

Report No.: E2/2014/C0004 Issue Date: Nov. 25, 2015

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# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

Product Name: 13 dBi Outdoor PoE Access Point

**Brand Name:** TRENDnet

Model No.: TEW-734APO

**Model Different:** N/A

FCC ID: XU8TEW734APO

**Report No.:** E2/2014/C0004

**Issue Date:** Nov. 25, 2015

FCC Rule Part: §15.407

Prepared for: TRENDnet, Inc.

20675 Manhattan Place, Torrance, CA 90501,

U.S.A

Prepared by: SGS Taiwan Ltd.

Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan

City, Taiwan 333





Cesting Laboratory
0513

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## VERIFICATION OF COMPLIANCE

TRENDnet, Inc. **Applicant:** 

20675 Manhattan Place, Torrance, CA 90501, U.S.A

**Product Name:** 13 dBi Outdoor PoE Access Point

**Brand Name: TRENDnet** 

**Model No.:** TEW-734APO

**Model Different:** N/A

**FCC ID:** XU8TEW734APO

**File Number:** E2/2014/C0004

**Date of Test:** Aug. 04, 2014 ~ Nov. 25, 2015

Aug. 04, 2014 **Date of EUT Received:** 

## 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 C63.4:2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407.

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

Test By:	Marcus Tseng	Date:	Nov. 25, 2015	
Prepared By:	Marcus Tseng / Engineer Karen Huang	Date:	Nov. 25, 2015	
Approved By:	Karen Huang / Clerk  Jim Chang / Asst. Manager	Date:	Nov. 25, 2015	

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# **Revision History**

Report Number	Revision	Description	Issue Date
E2/2014/C0004	Rev.00	Initial creation of document	Nov. 25, 2015

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## **GENERAL INFORMATION**

# 1.1. Product Description

## General:

Product Name:	13 dBi Outo	13 dBi Outdoor PoE Access Point				
Brand Name:	TRENDnet	TRENDnet				
Model No.:	TEW-734A	PO				
Model difference:	N/A					
Hardware Version:	N/A					
Software Version:	N/A					
Pole Mounting Ring:	Model No.: N/A, Supplier: N/A					
Ferrite Suppression Core:	Model No.: N/A, Supplier: N/A					
Grounding Wire:	Model No.: N/A, Supplier: N/A					
	24V by AC/DC Power Adapter					
Power Supply:	Adapter:	Model No.:GRT-240100, Supplier: GREAT POWER SUPPLY CO.,LTD				

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#### WLAN:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology		
11a	5150-5250	3	Avg. Power: 15.71 dBm			
(5GHz)	5725-5850	3	Avg. Power: 11.39 dBm			
11n	HT20 5150-5250	3	Avg. Power: (MIMO Chain 0): 15.12dBm (MIMO Chain 1): 15.74dBm (MIMO Chain 0+1):18.45 dBm			
(5GHz)	HT20 5725-5850	3	Avg. Power: (MIMO Chain 0): 12.02dBm (MIMO Chain 1): 12.32dBm (MIMO Chain 0+1):15.18 dBm	OFDM		
11n	HT40 5150-5250	2	Avg. Power: (MIMO Chain 0): 13.71dBm (MIMO Chain 1): 14.01.dBm (MIMO Chain 0+1):16.87 dBm			
(5GHz)	HT40 5725-5850	2	Avg. Power: (MIMO Chain 0):11.91 dBm (MIMO Chain 1): 12.06dBm (MIMO Chain 0+1):15.00 dBm			
Antenna Designation:		Printed Antenna, Model No.: 25-600001-00N Supplier:ZCOM. Main: Gain: 5GHz Gain:9.57dBi (5150MHz-5250MHz) 5GHz Gain:9.91dBi (5745MHz-5825MHz) Aux: Gain: 5GHz Gain: 9.72dBi (5150MHz-5250MHz) 5GHz Gain: 9.23dBi (5745MHz-5825MHz)				
Modulat	ion type:	64QAM, 16QAM, QPSK, BPSK for OFDM				
Transitio	on Rate:	802.11 a_20MHz: 6 – 54Mbps 802.11 n_20MHz: 6.5 – 144Mbps 802.11 n_40MHz: 13.5 – 300Mbps				

This report applies for frequency bands 5150 MHz- 5250MHz and 5725 MHz- 5850MHz.

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## IEEE 802.11n Spec:

MCS				NG	nna			Datarate(Mbps)				
Index	Nss	Modulation	R	NBPSC	NC.	NCBPS		NDBPS		nsGI	400nsGI	
			12000		20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bite per single carrier
NCBPS	Number of coded bite per symbol
NDBPS	Number of data bite per symbol
GI	Guard interval

## 802.11n\_HT20 MCS8 -15

Mos	MCS					N	N	Data rate (Mb/s)		
MCS Index	Modulation	R	N <sub>BPSCS</sub> (i <sub>SS</sub> )	N <sub>SD</sub>	N <sub>SP</sub>	N <sub>CBPS</sub>	$N_{DBPS}$	800 ns GI	400 ns GI (see NOTE)	
8	BPSK	1/2	1	52	4	104	52	13.0	14.4	
9	QPSK	1/2	2	52	4	208	104	26.0	28.9	
10	QPSK	3/4	2	52	4	208	156	39.0	43.3	
11	16-QAM	1/2	4	52	4	416	208	52.0	57.8	
12	16-QAM	3/4	4	52	4	416	312	78.0	86.7	
13	64-QAM	2/3	6	52	4	624	416	104.0	115.6	
14	64-QAM	3/4	6	52	4	624	468	117.0	130.0	
15	64-QAM	5/6	6	52	4	624	520	130.0	144.4	
NOTE-T	NOTE—The 400 ns GI rate values are rounded to 1 decimal place.									

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## 1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: XU8TEW734APO filing to comply with Section 15.407 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under the certification procedure.

## 1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:2009 & KDB789033 D02 published on 06, 06, 2014. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Jun. 2014 KDB789033 D02 for compliance to FCC 47 CFR 15.407 requirements.

## 1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan Township, Taoyuan County, Taiwan 333 which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number: 990257. Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

## 1.5. Special Accessories

There is 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. According to the general criterion in Section 7.1 of ANSI C63.4:2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 & 6.2.2, is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

## 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 according to the requirements in Section 8 and 13 and of ANSI C63.4:2009,.

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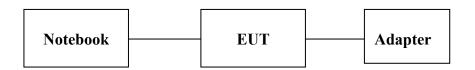


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# 2.4. Configuration of Tested System

Fig. 2-1 Radiated Emission & Conducted Configuration



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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	L412	LR-027LM	shielding	Un-shielding

Fig. 2-2 AC Power Line Conducted Emission



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

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

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## **SUMMARY OF TEST RESULT**

FCC Rules	<b>Description Of Test</b>	Result
§15.207	AC Power Line Conducted	Compliant
	Emission	
§15.407(a) (1) (2)	26 dB & 6dB & 99%	Compliant
	Emission Bandwidth	
§15.407(a) (1) (2)	The Maximum Output Pow-	Compliant
	er Measurement	
§15.407(a) (5)	Peak Power Spectral Density	Compliant
	Measurement	
§15.407(b) (1) (2) (3)	Undesirable Emission – Con-	Compliant
	ducted Measurement	
§15.407(b) (1) (2) (3)(6) (7)	Undesirable Emission – Radiated	Compliant
	Measurement	
§15.407(c)	Transmission in case of Absence	Compliant
	of Information	
§15.407(g)	Frequency Stability	Compliant
§15.203	Antenna Requirement	Compliant

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## 4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

a mode:

5150 MHz-5250MHz: Channel lowest(5180MHz)

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Remark: While conducting average power measurement, duty cycle of each mode (n\_ht20/n\_ht40) shall be greater than 98%. All duty cycle is pre-scanned, but verified to be greater than 98%, where  $n_ht20 = 99\%$ , and  $n_ht_40 = 98.96\%$ , where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

#### Formula:

 $Duty\ Cycle = Ton / (Ton + Toff)$ 

## Test Procedure:

Set span = 0, RBW = 8MHz, the largest as possible, VBW = 8MHz, Detector = Peak, and RBW, and VBW =8 MHz where zero-span is permissible, that > 50/T, where T is  $\sim 4.3$ ms Duty Cycle:

	Antenna	<b>Duty Cycle</b>	Duty Fator (dB)
802.11 a	Single	0.968	0.14

Mimo-Main

802.11 n\_20

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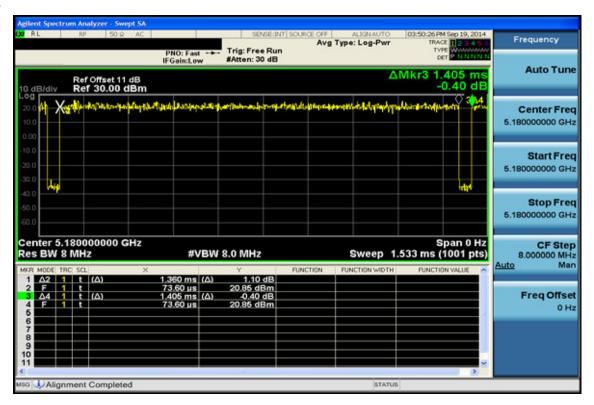


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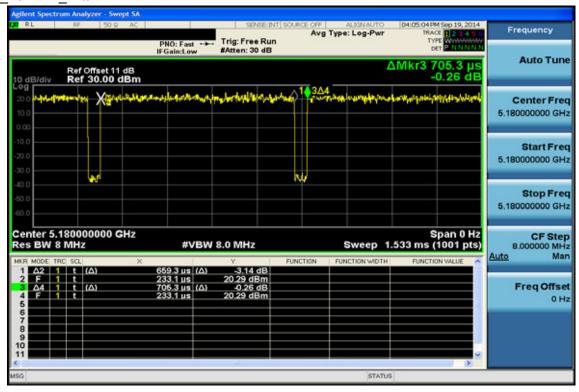
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## **Duty Factor:**

#### 802.11a



#### 802.11 n 20MHz Main



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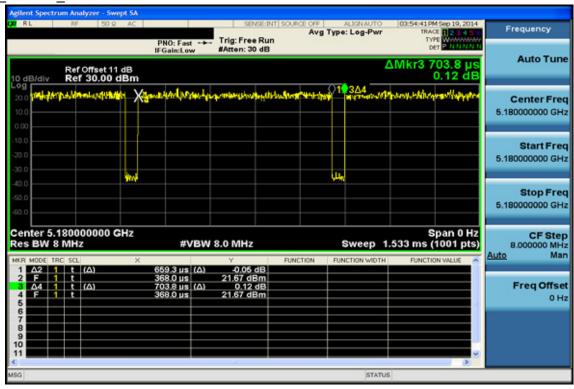
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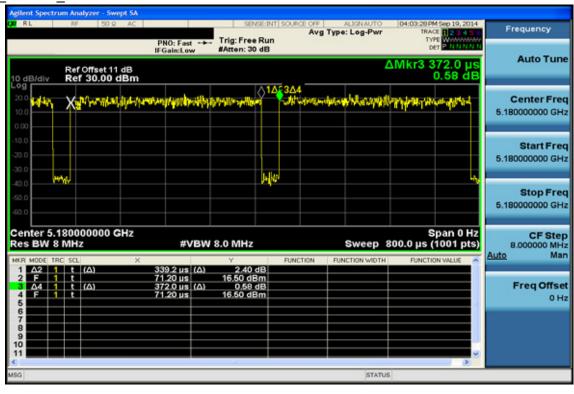
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## 802.11 n 20MHz Aux



#### 802.11 n 40MHz Main



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## 802.11 n 40MHz Aux



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## **MEASUREMENT UNCERTAINTY**

Test Items	Uncertainty	
AC Power Line Conducted Emission	+/- 2.586 dB	
26 dB and 99% Emission Bandwidth	+/- 123.36 Hz	
The Maximum Output Power Measurement	+/- 1.42 dB	
Peak Power Spectral Density Measurement	+/- 1.55 dB	
Peak Excursion Measurement	+/- 1.55 dB	
Undesirable Emission –	+/- 1.55 dB	
Conducted Measurement		
Transmission in case of Absence of Information	+/- 1.55 dB	
Frequency Stability	+/- 123.36 Hz	
TPC and DFS Measurement	+/- 123.36 Hz	
Temperature	+/- 0.8 °C	
Humidity	+/- 4.7 %	
DC / AC Power Source	DC= +/- 1%, 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 : <b>Horizontal</b> )	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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## **CONDUCTED EMISSION TEST**

## 6.1. Standard Applicable

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

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

#### Note

## **6.2.** Measurement Equipment Used:

Conducted Emission Test Site						
<b>EQUIPMENT</b>	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015	
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015	
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/19/2014	03/18/2015	
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2013	11/25/2014	
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015	

## 6.3. EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2009.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz power source.

