MEASUREMENT REPORT

of

2.4GHz MCE Keyboard with Optical Trackball

Applicant	**:**	Itron Technology Inc.
FCC ID	**:**	F2QSCORPIUSP20MTU
EUT	**:**	2.4GHz MCE Keyboard with Optical Trackball
Model	**:**	Scorpius-P20MT

Test by :

Training Research Co., Ltd.

TEL : 886-2-26935155 FAX : 886-2-26934440

No. 255, Nan-yang Street, Shijr, Taipei Hsien 221, Taiwan

CERTIFICATION

We here by verify that:

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (2003) as a reference. All tests were conducted by ***Training Research Co., Ltd.***, No. 255, Nan-yang Street, Shijr, Taipei Hsien 221, Taiwan. Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart C Section 15.249.

Applicant	**:**	Itron Technology Inc.
Applicant address	**:**	9F, No. 75, Sec 1, Hsin Tai Wu Road, Hsichih, Taipei Hsien, Taiwan
Report No.	**:**	I2615061064
Test Date	**:**	June 06, 2007

Prepared by: Jack Tsai ***Jack Tsai***

Approved by: Frank Tsai ***Frank Tsai***

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(3) This test report, measurements made by TRC are traceable to the NIST only Conducted and Radiated Method.

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Chapter 1 General

1.1 Introduction

The following measurement report is submitted on behalf of Applicant in support of a wireless mouse certification in accordance with Part 2 Subpart J and Part 15 Subpart C of the Commission's Rules and Regulations.

1.2 Description of EUT

FCC ID	**:**	F2QSCORPIUSP20MTU
Product Name	**:**	2.4GHz MCE Keyboard with Optical Trackball
Model	**:**	Scorpius-P20MT
Frequency Range	**:**	2400MHz ~ 2483.5MHz
Operating Frequency	**:**	2405MHz ~ 2468MHz
Modulation Skill	**:**	GFSK
Power Type	**:**	Powered by DC 1.5V batteries (AA*2)

1.3 Test method

The fundamental frequency of transmitter emitted is due to a press on button of the EUT. There are security codes for avoiding the possibility of duplicating codes in adjacent systems. The coding must be matching with the companion receiver.

While testing the EUT was adjusted at a position, which transmits the maximum emission.

Test mode

Set different channel (CH Lowest/CH Middle/CH Highest) being tested

(a) Radiated test:

making EUT to the mode of continuous TX

(b) Conducted and radiated test:

making EUT to the charging mode.

1.4 Description of Support Equipment

In order to construct the minimum testing, following equipment were used as the support units.

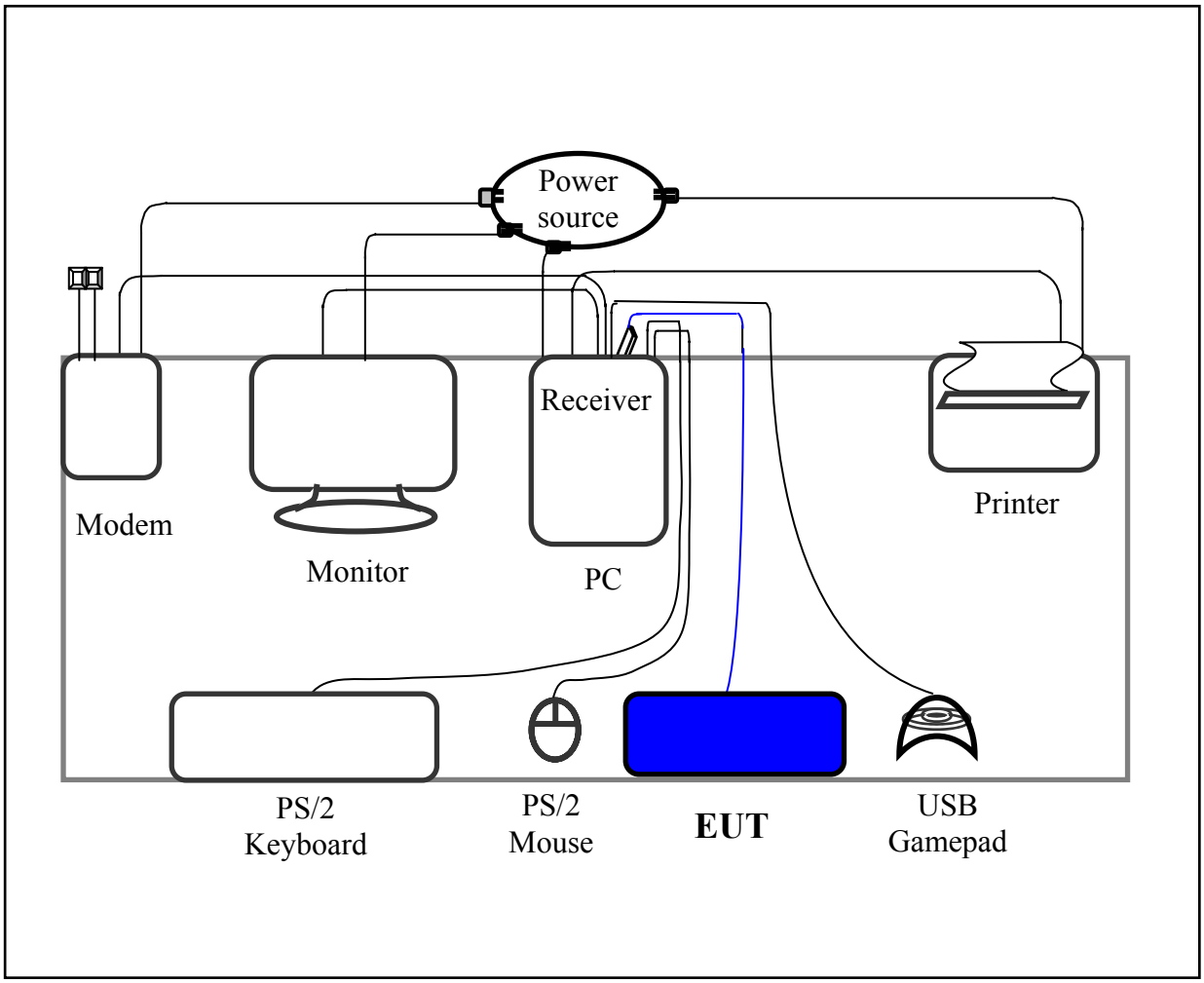
PC	**:**	**HP, IBM 8434**
Model No.	:	Pavilion t1000; IVG
Serial No.	:	TWL3320051; 99CCZA3
FCC ID	:	DoC (Declaration of Confirmation) Approved
BSMI	:	R33001; R33026
Power type	:	100 ~ 127VAC/6A, 200 ~ 240VAC/3A, 50 ~ 60Hz, Switching
Power cord	:	Non-shielded, 1.8m length, Plastic hood, No ferrite core
Monitor	**:**	**HP 15' Color Monitor**
Model No.	:	D8894A
Serial No.	:	CN02364355
FCC ID	:	ARSCM356N
BSMI	:	3882A031
Power type	:	100 ~ 240 VAC / 1.5A, 50 ~ 60 Hz, Switching
Power cord	:	Non-shielded, 1.80m length, Plastic hood, No ferrite core
Data cable	:	Shielded, 1.50m length, Plastic hood, with ferrite core
Printer	**:**	**EPSON**
Model No.	:	B241A
Serial No.	:	FAPY155090
FCC ID	:	N/A, DoC Approved
BSMI	:	R33126
Power type	:	Switching adaptor
Power cord	:	Non-shielded, 198cm length, No ferrite core
Data cable	:	Shielded, 1.50m length, No ferrite core
PS/2 Mouse	**:**	**HP**
Model No.	:	M-UR89, M-S69
Serial No.	:	LZS21750238, 334684-002 323614-001
FCC ID	:	DoC Approved
BSMI	:	3892D767, R41126
Power type	:	By PC
Power cord	:	Shielded, 1.90m length, No ferrite core

