Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 1 of 73

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: VIBRA Anti-napping Bluetooth Headset

Brand Name: VIBRA

Model Name: VIBRA 801

Model Difference: N/A

FCC ID: XHS-VIBRA801

Report No.: ER/2009/60004

Issue Date: June. 29, 2009

FCC Rule Part: §15.247 / DSS

Prepared for: S-MS International Co.,Ltd

18F., No.182, Sec.2, Dunhua S.Rd., Taipei

106, Taiwan

Prepared by: SGS Taiwan Ltd.

Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial

Zone, Taipei County, Taiwan





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t (886-2) 2299-3279

f (886-2) 2298-0488



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Page: 2 of 73

VERIFICATION OF COMPLIANCE

S-MS International Co.,Ltd **Applicant:**

18F., No.182, Sec.2, Dunhua S.Rd., Taipei 106, Taiwan

Equipment Under Test: VIBRA Anti-napping Bluetooth Headset

Brand Name: VIBRA

VIBRA 801 Model No.:

N/A **Model Difference:**

XHS-VIBRA801 FCC ID:

ER/2009/60004 **File Number:**

Jun. 15, 2009 ~ Jun. 25, 2009 Date of test:

Date of EUT Received: Jun. 15, 2009

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4:2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

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

Test By:	Jason Whe	Date:	Jun. 29, 2009	
_	Jason Wu / Engineer			
Prepared By:	Ena Cono	Date:	Jun. 29, 2009	
Approved By:	Eva Kao / Ass. Supervisor Jun Ch ang	Date:	Jun. 29, 2009	

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Jim Chang / Sr. Engineer



Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 3 of 73

Version

Version No.	Date	Description
00	Jun. 29, 2009	Initial creation of document

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t (886-2) 2299-3279



Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 4 of 73

Table of Contents

ı.	GEN	ERAL INFORMATION	•••••••
	1.1.	Related Submittal(s) / Grant (s)	8
	1.2.	Test Methodology	8
	1.3.	Test Facility	8
	1.4.	Special Accessories	8
	1.5.	Equipment Modifications	8
2.	SYST	TEM TEST CONFIGURATION	9
	2.1.	EUT Configuration	9
	2.2.	EUT Exercise	9
	2.3.	Test Procedure	9
	2.4.	Configuration of Tested System	10
3.	SUM	MARY OF TEST RESULTS	11
4.	DES	CRIPTION OF TEST MODES	11
5.	CON	DUCTED EMISSION TEST	12
	5.1.	Standard Applicable	12
	5.2.	EUT Setup	12
	5.3.	Measurement Procedure	12
	5.4.	Measurement Equipment Used:	13
	5.5.	Measurement Result	13
6.	PEA	K OUTPUT POWER MEASUREMENT	16
	6.1.	Standard Applicable	16
	6.2.	Measurement Equipment Used	16
	6.3.	.Test Set-up:	16
	6.4.	Measurement Procedure:	17
	6.5.	Measurement Result	17
7.	20dB	BAND WIDTH	22
	7.1.	Standard Applicable	22
	7.2.	Measurement Equipment Used	22
	7.3.	Test Set-up	22
	7.4.	Measurement Procedure:	22
	7.5	Measurement Result:	23

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Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 5 of 73

8.	100KHz BANDWIDTH OF BAND EDGES MEASUREMENT					
	8.1.	Standard Applicable				
	8.2.	Measurement Equipment Used	28			
	8.3.	Test SET-UP:	29			
	8.4.	Measurement Procedure	30			
	8.5.	Field Strength Calculation	30			
	8.6.	Measurement Result	30			
9.	SPUR	RIOUS RADIATED EMISSION TEST	39			
	9.1.	Standard Applicable	39			
	9.2.	Measurement Equipment Used:	39			
	9.3.	Test SET-UP:	39			
	9.4.	Measurement Procedure:	39			
	9.5.	Field Strength Calculation	40			
	9.6.	Measurement Result:	40			
10.	FRE(QUENCY SEPARATION	56			
	10.1.	Standard Applicable	56			
	10.2.	Measurement Equipment Used:	56			
	10.3.	Test Set-up:	56			
	10.4.	Measurement Procedure:	56			
	10.5.	Measurement Result:	56			
11.	NUM	BER OF HOPPING FREQUENCY	58			
	11.1.	Standard Applicable				
	11.2.	Measurement Equipment Used:	58			
	11.3.	Test Set-up:	58			
	11.4.	Measurement Procedure:	58			
	11.5.	Measurement Result:	58			
12.	TIME	E OF OCCUPANCY (DWELL TIME)	61			
	12.1.	Standard Applicable	61			
	12.2.	Measurement Equipment Used:	61			
	12.3.	Test Set-up:	61			
	12.4.	Measurement Procedure:	61			
	12.5	Measurement Result	62			

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Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 6 of 73

13.	Peak	Power Spectral Density	69
		Standard Applicable	
	13.2.	Measurement Equipment Used:	69
	13.3.	Test Set-up:	69
	13.4.	Measurement Procedure:	69
	13.5.	Measurement Result	69
14.	ANTI	ENNA REQUIREMENT	73
	14.1.	Standard Applicable	73
	14.2.	Antenna Connected Construction	73



Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 7 of 73

1. GENERAL INFORMATION

General:	
Product Name:	VIBRA Anti-napping Bluetooth Headset
Brand Name:	VIBRA
Model Number:	VIBRA 801
Model Difference:	N/A
Power Supply:	Battery: 3.7V battery, Model: H481525 or DC 5V from USB
USB Cable:	One provide, Model No: N/A
Hardware Version:	V2009042004
Software Version:	1.0
Bluetooth:	
Bluetooth Version	□ V1.1 (GFSK) □ V1.2 (GFSK) □ V2.0 (GFSK) □ V2.0 + EDR (GFSK + /4DQPSK + 8DPSK) □ V2.1 + EDR (GFSK + /4DQPSK + 8DPSK)
Frequency Range	2402 – 2480MHz
Channel number	79 channels max.
Rated Power	3.96 dBm Peak
Modulation type	Frequency Hopping Spread Spectrum (FHSS)
Antenna Designation	Chip Antenna 2dBi.

This test report applies for Bluetooth.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 8 of 73

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

This submittal(s) (test report) is intended for FCC ID: <u>XHS-VIBRA801</u> filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a Doc procedure.

1.2. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.3. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

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

1.4. Special Accessories

Not available for this EUT intended for grant.

1.5. Equipment Modifications

Not available for this EUT intended for grant.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 9 of 73

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

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

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 requirements in Section 7 and 13 of ANSI C63.4: 2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

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 reguirements in Section 8 and 13 and Sub clause 8.3.1.2 of ANSI C63.4: 2003.

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Page: 10 of 73

2.4. Configuration of Tested System

Fig. 2-1 AC Power line and Radiated Emission Configuration

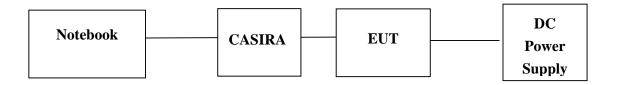


Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Ca- ble	Power Cord
1	Notebook	Compaq	Presarlo 2100	CNE345Q1R	N/A	Shielded
2	CASIRA	BCES301199/1	CSR	8836310305	N/A	Shielded
3	Software	BlueSuite 1.22	CSR	7383070403	N/A	N/A

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 11 of 73

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	Conducted Emission	Compliant
§15.247(b)(1)	Peak Output Power	Compliant
§15.247(a)	20dB Bandwidth	No Limit
§15.247I	100 KHz Bandwidth Of Fre-	Compliant
	quency Band Edges	
§15.209(a) (f)	Spurious Emission	Compliant
§15.247(a)(1)	Frequency Separation	Compliant
§15.247(a)(1)(iii)	Number of hopping frequency	Compliant
§15.247(a)(1)(iii)	Time of Occupancy	Compliant
§15.247	Peak Power Density	Compliant
§15.203,	Antenna Requirement	Compliant
§15.247(b)(4)(i)		

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

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

Channel low (2402MHz) · mid (2441MHz) and high (2480MHz) with highest data rate are chosen for full testing.

