

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

	OF
Product Name:	Dual-Band 2x2 802.11ac and BT4.1 Combo Module
Brand Name:	Foxconn
Model No.:	WBUA31
Model Difference:	N/A
FCC ID:	RX3-WBUA31
IC:	2878F-WBUA31
Report No.:	ER/2016/80013-01
Issue Date:	Sep. 02, 2019
FCC Rule Part:	§15.407
IC Rule Part	RSS-247 issue 1 May 2015
Prepared for:	Hon Hai Precision Industry Co., Ltd. No.151, Sec. 1, Nankan Rd., Lujhu Town- ship, Taoyuan County, 33859, Taiwan (R.O.C)
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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VERIFICATION OF COMPLIANCE

Applicant:	Hon Hai Precision Industry Co., Ltd. No.151, Sec. 1, Nankan Rd., Lujhu Township, Taoyuan County, 33859, Taiwan (R.O.C)
Product Name:	Dual-Band 2x2 802.11ac and BT4.1 Combo Module
Brand Name:	Foxconn
Model No.:	WBUA31
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FCC ID:	RX3-WBUA31
IC:	2878F-WBUA31
File Number:	ER/2016/80013-01
Date of test:	Aug. 02, 2016 ~ Aug. 19, 2016
Date of EUT Received:	Aug. 02, 2016

We hereby certify that:

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

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

Test By:	Marcus Tse	eng Date:	Sep. 02, 2019
Prepared By:	Marcus Tseng/En Karen Huo	-	Sep. 02, 2019
Approved By: _	Karen Huang / C Jim Chang / Asst. M	ang Date:	Sep. 02, 2019

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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2016/80013	Rev.00	Initial creation of docu- ment	All	Aug. 19, 2016	Karen Huang
ER/2016/80013-01	Rev.01	Add section 1.7 remark and conduction data updated	Page 10, 23~24	Sep. 02, 2019	Karen Huang

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GENERAL INFORMATION 1.

1.1 Product Description

General:

Product Name:	Dual-Band 2x2 802.11ac and BT4.1 Combo Module
Brand Name:	Foxconn
Model No.:	WBUA31
Model Difference:	N/A
Product SW/HW version:	N/A / DVT
Radio SW/HW version:	N/A / N/A
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	3.3Vdc from Test Kit

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WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Avg.) / (EIRP)	Modulation Technology	
	5150~5250	4	13.98 dBm (Avg.) / 19.33 dBm (EIRP)		
11a	5250~5350	4	13.78 dBm	OFDM	
IIa	5470~5725	12	13.71 dBm		
	5725-5850	5	13.98 dBm		
	HT20 / VHT20 5150~5250	4	HT: 12.96 dBm (Avg.) / 21.32 dBm (EIRP) (Worst Case)		
11n /	HT20 / VHT20 5250~5350	4	HT: 12.97 dBm (Worst Case)	OFDM	
ac_20M ·	HT20 / VHT20 5470~5725	12	HT: 12.97 dBm (Worst Case)		
	HT20 / VHT20 5725-5850	5	HT: 12.79 dBm (Worst Case)		
	HT40 / VHT40 5150~5250	2	HT: 11.63 dBm (Avg.) / 19.99 dBm (EIRP) (Worst Case)		
11n /	HT40 / VHT40 5250~5350	2	HT: 11.92 dBm (Worst Case)	OFDM	
ac_40M ·	HT40 / VHT40 5470~5725	6	HT: 11.98 dBm (Worst Case)		
	HT40 / VHT40 5725-5850	2	HT: 11.81 dBm (Worst Case)		
	VHT80 5150~5250	1	8.80 dBm (Avg.) / 17.16 dBm (EIRP)		
11ac_80M	VHT80 5250~5350	1	8.80 dBm	OFDM	
	VHT80 5470~5725	3	8.89 dBm		
	VHT80 5725-5850	1	8.78 dBm		

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Antenna Designation	PIFA Antenna Main: Part No.: W-M-D-B-N-0-0560(65"), Supplier: Foxconn 5GHz Gain: 4.12dBi (5150MHz-5250MHz) 5GHz Gain: 4.12dBi (5250MHz-5350MHz) 5GHz Gain: 4.05dBi (5470MHz-5725MHz) 5GHz Gain: 4.05dBi (5725MHz-5850MHz) 5GHz Gain: 4.57dBi (5725MHz-5850MHz) 5GHz Gain: 2.03dBi (5725MHz-5850MHz) Part No.: W-M-D-B-N-0-0560(70"), Supplier: Foxconn 5GHz Gain: 2.03dBi (5150MHz-5250MHz) 5GHz Gain: 2.03dBi (5250MHz-5350MHz) 5GHz Gain: 2.42dBi (5470MHz-5725MHz) 5GHz Gain: 2.93dBi (5725MHz-5850MHz) 5GHz Gain: 5.35dBi (5150MHz-5250MHz) 5GHz Gain: 5.35dBi (5250MHz-5350MHz) 5GHz Gain: 5.35dBi (5250MHz-5350MHz) 5GHz Gain: 2.91dBi (5470MHz-5725MHz) 5GHz Gain: 2.91dBi (5470MHz-5725MHz) 5GHz Gain: 2.91dBi (5470MHz-5725MHz) 5GHz Gain: 2.91dBi (5725MHz-5850MHz) Part No.: W-M-S-D-N-2-2100(70"), Supplier: Foxconn 5GHz Gain: 2.74dBi (5150MHz-5250MHz) 5GHz Gain: 2.74dBi (5250MHz-5350MHz) 5GHz Gain: 2.74dBi (5250MHz-5350MHz) 5GHz Gain: 2.74dBi (5250MHz-5350MHz) 5GHz Gain: 1.83dBi (5470MHz-5725MHz) 5GHz Gain: 2.62dBi (5725MHz-5850MHz)
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_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 supporting 802.11a/b/g/n/ac, Bluetooth, features, and below is details of information.

Product Feature				
Product Name: Dual-Band 2x2 802.11ac and BT4.1 Combo Module				
Brand Name: Foxconn				
Model No.: WBUA31				
Model Difference: N/A				
FCC ID:	RX3-WBUA31			
IC:	2878F-WBUA31			
Bluetooth Version V4.1 dual mode + HS				
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

FCC KDB 662911 D01 Multiple Transmitter Output

FCC KDB 644545 D03 Guidance for IEEE 802.11ac

RSS-247 issue 1 May 2015

RSS-Gen issue4 Nov. 2014

ANSI C63.10:2013

Note:

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

1.4 Test Facility

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

FCC Designation number is: TW0001

ISED#: 4620A

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.

1.7 Remarks

The original test report ER/2016/80013 will be withdrawn with this test report ER/2016/80013-01 and is no longer valid when the withdrawal occurred.

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SYSTEM TEST CONFIGURATION 2.

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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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 0.9dB, and 10dB attenuator.

SISO mode offset:

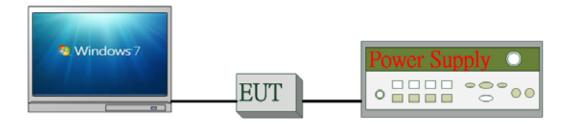
= RF cable loss (dB)+ attenuation factor(dB)=10.9(dB) MIMO mode offset = RF cable loss (dB)+ attenuation factor(dB)+ 10 log(NANT) dB =13.9(dB)

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2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



lte m	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	Unshielded
3.	Notebook	Lenovo	L420	LR-7HXZA	Shielded	Unshielded
4.	Test Kit	N/A	N/A	N/A	N/A	N/A

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SUMMARY OF TEST RESULT 3.

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emis- sion	Compliant
§15.403(i) §15.407(e)	RSS-247 §6.2.1~ 4 (1) RSS-Gen §6.6	26 dB & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.407(g)	RSS-Gen §6.11	Frequency Stability	Compliant
§15.203 §15.407(a)	RSS- Gen §6.7 RSS- Gen §8.3	Antenna Requirement	Compliant

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4. DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

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

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

2 channels are provided for 802.11n_HT40, 802.11ac_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac_VHT80

CHANNEL	FREQUENCY
42	5210 MHz

Operated band in 5250 MHz ~5350 MHz:

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

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

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac_VHT80

CHANNEL	FREQUENCY
58	5290 MHz

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Operated band in 5470 MHz ~5725 MHz:

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz
	1		

5 channels are provided for 802.11n HT40, 802.11ac_VHT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac_VHT80

	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
F	106	5530 MHz	138	5690 MHz
	122	5610 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:									
RADIATED EMISSION TEST (BELOW 1 GHz)									
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	MAIN			
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO			
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	MAIN			
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO			
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	MAIN			
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS8	MIMO			
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN			
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	E180 E240	26 to 19	26 11 10	OFDM	6	MAIN			
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO			
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO			
802.11ac_VHT80	5210	42	42	OFDM	MCS8	MIMO			
802.11a	5260~5320	52 to 64	52 60 64	OFDM	6	MAIN			
802.11n_HT20	5200~5520	52 to 64 52,60,64		OFDM	MCS8	MIMO			
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	ΜΙΜΟ			
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO			

RADIATED EMISSION TEST:

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MODE	FREQUENCY BAND (MHz)		TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5500~5720	100 to 111	100 116 140	OFDM	6	MAIN
802.11n_HT20	5500~5720	100 to 144	100,116,140	OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS8	MIMO
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	MAIN
802.11n_HT20	5745~5625	149 10 105	149,157,105	OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS8	MIMO

Note:

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

Remark: The device will not operate in 5600~5650MHz band for IC.