PS/2 Keyboard	**:**	**HP**
Model No.	:	5187-0343, KB0133
Serial No.	:	265987-AB1 Tch 323686-AB1, B69360MGAPW0HF
FCC ID	:	DoC Approved
BSMI	:	3892C981, R31310
Power type	:	By PC
Data cable	:	Shielded, 1.85m length, no ferrite core
Modem	**:**	**ACEEX**
Model No.	:	DM-1414
Serial No.	:	9010583
FCC ID	:	IFAXDM1414
Power type	:	Linear
Power cord	:	Non-shielded, 1.9m length, No ferrite cord
Data cable	:	RS232, Shielded, 1.2m length, No ferrite core
		RJ11C x 2, 7’ length non-shielded, No ferrite core
USB Game pad	**:**	**Logitech**
Model No.	:	G-UC3B
Serial No.	:	AE3500500
FCC ID	:	DoC Approved
BSMI	:	4902A047
Power Cable	:	Shielded, 187cm length, Plastic hood, No ferrite core.
LAN Card	**:**	**D-Link**
Model No.	:	DFE-530TX
Serial No.	:	0050BAE3158B, 0050BAE32FF3
FCC ID	:	DoC Approved
WLAN Card	**:**	**Gemtek Technology Co., Ltd.**
Model No.	:	C911003
FCC ID	:	MXF-C911003
Receiver	**:**	Itron Technology Inc.
Model No.	:	Scorpius-P20MT
FCC ID	:	DoC Approved

PC	**:**	**IBM ThinkPad T43**
Model No.	:	2668-IVE
Serial No.	:	L3TGYY
FCC ID	:	N/A, DoC Approved
BSMI	:	R33B65
DGT	:	ETC093LPD0126, CTL093LPD0257
Power adaptor	**:**	**IBM**
Part No.	:	92P1018
Serial No.	:	11S92P1018Z1ZAPU57M9W6 REV: D
FCC ID	:	N/A, DoC Approved
BSMI	:	D33030
Power type	:	100 ~ 240VAC / 50 ~ 60Hz, 1.0 ~ 0.4A, Switching
Power cord	:	Primary: Non-shielded, 1.0m length, Plastic hood, No ferrite core
		Secondary: Shielded, 1.84m length, Plastic hood, ferrite core

