

REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 1 of 56

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Bluetooth Home Stereo Transmitter &

Receiver

N/A **Brand Name:**

99004 **Model Name:**

N/A **Model Differences:**

QOB99004 FCC ID:

EF/2006/90013 **Report No.:**

Issue Date: Oct. 17, 2006

FCC Rule Part: §15.247

Prepared for: Jasco Products Company

10 East memorial Road, Oklahoma city,

OK 73114, USA

Prepared by: SGS Taiwan Ltd.

No. 134, Wu Kung Rd., Wuku Industrial

Zone, Taipei County, Taiwan.





Note: This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This document may be altered or revised by SGS Taiwan Ltd. personnel only, and shall be noted in the revision section of the document.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 2

VERIFICATION OF COMPLIANCE

Applicant: Jasco Products Company

10 East memorial Road, Oklahoma city, OK 73114, USA

Bluetooth Home Stereo Transmitter & Receiver **Equipment Under Test:**

Brand Name: N/A

FCC ID Number: QOB99004

Model No.: 99004

Model Difference: N/A

File Number: EF/2006/90013

Date of test: Oct. 01, 2006 ~ Oct. 13, 2006

Date of EUT Received: Oct. 13, 2006

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 Wu	Date	Oct. 17, 2006	
_	Jason Wu/Sr. Engineer			
Prepared By:	Elisa Chen	Date	Oct. 17, 2006	
_	Elisa Chen/Asst. Supervisor			
Approved By:	Timent Su	Date	Oct. 17, 2006	
_	Vincent Su/Manager			

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification, and Jurisdictional issued defined therein. The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. 此報告是遵循本公司訂定之通用服務條款所製作發放。請注意此條款列印於背面,將本公司之義務,免責,管

轄權皆明確規範之。此報告結果除非另有說明僅對檢驗之樣品負責。本報告未經本公司書面許可,不可部份複製。



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 3

Version

Version No.	Date
00	Oct. 17, 2006



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 4

Table of Contents

1.	GEN	ERAL INFORMATION	
	1.1.	Product Description	
	1.2.	Related Submittal(s) / Grant (s)	
	1.3.	Test Methodology	
	1.4.	Test Facility	
	1.5.	Special Accessories	
	1.6.	Equipment Modifications	
2.	SYST	FEM TEST CONFIGURATION	
	2.1.	EUT Configuration	8
	2.2.	EUT Exercise	8
	2.3.	Test Procedure	8
	2.4.	Configuration of Tested System	9
3.	SUM	MARY OF TEST RESULTS	1(
4.	DES	CRIPTION OF TEST MODES	10
5.	CON	DUCTED EMISSION TEST	1
	5.1.	Standard Applicable	1
	5.2.	EUT Setup	1
	5.3.	Measurement Procedure	1
	5.4.	Measurement Equipment Used:	12
	5.5.	Measurement Result	12
6.	PEA]	K OUTPUT POWER MEASUREMENT	17
	6.1.	Standard Applicable	17
	6.2.	Measurement Procedure	17
	6.3.	Measurement Result	17
	6.4.	Measurement Equipment Used:	17
7.	20dB	BAND WIDTH	20
	7.1.	Standard Applicable	
	7.2.	Measurement Procedure	20
	7.3.	Measurement Result	20
	74	Measurement Equipment Used:	20



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 5

8.	100K	Hz BANDWIDTH OF BAND EDGES MEASUREMENT	23
	8.1.	Standard Applicable	23
	8.2.	Measurement Procedure	23
	8.3.	Measurement Result	23
	8.4.	Measurement Equipment Used:	23
9.	SPUR	RIOUS RADIATED EMISSION TEST	27
	9.1.	Standard Applicable	27
	9.2.	EUT Setup	27
	9.3.	Measurement Procedure	27
	9.4.	Test SET-UP (Block Diagram of Configuration)	28
	9.5.	Measurement Equipment Used:	29
	9.6.	Field Strength Calculation	29
	9.7.	Measurement Result	29
10.	FRE(QUENCY SEPARATION	43
	10.1.	Standard Applicable	43
	10.2.	Measurement Procedure	43
	10.3.	Measurement Result	43
	10.4.	Measurement Equipment Used:	43
11.	NUM	BER OF HOPPING FREQUENCY	45
	11.1.	Standard Applicable	45
	11.2.	Measurement Procedure	45
	11.3.	Measurement Result	45
	11.4.	Measurement Equipment Used:	45
12.	TIME	E OF OCCUPANCY (DWELL TIME)	47
	12.1.	Standard Applicable	47
	12.2.	Measurement Procedure	47
	12.3.	Measurement Result	47
	12.4.	Measurement Equipment Used:	48
13.	Peak	Power Spectral Density	53
	13.1.	Standard Applicable	
	13.2.	Measurement Procedure	53
	13.3.	Measurement Result	53
	13.4.	Measurement Equipment Used:	53



REPORT NO: EF/2006/90013 **DATE: Oct. 17, 2006**

Page: 6

14.	ANTI	ENNA REQUIREMENT	56
	14.1.	Standard Applicable	56
	14.2.	Antenna Connected Construction	56



REPORT NO: EF/2006/90013 **FCC ID: QOB99004**

DATE: Oct. 17, 2006

Page: 7

1. GENERAL INFORMATION

1.1. Product Description

The Jasco Products Company, Model: 99004 is a Bluetooth Home Stereo Transmitter & Receiver.

The EUT is compliance with Bluetooth Standard.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2402 2480Hz, 79 channels
- B). Rated output power: 16.66 dBm
- C). Modulation type: Frequency Hopping Spread Spectrum (FHSS)
- D). Antenna Designation: Dipole Antenna, 1.9dBi, Non-User Replaceable (Fixed)
- E). Power Supply: 5V from AC/DC Adaptor, Model: DVR-0550-3512

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

This submittal(s) (test report) is intended for FCC ID: QOB99004 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.

1.3. 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.

1.4. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Both OATS and Anechoic chamber (3 meters) was accredited by TAF (0513).

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 8

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 according to the requirements in Section 8 and 13 of ANSI C63.4-2003.



