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### ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E AND INDUSTRY CANADA RSS 247 REQUIREMENT

OF

**Product Name: Smart Module** 

**Brand Name:** N/A

**SIMT 1502** Model No.:

**Model Difference:** N/A

FCC ID: UDV-20170406

IC: 8460A-20170406

**Report No.:** ER/2017/50038

**Issue Date:** Aug. 09, 2017

**FCC Rule Part:** §15.407

**IC Rule Part** RSS-247 issue 2 Feb. 2017

SHANGHAI SIMCOM LIMITED **Prepared for:** 

> **Building A, SIM Technology Building,** No.633, Jinzhong Road, Changning Dis-

trict, Shanghai

Prepared by: SGS Taiwan Ltd.

> **Electronics & Communication Laboratory** No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City,

Taiwan 24803





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### VERIFICATION OF COMPLIANCE

**Applicant:** SHANGHAI SIMCOM LIMITED

Building A, SIM Technology Building, No.633, Jinzhong Road,

Changning District, Shanghai

**Product Name: Smart Module** 

**Brand Name:** N/A

Model No.: SIMT 1502

**Model Difference:** N/A

FCC ID: UDV-20170406

IC: 8460A-20170406

File Number: ER/2017/50038

Date of test: May 08, 2017 ~ Aug. 08, 2017

Date of EUT Received: May 08, 2017

### 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:	On Li	Date:	Aug. 09, 2017
Prepared By:	Tin Lin / Engineer Karen Huang	Date:	Aug. 09, 2017
Approved By:	Karen Huang / Clerk  The Chang  Jim Chang / Asst. Manager	Date:	Aug. 09, 2017

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## **Revision History**

Report Number	Revision	Description	Issue Date
ER/2017/50038	Rev.00	Initial creation of document	Jul. 21, 2017
ER/2017/50038	Rev.01	Update measurement data	Aug. 09, 2017

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### **GENERAL INFORMATION**

#### 1.1 Product Description

#### General:

ochicial.	
Product Name:	Smart Module
Brand Name:	N/A
Model No.:	SIMT 1502
Model Difference:	N/A
Product SW/HW version:	CB03_8909_V4.4_20160901/ V1.2
Radio SW/HW version:	N/A / N/A
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	3.8Vdc from DC power Supply

Antenna Designation	External Antenna, 5GHz Gain: 3.37 dBi (5150MHz-5250MHz) 5GHz Gain: 3.23 dBi (5250MHz-5350MHz) 5GHz Gain: 1.51 dBi (5470MHz-5725MHz) 5GHz Gain: 0.42 dBi (5725MHz-5850MHz)
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 - 72.2Mbps 802.11 n_40MHz: 13.5 - 150.0Mbps

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#### FCC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology	
	5150~5250	4	15.98 dBm		
11a	5250~5350	4	16.36 dBm	OEDM	
Ha	5470~5725	12	15.54 dBm	OFDM	
	5725-5850	5	14.26 dBm		
	HT20 5150~5250	4	16.00 dBm	- OFDM	
11 <sub>n</sub>	HT20 5250~5350	4	16.31 dBm		
11n	HT20 5470~5725	12	15.58 dBm		
	HT20 5725-5850	5	14.33 dBm		
	HT40 5150~5250	2	16.54 dBm		
11n	HT40 5250~5350	2	16.50 dBm	OFDM	
	HT40 5470~5725	6	14.07 dBm	OFDIVI	
	HT40 5725-5850	2	14.29 dBm		

#### IC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.) / (EIRP)	Modulation Technology
	5150~5250	4	15.98 dBm (EIRP)	
	5250~5350	4	16.36 dBm	
11a	5500~5580	5	14.66 dBm	OFDM
	5700~5700	1	15.54 dBm	
	5745-5825	5	14.26 dBm	
	HT20 5150~5250	4	16.00 dBm (EIRP)	
	HT20 5250~5350	4	16.31 dBm	
11n	HT20 5500~5580	5	14.53 dBm	OFDM
	HT20 5660~5720	4	15.58 dBm	
	HT20 5745-5825	5	14.33 dBm	
	HT40 5150~5250	2	16.54 dBm (EIRP)	
	HT40 5250~5350	2	16.50 dBm	
11n	HT40 5510~5550	2	14.07 dBm	OFDM
	HT40 5670~5670	1	13.01 dBm	
	HT40 5755-5795	2	14.29 dBm	

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#### 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules

RSS-247 issue 2 Feb. 2017

RSS-Gen issue4 Nov. 2014

ANSI C63.10:2013

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

#### 1.3 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

Canada Registration Number: 4620A-5

#### 1.4 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

#### 2.1 EUT Configuration

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

#### 2.2 EUT Exercise

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

#### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is 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.

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#### **Measurement Results Explanation Example** 2.4

#### 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 2dB, and 10dB attenu-

= RF cable loss (dB)+ attenuation factor(dB)=12(dB)

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#### **Configuration of Tested System** 2.5

Fig. 2-1 Configuration of Conducted and Radiated Tested System



Fig. 2-2 Conduction



**Table 2-1 Equipment Used in Tested System** 

Ite m	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	R9-YYG88	Shielded	Un-shielded
3.	Test Tool Kit	N/A	N/A	N/A	N/A	N/A

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#### SUMMARY OF TEST RESULT

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	RSS-247 §6.2.1~ 4 (1) RSS-Gen §6.6	26 dB & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.407(g)	RSS-Gen §6.11	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

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

2 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

Operated band in 5250 MHz ~5350 MHz:

4 channels are provided for 802.11a, 802.11n\_HT20

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

2 channels are provided for 802.11n\_HT40

	_		
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

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

11 channels are provided for FCC 802.11a, 802.11n HT20

•	,	_	
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

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

### Note: Channels from 5600MHz ~ 5650MHz are disabled when this product is marketed withing Canada.

Operated band in 5725 MHz ~5850 MHz:

5 channels are provided for 802.11a, 802.11n\_HT20

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

#### 2 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

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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.

#### RADIATED FMISSION TEST

ADIATED EMISS	ADIATED EMISSION TEST:				
RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11a	5180~5240	36 to 48	44	OFDM	6
802.11a	5260~5320	52 to 64	60	OFDM	6
802.11a	5500~5720	100 to 140	116	OFDM	6
802.11a	5745~5825	149 to 165	157	OFDM	6
	RADIATED EMISSION TEST (ABOVE 1 GHz)				
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6
802.11n_HT20	3100~3240	30 10 40	30,44,40	OFDM	MCS0
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0
802.11a	5260~5320	52 to 64	52 60 64	OFDM	6
802.11n_HT20	5200~5320	52 to 64	52,60,64	OFDM	MCS0
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0

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MODE	FREQUENCY BAND (MHz)		TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11a	5500 5700	100 to 144	100 116 140	OFDM	6
802.11n_HT20	5500~5720	100 to 144	100,116,140	OFDM	MCS0
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS0
802.11a	5745~5825	149 to 165	140 157 165	OFDM	6
802.11n_HT20	0140~0020	149 (0 165	149,157,165	OFDM	MCS0
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0

#### 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 H position was reported.

#### ANTENNA PORT CONDUCTED MEASUREMENT:

TIENNATORT CONDUCTED MEAGOREMENT.						
	CONDUCTED TEST					
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	
802.11n_HT20	3180~3240	30 10 46	30,44,40	OFDM	MCS0	
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	
802.11a	5260~5320	52 to 64	F2 G0 G4	OFDM	6	
802.11n_HT20	5260~5320	52 10 64	52,60,64	OFDM	MCS0	
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	
802.11n_HT20	5500~5720	100 to 140	100,110,140	OFDM	MCS0	
802.11n_HT40	5510~5710	102 to 134	102,110,134	OFDM	MCS0	
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	
802.11n_HT20	3745~5625	148 (0 100	149,107,100	OFDM	MCS0	
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS0	

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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:

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

	9kHz – 30MHz: +/- 2.87 dB	
	30MHz - 167MHz: +/- 4.22dB	
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB	
(Polarization : <b>Horizontal</b> )	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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\*\*Reference of the sample of 90 days only.

\*\*Reference of 10 day

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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	

#### 6.2. Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018			
LISN	SCHWARZ BECK	NSLK 8127	8127-649	05/22/2016	05/21/2017			
LISN	MESS TEC	FCC-LISN-50/250-25- 2-01	4034	03/19/2017	03/18/2018			
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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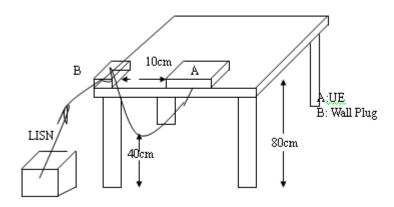
<sup>1.</sup> The lower limit shall apply at the transition frequencies

<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50



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#### 6.4. Test SET-UP



#### 6.5. Measurement Procedure

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

#### 6.6. Measurement Result

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

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

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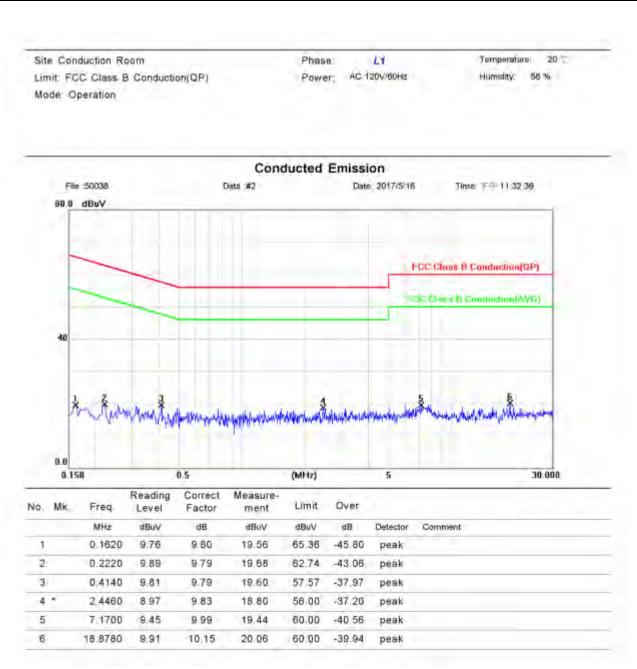
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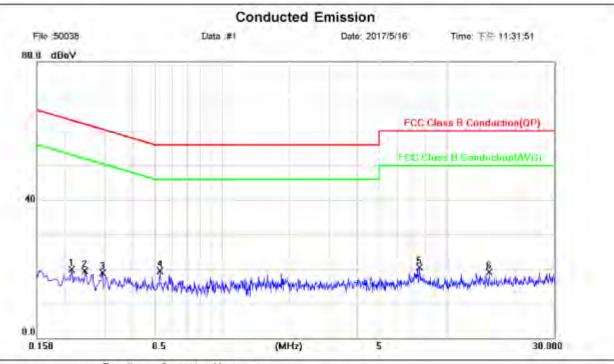
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Temperature Site Conduction Room Phase: AC 120V/50Hz Humidity: Limit: FCC Class B Conduction(QP) Power: Mode: Operation



No	Mk.	Freq	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
- 1		0.2140	10.06	9.79	19.85	63.05	-43.20	peak		
2		0.2460	9.76	9.79	19.55	61.89	-42.34	peak		
3	-	0.2940	9.16	9,79	18,95	60.41	-41.46	peak		
-4	*	0.5300	9.67	9.79	19.46	56.00	-36.54	peak		
5		7.5260	10.49	10.00	20.49	60.00	-39.51	peak		
6		15.4340	B.95	10.11	19.06	60.00	-40.94	peak		

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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	87.33	0.59
802.11n_20	86.46	0.63
802.11n_40	76.02	1.19

Duty Cycle Factor: 10 \* log(1/0.8733) = 0.59Duty Cycle Factor:  $10 * \log(1/0.8646) = 0.63$ Duty Cycle Factor:  $10 * \log(1/0.7602) = 1.19$ 

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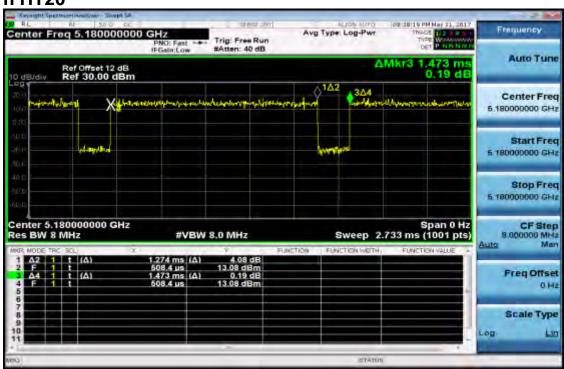


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### **DUTY CYCLE TEST SIGNAL Measurement Result** 802.11a



#### 802.11n HT20



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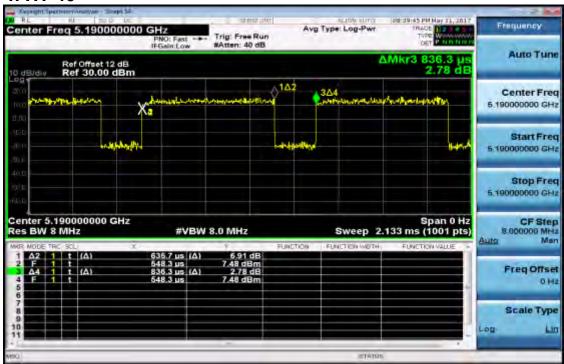
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#### 802.11 n HT 40



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#### 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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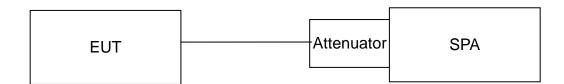


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#### 8.3 **Measurement Equipment Used**

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
EXA Spectrum Ana- lyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018			
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018			
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018			
Splitter	Agilent	11636B	N/A	01/05/2017	01/04/2018			

### 8.4 Test Set-up



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### 8.5 Measurement Result 26dB Bandwidth

802.11a Main

802 11n HT20 Main

OUZ.TTa_IVIAT			002.1111_1112	LO_IVIAIII				
Frequency (MHz)	26dB BW	10 Log (B) (dB)	Frequency (MHz)	26dB BW	10 Log (B) (dB)	802.11n _HT	40_Main	
()	(MHz)	(0.2)	()	(MHz)	(42)		26dB	40 1 (D)
5180	28.80	14.594	5180	29.90	14.757	Frequency (MHz)	BW	10 Log (B) (dB)
5220	30.00	14.771	5220	29.88	14.753	(141112)	(MHz)	(ub)
5240	30.00	14.771	5240	30.00	14.771	5190	50.00	16.990
5260	30.00	14.771	5260	30.00	14.771	5230	50.00	16.990
5300	30.00	14.771	5300	29.87	14.752	5270	50.00	16.990
5320	30.00	14.771	5320	29.98	14.768	5310	50.00	16.990
5500	29.68	14.725	5500	30.00	14.771	5510	50.00	16.990
5580	29.62	14.715	5580	29.64	14.718	5550	47.30	16.749
5700	29.98	14.769	5700	29.95	14.765	5670	49.34	16.932

802.11a\_Main

802.11 n\_HT20\_Main

_	6dB	(0)	_	6dB	(2)	802.11n_HT4	_HT40_Main		
Frequency (MHz)	BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	BW	10 Log (B) (dB)	
5745	16.48	12.170	5745	17.66	12.469	(141112)	(MHz)	(42)	
5785	16.41	12.152	5785	17.66	12.469	5755	35.21	15.467	
5825	16.41	12.152	5825	17.62	12.459	5795	35.21	15.467	

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### 99% Bandwidth

#### 802.11a Main

**=						
Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)				
5180	16.600	12.201				
5220	16.500	12.175				
5240	16.572	12.194				
5260	16.609	12.203				
5300	16.574	12.194				
5320	16.433	12.157				
5500	16.439	12.159				
5580	16.434	12.157				
5700	16.507	12.177				

#### 802.11n HT20 Main

••=						
Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)				
5180	17.811	12.507				
5220	17.950	12.541				
5240	17.781	12.500				
5260	17.829	12.511				
5300	17.803	12.505				
5320	17.763	12.495				
5500	17.690	12.477				
5580	17.904	12.530				
5700	17.766	12.496				

#### 802.11n \_HT40\_Main

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	36.319	15.601
5230	36.332	15.603
5270	36.339	15.604
5310	36.335	15.603
5510	36.309	15.600
5550	36.380	15.609
5670	36.311	15.600

#### 802.11a Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)					
5745	16.61	12.203					
5785	16.57	12.194					
5825	16.54	12.186					

#### 802.11n\_HT20\_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.76	12.495
5785	17.82	12.510
5825	17.90	12.528

#### 802.11n \_HT40\_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.28	15.597
5795	36.34	15.604

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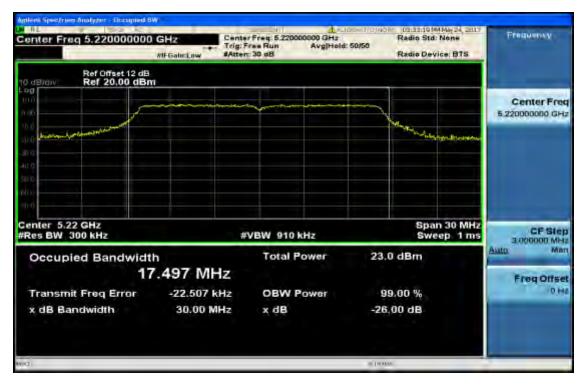


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## 802.11a, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180MHz)



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



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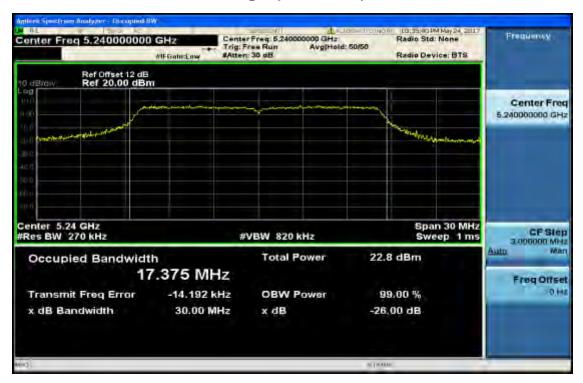
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### 26dB Band Width Test Data CH-High (5240MHz)



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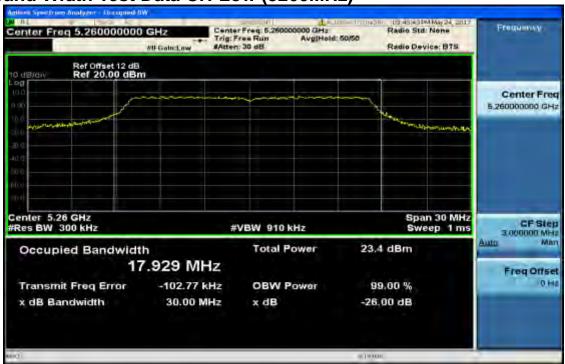
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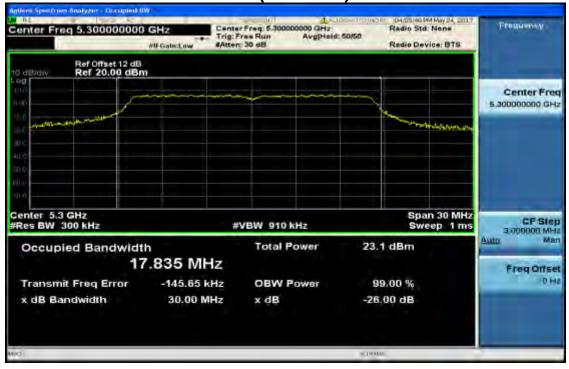


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### 802.11a, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5260MHz)



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



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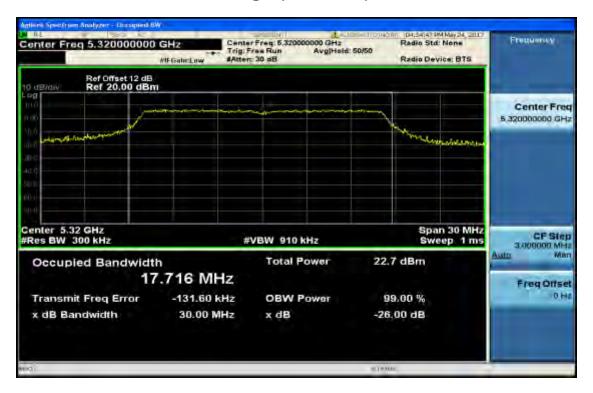
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### 26dB Band Width Test Data CH-High (5320MHz)



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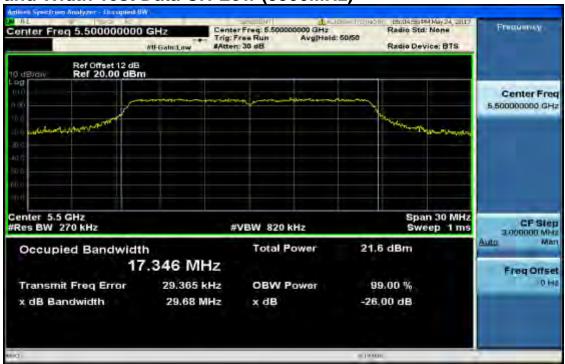
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### 802.11a, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5500MHz)



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



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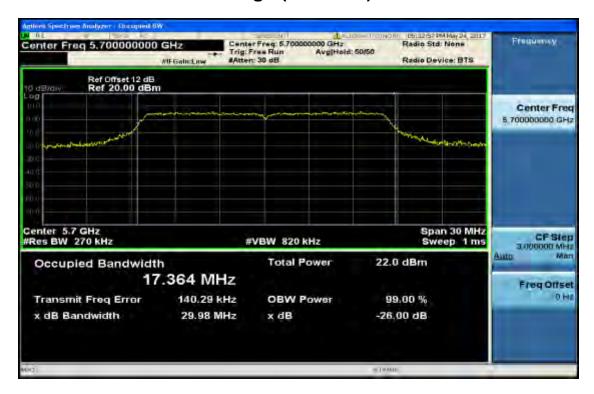
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### 26dB Band Width Test Data CH-High (5700MHz)



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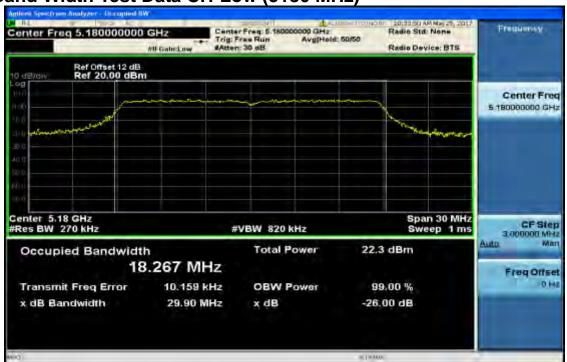
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### 802.11n HT20, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180 MHz)



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



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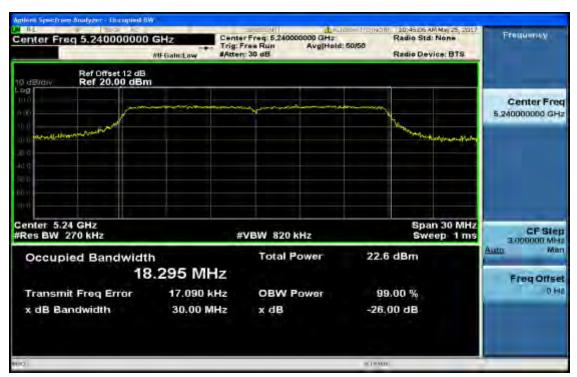
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### 26dB Band Width Test Data CH-High (5240 MHz)



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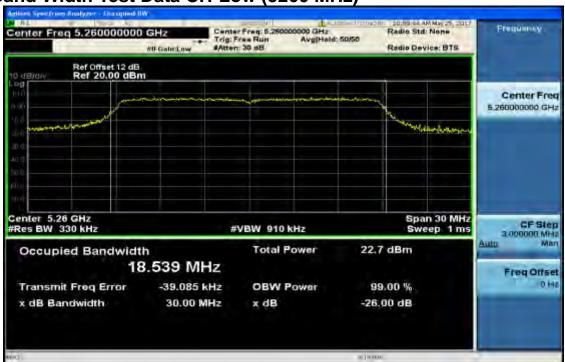
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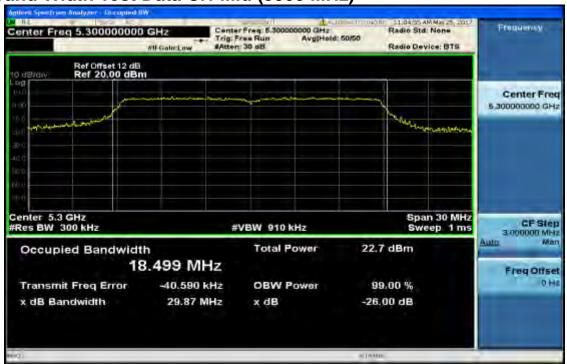


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### 802.11n HT20, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5260 MHz)



