

FCC ID: NM8PB99200

Report No.: EH/20010/30025 Issue Date: Mar. 10, 2010 Page: 1 of 62

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name:	Smartphone		
Brand Name:	HTC		
Model Name:	PB99200		
Model Difference:	N/A		
FCC ID:	NM8PB99200		
Report No.:	EH/2010/30025		
Issue Date:	Mar. 10, 2010		
FCC Rule Part:	§15.247, Cat: DSS		
Prepared for:	HTC Corporation		
	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan.		
Prepared by:	SGS Taiwan Ltd.		
	Electronics & Communication Laboratory		
	No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan		



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FCC ID: NM8PB99200

Report No.: EH/20010/30025 Issue Date: Mar. 10, 2010 Page: 2 of 62

VERIFICATION OF COMPLIANCE

Applicant:	HTC Corporation No. 23 Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan.
Equipment Under Test:	Smartphone
Brand Name:	HTC
Model No.:	PB99200
Model Difference:	N/A
FCC ID:	NM8PB99200
File Number:	EH/2010/30025
Date of test:	Mar. 04, 2010 ~ Mar. 09, 2010
Date of EUT Received:	Mar. 04, 2010

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:	Sey Wong	Date:	Mar. 10, 2010	
	Sky Wang / Asst. Supervisor			
Prepared By:	Gigi yeh	Date:	Mar. 10, 2010	
-	Gigi Yeh / Clerk			
Approved By:	Timent In	Date:	Mar. 10, 2010	
-	Vincent Su / Manager			

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Version

Version No.	Date	Description		
00 Mar. 10, 2010		Initial creation of document		

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1. GENERAL INFORMATION

General:

Product Name	Smartphone			
Brand Name	НТС			
Model Name	PB99200			
Model Difference	N/A			
Data Cable (USB)	 Model No.: DC M410, Brand Name: MEC Model No.: DC M410, Brand Name: Foxlink 			
Simple Hands-free (SHF)	 Model No.: RC E160, Brand Name: Cotron Model No.: RC E160, Brand Name: Merry 			
LCD Panel:	Model No.: AMS369FG03-0, Brand Name: SMD			
Camera	 Model No.: 08PM15A, Brand Name: LITEON Model No.: CHT5A-007A, Brand Name: FOXCONN 			
	3.7 Vdc re-chargeable battery or 5Vdc by AC/DC power adapter			
	Battery:1.Model No.: BB99100, Brand Name: Formosa2.Model No.: BB99100, Brand Name: HT-Energy			
Power Supply	Adapter:1. Model: TC X250 (X=C, U, E), Brand Name: Delta2. Model: TC X250 (X=B, U, E), Brand Name: Emerson3. Model: TC P300, Brand Name: Delta4. Model: TC P300, Brand Name: Foxlink			

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GSM and WCDMA:

	Operating Frequency	Rated Power	
	GSM/GPRS 850, Class 12	824.2 MHz- 848.8 MHz	33 dBm
	GSM/GPRS 900, Class 12	880.2MHz – 914.8MHz	33 dBm
	GSM/GPRS 1800, Class 12 1710.2MHz – 1784.8N		30 dBm
Cellular Phone Standards	GSM/GPRS 1900, Class 12	1850.2MHz – 1909.8MHz	30 dBm
Frequency Range and Power:	EDGE 850, Class 12 824.2 MHz– 848.8 MHz		27 dBm
	EDGE 900, Class 12 880.2MHz – 914.8MHz		27 dBm
	EDGE 1800, Class 12	1710.2MHz – 1784.8MHz	26 dBm
	EDGE 1900, Class 12 1850.2MHz – 1909.8		26 dBm
	WCDMA/HSUPA/HSDPA Band I 1922.4MHz –1977.6MHz		24 dBm
	WCDMA/HSUPA/HSDPA Band VIII 882.4MHz –912.6MH		24 dBm
Hardware Version:	N/A		
Software Version:	N/A		
IMEI:	357841030038364		

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WLAN: 802.11 b/g:

Frequency Range:	802.11 b/g: 2412 – 2462 MHz
Channel number:	11 channels
Output Power:	802.11 b: 17.41dBm 802.11 g: 13.54dBm
Modulation Technology:	DSSS, OFDM
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM
Transition Rate:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps
Antenna Designation:	PIFA Antenna, 1.1dBi.

Bluetooth:

Bluetooth Version:	V2.1 + EDR (GFSK + $\pi/4$ DQPSK + 8DPSK)	
Channel number:	79 channels	
Modulation type: Frequency Hopping Spread Spectrum		
Rated Power:1.85 dBm		
Frequency Range:	2.402GHz – 2.480GHz	
Dwell Time:	<= 0.4s	
Operating Mode:	Point-to-Point	
Antenna Designation:PIFA Antenna, 1.1dBi.		

GPS:

Receiver Frequency	L1 Band, 1575.42MHz
Frequency Conversion os- cillator	19.2MHz
Antenna Designation	PIFA Antenna

The EUT is compliance with Bluetooth 2.1 + EDR Standard.

This report applies for Bluetooth

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

This submittal(s) (test report) is intended for FCC ID: NM8PB99200 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.: EH/20010/30025 Issue Date: Mar. 10, 2010 Page: 10 of 62

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 requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4: 2003.

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2.4. Configuration of Tested System

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

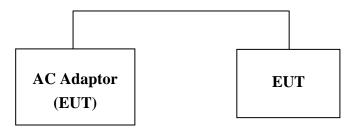


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	N/A					

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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
§15.203,	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, Mid and High with highest rated data rate were chosen for full testing.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Bluetooth Transmitter for channel Low, Mid and High the worst case H position was reported.

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

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.

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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5.4. Measurement Equipment Used:

	Conducted Emission Test Site						
EQUIPMENT MFR		MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2009	09/14/2010		
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2010	02/01/2011		
LISN	FCC	FCC-LISN-50/250-2 5-2-01	04034	02/02/2010	02/01/2011		
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2009	11/27/2010		

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.