Pre-scanned was done on antenna set W-M-D-B-N-0-0560 & W-M-S-D-N-2-1940 (65"), and antenna set W-M-D-B-N-0-0560 & W-M-S-D-N-2-2100 (70"). The W-M-D-B-N-0-0560 & W-M-S-D-N-2-1940 (65") results higher emission at 5GHz. Therefore, the completed set of measurement was done on antenna W-M-D-B-N-0-0560 & W-M-S-D-N-2-1940 (65") to presented on this test repot.

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ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST								
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
802.11a				OFDM	6	MAIN			
802.11n_HT20 802.11ac_VHT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO			
802.11n_HT40 802.11ac_VHT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO			
802.11ac_VHT80	5210	42	42	OFDM	MCS8	ΜΙΜΟ			
802.11a		52 to 64		OFDM	6	MAIN			
802.11n_HT20 802.11ac_VHT20	_		52,60,64	OFDM	MCS8	MIMO			
802.11n_HT40 802.11ac_VHT40	5270~5310	54 to 62	54,62	OFDM	MCS8	МІМО			
802.11ac_VHT80	5290	58	58	OFDM	MCS8	MIMO			
802.11a				OFDM	6	MAIN			
802.11n_HT20 802.11ac_VHT20	5500~5720	100 to 144	100,116,140,144	OFDM	MCS8	MIMO			
802.11n_HT40 802.11ac_VHT40	5510~5710	102 to 142	102,110,134,142	OFDM	MCS8	МІМО			
802.11ac_VHT80	5530~5690	106 to 138	106,122,138	OFDM	MCS8	MIMO			
802.11a				OFDM	6	MAIN			
802.11n_HT20 802.11ac_VHT20	5745~5825	149 to 165	149,157,165	OFDM	MCS8	MIMO			
802.11n_HT40 802.11ac_VHT40	5755~5795	151 to 159	151,159	OFDM	MCS8	МІМО			
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:

	9kHz – 30MHz: +/- 2.87 dB
	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

	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB
-	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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CONDUCTED EMISSION TEST 6.

6.1. Standard Applicable

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

	Limits							
Frequency range	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	Note							
1.The lower limit shall apply at the transition frequencies								
2. The limit decreases linearly wit	h the logarithm of the frequency ir	the range 0.15 MHz to 0.50						

MHz.

6.2. Measurement Equipment Used

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017					
LISN	SCHWARZ BECK	NSLK 8127	8127-649	05/16/2016	05/15/2017					
LISN	MESS TEC	FCC-LISN-50/250- 25-2-01	4034	05/16/2016	05/15/2017					
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2015	11/25/2016					

6.3. EUT Setup

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

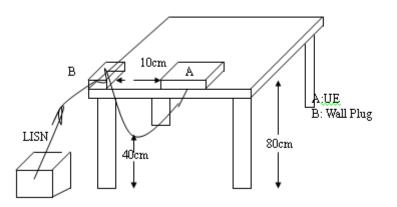
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6.4. Test SET-UP



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

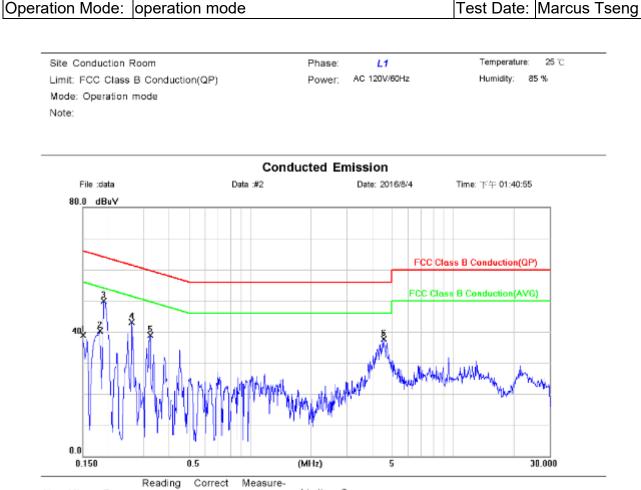
Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit

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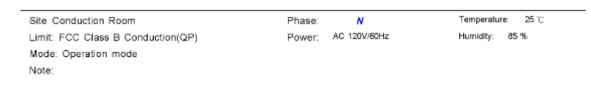
AC POWER LINE CONDUCTED EMISSION TEST DATA

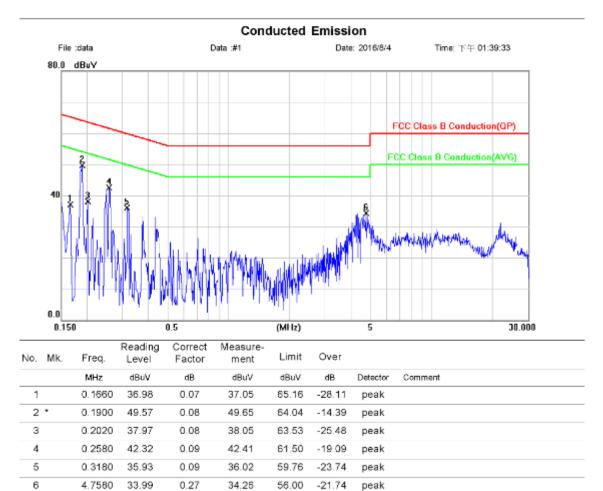


No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1500	38.78	0.07	38.85	66.00	-27.15	peak	
2	0.1820	40.16	0.08	40.24	64.39	-24.15	peak	
3 *	0.1900	49.79	0.08	49.87	64.04	-14.17	peak	
4	0.2620	42.94	0.09	43.03	61.37	-18.34	peak	
5	0.3220	38.74	0.09	38.83	59.66	-20.83	peak	
6	4.5580	37.44	0.27	37.71	56.00	-18.29	peak	

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DUTY CYCLE TEST SIGNAL 7.

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

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

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

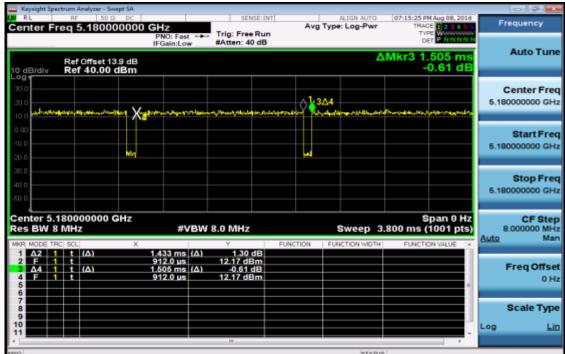
Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle
802.11a	95.20	0.21
802.11n_20	94.90	0.23
802.11ac_20	94.87	0.23
802.11n_40	90.44	0.44
802.11ac_40	87.44	0.58
802.11ac_80	82.93	0.81

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DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



802.11n HT20

Keysight Spectrum Analyzer - Swept SA			
RL RF 50 Ω DC Center Freq 5.180000000 (GHZ PNO: Fast Trig: Free Run	ALIGN AUTO 07:16:00 PM Aug 08, 2016 Avg Type: Log-Pwr TRACE 2.3.4.5 c TYPE OFT P. NNNNN	Frequency
Ref Offset 13.9 dB	IFGain:Low #Atten: 40 dB	۵.53 dB	Auto Tune
200 100	anity Xagitati tanayisiyaa tinaa mina tay tahayan ti	nanskantashara nanskantashara	Center Free 5.180000000 GH
-10.0			Start Free 5.180000000 GH
-30.0			Stop Fre 5.180000000 GH
Center 5.180000000 GHz Res BW 8 MHz	#VBW 8.0 MHz	Span 0 Hz Sweep 3.600 ms (1001 pts)	CF Ste 8.000000 MH <u>Auto</u> Ma
1 Δ2 1 t (Δ) 2 F 1 t 3 Δ4 1 t (Δ)	1.339 ms (Δ) 1.91 dB 1.156 ms 11.67 dBm 1.411 ms (Δ) 0.63 dB 1.156 ms 11.57 dBm		Freq Offse 0 H
7 8 9 10			Scale Type
11	17	STATUS	

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802.11ac VHT20

Keysight Spectrum Analyzer - Swept	SA				- 4
enter Freq 5.180000	000 GHz PN0: Fast	rig: Free Run	Avg Type: Log-Pwr	07:17:28 PM Aug 08, 2016 TRACE 1 2 3 4 5 6 Type	Frequency
Ref Offset 13.9 dB/div Ref 40.00 dB	IFGain:Low #	Atten: 40 dB	ΔΝ	lkr3 1.420 ms -0.94 dB	Auto Tur
an a	وور ور الر معادر رسیار از رز زور ور اور اور اور اور اور اور اور اور او	4. martine	10304 	alli-station also without surface	Center Fre 5.18000000 GR
00 1.0 1.0					Start Fre 5.180000000 GF
0.0 0.0					Stop Fre 5.180000000 GH
enter 5.180000000 GH es BW 8 MHz R MODE TRCI SCLI	z #VBW 8.	Y FUNCT	-	Span 0 Hz 00 ms (1001 pts)	CF Ste 8.000000 Mi <u>Auto</u> Mi
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.347 ms (Δ) 390.0 μs 1 1.420 ms (Δ)	-1.30 dB 2.22 dBm -0.94 dB 2.22 dBm		-	Freq Offs 01
7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					Scale Typ
				, ,	
a			STATUS		

