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### ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

**Product Name: Mobile Phone** 

**Brand Name: FUJITSU** 

F-04J Model No.:

**Model Difference:** N/A

FCC ID: VQK-F04J

**Report No.:** ER/2016/B0018

**Issue Date:** Dec. 14, 2016

**FCC Rule Part: §15.407** 

**Fuiitsu Limited** 

**Prepared for:** 1-1, Kamikodanaka 4-chome, Nakahara-ku,

Kawasaki 211-8588, Japan

SGS Taiwan Ltd.

**Electronics & Communication Laboratory** 

Prepared by: No.134, Wu Kung Road, New Taipei Industrial

Park, Wuku District, New Taipei City, Taiwan

24803





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### VERIFICATION OF COMPLIANCE

Fujitsu Limited

Applicant: 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588,

Mobile Phone **Product Name:** 

**FUJITSU Brand Name:** 

F-04J Model No.:

N/A **Model Difference:** 

VQK-F04J FCC ID:

ER/2016/B0018 **File Number:** 

Nov. 07, 2016 ~ Dec. 01, 2016 Date of Test:

Date of EUT Received: Nov. 07, 2016

### We hereby certify that:

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

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

Test By:	Marcus 7 seng	Date:	Dec. 14, 2016	
Prepared By:	Marcus Tseng / Engineer Karen Huang	Date:	Dec. 14, 2016	
Approved By:	Karen Huang / Clerk  Jim Chang / Asst. Manager	Date:	Dec. 14, 2016	

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2016/B0018	Rev.00	Initial creation of document	Dec. 14, 2016

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#### 1. GENERAL INFORMATION

### 1.1 Product Description

General:

Product Name:	Mobile Phone		
Brand Name:	FUJITSU		
Model No.:	F-04J		
Model Difference:	N/A		
Hardware Version:	V2.1.0		
Software Version:	R028.1e		
Cradle:	Model No.: F46, Supplier: FUJITSU LIMITED		
	3.8Vdc fro Adapter /	om Rechargeable Li-ion Battery or 5Vdc from AC/DC Cradle	
Power Supply:	Battery: Model No.: F35, Supplier: FUJITSU CONNECTE TECHNOLOGIES LIMITED		
	Adapter: Model No.: FMV-AC346, Supplier: FUJITSU LIMITED		

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#### WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology
	5150~5250	4	12.62 dBm (Avg.)	
11a	5250~5350	4	12.56 dBm (Avg.)	OFDM
	5470~5725	12	12.02 dBm (Avg.)	
	HT / VHT20 5150~5250	4	HT: 12.77 dBm (Avg.) (Worst Case)	
11n / ac_20M	HT / VHT20 5250~5350	4	HT: 12.60 dBm (Avg.) (Worst Case)	OFDM
	HT / VHT20 5470~5725	11	HT: 12.03 dBm (Avg.) (Worst Case)	
	HT / VHT40 5150~5250	2	HT: 12.72 dBm (Avg.) (Worst Case)	
11n / ac_40M	HT / VHT40 5250~5350	2	HT: 12.65 dBm (Avg.) (Worst Case)	OFDM
	HT / VHT40 5470~5725	5	HT: 12.18 dBm (Avg.) (Worst Case)	
	VHT80 5150~5250	1	12.39 dBm (Avg.)	
11ac_80M	VHT80 5250~5350	1	12.46 dBm (Avg.)	OFDM
	VHT80 5470~5725	2	11.77 dBm (Avg.)	

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Antenna Designation	λ/4 Monopole Antenna, 5GHz Gain: -4.6dBi (5150MHz-5250MHz) 5GHz Gain: -4.6dBi (5250MHz-5350MHz) 5GHz Gain: -4.6dBi (5470MHz-5725MHz)
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_20 / ac VHT20MHz: 6.5 - 65Mbps 802.11 n_40 / ac VHT40MHz: 13.5 - 135Mbps 802.11 ac_80MHz: 29.3 - 292.5Mbps

#### 1.2 Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting below features.

	Product Feature			
GSM Operating Band(s)	GSM 850/1900MHz			
GPRS Multi Slot Class	GPRS Class 11			
WCDMA Operating Band(s)	FDD Band V			
WCDMA Rel. Version	Rel.9			
Bluetooth Version	V4.2 dual mode			
Wi-Fi- Specification	802.11a/b/g/n/ac			
NFC Specification	NFC			

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

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#### 1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules

FCC KDB 644545 D03 Guidance for IEEE 802.11ac v01

ANSI C63.10:2013

Note:

All test items have been performed and record as per the above standards.

#### 1.4 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Numbers are: 509634

#### 1.5 Special Accessories

There are no special accessories used while test was conducted.

#### **Equipment Modifications**

There was no modification incorporated into the EUT.

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#### SYSTEM TEST CONFIGURATION

#### **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.

#### **Test Procedure**

#### 2.3.1 Conducted Emissions

The EUT is a placed on as 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 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. 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.

### **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 2.9dB, and 10dB attenuator. offset = RF cable loss (dB)+ attenuation factor(dB)=12.9(dB)

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#### 2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Emission

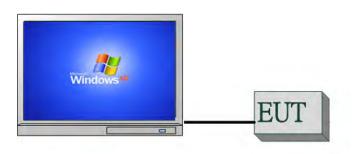


Fig. 2-2 Conducted Emission Configuration

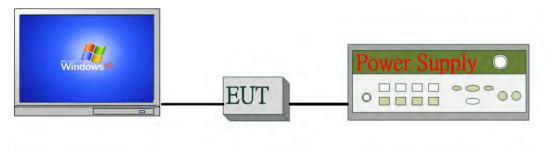
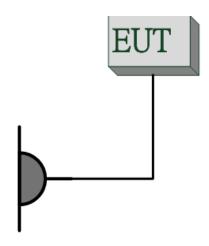


Fig. 2-3 Configuration of Conducted Tested System



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#### **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	L430	N/A	Shielded	Unshielded
3.	DC Power Supply	Agilent	E3640A	KR93300208	N/A	Unshielded

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#### **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 & 6dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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#### **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

	· · · · · <u>_</u> · · · · · · , · · · · ·	· · · · · · · · · · · · · · · · · · ·	
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 5250 MHz ~5350 MHz:

4 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n HT40, 802.11ac VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac VHT80

_		
Ī	CHANNEL	FREQUENCY
	58	5290 MHz

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#### Operated band in 5470 MHz ~5725 MHz:

11 channels are provided for 802.11a, 802.11n HT20, 802.11ac VHT20

310 11 a 0 a 1 a 1 a 1 a 1 a 1 a 1 a 1 a						
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY			
100	5500 MHz	124	5620 MHz			
104	5520 MHz	128	5640 MHz			
108	5540 MHz	132	5660 MHz			
112	5560 MHz	136	5680 MHz			
116	5580 MHz	140	5700 MHz			
120	5600 MHz					

5 channels are provided for 802.11n\_HT40, 802.11ac\_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

#### 2 channesl are provided for 802.11ac\_VHT80

1							
CHANNEL FR		FREQUENCY	CHANNEL	FREQUENCY			
	106	5530 MHz	122	5610 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:**

NADIA I ED EIVII	OOIOIT ILOI.					
	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	36,44,48	OFDM	6	MAIN
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MAIN
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN
802.11ac_VHT80	5290	58	58	OFDM	MCS0	MAIN
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	MAIN
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS0	MAIN
	RADI	ATED EMISS	SION TEST (A	BOVE 1 GHz)		
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	26 44 49	OFDM	6	MAIN
802.11n_HT20	5160~5240	30 10 40	36,44,48	OFDM	MCS0	MAIN
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MAIN
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MAIN
802.11a	E000 E000	E0 +0 C4	E0 C0 C4	OFDM	6	MAIN
802.11n_HT20	5260~5320	52 to 64	52,60,64	OFDM	MCS0	MAIN
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	MAIN
802.11ac_VHT80	5290	58	58	OFDM	MCS0	MAIN

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MODE	FREQUENCY BAND (MHz)		TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5500~5720	100 to 144	100,116,140	OFDM	6	MAIN
802.11n_HT20				OFDM	MCS0	MAIN
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS0	MAIN
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS0	MAIN

#### 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 E1 position was reported.

#### ANTENNA PORT CONDUCTED MEASUREMENT:

ANTENNATO	CONDUCTED TEST					
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	26 44 49	OFDM	6	MAIN
802.11n_HT20	5160~5240	30 10 40	36,44,48	OFDM	MCS0	MAIN
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	MAIN
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MAIN
802.11a	5260~5320	FO to 64	F0 60 64	OFDM	6	MAIN
802.11n_HT20	5260~5320	52 to 64	52,60,64	OFDM	MCS0	MAIN
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	MAIN
802.11ac_VHT80	5290	58	58	OFDM	MCS0	MAIN
802.11a	FF00 F700	100 += 140	100 110 140	OFDM	6	MAIN
802.11n_HT20	5500~5700	100 to 140	100,116,140	OFDM	MCS0	MAIN
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS0	MAIN
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS0	MAIN

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#### **MEASUREMENT UNCERTAINTY**

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

Radiated Spurious Emission:

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

	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	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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#### 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	Limits dB(uV)				
MHz	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	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017			
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/16/2016	05/15/2017			
LISN	MESS TEC	FCC-LISN-50/250 -25-2-01	4034	05/16/2016	05/15/2017			
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2016	11/25/2017			

#### 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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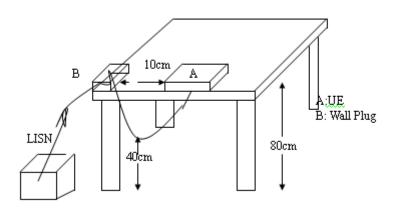
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#### 6.4. Test SET-UP



#### 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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20 0

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Temperature:

Humidity:

#### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode: Operation mode Test By: Tin

Phase:

Power.

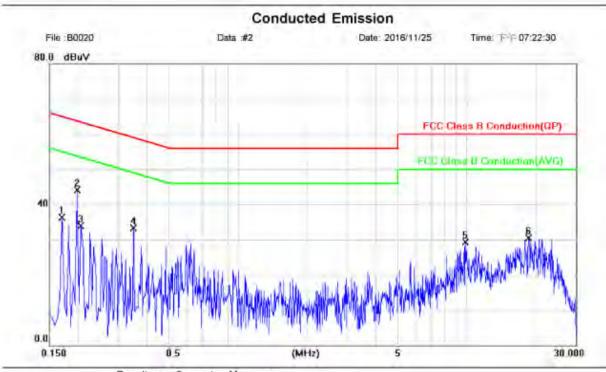
AC 120V/60Hz

Site Conduction Room

Limit: FCC Class B Conduction(QP)

Mode: Operation

Note: Adapter:FMV-AC346



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.1700	36.33	0.07	36.40	64.96	-28,56	peak		
2	•	0.1980	43.98	0.08	44.06	63.69	-19.63	peak		
3	7.1	0.2060	33.76	0.08	33.84	63.37	-29.53	peak		
4		0.3500	33.19	0.10	33.29	58.96	-25.67	peak		
5		9.8620	28.97	0.37	29.34	60.00	-30.66	peak		
6	d	18.6900	29.99	0.45	30.44	60.00	-29.56	peak		

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20 T

58 %

30.000

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Site Conduction Room

Phase: Power:

N AC 120V/60Hz Temperature:

Humidity.

Limit: FCC Class B Conduction(QP)

Mode: Operation

0.150

Note: Adapter:FMV-AC346

Conducted Emission File: B0020 Data :#1 Date: 2016/11/25 Time: F = 07:21:24 80.0 dBuV FCC Class & Conduction(QP) FOC Class & Conduction(AVG)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1540	37.70	0.07	37.77	65.78	-28.01	peak		
2		0.1740	36.35	0.07	36.42	64.77	-28.35	peak		
3		0.2020	44.04	0.08	44.12	63.53	-19.41	peak		
4		0.5300	33.21	0.10	33.31	56.00	-22.69	peak		
5		0.6500	32.74	0.11	32.85	56.00	-23.15	peak		
6		18.1380	32.44	0.44	32.88	60.00	-27.12	peak		

(MHz)

5

0.5

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#### **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:

Duty Cycle = Ton / (Ton+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	99.99	0.00
802.11n_20	99.99	0.00
802.11ac_20	99.99	0.00
802.11n_40	99.42	0.03
802.11ac_40	99.50	0.02
802.11ac_80	96.22	0.17

Duty Cycle Factor:  $10 * \log(1/0.9999) = 0$ Duty Cycle Factor:  $10 * \log(1/0.9999) = 0$ Duty Cycle Factor:  $10 * \log(1/0.9999) = 0$ Duty Cycle Factor:  $10 * \log(1/0.9942) = 0.03$ Duty Cycle Factor: 10 \* log(1/0.995) = 0.02Duty Cycle Factor:  $10 * \log(1/0.9622) = 0.17$ 

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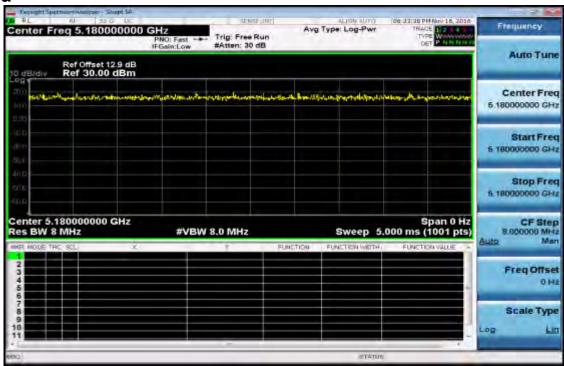
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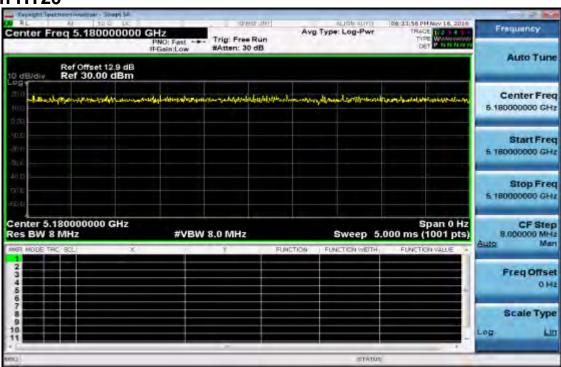


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### **DUTY CYCLE TEST SIGNAL Measurement Result** 802.11a



#### 802.11n HT20



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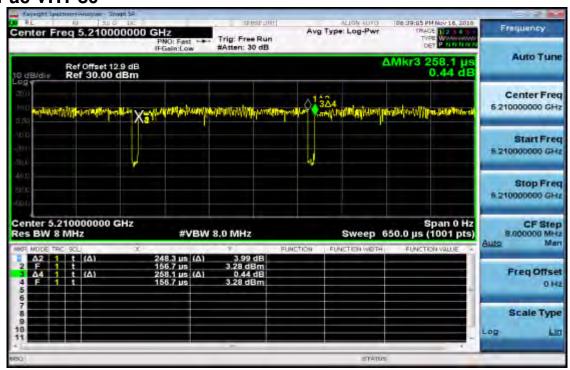


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#### 802.11n HT 40



# 802.11 ac VHT 80



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#### 8. 26dB & 6dB 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. Repeat above procedures until all test default channel measured were complete.

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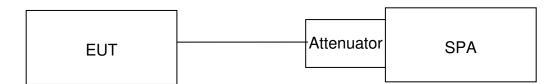


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#### Measurement Equipment Used

SGS Conducted Room							
Name of Equipment	Manufacturer	Manufacturer Model S		Calibration Date	Calibration Due		
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016		
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016		
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017		
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017		
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017		
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017		
DC Power Supply	Agilent	E3640A	MY52410006	11/04/2016	11/03/2017		
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017		

#### 8.4 Test Set-up



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#### 8.5 Measurement Result 26dB Bandwidth

802.11a Main

002.11a_Wa111					
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)			
5180	21.62	13.349			
5220	22.20	13.464			
5240	21.58	13.341			
5260	21.74	13.373			
5300	22.07	13.438			
5320	21.98	13.420			
5500	21.98	13.420			
5580	21.95	13.414			
5700	22.27	13.477			

802.11n HT20 Main

002.1111_11120_IWAII1					
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)			
5180	22.33	13.489			
5220	21.97	13.418			
5240	22.43	13.508			
5260	21.90	13.404			
5300	22.29	13.481			
5320	22.13	13.450			
5500	21.74	13.373			
5580	22.51	13.524			
5700	22.40	13.502			

802.11n HT40 Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	42.98	16.333
5230	44.36	16.470
5270	43.25	16.360
5310	42.03	16.236
5510	43.03	16.338
5550	44.27	16.461
5670	42.97	16.332

802.11ac VHT80 Main

00211140 _V11100_III4III					
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)			
5210	81.07	19.089			
5290	82.99	19.190			
5530	83.12	19.197			
5610	83.58	19.221			

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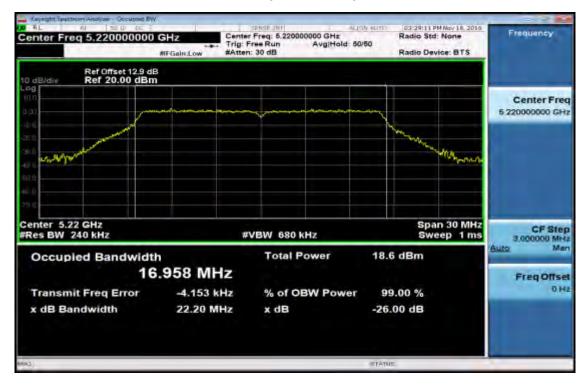


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## 802.11a, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180MHz)



### 26dB Band Width Test Data CH-Mid (5220MHz)



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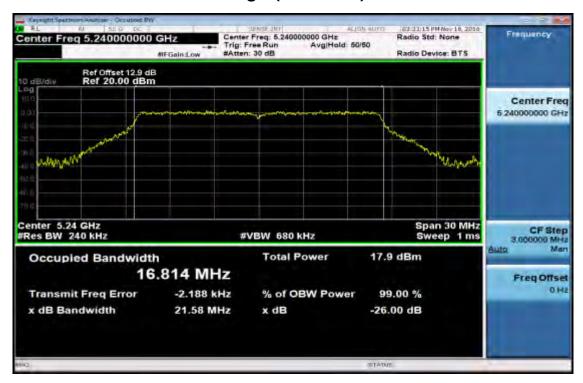
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# 26dB Band Width Test Data CH-High (5240MHz)



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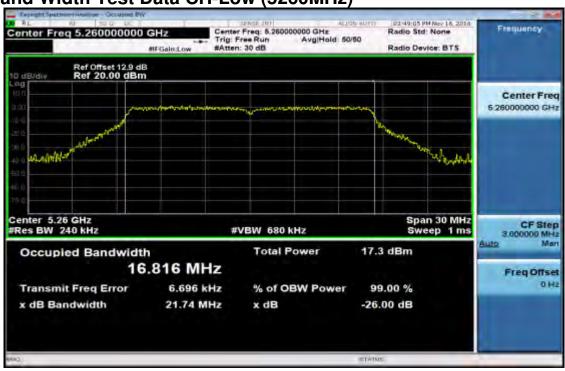
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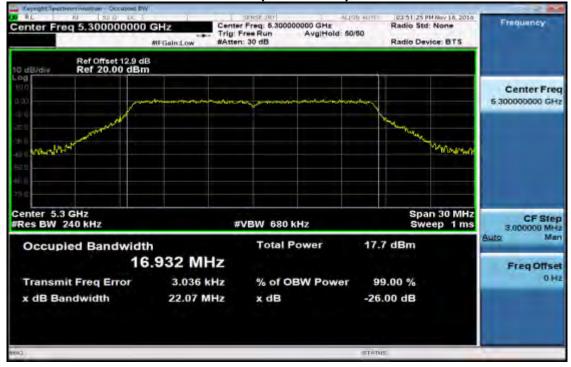


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### 802.11a, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5260MHz)



## 26dB Band Width Test Data CH-Mid (5300MHz)



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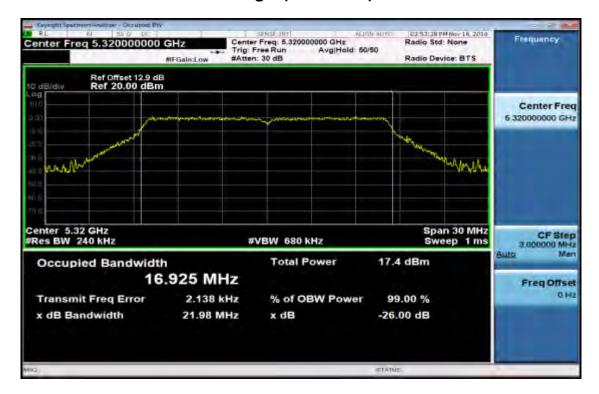
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### 26dB Band Width Test Data CH-High (5320MHz)



