ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E REQUIREMENT

OF

Product Name:	**IEEE 802.11 a/n Outdoor Wireless CPE**
Brand Name:	**ZDC**
Model No.:	**ZN-7200-2AEI-L / ZAC-1023-5-13 / ZAC-502 / ZWA-3080**
Model Different:	**Different models for the market segmentation**
FCC ID:	**M4Y-ZAC10235IO**
Report No.:	**E2/2015/30076**
Issue Date:	**Apr. 13, 2015**
FCC Rule Part:	**§15.407**
Prepared for:	**Z-Com,Inc. 5F, No.8, Hsin Ann Rd., Hsinchu Science Park,Hsinchu, 30078 Taiwan**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333**

VERIFICATION OF COMPLIANCE

Applicant:	Z-Com,Inc. 5F, No.8, Hsin Ann Rd., Hsinchu Science Park,Hsinchu, 30078 Taiwan
Product Name:	IEEE 802.11 a/n Outdoor Wireless CPE
Brand Name:	ZDC
Model No.:	ZN-7200-2AEI-L / ZAC-1023-5-13 / ZAC-502 / ZWA-3080
Model Different:	Different models for the market segmentation
FCC ID:	M4Y-ZAC10235IO
File Number:	E2/2015/30076
Date of Test:	Aug. 04, 2014 ~ Oct. 07, 2014
Date of EUT Received:	Aug. 04, 2014

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:***	Apr. 13, 2015
	Marcus Tseng / Engineer		
Prepared By:	Violetta Tang	***Date:***	Apr. 13, 2015
	Violetta Tang / Clerk		
Approved By:	Jim Chang	***Date:***	Apr. 13, 2015
	Jim Chang / Asst. Manager		

Revision History

Report Number	Revision	Description	Issue Date
E2/2015/30076	Rev.00	Initial creation of document	Apr. 13, 2015

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1. GENERAL INFORMATION

1.1. Product Description

General:

Product Name:	IEEE 802.11 a/n Outdoor Wireless CPE	
Brand Name:	ZDC	
Model No.:	ZN-7200-2AEI-L / ZAC-1023-5-13 / ZAC-502 / ZWA-3080	
Model difference:	Different models for the market segmentation	
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	
Power Supply:	24V by AC/DC Power Adapter	
	Adapter:	Model No.:GRT-240100, Supplier: GREAT POWER SUPPLY CO.,LTD

Note:

ZN-7200-2AEI-L is technically identical with ZAC-1023-5-13 / ZAC-502 / ZWA-3080.

And different models for the market segmentation:

ZN-7200-2AEI-L → Worldwide

ZAC-1023-5-13→ Europe, USA, Taiwan, Asia

ZAC-502 / ZWA-3080→ China, Taiwan, Southeast Asia

WLAN:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology
11a (5GHz)	5150-5250	3	Avg. Power: 15.71 dBm	OFDM
	5725-5850	3	Avg. Power: 11.39 dBm	
11n (5GHz)	HT20 5150-5250	3	Avg. Power: (MIMO Chain 0): 15.12dBm (MIMO Chain 1): 15.74dBm (MIMO Chain 0+1):18.45 dBm	
	HT20 5725-5850	3	Avg. Power: (MIMO Chain 0): 12.02dBm (MIMO Chain 1): 12.32dBm (MIMO Chain 0+1):15.18 dBm	
11n (5GHz)	HT40 5150-5250	2	Avg. Power: (MIMO Chain 0): 13.71dBm (MIMO Chain 1): 14.01.dBm (MIMO Chain 0+1):16.87 dBm	
	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)			
Modulation type:	64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition 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.

IEEE 802.11n Spec:

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					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

MCS Index	Modulation	R	$N_{BPSCS}(i_{SS})$	N_{SD}	N_{SP}	N_{CBPS}	N_{DBPS}	Data rate (Mb/s)	
								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—The 400 ns GI rate values are rounded to 1 decimal place.									

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

This submittal(s) (test report) is intended for **FCC ID: M4Y-ZAC10235IO** 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.

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,.

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

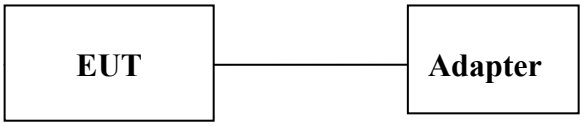


Table 2-2 Equipment Used in Tested System

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

3. SUMMARY OF TEST RESULT

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

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)、Mid(5220MHz) and Highest(5240MHz)with 6Mbps data rate are chosen for full testing.
5725 MHz-5850MHz: Channel lowest(5745MHz)、Mid(5785MHz) and Highest(5825MHz)with 6Mbps data rate are chosen for full testing.

n HT 20 mode:
5150 MHz-5250MHz: Channel lowest(5180MHz)、Mid(5220MHz) and Highest(5240MHz)with 13 Mbps data rate are chosen for full testing
5725 MHz-5850MHz: Channel lowest(5745MHz)、Mid(5785MHz) and Highest(5825MHz)with 13 Mbps data rate are chosen for full testing.

n HT 40 mode:
5150 MHz-5250MHz: Channel lowest (5190MHz) and Highest (5230MHz)with 27Mbps data rate are chosen for full testing
5755MHz-5795MHz: Channel lowest (5755MHz) and Highest (5795MHz)with 27Mbps data rate are chosen for full testing

The worst case is determined by the output power that generates the highest emission. As examined in the section of output power measurement, the section 7.5, the lowest data rate at a/n_HT20/n_HT40 resulted the highest level of fundamental emission, and therefore, the lowest data rate is chosen as the worst-case to conduct the remaining of other mandatory test cases.

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

Pre-scanned was done on Main antenna and Aux antenna. Main antenna results higher emission at (5150MHz-5250MHz) and Aux antenna results higher emission at (5745MHz-5825MHz). Therefore, the completed set of measurement was done on Main antenna, to be presented on this test report.

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:

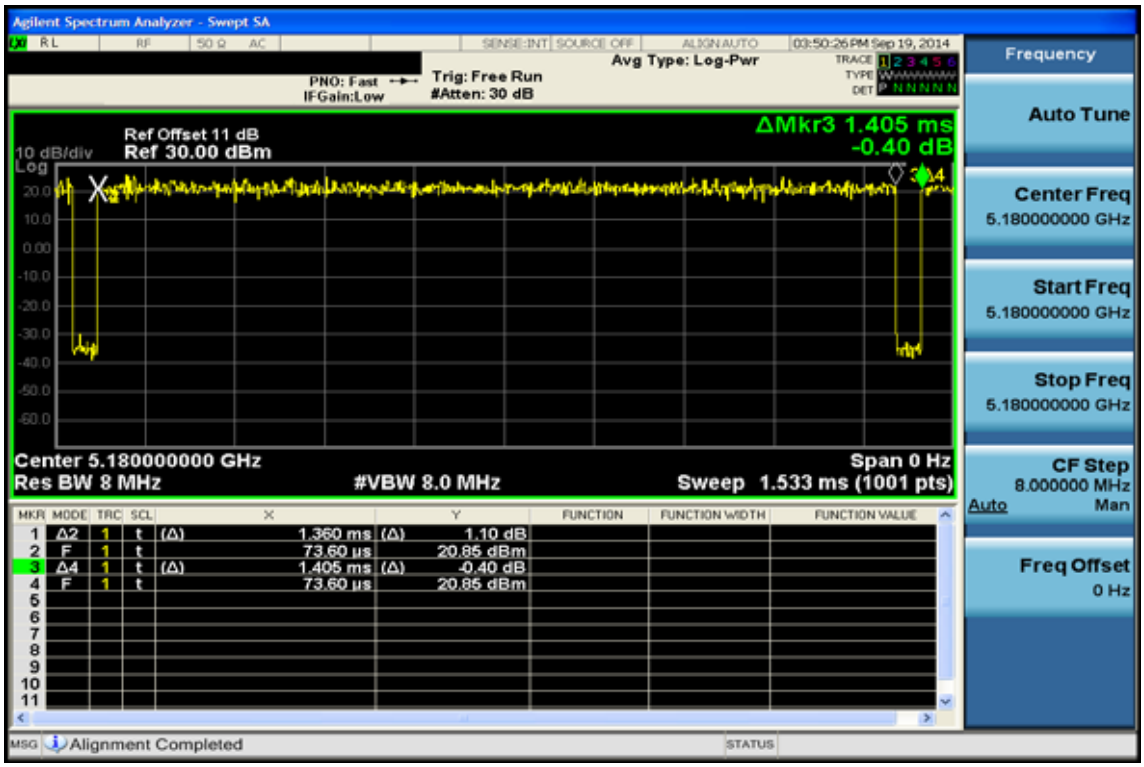
Set span = 0, RBW = 8MHz, the largest as possible, VBW = 8MHz, Detector = Peak, and RBW, and VBW =8 MHz where zero-span is permissible, that > 50/T, where T is ~ 4.3ms

Duty Cycle:

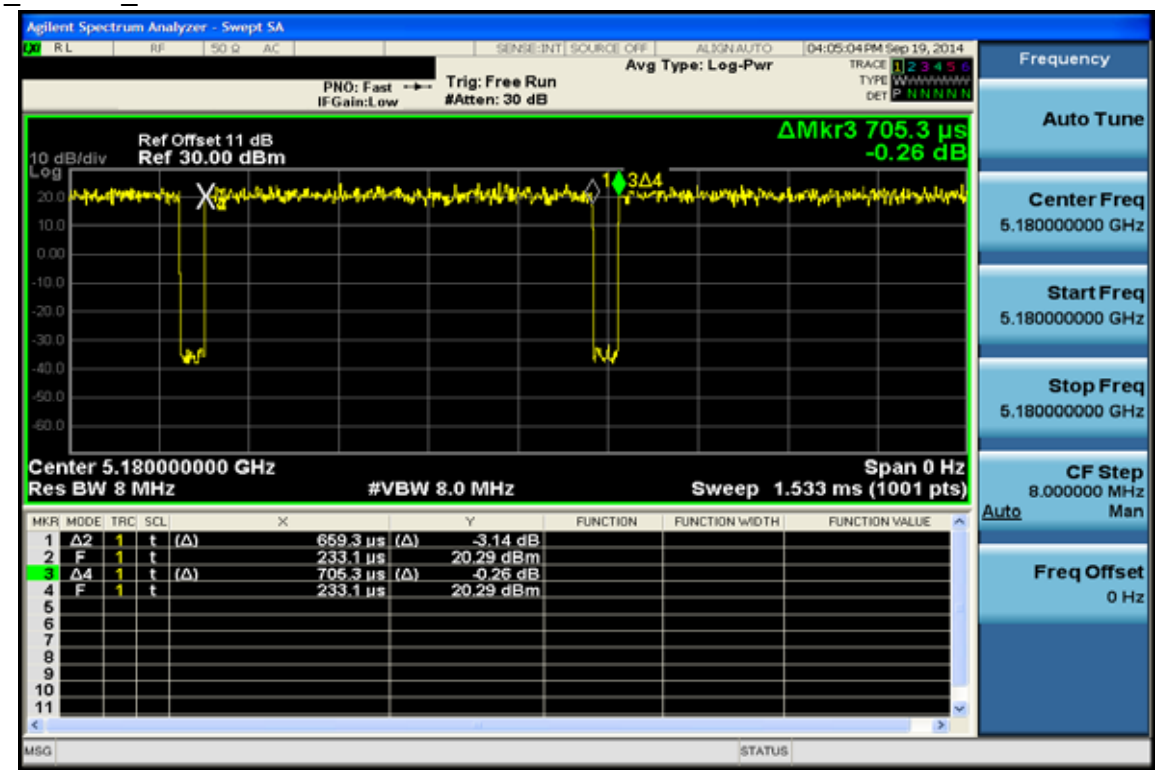
	Antenna	Duty Cycle	Duty Fator (dB)
802.11 a	**Single**	0.968	0.14
802.11 n_20	**Mimo-Main**	0.9348	0.29
	Mimo-Aux	0.9368	0.28
802.11 n_40	**Mimo-Main**	0.9118	0.40
	Mimo-Aux	0.9118	0.40

Duty Factor:

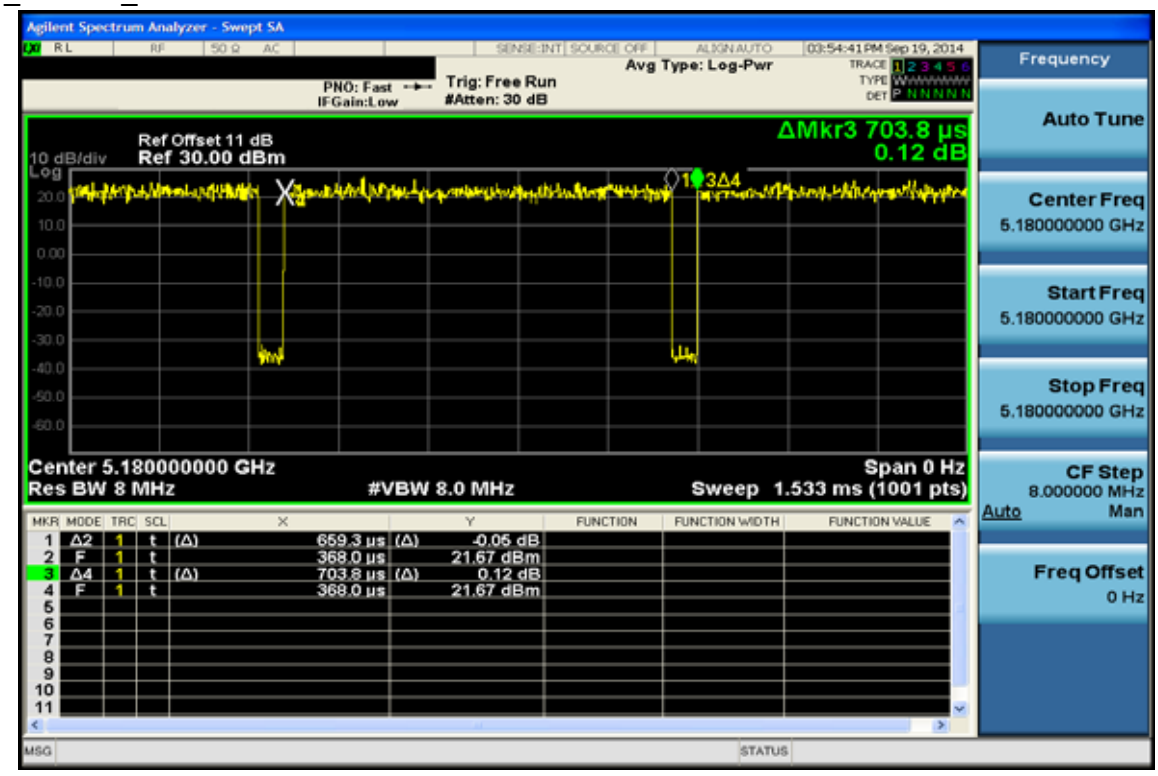
802.11a



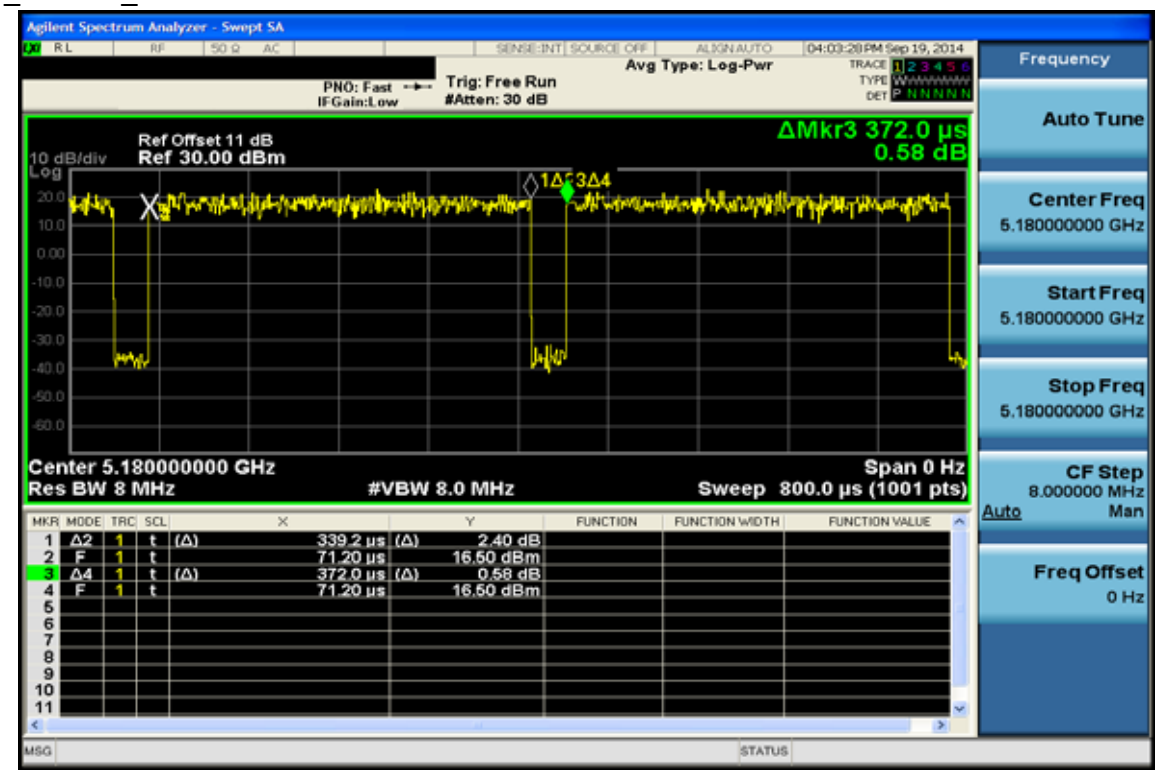
802.11 n_20MHz_Main



802.11 n_20MHz_Aux



802.11 n_40MHz_Main



802.11 n_40MHz_Aux

5. 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 – Conducted Measurement	+/- 1.55 dB
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:

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

Measurement uncertainty (Polarization : **Horizontal**)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	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.

6. CONDUCTED EMISSION TEST

6.1. Standard Applicable

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

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

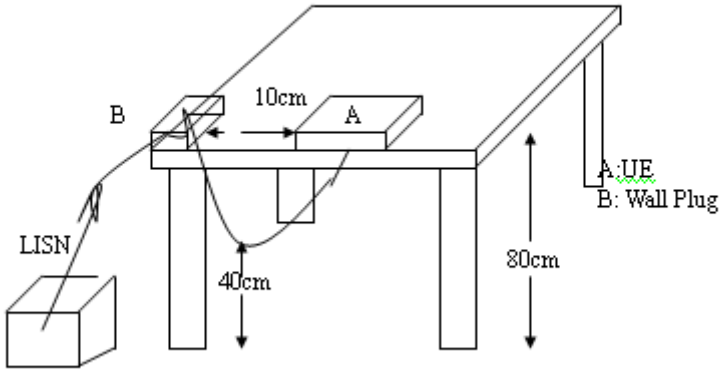
6.2. Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
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.

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

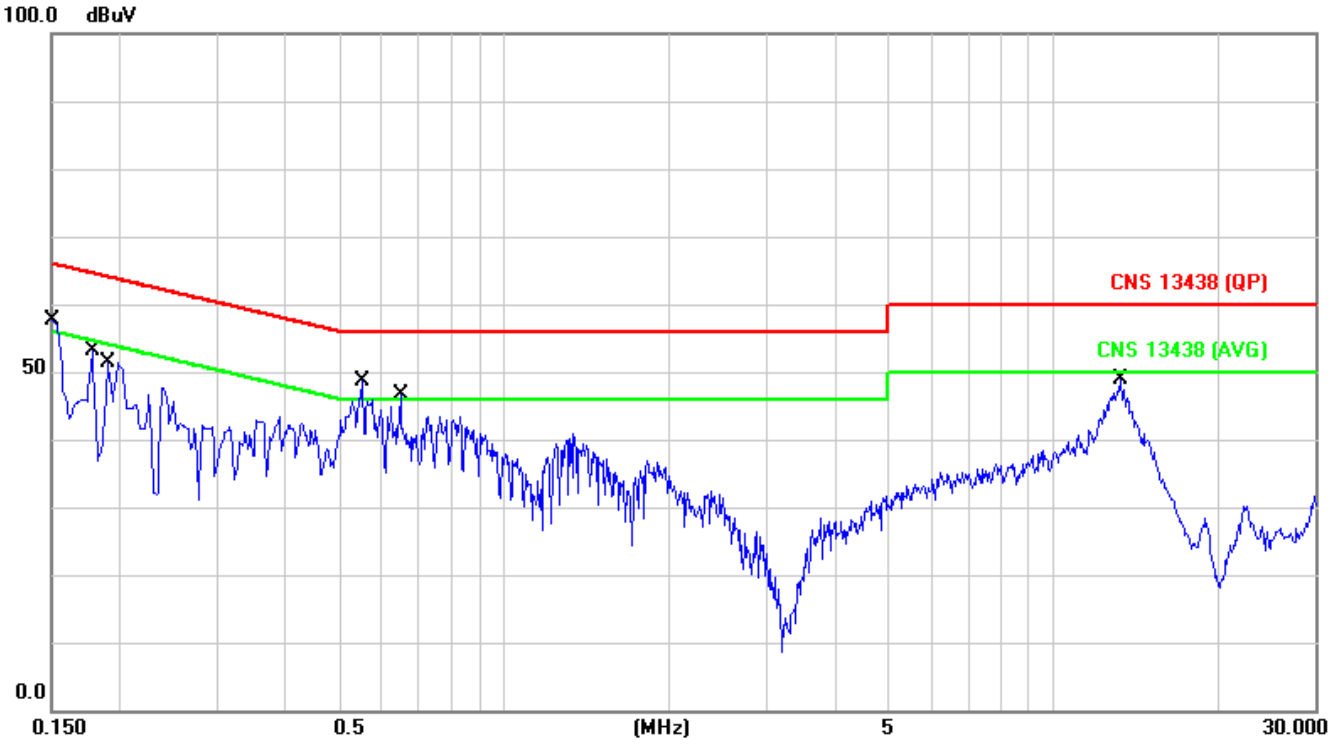
6.6. Measurement Result

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

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

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 10, 2014
Temperature:	26 ℃	Humidity:	60 %	Test By:	Marcus



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1500	53.70	0.10	53.80	66.00	-12.20	QP	
2		0.1500	36.10	0.10	36.20	56.00	-19.80	AVG	
3		0.1780	50.50	0.10	50.60	64.58	-13.98	QP	
4		0.1780	34.10	0.10	34.20	54.58	-20.38	AVG	
5		0.1900	45.30	0.09	45.39	64.04	-18.65	QP	
6		0.1900	36.50	0.09	36.59	54.04	-17.45	AVG	
7		0.5540	44.80	0.25	45.05	56.00	-10.95	QP	
8		0.5540	33.00	0.25	33.25	46.00	-12.75	AVG	
9		0.6500	39.90	0.29	40.19	56.00	-15.81	QP	
10		0.6500	35.20	0.29	35.49	46.00	-10.51	AVG	
11		13.3060	41.50	0.63	42.13	60.00	-17.87	QP	
12		13.3060	35.80	0.63	36.43	50.00	-13.57	AVG	

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

7. 26dB & 6dB 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.