REPORT NO: EF/2006/90013

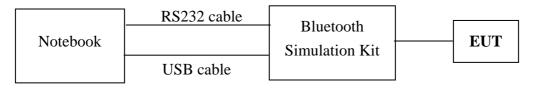
DATE: Oct. 17, 2006

Page: 9

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

Radiated Emission:



Conducted Emission:

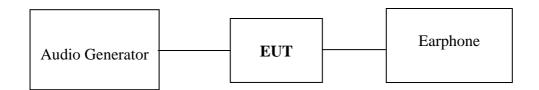


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	Bluetooh Simulation Kit	BluePacket	BPA01.PCB	N/A	N/A	Un-shielding	Un-shielding
2.	Notebook	IBM	T40	N/A	99HCYF4	N/A	Un-shielding

This Test Report is issued by the Company subject to its General Conditions of Service printed overleaf. Attention is drawn to the limitations of liability, indemnification, and Jurisdictional issued defined therein. The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. 此報告是遵循本公司訂定之通用服務條款所製作發放。請注意此條款列印於背面,將本公司之義務,免責,管 轄權皆明確規範之。此報告結果除非另有說明僅對檢驗之樣品負責。本報告未經本公司書面許可,不可部份複製。

SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. / 台場五股工業區五工路134號 f (886-2) 2298-2698 www.sas.com.tw



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 10

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	Compliant
§15.247(c)	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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 11

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	Lin dB(
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 host PC. 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 110Vac/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.

^{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: EF/2006/90013

DATE: Oct. 17, 2006

Page: 12

5.4. Measurement Equipment Used:

	Conduc	ted Emission T	est Site		
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EMC Analyzer	HP	8594EM	3624A00203	09/02/2006	09/03/2007
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2006	06/10/2007
Transient Limiter	НР	11947A	3107A02062	09/02/2006	09/03/2007
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2005	12/30/2006
LISN	Rolf-Heine	NNB-2/16Z	99013	12/24/2005	12/23/2006
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2005	12/01/2006

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-peak.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

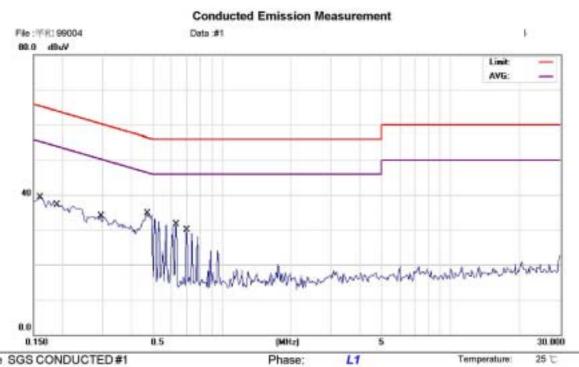
Humidity: Air Pressure:

hpa

Page: 13

AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	TX Mode			Test Date:	Oct. 05 2006
Temperature:	25	Humidity:	62 %	Test By:	Jason



Site SGS CONDUCTED#1

Limit: CISPR22 Class B Conduction(QP)

EUT: BT Transmitter & Receiver

M/N: 99004 Note: TX mode

No. Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1600	38.56	0.69	39.25	65.46	-26.21	QP	Solescomes
2	0.1914	36.25	0.74	36.99	63.98	-26.99	QP	
3	0.2950	33.02	0.79	33.81	60.38	-26.57	QP	
4 *	0.4700	33.88	0.87	34.75	56.51	-21.76	QP	
5	0.6300	30.79	0.80	31.59	56.00	-24.41	QP	
6	0.7000	29.14	0.76	29.90	56.00	-26.10	QP	

Power:

Distance:

AC 120V/60Hz



REPORT NO: EF/2006/90013

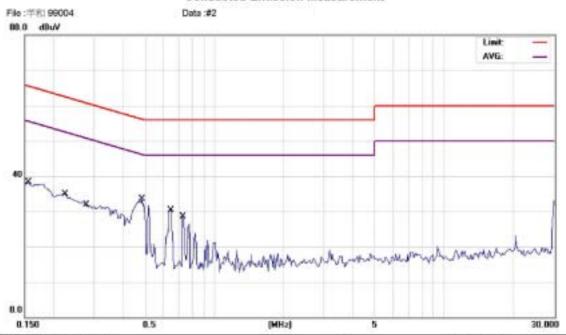
DATE: Oct. 17, 2006

Temperature:

Humidity: Air Pressure: 25 ℃

Page: 14

Conducted Emission Measurement



Phase:

Power:

Distance:

N

AC 120V/60Hz

Site SGS CONDUCTED#1

Limit: CISPR22 Class B Conduction(QP)

EUT: BT Transmitter & Receiver

M/N: 99004 Note: TX mode

No. Mk.	/lk. Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dΒ	dBuV	dBuV	dB	Detector
1	0.1550	37.61	0.69	38.30	65.73	-27.43	QP	
2	0.2250	34.22	0.76	34.98	62.63	-27.65	QP	
3	0.2800	30.78	0.78	31.56	60.82	-29.26	QP	
4 *	0.4850	32.72	0.87	33.59	56.25	-22.66	QP	
5	0.6500	29.61	0.79	30.40	56.00	-25.60	QP	
6	0.7300	27.83	0.74	28.57	56.00	-27.43	QP	



REPORT NO: EF/2006/90013

Temperature:

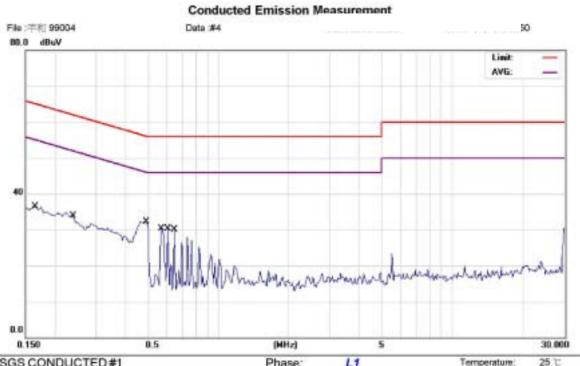
Air Pressure:

Humidity:

DATE: Oct. 17, 2006

Page: 15

Operation Mode:	RX Mode			Test Date:	Oct. 05 2006
Temperature:	25	Humidity:	62 %	Test By:	Jason



Phase:

Power:

Distance:

L1

AC 120V/60Hz

Site SGS CONDUCTED#1

Limit: CISPR22 Class B Conduction(QP)

EUT: BT Transmitter & Receiver

M/N: 99004 Note: RX mode

No. N	Иk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1650	35.86	0.70	36.56	65.21	-28.65	QP	
2		0.2378	33.01	0.77	33.78	62.17	-28.39	QP	
3 .	•	0.4900	31.50	0.88	32.38	56.17	-23.79	QP	
4		0.5700	29.55	0.84	30.39	56.00	-25.61	QP	
5		0.6100	29.51	0.81	30.32	56.00	-25.68	QP	
6		0.6500	29.27	0.79	30.06	56.00	-25.94	QP	



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Temperature:

Air Pressure:

Humidity:

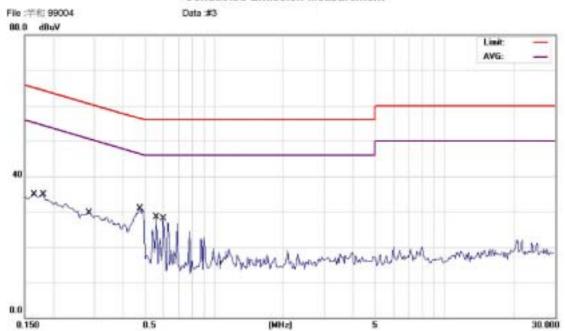
25 T

hpa

62 %

Page: 16

Conducted Emission Measurement



Phase:

Power:

Distance:

N

AC 120V/60Hz

Site SGS CONDUCTED#1

Limit: CISPR22 Class B Conduction(QP)

EUT: BT Transmitter & Receiver

M/N: 99004 Note: RX mode

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1650	34.29	0.70	34.99	65.21	-30.22	QP	
2		0.1800	34.26	0.72	34.98	64.49	-29.51	QP	
3		0.2850	28.97	0.79	29.76	60.67	-30.91	QP	
4		0.4750	30.06	0.87	30.93	56.43	-25.50	QP	
5		0.5600	27.71	0.84	28.55	56.00	-27.45	QP	
6		0.6000	27.25	0.82	28.07	56.00	-27.93	QP	



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 17

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 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.

6.3. Measurement Result

СН	Frequency (MHz)	Reading Power dBm	Cable Loss	Output Power dBm	Output Power W	Limit (W)
LOW	2402.0	16.66	0.00	16.66	0.04634	1
MID	2441.0	16.13	0.00	16.13	0.04102	1
HIGH	2480.0	14.92	0.00	14.92	0.03105	1

*Note: 10.8dB offset

6.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/27/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	01/22/2006	01/21/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

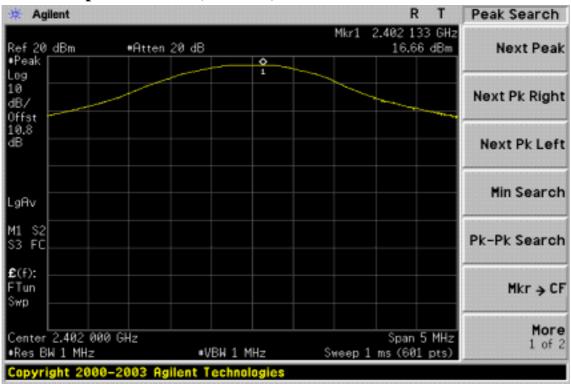


REPORT NO: EF/2006/90013

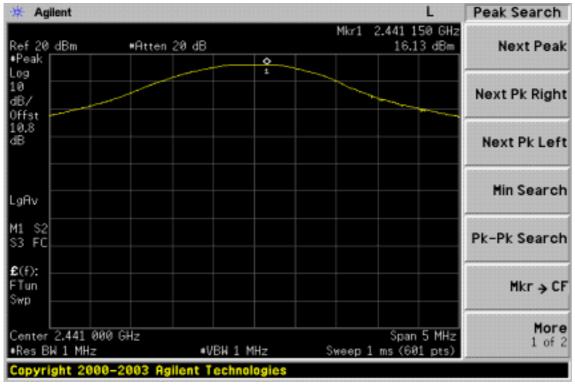
DATE: Oct. 17, 2006

Page: 18

Peak Power Output Data Plot (CH Low)



Peak Power Output Data Plot (CH Mid)



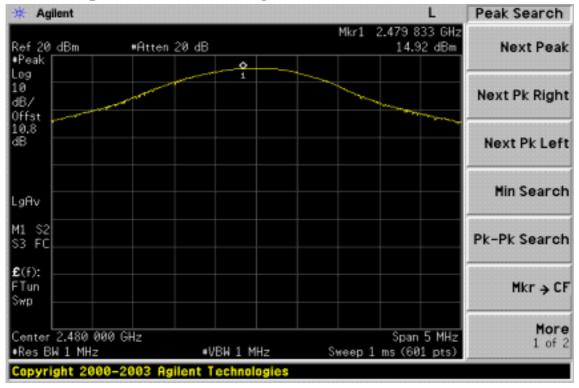


REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 19

Peak Power Output Data Plot (CH High)





REPORT NO: EF/2006/90013 **FCC ID: QOB99004**

DATE: Oct. 17, 2006

Page: 20

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 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=10KHz (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.

7.3. Measurement Result

СН	Bandwidth	2/3 Bandwidth
	(MHz)	(MHz)
Lower	1.266	0.844
Mid	1.266	0.844
Higher	1.264	0.843

7.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/27/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	01/22/2006	01/21/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

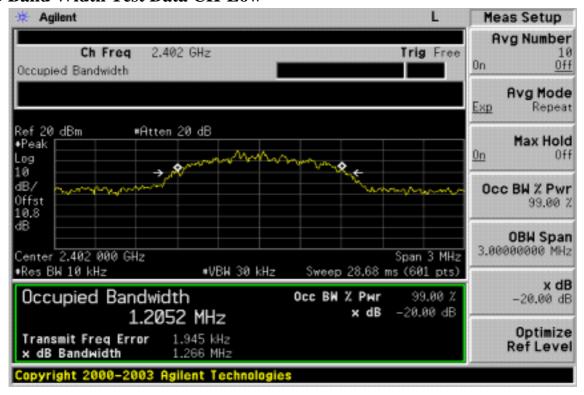


REPORT NO: EF/2006/90013

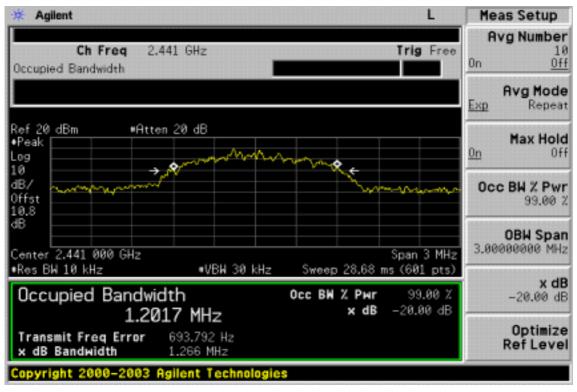
DATE: Oct. 17, 2006

Page: 21

20dB Band Width Test Data CH-Low



20dB Band Width Test Data CH-Mid



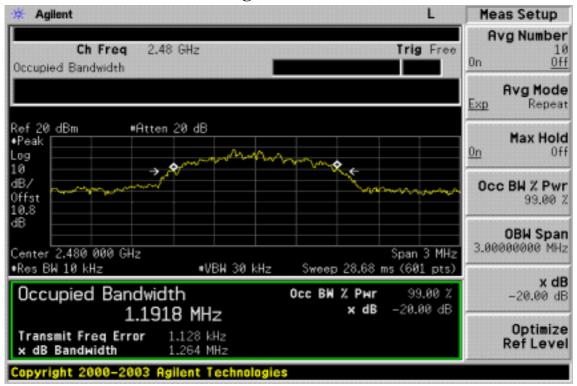


REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 22

20dB Band Width Test Data CH-High





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 23

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 in 15.209(a).

