

# **ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT **AND INDUSTRY CANADA RSS 210**

	OF			
Product Name:	Tablet Computer			
Brand Name:	acer			
Marketing Name:	ICONIA W4-820; ICONIA W4-820P Different name for market segmentation			
Model No.:	EE6			
Model Difference:	N/A			
FCC ID:	HLZEE6			
IC:	1754F-EE6			
Report No.:	ER/2013/80066			
Issue Date:	Sep. 26, 2013			
FCC Rule Part:	§15.247, Cat: DTS			
IC Rule Part:	RSS-210 issue 8 :2010, Annex 8			
Prepared for:	Acer Incorporated 8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)			
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803			
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# VERIFICATION OF COMPLIANCE

Applicant:	Acer Incorporated 8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)
Product Name:	Tablet Computer
Brand Name:	acer
Marketing Name:	ICONIA W4-820; ICONIA W4-820P Different name for market segmentation
Model No.:	EE6
Model Difference:	N/A
FCC ID:	HLZEE6
IC:	1754F-EE6
File Number:	ER/2013/80066
Date of test:	Aug. 29, 2013 ~ Sep. 23, 2013
Date of EUT Received:	Aug. 29, 2013

# 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 RSS-Gen. issue 3 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 15.247 and IC RSS 210 issue 8: 2010 Annex 8. The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Tseng	Date	Sep. 26, 2013
Prepared By:	Marcus Tseng / Engineer Utoletta Tang	Date	Sep. 26, 2013
Approved By:	Violetta Tang / Clerk Jim Chang Jim Chang / Supervisor	Date	Sep. 26, 2013

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# Version

Version No.	Date	Description
00	Sep. 26, 2013	Initial creation of document

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#### **GENERAL INFORMATION** 1

#### **Product description** 1.1

General:

Product Name:	Tablet Comp	Tablet Computer			
Brand Name:	acer				
Marketing Name:		-820; ICONIA W4-820P ne for market segmentation			
Model No.:	EE6				
Model Difference:	N/A				
Hardware Version:	B3B				
Software Version:	BIOS v012				
	3.75Vdc Rechargeable Li-polymer battery pack or 5.35Vdc from AC/DC adapter				
		1.Model No.: AC13F3L Supplier: Sanyo Electric Co., Ltd.			
Power Supply:	Battery:	2. Model No.: AC13F8L Supplier: LG CHEMICAL LTD			
		1.Model No.: W12-010N3A, Supplier: Chicony			
	Adapter:	2.Model No.: PSAI10R-050Q Supplier: Phihong Technology Co., Ltd.			
		3.Model No.: DELTA ADP-10HW AA Supplier: DELTA-SINGAPORE			

### WLAN 2.4GHz+5.7GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Peak)	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b: 17.63dBm g: 21.22dBm	DSSS OFDM	b: 10M4G1D g: 16M4D1D
11n (2.4GHz)	HT20 2412-2462	11	n: 20.29dBm (MIMO Chain0) n: 21.02dBm (MIMO Chain 1) n: 23.65dBm (MIMO Chain 0+1)	OFDM	17M5D1D

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Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission	
11a	5725-5850	5	a: 21.22dBm		16M4D1D	
11n (5GHz)	HT20 5725-5850	5	n: 20.36dBm (MIMO Chain0) n: 21.01dBm (MIMO Chain 1) n: 23.71dBm (MIMO Chain 0+1)	OFDM	17M5D1D	
11n (5GHz)	HT40 5725-5850	2	n: 20.23dBm (MIMO Chain0) n: 20.98dBm (MIMO Chain 1) n: 23.63dBm (MIMO Chain 0+1)	36M4D1D		
Antenna	Designation:		PIFA Antenna 1. Main: 2.4GHz: 0.34dBi / 5GHz: -0.35dBi 2. Aux: 2.4GHz: 0.35dBi / 5GHz: 1.13dBi			
Antenna Part number:			Main: 57.EL 115.OBS Aux: 57.EL 115.OBT			
Modulation type			CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:			802.11 a: 6/9/12/18/24/36/48/54 Mbps; 802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 - 144Mbps 802.11 n_40MHz: 13.5 - 300Mbps			

The 2.4G max antenna gain is 0.35dBi which was choosing for Radiated Spurious Emission test.

The 5G max antenna gain is 1.13dBi which was choosing for Radiated Spurious Emission test.

The EUT is in compliance with FCC §15.247 at which the frequency band of 2400~2483.5, and 5725~5850MHz has been tested.

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#### IEEE 802.11n Spec:

MCS	MCS					NG	nno.	NID	nna		Datarat	e(Mbps)	
Index	Nss Modulation	R	NBPSC	NC	BPS	NDBPS		800	nsGI	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

1100								Data ra	nte (Mb/s)
MCS Index	Modulation	R	N <sub>BPSCS</sub> (i <sub>SS</sub> )	N <sub>SD</sub>	N <sub>SP</sub>	N <sub>CBPS</sub>	N <sub>DBPS</sub>	800 ns GI	400 ns GI (see NOTE)
8	BPSK	1/2	1	52	4	104	52	13.0	14.4
9	QPSK	1/2	2	52	4	208	104	26.0	28.9
10	QPSK	3/4	2	52	4	208	156	39.0	43.3
11	16-QAM	1/2	4	52	4	416	208	52.0	57.8
12	16-QAM	3/4	4	52	4	416	312	78.0	86.7
13	64-QAM	2/3	6	52	4	624	416	104.0	115.6
14	64-QAM	3/4	6	52	4	624	468	117.0	130.0
15	64-QAM	5/6	6	52	4	624	520	130.0	144.4
NOTE-T	The 400 ns GI rate	values	are rounded to 1	decima	l place.				

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### 802.11n HT40 MCS8 -15

MCS	MCS Modulation	P	NG	N	N	N	N	Data rat	e (Mb/s)
Index	Modulation	R	N <sub>BPSCS</sub> (i <sub>SS</sub> )	N <sub>.SD</sub>	N <sub>SP</sub>	N <sub>CBPS</sub>	BPS N <sub>DBPS</sub>	800 ns GI	400 ns GI
8	BPSK	1/2	1	108	6	216	108	27.0	30.0
9	QPSK	1/2	2	108	6	432	216	54.0	60.0
10	QPSK	3/4	2	108	6	432	324	81.0	90.0
11	16-QAM	1/2	4	108	6	864	432	108.0	120.0
12	16-QAM	3/4	4	108	6	864	648	162.0	180.0
13	64-QAM	2/3	6	108	6	1296	864	216.0	240.0
14	64-QAM	3/4	6	108	6	1296	972	243.0	270.0
15	64-QAM	5/6	6	108	6	1296	1080	270.0	300.0

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

This submittal(s) (test report) is intended for FCC ID: <u>HLZEE6</u> filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. And IC: <u>1754F-EE6</u> filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B under the DoC procedure.

## 1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009 and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Apr 2013 KDB558074 D01 V03 for compliance to FCC 47CFR 15.247 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.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number is: 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 are no special accessories used while test was conducted.

### **1.6 Equipment Modifications**

There was no modification incorporated into the EUT.

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# **2** SYSTEM TEST CONFIGURATION

# 2.1 EUT Configuration

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

### 2.2 EUT Exercise

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

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. 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 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 and of ANSI C63.4:2009,

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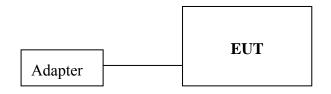
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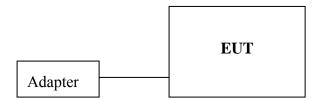


#### 2.4 **Configuration of Tested System**

## Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration



### Fig. 2-2 AC Power Line Conducted Emission



#### **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

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台灣檢驗科技股份有限公司	t (886-2) 2299-3279	f (886-2) 2298-0488	www.tw.sgs.com	



#### SUMMARY OF TEST RESULTS 3

FCC / IC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §7.2.4	AC Power Line Conducted Emission	Compliant
§15.247(b) (3) RSS-210 §A8.4(4)	Peak Output Power	Compliant
§15.247(a)(2) RSS-210 §A8.2 (a)	6dB Bandwidth	Compliant
§15.247(d) RSS-210 §A8.5	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d) RSS-210 §A8.5	Spurious Emission	Compliant
§15.247(e) RSS-210 §A8.2(b)	Peak Power Density	Compliant
§15.203 RSS-GEN §7.1.2,	Antenna Requirement	Compliant
RSS-Gen §4.6.1	99% Power Bandwidth	Compliant

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# **4 DESCRIPTION OF TEST MODES**

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n\_20MHz mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 a mode: Channel low (5745MHz), mid (5785MHz) and high (5825MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n (5GHz) \_20MHz: Lowest (5745MHz), Mid (5785MHz) and high (5825MHz) with 6.5 Mbps lowest data rate are chosen for full testing.

802.11 n (5GHz) \_40MHz: Lowest (5755MHz) and high (5795MHz) with 13.5 Mbps lowest 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/b/g/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 802.11a/b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was tested as resulted in pre-scanned measurement with respect to 2.4GHz 802.11b/g/n, and E1 position for 5.8GHz 802.11a/n\_HT20/n\_HT40.

Pre-scanned was done on antenna: 57.EL 115.OBS and antenna 57.EL 115.OBT, and antenna 57.EL 115.OBT results higher emission at 2.4GHz, and 5.8GHz. Therefore, the completed set of measurement was done on antenna: 57.EL 115.OBT to be presented on this test repot.

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Directional gain (MIMO)

The Tx transmission to construct MIMO operation is cyclic delay diversity, and the following deduction to obtain the array gain of MIMO operation is based on the approach given by KDB 662911 D01.

Gain with 5.8G is combined with the identical gain:

- (i) If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.
  - For power spectral density (PSD) measurements on all devices, *Array Gain = 10 log(N<sub>ANT</sub>/N<sub>SS</sub>) dB*.
  - For power measurements on IEEE 802.11 devices, <sup>1,2</sup>
    - Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \le 4$ ; Array Gain = 0 dB (i.e., no array gain) for channel widths  $\ge 40$  MHz for any  $N_{ANT}$ ; Array Gain = 5 log( $N_{ANT}/N_{SS}$ ) dB or 3 dB, whichever is less, for 20-MHz channel widths with  $N_{ANT} \ge 5$ .

Array gain = 0dBi (ERP/EIRP related measurement) Array gain = 3.01dBi (peak spectral density)

MIMO gain = gain (nominal gain) + array gain = (2.04 + 0)dBi = 2.04dBi

Gain with 2.4G is combined with different magnitude of two antennas:

- (ii) If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:
  - Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain; or,

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DirectionalGain = 
$$10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;  $N_{SS}$  = the number of independent spatial streams of data;  $N_{ANT}$  = the total number of antennas

 $g_{j,k} = 10^{G_k/20}$  if the *k*th antenna is being fed by spatial stream *j*, or zero if it is not;  $G_k$  is the gain in dBi of the kth antenna.

Directive Gain = 0.34dBi MIMO Gain = (0.35 + 0.34)dBi = 0.69dBi

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#### 5 **MEASUREMENT UNCERTAINTY**

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55dB (for Spectrum) +/- 1.42 dB (for Power Meter)
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
99% Power Bandwidth	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

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

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

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

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# **6 CONDUCTED EMISSION TEST**

# 6.1 Standard Applicable:

According to §15.207 and RSS-Gen §7.2.4, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range	LimitsFrequency rangedB(uV)					
MHz	Quasi-peak	Average				
0.15 to 0.50	66 to 56	56 to 46				
0.50 to 5	56	46				
5 to 30	60	50				
Note						
1. The lower limit shall apply at the transition frequencies						

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

# 6.2 Measurement Equipment Used:

Conducted Emission Test Site								
EQUIPMENT	EQUIPMENT MFR MC		SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
EMI Test Receiver	R&S	ESCI7	100759	02/08/2013	02/07/2014			
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2012	09/22/2013			
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2013	03/22/2014			
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2013	03/22/2014			
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2013	01/04/2014			

# 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 EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

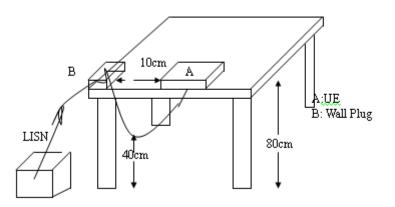
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# 6.4 Test SET-UP (Block Diagram of Configuration)



#### 6.5 Measurement Procedure:

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

#### 6.6 Measurement Result:

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

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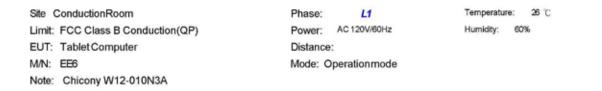
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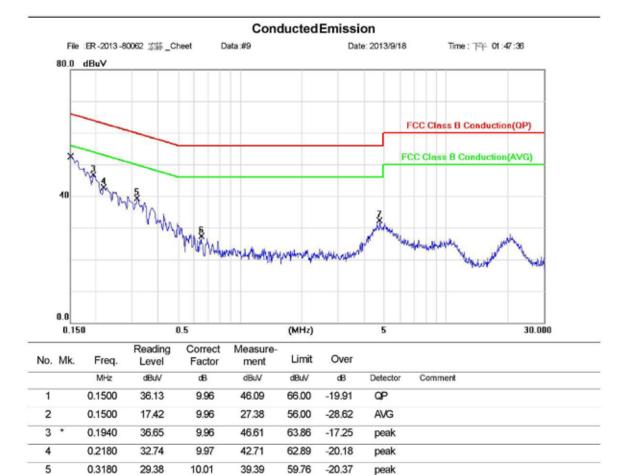
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# AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 18, 2013
Temperature:	26	Humidity:	60 %	Test By:	Marcus
Adapter Model:	W12-010N3A (Chicony)			Probe:	L1/N





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10.02

10.16

27.40

32 37

56.00

56.00

-28.60

-23.63

peak

peak

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6

7

0.6500

4.7780

17.38

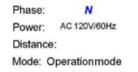
22.21

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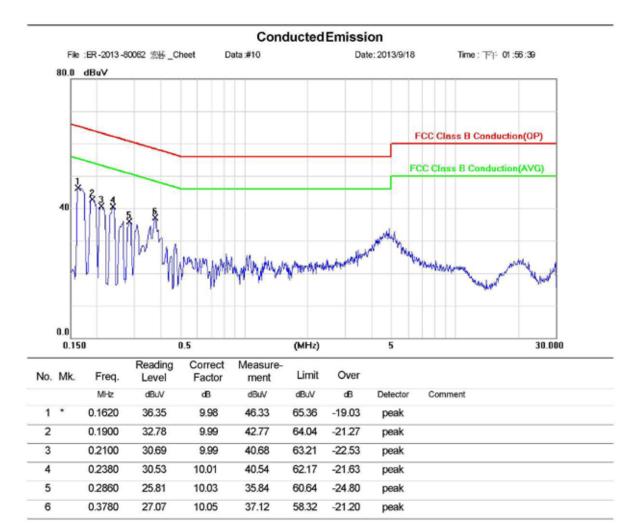


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Site ConductionRoom Limit: FCC Class B Conduction(QP) EUT: TabletComputer M/N: EE6 Note: Chicony W12-010N3A



Temperature: 28 °C Humidity: 60%



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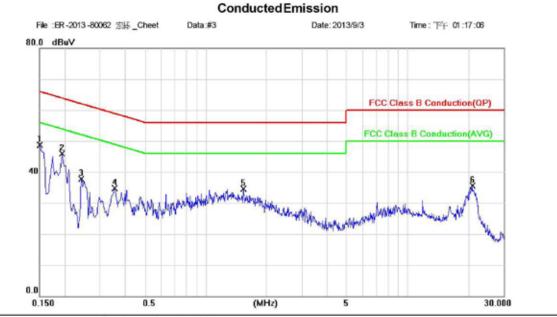
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# AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 03, 2013
Temperature:	26	Humidity:	60 %	Test By:	Marcus
Adapter Model:	PSAI10R-050Q (F	Phihong)		Probe:	L1/N

Site ConductionRoom	Phase: L1	Temperature: 26 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 60%
EUT: TabletComputer	Distance:	
M/N: EE6	Mode: Operationmode	
Note:		



No. Mk. Fr		Reading Freq. Level	Correct Factor	Measure- ment	Limit	Limit Over	Over		
		MHz	dBuV	dB	dBuV	dBulV	dB	Detector	Comment
1	*	0.1500	38.73	9.96	48.69	66.00	-17.31	peak	
2		0.1940	35.95	9.96	45.91	63.86	-17.95	peak	
3		0.2420	27.76	9.98	37.74	62.03	-24.29	peak	
4		0.3540	24.72	10.02	34.74	58.87	-24.13	peak	
5		1.5420	24.37	10.08	34.45	56.00	-21.55	peak	
6		20.9540	25.19	10.39	35.58	60.00	-24.42	peak	

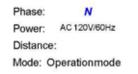
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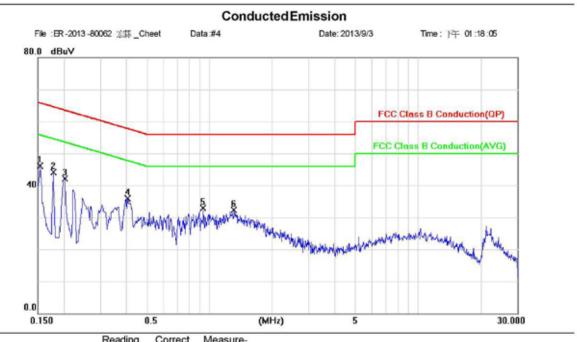


Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 23 of 172

Site ConductionRoom Limit: FCC Class B Conduction(QP) EUT: Tablet Computer M/N: EE6 Note:



Temperature: 26 °C Humidity: 60%



No.	Mk.	Freq.	Level	Factor	ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	*	0.1540	36.16	9.98	46.14	65.78	-19.64	peak		
2		0.1780	34.03	9.99	44.02	64.58	-20.56	peak		
3		0.2020	32.18	9.99	42.17	63.53	-21.36	peak		
4		0.4060	25.83	10.05	35.88	57.73	-21.85	peak		
5		0.9380	22.83	10.09	32.92	56.00	-23.08	peak		
6		1.3140	22.29	10.09	32.38	56.00	-23.62	peak		

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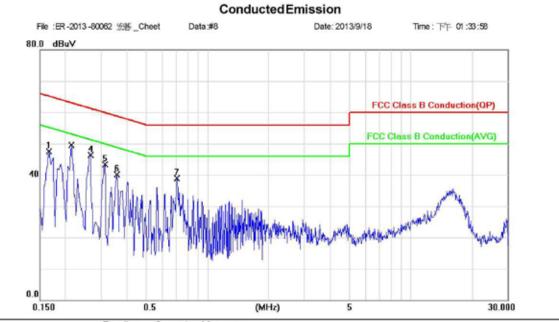
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# AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 18, 2013
Temperature:	26	Humidity:	60 %	Test By:	Marcus
Adapter Model:	DELTAADP-10H	W AA (Delta)		Probe:	L1/N

Site ConductionRoom	Phase: L1	Temperature: 26 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 60%
EUT: TabletComputer	Distance:	
M/N; EE6	Mode: Operationmode	
Note: Delta ADP-10HW AA		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1660	37.62	9.96	47.58	65.16	-17.58	peak	
2		0.2140	32.35	9.97	42.32	63.05	-20.73	QP	
3		0.2140	18.55	9.97	28.52	53.05	-24.53	AVG	
4	•	0.2660	36.31	10.00	46.31	61.24	-14.93	peak	
5		0.3140	33.20	10.01	43.21	59.86	-16.65	peak	
6		0.3580	30.07	10.02	40.09	58.77	-18.68	peak	
7		0.7100	28.84	10.04	38.88	56.00	-17.12	peak	

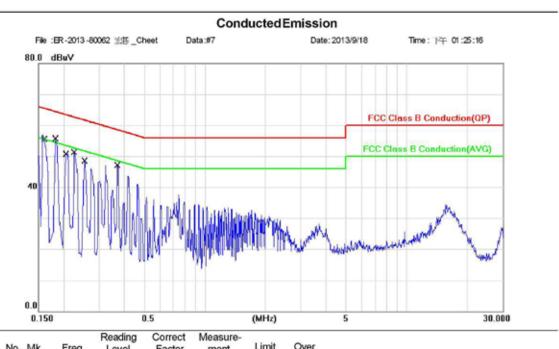
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Site ConductionRoom Limit: FCC Class B Conduction(QP) EUT: TabletComputer M/N: EE6 Note: Delta ADP-10HW AA

Phase: N AC 120V/60Hz Power: Distance: Mode: Operationmode Temperature: 26 °C Humidity: 60%



NO. WIK.	Freq.	Level	Factor	ment	Linit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1620	35.84	9.98	45.82	65.36	-19.54	QP	
2	0.1620	15.73	9.98	25.71	55.36	-29.65	AVG	
3	0.1820	36.83	9.99	46.82	64.39	-17.57	QP	
4	0.1820	19.76	9.99	29.75	54.39	-24.64	AVG	
5	0.2060	35.10	9.99	45.09	63.37	-18.28	QP	
6	0.2060	16.14	9.99	26.13	53.37	-27.24	AVG	
7 *	0.2260	36.72	10.00	46.72	62.60	-15.88	QP	
8	0.2260	20.25	10.00	30.25	52.60	-22.35	AVG	
9	0.2540	31.48	10.02	41.50	61.63	-20.13	QP	
10	0.2540	12.73	10.02	22.75	51.63	-28.88	AVG	
11	0.3700	27.26	10.05	37.31	58.50	-21.19	QP	
12	0.3700	8.95	10.05	19.00	48.50	-29.50	AVG	

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# 7 PEAK OUTPUT POWER MEASUREMENT

# 7.1 Standard Applicable:

According to §15.247 (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to RSS-210 issue 8,§A8.4(4), for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmitted power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.

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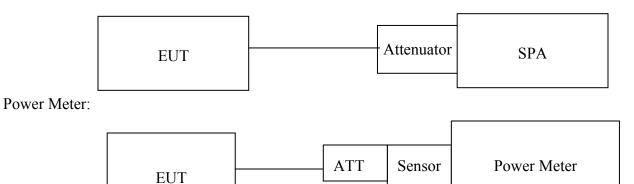


#### 7.2 **Measurement Equipment Used:**

	Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
Power Meter	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014			
Power Sensor	Anritsu	MA2411B	917032	02/08/2012	02/07/2014			
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014			
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/15/2013	03/14/2014			
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2013	02/27/2014			
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2013	01/04/2014			
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2013	02/27/2014			
Splitter	Agilent	11636B	N/A	02/28/2013	02/27/2014			

### 7.3 Test Set-up:

Spectrum:



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#### 7.4 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 or spectrum. (**Peak power setting on Spectrum:** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =peak, Sweep = Auto. Setting on spectrum is adjusted based on the mandatory procedure in 9.1.2 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.1.3 in KDB558074 is followed.

(Avg. power setting on Spectrum: Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =Avg., Trace avg =100, Sweep = Auto, Setting on spectrum is adjusted based on the mandatory procedure in 9.2.2.4 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.2.3, option 3 in KDB558074 is followed.

- 3. Record the max. Reading as observed from Spectrum or Power Meter.
- 4. Repeat above procedures until all frequency of interest measured was complete.
- 5. For MIMO operation, measurement is done per chain basis, and then sum the simultaneous transmitting output in linear.

