

Report No.: ER/2015/40012 **Issue Date: Jul. 09, 2015** 

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## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

*OF* 

**Product Name:** 7-inch Rugged Tablet

**Pioneerpos Brand Name:** 

DASH 7" Robust Tablet PC **Marketing Name:** 

DASH7E1 Model No.:

N/A **Model Difference:** 

CPOD7E1 FCC ID:

ER/2015/40012 **Report No.:** 

Jul. 09, 2015 **Issue Date:** 

**FCC Rule Part: §15.407** 

Prepared for: **Pioneer POS Solution, Inc.** 

238 Benton Ct., City of Industry, CA 91789

SGS Taiwan Ltd. Prepared by:

> **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

Pioneer POS Solution, Inc. **Applicant:** 

238 Benton Ct., City of Industry, CA 91789

**Product Name:** 7-inch Rugged Tablet

**Brand Name: Pioneerpos** 

DASH 7" Robust Tablet PC **Marketing Name:** 

Model No.: DASH7E1

**Model Difference:** N/A

**FCC ID:** CPOD7E1

**File Number:** ER/2015/40012

Date of test: Apr. 02, 2015 ~ Jul. 03, 2015

**Date of EUT Received:** Apr. 02, 2015

## We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

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

Test By:	Marcus Tseng	Date:	Jul. 09, 2015
Prepared By:	Marcus Tseng / Engineer Vto letta Tang	Date:	Jul. 09, 2015
Approved By:	Violetta Tang / Clerk  Jim Chang / Asst. Manager	Date:	Jul. 09, 2015

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2015/40012	Rev.00	Initial creation of document	Jul. 09, 2015

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### **GENERAL INFORMATION**

## **Product Description**

General:

Product Name:	7-inch Rugged Tablet		
Brand Name:	Pioneerpos		
Marketing Name:	DASH 7"	Robust Tablet PC	
Model No.:	DASH7E1		
Model Difference:	N/A		
Product SW/HW version:	20150128 / A0.3_0_0		
Radio SW/HW version:	N/A		
Test SW Version:	N/A		
RF power setting in TEST SW:	EST SW: N/A		
	7.4Vdc from Rechargeable Li-ion Battery or 12V from AC/DC Adapter		
Power Supply:	Battery:	Model No.: J1067, Supplier: JHT	
	Adapter:	Model No.: LTE-24E-S2-2, Supplier: Li Tone Electronics Co., Ltd	

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#### WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology	
	5150~5250	4	9.88dBm		
	5250~5350	4	10.34dBm	OFDM	
11a	5470~5725	11	10.19dBm	OFDM	
	5725-5850	5	10.32dBm		
	HT20 5150~5250	4	10.36dBm (MIMO Chain 0+1)		
11	HT20 5250~5350	4	10.31dBm (MIMO Chain 0+1)	OFDM	
11n	HT20 5470~5725	11	10.50dBm (MIMO Chain 0+1)	OFDM	
	HT20 5725-5850	5	10.15dBm (MIMO Chain 0+1)		
	HT40 5150~5250	2	10.45dBm (MIMO Chain 0+1)	OFDM	
11	HT40 5250~5350	2	10.29dBm (MIMO Chain 0+1)		
11n	HT40 5470~5725	5	9.90dBm (MIMO Chain 0+1)		
	HT40 5725-5850	2	10.51dBm (MIMO Chain 0+1)		
Antenna Designation			PIFA Antenna, Main: Gain: 6.54dBi (5150MHz-5350MHz) 5.19dBi (5470MHz-5725MHz) / 3.67dBi (5725MHz-5850MHz) Aux: Gain: 1.79dBi (5150MHz-5350MHz) 1.90dBi (5470MHz-5725MHz) / 2.43dBi (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 – 135Mbps 802.11 n_40MHz: 13.5 – 300Mbps		



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## **Product Feature of Equipment Under Test**

The equipment under Test (Hereafter Called: EUT) is 7-inch Rugged Tablet supporting, Wi-Fi 802.11abgn, Bluetooth with GPS and NFC features and below is details of information

Product Feature  Product Feature				
Product Name: 7-inch Rugged Tablet				
Brand Name: Pioneerpos				
Marketing Name:	DASH 7" Robust Tablet PC			
Model No.:	DASH7E1			
Model Difference:	N/A			
FCC ID	CPOD7E1			
Wi-Fi Specification	802.11a/b/g/n			
Bluetooth Version	V4.0 dual mode +EDR			
NFC Specification	NFC			

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

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#### 1.3 **Test Methodology of Applied Standards**

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01

FCC KDB 662311 D01 Multiple Transmitter Output

ANSI C63.10:2009

#### Note:

- 1. All test items have been performed and record as per the above standards.
- 2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.
- The EUT was placed 0.8m height for frequency above 1GHz in accordance with AN-3. SI C63.10:2009.

## **Test Facility**

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

FCC Registration Numbers are: 990257

Canada Registration Number: 4620A-5.

#### **Special Accessories** 1.5

There are no special accessories used while test was conducted.

#### **Equipment Modifications** 1.6

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 which is 0.8 m above ground plane. 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** 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 1.6dB and 10dB attenuator.

#### Single mode offset

=  $\overrightarrow{RF}$  cable loss (dB)+ attenuation factor(dB) +duty factor = 11.6(dB)

#### N20 MIMO mode offset

= RF cable loss (dB)+ attenuation factor(dB)+ 10 log(NANT) dB+duty factor=14.6(dB)

#### N40 MIMO mode offset

= RF cable loss (dB)+ attenuation factor(dB)+ 10 log(NANT) dB+duty factor=14.6(dB)

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# **Configuration of Tested System**

Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration

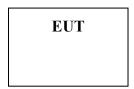
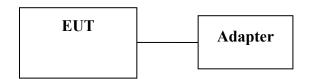


Fig. 2-2 AC Power Line Conducted Emission



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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A

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## **SUMMARY OF TEST RESULT**

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	26 dB & 6dB Emission Bandwidth	Compliant
§15.407(a)	Maximum Conducted Output Power	Compliant
§15.407(a)	Power Spectral Density	Compliant
§15.407(b)	Undesirable Radiated Emissions	Compliant
§15.407(c)	Transmission in case of Absence of Information	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.203 §15.407(a)	Antenna Requirement	Compliant

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### **DESCRIPTION OF TEST MODES**

#### **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

CHA	NNEL	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

Operated band in 5470 MHz ~5725 MHz:

11 channels are provided for 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		

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## 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 EMISSION TEST:**

RADIATED EMISSION TEST:						
RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	MAIN
802.11a	5260~5320	52 to 64	60	OFDM	6	MAIN
802.11a	5500~5700	100 to 140	116	OFDM	6	MAIN
802.11a	5745~5825	149 to 165	157	OFDM	6	MAIN
	RA	ADIATED EM	ISSION TEST	(ABOVE 1 GHz)	)	
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	26 44 49	OFDM	6	MAIN
802.11n_HT20	3180~3240	30 10 48	36,44,48	OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN
802.11n_HT20	3200~3320	32 10 04	32,00,04	OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11a	5500~5700	100 to 140	100 116 140	OFDM	6	MAIN
802.11n_HT20	3300~3700	100 to 140	100,116,140	OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	140 157 165	OFDM	6	MAIN
802.11n_HT20	3/43~3823	149 10 103	149,157,165	OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO

#### Note:

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

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#### ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST					
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	26 11 19	OFDM	6	MAIN
802.11n_HT20		30 10 48	36,44,48	OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11a	5260~5320	52 to 64	52 60 64	OFDM	6	MAIN
802.11n_HT20		32 10 04	52,60,64	OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	MAIN
802.11n_HT20	3300~3700	100 to 140	100,110,140	OFDM	MCS8	MIMO
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11a	5745 5025	140 / 165	140 157 165	OFDM	6	MAIN
802.11n_HT20	5745~5825	149 to 165	149,157,165	OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO

Note: FCC ID, CPOD7E1, and FCC ID CPOD7E1-LTE share the equivalently identical enclosure, material of coating, I/O function, PCB board, display, and power source. In addition, ID CPOD7E1, and ID CPOD7E1-LTE implement the same Bluetooth/WLAN chipset/module with the same antenna that operates with the same transmitted power level. Hence, this given test report contains the identical test results that inherent from ID CPOD7E1-LTE.

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### **MEASUREMENT UNCERTAINTY**

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

Radiated Spurious Emission:

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

Measurement uncertainty	30MHz - 167MHz: +/- 4.22dB		
	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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#### 6. CONDUCTED EMISSION TEST

## 6.1. Standard Applicable

According to §15.207, frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range	Limits dB(uV)			
MHz	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

#### Note

- 1. The lower limit shall apply at the transition frequencies
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 6.2. Measurement Equipment Used

Conducted Emission Test Site							
<b>EQUIPMENT</b>	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100760	05/04/2014	05/03/2015		
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/15/2015	05/14/2016		
LISN	FCC	FCC-LISN-50/250-25 -2-01	04034	03/13/2015	03/12/2016		
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2014	11/25/2015		

#### 6.3. EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2009.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz power source.

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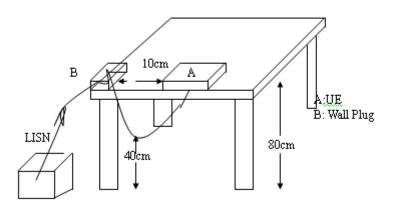
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#### 6.4. Test SET-UP



#### **6.5.** Measurement Procedure

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

#### 6.6. Measurement Result

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

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

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#### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Apr. 22, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
			•	Phase:	L1

Phase:

Site ConductionRoom

L1

Power: AC 120V/60Hz

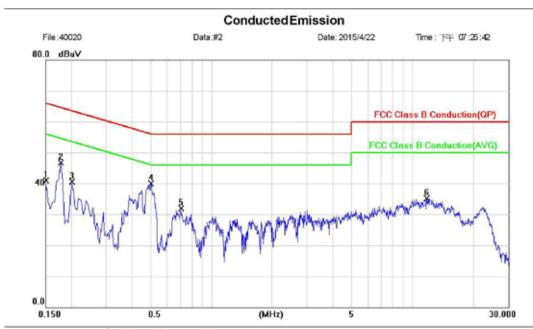
Temperature:

Humidity:

Limit: FCC Class B Conduction(QP)

Mode: Operation

Note: Adapter:LTE24E-S2-2



No. N	Λk. F	req.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dВ	dBuV	dBuV	dΒ	Detector	Comment
1	(	0.1500	40.84	0.05	40.89	66.00	-25.11	peak	
2	(	).1780	46.69	0.06	46.75	64.58	-17.83	peak	
3	(	2020	40.51	0.06	40.57	63.53	-22.96	peak	
4 *	(	).5020	39.79	80.0	39.87	56.00	-16.13	peak	
5	(	0.7060	31.80	0.09	31.89	56.00	-24.11	peak	
6	11	.7460	34.79	0.38	35.17	60.00	-24.83	peak	

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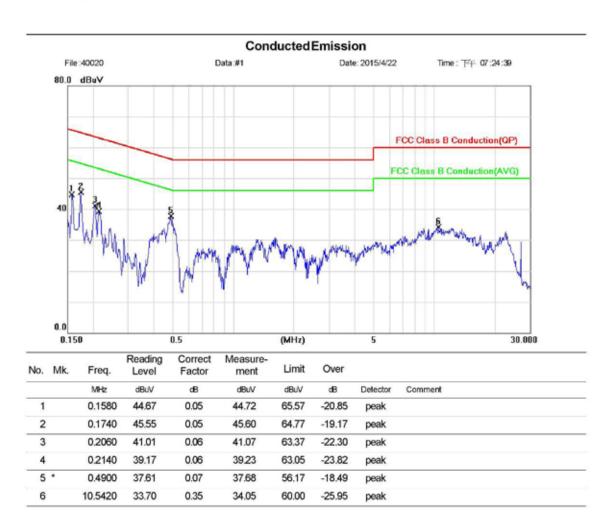
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Operation Mode:	Operation mode			Test Date:	Apr. 22, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
				Phase:	N

24 10 Site ConductionRoom Temperature: Phase: N Limit: FCC Class B Conduction(QP) AC 120V/60Hz Humidity: Power:

Mode: Operation

Note: Adapter:LTE24E-S2-2



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### 7. DUTY CYCLE TEST SIGNAL

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

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

#### Formula:

Duty Cycle = Ton / (Ton+Toff)

#### **Measurement Procedure:**

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

## **Duty Cycle:**

	Duty Cycle	Duty Factor (dB)
802.11a	95.35%	0.21
802.11n_20 (MIMO)	90.78%	0.42
802.11n_40 (MIMO)	83.76%	0.77

Duty Cycle Factor:  $10 * \log (1/0.9535) = 0.21$ Duty Cycle Factor:  $10 * \log (1/0.9078) = 0.42$ Duty Cycle Factor:  $10 * \log (1/0.8376) = 0.77$ 

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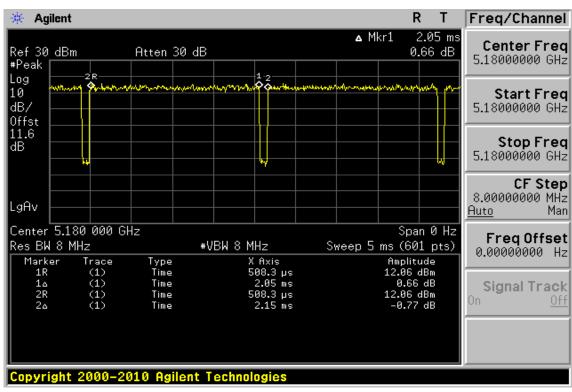
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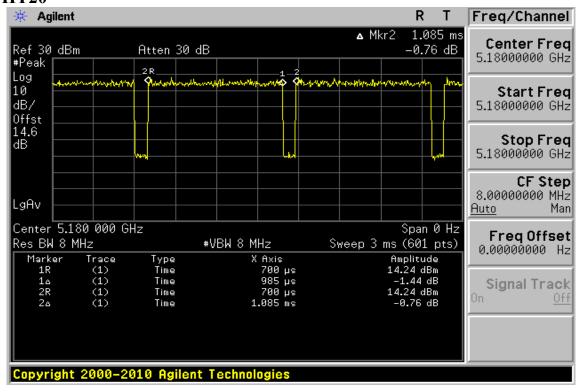
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## **DUTY CYCLE TEST SIGNAL Measurement Result** 802.11a



#### 802.11n HT20



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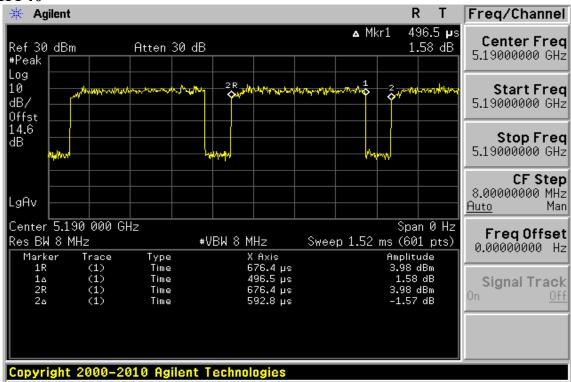
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#### 802.11n HT40



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#### 26dB & 6dB EMISSION BANDWIDTH MEASUREMENT

## 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

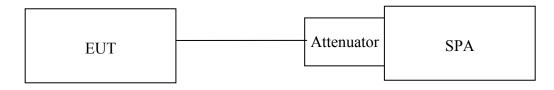
### **8.2** Measurement Procedure

- 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 v01.
- 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.

**Measurement Equipment Used** 8.3

	Conducted Emission Test Site					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016	
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016	
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016	
Splitter	Agilent	11636B	N/A	01/02/2015	01/01/2016	

## **Test Set-up**



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## **Measurement Result**

## 26dB Bandwidth

802.11a

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	22.518	13.53
5220	22.371	13.50
5240	22.396	13.50
5260	22.930	13.60
5300	22.060	13.44
5320	22.482	13.52
5500	21.460	13.32
5580	22.861	13.59
5700	22.014	13.43

### 802.11n HT20 (Main)

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	22.055	13.44
5220	22.698	13.56
5240	23.189	13.65
5260	22.683	13.56
5300	22.535	13.53
5320	21.449	13.31
5500	22.401	13.50
5580	22.316	13.49
5700	22.875	13.59

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#### 802.11n HT20 (Aux)

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	23.103	13.64
5220	22.306	13.48
5240	21.651	13.35
5260	21.922	13.41
5300	23.094	13.63
5320	21.443	13.31
5500	21.446	13.31
5580	22.073	13.44
5700	22.679	13.56

### 802.11n HT40 (Main)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	48.519	16.86
5230	48.013	16.81
5270	48.328	16.84
5310	47.937	16.81
5510	47.612	16.78
5550	46.976	16.72
5670	47.254	16.74

### 802.11n HT40 (Aux)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	48.864	16.89
5230	48.464	16.85
5270	47.912	16.80
5310	48.593	16.87
5510	47.130	16.73
5550	47.396	16.76
5670	47.708	16.79

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## 6dB Bandwidth (5725 MHz~ 5850 MHz)

802.11a

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	15.158	11.81
5785	16.055	12.06
5825	15.888	12.01

#### 802.11n HT20 (Main)

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	14.476	11.61
5785	15.939	12.02
5825	14.802	11.70

## 802.11n\_HT20 (Aux)

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	15.120	11.80
5785	15.160	11.81
5825	15.516	11.91

#### 802.11n HT40 (Main)

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	36.370	15.61
5795	36.387	15.61

### 802.11n\_HT40 (Aux)

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	36.304	15.60
5795	36.380	15.61

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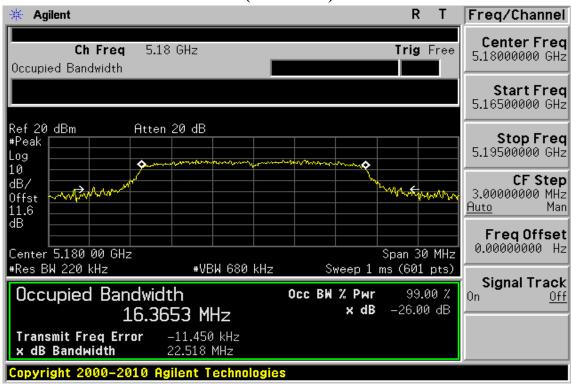
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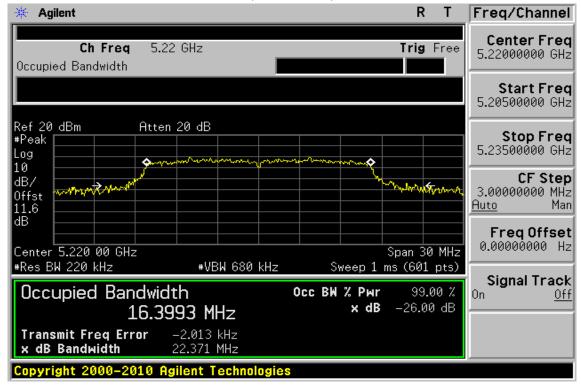
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# 802.11a, 5150~5250 MHz 26dB Band Width Test Data CH-Low (5180MHz)



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



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



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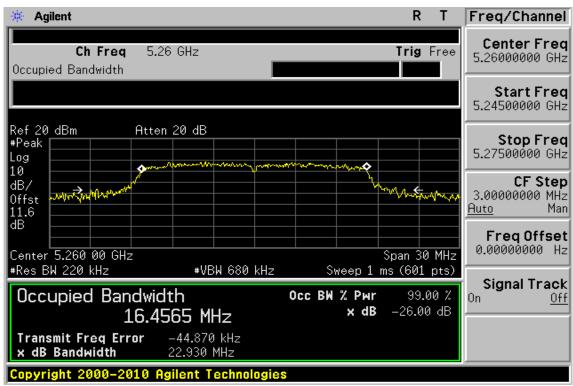
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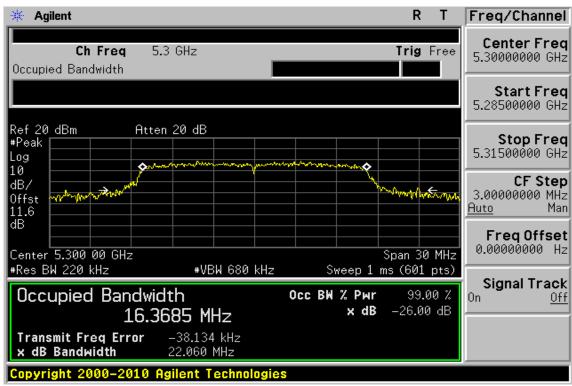
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# 802.11a, 5250~5350 MHz 26dB Band Width Test Data CH-Low (5260MHz)



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



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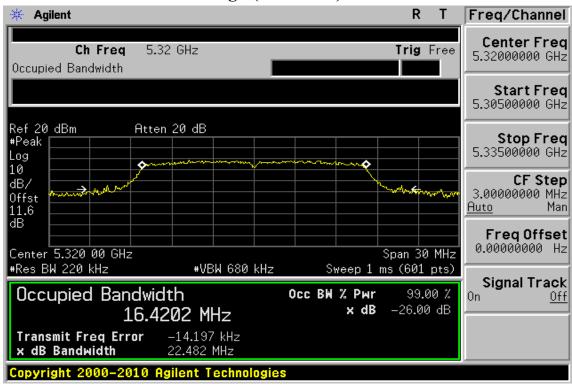
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## 26dB Band Width Test Data CH-High (5320MHz)



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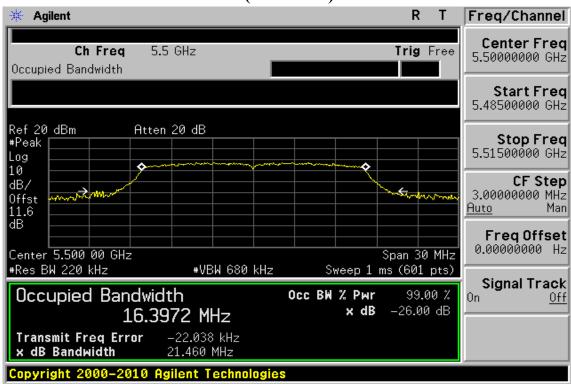
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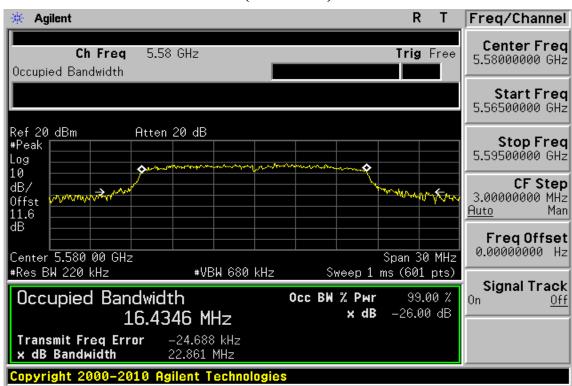
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# 802.11a, 5470~5725 MHz 26dB Band Width Test Data CH-Low (5500MHz)



