

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

Product Name: AC1900 High Power Dual Band Wireless
USB Adapter

Brand Name: TRENDnet

Marketing Name: TEW-809UB AC1900 High Power Wireless
Dual Band USB Adapter

Model No.: TEW-809UB

Model Difference: N/A

FCC ID: XU8TEW809UB

Report No.: E2/2015/C0043

Issue Date: Aug. 01, 2016

FCC Rule Part: §15.407

Prepared for: TRENDNET, Inc.
20675 Manhattan Place Torrance, CA
90501 USA

Prepared by: SGS Taiwan Ltd.
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VERIFICATION OF COMPLIANCE

Applicant: TRENDNET, Inc.
20675 Manhattan Place Torrance, CA 90501 USA

Product Name: AC1900 High Power Dual Band Wireless USB Adapter

Brand Name: TRENDnet

Marketing Name: TEW-809UB AC1900 High Power Wireless Dual Band USB Adapter

Model No.: TEW-809UB

Model Difference: N/A

FCC ID: XU8TEW809UB

File Number: E2/2015/C0043

Date of test: Dec. 14, 2015 ~ Jul. 29, 2016

Date of EUT Received: Dec. 14, 2015

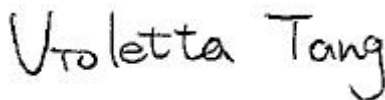
We hereby certify that:

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.

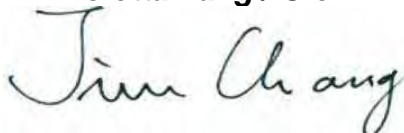
The test results of this report relate only to the tested sample identified in this report.

Test By:**Date:**

Aug. 01, 2016

Aken Huang / Engineer**Prepared By:****Date:**

Aug. 01, 2016

Violetta Tang / Clerk**Approved By:****Date:**

Aug. 01, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
E2/2015/C0043	Rev.00	Initial creation of document	Aug. 01, 2016

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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	AC1900 High Power Dual Band Wireless USB Adapter
Brand Name:	TRENDnet
Marketing Name:	TEW-809UB AC1900 High Power Wireless Dual Band USB Adapter
Model No.:	TEW-809UB
Model Difference:	N/A
Product SW/HW version:	1.0 / 1.0
Radio SW/HW version:	1.0 / 1.0
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	5Vdc from USB Port

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WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology
11a	5150~5250	4	21.54dBm	OFDM
	5725-5850	5	19.75dBm	
11n / ac_20M	HT20 / VHT20 5150~5250	4	VHT: 17.14dBm (Worst Case)	OFDM
	HT20 / VHT20 5725-5850	5	VHT: 21.92dBm (Worst Case)	
11n / ac_40M	HT40 / VHT40 5150~5250	2	VHT: 19.79dBm (Worst Case)	OFDM
	HT40 / VHT40 5725-5850	2	VHT: 20.57dBm (Worst Case)	
11ac_80M	VHT80 5150~5250	1	17.73dBm	OFDM
	VHT80 5725-5850	1	17.38dBm	
Antenna Designation		1. Dipole Antenna, Part No.: L142-000047 Gain: 5.01dBi (5150MHz-5250MHz) Gain: 5.07dBi (5725MHz-5850MHz) 2. Dipole Antenna, Part No.: L142-082450-016 Gain: 5.01dBi (5150MHz-5250MHz) Gain: 5.07dBi (5725MHz-5850MHz) 3. Dipole Antenna, Part No.: S142-082450-016 Gain: 5.01dBi (5150MHz-5250MHz) Gain: 5.07dBi (5725MHz-5850MHz)		
Modulation type		64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only		
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n/ac_20MHz: 6.5 – 144.4Mbps / 300Mbps 802.11 n/ac_40MHz: 13.5 – 144.4Mbps / 300Mbps 802.11 ac_80MHz: 29.3 – 650Mbps		

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01

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.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333. (TAF code 0513)

FCC Registration Numbers are: 735305

Canada Registration Number: 4620A-5

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 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/ 50 uH 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 6.7dB, and 10dB attenuator. *SISO mode offset = RF cable loss (dB)+ attenuation factor(dB)=16.7(dB)

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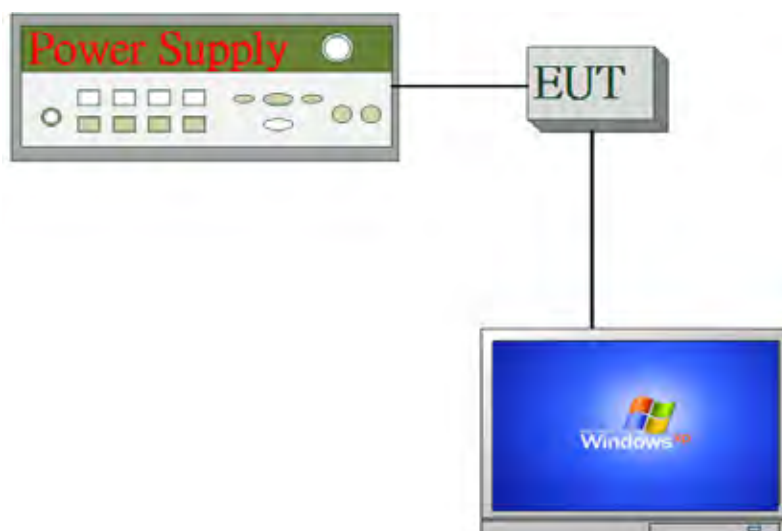
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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission



Fig. 2-2 Conducted Emission



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Fig. 2-3 AC Power Line Conducted Emission

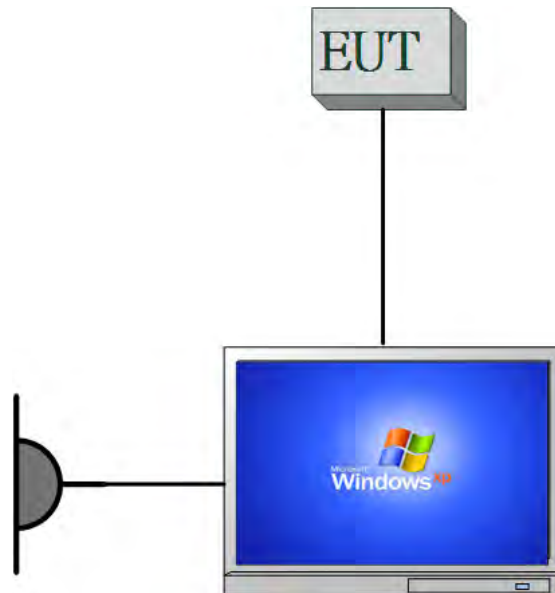


Table 2-1 Equipment Used in Tested System

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	L412	LR-027LM	N/A	N/A
3.	DC Power Supply	Agilent	E3640A	MY53140006	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)	26 dB 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 5150 MHz ~5250 MHz:

4 channels are provided for 802.11a, 802.11n_HT20, 802.11ac_VHT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n_HT40, 802.11ac_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac_VHT80

CHANNEL	FREQUENCY
42	5210 MHz

Operated band in 5725 MHz ~5850 MHz:

5 channels are provided for 802.11a, 802.11n_HT20, 802.11ac_VHT20

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, 802.11ac_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac_VHT80

CHANNEL	FREQUENCY
155	5775 MHz

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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 802.11n and ac modes, and 802.11n yields the highest reading that generates the highest emission. Therefore, 802.11n as the mode 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	5180~5240	36 to 48	44	OFDM	6	MAIN
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN
802.11ac_VHT20				OFDM	MCS8	MIMO
802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11ac_VHT20				OFDM	MCS8	MIMO
802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	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 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

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ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11n_HT20 802.11ac_VHT20				OFDM	MCS8	MIMO
802.11n_HT40 802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB 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. CONDUCTED EMISSION TEST

6.1. Standard Applicable

Frequency range within 150 kHz to 30 MHz 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	ESCI 7	100950	12/12/2015	12/11/2016
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	01/06/2016	01/07/2017
LISN	Schwarzbeck	NSLK 8127	8127-648	06/09/2015	06/08/2016
LISN	Rolf-Heine	NNB-2/16Z	99012	03/04/2015	03/03/2016
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

6.3. EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

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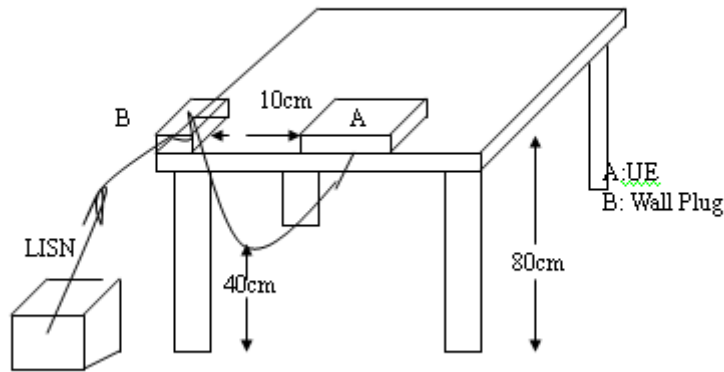
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6.4. Test SET-UP



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

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit

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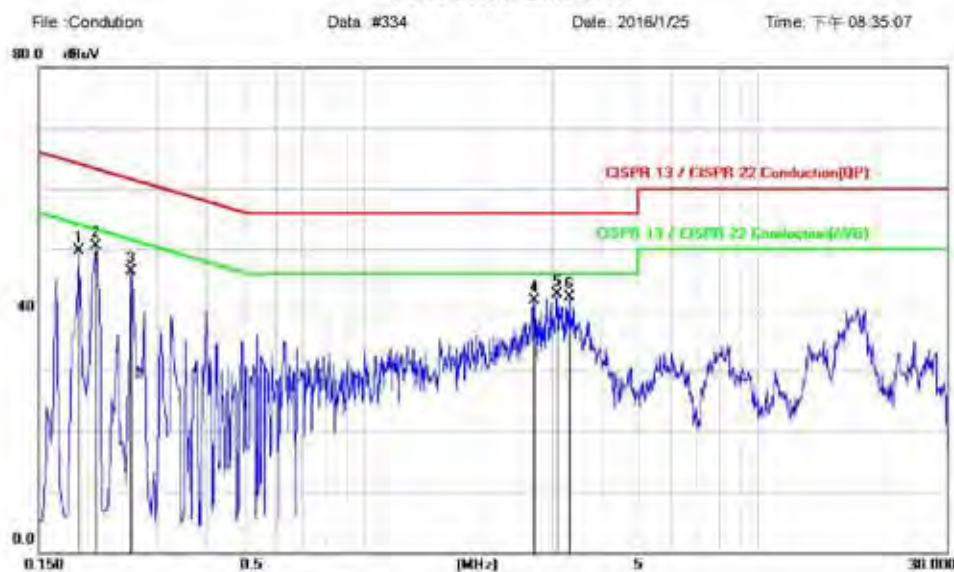
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Jan. 25, 2016
Temperature:	16	Humidity:	43 %	Test By:	Aken

Site : Conduction Room Phase: **L1** Temperature: 15 °C
 Limit: CISPR 13 / CISPR 22 Conduction(QP) Power: AC 120V/60Hz Humidity: 43 %
 Mode:
 Note:

Conducted Emission



No.	Mk.	Freq	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1900	49.56	0.07	49.63	64.04	-14.41	peak	
2 *		0.2100	50.46	0.07	50.53	63.21	-12.68	peak	
3		0.2580	46.20	0.10	46.30	61.50	-15.20	peak	
4		2.7100	40.91	0.59	41.50	56.00	-14.50	peak	
5		3.0940	41.88	0.60	42.48	56.00	-13.52	peak	
6		3.3220	41.48	0.60	42.08	56.00	-13.92	peak	

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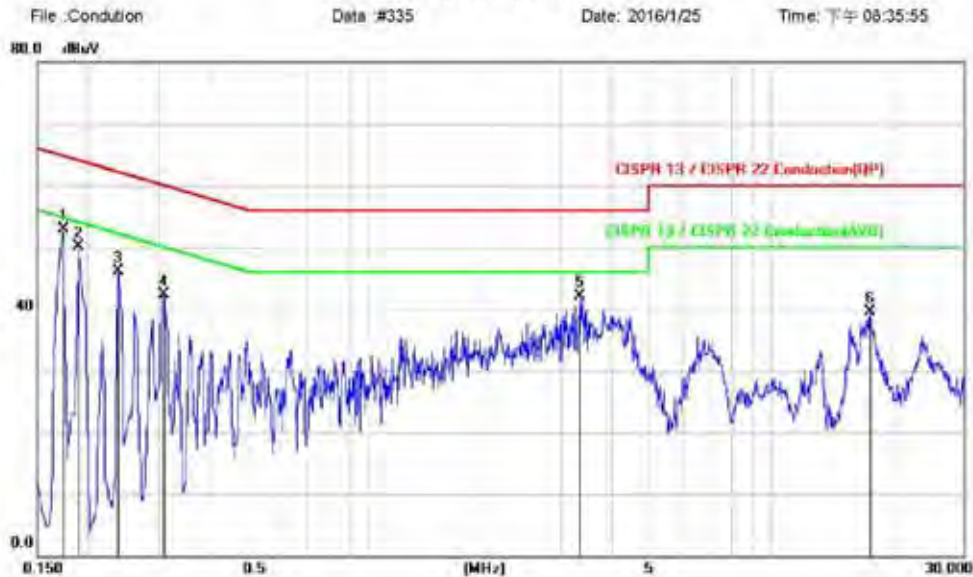
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Site : Conduction Room Phase: **N** Temperature: 16 °C
Limit: CISPR 13 / CISPR 22 Conduction(QP) Power: AC 120V/60Hz Humidity: 43 %
Mode:
Note:

Conducted Emission



No.	Mk	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1740	52.76	0.14	52.90	64.77	-11.87	peak	
2		0.1900	49.89	0.13	50.02	64.04	-14.02	peak	
3		0.2380	45.91	0.15	46.06	62.17	-16.11	peak	
4		0.3100	42.20	0.18	42.38	59.97	-17.59	peak	
5		3.3620	41.36	0.65	42.01	56.00	-13.99	peak	
6		17.6420	38.96	0.61	39.57	60.00	-20.43	peak	

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7. 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/Duty Cycle)
802.11a	96.37	0.16
802.11ac_20	89.51	0.48
802.11ac_40	82.32	0.84
802.11ac_80	72.73	1.38

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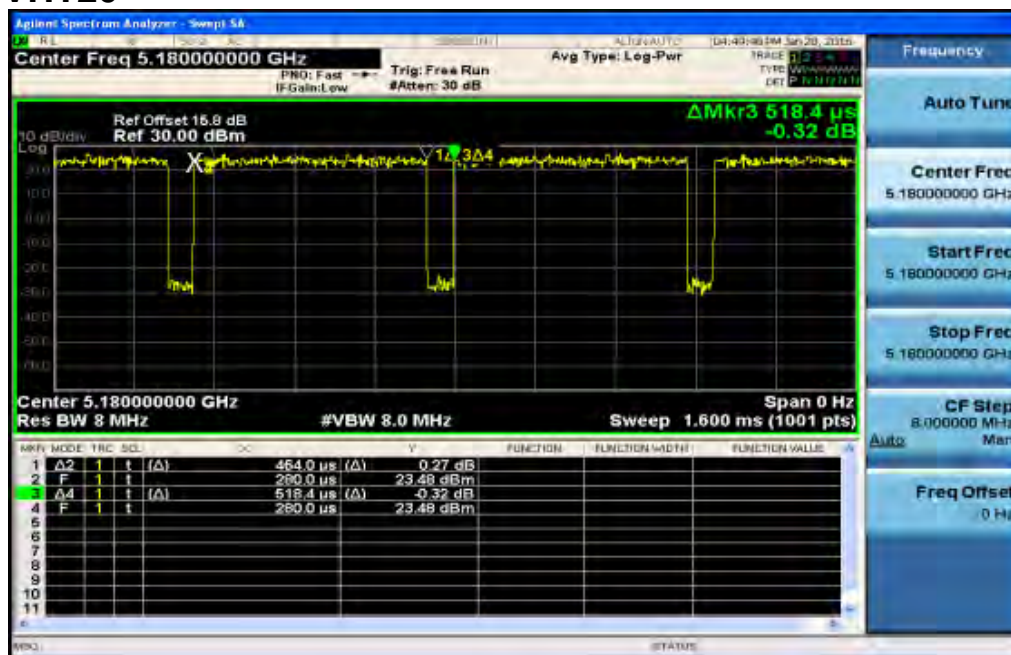
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DUTY CYCLE TEST SIGNAL Measurement Result



802.11ac VHT20



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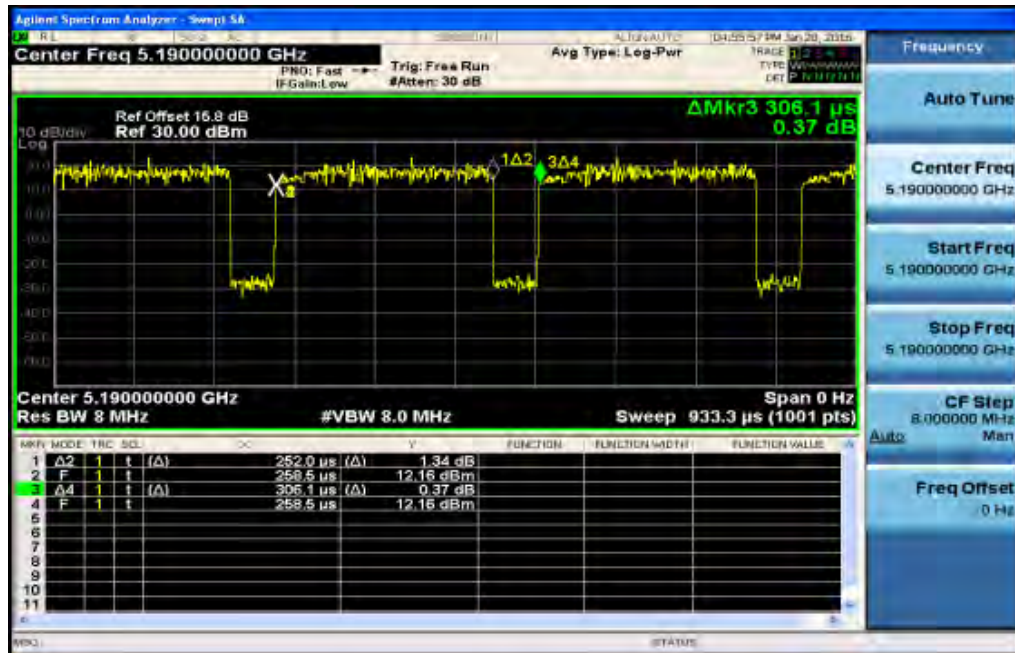
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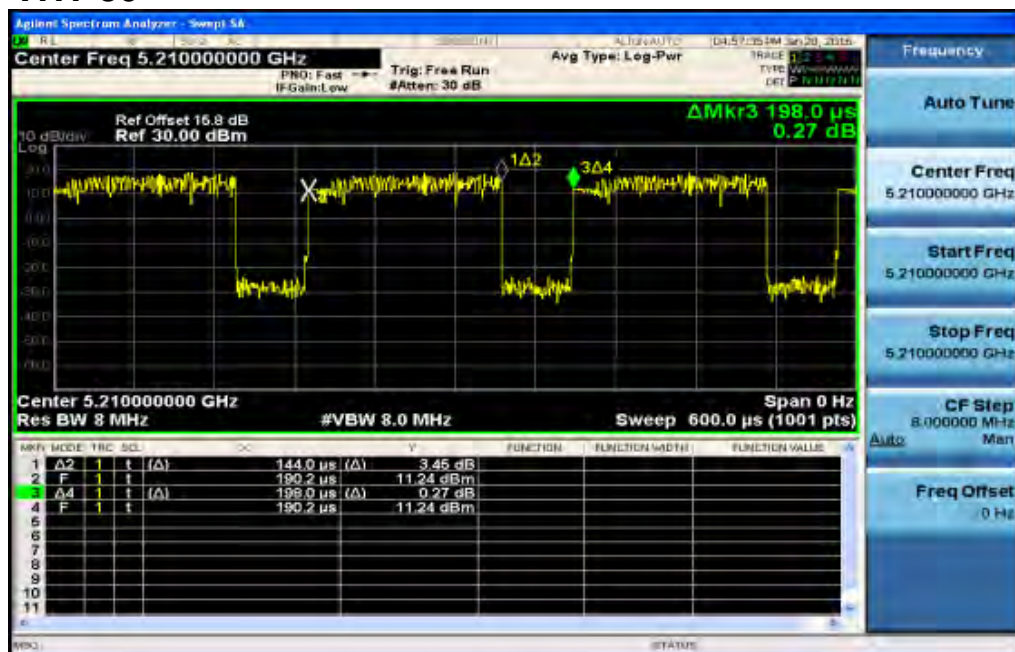
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802.11 ac VHT 40



802.11 ac VHT 80



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8. 26dB & 6dB & 99% EMISSION BANDWIDTH MEASUREMENT

8.1 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

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.
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. 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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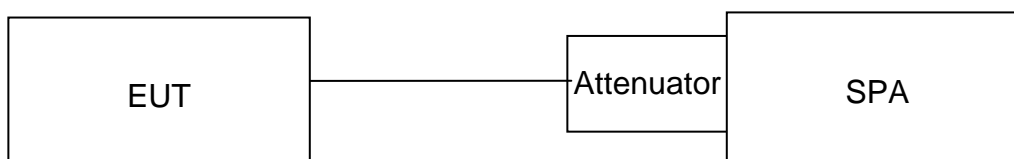
8.3 Measurement Equipment Used

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
Signal Generator	R&S	SMU200A	105303	12/22/2015	12/21/2016
DC Block	PASTERNAK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF37	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF38	12/19/2015	12/18/2016
Attenuator	WOKEN	6SR1211	RF41	12/19/2015	12/18/2016

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017

Note: The measurement was taken place with the long duration of the time, and additional equipment list as shown above indicate those equipment of which has been subject to undertake the calibration in intermediate period of time of the measurement.

8.4 Test Set-up



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8.5 Measurement Result

26dB Bandwidth

802.11a_Main

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	22.17	13.458
5220	25.84	14.123
5240	20.80	13.181

802.11a_Aux1

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	21.67	13.359
5220	21.43	13.310
5240	20.19	13.051

802.11a_Aux2

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	20.80	13.181
5220	21.53	13.330
5240	20.49	13.115

802.11ac_VHT20_Main

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	22.19	13.462
5220	21.21	13.265
5240	21.15	13.253

802.11ac_VHT20_Aux1

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	21.58	13.341
5220	21.91	13.406
5240	19.71	12.947

802.11ac_VHT20_Aux2

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	22.10	13.444
5220	21.89	13.402
5240	20.11	13.034

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802.11ac _VHT40_Main

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5190	43.64	16.399
5230	40.06	16.027

802.11ac _VHT40_Aux1

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5190	42.81	16.315
5230	42.39	16.273

802.11ac _VHT40_Aux2

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5190	43.56	16.391
5230	44.06	16.440

802.11ac _VHT80_Main

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5210	90.82	19.582

802.11ac _VHT80_Aux1

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5210	111.50	20.473

802.11ac _VHT80_Aux2

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5210	108.90	20.370

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6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Peak detector for FCC

802.11a_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	15.87	12.006
5785	16.40	12.148
5825	16.52	12.180

802.11a_Aux1

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	15.62	11.937
5785	16.48	12.170
5825	16.48	12.170

802.11a_Aux2

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	14.68	11.667
5785	16.40	12.148
5825	16.45	12.162

802.11ac_VHT20_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	14.61	11.647
5785	17.63	12.463
5825	17.65	12.467

802.11ac_VHT20_Aux1

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.09	12.327
5785	17.88	12.523
5825	17.63	12.463

802.11ac_VHT20_Aux2

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	14.59	11.641
5785	17.68	12.475
5825	17.60	12.455

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802.11ac_VHT40_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5755	35.12	15.456
5795	36.41	15.612

802.11ac_VHT40_Aux1

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5755	30.45	14.836
5795	36.50	15.623

802.11ac_VHT40_Aux2

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5755	34.35	15.359
5795	36.59	15.634

802.11ac_VHT80_Main

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5775	74.58	18.726

802.11ac_VHT80_Aux1

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5775	75.85	18.800

802.11ac_VHT80_Aux2

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5775	75.86	18.800

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99% Bandwidth
(5150~5250 MHz)
802.11a

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.23	< 5250

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.23	< 5250

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.23	< 5250

802.11ac VHT20

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.85	< 5250

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.8	< 5250

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5248.85	< 5250

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802.11ac VHT40

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.05	< 5250

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.05	< 5250

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.05	< 5250

802.11ac VHT80

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5248.05	< 5250

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5248.04	< 5250

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5210	5248.04	< 5250

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5725~5850MHz

802.11a

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.75	> 5725

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.75	> 5725

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.8	> 5725

802.11ac VHT20

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.2	> 5725

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.2	> 5725

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5745	5736.25	> 5725

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802.11ac VHT40

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5755	5737.1	> 5725

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5755	5737	> 5725

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5755	5737.1	> 5725

802.11ac VHT80

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5775	5737	> 5725

Aux1

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5775	5737.12	> 5725

Aux2

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5775	5736.88	> 5725

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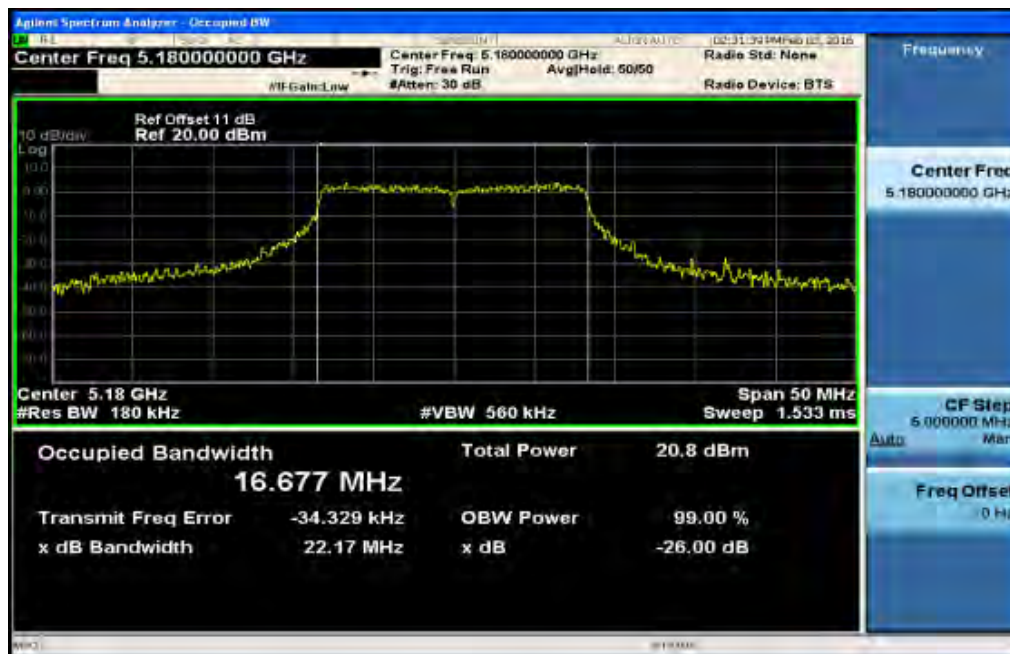
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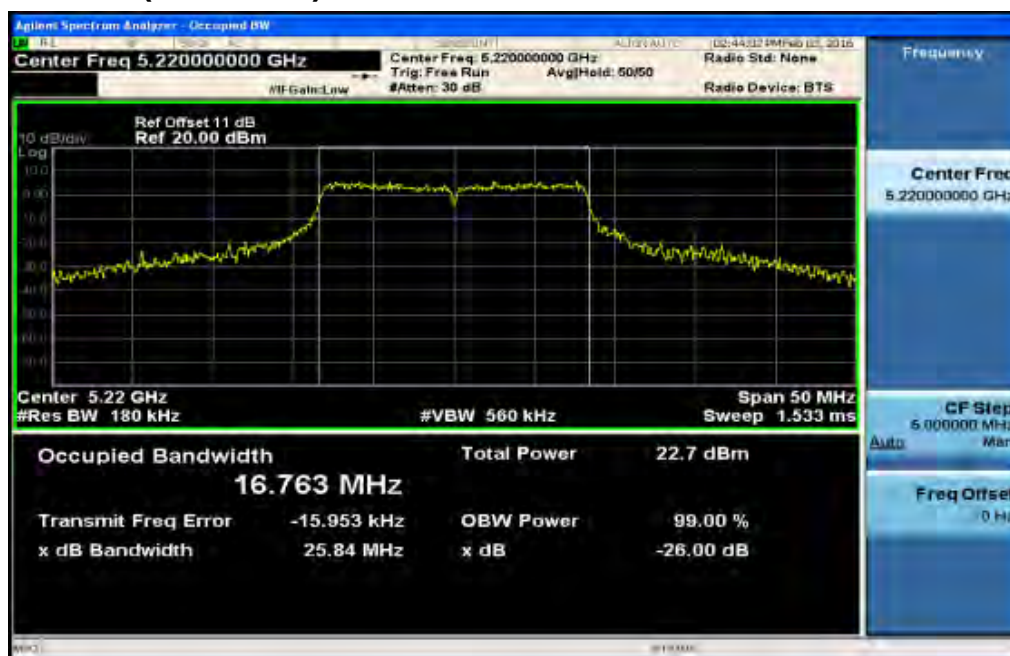
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26dB & 99% Bandwidth 802.11a, 5150~5250 MHz (Main) Test Data CH-Low (5180MHz)



Test Data CH-Mid (5220MHz)



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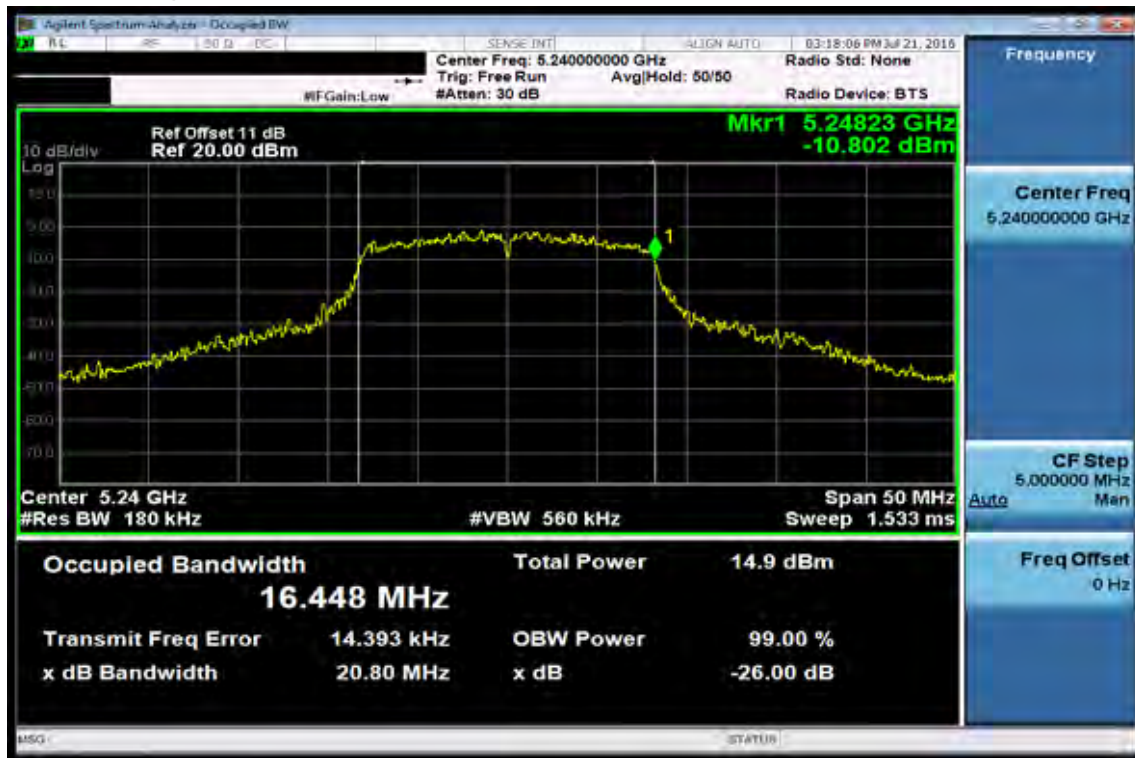
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Test Data CH-High (5240MHz)



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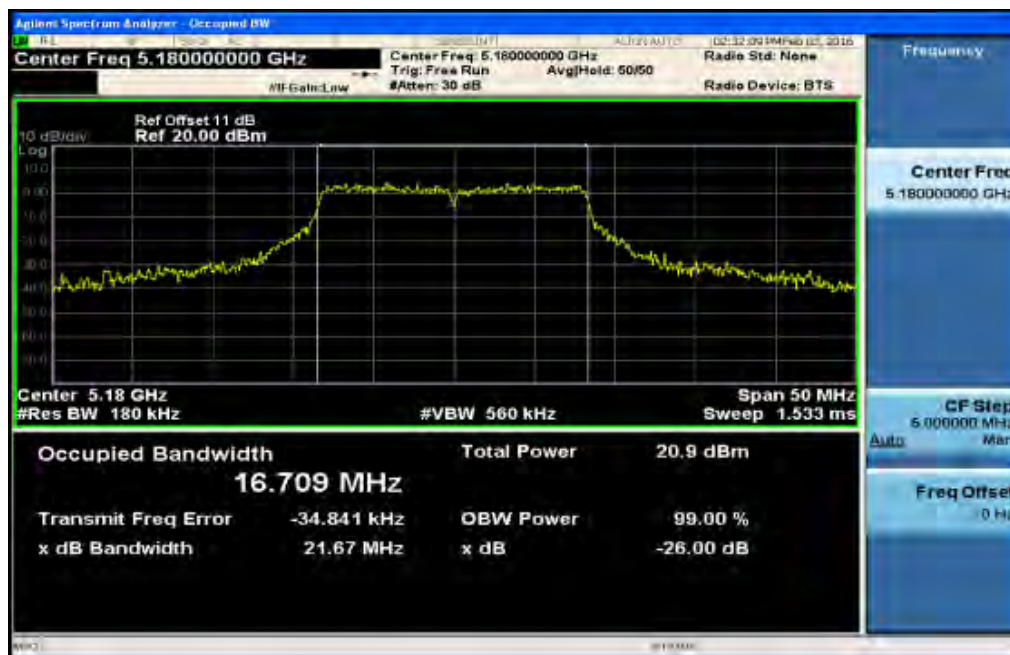
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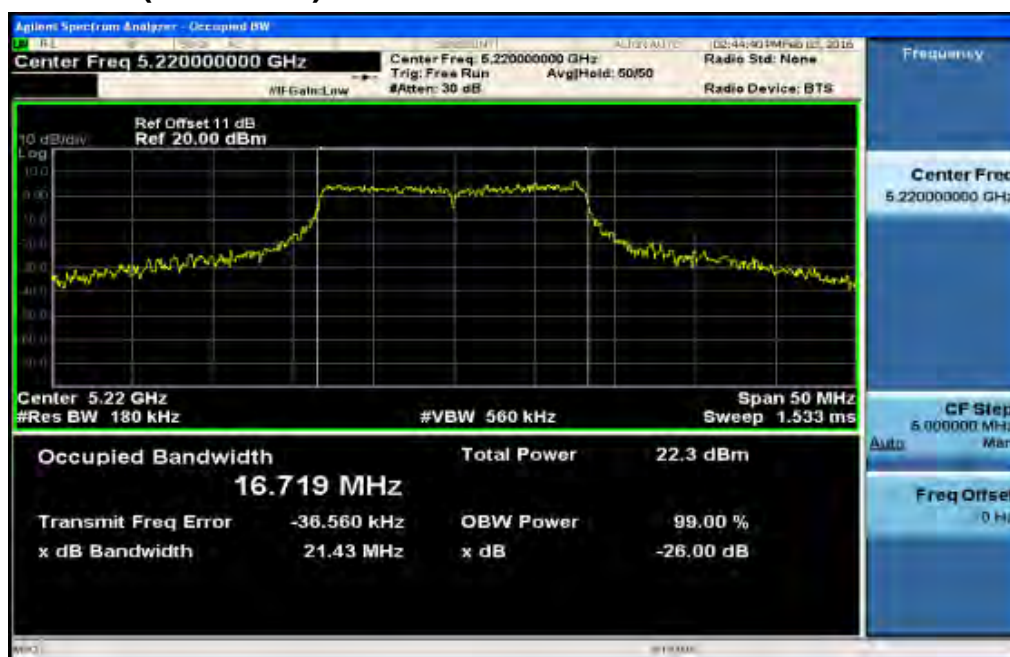
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802.11a, 5150~5250 MHz (Aux1) Test Data CH-Low (5180MHz)