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<sup>1.</sup> The lower limit shall apply at the transition frequencies

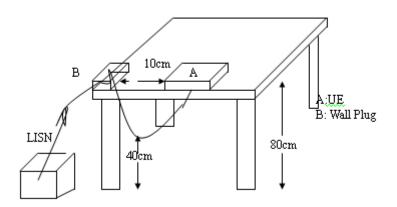
<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.



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## 6.4. Test SET-UP (Block Diagram of Configuration)



## 6.5. Measurement Procedure

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

## 6.6. Measurement Result

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

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

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode: Operation mode Test Date: Sep. 10, 2014

Temperature: 26

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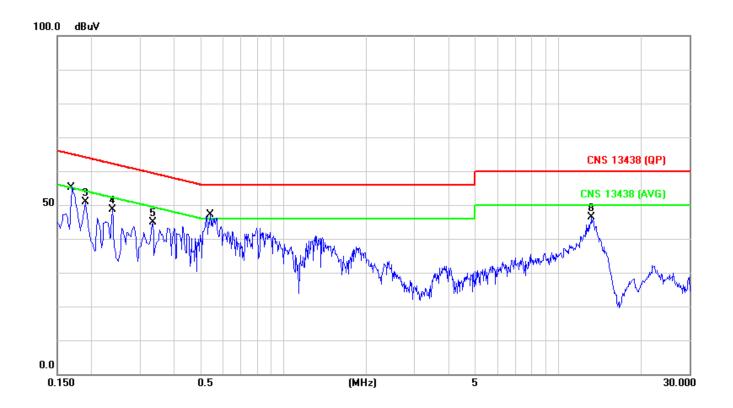
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No.₽	Mk.₽	Freq.₽	Reading₽	Factor€	Measurement	Limit₽	Over₽	Detector₽	Comment₽
42	4	(MHz)₽	dBuV₽	(dB)₄ <sup>□</sup>	(dBuV)₽	(dBuV)₽	(dB)₽	₽	4
1⇔	4	0.1700₽	49.50₽	0.09₽	49.59₽	64.96₽	-15.37₽	QP₽	₽
2↔	٠	0.1700₽	30.90₽	0.09₽	30.99₽	54.96₽	-23.97₽	AVG₽	ė.
3↔	٠	0.1900₽	50.82₽	0.09₽	50.91₽	64.04₽	-13.13₽	peak₽	ė.
4↔	٠	0.2380₽	48.58₽	0.11₽	48.69₽	62.17₽	-13.48₽	peak₽	ė.
5₽	٠	0.3340₽	44.61₽	0.15₽	44.76₽	59.35₽	-14.59₽	peak₽	ė.
6₽	*,	0.5420₽	44.50₽	0.25₽	44.75₽	56.00₽	-11.25₽	QP₽	ė.
7₽	٠	0.5420₽	31.70₽	0.25₽	31.95₽	46.00₽	-14.05₽	AVG₽	ė.
8₽	₽	13.2060₽	45.86₽	0.64₽	46.50₽	60.00₽	-13.50₽	peak₽	ą.

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## 7. 26dB & 6dB & 99% EMISSION BANDWIDTH MEASUREMENT

# 7.1 Standard Applicable

According to §15.407(a). No Limit required.

According to §15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## 7.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode. (5150-5250MHz)
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.

3.

- 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 5.725-5.85GHz
- 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.

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# 7.3 Measurement Equipment Used:

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibra-	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2013/10/26	2014/10/25
Power Meter	Anritsu	ML2496A	1326001	2014/06/20	2015/06/19
Power Sensor	Anritsu	MA2411B	1315048	2014/06/20	2015/06/19
Power Sensor	Anritsu	MA2411B	1315049	2014/06/20	2015/06/19
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	2	2014/01/06	2015/01/05
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	3	2014/01/06	2015/01/05
Coaxial Cable 80cm	WOKEN	00100A1F1A185C	1	2014/01/06	2015/01/05
DC Block	Mini-Circuits	BLK-18-S+	4	2014/01/06	2015/01/05
DC Block	PASTERNACK	PE8210	5	2014/01/06	2015/01/05
Splitter	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-019	2014/01/06	2015/01/05
Splitter	WOKEN	NA	DOM35LW1A2	2014/01/06	2015/01/05
Attenuator	Mini-Circuits	BW-S10W2+	6	2014/01/06	2015/01/05
Attenuator	WOKEN	218FS-10	7	2014/01/06	2015/01/05
Temperature Chamber	TERCHY	MHK-120LK	1020582	2014/06/18	2015/06/17
Communication Tester	R&S	CMW500	131121	2014/01/16	2015/01/15
Communication Tester	Anritsu	MT8820C	6201107337	2014/04/24	2015/04/23
DC Power Supply	Agilent	E3640A	MY53140006	2014/05/31	2015/05/30
DC Power Supply	Agilent	E3640A	MY53130054	2014/05/21	2015/05/20

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Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibra- tion Date	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY53400256	2013/10/26	2014/10/25
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	2	2014/01/06	2015/01/05
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	3	2014/01/06	2015/01/05
Coaxial Cable 80cm	WOKEN	00100A1F1A185C	1	2014/01/06	2015/01/05
DC Block	Mini-Circuits	BLK-18-S+	4	2014/01/06	2015/01/05
DC Block	PASTERNACK	PE8210	5	2014/01/06	2015/01/05
Splitter	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-019	2014/01/06	2015/01/05
Splitter	WOKEN	NA	DOM35LW1A2	2014/01/06	2015/01/05
Attenuator	Mini-Circuits	BW-S10W2+	6	2014/01/06	2015/01/05
Attenuator	WOKEN	218FS-10	7	2014/01/06	2015/01/05
Communication Tester	R&S	CMW500	131121	2014/01/16	2015/01/15
Communication Tester	Anritsu	MT8820C	6201107337	2014/04/24	2015/04/23

Conducted Emission Test Site – For 99% Bandwidth					
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		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	00100A1F1A1 95C	RF01	12/19/2014	12/18/2015
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015
Splitter	RF-LAMBAD	RFLT2W1G18 G	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

Remark: Please note that the duration to conduct the test took place in the mean time when the calibration for several equipments is due, and therefore extra tables of equipment calibration is constructed to indicate the calibration work is still maintained.

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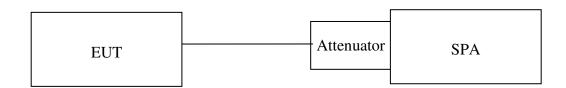
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# **Test Set-up:**



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## 7.5 Measurement Result

802.11a, 5150~5250MHz

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5180	22.000	13.42
5220	21.530	13.33
5240	21.810	13.39

802.11n HT20, 5150~5250MHz

Main

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5180	21.560	13.34
5220	21.230	13.27
5240	20.800	13.18

Aux

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5180	21.040	13.23
5220	21.040	13.23
5240	21.140	13.25

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## 802.11n HT40, 5150~5250MHz

#### Main

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	44.370	16.47
5230	43.930	16.43

Aux

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5190	42.650	16.30
5230	42.820	16.32

## 802.11a, 5725~5850MHz

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5745	16.330	12.13
5785	16.070	12.06
5825	16.050	12.05

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## 802.11n HT20, 5725~5850MHz

#### Main

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5745	17.630	12.46
5785	17.630	12.46
5825	17.640	12.46

#### Aux

Frequency (MHz)	6dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5745	17.570	12.45
5785	17.590	12.45
5825	17.550	12.44

## 802.11n HT40, 5725~5850MHz

#### Main

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	35.790	15.54
5795	35.720	15.53

#### Aux

Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log (B) (dB)
5755	35.860	15.55
5795	35.560	15.51

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#### 20dB Bandwidth

802.11a, 5150~5250 MHz

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5249.090	5250

802.11n HT20, 5150~5350 MHz

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5249.540	5250

Aux

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5240	5249.510	5250

802.11n HT40, 5150~5350 MHz

Main

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.780	5250

Aux

Frequency (MHz)	Measured Frequency (MHz)	Limit (MHz)
5230	5248.670	5250

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## For 99% Bandwidth

802.11a, 5150~5250 MHz

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5240	16.362	12.14

802.11n HT20, 5150~5350 MHz

Main

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5240	17.555	12.44

Aux

Frequency (MHz)	99% Bandwidth (MHz)	10 Log (B) (dB)
5240	17.554	12.44

802.11n HT40, 5150~5350 MHz

Main

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5230	36.540	15.63

Aux

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5230	36.530	15.63

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## 802.11a, 5725~5850MHz

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5745	16.364	12.14

802.11n HT20, 5725~5850MHz

Main

Frequency (MHz)	99% Bandwidth (MHz)	10 Log (B) (dB)
5745	17.580	12.45

Aux

Frequency (MHz)	99% Bandwidth (MHz)	10 Log (B) (dB)
5745	17.551	12.44

802.11n HT40, 5725~5850MHz

Main

Frequency (MHz)	99% Bandwidth (MHz)	10 Log (B) (dB)
5755	36.299	15.60

Aux

Frequency	99% Bandwidth	10 Log (B)
(MHz)	(MHz)	(dB)
5755	36.272	15.60

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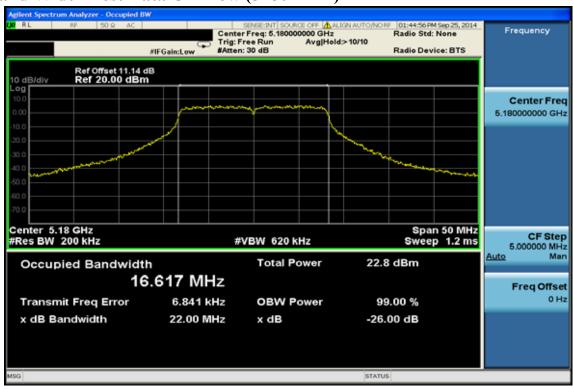
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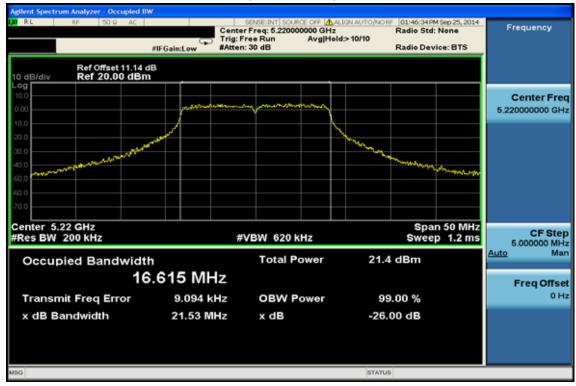
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# 802.11a, 5150~5250 MHz 26dB Band Width Test Data CH-Low (5180 MHz)



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



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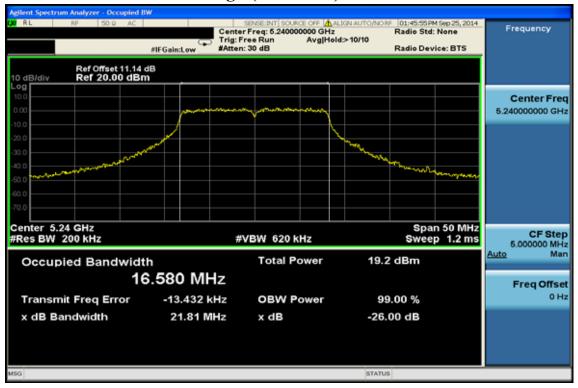
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# 26dB Band Width Test Data CH-High (5240MHz)



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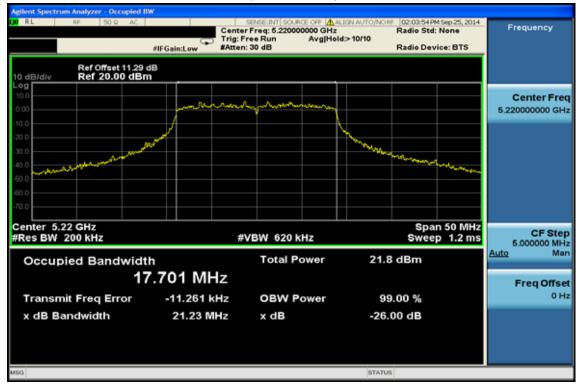
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# 802.11n HT20, 5150~5250 MHz for Main 26dB Band Width Test Data CH-Low (5180MHz)