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



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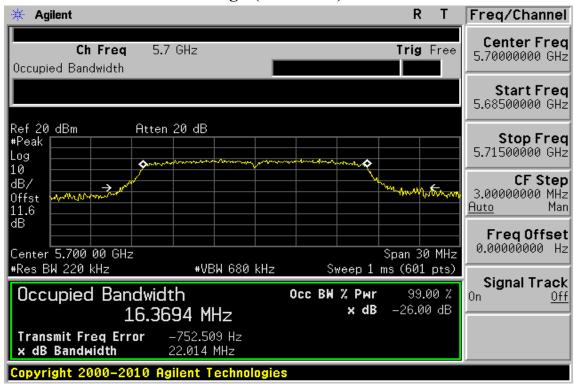
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## 26dB Band Width Test Data CH-High (5700MHz)



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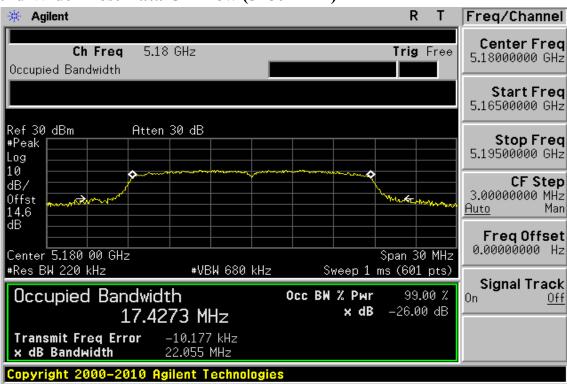
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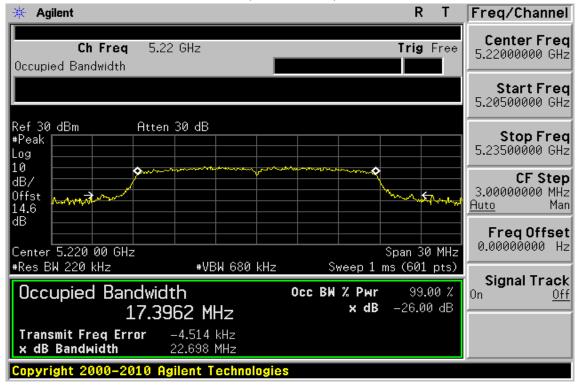
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# 802.11n HT20, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180 MHz)



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



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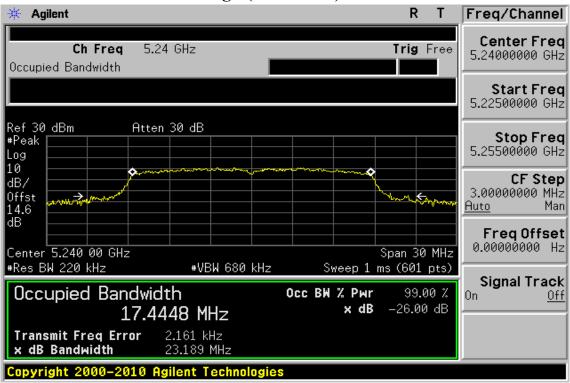
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## 26dB Band Width Test Data CH-High (5240 MHz)



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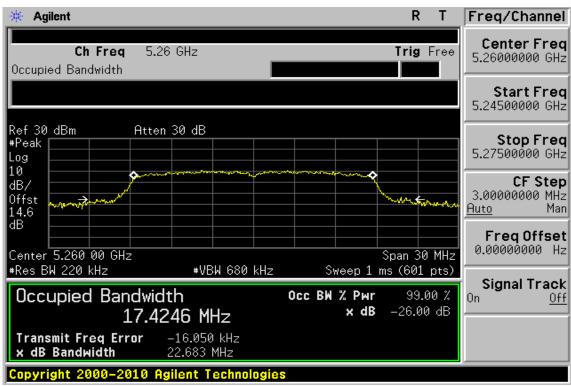
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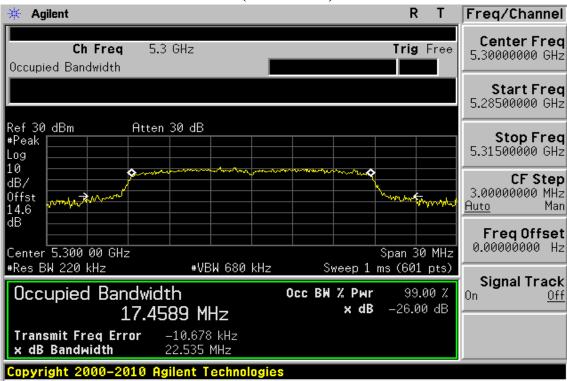
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# 802.11n HT20, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5260 MHz)



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



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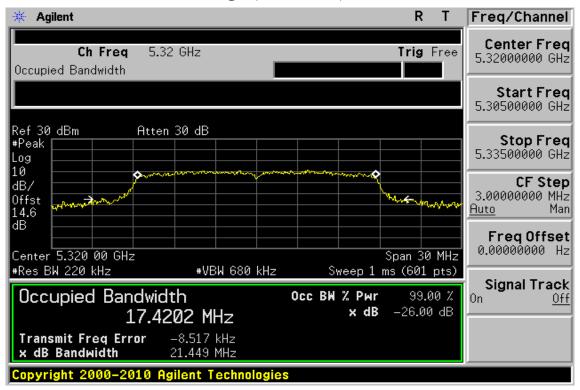
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## 26dB Band Width Test Data CH-High (5320 MHz)



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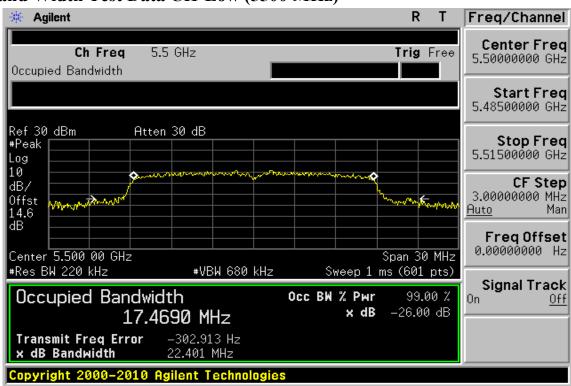
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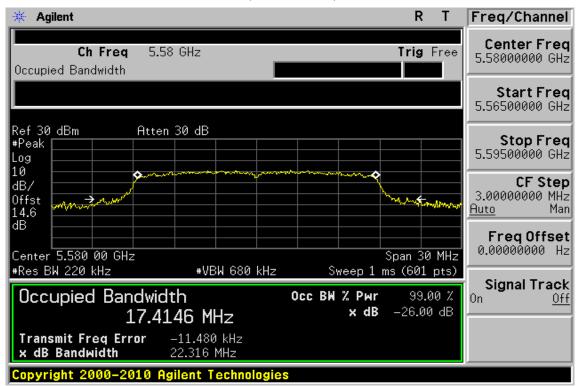
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## 802.11n HT20, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5500 MHz)



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



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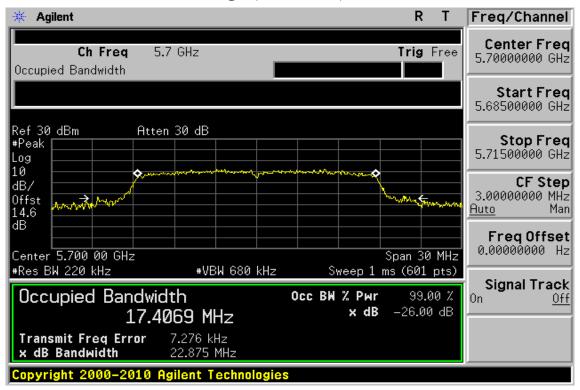
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## 26dB Band Width Test Data CH-High (5700 MHz)



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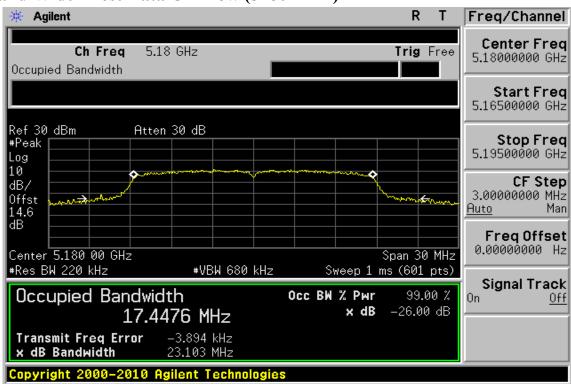
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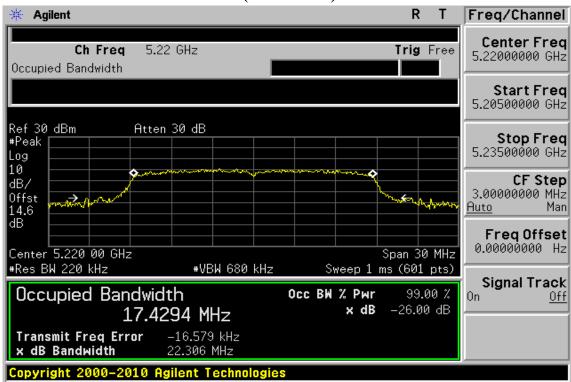
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# 802.11n HT20, 5150~5250 MHz (Aux) 26dB Band Width Test Data CH-Low (5180 MHz)



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



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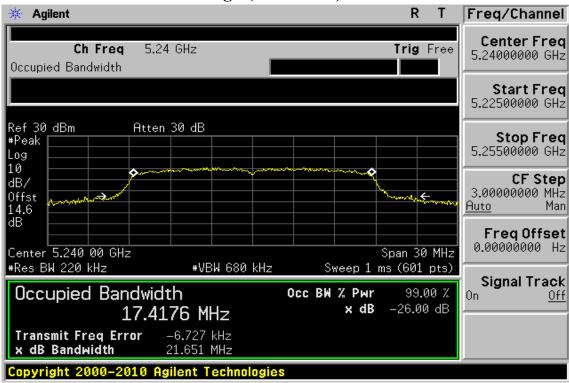
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## 26dB Band Width Test Data CH-High (5240 MHz)



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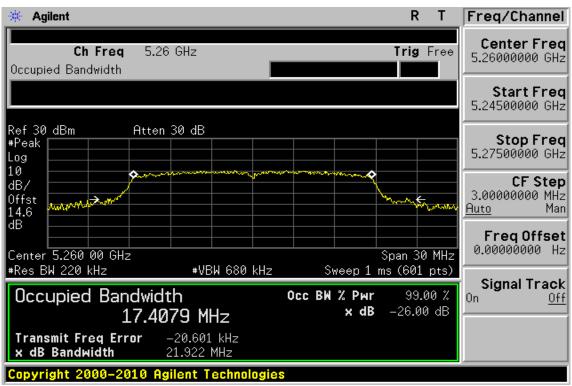
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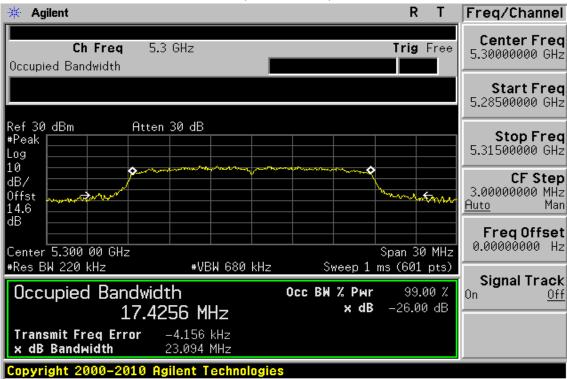
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# 802.11n HT20, 5250~5350 MHz (Aux) 26dB Band Width Test Data CH-Low (5260 MHz)



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



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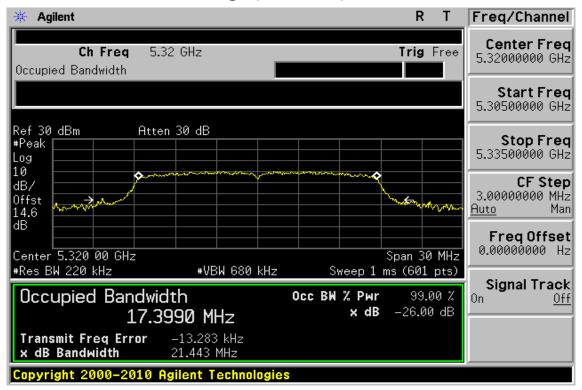
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## 26dB Band Width Test Data CH-High (5320 MHz)



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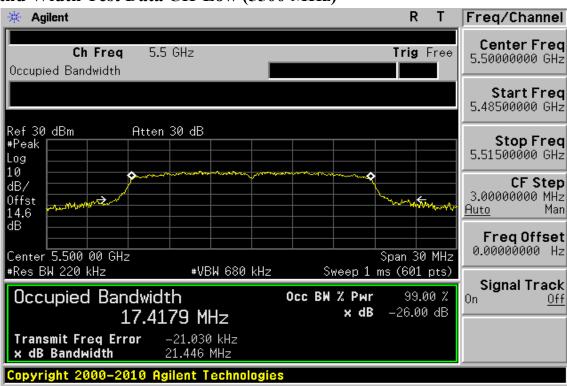
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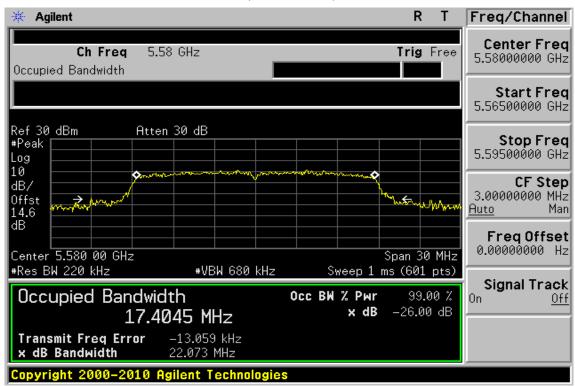
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# 802.11n HT20, 5470~5725 MHz (Aux) 26dB Band Width Test Data CH-Low (5500 MHz)



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



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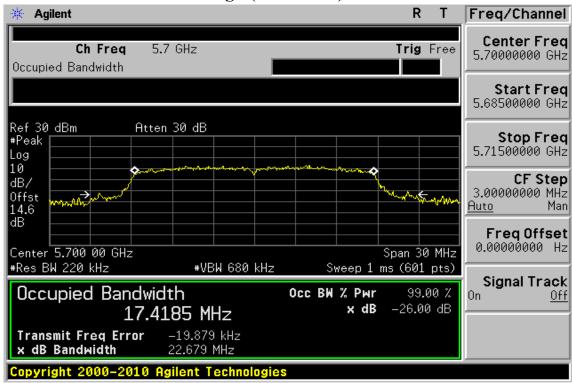
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## 26dB Band Width Test Data CH-High (5700 MHz)



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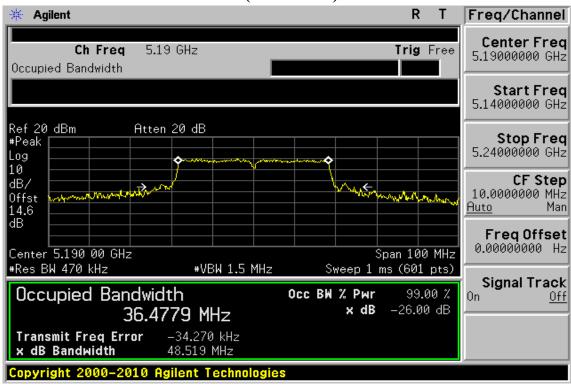
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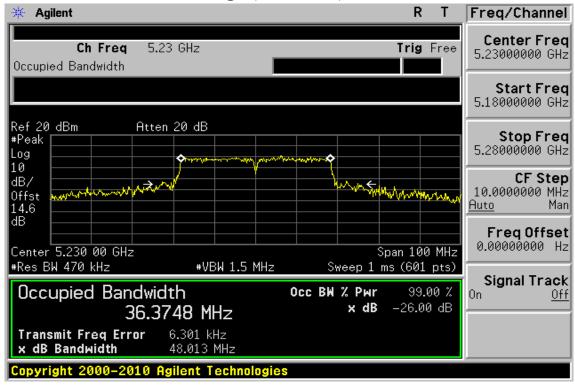
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# 802.11n HT40, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5190 MHz)



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



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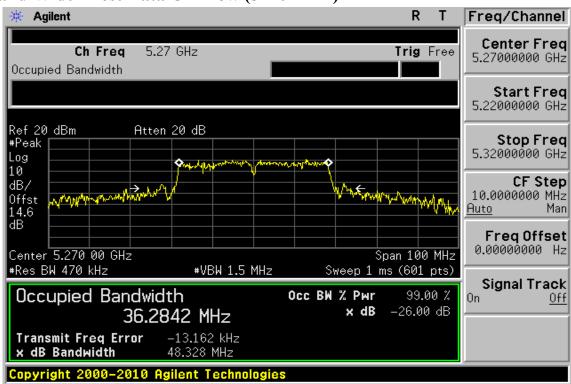
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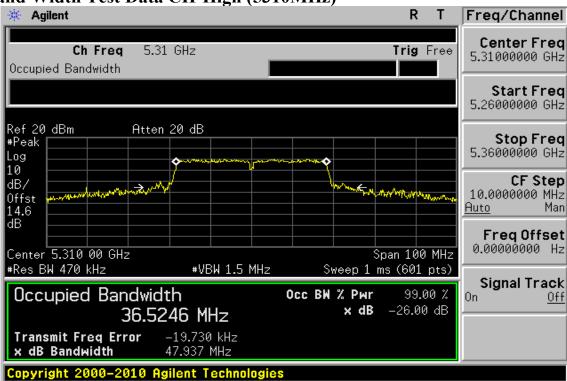
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# 802.11n HT40, 5250~5350 MHz (Main) 26dB Band Width Test Data CH-Low (5270 MHz)



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



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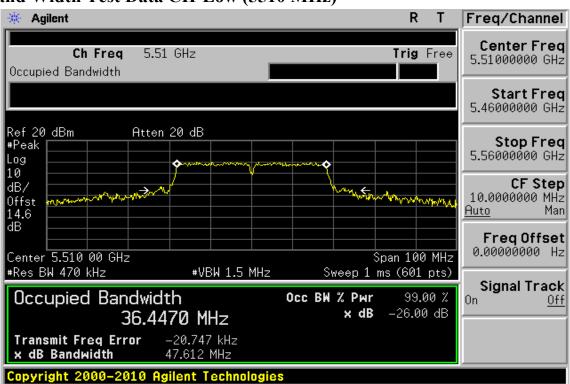
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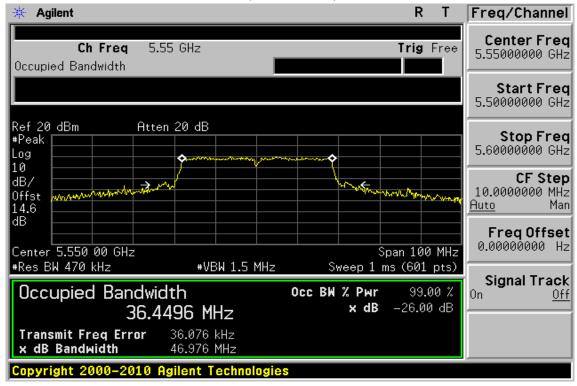
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# 802.11n HT40, 5470~5725 MHz (Main) 26dB Band Width Test Data CH-Low (5510 MHz)



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



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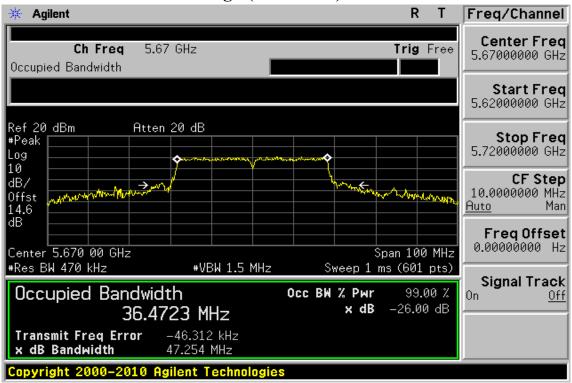
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## 26dB Band Width Test Data CH-High (5670 MHz)



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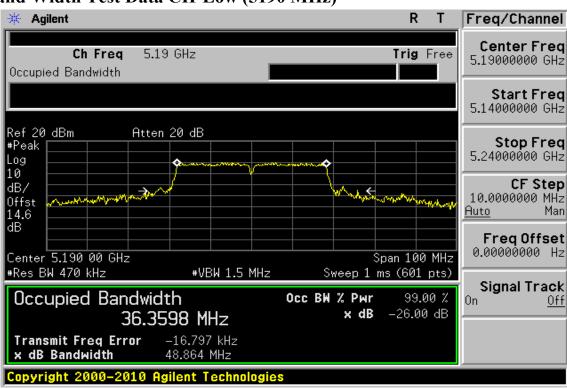
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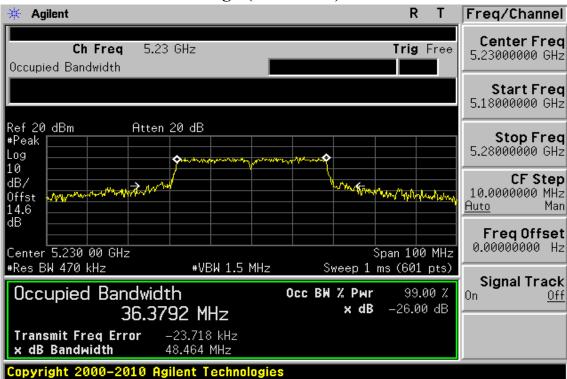
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# 802.11n HT40, 5150~5250 MHz (Aux) 26dB Band Width Test Data CH-Low (5190 MHz)



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



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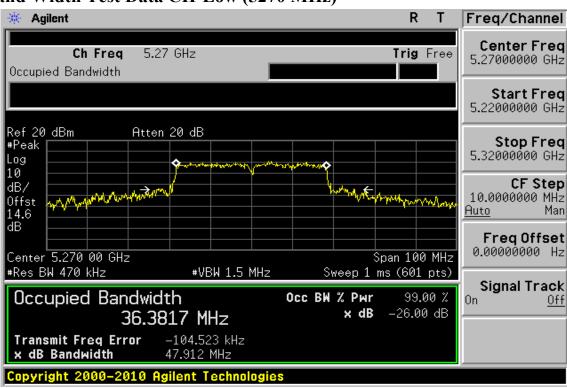
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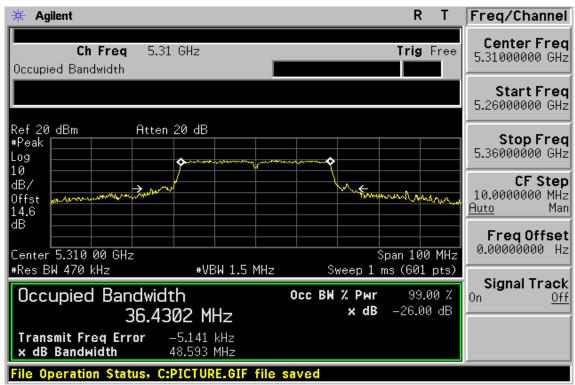
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# 802.11n HT40, 5250~5350 MHz (Aux) 26dB Band Width Test Data CH-Low (5270 MHz)