1.5 Configuration of System Under Test

1.5.1 Conducted and Radiated of Charging

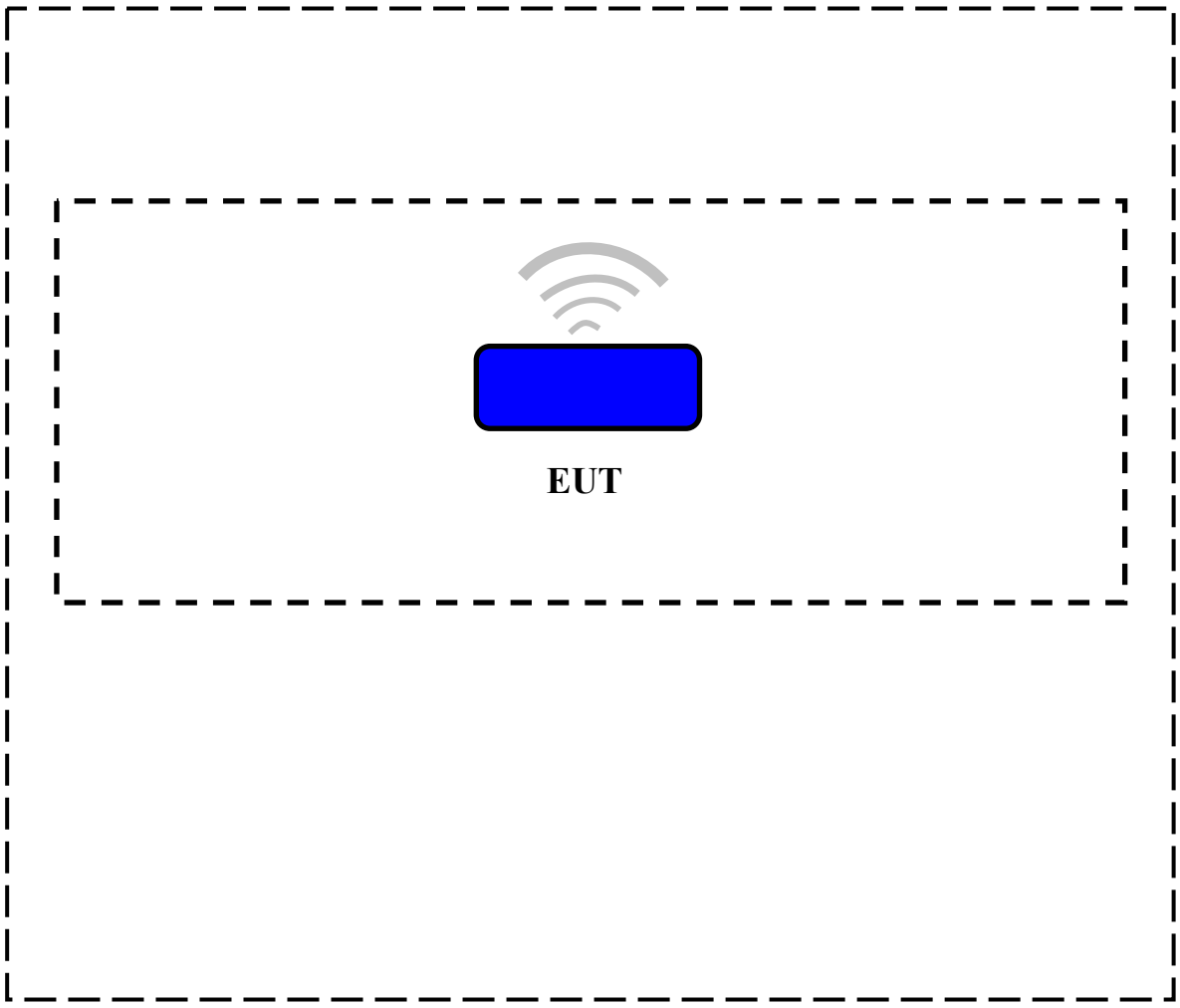


Connections of Equipment

PC:

*Parallel Port …….. a printer
*VGA Port …… a monitor
*Serial Port ……..... an external modem
*PS/2-key Port …….. a PS/2 keyboard
*PS/2-mouse Port ….. a PS/2 mouse
*USB#1 Port ……. a USB gamepad
*USB#2 Port …… a Receiver

1.5.2 Radiated of Transmission



1.6 Test Procedure

All measurements contained in this report were performed mainly according to the techniques described in Measurement procedure ANSI C63.4 (2003).

1.7 Location of the Test Site

The radiated emissions measurements required by the rules were performed on the **three-meter**, **Anechoic Chamber (FCC Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F, No. 255, Nan-yang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in an anechoic chamber also located at Training Research Co., Ltd. 1F, No. 255, Nan-yang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

1.8 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests was chosen as that which produced the highest emission levels. However, only those conditions which the EUT was considered likely to encounter in normal use were investigated.

In test, they were set in high power and continuously transmitting mode. The Highest, Middle and Lowest of EUT were all tested. The setting up procedure is recorded on 1.3 Test Method.

Chapter 2 Conducted Emissions Measurements

2.1 Test Condition & Setup

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPR quasi-peak and average detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 150KHz to 30MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 4.3

There is a test condition apply in this test item, the test procedure description as <1.3 test method>. Three channels were tested, one in the CH Lowest, one in the CH Middle and the other in CH Highest.

2.2 List of Test Instruments

Calibration Date

Instrument Name	Model	Brand	Serial No.	Next time
Receiver	SCR3102	SCHAFFNER	012	12/08/07
LISN (EUT)	3825/2	EMCO	9411-2284	08/18/07
LISN (Support E.)	3825/2	EMCO	9210-2007	08/18/07
Pre-amplifier	CB-001	TRC	98-02	08/28/07
Line Switch Box	CB-01	TRC	98-04	08/28/07
FTB-1-6 Attenuator	15542	Mini – Circuits	9620 03	08/28/07
20dB Attenuator	CAT-20	Mini – Circuits	9620 13	08/28/07
Coaxial Cable	BNC3200B-0058	JYEBAO	CL-05	08/28/07
Coaxial Cable	BNC31VB-0316	JYEBAO	IF-01CA0069-036	08/28/07
50 Ohm Terminator	370BNM	NARDA	PWR5W	07/20/07
50 Ohm Terminator	370BNM	NARDA	PWR5W	07/20/07
50 Ohm Terminator	370BNM	NARDA	PWR5W	12/02/07
50 Ohm Terminator	370BNM	NARDA	PWR5W	12/02/07

The level of confidence of 95%, the uncertainty of measurement of conducted emission is +3.10dB / -4.84dB.

2.3 Test Result of Conducted Emissions

The following table shows a summary of the highest emissions of power line conducted emissions on the LIVE and NETURAL conductors of the EUT power cord. The test data only recorded worst case in report.

