

Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

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## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

*OF* 

**Product Name: PDA Phone** 

**Brand Name:** Sony

Model No.: C1904

Type No.: PM-0480-BV

**Model Difference:** N/A

FCC ID: PY7PM-0480

IC: 4170B-PM0480

EH/2013/40009 **Report No.:** 

**Issue Date:** Jun. 06, 2013

**FCC Rule Part:** §15.247, Cat: DTS

IC Rule Part: RSS-210 issue 8 :2010, Annex 8

**Sony Mobile Communications AB Prepared for:** 

Nya Vattentornet 22188 Lund/SWEDEN

SGS Taiwan Ltd.

**Electronics & Communication Laboratory** 

Prepared by: No.134, Wu Kung Road, New Taipei Industrial

Park, Wuku District, New Taipei City, Taiwan

24803





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## VERIFICATION OF COMPLIANCE

**Applicant:** Sony Mobile Communications AB

Nya Vattentornet 22188 Lund/SWEDEN

PDA Phone **Product Name:** 

**Brand Name:** Sony

C1904 **Model No.:** 

Type No.: PM-0480-BV

**Model Difference:** N/A

FCC ID: PY7PM-0480

IC: 4170B-PM0480

**File Number:** EH/2013/40009

Date of test: Apr. 01, 2013 ~ May. 28, 2013

**Date of EUT Received:** Apr. 01, 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 & ANSI 63.10:2009 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 Iseng	Date	Jun. 06, 2013	
Prepared By:	Marcus Tseng / Engineer Utoletta Tang	Date	Jun. 06, 2013	
Approved By:	Violetta Tang / Clerk  Jim Chang / Supervisor	Date	Jun. 06, 2013	

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# **Revision History**

Report Number	Revision	Description	Issue Date	
EH/2013/40009	Rev.01	Initial creation of document	May. 28, 2013	
EH/2013/40009	1. Update Product Description "Marketing Name" into "Model No." and update "Model No." into		Jun. 06, 2013	

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## **GENERAL INFORMATION**

## **Product description**

General:

Product Name:	PDA Phon	e	
Brand Name:	Sony		
Model No.:	C1904		
Type No.:	PM-0480-	BV	
Model Difference:	N/A		
Data Cable (USB):	Model No.: EC450, Supplier: K-one Part No.: 1242-6715.3, Length: 100 cm		
Simple Hands-Free (SHF-White):	Model No. Type No.:	: MH410c, Supplier: Foster Electric AG-1100	
Simple Hands-Free (SHF-Black):	Model No.: MH410c, Supplier: Foster Electric Type No.: CCA-0004017		
Car Charger:	Model No.: AN400, Supplier: Salcomp Type No.: CAA-0003013		
Hi-Fi Wireless Headset:	Model No.: MW600, Supplier: BALDA Type No.: DDA-0002029.B coupling with Simple Hands Free (Model No.: MH755, Supplier: BALDA Type No.: AG-0502)		
Hardware Version:	A		
Software Version:	15.1.A.1.3		
	3.7Vdc		
Power Supply:	Battery:	Model No.: BA900, Supplier: Sony Type No.: AB-0500	
	Adapter:	Model No.: EP800, Supplier: Salcomp Type No.: CAA-0002016-US	

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### Bluetooth BR+EDR:

Bluetooth Version:	V3.0+HS
Channel number:	79 channels
Modulation type:	Frequency Hopping Spread Spectrum
Transmit Power:	9.75dBm
Frequency Range:	2.402GHz – 2.480GHz
Dwell Time:	<= 0.4s
Antenna Designation:	PIFA Antenna, Gain: 2.55dBi
Type of Emission:	915KF7D (GFSK) / 1M15G7D (π/4DQPSK) /1M20G7D (8DPSK)

## Bluetooth Low Energy:

Frequency Range:	2402 – 2480MHz
Bluetooth Version:	V4.0 Dual mode
Channel number:	40 channels
Modulation type:	GFSK
Transmit Power:	1.46dBm (Peak)
Antenna Designation:	PIFA Antenna, Gain: 2.55dBi
Type of Emission:	1M05F7D

Operating Frequency:	13.56MHz
Transmit Power:	< 123dBuV/m at 3m.
Number of Channels:	1
Antenna Type:	Loop Antenna
Modulation Type:	ASK, BPSK
Type of Emission:	15K0F1D

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### GSM / WCDMA:

	Operating Frequency		Rated Power				
	GSM/GPRS 850, Class 12	824.2 MHz- 848.8 MHz	33dBm				
	EDGE 850, Class 12	824.2 MHz- 848.8 MHz	27dBm				
Cellular Phone Standards	GSM/GPRS 1900, Class 12	1850.2MHz – 1909.8MHz	30dBm				
Frequency Range and	EDGE 1900, Class 12	1850.2MHz – 1909.8MHz	26dBm				
Power:	WCDMA/HSUPA/HSDPA /HSPA+ Band II	1852.4MHz – 1907.6MHz	24dBm				
	WCDMA/HSUPA/HSDPA /HSPA+ Band IV	1712.4MHz - 1752.6MHz	24dBm				
	WCDMA/HSUPA/HSDPA /HSPA+ Band V	1.820.4MHZ - 840.0MHZ					
Type of Emission:	GSM 850: 248KGXW, GSM 1900: 247KGXW GPRS 850: 247KGXW, GPRS 1900: 247KGXW EDGE 850: 244KG7W, EDGE 1900: 242KG7W WCDMA Band II: 4M20F9W, WCDMA Band IV: 4M16F9W, WCDMA Band V: 4M26F9W HSDPA Band II: 4M22F9W, HSDPA Band IV: 4M23F9W, HSDPA Band V: 4M17F9W HSUPA Band II: 4M20F9W, HSUPA Band IV: 4M25F9W, HSUPA Band V: 4M27F9W						
IMEI:	004402146699511						

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### WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	nannele I		Modulation Technology	Type of Emission		
	5150~5250	4	12.85dBm	12.11dBm		16M7D1D		
11a	5250~5350	4	12.81dBm	13.82dBm	OFDM	16M7D1D		
	5470~5725	11	12.94dBm	15.64dBm		16M6D1D		
	HT20 5150~5250	4	HT20: 12.87dBm	HT20: 12.13dBm		17M7D1D		
11n	HT20 5250~5350	4	HT20: HT20: OFDM		OFDM	17M8D1D		
	HT20 5470~5725	8	HT20: 12.94dBm	HT20: 15.64dBm		17M7D1D		
	HT40 5150~5250	')				36M1D1D		
11n	HT40 5250~5350	2 HT40: HT40: 12.84dBm OFDM		36M1D1D				
	HT40 5470~5725	3	HT40: 11.88dBm	HT40: 14.58dBm		36M0D1D		
Antenna Designation 5GH 5GH			PIFA Antenna, 5GHz Gain: -0.74dBi (5150MHz-5250MHz) 5GHz Gain: 1.01dBi (5250MHz-5350MHz) 5GHz Gain: 2.70dBi (5470MHz-5725MHz)					
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 n_20MHz: 6.5 – 65.0Mbps 802.11 n_40MHz: 13.5 – 135.0Mbps						

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#### WLAN 2.4GHz+5.7GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	Type of Emission		
11b/g	2412-2462	11	b: 17.61dBm g: 21.00dBm	DSSS, OFDM	b: 13M5G1D g: 16M6D1D		
11n	HT20 2412-2462	11	HT20: 21.11dBm	OFDM	n: 17M8D1D		
11a	5725-5850	5	a: 20.12dBm		a: 16M7D1D		
11n (5GHz)	HT20 5725-5850	5	HT20: 20.13dBm	OFDM	n_20HT:17M8D1D		
11n (5GHz)	HT40 5725-5850	2	HT40: 19.66dBm		n_40HT:36M0D1D		
Antenna l	Designation:	PIFA Antenna, 2.4GHz Gain: 2.55dBi 5GHz Gain: 1.66dBi (5725MHz-5850MHz)					
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM					
Transition	n 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 – 65.0Mbps 802.11 n_40MHz: 13.5 – 135.0Mbps					

The 2.4G max antenna gain is 2.55dBi which was choosing for Radiated Spurious Emission test.

The 5G max antenna gain is 1.66dBi 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					NG	Nonna Nonna		Datarate(Mbps)				
Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150

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

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

This submittal(s) (test report) is intended for FCC ID: PY7PM-0480 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. And IC: 4170B-PM0480 filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 8. The composite system (digital device) is compliance with Subpart B is authorized under the certification procedure.

#### 1.3 **Test Methodology**

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009 and ANSI 63.10:2009 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.

#### **Test Facility** 1.4

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. & ANSI C63.10:2009. FCC Registration Number: 990257. Canada Registration Number: 4620A-4.

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

#### **Special Accessories** 1.5

There are no special accessories used while test was conducted.

#### **Equipment Modifications** 1.6

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 & 6.2 ANSI 63.10:2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 & 6.2.2, and 6.2.3 in ANSI 63.10:2009 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, & Section 6.3, 6.4, 6.5, and 6.6 of ANSI 63.10:2009.ANSI C63.10:2009.

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## **Configuration of Tested System**

Fig. 2-1 Radiated Emission

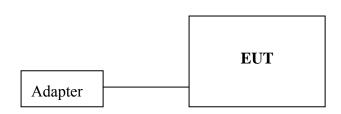
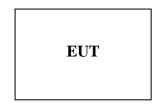


Fig. 2-2 Conducted (Antenna Port) Configuration



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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	<b>Power Cord</b>
1.	WLAN Test Software	QRCT	2.4.83.0	N/A	N/A	N/A

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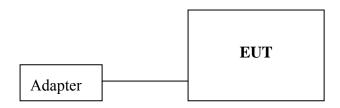
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Fig. 2-3 AC Power Line Conducted Emission



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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	QRCT	2.4.83.0	N/A	N/A	N/A

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## SUMMARY OF TEST RESULTS

FCC 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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### 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 reported.

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### **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					
Magazinamant vingantaintiv	180MHz -417MHz: +/- 3.19dB					
Measurement uncertainty (Polarization : <b>Vertical</b> )	0.417GHz-1GHz: +/- 3.19dB					
(1 olulization : Vertical)	1GHz - 18GHz: +/- 4.04dB					
	18GHz - 40GHz: +/- 4.04dB					
	30MHz - 167MHz: +/- 4.22dB					
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB					
(Polarization : <b>Horizontal</b> )	0.5GHz-1GHz: +/- 3.39dB					
	1GHz - 18GHz: +/- 4.08dB					
	18GHz - 40GHz: +/- 4.08dB					

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

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## CONDUCTED EMISSION TEST

#### 6.1 **Standard Applicable:**

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

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

#### Note

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

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013					
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 & ANSI 63.10:2009.
- 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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<sup>1.</sup> The lower limit shall apply at the transition frequencies

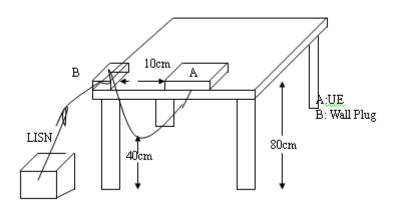
<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.



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



#### **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

#### **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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Temperature:

Humidity:

## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode		Test Date:	Apr. 24, 2013	
Temperature:	26	Humidity:	60 %	Test By:	Marcus

Site ConductionRoom

Limit: FCC Class B Conduction(QP)

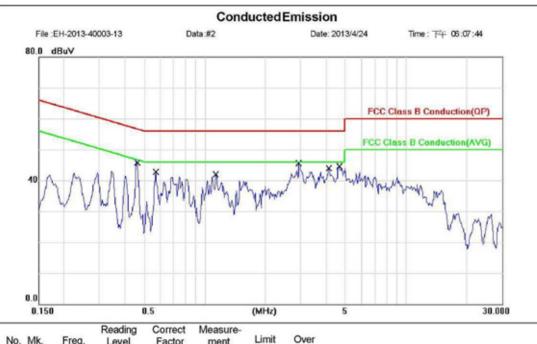
PDA Phone M/N: C1904

Note:

Phase: L1 Power: AC 120V/60Hz

Distance:

Mode: Operationmode



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dΒ	dBuV	dBuV	dΒ	Detector	Comment
1		0.4681	37.79	0.07	37.86	56.55	-18.69	QP.	
2		0.4681	27.37	0.07	27.44	46.55	-19.11	AVG	
3		0.5703	22.96	0.08	23.04	56.00	-32.96	QP.	
4		0.5703	18.65	0.08	18.73	46.00	-27.27	AVG	
5	*	1.1406	41.78	0.08	41.86	56.00	-14.14	QP.	
6		2.9336	31.45	0.10	31.55	56.00	-24.45	QP	
7		2.9336	20.71	0.10	20.81	46.00	-25.19	AVG	
8		4.1406	33.27	0.12	33.39	56.00	-22.61	QP	
9		4.1406	21.85	0.12	21.97	46.00	-24.03	AVG	
10		4.6523	33.13	0.13	33.26	56.00	-22.74	QP	
11		4.6523	23.59	0.13	23.72	46.00	-22.28	AVG	

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Site ConductionRoom

Limit: FCC Class B Conduction(QP)

EUT: PDA Phone M/N: C1904

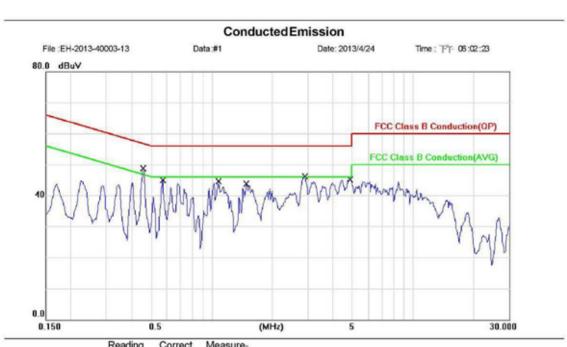
Note:

Phase: AC 120V/60Hz Power:

Distance:

Mode: Operation mode





No.	Mk.	Freq.	Level	Factor	ment	Limit	Over		
		MHz	dBuV	dΒ	dBuV	dBuV	ďΒ	Detector	Comment
1		0.4586	47.21	0.12	47.33	56.72	-9.39	QP.	
2		0.4586	41.62	0.12	41.74	46.72	-4.98	AVG	
3		0.5703	42.78	0.14	42.92	56.00	-13.08	QP.	
4		0.5703	37.22	0.14	37.36	46.00	-8.64	AVG	
5		1.0781	38.71	0.16	38.87	56.00	-17.13	QP.	
6		1.0781	30.31	0.16	30.47	46.00	-15.53	AVG	
7		1.4805	38.88	0.16	39.04	56.00	-16.96	QP.	
8		1.4805	29.48	0.16	29.64	46.00	-16.36	AVG	
9		2.9141	40.99	0.17	41.16	56.00	-14.84	QP.	
10		2.9141	31.72	0.17	31.89	46.00	-14.11	AVG	
11		4.8711	38.96	0.20	39.16	56.00	-16.84	QP	
12		4.8711	29.23	0.20	29.43	46.00	-16.57	AVG	

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### 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.

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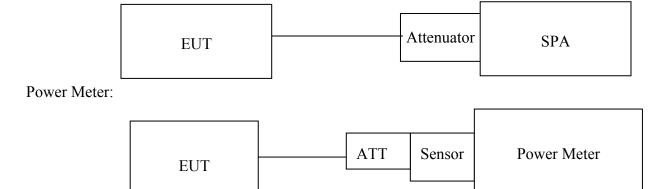
As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signaling alphabet when the 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 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.

## 7.2 Measurement Equipment Used:

Conducted Emission Test Site											
EQUIPMENT	MFR MODEL SERIAL		SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Power Sensor	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014						
Power Meter	Anritsu	MA2411B	917032	02/08/2012	02/07/2014						
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2013	04/14/2014						
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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#### **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.

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, and result as obtained below shows only the most representative ones b = 96.5%, g = 98.2%, and  $n_ht_20 = 98\%$ , a = 98.6,  $n_20(5G) = 99\%$ , and  $n_40(5G) = 99.3\%$ , where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage. Formula:

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

## Test Procedure:

Set span = 0, RBW = 1MHz, VBW = 3MHz, Detector = Peak*Duty Cycle:* 

	<b>Duty Cycle</b>
802.11b	0.965
802.11g	0.982
802.11n_20 (2.4G)	0.980
802.11a	0.986
802.11n_20 (5G)	0.990
802.11n_40 (5G)	0.993

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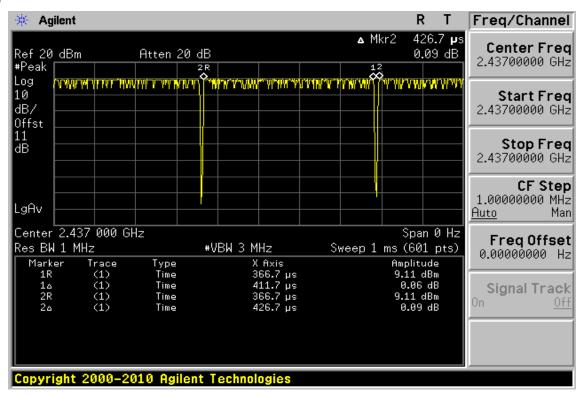
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Duty Cycle Factor:  $10 * \log (1/0.965) = 0.15$ 

## **Duty Factor:**

#### 802.11 b



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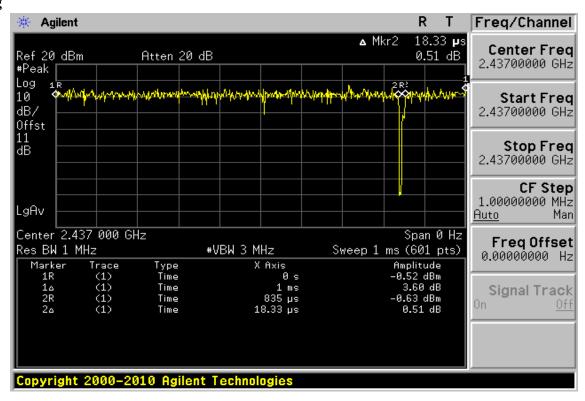
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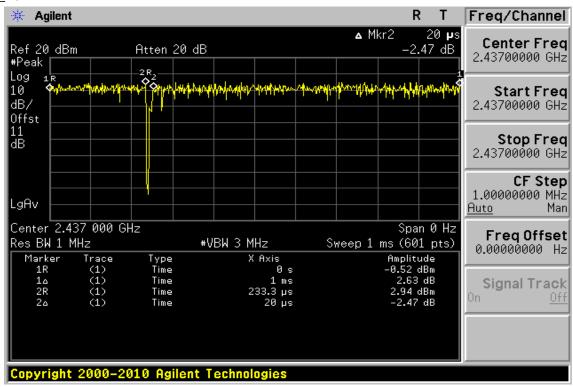
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#### 802.11 g



#### 802.11 n 20 MHz



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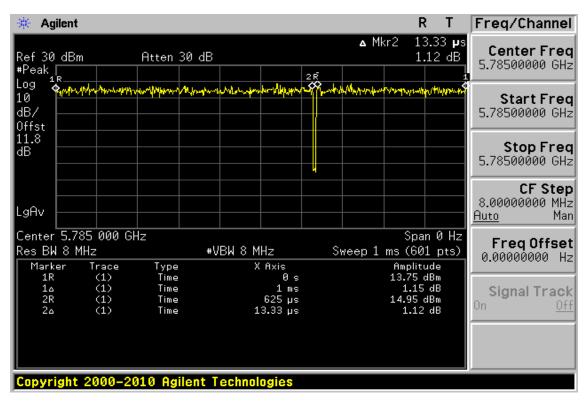
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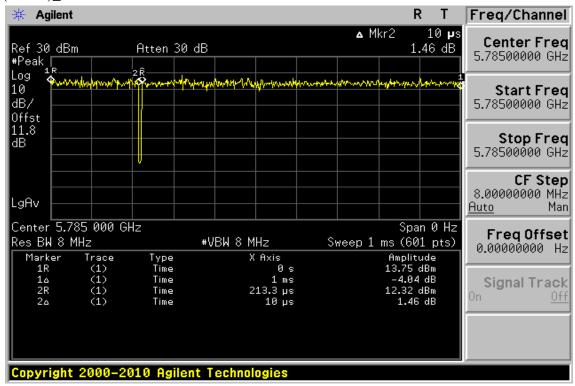
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#### 802.11a



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



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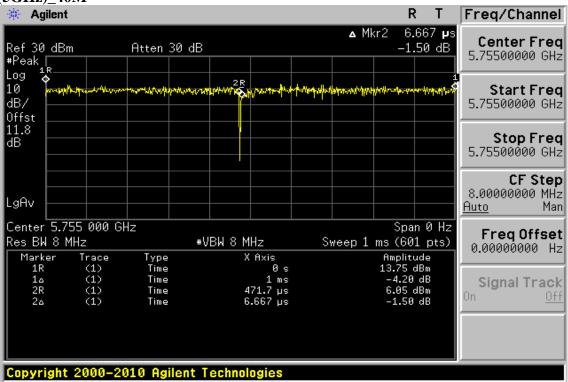
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### 802.11 n (5GHz)\_40M



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

### 802.11b

V2:110													
	_		Peak Power Output (dBm)										
CII	Frequency		Data		Deguined Limit								
СН	(MHz)	1	2	11	Required Limit								
1	2412	17.58	17.55	17.51	17.47	1 Watt = 30 dBm							
6	2437	17.61	17.58	17.55	17.51	1 Watt = 30 dBm							
11	2462	17.55	17.51	17.47	17.42	1 Watt = 30 dBm							

			Average Power Output (dBm)										
CII	Frequency		Data		Degrained Limit								
СН	(MHz)	1	2	11	Required Limit								
1	2412	14.91	<b>14.91</b> 14.88 14.85 14.81										
6	2437	14.87	14.84	14.80	14.77	1 Watt = 30 dBm							
11	2462	14.86	14.82	14.78	14.74	1 Watt = 30 dBm							

#### 802.11g

			Peak Power Output(dBm)											
CII	Frequency				D 1111.4									
СН	(MHz)	6	9	12	18	24	36	48	54	Required Limit				
1	2412	20.75	20.73	20.70	20.68	20.66	20.64	20.62	20.60	1 Watt = 30 dBm				
6	2437	20.91	20.89	20.86	20.84	20.82	20.80	20.78	20.76	1 Watt = 30 dBm				
11	2462	21.00	20.98	20.95	20.93	20.91	20.89	20.87	20.85	1 Watt = 30 dBm				

			Average Power Output(dBm)											
CII	Frequency				D . 11. 4									
СН	(MHz)	6	9	12	18	24	36	48	54	Required Limit				
1	2412	12.08	12.00	11.98	11.94	11.90	11.87	11.85	11.81	1 Watt = 30 dBm				
6	2437	12.17	12.09	12.07	12.03	12.00	11.96	11.93	11.90	1 Watt = 30 dBm				
11	2462	12.30	12.21	12.19	12.15	12.12	12.08	12.05	12.01	1 Watt = 30 dBm				

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### 802.11n 20M

			Peak Power Output(dBm)										
СН	Frequency		Required										
СН	(MHz)	MCS0	MCS0 MCS1 MCS2 MCS3 MCS4 MCS5 MCS6 MCS7										
1	2412	20.85	20.84	20.82	20.79	20.75	20.74	20.72	20.70	1 Watt = 30 dBm			
6	2437	20.66	20.65	20.63	20.60	20.56	20.55	20.53	20.51	1 Watt = 30 dBm			
11	2462	21.11	21.10	21.08	21.05	21.01	21.00	20.98	20.96	1 Watt = 30 dBm			

			Average Power Output(dBm)										
CII	Frequency			Required									
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit			
1	2412	12.13	12.06	12.00	11.98	11.94	11.90	11.87	11.85	1 Watt = 30 dBm			
6	2437	12.17	12.09	12.07	12.03	12.00	11.96	11.93	11.90	1 Watt = 30 dBm			
11	2462	12.31	12.21	12.19	12.15	12.12	12.08	12.05	12.01	1 Watt = 30 dBm			

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### 802.11a

CIT	Frequency		Data Rate										
СН	(MHz)	6	9	Required Limit									
149	5745	20.12	20.10	20.07	20.05	20.02	20.00	19.97	19.95	1 Watt = 30 dBm			
157	5785	20.06	20.04	20.01	19.99	19.96	19.94	19.91	19.89	1 Watt = 30 dBm			
165	5825	19.97	19.95	19.92	19.90	19.87	19.85	19.82	19.80	1 Watt = 30 dBm			

				)						
CIT	Frequency	D . 17								
СН	(MHz)	6	Data Rate           6         9         12         18         24         36         48         54							Required Limit
149	5745	12.81	12.80	12.77	12.76	12.74	12.73	12.71	12.68	1 Watt = 30 dBm
157	5785	12.70	12.66	12.64	12.63	12.60	12.59	12.58	12.56	1 Watt = 30 dBm
165	5825	12.64	12.63	12.61	12.60	12.59	12.58	12.56	12.55	1 Watt = 30 dBm

802.11n (5GHz) 20M

CIT	Frequency		Data Rate									
СН	(MHz)	MCS0								Required Limit		
149	5745	20.05	20.04	20.01	19.99	19.96	19.93	19.92	19.89	1 Watt = 30 dBm		
157	5785	20.08	20.07	20.04	20.02	19.99	19.96	19.95	19.92	1 Watt = 30 dBm		
165	5825	20.13	20.12	20.09	20.07	20.04	20.01	20.00	19.97	1 Watt = 30 dBm		

				)						
CIT	Frequency									
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Required Limit
149	5745	12.90	12.88	12.87	12.84	12.83	12.80	12.79	12.77	1 Watt = 30 dBm
157	5785	12.86	12.84	12.82	12.79	12.76	12.74	12.72	12.71	1 Watt = 30 dBm
165	5825	12.91	12.88	12.87	12.84	12.83	12.80	12.79	12.77	1 Watt = 30 dBm

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802.11n (5GHz) 40M

	(CG112)_ 101												
			Peak Power Output(dBm)										
CIT	Frequency	D . 17											
СН	(MHz)	MCS0	1CS0 MCS1 MCS2 MCS3 MCS4 MCS5 MCS6 MCS7						MCS7	Required Limit			
151	5755	19.66	19.65	19.63	19.60	19.58	19.55	19.54	19.52	1 Watt = 30 dBm			
159	5795	19.20	19.19	19.17	19.14	19.12	19.09	19.08	19.06	1 Watt = 30 dBm			

			Average Power Output(dBm)								
CII	Frequency										
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Required Limit	
151	5755	11.90	11.88	11.87	11.84	11.83	11.80	11.79	11.77	1 Watt = 30 dBm	
159	5795	11.86	11.84	11.82	11.79	11.76	11.74	11.72	11.71	1 Watt = 30 dBm	

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

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#### 802.11b

			EIRP (dBm)										
СН	Frequency		Doguinal Limit										
Сн	(MHz)	1	2	5.5	11	Required Limit							
1	2412	17.46	17.43	17.4	17.36	4 Watts = 36 dBm							
6	2437	17.42	17.39	17.35	17.32	4 Watts = 36 dBm							
11	2462	17.41	17.37	17.33	17.29	4 Watts = 36 dBm							

### 802.11g

02.11g														
			EIRP (dBm)											
CII	Frequency				D									
СН	(MHz)	6	9	12	18	24	36	48	54	Required Limit				
1	2412	14.63	14.55	14.53	14.49	14.45	14.42	14.40	14.36	4 Watts = 36 dBm				
6	2437	14.72	14.64	14.62	14.58	14.55	14.51	14.48	14.45	4 Watts = 36 dBm				
11	2462	14.85	14.76	14.74	14.70	14.67	14.63	14.60	14.56	4 Watts = 36 dBm				

#### 802.11n 20M

0020	702.11I_2071												
			EIRP (dBm)										
CII	Frequency		Required										
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Limit			
1	2412	14.68	14.61	14.55	14.53	14.49	14.45	14.42	14.40	4 Watts = 36 dBm			
6	2437	14.72	14.64	14.62	14.58	14.55	14.51	14.48	14.45	4 Watts = 36 dBm			
11	2462	14.86	14.76	14.74	14.70	14.67	14.63	14.60	14.56	4 Watts = 36 dBm			

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### 802.11a

CII	Frequency				Data	Rate				D . 17. "
СН	CH (MHz)	6	9	12	18	24	36	48	54	Required Limit
149	5745	14.47	14.46	14.43	14.42	14.40	14.39	14.37	14.34	4 Watts = 36 dBm
157	5785	14.36	14.32	14.30	14.29	14.26	14.25	14.24	14.22	4 Watts = 36 dBm
165	5825	14.30	14.29	14.27	14.26	14.25	14.24	14.22	14.21	4 Watts = 36 dBm

802.11n (5GHz) 20M

CII	Frequency									
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Required Limit
149	5745	14.56	14.54	14.53	14.50	14.49	14.46	14.45	14.43	4 Watts = 36 dBm
157	5785	14.52	14.50	14.48	14.45	14.42	14.40	14.38	14.37	4 Watts = 36 dBm
165	5825	14.57	14.54	14.53	14.50	14.49	14.46	14.45	14.43	4 Watts = 36 dBm

802.11n (5GHz) 40M

			EIRP (dBm)									
CII	Frequency											
СН	(MHz)	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	Required Limit		
151	5755	13.56	13.54	13.53	13.50	13.49	13.46	13.45	13.43	4 Watts = 36 dBm		
159	5795	13.52	13.50	13.48	13.45	13.42	13.40	13.38	13.37	4 Watts = 36 dBm		

<sup>\*</sup> Note: EIRP = Average Power + Gain, where the nominal gain of the antenna (2.55dBi for 2.4GHz, and 1.66dBi for 5GHz

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### 6dB BANDWIDTH

## **Standard Applicable:**

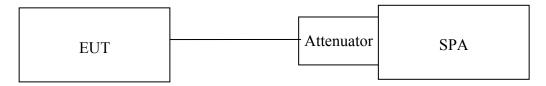
According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

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.

#### **Measurement Equipment Used:** 8.2

	Conducted Emission Test Site											
EQUIPMENT	MFR	MFR MODEL		LAST	CAL DUE.							
TYPE		NUMBER	NUMBER	CAL.								
Power Sensor	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014							
Power Meter	Anritsu	MA2411B	917032	02/08/2012	02/07/2014							
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2013	04/14/2014							
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							

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



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#### **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:**

#### 802.11b

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
2412	8592	> 500	PASS
2437	8578	> 500	PASS
2462	8143	> 500	PASS

#### 802.11g

Frequency	Bandwidth	Limit	Result	
(MHz)	(kHz)	(kHz)		
2412	16414	> 500	PASS	
2437	16398	> 500	PASS	
2462	16465	> 500	PASS	

#### 802.11n\_20M

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
2412	17628	> 500	PASS
2437	17611	> 500	PASS
2462	17666	> 500	PASS

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#### 802.11a

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
5745	16457	> 500	PASS
5785	16388	> 500	PASS
5825	16389	> 500	PASS

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

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
5745	17650	> 500	PASS
5785	17638	> 500	PASS
5825	17636	> 500	PASS

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

Frequency	Bandwidth	Limit	Result
(MHz)	(kHz)	(kHz)	
5755	35381	> 500	PASS
5795	34931	> 500	PASS

\* Note: Offset 11dB for 2.4G 802.11b/g/n\_20;

Offset 11.8dB for 5G 802.11a/n\_20/n\_40.