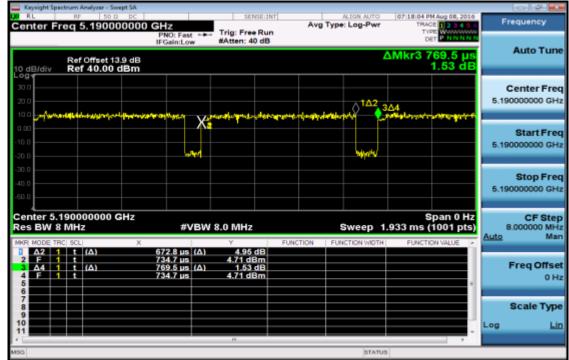
802.11 n HT 40

Keysight Spe	ctrum Anal	yzer - Swept SA					_					_	
11.56	1.0	50 Ω D 900000	00 GHz	Fast 🛶	Trig: Free #Atten: 40		Avg	ALIGN Type: Log		TR	PM Aug 08, 2016 ACE 1 2 3 4 5 YPE WOMMON		Frequency
dB/div		fset 13.9 d 0.00 dBr	в	LOW	W111011. 40	00				AMkr3	734.4 µs 0.70 dE		Auto Tur
	Manaumada	-		× v2	م مواجعة مع	11-15-11-1-1	nninter og	es established	¢ ^{1∆}	3∆4 ,100000000	()	5.1	Center Fre
0.0				X					44.00			5.1	Start Fr 190000000 G
0.0 0.0 0.0												5.1	Stop Fr 190000000 G
enter 5.1 es BW 8	MHz	000 GHz	x	#VBW	8.0 MHz	ELIN	ICTION	Swe		.800 ms	Span 0 Hz (1001 pts)	Auto	CF St 8.000000 M
Δ2 1 2 F 1 3 Δ4 1	t (Δ t t		664.2 691.2	μs (Δ)	2.77 d 5.31 dB 0.70 d 5.31 dB	B m B				PONC	HON TALGE		Freq Offs 0
7 8 9 0												Log	Scale Ty
												Log	
3									STATUS				

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802.11 ac VHT 40



802.11 ac VHT 80

	m Analyzer - Swept SA							
enter Fred	5.210000000	GHz PNO: Fast	Trig: Free Run	Avg Typ	ALIGN AUTO	07:18:35 PM Aug 08, 20 TRACE 1 2 3 4 TYPE WWWWW DET P N N N	5 6	Frequency
0 dB/div	tef Offset 13.9 dB tef 40.00 dBm	IFGain:Low	#Atten: 40 dB		4	ΔMkr3 400.0 μ -4.65 d	5	Auto Tur
0.0 10.0				. 1	Δ2		5.	Center Fre 210000000 GF
0.0 1.00 0.0 0.0	an tan tan tan tan tan tan tan tan tan t	vi Xs ^{link}	hyunana katala ta	perterent and the second se	3 <u>44</u> 4	altrar ang di taka lan		Start Fre 210000000 GF
0.0 0.0 60.0							5.	Stop Fre 21000000 GF
enter 5.210 es BW 8 M		#VBW	8.0 MHz		Sweep 1.	Span 0 H .067 ms (1001 pt FUNCTION VALUE		CF Ste 8.000000 Mi
1 Δ2 1 2 F 1 3 Δ4 1	t (Δ) t (Δ) t (Δ)	331.7 μs (Δ) 377.6 μs 400.0 μs (Δ) 377.6 μs	1.69 dB 2.95 dBm -4.65 dB 2.95 dBm	Fortune Pu		CONCIDENTIALUE		Freq Offs 0 F
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9								Scale Typ
1			17				- Log	L

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8. 26dB & 6dB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

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

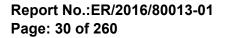
8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
 - a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
 - b. Mark the peak frequency and -26dB (upper and lower) frequency.
- 4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
- 5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
 - a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak,

Sweep=auto

- b. Mark the peak frequency and -6dB (upper and lower) frequency.
- 6. Repeat above procedures until all test default channel measured were complete.

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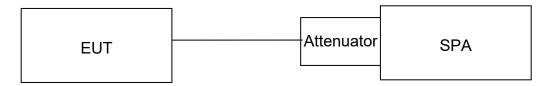




8.3 Measurement Equipment Used

	Conducted Emission Test Site						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016		
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016		
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017		
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017		
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017		
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017		
DC Power Supply	Agilent	E3640A	MY52410006	11/05/2015	11/04/2016		
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017		

8.4 Test Set-up



8.5 Measurement Result 26dB Bandwidth

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802.11a_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	26.73	14.271
5220	22.83	13.585
5240	23.24	13.662
5260	22.62	13.545
5300	19.58	12.917
5320	20.01	13.012
5500	19.25	12.845
5580	19.44	12.887
5700	19.00	12.787

802.11n_HT20_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	19.88	12.985
5220	19.93	12.994
5240	19.73	12.950
5260	19.67	12.939
5300	19.80	12.966
5320	19.89	12.986
5500	21.08	13.239
5580	20.26	13.067
5700	20.17	13.047

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)				
5180	20.15	13.043				
5220	19.93	12.994				
5240	20.70	13.159				
5260	20.26	13.066				
5300	19.63	12.930				
5320	19.70	12.946				
5500	19.89	12.986				
5580	19.73	12.952				
5700	19.73	12.951				

802.11n _HT40_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.82	16.109
5230	43.03	16.338
5270	40.39	16.062
5310	44.72	16.505
5510	41.33	16.163
5550	40.48	16.073
5670	41.72	16.204

802.11n_HT20_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	41.00	16.127
5230	40.72	16.098
5270	39.96	16.016
5310	41.41	16.171
5510	41.27	16.156
5550	40.04	16.025
5670	42.22	16.256

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802.11 ac _VHT80_Main

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	82.88	19.184
5290	80.97	19.083
5530	83.14	19.198
5610	81.68	19.121

802.11ac _VHT80_Aux1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	83.19	19.201
5290	85.39	19.314
5530	80.80	19.074
5610	83.04	19.193

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99% Bandwidth

802.11a_Main

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.443	12.160
5220	16.408	12.151
5240	16.385	12.144
5260	16.410	12.151
5300	16.365	12.139
5320	16.351	12.135
5500	16.289	12.119
5580	16.311	12.125
5700	16.304	12.123

802.11n_HT20_Main

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.434	12.414
5220	17.434	12.414
5240	17.432	12.413
5260	17.428	12.412
5300	17.463	12.421
5320	17.405	12.407
5500	17.398	12.405
5580	17.391	12.403
5700	17.363	12.396

802.11n _HT40_Main

802.11n_H	IT20_Aux1
	0.0%

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.432	12.413
5220	17.430	12.413
5240	17.448	12.417
5260	17.414	12.409
5300	17.400	12.405
5320	17.404	12.406
5500	17.395	12.404
5580	17.394	12.404
5700	17.430	12.413

802.11n _HT40_Aux1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	35.855	15.545
5230	35.845	15.544
5270	35.873	15.548
5310	35.849	15.545
5510	35.308	15.479
5550	35.871	15.547
5670	35.877	15.548

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	35.853	15.545
5230	35.851	15.545
5270	35.816	15.541
5310	35.895	15.550
5510	35.833	15.543
5550	35.858	15.546
5670	35.796	15.538

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802.11 ac	VHT80_Main
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802.11ac _VHT80_Aux1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	
5210	74.941	18.747	
5290	74.990	18.750	
5530	75.017	18.752	
5610	74.939	18.747	

(B)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
7	5210	75.033	18.753
)	5290	75.021	18.752
2	5530	74.934	18.747
7	5610	74.930	18.747

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

802.11a_Main		
Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.06	11.779
5785	14.41	11.586
5825	15.31	11.849

802.11n_HT20_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.10	11.791
5785	15.14	11.800
5825	15.15	11.803

802.11n_HT20_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.15	11.804
5785	15.17	11.810
5825	15.12	11.796

802.11n_HT40_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.10	15.453
5795	35.10	15.453

802.11n_HT40_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	35.10	15.453
5795	35.11	15.455

802.11 ac _VHT80_Main

6dB Frequency 10 Log (B) BW (MHz) (dB) (MHz) 18.753 5775 75.04

802.11ac _VHT80_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	75.13	18.758

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6dB Bandwidth (5725 MHz~ 5850 MHz) measure with Average detector for IC

8	02.	.11	la	Ма	in

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.22	11.824
5785	15.25	11.833
5825	14.55	11.629

802.11n HT20 Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.17	12.087
5785	16.68	12.222
5825	17.13	12.338

802.11n_HT20_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	15.82	11.992
5785	15.34	11.858
5825	14.92	11.738

802.11n_HT40_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	33.70	15.276
5795	33.38	15.235

802.11n_HT40_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	34.68	15.401
5795	33.02	15.188