Test Conditions: Temperature : 25.0 °C Humidity : 73.0 % RH

Test Mode: Charging mode

Power Connected Emissions					***FCC Class B***		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	334.000	35.04	---	---	60.74	50.74	-15.70
	504.000	34.79	---	---	56.00	46.00	-11.21
	832.000	35.19	---	---	56.00	46.00	-10.81
	1503.000	37.79	---	---	56.00	46.00	-8.21
	2265.000	36.90	---	---	56.00	46.00	-9.10
	2925.000	36.59	---	---	56.00	46.00	-9.41
	5600.000	41.85	---	---	60.00	50.00	-8.15
	9880.000	33.83	---	---	60.00	50.00	-16.17
	18240.000	41.42	---	---	60.00	50.00	-8.58
Line 2	413.000	41.18	---	---	58.49	48.49	-7.31
	581.000	30.44	---	---	56.00	46.00	-15.56
	919.000	28.01	---	---	56.00	46.00	-17.99
	1550.000	34.97	---	---	56.00	46.00	-11.03
	2265.000	28.99	---	---	56.00	46.00	-17.01
	3189.000	33.64	---	---	56.00	46.00	-12.36
	5000.000	36.32	---	---	60.00	50.00	-13.68
	8870.000	30.30	---	---	60.00	50.00	-19.70
	18580.000	40.14	---	---	60.00	50.00	-9.86

NOTE:

(1)Margin = Peak Amplitude – Limit, *The reading amplitudes are all under limit.*

(2)A "+" sign in the margin column means the emission is OVER the Class B Limit and "–" sign of means UNDER the Class B limit

Chapter 3 Transmitter Duty Cycle Measurements

3.1 Test Condition and Setup

The duty cycle measurements were performed in a shielded enclosure. The EUT was placed on a wooded table which is 0.8 meters height and a bi-log periodic antenna was used distance about 3 meters for receiving. While testing EUT was set to transmit continuously. Various key configurations were also investigated to find the maximum duty cycle.

The resolution bandwidth and video bandwidth of the spectrum analyzer was all set to 1MHz to encompass all significant spectral components during the test. The analyzer operated in linear scale and zero span mode after tuning to the transmitter carrier frequency. The spectrum analyzer measured pules width. The pulse width was determined by the difference between the two half voltage points on a pulse.

The duty cycle was determined by the following equation:

$$\text{Duty Cycle (\%)} = \frac{\text{Total on interval in a complete pulse train}}{\text{Length of a complete pulse train}} \text{ X } 100\%$$

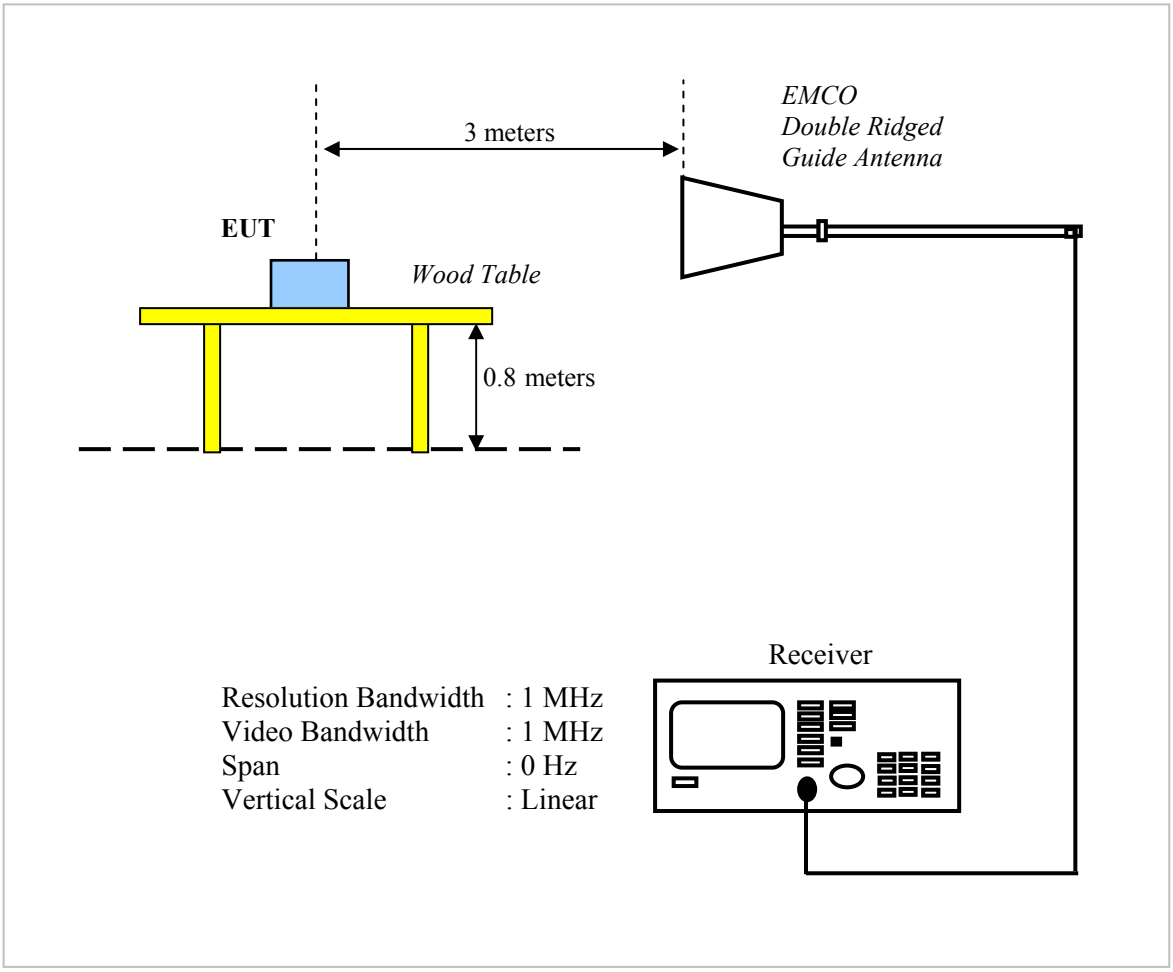
To calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and be obtained from following conversion:

Duty Cycle Correction Factor (dB) = 20 X Log_{10} Duty Cycle

3.2 List of Test Instruments

				Calibration Date
Instrument Name	Model No.	Brand	Serial No.	Next time
EMI Receiver	8546A	H P	3520A00242	09/06/07
RF Filter Section	85460A	H P	3448A00217	09/06/07
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	12/11/07
Spectrum Analyzer	8564E	HP	3720A00840	12/11/07
Microwave Preamplifier	84125C	HP	US36433002	11/18/07
Horn Antenna	3115	EMCO	9104-3668	02/05/08

3.3 Test Instruments Configuration



3.4 Test Result

Following is the test result, which produce maximum duty cycle:

Total on interval in a complete pulse train

= 222μs

Length of a complete pulse train

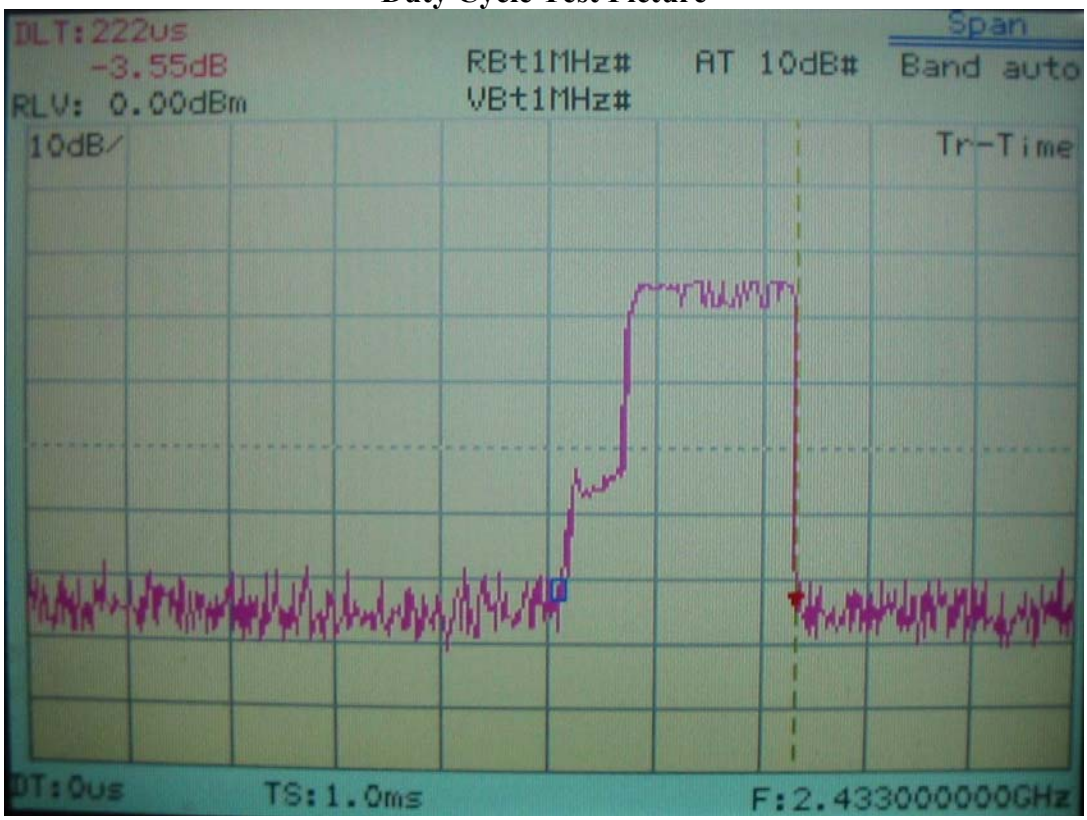
= 1.81ms

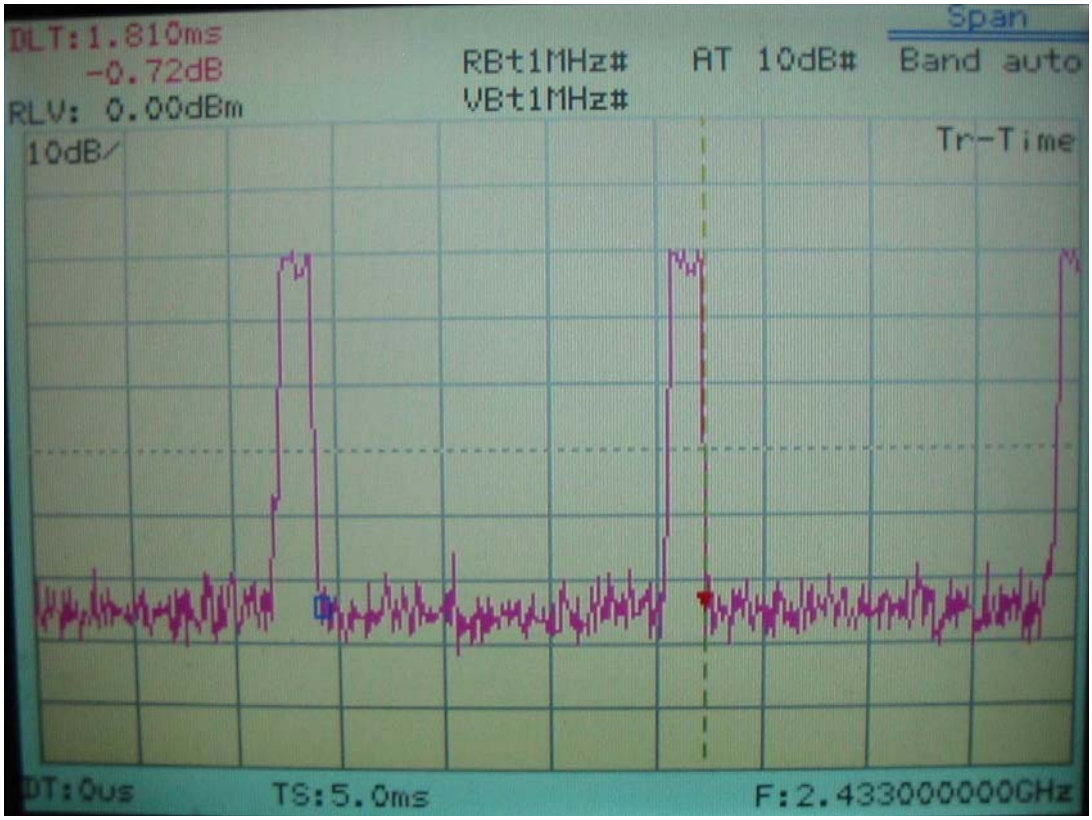
Duty Cycle (%) = 0.222ms / 1.81ms * 100% = 0.123

Duty Cycle Correction Factor (dB) = 20 * Log (0.123) = -18.20

A plot is attached on the following page.