*Pre-anaysis Check: While conducting average power measurement, duty cycle of each mode (a/n\_ht20) shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, resulted as obtained below, and showed only the most representative ones* 

Tabular results as indicates below entails the results of duty factor for all supported modes. *Formula:* 

*Duty Cycle* = *Ton* / (*Ton*+*Toff*)

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### **Test Procedure:**

Set span = 0, RBW = 1MHz, VBW = 3MHz, Detector = PeakDuty Cycle:

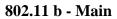
	Antenna	Duty Cycle	Duty Factor (dBm)
802.11b	Single-Main	0.9860	0.06
802.11g	Single-Main	0.9831	0.07
802.11n 20	MIMO-Main	0.9755	0.06
(2.4G)	MIMO-Aux	0.9755	0.06
802.11a	Single-Main	0.9883	0.05
	MIMO-Main	0.9764	0.10
802.11n_20 (5G)	MIMO-Aux	0.9764	0.10
802 11m 40 (5C)	MIMO-Main	0.9721	0.12
802.11n_40 (5G)	MIMO-Aux	0.9721	0.12

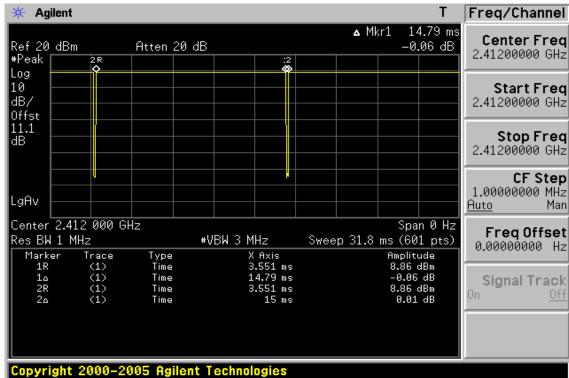
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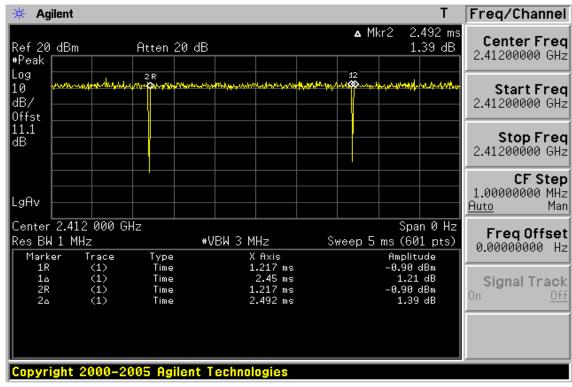


### **Duty Factor:**





#### 802.11 g - Main



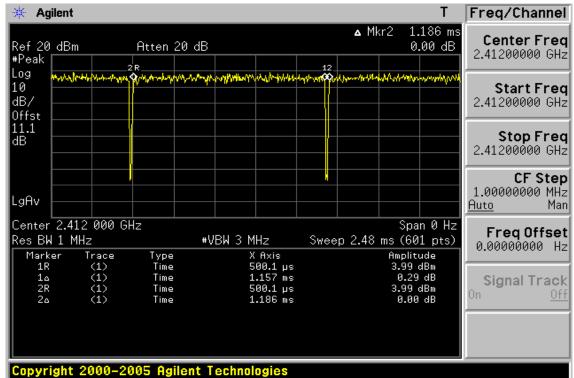
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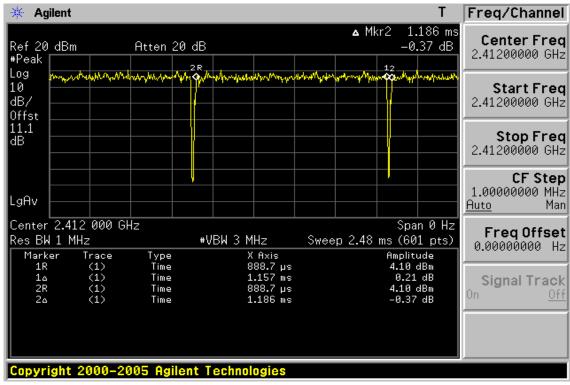
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#### 802.11 n\_20 MHz - MIMO Main



#### 802.11 n\_20 MHz - MIMO Aux



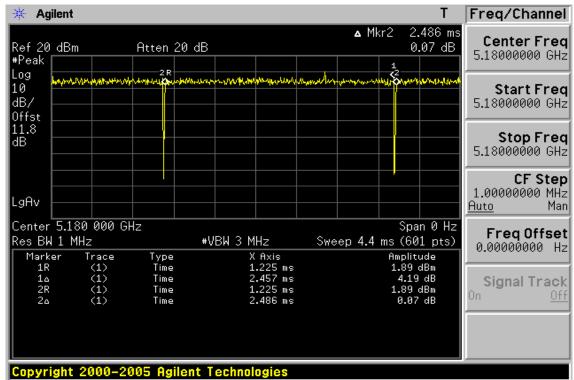
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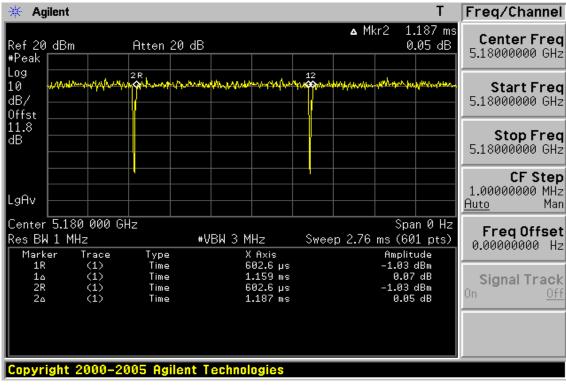
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#### 802.11a - Main



#### 802.11 n (5GHz) 20M - MIMO Main



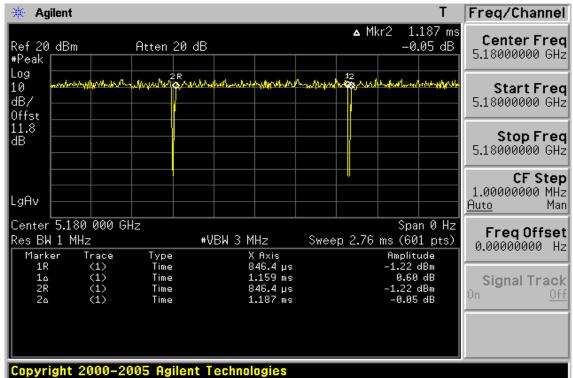
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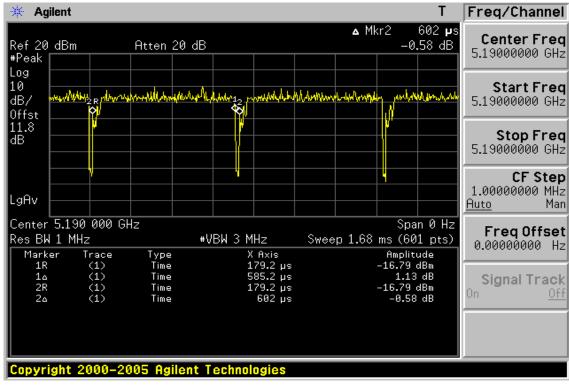


#### 802.11 n (5GHz) 20M - MIMO Aux



#### 802.11 n (5GHz) 40M - MIMO Main

台灣檢驗



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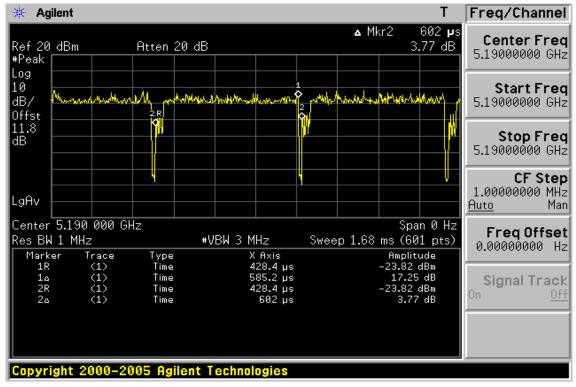
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#### 802.11 n (5GHz)\_40M - MIMO Aux



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#### 7.5 **Measurement Result:**

#### 802.11b (Main)

			Peak Power Output (dBm)										
СП	Frequency		Degratized Limit										
СН	(MHz)	1	2	Required Limit									
1	2412	17.33	17.22	17.08	16.94	1 Watt = 30 dBm							
6	2437	17.48	17.42	17.35	17.26	1 Watt = 30 dBm							
11	2462	17.63	17.57	17.56	17.53	1 Watt = 30 dBm							

			Average Power Output (dBm)									
СП	Frequency		Required Limit									
СН	(MHz)	1	1 2 5.5 11									
1	2412	13.44	13.36	13.31	13.25	1 Watt = 30 dBm						
6	2437	13.75	13.63	13.59	13.55	1 Watt = 30 dBm						
11	2462	13.97	13.84	13.80	13.67	1 Watt = 30 dBm						

#### 802.11g (Main)

				<b>m</b> )						
СН	Frequency		Data Rate							Dequined Limit
Сп	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>
1	2412	20.95	20.88	20.85	20.76	20.75	20.72	20.64	20.64	1 Watt = 30 dBm
6	2437	21.09	20.95	20.87	20.74	20.64	20.56	20.46	20.41	1 Watt = 30 dBm
11	2462	21.22	21.12	21.01	20.87	20.73	20.61	20.51	20.39	1 Watt = 30 dBm

				Bm)								
СП	Frequency			Degratized Lineit								
СН	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>		
1	2412	11.38	11.34	11.30	11.26	11.23	11.17	11.14	11.13	1 Watt = 30 dBm		
6	2437	12.04	11.97	11.95	11.84	11.82	11.75	11.68	11.64	1 Watt = 30 dBm		
11	2462	12.27	12.15	12.07	12.00	11.99	11.96	11.88	11.79	1 Watt = 30 dBm		

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#### 802.11n 20M (Aux)

			Peak Power Output(dBm)									
СП	Frequency Data Rate									Required		
CH	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit		
1	2412	19.67	19.63	19.59	19.47	19.42	19.35	19.31	19.18	1 Watt = 30 dBm		
6	2437	19.77	19.72	19.70	19.69	19.57	19.45	19.40	19.37	1 Watt = 30 dBm		
11	2462	19.88	19.81	19.74	19.66	19.54	19.47	19.39	19.38	1 Watt = 30 dBm		

	_		Average Power Output(dBm)									
СН	Gu Frequency Data Rate									Required		
СП	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit		
1	2412	9.62	9.61	9.48	9.35	9.31	9.23	9.18	9.11	1 Watt = 30 dBm		
6	2437	9.72	9.70	9.63	9.51	9.45	9.43	9.29	9.17	1 Watt = 30 dBm		
11	2462	9.96	9.91	9.84	9.72	9.71	9.62	9.61	9.55	1 Watt = 30 dBm		

#### 802.11n\_20M (2.4G) MIMO Chain 0

			Peak Power Output(dBm)									
СН	Frequency				Data	Rate				Required		
Сп	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit		
1	2412	20.29	20.23	20.12	20.01	19.93	19.82	19.75	19.74	1 Watt = 30 dBm		
6	2437	20.22	20.12	20.08	19.96	19.86	19.82	19.75	19.71	1 Watt = 30 dBm		
11	2462	20.02	19.90	19.86	19.85	19.78	19.68	19.65	19.56	1 Watt = 30 dBm		

			Average Power Output(dBm)									
СП	Frequency		Data Rate									
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit		
1	2412	8.93	8.80	8.79	8.78	8.73	8.73	8.70	8.62	1 Watt = 30 dBm		
6	2437	9.13	9.08	8.97	8.91	8.85	8.76	8.62	8.58	1 Watt = 30 dBm		
11	2462	9.43	9.29	9.19	9.13	9.00	8.90	8.89	8.86	1 Watt = 30 dBm		

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### 802.11n 20M (2.4G) MIMO Chain 1

СН	Frequency		Data Rate										
Сп	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit			
1	2412	20.97	20.93	20.82	20.81	20.79	20.70	20.56	20.50	1 Watt = 30 dBm			
6	2437	21.02	20.96	20.91	20.86	20.81	20.81	20.80	20.76	1 Watt = 30 dBm			
11	2462	20.77	20.64	20.51	20.42	20.35	20.34	20.33	20.26	1 Watt = 30 dBm			

СН	Frequency		Data Rate											
Сп	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit				
1	2412	9.35	9.31	9.25	9.25	9.17	9.11	8.97	8.89	1 Watt = 30 dBm				
6	2437	9.52	9.39	9.26	9.23	9.21	9.08	9.03	8.98	1 Watt = 30 dBm				
11	2462	9.67	9.66	9.62	9.62	9.48	9.46	9.34	9.23	1 Watt = 30 dBm				

#### 802.11n\_20M (2.4G) MIMO Chain 0+Chain 1

СН	Frequency		Data Rate										
Сп	(MHz)	MCS8	MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
1	2412	23.65	23.60	23.49	23.44	23.39	23.29	23.18	23.15	1 Watt = 30 dBm			
6	2437	23.65	23.57	23.53	23.44	23.37	23.35	23.32	23.28	1 Watt = 30 dBm			
11	2462	23.42	23.30	23.21	23.15	23.08	23.03	23.01	22.93	1 Watt = 30 dBm			

			Average Power Output(dBm)										
СН	Frequency		Data Rate										
Сп	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit			
1	2412	12.16	12.07	12.04	12.03	11.97	11.93	11.85	11.77	1 Watt = 30 dBm			
6	2437	12.34	12.25	12.13	12.08	12.04	11.93	11.84	11.79	1 Watt = 30 dBm			
11	2462	12.56	12.49	12.42	12.39	12.26	12.20	12.13	12.06	1 Watt = 30 dBm			

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802.11a (Main)

			Peak Power Output (dBm)										
OII	Frequency			D 11									
СН	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>			
149	5745	20.96	20.96	20.94	20.92	20.78	20.68	20.68	20.57	1 Watt = 30 dBm			
157	5785	21.22	21.16	21.04	20.90	20.84	20.82	20.76	20.62	1 Watt = 30 dBm			
165	5825	20.85	20.76	20.73	20.71	20.66	20.64	20.52	20.45	1 Watt = 30 dBm			

OII	Frequency			D 11. 4						
СН	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>
149	5745	11.62	11.58	11.46	11.40	11.31	11.23	11.22	11.22	1 Watt = 30 dBm
157	5785	11.57	11.46	11.40	11.33	11.22	11.22	11.21	11.18	1 Watt = 30 dBm
165	5825	11.60	11.47	11.36	11.35	11.24	11.15	11.05	10.99	1 Watt = 30 dBm

#### 802.11n (5GHz)\_20M (Main)

CII	Frequency		-	Deguined Limit						
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	<b>Required Limit</b>
149	5745	20.84	20.81	20.68	20.68	20.57	20.47	20.35	20.28	1 Watt = 30 dBm
157	5785	21.30	21.27	21.27	21.21	21.16	21.16	21.13	21.02	1 Watt = 30 dBm
165	5825	19.95	19.88	19.76	19.64	19.55	19.44	19.34	19.21	1 Watt = 30 dBm

				)						
CII	Frequency			D . II						
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	<b>Required Limit</b>
149	5745	8.13	8.04	8.00	7.89	7.86	7.72	7.69	7.55	1 Watt = 30 dBm
157	5785	8.04	8.02	8.01	7.92	7.89	7.79	7.74	7.63	1 Watt = 30 dBm
165	5825	8.00	7.92	7.92	7.88	7.86	7.79	7.71	7.63	1 Watt = 30 dBm

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### 802.11n (5GHz) 20M MIMO Chain 0

OII	Frequency			D						
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Required Limit
149	5745	20.31	20.27	20.19	20.14	20.00	19.89	19.77	19.70	1 Watt = 30 dBm
157	5785	20.21	20.10	19.99	19.99	19.94	19.84	19.84	19.83	1 Watt = 30 dBm
165	5825	20.36	20.25	20.15	20.05	19.91	19.91	19.86	19.82	1 Watt = 30 dBm

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
149	5745	7.90	7.89	7.79	7.65	7.53	7.47	7.33	7.31	1 Watt = 30 dBm			
157	5785	7.98	7.94	7.81	7.81	7.80	7.76	7.62	7.49	1 Watt = 30 dBm			
165	5825	7.95	7.94	7.83	7.74	7.61	7.54	7.46	7.36	1 Watt = 30 dBm			

### 802.11n (5GHz)\_20M MIMO Chain 1

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
149	5745	20.98	20.96	20.86	20.81	20.81	20.75	20.67	20.67	1 Watt = 30 dBm			
157	5785	20.85	20.77	20.75	20.67	20.57	20.45	20.35	20.34	1 Watt = 30 dBm			
165	5825	21.01	21.00	20.96	20.94	20.84	20.82	20.71	20.70	1 Watt = 30 dBm			

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	ICS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
149	5745	7.72	7.58	7.48	7.43	7.31	7.17	7.04	6.91	1 Watt = 30 dBm			
157	5785	7.58	7.44	7.36	7.34	7.29	7.22	7.11	7.01	1 Watt = 30 dBm			
165	5825	7.31	7.24	7.10	6.98	6.98	6.92	6.81	6.81	1 Watt = 30 dBm			

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802.11n (5GHz) 20M MIMO Chain 0+ Chain1

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	ICS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
149	5745	23.67	23.64	23.55	23.50	23.44	23.36	23.26	23.23	1 Watt = 30 dBm			
157	5785	23.56	23.46	23.40	23.36	23.28	23.17	23.12	23.11	1 Watt = 30 dBm			
165	5825	23.71	23.66	23.59	23.53	23.42	23.40	23.32	23.30	1 Watt = 30 dBm			

			Average Power Output(dBm)											
CII	Frequency		Data Rate											
СН	(MHz)	MCS8	1CS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15											
149	5745	10.82	10.75	10.65	10.55	10.43	10.33	10.20	10.12	1 Watt = 30 dBm				
157	5785	10.79	10.71	10.60	10.59	10.56	10.51	10.38	10.27	1 Watt = 30 dBm				
165	5825	10.65	10.61	10.49	10.39	10.32	10.25	10.16	10.10	1 Watt = 30 dBm				

### 802.11n (5GHz)\_40M (Main)

			Peak Power Output(dBm)										
CII	Frequency		-	D 11. 4									
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	<b>Required Limit</b>			
151	5755	19.99	19.86	19.79	19.70	19.67	19.60	19.55	19.42	1 Watt = 30 dBm			
159	5795	20.03	19.92	1 Watt = 30 dBm									

			Average Power Output(dBm)										
CII	Frequency			D									
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	<b>Required Limit</b>			
151	5755	7.81	7.69	7.67	7.67	7.63	7.53	7.48	7.44	1 Watt =			
	0,00		1.05	1.07	1.07	1.00	1.00	/.10	,	30 dBm			
159	5795	7.68	7.57	7.50	7.39	7.35	7.27	7.26	7.22	1 Watt = 30 dBm			

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### 802.11n (5GHz)\_40M MIMO Chain 0

			Peak Power Output(dBm)										
CII	Frequency			D 1 11 1									
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
151	5755	20.23	20.12	20.09	20.08	19.94	19.88	19.74	19.69	1 Watt = 30 dBm			
159	5795	20.22	20.12	20.07	20.05	19.99	19.88	19.74	19.61	1 Watt = 30 dBm			

			Average Power Output(dBm)										
CII	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
151	5755	7.55	7.51	7.42	7 37	7.36	7 29	7 24	7.13	1 Watt =			
131	5755	1.55	7.31	1.42	1.57	7.30	1.29	1.24	1.13	<b>30 dBm</b>			
150	<b>5705</b>	7 4 4	7.40	7.22	7.00	7 1 1	7.00	7.04	( 00	1 Watt =			
159	5795	7.44	7.40	7.32	7.23	7.11	7.09	7.04	6.98	30 dBm			

#### 802.11n (5GHz)\_40M MIMO Chain 1

			Peak Power Output(dBm)										
OII	Frequency			<b>Required</b> Limit									
СН	(MHz)	MCS8	CS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
151	5755	20.95	20.91	20.84	20.79	20.75	20.62	20.50	20.45	1 Watt = 30 dBm			
159	5795	20.98	20.94	20.90	20.84	20.73	20.68	20.61	20.61	1 Watt = 30 dBm			

			Average Power Output(dBm)											
CII	Frequency		Data Rate											
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>				
151	5755	7.26	7.19	7.18	7.05	6.93	6.82	6.72	6.60	1 Watt = 30 dBm				
159	5795	6.94	6.93	6.89	6.75	6.64	6.50	6.45	6.33	1 Watt = 30 dBm				

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			Peak Power Output(dBm)											
CII	Frequency		Data Rate											
СН	(MHz)	MCS8	MCS9	<b>Required Limit</b>										
151	5755	23.62	23.55	23.50	23.46	23.38	23.28	23.15	23.10	1 Watt = 30 dBm				
159	5795	23.63	23.56	23.15	1 Watt = 30 dBm									

### 802.11n (5GHz) 40M MIMO Chain 0+Chain 1

			Average Power Output(dBm)										
CII	Frequency				D 11								
СН	(MHz)	MCS8	MCS9	<b>Required Limit</b>									
151	5755	10.42	10.36	10.31	10.22	10.16	10.07	10.00	9.88	1 Watt = 30 dBm			
159	5795	10.21	10.18	10.12	10.01	9.89	9.82	9.77	9.68	1 Watt = 30 dBm			

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

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### 802.11b (Main)

				EIRP (dB	<b>m</b> )	
СН	Frequency		Data		Dequined Limit	
Сн	(MHz)	1	2	5.5	11	Required Limit
1	2412	13.78	13.70	13.65	13.59	4 Watts = 36 dBm
6	2437	14.09	13.97	13.93	13.89	4 Watts = 36 dBm
11	2462	14.31	14.18	14.14	14.01	4 Watts = 36 dBm

### 802.11g (Main)

						EII	RP (dB	m)		
СН	Frequency					Dequined Limit				
Сп	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>
1	2412	11.72	11.68	11.64	11.60	11.57	11.51	11.48	11.47	4 Watts = 36 dBm
6	2437	12.38	12.31	12.29	12.18	12.16	12.09	12.02	11.98	4 Watts = 36 dBm
11	2462	12.61	12.49	12.41	12.34	12.33	12.30	12.22	12.13	4 Watts = 36 dBm

### 802.11n\_20M (2.4G) (Aux)

СН	Frequency		Data Rate										
Сп	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit			
1	2412	9.97	9.96	9.83	9.70	9.66	9.58	9.53	9.46	4 Watts = 36 dBm			
6	2437	10.07	10.05	9.98	9.86	9.80	9.78	9.64	9.52	4 Watts = 36 dBm			
11	2462	10.31	10.26	10.19	10.07	10.06	9.97	9.96	9.90	4 Watts = 36 dBm			

### 802.11n 20M (2.4G) MIMO Chain 0

СН	Frequency		Data Rate										
Сп	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	Limit			
1	2412	9.62	9.49	9.48	9.47	9.42	9.42	9.39	9.31	4 Watts = 36 dBm			
6	2437	9.82	9.77	9.66	9.60	9.54	9.45	9.31	9.27	4 Watts = 36 dBm			
11	2462	10.12	9.98	9.88	9.82	9.69	9.59	9.58	9.55	4 Watts = 36 dBm			