The Radiated Spurious Emission was performed at X. Y. and Z. axle. The worst case Y axle with BDR mode was reported.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 12 of 73

5. CONDUCTED EMISSION TEST

5.1. Standard Applicable

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

Frequency range		mits (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

5.2. EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2003.
- 2. The EUT was plug-in the AC/DC Power adapter. The host system was placed on the center of the back edge on the test table. The peripherals was placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The spacing between the peripherals was 10 centimeters.
- 4. External I/O cables were draped along the edge of the test table and bundle when necessary.
- 5. The host system was connected with 120Vac/60Hz power source.

5.3. 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 frequency measured were complete.

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^{1.} The lower limit shall apply at the transition frequencies

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



Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 13 of 73

5.4. Measurement Equipment Used:

Conducted Emission Test Site									
EQUIPMENT	MED	MODEL	SERIAL	LAST	CAL DIE				
TYPE	MFR	NUMBER	NUMBER	CAL.	CAL DUE.				
EMI Test Receiver	R&S	ESCS30	828985/004	09/16/2008	09/15/2009				
LISN	Rolf-Heine	NNB-2/16Z	99012	04/28/2009	04/27/2010				
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	04/28/2009	04/27/2010				
Coaxial Cables	N/A	WK CE Cable	N/A	10/30/2008	10/29/2009				

5.5. Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

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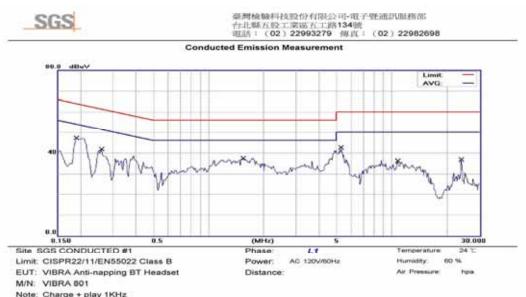


Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 14 of 73

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode: Operation and Charge Mode			Test Date:	Jun. 15, 2009	
Temperature:	24	Humidity:	60%	Test By:	Jason



Note: Charge + play 1KHz

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	*	0.1900	46.94	0.13	47.07	64.04	-16.97	QP		
2		0.2600	41.53	0.11	41.64	61.43	-19.79	QP		
3		1.5500	37.18	0.11	37.29	56.00	-18.71	QP		
4		5.3000	42.37	0.18	42.55	60.00	-17.45	QP		
5		10.7700	35.63	0.43	36.06	60.00	-23.94	QP		
6		24.0000	36.34	0.28	36.62	60.00	-23.38	QP		

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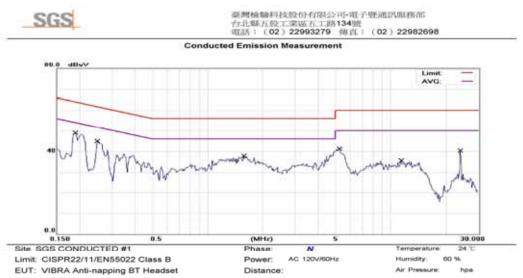
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 15 of 73



M/N: VIBRA 801

Note: Charge + play 1KHz

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1900	48.86	0.14	49.00	64.04	-15.04	QP	
2		0.2500	44.85	0.12	44.97	61.76	-16.79	QP	
3		1.5800	37.51	0.12	37.63	56.00	-18.37	QP	
4		5.2400	40.86	0.18	41.04	60.00	-18.96	QP	
5		11.3800	35.02	0.43	35.45	60.00	-24.55	QP	
6		24.0000	40.03	0.32	40.35	60.00	-19.65	QP	

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Page: 16 of 73

6. PEAK OUTPUT POWER MEASUREMENT

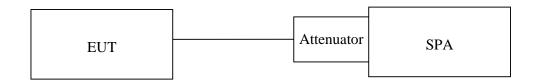
6.1. Standard Applicable

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1Watt. For all other frequency hopping systems in the 2400 – 2483.5MHz band: 0.125 Watts.

6.2. Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
ТҮРЕ		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2008	04/18/2010				
Spectrum Analyzer	Agilent	E4440A	MY45304525	01/23/2008	01/22/2010				
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2009	01/04/2010				
DC Block	Agilent	BLK-18	155452	07/05/2009	07/04/2010				
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2009	07/04/2010				
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2009	07/04/2010				
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2009	07/04/2010				
Splitter	Agilent	11636B	N/A	07/05/2009	07/04/2010				

6.3. Test Set-up:



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 17 of 73

6.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Channel power function, RBW, VBW = 1MHz)
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.

6.5. Measurement Result

BDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	3.18	0.00	3.18	0.00208	1
2441.00	3.96	0.00	3.96	0.00249	1
2480.00	3.62	0.00	3.62	0.00230	1

EDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	3.04	0.00	3.04	0.00201	1
2441.00	3.88	0.00	3.88	0.00244	1
2480.00	3.65	0.00	3.65	0.00232	1

Offset 0.5 dB

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 18 of 73

Peak Power Output Data Plot (CH Low) (BDR mode)



Peak Power Output Data Plot (CH Mid) (BDR mode)



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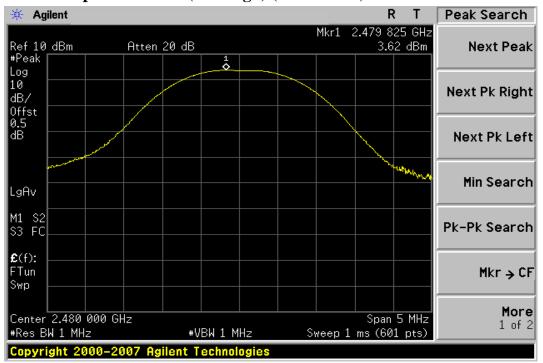
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Page: 19 of 73

Peak Power Output Data Plot (CH High) (BDR mode)



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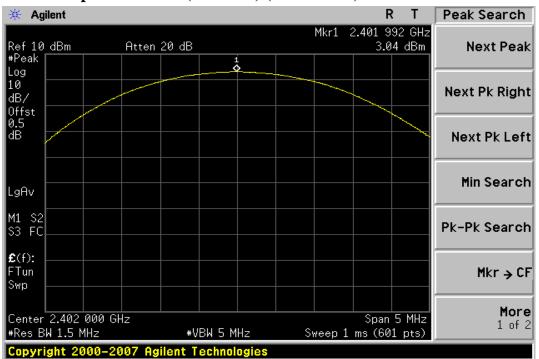
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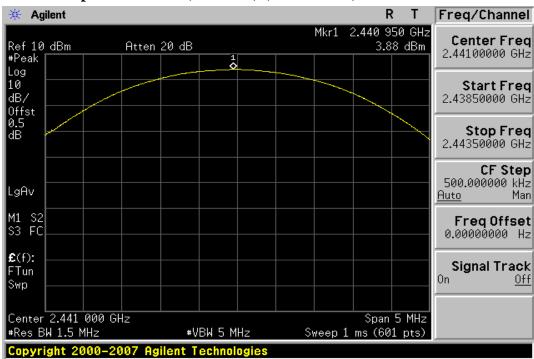
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Page: 20 of 73

Peak Power Output Data Plot (CH Low) (EDR mode)



Peak Power Output Data Plot (CH Mid) (EDR mode)



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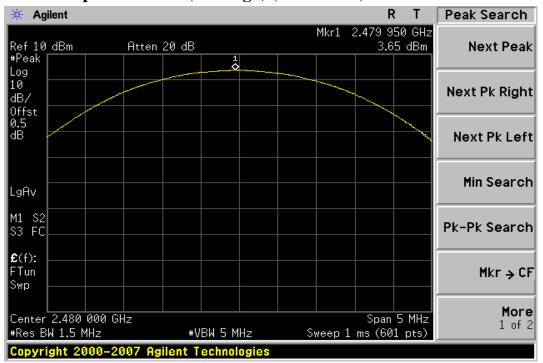
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 21 of 73

Peak Power Output Data Plot (CH High) (EDR mode)



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 22 of 73

7. 20dB BAND WIDTH

7.1. Standard Applicable

For frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

7.2. Measurement Equipment Used

Refer to section 6.2 for details.

7.3. Test Set-up

Refer to section 6.3 for details.

7.4. Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as EDR Mode RBW=10KHz (1 % of Bandwidth.), BDR Mode RBW=15KHz (1% of Bandwidth), Span= 3MHz, Sweep=auto
- 4. Mark the peak frequency and –20dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.