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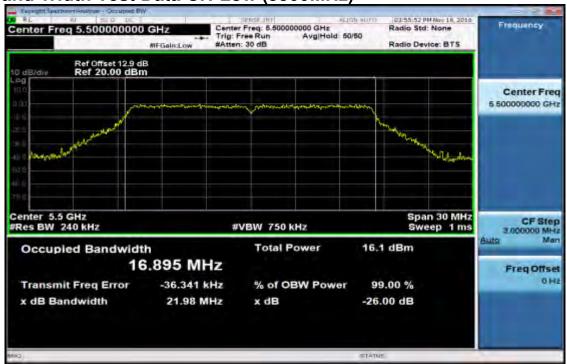
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### 802.11a, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5500MHz)



### 26dB Band Width Test Data CH-Mid (5580MHz)



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### 26dB Band Width Test Data CH-High (5700MHz)



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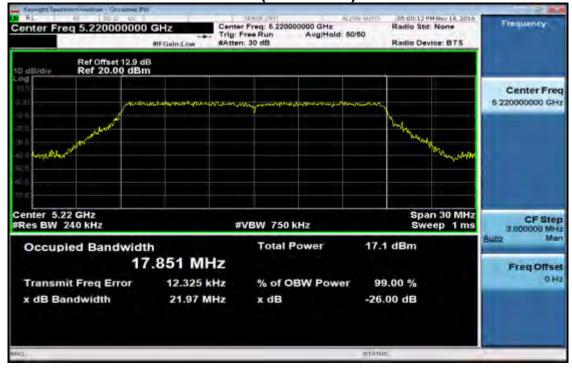


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### 802.11n HT20, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180 MHz)



## 26dB Band Width Test Data CH-Mid (5220 MHz)



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## 26dB Band Width Test Data CH-High (5240 MHz)



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### 802.11n HT20, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5260 MHz)



## 26dB Band Width Test Data CH-Mid (5300 MHz)



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# 26dB Band Width Test Data CH-High (5320 MHz)



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### 802.11n HT20, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5500 MHz)



## 26dB Band Width Test Data CH-Mid (5580 MHz)



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# 26dB Band Width Test Data CH-High (5700 MHz)



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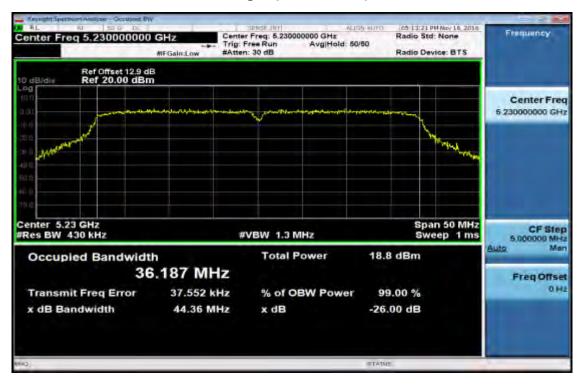
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### 802.11n HT40, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5190 MHz)



## 26dB Band Width Test Data CH-High (5230 MHz)



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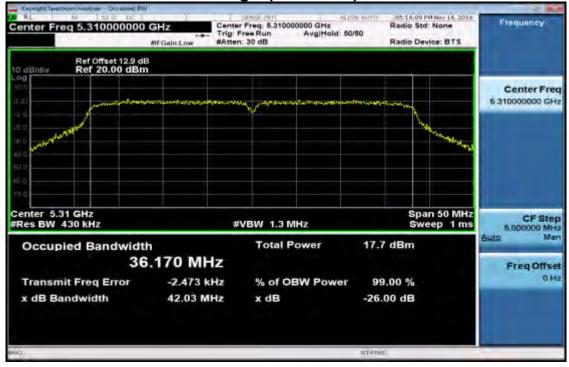


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### 802.11n HT40, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5270 MHz)



26dB Band Width Test Data CH-High (5310MHz)



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### 802.11n HT40, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5510 MHz)



## 26dB Band Width Test Data CH-Mid (5550 MHz)



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# 26dB Band Width Test Data CH-High (5670 MHz)



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### 802.11ac VHT80, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Mid (5210 MHz)



802.11ac VHT80, 5250~5350 MHz 26dB Band Width Test Data CH-Mid (5290 MHz)



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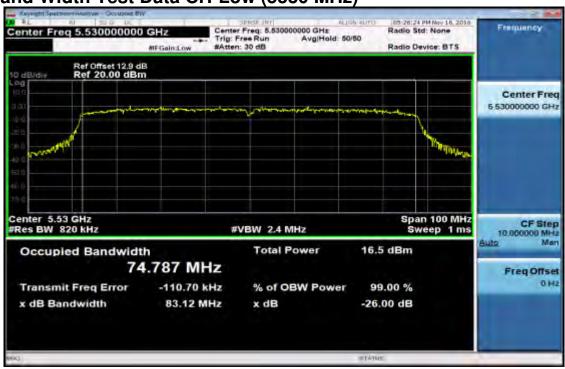
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### 802.11ac VHT80, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5530 MHz)



## 802.11ac VHT80, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-High (5610 MHz)



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### MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

### **Standard Applicable**

#### **FCC**

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	V		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 direction-al gain of the antenna exceeds 6 dBi.

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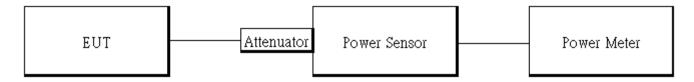
#### 9.2 Measurement Procedure

- 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.
- 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/duty cycle).
- 6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

### 9.3 Measurement Equipment Used

	SGS Conducted Room									
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due					
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016					
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016					
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017					
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017					
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017					
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017					
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017					
DC Power Supply	Agilent	E3640A	MY52410006	11/04/2016	11/03/2017					
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017					

### 9.4 Test Set-up



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### 9.5 Measurement Result **Conducted output power**

### 802.11a Main

002.11u_								
СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	MCS0	12.61	18.239		23.98		PASS
44	5220	MCS0	12.25	16.788		23.98		PASS
48	5240	MCS0	12.62	18.281		23.98		PASS
52	5260	MCS0	12.56	18.030	23.98	or 11+10log(B) =	24.37	PASS
60	5300	MCS0	12.30	16.982	23.98	or 11+10log(B) =	24.44	PASS
64	5320	MCS0	12.17	16.482	23.98	or $11+10\log(B) =$	24.42	PASS
100	5500	MCS0	12.02	15.922	23.98	or 11+10log(B) =	24.42	PASS
116	5580	MCS0	11.95	15.668	23.98	or 11+10log(B) =	24.41	PASS
140	5700	MCS0	11.65	14.622	23.98	or 11+10log(B) =	24.48	PASS

### 802.11n\_HT20\_Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	MCS0	12.75	18.836		23.98		PASS
44	5220	MCS0	12.53	17.906		23.98		PASS
48	5240	MCS0	12.77	18.923		23.98		PASS
52	5260	MCS0	12.60	18.197	23.98	or $11+10\log(B) =$	24.40	PASS
60	5300	MCS0	12.43	17.498	23.98	or 11+10log(B) =	24.48	PASS
64	5320	MCS0	12.53	17.906	23.98	or $11+10\log(B) =$	24.45	PASS
100	5500	MCS0	12.03	15.959	23.98	or $11+10\log(B) =$	24.37	PASS
116	5580	MCS0	11.87	15.382	23.98	or 11+10log(B) =	24.52	PASS
140	5700	MCS0	11.85	15.311	23.98	or 11+10log(B) =	24.50	PASS

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### 802.11n\_HT40\_Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
38	5190	MCS0	12.59	18.155		23.98		PASS
46	5230	MCS0	12.72	18.707		23.98		PASS
54	5270	MCS0	12.65	18.408	23.98	or $11+10\log(B) =$	27.36	PASS
62	5310	MCS0	12.53	17.906	23.98	or 11+10log(B) =	27.24	PASS
102	5510	MCS0	12.18	16.520	23.98	or $11+10\log(B) =$	27.34	PASS
110	5550	MCS0	12.03	15.959	23.98	or 11+10log(B) =	27.46	PASS
134	5670	MCS0	11.98	15.776	23.98	or 11+10log(B) =	27.33	PASS

#### 802.11ac VHT20 Main

002.11ac	VIIIZO Maii	•						
СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	MCS0	12.68	18.535		23.98		PASS
44	5220	MCS0	12.41	17.418		23.98		PASS
48	5240	MCS0	12.56	18.030		23.98		PASS
52	5260	MCS0	12.39	17.338	23.98	or $11+10log(B) =$	24.40	PASS
60	5300	MCS0	12.22	16.672	23.98	or $11+10log(B) =$	24.48	PASS
64	5320	MCS0	12.32	17.061	23.98	or $11+10log(B) =$	24.45	PASS
100	5500	MCS0	11.82	15.205	23.98	or $11+10log(B) =$	24.37	PASS
116	5580	MCS0	11.66	14.655	23.98	or 11+10log(B) =	24.52	PASS
140	5700	MCS0	11.64	14.588	23.98	or $11+10log(B) =$	24.50	PASS

### 802.11ac VHT40 Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
38	5190	MCS0	12.56	18.030		23.98		PASS
46	5230	MCS0	12.27	16.866		23.98		PASS
54	5270	MCS0	12.42	17.458	23.98	or $11+10log(B) =$	27.36	PASS
62	5310	MCS0	12.25	16.788	23.98	or $11+10\log(B) =$	27.24	PASS
102	5510	MCS0	12.08	16.144	23.98	or 11+10log(B) =	27.34	PASS
110	5550	MCS0	12.17	16.482	23.98	or $11+10\log(B) =$	27.46	PASS
134	5670	MCS0	11.68	14.723	23.98	or 11+10log(B) =	27.33	PASS

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### 802.11ac VHT80 Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
42	5210	MCS0	12.39	17.338		23.98		PASS
58	5290	MCS0	12.46	17.620	23.98	or $11+10\log(B) =$	30.19	PASS
106	5530	MCS0	11.77	15.031	23.98	or $11+10\log(B) =$	30.20	PASS
122	5610	MCS0	11.72	14.859	23.98	or 11+10log(B) =	30.22	PASS

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### 10. PEAK POWER SPECTRAL DENSITY

### 10.1 Standard Applicable

### **FCC**

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	V		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.

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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.
- 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≥ 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. User 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

SGS Conducted Room								
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due			
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017			

### 10.4 Test Set-up



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### 10.5 Measurement Result

POWER	POWER DENSITY 802.11a MODE								
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)						
5180	0.39	11	-10.61						
5220	-0.06	11	-11.06						
5240	0.34	11	-10.66						
5260	0.42	11	-10.58						
5300	-0.89	11	-11.89						
5320	-1.07	11	-12.07						
5500	-1.39	11	-12.39						
5580	-1.69	11	-12.69						
5700	-0.61	11	-11.61						

POWER DENSITY 802.11n HT20 MODE								
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)					
5180	0.82	11	-10.18					
5220	-0.17	11	-11.17					
5240	0.60	11	-10.40					
5260	-0.20	11	-11.20					
5300	-1.07	11	-12.07					
5320	-1.12	11	-12.12					
5500	-2.07	11	-13.07					
5580	-1.96	11	-12.96					
5700	-1.05	11	-12.05					

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POWER DENSITY 802.11n HT40 MODE				
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	
5190	-2.37	11	-13.37	
5230	-2.92	11	-13.92	
5270	-3.29	11	-14.29	
5310	-4.29	11	-15.29	
5510	-5.38	11	-16.38	
5550	-5.43	11	-16.43	
5670	-3.96	11	-14.96	

POWER DENSITY 802.11ac VHT80 MODE				
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	
5210	-6.21	11	-17.21	
5290	-7.05	11	-18.05	
5530	-9.24	11	-20.24	
5610	-8.74	11	-19.74	

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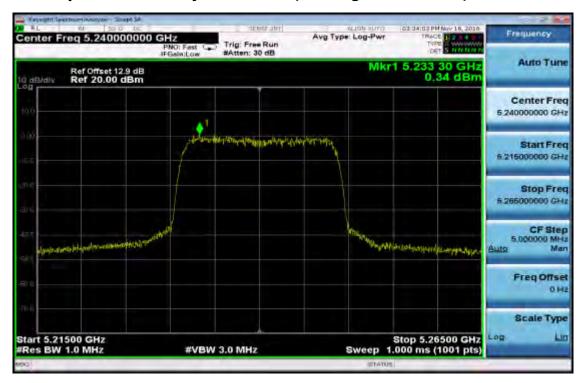
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# Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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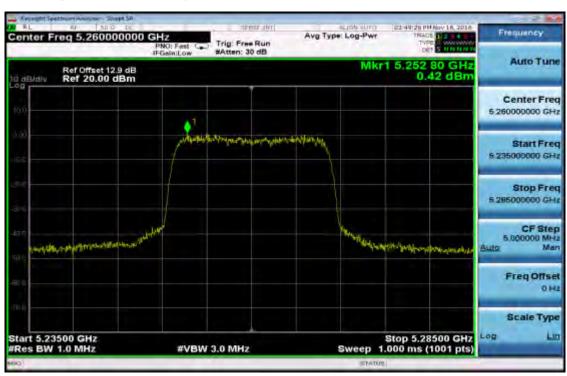
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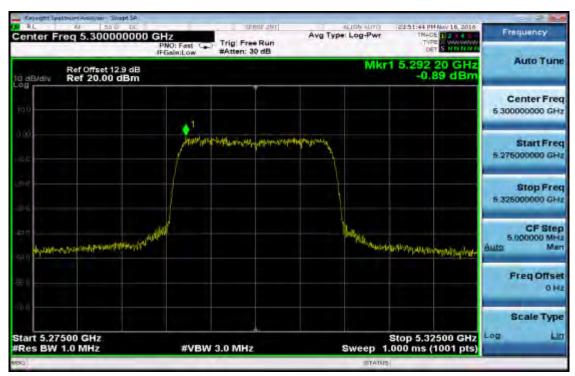


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## 802.11a 5250~5350 MHz Peak Power Spectral Density Data Plot (CH Low 5260 MHz)



## Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



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## Peak Power Spectral Density Data Plot (CH High 5320 MHz)



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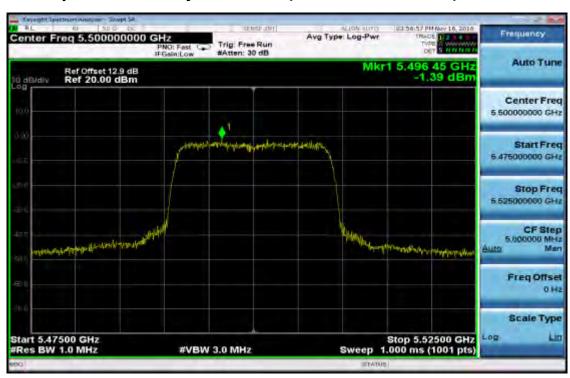
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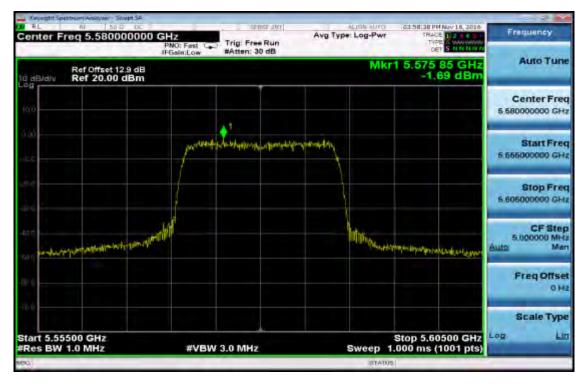


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## 802.11a 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



## Peak Power Spectral Density Data Plot (CH Mid 5580 MHz)



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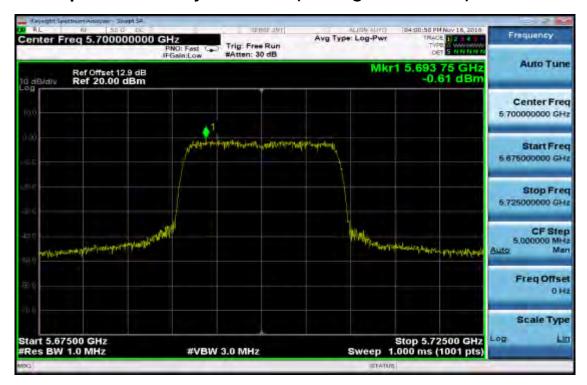
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### Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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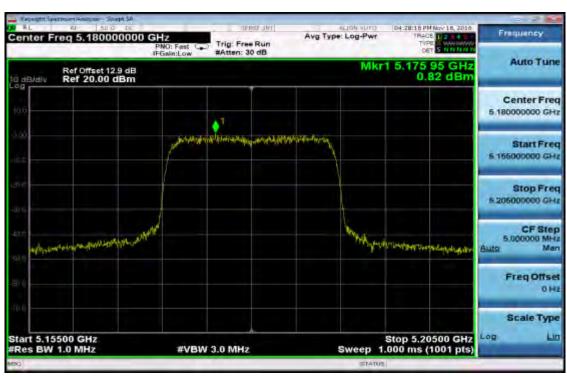
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## 802.11n HT20, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



### 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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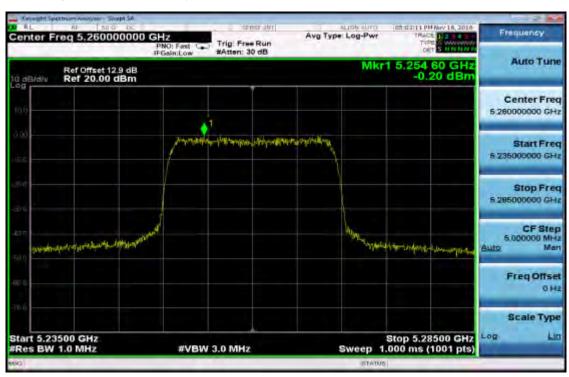
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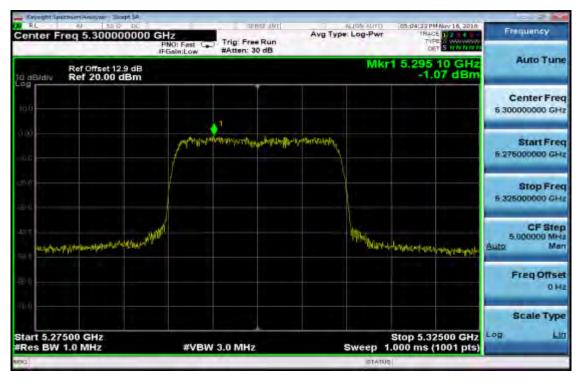


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### 802.11n HT20, 5250~5350 MHz Peak Power Spectral Density Data Plot (CH Low 5260MHz)



## Peak Power Spectral Density Data Plot (CH Mid 5300 MHz)



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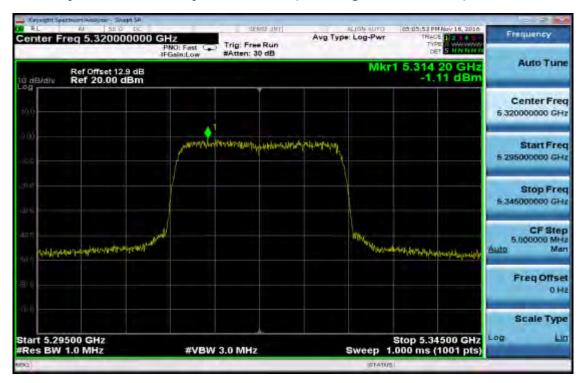
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## Peak Power Spectral Density Data Plot (CH High 5320 MHz)



