

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

#### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT $\land r$

	OF
Product Name:	Wireless Cable Modem Gateway
Brand Name:	Castlenet
Model No.:	CBV3843Z4S; CBW3843G4S,CBW383G4S
Model Difference:	Without VOIP & For marketing purpose used
FCC ID:	RK9-CBV3843Z4S
Report No.:	E2/2015/90040
Issue Date:	Oct. 08, 2015
FCC Rule Part:	§15.407
Prepared for:	CastleNet Technology Inc. No.64,Chung-Shan Rd., Tu-Cheng District, New Taipei City, 23680, Taiwan
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Indus- trial Park, Wuku District, New Taipei City, Taiwan 24803



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FCC ID: RK9-CBV3843Z4S

Report No.: E2/2015/90040 Issue Date: Oct. 26, 2015 Page 2 of 132

# VERIFICATION OF COMPLIANCE

Applicant:	CastleNet Technology Inc.
	No.64, Chung-Shan Rd., Tu-Cheng District, New Taipei City,
	23680, Taiwan
Product Name:	Wireless Cable Modem Gateway
Brand Name:	Castlenet
Model No.:	CBV3843Z4S; CBW3843G4S,CBW383G4S
Model Difference:	Without VOIP & For marketing purpose used
FCC ID:	RK9-CBV3843Z4S
File Number:	E2/2015/90040
Date of test:	Sep. 21, 2015 ~ Oct. 08, 2015
Date of EUT Received:	Sep. 21, 2015

## We hereby certify that:

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

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

Test By:	Aken Huang	Date:	Oct. 08, 2015
-	Aken Huang / Engineer		
Prepared By:	karen Huang	Date:	Oct. 08, 2015
-	Karen Huang / Clerk		
Approved By:	Sim Chang	Date:	Oct. 08, 2015
	Jim Chang / Asst. Manager		

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# **Revision History**

Report Number	Revision	Description	Issue Date	
E2/2015/90040	Rev.00	Initial creation of document	Oct. 08, 2015	

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## 1. GENERAL INFORMATION

## **1.1 Product Description**

General:

Product Name:	Wireless Ca	able Modem Gateway	
Brand Name:	Castlenet		
Model No.:	CBV3843Z4	4S; CBW3843G4S,CBW383G4S	
Product SW/HW version:	571mp1 / A	0	
Radio SW/HW version:	N/A		
RF power setting in TEST SW:	N/A		
	12V from AC/DC adapter		
Power Supply:	Adapter: 1. Model No.: WA-24Q12FU, Supplier: APD 2. Model No.: ADS0306-W 120250, Supplier: AOEM		

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#### WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.)	Modulation Technology
110	5150~5250	4	18.21dBm	OFDM
11a	5725-5850	5	18.71dBm	OFDM
11n /	HT20 / VHT20 5150~5250	4	21.64dBm (Worst Case)	OFDM
ac_20M	HT20 / VHT20 5725-5850	5	21.18dBm (Worst Case)	
11n /	HT40 / VHT40 5150~5250	2	16.80dBm (Worst Case)	OFDM
ac_40M	HT40 / VHT40 5725-5850	2	19.08dBm (Worst Case)	
11ac 80M	VHT80 5150~5250	1	17.00dBm	OFDM
1100_0000	VHT80 5725-5850	1	15.46dBm	
Antenna [	Designation	Supplier: T 5GHz Gain 5GHz Gain Aux 1: Part No.: A Supplier: T 5GHz Gain 5GHz Gain Aux 2: Part No.: A Supplier: T 5GHz Gain	INA IDP1I-W0001, aiwan Anjie Electronics Co., Ltd. : 5.35dBi (5150MHz-5250MHz) : 5.11dBi (5725MHz-5850MHz) IDP1I-W0001, aiwan Anjie Electronics Co., Ltd. : 5.72dBi (5150MHz-5250MHz) : 5.75dBi (5725MHz-5850MHz) P11I-00001, aiwan Anjie Electronics Co., Ltd. : 5.65dBi (5150MHz-5250MHz) : 5.65dBi (5725MHz-5850MHz)	
Modulatio	n type	64QAM, 16	QAM, QPSK, BPSK for OFDM	

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Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300Mbps 802.11 ac_20MHz: 6.5 – 144.4Mbps 802.11 ac_40MHz: 13.5 – 300Mbps 802.11 ac_80MHz: 29.3 – 650Mbps
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## 1.2 Product Feature of Equipment Under Test

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

Product Feature			
Product Name:	Wireless Cable Modem Gateway		
Brand Name:	Castlenet		
Model No.:	CBV3843Z4S; CBW3843G4S,CBW383G4S		
Model Difference:	Without VOIP & For marketing purpose used		
FCC ID	RK9-CBV3843Z4S		
Wi-Fi Specification	802.11a/b/g/n/ac		

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

FCC KDB 644545 D03 Guidance for IEEE 802.11ac v01

ANSI C63.10:2013

Note:

- 1. All test items have been performed and record as per the above standards.
- 2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.
- The EUT was placed 1.5m height for frequency above 1GHz in accordance 3. with ANSI C63.10:2013.

#### 1.4 Test Facility

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

FCC Registration Numbers are: 628985

Canada Registration Number: 4620A-5

#### 1.5 Special Accessories

There are no special accessories used while test was conducted.

#### **1.6 Equipment Modifications**

There was no modification incorporated into the EUT.

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## 2. SYSTEM TEST CONFIGURATION

## 2.1 EUT Configuration

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

## 2.2 EUT Exercise

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

#### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is 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 §15.107. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Radiated Emissions

The EUT is 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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## 2.4 Measurement Results Explanation Example For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

#### Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example with cable loss 6.5dB and 10dB attenuator.

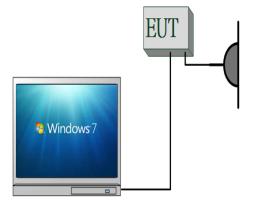
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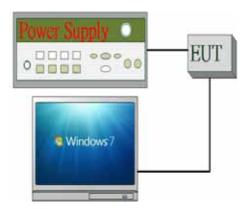


## 2.5 Configuration of Tested System

## Fig. 2-1 Radiated Emission



## Fig. 2-2 Conducted (Antenna Port) & & AC Power Line Conducted Emission Configuration



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

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	DRTU	N/A	N/A	N/A	N/A
2.	DC Power Supply	HP	E3640A	KR93300208	Shield	Un-shield
3.	Notebook	Lenovo	L420	LR-7HXZA	Shield	Un-shield

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#### SUMMARY OF TEST RESULT 3.

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

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#### **DESCRIPTION OF TEST MODES** 4.

## 4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac VHT80

CHANNEL	FREQUENCY	
42	5210 MHz	

Operated band in 5725 MHz ~5850 MHz:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

#### 1 channel is provided for 802.11ac VHT80

CHANNEL	FREQUENCY	
155	5775 MHz	

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## 4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- Test program used to control the EUT for staying in continuous transmitting mode is programmed.
- 3. Investigation has been done on all the possible configurations for searching the worst case.
- 4. The given UE is pre-scanned among 802.11n and ac modes, and 802.11ac yields the highest reading that generates the highest emission. Therefore, 802.11ac as the mode of test configuration is chosen to carry out the relevantly mandatory test items.

	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	AUX 1
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	157	OFDM	6	AUX 1
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO
	RADI	ATED EMISS	ION TEST (A	BOVE 1 GHz)		
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	E100 E040	26 to 19	26 44 49	OFDM	6	AUX 1
802.11ac_VHT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	ΜΙΜΟ
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	AUX 1
802.11ac_VHT20	5745~5625	149 10 105	149,157,105	OFDM	MCS8	MIMO
802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	МІМО
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

#### **RADIATED EMISSION TEST:**

#### Note:

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

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#### ANTENNA PORT CONDUCTED MEASUREMENT:

		CON	IDUCTED TEST			
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a				OFDM	6	AUX 1
802.11ac_HT20 802.11ac_VHT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
802.11ac_HT40 802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS8	ΜΙΜΟ
802.11a				OFDM	6	AUX 1
802.11ac_HT20 802.11ac_VHT20	5745~5825	149 to 165	149,157,165	OFDM	MCS8	MIMO
802.11ac_HT40 802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

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#### **MEASUREMENT UNCERTAINTY** 5.

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

Radiated Spurious Emission:

	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

	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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# 6. CONDUCTED EMISSION TEST

## 6.1. Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range	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					

## 6.2. Measurement Equipment Used

	Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2014	12/11/2015					
Coaxial Cables	N/A	N30N30-1042-150 cm	N/A		01/07/2016					
LISN	LISN Schwarzbec NSLK 8		8127-648	06/09/2015	06/08/2016					
LISN Rolf-Heine		NNB-2/16Z	99012	03/04/2015	03/03/2016					
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.					

## 6.3. EUT Setup

MHz.

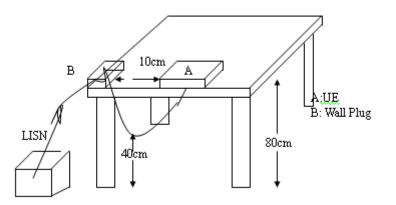
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz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

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## 6.4. Test SET-UP



#### 6.5. Measurement Procedure

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 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

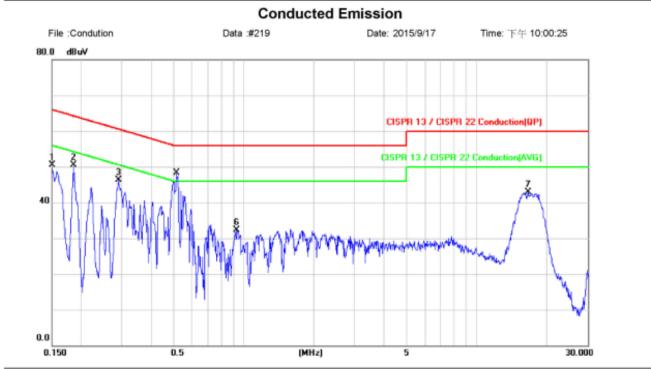
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 17, 2015
Temperature:	26	Humidity:	Test By:	Ashton	
Model No.:	Adapter: ADS03	06-W 120250	Phase:	L1	



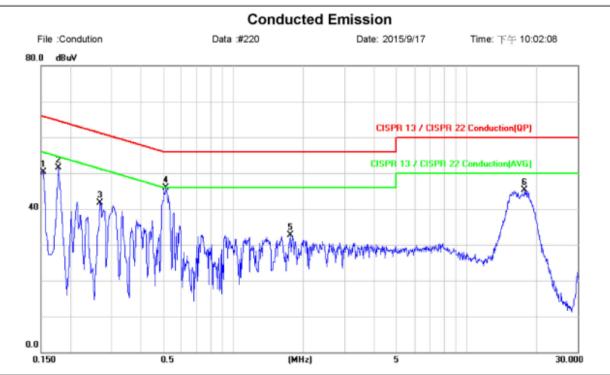
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	50.39	0.08	50.47	66.00	-15.53	peak	
2		0.1860	50.52	0.07	50.59	64.21	-13.62	peak	
3		0.2900	46.13	0.11	46.24	60.52	-14.28	peak	
4	*	0.5140	46.40	0.24	46.64	56.00	-9.36	QP	
5		0.5140	34.70	0.24	34.94	46.00	-11.06	AVG	
6		0.9380	31.91	0.40	32.31	56.00	-23.69	peak	
7		16.6460	42.24	0.60	42.84	60.00	-17.16	peak	

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Operation Mode:	Operation mode			Test Date:	Sep. 17, 2015
Temperature:	26	Humidity:	54 %	Test By:	Ashton
Model No.:	Adapter: ADS030	06-W 120250		Phase:	Ν



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1540	50.19	0.14	50.33	65.78	-15.45	peak	
2		0.1780	51.34	0.14	51.48	64.58	-13.10	peak	
3		0.2700	41.57	0.16	41.73	61.12	-19.39	peak	
4	*	0.5140	45.65	0.29	45.94	56.00	-10.06	peak	
5		1.7700	32.17	0.60	32.77	56.00	-23.23	peak	
6		17.8220	44.77	0.61	45.38	60.00	-14.62	peak	

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4

5

6

4.4660

8.7860

20.3140

34.17

28.91

29.87

0.61

0.68

0.56

34.78

29.59

30.43

56.00

60.00

60.00

-21.22

-30.41

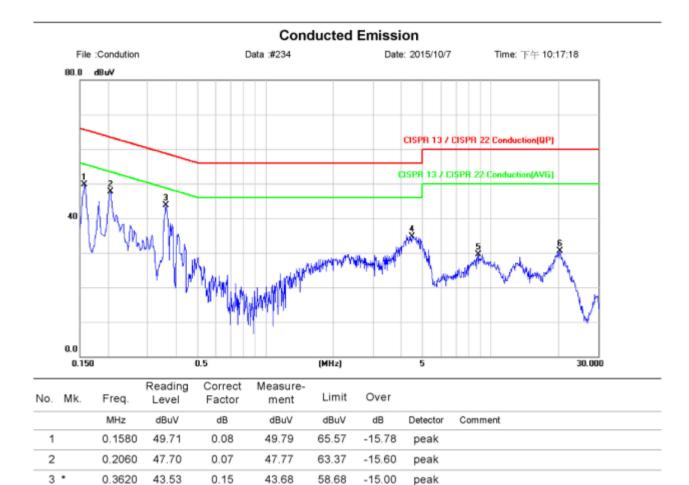
-29.57

peak

peak

peak

Operation Mode:	Operation mode			Test Date:	Oct. 07, 2015
Temperature:	23	Humidity:	Test By:	Ashton	
Model No.:	Adapter: WA-240	Q12FU	Phase:	L1	



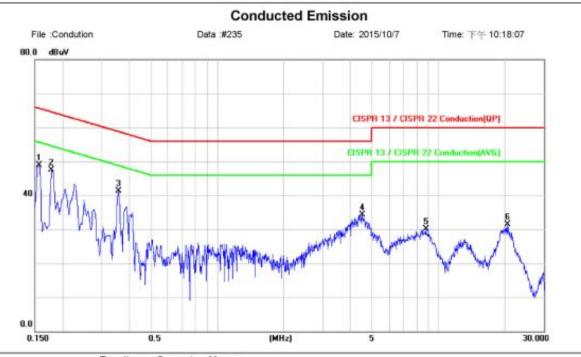
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Operation Mode:	Operation mode			Test Date:	Oct. 07, 2015
Temperature:	23	Humidity:	69 %	Test By:	Ashton
Model No.:	Adapter: WA-240	Q12FU	Phase:	Ν	



No.	MK.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	•	0.1580	48.69	0.14	48.83	65.57	-16.74	peak		
2		0.1780	47.33	0.14	47.47	64.58	-17.11	peak		
3		0.3580	41.20	0.20	41.40	58.77	-17.37	peak		
4		4.5420	33.69	0.67	34.36	56.00	-21.64	peak		
5		8,8060	29.47	0.73	30.20	60.00	-29.80	peak		
6		20.4980	30.84	0.60	31.44	60.00	-28.56	peak		
-		20.4500	00.04	0.00	51.44	00.00	-20.00	hear		

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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	95.2%	0.21
802.11n_20 (MIMO)	95.2%	0.21
802.11n_40 (MIMO)	78.3%	1.06
802.11 ac80 (MIMO)	87.2%	0.60