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Report No.: ER/2009/60004 **Issue Date: June. 29, 2009**

Page: 23 of 73

7.5. Measurement Result:

BDR Mode

CH	Bandwidth
	(KHz)
Lower	830.332
Mid	830.509
Higher	830.441

EDR Mode

СН	Bandwidth (MHz)	2/3 Bandwidth (MHz)
Lower	1.250	0.833
Mid	1.256	0.837
Higher	1.254	0.836

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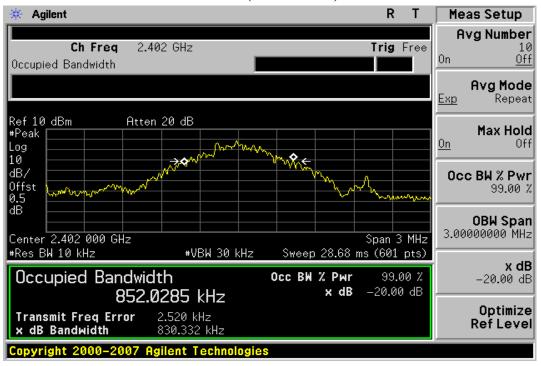
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 24 of 73

20dB Band Width Test Data CH-Low (BDR mode)



20dB Band Width Test Data CH-Mid (BDR mode)



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 25 of 73

20dB Band Width Test Data CH-High (BDR mode)



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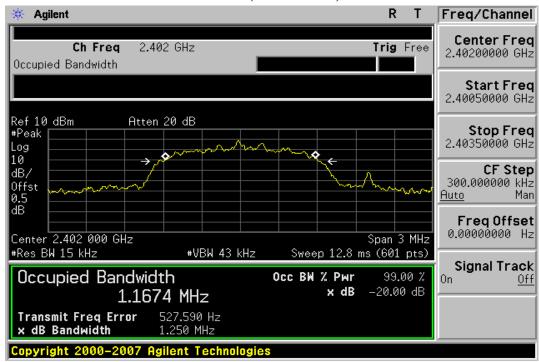
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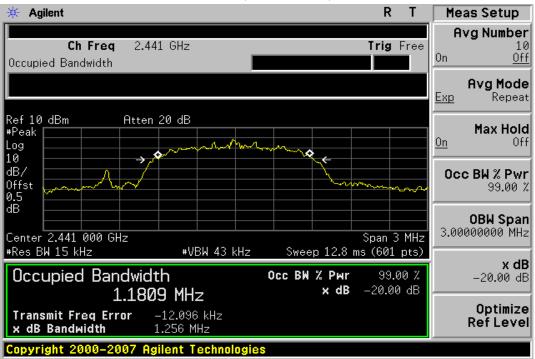
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 26 of 73

20dB Band Width Test Data CH-Low (EDR mode)



20dB Band Width Test Data CH-Mid (EDR mode)



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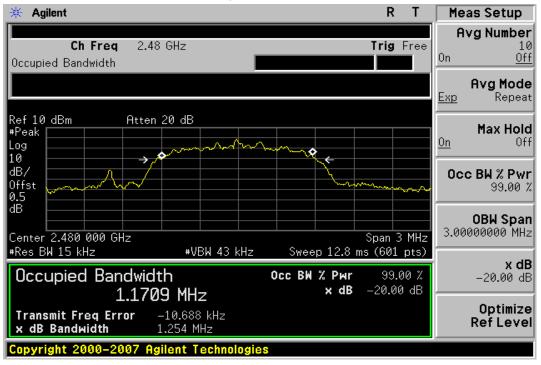
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 27 of 73

20dB Band Width Test Data CH-High (EDR mode)



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 28 of 73

8. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1. Standard Applicable

According to §15.247(c), 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 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

8.2. Measurement Equipment Used

8.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

8.2.2. Radiated emission:

966 Chamber										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2009	02/11/2010					
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/15/2008	11/14/2009					
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-320	03/14/2009	03/13/2010					
Pre-Amplifier	Agilent	8447D	1937A02834	11/30/2008	11/29/2009					
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2009	01/04/2010					
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	SUCOFLEX 104PEA-10M	10m	01/05/2009	01/04/2010					
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2009	01/04/2010					

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 29 of 73

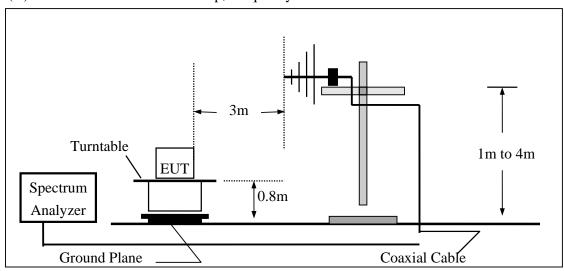
8.3. Test SET-UP:

8.3.1. Conducted Emission at antenna port:

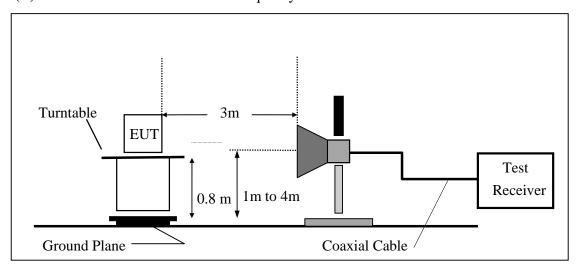
Refer to section 6.3 for details.

8.3.2. 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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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 30 of 73

8.4. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
- 5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
- 6. Repeat above procedures until all frequency measured were complete.
- 7. Radiated Emission refer to section 9.

8.5. 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	

8.6. Measurement Result

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

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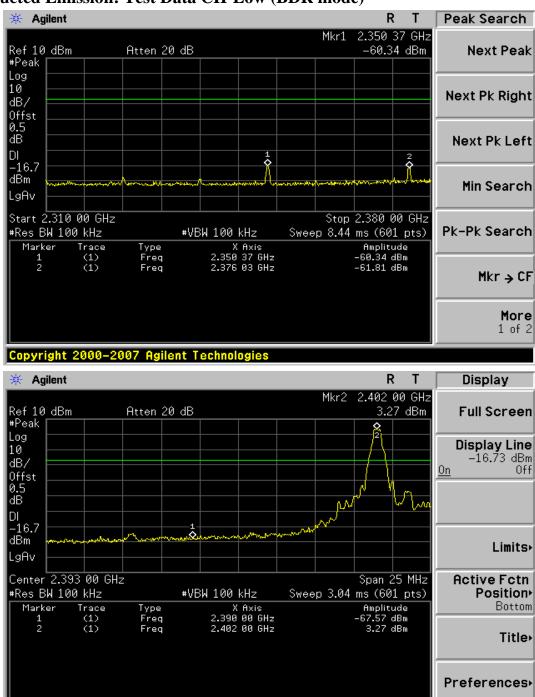
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 31 of 73

Conducted Emission: Test Data CH-Low (BDR mode)



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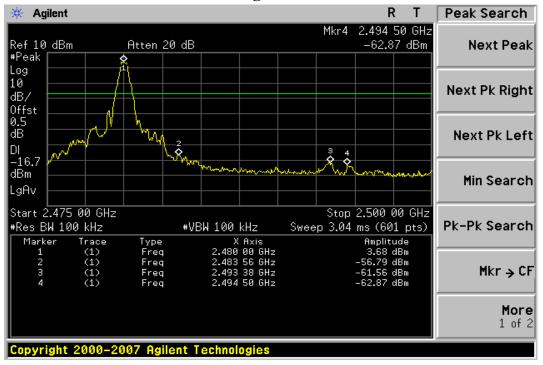
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 32 of 73

Conducted Emission: Test Data CH-High



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 33 of 73

Radiated Emission: (BDR mode)

Operation Mode TX CH Low Test Date June 15, 2009

Fundamental Frequency 2402 MHz Test By Jason Temperature 25 Pol Ver.