Test Data CH-Mid (5220MHz)



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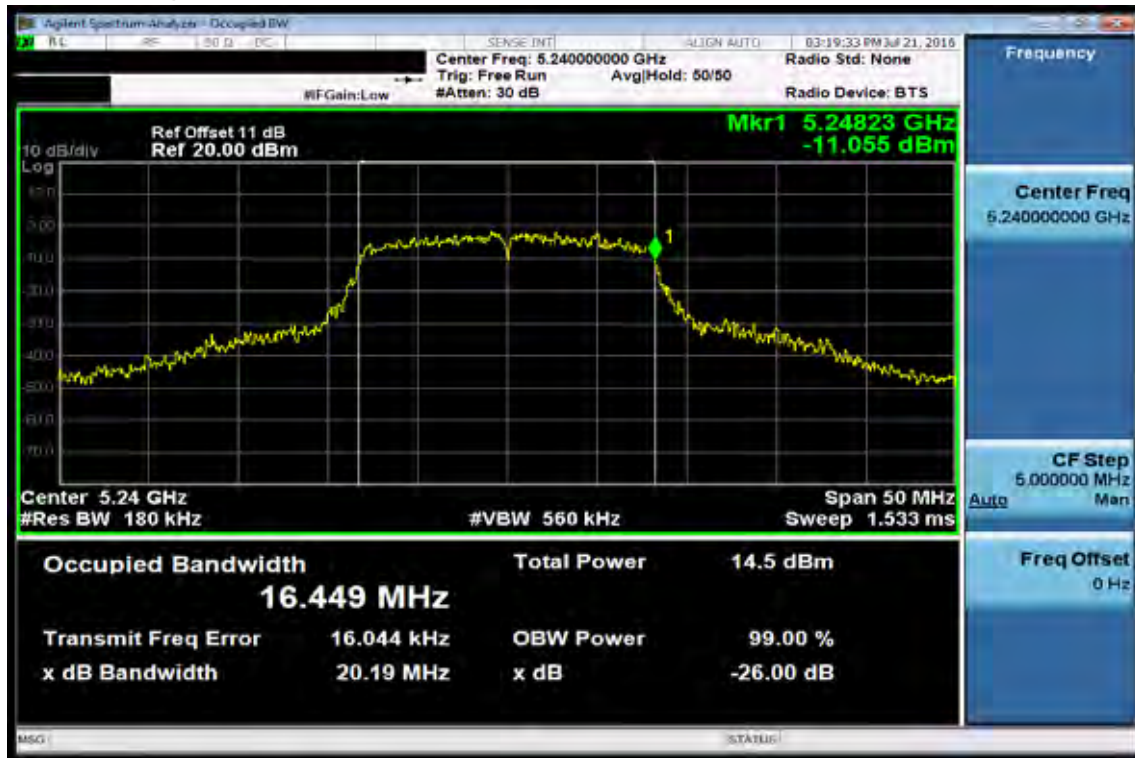
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Test Data CH-High (5240MHz)



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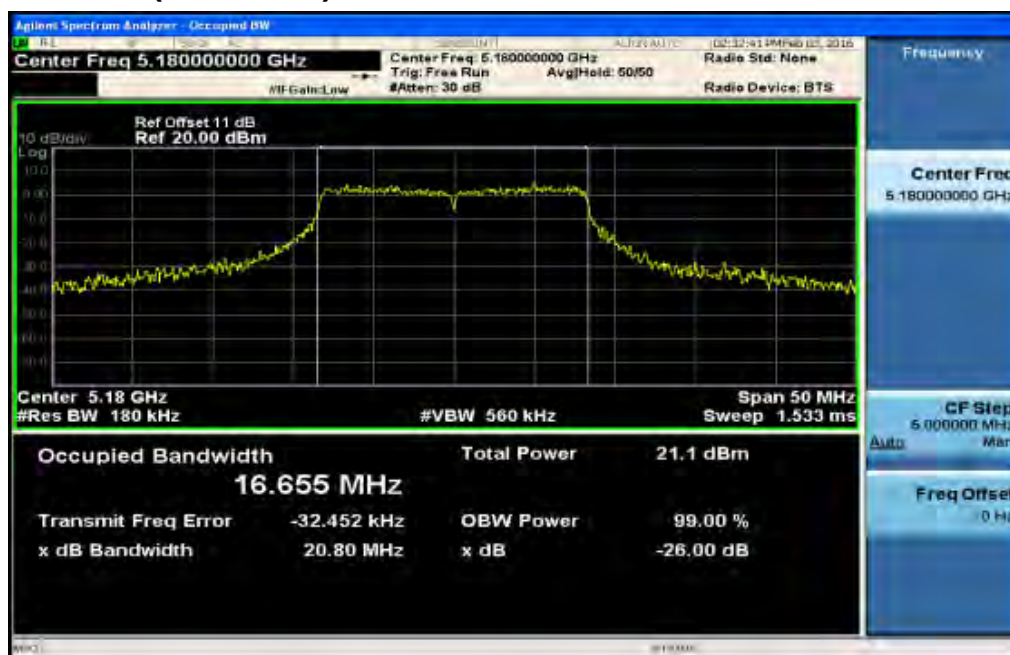
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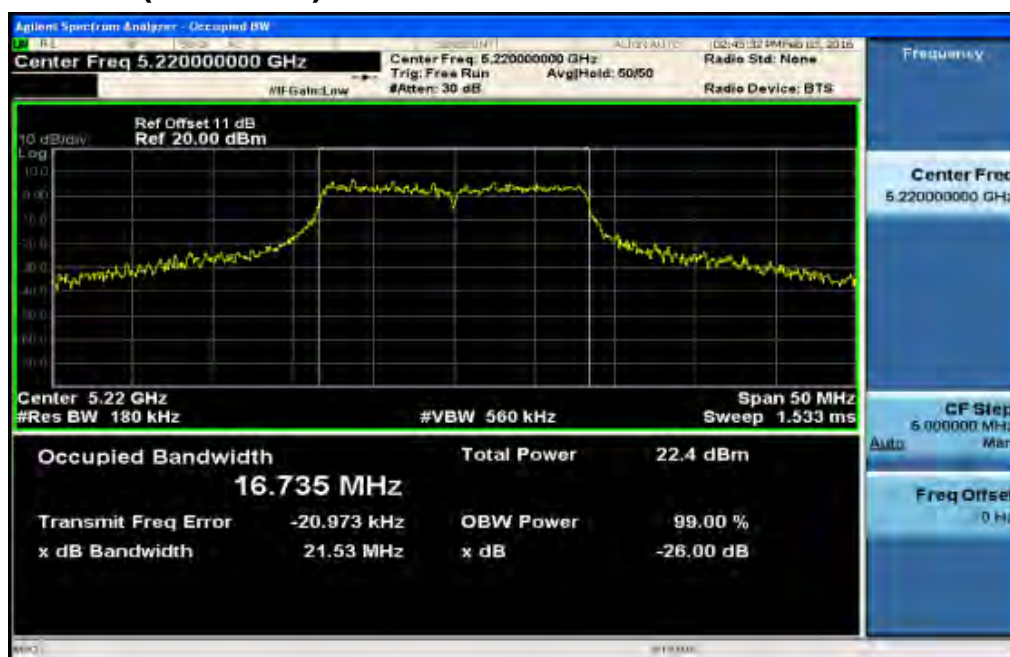
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802.11a, 5150~5250 MHz (Aux2)
Test Data CH-Low (5180MHz)



Test Data CH-Mid (5220MHz)

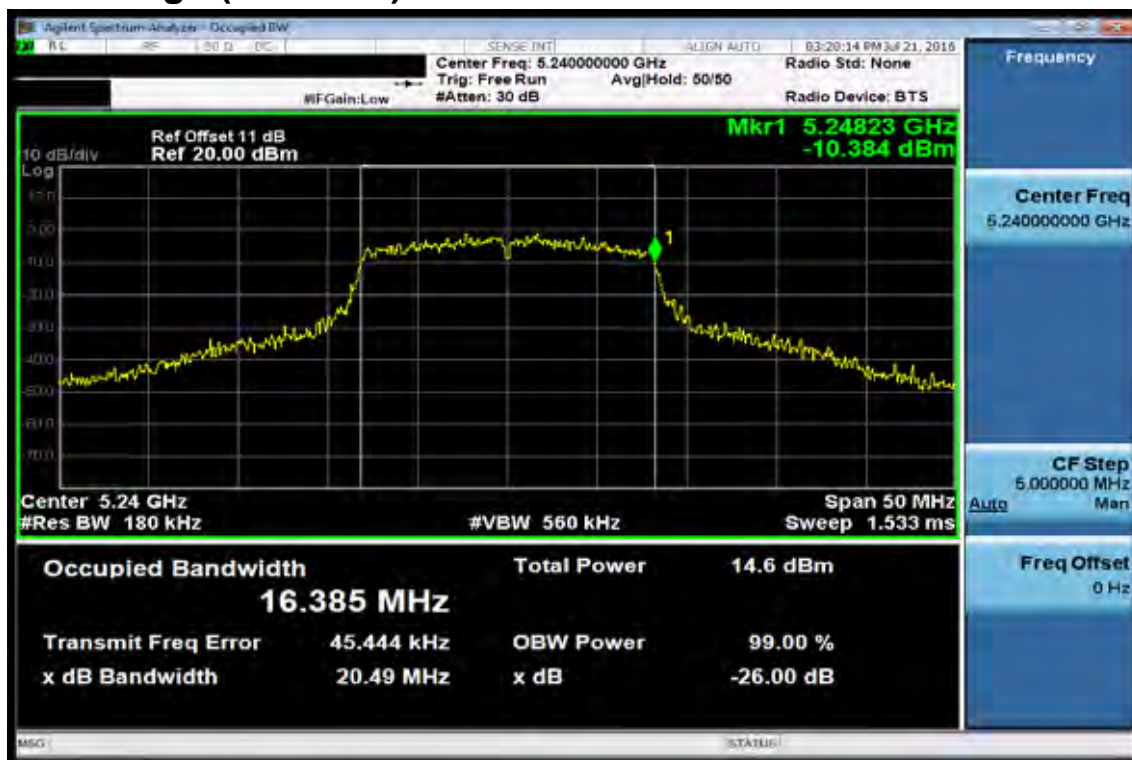


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Test Data CH-High (5240MHz)



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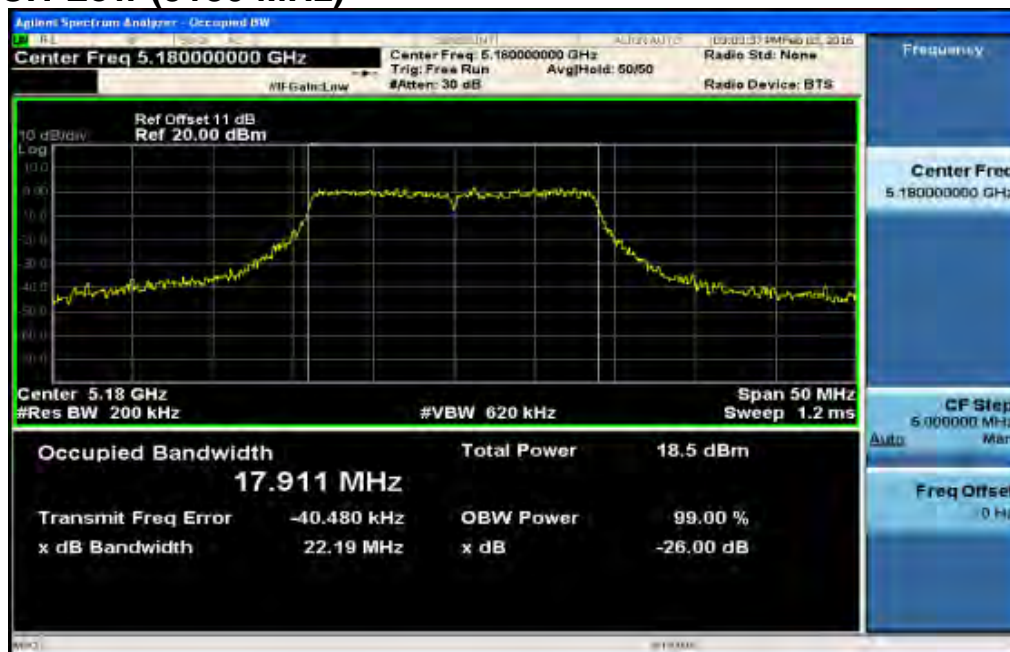
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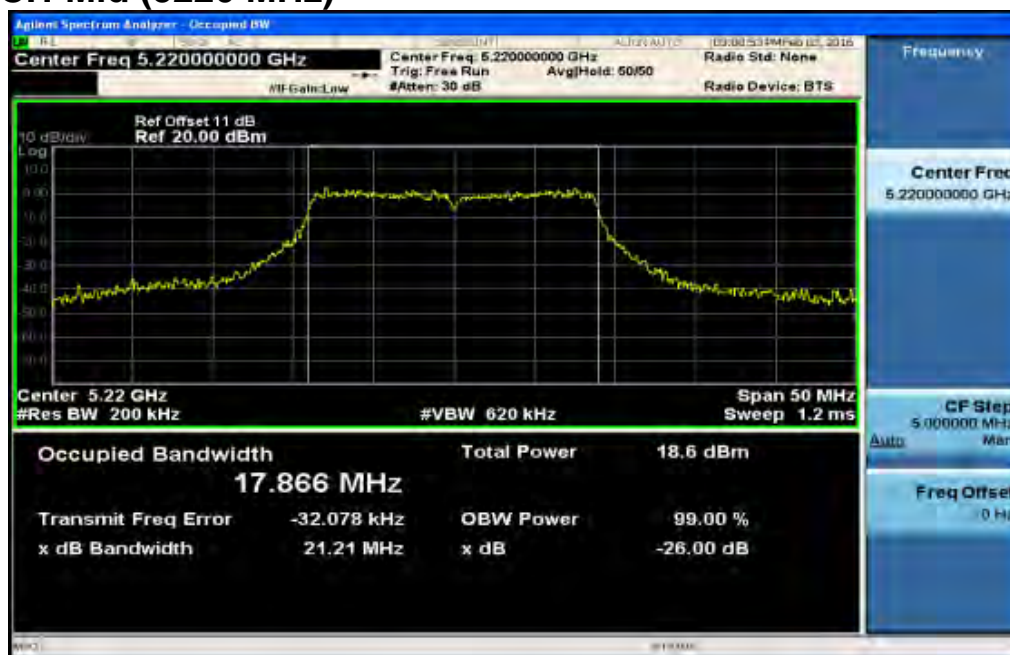
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802.11ac VHT20, 5150~5250 MHz (Main) Test Data CH-Low (5180 MHz)



Test Data CH-Mid (5220 MHz)



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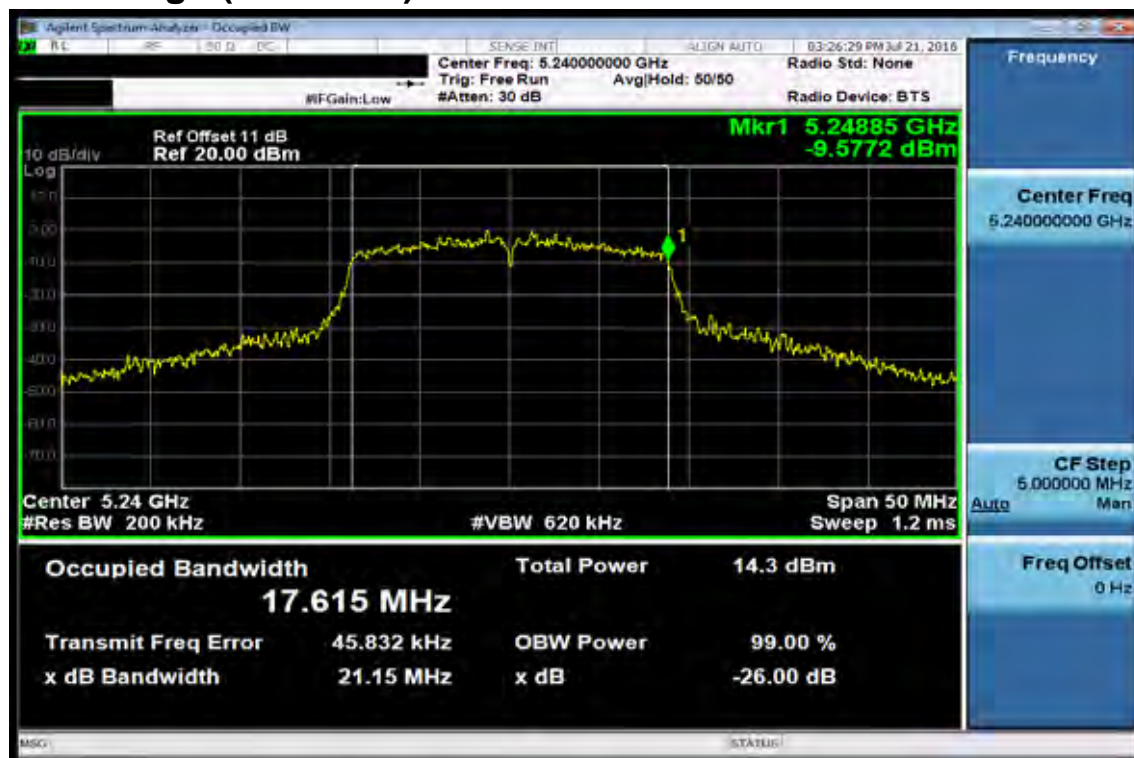
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Test Data CH-High (5240 MHz)



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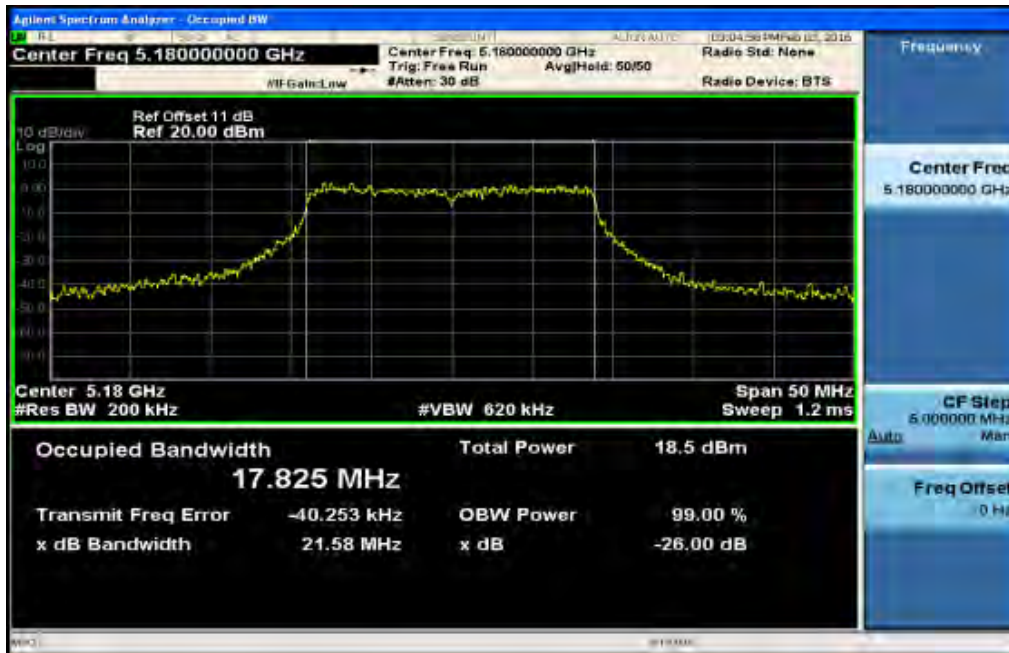
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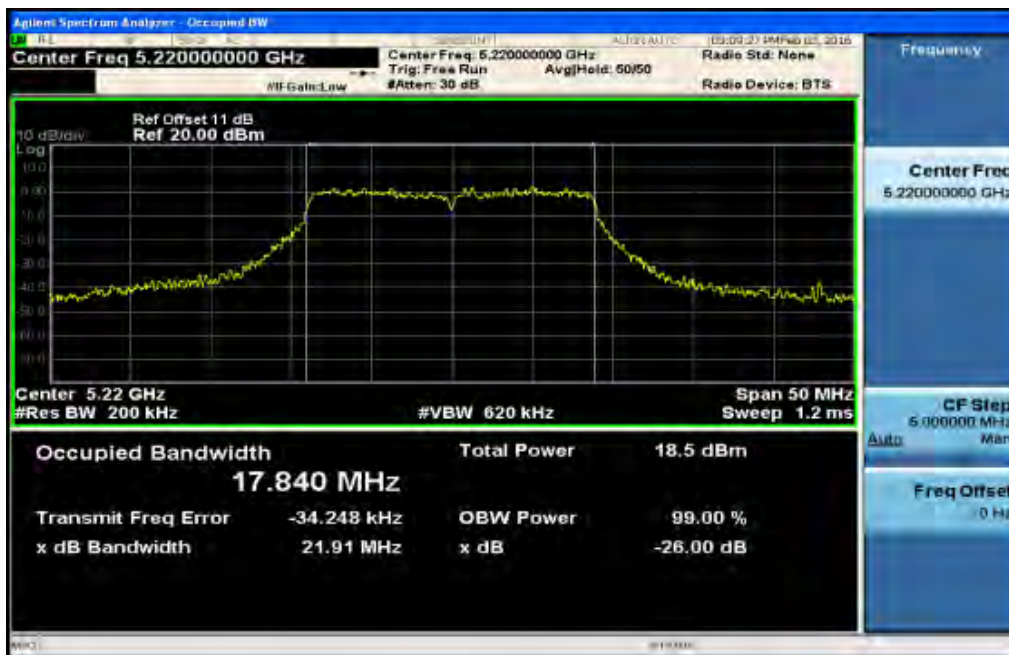
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802.11ac VHT20, 5150~5250 MHz (Aux1) Test Data CH-Low (5180 MHz)



Test Data CH-Mid (5220 MHz)



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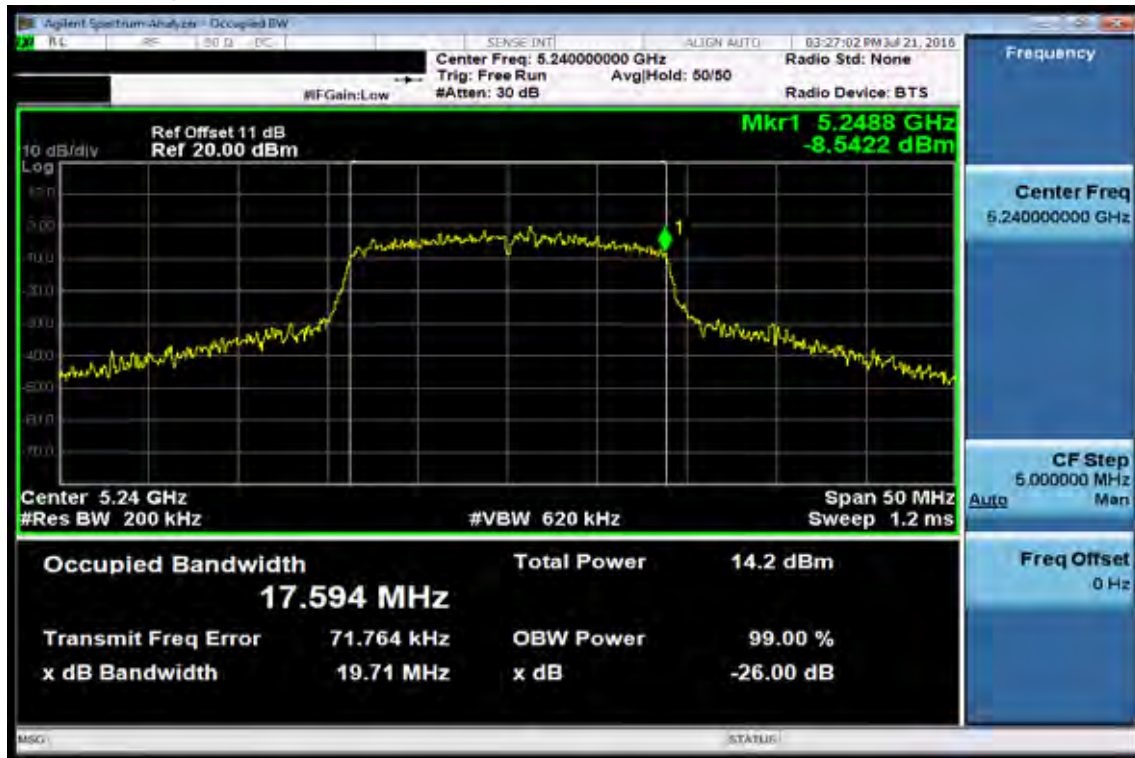
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Test Data CH-High (5240 MHz)



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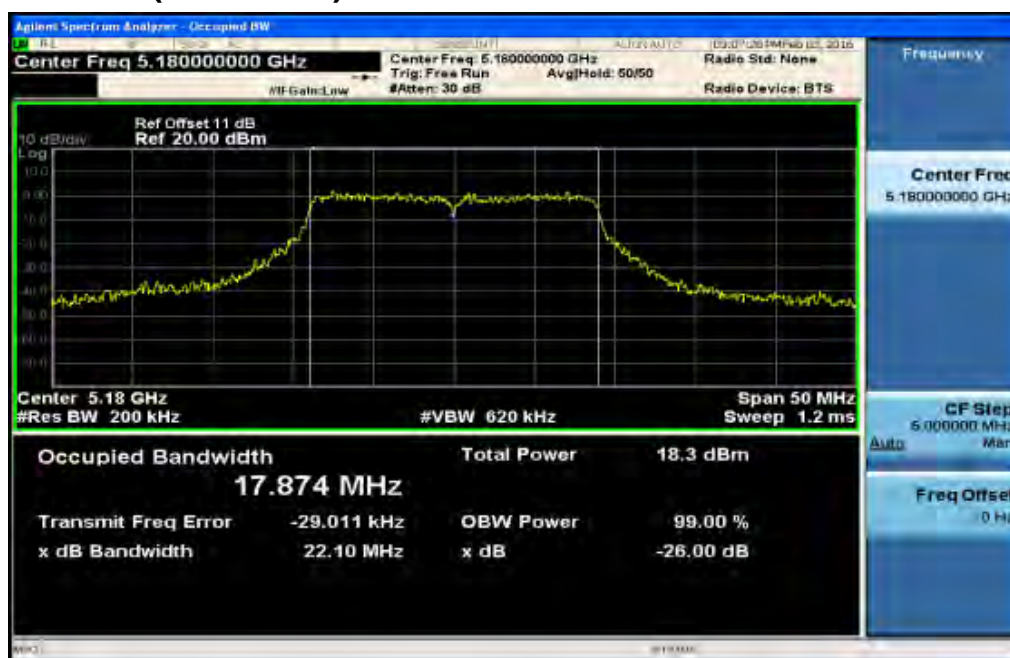
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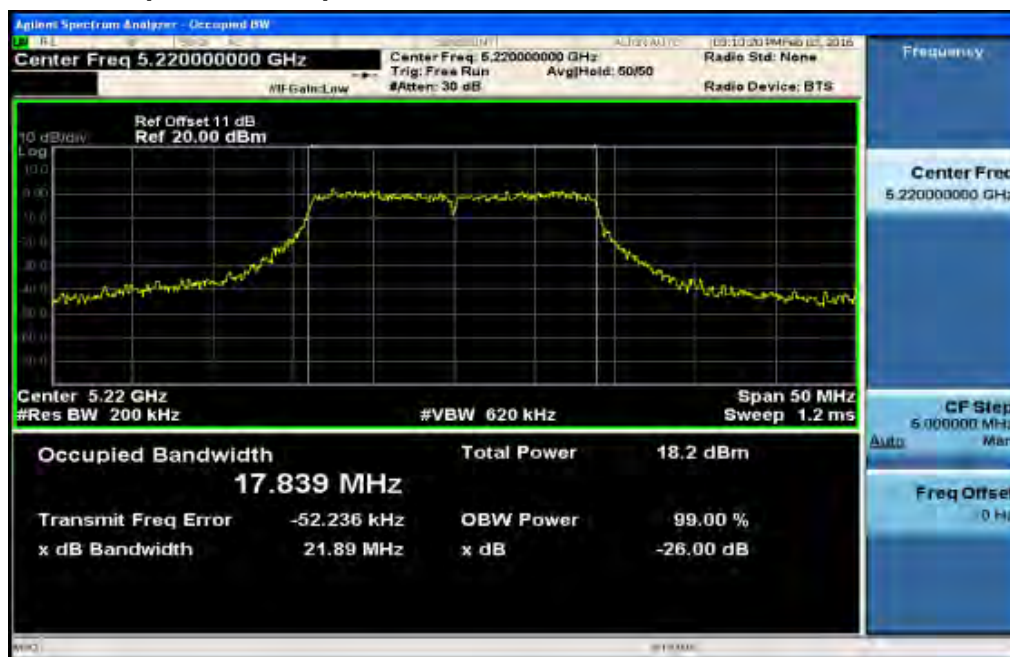
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802.11ac VHT20, 5150~5250 MHz (Aux2) Test Data CH-Low (5180 MHz)



Test Data CH-Mid (5220 MHz)



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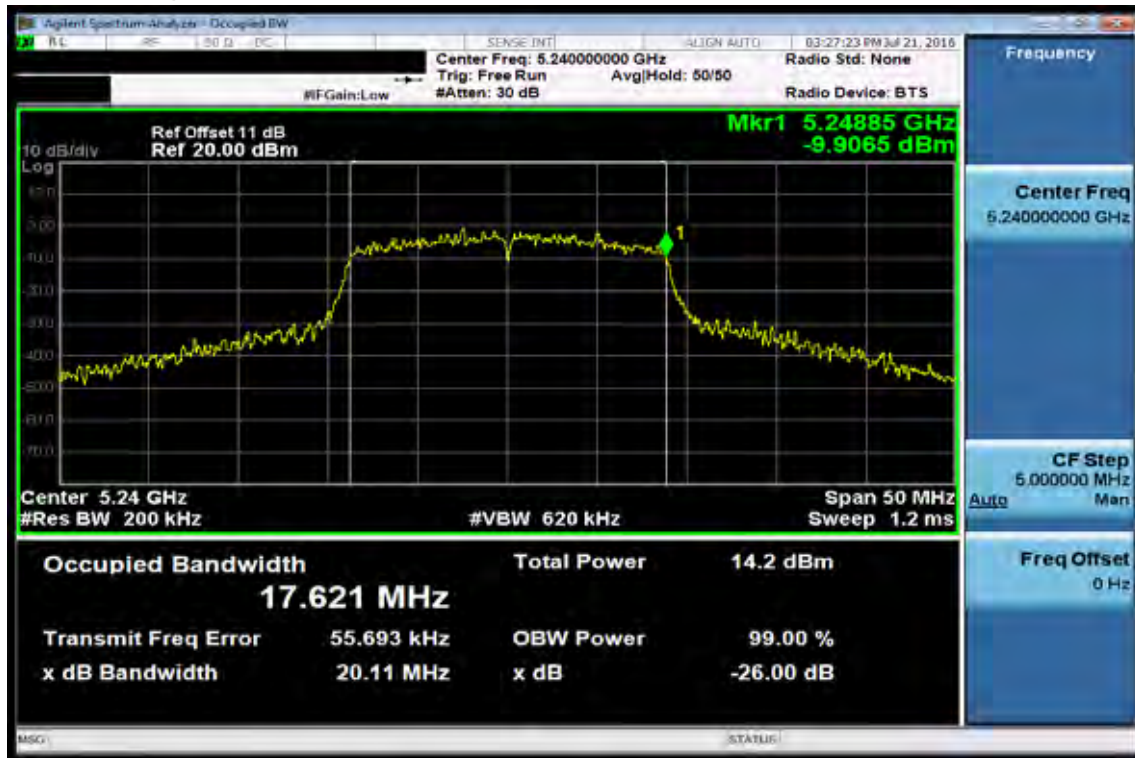
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Test Data CH-High (5240 MHz)



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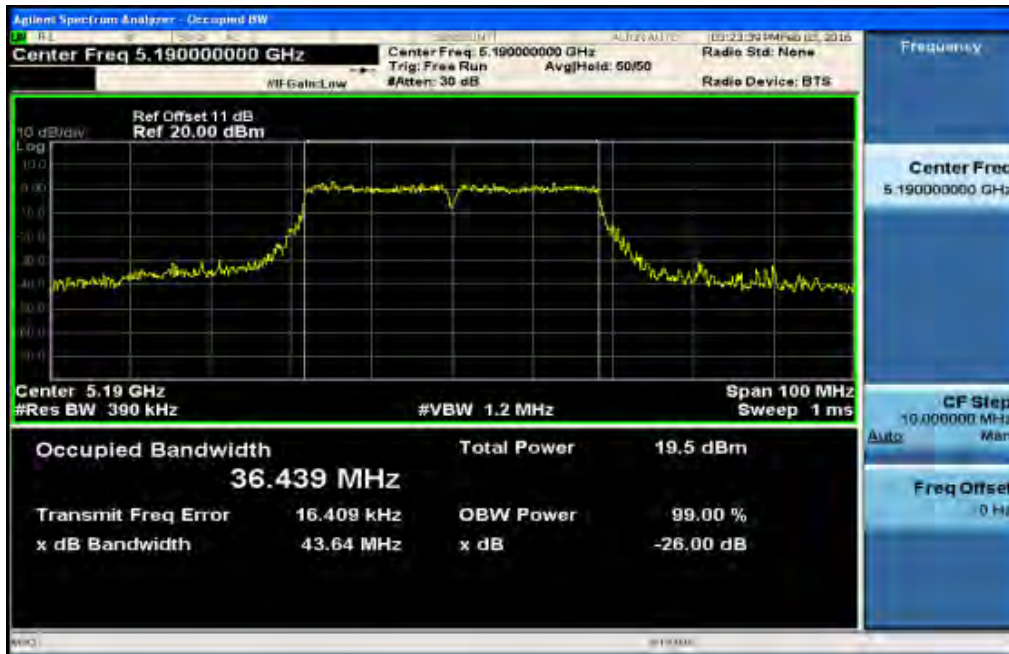
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802.11ac VHT40, 5150~5250 MHz (Main) Test Data CH-Low (5190 MHz)



Test Data CH-High (5230 MHz)



