CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C

Report No.: ET94S-10-059-01

Client:	Fiber Logic Communications, Inc.
Product:	OptiQwave-8310 STM-1 Digital Microwave System
Model:	OptiQwave-8310
FCC ID:	SBRFL8310
Manufacturer/supplier:	Fiber Logic Communications, Inc..

Date test item received:	2005/10/05
Date test campaign completed:	2005/11/08
Date of issue:	2005/11/16

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Internal photos 16 pages
Setup photos 6 pages

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Client	: Fiber Logic Communications, Inc.
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Manufacturer	: Fiber Logic Communications, Inc.
Address	: 5F-3, No.9 Prosperity Road One, Science-Based Industrial Park, Hsinchu, Taiwan
EUT	: OptiQwave-8310 STM-1 Digital Microwave System
Trade name	: Fiber Logic Communications, Inc.
Model No.	: OptiQwave-8310
Power Source	: AC 110V , 60Hz
Regulations applied	: FCC 47 CFR, Part 15 Subpart C (2005)

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

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② ISO/IEC 17025: BSMI, CNLA, DGT, NVLAP, CCIBLAC, UL, Compliance

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⑤ FCC Registration Number: 90588, 91094, 91095

NVLAP Lab Code 200133-0

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : OptiQwave-8310 STM-1 Digital Microwave System
b) Trade Name : Fiber Logic Communications, Inc.
c) Model No. : OptiQwave-8310
d) Power Supply : AC 110V , 60Hz

1.2 Characteristics of Device

The EUT is a digital microwave system that provides STM-1 point-to-point wireless connections in ISM band. Use 32 QAM modulation. The output power is 17 dBm.
There are two operation frequencies:

Channel	Frequency (MHz)
L1	5750
H1	5825

Two external antennas were used for testing:

	Brand Name	Model No.	Type
Antenna A	Tripoint Global	DFPD1-52	Flat Panel
Antenna B	Andrew	P6F-52	Parabolic

1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.4 and FCC CFR 47 Part 2 and Part 15.

1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.
This site has been accreditation as a FCC filing site.

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For unintentional device, according to §15.107(a) Line Conducted Emission Limits is as following:

Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

*Decreases with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limits is same as above table.

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

(3) Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

(4) Bandwidth Requirement

According to 15.247 (a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

(5) Output Power Requirement

For systems using digital modulation , according to 15.247(b), the maximum peak output power of the intentional radiator shall not exceed 1 Watt.

(6) Spurious Emissions Measurement

According to 15.247 (c) , in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

(7) Power Density Requirement

According to 15.247 (d) , for digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission..

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communicationss Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3. SYSTEM TEST CONFIGURATION

3.1 Devices for Tested System

Device	Manufacture	Model No.	S/N No.	Cable Description
OptiQwave-8310*	Fiber Logic Communications, Inc.	OptiQwave-8310	----	1.8m Unshielded Power Cable
Antenna A (Flat Panel Antenna)	Gabriel electronics Inc.	DFPD1-52	----	5.8m Shielded Signal Cable
Antenna B (Parabolic Antenna)	Andrew	P6F-52	----	5.8m Shielded Signal Cable

Note:

Remark "*" means equipment under test.

4 CONDUCTED EMISSION MEASUREMENT

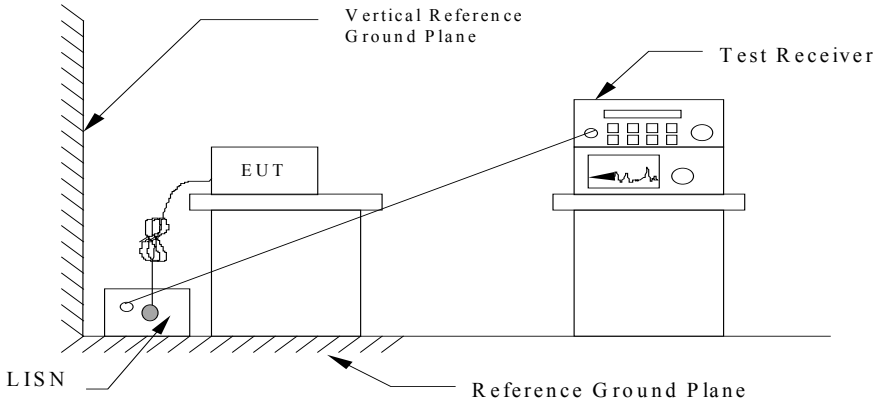
4.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and §15.207(a) respectively. Both Limits are identical specification.

4.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 1 : Conducted emissions measurement configuration



4.3 Conducted Emission Data

4.3.1 Operation Mode: Antenna A

Test Date : Nov. 03, 2005 Temperature : 24℃ Humidity : 58%

Freq. (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.165	53.8	53.1	----	----	0.2	54.0	53.3	----	----	65.2	55.2	-11.2
0.243	45.1	***	----	----	0.2	45.3	***	----	----	62.0	52.0	-16.7
0.247	***	48.9	----	----	0.2	***	49.1	----	----	61.9	51.9	-12.8
0.329	40.3	43.8	----	----	0.2	40.5	44.0	----	----	59.5	49.5	-15.5
0.411	28.6	30.3	----	----	0.2	28.8	30.5	----	----	57.6	47.6	-27.1
0.595	***	30.3	----	----	0.2	***	30.5	----	----	56.0	46.0	-25.5
6.660	28.8	***	----	----	0.2	29.0	***	----	----	60.0	50.0	-31.0
8.906	***	27.1	----	----	0.2	***	27.3	----	----	60.0	50.0	-32.7
9.859	23.0	***	----	----	0.2	23.2	***	----	----	60.0	50.0	-36.8

Note:

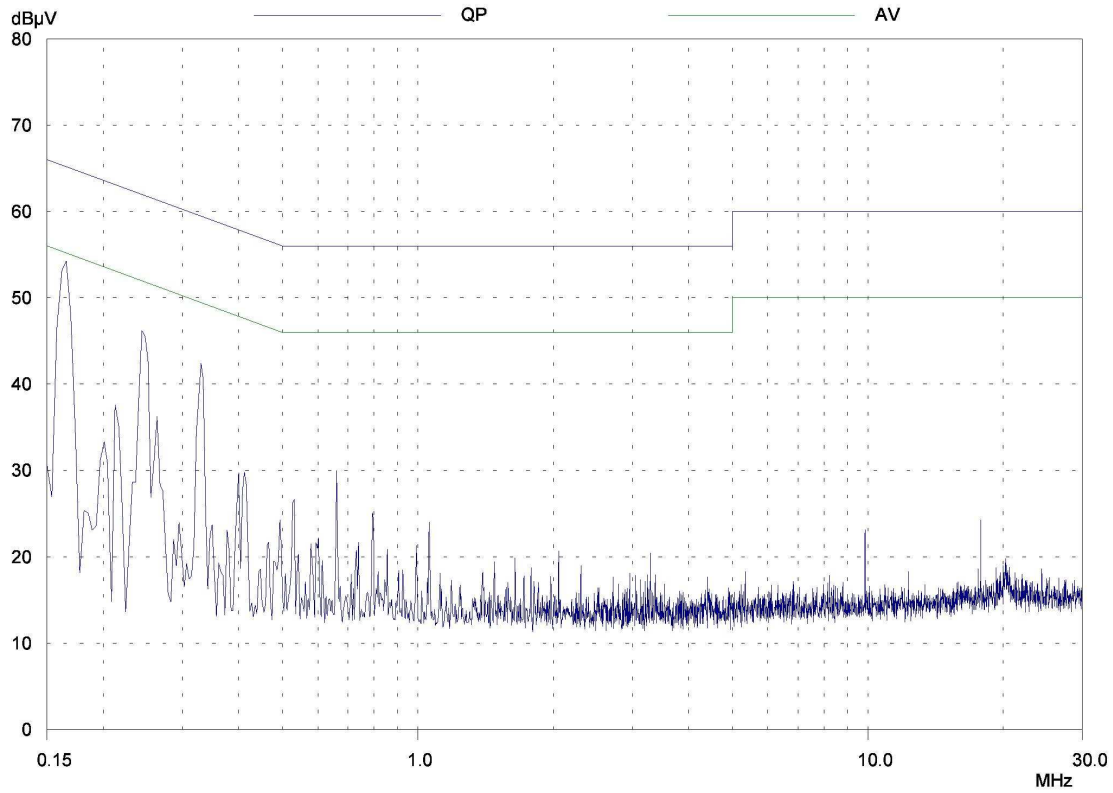
1. Place of measurement: EMC LAB. of the ETC.
2. "***" means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. "#" means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.
6. Please refer to page 14 to page 15 for chart