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### 802.11n 20M (2.4G) MIMO Chain 1

СП	Frequency		Data Rate											
CH	(MHz)	MCS8	MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15											
1	2412	10.04	10.00	9.94	9.94	9.86	9.80	9.66	9.58	4 Watts = 36 dBm				
6	2437	10.21	10.08	9.95	9.92	9.90	9.77	9.72	9.67	4 Watts = 36 dBm				
11	2462	10.36	10.35	10.31	10.31	10.17	10.15	10.03	9.92	4 Watts = 36 dBm				

### 802.11n\_20M (2.4G) MIMO Chain 0+Chain 1

СН	Frequency		Data Rate										
Сп	(MHz)	MCS8	MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15										
1	2412	12.85	12.76	12.73	12.72	12.66	12.62	12.54	12.46	4 Watts = 36 dBm			
6	2437	13.03	12.94	12.82	12.77	12.73	12.62	12.53	12.48	4 Watts = 36 dBm			
11	2462	13.25	13.18	13.11	13.08	12.95	12.89	12.82	12.75	4 Watts = 36 dBm			

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802.11a (Main)

CII	Frequency			D 111.4						
СН	(MHz)	6	9	12	18	24	36	48	54	<b>Required Limit</b>
149	5745	11.27	11.23	11.11	11.05	10.96	10.88	10.87	10.87	4 Watts = 36 dBm
157	5785	11.22	11.11	11.05	10.98	10.87	10.87	10.86	10.83	4 Watts = 36 dBm
165	5825	11.25	11.12	11.01	11.00	10.89	10.80	10.70	10.64	4 Watts = 36 dBm

### 802.11n (5GHz)\_20M (Main)

CII	Frequency			D						
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	<b>Required Limit</b>
149	5745	7.78	7.69	7.65	7.54	7.51	7.37	7.34	7.20	4 Watts = 36 dBm
157	5785	7.69	7.67	7.66	7.57	7.54	7.44	7.39	7.28	4 Watts = 36 dBm
165	5825	7.65	7.57	7.57	7.53	7.51	7.44	7.36	7.28	4 Watts = 36 dBm

### 802.11n (5GHz)\_20M MIMO Chain 0

	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
149	5745	9.94	9.93	9.83	9.69	9.57	9.51	9.37	9.35	4 Watts = 36 dBm			
157	5785	10.02	9.98	9.85	9.85	9.84	9.80	9.66	9.53	4 Watts = 36 dBm			
165	5825	9.99	9.98	9.87	9.78	9.65	9.58	9.50	9.40	4 Watts = 36 dBm			

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### 802.11n (5GHz)\_20M MIMO Chain 1

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
149	5745	9.76	9.62	9.52	9.47	9.35	9.21	9.08	8.95	4 Watts = 36 dBm			
157	5785	9.62	9.48	9.40	9.38	9.33	9.26	9.15	9.05	4 Watts = 36 dBm			
165	5825	9.35	9.28	9.14	9.02	9.02	8.96	8.85	8.85	4 Watts = 36 dBm			

### 802.11n (5GHz)\_20M MIMO Chain 0+Chain 1

OII	Frequency			D . 11						
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>
149	5745	12.86	12.79	12.69	12.59	12.47	12.37	12.24	12.16	4 Watts = 36 dBm
157	5785	12.83	12.75	12.64	12.63	12.60	12.55	12.42	12.31	4 Watts = 36 dBm
165	5825	12.69	12.65	12.53	12.43	12.36	12.29	12.20	12.14	4 Watts = 36 dBm

#### 802.11n (5GHz)\_40M (Main)

CII	Frequency		Data Rate									
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>		
151	5755	7.46	7.34	7.32	7.32	7.28	7.18	7.13	7.09	4 Watts = 36 dBm		
159	5795	7.33	7.22	7.15	7.04	7.00	6.92	6.91	6.87	4 Watts = 36 dBm		

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### 802.11n (5GHz)\_40M MIMO Chain 0

CII	Frequency		Data Rate										
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>			
151	5755	9.09	9.05	8.96	8.91	8.90	8.83	8.78	8.67	4 Watts = 36 dBm			
159	5795	8.98	8.94	8.86	8.77	8.65	8.63	8.58	8.52	4 Watts = 36 dBm			

### 802.11n (5GHz)\_40M MIMO Chain 1

			EIRP (dBm)							
CII	Frequency	Data Rate					<b>D 1 1 1 1 1</b>			
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>
151	5755	8.80	8.73	8.72	8.59	8.47	8.36	8.26	8.14	4 Watts = 36 dBm
159	5795	8.48	8.47	8.43	8.29	8.18	8.04	7.99	7.87	4 Watts = 36 dBm

### 802.11n (5GHz)\_40M MIMO Chain 0+Chain 1

			EIRP (dBm)							
Frequency   Data Rate				-	-	<b>D</b>				
СН	(MHz)	MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15	<b>Required Limit</b>
151	5755	11.96	11.90	11.85	11.76	11.70	11.61	11.54	11.42	4 Watts = 36 dBm
159	5795	11.75	11.72	11.66	11.55	11.43	11.36	11.31	11.22	4 Watts = 36 dBm

\* Note: EIRP = Average Power + Gain, where the nominal gain of the antenna (0.34dBi for 2.4GHz Main, 0.35dBi for 2.4GHz Aux, and -0.35dBi for 5GHz Main, 1.13dBi for 5GHz Aux, 0.69dBi for 2.4GHz (MIMO) and 2.04dBi for 5GHz (MIMO)), where MIMO gain = directive gain + nominal gain.

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### 8 6dB BANDWIDTH

### 8.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

According to RSS 210 issue 8: 2010Annex 8.2. Systems employing digital modulation techniques (which includes direct sequence) can now be certified under RSS-210 provided they comply with the following requirements: The minimum 6 dB bandwidth shall be at least 500 kHz.

### 8.2 Measurement Equipment Used:

Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Power Meter	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014		
Power Sensor	Anritsu	MA2411B	917032	02/08/2012	02/07/2014		
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014		
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/15/2013	03/14/2014		
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2013	02/27/2014		
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2013	01/04/2014		
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2013	02/27/2014		
Splitter	Agilent	11636B	N/A	02/28/2013	02/27/2014		

#### 8.3 Test Set-up:

EUT		Attenuator	SPA
	L		

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### 8.4 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 spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto, the setting on spectrum is adjusted based on the procedure as guide in 8.1 option 1 of KDB558074.
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency of interest measured was complete.

### 8.5 Measurement Result:

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
2412	8112	> 500	PASS
2437	8140	> 500	PASS
2462	8103	> 500	PASS

802.11b

#### 802.11g

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
2412	15372	> 500	PASS
2437	16164	> 500	PASS
2462	14879	> 500	PASS

#### 802.11n\_20M MIMO-Main

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
2412	15179	> 500	PASS
2437	15619	> 500	PASS
2462	15163	> 500	PASS

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### 802.11n\_20M MIMO-Aux

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
2412	16304	> 500	PASS
2437	15889	> 500	PASS
2462	15157	> 500	PASS

#### 802.11a

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
5745	15063	> 500	PASS
5785	15379	> 500	PASS
5825	16395	> 500	PASS

### 802.11n (5GHz)\_20M MIMO-Main

Frequency	Frequency Bandwidth		Result
(MHz)	(kHz)	(kHz)	
5745	15192	> 500	PASS
5785	15175	> 500	PASS
5825	15123	> 500	PASS

### 802.11n (5GHz) 20M MIMO-Aux

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
5745	15973	> 500	PASS
5785	16571	> 500	PASS
5825	15529	> 500	PASS

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#### 802.11n (5GHz)\_40M MIMO-Main

Frequency	Bandwidth Limit		Result
(MHz)	(kHz)	(kHz)	
5755	35503	> 500	PASS
5795	35883	> 500	PASS

#### 802.11n (5GHz)\_40M MIMO-Aux

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
5755	36391	> 500	PASS
5795	36342	> 500	PASS

\* Note: Offset 11.2dB for 2.4G 802.11b/g; Offset 14.2dB for 2.4G 802.11n\_20 Offset 11.8dB for 5G 802.11a; Offset 14.9dB for 5G 802.11n\_20/n\_40 \* Note: The diamond reveals X decibel level

\*Refer to next page for plots

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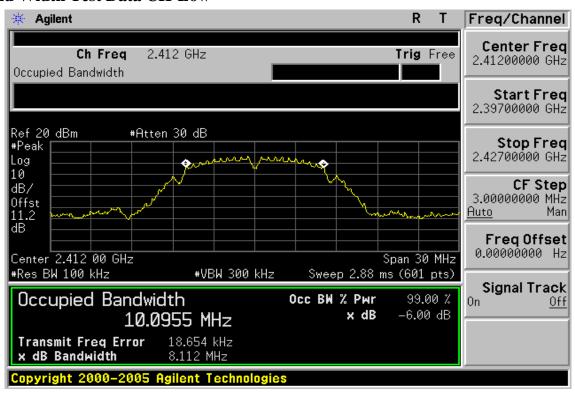
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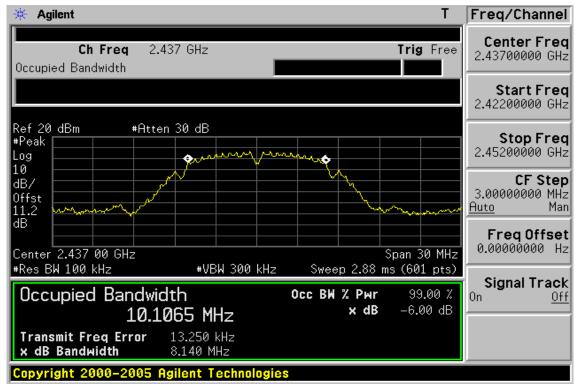
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### 802.11b 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



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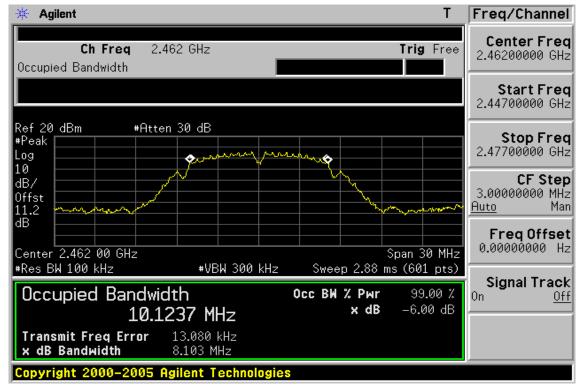
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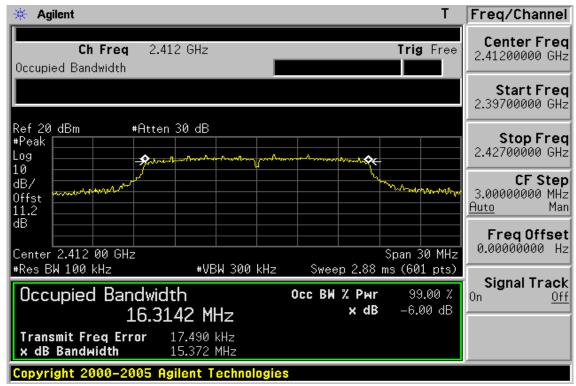


### 6dB Band Width Test Data CH-High



### 802.11g

### 6dB Band Width Test Data CH-Low



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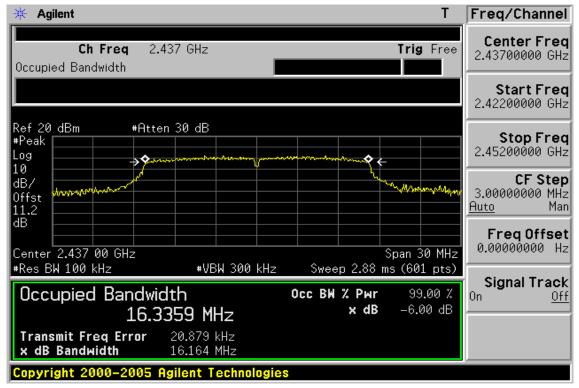
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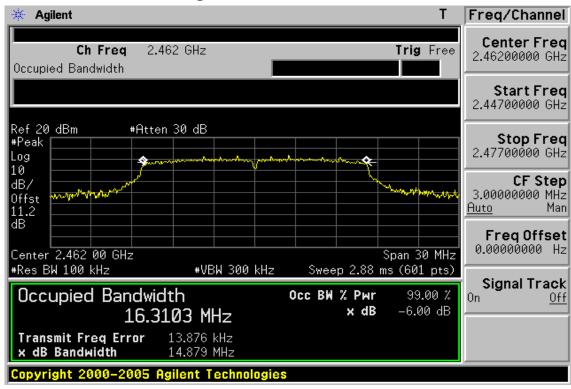
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### 6dB Band Width Test Data CH-Mid



### 6dB Band Width Test Data CH-High



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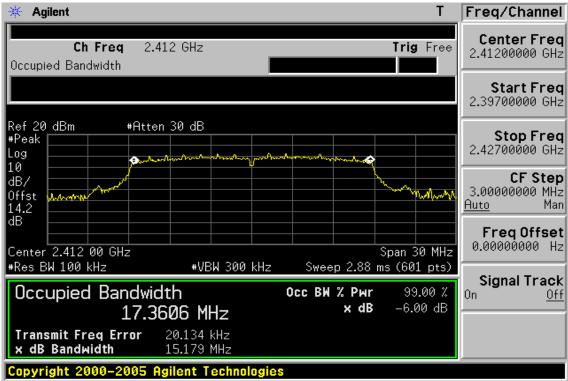
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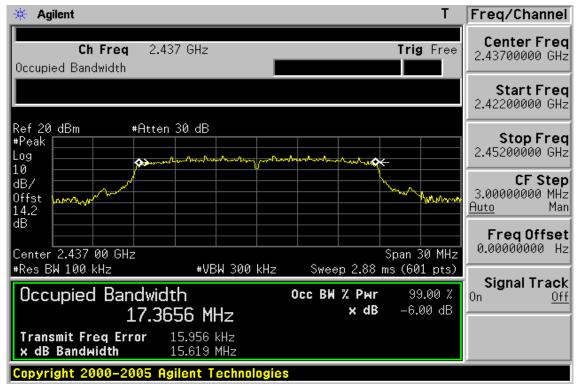


# 802.11n\_20M MIMO-Main

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



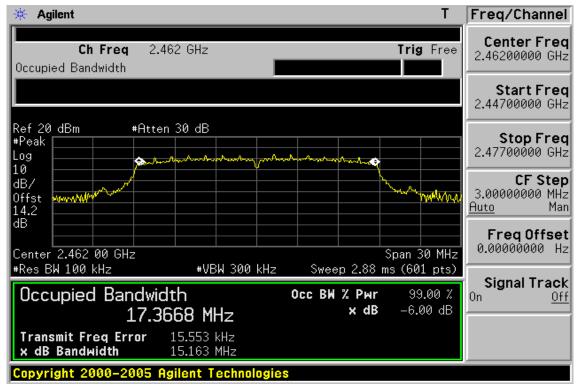
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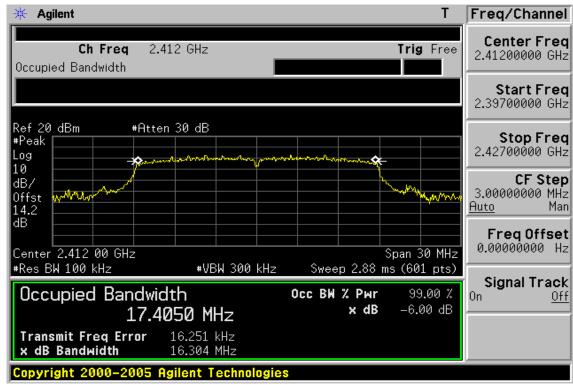


### 6dB Band Width Test Data CH-High



### 802.11n 20M MIMO-Aux

### 6dB Band Width Test Data CH-Low



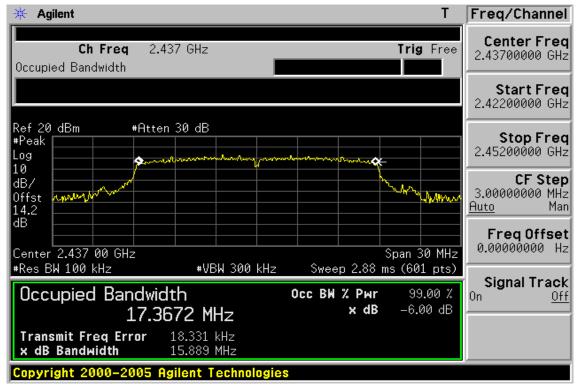
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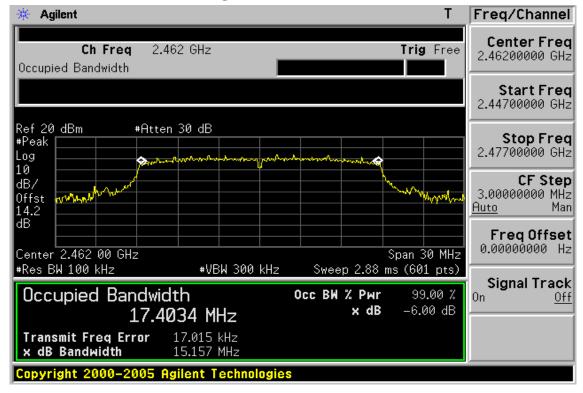
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### 6dB Band Width Test Data CH-Mid



### 6dB Band Width Test Data CH-High



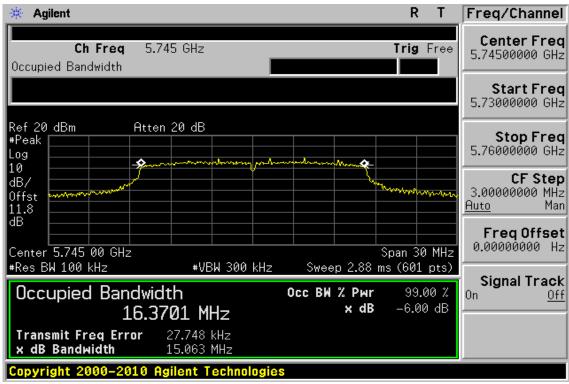
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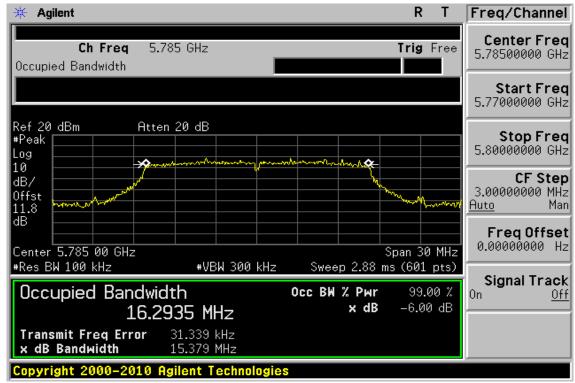
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## 802.11a 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



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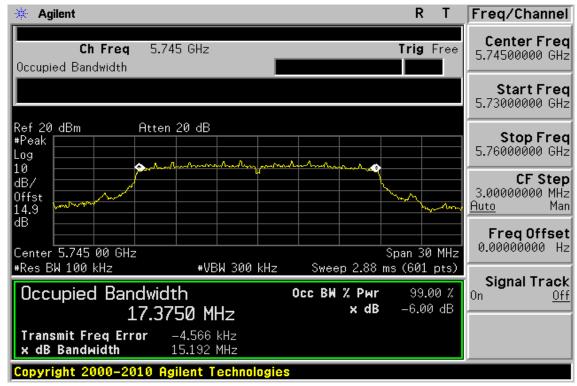


### 6dB Band Width Test Data CH-High



### 802.11n (5GHz) 20M MIMO-Main

### 6dB Band Width Test Data CH-Low



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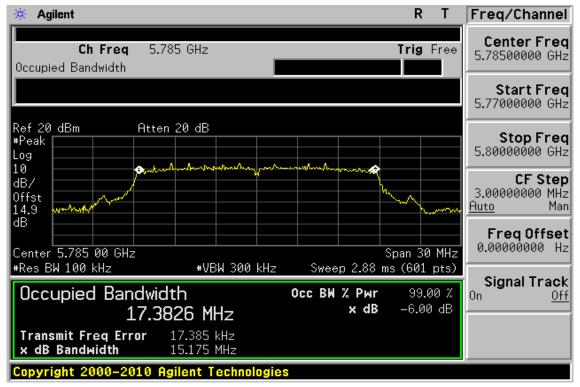
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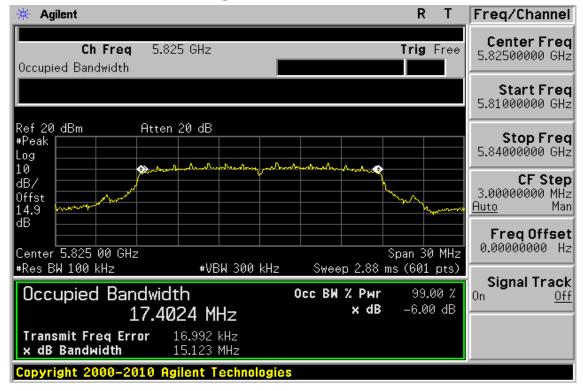
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### 6dB Band Width Test Data CH-Mid



### 6dB Band Width Test Data CH-High



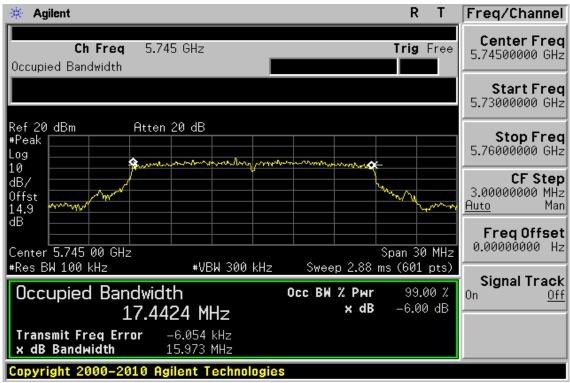
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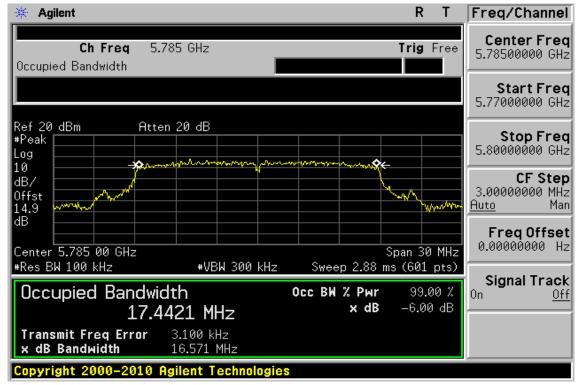
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## 802.11n (5GHz) 20M MIMO-Aux 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