Humidity 65 %

	Peak	$\mathbf{A}\mathbf{V}$		Actu	al FS	P ea k	$\mathbf{A}\mathbf{V}$		
Freq. (MHz)	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/n	0	Remark
2390.00	44.32		-1.39	42.93		74.00	54.00	-11.07	Peak
Operation	Mode	TX C	CH Low			Test	Date	June 15, 20	009
Fundamen	tal Freque	ncy 2402	MHz			Test	By	Jason	
Temperatu	ire	25				Pol		Hor.	
Humidity		65 %							
	Peak	$\mathbf{A}\mathbf{V}$		Actu	al FS	P ea k	$\mathbf{A}\mathbf{V}$		
Freq.	Reading	Reading	Ant./CL	Peak	$\mathbf{A}\mathbf{V}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/n	n) (dB)	
2390.00	44.81		-1.39	43.42		74.00	54.00	-10.58	Peak

Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column_o
- (3) Spectrum Peak Setting: 1GHz-26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 34 of 73

ΔV

Radiated Emission: (BDR mode)

Operation Mode TX CH High Test Date June 15, 2009

Fundamental Frequency 2480 MHz Test By Jason Temperature 25 Pol Ver.

Humidity 65 %

Paak

ΔV

	1 can	A V		Attu	arrs	1 can	A V		
Freq. (MHz)	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/n	0	Remark
	(/	(4241)	` ,		(424 (7111)			, , ,	
2483.56	45.79		-0.92	44.87		74.00	54.00	-9.13	Peak
Operation	Mode	TX C	H High			Test	Date	June 15, 20	009
Fundamen	tal Freque	ncv 2480	MHz			Test	Bv	Jason	
	•	,				Pol	•	Hor.	
Temperatu	116	25				FOI		пог.	
Humidity		65 %							
	Peak	ΑV		A ctu	ıal FS	Peak	ΑV		
	Ican	7 . V		11 Ct u	al I b	1 can	7 K		
Freq.	Reading	Reading	Ant./CL	P ea k	$\mathbf{A}\mathbf{V}$	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/r	n) (dB)	
2483.56	44.22		-0.92	43.30		74.00	54.00	-10.70	Peak

Actual FS

Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column_o
- (3) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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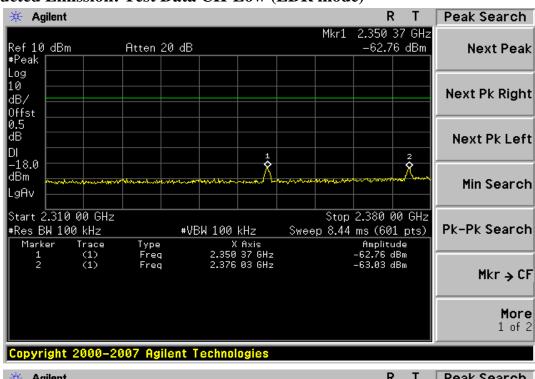
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 35 of 73

Conducted Emission: Test Data CH-Low (EDR mode)





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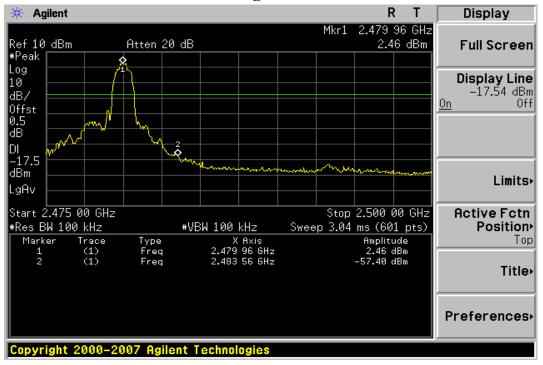
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Page: 36 of 73

Conducted Emission: Test Data CH-High



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 37 of 73

Radiated Emission: (EDR mode)

Operation Mode TX CH Low Test Date Jun. 15, 2009

Fundamental Frequency 2402 MHz Test By Jason Temperature 25 °C Pol Ver.

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2390.00	44.32		-1.39	42.93		74.00	54.00	-11.07	Peak
Operation Fundamen			H Low MHz			Test l		n. 15, 200 son	9
Temperatu	re	25				Pol	Но	or.	
Humidity		65 %							
	P ea k	\mathbf{AV}		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2390.00	44.81		-10.81	34.00		74.00	54.00	-20.00	Peak

Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column_o
- $(3) Spectrum\ Peak\ Setting: 1GHz-\ 26GHz,\ RBW=\ 1MHz,\ VBW=\ 3MHz,\ Sweep\ time=\ 200\ ms.$
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 38 of 73

Radiated Emission: (EDR mode)

Operation Mode TX CH High Test Date Jun. 15, 2009

Fundamental Frequency 2480 MHz Test By Jason Temperature 25 Pol Ver.

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
2483.56	45.79		-0.92	44.87		74.00	54.00	-9.13	Peak
Operation :	Mode	TX C	H High			Test l	Date Jur	n. 15, 200	9
Fundamen	tal Frequen	cy 2480	MHz			Test 1	By Jas	on	
Temperatu	re	25				Pol	Но	r.	
Humidity		65 %							

	P ea k	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m) (dBuV/m)	(dB)	
2483.56	4422		10 46	33.76		74.00	54.00	-20.24	Peak

Remark:

- (1) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column_o
- (3) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- (4) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 39 of 73

9. SPURIOUS RADIATED EMISSION TEST

9.1. Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). 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.

9.2. Measurement Equipment Used:

9.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2. Radiated emission:

Refer to section 7.2 for details.

9.3. Test SET-UP:

9.3.1. Conducted Emission at antenna port:

Refer to section 6.3 for details.

9.3.2. Radiated emission:

Refer to section 7.3 for details.

9.4. Measurement Procedure:

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 4. 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. Repeat above procedures until all frequency measured were complete.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 40 of 73

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	

9.6. Measurement Result:

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

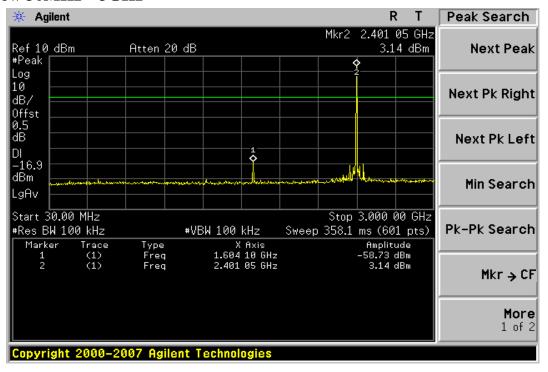
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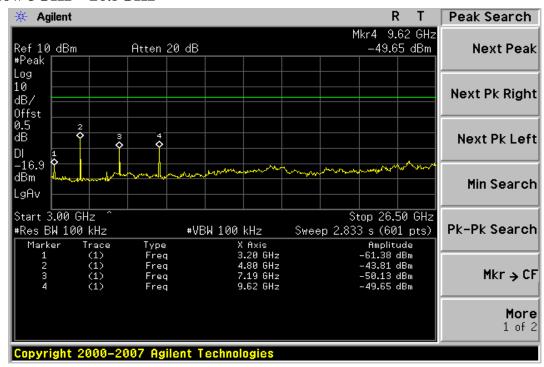
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 41 of 73

Conducted Spurious Emission Measurement Result (BDR mode) Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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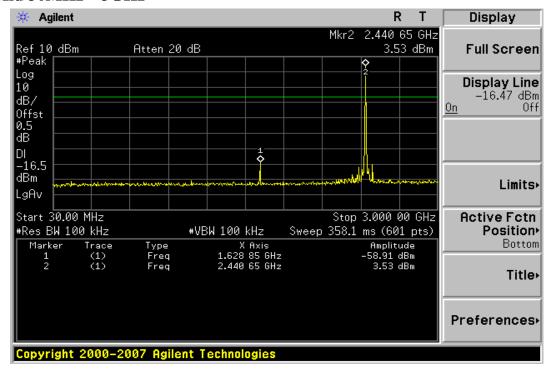
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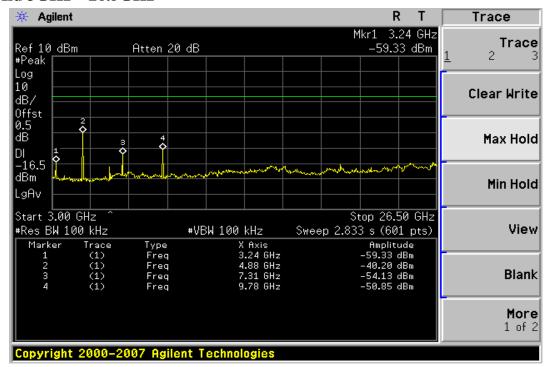
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 42 of 73

