

TEST REPORT For FCC

Test Report No. : CTK-2013-00816
Date of Issue : 2013-05-13
FCC ID : A3LWEA302I
Model/Type No. : WEA302i
Kind of Product : Access Point
Applicant : Samsung Electronics Co., Ltd.
Applicant Address : 129, Samsung-ro Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea, 443-742
Manufacturer : Samsung Electronics Co., Ltd.
Manufacturer Address : 129, Samsung-ro Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea, 443-742
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Telephone : +82-31-279-4259
Received Date : 2013-02-04
Test period : Start : 2013-02-04 End : 2013-04-20

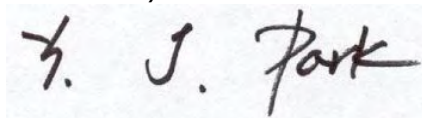
The test results presented in this report relate only to the object tested.

Tested by



Won-Jae, Hwang
Test Engineer
Date: 2013-05-13

Reviewed by



Young-Joon, Park
Technical Manager
Date: 2013-05-13



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REPORT REVISION HISTORY

Date	Revision	Page No
2013-05-13	Issued (CTK-2013-00816)	All

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1.0 General Product Description

Equipment model name	WEA302i
Serial number	Prototype
EUT condition	Pre-production, not damaged
Frequency Range	802.11a/n_HT20 : 5745 MHz - 5825 MHz 802.11n_HT40 : 5755 MHz - 5795 MHz 802.11b/g/n_HT20 : 2412 MHz - 2462 MHz 802.11n_HT40 : 2422 MHz - 2452 MHz
RF output power	802.11a : 14.51 dBm 802.11b : 14.77 dBm 802.11g : 15.22 dBm 802.11n_HT20(2.4GHz) : 15.17 dBm 802.11n_HT20(5 GHz) : 14.55 dBm 802.11n_HT40(2.4GHz) : 15.47 dBm 802.11n_HT40(5 GHz) : 13.83 dBm
Number of channels	802.11a/n_HT20(5GHz) : 5 802.11b/g/n_HT20(2.4GHz) : 11 802.11n_HT40(5GHz) : 3 802.11n_HT40(2.4GHz) : 9
Transfer Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11a/g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n : up to 300 Mbps
Type of Modulation	802.11b : DSSS 802.11a/g/n : OFDM
Duty cycle TX power	1.0
Power Source	DC 12 V(Adaptor), DC 48 V(PoE)
Antenna Type	Dipole antenna

* Antenna Configuration

There are ten antennas in the EUT:

The antenna A1, A2, A3, A4 are 5GHz Dipole type.

The antenna A5, A6, A7, A8 are 2.4GHz Dipole type.

The antenna M1, M2 are 2.4GHz & 5GHz Dipole type.

All antennas have been tested. The worse data of each antenna type are shown. Configuration list as below:

5 GHz : A1, A3, M1, M2 (A1 and A2 use one amplifier, A3 and A4 use one amplifier)

2.4 GHz : A5, A7, M1, M2 (A5 and A6 use one amplifier, A7 and A8 use one amplifier)

* Test mode

The worst-case data rates are determined to be as follows for each mode.

802.11b mode, 20 MHz Channel Bandwidth, 11 Mb/s, CCK Modulation

802.11g mode, 20 MHz Channel Bandwidth, 24 Mb/s, OFDM Modulation

802.11a mode, 20 MHz Channel Bandwidth, 6 Mb/s, OFDM Modulation

802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS 5, OFDM Modulation

802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS 5, OFDM Modulation

1.1 Tested Frequency

802.11b, 802.11g, 802.11n_HT20

	LOW	MID	HIGH
Frequency (MHz)	2412	2437	2462

802.11n_HT40

	LOW	MID	HIGH
Frequency (MHz)	2422	2437	2452

802.11a, 802.11n_HT20

	LOW	MID	HIGH
Frequency (MHz)	5745	5785	5825

802.11n_HT40

	LOW	MID	HIGH
Frequency (MHz)	5755	-	5795

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Personal Computer	Personal Computer	DB-A150	ZMSI96BSB00125F
LCD Monitor	BNEQ CORPORATION	E176FPb	CN-OKC139-46633-61J-6TWU
Keyboard (PS/2 type)	DONGGUAN	SK-2880	B943C0ACPS740M
Mouse (USB type)	SAMSUNG	SC-1000	1050014791

1.4 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.5 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



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1.6 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 m & 10 m OATS, 3 m & 10 m SAC and Conducted Test Site to perform FCC Part 15/18 measurements	 805871
JAPAN	VCCI	10 m OATS, 3 m & 10 m SAC and Conducted Test Site	 R-948, C-986, T-1843
KOREA	KCC	EMI (10 m OATS, 10 m SAC and Conducted Test Site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and Interruptions)	 No. 51, KR0025
International	KOLAS	EMC	

2 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Maximum Output Power	< 1 Watt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.247(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
				C
15.209	Field Strength of Harmonics	15.209(a)	Radiated	C
15.207	AC Conducted Emissions	15.207(a)	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

- FCC Part 15.247, ANSI C63.4-2003

The tests were performed according to the method of measurements prescribed in

KDB No.558074

2.1 Technical Characteristic Test

2.1.1 6dB Bandwidth

Procedure:

The bandwidth at 6dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 40 MHz

VBW = 100 kHz (VBW ≥ RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data:

Ant : A1 (5GHz)

	6 dB Bandwidth (MHz)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	16.50	16.46	16.48
802.11an HT20	17.76	17.74	17.72
Mode	5755 MHz		5795 MHz
802.11an HT40	36.53		36.50
Measurement	± 3 dB		

Ant : A3 (5GHz)

	6 dB Bandwidth (MHz)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	16.51	16.53	16.50
802.11an HT20	17.70	17.73	17.72
Mode	5755 MHz		5795 MHz
802.11an HT40	36.49		16.52
Measurement	± 3 dB		



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Ant : M1 (5GHz)

	6 dB Bandwidth (MHz)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	16.49	16.51	16.50
802.11an HT20	17.74	17.71	17.71
Mode	5755 MHz		5795 MHz
802.11an HT40	36.49		36.48
Measurement	± 3 dB		

Ant : M2 (5GHz)

	6 dB Bandwidth (MHz)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	16.53	16.52	16.50
802.11an HT20	17.71	17.72	17.75
Mode	5755 MHz		5795 MHz
802.11an HT40	36.47		36.45
Measurement	± 3 dB		

Ant : A5 (2.4GHz)

	6 dB Bandwidth (MHz)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	10.39	10.59	10.51
802.11g	16.53	16.54	16.56
802.11n HT20	17.75	17.77	17.76
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	36.54	36.54	36.56
Measurement	± 3 dB		

Ant : A7 (2.4GHz)

	6 dB Bandwidth (MHz)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	10.91	10.40	10.35
802.11g	16.54	16.53	16.52
802.11n HT20	17.72	17.74	17.75
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	36.55	36.55	36.58
Measurement	± 3 dB		



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Ant : M1 (2.4GHz)

	6 dB Bandwidth (MHz)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	10.39	10.38	10.60
802.11g	16.56	16.55	16.52
802.11n HT20	17.76	17.75	17.76
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	36.54	36.52	36.53
Measurement	± 3 dB		

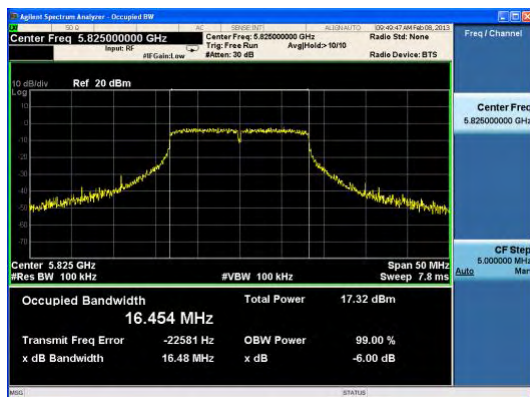
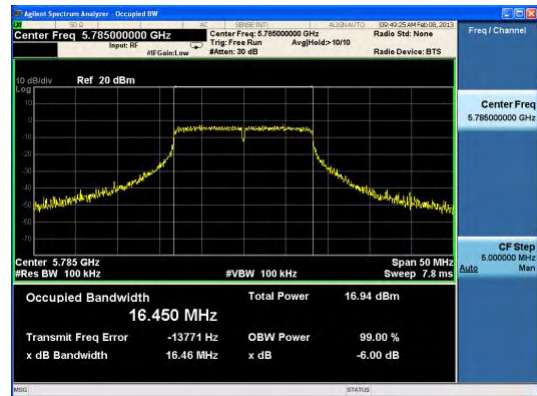
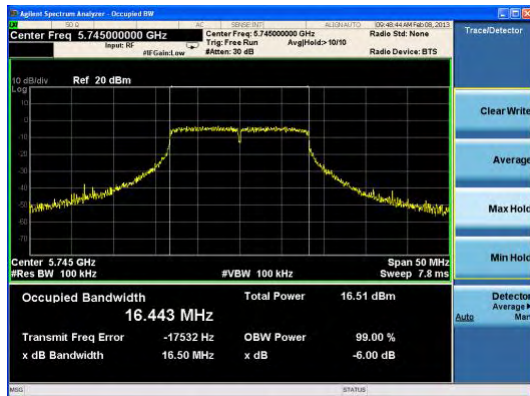
Ant : M2 (2.4GHz)

