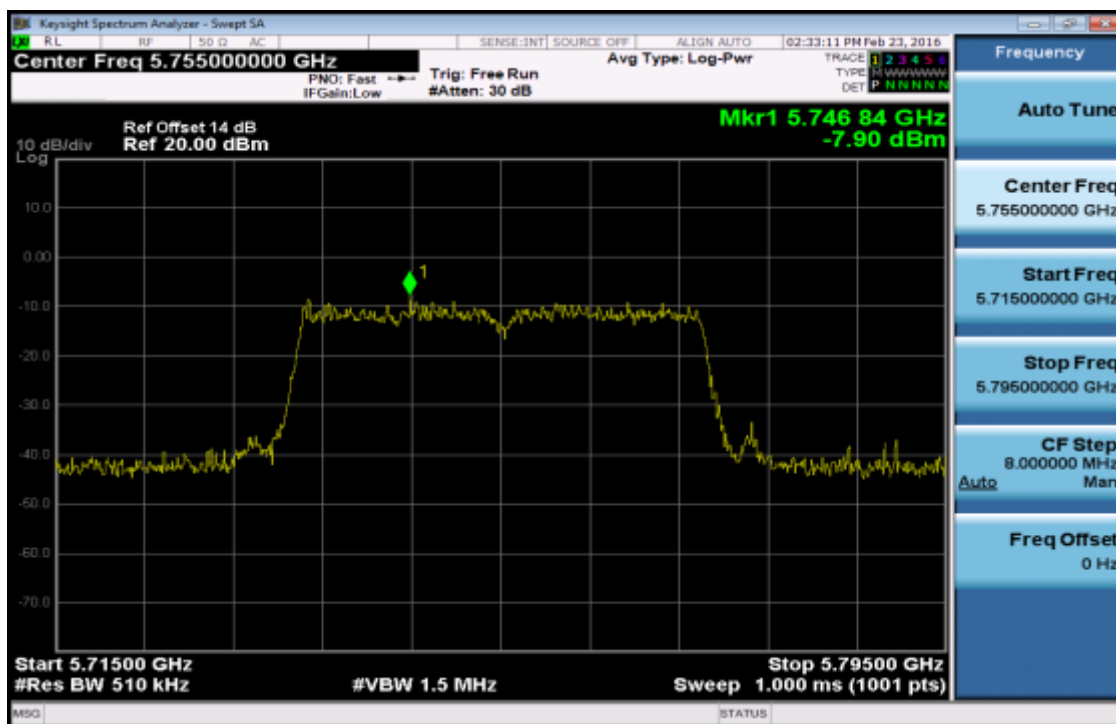
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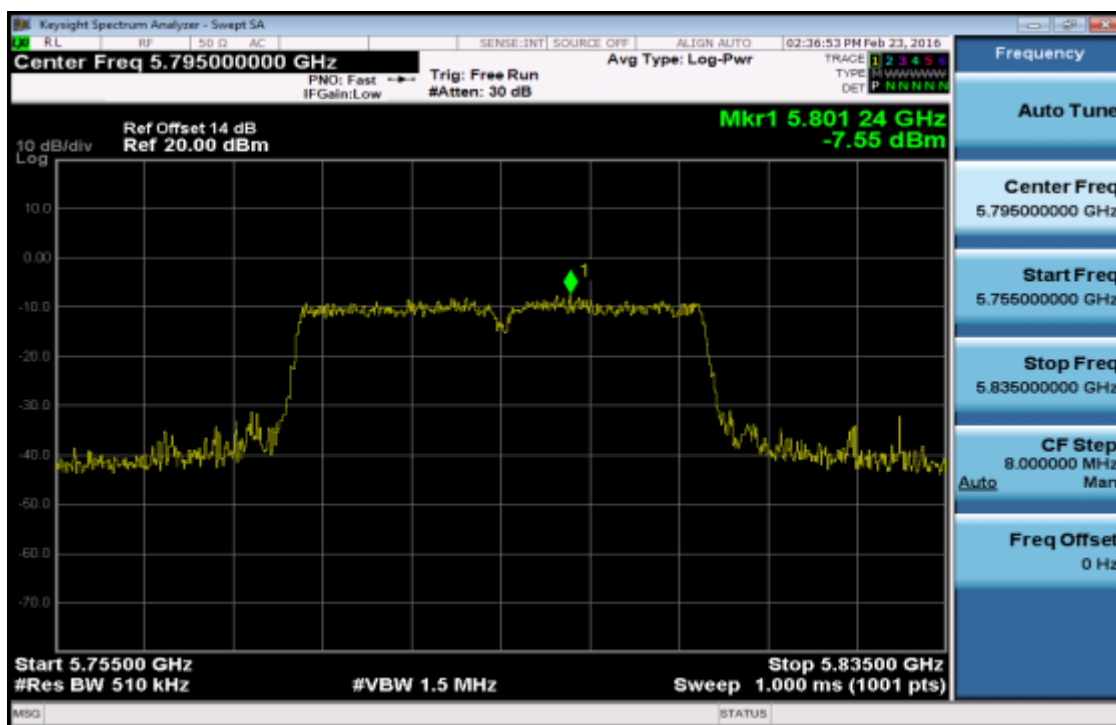
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802.11n HT40, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5755 MHz)



Peak Power Spectral Density Data Plot (CH High 5795 MHz)



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10 UNDESIRABLE RADIATED EMISSION MEASUREMENT1

10.1 Standard Applicable

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

1. For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
2. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
3. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
4. For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

APPLICABLE TO	LIMIT	
FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 r01	FIELD STRENGTH AT 3m	
	PK: 74 (dBμV/m)	AV 54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.3 (dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK: -27 (dBm/MHz) PK: -17 (dBm/MHz)	PK: 68.3 (dBμV/m) PK: 78.2 (dBμV/m)

$EIRP = (E \cdot d)^2 / 30$, where E is the field in V/m, d is the measurement distance (3m), EIRP is the equivalent isotropically radiated power in Watts.

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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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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10.2 Measurement Equipment Used

SGS 966 Chamber No.C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	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

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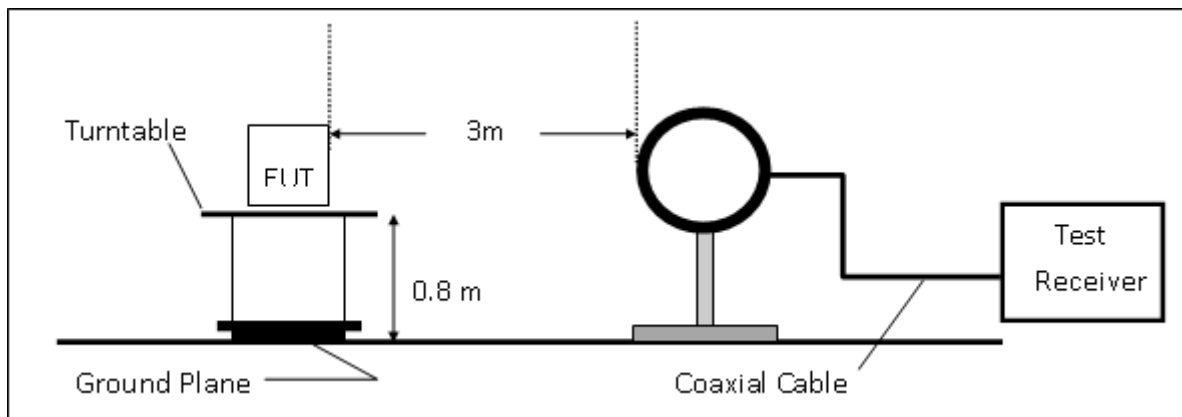
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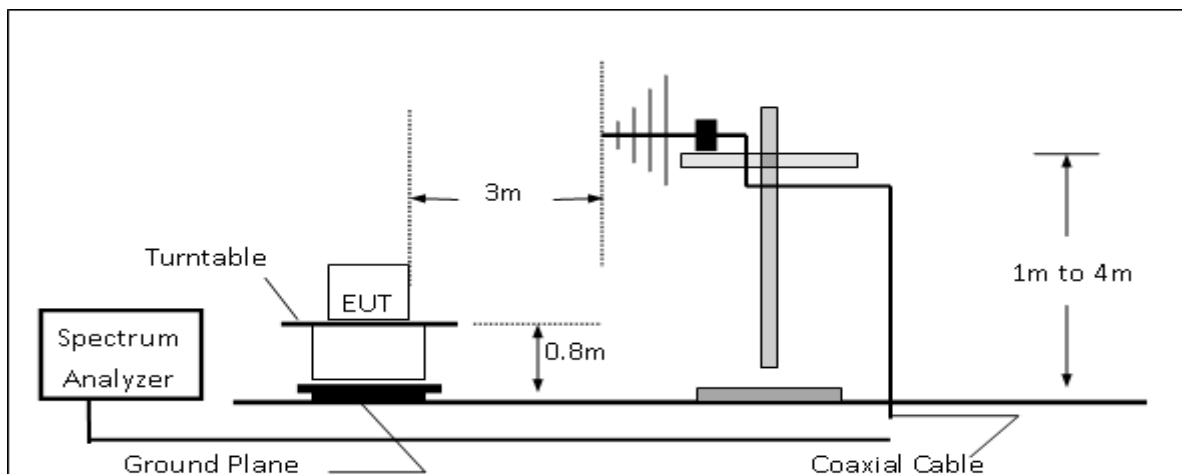
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10.3 Test SET-UP

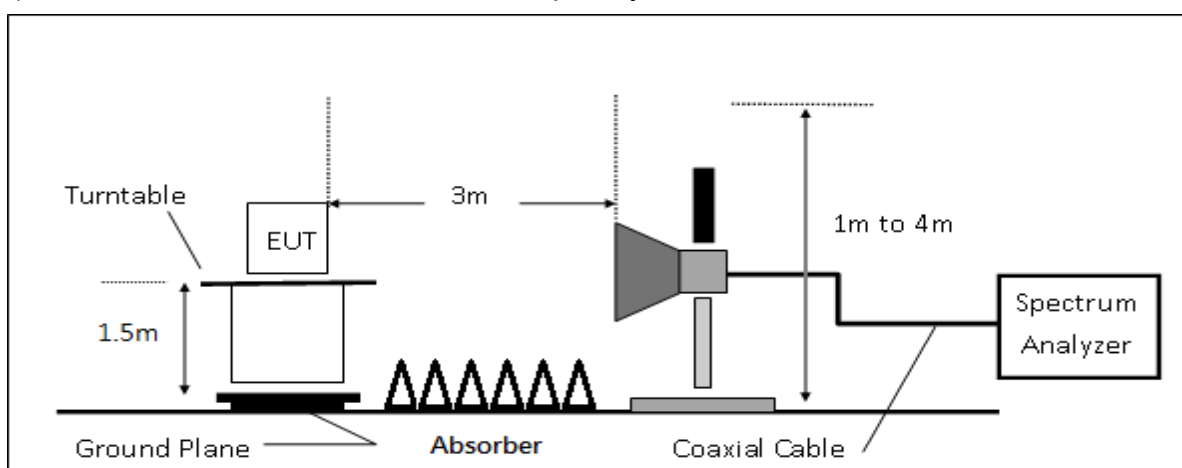
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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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10.4 Measurement Procedure

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01 r01.
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. 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.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. 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.
8. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
9. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
10. Repeat above procedures until all frequency measured were complete.

10.5 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)

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Note :

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

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

10.6 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.

10.7 Measurement Result

Refer to attach tabular data sheets.

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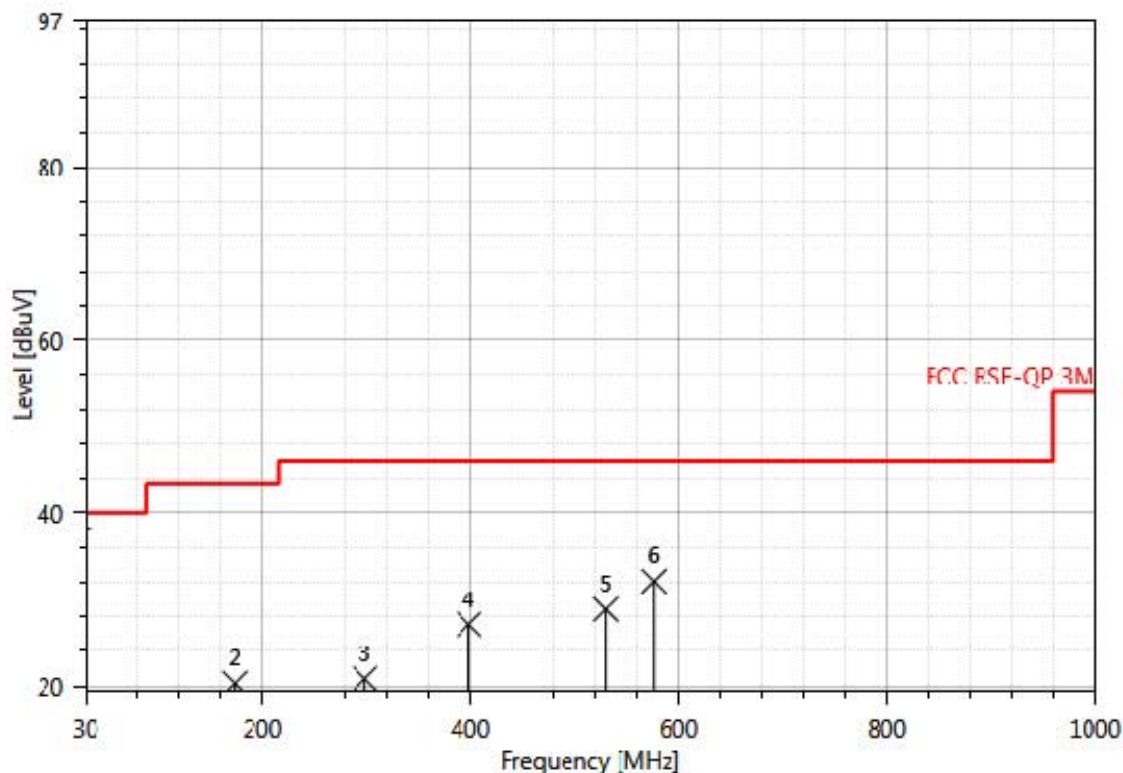
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10.8 Radiated Spurious Emission Measurement Result (Internal Antenna)

Below 1GHz Worst-Case Data (Internal Antenna):

802.11a, 5725~5850 MHz

Operation Mode :	802.11aB4	Test Date :	02/23/2016 01:40:43
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 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
30.00	S	36.02	45.21	-9.19	40.00	-3.98
173.56	S	20.34	28.30	-7.96	43.50	-23.16
298.69	S	20.86	26.81	-5.95	46.00	-25.14
398.60	S	27.13	31.10	-3.97	46.00	-18.87
529.55	S	28.85	30.10	-1.25	46.00	-17.15
576.11	S	32.13	32.77	-0.64	46.00	-13.87

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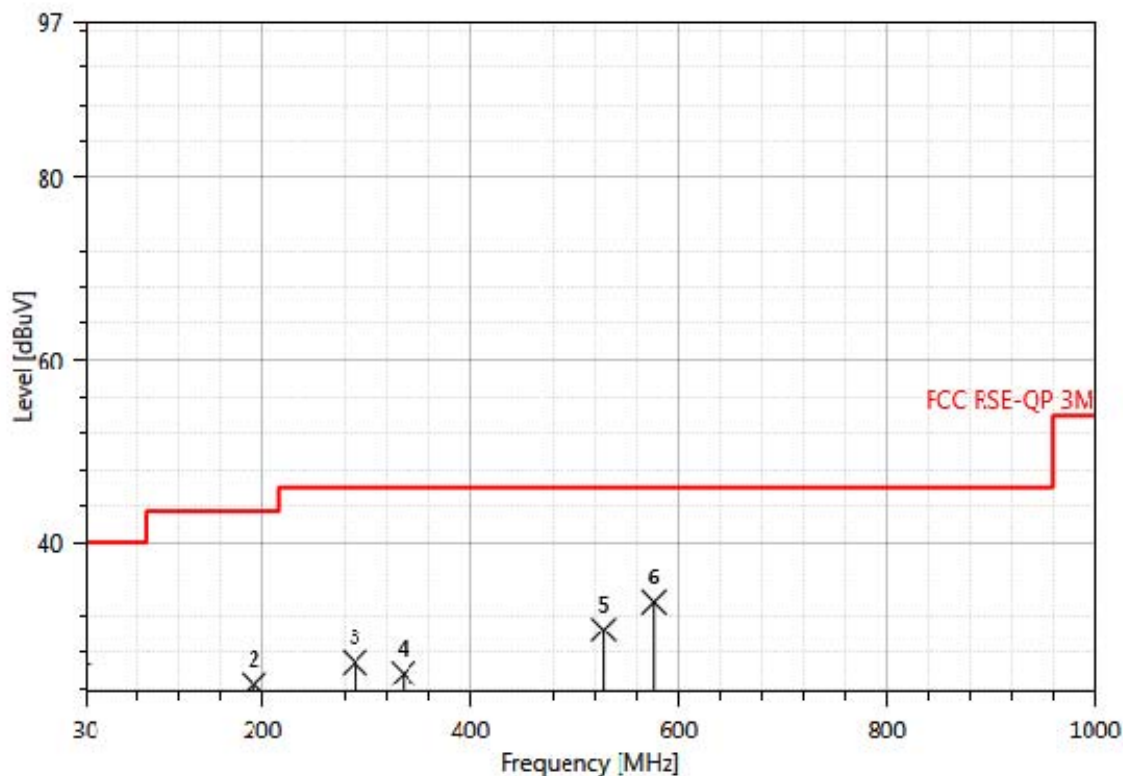
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Operation Mode :	802.11aB4	Test Date :	02/23/2016 01:40:44
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
30.00	S	24.77	33.96	-9.19	40.00	-15.23
191.99	S	24.52	33.94	-9.42	43.50	-18.98
288.99	S	26.93	33.01	-6.08	46.00	-19.07
335.55	S	25.72	31.04	-5.32	46.00	-20.28
527.61	S	30.50	31.81	-1.32	46.00	-15.50
576.11	S	33.50	34.14	-0.64	46.00	-12.50