Duty Cycle Factor: 10 \* log (1/0.952) = 0.21 Duty Cycle Factor: 10 \* log (1/0.952) = 0.21 Duty Cycle Factor: 10 \* log (1/0.783) = 1.06 Duty Cycle Factor: 10 \* log (1/0.872) = 0.60

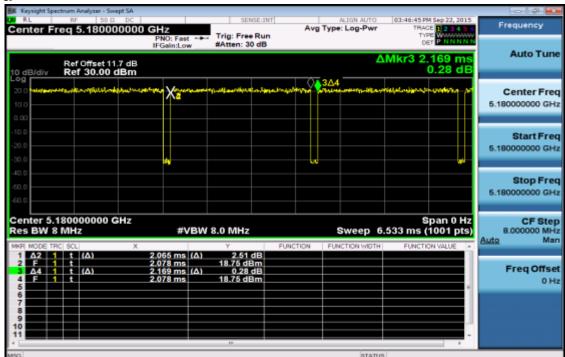
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## **DUTY CYCLE TEST SIGNAL Measurement Result** 802.11a



## 802.11n HT20

Keysight Spectrum And						
RL RL RF	180000000 GHz		SENSE:INT	ALIGN AUTO Avg Type: Log-Pw	TRACE 1 2 3 4 5 6	Frequency
Ref 0	PNC IFGa Iffset 16.5 dB	East	rig: Free Run Atten: 30 dB		ΔMkr3 2.014 ms	Auto Tune
10 dB/div Ref : 20.0	30.00 dBm	Xatura	rdteslandtesland	- a.spi - 344 Auroway	-2.36 dB	Center Free
0.00 -10.0 -20.0						Start Free 5.180000000 GH
-30.0 -40.0 -50.0 -60.0						Stop Free 5.180000000 GH
Center 5.18000 Res BW 8 MHz		#VBW 8.0	) MHz Y FUNC		Span 0 Hz 6.067 ms (1001 pts)	CF Ste 8.000000 MH Auto Ma
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.00	4 ms (Δ)	0.70 dB 11.30 dBm -2.36 dB 11.30 dBm		H PONCTION VALUE A	Freq Offse 0 H
6 7 8 9 10						
193				STAT	vs	

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#### 802.11 n HT 40

Keysight Spectrum Analyzer - Swept					
nter Freq 5.190000	0000 GHz PNO: Fast	Trig: Free Run	Aug Type: Log-Pwr	10:20:14 PM Sep 22, 2015 TRACE 1 2 3 4 5 0 TYPE	Frequency
Ref Offset 16.5 dB/div Ref 30.00 dB	IFGain:Low	#Atten: 30 dB		ΔMkr3 450.8 μs -0.63 dB	Auto Tu
9 10 10 <b>1-11-1-1-1-1-1-1-1-1-1-1-1-1-1</b> 10	Xamerican	v <sup>4,</sup> 4y-4 <sup>1</sup> /4-10 <sup>1∆2</sup>	● <sup>3∆4</sup> ↓ <sup>3™</sup> +→ <b>↓</b> ₩/₩↓₩₩₩¥₽₩-₩1	and a second	Center Fr 5.190000000 0
	weekani.	401.44		- muhapa	Start Fr 5.190000000 (
0 .0					Stop F 5.190000000 0
nter 5.190000000 GH s BW 8 MHz		W 8.0 MHz	Sweep	Span 0 Hz 1.400 ms (1001 pts)	CF S 8.000000 f <u>Auto</u>
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	352.8 μs (Δ) 362.6 μs 450.8 μs (Δ) 362.6 μs	0.94 dB 9.05 dBm			Freq Off
6 8 9 0					

## 802.11 ac VHT 80

Keysight Spe	ctrum													
enter Fr	n P91		00000	GHZ PNO: Fas		rig: Fre	Run	Avg Type	Log-P		TRAC	4 Sep 23, 2015 E 1 2 3 4 5 6 E		Frequency
		Offset 1		PNO: Fas IFGain:Lo		Atten: 3				-	Mkr3 2	PNNNN		Auto Tu
dB/div 9 10 10 10	Re	<u>r 30.00</u> X	dBm Ari-ywn	fo <b>f</b> teftering	/ <b>***</b> *	∆2 ♦ <sup>3∆4</sup>	k=npatarold	waperio (##	~#i	r	and the state	9.34 GB	5.2	Center Fr 210000000 G
						1							5.2	Start Fr 210000000 G
		·				r.							5.2	Stop Fr 210000000 G
nter 5.2 s BW 8	мн	z		#\	/BW 8.	0 MHz					60.0 µs (	pan 0 Hz 1001 pts)	Auto	CF St 8.000000 M
R MODE TR 6 1 6 1 6 1 6 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7	t	(Δ) (Δ)	X	192.1 µs 73.26 µs 220.4 µs 73.26 µs		Y 7.97 di -6.34 7.97 di	dB Bm dB	CTION FU	ICTION WI	отн	FUNCTION	ON VALUE *		Freq Offs 0
	_	_				10				_				

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## 8. 26dB & 6dB EMISSION BANDWIDTH MEASUREMENT

## 8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C. The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

### 8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules 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.

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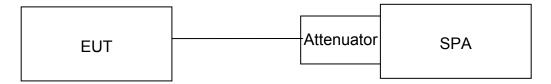
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## 8.3 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
ТҮРЕ		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016	
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016	
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016	
Power Sensor	Anritsu	MA2411B	1315049	06/23/2015	06/22/2016	
Coaxial Cable 30cm	WOKEN	00100A1F1A 195C	RF01	12/19/2014	12/18/2015	
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015	
Splitter	RF-LAMBAD	RFLT2W1G1 8G	RF35	12/19/2014	12/18/2015	
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015	
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2015	05/03/2016	

#### 8.4 Test Set-up



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# 8.5 Measurement Result

#### 26dB Bandwidth

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	19.81	12.97
5220	20.33	13.08
5240	20.34	13.08

#### 802.11n\_HT20 (Main)

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	20.06	13.02
5220	19.94	13.00
5240	19.89	12.99

#### 802.11n HT20 (Aux 1)

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	19.98	13.01
5220	20.02	13.01
5240	19.77	12.96

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#### 802.11n HT20 (Aux2)

Frequency (MHz)	26dB Bandwidth (MHz)	10 Log (B) (dB)
5180	19.43	12.88
5220	20.10	13.03
5240	19.84	12.98

#### 802.11n \_HT40 (Main)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	39.01	15.91
5230	38.97	15.91

#### 802.11n HT40 (Aux 1)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	38.95	15.91
5230	38.76	15.88

#### 802.11n \_HT40 (Aux 2)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	38.66	15.87
5230	38.90	15.90

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#### 802.11 ac 80 (Main)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5210	81.02	19.09
5775	76.67	18.85

802.11\_ac 80 (Aux 1)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5210	80.47	19.06
5775	75.79	18.80

802.11 ac 80 (Aux 2)

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5210	81.06	19.09
5775	76.43	18.83

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

802.11a

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	16.41	12.15
5785	16.35	12.14
5825	16.38	12.14

#### 802.11n\_HT20 (Main)

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.61	12.46
5785	17.62	12.46
5825	17.71	12.48

#### 802.11n HT20 (Aux 1)

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.63	12.46
5785	17.65	12.47
5825	17.67	12.47

#### 802.11n\_HT20 (Aux 2)

Frequency (MHz)	6dB Bandwidth (MHz)	10 Log (B) (dB)
5745	17.57	12.45
5785	17.61	12.46
5825	17.70	12.48

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#### 802.11n HT40 (Main)

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	36.42	15.61
5795	36.40	15.61

#### 802.11n HT40 (Aux 1)

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	36.28	15.60
5795	36.45	15.62

#### 802.11n\_HT40 (Aux 2)

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	36.51	15.62
5795	36.40	15.61

#### 802.11n ac 80 (Main)

Frequency	6dB Bandwidth (B)	10 Log (B)
(MHz)	(MHz)	(dB)
5775	76.07	18.81

#### 802.11n ac 80 (AUX 1)

Frequency	6dB Bandwidth (B)	10 Log (B)
(MHz)	(MHz)	(dB)
5775	76.28	18.82

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#### 802.11n ac 80 (AUX 2)

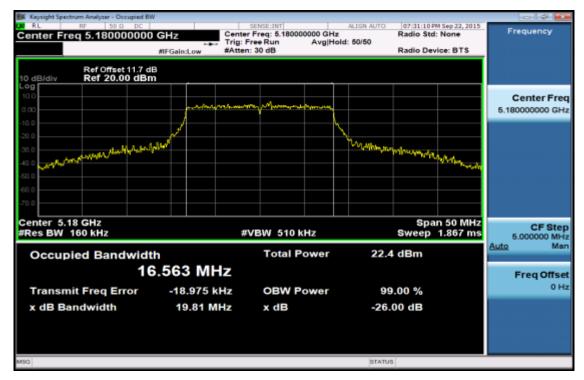
Frequency	6dB Bandwidth (B)	10 Log (B)
(MHz)	(MHz)	(dB)
5775	76.34	18.83

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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)



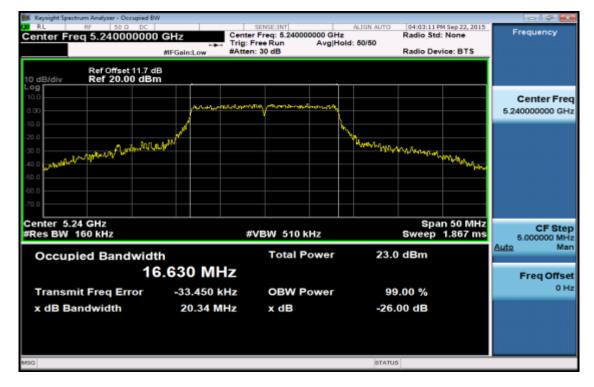
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# 26dB Band Width Test Data CH-High (5240MHz)



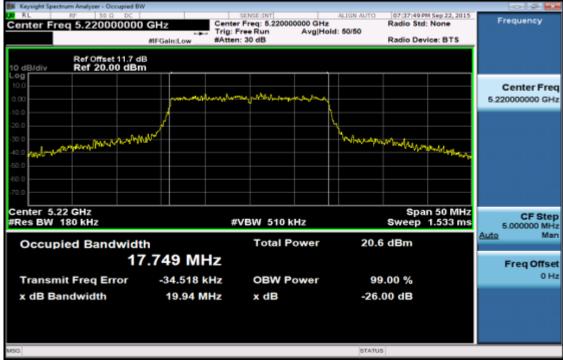
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### 802.11n HT20, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5180 MHz)

RL 07:33:17 PM Sep 22, 2015 Radio Std: None Zenter Freq: 5.18000000 GHz Trig: Free Run Avg|Hold: 50/50 #Atten: 30 dB Frequency Center Freg 5.180000000 GHz Radio Device: BTS #IFGain:Low Ref Offset 11.7 dB Ref 20.00 dBm Center Freq 5.18000000 GHz when we Mary Mary nah Span 50 MHz Sweep 1.533 ms Center 5.18 GHz #Res BW 180 kHz CF Step #VBW 510 kHz 5.000000 Auto Mar Total Power 20.7 dBm Occupied Bandwidth 17.733 MHz Freq Offset Transmit Freq Error 0 Hz -38.068 kHz OBW Power 99.00 % x dB Bandwidth 20.06 MHz x dB -26.00 dB

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



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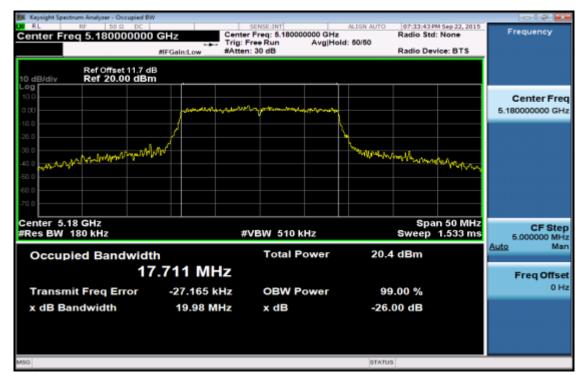
# 26dB Band Width Test Data CH-High (5240 MHz)

M Keysight Spectrum Analyzer - Occupied B	W				
Center Freq 5.24000000		sense:int er Freg: 5.24000000 GHz		M Sep 22, 2015 : None	Frequency
Conter Freq 5.24000000	Trig:	Free Run Avg Ho n: 30 dB	Radio De	vice: BTS	
	MFGain:Low write	11. 00 0D	Radio De	noe. B t s	
10 dB/div Ref 20.00 dB					
10.0					Center Freq
0.00	and a start and	manularialistance			5.240000000 GHz
-10.0		Y I			
-20.0					
30.0	NM .		Man and a d		
40.0 Manual strategies and Alter and Alter			-anner mary him he	the horal and here	
-50.0					
-60.0					
-70.0					
Center 5.24 GHz			Sna	n 50 MHz	
#Res BW 180 kHz	1	VBW 510 kHz		1.533 ms	CF Step 5.000000 MHz
Occurried Devided	41-	Total Power	20.8 dBm		Auto Man
Occupied Bandwid		Total Power	20.0 dBm		
1	7.706 MHz				Freq Offset
Transmit Freq Error	-46.426 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	19.89 MHz	x dB	-26.00 dB		
MSG			STATUS		

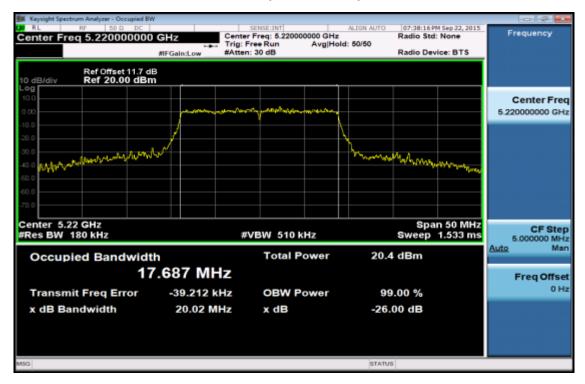
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### 802.11n HT20, 5150~5250 MHz (Aux 1) 26dB Band Width Test Data CH-Low (5180 MHz)



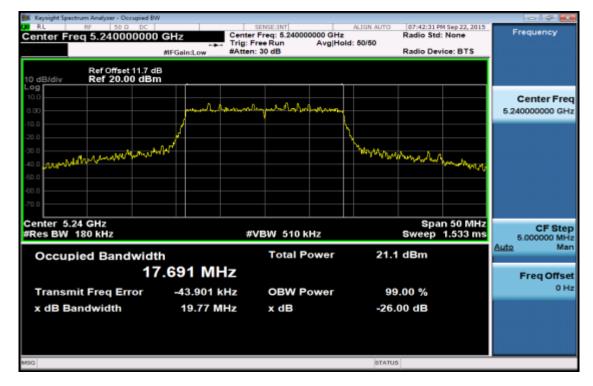
## 26dB Band Width Test Data CH-Mid (5220 MHz)



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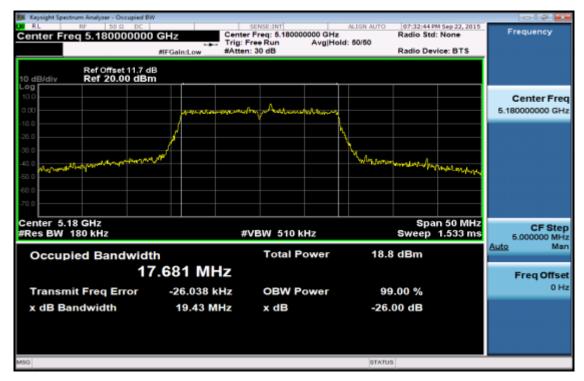
# 26dB Band Width Test Data CH-High (5240 MHz)



