

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** Wireless Entertainment Ergo Keyboard with Touchpad

**Brand Name:** Ortek

**Model Name:** WKB-1000, KW-920, WKB-14, PX-3070, AKB-1000, AKB-19, 13-WKB240, 1089, WKB-1000M, WKB-1000P, WKB-1000C

**Model Different:** Please See page 5

**FCC ID:** GM8WKB1000

**Report No.:** ER/2007/B0043

**Issue Date:** Dec. 18, 2007

**FCC Rule Part:** §15.249

**Prepared for** ORtek Technology Inc.  
13F, Number 150, Jian Yi Rd. Chung Ho  
City, Taipei Hsien, Taiwan, R.O.C

**Prepared by** SGS Taiwan Ltd.  
Electronics & Communication Laboratory  
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Zone, Taipei County, Taiwan.



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**VERIFICATION OF COMPLIANCE**

**Applicant:** ORtek Technology Inc.  
13F,Number 150,Jian Yi Rd. Chung Ho City, Taipei Hsien,  
Taiwan,R.O.C

**Product Name:** Wireless Entertainment Ergo Keyboard with Touchpad

**Brand Name:** Ortek

**FCC ID Number:** GM8WKB1000

**Model No.:** WKB-1000, KW-920, WKB-14, PX-3070, AKB-1000, AKB-19,  
13-WKB240, 1089, WKB-1000M, WKB-1000P,WKB-1000C

**Model Difference:** Please See page 5

**File Number:** ER/2007/B0043

**Date of test:** Nov. 12, 2007 ~ Dec. 14, 2007

**Date of EUT Received:** Nov. 11, 2007

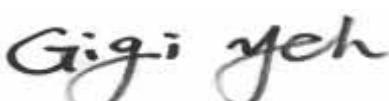
**We hereby certify that:**

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 15.249.

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

**Test By:****Date**

Dec. 18, 2007

*Jim Chang / Sr.Engineer***Prepared By:****Date**

Dec. 18, 2007

*Gigi Yeh / Clerk***Approved By:****Date**

Dec. 18, 2007

*Vincent Su / Manager*

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## Version

Version No.	Date
00	Dec. 18, 2007
01	Dec. 20, 2007

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## 1. GENERAL INFORMATION

### 1.1 Product Description

The ORtek Technology Inc., WKB-1000 (referred to as the EUT in this report) is a Response Receiver.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2403~2480MHz, 8 channels (2.403 GHz, 2.405 GHz, 2.425 GHz, 2.445 GHz, 2.468 GHz, 2.476 GHz, 2.478 GHz, 2.480 GHz)
- B). Modulation Type: DSSS (GFSK)
- C). Power Supply: 1.5Vdc from AAA Battery\*2
- D): Model Different:
  - 1. KW-920, WKB-14, PX-3070, AKB-1000, AKB-19,13-WKB240,1089: Different model name depend on different traders.
  - 2. WKB-1000M: M: For different exterior looks
  - 3. WKB-1000C: Non-TOUCHPAD
  - 4. WKB-1000P: For PS3

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

This submittal(s) (test report) is intended for FCC ID: **GM8WKB1000** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

### 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.

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## 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, 3m Semi-Anechoic chamber FCC Registration Number: 23194 and Canada Registration Number: 4620A-1.

## 1.5 Special Accessories

Not available for this EUT intended for grant.

## 1.6 Equipment Modifications

Not available for this EUT intended for grant.

## 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 Transmitter was operated in the engineering operating mode. the Tx frequency was fixed which 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.

## 2.4 Limitation

### (1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

### (2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
2400 – 2483.5	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
5725 – 5875	50 mV/m (94dBuV/m)	500 uV/m (54dBuV/m)	3
24.0 – 24.25 GHz	250 mV/m (107.95dBuV/m)	2500 uV/m (67.95dBuV/m)	3

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### (3) Radiated Emission 15.249 (d)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

### (4) Radiated Emission 15.249(e)

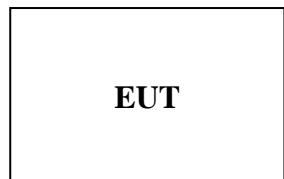
For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.

## 2.5 Configuration of Tested System

**Fig. 2-1 Configuration of TX**



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

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

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

**Grounding:** Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

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### 3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.249(a)(e)	Radiated Emission	Compliant
§15.249(d)	26dB band width Measurement	Compliant

#### Description of test modes

Frequency 2403MHz, 2445MHz and 2480MHz are chosen for full testing.

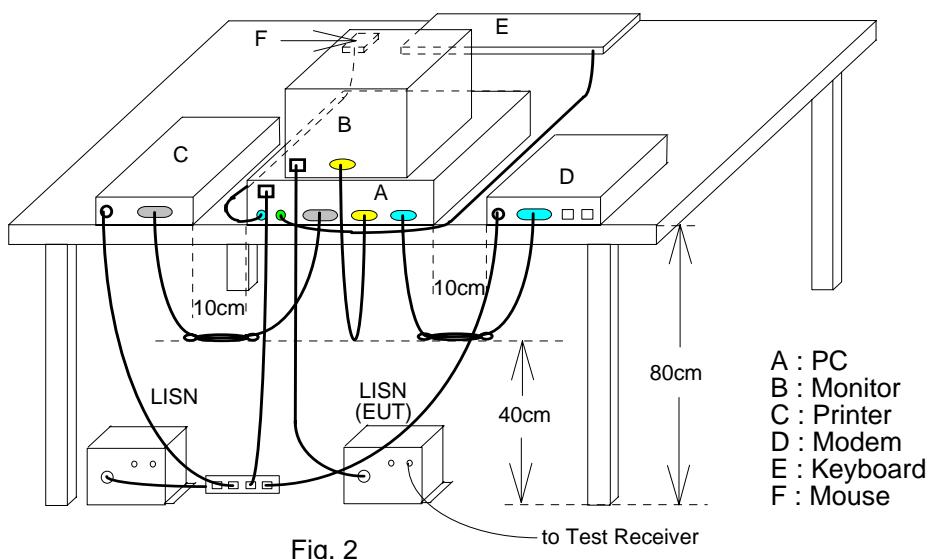
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## 4. Conducted Emissions Test