Conducted Emission

Peak Value

EUT:	8310
Manuf:	
Op Cond:	Low
Operator:	Jengde
Test Spec:	
Comment:	L1
Result File:	low_l1.dat : New Measurement

Final Measurement:	Detector:	
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	10 dB



Conducted Emission

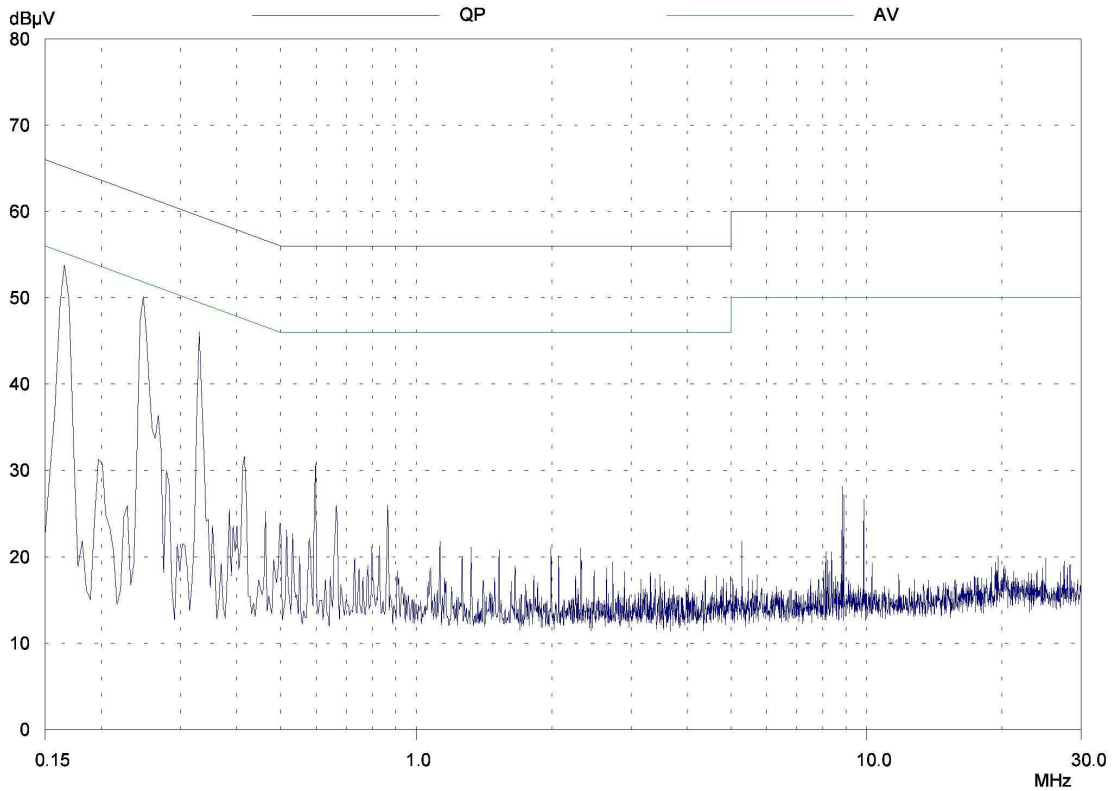
Peak Value

EUT:	8310
Manuf:	
Op Cond:	Low
Operator:	Jengde
Test Spec:	
Comment:	L2

Result File: low_l2.dat : New Measurement

Final Measurement:

Detector:	
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB



4.3.2 Operation Mode: Antenna B

Test Date : Nov. 03, 2005 Temperature : 24℃ Humidity : 58%

Freq. (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dB)
	Q.P Value		AVG. Value			Q.P Value		AVG. Value		Q.P Value	AVG. Value	Q.P. or AVG.
	L1	L2	L1	L2		L1	L2	L1	L2			
0.165	52.8	***	----	----	0.2	53.0	***	----	----	65.2	55.2	-12.2
0.169	***	52.8	----	----	0.2	***	53.0	----	----	65.0	55.0	-12.0
0.251	50.8	48.8	----	----	0.2	51.0	49.0	----	----	61.7	51.7	-10.7
0.333	41.9	42.6	----	----	0.2	42.1	42.8	----	----	59.4	49.4	-16.6
0.400	34.2	***	----	----	0.2	34.4	***	----	----	57.9	47.9	-23.5
0.410	***	33.0	----	----	0.2	***	33.2	----	----	57.6	47.6	-24.4
0.601	31.3	30.7	----	----	0.2	31.5	30.9	----	----	56.0	46.0	-24.5
4.763	28.6	***	----	----	0.2	28.8	***	----	----	56.0	46.0	-27.2
9.859	***	26.3	----	----	0.2	***	26.5	----	----	60.0	50.0	-33.5

Note:

1. Place of measurement: EMC LAB. of the ETC.
2. "***" means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. "#" means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.
6. Please refer to page 17 to page 18 for chart

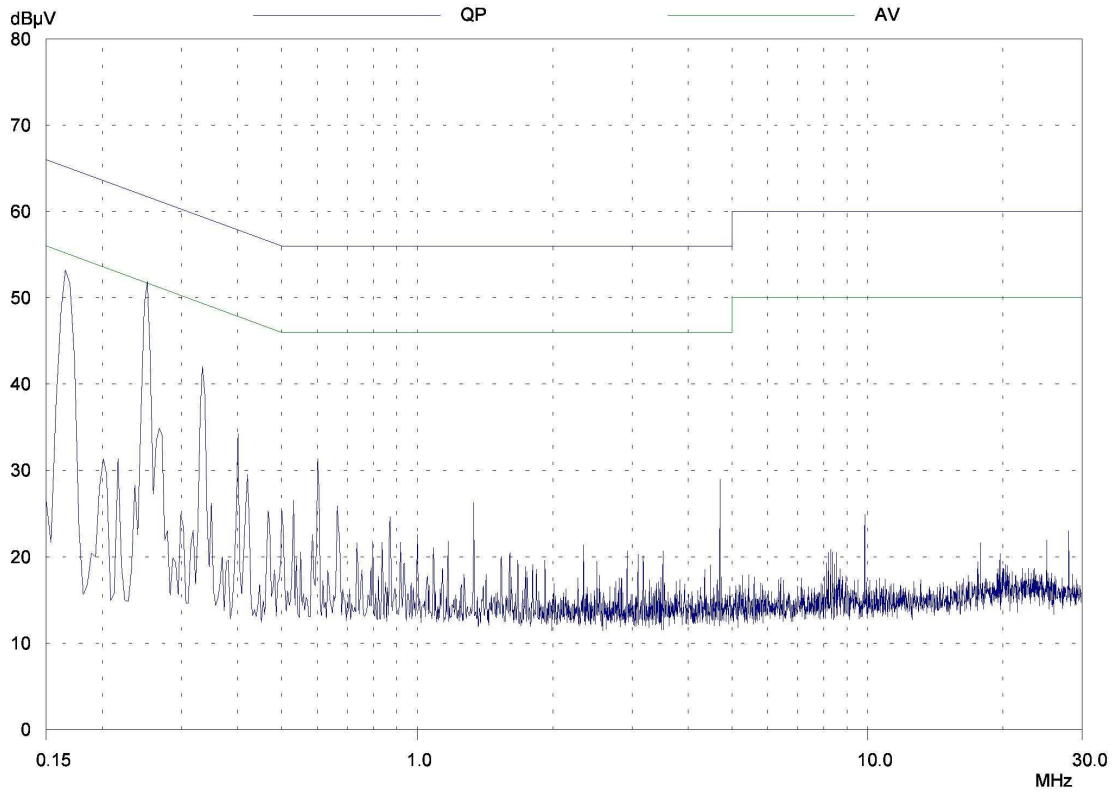
Conducted Emission

Peak Value

EUT:	8310
Manuf:	
Op Cond:	Hi
Operator:	Jengde
Test Spec:	
Comment:	L1

Result File: hi_l1.dat : New Measurement

Final Measurement:	Detector:	
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	10 dB



