

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

**Product Name:** 2.4GHz Wireless Dongle  
**Brand Name:** N/A  
**Model No.:** C55  
**Model Difference:** N/A  
**FCC ID:** P5A-CL0029  
**IC:** 9468A-000C55  
**Report No.:** ER/2012/80014  
**Issue Date:** Aug. 24, 2012  
**FCC Rule Part:** §15.249  
**IC Rule Part:** RSS-210 issue 8: 2010, Annex 2.9  
**Prepared for:** ARESON Technology Corp.  
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## VERIFICATION OF COMPLIANCE

**Applicant:** ARESON Technology Corp.  
11F, No. 646, Sec. 5, Chongxin Rd., Sanchung Dist., New Taipei City  
241, Taiwan (R.O.C.)

**Product Description:** 2.4GHz Wireless Dongle

**FCC ID:** P5A-CL0029

**IC:** 9468A-000C55

**Brand Name:** N/A

**Model No.:** C55

**Model Difference:** N/A

**File Number:** ER/2012/80014

**Date of test:** Aug. 09, 2012 ~ Aug. 22, 2012

**Date of EUT Received:** Aug. 09, 2012

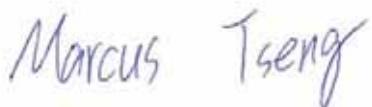
### We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory.

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (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 and RSS-210 issue 8: 2010 Annex 2.9.

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

**Test By:**

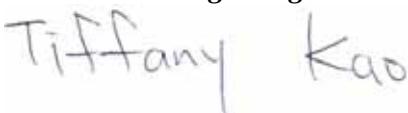


**Date:**

Aug. 24, 2012

*Marcus Tseng / Engineer*

**Prepared By:**

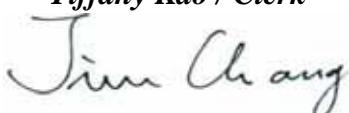


**Date:**

Aug. 24, 2012

*Tiffany Kao / Clerk*

**Approved By:**



**Date:**

Aug. 24, 2012

*Jim Chang / Supervisor*

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## Version

Version No.	Date	Description
00	Aug. 24, 2012	Initial creation of document

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## TABLE OF CONTENTS

<b>1. GENERAL INFORMATION.....</b>	<b>6</b>
1.1. PRODUCT DESCRIPTION.....	6
1.2. RELATED SUBMITTAL(S) / GRANT (S) .....	7
1.3. TEST METHODOLOGY.....	7
1.4. TEST FACILITY .....	7
1.5. SPECIAL ACCESSORIES .....	7
1.6. EQUIPMENT MODIFICATIONS .....	7
<b>2. SYSTEM TEST CONFIGURATION.....</b>	<b>8</b>
2.1. EUT CONFIGURATION.....	8
2.2. EUT EXERCISE .....	8
2.3. TEST PROCEDURE.....	8
2.4. LIMITATION .....	9
2.5. CONFIGURATION OF TESTED SYSTEM .....	11
<b>3. SUMMARY OF TEST RESULTS .....</b>	<b>12</b>
<b>4. DESCRIPTION OF TEST MODES.....</b>	<b>12</b>
<b>5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION.....</b>	<b>12</b>
<b>6. CONDUCTED EMISSIONS TEST .....</b>	<b>13</b>
6.1 MEASUREMENT PROCEDURE:.....	13
6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	13
6.3 MEASUREMENT EQUIPMENT USED: .....	13
6.4 MEASUREMENT RESULT:.....	13
<b>7. RADIATED EMISSION TEST .....</b>	<b>146</b>
7.1 MEASUREMENT PROCEDURE.....	16
7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	16
7.3 MEASUREMENT EQUIPMENT USED: .....	17
7.4 FIELD STRENGTH CALCULATION .....	17
7.5 MEASUREMENT RESULT.....	18
<b>8. 20 DB BAND WIDTH MEASUREMENT .....</b>	<b>30</b>
8.1 MEASUREMENT PROCEDURE.....	30
8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	30
8.3 MEASUREMENT EQUIPMENT USED: .....	30
8.4 MEASUREMENT RESULTS: .....	30

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9. 99% BAND WIDTH MEASUREMENT.....	33
9.1 MEASUREMENT PROCEDURE.....	33
9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	33
9.3 MEASUREMENT EQUIPMENT USED: .....	33
9.4 MEASUREMENT RESULTS:.....	33

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## 1. GENERAL INFORMATION

### 1.1. Product Description

Product Name:	2.4GHz Wireless Dongle
Brand Name:	N/A
Model No.:	C55
Model Difference:	N/A
Hardware Version	01
Software Version	MA6410A
Operation Frequency:	2408~2474MHz
Channel number:	34 channels
Channel Spacing:	2MHz
Modulation Type:	GFSK
Power Supply	5V form USB Port
Antenna Designation:	Printed Antenna

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

This submittal(s) (test report) is intended for FCC ID: **P5A-CL0029** filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules and IC: **9468A-000C55** filing to comply with Industry Canada RSS-210 issue 8: 2010 Annex 2.9.

## 1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2007. Radiated testing was performed at an antenna to EUT distance 3 meters.

## 1.4. 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-4.

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

## 1.5. Special Accessories

Not available for this EUT intended for grant.

## 1.6. Equipment Modifications

Not available for this EUT intended for grant.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2. EUT Exercise

The Transmitter was operated in the engineering operating mode. the Tx frequency was fixed at 5736, 5762 and 5814 MHz which were 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 and RSS-Gen: 2007. 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 and RSS-Gen:2007.