\* Note: The arrow "->" reveals X decibel level

\*Refer to next page for plots

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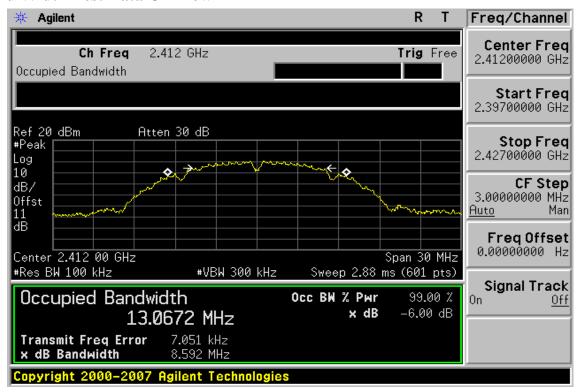


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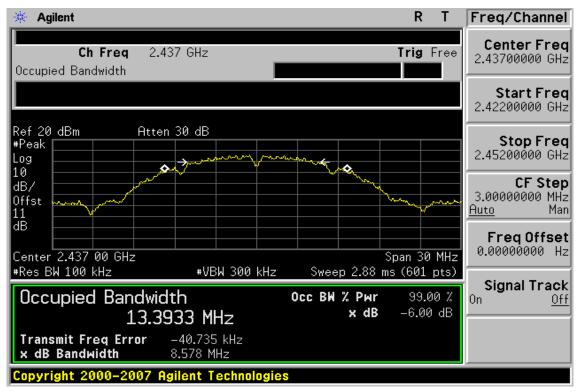
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#### 802.11b

## 6dB Band Width Test Data CH-Low



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



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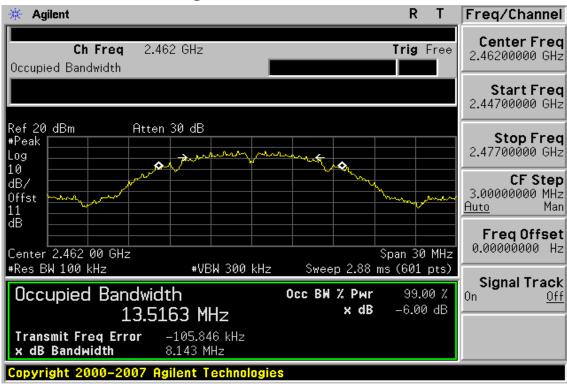
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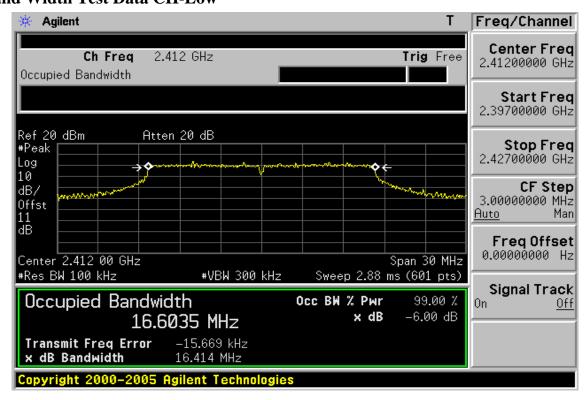
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## 6dB Band Width Test Data CH-High



802.11g

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



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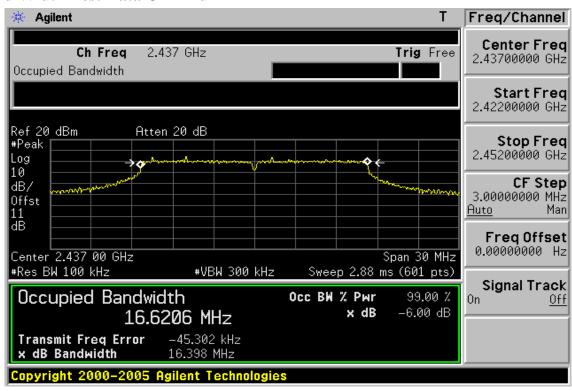
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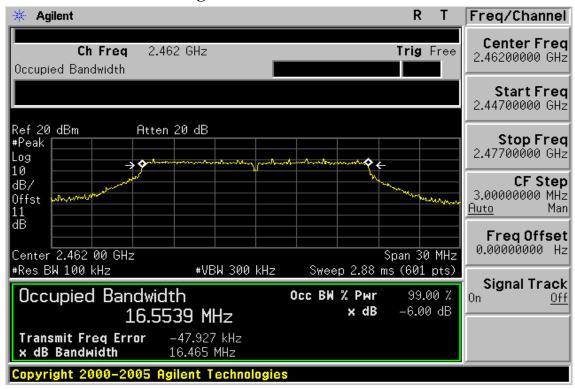
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#### 6dB Band Width Test Data CH-Mid



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



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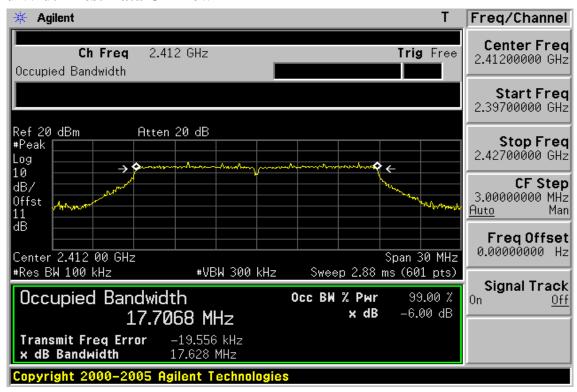


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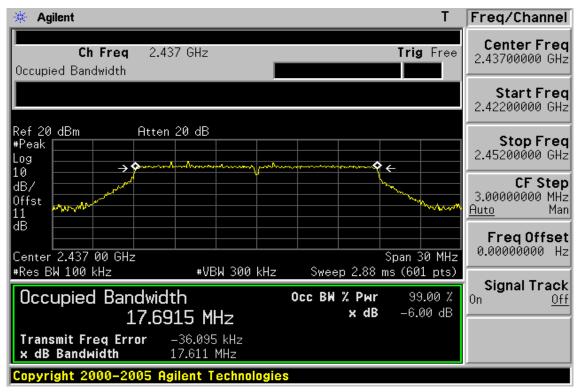
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#### 802.11n\_20M

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



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



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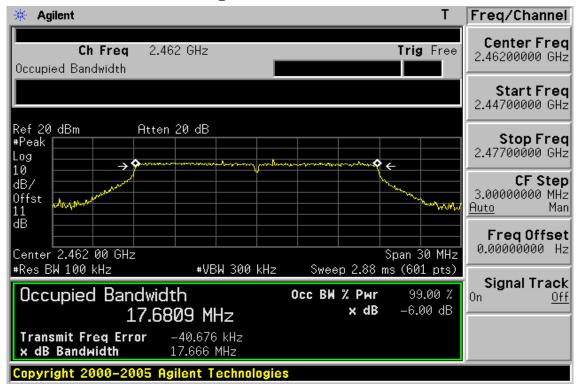
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## 6dB Band Width Test Data CH-High



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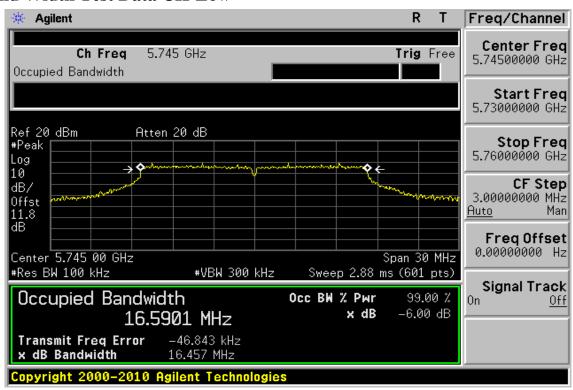


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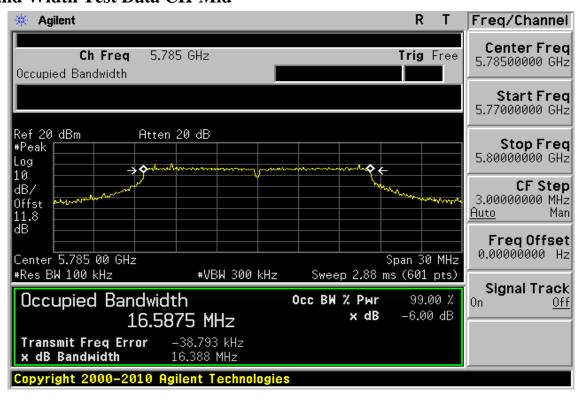
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#### 802.11a

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



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



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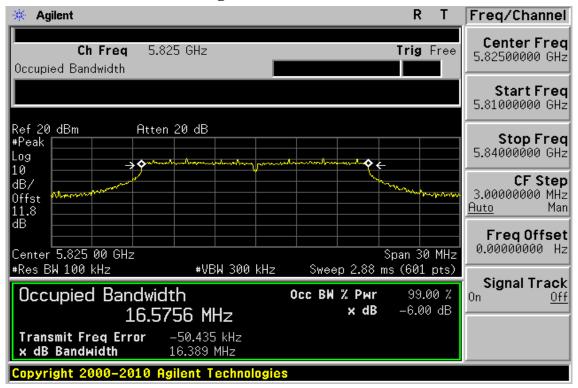
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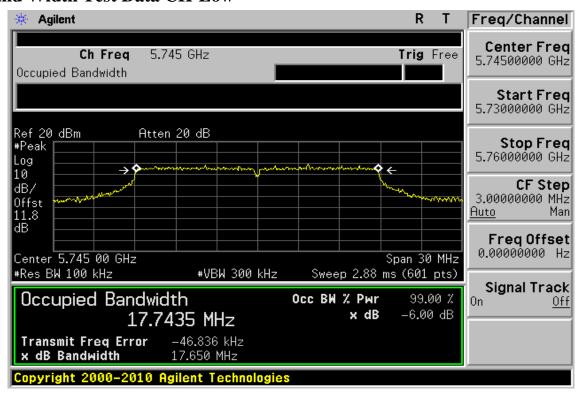
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## 6dB Band Width Test Data CH-High



## 802.11n (5GHz) 20M

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



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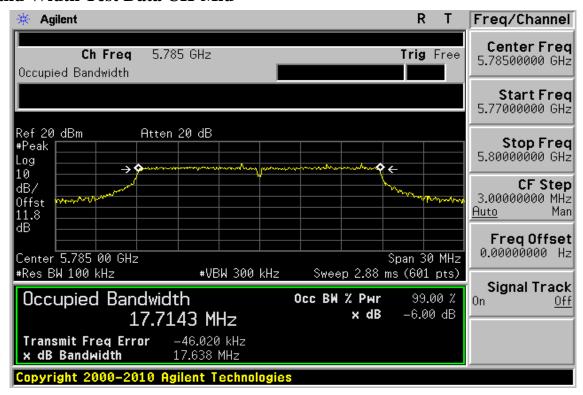
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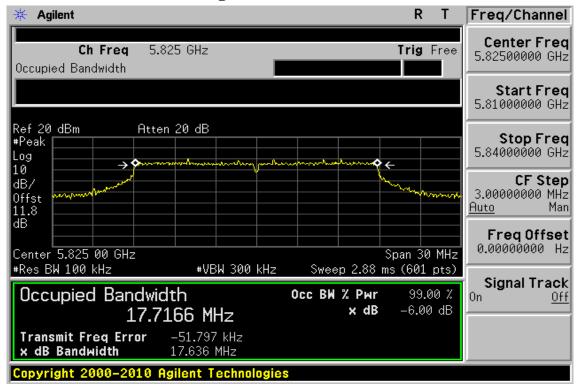
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#### 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High



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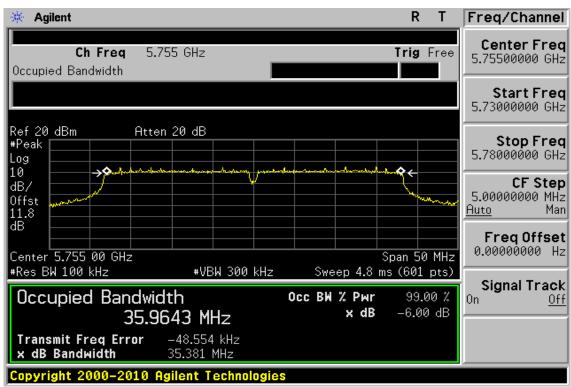
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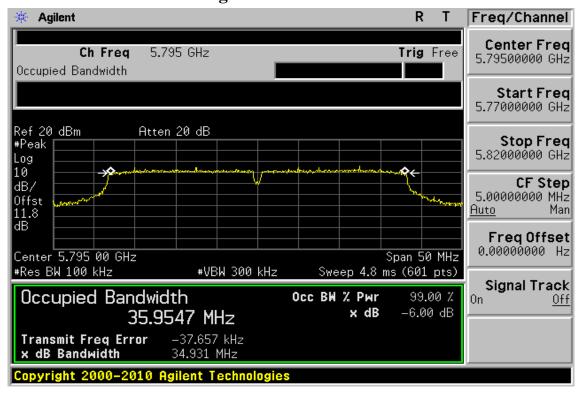
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## 802.11n (5GHz) 40M 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-High



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#### BAND EDGES MEASUREMENT

#### **Standard Applicable:** 9.1

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 in 15.209(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.

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

#### **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	04/15/2013	04/14/2014			
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	05/19/2011	05/18/2013			
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013			
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2013	01/03/2014			
Pre-Amplifier	FMC Instruments		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			
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	07/15/2012	07/14/2013			

966 Chamber							
EQUIPMENT MFR MODEL SERIAL LAST CAL D							
ТҮРЕ		NUMBER	NUMBER	CAL.			
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2013	05/18/2014		

Note: The measurement was taken place with the long duration of the time, and additional equipment list as shown above indicate those equipment of which has been subject to undertake the calibration in intermediate period of time of the measurement.

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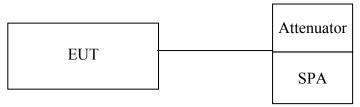


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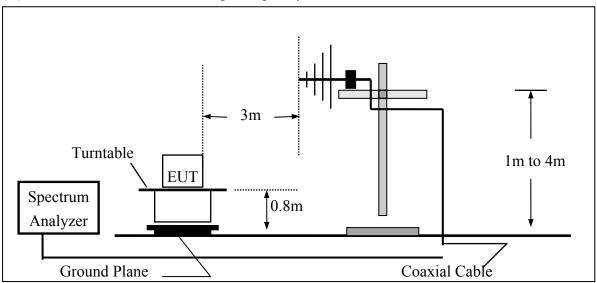
#### 9.3 Test SET-UP:

#### 9.3.1 Conducted Emission at antenna port:

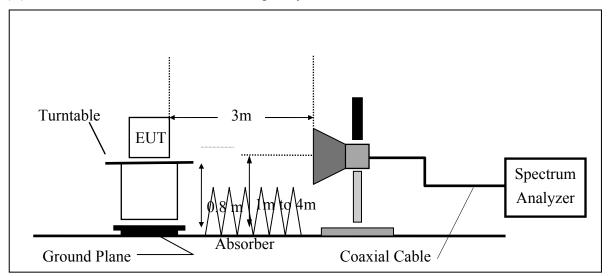


#### 9.3.2 Radiated emission:

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



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



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#### **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 11.1 of KDB558074:

- 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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#### 9.5 **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	

#### **Measurement Result:**

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

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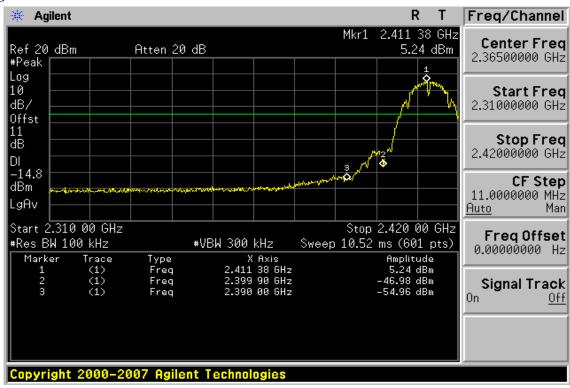
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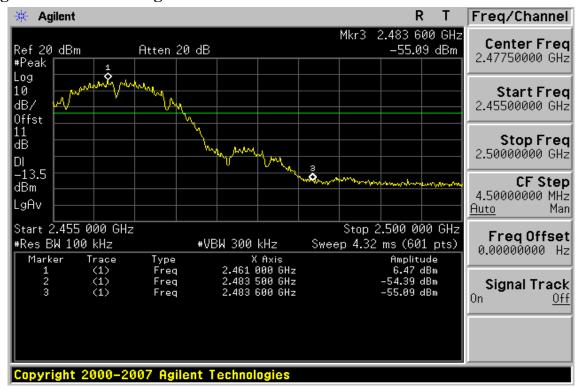
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## 802.11b - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



## **Band Edges Test Data CH-High**



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#### **Tabular Results:**

#### 802.11b

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
2.3999	-46.98	5.24	-15.0	Pass
2.4835	-54.39	6.47	-13.5	Pass

Note: Limit = Ref (The highest level of emission) dBm - 20dBm

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#### **Radiated Emission:**

For measurement plot of radiation revealing the compliance of 15,209, please refer to Appendix I.

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

**Operation Band** :802.11 b Test Date :2013-05-27 :2412 MHz power 15 dBm Temp./Humi. Fundamental Frequency :23deg C/52RH

Operation Mode :Band edge LOW Engineer  $\cdot JJ$ 

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

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2388.67	E	Average	37.25	2.12	39.37	54.00	-14.63
2388.67	E	Peak	55.20	2.12	57.32	74.00	-16.68
2390.00	E	Average	35.09	2.12	37.21	54.00	-16.79
2390.00	E	Peak	51.41	2.12	53.53	74.00	-20.47

**Operation Band** Test Date :802.11 b :2013-05-27 Fundamental Frequency :2412 MHz power 15 dBm Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2387.67	E	Average	42.00	2.72	44.72	54.00	-9.28
2387.67	E	Peak	61.24	2.72	63.96	74.00	-10.04
2390.00	E	Average	40.98	2.74	43.72	54.00	-10.28
2390.00	E	Peak	58.00	2.74	60.74	74.00	-13.26

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**Operation Band** :802.11 b Test Date :2013-05-27 Fundamental Frequency :2462 MHz power 15 dBm Temp./Humi. :23deg C/52RH

Operation Mode :Band edge HIGH Engineer

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

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

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

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

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2483.50	E	Average	37.88	2.53	40.41	54.00	-13.59
2483.50	E	Peak	53.12	2.53	55.65	74.00	-18.35
2486.76	E	Average	38.83	2.53	41.36	54.00	-12.64
2486.76	E	Peak	53.94	2.53	56.47	74.00	-17.53

Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2462 MHz power 15 dBm Temp./Humi. :23deg C/52RH

Operation Mode :Band edge HIGH Engineer :JJ

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBμV/m	dB
2483.50	E	Average	37.82	3.56	41.38	54.00	-12.62
2483.50	E	Peak	51.52	3.56	55.08	74.00	-18.92
2486.70	E	Average	38.45	3.57	42.02	54.00	-11.98
2486.70	E	Peak	53.82	3.57	57.39	74.00	-16.61

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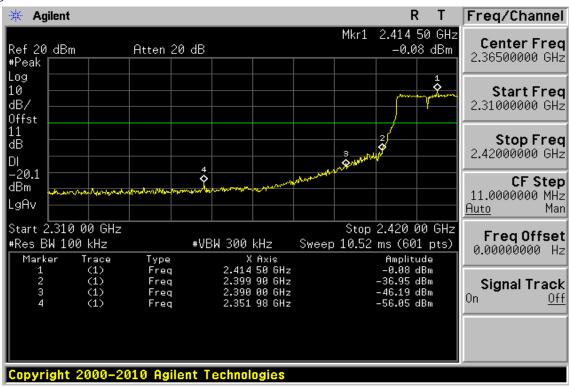
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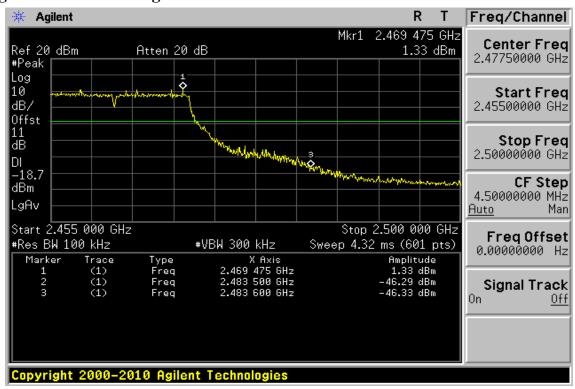
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# **802.11g - Unwanted Emissions into Non-Restricted Frequency Bands Band Edges Test Data CH-Low**



#### **Band Edges Test Data CH-High**



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#### **Tabular Results:**

#### 802.11g

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
2.3999	-36.95	-0.08	-20.10	Pass
2.4836	-46.33	1.33	-18.70	Pass

Note: Limit = Ref (The highest level of emission) dBm - 20dBm

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#### **Radiated Emission:**

For measurement plot of radiation revealing the compliance of 15.209, please refer to Appendix I.

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

**Operation Band** :802.11 g Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer :Nick

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	40.33	2.12	42.45	54.00	-11.55
2390.00	E	Peak	57.86	2.12	59.98	74.00	-14.02

Operation Band Test Date :2013-05-01 :802.11 g Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

:Nick Operation Mode :Band edge LOW Engineer

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	50.30	2.74	53.04	54.00	-0.96
2390.00	E	Peak	67.60	2.74	70.34	74.00	-3.66

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**Operation Band** :802.11 g Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge HIGH Engineer :Nick

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.

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	37.79	2.53	40.32	54.00	-13.68
2483.50	E	Peak	52.57	2.53	55.10	74.00	-18.90
Operation Band	d	:802.11 g	Tes	t Date		:2013-05-01	

:2462 MHz Fundamental Frequency Temp./Humi. :23deg C/52RH

Operation Mode :Band edge HIGH Engineer :Nick

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.

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

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	41.08	3.56	44.64	54.00	-9.36
2483.50	E	Peak	59.74	3.56	63.30	74.00	-10.70

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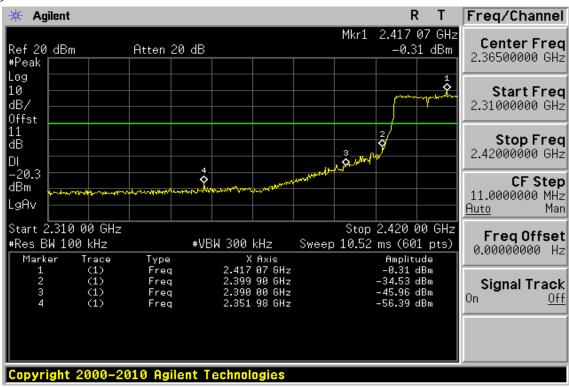
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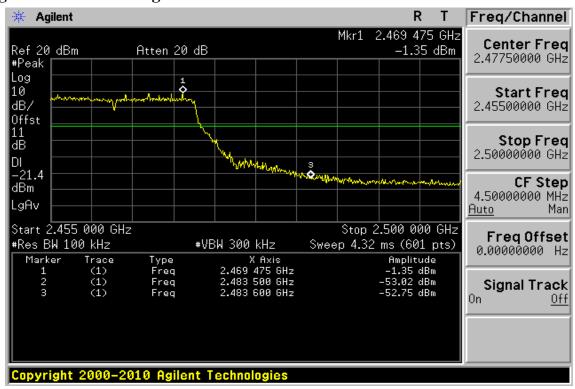
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## 802.11n\_20M- Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



#### **Band Edges Test Data CH-High**



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#### 802.11n\_20MHz

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
2.3999	-34.53	-0.31	-20.30	Pass
2.4836	-52.75	-1.35	-21.40	Pass

Note: Limit = Ref (The highest level of emission) dBm - 20dBm

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#### Radiated Emission: 802.11 n 20M mode

For measurement plot of radiation revealing the compliance of 15.209, please refer to Appendix I

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n 20M mode

**Operation Band** :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer :Nick

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.

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

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
2390.00	E	Average	41.17	2.12	43.29	54.00	-10.71
2390.00	E	Peak	57.17	2.12	59.29	74.00	-14.71

Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer :Nick

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	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	50.42	2.74	53.16	54.00	-0.84
2390.00	E	Peak	66.03	2.74	68.77	74.00	-5.23

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:HORIZONTAL

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge HIGH Engineer :Nick

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.

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 Leve	el	FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	39.52	2.53	42.05	54.00	-11.95
2483.50	E	Peak	55.54	2.53	58.07	74.00	-15.93
Operation Band Fundamental Frequency Operation Mode		:802.11 n20 :2462 MHz :Band edge		Test Date Temp./Humi. Engineer		:2013-05-01 :23deg_C/52 :Nick	RH

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

:E2 Plan

EUT Pol.

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

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

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

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

Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	41.98	3.56	45.54	54.00	-8.46
2483.50	E	Peak	58.74	3.56	62.30	74.00	-11.70

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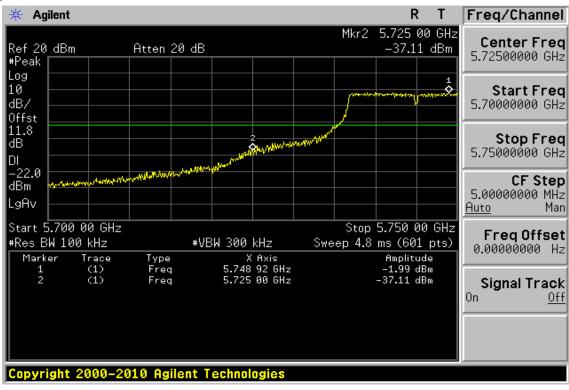
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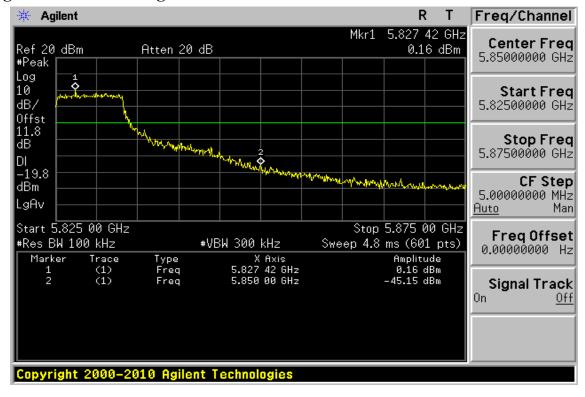
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# 802.11a - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



#### **Band Edges Test Data CH-High**



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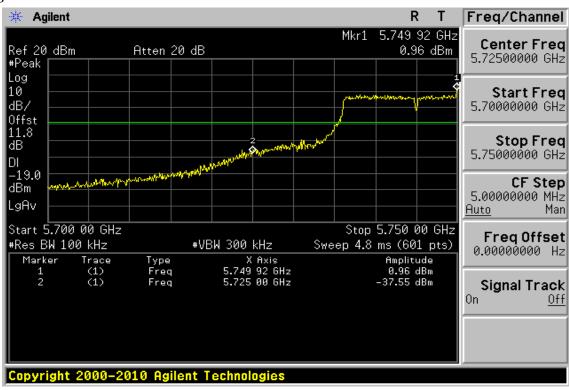
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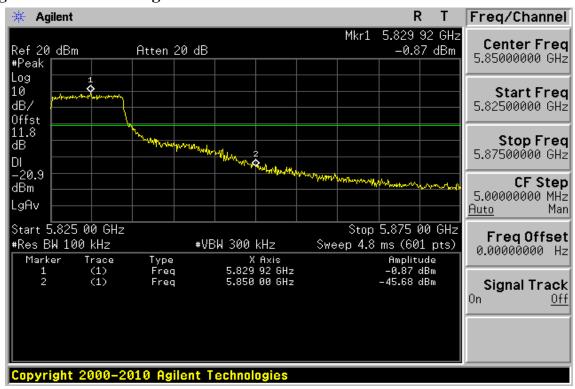
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# 802.11n (5GHz)\_20M - Unwanted Emissions into Non-Restricted Frequency Bands Band Edges Test Data CH-Low



#### **Band Edges Test Data CH-High**



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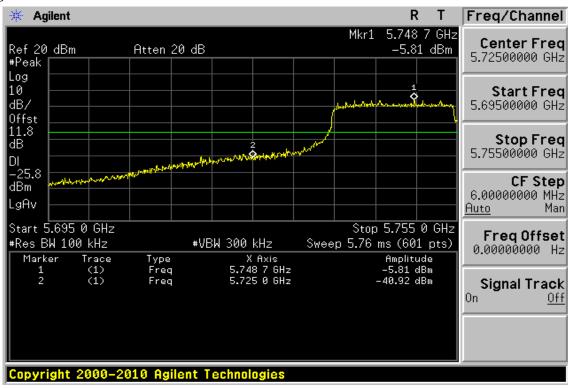
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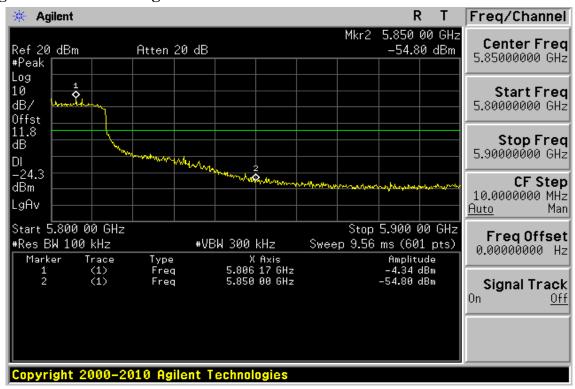
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## 802.11n (5GHz)\_40M - Unwanted Emissions into Non-Restricted Frequency Bands **Band Edges Test Data CH-Low**



#### **Band Edges Test Data CH-High**



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#### **Tabular Results:**

#### 802.11a

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
5.7250	-37.11	-1.99	-22.00	Pass
5.8500	-45.15	0.16	-19.80	Pass

#### 802.11n\_20M

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
5.7250	-37.55	0.96	-19.00	Pass
5.8500	-45.68	-0.87	-20.90	Pass

#### 802.11n\_40M

Frequency (GHz)	Results (dBm)	Ref (dBm)	Limit (dBm)	Verdict
5.7250	-40.92	-5.81	-25.80	Pass
5.8500	-54.80	-4.34	-24.30	Pass

Note: Limit = Ref (The highest level of emission) dBm - 20dBm

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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 emis-
- 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:**

- To connect Antenna Port of EUT to Spectrum. 1.
- Set RBW = 100K & VBW = 300K on Spectrum. 2.
- 3. 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)
- Via Software, combine 5 spans of frequency range into one plot 4.
- Repeat above procedures until all default test channel measured were complete. 5.

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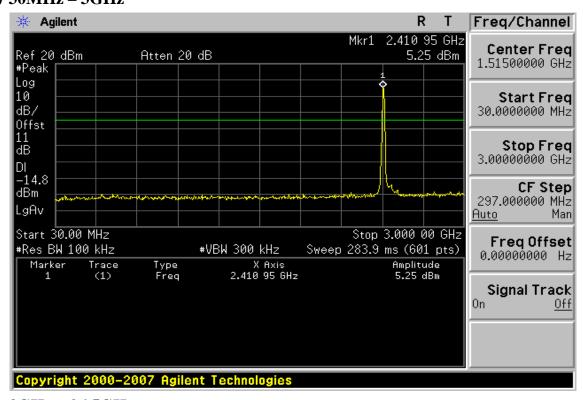
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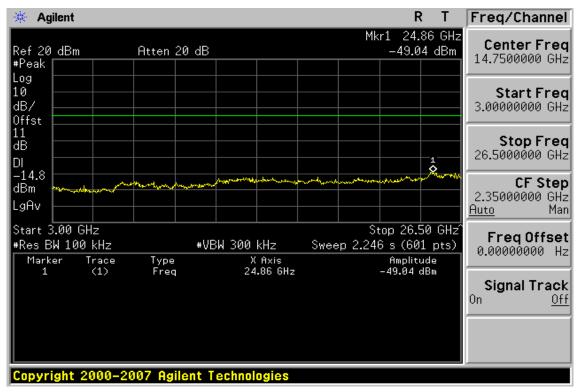
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## Conducted Spurious Emission Measurement Result (802.11b) Ch Low 30MHz – 3GHz



#### Ch Low 3GHz - 26.5GHz



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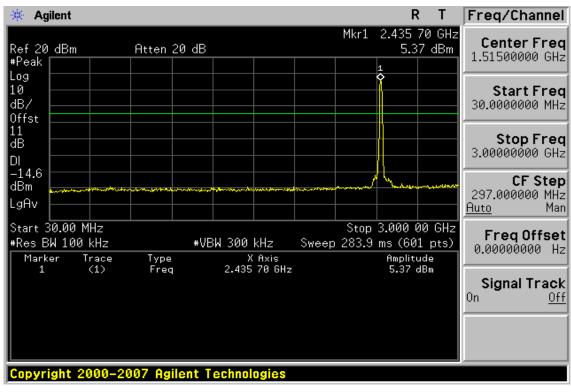
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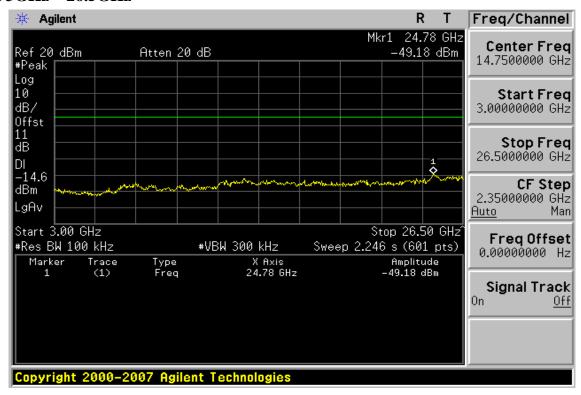
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#### Ch Mid 30MHz - 3GHz



### Ch Mid 3GHz - 26.5GHz



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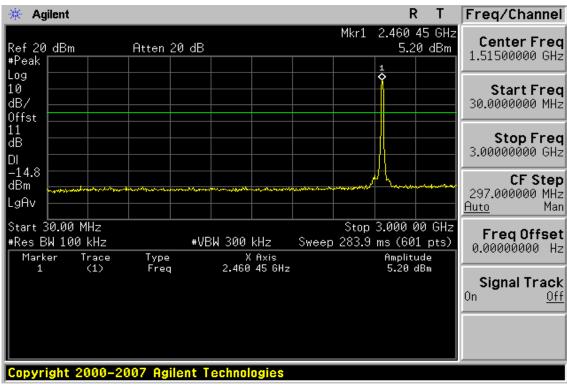
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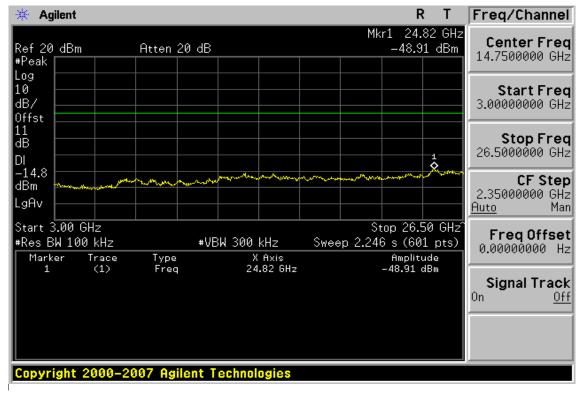
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# Ch High 30MHz – 3GHz



# Ch High 3GHz – 26.5GHz



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# **Tabular Results:**

### Out of Band emission at antenna terminals – 802.11b

Engineer Fundamental Frequency 2412 MHz :Nick

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2412.00	Ref	5.25		
< 30	S		-14.80	
30-1000	S		-14.80	
4824.00	Н		-14.80	
7236.00	Н		-14.80	
9648.00	Н		-14.80	
12060.00	Н		-14.80	
14472.00	Н		-14.80	
16884.00	Н		-14.80	
19296.00	Н		-14.80	
24120.00	Н		-14.80	
24860.00	S	-49.04	-14.80	34.24

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency Engineer 2437 MHz :Nick Operation Mode :TX Mid

