



MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Subpart C

Issued: July 14, 2010

Name and Address of the Applicant: PATLITE CORPORATION
8-8 Matsuyamachi, Chuo-ku, Osaka 542-0067 Japan

Test Item: Transmission unit

Identification: WDT-6M, WDT-5E

Serial No.: 01, 02

FCC ID: XQ3WDT

Sample Receipt Date: October 30, 2009

Test Specification: FCC Part 15 Subpart C, 15.247

Date of Testing: December 21, 28 and 29, 2009
January 7, 8 and 11,
June 29 and 30 and July 1, 2010

Test Result: PASS

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O. Itogawa, Engineer

Reviewed by: Y. Kawahara Date: July 14, 2010
Y. Kawahara, Deputy General Manager

Notes:

1. This Test Report should not be reproduced except in full, without the written approval of Cosmos Corporation.
2. All measurement data contained in this Test Report may have uncertainty. A judgment for the limitation should be taken into the count.
3. This Test Report is based on the tests made for sample provided, and it is not applicable to individual product identical to the sample.

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1. Description of Equipment Under Test

1.1 Product Description

Manufacturer	: PATLITE CORPORATION
Model (referred to as the EUT)	: WDT-6M, WDT-5E
Nominal Voltage	: DC 24V
Type of Modulation	: DSSS
Mode of Operation	: <input type="checkbox"/> duplex <input type="checkbox"/> 1/2 duplex <input checked="" type="checkbox"/> simplex <input type="checkbox"/> other
The type of the equipment	: <input type="checkbox"/> Stand-alone <input checked="" type="checkbox"/> Combined Equipment <input type="checkbox"/> Plug -In Card <input type="checkbox"/> Other (Module Unit)
The type of the antenna	: <input checked="" type="checkbox"/> Integral <input type="checkbox"/> external <input type="checkbox"/> Other
The type of power source	: <input type="checkbox"/> AC mains <input type="checkbox"/> Dedicated AC adapter (V) <input checked="" type="checkbox"/> DC Voltage <input type="checkbox"/> Battery
The type of battery (if applicable)	: N/A
Type of Operation	: <input type="checkbox"/> Continuous <input type="checkbox"/> Burst <input checked="" type="checkbox"/> Intermittent
Stand by Mode	: <input type="checkbox"/> Available <input checked="" type="checkbox"/> N/A
Intended functions	: Zigbee
The bandwidth of the IF filters	: N/A
Method of Communication Link	:
The operating frequency band	: 2405 to 2480MHz
The thermal limitation	: from +5 to +40

1.2 Antenna Description

No.	Type Name	Gain	Antenna Type	Remarks
1	AHD1403-244ST01	1.64dBi (-0.5dBd)	Dielectric chip antenna	Integral

1.3 Accompanied Peripherals Description

No.	Equipment Name	Manufacturer	Type Name	Serial Number	Remarks
1	Signal Tower	---	LE-502FBP	---	DC24V, 160mA

2. General Information

2.1 Test Methodology

All measurement subject to the present report was carried out according to the procedures in ANSI C63.4: 2003.

2.2 Test Facility

All measurement was performed in the following facility;

Cosmos Corporation EMC Lab. Ohnogi

(2-3571 Ohaza-iwatachi, Ohnogi, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan) The test firm has been filed since March 7, 2008 under CFR 47 Part.2.948.

2.3 Traceability

The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

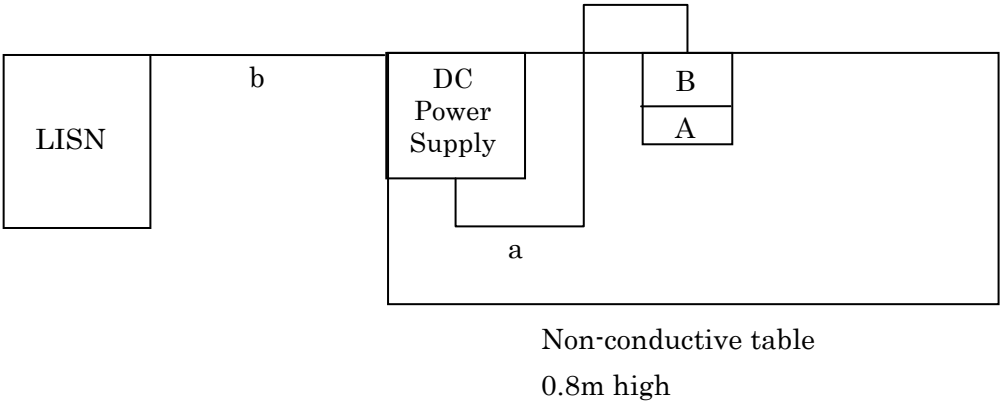
3. Summary of Test Results

Section	Test Item	Limit	Result
15. 207	AC Power Conducted Emission	See 5.1.2	Pass
15. 247(a)(1)	Spectrum Bandwidth of Frequency Hopping Spread Spectrum System	< 1MHz if using less than 15 non-overlapping channels	Pass
15. 247(a)(2)	Spectrum Bandwidth of Direct Sequence Spread Spectrum System	Min. 500kHz	Pass
15. 247(b)	Maximum Peak Output Power	Max. 1W (30dBm)	Pass
15. 247(d) 15. 209	Transmitter Radiated Emissions	See 5.4.2 See 5.5.2	Pass
15. 247(e)	Power Spectrum Density	Max. 8dBm	Pass
15. 247(d)	Band Edge Measurement	See 5.7.2	Pass

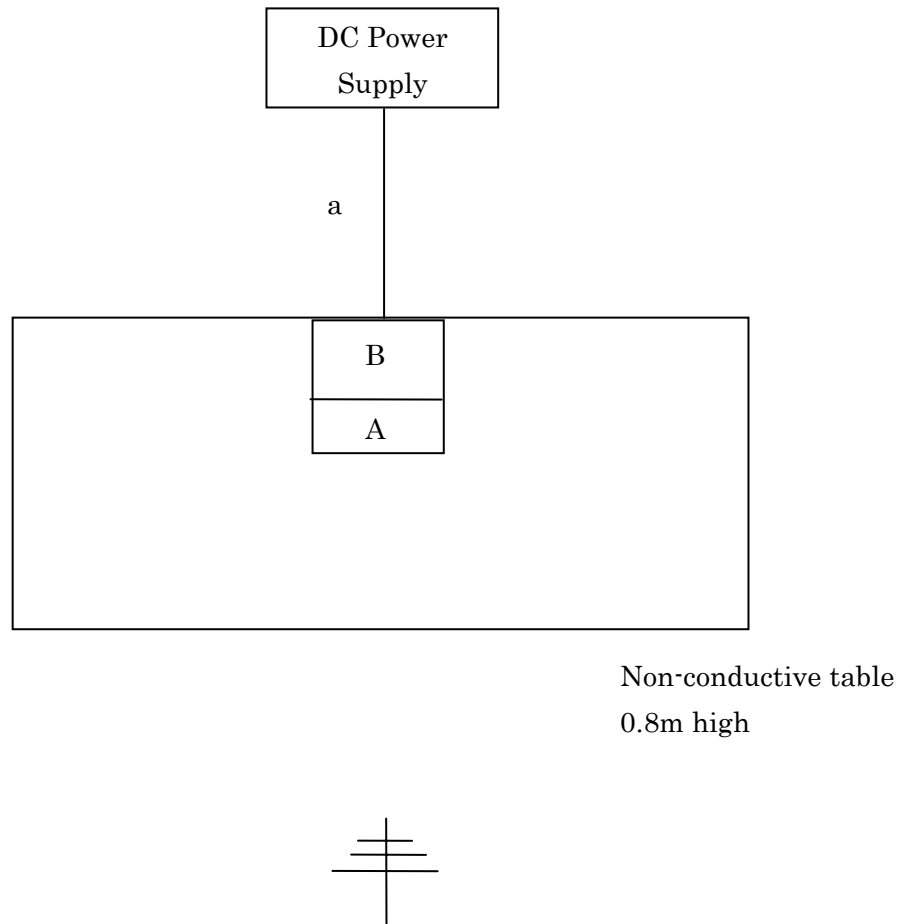
4. Test Configuration

	Instrument	Model		Cable	Length	Shield
A	Transmission unit	WDT-6M/ WDT-5E	a	DC Power Cable	1.0 m	×
B	Signal Tower	LE-502FBP	b	AC Power Cable	1.8 m	×

4.1 15. 207 AC Power Conducted Emission in Shield Room



4.2 15.247(d), 15.209 Transmitter Radiated Emissions, 15.209 Band Edge (Radiated), and
15.215 (c) 20 dB Bandwidth in 3m Anechoic Chamber



4.3 Test Mode

In all test configurations above, EUT makes continuous RF transmitting with manufacturer's specified power.

5. Measurement Result

5.1 15. 207 AC Power Conducted Emission

5.1.1 Setting Remarks

- Configure the EUT System in accordance with ANSI C63.4-2003.
- Non-conductive board (10mm thick) for EUT and non-conductive table (80cm high) for personal computer were used.
- Other power cord of support equipment is connected to another LISN to isolate its emission from the measured emission of EUT.
- The measuring port of LISN for support equipment was terminated by the 50Ω
- Activate the EUT System and run the software prepared for the test, if necessary.
- Refer to test configuration figure 4.1.

5.1.2 Minimum Standard

15. 207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

5.1.3 Result

EUT complies with the requirement.

Uncertainty of measurement : ± 2.26 dB
Temperature, Humidity : 24°C, 42 %

5.1.4 Measured Data

CJ10-094435E CE 0.15MHz-30MHz TotalNoise02.CED

<<Conducted Emission>>

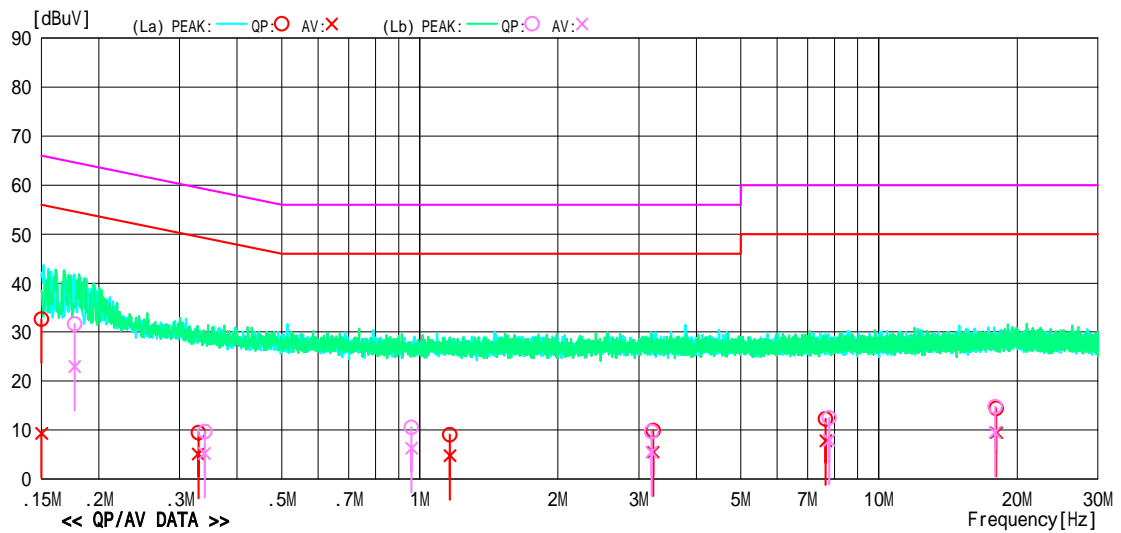
Cosmos Corporation Onoki Lab.
Date : 2010/07/01

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No : CJ10-094435E
Temp/Humi : 24 /42%
Condition : Operated
Remark :

Memo :

LIMIT : FCC 15.207(AV)
FCC 15.207(QP)



No	Freq. [MHz]	Reading Level		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV	QP	AV		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15013	22.4	-1.0	10.3	32.7	9.3	56.0	66.0	23.3	56.7	La	
2	0.32941	-0.7	-5.1	10.2	9.5	5.1	49.5	59.5	40.0	54.4	La	
3	1.16432	-1.1	-5.3	10.1	9.0	4.8	46.0	56.0	37.0	51.2	La	
4	3.22585	-0.4	-4.8	10.3	9.9	5.5	46.0	56.0	36.1	50.5	La	
5	7.65534	1.7	-2.8	10.6	12.3	7.8	50.0	60.0	37.7	52.2	La	
6	18.03032	3.3	-1.6	11.1	14.4	9.5	50.0	60.0	35.6	50.5	La	
7	0.17714	21.5	12.8	10.2	31.7	23.0	54.6	64.6	22.9	41.6	Lb	
8	0.34018	-0.6	-5.0	10.2	9.7	5.3	49.2	59.2	39.6	53.9	Lb	
9	0.95957	0.4	-3.8	10.1	10.5	6.3	46.0	56.0	35.5	49.7	Lb	
10	3.19870	-0.6	-4.8	10.3	9.7	5.5	46.0	56.0	36.3	50.5	Lb	
11	7.79514	1.9	-2.7	10.6	12.5	7.9	50.0	60.0	37.5	52.1	Lb	
12	17.91023	3.7	-1.5	11.0	14.7	9.5	50.0	60.0	35.3	50.5	Lb	

5.1.4 Measured Data (Continued)

CJ10-094435E CE 0.15MHz-30MHz TotalNoise02.CED

<<Conducted Emission>>

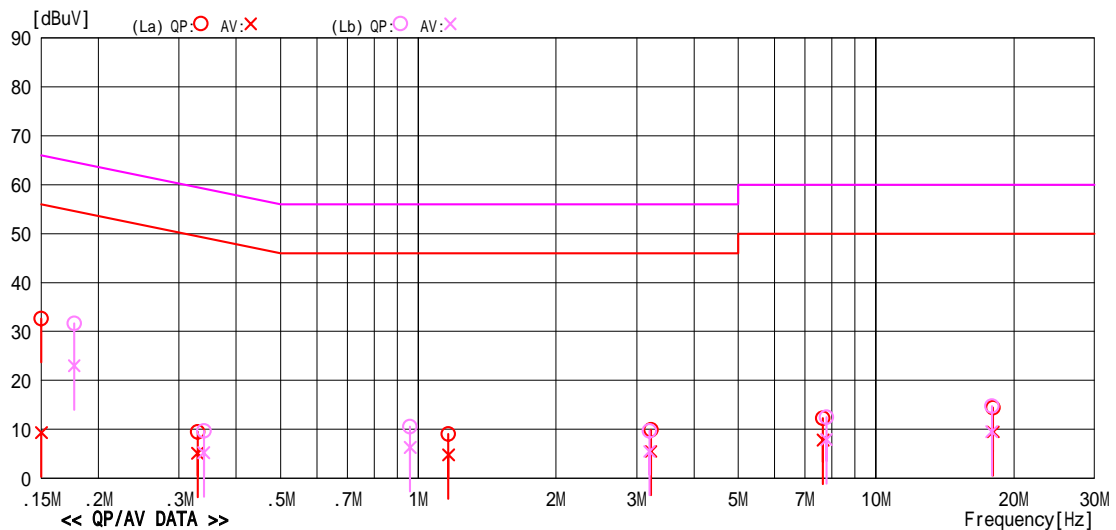
Cosmos Corporation Onoki Lab.
Date : 2010/07/01