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## 2.4. Limitation

### (1) Conducted Emission

According to section 15.207(a) and RSS-Gen §7.2.2 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) and RSS-210 issue 8,§A2.9(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

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### (3) Radiated Emission 15.249 (d) and RSS-210 issue 8,§A2.9(b)

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 and RSS-210 issue 8,§A2.9(a) as below, whichever is the lesser attenuation.

Frequency (MHz)	Field strength $\mu$ V/m	Distance (m)	Field strength at 3m dB $\mu$ V/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) and RSS-210 issue 8

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 dB $\mu$ V/m=20 log ( $\mu$ V/m)

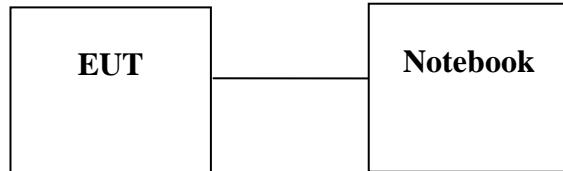
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision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

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## 2.5. Configuration of Tested System

**Fig. 2-1 Configuration**



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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	IBM	T60	L3DK794	shielding	Un-shielding

**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/ RSS-Gen §7.2.2	Conducted Emission	Compliant
§15.249(a)(d)(e) RSS-210 issue 8,§A2.9(a)(b)	Field Strength Measurement (TX and RX)	Compliant
§15.215(c)	20dB band width Measurement	Compliant
RSS-Gen §4.6.1	99% Power Bandwidth	Compliant

### 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 receive mode is programmed.

Channel low (2408MHz)、mid (2440MHz) and high (2474MHz) with highest data rate are chosen for full testing.

### 5. MEASUREMENT UNCERTAINTY FOR FIELD STRENGTH OF SPURIOUS RADIATION

Measurement uncertainty (Polarization : <b>Vertical</b> )	30MHz - 180MHz: 3.37dB
	180MHz -417MHz: 3.19dB
	0.417GHz-1GHz: 3.19dB
	1GHz - 18GHz: 4.04dB
	18GHz - 40GHz: 4.04dB

Measurement uncertainty (Polarization : <b>Horizontal</b> )	30MHz - 167MHz: 4.22dB
	167MHz -500MHz: 3.44dB
	0.5GHz-1GHz: 3.39dB
	1GHz - 18GHz: 4.08dB
	18GHz - 40GHz: 4.08dB

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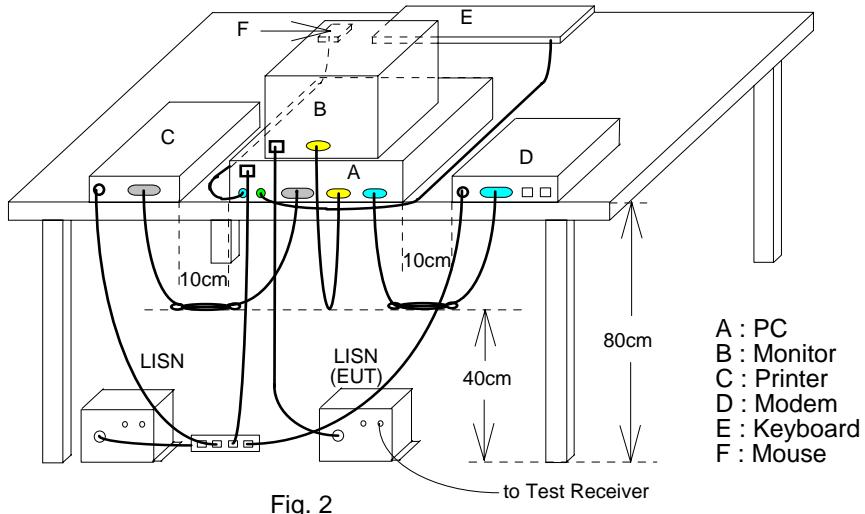
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## 6. CONDUCTED EMISSIONS TEST

## 6.1 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.

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



### 6.3 Measurement Equipment Used:

Conducted Emission Test Site					
<b>EQUIPMENT TYPE</b>	<b>MFR</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>LAST CAL.</b>	<b>CAL DUE.</b>
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2011	09/22/2012
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2012	03/22/2013
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2012	03/22/2013
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2012	01/04/2013

## 6.4 Measurement Result:

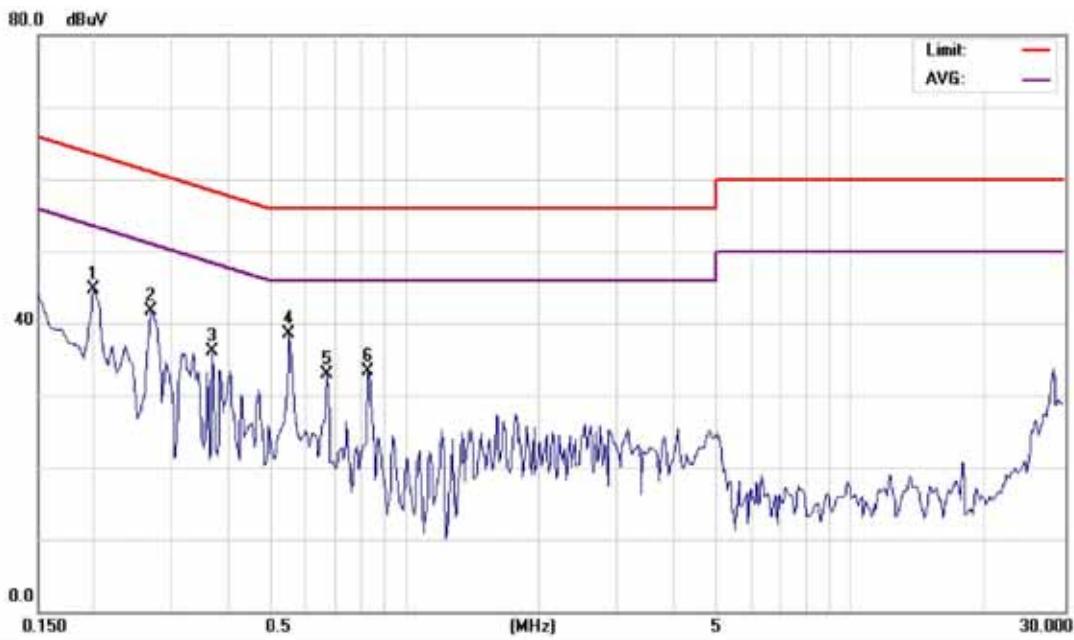
Refer to next page for measurement data and plots.