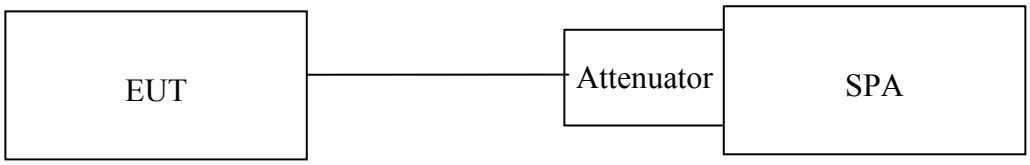
7.3 Measurement Equipment Used:

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**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

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration 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

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.

7.4 Test Set-up:



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

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

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

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

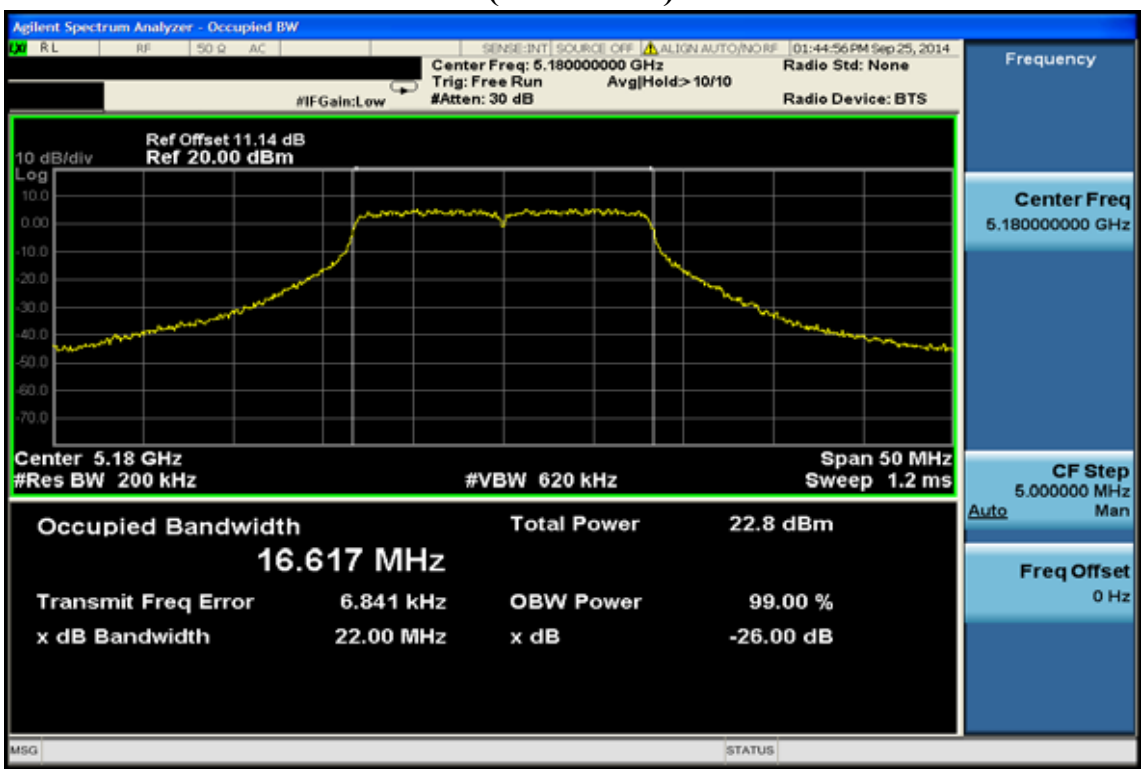
Main

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

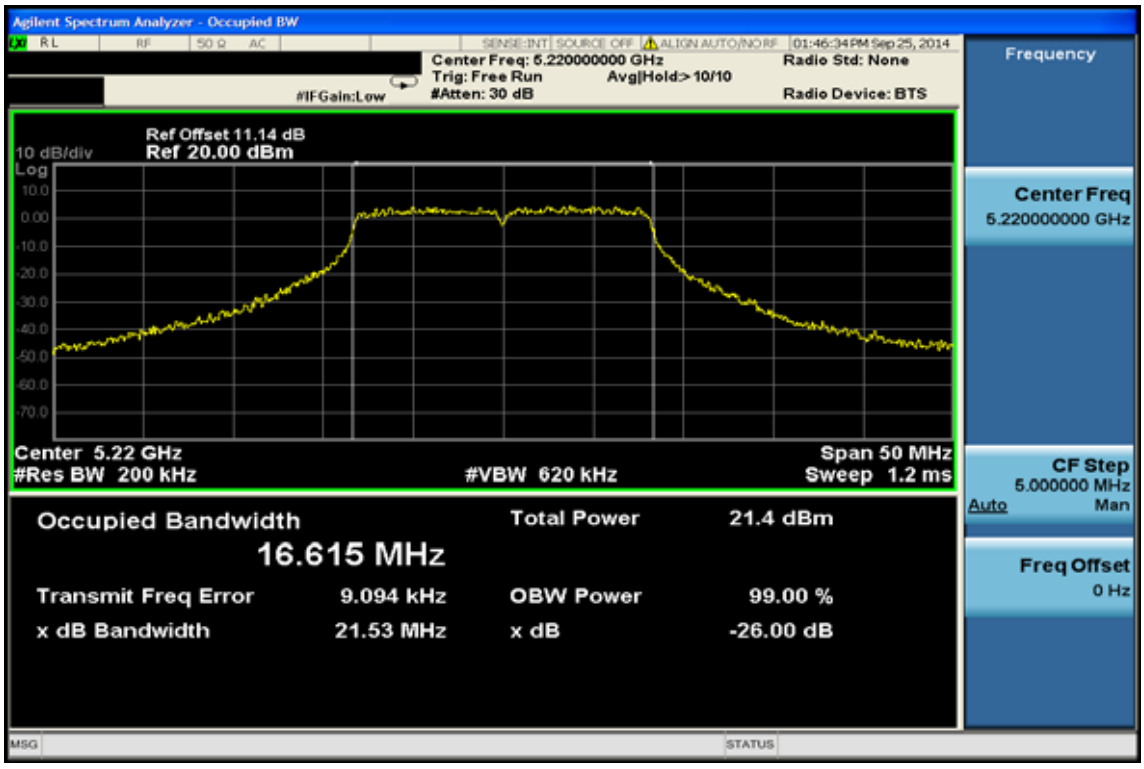
Aux

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

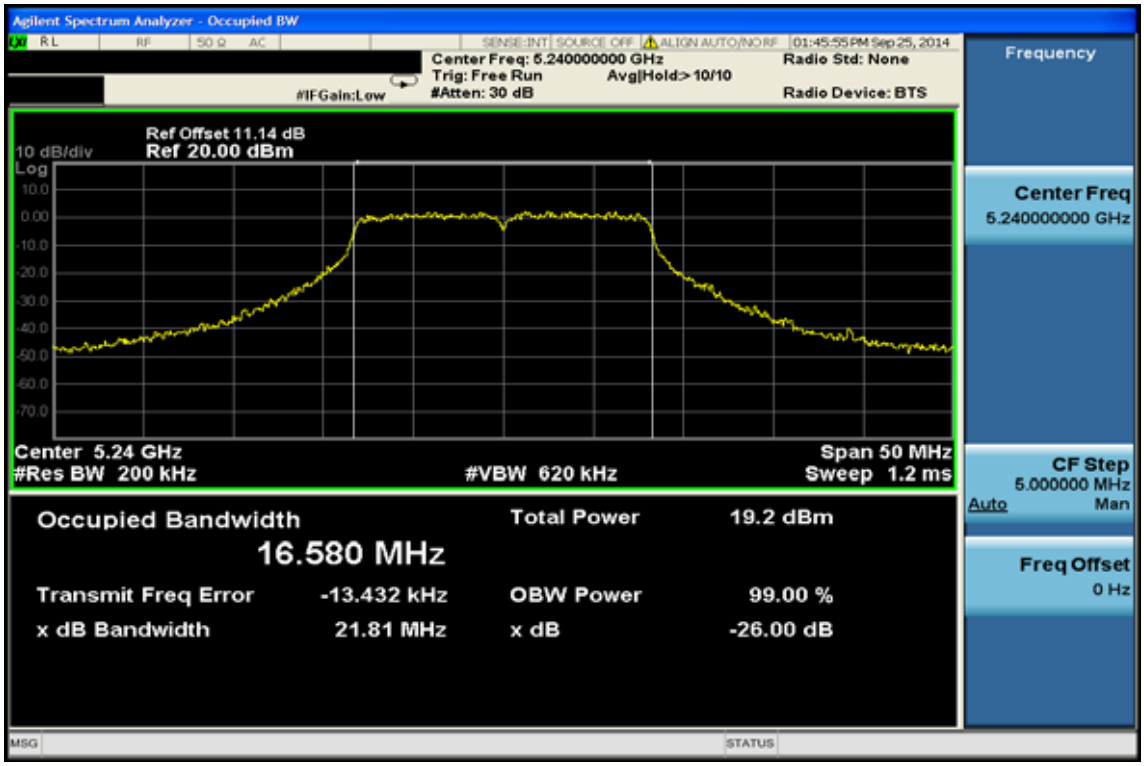
802.11a, 5150~5250 MHz
26dB Band Width Test Data CH-Low (5180 MHz)



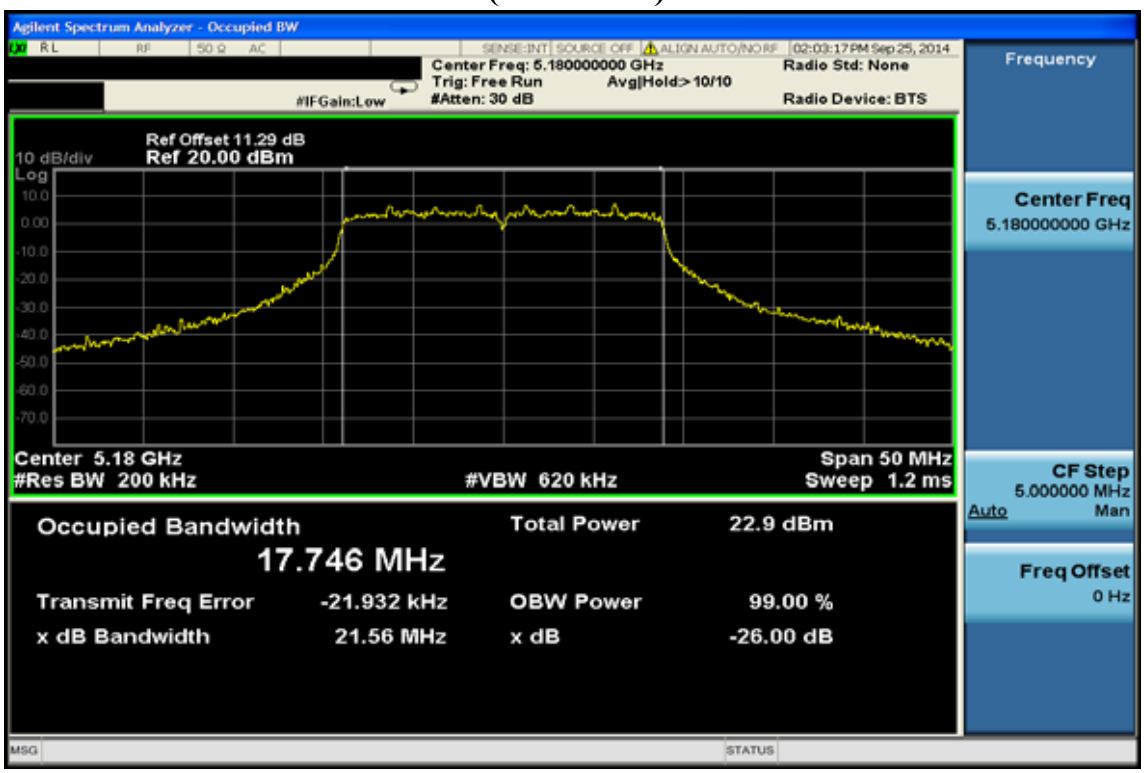
26dB Band Width Test Data CH-Mid (5220 MHz)



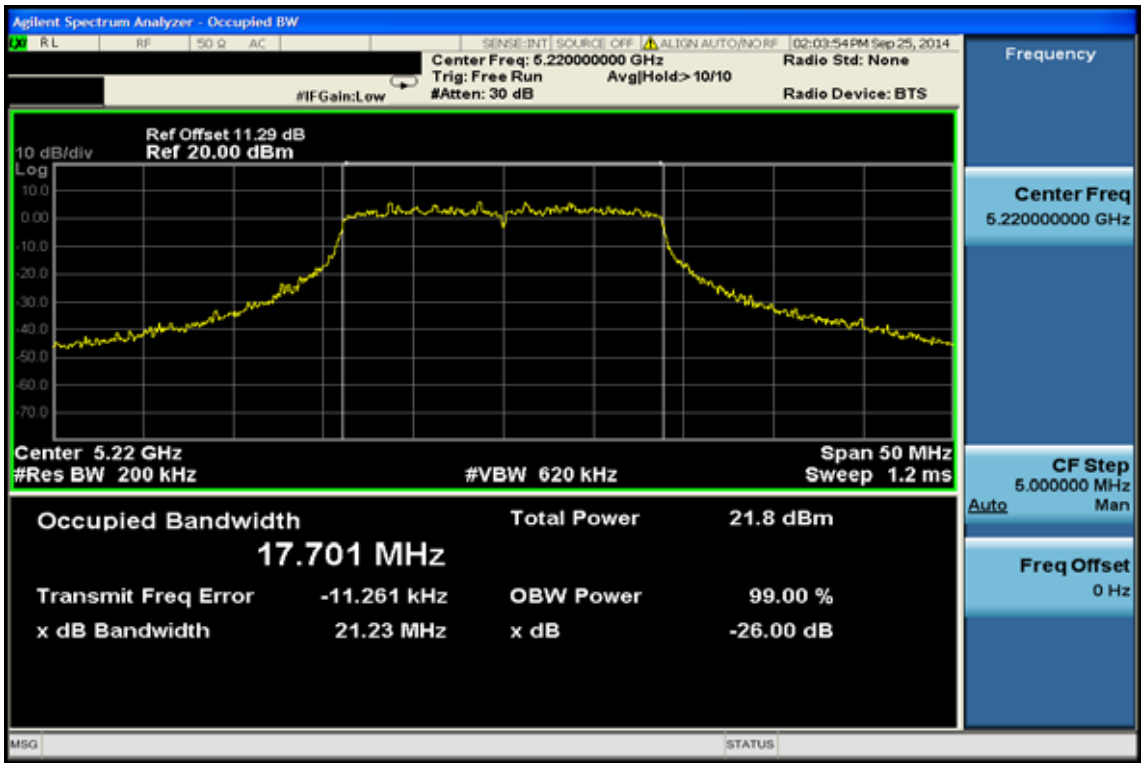
26dB Band Width Test Data CH-High (5240MHz)



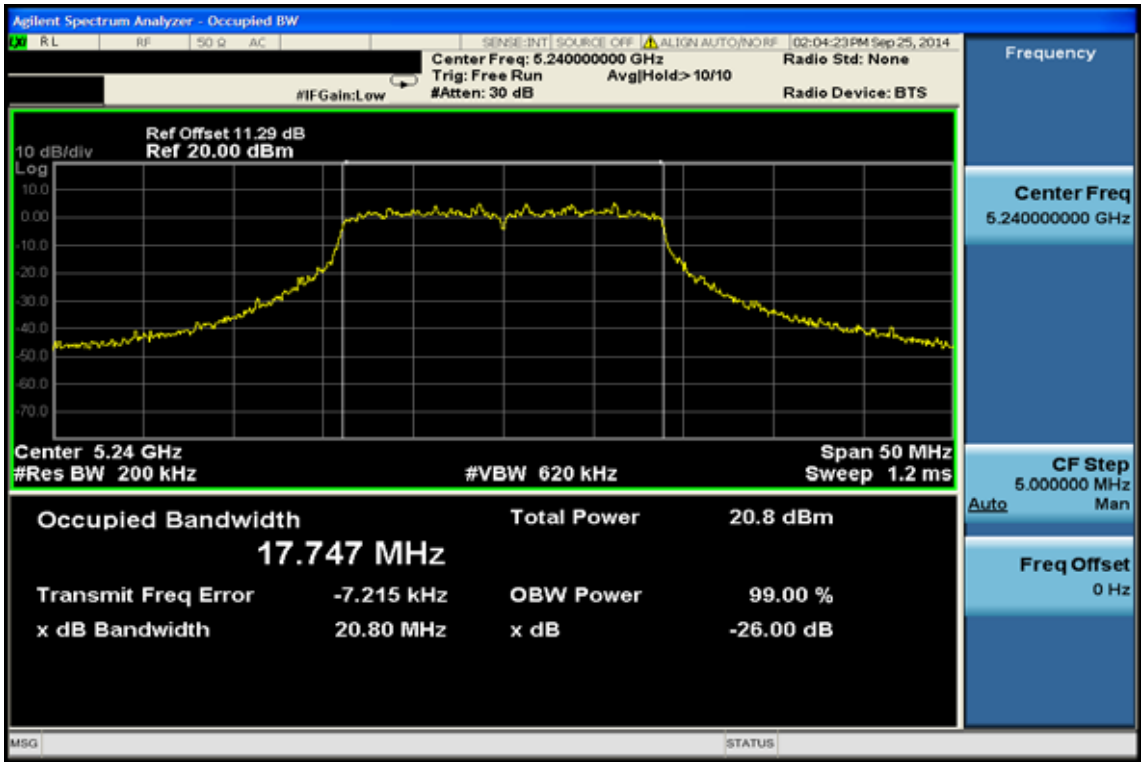
802.11n HT20, 5150~5250 MHz for Main
26dB Band Width Test Data CH-Low (5180MHz)



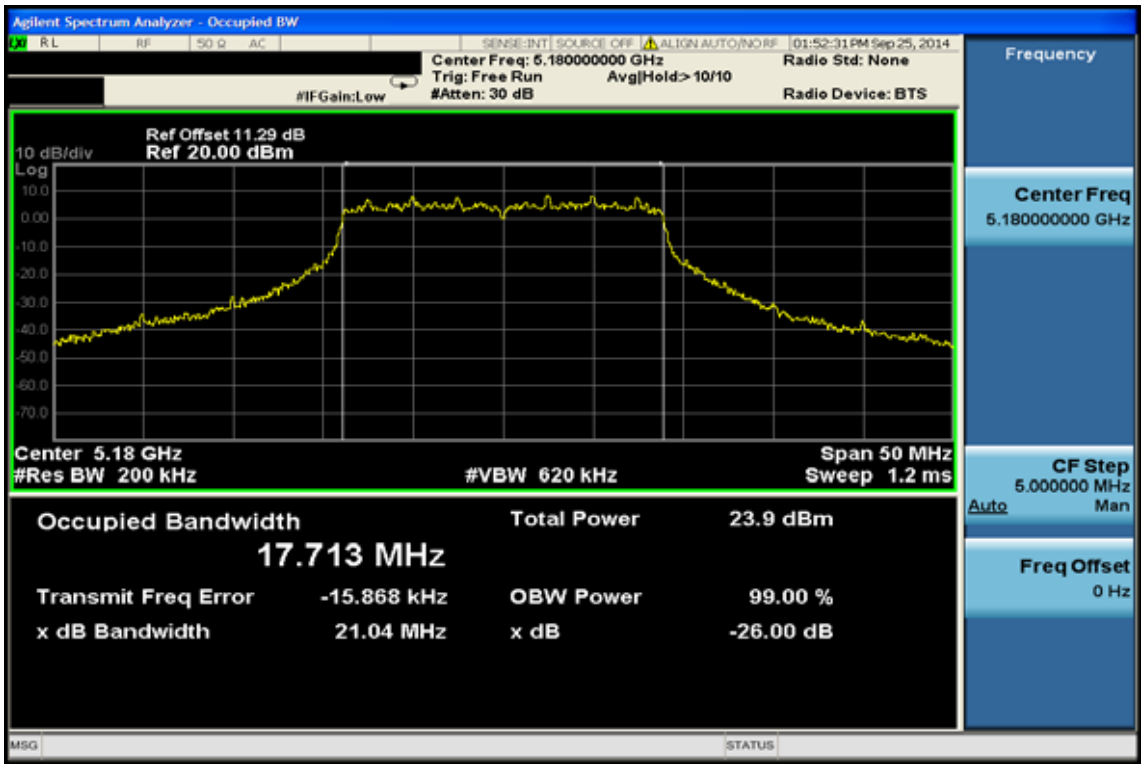
26dB Band Width Test Data CH-Mid (5220 MHz)