8.2. Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the 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 2.488GHz and record the max. level.
- 6. Repeat above procedures until all frequency measured were complete.
- 7. Radiated Emission refer to section 9.

8.3. Measurement Result

Refer to attach spectrum analyzer data chart.

8.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/26/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	01/22/2006	01/21/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

Note: Measurement Equipment for radiated emission refers to section 9.

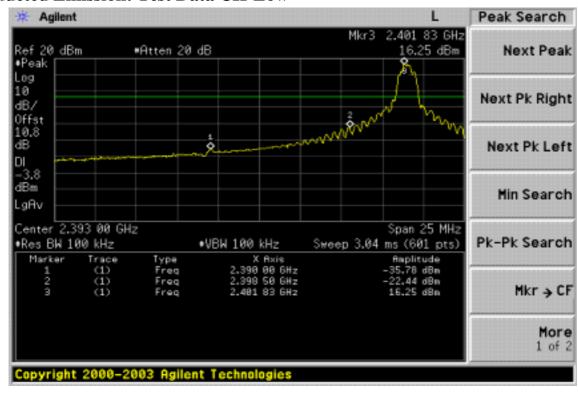


REPORT NO: EF/2006/90013

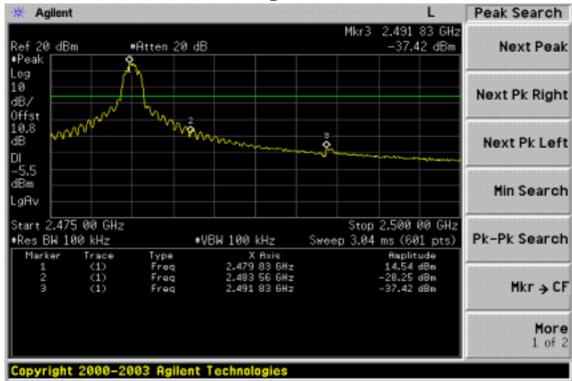
DATE: Oct. 17, 2006

Page: 24

Conducted Emission: Test Data CH-Low



Conducted Emission: Test Data CH-High





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 25

Radiated Emission:

Operation Mode TX CH Low Test Date Sep. 05, 2006

Fundamental Frequency 2402 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)	
-	2390.0						74.00	54.00		Peak
	2398.5						74.00	54.00		Peak

Operation Mode TX CH Low Test Date Sep. 05, 2006 Fundamental Frequency 2402 MHz Test By Jason

Temperature 25 Pol Hor. Humidity 65 %

Peak AV**Actual FS** Peak AVReading Reading Ant./CL Freq. Peak AVLimit Limit Margin Remark (dBuV) CF(dB) (dBuV/m) (dBuV/m) (dBuV/m)(MHz) (dBuV) (dB) 2390.0 74.00 54.00 Peak 2398.5 74.00 54.00 Peak

- (1) Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 26

Radiated Emission:

Operation Mode TX CH High Test Date Sep. 05, 2006

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)	
2483.6						74.00	54.00		Peak
2491.8						74.00	54.00		Peak

Operation Mode TX CH High Test Date Sep. 05, 2006

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 A	nt./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	Remark
_	(MHz)	(dBuV)	(dBuV) (CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
•	2483.6						74.00	54.00		Peak
	2491.8						74.00	54.00		Peak

- (1) Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 27

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. EUT Setup

- 1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-2003.
- 2. The EUT was put in the front of the test table. The peripherals was placed on the side of the host 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 PC system was connected with 110Vac/60Hz power source.

9.3. Measurement Procedure

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



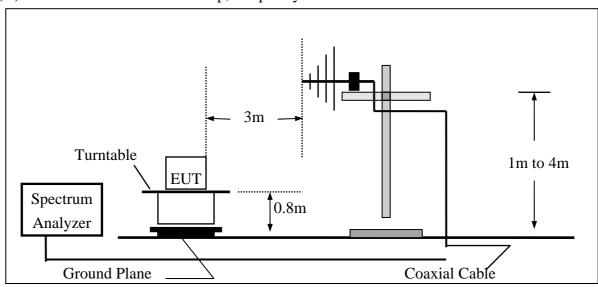
REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

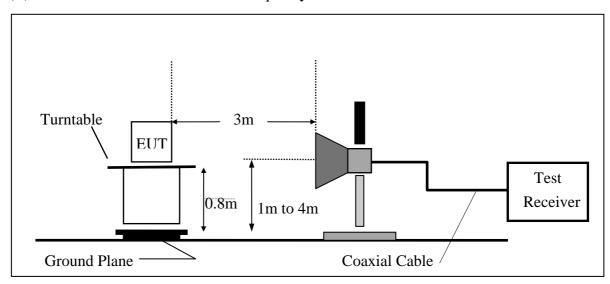
Page: 28

9.4. Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1GHz



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





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 29

9.5. **Measurement Equipment Used:**

	9	66 Chamber			
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/26/2007
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2006	06/02/2007
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	08/16/2006	08/15/2007
Horn antenna	Schwarzbeck	BBHA 9170	184/185	07/04/2006	07/03/2007
Pre-Amplifier	HP	8447D	2944A09469	07/19/2006	07/18/2007
Pre-Amplifier	HP	8494B	3008A00578	02/26/2006	02/25/2007
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	10/09/2006	10/08/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2006	10/08/2007
Site NSA	SGS	966 chamber	N/A	11/17/2005	11/16/2006

9.6. Field Strength Calculation

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

$$FS = RA + AF + CL - AG$$

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

9.7. Measurement Result

Refer to attach tabular data sheets.