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No : CJ10-094435E
Temp/Humi : 24 /42%
Condition : Operated
Remark :

Memo :

LIMIT : FCC 15.207(AV)
FCC 15.207(QP)



No	Freq. [MHz]	Reading Level		C.Fac	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV	QP	AV		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15013	22.4	-1.0	10.3	32.7	9.3	56.0	66.0	23.3	56.7	La	
2	0.32941	-0.7	-5.1	10.2	9.5	5.1	49.5	59.5	40.0	54.4	La	
3	1.16432	-1.1	-5.3	10.1	9.0	4.8	46.0	56.0	37.0	51.2	La	
4	3.22585	-0.4	-4.8	10.3	9.9	5.5	46.0	56.0	36.1	50.5	La	
5	7.65534	1.7	-2.8	10.6	12.3	7.8	50.0	60.0	37.7	52.2	La	
6	18.03032	3.3	-1.6	11.1	14.4	9.5	50.0	60.0	35.6	50.5	La	
7	0.17714	21.5	12.8	10.2	31.7	23.0	54.6	64.6	22.9	41.6	Lb	
8	0.34018	-0.6	-5.0	10.2	9.7	5.3	49.2	59.2	39.6	53.9	Lb	
9	0.95957	0.4	-3.8	10.1	10.5	6.3	46.0	56.0	35.5	49.7	Lb	
10	3.19870	-0.6	-4.8	10.3	9.7	5.5	46.0	56.0	36.3	50.5	Lb	
11	7.79514	1.9	-2.7	10.6	12.5	7.9	50.0	60.0	37.5	52.1	Lb	
12	17.91023	3.7	-1.5	11.0	14.7	9.5	50.0	60.0	35.3	50.5	Lb	

5.2 15. 247(a)(1) Spectrum Bandwidth and Channel Separation of Frequency Hopping Spread Spectrum System

5.2.1 Setting Remarks

- The both side of 20dB down value from peak power are measured by using delta-maker function of the spectrum analyzer.
- The spectrum analyzer is set-up as following;
 - ✓ Frequency Span : 10 MHz
 - ✓ Resolution bandwidth : 100 kHz
 - ✓ Video bandwidth : 300 kHz
 - ✓ Sweep : Auto
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- See test configuration figure 4.2.

5.2.2 Minimum Standard

The maximum permissible 20dB bandwidth is 1MHz, unless more than 15 non-overlapping channels are employed.

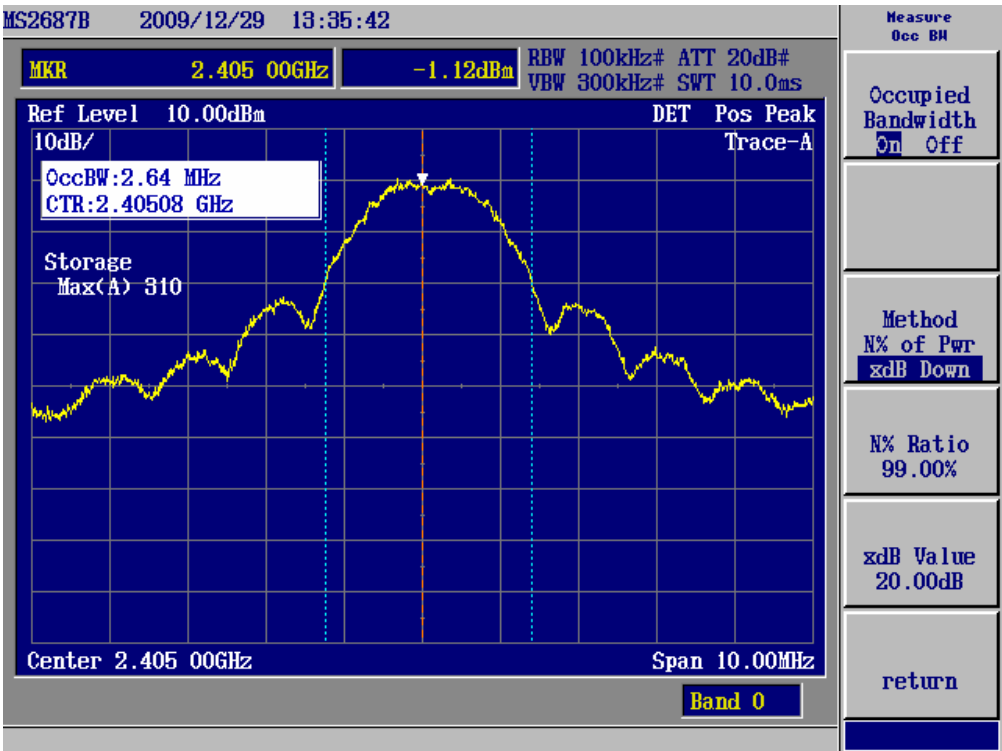
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

5.2.3 Result

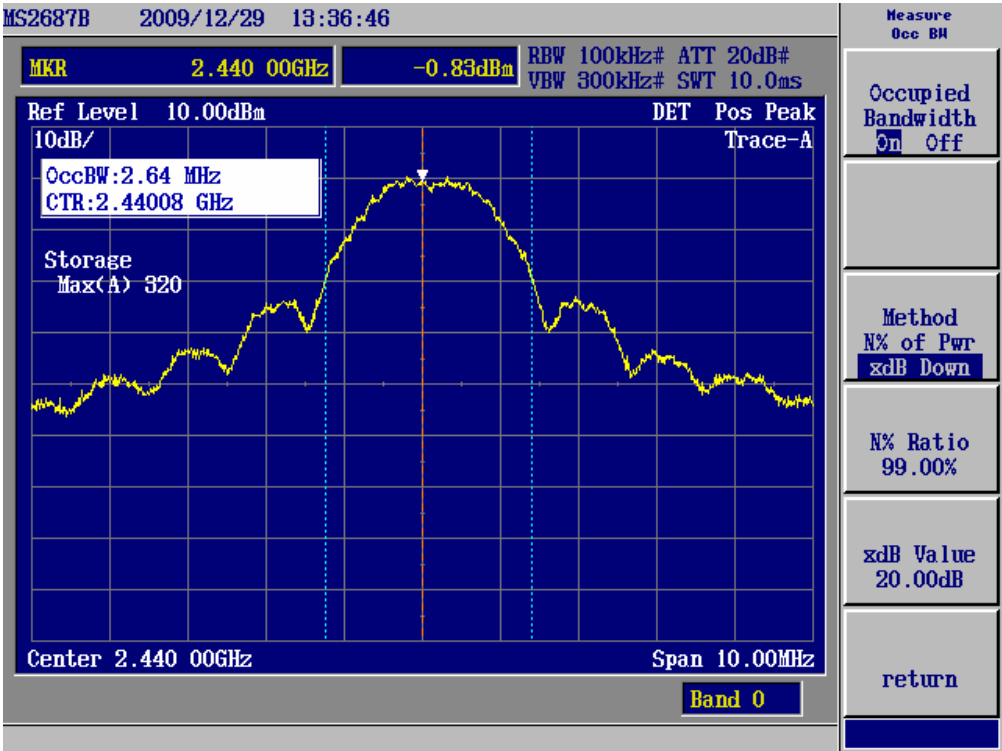
EUT complies with the requirement.

Uncertainty of measurement	: ± 1.2 dB
Temperature, Humidity	: 25 °C, 56%

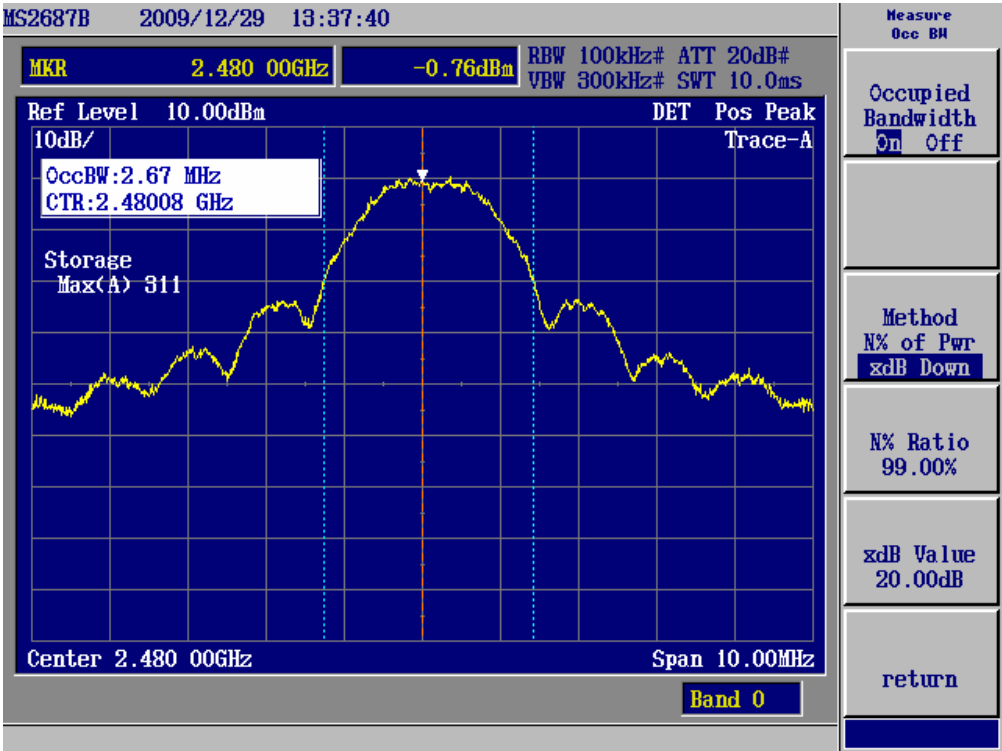
5.2.4 Measured Data
(11CH)



(18CH)



5.2.4 Measured Data (Continued)
(26CH)



5.3 15. 247(a)(2) Spectrum Bandwidth of Direct Sequence Spread Spectrum System

5.3.1 Setting Remarks

- The both side of 6dB down value from peak power are measured by using delta-maker function of the spectrum analyzer.
- The spectrum analyzer is set-up as following;

✓ Frequency Span	: 10 MHz
✓ Resolution bandwidth	: 100 kHz
✓ Video bandwidth	: 300 kHz
✓ Sweep	: Auto
✓ Detector function	: Peak
✓ Trace Mode	: Max Hold

- See test configuration figure 4.2.

5.3.2 Minimum Standard

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.

5.3.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB
Temperature, Humidity : 23°C, 45 %

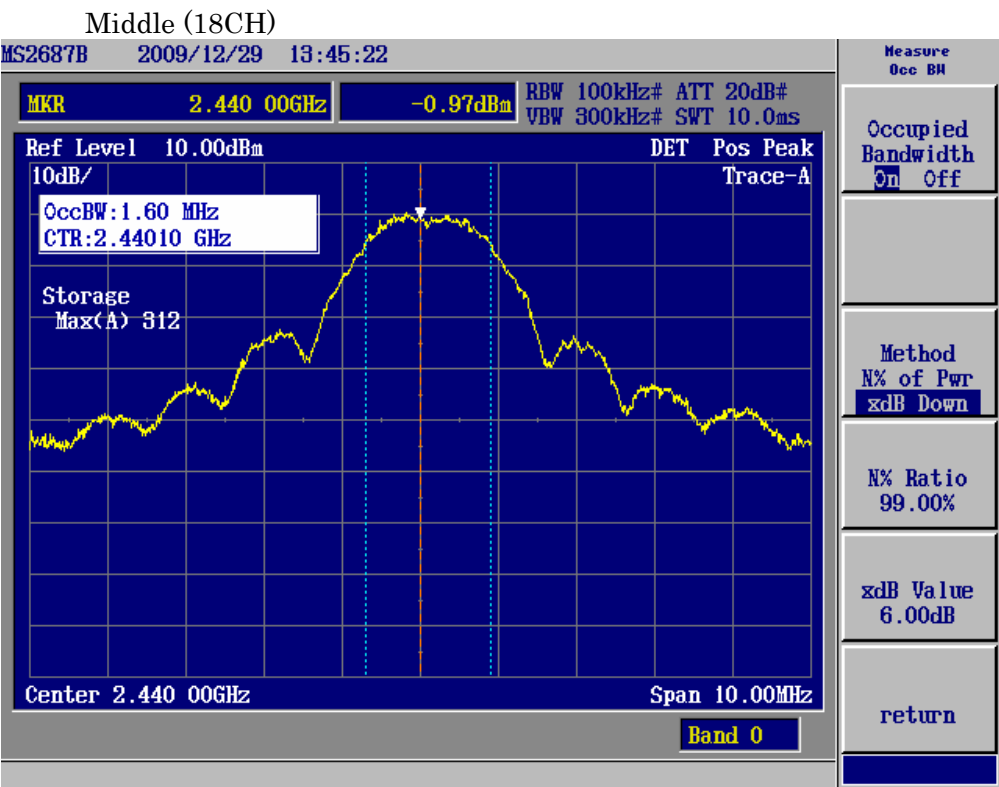
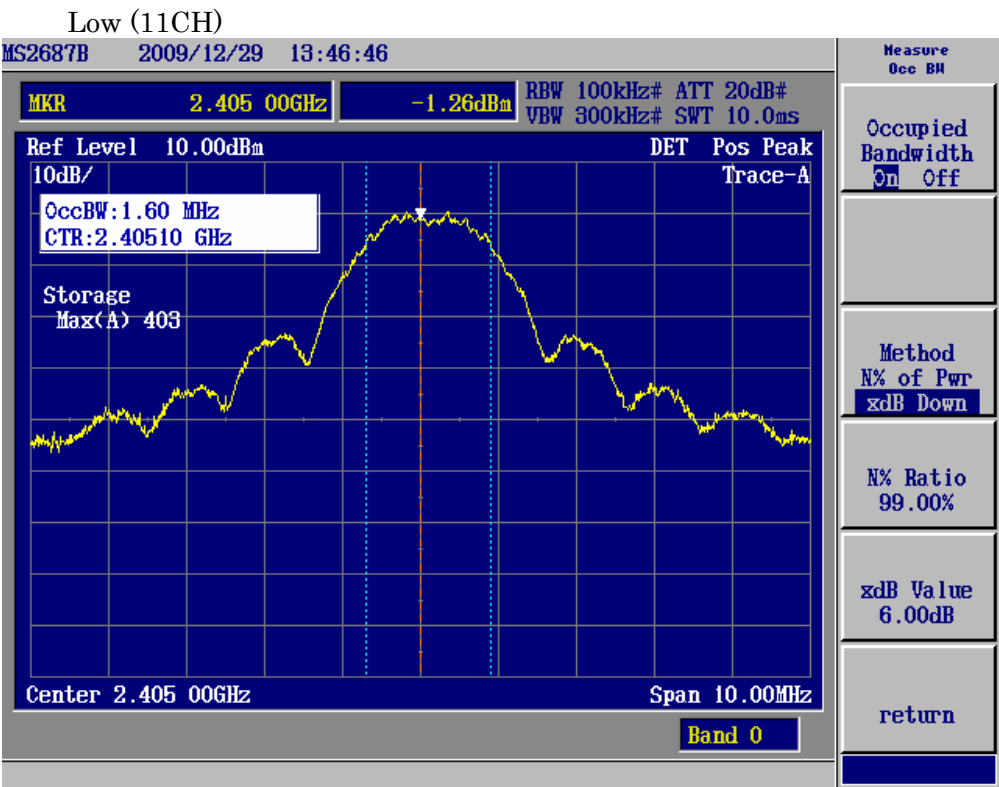
5.3.4 Measured Data