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Charger Mode			Test Date:	Aug. 20, 2012
Temperature:	23	Humidity:	61 %	Test By:	Marcus

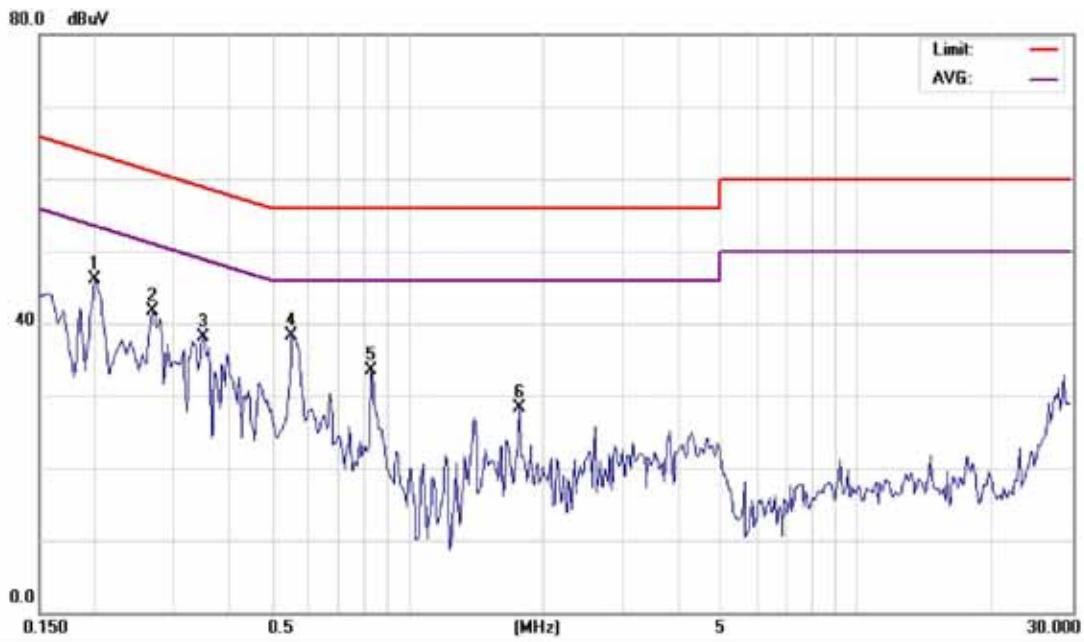


Site: ConductionRoom      Phase: **L1**      Temperature: 24 °C  
 Limit: FCC Class B Conduction(QP)      Power: AC 120V/60Hz      Humidity: 60%  
 EUT: 2.4GHz Wireless Dongle      Distance:  
 M/N: C55  
 Mode: Operationmode  
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dB	Detector	Comment
1		0.2000	44.55	0.12	44.67	63.61	-18.94	peak
2		0.2700	41.56	0.12	41.68	61.12	-19.44	peak
3		0.3700	35.98	0.12	36.10	58.50	-22.40	peak
4	*	0.5500	38.37	0.12	38.49	56.00	-17.51	peak
5		0.6700	32.81	0.12	32.93	56.00	-23.07	peak
6		0.8300	33.10	0.12	33.22	56.00	-22.78	peak

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Site: ConductionRoom  
Limit: FCC Class B Conduction(QP)  
EUT: 2.4GHz Wireless Dongle  
M/N: C55  
Mode: Operationmode  
Note:

Phase: **N** Temperature: 24 °C

Power: AC 120V/60Hz Humidity: 60%

Distance:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1	*	0.2000	45.98	0.13	46.11	63.61	-17.50	peak	
2		0.2700	41.48	0.13	41.61	61.12	-19.51	peak	
3		0.3500	38.05	0.12	38.17	58.96	-20.79	peak	
4		0.5500	38.17	0.12	38.29	56.00	-17.71	peak	
5		0.8300	33.28	0.13	33.41	56.00	-22.59	peak	
6		1.7800	28.06	0.15	28.21	56.00	-27.79	peak	

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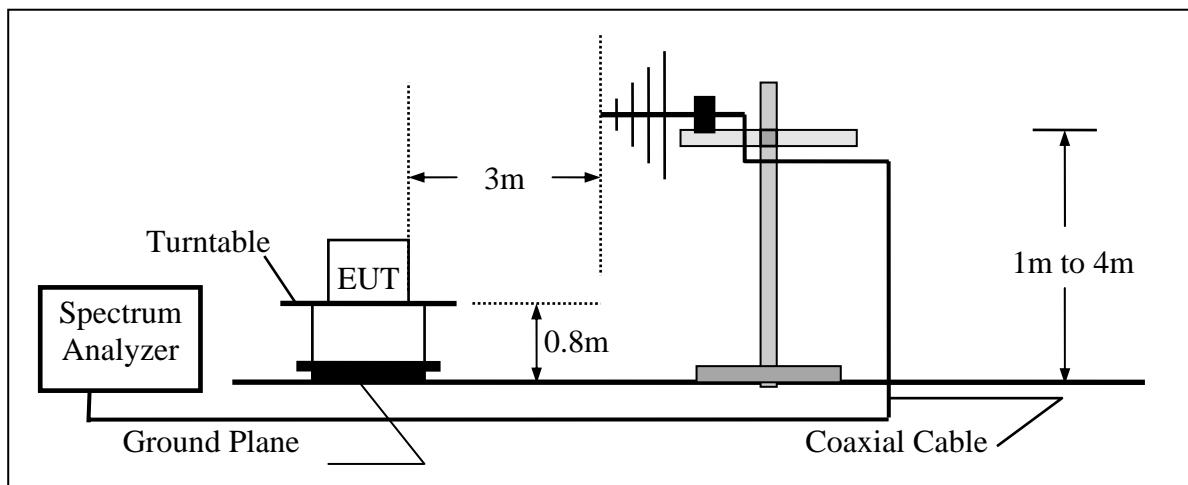
## 7. RADIATED EMISSION TEST