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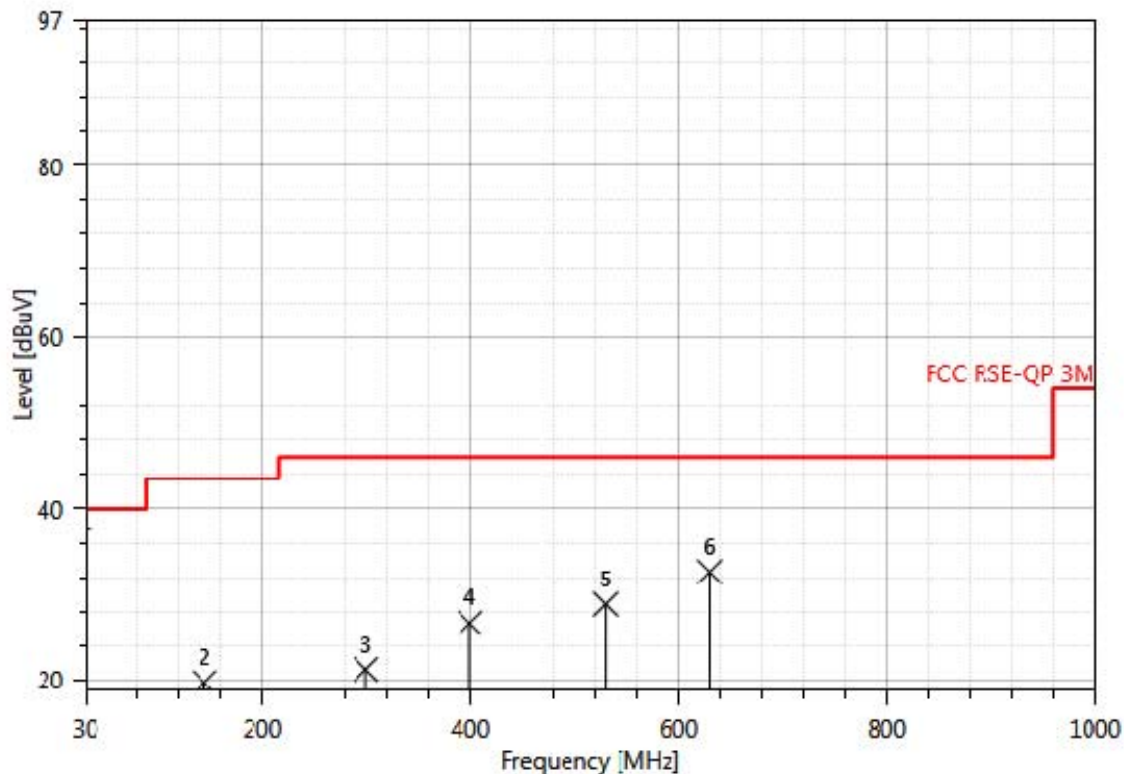
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802.11n HT40, 5725~5850 MHz

Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:40:45
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	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
30.00	S	35.70	44.88	-9.19	40.00	-4.30
144.46	S	19.72	27.79	-8.07	43.50	-23.78
299.66	S	21.26	27.18	-5.93	46.00	-24.74
399.57	S	26.66	30.59	-3.93	46.00	-19.34
529.55	S	28.86	30.11	-1.25	46.00	-17.14
629.46	S	32.64	32.49	0.15	46.00	-13.36

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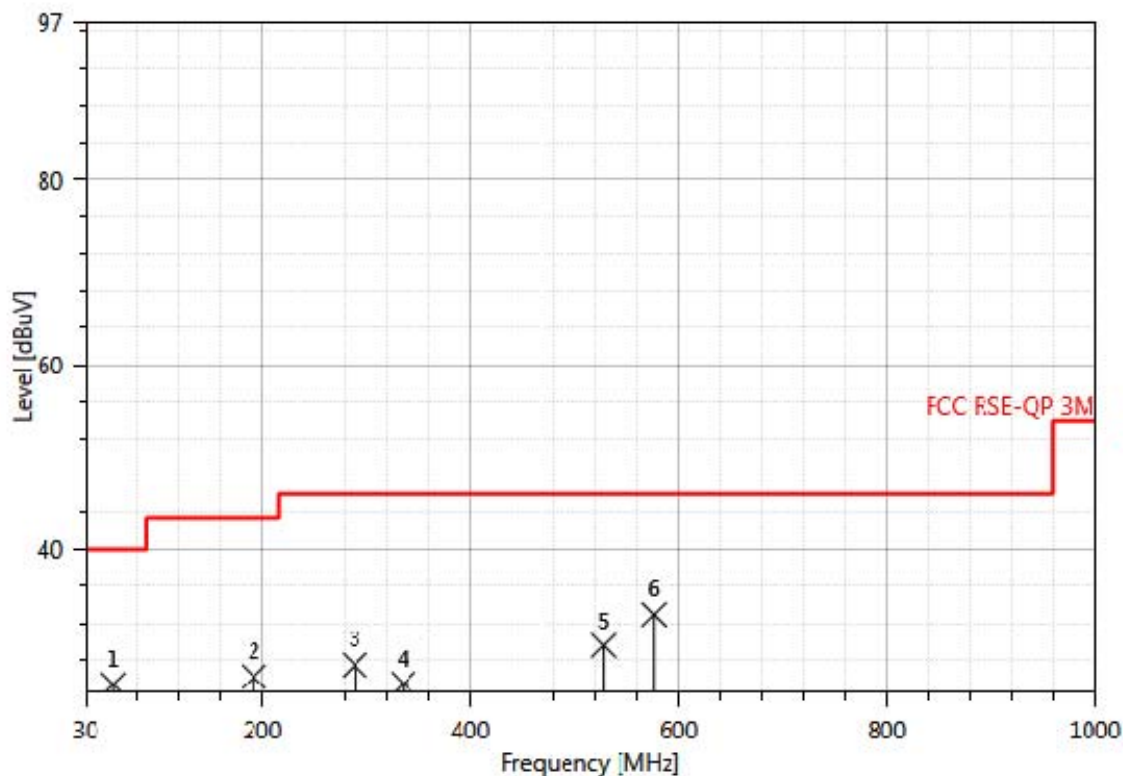
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Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:40:46
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq. MHz	Note F/H/E/S	Emission Level dBuV/m	Spectrum Reading Level dBuV	Factor dB	Limit @3m dBuV/m	Margin dB
57.16	S	25.46	33.43	-7.97	40.00	-14.54
191.99	S	26.29	35.71	-9.42	43.50	-17.21
288.99	S	27.55	33.63	-6.08	46.00	-18.45
335.55	S	25.52	30.85	-5.32	46.00	-20.48
527.61	S	29.63	30.94	-1.32	46.00	-16.37
576.11	S	33.01	33.65	-0.64	46.00	-12.99

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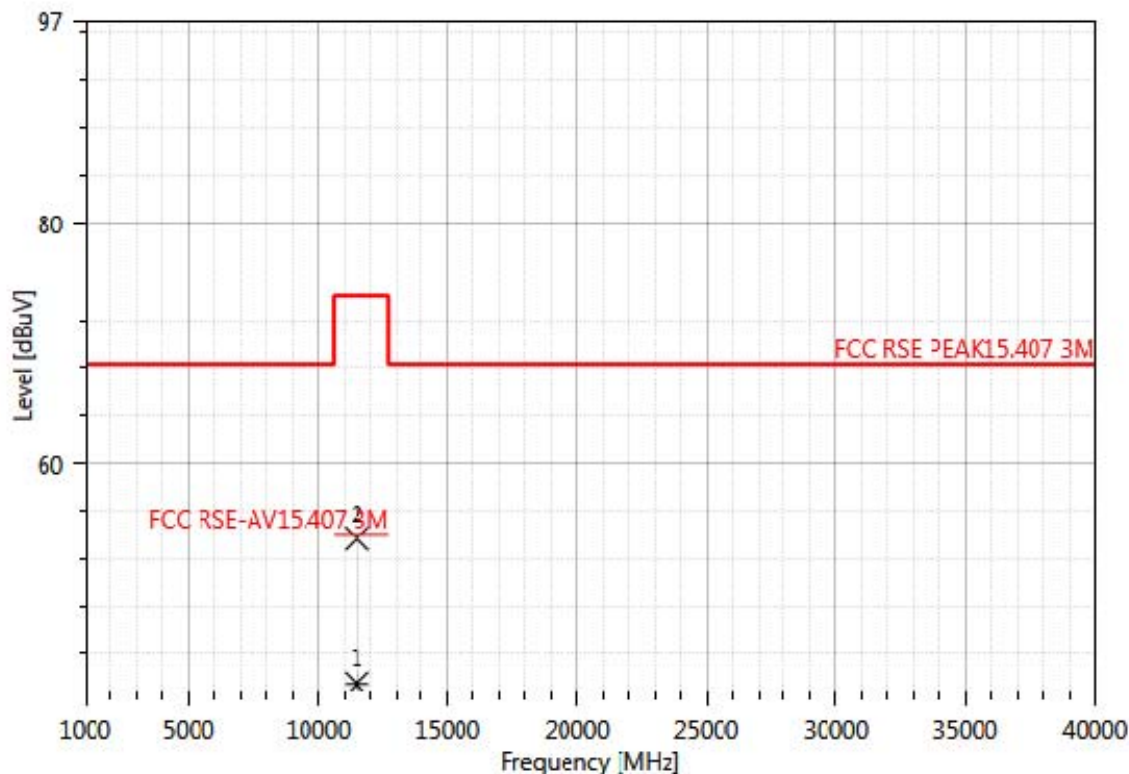
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Above 1GHz Worst-Case Data(Internal Antenna):

Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Mode :	802.11aB4	Test Date :	02/22/2016 19:58:42
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
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
11490.00	H	41.53	21.11	20.42	54.00	-12.47
11490.00	H	53.68	33.26	20.42	74.00	-20.32

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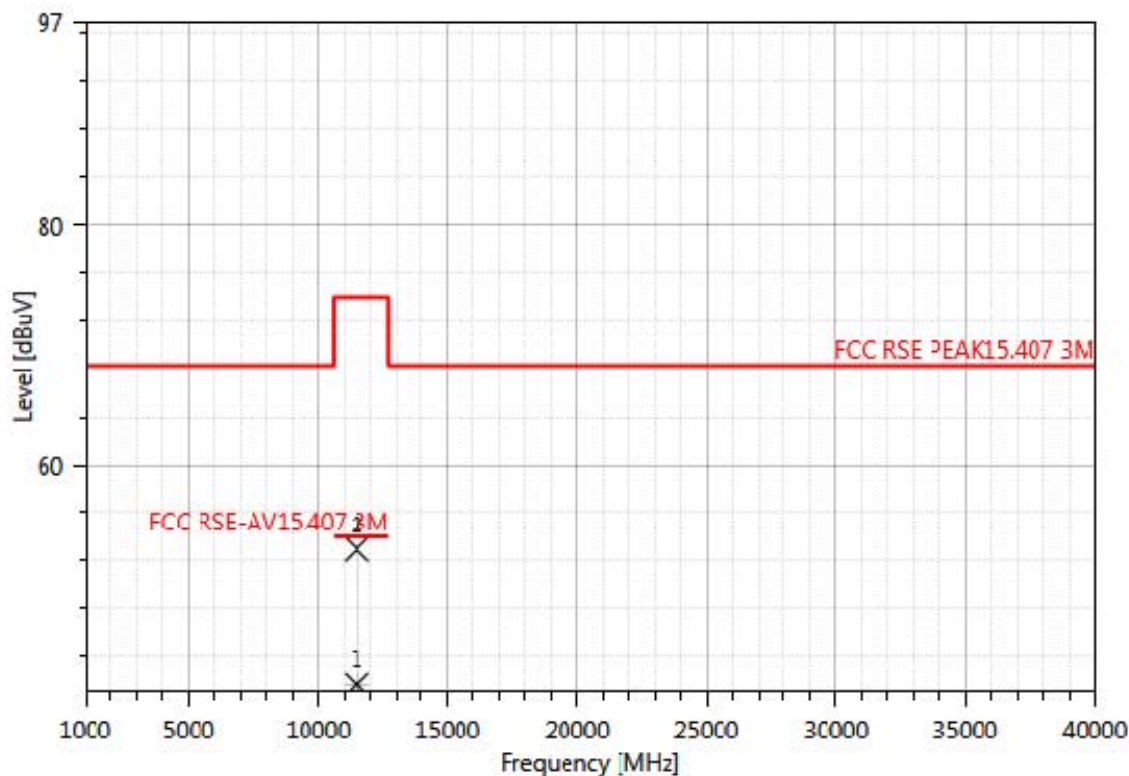
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Operation Mode :	802.11aB4	Test Date :	02/22/2016 19:58:53
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11490.00	H	41.65	21.23	20.42	54.00	-12.35
11490.00	H	52.95	32.53	20.42	74.00	-21.05

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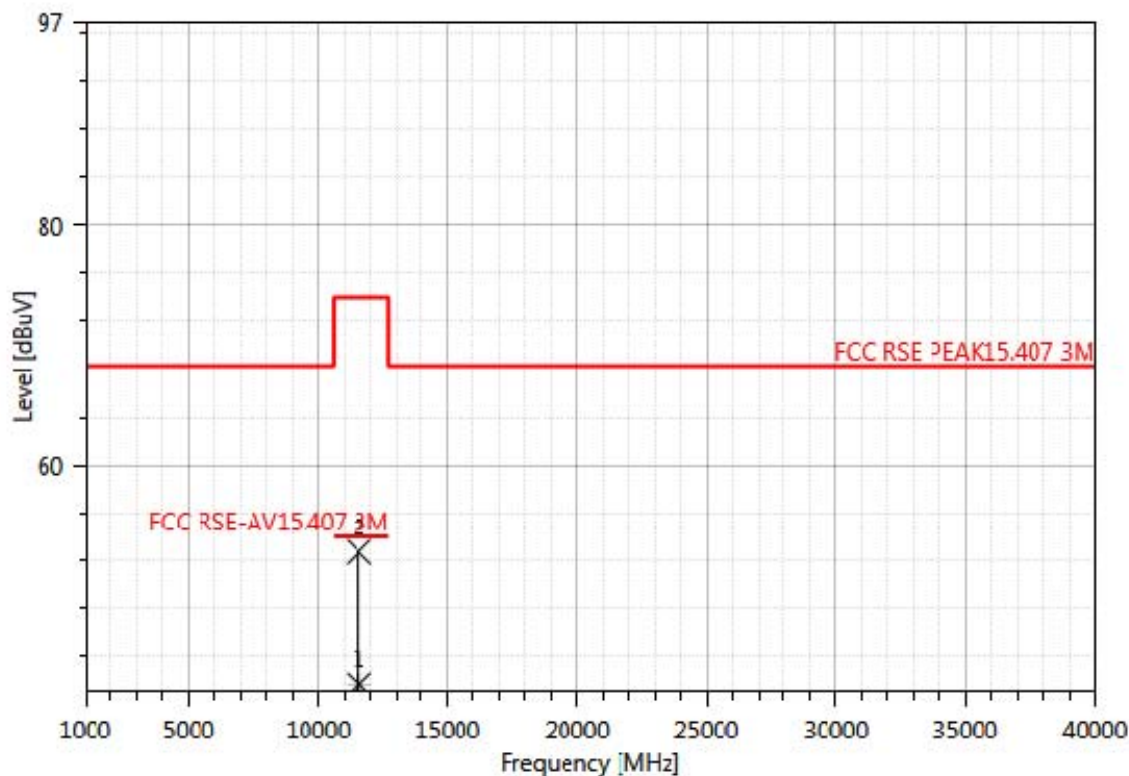
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Operation Mode :	802.11aB4	Test Date :	02/22/2016 20:13:37
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11570.00	H	41.68	21.09	20.59	54.00	-12.32
11570.00	H	52.76	32.17	20.59	74.00	-21.24

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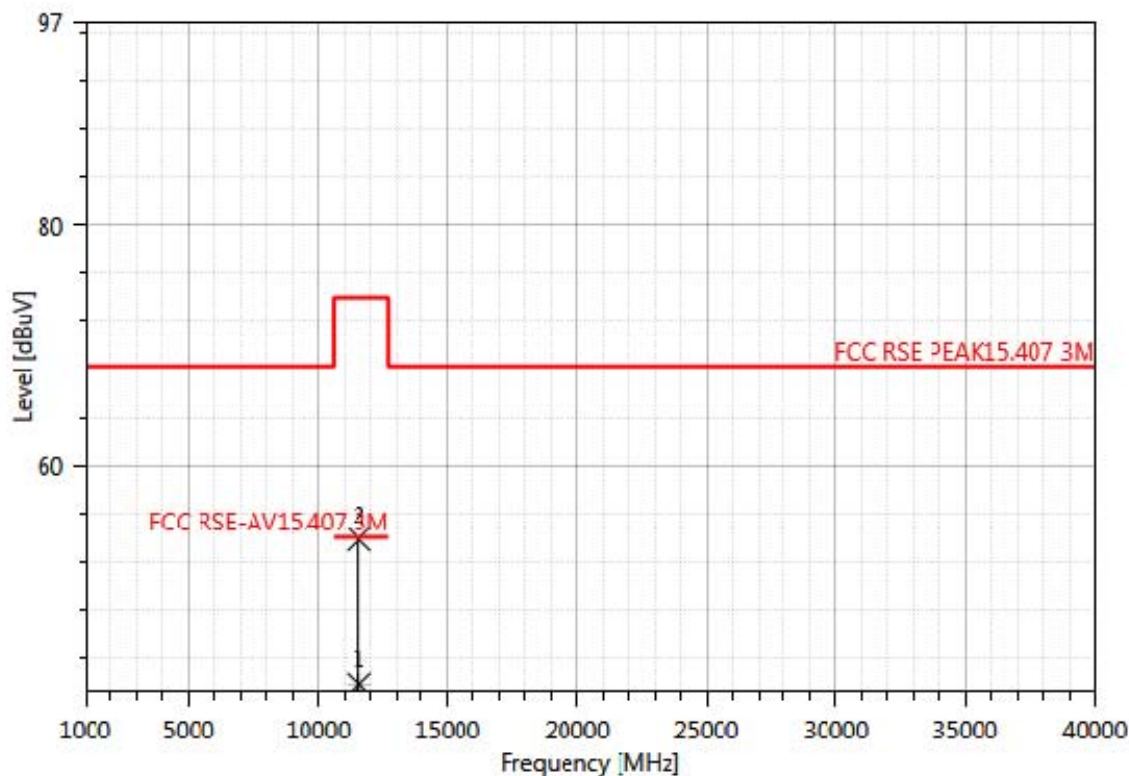
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Operation Mode : 802.11aB4
Fundamental Frequency : 5785 MHz
Operation Band : Tx CH MID
EUT Pol. : H Plane