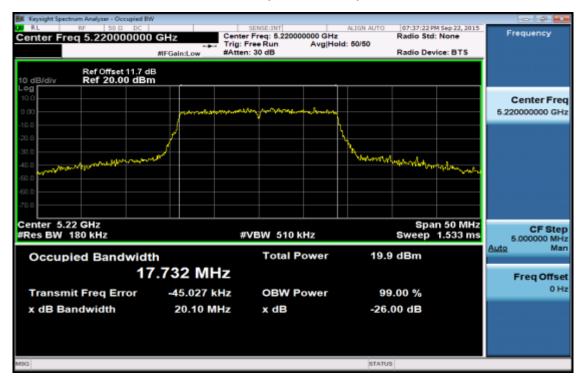
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### 802.11n HT20, 5150~5250 MHz (Aux 2) 26dB Band Width Test Data CH-Low (5180 MHz)



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



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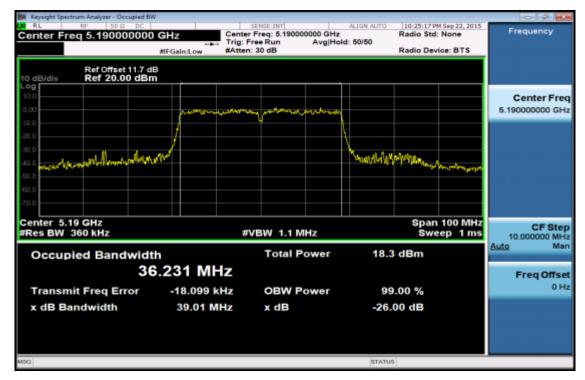
# 26dB Band Width Test Data CH-High (5240 MHz)

Keysight Spectrum Analyzer - Occupied B	W				- 2 2
Center Freq 5.24000000	Trig: F	SENSE:INT r Freq: 5.240000000 GHz Free Run Avg Ho h: 30 dB			Frequency
Ref Offset 11.7 o 10 dB/div Ref 20.00 dB Log					
0.00	proversion	heydladarhan			Center Free 5.240000000 GH:
-10.0	1				
-40.0			general and a second second	and many many	
-70.0					
Center 5.24 GHz #Res BW 180 kHz	#	VBW 510 kHz		n 50 MHz 1.533 ms	CF Step 5.000000 MH
Occupied Bandwid	<sup>th</sup> 7.714 MHz	Total Power	19.9 dBm		Auto Mar Freq Offse
Transmit Freq Error	-36.069 kHz	OBW Power	99.00 %		0 H
x dB Bandwidth	19.84 MHz	x dB	-26.00 dB		
MBG			STATUS		

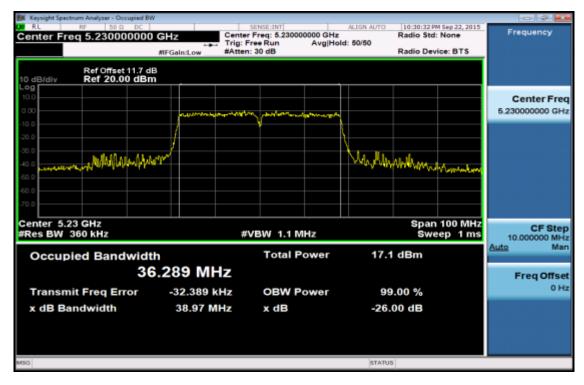
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# 802.11n HT40, 5150~5250 MHz (Main) 26dB Band Width Test Data CH-Low (5190 MHz)



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



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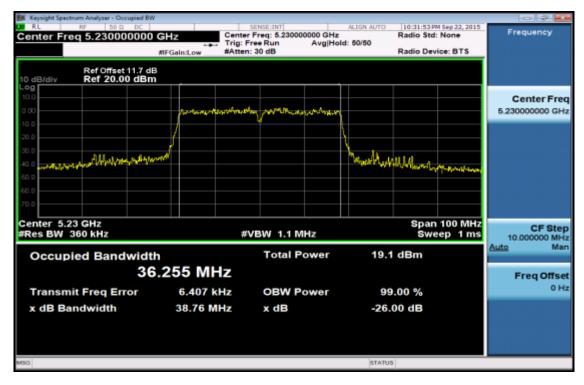


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# 802.11n HT40, 5150~5250 MHz (Aux 1) 26dB Band Width Test Data CH-Low (5190 MHz)

🗱 Keysight Spectrum Analyzer - Occupied BW					
Center Freq 5.190000000	GHz Cente	r Freq: 5.190000000 GHz	Radio Std	M Sep 22, 2015 : None	Frequency
	Irig: I	FreeRun Avg Ho n:30 dB	ld: 50/50 Radio Dev	rice: BTS	
Ref Offset 11.7 dE 10 dB/div Ref 20.00 dBm					
10.0 0.00 -10.0	provedurent	an and a start and a start and a start and a start a st			Center Freq 5.190000000 GHz
-20.0 -30.0 -40.0	w l		hope William and the advertision of the second s	had a land for the states	
-50.0					
Center 5.19 GHz #Res BW 360 kHz	#	VBW 1.1 MHz		ep 1 ms	CF Step 10.000000 MHz
Occupied Bandwidt	h	Total Power	18.5 dBm		Auto Man
36	.265 MHz				Freq Offset
Transmit Freq Error	28.242 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	38.95 MHz	x dB	-26.00 dB		
MSG			STATUS		

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

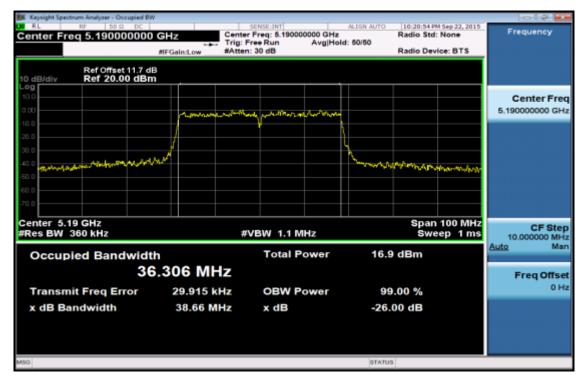


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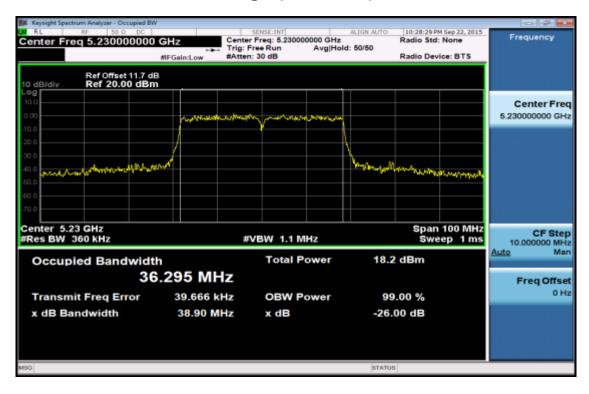
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### 802.11n HT40, 5150~5250 MHz (Aux 2) 26dB Band Width Test Data CH-Low (5190 MHz)



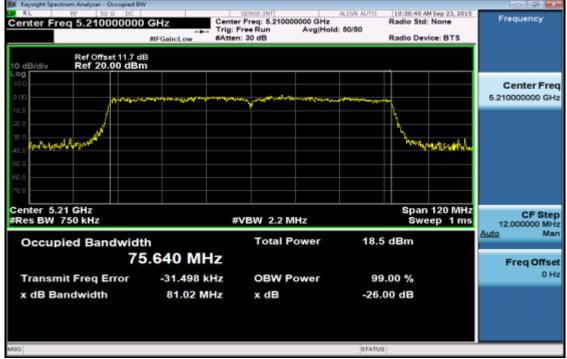
# 26dB Band Width Test Data CH-High (5230 MHz)



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



#### 802.11ac VHT80, 5150~5250 MHz (Aux 1) 26dB Band Width Test Data CH-Mid (5210 MHz)

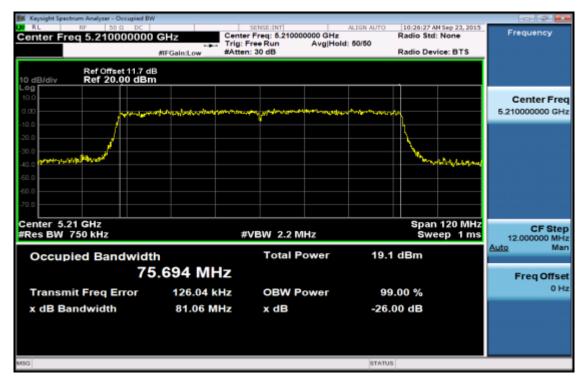
M Keysight Spectrum Analyzer - Occupied BW					
00 RL RF S0 Ω DC Center Freq 5.2100000000 G	Hz Center Trig: F	sense:INT r Freq: 5.210000000 GHz ree Run Avg Hol : 30 dB	Radio d: 50/50	00 AM Sep 23, 2015 Std: None Device: BTS	Frequency
Ref Offset 11.7 dB 10 dB/div Ref 20.00 dBm					
10.0					Center Freq 5.210000000 GHz
-10.0 -20.0 -30.0					
-40.0				mMan	
Center 5.21 GHz			Sp	an 120 MHz	CE Stor
#Res BW 750 kHz	#	VBW 2.2 MHz	S	weep 1ms	CF Step 12.000000 MHz Auto Man
Occupied Bandwidth 75.	718 MHz	Total Power	19.6 dBm		Freq Offset
Transmit Freq Error	-5.079 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	80.47 MHz	x dB	-26.00 dB		
MSG			STATUS		

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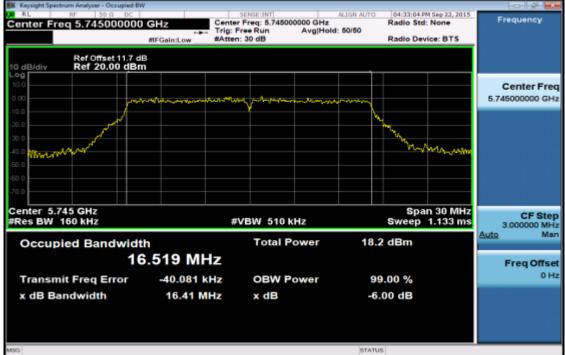
#### 802.11ac VHT80, 5150~5250 MHz (Aux 2) 26dB Band Width Test Data CH-Mid (5210 MHz)



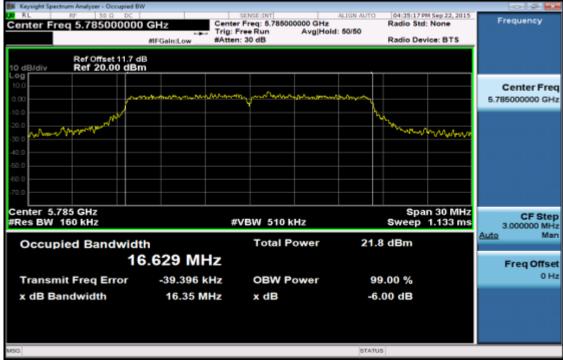
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### 802.11a, 5725~5850 MHz 6dB Band Width Test Data CH-Low (5745 MHz)



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



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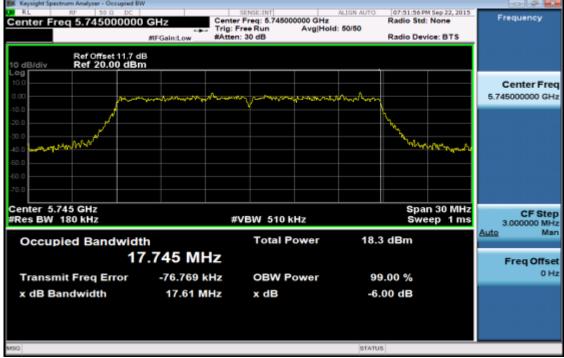


# 6dB Band Width Test Data CH-High (5825 MHz)

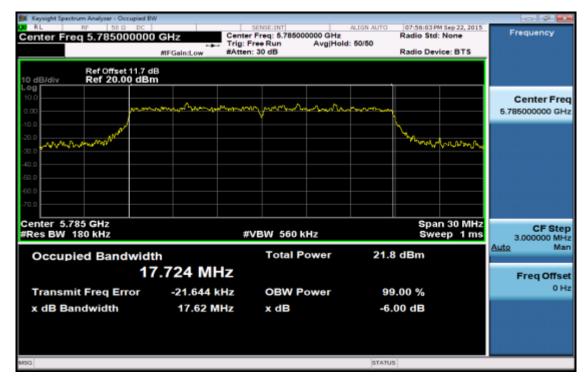
Center	Freq: 5.825000000 GHz	Radio Std		Frequency
			vice: BTS	
<u> </u>				Center Freq
hand a state of the second s	a marker and a marker and a second			5.825000000 GHz
		2-10-000		
			mana	
		Spa	n 30 MHz	
#\	/BW 510 kHz			CF Step 3.000000 MHz
	Total Power	22.1 dBm		<u>Auto</u> Man
656 MHz				Freq Offset
-48.444 kHz	OBW Power	99.00 %		0 Hz
16.38 MHz	x dB	-6.00 dB		
	G56 MHz -48.444 kHz	#VBW 510 kHz #VBW 510 kHz Total Power 656 MHz -48.444 kHz OBW Power	GHz Center Freq: 5.82500000 GHz Radio Std   IFGain:Low Trig: Free Run Avg Hold: 50/50 Radio Dev   #Atten: 30 dB Avg Hold: 50/50 Radio Dev   #Atten: 30 dB Std Radio Dev   #Atten: 30 dB Std Radio Dev   #VBW 510 kHz Spa   Std Sweep   Total Power 22.1 dBm   656 MHz 99.00 %	GHz Center Freq: 5.82500000 GHz Radio Std: None   IFGain:Low Avg Hold: 50/50 Radio Device: BTS   #Atten: 30 dB Avg Hold: 50/50 Radio Device: BTS   #Atten: 30 dB Avg Hold: 50/50 Radio Device: BTS   #Atten: 30 dB #Atten: 30 dB Radio Device: BTS   #Atten: 30 dB #Avg Hold: 50/50 Radio Device: BTS   #WBW 510 kHz Span 30 MHz   Sweep 1.133 ms Total Power 22.1 dBm   656 MHz 99.00 %

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### 802.11ac VHT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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

🗱 Keysight Spectrum Analyzer - (									- ×
Center Freq 5.8250			sense:int enter Freg: 5.8250	00000 GHz	ALIGN AUTO	Radio Std	M Sep 22, 2015	Frequency	У
Genter Freq 5.6250			rig: Free Run	Avg Hold	: 50/50				
	1	flFGain:Low #/	Atten: 30 dB			Radio De	vice: BTS		
10 dB/div Ref 20.	et 11.7 dB .00 dBm								
10.0								Center	Fred
0.00	Jum	mound	monor	monte	man			5.825000000	
-10.0	1					ι.		0.020000000	OTTE
-20.0	1					Manager 1			
30.0 how in Martin							Marine		
-40.0									
-50.0									
-60.0									
-70.0	_								
Center 5.825 GHz #Res BW 180 kHz			#VBW 560	Hz			eep 1 ms	CF \$ 3.000000	Step MHz
Occupied Ban	dwidth		Total F	ower	22.1	1 dBm		Auto	Man
	17.	777 MHz						Freq Of	ffset
Transmit Freq E	rror	-14.584 kHz	OBW P	ower	99	9.00 %			0 Hz
x dB Bandwidth		17.71 MHz	x dB		-6.	00 dB			
MSG					STATU	5			
									_

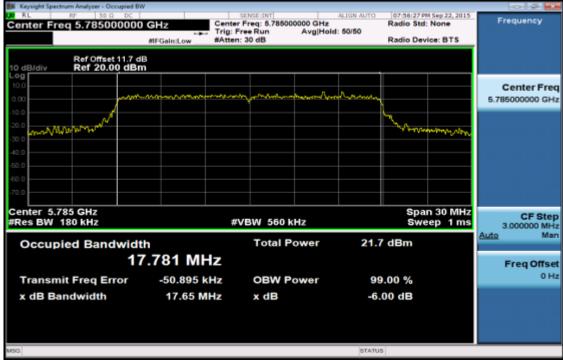
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### 802.11ac VHT20, 5725~5850 MHz (AUX 1) 6dB Band Width Test Data CH-Low (5745 MHz)

RL Keyn 07:52:22 PM Sep 22, 2015 Radio Std: None ALIGN A Center Free: 5.74500000 GHz Trig: Free Run Avg|Hold: 50/50 #Atten: 30 dB Frequency Center Freg 5.745000000 GHz Radio Device: BTS #IFGain:Low Ref Offset 11.7 dB Ref 20.00 dBm Center Freq 5.745000000 GHz Anno Center 5.745 GHz #Res BW 180 kHz Span 30 MHz CF Step #VBW 510 kHz Sweep 1 ms 3.000000 Auto Mar Total Power 18.3 dBm Occupied Bandwidth 17.675 MHz Freq Offset Transmit Freq Error 0 Hz -30.382 kHz OBW Power 99.00 % x dB Bandwidth 17.63 MHz x dB -6.00 dB

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



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No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號 SGS Taiwan Ltd.