### 4.1 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.

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



### 4.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	09/02/2007	09/03/2008
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2007	06/10/2008
Transient Limiter	HP	11947A	3107A02062	09/02/2007	09/03/2008
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2006	12/30/2007
LISN	Rolf-Heine	NNB-2/16Z	99013	12/24/2006	12/23/2007
Coaxial Cables	N/A	No. 3, 4	N/A	12/01/2007	12/01/2208

### 4.4 Measurement Result:

N/A

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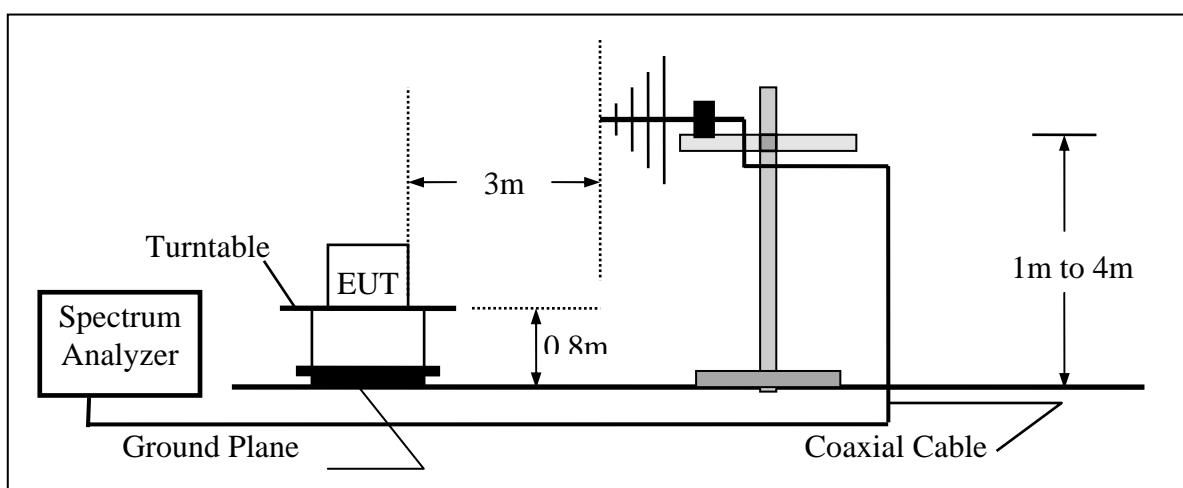
## 5. Radiated Emission Test

### 5.1 Measurement Procedure

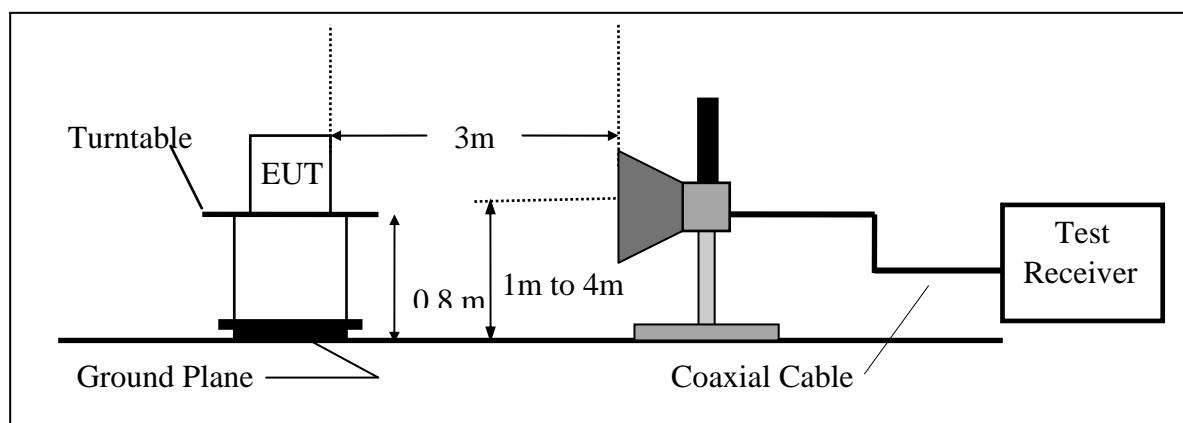
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

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

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



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



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### 5.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY43360126	03/29/2007	03/28/2008
Spectrum Analyzer	Agilent	E7405A	US41160416	08/27/2007	08/26/2008
Bilog Antenna	SCHWAZBECK	VULB9163	152	06/03/2007	06/02/2008
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	08/16/2006	08/15/2008
Horn antenna	Schwarzbeck	BBHA 9170	184/185	07/04/2006	07/03/2008
Pre-Amplifier	HP	8447D	2944A09469	07/19/2006	07/18/2008
Pre-Amplifier	HP	8449B	3008A00578	02/26/2007	02/25/2008
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	10/08/2008
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2006	10/08/2008
Site NSA	SGS	966 chamber	N/A	11/17/2006	11/16/2008

### 5.4 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		

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## 5.5 Measurement Result

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

Operation Mode	TX Low	Test Date	Dec. 10, 2007
Fundamental Frequency	2403MHz	Test By	Jim
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
61.04	V	Peak	40.47	-14.75	25.72	40.00	-14.28
77.53	V	Peak	42.54	-17.46	25.08	40.00	-14.92
96.93	V	Peak	45.85	-17.16	28.69	43.50	-14.81
126.03	V	Peak	34.55	-14.78	19.77	43.50	-23.73
143.49	V	Peak	34.31	-13.42	20.89	43.50	-22.61
218.18	V	Peak	32.86	-14.99	17.87	46.00	-28.13
58.13	H	Peak	41.18	-14.66	26.52	40.00	-13.48
75.59	H	Peak	43.25	-17.13	26.12	40.00	-13.88
96.93	H	Peak	47.27	-17.16	30.11	43.50	-13.39
126.03	H	Peak	35.51	-14.78	20.73	43.50	-22.77
589.69	H	Peak	32.85	-6.36	26.49	46.00	-19.51
872.93	H	Peak	33.02	-1.56	31.46	46.00	-14.54

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) 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, VBW=300KHz.