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



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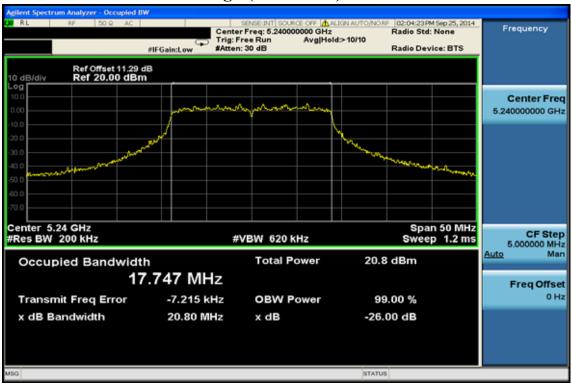
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# 26dB Band Width Test Data CH-High (5240 MHz)



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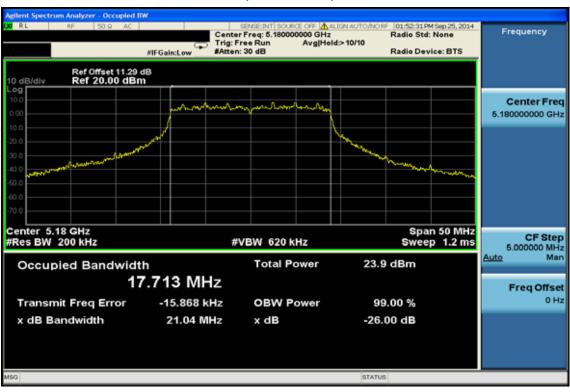
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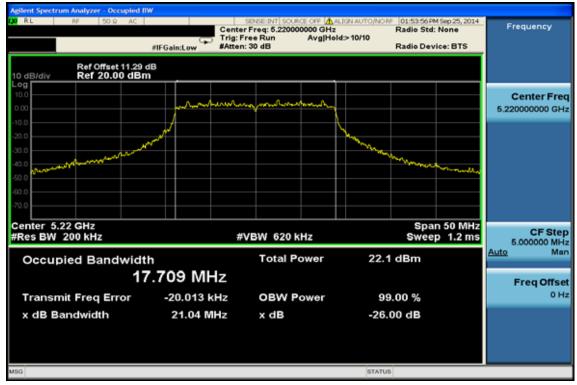
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#### 802.11n HT20, 5150~5250 MHz for Aux 26dB Band Width Test Data CH-Low (5180 MHz)



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



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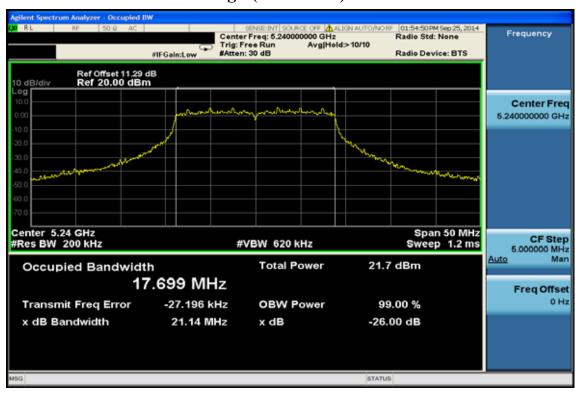
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#### 26dB Band Width Test Data CH-High (5240 MHz)



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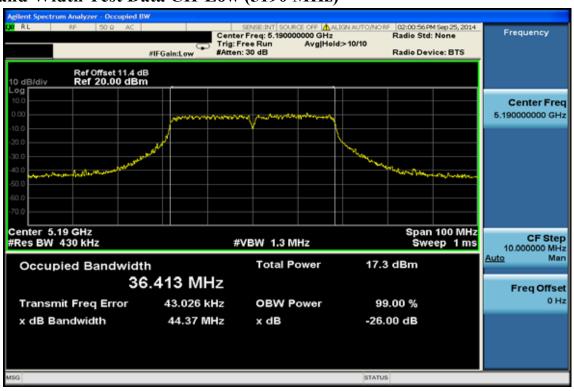
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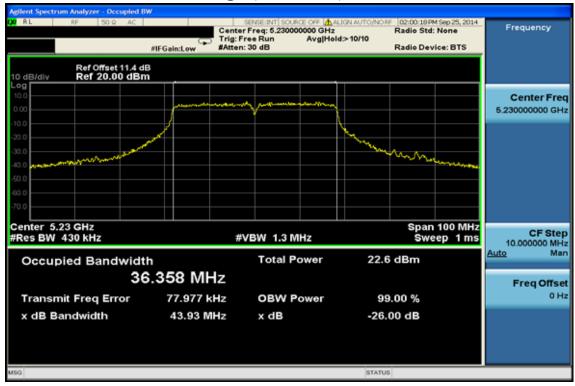
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## 802.11n HT40, 5150~5250 MHz for Main 26dB Band Width Test Data CH-Low (5190 MHz)



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



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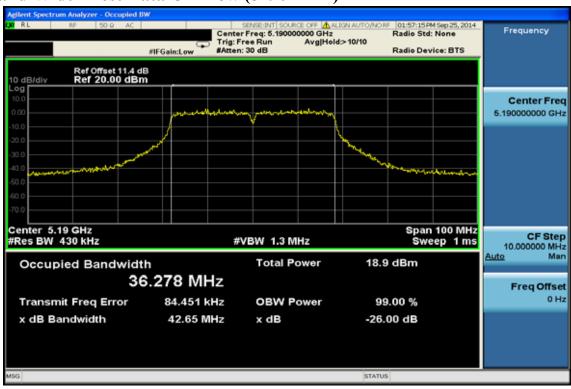
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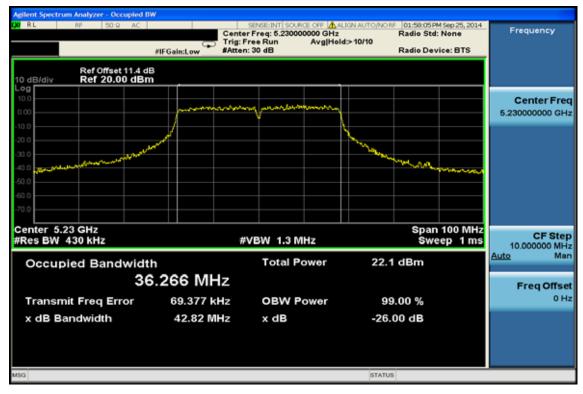
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#### 802.11n HT40, 5150~5250 MHz for Aux 26dB Band Width Test Data CH-Low (5190 MHz)



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



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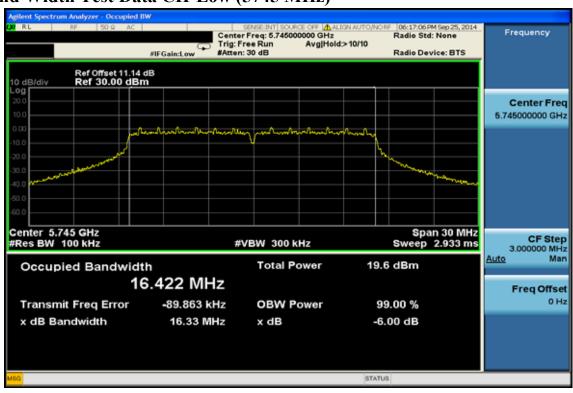
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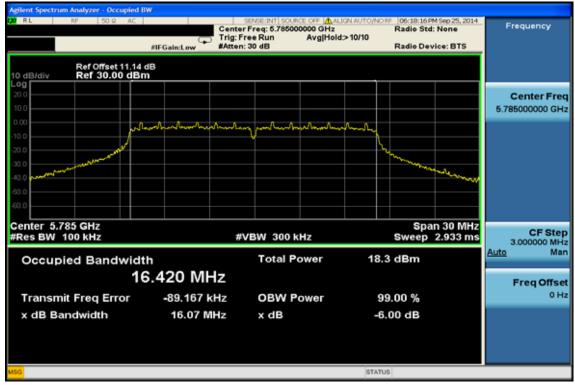
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#### 802.11a, 5725~5850 MHz 6dB Band Width Test Data CH-Low (5745 MHz)



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



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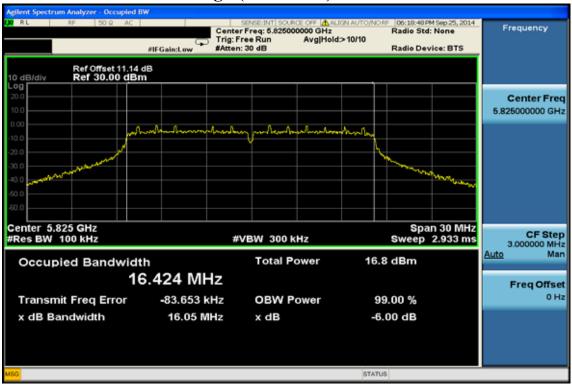
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#### 6dB Band Width Test Data CH-High (5825 MHz)



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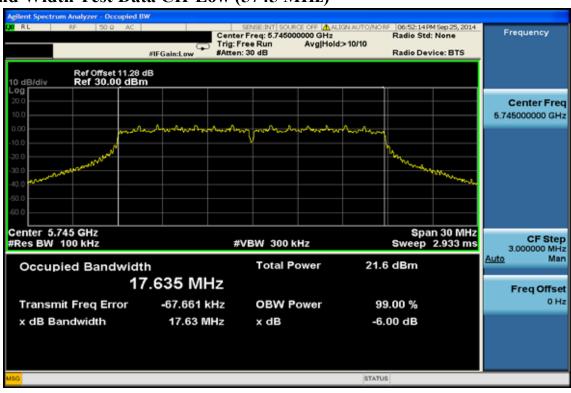
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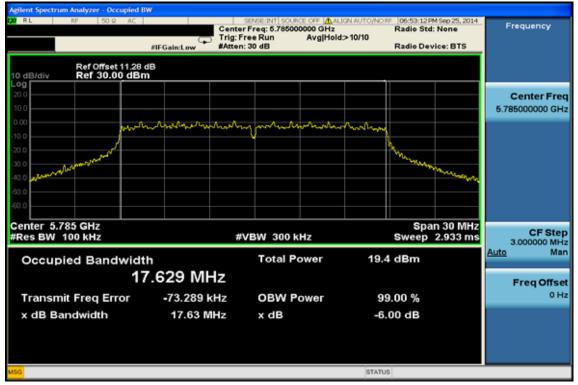
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#### 802.11n HT20, 5725~5850 MHz for Main 6dB Band Width Test Data CH-Low (5745 MHz)



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



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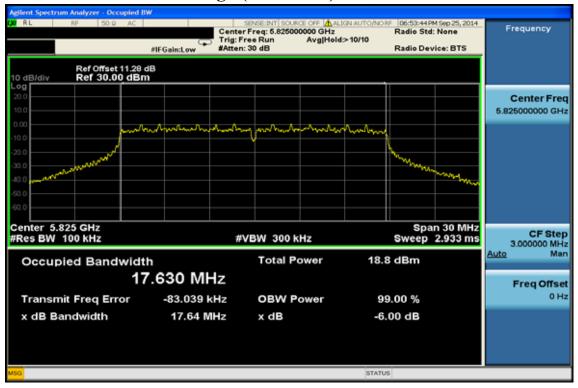
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#### 6dB Band Width Test Data CH-High (5825 MHz)



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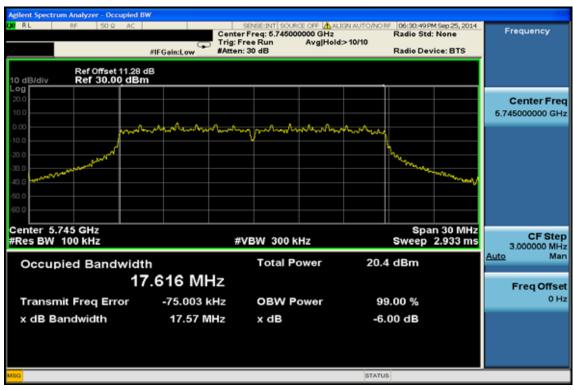
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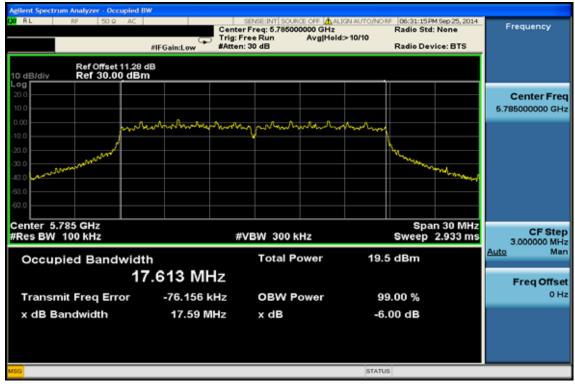
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#### 802.11n HT20, 5725~5850 MHz for Aux 6dB Band Width Test Data CH-Low (5745 MHz)