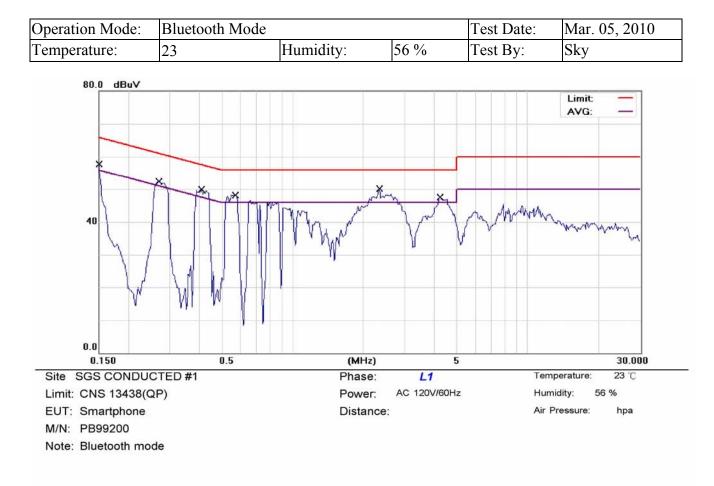
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AC POWER LINE CONDUCTED EMISSION TEST DATA



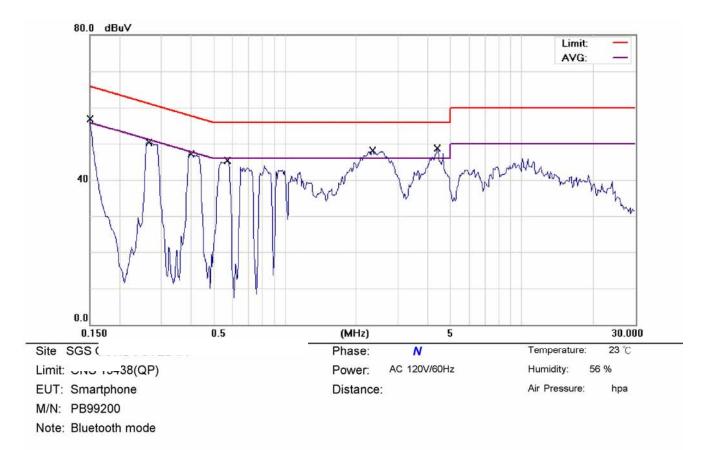
No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1507	51.26	0.17	51.43	65.96	-14.53	QP	
2		0.1507	27.52	0.17	27.69	55.96	-28.27	AVG	
3		0.2694	49.15	0.11	49.26	61.14	-11.88	QP	
4		0.2694	31.15	0.11	31.26	51.14	-19.88	AVG	
5	*	0.4088	45.92	0.08	46.00	57.67	-11.67	QP	
6		0.4088	25.39	0.08	25.47	47.67	-22.20	AVG	
7		0.5674	43.87	0.07	43.94	56.00	-12.06	QP	
8		0.5674	21.99	0.07	22.06	46.00	-23.94	AVG	
9		2.3330	42.20	0.13	42.33	56.00	-13.67	QP	
10		2.3330	21.45	0.13	21.58	46.00	-24.42	AVG	
11		4.2266	41.65	0.15	41.80	56.00	-14.20	QP	
12		4.2266	24.84	0.15	24.99	46.00	-21.01	AVG	

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No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1505	51.16	0.19	51.35	65.97	-14.62	QP	
2		0.1505	30.42	0.19	30.61	55.97	-25.36	AVG	
3		0.2639	47.87	0.13	48.00	61.31	-13.31	QP	
4		0.2639	32.66	0.13	32.79	51.31	-18.52	AVG	
5		0.3992	43.42	0.11	43.53	57.87	-14.34	QP	
6		0.3992	27.81	0.11	27.92	47.87	-19.95	AVG	
7		0.5678	41.95	0.10	42.05	56.00	-13.95	QP	
8		0.5678	25.92	0.10	26.02	46.00	-19.98	AVG	
9	*	2.3341	42.74	0.15	42.89	56.00	-13.11	QP	
10		2.3341	24.26	0.15	24.41	46.00	-21.59	AVG	
11		4.3853	42.26	0.18	42.44	56.00	-13.56	QP	
12		4.3853	27.08	0.18	27.26	46.00	-18.74	AVG	

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6. PEAK OUTPUT POWER MEASUREMENT

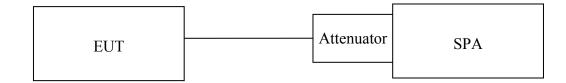
6.1. Standard Applicable

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.

	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	01/25/2010	01/24/2011		
DC Block	Agilent	BLK-18	155452	07/05/2009	07/04/2010		
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2010	01/04/2011		
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		

6.2. Measurement Equipment Used

6.3. .Test Set-up:



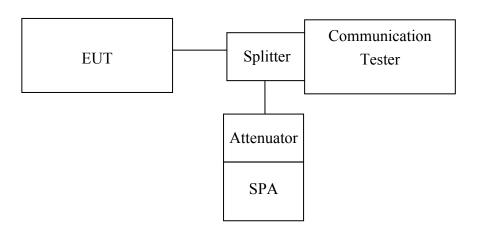
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6.4. Measurement Procedure:

- 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. (Max peak function, RBW, VBW = 1MHz)
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.

6.5. Measurement Result

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.00	0.00	0.00	0.00100	1
2441.00	0.90	0.00	0.90	0.00123	1
2480.00	1.46	0.00	1.46	0.00140	1

BDR mode.

EDR mode:

Frequency (MHz)	Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
2402.00	0.36	0.00	0.36	0.00109	1
2441.00	1.28	0.00	1.28	0.00134	1
2480.00	1.85	0.00	1.85	0.00153	1