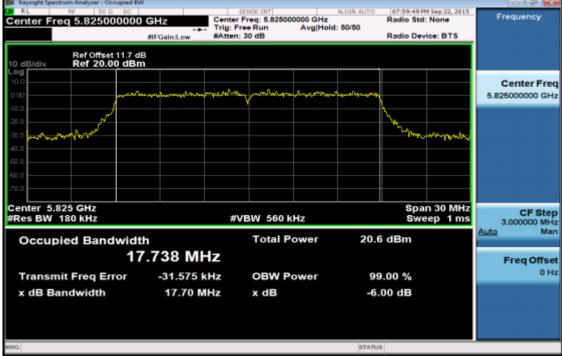
# 6dB Band Width Test Data CH-High (5825 MHz)

🗱 Keysight Spectrum	n Analyzer - Occupied	BW						
Center Freq	5.82500000	0 GHz		5.825000000 n Av	GHz g Hold: 50/5	Radio St		Frequency
		#IFGain:Low	#Atten: 30 dE	1		Radio De	vice: BTS	
10 dB/div	Ref Offset 11.7 Ref 20.00 dB							
10.0								Center Fre
0.00		Normanna	-harder and a star	www.how	www.han	- have		5.825000000 GH
-10.0								
-20.0	North Wall					- march	mann	
-30.0							or one of the Part	
-40.0								
-50.0								
-60.0								
-70.0								
Center 5.825			#\/B\4	560 kHz			an 30 MHz	CF Ste
#Res BW 18	U KHZ		#VBW	500 KHZ		5W	eep 1ms	3.000000 MH Auto Ma
Occupie	d Bandwid	ith	Тс	otal Powe	r	21.9 dBm		Auto Ma
	1	7.723 MI	Hz					Freq Offse
								0 H
	Freq Error	-32.902		BW Powe	r	99.00 %		
x dB Band	dwidth	17.67 N	IHZ X	dB		-6.00 dB		
100								
MSG						STATUS		

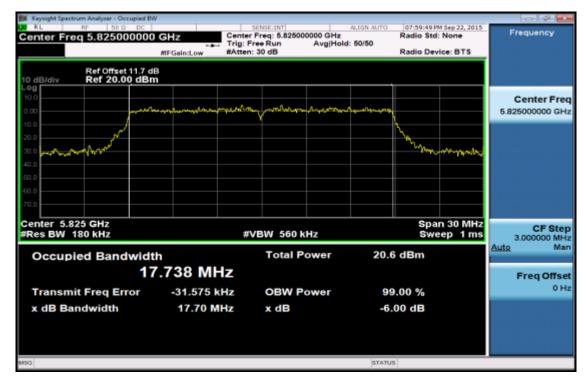
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### 802.11ac VHT20, 5725~5850 MHz (Aux 2) 6dB Band Width Test Data CH-Low (5745 MHz)



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

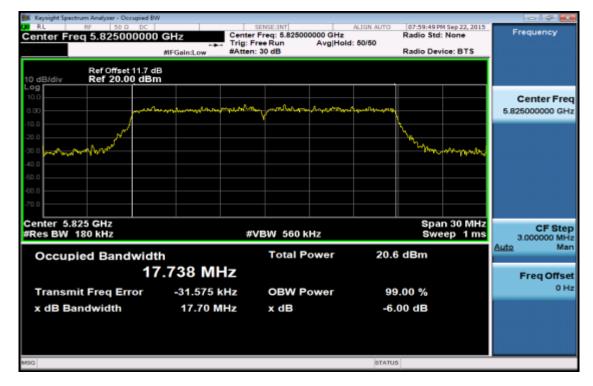


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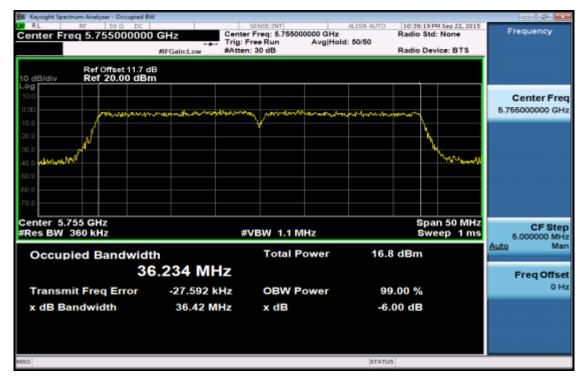
# 6dB Band Width Test Data CH-High (5825 MHz)



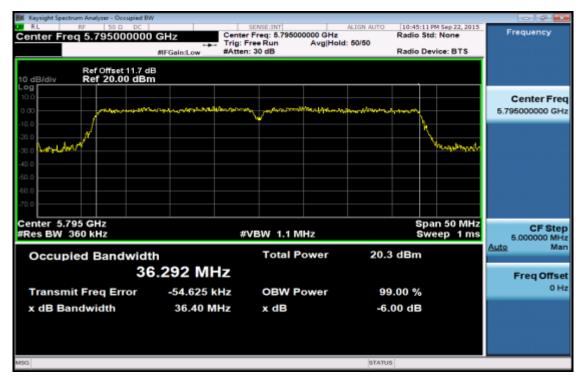
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# 802.11ac VHT40, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5755 MHz)



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

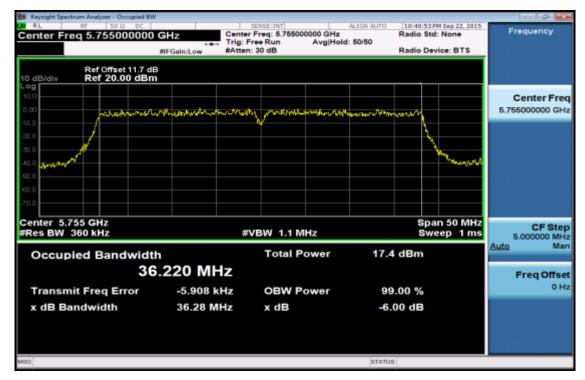


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# 802.11ac VHT40, 5725~5850 MHz (AUX 1) 6dB Band Width Test Data CH-Low (5755 MHz)



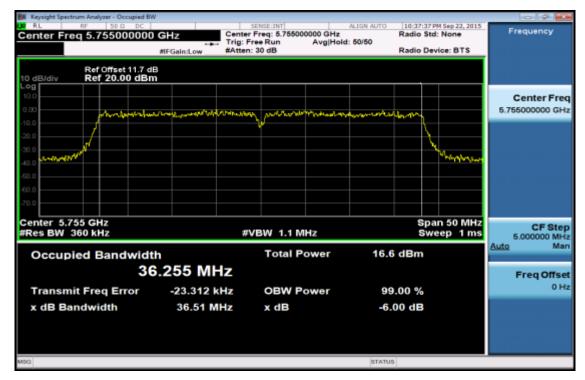
# 6dB Band Width Test Data CH-High (5795 MHz)

🎉 Keysight Spectrum Analyzer - Occupied B	N				
Center Freq 5.79500000	Trig:	sense:INT er Freq: 5.795000000 GHz Free Run Avg Ho en: 30 dB	Radio S	11 PM Sep 22, 2015 Std: None Device: BTS	Frequency
10 dB/div Ref Offset 11.7 d Ref 20.00 dB					
100 0.00 -10.0	nal square last the market	m januar manana	man		Center Freq 5.795000000 GHz
-20.0				Musered	
-50.0					
Center 5.795 GHz #Res BW 360 kHz		#VBW 1.1 MHz		pan 50 MHz weep 1 ms	CF Step 5.000000 MHz
Occupied Bandwid	<sup>th</sup> 6.333 MHz	Total Power	20.7 dBm		Auto Man Freg Offset
Transmit Freq Error	-10.356 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	36.45 MHz	x dB	-6.00 dB		
MSG			STATUS		

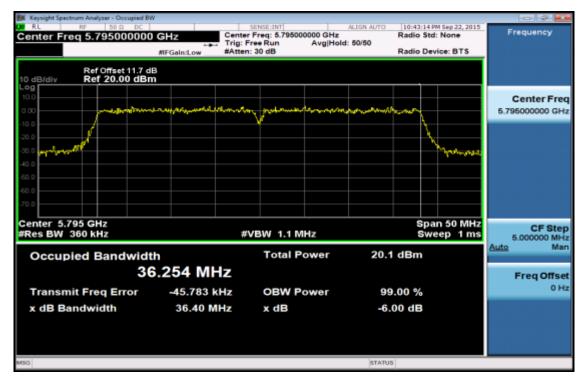
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# 802.11ac VHT40, 5725~5850 MHz (AUX 2) 6dB Band Width Test Data CH-Low (5755 MHz)



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



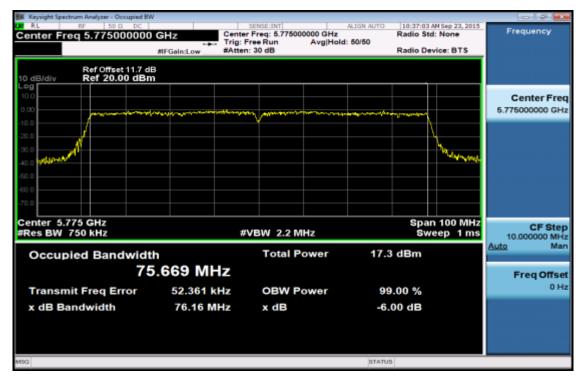
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# 802.11ac VHT80, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5775 MHz)



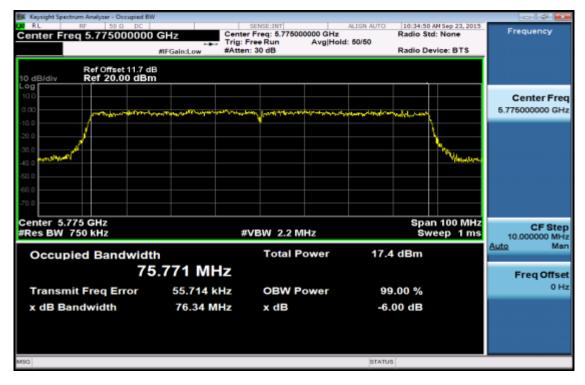
# 802.11ac VHT80, 5725~5850 MHz (Aux 1) 6dB Band Width Test Data CH-Low (5775 MHz)

Keysight Spectrum Analyzer - Occupied BW					
Center Freg 5.775000000	Center	Freq: 5.775000000 GHz	Radio S	td: None	Frequency
	IFGain:Low #Atten	ree Run Avg Holo : 30 dB		evice: BTS	
10 dB/div Ref 20.00 dBm					
100 0.00	استروب عن والبعان المحاد المحد المحاد والع	لا قد وارتقال المسالي الم	and the second second		Center Freq 5.775000000 GHz
-10.0					
-30.0 -40.0				a marine	
-50.0					
Center 5.775 GHz			Spa	an 100 MHz	CF Step
#Res BW 750 kHz	#\	/BW 2.2 MHz	Sv	veep 1 ms	10.000000 MHz
Occupied Bandwidth		Total Power	17.9 dBm		<u>Auto</u> Man
75.	772 MHz				Freq Offset
Transmit Freg Error	68.111 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	76.28 MHz	x dB	-6.00 dB		
MSG			STATUS		

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# 802.11ac VHT80, 5725~5850 MHz (Aux 2) 6dB Band Width Test Data CH-Low (5775 MHz)



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#### MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT 9.

#### 9.1 **Standard Applicable**

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

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

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

Effective Legacy Gain (dBi) = 5.72+3.01=8.73dBi for the U-NII-1.

Limit: 30dBm - (8.73 - 6dBi) = 27.27dBm

Effective Legacy Gain (dBi) = 5.75+3.01=8.76dBi for the U-NII-3 Band.

Limit: 30dBm - (8.76 - 6dBi) = 27.24dBm

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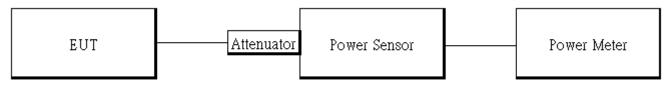
#### 9.2 Measurement Procedure

- 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	18.21	66.222	30	PASS
44	5220	18.15	65.313	30	PASS
48	5240	18.12	64.863	30	PASS
149	5745	15.38	34.514	30	PASS
157	5785	18.71	74.302	30	PASS
165	5825	18.66	73.451	30	PASS

#### 802.11n HT20 (MIMO)

	Frequency	AVERA	GE POWEF	R (dBm)	TOTAL	TOTAL	REQUIRED
СН	(MHz)	CHAIN 0	CHAIN 1	CHAIN 2	POWER	POWER	LIMIT
	(11112)				(dBm)	(mW)	(dBm)
36	5180	16.15	17.77	16.38	21.60	144.502	27.27
44	5220	16.33	17.69	16.46	21.64	145.961	27.27
48	5240	16.35	17.42	16.49	21.55	142.925	27.27
149	5745	13.07	13.34	12.38	17.72	59.152	27.24
157	5785	16.32	16.77	15.98	21.14	130.016	27.24
165	5825	16.41	16.86	15.91	21.18	131.275	27.24

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

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#### 802.11n HT40 (MIMO)

	Frequency	AVERAGE POWER (dBm)			TOTAL	TOTAL	REQUIRED
СН	Frequency (MHz)	CHAIN 0	CHAIN 1	CHAIN 2	POWER (dBm)	POWER (mW)	LIMIT (dBm)
38	5190	11.92	12.49	11.61	16.79	47.789	27.27
46	5230	12.06	12.24	11.76	16.80	47.816	27.27
151	5755	10.96	11.25	10.52	15.69	37.081	27.24
159	5795	14.29	14.72	13.87	19.08	80.880	27.24

802.11\_ac80 (MIMO)

	Frequency (MHz)	AVERAGE POWER (dBm)		TOTAL	TOTAL	REQUIRED	
СН		CHAIN 0	CHAIN 1	CHAIN 2	POWER (dBm)	POWER (mW)	LIMIT (dBm)
42	5210	12.16	12.65	11.84	17.00	50.127	27.27
155	5775	10.64	10.97	10.44	15.46	35.157	27.27

\* 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 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

Effective Legacy Gain (dBi) = 5.72+3.01=8.73dBi for the U-NII-1.