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



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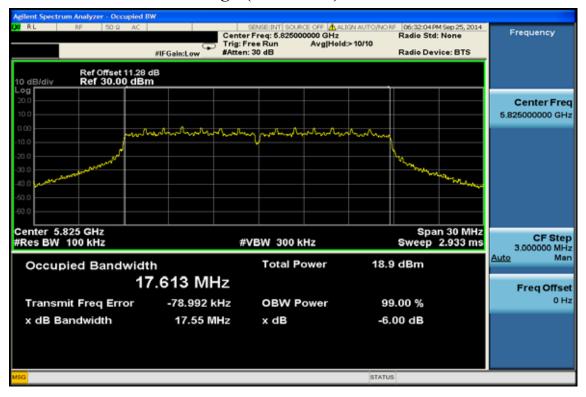
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#### 6dB Band Width Test Data CH-High (5825 MHz)



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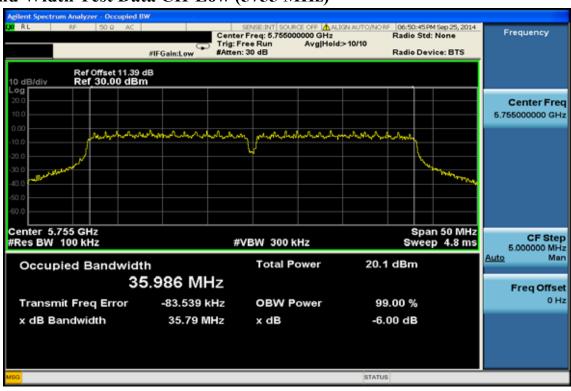
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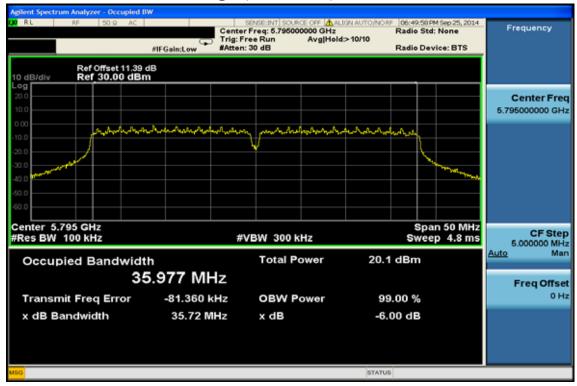


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### 802.11n HT40, 5725~5850 MHz for Main 6dB Band Width Test Data CH-Low (5755 MHz)



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



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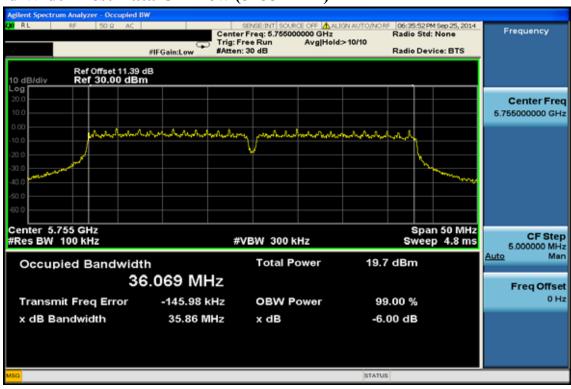
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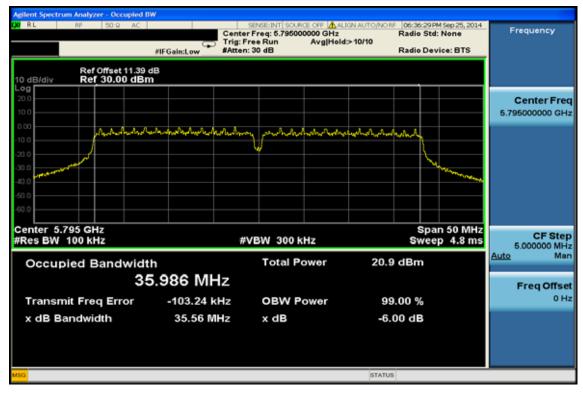
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#### 802.11n HT40, 5725~5850 MHz for Aux 6dB Band Width Test Data CH-Low (5755 MHz)



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



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# 802.11a, 5150~5250 MHz

### 20dB Band Width Test Data CH-High (5240MHz)



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#### 802.11n HT20, 5150~5350 MHz for Main 20dB Band Width Test Data CH-High (5240 MHz)



#### 802.11n HT20, 5150~5350 MHz for Aux 20dB Band Width Test Data CH-High (5240 MHz)



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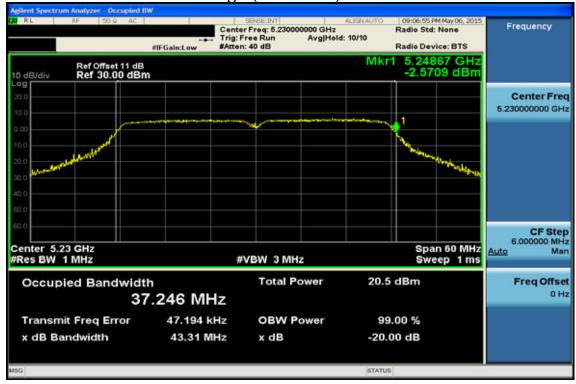
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#### 802.11n HT40, 5150~5350 MHz for Main 20dB Band Width Test Data CH-High (5230 MHz)



# 802.11n HT40, 5150~5350 MHz for Aux 20dB Band Width Test Data CH-High (5230MHz)



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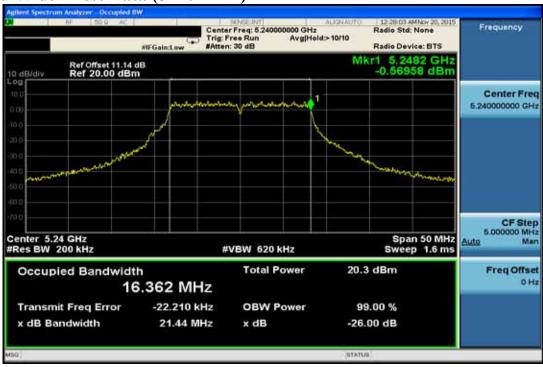
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### 802.11a, 5150~5250 MHz 99% Band Width Test Data (5240 MHz)



# 802.11n HT20, 5150~5250 MHz for Main 99% Band Width Test Data (5240 MHz)



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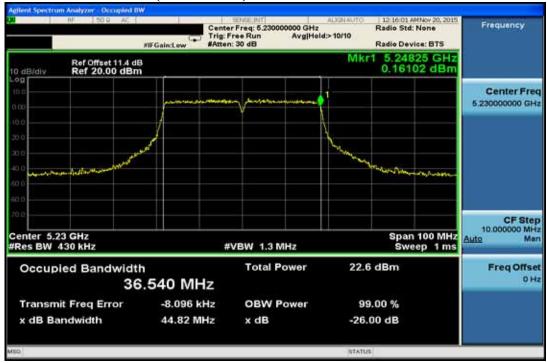
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### 802.11n HT20, 5150~5250 MHz for Aux 99% Band Width Test Data (5240 MHz)



### 802.11n HT40, 5150~5250 MHz for Main 99% Band Width Test Data (5230 MHz)



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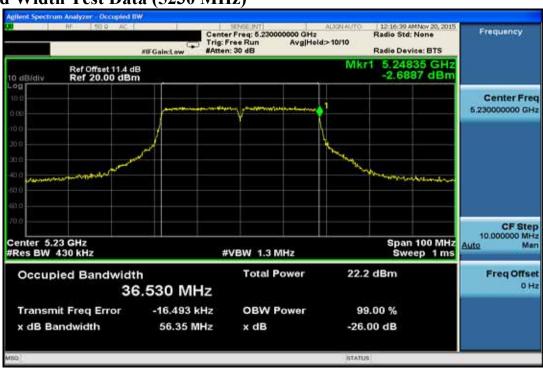
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#### 802.11n HT40, 5150~5250 MHz for Aux 99% Band Width Test Data (5230 MHz)



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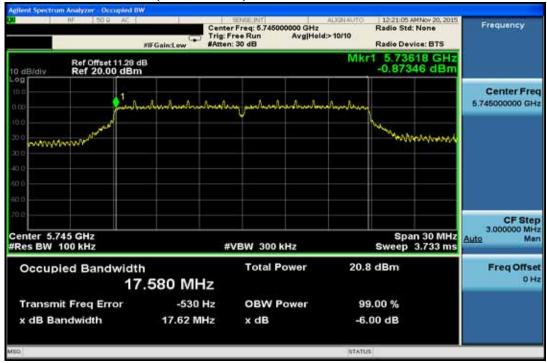
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### 802.11a, 5725~5850 MHz 99% Band Width Test Data (5745 MHz)



### 802.11n HT20, 5725~5850 MHz for Main 99% Band Width Test Data (5745 MHz)



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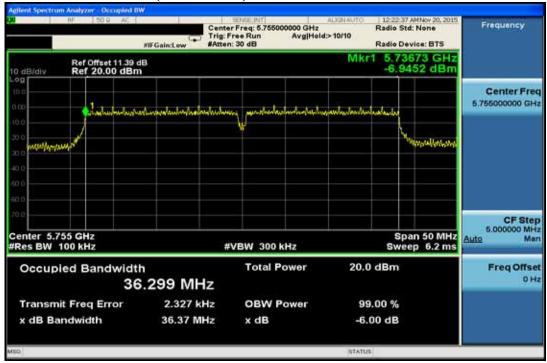


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### 802.11n HT20, 5725~5850 MHz for Aux 99% Band Width Test Data (5745 MHz)



### 802.11n HT40, 5725~5850 MHz for Main 99% Band Width Test Data (5755 MHz)



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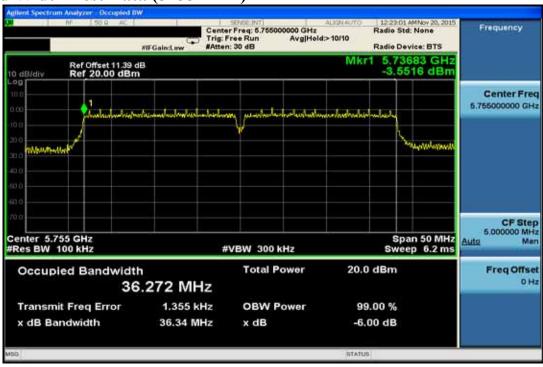
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#### 802.11n HT40, 5725~5850 MHz for Aux 99% Band Width Test Data (5755 MHz)



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#### 8. The MAXIMUM OUTPUT POWER MEASUREMENT

#### 8.1 Standard Applicable

According to §15.407(a)

For the band 5.150-5.350 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 1W (30dBm)

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

Effective Legacy Gain (dBi) = 12.73

The effective legacy gain is 12.73 dBi, therefore the limit needs to reduce.

Single mode: 30 - (9.72 - 6) = 26.28 dBm

MIMO mode: 30 - (12.73 - 6) = 23.27dBm

For the band 5.725-5.850 GHz, the maximum conducted power over the frequency of operation shall not exceed the lesser of 1W (30dBm)

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

Effective Legacy Gain (dBi) = 12.92

The effective legacy gain is 12.92 dBi, therefore the limit needs to reduce.

Single mode: 30 - (9.91 - 6) = 26.09dBm

MIMO mode: 30 - (12.92 - 6) = 23.08dBm

#### 8.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
- 3. Set the offset  $10*\log(1/x)$  (x=0.4), 0.397940 approximately
- 4. Record the max. reading.
- 5. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

Note: For EIRP/ERP measurement complying with RSS-210 9.2, the formula as deduced in 1.3.2 of KDB 412172 D02 is used to calculate. ERP/EIRP = Pt + Gt - Lc, where Pt= transmitter output power measured directly at antenna port, expressing in dBm, and Gt = gain of the transmitting antenna in dBi that can be referred in antenna spec provided by the manufacturer in section 1.1, Lc = signal attenuation in the cable between the transmitting port and antenna.