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz – 26.5GHz



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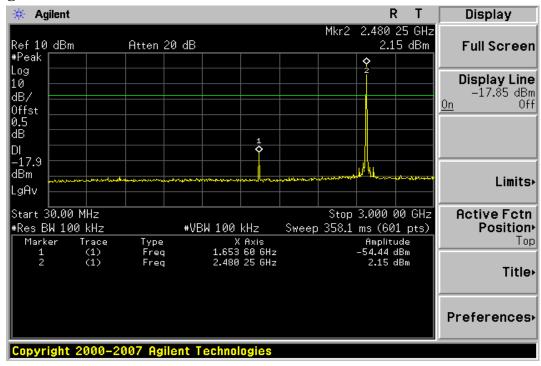
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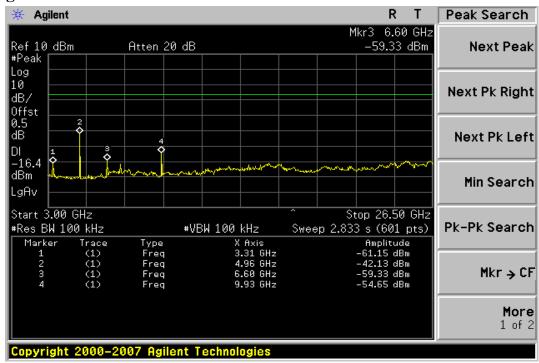
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 43 of 73

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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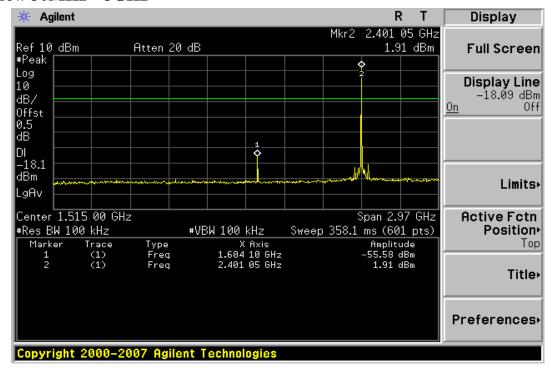
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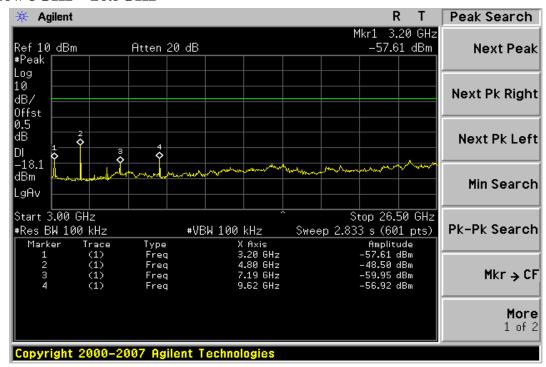
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 44 of 73

Conducted Spurious Emission Measurement Result (EDR mode) Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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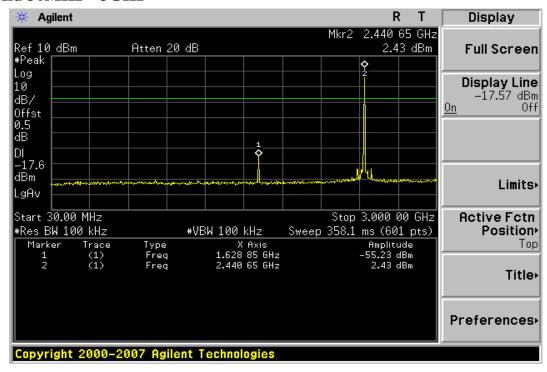
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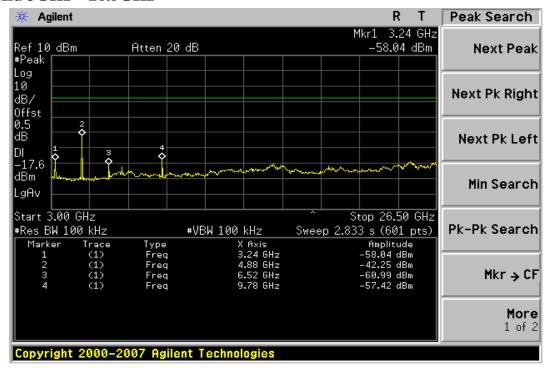
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 45 of 73

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz – 26.5GHz



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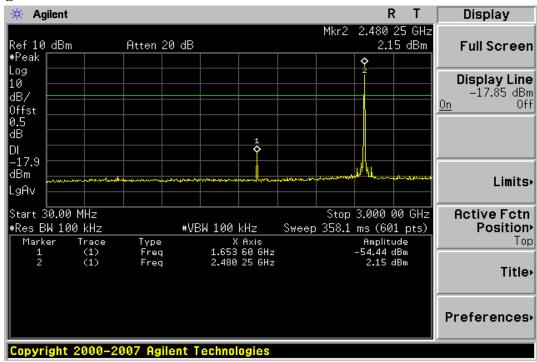
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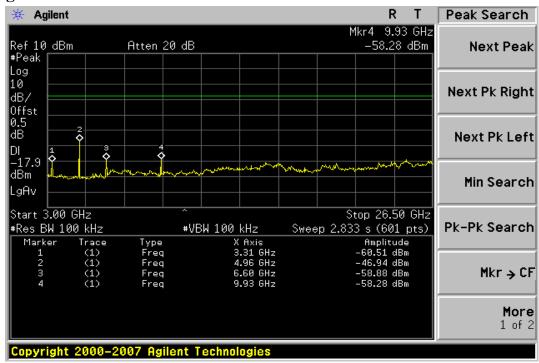
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 46 of 73

Ch High 30MHz - 3GHz



Ch High 3GHz - 26.5GHz



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 47 of 73

Radiated Spurious Emission Measurement Result (below 1GHz) (BDR mode, the worst case)

Operation Mode TX CH Low Test Date Jun. 15, 2009

Fundamental Frequency 2402MHz Test By Jason Temperature 25 Pol Ver./ Hor.

Humidity 65 %

	Freq.	Ant.Pol.	Detector	Reading	Factor	Actual FS	Limit3m	Safe Margin (dB) -8.74 -13.38 -12.78 -19.56 -16.77 -11.86 -7.12 -14.05 -17.99 -23.28 -20.40
		111111	Mode	2.00.029	2 40002	11000001 1 2		ente man gan
_	(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
	65.00	V	Peak	46.35	-15.09	31.26	40.00	-8.74
	92.08	V	Peak	47.50	-17.38	30.12	43.50	-13.38
	211.39	V	Peak	45.94	-15.22	30.72	43.50	-12.78
	261.83	V	Peak	40.07	-13.63	26.44	46.00	-19.56
	455.83	V	Peak	37.84	-8.61	29.23	46.00	-16.77
	798.24	V	Peak	37.22	-3.08	34.14	46.00	-11.86
	38.73	Н	Peak	46.72	-13.84	32.88	40.00	-7.12
	70.74	Н	Peak	42.22	-16.27	25.95	40.00	-14.05
	119.24	Н	Peak	40.83	-15.32	25.51	43.50	-17.99
	392.78	Н	Peak	32.97	-10.25	22.72	46.00	-23.28
	533.43	Н	Peak	33.56	-7.96	25.60	46.00	-20.40
	798.24	Н	Peak	34.90	-3.08	31.82	46.00	-14.18

Remark:

- 1 Measuring frequencies from 30 MHz to the 1GHz_o
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 3 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 48 of 73

Radiated Spurious Emission Measurement Result (below 1GHz)

Test Date Operation Mode TX CH Mid Jun. 15, 2009

Fundamental Frequency 2441MHz Test By Jason Ver./Hor. Pol Temperature 25

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
38.73	V	Peak	51.31	-13.84	37.47	40.00	-2.53
65.89	V	Peak	48.49	-15.09	33.40	40.00	-6.60
75.59	V	Peak	49.55	-17.13	32.42	40.00	-7.58
216.24	V	Peak	40.25	-15.05	25.20	46.00	-20.80
383.08	V	Peak	38.99	-10.57	28.42	46.00	-17.58
798.24	V	Peak	36.32	-3.08	33.24	46.00	-12.76
38.73	Н	Peak	46.82	-13.84	32.98	40.00	-7.02
70.74	Н	Peak	42.08	-16.27	25.81	40.00	-14.19
119.24	Н	Peak	39.22	-15.32	23.90	43.50	-19.60
213.33	Н	Peak	36.00	-15.16	20.84	43.50	-22.66
533.43	Н	Peak	34.25	-7.96	26.29	46.00	-19.71
800.18	Н	Peak	34.37	-3.04	31.33	46.00	-14.67