	6 dB Bandwidth (MHz)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	10.54	10.32	10.58
802.11g	16.53	16.54	16.53
802.11n HT20	17.74	17.75	17.75
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	36.50	36.48	36.52
Measurement	± 3 dB		

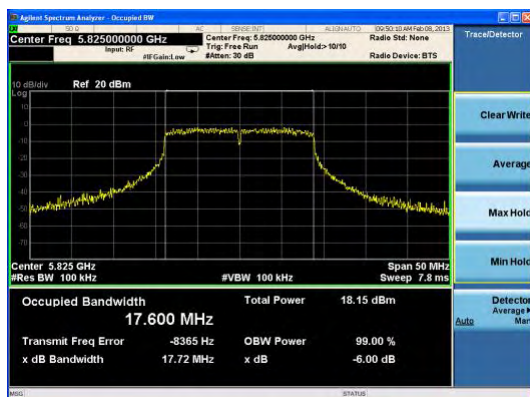
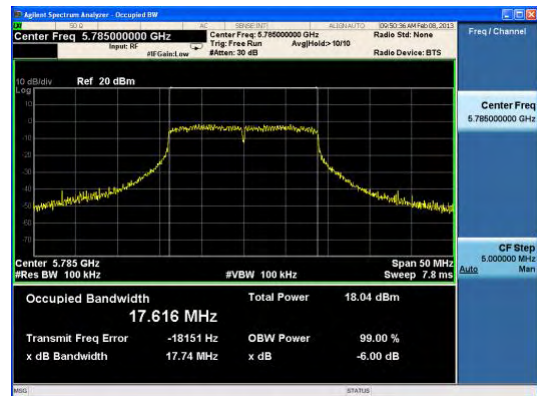
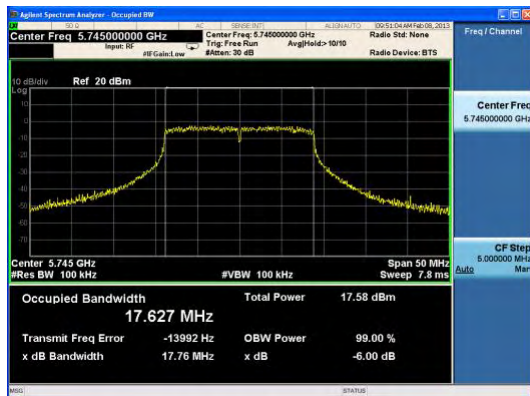
Minimum Standard:

6 dB Bandwidth > 500kHz

See next pages for actual measured spectrum plots.



Ant_A1 (5GHz) : 802.11a



Ant_A1 (5GHz) : 802.11a HT20



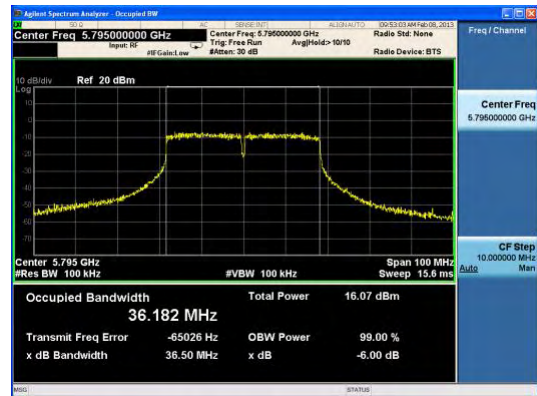
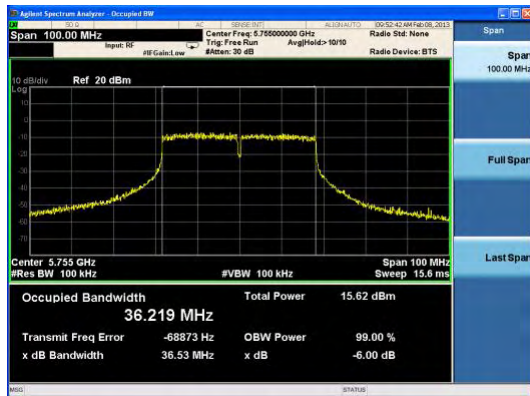
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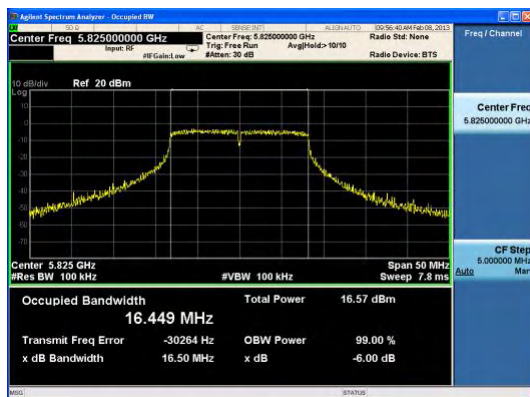
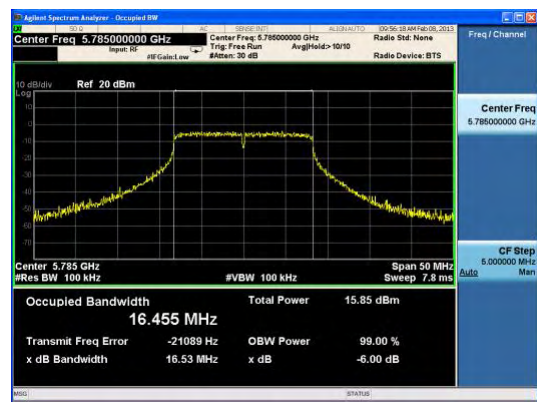
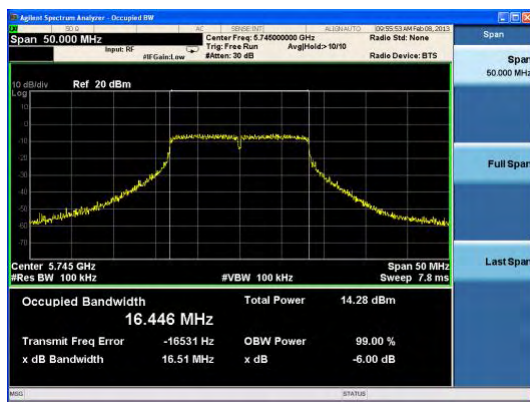
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Ant_A1 (5GHz) : 802.11a HT40