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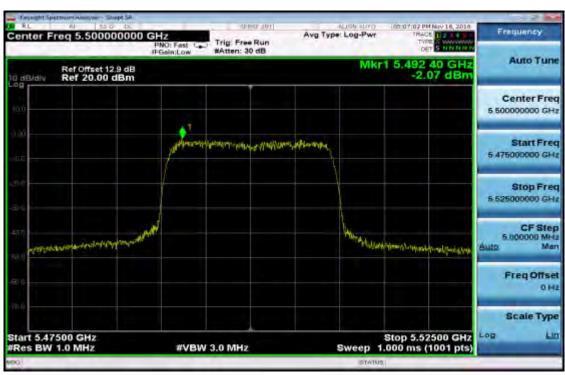
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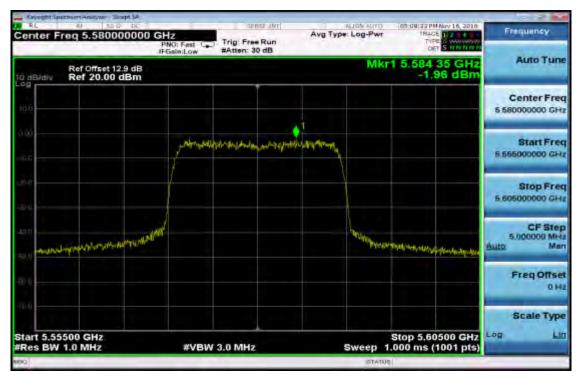


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## 802.11n HT20, 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



## Peak Power Spectral Density Data Plot (CH Mid 5580MHz)



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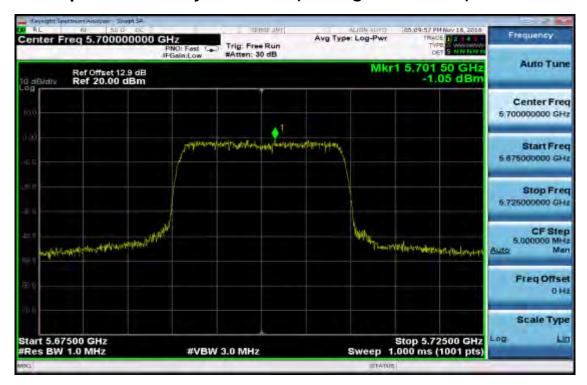
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### Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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## 802.11n HT40, 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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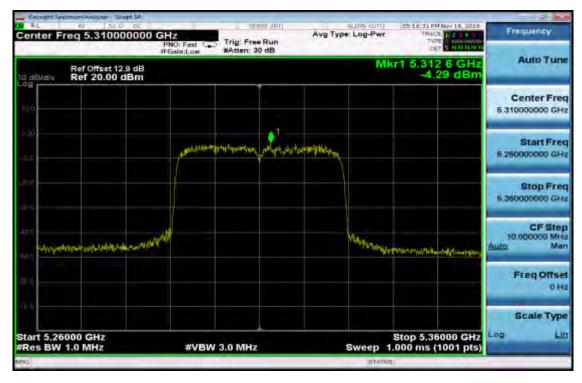


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### 802.11n HT40, 5250~5350 MHz Peak Power Spectral Density Data Plot (CH Low 5270 MHz)



## Peak Power Spectral Density Data Plot (CH High 5310 MHz)



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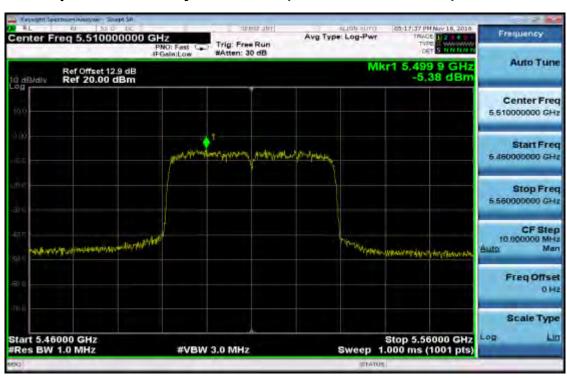
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### 802.11n HT40, 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



## Peak Power Spectral Density Data Plot (CH Mid 5550 MHz)



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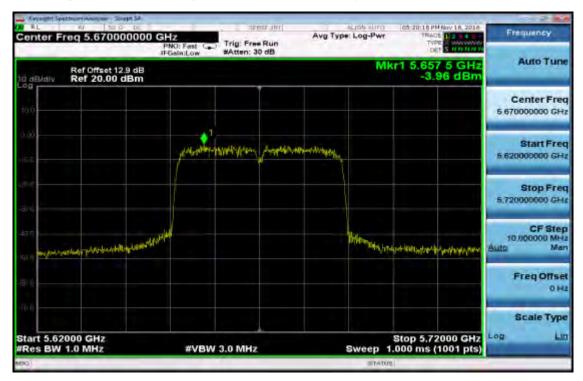
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# Peak Power Spectral Density Data Plot (CH High 5670 MHz)



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



# 802.11ac VHT80, 5250~5350 MHz

Peak Power Spectral Density Data Plot (CH Mid 5290 MHz)



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# 802.11ac VHT80, 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5530 MHz)



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## 11. UNDESIRABLE RADIATED EMISSION MEASUREMENT1

# **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.

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APPL	ICABLE TO	LIMIT			
UNII Test Pro	39033 D02 General cedures New Rules	FIELD STRENGTH AT 3m			
	v01r01	PK: 74 (dBμV/m)	AV 54 (dBμV/m)		
APPL	ICABLE TO	EIRP LIMIT	FIELD STRENGTH AT 3m		
15.407(b)(1)	RSS-247 §6.2.1 (2)				
15.407(b)(2)	RSS-247 §6.2.2 (2)	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)		
15.407(b)(3)	RSS-247 §6.2.3 (2)				
15.407(b)(4)	RSS-247 §6.2.4 (4)	PK: -27 (dBm/MHz) PK: -17 (dBm/MHz)	PK: 68.3 (dBμV/m) PK: 78.2 (dBμV/m)		
15.4	407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBµV/m) *1 PK:105.2 (dBµV/m) *2 PK: 110.8(dBµV/m) *3 PK:122.2 (dBµV/m) *4		

<sup>\*1</sup> beyond 75 MHz or more above of the bandedge.

 $EIRP = ((E*d)^2) / 30$ , 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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<sup>\*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

<sup>\*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

<sup>\*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.



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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  $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

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# 11.2 Measurement Equipment Used

SGS SAC-III									
Name of Equipment	Manufacturer	Model	Serial Num- ber	Calibration Date	Calibration Due				
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017				
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2016	01/28/2017				
Loop Antenna	ETS-Lindgren	6502	143303	12/23/2015	12/22/2016				
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/14/2015	12/13/2016				
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017				
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2016	01/01/2017				
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	01/02/2016	01/01/2017				
Turn Table	HD	DT420	N/A	N.C.R	N.C.R				
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R				
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R				
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2016	01/01/2017				
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017				
Low Loss Cable	Huber Suhner	966 TX	1	01/02/2016	01/01/2017				
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2015	12/11/2016				
Pre-Amplifier	EMC Instru- ments Corp.	EMC184045	980135	01/02/2016	01/01/2017				

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

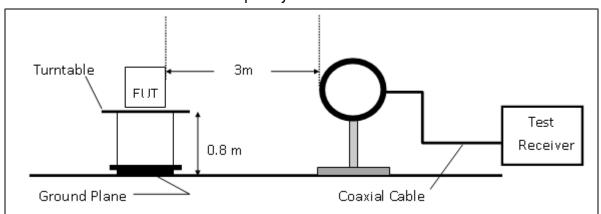
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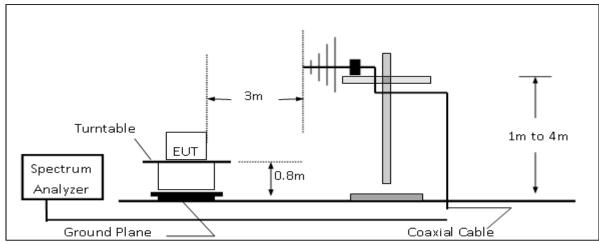
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### 11.3 Test SET-UP

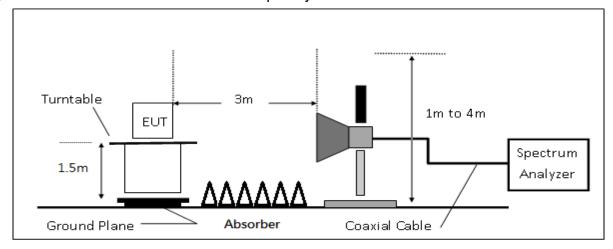
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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

- 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.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequen-3. cy> 1GHz above ground plane.
- 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.
- Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) 6. 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.
- 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	<b>G</b>	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/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**

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

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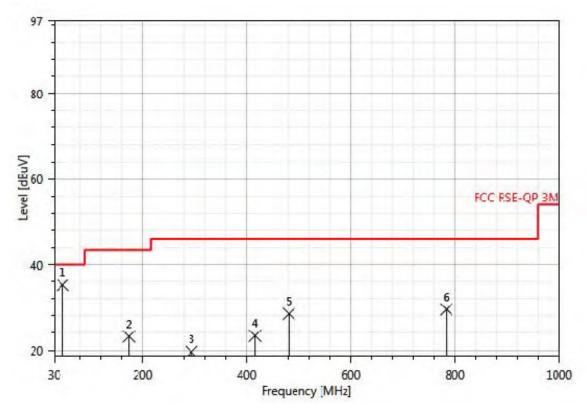
# **Radiated Spurious Emission Measurement Result Below 1GHz Worst-Case Data:** 802.11a 5150~5250 MHz

Operation Mode: Test Date: 11/21/2016 802.11 aB1

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
46.49	S	Peak	35.22	43.12	-7.91	40.00	-4.78
173.56	S	Peak	23.25	31.21	-7.96	43.50	-20.25
293.84	S	Peak	19.62	25.66	-6.05	46.00	-26.38
416.06	S	Peak	23.38	26.65	-3.27	46.00	-22.62
481.05	S	Peak	28.52	30.89	-2.37	46.00	-17.48
783.69	S	Peak	29.55	26.80	2.75	46.00	-16.45

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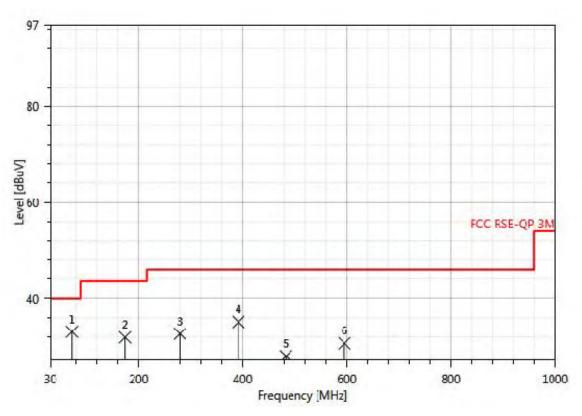
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Operation Mode: 802.11aB1 Test Date: 11/21/2016

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dΒμV/m	dB	dBuV/m	dB
71.71	S	Peak	33.02	43.64	-10.62	40.00	-6.98
173.56	S	Peak	31.86	39.82	-7.96	43.50	-11.64
279.29	S	Peak	32.60	39.02	-6.42	46.00	-13.40
391.81	S	Peak	35.05	39.20	-4.15	46.00	-10.95
482.99	S	Peak	27.92	30.40	-2.48	46.00	-18.08
595.51	S	Peak	30.60	30.56	0.04	46.00	-15.40

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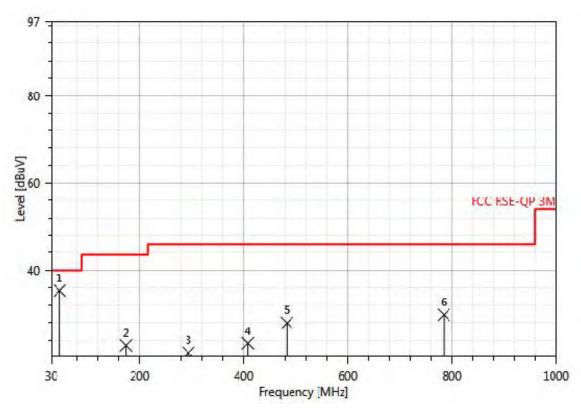
### 802.11a 5250~5350 MHz

Operation Mode: Test Date: 11/21/2016 802.11aB2

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH MID Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
46.49	S	Peak	35.35	43.26	-7.91	40.00	-4.65
173.56	S	Peak	22.80	30.76	-7.96	43.50	-20.70
293.84	S	Peak	21.11	27.16	-6.05	46.00	-24.89
408.30	S	Peak	23.32	26.85	-3.53	46.00	-22.68
482.99	S	Peak	27.93	30.40	-2.48	46.00	-18.07
784.66	S	Peak	29.81	27.15	2.66	46.00	-16.19

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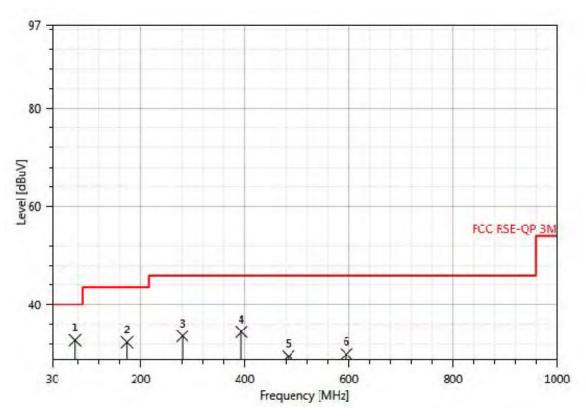
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
73.65	S	Peak	32.74	43.76	-11.02	40.00	-7.26
173.56	S	Peak	32.35	40.31	-7.96	43.50	-11.15
280.26	S	Peak	33.61	39.96	-6.35	46.00	-12.39
393.75	S	Peak	34.47	38.64	-4.18	46.00	-11.53
483.96	S	Peak	29.51	31.97	-2.46	46.00	-16.49
595.51	S	Peak	29.91	29.86	0.04	46.00	-16.09

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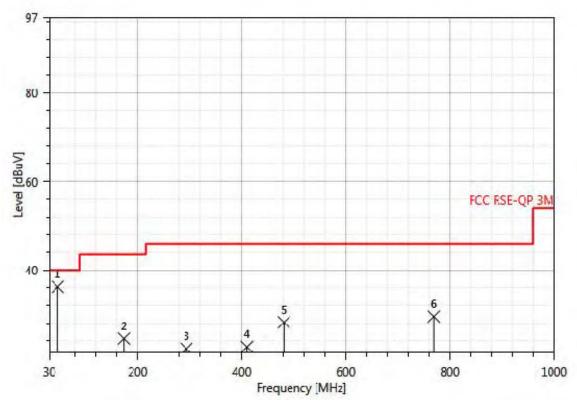
## 802.11a, 5470~5725 MHz

Operation Mode: Test Date: 11/21/2016 802.11aB3

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH MID Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dΒμV/m	dB	dBuV/m	dB
46.49	S	Peak	36.23	44.14	-7.91	40.00	-3.77
173.56	S	Peak	24.54	32.50	-7.96	43.50	-18.96
293.84	S	Peak	22.23	28.27	-6.05	46.00	-23.77
410.24	S	Peak	22.66	26.29	-3.62	46.00	-23.34
481.05	S	Peak	28.20	30.58	-2.37	46.00	-17.80
769.14	S	Peak	29.50	26.73	2.77	46.00	-16.50

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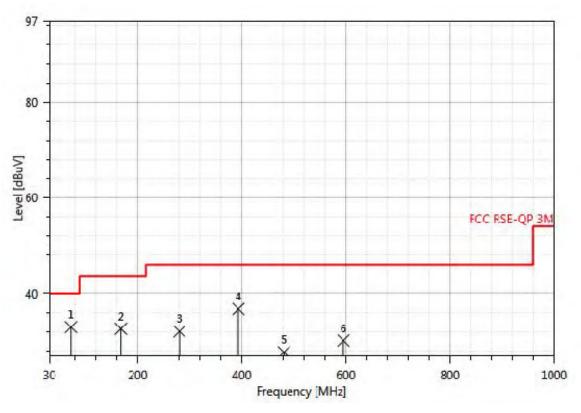
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
71.71	S	Peak	32.95	43.57	-10.62	40.00	-7.05
167.74	S	Peak	32.59	40.05	-7.46	43.50	-10.91
280.26	S	Peak	32.03	38.38	-6.35	46.00	-13.97
393.75	S	Peak	36.72	40.89	-4.18	46.00	-9.28
481.05	S	Peak	27.69	30.06	-2.37	46.00	-18.31
595.51	S	Peak	30.12	30.08	0.04	46.00	-15.88

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### **Above 1GHz Worst-Case Data:**

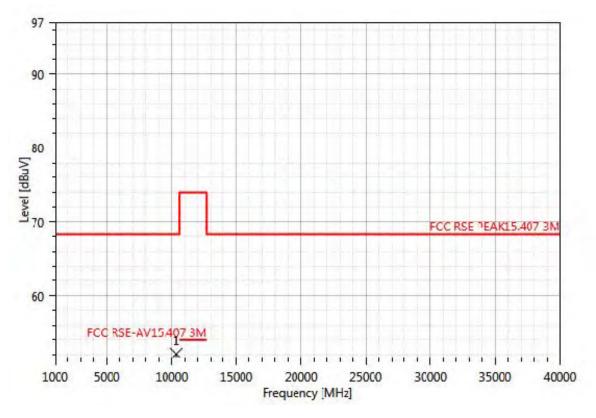
## Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

Test Date: Operation Mode: 802.11 aB1 11/21/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10360.00	Н	Peak	52.13	33.83	18.29	68.30	-16.17

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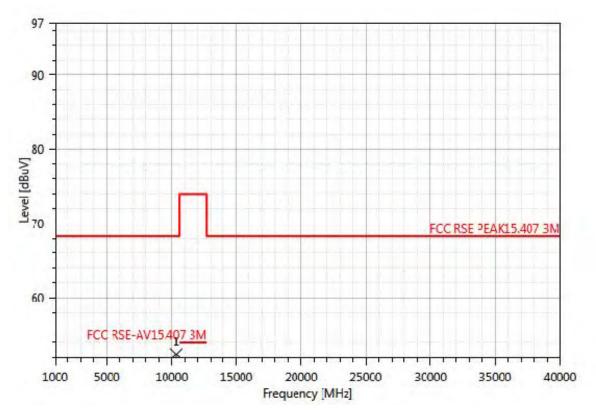
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Operation Mode: 802.11 aB1 Test Date: 11/21/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10360.00	Н	Peak	52.41	34.12	18.29	68.30	-15.89

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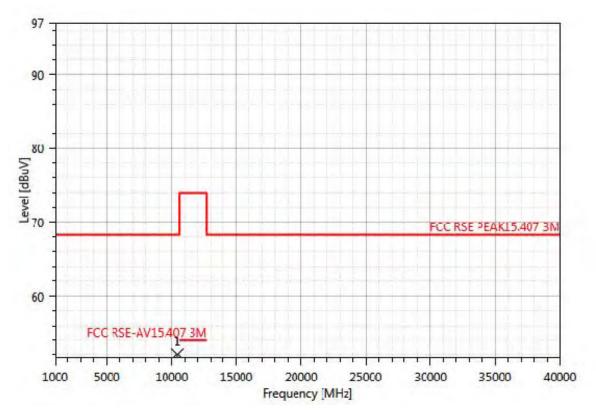
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Operation Mode: 802.11 aB1 Test Date: 11/21/2016

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10440.00	Н	Peak	52.11	33.43	18.68	68.30	-16.19

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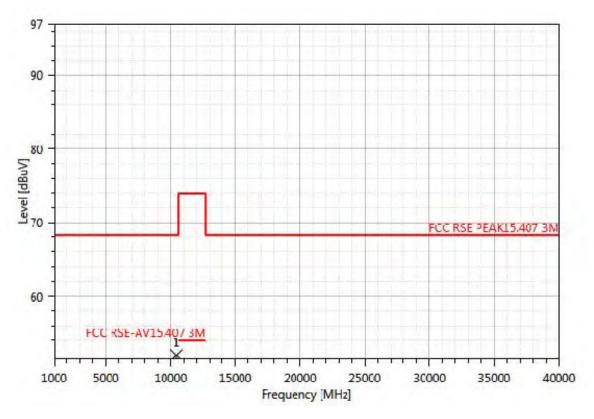
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Operation Mode: 802.11 aB1 Test Date: 11/21/2016

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	_
10440.00	Н	Peak	51.97	33.29	18.68	68.30	-16.33	