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2437.00	Ref	5.37		
<30	S		-14.60	
30-1000	S		-14.60	
4874.00	Н		-14.60	
7311.00	Н		-14.60	
9748.00	Н		-14.60	
12185.00	Н		-14.60	
14622.00	Н		-14.60	
17059.00	Н		-14.60	
19496.00	Н		-14.60	
21933.00	Н		-14.60	
24370.00	Н		-14.60	
24780.00	S	-49.18	-14.60	34.58

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency 2462 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2462.00	Ref	5.20		
<30	S		-14.80	
30-1000	S		-14.80	
4924.00	Н		-14.80	
7386.00	Н		-14.80	
9848.00	Н		-14.80	
12310.00	Н		-14.80	
14772.00	Н		-14.80	
17234.00	Н		-14.80	
19696.00	Н		-14.80	
22158.00	Н		-14.80	
24620.00	Н		-14.80	
24820.00	S	-48.91	-14.80	34.11

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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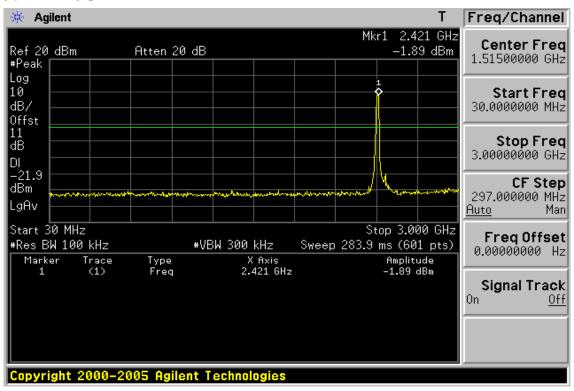
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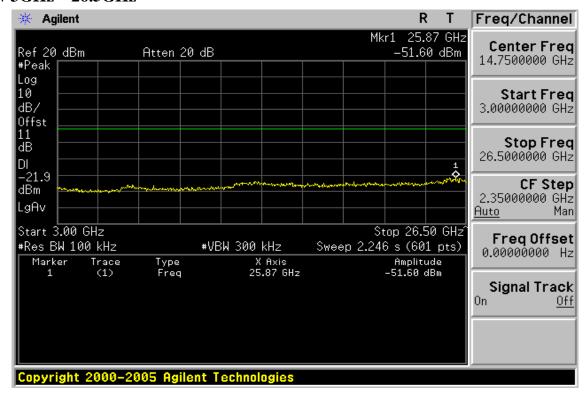
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# **Conducted Spurious Emission Measurement Result (802.11g)** Ch Low 30MHz - 3GHz



#### Ch Low 3GHz - 26.5GHz



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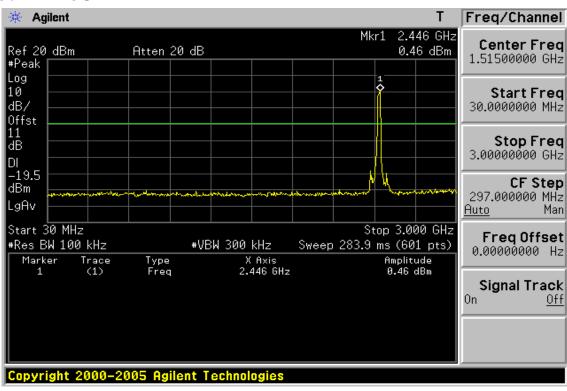
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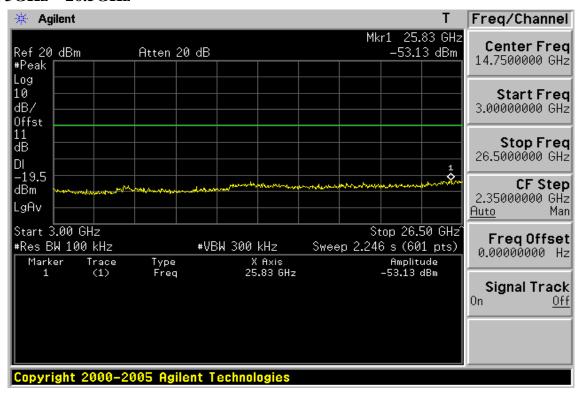
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#### Ch Mid 30MHz - 3GHz



### Ch Mid 3GHz - 26.5GHz



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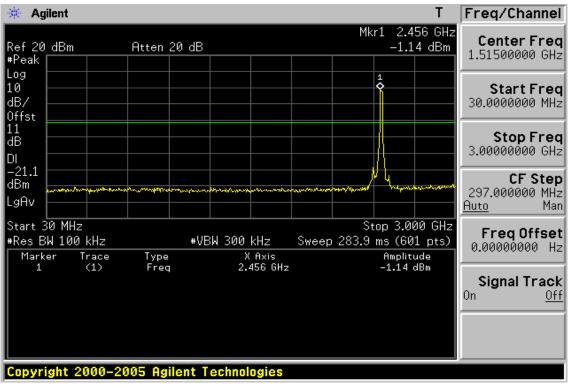
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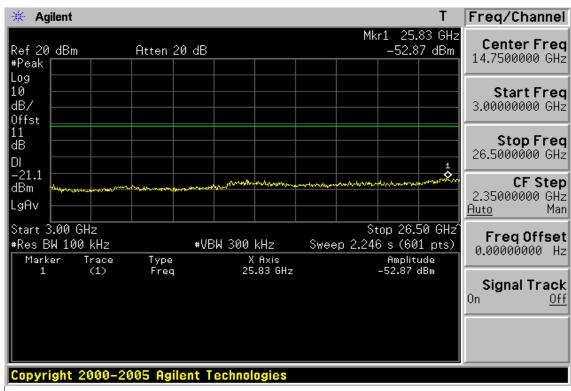
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# Ch High 30MHz - 3GHz



## Ch High 3GHz – 26.5GHz



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# **Tabular Results:**

### Out of Band emission at antenna terminals – 802.11g

Fundamental Frequency 2412 MHz :Nick Engineer

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2412.00	Ref	-1.89		
<30	S		-21.90	
30-1000	S		-21.90	
4824.00	Н		-21.90	
7236.00	Н		-21.90	
9648.00	Н		-21.90	
12060.00	Н		-21.90	
14472.00	Н		-21.90	
16884.00	Н		-21.90	
19296.00	Н		-21.90	
24120.00	Н		-21.90	
25870.00	S	-51.6	-21.90	29.70

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency Engineer 2437 MHz :Nick Operation Mode :TX Mid

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2437.00	Ref	0.46		
<30	S		-19.50	
30-1000	S		-19.50	
4874.00	Н		-19.50	
7311.00	Н		-19.50	
9748.00	Н		-19.50	
12185.00	Н		-19.50	
14622.00	Н		-19.50	
17059.00	Н		-19.50	
19496.00	Н		-19.50	
21933.00	Н		-19.50	
24370.00	Н		-19.50	
25830.00	S	-53.13	-19.50	33.63

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency 2462 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2462.00	Ref	-1.14		
<30	S		-21.10	
30-1000	S		-21.10	
4924.00	Н		-21.10	
7386.00	Н		-21.10	
9848.00	Н		-21.10	
12310.00	Н		-21.10	
14772.00	Н		-21.10	
17234.00	Н		-21.10	
19696.00	Н		-21.10	
22158.00	Н		-21.10	
24620.00	Н		-21.10	
25830.00	S	-52.87	-21.10	31.77

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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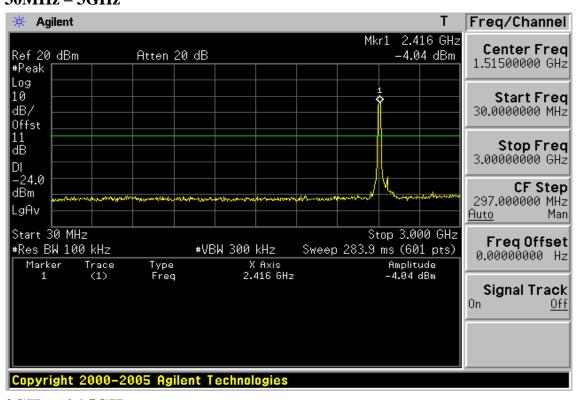
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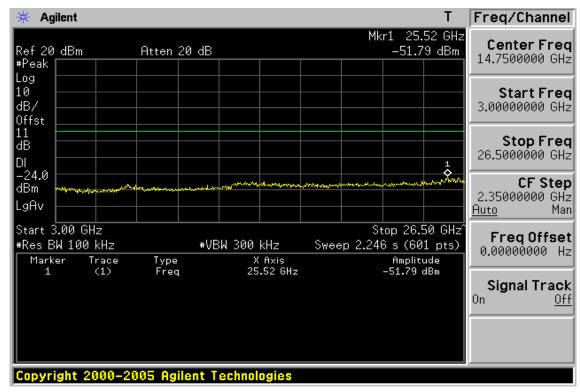
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# Conducted Spurious Emission Measurement Result (802.11n\_20M) Ch Low 30MHz – 3GHz



### Ch Low 3GHz - 26.5GHz



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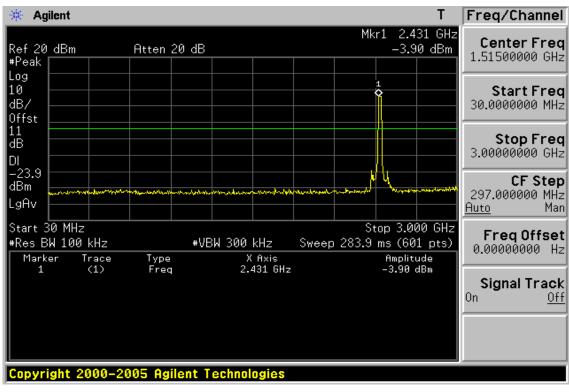
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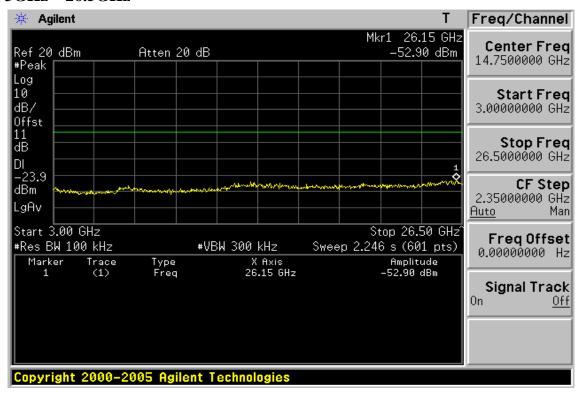
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#### Ch Mid 30MHz - 3GHz



### Ch Mid 3GHz - 26.5GHz



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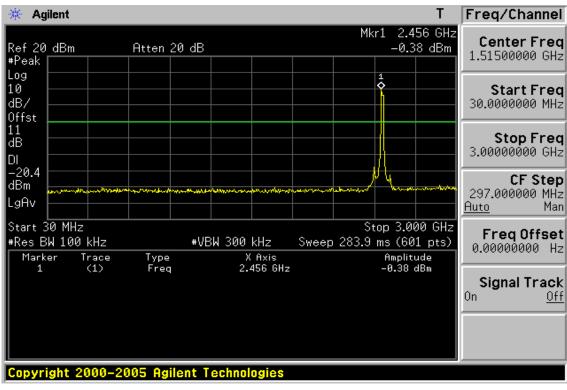
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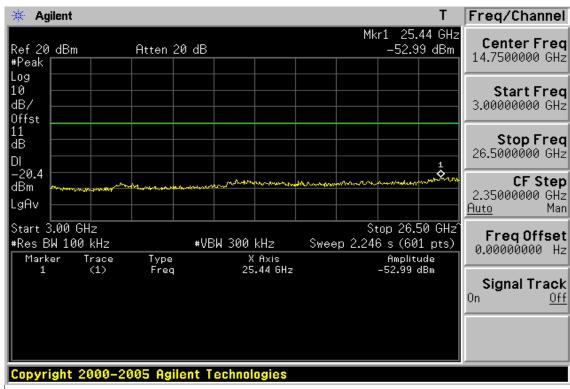
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# Ch High 30MHz - 3GHz



### Ch High 3GHz – 26.5GHz



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### **Tabular Results:**

### Out of Band emission at antenna terminals - 802.11n\_20M

Fundamental Frequency 2412 MHz Engineer :Nick

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2412.00	Ref	-4.04		
<30	S		-24.00	
30-1000	S		-24.00	
4824.00	Н		-24.00	
7236.00	H		-24.00	
9648.00	Н		-24.00	
12060.00	H		-24.00	
14472.00	Н		-24.00	
16884.00	Н		-24.00	
19296.00	Н		-24.00	
24120.00	Н		-24.00	
25520.00	S	-51.79	-24.00	27.79

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency Engineer 2437 MHz :Nick Operation Mode :TX Mid

Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
Ref	-3.90		
S		-23.90	
S		-23.90	
Н		-23.90	
S	-52.9	-23.90	29.00
	F/H/E/S  Ref S S H H H H H H	F/H/E/S dBm  Ref -3.90 S S H H H H H H H H H H H H	F/H/E/S       dBm       dBm         Ref       -3.90          S        -23.90         H        -23.90

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency 2462 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
2456.00	Ref	-0.38		
<30	S		-20.40	
30-1000	S		-20.40	
4924.00	Н		-20.40	
7386.00	Н		-20.40	
9848.00	Н		-20.40	
12310.00	Н		-20.40	
14772.00	Н		-20.40	
17234.00	Н		-20.40	
19696.00	Н		-20.40	
22158.00	Н		-20.40	
24620.00	Н		-20.40	
25440.00	S	-52.99	-20.40	32.59

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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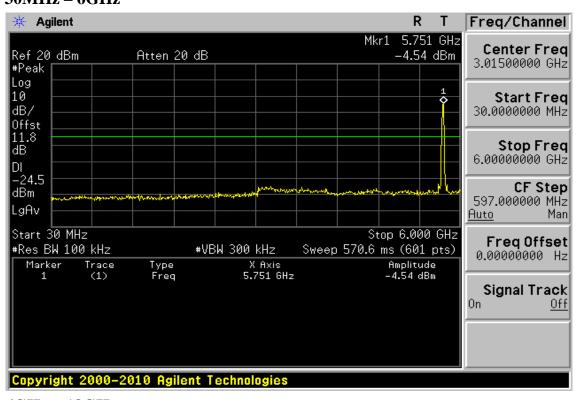
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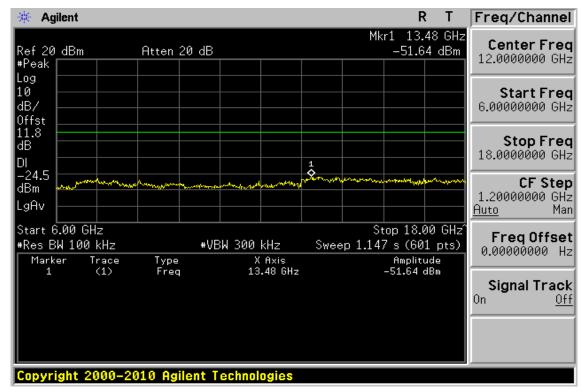
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# Conducted Spurious Emission Measurement Result (802.11a) Ch Low 30MHz – 6GHz



### Ch Low 6GHz - 18GHz



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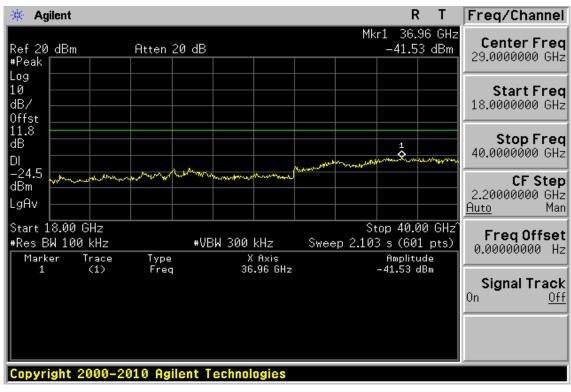
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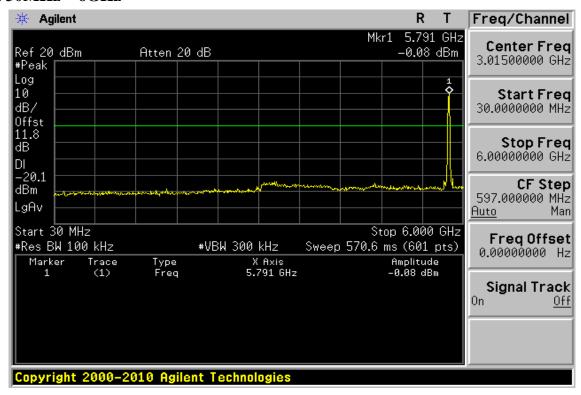
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#### Ch Low 18GHz – 40GHz



#### Ch Mid 30MHz – 6GHz



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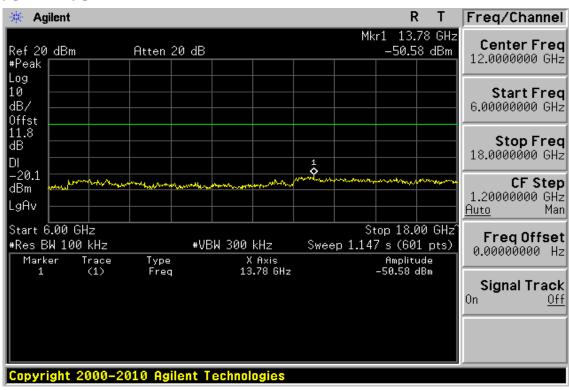
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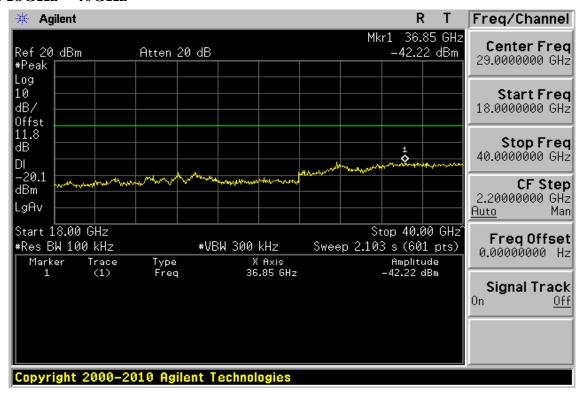
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#### Ch Mid 6GHz – 18GHz



#### Ch Mid 18GHz – 40GHz



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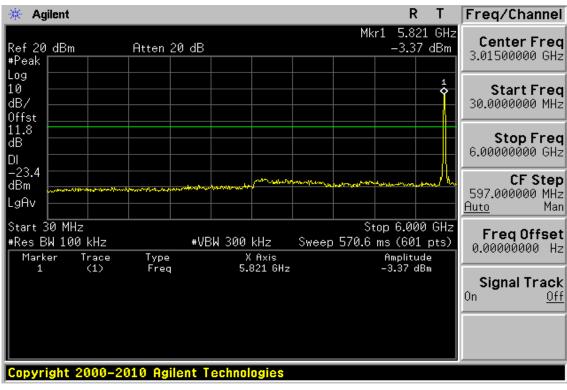
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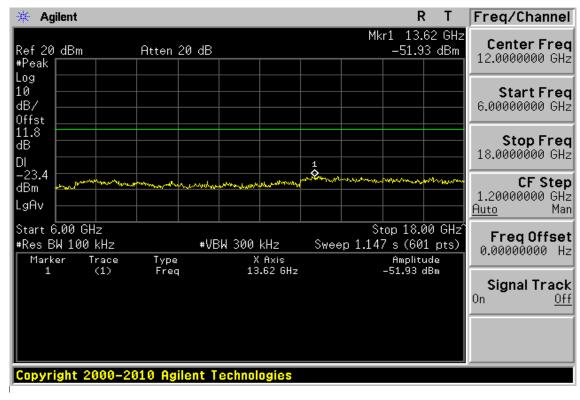
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# Ch High 30MHz – 6GHz



## Ch High 6GHz - 18GHz



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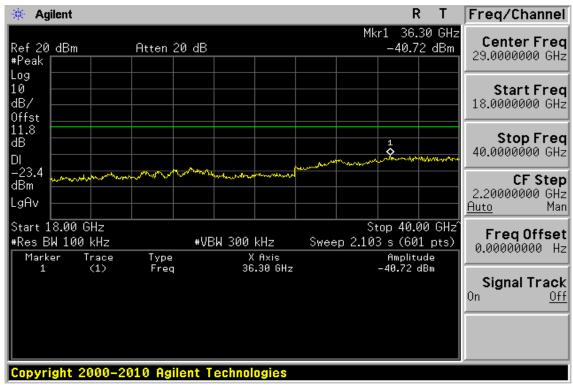
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# Ch High 18GHz - 40GHz



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### **Tabular Results:**

### Out of Band emission at antenna terminals – 802.11a

Fundamental Frequency 5745 MHz :Nick Engineer

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5751.00	Ref	-4.54		
<30	S		-24.50	
30-1000	S		-24.50	
11490.00	Н		-24.50	
13480.00	Н	-51.64	-24.50	27.14
17235.00	Н		-24.50	
22980.00	Н		-24.50	
28725.00	Н		-24.50	
34470.00	Н		-24.50	
36960.00	S	-41.53	-24.50	17.03

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency Engineer 5785 MHz :Nick Operation Mode :TX Mid

Freq. (MHz)	Note F/H/E/S	Reading dBm	Li mit dBm	Safe Margin dB
5791.00	Ref	-0.08		
< 30	S		-20.10	
30-1000	S		-20.10	
11490.00	Н		-20.10	
13780.00	S	-50.58	-20.10	30.48
17235.00	Н		-20.10	
22980.00	Н		-20.10	
28725.00	Н		-20.10	
34470.00	Н		-20.10	
36850.00	S	-42.22	-20.10	22.12

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency 5825 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5821.00	Ref	-3.37		
<30	S		-23.40	
30-1000	S		-23.40	
11650.00	Н		-23.40	
13620.00	S	-51.93	-23.40	28.53
17475.00	Н		-23.40	
23300.00	Н		-23.40	
29125.00	Н		-23.40	
34950.00	Н		-23.40	
36300.00	S	-40.72	-23.40	17.32

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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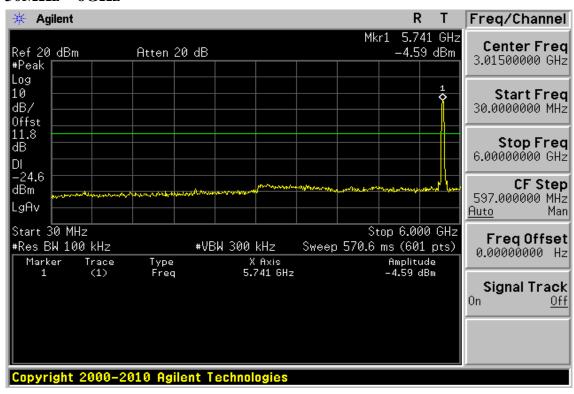
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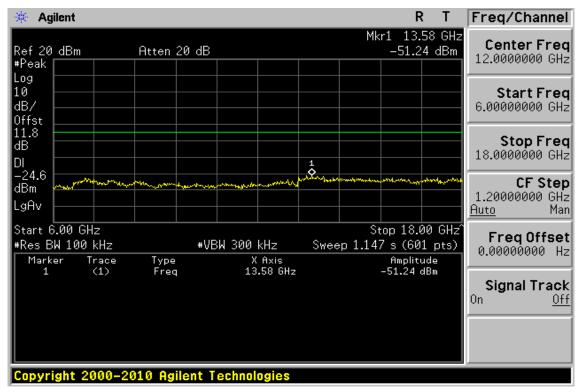
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# Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_20M) Ch Low 30MHz - 6GHz



### Ch Low 6GHz - 18GHz



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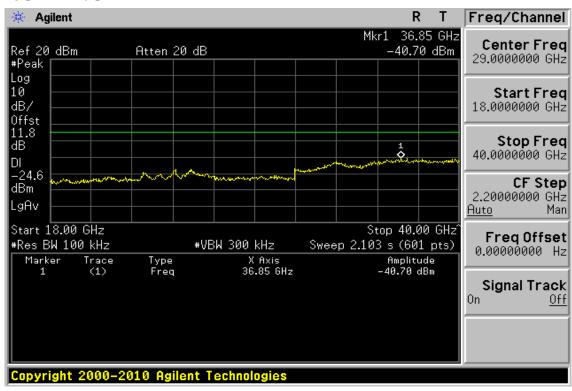
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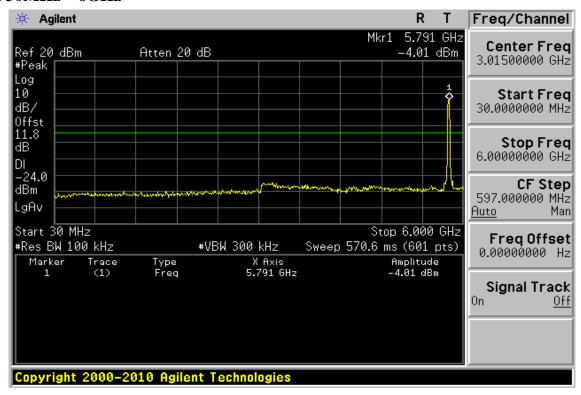
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#### Ch Low 18GHz – 40GHz



#### Ch Mid 30MHz – 6GHz



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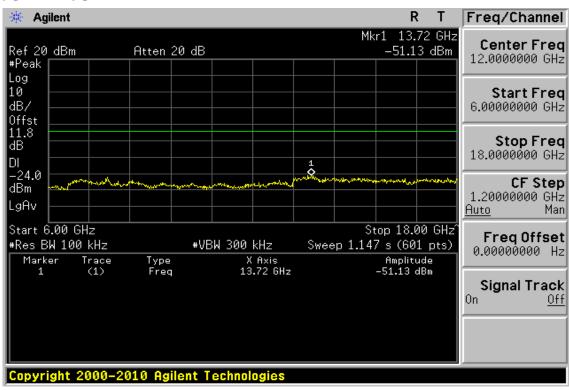
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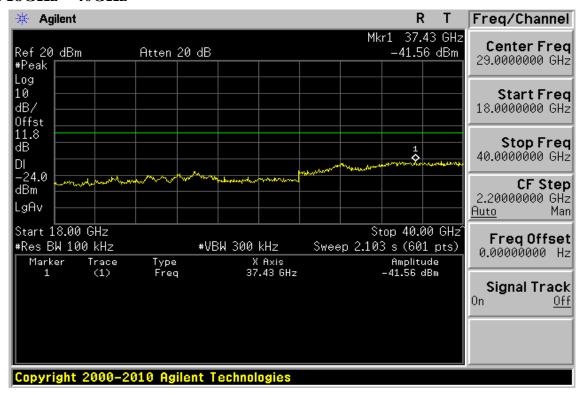
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#### Ch Mid 6GHz – 18GHz



### Ch Mid 18GHz - 40GHz



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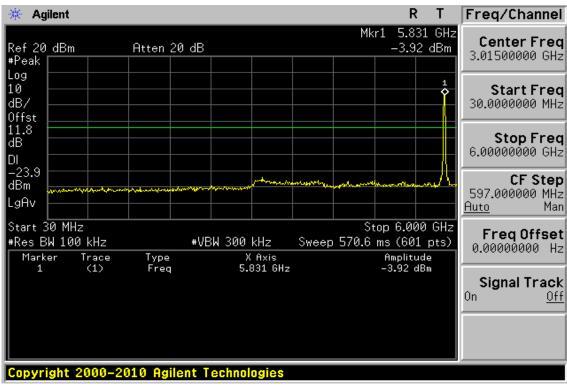
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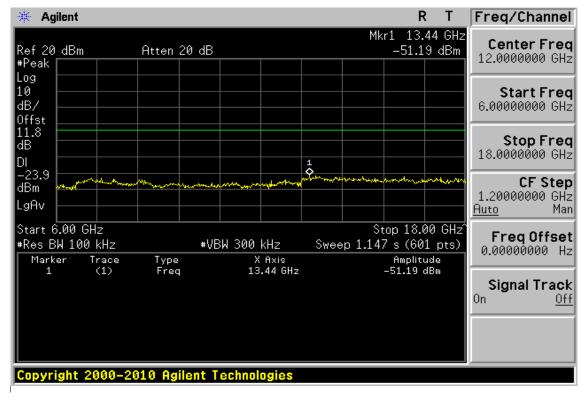
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# Ch High 30MHz – 6GHz



## Ch High 6GHz - 18GHz



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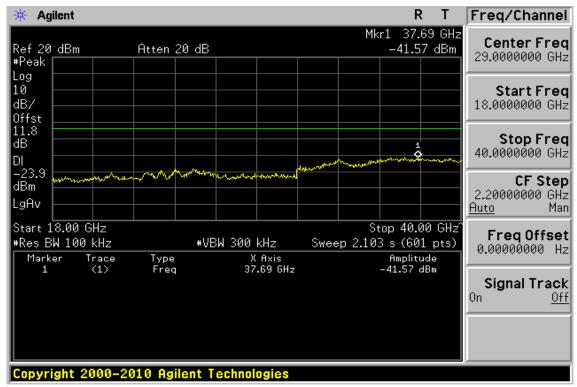
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### Ch High 18GHz - 40GHz



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### Out of Band emission at antenna terminals - 802.11n\_20M

Fundamental Frequency 5745 MHz Engineer :Nick

Operation Mode :TX Low

Freq (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5741.00	Ref	-4.59		
< 30	S		-24.60	
30-1000	S		-24.60	
11490.00	H		-24.60	
13580.00	S	-51.24	-24.60	26.64
17235.00	H		-24.60	
22980.00	H		-24.60	
34470.00	Н		-24.60	
36850.00	S	<b>-4</b> 0.7	-24.60	16.10

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) -20dBm

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Fundamental Frequency 5785 MHz Engineer :Nick Operation Mode :TX Mid

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5791.00	Ref	-4.01		
<30	S		-24.00	
30-1000	S		-24.00	
11570.00	Н		-24.00	
13720.00	S	-51.13	-24.00	27.13
17355.00	Н		-24.00	
23140.00	Н		-24.00	
28925.00	Н		-24.00	
34710.00	Н		-24.00	
37430.00	S	-41.56	-24.00	17.56

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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Fundamental Frequency 5825 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5831.00	Ref	-3.92		
<30	S		-23.90	
30-1000	S		-23.90	
11650.00	Н		-23.90	
13440.00	S	-51.19	-23.90	27.29
17475.00	Н		-23.90	
23300.00	Н		-23.90	
29125.00	Н		-23.90	
34950.00	Н		-23.90	
37690.00	S	-41.57	-23.90	17.67

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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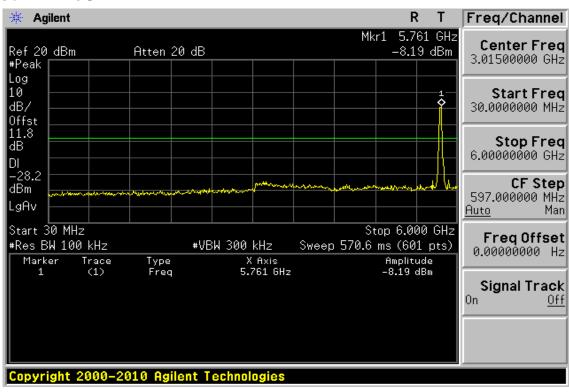
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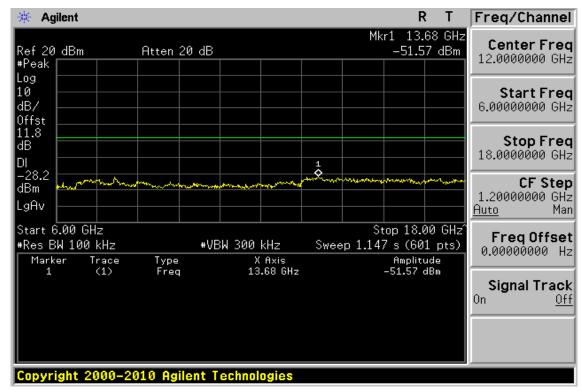
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# Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_40M) Ch Low 30MHz – 6GHz



### Ch Low 6GHz - 18GHz



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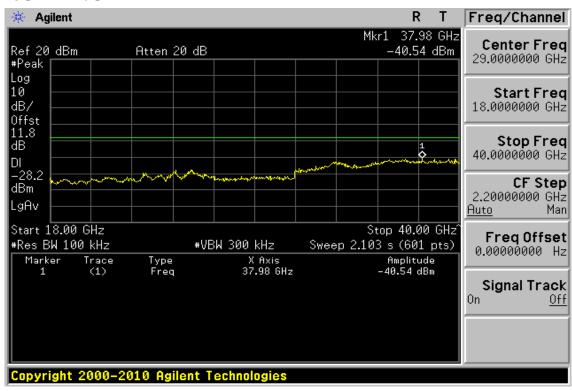
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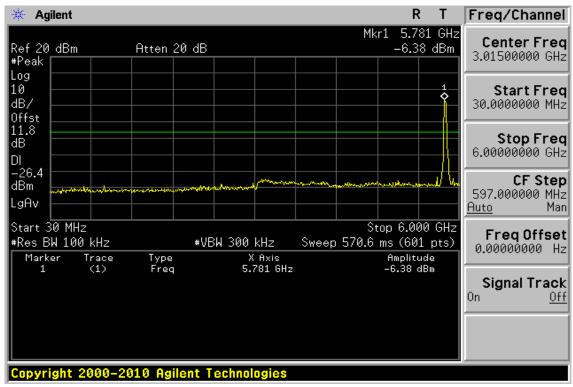
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#### Ch Low 18GHz – 40GHz



# Ch High 30MHz - 6GHz



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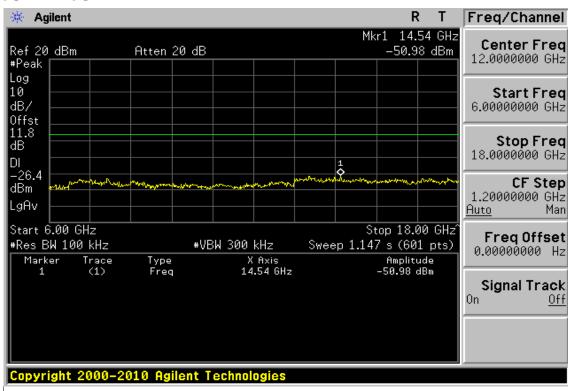
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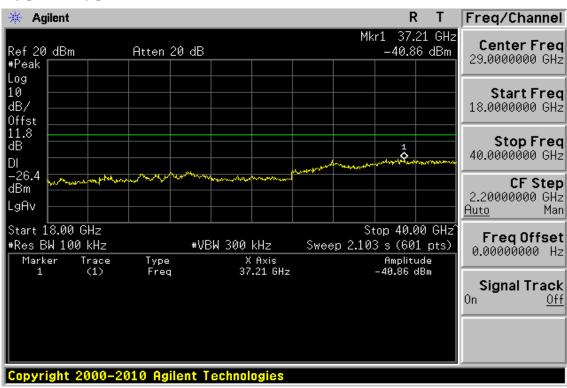
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# Ch High 6GHz - 18GHz



### Ch High 18GHz – 40GHz



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## Out of Band emission at antenna terminals - 802.11n\_40M

Fundamental Frequency 5755 MHz Engineer :Nick

Operation Mode :TX Low

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5761.00	Ref	-8.19		
< 30	S		-28.20	
30-1000	S		-28.20	
11510.00	H		-28.20	
13680.00	S	<i>-</i> 51.57	-28.20	23.37
17265.00	H		-28.20	
23020.00	H		-28.20	
28775.00	H		-28.20	
37980.00	S	-40.54	-28.20	12.34

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor. Ref: Reference Signal

Note2: Limit = Ref (the highest emission of the fundamental) -20dBm

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Fundamental Frequency 5795 MHz Engineer :Nick Operation Mode :TX High

Freq. (MHz)	Note F/H/E/S	Reading dBm	Limit dBm	Safe Margin dB
5781.00	Ref	-6.38		
<30	S		-26.40	
30-1000	S		-26.40	
11590.00	Н		-26.40	
14540.00	S	-50.98	-26.40	24.58
17385.00	Н		-26.40	
23180.00	Н		-26.40	
28975.00	Н		-26.40	
34770.00	Н		-26.40	
37210.00	S	-40.86	-26.40	14.46

"H": denotes Harmonic Frequency. "S": denotes Spurious Frequency. Note:

"---": denotes Noise Floor.