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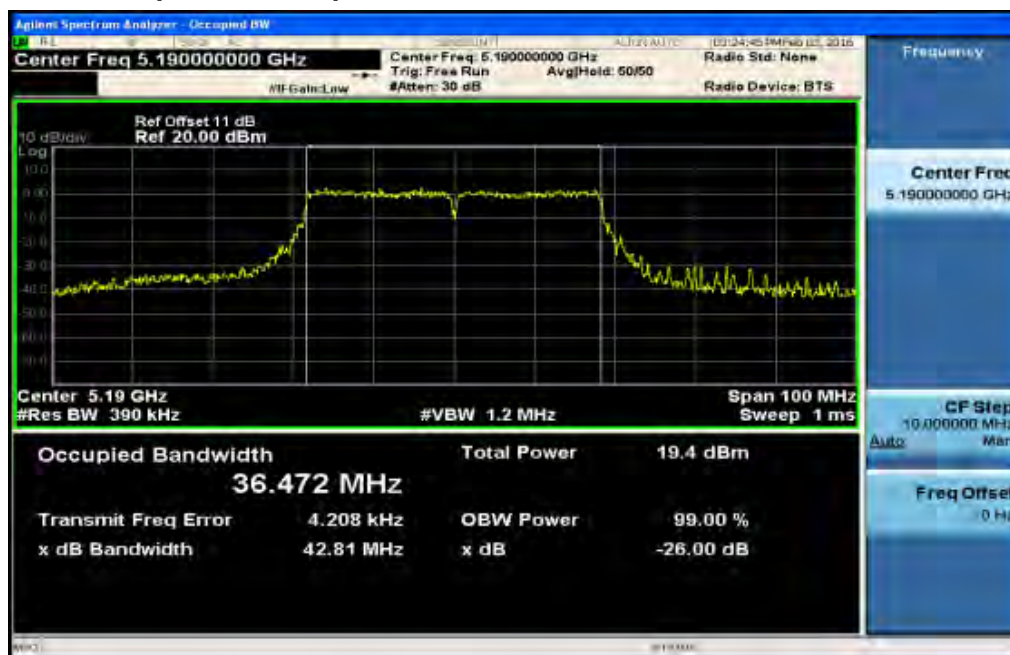
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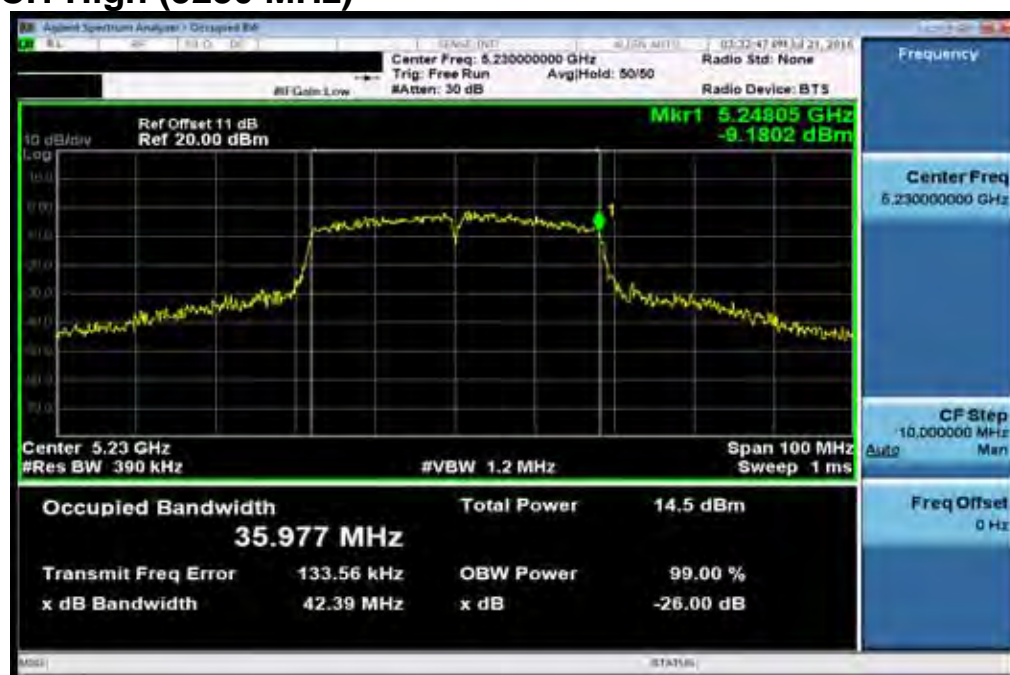
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802.11ac VHT40, 5150~5250 MHz (Aux1) Test Data CH-Low (5190 MHz)



Test Data CH-High (5230 MHz)



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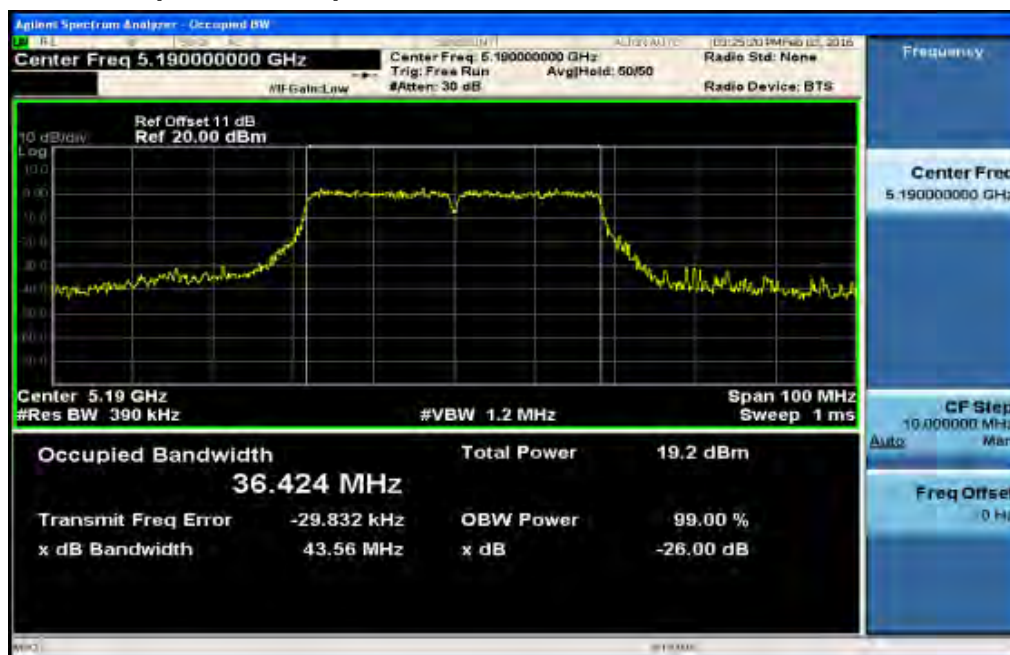
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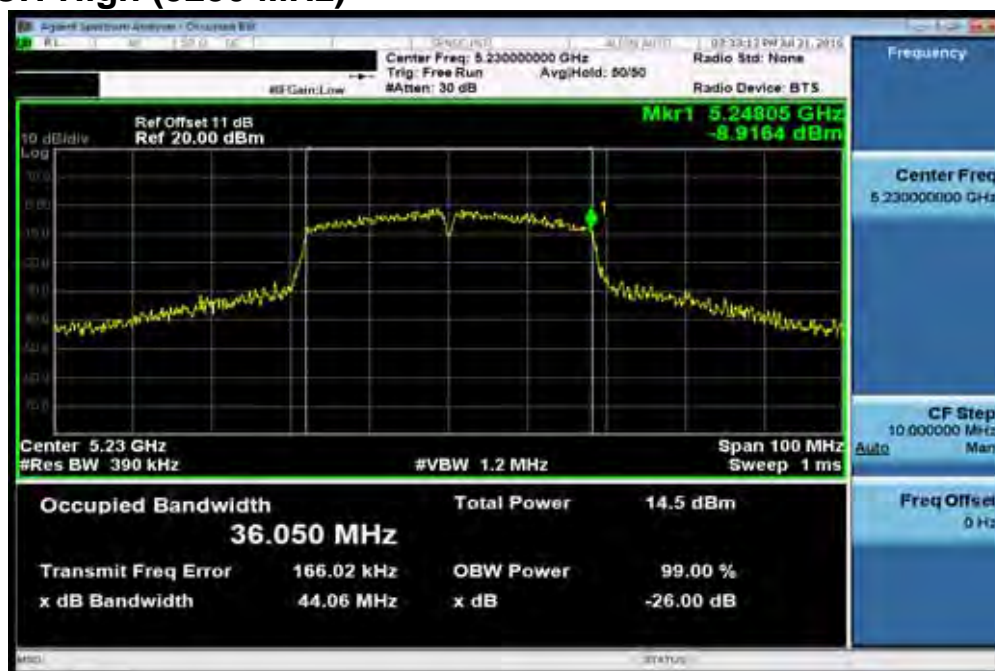
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802.11ac VHT40, 5150~5250 MHz (Aux2) Test Data CH-Low (5190 MHz)



Test Data CH-High (5230 MHz)



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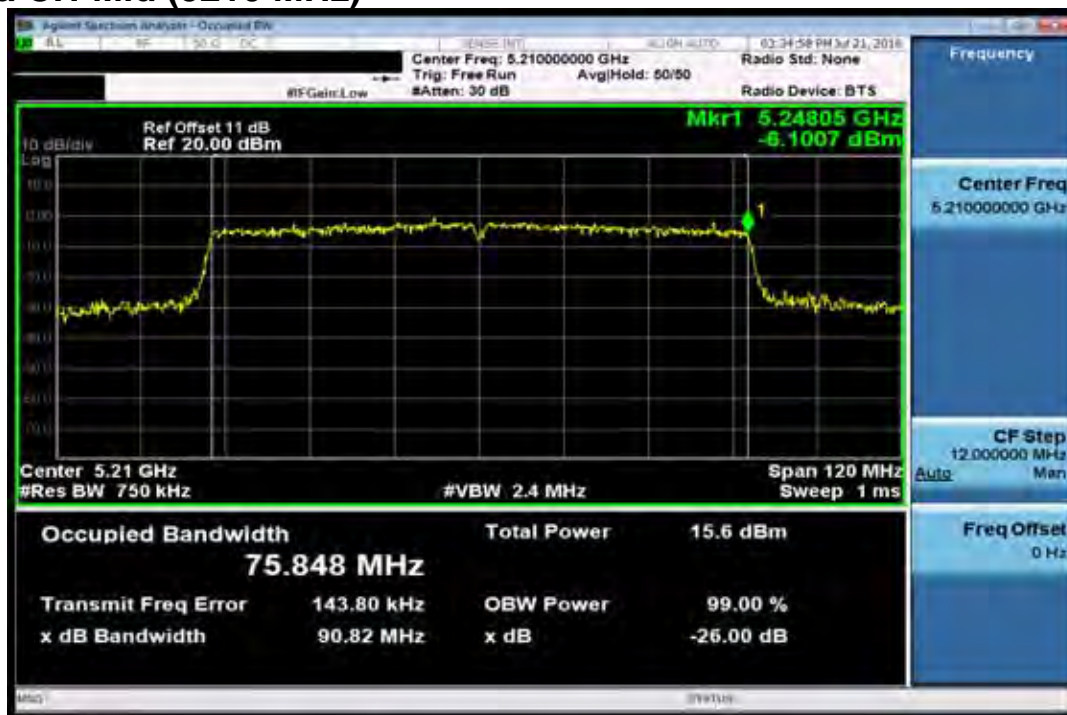
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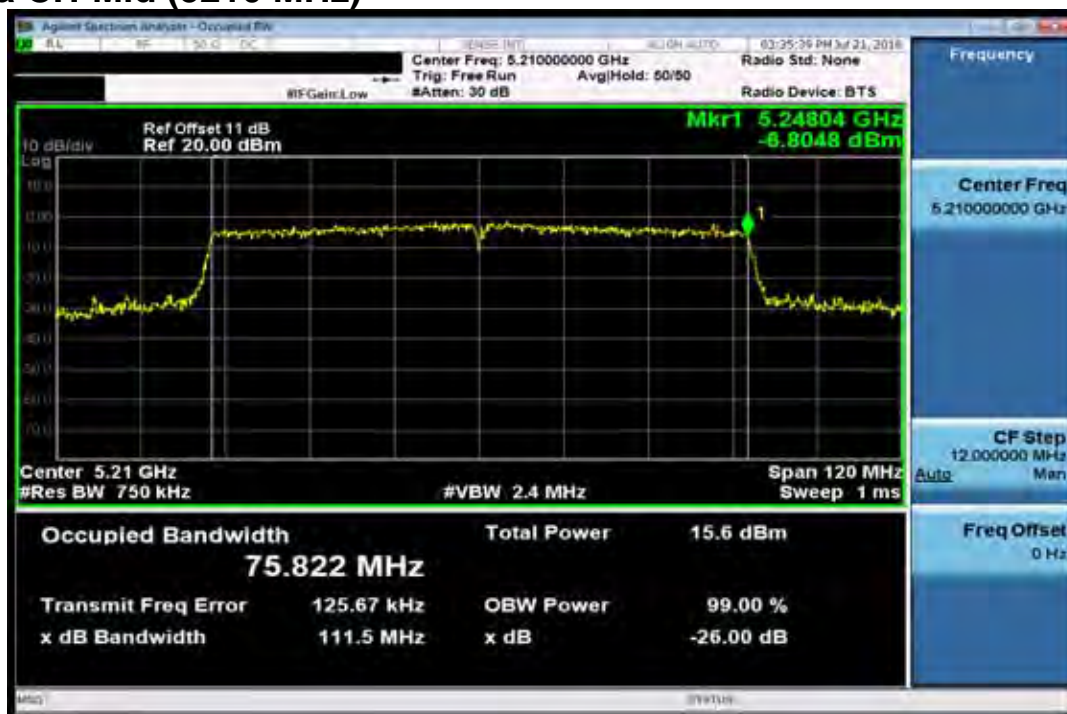
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802.11ac VHT80, 5150~5250 MHz (Main) Test Data CH-Mid (5210 MHz)



802.11ac VHT80, 5150~5250 MHz (Aux1) Test Data CH-Mid (5210 MHz)



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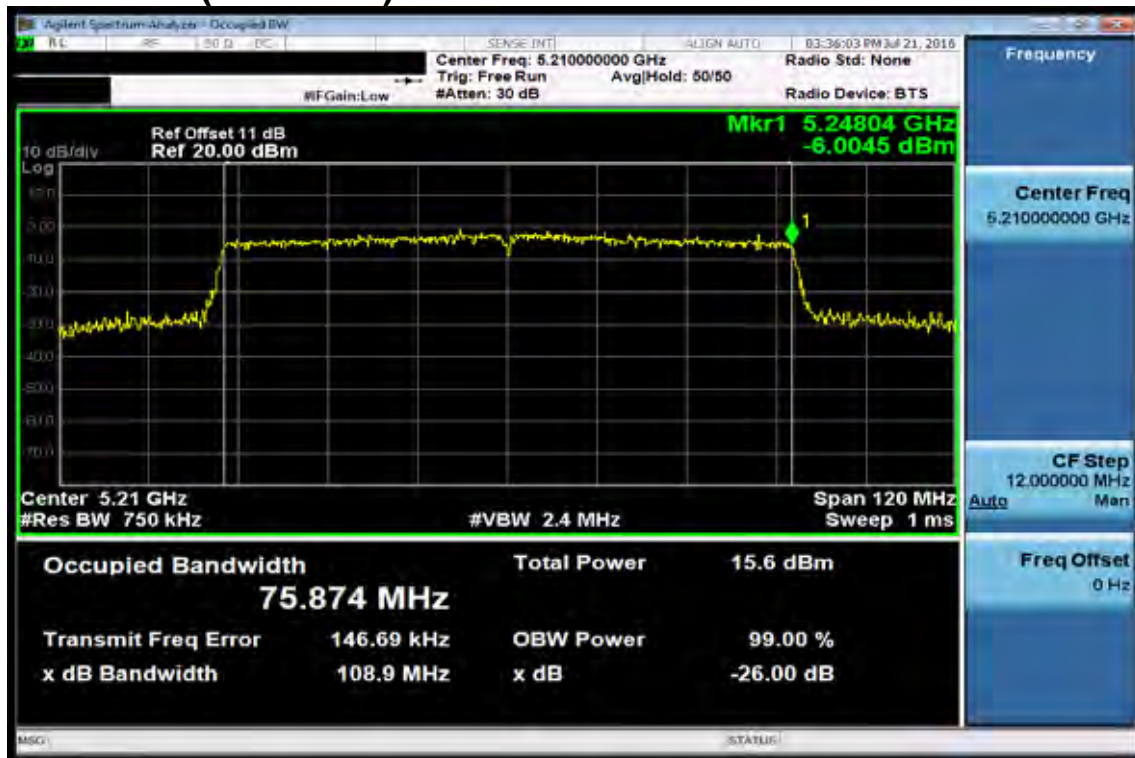
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802.11ac VHT80, 5150~5250 MHz (Aux2) Test Data CH-Mid (5210 MHz)



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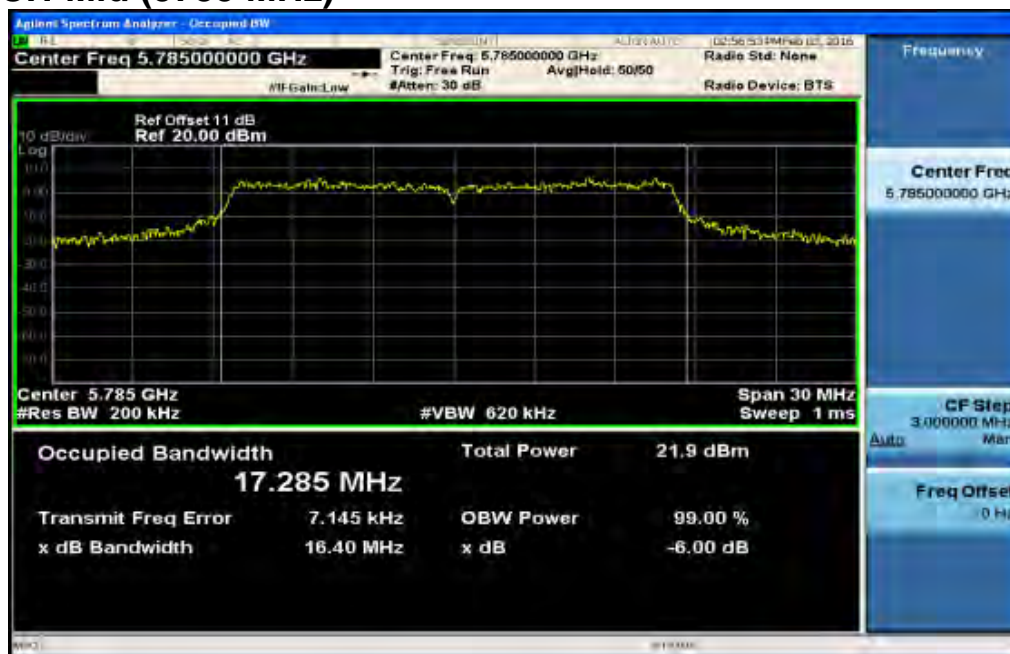
6dB & 99% Band Width Measurement

802.11a, 5725~5850 MHz (Main)

Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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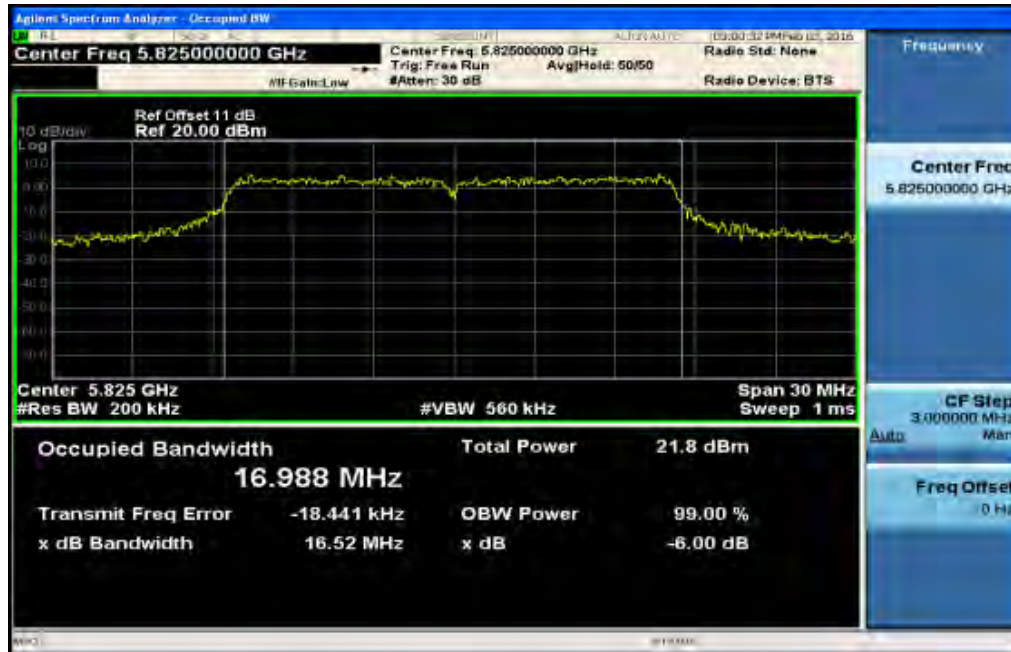
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Test Data CH-High (5825 MHz)



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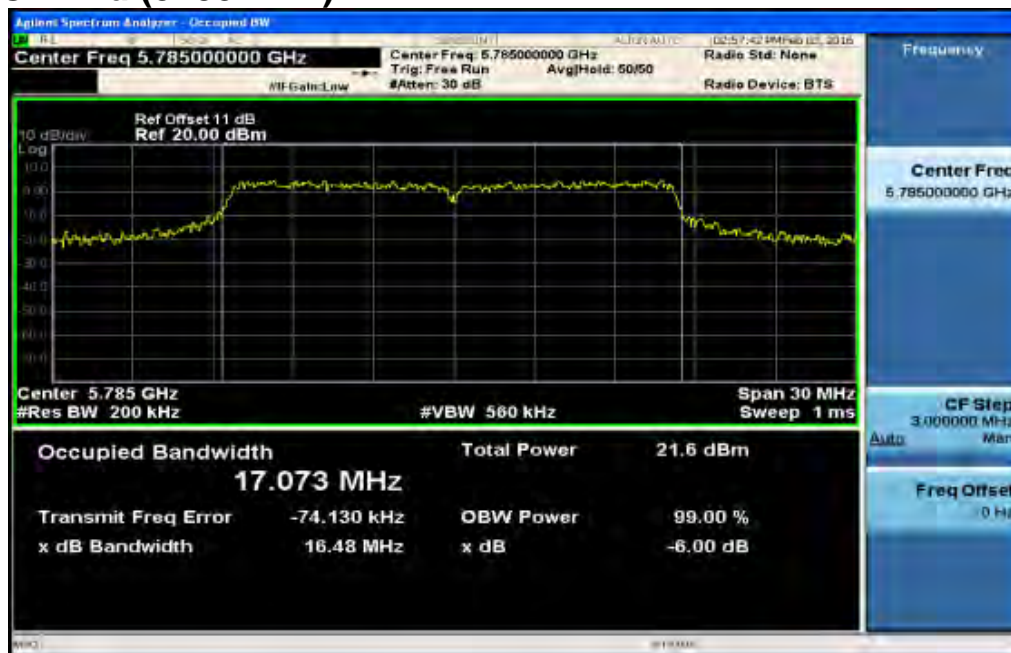
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802.11a, 5725~5850 MHz (Aux1) Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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Test Data CH-High (5825 MHz)



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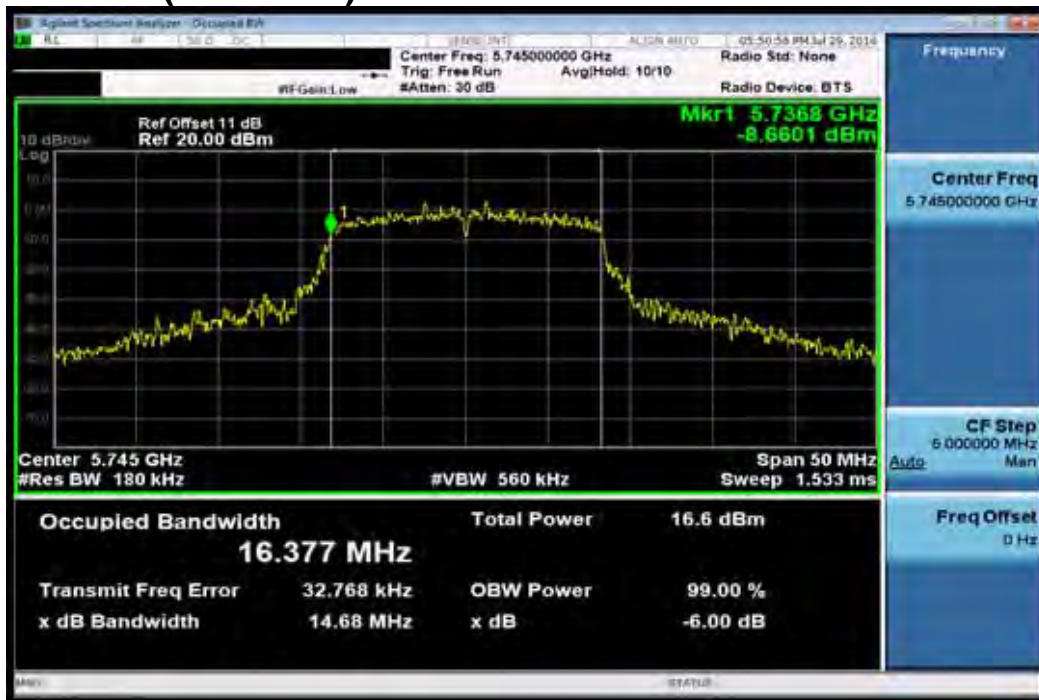
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802.11a, 5725~5850 MHz (Aux2) Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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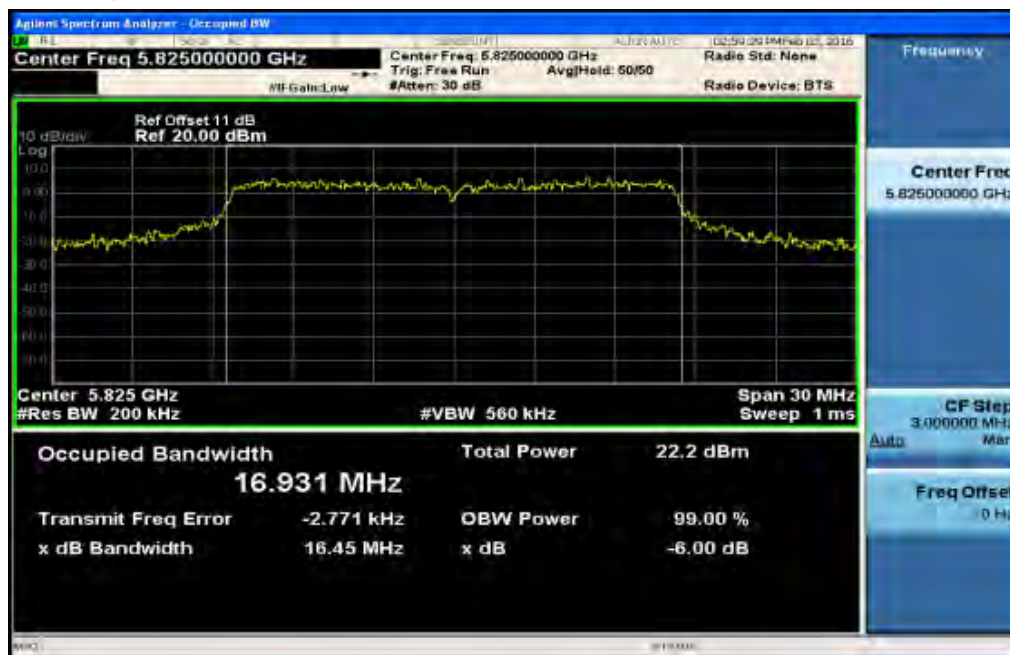
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Test Data CH-High (5825 MHz)



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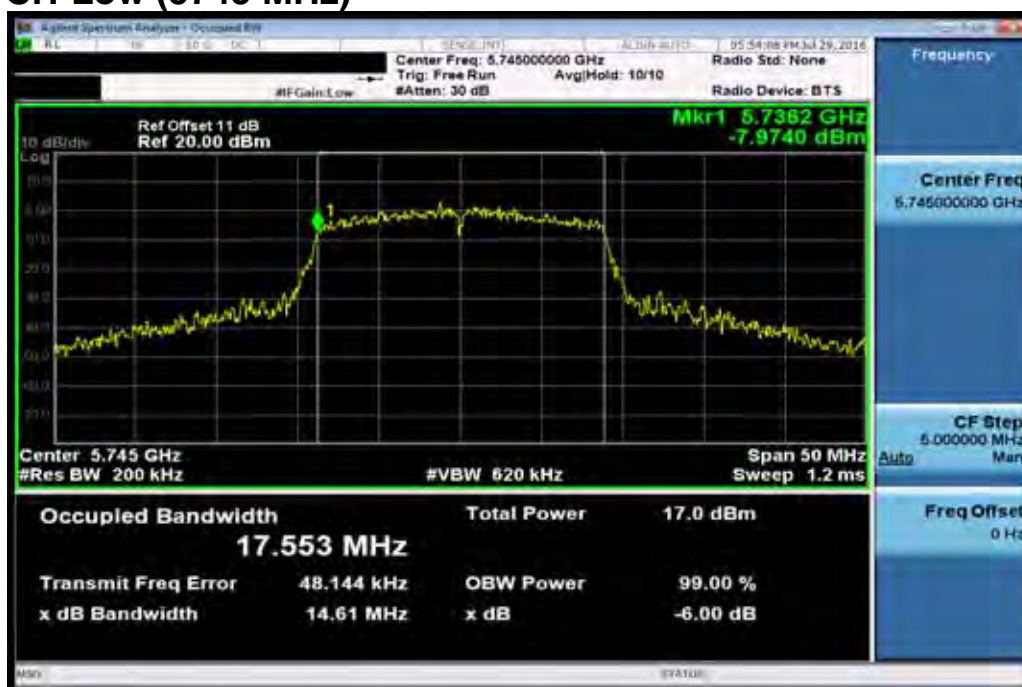
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802.11ac_VHT20, 5725~5850 MHz (Main) Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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Test Data CH-High (5825 MHz)



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802.11ac_VHT20, 5725~5850 MHz (Aux1) Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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Test Data CH-High (5825 MHz)



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802.11ac_VHT20, 5725~5850 MHz (Aux2) Test Data CH-Low (5745 MHz)



Test Data CH-Mid (5785 MHz)



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Test Data CH-High (5825 MHz)



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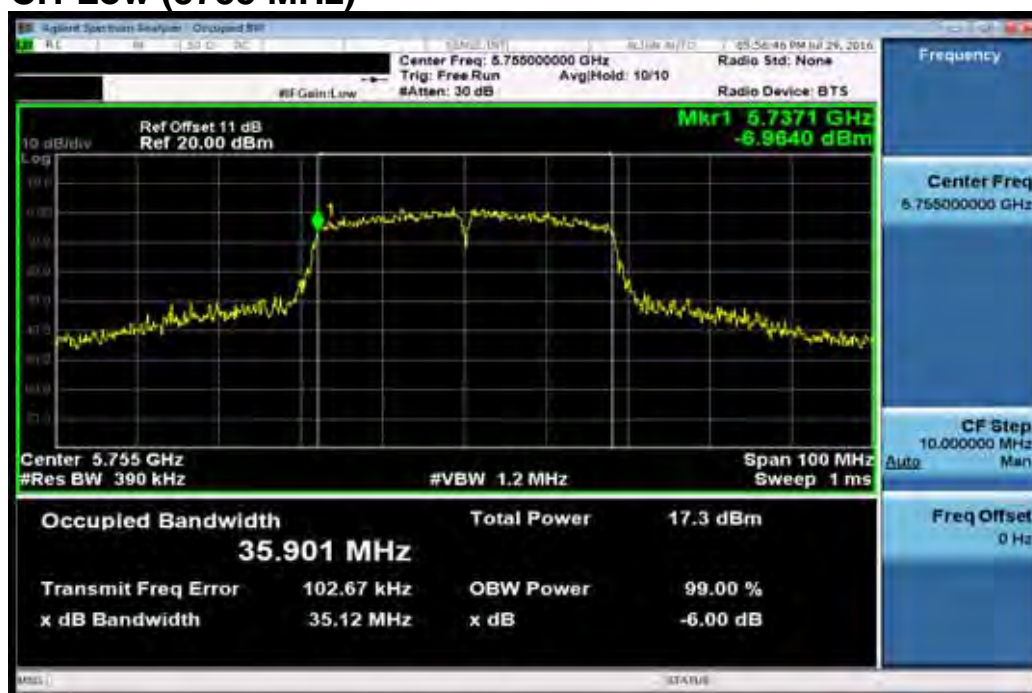
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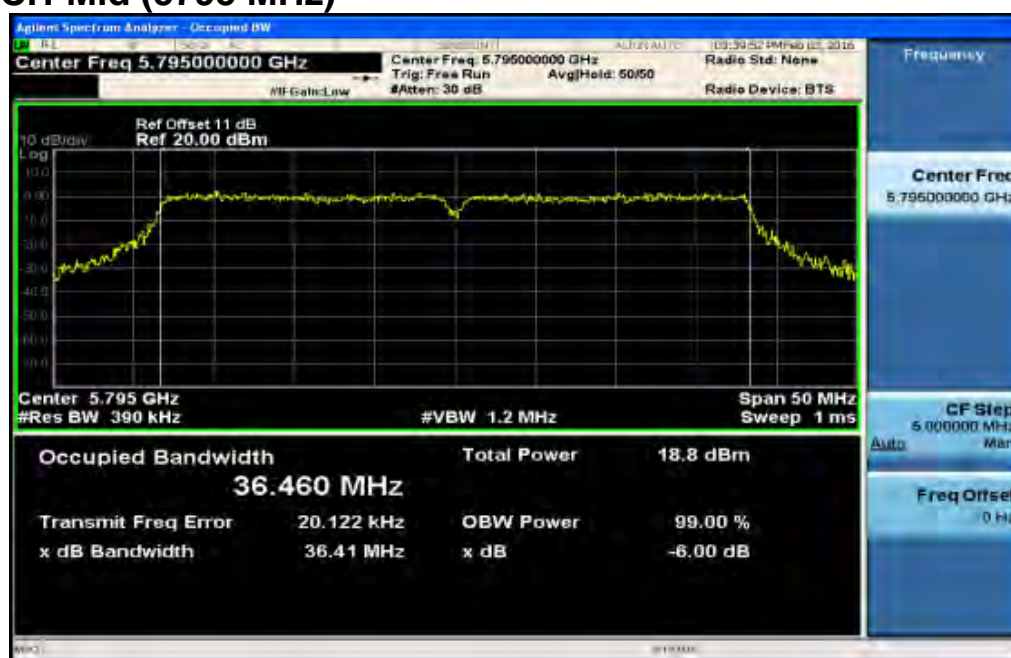
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802.11ac_VHT40, 5725~5850 MHz (Main) Test Data CH-Low (5755 MHz)



Test Data CH-Mid (5795 MHz)



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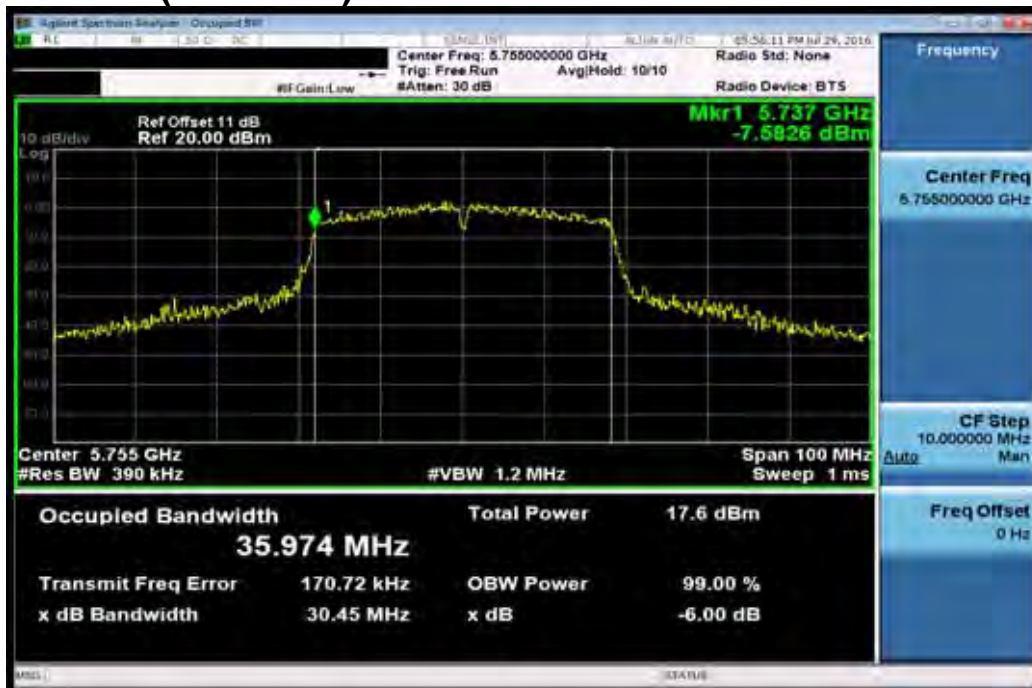
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802.11ac_VHT40, 5725~5850 MHz (Aux1) Test Data CH-Low (5755 MHz)



Test Data CH-Mid (5795 MHz)