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



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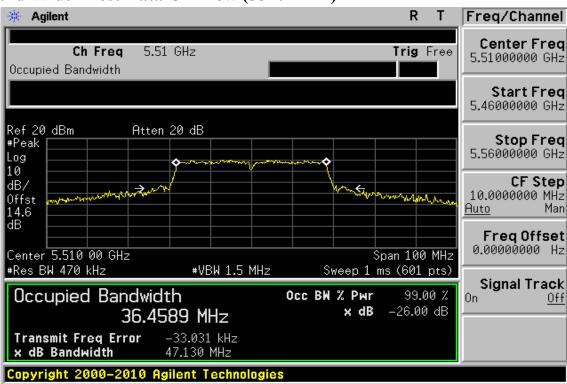
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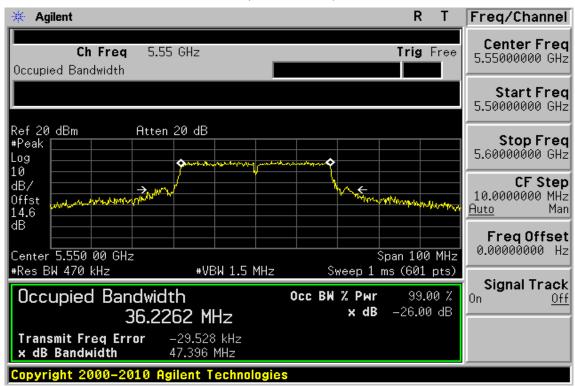
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# 802.11n HT40, 5470~5725 MHz (Aux) 26dB Band Width Test Data CH-Low (5510 MHz)



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



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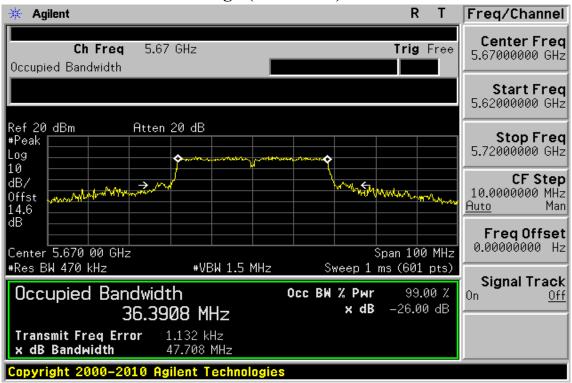
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## 26dB Band Width Test Data CH-High (5670 MHz)



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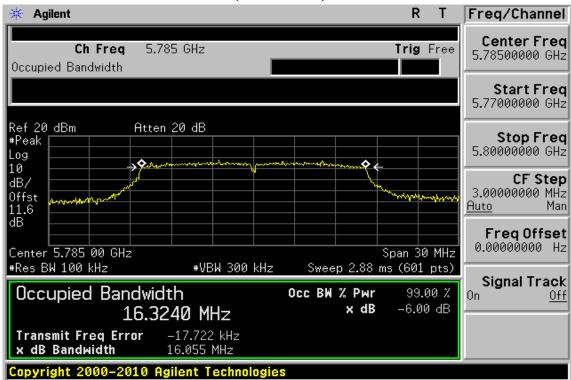
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# 802.11a, 5725~5850 MHz 6dB Band Width Test Data CH-Low (5745 MHz)



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



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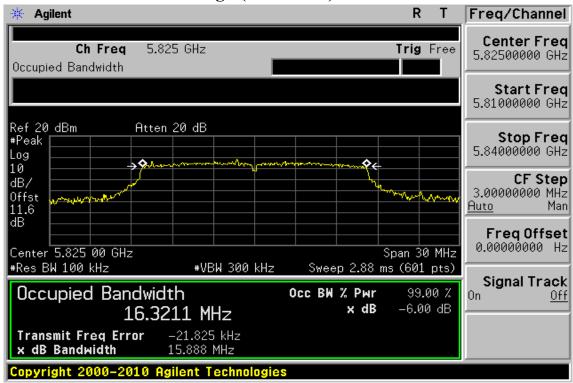
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## 6dB Band Width Test Data CH-High (5825 MHz)



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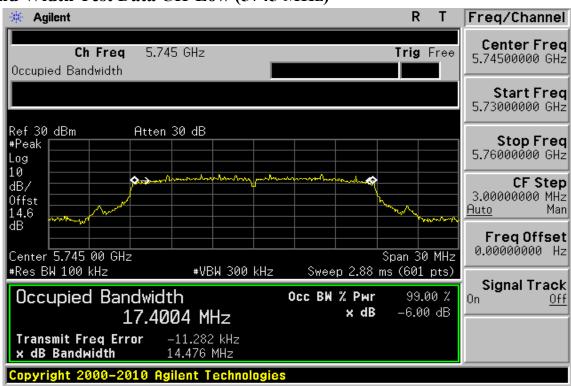
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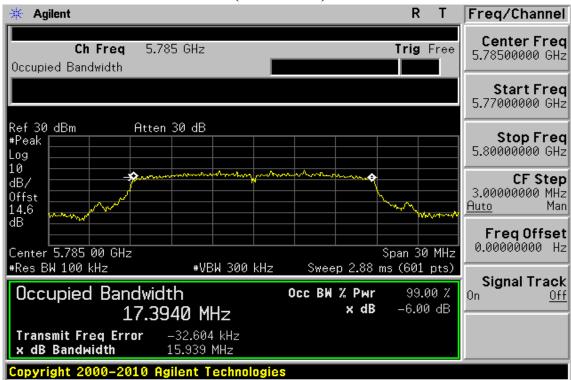
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# 802.11n HT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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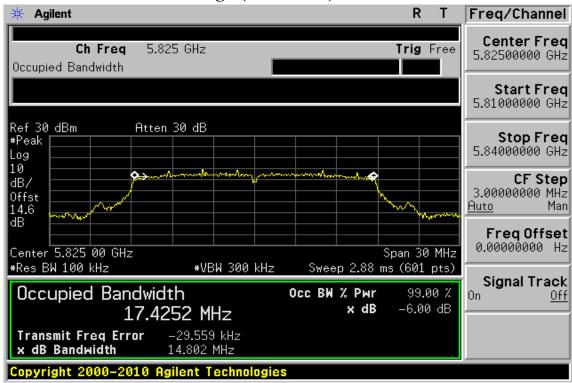
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## 6dB Band Width Test Data CH-High (5825 MHz)



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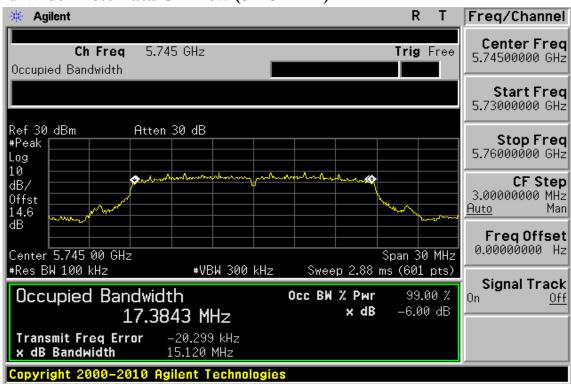
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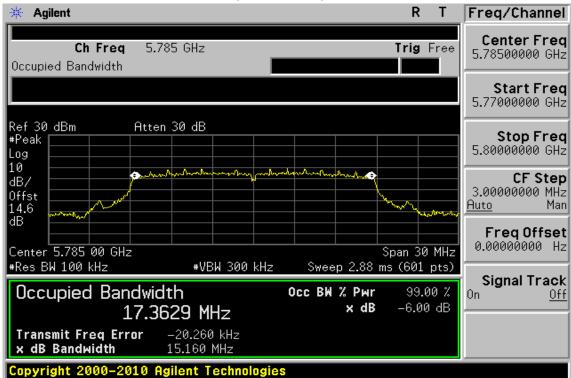
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# 802.11n HT20, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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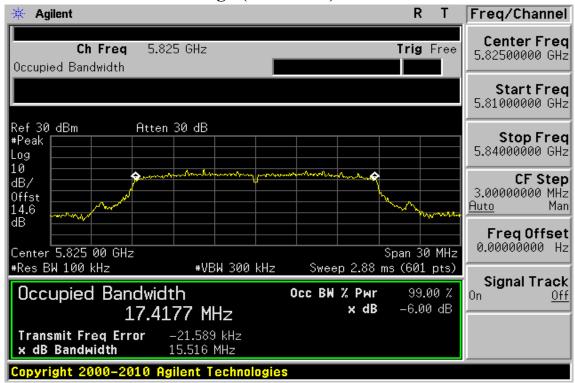
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## 6dB Band Width Test Data CH-High (5825 MHz)



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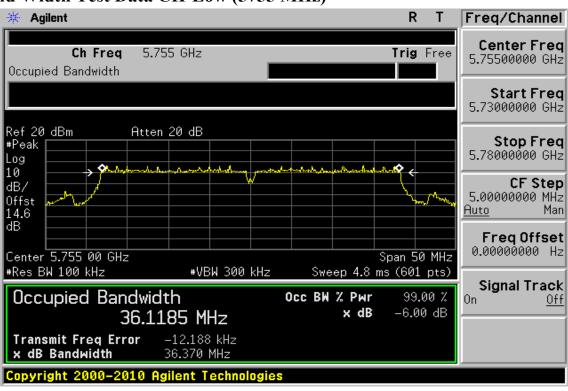
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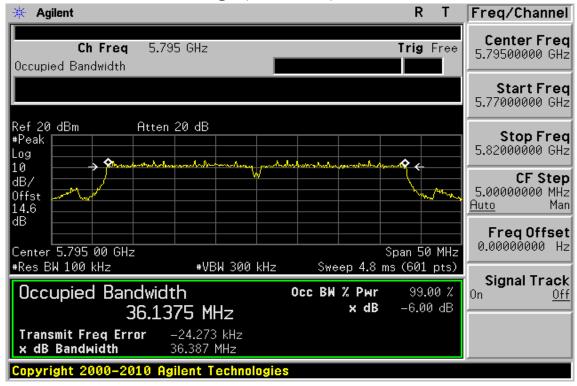
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# 802.11n HT40, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5755 MHz)



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



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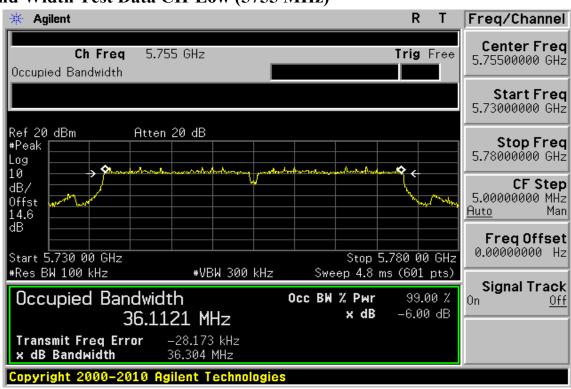
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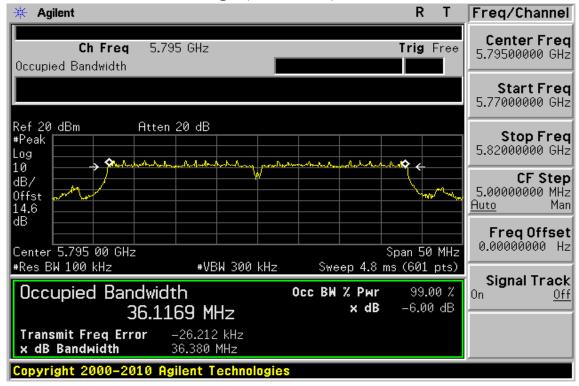
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# 802.11n HT40, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5755 MHz)



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



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#### 9. MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

## 9.1 Standard Applicable

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Mater device )	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
	<b>√</b>	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)

If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

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

Directional gain = gain of antenna element +  $10 \log (\# \text{ of TX antenna elements})$ 

Effective Legacy Gain (dBi) = 6.54+3.01=9.55dBi

Limit: 23.98dBm - (9.55 - 6dBi) = 20.43dBm

Therefore the limit needs to reduce for the U-NII-1 and U-NII-2A band.

Effective Legacy Gain (dBi) = 5.19+3.01=8.20dBi

Limit: 23.98dBm - (8.20-6dBi) = 21.78dBm

Therefore the limit needs to reduce for the U-NII-2C band.

Effective Legacy Gain (dBi) = 3.67+3.01=6.68dBi

Limit: 30dBm - (6.68 - 6dBi) = 29.32dBm

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

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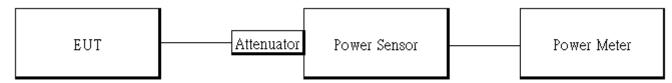
#### 9.2 Measurement Procedure

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

#### 9.3 Measurement Equipment Used

Refer to section 8.3 for details.

#### 9.4 Test Set-up



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#### 9.5 **Measurement Result**

802.11a

СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	9.36	8.630	23.98	PASS
44	5220	9.88	9.727	23.98	PASS
48	5240	9.76	9.462	23.98	PASS
52	5260	10.32	10.765	23.98 or 11+10log(B) =24.60	PASS
60	5300	10.34	10.814	23.98 or 11+10log(B) =24.44	PASS
64	5320	8.91	7.780	23.98 or 11+10log(B) =24.52	PASS
100	5500	5.90	3.890	23.98 or 11+10log(B) =24.32	PASS
116	5580	10.19	10.447	23.98 or 11+10log(B) =24.59	PASS
140	5700	7.69	5.875	23.98 or 11+10log(B) =24.43	PASS
149	5745	10.08	10.186	30	PASS
157	5785	10.32	10.765	30	PASS
165	5825	10.24	10.568	30	PASS

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#### 802.11n HT20 (MIMO)

	Е	AVERAGE F	POWER (dBm)	TOTAL TOTAL		REQUIRED	
СН	Frequency (MHz)	CHAIN 0 CHAIN 1		POWER (dBm)	POWER (mW)	LIMIT (dBm)	RESULT
36	5180	7.60	7.08	10.36	10.859	20.43	PASS
44	5220	7.45	6.55	10.03	10.078	20.43	PASS
48	5240	7.33	6.41	9.90	9.783	20.43	PASS
52	5260	7.27	6.18	9.77	9.483	20.43 or 11+10log(B) =24.56	PASS
60	5300	7.67	6.89	10.31	10.734	20.43 or 11+10log(B) =24.53	PASS
64	5320	6.90	6.04	9.50	8.916	20.43 or 11+10log(B) =24.31	PASS
100	5500	5.73	5.17	8.47	7.030	21.78 or 11+10log(B) =24.50	PASS
116	5580	7.29	6.73	10.03	10.068	21.78 or 11+10log(B) =24.49	PASS
140	5700	7.75	7.22	10.50	11.229	21.78 or 11+10log(B) =24.59	PASS
149	5745	7.26	6.50	9.91	9.788	29.32	PASS
157	5785	7.21	6.69	9.97	9.927	29.32	PASS
165	5825	7.36	6.90	10.15	10.343	29.32	PASS

#### 802.11n HT40 (MIMO)

		AVERAGE POWER (dBm)		TOTAL TOTAL		REQUIRED	
СН	Frequency (MHz)	CHAIN 0	CHAIN 0 CHAIN 1		POWER (mW)	LIMIT (dBm)	RESULT
38	5190	6.33	5.63	9.00	7.951	20.43	PASS
46	5230	7.87	6.97	10.45	11.101	20.43	PASS
54	5270	7.73	6.77	10.29	10.683	20.43 or 11+10log(B) =27.84	PASS
62	5310	5.59	4.49	8.09	6.434	20.43 or 11+10log(B) =27.81	PASS
102	5510	3.93	3.50	6.73	4.710	21.78 or 11+10log(B) =27.78	PASS
110	5550	6.93	6.55	9.75	9.450	21.78 or 11+10log(B) =27.72	PASS
134	5670	7.13	6.63	9.90	9.767	21.78 or 11+10log(B) =27.74	PASS
151	5755	7.66	7.11	10.40	10.975	29.32	PASS
159	5795	7.80	7.18	10.51	11.250	29.32	PASS

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

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#### 10. PEAK POWER SPECTRAL DENSITY

#### 10.1 Standard Applicable

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

If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

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

Directional gain = gain of antenna element +  $10 \log (\# \text{ of TX antenna elements})$ 

Effective Legacy Gain (dBi) = 6.54+3.01=9.55dBi

Limit: 11dBm - (9.55 - 6dBi) = 7.45dBm

Therefore the limit needs to reduce for the U-NII-1 and U-NII-2A band.

Effective Legacy Gain (dBi) = 5.19+3.01=8.20dBi

Limit: 11dBm - (8.20-6dBi) = 8.80dBm

Therefore the limit needs to reduce for the U-NII-2C band.

Effective Legacy Gain (dBi) = 3.67+3.01=6.68dBi

Limit: 30dBm - (6.68 - 6dBi) = 29.32dBm

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

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#### **10.2** Measurement Procedure

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

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

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

#### For U-NII-3 Band:

Set RBW=510 kHz, VBW= 3\*RBW, 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. MIMO Mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.
- 8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

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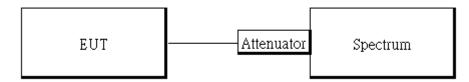
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## 10.3 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT MFR MODEL SERIAL L				LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016	
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016	
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016	

#### 10.4 Test Set-up



#### 10.5 Measurement Result

802.11a

Frequency	PPSD	Limit	Margin
(MHz)	(dBm)	(dBm)	(dB)
5180	-5.71	11.00	-16.71
5220	-5.83	11.00	-16.83
5240	-4.81	11.00	-15.81
5260	-3.83	11.00	-14.83
5300	-4.27	11.00	-15.27
5320	-5.85	11.00	-16.85
5500	-9.61	11.00	-20.61
5580	-4.69	11.00	-15.69
5700	-6.29	11.00	-17.29
5745	2.86	30.00	-27.14
5785	3.84	30.00	-26.16
5825	3.10	30.00	-26.90

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#### 802.11n HT20 (MIMO)

Frequency	PPSD	Limit	Margin
(MHz)	(dBm)	(dBm)	(dB)
5180	-4.16	7.45	-11.61
5220	-6.34	7.45	-13.79
5240	-5.71	7.45	-13.16
5260	-6.06	7.45	-13.51
5300	-4.29	7.45	-11.74
5320	-6.79	7.45	-14.24
5500	-6.86	8.80	-15.66
5580	-6.29	8.80	-15.09
5700	-6.30	8.80	-15.10
5745	2.94	29.32	-26.38
5785	4.08	29.32	-25.24
5825	3.75	29.32	-25.57

#### 802.11n HT40 (MIMO)

Frequency	PPSD	Limit	Margin
(MHz)	(dBm)	(dBm)	(dB)
5190	-14.22	7.45	-21.67
5230	-10.98	7.45	-18.43
5270	-11.88	7.45	-19.33
5310	-12.94	7.45	-20.39
5510	-14.48	8.80	-23.28
5550	-11.46	8.80	-20.26
5670	-11.58	8.80	-20.38
5755	0.93	29.32	-28.39
5795	1.92	29.32	-27.40

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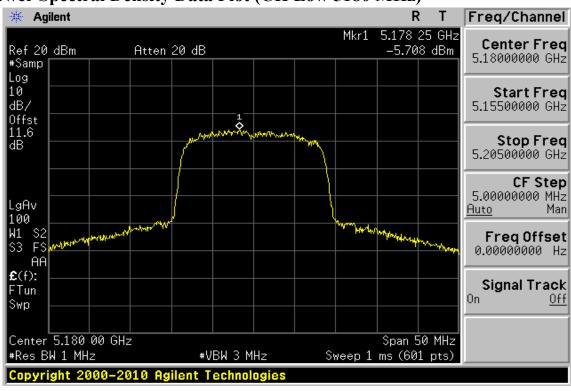
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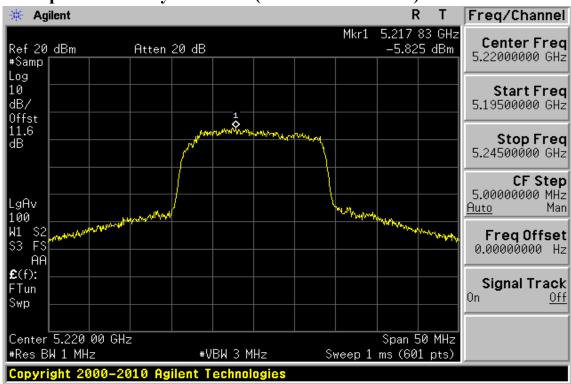
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## 802.11a, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



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



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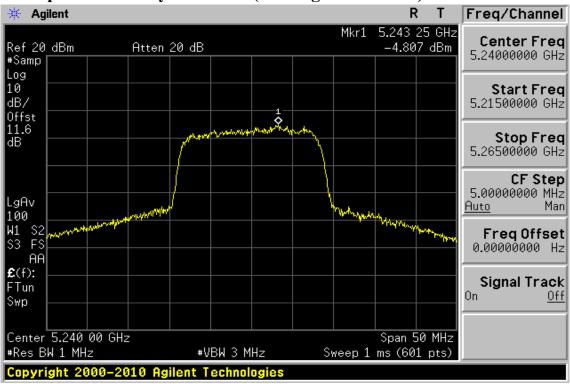
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#### Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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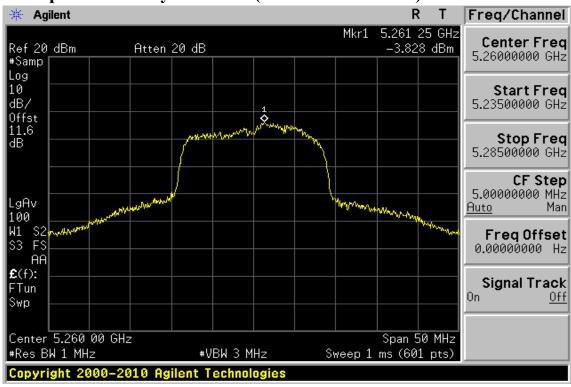


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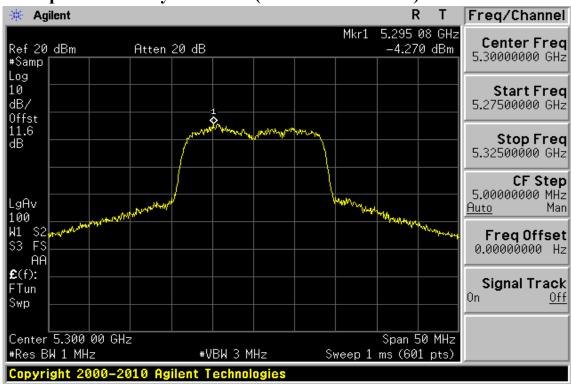
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#### 802.11a, 5250~5350 MHz