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



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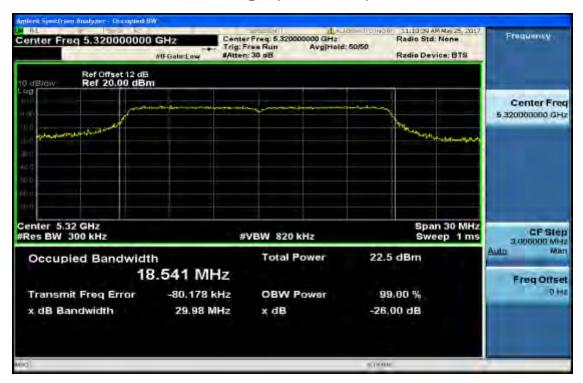
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### 26dB Band Width Test Data CH-High (5320 MHz)



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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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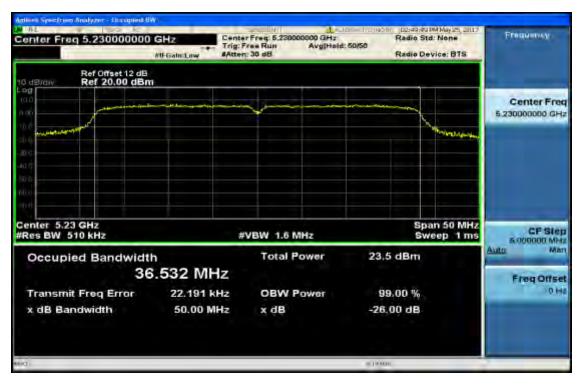


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# 802.11n HT40, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5190 MHz)



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



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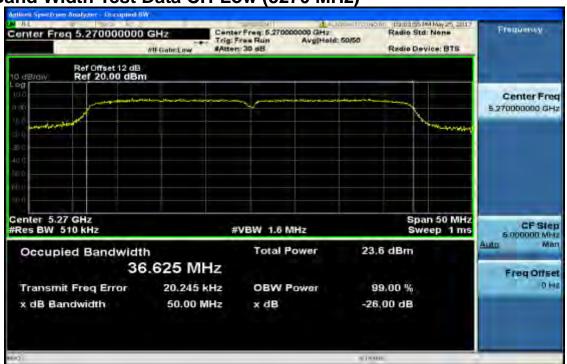
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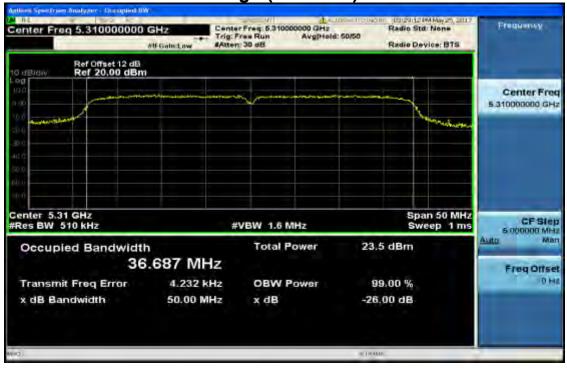


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#### 802.11n HT40, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5270 MHz)



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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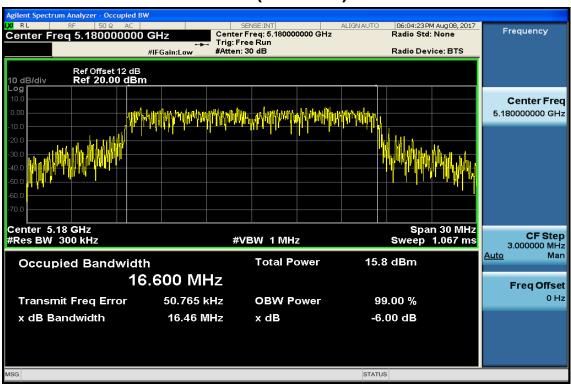
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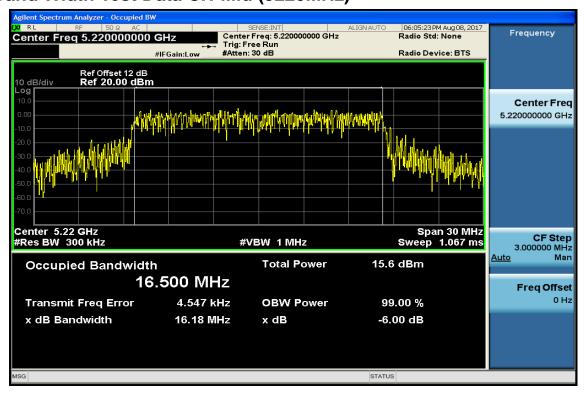


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# 802.11a, 5150~5250 MHz (Main) 99% Band Width Test Data CH-Low (5180MHz)



#### 99% Band Width Test Data CH-Mid (5220MHz)



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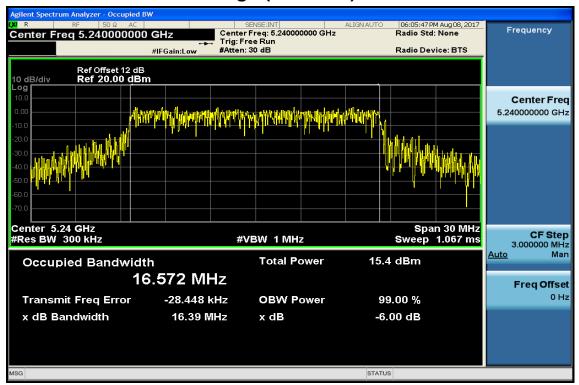
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#### 99% Band Width Test Data CH-High (5240MHz)



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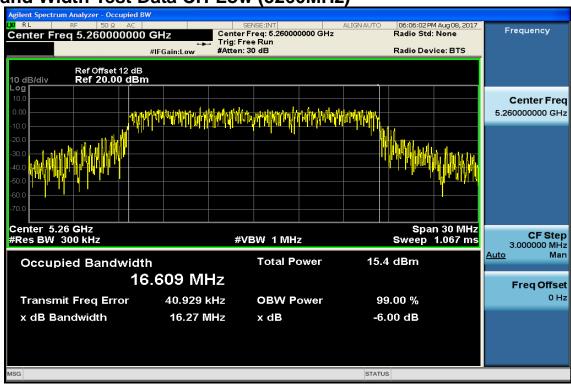
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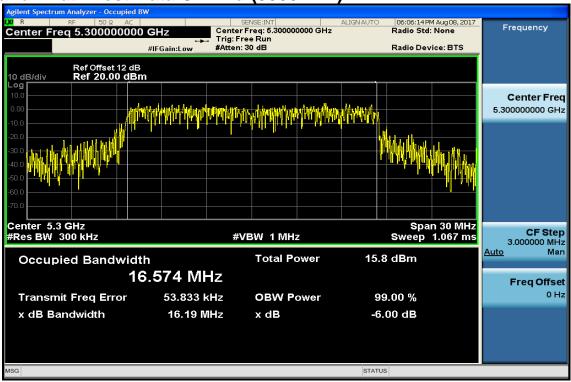


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## 802.11a, 5250~5350 MHz (Main) 99% Band Width Test Data CH-Low (5260MHz)



#### 99% Band Width Test Data CH-Mid (5300MHz)



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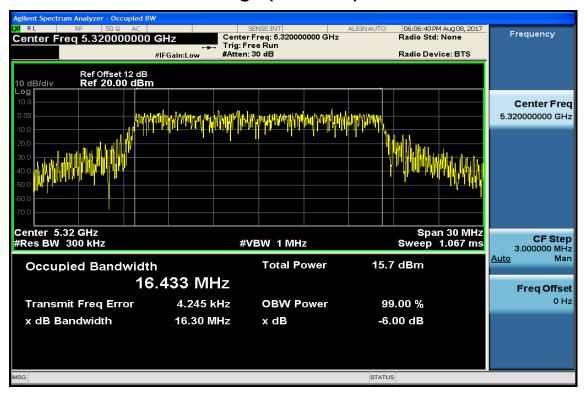
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#### 99% Band Width Test Data CH-High (5320MHz)



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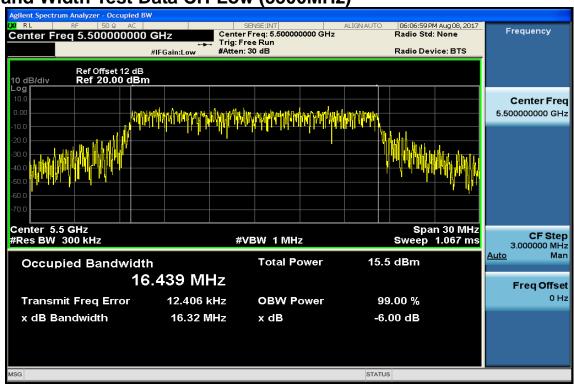
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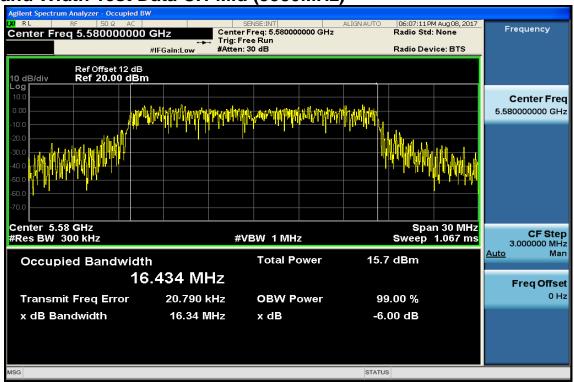


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### 802.11a, 5470~5725 MHz (Main) 99% Band Width Test Data CH-Low (5500MHz)



#### 99% Band Width Test Data CH-Mid (5580MHz)



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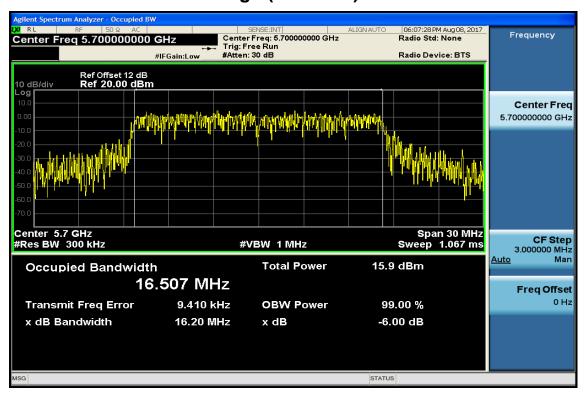
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#### 99% Band Width Test Data CH-High (5700MHz)



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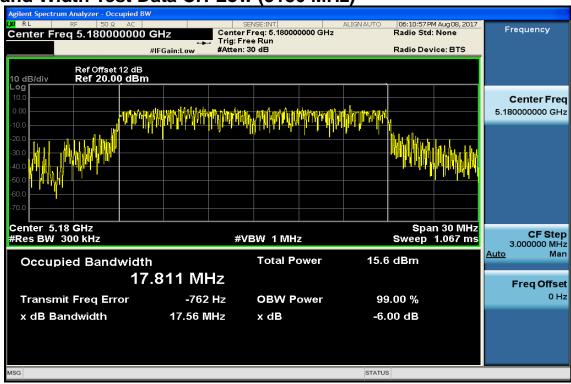
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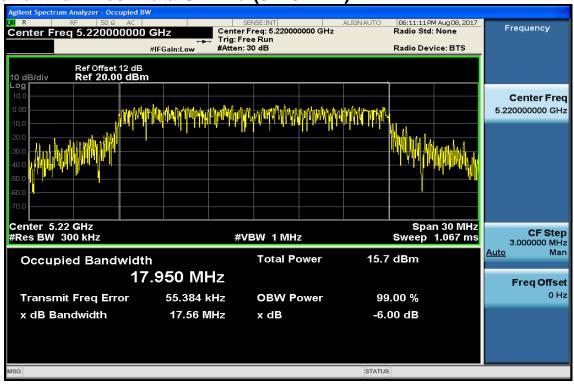


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## 802.11n HT20, 5150~5250 MHz (Main) 99% Band Width Test Data CH-Low (5180 MHz)



#### 99% Band Width Test Data CH-Mid (5220 MHz)



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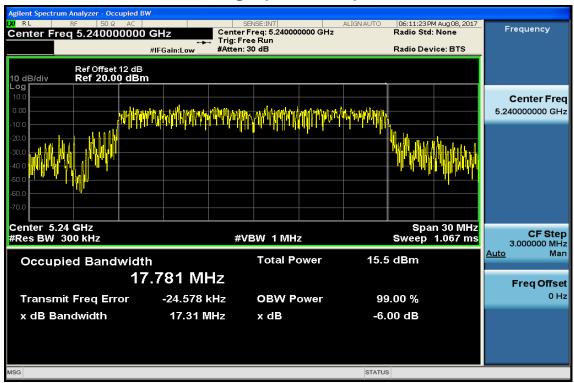
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### 99% Band Width Test Data CH-High (5240 MHz)



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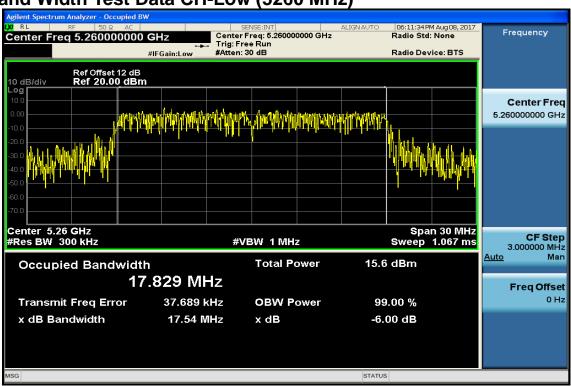
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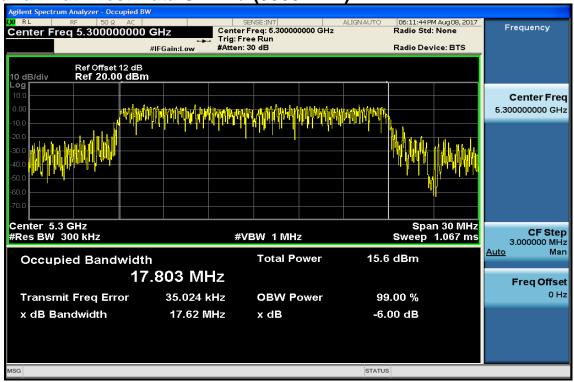


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# 802.11n HT20, 5250~5350 MHz (Main) 99% Band Width Test Data CH-Low (5260 MHz)



#### 99% Band Width Test Data CH-Mid (5300 MHz)



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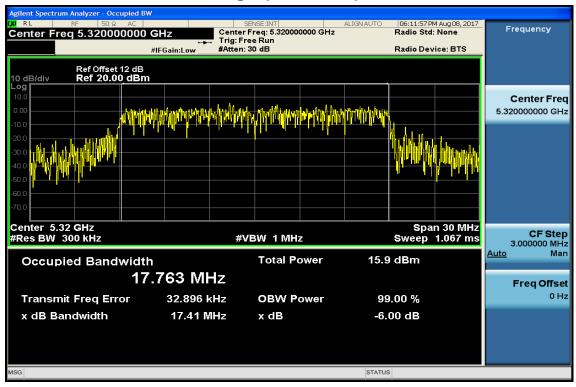
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### 99% Band Width Test Data CH-High (5320 MHz)



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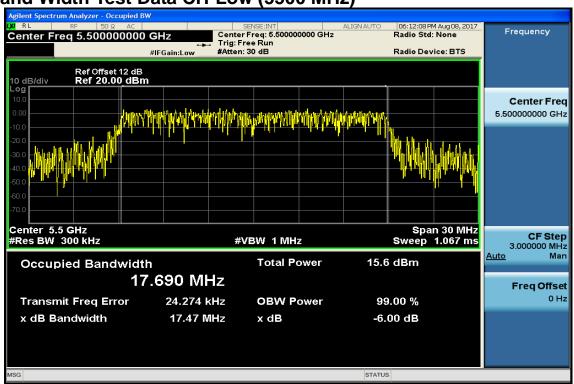
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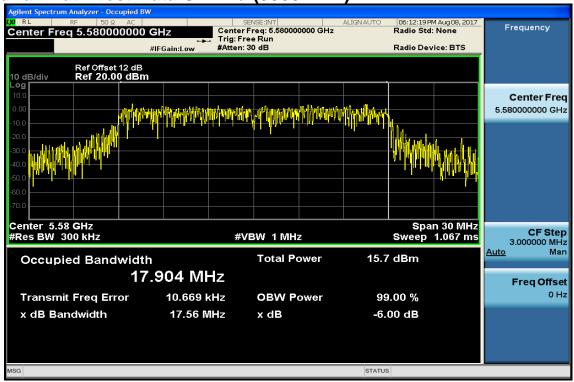


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## 802.11n HT20, 5470~5725 MHz (Main) 99% Band Width Test Data CH-Low (5500 MHz)



#### 99% Band Width Test Data CH-Mid (5580 MHz)



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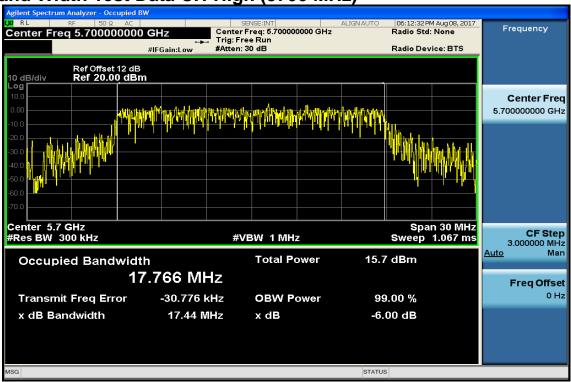
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#### 99% Band Width Test Data CH-High (5700 MHz)



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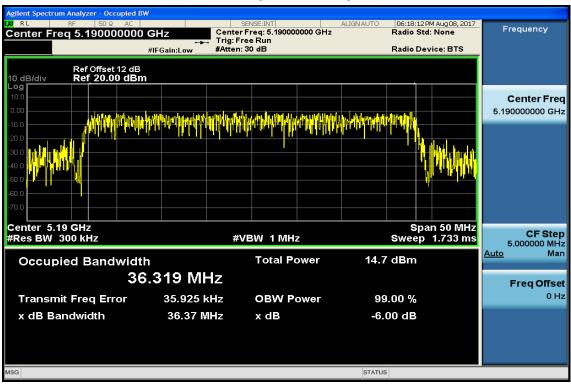
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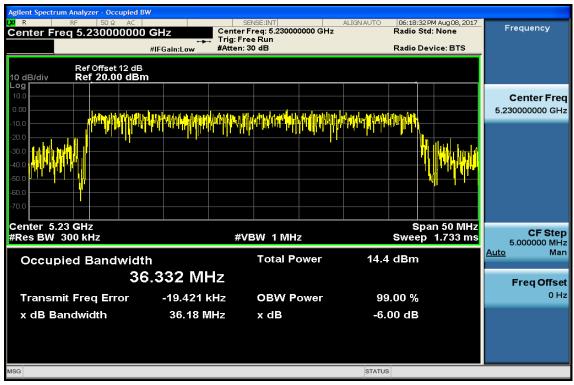


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# 802.11n HT40, 5150~5250 MHz (Main) 99% Band Width Test Data CH-Low (5190 MHz)



### 99% Band Width Test Data CH-High (5230 MHz)



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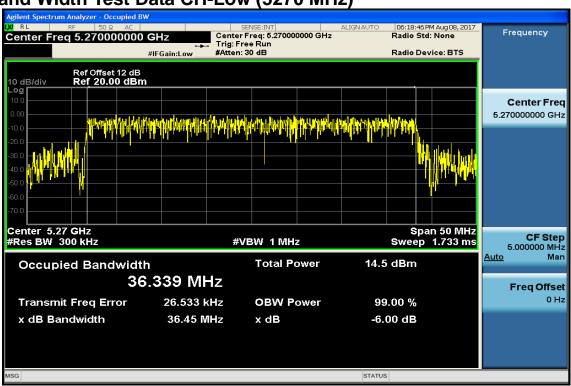
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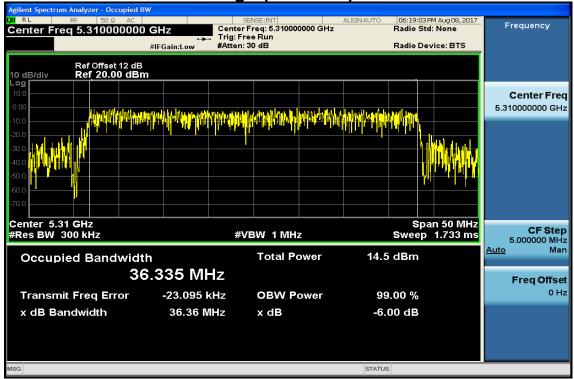


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### 802.11n HT40, 5250~5350 MHz (Main) 99% Band Width Test Data CH-Low (5270 MHz)



#### 99% Band Width Test Data CH-High (5310MHz)



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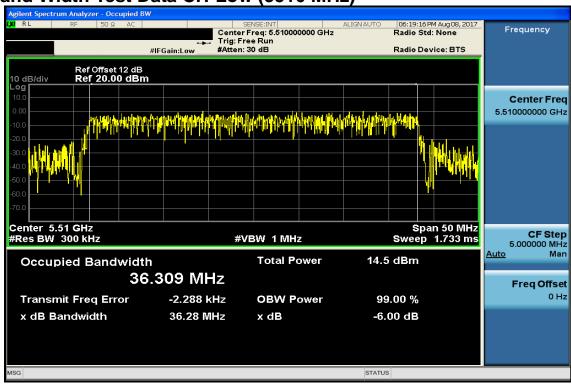
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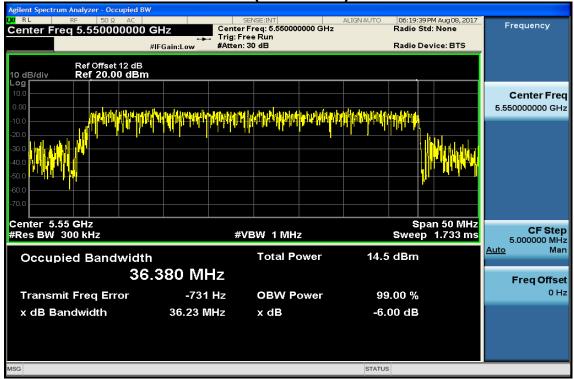


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#### 802.11n HT40, 5470~5725 MHz (Main) 99% Band Width Test Data CH-Low (5510 MHz)



#### 99% Band Width Test Data CH-Mid (5550 MHz)



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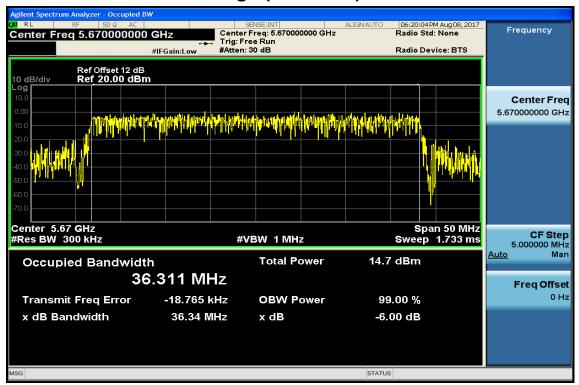
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#### 99% Band Width Test Data CH-High (5670 MHz)



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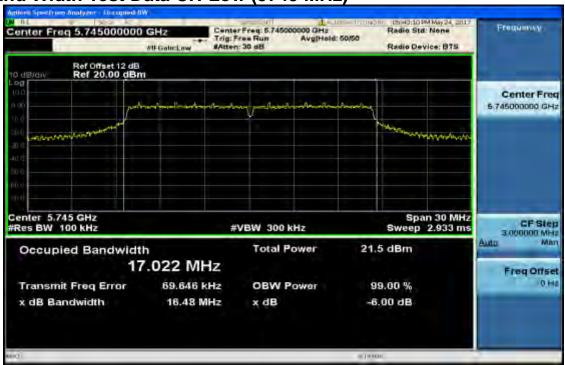
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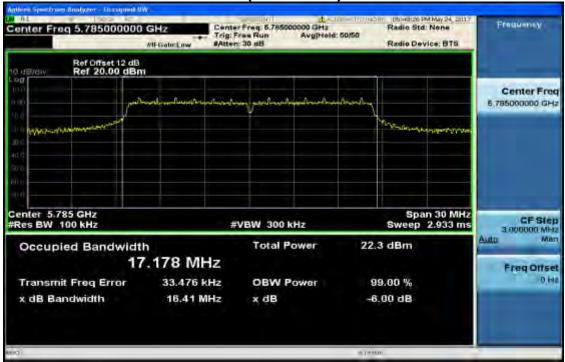
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# 6dB Band Width measure with Peak detector for FCC 802.11a, 5725~5850 MHz (Main)

6dB Band Width Test Data CH-Low (5745 MHz)



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



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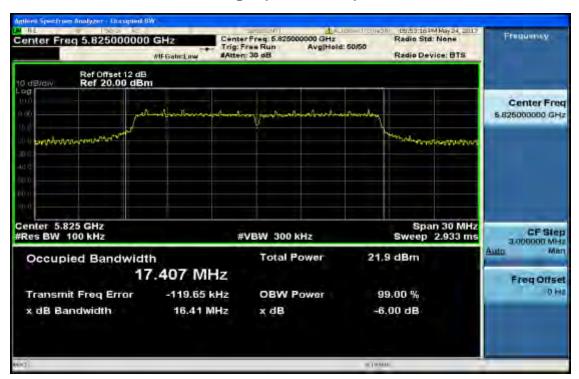
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### 6dB Band Width Test Data CH-High (5825 MHz)