Test Date : 02/22/2016 20:13:48
Temp. / Humi. : 21 deg_C / 62 RH
Test Engineer : Tin
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
11570.00	H	41.75	21.16	20.59	54.00	-12.25
11570.00	H	53.86	33.28	20.59	74.00	-20.14

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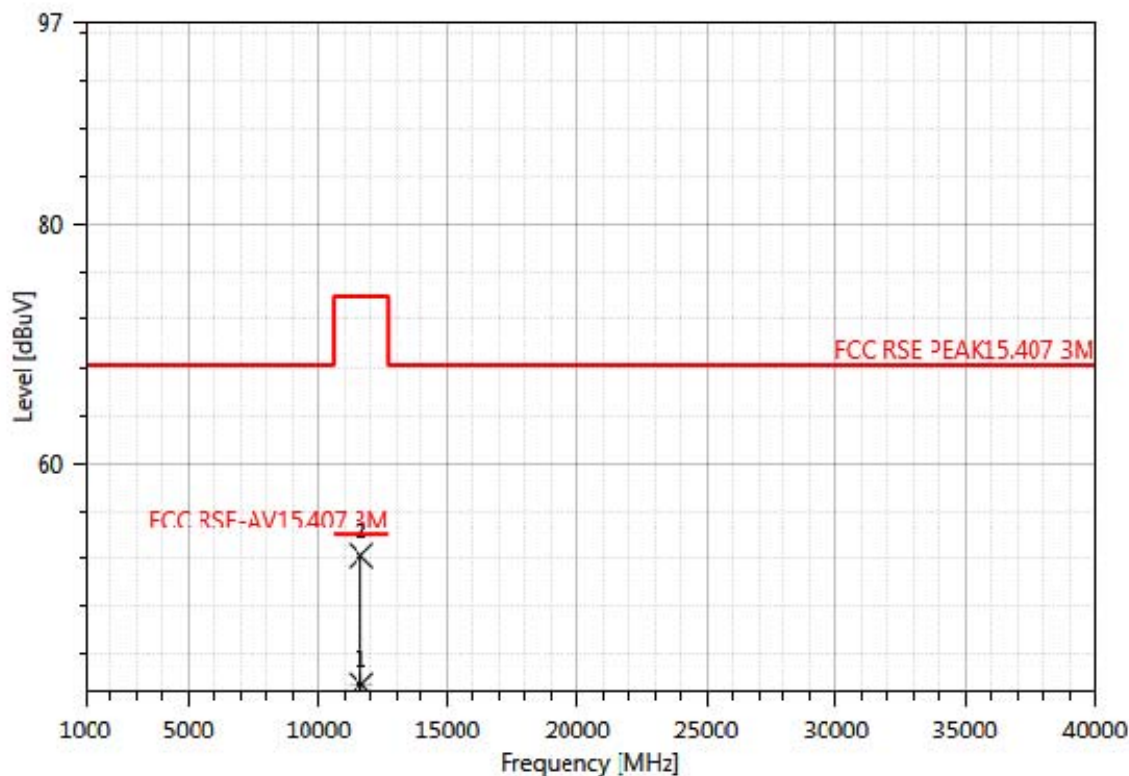
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Operation Mode :	802.11aB4	Test Date :	02/22/2016 20:17:26
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.47	21.04	20.43	54.00	-12.53
11650.00	H	52.27	31.84	20.43	74.00	-21.73

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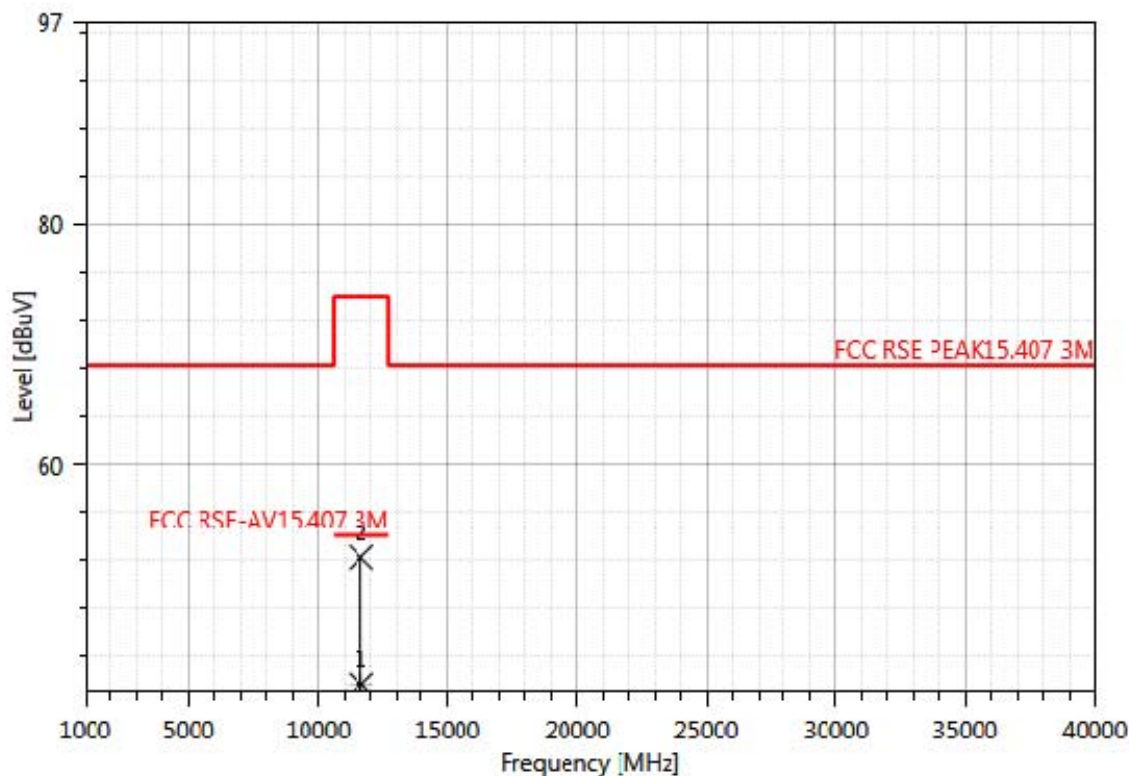
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Operation Mode :	802.11aB4	Test Date :	02/22/2016 20:17:37
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.54	21.11	20.43	54.00	-12.46
11650.00	H	52.18	31.75	20.43	74.00	-21.82

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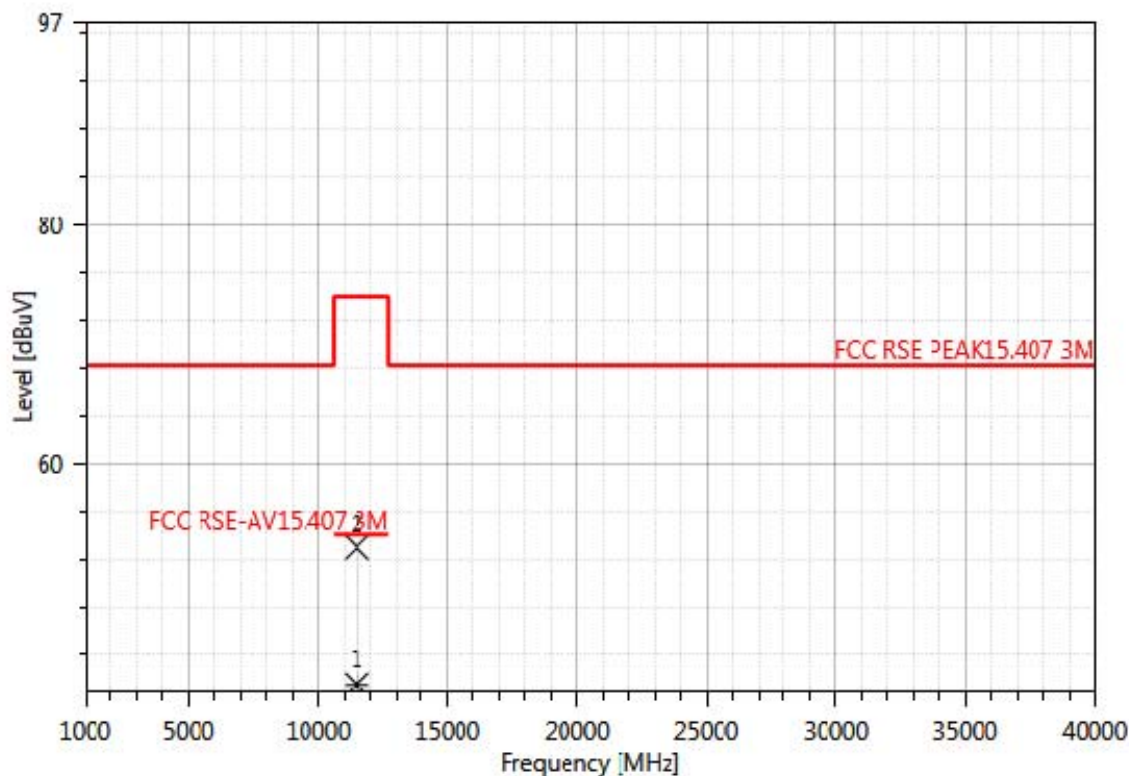
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Radiated Spurious Emission Measurement Result 802.11n HT20, 5725~5850 MHz

Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:21:22
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 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
11490.00	H	41.51	21.09	20.42	54.00	-12.49
11490.00	H	52.98	32.56	20.42	74.00	-21.02

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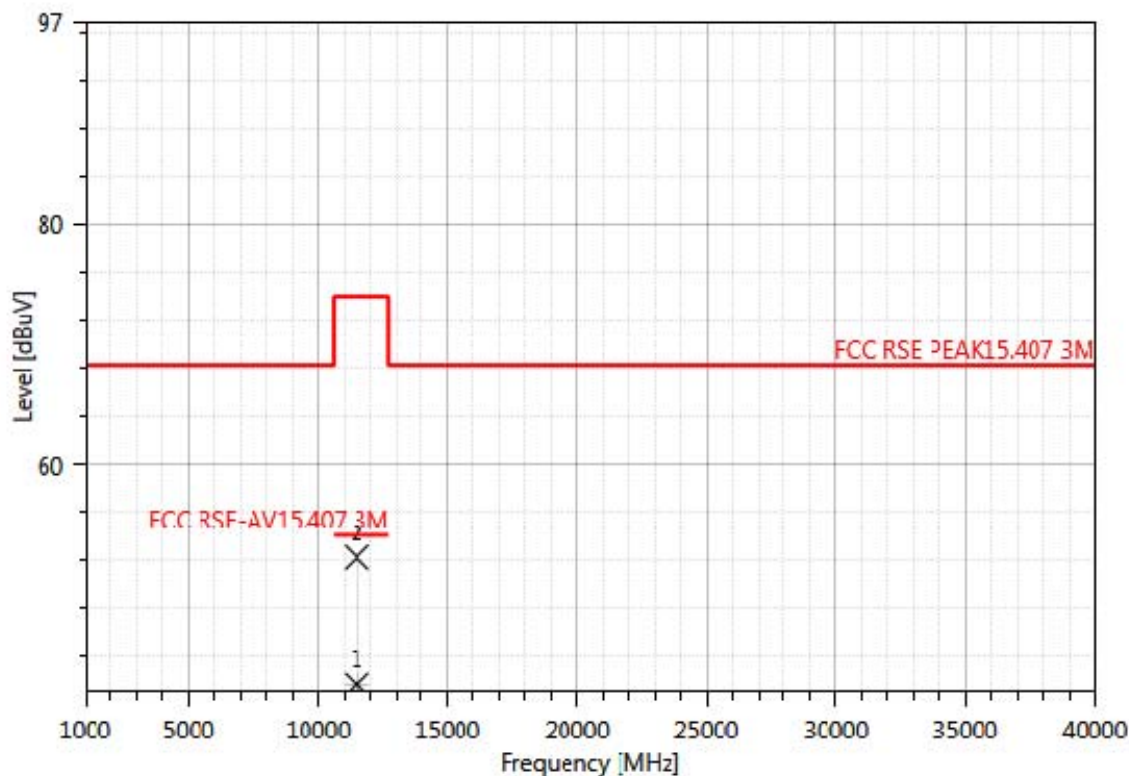
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Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:21:33
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11490.00	H	41.54	21.12	20.42	54.00	-12.46
11490.00	H	52.19	31.77	20.42	74.00	-21.81

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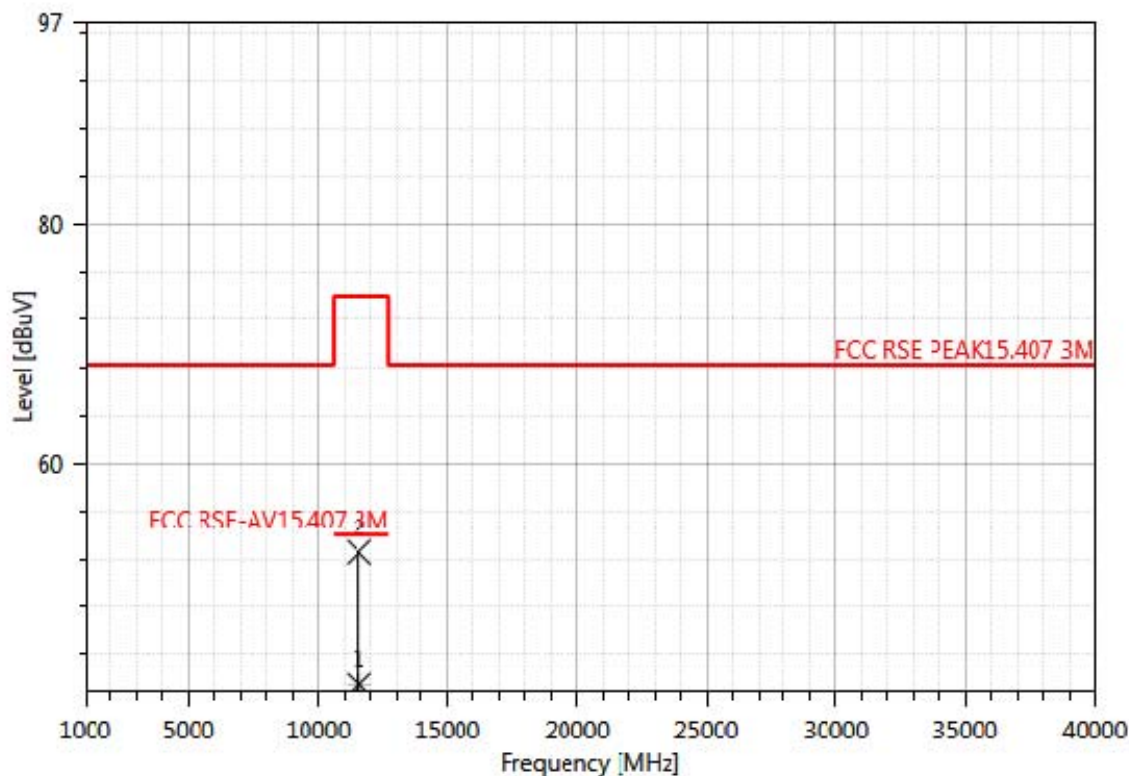
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Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:24:44
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11570.00	H	41.48	20.89	20.59	54.00	-12.52
11570.00	H	52.56	31.97	20.59	74.00	-21.44

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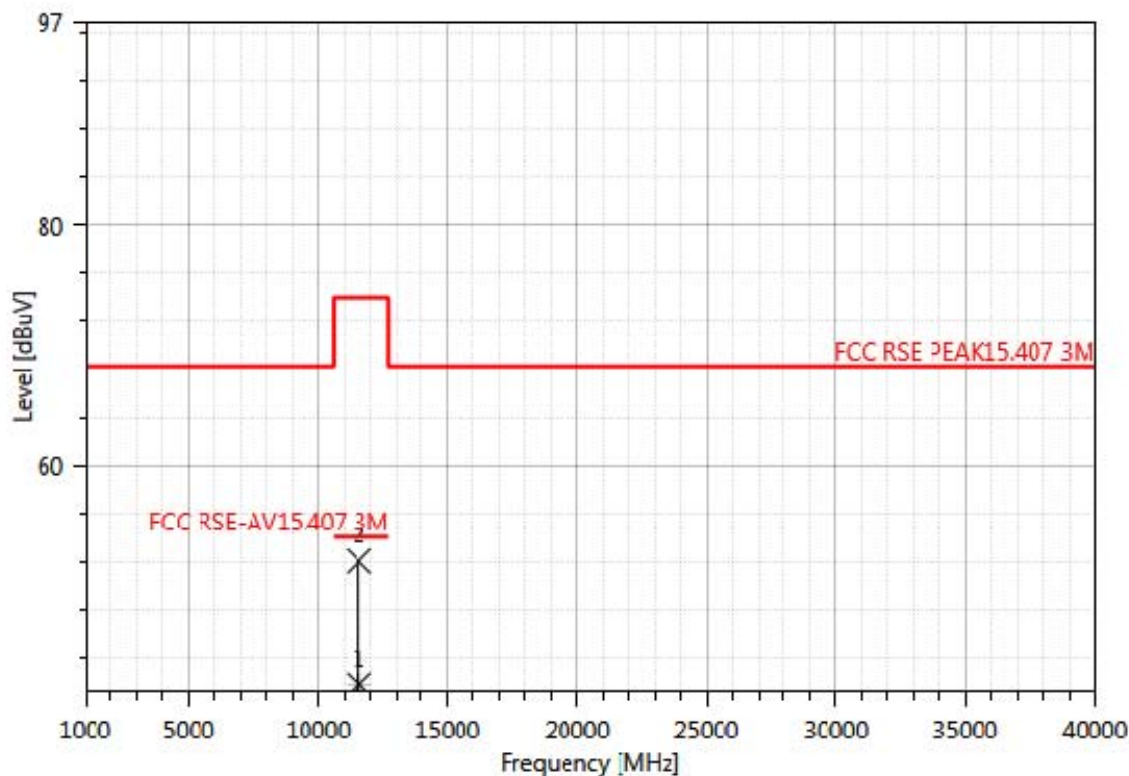
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Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:24:55
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
11570.00	H	41.72	21.13	20.59	54.00	-12.28
11570.00	H	52.04	31.45	20.59	74.00	-21.96