Note2: Limit = Ref (the highest emission of the fundamental) – 20dBm

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## Radiated Spurious Emission Measurement Result (802.11b)

For measurement plot of radiation, please refer to Appendix I.

Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2412 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX LOW Engineer :JJ

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
46.49	S	Peak	40.79	-13.80	26.99	40.00	-13.01
61.04	S	Peak	32.17	-14.78	17.39	40.00	-22.61
99.84	S	Peak	32.28	-16.84	15.44	43.50	-28.06
343.31	S	Peak	27.36	-11.76	15.60	46.00	-30.40
658.56	S	Peak	27.30	-6.40	20.90	46.00	-25.10
824.43	S	Peak	27.32	-3.92	23.40	46.00	-22.60
4824.00	Н	Average	30.02	7.07	37.09	54.00	-16.91
4824.00	Н	Peak	37.88	7.07	44.95	74.00	-29.05
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 :2013-05-27 Fundamental Frequency :2412 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX LOW Engineer :JJ

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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
59.10	S	Peak	26.76	-14.51	12.25	40.00	-27.75
156.10	S	Peak	27.21	-12.30	14.91	43.50	-28.59
286.08	S	Peak	28.23	-12.89	15.34	46.00	-30.66
535.37	S	Peak	28.22	-8.89	19.33	46.00	-26.67
712.88	S	Peak	25.96	-5.54	20.42	46.00	-25.58
870.99	S	Peak	26.58	-3.36	23.22	46.00	-22.78
4824.00	Н	Average	27.05	7.08	34.13	54.00	-19.87
4824.00	Н	Peak	37.95	7.08	45.03	74.00	-28.97
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 :2013-05-27 Fundamental Frequency :2437 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID Engineer :JJ

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	${ m d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB
61.04	S	Peak	32.24	-14.78	17.46	40.00	-22.54
99.84	S	Peak	32.02	-16.84	15.18	43.50	-28.32
114.39	S	Peak	31.96	-15.22	16.74	43.50	-26.76
209.45	S	Peak	27.50	-15.86	11.64	43.50	-31.86
474.26	S	Peak	28.20	-9.87	18.33	46.00	-27.67
706.09	S	Peak	26.98	-5.65	21.33	46.00	-24.67
4874.00	Н	Average	29.73	7.14	36.87	54.00	-17.13
4874.00	Н	Peak	37.15	7.14	44.29	74.00	-29.71
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 :2013-05-27 Fundamental Frequency :2437 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID Engineer :JJ

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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
62.01	S	Peak	26.70	-14.97	11.73	40.00	-28.27
138.64	S	Peak	26.52	-13.20	13.32	43.50	-30.18
170.65	S	Peak	26.03	-13.22	12.81	43.50	-30.69
354.95	S	Peak	28.08	-11.61	16.47	46.00	-29.53
598.42	S	Peak	28.11	-7.59	20.52	46.00	-25.48
817.64	S	Peak	27.01	-4.00	23.01	46.00	-22.99
4874.00	Н	Average	26.12	7.09	33.21	54.00	-20.79
4874.00	Н	Peak	37.03	7.09	44.12	74.00	-29.88
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 :2013-05-27 Fundamental Frequency :2462 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX HIGH Engineer :JJ

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	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
47.46	S	Peak	39.89	-13.85	26.04	40.00	-13.96
61.04	S	Peak	31.13	-14.78	16.35	40.00	-23.65
99.84	S	Peak	32.90	-16.84	16.06	43.50	-27.44
157.07	S	Peak	28.71	-12.29	16.42	43.50	-27.08
632.37	S	Peak	27.95	-6.90	21.05	46.00	-24.95
914.64	S	Peak	26.60	-2.53	24.07	46.00	-21.93
4924.00	Н	Average	33.83	7.19	41.02	54.00	-12.98
4924.00	Н	Peak	37.51	7.19	44.70	74.00	-29.30
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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Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2462 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX HIGH Engineer :JJ

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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
51.34	S	Peak	27.30	-13.99	13.31	40.00	-26.69
136.70	S	Peak	27.22	-13.36	13.86	43.50	-29.64
286.08	S	Peak	27.40	-12.89	14.51	46.00	-31.49
542.16	S	Peak	28.91	-8.74	20.17	46.00	-25.83
678.93	S	Peak	26.87	-6.05	20.82	46.00	-25.18
718.70	S	Peak	27.30	-5.45	21.85	46.00	-24.15
4924.00	Н	Average	28.31	7.08	35.39	54.00	-18.61
4924.00	Н	Peak	36.43	7.08	43.51	74.00	-30.49
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 :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	41.96	-13.76	28.20	40.00	-11.80
114.39	S	Peak	32.17	-15.22	16.95	43.50	-26.55
157.07	S	Peak	28.45	-12.29	16.16	43.50	-27.34
386.96	S	Peak	26.97	-11.19	15.78	46.00	-30.22
585.81	S	Peak	28.35	-7.86	20.49	46.00	-25.51
812.79	S	Peak	28.28	-4.04	24.24	46.00	-21.76
4824.00	Н	Average	28.89	7.07	35.96	54.00	-18.04
4824.00	Н	Peak	39.03	7.07	46.10	74.00	-27.90
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 g Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	31.44	-13.70	17.74	40.00	-22.26
156.10	S	Peak	27.01	-12.30	14.71	43.50	-28.79
286.08	S	Peak	27.39	-12.89	14.50	46.00	-31.50
647.89	S	Peak	28.06	-6.64	21.42	46.00	-24.58
729.37	S	Peak	27.98	-5.30	22.68	46.00	-23.32
818.61	S	Peak	28.22	-3.98	24.24	46.00	-21.76
4824.00	Н	Average	26.31	7.08	33.39	54.00	-20.61
4824.00	Н	Peak	37.69	7.08	44.77	74.00	-29.23
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 g Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	42.32	-13.70	28.62	40.00	-11.38
114.39	S	Peak	32.71	-15.22	17.49	43.50	-26.01
157.07	S	Peak	28.32	-12.29	16.03	43.50	-27.47
343.31	S	Peak	27.80	-11.76	16.04	46.00	-29.96
518.88	S	Peak	28.36	-9.24	19.12	46.00	-26.88
615.88	S	Peak	28.13	-7.21	20.92	46.00	-25.08
4874.00	Н	Average	26.54	7.14	33.68	54.00	-20.32
4874.00	Н	Peak	36.80	7.14	43.94	74.00	-30.06
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 g Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	30.65	-13.70	16.95	40.00	-23.05
160.95	S	Peak	26.56	-12.36	14.20	43.50	-29.30
301.60	S	Peak	26.93	-12.53	14.40	46.00	-31.60
604.24	S	Peak	28.21	-7.47	20.74	46.00	-25.26
677.96	S	Peak	27.75	-6.06	21.69	46.00	-24.31
828.31	S	Peak	27.70	-3.90	23.80	46.00	-22.20
4874.00	Н	Average	25.23	7.09	32.32	54.00	-21.68
4874.00	Н	Peak	36.98	7.09	44.07	74.00	-29.93
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 g Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	42.55	-13.70	28.85	40.00	-11.15
114.39	S	Peak	31.94	-15.22	16.72	43.50	-26.78
157.07	S	Peak	28.45	-12.29	16.16	43.50	-27.34
343.31	S	Peak	26.75	-11.76	14.99	46.00	-31.01
626.55	S	Peak	27.86	-7.00	20.86	46.00	-25.14
805.03	S	Peak	29.21	-4.14	25.07	46.00	-20.93
4924.00	Н	Average	24.09	7.19	31.28	54.00	-22.72
4924.00	Н	Peak	38.45	7.19	45.64	74.00	-28.36
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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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	29.76	-13.70	16.06	40.00	-23.94
150.28	S	Peak	26.36	-12.35	14.01	43.50	-29.49
286.08	S	Peak	27.03	-12.89	14.14	46.00	-31.86
438.37	S	Peak	26.89	-10.25	16.64	46.00	-29.36
600.36	S	Peak	28.04	-7.55	20.49	46.00	-25.51
871.96	S	Peak	27.05	-3.34	23.71	46.00	-22.29
4924.00	Н	Average	23.55	7.08	30.63	54.00	-23.37
4924.00	Н	Peak	36.37	7.08	43.45	74.00	-30.55
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 (802.11n\_20M)

Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	42.36	-13.76	28.60	40.00	-11.40
114.39	S	Peak	31.88	-15.22	16.66	43.50	-26.84
157.07	S	Peak	27.36	-12.29	15.07	43.50	-28.43
409.27	S	Peak	26.55	-10.87	15.68	46.00	-30.32
595.51	S	Peak	27.91	-7.66	20.25	46.00	-25.75
776.90	S	Peak	27.72	-4.52	23.20	46.00	-22.80
4824.00	Н	Average	29.55	7.07	36.62	54.00	-17.38
4824.00	Н	Peak	39.46	7.07	46.53	74.00	-27.47
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 :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	29.65	-13.76	15.89	40.00	-24.11
158.04	S	Peak	27.95	-12.30	15.65	43.50	-27.85
286.08	S	Peak	27.61	-12.89	14.72	46.00	-31.28
537.31	S	Peak	27.47	-8.84	18.63	46.00	-27.37
686.69	S	Peak	28.39	-5.92	22.47	46.00	-23.53
768.17	S	Peak	27.72	-4.65	23.07	46.00	-22.93
4824.00	Н	Average	26.68	7.08	33.76	54.00	-20.24
4824.00	Н	Peak	37.00	7.08	44.08	74.00	-29.92
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 :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	42.11	-13.70	28.41	40.00	-11.59
114.39	S	Peak	31.86	-15.22	16.64	43.50	-26.86
157.07	S	Peak	28.45	-12.29	16.16	43.50	-27.34
343.31	S	Peak	28.23	-11.76	16.47	46.00	-29.53
587.75	S	Peak	27.84	-7.82	20.02	46.00	-25.98
783.69	S	Peak	28.08	-4.40	23.68	46.00	-22.32
4874.00	Н	Average	25.41	7.14	32.55	54.00	-21.45
4874.00	Н	Peak	36.12	7.14	43.26	74.00	-30.74
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 :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBµV/m	dB
43.58	S	Peak	30.23	-13.70	16.53	40.00	-23.47
152.22	S	Peak	26.42	-12.32	14.10	43.50	-29.40
286.08	S	Peak	27.44	-12.89	14.55	46.00	-31.45
414.12	S	Peak	28.13	-10.75	17.38	46.00	-28.62
631.40	S	Peak	27.36	-6.92	20.44	46.00	-25.56
701.24	S	Peak	27.84	-5.73	22.11	46.00	-23.89
4874.00	Н	Average	24.75	7.09	31.84	54.00	-22.16
4874.00	Н	Peak	35.73	7.09	42.82	74.00	-31.18
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 :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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)

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	41.89	-13.76	28.13	40.00	-11.87
114.39	S	Peak	34.18	-15.22	18.96	43.50	-24.54
157.07	S	Peak	27.46	-12.29	15.17	43.50	-28.33
286.08	S	Peak	28.02	-12.89	15.13	46.00	-30.87
457.77	S	Peak	27.86	-9.99	17.87	46.00	-28.13
730.34	S	Peak	28.15	-5.29	22.86	46.00	-23.14
4924.00	Н	Average	24.53	7.19	31.72	54.00	-22.28
4924.00	Н	Peak	37.36	7.19	44.55	74.00	-29.45
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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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	31.04	-13.70	17.34	40.00	-22.66
150.28	S	Peak	26.65	-12.35	14.30	43.50	-29.20
286.08	S	Peak	27.26	-12.89	14.37	46.00	-31.63
455.83	S	Peak	27.54	-9.99	17.55	46.00	-28.45
638.19	S	Peak	27.30	-6.80	20.50	46.00	-25.50
849.65	S	Peak	27.88	-3.69	24.19	46.00	-21.81
4924.00	Н	Average	23.50	7.08	30.58	54.00	-23.42
4924.00	Н	Peak	36.00	7.08	43.08	74.00	-30.92
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 :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	42.54	-13.76	28.78	40.00	-11.22
114.39	S	Peak	31.28	-15.22	16.06	43.50	-27.44
343.31	S	Peak	27.76	-11.76	16.00	46.00	-30.00
571.26	S	Peak	27.30	-8.17	19.13	46.00	-26.87
714.82	S	Peak	27.79	-5.51	22.28	46.00	-23.72
899.12	S	Peak	27.46	-2.83	24.63	46.00	-21.37
11490.00	Н	Average	25.62	17.60	43.22	54.00	-10.78
11490.00	Н	Peak	26.69	17.60	44.29	74.00	-29.71
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470 00	Н						

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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	31.20	-13.76	17.44	40.00	-22.56
159.01	S	Peak	27.76	-12.28	15.48	43.50	-28.02
339.43	S	Peak	27.87	-11.82	16.05	46.00	-29.95
520.82	S	Peak	28.16	-9.20	18.96	46.00	-27.04
733.25	S	Peak	27.13	-5.24	21.89	46.00	-24.11
949.56	S	Peak	27.22	-2.10	25.12	46.00	-20.88
11490.00	Н	Average	30.29	17.40	47.69	54.00	-6.31
11490.00	Н	Peak	31.81	17.40	49.21	74.00	-24.79
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	$dB\mu V/m$	dBμV/m	dB
43.58	S	Peak	42.80	-13.70	29.10	40.00	-10.90
143.49	S	Peak	30.34	-12.82	17.52	43.50	-25.98
343.31	S	Peak	28.31	-11.76	16.55	46.00	-29.45
547.98	S	Peak	28.49	-8.61	19.88	46.00	-26.12
738.10	S	Peak	27.50	-5.15	22.35	46.00	-23.65
913.67	S	Peak	27.98	-2.56	25.42	46.00	-20.58
11570.00	Н	Average	26.12	17.69	43.81	54.00	-10.19
11570.00	Н	Peak	27.60	17.69	45.29	74.00	-28.71
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710 00	Н						

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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	32.00	-13.76	18.24	40.00	-21.76
147.37	S	Peak	26.84	-12.53	14.31	43.50	-29.19
349.13	S	Peak	28.10	-11.71	16.39	46.00	-29.61
545.07	S	Peak	28.07	-8.67	19.40	46.00	-26.60
728.40	S	Peak	28.48	-5.31	23.17	46.00	-22.83
944.71	S	Peak	28.01	-2.14	25.87	46.00	-20.13
11570.00	Н	Average	29.79	17.49	47.28	54.00	-6.72
11570.00	Н	Peak	30.83	17.49	48.32	74.00	-25.68
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	42.70	-13.70	29.00	40.00	-11.00
157.07	S	Peak	28.82	-12.29	16.53	43.50	-26.97
343.31	S	Peak	28.22	-11.76	16.46	46.00	-29.54
532.46	S	Peak	28.00	-8.95	19.05	46.00	-26.95
692.51	S	Peak	27.94	-5.85	22.09	46.00	-23.91
821.52	S	Peak	28.79	-3.95	24.84	46.00	-21.16
11650.00	Н	Average	27.05	17.78	44.83	54.00	-9.17
11650.00	Н	Peak	28.47	17.78	46.25	74.00	-27.75
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	$dB\mu V/m$	dBμV/m	dB
44.55	S	Peak	31.20	-13.76	17.44	40.00	-22.56
155.13	S	Peak	26.46	-12.30	14.16	43.50	-29.34
342.34	S	Peak	27.74	-11.78	15.96	46.00	-30.04
581.93	S	Peak	27.25	-7.94	19.31	46.00	-26.69
725.49	S	Peak	28.21	-5.35	22.86	46.00	-23.14
910.76	S	Peak	26.99	-2.61	24.38	46.00	-21.62
11650.00	Н	Average	27.62	17.58	45.20	54.00	-8.80
11650.00	Н	Peak	28.17	17.58	45.75	74.00	-28.25
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 n20M Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
40.67	S	Peak	43.26	-13.48	29.78	40.00	-10.22
157.07	S	Peak	27.78	-12.29	15.49	43.50	-28.01
343.31	S	Peak	28.38	-11.76	16.62	46.00	-29.38
537.31	S	Peak	27.42	-8.84	18.58	46.00	-27.42
730.34	S	Peak	26.98	-5.29	21.69	46.00	-24.31
924.34	S	Peak	27.06	-2.33	24.73	46.00	-21.27
11490.00	Н	Average	22.52	17.60	40.12	54.00	-13.88
11490.00	Н	Peak	35.36	17.60	52.96	74.00	-21.04
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	30.67	-13.76	16.91	40.00	-23.09
147.37	S	Peak	27.12	-12.53	14.59	43.50	-28.91
339.43	S	Peak	27.03	-11.82	15.21	46.00	-30.79
501.42	S	Peak	27.39	-9.55	17.84	46.00	-28.16
684.75	S	Peak	27.26	-5.96	21.30	46.00	-24.70
861.29	S	Peak	27.38	-3.50	23.88	46.00	-22.12
11490.00	Н	Average	22.21	17.40	39.61	54.00	-14.39
11490.00	Н	Peak	32.38	17.40	49.78	74.00	-24.22
17235.00	Н						
22980.00	Н						
28725.00	Н						
34470.00	Н						

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID 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)

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	42.65	-13.70	28.95	40.00	-11.05
157.07	S	Peak	29.66	-12.29	17.37	43.50	-26.13
343.31	S	Peak	29.30	-11.76	17.54	46.00	-28.46
555.74	S	Peak	28.43	-8.47	19.96	46.00	-26.04
727.43	S	Peak	28.78	-5.32	23.46	46.00	-22.54
903.00	S	Peak	27.32	-2.75	24.57	46.00	-21.43
11570.00	Н	Average	25.12	17.69	42.81	54.00	-11.19
11570.00	Н	Peak	35.57	17.69	53.26	74.00	-20.74
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
43.58	S	Peak	26.81	-13.70	13.11	40.00	-26.89
155.13	S	Peak	25.15	-12.30	12.85	43.50	-30.65
402.48	S	Peak	25.29	-11.00	14.29	46.00	-31.71
595.51	S	Peak	25.98	-7.66	18.32	46.00	-27.68
805.03	S	Peak	26.54	-4.14	22.40	46.00	-23.60
965.08	S	Peak	26.27	-2.04	24.23	54.00	-29.77
11570.00	Н	Average	21.05	17.49	38.54	54.00	-15.46
11570.00	Н	Peak	34.42	17.49	51.91	74.00	-22.09
17355.00	Н						
23140.00	Н						
28925.00	Н						
34710.00	Н						

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Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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)

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

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

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	dBμV/m	dB
40.67	S	Peak	42.59	-13.48	29.11	40.00	-10.89
157.07	S	Peak	29.12	-12.29	16.83	43.50	-26.67
343.31	S	Peak	27.65	-11.76	15.89	46.00	-30.11
527.61	S	Peak	27.85	-9.03	18.82	46.00	-27.18
688.63	S	Peak	28.18	-5.90	22.28	46.00	-23.72
910.76	S	Peak	27.25	-2.61	24.64	46.00	-21.36
11650.00	Н	Average	24.35	17.78	42.13	54.00	-11.87
11650.00	Н	Peak	34.79	17.78	52.57	74.00	-21.43
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950.00	Н						

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B} \mu \mathrm{V}$	dB	dBμV/m	$dB\mu V/m$	dB
44.55	S	Peak	30.66	-13.76	16.90	40.00	-23.10
158.04	S	Peak	27.88	-12.30	15.58	43.50	-27.92
312.27	S	Peak	27.05	-12.27	14.78	46.00	-31.22
509.18	S	Peak	27.67	-9.41	18.26	46.00	-27.74
677.96	S	Peak	27.76	-6.06	21.70	46.00	-24.30
902.03	S	Peak	26.27	-2.77	23.50	46.00	-22.50
11650.00	Н	Average	22.35	17.58	39.93	54.00	-14.07
11650.00	Н	Peak	34.25	17.58	51.83	74.00	-22.17
17475.00	Н						
23300.00	Н						
29125.00	Н						
34950 00	Н						

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Radiated Spurious Emission Measurement Result (802.11n (5GHz)\_40M)

Operation Band :802.11 n40M Test Date :2013-05-01 Fundamental Frequency :5755 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B} \mu \mathrm{V}$	dB	$dB\mu V/m$	dBμV/m	dB
43.58	S	Peak	43.40	-13.70	29.70	40.00	-10.30
157.07	S	Peak	27.31	-12.29	15.02	43.50	-28.48
343.31	S	Peak	27.37	-11.76	15.61	46.00	-30.39
508.21	S	Peak	27.38	-9.43	17.95	46.00	-28.05
734.22	S	Peak	27.93	-5.23	22.70	46.00	-23.30
928.22	S	Peak	27.31	-2.30	25.01	46.00	-20.99
11510.00	Н	Average	24.62	17.67	42.29	54.00	-11.71
11510.00	Н	Peak	35.73	17.67	53.40	74.00	-20.60
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530 00	Н						

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Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

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Operation Band :802.11 n40M Test Date :2013-05-01 Fundamental Frequency :5755 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{dB}\mu\mathrm{V}$	dB	dBμV/m	$dB\mu V/m$	dB
43.58	S	Peak	30.64	-13.70	16.94	40.00	-23.06
165.80	S	Peak	26.00	-12.77	13.23	43.50	-30.27
378.23	S	Peak	26.73	-11.31	15.42	46.00	-30.58
599.39	S	Peak	28.20	-7.57	20.63	46.00	-25.37
764.29	S	Peak	27.49	-4.72	22.77	46.00	-23.23
912.70	S	Peak	27.49	-2.57	24.92	46.00	-21.08
11510.00	Н	Average	22.59	17.47	40.06	54.00	-13.94
11510.00	Н	Peak	35.16	17.47	52.63	74.00	-21.37
17265.00	Н						
23020.00	Н						
28775.00	Н						
34530 00	Н						

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Operation Band :802.11 n40M Test Date :2013-05-01 Fundamental Frequency :5795 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	$\mathrm{d} \mathrm{B} \mu \mathrm{V}$	dB	dBμV/m	$dB\mu V/m$	dB
43.58	S	Peak	42.60	-13.70	28.90	40.00	-11.10
114.39	S	Peak	31.78	-15.22	16.56	43.50	-26.94
343.31	S	Peak	27.60	-11.76	15.84	46.00	-30.16
549.92	S	Peak	28.19	-8.58	19.61	46.00	-26.39
724.52	S	Peak	27.85	-5.37	22.48	46.00	-23.52
922.40	S	Peak	26.81	-2.37	24.44	46.00	-21.56
11590.00	Н	Average	26.08	17.69	43.77	54.00	-10.23
11590.00	Н	Peak	37.18	17.69	54.87	74.00	-19.13
17385.00	Н						
23180.00	Н						
28975.00	Н						
34770.00	Н						

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Operation Band :802.11 n40M Test Date :2013-05-01 Fundamental Frequency :5795 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX 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.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	30.49	-13.76	16.73	40.00	-23.27
147.37	S	Peak	26.87	-12.53	14.34	43.50	-29.16
286.08	S	Peak	27.84	-12.89	14.95	46.00	-31.05
485.90	S	Peak	27.28	-9.74	17.54	46.00	-28.46
669.23	S	Peak	27.67	-6.21	21.46	46.00	-24.54
861.29	S	Peak	27.63	-3.50	24.13	46.00	-21.87
11590.00	Н	Average	24.86	17.49	42.35	54.00	-11.65
11590.00	Н	Peak	35.68	17.49	53.17	74.00	-20.83
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)

#### 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  $VBW > 3 \times RBW$ .
- 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.

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#### 11.5 Measurement Result:

#### 802.11b

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-9.15	8
2437	-8.58	8
2462	-8.18	8

## 802.11g

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-12.83	8
2437	-12.51	8
2462	-12.98	8

#### 802.11n 20M

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
2412	-15.15	8
2437	-13.80	8
2462	-13.15	8

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#### 802.11a

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
5745	-14.44	8
5785	-14.03	8
5825	-13.07	8

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

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
5745	-14.40	8
5785	-13.72	8
5825	-14.45	8

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

Frequency	<b>RF Power Density</b>	Maximum Limit
MHz	Reading (dBm)	(dBm)
5755	-19.03	8
5795	-18.94	8

\* Note: Offset 11dB for 2.4G 802.11b/g/n\_20; Offset 11.8dB for 5G 802.11a/n\_20/n\_40.

\*Refer to next page for plots

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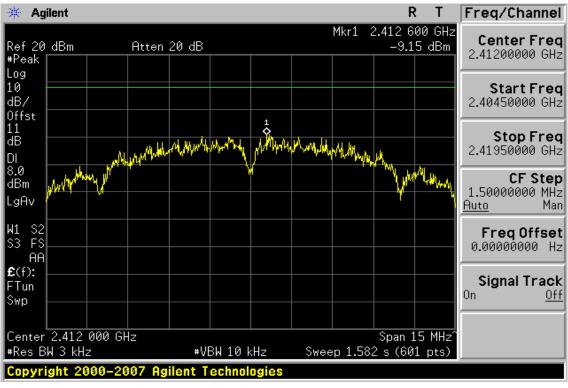
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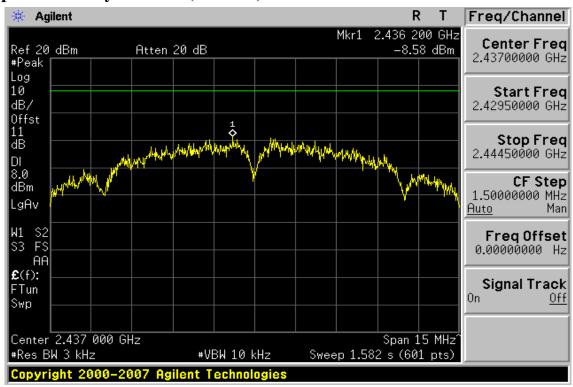
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802.11b Power Spectral Density Test Plot (CH-Low)



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



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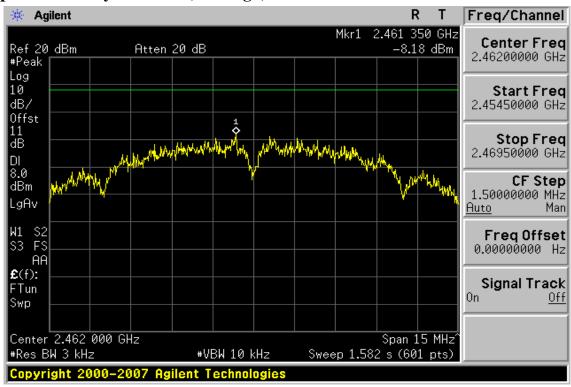
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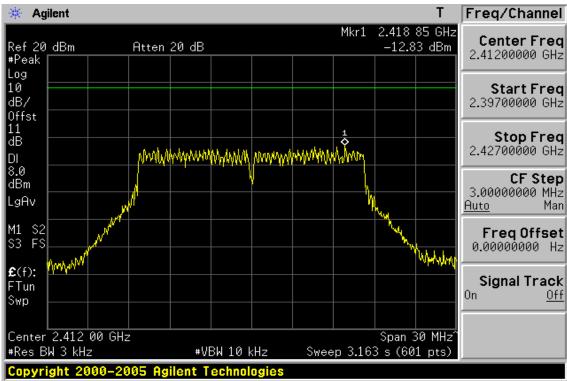
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## **Power Spectral Density Test Plot (CH-High)**



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



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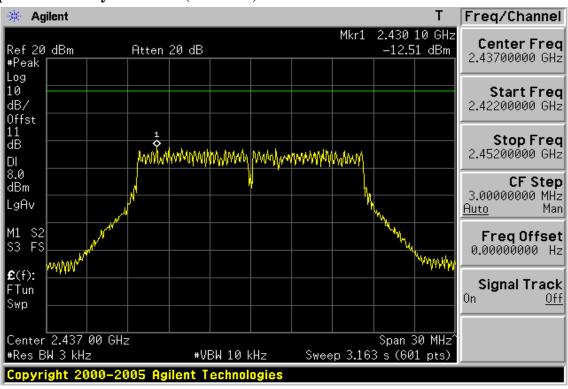
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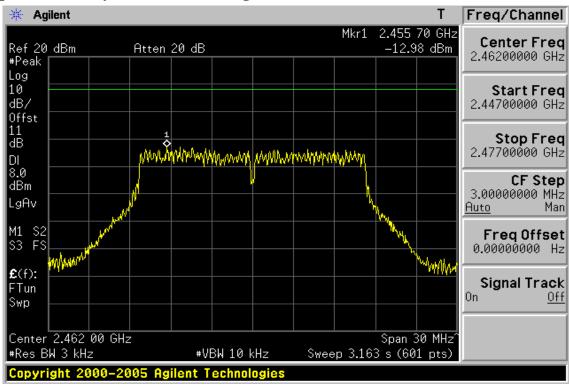
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## **Power Spectral Density Test Plot (CH-Mid)**



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



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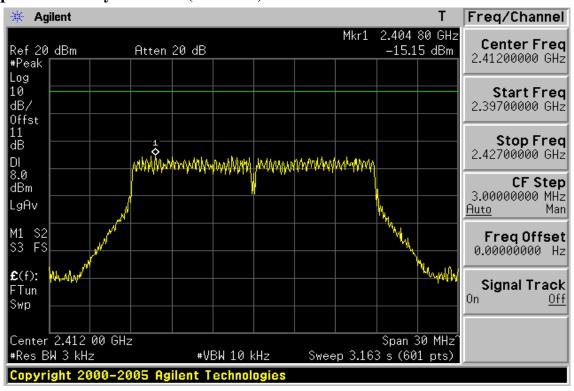


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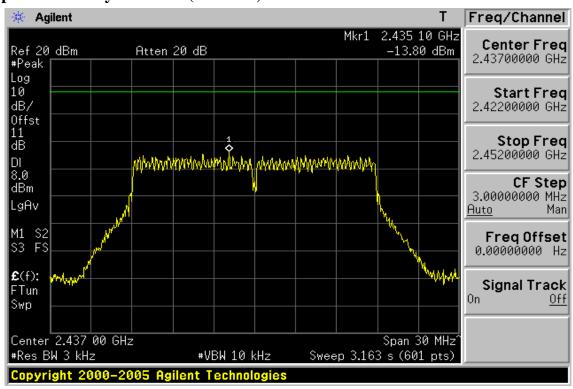
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#### 802.11n 20M

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



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



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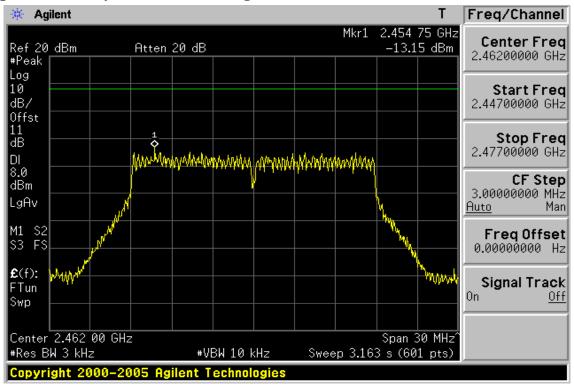
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## **Power Spectral Density Test Plot (CH-High)**