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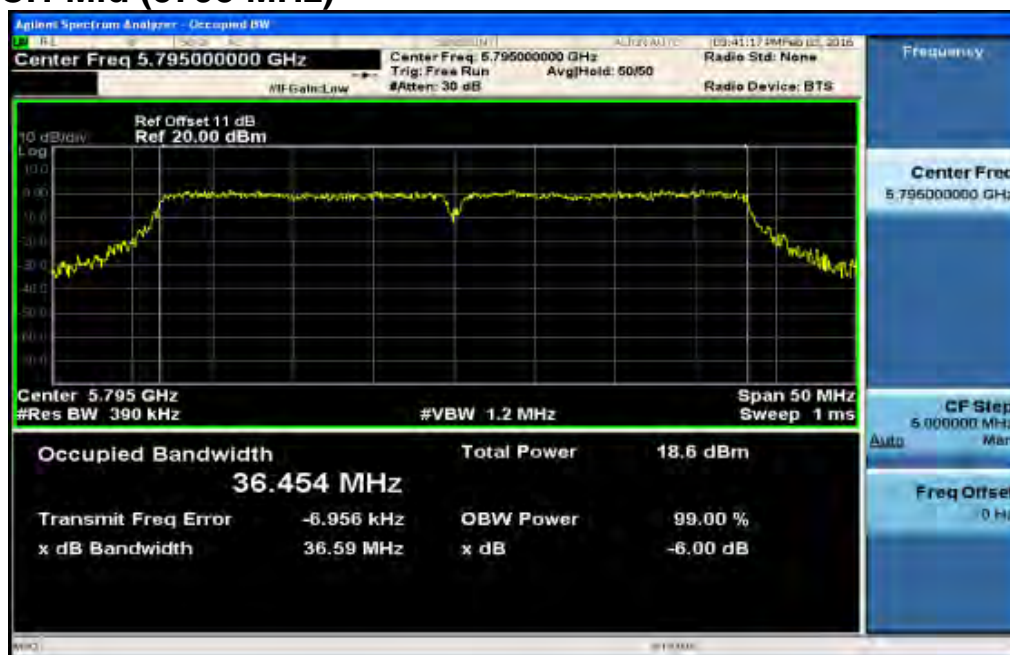
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802.11ac_VHT40, 5725~5850 MHz (Aux2) Test Data CH-Low (5755 MHz)



Test Data CH-Mid (5795 MHz)



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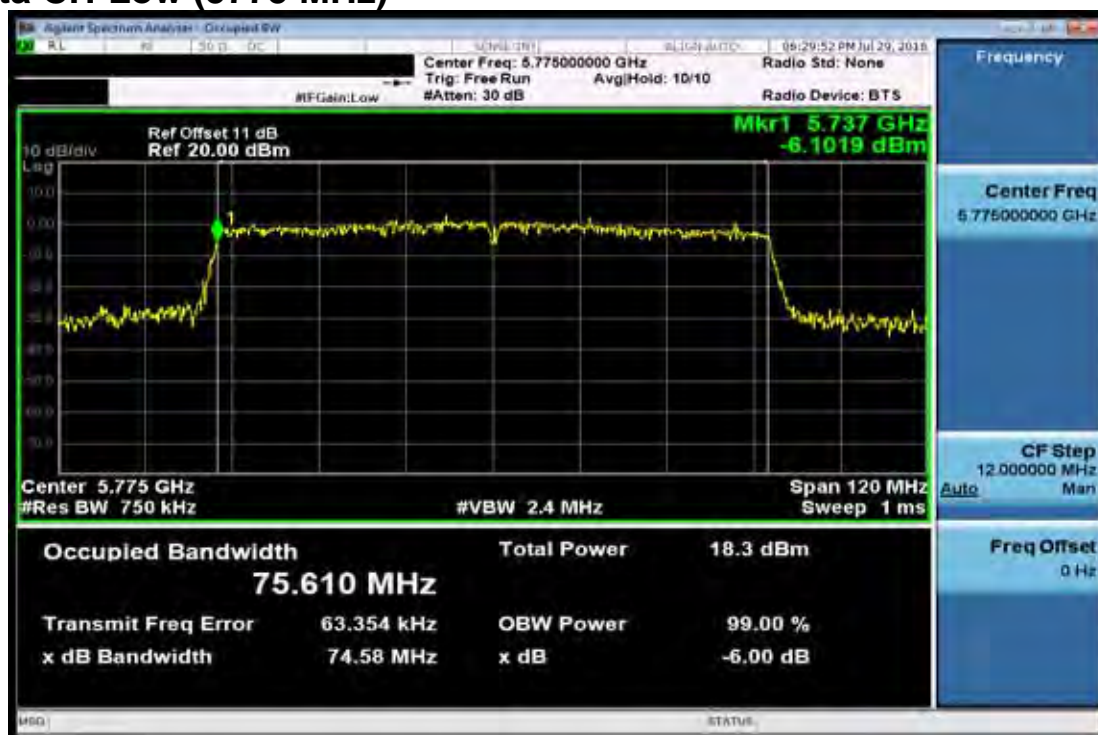
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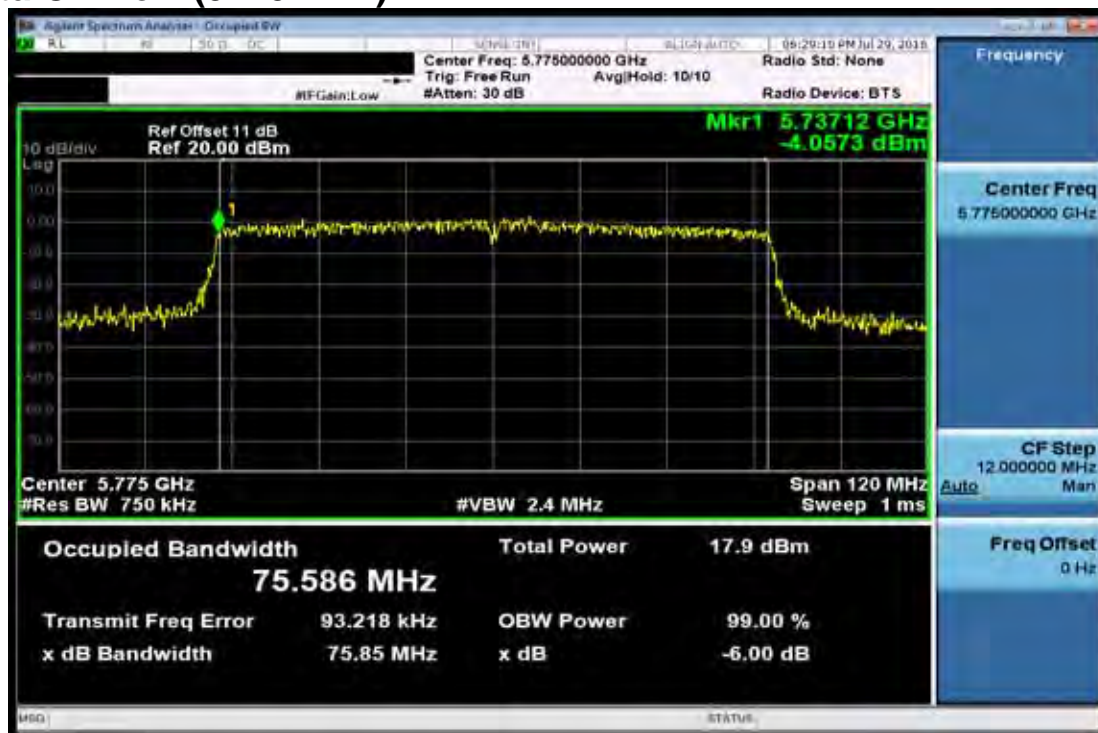
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802.11ac VHT80, 5725~5850 MHz (Main) Test Data CH-Low (5775 MHz)



802.11ac VHT80, 5725~5850 MHz (Aux1) Test Data CH-Low (5775 MHz)



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9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 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.

Note:

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
UNII-1	$5.01+4.77=9.78\text{dBi}$	$23.98\text{dBm} - (9.78 - 6 \text{ dBi}) = 20.22\text{dBm}$
U-NII-3	$5.07+4.77=9.84\text{dBi}$	$30 \text{ dBm} - (9.84 - 6 \text{ dBi}) = 26.16\text{dBm}$

Therefore the limit needs to reduce for the UNII-1 and U-NII-3 band.

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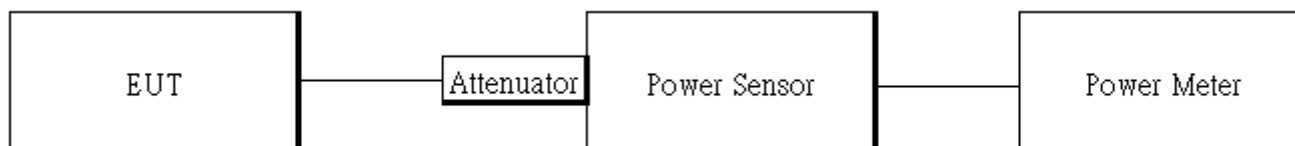
9.2 Measurement Procedure

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.
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.

9.3 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
Signal Generator	R&S	SMU200A	105303	12/22/2015	12/21/2016
DC Block	PASTERNAK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF37	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF38	12/19/2015	12/18/2016
Attenuator	WOKEN	6SR1211	RF41	12/19/2015	12/18/2016

9.4 Test Set-up



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9.5 Measurement Result

802.11a_Main

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	16.75	47.315	23.98	PASS
44	5220	17.76	59.704	23.98	PASS
48	5240	21.54	142.561	23.98	PASS
149	5745	16.52	44.875	30	PASS
157	5785	19.75	94.406	30	PASS
165	5825	18.95	78.524	30	PASS

802.11a_Aux1

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	14.85	30.549	23.98	PASS
44	5220	15.76	37.670	23.98	PASS
48	5240	19.42	87.498	23.98	PASS
149	5745	16.39	43.551	30	PASS
157	5785	19.62	91.622	30	PASS
165	5825	18.82	76.208	30	PASS

802.11a_Aux2

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	16.49	44.566	23.98	PASS
44	5220	17.5	56.234	23.98	PASS
48	5240	21.08	128.233	23.98	PASS
149	5745	12.39	17.338	30	PASS
157	5785	19.49	88.920	30	PASS
165	5825	18.65	73.282	30	PASS

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802.11ac_VHT20_MIMO

CH	Frequency (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1	CHAIN 2				
36	5180	12.97	9.4	12.18	16.54	45.045	20.2	PASS
44	5220	12.98	9.2	11.75	16.35	43.141	20.2	PASS
48	5240	14.01	9.92	12.24	17.14	51.744	20.2	PASS
149	5745	18.15	17.82	14.72	21.92	155.495	26.16	PASS
157	5785	17.43	17.29	14.45	21.36	136.776	26.16	PASS
165	5825	17.01	16.89	13.38	20.82	120.877	26.16	PASS

802.11ac_VHT40_MIMO

CH	Frequency (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1	CHAIN 2				
38	5190	12.65	8.96	11.68	16.13	41.001	20.2	PASS
46	5230	16.62	12.01	15.26	19.79	95.379	20.2	PASS
151	5755	14.21	14.09	10.79	18.06	64.003	26.16	PASS
159	5795	16.62	16.54	13.64	20.57	114.122	26.16	PASS

802.11ac_VHT80_MIMO

CH	Frequency (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
		CHAIN 0	CHAIN 1	CHAIN 2				
42	5210	14.3	10.57	13.21	17.73	59.259	20.2	PASS
155	5775	13.48	13.37	10.29	17.38	54.702	26.16	PASS

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10. PEAK POWER SPECTRAL DENSITY

10.1 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.

Note:

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
UNII-1	$5.01+4.77=9.78\text{dBi}$	$17\text{dBm} - (9.78 - 6 \text{ dBi}) = 13.22\text{dBm}$
U-NII-3	$5.07+4.77=9.84\text{dBi}$	$30\text{dBm} - (9.84 - 6 \text{ dBi}) = 26.16\text{dBm}$

Therefore the limit needs to reduce for the UNII-1 and U-NII-3 band.

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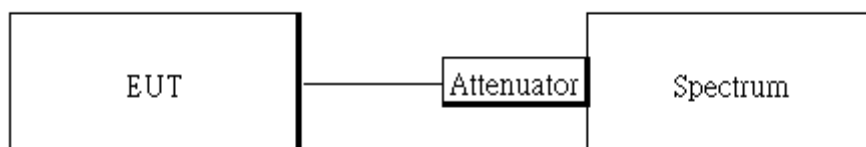
10.2 Measurement Procedure

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.
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.

10.3 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
Signal Generator	R&S	SMU200A	105303	12/22/2015	12/21/2016
DC Block	PASTERNAK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF37	12/19/2015	12/18/2016
Splitter	Marvelous	MVE8576	RF38	12/19/2015	12/18/2016
Attenuator	WOKEN	6SR1211	RF41	12/19/2015	12/18/2016

10.4 Test Set-up



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10.5 Measurement Result

POWER DENSITY 802.11a MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	4.04	17	-12.96
5220	3.70	17	-13.30
5240	4.07	17	-12.93
5745	8.11	30	-21.89
5785	9.73	30	-20.27
5825	10.24	30	-19.76

POWER DENSITY 802.11ac VHT20 MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	-0.44	13.22	-13.66
5220	-1.52	13.22	-14.74
5240	-2.74	13.22	-15.96
5745	13.71	26.16	-12.45
5785	14.39	26.16	-11.77
5825	13.98	26.16	-12.18

POWER DENSITY 802.11ac VHT40 MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5190	-2.79	13.22	-16.01
5230	-3.96	13.22	-17.18
5755	8.91	26.16	-17.25
5795	10.88	26.16	-15.28

POWER DENSITY 802.11ac VHT80 MODE			
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5210	-8.56	13.22	-21.78
5775	6.26	26.16	-19.90

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802.11a 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



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Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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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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802.11ac VHT20, 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



Peak Power Spectral Density Data Plot (CH Mid 5220 MHz)



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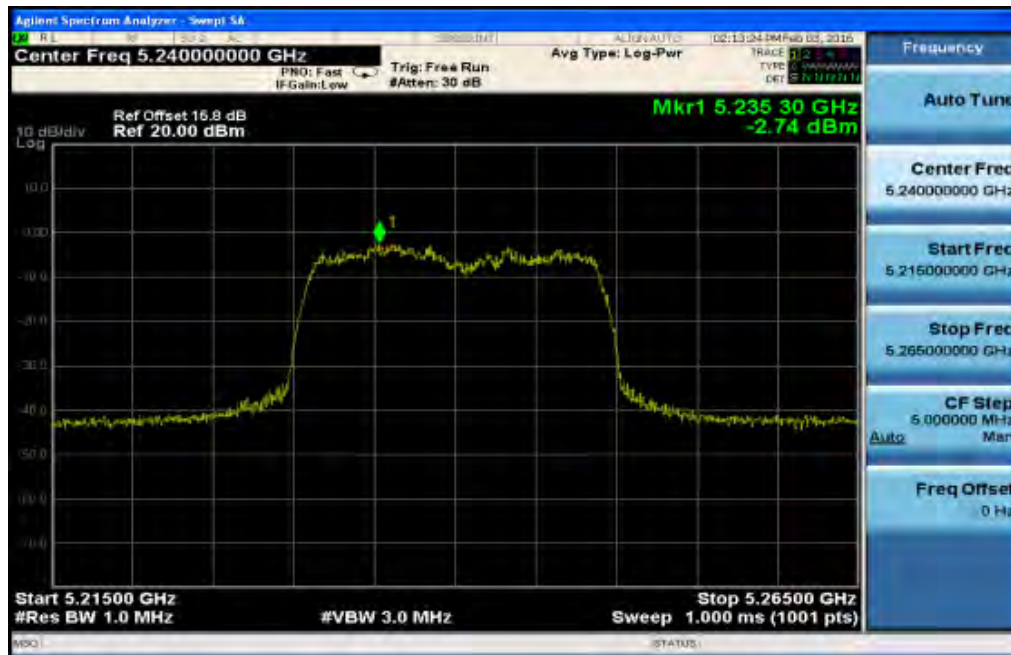
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Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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802.11ac VHT20, 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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802.11ac VHT40, 5150~5250 MHz

Peak Power Spectral Density Data Plot (CH Low 5190 MHz)



Peak Power Spectral Density Data Plot (CH High 5230 MHz)



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802.11ac VHT40, 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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802.11ac VHT80, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Mid 5210 MHz)



802.11ac VHT80, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Mid 5775 MHz)



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11. UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 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	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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11.2 Measurement Equipment Used

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016
Loop Antenna	ETS-Lindgren	6502	00143303	12/09/2015	12/08/2016
Broadband Antenna	TESEQ	CBL 6112D	35240	12/05/2015	12/04/2016
Horn Antenna	ETS-Lindgren	3117	00143272	12/08/2015	12/07/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/25/2015	07/24/2016
Pre Amplifier	EMC Instruments	EMC330	980096	12/19/2015	12/18/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/19/2015	12/18/2016
Pre Amplifier	R&S	SCU-18	10204	12/19/2015	12/18/2016
Pre Amplifier	R&S	SCU-26	100780	12/19/2015	12/18/2016
Pre Amplifier	R&S	SCU-40	100356	12/19/2015	12/18/2016
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF27	12/19/2015	12/18/2016
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2015	05/03/2016
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

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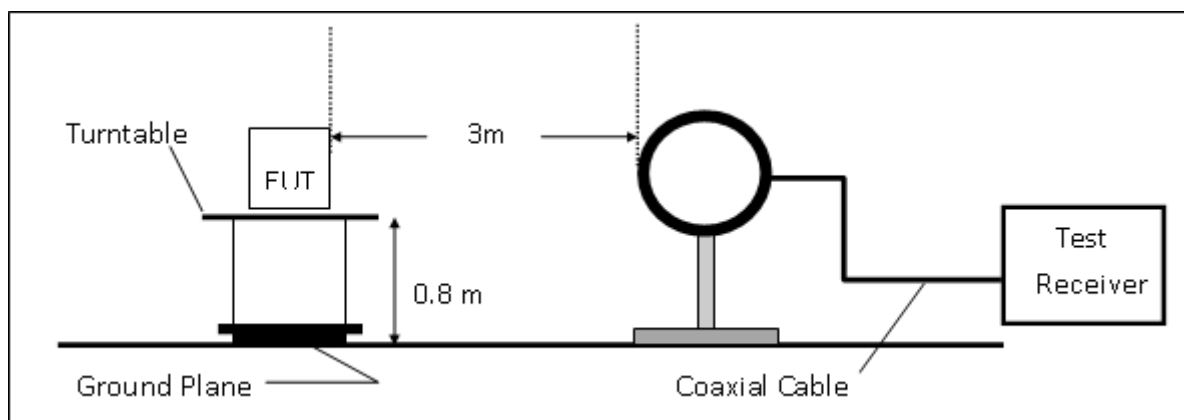
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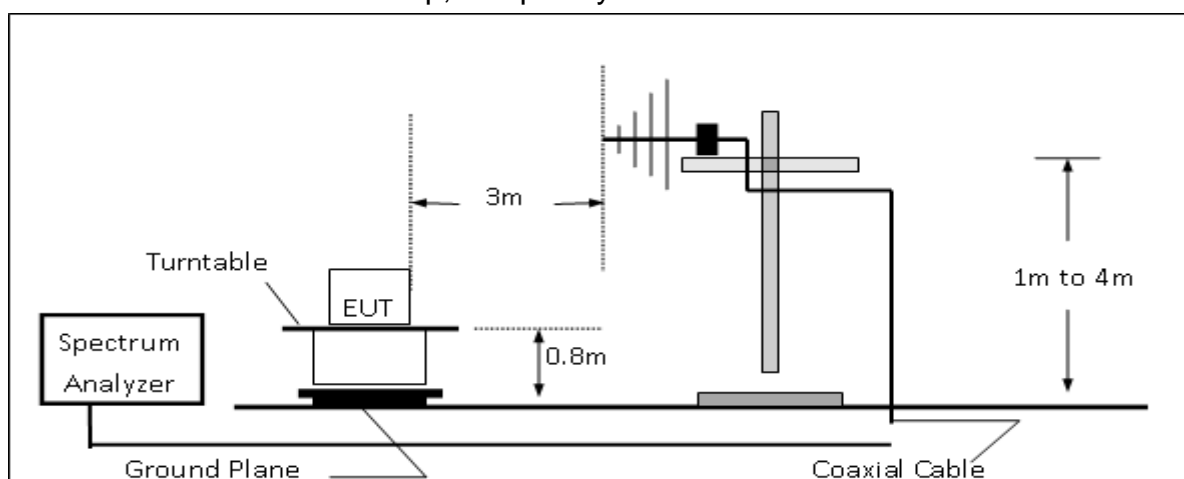
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11.3 Test SET-UP

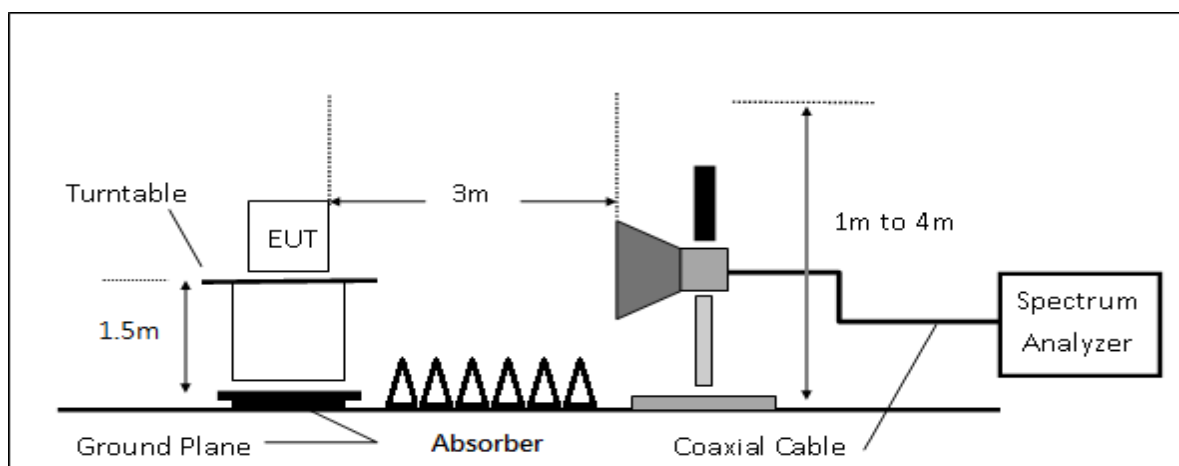
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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 EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
3. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plane.
4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
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. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
11. Repeat above procedures until all frequency measured were complete.

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)

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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

Refer to attach tabular data sheets.

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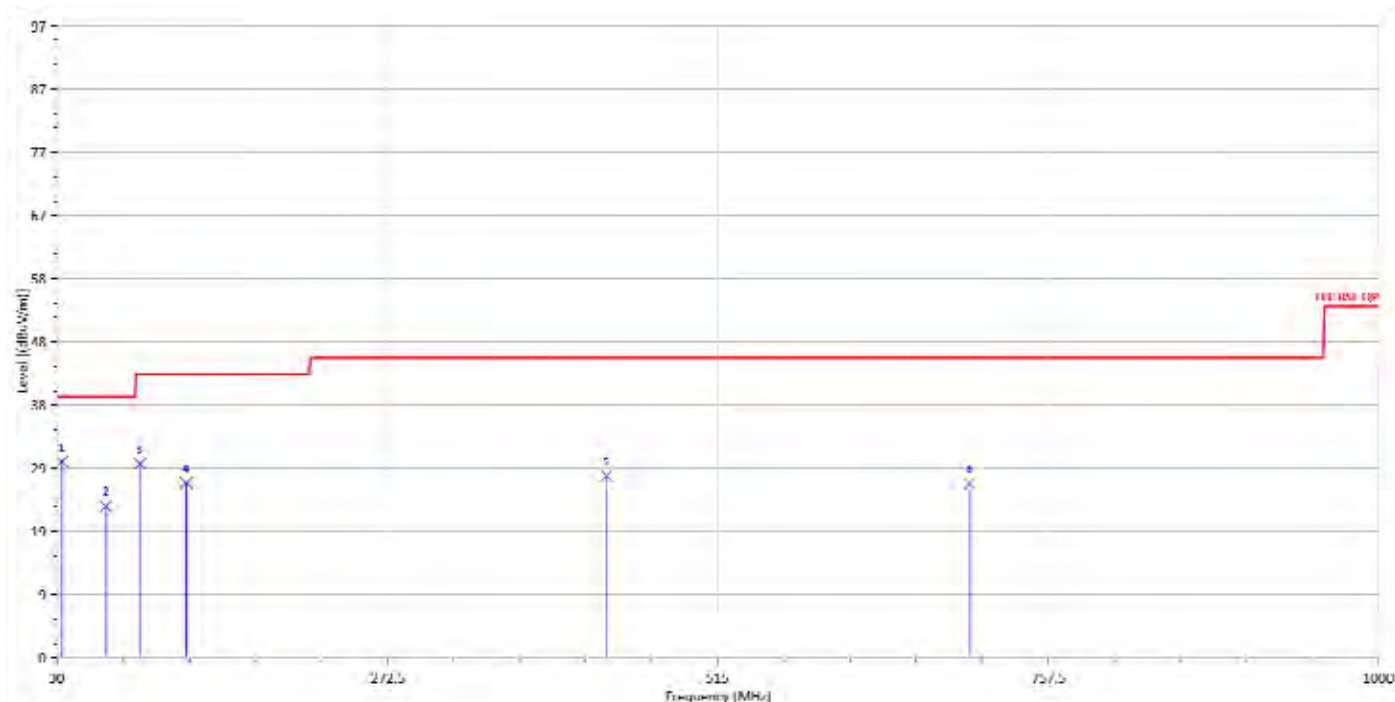
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Radiated Spurious Emission Measurement Result

Below 1GHz Worst-Case Data:

802.11a 5150~5250 MHz

Operation Mode :	802.11a	Test Date :	2016/1/25
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
33.88	S	Peak	45.29	-15.22	30.06	40	-9.94
65.89	S	Peak	51.35	-28.09	23.26	40	-16.74
91.11	S	Peak	55.17	-25.42	29.74	43.5	-13.76
125.06	S	Peak	48.17	-21.38	26.79	43.5	-16.71
433.52	S	Peak	43.30	-15.45	27.85	46	-18.15
700.27	S	Peak	37.81	-11.13	26.68	46	-19.32

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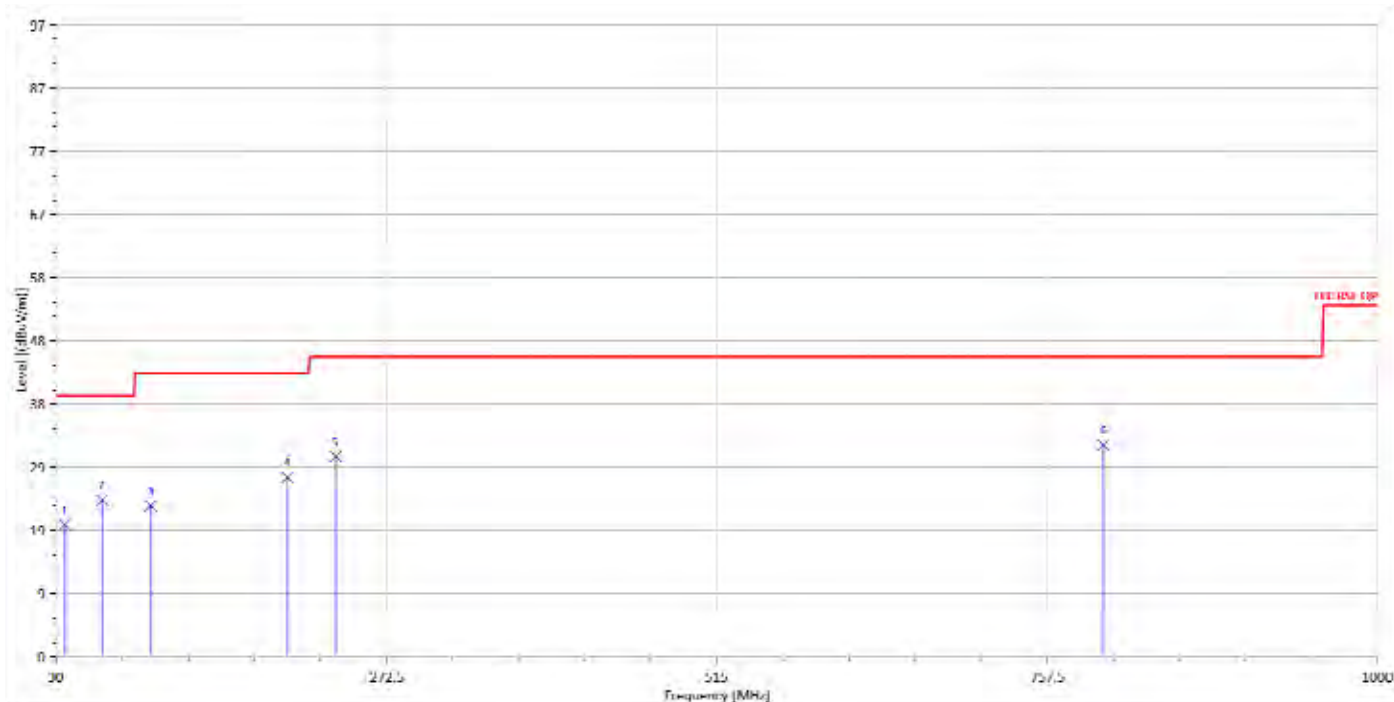
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Operation Mode : 802.11 a Test Date : 2016/1/25
Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
36.79	S	Peak	37.23	-16.96	20.27	40	-19.73
63.95	S	Peak	52.26	-28.21	24.05	40	-15.95
99.84	S	Peak	47.04	-23.84	23.20	43.5	-20.30
199.75	S	Peak	50.72	-23.28	27.44	43.5	-16.06
235.64	S	Peak	52.30	-21.60	30.70	46	-15.30
799.21	S	Peak	41.98	-9.51	32.48	46	-13.52

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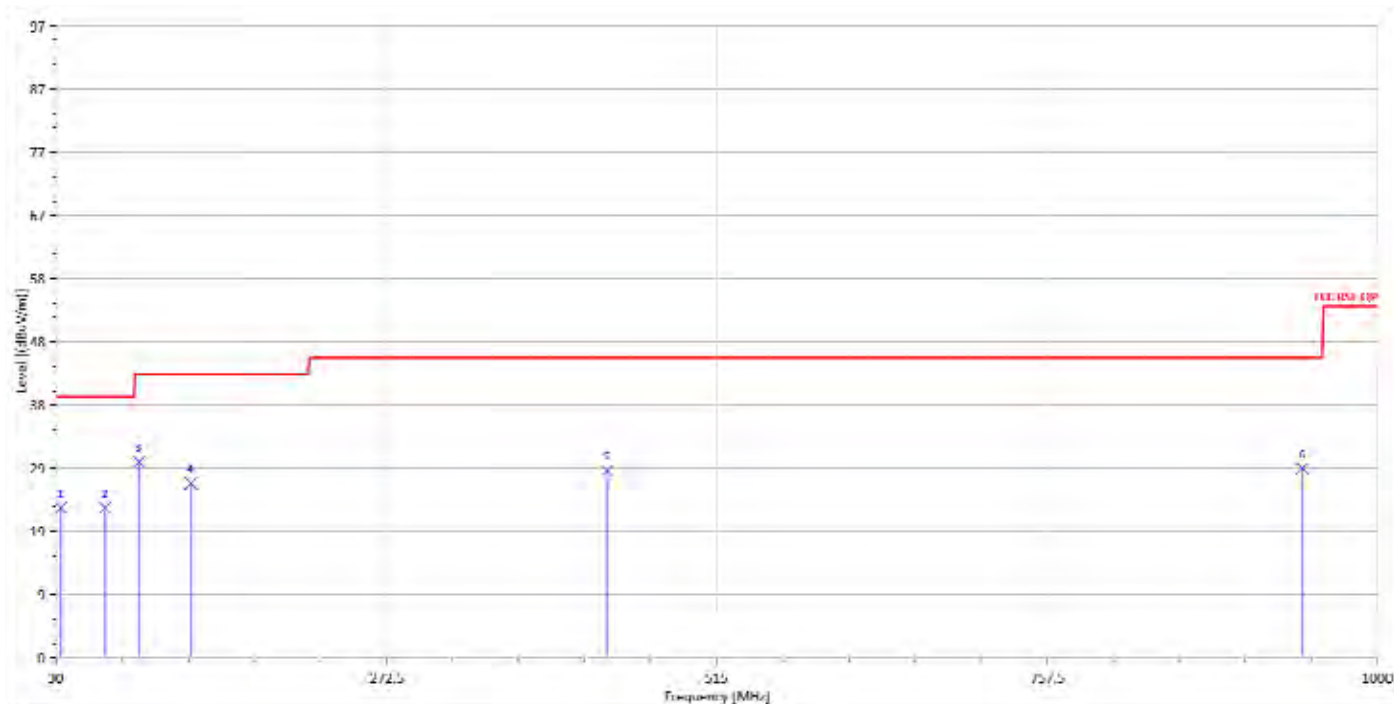
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802.11a, 5725~5850 MHz

Operation Mode :	802.11a	Test Date :	2016/1/25
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
33.88	S	Peak	38.26	-15.22	23.03	40	-16.97
65.89	S	Peak	51.13	-28.09	23.03	40	-16.97
91.11	S	Peak	55.43	-25.42	30.01	43.5	-13.49
128.94	S	Peak	48.03	-21.34	26.69	43.5	-16.81
434.49	S	Peak	44.10	-15.43	28.67	46	-17.33
944.71	S	Peak	36.69	-7.67	29.02	46	-16.98

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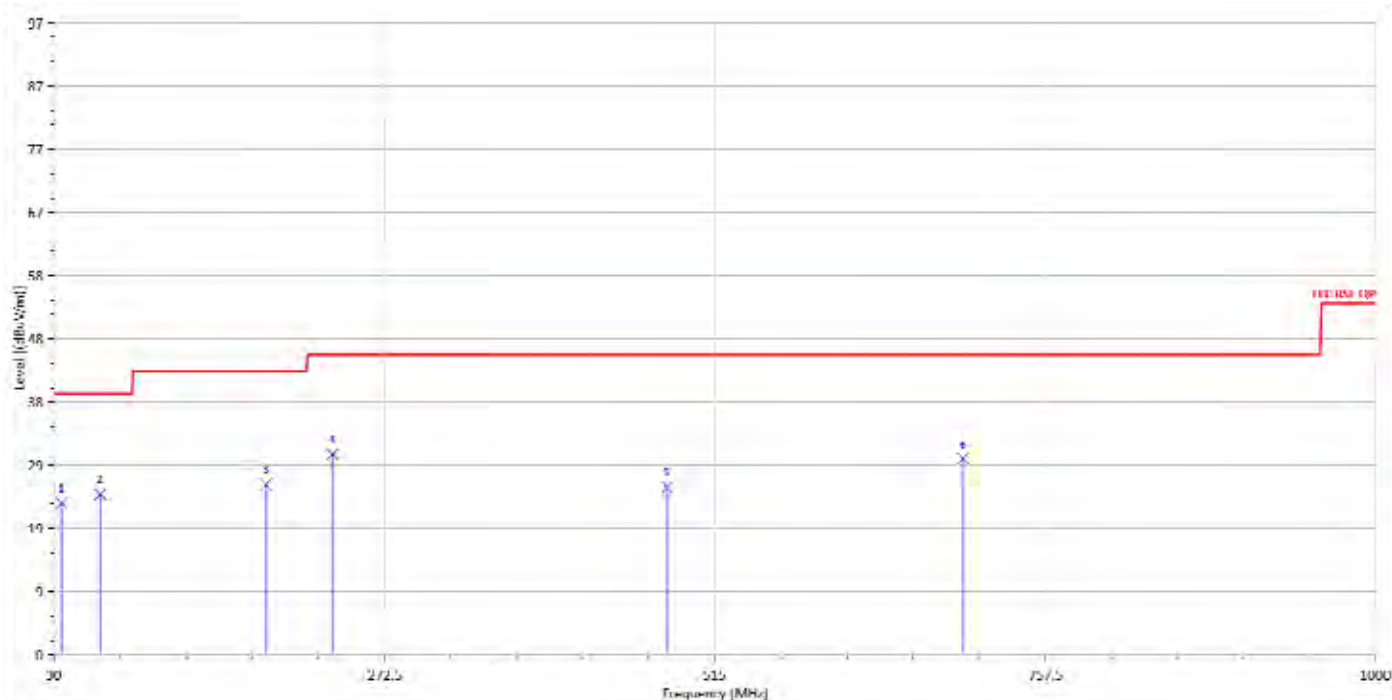
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Operation Mode : 802.11 a Test Date : 2016/1/25
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
35.82	S	Peak	39.63	-16.34	23.28	40	-16.72
63.95	S	Peak	52.86	-28.21	24.65	40	-15.35
186.17	S	Peak	50.36	-24.25	26.11	43.5	-17.39
234.67	S	Peak	52.40	-21.70	30.70	46	-15.30
480.08	S	Peak	39.99	-14.30	25.69	46	-20.31
697.36	S	Peak	41.15	-11.09	30.06	46	-15.94