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**Radiated Spurious Emission Measurement Result (below 1GHz)**

Operation Mode	TX Mid	Test Date	Dec. 12, 2007
Fundamental Frequency	2445MHz	Test By	Jim
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
58.13	V	Peak	41.97	-14.66	27.31	40.00	-12.69
96.93	V	Peak	46.21	-17.13	29.08	43.50	-14.42
126.03	V	Peak	35.24	-17.16	18.08	43.50	-25.42
150.28	V	Peak	32.24	-14.78	17.46	43.50	-26.04
523.73	V	Peak	32.35	-12.83	19.52	46.00	-26.48
926.28	V	Peak	32.07	-12.59	19.48	46.00	-26.52
58.13	H	Peak	40.58	-13.78	26.80	40.00	-13.20
75.59	H	Peak	42.36	-17.13	25.23	40.00	-14.77
96.93	H	Peak	46.89	-17.16	29.73	43.50	-13.77
126.03	H	Peak	37.57	-12.83	24.74	43.50	-18.76
150.28	H	Peak	34.85	-9.46	25.39	43.50	-18.11
318.09	H	Peak	31.86	-4.97	26.89	46.00	-19.11

**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) 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, VBW=300KHz.

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**Radiated Spurious Emission Measurement Result (below 1GHz)**

Operation Mode	TX High	Test Date	Jun. 12, 2007
Fundamental Frequency	2480MHz	Test By	Danny
Temperature	25	Pol	Ver./Hor
Humidity	65 %		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
58.13	V	Peak	42.86	-14.66	28.20	40.00	-11.80
77.53	V	Peak	45.85	-17.13	28.72	40.00	-11.28
96.93	V	Peak	49.36	-17.16	32.20	43.50	-11.30
140.58	V	Peak	36.03	-13.00	23.03	43.50	-20.47
219.15	V	Peak	34.14	-13.26	20.88	46.00	-25.12
475.23	V	Peak	32.86	-4.96	27.90	46.00	-18.10
43.58	H	Peak	41.88	-14.66	27.22	40.00	-12.78
75.59	H	Peak	43.13	-17.13	26.00	40.00	-14.00
96.93	H	Peak	45.93	-17.16	28.77	43.50	-14.73
150.28	H	Peak	33.45	-14.78	18.67	43.50	-24.83
417.03	H	Peak	31.98	-13.26	18.72	46.00	-27.28
701.24	H	Peak	32.98	-9.82	23.16	46.00	-22.84

**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) 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, VBW=300KHz.

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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode: TX Low  
Fundamental Frequency: 2403MHz  
Temperature : 25  
Humidity : 65 %

Test Date : Dec. 12, 2007  
Test By: Jim  
Pol: Vertical

Freq. (MHz)	Ant. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual		Peak Limit (dBuV/m)	AV Limit (dB)
					Peak FS (dBuV/m)	AV FS (dBuV/m)		
2403.0	V	81.56	--	-1.39	80.17	--	114.00	94.00
2390.0	V	35.01	--	-1.39	33.62	--	74.00	54.00
4806.0	V	38.92	--	5.99	44.91	--	74.00	54.00
7209.0	V	37.63	--	12.89	50.52	--	74.00	54.00
9612.0	V	--	--			--	74.00	54.00
12015.0	V	--	--			--	74.00	54.00
14418.0	V	--	--			--	74.00	54.00
16821.0	V	--	--			--	74.00	54.00
19224.0	V	--	--			--	74.00	54.00
21627.0	V	--	--			--	74.00	54.00
24030.0	V	--	--			--	74.00	54.00

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode: TX Low Test Date : Dec. 12, 2007  
Fundamental Frequency: 2403MHz Test By: Jim  
Temperature : 25 Pol: Horizontal  
Humidity : 65 %

Freq. (MHz)	Ant. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
							at 3m (dBuV/m)	AV Limit (dBuV/m)		
2403.0	H	83.99	--	-1.39	82.60	--	114.00	94.00	-11.40	F
2390.0	H	41.81	--	-1.39	40.42	--	74.00	54.00	-13.58	
1188.5	H	45.36	--	-7.33	38.03	--	74.00	54.00	-15.97	S
2748.5	H	43.97	--	-0.99	42.98	--	74.00	54.00	-11.02	S
4806.0	H	36.64	--	5.99	42.63	--	74.00	54.00	-11.37	H
7209.0	H	--	--		--	--	74.00	54.00		H
9612.0	H	--	--		--	--	74.00	54.00		H
12015.0	H	--	--		--	--	74.00	54.00		H
14418.0	H	--	--		--	--	74.00	54.00		H
16821.0	H	--	--		--	--	74.00	54.00		H
19224.0	H	--	--		--	--	74.00	54.00		H
21627.0	H	--	--		--	--	74.00	54.00		H
24030.0	H	--	--		--	--	74.00	54.00		H

**Remark:**

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode: TX Mid  
Fundamental Frequency: 2445MHz  
Temperature : 25  
Humidity : 65 %

Test Date : Dec. 12, 2007  
Test By: Jim  
Pol: Vertical

Freq. (MHz)	Ant. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual	Actual	Peak Limit	AV Limit	Margin (dB)	
					Peak FS (dBuV/m)	AV FS (dBuV/m)	at 3m (dBuV/m)	at 3m (dBuV/m)		
2445.0	V	83.60	--	-1.12	82.48	--	114.00	94.00	-11.52	F
1741.0	V	44.24	--	-4.71	39.53	--	74.00	54.00	-14.47	S
4890.0	V	38.31	--	6.17	44.48	--	74.00	54.00	-9.52	H
7335.0	V	36.90	--	9.93	46.83	--	74.00	54.00	-7.17	H
9780.0	V	--	--			--	74.00	54.00		H
12225.0	V	--	--			--	74.00	54.00		H
14670.0	V	--	--			--	74.00	54.00		H
17115.0	V	--	--			--	74.00	54.00		H
19560.0	V	--	--			--	74.00	54.00		H
22005.0	V	--	--			--	74.00	54.00		H
24450.0	V	--	--			--	74.00	54.00		H

**Remark:**

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode: TX Mid  
Fundamental Frequency: 2445MHz  
Temperature : 25  
Humidity : 65 %

Test Date : Dec. 12, 2007  
Test By: Jim  
Pol: Horizontal

Freq. (MHz)	Ant. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit		AV Limit (dB)	Margin
							at 3m (dBuV/m)	at 3m (dBuV/m)		
2445.0	H	84.92	--	-1.12	83.80	--	114.00	94.00	-10.20	F
1221.0	H	45.63	--	-7.17	38.46	--	74.00	54.00	-15.54	S
1741.0	H	42.99	--	-4.71	38.28	--	74.00	54.00	-15.72	S
4890.0	H	40.20	--	6.17	46.37	--	74.00	54.00	-7.63	H
7335.0	H	37.67	--	9.93	47.60	--	74.00	54.00	-6.40	H
9780.0	H	--	--		--	--	74.00	54.00		H
12225.0	H	--	--		--	--	74.00	54.00		H
14670.0	H	--	--		--	--	74.00	54.00		H
17115.0	H	--	--		--	--	74.00	54.00		H
19560.0	H	--	--		--	--	74.00	54.00		H
22005.0	H	--	--		--	--	74.00	54.00		H
24450.0	H	--	--		--	--	74.00	54.00		H