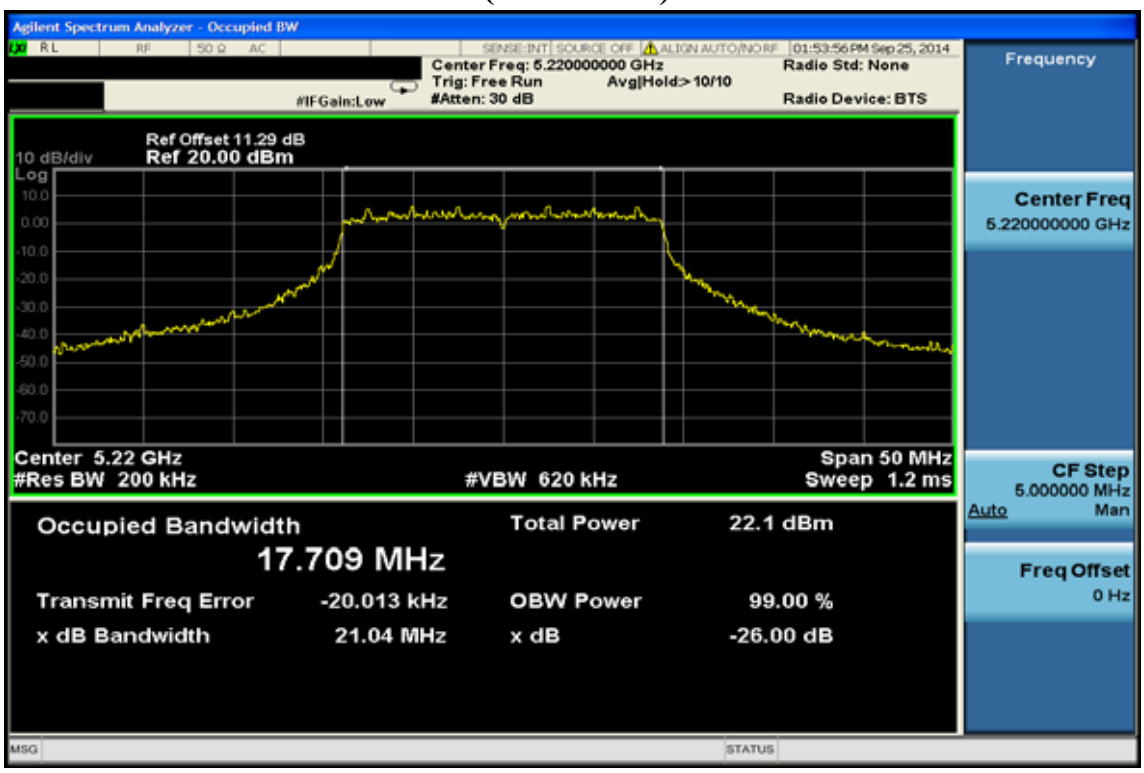
26dB Band Width Test Data CH-High (5240 MHz)



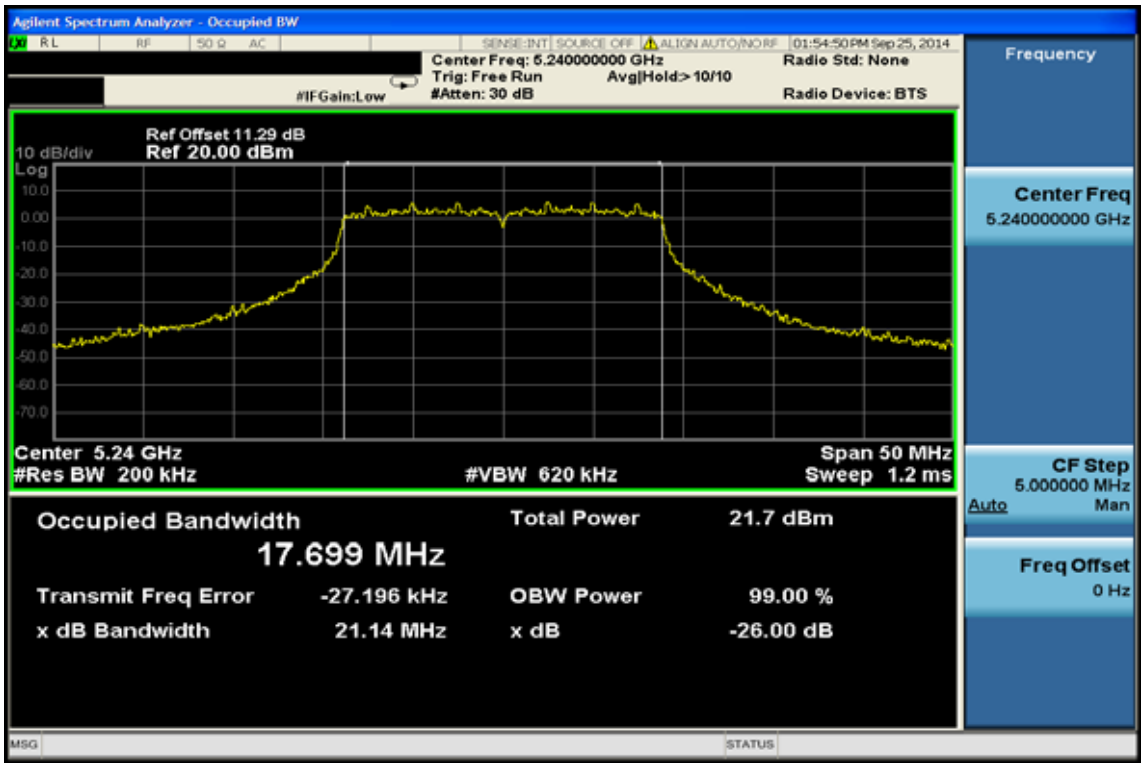
802.11n HT20, 5150~5250 MHz for Aux
26dB Band Width Test Data CH-Low (5180 MHz)



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

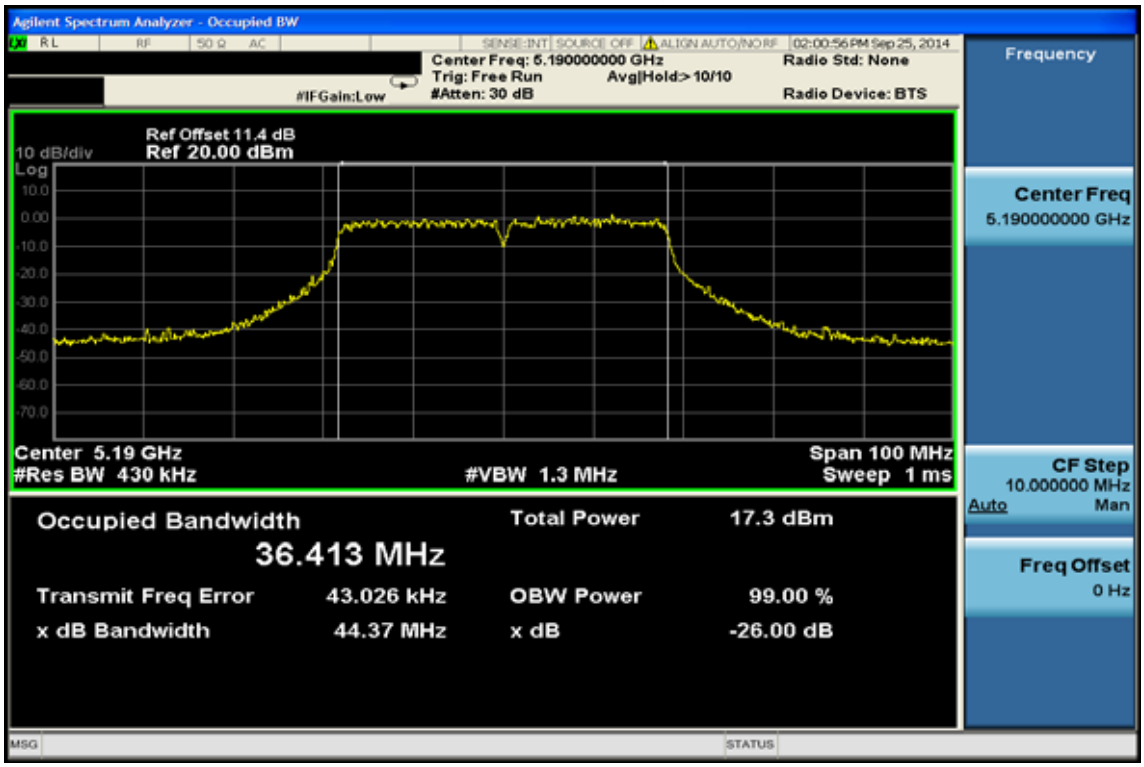


26dB Band Width Test Data CH-High (5240 MHz)

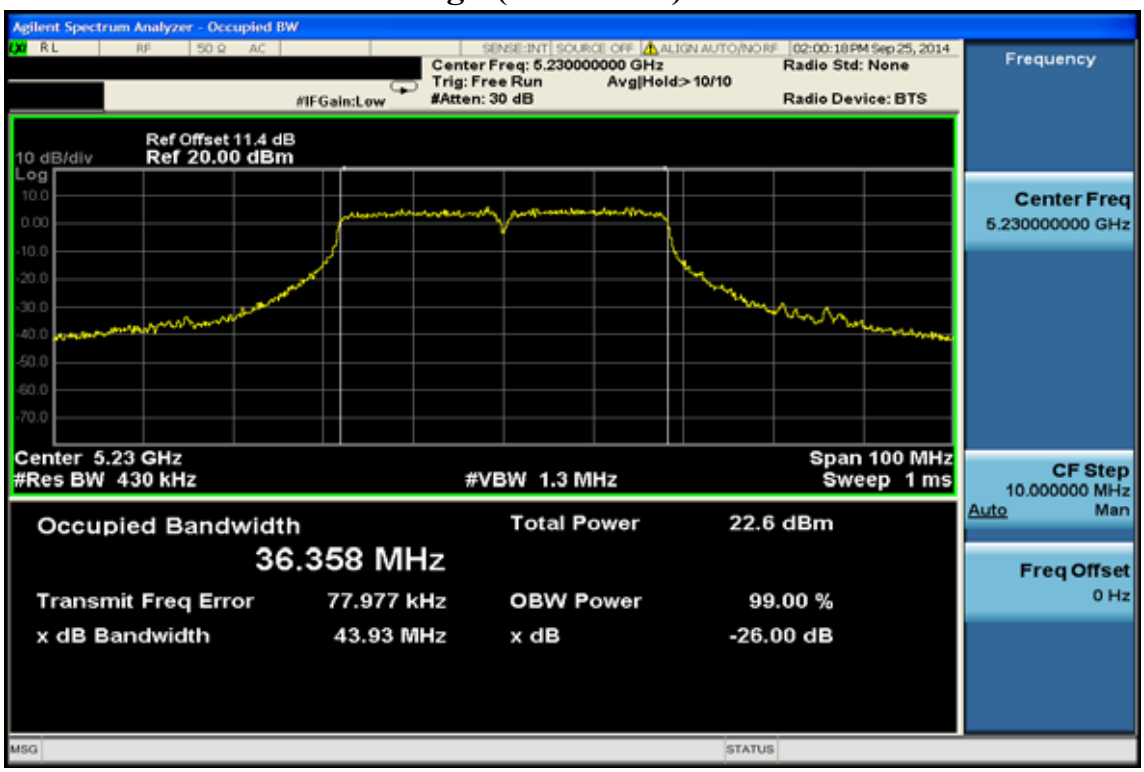


802.11n HT40, 5150~5250 MHz for Main

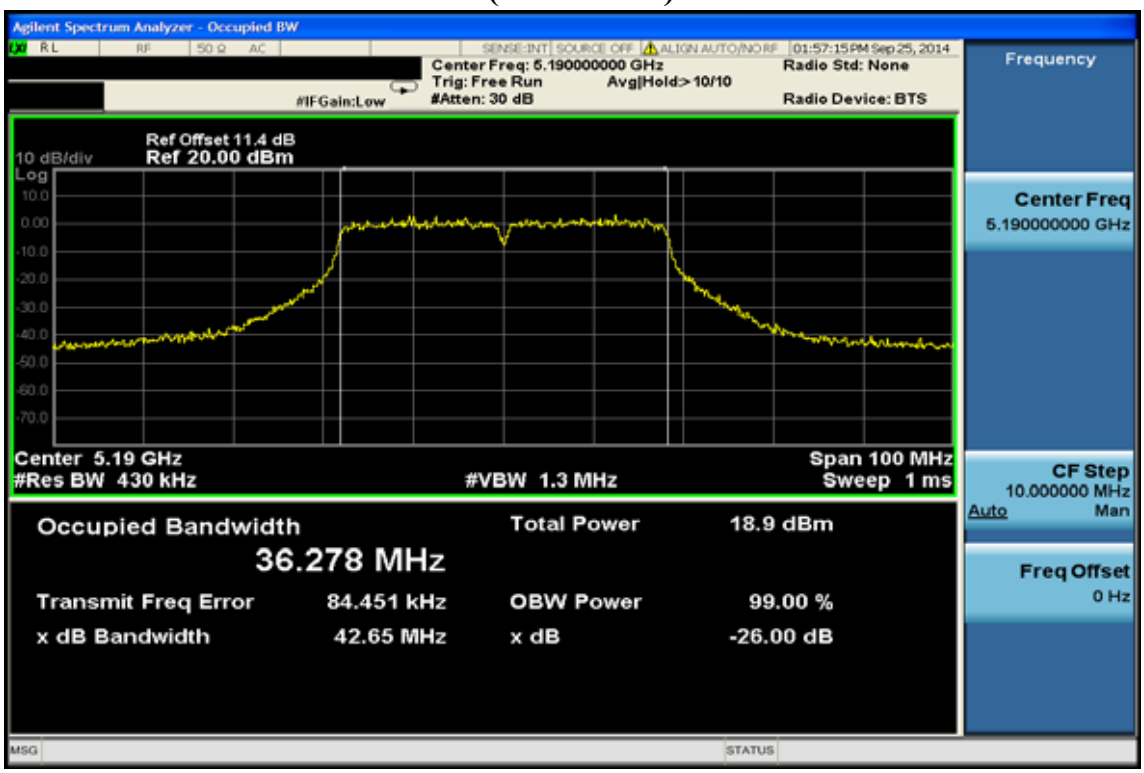
26dB Band Width Test Data CH-Low (5190 MHz)



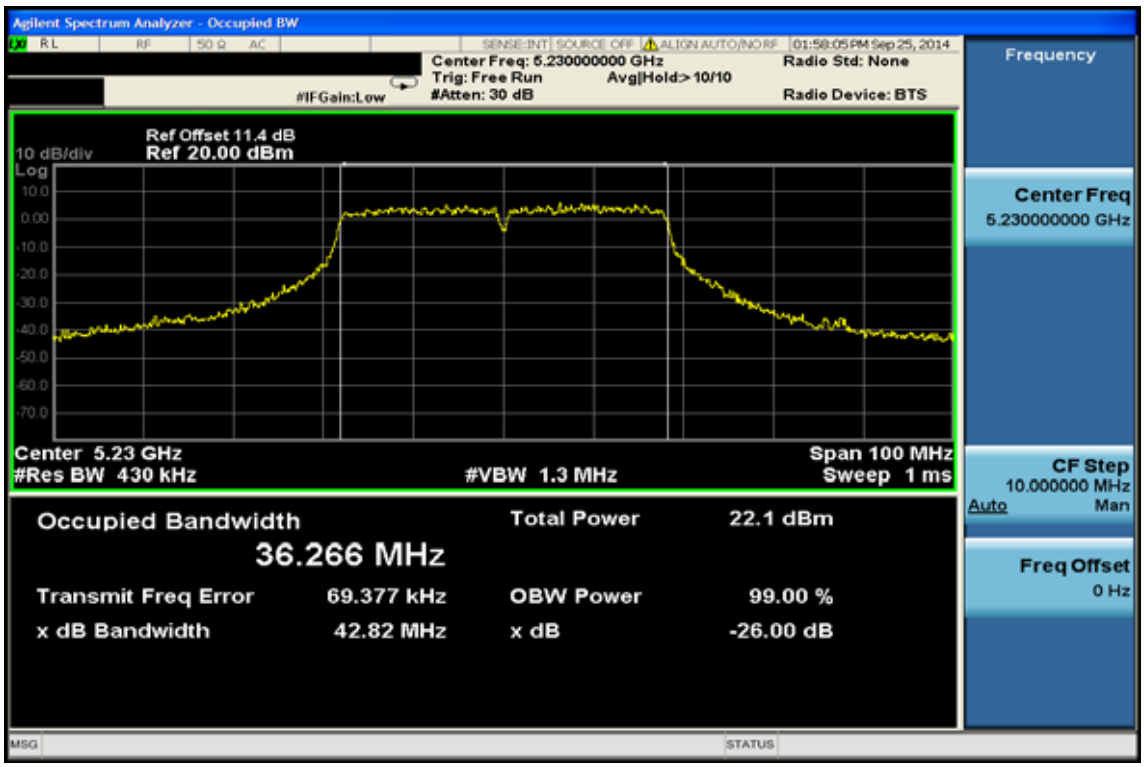
26dB Band Width Test Data CH-High (5230 MHz)



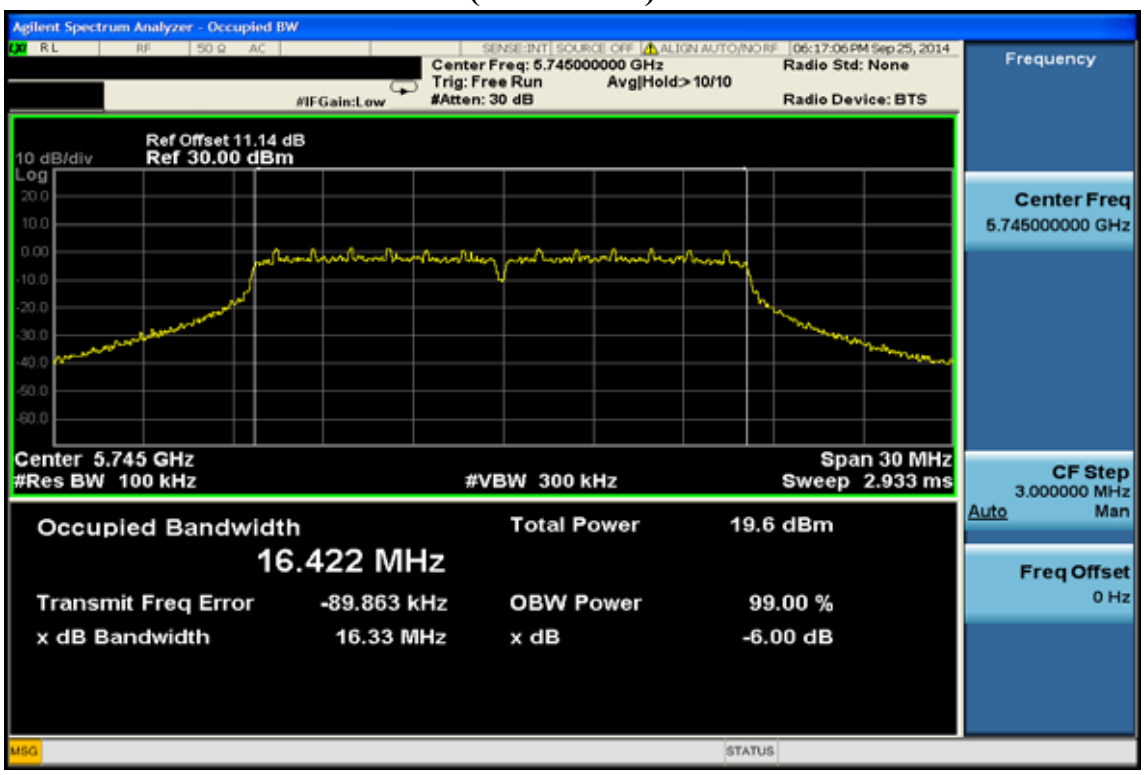
802.11n HT40, 5150~5250 MHz for Aux
26dB Band Width Test Data CH-Low (5190 MHz)