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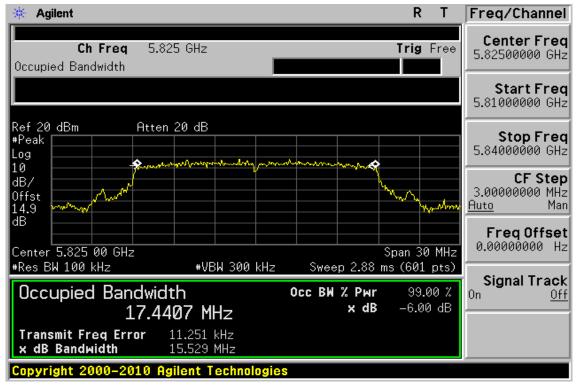
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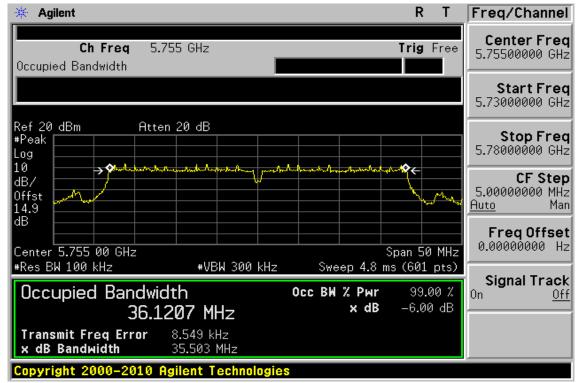


### 6dB Band Width Test Data CH-High



### 802.11n (5GHz)\_40M MIMO-Main

### 6dB Band Width Test Data CH-Low



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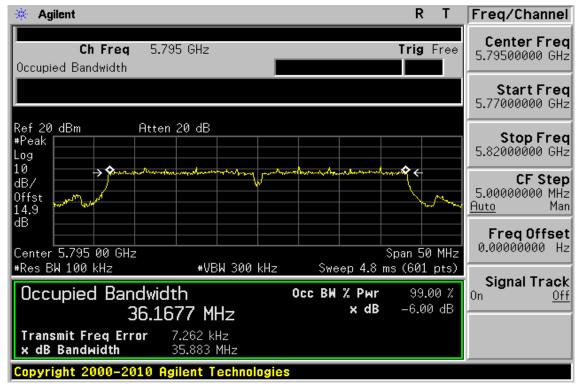
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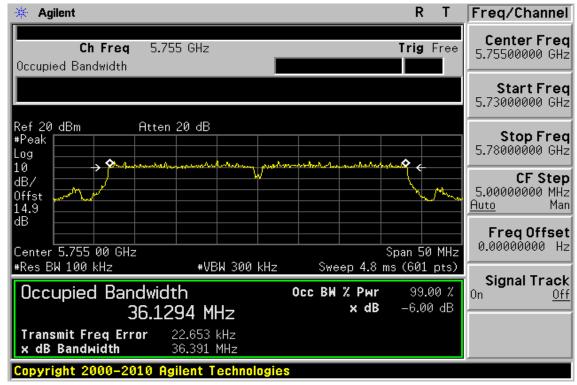


### 6dB Band Width Test Data CH-High



### 802.11n (5GHz)\_40M MIMO-Aux

### 6dB Band Width Test Data CH-Low



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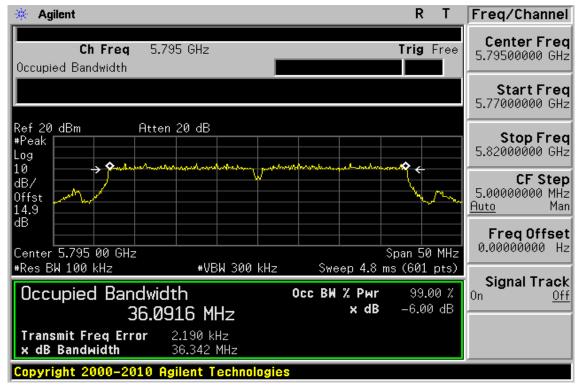
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### 6dB Band Width Test Data CH-High



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### 9 BAND EDGES MEASUREMENT

### 9.1 Standard Applicable:

According to \$15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in \$15.205(a), must also comply with the radiated emission limits specified in15.209(a).

According to RSS-Gen §7.2.5 and RSS-210 issue 8,§A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 5 and 6 is not required. In addition, radiated emissions which fall in the restricted bands of Table 3 must also comply with the radiated emission limits specified in Tables 5 and 6.

#### 9.2 Measurement Equipment Used:

#### 9.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

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### 9.2.2 Radiated emission:

966 Chamber							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100759	02/08/2013	02/07/2014		
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014		
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/06/2013	02/07/2014		
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013		
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014		
Horn antenna	ETS.LINDGREN	3117	123995	05/31/2013	05/30/2014		
Horn Antenna	Schwarzbeck	BBHA9170	184	01/17/2012	01/16/2014		
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2013	01/03/2014		
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2013	01/03/2014		
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2013	02/28/2014		
5725-5875 Band Reject Filter	Micro-Tronics	BRM50705	1	01/04/2013	01/03/2014		
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2013	02/27/2014		
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2013	02/27/2014		
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	01/04/2013	01/03/2014		
3m Site NSA	SGS	966 chamber	N/A	07/15/2013	07/14/2014		

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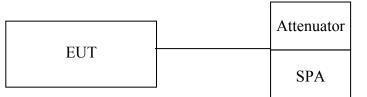
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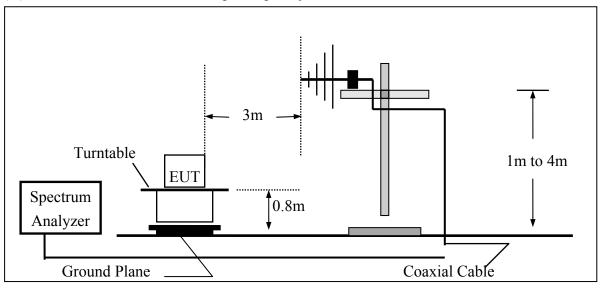
### 9.3 Test SET-UP:

### 9.3.1 Conducted Emission at antenna port:

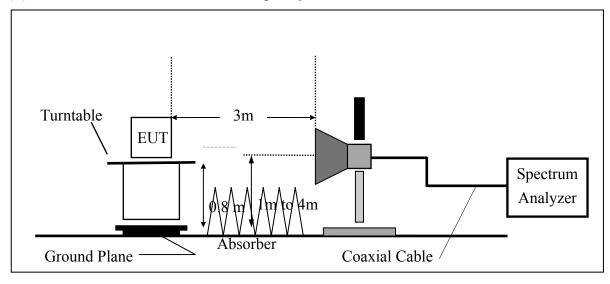


### 9.3.2 Radiated emission:

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



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



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### 9.4 Measurement Procedure:

Unwanted Emissions into Non-Restricted Frequency Bands, Measurement Procedure followed by 11.1 of KDB558074 D01

- 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 spectrum analyzer.
- 3. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 4. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
- 5. Mark the highest reading of the emission as the reference level measurement.
- 6. Set DL as the limit = reading on marker 1 20dBm
- 7. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 KHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- 8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Unwanted Emission falling into Restricted Frequency Bands, Measurement Procedure followed by 12.1 of KDB558074 D01

- 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. When 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.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 7.On spectrum, following 8.1.2, and RBW = 1MHz, VBW = 3MHz, & Marker 2390MHz, and 2483.5MHz (Peak Measurement). Average Measurement: following 8.2 with the modification span to 1MHz, &RBW = 1MHz, VBW = 3MHz and peak marker function to obtain the highest reading on 2390, and 2483.5MHz.
- 8. Repeat above procedures until all default test channel (low, middle, and high) was complete

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Note: For MIMO operation, directional gain is not subjected to offset back as prescribe in KDB 662911 D01 for relative out-of-band measurement, including conducted bandedge falling into non-restricted frequency band.

#### **Field Strength Calculation:** 9.5

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:

$$\mathbf{FS} = \mathbf{RA} + \mathbf{AF} + \mathbf{CL} - \mathbf{AG}$$

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

#### **Measurement Result:** 9.6

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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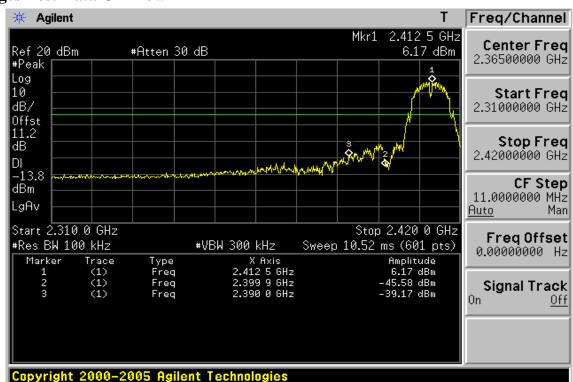
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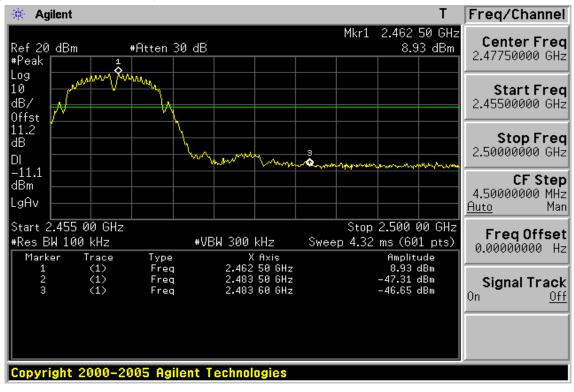
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### **Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 b mode

Operation Band	:802.11 b	Test Date	:2013-09-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.4 deg C / 57 RH
Operation Mode	:Bandedge LOW	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	41.78	2.51	44.29	54.00	-9.71
2390.00	E	Peak	53.39	2.51	55.90	74.00	-18.10

Operation Band	:802.11 b	Test Date	:2013-09-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge LOW	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	45.15	3.13	48.28	54.00	-5.72
2390.00	Е	Peak	56.61	3.13	59.74	74.00	-14.26

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Test Date	:2013-09-12
Temp./Humi.	:25.4 deg_C / 57 RH
Engineer	:Louis
Measurement Antenna Pol.	:VERTICAL
[	Temp./Humi. Engineer

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	43.11	2.87	45.98	54.00	-8.02
2483.50	Е	Peak	53.78	2.87	56.65	74.00	-17.35

Operation Band	:802.11 b	Test Date	:2013-09-12
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.4 deg C / 57 RH
Operation Mode	:Bandedge HIGH	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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.

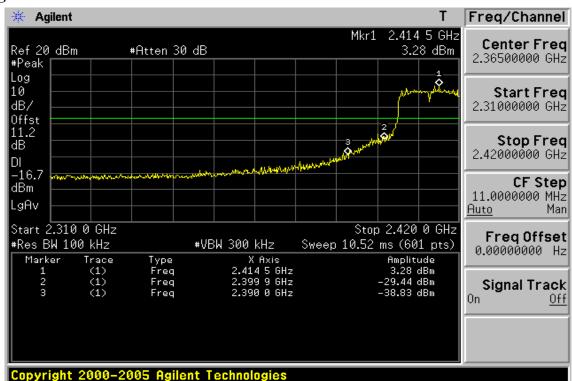
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	44.84	3.90	48.74	54.00	-5.26
2483.50	E	Peak	56.29	3.90	60.19	74.00	-13.81

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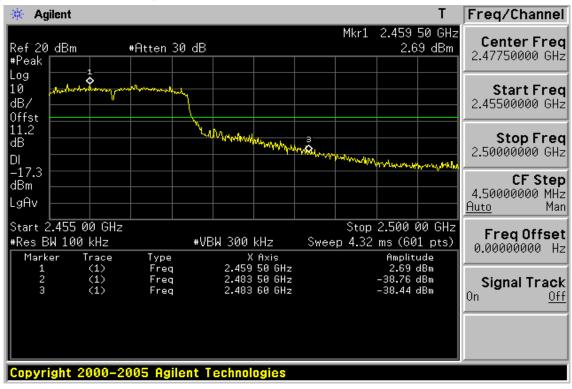








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#### **Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 g mode

•	1 5	, e	
Operation Band	:802.11 g	Test Date	:2013-09-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge LOW	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	42.33	2.51	44.84	54.00	-9.16
2390.00	E	Peak	68.08	2.51	70.59	74.00	-3.41

Operation Band	:802.11 g	Test Date	:2013-09-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge LOW	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	43.38	3.13	46.51	54.00	-7.49
2390.00	Е	Peak	69.98	3.13	73.11	74.00	-0.89

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Operation Band	:802.11 g	Test Date	:2013-09-12
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge HIGH	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	42.72	2.87	45.59	54.00	-8.41
2483.50	Е	Peak	69.13	2.87	72.00	74.00	-2.00

Operation Band	:802.11 g	Test Date	:2013-09-12
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.4 deg C / 57 RH
Operation Mode	:Bandedge HIGH	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	43.90	3.90	47.80	54.00	-6.20
2483.50	E	Peak	69.88	3.90	73.78	74.00	-0.22

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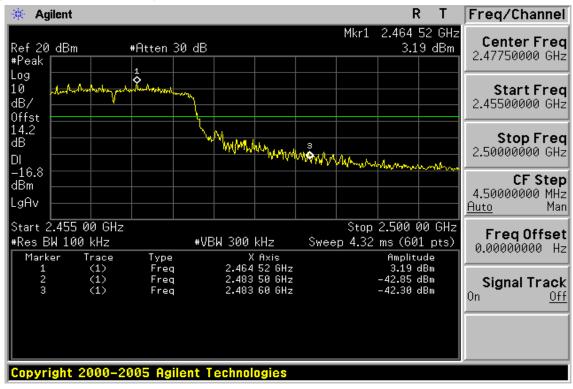
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# 802.11n\_20M- Unwanted Emissions into Non-Restricted Frequency Bands Band Edges Test Data CH-Low





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#### **Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n 20M mode :802.11 n20M Test Date **Operation Band** :2013-09-12 Fundamental Frequency :2412 MHz Temp./Humi. :25.4 deg C / 57 RH **Operation Mode** :Bandedge LOW Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :VERTICAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	41.21	2.51	43.72	54.00	-10.28
2390.00	E	Peak	66.80	2.51	69.31	74.00	-4.69

Operation Band	:802.11 n20M	Test Date	:2013-09-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge LOW	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	40.26	3.13	43.39	54.00	-10.61
2390.00	E	Peak	64.81	3.13	67.94	74.00	-6.06

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Operation Band	:802.11 n20M	Test Date	:2013-09-12
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.4 deg_C / 57 RH
Operation Mode	:Bandedge HIGH	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	38.55	2.87	41.42	54.00	-12.58
2483.50	Е	Peak	65.25	2.87	68.12	74.00	-5.88

Operation Band	:802.11 n20M	Test Date	:2013-09-12
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.4 deg C / 57 RH
Operation Mode	:Bandedge HIGH	Engineer	:Louis
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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.

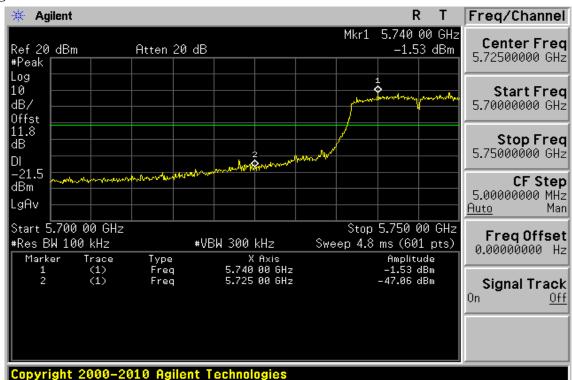
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	41.48	3.90	45.38	54.00	-8.62
2483.50	E	Peak	64.65	3.90	68.55	74.00	-5.45

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# **802.11a - Unwanted Emissions into Non-Restricted Frequency Bands** Band Edges Test Data CH-Low





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🔆 Agilent R Т Freq/Channel Mkr1 5.740 00 GHz Center Freq Ref 20 dBm Atten 20 dB -0.96 dBm 5.72500000 GHz #Peak Log 10 Start Freq and rates and . dB/ 5.70000000 GHz Offst 14.9 Stop Freq dB 5.75000000 GHz and the state of t DI A male WWWWWWW 21.0 CF Step dBm 5.00000000 MHz LgAv Man Auto Start 5.700 00 GHz Stop 5.750 00 GHz Freq Offset 0.00000000 Hz #Res BW 100 kHz #VBW 300 kHz Sweep 4.8 ms (601 pts) X Axis 5.740 00 GHz Marker Amplitude Trace Туре (1)Freq -0.96 dBm 2 (1)Freq 5.725 00 GHz -42.28 dBm Signal Track 0n <u>Off</u> Copyright 2000-2010 Agilent Technologies





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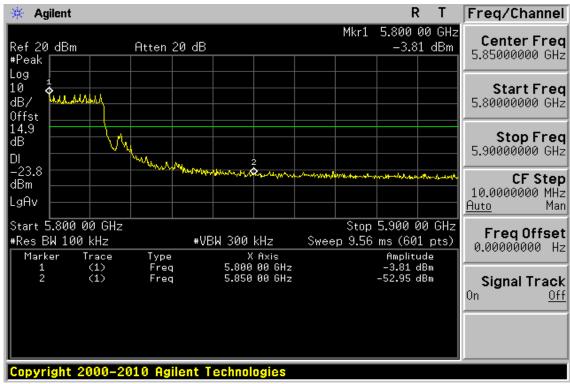
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🔆 Agilent R Т Freq/Channel Mkr1 5.750 00 GHz Center Freq Ref 20 dBm Atten 20 dB -4.13 dBm 5.72500000 GHz #Peak Log 10 Start Freq A 8. dB/ 5.70000000 GHz Offst 14.9 Stop Freq dB 5.75000000 GHz when when when and DI ማስለ Will alw 24.1 CF Step dBm 5.00000000 MHz LgAv Man Auto Start 5.700 00 GHz Stop 5.750 00 GHz Freq Offset 0.00000000 Hz #Res BW 100 kHz #VBW 300 kHz Sweep 4.8 ms (601 pts) X Axis 5.750 00 GHz Marker Amplitude Trace Туре (1)Freq -4.13 dBm 2 (1)Freq 5.725 00 GHz -43.82 dBm Signal Track 0n <u>Off</u> Copyright 2000-2010 Agilent Technologies





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# **10 SPURIOUS EMISSION TEST 10.1 Standard Applicable**

According to §15.247(d),

Emission at antenna port:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

# **Radiated Spurious Emission**

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-Gen §7.2.5 and RSS-210 issue 8.§A8.5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 5 and 6 is not required. In addition, radiated emissions which fall in the restricted bands of Table 3 must also comply with the radiated emission limits specified in Tables 5 and 6 of RSS-GEN.

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#### 10.2 Measurement Equipment Used:

#### 10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

#### 10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

#### 10.3 Test SET-UP:

#### **10.3.1 Conducted Emission at antenna port:**

Refer to section 7.3 for details.

#### 10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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# **10.4 Measurement Procedure:**

# **Radiated Emission:**

- 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. When 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.
- 5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 7. Repeat above procedures until all default test channel measured were complete.

# **Conducted Emission:**

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. Set RBW = 100K & VBW = 300K on Spectrum.
- Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz, 18G to 40GHz (applicable if operation mode is 5GHz)
- 4. Via Software, combine 5 spans of frequency range into one plot
- 5. Repeat above procedures until all default test channel measured were complete.

*Note: For MIMO operation, directional gain is not subjected to offset back as prescribe in KDB 662911 D01 for relative out-of-band measurement, including conducted bandedge falling into non-restricted frequency band.* 

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# 10.5 Field Strength Calculation

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

# FS = RA + AF + CL - AG

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

#### **10.6 Measurement Result:**

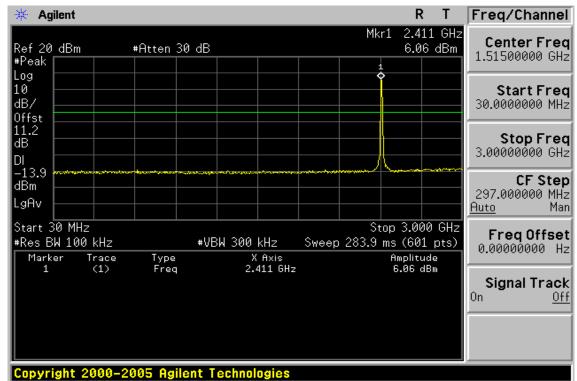
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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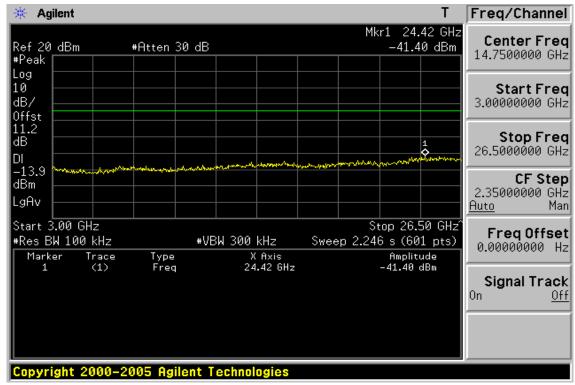
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# Conducted Spurious Emission Measurement Result (802.11b) Ch Low 30MHz – 3GHz





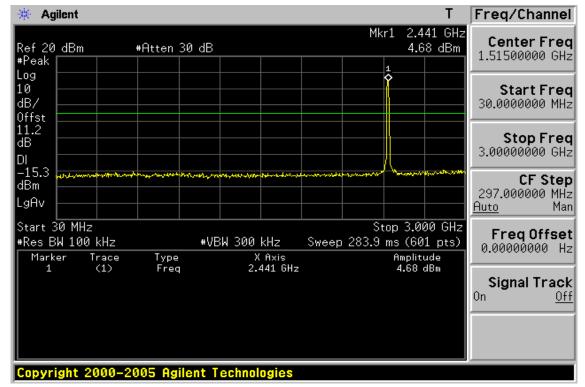


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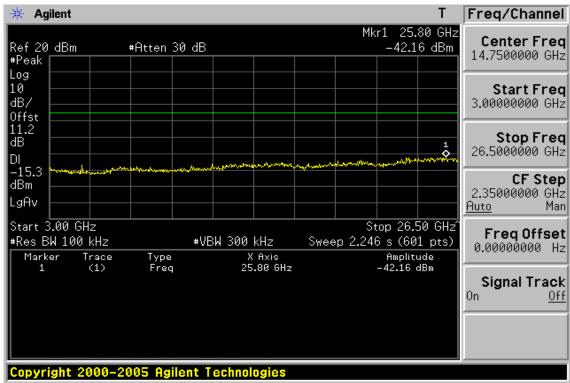
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#### Ch Mid 30MHz – 3GHz



# Ch Mid 3GHz - 26.5GHz

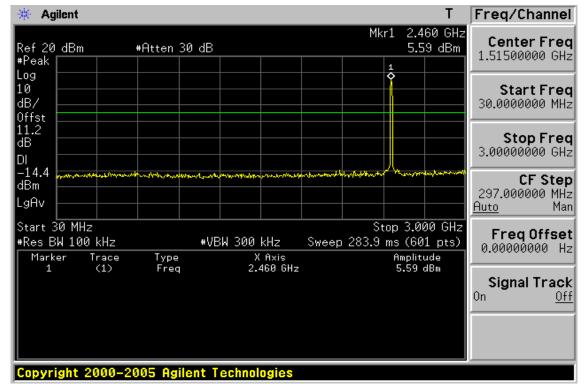


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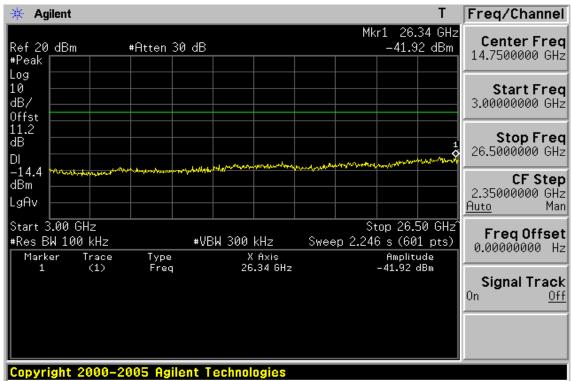
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz



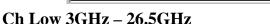
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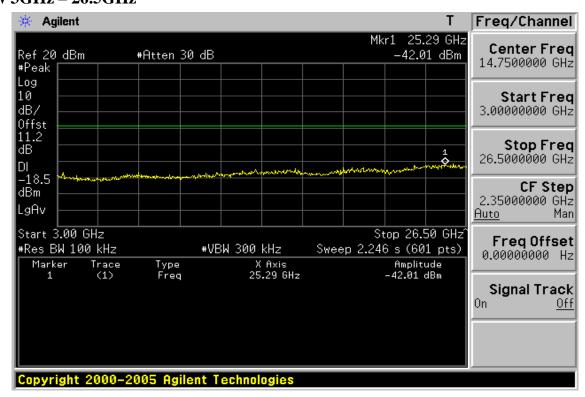


#### <u>ж</u>. Agilent Т Freq/Channel Mkr1 2.406 GHz **Center Freq** 1.49 dBm Ref 20 dBm #Atten 30 dB 1.51500000 GHz #Peak Log 10 Start Freq dB/ 30.0000000 MHz Offst 11.2Stop Freq dB 3.00000000 GHz DI -18.5 **CF** Step dBm 297.000000 MHz \_gAv Man Auto Center 1.515 GHz Span 2.97 GHz Freq Offset Sweep 283.9 ms (601 pts) #Res BW 100 kHz #VBW 300 kHz 0.00000000 Hz Marker X Axis Amplitude Trace Type 2.406 GHz (1)Frea 1.49 dBm Signal Track 0n <u>Off</u>

# Conducted Spurious Emission Measurement Result (802.11g) Ch Low 30MHz – 3GHz



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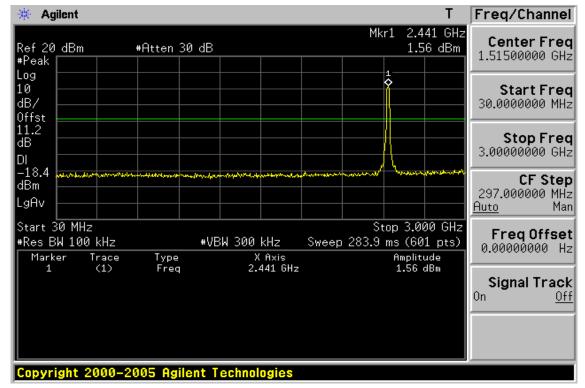


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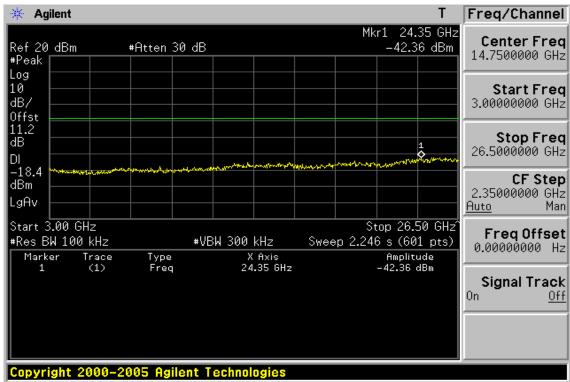
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#### Ch Mid 30MHz – 3GHz



# Ch Mid 3GHz - 26.5GHz

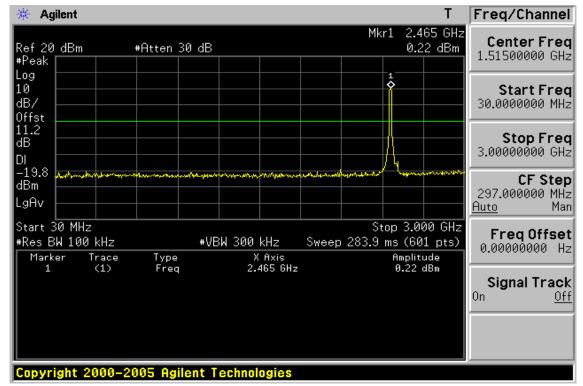


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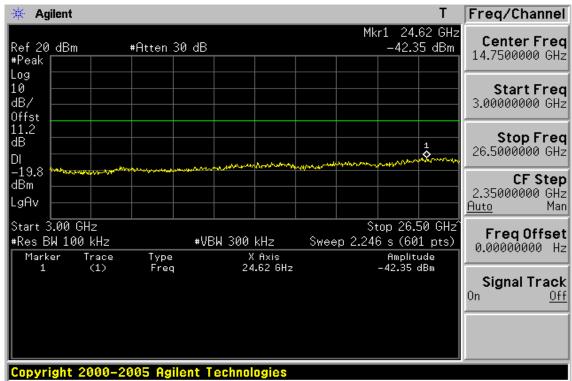
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz

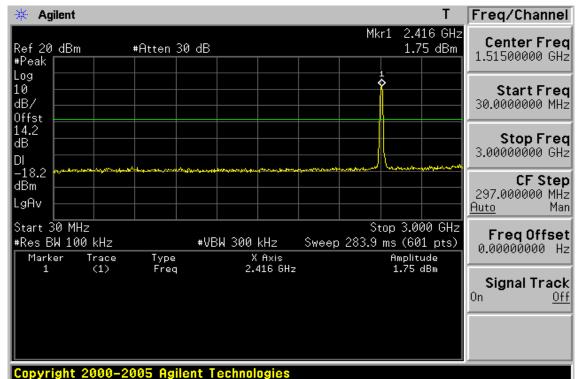


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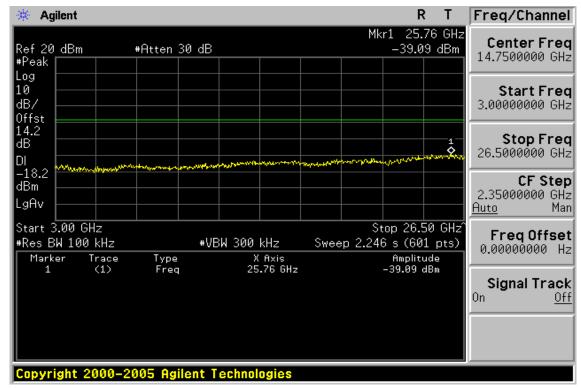
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# Conducted Spurious Emission Measurement Result (802.11n\_20M) Ch Low 30MHz – 3GHz



# Ch Low 3GHz - 26.5GHz

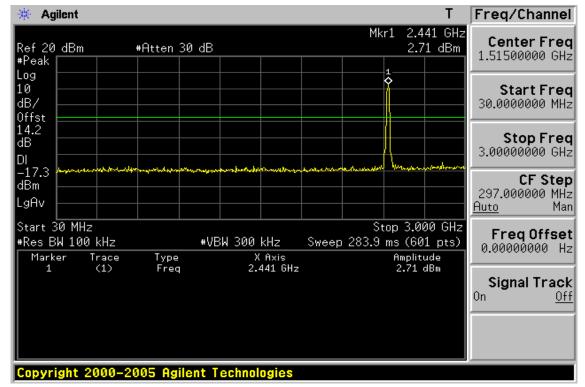


Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

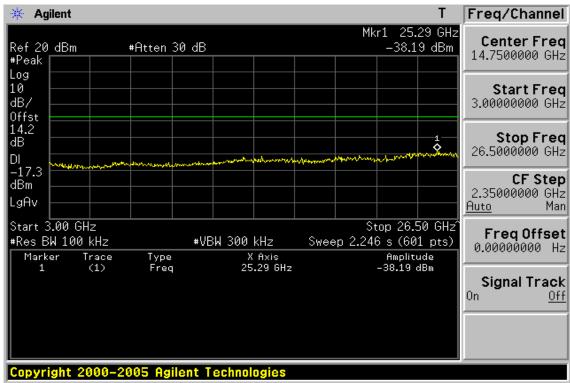
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#### Ch Mid 30MHz – 3GHz



# Ch Mid 3GHz - 26.5GHz

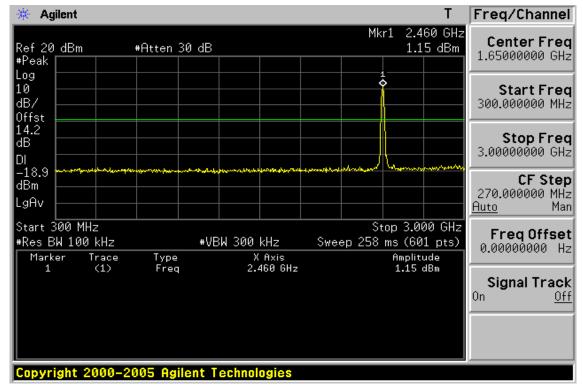


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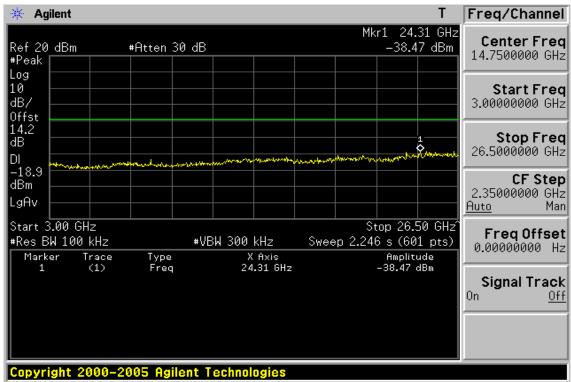
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz

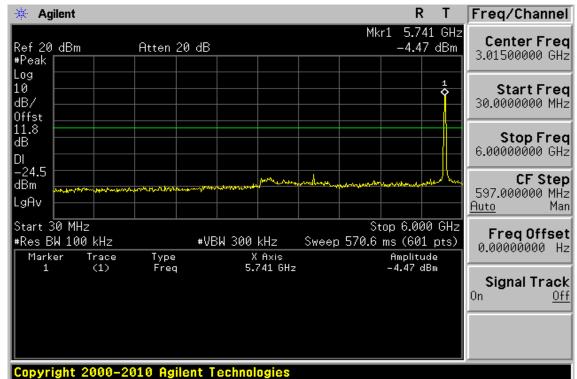


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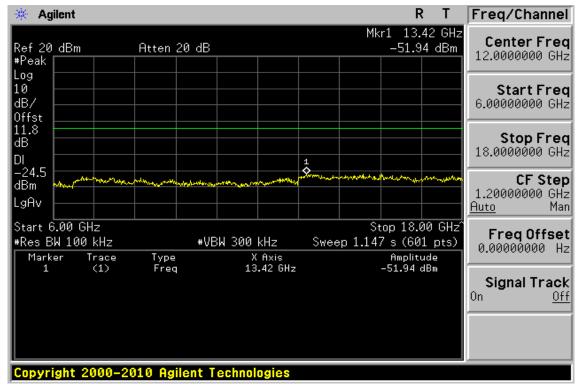
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# Conducted Spurious Emission Measurement Result (802.11a) Ch Low 30MHz – 6GHz



# Ch Low 6GHz - 18GHz

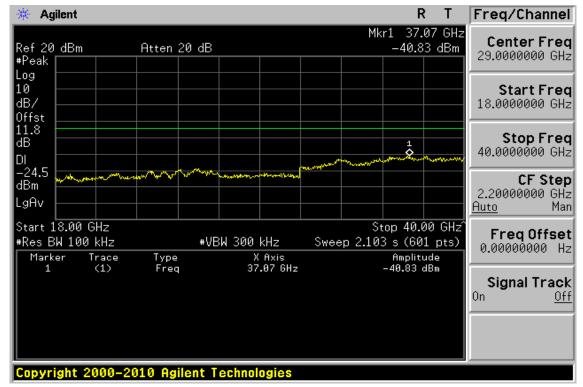


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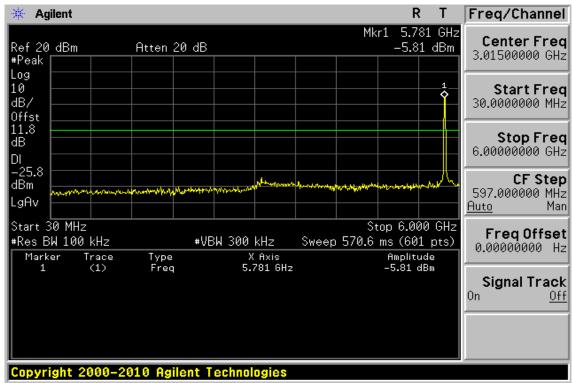
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# Ch Low 18GHz – 40GHz



#### Ch Mid 30MHz – 6GHz

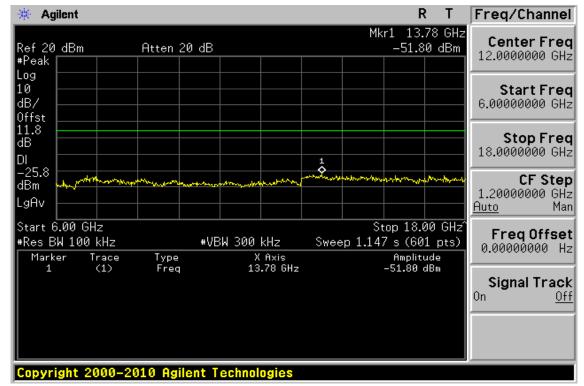


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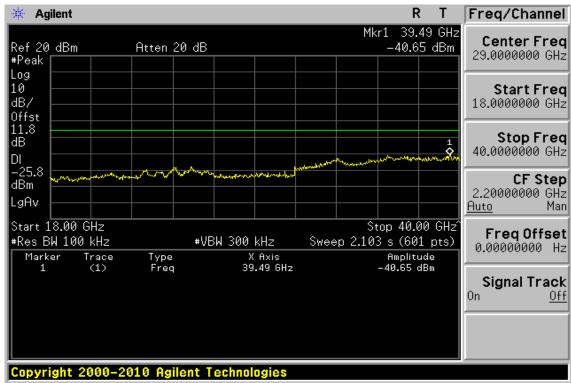
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# Ch Mid 6GHz – 18GHz



# Ch Mid 18GHz – 40GHz

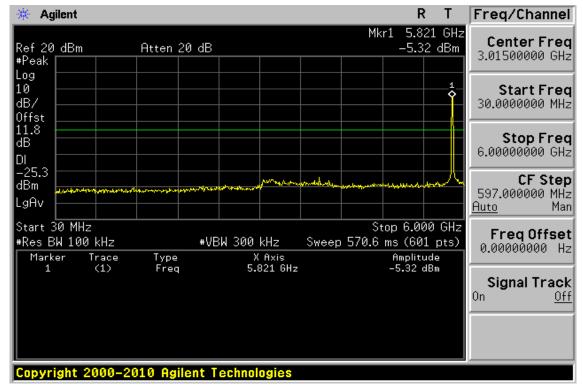


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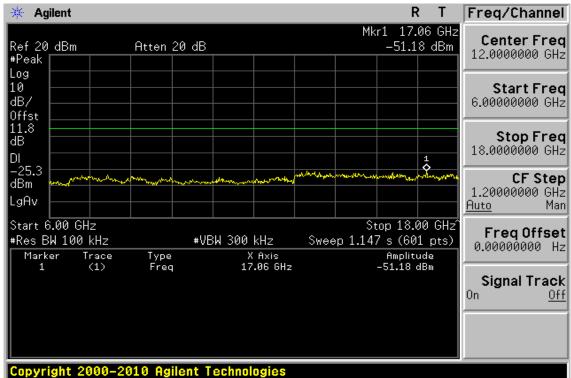
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# Ch High 30MHz - 6GHz



# Ch High 6GHz – 18GHz



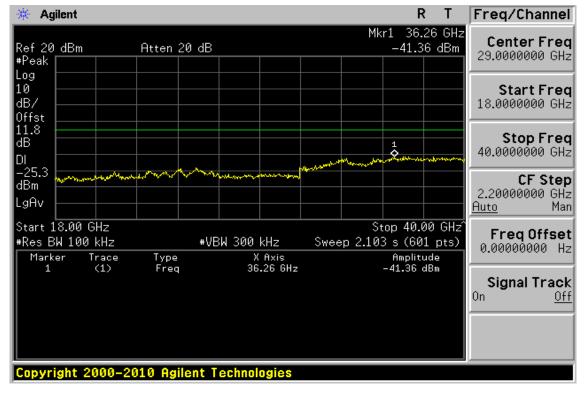
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#### Ch High 18GHz – 40GHz



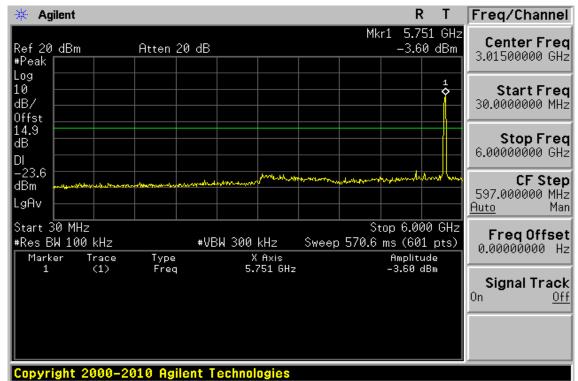
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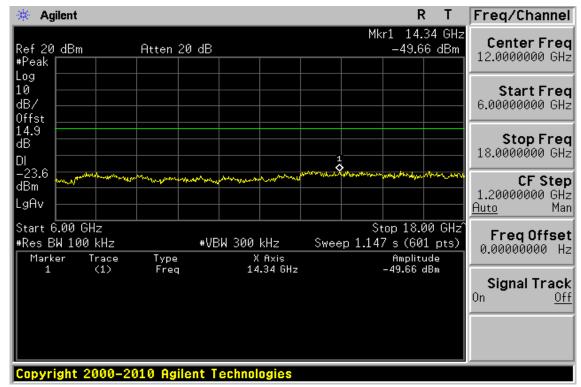
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# Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_20M) Ch Low 30MHz – 6GHz



# Ch Low 6GHz - 18GHz

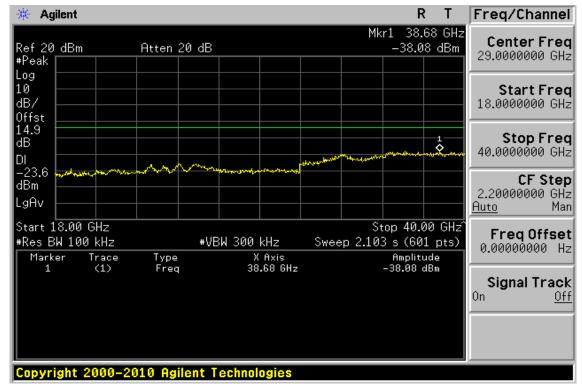


Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

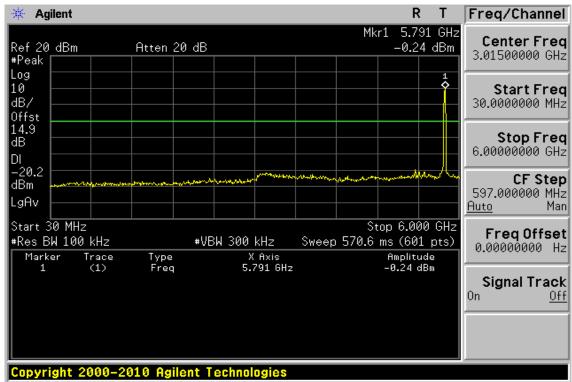
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# Ch Low 18GHz – 40GHz



# Ch Mid 30MHz – 6GHz

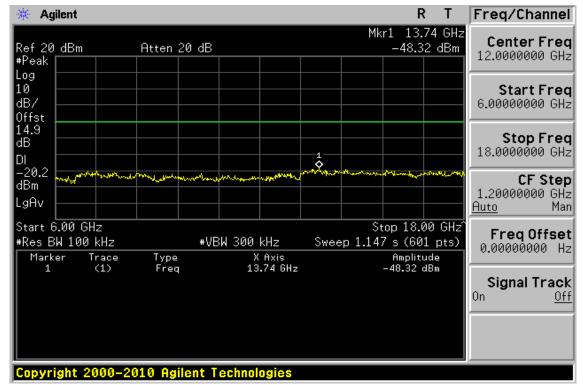


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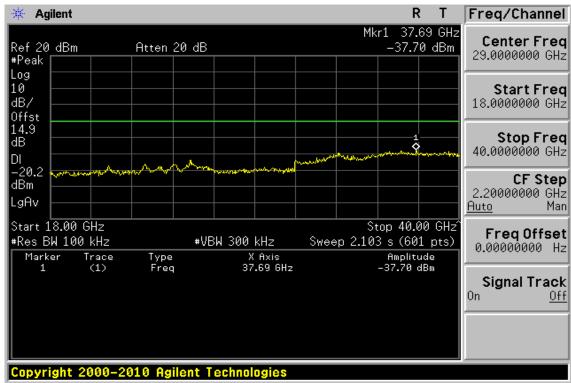
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#### Ch Mid 6GHz – 18GHz



# Ch Mid 18GHz – 40GHz

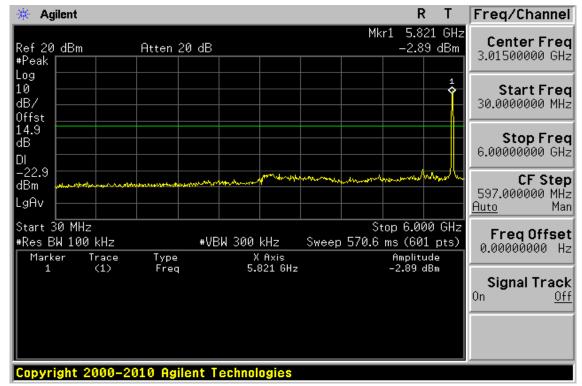


Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

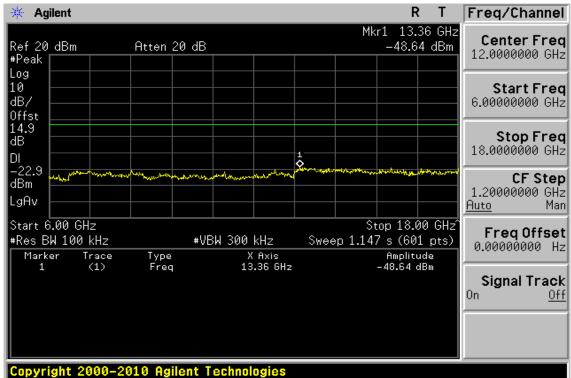
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# Ch High 30MHz - 6GHz