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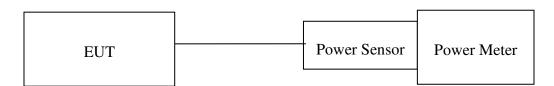
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#### 8.3 **Measurement Equipment Used:**

Refer to section 7.3 for details.

#### 8.4 **Test Set-up:**



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#### 8.5 Measurement Result

802 11 a

	$\frac{2.11 \text{ a}}{\text{ole loss}} = 0$	The Maximum Output Power								
СН	Frequency (MHz)		Data Rate					Required Limit		
	(1/2222)	6M	9M	12M	18M	24M	36M	48M	54M	
36	5180	15.71	15.37	15.01	14.69	14.34	14.01	13.68	13.23	26.28 dBm
44	5220	15.14	14.77	14.36	13.98	13.60	13.22	12.82	12.57	26.28 dBm
48	5240	12.41	12.06	11.63	11.24	10.82	10.43	10.04	9.75	26.28 dBm

Note: Offset 11dB

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802.11n HT20 MIMO operation CH0

Cable loss = (	)	The Maximum Output Powe	er
CH Frequen (MHz)	ey	Data Rate	Required Limit
	MCS8		

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802 11n HT40 MIMO operation CH0

Cable loss = 0	The Maximum Output Power	
CH Frequency (MHz)	Data Rate	Required Lim- it

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802.11 a

Cal	ole loss = $0$		The Maximum Output Power							
СН	Frequency (MHz)		Data Rate				Required Limit			
	(1/1112)	6M	9M	12M	18M	24M	36M	48M	54M	riequii eu Eiiiii
149	5745	11.39	11.04	10.72	10.38	10.04	9.70	9.37	8.86	26.09 dBm
157	5785	10.44	10.10	9.74	9.40	9.06	8.69	8.34	7.88	26.09 dBm
165	5825	10.10	9.75	9.41	9.08	8.75	8.43	8.11	7.65	26.09 dBm

Note: Offset 11dB

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802.11n HT20 MIMO operation CH0

0021111111201	Anti-o operation erro	
Cable loss = 0	The Maximum Output Power	
CH Frequency (MHz)	Data Rate	Required Limit
	MCS8	

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802.11n HT40 MIMO operation CH0

Cat	ole loss = 0	The Maximum Output Power	
СН	Frequency (MHz)	Data Rate MCS8	Required Lim- it

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#### **Maximum Power Spectral Density**

## **Standard Applicable**

According to §15.407(a)

- 1. For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 17 dBm in any 1 MHz band.
- 2. For the band 5.725-5.850 GHz and 5.47-5.725GMHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band.

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.

#### Measurement Procedure (following procedure F, & E) d) method SA-2 in KDB789033 D02) 9.2

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- 3. Set RBW=1MHz, VBW=3MHz, Span=50MHz/80MHz (Base Mode), 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)
- 4. User the cursor on spectrum to peak search the highest level of trace
- 5. Add offset, duty factor = 0.013048, on the spectrum
- 6. Record the max. reading.
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

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

Refer to section 7.3 for details.

#### 9.4 Test Set-up:

Refer to section 7.4 for details.

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#### 9.5 Measurement Result

802.11a, 5150~5250 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	1.36	13.28	-11.92
5220	-2.30	13.28	-15.58
5240	-1.60	13.28	-14.88

Note: Offset 11.14dB

802.11n HT20, 5150~5250 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5180	3.28	10.27	-6.99
5220	-2.25	10.27	-12.52
5240	0.62	10.27	-9.65

Note: Offset 11.29dB

802.11n HT40, 5150~5250 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5190	-9.51	10.27	-19.78
5230	-1.69	10.27	-11.96

Note: Offset 11.4dB

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802.11a, 5725~5850 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5745	-5.69	26.09	-31.78
5785	-7.52	26.09	-33.61
5825	-7.80	26.09	-33.89

Note: Offset 11.14dB

802.11n HT20, 5725~5850 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5745	-7.69	23.08	-30.77
5785	-6.66	23.08	-29.74
5825	-7.09	23.08	-30.17

Note: Offset 11.28dB

#### 802.11n HT40, 5725~5850 MHz

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
5755	-11.70	23.08	-34.78
5795	-9.02	23.08	-32.10

Note: Offset 11.39dB

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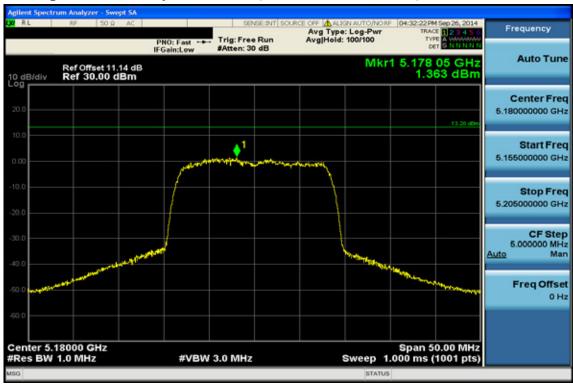


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# 802.11a, 5150~5250 MHz

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



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



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



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



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



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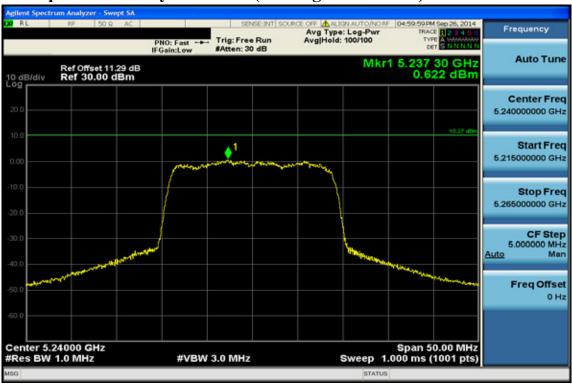
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#### Peak Power Spectral Density Data Plot (CH High 5240 MHz)



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# 802.11n HT40, 5150~5250 MHz

# Peak Power Spectral Density Data Plot (CH Low 5190 MHz)



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



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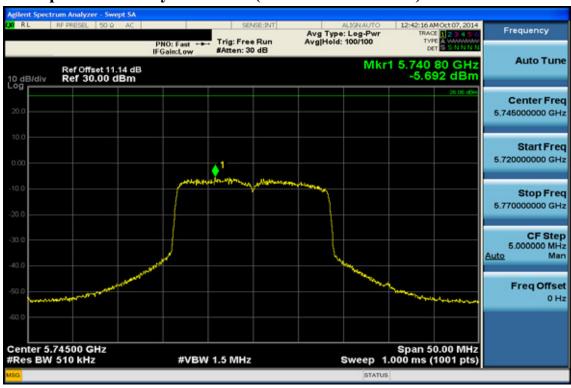
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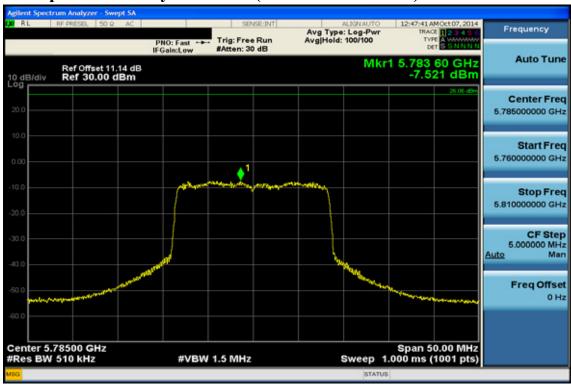
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# 802.11a, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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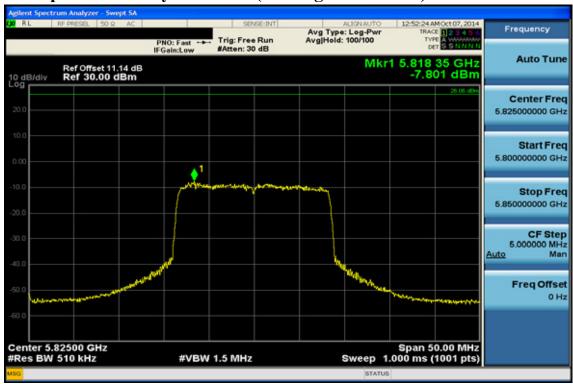
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# Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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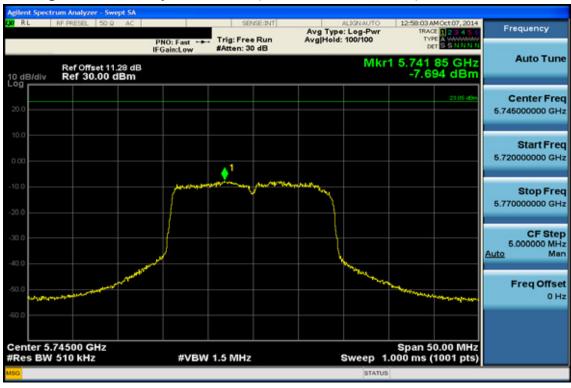
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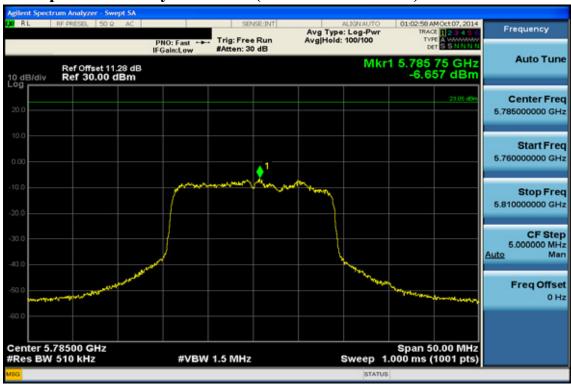
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# 802.11a, 5725~5850 MHz Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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



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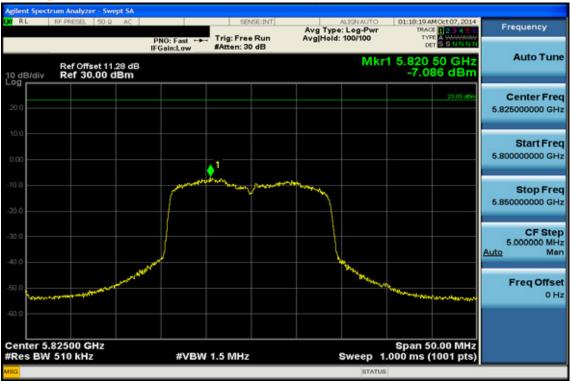
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# Peak Power Spectral Density Data Plot (CH High 5825 MHz)



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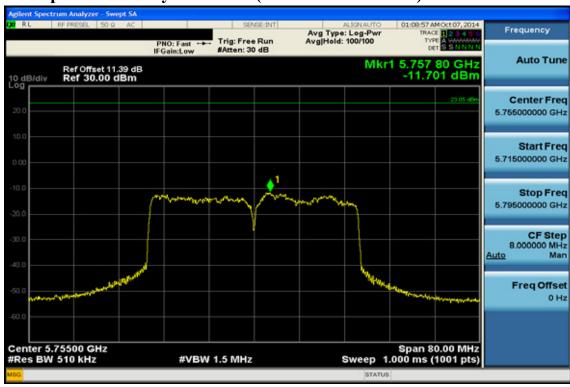
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# 802.11n HT40, 5725~5850 MHz

# Peak Power Spectral Density Data Plot (CH Low 5755 MHz)



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



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# 10 UNDESIRABLE EMISSION - RADIATED MEASUREMENT

# 10.1 Standard Applicable

According to §15.407(b) (6) (7),

- (b) Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
  - (1) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.
  - (2) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
  - (3) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

Procedure H1) a) b) c) are adopted, KDB 789033 D02, where the conducted measurement is being used to comply with out of emission requirement as per FCC 15.407 b) 6) 7)

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# §15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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<sup>&</sup>lt;sup>2</sup> Above 38.6



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# §15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS

### FCC PART 15.209

1001111111000							
MEASURING DISTANCE OF 3 METER							
FREQUENCY RANGE	FIELD STRENGTH	FIELD STRENGTH					
(MHz)	(Microvolts/m)	(dBuV/m)					
30-88	100	40					
88-216	150	43.5					
216-960	200	46					
Above 960	500	54					

## 10.1.1 Transmitter Spurious Emission Limits

Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown below. Additionally, the level of any transmitter spurious emission shall not exceed the level of the transmitter's fundamental emission.