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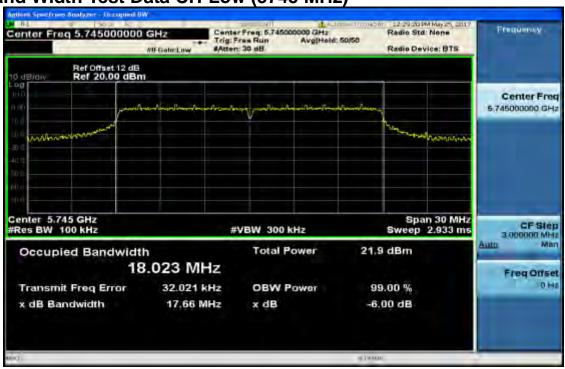
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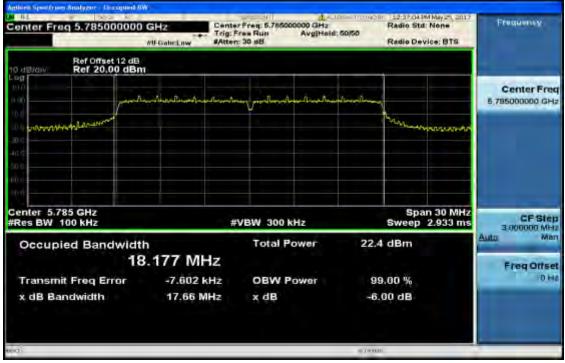


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## 802.11n\_HT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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



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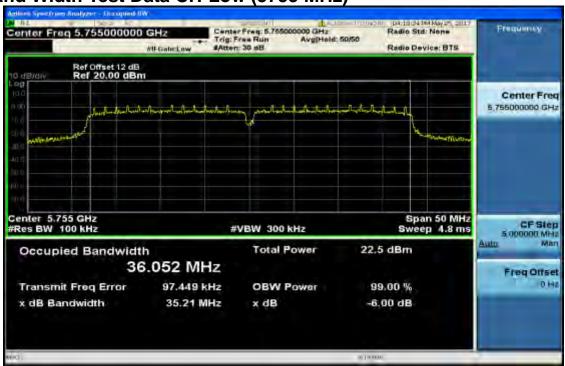
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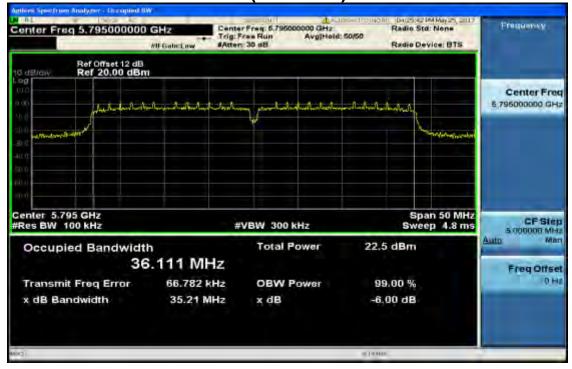


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## 802.11n\_HT40, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5755 MHz)



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



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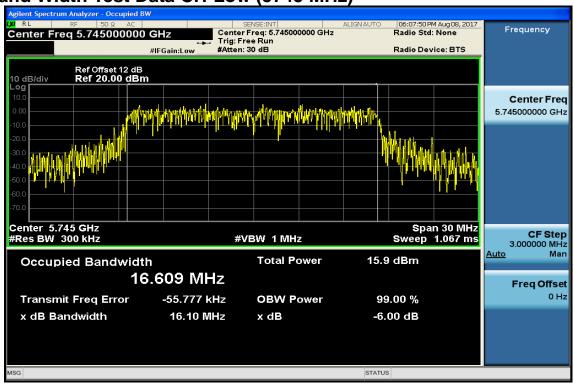
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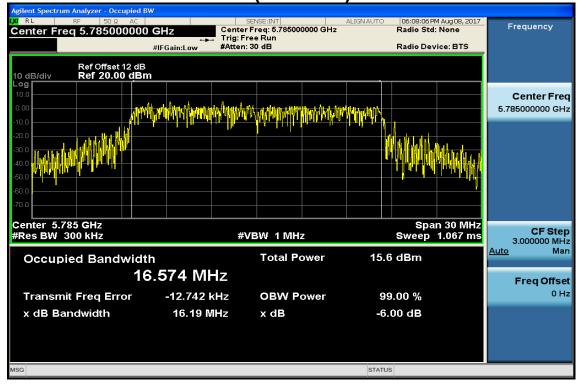
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# 6dB Band Width measure with Average detector for IC 802.11a, 5725~5850 MHz (Main)

6dB Band Width Test Data CH-Low (5745 MHz)



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



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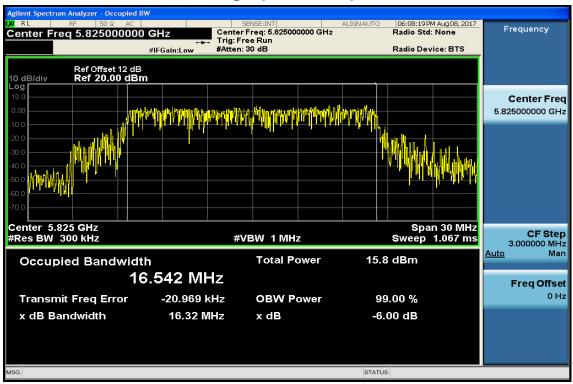
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# 6dB Band Width Test Data CH-High (5825 MHz)



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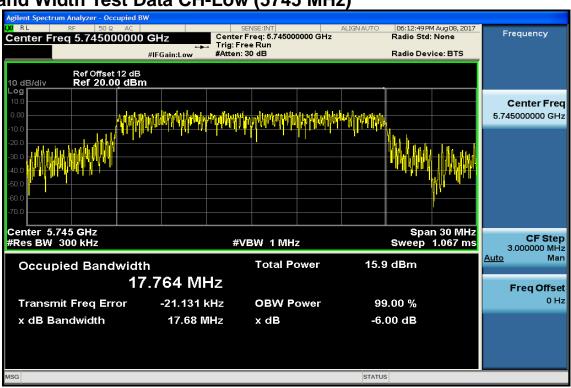
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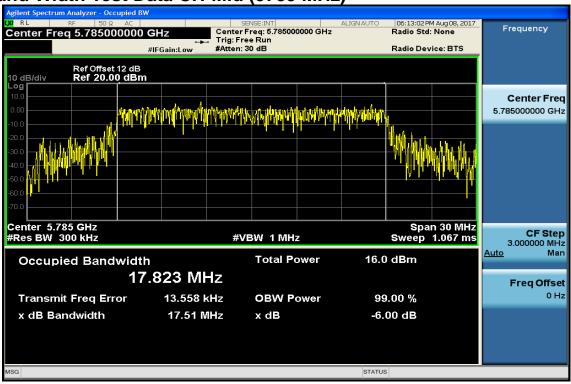


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# 802.11n\_HT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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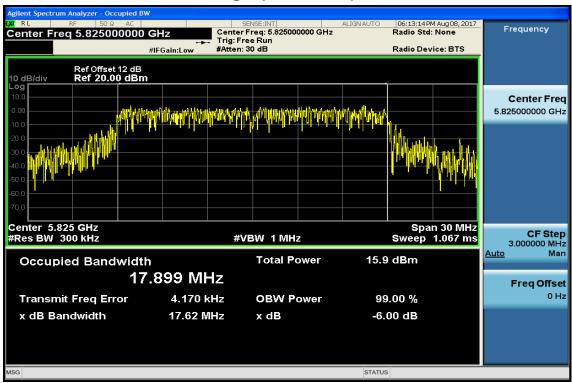
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### 6dB Band Width Test Data CH-High (5825 MHz)



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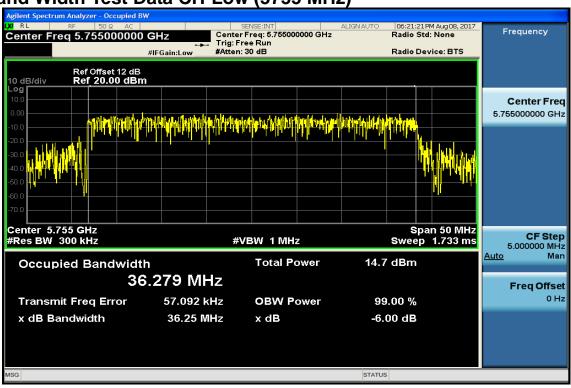
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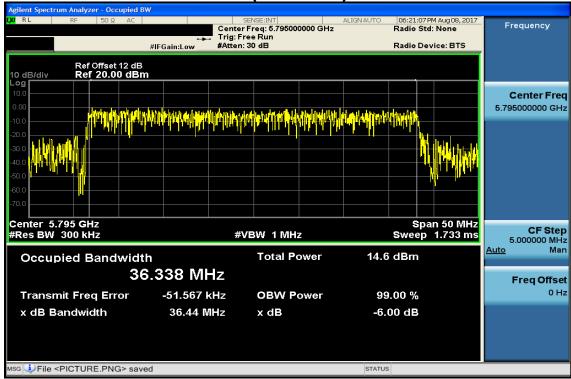


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# 802.11n\_HT40, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5755 MHz)



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



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#### MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

#### 9.1 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)		
	V	Mobile and portable clinet device	250mW(23.98dBm)		
U-NII-2A	V		250mW(23.98dBm) or 11dBm+10 log B		
U-NII-2C	V		250mW(23.98dBm) or 11dBm+10 log B		
U-NII-3	V		1 Watt(30dBm)		

#### IC

<u>~</u>						
OPERZTION FREQUENCY BAND	LIMIT					
5150~5250 MHz	EIRP shall not exceed 200 mW or 10 + 10 log <sub>10</sub> B, dBm					
5250~5350 MHz	Conducted output power shall not exceed 250 mW or 11 +10 log <sub>10</sub> B EIRP shall not exceed 1.0 W or 17 + 10 log <sub>10</sub> B, dBm					
5470-5600 MHz and 5650-5725 MHz	Conducted output power shall not exceed 250 mW or 11 +10 log <sub>10</sub> B EIRP shall not exceed 1.0 W or 17 + 10 log <sub>10</sub> B, dBm					
5725~5850 MHz	Conducted output power shall not exceed 1 W					

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.

#### 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.

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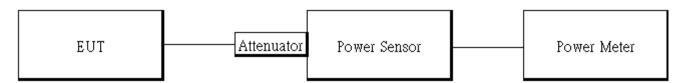
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#### **Measurement Equipment Used** 9.3

Refer to section 8.3 for details.

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017				
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017				
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018				
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018				
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018				

#### 9.4 Test Set-up



#### 9.5 Measurement Result

#### **FCC**

802.11a Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	6M	15.45	35.061		23.98		PASS
44	5220	6M	15.91	38.978		23.98		PASS
48	5240	6M	15.98	39.612		23.98		PASS
52	5260	6M	16.10	40.721	23.98	or 11+10log(B) =	25.77	PASS
60	5300	6M	16.29	42.542	23.98	or 11+10log(B) =	25.77	PASS
64	5320	6M	16.36	43.234	23.98	or 11+10log(B) =	25.77	PASS
100	5500	6M	14.66	29.230	23.98	or 11+10log(B) =	25.72	PASS
116	5580	6M	14.18	26.171	23.98	or 11+10log(B) =	25.72	PASS
140	5700	6M	15.54	35.795	23.98	or 11+10log(B) =	25.77	PASS
149	5745	6M	13.81	24.034		30		PASS
157	5785	6M	14.26	26.658		30		PASS
165	5825	6M	13.62	23.005		30		PASS

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#### 802.11n\_HT20\_Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	MCS0	15.53	35.767		23.98		PASS
44	5220	MCS0	16.00	39.855		23.98		PASS
48	5240	MCS0	15.99	39.764		23.98		PASS
52	5260	MCS0	16.07	40.503	23.98	or 11+10log(B) =	25.77	PASS
60	5300	MCS0	16.06	40.410	23.98	or 11+10log(B) =	25.75	PASS
64	5320	MCS0	16.31	42.804	23.98	or 11+10log(B) =	25.77	PASS
100	5500	MCS0	14.53	28.411	23.98	or 11+10log(B) =	25.77	PASS
116	5580	MCS0	14.33	27.132	23.98	or 11+10log(B) =	25.72	PASS
140	5700	MCS0	15.58	36.181	23.98	or 11+10log(B) =	25.76	PASS
149	5745	MCS0	13.88	24.462		30		PASS
157	5785	MCS0	14.33	27.132		30		PASS
165	5825	MCS0	13.64	23.147		30		PASS

#### 802.11n HT40 Main

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
38	5190	MCS0	16.36	43.270		23.98		PASS
46	5230	MCS0	16.54	45.101		23.98		PASS
54	5270	MCS0	16.50	44.688	23.98	or 11+10log(B) =	27.99	PASS
62	5310	MCS0	16.32	42.873	23.98	or 11+10log(B) =	27.99	PASS
102	5510	MCS0	14.07	25.538	23.98	or 11+10log(B) =	27.99	PASS
110	5550	MCS0	13.02	20.053	23.98	or 11+10log(B) =	27.75	PASS
134	5670	MCS0	13.01	20.007	23.98	or 11+10log(B) =	27.93	PASS
151	5755	MCS0	13.95	24.842		30		PASS
159	5795	MCS0	14.29	26.865		30	·	PASS

<sup>\*</sup> Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.

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IC

#### 802.11a Main

<u> </u>							
СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
52	5260	16.10	40.721	23.98	or 11+10log(B) =	23.20	PASS
60	5300	16.29	42.542	23.98	or 11+10log(B) =	23.19	PASS
64	5320	16.36	43.234	23.98	or 11+10log(B) =	23.16	PASS
100	5500	14.66	29.230	23.98	or 11+10log(B) =	23.16	PASS
116	5580	14.18	26.171	23.98	or 11+10log(B) =	23.16	PASS
140	5700	15.54	35.795	23.98	or 11+10log(B) =	23.18	PASS
149	5745	13.81	24.034		30		PASS
157	5785	14.26	26.658		30		PASS
165	5825	13.62	23.005		30		PASS

#### 802.11n HT20 Main

	<b></b> a	=					
СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
52	5260	16.07	40.503	23.98	or 11+10log(B) =	23.50	PASS
60	5300	16.06	40.410	23.98	or 11+10log(B) =	23.50	PASS
64	5320	16.31	42.804	23.98	or 11+10log(B) =	23.52	PASS
100	5500	14.53	28.411	23.98	or 11+10log(B) =	23.52	PASS
116	5580	14.33	27.132	23.98	or 11+10log(B) =	23.52	PASS
140	5700	15.58	36.181	23.98	or 11+10log(B) =	23.51	PASS
149	5745	13.88	24.462		30		PASS
157	5785	14.33	27.132		30		PASS
165	5825	13.64	23.147		30		PASS

#### 802.11n HT40 Main

		=					
СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
54	5270	16.50	44.688	23.98	or 11+10log(B) =	26.57	PASS
62	5310	16.32	42.873	23.98	or 11+10log(B) =	26.58	PASS
102	5510	14.07	25.538	23.98	or 11+10log(B) =	26.59	PASS
110	5550	13.02	20.053	23.98	or 11+10log(B) =	26.57	PASS
134	5670	13.01	20.007	23.98	or 11+10log(B) =	26.59	PASS
151	5755	13.95	24.842		30		PASS
159	5795	14.29	26.865		30		PASS

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

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#### 802.11a\_Main

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
36	5180	15.45	3.370	18.82	76.177	23.01	or 10+10log(B)=	22.20	PASS
44	5220	15.91	3.370	19.28	84.688	23.01	or 10+10log(B)=	22.17	PASS
48	5240	15.98	3.370	19.35	86.064	23.01	or 10+10log(B)=	22.19	PASS
52	5260	16.10	3.230	19.33	85.669	30	or 17+10log(B)=	29.20	PASS
60	5300	16.29	3.230	19.52	89.500	30	or 17+10log(B)=	29.19	PASS
64	5320	16.36	3.230	19.59	90.954	30	or 17+10log(B)=	29.16	PASS
100	5500	14.66	1.510	16.17	41.383	30	or 17+10log(B)=	29.16	PASS
116	5580	14.18	1.510	15.69	37.053	30	or 17+10log(B)=	29.16	PASS
140	5700	15.54	1.510	17.05	50.678	30	or 17+10log(B)=	29.18	PASS

#### 802.11n HT20 Main

<u> </u>	_11120_IVIGI11								
СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
36	5180	15.53	3.370	18.90	77.712	23.01	or 10+10log(B)=	22.51	PASS
44	5220	16.00	3.370	19.37	86.594	23.01	or 10+10log(B)=	22.54	PASS
48	5240	15.99	3.370	19.36	86.395	23.01	or 10+10log(B)=	22.50	PASS
52	5260	16.07	3.230	19.30	85.209	30	or 17+10log(B)=	29.51	PASS
60	5300	16.06	3.230	19.29	85.013	30	or 17+10log(B)=	29.50	PASS
64	5320	16.31	3.230	19.54	90.051	30	or 17+10log(B)=	29.50	PASS
100	5500	14.53	1.510	16.04	40.224	30	or 17+10log(B)=	29.48	PASS
116	5580	14.33	1.510	15.84	38.414	30	or 17+10log(B)=	29.53	PASS
140	5700	15.58	1.510	17.09	51.226	30	or 17+10log(B)=	29.50	PASS

#### 802.11n\_HT40\_Main

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		RESULT		
38	5190	16.36	3.370	19.73	94.013	23.01	or 10+10log(B)=	25.60	PASS
46	5230	16.54	3.370	19.91	97.991	23.01	or 10+10log(B)=	25.60	PASS
54	5270	16.50	3.230	19.73	94.013	30	or 17+10log(B)=	32.60	PASS
62	5310	16.32	3.230	19.55	90.196	30	or 17+10log(B)=	32.60	PASS
102	5510	14.07	1.510	15.58	36.157	30	or 17+10log(B)=	32.60	PASS
110	5550	13.02	1.510	14.53	28.391	30	or 17+10log(B)=	32.61	PASS
134	5670	13.01	1.510	14.52	28.326	30	or 17+10log(B)=	32.60	PASS

\* Note: EIRP = Average Power + Gain

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#### 10 PEAK POWER SPECTRAL DENSITY

#### 10.1 Standard Applicable

#### **FCC**

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

IC

OPERATION FREQUENCY BAND	LIMIT			
5150~5250 MHz	EIRP spectral density 10 dBm / MHz			
5250~5350 MHz	11dBm / MHz			
5470-5600 MHz and 5650-5725 MHz	11dBm / MHz			
5725~5850 MHz	30dBm / 500 kHz			

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 .
- 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:

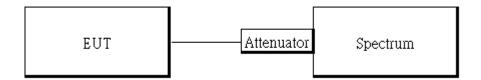
Set RBW=500 kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

- 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

Conducted Emission Test Site											
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018						
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018						
Coaxial Cable	HUBER+SUHN ER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018						
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018						

#### 10.4 Test Set-up



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#### 10.5 Measurement Result

POWER	DENSITY 802.	11a MOD	E	POWER DE	NSITY 802.11n	HT20 M	ODE
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	-2.07	17	-19.07	5180	-4.60	17	-21.60
5220	-0.04	17	-17.04	5220	-3.14	17	-20.14
5240	1.29	17	-15.71	5240	-2.77	17	-19.77
5260	-0.58	11	-11.58	5260	-2.22	11	-13.22
5300	-1.71	11	-12.71	5300	-2.17	11	-13.17
5320	-1.39	11	-12.39	5320	-3.15	11	-14.15
5500	-2.07	11	-13.07	5500	-4.19	11	-15.19
5580	-4.30	11	-15.30	5580	-4.35	11	-15.35
5700	-0.46	11	-11.46	5700	-3.46	11	-14.46
5745	8.49	30	-21.51	5745	7.74	30	-22.26
5785	8.89	30	-21.11	5785	8.29	30	-21.71
5825	8.34	30	-21.66	5825	8.41	30	-21.59

POWER DE	NSITY 802.11n	HT 40 M	ODE
Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5190	-8.87	17	-25.87
5230	-9.77	17	-26.77
5270	-7.8	11	-18.80
5310	-7.9	11	-18.90
5510	-11.52	11	-22.52
5550	-11.98	11	-22.98
5670	-10.84	11	-21.84
5755	5.18	30	-24.82
5795	4.93	30	-25.07

#### **EIRP**

E	EIRP spectral density 802.11a MODE					EIRP spectral density 802.11n HT20 MODE					
Freq. (MHz)	PPSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)	Freq. (MHz)	PPSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)
5180	-2.07	3.37	1.30	10	-12.07	5180	-4.60	3.37	-1.23	10	-14.60
5220	-0.04	3.37	3.33	10	-10.04	5220	-3.14	3.37	0.23	10	-13.14
5240	1.29	3.37	4.66	10	-8.71	5240	-2.77	3.37	0.60	10	-12.77

EIRP spectral density 802.11n HT40 MODE							
Freq. (MHz)	PPSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)		
5180	-8.87	3.37	-5.50	10	-18.87		
5220	-9.77	3.37	-6.40	10	-19.77		

Note:

SISO offset=

12 dB

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### 802.11a 5150~5250 MHz

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



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



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



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### 802.11a 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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### 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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## Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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#### 802.11a 5725~5850 MHz

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



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



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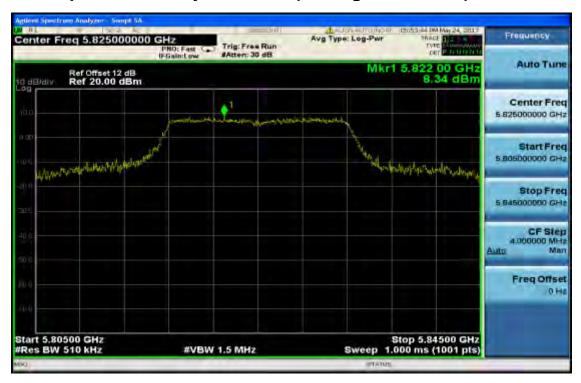
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### Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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



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



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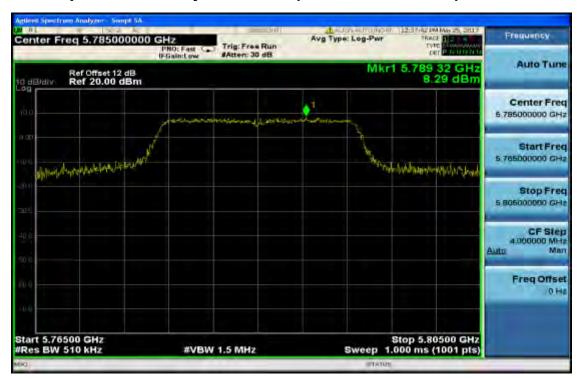
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# 802.11n HT20, 5725~5850 MHz

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



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



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### Peak Power Spectral Density Data Plot (CH High 5825 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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### 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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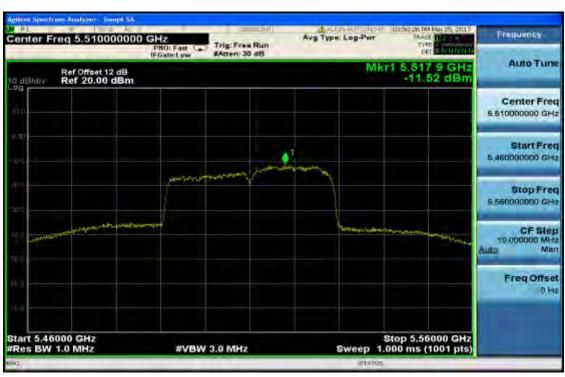
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### 802.11n HT40, 5470~5725 MHz Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



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



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



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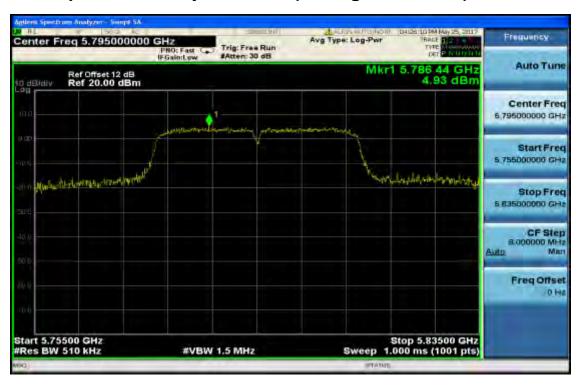


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### 802.11n HT40, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5755 MHz)



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



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#### 11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

#### 11.1 Standard Applicable

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

- 1. For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
- 2. For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

APPLICABLE TO	LIMIT				
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRENGTH AT 3m				
	PK: 74 (dBμV/m)	AV 54 (dBμV/m)			
APPLICABLE 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 15.407(b)(3) RSS-247 6.2.3.2	PK: -27 (dBm/MHz)	PK: 68.3 (dBµV/m)			
15.407(b)(4)(i) RSS-247 6.2.4.2	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  $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

#### **Measurement Equipment Used**

SGS 966 Chamber No.C								
EQUIPMENT	EQUIPMENT	EQUIPMENT	EQUIPMENT	EQUIPMENT	EQUIPMENT			
TYPE	TYPE	TYPE	TYPE	TYPE	TYPE			
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018			
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018			
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017			
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017			
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017			
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018			
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	01/05/2017	01/04/2018			
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	01/05/2017	01/04/2018			
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017			
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018			
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017			
Pre-Amplifier	EMC Instru- ments Corp.	EMC184045	980135	01/05/2017	01/04/2018			

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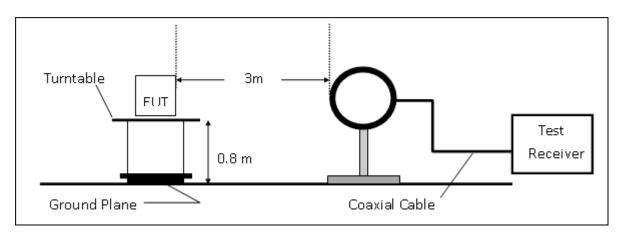
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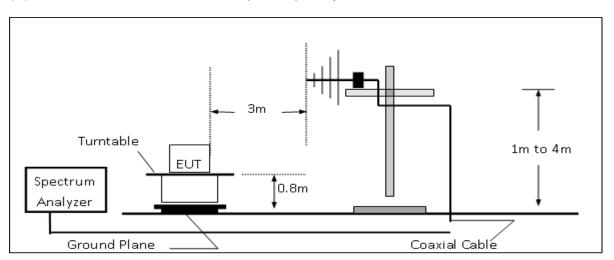
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#### 11.3 Test SET-UP

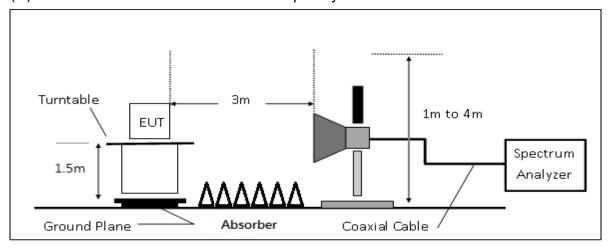
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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#### 11.4 Measurement Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- 3. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 11. Repeat above procedures until all frequency measured were complete.