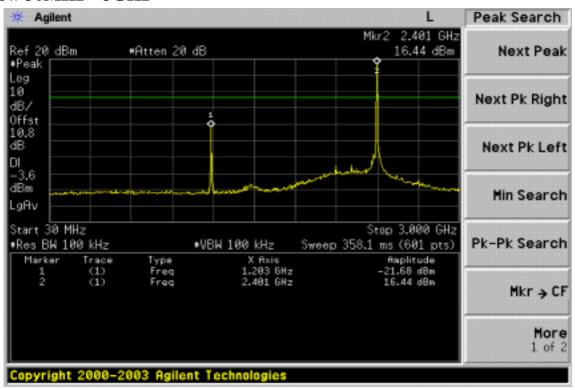


REPORT NO: EF/2006/90013

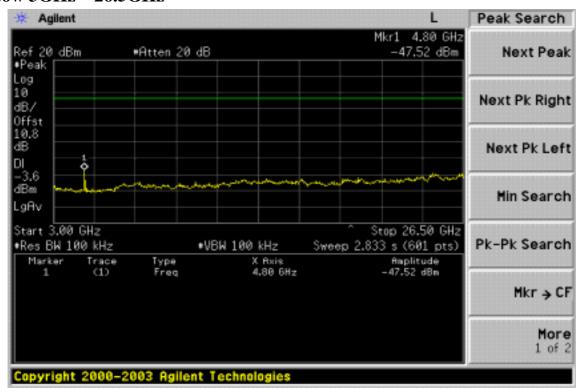
DATE: Oct. 17, 2006

Page: 30

Conducted Spurious Emission Measurement Result Ch Low 30MHz - 3GHz



Ch Low 3GHz – 26.5GHz



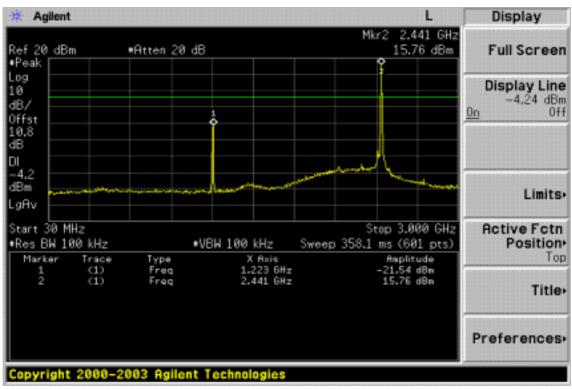


REPORT NO: EF/2006/90013

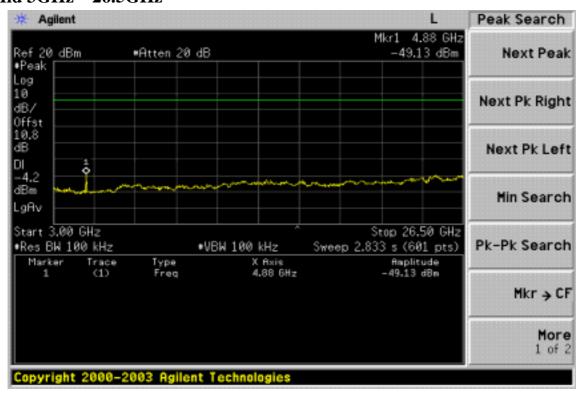
DATE: Oct. 17, 2006

Page: 31

Ch Mid 30MHz - 3GHz



Ch Mid 3GHz – 26.5GHz



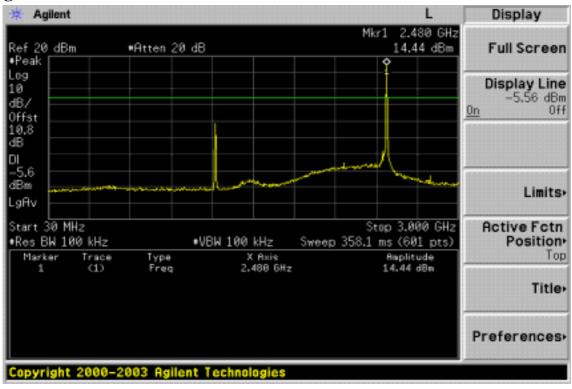


REPORT NO: EF/2006/90013

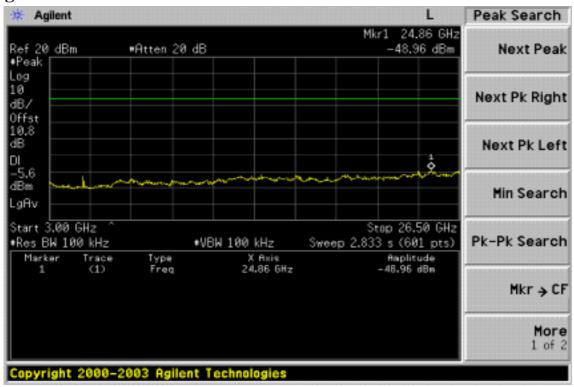
DATE: Oct. 17, 2006

Page: 32

Ch High 30MHz – 3GHz



Ch High 3GHz - 26.5GHz





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 33

Radiated Spurious Emission Measurement Result (below 1GHz)

TX CH Low Test Date Oct. 03, 2006 Operation Mode

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

Humidity 65 %

Freq.	q. Ant.Pol. Detector Mode		Reading	Factor	Actual FS	Limit3m	Safe Margin	
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
30.00	V	Peak	47.94	-14.97	32.97	40.00	-7.03	
95.96	V	Peak	46.73	-17.21	29.52	43.50	-13.98	
299.66	V	Peak	51.98	-13.13	38.85	46.00	-7.15	
598.42	V	Peak	38.53	-6.06	32.47	46.00	-13.53	
622.67	V	Peak	45.45	-5.53	39.92	46.00	-6.08	
671.17	V	Peak	39.50	-5.04	34.46	46.00	-11.54	
30.00	Н	Peak	44.87	-14.97	29.9	40.00	-10.10	
98.87	Н	Peak	49.32	-17.06	32.26	43.50	-11.24	
299.66	Н	Peak	51.95	-13.13	38.82	46.00	-7.18	
598.42	Н	Peak	39.73	-6.06	33.67	46.00	-12.33	
622.67	Н	Peak	48.01	-5.53	42.48	46.00	-3.52	
671.17	Н	Peak	41.98	-5.04	36.94	46.00	-9.06	

- 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 Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 34

Radiated Spurious Emission Measurement Result (below 1GHz)

TX CH Mid Test Date Oct. 03, 2006 Operation Mode

Fundamental Frequency 2441MHz Test By Jason Temperature 25 Pol Ver./Hor. 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)	
30.00	V	Peak	47.05	-14.97	32.08	40.00	-7.92	
95.96	V	Peak	47.56	-17.21	30.35	43.50	-13.15	
299.66	V	Peak	51.29	-13.13	38.16	46.00	-7.84	
598.42	V	Peak	38.04	-6.06	31.98	46.00	-14.02	
622.67	V	Peak	43.85	-5.53	38.32	46.00	-7.68	
671.17	V	Peak	40.59	-5.04	35.55	46.00	-10.45	
30.00	Н	Peak	45.27	-14.97	30.30	40.00	-9.70	
98.87	Н	Peak	49.60	-17.06	32.54	43.50	-10.96	
299.66	Н	Peak	53.52	-13.13	40.39	46.00	-5.61	
598.42	Н	Peak	39.82	-6.06	33.76	46.00	-12.24	
622.67	Н	Peak	48.12	-5.53	42.59	46.00	-3.41	
671.17	Н	Peak	42.59	-5.04	37.55	46.00	-8.45	