802.11ac _VHT80_Main

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	70.54	18.484

802.11ac _VHT80_Aux1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	73.11	18.640

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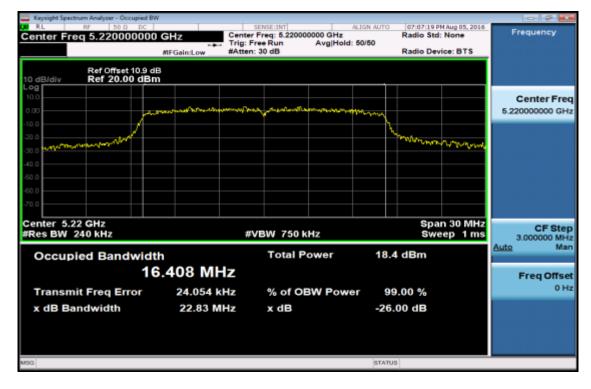
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26dB & 99% Band Width Test Data CH-Low (5180MHz)



26dB & 99% Band Width Test Data CH-Mid (5220MHz)



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26dB & 99% Band Width Test Data CH-High (5240MHz)

Keysight Spectrum Analyzer - Occupied BW					
Center Freq 5.240000000	Trig: F	r Freq: 5.240000000 GHz Free Run Avg Hold h: 30 dB	Radio St d: 50/50	evice: BTS	Frequency
Ref Offset 10.9 dB 10 dB/div Ref 20.00 dBm					
0.00	pullen and a state of the state	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Center Free 5.24000000 GH:
-10.0 -20.0 -30.0 Ammentant			and and a second se	www.www.	
-40.0					
-70.0					
Center 5.24 GHz #Res BW 240 kHz	#	VBW 680 kHz		an 30 MHz /eep 1 ms	CF Step 3.000000 MH
Occupied Bandwidth 16	n .385 MHz	Total Power	18.6 dBm		Auto Mar Freq Offse
Transmit Freq Error x dB Bandwidth	10.485 kHz 23.24 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		0 H:
x ab bandwiddr	25/24 11112	X (10	-20.00 08		
MSG			STATUS		

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802.11a, 5250~5350 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5260MHz)

Keysight Spectrum Analyzer - Occupied BW					- ÷ 🕺
Center Freq 5.260000000	GHz Center	Freq: 5.26000000 GHz		27:28 PM Aug 05, 2016 io Std: None	Frequency
Center Freq 5.20000000	Trig: F	Free Run Avg Hold		io Device: BTS	
	mFGain:Low	. 30 00	Rau	IO DEVICE. BTS	
Ref Offset 10.9 dE 10 dB/div Ref 20.00 dBm					
10.0					Center Freq
0.00	and and and the lot of the second	- manation	and the second s		5.26000000 GHz
-10.0					
20.0 assessing and the			and the second	and a property	
-30.0				In the We	
-40.0					
-50.0					
-60.0					
-70.0					
Center 5.26 GHz #Res BW 270 kHz	#	VBW 750 kHz		Span 30 MHz Sweep 1 ms	CF Step 3.000000 MHz
Occupied Bandwidt	h	Total Power	18.6 dB	m	Auto Man
16	.410 MHz				Freq Offset
Transmit Freq Error	15.219 kHz	% of OBW Pow	er 99.00	%	0 Hz
x dB Bandwidth	22.62 MHz	x dB	-26.00 d	B	

26dB & 99% Band Width Test Data CH-Mid (5300MHz)



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26dB & 99% Band Width Test Data CH-High (5320MHz)

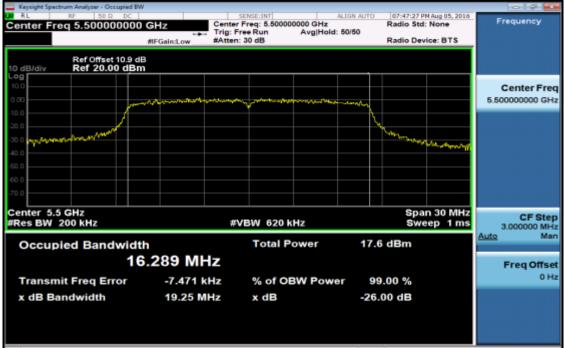
Keysight Spectrum Analyzer - Occupied B	w					
Center Freq 5.32000000		SENSE:INT Center Freq: 5.32000 Trig: Free Run #Atten: 30 dB	ALIGN AL 0000 GHz Avg Hold: 50/50	Radio Std Radio Dev		Frequency
Ref Offset 10.9 o 10 dB/div Ref 20.00 dB						
10.0	land a start and the start of the	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and a state of the second	7		Center Freq 5.320000000 GHz
20.0 Margan Barrow Market				And Man share	www.willing	
-40.0 -50.0 -60.0						
Center 5.32 GHz #Res BW 220 kHz		#VBW 680 k	Hz		n 30 MHz ep 1 ms	CF Step 3.000000 MHz
Occupied Bandwid	th 6.351 MHz	Total P	ower	17.9 dBm		Auto Man Freq Offset
Transmit Freq Error	-10.562 kH		BW Power	99.00 %		0 Hz
x dB Bandwidth	20.01 MH	z xdB		26.00 dB		
MSG			8	TATUS		

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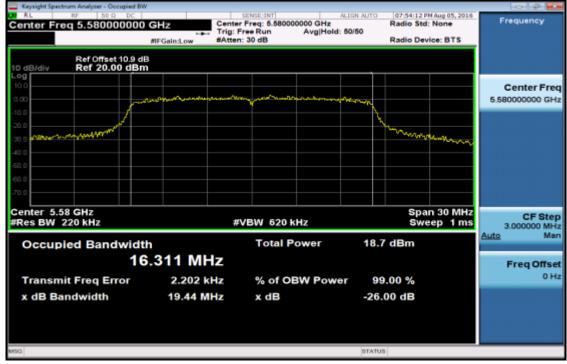
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802.11a, 5470~5725 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5500MHz)



26dB & 99% Band Width Test Data CH-Mid (5580MHz)



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26dB & 99% Band Width Test Data CH-High (5700MHz)

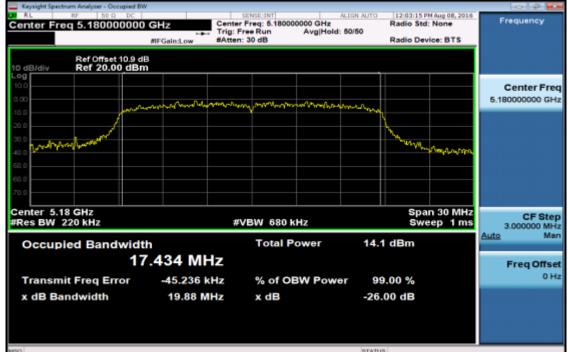
Keysight Spectre	rum Analyzer - Occ	-									
Center Fre	r 50 Ω g 5.70000		Hz	Center Fre			ALIGN AUT		05 PM Aug 05, 2016 Std: None	Frequenc	;y
			IFGain:Low	#Atten: 30		Avg Hold	: 50/50	Radio	Device: BTS		
	Ref Offset										
10 dB/div Log	Ref 20.00) dBm	_								
10.0										Center	Freq
0.00		Sec. 1	ر. میں اکر و اکس میں میں اکر	and a service of		mourie	all and			5.70000000	0 GHz
-10.0		5							_		
-20.0	A and all the	r						tra			
	Awardow							June Co	monor		
-40.0											
-50.0											
-70.0											
Center 5.7 #Res BW 2				#VB	W 620 k	Hz			pan 30 MHz weep 1 ms	CF 3.000000	Step MHz
Occupi	ed Band	width			Total P	ower	17	7.5 dBm		Auto	Man
occupi	eu Danu		304 MI	-							
										Freq O	0 Hz
Transmi	it Freq Err	or	-17.429	Hz	% of O	SW Powe	er	99.00 %			UHZ
x dB Bar	ndwidth		19.00 N	Hz	x dB		-2	6.00 dB			
MSG							81/	TUS			

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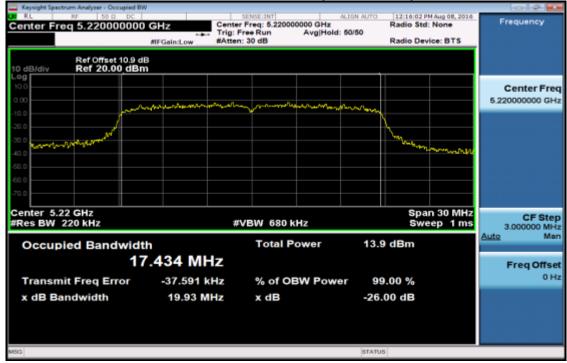
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802.11n HT20, 5150~5250 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5180 MHz)



26dB & 99% Band Width Test Data CH-Mid (5220 MHz)