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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**Radiated Spurious Emission Measurement Result (above 1GHz)**

Operation Mode: TX High  
Fundamental Frequency: 2480MHz  
Temperature : 25  
Humidity : 65 %

Test Date : Dec. 12, 2007  
Test By: Jim  
Pol: Vertical

Freq. (MHz)	Ant. H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Factor (dB)	Actual		Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)
					Peak FS (dBuV/m)	AV FS (dBuV/m)			
2480.0	V	80.24	--	-0.92	79.32	--	114.00	94.00	-14.68
2483.6	V	38.71	--	-0.92	37.79	--	114.00	94.00	-56.21
2483.5	V	42.5	--	0	42.50	--	74.00	54.00	-11.50
4960.0	V	38.15	--	6.36	44.51	--	74.00	54.00	-9.49
7440.0	V	--	--			--	74.00	54.00	H
9920.0	V	--	--			--	74.00	54.00	H
12400.0	V	--	--			--	74.00	54.00	H
14880.0	V	--	--			--	74.00	54.00	H
17360.0	V	--	--			--	74.00	54.00	H
19840.0	V	--	--			--	74.00	54.00	H
22320.0	V	--	--			--	74.00	54.00	H
24800.0	V	--	--			--	74.00	54.00	H

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

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

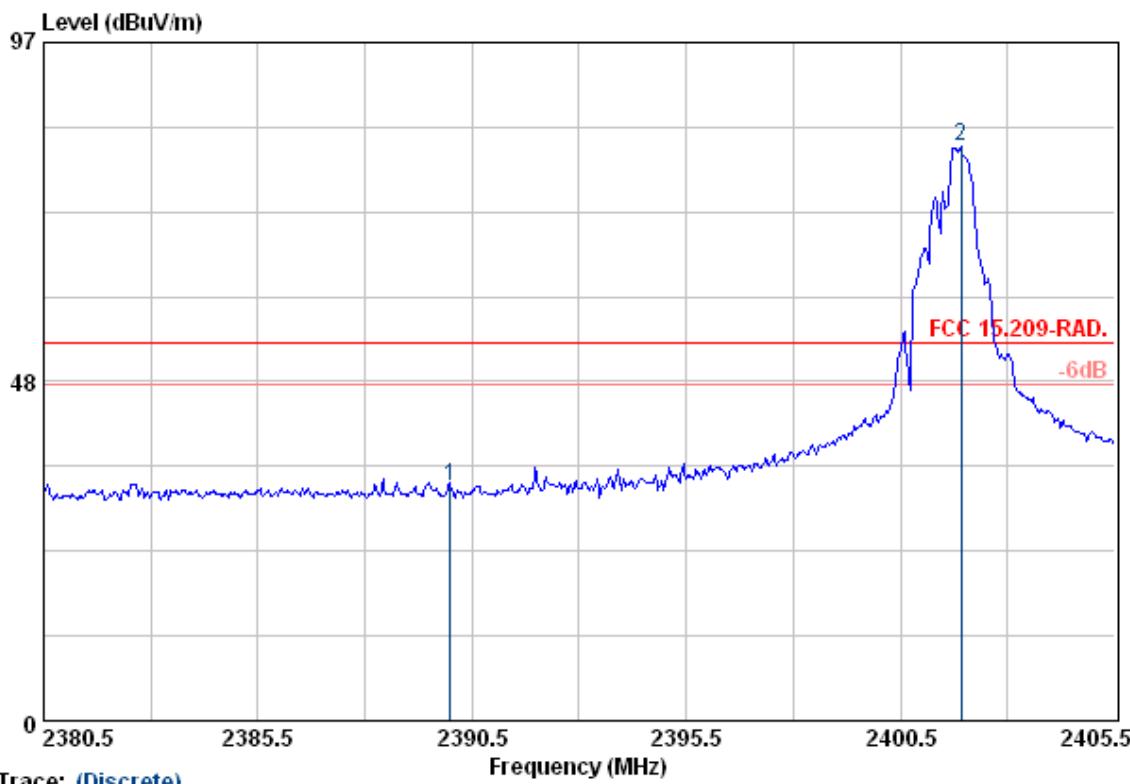
Operation Mode: TX High Test Date : Dec. 12, 2007  
Fundamental Frequency: 2480MHz Test By: Jim  
Temperature : 25 Pol: Horizontal  
Humidity : 65 %

Freq. (MHz)	Ant. H/V	Peak	AV	Factor (dB)	Actual Peak FS (dBuV/m)	Actual AV FS (dBuV/m)	Peak Limit at 3m (dBuV/m)	AV Limit at 3m (dBuV/m)	Margin (dB)	
		Reading (dBuV)	Reading (dBuV)							
2480.0	H	84.30	--	-0.92	83.38	--	114.00	94.00	-10.62	F
2483.6	H	46.25	--	-0.92	45.33	--	114.00	94.00	-48.67	
1240.5	H	47.58	--	-7.08	40.50	--	74.00	54.00	-13.50	S
2833.0	H	47.12	--	0.00	47.12	--	74.00	54.00	-6.88	S
4960.0	H	39.15	--	6.36	45.51	--	74.00	54.00	-8.49	H
7440.0	H	--	--			--	74.00	54.00		H
9920.0	H	--	--			--	74.00	54.00		H
12400.0	H	--	--			--	74.00	54.00		H
14880.0	H	--	--			--	74.00	54.00		H
17360.0	H	--	--			--	74.00	54.00		H
19840.0	H	--	--			--	74.00	54.00		H
22320.0	H	--	--			--	74.00	54.00		H
24800.0	H	--	--			--	74.00	54.00		H

Remark :

- (1) Measuring frequencies from 30MHz to the 10th of fundamental frequency .
- (2) Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB
- (3) "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- (4) 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.
- (5) Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- (6) Spectrum AV mode IF B bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