## Peak Power Spectral Density Data Plot (CH Low 5260 MHz)



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



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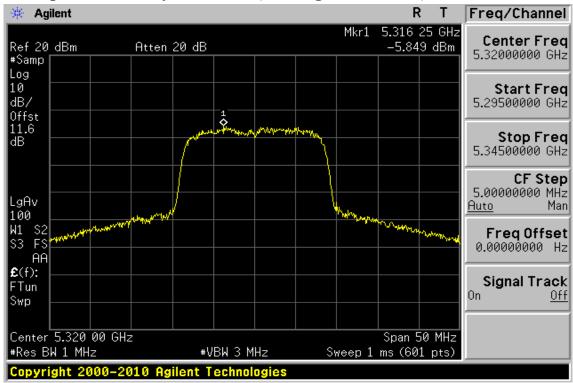
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## Peak Power Spectral Density Data Plot (CH High 5320 MHz)



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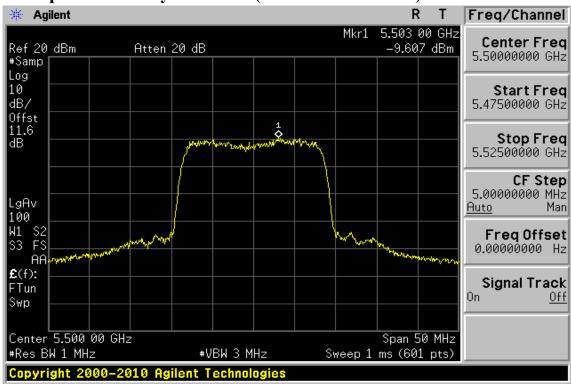


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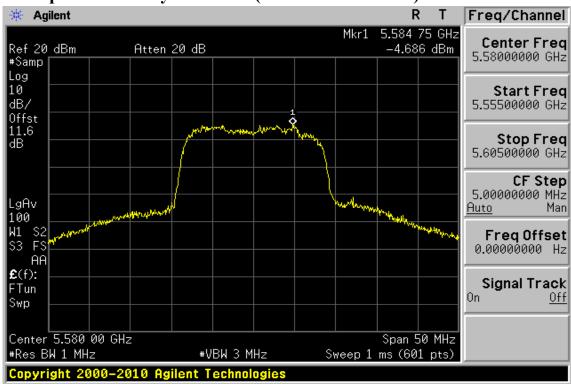
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#### 802.11a, 5470~5725 MHz

## Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



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



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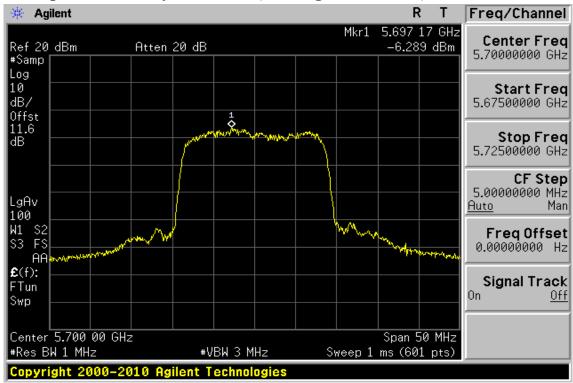
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## Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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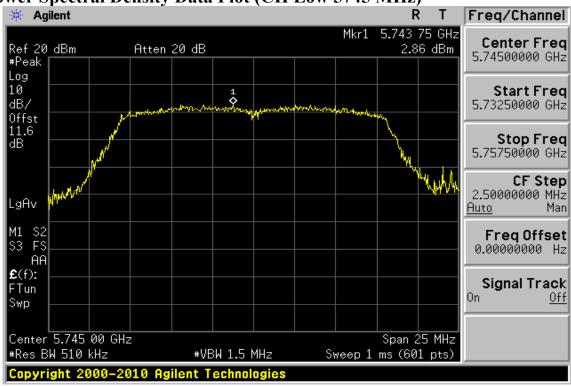


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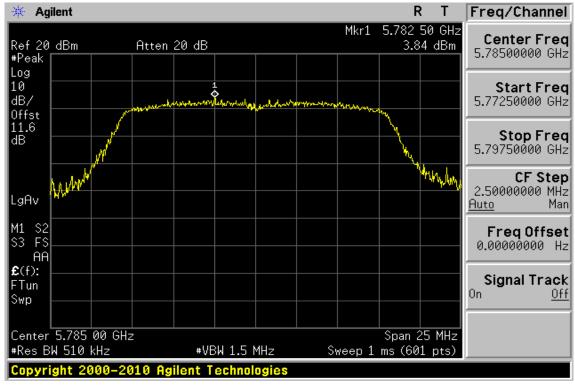
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#### 802.11a, 5725~5850 MHz

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



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



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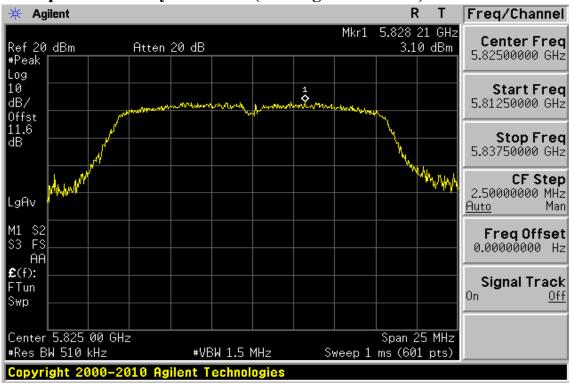
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#### Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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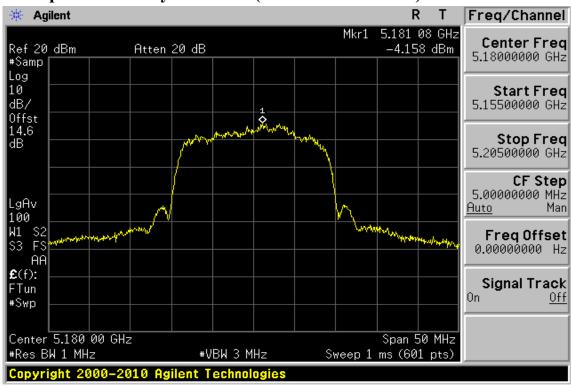


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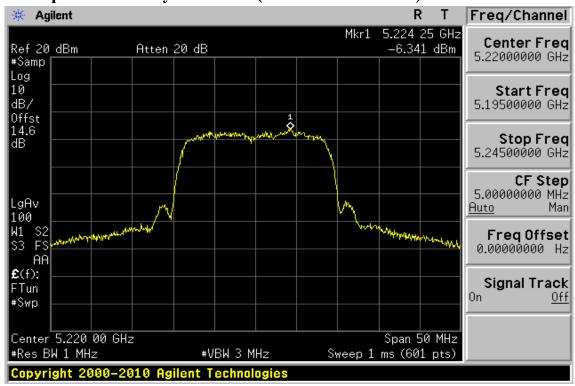
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## 802.11n HT20, 5150~5250 MHz (MIMO)

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



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



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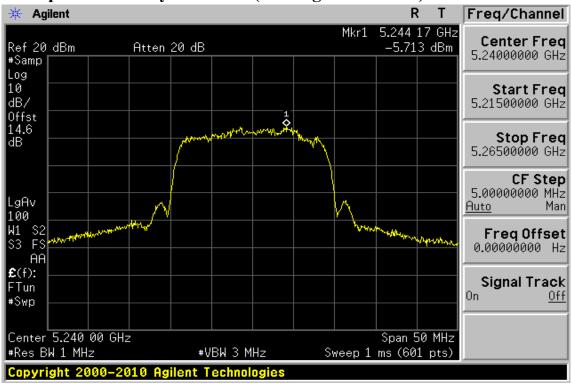
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#### Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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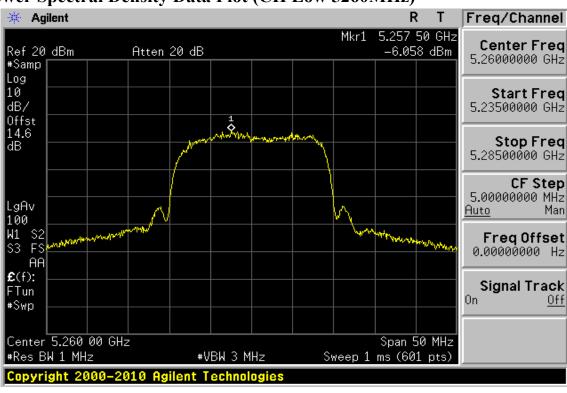
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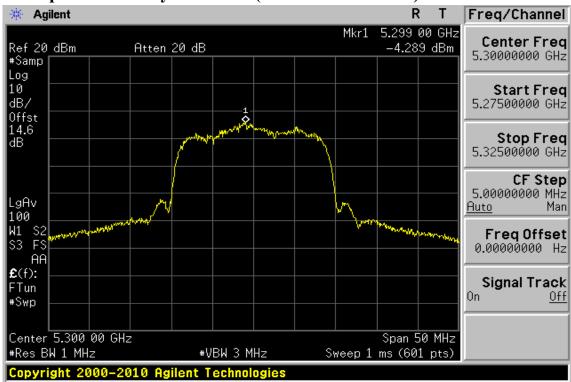
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## 802.11n HT20, 5250~5350 MHz (MIMO) Peak Power Spectral Density Data Plot (CH Low 5260MHz)



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



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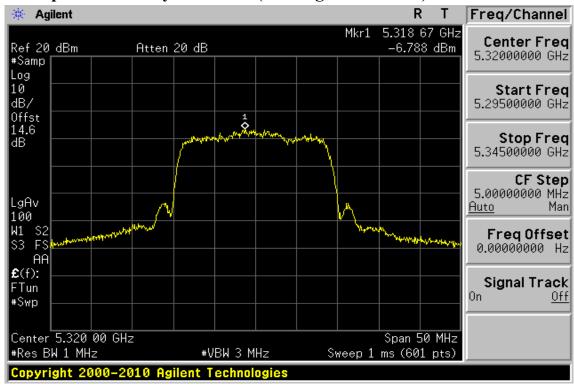
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## Peak Power Spectral Density Data Plot (CH High 5320 MHz)



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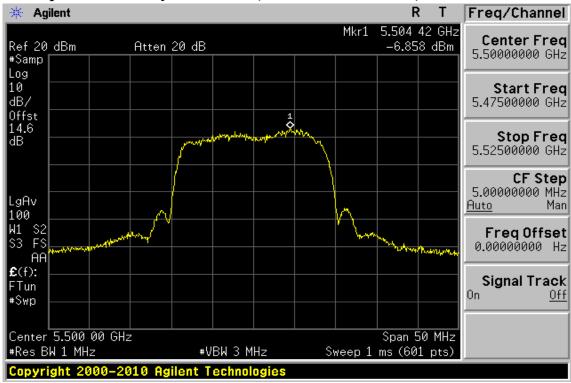


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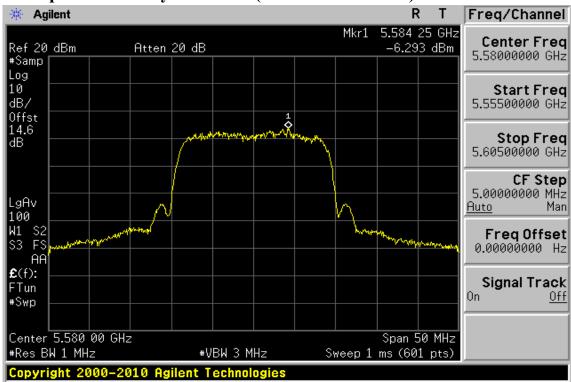
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# 802.11n HT20, 5470~5725 MHz (MIMO)

## Peak Power Spectral Density Data Plot (CH Low 5500 MHz)



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



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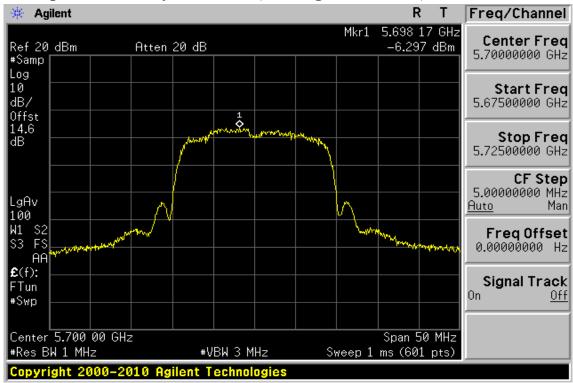
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## Peak Power Spectral Density Data Plot (CH High 5700 MHz)



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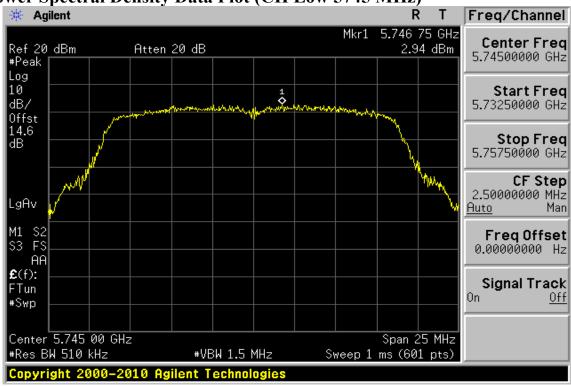


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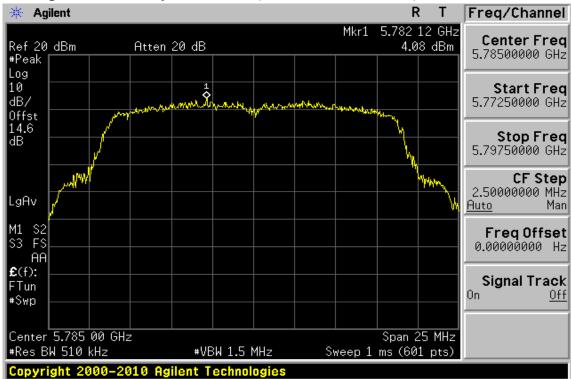
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## 802.11n HT20, 5725~5850 MHz (MIMO)

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



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



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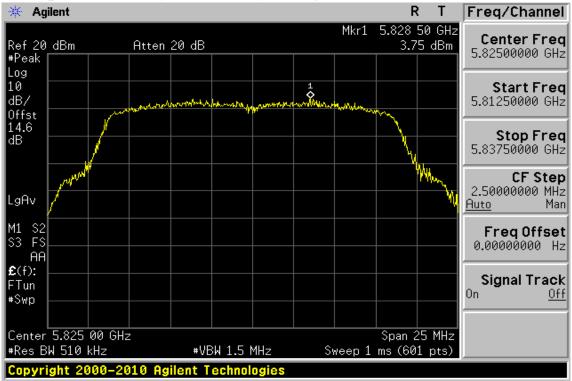
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#### Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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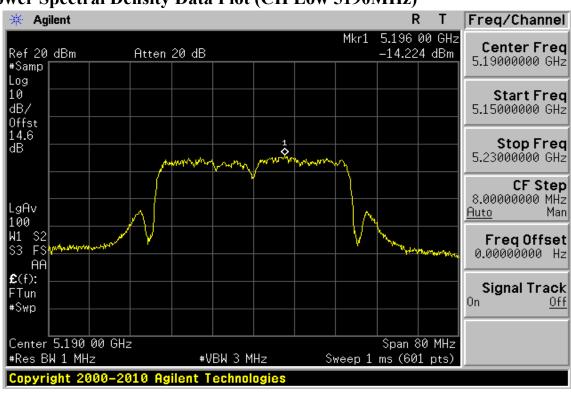
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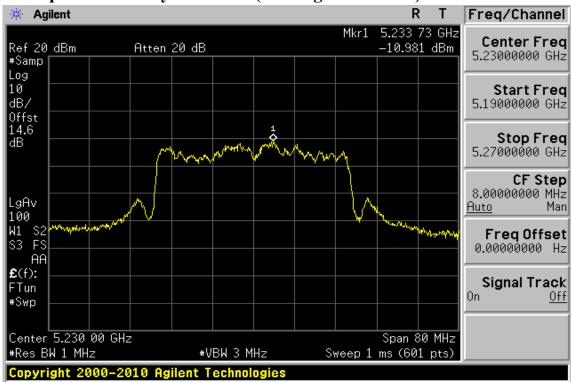
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## 802.11n HT40, 5150~5250 MHz (MIMO) Peak Power Spectral Density Data Plot (CH Low 5190MHz)



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



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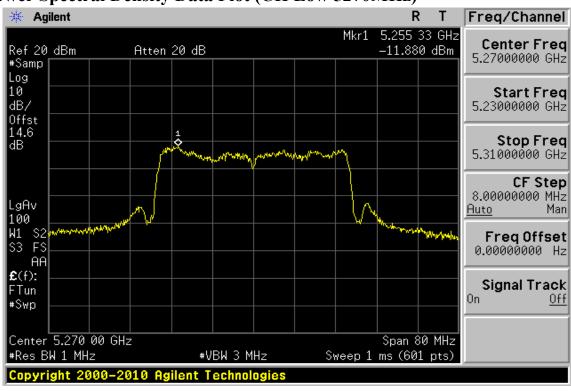
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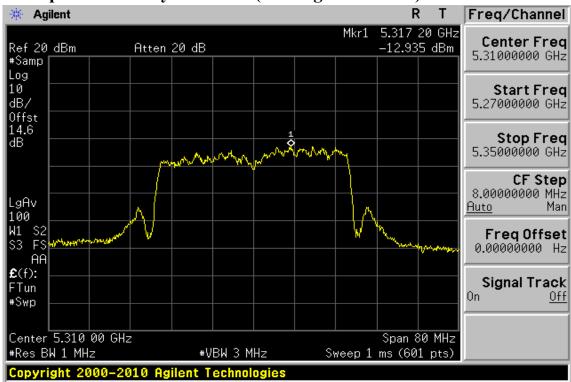
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## 802.11n HT40, 5250~5350 MHz (MIMO) Peak Power Spectral Density Data Plot (CH Low 5270MHz)



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



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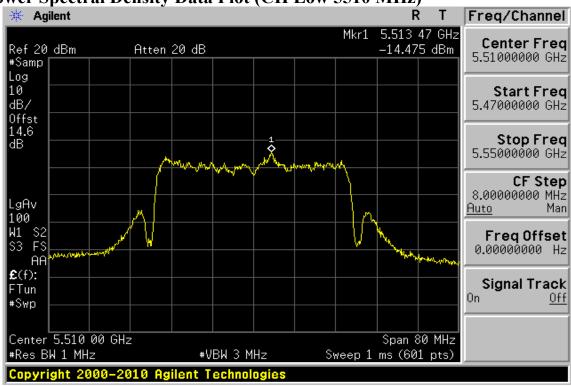


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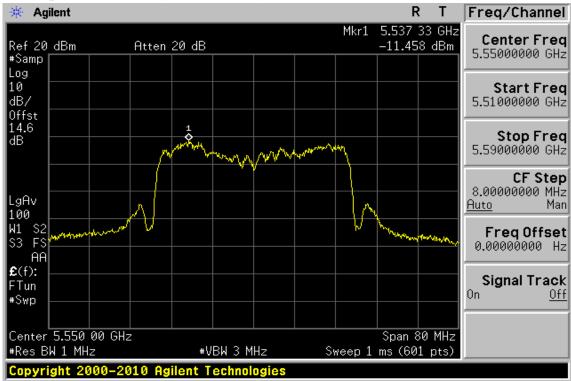
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## 802.11n HT40, 5470~5725 MHz (MIMO)

#### Peak Power Spectral Density Data Plot (CH Low 5510 MHz)



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



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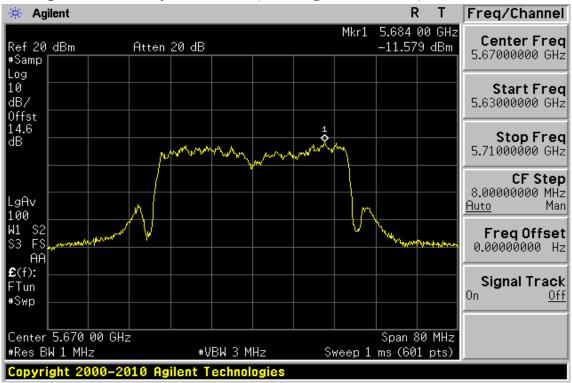
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## Peak Power Spectral Density Data Plot (CH High 5670 MHz)



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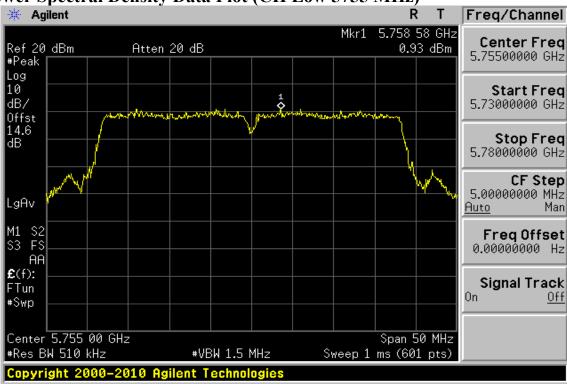


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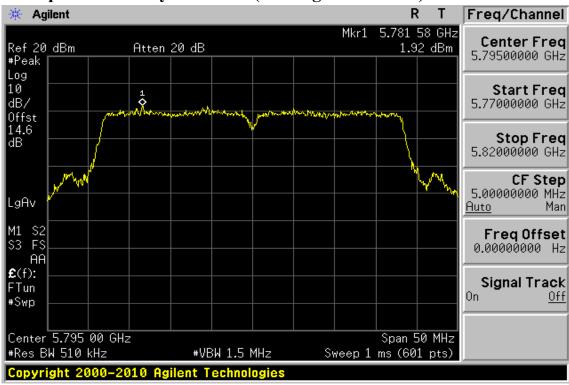
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#### 802.11n HT40, 5725~5850 MHz (MIMO)

#### 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 MEASUREMENT1

#### **Standard Applicable**

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

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

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

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

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

specified as below table.		1
Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level  $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

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## **Measurement Equipment Used**

	966 Chamber										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016						
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016						
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015						
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015						
Loop Antenna	ETS.LINDGREN	6502	00148045	07/03/2014	07/02/2015						
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015						
Horn antenna	ETS.LINDGREN	3117	123995	05/05/2015	05/04/2016						
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015						
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/02/2015	01/01/2016						
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2015	01/01/2016						
Pre-Amplifier	Agilent	8449B	3008A00578	01/02/2015	01/01/2016						
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016						
5150-5350 Band Reject Filter	Micro-Tronics	BRM50703	1	01/02/2015	01/01/2016						
5470-5725 Band Reject Filter	Micro-Tronics	BRM50704	1	01/02/2015	01/01/2016						
5725-5875 Band Reject Filter	Micro-Tronics	BRM50705	1	01/02/2015	01/01/2016						
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	01/02/2015	01/01/2016						
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	01/02/2015	01/01/2016						
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016						
Turn Table	HD	DT420	N/A	N.C.R	N.C.R						
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R						
Controller	HD	HD100	N/A	N.C.R	N.C.R						
Low Loss Cable	Huber Suhner	966_Rx	9	01/02/2015	01/01/2016						
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015						

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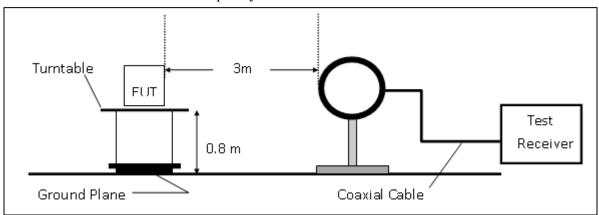
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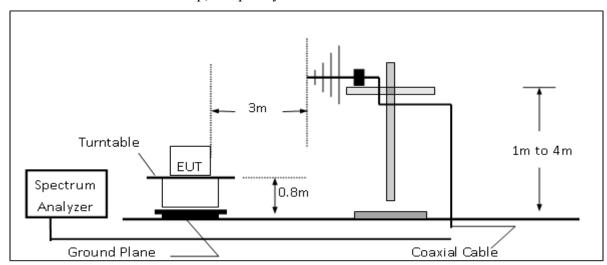
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#### **Test SET-UP** 11.3

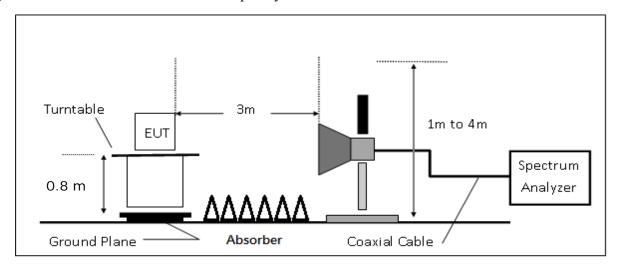
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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#### 11.4 Measurement Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
- 3. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 0.8m 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  $\ge 1/T$  (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)

#### Note:

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

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

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**

224.