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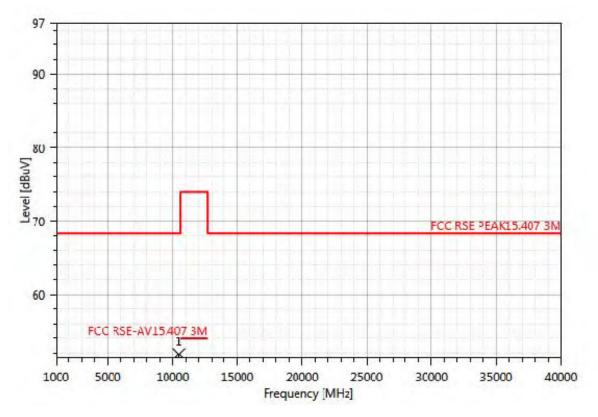
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Operation Mode: 802.11 aB1 Test Date: 11/21/2016

Fundamental Frequency: 5240 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10480.00	Н	Peak	51.86	33.56	18.29	68.30	-16.44

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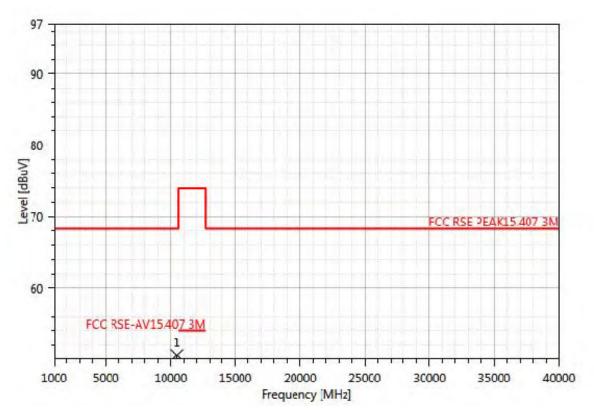
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Operation Mode: 802.11 aB1 Test Date: 11/21/2016

Fundamental Frequency: 5240 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10480.00	Н	Peak	50.61	32.32	18.29	68.30	-17.69

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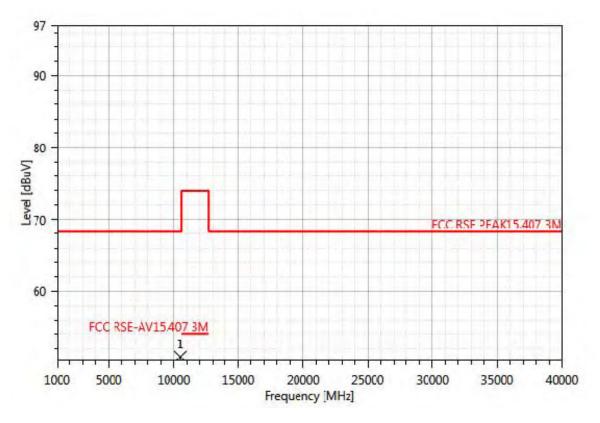
## Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

Operation Mode: 802.11 aB2 Test Date: 11/21/2016

Fundamental Frequency: 5260 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
10520.00	Н	Peak	50.89	31.51	19.37	68.30	-17.41

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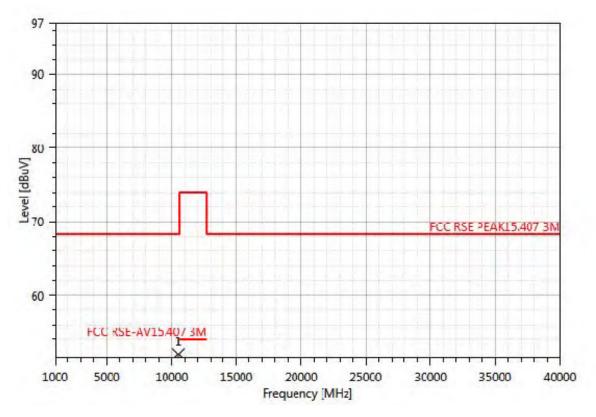
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5260 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10520.00	Н	Peak	52.00	32.63	19.37	68.30	-16.30

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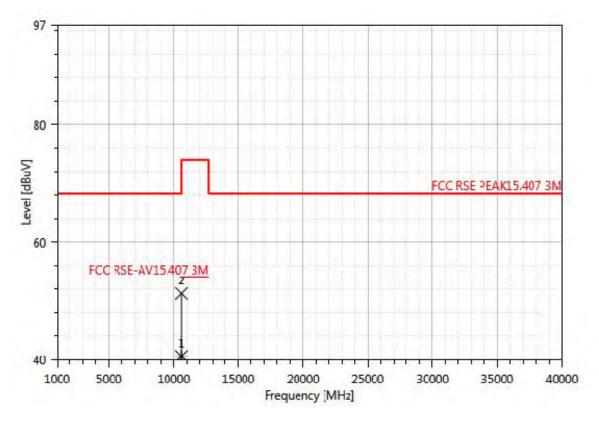
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dΒμV/m	dB	dBuV/m	dB
10600.00	Н	Average	40.55	21.64	18.91	54.00	-13.45
10600.00	Н	Peak	51.26	32.36	18.91	74.00	-22.74

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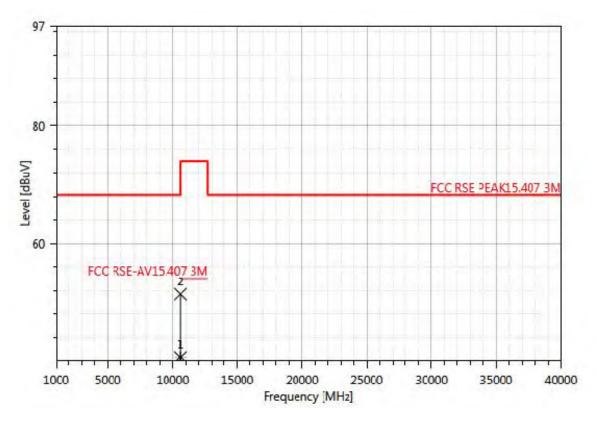
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
10600.00	Н	Average	40.68	21.77	18.91	54.00	-13.32
10600.00	Н	Peak	51.42	32.52	18.91	74.00	-22.58

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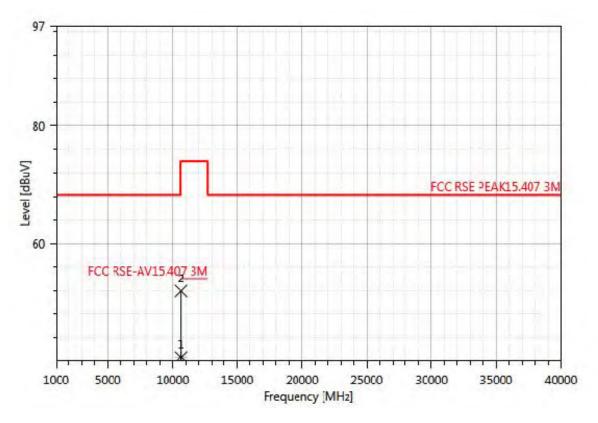
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10640.00	Н	Average	40.67	21.49	19.18	54.00	-13.33
10640.00	Н	Peak	51.93	32.75	19.18	74.00	-22.07

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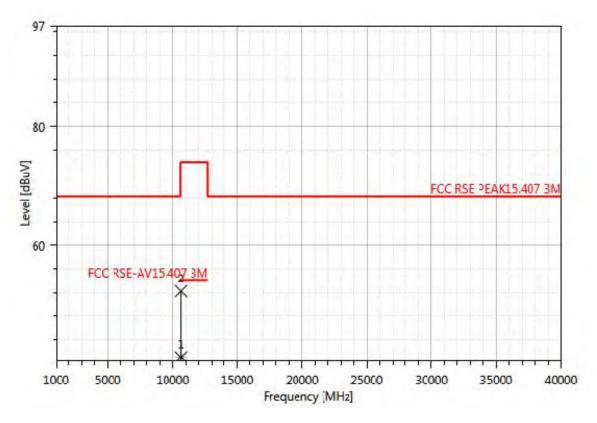
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Operation Mode: 802.11aB2 Test Date: 11/21/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10640.00	Н	Average	41.10	21.92	19.18	54.00	-12.90
10640.00	Н	Peak	52.26	33.08	19.18	74.00	-21.74

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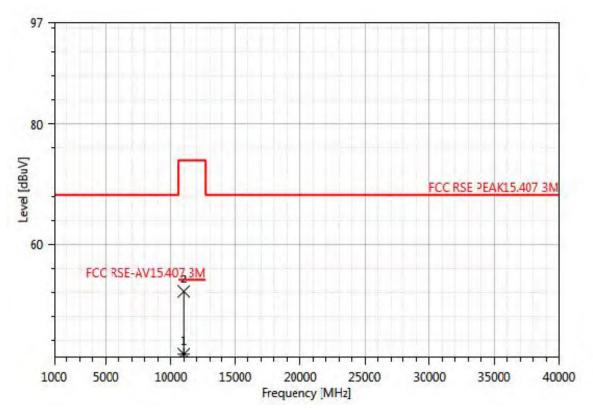
## Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

Operation Mode: 802.11 aB3 Test Date: 11/21/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11000.00	Н	Average	41.73	21.56	20.17	54.00	-12.27
11000.00	Н	Peak	52.14	31.97	20.17	74.00	-21.86

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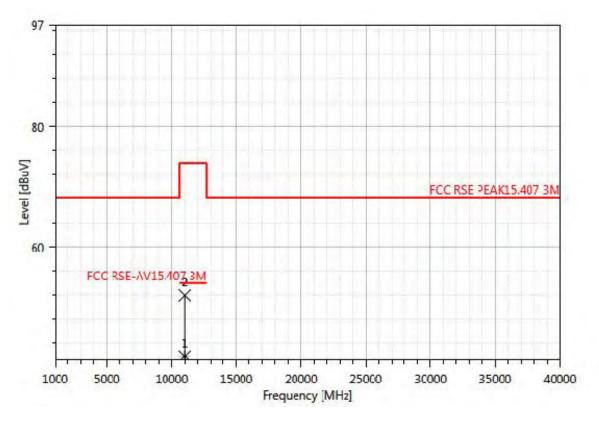
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11000.00	Н	Average	41.84	21.67	20.17	54.00	-12.16
11000.00	Н	Peak	52.00	31.83	20.17	74.00	-22.00

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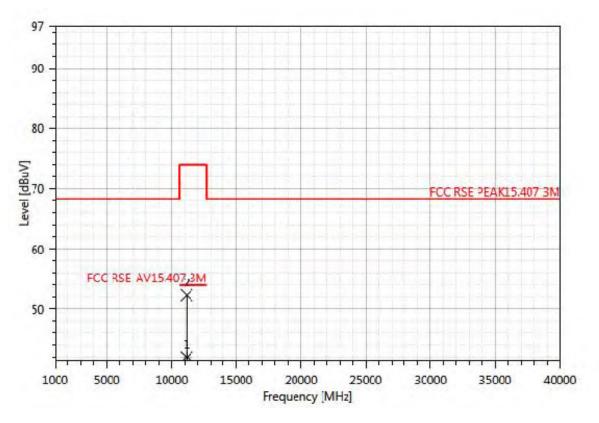
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11160.00	Н	Average	42.06	21.61	20.45	54.00	-11.94
11160.00	Н	Peak	52.37	31.92	20.45	74.00	-21.63

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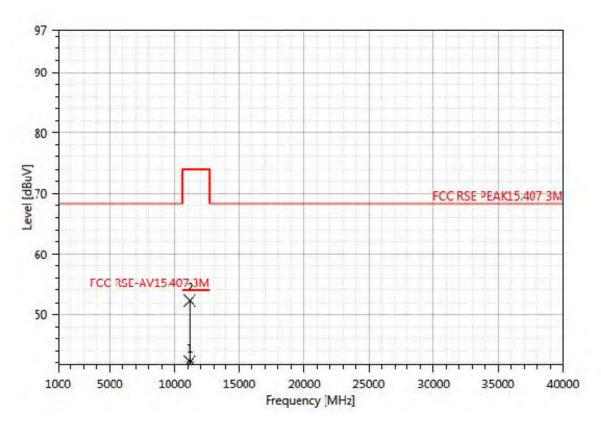
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11160.00	Н	Average	42.30	21.85	20.45	54.00	-11.70
11160.00	Н	Peak	52.33	31.89	20.45	74.00	-21.67

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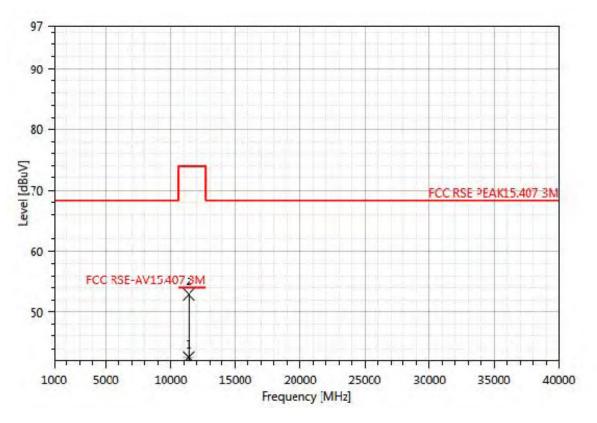
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11400.00	Н	Average	42.59	22.03	20.56	54.00	-11.41
11400.00	Н	Peak	52.92	32.36	20.56	74.00	-21.08

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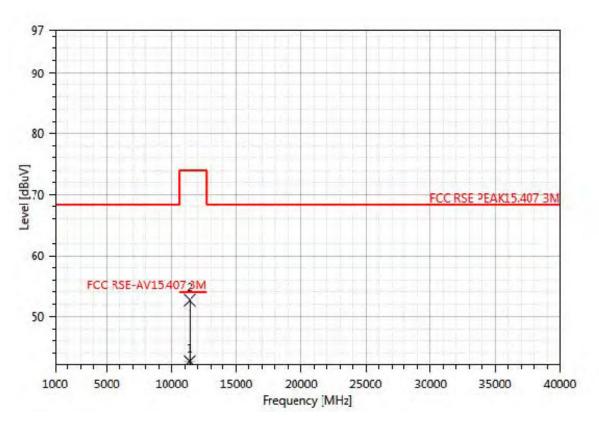
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Operation Mode: 802.11aB3 Test Date: 11/21/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11400.00	Н	Average	42.69	22.13	20.56	54.00	-11.31
11400.00	Н	Peak	52.72	32.16	20.56	74.00	-21.28

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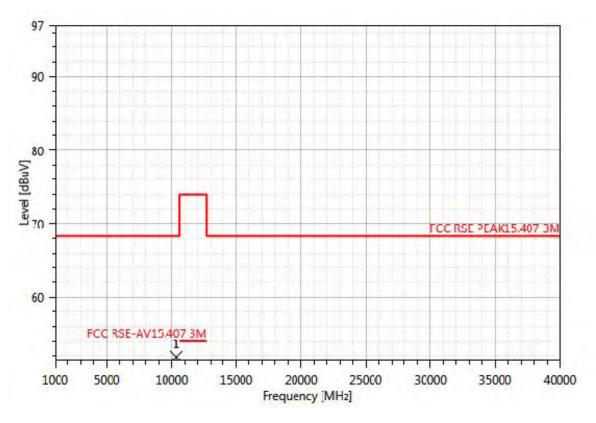
# Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	
10360.00	Н	Peak	51.88	33.58	18.29	68.30	-16.42	

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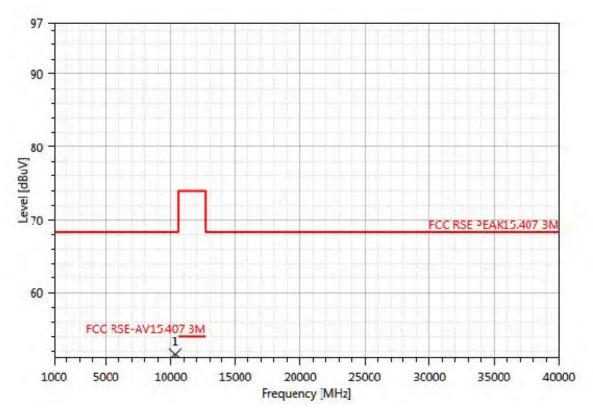
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Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10360.00	Н	Peak	51.59	33.30	18.29	68.30	-16.71

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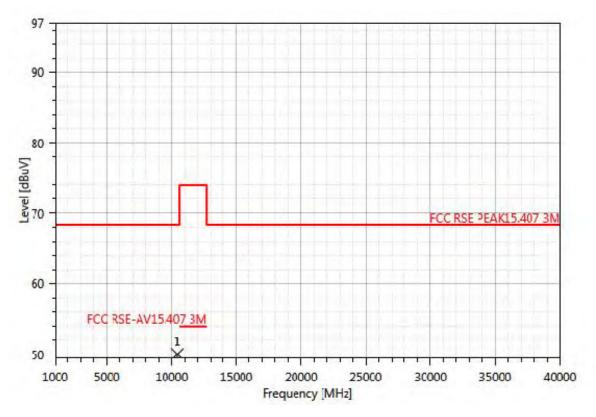
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Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10440.00	Н	Peak	50.01	31.32	18.68	68.30	-18.29

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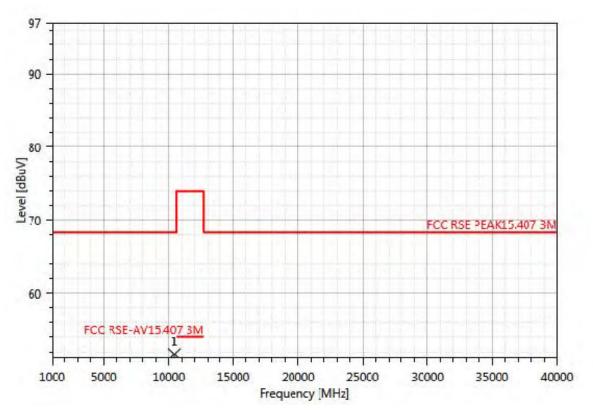
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Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5220 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10440.00	Н	Peak	51.64	32.96	18.68	68.30	-16.66

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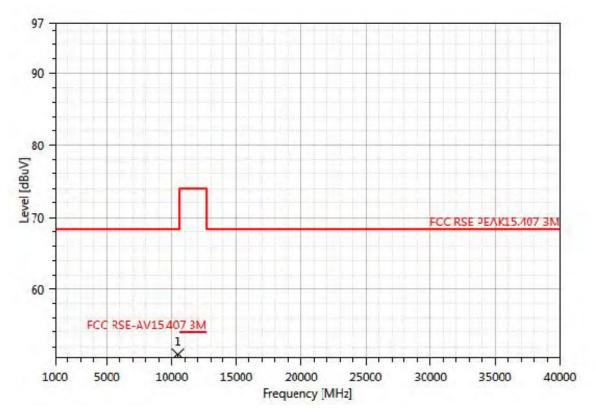
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Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5240 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10480.00	Н	Peak	50.98	32.69	18.29	68.30	-17.32

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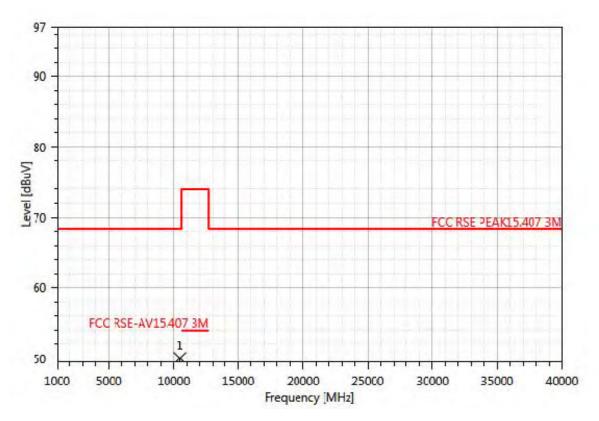
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Operation Mode: 802.11 n20B1 Test Date: 11/21/2016

Fundamental Frequency: 5240 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10480.00	Н	Peak	50.03	31.74	18.29	68.30	-18.27

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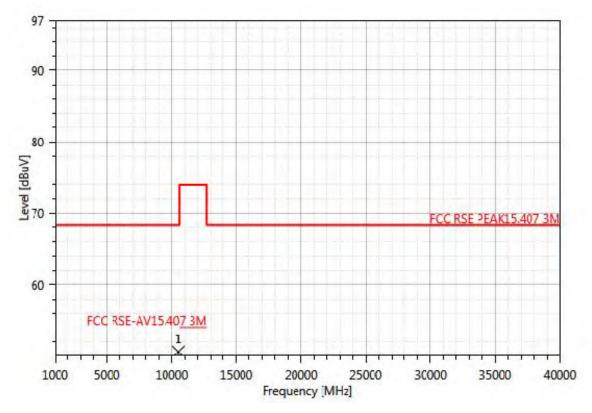
## Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5260 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10520.00	Н	Peak	50.61	31.24	19.37	68.30	-17.69