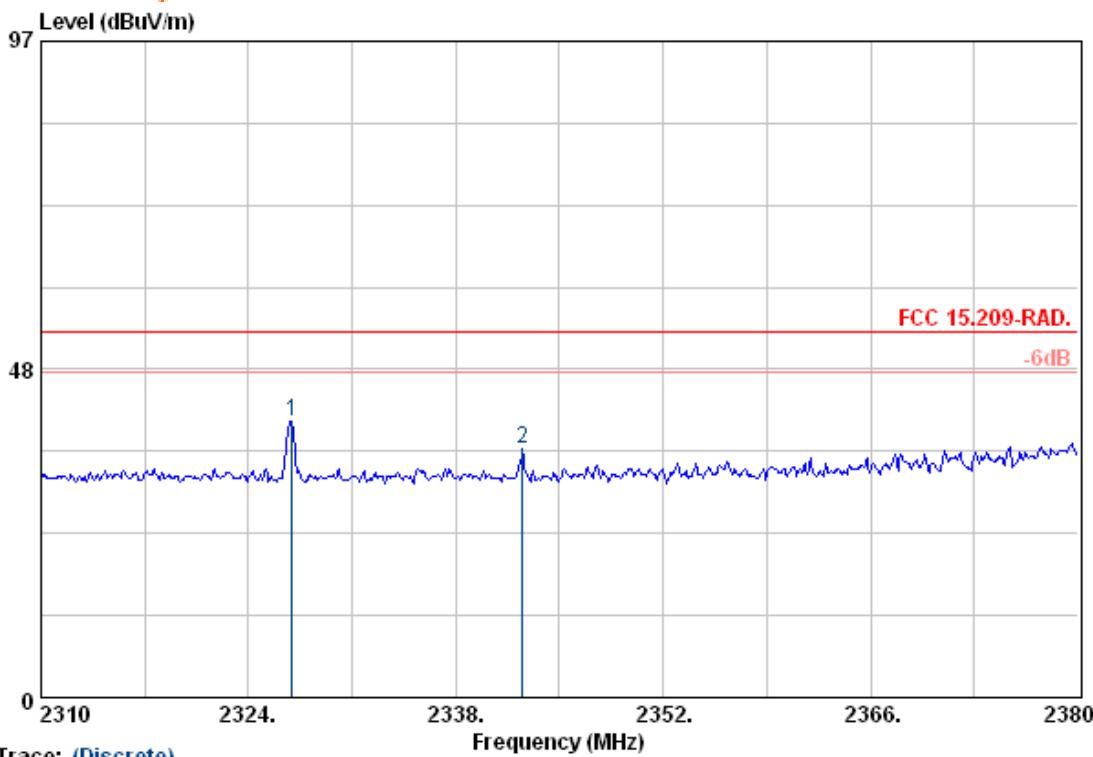
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**Band Edge : Test Data CH-Low**

Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D VERTICAL 149cm 0deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge LOW  
Temp./Humid. : 25/65  
Operator : Duka

	Read	Antenna	Preamp	Cable	Limit	Over	Over		
	Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remar
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB
1	2390.00	35.01	27.23	33.83	5.21	-1.39	33.62	54.00	-20.38
2	2401.93	83.36	27.23	33.83	5.24	-1.36	82.00	54.00	28.00

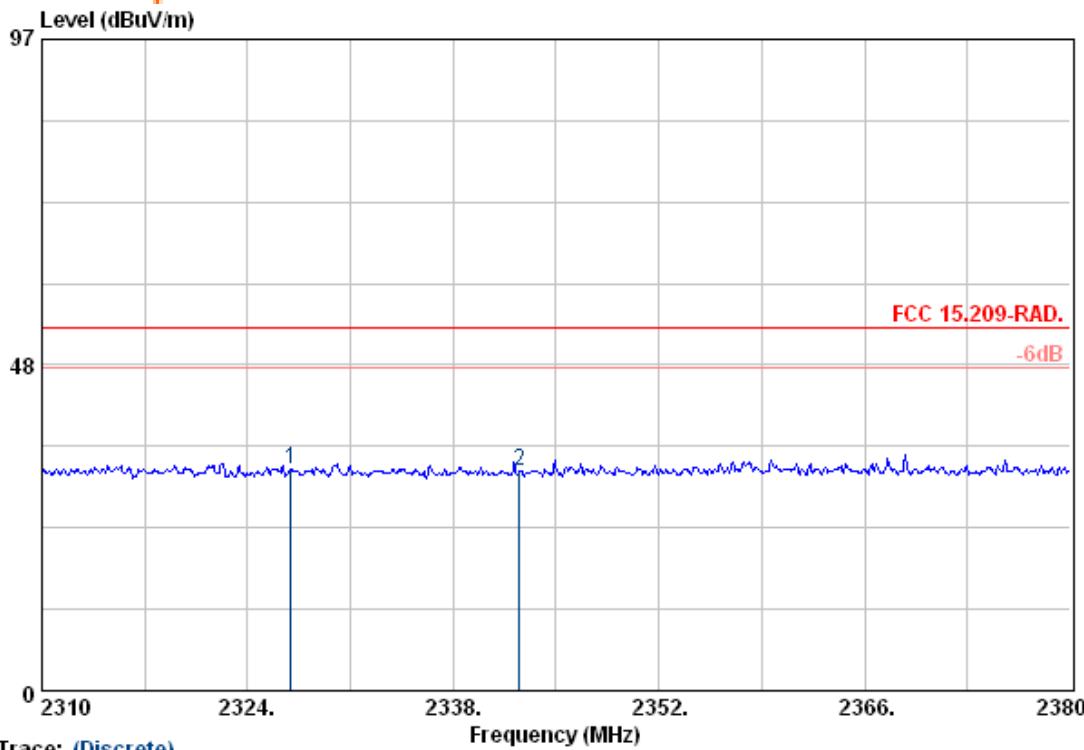
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Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D HORIZONTAL 149cm 360deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge LOW  
Temp./Humid. : 25/65  
Operator : Duka

Freq	Read	Antenna	Preamp	Cable	Limit	Over	Limit	Remar
	Level	Factor	Factor	Loss				
MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB
1	2326.94	42.59	27.00	33.88	5.15	-1.73	40.86	54.00 -13.14 Peak
2	2342.48	38.37	27.06	33.86	5.18	-1.62	36.75	54.00 -17.25 Peak