- 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 Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 35

Radiated Spurious Emission Measurement Result (below 1GHz)

TX CH High Test Date Oct. 03, 2006 Operation Mode

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

Humidity 65 %

Freq.	Ant.Pol.	Ant.Pol. Detector Mode Reading		Factor Actual FS		Limit3m	Safe Margin	
 (MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
30.00	V	Peak	47.75	-14.97	32.78	40.00	-7.22	
95.96	V	Peak	46.76	-17.21	29.55	43.50	-13.95	
299.66	V	Peak	51.58	-13.13	38.45	46.00	-7.55	
598.42	V	Peak	38.16	-6.06	32.1	46.00	-13.90	
622.67	V	Peak	44.11	-5.53	38.58	46.00	-7.42	
671.17	V	Peak	40.17	-5.04	35.13	46.00	-10.87	
30.00	Н	Peak	45.01	-14.97	30.04	40.00	-9.96	
98.87	Н	Peak	51.15	-17.06	34.09	43.50	-9.41	
299.66	Н	Peak	53.11	-13.13	39.98	46.00	-6.02	
598.42	Н	Peak	39.60	-6.06	33.54	46.00	-12.46	
622.67	Н	Peak	47.85	-5.53	42.32	46.00	-3.68	
671.17	Н	Peak	42.25	-5.04	37.21	46.00	-8.79	

- 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 Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 36

Radiated Spurious Emission Measurement Result (above 1GHz)

TX CH Low Oct. 03, 2006 Operation Mode Test Date

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

Humidity 65 %

	Peak	\mathbf{AV}		Actu	ıal FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m	(dBuV/m)(dBuV/m)	(dBuV/m)	(dB)	Remarl
1201.5	69.05	47.10	-7.27	61.78	39.83	74.00	54.00	-14.17	AV
4804.0	41.54		6.02	47.56		74.00	54.00	-6.44	Peak
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
- (2) Datas 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_o
- (4) Spectrum Peak Setting: 1GHz-26GHz, RBW=1MHz, VBW=3MHz, Sweep time=200
- (5) Spectrum AV Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time=200 ms.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 37

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Low Test Date Oct. 03, 2006

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

Humidity 65 %

	Peak	\mathbf{AV}		Actu	al FS	Peak	\mathbf{AV}		
Freq. (MHz)	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1052.0	72.98	47.30	-7.27	65.71	40.03	74.00	54.00	-13.97	AV
4804.0						74.00	54.00		
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency_o
- (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_o
- (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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 38

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Oct. 03, 2006

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

Humidity 65 %

	Peak	AV		Actu	al FS	Peak	\mathbf{AV}		
Freq.	Reading	Reading	Ant./CL	Peak	\mathbf{AV}	Limit	Limit	Margin	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	Remark
1214.5	70.71	47.09	-7.21	63.50	39.88	74.00	54.00	-14.12	AV
2137.5	44.74		-2.70	42.04		74.00	54.00	-11.96	Peak
4882.0	38.54		6.17	44.71		74.00	54.00	-9.29	Peak
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency_o
- (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_o
- (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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 39

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH Mid Test Date Oct. 03, 2006

Fundamental Frequency 2441 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	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	Remark
1214.5	71.96	47.45	-7.21	64.75	40.24	74.00	54.00	-13.76	AV
2137.5	44.10		-2.70	41.40		74.00	54.00	-12.60	Peak
4882.0	38.17		6.17	44.34		74.00	54.00	-9.66	Peak
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency_o
- (2) Datas 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_o
- (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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 40

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Oct. 03, 2006

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	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	Remark
1234.0	71.10	47.91	-7.08	64.02	40.83	74.00	54.00	-13.17	AV
2170.0	46.49		-2.54	43.95		74.00	54.00	-10.05	Peak
4960.0						74.00	54.00		
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency,
- (2) Datas 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_o
- (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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 41

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode TX CH High Test Date Oct. 03, 2006

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	
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	Remar
1234.0	73.74	48.64	-7.08	66.66	41.56	74.00	54.00	-12.44	AV
2170.0	40.71		-2.54	38.17		74.00	54.00	-15.83	Peak
4960.0	38.51		6.38	44.89		74.00	54.00	-9.11	Peak
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		

- (1) Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency_o
- (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_o
- (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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 42

Radiated Spurious Emission Measurement Result (below 1GHz)

Audio-In Mode Test Date Oct. 03, 2006 Operation Mode

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

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)
30.00	V	Peak	46.98	-14.97	32.01	40.00	-7.99
100.81	V	Peak	47.39	-16.94	30.45	43.50	-13.05
299.66	V	Peak	50.05	-13.13	36.92	46.00	-9.08
598.42	V	Peak	38.22	-6.06	32.16	46.00	-13.84
622.67	V	Peak	45.28	-5.53	39.75	46.00	-6.25
671.17	V	Peak	39.98	-5.04	34.94	46.00	-11.06
39.70	Н	Peak	42.04	-13.73	28.31	40.00	-11.69
98.87	Н	Peak	49.84	-17.06	32.78	43.50	-10.72
299.66	Н	Peak	53.61	-13.13	40.48	46.00	-5.52
598.42	Н	Peak	39.01	-6.06	32.95	46.00	-13.05
622.67	Н	Peak	47.90	-5.53	42.37	46.00	-3.63
671.17	Н	Peak	42.11	-5.04	37.07	46.00	-8.93

- 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 Datas 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.



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 43

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 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 5 MHz, Sweep = auto.
- 5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

10.3. Measurement Result

Channel separation	Limit	Result
MHz	kHz	
1	>=25KHz or 2/3* 20 dB bandwidth	PASS

10.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/26/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	01/22/2006	01/21/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2006	10/06/2007

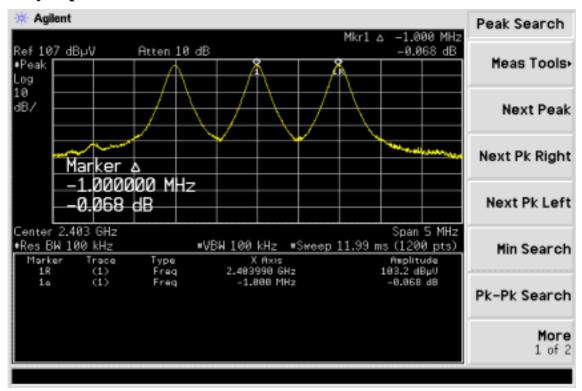


REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 44

Frequency Separation Test Data





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 45

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 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.