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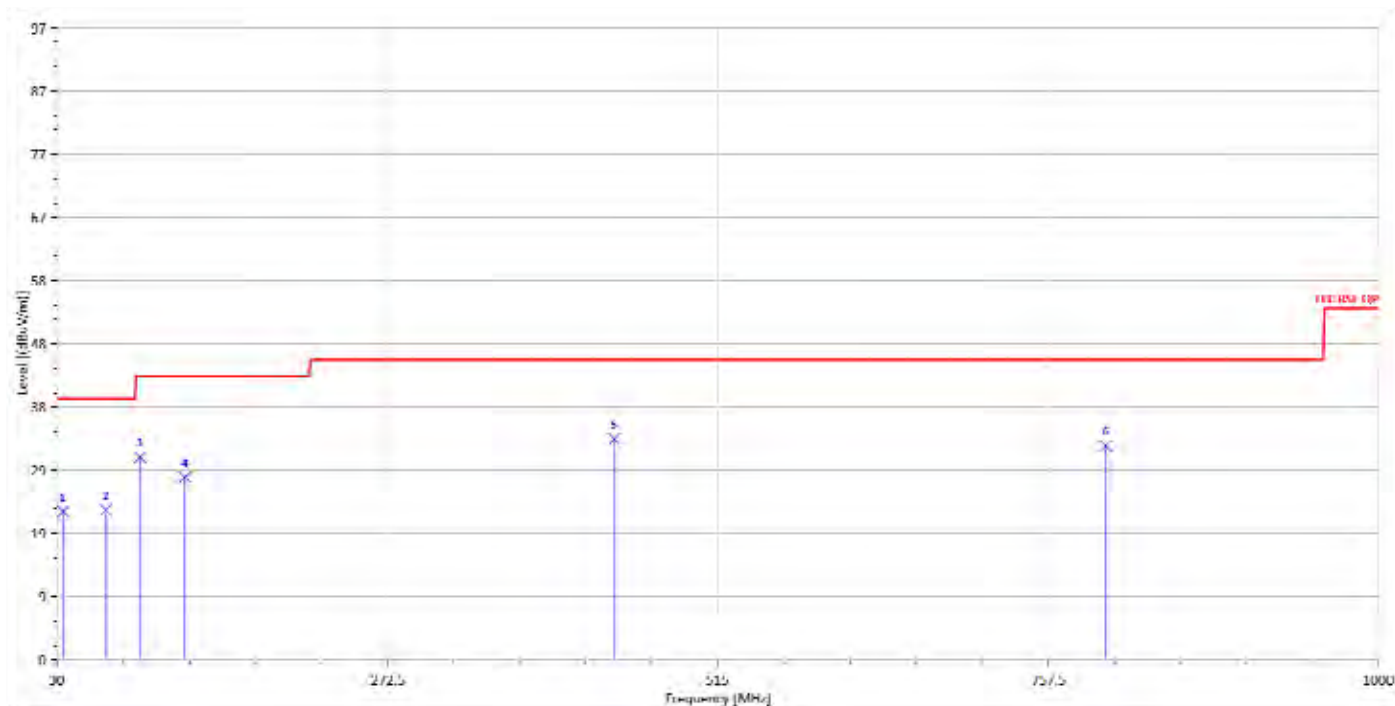
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802.11ac VHT80, 5150~5250 MHz

Operation Mode :	802.11 ac80	Test Date :	2016/1/25
Fundamental Frequency :	5210 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
34.85	S	Peak	38.54	-15.75	22.79	40	-17.21
65.89	S	Peak	51.10	-28.09	23.00	40	-17.00
91.11	S	Peak	56.45	-25.42	31.03	43.5	-12.47
124.09	S	Peak	49.32	-21.39	27.94	43.5	-15.56
439.34	S	Peak	49.22	-15.34	33.88	46	-12.12
800.18	S	Peak	42.29	-9.49	32.80	46	-13.20

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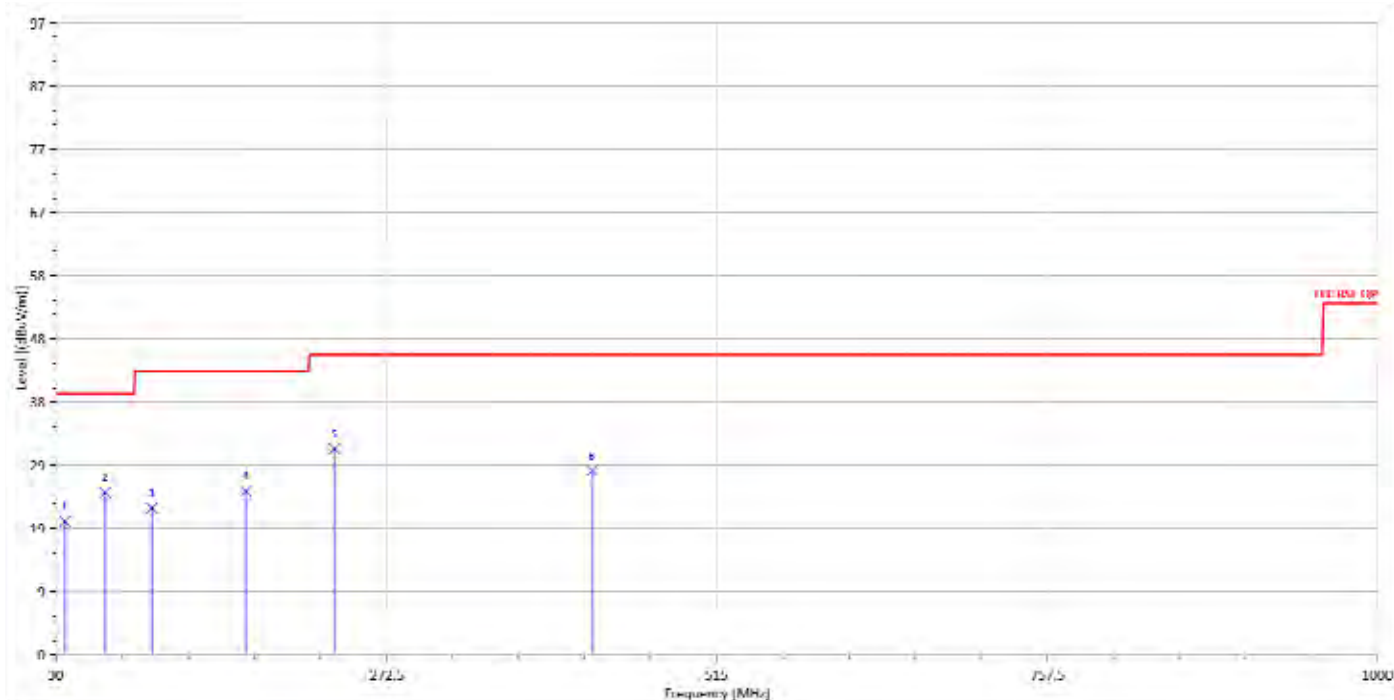
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Operation Mode : 802.11 ac80 Test Date : 2016/1/25
Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
36.79	S	Peak	37.42	-16.96	20.46	40	-19.54
65.89	S	Peak	53.01	-28.09	24.91	40	-15.09
100.81	S	Peak	46.22	-23.69	22.53	43.5	-20.97
169.68	S	Peak	48.86	-23.70	25.16	43.5	-18.34
234.67	S	Peak	53.29	-21.70	31.59	46	-14.41
423.82	S	Peak	43.66	-15.42	28.24	46	-17.76

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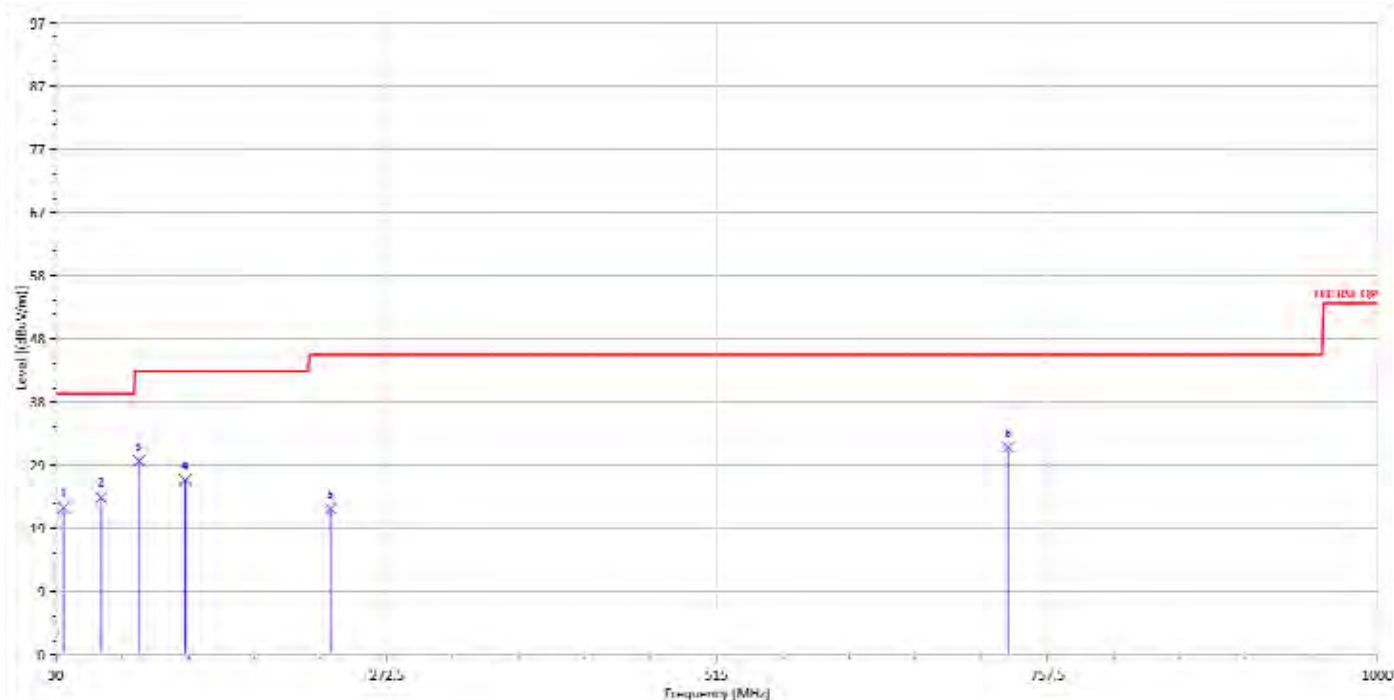
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Operation Mode : 802.11 ac80 Test Date : 2016/1/25
Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
35.82	S	Peak	38.94	-16.34	22.59	40	-17.41
62.98	S	Peak	52.41	-28.27	24.15	40	-15.85
91.11	S	Peak	55.13	-25.42	29.71	43.5	-13.79
125.06	S	Peak	48.12	-21.38	26.74	43.5	-16.76
231.76	S	Peak	44.51	-22.08	22.44	46	-23.56
729.37	S	Peak	42.50	-10.66	31.84	46	-14.16

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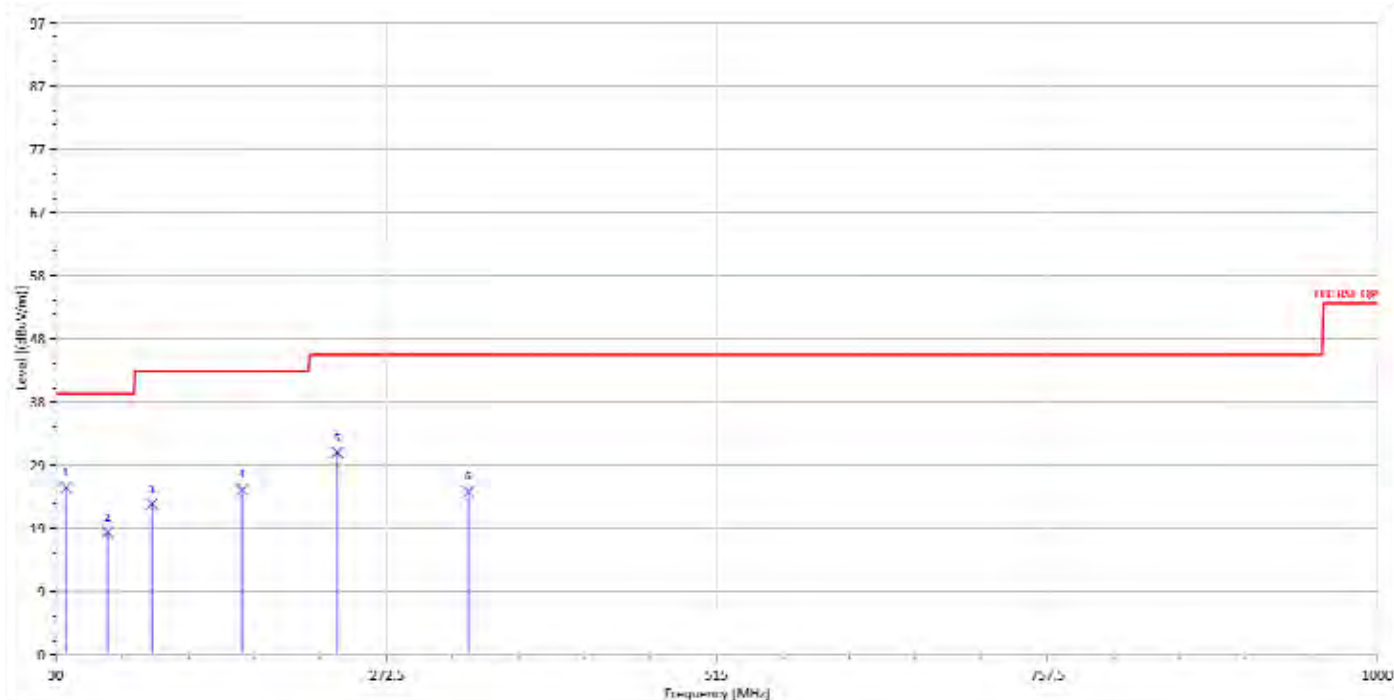
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Operation Mode : 802.11ac80 Test Date : 2016/1/25
Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
37.76	S	Peak	43.25	-17.57	25.68	40	-14.32
67.83	S	Peak	46.76	-27.95	18.81	40	-21.19
100.81	S	Peak	46.89	-23.69	23.20	43.5	-20.30
166.77	S	Peak	49.00	-23.63	25.37	43.5	-18.13
236.61	S	Peak	52.53	-21.50	31.03	46	-14.97
332.64	S	Peak	43.21	-18.15	25.06	46	-20.94

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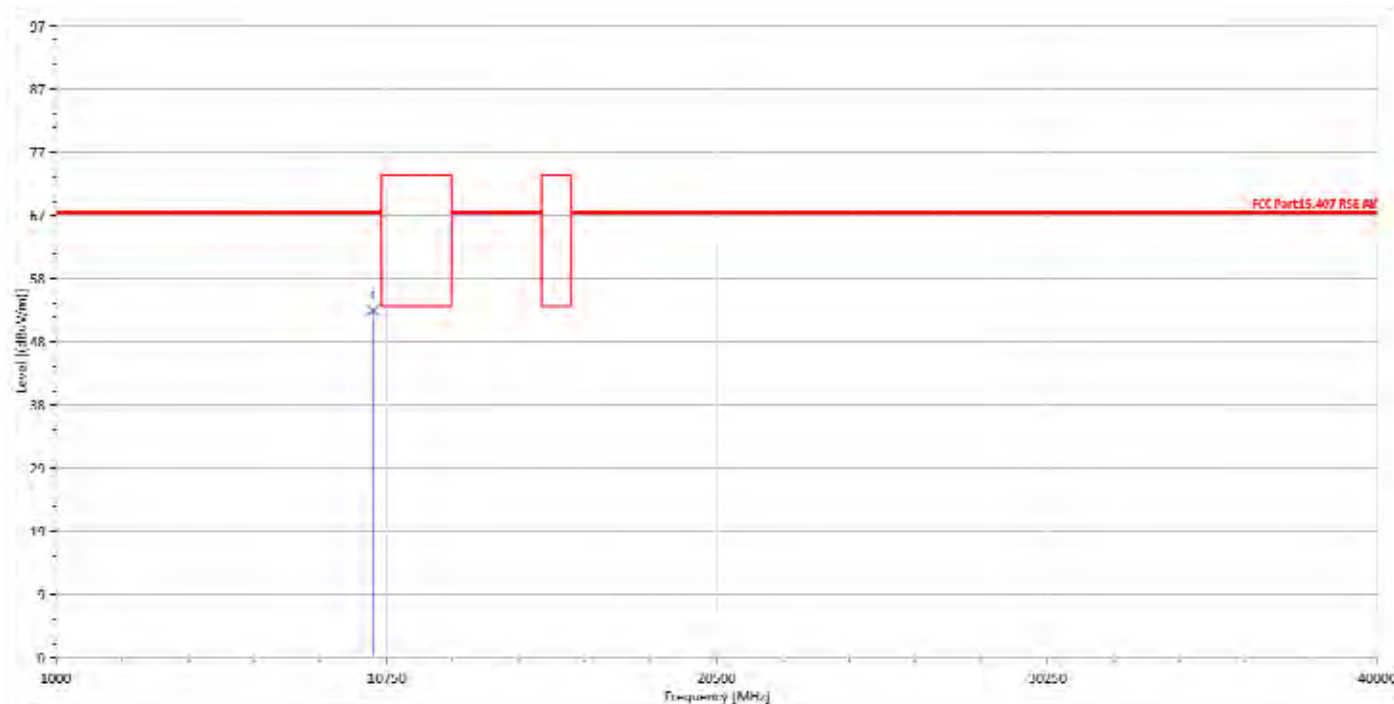
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Above 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

Operation Mode :	802.11a	Test Date :	2016/1/25
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
1036.00	H	Peak	34.40	18.94	53.34	68.3	-14.96

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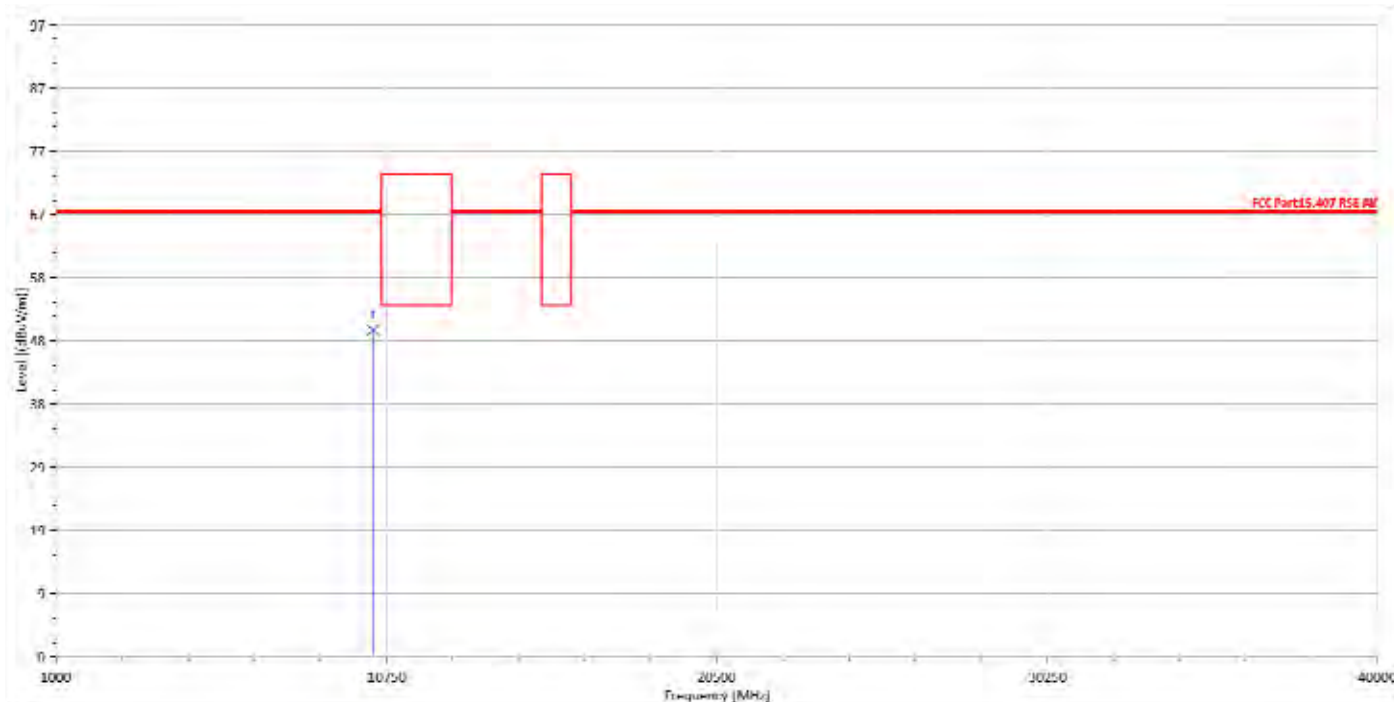
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	H	Peak	31.22	18.94	50.16	68.3	-18.14

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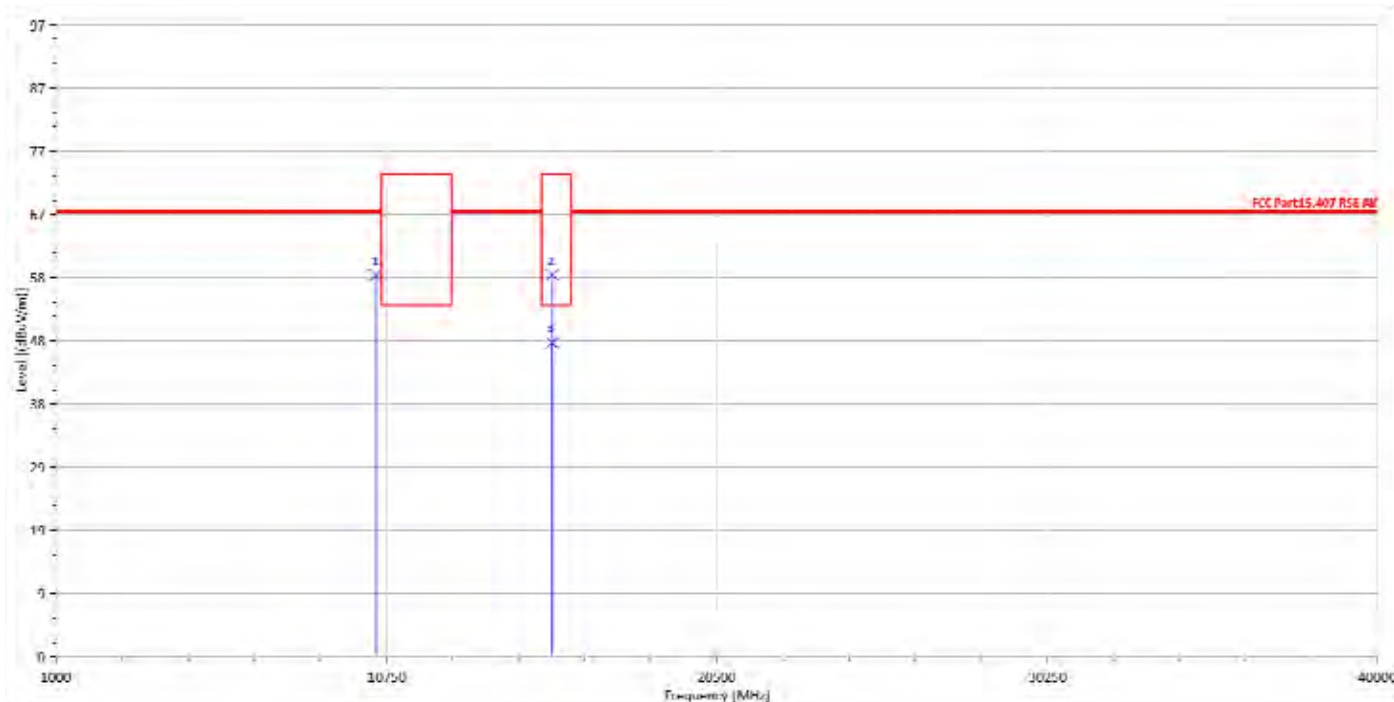
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	H	Peak	39.50	19.03	58.53	68.3	-9.77
15660.00	H	Peak	32.52	26.06	58.58	74	-15.42
15660.00	H	Average	22.14	26.06	48.20	54	-5.80

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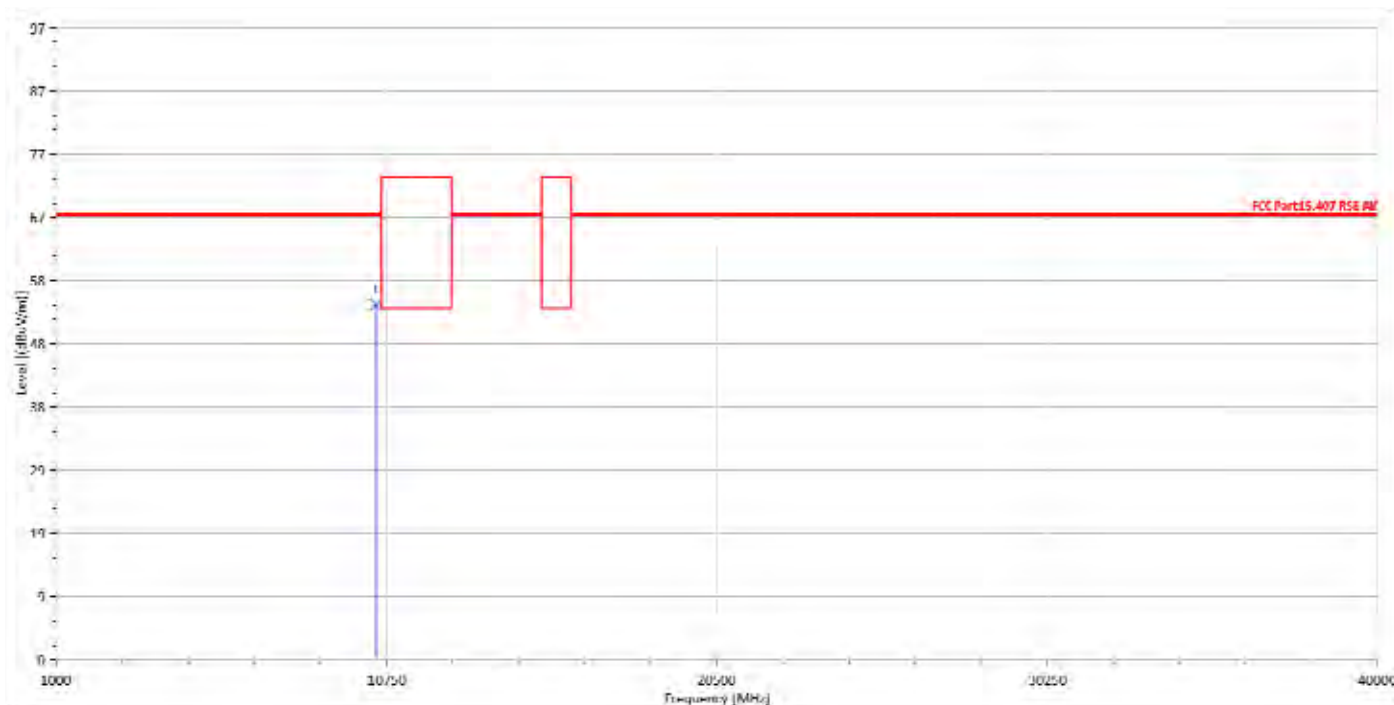
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5220 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	H	Peak	35.47	19.03	54.49	68.3	-13.81

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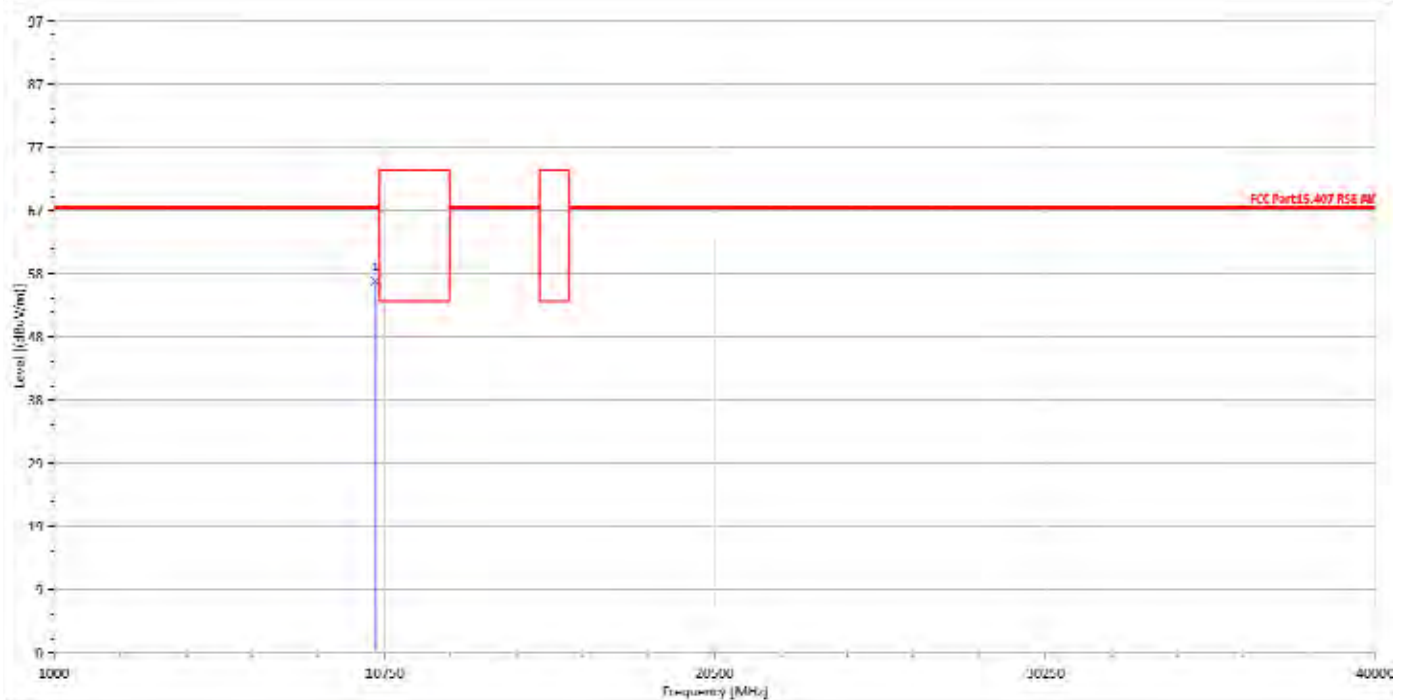
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Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5240 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	H	Peak	37.84	19.13	56.97	68.3	-11.33

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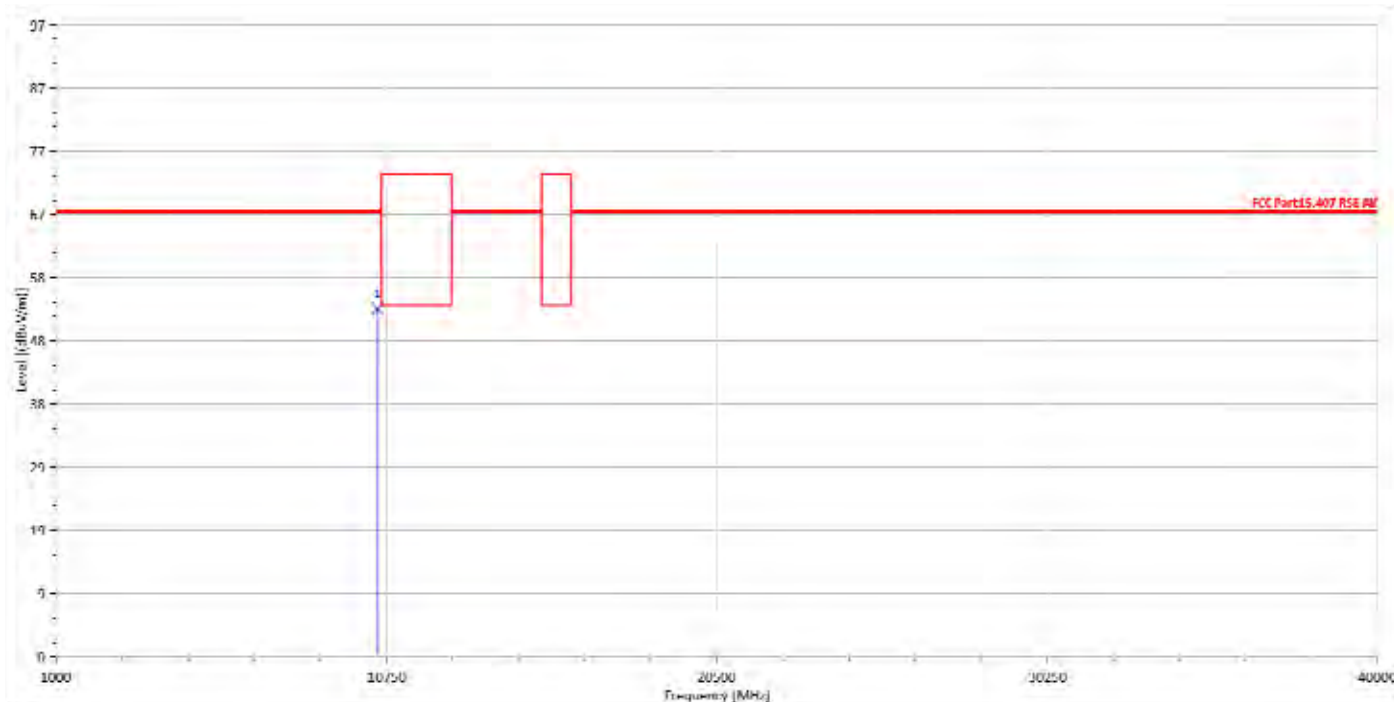
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Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5240 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
10480.00	H	Peak	34.33	19.13	53.45	68.3	-14.85

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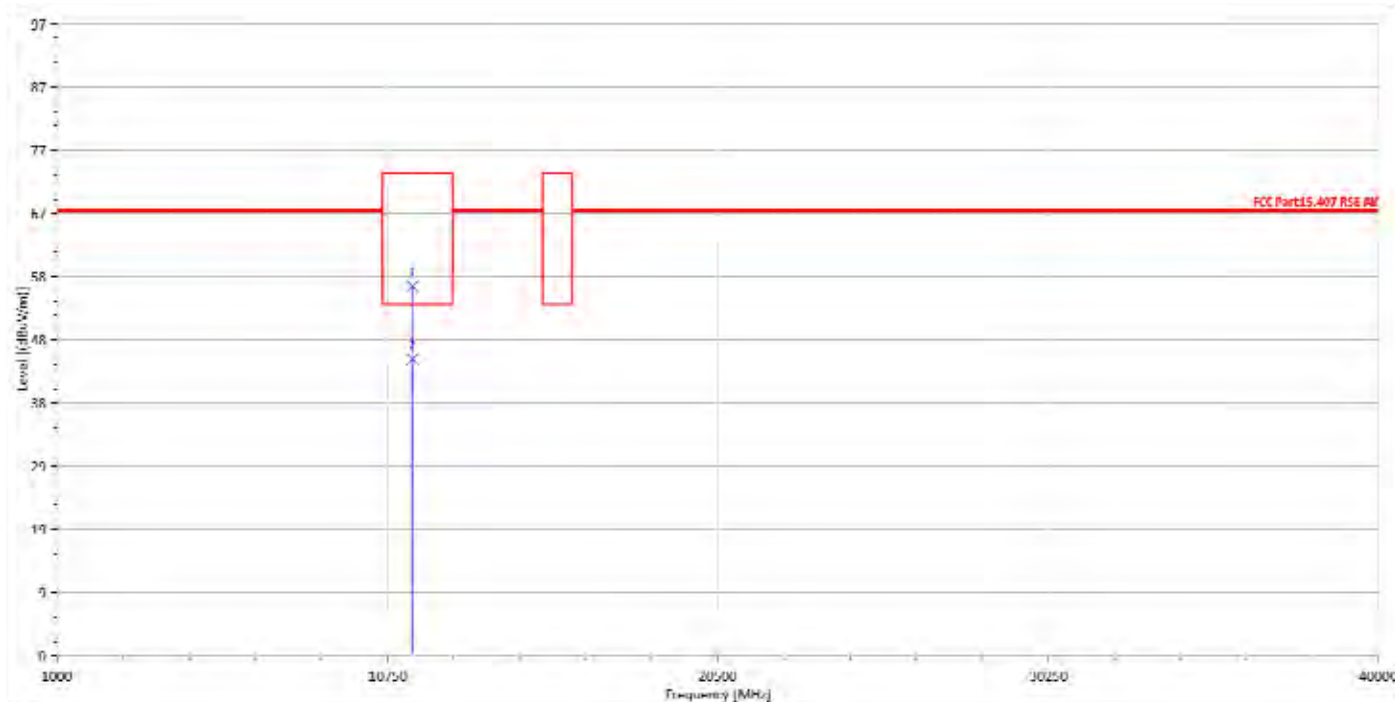
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Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Mode :	802.11a	Test Date :	2016/1/25
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
11490.00	H	Peak	35.58	21.08	56.67	74	-17.33
11490.00	H	Average	24.42	21.08	45.50	54	-8.50