# Ch High 6GHz – 18GHz



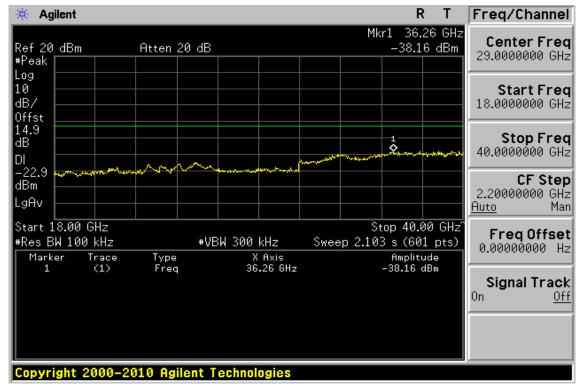
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# Ch High 18GHz – 40GHz



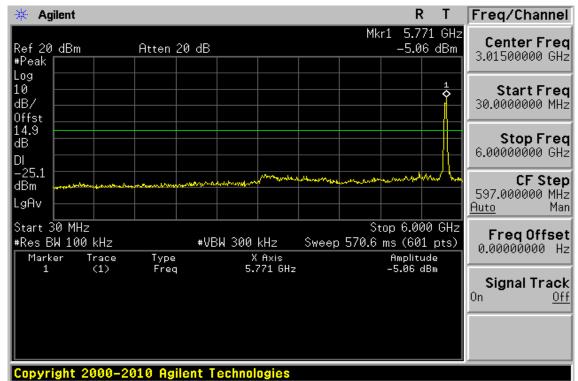
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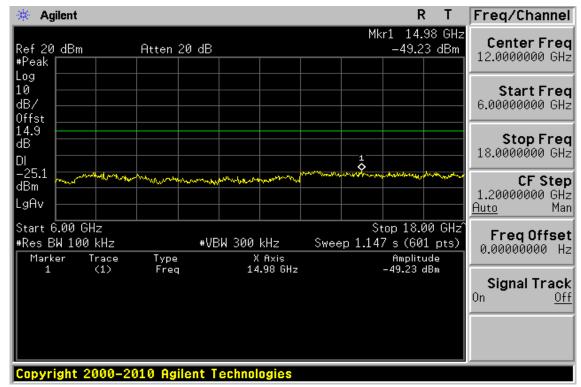
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# Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_40M) Ch Low 30MHz – 6GHz



# Ch Low 6GHz - 18GHz

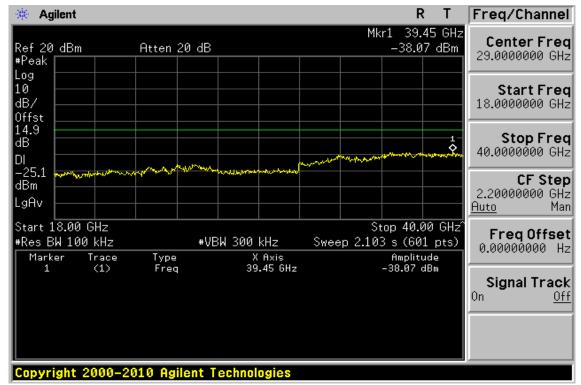


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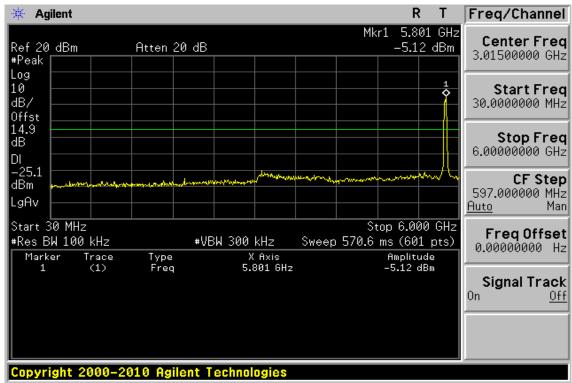
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# Ch Low 18GHz – 40GHz



# Ch High 30MHz – 6GHz

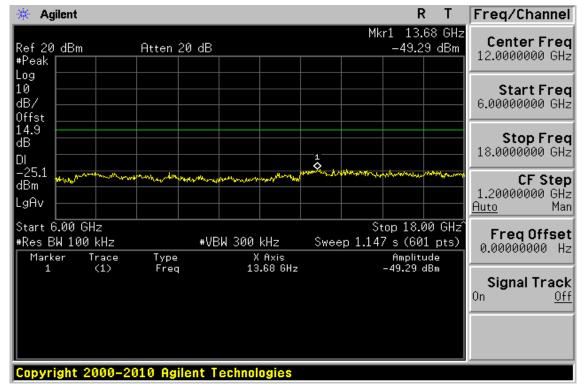


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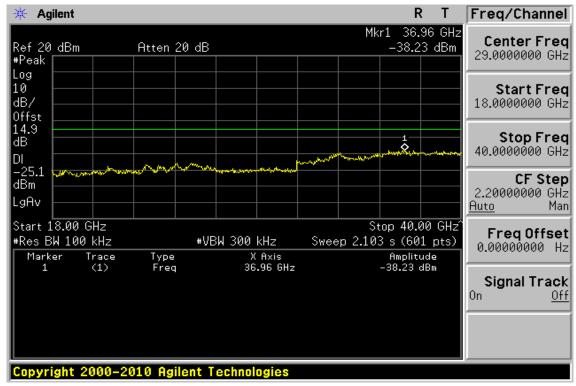
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# Ch High 6GHz – 18GHz



# Ch High 18GHz – 40GHz



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#### **Radiated Spurious Emission Measurement Result (802.11b)**

Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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
96.93	S	Peak	34.70	-16.82	17.88	43.50	-25.62
347.19	S	Peak	28.37	-11.49	16.88	46.00	-29.12
419.94	S	Peak	30.54	-10.24	20.30	46.00	-25.70
549.92	S	Peak	28.20	-7.84	20.36	46.00	-25.64
700.27	S	Peak	27.52	-4.83	22.69	46.00	-23.31
796.30	S	Peak	28.16	-3.77	24.39	46.00	-21.61
4824.00	Н	Average	43.53	7.27	50.80	54.00	-3.20
4824.00	Н	Peak	45.22	7.27	52.49	74.00	-21.51
7236.00	Н						
9648.00	Н						
12060.00	Н						
14472.00	Н						
16884.00	Н						
19296.00	Н						
21708.00	Н						

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Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
156.10	S	Peak	27.12	-11.97	15.15	43.50	-28.35
262.80	S	Peak	29.57	-13.44	16.13	46.00	-29.87
399.57	S	Peak	32.37	-10.76	21.61	46.00	-24.39
549.92	S	Peak	33.81	-7.84	25.97	46.00	-20.03
630.43	S	Peak	32.16	-5.96	26.20	46.00	-19.80
749.74	S	Peak	28.93	-4.19	24.74	46.00	-21.26
4824.00	Н	Average	39.31	7.28	46.59	54.00	-7.41
4824.00	Н	Peak	40.70	7.28	47.98	74.00	-26.02
7236.00	Н						
9648.00	Н						
12060.00	Н						
14472.00	Н						
16884.00	Н						
19296.00	Н						
21708.00	Н						
24120.00	Н						

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Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
			·		·	·	
99.84	S	Peak	34.54	-16.61	17.93	43.50	-25.57
315.18	S	Peak	29.21	-11.95	17.26	46.00	-28.74
419.94	S	Peak	30.37	-10.24	20.13	46.00	-25.87
600.36	S	Peak	28.74	-6.67	22.07	46.00	-23.93
700.27	S	Peak	28.12	-4.83	23.29	46.00	-22.71
729.37	S	Peak	28.02	-4.45	23.57	46.00	-22.43
4874.00	Н	Average	42.96	7.47	50.43	54.00	-3.57
4874.00	Н	Peak	44.31	7.47	51.78	74.00	-22.22
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						
• • • • • • • •							

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Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
315.18	S	Peak	30.17	-11.95	18.22	46.00	-27.78
399.57	S	Peak	32.60	-10.76	21.84	46.00	-24.16
549.92	S	Peak	34.03	-7.84	26.19	46.00	-19.81
600.36	S	Peak	31.15	-6.67	24.48	46.00	-21.52
630.43	S	Peak	32.04	-5.96	26.08	46.00	-19.92
749.74	S	Peak	29.53	-4.19	25.34	46.00	-20.66
4874.00	Н	Average	35.56	7.42	42.98	54.00	-11.02
4874.00	Н	Peak	39.87	7.42	47.29	74.00	-26.71
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						
24370.00	Н						

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Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
89.17	S	Peak	35.48	-17.36	18.12	43.50	-25.38
343.31	S	Peak	27.74	-11.53	16.21	46.00	-29.79
419.94	S	Peak	30.76	-10.24	20.52	46.00	-25.48
549.92	S	Peak	28.58	-7.84	20.74	46.00	-25.26
630.43	S	Peak	29.19	-5.96	23.23	46.00	-22.77
762.35	S	Peak	27.78	-4.06	23.72	46.00	-22.28
4924.00	Н	Average	40.54	7.61	48.15	54.00	-5.85
4924.00	Н	Peak	44.44	7.61	52.05	74.00	-21.95
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						
17234.00	Н						
19696.00	Н						
22158.00	Н						

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Operation Band	:802.11 b	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
158.04	S	Peak	27.19	-11.96	15.23	43.50	-28.27
262.80	S	Peak	33.15	-13.44	19.71	46.00	-26.29
399.57	S	Peak	31.72	-10.76	20.96	46.00	-25.04
549.92	S	Peak	33.64	-7.84	25.80	46.00	-20.20
630.43	S	Peak	32.04	-5.96	26.08	46.00	-19.92
749.74	S	Peak	29.82	-4.19	25.63	46.00	-20.37
4924.00	Н	Average	36.11	7.50	43.61	54.00	-10.39
4924.00	Н	Peak	38.45	7.50	45.95	74.00	-28.05
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						
17234.00	Н						
19696.00	Н						
22158.00	Н						
24620.00	Н						

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#### **Radiated Spurious Emission Measurement Result (802.11g)**

Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

14472.00

16884.00

19296.00

21708.00

24120.00

Η

Η

Η

Η

Η

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
96.93	S	Peak	35.56	-16.82	18.74	43.50	-24.76
343.31	S	Peak	28.37	-11.53	16.84	46.00	-29.16
600.36	S	Peak	31.65	-6.67	24.98	46.00	-21.02
630.43	S	Peak	30.75	-5.96	24.79	46.00	-21.21
700.27	S	Peak	29.60	-4.83	24.77	46.00	-21.23
771.08	S	Peak	27.93	-3.96	23.97	46.00	-22.03
2372.00	S	Average	34.64	2.46	37.10	54.00	-16.90
2372.00	S	Peak	51.94	2.46	54.40	74.00	-19.60
4824.00	Н	Average	31.12	7.27	38.39	54.00	-15.61
4824.00	Н	Peak	42.08	7.27	49.35	74.00	-24.65
7236.00	Н						
9648.00	Н						
12060.00	Н						

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Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 115 of 172

Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
160.95	S	Peak	27.40	-12.03	15.37	43.50	-28.13
315.18	S	Peak	31.81	-11.95	19.86	46.00	-26.14
367.56	S	Peak	33.37	-11.19	22.18	46.00	-23.82
399.57	S	Peak	34.30	-10.76	23.54	46.00	-22.46
549.92	S	Peak	30.32	-7.84	22.48	46.00	-23.52
630.43	S	Peak	31.47	-5.96	25.51	46.00	-20.49
2358.00	S	Average	36.12	2.89	39.01	54.00	-14.99
2358.00	S	Peak	52.57	2.89	55.46	74.00	-18.54
4824.00	Н	Average	29.63	7.28	36.91	54.00	-17.09
4824.00	Н	Peak	38.34	7.28	45.62	74.00	-28.38
7236.00	Н						
9648.00	Н						
12060.00	Н						
14472.00	Н						

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Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 116 of 172

Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
99.84	S	Peak	34.94	-16.61	18.33	43.50	-25.17
367.56	S	Peak	29.09	-11.19	17.90	46.00	-28.10
419.94	S	Peak	29.64	-10.24	19.40	46.00	-26.60
600.36	S	Peak	30.66	-6.67	23.99	46.00	-22.01
630.43	S	Peak	31.70	-5.96	25.74	46.00	-20.26
864.20	S	Peak	28.29	-3.03	25.26	46.00	-20.74
4874.00	Н	Average	30.03	7.47	37.50	54.00	-16.50
4874.00	Н	Peak	40.65	7.47	48.12	74.00	-25.88
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						
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Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
262.80	S	Peak	31.77	-13.44	18.33	46.00	-27.67
315.18	S	Peak	31.50	-11.95	19.55	46.00	-26.45
367.56	S	Peak	33.60	-11.19	22.41	46.00	-23.59
399.57	S	Peak	33.93	-10.76	23.17	46.00	-22.83
630.43	S	Peak	31.38	-5.96	25.42	46.00	-20.58
749.74	S	Peak	29.32	-4.19	25.13	46.00	-20.87
4874.00	Н	Average	28.30	7.42	35.72	54.00	-18.28
4874.00	Н	Peak	38.15	7.42	45.57	74.00	-28.43
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						
24370.00	Н						

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Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 118 of 172

Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
99.84	S	Peak	34.65	-16.61	18.04	43.50	-25.46
419.94	S	Peak	29.49	-10.24	19.25	46.00	-26.75
549.92	S	Peak	28.97	-7.84	21.13	46.00	-24.87
600.36	S	Peak	32.22	-6.67	25.55	46.00	-20.45
630.43	S	Peak	31.05	-5.96	25.09	46.00	-20.91
700.27	S	Peak	28.72	-4.83	23.89	46.00	-22.11
2498.00	S	Average	32.14	2.92	35.06	54.00	-18.94
2498.00	S	Peak	50.46	2.92	53.38	74.00	-20.62
4924.00	Н	Average	27.57	7.61	35.18	54.00	-18.82
4924.00	Н	Peak	37.96	7.61	45.57	74.00	-28.43
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						

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Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 119 of 172

Operation Band	:802.11 g	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
262.80	S	Peak	31.11	-13.44	17.67	46.00	-28.33
315.18	S	Peak	30.93	-11.95	18.98	46.00	-27.02
367.56	S	Peak	32.79	-11.19	21.60	46.00	-24.40
399.57	S	Peak	34.86	-10.76	24.10	46.00	-21.90
630.43	S	Peak	32.54	-5.96	26.58	46.00	-19.42
749.74	S	Peak	28.45	-4.19	24.26	46.00	-21.74
2498.00	S	Average	29.15	4.02	33.17	54.00	-20.83
2498.00	S	Peak	51.53	4.02	55.55	74.00	-18.45
4924.00	Н	Average	25.97	7.50	33.47	54.00	-20.53
4924.00	Н	Peak	36.54	7.50	44.04	74.00	-29.96
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						

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#### Radiated Spurious Emission Measurement Result (802.11n\_20M)

Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	S	Peak	32.22	-14.15	18.07	40.00	-21.93
99.84	S	Peak	34.32	-16.61	17.71	43.50	-25.79
343.31	S	Peak	28.51	-11.53	16.98	46.00	-29.02
549.92	S	Peak	29.68	-7.84	21.84	46.00	-24.16
600.36	S	Peak	31.18	-6.67	24.51	46.00	-21.49
630.43	S	Peak	31.65	-5.96	25.69	46.00	-20.31
4824.00	Н	Average	28.60	7.27	35.87	54.00	-18.13
4824.00	Н	Peak	38.69	7.27	45.96	74.00	-28.04
7236.00	Н						
9648.00	Н						
12060.00	Н						
14472.00	Н						
16884.00	Н						
19296.00	Н						
21708.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2412 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
315.18	S	Peak	31.51	-11.95	19.56	46.00	-26.44
367.56	S	Peak	31.87	-11.19	20.68	46.00	-25.32
399.57	S	Peak	33.43	-10.76	22.67	46.00	-23.33
549.92	S	Peak	30.03	-7.84	22.19	46.00	-23.81
630.43	S	Peak	31.13	-5.96	25.17	46.00	-20.83
749.74	S	Peak	30.52	-4.19	26.33	46.00	-19.67
4824.00	Н	Average	27.45	7.28	34.73	54.00	-19.27
4824.00	Н	Peak	37.06	7.28	44.34	74.00	-29.66
7236.00	Н						
9648.00	Н						
12060.00	Н						
14472.00	Н						
16884.00	Н						
19296.00	Н						
21708.00	Н						
24120.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.00	S	Peak	32.20	-14.21	17.99	40.00	-22.01
99.84	S	Peak	35.22	-16.61	18.61	43.50	-24.89
343.31	S	Peak	27.51	-11.53	15.98	46.00	-30.02
549.92	S	Peak	29.50	-7.84	21.66	46.00	-24.34
630.43	S	Peak	31.32	-5.96	25.36	46.00	-20.64
700.27	S	Peak	29.31	-4.83	24.48	46.00	-21.52
4874.00	Н	Average	25.11	7.47	32.58	54.00	-21.42
4874.00	Н	Peak	39.44	7.47	46.91	74.00	-27.09
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2437 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
262.80	S	Peak	30.78	-13.44	17.34	46.00	-28.66
315.18	S	Peak	32.02	-11.95	20.07	46.00	-25.93
367.56	S	Peak	33.59	-11.19	22.40	46.00	-23.60
399.57	S	Peak	34.22	-10.76	23.46	46.00	-22.54
630.43	S	Peak	30.55	-5.96	24.59	46.00	-21.41
849.65	S	Peak	29.29	-3.25	26.04	46.00	-19.96
4874.00	Н	Average	26.25	7.42	33.67	54.00	-20.33
4874.00	Н	Peak	38.05	7.42	45.47	74.00	-28.53
7311.00	Н						
9748.00	Н						
12185.00	Н						
14622.00	Н						
17059.00	Н						
19496.00	Н						
21933.00	Н						
24370.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.97	S	Peak	31.41	-14.17	17.24	40.00	-22.76
99.84	S	Peak	34.61	-16.61	18.00	43.50	-25.50
343.31	S	Peak	27.03	-11.53	15.50	46.00	-30.50
549.92	S	Peak	30.08	-7.84	22.24	46.00	-23.76
600.36	S	Peak	30.41	-6.67	23.74	46.00	-22.26
630.43	S	Peak	30.80	-5.96	24.84	46.00	-21.16
4924.00	Н	Average	25.65	7.61	33.26	54.00	-20.74
4924.00	Н	Peak	37.98	7.61	45.59	74.00	-28.41
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						
17234.00	Н						
19696.00	Н						
22158.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-07
Fundamental Frequency	:2462 MHz	Temp./Humi.	:24 deg_C / 61 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
315.18	S	Peak	31.53	-11.95	19.58	46.00	-26.42
367.56	S	Peak	32.08	-11.19	20.89	46.00	-25.11
399.57	S	Peak	34.26	-10.76	23.50	46.00	-22.50
500.45	S	Peak	30.13	-8.97	21.16	46.00	-24.84
630.43	S	Peak	30.64	-5.96	24.68	46.00	-21.32
749.74	S	Peak	29.85	-4.19	25.66	46.00	-20.34
4924.00	Н	Average	24.86	7.50	32.36	54.00	-21.64
4924.00	Н	Peak	37.06	7.50	44.56	74.00	-29.44
7386.00	Н						
9848.00	Н						
12310.00	Н						
14772.00	Н						
17234.00	Н						
19696.00	Н						
22158.00	Н						
24620.00	Н						

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#### **Radiated Spurious Emission Measurement Result (802.11a)**

Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg C/55RH
Operation Mode	:TX LOW	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.79	-13.43	33.36	40.00	-6.64
209.45	S	Peak	37.54	-15.63	21.91	43.50	-21.59
311.30	S	Peak	40.82	-12.03	28.79	46.00	-17.21
518.88	S	Peak	30.62	-8.54	22.08	46.00	-23.92
622.67	S	Peak	35.95	-6.11	29.84	46.00	-16.16
830.25	S	Peak	27.67	-3.44	24.23	46.00	-21.77
11490.00	Н	Average	21.80	17.72	39.52	54.00	-14.48
11490.00	Н	Peak	32.00	17.72	49.72	74.00	-24.28
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX LOW	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	36.05	-16.79	19.26	40.00	-20.74
200.72	S	Peak	42.61	-15.86	26.75	43.50	-16.75
311.30	S	Peak	41.73	-12.03	29.70	46.00	-16.30
450.01	S	Peak	32.51	-9.52	22.99	46.00	-23.01
622.67	S	Peak	35.79	-6.11	29.68	46.00	-16.32
878.75	S	Peak	31.16	-2.81	28.35	46.00	-17.65
11490.00	Н	Average	22.16	17.52	39.68	54.00	-14.32
11490.00	Н	Peak	34.56	17.52	52.08	74.00	-21.92
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX MID	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.68	-13.43	33.25	40.00	-6.75
121.18	S	Peak	33.18	-14.16	19.02	43.50	-24.48
276.38	S	Peak	38.64	-12.94	25.70	46.00	-20.30
450.01	S	Peak	29.81	-9.52	20.29	46.00	-25.71
622.67	S	Peak	36.37	-6.11	30.26	46.00	-15.74
749.74	S	Peak	30.42	-4.19	26.23	46.00	-19.77
11490.00	Н	Average	21.60	17.72	39.32	54.00	-14.68
11490.00	Н	Peak	32.81	17.72	50.53	74.00	-23.47
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX MID	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	36.11	-16.79	19.32	40.00	-20.68
199.75	S	Peak	43.03	-15.86	27.17	43.50	-16.33
311.30	S	Peak	41.53	-12.03	29.50	46.00	-16.50
415.09	S	Peak	30.83	-10.36	20.47	46.00	-25.53
518.88	S	Peak	32.34	-8.54	23.80	46.00	-22.20
622.67	S	Peak	35.76	-6.11	29.65	46.00	-16.35
11490.00	Н	Average	21.60	17.52	39.12	54.00	-14.88
11490.00	Н	Peak	33.41	17.52	50.93	74.00	-23.07
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	47.22	-13.43	33.79	40.00	-6.21
211.39	S	Peak	36.69	-15.53	21.16	43.50	-22.34
311.30	S	Peak	39.35	-12.03	27.32	46.00	-18.68
450.01	S	Peak	29.85	-9.52	20.33	46.00	-25.67
553.80	S	Peak	29.20	-7.75	21.45	46.00	-24.55
749.74	S	Peak	30.87	-4.19	26.68	46.00	-19.32
11650.00	Н	Average	21.24	18.00	39.24	54.00	-14.76
11650.00	Н	Peak	32.44	18.00	50.44	74.00	-23.56
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band	:802.11 a	Test Date	:2013-09-10
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	35.32	-16.79	18.53	40.00	-21.47
197.81	S	Peak	42.41	-15.77	26.64	43.50	-16.86
311.30	S	Peak	40.94	-12.03	28.91	46.00	-17.09
450.01	S	Peak	32.17	-9.52	22.65	46.00	-23.35
622.67	S	Peak	35.56	-6.11	29.45	46.00	-16.55
877.78	S	Peak	31.33	-2.83	28.50	46.00	-17.50
11650.00	Н	Average	21.48	17.80	39.28	54.00	-14.72
11650.00	Н	Peak	33.10	17.80	50.90	74.00	-23.10
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Radiated Spurious Emission Measurement Result (802.11n (5GHz)_20M)Operation Band:802.11 n20MTest Date:2013-09-10Fundamental Frequency:5745 MHzTemp./Humi.:25.6 deg_C/55RHOperation Mode:TX LOWEngineer:LouisEUT Pol.:E1 PlanMeasurement Antenna Pol.:VERTICALActual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB):VERTICALFactor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)Note : "F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.							55RH		
N						, ,			
		: denotes Band	0 1 1	; "S" : denotes Sp	ourious Frequency.				
	Freq.	Note	Detector Mode	Spectrum Reading Leve	Factor	Actual FS	Limit @3m	Margin	
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
	39.70 210.42 311.30 450.01 622.67 777.87 11490.00 11490.00 17235.00 22980.00	S S S S H H H H	Peak Peak Peak Peak Peak Average Peak 	46.25 36.97 39.06 30.25 36.56 29.15 21.77 33.33	-13.43 -15.59 -12.03 -9.52 -6.11 -3.89 17.72 17.72	32.82 21.38 27.03 20.73 30.45 25.26 39.49 51.05	40.00 43.50 46.00 46.00 46.00 46.00 54.00 74.00	-7.18 -22.12 -18.97 -25.27 -15.55 -20.74 -14.51 -22.95	
	28725.00 34470.00	H H							