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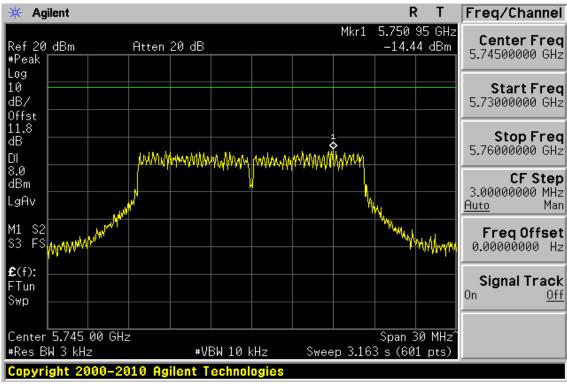
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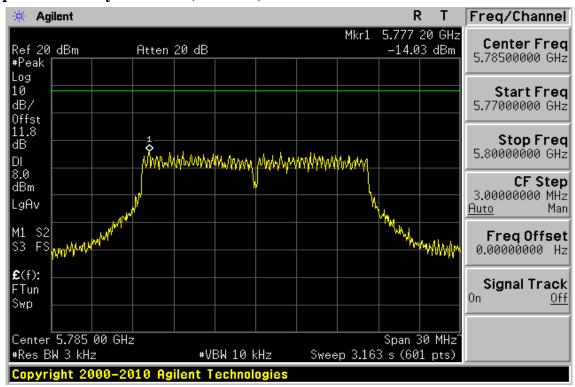
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802.11a Power Spectral Density Test Plot (CH-Low)



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



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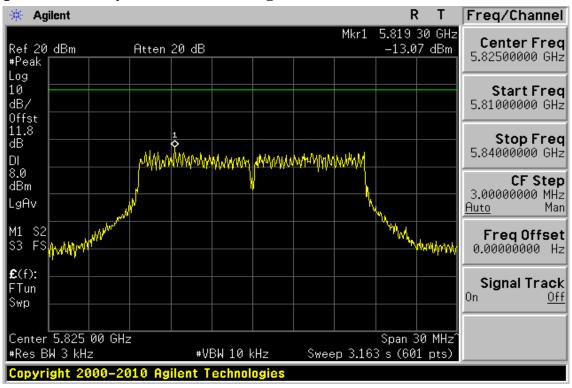
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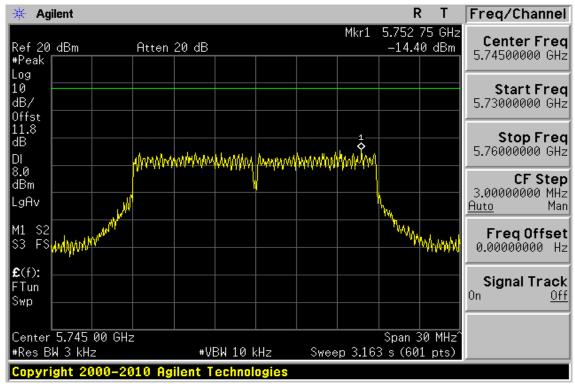
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## **Power Spectral Density Test Plot (CH-High)**



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

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



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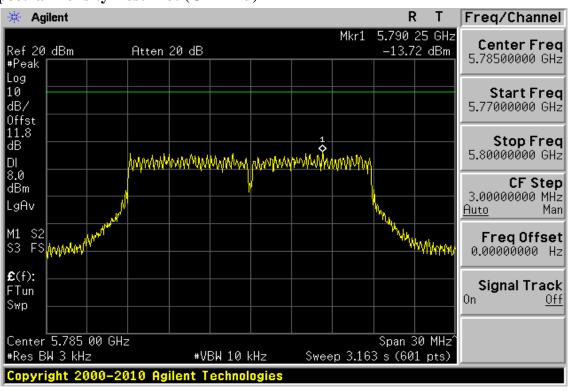
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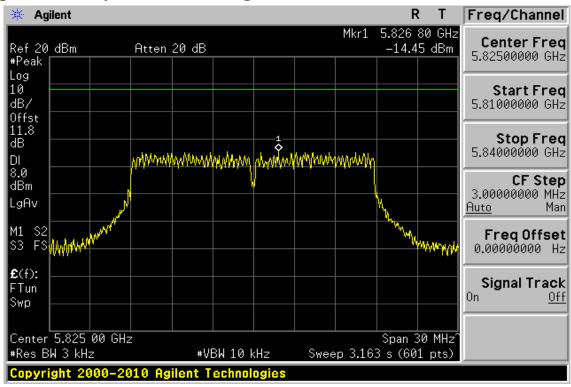
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## **Power Spectral Density Test Plot (CH-Mid)**



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



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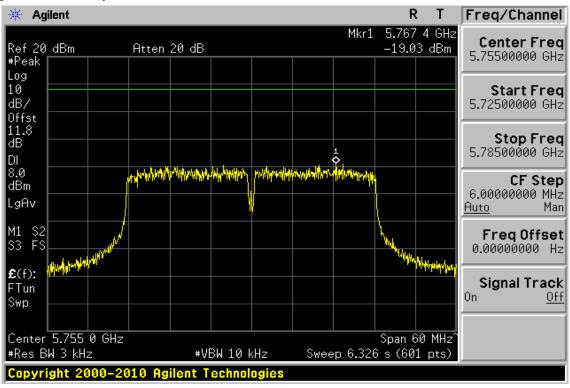


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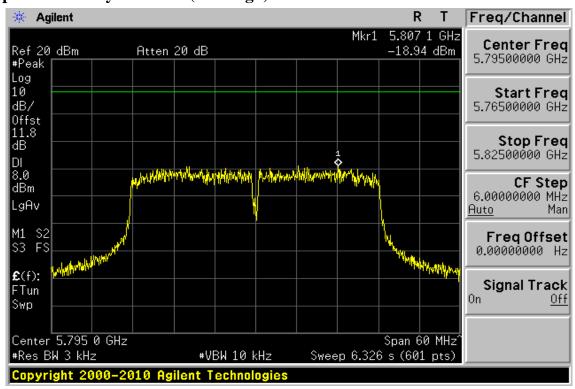
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#### 802.11n (5GHz)\_40M

## **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 2.55dBi for 2.4GHz, 1.66dBi for 5725-5850 MHz and 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	13.4926
2437	13.3858
2462	13.3452

#### 802.11g

Frequency	99%Bandwidth
MHz	(MHz)
2412	16.5029
2437	16.5444
2462	16.6196

#### 802.11n\_20M

Frequency	99%Bandwidth
MHz	(MHz)
2412	17.7336
2437	17.7682
2462	17.6359

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#### 802.11a

Frequency	99%Bandwidth
MHz	(MHz)
5745	16.5783
5785	16.6757
5825	16.5168

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

Frequency MHz	99%Bandwidth (MHz)
5745	17.7244
5785	17.7071
5825	17.7669

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

Frequency	99%Bandwidth
MHz	(MHz)
5755	35.9974
5795	35.9827

Note: Refer to next page for plots.

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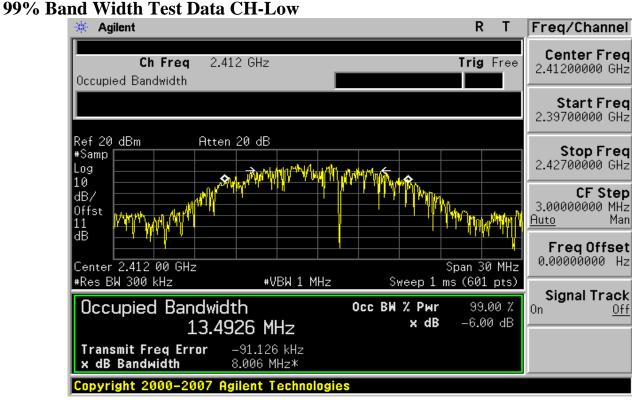
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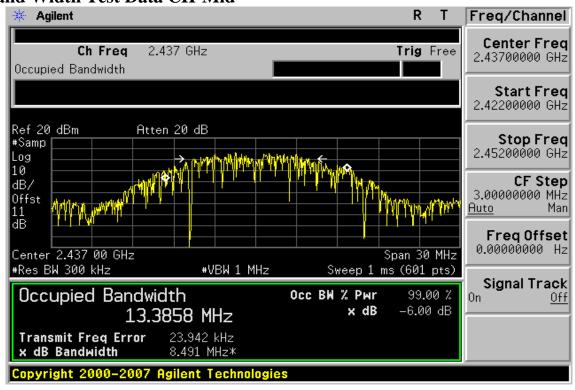
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## 802.11b



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



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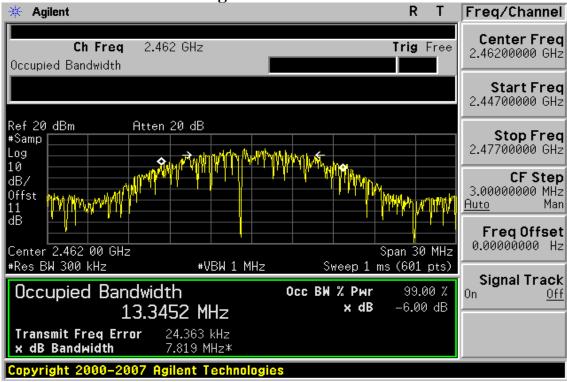
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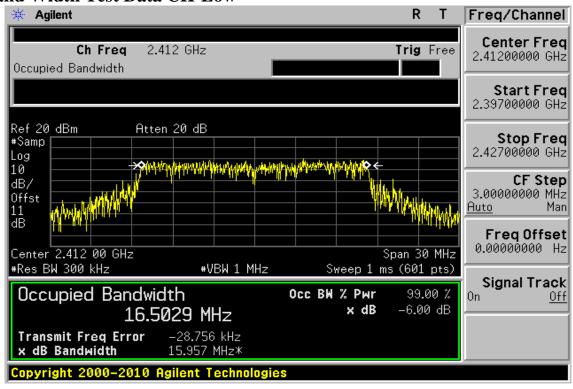
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## 99% Band Width Test Data CH-High



## 802.11g

## 99% Band Width Test Data CH-Low



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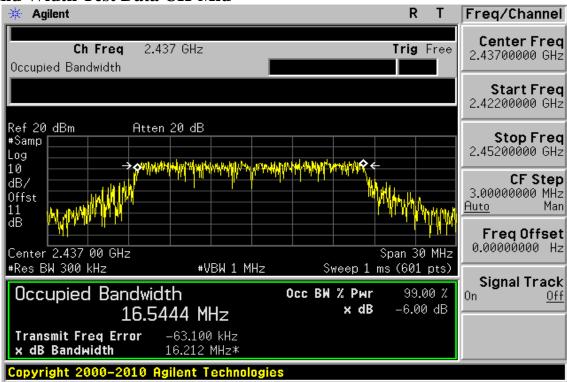
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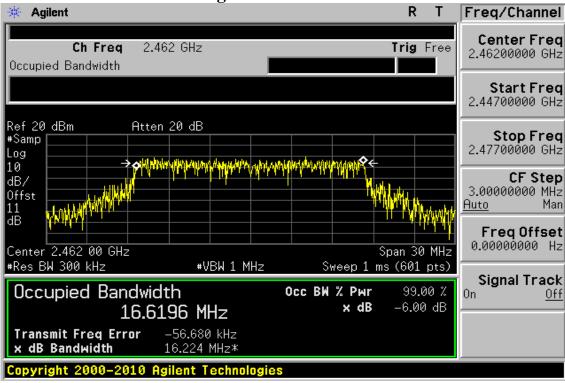
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#### 99% Band Width Test Data CH-Mid



## 99% Band Width Test Data CH-High



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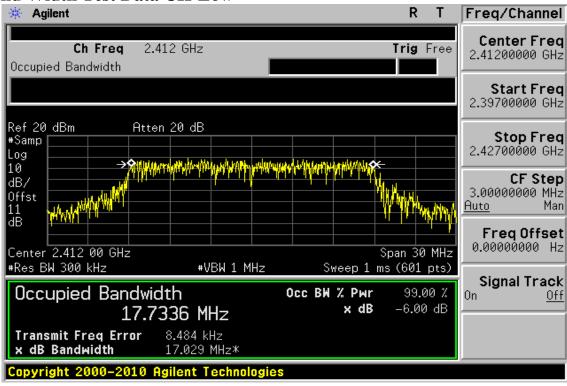


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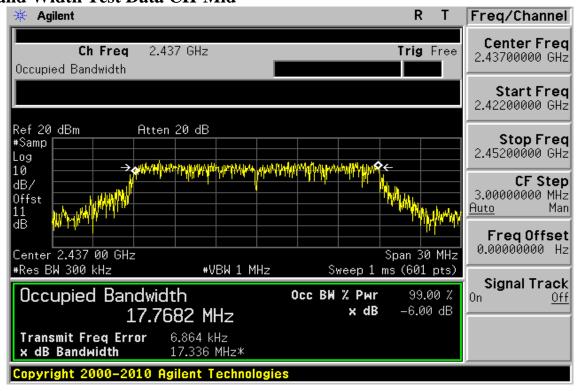
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## 802.11n 20M

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



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



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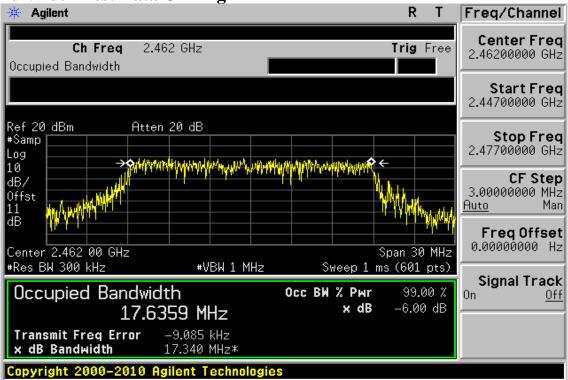
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## 99% Band Width Test Data CH-High



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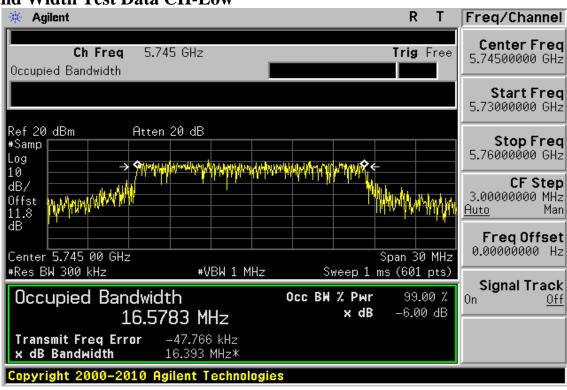
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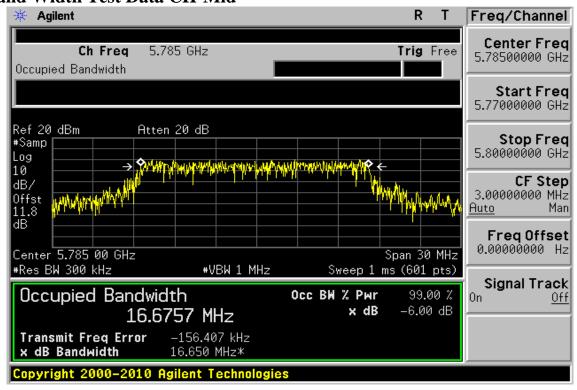
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## 802.11a 99% Band Width Test Data CH-Low



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



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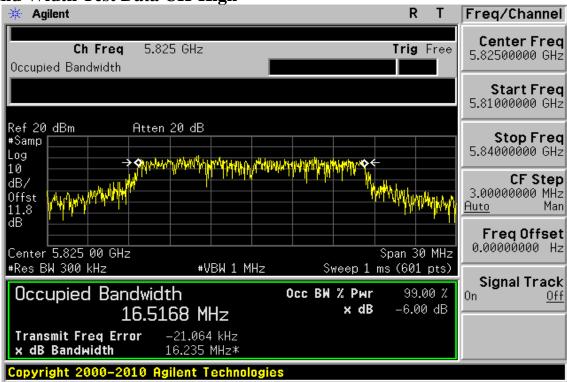
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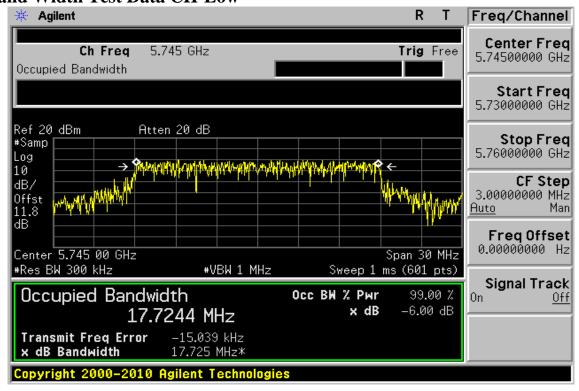
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## 99% Band Width Test Data CH-High



## 802.11n (5GHz)\_20M

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



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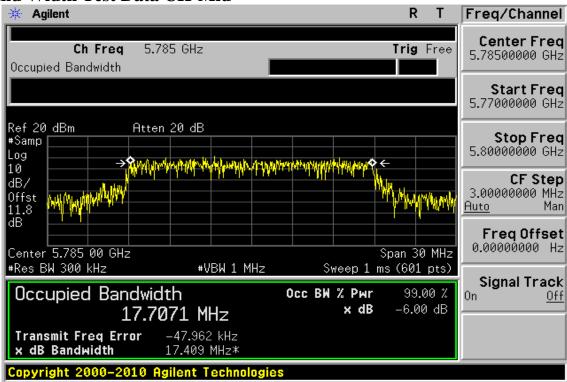
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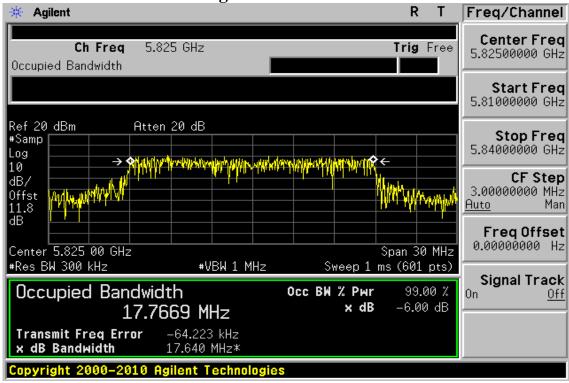
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#### 99% Band Width Test Data CH-Mid



## 99% Band Width Test Data CH-High



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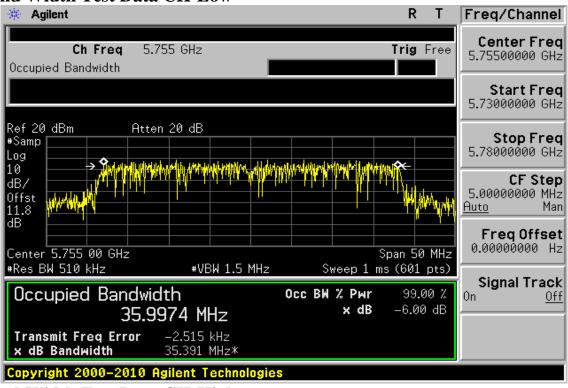


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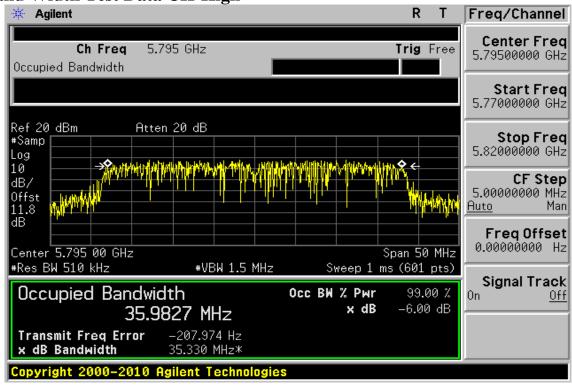
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## 802.11n (5GHz) 40M

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



## 99% Band Width Test Data CH-High



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# **APPENDIX 1** MEASUREMENT PLOT OF RADIATED SPURIOUS **EMISSION**

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\*\*SCENTER LINE 3.43 \*\*\*\*

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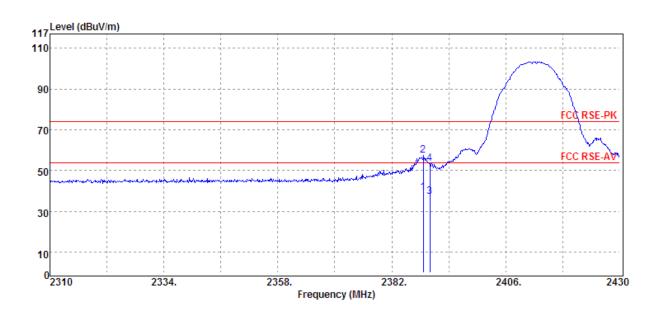
#### **Band Edges Radiated Emission:**

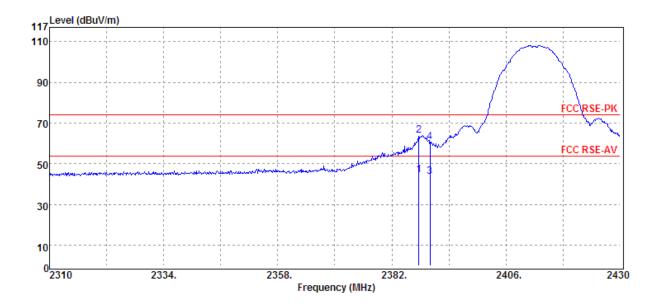
Note: The emission that surpasses the limit of peak represents the fundamental emission of the operation that does not account to be conformed to the limit of the interest.

#### 802.11b

Operation Band:802.11 bTest Date:2013-05-27Fundamental Frequency:2412 MHz power 15 dBmTemp./Humi.:23deg\_C/52RHOperation Mode:Band edge LOWEngineer:JJ

EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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Operation Band Fundamental Frequency Operation Mode EUT Pol.

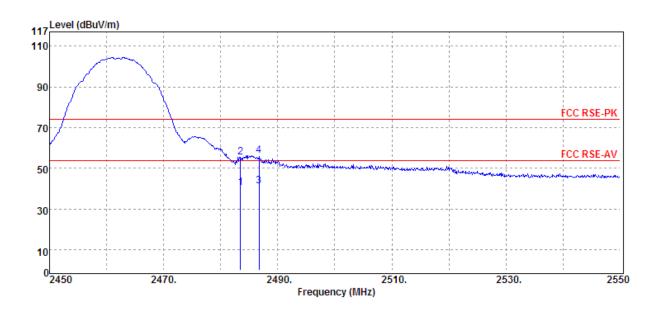
:802.11 b :2462 MHz power 15 dBm Temp./Humi. :Band edge HIGH

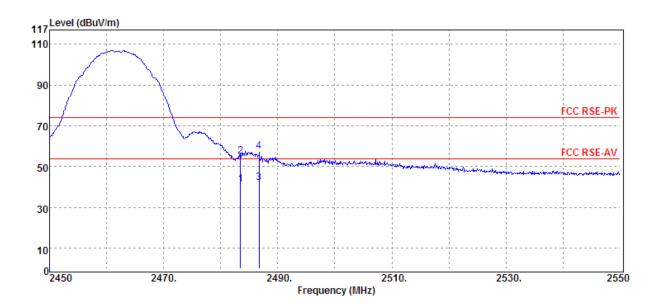
:E2 Plan

Test Date Engineer

:2013-05-27 :23deg\_C/52RH

Measurement Antenna Pol. :Ver. / Hor.





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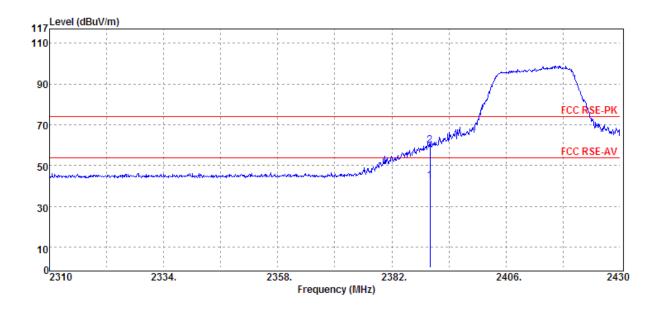
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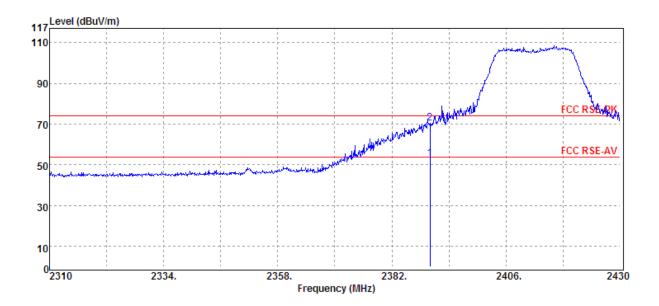
802.11g

Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer :Nick

EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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Operation Band Fundamental Frequency Operation Mode EUT Pol.

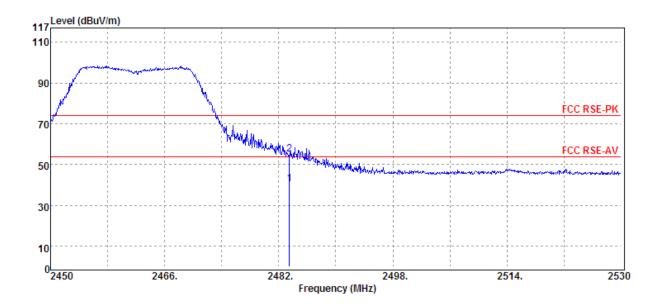
:802.11 g :2462 MHz :Band edge HIGH

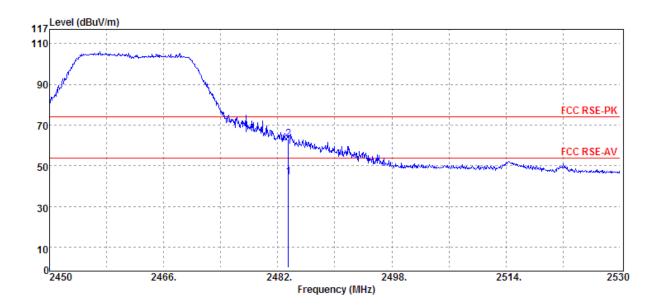
:E2 Plan

Test Date Temp./Humi. :2013-05-01 :23deg C/52RH

Engineer :Nick

Measurement Antenna Pol. :Ver. / Hor.





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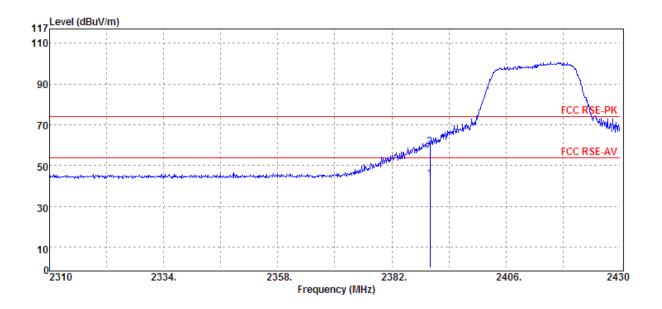
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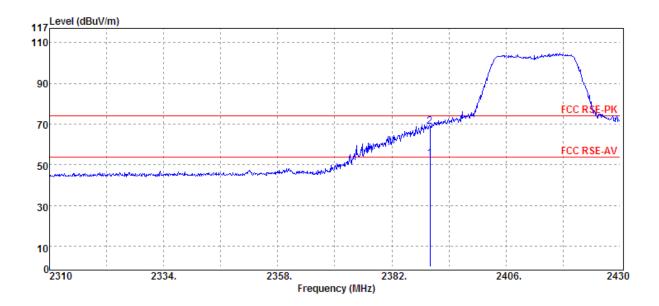
11n\_20 (2.4GHz)

Operation Band :802.11 n20M **Test Date** :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :Band edge LOW Engineer :Nick

EUT Pol. Measurement Antenna Pol. :E2 Plan :Ver. / Hor.





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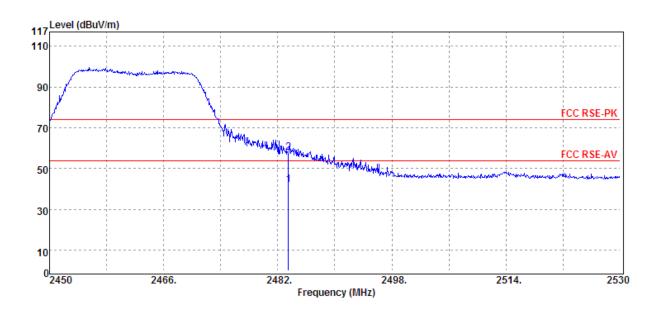
Operation Band Fundamental Frequency Operation Mode EUT Pol.

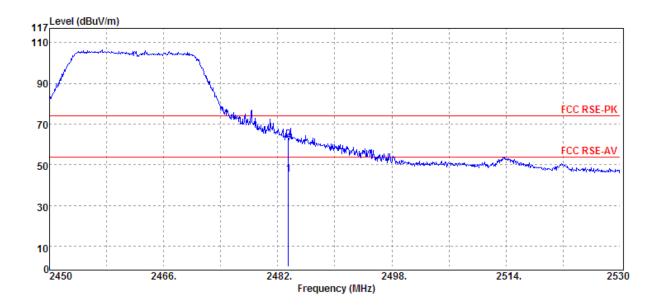
:802.11 n20M :2462 MHz :Band edge HIGH :E2 Plan

**Test Date** :2013-05-01 Temp./Humi. :23deg C/52RH

Engineer :Nick

Measurement Antenna Pol. :Ver. / Hor.





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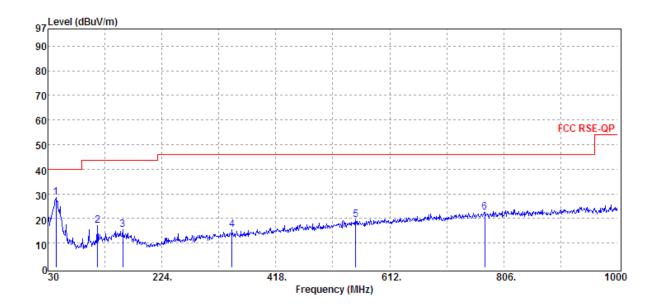
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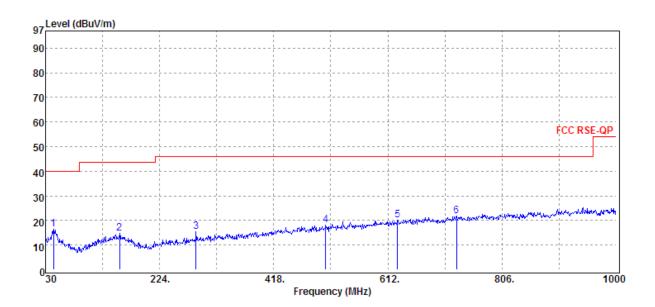
#### Radiated Spurious Emission Measurement photos Result (below 1GHz)

Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2412 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX LOW Engineer

EUT Pol. : E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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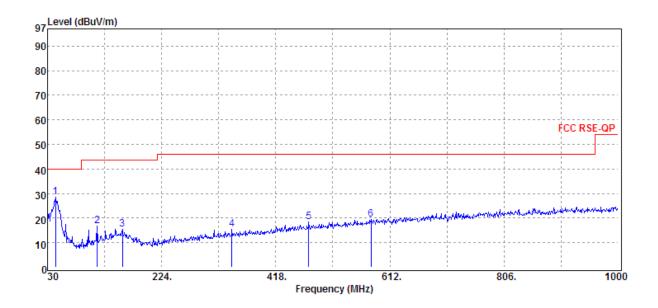
Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

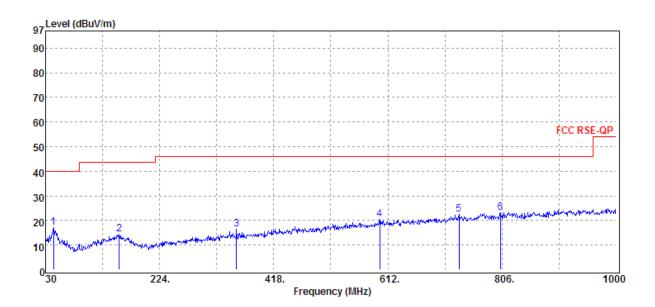
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Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2437 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX MID Engineer

EUT Pol. : E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 b :2462 MHz power 15 dBm Temp./Humi. :TX HIGH

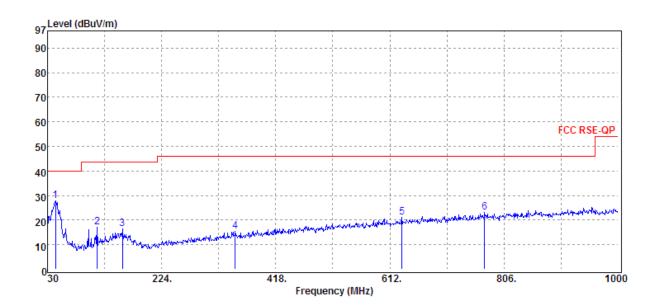
: E2 Plan

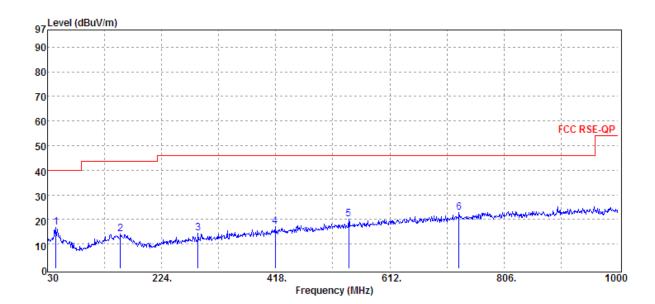
Test Date

:2013-05-27 :23deg\_C/52RH

Engineer

Measurement Antenna Pol. :Ver. / Hor.