### 7.1 Measurement Procedure

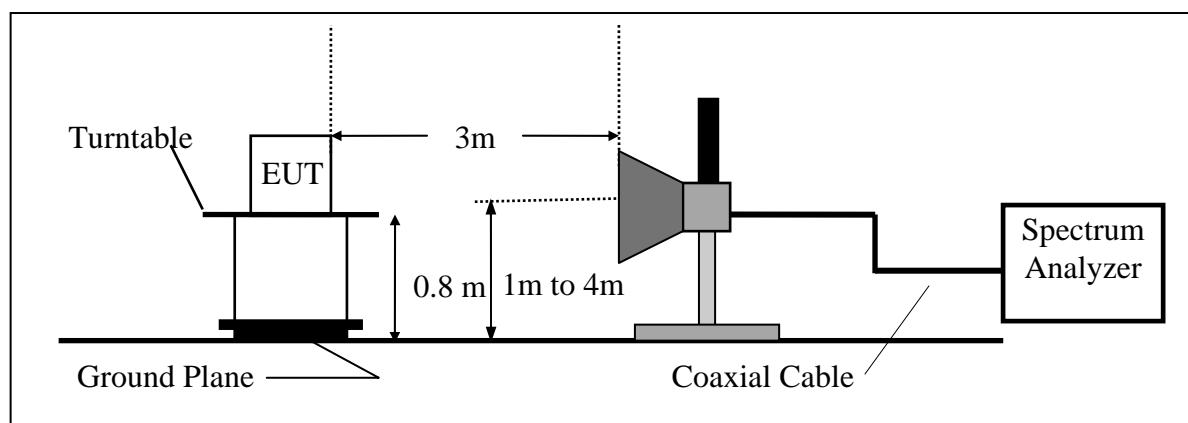
1. The EUT was placed on a turntable that is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above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

### 7.2 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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### 7.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2012	02/28/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/04/2012	01/03/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2012	07/14/2013

### 7.4 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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## 7.5 Measurement Result

### Radiated Spurious Emission Measurement Result

Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2408 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX LOW MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V/m	dB $\mu$ V/m	dB
2407.49	F	Average	88.04	4.67	92.71	94.00	-1.29
2407.49	F	Peak	91.42	4.67	96.09	114.00	-17.91

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2408 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX LOW MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit	Margin
					FS dB $\mu$ V	@3m dB $\mu$ V/m	dB $\mu$ V/m
2408.48	F	Average	81.01	5.37	86.38	94.00	-7.62
2408.48	F	Peak	83.11	5.37	88.48	114.00	-25.52

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2440 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX MID MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V/m		
		PK/QP/AV	dB $\mu$ V				
2439.49	F	Average	86.51	4.85	91.36	94.00	-2.64
2439.49	F	Peak	88.64	4.85	93.49	114.00	-20.51

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2440 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX MID MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m	Margin
						dB $\mu$ V/m	dB
2439.49	F	Average	87.45	5.68	93.13	94.00	-0.87
2439.49	F	Peak	90.36	5.68	96.04	114.00	-17.96

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2474 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX HIGH MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V/m	dB $\mu$ V/m	dB
2473.49	F	Average	78.14	5.20	83.34	94.00	-10.66
2473.49	F	Peak	80.27	5.20	85.47	114.00	-28.53

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2474 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX HIGH MAIN	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V/m	dB $\mu$ V/m	dB
2474.49	F	Average	87.12	6.19	93.31	94.00	-0.69
2474.49	F	Peak	91.68	6.19	97.87	114.00	-16.13

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2408 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V/m	dB $\mu$ V/m	dB
71.71	S	Peak	47.90	-16.69	31.21	40.00	-8.79
222.06	S	Peak	48.64	-15.04	33.60	46.00	-12.40
311.30	S	Peak	43.76	-12.30	31.46	46.00	-14.54
399.57	S	Peak	39.25	-11.06	28.19	46.00	-17.81
700.27	S	Peak	39.35	-5.75	33.60	46.00	-12.40
979.63	S	Peak	35.30	-1.97	33.33	54.00	-20.67
4816.00	H	Average	27.18	9.58	36.76	54.00	-17.24
4816.00	H	Peak	35.09	9.58	44.67	74.00	-29.33
7224.00	H	---					
9632.00	H	---					
12040.00	H	---					
14448.00	H	---					
16856.00	H	---					
19264.00	H	---					
21672.00	H	---					
24080.00	H	---					