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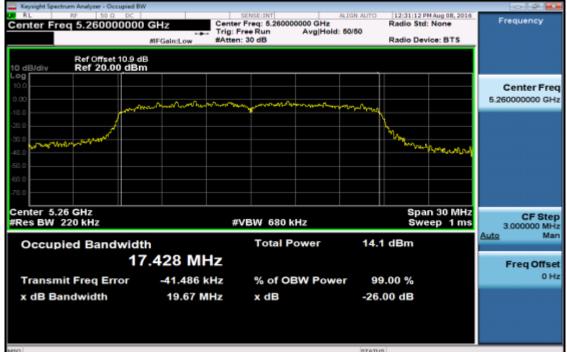
26dB & 99% Band Width Test Data CH-High (5240 MHz)

Image: Section of the section of t	Frequency
Ref Offset 10.9 dB 10 dB/div Ref 20.00 dBm	
10 dB/div Ref 20.00 dBm	
100	Center Freq
0.00	5.240000000 GHz
-10.0	
30.0 When the second se	
-0.0	
70.0	
Center 5.24 GHz Span 30 MHz	
#Res BW 220 kHz #VBW 680 kHz Sweep 1 ms	CF Step 3.000000 MHz
Occupied Bandwidth Total Power 14.3 dBm	<u>uto</u> Man
17.432 MHz	
	Freq Offset 0 Hz
Transmit Freq Error -50.356 kHz % of OBW Power 99.00 %	0 112
x dB Bandwidth 19.73 MHz x dB -26.00 dB	
MSG STATUS	

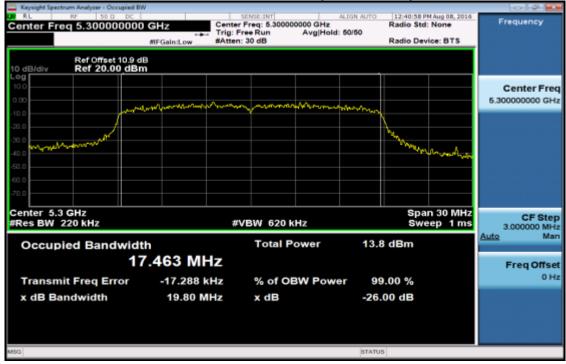
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802.11n HT20, 5250~5350 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5260 MHz)



26dB & 99% Band Width Test Data CH-Mid (5300 MHz)



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26dB & 99% Band Width Test Data CH-High (5320 MHz)

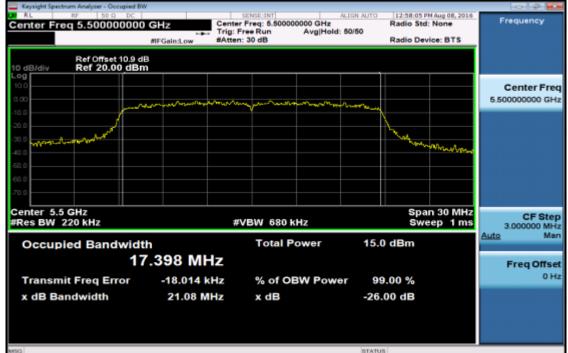
Keysight Spectrum Analyzer - Occupied BW					
Center Freq 5.320000000	GHZ Center	Freq: 5.320000000 GHz	Radio S	0 PM Aug 08, 2016 td: None	Frequency
		: 30 dB		evice: BTS	
10 dB/div Ref Offset 10.9 dB					
10.0					Center Freq
0.00	م المار ا	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Mar		5.320000000 GHz
-10.0					
30.0			John Martin		
-40.0 May 11 mar - 1 - 1 - 1			· ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	marther	
-50.0					
-70.0					
Center 5.32 GHz			Sr	an 30 MHz	
#Res BW 220 kHz	#	VBW 620 kHz		weep 1 ms	CF Step 3.000000 MHz
Occupied Bandwidt	h	Total Power	14.0 dBm		Auto Man
17	.405 MHz				Freq Offset
Transmit Freq Error	-8.785 kHz	% of OBW Pow	er 99.00 %		0 Hz
x dB Bandwidth	19.89 MHz	x dB	-26.00 dB		
MSG			STATUS		

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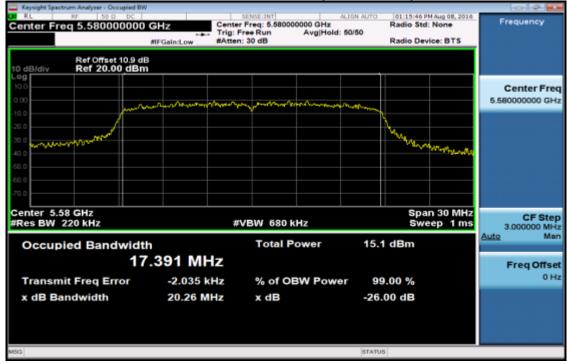
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802.11n HT20, 5470~5725 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5500 MHz)



26dB & 99% Band Width Test Data CH-Mid (5580 MHz)



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26dB & 99% Band Width Test Data CH-High (5700 MHz)

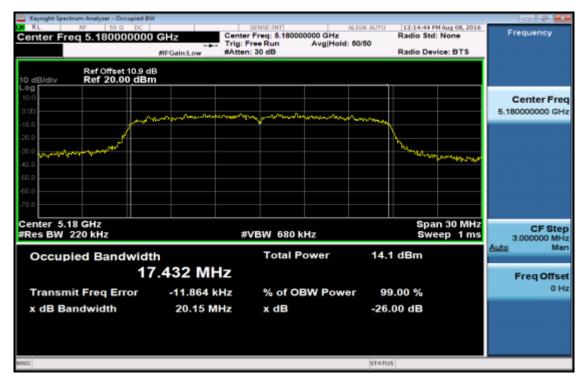
Keysight Spectrum Analyzer - Occupied 8	WV .				
Center Freq 5.70000000	Trig	sense:INT ter Freq: 5.700000000 GHz : Free Run Avg Hold en: 30 dB	Radio S 1: 50/50	1 PM Aug 08, 2016 itd: None Nevice: BTS	Frequency
Ref Offset 10.9 10 dB/div Ref 20.00 dB					
10.0	And the second	monter	m		Center Freq 5.70000000 GHz
-20.0 -20.0			- have	Mulmenne	
-40.0 -50.0 -60.0					
Center 5.7 GHz				an 30 MHz	CF Step
#Res BW 220 kHz Occupied Bandwid		#VBW 680 kHz Total Power	16.0 dBm	weep 1ms	3.000000 MHz <u>Auto</u> Man
1	7.363 MHz				Freq Offset
Transmit Freq Error	-27.309 kHz	% of OBW Pow	er 99.00 %		0 Hz
x dB Bandwidth	20.17 MHz	x dB	-26.00 dB		
MSG			STATUS		

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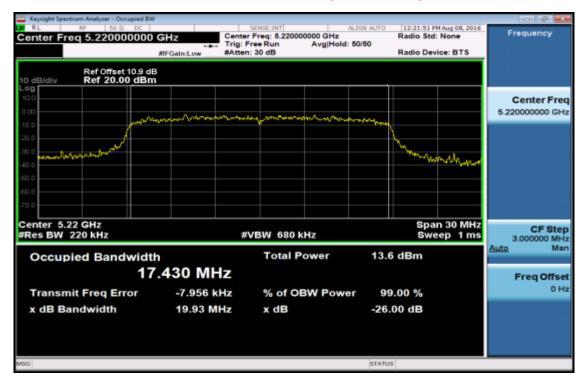
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802.11n HT20, 5150~5250 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5180 MHz)



26dB & 99% Band Width Test Data CH-Mid (5220 MHz)



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26dB & 99% Band Width Test Data CH-High (5240 MHz)

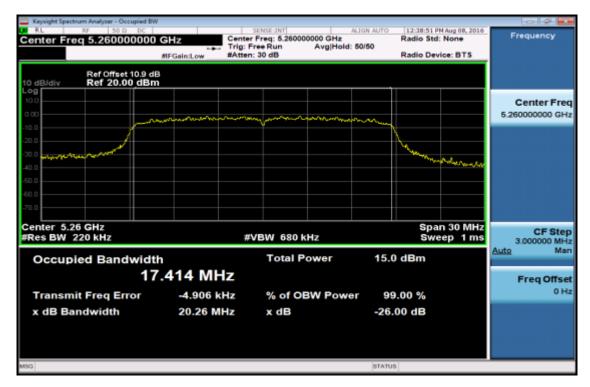
Keysight Spectrum Analyzer - Occupied E	WV .				
Center Freq 5.24000000	Trig	sense:INT Iter Freq: 5.240000000 GHz J: Free Run Avg Holo ten: 30 dB	Radio St d: 50/50	evice: BTS	Frequency
Ref Offset 10.9 (10 dB/div Ref 20.00 dB					
0.00	and the for the former	m when a	Marine and		Center Freq 5.24000000 GHz
-10.0 -20.0 -30.0					
-40.0				mmm	
-60.0					
Center 5.24 GHz #Res BW 220 kHz		#VBW 680 kHz		an 30 MHz veep 1 ms	CF Step 3.000000 MHz
Occupied Bandwid	th 7.448 MHz	Total Power	14.0 dBm		Auto Man Freq Offset
Transmit Freq Error x dB Bandwidth	-11.277 kHz 20.70 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		0 H:
MSG			STATUS		