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

#### 802.11a, 5150~5250 MHz

**Operation Band** :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :TX MID Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

97 Level (dBuV/m) 90 80 70 60 FCC RSF-OP 50 40 30 20 10

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	34.99	-10.22	24.77	40.00	-15.23
233.70	S	Peak	29.05	-10.69	18.36	46.00	-27.64
323.91	S	Peak	35.68	-7.67	28.01	46.00	-17.99
359.80	S	Peak	32.41	-7.03	25.38	46.00	-20.62
480.08	S	Peak	30.23	-4.59	25.64	46.00	-20.36
633.34	S	Peak	31.24	-2.44	28.80	46.00	-17.20

Frequency (MHz)

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Operation Band Fundamental Frequency

Operation Mode :TX MID EUT Pol. :E1 Plan

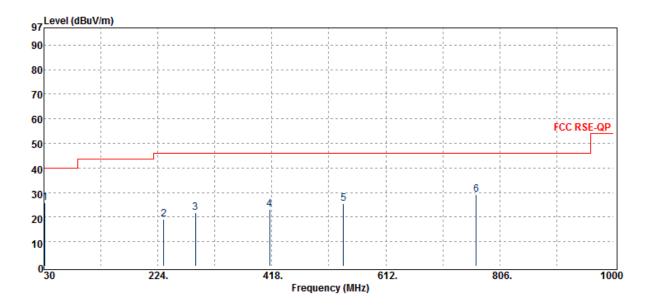
:802.11 a :5220 MHz **Test Date** Temp./Humi. Engineer

Measurement Antenna Pol.

:23 deg\_C / 58 RH :Curry

:HORIZONTAL

:2015-06-25



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	35.97	-10.22	25.75	40.00	-14.25
233.70	S	Peak	29.84	-10.69	19.15	46.00	-26.85
288.02	S	Peak	29.96	-8.24	21.72	46.00	-24.28
414.12	S	Peak	28.97	-5.75	23.22	46.00	-22.78
540.22	S	Peak	29.53	-4.01	25.52	46.00	-20.48
766.23	S	Peak	28.26	1.09	29.35	46.00	-16.65

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#### 802.11a, 5250~5350 MHz

**Operation Band** Fundamental Frequency Operation Mode

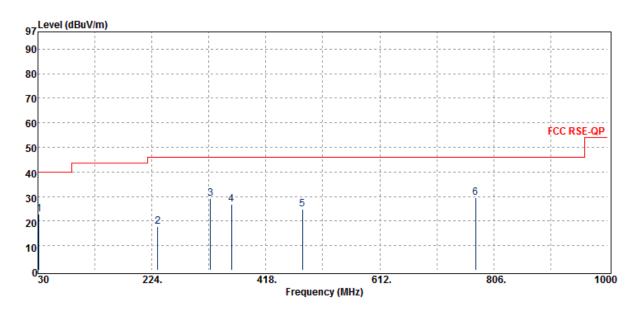
EUT Pol.

:802.11 a :5300 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	32.91	-10.22	22.69	40.00	-17.31
233.70	S	Peak	28.32	-10.69	17.63	46.00	-28.37
323.91	S	Peak	36.90	-7.67	29.23	46.00	-16.77
359.80	S	Peak	33.72	-7.03	26.69	46.00	-19.31
480.08	S	Peak	29.34	-4.59	24.75	46.00	-21.25
774.96	S	Peak	28.72	0.73	29.45	46.00	-16.55

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

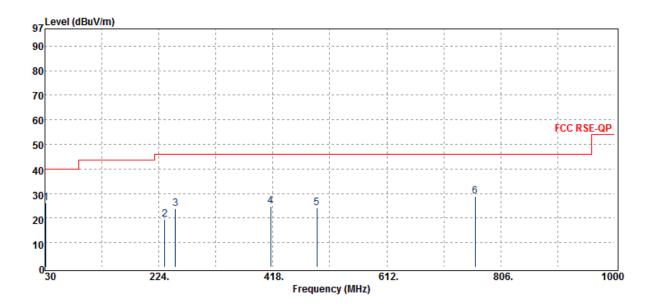
:802.11 a :5300 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

Measurement Antenna Pol.

:2015-06-25 :23 deg\_C / 58 RH

:Curry :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	36.36	-10.22	26.14	40.00	-13.86
233.70	S	Peak	30.23	-10.69	19.54	46.00	-26.46
252.13	S	Peak	33.58	-9.79	23.79	46.00	-22.21
414.12	S	Peak	30.72	-5.75	24.97	46.00	-21.03
492.69	S	Peak	28.41	-4.29	24.12	46.00	-21.88
762.35	S	Peak	27.78	1.14	28.92	46.00	-17.08

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#### 802.11a, 5470~5725 MHz

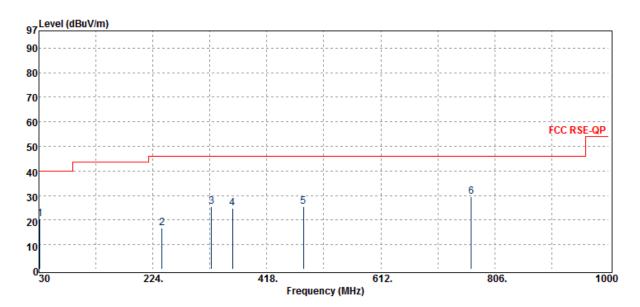
**Operation Band** Fundamental Frequency Operation Mode

EUT Pol.

:802.11 a :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. :2015-06-25 :23 deg\_C / 58 RH

Engineer :Curry Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	30.67	-10.22	20.45	40.00	-19.55
239.52	S	Peak	27.01	-10.28	16.73	46.00	-29.27
323.91	S	Peak	33.05	-7.67	25.38	46.00	-20.62
359.80	S	Peak	31.96	-7.03	24.93	46.00	-21.07
480.08	S	Peak	30.10	-4.59	25.51	46.00	-20.49
766.23	S	Peak	28.60	1.09	29.69	46.00	-16.31

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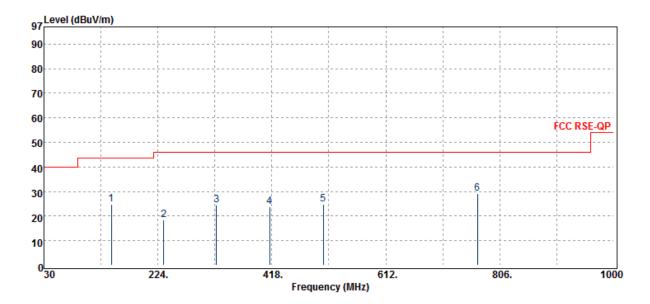
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 a :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH :Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
144.46	S	Peak	34.58	-9.69	24.89	43.50	-18.61
233.70	S	Peak	29.24	-10.69	18.55	46.00	-27.45
323.91	S	Peak	32.32	-7.67	24.65	46.00	-21.35
414.12	S	Peak	29.67	-5.75	23.92	46.00	-22.08
505.30	S	Peak	29.22	-4.43	24.79	46.00	-21.21
768.17	S	Peak	28.28	1.03	29.31	46.00	-16.69

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#### 802.11a, 5725~5850 MHz

EUT Pol.

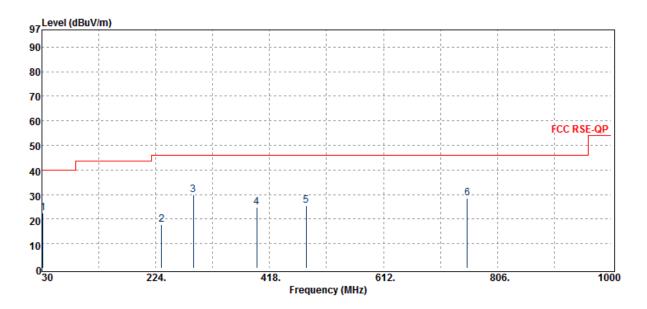
**Operation Band** :802.11 a Fundamental Frequency Operation Mode

:5785 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	32.65	-10.22	22.43	40.00	-17.57
233.70	S	Peak	28.54	-10.69	17.85	46.00	-28.15
288.02	S	Peak	38.19	-8.24	29.95	46.00	-16.05
395.69	S	Peak	30.84	-6.07	24.77	46.00	-21.23
480.08	S	Peak	30.21	-4.59	25.62	46.00	-20.38
754.59	S	Peak	27.65	0.73	28.38	46.00	-17.62

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

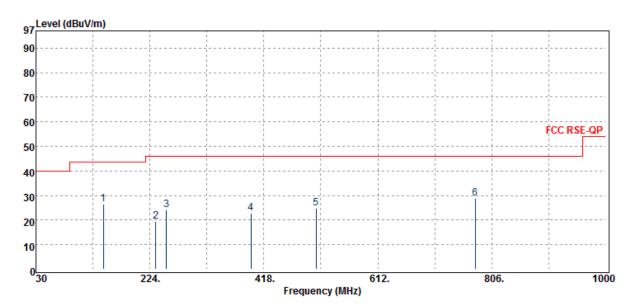
:802.11 a :5785 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
144.46	S	Peak	36.30	-9.69	26.61	43.50	-16.89
233.70	S	Peak	30.31	-10.69	19.62	46.00	-26.38
252.13	S	Peak	33.90	-9.79	24.11	46.00	-21.89
395.69	S	Peak	28.80	-6.07	22.73	46.00	-23.27
507.24	S	Peak	29.30	-4.47	24.83	46.00	-21.17
777.87	S	Peak	28.40	0.50	28.90	46.00	-17.10

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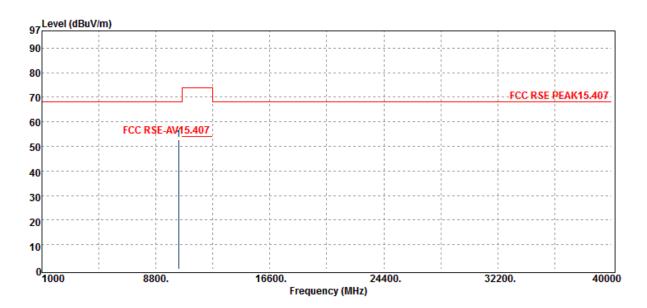
#### **Above 1GHz Worst-Case Data:**

#### 802.11a, 5150~5250 MHz

Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :TX LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
10360.00	Н	Peak	34.89	17.65	52.54	68.30	-15.76

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

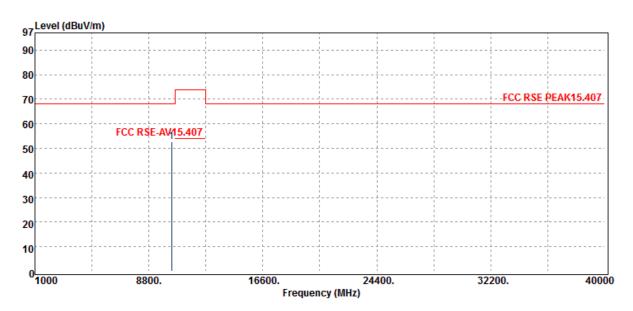
:802.11 a :5180 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



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	
10360.00	Н	Peak	35.07	17.65	52.72	68.30	-15.58	

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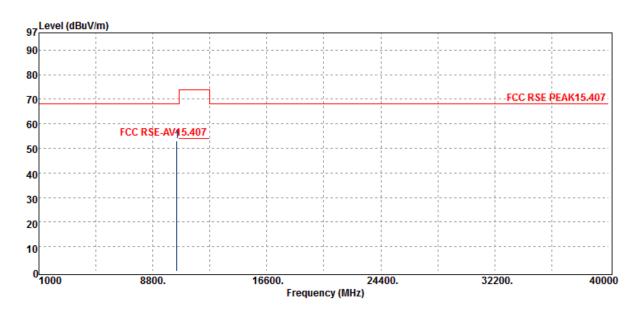
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX MID Engineer :Curry :VERTICAL EUT Pol. :E1 Plan 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
10440.00	Н	Peak	34.43	18.47	52.90	68.30	-15.40

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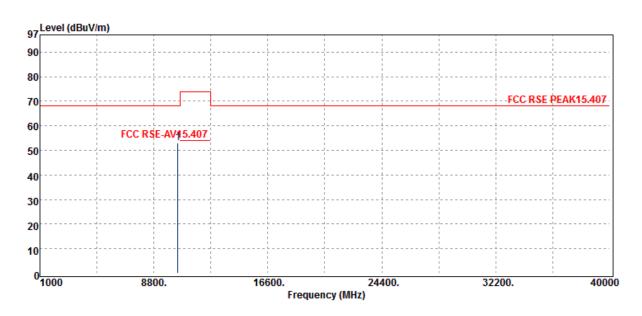
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5220 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode

:TX MID Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :HORIZONTAL



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	
10440.00	Н	Peak	34.45	18.47	52.92	68.30	-15.38	

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Operation Band Fundamental Frequency Operation Mode

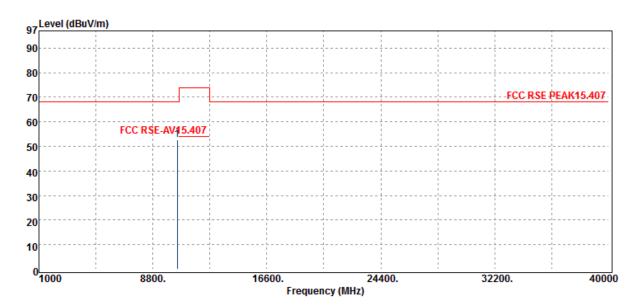
EUT Pol.

:802.11 a :5240 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	
10480.00	Н	Peak	34.62	18.23	52.85	68.30	-15.45	

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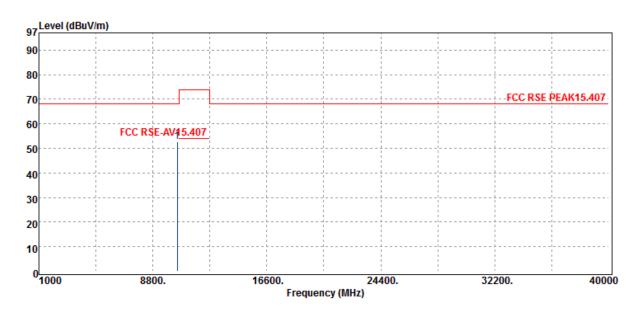
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5240 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :TX HIGH Engineer :Curry

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



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
	10480.00	Н	Peak	34.42	18.23	52.65	68.30	-15.65

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### Band edge falling to restricted band

Operation Band :802.11 a Test Date :2015-06-23

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :Band Edge LOW Engineer :Curry

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

Note	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
E	Average	40.61	9.74	50.35	54.00	-3.65
Е	Peak	61.37	9.74	71.11	74.00	-2.89
	F/H/E/S E	Mode F/H/E/S PK/QP/AV  E Average	Mode Reading Level F/H/E/S PK/QP/AV dBμV  E Average 40.61	Mode         Reading Level           F/H/E/S         PK/QP/AV         dBμV         dB           E         Average         40.61         9.74	Mode         Reading Level         FS           F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m           E         Average         40.61         9.74         50.35	Mode         Reading Level         FS         @3m           F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           E         Average         40.61         9.74         50.35         54.00

Operation Band :802.11 a Test Date :2015-06-23 Fundamental Frequency :5180 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

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
5150.00	E	Average	41.24	9.74	50.98	54.00	-3.02
5150.00	E	Peak	63.23	9.74	72.97	74.00	-1.03

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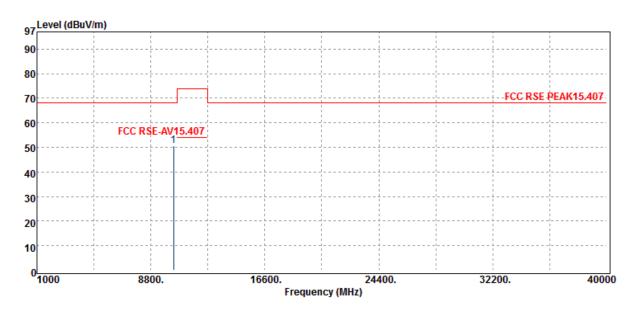
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# Radiated Spurious Emission Measurement Result 802.11n HT20, 5150~5250 MHz (MIMO)

**Operation Band** :802.11 n20M **Test Date** :2015-06-25

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan 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	
10360.00	Н	Peak	33.01	17.65	50.66	68.30	-17.64	

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Operation Band Fundamental Frequency

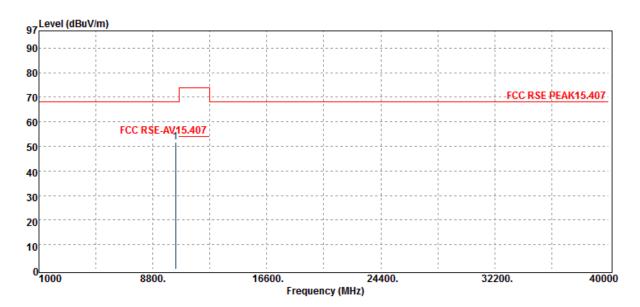
Operation Mode EUT Pol.

:802.11 n20M :5180 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH :Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10360.00	Н	Peak	34.13	17.65	51.78	68.30	-16.52	

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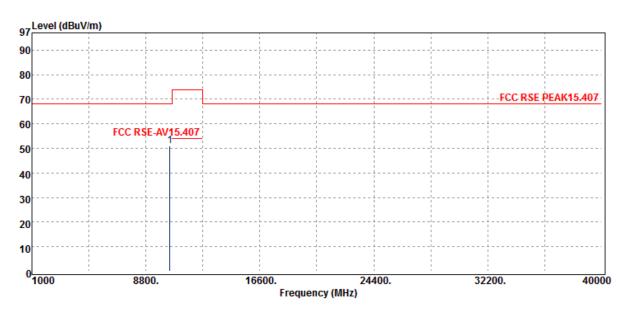
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Operation Band :802.11 n20M **Test Date** :2015-06-25

Fundamental Frequency Temp./Humi. :5220 MHz :23 deg\_C / 58 RH Operation Mode :TX MID Engineer :Curry

:VERTICAL EUT Pol. :E1 Plan 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
10440.00	Н	Peak	32.63	18.47	51.10	68.30	-17.20

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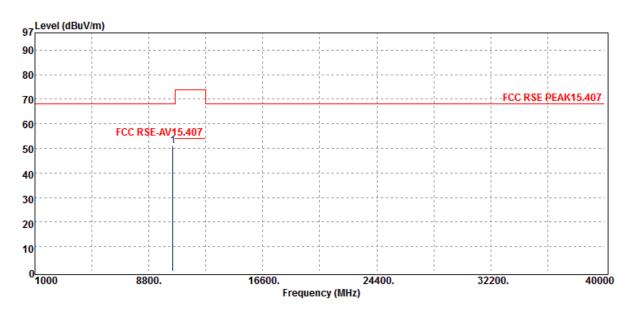
:2015-06-25

Operation Band :802.11 n20M **Test Date** 

Fundamental Frequency Temp./Humi. :5220 MHz :23 deg\_C / 58 RH

Operation Mode :TX MID Engineer :Curry

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



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
	MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
10	0440.00	Н	Peak	32.64	18.47	51.11	68.30	-17.19

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Operation Band Fundamental Frequency

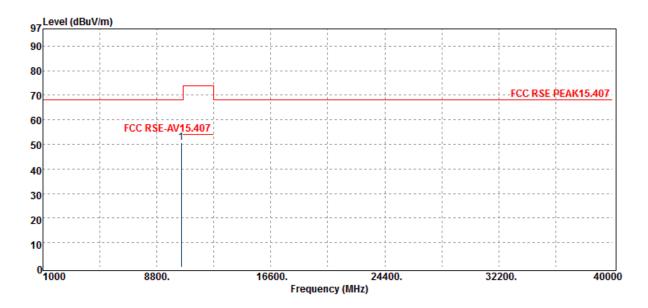
Operation Mode EUT Pol.