Ant_A3 (5GHz) : 802.11a



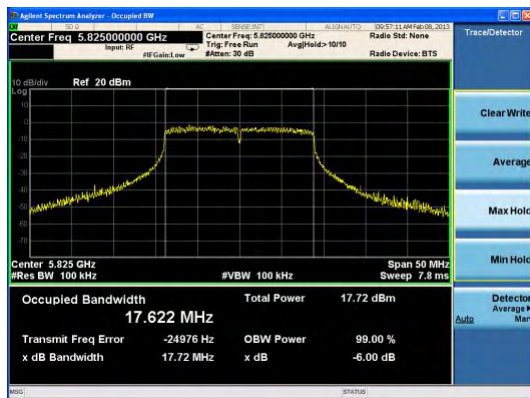
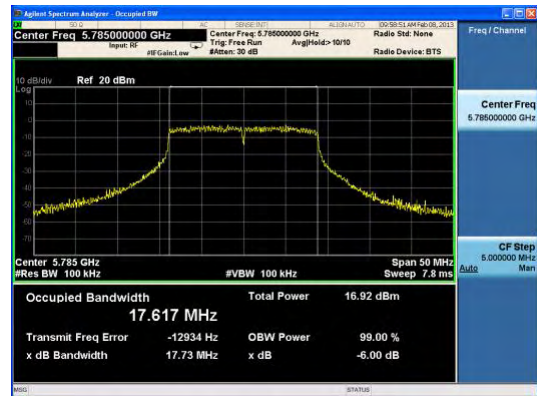
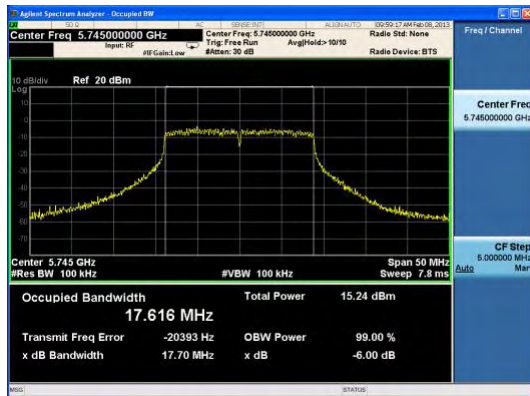
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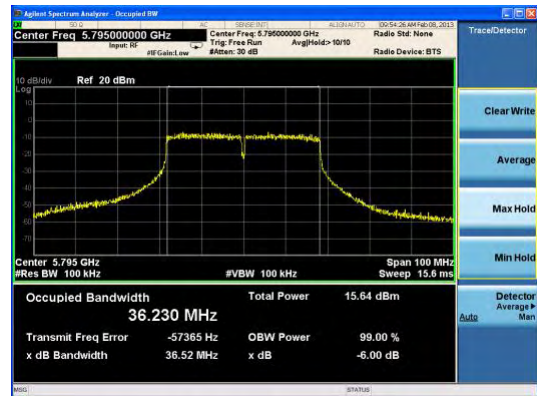
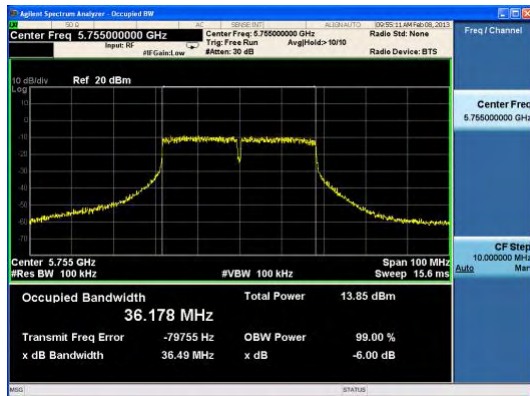
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Ant_A3 (5GHz) : 802.11a HT20



Ant_A3 (5GHz) : 802.11a HT40



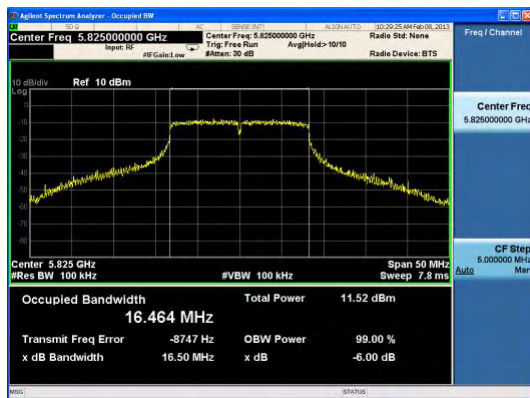
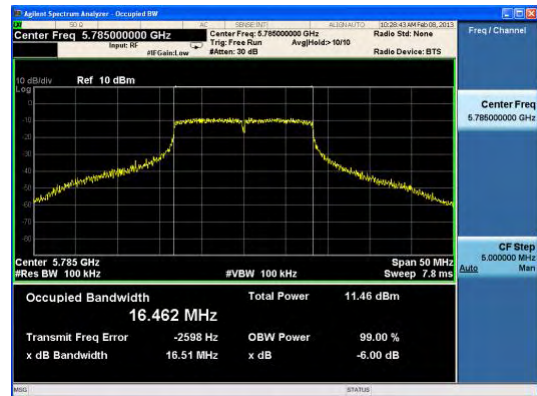
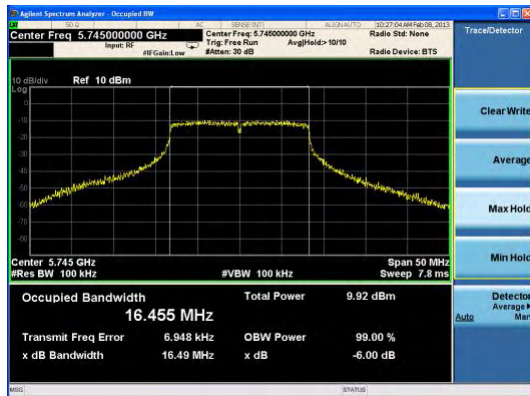
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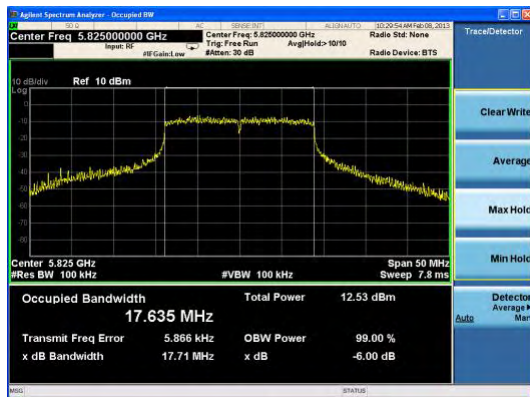
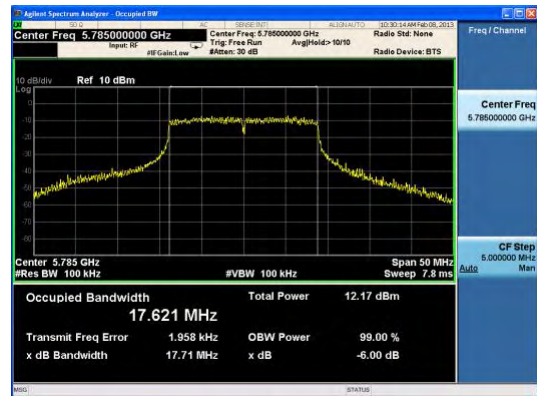
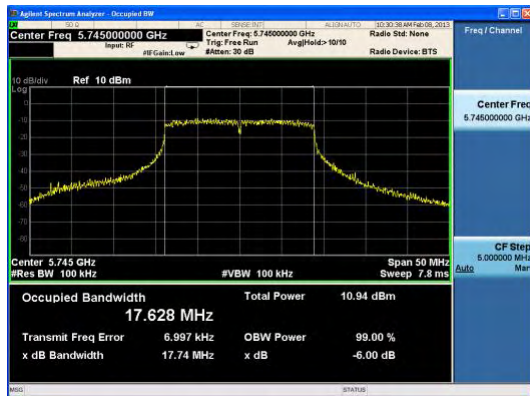
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Ant_M1 (5GHz) : 802.11a



Ant_M1 (5GHz) : 802.11a HT20



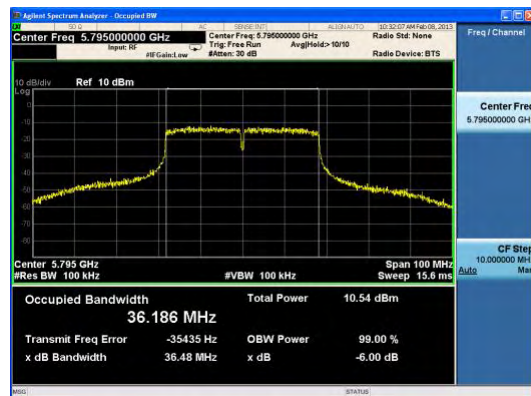
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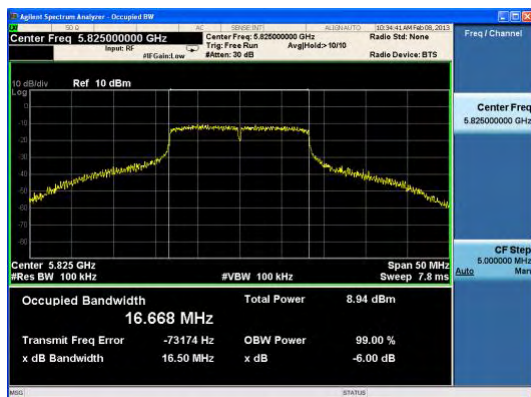
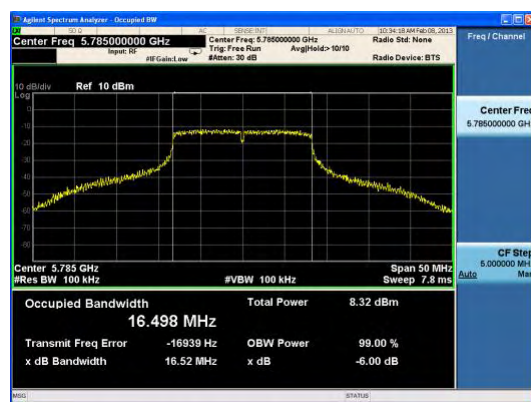
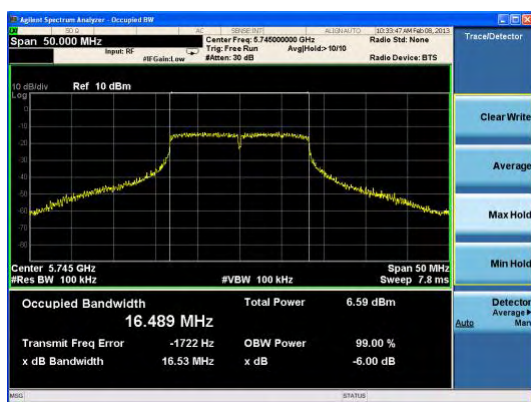
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Ant_M1 (5GHz) : 802.11a HT40