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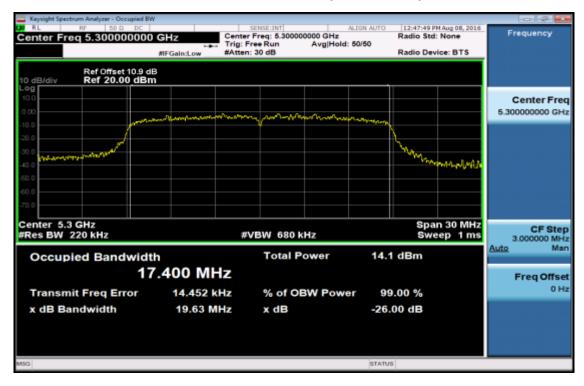
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802.11n HT20, 5250~5350 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5260 MHz)



26dB & 99% Band Width Test Data CH-Mid (5300 MHz)



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26dB & 99% Band Width Test Data CH-High (5320 MHz)

Keysight Spectrum Analyzer - Occupied B					
Center Freg 5.32000000	GHz Center	Freq: 5.320000000 GHz	Radio Str	PM Aug 08, 2016 d: None	Frequency
	Trig: F	ree Run Avg Hold : 30 dB		vice: BTS	
10 dB/div Ref 20.00 dB					
100 0.00 -10.0	and and a second second second	mmm	manna		Center Freq 5.320000000 GHz
-20.0 -30.0 -40.0 -50.0			- Current of the second	Monthaltaria	
-60.0					
Center 5.32 GHz #Res BW 220 kHz	#*1	VBW 620 kHz		an 30 MHz eep 1 ms	CF Step 3.000000 MHz
Occupied Bandwid	th 7.404 MHz	Total Power	13.9 dBm		Auto Man Freq Offset
Transmit Freq Error	6.343 kHz	% of OBW Powe	er 99.00 %		0 Hz
x dB Bandwidth	19.70 MHz	x dB	-26.00 dB		
MSG			STATUS		

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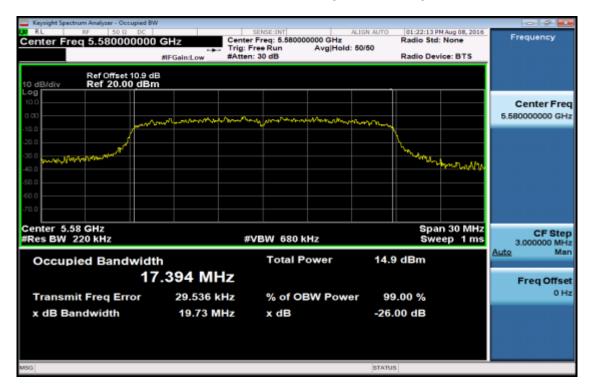
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802.11n HT20, 5470~5725 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5500 MHz)

Keysight Spectrum Analyzer - Occupied BW					- 2 🛋
Center Freq 5.500000000	Trig: F	Freq: 5.50000000 GHz	Radio Sto 50/50	PM Aug 08, 2016 d: None vice: BTS	Frequency
Ref Offset 10.9 dE					
100 0.00		and way was a star and a star and a star	and a second		Center Free 5.50000000 GH
-10.0 -20.0			- Marrie	Alanavara	
-40.0				an an an an an Al Andrews	
Center 5.5 GHz				an 30 MHz	CF Ster
#Res BW 220 kHz		VBW 680 kHz		eep 1 ms	3.000000 MH Auto Ma
Occupied Bandwidt	h .395 MHz	Total Power	14.8 dBm		Freq Offse
Transmit Freq Error	11.948 kHz	% of OBW Powe	r 99.00 %		0 H
x dB Bandwidth	19.89 MHz	x dB	-26.00 dB		
450			STATUS		

26dB & 99% Band Width Test Data CH-Mid (5580 MHz)



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26dB & 99% Band Width Test Data CH-High (5700 MHz)

Keysight Spectrum Analyzer - Occupied					
Center Freq 5.70000000	0 GHz Cent	sense:INT ter Freq: 5.700000000 GHz : Free Run Avg Hold en: 30 dB	Radio Sto 1: 50/50	None vice: BTS	Frequency
Ref Offset 10.9 10 dB/div Ref 20.00 dB					
0.00	10 and and the second second second	Mark water and the second and the se	handan		Center Fred 5.70000000 GH;
-10.0 -20.0 -30.0			han h		
-40.0				*****	
-70.0					
Center 5.7 GHz #Res BW 220 kHz		#VBW 680 kHz		an 30 MHz eep 1 ms	CF Step 3.000000 MH
Occupied Bandwid	ath 7.430 MHz	Total Power	15.1 dBm		<u>Auto</u> Mar Freq Offse
Transmit Freq Error x dB Bandwidth	-43.996 kHz 19.73 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		OH
M9G			STATUS		

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802.11n HT40, 5150~5250 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5190 MHz)



26dB & 99% Band Width Test Data CH-High (5230 MHz)



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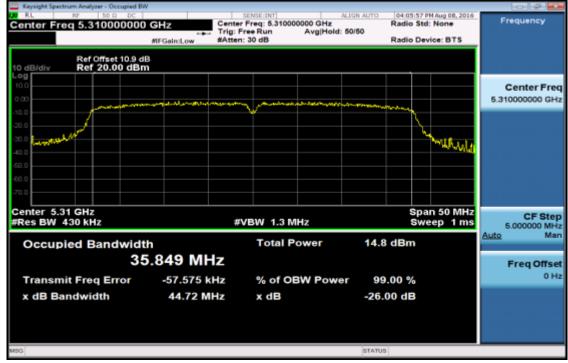
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802.11n HT40, 5250~5350 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5270 MHz)



26dB & 99% Band Width Test Data CH-High (5310MHz)



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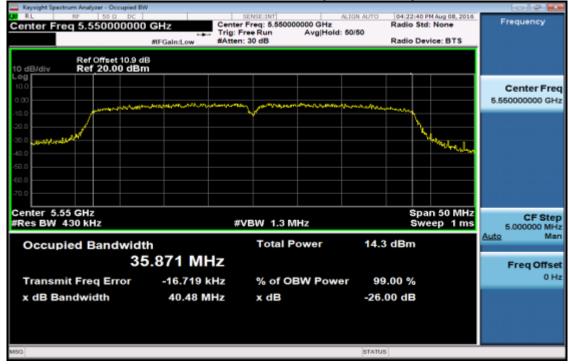
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802.11n HT40, 5470~5725 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5510 MHz)



26dB & 99% Band Width Test Data CH-Mid (5550 MHz)



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26dB & 99% Band Width Test Data CH-High (5670 MHz)



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802.11n HT40, 5150~5250 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5190 MHz)



26dB & 99% Band Width Test Data CH-High (5230 MHz)



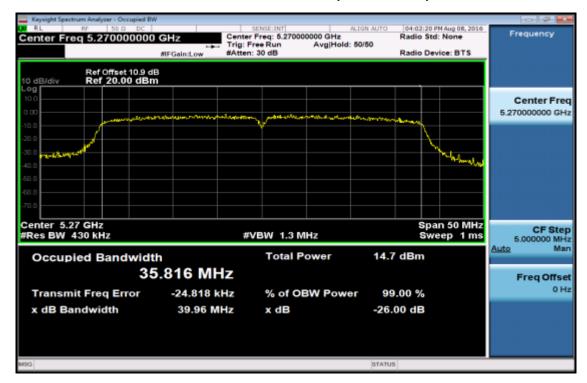
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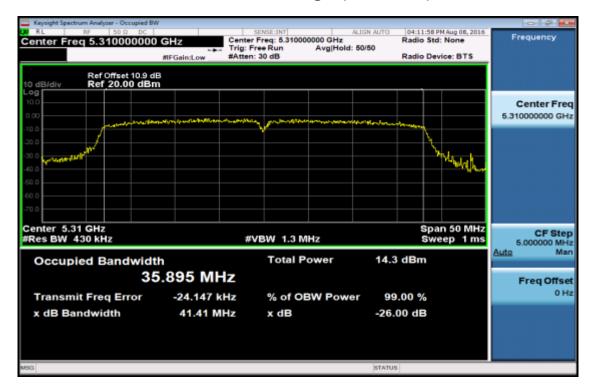
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802.11n HT40, 5250~5350 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5270 MHz)



26dB & 99% Band Width Test Data CH-High (5310MHz)



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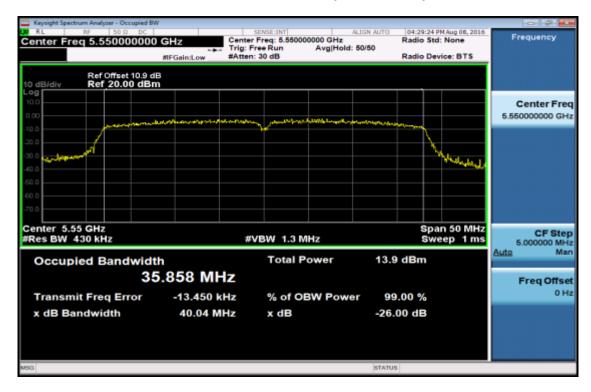
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802.11n HT40, 5470~5725 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5510 MHz)



26dB & 99% Band Width Test Data CH-Mid (5550 MHz)