Conducted Emission

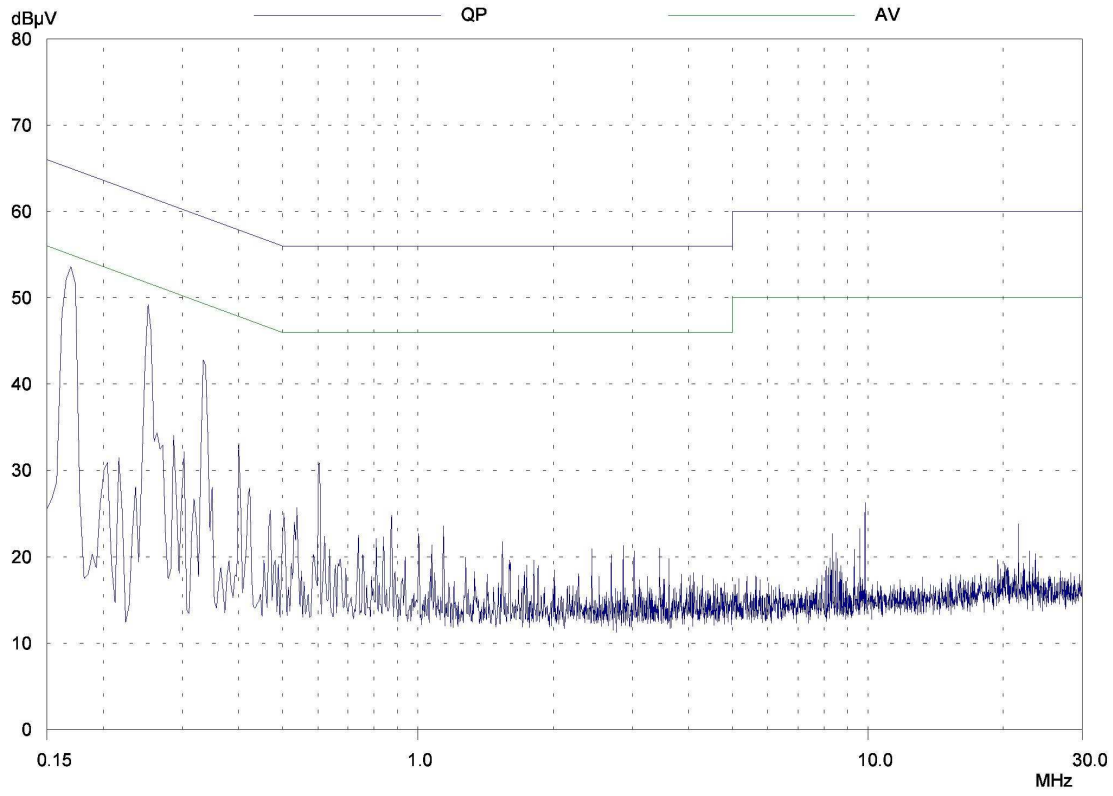
Peak Value

EUT:	8310
Manuf:	
Op Cond:	Hi
Operator:	Jengde
Test Spec:	
Comment:	L2

Result File: hi_l2.dat : New Measurement

Final Measurement:

Detector:	
Meas Time:	1sec
Peaks:	8
Acc Margin:	10 dB



4.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR (Included Cable Loss)

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

RESULT = 22.5 + 0.1 = 22.6 dB μ V

Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]

= 13.48 μ V

4.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test.

Equipment	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde and Schwarz	ESCS30	04/01/2006
Line Impedance Stabilization network	EMCO	3825	11/09/2006

5 ANTENNA REQUIREMENT

5.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to §15.247 (c) (1) (ii), system operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

5.2 Antenna Construction and Directional Gain

Antenna A

Manufacturer:	Gabriel electronics Inc.
Model No.:	DFPD1-52
Frequency :	5.250 - 5.850 GHz
Size :	1 ft
Gain:	Low : 23.0 dBi
	Mid : 23.5 dBi
	Higt: 23.9 dBi

Antenna B

Manufacturer:	Andrew Corporation
Model No.:	D6F-52
Frequency :	5.250 - 5.850 GHz
Size :	6 ft
Gain:	Low : 37.0 dBi
	Mid : 37.6 dBi
	Higt: 38.1 dBi

6 EMISSION BANDWIDTH MEASUREMENT

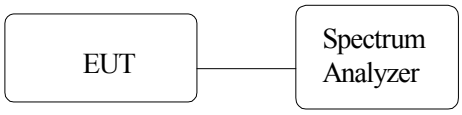
6.1 Standard Applicable

According to 15.247(a)(2), system using digital modulation techniques, the minimum 6dB bandwidth shall be at least 500 kHz.

6.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Figure 2: Emission bandwidth measurement configuration.



6.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Hewlett-Packard	8564EC	09/16/2006

6.4 Measurement Data

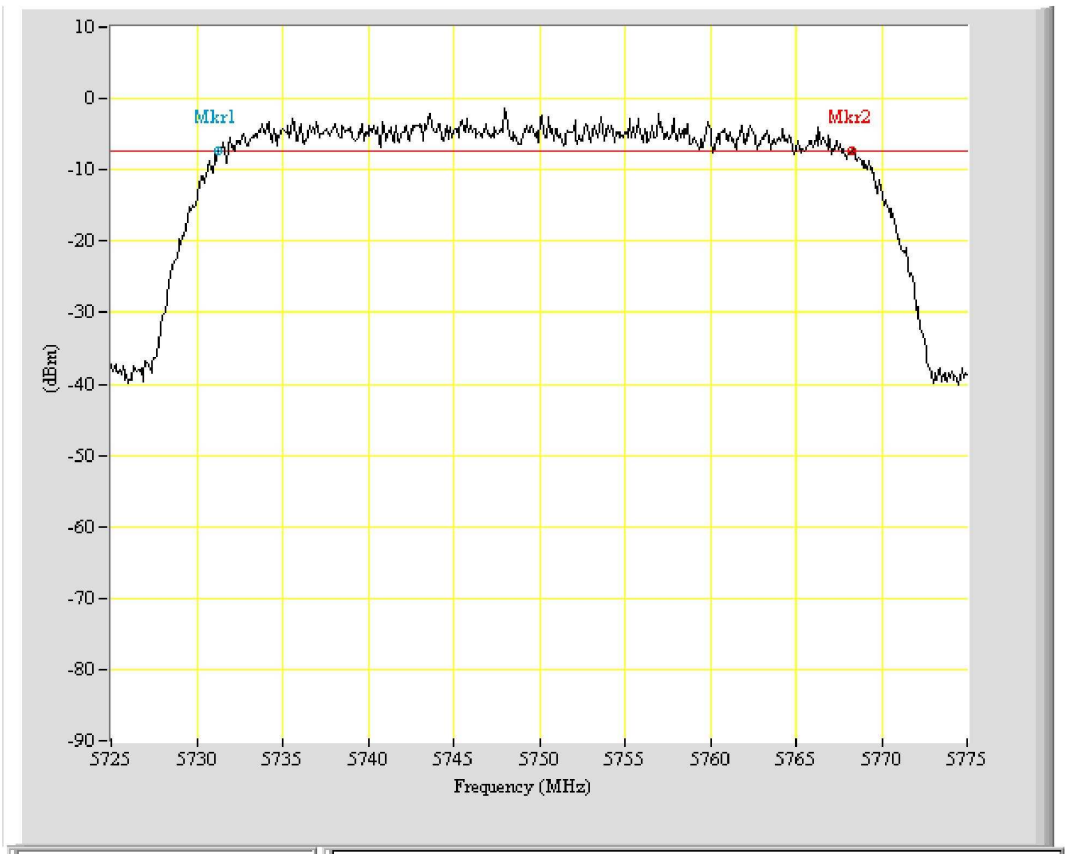
Test Date: Oct. 04, 2005 Temperature: 25℃ Humidity: 62 %