Ant_M2 (5GHz) : 802.11a



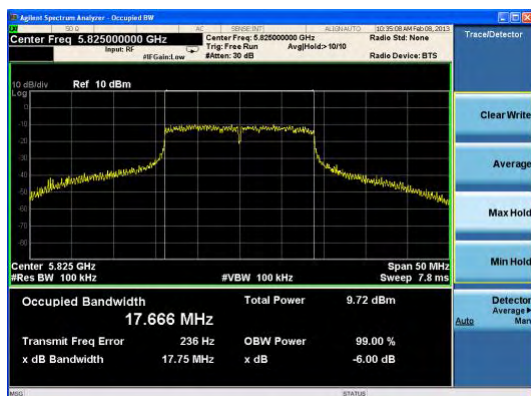
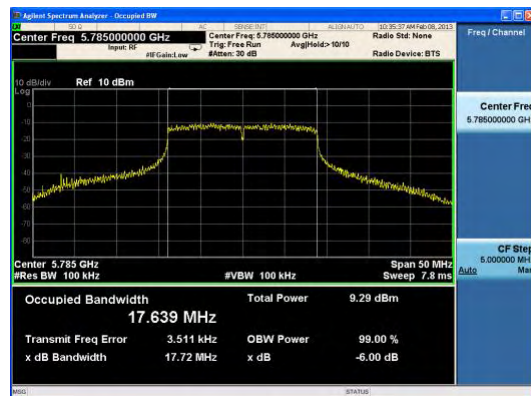
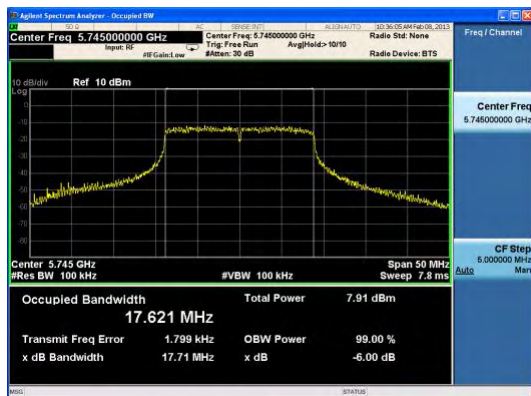
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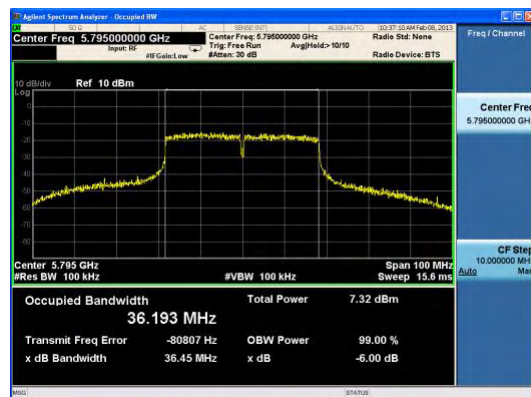
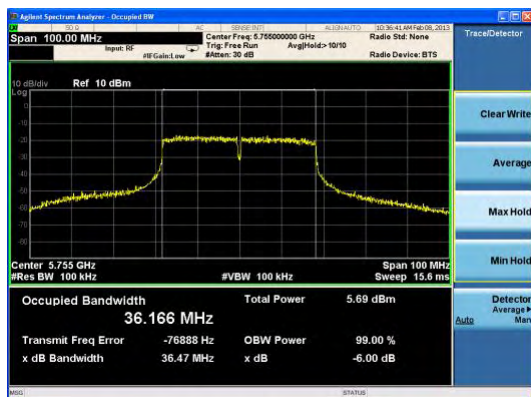
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Ant_M2 (5GHz) : 802.11a HT20



Ant_M2 (5GHz) : 802.11a HT40



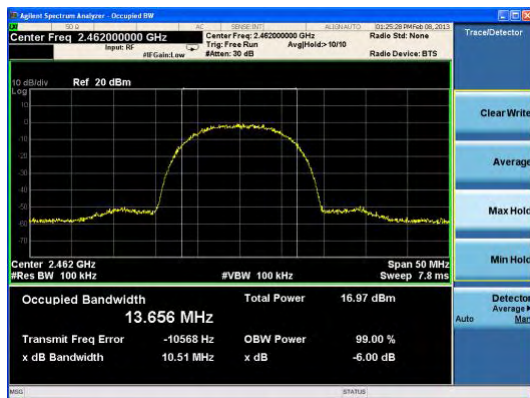
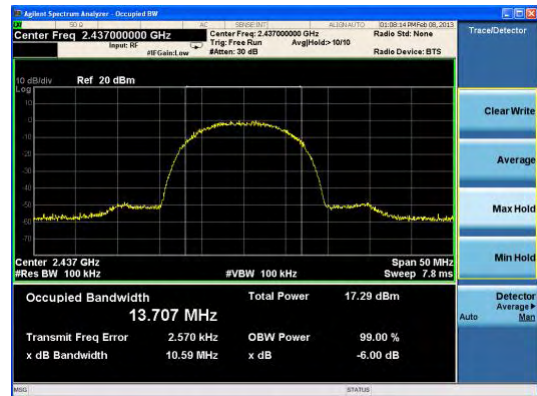
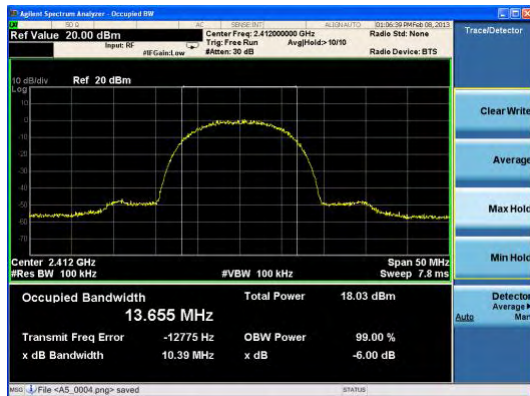
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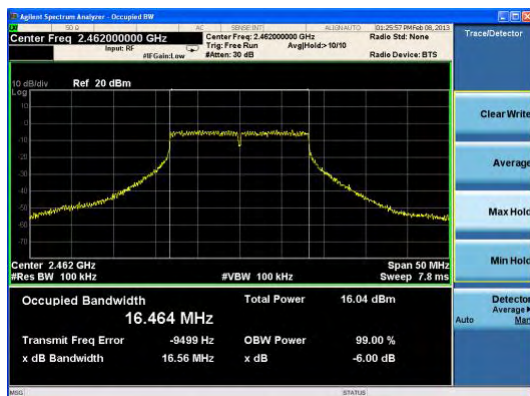
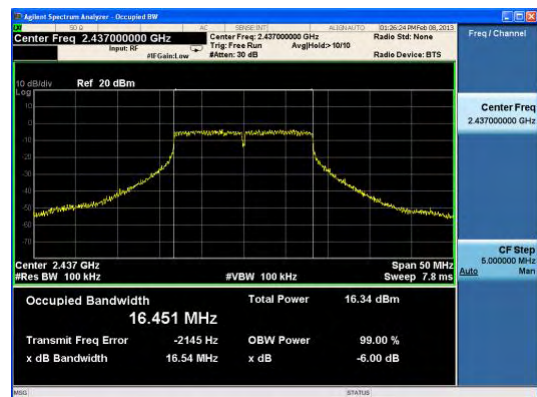
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Ant_A5 (2.4GHz) : 802.11b