Remark:

- 1 Measuring frequencies from 30 MHz to the 1GHz_o
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 3 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 49 of 73

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH High Test Date Jun. 15, 2009

Fundamental Frequency 2480MHz Test By Jason Pol Ver./Hor. Temperature 25

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
67.83	V	Peak	47.25	-13.84	33.41	40.00	-6.59
90.14	V	Peak	48.86	-15.60	33.26	43.50	-10.24
211.39	V	Peak	40.41	-17.62	22.79	43.50	-20.71
383.08	V	Peak	36.31	-10.57	25.74	46.00	-20.26
798.24	V	Peak	36.79	-3.08	33.71	46.00	-12.29
38.73	Н	Peak	45.48	-13.84	31.64	40.00	-8.36
72.68	Н	Peak	42.85	-15.60	27.25	40.00	-12.75
119.24	Н	Peak	38.42	-17.62	20.80	43.50	-22.70
208.48	Н	Peak	35.56	-15.22	20.34	43.50	-23.16
460.68	Н	Peak	32.86	-10.57	22.29	46.00	-23.71
798.24	Н	Peak	34.46	-3.08	31.38	46.00	-14.62

Remark:

- 1 Measuring frequencies from 30 MHz to the 1GHz_o
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 3 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 50 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Jun. 15, 2009

Fundamental Frequency 2402 MHz Test By Jason Pol **Temperature** Ver. 25

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
3626.0	35.31		2.46	37.77		74.00	54.00	-16.23	Peak
4796.0	47.96	43.76	5.99	53.95	49.75	74.00	54.00	-4.25	AV
7206.0						74.00	54.00		
9608.0						74.00	54.00		
12010.0						74.00	54.00		
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		
24020.0						74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 51 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Jun. 15, 2009

Fundamental Frequency 2402 MHz Test By Jason Pol **Temperature** Hor. 25

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
3223.0	41.46		1.15	42.61		74.00	54.00	-11.39	Peak
4796.0	46.76	45.68	5.99	52.75	51.67	74.00	54.00	-2.33	AV
9608.0						74.00	54.00		
12010.0						74.00	54.00		
14412.0						74.00	54.00		
16814.0						74.00	54.00		
19216.0						74.00	54.00		
21618.0						74.00	54.00		
24020.0						74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms.
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 52 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Jun. 15, 2009

Fundamental Frequency 2441 MHz Test By Jason Pol Ver. **Temperature** 25

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1630.5	42.03		-5.26	36.77		74.00	54.00	-17.23	Peak
4880.5	48.48	44.36	6.17	54.65	50.53	74.00	54.00	-3.47	Avg
7323.0						74.00	54.00		
9764.0						74.00	54.00		
12205.0						74.00	54.00		
14646.0						74.00	54.00		
17087.0						74.00	54.00		
19528.0						74.00	54.00		
21969.0						74.00	54.00		
24410.0						74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 53 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Jun. 15, 2009

Fundamental Frequency 2441 MHz Test By Jason Temperature 25 Pol Hor.

Humidity 65 %

Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
35.87		1.06	36.93		74.00	54.00	-17.07	Peak
51.83	46.80	6.17	58.00	52.97	74.00	54.00	-1.03	Avg
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
					74.00	54.00		
	Reading (dBuV) 35.87 51.83	Reading (dBuV) Reading (dBuV) 35.87 51.83 46.80	Reading (dBuV) Reading (dBuV) Ant./CL (CF(dB)) 35.87 1.06 51.83 46.80 6.17	Reading (dBuV) Reading (dBuV) Ant./CL (dBuV/m) Peak (dBuV/m) 35.87 1.06 36.93 51.83 46.80 6.17 58.00 </td <td>Reading (dBuV) Reading (dBuV) Ant./CL (dBuV) Peak (dBuV/m) AV (dBuV/m) 35.87 1.06 36.93 51.83 46.80 6.17 58.00 52.97 </td> <td>Reading (dBuV) Reading (dBuV) Ant./CL (dBuV) Peak (dBuV)m (dBuV/m) Limit (dBuV/m) (dBuV/m) 35.87 1.06 36.93 74.00 51.83 46.80 6.17 58.00 52.97 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00</td> <td>Reading (dBuV) Ant./CL (dBuV) Peak (dBuV) AV (dBuV) Limit (dBuV) Limit (dBuV) 35.87 1.06 36.93 74.00 54.00 51.83 46.80 6.17 58.00 52.97 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00</td> <td>Reading (dBuV) Ant./CL (dBuV) Peak (dBuV) AV (dBuV) Limit (dBuV) Limit (dBuV) Margin (dBuV) 35.87 1.06 36.93 74.00 54.00 -17.07 51.83 46.80 6.17 58.00 52.97 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03</td>	Reading (dBuV) Reading (dBuV) Ant./CL (dBuV) Peak (dBuV/m) AV (dBuV/m) 35.87 1.06 36.93 51.83 46.80 6.17 58.00 52.97	Reading (dBuV) Reading (dBuV) Ant./CL (dBuV) Peak (dBuV)m (dBuV/m) Limit (dBuV/m) (dBuV/m) 35.87 1.06 36.93 74.00 51.83 46.80 6.17 58.00 52.97 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00 74.00	Reading (dBuV) Ant./CL (dBuV) Peak (dBuV) AV (dBuV) Limit (dBuV) Limit (dBuV) 35.87 1.06 36.93 74.00 54.00 51.83 46.80 6.17 58.00 52.97 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00 74.00 54.00	Reading (dBuV) Ant./CL (dBuV) Peak (dBuV) AV (dBuV) Limit (dBuV) Limit (dBuV) Margin (dBuV) 35.87 1.06 36.93 74.00 54.00 -17.07 51.83 46.80 6.17 58.00 52.97 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03 74.00 54.00 -1.03

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 54 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Jun. 15, 2009

Fundamental Frequency 2480 MHz Test By Jason Temperature 25 Pol Ver.

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1448.5	40.92		-6.14	34.78		74.00	54.00	-19.22	Peak
4958.5	45.01	43.19	6.36	51.37	49.55	74.00	54.00	-4.45	Avg
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		
14880.0						74.00	54.00		
17360.0						74.00	54.00		
19840.0						74.00	54.00		
22320.0						74.00	54.00		
24800.0						74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz- 26GHz, RBW= 1MHz, VBW= 3MHz, Sweep time= 200 ms
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 55 of 73

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Jun. 15, 2009

Fundamental Frequency 2480 MHz Test By Jason Temperature 25 Pol Hor.

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1968.5	39.80		-3.59	36.21		74.00	54.00	-17.79	Peak
4958.5	46.53	45.21	6.36	52.89	51.57	74.00	54.00	-2.43	Avg
7440.0						74.00	54.00		
9920.0						74.00	54.00		
12400.0						74.00	54.00		
14880.0						74.00	54.00		
17360.0						74.00	54.00		
19840.0						74.00	54.00		
22320.0						74.00	54.00		
24800.0						74.00	54.00		

Remark:

- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- 2 Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200 ms.
- 5 Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 56 of 73

10. FREQUENCY SEPARATION

10.1. Standard Applicable

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

10.2. Measurement Equipment Used:

Refer to section 6.2 for details.

10.3. Test Set-up:

Refer to section 6.3 for details.

10.4. 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 center frequency of spectrum analyzer = middle of hopping channel .
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Adjust Span to 3.0 MHz, Sweep = auto.
- 5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

10.5. Measurement Result:

Channel separation (MHz)	Limit	Result	
1	>=25KHz or 2/3 times 20dB bandwidth	PASS	

Note: Refer to next page for plots.