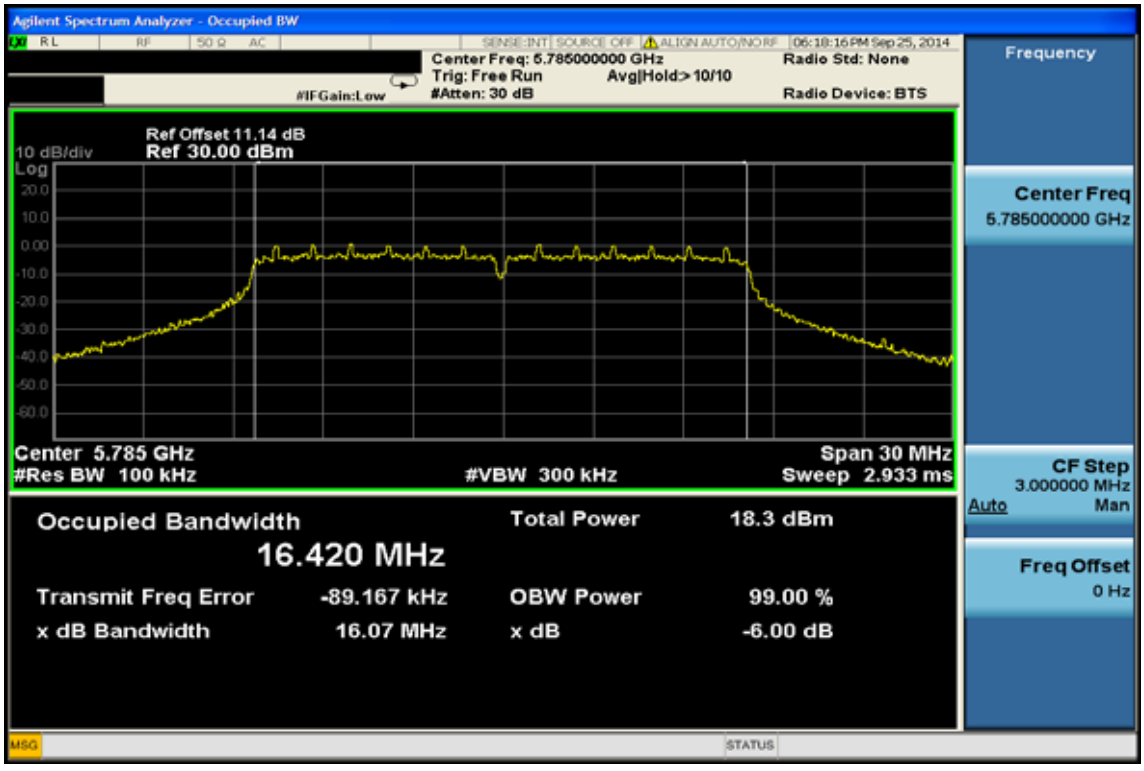
26dB Band Width Test Data CH-High (5230MHz)



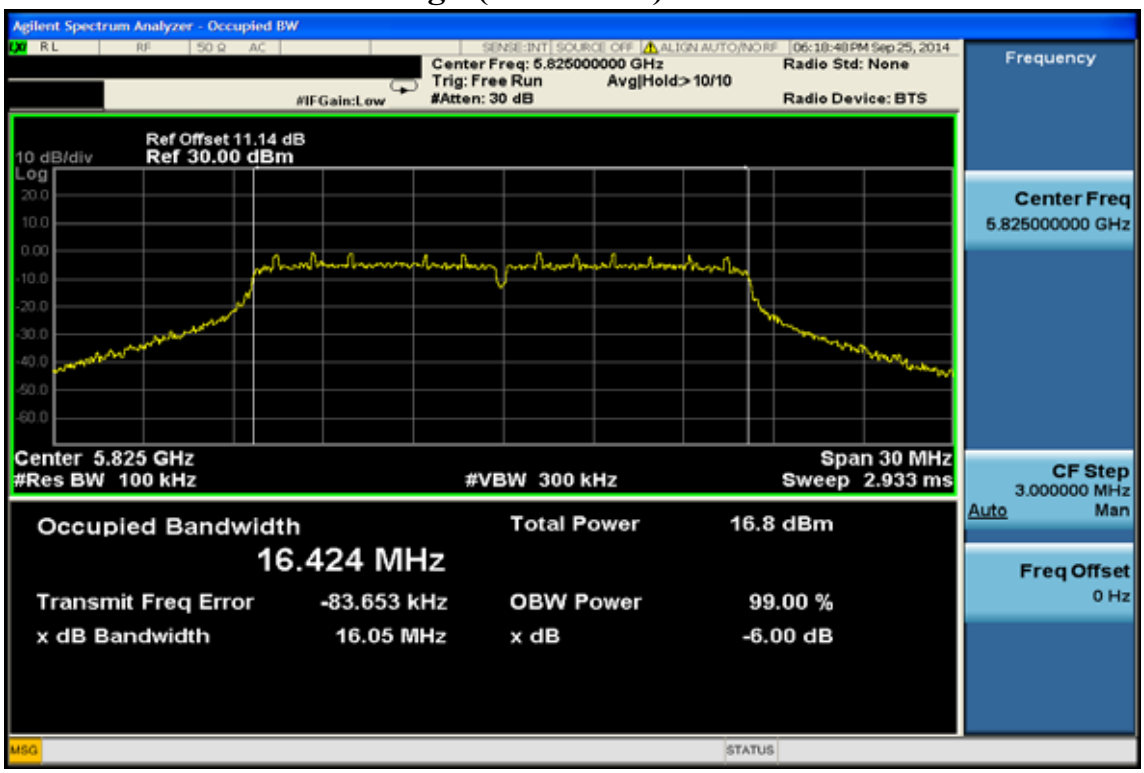
802.11a, 5725~5850 MHz
6dB Band Width Test Data CH-Low (5745 MHz)



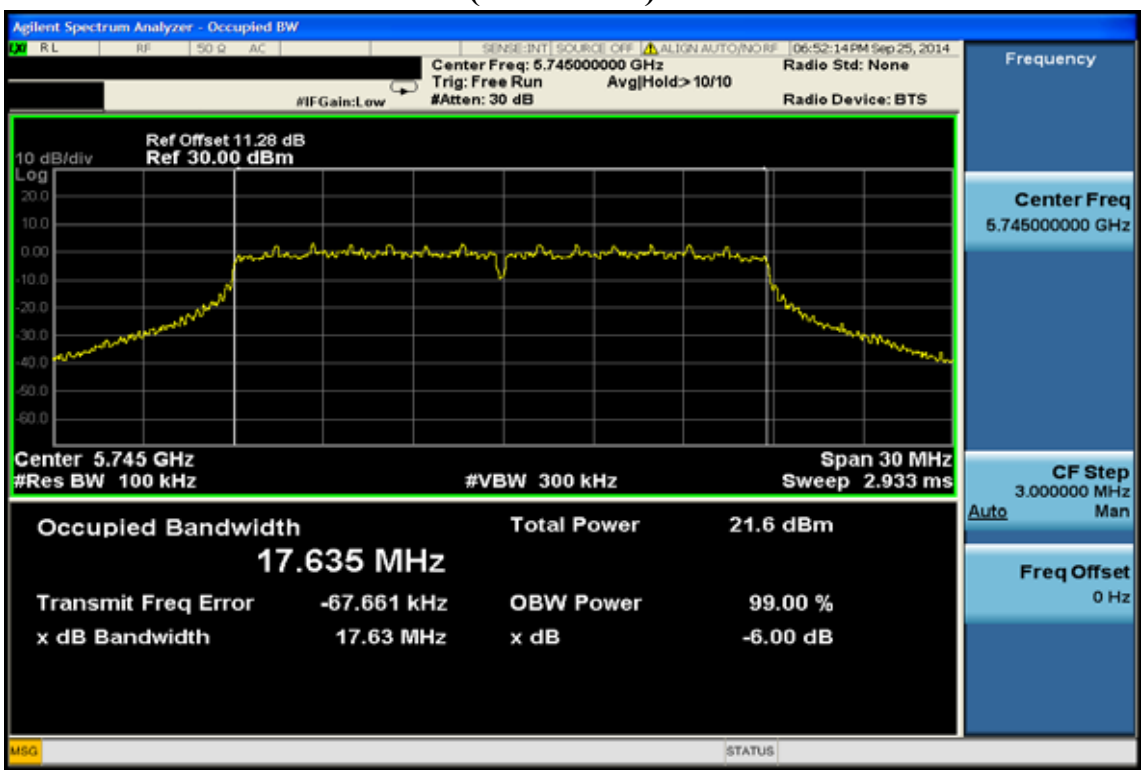
6dB Band Width Test Data CH-Mid (5785 MHz)



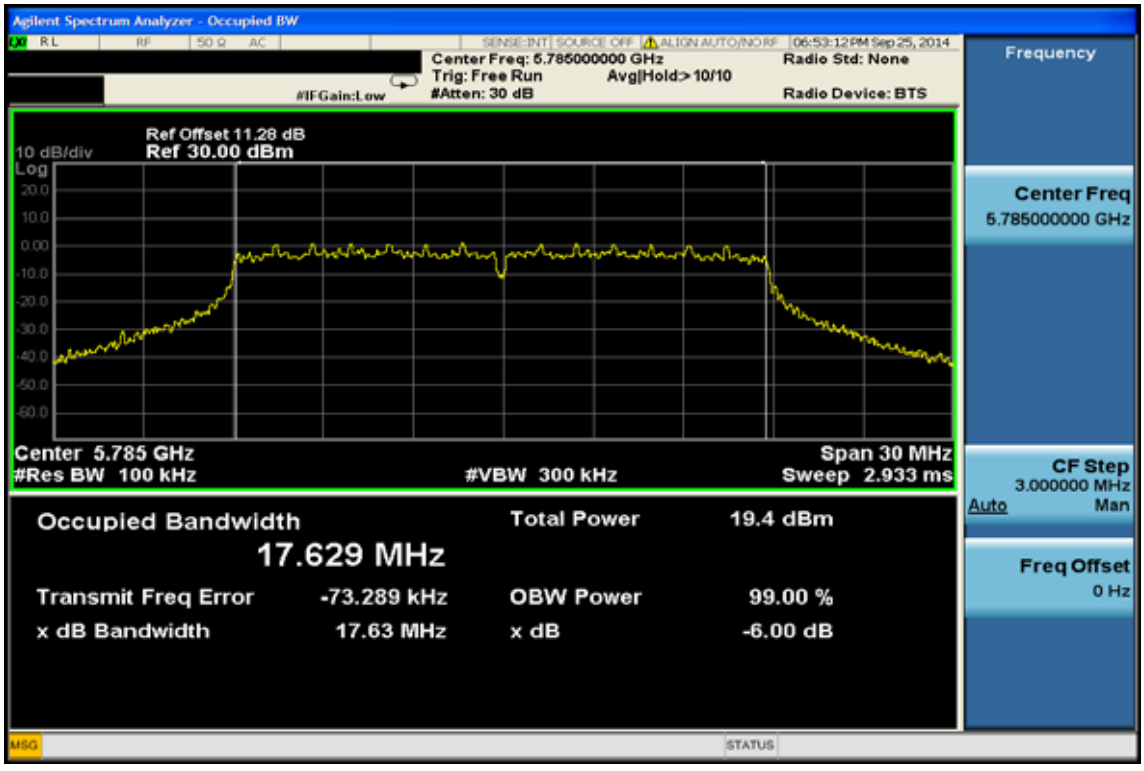
6dB Band Width Test Data CH-High (5825 MHz)



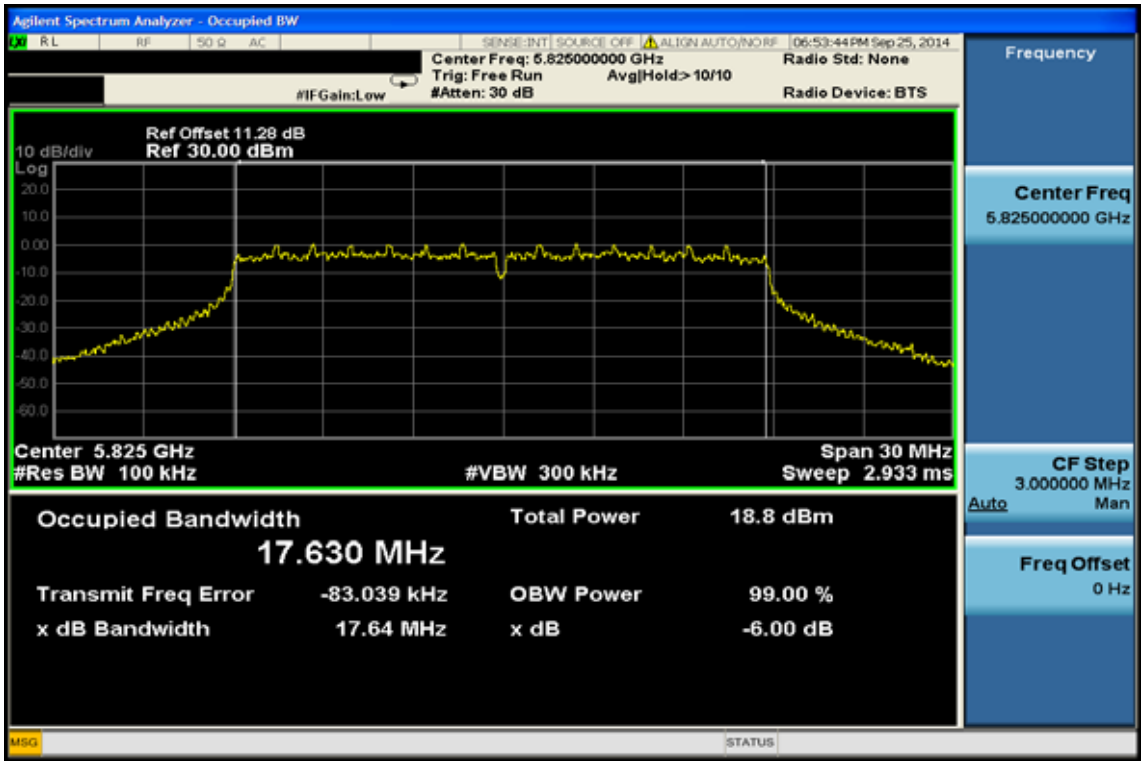
802.11n HT20, 5725~5850 MHz for Main
6dB Band Width Test Data CH-Low (5745 MHz)



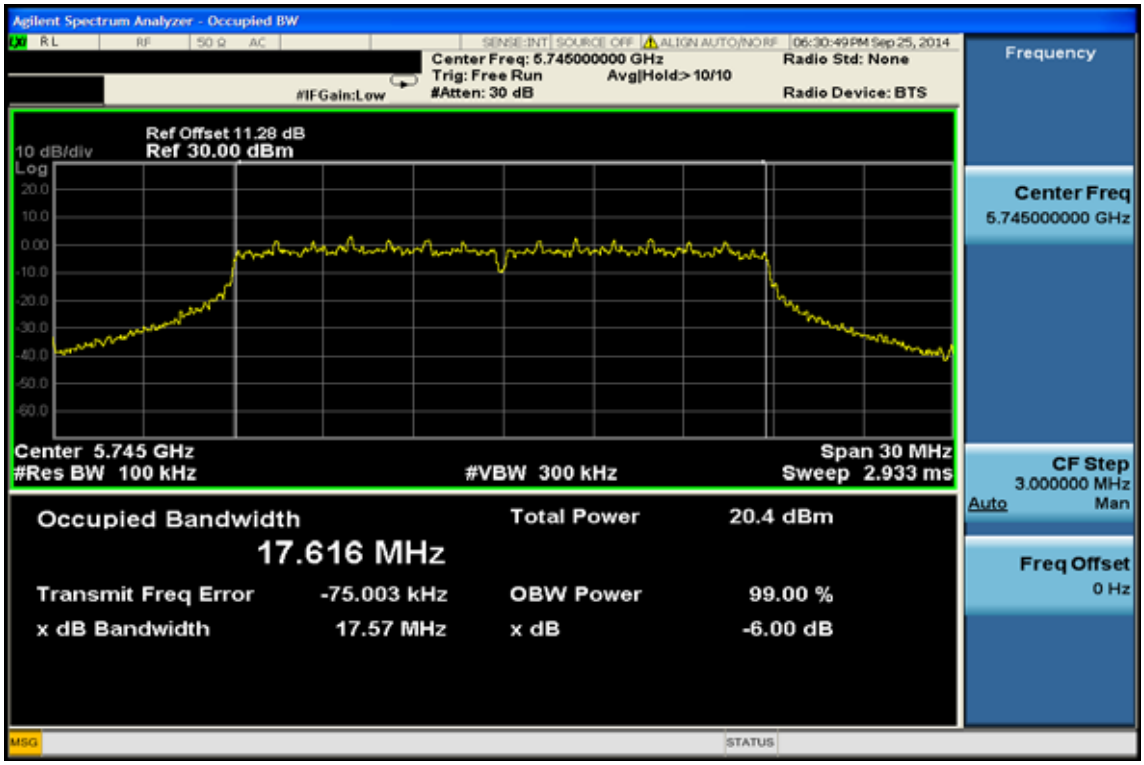
6dB Band Width Test Data CH-Mid (5785 MHz)



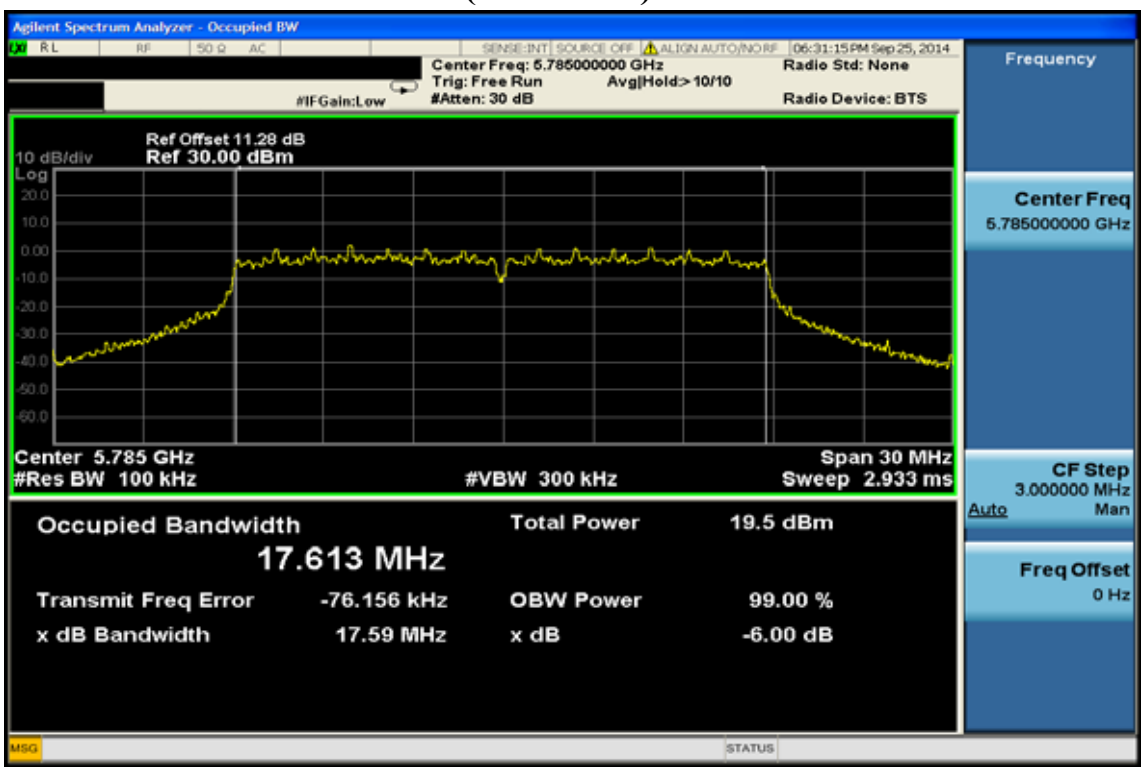
6dB Band Width Test Data CH-High (5825 MHz)



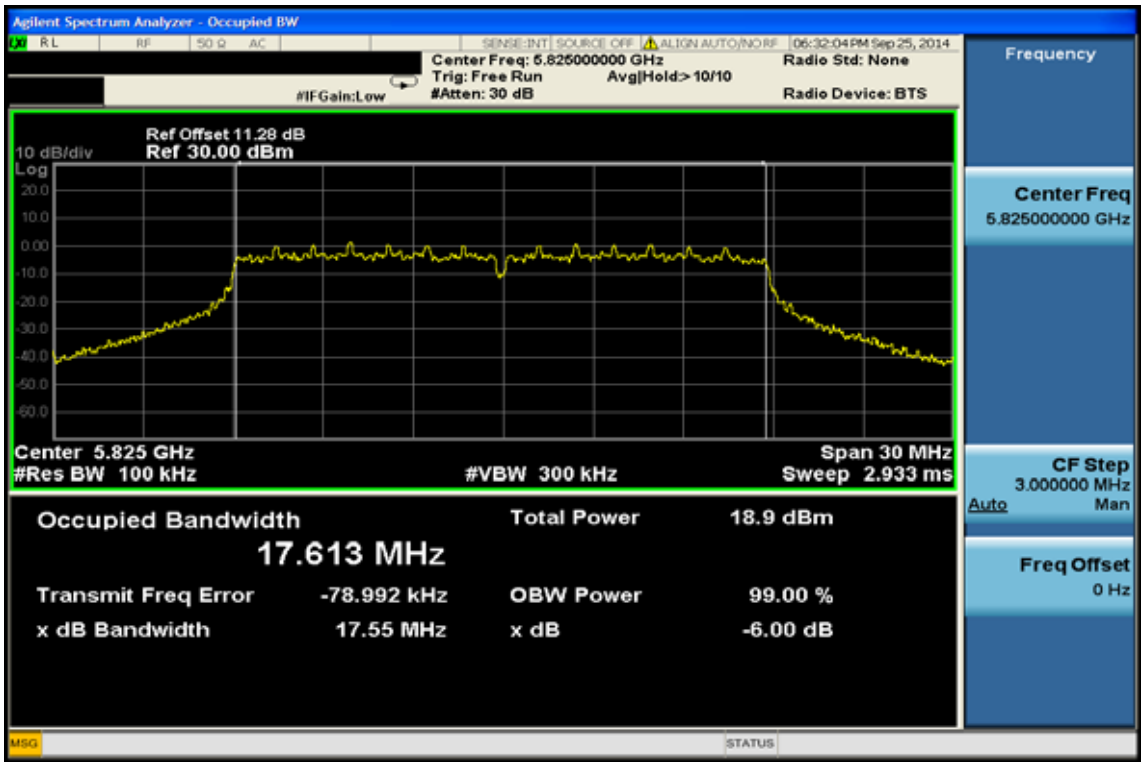
802.11n HT20, 5725~5850 MHz for Aux
6dB Band Width Test Data CH-Low (5745 MHz)