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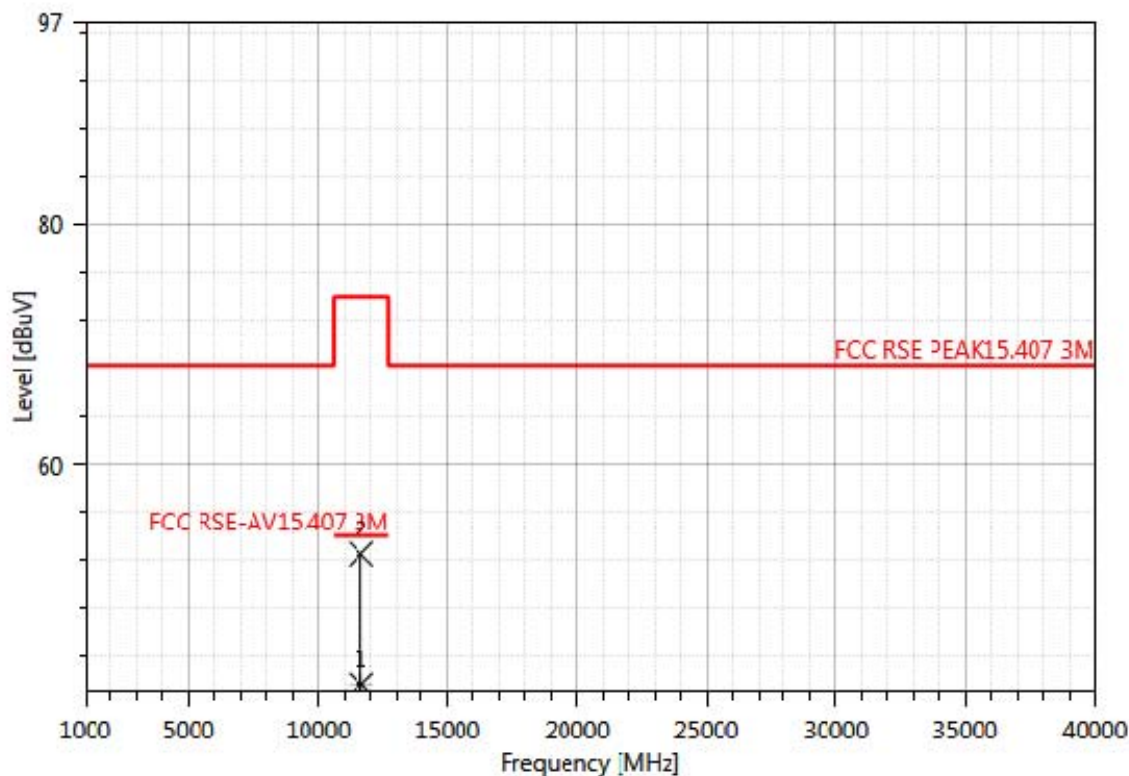
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Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:27:55
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.58	21.15	20.43	54.00	-12.42
11650.00	H	52.49	32.06	20.43	74.00	-21.51

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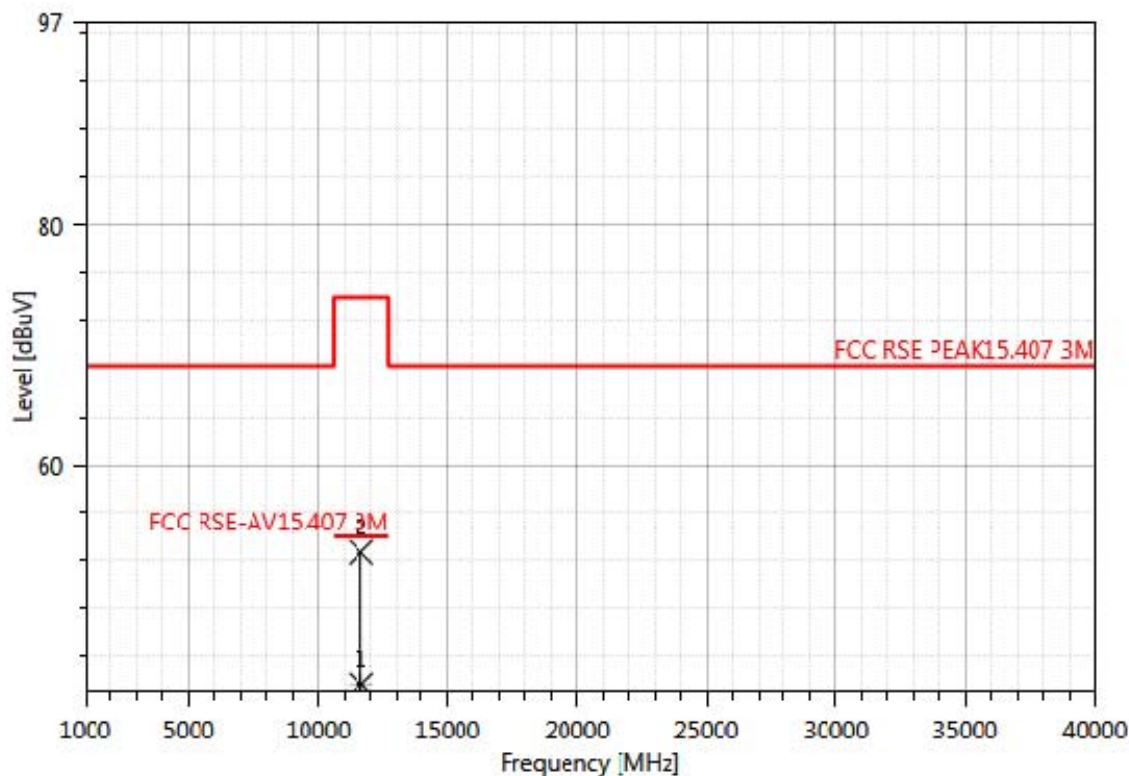
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Operation Mode :	802.11n20B4	Test Date :	02/22/2016 20:28:06
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.65	21.22	20.43	54.00	-12.35
11650.00	H	52.69	32.26	20.43	74.00	-21.31

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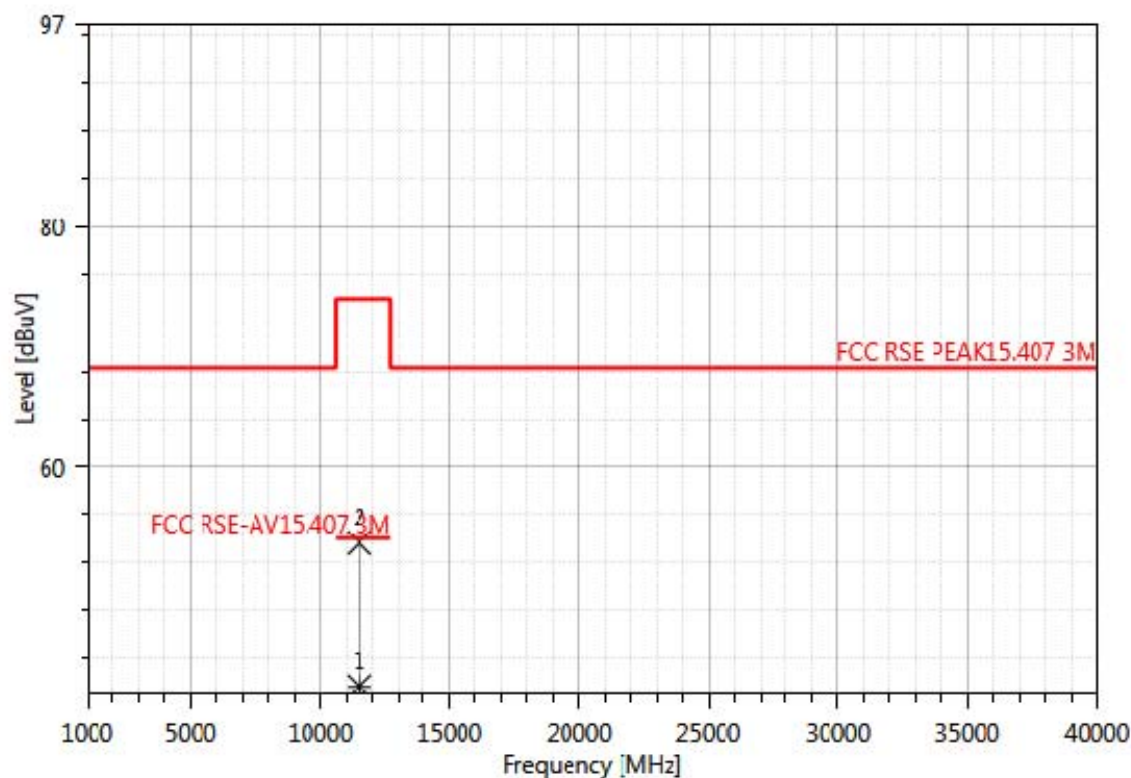
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5725~5850 MHz

Operation Mode :	802.11n40B4	Test Date :	02/22/2016 20:31:12
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 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
11510.00	H	41.61	21.22	20.39	54.00	-12.39
11510.00	H	53.63	33.24	20.39	74.00	-20.37

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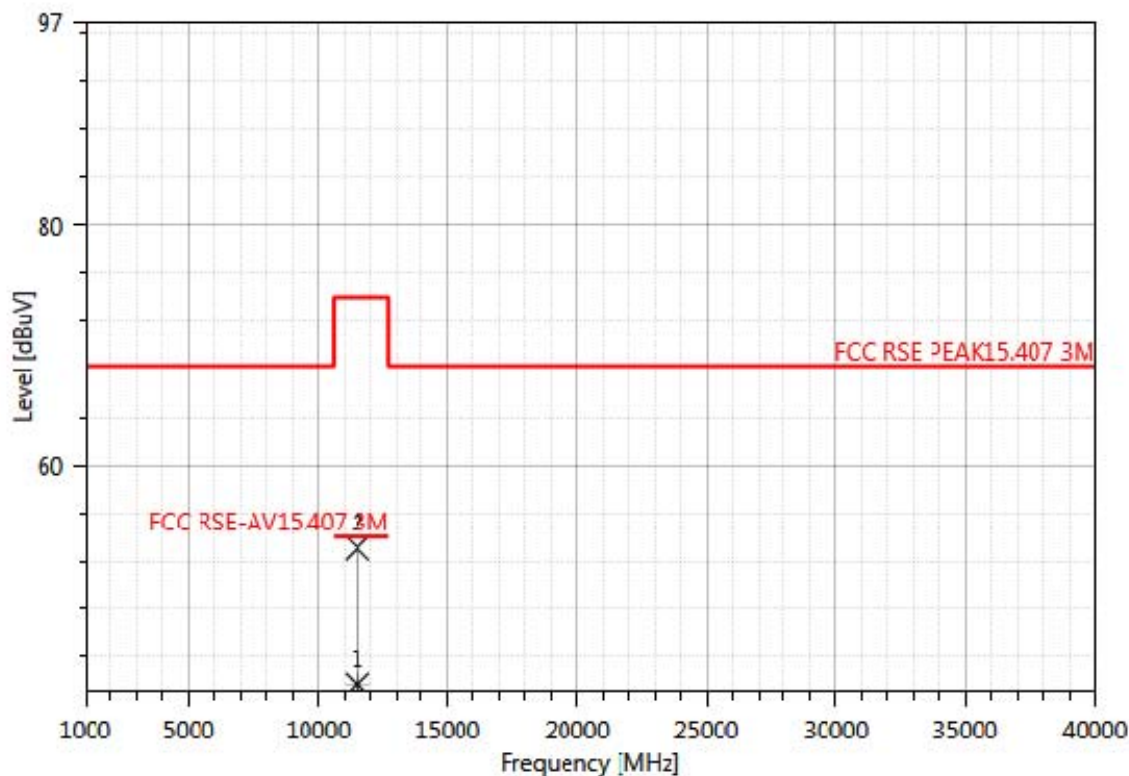
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Operation Mode :	802.11n40B4	Test Date :	02/22/2016 20:31:24
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11510.00	H	41.70	21.31	20.39	54.00	-12.30
11510.00	H	53.07	32.68	20.39	74.00	-20.93

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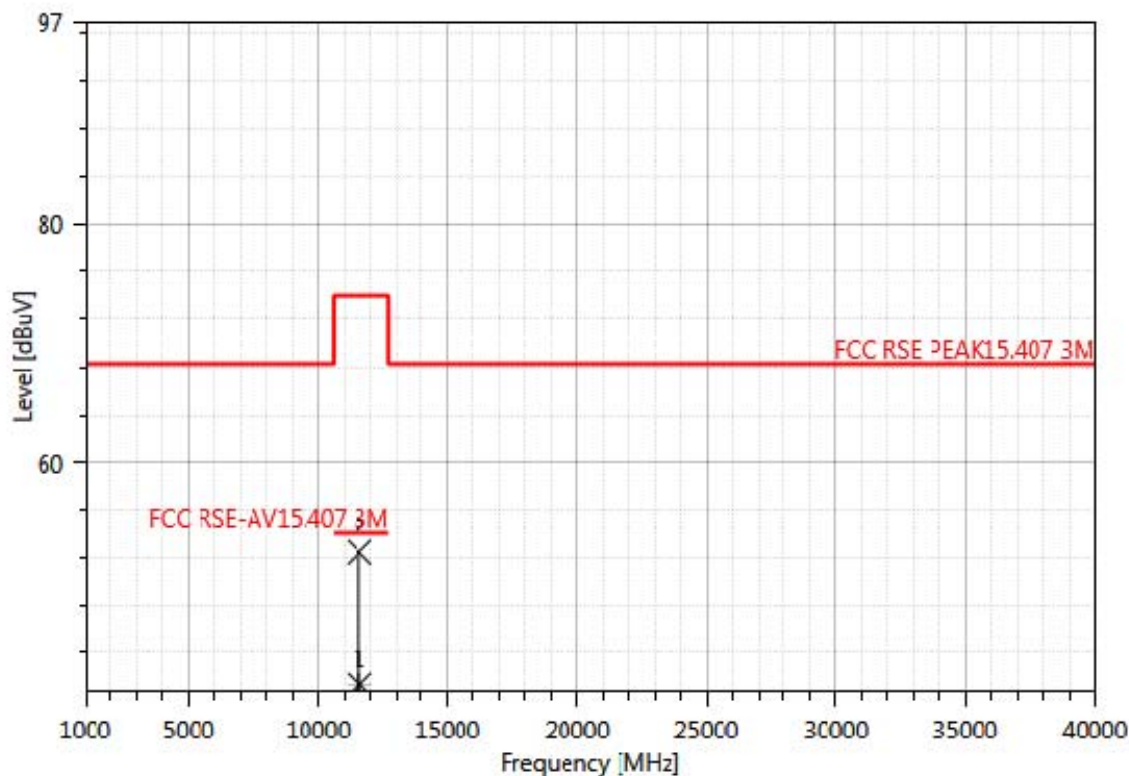
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Operation Mode :	802.11n40B4	Test Date :	02/22/2016 20:35:37
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11590.00	H	41.34	20.91	20.43	54.00	-12.66
11590.00	H	52.45	32.01	20.43	74.00	-21.55

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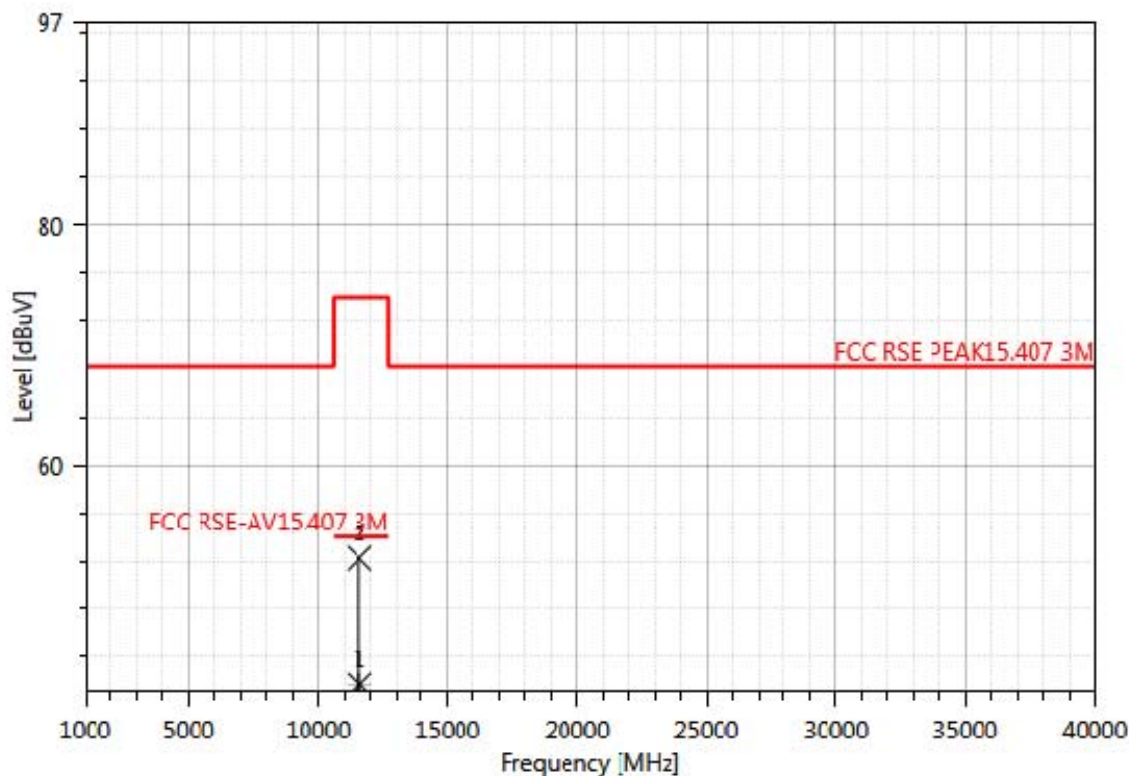
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Operation Mode :	802.11n40B4	Test Date :	02/22/2016 20:35:48
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plane	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level	Reading Level		@3m	
		dBuV/m	dBuV	dB	dBuV/m	dB
11590.00	H	41.34	20.91	20.43	54.00	-12.66
11590.00	H	52.45	32.01	20.43	74.00	-21.55