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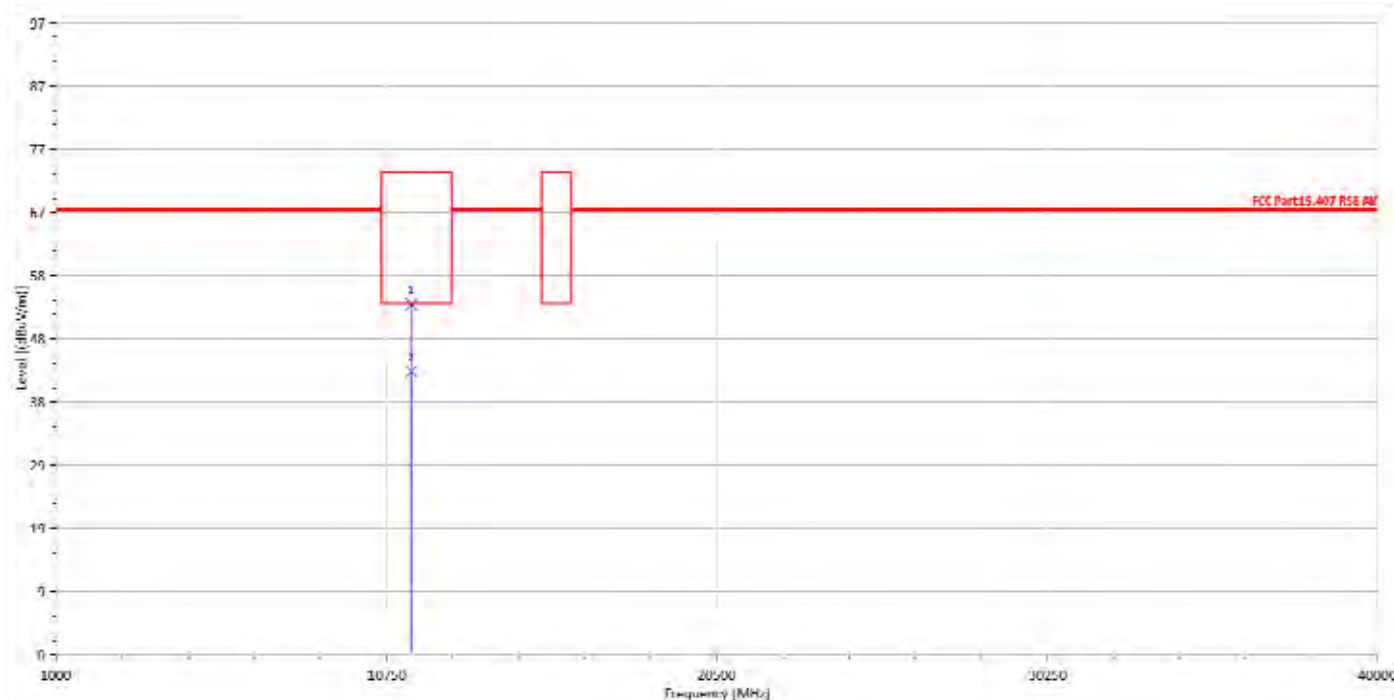
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	H	Peak	32.70	21.08	53.79	74	-20.21
11490.00	H	Average	22.34	21.08	43.42	54	-10.58

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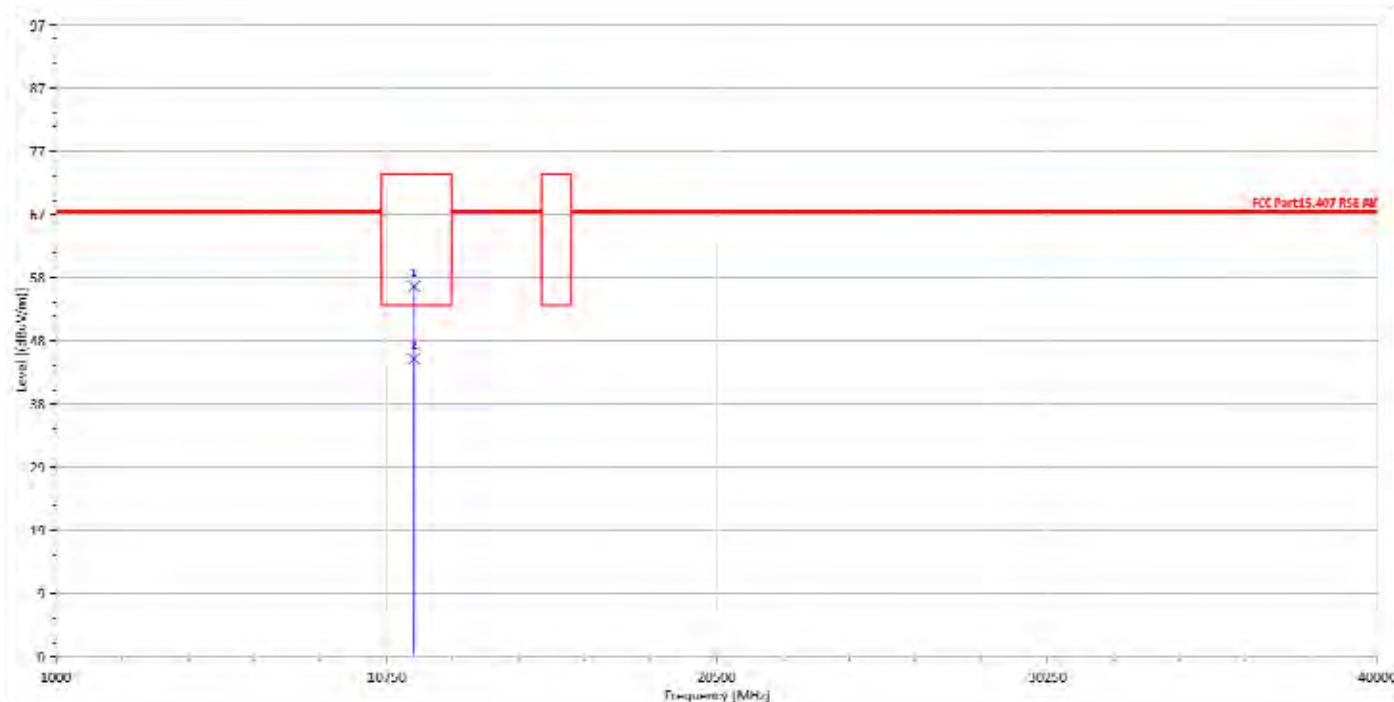
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11570.00	H	Peak	35.64	21.14	56.78	74	-17.22
11570.00	H	Average	24.54	21.14	45.68	54	-8.32

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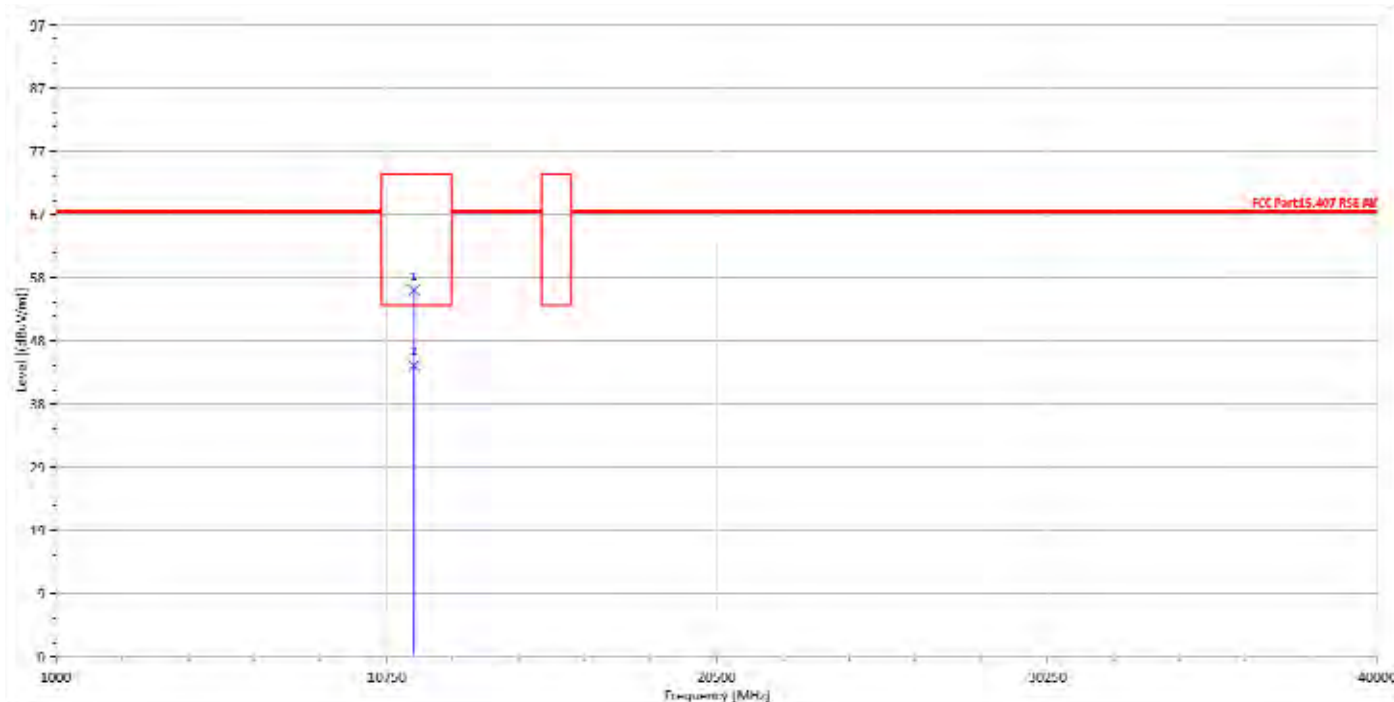
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Operation Mode : 802.11a Test Date : 2016/1/25
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11570.00	H	Peak	35.05	21.14	56.18	74	-17.82
11570.00	H	Average	23.51	21.14	44.65	54	-9.35

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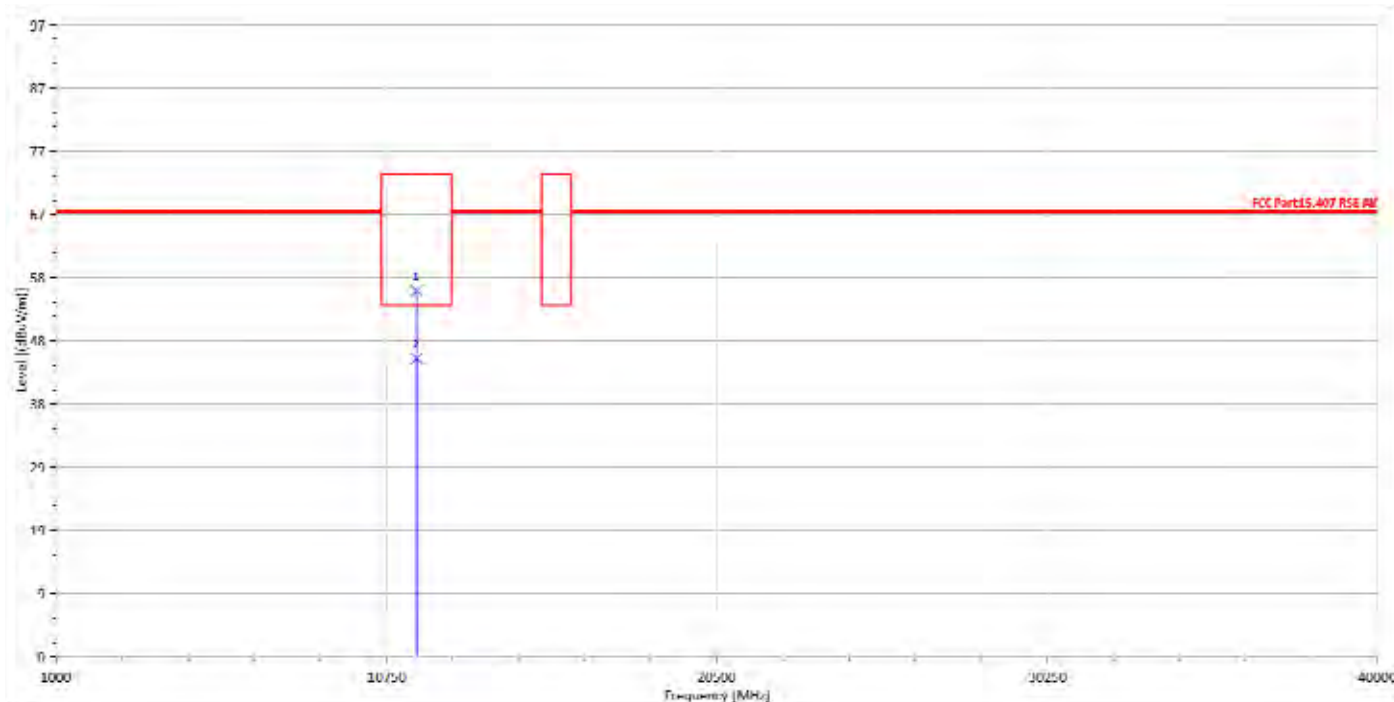
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Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11650.00	H	Peak	34.83	21.27	56.10	74	-17.90
11650.00	H	Average	24.51	21.27	45.78	54	-8.22

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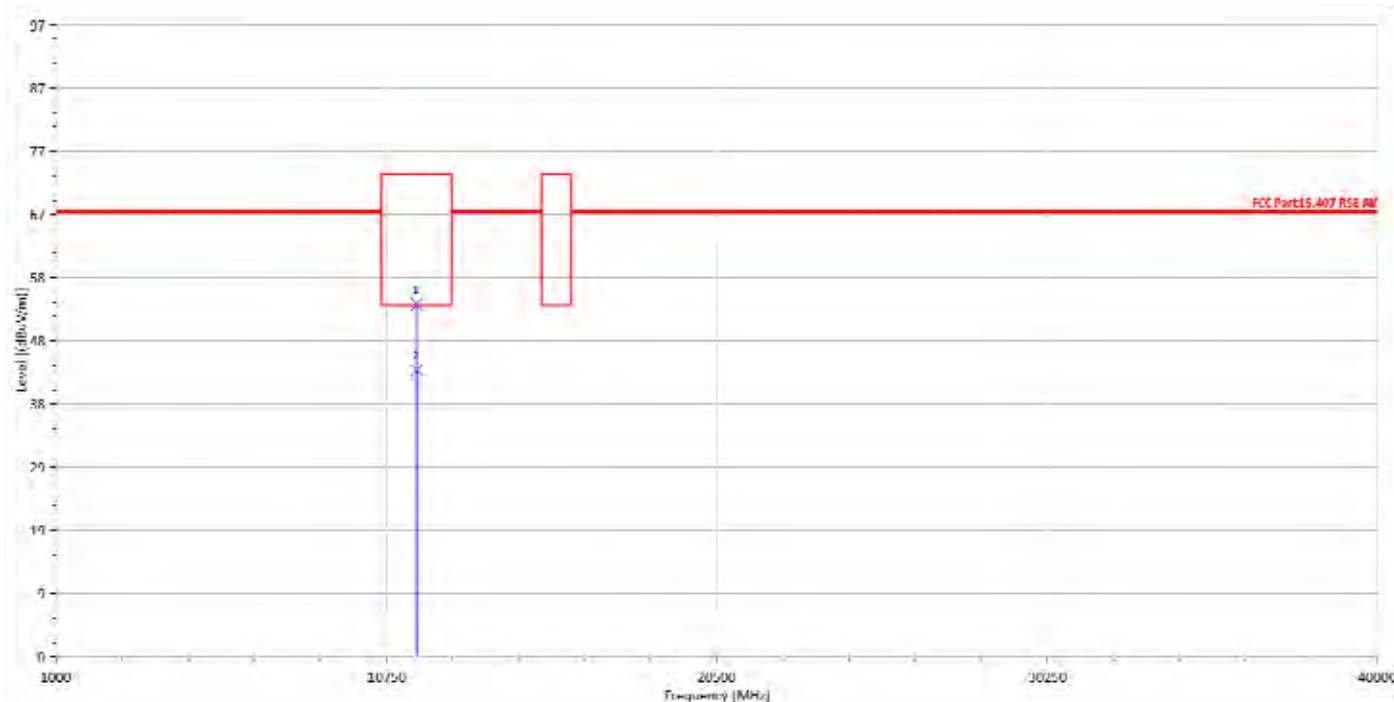
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Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11650.00	H	Peak	32.78	21.27	54.06	74	-19.94
11650.00	H	Average	22.71	21.27	43.98	54	-10.02

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Band edge falling to restricted band

802.11a mode

Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5147.80	S	Peak	61.43	11.15	72.58	74	-1.42
5147.80	S	Average	39.38	11.15	50.53	54	-3.47
5150.00	E	Peak	60.15	11.14	71.29	74	-2.71
5150.00	E	Average	41.48	11.14	52.62	54	-1.38

Operation Mode :	802.11 a	Test Date :	2016/1/25
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5150.00	E	Peak	60.73	0.00	60.73	74	-13.27
5150.00	E	Average	33.57	0.00	33.57	54	-20.43

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Operation Mode : 802.11 a Test Date : 2016/1/25
 Fundamental Frequency : 5240 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	54.09	11.30	65.39	74	-8.61
5350.00	E	Average	36.48	11.30	47.78	54	-6.22

Operation Mode : 802.11 a Test Date : 2016/1/25
 Fundamental Frequency : 5240 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	45.47	11.30	56.77	74	-17.23
5350.00	E	Average	32.57	11.30	43.87	54	-10.13

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 Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5713.90	S	Peak	48.10	12.31	60.41	68.3	-7.89
5725.00	E	Peak	62.98	12.27	75.25	78.2	-2.95

Operation Mode : 802.11 a Test Date : 2016/1/25
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5714.70	S	Peak	43.61	12.30	55.91	68.3	-12.39
5725.00	E	Peak	56.27	12.27	68.54	78.2	-9.66

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Operation Mode : 802.11 a Test Date : 2016/1/25
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	58.21	12.61	70.82	78.2	-7.38
5851.20	S	Peak	59.37	12.62	72.00	78.2	-6.20
5864.10	S	Peak	54.09	12.74	66.83	68.3	-1.47

Operation Mode : 802.11 a Test Date : 2016/1/25
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	52.78	12.61	65.39	78.2	-12.81
5860.90	S	Peak	49.18	12.72	61.90	68.3	-6.40

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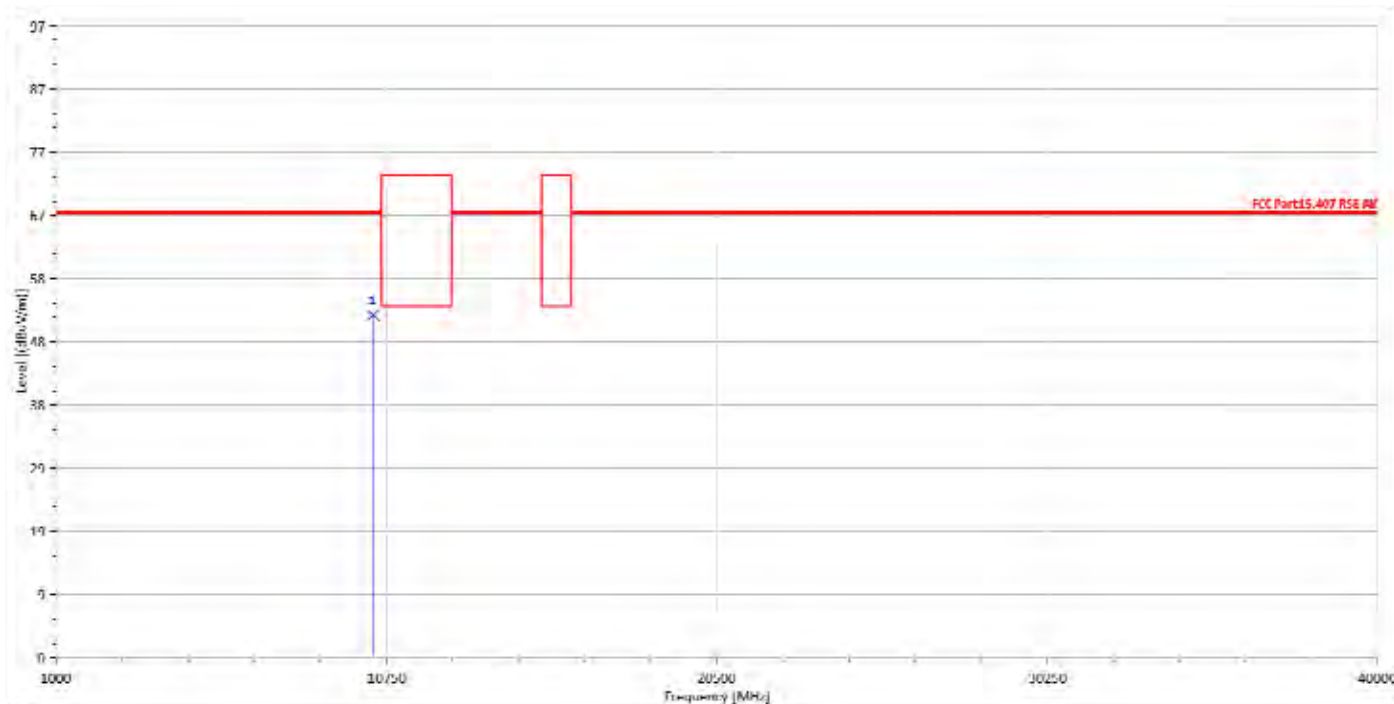
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Radiated Spurious Emission Measurement Result 802.11ac VHT20, 5150~5250 MHz

Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	H	Peak	33.70	18.94	52.64	68.3	-15.66

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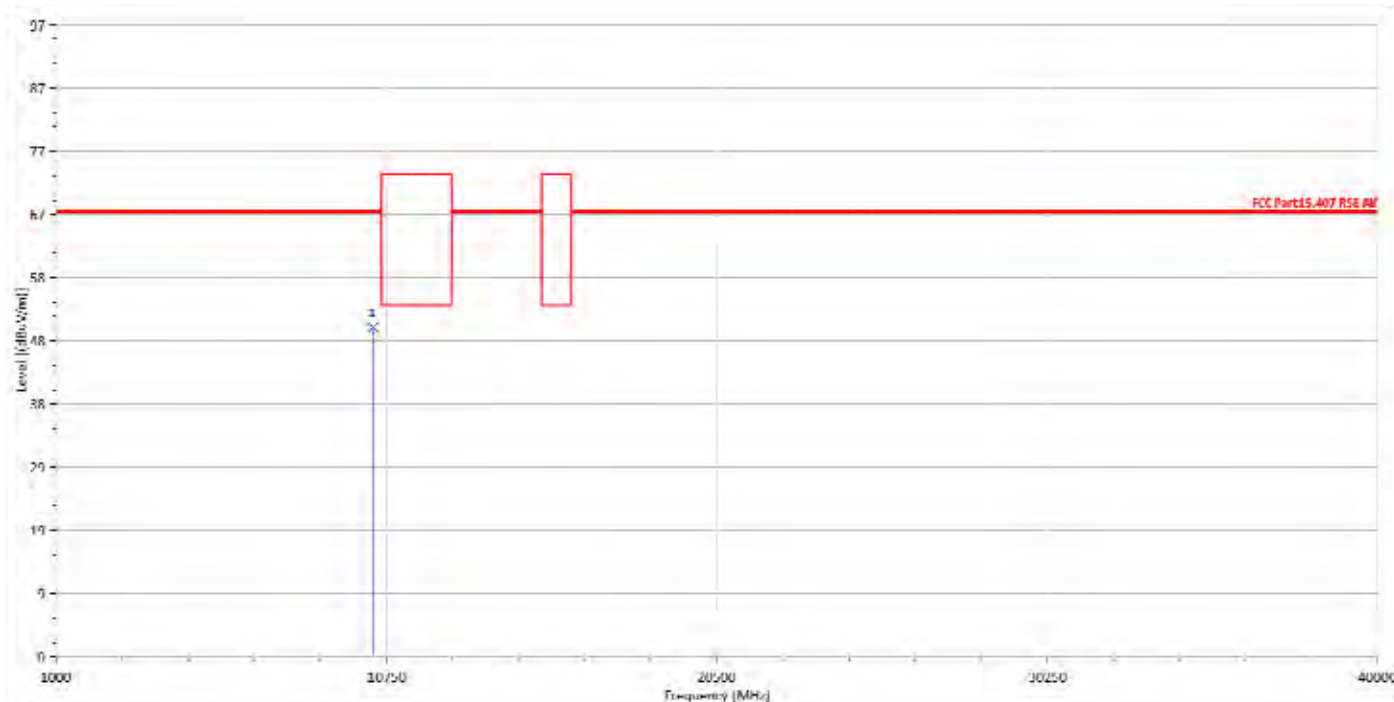
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Operation Mode : 802.11ac20 Test Date : 2016/1/25
Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10360.00	H	Peak	31.64	18.94	50.58	68.3	-17.72

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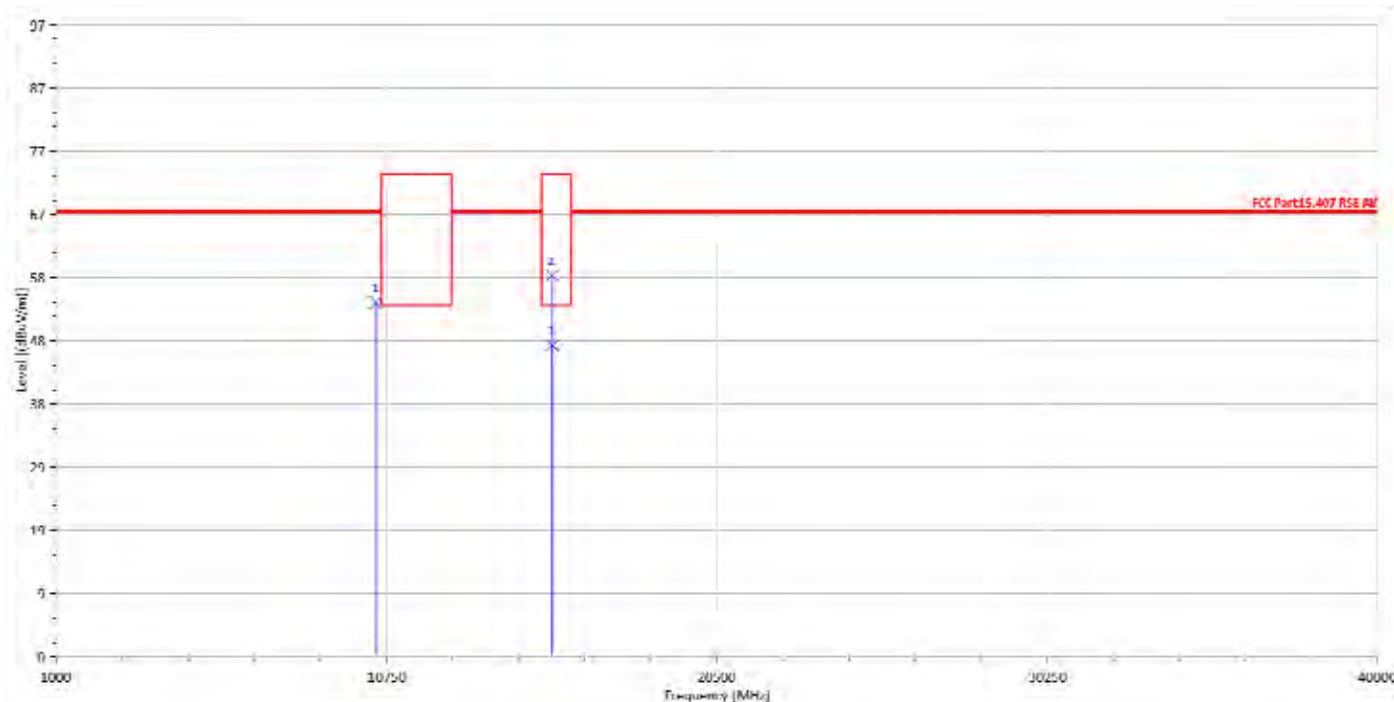
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10440.00	H	Peak	35.30	19.03	54.33	68.3	-13.97
15660.00	H	Peak	32.41	26.06	58.48	74	-15.52
15660.00	H	Average	21.77	26.06	47.83	54	-6.17

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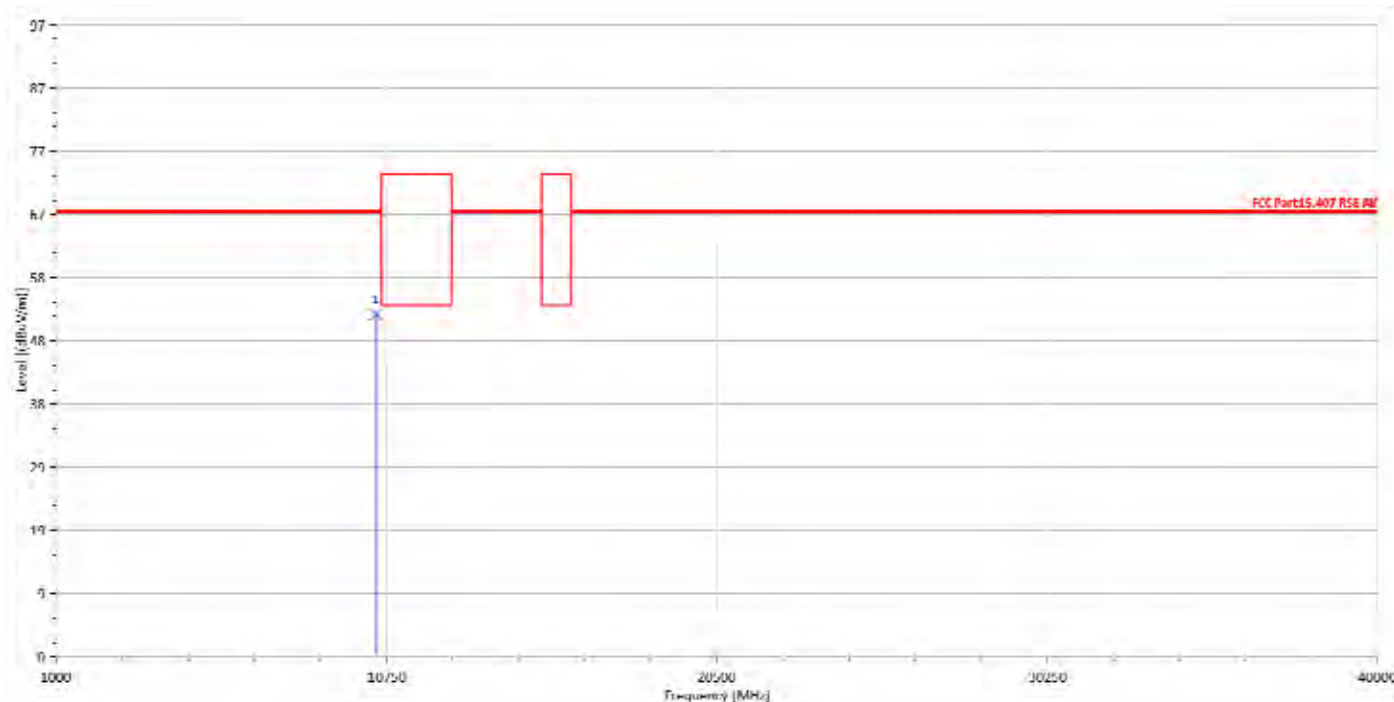
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
10440.00	H	Peak	33.60	19.03	52.62	68.3	-15.68

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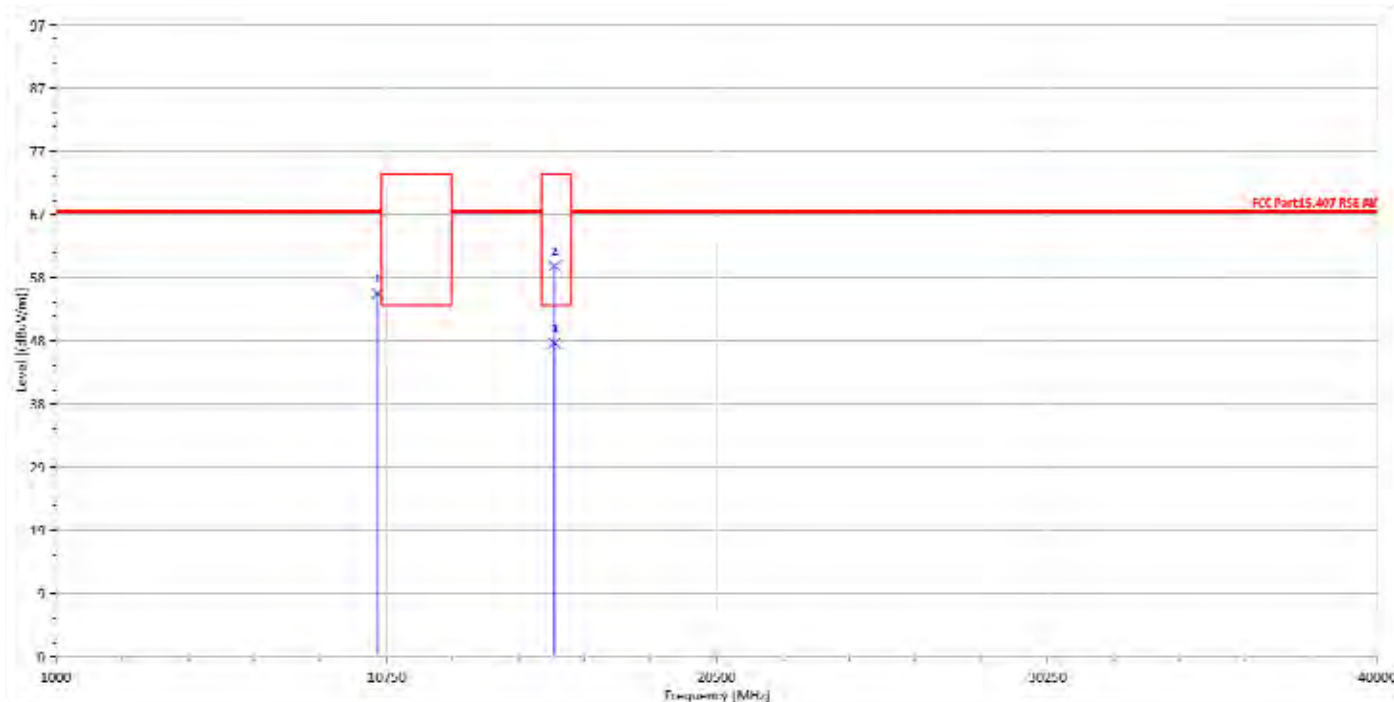
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5240 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10480.00	H	Peak	36.54	19.13	55.67	68.3	-12.63
15720.00	H	Peak	33.85	26.13	59.98	74	-14.02
15720.00	H	Average	21.99	26.13	48.12	54	-5.88