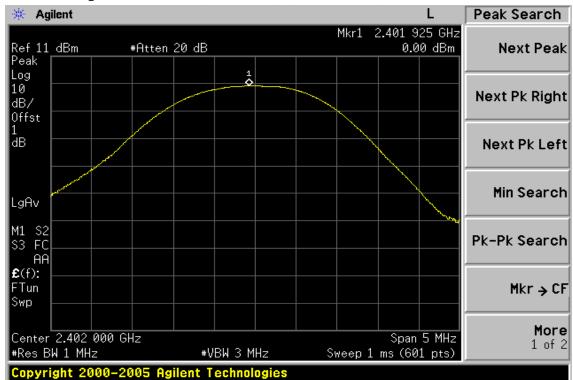
NOTE: offset: 1dB

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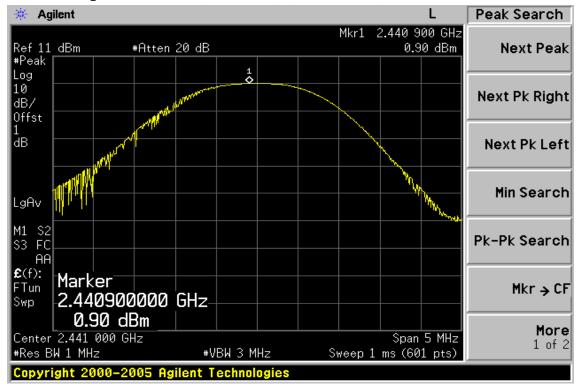


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Peak Power Output Data Plot (CH Low) (BDR mode)

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

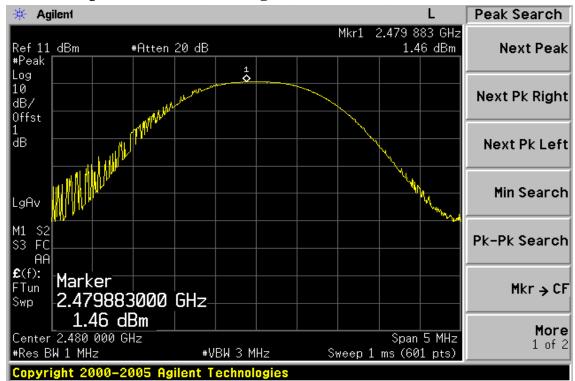


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Peak Power Output Data Plot (CH High) (BDR mode)

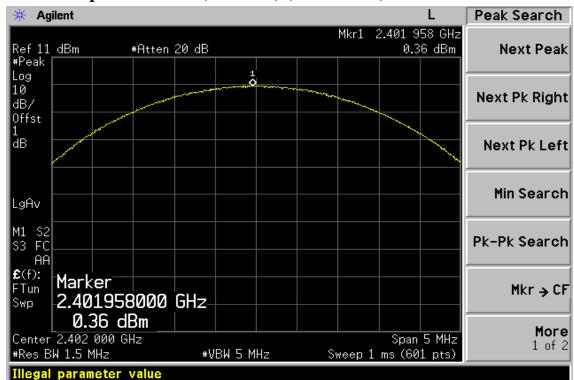
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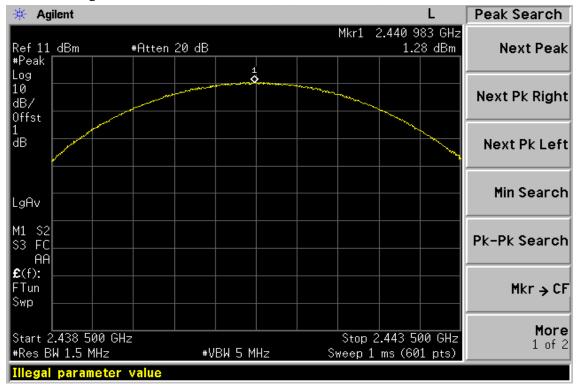


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Peak Power Output Data Plot (CH Low) (EDR mode)

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

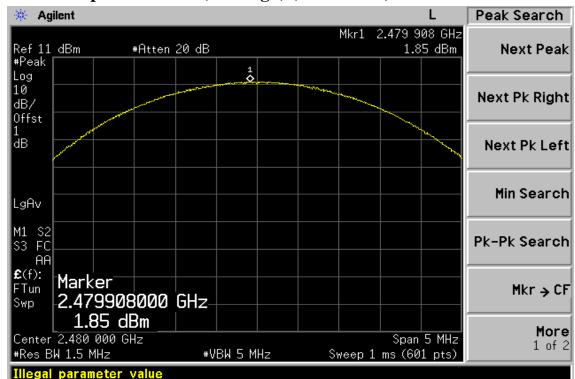


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Peak Power Output Data Plot (CH High) (EDR mode)

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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 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.

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7.5. Measurement Result:

BDR mode:

СН	Bandwidth
	(kHz)
Lower	925.610
Mid	926.044
Higher	926.089

EDR mode:

СН	Bandwidth	2/3 Bandwidth
	(MHz)	(MHz)
Lower	1.243	0.829
Mid	1.257	0.838
Higher	1.255	0.837

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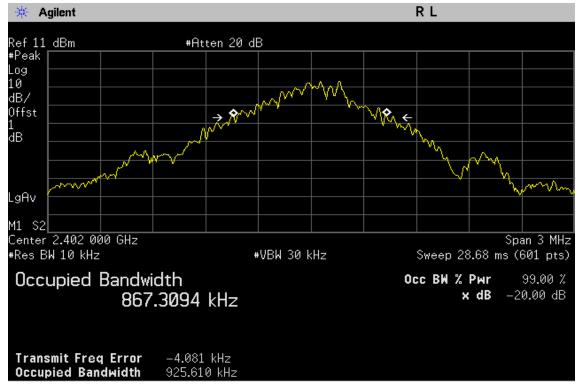
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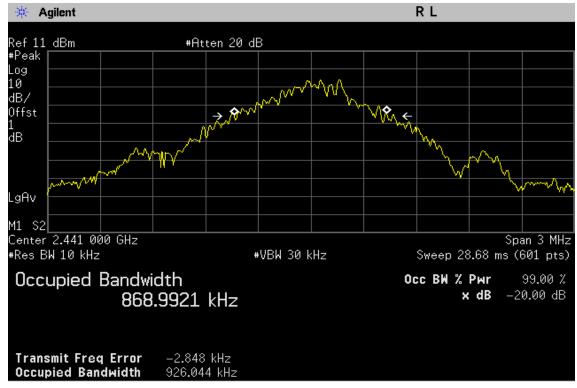


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20dB Band Width Test Data CH-Low (BDR mode)