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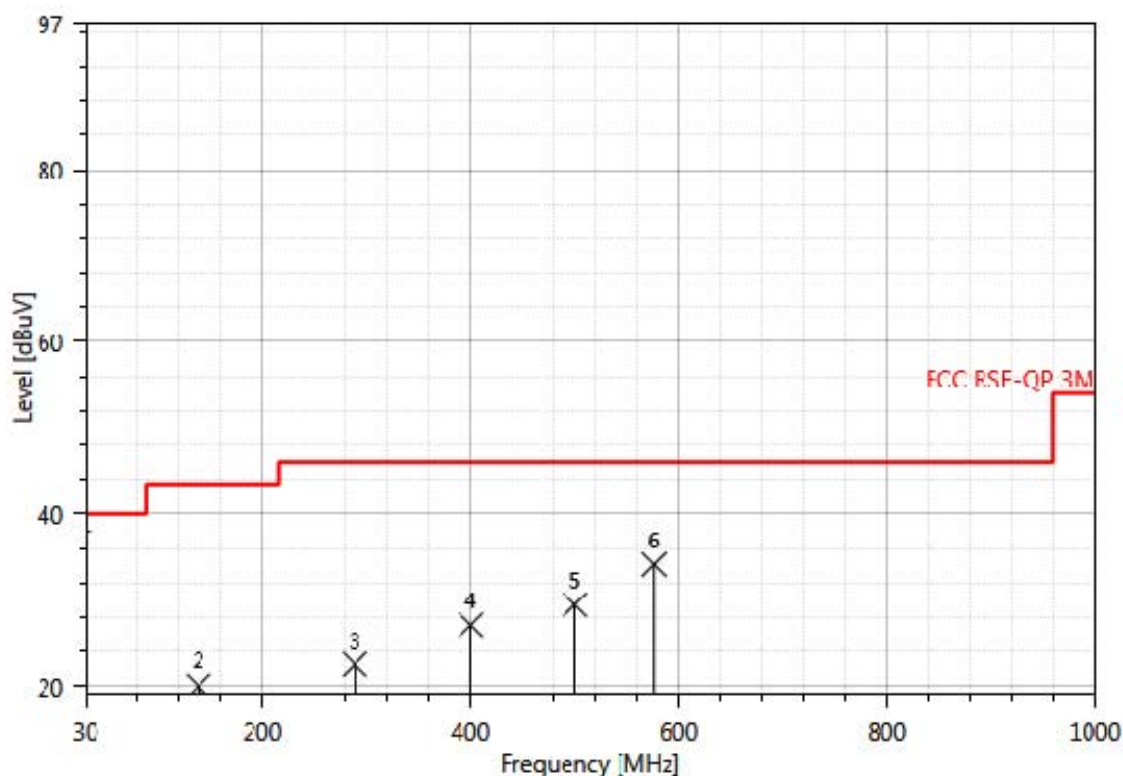
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10.9 Radiated Spurious Emission Measurement Result (External Antenna)

Below 1GHz Worst-Case Data (External Antenna):

802.11a, 5725~5850 MHz

Operation Mode :	802.11aB4	Test Date :	02/23/2016 01:37:36
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plan	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
30.00	S	35.89	45.07	-9.19	40.00	-4.11
138.64	S	20.03	28.52	-8.49	43.50	-23.47
288.99	S	22.51	28.59	-6.08	46.00	-23.49
400.54	S	27.13	31.06	-3.94	46.00	-18.87
500.45	S	29.47	32.15	-2.69	46.00	-16.53
576.11	S	34.13	34.78	-0.64	46.00	-11.87

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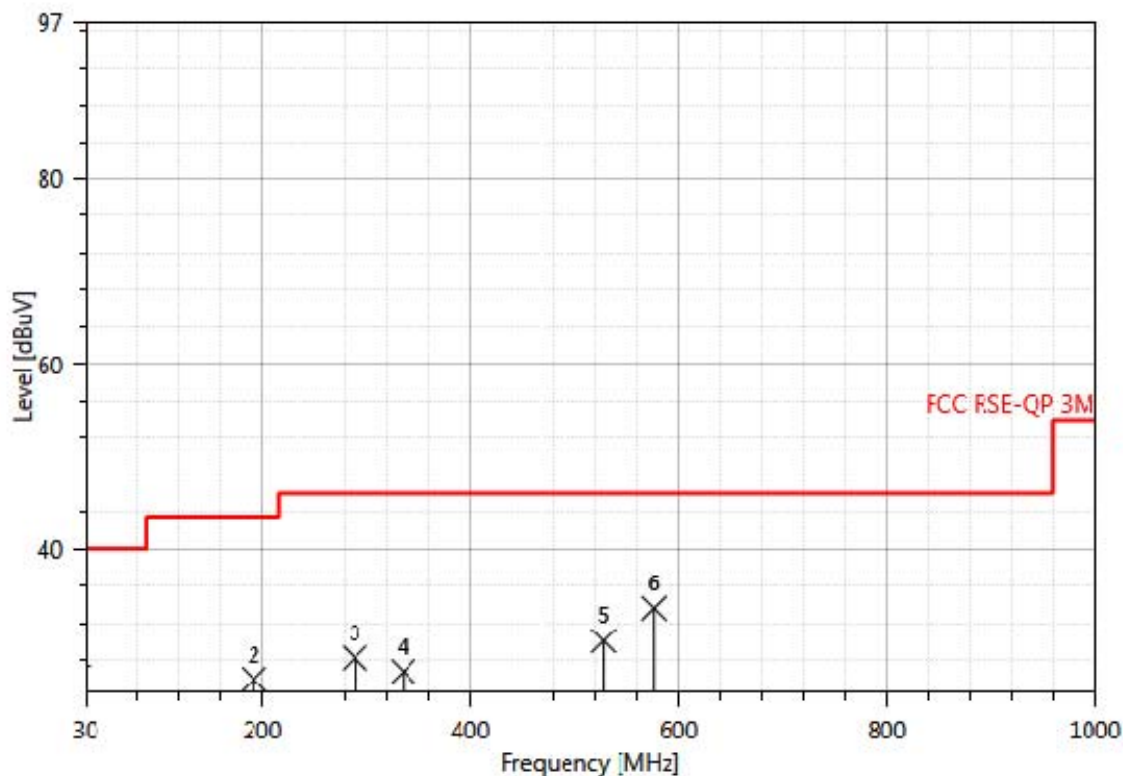
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Operation Mode : 802.11aB4
Fundamental Frequency : 5785 MHz
Operation Band : Tx CH MID
EUT Pol. : H Plan

Test Date : 02/23/2016 01:37:37
Temp. / Humi. : 21 deg_C / 62 RH
Test Engineer : Tin
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
30.00	S	25.36	34.55	-9.19	40.00	-14.64
191.99	S	25.92	35.34	-9.42	43.50	-17.58
288.99	S	28.23	34.31	-6.08	46.00	-17.77
335.55	S	26.75	32.07	-5.32	46.00	-19.25
527.61	S	30.07	31.38	-1.32	46.00	-15.93
576.11	S	33.58	34.23	-0.64	46.00	-12.42

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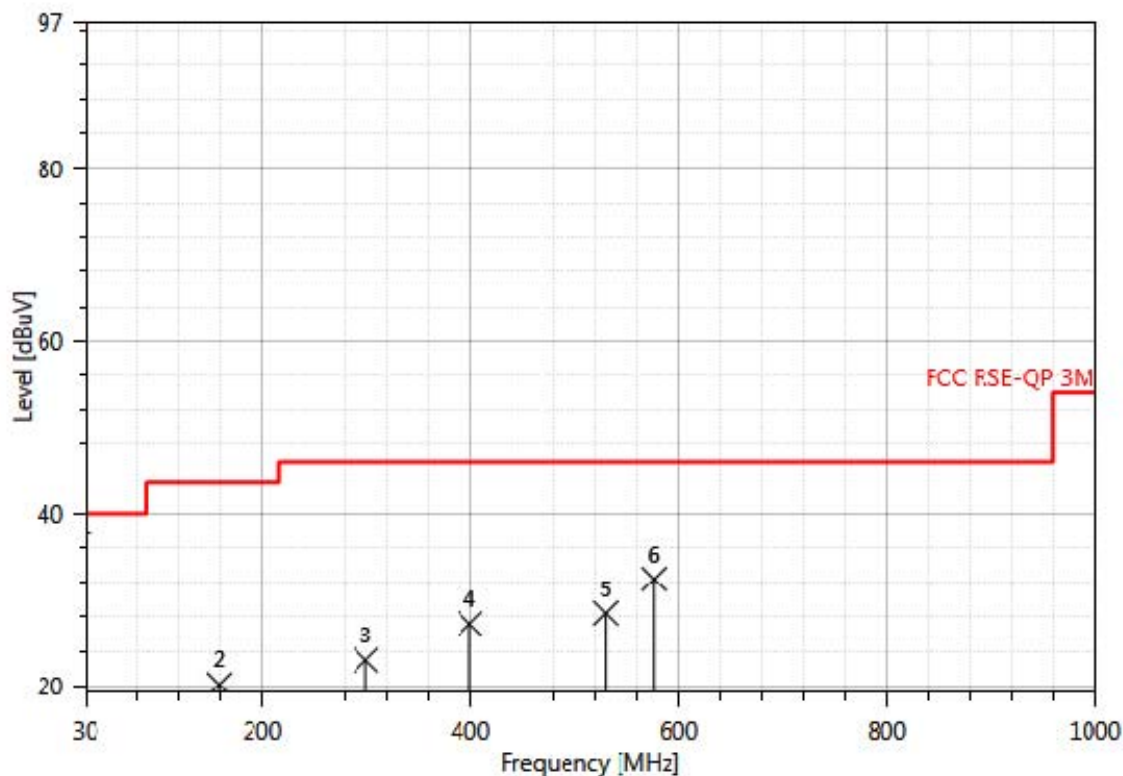
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802.11n HT40, 5725~5850 MHz

Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:37:38
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	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
30.00	S	35.48	44.67	-9.19	40.00	-4.52
159.01	S	20.16	27.54	-7.38	43.50	-23.34
299.66	S	22.99	28.92	-5.93	46.00	-23.01
399.57	S	27.23	31.16	-3.93	46.00	-18.77
529.55	S	28.45	29.70	-1.25	46.00	-17.55
576.11	S	32.39	33.04	-0.64	46.00	-13.61

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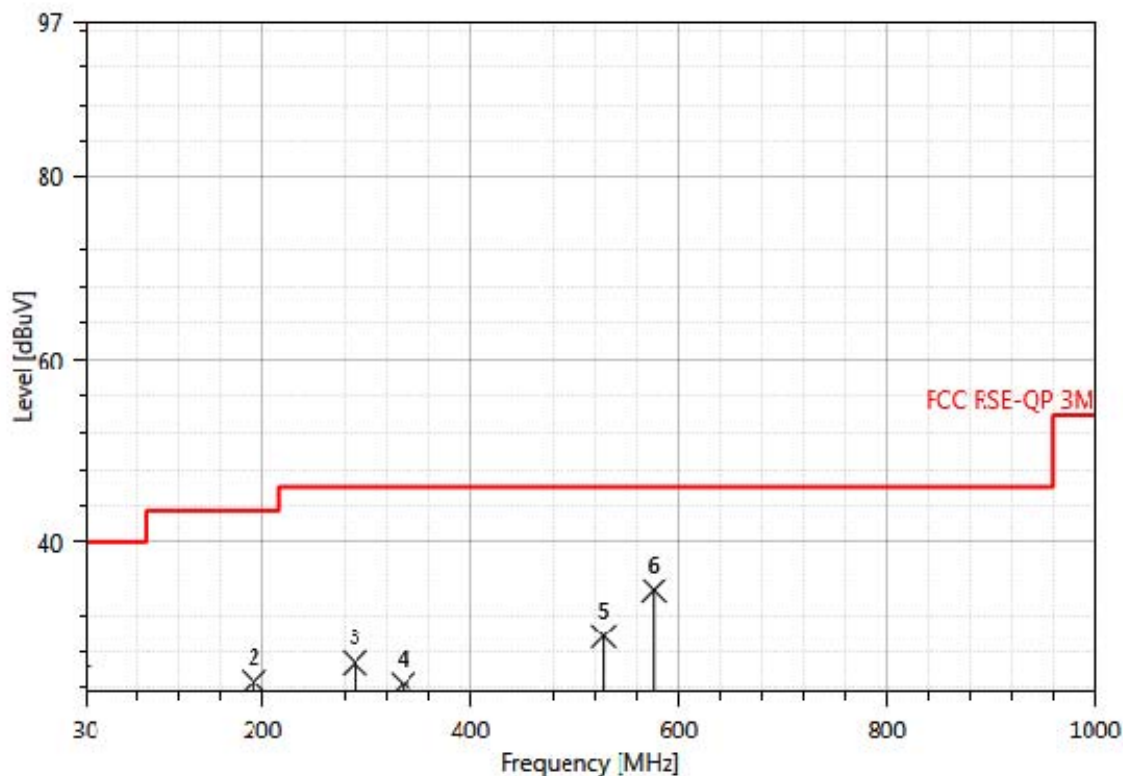
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Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:37:39
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
30.00	S	24.45	33.64	-9.19	40.00	-15.55
191.99	S	24.74	34.16	-9.42	43.50	-18.76
288.99	S	26.81	32.89	-6.08	46.00	-19.19
335.55	S	24.49	29.81	-5.32	46.00	-21.51
527.61	S	29.71	31.03	-1.32	46.00	-16.29
576.11	S	34.70	35.34	-0.64	46.00	-11.30

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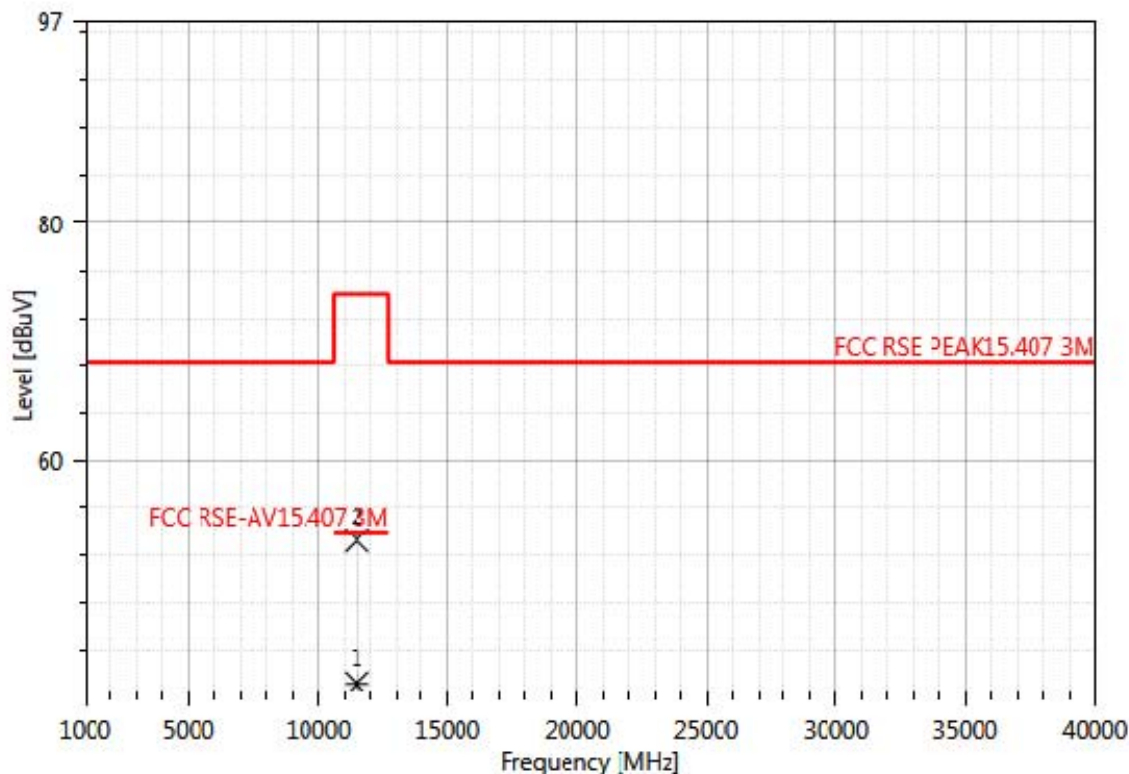
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Above 1GHz Worst-Case Data(External Antenna):

Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Mode :	802.11aB4	Test Date :	02/23/2016 00:48:23
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	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
11490.00	H	41.20	20.78	20.42	54.00	-12.80
11490.00	H	53.27	32.85	20.42	74.00	-20.73