11.3. Measurement Result

Total No of	Limit (CH)	Measurement result (CH)	Result
hopping channel	15	79	Pass

11.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/26/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	01/22/2006	01/21/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2006	10/06/2007



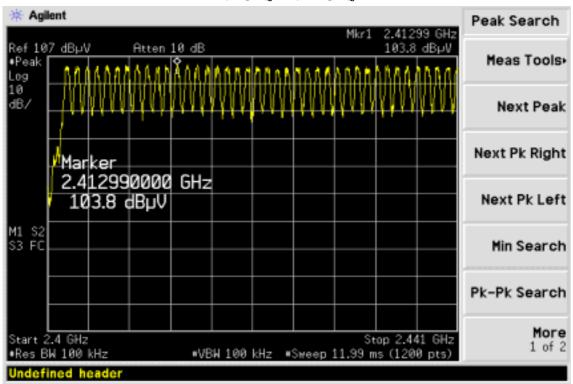
REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

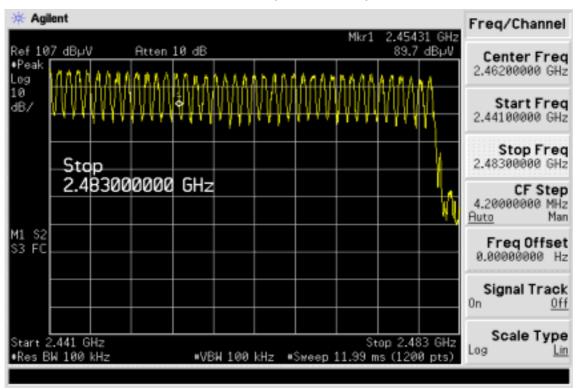
Page: 46

Channel Number

2.4 GHz - 2.441GHz



2.441 GHz - 2.4835GHz





REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 47

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 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 = 0Hz, Adjust Sweep = 30s.
- 5. Repeat above procedures until all frequency measured were complete.

12.3. Measurement Result

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

CH Low: DH1 time slot = 0.405 (ms) * (1600/(1*79)) * 31.6 = 259.1 (ms)

DH3 time slot = 1.675 (ms) * (1600/(3*79)) * 31.6 = 357.2 (ms)

DH5 time slot = 2.925 (ms) * (1600/(5*79)) * 31.6 = 374.3 (ms)

CH Mid: DH1 time slot = 0.405 (ms) * (1600/(1*79)) * 31.6 = 259.1 (ms)

DH3 time slot = 1.675 (ms) * (1600/(3*79)) * 31.6 = 357.2 (ms)

DH5 time slot = 2.906 (ms) * (1600/(5*79)) * 31.6 = 371.9 (ms)

CH High: DH1 time slot = 0.416 (ms) * (1600/(1*79)) * 31.6 = 266.1 (ms)

DH3 time slot = 1.662 (ms) * (1600/(3*79)) * 31.6 = 354.5 (ms)

DH5 time slot = 2.906 (ms) * (1600/(5*79)) * 31.6 = 371.9 (ms)



REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 48

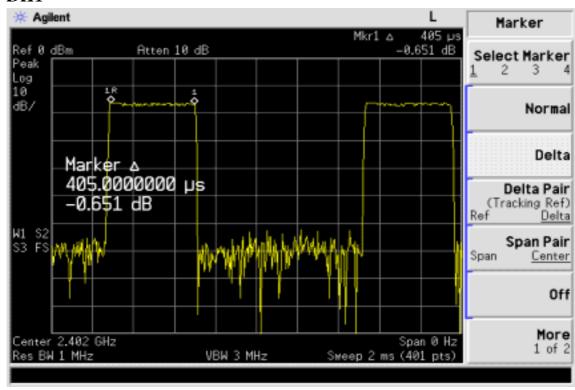
12.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/27/2007
Spectrum Analyzer	Agilent	E4446A	MY43360126	03/29/2006	03/28/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2006	10/06/2007

Dwell Time Test Data

CH-Low

DH1



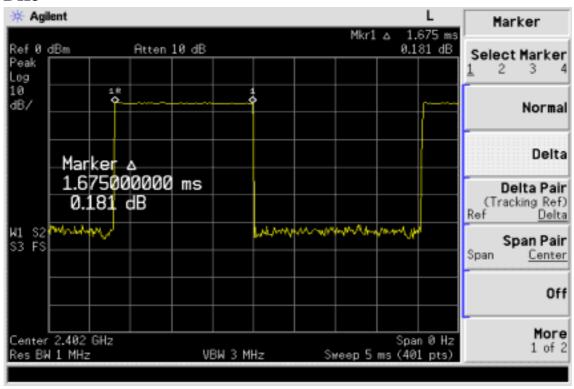


REPORT NO: EF/2006/90013

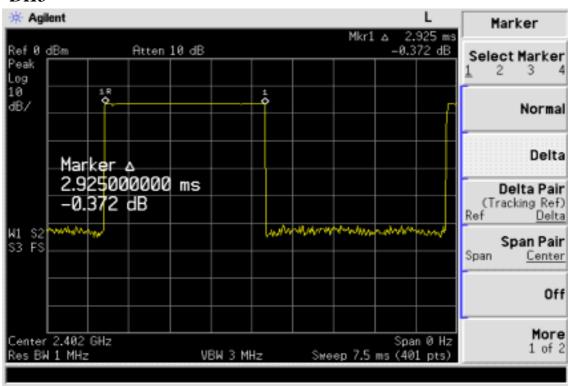
DATE: Oct. 17, 2006

Page: 49

DH3



DH5





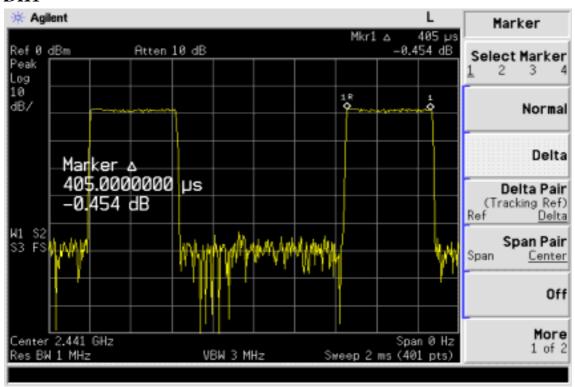
REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