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



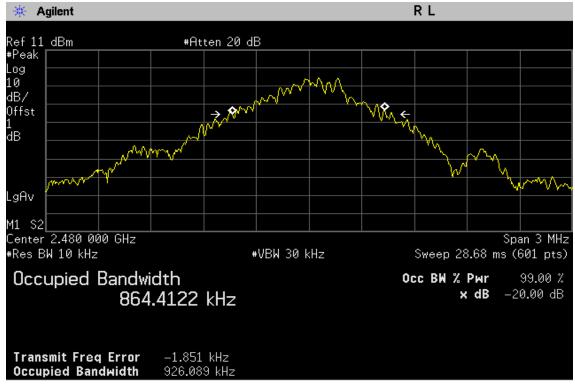
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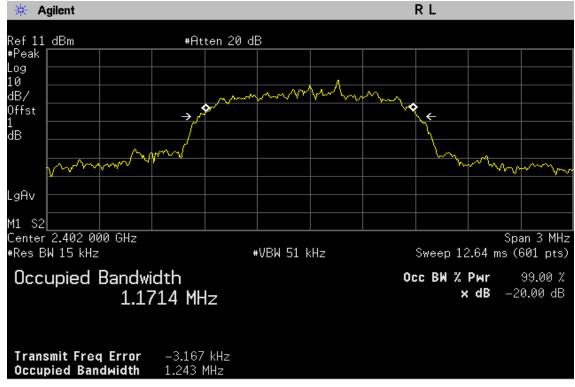
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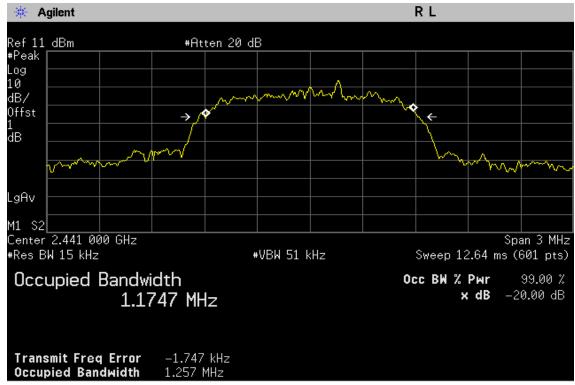


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20dB Band Width Test Data CH-Low (EDR mode)



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



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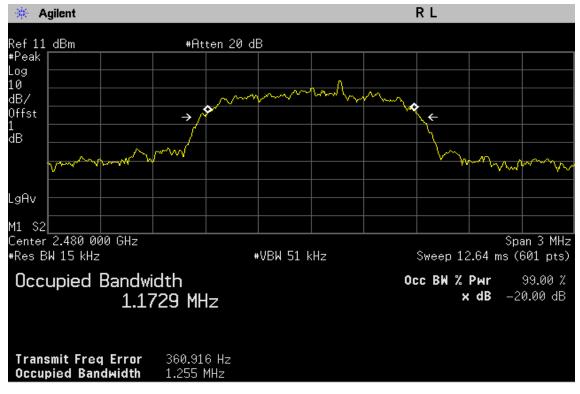
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20dB Band Width Test Data CH-High (EDR mode)



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100KHz BANDWIDTH OF BAND EDGES MEASUREMENT 8.

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.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2010	02/11/2011		
Loop antenna	MESSTEC	FLA30	03/10086	07/08/2009	07/07/2011		
Bilog Antenna	SCHWAZBECK	VULB9160	3136	09/15/2009	09/14/2010		
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2008	05/08/2010		
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2009	11/27/2010		
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2010	01/04/2011		
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	01/05/2010	01/04/2011		
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2010	01/04/2011		
3m Site	SGS	966 chamber	N/A	11/08/2009	11/07/2010		

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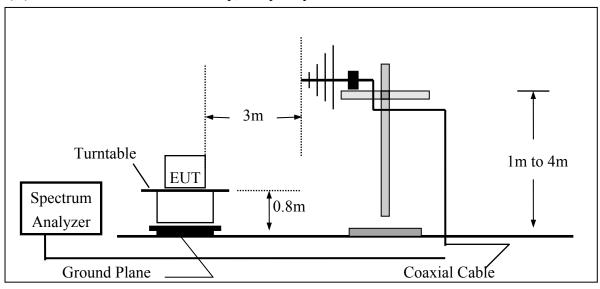
8.3. Test SET-UP:

8.3.1. Conducted Emission at antenna port:

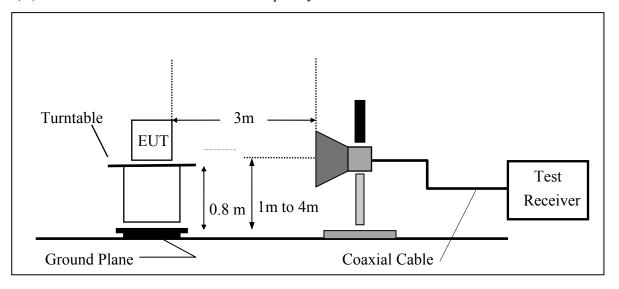
Refer to section 6.3 for details.

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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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.

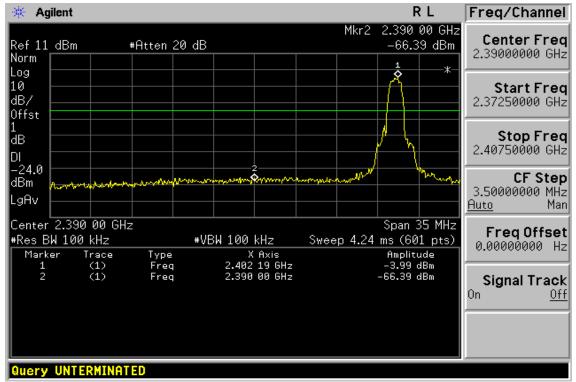
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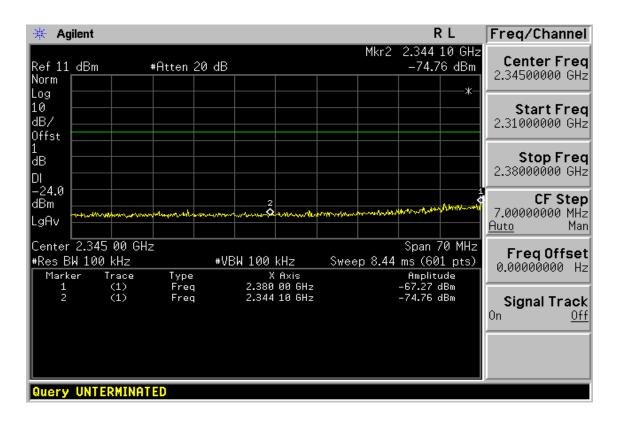
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Conducted Emission: Test Data CH-Low (EDR mode)