Ant_A5 (2.4GHz) : 802.11g



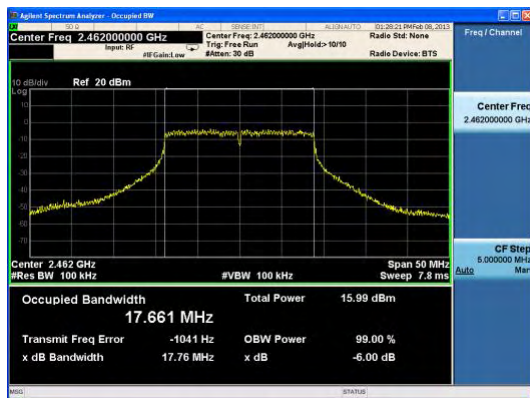
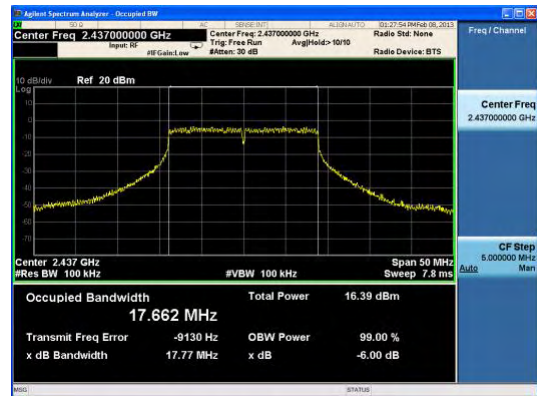
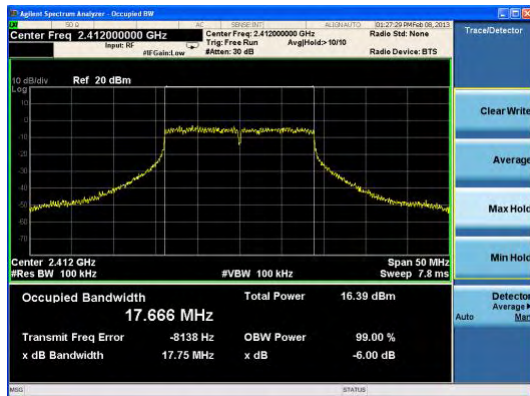
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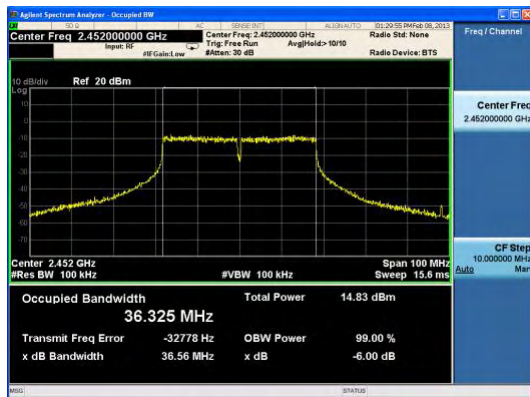
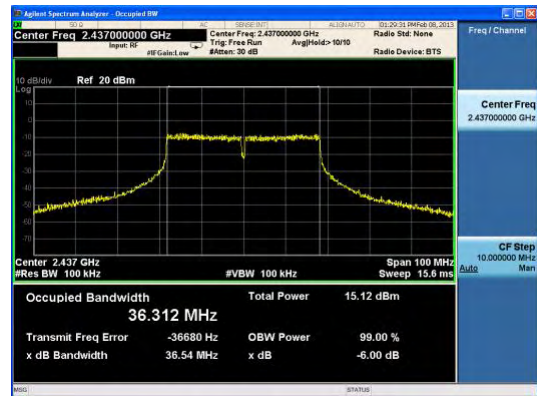
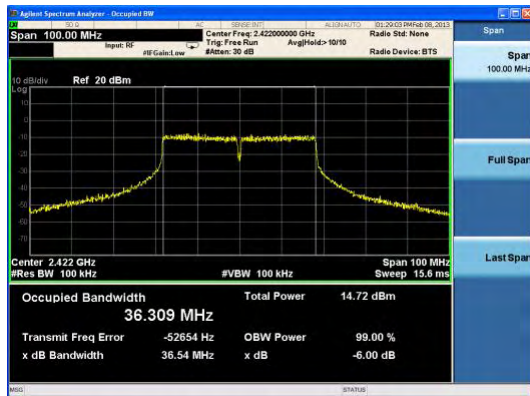
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Ant_A5 (2.4GHz) : 802.11n HT20



Ant_A5 (2.4GHz) : 802.11n HT40



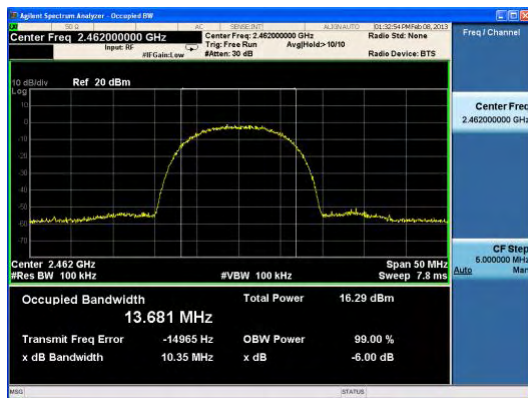
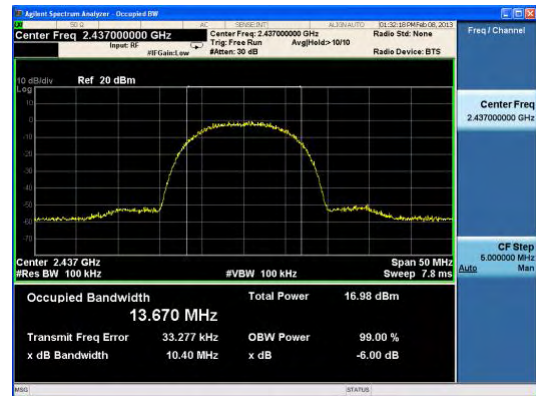
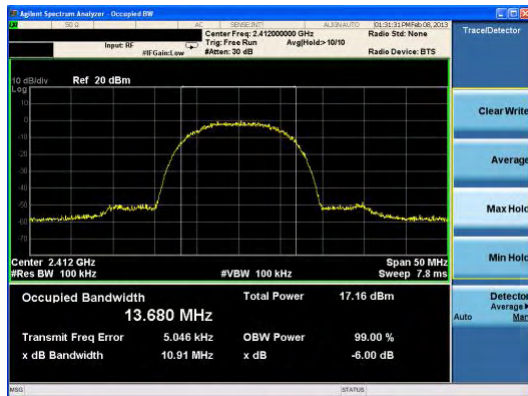
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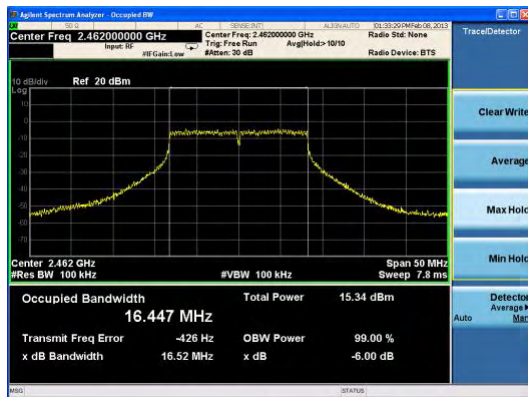
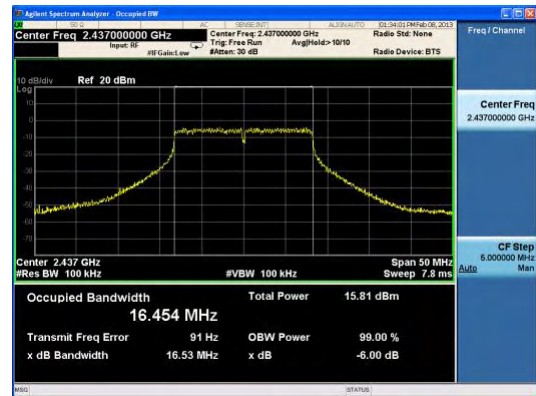
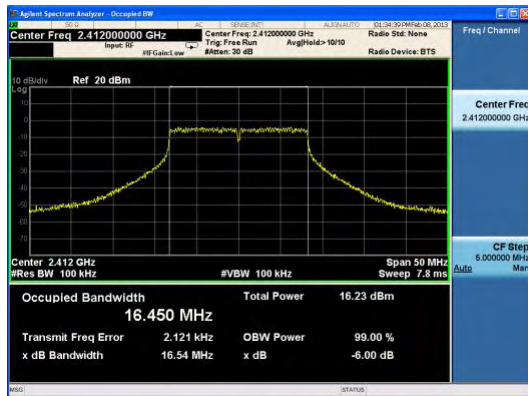
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Ant_A7 (2.4GHz) : 802.11b