Table 5: General Field Strength Limits for Transmitters at Frequencies Above 30 MHz

Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

Note: Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

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# 10.1.2 Unwanted Emission that complies with the undesirable emission ruling by 15.407 (b) (1) (2) (3),

Frequencies (MHz)	EIRP Limit (dBm)	<b>Equivalent Field Strength at</b>	
		3m (dBuV/m)	
5150 - 5250	-27	68.3	
5250 - 5250	-27	68.3	
5470 - 5725	-27	68.3	
5725 - 5850	-27	68.3	

Limit derivation in terms of Field Strength:

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.

 $E = 1000000* (30*EIRP)^(1/2) / 3 uV/m$ = 68.3dBuV/m

# 10.1.3 Band edge that complies with the ruling by FCC 14-30 (iv) (6),

Frequencies (MHz)	EIRP Limit (dBm)	<b>Equivalent Field Strength at</b>
		3m (dBuV/m)
5725 – 5850	-17	78.2

Limit derivation in terms of band edge:

 $E = 1000000* (30*EIRP)^{(1/2)} / 3 uV/m$ 

= 78.2 dBuV/m

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# 10.2 EUT Setup

- The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4:2009.
- 2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
- 4. The spacing between the peripherals was 10 centimeters.
- 5. External I/O cables were draped along the edge of the test table and bundle when necessary.
- The host PC system was connected with 120Vac/60Hz power source. 6.

# 10.3 Measurement Procedure

- The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance. 4.
- And also, each emission was to be maximized by changing the polarization of receiving antenna 5. both horizontal and vertical.
- Repeat above procedures until all frequency measured were complete. 6.

For measurements below 1GHz, follow the KDB 789033 D02 requirements in section H)3), "General Requirements for Unwanted Emissions Measurements' Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

For Measurement above 1GHz, for peak unwanted emission measurements follow the KDB 789033 D02 requirements in section H)5) b), for average unwanted emission measurements follow the KDB 789033 D02 requirements in section H)6) c) or d).

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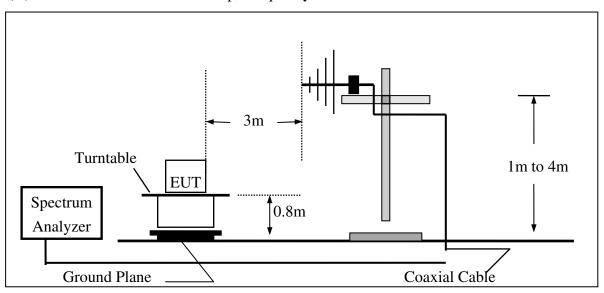


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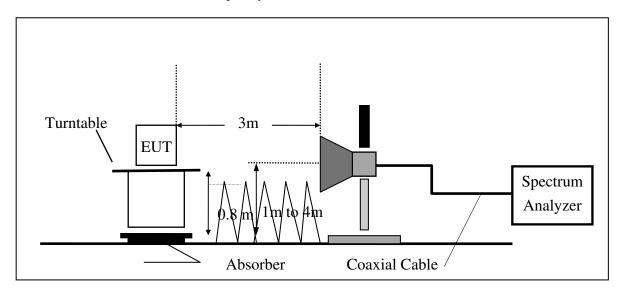
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#### 10.4 **Test SET-UP (Block Diagram of Configuration)**

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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



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#### **Measurement Equipment Used:** 10.5

966 Chamber								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015			
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015			
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	01/20/2014	01/19/2015			
Spectrum Analyzer	R&S	FSV-30	101398	10/22/2013	10/21/2014			
Loop Antenna	ETS.LINDGREN	6502	00148045	07/03/2014	07/02/2015			
Bilog Antenna	SCHWAZBECK	VULB9168	378	05/19/2014	05/18/2015			
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015			
Horn Antenna	Schwarzbeck	BBHA9170	184	01/23/2014	01/22/2015			
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	EMC0126530 980038		01/02/2015			
Pre-Amplifier	Agilent	8447D	2944A07676	01/03/2014	01/02/2015			
Pre-Amplifier	Agilent	8449B	3008A00578	01/03/2014	01/02/2015			
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/24/2014	01/23/2015			
5150-5250 Band Reject Filter	Micro-Tronics	BRM50703	1	01/03/2014	01/02/2015			
5470-5725 Band Reject Filter	Micro-Tronics	BRM50704	1	01/03/2014	01/02/2015			
5725-5875 Band Reject Filter	Micro-Tronics	BRM50705	1	01/03/2014	01/02/2015			
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	02/27/2014	02/26/2015			
2GHz High Pass Filter	Micro-Tronics	HPM50110	36	02/27/2014	02/26/2015			
Attenuator	Mini-Circuit	BW-S10W2+	002	02/27/2014	02/26/2015			
Turn Table	HD	DT420	N/A	N.C.R	N.C.R			
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R			
Controller	HD	HD100	N/A	N.C.R	N.C.R			
Low Loss Cable	Huber Suhner	966_Rx	9	01/03/2014	01/02/2015			
3m Site NSA	SGS	966 chamber	N/A	07/15/2014	07/14/2015			

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# 10.6 Field Strength Calculation

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

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

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

#### 10.7 **Measurement Result**

Refer to attach tabular data sheets.

### **NOTE:**

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

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

Operation Band :802.11 a Test Date :2014-09-17 Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dΒμV/ m	dB
79.47	S	Peak	61.62	-26.77	34.85	40.00	-5.15
104.69	S	Peak	45.57	-22.54	23.03	43.50	-20.47
244.37	S	Peak	46.52	-20.99	25.53	46.00	-20.47
400.54	S	Peak	40.49	-15.56	24.93	46.00	-21.07
600.36	S	Peak	38.60	-12.32	26.28	46.00	-19.72
714.82	S	Peak	37.53	-11.30	26.23	46.00	-19.77
5578.00	Н	Peak	48.44	6.91	55.34	68.30	-12.96
10360.00	Н	Peak	26.50	15.31	41.81	68.30	-36.36
15540.00	Н						
20720.00	Н						
25900.00	Н						
31080.00	Н						
36260.00	Н						

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Operation Band :802.11 a Test Date :2014-09-17

Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
78.50	S	Peak	49.44	-26.94	22.50	40.00	-17.50
111.48	S	Peak	58.82	-22.03	36.79	43.50	-6.71
220.12	S	Peak	52.43	-24.07	28.36	46.00	-17.64
400.54	S	Peak	41.51	-15.56	25.95	46.00	-20.05
600.36	S	Peak	35.77	-12.32	23.46	46.00	-22.54
700.27	S	Peak	35.78	-11.42	24.36	46.00	-21.64
5459.00	Н	Peak	50.78	6.43	57.22	68.30	-11.08
10360.00	Н	Peak	29.14	15.31	44.45	68.30	-23.85
15540.00	Н						
20720.00	Н						
25900.00	Н						
31080.00	Н						
36260.00	Н						

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Operation Band :802.11 a Test Date :2014-09-17

Fundamental Frequency :5220 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode Engineer :TX MID :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	62.11	-26.77	35.33	40.00	-4.67
209.45	S	Peak	50.08	-23.89	26.19	43.50	-17.31
244.37	S	Peak	46.50	-20.99	25.51	46.00	-20.49
400.54	S	Peak	39.01	-15.56	23.44	46.00	-22.56
600.36	S	Peak	38.45	-12.32	26.14	46.00	-19.86
695.42	S	Peak	41.48	-11.44	30.04	46.00	-15.96
5459.00	Н	Peak	49.54	6.43	55.97	68.30	-12.33
10440.00	Н	Peak	27.21	15.68	42.89	68.30	-25.41
15660.00	Н						
20880.00	Н						
26100.00	Н						
31320.00	Н						
36540.00							

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Operation Band :802.11 a Test Date :2014-09-17

Fundamental Frequency :5220 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode Engineer :TX MID :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d}\mathrm{B}\!\mu\mathrm{V}$	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	50.92	-26.77	24.15	40.00	-15.85
174.53	S	Peak	47.46	-23.96	23.50	43.50	-20.00
220.12	S	Peak	55.65	-24.07	31.58	46.00	-14.42
400.54	S	Peak	41.42	-15.56	25.85	46.00	-20.15
600.36	S	Peak	37.54	-12.32	25.22	46.00	-20.78
705.12	S	Peak	37.31	-11.25	26.06	46.00	-19.94
5459.00	Н	Peak	50.32	6.43	56.75	68.30	-11.55
10440.00	Н	Peak	28.80	15.68	44.48	68.30	-23.82
15660.00	Н						
20880.00	Н						
26100.00	Н						
31320.00	Н						
36540.00							

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Operation Band :802.11 a Test Date :2014-09-17

Fundamental Frequency :5240 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode Engineer :TX HIGH :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	60.81	-26.77	34.03	40.00	-5.97
220.12	S	Peak	51.47	-24.07	27.41	46.00	-18.59
244.37	S	Peak	46.21	-20.99	25.22	46.00	-20.78
470.38	S	Peak	43.07	-14.60	28.47	46.00	-17.53
600.36	S	Peak	38.14	-12.32	25.83	46.00	-20.17
695.42	S	Peak	41.01	-11.44	29.57	46.00	-16.43
5473.00	Н	Peak	47.80	6.40	54.20	68.30	-14.10
10480.00	Н	Peak	26.96	15.99	42.95	68.30	-25.35
15720.00	Н						
20960.00	Н						
26200.00	Н						
31440.00	Н						
36680.00							

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t (886-2) 2299-3279



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Operation Band :802.11 a Test Date :2014-09-17

Fundamental Frequency :5240 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode Engineer :TX HIGH :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	49.56	-26.77	22.79	40.00	-17.21
169.68	S	Peak	48.95	-23.69	25.25	43.50	-18.25
220.12	S	Peak	53.89	-24.07	29.82	46.00	-16.18
400.54	S	Peak	41.77	-15.56	26.21	46.00	-19.79
600.36	S	Peak	37.19	-12.32	24.87	46.00	-21.13
700.27	S	Peak	44.24	-11.42	32.82	46.00	-13.18
5599.00	S	Peak	50.22	6.89	57.11	68.30	-11.19
10480.00	Н	Peak	28.40	15.99	44.39	68.30	-23.91
15720.00	Н						
20960.00	Н						
26200.00	Н						
31440.00	Н						
36680.00	Н						

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### **Radiated Emission:**

**Operation Band** :802.11 a Test Date :2014-09-16 Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5147.56	S	Average	45.23	6.11	51.34	54.00	-2.66
5147.56	S	Peak	67.17	6.11	73.28	74.00	-0.72
5150.00	E	Average	41.96	6.12	48.08	54.00	-5.93
5150.00	E	Peak	66.14	6.12	72.25	74.00	-1.75

Operation Band :802.11 a Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5180 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5150.00	E	Peak	65.57	6.12	71.68	74.00	-2.32
5150.00	E	Average	40.80	6.12	46.92	54.00	-7.08

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

Operation Band :802.11 n20M **Test Date** :2014-09-17

Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
58.13	S	Peak	62.26	-28.71	33.54	40.00	-6.46
79.47	S	Peak	62.32	-26.77	35.54	40.00	-4.46
250.19	S	Peak	45.84	-20.40	25.45	46.00	-20.55
400.54	S	Peak	40.08	-15.56	24.52	46.00	-21.48
600.36	S	Peak	41.15	-12.32	28.84	46.00	-17.16
710.94	S	Peak	42.15	-11.21	30.94	46.00	-15.06
5459.00	S	Peak	50.25	6.43	56.69	68.30	-11.61
10360.00	Н	Peak	27.59	15.31	42.90	68.30	-25.40
15540.00	Н						
20720.00	Н						
25900.00	Н						
31080.00	Н						
36260.00	Н						

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Operation Band Test Date :2014-09-17 :802.11 n20M Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