#### 11.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(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**

Refer to attach tabular data sheets.

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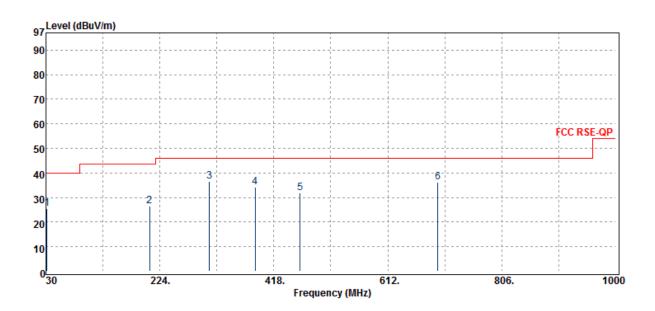
### **Radiated Spurious Emission Measurement Result Below 1GHz Worst-Case Data:**

#### 802.11a 5150~5250 MHz

**Operation Band Test Date** :802.11aB1 :2017-05-16

Fundamental Frequency Temp./Humi. :5220 MHz :22 deg C / 61 RH

**Operation Mode** :Tx CH MID Engineer :Mike EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
31.94	S	Peak	34.65	-9.11	25.54	40.00	-14.46
206.54	S	Peak	36.24	-9.71	26.53	43.50	-16.97
308.39	S	Peak	42.27	-5.57	36.70	46.00	-9.30
385.99	S	Peak	38.49	-4.31	34.18	46.00	-11.82
462.62	S	Peak	34.30	-2.56	31.74	46.00	-14.26
697.36	S	Peak	34.74	1.36	36.10	46.00	-9.90

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**Operation Band** :802.11aB1 Fundamental Frequency

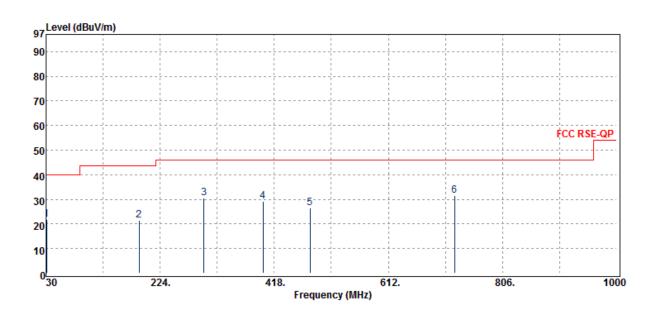
:5220 MHz Operation Mode :Tx CH MID EUT Pol. :H Plane

:2017-05-16 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
30.97	S	Peak	31.10	-9.15	21.95	40.00	-18.05
188.11	S	Peak	30.52	-9.20	21.32	43.50	-22.18
298.69	S	Peak	36.39	-5.95	30.44	46.00	-15.56
398.60	S	Peak	33.02	-3.97	29.05	46.00	-16.95
479.11	S	Peak	28.94	-2.39	26.55	46.00	-19.45
724.52	S	Peak	29.74	1.69	31.43	46.00	-14.57

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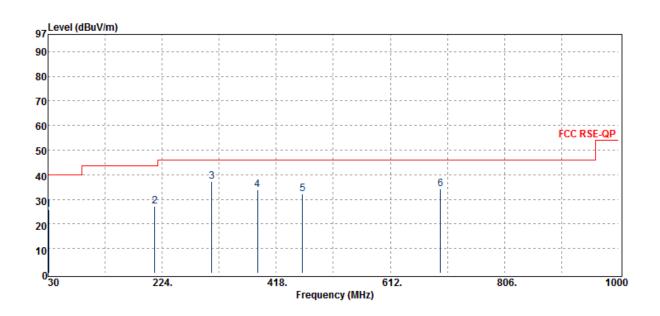
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#### 802.11a 5250~5350 MHz

:2017-05-16 **Operation Band** :802.11aB2 **Test Date** 

Fundamental Frequency :5300 MHz Temp./Humi. :22 deg\_C / 61 RH

**Operation Mode** :Tx CH MID Engineer :Mike EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
30.97	S	Peak	34.86	-9.15	25.71	40.00	-14.29
211.39	S	Peak	36.81	-9.70	27.11	43.50	-16.39
308.39	S	Peak	42.94	-5.57	37.37	46.00	-8.63
385.99	S	Peak	38.17	-4.31	33.86	46.00	-12.14
462.62	S	Peak	34.67	-2.56	32.11	46.00	-13.89
697.36	S	Peak	32.98	1.36	34.34	46.00	-11.66

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**Operation Band** :802.11aB2 Fundamental Frequency

Operation Mode EUT Pol.

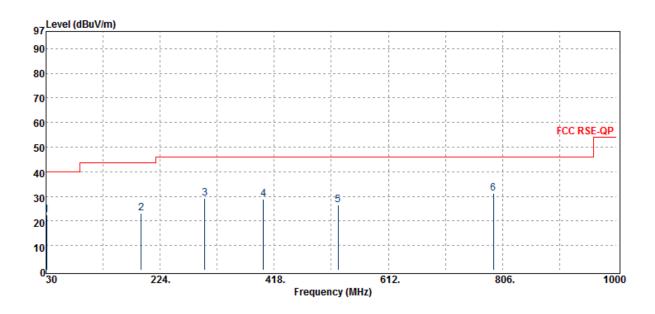
:5300 MHz :Tx CH MID :H Plane

:2017-05-16 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
30.97	S	Peak	31.52	-9.15	22.37	40.00	-17.63
191.99	S	Peak	32.53	-9.42	23.11	43.50	-20.39
299.66	S	Peak	35.00	-5.93	29.07	46.00	-16.93
399.57	S	Peak	32.86	-3.92	28.94	46.00	-17.06
526.64	S	Peak	27.83	-1.44	26.39	46.00	-19.61
790.48	S	Peak	28.44	2.86	31.30	46.00	-14.70

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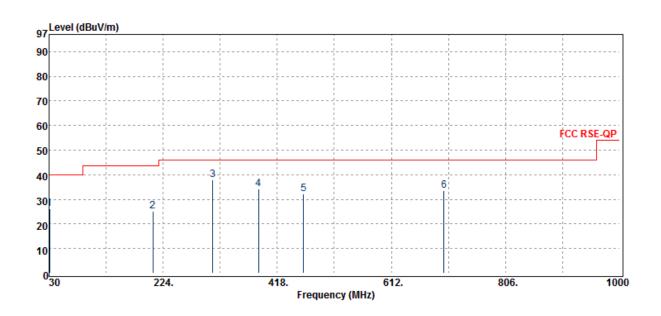
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#### 802.11a, 5470~5725 MHz

**Operation Band** :2017-05-16 **Test Date** :802.11aB3

Fundamental Frequency :5580 MHz Temp./Humi. :22 deg\_C / 61 RH

Operation Mode :Tx CH MID Engineer :Mike EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
30.97	S	Peak	35.22	-9.15	26.07	40.00	-13.93
206.54	S	Peak	35.03	-9.71	25.32	43.50	-18.18
308.39	S	Peak	43.36	-5.57	37.79	46.00	-8.21
385.99	S	Peak	38.52	-4.31	34.21	46.00	-11.79
462.62	S	Peak	34.67	-2.56	32.11	46.00	-13.89
701.24	S	Peak	32.18	1.44	33.62	46.00	-12.38

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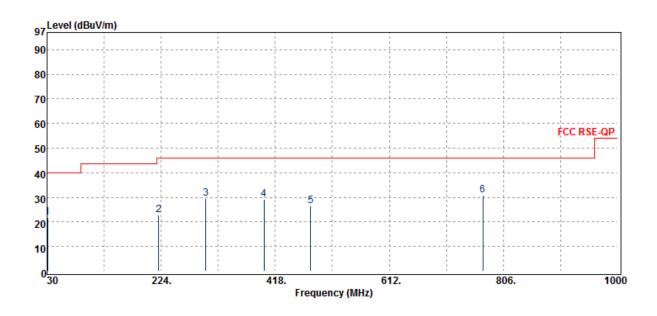


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**Operation Band** :2017-05-16 :802.11aB3 **Test Date Fundamental Frequency** :5580 MHz Temp./Humi. :22 deg\_C / 61 RH

Operation Mode :Tx CH MID Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
30.97	S	Peak	31.09	-9.15	21.94	40.00	-18.06
220.12	S	Peak	32.01	-9.25	22.76	46.00	-23.24
299.66	S	Peak	35.49	-5.93	29.56	46.00	-16.44
398.60	S	Peak	33.09	-3.97	29.12	46.00	-16.88
478.14	S	Peak	28.78	-2.43	26.35	46.00	-19.65
771.08	S	Peak	28.43	2.61	31.04	46.00	-14.96

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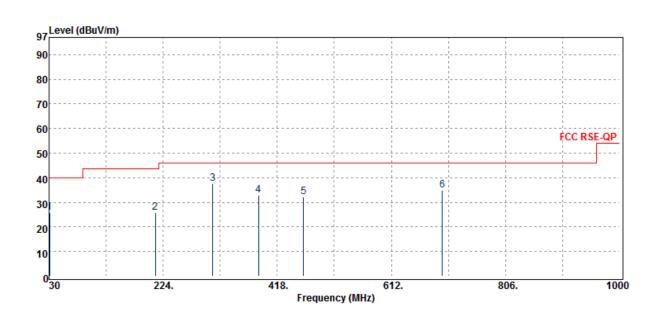
#### 802.11a, 5725~5850 MHz

**Operation Band** :2017-05-16 **Test Date** :802.11aB4

Fundamental Frequency :5785 MHz Temp./Humi. :22 deg\_C / 61 RH

Operation Mode :Tx CH MID Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
30.97	S	Peak	35.13	-9.15	25.98	40.00	-14.02
210.42	S	Peak	35.53	-9.76	25.77	43.50	-17.73
308.39	S	Peak	43.14	-5.57	37.57	46.00	-8.43
385.99	S	Peak	37.18	-4.31	32.87	46.00	-13.13
462.62	S	Peak	34.67	-2.56	32.11	46.00	-13.89
698.33	S	Peak	33.52	1.40	34.92	46.00	-11.08

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**Operation Band** :802.11aB4 Fundamental Frequency :5785 MHz Operation Mode

EUT Pol.

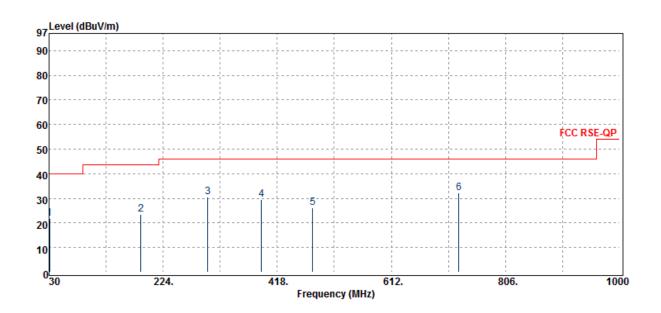
:Tx CH MID :H Plane

:2017-05-16 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
30.97	S	Peak	30.98	-9.15	21.83	40.00	-18.17
186.17	S	Peak	32.59	-9.10	23.49	43.50	-20.01
299.66	S	Peak	36.31	-5.93	30.38	46.00	-15.62
390.84	S	Peak	33.84	-4.18	29.66	46.00	-16.34
478.14	S	Peak	28.68	-2.43	26.25	46.00	-19.75
726.46	S	Peak	30.42	1.74	32.16	46.00	-13.84

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

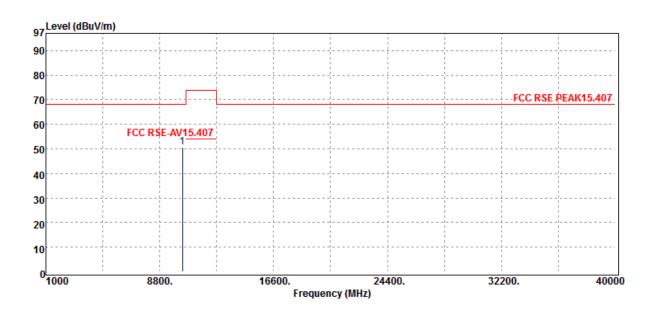
# Radiated Spurious Emission Measurement Result 802.11a, 5150~5250 MHz

**Operation Band** :2017-05-16 :802.11aB1 Test Date

**Fundamental Frequency** :5180 MHz Temp./Humi. :23 deg C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10360.00	Н	Peak	32.53	18.29	50.82	68.30	-17.48

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**Operation Band** :802.11aB1 Fundamental Frequency :5180 MHz **Operation Mode** 

EUT Pol.

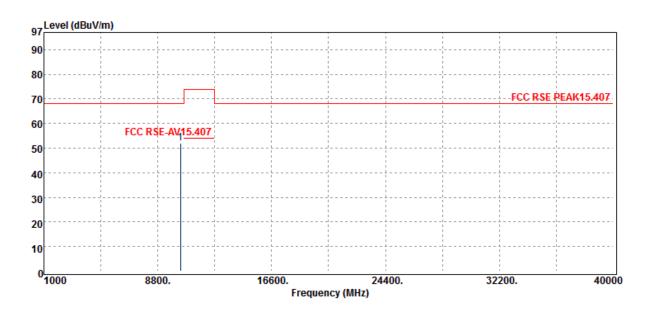
:Tx CH LOW :H Plane

:2017-05-16 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10360.00	Н	Peak	33.84	18.29	52.13	68.30	-16.17

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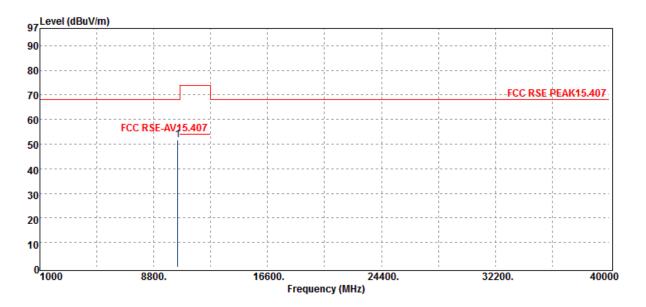
Page: 114 of 236

:2017-05-15 **Operation Band** :802.11aB1 **Test Date** 

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer :Mike EUT Pol.

:H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10440.00	Н	Peak	33.07	18.69	51.76	68.30	-16.54

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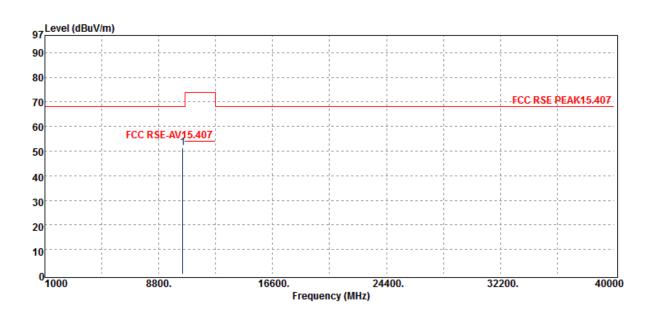


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:2017-05-15 **Operation Band** :802.11aB1 **Test Date** 

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer :Mike EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10440.00	Н	Peak	32.57	18.69	51.26	68.30	-17.04

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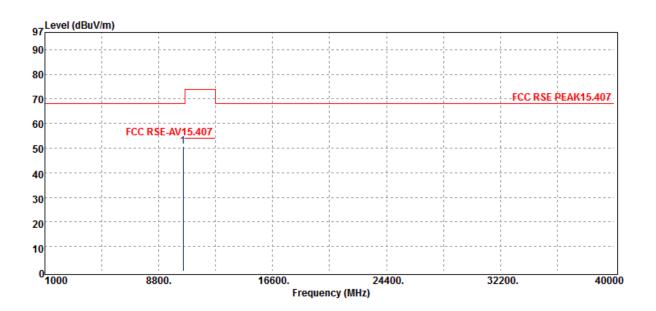
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB1 :5240 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10480.00	Н	Peak	32.38	18.30	50.68	68.30	-17.62

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**Operation Band** :802.11aB1 Fundamental Frequency :5240 MHz **Operation Mode** :Tx CH HIGH

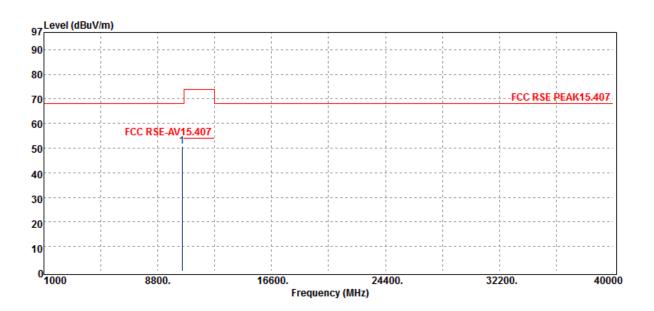
EUT Pol. :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB	
10480.00	Н	Peak	32.30	18.30	50.60	68.30	-17.70	

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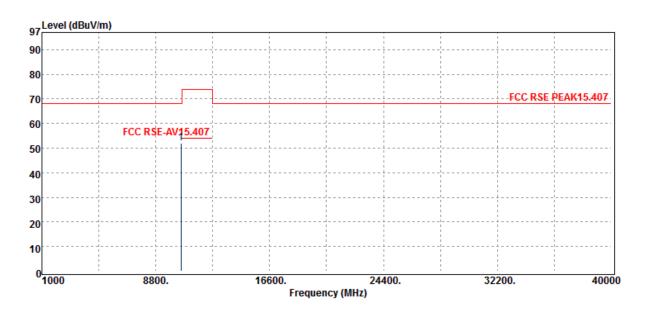
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### Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

**Operation Band** :802.11aB2 **Test Date** :2017-05-15

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10520.00	Н	Peak	32.79	19.38	52.17	68.30	-16.13

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

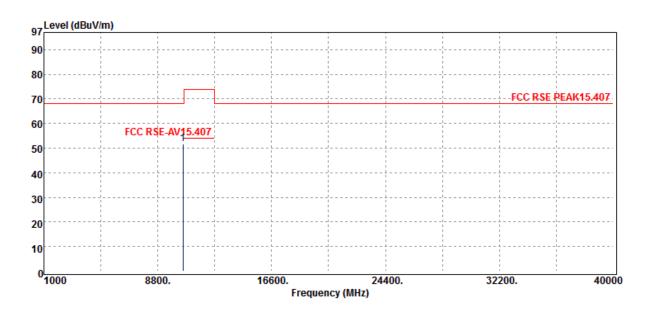
:802.11aB2 :5260 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10520.00	Н	Peak	32.45	19.38	51.83	68.30	-16.47

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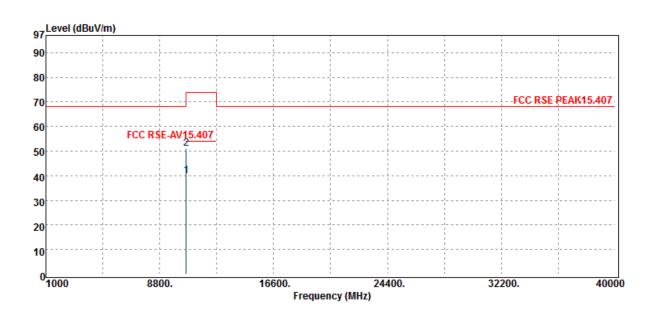


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:2017-05-15 **Operation Band** :802.11aB2 **Test Date** 

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer :Mike EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10600.00	Н	Average	20.88	18.91	39.79	54.00	-14.21
10600.00	Н	Peak	32.14	18.91	51.05	74.00	-22.95

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**Operation Band** :802.11aB2 Fundamental Frequency :5300 MHz

**Operation Mode** 

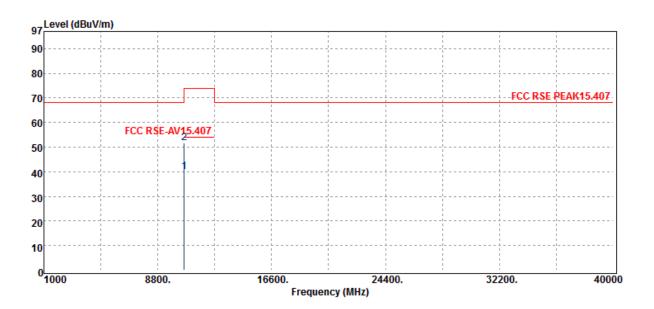
:Tx CH MID EUT Pol. :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
10600.00	Н	Average	20.91	18.91	39.82	54.00	-14.18
10600.00	Н	Peak	32.78	18.91	51.69	74.00	-22.31

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

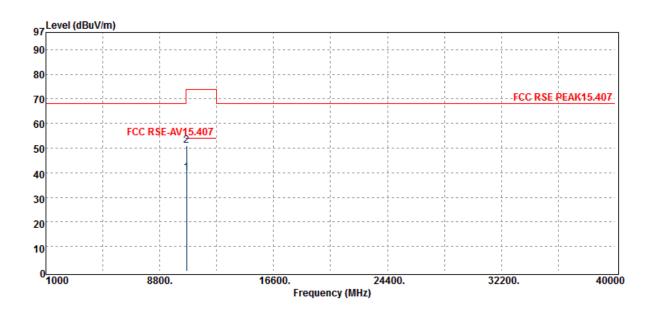
:802.11aB2 :5320 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10640.00	Н	Average	20.81	19.19	40.00	54.00	-14.00
10640.00	Н	Peak	31.86	19.19	51.05	74.00	-22.95

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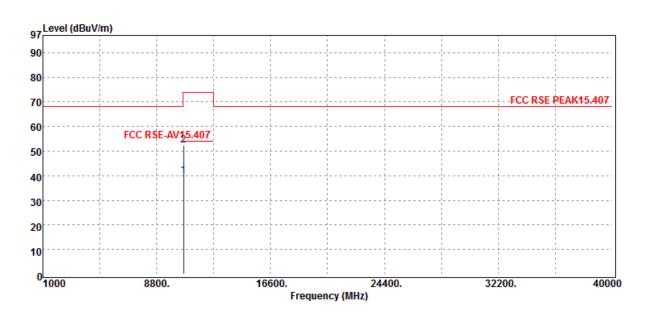
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5320 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
10640.00	Н	Average	20.77	19.19	39.96	54.00	-14.04
10640.00	Н	Peak	33.10	19.19	52.29	74.00	-21.71

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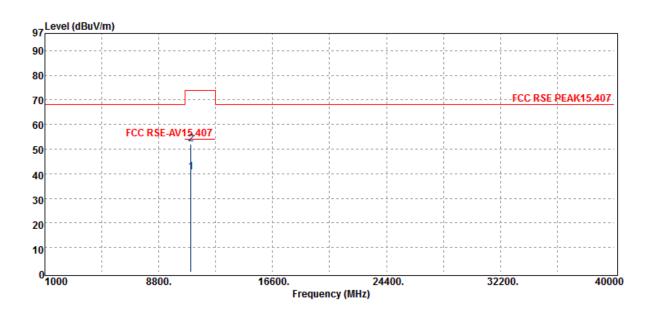
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### Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

**Operation Band** :802.11aB3 **Test Date** :2017-05-15 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
11000.00	Н	Average	20.52	20.16	40.68	54.00	-13.32
11000.00	Н	Peak	31.99	20.16	52.15	74.00	-21.85