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2408 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX LOW	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit	Margin
					FS dB $\mu$ V	@3m dB $\mu$ V/m	dB $\mu$ V/m
73.65	S	Peak	51.08	-17.00	34.08	40.00	-5.92
166.77	S	Peak	39.59	-12.87	26.72	43.50	-16.78
299.66	S	Peak	44.81	-12.58	32.23	46.00	-13.77
444.19	S	Peak	39.76	-10.12	29.64	46.00	-16.36
664.38	S	Peak	36.99	-6.30	30.69	46.00	-15.31
833.16	S	Peak	37.94	-3.85	34.09	46.00	-11.91
4816.00	H	Average	27.25	9.60	36.85	54.00	-17.15
4816.00	H	Peak	36.81	9.60	46.41	74.00	-27.59
7224.00	H	---					
9632.00	H	---					
12040.00	H	---					
14448.00	H	---					
16856.00	H	---					
19264.00	H	---					
21672.00	H	---					
24080.00	H	---					

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2440 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m
71.71	S	Peak	46.25	-16.69	29.56	40.00	-10.44
155.13	S	Peak	50.30	-12.30	38.00	43.50	-5.50
311.30	S	Peak	44.52	-12.30	32.22	46.00	-13.78
665.35	S	Peak	36.84	-6.28	30.56	46.00	-15.44
700.27	S	Peak	38.64	-5.75	32.89	46.00	-13.11
979.63	S	Peak	34.62	-1.97	32.65	54.00	-21.35
4880.00	H	Average	26.76	10.16	36.92	54.00	-17.08
4880.00	H	Peak	36.68	10.16	46.84	74.00	-27.16
7320.00	H	---					
9760.00	H	---					
12200.00	H	---					
14640.00	H	---					
17080.00	H	---					
19520.00	H	---					
21960.00	H	---					
24400.00	H	---					

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2440 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX MID	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m	Margin
						dB $\mu$ V/m	dB $\mu$ V/m
73.65	S	Peak	52.47	-17.00	35.47	40.00	-4.53
299.66	S	Peak	43.70	-12.58	31.12	46.00	-14.88
431.58	S	Peak	37.05	-10.40	26.65	46.00	-19.35
664.38	S	Peak	37.28	-6.30	30.98	46.00	-15.02
700.27	S	Peak	35.43	-5.75	29.68	46.00	-16.32
833.16	S	Peak	30.42	-3.85	26.57	46.00	-19.43
4880.00	H	Average	26.72	10.11	36.83	54.00	-17.17
4880.00	H	Peak	35.76	10.11	45.87	74.00	-28.13
7320.00	H	---					
9760.00	H	---					
12200.00	H	---					
14640.00	H	---					
17080.00	H	---					
19520.00	H	---					
21960.00	H	---					
24400.00	H	---					

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2474 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:VERTICAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit	Margin
					FS dB $\mu$ V	@3m dB $\mu$ V/m	
71.71	S	Peak	47.47	-16.69	30.78	40.00	-9.22
299.66	S	Peak	37.76	-12.58	25.18	46.00	-20.82
313.24	S	Peak	41.69	-12.24	29.45	46.00	-16.55
500.45	S	Peak	36.16	-9.58	26.58	46.00	-19.42
664.38	S	Peak	36.67	-6.30	30.37	46.00	-15.63
700.27	S	Peak	39.75	-5.75	34.00	46.00	-12.00
4948.00	H	Average	26.58	9.96	36.54	54.00	-17.46
4948.00	H	Peak	35.03	9.96	44.99	74.00	-29.01
7422.00	H	---					
9896.00	H	---					
12370.00	H	---					
14844.00	H	---					
17318.00	H	---					
19792.00	H	---					
22266.00	H	---					
24740.00	H	---					

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Operation Band	:2.4G	Test Date	:2012-08-21
Fundamental Frequency	:2474 MHz	Temp./Humi.	:26.3 deg_C / 60 RH
Operation Mode	:TX HIGH	Engineer	:Marcus
EUT Pol.	:E2	Measurement Antenna Pol.	:HORIZONTAL

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

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

Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual	Limit @3m	Margin
					FS dB $\mu$ V	dB $\mu$ V/m	dB $\mu$ V/m
72.68	S	Peak	50.85	-16.83	34.02	40.00	-5.98
151.25	S	Peak	44.37	-12.34	32.03	43.50	-11.47
299.66	S	Peak	41.85	-12.58	29.27	46.00	-16.73
433.52	S	Peak	34.22	-10.36	23.86	46.00	-22.14
666.32	S	Peak	37.12	-6.27	30.85	46.00	-15.15
795.33	S	Peak	32.87	-4.26	28.61	46.00	-17.39
4948.00	H	Average	26.00	9.82	35.82	54.00	-18.18
4948.00	H	Peak	34.45	9.82	44.27	74.00	-29.73
7422.00	H	---					
9896.00	H	---					
12370.00	H	---					
14844.00	H	---					
17318.00	H	---					
19792.00	H	---					
22266.00	H	---					
24740.00	H	---					

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## 8. 20 dB BAND WIDTH MEASUREMENT

### 8.1 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 = 100kHz, VBW = 300kHz, Span =5MHz.
4. Set SPA Max hold. Mark peak, -20dB.

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

Same as 7.2 Radiated Emission Measurement.

### 8.3 Measurement Equipment Used:

Same as 7.3 Radiated Emission Measurement.