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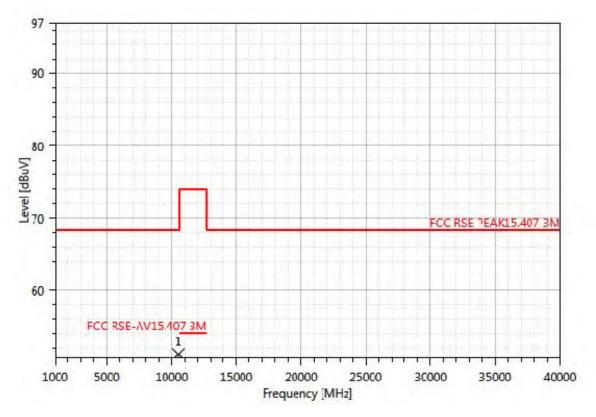
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Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5260 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10520.00	Н	Peak	51.15	31.78	19.37	68.30	-17.15

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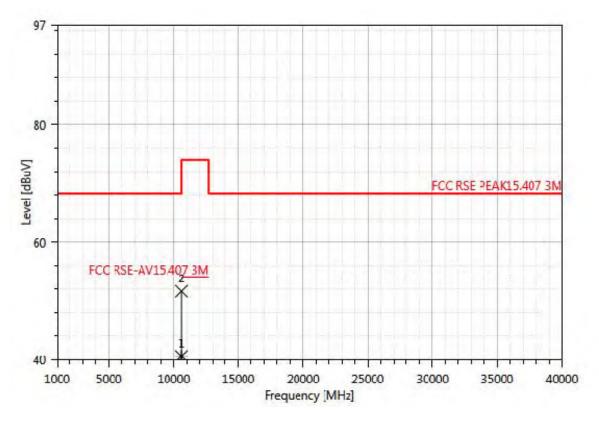
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Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dΒμV/m	dB	dBuV/m	dB
10600.00	Н	Average	40.55	21.64	18.91	54.00	-13.45
10600.00	Н	Peak	51.63	32.72	18.91	74.00	-22.37

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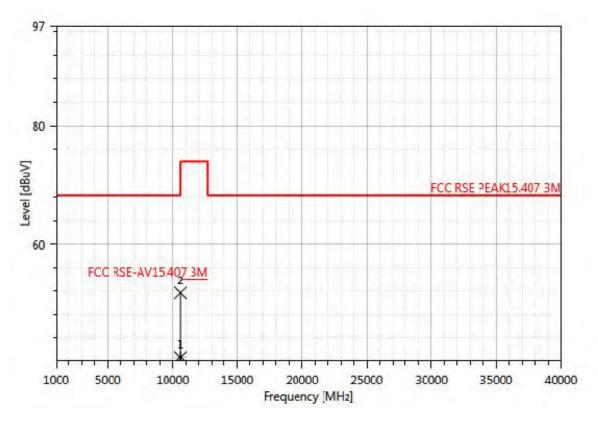
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Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5300 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10600.00	Н	Average	40.79	21.88	18.91	54.00	-13.21
10600.00	Н	Peak	51.73	32.82	18.91	74.00	-22.27

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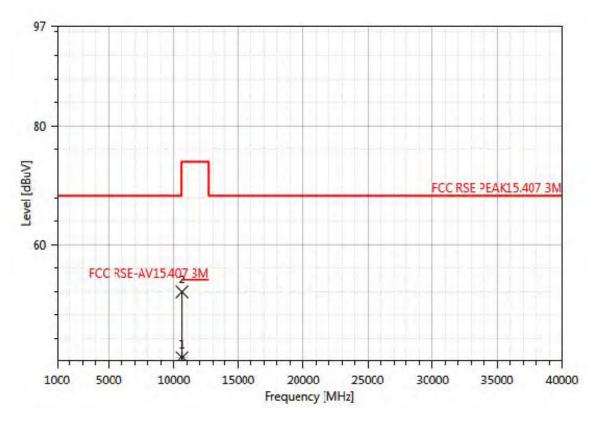
Page: 115 of 189

Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
10640.00	Н	Average	40.92	21.74	19.18	54.00	-13.08
10640.00	Н	Peak	51.98	32.79	19.18	74.00	-22.02

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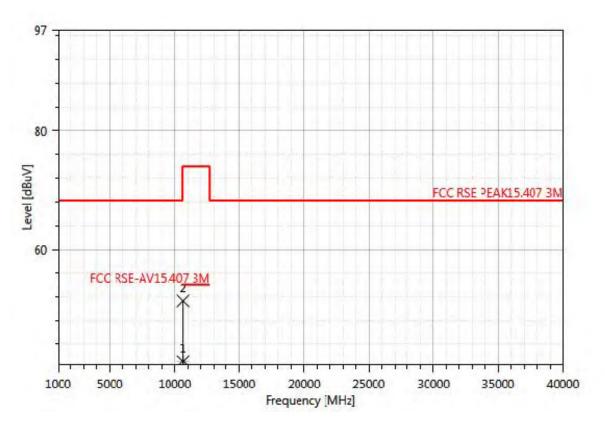
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Operation Mode: 802.11 n20B2 Test Date: 11/21/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10640.00	Н	Average	41.17	21.99	19.18	54.00	-12.83
10640.00	Н	Peak	51.37	32.18	19.18	74.00	-22.63

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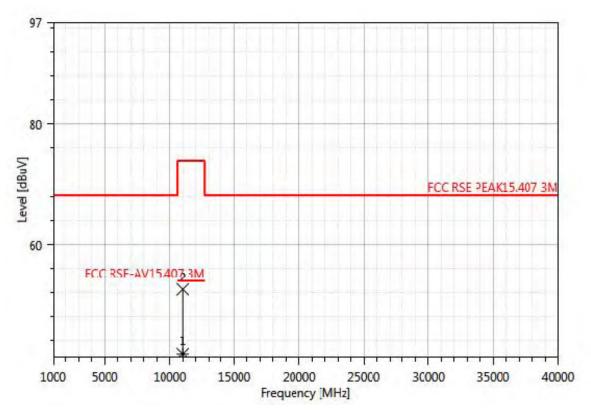
### Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz

Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Fred	ı. Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MH:	z F/H/E/	S QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
11000	.00 H	Average	41.87	21.70	20.17	54.00	-12.13
11000	.00 H	Peak	52.60	32.43	20.17	74.00	-21.40

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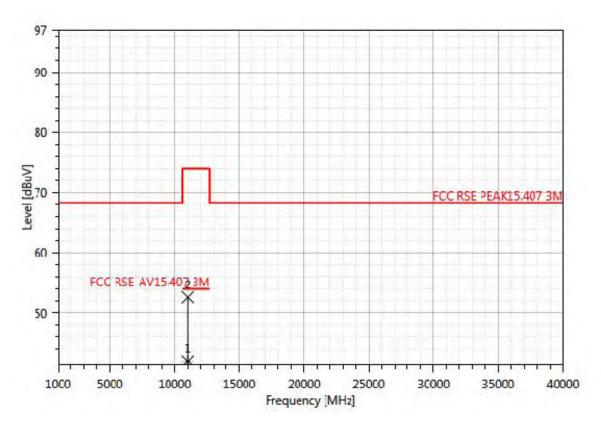
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Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11000.00	Н	Average	42.02	21.85	20.17	54.00	-11.98
11000.00	Н	Peak	52.64	32.47	20.17	74.00	-21.36

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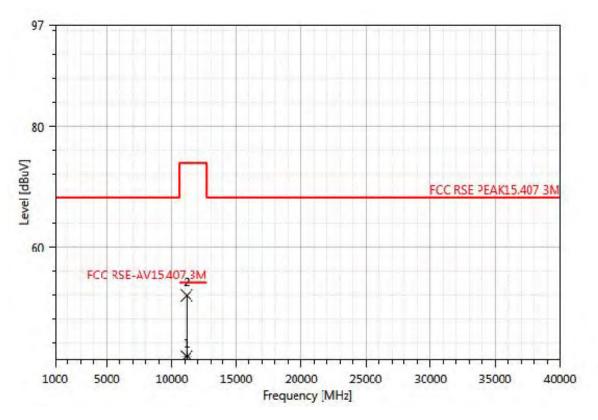
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Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11160.00	Н	Average	41.78	21.33	20.45	54.00	-12.22
11160.00	Н	Peak	51.94	31.49	20.45	74.00	-22.06

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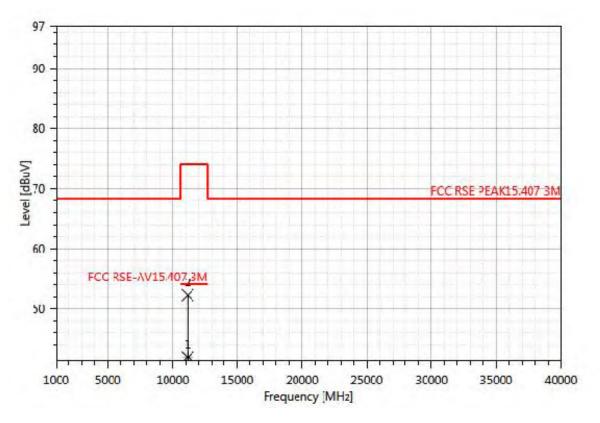
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Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5580 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11160.00	Н	Average	41.89	21.44	20.45	54.00	-12.11
11160.00	Н	Peak	52.23	31.78	20.45	74.00	-21.77

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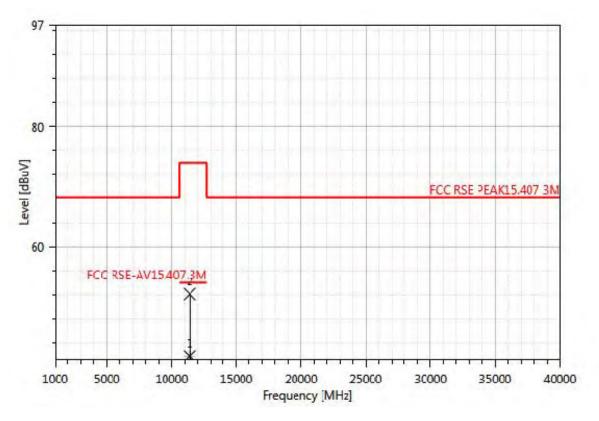
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Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11400.00	Н	Average	41.74	21.18	20.56	54.00	-12.26
11400.00	Н	Peak	52.12	31.56	20.56	74.00	-21.88

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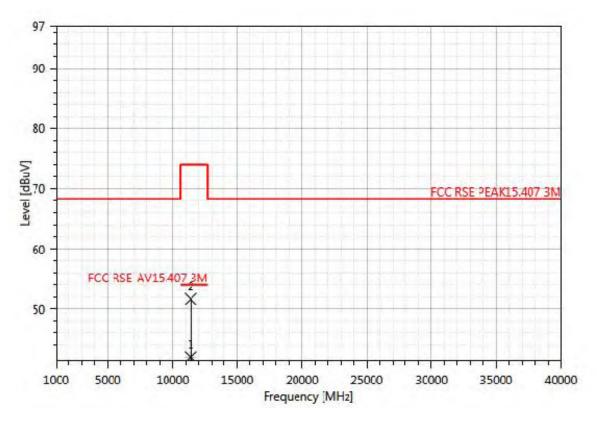
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Operation Mode: 802.11 n20B3 Test Date: 11/21/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11400.00	Н	Average	42.03	21.47	20.56	54.00	-11.97
11400.00	Н	Peak	51.71	31.15	20.56	74.00	-22.29

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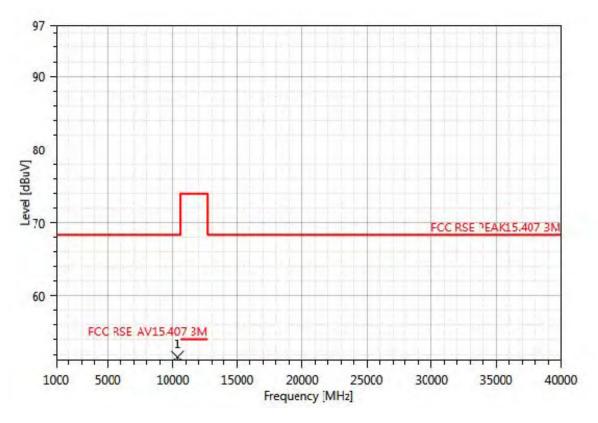
#### Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

Operation Mode: 802.11 n40B1 Test Date: 11/21/2016

Fundamental Frequency: 5190 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10380.00	Н	Peak	51.63	33.51	18.12	68.30	-16.67

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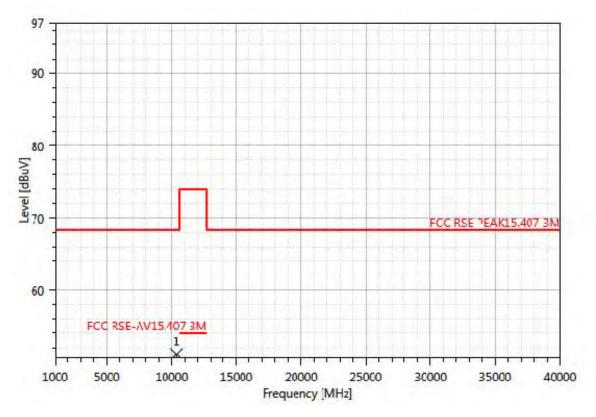
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Operation Mode: 802.11n40B1 Test Date: 11/21/2016

Fundamental Frequency: 5190 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10380.00	Н	Peak	51.13	33.01	18.12	68.30	-17.17

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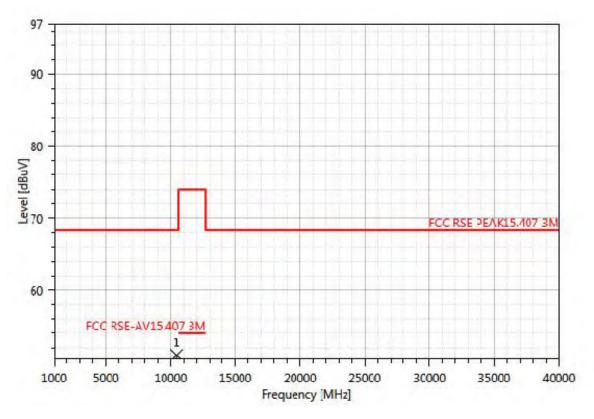
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Operation Mode: 802.11n40B1 Test Date: 11/21/2016

Fundamental Frequency: 5230 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10460.00	Н	Peak	50.96	32.42	18.54	68.30	-17.34

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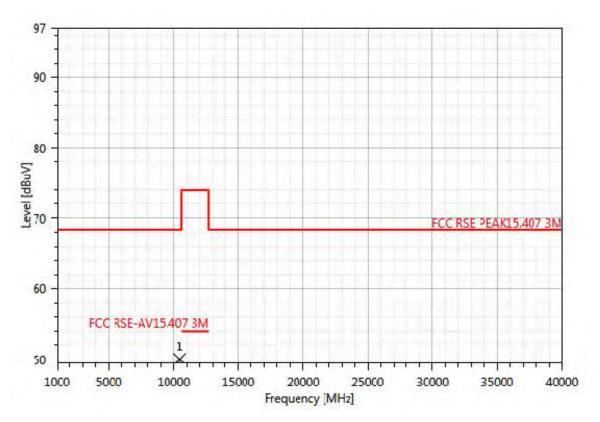
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Operation Mode: 802.11n40B1 Test Date: 11/21/2016

Fundamental Frequency: 5230 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10460.00	Н	Peak	49.99	31.45	18.54	68.30	-18.31

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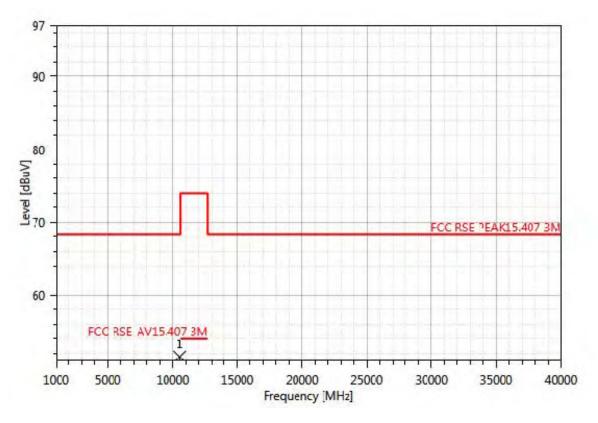
#### Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz

Operation Mode: 802.11 n40B2 Test Date: 11/21/2016

Fundamental Frequency: 5270 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
10540.00	Н	Peak	51.54	32.37	19.17	68.30	-16.76

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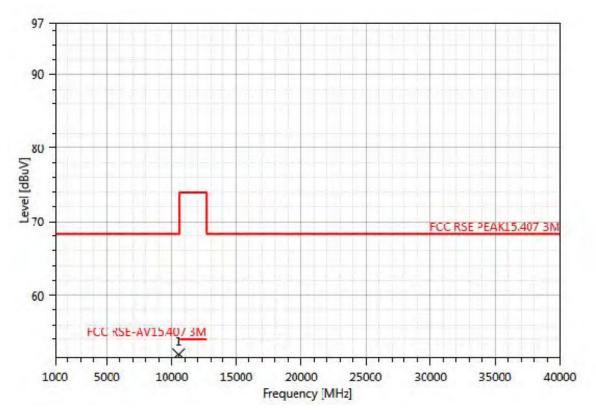
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Operation Mode: 802.11 n40B2 Test Date: 11/21/2016

Fundamental Frequency: 5270 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10540.00	Н	Peak	51.97	32.80	19.17	68.30	-16.33

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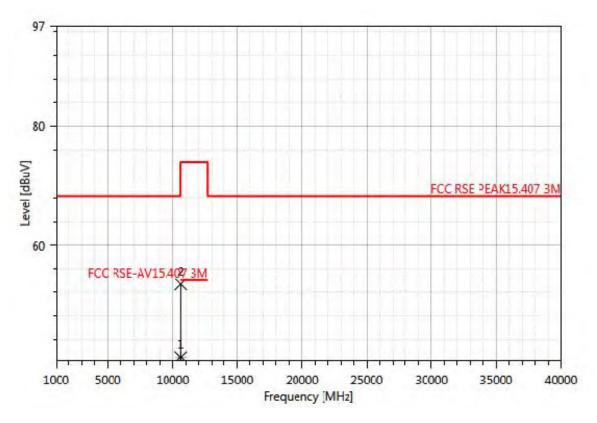
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Operation Mode: 802.11 n40B2 Test Date: 11/21/2016

Fundamental Frequency: 5310 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
10620.00	Н	Average	41.05	21.94	19.11	54.00	-12.95
10620.00	Н	Peak	53.36	34.26	19.11	74.00	-20.64

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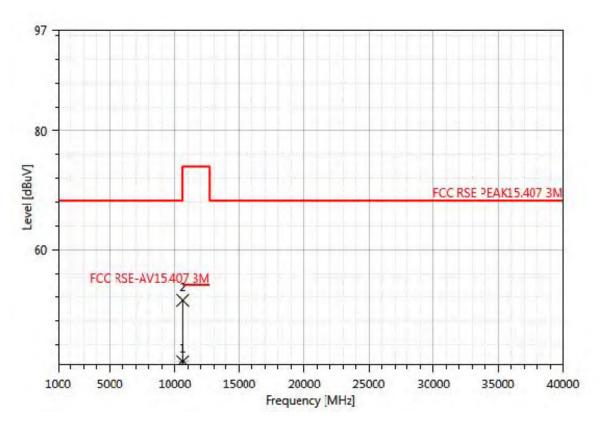
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Operation Mode: 802.11 n40B2 Test Date: 11/21/2016

Fundamental Frequency: 5310 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10620.00	Н	Average	41.21	22.10	19.11	54.00	-12.79
10620.00	Н	Peak	51.49	32.38	19.11	74.00	-22.51

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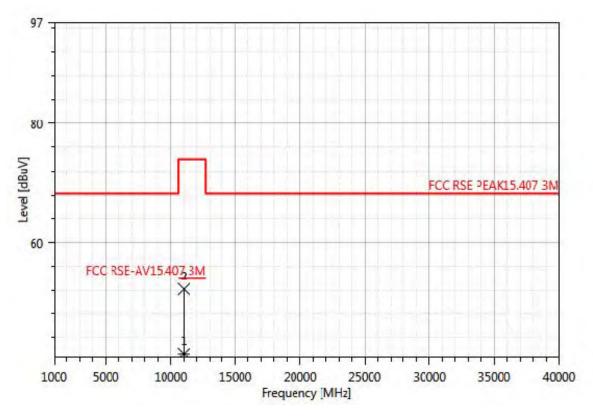
#### Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11020.00	Н	Average	41.31	21.15	20.16	54.00	-12.69
11020.00	Н	Peak	52.20	32.04	20.16	74.00	-21.80