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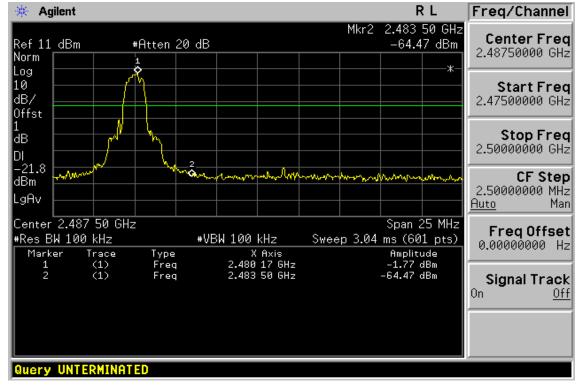
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Conducted Emission: Test Data CH-High



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FCC ID: NM8PB99200

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Radiated Emission: (EDR mode)

Operation Mode Fundamental Frequency Temperature Humidity	TX CH Low 2402 MHz 25 °C 65 %	Test Date Test By Pol	Mar. 05, 2010 Sky Ver.

	Peak	AV		Actual FS		Peak	AV		
Freq.	Reading	Reading	Ant/CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m) (dB)	
2390.00	52.68		-10.66	42.02		74.00	54.00	-11.98	Peak
Operation Mode TX CH Low				Te	est Date	Mar. 05, 2010			
Fundamental Frequency 2402 MHz		Test By		Sky					
Temperature 25				Pc	01	Hor.			
Humidity		65 %	0						
	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant/CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m) (dB)	
2390.00	53.35		-10.66	33.64		74.00	54.00	-20.36	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.
- (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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Radiated Emission: (EDR mode)

	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant/CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBu V/m) (dB)	
2483.56	55.68		-10.36	45.32		74.00	54.00	-8.68	Peak
Operation Mode TX CH High					est Date	Mar. 05, 2010			
Fundamental Frequency 2480 MI) MHz				est By	Sky		
Temperatu	ire	25				Ро	01	Hor.	
Humidity		65 %	Ó						
	Peak	AV		Actu	al FS	Peak	AV		
Freq.	Reading	Reading	Ant/CL	Peak	AV	Limit	Limit	Margin	Remark
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m	(dB)	
2483.56	60.66		-10.36	50.30		74.00	54.00	-3.70	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.

(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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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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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:

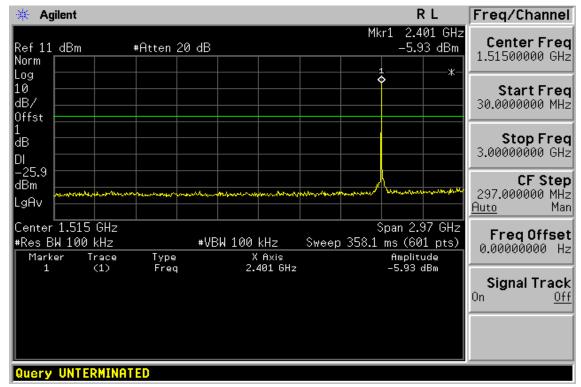
Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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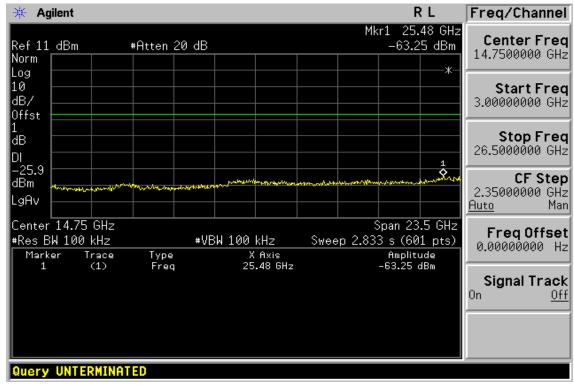


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Conducted Spurious Emission Measurement Result (EDR mode) Ch Low 30MHz – 3GHz



Ch Low 3GHz – 26.5GHz



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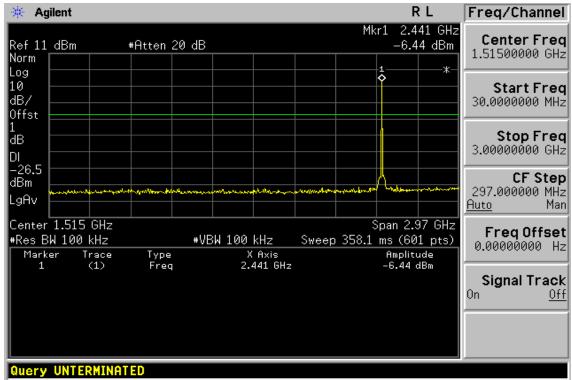
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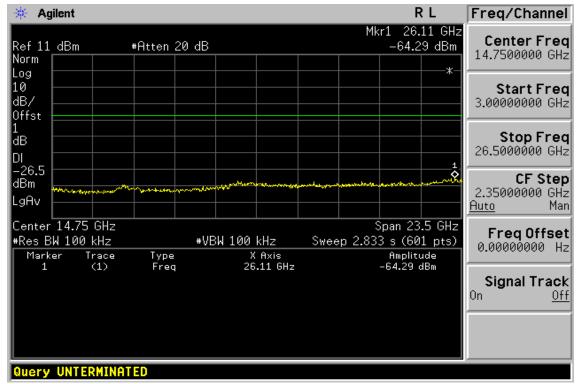