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Operation Band	:802.11 n20M	Test Date	:2013-09-10
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX LOW	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
73.65	S	Peak	36.21	-16.79	19.42	40.00	-20.58
200.72	S	Peak	42.83	-15.86	26.97	43.50	-16.53
311.30	S	Peak	42.31	-12.03	30.28	46.00	-15.72
415.09	S	Peak	31.27	-10.36	20.91	46.00	-25.09
622.67	S	Peak	36.11	-6.11	30.00	46.00	-16.00
726.46	S	Peak	31.02	-4.48	26.54	46.00	-19.46
11490.00	Н	Average	22.09	17.52	39.61	54.00	-14.39
11490.00	Н	Peak	32.70	17.52	50.22	74.00	-23.78
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-10
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX MID	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.75	-13.43	33.32	40.00	-6.68
210.42	S	Peak	37.01	-15.59	21.42	43.50	-22.08
311.30	S	Peak	39.82	-12.03	27.79	46.00	-18.21
450.01	S	Peak	29.75	-9.52	20.23	46.00	-25.77
622.67	S	Peak	36.29	-6.11	30.18	46.00	-15.82
749.74	S	Peak	29.86	-4.19	25.67	46.00	-20.33
11490.00	Н	Average	21.68	17.72	39.40	54.00	-14.60
11490.00	Н	Peak	33.38	17.72	51.10	74.00	-22.90
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-10
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX MID	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
200.72	S	Peak	42.78	-15.86	26.92	43.50	-16.58
311.30	S	Peak	41.05	-12.03	29.02	46.00	-16.98
450.01	S	Peak	32.10	-9.52	22.58	46.00	-23.42
549.92	S	Peak	32.06	-7.84	24.22	46.00	-21.78
622.67	S	Peak	35.20	-6.11	29.09	46.00	-16.91
726.46	S	Peak	29.90	-4.48	25.42	46.00	-20.58
11490.00	Н	Average	21.70	17.52	39.22	54.00	-14.78
11490.00	Н	Peak	32.62	17.52	50.14	74.00	-23.86
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-10
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.58	-13.43	33.15	40.00	-6.85
276.38	S	Peak	38.89	-12.94	25.95	46.00	-20.05
450.01	S	Peak	29.92	-9.52	20.40	46.00	-25.60
518.88	S	Peak	30.20	-8.54	21.66	46.00	-24.34
622.67	S	Peak	36.20	-6.11	30.09	46.00	-15.91
749.74	S	Peak	31.10	-4.19	26.91	46.00	-19.09
11650.00	Н	Average	21.25	18.00	39.25	54.00	-14.75
11650.00	Н	Peak	32.29	18.00	50.29	74.00	-23.71
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band	:802.11 n20M	Test Date	:2013-09-10
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
200.72	S	Peak	42.97	-15.86	27.11	43.50	-16.39
276.38	S	Peak	41.73	-12.94	28.79	46.00	-17.21
450.01	S	Peak	32.31	-9.52	22.79	46.00	-23.21
549.92	S	Peak	31.08	-7.84	23.24	46.00	-22.76
622.67	S	Peak	35.43	-6.11	29.32	46.00	-16.68
765.26	S	Peak	28.74	-4.02	24.72	46.00	-21.28
11650.00	Н	Average	21.50	17.80	39.30	54.00	-14.70
11650.00	Н	Peak	31.57	17.80	49.37	74.00	-24.63
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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#### FCC ID: HLZEE6 IC: 1754F-EE6

Radiated Spurious Emission Measurement Result (802.11n (5GHz)_40M)Operation Band:802.11 n40MTest DateFundamental Frequency:5755 MHzTemp./Humi.Operation Mode:TX LOWEngineerEUT Pol.:E1 PlanMeasurement Antenna Pol.				:2013-09-10 :25.6 deg_C/5 :Louis :VERTICAL	5RH		
Actual FS(dBµV	V/m) = SPA.	Reading level(dE	$B\mu V$ ) + Factor(dB	3)			
Factor(dB) = Ar	ntenna Factor(	$dB\mu V/m) + Cab$	le Loss(dB) – Pre	e_Amplifier Gain(	dB)		
Note : " $F$ " : $c$	lenotes Fundar	nental Frequency	/.; "H": denotes I	Harmonic Frequency	<i>y</i> .		
"E"	: denotes Band	Edge Frequency.	; "S" : denotes Sp	ourious Frequency.			
··	: denotes Noi	se Floor.					
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Leve	1	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.86	-13.43	33.43	40.00	-6.57
276.38	S	Peak	39.37	-12.94	26.43	46.00	-19.57
450.01	S	Peak	30.35	-9.52	20.83	46.00	-25.17
622.67	S	Peak	35.69	-6.11	29.58	46.00	-16.42
749.74	S	Peak	30.45	-4.19	26.26	46.00	-19.74
877.78	S	Peak	29.43	-2.83	26.60	46.00	-19.40
11510.00	Н	Average	21.61	17.77	39.38	54.00	-14.62
11510.00	Н	Peak	32.01	17.77	49.78	74.00	-24.22
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530.00	Н						

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Operation Band	:802.11 n40M	Test Date	:2013-09-10
Fundamental Frequency	:5755 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX LOW	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
186.17	S	Peak	41.23	-14.94	26.29	43.50	-17.21
276.38	S	Peak	41.56	-12.94	28.62	46.00	-17.38
311.30	S	Peak	41.79	-12.03	29.76	46.00	-16.24
450.01	S	Peak	31.67	-9.52	22.15	46.00	-23.85
622.67	S	Peak	35.30	-6.11	29.19	46.00	-16.81
871.96	S	Peak	30.78	-2.92	27.86	46.00	-18.14
11510.00	Н	Average	21.87	17.57	39.44	54.00	-14.56
11510.00	Н	Peak	32.49	17.57	50.06	74.00	-23.94
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530.00	Н						

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Report No.: ER/2013/80066 Issue Date: Sep. 26, 2013 Page: 140 of 172

Operation Band	:802.11 n40M	Test Date	:2013-09-10
Fundamental Frequency	:5795 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:VERTICAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
39.70	S	Peak	46.61	-13.43	33.18	40.00	-6.82
276.38	S	Peak	38.94	-12.94	26.00	46.00	-20.00
311.30	S	Peak	39.23	-12.03	27.20	46.00	-18.80
518.88	S	Peak	31.33	-8.54	22.79	46.00	-23.21
622.67	S	Peak	35.82	-6.11	29.71	46.00	-16.29
749.74	S	Peak	30.59	-4.19	26.40	46.00	-19.60
11590.00	Н	Average	21.48	17.92	39.40	54.00	-14.60
11590.00	Н	Peak	32.36	17.92	50.28	74.00	-23.72
17385.00	Н						
23180.00	Н						
28975.00	Н						
34770.00	Н						

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Operation Band	:802.11 n40M	Test Date	:2013-09-10
Fundamental Frequency	:5795 MHz	Temp./Humi.	:25.6 deg_C/55RH
Operation Mode	:TX HIGH	Engineer	:Louis
EUT Pol.	:E1 Plan	Measurement Antenna Pol.	:HORIZONTAL

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

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

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

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

"---" : denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
199.75	S	Peak	43.03	-15.86	27.17	43.50	-16.33
311.30	S	Peak	41.78	-12.03	29.75	46.00	-16.25
450.01	S	Peak	32.03	-9.52	22.51	46.00	-23.49
622.67	S	Peak	35.67	-6.11	29.56	46.00	-16.44
752.65	S	Peak	28.26	-4.16	24.10	46.00	-21.90
871.96	S	Peak	31.46	-2.92	28.54	46.00	-17.46
11590.00	Н	Average	21.59	17.72	39.31	54.00	-14.69
11590.00	Н	Peak	32.46	17.72	50.18	74.00	-23.82
17385.00	Н						
23180.00	Н						
28975.00	Н						
34770.00	Н						

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# **11 PEAK POWER SPECTRAL DENSITY**

# **11.1 Standard Applicable:**

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-210 issue 8, §A8.2(b) The transmitter power spectral density (into the antenna) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## **11.2 Measurement Equipment Used:**

Refer to section 7.2 for details.

#### 11.3 Test Set-up:

Refer to section 7.3 for details. (Spectrum Option)

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# 11.4 Measurement Procedure (following the measurement procedure 10.2 of KDB558074):

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. Set the RBW  $\geq$  3 kHz.
- 4. Set the VBW > 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

11. 802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. . The single transmitting mode is only reported measurement that produces higher value of outcome.

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#### **11.5 Measurement Result:**

#### 802.11b

Frequency	<b>RF</b> Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-8.30	8
2437	-7.01	8
2462	-8.11	8

#### 802.11g

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-11.55	8
2437	-10.70	8
2462	-10.91	8

#### 802.11n 20M

Frequency	<b>RF</b> Power Density	Maximum Limit	
MHz	Reading (dBm)	(dBm)	
2412	-11.53	8	
2437	-10.86	8	
2462	-12.14	8	

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#### 802.11a

Frequency	<b>RF</b> Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
5745	-15.93	8
5785	-15.43	8
5825	-14.82	8

#### 802.11n (5GHz)\_20M\_MIMO

Frequency	<b>RF</b> Power Density	Maximum Limit
MHz	Reading (dBm)	(dBm)
5745	-15.78	8
5785	-15.69	8
5825	-15.67	8

#### 802.11n (5GHz)\_40M\_MIMO

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
5755	-18.53	8
5795	-19.06	8

\* Note: Offset 11.2dB for 2.4G 802.11b/g; Offset 14.2dB for 2.4G 802.11n\_20 Offset 11.8dB for 5G 802.11a; Offset 14.9dB for 5G 802.11/n\_20/n\_40.

\*Refer to next page for plots

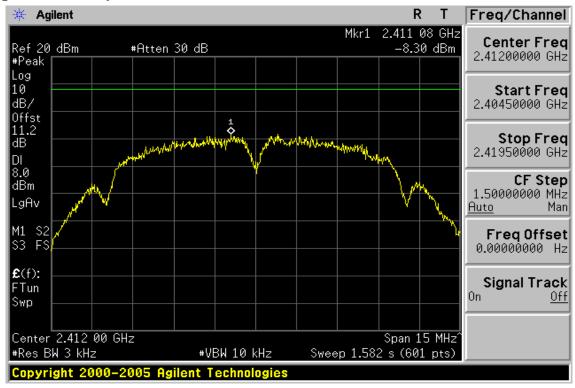
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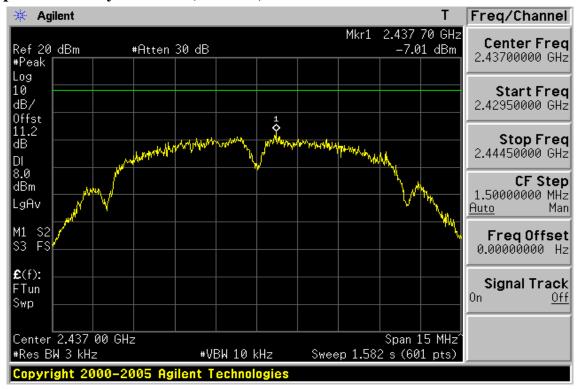


### 802.11b





**Power Spectral Density Test Plot (CH-Mid)** 



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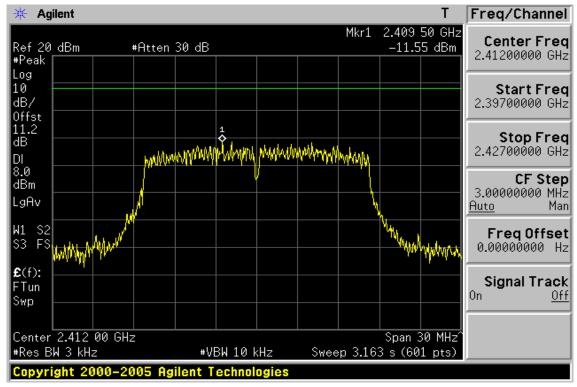


🔆 Agilent Freq/Channel т Mkr1 2.462 72 GHz **Center Freq** Ref 20 dBm #Atten 30 dB -8.11 dBm 2.46200000 GHz #Peak Log 10 Start Freq dB/ 2.45450000 GHz Offst \$ 11.2 Stop Frea dB WWW WWWW W malingle 2.46950000 GHz DI 8.0 CF Step dBm 1.50000000 MHz LgAv Man Auto Μ1 S2 Freq Offset S3 FS 0.00000000 Hz £(f): Signal Track FTun 0n Off Swp Center 2.462 00 GHz Span 15 MHz #Res BW 3 kHz ₩VBW 10 kHz Sweep 1.582 s (601 pts) Copyright 2000–2005 Agilent Technologies

### Power Spectral Density Test Plot (CH-High)

### 802.11g

### Power Spectral Density Test Plot (CH-Low)



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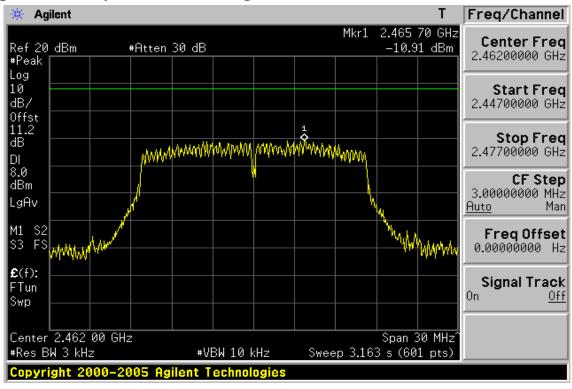
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🔆 Agilent Freq/Channel т Mkr1 2.439 40 GHz **Center Freq** Ref 20 dBm #Atten 30 dB -10.70 dBm 2.43700000 GHz #Peak Log Start Freq 10 dB/ 2.42200000 GHz Offst 11.2 Ŷ Stop Frea dB Monthenner MMMMMMMM 2.45200000 GHz DI 8.0 CF Step dBm 3.00000000 MHz LgAv Man Auto Μ1 S2 Freq Offset FS S3 0.00000000 Hz £(f): Signal Track FTun 0n Off Swp Center 2.437 00 GHz Span 30 MHz #Res BW 3 kHz #VBW 10 kHz Sweep 3.163 s (601 pts) Copyright 2000-2005 Agilent Technologies

### **Power Spectral Density Test Plot (CH-Mid)**

### **Power Spectral Density Test Plot (CH-High)**



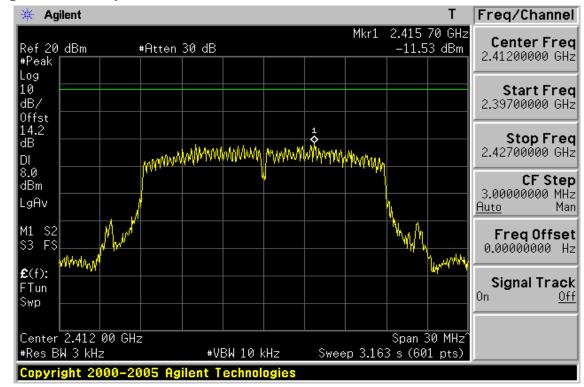
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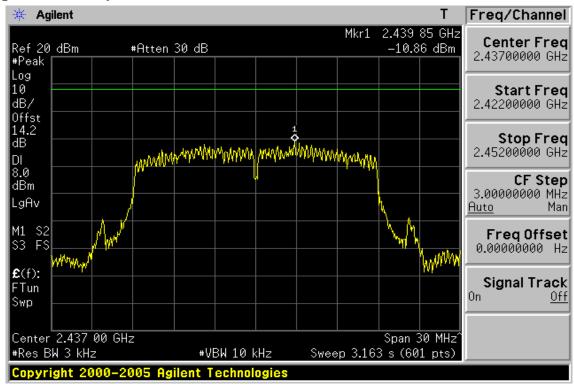


### 802.11n\_20M



### **Power Spectral Density Test Plot (CH-Low)**

**Power Spectral Density Test Plot (CH-Mid)** 



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#### 🔆 Agilent Freq/Channel Т Mkr1 2.457 00 GHz **Center Freq** -12.14 dBm Ref 20 dBm #Atten 30 dB 2.46200000 GHz #Peak Log 10 Start Freq dB/ 2.44700000 GHz Offst 14.2 Stop Frea p. Magaritanapa dB million Million Manager 2.47700000 GHz DI 8.0 CF Step dBm 3.00000000 MHz LgAv Man Auto Μ1 S2 Freq Offset S3 FS 0.00000000 Hz hand ere and £(f): Signal Track FTun 0n Off Swp Center 2.462 00 GHz Span 30 MHz #Res BW 3 kHz ₩VBW 10 kHz Sweep 3.163 s (601 pts) Copyright 2000-2005 Agilent Technologies

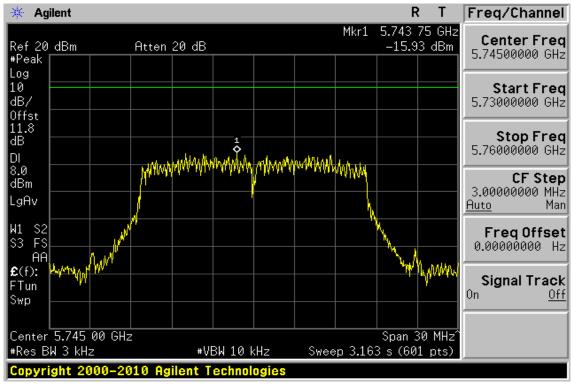
#### Power Spectral Density Test Plot (CH-High)

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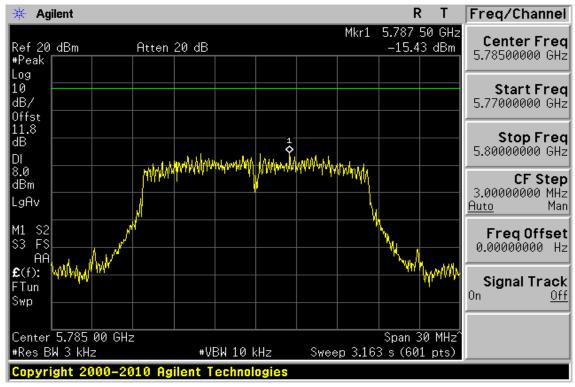
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### 802.11a **Power Spectral Density Test Plot (CH-Low)**



**Power Spectral Density Test Plot (CH-Mid)** 



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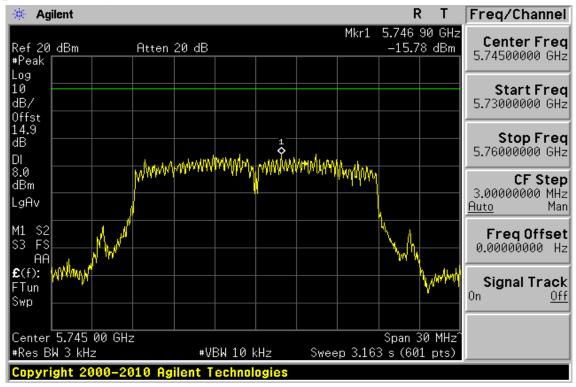


#### 🔆 Agilent R т Freq/Channel Mkr1 5.829 40 GHz Center Freq Ref 20 dBm -14.82 dBm Atten 20 dB 5.82500000 GHz #Peak Log 10 Start Freq dB/ 5.81000000 GHz Offst 11.8Stop Freq dB 5.84000000 GHz DI 8.0 CF Step dBm 3.00000000 MHz LgAv Auto Man S2 FS Μ1 Freq Offset 0.00000000 Hz S3 AA di. £(f): how Signal Track FTun 0n Off Swp Center 5.825 00 GHz Span 30 MHz #Res BW 3 kHz ₩VBW 10 kHz Sweep 3.163 s (601 pts) Copyright 2000-2010 Agilent Technologies

## Power Spectral Density Test Plot (CH-High)

#### 802.11n (5GHz) 20M

### **Power Spectral Density Test Plot (CH-Low)**



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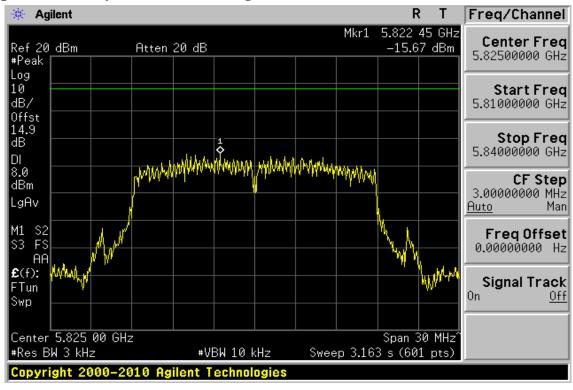
Taiwan L



#### 🔆 Agilent Freq/Channel R Т Mkr1 5.781 30 GHz **Center Freq** Ref 20 dBm Atten 20 dB -15.69 dBm 5.78500000 GHz #Peak Log 10 Start Freq dB/ 5.77000000 GHz Offst 14.9 Stop Frea dB Ŷ 5.80000000 GHz DI 8.0 CF Step dBm 3.00000000 MHz LgAv Man Auto Μ1 S2 Freq Offset FS S3 0.00000000 Hz AA £(f): Signal Track We have FTun 0n Off Swp Center 5.785 00 GHz Span 30 MHz #Res BW 3 kHz #VBW 10 kHz Sweep 3.163 s (601 pts) Copyright 2000-2010 Agilent Technologies

### **Power Spectral Density Test Plot (CH-Mid)**

### **Power Spectral Density Test Plot (CH-High)**



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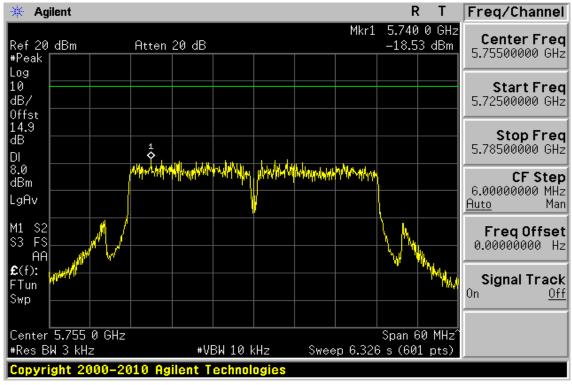
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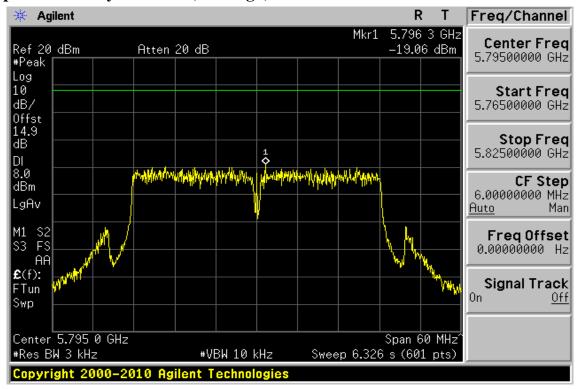


### 802.11n (5GHz)\_40M

#### Power Spectral Density Test Plot (CH-Low)



**Power Spectral Density Test Plot (CH-High)** 



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### **12 ANTENNA REQUIREMENT**

### **12.1 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.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

### 12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 0.35dBi for 2.4GHz, 1.13dBi for 5725-5850 MHz, and 0.69dBi for 2.4GHz MIMO, and 2.04dBi for 5.8G MIMO. In addition, the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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# 13 99% BANDWIDTH MEASUREMENT

## 13.1 Standard Applicable:

RSS-Gen §4.6.1, the transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded.