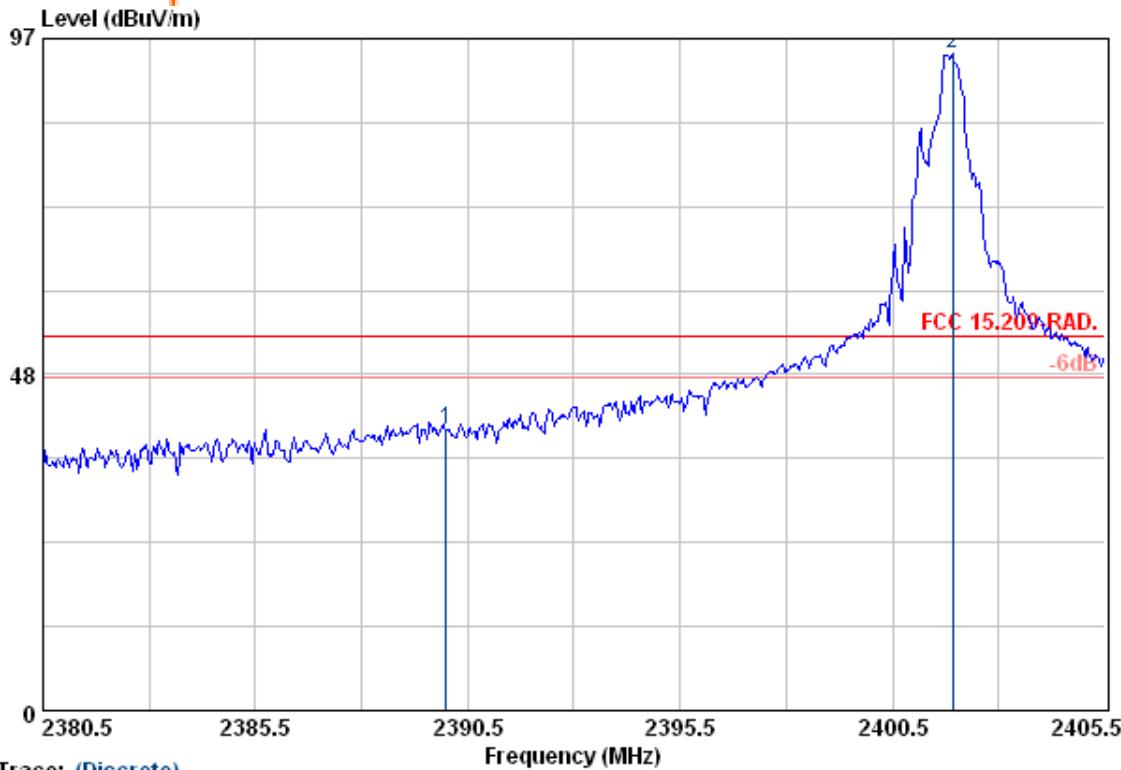
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Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D VERTICAL 149cm 0deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge LOW  
Temp./Humid. : 25/65  
Operator : Duka

	Freq	Read	Antenna	Preamp	Cable		Limit	Over	Limit	Remar
		Level	Factor	Factor	Loss	Factor				
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2326.94	34.76	27.00	33.88	5.15	-1.73	33.03	54.00	-20.97	Peak
2	2342.48	34.19	27.06	33.86	5.18	-1.62	32.57	54.00	-21.43	Peak

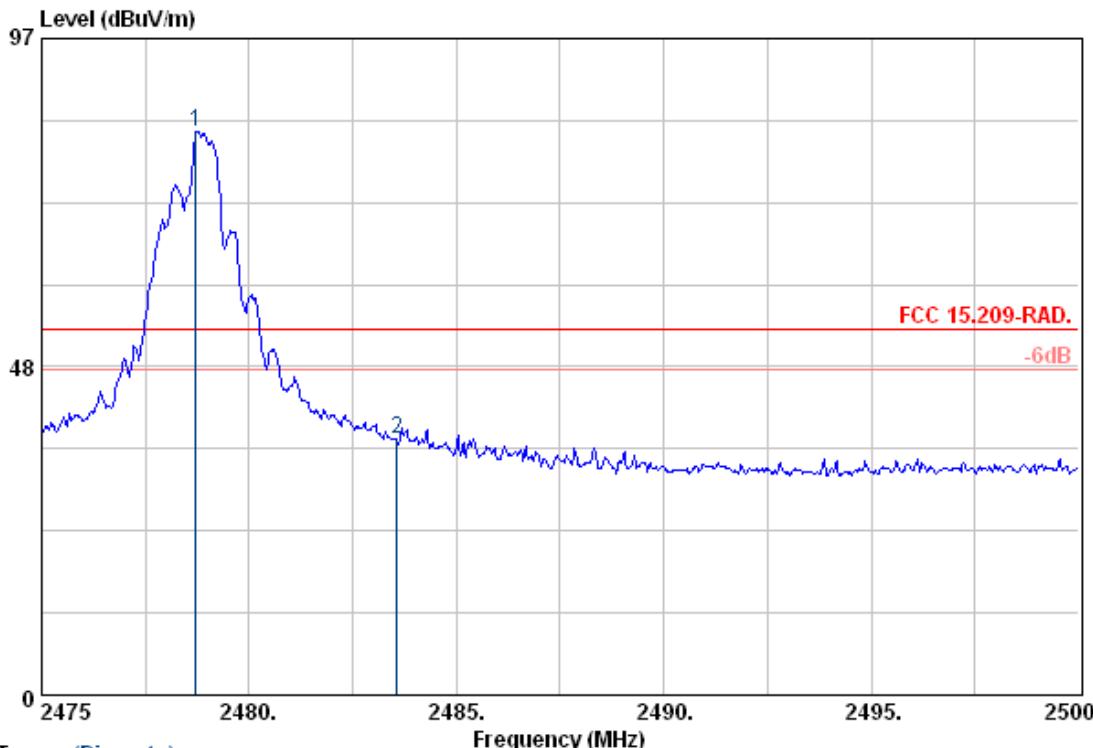
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Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D HORIZONTAL 149cm 360deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge LOW  
Temp./Humid. : 25/65  
Operator : Duka

	Read	Antenna	Preamp	Cable	Limit	Over				
	Freq	Level	Factor	Factor	Loss	Factor	Line	Limit	Remar	
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1	2390.00	41.81	27.23	33.83	5.21	-1.39	40.42	54.00	-13.58	
2	X	2401.93	96.17	27.23	33.83	5.24	-1.36	94.81	54.00	40.81