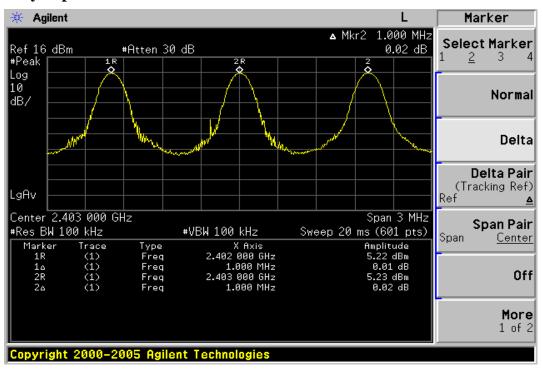
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 57 of 73

Frequency Separation Test Data



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 58 of 73

11. NUMBER OF HOPPING FREQUENCY

11.1. Standard Applicable

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

11.2. Measurement Equipment Used:

Refer to section 6.2 for details.

11.3. Test Set-up:

Refer to section 6.3 for details.

11.4. 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 spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz,
- 5. Max hold, view and count how many channel in the band.

11.5. Measurement Result:

Note: Refer to next page for plots.

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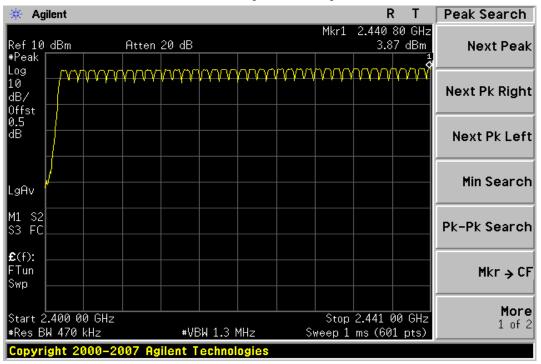


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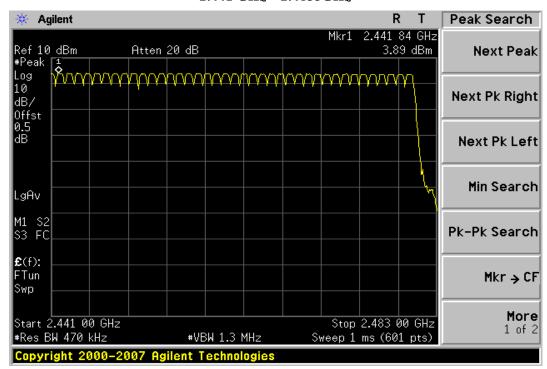
Page: 59 of 73

Channel Number

2.4 GHz - 2.441GHz



2.441 GHz - 2.4835GHz



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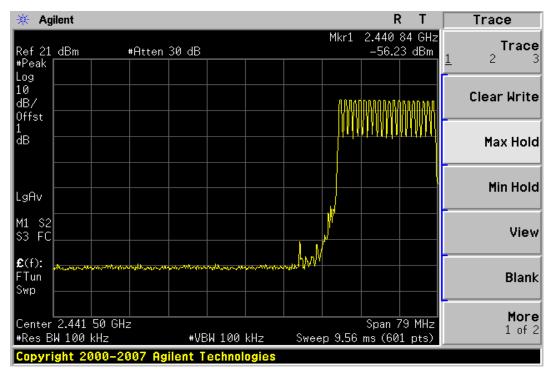
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 60 of 73

Channel Number: AFH Mode



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 61 of 73

12. TIME OF OCCUPANCY (DWELL TIME)

12.1. Standard Applicable

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 seconds multiplied by the number of hopping channel employed.

12.2. Measurement Equipment Used:

Refer to section 6.2 for details.

12.3. Test Set-up:

Refer to section 6.3 for details.

12.4. 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 center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW =1MHz, Span = 0Hz, Adjust Sweep = 30s.
- 5. Repeat above procedures until all frequency measured were complete.

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 62 of 73

12.5. Measurement Result

A period time = 0.4 (ms) * 79 = 31.6 (s)

CH Low: DH1 time slot = 0.3952 (ms) * (1600/(1*79)) * 31.6 = 252.928 (ms)

DH3 time slot = 1.653 (ms) * (1600/(3*79)) * 31.6 = 352.64 (ms)

DH5 time slot = 2.900 (ms) * (1600/(5*79)) * 31.6 = 371.2 (ms)

CH Mid: DH1 time slot = 0.3952 (ms) * (1600/(1*79)) * 31.6 = 252.928 (ms)

DH3 time slot = 1.653(ms) * (1600/(3*79)) * 31.6 = 352.64 (ms)

DH5 time slot = 2.900 (ms) * (1600/(5*79)) * 31.6 = 371.2 (ms)

CH High: DH1 time slot = 0.3952 (ms) * (1600/(1*79)) * 31.6 = 252.928 (ms)

DH3 time slot = 1.653 (ms) * (1600/(3*79)) * 31.6 = 352.64 (ms)

DH5 time slot = 2.900 (ms) * (1600/(5*79)) * 31.6 = 371.2 (ms)

Note: Refer to next page for plots.

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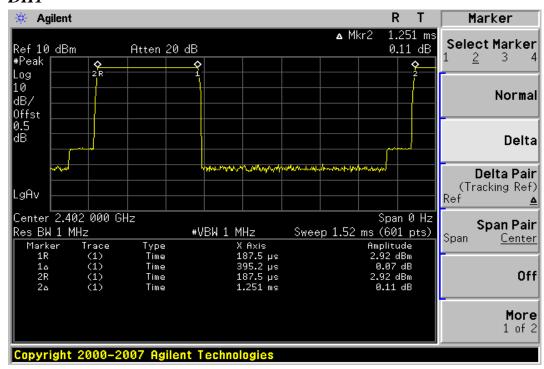
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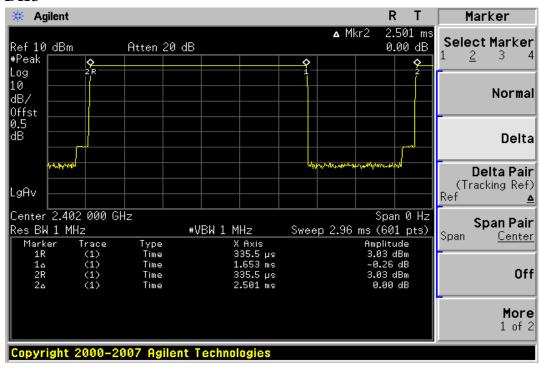
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Page: 63 of 73

CH-Low DH1



DH3



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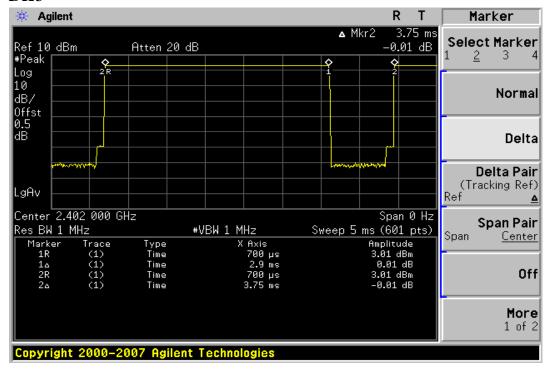
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Page: 64 of 73

DH5



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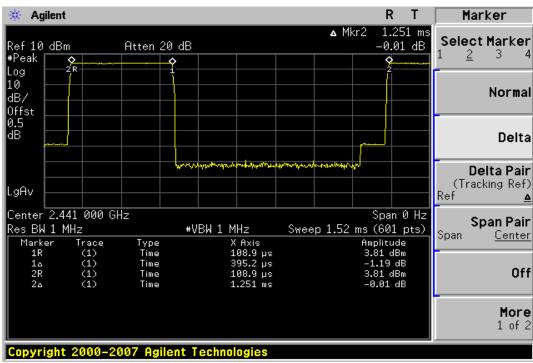
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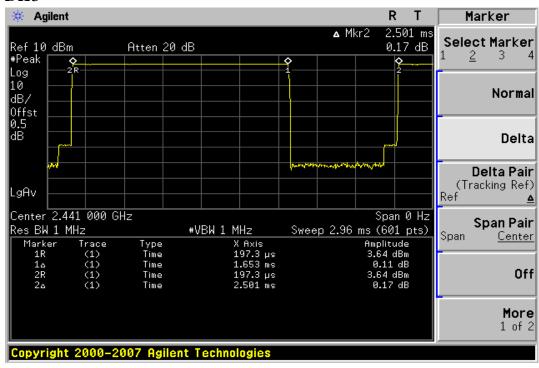
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Page: 65 of 73