:802.11 n20M :5240 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10480.00	Н	Peak	32.59	18.23	50.82	68.30	-17.48	

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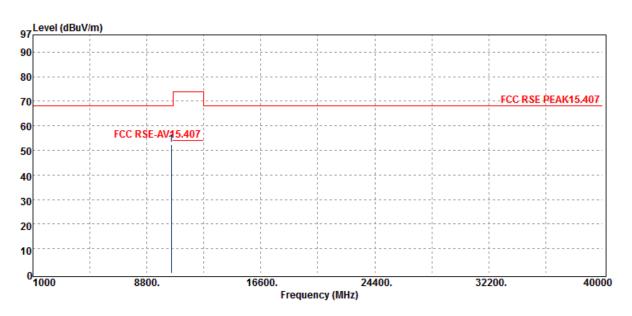
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Operation Band :802.11 n20M **Test Date** :2015-06-25

Fundamental Frequency :5240 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :TX HIGH Engineer :Curry

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



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	
10480.00	Н	Peak	34.29	18.23	52.52	68.30	-15.78	

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#### Band edge falling to restricted band

**Operation Band** :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

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
5150.00	E	Average	40.93	10.32	51.25	54.00	-2.75
5150.00	E	Peak	58.49	10.32	68.81	74.00	-5.19

**Operation Band** :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5180 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

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

 $Factor(dB) = Antenna \ Factor(dB\mu V/m) + Cable \ Loss(dB) - Pre\_Amplifier \ Gain(dB)$ 

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

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
5150.00	E	Average	41.22	10.32	51.54	54.00	-2.46
5150.00	E	Peak	60.07	10.32	70.39	74.00	-3.61

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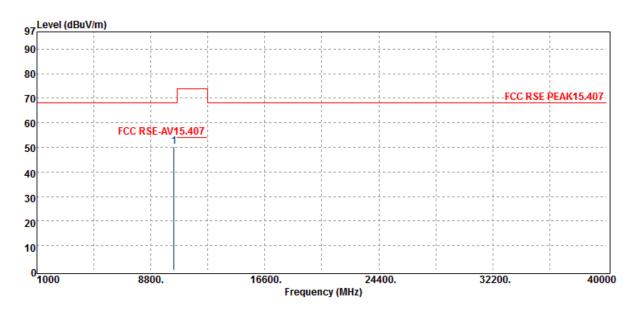
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# Radiated Spurious Emission Measurement Result 802.11n HT40, 5150~5250 MHz (MIMO)

**Operation Band** :802.11 n40M **Test Date** :2015-06-25

Fundamental Frequency :5190 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan 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
1	10380.00	Н	Peak	32.43	18.00	50.43	68.30	-17.87

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

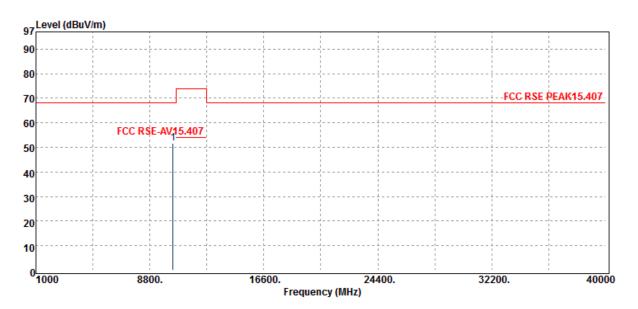
:802.11 n40M :5190 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
10380.00	Н	Peak	33.60	18.00	51.60	68.30	-16.70

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Operation Band Fundamental Frequency Operation Mode

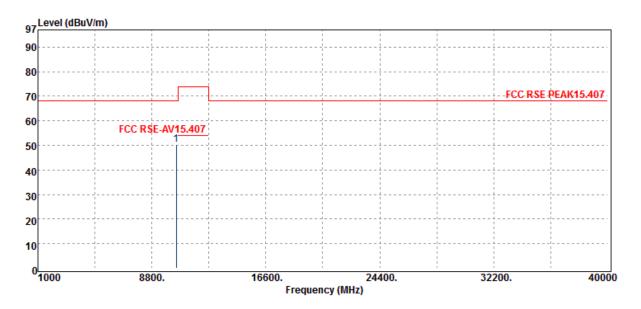
EUT Pol.

:802.11 n40M :5230 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10460.00	Н	Peak	32.10	18.36	50.46	68.30	-17.84	

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

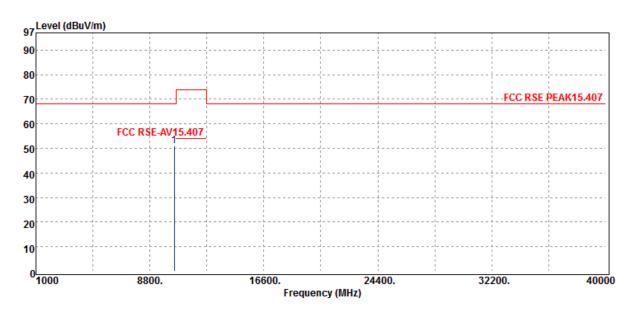
:802.11 n40M :5230 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBµV/m	dBμV/m	dB	
10460.00	Н	Peak	32.82	18.36	51.18	68.30	-17.12	

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#### Band edge falling to restricted band

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5190 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :Band Edge LOW Engineer

:Curry :VERTICAL EUT Pol. :E1 Plan 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
5150.00	E	Average	42.79	10.32	53.11	54.00	-0.89
5150.00	E	Peak	60.18	10.32	70.50	74.00	-3.50

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5190 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

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
5150.00	E	Average	42.38	10.32	52.70	54.00	-1.30
5150.00	E	Peak	61.15	10.32	71.47	74.00	-2.53

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Report No.: ER/2015/40012 Issue Date: Jul. 09, 2015

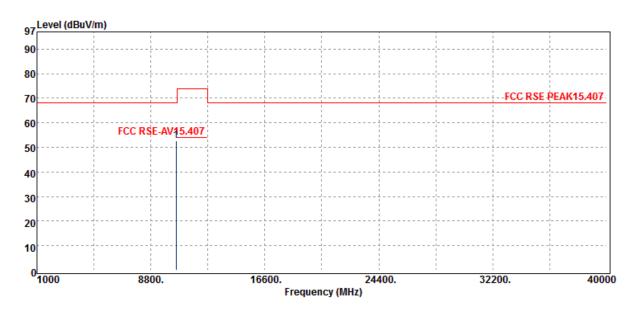
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# Radiated Spurious Emission Measurement Result 802.11a, 5250MHz-5350MHz

**Operation Band** :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan 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	
10520.00	Н	Peak	34.24	18.35	52.59	68.30	-15.71	

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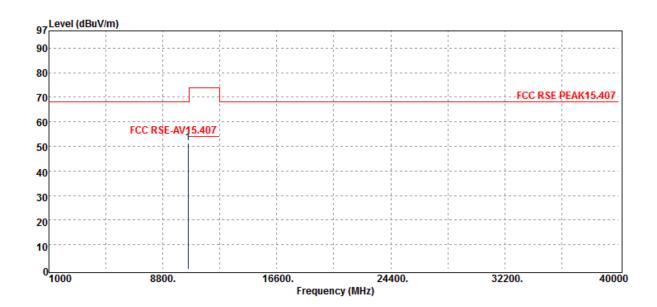
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :HORIZONTAL



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
10520.00	Н	Peak	33.03	18.35	51.38	68.30	-16.92

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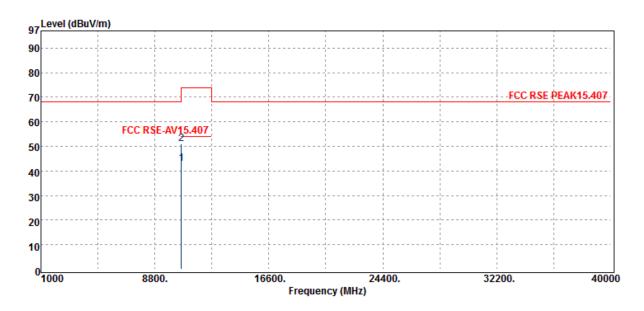
Operation Band Fundamental Frequency

Operation Mode EUT Pol.

:802.11 a :5300 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. :2015-06-25 :23 deg\_C / 58 RH

Engineer :Curry :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	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
10600.00	Н	Average	24.31	18.69	43.00	54.00	-11.00
10600.00	Н	Peak	32.36	18.69	51.05	74.00	-22.95

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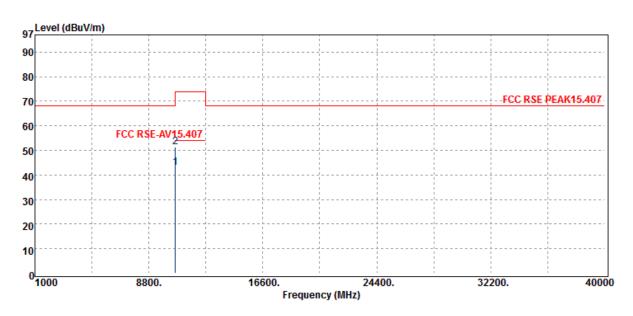
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5300 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :TX MID Engineer :Curry

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



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
10600.00	Н	Average	24.19	18.69	42.88	54.00	-11.12
10600.00	Н	Peak	32.69	18.69	51.38	74.00	-22.62

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Operation Band Fundamental Frequency Operation Mode

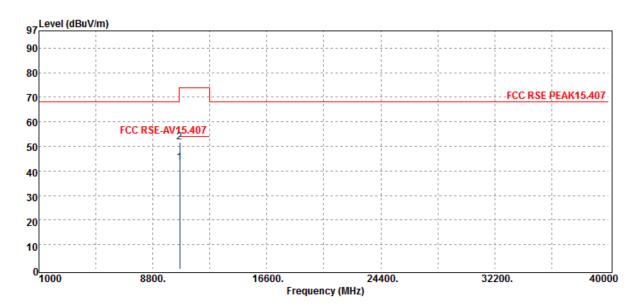
EUT Pol.

:802.11 a :5320 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	
10640.00	Н	Average	24.42	19.02	43.44	54.00	-10.56	
10640.00	Н	Peak	32.58	19.02	51.60	74.00	-22.40	

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

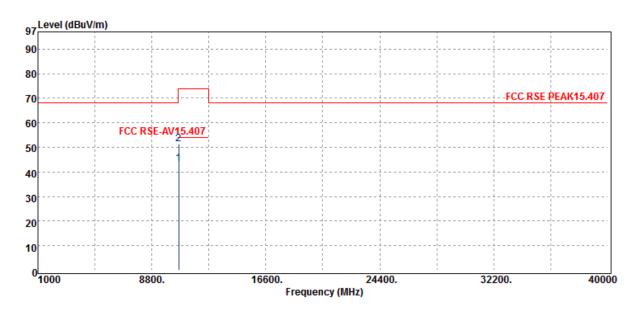
:802.11 a :5320 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
10640.00	Н	Average	24.39	19.02	43.41	54.00	-10.59
10640.00	Н	Peak	32.49	19.02	51.51	74.00	-22.49

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Band edge falling to restricted band

Operation Band :802.11 a Test Date :2015-06-23 Fundamental Frequency :5320 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

:VERTICAL EUT Pol. :E1 Plan 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
5350.00	E	Average	43.10	10.38	53.48	54.00	-0.52
5350.00	E	Peak	61.95	10.38	72.33	74.00	-1.67

Operation Band :802.11 a Test Date :2015-06-23

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5350.00	E	Average	43.18	10.38	53.56	54.00	-0.44
5350.00	E	Peak	62.59	10.38	72.97	74.00	-1.03

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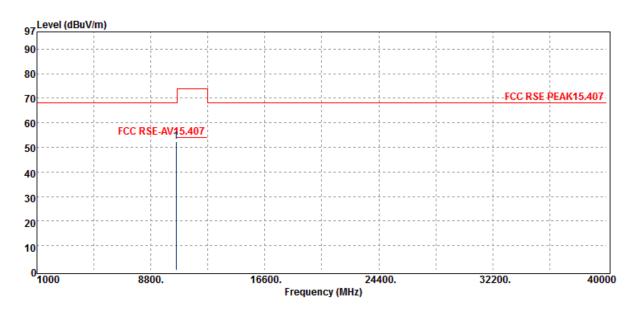
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# Radiated Spurious Emission Measurement Result 802.11n HT20, 5250~5350 MHz (MIMO)

**Operation Band** :802.11 n20M **Test Date** :2015-06-25

Fundamental Frequency :5260 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10520.00	Н	Peak	34.12	18.35	52.47	68.30	-15.83	

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

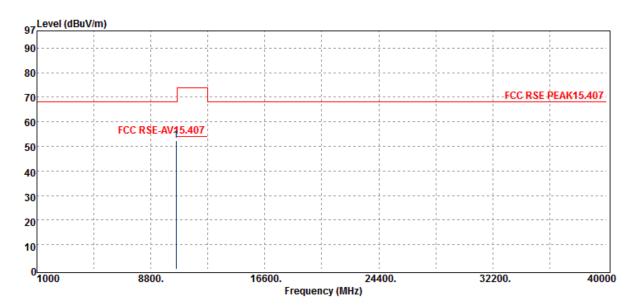
:802.11 n20M :5260 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBµV/m	dBμV/m	dB	
10520.00	Н	Peak	34.09	18.35	52.44	68.30	-15.86	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

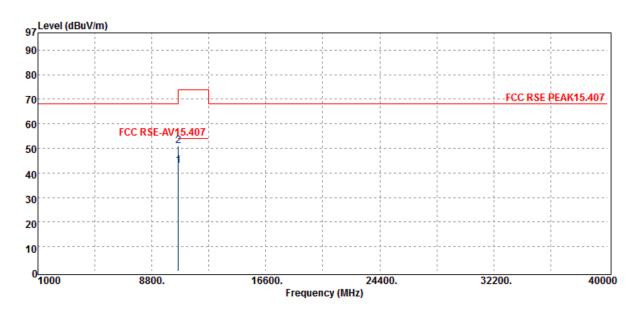
:802.11 n20M :5300 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25

:23 deg\_C / 58 RH :Curry

: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	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
10600.00	Н	Average	24.41	18.69	43.10	54.00	-10.90
10600.00	Н	Peak	32.20	18.69	50.89	74.00	-23.11

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

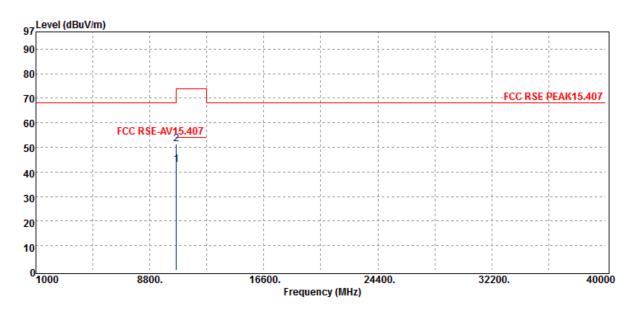
:802.11 n20M :5300 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



	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	$\mathrm{dB}\mu\mathrm{V/m}$	dB	
	10600.00	Н	Average	24.36	18.69	43.05	54.00	-10.95	
	10600.00	Н	Peak	32.68	18.69	51.37	74.00	-22.63	

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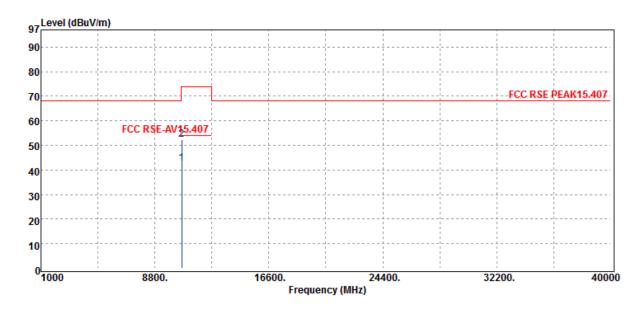
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n20M :5320 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10640.00	Н	Average	23.46	19.02	42.48	54.00	-11.52	
10640.00	Н	Peak	33.38	19.02	52.40	74.00	-21.60	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

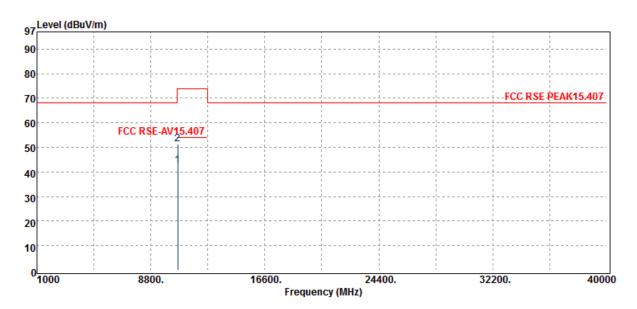
:802.11 n20M :5320 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
10640.00	Н	Average	23.55	19.02	42.57	54.00	-11.43
10640.00	Н	Peak	32.23	19.02	51.25	74.00	-22.75

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Band edge falling to restricted band

Operation Band :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

:VERTICAL EUT Pol. :E1 Plan 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
5350.00	E	Average	40.99	10.97	51.96	54.00	-2.04
5350.00	E	Peak	56.81	10.97	67.78	74.00	-6.22

**Operation Band** :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5320 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

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
5350.00	E	Average	41.20	10.97	52.17	54.00	-1.83
5350.00	E	Peak	58.47	10.97	69.44	74.00	-4.56

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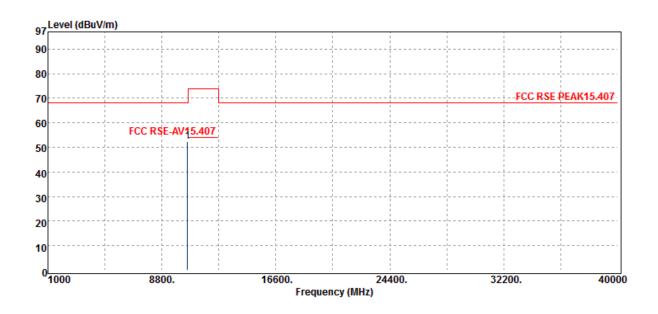
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### Radiated Spurious Emission Measurement Result 802.11n HT40, 5250~5350 MHz (MIMO)

Operation Band :802.11 n40M **Test Date** :2015-06-25 Fundamental Frequency :5270 MHz Temp./Humi.

:23deg\_C / 58 RH Operation Mode :TX LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL



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	
10540.00	Н	Peak	34.06	18.45	52.51	68.30	-15.79	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

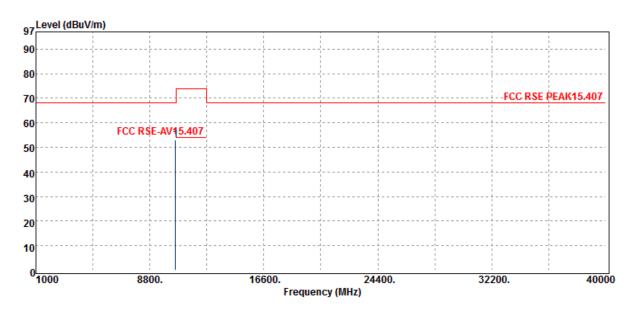
:802.11 n40M :5270 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
10540.00	Н	Peak	34.61	18.45	53.06	68.30	-15.24	

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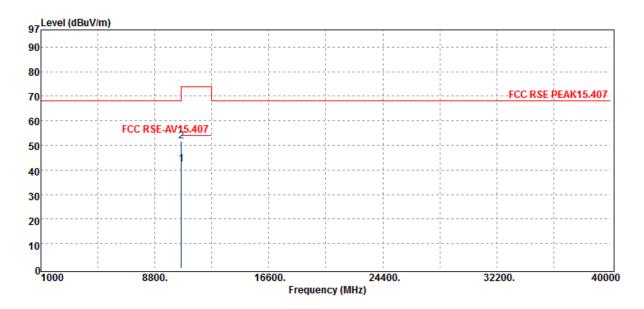
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n40M :5310 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



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	
10620.00	Н	Average	23.60	18.86	42.46	54.00	-11.54	
10620.00	Н	Peak	32.77	18.86	51.63	74.00	-22.37	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

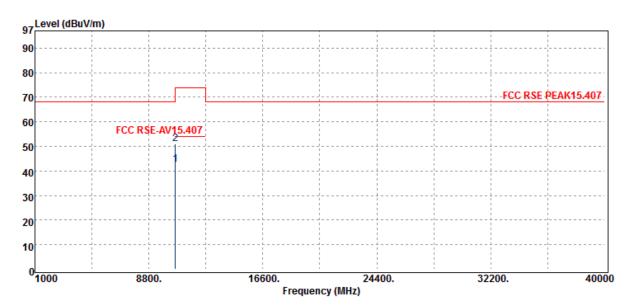
:802.11 n40M :5310 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B} \mu \mathrm{V}$	dB	$dB\mu V/m$	dBμV/m	dB
10620.00	Н	Average	23.84	18.86	42.70	54.00	-11.30
10620.00	Н	Peak	32.11	18.86	50.97	74.00	-23.03

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#### Band edge falling to restricted band

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5310 MHz Temp./Humi. :23deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry :VERTICAL EUT Pol. :E1 Plan 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
5350.00	E	Average	42.43	10.97	53.40	54.00	-0.60
5350.00	Е	Peak	59.83	10.97	70.80	74.00	-3.20

**Operation Band** :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5310 MHz Temp./Humi. :23deg C / 58 RH Operation Mode :Band Edge HIGH Engineer :Curry

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

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
5350.00	E	Average	42.07	10.97	53.04	54.00	-0.96
5350.00	E	Peak	59.97	10.97	70.94	74.00	-3.06

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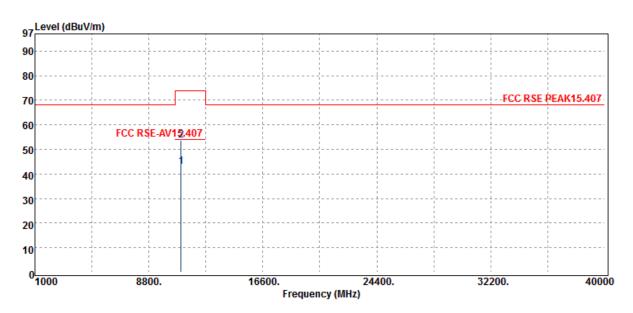
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## Radiated Spurious Emission Measurement Result 802.11a, 5470~5725 MHz

**Operation Band** :802.11 a Test Date :2015-06-25

Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :TX LOW Engineer :Curry

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



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBµV/m	dBμV/m	dB
11000.00	Н	Average	23.16	19.82	42.98	54.00	-11.02
11000.00	Н	Peak	33.87	19.82	53.69	74.00	-20.31

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

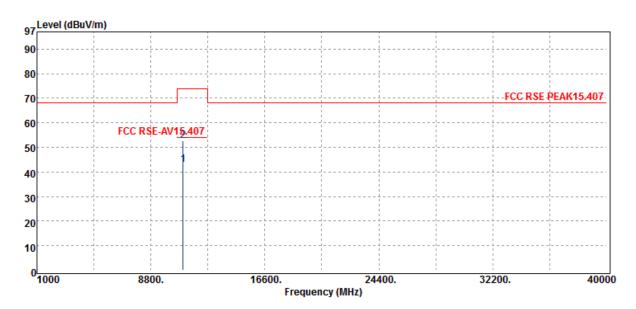
:802.11 a :5500 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11000.00	Н	Average	23.24	19.82	43.06	54.00	-10.94
11000.00	Н	Peak	32.79	19.82	52.61	74.00	-21.39

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Operation Band Fundamental Frequency Operation Mode

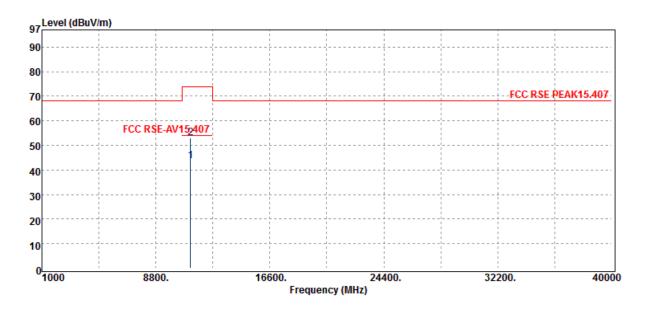
EUT Pol.