**.** .

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dBμV/ m	dB
79.47	S	Peak	50.92	-26.77	24.15	40.00	-15.85
114.39	S	Peak	49.78	-21.93	27.85	43.50	-15.65
220.12	S	Peak	55.81	-24.07	31.74	46.00	-14.26
400.54	S	Peak	45.22	-15.56	29.65	46.00	-16.35
600.36	S	Peak	41.56	-12.32	29.24	46.00	-16.76
700.27	S	Peak	40.99	-11.42	29.56	46.00	-16.44
5599.00	S	Peak	51.00	6.89	57.89	68.30	-10.41
10360.00	Н	Peak	28.66	15.31	43.98	68.30	-24.32
15540.00	Н						
20720.00	Н						
25900.00	Н						
31080.00	Н						
36260.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5220 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode Engineer :TX MID :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	62.51	-26.61	35.90	40.00	-4.10
109.54	S	Peak	52.96	-22.12	30.84	43.50	-12.66
239.52	S	Peak	48.28	-21.66	26.62	46.00	-19.38
400.54	S	Peak	45.59	-15.56	30.03	46.00	-15.97
600.36	S	Peak	41.35	-12.32	29.03	46.00	-16.97
695.42	S	Peak	36.21	-11.44	24.77	46.00	-21.23
5452.00	S	Peak	48.53	6.45	54.98	68.30	-13.32
10440.00	Н	Peak	27.64	15.83	43.47	68.30	-24.83
15660.00	Н						
20880.00	Н						
26100.00	Н						
31320.00	Н						
36540.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5220 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode Engineer :TX MID :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	51.62	-26.77	24.85	40.00	-15.15
114.39	S	Peak	50.45	-21.93	28.52	43.50	-14.98
220.12	S	Peak	52.59	-24.07	28.52	46.00	-17.48
400.54	S	Peak	40.98	-15.56	25.42	46.00	-20.58
600.36	S	Peak	41.04	-12.32	28.73	46.00	-17.27
700.27	S	Peak	40.25	-11.42	28.83	46.00	-17.17
5599.00	S	Peak	52.34	6.89	59.23	68.30	-9.07
10440.00	Н	Peak	28.83	15.68	44.52	68.30	-23.78
15660.00	Н						
20880.00	Н						
26100.00	Н						
31320.00	Н						
36540.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5240 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX HIGH Engineer :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	$dB\mu V/m$	dB
80.44	S	Peak	52.72	-26.61	26.12	40.00	-13.88
169.68	S	Peak	49.20	-23.69	25.51	43.50	-17.99
220.12	S	Peak	52.55	-24.07	28.48	46.00	-17.52
400.54	S	Peak	48.75	-15.56	33.18	46.00	-12.82
600.36	S	Peak	40.63	-12.32	28.31	46.00	-17.69
705.12	S	Peak	35.26	-11.25	24.01	46.00	-21.99
5529.00	S	Peak	49.05	6.68	55.73	68.30	-12.57
10480.00	Н	Peak	27.29	16.23	43.52	68.30	-24.78
15720.00	Н						
20960.00	Н						
26200.00	Н						
31440.00	Н						
36680.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5240 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
45.52	S	Peak	59.45	-24.42	35.03	40.00	-4.97
81.41	S	Peak	62.24	-26.45	35.80	40.00	-4.20
109.54	S	Peak	58.25	-22.12	36.12	43.50	-7.38
239.52	S	Peak	45.56	-21.66	23.90	46.00	-22.10
400.54	S	Peak	44.95	-15.56	29.39	46.00	-16.61
600.36	S	Peak	46.44	-12.32	34.12	46.00	-11.88
5459.00	S	Peak	49.54	6.43	55.97	68.30	-12.33
10480.00	Н	Peak	27.59	16.23	43.82	68.30	-24.48
15720.00	Н						
20960.00	Н						
26200.00	Н						
31440.00	Н						
36680.00	Н						

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### **Radiated Emission:**

**Operation Band** :802.11 n20M Test Date :2014-09-16 Fundamental Frequency :5180 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level	1	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5150.00	E	Peak	66.71	6.12	72.83	74.00	-1.18
5150.00	E	Average	41.16	6.12	47.28	54.00	-6.72
Operation Ban		:802.11 n20M		Test Date		:2014-09-16	
Fundamental Frequency		:5180 MHz	Γ	Temp./Humi.		:25.5deg_C/5	2RH
Operation Mod	مه	·Rand Edge I	$\mathbf{OW}$	Inginaar		·Iarry	

Operation Mode :Band Edge LOW :Jerry

EUT Pol. :E2 Plane :HORIZONTAL Measurement Antenna Pol.

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
	5150.00	E	Average	40.63	6.12	46.75	54.00	-7.25
	5150.00	E	Peak	65.26	6.12	71.37	74.00	-2.63

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

Operation Band :802.11 n40M **Test Date** :2014-09-17

Fundamental Frequency :5190 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX LOW Engineer

:Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	61.73	-26.61	35.12	40.00	-4.88
239.52	S	Peak	55.40	-21.66	33.74	46.00	-12.26
400.54	S	Peak	45.92	-15.56	30.36	46.00	-15.64
549.92	S	Peak	36.02	-12.36	23.66	46.00	-22.34
600.36	S	Peak	42.01	-12.32	29.70	46.00	-16.30
700.27	S	Peak	36.61	-11.42	25.19	46.00	-20.81
5585.00	S	Peak	45.38	6.90	52.28	68.30	-16.02
10380.00	Н	Peak	26.22	15.80	42.02	68.30	-26.28
15570.00	Н						
20760.00	Н						
25950.00	Н						
31140.00	Н						
36330.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17

Fundamental Frequency :5190 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	$dB\mu V/m$	dB
79.47	S	Peak	52.30	-26.77	25.53	40.00	-14.47
114.39	S	Peak	50.58	-21.93	28.65	43.50	-14.85
169.68	S	Peak	49.74	-23.69	26.05	43.50	-17.45
220.12	S	Peak	52.80	-24.07	28.73	46.00	-17.27
400.54	S	Peak	41.49	-15.56	25.93	46.00	-20.07
690.57	S	Peak	40.37	-11.48	28.89	46.00	-17.11
5641.00	S	Peak	50.21	7.10	57.30	68.30	-11.00
10380.00	Н	Peak	26.80	15.80	42.60	68.30	-25.70
15570.00	Н						
20760.00	Н						
25950.00	Н						
31140.00	Н						
36330.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17

Fundamental Frequency :5230 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	62.46	-26.61	35.86	40.00	-4.14
244.37	S	Peak	49.82	-20.99	28.84	46.00	-17.16
345.25	S	Peak	42.55	-17.51	25.04	46.00	-20.96
400.54	S	Peak	44.90	-15.56	29.34	46.00	-16.66
600.36	S	Peak	42.48	-12.32	30.16	46.00	-15.84
705.12	S	Peak	39.43	-11.25	28.18	46.00	-17.82
5557.00	S	Peak	46.78	6.92	53.70	68.30	-14.60
10460.00	Н	Peak	26.53	15.76	42.30	68.30	-26.00
15690.00	Н						
20920.00	Н						
26150.00	Н						
31380.00	Н						
36610.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17

Fundamental Frequency :5230 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	52.50	-26.77	25.73	40.00	-14.27
169.68	S	Peak	49.60	-23.69	25.91	43.50	-17.59
220.12	S	Peak	52.80	-24.07	28.73	46.00	-17.27
400.54	S	Peak	41.74	-15.56	26.17	46.00	-19.83
600.36	S	Peak	40.75	-12.32	28.43	46.00	-17.57
783.69	S	Peak	38.19	-10.32	27.87	46.00	-18.13
5641.00	S	Peak	51.25	7.10	58.35	68.30	-9.95
10460.00	Н	Peak	26.81	15.76	42.58	68.30	-25.72
15690.00	Н						
20920.00	Н						
26150.00	Н						
31380.00	Н						
36610.00	Н						

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### **Radiated Emission:**

**Operation Band** :802.11 n40M Test Date :2014-09-16 Fundamental Frequency :5190 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5150.00	E	Average	45.98	6.12	52.10	54.00	-1.90
5150.00	E	Peak	66.72	6.12	72.84	74.00	-1.17
Operation Band Fundamental Frequency		:802.11 n40M :5190 MHz		t Date np./Humi.		:2014-09-16 :25.5deg_C/5	2RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5150.00	E	Average	46.33	6.12	52.45	54.00	-1.56
5150.00	E	Peak	65.27	6.12	71.39	74.00	-2.61

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

Operation Band :802.11 a Test Date :2014-09-17 Fundamental Frequency :5745 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	62.50	-26.77	35.72	40.00	-4.28
114.39	S	Peak	45.84	-21.93	23.91	43.50	-19.59
255.04	S	Peak	48.01	-19.88	28.13	46.00	-17.87
400.54	S	Peak	43.66	-15.56	28.09	46.00	-17.91
600.36	S	Peak	44.06	-12.32	31.74	46.00	-14.26
700.27	S	Peak	44.10	-11.42	32.67	46.00	-13.33
5347.00	S	Peak	50.96	6.63	57.60	68.30	-10.70
11490.00	Н	Peak	26.62	18.22	44.84	74.00	-29.16
11490.00	Н	Average	23.96	18.22	42.18	54.00	-11.82
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band ::802.11 a Test Date :2014-09-17

Fundamental Frequency :5745 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	50.88	-26.77	24.11	40.00	-15.89
169.68	S	Peak	48.96	-23.69	25.27	43.50	-18.23
220.12	S	Peak	53.64	-24.07	29.57	46.00	-16.43
400.54	S	Peak	41.75	-15.56	26.18	46.00	-19.82
695.42	S	Peak	35.67	-11.44	24.23	46.00	-21.77
795.33	S	Peak	37.38	-10.09	27.29	46.00	-18.71
5361.00	S	Peak	52.28	6.65	58.94	68.30	-9.36
11490.00	Н	Peak	27.71	18.22	45.93	74.00	-28.07
11490.00	Н	Average	24.62	18.22	42.84	54.00	-11.16
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band ::802.11 a Test Date :2014-09-17

Fundamental Frequency :5785 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode Engineer :TX MID :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
64.92	S	Peak	64.44	-29.22	35.22	40.00	-4.78
79.47	S	Peak	61.63	-26.77	34.86	40.00	-5.14
250.19	S	Peak	51.35	-20.40	30.95	46.00	-15.05
400.54	S	Peak	45.97	-15.56	30.41	46.00	-15.59
600.36	S	Peak	43.84	-12.32	31.52	46.00	-14.48
695.42	S	Peak	37.73	-11.44	26.29	46.00	-19.71
5361.00	S	Peak	50.25	6.65	56.90	68.30	-11.40
11570.00	Н	Peak	27.10	18.24	45.34	74.00	-28.66
11570.00	Н	Average	24.96	18.24	43.20	54.00	-10.80
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band ::802.11 a Test Date :2014-09-17

Fundamental Frequency :5785 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode Engineer :TX MID :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	49.87	-26.77	23.10	40.00	-16.90
169.68	S	Peak	50.23	-23.69	26.53	43.50	-16.97
220.12	S	Peak	52.73	-24.07	28.67	46.00	-17.33
400.54	S	Peak	41.91	-15.56	26.35	46.00	-19.66
600.36	S	Peak	36.25	-12.32	23.93	46.00	-22.07
695.42	S	Peak	35.93	-11.44	24.49	46.00	-21.51
5375.00	S	Peak	52.19	6.65	58.85	68.30	-9.45
11570.00	Н	Peak	27.85	18.24	46.08	74.00	-27.92
11570.00	Н	Average	25.13	18.24	43.37	54.00	-10.63
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band ::802.11 a Test Date :2014-09-17

Fundamental Frequency :5825 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX HIGH Engineer :Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
38.73	S	Peak	55.58	-20.40	35.18	40.00	-4.82
78.50	S	Peak	62.25	-26.94	35.32	40.00	-4.68
250.19	S	Peak	45.99	-20.40	25.59	46.00	-20.41
400.54	S	Peak	40.46	-15.56	24.90	46.00	-21.10
600.36	S	Peak	42.83	-12.32	30.51	46.00	-15.49
695.42	S	Peak	36.84	-11.44	25.40	46.00	-20.60
5368.00	S	Peak	50.75	6.65	57.40	68.30	-10.90
11650.00	Н	Peak	27.67	17.79	45.46	74.00	-28.54
11650.00	Н	Average	24.53	17.79	42.32	54.00	-11.68
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band ::802.11 a Test Date :2014-09-17

Fundamental Frequency :5825 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	51.58	-26.77	24.80	40.00	-15.20
169.68	S	Peak	49.97	-23.69	26.28	43.50	-17.22
220.12	S	Peak	52.94	-24.07	28.87	46.00	-17.13
400.54	S	Peak	42.01	-15.56	26.44	46.00	-19.56
600.36	S	Peak	40.65	-12.32	28.33	46.00	-17.67
695.42	S	Peak	41.04	-11.44	29.60	46.00	-16.40
5375.00	S	Peak	51.38	6.65	58.04	68.30	-10.26
11650.00	Н	Peak	27.49	17.79	45.28	74.00	-28.72
11650.00	Н	Average	24.53	17.79	42.32	54.00	-11.68
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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### **Radiated Emission:**