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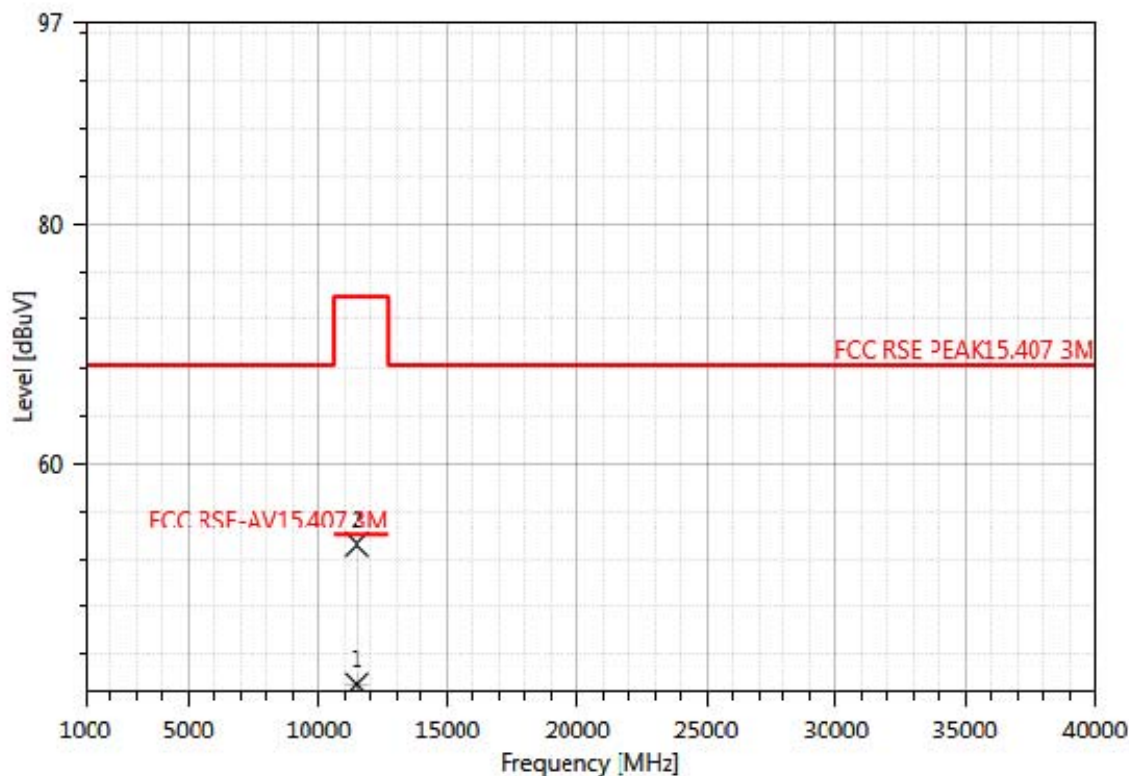
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Operation Mode :	802.11aB4	Test Date :	02/23/2016 00:48:34
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11490.00	H	41.50	21.08	20.42	54.00	-12.50
11490.00	H	53.21	32.79	20.42	74.00	-20.79

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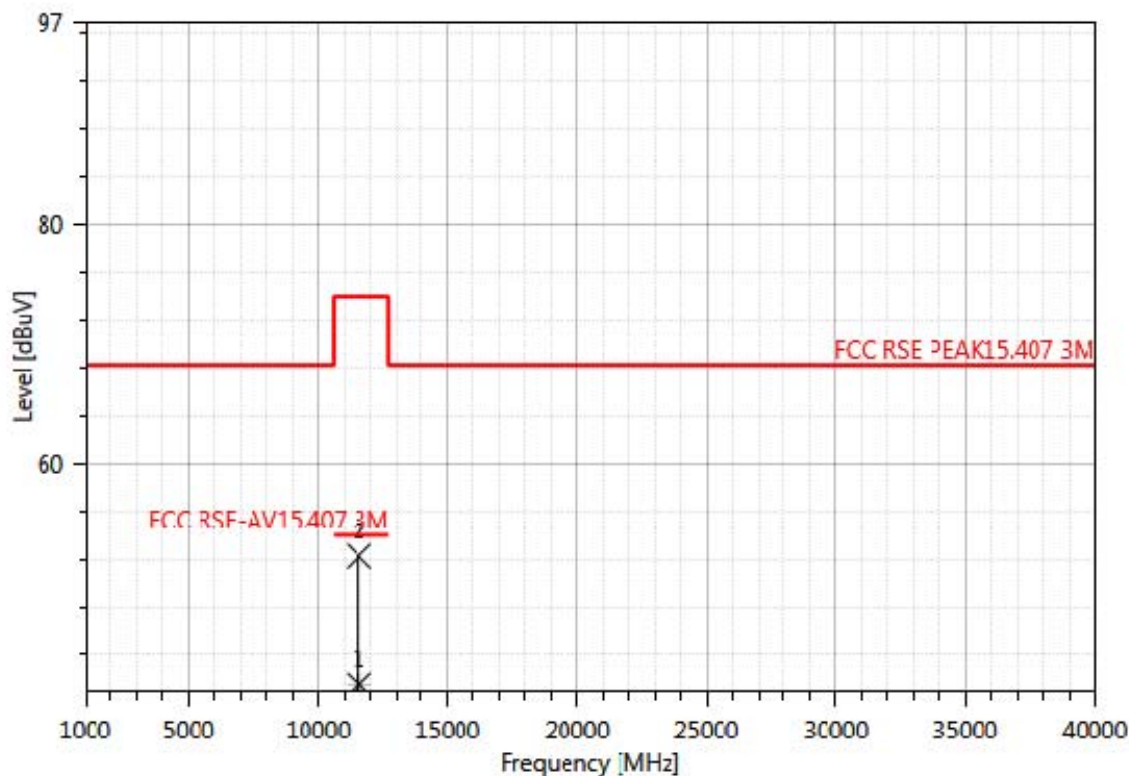
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Operation Mode :	802.11aB4	Test Date :	02/23/2016 00:52:46
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11570.00	H	41.52	20.93	20.59	54.00	-12.48
11570.00	H	52.27	31.68	20.59	74.00	-21.73

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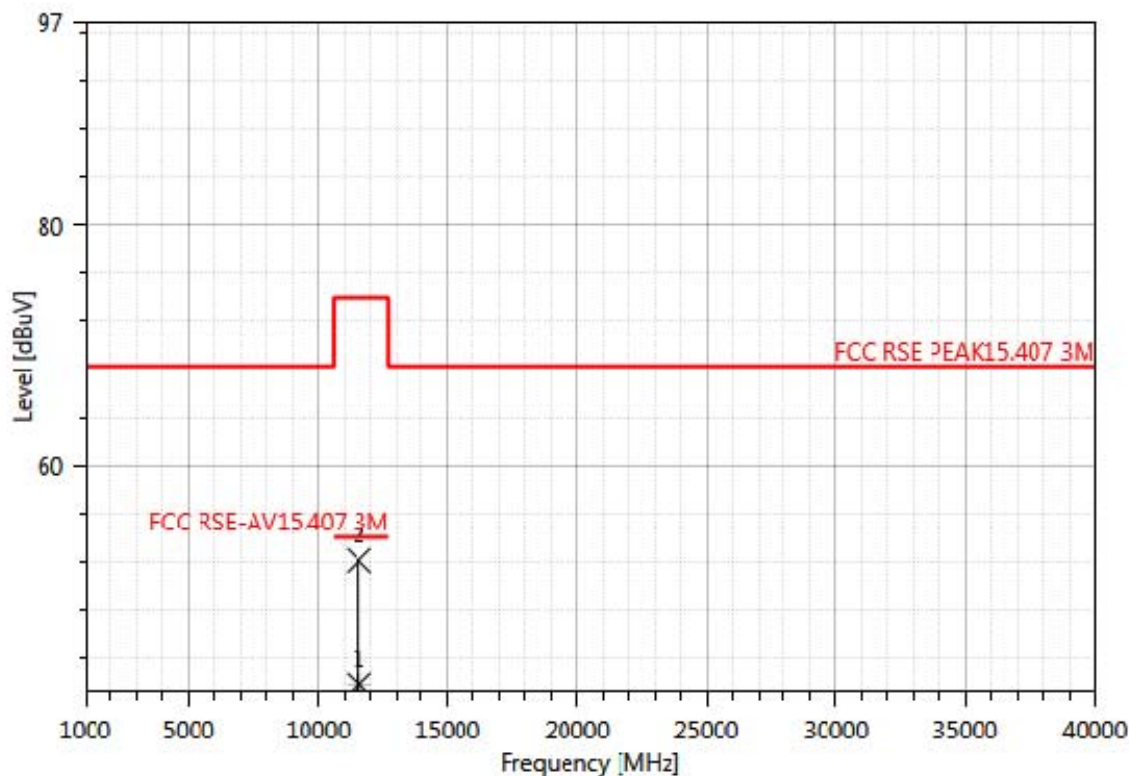
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Operation Mode : 802.11aB4
Fundamental Frequency : 5785 MHz
Operation Band : Tx CH MID
EUT Pol. : H Plan

Test Date : 02/23/2016 00:52:57
Temp. / Humi. : 21 deg_C / 62 RH
Test Engineer : Tin
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
11570.00	H	41.75	21.16	20.59	54.00	-12.25
11570.00	H	52.10	31.51	20.59	74.00	-21.90

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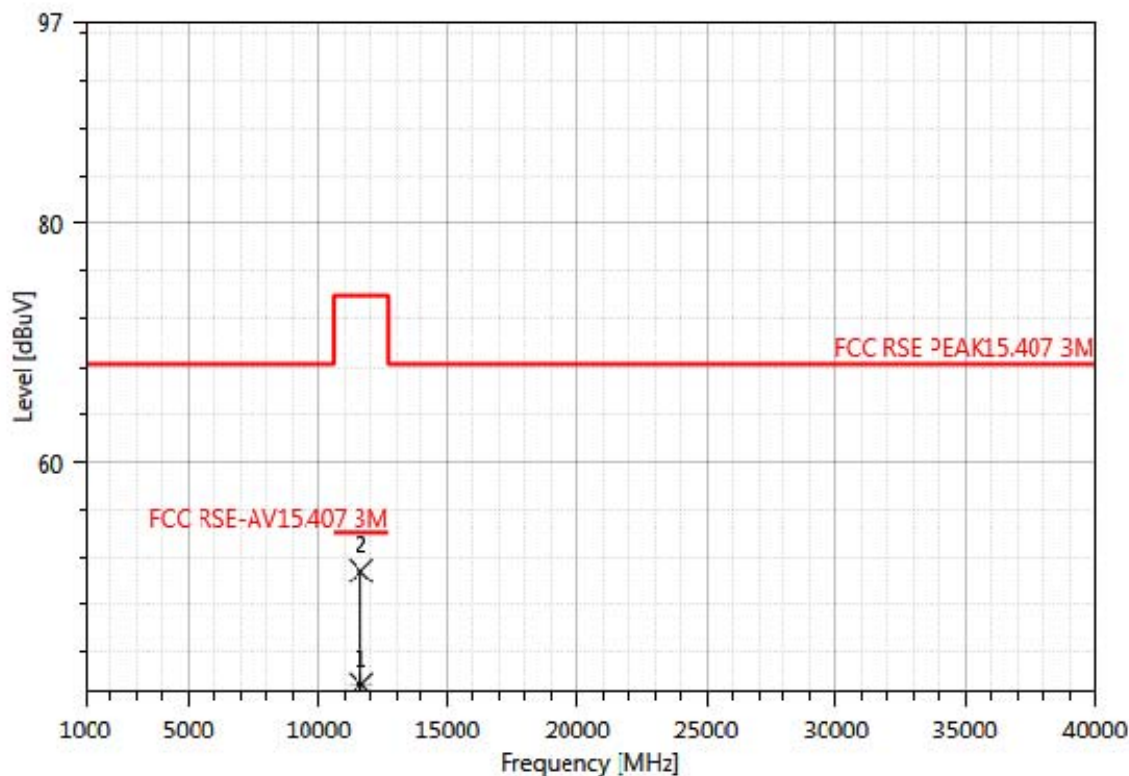
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Operation Mode :	802.11aB4	Test Date :	02/23/2016 00:54:52
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.31	20.88	20.43	54.00	-12.69
11650.00	H	50.85	30.42	20.43	74.00	-23.15

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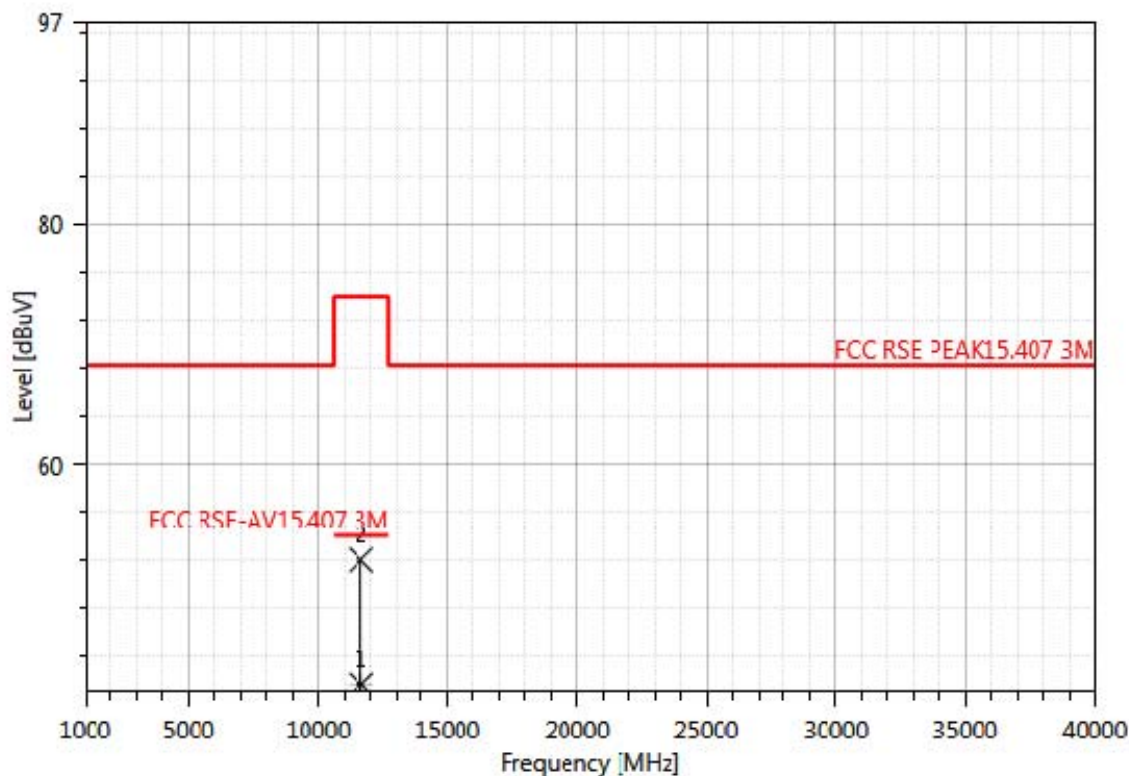
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Operation Mode :	802.11aB4	Test Date :	02/23/2016 00:55:03
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.54	21.11	20.43	54.00	-12.46
11650.00	H	51.99	31.56	20.43	74.00	-22.01

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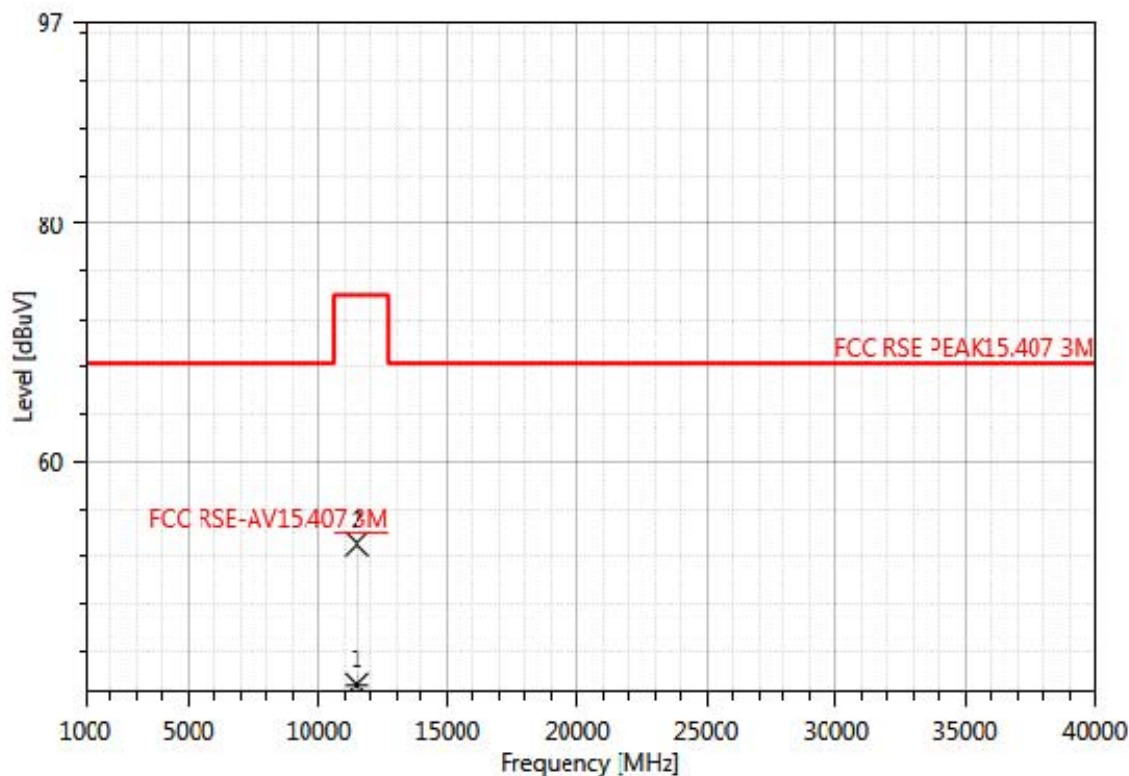
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Radiated Spurious Emission Measurement Result 802.11n HT20, 5725~5850 MHz

Operation Mode :	802.11n20B4	Test Date :	02/23/2016 00:58:09
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	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
11490.00	H	41.21	20.79	20.42	54.00	-12.79
11490.00	H	53.02	32.60	20.42	74.00	-20.98