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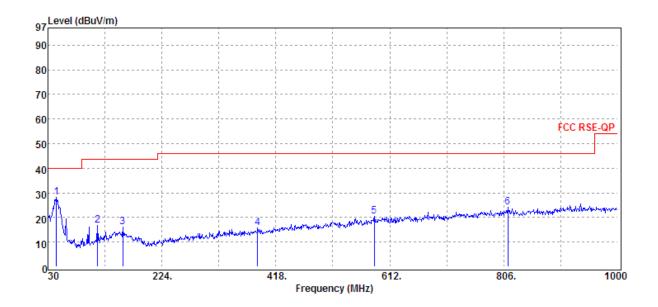


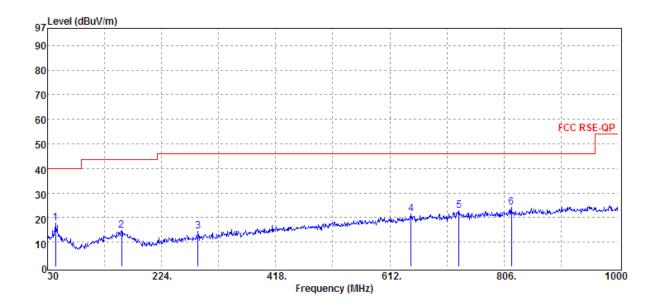
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Operation Band :802.11 g **Test Date** :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis EUT Pol. Measurement Antenna Pol. :Ver. / Hor. :E2 Plan





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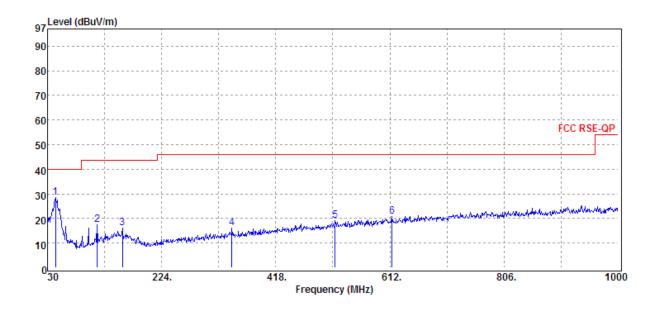


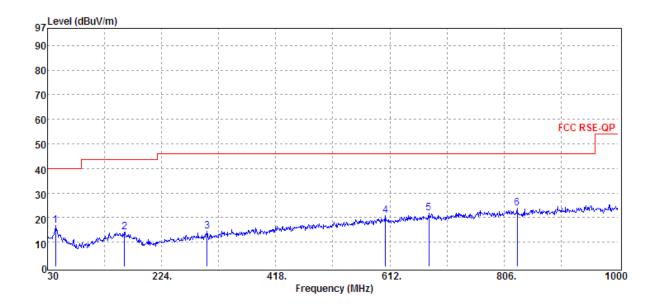
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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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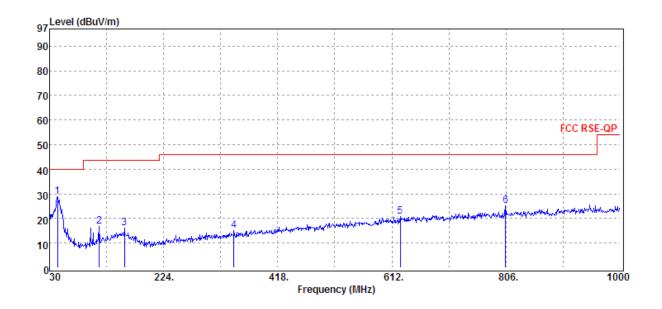


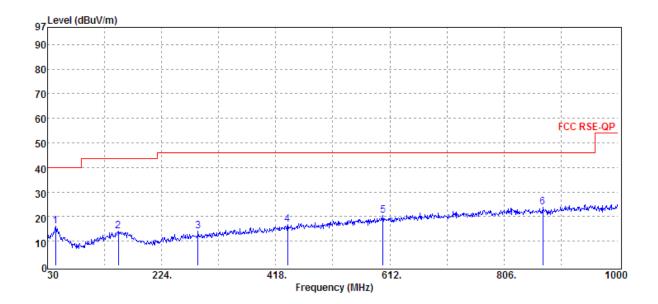
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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX HIGH Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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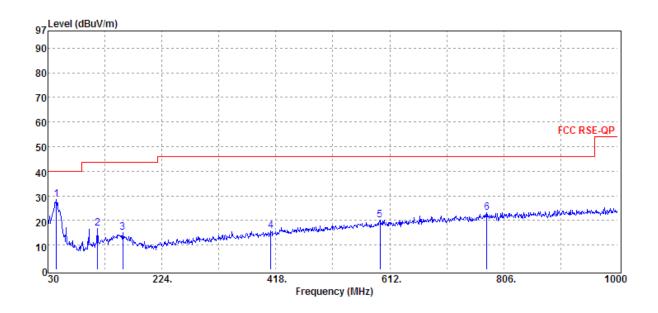


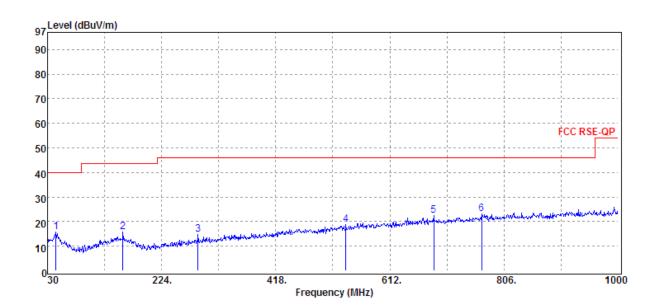
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:802.11 n20M Operation Band **Test Date** :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis EUT Pol. Measurement Antenna Pol. :Ver. / Hor. :E2 Plan





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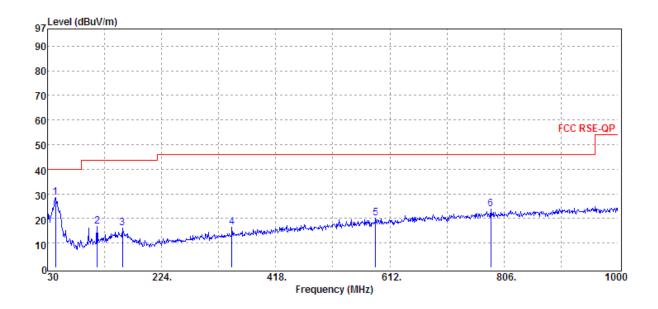


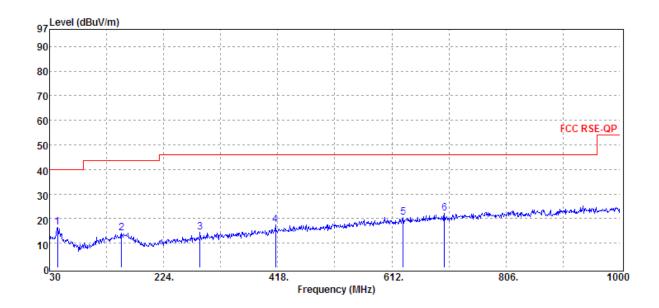
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:802.11 n20M Operation Band **Test Date** :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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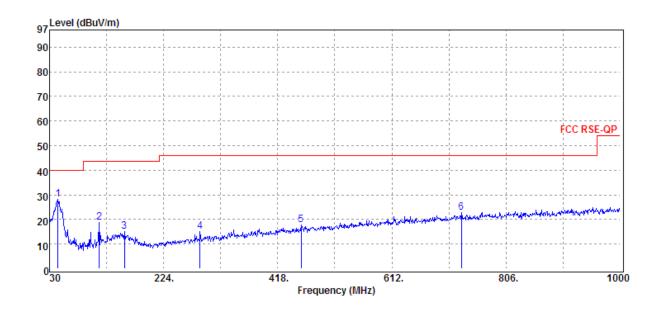


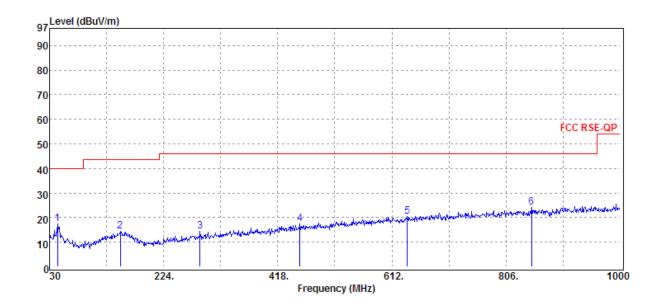
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:802.11 n20M Operation Band **Test Date** :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX HIGH Engineer :Louis

EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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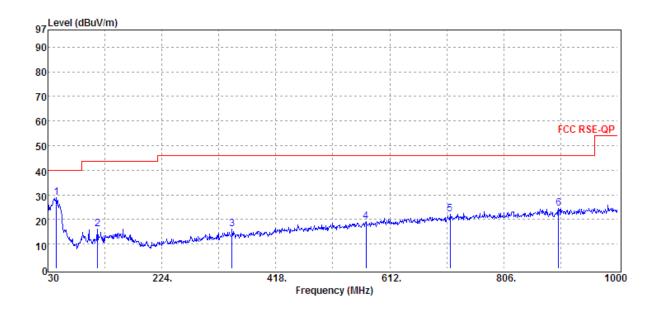


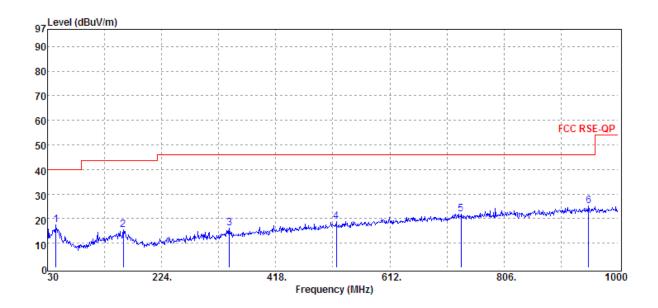
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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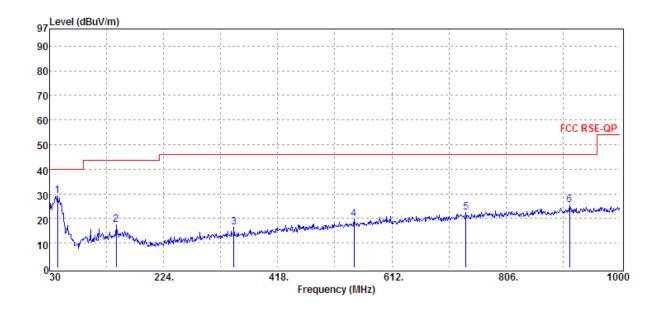


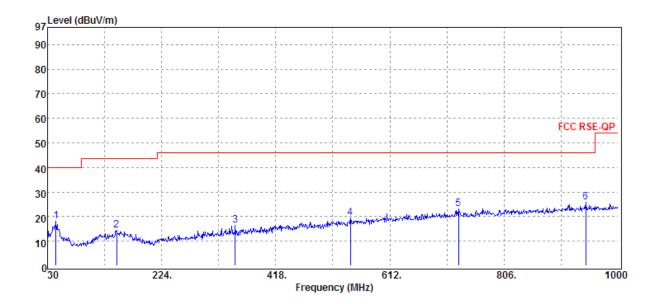
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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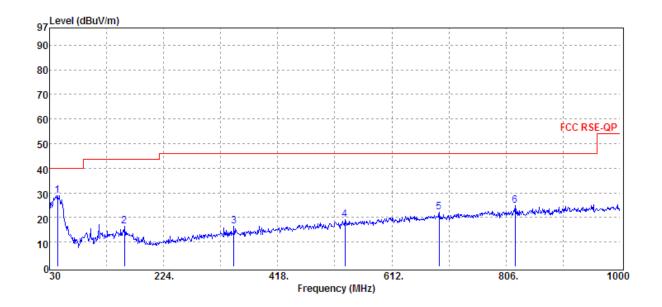


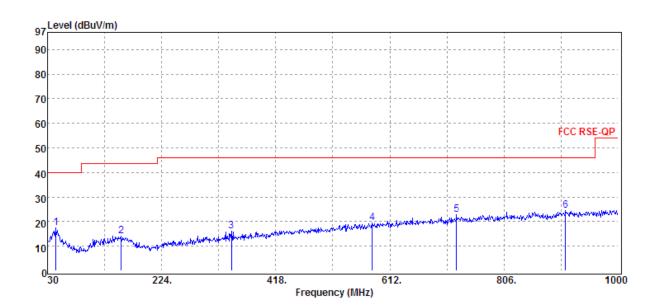
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH :TX HIGH

Operation Mode Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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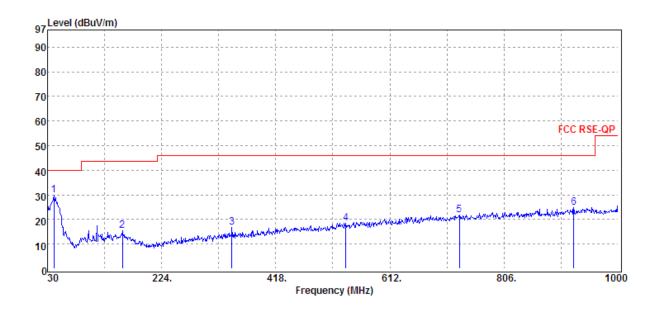


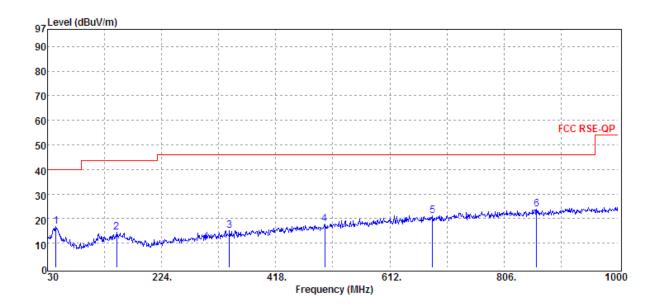
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX LOW Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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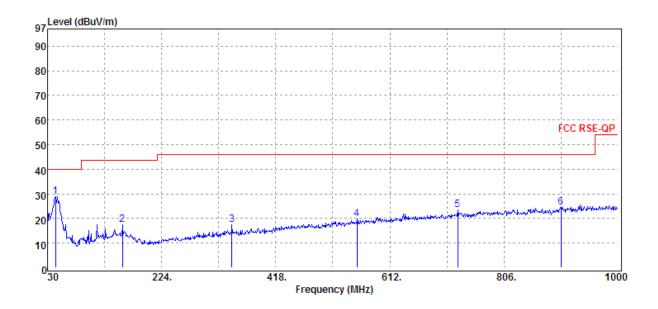


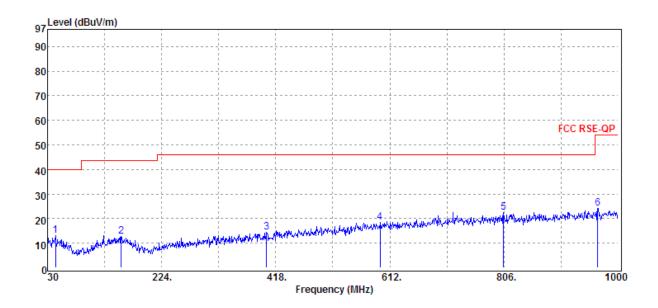
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Operation Band :802.11 n20M **Test Date** :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. /Hor.





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Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

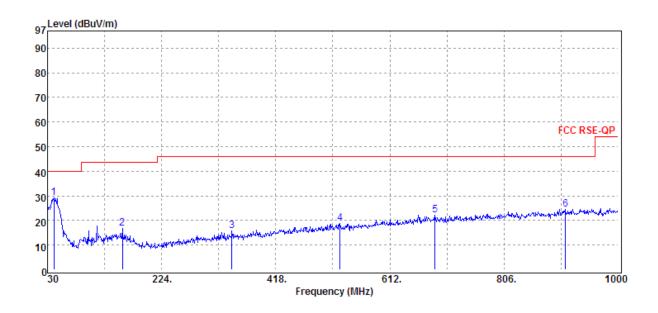
Page: 191 of 261

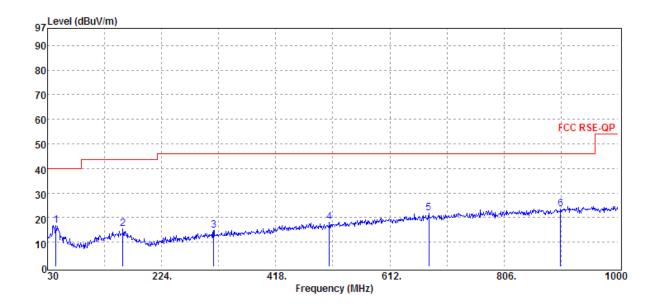
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n20M :5825 MHz :TX HIGH :E2

**Test Date** :2013-05-01 Temp./Humi. :23deg C/52RH

Engineer :Louis Measurement Antenna Pol. :Ver. / Hor.





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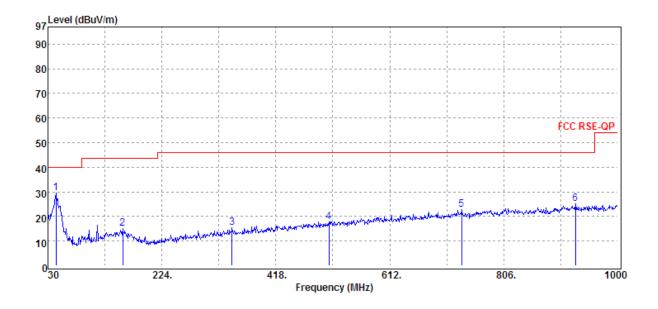


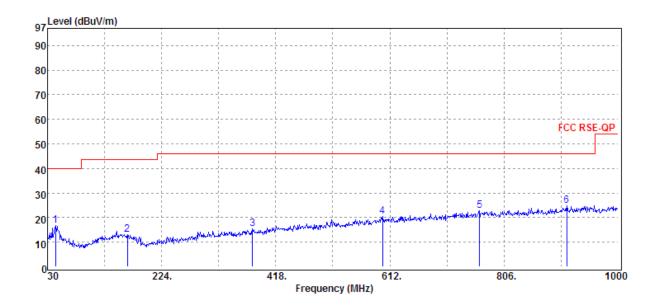
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Operation Band :802.11 n40M **Test Date** :2013-05-01 Fundamental Frequency :5755 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis EUT Pol. :E2 Plan Measurement Antenna Pol. :Ver. / Hor.





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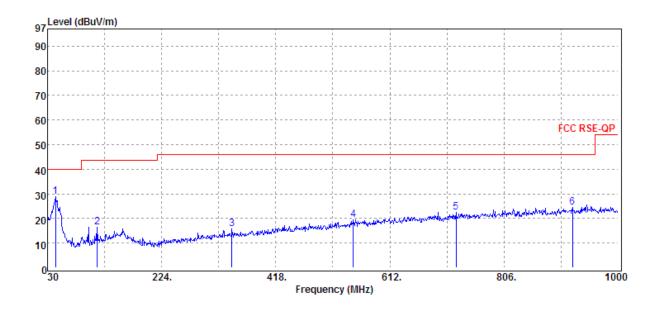
Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

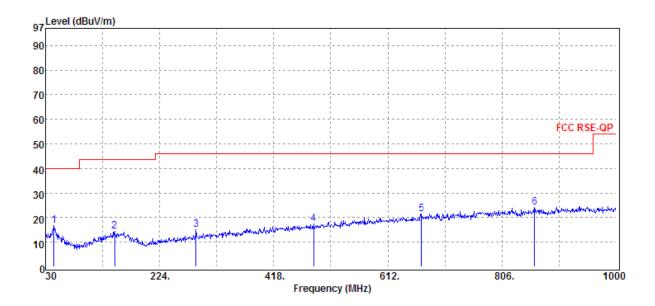
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Operation Band
Fundamental Frequency
Operation Mode
EUT Pol.

:802.11 n40M :5795 MHz :TX HIGH :E2 Plan Test Date :2013-05-01
Temp./Humi. :23deg\_C/52RH

Engineer :Louis
Measurement Antenna Pol. :Ver. / Hor.





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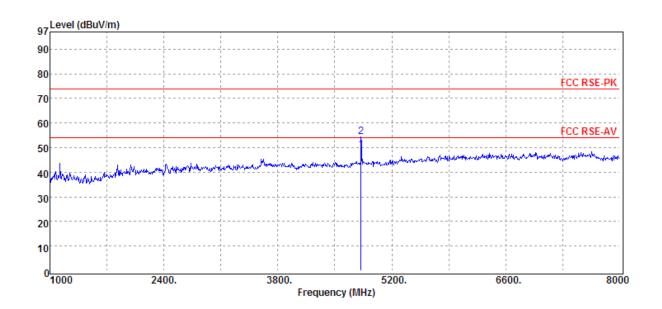
Page: 194 of 261

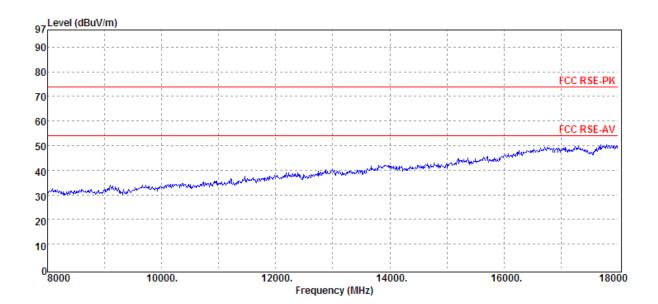
## Radiated Spurious Emission Measurement photos Result (above 1GHz)

Operation Band :802.11 b Test Date :2013-05-27 Fundamental Frequency :2412 MHz power 15 dBm Temp./Humi. :23deg\_C/52RH

Operation Mode :TX LOW Engineer

EUT Pol. ·E2 Plan :VERTICAL Measurement Antenna Pol.





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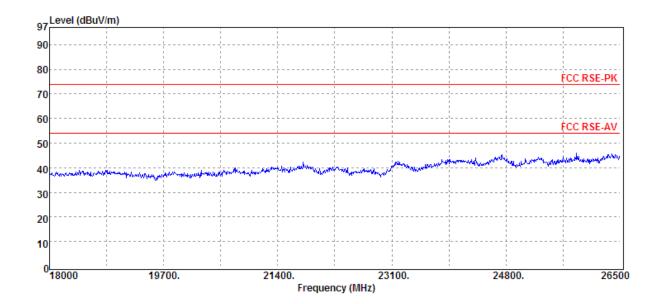
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Operation Band Fundamental Frequency Operation Mode EUT Pol.

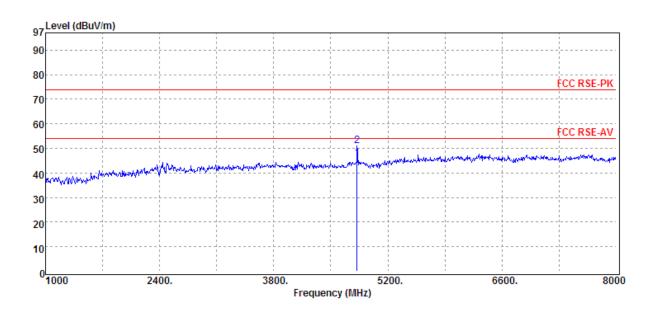
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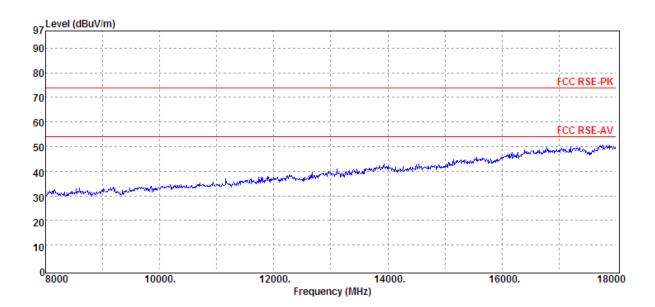
:E2 Plan

Test Date :2013-05-27 :23deg\_C/52RH

Engineer

Measurement Antenna Pol. :HORIZONTAL





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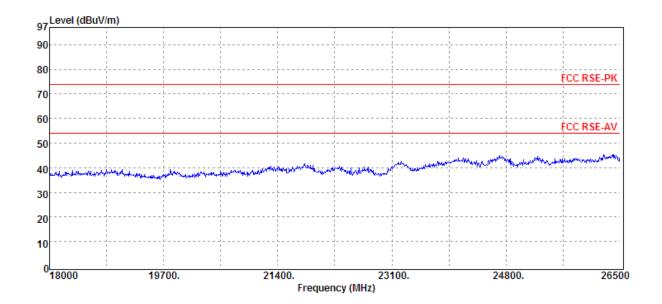
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Operation Band Fundamental Frequency Operation Mode EUT Pol.

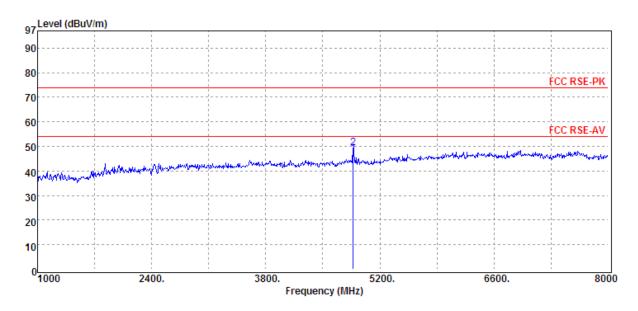
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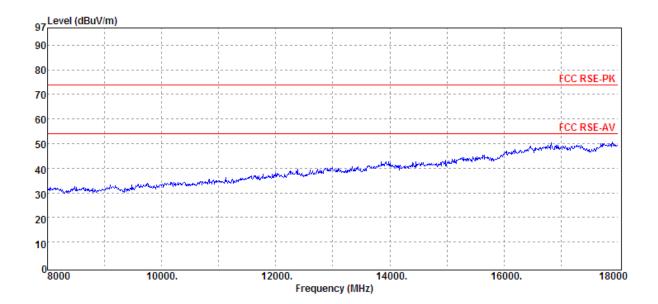
:E2 Plan

**Test Date** Engineer

:2013-05-27 :23deg\_C/52RH

Measurement Antenna Pol. :VERTICAL





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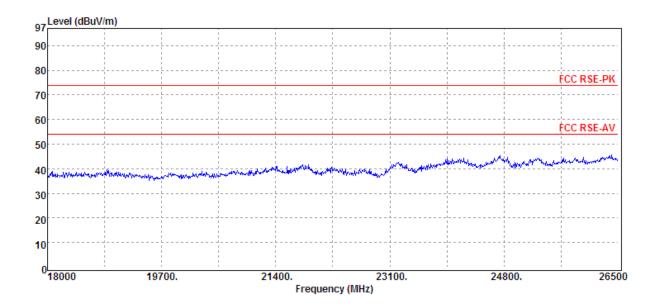
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Operation Band Fundamental Frequency Operation Mode EUT Pol.

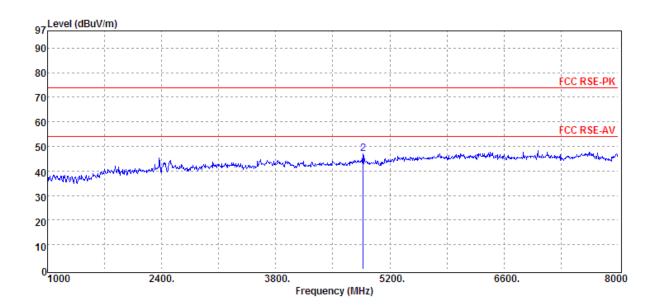
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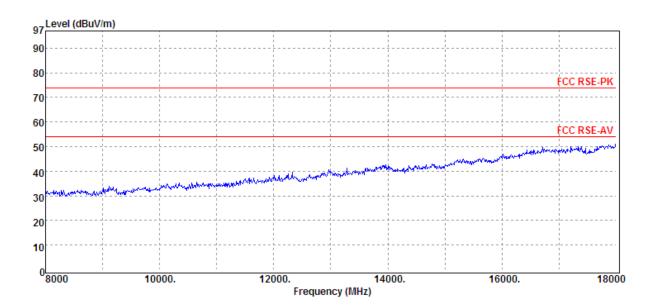
:E2 Plan

Test Date Engineer

:2013-05-27 :23deg\_C/52RH

Measurement Antenna Pol. :HORIZONTAL





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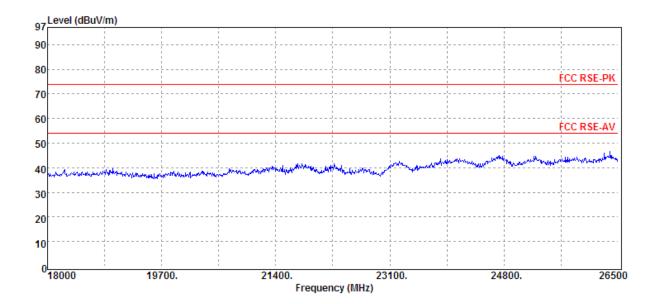
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Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

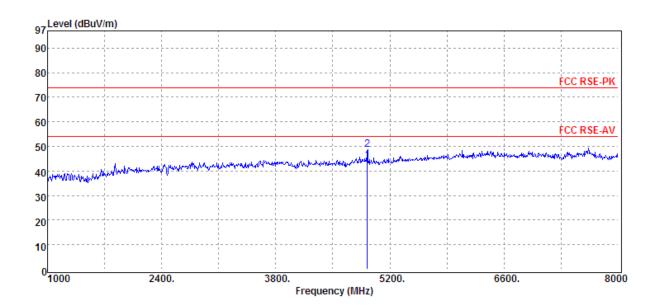
Page: 202 of 261

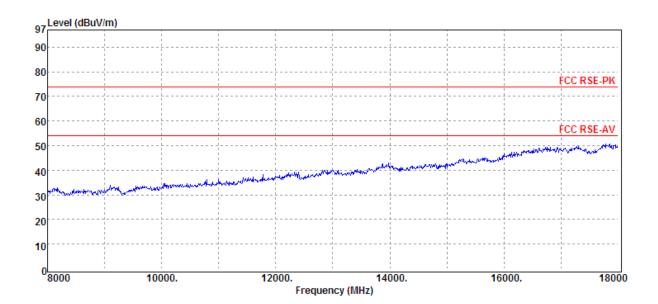
Operation Band Fundamental Frequency Operation Mode EUT Pol. :802.11 b Test Date :2462 MHz power 15 dBm Temp./Humi. :TX HIGH Engineer

:E2 Plan

Test Date :2013-05-27
Temp./Humi. :23deg\_C/52RH
Engineer :JJ

Measurement Antenna Pol. :VERTICAL





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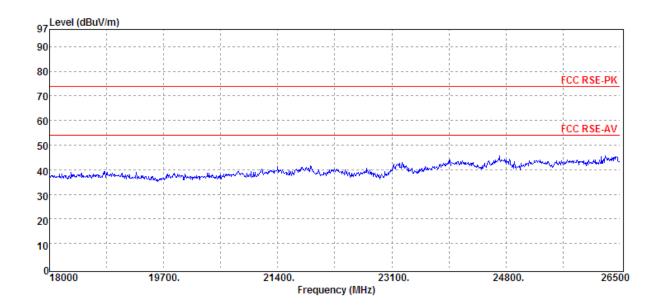
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Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 b :2462 MHz power 15 dBm Temp./Humi. :TX HIGH

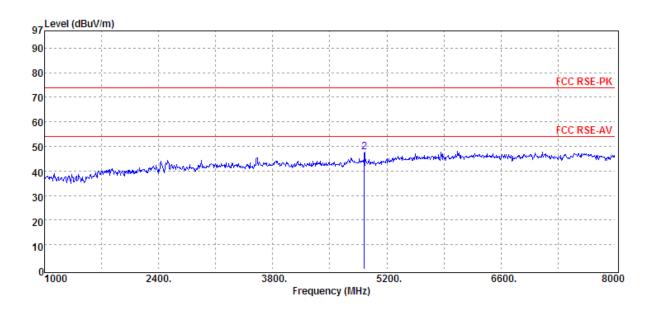
:E2 Plan

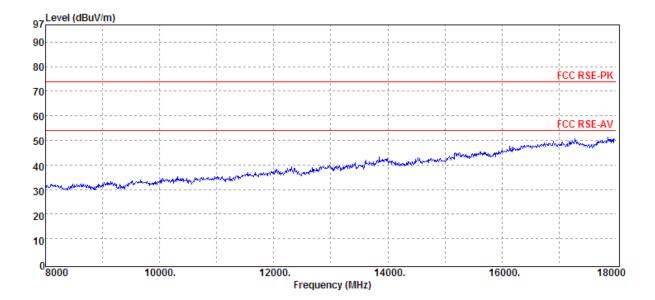
Test Date Engineer

Measurement Antenna Pol.