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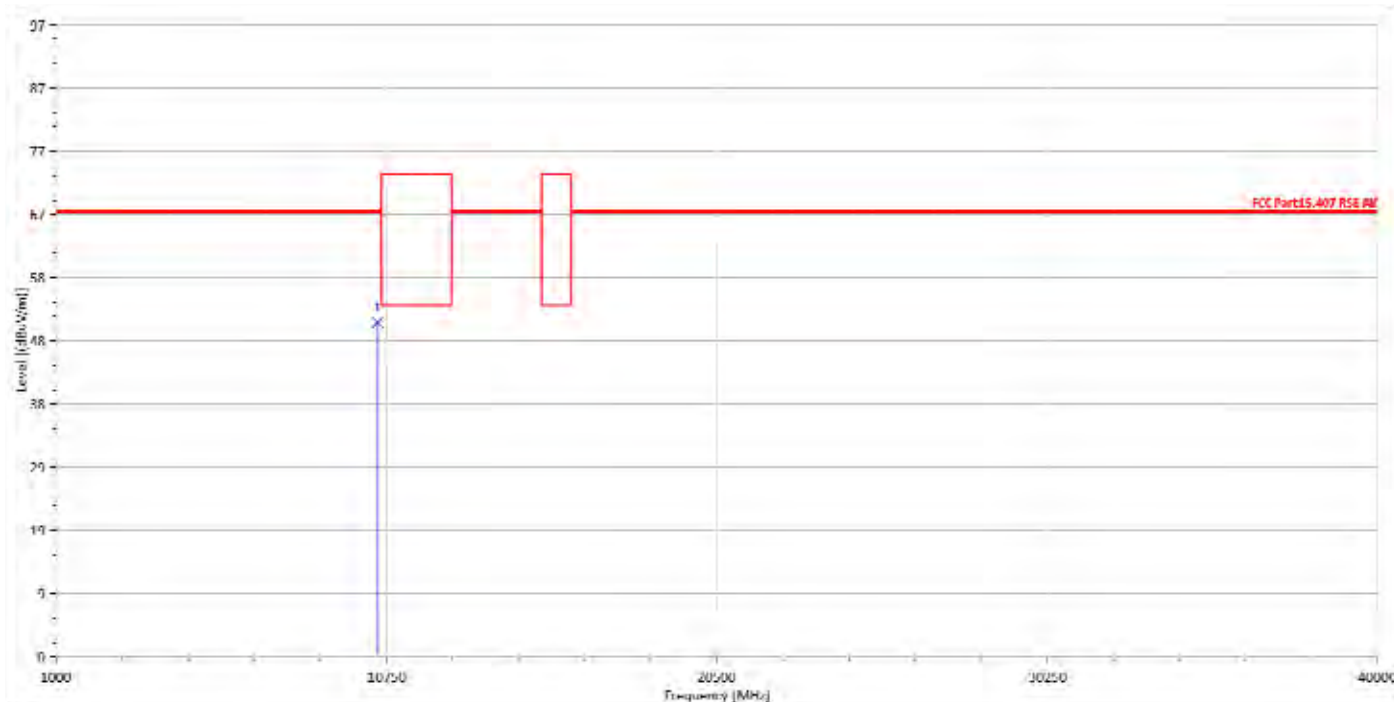
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5240 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
10480.00	H	Peak	32.21	19.13	51.34	68.3	-16.96

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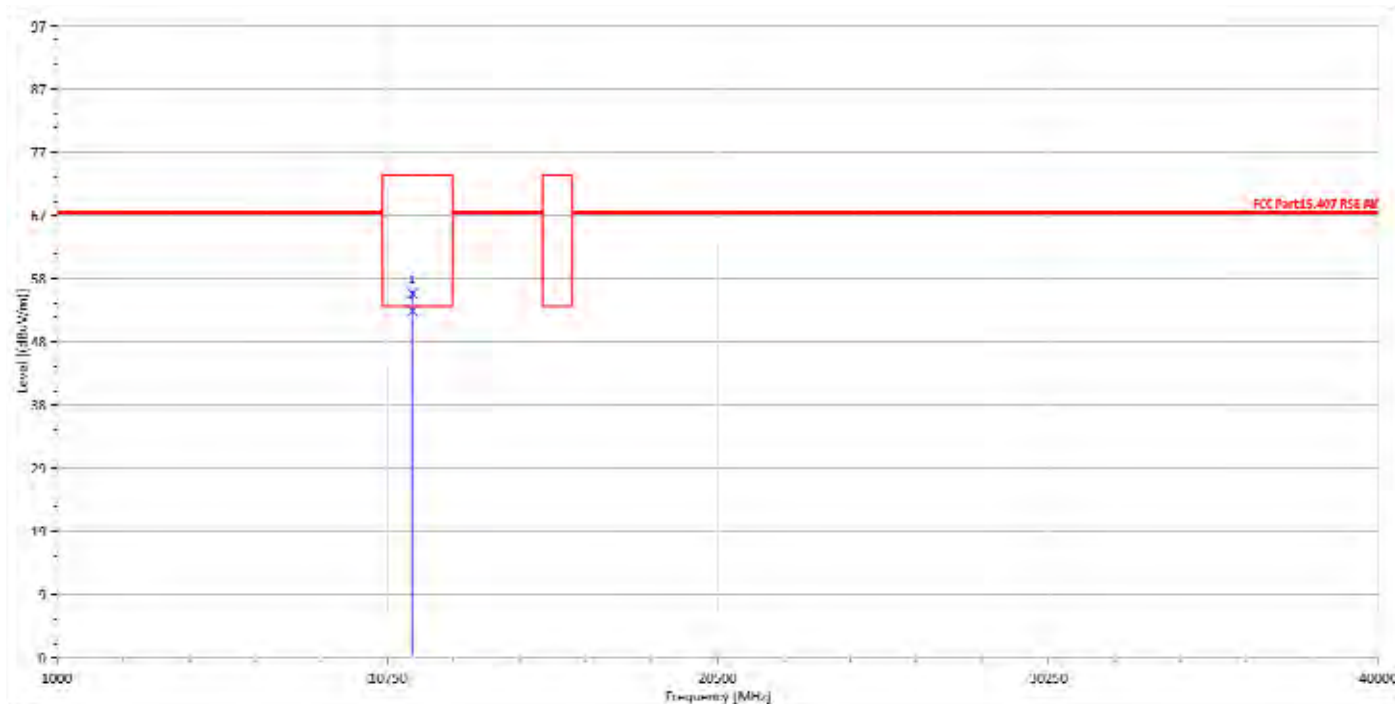
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Radiated Spurious Emission Measurement Result 802.11ac VHT20, 5725~5850 MHz

Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11490.00	H	Peak	34.75	21.08	55.83	74	-18.17
11490.00	H	Average	32.21	21.08	53.29	54	-0.71

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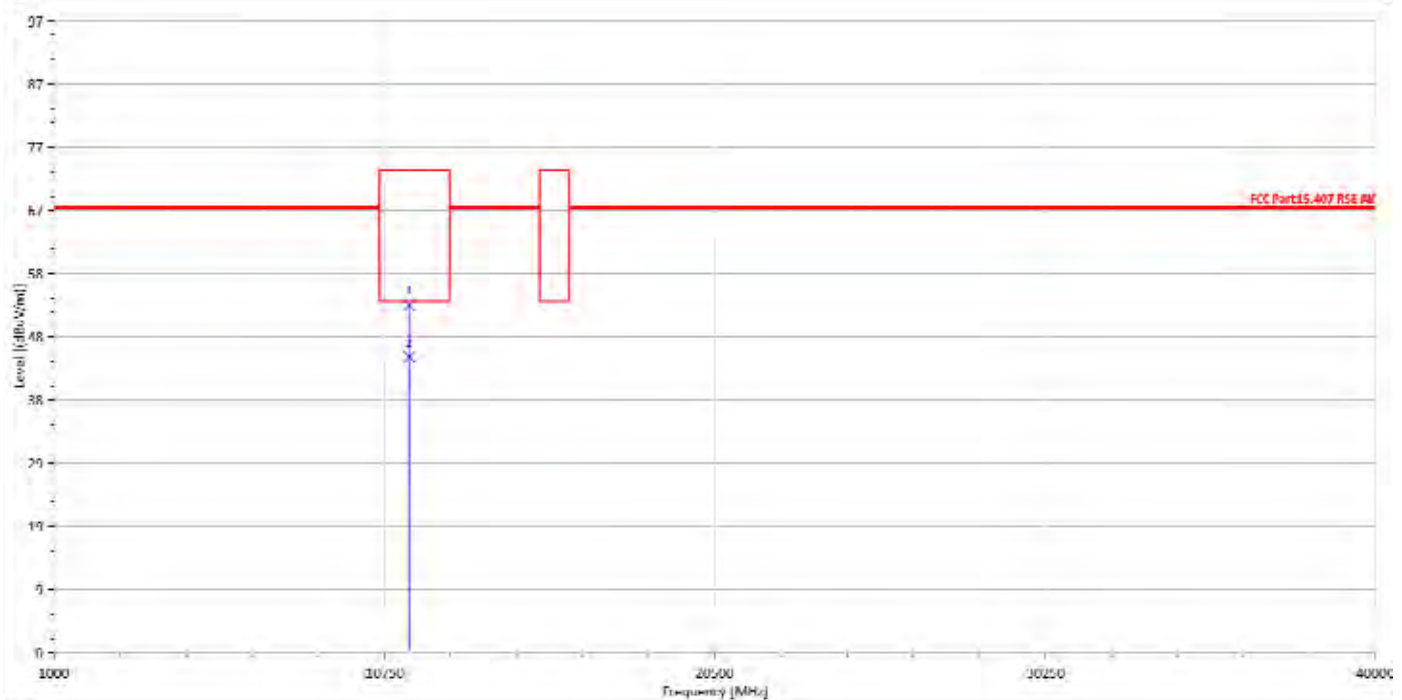
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5745 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11490.00	H	Peak	32.31	21.08	53.39	74	-20.61
11490.00	H	Average	24.28	21.08	45.36	54	-8.64

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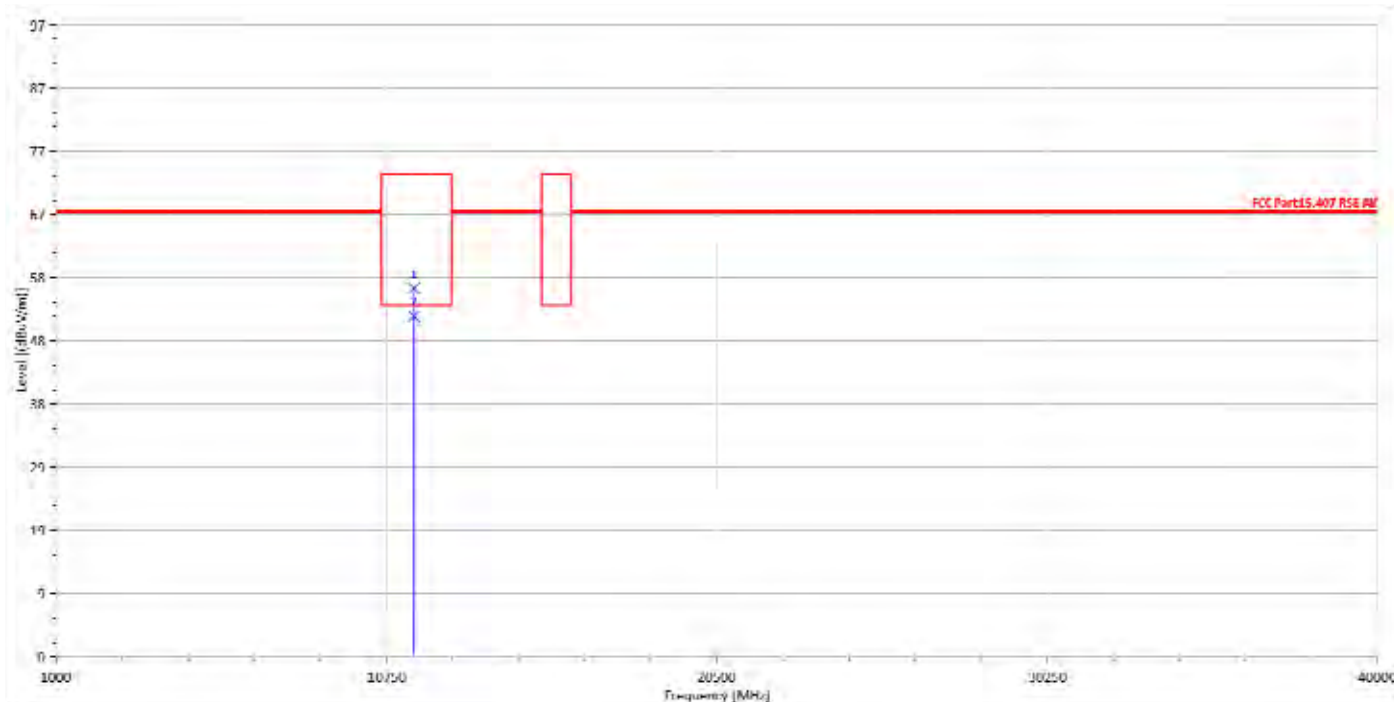
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5785 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
11570.00	H	Peak	35.38	21.14	56.52	74	-17.48
11570.00	H	Average	31.18	21.14	52.32	54	-1.68

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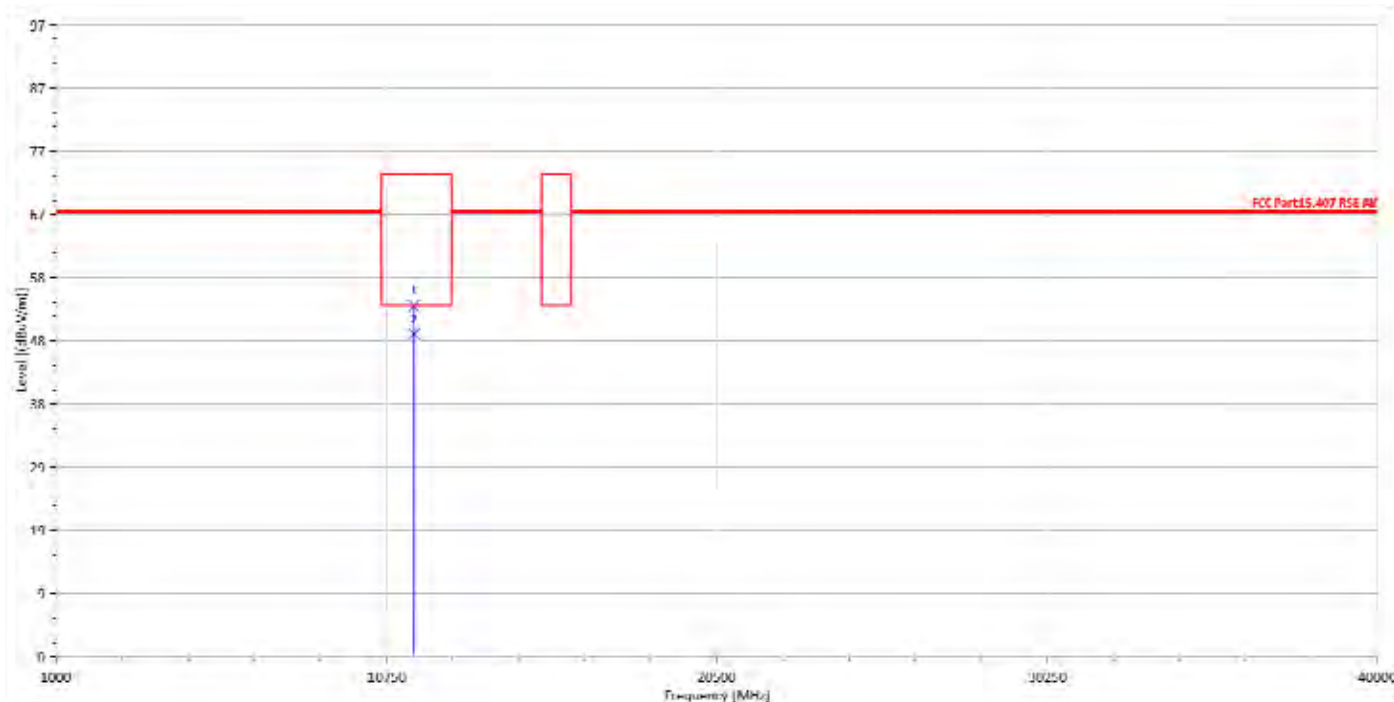
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Operation Mode : 802.11ac20 Test Date : 2016/1/25
Fundamental Frequency : 5785 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Mid Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
11570.00	H	Peak	32.72	21.14	53.85	74	-20.15
11570.00	H	Average	28.43	21.14	49.57	54	-4.43

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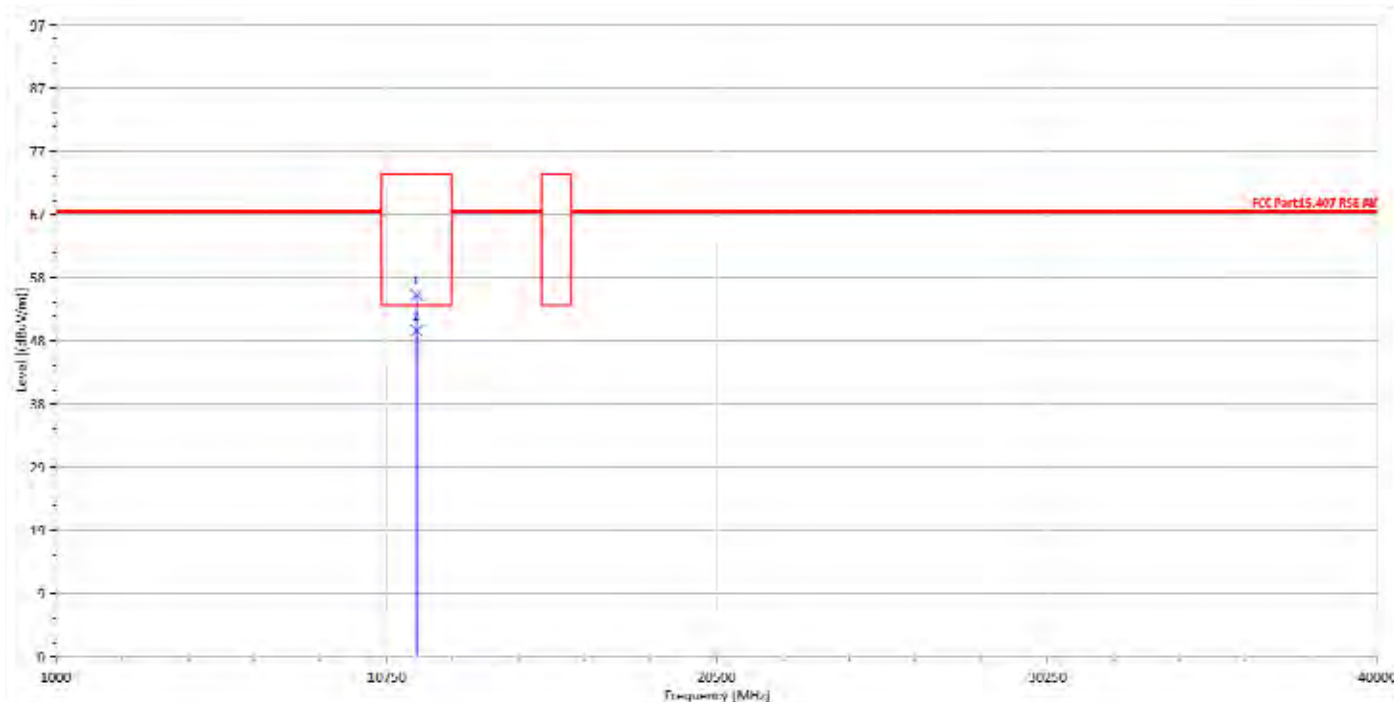
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11650.00	H	Peak	34.20	21.27	55.47	74	-18.53
11650.00	H	Average	28.80	21.27	50.07	54	-3.93

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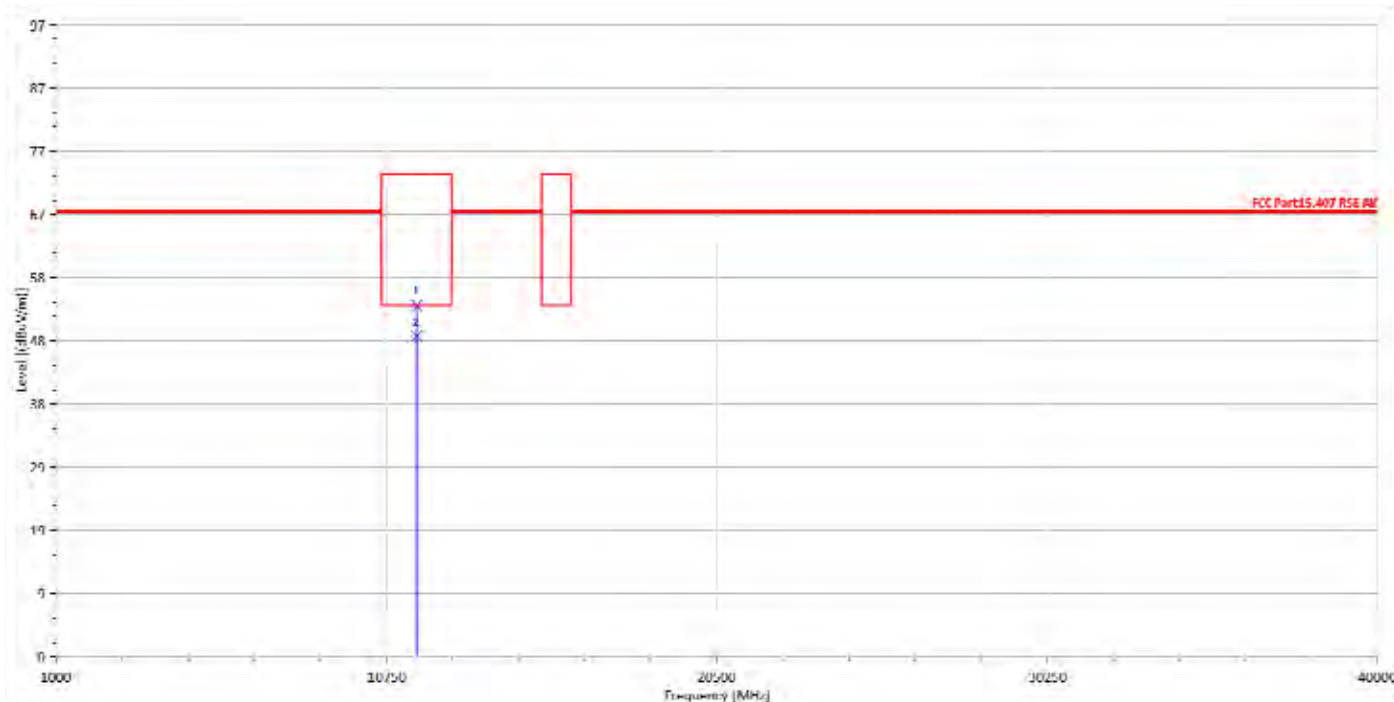
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Operation Mode :	802.11 ac20	Test Date :	2016/1/25
Fundamental Frequency :	5825 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11650.00	H	Peak	32.64	21.27	53.91	74	-20.09
11650.00	H	Average	27.95	21.27	49.22	54	-4.78

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Band edge falling to restricted band

802.11ac VHT20 mode

Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5150.00	E	Peak	61.10	11.14	72.24	74	-1.76
5150.00	E	Average	41.55	11.14	52.69	54	-1.31

Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5180 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5144.92	S	Peak	50.49	11.17	61.65	74	-12.35
5144.92	S	Average	32.26	11.17	43.43	54	-10.57
5150.00	E	Peak	49.07	11.14	60.21	74	-13.79
5150.00	E	Average	32.95	11.14	44.09	54	-9.91

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Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5240 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	47.54	11.30	58.84	74	-15.16
5350.00	E	Average	33.79	11.30	45.09	54	-8.91

Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5240 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	42.44	11.30	53.74	74	-20.26
5350.00	E	Average	31.96	11.30	43.26	54	-10.74

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Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5714.90	S	Peak	54.04	12.30	66.34	68.3	-1.96
5721.40	S	Peak	63.64	12.28	75.93	78.2	-2.27
5725.00	E	Peak	64.88	12.27	77.15	78.2	-1.05

Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5745 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5710.20	S	Peak	48.14	12.32	60.46	68.3	-7.84
5724.40	S	Peak	57.27	12.27	69.54	78.2	-8.66
5725.00	E	Peak	57.17	12.27	69.44	78.2	-8.76

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Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	60.69	12.61	73.30	78.2	-4.90
5862.50	S	Peak	54.58	12.73	67.31	68.3	-0.99

Operation Mode : 802.11 ac20 Test Date : 2016/1/25
 Fundamental Frequency : 5825 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	54.66	12.61	67.27	78.2	-10.93
5862.20	S	Peak	50.88	12.73	63.61	68.3	-4.69

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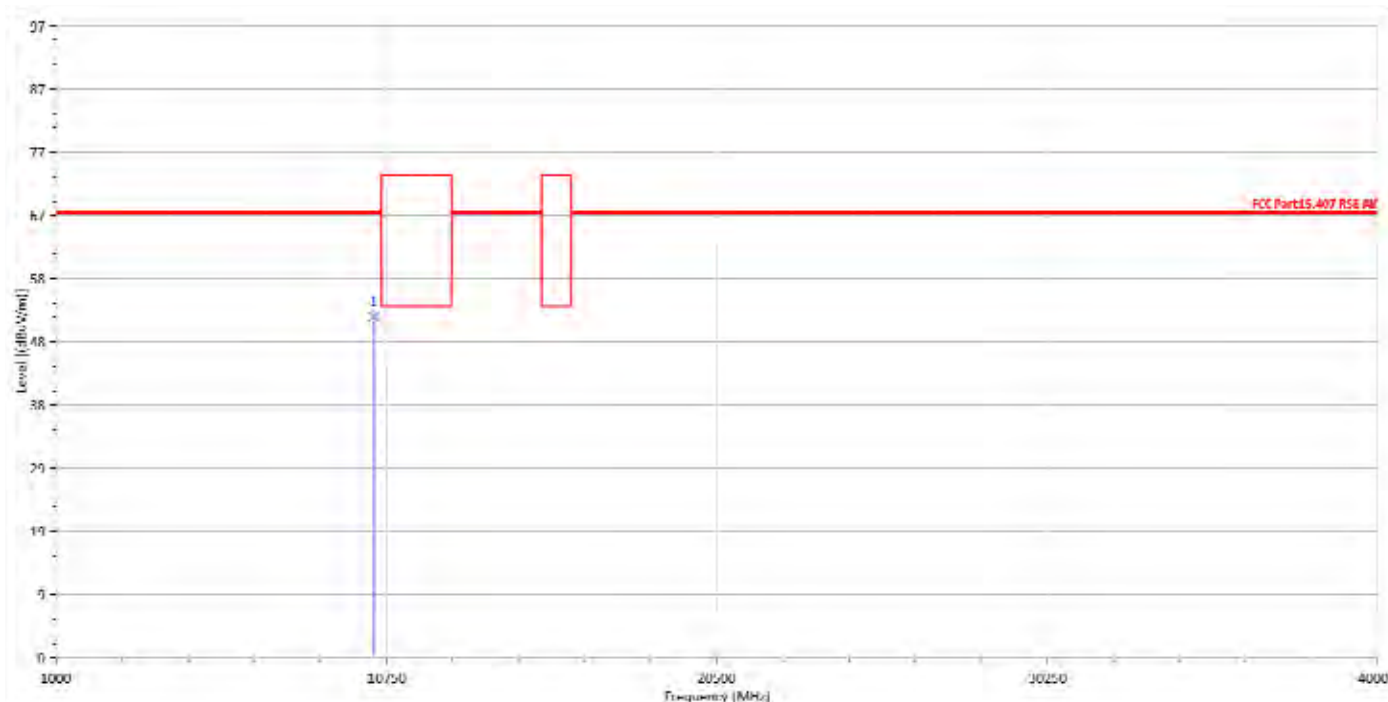
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Radiated Spurious Emission Measurement Result 802.11ac VHT40, 5150~5250 MHz

Operation Mode :	802.11 ac40	Test Date :	2016/1/25
Fundamental Frequency :	5190 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10380.00	H	Peak	33.38	19.01	52.39	68.3	-15.91

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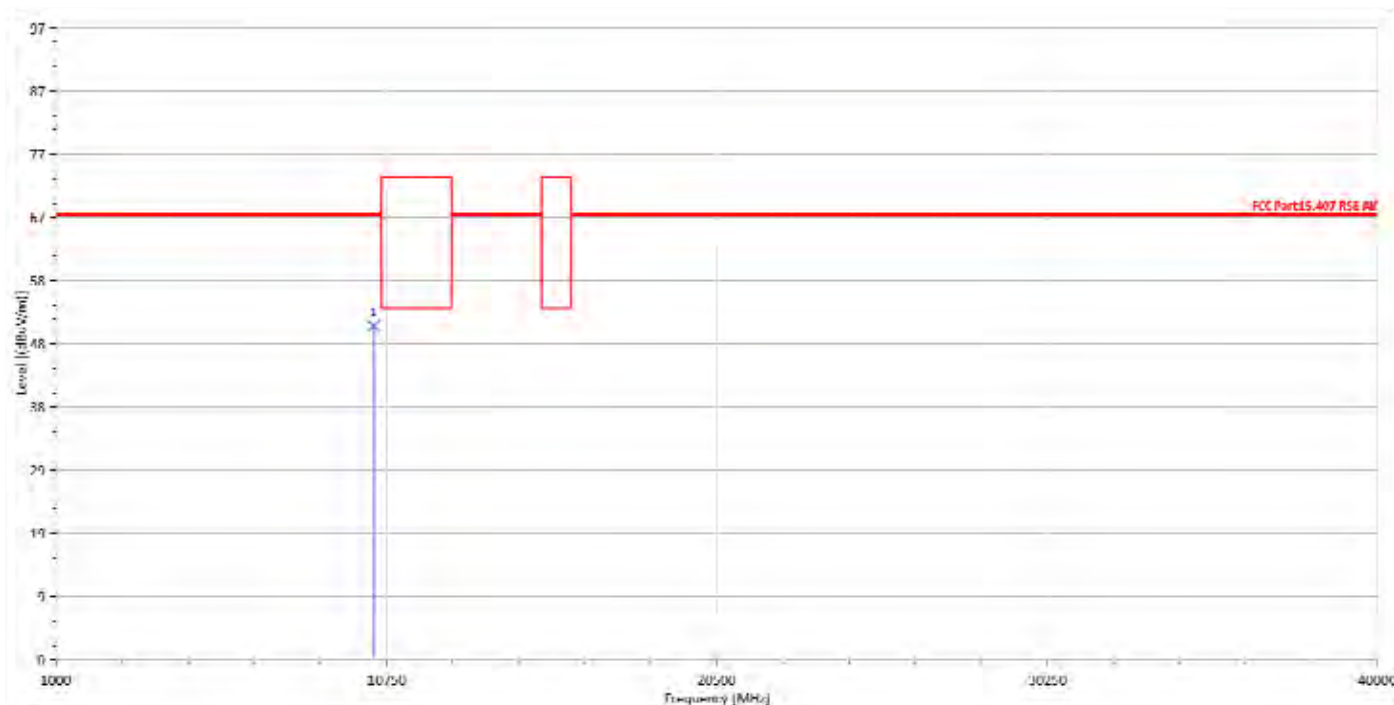
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Operation Mode :	802.11ac40	Test Date :	2016/1/25
Fundamental Frequency :	5190 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
10380.00	H	Peak	32.26	19.01	51.28	68.3	-17.02

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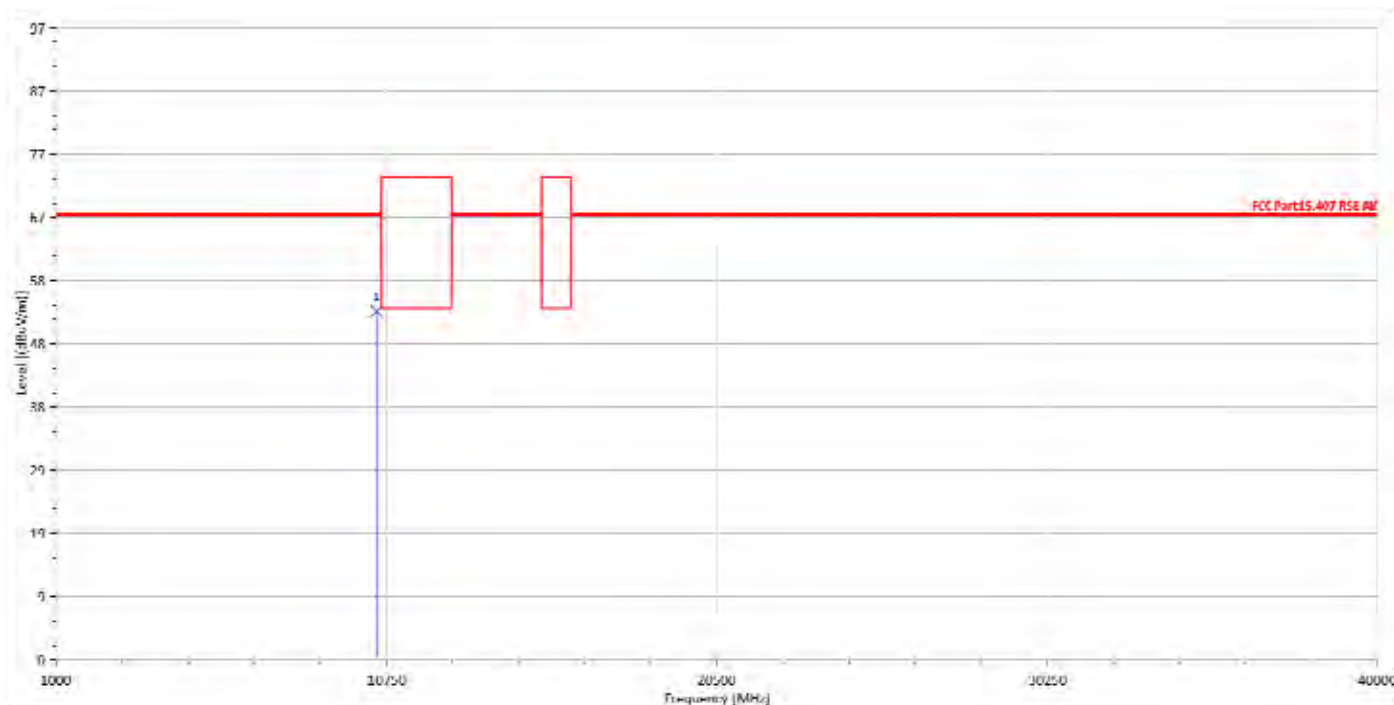
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Operation Mode :	802.11 ac40	Test Date :	2016/1/25
Fundamental Frequency :	5230 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10460.00	H	Peak	34.42	19.11	53.53	68.3	-14.77

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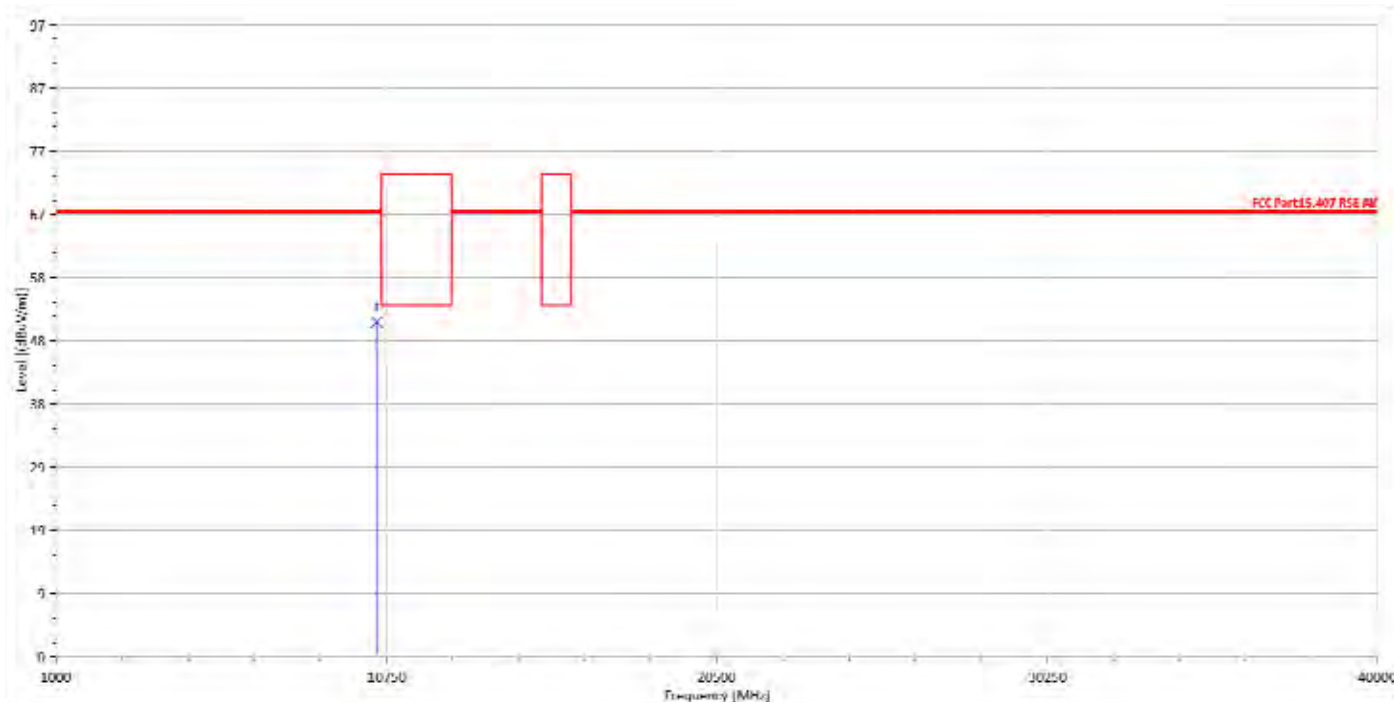
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Operation Mode :	802.11ac40	Test Date :	2016/1/25
Fundamental Frequency :	5230 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
10460.00	H	Peak	32.28	19.11	51.39	68.3	-16.91