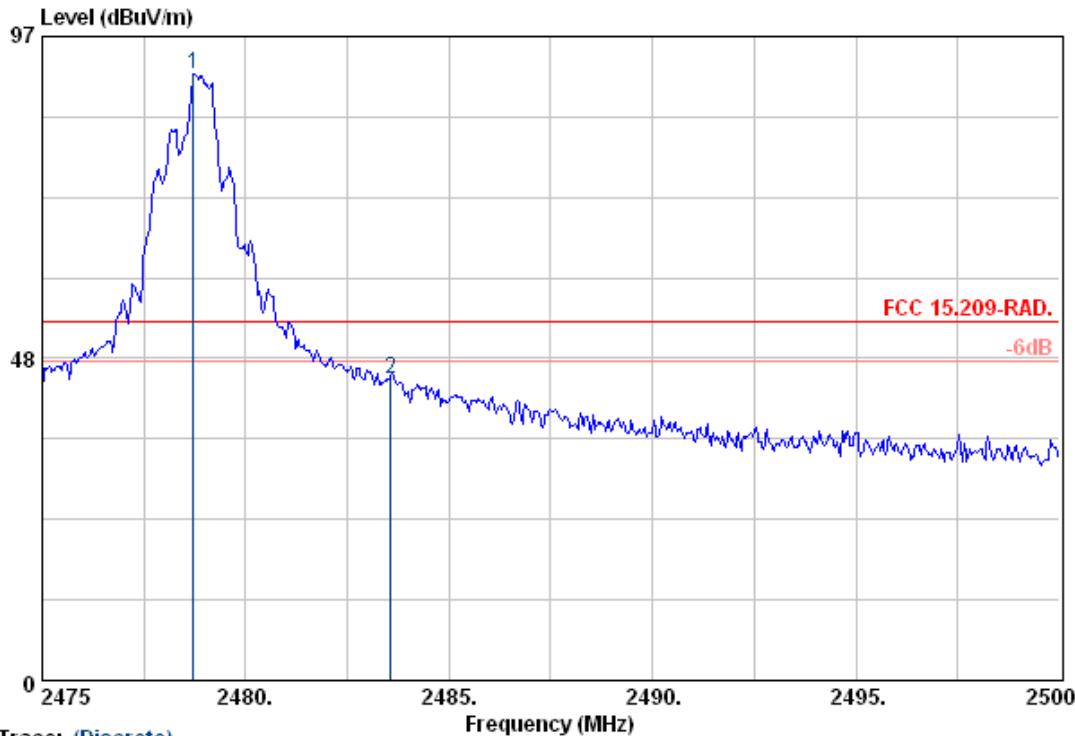
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**Band Edge: Test Data CH-High**

Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D VERTICAL 149cm 0deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge HIGH  
Temp./Humid. : 25/65  
Operator : Duka

	Freq	Read	Antenna	Preamp	Cable	Limit	Over	Over	Remar
	MHz	dBuV	Level	Factor	Factor	Loss	Factor	Line	Limit
1 X	2478.73	84.14	27.52	33.78	5.34	-0.92	83.22	54.00	29.22 Peak
2	2483.56	38.71	27.52	33.78	5.34	-0.92	37.79	54.00	-16.21 Peak

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Site : RF Site  
Condition : FCC 15.209-RAD. 3m BBHA9120D HORIZONTAL 149cm 360deg  
Project No. :  
Applicant :  
EUT Description :  
EUT Model :  
Test Mode : TX Band Edge HIGH  
Temp./Humid. : 25/65  
Operator : Duka

	Freq MHz	Read	Antenna	Preamp	Cable	Limit Line	Over Limit	Remar
		Level dBuV	Factor dB/m	Factor dB	Loss Factor dB			
1 X	2478.73	92.25	27.52	33.78	5.34	-0.92	91.33	54.00
2	2483.56	46.25	27.52	33.78	5.34	-0.92	45.33	54.00

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## 6. 26 dB Band Width Measurement

### 6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW = 100KHz, Span =2MHz.
4. Set SPA Max hold. Mark peak, -26dB.

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

Same as 4.2 Radiated Emission Measurement.