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

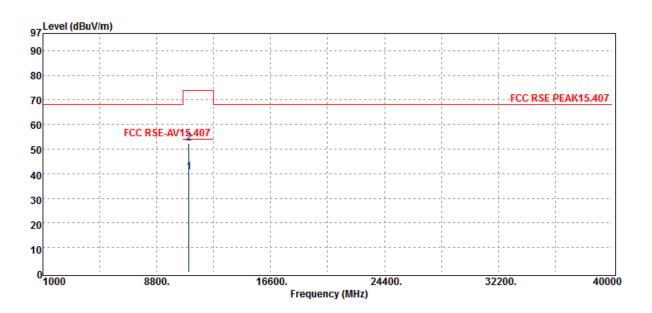
:802.11aB3 :5500 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11000.00	Н	Average	20.49	20.16	40.65	54.00	-13.35
11000.00	Н	Peak	32.10	20.16	52.26	74.00	-21.74

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**Operation Band** Fundamental Frequency

**Operation Mode** EUT Pol.

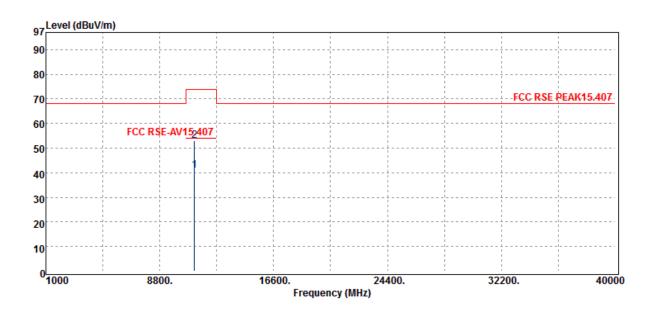
:802.11aB3 :5580 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
11160.00	Н	Average	20.68	20.44	41.12	54.00	-12.88
11160.00	Н	Peak	32.44	20.44	52.88	74.00	-21.12

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

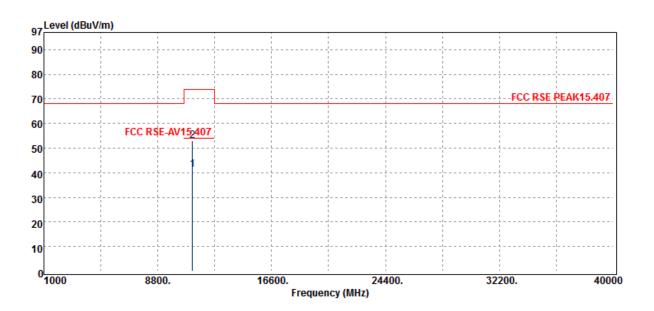
:802.11aB3 :5580 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
11160.00	Н	Average	20.73	20.44	41.17	54.00	-12.83
11160.00	Н	Peak	32.70	20.44	53.14	74.00	-20.86

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

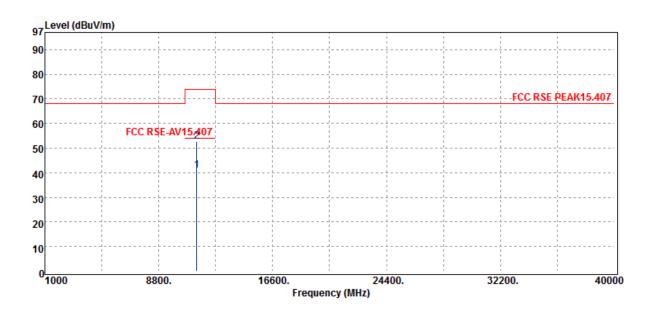
:802.11aB3 :5700 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11400.00	Н	Average	20.55	20.56	41.11	54.00	-12.89
11400.00	Н	Peak	32.13	20.56	52.69	74.00	-21.31

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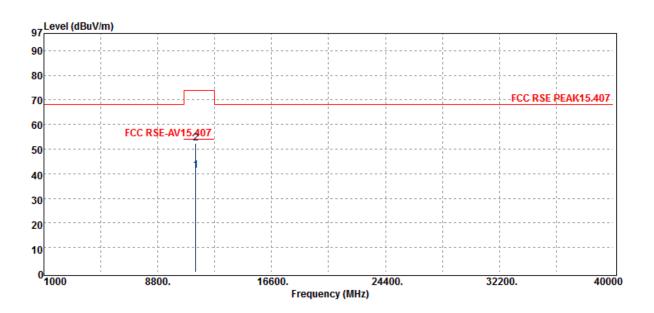
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11400.00	Н	Average	20.57	20.56	41.13	54.00	-12.87
11400.00	Н	Peak	31.74	20.56	52.30	74.00	-21.70

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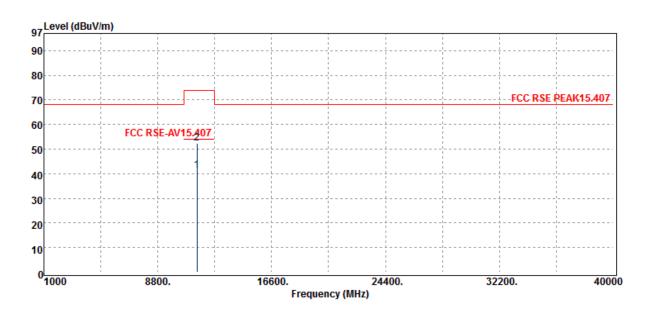
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## Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

**Operation Band** :802.11aB4 **Test Date** :2017-05-15

Fundamental Frequency :5745 MHz Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11490.00	Н	Average	20.82	20.42	41.24	54.00	-12.76
11490.00	Н	Peak	31.80	20.42	52.22	74.00	-21.78

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

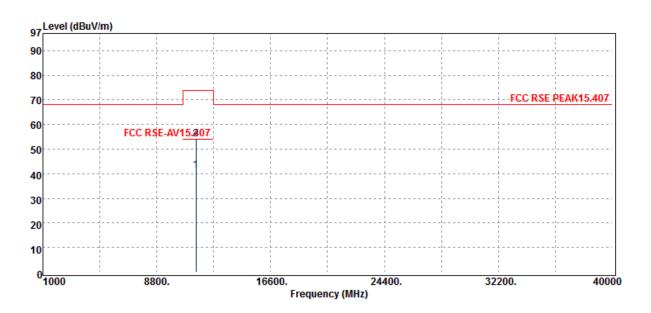
:802.11aB4 :5745 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
							_
11490.00	Н	Average	20.77	20.42	41.19	54.00	-12.81
11490.00	Н	Peak	33.71	20.42	54.13	74.00	-19.87

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**Operation Band** Fundamental Frequency

**Operation Mode** EUT Pol.

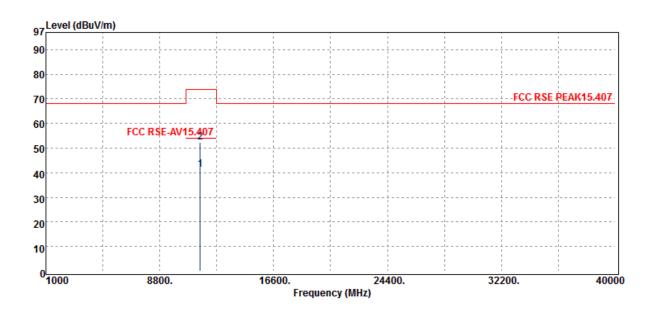
:802.11aB4 :5785 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11570.00	Н	Average	20.73	20.58	41.31	54.00	-12.69
11570.00	Н	Peak	31.68	20.58	52.26	74.00	-21.74

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

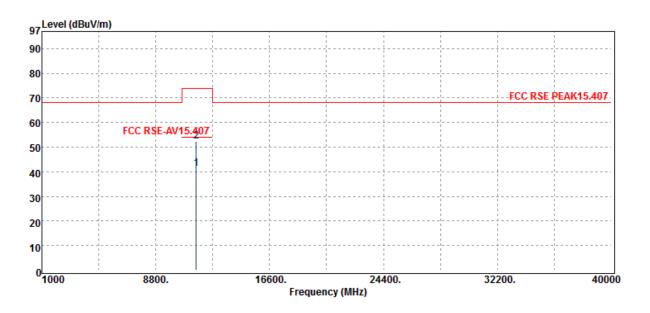
:802.11aB4 :5785 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11570.00	Н	Average	20.76	20.58	41.34	54.00	-12.66
11570.00	Н	Peak	31.77	20.58	52.35	74.00	-21.65

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

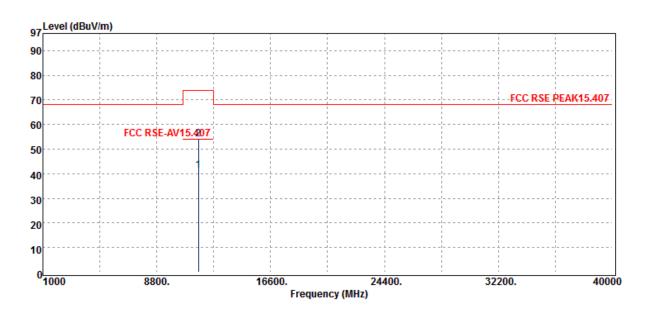
:802.11aB4 :5825 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11650.00	Н	Average	20.78	20.43	41.21	54.00	-12.79
11650.00	Н	Peak	33.65	20.43	54.08	74.00	-19.92

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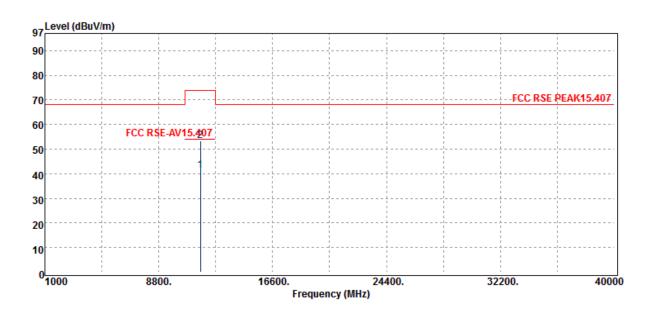
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB4 :5825 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11650.00	Н	Average	20.74	20.43	41.17	54.00	-12.83
11650.00	Н	Peak	33.09	20.43	53.52	74.00	-20.48

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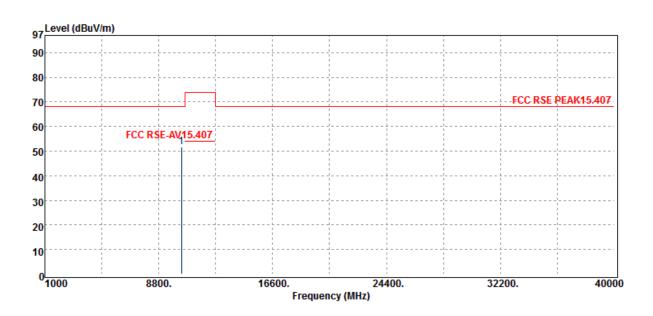
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# Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz

**Operation Band** :802.11n20B1 **Test Date** :2017-05-15 Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10360.00	Н	Peak	33.47	18.29	51.76	68.30	-16.54

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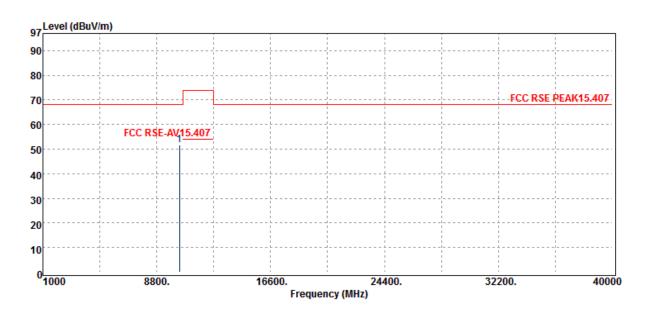
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**Operation Band** :802.11n20B1 Fundamental Frequency :5180 MHz **Operation Mode** :Tx CH LOW EUT Pol. :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10360.00	Н	Peak	33.31	18.29	51.60	68.30	-16.70

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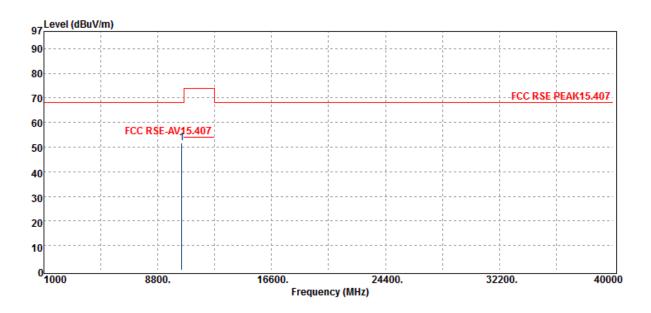


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:2017-05-15 **Operation Band** :802.11n20B1 **Test Date** Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH MID Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10440.00	Н	Peak	33.07	18.69	51.76	68.30	-16.54

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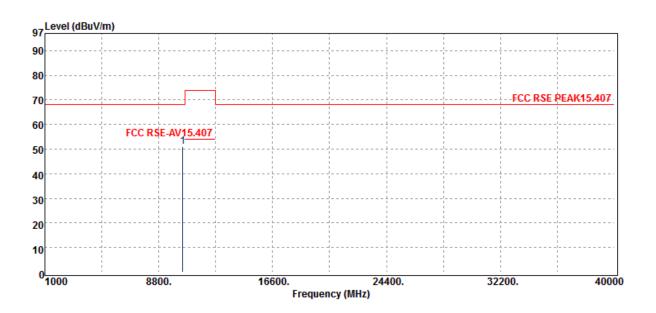
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B1 :5220 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10440.00	Н	Peak	32.21	18.69	50.90	68.30	-17.40

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

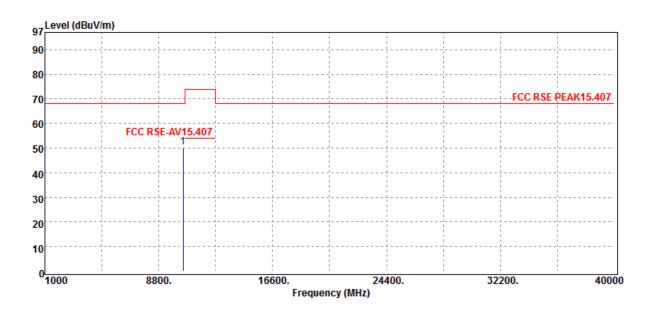
:802.11n20B1 :5240 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10480.00	Н	Peak	32.12	18.30	50.42	68.30	-17.88

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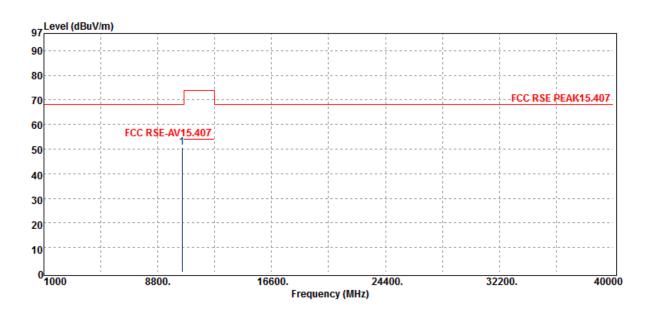
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B1 :5240 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10480.00	Н	Peak	32.29	18.30	50.59	68.30	-17.71

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:2017-05-15

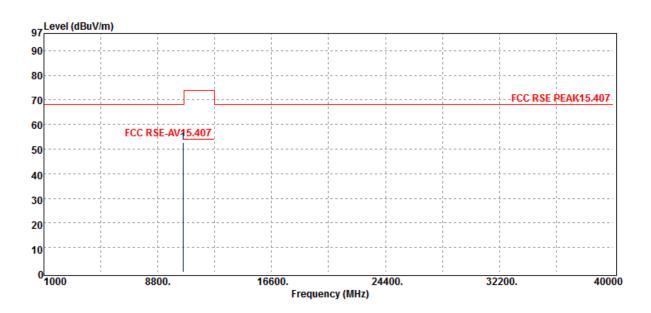
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## Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz

**Operation Band** :802.11n20B2 **Test Date** Fundamental Frequency :5260 MHz

Temp./Humi. :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10520.00	Н	Peak	33.27	19.38	52.65	68.30	-15.65

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

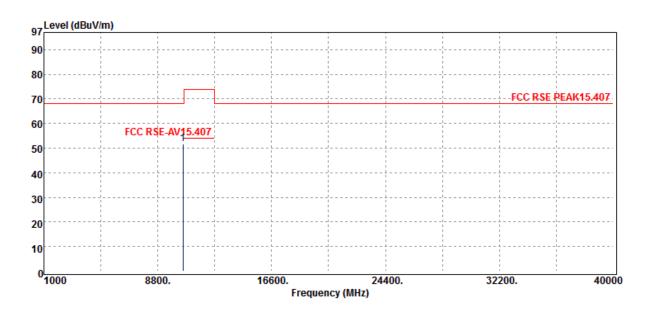
:802.11n20B2 :5260 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10520.00	Н	Peak	32.33	19.38	51.71	68.30	-16.59

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

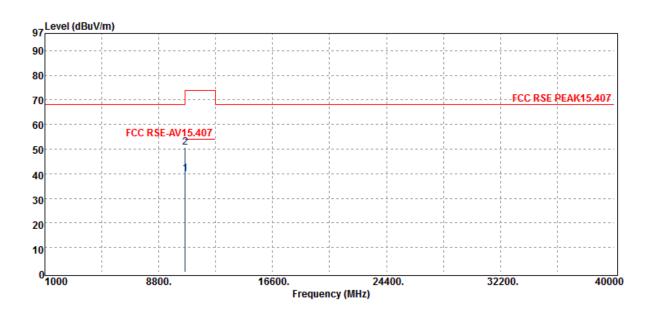
:802.11n20B2 :5300 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10600.00	Н	Average	20.89	18.91	39.80	54.00	-14.20
10600.00	Н	Peak	31.94	18.91	50.85	74.00	-23.15

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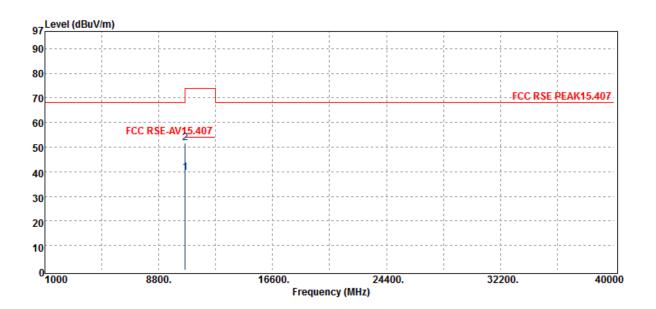
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5300 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
10600.00	Н	Average	20.77	18.91	39.68	54.00	-14.32
10600.00	Н	Peak	32.91	18.91	51.82	74.00	-22.18

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

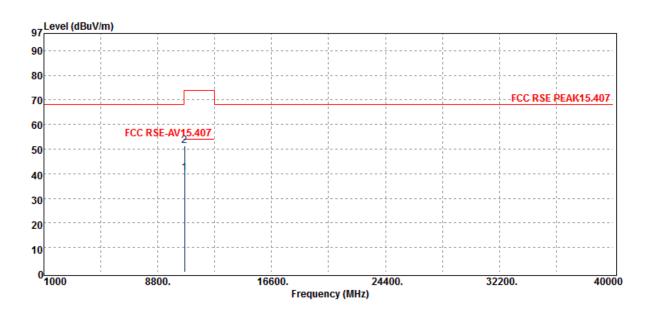
:802.11n20B2 :5320 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10640.00	Н	Average	20.94	19.19	40.13	54.00	-13.87
10640.00	Н	Peak	32.28	19.19	51.47	74.00	-22.53

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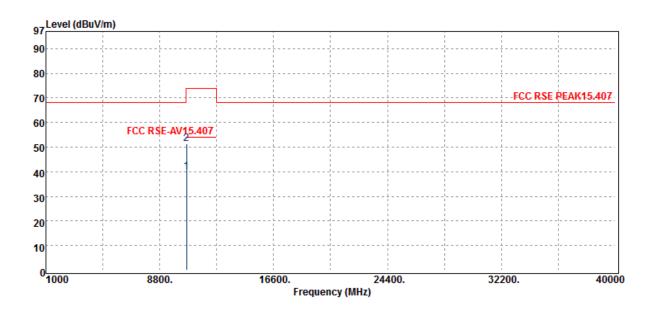
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
10640.00	Н	Average	20.90	19.19	40.09	54.00	-13.91
10640.00	Н	Peak	32.16	19.19	51.35	74.00	-22.65

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

**Operation Band** :802.11n20B3 Fundamental Frequency :5500 MHz

**Operation Mode** 

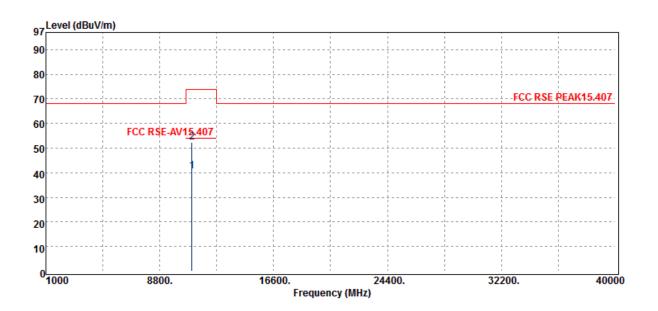
:Tx CH LOW EUT Pol. :H Plane

**Test Date** :2017-05-15

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11000.00	Н	Average	20.48	20.16	40.64	54.00	-13.36
11000.00	Н	Peak	32.17	20.16	52.33	74.00	-21.67

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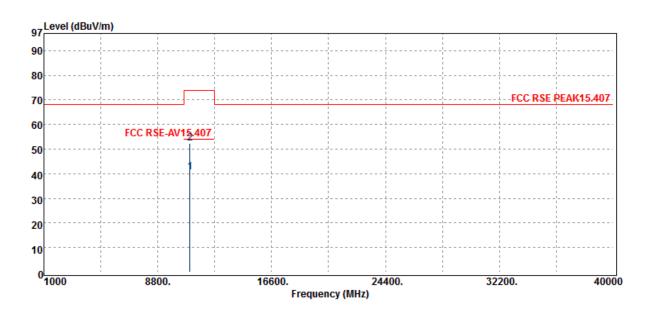
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11000.00	Н	Average	20.50	20.16	40.66	54.00	-13.34
11000.00	Н	Peak	32.32	20.16	52.48	74.00	-21.52

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

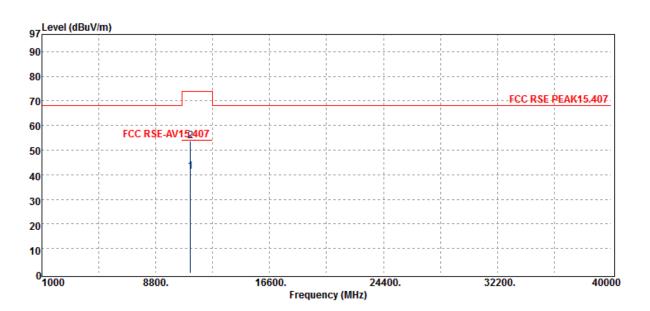
:802.11n20B3 :5580 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11160.00	Н	Average	20.85	20.44	41.29	54.00	-12.71
11160.00	Н	Peak	33.32	20.44	53.76	74.00	-20.24

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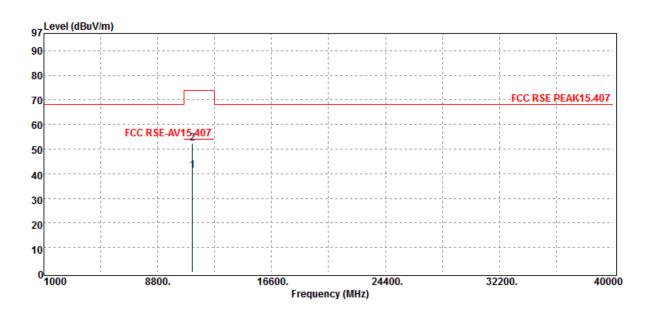
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5580 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11160.00	Н	Average	20.81	20.44	41.25	54.00	-12.75
11160.00	Н	Peak	31.92	20.44	52.36	74.00	-21.64

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

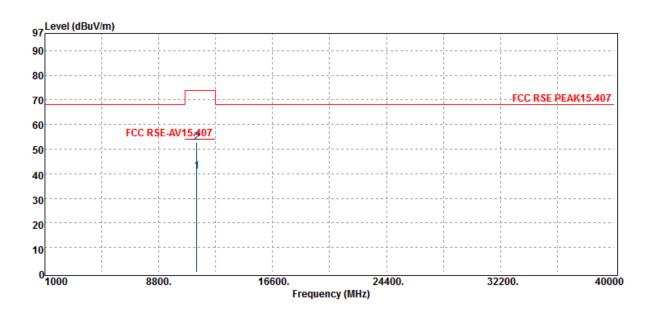
:802.11n20B3 :5700 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11400.00	Н	Average	20.54	20.56	41.10	54.00	-12.90
11400.00	Н	Peak	32.29	20.56	52.85	74.00	-21.15