**Operation Band** :802.11 a Test Date :2014-09-16 Fundamental Frequency :5745 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d}\mathrm{B}\!\mu\mathrm{V}$	dB	$dB\mu V/m$	dΒμV/ m	dB
5725.00	Е	Peak	51.36	7.15	58.51	78.20	-19.69

Operation Band :802.11 a Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5745 MHz

:25.5deg\_C/52RH Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5725.00	Е	Peak	63.17	7.15	70.32	78.20	-7.88

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Operation Band :802.11 a Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5825 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

Measurement Antenna Pol. EUT Pol. :E2 Plane :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dΒμV/ m	dB
5850.00	Е	Peak	47.92	7.78	55.70	78.20	-22.50

Operation Band :802.11 a Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5825 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5850.00	Е	Peak	48.37	7.78	56.15	78.20	-22.05

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

Operation Band :802.11 n20M Test Date :2014-09-17 Temp./Humi. Fundamental Frequency :5745 MHz :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B}\!\mu\mathrm{V}$	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	61.86	-26.61	35.25	40.00	-4.75
214.30	S	Peak	46.40	-24.27	22.13	43.50	-21.37
244.37	S	Peak	46.32	-20.99	25.33	46.00	-20.67
400.54	S	Peak	41.22	-15.56	25.66	46.00	-20.34
600.36	S	Peak	41.64	-12.32	29.32	46.00	-16.68
700.27	S	Peak	37.02	-11.42	25.59	46.00	-20.41
5340.00	S	Peak	51.13	6.59	57.72	74.00	-16.28
11490.00	Н	Peak	26.67	18.22	44.89	74.00	-29.11
11490.00	Н	Average	24.16	18.22	42.38	54.00	-11.62
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17 Fundamental Frequency :5745 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d}\mathrm{B}\!\mu\mathrm{V}$	dB	$dB\mu V/m$	$dB\mu V/m$	dB
79.47	S	Peak	52.21	-26.77	25.44	40.00	-14.56
169.68	S	Peak	49.88	-23.69	26.19	43.50	-17.31
220.12	S	Peak	53.38	-24.07	29.31	46.00	-16.69
400.54	S	Peak	41.95	-15.56	26.39	46.00	-19.61
695.42	S	Peak	36.47	-12.32	24.16	46.00	-21.84
795.33	S	Peak	35.48	-11.42	24.05	46.00	-21.95
5361.00	S	Peak	50.10	6.64	56.73	68.30	-11.57
11490.00	Н	Peak	26.70	18.22	44.92	74.00	-29.08
11490.00	Н	Average	24.26	18.22	42.48	54.00	-11.52
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5785 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode Engineer :TX MID :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	62.26	-26.61	35.65	40.00	-4.35
119.24	S	Peak	47.05	-21.75	25.30	43.50	-18.20
250.19	S	Peak	50.88	-20.40	30.48	46.00	-15.52
400.54	S	Peak	44.98	-15.56	29.41	46.00	-16.59
600.36	S	Peak	41.86	-12.32	29.54	46.00	-16.46
695.42	S	Peak	36.21	-11.44	24.77	46.00	-21.23
5424.00	S	Peak	50.65	6.55	57.20	68.30	-11.10
11570.00	Н	Peak	26.90	18.24	45.14	74.00	-28.86
11570.00	Н	Average	24.63	18.24	42.87	54.00	-11.13
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17 Fundamental Frequency :5785 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode Engineer :TX MID :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	51.91	-26.61	25.30	40.00	-14.70
169.68	S	Peak	50.03	-23.69	26.34	43.50	-17.16
220.12	S	Peak	53.17	-24.07	29.10	46.00	-16.90
400.54	S	Peak	41.79	-15.56	26.22	46.00	-19.78
600.36	S	Peak	41.84	-12.32	29.52	46.00	-16.48
690.57	S	Peak	37.84	-11.48	26.36	46.00	-19.64
5361.00	S	Peak	52.34	6.65	58.99	68.30	-9.31
11570.00	Н	Peak	27.36	18.24	45.60	74.00	-28.40
11570.00	Н	Average	24.85	18.24	43.09	54.00	-10.91
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5825 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
45.52	S	Peak	59.51	-24.42	35.09	40.00	-4.91
79.47	S	Peak	62.55	-26.77	35.77	40.00	-4.23
239.52	S	Peak	45.23	-21.66	23.57	46.00	-22.43
400.54	S	Peak	41.01	-15.56	25.44	46.00	-20.56
600.36	S	Peak	40.71	-12.32	28.39	46.00	-17.61
700.27	S	Peak	36.48	-11.42	25.05	46.00	-20.95
5389.00	S	Peak	50.10	6.65	56.75	68.30	-11.55
11650.00	Н	Peak	26.64	17.79	44.43	74.00	-29.57
11650.00	Н	Average	24.42	17.79	42.21	54.00	-11.79
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band :802.11 n20M Test Date :2014-09-17

Fundamental Frequency :5825 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	52.53	-26.61	25.92	40.00	-14.08
169.68	S	Peak	49.86	-23.69	26.17	43.50	-17.33
220.12	S	Peak	52.35	-24.07	28.28	46.00	-17.72
400.54	S	Peak	41.51	-15.56	25.95	46.00	-20.05
600.36	S	Peak	41.90	-12.32	29.58	46.00	-16.42
690.57	S	Peak	38.21	-11.48	26.73	46.00	-19.27
5403.00	S	Peak	51.03	6.64	57.67	68.30	-10.63
11650.00	Н	Peak	27.17	17.79	44.96	74.00	-29.04
11650.00	Н	Average	24.50	17.79	42.29	54.00	-11.71
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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## **Radiated Emission:**

**Operation Band** :802.11 n20M Test Date :2014-09-16 Fundamental Frequency :5745 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	dΒμV/ m	dB
5725.00	Е	Peak	59.34	7.15	66.50	78.20	-11.70

Operation Band :802.11 n20M Test Date :2014-09-16

Fundamental Frequency Temp./Humi. :5745 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
	5725.00	Е	Peak	64.48	7.15	71.63	78.20	-6.57

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Operation Band :802.11 n20M Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5825 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

Measurement Antenna Pol. EUT Pol. :E2 Plane :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5850.00	E	Peak	51.20	7.78	58.98	78.20	-19.22

Operation Band :802.11 n20M Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5825 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5850.00	Е	Peak	50.59	7.78	58.37	78.20	-19.83

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## Radiated Spurious Emission Measurement Result (802.11n (5GHz) 40M) (SectorAntenna)

**Operation Band** :802.11 n40M Test Date :2014-09-17 Fundamental Frequency :5755 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	62.28	-26.77	35.51	40.00	-4.49
239.52	S	Peak	45.51	-21.66	23.85	46.00	-22.15
400.54	S	Peak	40.64	-15.56	25.07	46.00	-20.93
600.36	S	Peak	42.14	-12.32	29.83	46.00	-16.17
700.27	S	Peak	36.67	-11.42	25.24	46.00	-20.76
800.18	S	Peak	33.50	-10.16	23.34	46.00	-22.66
5347.00	S	Peak	52.14	6.63	58.77	68.30	-9.53
11510.00	Н	Peak	26.83	18.30	45.13	74.00	-28.87
11510.00	Н	Average	24.16	18.30	42.46	54.00	-11.54
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17 Fundamental Frequency :5755 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	$dB\mu V/m$	$dB\mu V/m$	dB
79.47	S	Peak	51.20	-26.77	24.43	40.00	-15.57
169.68	S	Peak	54.90	-23.69	31.21	43.50	-12.29
274.44	S	Peak	50.37	-19.69	30.68	46.00	-15.32
400.54	S	Peak	41.29	-15.56	25.73	46.00	-20.27
600.36	S	Peak	40.43	-12.32	28.12	46.00	-17.88
730.34	S	Peak	37.88	-10.90	26.97	46.00	-19.03
5361.00	S	Peak	48.98	6.65	55.63	68.30	-12.67
11510.00	Н	Peak	26.78	18.30	45.08	74.00	-28.92
11510.00	Н	Average	24.18	18.30	42.48	54.00	-11.52
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17

Fundamental Frequency :5795 MHz Temp./Humi. :25.5deg\_C/52RH Operation Mode :TX HIGH Engineer

:Jerry EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
79.47	S	Peak	62.68	-26.77	35.91	40.00	-4.09
107.60	S	Peak	53.76	-22.28	31.48	43.50	-12.02
250.19	S	Peak	48.33	-20.40	27.93	46.00	-18.07
400.54	S	Peak	43.84	-15.56	28.28	46.00	-17.72
600.36	S	Peak	41.82	-12.32	29.51	46.00	-16.50
685.72	S	Peak	40.01	-11.65	28.36	46.00	-17.64
5347.00	S	Peak	51.01	6.63	57.65	68.30	-10.65
11590.00	Н	Peak	26.93	18.10	45.03	74.00	-28.97
11590.00	Н	Average	24.40	18.10	42.50	54.00	-11.50
17385.00	Н						
23180.00	Н						
28975.00	Н						
34770.00	Н						

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Operation Band :802.11 n40M Test Date :2014-09-17 Fundamental Frequency :5795 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :TX HIGH Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
80.44	S	Peak	52.03	-26.61	25.42	40.00	-14.58
148.34	S	Peak	51.19	-22.61	28.58	43.50	-14.92
220.12	S	Peak	56.12	-24.07	32.05	46.00	-13.95
400.54	S	Peak	44.87	-15.56	29.31	46.00	-16.69
600.36	S	Peak	37.92	-12.32	25.60	46.00	-20.40
695.42	S	Peak	41.66	-11.44	30.21	46.00	-15.79
5361.00	S	Peak	51.43	6.65	58.09	68.30	-10.21
11590.00	Н	Peak	27.32	18.10	45.42	74.00	-28.58
11590.00	Н	Average	24.53	18.10	42.63	54.00	-11.37
17385.00	Н						
23180.00	Н						
28975.00	Н						
34770.00	Н						

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### **Radiated Emission:**

**Operation Band** :802.11 n40M Test Date :2014-09-16 Fundamental Frequency Temp./Humi. :5755 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

EUT Pol. :E2 Plane Measurement Antenna Pol. :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d}\mathrm{B}\!\mu\mathrm{V}$	dB	$dB\mu V/m$	$dB\mu V/m$	dB
5725.0	0 E	Peak	64.35	7.15	71.50	78.20	-6.70

Operation Band :802.11 n40M Test Date :2014-09-16

Fundamental Frequency Temp./Humi. :5755 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5725.00	Е	Peak	65.45	7.15	72.60	78.20	-5.60

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Operation Band :802.11 n40M Test Date :2014-09-16 Fundamental Frequency :5795 MHz Temp./Humi. :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer

Measurement Antenna Pol. EUT Pol. :E2 Plane :VERTICAL

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5850.00	Е	Peak	49.75	7.78	57.53	78.20	-20.67

Operation Band :802.11 n40M Test Date :2014-09-16

Fundamental Frequency Temp./Humi. :5795 MHz :25.5deg\_C/52RH

Operation Mode :Band Edge LOW Engineer :Jerry

EUT Pol. :E2 Plane Measurement Antenna Pol. :HORIZONTAL

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

Factor(dB) = Antenna Factor(dBuV/m) + Cable Loss(dB) - Pre Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dΒμV/ m	dΒμV/ m	dB
5850.00	Е	Peak	51.09	7.78	58.87	78.20	-19.33

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## 11 TRANSMISSION IN THE ABSENCE OF DATA

# 11.1 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.

## 11.2 Result:

While the EUT is not transmitting any function, EUT can automatically controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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# 12 FREQUENCY STABILITY

# Standard Applicable

According to §15.407 (g) 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.

#### 12.2 **Result:**

Operation Mode	802.11a	Test Date	2014,10,04	
Temperature	:24			

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Operation Mode 2014,10,04 802.11n HT20 Test Date

:24 Temperature

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# 13 ANTENNA REQUIREMENT

# 13.1 Standard Applicable

For intentional device, 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.

## 13.2 Antenna Connected Construction

The directional gains of antenna used for transmitting is 9.72dBi (5150~5250MHz), 9.91dBi (5745~5825MHz) and the antenna is designed with permanent attached and no consideration of replacement. Please see EUT photo and antenna spec.for details.

~ End of Report ~

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