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

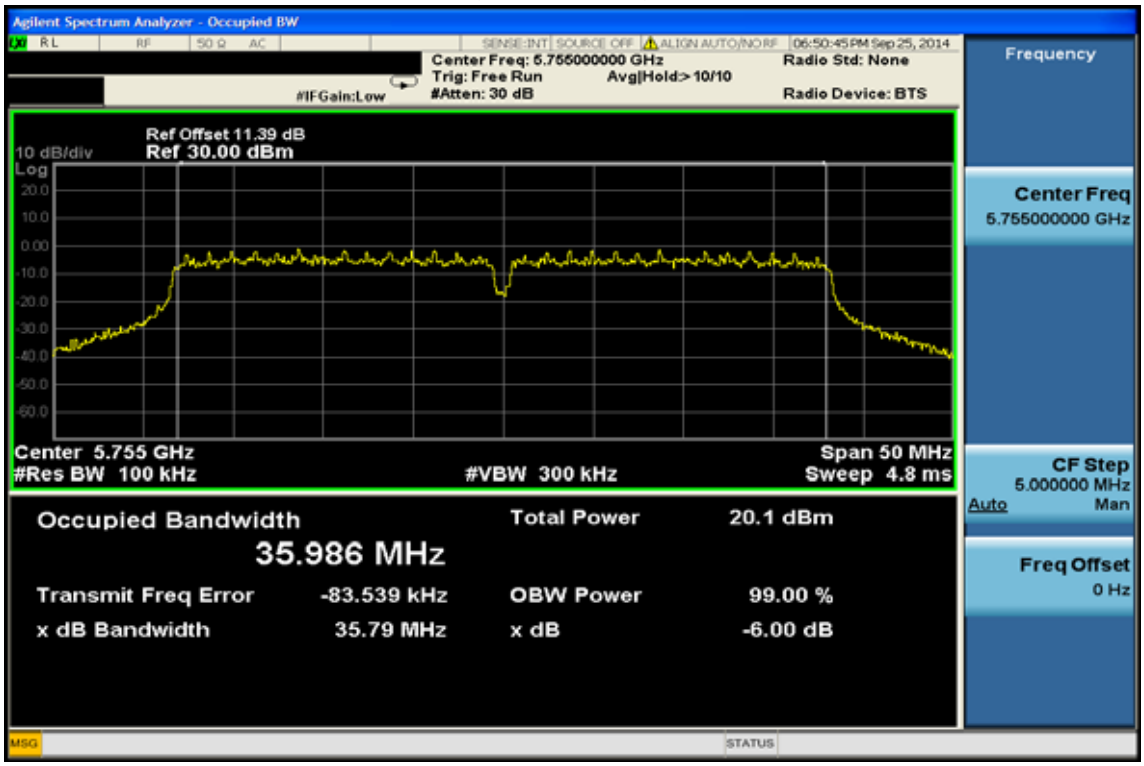


6dB Band Width Test Data CH-High (5825 MHz)

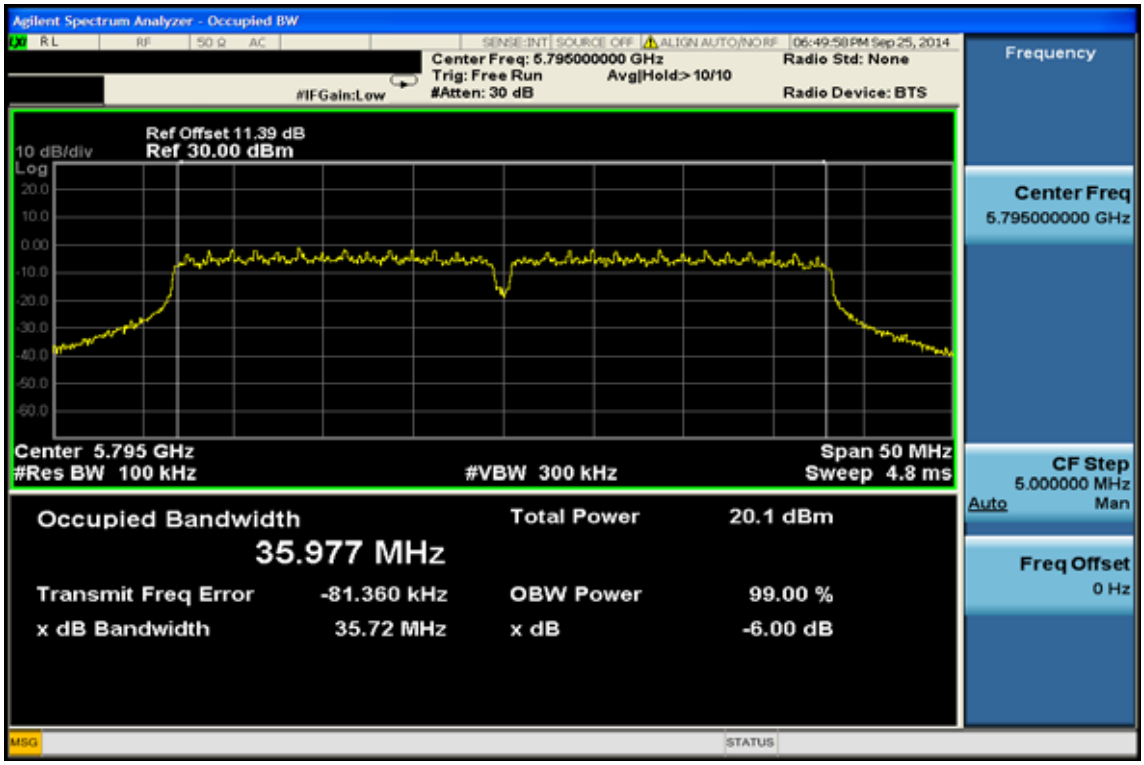


802.11n HT40, 5725~5850 MHz for Main

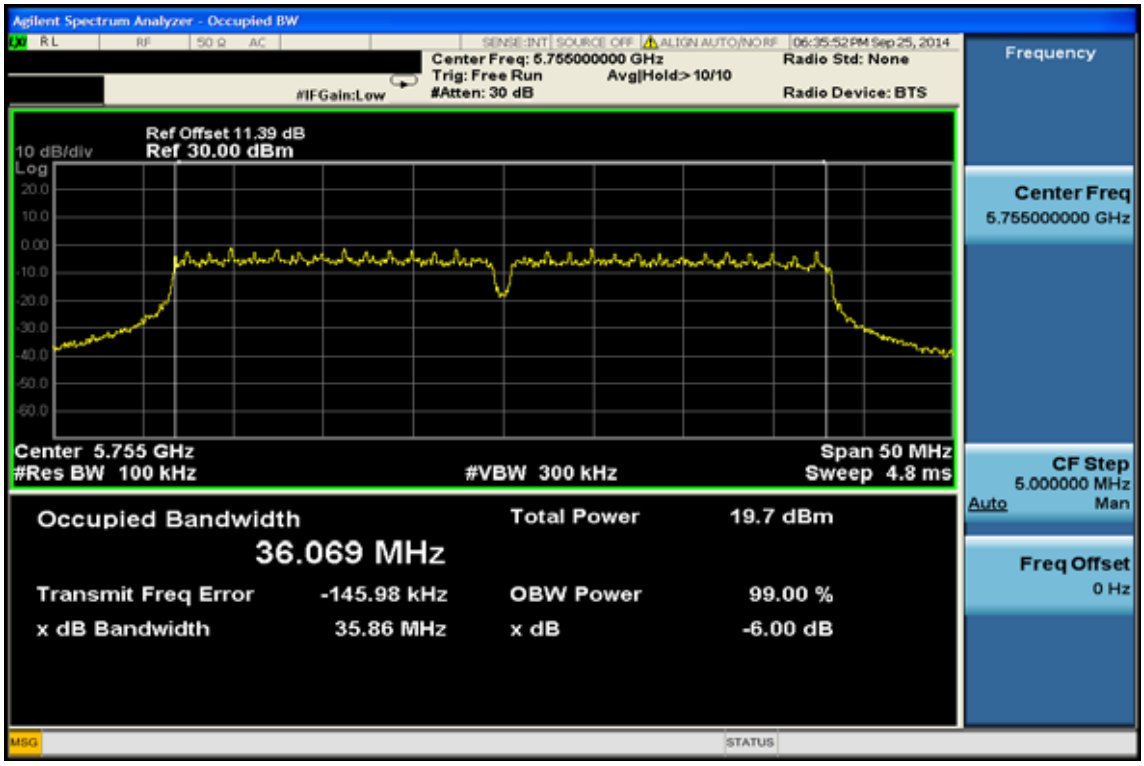
6dB Band Width Test Data CH-Low (5755 MHz)



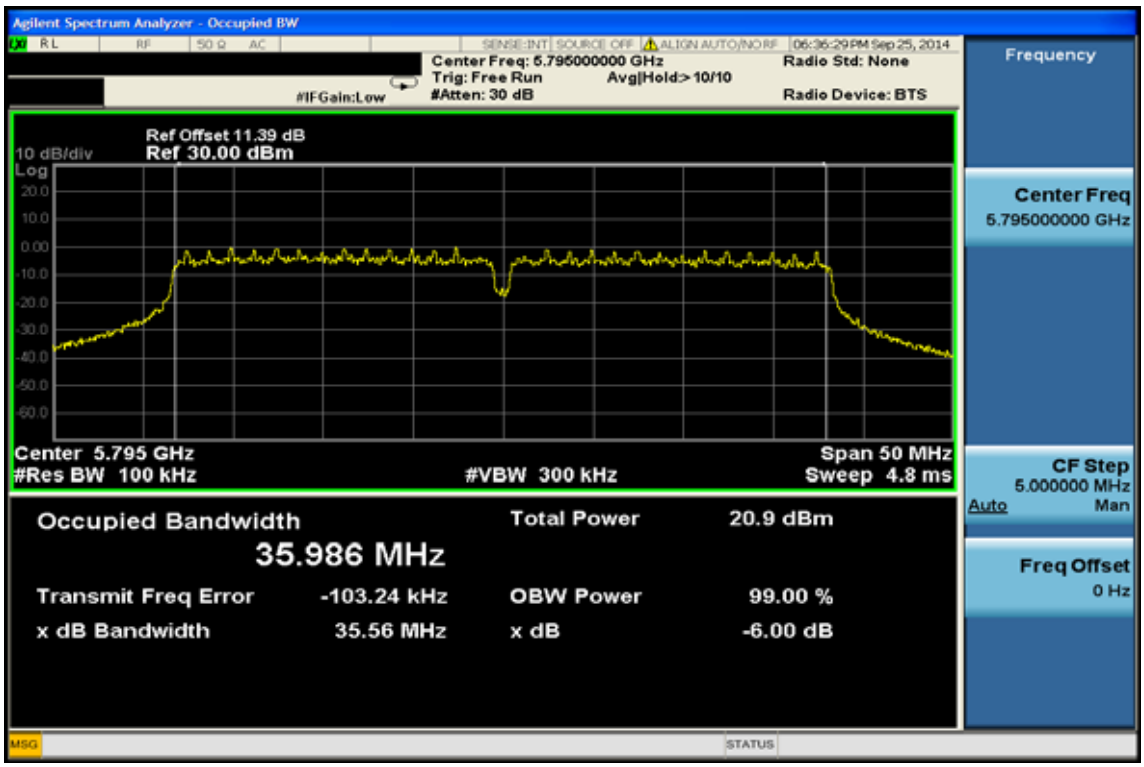
6dB Band Width Test Data CH-High (5795 MHz)



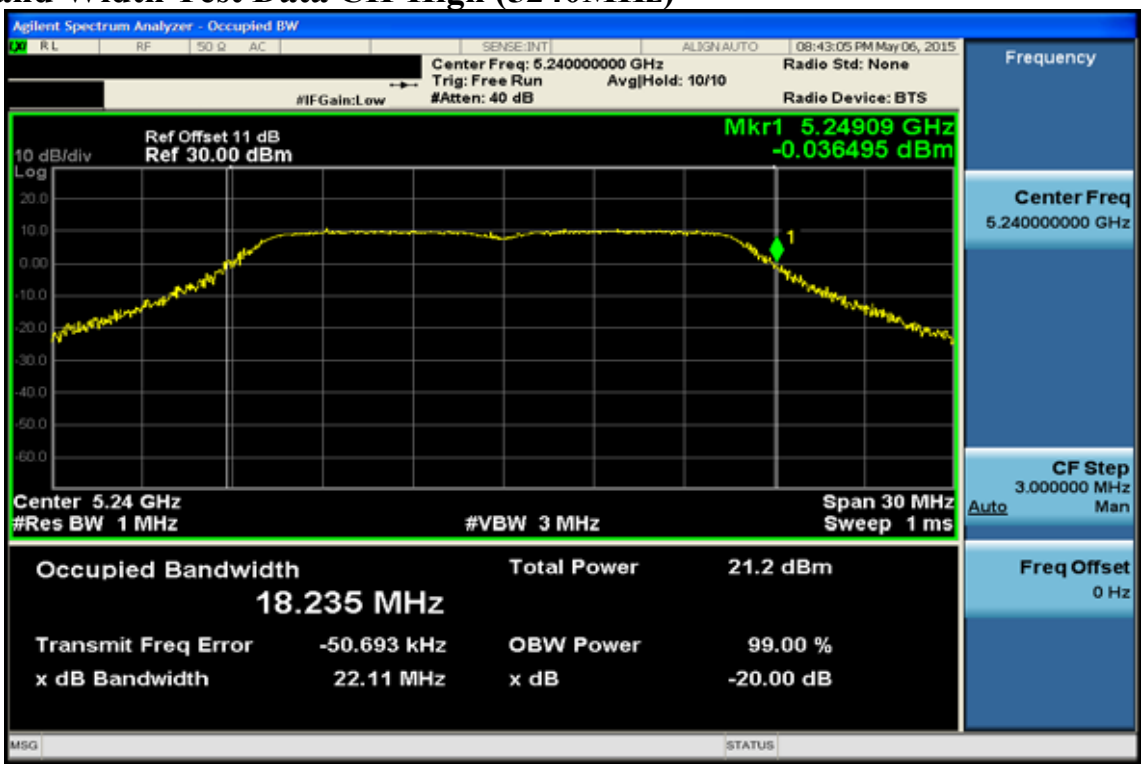
802.11n HT40, 5725~5850 MHz for Aux
6dB Band Width Test Data CH-Low (5755 MHz)



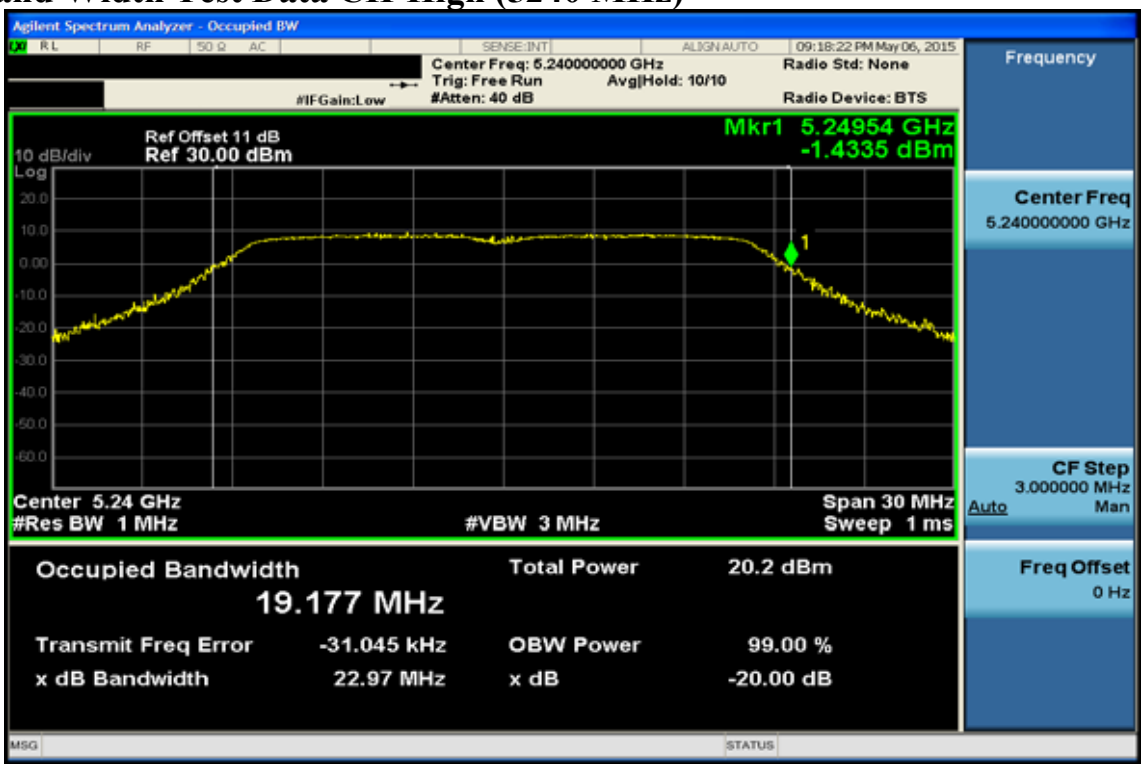
6dB Band Width Test Data CH-High (5795MHz)



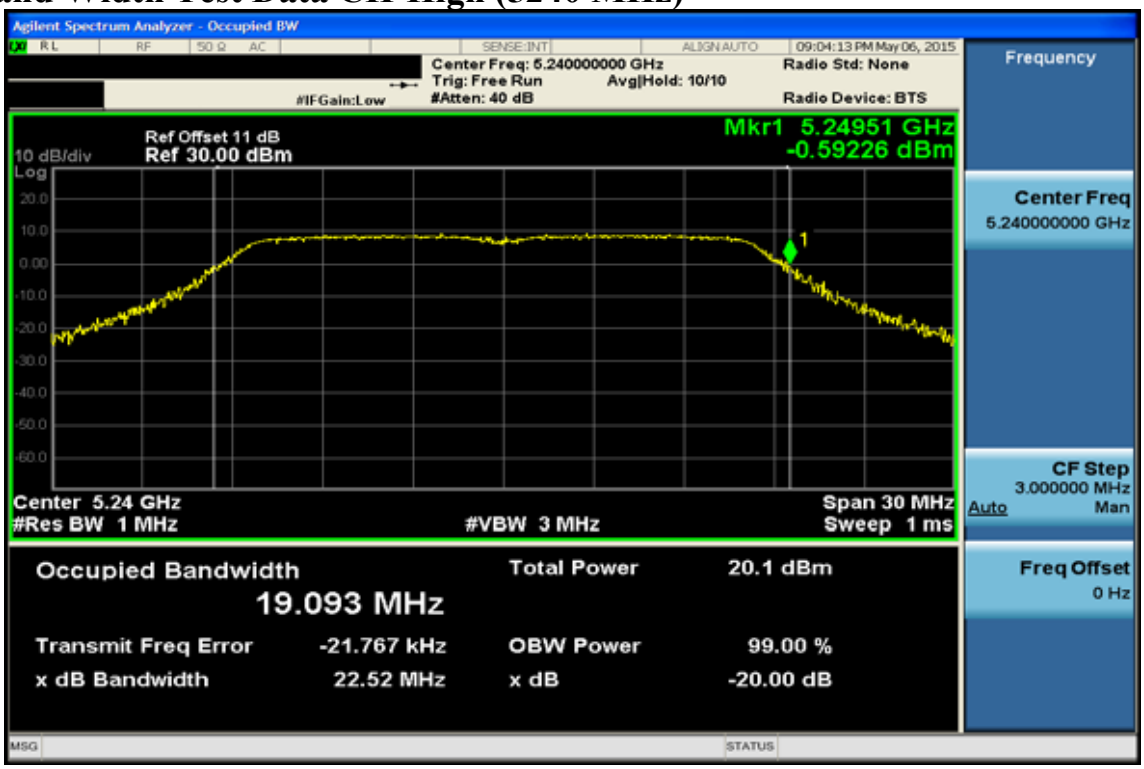
802.11a, 5150~5250 MHz
20dB Band Width Test Data CH-High (5240MHz)