:2013-05-27 :23deg\_C/52RH

:HORIZONTAL





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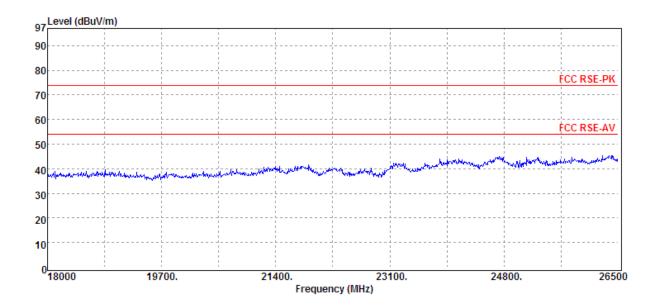
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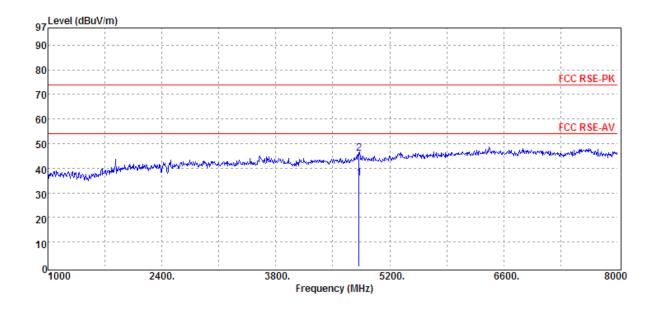
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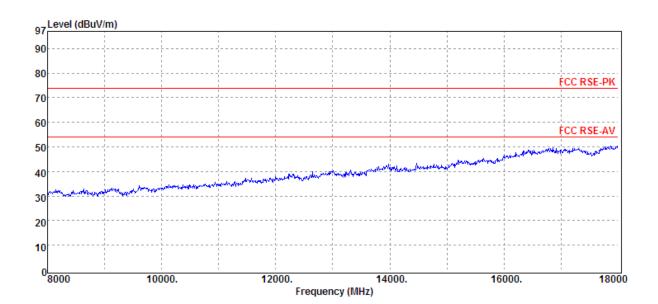
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Operation Band :802.11 g **Test Date** :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis

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





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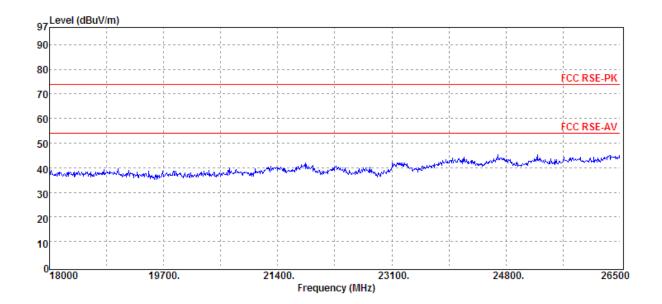
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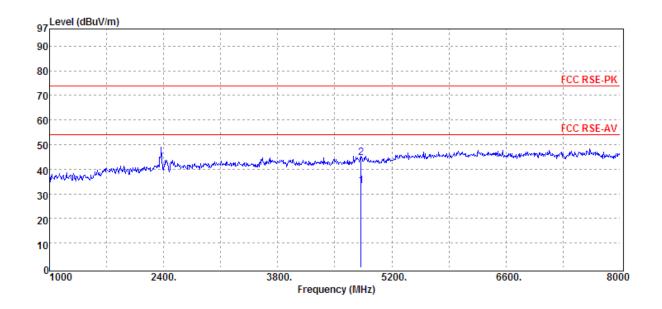


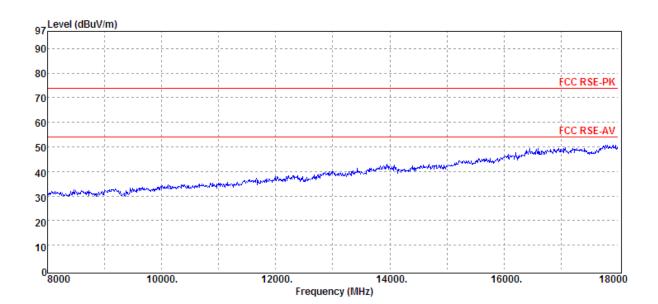
Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg\_C/52RH Operation Mode :TX LOW Engineer :Louis

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





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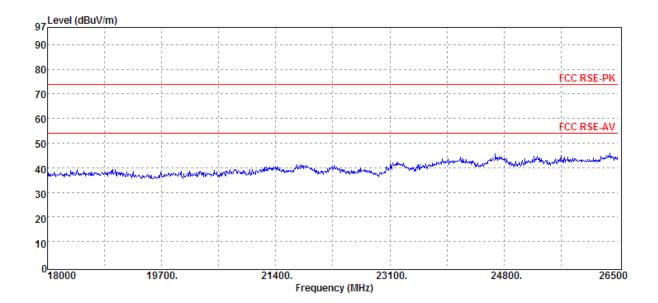
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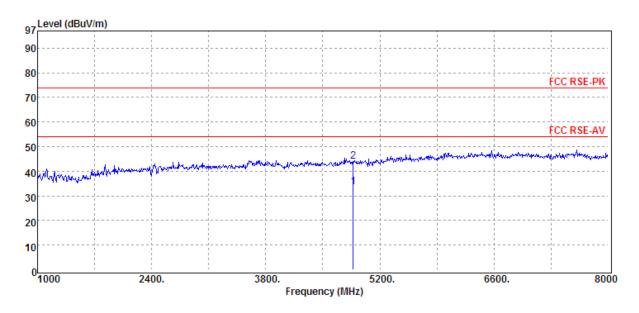
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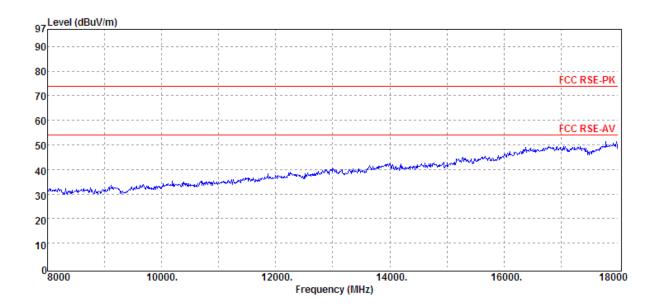
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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis

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





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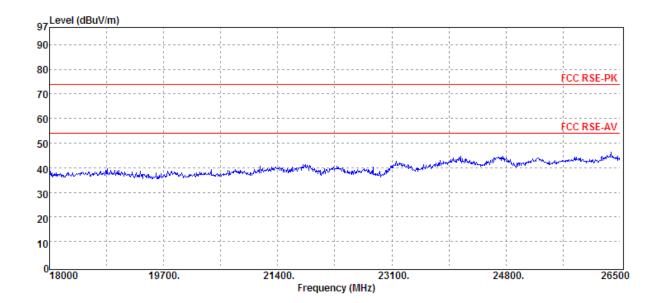
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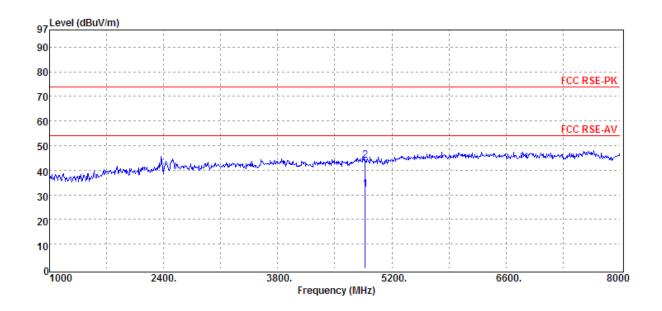


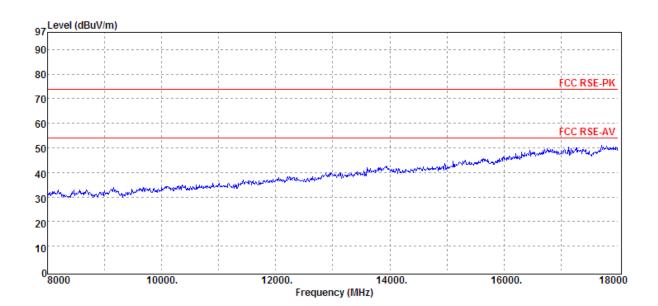
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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX MID Engineer :Louis

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





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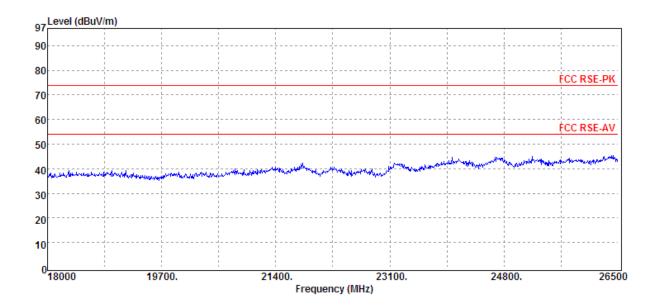
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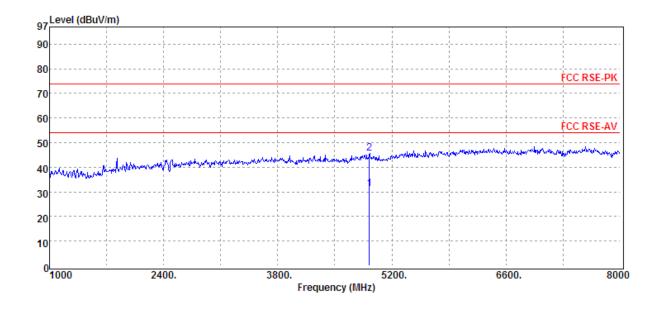
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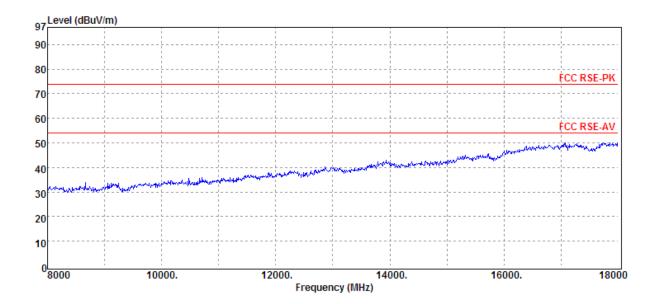
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Operation Band :802.11 g Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





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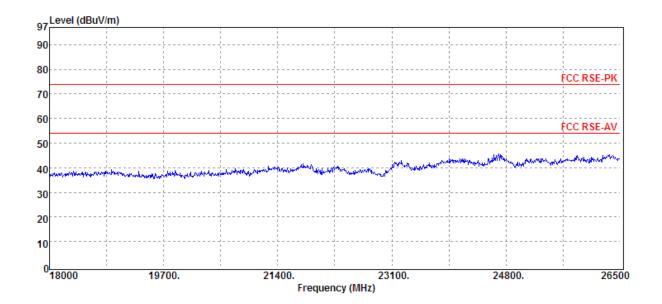
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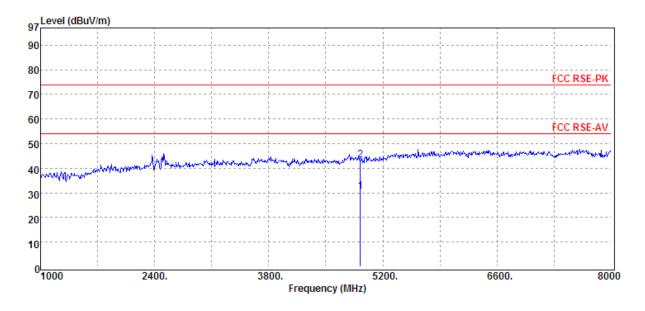
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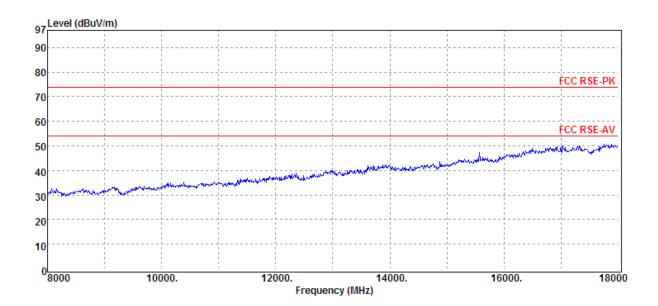
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Operation Band :802.11 g Test Date :2013-05-01 :2462 MHz Fundamental Frequency Temp./Humi. :23deg C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





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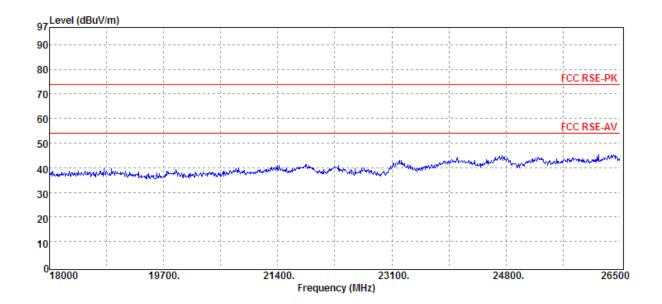
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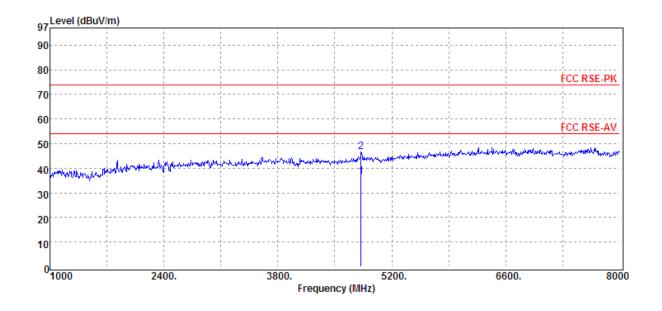
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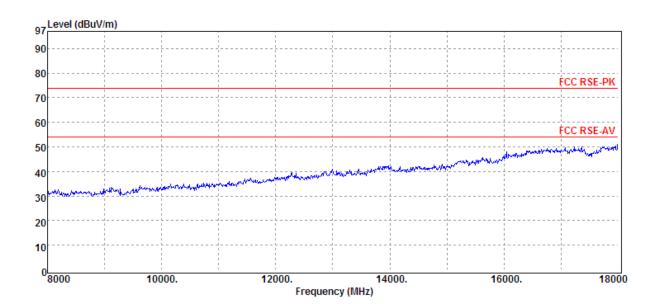
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Operation Band :802.11 n20M **Test Date** :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis

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





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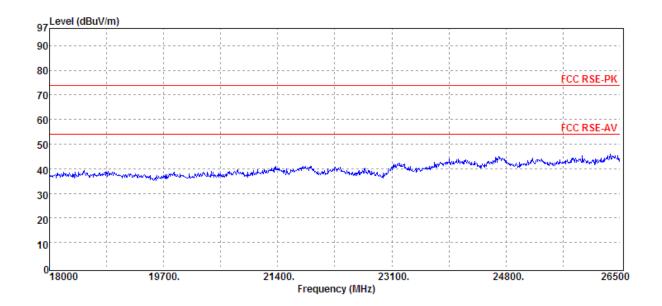
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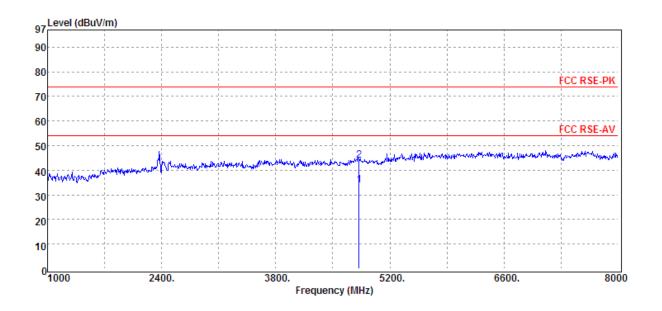


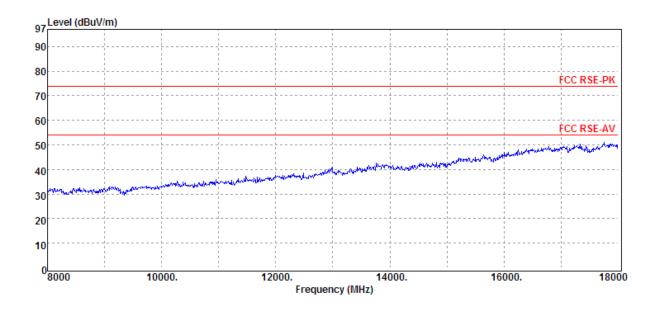
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2412 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX LOW Engineer :Louis

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





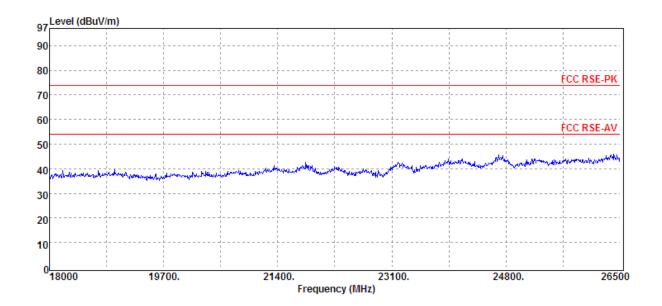
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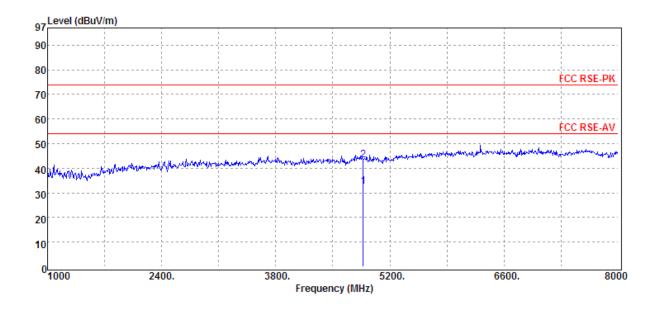
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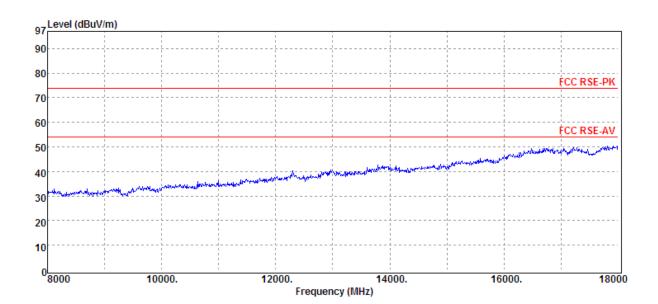
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Operation Band :802.11 n20M **Test Date** :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis

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





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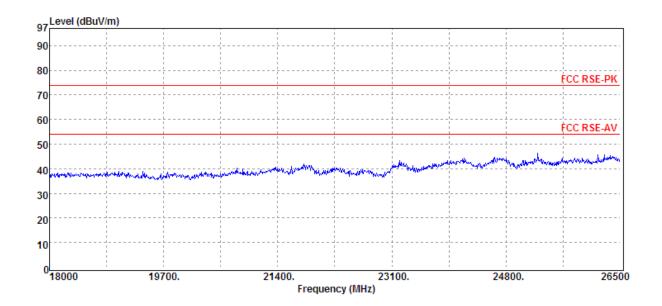
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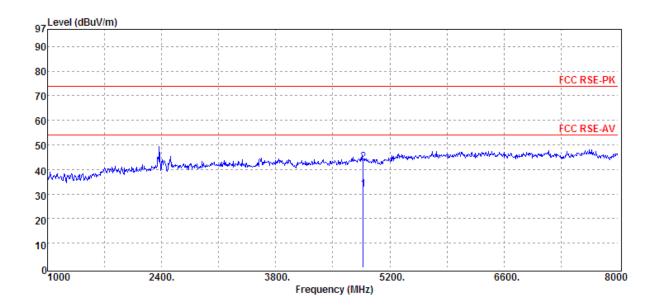


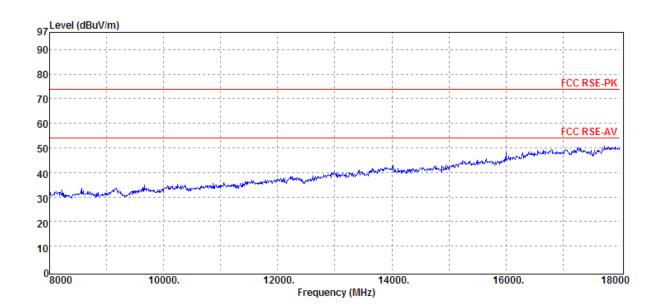
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2437 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX MID Engineer :Louis

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





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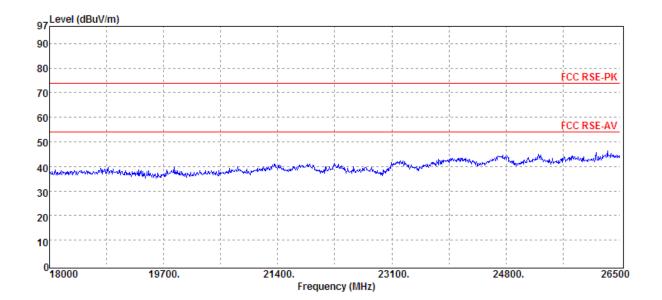
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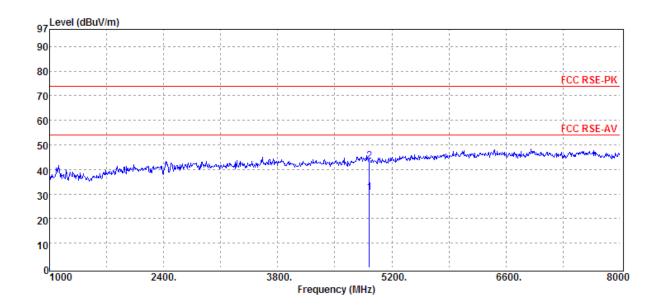
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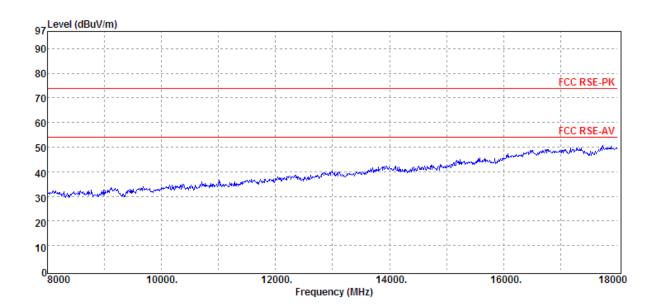
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :2462 MHz Temp./Humi. :23deg\_C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





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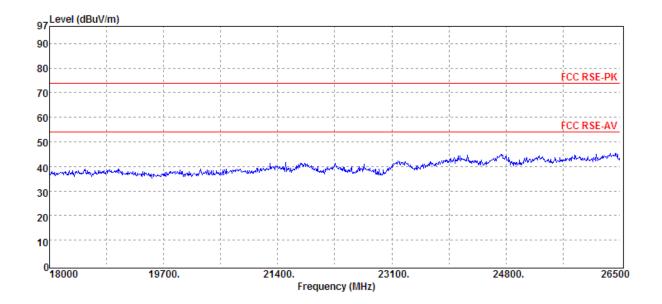
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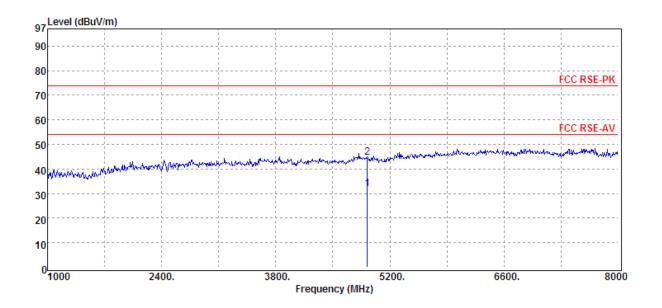


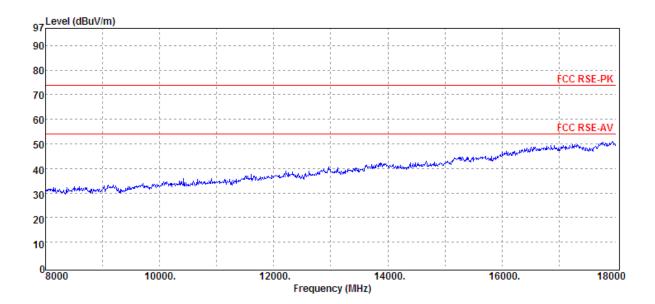
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**Operation Band** :2013-05-01 :802.11 n20M **Test Date** Fundamental Frequency :2462 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX HIGH Engineer :Louis

EUT Pol ·E2 Plan Measurement Antenna Pol. :HORIZONTAL





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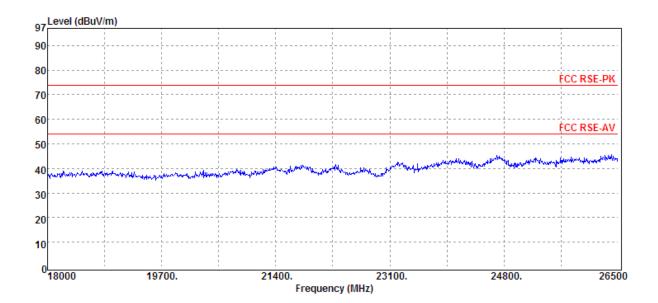
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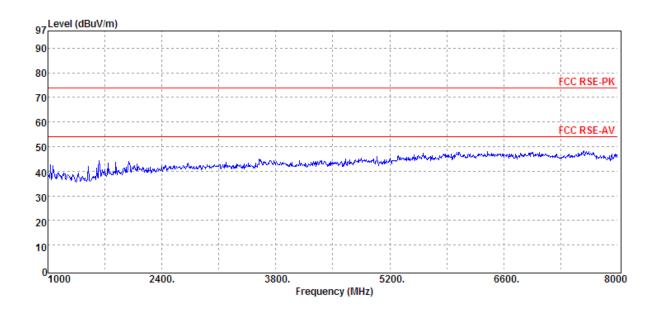
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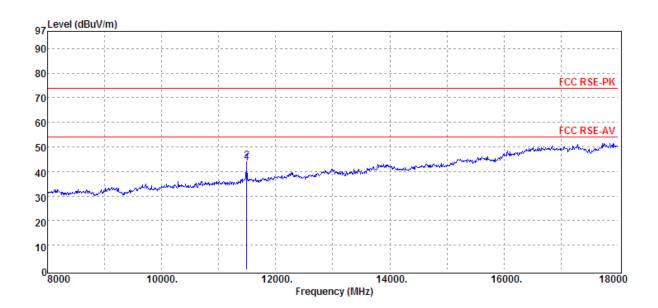
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**Operation Band** :802.11 a Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis

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





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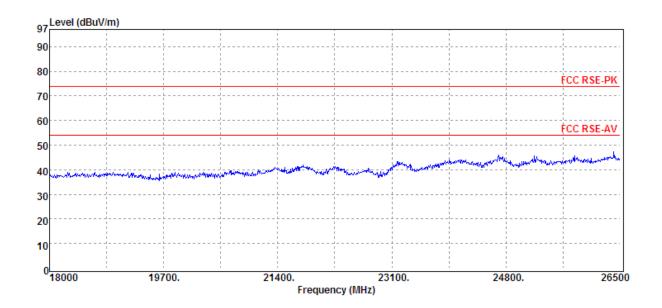
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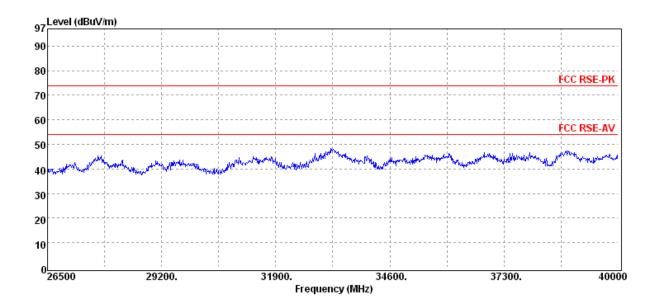
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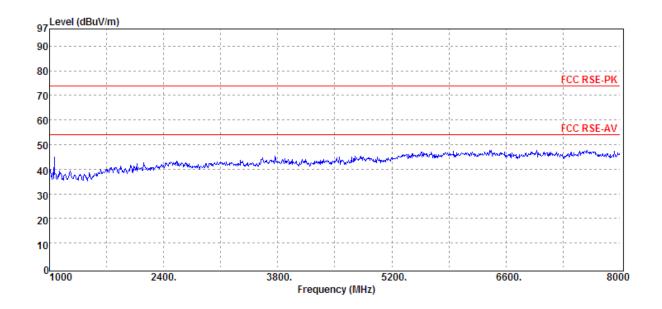


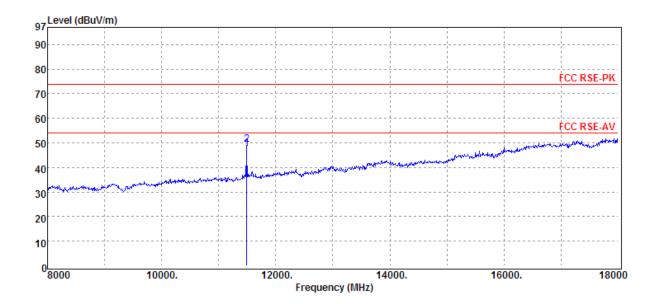
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX LOW Engineer :Louis

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





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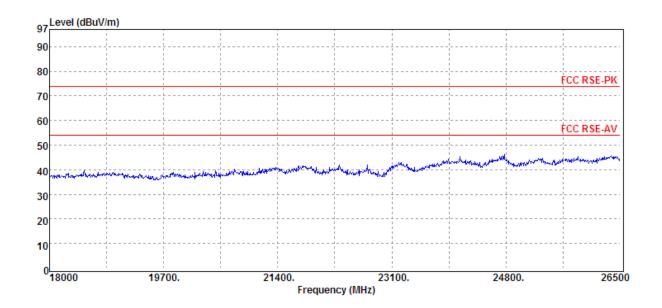
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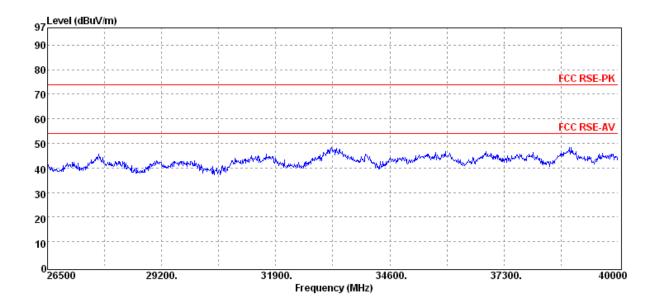
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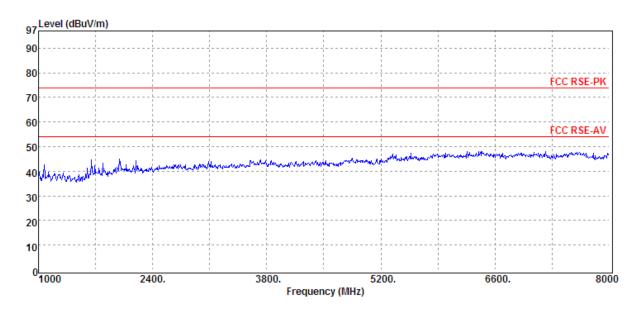
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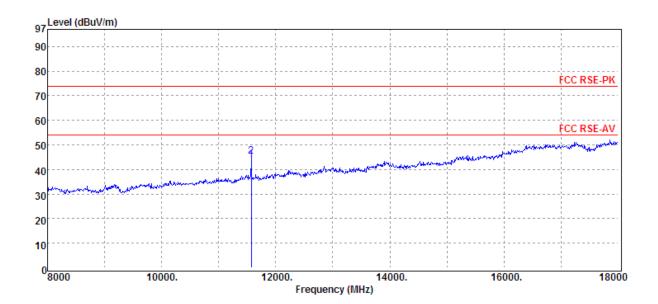
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis

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





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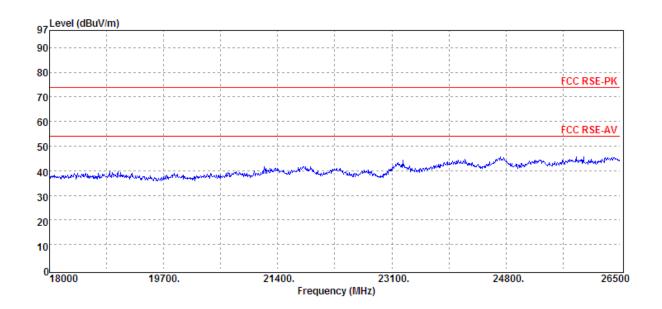
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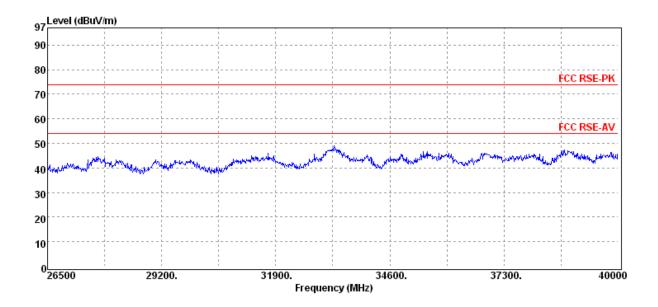
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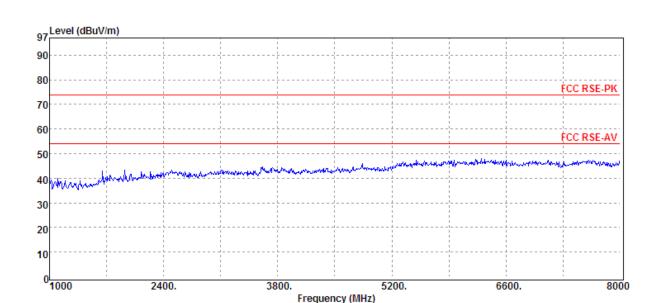


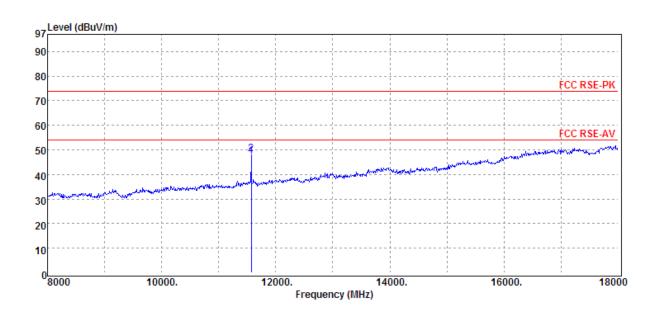
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX MID Engineer :Louis