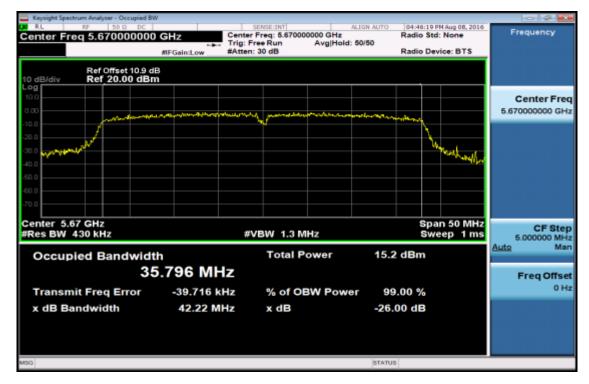
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26dB & 99% Band Width Test Data CH-High (5670 MHz)



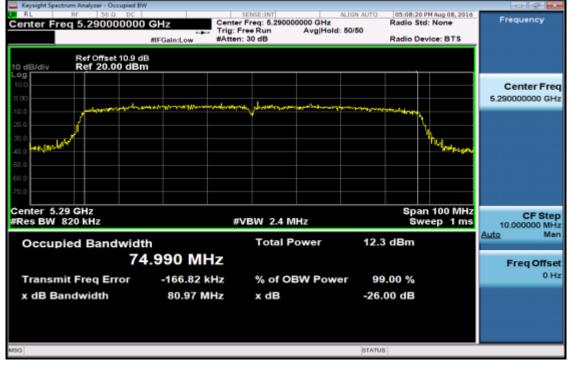
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802.11ac VHT80, 5150~5250 MHz (Main) 26dB & 99% Band Width Test Data CH-Mid (5210 MHz)



802.11ac VHT80, 5250~5350 MHz 26dB & 99% Band Width Test Data CH-Mid (5290 MHz)



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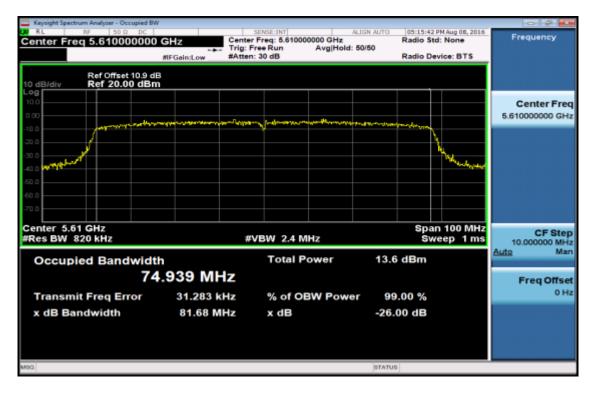
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802.11ac VHT80, 5470~5725 MHz (Main) 26dB & 99% Band Width Test Data CH-Low (5530 MHz)



26dB & 99% Band Width Test Data CH-High (5610 MHz)



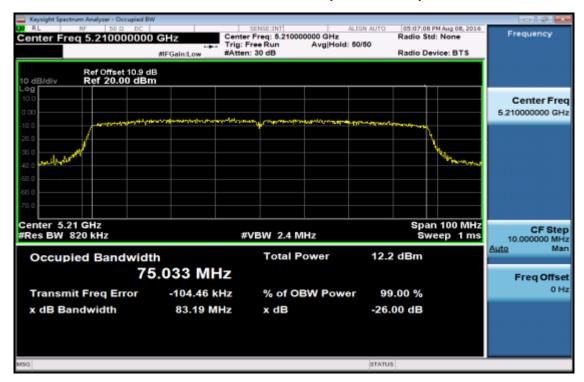
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802.11ac VHT80, 5150~5250 MHz (Aux) 26dB & 99% Band Width Test Data CH-Mid (5210 MHz)



802.11ac VHT80, 5250~5350 MHz 26dB & 99% Band Width Test Data CH-Mid (5290 MHz)

Keynight Spectrum Analyzer - Occupied B	N				- 3 🛋
Center Freq 5.290000000	Trig:	sense:int r Freq: 5.290000000 GHz Free Run Avg Hold n: 30 dB	Radio 5	OPHAug 08, 2016 Std: None Device: BTS	Frequency
Ref Offset 10.9 d 10 dB/div Ref 20.00 dBr					
10.0 0.00 -10.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ant grade provide a second		Center Freq 5.290000000 GHz
-20.0 -30.0 -40.0				A. Marriel	
-50.0 -60.0					
Center 5.29 GHz #Res BW 820 kHz	4	VBW 2.4 MHz		an 100 MHz weep 1 ms	CF Step 10.000000 MHz
Occupied Bandwid	th 5.021 MHz	Total Power	12.6 dBm		Auto Man Freq Offset
Transmit Freq Error	-93.681 kHz	% of OBW Pow	er 99.00 %		0 Hz
x dB Bandwidth	85.39 MHz	x dB	-26.00 dB		
MSG			STATUS		

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802.11ac VHT80, 5470~5725 MHz (Aux) 26dB & 99% Band Width Test Data CH-Low (5530 MHz)

Keysight Spectrum Analyzer - Occupied BV					
Center Freq 5.530000000	RF 59 00 DC SERESE::NT ALIGN AUTO 05:14:28 PH Aug 08, 2011 SC 5,5300000000 GHz Center Freq: 5.530000000 GHz Radio Std: None Trig: Free Run Avg Hold: 50/50 #Atten: 30 dB Radio Device: BTS				
10 dB/div Ref Offset 10.9 dB					
10.0 .10.0 .10.0		N reasoning and any rates	H-MAR Hardson		Center Fre 5.530000000 GH
-20.0				Walked	
-40.0					
70.0 Center 5.53 GHz #Res BW 820 kHz	#	/BW 2.4 MHz		n 100 MHz /eep 1 ms	CF Ste
Occupied Bandwidt		Total Power	12.8 dBm		10.000000 MH <u>Auto</u> Ma
	-24.265 kHz	% of OBW Powe	er 99.00 %		Freq Offse 0 H
x dB Bandwidth	80.80 MHz	x dB	-26.00 dB		
190			STATUS		

26dB & 99% Band Width Test Data CH-High (5610 MHz)



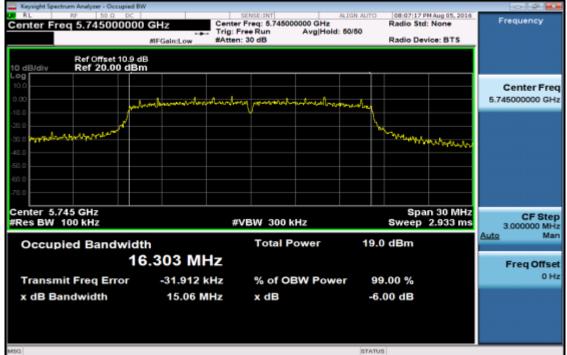
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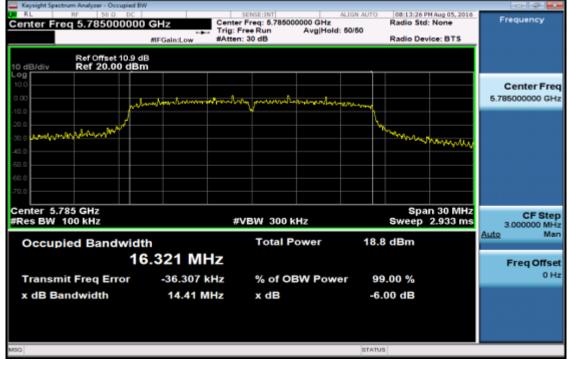
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6dB Band Width measure with Peak detector for FCC 802.11a, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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

Keysight Spectrum Analyzer - Occupied					
Center Freq 5.82500000	00 GHz Cent	er Freq: 5.825000000 GHz	Radio Std:		Frequency
		:FreeRun Avg Hold: en:30 dB	Radio Devic	e: BTS	
Ref Offset 10.9 10 dB/div Ref 20.00 dE					
10.0		way portration			Center Freq 5.82500000 GHz
-10.0		V			
-30.0 W-4A40A746 WAAAAAAA				4V~~~~	
-50.0					
Center 5.825 GHz				30 MHz	CF Step
#Res BW 100 kHz		#VBW 300 kHz	Sweep 2	2.933 ms	3.000000 MHz Auto Man
Occupied Bandwig	dth 6.326 MHz	Total Power	18.8 dBm		Freq Offset
Transmit Freq Error	-37.220 kHz	% of OBW Powe	er 99.00 %		0 Hz
x dB Bandwidth	15.31 MHz	x dB	-6.00 dB		
MSG			STATUS		

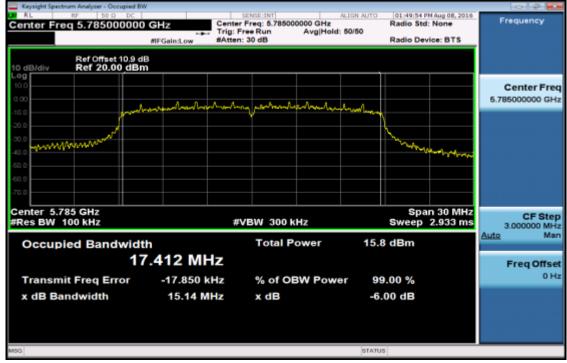
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802.11n HT20, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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