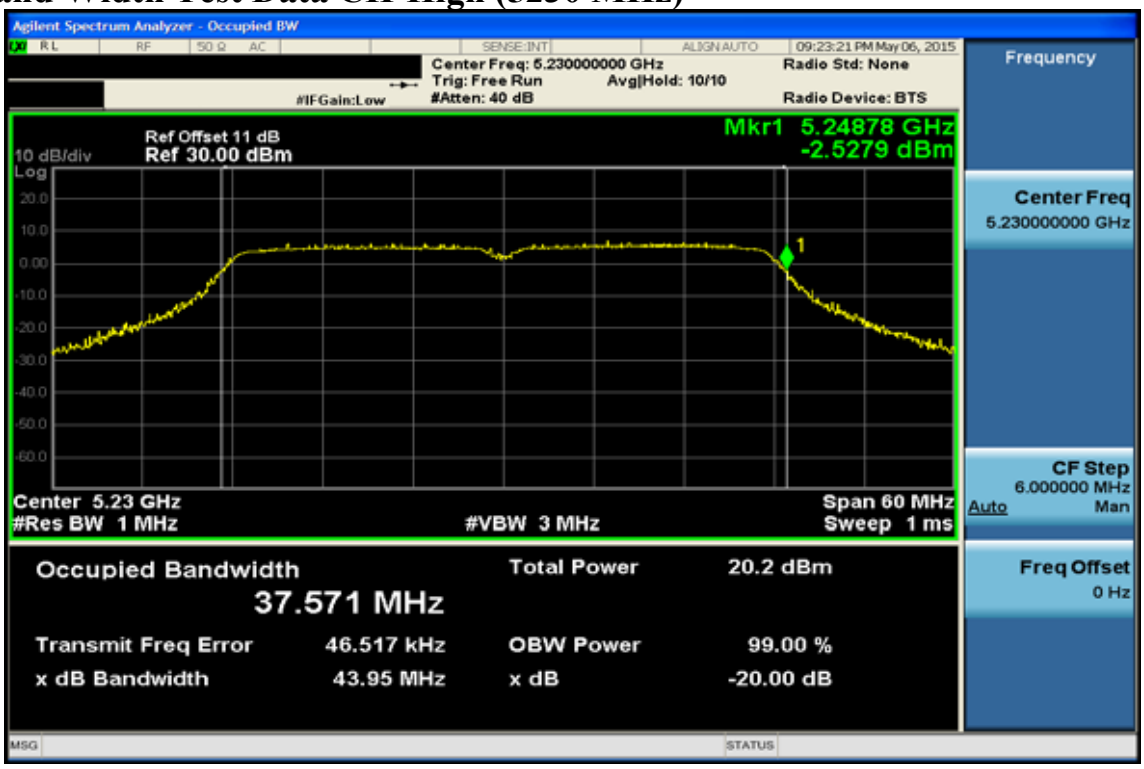
802.11n HT20, 5150~5350 MHz for Main
20dB Band Width Test Data CH-High (5240 MHz)



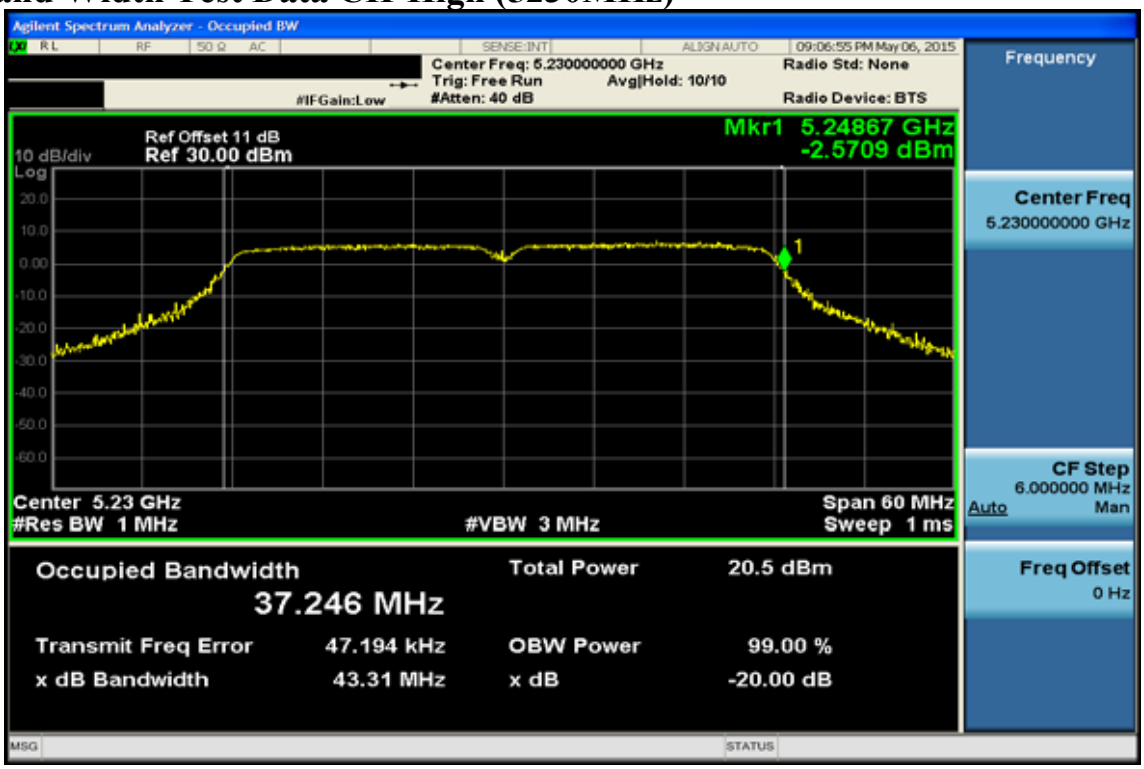
802.11n HT20, 5150~5350 MHz for Aux
20dB Band Width Test Data CH-High (5240 MHz)



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)



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 (# of TX antenna elements)

Effective Legacy Gain (dBi) = 12.73

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

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 (# of TX antenna elements)

Effective Legacy Gain (dBi) = 12.92

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

8.2 Measurement Procedure

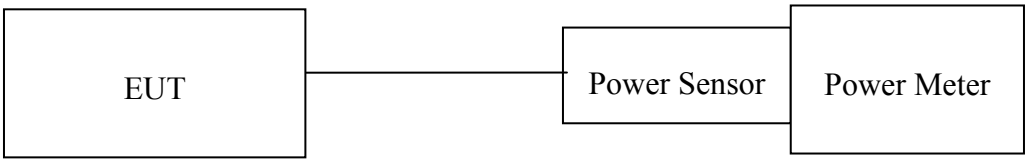
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Set the offset 10*log(1/x) (x=0.4), 0.397940 approximately
4. Record the max. reading.
5. Repeat above procedures until all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

8.3 Measurement Equipment Used:

Refer to section 7.3 for details.

8.4 Test Set-up:



8.5 Measurement Result

802.11 a

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

802.11n HT20 MIMO operation CH0

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
36	5180	15.12	14.77	14.41	14.05	13.69	13.32	12.92	12.35	**23.27 dBm**
44	5220	14.21	13.84	13.50	13.17	12.84	12.49	12.16	11.67	**23.27 dBm**
48	5240	13.14	12.78	12.46	12.13	11.77	11.43	11.07	10.57	**23.27 dBm**

802.11n HT20 MIMO operation CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
36	5180	15.74	15.35	14.96	14.59	14.23	13.86	13.47	12.98	**23.27 dBm**
44	5220	14.32	13.98	13.63	13.32	12.98	12.65	12.31	11.84	**23.27 dBm**
48	5240	13.44	13.06	12.66	12.29	11.91	11.54	11.14	10.68	**23.27 dBm**

802.11n HT20 MIMO operation CH0+CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
36	5180	18.45	18.08	17.70	17.34	16.98	16.61	16.21	15.69	**23.27 dBm**
44	5220	17.28	16.92	16.58	16.26	15.92	15.58	15.25	14.77	**23.27 dBm**
48	5240	16.30	15.93	15.57	15.22	14.85	14.50	14.12	13.64	**23.27 dBm**

Note: Offset 11dB

802.11n HT40 MIMO operation CH0

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
38	5190	9.71	9.35	9.01	8.68	8.34	8.02	7.66	7.18	**23.27 dBm**
46	5230	13.71	13.39	13.04	12.71	12.35	11.99	11.64	11.15	**23.27 dBm**

802.11n HT40 MIMO operation CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
38	5190	10.78	10.40	10.03	9.65	9.30	8.95	8.60	8.34	**23.27 dBm**
46	5230	14.01	13.65	13.30	12.93	12.56	12.18	11.82	11.23	**23.27 dBm**

802.11n HT40 MIMO operation CH0+CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
38	5190	13.29	12.92	12.56	12.20	11.86	11.52	11.17	10.81	**23.27 dBm**
46	5230	16.87	16.53	16.18	15.83	15.47	15.10	14.74	14.20	**23.27 dBm**

Note: Offset 11dB

802.11 a

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		6M	9M	12M	18M	24M	36M	48M	54M	
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

802.11n HT20 MIMO operation CH0

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
149	5745	12.02	11.67	11.36	11.03	10.69	10.35	10.02	9.49	**23.08 dBm**
157	5785	11.18	10.83	10.49	10.12	9.77	9.42	9.10	8.68	**23.08 dBm**
165	5825	10.32	9.98	9.65	9.30	8.98	8.66	8.33	7.82	**23.08 dBm**

802.11n HT20 MIMO operation CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
149	5745	12.32	11.94	11.58	11.24	10.87	10.51	10.14	9.68	**23.08 dBm**
157	5785	11.19	10.85	10.52	10.21	9.87	9.52	9.22	8.79	**23.08 dBm**
165	5825	10.57	10.21	9.86	9.51	9.17	8.83	8.49	7.98	**23.08 dBm**

802.11n HT20 MIMO operation CH0+CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
149	5745	15.18	14.82	14.48	14.15	13.79	13.44	13.09	12.60	**23.08 dBm**
157	5785	14.20	13.85	13.52	13.18	12.83	12.48	12.17	11.75	**23.08 dBm**
165	5825	13.46	13.11	12.77	12.42	12.09	11.76	11.42	10.91	**23.08 dBm**

Note: Offset 11dB

802.11n HT40 MIMO operation CH0

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
151	5755	10.09	9.76	9.42	9.10	8.78	8.44	8.12	7.84	**23.08 dBm**
159	5795	11.91	11.56	11.23	10.88	10.56	10.21	9.85	9.47	**23.08 dBm**

802.11n HT40 MIMO operation CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
151	5755	10.41	10.07	9.71	9.36	9.02	8.65	8.31	8.11	**23.08 dBm**
159	5795	12.06	11.70	11.38	11.03	10.67	10.33	10.01	9.67	**23.08 dBm**

802.11n HT40 MIMO operation CH0+CH1

Cable loss = 0		The Maximum Output Power								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	
151	5755	13.26	12.93	12.58	12.24	11.91	11.56	11.23	10.99	**23.08 dBm**
159	5795	15.00	14.64	14.32	13.97	13.63	13.28	12.94	12.58	**23.08 dBm**

Note: Offset 11dB

9 Maximum Power Spectral Density

9.1 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.

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

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.

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

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

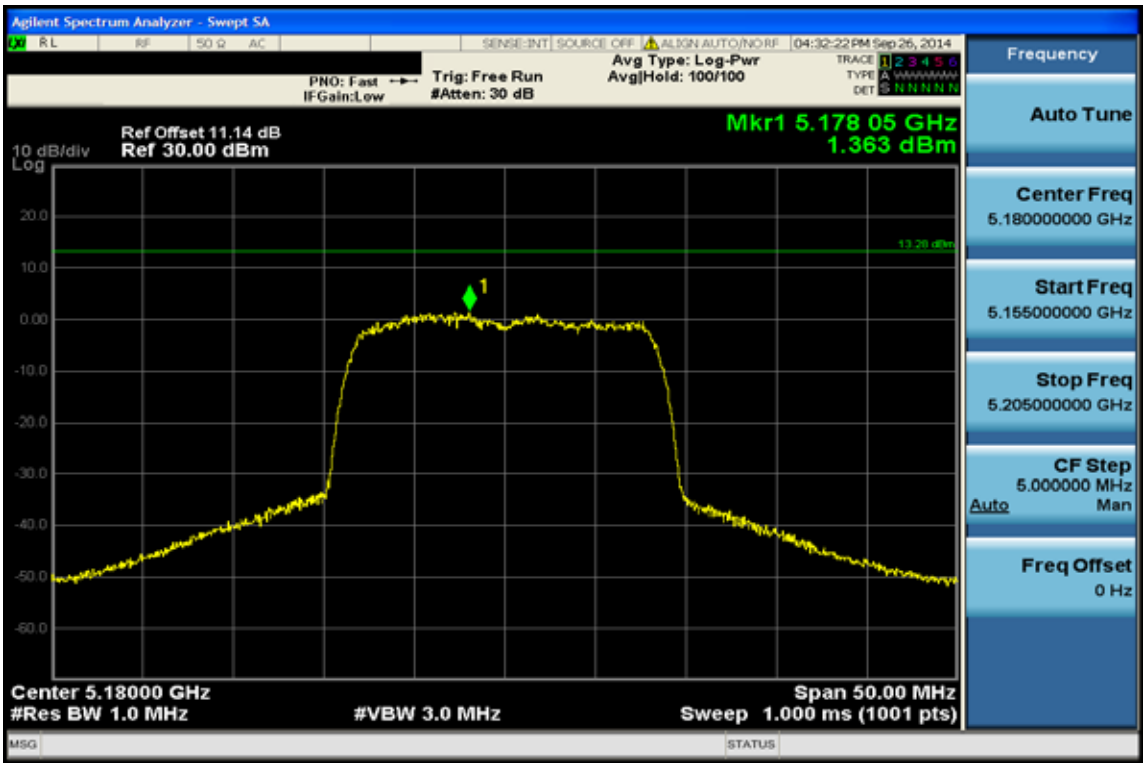
802.11n HT40, 5725~5850 MHz

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

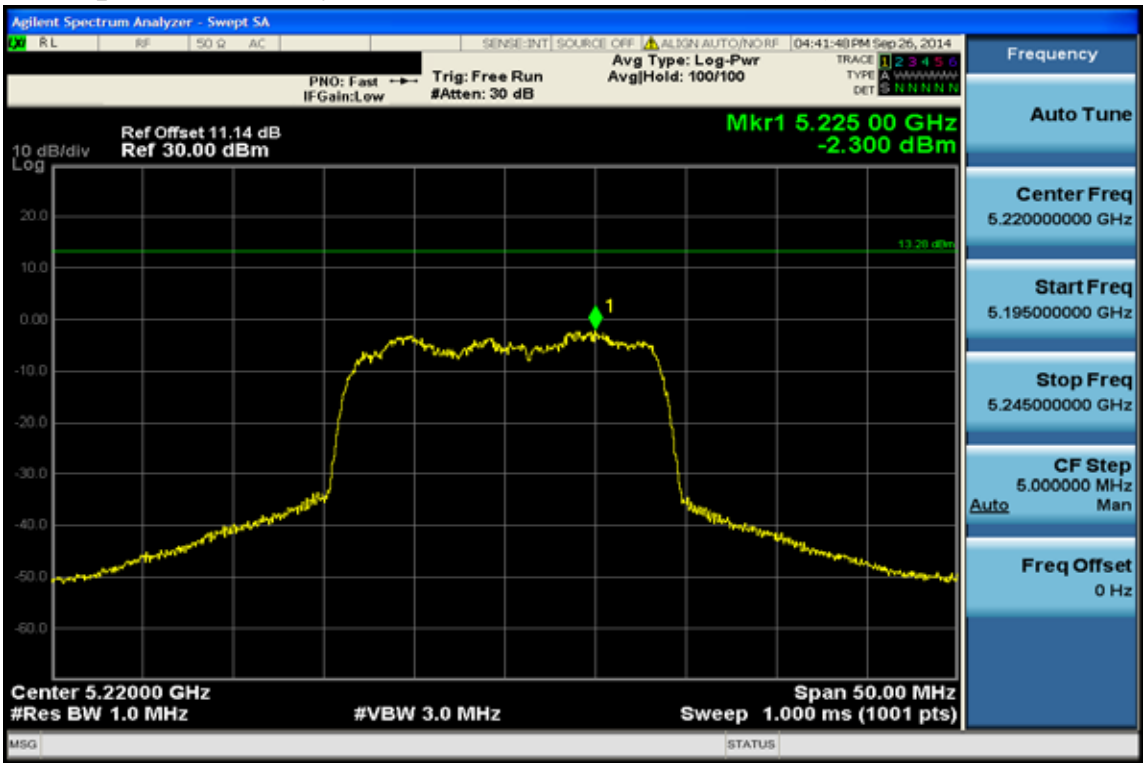
Note: Offset 11.39dB

802.11a, 5150~5250 MHz

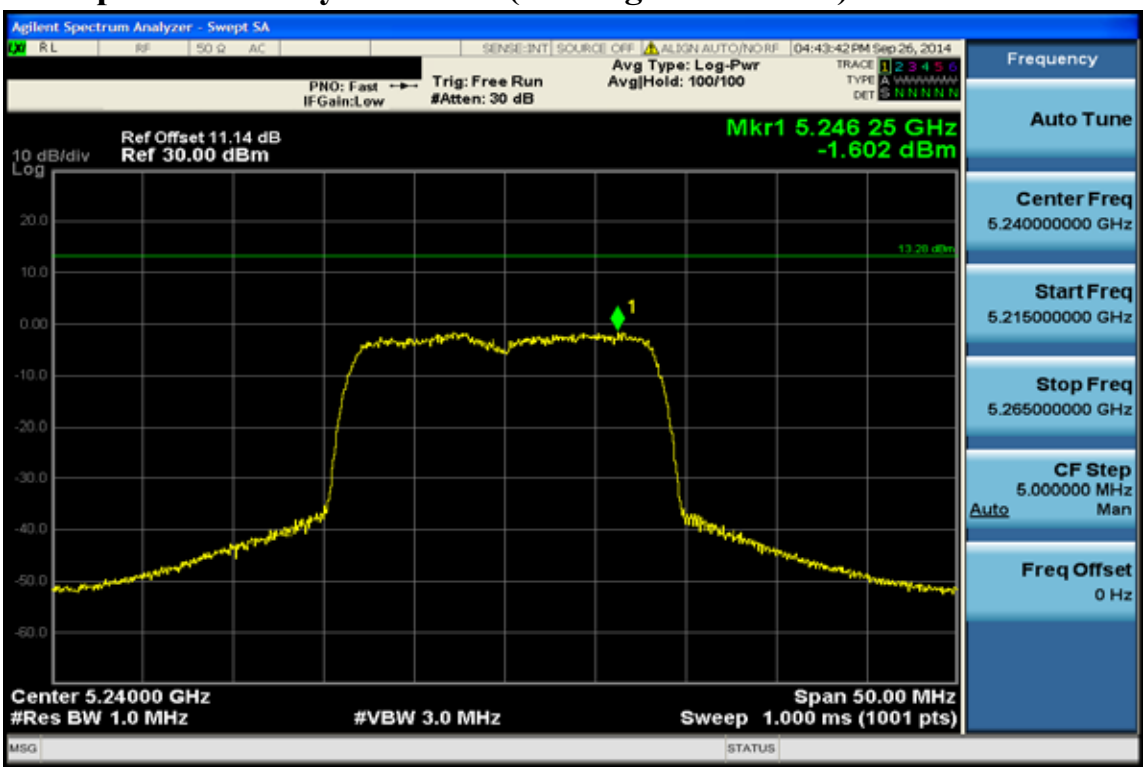
Peak Power Spectral Density Data Plot (CH Low 5180 MHz)



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

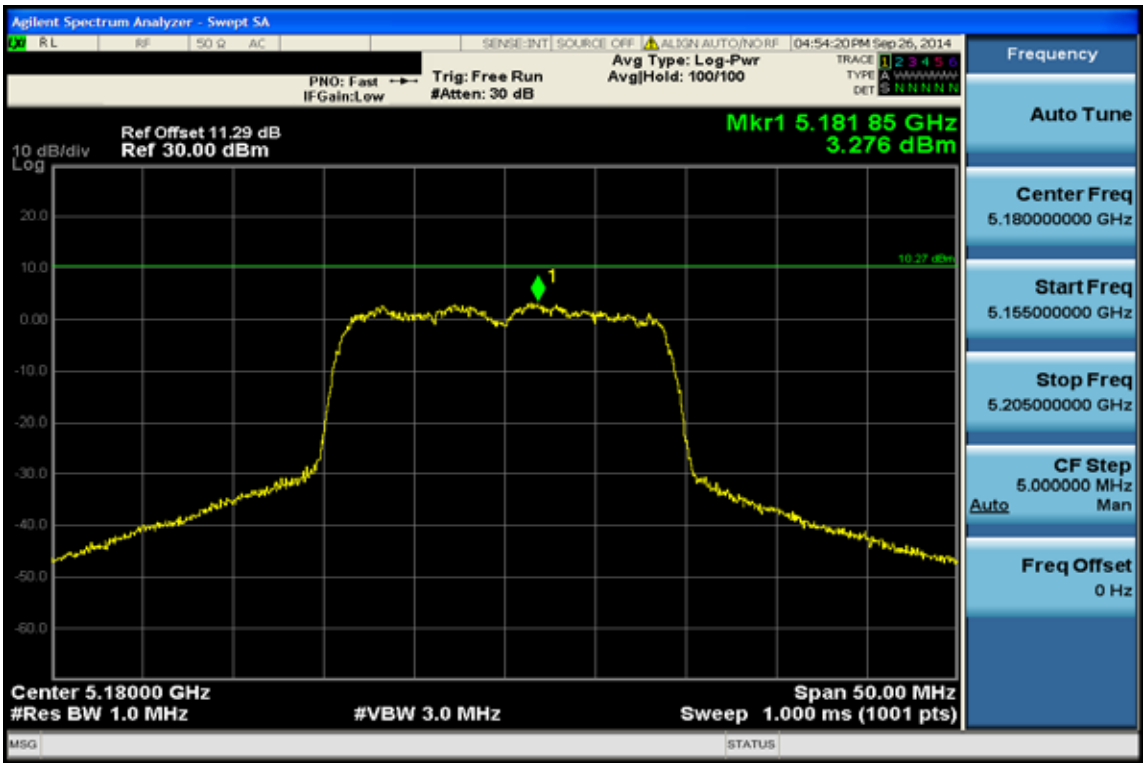


Peak Power Spectral Density Data Plot (CH High 5240 MHz)