CH-Mid DH1



DH3



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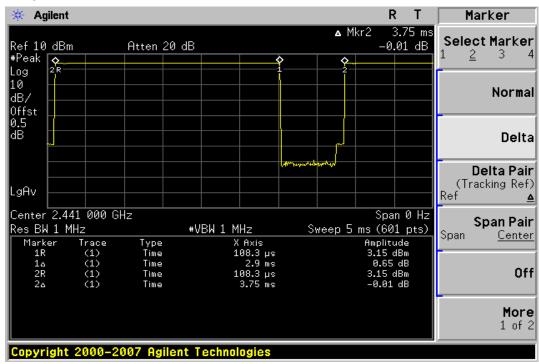
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Page: 66 of 73

DH5



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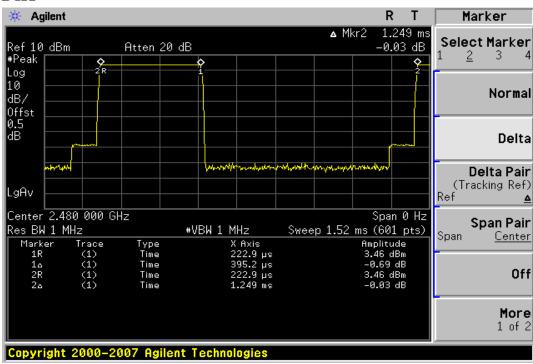
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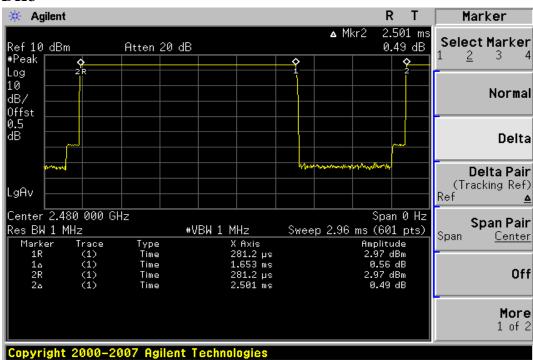
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Page: 67 of 73

CH-High DH1



DH3



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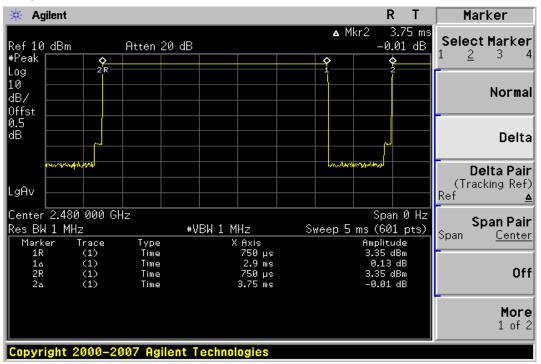
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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 68 of 73

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f (886-2) 2298-0488

台灣檢驗科技股份有限公司

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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 69 of 73

13. Peak Power Spectral Density

13.1. Standard Applicable

According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

13.2. Measurement Equipment Used:

Refer to section 6.2 for details.

13.3. Test Set-up:

Refer to section 6.3 for details.

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 = 3KHz, VBW = 10KHz, Span = 1.5MHz, Sweep=100s
- 4. Record the max. reading.
- 5. Repeat above procedures until all frequency measured were complete.

13.5. Measurement Result (BDR Mode)

СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit	
	Reading (dBm)	(dB)	Level (dBm)	(dBm)	
Low	-9.66	0.00	-8.37	8	
Mid	-8.98	0.00	-7.57	8	
High	-9.74	0.00	-9.74	8	

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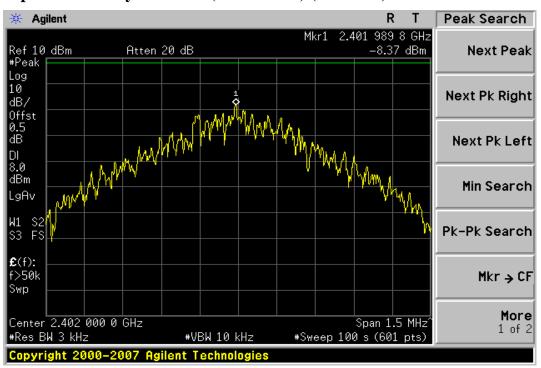
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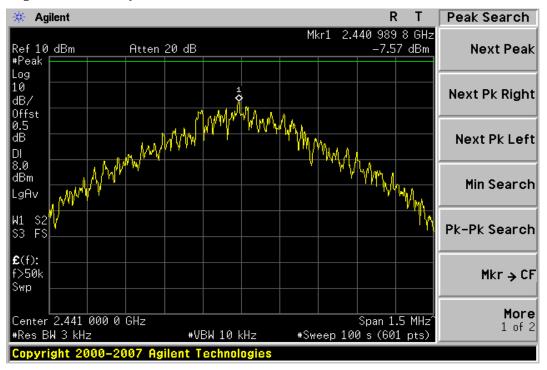
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 70 of 73

Power Spectral Density Test Plot (BDR Mode) (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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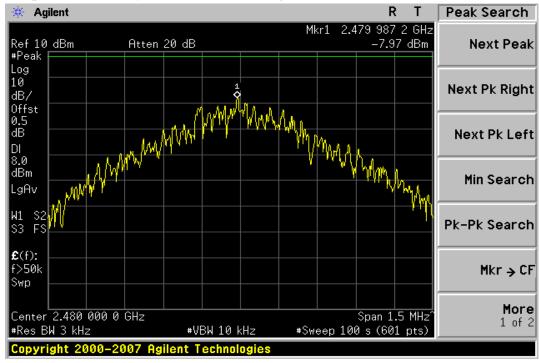
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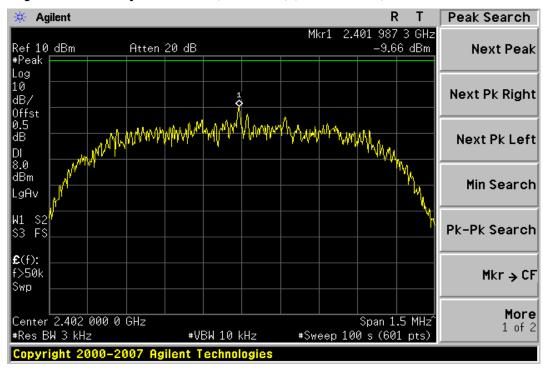
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 71 of 73

Power Spectral Density Test Plot (CH-High)



Power Spectral Density Test Plot (CH-Low)(EDR Mode)



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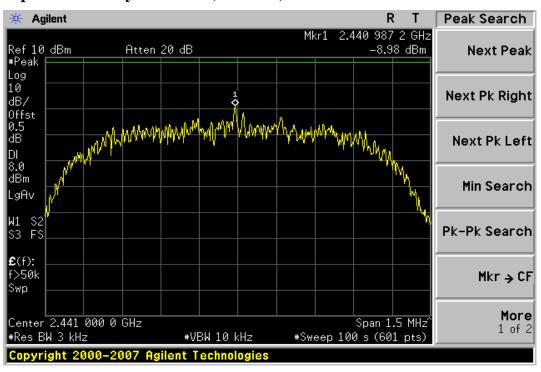
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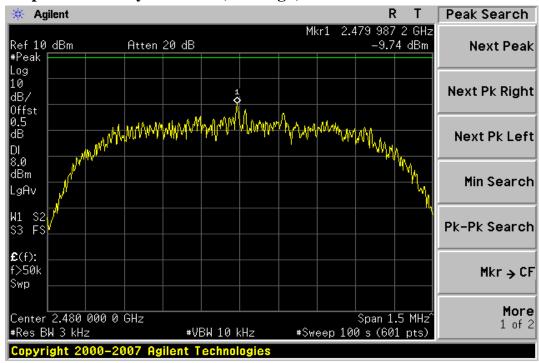
Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 72 of 73

Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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Report No.: ER/2009/60004 Issue Date: June. 29, 2009

Page: 73 of 73

14. ANTENNA REQUIREMENT

14.1. 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.

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

14.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 2dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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