Ant_A7 (2.4GHz) : 802.11g



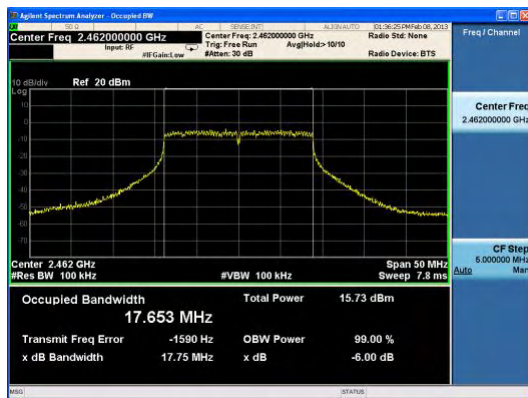
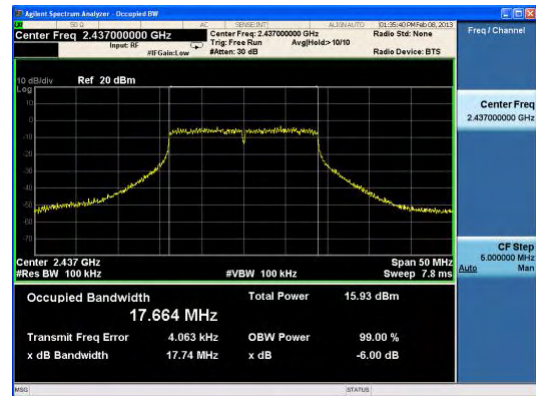
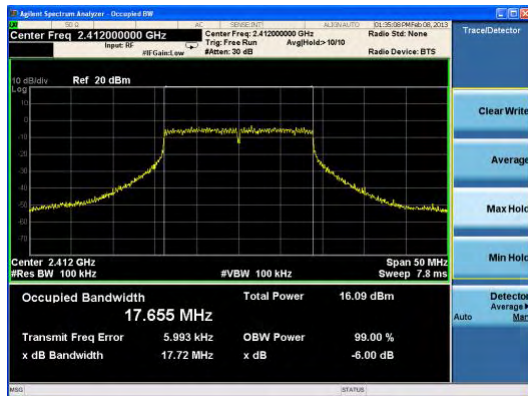
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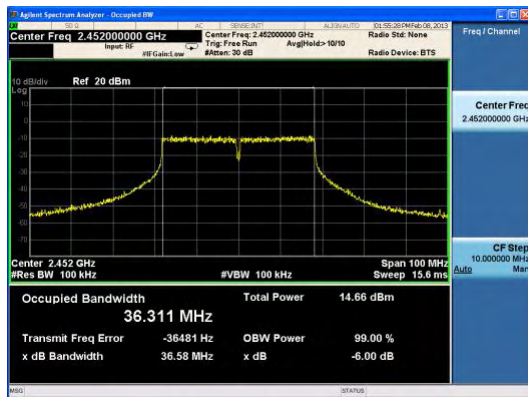
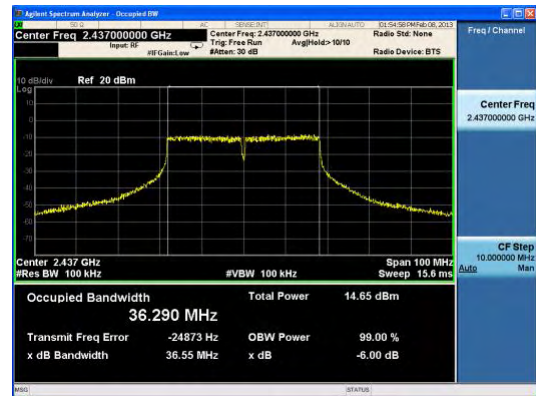
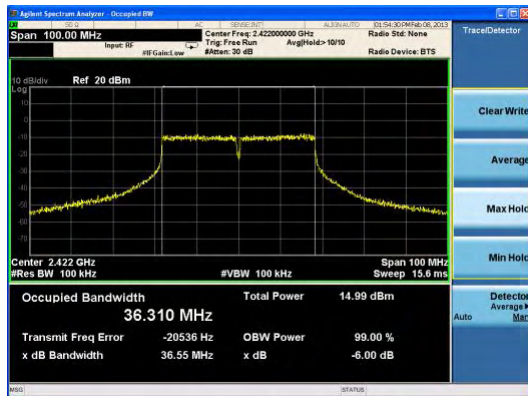
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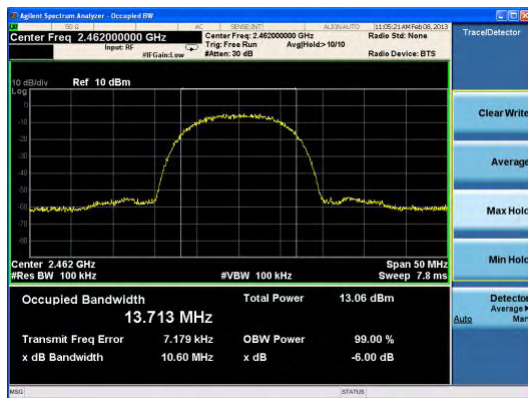
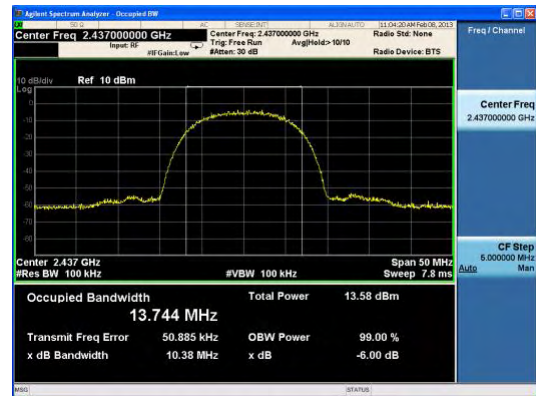
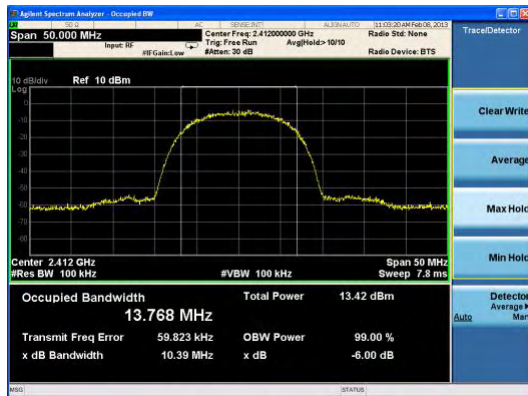
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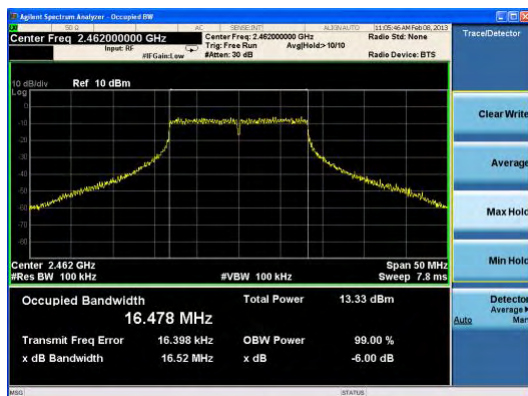
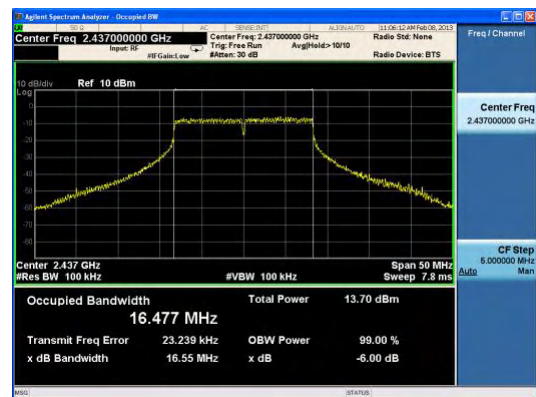
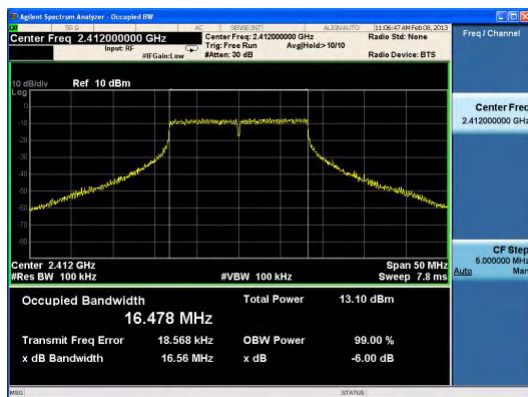
Ant_A7 (2.4GHz) : 802.11n HT20