### 8.4 Measurement Results:

2408 Channel = 2.215MHz

2440 Channel = 2.202MHz

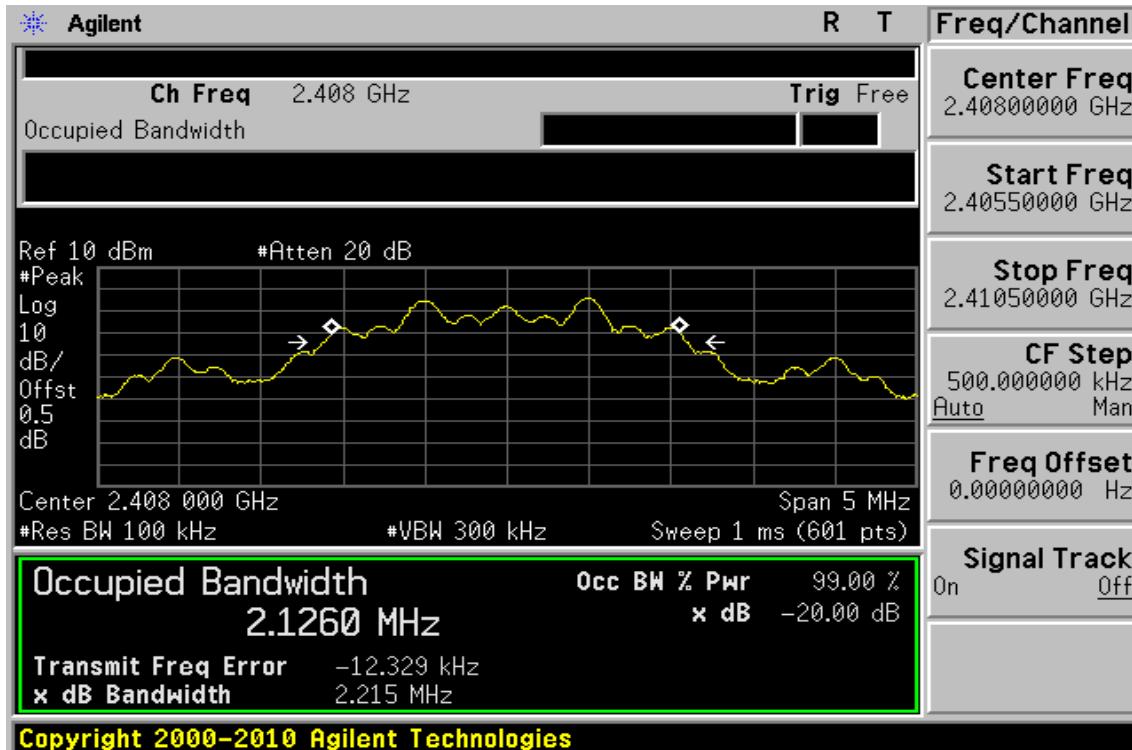
2474 Channel = 2.215MHz

Refer to attached data chart.

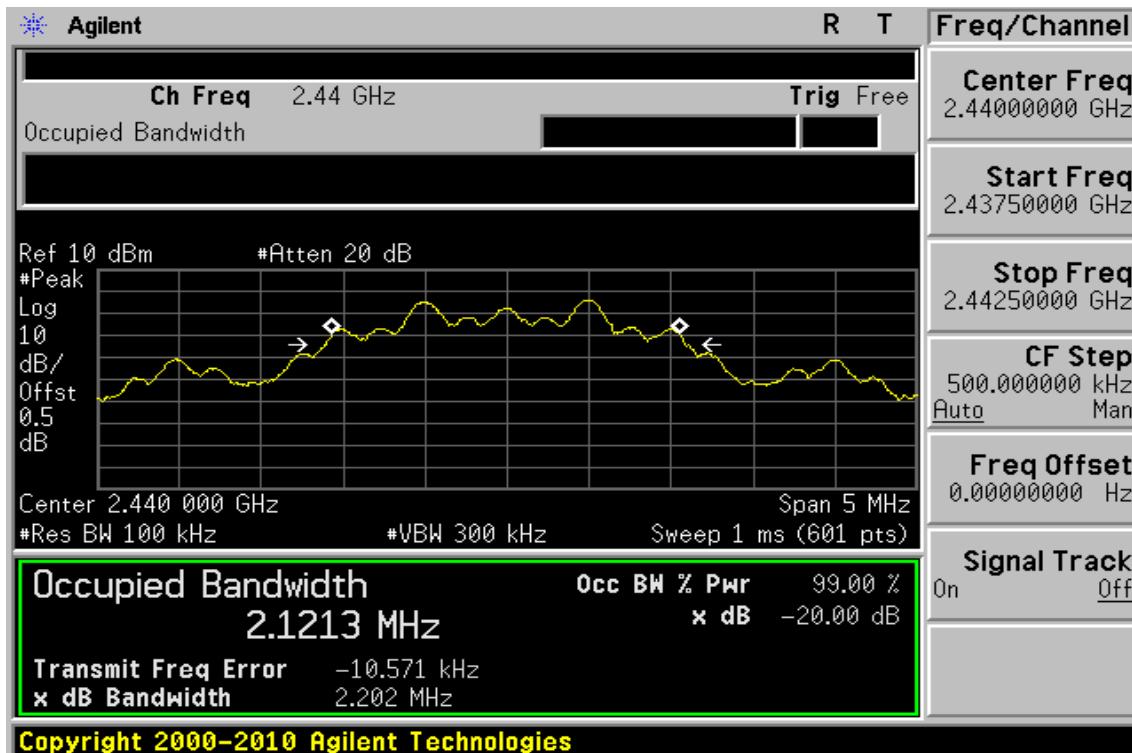
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### 20dB Bandwidth Test Data CH-Low