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Ch Mid 30MHz – 3GHz





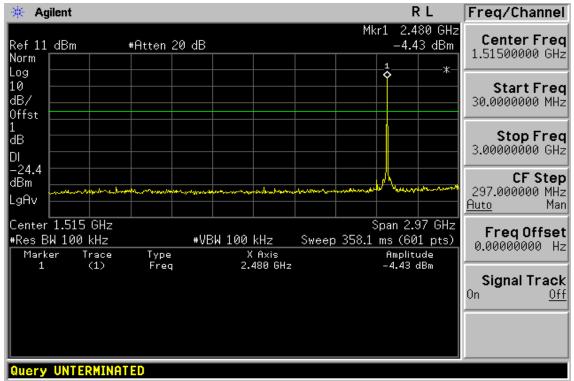


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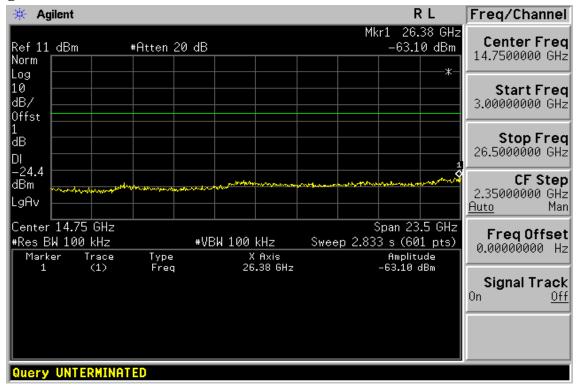


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Ch High 30MHz – 3GHz







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Radiated Spurious Emission Measurement Result (below 1GHz) (EDR mode)

Operation Mode	TX CH Low	Test Date	Mar. 05, 2010
Fundamental Frequency	2402MHz	Test By	Sky
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)
	58.13	V	Peak	56.32	-26.35	29.97	40.00	-10.03
	104.69	V	Peak	58.57	-29.76	28.81	43.50	-14.69
	227.88	V	Peak	48.52	-30.26	18.26	46.00	-27.74
	252.13	V	Peak	48.20	-20.79	27.41	46.00	-18.59
	347.19	V	Peak	45.83	-27.30	18.53	46.00	-27.47
	560.59	V	Peak	45.65	-23.54	22.11	46.00	-23.89
	33.88	Н	Peak	49.40	-25.72	23.68	40.00	-16.32
	104.69	Н	Peak	49.96	-29.76	30.74	43.50	-12.76
	276.38	Н	Peak	46.26	-29.14	17.12	46.00	-28.88
	371.44	Н	Peak	45.74	-26.67	19.07	46.00	-26.93
	512.09	Н	Peak	43.13	-24.47	31.28	46.00	-14.72
	620.73	Н	Peak	43.43	-22.29	21.14	46.00	-24.86

Remark :

- 1 Measuring frequencies from 30 MHz to the 1GHz.
- 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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Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	Mar. 05, 2010
Fundamental Frequency	2441MHz	Test By	Sky
Temperature	25 °C	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)
	58.13	V	Peak	56.06	-26.35	29.71	40.00	-10.29
	104.69	V	Peak	58.79	-29.76	29.03	43.50	-14.47
	252.13	V	Peak	49.21	-29.79	19.42	46.00	-26.58
	300.63	V	Peak	44.08	-28.46	31.13	46.00	-14.87
	324.88	V	Peak	46.51	-27.77	18.74	46.00	-27.26
	439.34	V	Peak	44.27	-25.15	31.32	46.00	-14.68
	34.85	Н	Peak	49.62	-25.72	23.90	40.00	-16.10
	104.69	Н	Peak	49.59	-29.76	19.83	43.50	-23.67
	276.38	Н	Peak	46.96	-29.14	17.82	46.00	-28.18
	324.88	Н	Peak	46.26	-27.77	18.49	46.00	-27.51
	465.53	Н	Peak	43.01	-24.95	18.06	46.00	-27.94
	615.88	Н	Peak	43.99	-22.40	21.59	46.00	-24.41

Remark :

- 1 Measuring frequencies from 30 MHz to the 1GHz.
- 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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Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	Mar. 05, 2010
Fundamental Frequency	2480MHz	Test By	Sky
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)
	58.13	V	Peak	55.52	-26.35	29.17	40.00	-10.83
	104.69	V	Peak	57.88	-29.76	28.12	43.50	-15.38
	252.13	V	Peak	49.50	-29.79	19.71	46.00	-26.29
	324.88	V	Peak	45.88	-27.77	18.11	46.00	-27.89
	484.93	V	Peak	43.68	-24.73	18.95	46.00	-27.05
	725.49	V	Peak	43.38	-20.83	22.55	46.00	-23.45
	104.69	Н	Peak	49.52	-29.76	19.76	43.50	-23.74
	252.13	Н	Peak	48.33	-29.79	18.54	46.00	-27.46
	276.38	Н	Peak	49.53	-29.14	20.39	46.00	-25.61
	300.63	Н	Peak	50.39	-28.46	21.93	46.00	-24.07
	565.44	Н	Peak	43.07	-23.46	19.61	46.00	-26.39
	761.38	Н	Peak	43.39	-20.37	23.02	46.00	-22.98

Remark :

- 1 Measuring frequencies from 30 MHz to the 1GHz.
- 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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Operation Mode	TX CH Low	Test Date	Mar. 05, 2010
Fundamental Frequency	2402 MHz	Test By	Sky
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV	
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4804.0	46.85		-5.92	40.93		74.00	54.00	-13.07
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.
- Spectrum AV Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms. (5)

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Operation Mode	TX CH Low	Test Date	Mar. 05, 2010
Fundamental Frequency	2402 MHz	Test By	Sky
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV	
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4804.0	44.36		-5.92	38.44		74.00	54.00	-15.56
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:

- Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency. (1)
- (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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Operation Mode	TX CH Mid	Test Date	Mar. 05, 2010
Fundamental Frequency	2441 MHz	Test By	Sky
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV	
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4882.0	47.86		-5.79	42.07		74.00	54.00	-11.93
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:

- Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency. (1)
- (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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Operation Mode	TX CH Mid	Test Date	Mar. 05, 2010
Fundamental Frequency	2441 MHz	Test By	Sky
Temperature	25	Pol	Hor.
Humidity	65 %		

Margin
(dB)
-12.69

Remark:

- Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency. (1)
- (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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Operation Mode	TX CH High	Test Date	Mar. 05, 2010
Fundamental Frequency	2480 MHz	Test By	Sky
Temperature	25	Pol	Ver.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV	
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin
 (MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4960.0	49.07		-5.68	43.39		74.00	54.00	-10.61
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:

- Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency. (1)
- (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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Operation Mode	TX CH High	Test Date	Mar. 05, 2010
Fundamental Frequency	2480 MHz	Test By	Sky
Temperature	25	Pol	Hor.
Humidity	65 %		

	Peak	AV		Actu	al FS	Peak	AV	
Freq.	Reading	Reading	Ant./CL	Peak	AV	Limit	Limit	Margin
(MHz)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
4960.0	49.84		-5.68	44.16		74.00	54.00	-9.84
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:

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

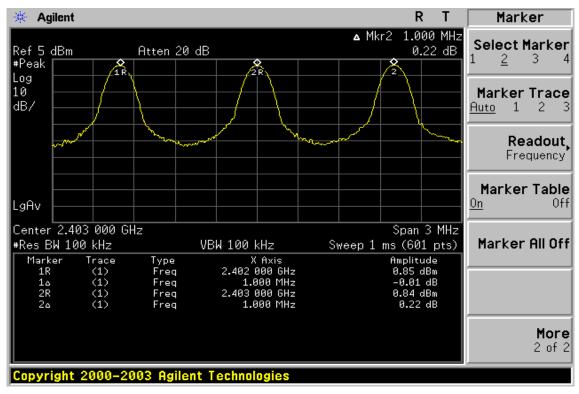
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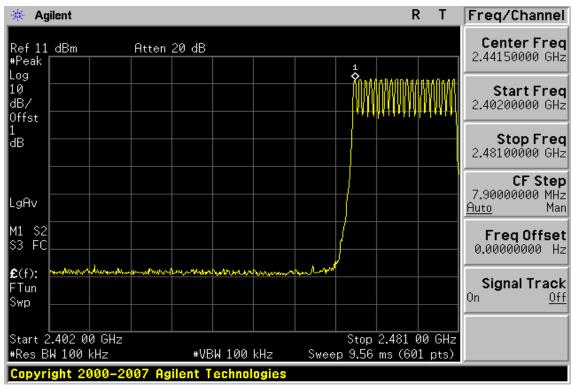


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Frequency Separation Test Data



AFH mode



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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=430KHz, VBW=1MHz.
- 5. Max hold, view and count how many channel in the band.

11.5. Measurement Result:

Note: Refer to next page for plots.

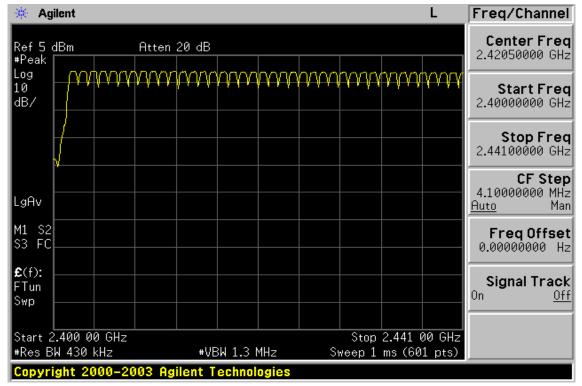
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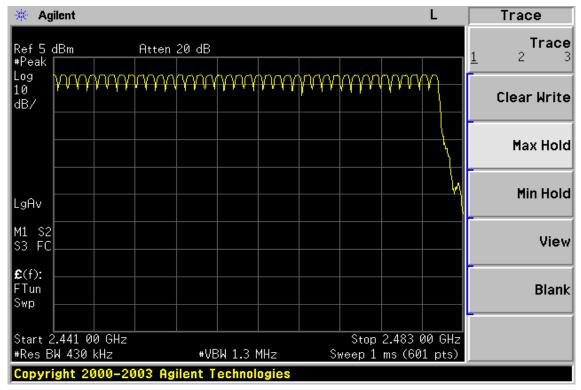
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Channel Number

2.4 GHz – 2.441GHz



2.441 GHz – 2.4835GHz



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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=100KHz, Span = 0Hz, Adjust Sweep = 30s.
- 5. Repeat above procedures until all frequency measured were complete.

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12.5. Measurement Result

A period time	= 0.4 (ms) * 79 = 31.6 (s)
CH Low:	DH1 time slot = $0.380 \text{ (ms)} * (1600/(1*79)) * 31.6 = 243.1 \text{ (ms)}$
	DH3 time slot = $1.640 \text{ (ms)} * (1600/(3*79)) * 31.6 = 349.9 \text{ (ms)}$
	DH5 time slot = 2.892 (ms) * (1600/(5*79)) * 31.6 = 370.18 (ms)
CH Mid:	DH1 time slot = $0.383 \text{ (ms)} * (1600/(1*79)) * 31.6 = 245.12 \text{ (ms)}$
	DH3 time slot = $1.640 \text{ (ms)} * (1600/(3*79)) * 31.6 = 349.87 \text{ (ms)}$
	DH5 time slot = 2.883 (ms) * (1600/(5*79)) * 31.6 = 369.02 (ms)
CH High:	DH1 time slot = $0.383 \text{ (ms)} * (1600/(1*79)) * 31.6 = 245.12 \text{ (ms)}$
	DH3 time slot = $1.640 \text{ (ms)} * (1600/(3*79)) * 31.6 = 349.87 \text{ (ms)}$
	DH5 time slot = 2.883 (ms) * (1600/(5*79)) * 31.6 = 369.02 (ms)

Note: Refer to next page for plots.

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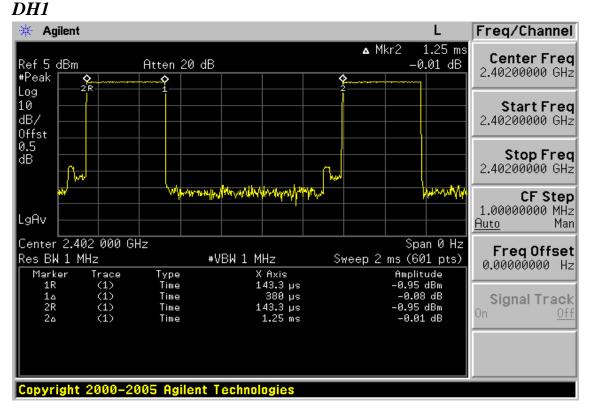
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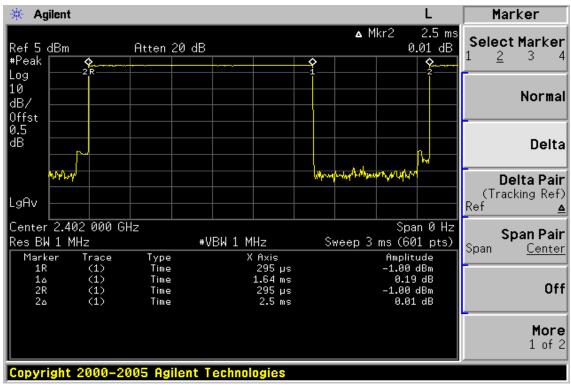