:802.11 a :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11160.00	Н	Average	23.55	20.21	43.76	54.00	-10.24
11160.00	Н	Peak	32.96	20.21	53.17	74.00	-20.83

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

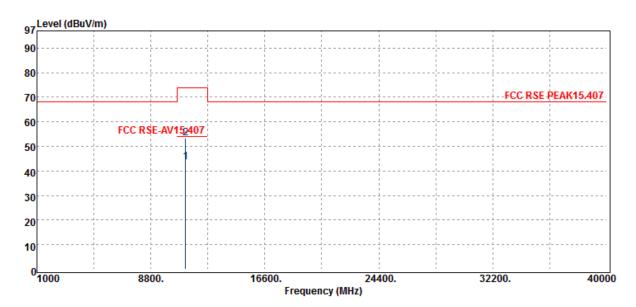
:802.11 a :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11160.00	Н	Average	23.47	20.21	43.68	54.00	-10.32
11160.00	Н	Peak	33.17	20.21	53.38	74.00	-20.62

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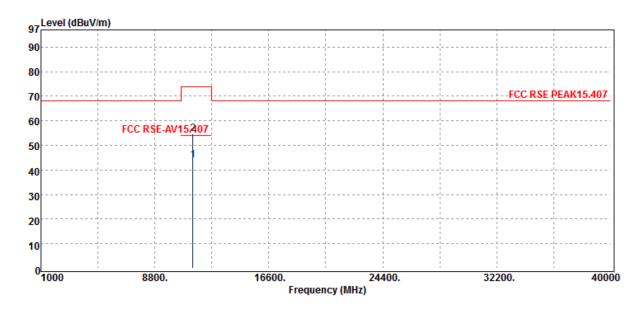
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 a :5700 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



Fı	req.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@3m		
M	IHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
114	00.00	Н	Average	23.48	20.65	44.13	54.00	-9.87	
114	00.00	Н	Peak	34.10	20.65	54.75	74.00	-19.25	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

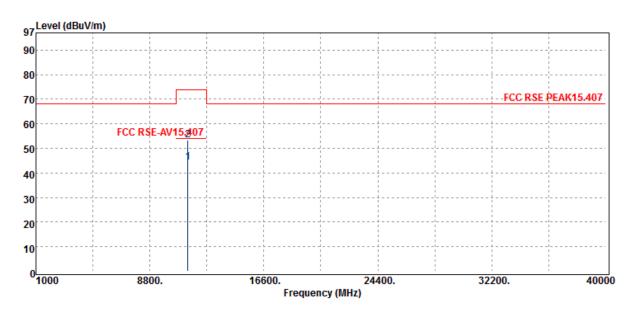
:802.11 a :5700 MHz :TX HIGH :E1 Plan

Test Date Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB
11400.00	Н	Average	23.57	20.65	44.22	54.00	-9.78
11400.00	Н	Peak	32.69	20.65	53.34	74.00	-20.66

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Band edge falling to restricted band

Operation Band :802.11 a Test Date :2015-06-24

Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :Band Edge LOW Engineer :Curry

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

Freq.	Note	Detector Mode	Spectrum Reading Leve		Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5460.00 5460.00	E E	Average Peak	37.88 52.59	10.89 10.89	48.77 63.48	54.00 74.00	-5.23 -10.52
5470.00	Е	Peak	54.27	10.91	65.18	68.30	-3.12
Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11 a :5500 MHz :Band Edge I :E1 Plan	LOW 1	Гest Date Геmp./Humi. Engineer Measurement Ant	enna Pol.	:2015-06-24 :23 deg_C / 5 :Curry :HORIZONT	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Leve	el	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
5460.00 5460.00 5470.00	E E E	Average Peak Peak	37.88 52.92 55.42	10.89 10.89 10.91	48.77 63.81 66.33	54.00 74.00 68.30	-5.23 -10.19 -1.97

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**Operation Band** :802.11 a Test Date :2015-06-25

Fundamental Frequency :5700 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry :VERTICAL EUT Pol. :E1 Plan Measurement Antenna Pol.

Freq. Note Detector Spectrum Factor Actual Limit Margin FS Reading Level Mode @3m  $dB\mu V/m$ MHz F/H/E/S PK/OP/AV dBμV dBµV/m dΒ dΒ 5725.00 Е 55.85 11.04 66.89 68.30 -1.41 Peak

Operation Band :802.11 a Test Date :2015-06-25

Fundamental Frequency Temp./Humi. :23 deg C / 58 RH :5700 MHz

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725.00	E	Peak	56.10	11.04	67.14	68.30	-1.16

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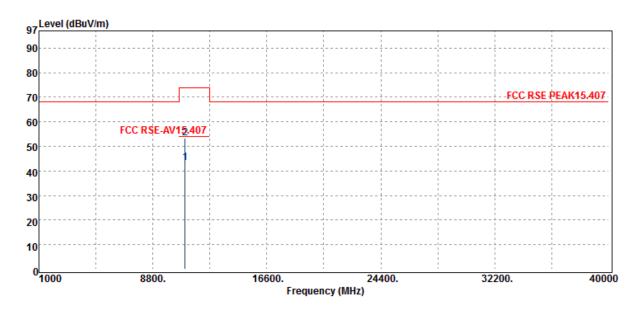
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### Radiated Spurious Emission Measurement Result 802.11n HT20, 5470~5725 MHz (MIMO)

**Operation Band** :802.11 n20M **Test Date** :2015-06-25 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
11000.00	Н	Average	23.61	19.82	43.43	54.00	-10.57
11000.00	Н	Peak	33.69	19.82	53.51	74.00	-20.49

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

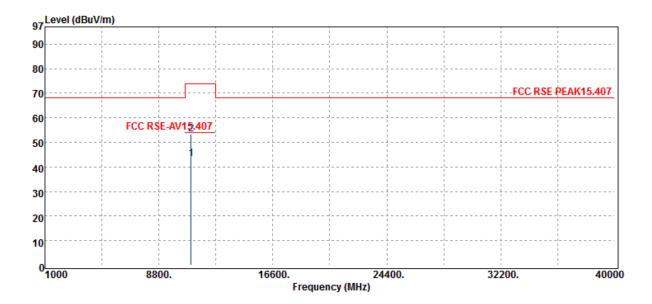
:802.11 n20M :5500 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

Measurement Antenna Pol.

:2015-06-25 :23 deg\_C / 58 RH

:Curry :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
11000.00	Н	Average	23.51	19.82	43.33	54.00	-10.67
11000.00	Н	Peak	33.65	19.82	53.47	74.00	-20.53

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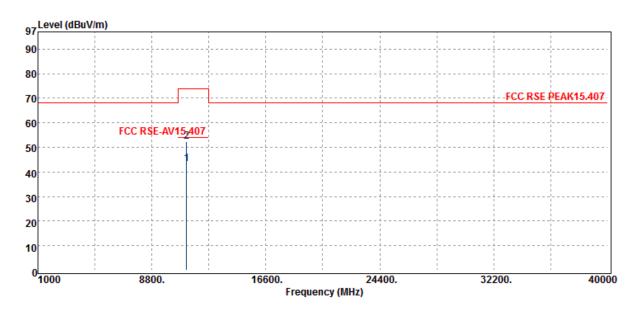
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n20M :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



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	
11160.00	Н	Average	23.17	20.21	43.38	54.00	-10.62	
11160.00	Н	Peak	32.21	20.21	52.42	74.00	-21.58	
	MHz 11160.00	MHz F/H/E/S  11160.00 H	Mode MHz F/H/E/S PK/QP/AV  11160.00 H Average	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV  11160.00 H Average 23.17	MHz F/H/E/S PK/QP/AV dBμV dB  11160.00 H Average 23.17 20.21	Mode Mode Meading Level         FS dBμV           MHz         F/H/E/S         PK/QP/AV         dBμV         dB dBμV/m           11160.00         H         Average         23.17         20.21         43.38	Mode MHz         Reading Level PK/QP/AV         FS dBμV         @3m dBμV/m           11160.00         H         Average         23.17         20.21         43.38         54.00	Mode Mode Meading Level         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m         dBμV/m         dB           11160.00         H         Average         23.17         20.21         43.38         54.00         -10.62

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

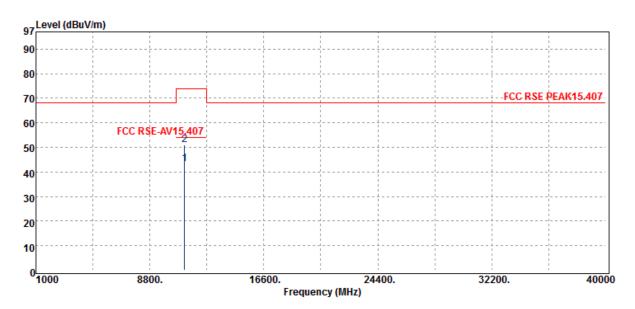
:802.11 n20M :5580 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



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	
11160.00	Н	Average	23.24	20.21	43.45	54.00	-10.55	
11160.00	Н	Peak	30.87	20.21	51.08	74.00	-22.92	

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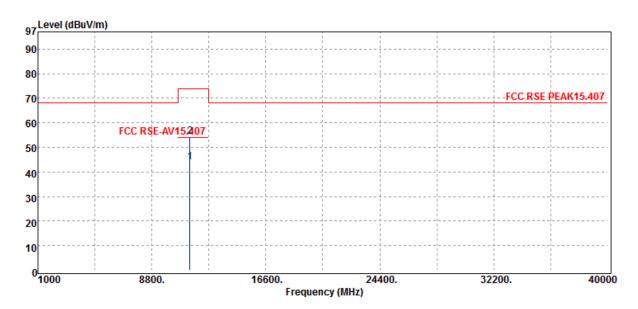
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n20M :5700 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



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	
11400.00	Н	Average	23.48	20.65	44.13	54.00	-9.87	
11400.00	Н	Peak	33.63	20.65	54.28	74.00	-19.72	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

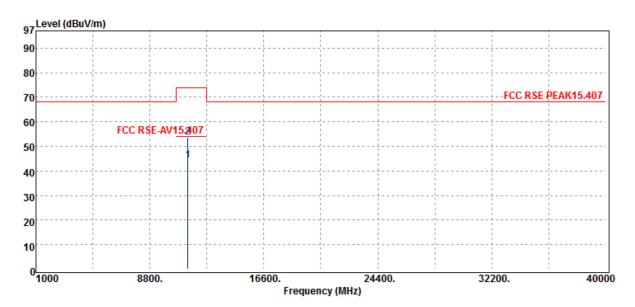
:802.11 n20M :5700 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11400.00	Н	Average	23.52	20.65	44.17	54.00	-9.83
11400.00	Н	Peak	33.20	20.65	53.85	74.00	-20.15

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Band edge falling to restricted band

:802.11 n20M Operation Band Test Date :2015-06-24 Fundamental Frequency :5500 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

:VERTICAL EUT Pol. :E1 Plan 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
5460.00	E	Average	39.61	10.89	50.50	54.00	-3.50
5460.00	E	Peak	52.03	10.89	62.92	74.00	-11.08
5470.00	E	Peak	51.85	10.91	62.76	68.30	-5.54

:2015-06-24 Operation Band :802.11 n20M Test Date

Fundamental Frequency :5500 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

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
5460.00	E	Average	39.84	10.89	50.73	54.00	-3.27
5460.00	E	Peak	53.59	10.89	64.48	74.00	-9.52
5470.00	E	Peak	54.53	10.91	65.44	68.30	-2.86

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Operation Band :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5700 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

:VERTICAL EUT Pol. :E1 Plan 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	E	Peak	55.06	11.04	66.10	68.30	-2.20

Operation Band **Test Date** :802.11 n20M :2015-06-24

Fundamental Frequency :5700 MHz Temp./Humi. :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
5725.00	E	Peak	55.50	11.04	66.54	68.30	-1.76

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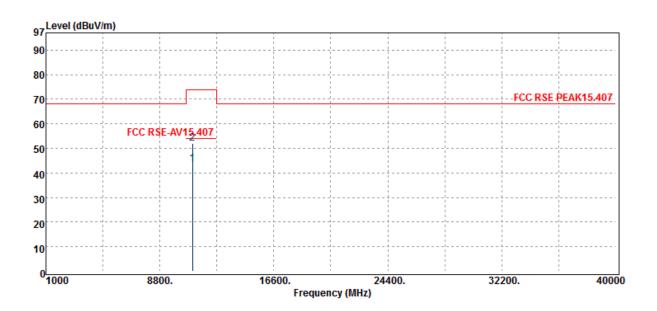


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# Radiated Spurious Emission Measurement Result 802.11n HT40, 5470~5725 MHz (MIMO)

**Operation Band** :802.11 n40M **Test Date** :2015-06-25 Fundamental Frequency :5510 MHz Temp./Humi. :23deg\_C / 58 RH Operation Mode :TX LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
11020.00	Н	Average	23.67	19.81	43.48	54.00	-10.52	
11020.00	Н	Peak	32.34	19.81	52.15	74.00	-21.85	
		_ 3011			2=.10		_	1.00

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

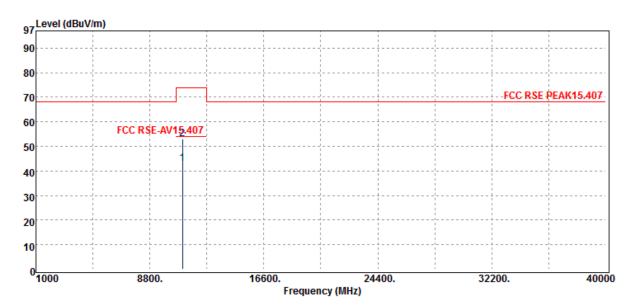
:802.11 n40M :5510 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
11020.00	Н	Average	23.13	19.81	42.94	54.00	-11.06	
11020.00	Н	Peak	33.27	19.81	53.08	74.00	-20.92	

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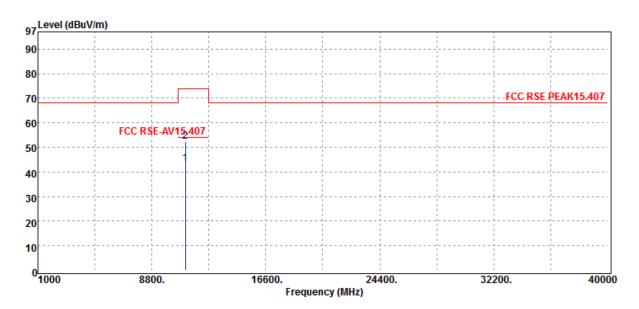
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n40M :5550 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



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	
11100.00	Н	Average	23.23	20.23	43.46	54.00	-10.54	
11100.00	Н	Peak	32.03	20.23	52.26	74.00	-21.74	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

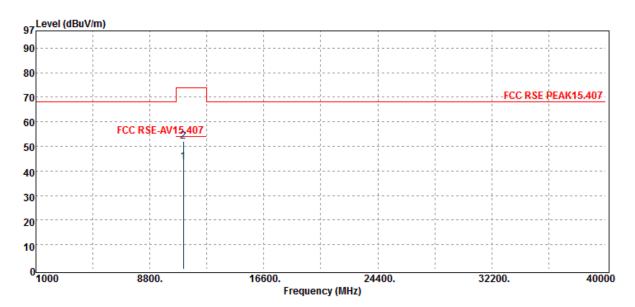
:802.11 n40M :5550 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11100.00	Н	Average	23.42	20.23	43.65	54.00	-10.35
11100.00	Н	Peak	31.77	20.23	52.00	74.00	-22.00

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

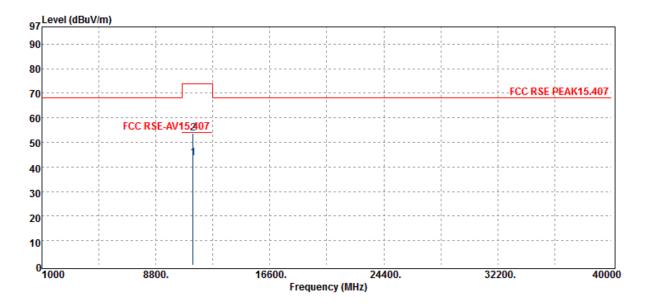
:802.11 n40M :5670 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

Measurement Antenna Pol.

:2015-06-25 :23deg\_C / 58 RH

:Curry :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11340.00	Н	Average	23.11	20.64	43.75	54.00	-10.25
11340.00	Н	Peak	33.07	20.64	53.71	74.00	-20.29

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

10

0 1000

8800.

:802.11 n40M :5670 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

Measurement Antenna Pol.

24400.

:2015-06-25 :23deg\_C / 58 RH

40000

:Curry :HORIZONTAL

32200.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
11340.00	Н	Average	23.24	20.64	43.88	54.00	-10.12
11340.00	Н	Peak	32.04	20.64	52.68	74.00	-21.32

Frequency (MHz)

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Band edge falling to restricted band

Operation Band :802.11 n40M Test Date :2015-06-24 Fundamental Frequency :5510 MHz Temp./Humi. :23deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

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
5460.00	E	Average	39.49	10.89	50.38	54.00	-3.62
5460.00	E	Peak	52.54	10.89	63.43	74.00	-10.57
5470.00	E	Peak	55.83	10.91	66.74	68.30	-1.56

Test Date :2015-06-24 **Operation Band** :802.11 n40M Fundamental Frequency :5510 MHz Temp./Humi. :23deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

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)

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

The trace on RE (radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

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
5460.00	E	Average	39.94	10.89	50.83	54.00	-3.17
5460.00	E	Peak	52.35	10.89	63.24	74.00	-10.76
5470.00	Е	Peak	55.91	10.91	66.82	68.30	-1.48

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**Operation Band** :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5670 MHz Temp./Humi. :23deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Freq. Note Detector Spectrum Factor Actual Limit Margin FS Reading Level Mode @3m  $dB\mu V/m$ MHz F/H/E/S PK/OP/AV dBμV dBµV/m dΒ dΒ 5725.00 Е 53.91 11.04 64.95 68.30 -3.35 Peak

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :23deg\_C / 58 RH Temp./Humi. :5670 MHz

:Curry Operation Mode :Band Edge HIGH Engineer

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725.00	Е	Peak	53.71	11.04	64.75	68.30	-3.55

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Report No.: ER/2015/40012 Issue Date: Jul. 09, 2015

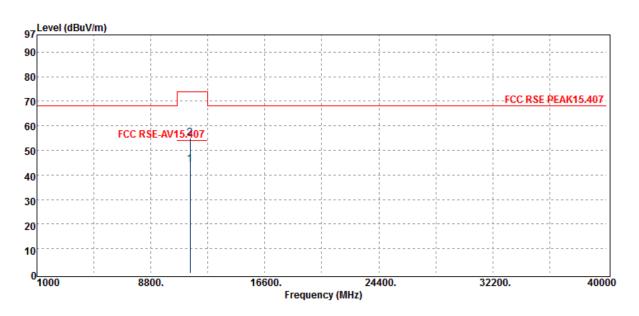
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#### Radiated Spurious Emission Measurement Result 802.11a, 5725~5850 MHz

Operation Band Test Date :802.11 a :2015-06-25

Fundamental Frequency :5745 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :TX LOW Engineer :Curry :VERTICAL EUT Pol. :E1 Plan Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
11490.00	Н	Average	23.61	20.81	44.42	54.00	-9.58
11490.00	Н	Peak	34.18	20.81	54.99	74.00	-19.01

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

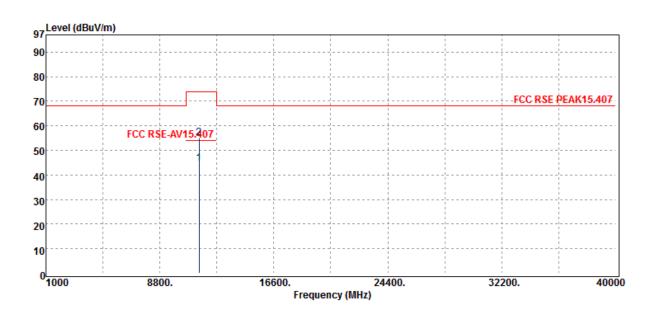
:802.11 a :5745 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



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
11490.00	Н	Average	23.72	20.81	44.53	54.00	-9.47
11490.00	Н	Peak	34.30	20.81	55.11	74.00	-18.89

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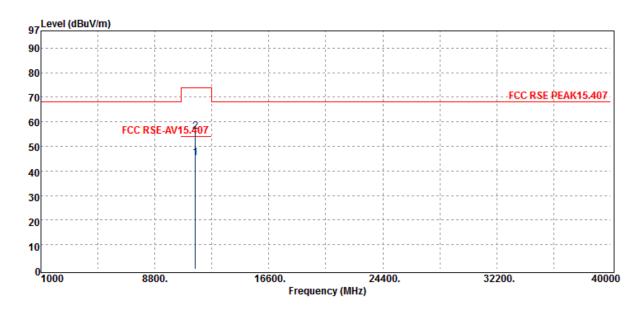
Operation Band :802.11 a

Fundamental Frequency :5785 MHz Operation Mode :TX MID

EUT Pol. :E1 Plan **Test Date** :2015-06-25 Temp./Humi. :23 deg\_C / 58 RH

Engineer :Curry

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB
11570.00	Н	Average	24.26	21.16	45.42	54.00	-8.58
11570.00	Н	Peak	34.90	21.16	56.06	74.00	-17.94
	MHz 11570.00	MHz F/H/E/S  11570.00 H	Mode MHz F/H/E/S PK/QP/AV  11570.00 H Average	Mode Reading Level  MHz F/H/E/S PK/QP/AV dBμV  11570.00 H Average 24.26	Mode         Reading Level           MHz         F/H/E/S         PK/QP/AV         dBμV         dB           11570.00         H         Average         24.26         21.16	Mode         Reading Level         FS           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m           11570.00         H         Average         24.26         21.16         45.42	Mode Mode Meading Level         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           11570.00         H         Average         24.26         21.16         45.42         54.00

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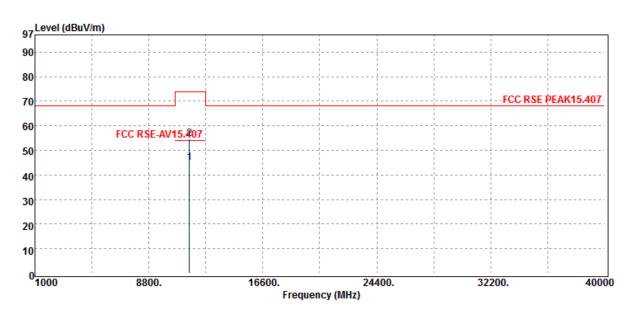
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Operation Band :802.11 a **Test Date** :2015-06-25

Fundamental Frequency :5785 MHz Temp./Humi. :23 deg\_C / 58 RH Operation Mode :TX MID Engineer :Curry