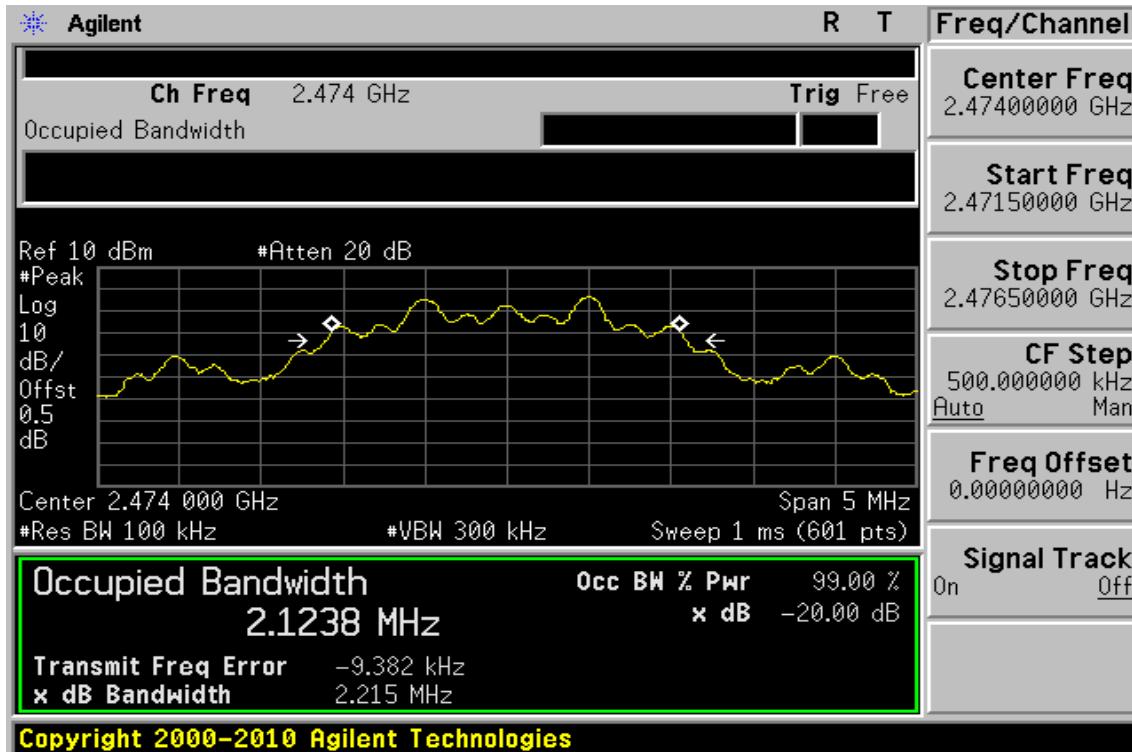


### 20dB Bandwidth Test Data CH-Mid



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**20dB Bandwidth Test Data CH-High**

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## 9. 99% BAND WIDTH MEASUREMENT

### 9.1 Measurement Procedure

- 1 Place the EUT on the table and set it in transmitting mode.
- 2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3 Set the spectrum analyzer as RBW=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto
- 4 Turn on the 99% bandwidth function, max reading..
- 5 Repeat above procedures until all frequency measured were complete.

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

Same as 7.2 Radiated Emission Measurement.

### 9.3 Measurement Equipment Used:

Same as 7.3 Radiated Emission Measurement.

### 9.4 Measurement Results:

2408 Channel = 2.1260MHz

2440 Channel = 2.213MHz

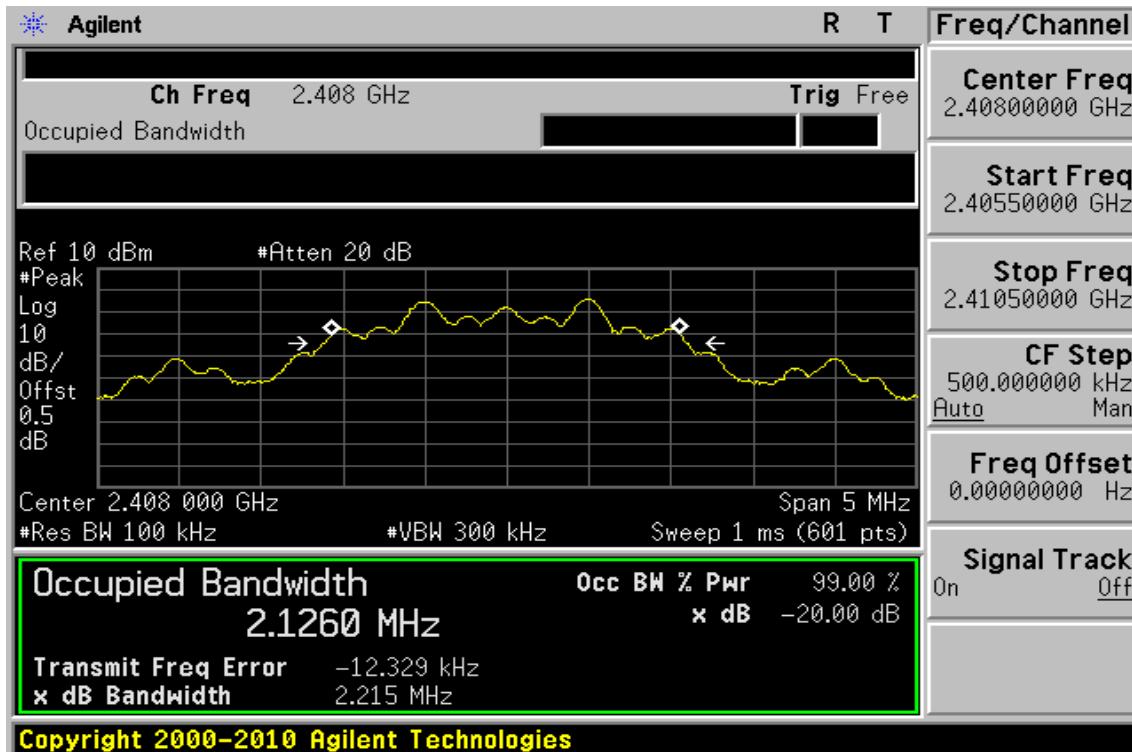
2474 Channel = 2.1238MHz

Refer to attached data chart.