Duty Cycle Test Picture





Chapter 4 Radiated Emissions Measurements

4.1 Test Condition & Setup

We'd performed the test by the radiated emission skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. For the measurement above 1GHz, according to the guidance we'd set the spectrum analyzer's 6dB bandwidth RBW to 1MHz.

This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard 85460A EMI Receiver, SCHWARZECK whole range Small Biconical Antenna (model: UBAA9114 & BBVU9135) is used to measure frequency from 30 MHz to 1GHz. The final test is used the HP 85460A spectrum and 8564E spectrum was examined from 1GHz to 25GHz using an Hewlett Packard Spectrum Analyzer, EMCO/HP Horn Antenna (Model 3115 / 84125-80008) for 1G - 25GHz.

A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 25GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 25GHz) and the analyzer was operated in the maximum hold mode. There is a test condition applies in this test item, the test procedure description as the following:

Three channels were tested, one in the top, one in the middle and the other in bottom. The setting up procedure is recorded on <1.3>

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies corresponding to upper, middle and bottom channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB), and cable loss (dB) at the appropriate frequency. Since the EUT was set to transmit continuously, with *duty cycle* is present.

For frequency between 30MHz to 1000MHz

FIa (dBuV/m) = FIr (dBμV) + Correction Factors + Duty Cycle

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna factor + (Cable loss – Amplitude gain) + Switching box loss

For frequency between 1GHz to 25GHz

FIa (dBμV/m) = FIr (dBμV) + Correction Factor + Duty Cycle

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna factor + (Cable loss – Amplitude gain) + Switching box loss

4.2 List of Test Instruments

				Calibration Date
Instrument Name	**Model**	**Brand**	**Serial No.**	**Next time**
EMI Receiver	8546A	HP	3520A00242	09/06/07
RF Filter Section	85460A	HP	3448A00217	09/06/07
Small Biconical Antenna	UBAA9114 & BBVU9135	SCHWARZECK	127	12/07/07
Pre-amplifier	PA1F	TRC	1FAC	08/20/07
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	08/20/07
Coaxial Cable (Double shielded, 15 meter)	A30A30-0058-50FS-15M	JYEBAO	SMA-01	08/20/07
Coaxial Cable (1.1 meter)	A30A30-0058-50FS-1M	JYEBAO	SMA-02	08/20/07
Spectrum Analyzer	8564E	HP	3720A00840	12/11/07
Microwave Preamplifier	84125C	HP	US36433002	11/18/07
Horn Antenna	3115	EMCO	9104-3668	02/05/08
Standard Guide Horn Antenna	84125-80008	HP	18-26.5GHz	12/12/07
Standard Guide Horn Antenna	84125-80001	HP	26.5-40GHz	12/12/07
Pre-amplifier	PA2F	TRC	2F1GZ	06/20/07
Coaxial Cable (3 miter)	A30A30-0058-50FST118	JYEBAO	MSA-05	06/20/07
Coaxial Cable (1 meter)	A30A30-0058-50FST118	JYEBAO	MSA-04	06/20/07

4.3 Test Result of Radiated Emissions

The peak values of fundamental emissions from the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following.

Testing room : Temperature : 25 ° C Humidity : 73 % RH

Fundamental Emissions

Channel	Frequency (MHz)	A. P. (H/V)	A.H. (m)	Table (degree)	Peak (dBμV/m)	Duty Cycle	True Value (dBμV/m)	Limit (dBμV)	Margin (dBμV)
Lowest	2405	H	1.00	157	87.55	-18.20	69.35	94.00	-24.65
		V	1.00	40	78.39	-18.20	60.19	94.00	-33.81
Middle	2441	H	1.00	155	85.16	-18.20	66.96	94.00	-27.04
		V	1.00	123	73.49	-18.20	55.29	94.00	-38.71
Highest	2468	H	1.00	276	86.06	-18.20	67.86	94.00	-26.14
		V	1.00	7	75.23	-18.20	57.03	94.00	-36.97

Note:

1. A. P. means antenna polarization, horizontal and vertical.
2. A. H. means antenna height.
3. Table means turntable turning position.
4. Peak amplitude means the fundamental emission measured.
5. True Value = Peak Value + Duty Cycle
6. Margin = True Value – Limit

4.4 Test Result of Spurious Radiated Emissions

The highest peak values of radiated emissions form the EUT at various antenna heights, antenna polarization, EUT orientation, etc. are recorded on the following.

Testing room : Temperature : 25 °C Humidity : 73% RH

Radiated Emissions of Horizontal for 30MHz to 25GHz [Lowest Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
196.11	23.67	1.00	353	-3.47	20.20	---	20.20	43.50	-23.30
322.21	26.98	1.00	177	-2.62	24.36	---	24.36	46.00	-21.64
869.05	21.15	1.00	177	13.99	35.14	---	35.14	46.00	-10.86
2335.42	42.83	1.00	20	9.03	51.86	-18.20	33.66	53.96	-20.30
12024.79	37.10	1.00	295	9.96	47.06	-18.20	28.86	53.96	-25.10
19239.58	46.20	1.00	89	1.60	47.80	-18.20	29.60	53.96	-24.36
21644.37	45.49	1.00	285	2.82	48.31	-18.20	30.11	53.96	-23.85
24049.17	45.29	1.00	334	3.33	48.62	-18.20	30.42	53.96	-23.54

Radiated Emissions of Vertical for 30MHz to 25GHz [Lowest Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
117.30	23.47	1.00	333	-2.25	21.22	---	21.22	43.50	-22.28
285.84	28.65	1.00	7	-3.48	25.17	---	25.17	46.00	-20.83
701.73	20.92	1.00	199	9.55	30.47	---	30.47	46.00	-15.53
2679.17	34.66	1.00	360	9.83	44.49	-18.20	26.29	53.96	-27.67
4811.04	46.77	1.00	322	3.71	50.48	-18.20	32.28	53.96	-21.68
19239.58	46.53	1.00	107	1.60	48.13	-18.20	29.93	53.96	-24.03
21644.37	45.20	1.00	280	2.82	48.02	-18.20	29.82	53.96	-24.14
24049.17	45.27	1.00	336	3.33	48.60	-18.20	30.40	53.96	-23.56