Frequency (MHz)	Frequency Bandwidth (MHz)	Limit (MHz)	Margin (dB)
2405 (11ch)	1.60	0.5	1.1

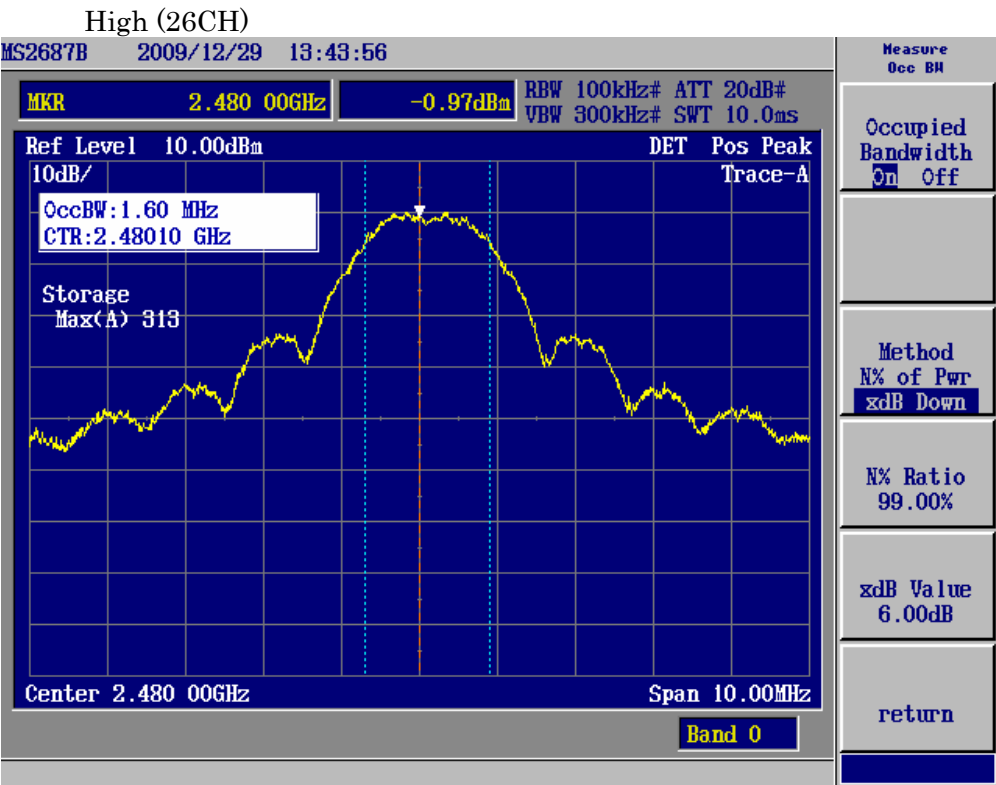
Frequency (MHz)	Frequency Bandwidth (MHz)	Limit (MHz)	Margin (dB)
2440(18ch)	1.60	0.5	1.1

Frequency (MHz)	Frequency Bandwidth (MHz)	Limit (MHz)	Margin (dB)
2480(26ch)	1.60	0.5	1.1

5.3.4 Measured Data (Continued)



5.3.4 Measured Data (Continued)



5.4 15. 247(b) Maximum Peak Output Power

5.4.1 Setting Remarks

- See test configuration figure 4.2.
- The maximum peak output power is measured as following;
 1. The diode detector is inserted between EUT and the oscilloscope.
 2. The oscilloscope is used to read the peak response of the detector.
 3. Replaced EUT by the signal generator (SG).
 4. Adjusted the frequency of SG to the fundamental frequency.
 5. Adjusted the amplitude of SG to be the same peak recorded in 2.
- The oscilloscope is set-up as following;
 - ✓ Voltage level range : 10 mV / Div
 - ✓ Sampling time : 1.00GS / s
 - ✓ Function : Peak search

5.4.2 Minimum Standard

The maximum peak output power 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.

5.4.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.5 dB

Temperature, Humidity : 23°C, 45%

5.4.4 Measured Data

Frequency (MHz)	Power Supply Voltage [V]	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2405 (11ch)	3.00	3.05	30	26.95
	2.55	3.04	30	26.96
	3.45	3.07	30	26.93

Frequency (MHz)	Power Supply Voltage [V]	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2440 (18ch)	3.00	2.91	30	27.09
	2.55	2.88	30	27.12
	3.45	2.91	30	27.09

Frequency (MHz)	Power Supply Voltage [V]	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2480 (26ch)	3.00	2.61	30	27.39
	2.55	2.61	30	27.39
	3.45	2.62	30	27.38

5.5 15. 247(d) Transmitter Suprious Emissions (Conducted)

5.5.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The Spectrums are scanned from the lowest generated frequency of EUT up to the 10th harmonics by using the spectrum analyzer.
- The spectrum analyzer is set-up as following;

✓	Resolution bandwidth	: 100 kHz
✓	Video bandwidth	: 100 kHz
✓	Sweep	: Auto
✓	Detector function	: Peak
✓	Trace Mode	: Max Hold

- See test configuration figure 4.2.

5.5.2 Minimum Standard

15.247 (d) 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

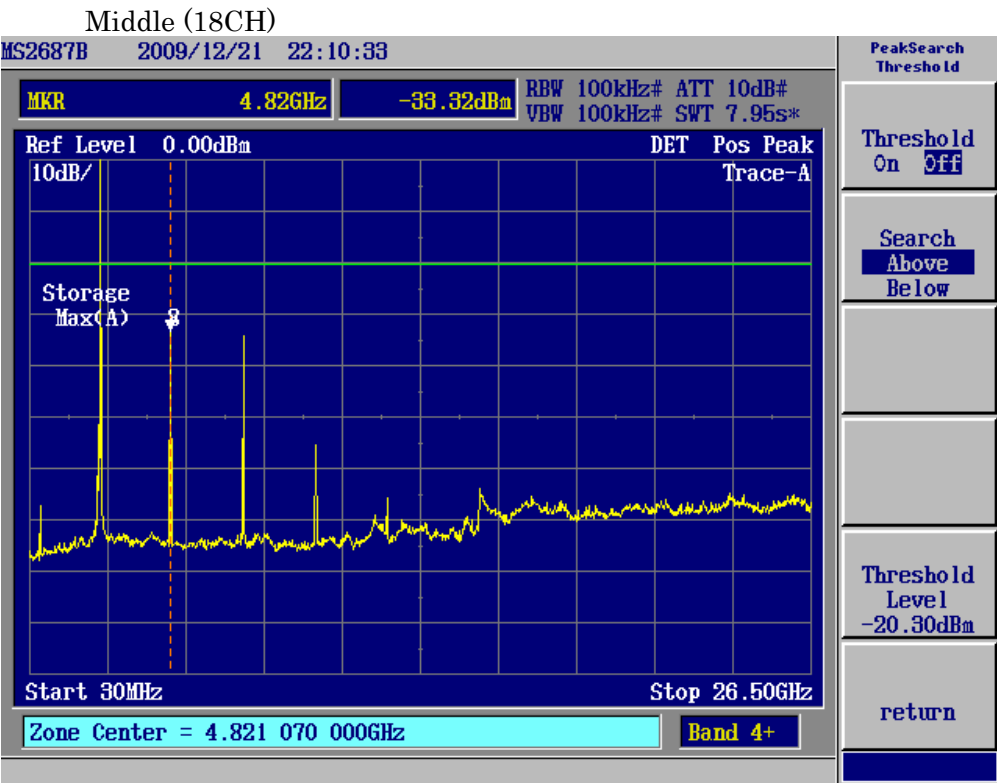
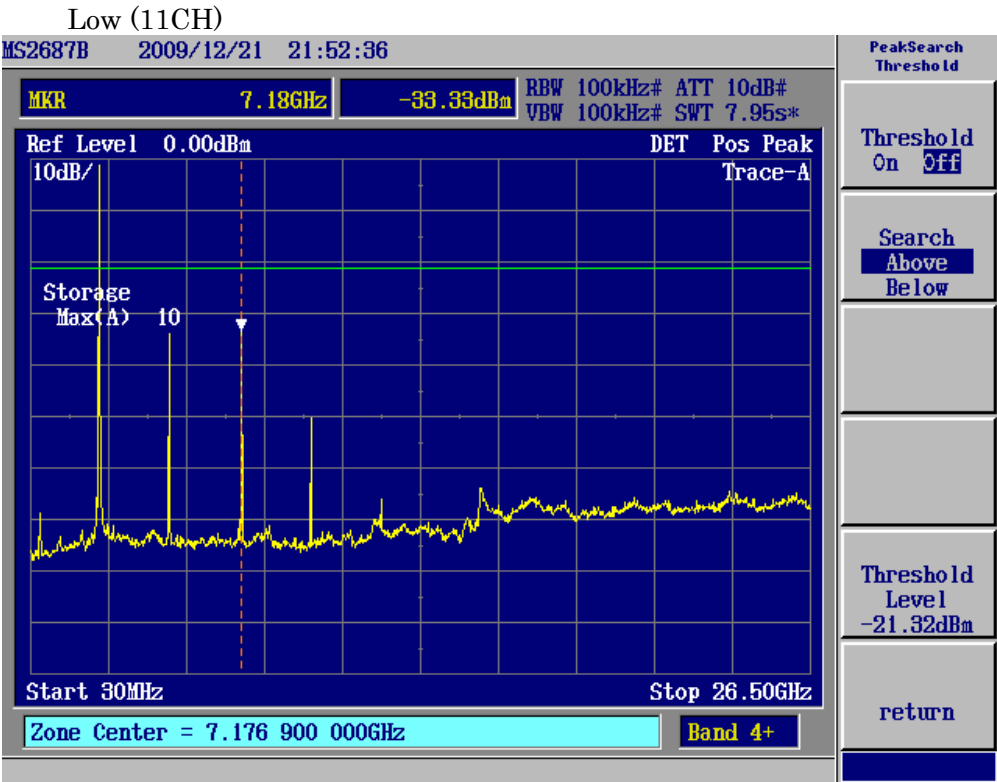
5.5.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB

Temperature, Humidity : 25°C, 57%

5.5.4 Measured Data



5.5.4 Measured Data (Continued)



5.6 15. 247(d) Transmitter Radiated Emissions (Radiated)

5.6.1 Setting Remarks

- The data lists in “5.5.4 Measured Data “ list the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit.
- In the frequency range between 30MHz to 25 GHz (as 10th harmonics), the Electric Field Strength is measured in accordance with ANSI C63.4: 2003 and CISPR22: 1997.
- The test setup is made in accordance with ANSI C63.4: 2003.
- The antenna is measured at 1-4m height.
- The EUT is placed on the non-conductive table in the center of turntable. The height of this table is 0.8m.
- The measurement is carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment is recorded.
- By varying the configuration of the test sample and the cable routing, it is attempted to maximize the emission.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1:1993.
- The spectrum analyzer is set-up as following;

(Frequency range : 30 - 1000 MHz)

- ✓ Resolution bandwidth : 100 kHz
- ✓ Video bandwidth : 300 kHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

(Frequency range : Above 1000 MHz)

- ✓ Resolution bandwidth : 1 MHz
- ✓ Video bandwidth : 1 MHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

- EMI Test Receiver analyzer is set-up as following;

- ✓ IF bandwidth : 120 kHz (Quasi-Peak Detector)
- ✓ IF bandwidth : 1 MHz (Average Detector)

- See test configuration figure 4.2.

5.6.2 Minimum Standard

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)).

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., § § 15.231 and 15.241.