Ant_A7 (2.4GHz) : 802.11n HT40



Ant_M1 (2.4GHz) : 802.11b



Ant_M1 (2.4GHz) : 802.11g



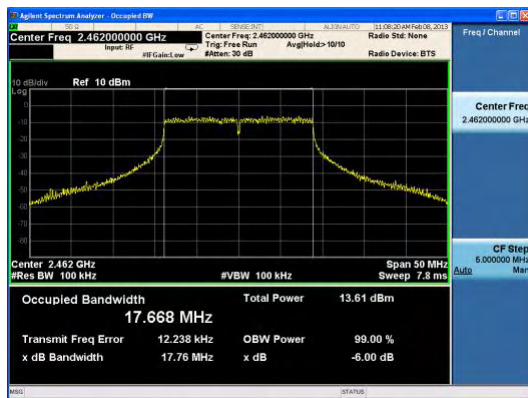
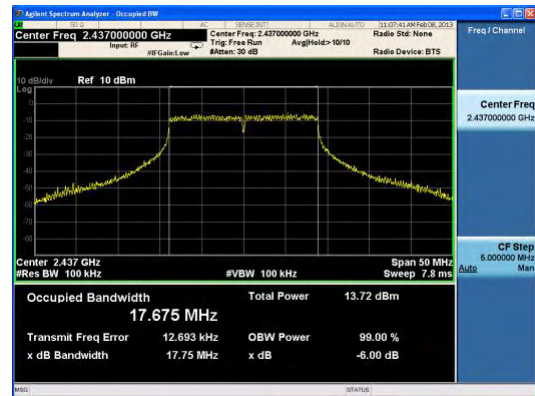
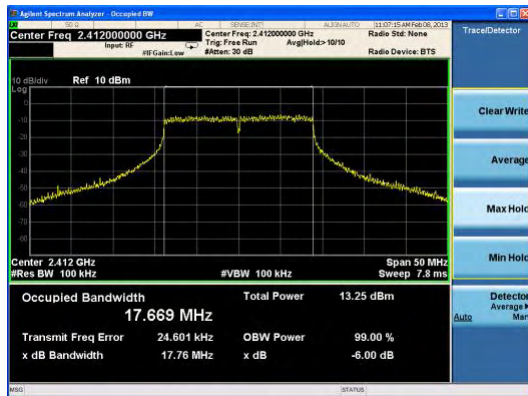
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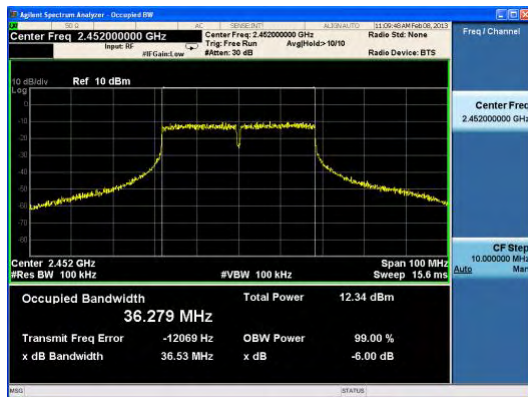
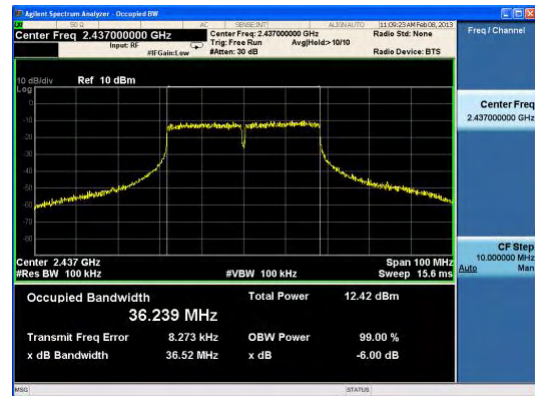
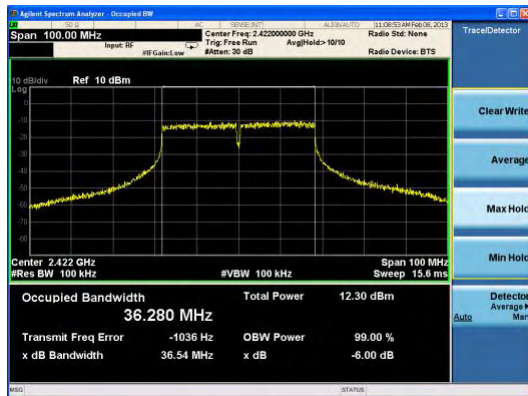
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Ant_M1 (2.4GHz) : 802.11n HT20



Ant_M1 (2.4GHz) : 802.11n HT40



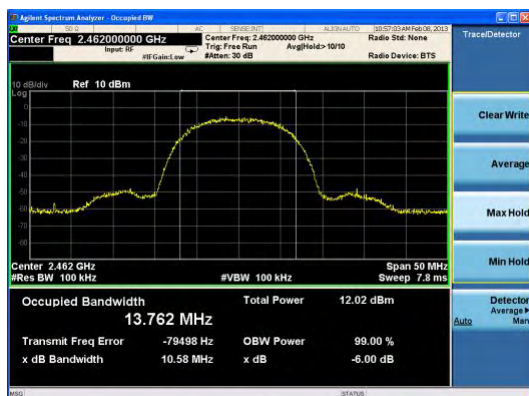
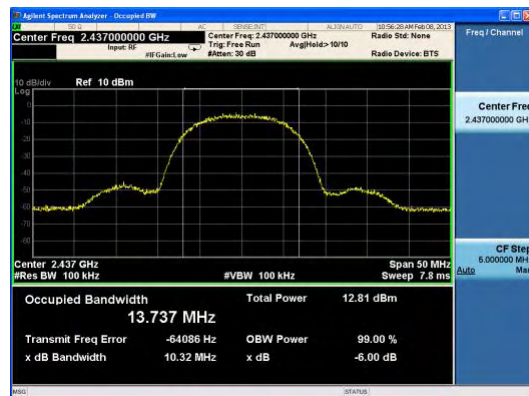
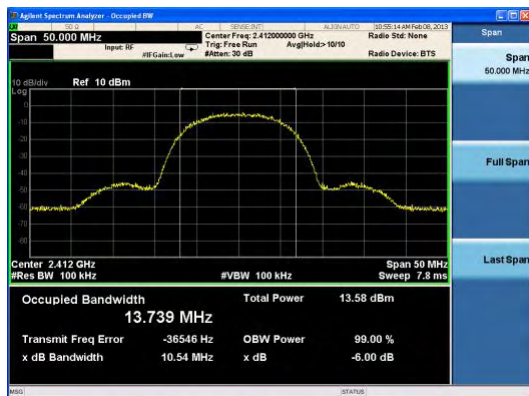
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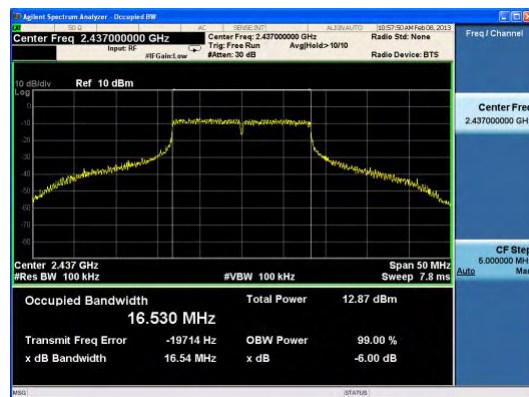
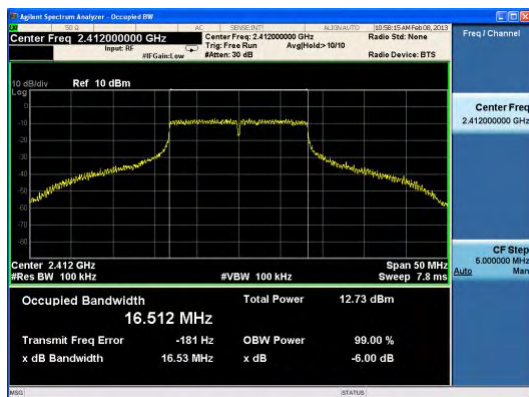
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Ant_M2 (2.4GHz) : 802.11b