Radiated Emissions of Horizontal for 30MHz to 25GHz [Middle Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
187.62	25.09	1.00	232	-3.79	21.30	---	21.30	43.50	-22.20
329.49	27.37	1.00	167	-2.53	24.84	---	24.84	46.00	-21.16
564.71	20.57	1.00	325	5.47	26.04	---	26.04	46.00	-19.96
2391.67	41.00	1.00	78	9.19	50.19	-18.20	31.99	53.96	-21.97
2722.92	39.33	1.00	167	9.91	49.24	-18.20	31.04	53.96	-22.92
12206.04	38.61	1.00	358	9.79	48.40	-18.20	30.20	53.96	-23.76
21970.21	47.00	1.00	50	2.95	49.95	-18.20	31.75	53.96	-22.21
24410.42	46.83	1.00	151	3.10	49.93	-18.20	31.73	53.96	-22.23

Radiated Emissions of Vertical for 30MHz to 25GHz [Middle Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
117.30	22.95	1.00	163	-2.25	20.70	---	20.70	43.50	-22.80
287.05	29.66	1.00	107	-3.45	26.21	---	26.21	46.00	-19.79
607.15	20.91	1.00	99	6.68	27.59	---	27.59	46.00	-18.41
2722.92	37.17	1.00	259	9.91	47.08	-18.20	28.88	53.96	-25.08
7324.37	38.77	1.00	136	10.33	49.10	-18.20	30.90	53.96	-23.06
19530.00	46.82	1.00	217	1.70	48.52	-18.20	30.32	53.96	-23.64
21970.21	47.16	1.00	45	2.95	50.11	-18.20	31.91	53.96	-22.05
24410.42	46.82	1.00	137	3.10	49.92	-18.20	31.72	53.96	-22.24

Radiated Emissions of Horizontal for 30MHz to 25GHz [Highest Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
307.66	27.20	1.00	287	-2.80	24.40	---	24.40	46.00	-21.60
330.70	27.19	1.00	257	-2.51	24.68	---	24.68	46.00	-21.32
564.71	20.57	1.00	152	5.47	26.04	---	26.04	46.00	-19.96
2572.92	38.33	1.00	70	9.63	47.96	-18.20	29.76	53.96	-24.20
4937.92	46.27	1.00	168	4.17	50.44	-18.20	32.24	53.96	-21.72
7402.92	41.44	1.00	153	10.39	51.83	-18.20	33.63	53.96	-20.33
19746.04	47.34	1.00	334	1.89	49.23	-18.20	31.03	53.96	-22.93
24679.58	46.00	1.00	340	3.02	49.02	-18.20	30.82	53.96	-23.14

Radiated Emissions of Vertical for 30MHz to 25GHz [Highest Channel]

Radiated Emission				CF	Peak Value	Duty Cycle	True Value	FCC Class B	
Frequency (MHz)	Amplitude (dBμV)	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
117.30	24.11	1.00	13	-2.25	21.86	---	21.86	43.50	-21.64
285.84	29.57	1.00	215	-3.48	26.09	---	26.09	46.00	-19.91
894.51	20.99	1.00	21	14.95	35.94	---	35.94	46.00	-10.06
2506.25	41.00	1.00	329	9.50	50.50	-18.20	32.30	53.96	-21.66
7402.92	39.94	1.00	99	10.39	50.33	-18.20	32.13	53.96	-21.83
19742.50	47.82	1.00	184	1.89	49.71	-18.20	31.51	53.96	-22.45
22211.04	45.32	1.00	72	3.34	48.66	-18.20	30.46	53.96	-23.50
24679.58	45.82	1.00	82	3.02	48.84	-18.20	30.64	53.96	-23.32

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)
3. Peak Value = Reading Amplitude + Correction Factors
4. True Value = Peak Value + Duty Cycle