### 6.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

### 6.4 Measurement Results:

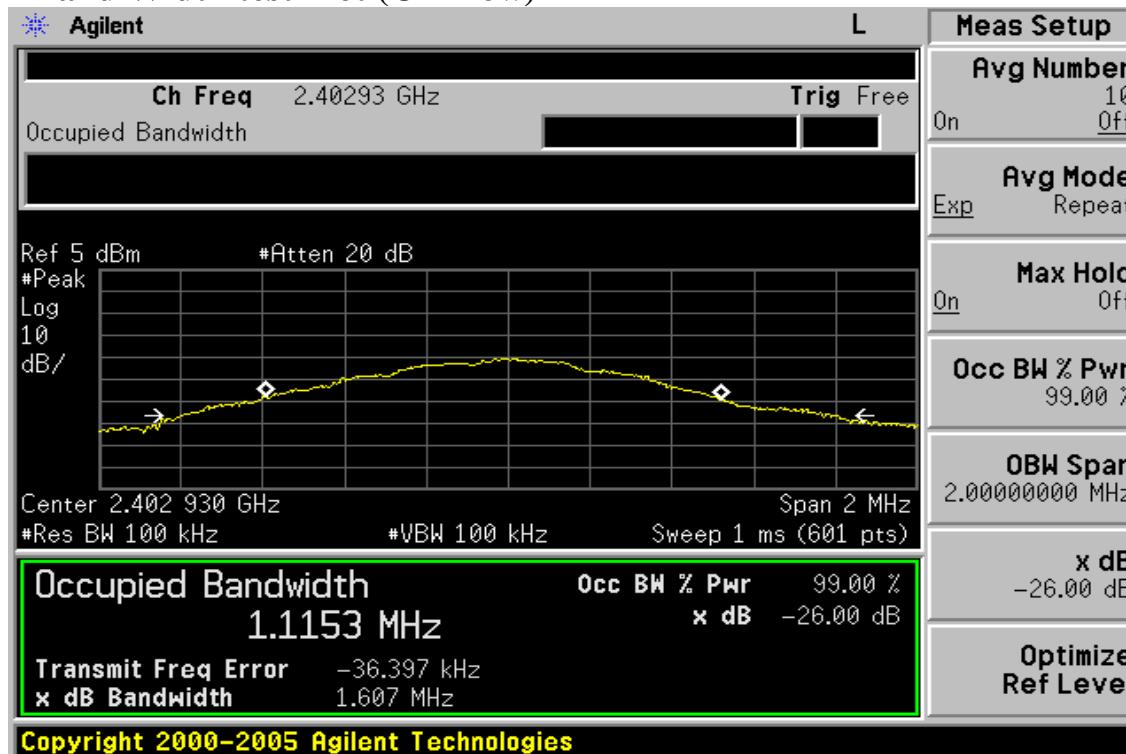
Channel Lowest = 1.607MHz

Channel Mid = 1.567MHz

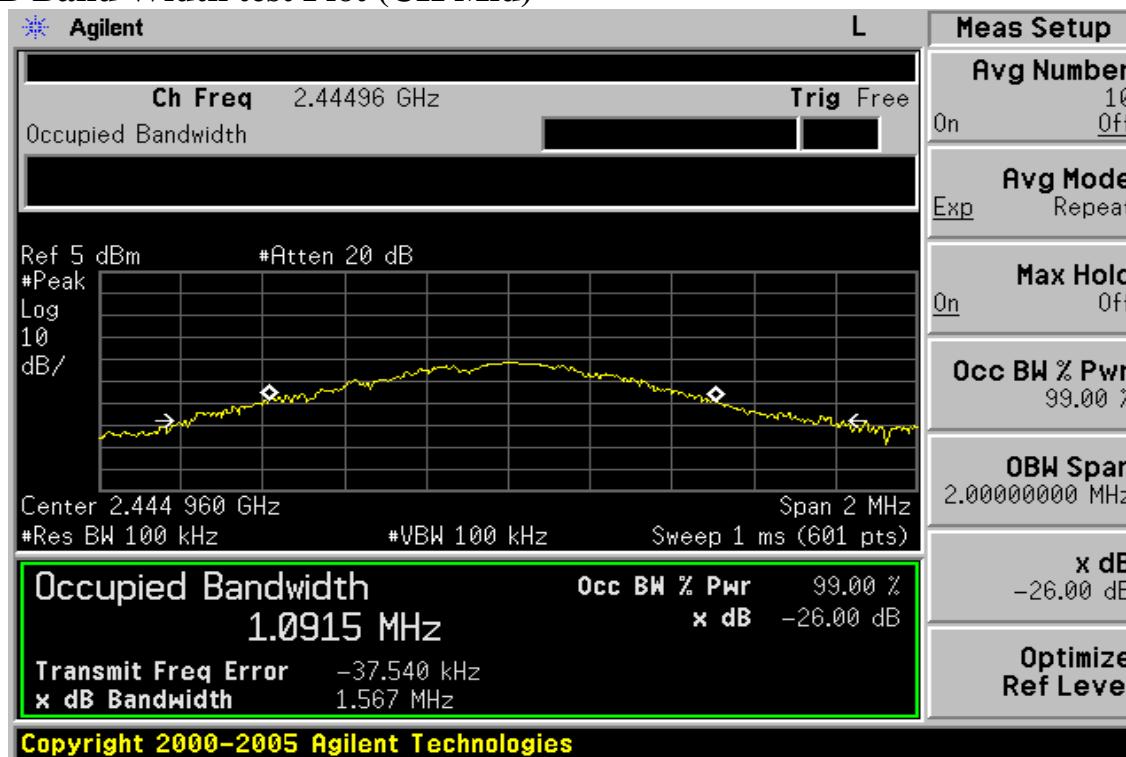
Channel Highest = 1.588MHz

Refer to attached data chart.

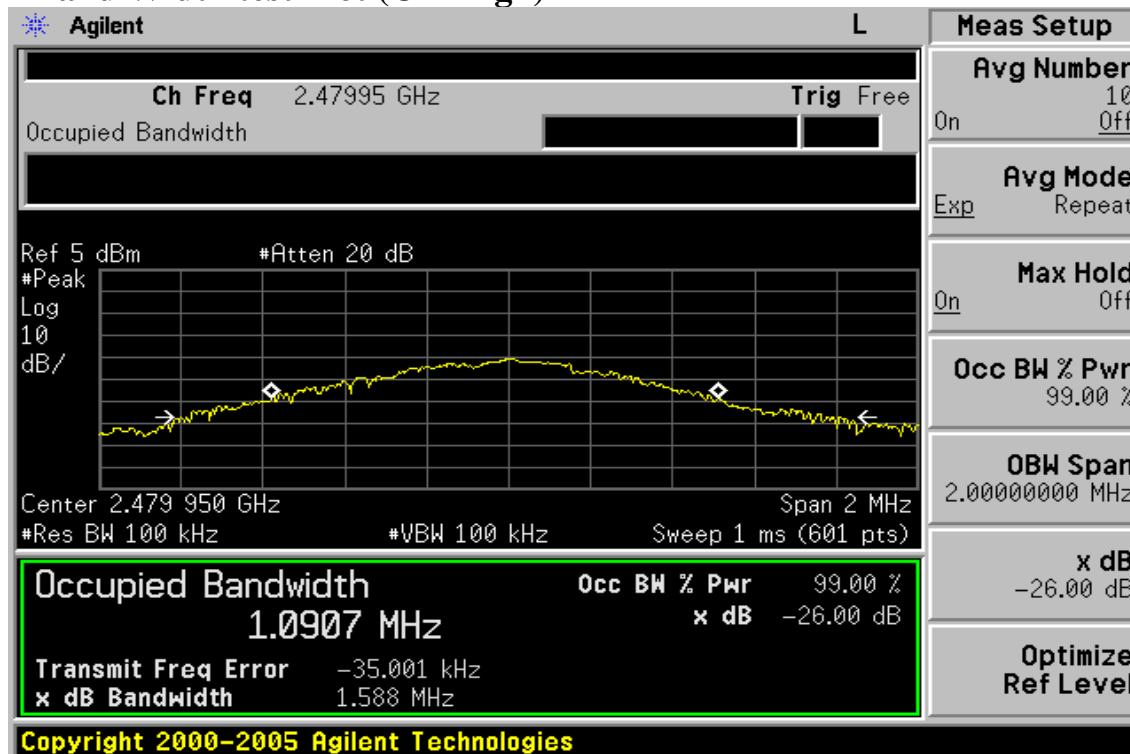
## 26dB Band Width test Plot (CH Low)



## 26dB Band Width test Plot (CH Mid)



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**26dB Band Width test Plot (CH High)**

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