Ant_M2 (2.4GHz) : 802.11g



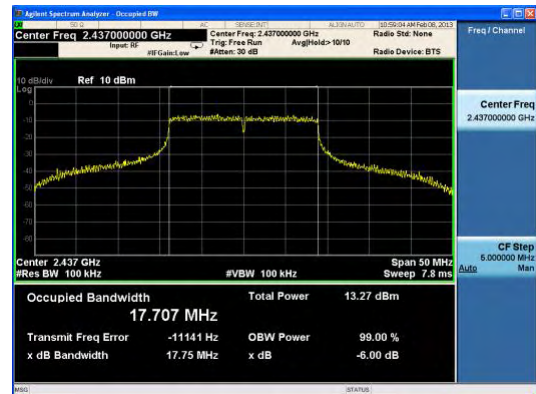
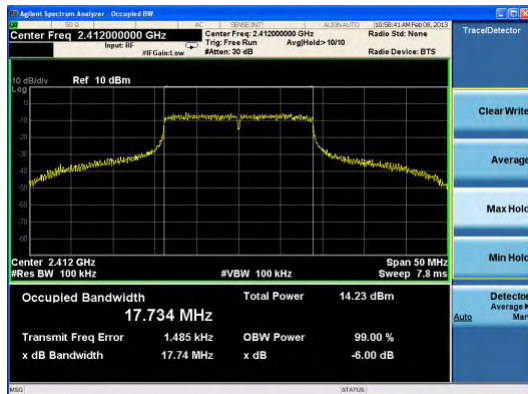
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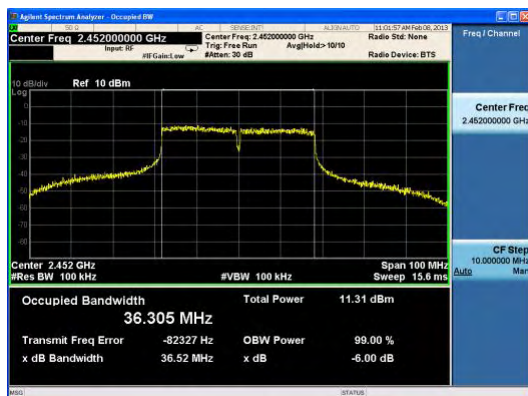
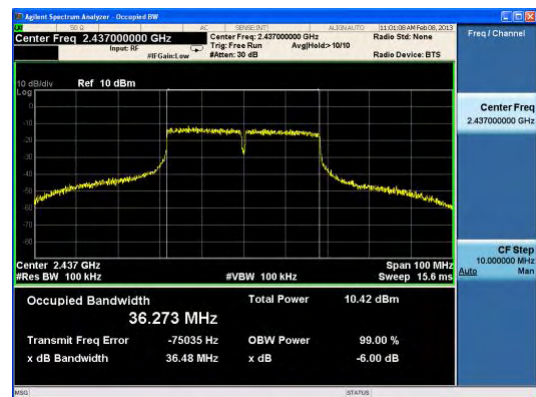
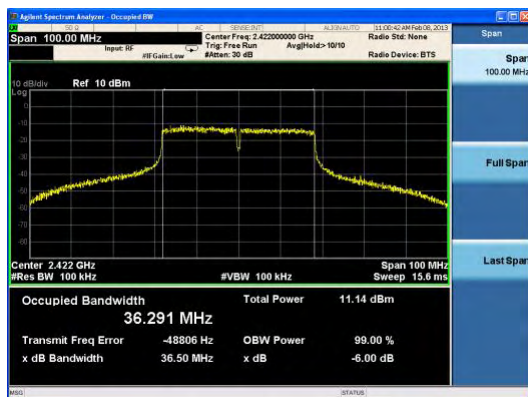
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Ant_M2 (2.4GHz) : 802.11n HT20



Ant_M2 (2.4GHz) : 802.11n HT40

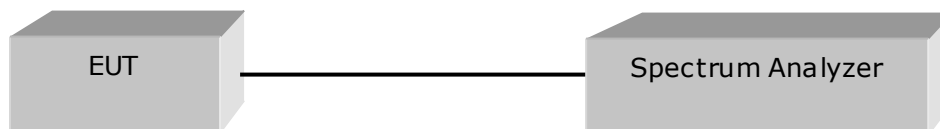
2.1.2 Maximum peak Conducted Output Power

Test Location

RF Test Room

Test Procedures

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.



Limit

< 1 W

Test Results

Cable loss : 5 GHz : 2.94 dB
2.4 GHz : 1.86 dB

Output Power Calculation : Maximum peak Conducted Output Power = Measurement data + Cable loss



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Ant : A1 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	11.15	11.33	12.32
802.11an HT20	11.29	11.47	12.36
Mode	5755 MHz		5795 MHz
802.11an HT40	11.14		11.19
Measurement	± 3 dB		

Ant : A3 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	9.66	10.15	10.50
802.11an HT20	9.79	10.19	10.54
Mode	5755 MHz		5795 MHz
802.11an HT40	9.82		10.42
Measurement	± 3 dB		

Ant : M1 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	7.80	8.59	8.77
802.11an HT20	7.72	8.55	8.96
Mode	5755 MHz		5795 MHz
802.11an HT40	6.65		8.13
Measurement	± 3 dB		

Ant : M2 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	7.46	7.61	8.55
802.11an HT20	7.50	7.63	9.00
Mode	5755 MHz		5795 MHz
802.11an HT40	6.87		7.76
Measurement	± 3 dB		



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Ant : A5 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	11.27	11.70	10.86
802.11g	11.92	12.21	11.63
802.11n HT20	11.99	12.12	11.61
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	12.15	12.26	12.33
Measurement	± 3 dB		

Ant : A7 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	11.29	11.81	11.45
802.11g	11.96	12.20	11.88
802.11n HT20	11.94	12.20	11.92
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	12.37	12.37	12.58
Measurement	± 3 dB		

Ant : M1 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	9.07	8.90	7.90
802.11g	10.10	10.40	9.68
802.11n HT20	10.02	10.38	9.53
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	10.74	10.41	10.06
Measurement	± 3 dB		

Ant : M2 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	8.26	7.68	8.70
802.11g	10.34	9.34	9.74
802.11n HT20	10.32	9.41	9.80
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	10.33	9.65	9.36
Measurement	± 3 dB		



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Ant : A1+A3 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	13.48	13.79	14.51
802.11an HT20	13.61	13.89	14.55
Mode	5755 MHz		5795 MHz
802.11an HT40	13.54		13.83
Measurement	± 3 dB		

Ant : M1+M2 (5GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	5745 MHz	5785 MHz	5825 MHz
802.11a	10.64	11.14	11.67
802.11an HT20	10.62	11.12	11.99
Mode	5755 MHz		5795 MHz
802.11an HT40	9.77		10.96
Measurement	± 3 dB		

Ant : A5+A7 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	14.29	14.77	14.18
802.11g	14.95	15.22	14.77
802.11n HT20	14.98	15.17	14.78
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	15.27	15.33	15.47
Measurement	± 3 dB		

Ant : M1+M2 (2.4GHz)

	Maximum peak Conducted Output Power (dBm)		
Mode	2412 MHz	2437 MHz	2462 MHz
802.11b	11.69	11.34	11.33
802.11g	13.23	12.91	12.72
802.11n HT20	13.18	12.93	12.68
Mode	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	13.55	13.06	12.73
Measurement	± 3 dB		



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Ant_A1 (5GHz) : 802.11a



Ant_A1 (5GHz) : 802.11a HT20



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Ant_A1 (5GHz) : 802.11a HT40



Ant_A3 (5GHz) : 802.11a



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Ant_A3 (5GHz) : 802.11a HT20



Ant_A3 (5GHz) : 802.11a HT40



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Ant_M1 (5GHz) : 802.11a



Ant_M1 (5GHz) : 802.11a HT20



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Ant_M1 (5GHz) : 802.11a HT40



Ant_M2 (5GHz) : 802.11a



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Ant_M2 (5GHz) : 802.11a HT20



Ant_M2 (5GHz) : 802.11a HT40



Ant_A5 (2.4GHz) : 802.11b



Ant_A5 (2.4GHz) : 802.11g



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Ant_A5 (2.4GHz) : 802.11n HT20



Ant_A5 (2.4GHz) : 802.11n HT40



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Ant_A7 (2.4GHz) : 802.11b



Ant_A7 (2.4GHz) : 802.11g