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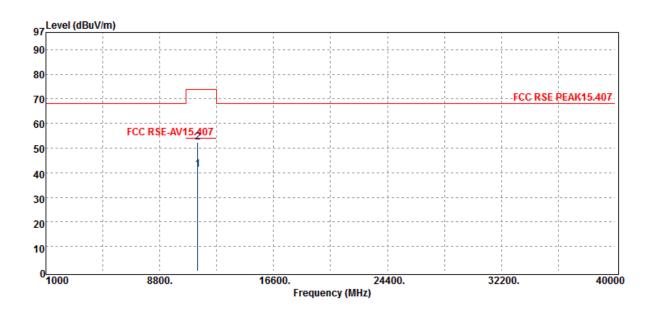
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11400.00	Н	Average	20.59	20.56	41.15	54.00	-12.85
11400.00	Н	Peak	31.72	20.56	52.28	74.00	-21.72

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

**Operation Band** :802.11n20B4 Fundamental Frequency :5745 MHz

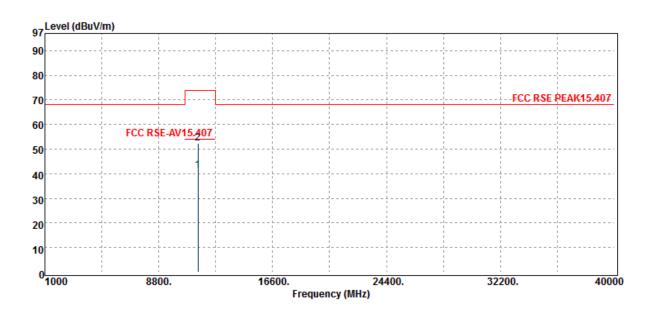
**Operation Mode** :Tx CH LOW

EUT Pol. :H Plane **Test Date** :2017-05-15

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11490.00	Н	Average	20.84	20.42	41.26	54.00	-12.74
11490.00	Н	Peak	32.01	20.42	52.43	74.00	-21.57

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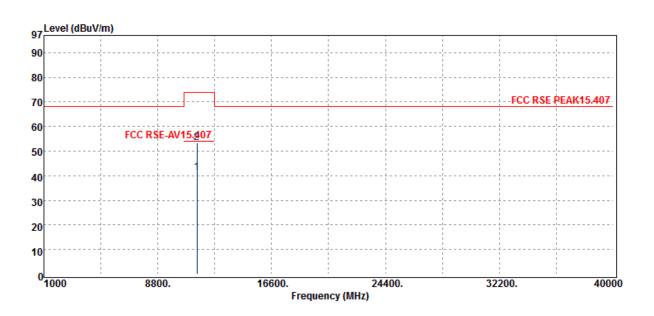
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5745 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11490.00	Н	Average	20.79	20.42	41.21	54.00	-12.79
11490.00	Н	Peak	33.02	20.42	53.44	74.00	-20.56

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

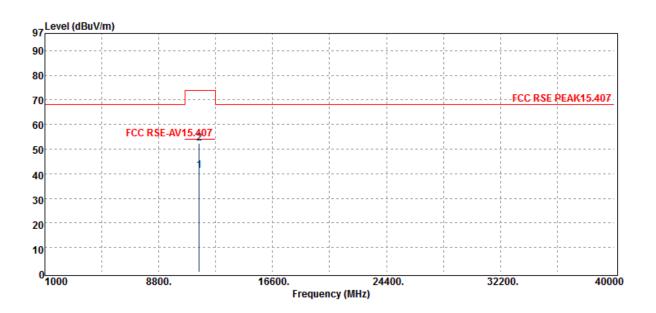
:802.11n20B4 :5785 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11570.00	Н	Average	20.69	20.58	41.27	54.00	-12.73
11570.00	Н	Peak	31.85	20.58	52.43	74.00	-21.57

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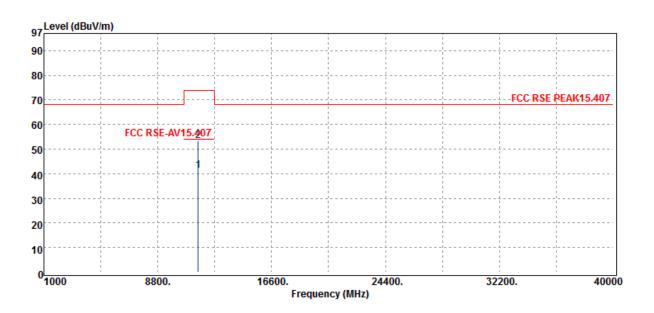
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5785 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11570.00	Н	Average	20.73	20.58	41.31	54.00	-12.69
11570.00	Н	Peak	32.75	20.58	53.33	74.00	-20.67

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

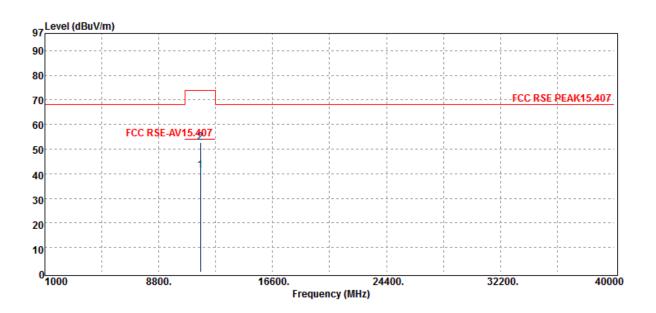
:802.11n20B4 :5825 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11650.00	Н	Average	20.75	20.43	41.18	54.00	-12.82
11650.00	Н	Peak	32.19	20.43	52.62	74.00	-21.38

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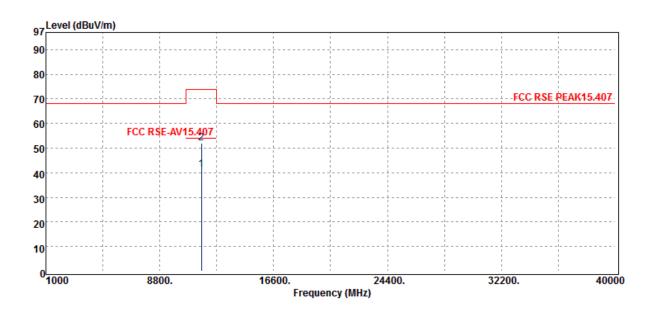
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5825 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11650.00	Н	Average	20.77	20.43	41.20	54.00	-12.80
11650.00	Н	Peak	31.76	20.43	52.19	74.00	-21.81

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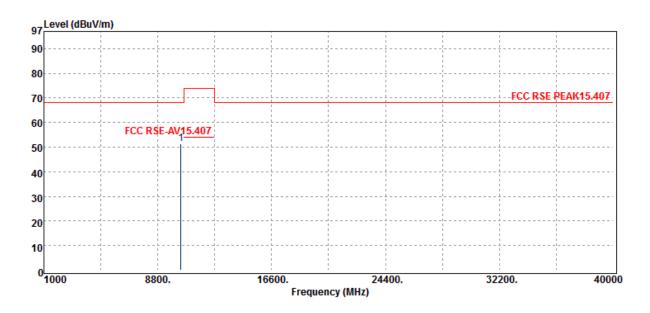
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## Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz

**Operation Band** :802.11n40B1 **Test Date** :2017-05-15 Fundamental Frequency :5190 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
10380.00	Н	Peak	33.37	18.12	51.49	68.30	-16.81

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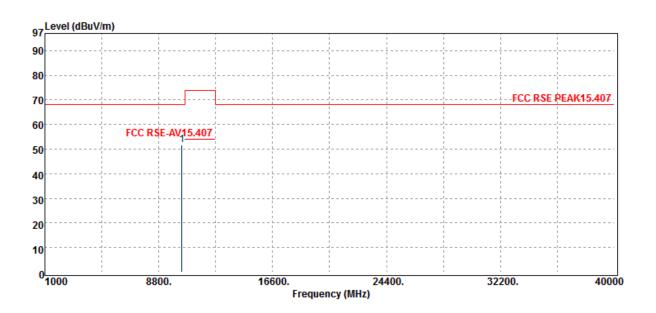
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B1 :5190 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
10380.00	Н	Peak	33.57	18.12	51.69	68.30	-16.61

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

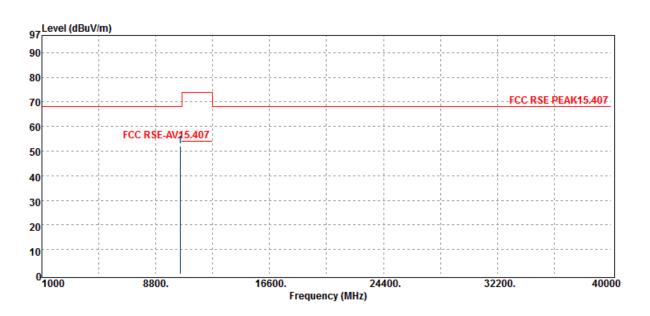
:802.11n40B1 :5230 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10460.00	Н	Peak	33.49	18.55	52.04	68.30	-16.26

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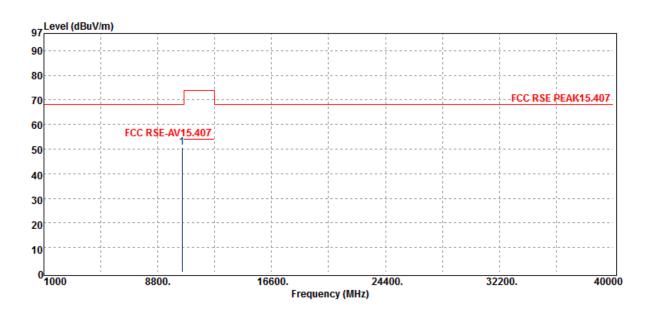
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B1 :5230 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10460.00	Н	Peak	32.01	18.55	50.56	68.30	-17.74

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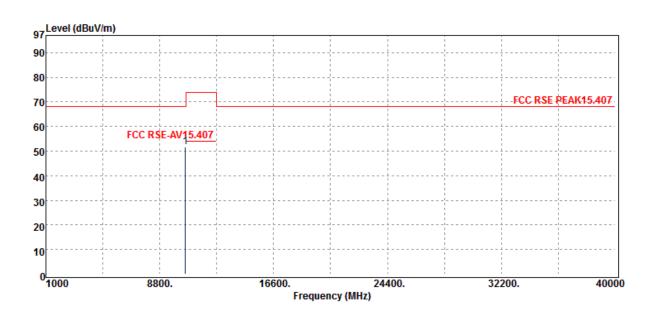
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#### Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz

**Operation Band** :802.11n40B2 **Test Date** :2017-05-15 Fundamental Frequency :5270 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10540.00	Н	Peak	32.56	19.17	51.73	68.30	-16.57

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

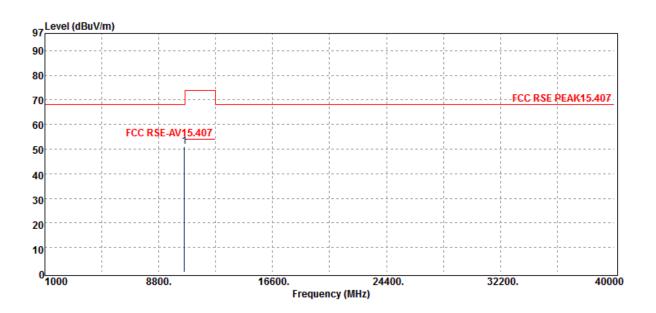
:802.11n40B2 :5270 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
10540.00	Н	Peak	31.96	19.17	51.13	68.30	-17.17

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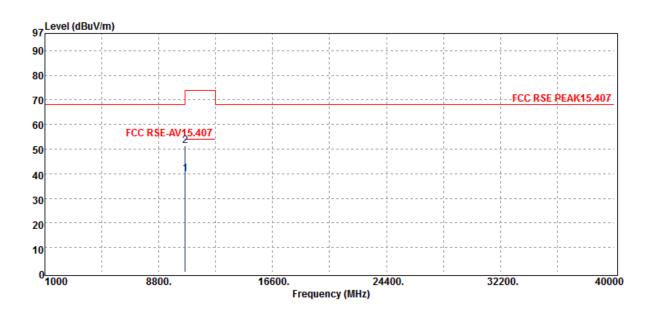
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
10620.00	Н	Average	20.78	19.11	39.89	54.00	-14.11
10620.00	Н	Peak	32.22	19.11	51.33	74.00	-22.67

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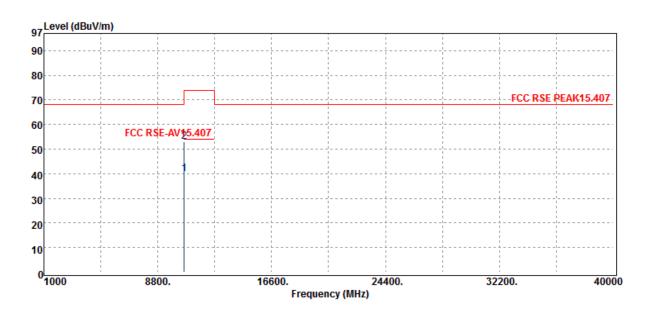
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
10620.00	Н	Average	20.74	19.11	39.85	54.00	-14.15
10620.00	Н	Peak	33.89	19.11	53.00	74.00	-21.00

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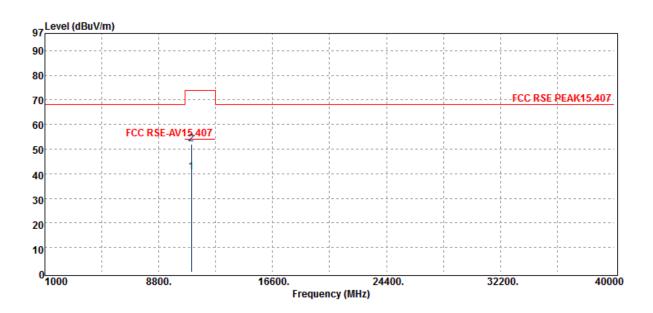
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## Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz

**Operation Band** :802.11n40B3 **Test Date** :2017-05-15 Fundamental Frequency :5510 MHz Temp./Humi. :23 deg\_C / 62 RH

**Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
							_
11020.00	Н	Average	20.41	20.16	40.57	54.00	-13.43
11020.00	Н	Peak	31.94	20.16	52.10	74.00	-21.90

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

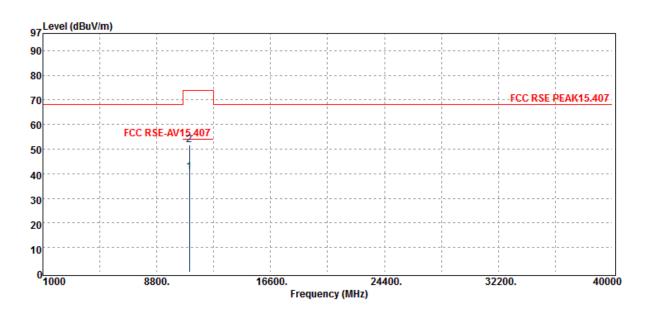
:802.11n40B3 :5510 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11020.00	Н	Average	20.48	20.16	40.64	54.00	-13.36
11020.00	Н	Peak	31.68	20.16	51.84	74.00	-22.16

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

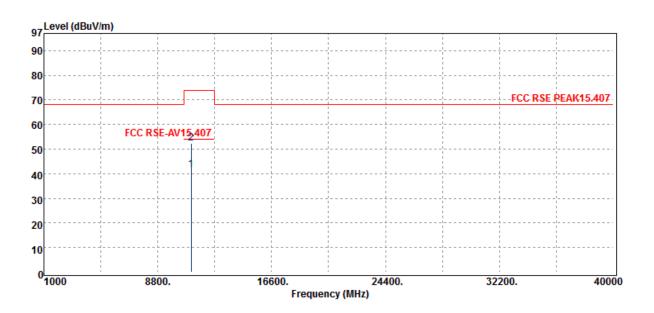
:802.11n40B3 :5550 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11100.00	Н	Average	21.23	20.32	41.55	54.00	-12.45
11100.00	Н	Peak	32.00	20.32	52.32	74.00	-21.68

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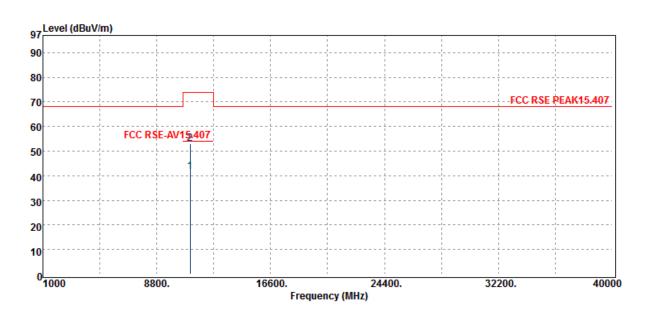
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5550 MHz :Tx CH MID :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11100.00	Н	Average	21.29	20.32	41.61	54.00	-12.39
11100.00	Н	Peak	32.68	20.32	53.00	74.00	-21.00

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

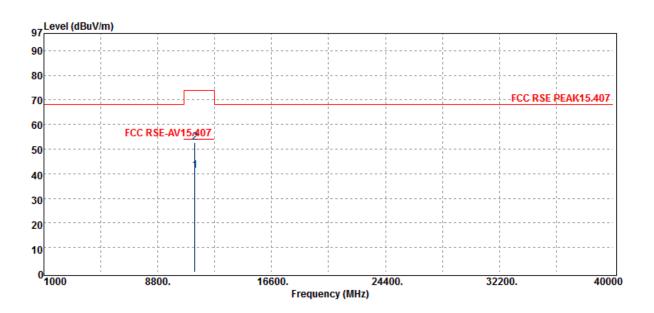
:802.11n40B3 :5670 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11340.00	Н	Average	21.04	20.38	41.42	54.00	-12.58
11340.00	Н	Peak	32.20	20.38	52.58	74.00	-21.42

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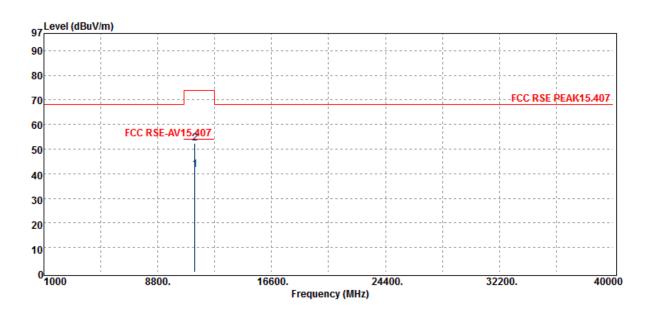
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11340.00	Н	Average	21.10	20.38	41.48	54.00	-12.52
11340.00	Н	Peak	32.02	20.38	52.40	74.00	-21.60

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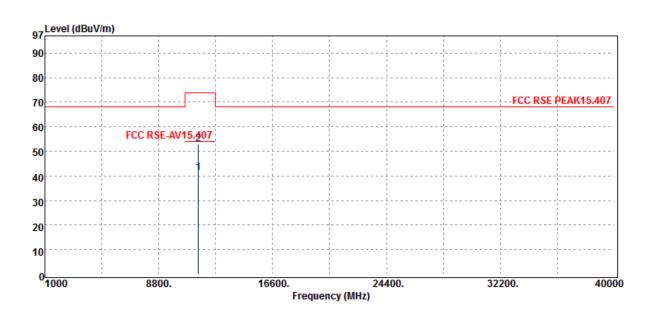
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## Radiated Spurious Emission Measurement Result 802.11n HT40, 5725~5850 MHz

**Operation Band** :802.11n40B4 **Test Date** :2017-05-15

Temp./Humi. Fundamental Frequency :5755 MHz :23 deg\_C / 62 RH **Operation Mode** :Tx CH LOW Engineer :Mike

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



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
							_
11510.00	Н	Average	20.80	20.38	41.18	54.00	-12.82
11510.00	Н	Peak	32.67	20.38	53.05	74.00	-20.95

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

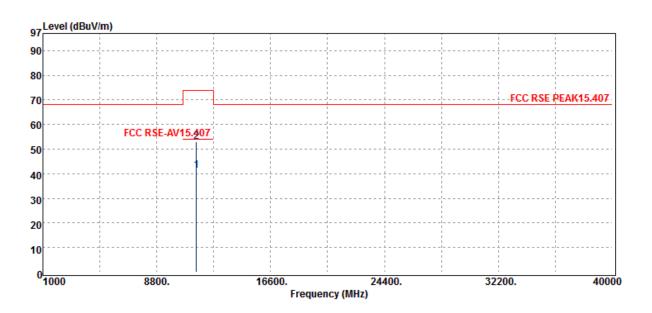
:802.11n40B4 :5755 MHz :Tx CH LOW :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11510.00	Н	Average	20.77	20.38	41.15	54.00	-12.85
11510.00	Н	Peak	32.64	20.38	53.02	74.00	-20.98

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

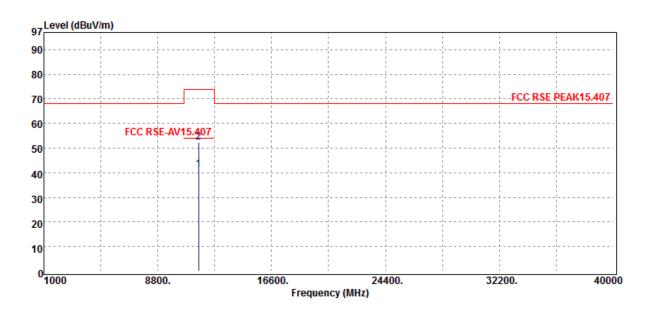
:802.11n40B4 :5795 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** 

Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
							_
11590.00	Н	Average	20.75	20.43	41.18	54.00	-12.82
11590.00	Н	Peak	32.01	20.43	52.44	74.00	-21.56

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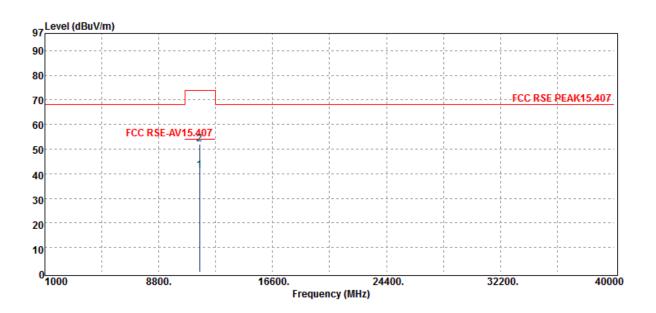
**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B4 :5795 MHz :Tx CH HIGH :H Plane

:2017-05-15 **Test Date** Temp./Humi. :23 deg\_C / 62 RH

Engineer :Mike

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
							_
11590.00	Н	Average	20.73	20.43	41.16	54.00	-12.84
11590.00	Н	Peak	31.68	20.43	52.11	74.00	-21.89

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# Band edge falling to restricted band

802.11a mode

**Operation Band** :802.11aB1

Fundamental Frequency :5180 MHz

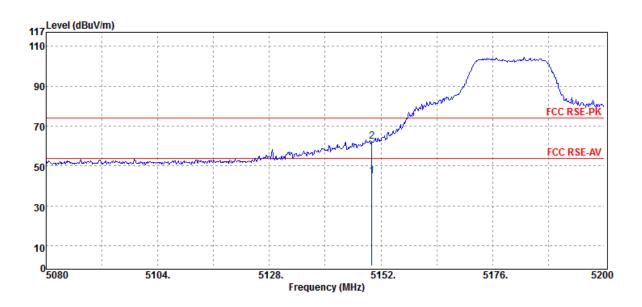
Operation Mode :Bandedge CH LOW

EUT Pol. :H Plane **Test Date** :2017-05-12

Temp./Humi. :22 deg C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5150.00	Е	Average	38.89	5.88	44.77	54.00	-9.23
5150.00	Е	Peak	56.52	5.88	62.40	74.00	-11.60

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB1 :5180 MHz

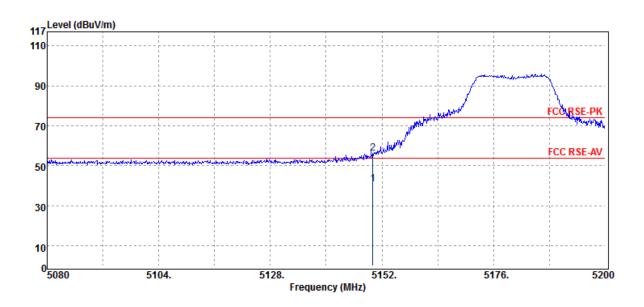
:Bandedge CH LOW

:H Plane

:2017-05-12 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
5150.00	Е	Average	35.15	5.88	41.03	54.00	-12.97
5150.00	Е	Peak	50.52	5.88	56.40	74.00	-17.60

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5320 MHz

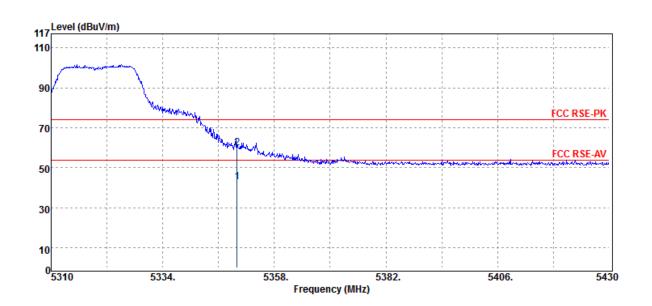
:Bandedge CH HIGH

:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5350.00	Е	Average	36.57	6.16	42.73	54.00	-11.27
5350.00	Е	Peak	53.83	6.16	59.99	74.00	-14.01