The span between the two recorded frequencies is the occupied bandwidth.

### **13.2 Measurement Equipment Used:**

Refer to section 7.2 for details.

### 13.3 Test Set-up:

Refer to section 7.3 for details. (Spectrum analyzer)

### **13.4 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 spectrum analyzer.
- 3. Set the spectrum analyzer as RBW=1% of the Span, VBW = 3 times RBW, Span= 30 MHz /50MHz.
- 4. Turn on the 99% bandwidth function, max reading..
- 5. Repeat above procedures until all frequency measured were complete.

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#### **13.5 Measurement Result:**

#### 802.11b

Frequency	99%Bandwidth
MHz	(MHz)
2412	9.9374
2437	10.0936
2462	10.3508

#### 802.11g

Frequency	99%Bandwidth
MHz	(MHz)
2412	16.3223
2437	16.3522
2462	16.2246

### 802.11n\_20M MIMO-Main

Frequency	99%Bandwidth
MHz	(MHz)
2412	17.4552
2437	17.4407
2462	17.3980

#### 802.11n\_20M MIMO-Aux

Frequency	99%Bandwidth
MHz	(MHz)
2412	17.4828
2437	17.3188
2462	17.3080

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#### 802.11a

Frequency	99%Bandwidth
MHz	(MHz)
5745	16.3522
5785	16.4005
5825	16.3128

#### 802.11n (5GHz)\_20M MIMO-Main

Frequency	99%Bandwidth
MHz	(MHz)
5745	17.3738
5785	17.3633
5825	17.4592

#### 802.11n (5GHz)\_20M MIMO-Aux

Frequency	99%Bandwidth
MHz	(MHz)
5745	17.4999
5785	17.4419
5825	17.3531

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#### 802.11n (5GHz)\_40M MIMO-Main

Frequency	99%Bandwidth	
MHz	(MHz)	
5755	36.1948	
5795	36.2231	

#### 802.11n (5GHz)\_40M MIMO-Aux

Frequency	99%Bandwidth	
MHz	(MHz)	
5755	36.3592	
5795	36.2565	

Note: Refer to next page for plots.

Note: "->" reveals the bandwidth measurement in 99%.

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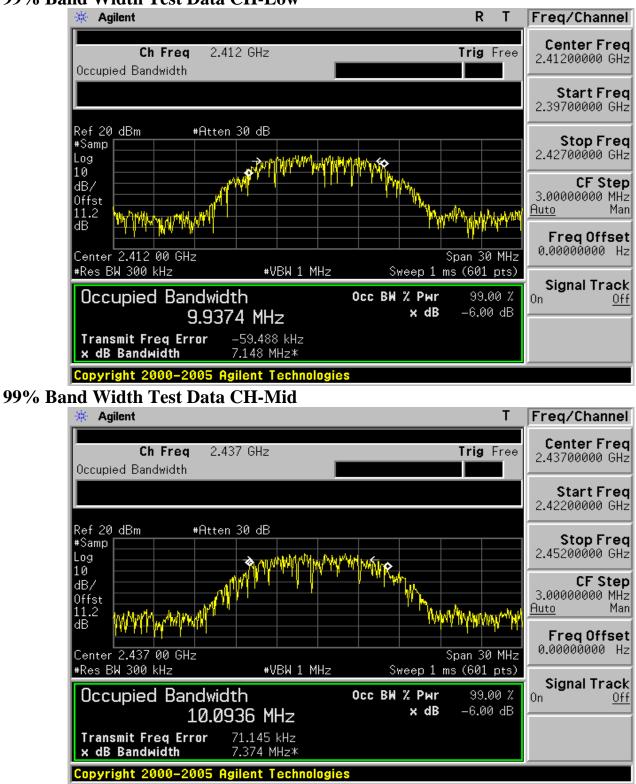
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# 802.11b 99% Band Width Test Data CH-Low

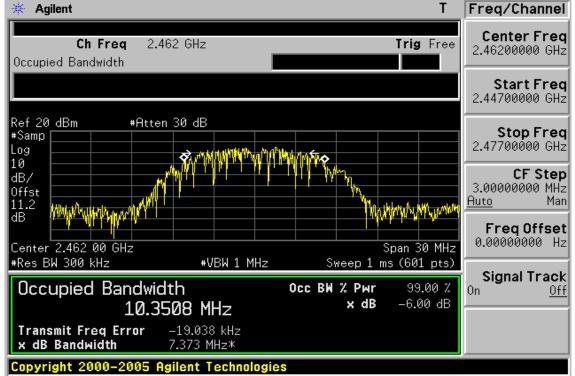


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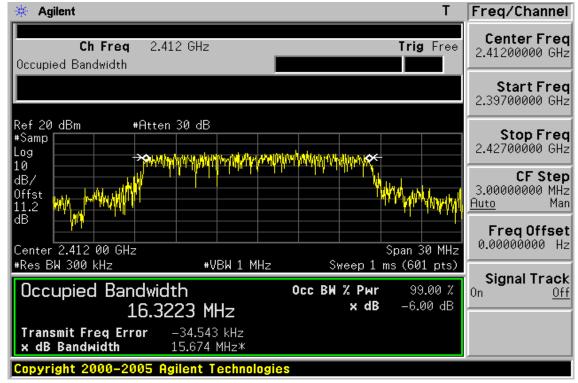


### 99% Band Width Test Data CH-High



### 802.11g

### 99% Band Width Test Data CH-Low

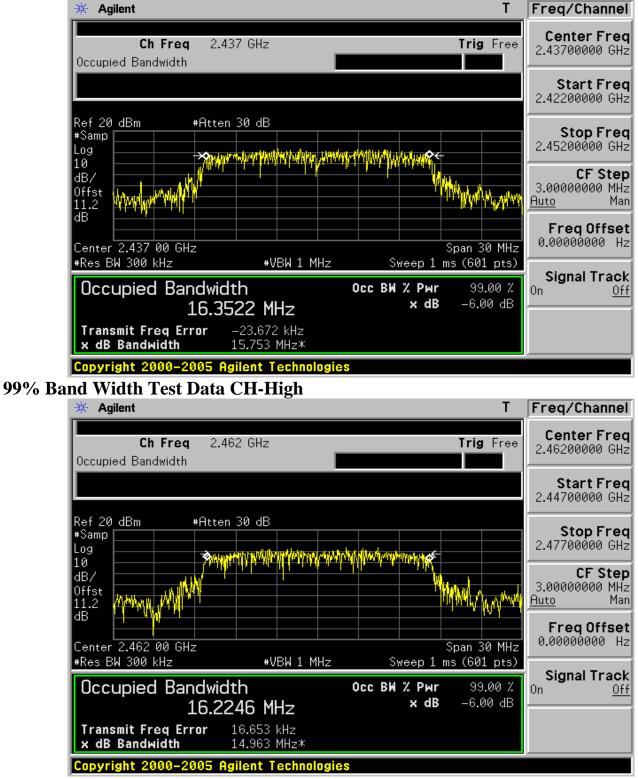


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### 99% Band Width Test Data CH-Mid



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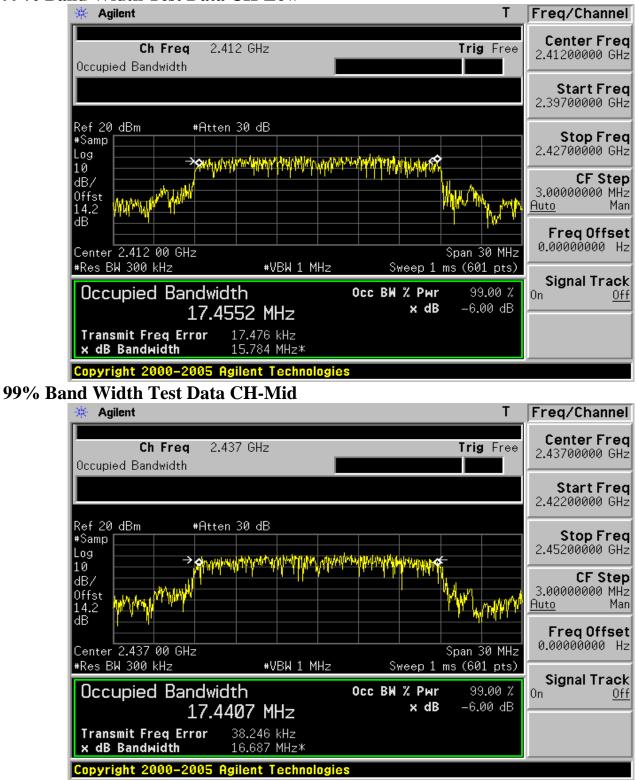
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## 802.11n\_20M MIMO-Main 99% Band Width Test Data CH-Low

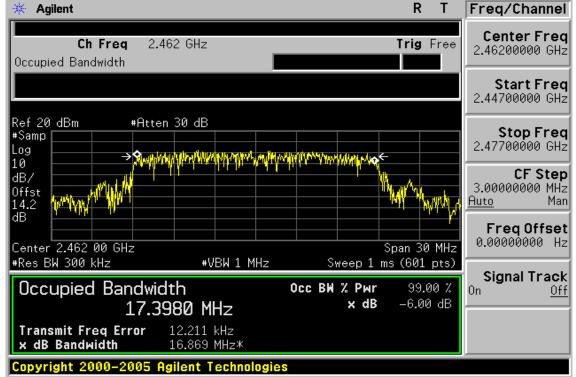


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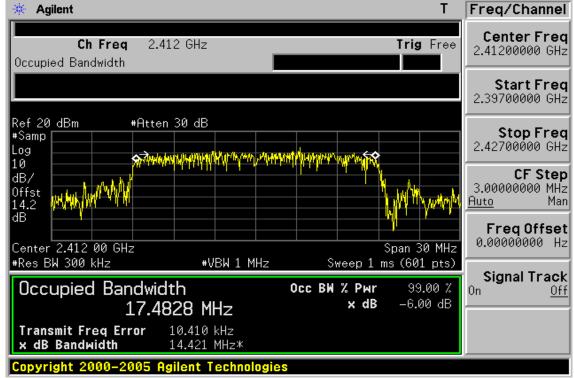


### 99% Band Width Test Data CH-High



# 802.11n 20M MIMO-Aux

### 99% Band Width Test Data CH-Low



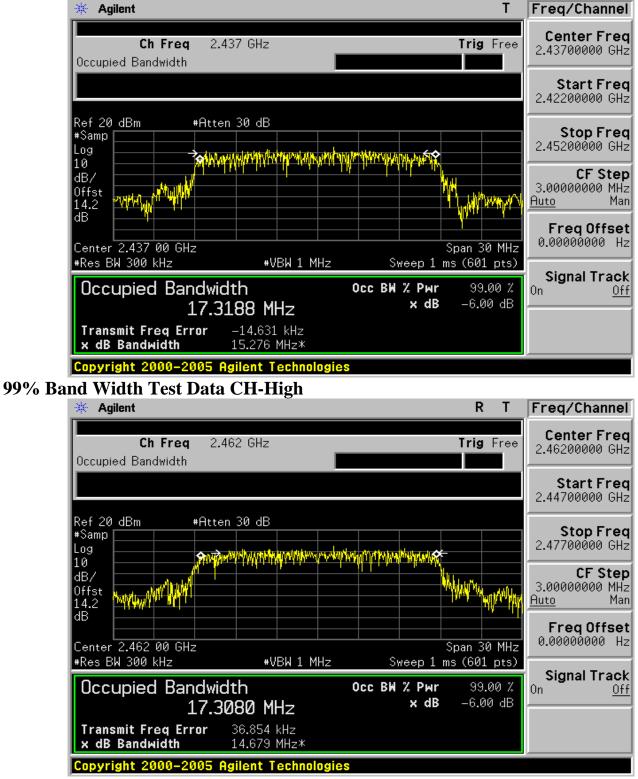
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### 99% Band Width Test Data CH-Mid

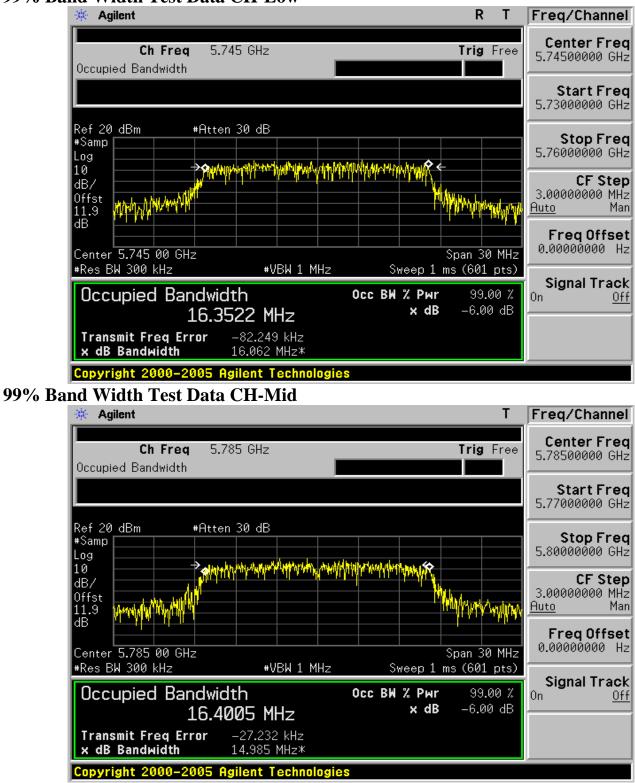


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# 802.11a 99% Band Width Test Data CH-Low

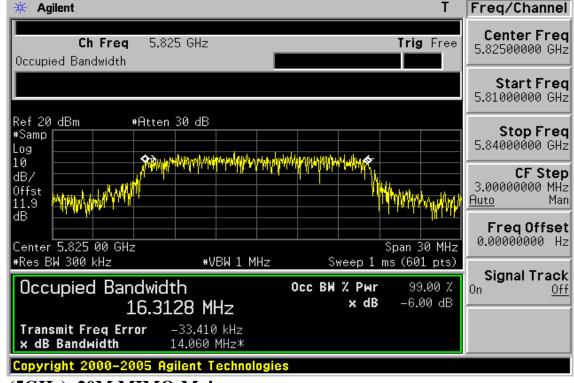


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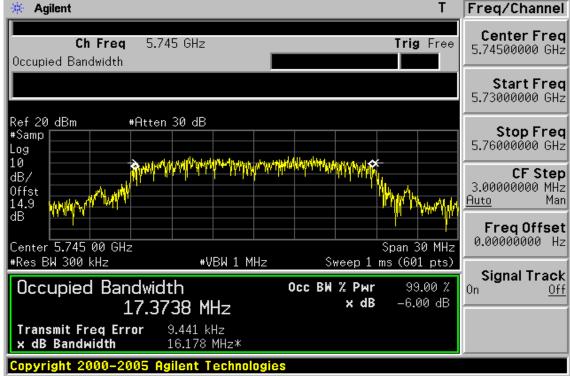


### 99% Band Width Test Data CH-High



# 802.11n (5GHz)\_20M MIMO-Main

### 99% Band Width Test Data CH-Low

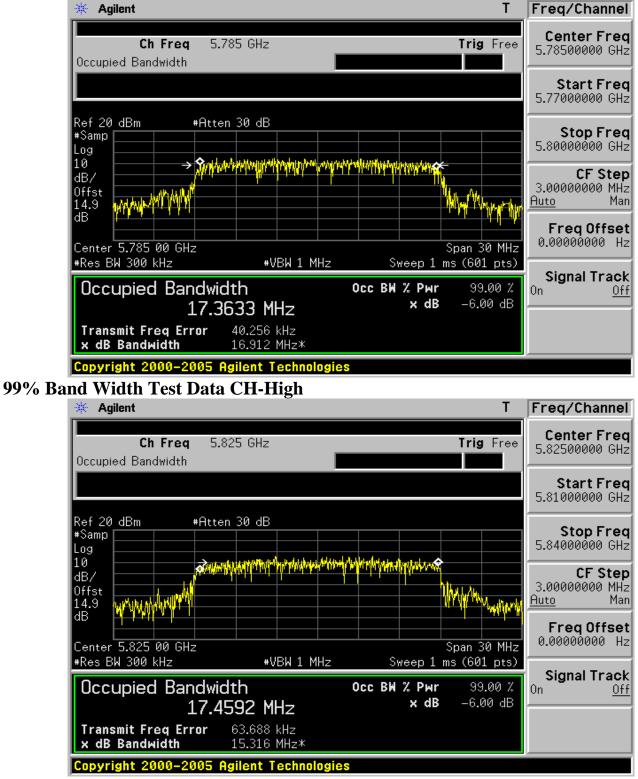


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### 99% Band Width Test Data CH-Mid

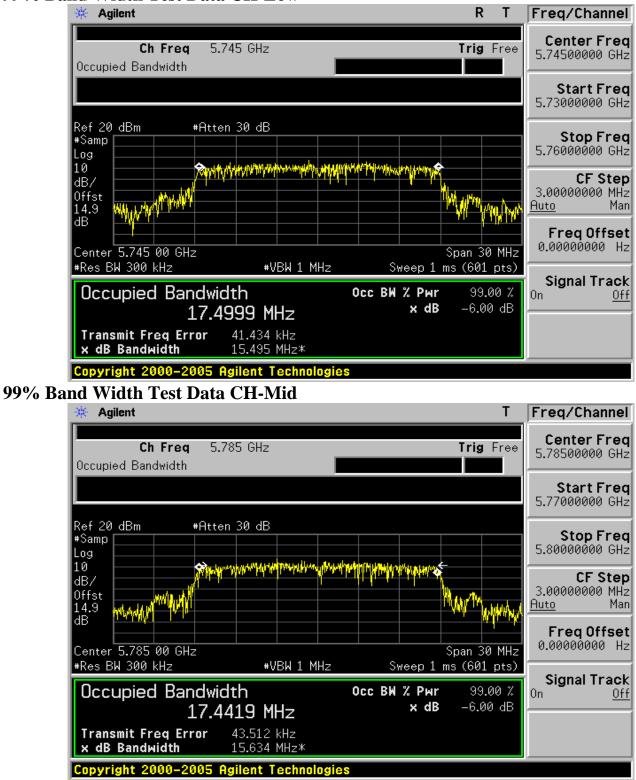


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## 802.11n (5GHz)\_20M MIMO-Aux 99% Band Width Test Data CH-Low

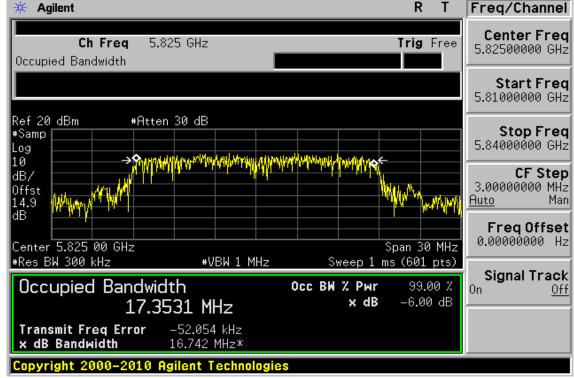


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除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

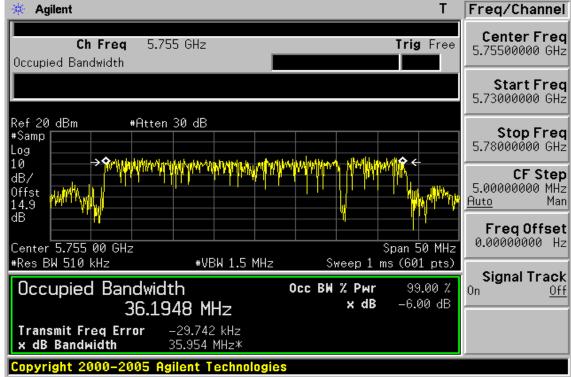


### 99% Band Width Test Data CH-High



# 802.11n (5GHz)\_40M MIMO-Main

### 99% Band Width Test Data CH-Low

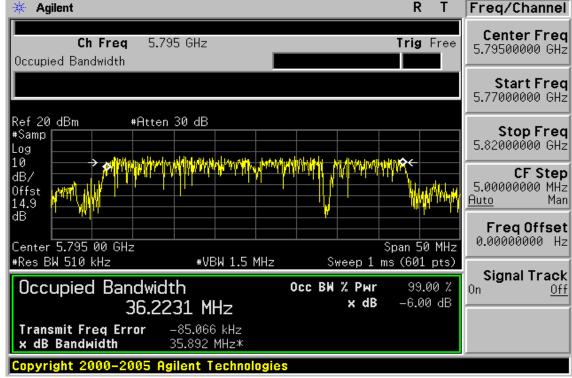


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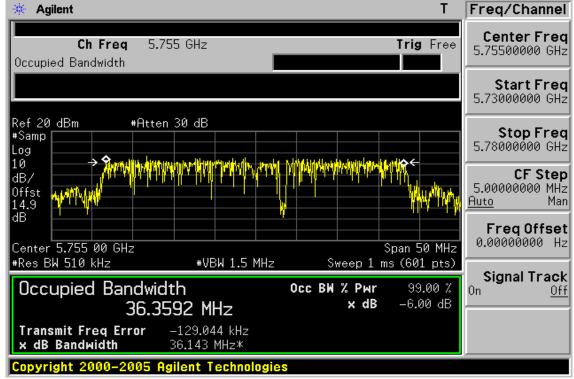


### 99% Band Width Test Data CH-High



# 802.11n (5GHz)\_40M MIMO-Aux

### 99% Band Width Test Data CH-Low



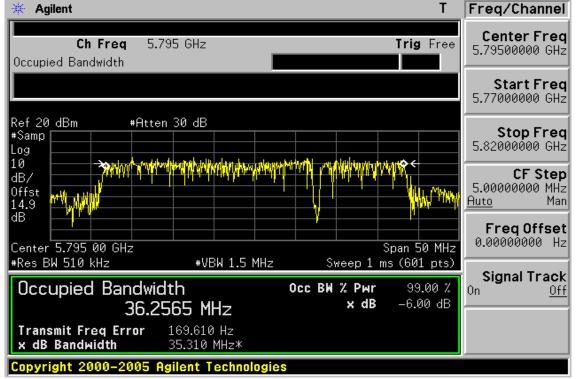
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### 99% Band Width Test Data CH-High



~ End of Report ~

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