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





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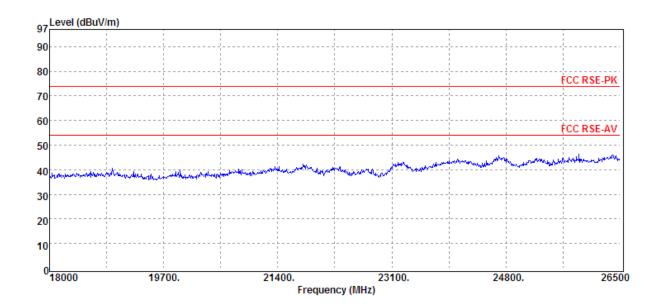
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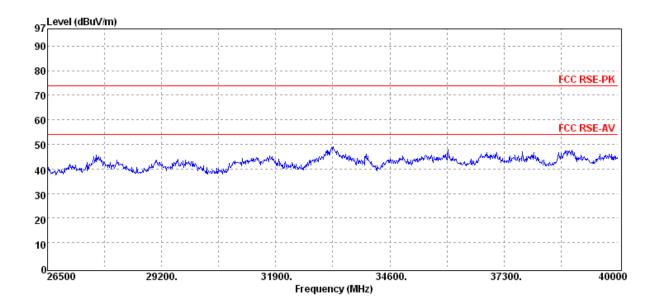
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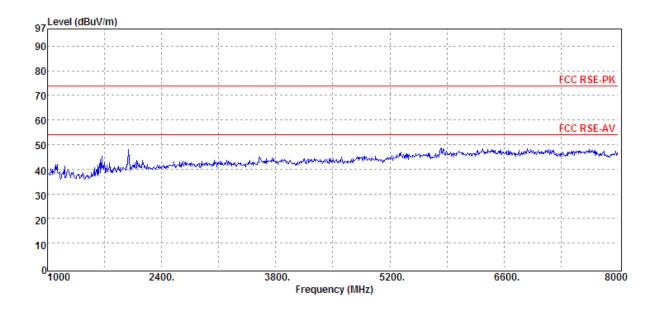
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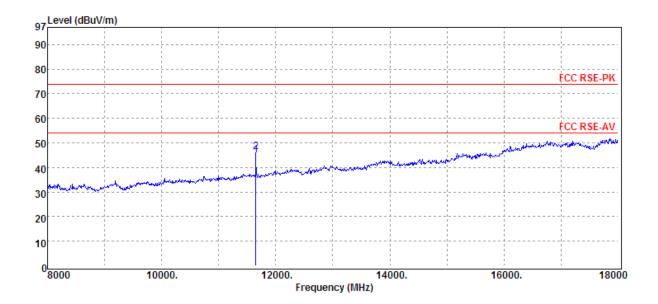
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





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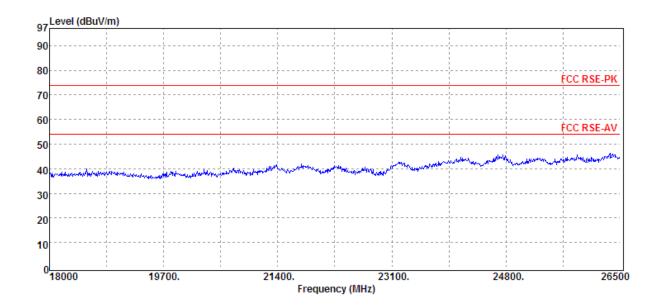
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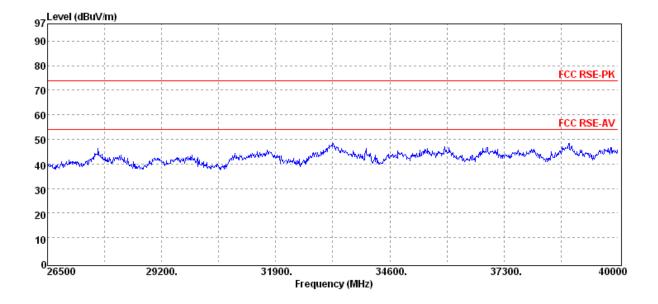
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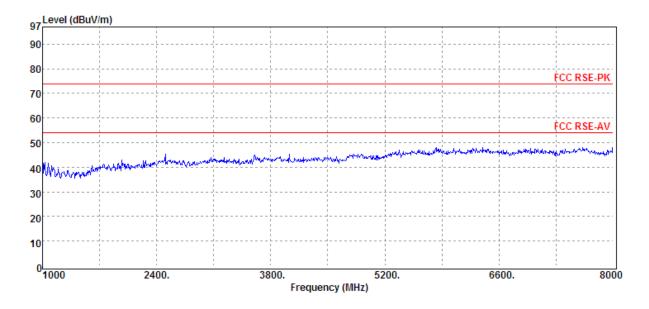
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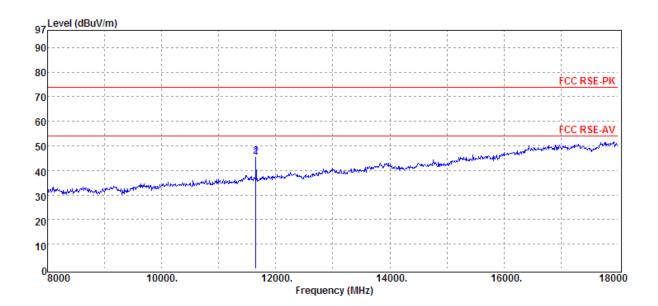
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Operation Band :802.11 a Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





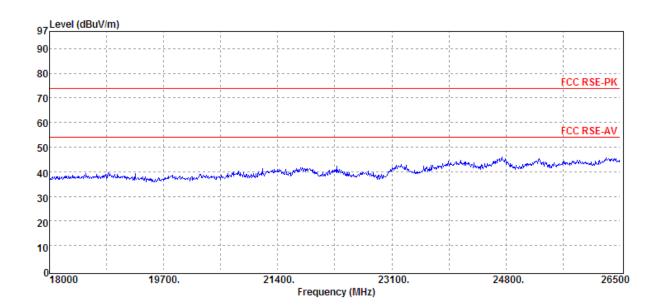
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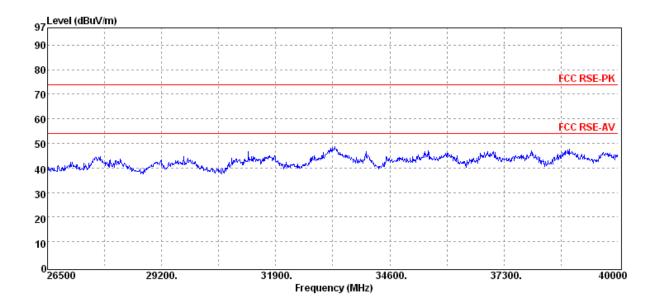
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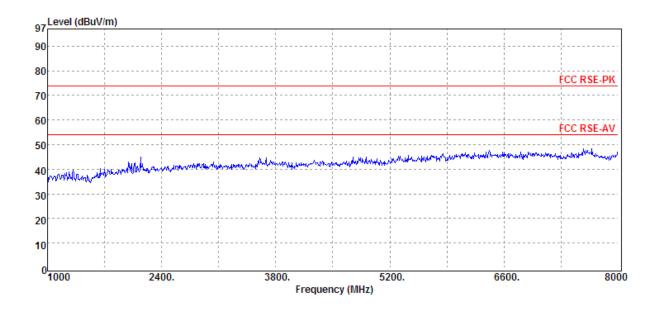
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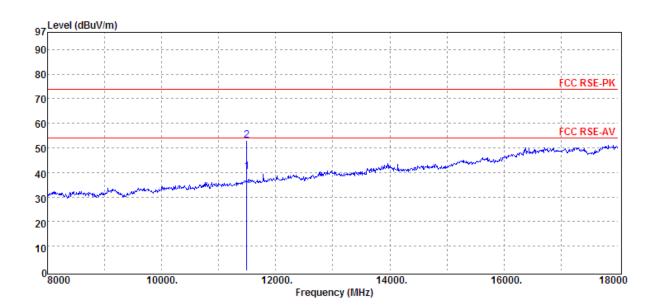
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX LOW Engineer :Louis

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





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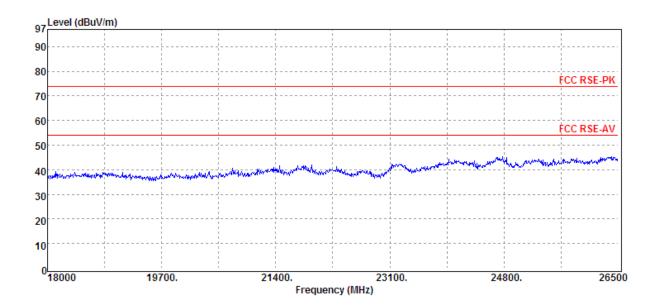
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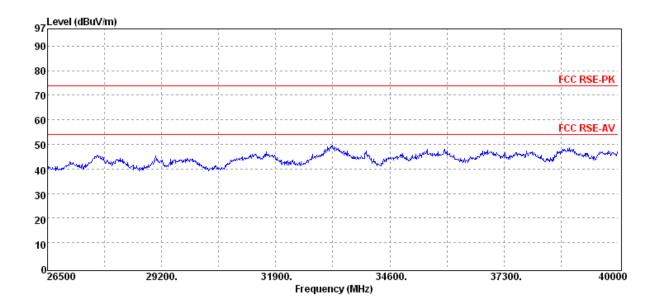
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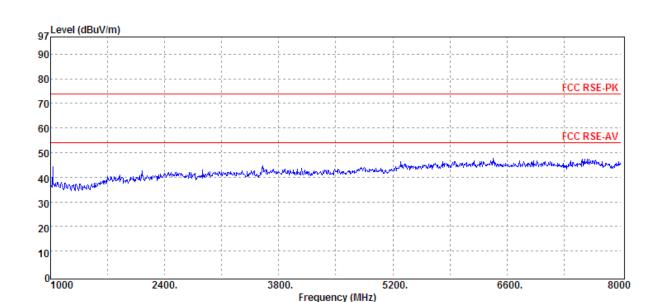


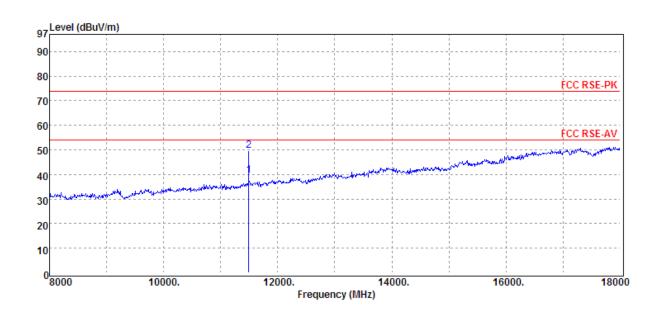
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5745 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX LOW Engineer :Louis

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





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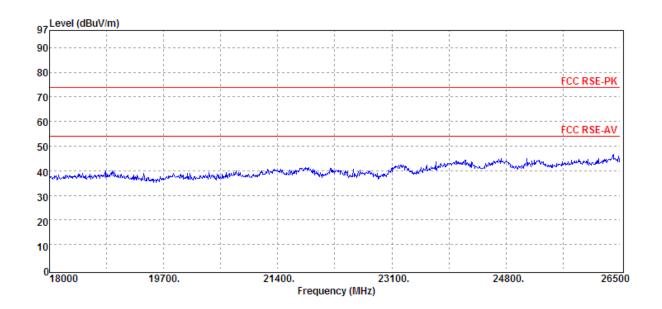
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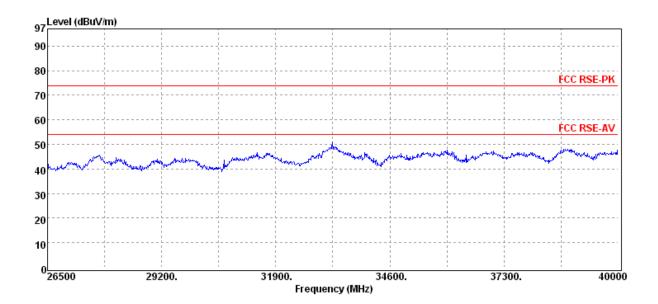
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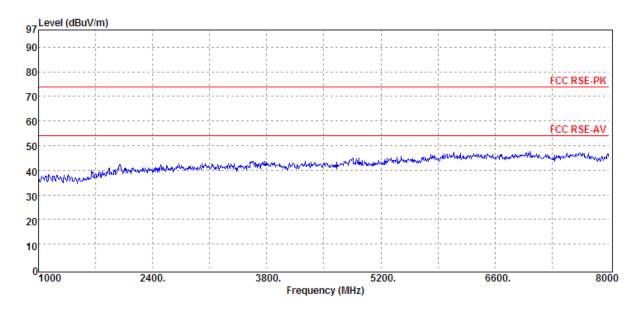
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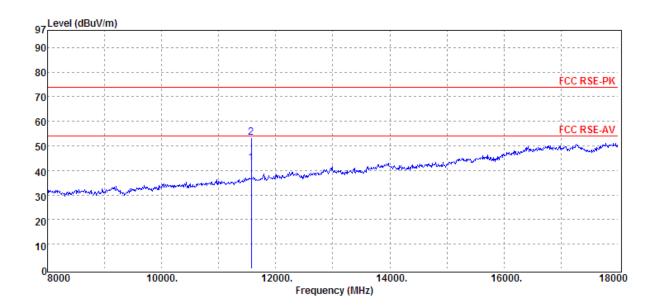
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX MID Engineer :Louis

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





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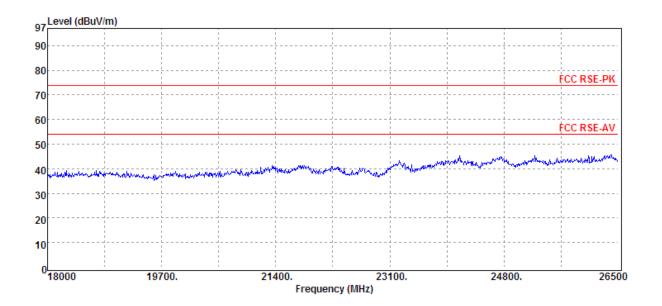
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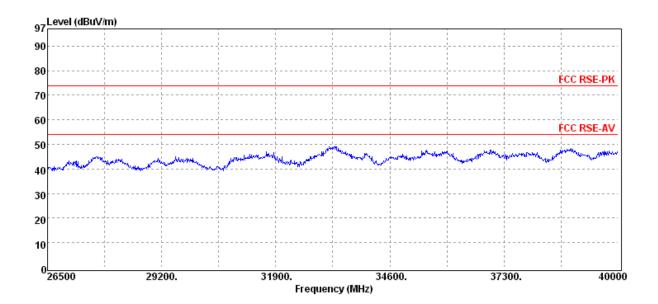
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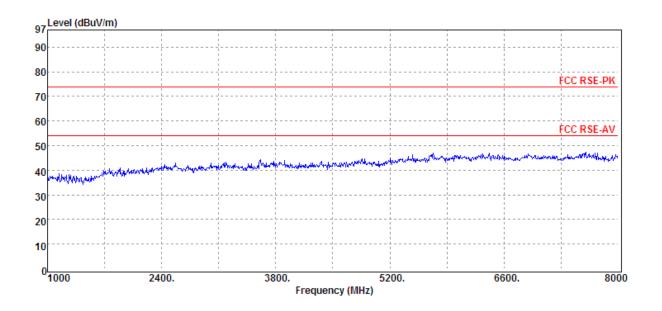


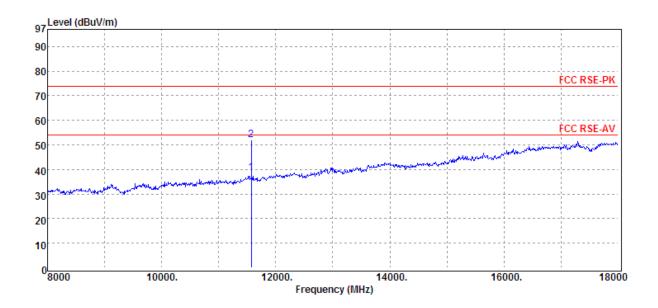
Report No.: EH/2013/40009 Issue Date: Jun. 06, 2013

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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5785 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX MID Engineer :Louis

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





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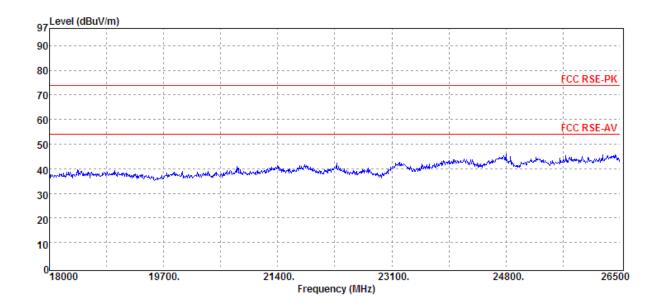
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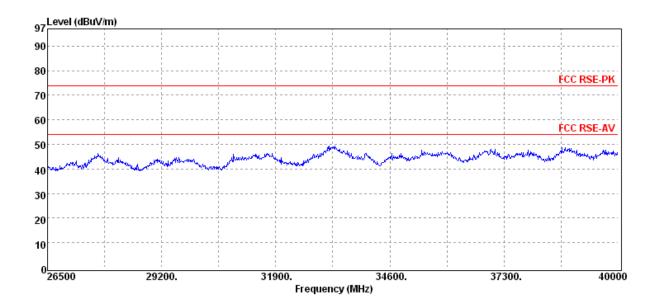
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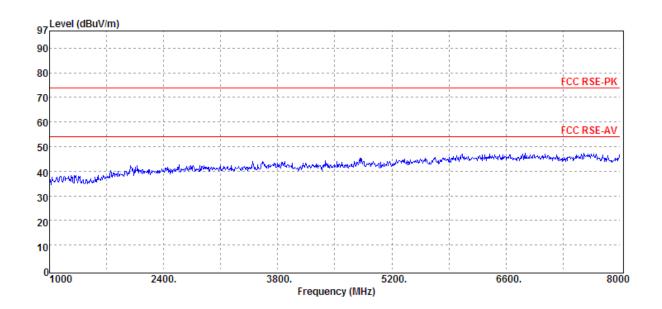


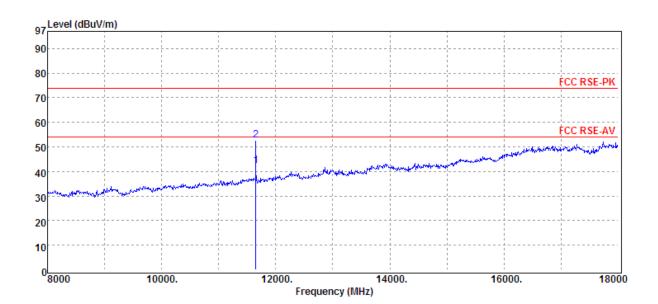
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Operation Band:802.11 n20MTest Date:2013-05-01Fundamental Frequency:5825 MHzTemp./Humi.:23deg\_C/52RHOperation Mode:TX HIGHEngineer:Louis

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





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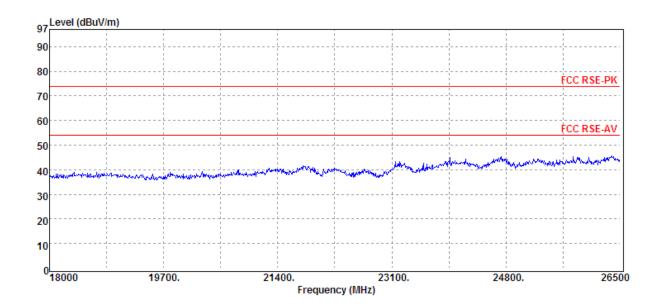
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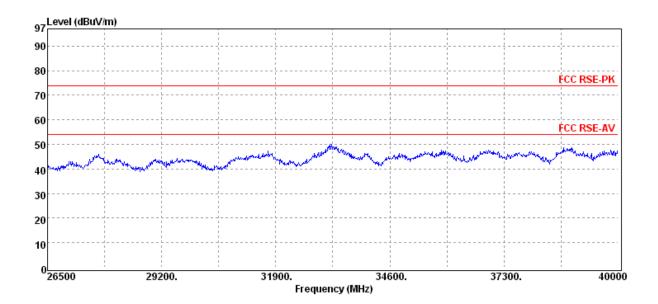
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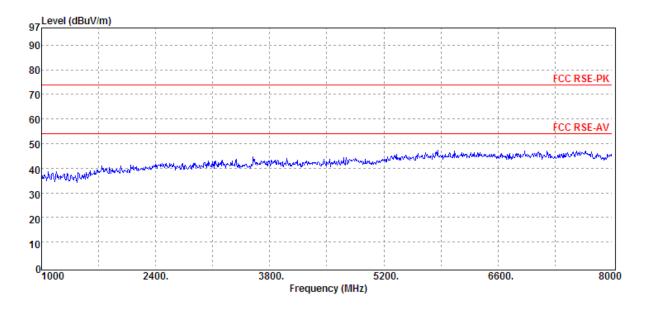
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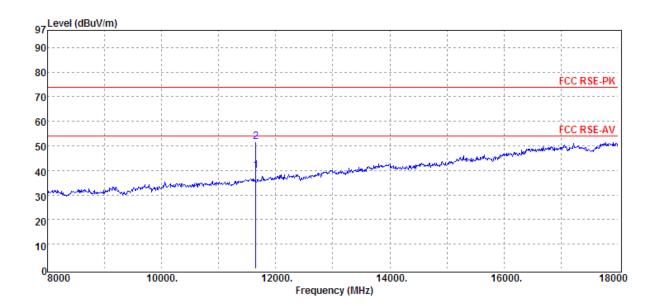
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Operation Band :802.11 n20M Test Date :2013-05-01 Fundamental Frequency :5825 MHz Temp./Humi. :23deg C/52RH

Operation Mode :TX HIGH Engineer :Louis

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





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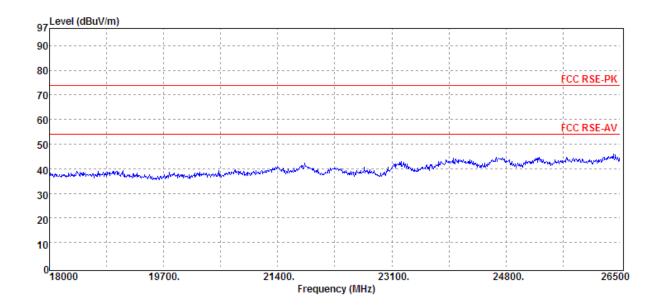
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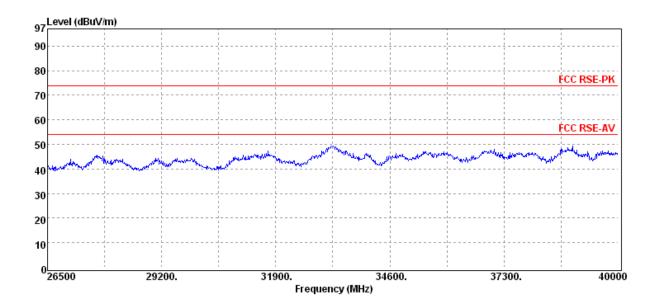
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Operation Band :802.11 n40M **Test Date** :2013-05-01 Fundamental Frequency :5755 MHz Temp./Humi. :23deg C/52RH :TX LOW

Operation Mode Engineer :Louis EUT Pol. Measurement Antenna Pol. :E2 Plan :VERTICAL

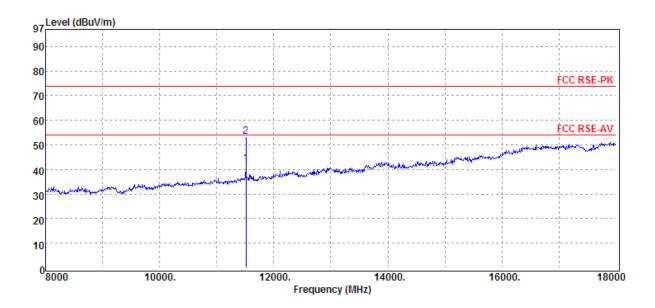
Level (dBuV/m) 80 FCC RSE-PK 60 50 30

Frequency (MHz)

5200.

6600.

8000



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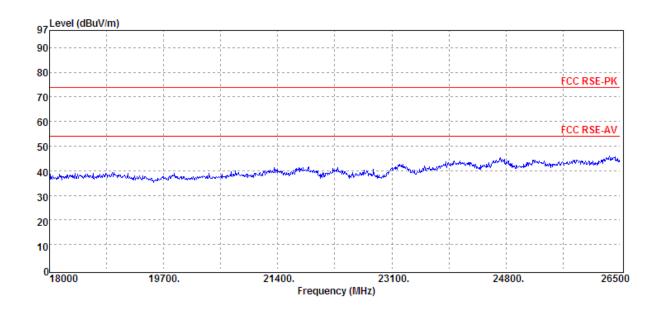
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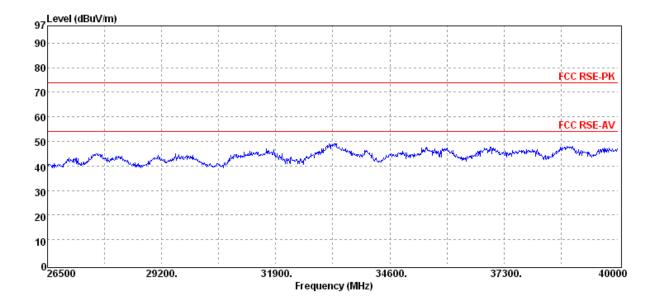
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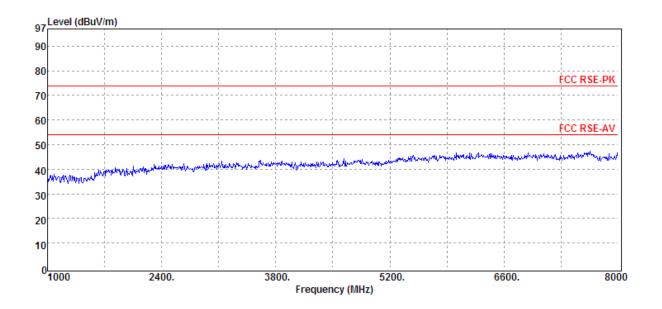


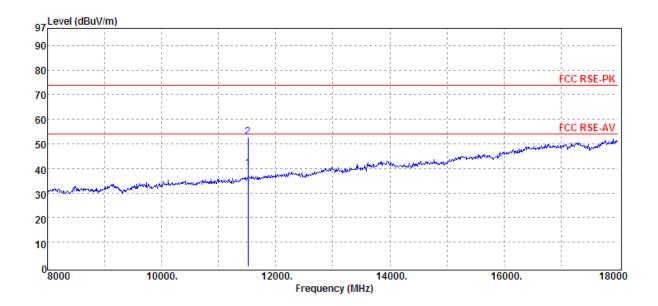
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Operation Band :802.11 n40M **Test Date** :2013-05-01 Fundamental Frequency :5755 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX LOW Engineer :Louis

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





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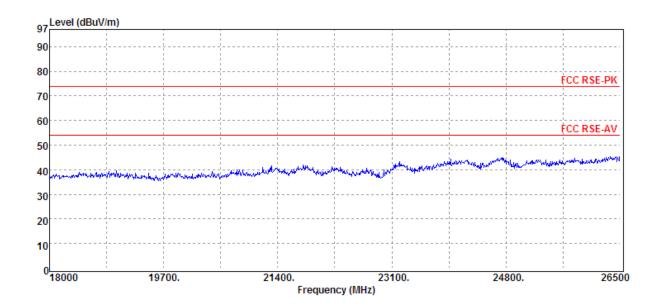
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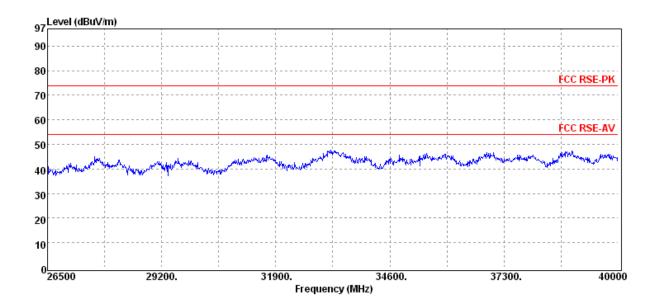
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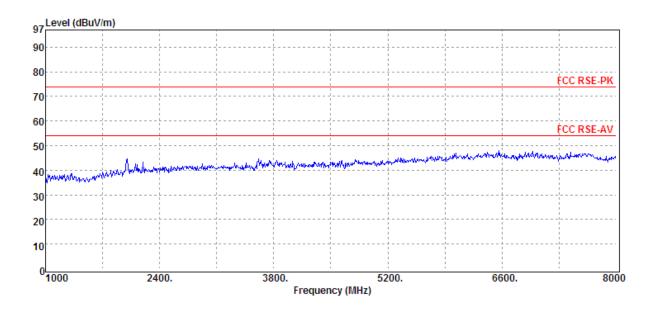


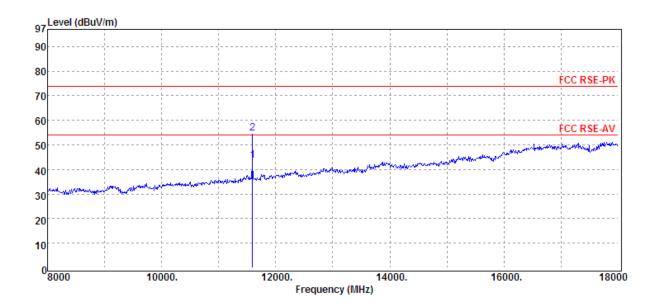
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Operation Band :802.11 n40M **Test Date** :2013-05-01 Fundamental Frequency :5795 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX HIGH Engineer :Louis

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





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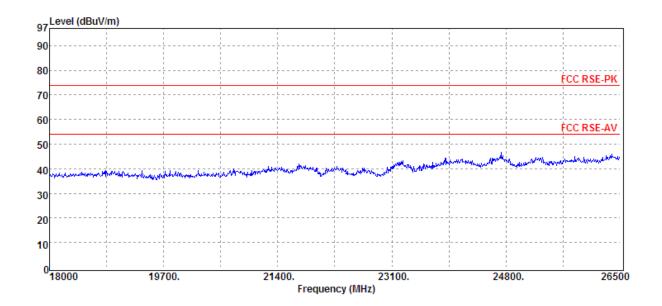
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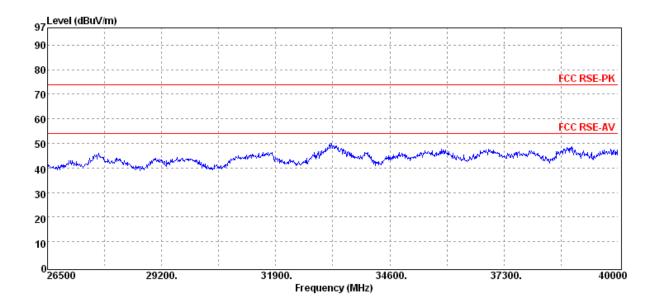
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台灣檢驗科技股份有限公司

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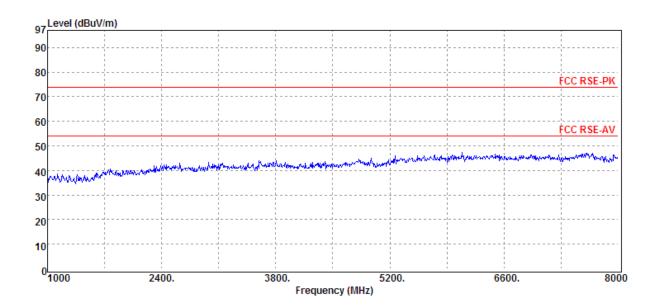


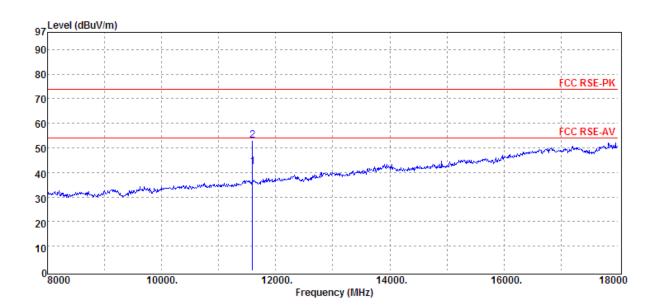
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Operation Band :802.11 n40M **Test Date** :2013-05-01 Fundamental Frequency :5795 MHz Temp./Humi. :23deg C/52RH Operation Mode :TX HIGH Engineer :Louis

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





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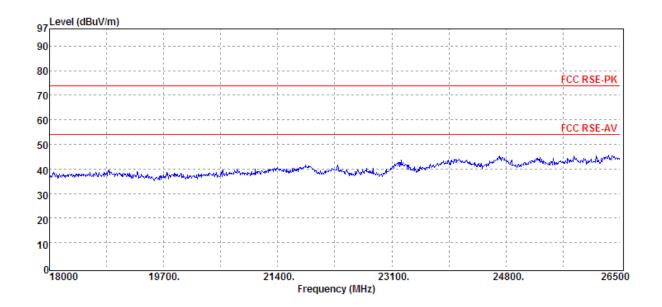
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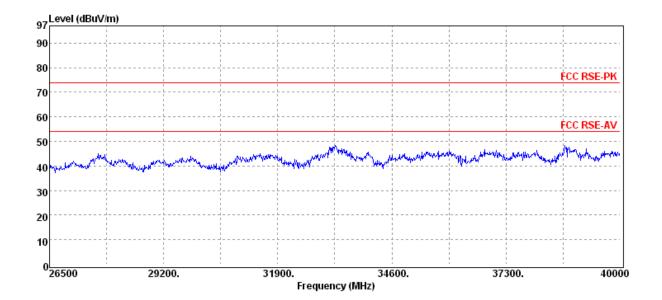
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~ End of Report ~

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