Limit: 30dBm - (8.73 - 6dBi) = 27.27dBm

Effective Legacy Gain (dBi) = 5.75+3.01=8.76dBi for the U-NII-3 Band.

Limit: 30dBm – (8.76 – 6dBi) = 27.24dBm

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#### **10.2 Measurement Procedure**

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

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

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

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

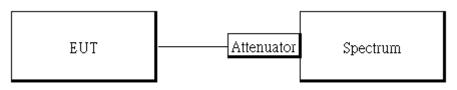
Set RBW=500 kHz, VBW $\ge$  3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

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

Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	KEYSIGHT	N9010A	MY5451056 8	04/14/2015	04/13/2016		
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015		
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015		
Attenuator	WOKEN	6SR1211	RF41	12/19/2014	12/18/2015		

#### 10.3 Measurement Equipment Used

#### 10.4 Test Set-up



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#### **10.5 Measurement Result**

#### 802.11a

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	8.140	17.00	-8.86
5220	8.760	17.00	-8.24
5240	7.560	17.00	-9.44
5745	5.870	30.00	-24.13
5785	9.350	30.00	-20.65
5825	9.560	30.00	-20.44

#### 802.11n HT20 (MIMO)

	quency MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5	5180	4.260	17.00	-12.74
5	5220	5.020	17.00	-11.98
5	5240	4.440	17.00	-12.56
5	5745	12.570	30.00	-17.43
5	5785	15.860	30.00	-14.14
5	5825	15.370	30.00	-14.63

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#### 802.11n HT40 (MIMO)

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5190	-3.310	11.00	-14.31
5230	-3.040	11.00	-14.04
5755	7.240	30.00	-22.76
5795	12.280	30.00	-17.72

#### 802.11 ac80 (MIMO)

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5210	-3.200	11.00	-14.20
5775	6.140	30.00	-23.86

Note: As cable loss+ Duty cycle factor that offsets on the Spectrum.

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



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



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



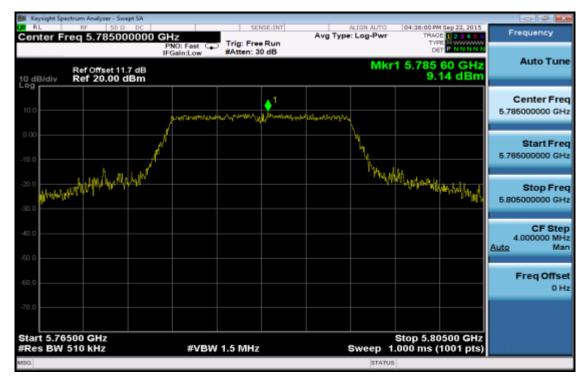
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## 802.11a 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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

iep 22, 2015 Frequency Avg Type: Log-Pwr 5.825000000 GHz Center Frea Trig: Free Run #Atten: 30 dB PNO: Fast 😱 IFGain:Low D Auto Tune Mkr1 5.825 84 GHz 9.35 dBm Ref Offset 11.7 dB Ref 20.00 dBm 10 dB/div Center Freq 1 5.825000000 GHz Start Freq 5.805000000 GH; www. added by loom uhuhun MVAVIA. Stop Freq 5.845000000 GHz CF Step 4.000000 M Man Auto Freq Offset 0 Hz Stop 5.84500 GHz Sweep 1.000 ms (1001 pts) Start 5.80500 GHz #Res BW 510 kHz #VBW 1.5 MHz

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

Keysight Spect	trum Analyzer - Swept SA								
Center Fre	eq 5.18000000	0 GHz PN0: Fast	Trig: Free			Log-Pwr	TRAC	E A WWWWW	Frequency
	Ref Offset 16.5 dB Ref 20.00 dBm	IFGain:Low	#Atten: 30	dB		Mkr	1 5.187 4.	00 GHz 05 dBm	Auto Tune
10.0					<b>↓</b> 1				Center Fre 5.180000000 GH
-10.0		/M <sup>err</sup> uning	Wegery, Allert	Y HANGLING	19 AND				<b>Start Fre</b> 5.155000000 GH
30.0	uppeligner and	protected				fuller for	with the first		Stop Fre 5.205000000 GF
40.0								TAILUPAGON	CF Ste 5.000000 MI <u>Auto</u> M
50.0									Freq Offs 01
70.0 Start 5.155	00 GHz						Stop 5.20	0500 GHz	
Res BW 1		#VBW	3.0 MHz			Sweep 1		1001 pts)	
93						STATUS	3		

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





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

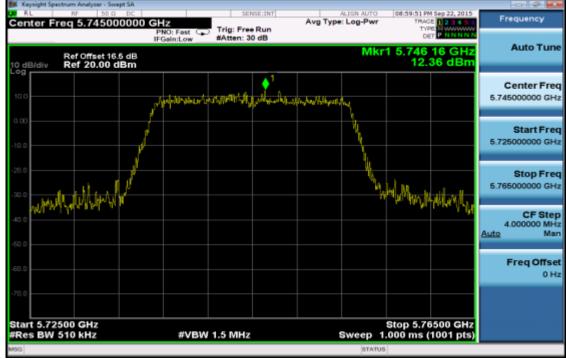


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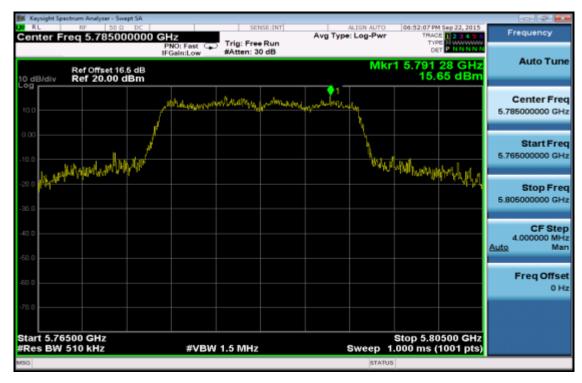
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# 802.11n HT20, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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

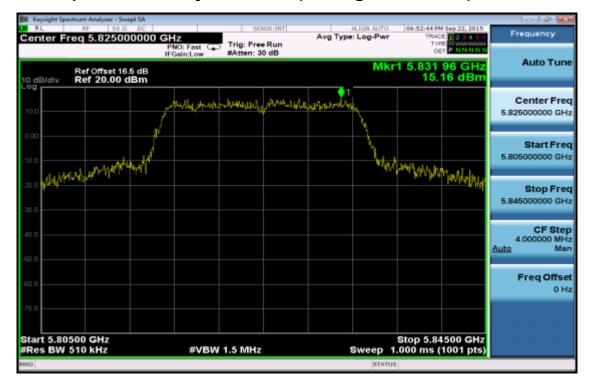


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# Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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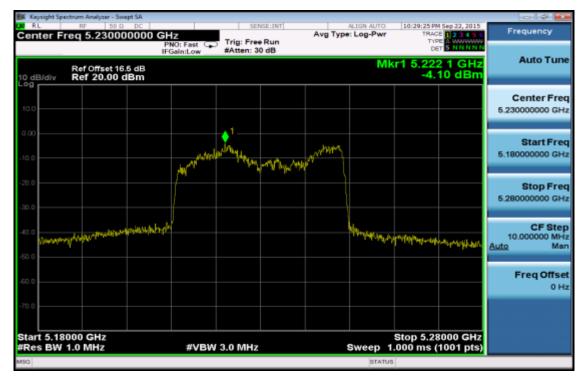
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# 802.11n HT40, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH Low 5190 MHz)

🗱 Keysight Spectrum Analyzer - Swept SA				- 3 🛋
Center Freq 5.190000000	GHz	Aug Type: Log-Pwr	10:23:47 PM Sep 22, 2015 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 16.5 dB	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Mk	r1 5.207 4 GHz -4.37 dBm	Auto Tune
10.0				Center Freq 5.190000000 GHz
-10.0	And the second s			Start Freq 5.140000000 GHz
-20.0				Stop Freq 5.240000000 GHz
-40.0 -60.0		hannahan	erniners-servicestilt	CF Step 10.000000 MHz Auto Man
-60.0				Freq Offset 0 Hz
Start 5.14000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 5.24000 GHz	
MBG	#VBW 5.0 MHz	Sweep 1.	000 ms (1001 pts)	

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

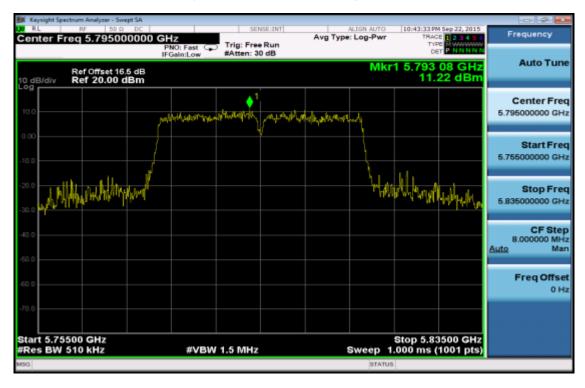




# 802.11n HT40, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5755 MHz)

Keysight Spectrum Analyzer - Swept SA				- 2 <b>-</b>
Center Freq 5.755000000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	10:38:03 PM Sep 22, 2015 TRACE 2 3 4 5 6	Frequency
PNO: Fast IFGain:Lov Ref Offset 16.5 dB		Mkr1	5.751 32 GHz	Auto Tune
10 dB/div Ref 20.00 dBm			6.18 dBm	
10.0				Center Freq 5.755000000 GHz
0.00	MHMM as about Board and	and a state of the		Start Freq
-10.0				5.715000000 GHz
-20.0				Stop Freq
-30.0		Valat	WHY AND WARNING	5.795000000 GHz
-40.0				CF Step 8.000000 MHz Auto Man
-50.0				
-60.0				Freq Offset 0 Hz
-70.0				
Start 5.71500 GHz #Res BW 510 kHz #V	/BW 1.5 MHz		top 5.79500 GHz 00 ms (1001 pts)	
MRG WY STORNZ #V	BW 1.5 MHZ	SWEEP	00 ms (100 l pts)	

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



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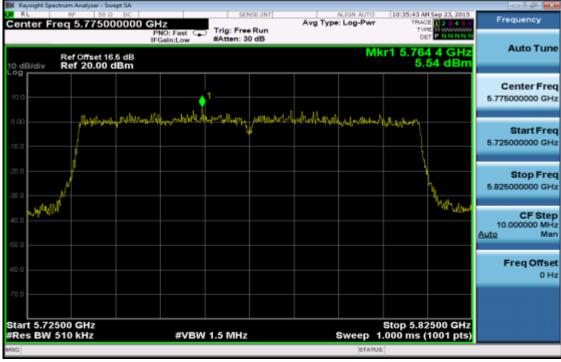
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# 802.11ac VHT80, 5150~5250 MHz Peak Power Spectral Density Data Plot (CH ,Mid 5210 MHz)



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





# 11. UNDESIRABLE RADIATED EMISSION MEASUREMENT1

### 11.1 Standard Applicable

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

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

APPLICABLE TO	LIMIT				
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRE	NGTH AT 3m			
v01	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:

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

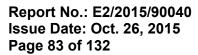
### Note:

1. The lower limit shall apply at the transition frequencies.

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

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## 11.2 Measurement Equipment Used

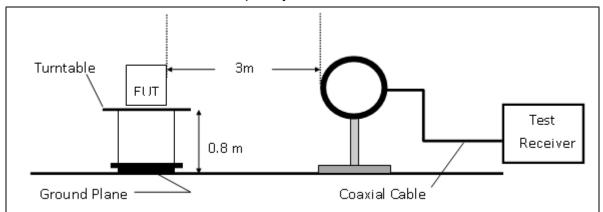
SGS 966 Chamber No.C									
Name of Equip-	e of Equip- Manufacturer Model Serial Number				Calibration				
ment				Date	Due				
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016				
Loop Antenna	ETS-Lindgren	6502	00143303	12/09/2014	12/08/2015				
Broadband Antenna	TESEQ	CBL 6112D	35240	12/05/2014	12/04/2015				
Horn Antenna	ETS-Lindgren	3117	00143272	12/08/2014	12/07/2015				
Horn Antenna	ETS-Lindgren	3160-09	00117911	11/13/2014	11/12/2015				
Horn Antenna	ETS-Lindgren	3160-10	00117783	11/13/2014	11/12/2015				
Pre Amplifier	EMC Instruments	EMC330	980096	12/19/2014	12/18/2015				
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/19/2014	12/18/2015				
Pre Amplifier	R&S	SCU-18	10204	12/19/2014	12/18/2015				
Pre Amplifier	R&S	SCU-26	100780	12/19/2014	12/18/2015				
Pre Amplifier	R&S	SCU-40	100356	12/19/2014	12/18/2015				
Pre Amplifier	EMC Instruments	EMC184045B	980135	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/19/2014	12/18/2015				
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/19/2014	12/18/2015				
Attenuator	WOKEN	218FS-10	RF27	12/19/2014	12/18/2015				
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016				
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016				
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2015	05/03/2016				
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.				
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.				
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.				
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.				

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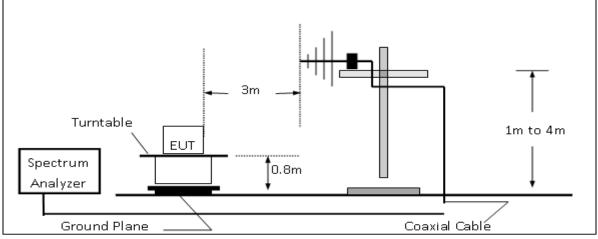
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### 11.3 Test SET-UP

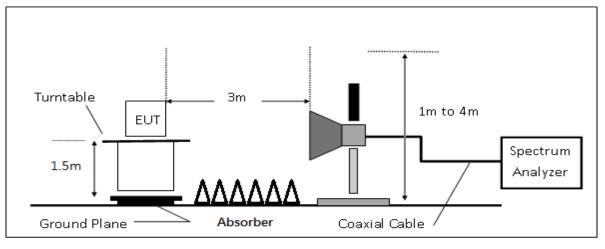
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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### 11.4 Measurement Procedure

- The EUT was placed on a turn table which is 0.8m above ground plane. 1.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequen-3. cy> 1GHz above ground plane.
- The turn table shall rotate 360 degrees to determine the position of maximum emission 4. level.
- 5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) 6. and Quasi-peak (QP) at frequency below 1 GHz.
- Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency 7. above 1 GHz.
- Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 8. 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:

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

### FS = RA + AF + CL - AG

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

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

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### Note :

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

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

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

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

#### 11.7 Measurement Result

Refer to attach tabular data sheets.