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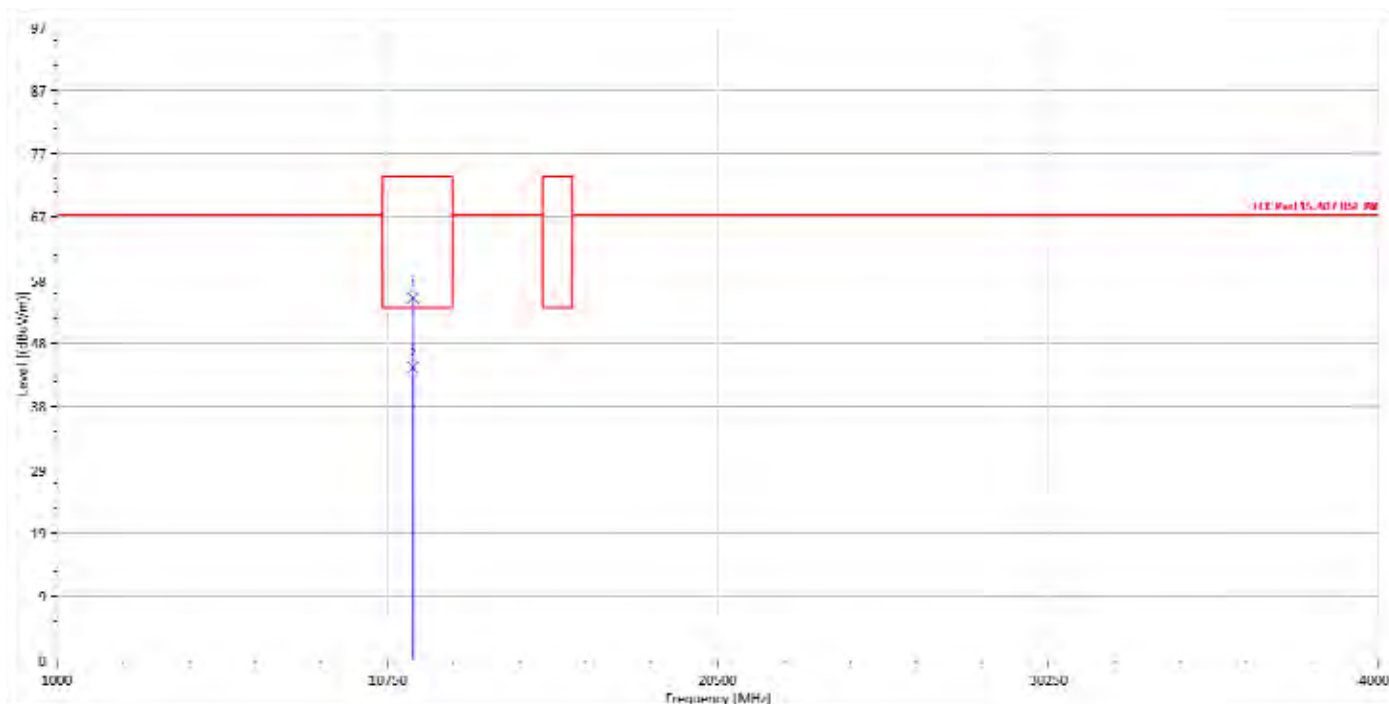
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Radiated Spurious Emission Measurement Result 802.11ac VHT40, 5725~5850 MHz

Operation Mode :	802.11 ac40	Test Date :	2016/1/25
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
11510.00	H	Peak	34.35	21.17	55.51	74	-18.49
11510.00	H	Average	23.67	21.17	44.84	54	-9.16

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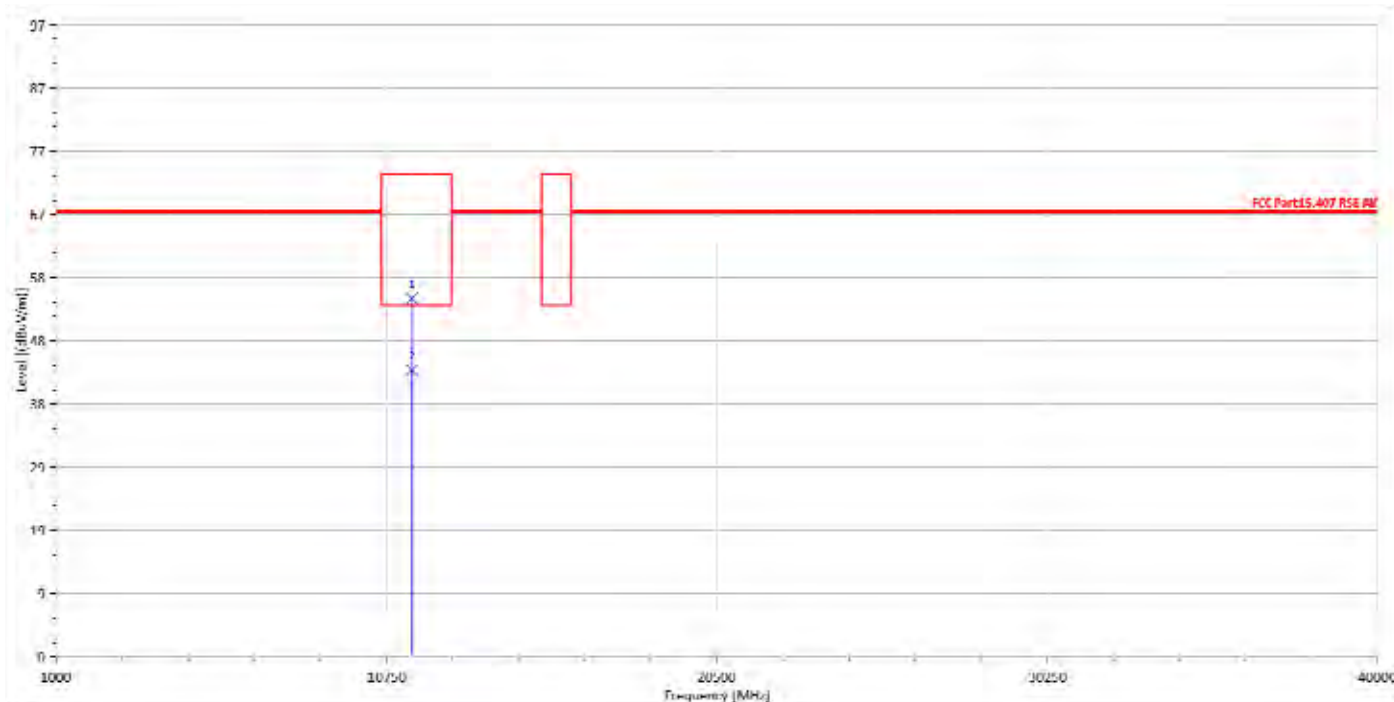
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Operation Mode :	802.11ac40	Test Date :	2016/1/25
Fundamental Frequency :	5755 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11510.00	H	Peak	33.78	21.17	54.95	74	-19.05
11510.00	H	Average	22.79	21.17	43.96	54	-10.04

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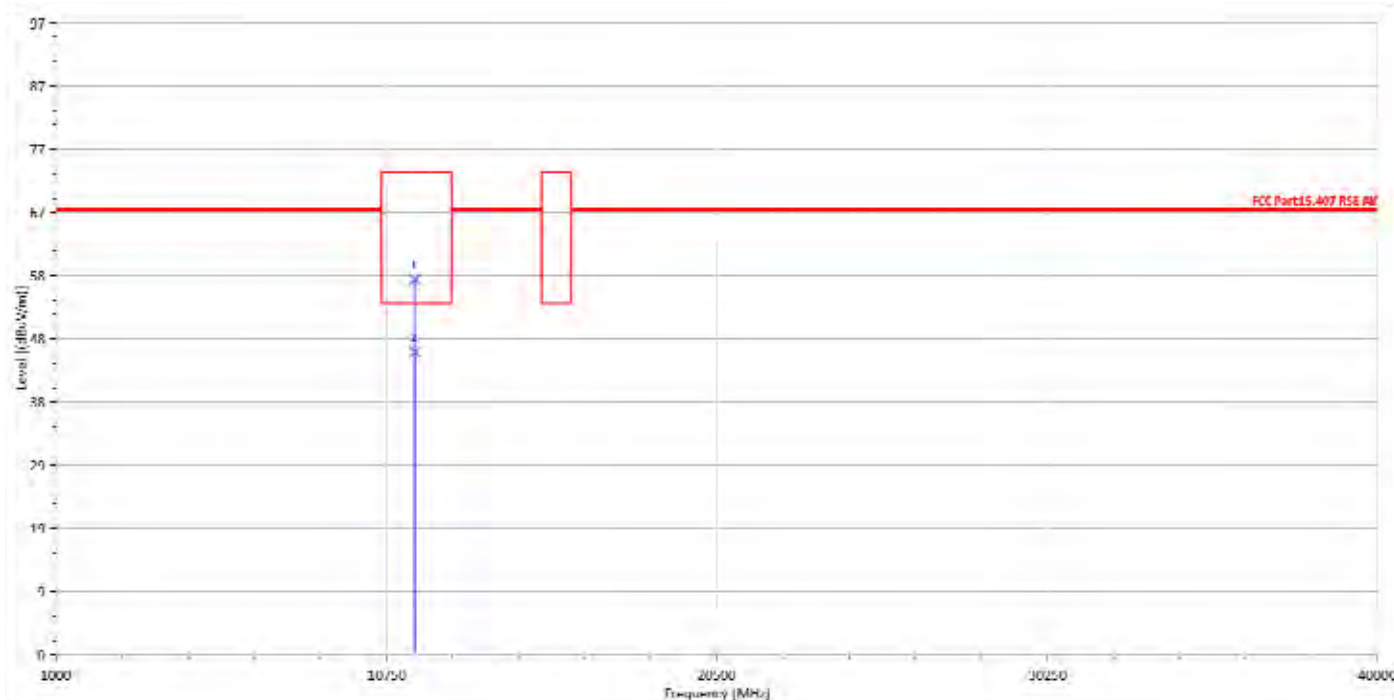
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Operation Mode :	802.11ac40	Test Date :	2016/1/25
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11590.00	H	Peak	36.28	21.28	57.56	74	-16.44
11590.00	H	Average	25.19	21.28	46.47	54	-7.53

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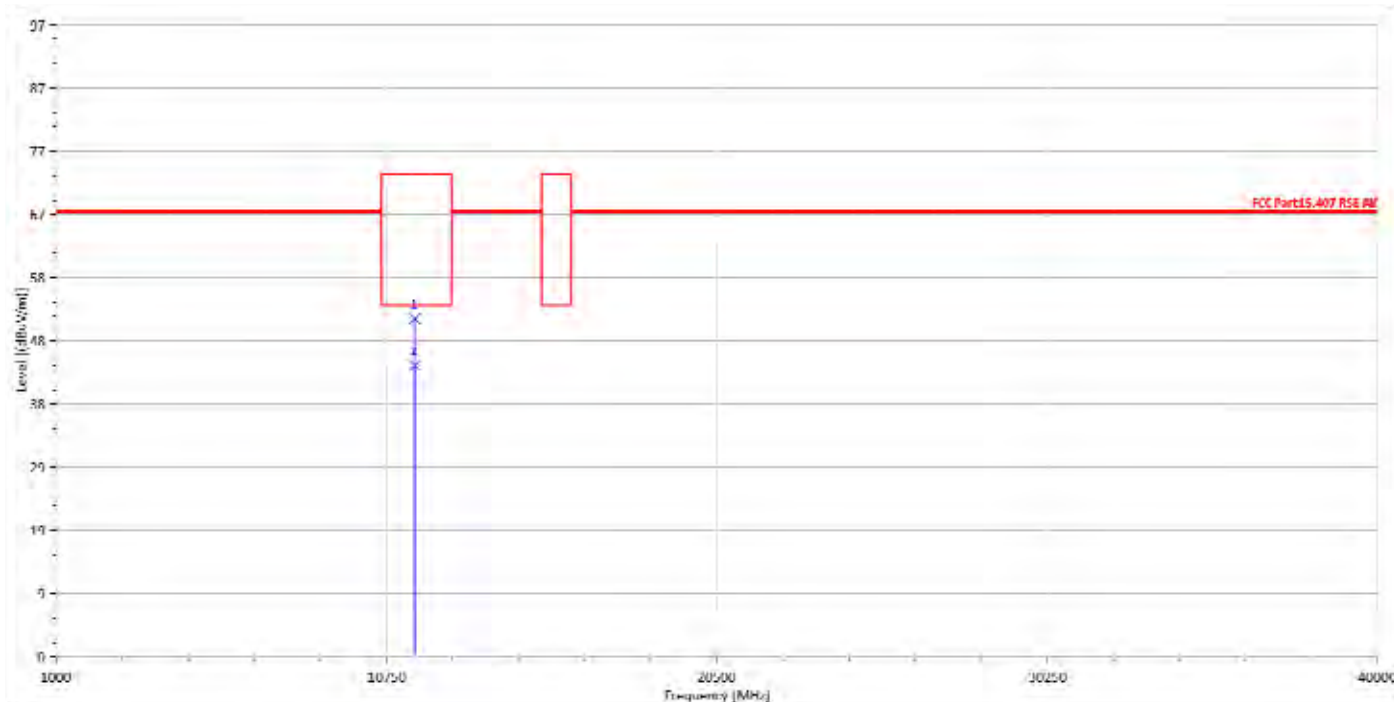
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Operation Mode :	802.11ac40	Test Date :	2016/1/25
Fundamental Frequency :	5795 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	
11590.00	H	Peak	30.63	21.28	51.90	74	-22.10
11590.00	H	Average	23.41	21.28	44.69	54	-9.31

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Band edge falling to restricted band

802.11ac VHT40 mode

Operation Mode : 802.11ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5190 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5146.00	S	Peak	62.34	11.16	73.50	74	-0.50
5146.00	S	Average	37.17	11.16	48.33	54	-5.67
5150.00	E	Peak	56.98	11.14	68.12	74	-5.88
5150.00	E	Average	38.18	11.14	49.32	54	-4.68

Operation Mode : 802.11ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5190 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Pony
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5145.28	S	Peak	48.93	11.16	60.09	74	-13.91
5145.28	S	Average	32.29	11.16	43.45	54	-10.55
5150.00	E	Peak	46.56	11.14	57.70	74	-16.30
5150.00	E	Average	32.74	11.14	43.88	54	-10.12

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Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5230 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	53.54	11.30	64.84	74	-9.16
5350.00	E	Average	36.40	11.30	47.70	54	-6.30
5354.80	S	Peak	60.36	11.31	71.67	74	-2.33
5354.80	S	Average	35.63	11.31	46.94	54	-7.06

Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5230 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5350.00	E	Peak	44.10	11.30	55.40	74	-18.60
5350.00	E	Average	32.69	11.30	43.99	54	-10.01
5355.80	S	Peak	48.15	11.31	59.47	74	-14.53
5355.80	S	Average	32.58	11.31	43.89	54	-10.11

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Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5710.10	S	Peak	55.40	12.32	67.72	68.3	-0.58
5721.20	S	Peak	59.63	12.28	71.91	78.2	-6.29
5725.00	S	Peak	56.30	12.27	68.57	78.2	-9.63

Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5719.80	S	Peak	53.59	12.29	65.88	78.2	-12.32
5725.00	E	Peak	48.96	12.27	61.23	78.2	-16.97

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Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	55.48	12.61	68.09	78.2	-10.11
5860.20	S	Peak	54.31	12.71	67.02	68.3	-1.28

Operation Mode : 802.11 ac40 Test Date : 2016/1/22
 Fundamental Frequency : 5795 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	49.68	12.61	62.29	78.2	-15.91
5850.30	S	Peak	50.37	12.61	62.99	78.2	-15.21

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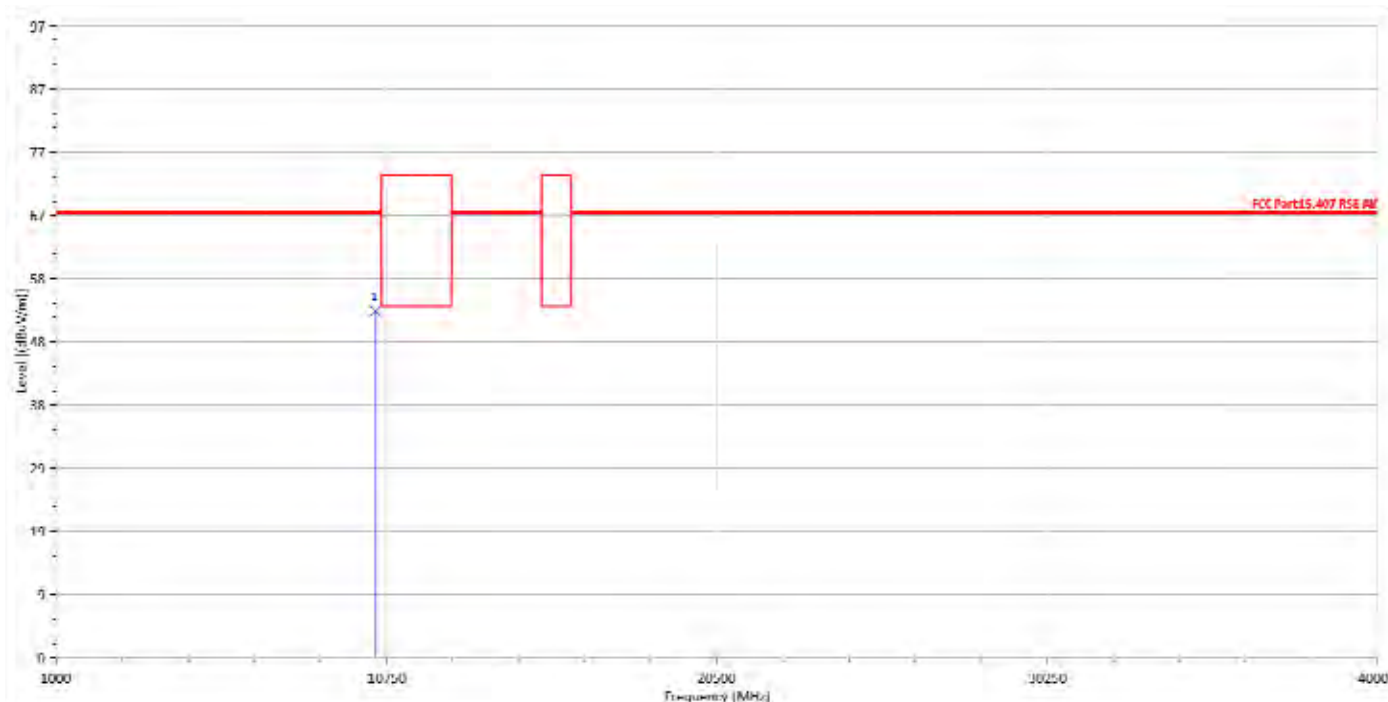
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz

Operation Mode :	802.11 ac80	Test Date :	2016/1/25
Fundamental Frequency :	5210 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
10420.00	H	Peak	34.29	18.96	53.25	68.3	-15.05

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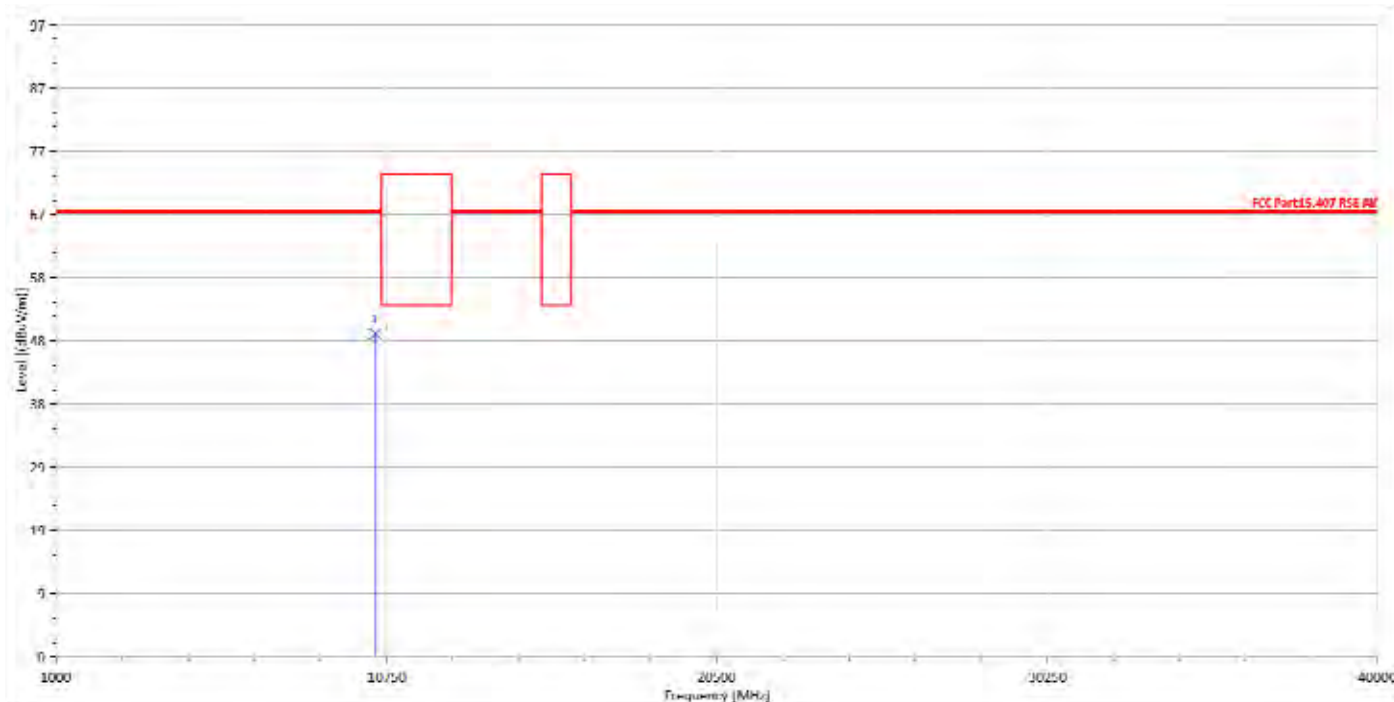
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Operation Mode :	802.11 ac80	Test Date :	2016/1/25
Fundamental Frequency :	5210 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
10420.00	H	Peak	30.63	18.96	49.59	68.3	-18.71

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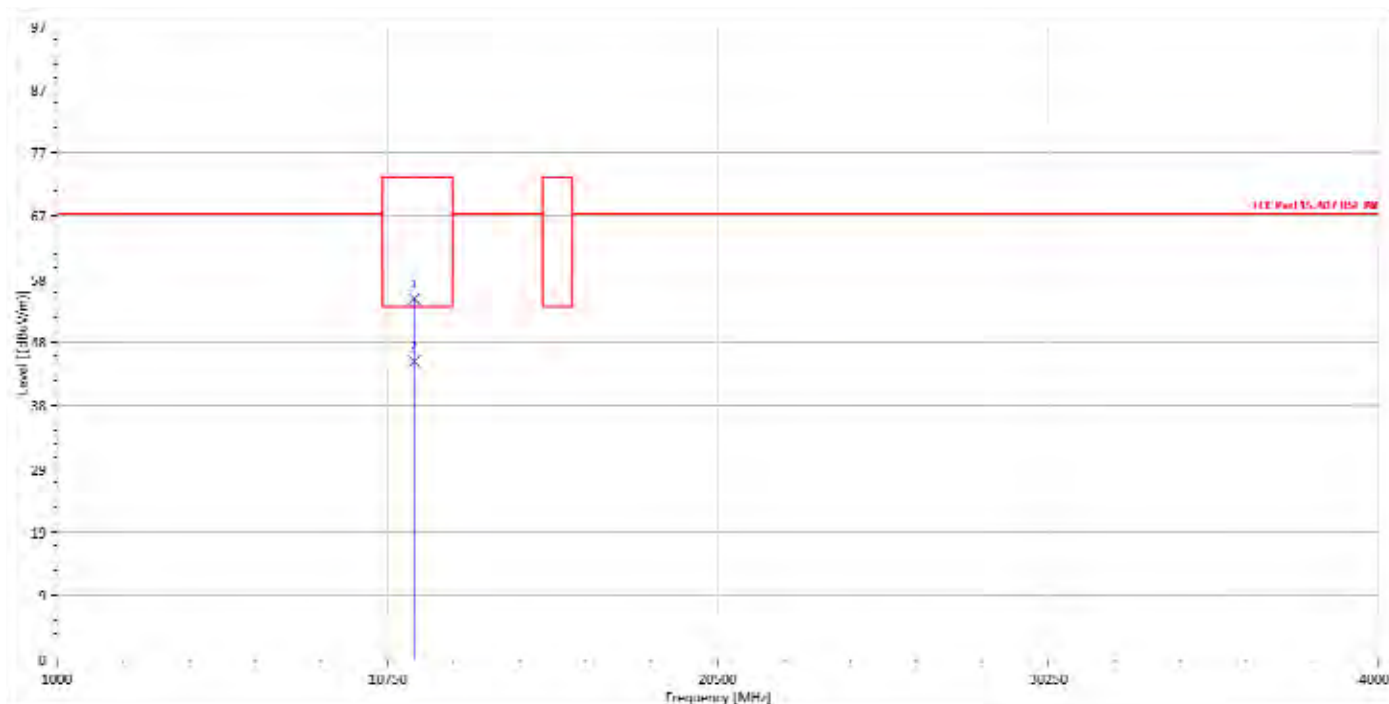
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Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5725~5850 MHz

Operation Mode :	802.11ac80	Test Date :	2016/1/25
Fundamental Frequency :	5775 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	dB
11550.00	H	Peak	34.27	20.97	55.24	74	-18.76
11550.00	H	Average	24.73	20.97	45.70	54	-8.30

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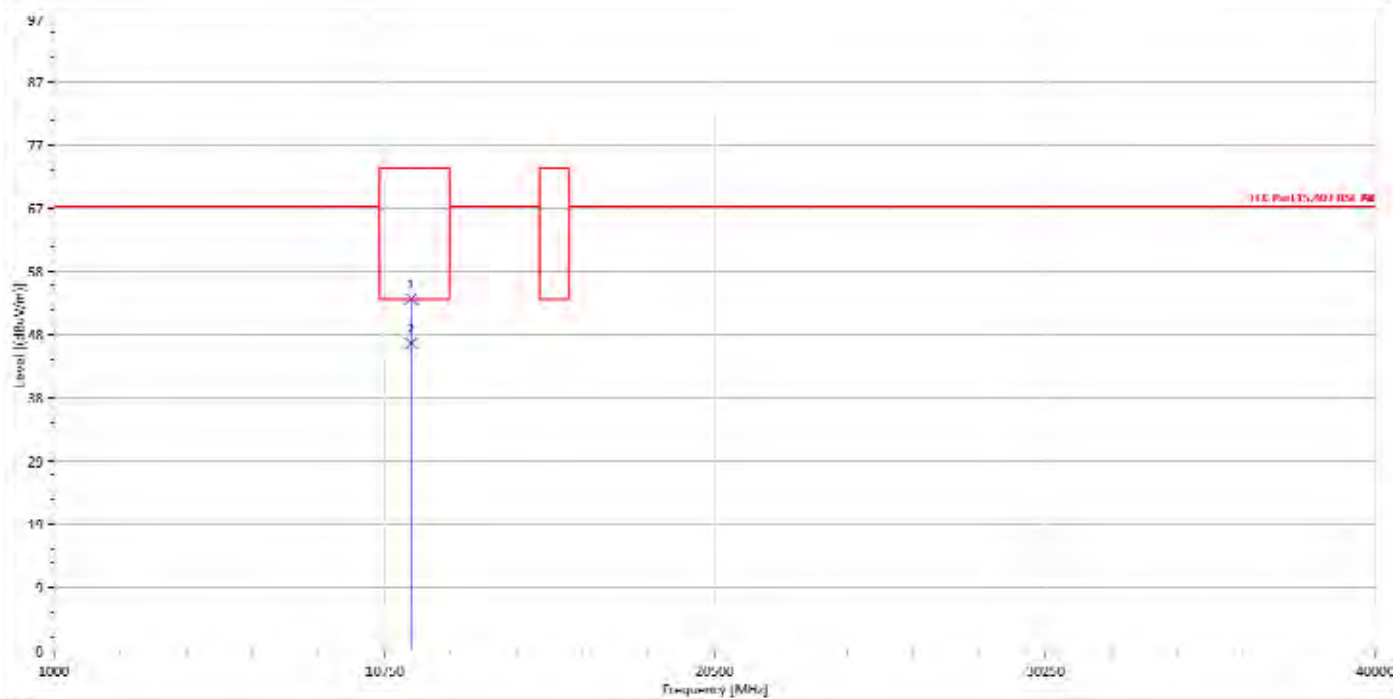
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Operation Mode : 802.11 ac80 Test Date : 2016/1/25
Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
Operation Band : Tx CH Low Test Engineer : Pony
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
11550.00	H	Peak	33.11	20.97	54.09	74	-19.91
11550.00	H	Average	26.21	20.97	47.18	54	-6.82

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Band edge falling to restricted band

802.11ac VHT80 mode

Operation Mode : 802.11 ac80 Test Date : 2016/1/22
 Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5123.60	S	Peak	61.88	11.18	73.06	74	-0.94
5123.60	S	Average	38.99	11.18	50.17	54	-3.83
5150.00	E	Peak	58.74	11.14	69.88	74	-4.12
5150.00	E	Average	40.21	11.14	51.35	54	-2.65

Operation Mode : 802.11 ac80 Test Date : 2016/1/22
 Fundamental Frequency : 5210 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5123.40	S	Peak	50.15	11.18	61.33	74	-12.67
5123.40	S	Average	32.86	11.18	44.04	54	-9.96
5150.00	E	Peak	48.31	11.14	59.46	74	-14.54
5150.00	E	Average	33.47	11.14	44.61	54	-9.39

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Operation Mode : 802.11 ac80 Test Date : 2016/1/23
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5712.40	S	Peak	54.66	12.31	66.97	68.3	-1.33
5721.40	S	Peak	57.79	12.28	70.07	78.2	-8.13
5725.00	E	Peak	55.12	12.27	67.39	78.2	-10.81

Operation Mode : 802.11 ac80 Test Date : 2016/1/23
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH Low Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5723.40	S	Peak	50.05	12.28	62.33	78.2	-15.87
5725.00	E	Peak	48.16	12.27	60.43	78.2	-17.77

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Operation Mode : 802.11 ac80 Test Date : 2016/1/23
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	47.86	12.61	60.47	78.2	-17.73
5852.64	S	Peak	50.94	12.64	63.58	78.2	-14.62

Operation Mode : 802.11 ac80 Test Date : 2016/1/23
 Fundamental Frequency : 5775 MHz Temp. / Humi. : 22.7deg_C/57RH
 Operation Band : BE CH High Test Engineer : Ashton
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	46.09	12.61	58.70	78.2	-19.50
5853.72	S	Peak	46.51	12.65	59.16	78.2	-19.04

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12. TRANSMISSION IN THE ABSENCE OF DATA

12.1 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.

12.2 Result

No non-compliance noted:

Refer to the theory of operation.

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13. FREQUENCY STABILITY

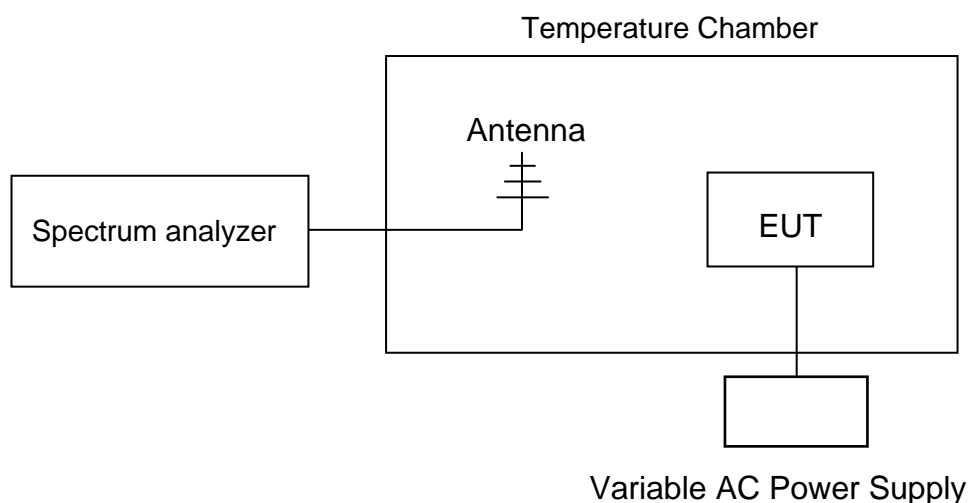
13.1 Standard Applicable

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.

13.2 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.

13.3 Test SET-UP



13.4 Measurement Equipment Used

Please refer to section 8.3 for the plot.

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13.5 Measurement Result

Operation Mode	802.11 a	Test Date	2016.01.30
Temperature	:17	Test By	Henry
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	5.75V	36	5180	5,179.96393	0.00000696
		44	5220	5,219.96423	0.00000685
		48	5240	5,239.96758	0.00000619
		149	5745	5,744.96256	0.00000652
		157	5785	5,784.96542	0.00000598
		165	5825	5,824.96251	0.00000644
	4.5V	36	5180	5,179.96405	0.00000694
		44	5220	5,219.96126	0.00000742
		48	5240	5,239.96469	0.00000674
		149	5745	5,744.96196	0.00000662
		157	5785	5,784.96312	0.00000638
		165	5825	5,824.96215	0.00000650
25	5V	36	5180	5,179.96800	0.00000618
		44	5220	5,219.96405	0.00000689
		48	5240	5,239.96346	0.00000697
		149	5745	5,744.96185	0.00000664
		157	5785	5,784.96225	0.00000653
		165	5825	5,824.96220	0.00000649

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Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
55	5.75V	36	5180	5,179.96530	0.00000670
		44	5220	5,219.96249	0.00000719
		48	5240	5,239.96469	0.00000674
		149	5745	5,744.96345	0.00000636
		157	5785	5,784.96346	0.00000632
		165	5825	5,824.96156	0.00000660
	4.5V	36	5180	5,179.96496	0.00000676
		44	5220	5,219.96269	0.00000715
		48	5240	5,239.96521	0.00000664
		149	5745	5,744.96210	0.00000660
		157	5785	5,784.96860	0.00000543
		165	5825	5,824.96346	0.00000627

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Operation Mode	802.11 n_HT40	Test Date	2016.01.30
Temperature	:17	Test By	Henry
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	5.75V	38	5190	5,189.96512	0.00000672
		46	5230	5,229.96195	0.00000728
		151	5755	5,754.96126	0.00000673
		159	5795	5,794.96452	0.00000612
	4.5V	38	5190	5,189.96469	0.00000680
		46	5230	5,229.96563	0.00000657
		151	5755	5,754.96546	0.00000600
		159	5795	5,794.96645	0.00000579
25	3.3V	38	5190	5,189.96500	0.00000674
		46	5230	5,229.96405	0.00000687
		151	5755	5,754.96153	0.00000668
		159	5795	5,794.96216	0.00000653
55	5.75V	38	5190	5,189.96153	0.00000741
		46	5230	5,229.96195	0.00000728
		151	5755	5,754.96645	0.00000583
		159	5795	5,794.96451	0.00000612
	4.5V	38	5190	5,189.96489	0.00000676
		46	5230	5,229.96573	0.00000655
		151	5755	5,754.96349	0.00000634
		159	5795	5,794.96650	0.00000578

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Operation Mode	802.11 ac_VHT80	Test Date	2016.01.30
Temperature	:17	Test By	Henry
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
-10	5.75V	42	5210	5,209.96687	0.00000636
		155	5775	5,774.96254	0.00000649
	4.5V	42	5210	5,209.96498	0.00000672
		155	5775	5,774.96159	0.00000665
25	5V	42	5210	5,209.96472	0.00000677
		155	5775	5,774.96140	0.00000668
55	5.75V	42	5210	5,209.96369	0.00000697
		155	5775	5,774.96753	0.00000562
	4.5V	42	5210	5,209.96357	0.00000699
		155	5775	5,774.96320	0.00000637

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14. ANTENNA REQUIREMENT

14.1 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.

14.2 Antenna Connected Construction

Dipole antenna designs are 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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