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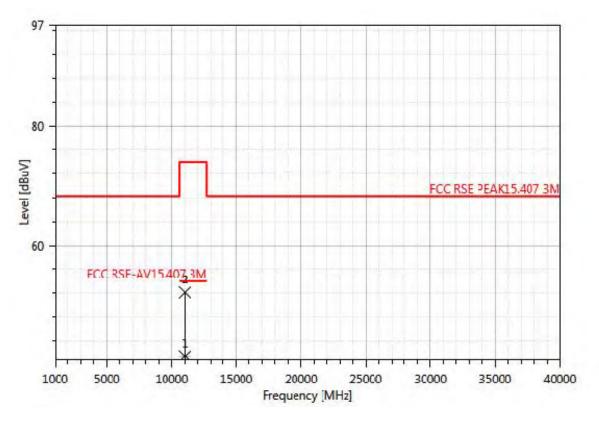
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Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11020.00	Н	Average	41.42	21.26	20.16	54.00	-12.58
11020.00	Н	Peak	52.13	31.97	20.16	74.00	-21.87

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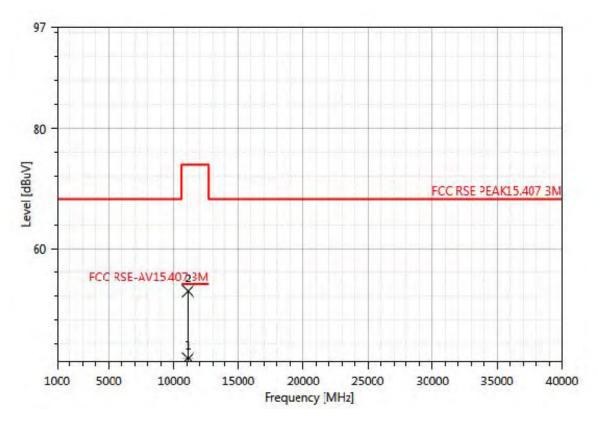
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Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5550 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	
_	11100.00	Н	Average	41.65	21.33	20.32	54.00	-12.35	
	11100.00	Н	Peak	52.84	32.52	20.32	74.00	-21.16	

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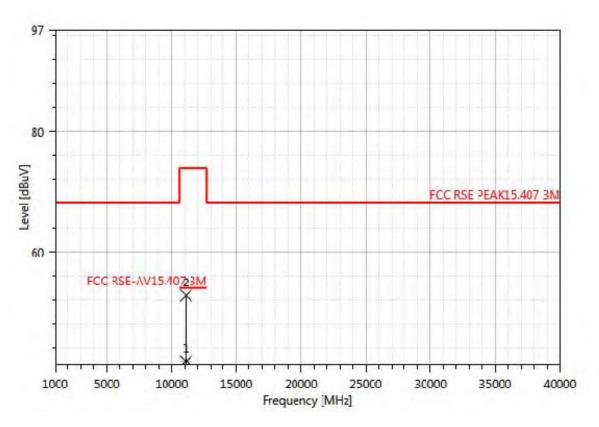
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Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5550 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11100.00	Н	Average	41.81	21.49	20.32	54.00	-12.19
11100.00	Н	Peak	52.77	32.45	20.32	74.00	-21.23

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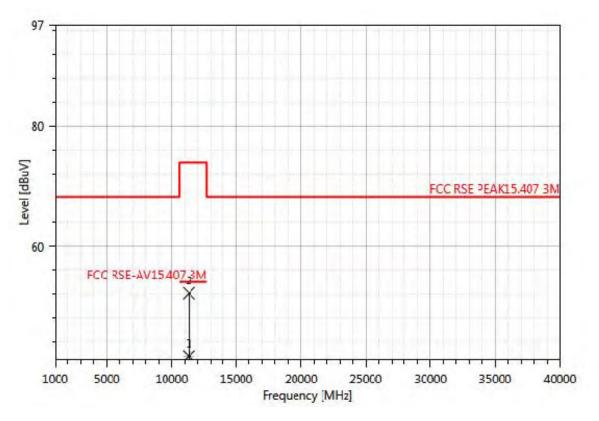
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Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5670 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11340.00	Н	Average	41.60	21.22	20.38	54.00	-12.40
11340.00	Н	Peak	52.15	31.77	20.38	74.00	-21.85

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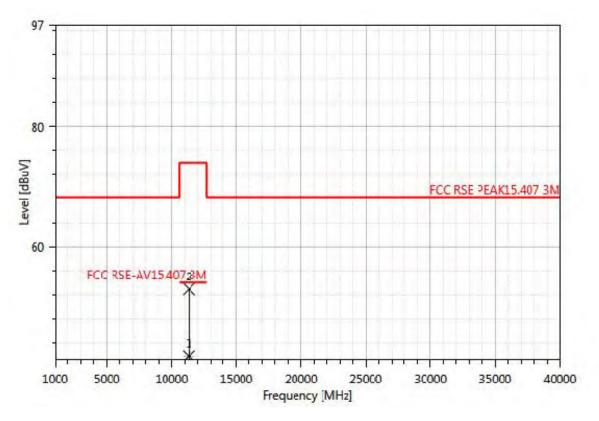
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Operation Mode: 802.11 n40B3 Test Date: 11/21/2016

Fundamental Frequency: 5670 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11340.00	Н	Average	41.72	21.34	20.38	54.00	-12.28
11340.00	Н	Peak	52.93	32.54	20.38	74.00	-21.07

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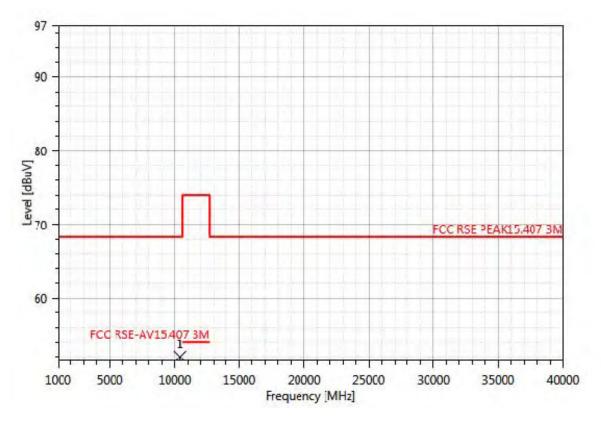
# Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5150~5250 MHz

Operation Mode: 802.11 ac80 B1 Test Date: 11/21/2016

Fundamental Frequency: 5210 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10420.00	Н	Peak	52.03	33.31	18.71	68.30	-16.27

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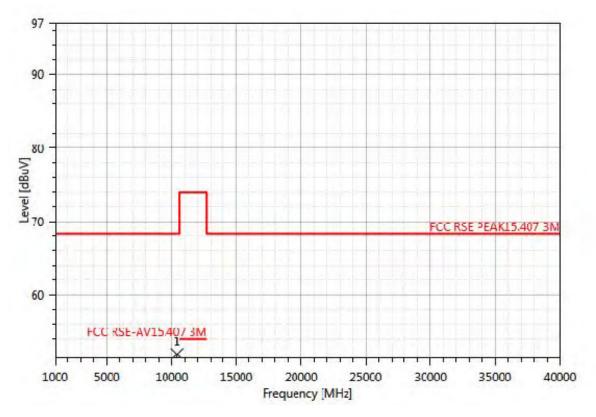
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Operation Mode: 802.11 ac80 B1 Test Date: 11/21/2016

Fundamental Frequency: 5210 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10420.00	Н	Peak	51.94	33.22	18.71	68.30	-16.36

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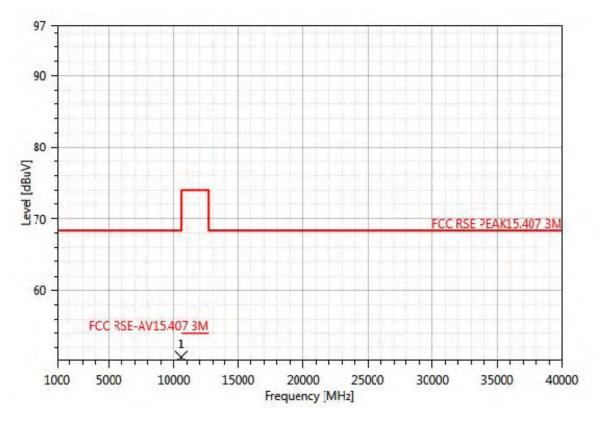
#### Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5250~5350 MHz

Operation Mode: 802.11 ac80 B2 Test Date: 11/21/2016

Fundamental Frequency: 5290 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Tx CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
10580.00	Н	Peak	50.73	31.85	18.88	68.30	-17.57

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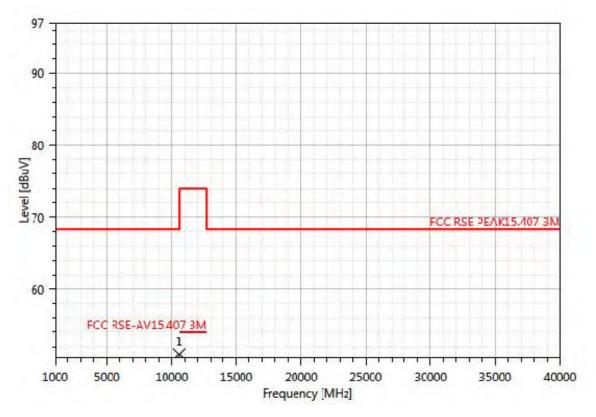
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Operation Mode: 802.11 ac80 B2 Test Date: 11/21/2016

Fundamental Frequency: 5290 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
10580.00	Н	Peak	50.97	32.09	18.88	68.30	-17.33

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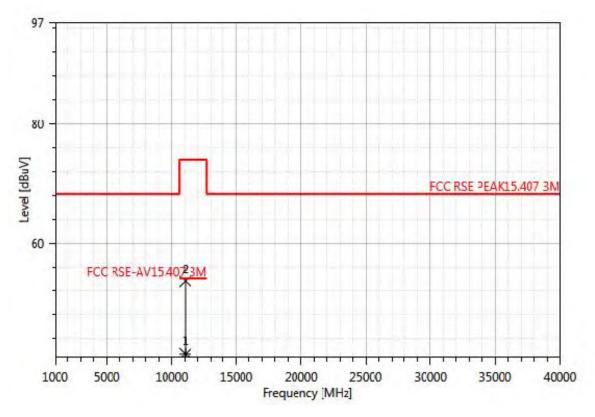
## Radiated Spurious Emission Measurement Result 802.11ac VHT80, 5470~5725 MHz

Operation Mode: 802.11 ac80 B3 Test Date: 11/21/2016

21 deg\_C / 62 RH Fundamental Frequency: 5530 MHz Temp. / Humi. :

Operation Band: Tx CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11060.00	Н	Average	41.45	21.19	20.26	54.00	-12.55
11060.00	Н	Peak	53.60	33.34	20.26	74.00	-20.40

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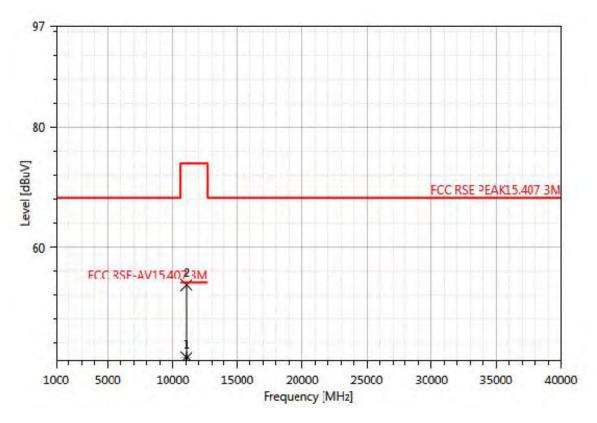
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Operation Mode: 802.11 ac80 B3 Test Date: 11/21/2016

Fundamental Frequency: 5530 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11060.00	Н	Average	41.55	21.29	20.26	54.00	-12.45
11060.00	Н	Peak	53.60	33.33	20.26	74.00	-20.40

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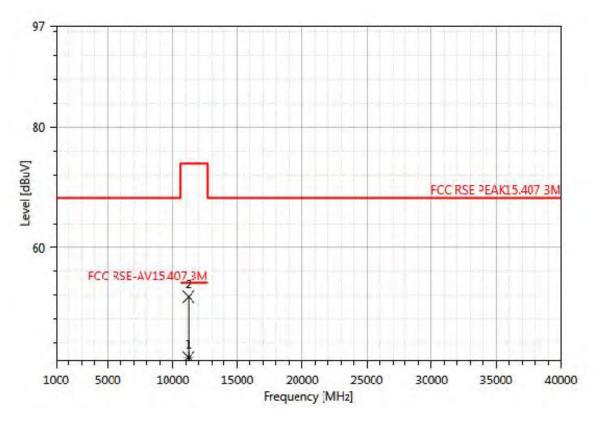
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Operation Mode: 802.11 ac80 B3 Test Date: 11/21/2016

Fundamental Frequency: 5610 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
11220.00	Н	Average	41.62	21.14	20.48	54.00	-12.38
11220.00	Н	Peak	51.76	31.28	20.48	74.00	-22.24

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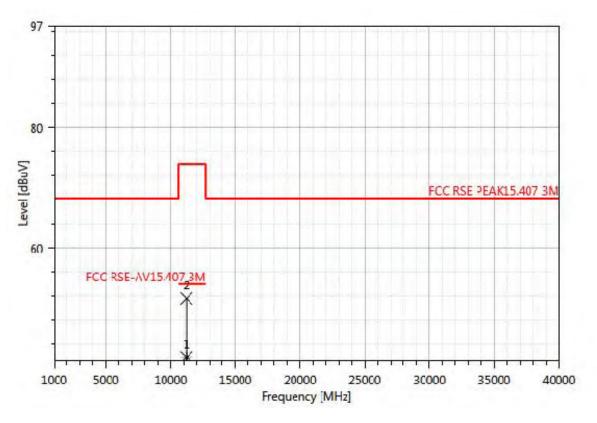
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Operation Mode: 802.11 ac80 B3 Test Date: 11/21/2016

Fundamental Frequency: 5610 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

EUT Pol.: Measurement Antenna Pol.: HORIZONTAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
11220.00	Н	Average	41.82	21.34	20.48	54.00	-12.18
11220.00	Н	Peak	51.64	31.16	20.48	74.00	-22.36

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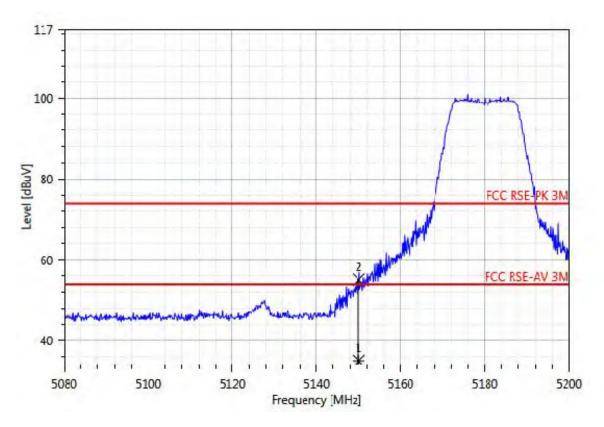
# Band edge falling to restricted band 802.11a mode

Operation Mode: Test Date: 11/17/2016 802.11 aB1

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
51 50.00	Е	Average	34.96	29.08	5.88	54.00	-19.04
5150.00	Ε	Peak	55.11	49.23	5.88	74.00	-18.89

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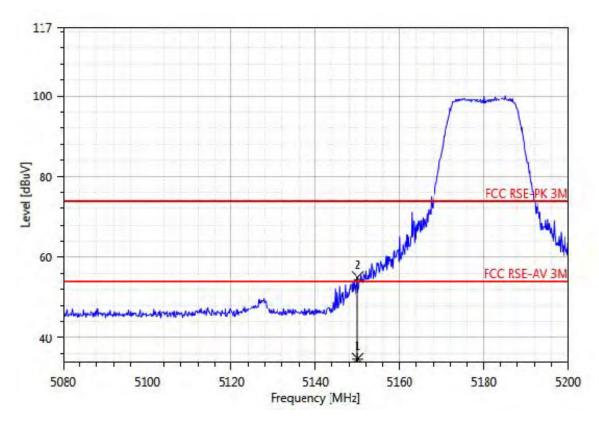
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Operation Mode: 802.11 aB1 Test Date: 11/17/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5150.00	Е	Average	34.76	28.88	5.88	54.00	-19.24
5150.00	Ε	Peak	55.00	49.12	5.88	74.00	-19.00

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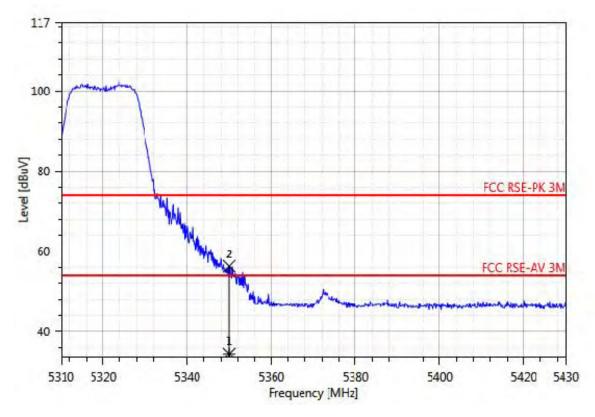
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Operation Mode: 802.11 aB2 Test Date: 11/17/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5350.00	Е	Average	34.36	28.21	6.15	54.00	-19.64
5350.00	Ε	Peak	56.23	50.08	6.15	74.00	-17.77



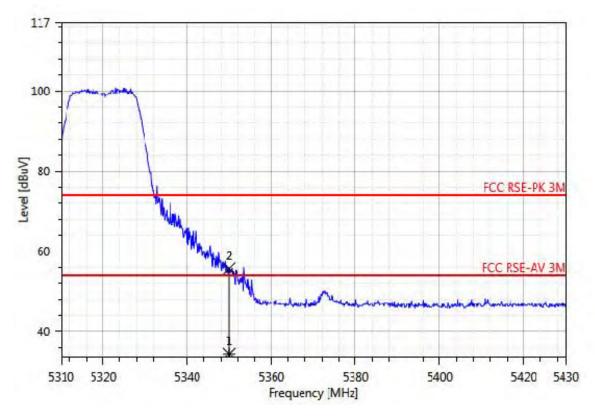
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802.11aB2 Operation Mode: Test Date: 11/17/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5350.00	Е	Average	34.33	28.18	6.15	54.00	-19.67
5350.00	Ε	Peak	55.62	49.47	6.15	74.00	-18.38



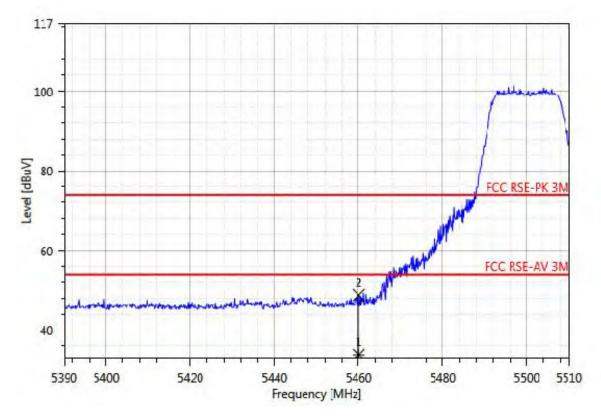
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802.11aB3 Operation Mode: Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	
٠	5460.00	Е	Average	33.79	27.56	6.23	54.00	-20.21	_
	5460.00	Е	Peak	48.80	42.56	6.23	74.00	-25.20	

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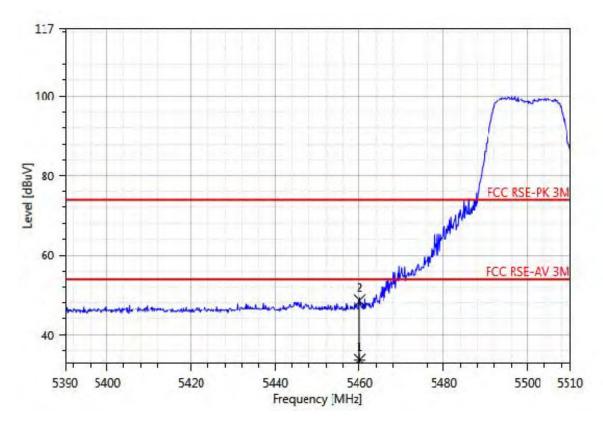
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802.11aB3 Operation Mode: Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	
5460.00	Е	Average	33.70	27.47	6.23	54.00	-20.30	_
5460.00	Е	Peak	48.61	42.37	6.23	74.00	-25.39	



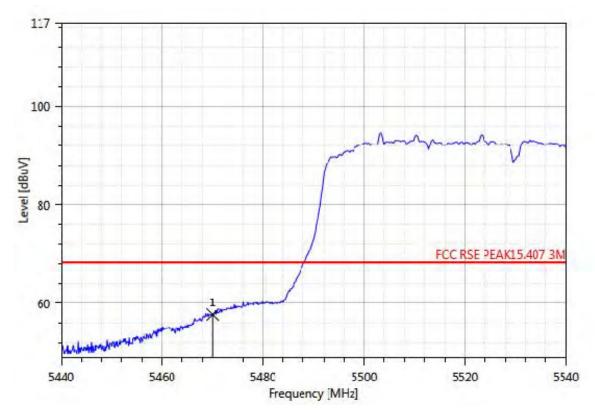
Page: 151 of 189

Operation Mode: 802.11 aB3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer :

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5470.00	E	Peak	57.60	51.34	6.26	68.30	-10.70

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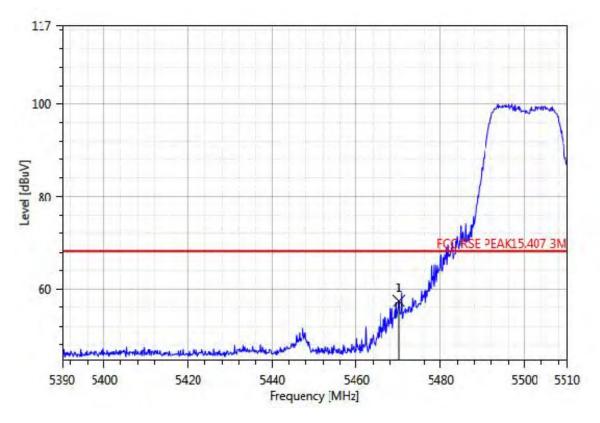
Page: 152 of 189

Operation Mode: 802.11 aB3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5470.00	Е	Peak	57.47	51.20	6.26	68.30	-10.83



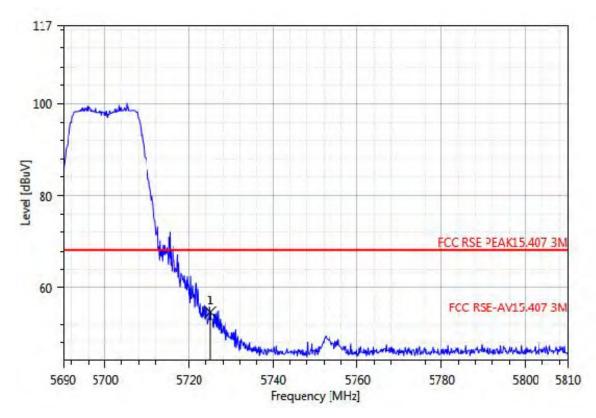
Page: 153 of 189

Operation Mode: 802.11 aB3 Test Date: 11/17/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5725.00	E	Peak	54.65	48.06	6.59	68.30	-13.65



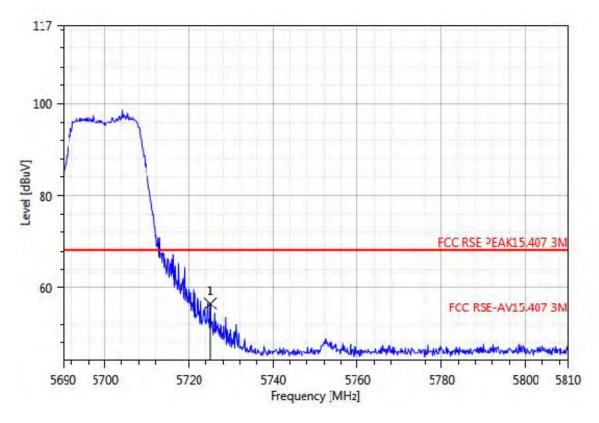
Page: 154 of 189

Operation Mode: 802.11 aB3 Test Date: 11/17/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
5725.00	Е	Peak	56.57	49.98	6.59	68.30	-11.73



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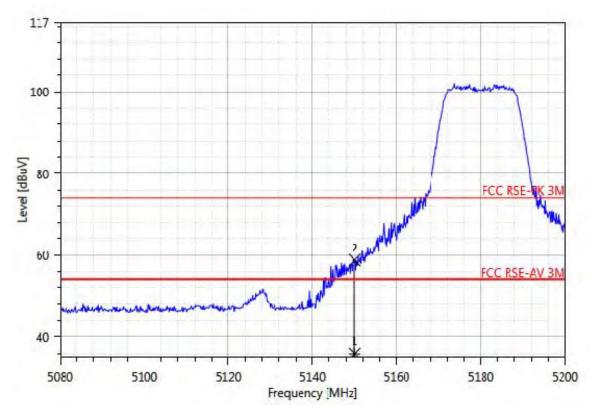
## 802.11n20 HT mode

Operation Mode: 802.11 n20B1 Test Date: 11/17/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5150.00	Е	Average	35.83	29.95	5.88	54.00	-18.17
5150.00	Ε	Peak	58.79	52.90	5.88	74.00	-15.21



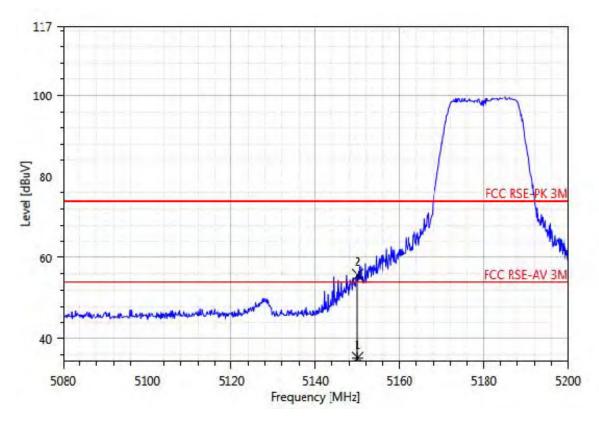
Page: 156 of 189

Operation Mode: 802.11 n20B1 Test Date: 11/17/2016

Fundamental Frequency: 5180 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
_	5150.00	Е	Average	35.32	29.43	5.88	54.00	-18.68
	5150.00	Ε	Peak	55.77	49.88	5.88	74.00	-18.23



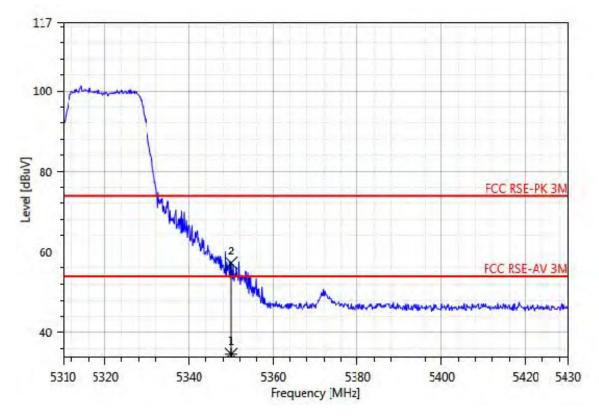
Page: 157 of 189

Operation Mode: 802.11 n20B2 Test Date: 11/17/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5350.00	E	Average	34.64	28.49	6.15	54.00	-19.36
5350.00	E	Peak	57.21	51.06	6.15	74.00	-16.79



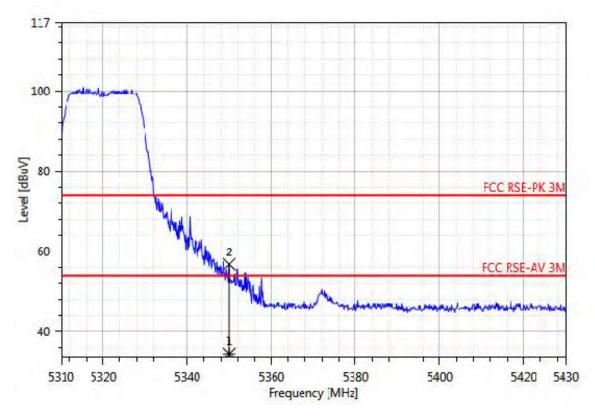
Page: 158 of 189

Operation Mode: 802.11 n20B2 Test Date: 11/17/2016

Fundamental Frequency: 5320 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5350.00	Е	Average	34.45	28.30	6.15	54.00	-19.55
5350.00	Ε	Peak	56.77	50.62	6.15	74.00	-17.23



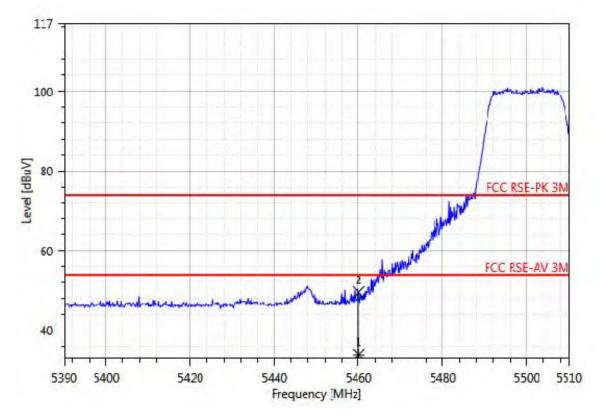
Page: 159 of 189

Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	_
5460.00	Е	Average	33.88	27.65	6.23	54.00	-20.12	
5460.00	Е	Peak	49.55	43.32	6.23	74.00	-24.45	



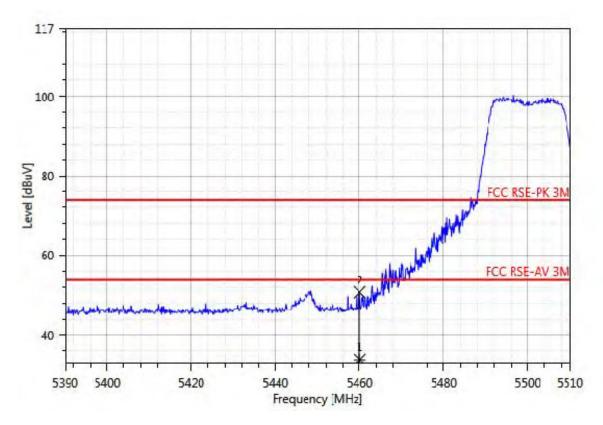
Page: 160 of 189

Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	
5460.00	Е	Average	33.77	27.54	6.23	54.00	-20.23	_
5460.00	Е	Peak	50.72	44.48	6.23	74.00	-23.28	

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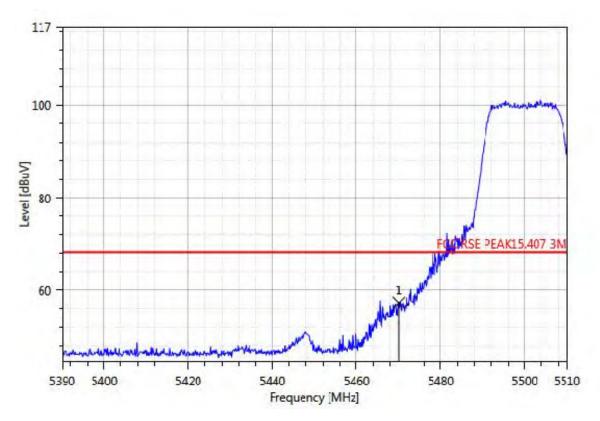
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Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer :

EUT Pol.: Measurement Antenna Pol.: VERTICAL E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5470.00	E	Peak	57.28	51.02	6.26	68.30	-11.02

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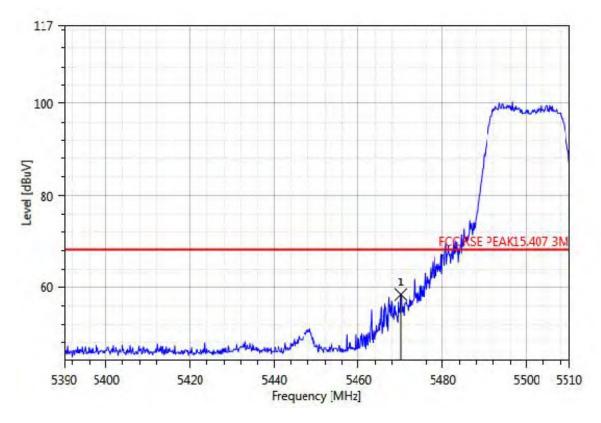
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Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5500 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
5470.00	Е	Peak	58.44	52.17	6.26	68.30	-9.86

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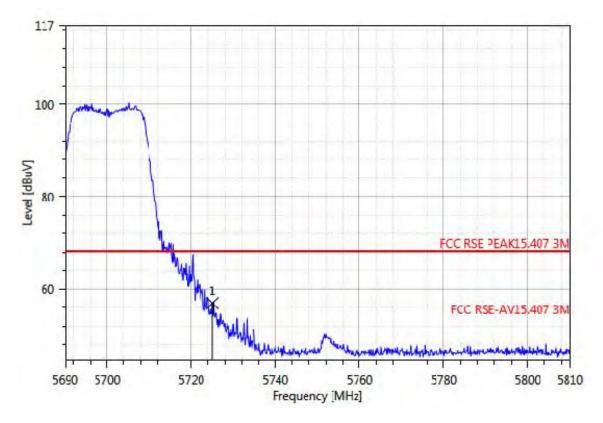
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Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
_	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	_
_	5725.00	Е	Peak	57.00	50.41	6.59	68.30	-11.30	



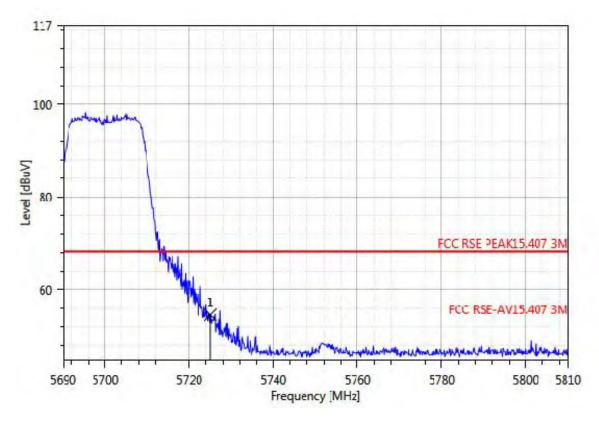
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Operation Mode: 802.11 n20B3 Test Date: 11/17/2016

Fundamental Frequency: 5700 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB	_
5725.00	Е	Peak	54.54	47.95	6.59	68.30	-13.76	_



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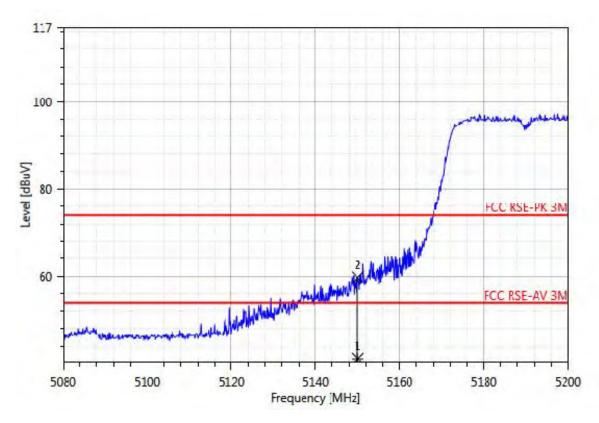
## 802.11n40 HT mode

Operation Mode: 802.11 n40B1 Test Date: 11/17/2016

Fundamental Frequency: 5190 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5150.00	Е	Average	41.12	35.24	5.88	54.00	-12.88
5150.00	Ε	Peak	59.75	53.87	5.88	74.00	-14.25

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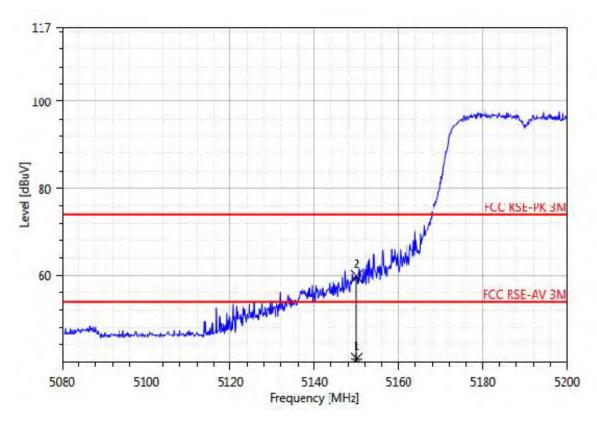
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Operation Mode: 802.11 n40B1 Test Date: 11/17/2016

Fundamental Frequency: 5190 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5150.00	Е	Average	40.83	34.95	5.88	54.00	-13.17
5150.00	Ε	Peak	59.85	53.96	5.88	74.00	-14.15

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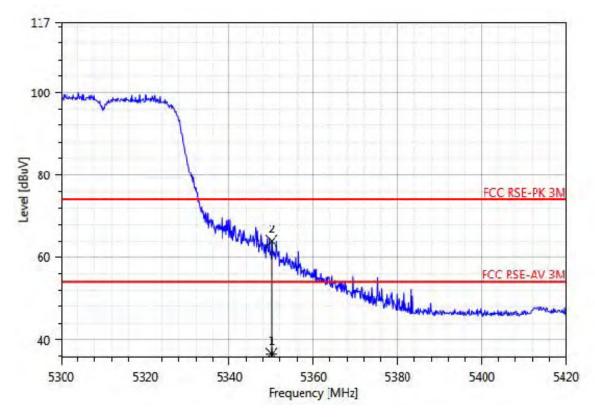
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Operation Mode: 802.11 n40B2 Test Date: 11/17/2016

Fundamental Frequency: 5310 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5350.00	Е	Average	36.61	30.46	6.15	54.00	-17.39
5350.00	Ε	Peak	63.98	57.83	6.15	74.00	-10.02



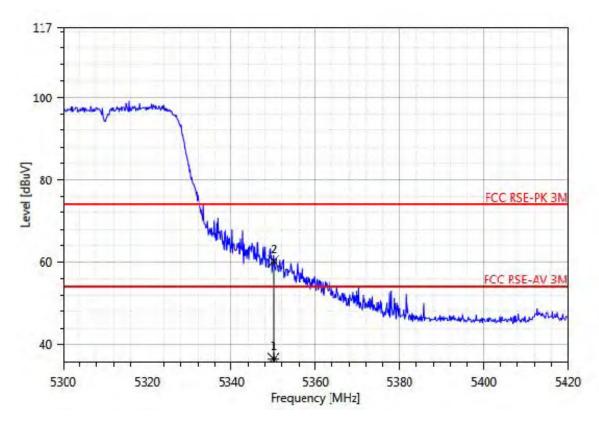
Page: 168 of 189

Operation Mode: 802.11 n40B2 Test Date: 11/17/2016

Fundamental Frequency: 5310 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
	MHz	F/H/E/S	QP/AV/PK	dBμV/m	dΒμV/m	dB	dBuV/m	dB
_	5350.00	Е	Average	36.54	30.39	6.15	54.00	-17.46
	5350.00	Ε	Peak	60.20	54.05	6.15	74.00	-13.80



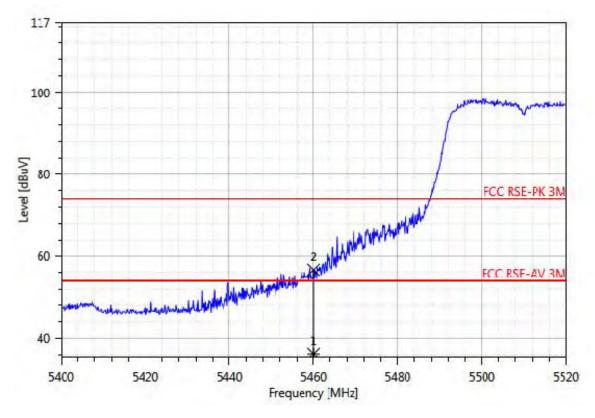
Page: 169 of 189

Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5460.00	Е	Average	36.23	30.00	6.23	54.00	-17.77
5460.00	Ε	Peak	56.70	50.46	6.23	74.00	-17.30