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875.84

S

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

Operation Fundamer Operation EUT Pol. :	ntal Frequen Band :		20 MHz Temp. / Humi. : CH MID Test Engineer :			2015/9/17 22.7deg_C Ashton Vertical	/57RH	
Freq.	Note	Detector	•	ectum	Factor	Actual	Limit	Margin
		Mode		ling Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV		lΒμV	dB	dBµV/m	dBµV/m	dB
65.89	S	QP		63.80	-28.09	35.71	40	-4.29
125.06	S	Peak		60.93	-21.38	39.55	43.5	-3.95
500.45	S	Peak	5	52.66	-14.29	38.37	46	-7.63
625.58	S	Peak	5	53.61	-12.06	41.55	46	-4.45
729.37	S	Peak	5	52.70	-10.66	42.04	46	-3.96
875.84	S	Peak	4	9.29	-8.49	40.80	46	-5.20
Operation	ntal Frequen Band :	equency : 5220 MHz Temp. / Humi. :				2015/9/17 22.7deg_C Ashton	/57RH	
EUT Pol. :		E1		Measuren	nent Anteni	na Pol. :	Horizontal	
Freq.	Note	Detector Mode	•	ectum ling Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	C	lΒμV	dB	dBµV/m	dBµV/m	dB
66.16	S	QP	6	63.10	-28.07	35.03	40	-4.97
125.06	S	Peak	5	56.32	-21.38	34.94	43.5	-8.56
247.28	S	Peak	4	9.97	-20.64	29.33	46	-16.67
375.32	S	Peak	4	8.61	-16.68	31.93	46	-14.07
625.58	S	Peak	4	7.10	-12.06	35.04	46	-10.96

Peak

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43.08

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-8.49

34.59

46

-11.41



### 802.11ac VHT80, 5150~5250 MHz

Fundamental Frequency: 5210 M		02.11ac80 210 MHz X CH LOW 1	Test En	ite : Humi. : gineer : ement Anter	nna Pol. :	2015/9/17 22.7deg_( Ashton Vertical		
Freq.	Note	Detect		ectum	Factor	Actual	Limit	Margin
		Mode		ling Level		FS	@3m	
MHz	F/H/E/S	PK/QP/	/AV c	dΒμV	dB	dBµV/m	dBµV/m	dB
65.89	S	QP	e	6.10	-28.09	38.01	40	-1.99
125.06	S	Peak	к (	60.99	-21.38	39.61	43.5	-3.89
500.45	S	Peak	K t	52.68	-14.29	38.40	46	-7.60
625.58	S	Peak	c t	53.11	-12.06	41.05	46	-4.95
738.10	S	Peak	κ 4	47.99	-10.30	37.69	46	-8.31
875.84	S	Peak	ζ 4	48.69	-8.49	40.20	46	-5.80
Operation Mode : 802		802.11ac80 Tes		Test Date :		2015/9/17		
Fundamental Frequency: 521		210 MHz	Temp. /	Temp. / Humi. :		22.7deg_0	C/57RH	
Operation E	Band:	Т	X CH LOW	Test Engineer :			Ashton	
EUT Pol. :		E	1	Measur	ement Anter	nna Pol. :	Horizonta	

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
65.89	S	QP	63.12	-28.09	35.03	40	-4.97
137.67	S	Peak	57.21	-21.58	35.63	43.5	-7.87
243.40	S	Peak	50.64	-20.91	29.73	46	-16.27
625.58	S	Peak	47.23	-12.06	35.17	46	-10.83
729.37	S	Peak	49.72	-10.66	39.06	46	-6.94
875.84	S	Peak	43.26	-8.49	34.77	46	-11.23

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46

46

-4.65

-5.80

### 802.11a, 5725~5850 MHz

625.58

875.84

S

S

Peak

Peak

Operation Fundamer Operation EUT Pol. :	ntal Frequen Band :	•	-	Test Date Temp. / H Test Engi Measuren	lumi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Vertical	//57RH
Freq.	Note	Detector Mode		ectum ing Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		Βµ̈́V	dB	dBµV/m	dBµV/m	dB
65.89	S	QP	6	3.82	-28.09	35.73	40	-4.27
125.06	S	Peak	6	0.96	-21.38	39.58	43.5	-3.92
500.45	S	Peak	5	2.78	-14.29	38.49	46	-7.51

Operation Mode :	802.11a	Test Date :	2015/9/17
Fundamental Frequency:	5785 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	TX CH MID	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal

53.41

48.69

-12.06

-8.49

41.35

40.20

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
66.14	S	QP	63.21	-28.08	35.13	40	-4.87
139.61	S	Peak	56.31	-21.63	34.68	43.5	-8.82
375.32	S	Peak	48.31	-16.68	31.63	46	-14.37
500.45	S	Peak	46.33	-14.29	32.04	46	-13.96
625.58	S	Peak	47.41	-12.06	35.36	46	-10.64
875.84	S	Peak	42.53	-8.49	34.04	46	-11.96

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### 802.11ac VHT80, 5725~5850 MHz

Operation Mode :802.11Fundamental Frequency :5775 MOperation Band :TX CHEUT Pol. :E1		/Hz Temp. / H LOW Test Engi		Humi. :	nna Pol. :	2015/9/17 22.7deg_C/57RH Ashton Vertical		
Freq.	Note	Detector Mode	•	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dE	ΒµV	dB	dBµV/m	dBµV/m	dB
33.88	S	Peak	50	0.03	-15.22	34.81	40	-5.19
65.89	S	QP	66.33		-28.09	38.24	40	-1.76
125.06	S	Peak	61.22		-21.38	39.84	43.5	-3.66
500.45	S	Peak	52.50		-14.29	38.21	46	-7.79
625.58	S	Peak	53.41		-12.06	41.35	46	-4.65
875.84	S	Peak	48	3.90	-8.49	40.42	46	-5.58
Freq.	Note	Detector Mode	-	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dE	ΒµV	dB	dBµV/m	dBµV/m	dB
65.89	S	QP	63	3.23	-28.09	35.14	40	-4.86
139.61	S	Peak	56	6.54	-21.63	34.91	43.5	-8.59
375.32	S	Peak	48	3.06	-16.68	31.38	46	-14.62
500.45	S	Peak	46	6.26	-14.29	31.97	46	-14.03
625.58	S	Peak	46	6.80	-12.06	34.74	46	-11.26
875.84	S	Peak	42	2.32	-8.49	33.84	46	-12.16

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### Above 1GHz Worst-Case Data: 802.11a, 5150~5250 MHz

Operation Mode :	802.11a	Test Date:	2015/9/17
Fundamental Frequency :	5180 MHz	Temp. / Humi.:	22.7deg_C/57RH
Operation Band :	TX CH LOW	Test Engineer:	Ashton
EUT Pol. :	E1	Measurement Antenna Pol.:	Vertical

Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10360.00	Н	Peak	32.90	18.94	51.84	68.3	-16.46
15540.00	Н	Peak	33.42	25.80	59.21	74	-14.79
15540.00	Н	Average	21.72	25.80	47.52	54	-6.48

Operation Mode :	802.11a	Test Date :	2015/9/17
Fundamental Frequency:	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	TX CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10360.00	Н	Peak	35.30	18.94	54.24	68.3	-14.06
15540.00	Н	Peak	34.74	25.80	60.54	74	-13.46
15540.00	Н	Average	21.74	25.80	47.54	54	-6.46



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Operation Mode: Fundamental Frequency: Operation Band:		y: 5220 M	802.11a 5220 MHz TX CH MID		Test Date : Temp. / Humi. : Test Engineer :			2015/9/17 22.7deg_C/57RH Ashton	
EUT Pol. :		E1	5		Vertical				
Freq.	Note	Detector	S	pectum	Factor	Actual	Limit	Margin	
		Mode	Rea	iding Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV		dBµV	dB	dBµV/m	dBµV/m	dB	
10440.00	Н	Peak		34.18	19.03	53.21	68.3	-15.09	
10440.00	Н	Average		21.46	19.03	40.49	68.3	-27.81	

Operation Mode :	802.11a	Test Date :	2015/9/17
Fundamental Frequency:	5220 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	TX CH MID	Test Engineer :	Ashton
EUT Pol.:	E1	Measurement Antenna Pol. :	Horizontal

Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10440.00	Н	Peak	34.66	19.03	53.69	68.3	-14.61
15660.00	Н	Peak	34.69	26.06	60.75	74	-13.25
15660.00	Н	Average	21.67	26.06	47.73	54	-6.27



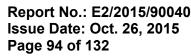
### FCC ID: RK9-CBV3843Z4S

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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11a 5240 MHz TX CH HIGH E1		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq.	Note	Detector Mode	Read	ectum ling Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		lΒμV	dB	dBµV/m	dBµV/m	dB
10480.00	Н	Peak	3	33.55	19.13	52.67	68.3	-15.63
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11a 5240 MH TX CH H E1		Test Date Temp. / H Test Engi Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq.	Note	Detector Mode		ectum ling Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		lΒµV	dB	dBµV/m	dBµV/m	dB
10480.00	Н	Peak	3	34.28	19.13	53.41	68.3	-14.89
15720.00	Н	Peak	3	33.44	26.13	59.57	74	-14.43
15720.00	Н	Average	2	21.25	26.13	47.38	54	-6.62

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### Band edge falling to restricted band

Operation Mode:	802.11a	Test Date :	2015/9/17
Fundamental Frequency:	5180 MHz	Temp. / Humi. :	22.7deg C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5146.72	S	Peak	53.30	11.16	64.46	74	-9.54
5146.72	S	Average	34.36	11.16	45.52	54	-8.48
5150.00	E	Peak	50.20	11.14	61.34	74	-12.66
5150.00	Е	Average	35.75	11.14	46.89	54	-7.11

Operation Mode :	802.11a	Test Date :	2015/9/17
Fundamental Frequency:	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol.:	Horizontal

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5146.72	S	Peak	61.83	11.16	72.99	74	-1.01
5146.72	S	Average	32.29	11.16	43.45	54	-10.55
5150.00	E	Peak	58.17	11.14	69.31	74	-4.69
5150.00	E	Average	41.29	11.14	52.43	54	-1.57



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Operation Mode :	802.11a	Test Date :			2015/9/17	
Fundamental Frequency :	5240 MHz	Temp. / Humi. :			22.7deg_C/57RH	
Operation Band :	BE CH HIGH	Test Engineer :			Ashton	
EUT Pol. :	E1	Measurement Antenna Pol. :			Vertical	
Mode Readi MHz F/H/E/S PK/QP/AV d 5350.00 E Peak 4		ectum ing Level IBμV I4.35 32.29	Factor dB 11.30 11.30	Actual FS dBµV/m 55.65 43.59	Limit @3m dBµV/m 74 54	Margin dB -18.35 -10.41
Operation Mode :	802.11a	Test Date :			2015/9/17	
Fundamental Frequency :	5240 MHz	Temp. / Humi. :			22.7deg_C/57RH	
Operation Band :	BE CH HIGH	Test Engineer :			Ashton	
EUT Pol. :	E1	Measurement Antenna Pol. :			Horizontal	

Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	E	Peak	44.88	11.30	56.18	74	-17.82
5350.00	E	Average	34.15	11.30	45.45	54	-8.55
5353.35	S	Peak	47.81	11.32	59.13	74	-14.87
5353.35	S	Average	34.86	11.32	46.18	54	-7.82

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#### 802.11n\_20M, 5150~5250 MHz

Operation Mo Fundamental Operation Ba EUT Pol. :	Frequency:	802.11n2 5180 MH TX CH L0 E1	z Temp. / H OW Test Engi	Test Date: Temp. / Humi.: Test Engineer: Measurement Antenna Pol.:			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 10360.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Spectum Reading Level dBµV 34.74	Factor dB 18.94	Actual FS dBµV/m 53.68	Limit @3m dBµV/m 68.3	Margin dB -14.62	
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n2 5180 MH TX CH Lu E1	z Temp. / H OW Test Engi	Test Date: Temp. / Humi.: Test Engineer: Measurement Antenna		2015/9/17 22.7deg_C/57RH Ashton Horizontal		
Freq. MHz 10360.00 15540.00 15540.00	Note F/H/E/S H H H	Detector Mode PK/QP/AV Peak Peak Average	Spectum Reading Level dBµV 32.90 33.49 21.26	Factor dB 18.94 25.80 25.80	Actual FS dBµV/m 51.84 59.29 47.06	Limit @3m dBµV/m 68.3 74 54	Margin dB -16.46 -14.71 -6.94	



15660.00

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Average

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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n2 : 5220 MH TX CH M E1	z Temp. / Hu IID Test Engin	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7 deg_C/57 RH Ashton Vertical	
Freq. MHz 10440.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Spectum Reading Level dBµV 32.33	Factor dB 19.03	Actual FS dBµV/m 51.35	Limit @3m dBµV/m 68.3	Margin dB -16.95	
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n2 : 5220 MH TX CH M E1	z Temp. / Hu IID Test Engin	ımi. :		2015/9/17 22.7 deg_C/57 Ashton Horizontal	7RH	
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	•	dB	
10440.00	Н	Peak	32.97	19.03	52.00	68.3	-16.30	
15660.00	Н	Peak	33.16	26.06	59.22	74	-14.78	

21.80

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26.06

47.86

54

-6.14



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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n20 5240 MHz TX CH HIGH E1		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 10480.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Mode Read (/QP/AV c		Factor dB 19.13	Actual FS dBµV/m 51.47	Limit @3m dBµV/m 68.3	Margin dB -16.83
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n2 5240 MH TX CH H E1	łz	Test Date Temp. / H Test Engin Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq. MHz 10480.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Read	oectum ding Level dBµV 32.45	Factor dB 19.13	Actual FS dBµV/m 51.58	Limit @3m dBµV/m 68.3	Margin dB -16.72



### Band edge falling to restricted band

Operation Mode:	802.11n20	Test Date :	2015/9/17
Fundamental Frequency:	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	BE CH LOW	Test Engineer :	Ashton
EUT Pol.:	E1	Measurement Antenna Pol. :	Vertical

Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5149.60	S	Peak	61.67	11.14	72.82	74	-1.18
5149.60	S	Average	41.82	11.14	52.96	54	-1.04
5150.00	E	Peak	60.46	11.14	71.60	74	-2.40
5150.00	E	Average	41.81	11.14	52.95	54	-1.05

Operation Mode :	802.11n20	Test Date :	2015/9/17
Fundamental Frequency:	5180 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5149.12	S	Peak	61.54	11.15	72.69	74	-1.31
5149.12	S	Average	40.11	11.15	51.26	54	-2.74
5150.00	E	Peak	60.90	11.14	72.04	74	-1.96
5150.00	Е	Average	40.54	11.14	51.68	54	-2.32



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Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11n : 5240 Mł BE CH ł E1	Hz Te HIGH Te	st Date : mp. / Humi. : st Engineer : asurement Ante	2015/9/17 22.7deg_C/57RH Ashton Vertical		
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Spectu Reading L dBµV 45.81 32.91	e vel dB 11.30	Actual FS dBµV/m 57.11 44.21	Limit @3m dBµV/m 74 54	Margin dB -16.89 <i>-</i> 9.79
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		5240 MHz BE CH HIGH		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :		2015/9/17 22.7deg_C/57RH Ashton Horizontal	
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Spectu Reading L dBµ∨ 46.78 33.93	e vel dB 11.30	Actual FS dBμV/m 58.08 45.23	Limit @3m dBµV/m 74 54	Margin dB -15.92 -8.77



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#### 802.11n\_40M, 5150~5250 MHz