Channel	Frequency (MHz)	Data Transfer Rate (Mbps)	6dB Bandwidth (MHz)	FCC Limit (kHz)	Chart
L1	5750	1	36.583	500	Page 23
H1	5825	1	37.000	500	Page 24

Note:

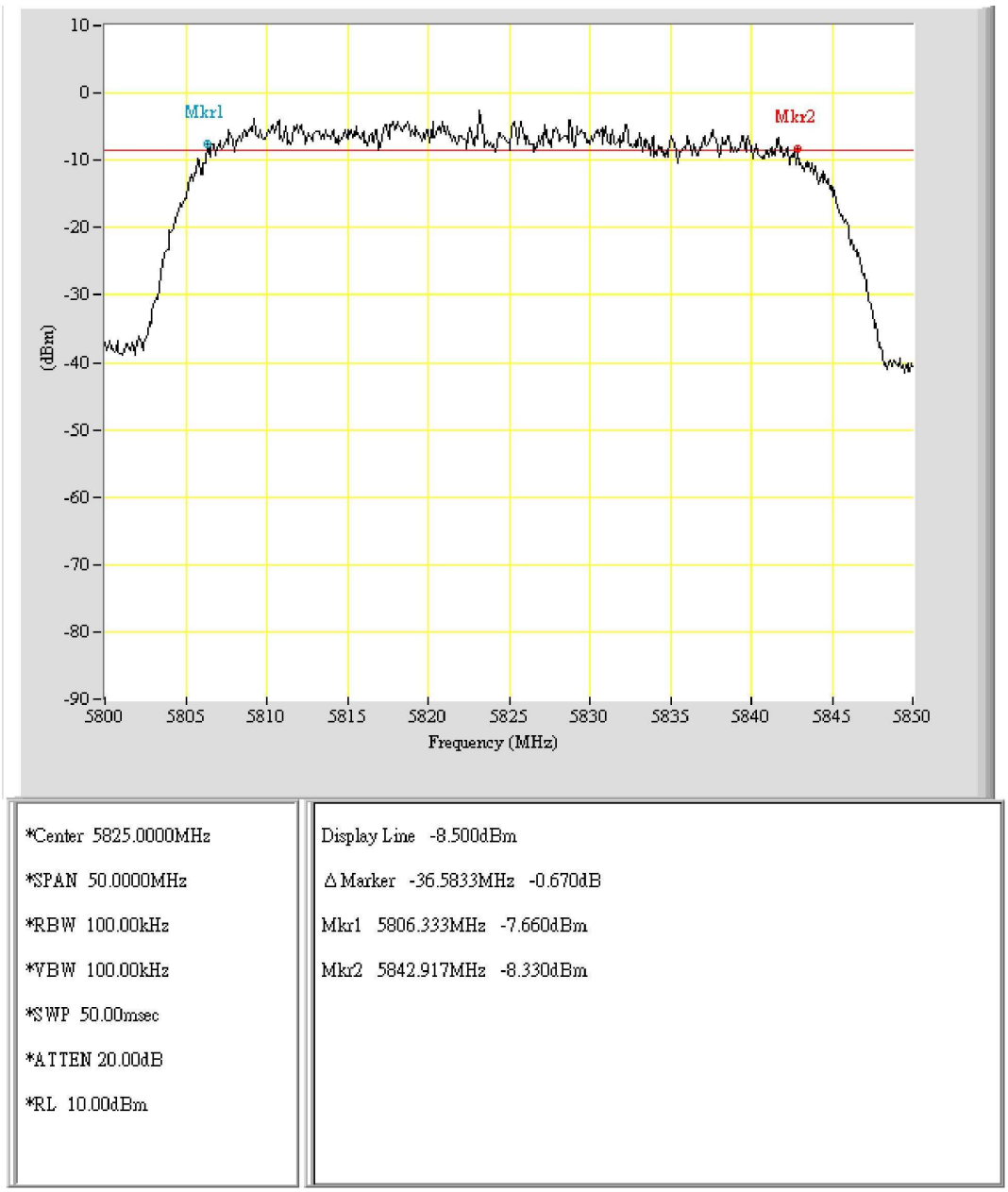
1.Please refer to page 23 to page 24 for chart

2. The estimated measurement uncertainty of the result measurement is 8.25×10^{-7} *(1GHz≦f≦ 18GHz)*



*Center 5750.0000MHz	Display Line -7.330dBm
*SPAN 50.0000MHz	ΔMarker -37.0000MHz 0.000dB
*RBW 100.00kHz	Mkr1 5731.250MHz -7.330dBm
*VBW 300.00kHz	Mkr2 5768.250MHz -7.330dBm
*SWP 50.00msec	
*ATTEN 20.00dB	
*RL 10.00dBm	

EUT: 8310
Purpose: 6dB_BW
Condition: L1
Note:



EUT: 8310
Purpose: 6dB_BW
Condition: H1
Note:

7 OUTPUT POWER MEASUREMENT

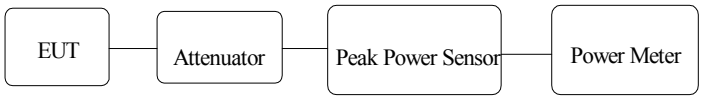
7.1 Standard Applicable

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 3. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range.
3. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.
4. Repeat above procedures until all frequencies measured were complete.

Figure 3: output power measurement configuration.



7.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2006
Power Meter	Boonton	4532	06/13/2006
Peak Power Sensor	Boonton	56518	07/21/2006

7.4 Measurement Data

Test Date: Oct. 04, 2005 Temperature: 25℃ Humidity: 62 %

Channel	Frequency (MHz)	Data Transfer Rate (Mbps)	Reading (dBm)	Attenuator & Cable Loss (dB)	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (mW)	FCC Limit (mW)
L1	5750	1	1.5	-15.5	17.00	50.1	1000
H1	5825	1	0.3	-16.5	16.83	48.1	1000

Note:

The estimated measurement uncertainty of the result measurement is ±1.5dB(1GHz≦f≦18GHz)

8 POWER DENSITY MEASUREMENT

8.1 Standard Applicable

According to 15.247(d), for direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 2. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of spectrum analyzer on highest level appearing on spectral display within a 300 kHz frequency span.
4. Set the spectrum analyzer on a 3 kHz resolution bandwidth and 10 kHz video bandwidth as well as max. hold function, then record the measurement result.
5. Repeat above procedures until all measured frequencies were complete.

8.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Hewlett-Packard	8564EC	09/16/2006