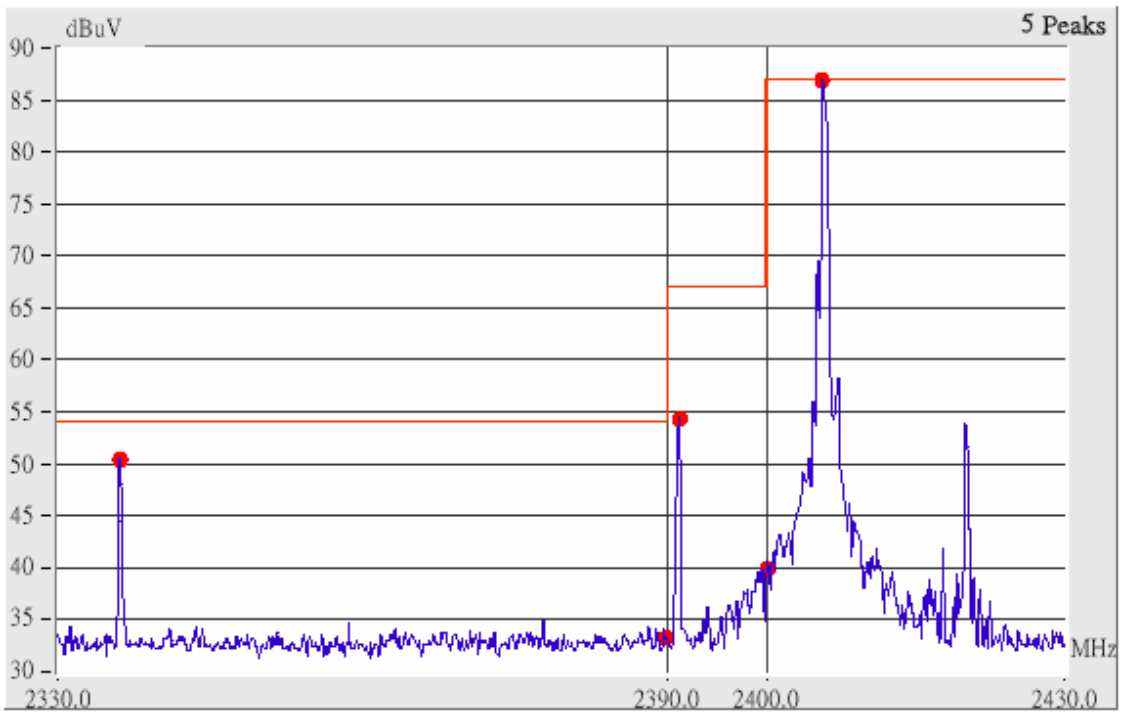
4.5 Test Result of the Bandedge

§ 15.249 (c) Emissions 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 §15.209, whichever is the lesser attenuation.

We perform this section by the *radiated manner*, the RBW is set to 100kHz and VBW>RBW. We'd made the observation *up to 10th harmonics and the criterion is all the harmonic/spurious emissions must be 50dB below the highest emission level measured.* If the emissions fall in the restricted bands stated in the Part15.205(a) must also *comply with the radiated emission limits specified in Part15.209(a). (Peak mode: RBW=VBW=1MHz, Average mode: RBW=1MHz; VBW=10Hz)*

The following pages show our observations referring to the lowest channel and highest channel respectively. Test Condition & Setup: same as 4.1 to 4.2.

Lowest

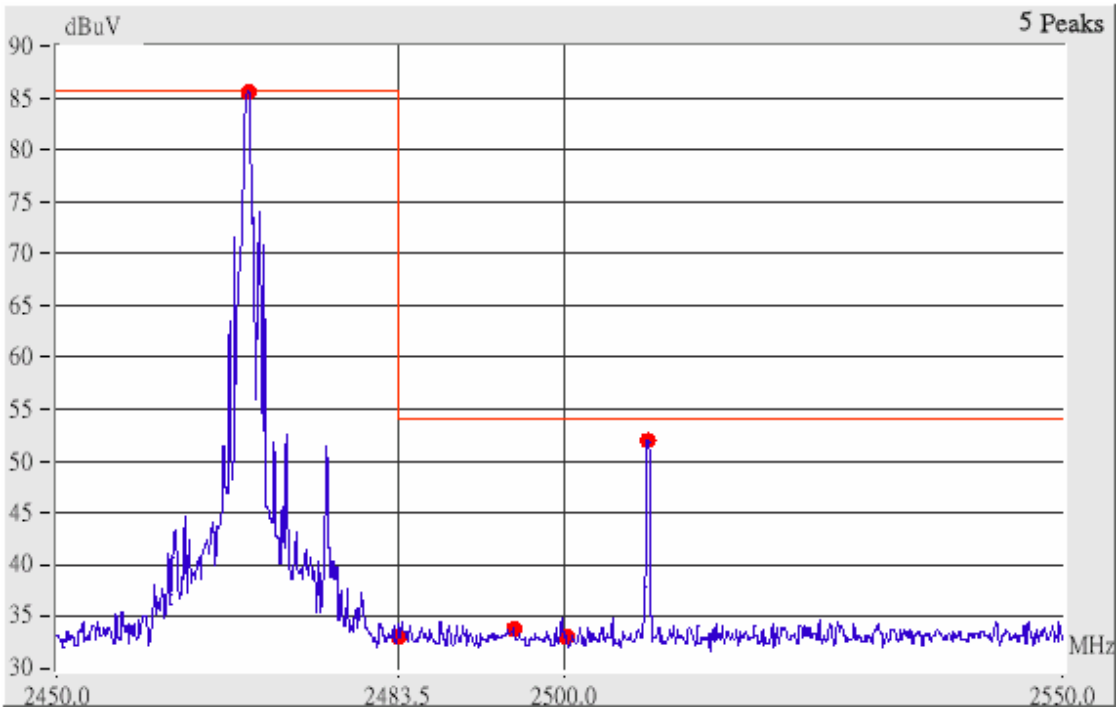


This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of lowest channel.

1. The lobe left by the fundamental side is already 50dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission				*CF*	*Peak Value*	*Duty Cycle*	*True Value*	*FCC Class B*	
Frequency (MHz)	Ant. P.	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
2336.12	Hor	1.00	287	9.03	50.53	-18.20	32.33	53.96	-21.63
2390.88	Hor	1.00	209	9.18	54.35	-18.20	36.15	53.96	-17.81
2335.69	Ver	1.00	358	9.03	46.86	-18.20	28.66	53.96	-25.30
2390.83	Ver	1.00	144	9.18	45.68	-18.20	27.48	53.96	-26.48

Highest



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of highest channel.

1. The lobe right by the fundamental side is already 50dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

Radiated Emission				*CF*	*Peak Value*	*Duty Cycle*	*True Value*	*FCC Class B*	
Frequency (MHz)	Ant. P.	Ant. H. (m)	Angle	(dB)	(dBμV/m)	(dB)	(dBμV/m)	Limit (Avg.) (dBμV/m)	Margin (dB)
2483.50	Hor	1.00	314	9.44	46.28	-18.20	28.08	53.96	-25.88
2492.83	Hor	1.00	354	9.47	50.64	-18.20	32.44	53.96	-21.52
2500.12	Hor	1.00	211	9.49	43.32	-18.20	25.12	53.96	-28.84
2508.12	Hor	1.00	354	9.51	52.01	-18.20	33.81	53.96	-20.15
2483.50	Ver	1.00	150	9.44	33.61	-18.20	15.41	53.96	-38.55
2490.50	Ver	1.00	166	9.46	33.97	-18.20	15.77	53.96	-38.19
2500.07	Ver	1.00	287	9.49	32.82	-18.20	14.62	53.96	-39.34
2508.06	Ver	1.00	322	9.51	43.84	-18.20	25.64	53.96	-28.32