Fundamental	Decration Mode :802.11n40Test Date :ndamental Frequency :5190 MHzTemp. / HumDecration Band :TX CH LOWTest EngineJT Pol. :E1Measurement		umi. : neer :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Vertical	/57RH		
Freq. MHz 10360.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Read c	ectum ling Level IBµV 31.01	Factor dB 18.94	Actual FS dBµV/m 49.95	Limit @3m dBµV/m 68.3	Margin dB -18.36
Operation Mode :802.11n40Fundamental Frequency :5190 MHzOperation Band :TX CH LOWEUT Pol. :E1		Test Date Temp. / H Test Engir Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Horizontal	/57RH		
Freq. MHz 10360.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Read c	ectum ling Level IBμV 31.96	Factor dB 18.94	Actual FS dBµV/m 50.90	Limit @3m dBµV/m 68.3	Margin dB -17.40



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Fundamenta	Fundamental Frequency : 5230 MHz Temp. / Operation Band : TX CH HIGH Test Eng		Test Date Temp. / H Test Engi Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Vertical	/57RH	
Freq. MHz 10460.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Read d	ectum ing Level IBµV i4.42	Factor dB 19.11	Actual FS dBµV/m 53.54	Limit @3m dBµV/m 68.3	Margin dB -14.76
Operation Mode :802.11n40Fundamental Frequency :5230 MHzOperation Band :TX CH HIGHEUT Pol. :E1		łz	Test Date Temp. / H Test Engin Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH	
Freq. MHz 10460.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Read d	ectum ing Level IBµV 57.82	Factor dB 19.11	Actual FS dBµV/m 56.93	Limit @3m dBµV/m 68.3	Margin dB -11.37



### Band edge falling to restricted band

Operation Mode:	802.11n40	Test Date :	2015/9/17
Fundamental Frequency:	5190 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5143.60	S	Peak	60.88	11.17	72.05	74	-1.95
5143.60	S	Average	36.40	11.17	47.57	54	-6.43
5150.00	E	Average	37.97	11.14	49.11	54	-4.89
5150.00	Е	Peak	57.91	11.14	69.05	74	-4.95

Operation Mode :	802.11n40	Test Date :	2015/9/17
Fundamental Frequency:	5190 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol.:	E1	Measurement Antenna Pol.:	Horizontal

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5149.48	S	Peak	55.74	11.14	66.88	74	-7.12
5149.48	S	Average	37.04	11.14	48.18	54	-5.82
5150.00	E	Peak	54.48	11.14	65.62	74	-8.38
5150.00	E	Average	37.17	11.14	48.31	54	-5.69

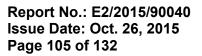
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Operation Mode :802.11n40Fundamental Frequency :5230 MHzOperation Band :BE CH HIGHEUT Pol. :E1		Test Date Temp. / H Test Eng Measurer	lumi. :	ina Pol. :	2015/9/17 22.7deg_0 Ashton Vertical	2.7deg_C/57RH shton		
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Readir dE 43	ectum ng Level 3µV 3.16 2.55	Factor dB 11.30 11.30	Actual FS dBµV/m 54.46 43.85	Limit @3m dBµV/m 74 54	Margin dB -19.54 -10.15
Operation Mode :802.11n40Fundamental Frequency :5230 MHzOperation Band :BE CH HIGHEUT Pol. :E1		Ηz	Test Date Temp. / H Test Eng Measurer	lumi. :	ına Pol. :	2015/9/17 22.7deg_0 Ashton Horizontal	C/57RH	
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Readir dE 43	ectum ng Level 3μV 3.34 2.75	Factor dB 11.30 11.30	Actual FS dBμV/m 54.64 44.05	Limit @3m dBµV/m 74 54	Margin dB -19.36 -9.95





### 802.11ac VHT80, 5150~5250 MHz

Operation Mode :802.11ac80Fundamental Frequency :5210 MHzOperation Band :TX CH LOWEUT Pol. :E1		Hz Temp. / H LOW Test Engi	umi. :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Vertical	/57RH	
Freq. MHz 10420.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Spectum Reading Level dBµV 32.97	Factor dB 18.96	Actual FS dBµV/m 51.93	Limit @3m dBµV/m 68.3	Margin dB -16.37
Operation Mode :802.11ac80Fundamental Frequency :5210 MHzOperation Band :TX CH LOWEUT Pol. :E1			Hz Temp. / H LOW Test Engi	umi. :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Horizontal	/57RH
Freq. MHz 10420.00	Note F/H/E/S H	Detector Mode PK/QP/AV Peak	Spectum Reading Level dBµV 36.97	Factor dB 18.96	ActuaI FS dBµV/m 55.93	Limit @3m dBµV/m 68.3	Margin dB -12.37



### Band edge falling to restricted band

Operation Mode:	802.11ac80	Test Date :	2015/9/17
Fundamental Frequency:	5210 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5134.10	S	Peak	61.10	11.22	72.32	74	-1.68
5134.10	S	Average	39.34	11.22	50.56	54	-3.44
5150.00	E	Peak	58.91	11.14	70.06	74	-3.94
5150.00	Е	Average	40.03	11.14	51.17	54	-2.83

Operation Mode :	802.11ac80	Test Date :	2015/9/17
Fundamental Frequency:	5210 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH LOW	Test Engineer :	Ashton
EUT Pol.:	E1	Measurement Antenna Pol.:	Horizontal

Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5149.80	S	Peak	59.57	11.14	70.71	74	-3.29
5149.80	S	Average	39.53	11.14	50.67	54	-3.33
5150.00	E	Peak	55.13	11.14	66.27	74	-7.73
5150.00	Е	Average	39.54	11.14	50.68	54	-3.32



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Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11ac80 : 5210 MHz BE CH HIGH E1		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Readi di 43	ectum ng Level ΒμV 3.63 3.10	Factor dB 11.30 11.30	Actual FS dBµV/m 54.93 44.40	Limit @3m dBµV/m 74 54	Margin dB -19.07 -9.60
Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	5210 MHz Temp BE CH HIGH Test E		Test Date Temp. / H Test Eng Measurer	lumi. :	ina Pol. :	2015/9/17 22.7deg_C/57RH Ashton Horizontal	
Freq. MHz 5350.00 5350.00	Note F/H/E/S E E	Detector Mode PK/QP/AV Peak Average	Readi di 4	ectum ng Level ΒμV 4.52 3.25	Factor dB 11.30 11.30	Actual FS dBµV/m 55.82 44.55	Limit @3m dBµV/m 74 54	Margin dB -18.18 -9.45

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### 802.11a, 5725~5850 MHz

Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11a 5745 MHz TX CH LOW E1		Test Date: Temp. / Humi.: Test Engineer: Measurement Antenna Pol.:			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 11490.00 11490.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectum Reading Level dBµV 35.17 22.24		Factor dB 21.08 21.08	Actual FS dBµV/m 56.26 43.32	Limit @3m dBµV/m 74 54	Margin dB -17.74 -10.68
Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		5745 MHz TX CH LOW		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Horizontal	
Freq. MHz 11490.00 11490.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Read c	ectum ing Level IBμV 66.78 22.61	Factor dB 21.08 21.08	Actual FS dBµV/m 57.86 43.69	Limit @3m dBµV/m 74 54	Margin dB -16.14 -10.31



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Operation Mode : Fundamental Fre Operation Band :	quency : 5785 M	VHz Temp. / Hu	ımi. :		2015/9/17 22.7deg_C/57RH Ashton	
EUT Pol. :	E1	Measurem	ent Antenna	a Pol. :	Vertical	
Freq. No	ote Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz F/H	/E/S PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11570.00 H	H Peak	36.25	21.14	57.39	74	-16.61
11570.00 H	H Average	21.92	21.14	43.06	54	-10.94
Operation Mode : Fundamental Fre Operation Band : EUT Pol. :	quency : 5785 M	MHz Temp. / Hu HMID Test Engir	ımi. :	a Pol. :	2015/9/17 22.7deg_C/ Ashton Horizontal	57RH
Freq. No	ote Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz F/H	/E/S PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11570.00 H	H Peak	37.80	21.14	58.94	74	-15.06
11570.00 H						



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Operation Mode :802.11aFundamental Frequency :5825 MHzOperation Band :TX CH HIGHEUT Pol. :E1			IIGH Test E	Date : . / Humi. : Engineer : urement Anten	2015/9/17 22.7deg_C/57RH Ashton Vertical		
Freq. MHz 11650.00 11650.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectum Reading Lev dBµV 36.92 22.37	Factor vel 21.27 21.27	Actual FS dBµV/m 58.19 43.64	Limit @3m dBµV/m 74 54	Margin dB -15.81 -10.36
Fundamenta	Operation Mode :802.11aFundamental Frequency :5825 MHzOperation Band :TX CH HIGHEUT Pol. :E1		IIGH Test E	Date : . / Humi. : Engineer : urement Anten	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq. MHz 11650.00 11650.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectum Reading Lev dBµV 38.31 23.47	Factor vel 21.27 21.27	Actual FS dBµV/m 59.58 44.74	Limit @3m dBµV/m 74 54	Margin dB -14.42 -9.26



### Band edge falling to restricted band

Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	Frequency : 5745 MHz			Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :		
Freq.	Note	Detector	Spectu			Limit	Margin
		Mode	Reading I		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµ∖		•	dBµV/m	dB
5724.80	S	Peak	60.97	' 12.2	7 73.25	78.2	-4.95
5725.00	E	Peak	56.50	12.2	7 68.77	78.2	-9.43
Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11a : 5745 MH BE CH L E1	lz Te .OW Te	st Date : mp. / Humi. : st Engineer : easurement A	ntenna Pol. :	2015/9/17 22.7deg_ Ashton Horizonta	C/57RH
Freq.	Note	Detector Mode	Spectu Reading I		or Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµ∖		_	dBµV/m	dB
5725.00	E	Peak	64.73		•	78.2	-1.20
5725.00	L	FCan	04.70	12.2	<i>i i</i> .00	10.2	-1.20

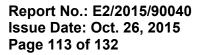
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Fundamenta	ration Mode : 802.11a damental Frequency : 5825 MHz ration Band : BE CH HIGH Pol. : E1			Test Date Temp. / H Test Eng Measurer	łumi. :	ina Pol. :	2015/9/17 22.7deg_0 Ashton Vertical	C/57RH
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Readir	ectum ng Le vel 3µV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Marg in dB
5850.00	E	Peak		5.14	12.61	67.75	78.2	-10.45
Fundamenta	Operation Mode : 802.11a undamental Frequency : 5825 MHz Operation Band : BE CH HIGH CUT Pol. : E1		Ηz	Test Date Temp. / H Test Eng Measurer	lumi. :	ına Pol. :	2015/9/17 22.7deg_0 Ashton Horizontal	C/57RH
Freq.	Note	Detector	•	ctum	Factor	Actual FS	Limit	Margin
MHz 5850.00	F/H/E/S E	Mode PK/QP/AV Peak	dE	ng Level 3µV 3.16	dB 12.61	ΗS dBμV/m 75.77	@3m dBµV/m 78.2	dB -2.43



# 802.11n 20M, 5725~5850 MHz

Operation Mo Fundamenta Operation Ba EUT Pol. :	Frequency :	802.11n2 5745 MH TX CH L E1	lz	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 11490.00 11490.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Readi d 3	ectum ing Level BµV 3.04 2.10	Factor dB 21.08 21.08	Actual FS dBµV/m 54.12 43.18	Limit @3m dBµV/m 74 54	Margin dB -19.88 -10.82
Operation Mo Fundamenta Operation Ba EUT Pol. :	Frequency:	802.11n2 5745 MH TX CH L E1	lz	Test Date Temp. / H Test Engii Measuren	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq.	Note	Detector Mode	•	ectum ing Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		BµV	dB	dBµV/m	dBµV/m	dB
11490.00	Н	Peak		5.83	21.08	56.92	74	-17.08
11490.00	Н	Average	2	2.50	21.08	43.58	54	-10.42



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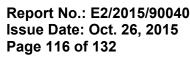
Operation Mo Fundamenta Operation Ba EUT Pol. :	tal Frequency : 5785 MHz			Date : b. / Humi. : Engineer : surement Ante	2015/9/17 22.7 deg_C/57 RH Ashton Vertical		
Freq. MHz 11570.00 11570.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectu Reading dBµ\ 34.7 22.2	Level / dB 1 21.1	FS dBµV/n 4 55.84	@3m n dBµV/m 74	Margin dB -18.16 -10.65
Operation Mo Fundamenta Operation Ba EUT Pol. :	Frequency:	802.11n20 5785 MHz TX CH MI E1	: Temp D Test	Date : b. / Humi. : Engineer : surement Ante	nna Pol. :	2015/9/17 22.7 deg_C/5 Ashton Horizontal	7RH
Freq. MHz 11570.00 11570.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectu Reading dBµ\ 36.6 22.7	Level / dB 6 21.1	FS dBµV/n 4 57.80	@3m n dBµV/m	Margin dB -16.20 -10.13



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Fundamental	Operation Mode :802.11n20Fundamental Frequency :5825 MHzOperation Band :TX CH HIGHEUT Pol. :E1			Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq. MHz 11650.00 11650.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Readi d I 36	ectum ng Level ΒμV δ.25 2.21	Factor dB 21.27 21.27	Actual FS dBµV/m 57.53 43.48	Limit @3m dBµV/m 74 54	Margin dB -16.47 -10.52
Fundamental	peration Mode : 802.11n20 undamental Frequency : 5825 MHz peration Band : TX CH HIGH UT Pol. : E1		lz IIGH	Test Date Temp. / H Test Engi Measuren	umi. :	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq. MHz 11650.00 11650.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Readi d I 36	ectum ng Level 3μV 3.51 2.67	Factor dB 21.27 21.27	Actual FS dBµV/m 57.78 43.94	Limit @3m dBµV/m 74 54	Margin dB -16.22 -10.06

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#### Band edge falling to restricted band

Operation M Fundamenta Operation B EUT Pol. :	al Frequency	802.11r y : 5745 M BE CH E1	Hz Temp. / LOW Test Eng	Humi. :	2015/9/17 22.7deg_C/57RH Ashton Vertical		
Freq. MHz 5658.10	Note F/H/E/S S	Detector Mode PK/QP/AV Peak	Spectum Reading Level dBµV 52.17	Factor dB 12.13	Actual FS dBµV/m 64.30	Limit @3m dBµV/m 68.3	Margin dB -4.00
5725.00	E	Peak	64.70	12.13	76.97	78.2	-1.23
Operation Mode :802.11nFun damental Frequency :5745 MHOperation Band :BE CH LEUT Pol. :E1		Hz Temp. / Humi. : OW Test Engineer :		umi.:			
Fundamenta Operation B	al Frequency	y : 5745 M BE CH	Hz Temp. / LOW Test Eng	Humi. : gineer :	enna Pol. :	2015/9/17 22.7deg_ Ashton Horizonta	C/57RH
Fundamenta Operation B	al Frequency	y : 5745 M BE CH	Hz Temp. / LOW Test Eng Measure Spectum	Humi. : gineer :	enna Pol. : Actual FS	22.7deg_ Ashton Horizonta Limit	C/57RH
Fundamenta Operation B EUT Pol. :	al Frequency Band :	y : 5745 M BE CH E1 Detector	Hz Temp. / LOW Test Eng Measure Spectum Reading Level	Humi. : gineer : ement Ante	Actual FS	22.7deg_ Ashton Horizonta Limit @3m	C/57RH
Fundamenta Operation B EUT Pol. : Freq.	al Frequency Band : Note	y : 5745 M BE CH E1 Detector Mode	Hz Temp. / LOW Test Eng Measure Spectum	Humi. : gineer : ement Ante Factor	Actual	22.7deg_ Ashton Horizonta Limit	C/57RH Il Margin
Fun damenta Operation B EUT Pol. : Freq. MHz	al Frequency Band : Note F/H/E/S S	y : 5745 M BE CH E1 Detector Mode PK/QP/AV	Hz Temp. / LOW Test Eng Measure Spectum Reading Level dBµV	Humi. : gineer : ement Ante Factor dB	Actual FS dBµV/m	22.7deg_ Ashton Horizonta Limit @3m dBµV/m	C/57RH Il Margin dB
Fun damenta Operation B EUT Pol. : Freq. MHz 5663.20	al Frequency Band : Note F/H/E/S	y : 5745 M BE CH E1 Detector Mode PK/QP/AV Peak	Hz Temp. / LOW Test Eng Measure Spectum Reading Level dBµV 51.88	Humi. : gineer : ement Ante Factor dB 12.16	Actual FS dBµV/m 64.04	22.7deg_ Ashton Horizonta Limit @3m dBµV/m 68.3	C/57RH Il Margin dB -4.26