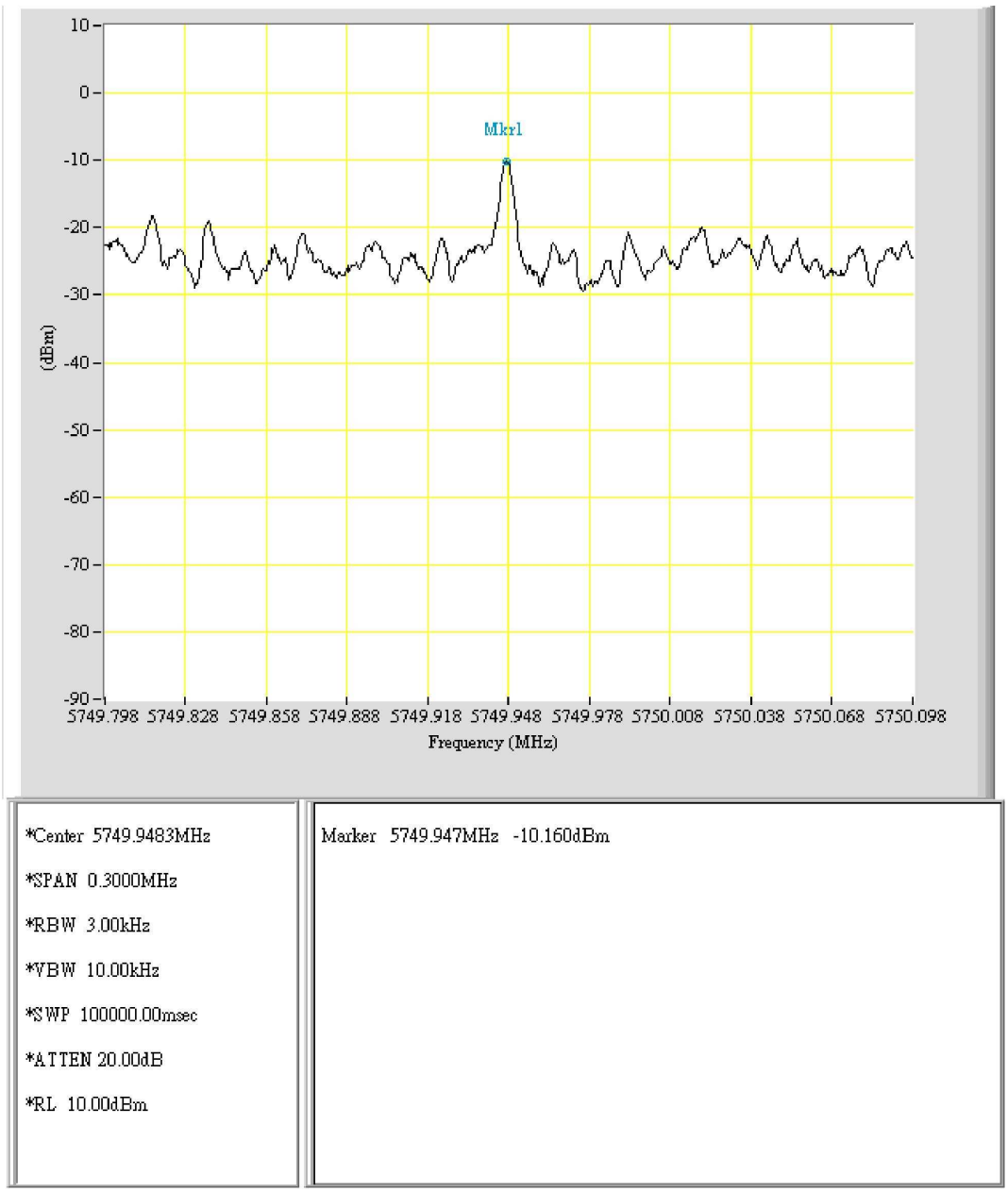
8.4 Measurement Data

Test Date: Oct. 04, 2005 Temperature: 25 ℃ Humidity: 62 %

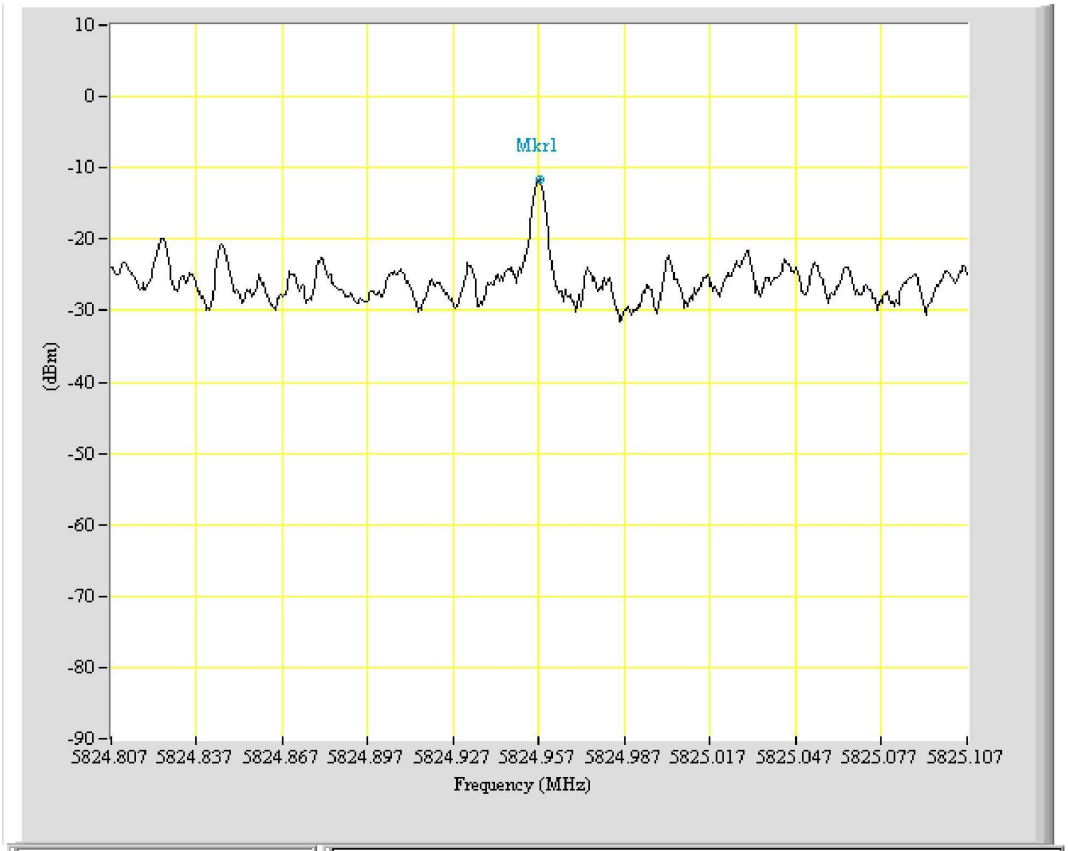
Channel	Frequency (MHz)	Data Transfer Rate (Mbps)	Reading (dBm)	Cable Loss (dB)	Peak Power Spectral Density (dBm)	FCC Limit (dBm)	Chart
L1	5750	1	-10.16	5.5	-4.66	8	Page 29
H1	5825	1	-11.66	6.5	-5.16	8	Page 30

Note:

1. *Please refer to page 29 to page 30 for chart*
2. *The estimated measurement uncertainty of the result measurement is ±1.5dB(1GHz≦f≦ 18GHz)*



EUT: 8310
Purpose: PwrDensity
Condition: L1
Note:



*Center 5824.9567MHz *SPAN 0.3000MHz *RBW 3.00kHz *VBW 10.00kHz *SWP 100000.00msec *ATTEN 20.00dB *RL 10.00dBm	Marker 5824.957MHz -11.660dBm

EUT: 8310
Purpose: PwrDensity
Condition: H1
Note:

9 SPURIOUS EMISSION - RF CONDUCTED MEASUREMENT

9.1 Standard Applicable

According to 12.247 (c) , in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 2. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Hewlett-Packard	8564EC	09/16/2006