5.6.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 3.28 dB

Temperature, Humidity : Refer to each data table

5.6.4 Measured Data

30MHz to 1GHz

<<Radiated Emission>>

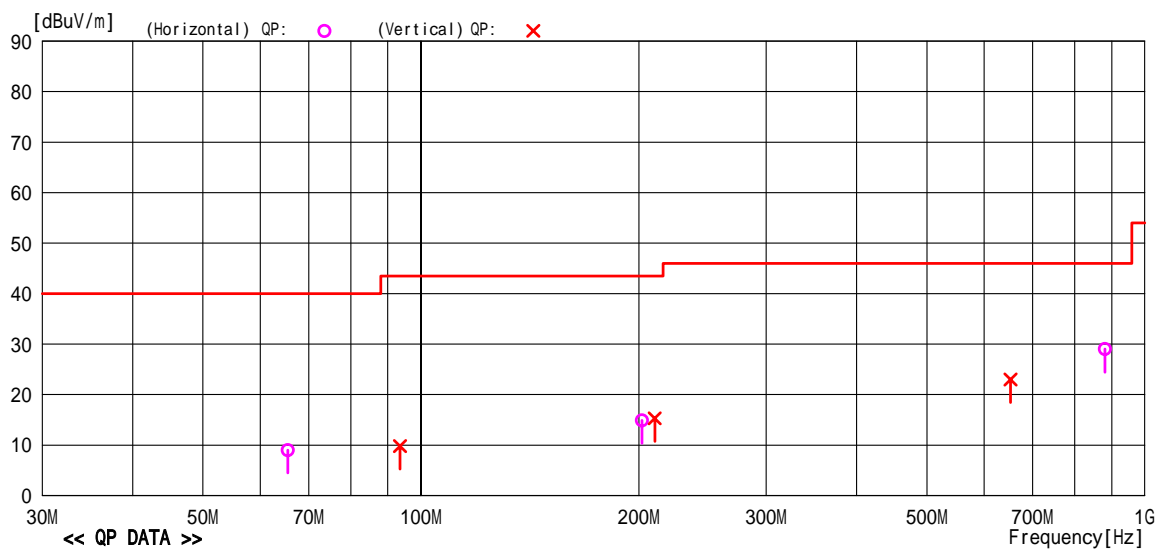
Cosmos Corporation Onoki Lab.
Date : 2010/06/30 00:43:35

Model Name : WDT-6M
Serial No. : 02
Operator : O. Itogawa
Power Supply : DC24V

Job No : CJ10-094435E
Temp./Humi. : 24 /40%
Condition : Tx CH11
Remark :

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	65.511	23.1	9.5	4.6	28.2	9.0	40.0	31.0	Hori.	100	0	BC	
2	202.004	21.8	14.8	6.0	27.7	14.9	43.5	28.6	Hori.	100	0	BC	
3	881.067	24.9	22.1	9.9	27.9	29.0	46.0	17.0	Hori.	100	0	LP	
4	93.556	23.5	9.5	4.9	28.1	9.8	43.5	33.7	Vert.	100	0	BC	
5	210.421	21.8	15.0	6.1	27.6	15.3	43.5	28.2	Vert.	100	0	BC	
6	652.705	23.1	19.6	8.9	28.6	23.0	46.0	23.0	Vert.	100	0	LP	

5.6.4 Measured Data (Continued)

30MHz to 1GHz

<<Radiated Emission>>

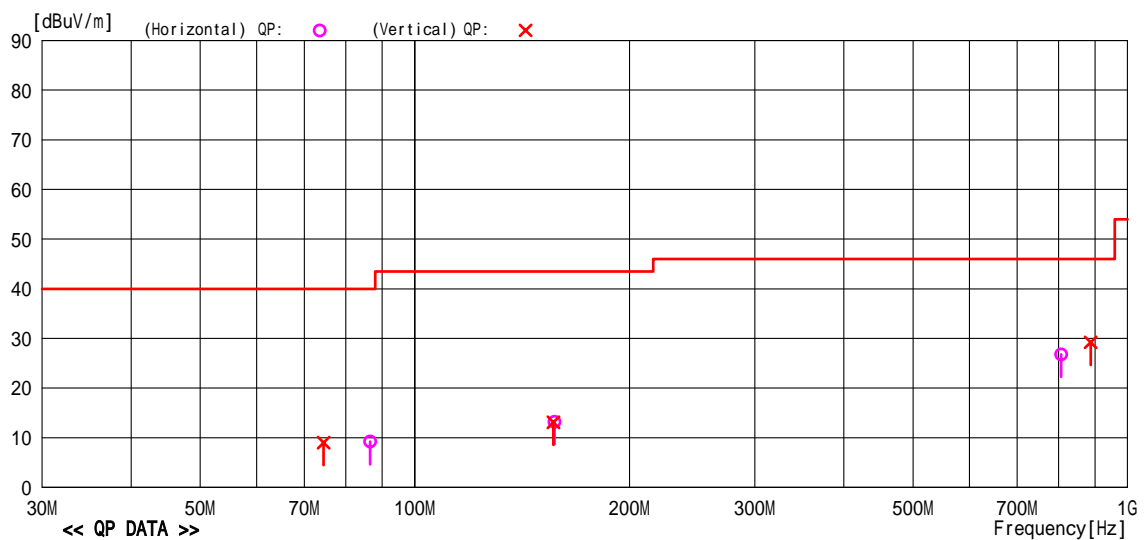
Cosmos Corporation Onoki Lab.
Date : 2010/06/30 00:15:32

Model Name : WDT-6M
Serial No. : 02
Operator : O. Itogawa
Power Supply : DC24V

Job No : CJ10-094435E
Temp./Humi. : 24 /40%
Condition : Tx CH18
Remark :

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	86.541	23.3	9.3	4.8	28.2	9.2	40.0	30.8	Hori.	100	0	BC	
2	157.099	23.4	12.1	5.6	27.9	13.2	43.5	30.3	Hori.	100	0	BC	
3	807.214	24.2	21.2	9.6	28.2	26.8	46.0	19.2	Hori.	100	0	LP	
4	74.475	23.3	9.1	4.8	28.2	9.0	40.0	31.0	Vert.	100	0	BC	
5	156.513	23.3	12.1	5.6	27.9	13.1	43.5	30.4	Vert.	100	0	BC	
6	887.841	24.9	22.2	9.9	27.8	29.2	46.0	16.8	Vert.	100	0	LP	

5.6.4 Measured Data (Continued)

30MHz to 1GHz

<<Radiated Emission>>

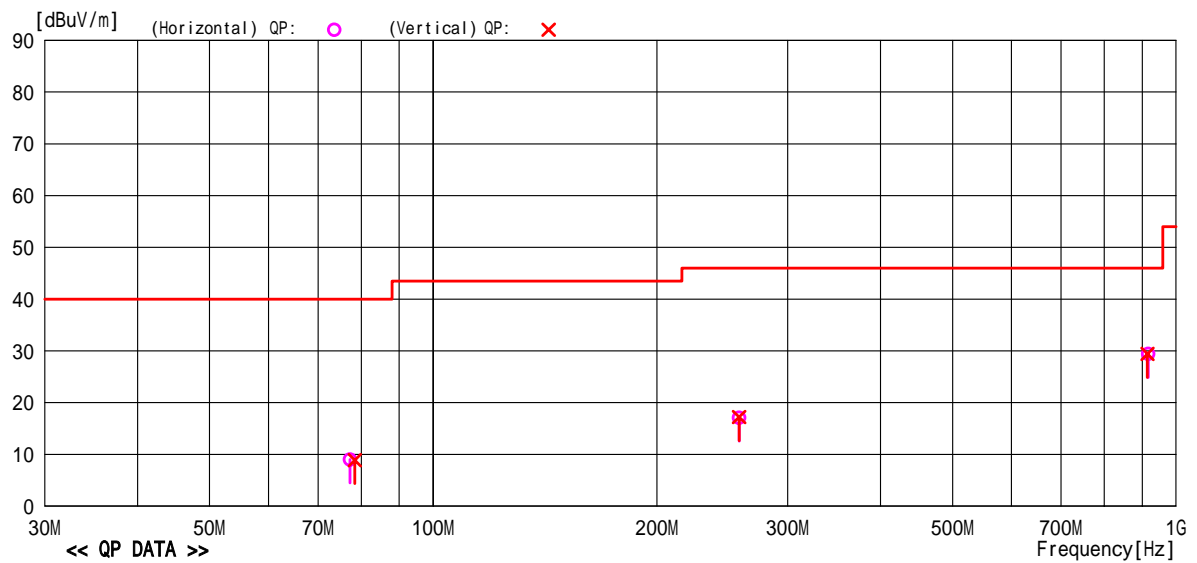
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 23:36:56

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No : CJ10-094435E
Temp./Humi. : 24 /40%
Condition : Tx CH26
Remark :

Memo : RBW:30M ~ 1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	77.247	23.4	9.0	4.8	28.2	9.0	40.0	31.0	Hori.	100	0	BC	
2	258.128	21.6	16.5	6.4	27.4	17.1	46.0	28.9	Hori.	100	0	BC	
3	916.919	24.6	22.5	10.0	27.7	29.4	46.0	16.6	Hori.	100	0	LP	
4	78.404	23.4	8.9	4.8	28.2	8.9	40.0	31.1	Vert.	100	0	BC	
5	258.116	21.7	16.5	6.4	27.4	17.2	46.0	28.8	Vert.	100	0	BC	
6	915.030	24.7	22.4	10.0	27.7	29.4	46.0	16.6	Vert.	100	0	LP	

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

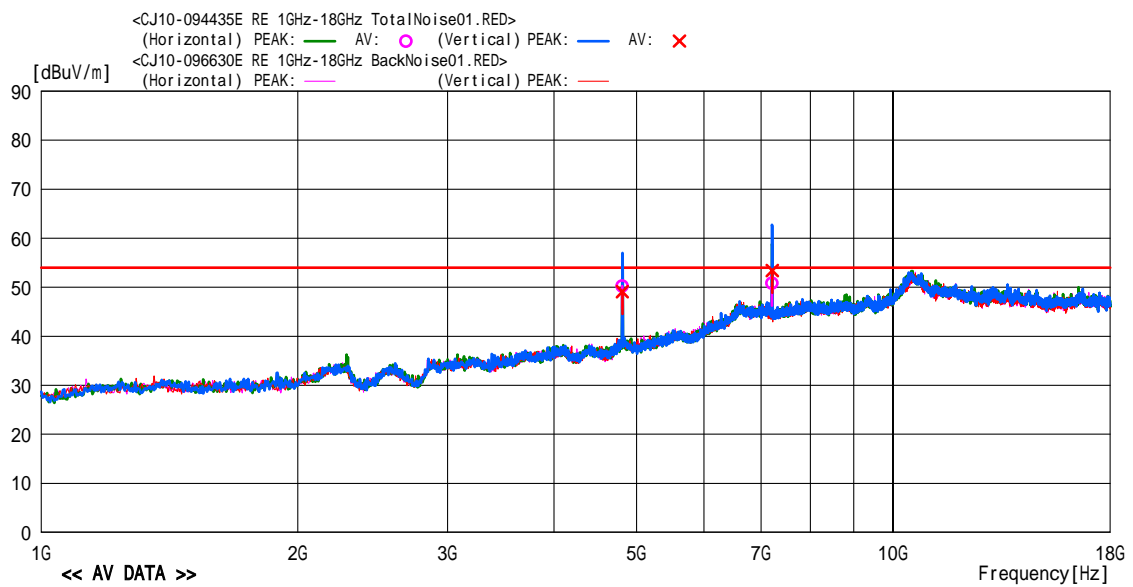
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 20:30:55

Model Name : WDT-6M
Serial No. : 02
Operator : O. Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH11
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4809.156	47.6	32.1	6.4	35.9	50.2	54.0	3.8	Hori.	103	301	AV	
2	7213.877	39.7	36.7	7.7	33.3	50.8	54.0	3.2	Hori.	103	255	AV	
3	4811.105	46.5	32.1	6.4	35.9	49.1	54.0	4.9	Vert.	100	307	AV	
4	7216.542	42.3	36.7	7.7	33.3	53.4	54.0	0.6	Vert.	100	353	AV	

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

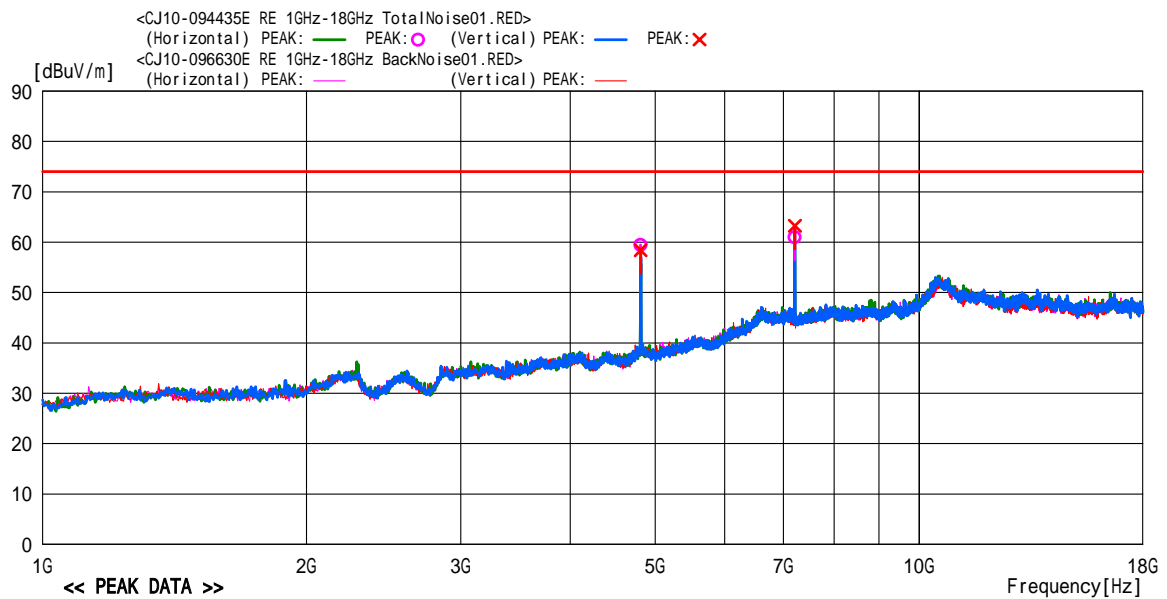
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 20:30:55

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH11
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4809.156	56.9	32.1	6.4	35.9	59.5	74.0	14.5	Hori.	103	301		PK
2	7213.877	49.9	36.7	7.7	33.3	61.0	74.0	13.0	Hori.	103	255		PK
3	4811.105	55.8	32.1	6.4	35.9	58.4	74.0	15.6	Vert.	100	307		PK
4	7216.542	52.1	36.7	7.7	33.3	63.2	74.0	10.8	Vert.	100	353		PK

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

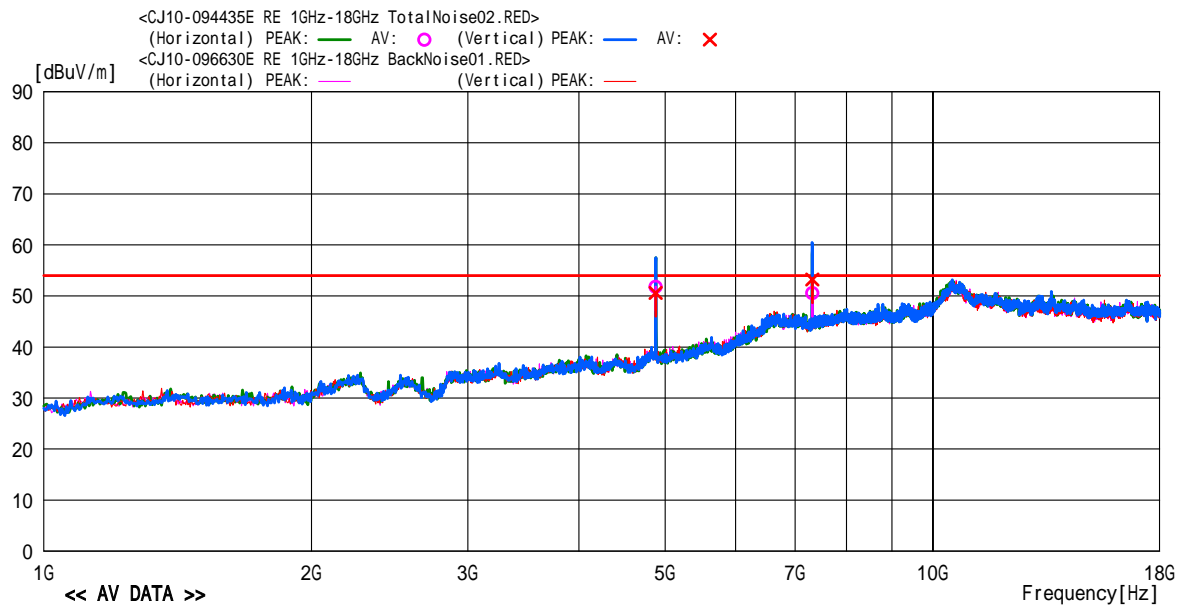
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 21:34:58

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH18
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4879.171	49.0	32.2	6.4	35.8	51.8	54.0	2.2	Hori.	103	232	AV	
2	7318.846	39.6	36.8	7.7	33.5	50.6	54.0	3.4	Hori.	100	251	AV	
3	4879.151	47.8	32.2	6.4	35.8	50.6	54.0	3.4	Vert.	100	307	AV	
4	7318.876	42.2	36.8	7.7	33.5	53.2	54.0	0.8	Vert.	100	338	AV	

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

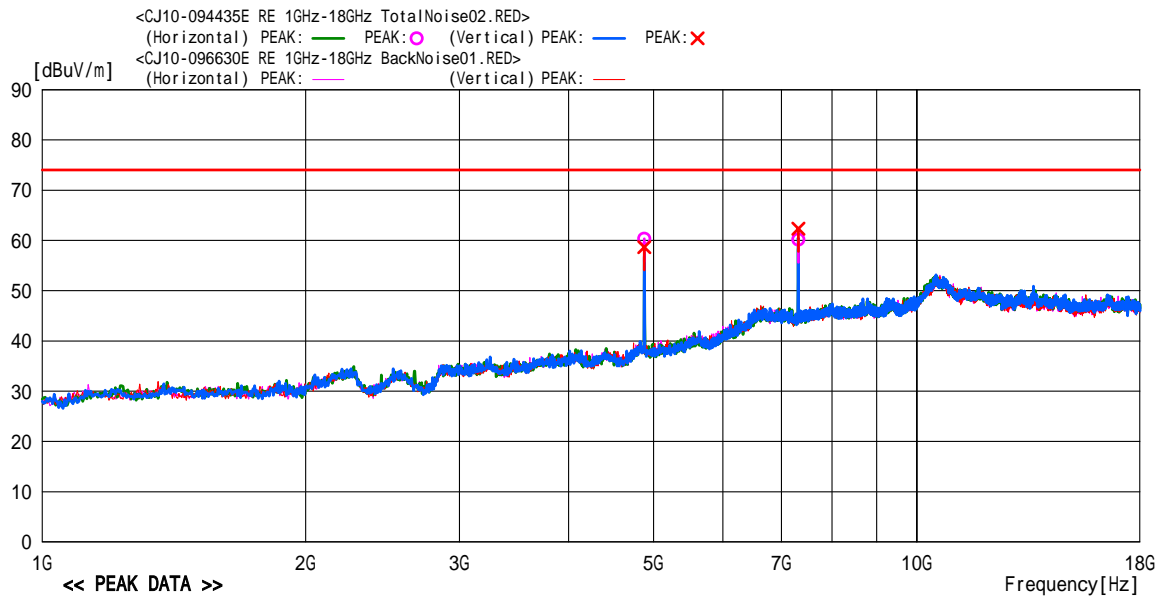
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 21:34:58

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH18
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4879.171	57.6	32.2	6.4	35.8	60.4	74.0	13.7	Hori.	103	232		PK
2	7318.846	49.2	36.8	7.7	33.5	60.2	74.0	13.8	Hori.	100	251		PK
3	4879.151	55.9	32.2	6.4	35.8	58.7	74.0	15.3	Vert.	100	307		PK
4	7318.876	51.3	36.8	7.7	33.5	62.3	74.0	11.7	Vert.	100	338		PK

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

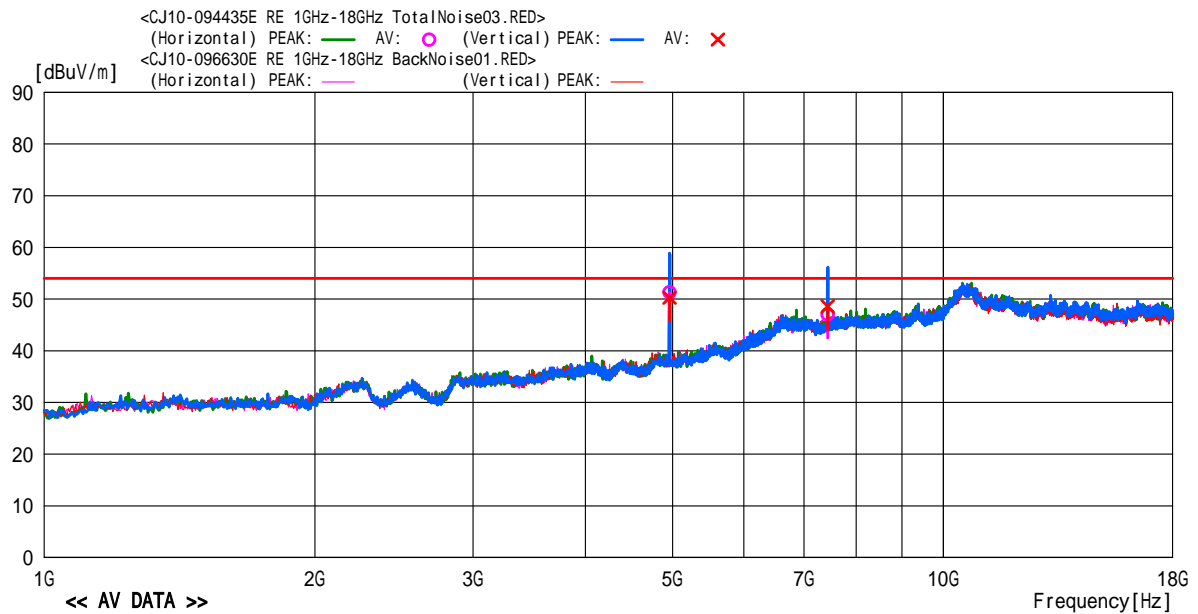
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 22:35:00

Model Name : WDT-6M
Serial No. : 02
Operator : O.Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH26
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(AV)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pol.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4961.124	48.3	32.3	6.4	35.7	51.3	54.0	2.7	Hori.	101	227	AV	
2	7438.796	36.0	36.8	7.8	33.6	47.0	54.0	7.0	Hori.	100	255	AV	
3	4959.181	47.3	32.3	6.4	35.7	50.3	54.0	3.7	Vert.	100	308	AV	
4	7438.871	37.6	36.8	7.8	33.6	48.6	54.0	5.4	Vert.	100	338	AV	

5.6.4 Measured Data (Continued)

1GHz to 18GHz

RADIATED EMISSION

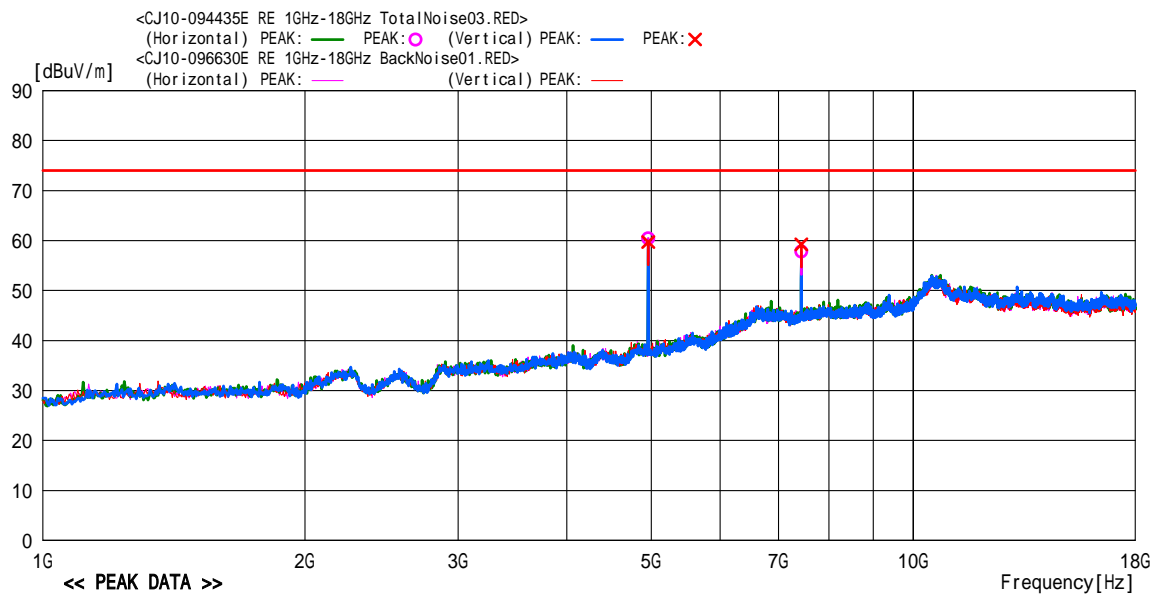
Cosmos Corporation Onoki Lab.
Date : 2010/06/29 22:35:00

Model Name : WDT-6M
Serial No. : 02
Operator : O. Itogawa
Power Supply : DC24V

Job No. : CJ10-094435E
Temp/Humi : 24 /40%
Condition : Tx CH26
Remark :

Memo : RBW:1GHz ~ (1MHz)

LIMIT : FCC Subpart C 15.209 (3m) 1G-26.5GHz(PK)



No	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	4961.124	57.4	32.3	6.4	35.7	60.4	74.0	13.6	Hori.	101	227		PK
2	7438.796	46.8	36.8	7.8	33.6	57.8	74.0	16.2	Hori.	100	255		PK
3	4959.181	56.7	32.3	6.4	35.7	59.7	74.0	14.3	Vert.	100	308		PK
4	7438.871	48.2	36.8	7.8	33.6	59.2	74.0	14.8	Vert.	100	338		PK

5.6.4 Measured Data (Continued)

No spurious emission for RF was found in 18GHz to 26.5GHz.

5.7 15. 247(e) Power Spectrum Density

5.7.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The loss of the coaxial cable is maximum 1 dB.
- The peak output power is determined by using the marker-data function of spectrum analyzer.
- The spectrum analyzer is set-up as following;

✓ Frequency Span	: 1.5 MHz
✓ Resolution bandwidth	: 3 kHz
✓ Video bandwidth	: 3 MHz
✓ Sweep	: 500sec
✓ Detector function	: Peak
✓ Trace Mode	: Max Hold

- See test configuration figure 4.2.

5.7.2 Minimum Standard

15.247 (e) For digitally modulated systems, the 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.7.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 0.8 dB

Temperature, Humidity : 23°C, 45%

5.7.4 Measured Data

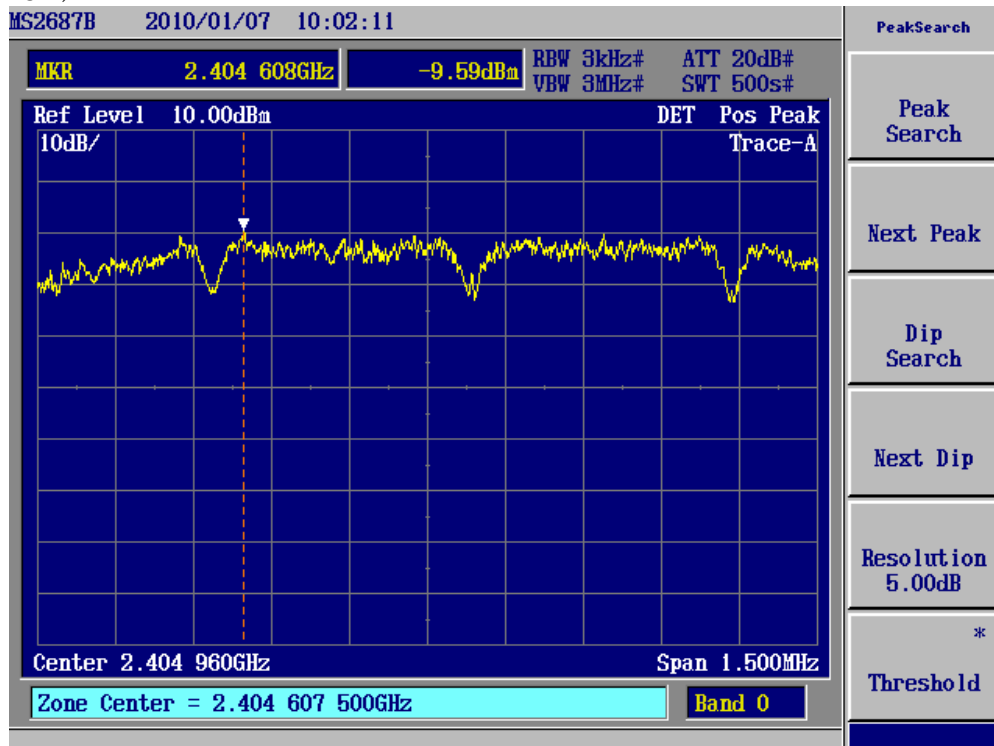
Frequency (MHz)	Correction Factor (dB)	Reading (dBm)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2405(11ch)	0.70	-9.59	-8.89	8	16.89

Frequency (MHz)	Correction Factor (dB)	Reading (dBm)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2440(18ch)	0.70	-9.41	-8.71	8	16.71

Frequency (MHz)	Correction Factor (dB)	Reading (dBm)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
2480(26ch)	0.70	-9.31	-8.61	8	16.61

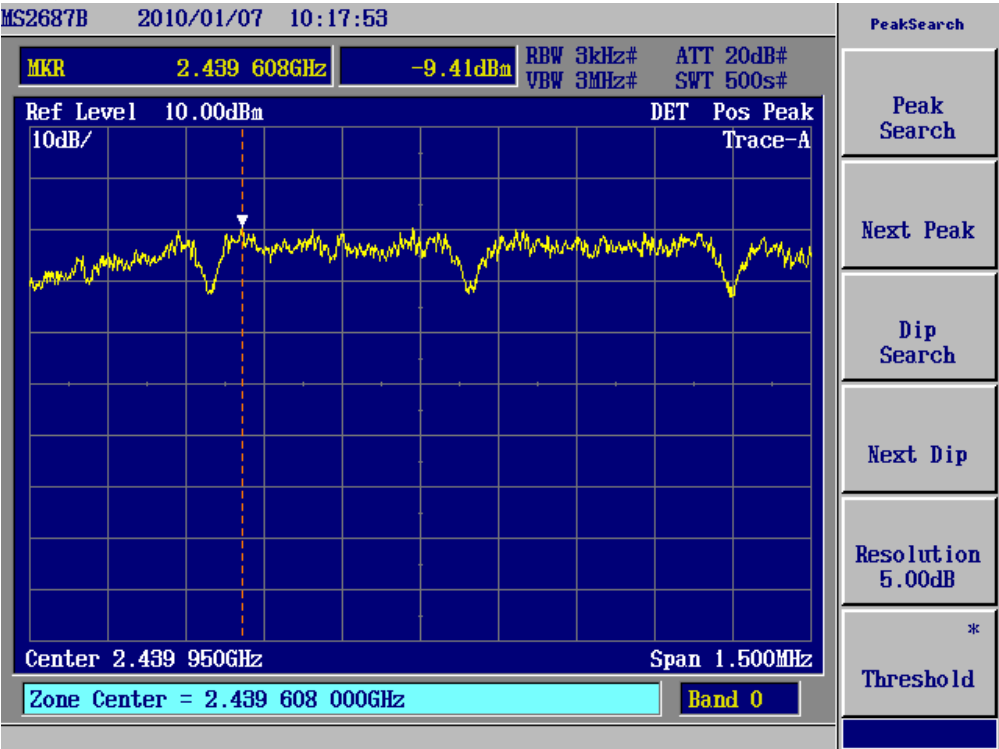
* Correction Factor = Cable Loss (dB) + External Attenuator (dB)

(11CH)

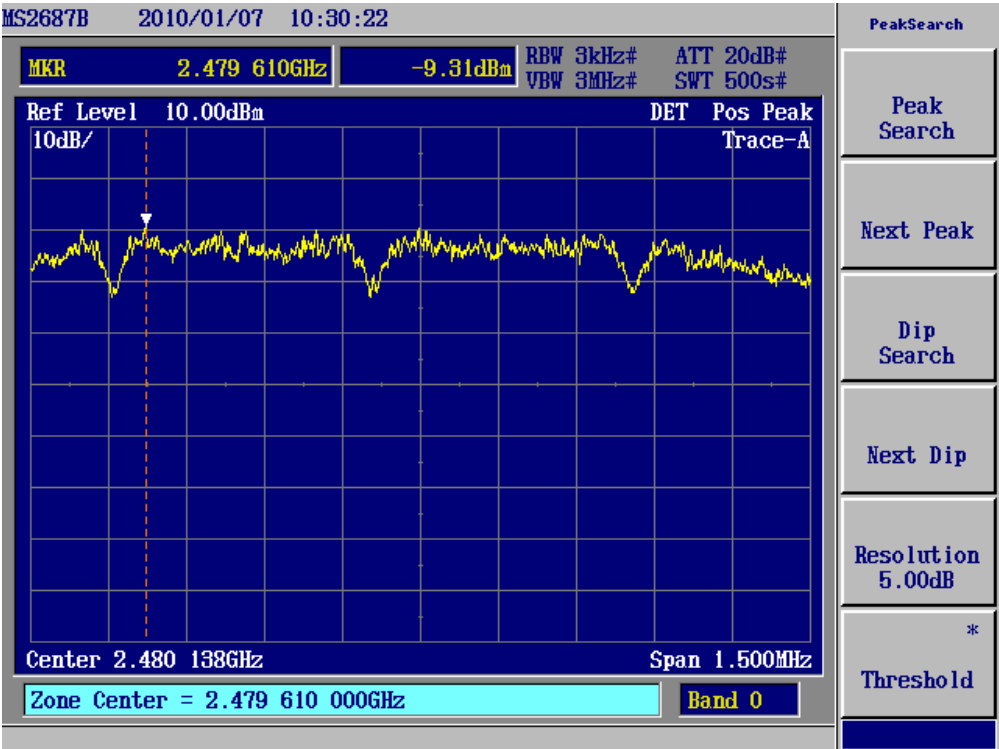


5.7.4 Measured Data (Continued)

(18CH)



(26CH)



5.8 15. 247(d) Band Edge Measurement

5.8.1 Setting Remarks

- EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator.
- The loss of the coaxial cable is maximum 1 dB.
- The emission at the band edge is measured by using the marker function of spectrum analyzer.
- The peak of the in-band emission is measured by using the marker to peak function of spectrum analyzer.
- This measurement is repeated in both side of the spectrum.
- The spectrum analyzer is set-up as following;
 - ✓ Frequency Span : 30MHz
 - ✓ Resolution bandwidth : 300kHz (1% of frequency span)
 - ✓ Video bandwidth : > RBW
 - ✓ Sweep : Auto
 - ✓ Detector function : Peak
 - ✓ Trace Mode : Max Hold
- Where band edge spectrum is too rough to find precise edge point, larger RBW i.e. 1MHz, 3MHz shall be applied as severer condition.
- See test configuration figure 4.2.

5.8.2 Minimum Standard

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency of Emission (MHz)	Limit of the band edge spurious emission (dB μ V)	
Below 2,390.0	Peak	Average
Above 2,483.5	74	54

5.8.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 2.6 dB

Temperature, Humidity : 24°C, 40%

5.8.4 Measured Data

The band edge emissions are calculated as following;

(Vertical)

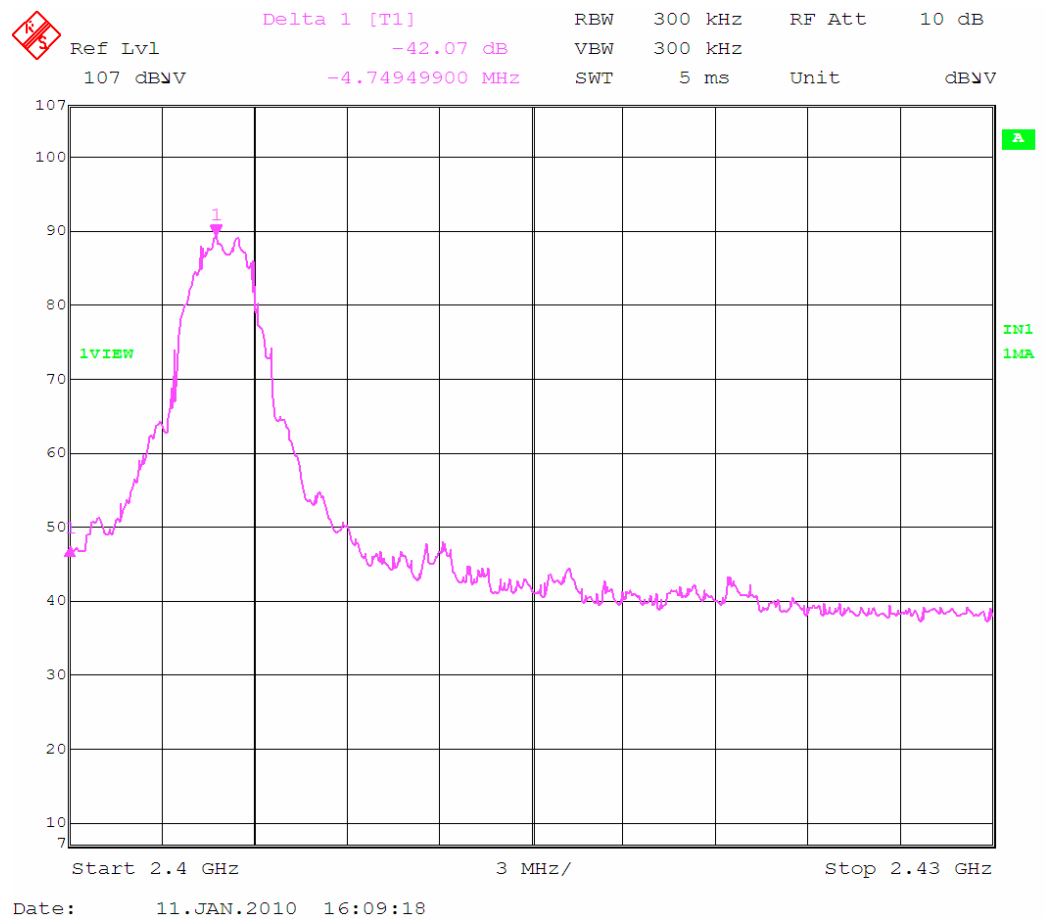
CH	P _{max}	P _{av}	P _{dev}	P _{dav}	c.f.	E _{be}	E _{av}	Limit (E _{be})	Limit (E _{av})	Margin (E _{be})	Margin (E _{av})
11	89.32	85.81	42.07	45.56	-1.7	45.6	38.6	74.0	54.0	28.5	15.5
26	93.34	89.35	38.62	39.79	-1.7	53.0	47.9	74.0	54.0	21.0	6.1

NOTE Vertical and Horizontal were measured and Vertical was confirmed as the worst.

- P_{max} : Maximum peak power of the fundamental.
P_{av} : Average of the fundamental.
P_{dev} : The amplitude delta between the peak power and the band edge emission.
E_{be} : Band edge emission.
E_{av} : Average of the band edge emission.

5.8.4 Measured Data (Continued)

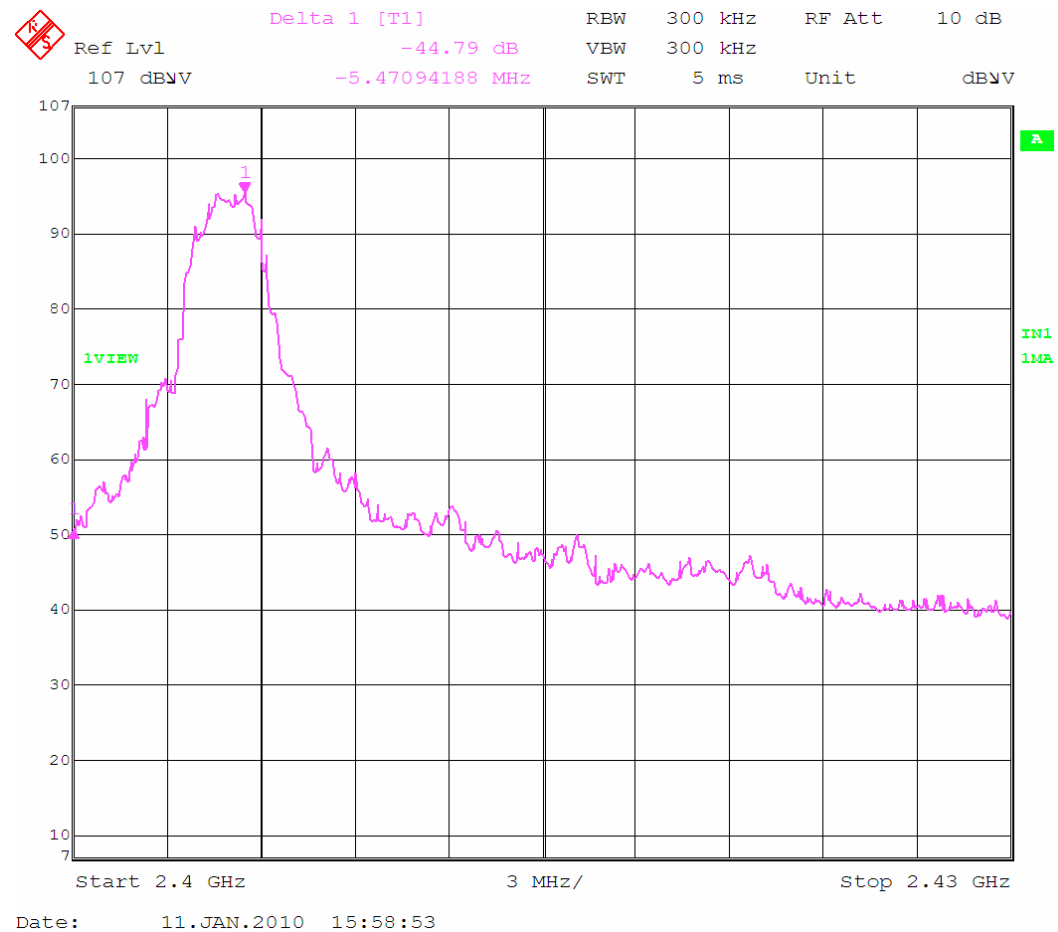
Lower frequency of the band edge
(11CH Vertical)