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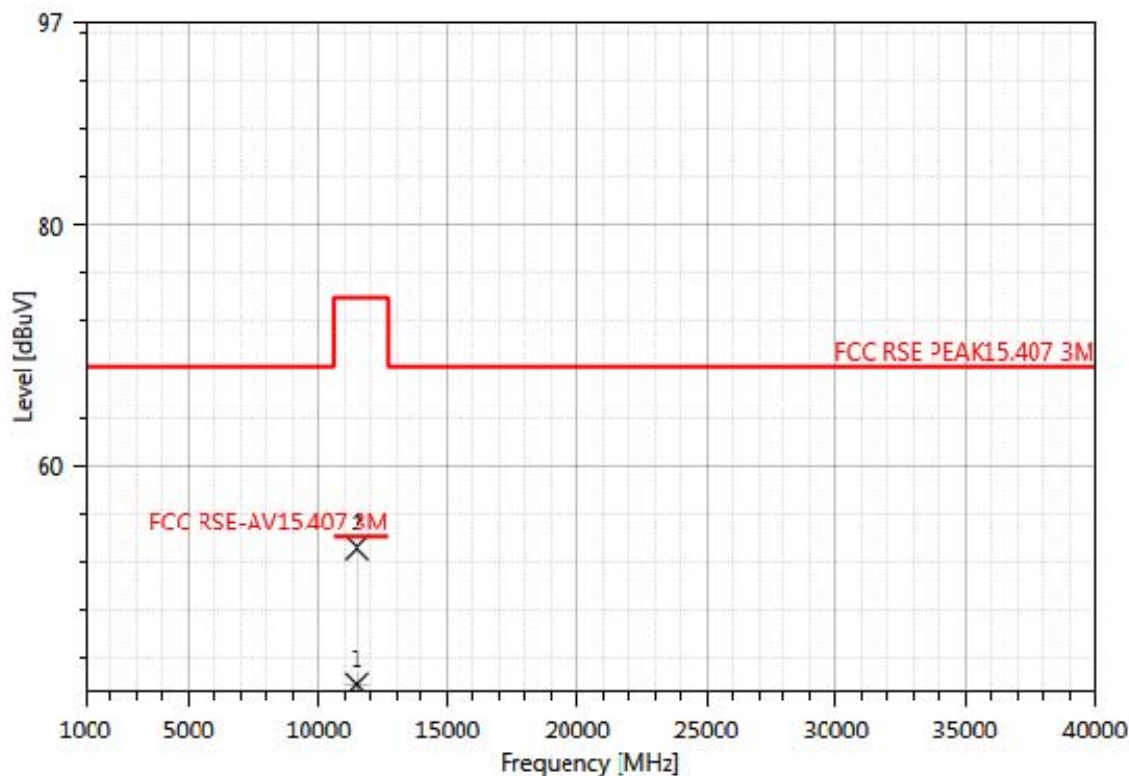
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Operation Mode :	802.11n20B4	Test Date :	02/23/2016 00:58:21
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11490.00	H	41.72	21.30	20.42	54.00	-12.28
11490.00	H	53.10	32.68	20.42	74.00	-20.90

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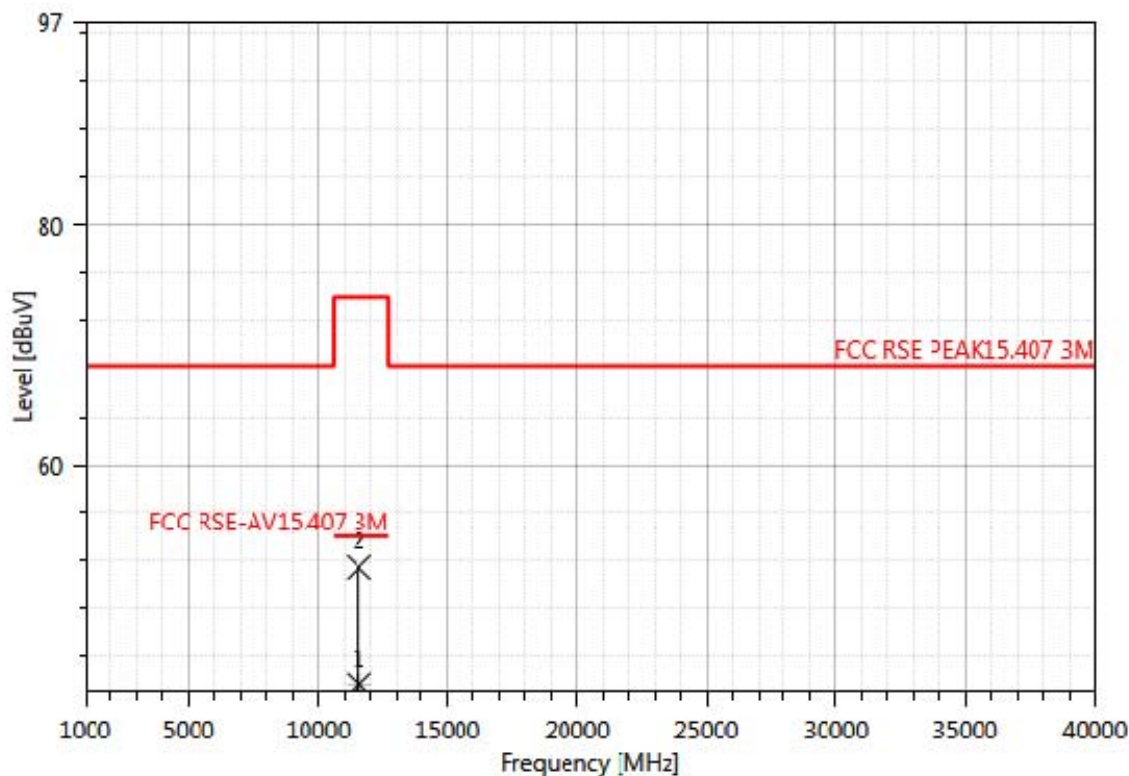
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Operation Mode :	802.11n20B4	Test Date :	02/23/2016 01:02:16
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11570.00	H	41.65	21.06	20.59	54.00	-12.35
11570.00	H	51.47	30.88	20.59	74.00	-22.53

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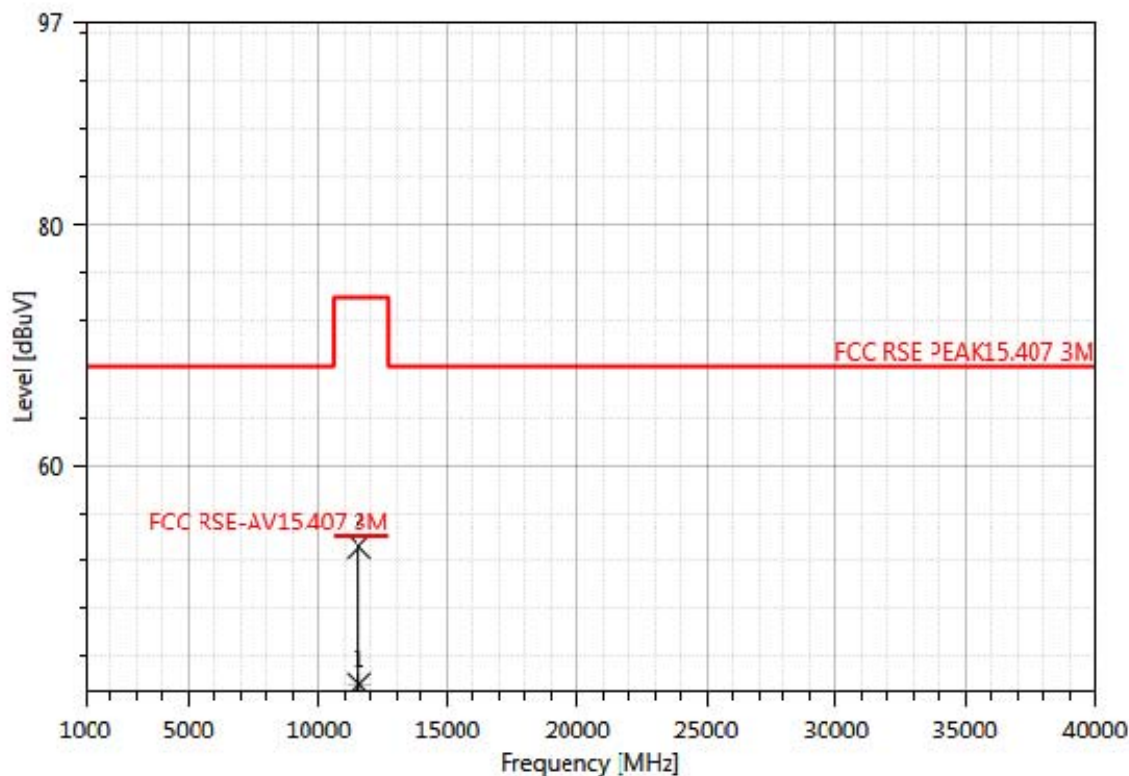
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Operation Mode :	802.11n20B4	Test Date :	02/23/2016 01:02:27
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH MID	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11570.00	H	41.68	21.09	20.59	54.00	-12.32
11570.00	H	53.17	32.59	20.59	74.00	-20.83

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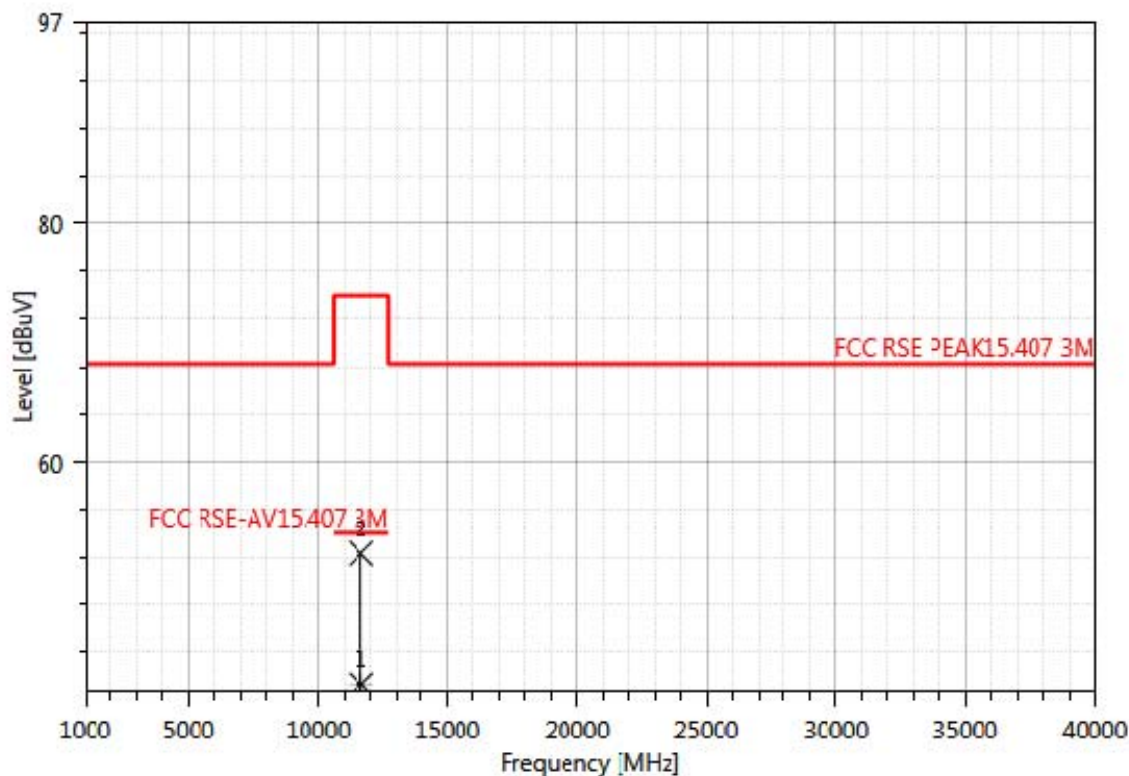
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Operation Mode :	802.11n20B4	Test Date :	02/23/2016 01:04:24
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.31	20.88	20.43	54.00	-12.69
11650.00	H	52.33	31.90	20.43	74.00	-21.67

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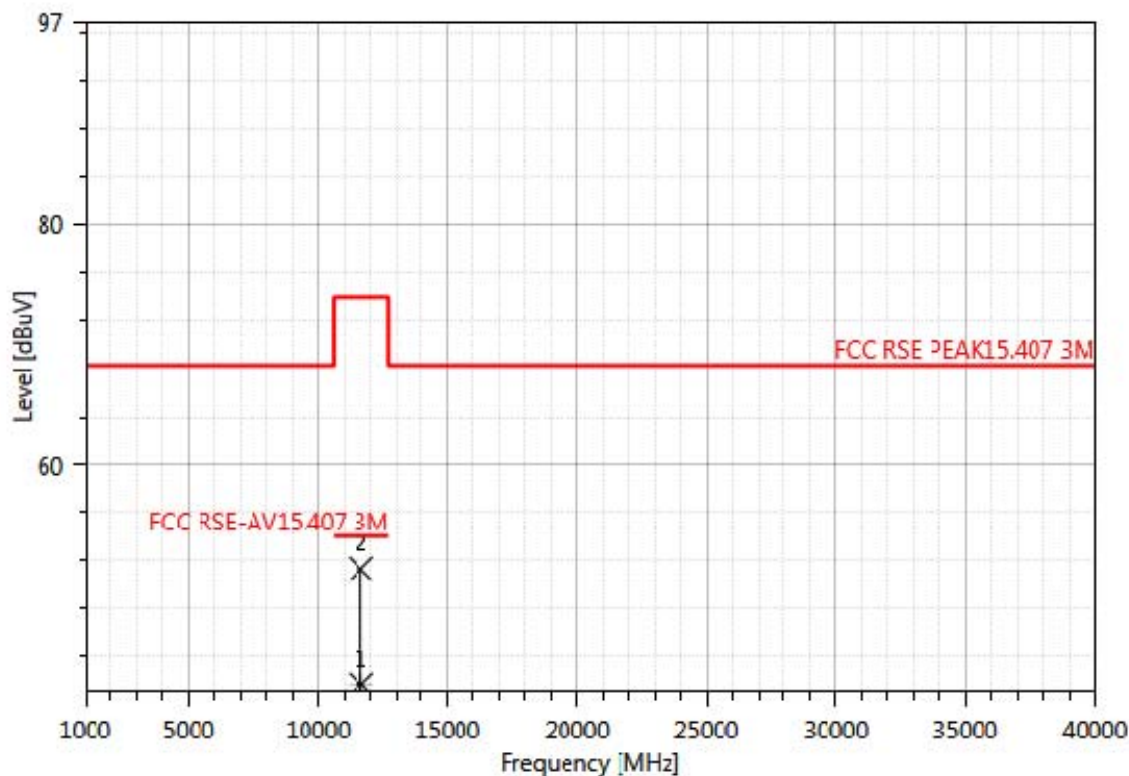
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Operation Mode :	802.11n20B4	Test Date :	02/23/2016 01:04:35
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11650.00	H	41.62	21.19	20.43	54.00	-12.38
11650.00	H	51.28	30.85	20.43	74.00	-22.72

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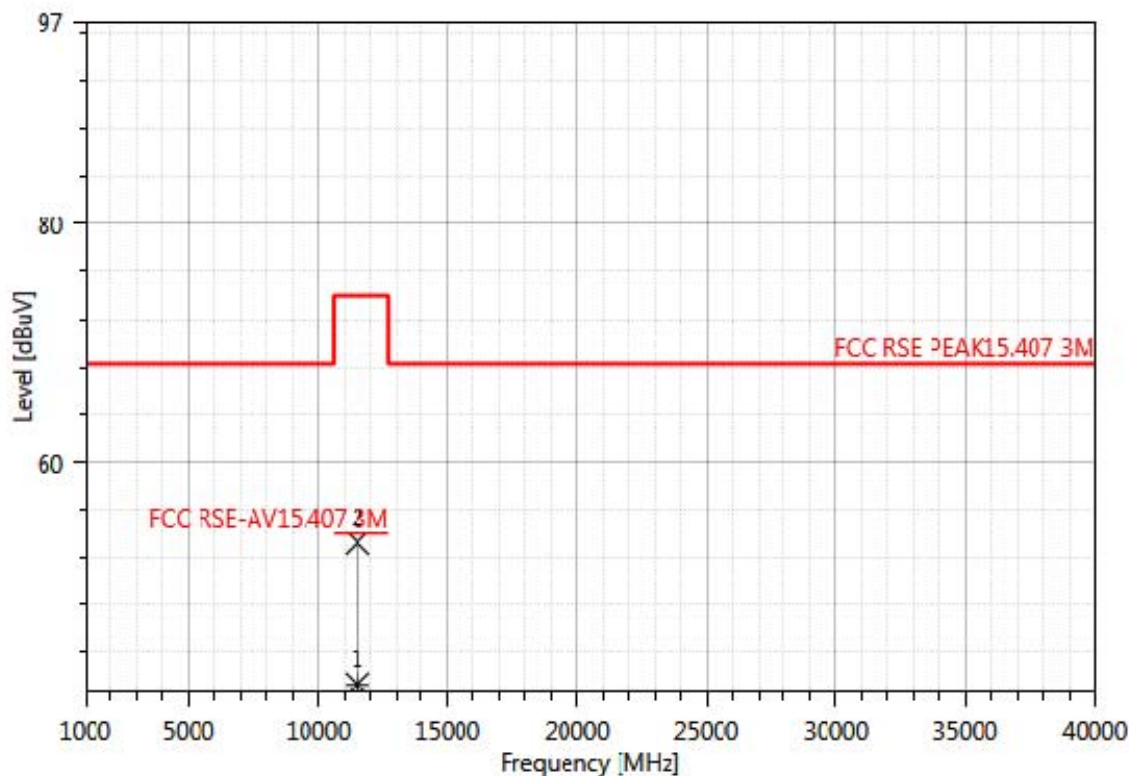
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Radiated Spurious Emission Measurement Result 802.11n HT40, 5725~5850 MHz

Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:07:08
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	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
11510.00	H	41.30	20.91	20.39	54.00	-12.70
11510.00	H	53.21	32.82	20.39	74.00	-20.79

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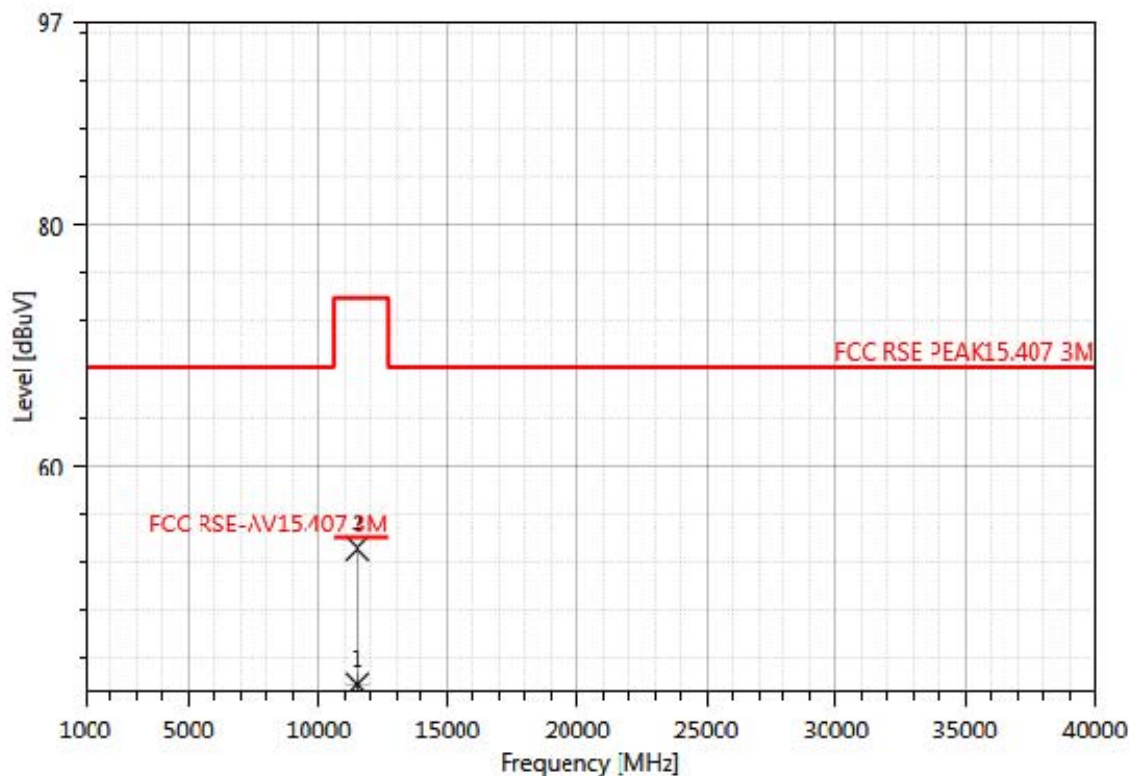
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Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:07:19
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11510.00	H	41.80	21.41	20.39	54.00	-12.20
11510.00	H	53.11	32.72	20.39	74.00	-20.89

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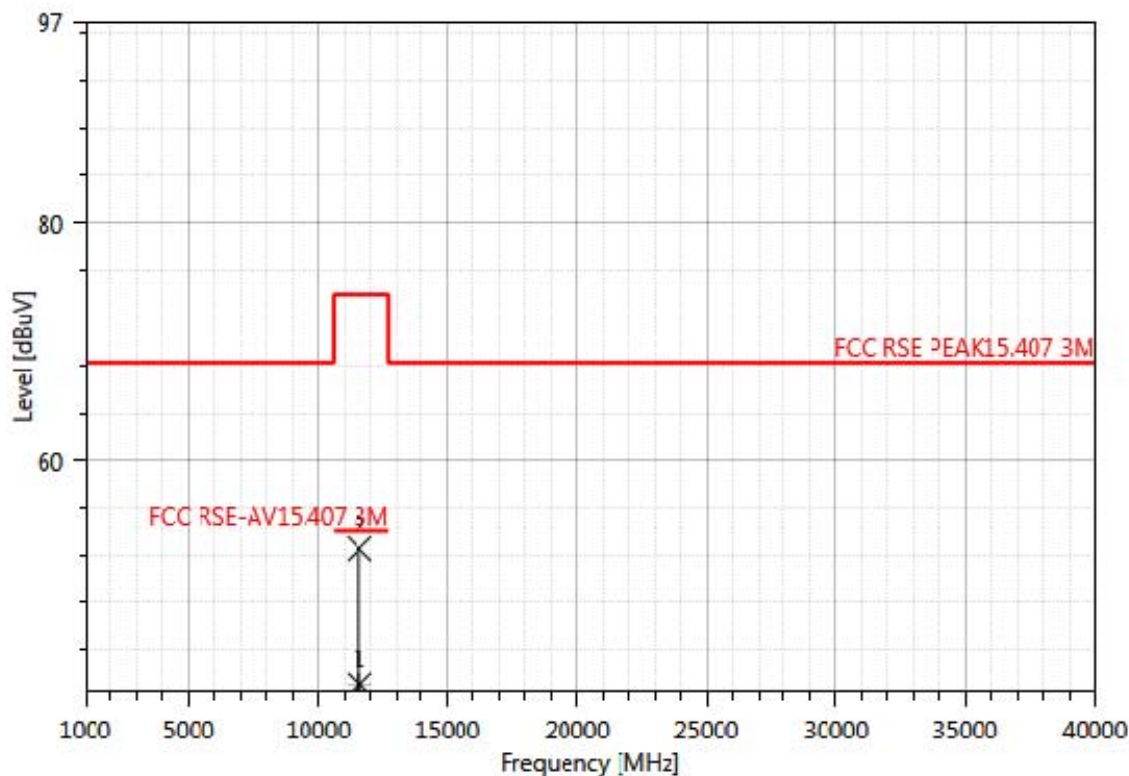
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Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:11:10
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	VERTICAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11590.00	H	41.12	20.69	20.43	54.00	-12.88
11590.00	H	52.55	32.12	20.43	74.00	-21.45

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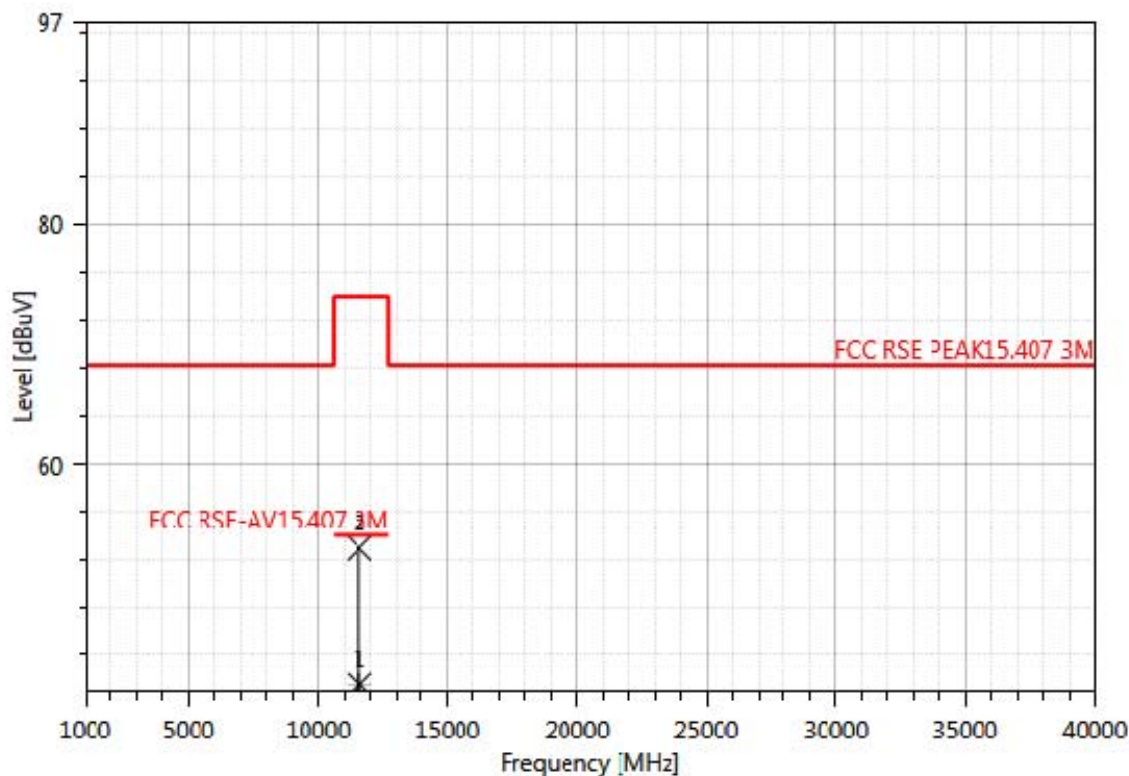
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Operation Mode :	802.11n40B4	Test Date :	02/23/2016 01:11:21
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH HIGH	Test Engineer :	Tin
EUT Pol. :	H Plan	Measurement Antenna Pol. :	HORIZONTAL



Freq.	Note	Emission	Spectrum	Factor	Limit	Margin
MHz	F/H/E/S	Level dBuV/m	Reading Level dBuV	dB	@3m dBuV/m	dB
11590.00	H	41.12	20.69	20.43	54.00	-12.88
11590.00	H	52.55	32.12	20.43	74.00	-21.45

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Band edge falling to restricted band (Internal Antenna)

802.11a 5725~5850 MHz

Operation Mode : 802.11aB4 Test Date : 02/22/2016 18:49:25
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge 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
5725.00	E	69.31	62.72	6.59	78.20	-8.89

Operation Mode : 802.11aB4 Test Date : 02/22/2016 18:55:27
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 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
5725.00	E	61.41	54.82	6.59	78.20	-16.79

Operation Mode : 802.11aB4 Test Date : 02/22/2016 19:01:00
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH 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
5850.00	E	68.09	60.81	7.28	78.20	-10.11

Operation Mode : 802.11aB4 Test Date : 02/22/2016 19:08:11
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 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
5850.00	E	59.40	52.12	7.28	78.20	-18.80

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802.11n_HT20, 5725~5850 MHz

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 19:14:25
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge 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
5725.00	E	68.73	62.14	6.59	78.20	-9.47

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 19:18:39
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 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
5725.00	E	70.35	63.76	6.59	78.20	-7.85

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 19:28:27
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH 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
5850.00	E	69.31	62.03	7.28	78.20	-8.89

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 19:34:39
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 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
5850.00	E	70.03	62.75	7.28	78.20	-8.17

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802.11n_HT40, 5725~5850 MHz

Operation Mode : 802.11n40B4 Test Date : 02/22/2016 19:40:29
 Fundamental Frequency : 5755 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge 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
5725.00	E	74.35	67.76	6.59	78.20	-3.85

Operation Mode : 802.11n40B4 Test Date : 02/22/2016 19:44:12
 Fundamental Frequency : 5755 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 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
5725.00	E	68.98	62.39	6.59	78.20	-9.22

Operation Mode : 802.11n40B4 Test Date : 02/22/2016 19:49:40
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH 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
5850.00	E	62.49	55.21	7.28	78.20	-15.71

Operation Mode : 802.11n40B4 Test Date : 02/22/2016 19:53:24
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 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
5850.00	E	57.52	50.23	7.28	78.20	-20.68

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Band edge falling to restricted band (External Antenna)

802.11a 5725~5850 MHz

Operation Mode : 802.11aB4 Test Date : 02/22/2016 21:08:28
Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
Operation Band : Bandedge CH LOW Test Engineer : Tin
EUT Pol. : H Plan 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
5725.00	E	68.67	62.08	6.59	78.20	-9.53

Operation Mode : 802.11aB4 Test Date : 02/22/2016 21:12:15
Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
Operation Band : Bandedge CH LOW Test Engineer : Tin
EUT Pol. : H Plan 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
5725.00	E	59.47	52.88	6.59	78.20	-18.73

Operation Mode : 802.11aB4 Test Date : 02/22/2016 21:16:22
Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
Operation Band : Bandedge CH HIGH Test Engineer : Tin
EUT Pol. : H Plan 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
5850.00	E	64.52	57.23	7.28	78.20	-13.68

Operation Mode : 802.11aB4 Test Date : 02/22/2016 21:21:04
Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
Operation Band : Bandedge CH HIGH Test Engineer : Tin
EUT Pol. : H Plan 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
5850.00	E	59.59	52.31	7.28	78.20	-18.61

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802.11n_HT20, 5725~5850 MHz

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 21:26:21
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 EUT Pol. : H Plan 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
5725.00	E	68.36	61.77	6.59	78.20	-9.84

Operation Mode : 802.11n20B4 Test Date : 02/22/2016 21:33:50
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 EUT Pol. : H Plan 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
5725.00	E	64.21	57.62	6.59	78.20	-13.99

Operation Mode : 802.11n20B4 Test Date : 02/23/2016 00:22:54
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 EUT Pol. : H Plan 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
5850.00	E	68.18	60.90	7.28	78.20	-10.02

Operation Mode : 802.11n20B4 Test Date : 02/23/2016 00:28:18
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 EUT Pol. : H Plan 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
5850.00	E	64.00	56.72	7.28	78.20	-14.20

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802.11n_HT40, 5725~5850 MHz

Operation Mode : 802.11n40B4 Test Date : 02/23/2016 00:33:12
 Fundamental Frequency : 5755 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 EUT Pol. : H Plan 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
5725.00	E	67.07	60.48	6.59	78.20	-11.13

Operation Mode : 802.11n40B4 Test Date : 02/23/2016 00:37:18
 Fundamental Frequency : 5755 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH LOW Test Engineer : Tin
 EUT Pol. : H Plan 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
5725.00	E	64.12	57.53	6.59	78.20	-14.08

Operation Mode : 802.11n40B4 Test Date : 02/23/2016 00:42:06
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 EUT Pol. : H Plan 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
5850.00	E	58.74	51.46	7.28	78.20	-19.46

Operation Mode : 802.11n40B4 Test Date : 02/23/2016 00:46:06
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 21 deg_C / 62 RH
 Operation Band : Bandedge CH HIGH Test Engineer : Tin
 EUT Pol. : H Plan 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
5850.00	E	57.52	50.23	7.28	78.20	-20.68

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11 TRANSMISSION IN THE ABSENCE OF DATA

11.1 Standard Applicable

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

11.2 Result

No non-compliance noted:

Refer to the theory of operation.

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12 FREQUENCY STABILITY

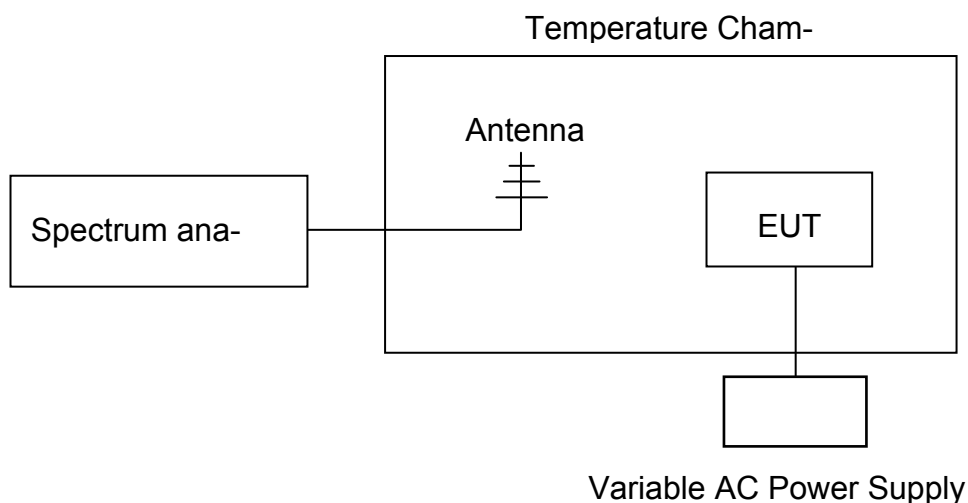
12.1 Standard Applicable

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

12.2 Measurement Procedure

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

12.3 Test SET-UP



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12.4 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	MY50420195	12/21/2015	12/20/2016
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016

12.5 Measurement Result

Operation Mode	802.11 a	Test Date	2016.02.24
Temperature	:24	Test By	Curry
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	3.63V	149	5745	5,744.97244	0.00000480
		157	5785	5,784.97233	0.00000478
		165	5825	5,824.97417	0.00000443
	2.97V	149	5745	5,744.97146	0.00000497
		157	5785	5,784.97304	0.00000466
		165	5825	5,824.97184	0.00000483
25	3.3V	149	5745	5,744.97295	0.00000471
		157	5785	5,784.97020	0.00000515
		165	5825	5,824.97040	0.00000508
55	3.63V	149	5745	5,744.97243	0.00000480
		157	5785	5,784.97383	0.00000452
		165	5825	5,824.97422	0.00000443
	2.97V	149	5745	5,744.97256	0.00000478
		157	5785	5,784.97371	0.00000454
		165	5825	5,824.97345	0.00000456

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Operation Mode	802.11 n_HT40	Test Date	2016.02.24
Temperature	:24	Test By	Curry
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	3.63V	151	5755	5,755.02490	-0.00000433
		159	5795	5,795.04981	-0.00000859
	2.97V	151	5755	5,755.04981	-0.00000865
		159	5795	5,795.04981	-0.00000859
25	3.3V	151	5755	5,755.02490	-0.00000433
		159	5795	5,795.04981	-0.00000859
55	3.63V	151	5755	5,755.02490	-0.00000433
		159	5795	5,795.04981	-0.00000859
	2.97V	151	5755	5,755.04981	-0.00000865
		159	5795	5,795.04981	-0.00000859

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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

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.

According to §15.407, If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected Construction

A PIFA antenna design is used.

The antenna is designed with permanent attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~

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