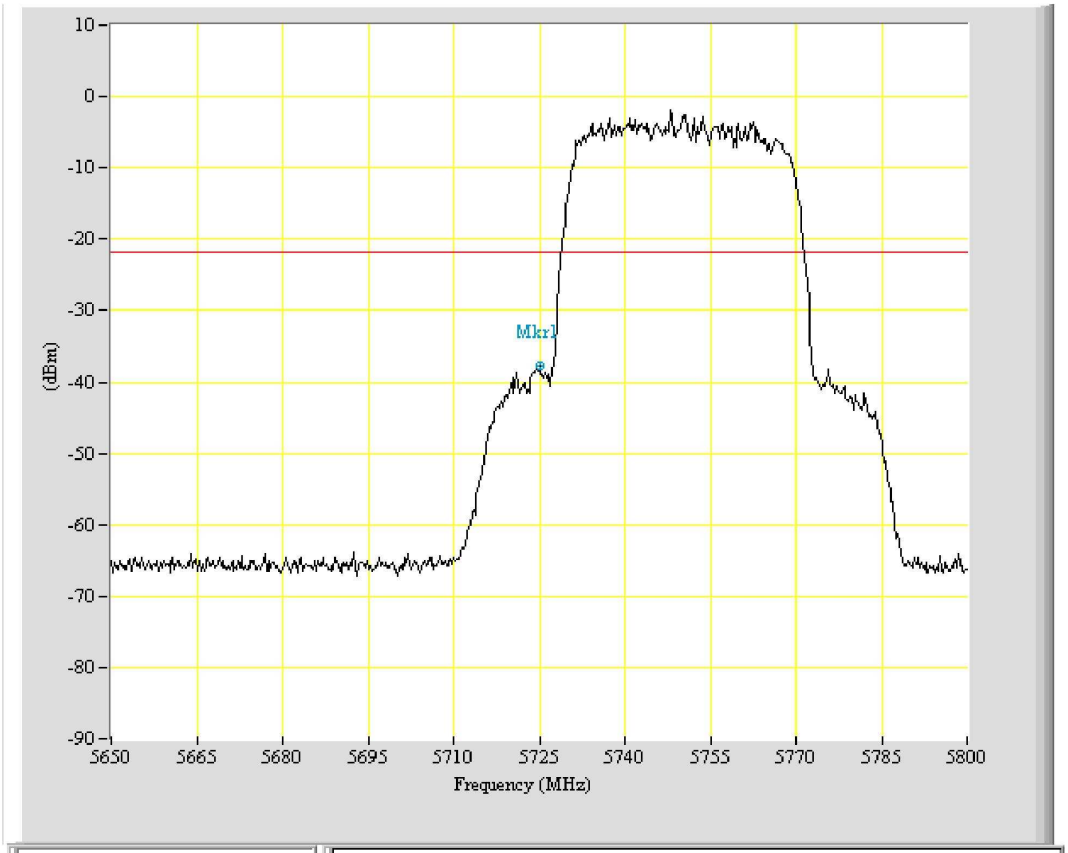
9.4 Measurement Data

Test Date: Oct. 04, 2005 Temperature: 25 ℃ Humidity: 62 %

Channel	Frequency(MHz)	Chart
L1	5750	Page 33, Page 35
H1	5825	Page 34, Page 36

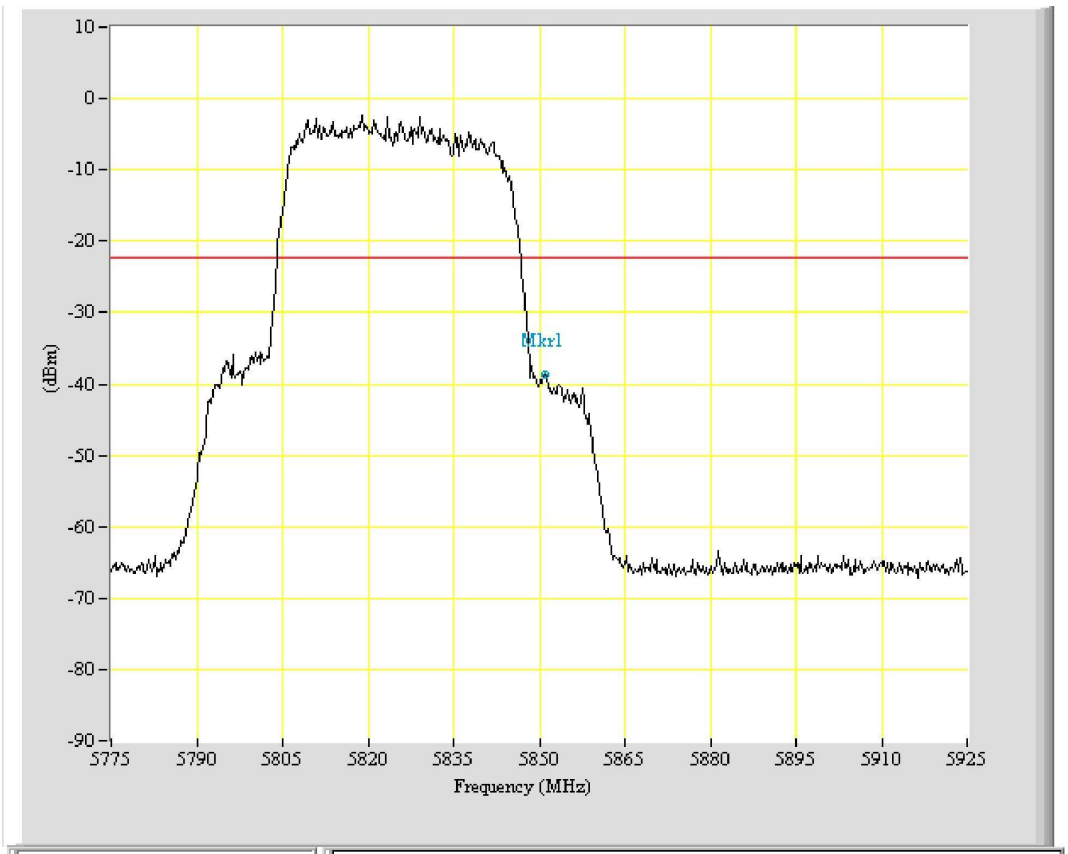
All out-of –band conducted emissions were more than 20dB below the carrier.

Note: Please refer to page 33 to page 36 for chart



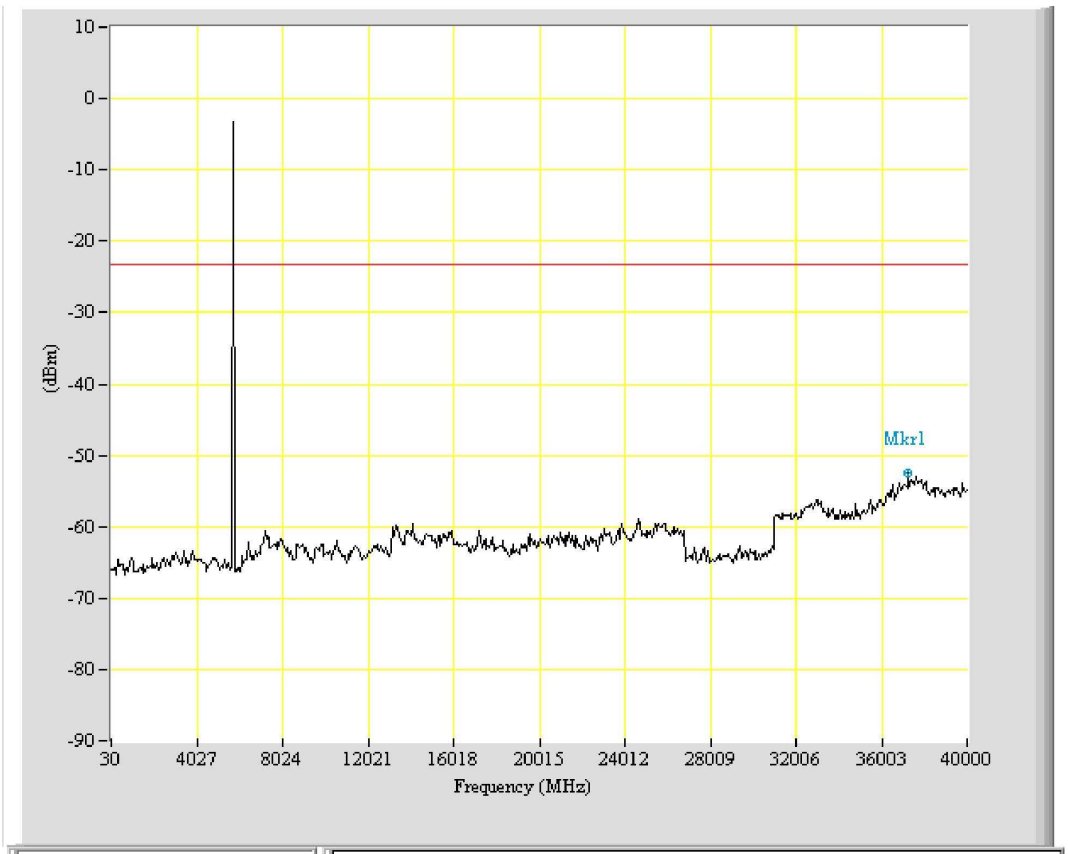
*Center 5725.0000MHz	Display Line -21.830dBm
*SPAN 150.0000MHz	Marker 5725.000MHz -37.830dBm
*RBW 100.00kHz	
*VBW 300.00kHz	
*SWP 50.00msec	
*ATTEN 20.00dB	
*RL 10.00dBm	