Delta 1 [T1]
42.07dB
4.74949900MHz

5.8.4 Measured Data (Continued)

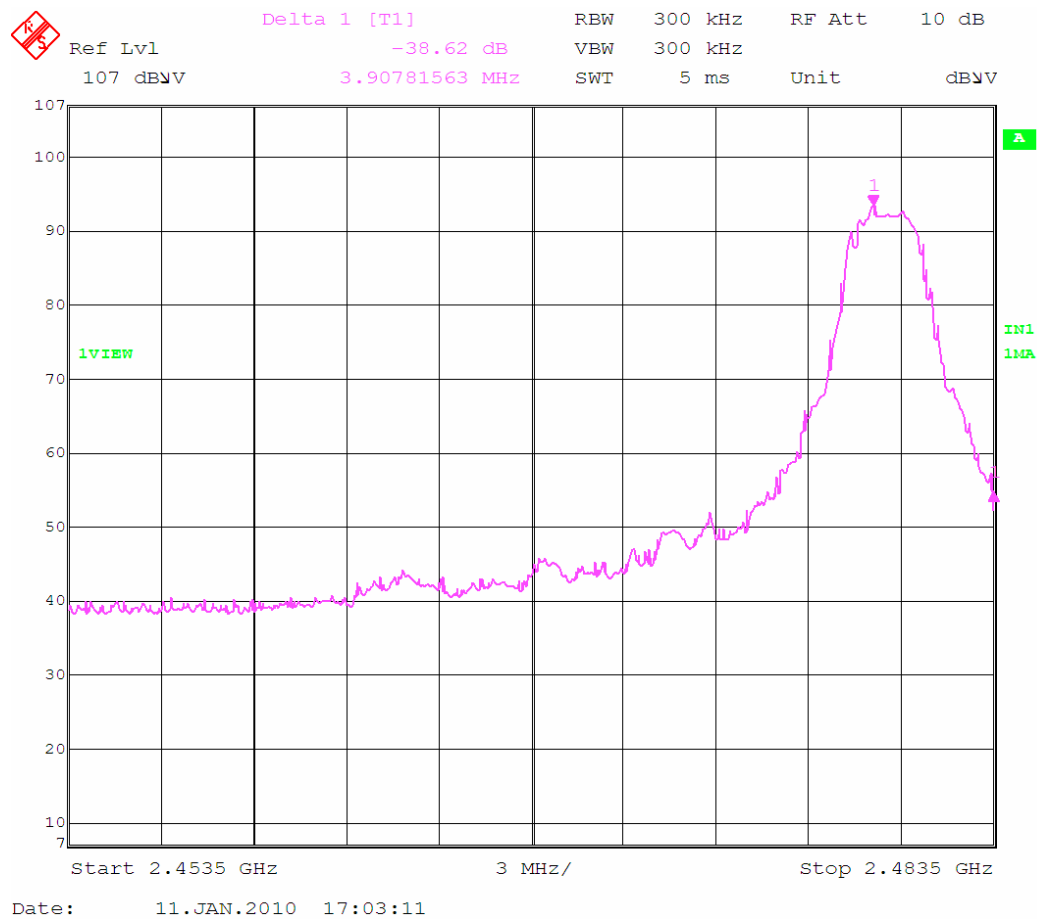
Lower frequency of the band edge
(11CH Horizontal)



Delta 1 [T1]
44.79dB
5.47094188MHz

5.8.4 Measured Data (Continued)

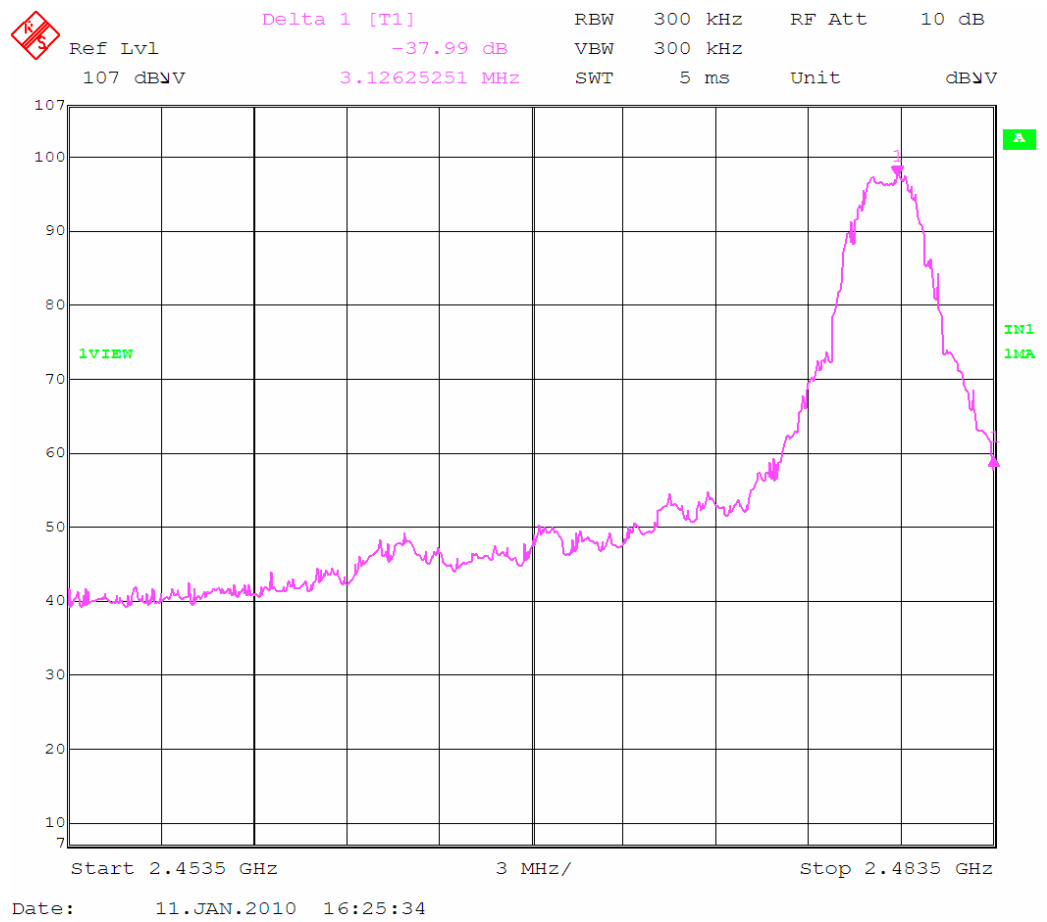
Higher frequency of the band edge
(26CH Vertical)



Delta 1 [T1]
- 38.62dB
3.90781563MHz

5.8.4 Measured Data (Continued)

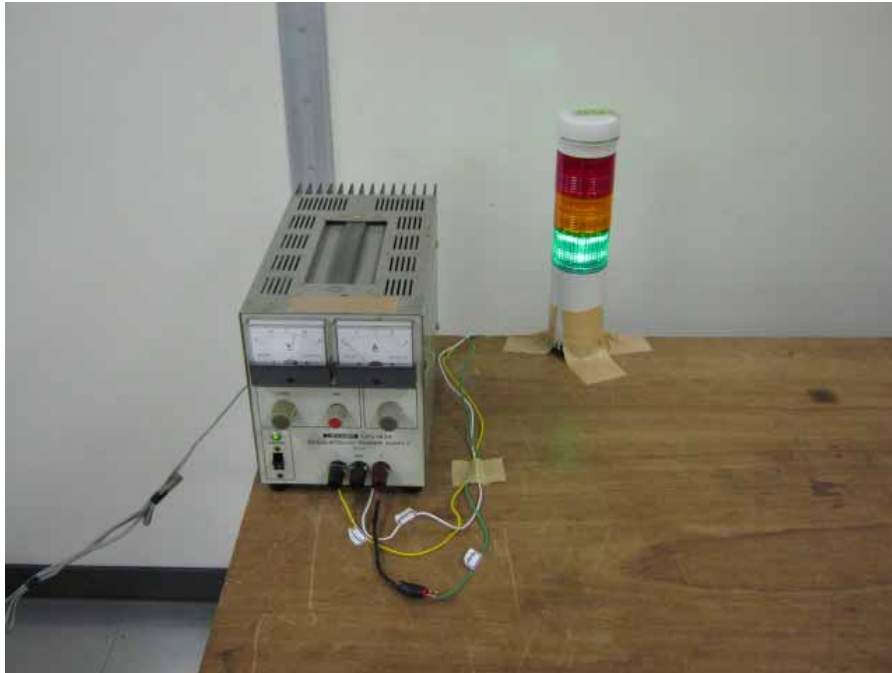
Higher frequency of the band edge
(26CH Horizontal)