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB2 :5320 MHz

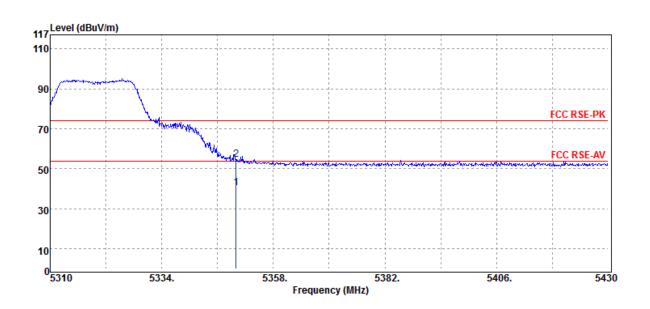
:Bandedge CH HIGH

:H Plane

:2017-05-12 **Test Date** :22 deg\_C / 61 RH

Temp./Humi. Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Average	34.17	6.16	40.33	54.00	-13.67
5350.00	Е	Peak	48.54	6.16	54.70	74.00	-19.30

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz

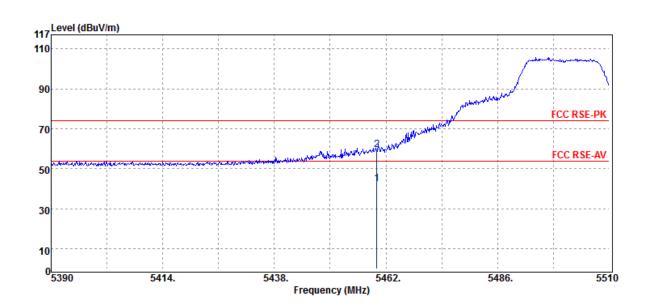
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 :22 deg\_C / 61 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5460.00	E	Average	36.39	6.23	42.62	54.00	-11.38
5460.00	E	Peak	53.48	6.23	59.71	74.00	-14.29

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**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

:802.11aB3 :5500 MHz

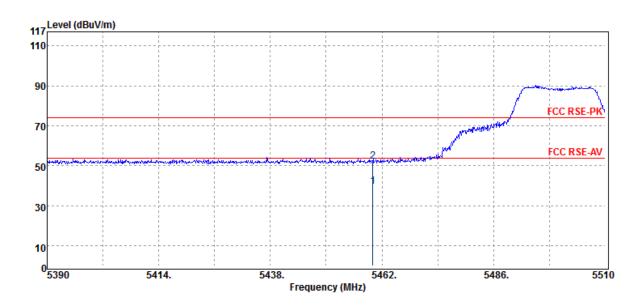
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5460.00	Е	Average	33.50	6.23	39.73	54.00	-14.27
5460.00	Е	Peak	45.79	6.23	52.02	74.00	-21.98

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz

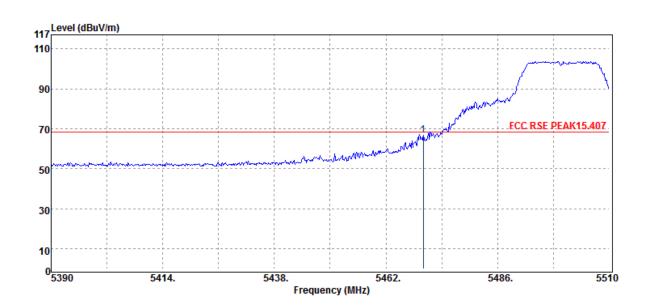
:Bandedge CH LOW RSE

:H Plane

**Test Date** :2017-05-12 :22 deg\_C / 61 RH

Temp./Humi. Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5470.00	Е	Peak	60.55	6.26	66.81	68.30	-1.49

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5500 MHz

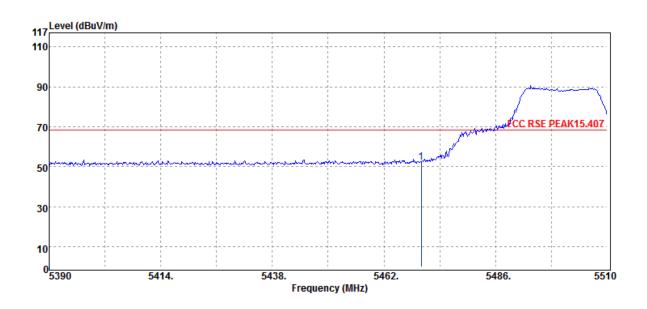
:Bandedge CH LOW RSE

:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5470.00	E	Peak	46.14	6.26	52.40	68.30	-15.90

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz

:Bandedge CH HIGH

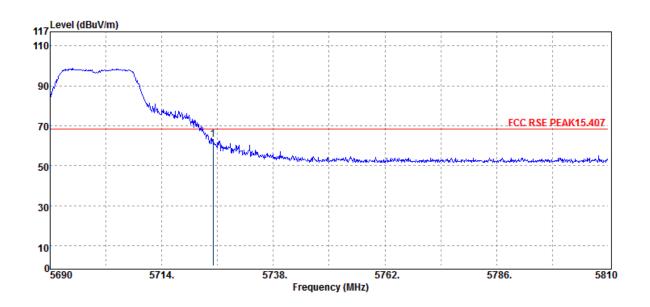
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5725.00	Е	Peak	56.59	6.59	63.18	68.30	-5.12

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB3 :5700 MHz

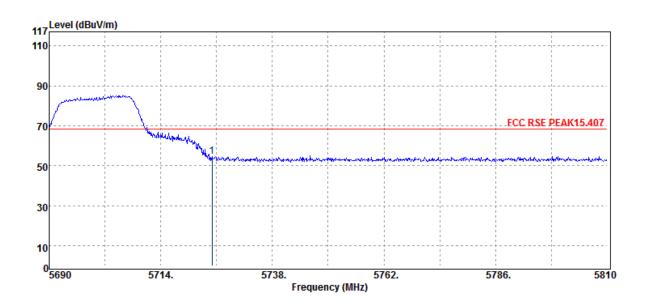
:Bandedge CH HIGH

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



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

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB4 :5745 MHz

:Bandedge CH LOW

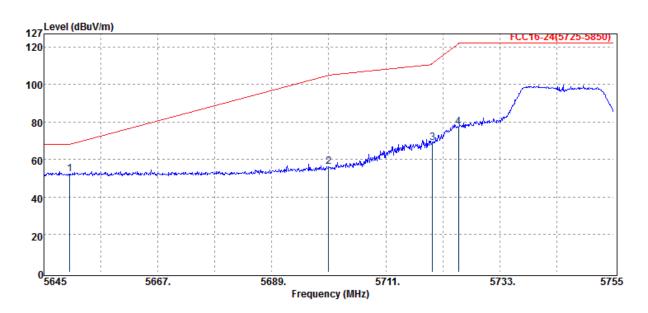
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
5650.00	Е	Peak	45.74	6.48	52.22	68.23	-16.01
5700.00	Е	Peak	49.58	6.67	56.25	105.23	-48.98
5720.00	Е	Peak	62.35	6.60	68.95	110.83	-41.88
5725.00	Е	Peak	70.63	6.59	77.22	122.23	-45.01

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB4 :5745 MHz

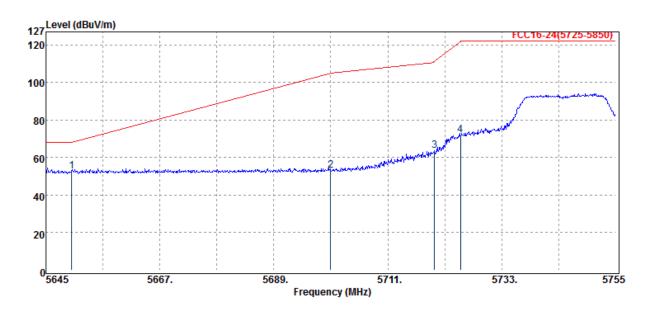
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
5650.00	Е	Peak	46.06	6.48	52.54	68.23	-15.69
5700.00	Е	Peak	46.67	6.67	53.34	105.23	-51.89
5720.00	Е	Peak	57.08	6.60	63.68	110.83	-47.15
5725.00	Е	Peak	65.49	6.59	72.08	122.23	-50.15

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB4 :5825 MHz

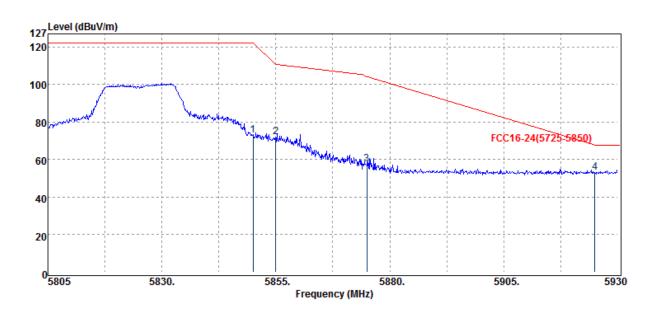
:Bandedge CH HIGH

:H Plane

:2017-05-12 **Test Date** :22 deg\_C / 61 RH

Temp./Humi. Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5850.00	Е	Peak	65.61	7.28	72.89	122.23	-49.34
5855.00	Е	Peak	64.68	7.32	72.00	110.83	-38.83
5875.00	Е	Peak	50.00	7.37	57.37	105.23	-47.86
5925.00	Е	Peak	45.92	7.39	53.31	68.23	-14.92

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Page: 191 of 236

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11aB4 :5825 MHz

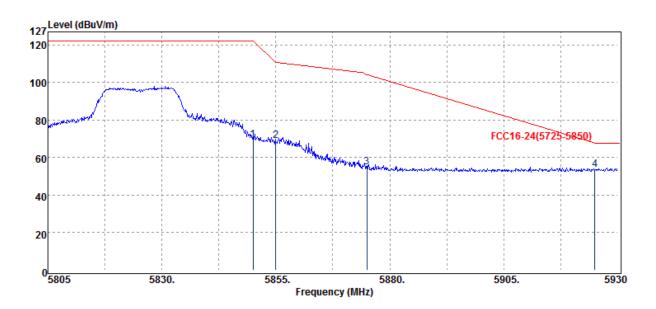
:Bandedge CH HIGH

:H Plane

:2017-05-12 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
5850.00	Е	Peak	62.17	7.28	69.45	122.23	-52.78
5855.00	Е	Peak	61.87	7.32	69.19	110.83	-41.64
5875.00	Е	Peak	47.38	7.37	54.75	105.23	-50.48
5925.00	Е	Peak	46.12	7.39	53.51	68.23	-14.72

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## 802.11n20 HT mode

**Operation Band Fundamental Frequency** 

**Operation Mode** EUT Pol.

:802.11n20B1 :5180 MHz

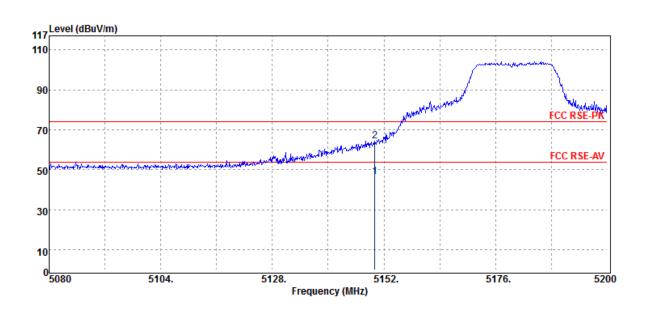
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 :22 deg\_C / 61 RH

Temp./Humi. Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	40.55	5.88	46.43	54.00	-7.57
5150.00	Е	Peak	58.39	5.88	64.27	74.00	-9.73

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B1 :5180 MHz

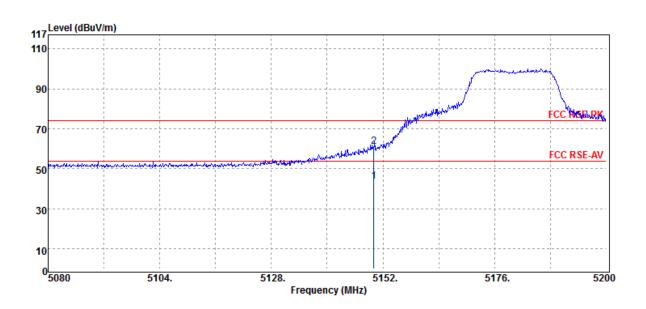
:Bandedge CH LOW

:H Plane

:2017-05-12 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5150.00	E	Average	37.93	5.88	43.81	54.00	-10.19
5150.00	Е	Peak	55.06	5.88	60.94	74.00	-13.06

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz

:Bandedge CH HIGH

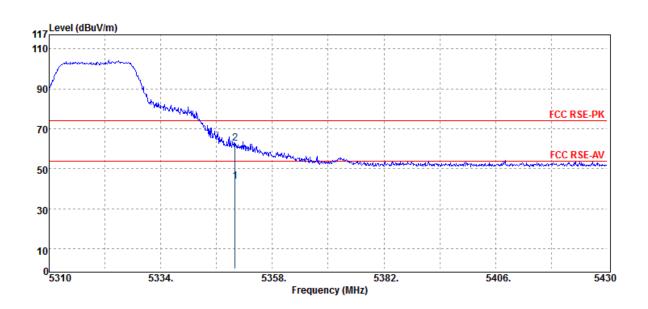
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
5350.00	Е	Average	37.42	6.16	43.58	54.00	-10.42
5350.00	Е	Peak	56.76	6.16	62.92	74.00	-11.08

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B2 :5320 MHz

:Bandedge CH HIGH

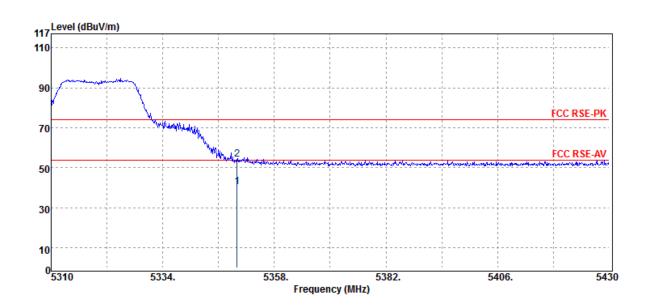
:H Plane

:2017-05-12 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5350.00	E	Average	34.15	6.16	40.31	54.00	-13.69
5350.00	Е	Peak	48.07	6.16	54.23	74.00	-19.77

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

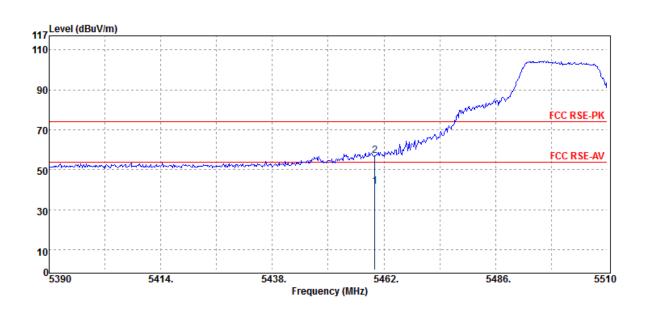
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5460.00	Е	Average	35.62	6.23	41.85	54.00	-12.15
5460.00	Е	Peak	50.96	6.23	57.19	74.00	-16.81

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

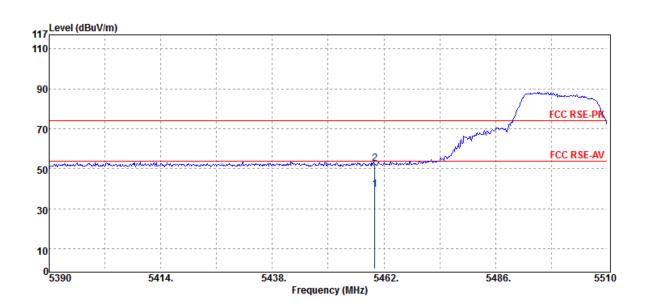
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5460.00	Е	Average	33.48	6.23	39.71	54.00	-14.29
5460.00	E	Peak	46.27	6.23	52.50	74.00	-21.50

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

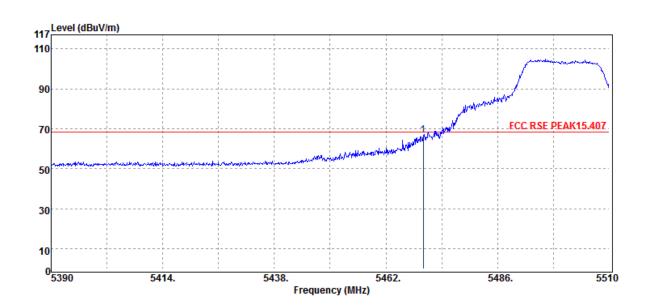
:Bandedge CH LOW RSE

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5470.00	Е	Peak	60.54	6.26	66.80	68.30	-1.50

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5500 MHz

:Bandedge CH LOW RSE

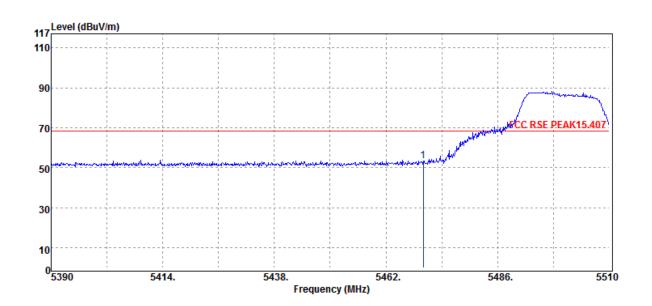
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5470.00	E	Peak	46.99	6.26	53.25	68.30	-15.05

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz

:Bandedge CH HIGH

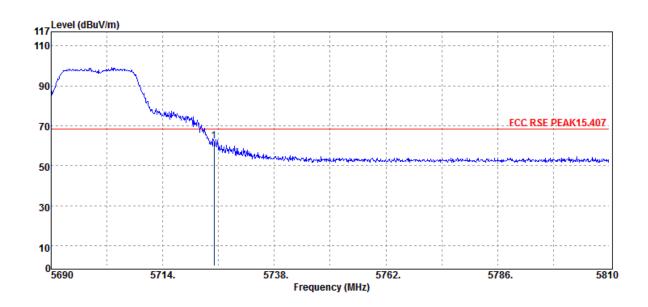
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5725.00	Е	Peak	55.56	6.59	62.15	68.30	-6.15

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B3 :5700 MHz

:Bandedge CH HIGH

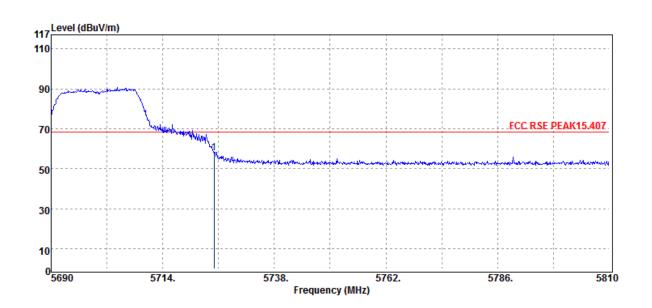
:H Plane

:2017-05-12 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5725.00	Е	Peak	51.36	6.59	57.95	68.30	-10.35

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5745 MHz

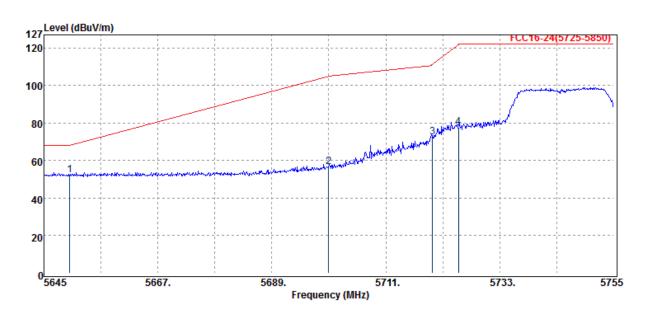
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5650.00	Е	Peak	45.68	6.48	52.16	68.23	-16.07
5700.00	Е	Peak	50.10	6.67	56.77	105.23	-48.46
5720.00	Е	Peak	65.85	6.60	72.45	110.83	-38.38
5725.00	Е	Peak	71.40	6.59	77.99	122.23	-44.24

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5745 MHz

:Bandedge CH LOW

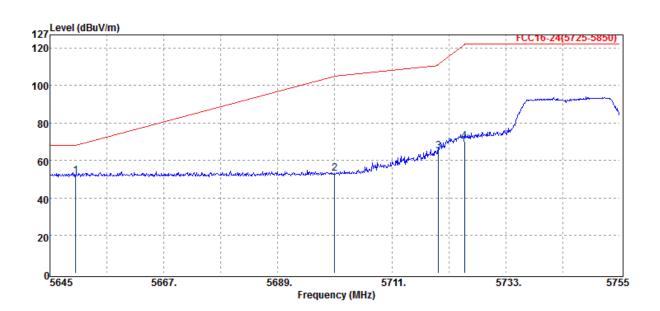
:H Plane

**Test Date** :2017-05-12

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5650.00	Е	Peak	45.42	6.48	51.90	68.23	-16.33
5700.00	Е	Peak	46.65	6.67	53.32	105.23	-51.91
5720.00	Е	Peak	58.28	6.60	64.88	110.83	-45.95
5725.00	Е	Peak	63.93	6.59	70.52	122.23	-51.71

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5825 MHz

:Bandedge CH HIGH

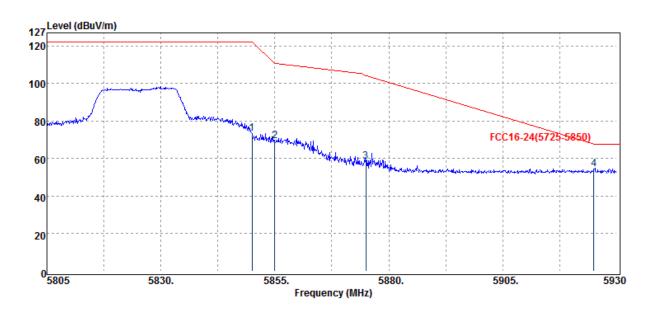
:H Plane

:2017-05-12 **Test Date** 

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5850.00	E	Peak	65.90	7.28	73.18	122.23	-49.05
5855.00	Е	Peak	62.08	7.32	69.40	110.83	-41.43
5875.00	Е	Peak	50.89	7.37	58.26	105.23	-46.97
5925.00	Е	Peak	46.99	7.39	54.38	68.23	-13.85

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20B4 :5825 MHz

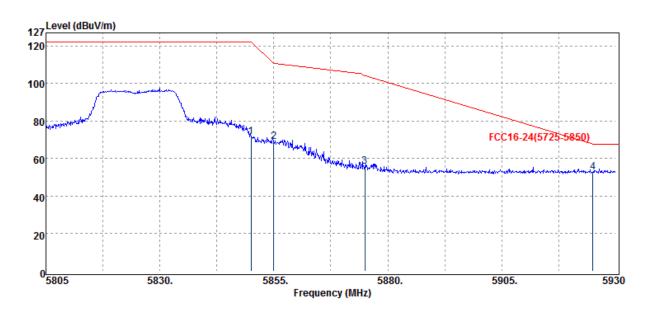
:Bandedge CH HIGH

:H Plane

:2017-05-12 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5850.00	Е	Peak	64.17	7.28	71.45	122.23	-50.78
5855.00	Е	Peak	61.79	7.32	69.11	110.83	-41.72
5875.00	Е	Peak	48.28	7.37	55.65	105.23	-49.58
5925.00	Е	Peak	45.29	7.39	52.68	68.23	-15.55

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## 802.11n40 HT mode

**Operation Band** Fundamental Frequency

**Operation Mode** EUT Pol.

:802.11n40B1 :5190 MHz

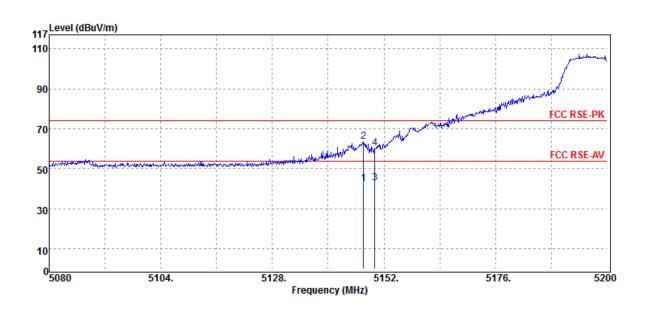
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 :22 deg\_C / 61 RH

Temp./Humi. Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5147.56	S	Average	36.56	5.89	42.45	54.00	-11.55
5147.56	S	Peak	57.50	5.89	63.39	74.00	-10.61
5150.00	Е	Average	37.11	5.88	42.99	54.00	-11.01
5150.00	Е	Peak	54.44	5.88	60.32	74.00	-13.68

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**Operation Band** Fundamental Frequency **Operation Mode** 

EUT Pol.

:802.11n40B1 :5190 MHz

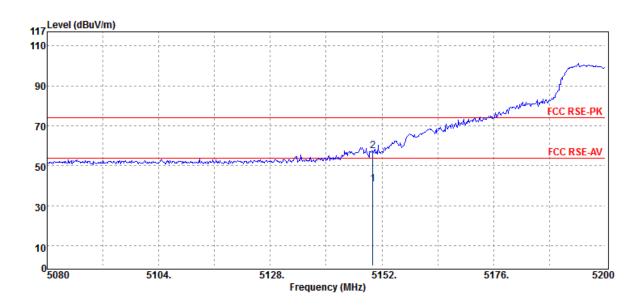
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-12 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5150.00	Е	Average	35.20	5.88	41.08	54.00	-12.92
5150.00	Е	Peak	51.53	5.88	57.41	74.00	-16.59

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz

:Bandedge CH HIGH

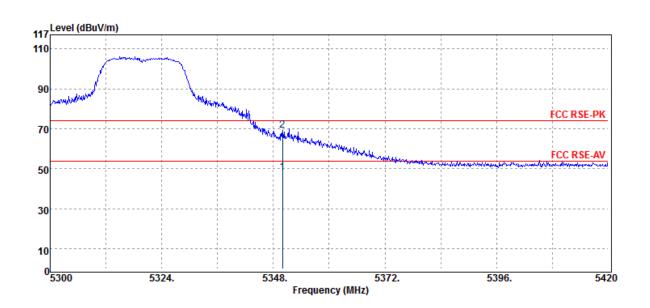
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5350.00	Е	Average	41.87	6.16	48.03	54.00	-5.97
5350.00	Е	Peak	63.03	6.16	69.19	74.00	-4.81

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B2 :5310 MHz

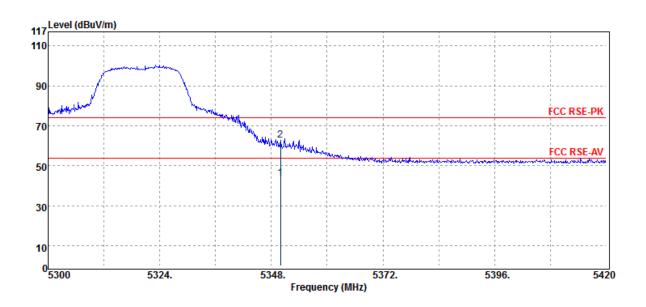
:Bandedge CH HIGH

:H Plane

:2017-05-15 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
5350.00	E	Average	37.39	6.16	43.55	54.00	-10.45
5350.00	Е	Peak	56.55	6.16	62.71	74.00	-11.29

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

:Bandedge CH LOW

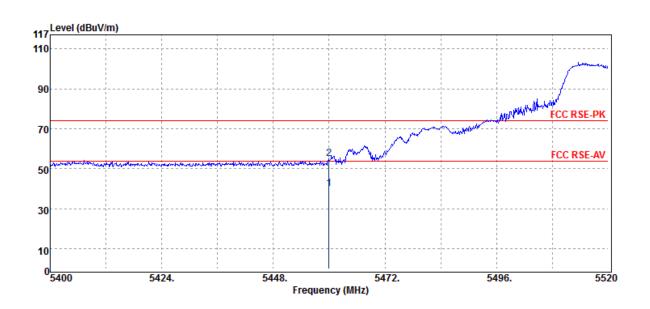
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5460.00	Е	Average	33.74	6.23	39.97	54.00	-14.03
5460.00	Е	Peak	48.74	6.23	54.97	74.00	-19.03

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz :Bandedge CH LOW

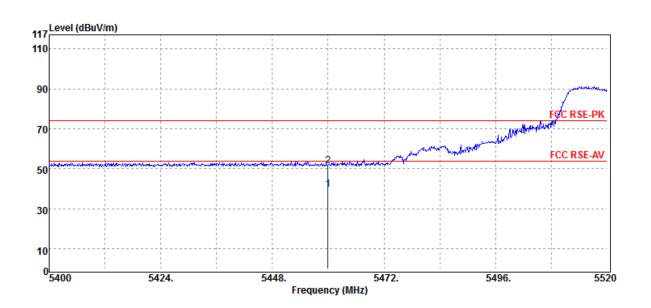
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5460.00	E	Average	33.47	6.23	39.70	54.00	-14.30
5460.00	Е	Peak	45.14	6.23	51.37	74.00	-22.63

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

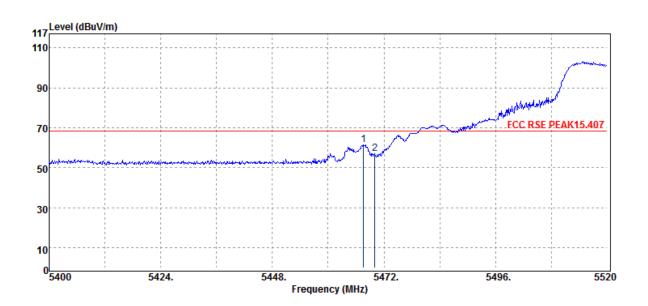
:Bandedge CH LOW RSE

:H Plane

**Test Date** :2017-05-15 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5467.56	S	Peak	55.31	6.25	61.56	68.30	-6.74
5470.00	E	Peak	50.62	6.26	56.88	68.30	-11.42

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Page: 213 of 236

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5510 MHz

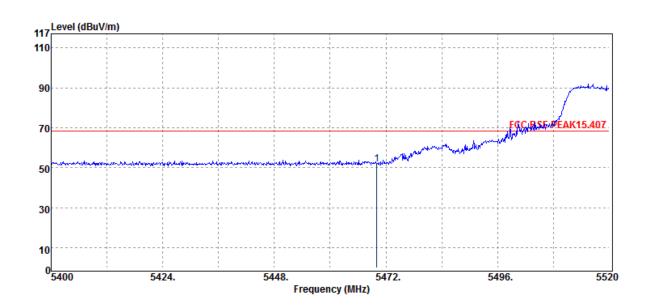
:Bandedge CH LOW RSE

:H Plane

**Test Date** :2017-05-15 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5470.00	Е	Peak	45.73	6.26	51.99	68.30	-16.31

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz

:Bandedge CH HIGH

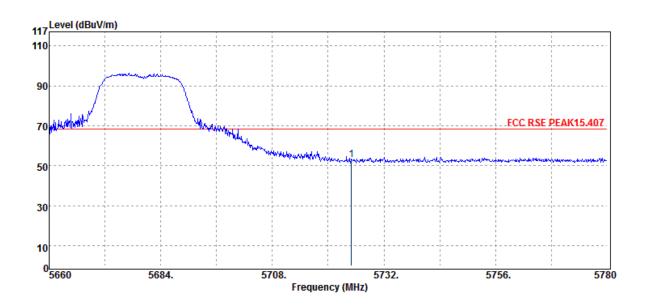
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5725.00	Е	Peak	46.47	6.59	53.06	68.30	-15.24

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B3 :5670 MHz

:Bandedge CH HIGH

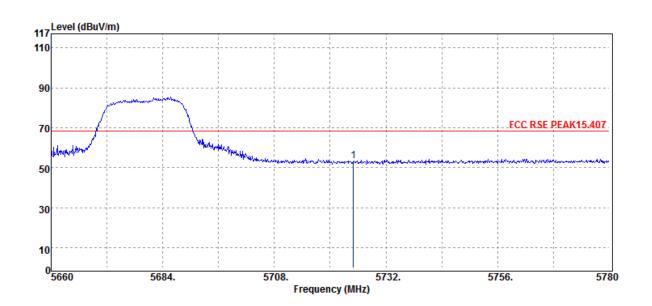
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5725.00	Е	Peak	46.90	6.59	53.49	68.30	-14.81

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B4 :5755 MHz

:Bandedge CH LOW

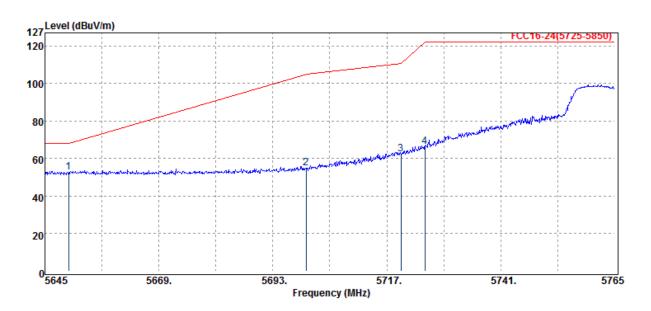
:H Plane

**Test Date** :2017-05-15

Temp./Humi. :22 deg\_C / 61 RH

Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBµV/m	dBμV/m	dB
5650.00	Е	Peak	46.14	6.48	52.62	68.23	-15.61
5700.00	Е	Peak	48.20	6.67	54.87	105.23	-50.36
5720.00	Е	Peak	56.00	6.60	62.60	110.83	-48.23
5725.00	Е	Peak	59.72	6.59	66.31	122.23	-55.92

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B4 :5755 MHz

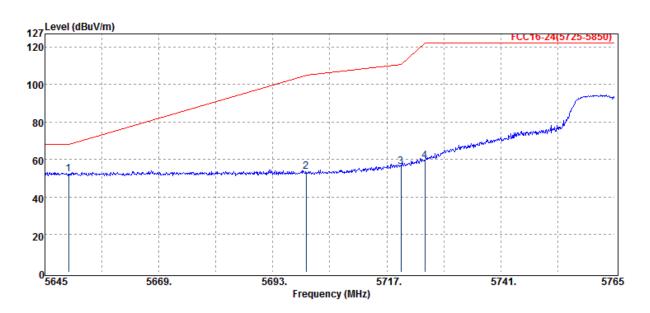
:Bandedge CH LOW

:H Plane

**Test Date** :2017-05-15 Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5650.00	Е	Peak	45.63	6.48	52.11	68.23	-16.12
5700.00	Е	Peak	46.93	6.67	53.60	105.23	-51.63
5720.00	Е	Peak	49.62	6.60	56.22	110.83	-54.61
5725.00	Е	Peak	52.94	6.59	59.53	122.23	-62.70

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B4 :5795 MHz

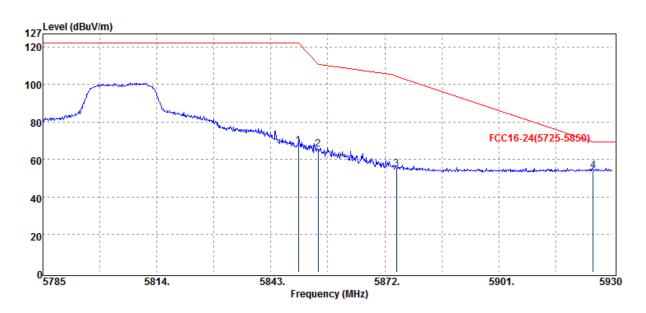
:Bandedge CH HIGH

:H Plane

**Test Date** :2017-05-15 :22 deg\_C / 61 RH

Temp./Humi. Engineer :Mike

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
5850.00	E	Peak	59.83	7.28	67.11	122.23	-55.12
5855.00	Е	Peak	58.23	7.32	65.55	110.83	-45.28
5875.00	E	Peak	47.66	7.37	55.03	105.23	-50.20
5925.00	Е	Peak	46.70	7.39	54.09	68.23	-14.14

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**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n40B4 :5795 MHz

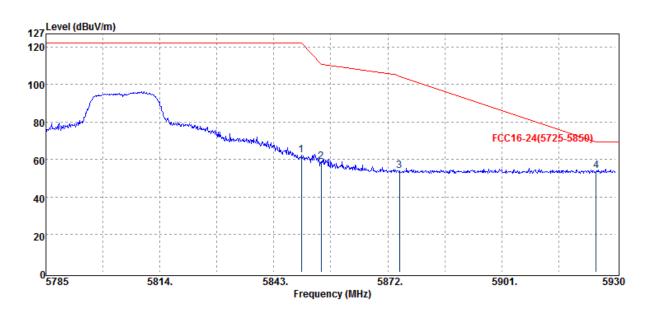
:Bandedge CH HIGH

:H Plane

:2017-05-15 **Test Date** Temp./Humi. :22 deg\_C / 61 RH

Engineer

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
5850.00	Е	Peak	55.30	7.28	62.58	122.23	-59.65
5855.00	Е	Peak	51.53	7.32	58.85	110.83	-51.98
5875.00	Е	Peak	46.85	7.37	54.22	105.23	-51.01
5925.00	Е	Peak	46.51	7.39	53.90	68.23	-14.33

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#### 12 TRANSMISSION IN THE ABSENCE OF DATA

## 12.1 Standard Applicable

According to §15.407(c)

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

#### 12.2 Result

No non-compliance noted:

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

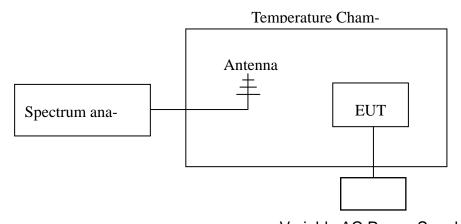
#### **Standard Applicable** 13.1

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



Variable AC Power Supply

## 13.4 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018			
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018			
Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018			
DC Power Supply	Agilent	E3640A	MY52410006	11/21/2016	11/20/2017			
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017			

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## **Measurement Result**

Operation Mode	802.11 a	Test Date	2017.5.24
Temperature	:17 °C	Test By	Cooper
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180	5,180.06006	-0.00001159
		44	5220	5,220.06006	-0.00001151
		48	5240	5,240.06006	-0.00001146
		52	5260	5,260.06006	-0.00001142
		60	5300	5,300.06006	-0.00001133
	3.63V	64	5320	5,320.06006	-0.00001129
		100	5500	5,500.06006	-0.00001092
		116	5580	5,580.06006	-0.00001076
		140	5700	5,700.04492	-0.00000788
		149	5745	5,745.06006	-0.00001045
		157	5785	5,785.06006	-0.00001038
		165	5825	5,825.06006	-0.00001031
-10 °C		36	5180	5,180.06006	-0.00001159
		44	5220	5,220.06006	-0.00001151
		48	5240	5,240.06006	-0.00001146
		52	5260	5,260.06006	-0.00001142
		60	5300	5,300.06006	-0.00001133
	2.97V	64	5320	5,320.06006	-0.00001129
		100	5500	5,500.06006	-0.00001092
		116	5580	5,580.06006	-0.00001076
		140	5700	5,700.06006	-0.00001054
		149	5745	5,745.06006	-0.00001045
		157	5785	5,785.06006	-0.00001038
		165	5825	5,825.06006	-0.00001031

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		36	5180	5,180.06006	-0.00001159
		44	5220	5,220.06006	-0.00001151
		48	5240	5,240.06006	-0.00001146
		52	5260	5,260.06006	-0.00001142
		60	5300	5,300.06006	-0.00001133
<b>25</b> ℃	3.3V	64	5320	5,320.06006	-0.00001129
		100	5500	5,500.06006	-0.00001092
		116	5580	5,580.07495	-0.00001343
		140	5700	5,700.06006	-0.00001054
		149	5745	5,745.06006	-0.00001045
		157	5785	5,785.06006	-0.00001038
		165	5825	5,825.06006	-0.00001031
		36	5180	5,180.06006	
		44	5220	5,220.06006	
		48	5240	5,240.06006	-0.00001146
		52	5260	5,260.06006	-0.00001142
		60	5300	5,300.06006	-0.00001133
		64	5320	5,320.06006	-0.00001129
	3.63V	100	5500	5,500.06006	-0.00001092
		116	5580	5,580.06006	-0.00001076
		140	5700	5,700.06006	-0.00001054
		149	5745	5,745.06006	-0.00001045
		157	5785	5,785.06006	-0.00001038
		165	5825	5,825.06006	-0.00001031
<b>55</b> ℃		36	5180	5,180.06006	-0.00001159
		44	5220	5,220.06006	-0.00001151
		48	5240	5,240.06006	-0.00001146
		52	5260	5,260.06006	-0.00001142
		60	5300	5,300.06006	-0.00001133
	2.97V	64	5320	5,320.06006	-0.00001129
		100	5500	5,500.04492	
		116	5580	5,580.06006	-0.00001076
		140	5700	5,700.06006	-0.00001054
		149	5745	5,745.06006	
		157	5785	5,785.06006	
		165	5825	5,825.06006	-0.00001031

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Operation Mode	802.11 n_HT40	Test Date	2017.5.24
Temperature	:17 ℃	Test By	Cooper
Humidity	:65 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190	5,190.04981	-0.00000960
		46	5230	5,230.04981	-0.00000952
		54	5270	5,270.04981	-0.00000945
		62	5310	5,310.04981	-0.00000938
	3.63V	102	5510	5,510.04981	-0.00000904
		110	5550	5,550.07495	-0.00001350
		134	5670	5,670.09985	-0.00001761
		151	5755	5,755.07495	-0.00001302
-10 °C		159	5795	5,795.09985	-0.00001723
		38	5190	5,190.05005	-0.00000964
		46	5230	5,230.07495	-0.00001433
		54	5270	5,270.07495	-0.00001422
		62	5310	5,310.07495	-0.00001412
	2.97V	102	5510	5,510.07495	-0.00001360
	ļ	110	5550	5,550.07495	-0.00001350
		134	5670	5,670.07495	-0.00001322
		151	5755	5,755.07495	-0.00001302
		159	5795	5,795.05005	-0.00000864

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		38	5190	5,190.02490	-0.00000480
		46	5230	5,230.07495	-0.00001433
		54	5270	5,270.02490	-0.00000473
		62	5310	5,310.07495	-0.00001412
<b>25</b> ℃	3.3V	102	5510	5,510.07495	-0.00001360
		110	5550	5,550.07495	-0.00001350
		134	5670	5,670.07495	-0.00001322
		151	5755	5,755.09985	-0.00001735
		159	5795	5,795.05005	-0.00000864
		38	5190	5,190.07495	-0.00001444
		46	5230	5,230.07495	-0.00001433
	3.63V	54	5270	5,270.07495	-0.00001422
		62	5310	5,310.05005	-0.00000943
		102	5510	5,510.07495	-0.00001360
		110	5550	5,550.04981	-0.00000897
		134	5670	5,670.07495	-0.00001322
		151	5755	5,755.05005	-0.00000870
		159	5795	5,795.10010	-0.00001727
<b>55</b> ℃		38	5190	5,190.07495	-0.00001444
		46	5230	5,230.05005	-0.00000957
		54	5270	5,270.02490	-0.00000473
		62	5310	5,310.05005	-0.00000943
	2.97V	102	5510	5,510.07495	-0.00001360
		110	5550	5,550.07495	-0.00001350
		134	5670	5,670.07495	-0.00001322
		151	5755	5,755.07495	-0.00001302
		159	5795	5,795.05005	-0.00000864

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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

A PIFA antenna design is used.

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

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

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# 15 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## 15.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time				
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm <sup>2</sup> )	(minute)				
	Limits for General Population/Uncontrolled Exposure							
0.3-1.34	614	1.63	*(100)	30				
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30				
30-300	27.5	0.073	0.2	30				
300-1500	/	/	F/1500	30				
1500-15000	/	/	1.0	30				

F = frequency in MHz

# Prediction of MPE limit at a given distance Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4\pi R^2$ 

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

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<sup>\* =</sup> Plane-wave equipment power density



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#### Maximum Permissible Exposure (MPE) Evaluation (Worst Case) 15.2

## MPE Prediction (5150~5250MHz)

Average output power at antenna input terminal:	16.54	(dBm)
Average output power at antenna input terminal:	45.08167	(mW)
Duty cycle:	76.02	(%)
Maximum Pav :	34.271086	(mW)
Peak Antenna gain (Maximum):	3.37	(dBi)
Peak Antenna gain (linear):	2.1727012	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5230	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.015	(mW/cm2)

#### **Measurement Result**

The predicted power density level at 20 cm is 0.015 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 5230MHz.

## MPE Prediction (5250~5350MHz)

Average output power at antenna input terminal:	16.50	(dBm)
Average output power at antenna input terminal:	44.668359	(mW)
Duty cycle:	76.02	(%)
Maximum Pav :	33.956887	(mW)
Peak Antenna gain (Maximum):	3.23	(dBi)
Peak Antenna gain (linear):	2.1037784	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5270	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.014	(mW/cm2)

## **Measurement Result**

The predicted power density level at 20 cm is 0.014 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 5270MHz.

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## MPE Prediction (5470~5725MHz)

Average output power at antenna input terminal:	15.58	(dBm)
Average output power at antenna input terminal:	36.140986	(mW)
Duty cycle:	86.46	(%)
Maximum Pav :	31.247497	(mW)
Peak Antenna gain (Maximum):	1.51	(dBi)
Peak Antenna gain (linear):	1.4157938	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5700	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.009	(mW/cm2)

#### **Measurement Result**

The predicted power density level at 20 cm is 0.009 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 5700MHz.

## MPE Prediction (5725~5850MHz)

,		
Average output power at antenna input terminal:	14.33	(dBm)
Average output power at antenna input terminal:	27.101916	(mW)
Duty cycle:	86.46	(%)
Maximum Pav :	23.432317	(mW)
Peak Antenna gain (Maximum):	0.42	(dBi)
Peak Antenna gain (linear):	1.1015393	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5785	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.005	(mW/cm2)

#### **Measurement Result**

The predicted power density level at 20 cm is 0.005 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 5785MHz.

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# 16 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## 16.1 Standard Applicable

According to RSS 102 March 19,2015 issue 5 §2.5.2 RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz<sub>6</sub> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $22.48/f_{0.5}W$  (adjusted for tune-up tolerance), where f is in MHz;

at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f_{0.6834}$  W (adjusted for tune-up tolerance), where f is in MHz;

This is a Mobile device, at which separation distance between the user and the device's antenna is 20cm. Therefore, section 2.5.2 shall be complied with.

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# **Maximum Permissible Exposure (MPE) Exemption (Worst Case)** 802.11a (5150~5250MHz)

Max. output power including tune-up tolerance:	16.54	(dBm)
Max. output power including tune-up tolerance:	45.08167	(mW)
Antenna gain (Peak):	3.37	(dBi)
Maximum antenna gain:	2.1727012	(numeric)
Frenquency	5230	MHz
Limit	4.5551	W
EIRP	0.0979	W

## **Evaluation Result**

The radiated power is 16.54 + 3.37 = 19.91 dBm(EIRP) = 97.949mW = 0.097949W that is less than or equal to 4.555W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

## 802.11a (5250~5350MHz)

Max. output power including tune-up tolerance:	16.5	(dBm)
Max. output power including tune-up tolerance:	44.668359	(mW)
Antenna gain (Peak):	3.23	(dBi)
Maximum antenna gain:	2.1037784	(numeric)
Frenquency	5270	MHz
Limit	4.5789	W
EIRP	0.0940	W

## **Evaluation Result**

The radiated power is 16.5 + 3.23 = 19.73 dBm(EIRP) = 93.972mW = 0.093972W that is less than or equal to 4.579W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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## 802.11a (5470~5725MHz)

Max. output power including tune-up tolerance:	15.58	(dBm)
Max. output power including tune-up tolerance:	36.140986	(mW)
Antenna gain (Peak):	1.51	(dBi)
Maximum antenna gain:	1.4157938	(numeric)
Frenquency	5700	MHz
Limit	4.8310	W
EIRP	0.0512	W

## **Evaluation Result**

The radiated power is 15.58 + 1.51 = 17.09 dBm(EIRP) =51.168mW =0.051168W that is less than or equal to 4.831W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

## 802.11a (5725~5850MHz)

Max. output power including tune-up tolerance:	14.33	(dBm)
Max. output power including tune-up tolerance:	27.101916	(mW)
Antenna gain (Peak):	0.42	(dBi)
Maximum antenna gain:	1.1015393	(numeric)
Frenquency	5785	MHz
Limit	4.8801	W
EIRP	0.0299	W

## **Evaluation Result**

The radiated power is 14.33 + 0.42 = 14.75 dBm(EIRP) = 29.854mW = 0.029854W that is less than or equal to 4.88W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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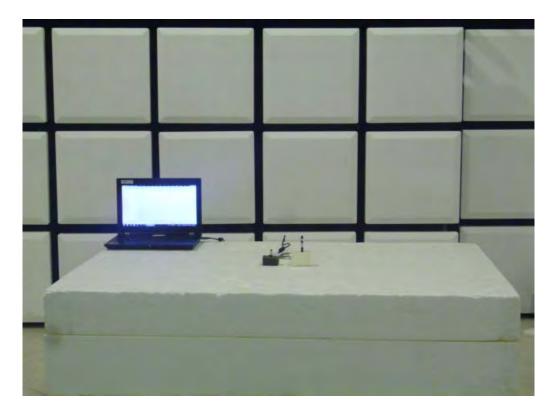


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## PHOTOGRAPHS OF SET UP

# Radiated Emission Set up Photos (Below 1GHz)





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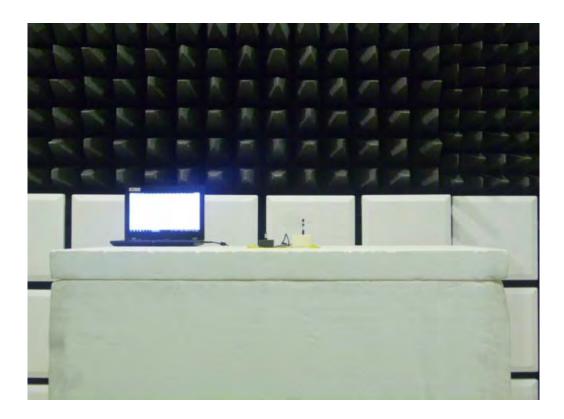
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# Radiated Emission Set up Photos (Above 1GHz)





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# **AC Power-line Conducted Emission Set up Photo**





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# **Conducted Setup Photo (Measurement at Antenna Port)**



## PHOTOGRAPHS OF EUT

Please refer to the attached file (EUT Photo)

~ End of Report ~

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