EUT: 8310
Purpose: Band_Edge
Condition: L1
Note:



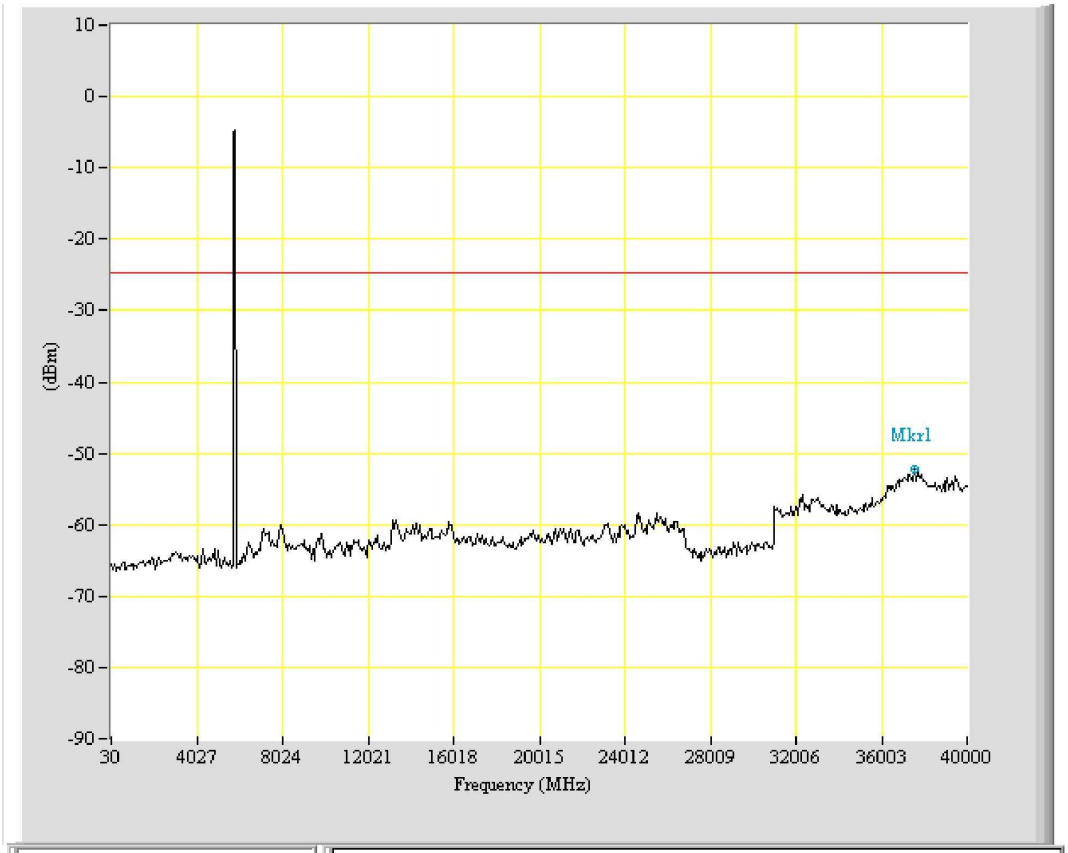
*Center 5850.0000MHz	Display Line -22.330dBm
*SPAN 150.0000MHz	Marker 5851.000MHz -38.660dBm
*RBW 100.00kHz	
*VBW 300.00kHz	
*SWP 50.00msec	
*ATTEN 20.00dB	
*RL 10.00dBm	

EUT: 8310
Purpose: Band_Edge
Condition: H1
Note:



*Center 20015.0000MHz	Display Line -23.330dBm
*SPAN 39970.0000MHz	Marker 37268.717MHz -52.500dBm
*RBW 100.00kHz	
*VBW 300.00kHz	
*SWP 10000.00msec	
*ATTEN 20.00dB	
*RL 10.00dBm	

EUT: 8310
Purpose: Band_Edge_All
Condition: L1
Note:



*Center 20015.0000MHz	Display Line -24.660dBm
*SPAN 39970.0000MHz	Marker 37535.183MHz -52.330dBm
*RBW 100.00kHz	
*VBW 300.00kHz	
*SWP 10000.00msec	
*ATTEN 20.00dB	
*RL 10.00dBm	

EUT: 8310
Purpose: Band_Edge_All
Condition: H1
Note:

10 RADIATED EMISSION MEASUREMENT

10.1 Standard Applicable

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and direct sequence spread spectrum, and the out band emission shall be comply with §15.247 (c)

10.2 Measurement Procedure

A.Preliminary Measurement For Portable Devices.

For **antenna movable** devices, the following procedure was performed to determine the maximum emission axis of antenna of EUT (X,Y and Z axis):

1. With the receiving antenna is H polarization, rotate the antenna of EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antennna is V polarization, rotate the antenna of EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. The axis of maximum emission from antenna of EUT was determined and the configuration was used to perform the final measurement.
4. The position in which the maximum noise occurred was "**Y** axis". (Please see the test setup photos)

B. Final Measurement

1. Setup the configuration per figure 4 and 5 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, it is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions. For emission frequencies measured above 1 GHz, a pre-scan be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

   Note : A filter was used to avoid pre-amplifier saturated when measure TX operation mode.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Check the three frequencies of highest emission with varying the datarate, placement of ANT. cables associated with EUT to obtain the worse case and record the result.

Figure 4 : Frequencies measured below 1 GHz configuration

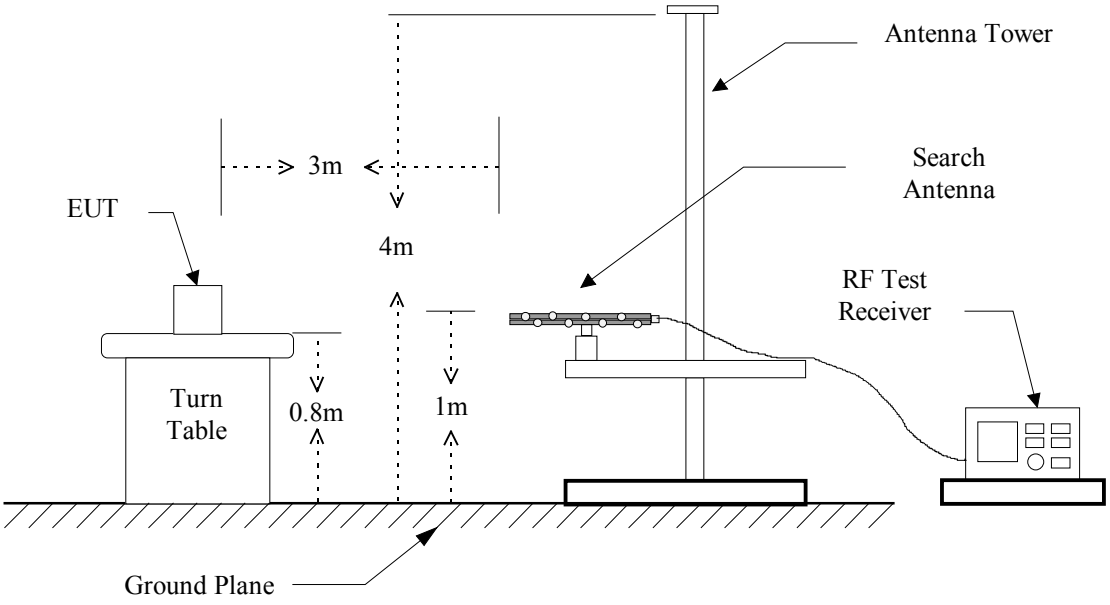
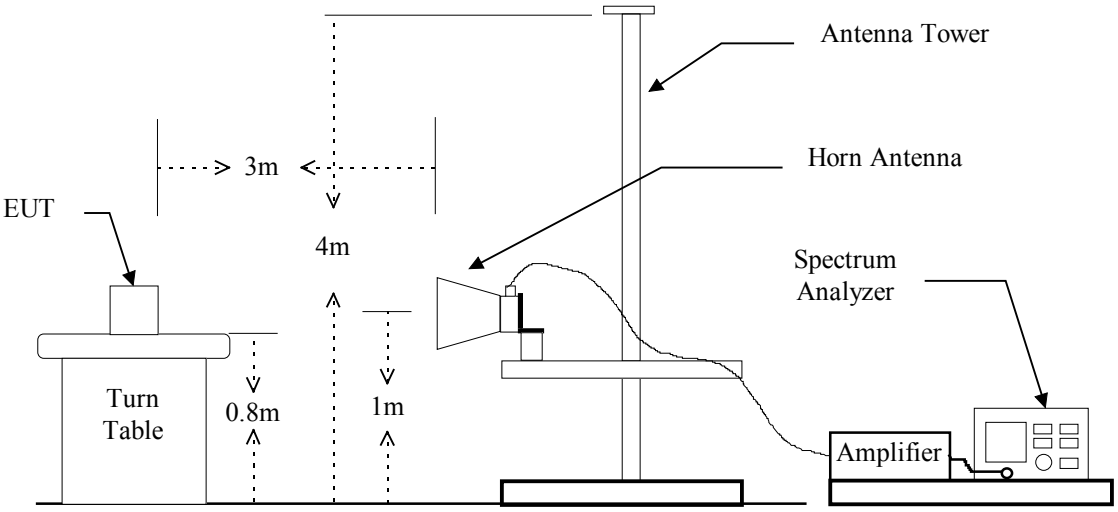