Delta 1 [T1]
- 37.99dB
3.12625251MHz

6. Photos

6.1 Setup Photo (AC Conducted Emission)

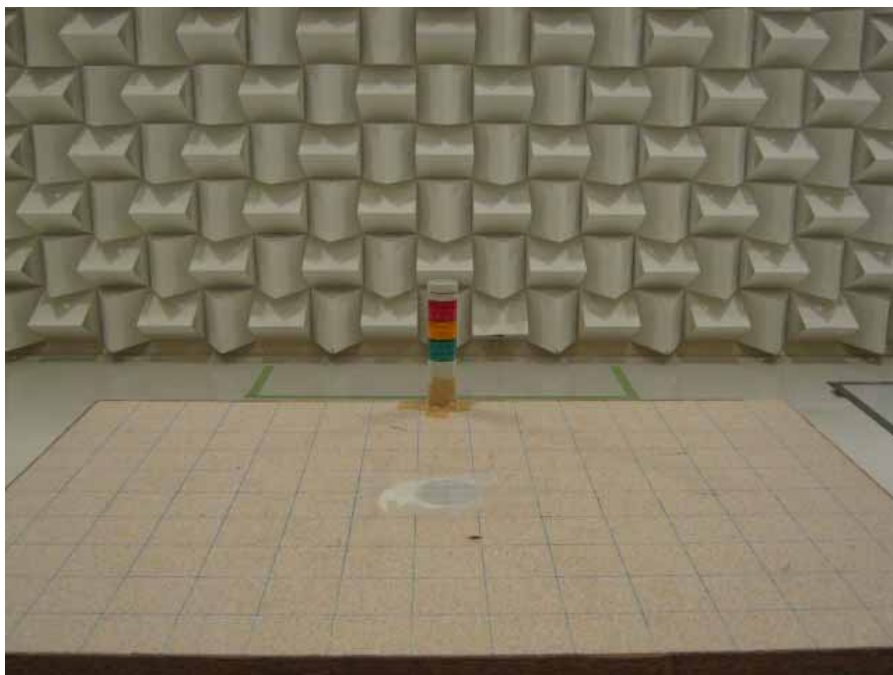


6.1 Setup Photo (Continued)
(AC Conducted Emission)

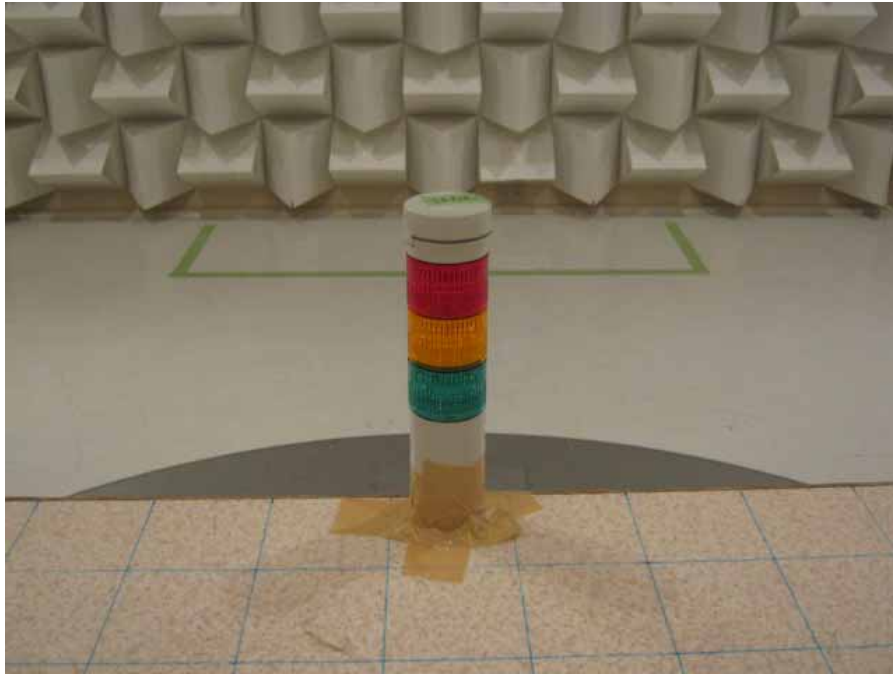


6.2 Setup Photo(Radiated Emission)

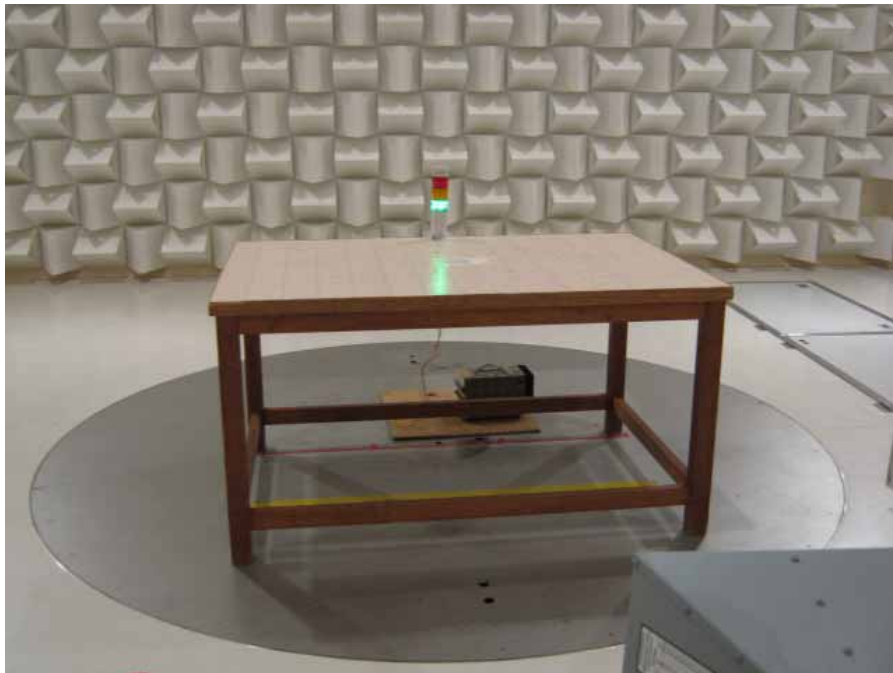
30MHz – 1GHz



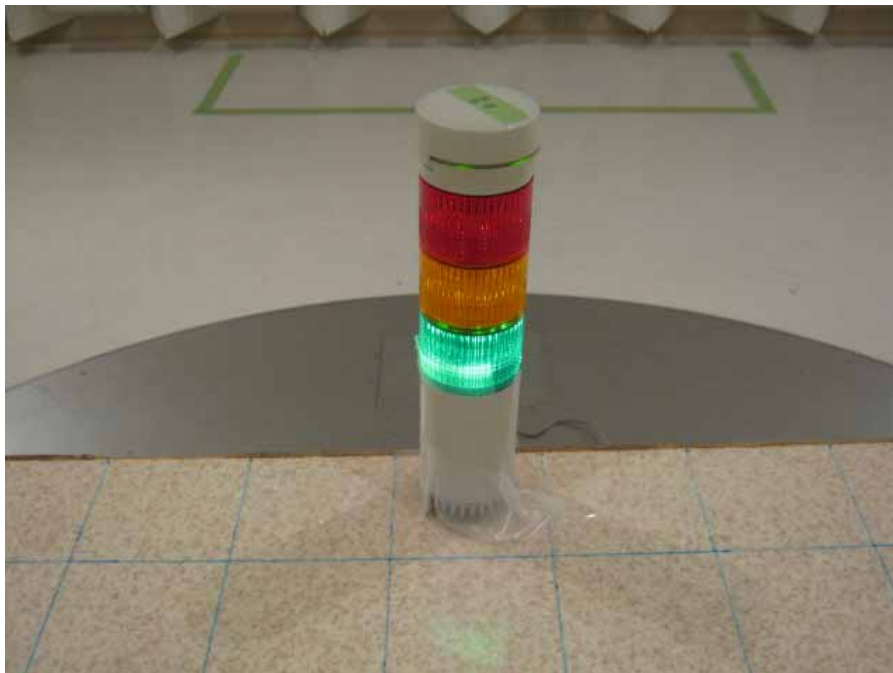
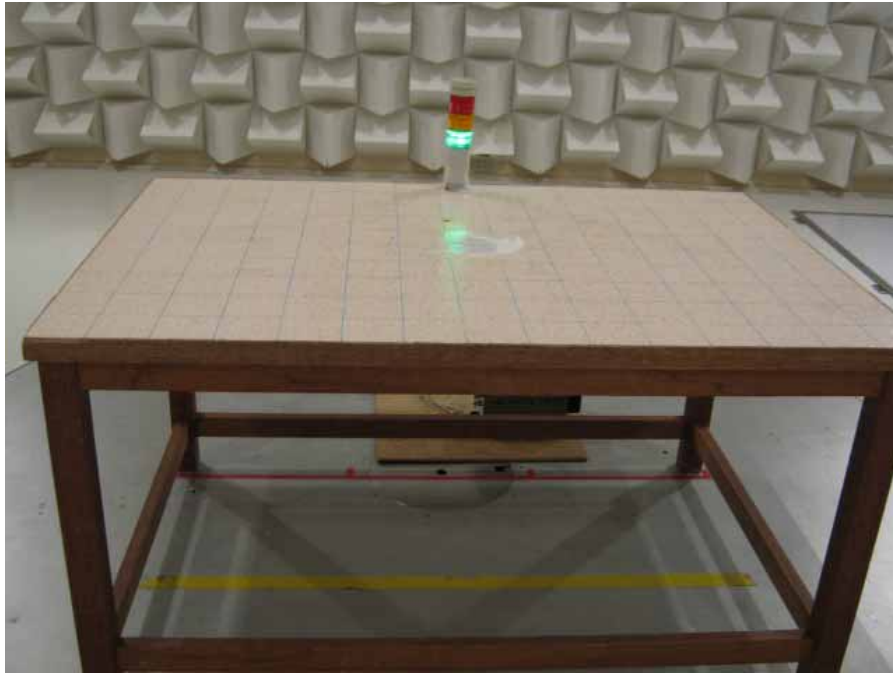
6.2 Setup Photo (Continued)
(Radiated Emission)
30MHz – 1GHz



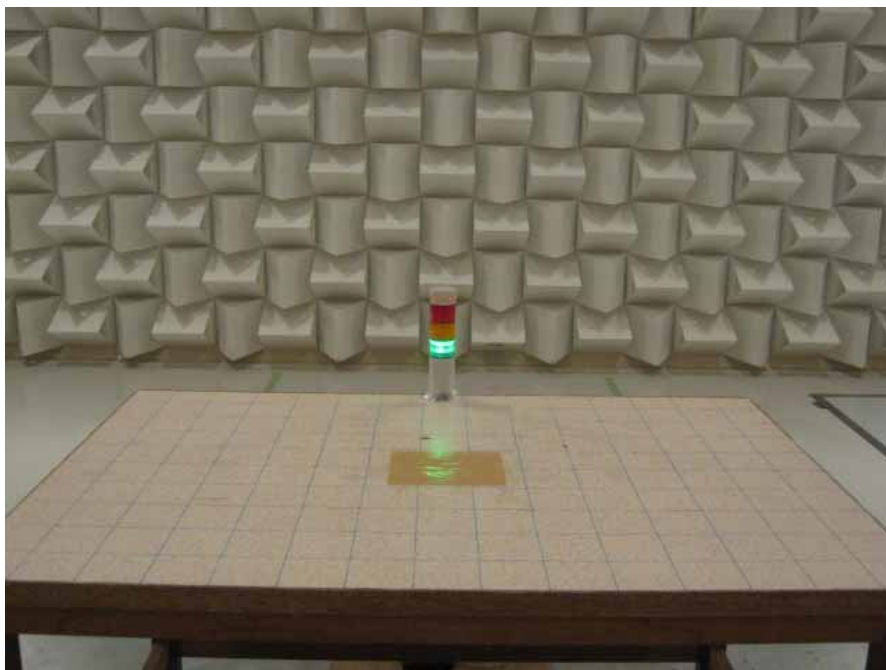
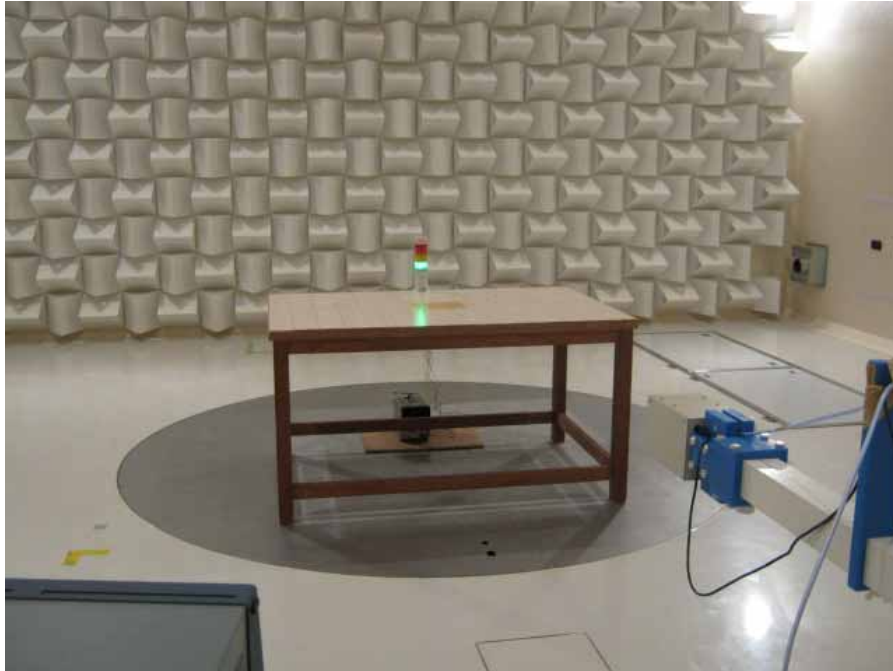
1GHz – 18GHz



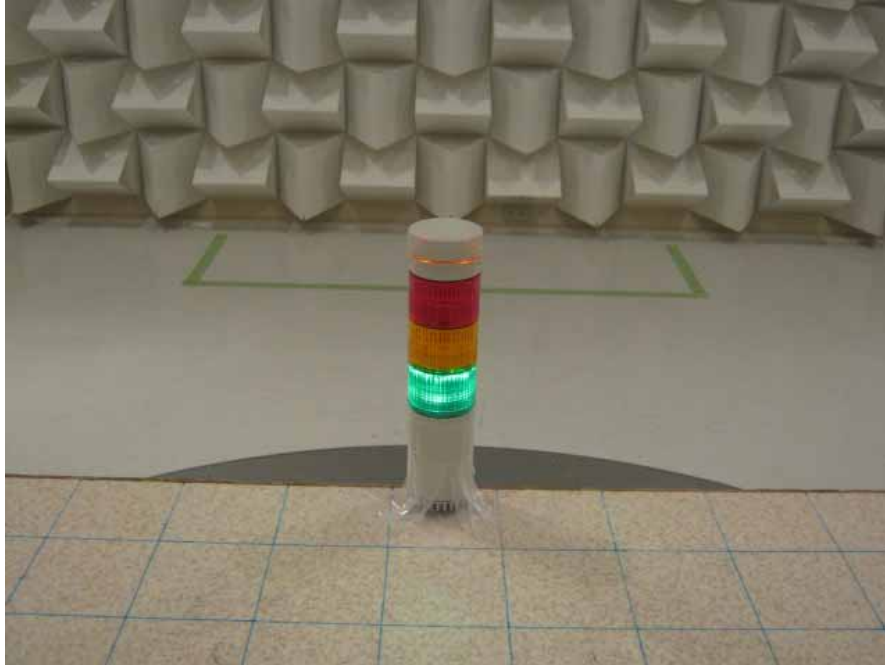
6.2 Setup Photo (Continued)
(Radiated Emission)
1GHz – 18GHz



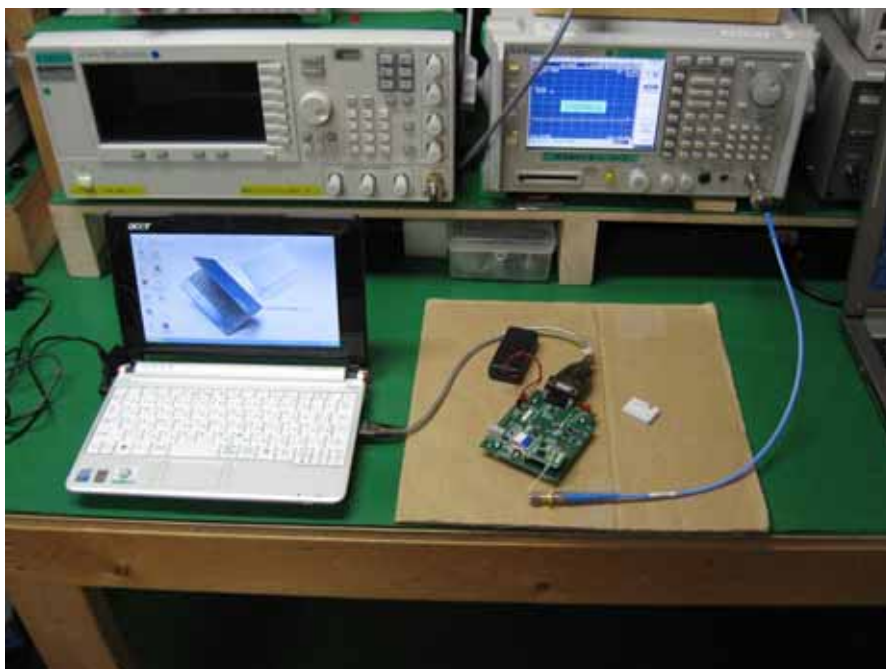
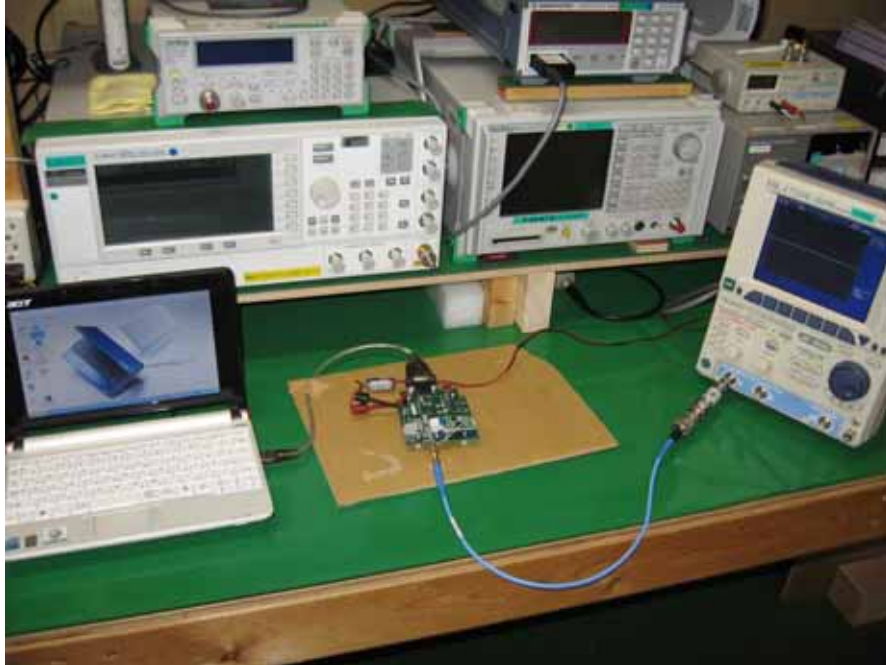
6.2 Setup Photo (Continued)
(Radiated Emission)
18GHz – 26.5GHz



6.2 Setup Photo (Continued)
(Radiated Emission)
18GHz – 26.5GHz



6.3 Setup Photo (All Other Test Items)



6.3 Setup Photo (Continued)
(All Other Test Items)



7. List of Test Measurement Instruments

7.1 AC Conducted Emission

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July, 2008 July, 2010
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100335	November, 2009 November, 2010
Artificial-Mains Network	KYORITSU CORPORATION	KNW-341C (for EUT)	8-1659-1	July, 2009 July, 2010
RF Selector	Techno Science Japan Corp.	RFM-E221	3148	Confirmed before Test

7.2 Radiated Emission Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	Confirmed before Test
EMI Test Receiver	ROHDE & SCHWARZ	ESIB40	100211	October, 2009 October, 2010
Biconical Antenna (30 to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	9124-311	September, 2009 September, 2010
Log.-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP 9108 A	645	September, 2009 September, 2010
Horn Antenna (1~12.5GHz)	SCHWARZBECK	BBHA 9120 D	443	January, 2010 January, 2011
Horn Antenna (12.5~18GHz)	ETS LINDGREN	3160-08	00033782	September, 2009 September, 2010
Horn Antenna (18~26.5GHz)	ETS LINDGREN	3160-09	00034723	September, 2009 September, 2010

7.3 Conducted Radio Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibration Date Next Calibration
DC Power Source	KIKUSUI	PAN60-6A	JK002503	---
Spectrum Analyzer	Anritsu	MS2687B	6200162706	April, 2010 April, 2011
Signal Generator	Agilent Technology	E8254A	US41140186	May, 2010 May, 2011
Oscilloscope	Tektronix	TDS794D	B031832	October, 2009 October, 2010
Diode Detector	Agilent Technology	423B	MY42241836	March, 2010 March, 2011