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Operation Mode :802.11n20Fundamental Frequency :5825 MHzOperation Band :BE CH HIGHEUT Pol. :E1			Test Dat Temp. / Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_0 Ashton Vertical		
Freq.	Note	Detector Mode	•	ctum Ig Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dE	βμV	dB	dBµV/m	dBµV/m	dB
5850.00	Е	Peak	63	.99	12.61	76.60	78.2	-1.60
5898.20	S	Peak	53	.78	12.91	66.68	68.3	-1.62
Fundamenta	Operation Mode : 802.11n20 Fundamental Frequency : 5825 MHz Operation Band : BE CH HIGH EUT Pol. : E1		Hz	Test Dat Temp. / Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_0 Ashton Horizonta	C/57RH
Freq.	Note	Detector Mode	•	ctum Ig Le vel	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		βμV	dB	dBµV/m	dBµV/m	dB
5850.00	E	Peak		.83	12.61	74.45	78.2	-3.75
5903.10	S	Peak		.52	12.95	66.47	68.3	-1.83
	-							



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#### 802.11n\_40M, 5725~5850 MHz

Operation Mo Fundamental Operation Ba EUT Pol. :	Frequency:	802.11n4 5755 MH TX CH L0 E1	z	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq.	Note	Detector Mode	Readi	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		BμV	dB	dBµV/m	dBµV/m	dB
11510.00	Н	Peak	-	2.47	21.17	53.64	74	-20.36
11510.00	Н	Average	2	2.19	21.17	43.36	54	-10.64
Operation Mo	de :	802.11n4	0	Test Date	:		2015/9/17	
Fundamental				Temp. / H	umi. :		22.7deg_C	/57RH
Operation Ba		TX CH L	OW	Test Engi			Ashton	
EUT Pol. :		E1		-	nent Antenr	na Pol. :	Horizontal	
Freq.	Note	Detector Mode	-	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	d	ΒµV	dB	dBµV/m	dBµV/m	dB
11510.00	Н	Peak	3	3.87	21.17	55.04	74	-18.96
11510.00	Н	Average	2	1.83	21.17	43.00	54	-11.00



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Operation Mode :802.11n40Fundamental Frequency :5795 MHzOperation Band :TX CH HIGHEUT Pol. :E1			Iz Temp. IIGH Test Ei	ate : / Humi. : ngineer : rement Anteni	na Pol. :	2015/9/17 22.7deg_C Ashton Vertical	/57RH
Freq. MHz 11590.00 11590.00	Note F/H/E/S H H	Detector Mode PK/QP/AV Peak Average	Spectum Reading Leve dBµV 32.38 22.16	Factor dB 21.28 21.28	Actual FS dBµV/m 53.66 43.44	Limit @3m dBµV/m 74 54	Margin dB -20.34 -10.56
Fundamenta	Operation Mode :802.11n40Fundamental Frequency :5795 MHzOperation Band :TX CH HIGHEUT Pol. :E1		lz Temp. IIGH Test Ei	ate : / Humi. : ngineer : rement Anteni	na Pol. :	2015/9/17 22.7deg_C Ashton Horizontal	/57RH
Freq.	Note	Detector Mode	Spectum Reading Leve	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	d BµV	dB	dBµV/m	dBµV/m	dB
11590.00	H	Peak	36.80	21.28	58.08	ταυμ γ/m 74	-15.92
11590.00	Н	Average	22.14	21.28	43.42	54	-10.58



### Band edge falling to restricted band

Operation M Fundamenta Operation Ba EUT Pol. :	I Frequency	802.11r : 5755 M BE CH E1	Hz	Test Date Temp. / I Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_C/57RH Ashton Vertical	
Freq.	Note	Detector Mode	-	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	d	ΒµV	dB	dBµV/m	dBµV/m	dB
5708.00	S	Peak	5	4.50	12.32	66.82	68.3	-1.48
5721.40	S	Peak	6	4.68	12.28	76.96	78.2	-1.24
5725.00	E	Peak	5	8.40	12.27	70.67	78.2	-7.53
Operation M Fundamenta Operation Ba EUT Pol. :	I Frequency	802.11r : 5755 MI BE CH I E1	Hz	Test Date Temp. / I Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_0 Ashton Horizontal	C/57RH
Freq.	Note	Detector Mode	•	ectum ng Le vel	Factor	Actual FS	Limit @3m	Margin
			4	DuV	AD	d Du V/m	dBu\//m	AD

						9	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5714.00	S	Peak	53.20	12.31	65.50	68.3	-2.80
5719.20	S	Peak	59.03	12.29	71.32	78.2	-6.88
5725.00	E	Peak	57.67	12.27	69.94	78.2	-8.26

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Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11n : 5795 Mł BE CH ł E1	Ηz	Test Date Temp. / F Test Eng Measure	lumi. :	ina Pol. :	2015/9/17 22.7deg_0 Ashton Vertical	C/57RH
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Readi d	ectum ng Level BµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5850.00 5861.70	E S	Peak Peak	-	5.76 4.64	12.61 12.72	68.37 67.36	78.2 68.3	-9.83 -0.94
Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11n : 5795 MI BE CH I E1	Ηz	Test Date Temp. / H Test Eng Measure	lumi. :	ina Pol. :	2015/9/17 22.7deg_0 Ashton Horizontal	C/57RH
Freq.	Note	Detector Mode	•	ectum ng Level	Factor	Actual FS	Limit @3m	Margin
MHz 5850.00 5865.90	F/H/E/S E S	PK/QP/AV Peak Peak	d 4	ВµV 9.68 0.98	dB 12.61 12.74	dBµV/m 62.29 63.72	dBµV/m 78.2 68.3	dB -15.91 -4.58



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### 802.11ac VHT80, 5725~5850 MHz

Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11a 5775 M TX CH E1	Hz	Test Date Temp. / H Test Engir Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Vertical	/57RH
Freq.	Note	Detector Mode		pectum ding Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		dBµV	dB	dBµV/m	dBµV/m	dB
11550.00	H	Peak		32.44	20.97	53.41	74	-20.59
11550.00	Н	Average		21.61	20.97	42.58	54	-11.42
Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11a 5775 M TX CH E1	Hz	Test Date Temp. / H Test Engir Measurem	umi. :	na Pol. :	2015/9/17 22.7deg_C/ Ashton Horizontal	/57RH
Freq.	Note	Detector Mode		pectum ding Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV		dBµV	dB	dBµV/m	dBµV/m	dB
11550.00	Н	Peak	;	32.07	20.97	53.04	74	-20.96
11550.00	Н	Average	:	22.21	20.97	43.18	54	-10.82

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### Band edge falling to restricted band

Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11a : 5775 Mł BE CH I E1	Hz	Test Date Temp. / I Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_( Ashton Vertical	
Freq. MHz 5714.80 5725.00	Note F/H/E/S S E	Detector Mode PK/QP/AV Peak Peak	Readi d 5	ectum ng Le vel ΒμV 4.86 4.23	Factor dB 12.30 12.27	Actual FS dBµV/m 67.17 66.50	Limit @3m dBµV/m 68.3 78.2	Margin dB -1.13 -11.70
Operation M Fundamenta Operation Ba EUT Pol. :	IFrequency	802.11a : 5775 MI BE CH I E1	Hz	Test Date Temp. / I Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_( Ashton Horizontal	C/57RH
Freq. MHz 5706.10 5712.60 5725.00	Note F/H/E/S S E	Detector Mode PK/QP/AV Peak Peak Peak	Readi d 5	ectum ng Level ВµV 5.01 4.98 6.64	Factor dB 12.31 12.31 12.27	Actual FS dBμV/m 67.32 67.29 68.91	Limit @3m dBµV/m 68.3 68.3 78.2	Margin dB -0.98 -1.01 -9.29



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Operation M Fundamenta Operation B EUT Pol. :	al Frequency	802.11a 5775 M BE CH E1	Hz	Test Dat Temp. / Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_0 Ashton Vertical	
Freq. MHz 5850.00 5860.32	Note F/H/E/S E S	Detector Mode PK/QP/AV Peak Peak	Readir dE 53	ectum ng Level 8µV 3.97 0.83	Factor dB 12.61 12.71	Actual FS dBµV/m 66.58 63.54	Limit @3m dBµV/m 78.2 68.3	Margin dB -11.62 -4.76
Operation M Fundamenta Operation B EUT Pol. :	alFrequency	802.11a 7 : 5775 M BE CH E1	Hz	Test Dat Temp. / Test Eng Measure	Humi. :	nna Pol. :	2015/9/17 22.7deg_0 Ashton Horizonta	C/57RH
Freq. MHz 5850.00 5864.52	Note F/H/E/S E S	Detector Mode PK/QP/AV Peak Peak	Readir dE 49	ectum ng Level 8µV ).96 .75	Factor dB 12.61 12.74	Actual FS dBµV/m 62.57 64.49	Limit @3m dBµV/m 78.2 68.3	Margin dB -15.63 -3.81



### 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**

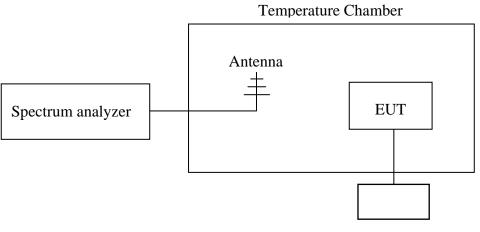
### 13.1 Standard Applicable

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

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#### **Measurement Equipment Used** 13.4

Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST			
TYPE		NUMBER	NUMBER	CAL.	CAL DUE.		
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016		
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/18/2015	06/17/2016		
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2015	05/03/2016		

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### 13.5 Measurement Result

Operation Mode	ТХ	Test Date	2015.09.23
Temperature	26	Test By	Wayne
Humidity	64 %		

Test Temp.	Test Volt- age	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		36	5180.0000	5,179.854470	0.1455
		44	5220.0000	5,219.840110	0.1599
	12.0\/	48	5240.0000	5,239.855130	0.1449
	13.8V	149	5745.0000	5,744.848870	0.1511
		157	5785.0000	5,784.853960	0.1460
0		165	5825.0000	5,824.856180	0.1438
0		36	5180.0000	5,179.859800	0.1402
		44	5220.0000	5,219.852740	0.1473
	10.8V	48	5240.0000	5,239.848800	0.1512
	10.00	149	5745.0000	5,744.859190	0.1408
		157	5785.0000	5,784.848480	(MHz) 0.1455 0.1599 0.1449 0.1511 0.1460 0.1438 0.1402 0.1473 0.1512
		165	5825.0000	5,824.844980	0.1550
		36	5180.0000	5,179.854200	0.1458
		44	5220.0000	5,219.858410	0.1416
25	12V	48	5240.0000	5,239.853190	0.1468
20	121	149	5745.0000	5,744.858390	0.1416
		157	5785.0000	5,784.848250	(MHz) 0.1455 0.1599 0.1449 0.1511 0.1460 0.1438 0.1402 0.1473 0.1402 0.1473 0.1512 0.1408 0.1515 0.1550 0.1458 0.1416 0.1416 0.1416 0.1517
		165	5825.0000	5,824.853040	0.1470

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					1
		36	5180.0000	5,179.859650	0.1403
		44	5220.0000	5,219.857450	0.1425
	40.01/	48	5240.0000	5,239.847680	0.1523
	13.8V	149	5745.0000	5,744.842790	0.1572
		157	5785.0000	5,784.841960	0.1580
40		165	5825.0000	5,824.851830	0.1482
40		36	5180.0000	5,179.854580	0.1454
		44	5220.0000	5,219.851730	0.1483
	40.01/	48	5240.0000	5,239.855860	0.1441
	10.8V	149	5745.0000	5,744.850300	0.1497
		157	5785.0000	5,784.844040	0.1560
		165	5825.0000	5,824.844880	0.1551

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Operation Mode	ТХ	Test Date	2015.09.23
Temperature	26	Test By	Wayne
Humidity	64 %		

Test Temp.	Test Volt- age	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
		38	5190.0000	5,189.827940	0.1721
	13.8V	46	5230.0000	5,229.836070	0.1639
	13.00	151	5755.0000	5,754.831040	0.1690
0		159	5795.0000	5,794.832840	0.1672
U		38	5190.0000	5,189.827910	0.1721
	10.01/	46	5230.0000	5,229.838950	0.1610
	10.8V	151	5755.0000	5,754.825900	0.1741
		159	5795.0000	5,794.830390	0.1696
		38	5190.0000	5,189.828310	0.1717
25	401/	46	5230.0000	5,229.822850	0.1771
20	12V	151	5755.0000	5,754.827190	0.1728
		159	5795.0000	5,794.835100	0.1649
		38	5190.0000	5,189.823110	0.1769
	40.01/	46	5230.0000	5,229.827790	0.1722
	13.8V	151	5755.0000	5,754.833560	0.1664
40		159	5795.0000	5,794.820090	0.1799
40		38	5190.0000	5,189.832800	(MHz) 0.1721 0.1639 0.1690 0.1672 0.1721 0.1721 0.1610 0.1741 0.1696 0.1717 0.1771 0.1771 0.1728 0.1649 0.1769 0.1722 0.1664
	40.00/	46	5230.0000	5,229.832720	0.1673
	10.8V	151	5755.0000	5,754.838260	0.1617
		159	5795.0000	5,794.833500	0.1665

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Operation Mode	ТХ	Test Date	2015.09.23
Temperature	26	Test By	Wayne
Humidity	64 %		

Test Temp.	Test Volt- age	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
0	13.8V	42	5210.0000	5,209.825070	0.1749
		155	5775.0000	5,774.828890	0.1711
	10.8V	42	5210.0000	5,209.827820	0.1722
		155	5775.0000	5,774.820330	0.1797
25	12V	42	5210.0000	5,209.839530	0.1605
		155	5775.0000	5,774.824420	0.1756
40	13.8V	42	5210.0000	5,209.825070	0.1749
		155	5775.0000	5,774.838630	0.1614
	10.8V	42	5210.0000	5,209.824980	0.1750
		155	5775.0000	5,774.836640	0.1634

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## **14. ANTENNA REQUIREMENT**

### 14.1 Standard Applicable

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

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

### 14.2 Antenna Connected Construction

A PIFA antenna design is used.

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

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

### ~ End of Report ~

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