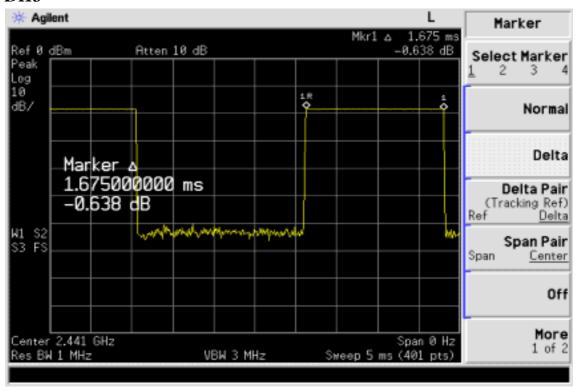
Page: 50

CH-Mid

DH1



DH3



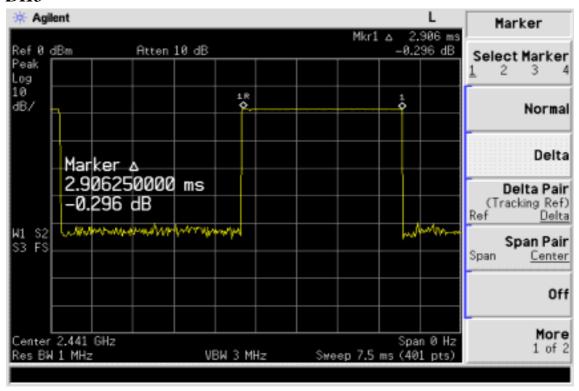


REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

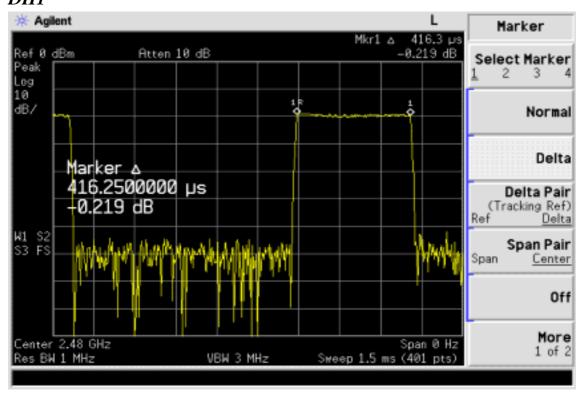
Page: 51

DH5



CH-High

DH1



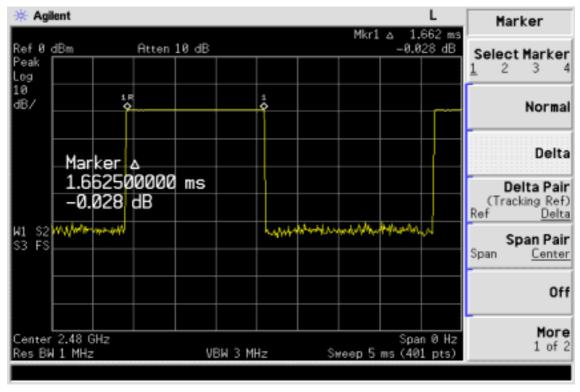


REPORT NO: EF/2006/90013

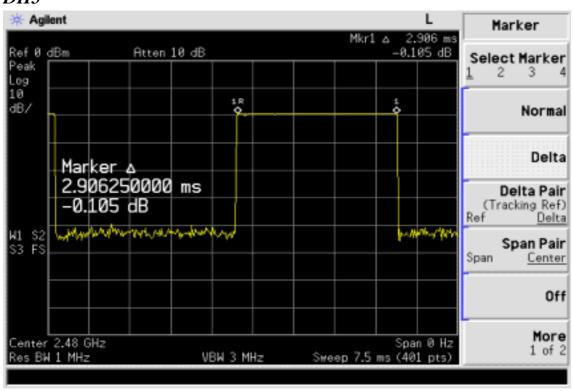
DATE: Oct. 17, 2006

Page: 52

DH3



DH5





REPORT NO: EF/2006/90013 FCC ID: QOB99004

DATE: Oct. 17, 2006

Page: 53

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 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.

13.3. Measurement Result

СН	RF Power Density	Cable loss	RF Power Density	Maximum Limit
Сп	Reading (dBm)	(dB)	Level (dBm)	(dBm)
Low	2.93	0.00	2.93	8
Mid	2.65	0.00	2.65	8
High	1.43	0.00	1.43	8

*Note: 10.8dB Offset

13.4. Measurement Equipment Used:

EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
Spectrum Analyzer	R&S	FSP 40	100034	05/27/2006	05/26/2007
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2006	08/26/2007
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	N/A	N/A
Attenuator	Mini-Circult	BW-S6W5	N/A	10/07/2005	10/06/2006

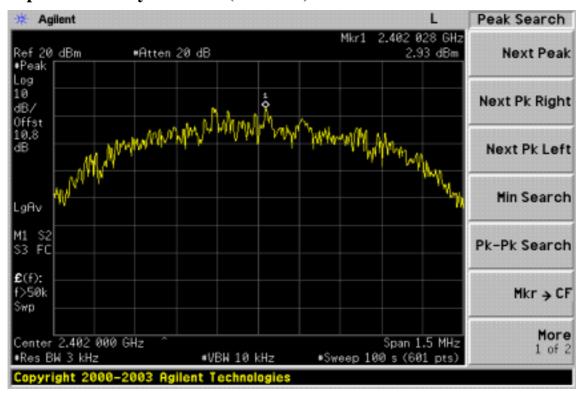


REPORT NO: EF/2006/90013

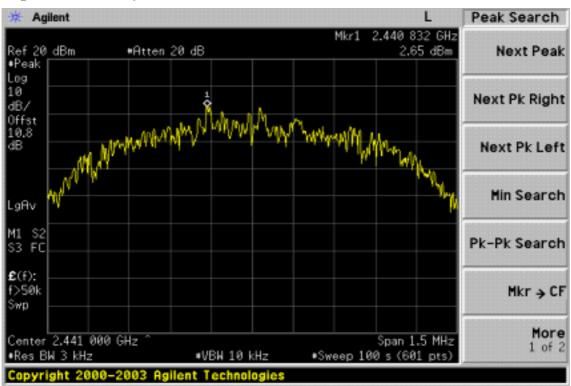
DATE: Oct. 17, 2006

Page: 54

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



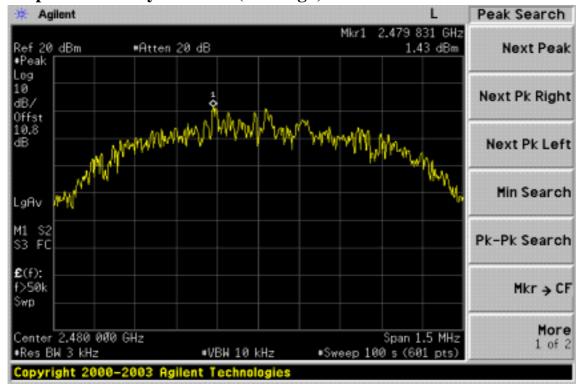


REPORT NO: EF/2006/90013

DATE: Oct. 17, 2006

Page: 55

Power Spectral Density Test Plot (CH-High)





REPORT NO: EF/2006/90013 FCC ID: QOB99004

DATE: Oct. 17, 2006

Page: 56

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 1.9dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.