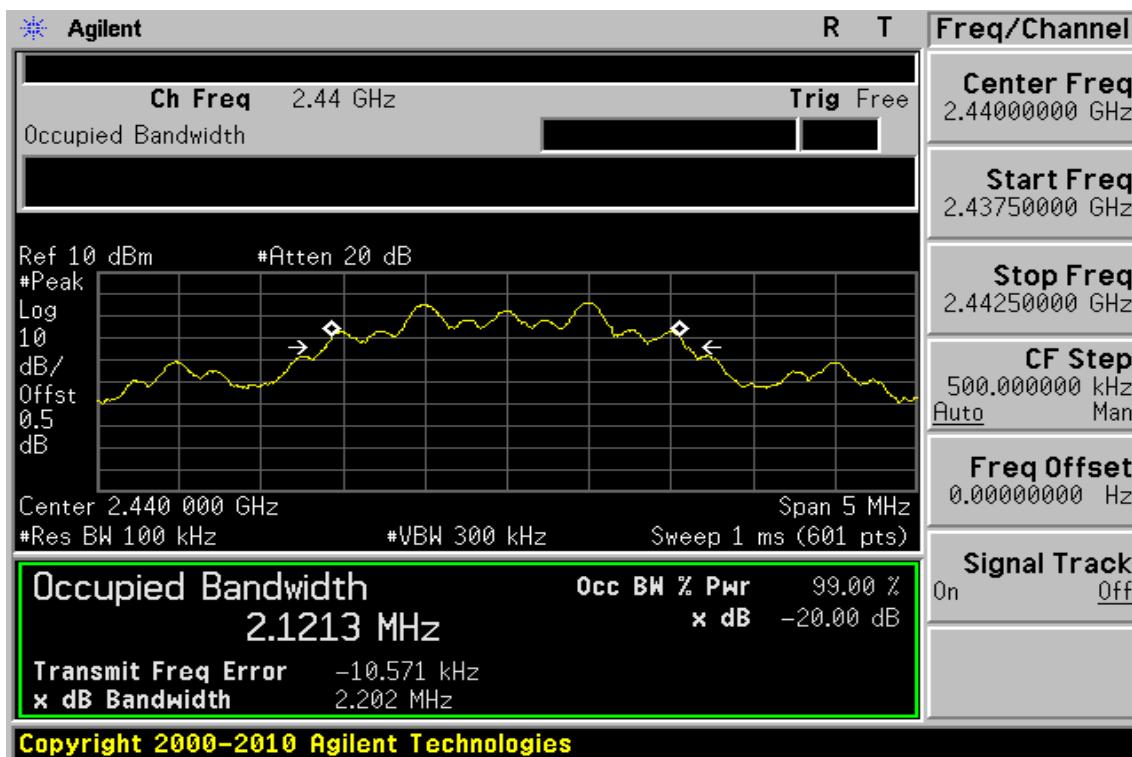
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### 99% Bandwidth Test Data CH-Low



### 99% Bandwidth Test Data CH-Mid

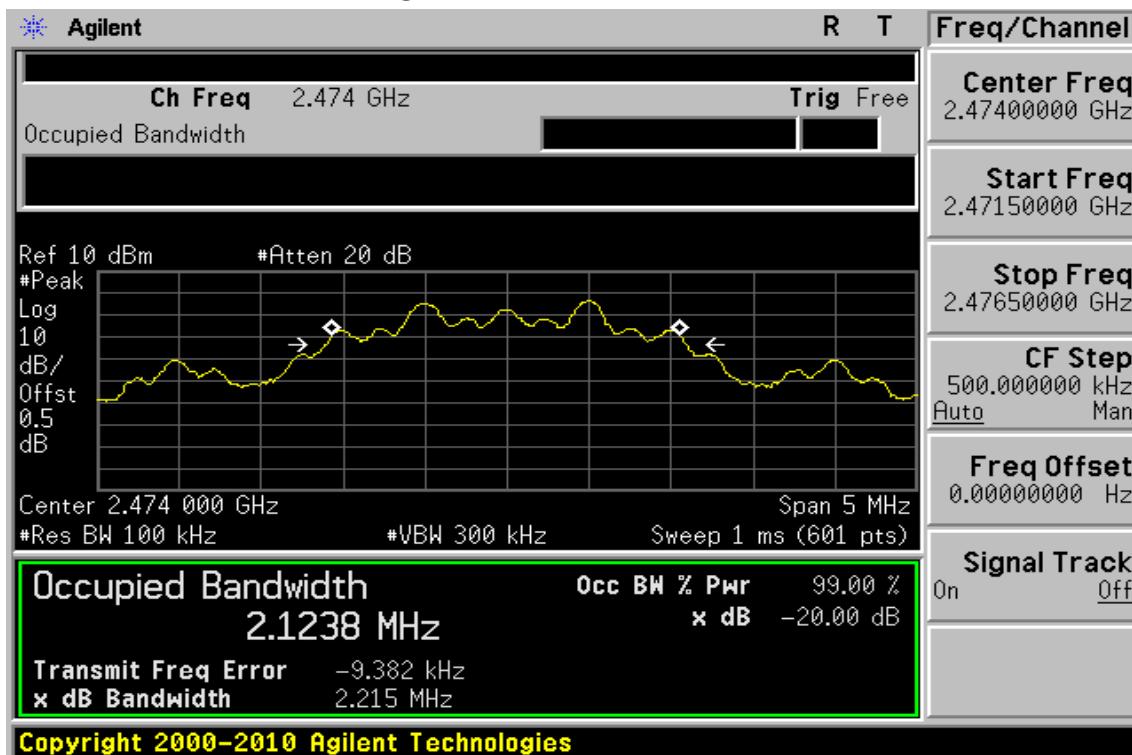


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**99% Bandwidth Test Data CH-High**



~ End of Report ~

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