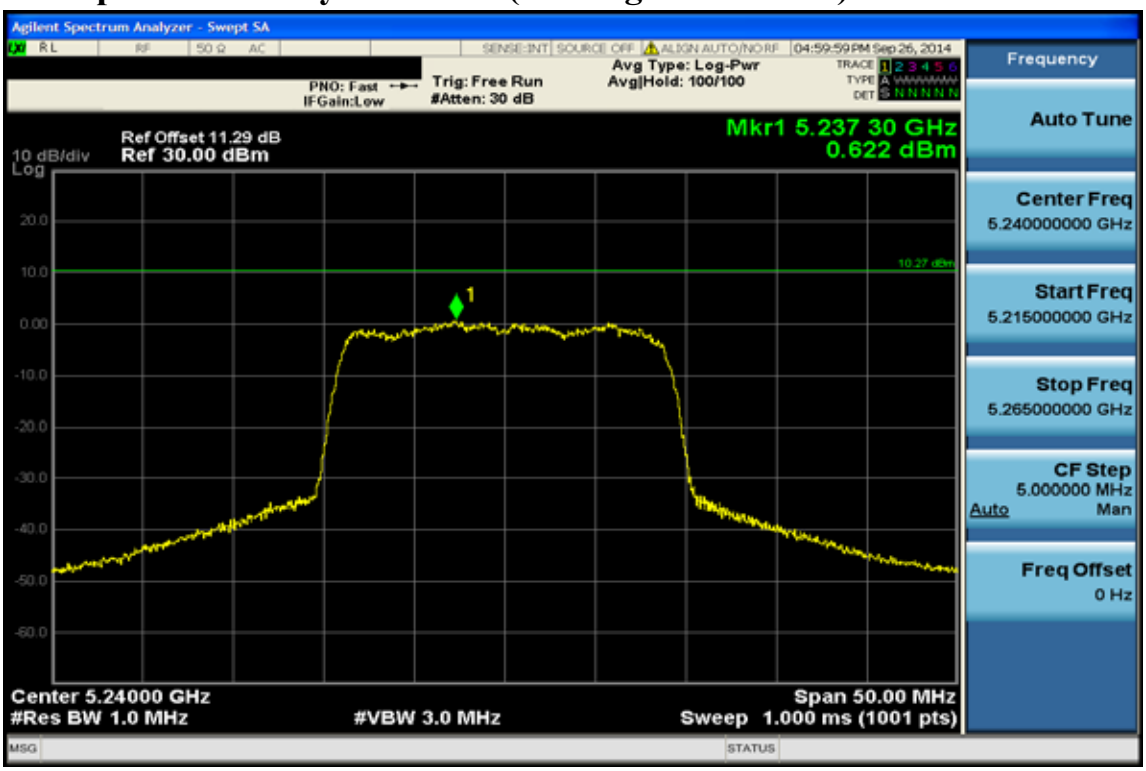
802.11n HT20, 5150~5250 MHz

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



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

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



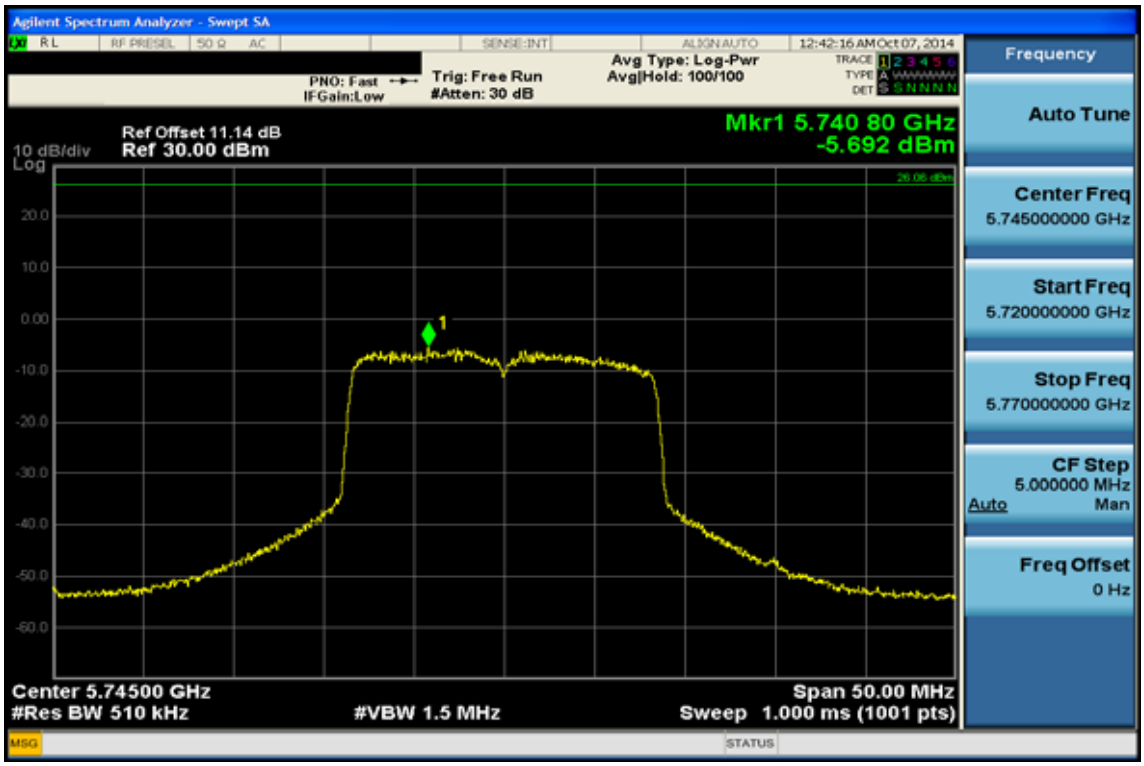
802.11n HT40, 5150~5250 MHz

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

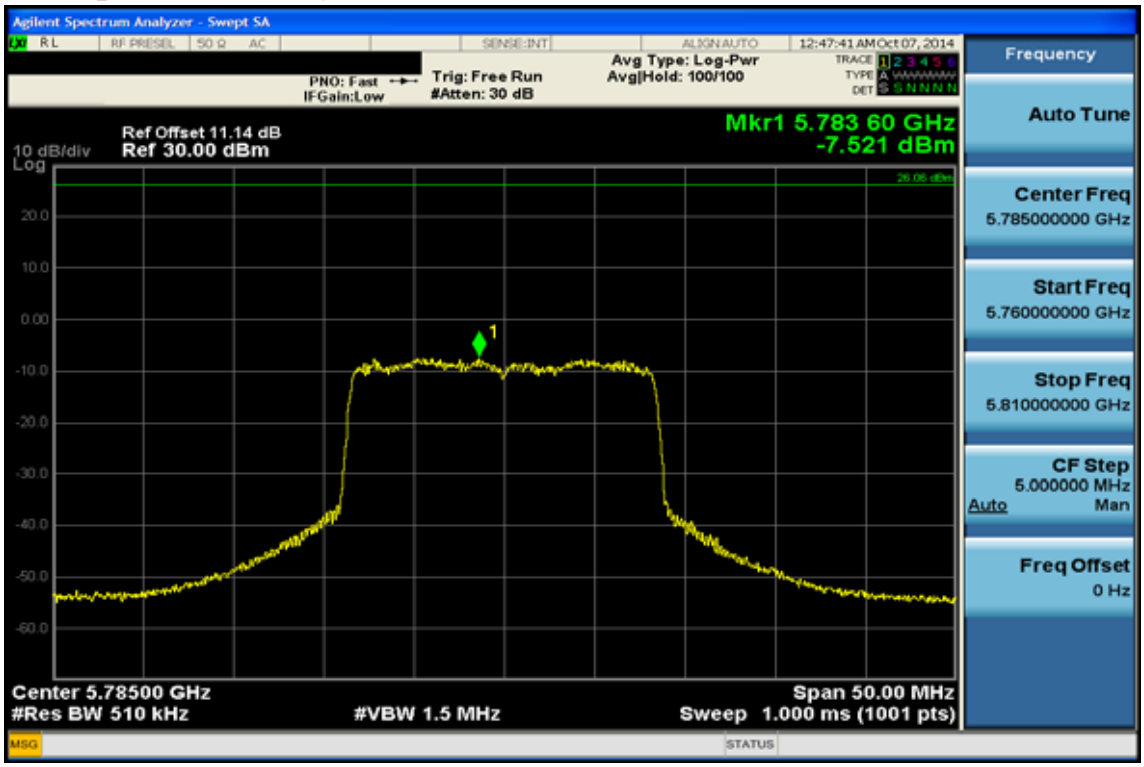
Peak Power Spectral Density Data Plot (CH High 5230 MHz)

802.11a, 5725~5850 MHz

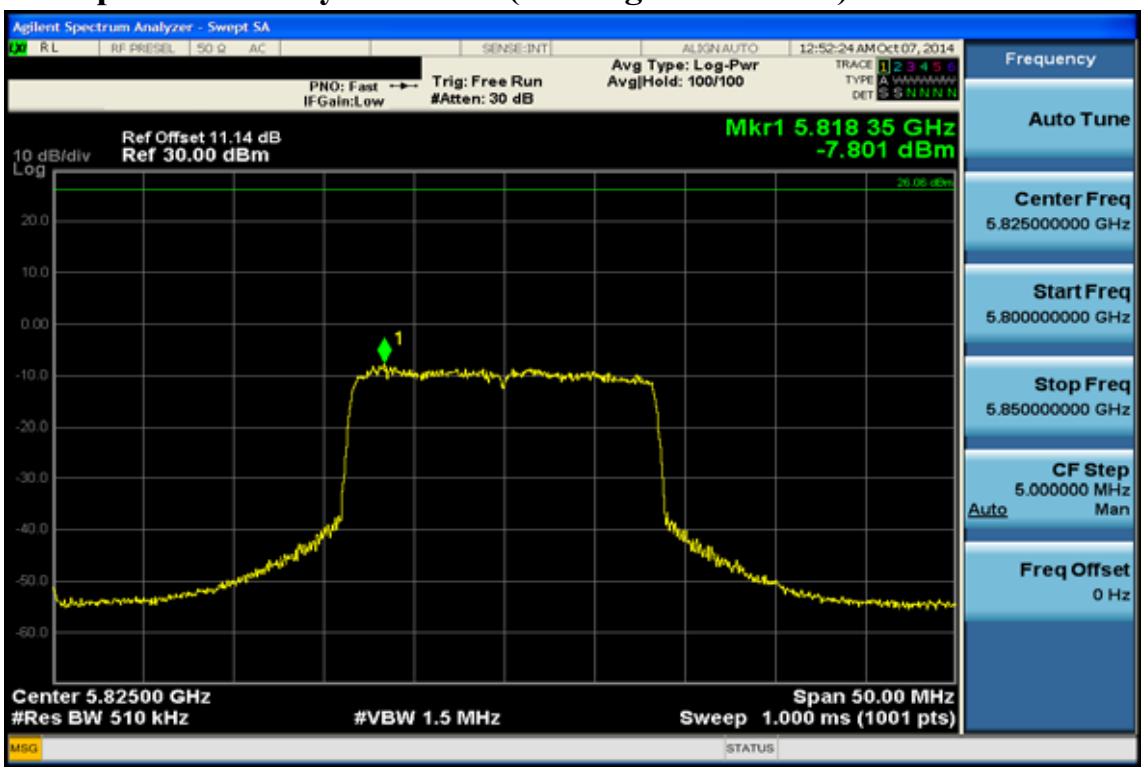
Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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

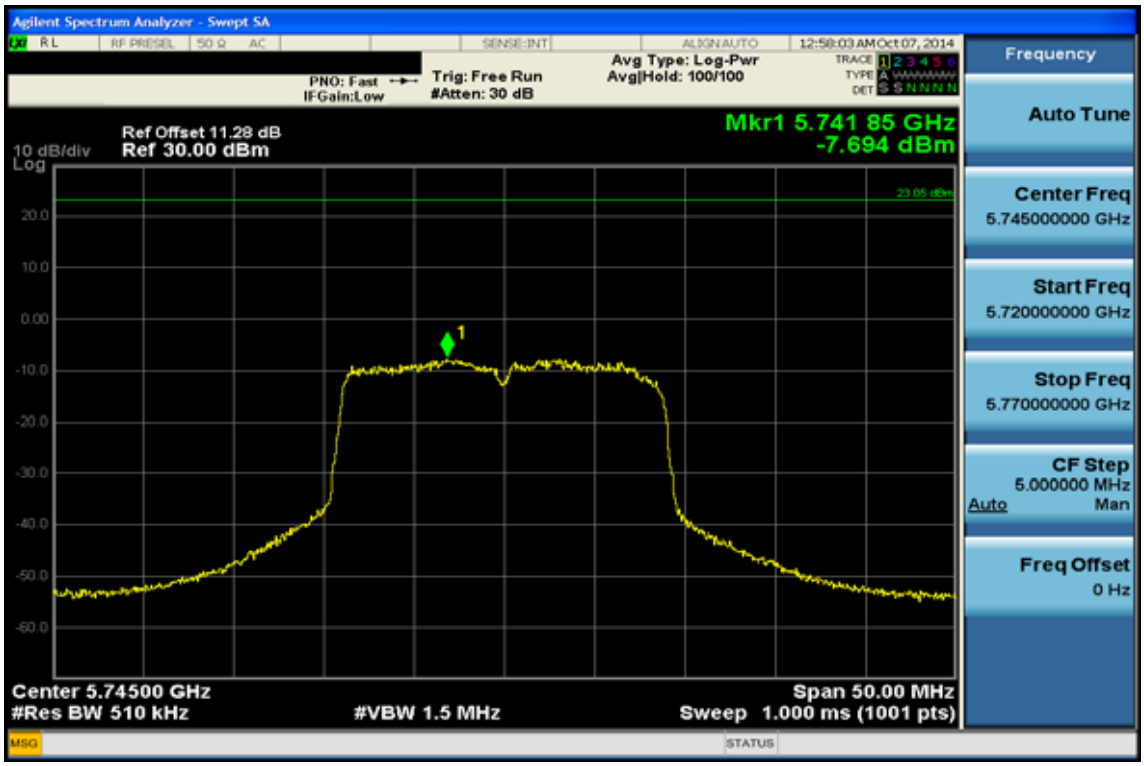


Peak Power Spectral Density Data Plot (CH High 5825 MHz)

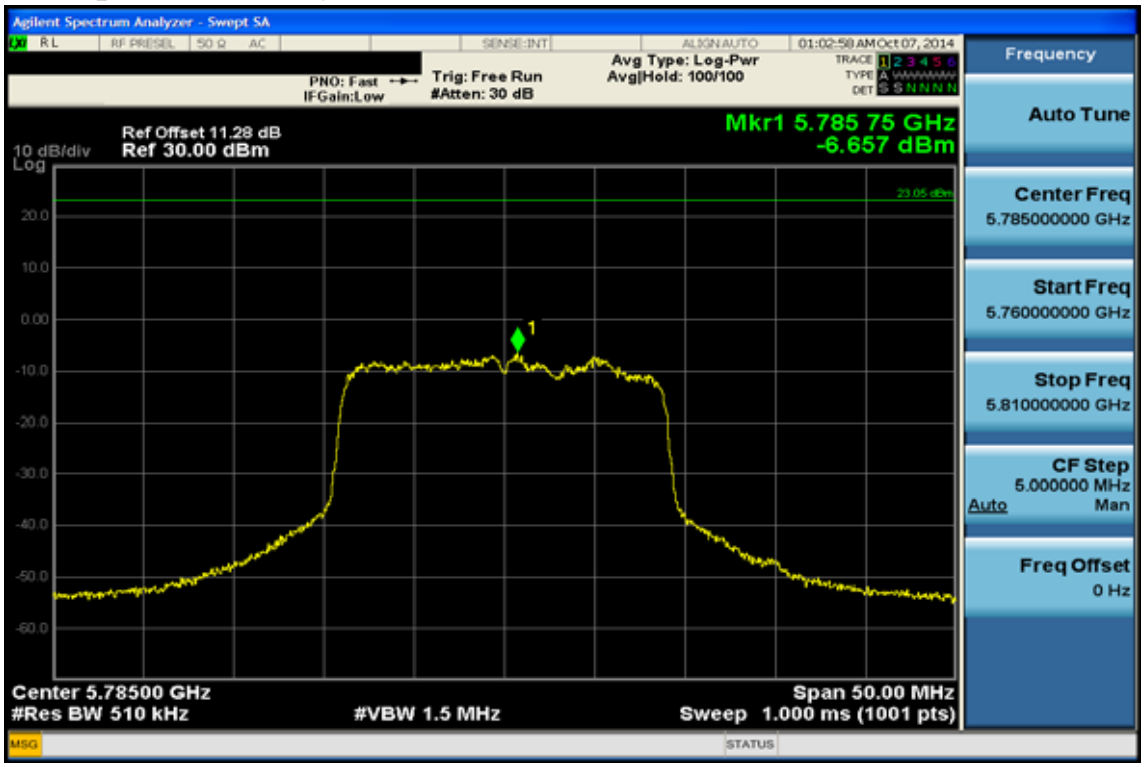


802.11a , 5725~5850 MHz

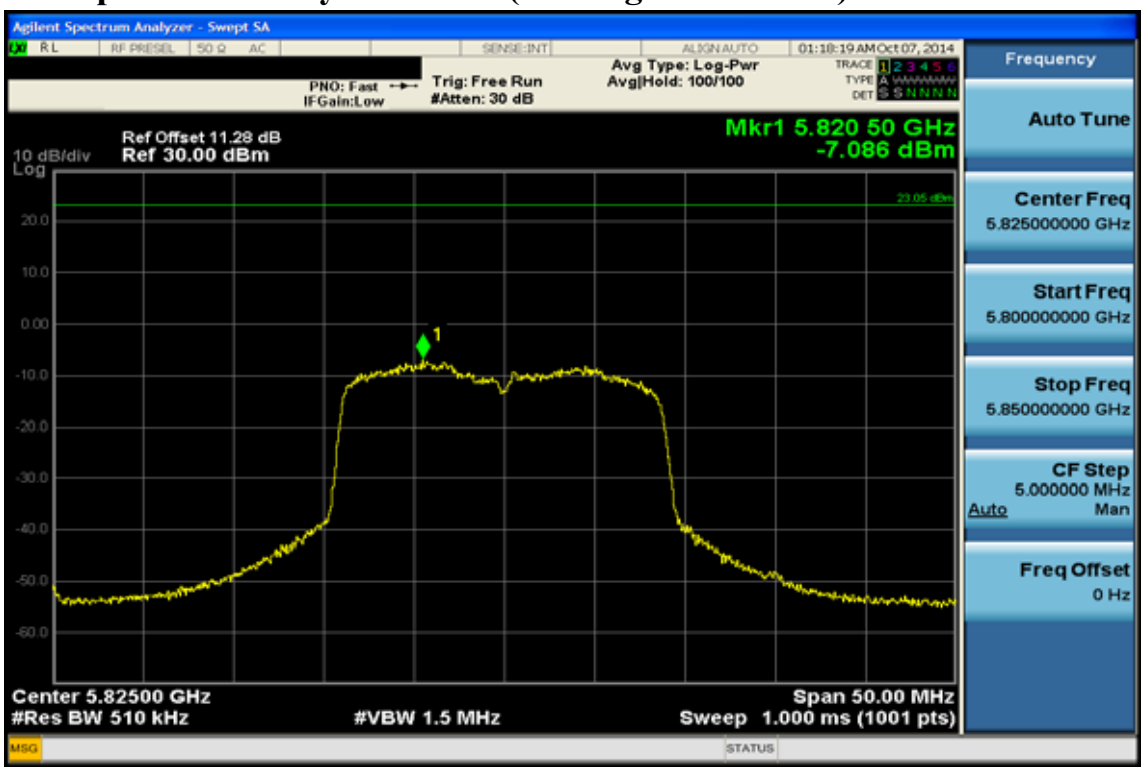
Peak Power Spectral Density Data Plot (CH Low 5745 MHz)