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CH-Low



DH3



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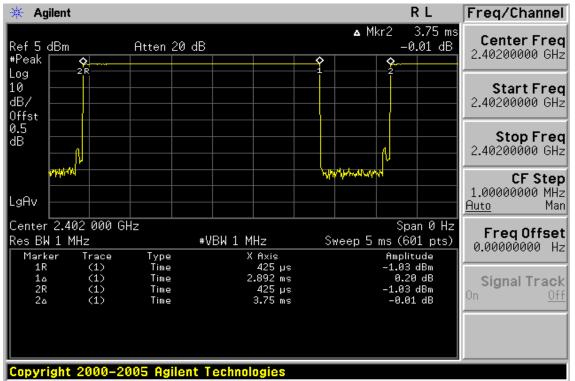
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DH5

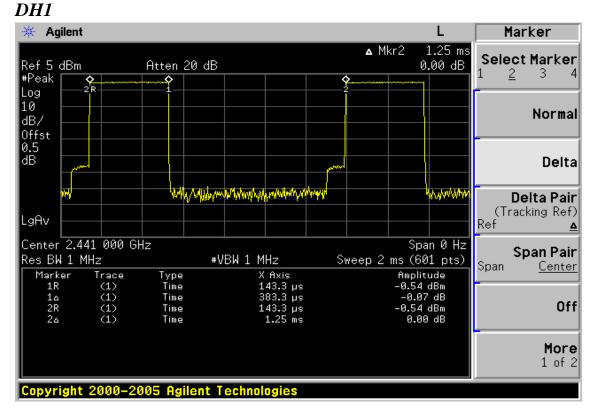


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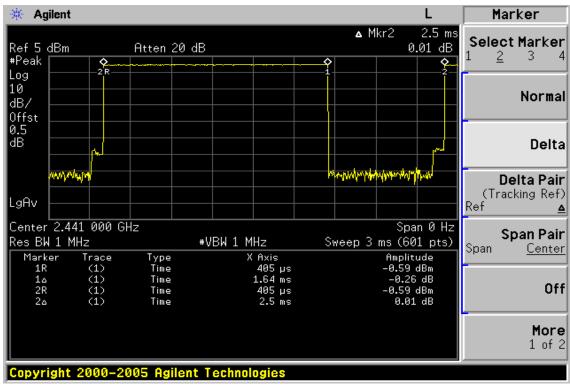


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CH-Mid



DH3



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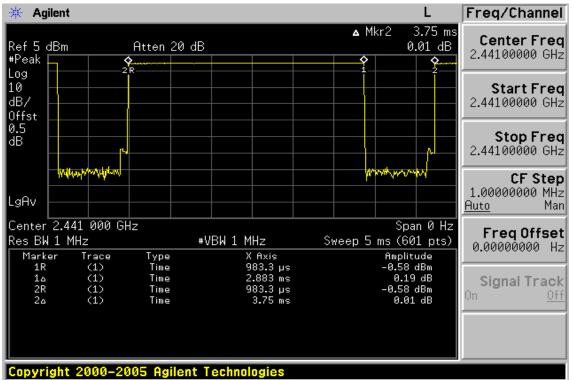
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DH5



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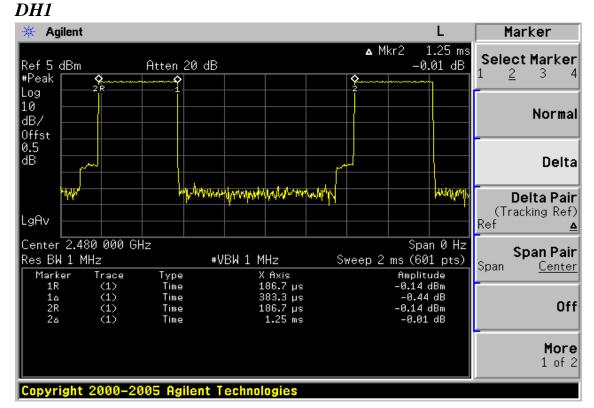
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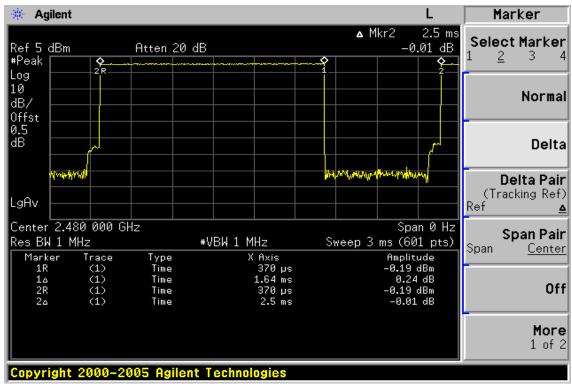


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CH-High



DH3



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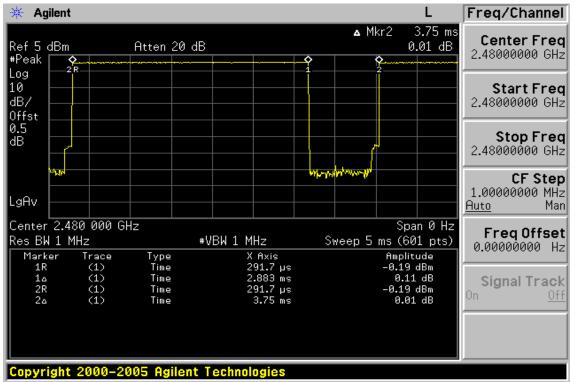
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DH5



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13. ANTENNA REQUIREMENT

13.1. 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.

13.2. Antenna Connected Construction

The directional gains of antenna used for transmitting is 1.1 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

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