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



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB	
11570.00	Н	Average	23.90	21.16	45.06	54.00	-8.94	
11570.00	Н	Peak	33.63	21.16	54.79	74.00	-19.21	
	MHz 11570.00	MHz F/H/E/S  11570.00 H	Mode MHz F/H/E/S PK/QP/AV  11570.00 H Average	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV  11570.00 H Average 23.90	Mode Reading Level  MHz F/H/E/S PK/QP/AV dBμV dB  11570.00 H Average 23.90 21.16	Mode Mode Meading Level         FS           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m           11570.00         H         Average         23.90         21.16         45.06	Mode Mode Meading Level         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           11570.00         H         Average         23.90         21.16         45.06         54.00	Mode         Reading Level         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m         dB           11570.00         H         Average         23.90         21.16         45.06         54.00         -8.94

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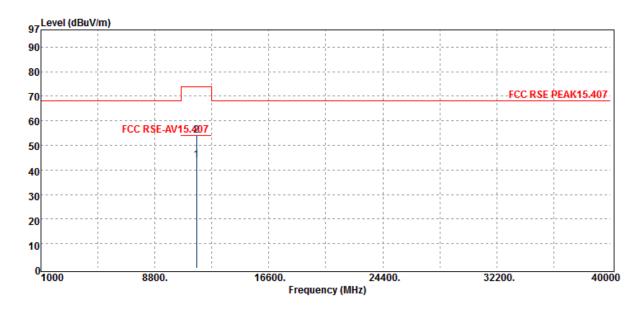
Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:802.11 a :5825 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. :2015-06-25 :23 deg\_C / 58 RH

Engineer :Curry Measurement Antenna Pol. :VERTICAL



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	
11650.00	Н	Average	23.12	20.93	44.05	54.00	-9.95	
11650.00	Н	Peak	33.05	20.93	53.98	74.00	-20.02	

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

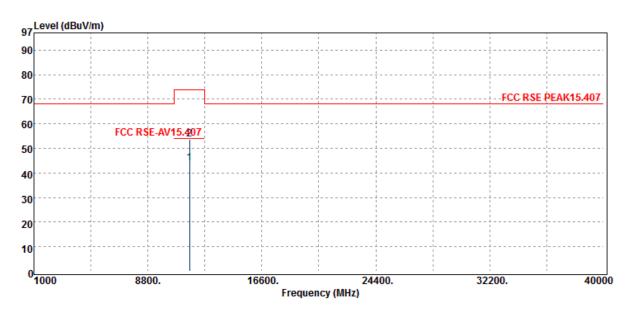
:802.11 a :5825 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Limit Margin
@3m
μV/m dB
54.00 -9.90
74.00 -20.33

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#### Band edge falling to restricted band

Operation Band :802.11 a Test Date :2015-06-24

Fundamental Frequency :5745 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Note Detector Spectrum Factor Actual Limit Margin Freq. FS Mode Reading Level @3mdBμV dBµV/m dBµV/m MHz F/H/E/S PK/QP/AV dΒ dΒ Е 63.37 11.04 74.41 78.20 -3.79 5725.00 Peak

Operation Band :802.11 a Test Date :2015-06-24

**Fundamental Frequency** Temp./Humi. :5745 MHz :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725.00	Е	Peak	64.72	11.04	75.76	78.20	-2.44

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Operation Band :802.11 a **Test Date** :2015-06-24

Fundamental Frequency :5825 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

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	58.09	11.50	69.59	78.20	-8.61

Operation Band Test Date :2015-06-24 :802.11 a

Fundamental Frequency Temp./Humi. :5825 MHz :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B} \mu \mathrm{V}$	dB	dBμV/m	dBμV/m	dB
5850.00	Е	Peak	55.50	11.50	67.00	78.20	-11.20

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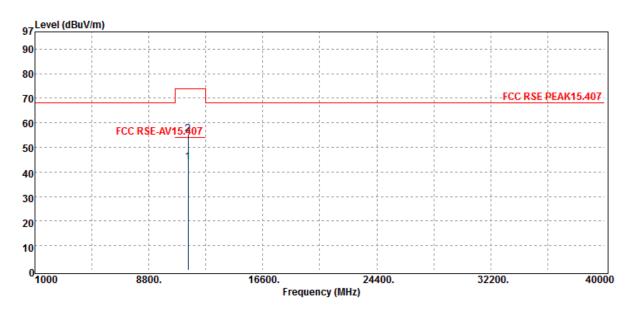
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#### Radiated Spurious Emission Measurement Result 802.11n HT20, 5725~5850 MHz (MIMO)

Operation Band :802.11 n20M **Test Date** :2015-06-25

Fundamental Frequency :5745 MHz Temp./Humi. :23 deg\_C / 58 RH

:TX LOW Operation Mode Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL



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	
11490.00	Н	Average	23.22	20.81	44.03	54.00	-9.97	
11490.00	Н	Peak	34.58	20.81	55.39	74.00	-18.61	
	MHz	MHz F/H/E/S  11490.00 H	MHz F/H/E/S PK/QP/AV  11490.00 H Average	MHz F/H/E/S PK/QP/AV dBμV  11490.00 H Average 23.22	MHz F/H/E/S PK/QP/AV dBμV dB  11490.00 H Average 23.22 20.81	MHz         Mode F/H/E/S         Reading Level PK/QP/AV         FS dBμV         FS dBμV/m           11490.00         H         Average         23.22         20.81         44.03	MHz         F/H/E/S         Mode PK/QP/AV         Reading Level dBμV         FS         @3m dBμV/m           11490.00         H         Average         23.22         20.81         44.03         54.00	Mode MHz         Reading Level PK/QP/AV         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB dBμV/m         dBμV/m         dBμV/m         dB           11490.00         H         Average         23.22         20.81         44.03         54.00         -9.97

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

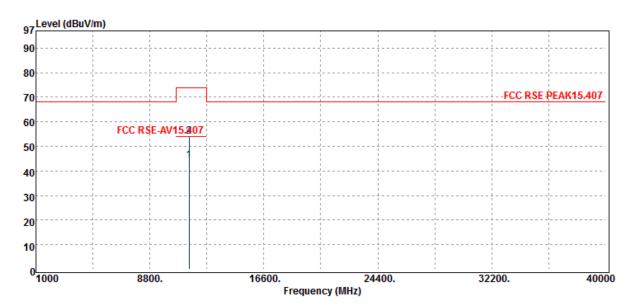
:802.11 n20M :5745 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



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	
11490.00	Н	Average	23.47	20.81	44.28	54.00	-9.72	
11490.00	Н	Peak	33.19	20.81	54.00	74.00	-20.00	

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Operation Band Fundamental Frequency Operation Mode

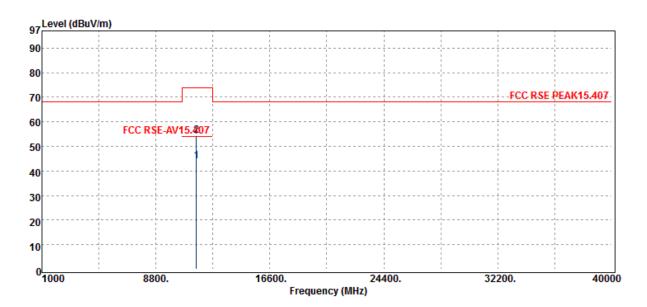
EUT Pol.

:802.11 n20M :5785 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry :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	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
11570.00	Н	Average	22.95	21.16	44.11	54.00	-9.89
11570.00	Н	Peak	33.09	21.16	54.25	74.00	-19.75

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

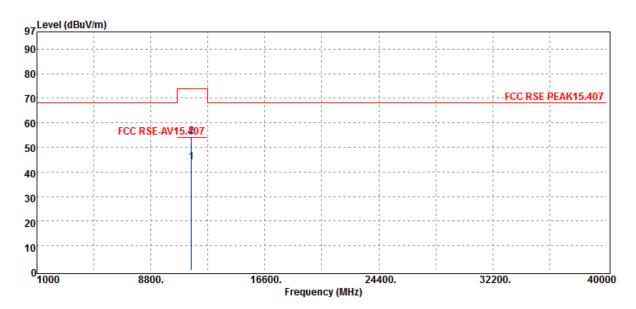
:802.11 n20M :5785 MHz :TX MID :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



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	
11570.00	Н	Average	22.89	21.16	44.05	54.00	-9.95	
11570.00	Н	Peak	33.17	21.16	54.33	74.00	-19.67	
	MHz	MHz F/H/E/S  11570.00 H	Mode MHz F/H/E/S PK/QP/AV  11570.00 H Average	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV  11570.00 H Average 22.89	MHz F/H/E/S PK/QP/AV dBμV dB  11570.00 H Average 22.89 21.16	Mode Meading Level         FS dBμV           MHz         F/H/E/S         PK/QP/AV         dBμV         dB dBμV/m           11570.00         H         Average         22.89         21.16         44.05	MHz         F/H/E/S         Mode PK/QP/AV         Reading Level dBμV         FS         @3m dBμV/m           11570.00         H         Average         22.89         21.16         44.05         54.00	Mode MHz         Reading Level PK/QP/AV         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m         dBμV/m         dB           11570.00         H         Average         22.89         21.16         44.05         54.00         -9.95

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Operation Band Fundamental Frequency Operation Mode

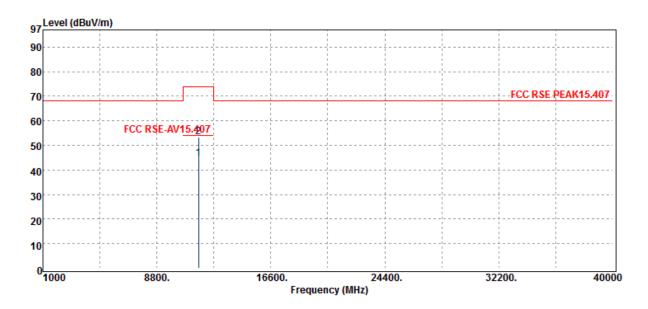
EUT Pol.

:802.11 n20M :5825 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
11650.00	Н	Average	23.66	20.93	44.59	54.00	-9.41	
11650.00	Н	Peak	32.49	20.93	53.42	74.00	-20.58	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

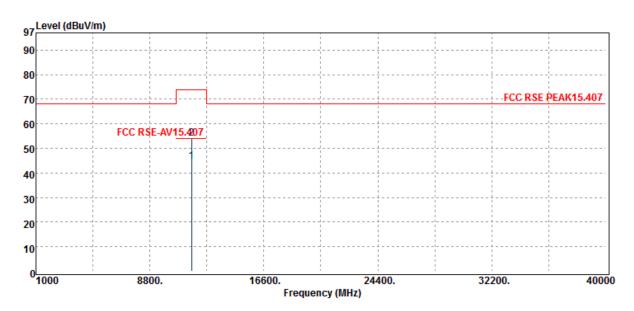
:802.11 n20M :5825 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23 deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
11650.00	Н	Average	23.71	20.93	44.64	54.00	-9.36
11650.00	Н	Peak	33.11	20.93	54.04	74.00	-19.96

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### Band edge falling to restricted band

Operation Band :802.11 n20M Test Date :2015-06-24

Fundamental Frequency :5745 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725 00	F	Peak	57.86	11.04	68 90	78 20	-9 30

Operation Band :802.11 n20M Test Date :2015-06-24

Fundamental Frequency Temp./Humi. :5745 MHz :23 deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725.00	Е	Peak	63.23	11.04	74.27	78.20	-3.93

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Operation Band :802.11 n20M **Test Date** :2015-06-24

Fundamental Frequency :5825 MHz Temp./Humi. :23 deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5850.00	Е	Peak	59.48	11.50	70.98	78.20	-7.22

Operation Band :802.11 n20M Test Date :2015-06-24

Fundamental Frequency Temp./Humi. :5825 MHz :23 deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5850.00	E	Peak	53.01	11.50	64.51	78.20	-13.69

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EUT Pol.

FCC ID: CPOD7E1

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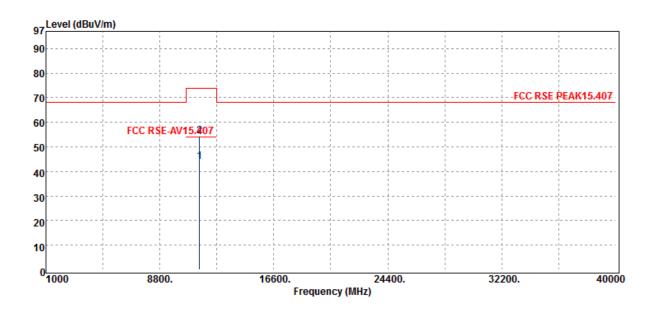
:VERTICAL

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

:E1 Plan

Operation Band :802.11 n40M **Test Date** :2015-06-25 Fundamental Frequency :5755 MHz Temp./Humi. :23deg\_C / 58 RH Operation Mode Engineer :TX LOW :Curry

Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBµV/m	dB
11510.00	Н	Average	22.99	21.03	44.02	54.00	-9.98
11510.00	Н	Peak	33.37	21.03	54.40	74.00	-19.60

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

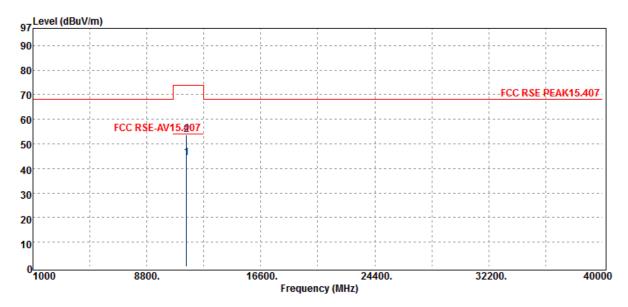
:802.11 n40M :5755 MHz :TX LOW :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margın	
			Mode	Reading Level		FS	@3m		
_	MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
	11510.00	Н	Average	23.11	21.03	44.14	54.00	-9.86	
	11510.00	Н	Peak	32.55	21.03	53.58	74.00	-20.42	

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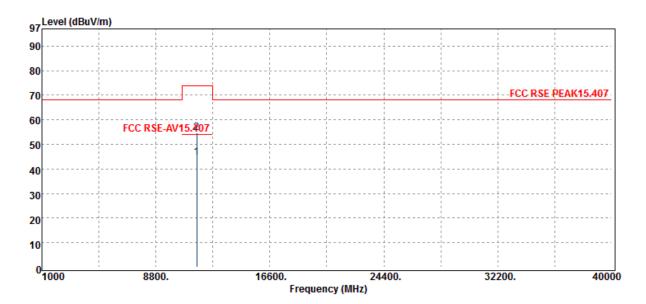
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n40M :5795 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry Measurement Antenna Pol. :VERTICAL



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	
11590.00	Н	Average	23.69	21.11	44.80	54.00	-9.20	
11590.00	Н	Peak	33.57	21.11	54.68	74.00	-19.32	
11590.00	Н	Peak	33.57	21.11	54.68	74.00		-19.32

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

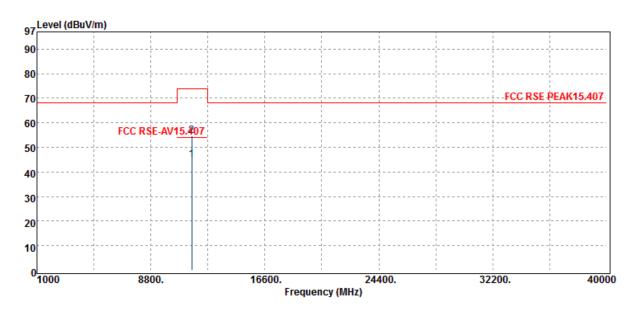
:802.11 n40M :5795 MHz :TX HIGH :E1 Plan

**Test Date** Temp./Humi. Engineer

:2015-06-25 :23deg\_C / 58 RH

:Curry

Measurement Antenna Pol. :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB	
11590.00	Н	Average	23.71	21.11	44.82	54.00	-9.18	
11590.00	Н	Peak	33.70	21.11	54.81	74.00	-19.19	
	MHz	MHz F/H/E/S  11590.00 H	Mode MHz F/H/E/S PK/QP/AV  11590.00 H Average	Mode Reading Level MHz F/H/E/S PK/QP/AV dBμV  11590.00 H Average 23.71	MHz F/H/E/S PK/QP/AV dBμV dB  11590.00 H Average 23.71 21.11	MHz         F/H/E/S         Mode PK/QP/AV         Reading Level dBμV         FS dBμV/m           11590.00         H         Average         23.71         21.11         44.82	MHz         F/H/E/S         Mode PK/QP/AV         Reading Level dBμV         FS         @3m dBμV/m           11590.00         H         Average         23.71         21.11         44.82         54.00	Mode MHz         Reading Level PK/QP/AV         FS         @3m           MHz         F/H/E/S         PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m         dBμV/m         dB           11590.00         H         Average         23.71         21.11         44.82         54.00         -9.18

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Band edge falling to restricted band

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5755 MHz Temp./Humi. :23deg\_C / 58 RH Operation Mode :Band Edge LOW Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBµV/m	dBμV/m	dB
5725.00	Е	Peak	60.73	11.04	71.77	78.20	-6.43

Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5755 MHz Temp./Humi. :23deg C / 58 RH

Operation Mode :Band Edge LOW Engineer :Curry

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
5725.00	E	Peak	60.06	11.04	71.10	78.20	-7.10

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Operation Band :802.11 n40M Test Date :2015-06-24

Fundamental Frequency :5795 MHz Temp./Humi. :23deg\_C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry EUT Pol. :E1 Plan Measurement Antenna Pol. :VERTICAL

Note Detector Spectrum Factor Actual Limit Margin Freq. FS Mode Reading Level @3mdBμV dBµV/m dBµV/m MHz F/H/E/S PK/QP/AV dΒ dΒ Е 52.91 11.50 64.41 78.20 -13.79 5850.00 Peak

Operation Band :802.11 n40M Test Date :2015-06-24 **Fundamental Frequency** Temp./Humi. :5795 MHz :23deg C / 58 RH

Operation Mode :Band Edge HIGH Engineer :Curry

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

Note Spectrum Factor Limit Margin Freq. Detector Actual Mode Reading Level FS @3m dBµV/m PK/QP/AV dΒμV dΒ dBµV/m dΒ MHz F/H/E/S 5850.00 Е Peak 53.44 11.50 64.94 78.20 -13.26

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### 12. TRANSMISSION IN THE ABSENCE OF DATA

# 12.1 Standard Applicable

According to §15.407(c)

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

### 12.2 Result

No non-compliance noted:

Refer to the theory of operation.

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### 13. FREQUENCY STABILITY

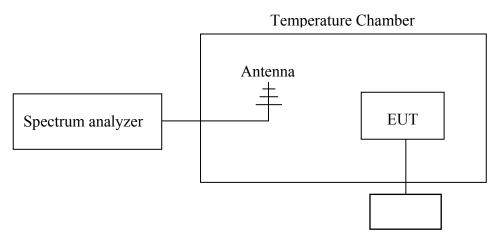
### 13.1 Standard Applicable

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

#### 13.2 Measurement Procedure

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

#### 13.3 Test SET-UP



Variable AC Power Supply

### 13.4 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT	MED	MODEL	SERIAL	LAST	CAL DHE	
TYPE	MFR	NUMBER	NUMBER	CAL.	CAL DUE.	
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016	
Temperature Chamber	TERCHY	MHG-120LF	911009	05/06/2015	05/05/2016	
AC Power Supply	APW-105N	887592	All Power	N/A	N/A	

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#### **Measurement Result** 13.5

Operation Mode	TX	Test Date	2015.07.01
Temperature	25	Test By	Cooper
Humidity	62 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
	7.4V	36	5180.0000	5,180.012431	-0.0124
		44	5220.0000	5,220.012516	-0.0125
		48	5240.0000	5,240.012364	-0.0124
		52	5260.0000	5,260.012451	-0.0125
		60	5300.0000	5,300.012396	-0.0124
25		64	5320.0000	5,320.012357	-0.0124
23		100	5500.0000	5,500.012422	-0.0124
		116	5580.0000	5,580.012412	-0.0124
		140	5700.0000	5,700.012461	-0.0125
		149	5745.0000	5,745.012511	-0.0125
		157	5785.0000	5,785.012486	-0.0125
		165	5825.0000	5,825.012400	-0.0124
	8.14V	36	5180.0000	5,180.012431	-0.0124
		44	5220.0000	5,220.012516	-0.0125
		48	5240.0000	5,240.012364	-0.0124
		52	5260.0000	5,260.012451	-0.0125
-20		60	5300.0000	5,300.012396	-0.0124
		64	5320.0000	5,320.012357	-0.0124
		100	5500.0000	5,500.012422	-0.0124
		116	5580.0000	5,580.012412	-0.0124
		140	5700.0000	5,700.012461	-0.0125
		149	5745.0000	5,745.012511	-0.0125
		157	5785.0000	5,785.012486	-0.0125
		165	5825.0000	5,825.012400	-0.0124

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•	_				
50		36	5180.0000	5,180.012431	-0.0124
		44	5220.0000	5,220.012516	-0.0125
		48	5240.0000	5,240.012364	-0.0124
		52	5260.0000	5,260.012451	-0.0125
		60	5300.0000	5,300.012396	-0.0124
	0.1477	64	5320.0000	5,320.012357	-0.0124
	8.14V	100	5500.0000	5,500.012422	-0.0124
		116	5580.0000	5,580.012412	-0.0124
		140	5700.0000	5,700.012461	-0.0125
		149	5745.0000	5,745.012511	-0.0125
		157	5785.0000	5,785.012486	-0.0125
		165	5825.0000	5,825.012400	-0.0124
		36	5180.0000	5,180.012431	-0.0124
		44	5220.0000	5,220.012516	-0.0125
		48	5240.0000	5,240.012364	-0.0124
		52	5260.0000	5,260.012451	-0.0125
		60	5300.0000	5,300.012396	-0.0124
20	6.6677	64	5320.0000	5,320.012357	-0.0124
-20	6.66V	100	5500.0000	5,500.012422	-0.0124
		116	5580.0000	5,580.012412	-0.0124
		140	5700.0000	5,700.012461	-0.0125
		149	5745.0000	5,745.012511	-0.0125
		157	5785.0000	5,785.012486	-0.0125
		165	5825.0000	5,825.012400	-0.0124
50	6.66V	36	5180.0000	5,180.012431	-0.0124
		44	5220.0000	5,220.012516	-0.0125
		48	5240.0000	5,240.012364	-0.0124
		52	5260.0000	5,260.012451	-0.0125
		60	5300.0000	5,300.012396	-0.0124
		64	5320.0000	5,320.012357	-0.0124
		100	5500.0000	5,500.012422	-0.0124
		116	5580.0000	5,580.012412	-0.0124
		140	5700.0000	5,700.012461	-0.0125
		149	5745.0000	5,745.012511	-0.0125
		157	5785.0000	5,785.012486	-0.0125
		165	5825.0000	5,825.012400	-0.0124

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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

An embedded-in antenna design is used.

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

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

~ End of Report ~

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