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

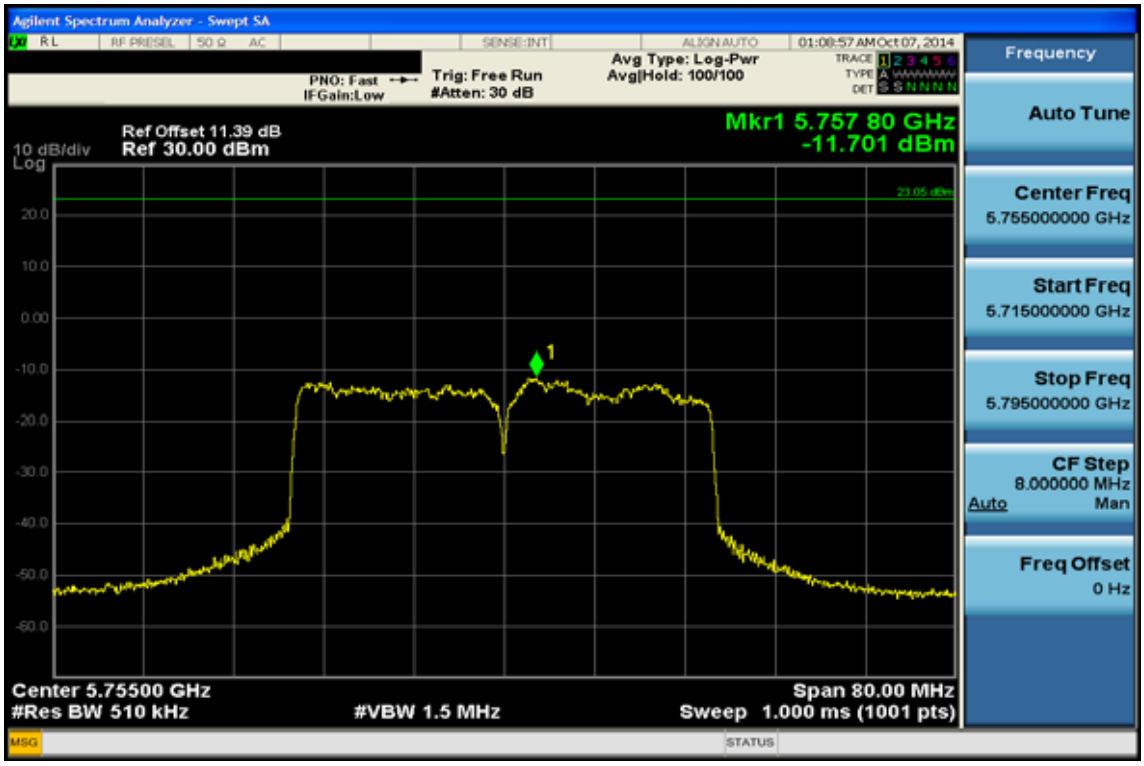


Peak Power Spectral Density Data Plot (CH High 5825 MHz)

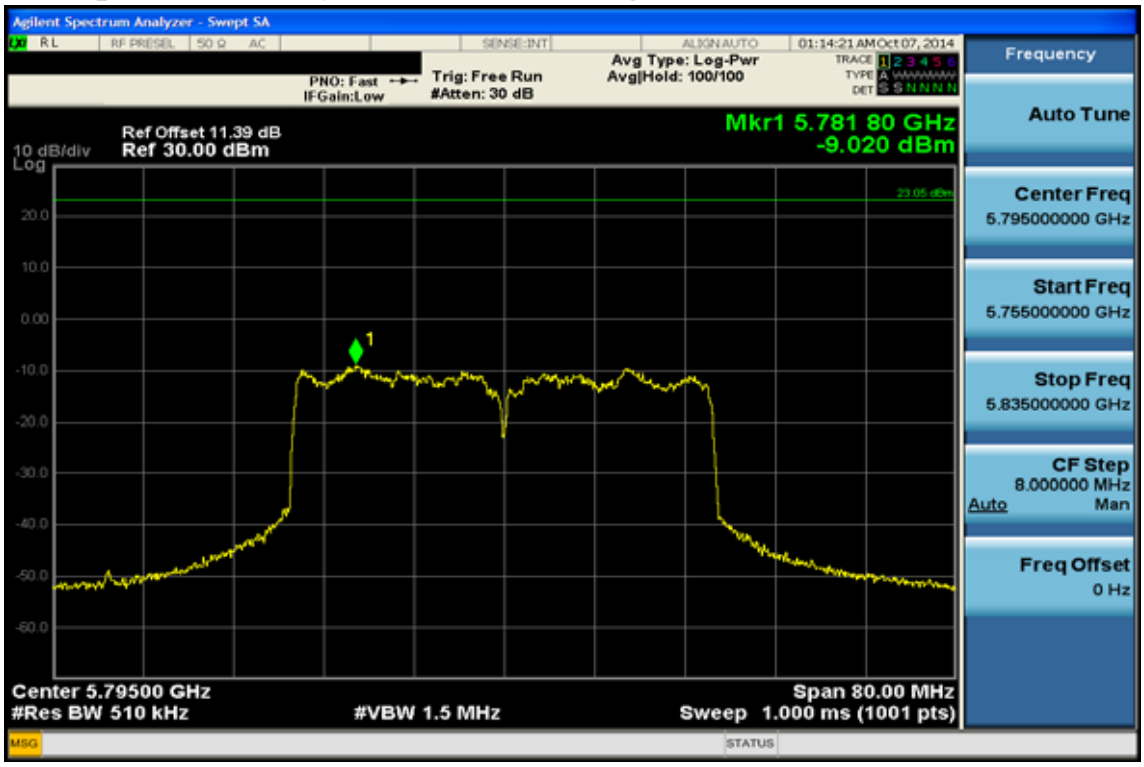


802.11n HT40, 5725~5850 MHz

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



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



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)

§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
[1]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	([2])
13.36 - 13.41	322 - 335.4		

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

[2] Above 38.6

(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.

§15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (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).

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

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

Limit derivation in terms of band edge:

E = 1000000* (30*EIRP)^(1/2) / 3 uV/m
= 78.2dBuV/m

10.2 EUT Setup

1. 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.
6. The host PC system was connected with 120Vac/60Hz power source.

10.3 Measurement Procedure

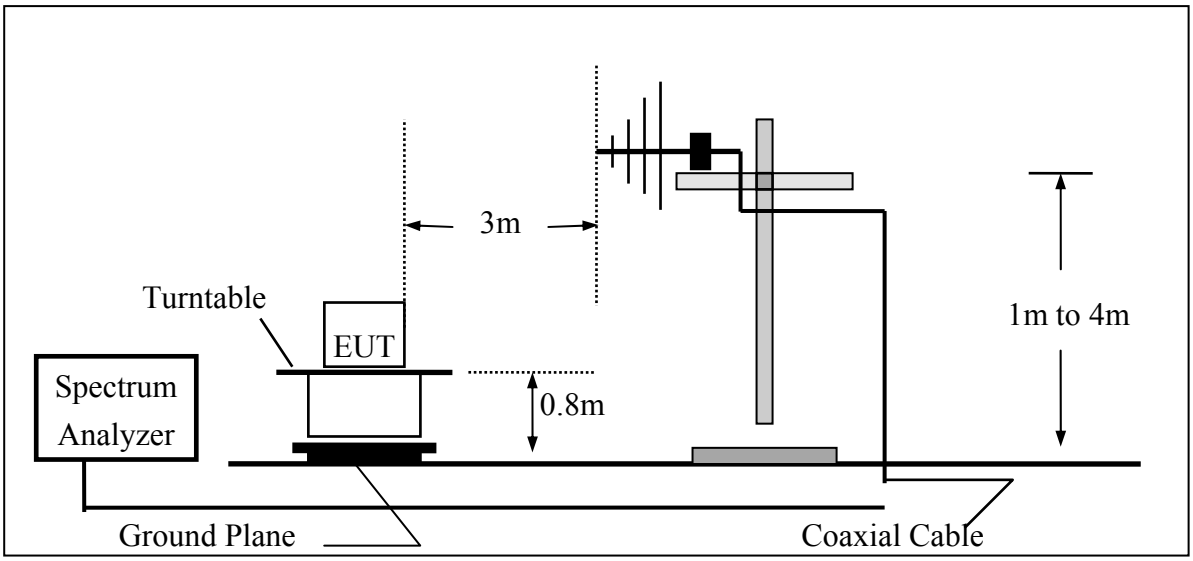
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was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

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.

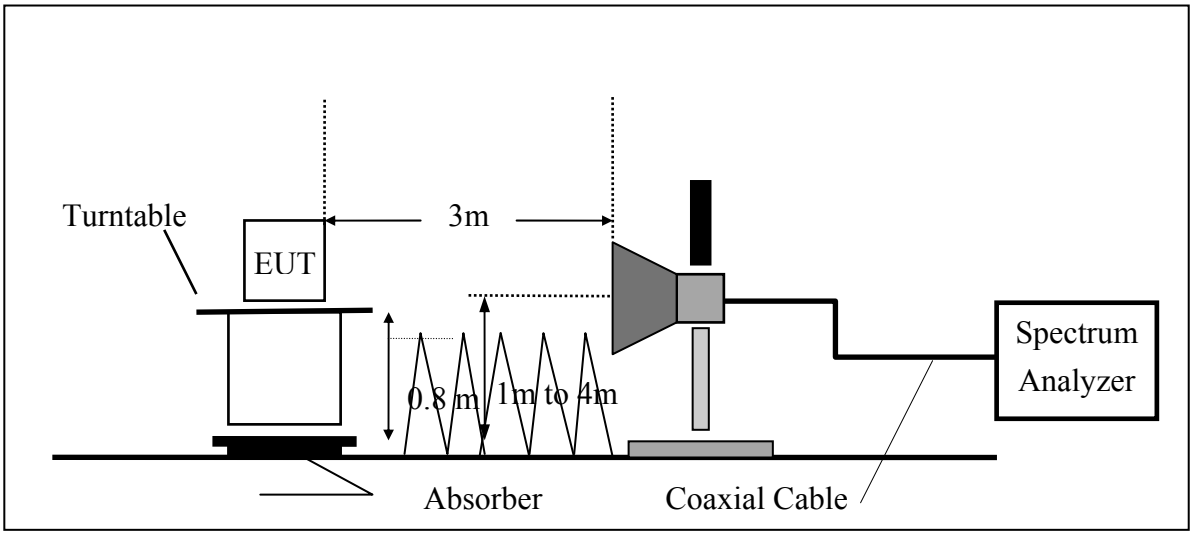
For Measurement above 1GHz, for peak unwanted emission measurements follow the KDB 789033 D02 requirements in section H)5) b), for average unwanted emission measurements follow the KDB 789033 D02 requirements in section H)6) c) or d).

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



10.5 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
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	980038	01/03/2014	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

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.

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	48.44	6.91	55.34	68.30	-12.96
10360.00	H	Peak	26.50	15.31	41.81	68.30	-36.36
15540.00	H	---					
20720.00	H	---					
25900.00	H	---					
31080.00	H	---					
36260.00	H						

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	50.78	6.43	57.22	68.30	-11.08
10360.00	H	Peak	29.14	15.31	44.45	68.30	-23.85
15540.00	H	---					
20720.00	H	---					
25900.00	H	---					
31080.00	H	---					
36260.00	H						

Operation Band	:802.11 a	Test Date	:2014-09-17
Fundamental Frequency	:5220 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	49.54	6.43	55.97	68.30	-12.33
10440.00	H	Peak	27.21	15.68	42.89	68.30	-25.41
15660.00	H	---					
20880.00	H	---					
26100.00	H	---					
31320.00	H	---					
36540.00							

Operation Band	:802.11 a	Test Date	:2014-09-17
Fundamental Frequency	:5220 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	50.32	6.43	56.75	68.30	-11.55
10440.00	H	Peak	28.80	15.68	44.48	68.30	-23.82
15660.00	H	---					
20880.00	H	---					
26100.00	H	---					
31320.00	H	---					
36540.00							

Operation Band	:802.11 a	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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	47.80	6.40	54.20	68.30	-14.10
10480.00	H	Peak	26.96	15.99	42.95	68.30	-25.35
15720.00	H	---					
20960.00	H	---					
26200.00	H	---					
31440.00	H	---					
36680.00							

Operation Band	:802.11 a	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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	28.40	15.99	44.39	68.30	-23.91
15720.00	H	---					
20960.00	H	---					
26200.00	H	---					
31440.00	H	---					
36680.00	H						

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	:5180 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
5150.00	E	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

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.59	15.31	42.90	68.30	-25.40
15540.00	H	---					
20720.00	H	---					
25900.00	H	---					
31080.00	H						
36260.00	H	---					

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.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	28.66	15.31	43.98	68.30	-24.32
15540.00	H	---					
20720.00	H	---					
25900.00	H	---					
31080.00	H						
36260.00	H	---					

Operation Band	:802.11 n20M	Test Date	:2014-09-17
Fundamental Frequency	:5220 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.64	15.83	43.47	68.30	-24.83
15660.00	H	---					
20880.00	H	---					
26100.00	H	---					
31320.00	H						
36540.00	H	---					

Operation Band	:802.11 n20M	Test Date	:2014-09-17
Fundamental Frequency	:5220 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	28.83	15.68	44.52	68.30	-23.78
15660.00	H	---					
20880.00	H	---					
26100.00	H	---					
31320.00	H						
36540.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.29	16.23	43.52	68.30	-24.78
15720.00	H	---					
20960.00	H	---					
26200.00	H	---					
31440.00	H						
36680.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.59	16.23	43.82	68.30	-24.48
15720.00	H	---					
20960.00	H	---					
26200.00	H	---					
31440.00	H						
36680.00	H	---					

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
5150.00	E	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 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	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.22	15.80	42.02	68.30	-26.28
15570.00	H	---					
20760.00	H	---					
25950.00	H	---					
31140.00	H	---					
36330.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.80	15.80	42.60	68.30	-25.70
15570.00	H	---					
20760.00	H	---					
25950.00	H	---					
31140.00	H	---					
36330.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.53	15.76	42.30	68.30	-26.00
15690.00	H	---					
20920.00	H	---					
26150.00	H	---					
31380.00	H	---					
36610.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.81	15.76	42.58	68.30	-25.72
15690.00	H	---					
20920.00	H	---					
26150.00	H	---					
31380.00	H	---					
36610.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
5150.00	E	Average	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	: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.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.62	18.22	44.84	74.00	-29.16
11490.00	H	Average	23.96	18.22	42.18	54.00	-11.82
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.71	18.22	45.93	74.00	-28.07
11490.00	H	Average	24.62	18.22	42.84	54.00	-11.16
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

Operation Band	::802.11 a	Test Date	:2014-09-17
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.10	18.24	45.34	74.00	-28.66
11570.00	H	Average	24.96	18.24	43.20	54.00	-10.80
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

Operation Band	::802.11 a	Test Date	:2014-09-17
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.85	18.24	46.08	74.00	-27.92
11570.00	H	Average	25.13	18.24	43.37	54.00	-10.63
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.67	17.79	45.46	74.00	-28.54
11650.00	H	Average	24.53	17.79	42.32	54.00	-11.68
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.49	17.79	45.28	74.00	-28.72
11650.00	H	Average	24.53	17.79	42.32	54.00	-11.68
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
5725.00	E	Peak	51.36	7.15	58.51	78.20	-19.69

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

Operation Band	:802.11 a	Test Date	:2014-09-16
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

Operation Band	:802.11 a	Test Date	:2014-09-16
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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

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.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.67	18.22	44.89	74.00	-29.11
11490.00	H	Average	24.16	18.22	42.38	54.00	-11.62
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.70	18.22	44.92	74.00	-29.08
11490.00	H	Average	24.26	18.22	42.48	54.00	-11.52
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

Operation Band	:802.11 n20M	Test Date	:2014-09-17
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.90	18.24	45.14	74.00	-28.86
11570.00	H	Average	24.63	18.24	42.87	54.00	-11.13
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

Operation Band	:802.11 n20M	Test Date	:2014-09-17
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:TX MID	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.36	18.24	45.60	74.00	-28.40
11570.00	H	Average	24.85	18.24	43.09	54.00	-10.91
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.64	17.79	44.43	74.00	-29.57
11650.00	H	Average	24.42	17.79	42.21	54.00	-11.79
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.17	17.79	44.96	74.00	-29.04
11650.00	H	Average	24.50	17.79	42.29	54.00	-11.71
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

Operation Band	:802.11 n20M	Test Date	:2014-09-16
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

Operation Band	:802.11 n20M	Test Date	:2014-09-16
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.83	18.30	45.13	74.00	-28.87
11510.00	H	Average	24.16	18.30	42.46	54.00	-11.54
17265.00	H	---					
23020.00	H	---					
28775.00	H	---					
34530.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.78	18.30	45.08	74.00	-28.92
11510.00	H	Average	24.18	18.30	42.48	54.00	-11.52
17265.00	H	---					
23020.00	H	---					
28775.00	H	---					
34530.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	26.93	18.10	45.03	74.00	-28.97
11590.00	H	Average	24.40	18.10	42.50	54.00	-11.50
17385.00	H	---					
23180.00	H	---					
28975.00	H	---					
34770.00	H	---					

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(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
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	H	Peak	27.32	18.10	45.42	74.00	-28.58
11590.00	H	Average	24.53	18.10	42.63	54.00	-11.37
17385.00	H	---					
23180.00	H	---					
28975.00	H	---					
34770.00	H	---					

Radiated Emission:

Operation Band	:802.11 n40M	Test Date	:2014-09-16
Fundamental Frequency	:5755 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV / m	dBμV / m	dB
5725.00	E	Peak	64.35	7.15	71.50	78.20	-6.70

Operation Band	:802.11 n40M	Test Date	:2014-09-16
Fundamental Frequency	:5755 MHz	Temp./Humi.	:25.5deg_C/52RH
Operation Mode	:Band Edge LOW	Engineer	:Jerry
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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

Actual FS(dBμV / m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV / m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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

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

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

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

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.

12 FREQUENCY STABILITY

12.1 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 ℃	Test By	Henry
Humidity	:60 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
25 ℃	24V	149	5745.0000	5,744.923700	0.0763
		157	5785.0000	5,784.937600	0.0624
		165	5825.0000	5,824.925500	0.0745
40 ℃	24V	149	5745.0000	5,744.924100	0.0759
		157	5785.0000	5,784.939100	0.0609
		165	5825.0000	5,824.926100	0.0739
0 ℃	24V	149	5745.0000	5,744.922700	0.0773
		157	5785.0000	5,784.935700	0.0643
		165	5825.0000	5,824.924400	0.0756

Operation Mode	802.11n HT20	Test Date	2014,10,04
Temperature	:24 ℃	Test By	Henry
Humidity	:60 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
25 ℃	24V	149	5745.0000	5,744.924500	0.0755
		157	5785.0000	5,784.922000	0.0780
		165	5825.0000	5,824.925200	0.0748
40 ℃	24V	149	5745.0000	5,744.925400	0.0746
		157	5785.0000	5,784.922700	0.0773
		165	5825.0000	5,824.925700	0.0743
0 ℃	24V	149	5745.0000	5,744.922800	0.0772
		157	5785.0000	5,784.920400	0.0796
		165	5825.0000	5,824.924400	0.0756

Operation Mode	802.11n_HT40	Test Date	2014,10,04
Temperature	:24 ℃	Test By	Henry
Humidity	:60 %		

Test Temp.	Test Voltage	Channel	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
25 ℃	15V	151	5755.0000	5,754.900000	0.1000
		159	5795.0000	5,794.920000	0.0800
40 ℃	15V	151	5755.0000	5,754.910000	0.0900
		159	5795.0000	5,794.930000	0.0700
0 ℃	15V	151	5755.0000	5,754.890000	0.1100
		159	5795.0000	5,794.910000	0.0900

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.

14 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

14.1 Standard Applicable

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

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

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

F = frequency in MHz

* = Plane-wave equipment power density

14.2 Maximum Permissible Exposure (MPE) Evaluation

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	**15.71**	0.0372	0.4246
5220	15.14	0.0327	0.4246
5240	12.41	0.0174	0.4246

MPE Prediction (802.11a 5150~5250)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	15.71	(dBm)
Maximum peak output power at antenna input terminal:	37.23917063	(mW)
Duty cycle:	96.8	(%)
Maximum Pav :	36.04751717	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0026908	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0026908mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5180MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	**18.45**	0.0700	0.2123
5220	17.28	0.0535	0.2123
5240	16.30	0.0427	0.2123

MPE Prediction (802.11n_HT20 5150~5250)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	18.45	(dBm)
Maximum peak output power at antenna input terminal:	69.9841996	(mW)
Duty cycle:	93.68	(%)
Maximum Pav :	65.56119819	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0048939	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0048939mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5180MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5190	13.29	0.0213	0.2123
5230	**16.87**	0.0486	0.2123

MPE Prediction (802.11n_HT40 5150~5250)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	16.87	(dBm)
Maximum peak output power at antenna input terminal:	48.64072057	(mW)
Duty cycle:	91.18	(%)
Maximum Pav :	44.35060901	(mW)
Antenna gain (typical):	9.72	(dBi)
Maximum antenna gain:	9.375620069	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5230	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0033106	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0033106mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5230MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	**11.39**	0.0138	0.4064
5785	10.44	0.0111	0.4064
5825	10.10	0.0102	0.4064

MPE Prediction (802.11a 5745~5825)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	11.39	(dBm)
Maximum peak output power at antenna input terminal:	13.77209469	(mW)
Duty cycle:	96.8	(%)
Maximum Pav :	13.33138766	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5745	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0010396	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0010396mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5745MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	**15.18**	0.0330	0.2032
5785	14.20	0.0263	0.2032
5825	13.46	0.0222	0.2032

MPE Prediction (802.11n_HT20 5745~5825)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	15.18	(dBm)
Maximum peak output power at antenna input terminal:	32.96097122	(mW)
Duty cycle:	93.68	(%)
Maximum Pav :	30.87783784	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5745	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0024080	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0024080mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5745MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5755	13.26	0.0212	0.2032
5795	**15.00**	0.0316	0.2032

MPE Prediction (802.11n_HT40 5755~5795)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where: S = Power density

P = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	15.00	(dBm)
Maximum peak output power at antenna input terminal:	31.6227766	(mW)
Duty cycle:	91.18	(%)
Maximum Pav :	28.83364771	(mW)
Antenna gain (typical):	9.91	(dBi)
Maximum antenna gain:	9.794899854	(numeric)
Prediction distance:	100	(cm)
Prediction frequency:	5795	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 100 (cm)	0.0022486	(mW/cm^2)

Measurement Result

The predicted power density level at 100 cm is 0.0022486mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5795MHz.

~ End of Report ~