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

Keysight Spectrum Analyzer - Occupied B					
Center Freq 5.82500000	GHz Center	Freq: 5.825000000 GHz	Radio Sto	PM Aug 08, 2016 d: None	Frequency
	#IFGain:Low #Atten:	ree Run Avg Hold: : 30 dB		vice: BTS	
10 dB/div Ref 20.00 dB					
10.0 0.00 -10.0	mahantimentration	m montant	handland		Center Freq 5.825000000 GHz
-20.0 -30.0 -40.0 emerily part of the					
-40.0 -50.0 -60.0 -70.0				*****	
Center 5.825 GHz #Res BW 100 kHz	#\	/BW 300 kHz		an 30 MHz 2.933 ms	CF Step 3.000000 MHz
Occupied Bandwid	th 7.408 MHz	Total Power	15.7 dBm		Auto Man Freq Offset
Transmit Freq Error	-32.612 kHz	% of OBW Powe	er 99.00 %		0 Hz
x dB Bandwidth	15.15 MHz	x dB	-6.00 dB		
MSG			STATUS		

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802.11n_HT20, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5745 MHz)

🔤 Keysight Spectrum Analyzer - Occupied BV					
Center Freq 5.745000000	GHz Cent	sense:int ter Freq: 5.745000000 GHz		6:26 PM Aug 08, 2016 o Std: None	Frequency
	Trig	:FreeRun Avg Holo en:30 dB		o Device: BTS	
Ref Offset 10.9 d 10 dB/div Ref 20.00 dBn					
لمبير الم	welson have not a set of the	hay war have no warden warden warden war	monte		Center Freq 5.74500000 GHz
20.0 30.0 40.0 50.0			have	mar marine	
-60.0					
Center 5.745 GHz #Res BW 100 kHz		#VBW 300 kHz		Span 30 MHz ep 2.933 ms	CF Step 3.000000 MHz
Occupied Bandwidt		Total Power	15.5 dBr	n	<u>Auto</u> Man
17	.457 MHz				Freq Offset
Transmit Freq Error	-12.491 kHz	% of OBW Pow	er 99.00 °	%	0 Ha
x dB Bandwidth	15.15 MHz	x dB	-6.00 d	В	
MSG			STATUS		

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



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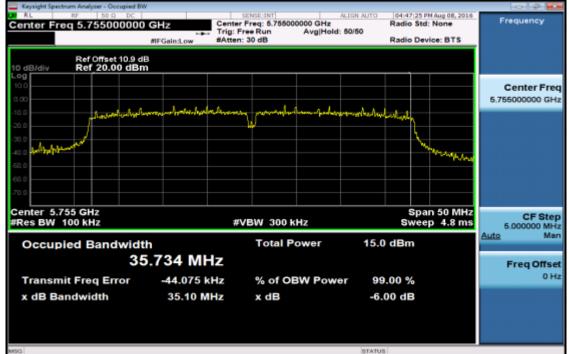
6dB Band Width Test Data CH-High (5825 MHz)

Keysight Spectrum Analyzer - Occupied B	W				
Center Freg 5.82500000		r Freq: 5.825000000 GHz	Radio Str	PH Aug 08, 2016 i: None	Frequency
	Trig: I	FreeRun Avg Hold n: 30 dB		vice: BTS	
Ref Offset 10.9 o 10 dB/div Ref 20.00 dB					
10.0 0.00 -10.0	melunarran	m portunder harden	thank and		Center Freq 5.825000000 GHz
20.0 30.0 40.0 Minter Market			a start and the start and the	motherpar	
-60.0				and	
-70.0 Center 5.825 GHz #Res BW 100 kHz	#	VBW 300 kHz		an 30 MHz 2.933 ms	CF Step 3.000000 MHz
Occupied Bandwid	th 7.431 MHz	Total Power	15.3 dBm		Auto Man Freq Offset
Transmit Freq Error	-15.818 kHz	% of OBW Powe	er 99.00 %		0 Hz
x dB Bandwidth	15.12 MHz	x dB	-6.00 dB		
MSG			STATUS		

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



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



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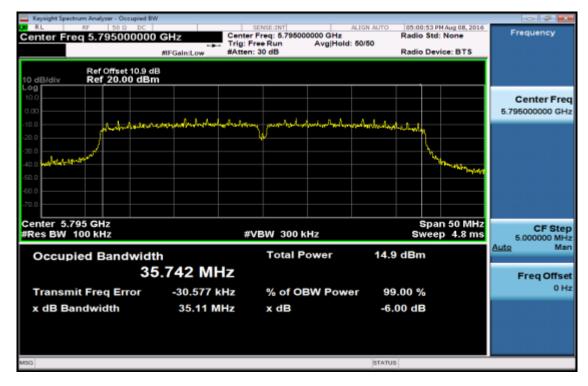
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802.11n HT40, 5725~5850 MHz (Aux) 6dB Band Width Test Data CH-Low (5755 MHz)



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



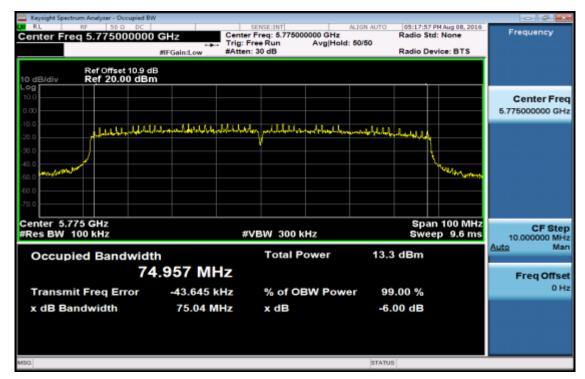
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802.11ac VHT80, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5775 MHz)



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

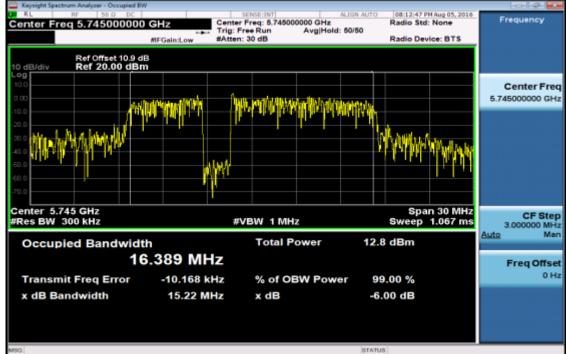
Keysight Spectrum								1			d) 🕺
Center Freq			Iz	Center Fr	req: 5.77500		ALIGN AUTO		7 PM Aug 08, 2016 td: None	Frequer	ncy
			Gain:Low	#Atten: 3		Avg Hold	: 50/50	Radio D	evice: BTS		
10 dB/div	Ref Offset 1 Ref 20.00										
10.0										Cente	r Fred
0.00										5.7750000	
-10.0	LANN	ويناءاوا واراري	with the	Mul	وإدارها والكسر		Musi	ALLA			
-30.0	\int				Y						
-40.0	/								And a		
-50.0									Waynes		
-60.0											
	011-										
Center 5.775 #Res BW 100				#VE	300 k	Hz			an 100 MHz ep 9.6 ms	CI 10.0000	F Step 00 MH:
Occupied	d Bandy	width			Total P	ower	13.	5 dBm		Auto	Mar
			71 MI	Ηz						Frea	Offse
Transmit I	Freg Erro	or	-13.3821	kHz	% of OE	W Pow	er 99	9.00 %			0 H:
x dB Band			75.13 N	IHz	x dB		-6	00 dB			
MSG							STATU	8			_
							_				_

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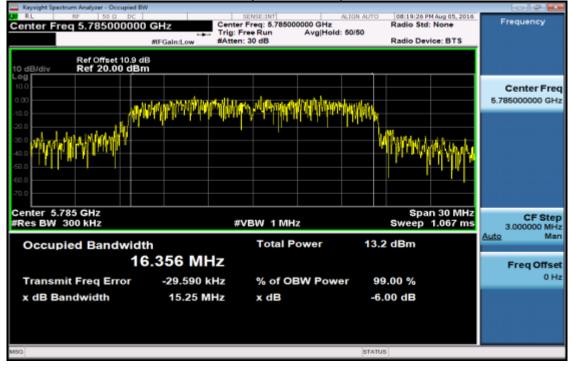
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6dB Band Width measure with Average detector for IC 802.11a, 5725~5850 MHz (Main) 6dB Band Width Test Data CH-Low (5745 MHz)



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

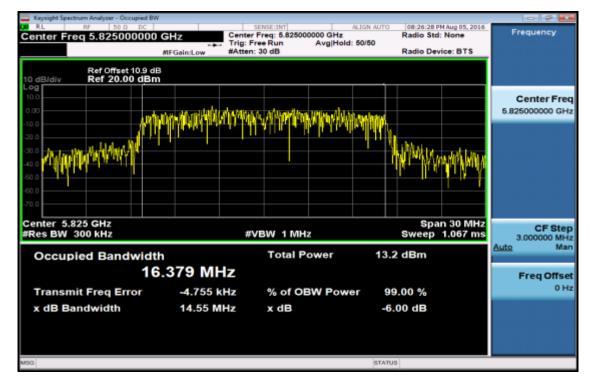


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6dB Band Width Test Data CH-High (5825 MHz)



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