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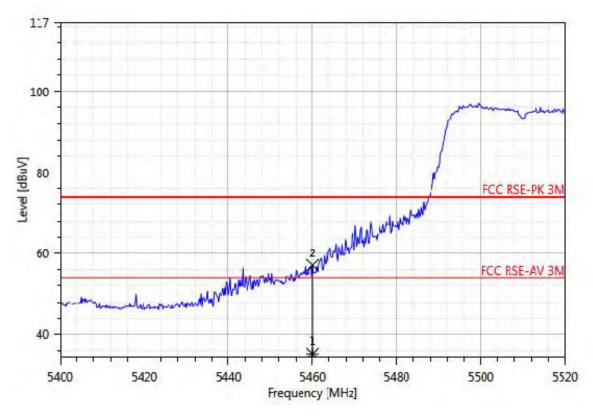
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Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
_	5460.00	Е	Average	35.22	28.99	6.23	54.00	-18.78
	5460.00	Ε	Peak	57.10	50.87	6.23	74.00	-16.90

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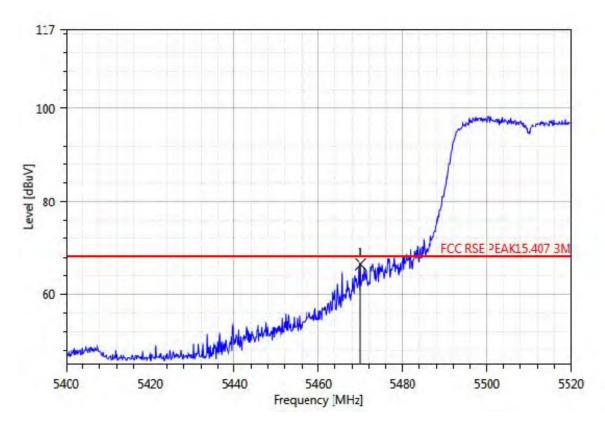
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Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5470.00	Е	Peak	66.48	60.22	6.26	68.30	-1.82



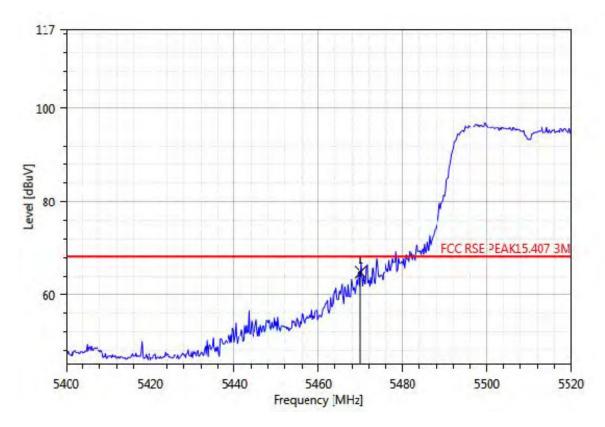
Page: 172 of 189

Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5510 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5470.00	Е	Peak	64.86	58.60	6.26	68.30	-3.44

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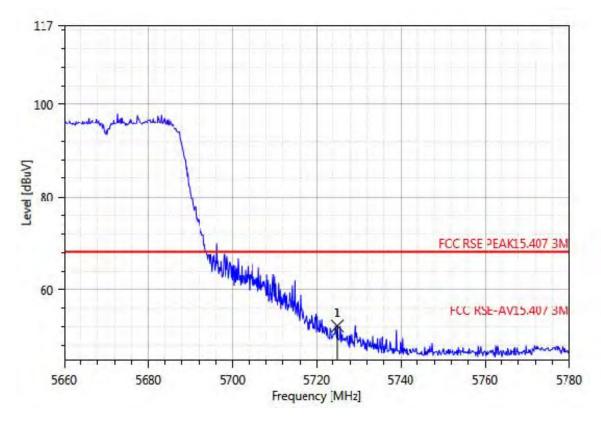
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Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5670 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
5725.00	Е	Peak	52.26	45.67	6.59	68.30	-16.04



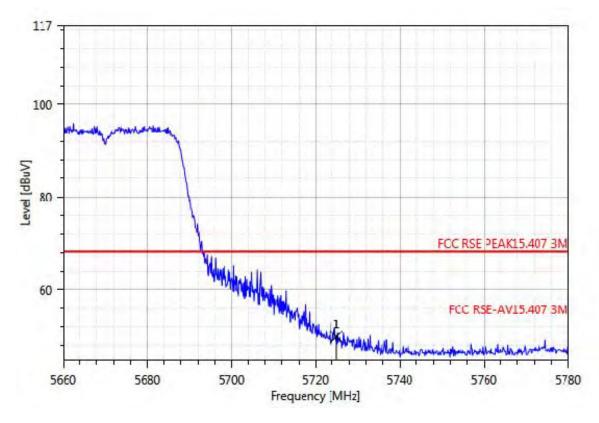
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Operation Mode: 802.11 n40B3 Test Date: 11/17/2016

Fundamental Frequency: 5670 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5725.00	Е	Peak	49.83	43.24	6.59	68.30	-18.47

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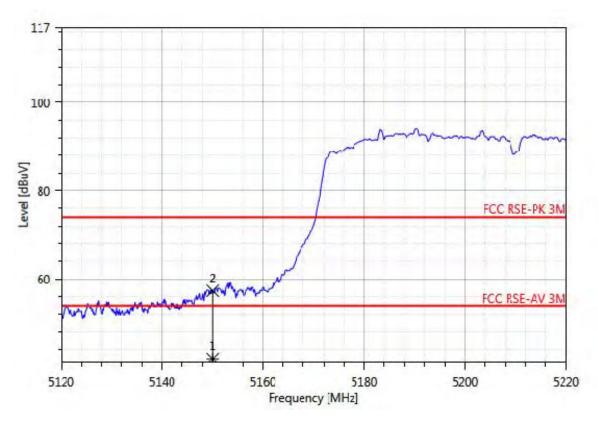
## 802.11ac80 VHT mode

Operation Mode: 802.11 ac80 B1 Test Date: 11/17/2016

Fundamental Frequency: 5210 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5150.00	Е	Average	41.93	36.05	5.88	54.00	-12.07
5150.00	Ε	Peak	57.33	51.45	5.88	74.00	-16.67

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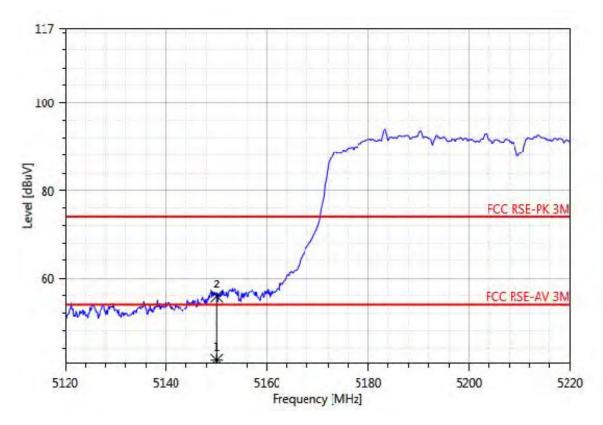
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Operation Mode: 802.11 ac80 B1 Test Date: 11/17/2016

Fundamental Frequency: 5210 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	_
5150.00	Е	Average	41.32	35.44	5.88	54.00	-12.68	
5150.00	Е	Peak	55.84	49.96	5.88	74.00	-18.16	



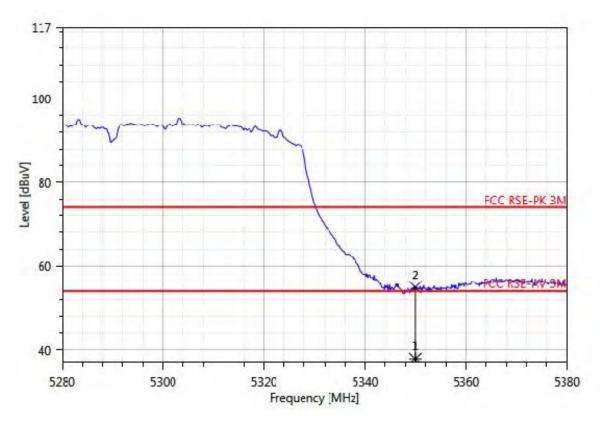
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Operation Mode: 802.11 ac80 B2 Test Date: 11/17/2016

Fundamental Frequency: 5290 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



I	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
53	350.00	Е	Average	37.84	31.69	6.15	54.00	-16.16
53	350.00	Ε	Peak	54.93	48.78	6.15	74.00	-19.07



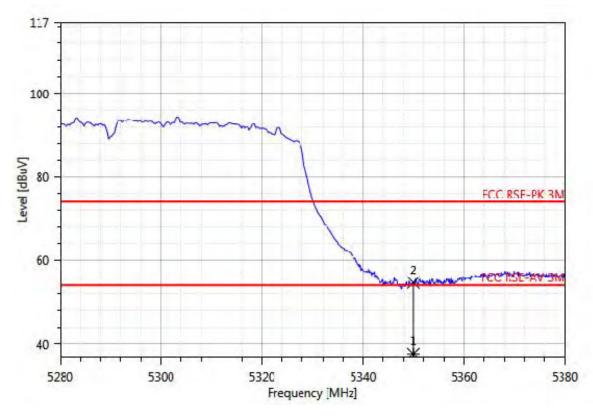
Page: 178 of 189

Operation Mode: 802.11 ac80 B2 Test Date: 11/17/2016

Fundamental Frequency: 5290 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH HIGH Test Engineer: Tin

Measurement Antenna Pol.: HORIZONTAL EUT Pol.: E1 Plane



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
5350.00	Е	Average	37.59	31.44	6.15	54.00	-16.41
5350.00	Ε	Peak	54.67	48.52	6.15	74.00	-19.33



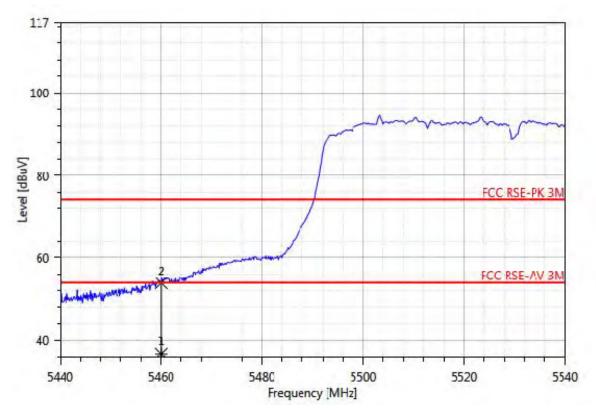
Page: 179 of 189

Operation Mode: 802.11 ac80 B3 Test Date: 11/17/2016

Fundamental Frequency: 5530 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB	
5460.00	Е	Average	36.78	30.55	6.23	54.00	-17.22	
5460.00	Ε	Peak	53.92	47.69	6.23	74.00	-20.08	

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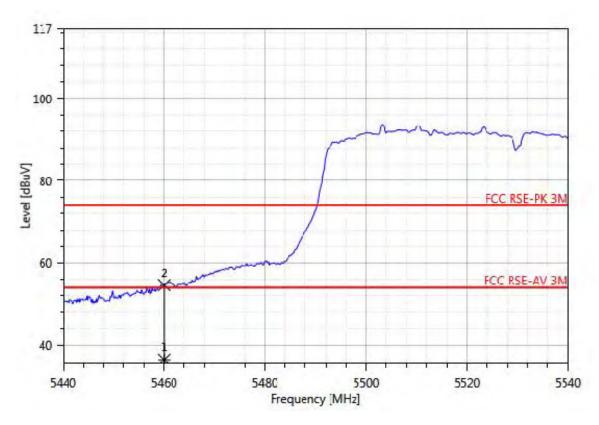
Page: 180 of 189

Operation Mode: 802.11 ac80 B3 Test Date: 11/17/2016

Fundamental Frequency: 5530 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW Test Engineer: Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	
٠	5460.00	Е	Average	36.47	30.24	6.23	54.00	-17.53	_
	5460.00	Е	Peak	54.62	48.38	6.23	74.00	-19.38	



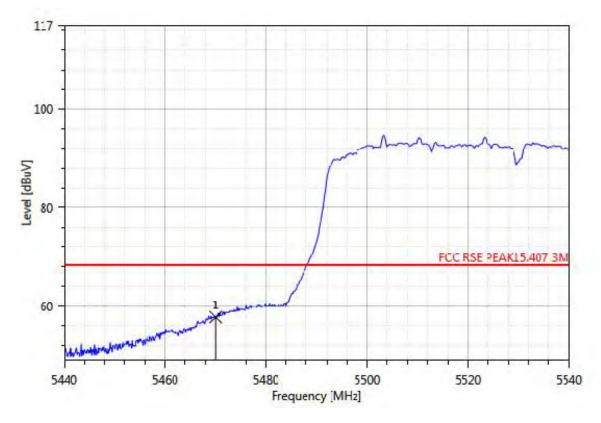
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Operation Mode: 802.11 ac80 B3 Test Date: 11/17/2016

Fundamental Frequency: 5530 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
5470.00	Е	Peak	57.69	51.43	6.26	68.30	-10.61

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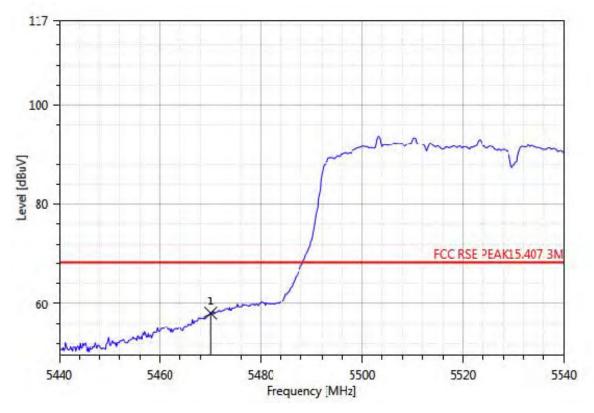
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Operation Mode: 802.11 ac80 B3 Test Date: 11/17/2016

Fundamental Frequency: 5530 MHz Temp. / Humi. : 21 deg\_C / 62 RH

Operation Band: Bandedge CH LOW | Test Engineer : Tin

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



F	req.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
N	ИHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
547	70.00	Ē	Peak	58.09	51.82	6.26	68.30	-10.21

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# TRANSMISSION IN THE ABSENCE OF DATA

# **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:

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving, the EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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# 13. FREQUENCY STABILITY

# 13.1 Standard Applicable

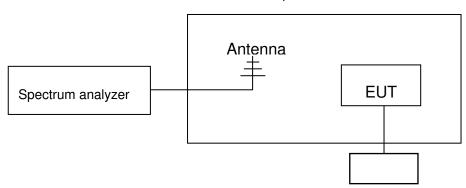
Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

#### 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

Temperature Chamber



# 13.4 Measurement Equipment Used: Variable AC Power Supply

SGS Conducted Room							
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due		
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017		
DC Power Supply	Agilent	E3640A	MY52410006	11/04/2016	11/03/2017		
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017		

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#### 13.5 **Measurement Result**

Operation Mode	802.11 a	Test Date	2016.11.16
Temperature	:17 ℃	Test By	Cooper
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,179.98100	0.00000367
		44	5220	5,219.98022	0.00000379
		48	5240	5,239.97928	0.00000395
		52	5260	5,259.97892	0.00000401
		60	5300	5,299.97854	0.00000405
	4.29V	64	5320	5,319.97831	0.00000408
		100	5500	5,499.97691	0.00000420
		116	5580	5,579.97638	0.00000423
		140	5700	5,699.97570	0.00000426
-10 °C		36	5180	5,179.98116	0.00000364
		44	5220	5,219.98036	0.00000376
		48	5240	5,239.97960	0.00000389
		52	5260	5,259.97897	0.00000400
		60	5300	5,299.97859	0.00000404
	3.51V	64	5320	5,319.97834	0.00000407
		100	5500	5,499.97702	0.00000418
		116	5580	5,579.97643	0.00000422
		140	5700	5,699.97575	0.00000425



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		36	5180	5,179.98134	0.00000360
		44	5220	5,219.98059	0.00000372
		48	5240	5,239.97981	0.00000385
		52	5260	5,259.97908	0.00000398
		60	5300	5,299.97871	0.00000402
<b>25</b> ℃	3.9V	64	5320	5,319.97841	0.00000406
		100	5500	5,499.97718	0.00000415
		116	5580	5,579.97651	0.00000421
		140	5700	5,699.97582	0.00000424
		36	5180	5,179.98070	0.00000373
		44	5220	5,219.97992	0.00000385
		48	5240	5,239.97909	0.00000399
		52	5260	5,259.97880	0.00000403
		60	5300	5,299.97846	0.00000406
		64	5320	5,319.97824	0.00000409
	4.29V	100	5500	5,499.97679	0.00000422
		116	5580	5,579.97629	0.00000425
		140	5700	5,699.97563	0.00000428
55 °C		36	5180	5,179.98085	0.00000370
		44	5220	5,219.98009	0.00000381
		48	5240	5,239.97916	0.00000398
		52	5260	5,259.97884	0.00000402
		60	5300	5,299.97849	0.00000406
	3.51V	64	5320	5,319.97826	0.00000409
		100	5500	5,499.97683	0.00000421
		116	5580	5,579.97632	0.00000424
		140	5700	5,699.97567	0.00000427

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Operation Mode	802.11 n_HT40	Test Date	2016.11.16
Temperature	:17 ℃	Test By	Cooper
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,189.97868	0.00000411
		46	5230	5,229.97836	0.00000414
		54	5270	5,269.98194	0.00000343
		62	5310	5,309.98033	0.00000370
	4.29V	102	5510	5,509.97804	0.0000399
		110	5550	5,549.97723	0.00000410
		134	5670	5,669.97625	0.00000419
		38	5190	5,189.97876	0.00000409
-10 °C		46	5230	5,229.97838	0.00000413
		54	5270	5,269.98242	0.00000334
		62	5310	5,309.98055	0.00000366
	3.51V	102	5510	5,509.97831	0.00000394
		110	5550	5,549.97737	0.00000408
		134	5670	5,669.97633	0.00000417
	_				
		38	5190	5,189.97907	0.00000403
		46	5230	5,229.97842	0.00000413
		54	5270	5,269.98369	0.00000309
		62	5310	5,309.98089	0.0000360
<b>25</b> ℃	3.9V	102	5510	5,509.97864	0.00000388
		110	5550	5,549.97756	0.00000404
	Ī	134	5670	5,669.97644	0.00000416
		38	5190	5,189.97856	0.00000413
		46	5230	5,229.97832	0.00000415
		54	5270	5,269.98125	0.00000356
		62	5310	5,309.97995	0.00000378
	4.29V	102	5510	5,509.97774	0.00000076
	1 4.23 V	110	5550	5,549.97703	
		134	5670	5,669.97614	0.00000414
<b>55</b> ℃		38	5190	5,189.97861	0.00000421
		46	5230	5,229.97834	0.00000414
		54	5270	5,269.98156	0.00000350
		62	5310	5,309.98012	0.00000374
	3.51V	102	5510	5,509.97788	0.00000401
		110	5550	5,549.97712	0.00000412
		134	5670	5,669.97620	0.00000420

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Operation Mode	802.11 ac_VHT80	Test Date	2016.11.16
Temperature	:17 ℃	Test By	Cooper
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		42	5210	5,209.97880	0.00000407
		58	5290	5,289.97825	0.00000411
	4.29V	106	5530	5,529.97674	0.00000421
		122	5610	5,609.97619	0.00000424
-10 °C		42	5210	5,209.97892	0.00000405
		58	5290	5,289.97830	0.00000410
	3.51 V	106	5530	5,529.97680	0.00000420
		122	5610	5,609.97623	0.00000424
	_	42	5210	5,209.97919	0.00000399
		58	5290	5,289.97835	0.00000409
<b>25</b> ℃	3.9V	106	5530	5,529.97696	0.00000417
		122	5610	5,609.97629	0.00000423
		42	5210	5,209.97868	0.00000409
		58	5290	5,289.97820	0.00000412
	4.29V	106	5530	5,529.97663	0.00000423
		122	5610	5,609.97610	0.00000426
<b>55</b> ℃		42	5210	5,209.97870	0.00000409
		58	5290	5,289.97824	0.00000411
	3.51 V	106	5530	5,529.97668	0.00000422
		122	5610	5,609.97614	0.00000425

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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

PIFA 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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