Figure 5 : Frequencies measured above 1 GHz configuration



10.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Hewlett-Packard	8546A	09/06/2006
BiconiLog Antenna	Schwarzbeck	9160	11/24/2006
Horn Antenna	EMCO	3115	06/04/2006
Horn Antenna	EMCO	3116	07/19/2006
Preamplifier	Hewlett-Packard	8449B	09/16/2006
Spectrum Analyzer	Hewlett-Packard	8564EC	09/15/2006
Spectrum Analyzer	Rohde & Schwarz	FSU46	10/03/2006
Amplifier Module	TRC	IJ07	03/10/2006

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	300 kHz
	Spectrum Analyzer	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

10.4 Radiated Emission Data

10.4.1 Harmonic

Test Date: Nov. 08, 2005 Temperature: 28 ℃ Humidity: 68 %

Antenna A

a) Channel L1

Fundamental Frequency: 5750 MHz

Frequency	Reading (dBuV)				Factor	Result @3m		Limit @3m	
	H		V		(dB)	(dBuV/m)		(dBuV/m)	
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave.
11500.000	---	---	---	---	7.5	---	---	74.0	54.0
17250.000	---	---	---	---	12.0	---	---	74.0	54.0
23000.000	---	---	---	---	17.4	---	---	74.0	54.0

b) Channel H1

Fundamental Frequency: 5825 MHz

Frequency	Reading (dBuV)				Factor	Result @3m		Limit @3m	
	H		V		(dB)	(dBuV/m)		(dBuV/m)	
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave.
11650.000	---	---	---	---	7.5	---	---	74.0	54.0
17475.000	---	---	---	---	12.0	---	---	74.0	54.0

Antenna B

a) Channel L1

Fundamental Frequency: 5750 MHz

Frequency	Reading (dBuV)				Factor	Result @3m		Limit @3m	
	H		V		(dB)	(dBuV/m)		(dBuV/m)	
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave.
11500.000	---	---	---	---	7.5	---	---	74.0	54.0
17250.000	---	---	---	---	12.0	---	---	74.0	54.0
23000.000	---	---	---	---	17.4	---	---	74.0	54.0

b) Channel H1

Fundamental Frequency: 5825 MHz

Frequency	Reading (dBuV)				Factor	Result @3m		Limit @3m	
	H		V		(dB)	(dBuV/m)		(dBuV/m)	
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave.
11650.000	---	---	---	---	7.5	---	---	74.0	54.0
17475.000	---	---	---	---	12.0	---	---	74.0	54.0

Note :

1. Item of margin shown in above table refer to average limit.
2. Remark "---" means that the emissions level is too low to be measured.

10.4.2 Spurious Emission

10.4.2.1 Operation Mode: Antenna A

Test Date: Nov. 07, 2005 Temperature: 28 ℃ Humidity: 68%

a) Emission frequencies below 1 GHz

Emission **Frequency** (MHz)	**Meter Reading** (dBuV)		*ORR'd* **Factor** (dB/m)	**Results** (dBuV/m)		**Limit** (3m) (dBuV/m)	**Margins** (dB)	**Table Degree** (deg)		**Ant. High** (m)	
	HOR.	**VERT.**		**HOR.**	**VERT.**			**HOR.**	**VERT.**	**HOR.**	**VERT.**
36.790	15.2	***	13.2	28.4	***	40.0	-11.6	53	***	1.1	***
38.730	***	20.4	13.2	***	33.6	40.0	-6.4	***	314	***	1.1
256.980	13.4	***	14.6	28.0	***	46.0	-18.0	45	***	1.1	***
342.340	***	15.5	18.1	***	33.6	46.0	-12.4	***	265	***	1.1
426.730	***	13.2	20.1	***	33.3	46.0	-12.7	***	186	***	1.1
455.830	15.1	21.3	20.7	35.8	42.0	46.0	-4.0	133	270	1.1	1.1
565.440	***	15.4	23.6	***	39.0	46.0	-7.0	***	278	***	1.1
664.380	14.3	***	25.7	40.0	***	46.0	-6.0	315	***	1.1	***
725.490	12.9	***	26.6	39.5	***	46.0	-6.5	307	***	1.1	***
785.630	16.3	16.9	27.2	43.5	44.1	46.0	-1.9	247	354	1.1	1.1

b) Emission frequencies above 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)
Radiated emission frequencies above 1 GHz to 40 GHz were too low to be measured.						

Note:

1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f≦300MHz).
   ±4.4dB (300MHz<f≦1000MHz).

10.4.2.2 Operation Mode: Antenna B

Test Date: Nov. 07, 2005 Temperature: 28 ℃ Humidity: 68%

a) Emission frequencies below 1 GHz

Emission **Frequency** (MHz)	**Meter Reading** (dBuV)		*ORR'd* **Factor** (dB/m)	**Results** (dBuV/m)		**Limit** (3m) (dBuV/m)	**Margins** (dB)	**Table Degree** (deg)		**Ant. High** (m)	
	HOR.	**VERT.**		**HOR.**	**VERT.**			**HOR.**	**VERT.**	**HOR.**	**VERT.**
38.730	***	21.1	13.2	***	34.3	40.0	-5.7	***	154	***	1.1
206.540	12.2	***	13.0	25.2	***	43.5	-18.3	53	***	1.1	***
342.340	11.2	16.1	18.1	29.3	34.2	46.0	-11.8	340	258	1.1	1.1
429.640	***	15.7	20.1	***	35.8	46.0	-10.2	***	318	***	1.1
455.830	14.3	***	20.7	35.0	***	46.0	-11.0	250	***	1.1	***
458.740	***	20.6	20.7	***	41.3	46.0	-4.7	***	234	***	1.1
664.380	11.8	***	25.7	37.5	***	46.0	-8.5	245	***	1.1	***
725.490	13.4	12.9	26.6	40.0	39.5	46.0	-6.0	169	157	1.1	1.1
785.630	17.1	17.1	27.2	44.3	44.3	46.0	-1.7	198	318	1.1	1.1

b) Emission frequencies above 1 GHz

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)
Radiated emission frequencies above 1 GHz to 40 GHz were too low to be measured.						

Note:

1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f≦300MHz).
   ±4.4dB (300MHz<f≦1000MHz).

10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain