

**MEASUREMENT/TECHNICAL REPORT  
 FCC Part 15 Subpart C**

Issued: August 30<sup>th</sup>, 2007

Name and Address of the Applicant:	KYOCERAMITA Corporation 2-28,1-CHOME, TAMATSUKURI, CHUO-KU, Osaka, 540-8585 Japan
Test Item:	Laser Printer
Identification:	FS-C5300DN
Serial No.:	---
FCC ID:	E522HN0120
Sample Receipt Date:	August 1 <sup>st</sup> , 2007
Test Specification:	FCC Part 15 Subpart C, 15.225
Date of Testing:	August 1 <sup>st</sup> - 7 <sup>th</sup> , 2007
Test Result:	PASS

Report Prepared by:	Cosmos Corporation 2-3571 Ohnogi, Watarai-cho, Watarai-gun, Mie, Japan 516-2102 Phone: +81-596-63-0707 Fax: +81-596-63-0777
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Tested by:	<u><i>D. Watanuki</i></u> D. Watanuki, Engineer	August 30th, 2007 Date
Reviewed by:	<u><i>Y. Kawahara</i></u> Y. Kawahara, Leader	August 30th, 2007 Date

- Notes:
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  2. All measurement data contained in this report may have uncertainty. A judgment for the limitation should be taken into the count.
  3. The report in this report apply only to the sample tested.

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**1. Description of Equipment Under Test**

1.1 Product Description

Manufacturer : KYOCERAMITA Corporation  
 Model (referred to as the EUT) : FS-C5300DN  
 : AC 120V  
 Type of Modulation : ASK  
 Mode of Operation :  duplex  1/2 duplex  simplex  other  
 The type of the equipment :  Stand-alone  Combined Equipment  
 :  Plug -In Card  Other (Module Unit)  
 The type of the antenna :  Integral  external  Other  
 The type of power source :  AC mains  Dedicated AC adapter ( V)  
 :  DC Voltage  Battery  
 The type of battery (if applicable) : N/A  
 Type of Operation :  Continuous  Burst  Intermittent  
 Stand by Mode :  Available  N/A  
 Intended functions : RFID Module Reader/Writer  
 The bandwidth of the IF filters : N/A  
 Method of Communication Link : Software to make maximum speed transmitting  
 The operating frequency band : 13.56 MHz  
 The thermal limitation : Not specified

1.2 Antenna Description

No.	Type Name	Gain	Antenna Type	Remarks
1	39221	- 43dB	Printed Loop	Originally Integrated.

1.3 Accompanied Peripherals Description

No.	Equipment Name	Manufacturer	Type Name	Serial Number	Remarks
1	PC	DELL	DHP 4500C	BW5941X	115V/230V 1.5A/0.75A Applied to Radiated Emission
2	Monitor	HP	D5258A	TH03900078	100-240V 1.4A Applied to Radiated Emission

## 2. General Information

### 2.1 Test Methodology

All measurement subject to the present test report is 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 site has been filed by FCC.

### 2.3 Tractability

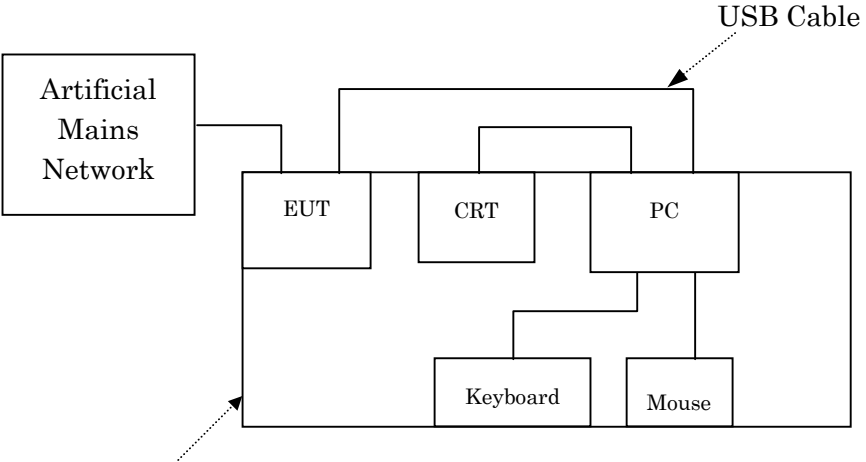
The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

## 3. Summary of Test Results

<b>Section</b>	<b>Test Item</b>	<b>Limit</b>	<b>Result</b>
15. 207	AC Power Conducted Emission	Limit: min.48dBuV	Pass
15. 209	Field Strength of Spurious Emission	Refer to 15. 209	Pass
15. 225	Maximum Output Power	15,848 uV/m @ 30 m	Pass
15. 225	Frequency Tolerance	± 0.01 %	Pass

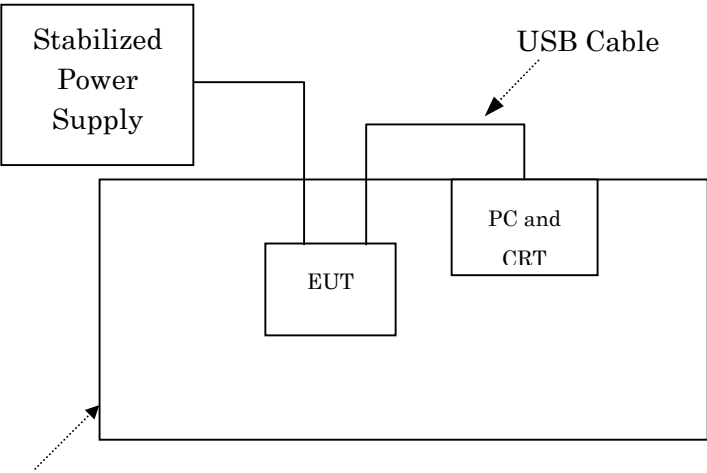
**4. Test Configuration**

4.1 Conducted Emission Measurement

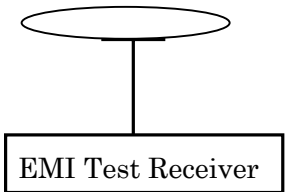


Non-conductive table, 0.4m high  
Non-conductive board, 12mm thick

4.2 Radiated Measurement in 3m Anechoic Chamber



Non-conductive table, 0.8 m high



\* The support PC was placed under the non-conducted table to avoid screening RF emission of EUT.

Antenna (Loop, Biconical and Log-periodic)

### 4.3 Test Mode

In all test configurations above, EUT makes communication link between the integrated RFID module and a RFID tag in a dedicated ink ribbon with the maximum RF power by a special test program.

Maximum Output Power and Frequency Tolerance measurement were performed with an external stabilized DC power supply voltage varied between 85% and 115% of the nominal rated supply voltage 120 VAC.

Frequency Tolerance measurement is performed under the following extreme condition:

Temperature: - 20 to +50

Voltage: 102 to 138 VAC

**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.
- A wooden test table (1.5m×1.0m, height 0.8m) was used.
- EUT's dedicated AC adapter connected to Artificial Mains Network (AMN).
- Other power cord of support equipment is connected to another AMN to isolate its emission from the measured emission of EUT.
- The measuring port of AMN 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**

(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 : N/A



5.1.4 Measured Data

Measured Value Table

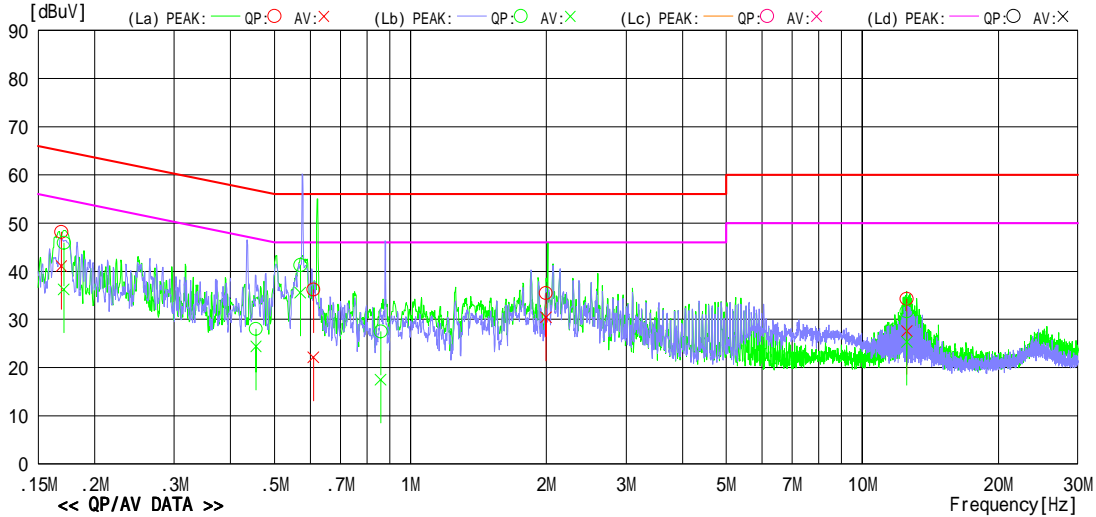
CJ07-063105E CE 01 (FS-C5300DN).CED

<<Conducted Emission>>

Cosmos Corporation --EMC--  
Date : 2007/08/02 11:42:02

Model Name	: FS-C5300DN	Job No	: CJ07-063105E
Serial No.	:	Temp./Humi.	: 26 /45%
Operator	: D.Watanuki	Condition	:
Power Supply	: AC120V,60Hz	Remark	: RBW:9KHz VBW:100KHz
Memo	: LISN:KNW-244C		

LIMIT : CISPR Pub 22 Class B  
CISPR Pub 22 Class B(AV)



No	Freq. [MHz]	Reading Level		C. Fac [dB]	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV				
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dB]	[dB]				
1	0.16896	38.2	31.2	9.9	48.1	41.1	65.0	55.0	16.9	13.9	La	
2	0.60947	26.2	12.1	10.0	36.2	22.1	56.0	46.0	19.8	23.9	La	
3	1.99446	25.3	20.2	10.2	35.5	30.4	56.0	46.0	20.5	15.6	La	
4	12.54292	23.2	16.6	11.0	34.2	27.6	60.0	50.0	25.8	22.4	La	
5	0.17100	36.0	26.4	9.9	45.9	36.3	64.9	54.9	19.0	18.6	Lb	
6	0.45511	18.0	14.4	10.0	28.0	24.4	56.8	46.8	28.8	22.4	Lb	
7	0.57100	31.3	25.6	10.0	41.3	35.6	56.0	46.0	14.7	10.4	Lb	
8	0.86012	17.4	7.4	10.1	27.5	17.5	56.0	46.0	28.5	28.5	Lb	
9	12.54197	20.7	14.4	10.9	31.6	25.3	60.0	50.0	28.4	24.7	Lb	

## 5.2 15. 209 Transmitter Radiated Emissions

### 5.2.1 Setting Remarks

- The data lists in “5.2.4 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 9kHz to 1 GHz, the Electric Field Strength was measured in accordance with ANSI C63.4: 2003 and CISPR22: 1997.
- The test setup was made in accordance with ANSI C63.4: 2003.
- The antenna was measured at 1-4m height for 30MHz to 1GHz.
- The EUT was placed on the non-conductive table in the center of turntable. The height of this table was 0.8m.
- The measurement was carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment was recorded.
- Below 30MHz, a loop antenna was used at 1m height.
- By varying the configuration of the test sample and the cable routing, it was attempted to maximize the emission.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1:1993.
- 9-90 kHz, 110-490 kHz are based on measurements employing an average detector.
- The spectrum analyzer was set-up as following;

(Frequency range : 9kHz - 30 MHz)

- ✓ Resolution bandwidth : 10 kHz
- ✓ Video bandwidth : 100 kHz
- ✓ Detector function : Peak
- ✓ Trace Mode : Max Hold

(Frequency range : 30 - 1000 MHz)

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

- EMI Test Receiver analyzer was set-up as following (Quasi-Peak Detector);
  - ✓ IF bandwidth : 200 Hz (9kHz - 150kHz)
  - ✓ IF bandwidth : 9 kHz (150kHz - 30MHz)
  - ✓ IF bandwidth : 120 kHz (30MHz - 1GHz)
- Refer to test configuration figure 4.2.

**5.2.2 Minimum Standard**

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

**5.2.3 Result**

**EUT complies with the requirement.**

Uncertainty of measurement result:  $\pm 3.64$  dB

Temperature, Humidity : Refer to each data table

5.2.4 Measured Data

9kHz to 30MHz

FCC15.225\_CJ07-063105E.MED

<<Electromagnetic Radiation>>

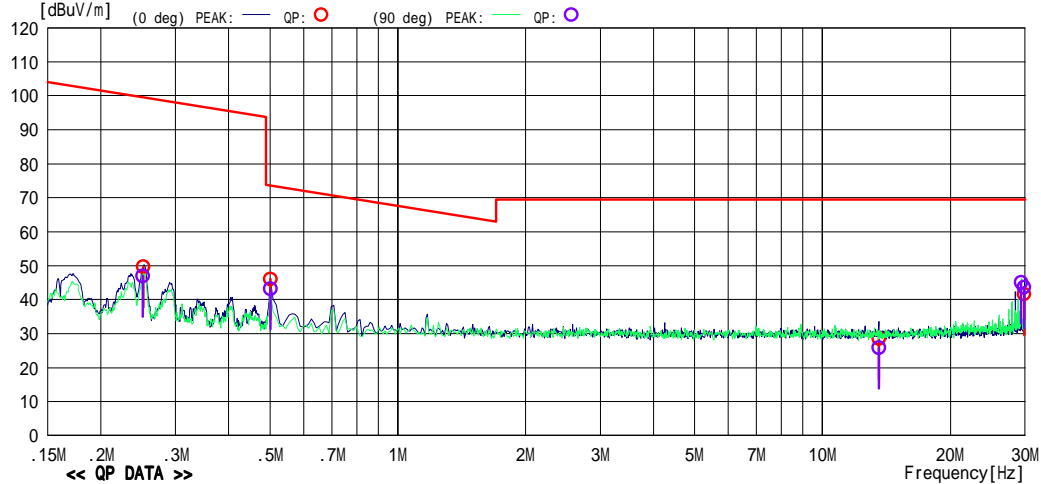
Cosmos Corporation --EMC--  
 Date : 2007/08/01 10:34:32

Model Name : FS-C5300DN  
 Serial No. : SPL 7500033  
 Operator : D.Watanuki  
 Power Supply : AC 120V,60Hz

Job No. : CJ07-063105E  
 Temp./Humi. : 24 /46%  
 Condition :  
 Remark :

Memo :

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz



<< QP DATA >>

No	Freq.	Reading	Ant. Fac	Loss	Result	Limit	Margin	Antenna	Angle
	[MHz]	[dBuV]	[dB/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]
1	0.25176	30.5	19.0	0.2	49.7	99.6	49.9	0deg	255
2	0.50165	26.9	19.0	0.2	46.1	73.6	27.5	0deg	251
3	13.56064	9.4	18.4	0.8	28.6	69.5	40.9	0deg	288
4	29.81297	21.8	18.6	1.2	41.6	69.5	27.9	0deg	287
5	0.25131	27.8	19.0	0.2	47.0	99.6	52.6	90deg	332
6	0.50135	24.0	19.0	0.2	43.2	73.6	30.4	90deg	335
7	13.56024	6.7	18.4	0.8	25.9	69.5	43.6	90deg	77
8	29.34503	25.1	18.7	1.2	45.0	69.5	24.5	90deg	283
9	29.81537	23.8	18.6	1.2	43.6	69.5	25.9	90deg	318

30MHz to 1GHz

FCC15.225\_CJ07-063105E RE TotalNoise 01 (FS-C5300DN).RED

<<Radiated Emission>>

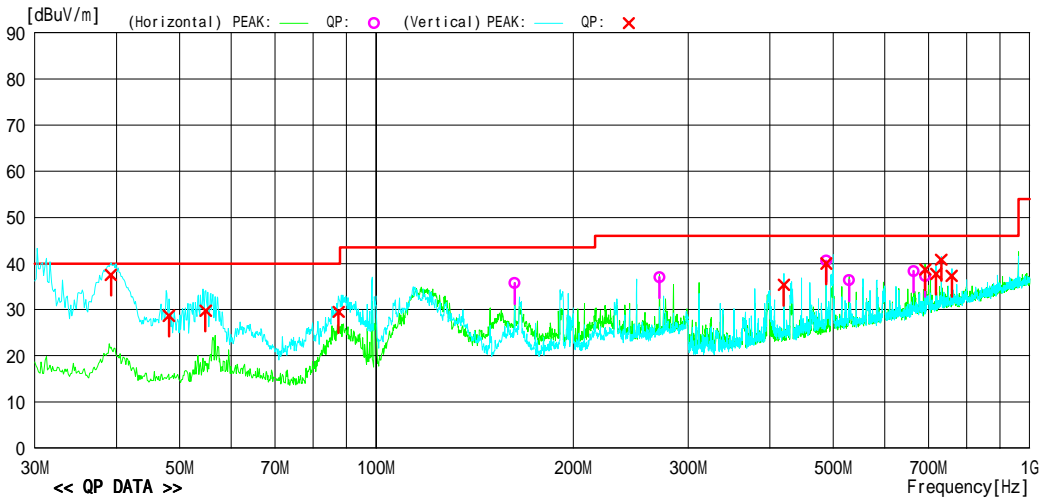
Cosmos Corporation --EMC--  
 Date : 2007/08/01 14:45:51

Model Name : FS-C5300DN  
 Serial No. : SPL 7500033  
 Operator : D.Watanuki  
 Power Supply : AC 120V 60Hz

Job No : CJ07-063105E  
 Temp./Humi. : 25 /37%  
 Condition :  
 Remark : 3m distance

Memo :

LIMIT : FCC 15.209 3m



<< QP DATA >>

No	Freq.	Reading	C. Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	162.710	46.3	-10.6	35.7	43.5	7.8	Hori.	137	100	BC	
2	271.202	41.3	-4.3	37.0	46.0	9.0	Hori.	118	286	BC	
3	488.141	44.1	-3.5	40.6	46.0	5.4	Hori.	123	113	LP	
4	528.848	39.1	-2.7	36.4	46.0	9.6	Hori.	120	96	LP	
5	664.434	38.8	-0.5	38.3	46.0	7.7	Hori.	100	119	LP	
6	691.578	37.3	0.0	37.3	46.0	8.7	Hori.	171	307	LP	
7	39.249	50.4	-12.9	37.5	40.0	2.5	Vert.	100	317	BC	
8	48.161	42.8	-14.1	28.7	40.0	11.3	Vert.	100	331	BC	
9	54.780	44.6	-14.8	29.8	40.0	10.2	Vert.	100	285	BC	
10	87.515	44.2	-14.7	29.5	40.0	10.5	Vert.	100	307	BC	
11	420.360	40.6	-5.2	35.4	46.0	10.6	Vert.	155	106	LP	
12	488.146	43.5	-3.5	40.0	46.0	6.0	Vert.	121	119	LP	
13	691.553	38.7	0.0	38.7	46.0	7.3	Vert.	162	308	LP	
14	718.682	36.9	0.8	37.7	46.0	8.3	Vert.	100	121	LP	
15	732.234	39.8	1.0	40.8	46.0	5.2	Vert.	161	110	LP	
16	759.353	36.1	1.2	37.3	46.0	8.7	Vert.	154	208	LP	

**5.3 Maximum Carrier Output Power**

5.3.1 Setting Remarks

- Refer to 5.2.1
- The EUT was placed on the non-conductive table in the center of turntable. The height of this table was 1m.
- The measurement was carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment was recorded.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1:1993.
- The spectrum analyzer was set-up as following;
  - ✓ Frequency Span : Appropriate to determine carrier frequency.
  - ✓ Resolution bandwidth : Appropriate to determine carrier frequency.
  - ✓ Video bandwidth : Appropriate to determine carrier frequency.
  - ✓ Sweep : Auto
  - ✓ Detector function : Peak
  - ✓ Trace Mode : Max Hold
- EMI Test Receiver analyzer was set-up as following (Quasi-Peak Detector);
  - ✓ IF bandwidth : 9 kHz
- Refer to test configuration figure 4.2.

5.3.2 Minimum Standard

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

5.3.3 Result

**EUT complies with the requirement.**

Uncertainty of measurement result: ± 3.64 dB  
 Temperature, Humidity : Refer to each data table

5.3.4 Measured Data (3m distance)

(102 VAC)

Frequency (MHz)	Polarization (°)	Correction Factor (dB)	Reading (dBuV)	Peak Power (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.11	0	18.5	12.8	31.3	80.5	49.2
13.41	0	18.4	13	31.4	80.5	49.1
13.553	0	18.4	13	31.4	90.47	59.07
13.560 (Carrier)	0	18.4	21.06	39.46	124	84.54
13.567	0	18.4	13.1	31.5	90.47	58.97
13.71	0	18.4	13.5	31.9	80.5	48.6
14.01	0	18.4	12.9	31.3	80.5	49.2

(120 VAC)

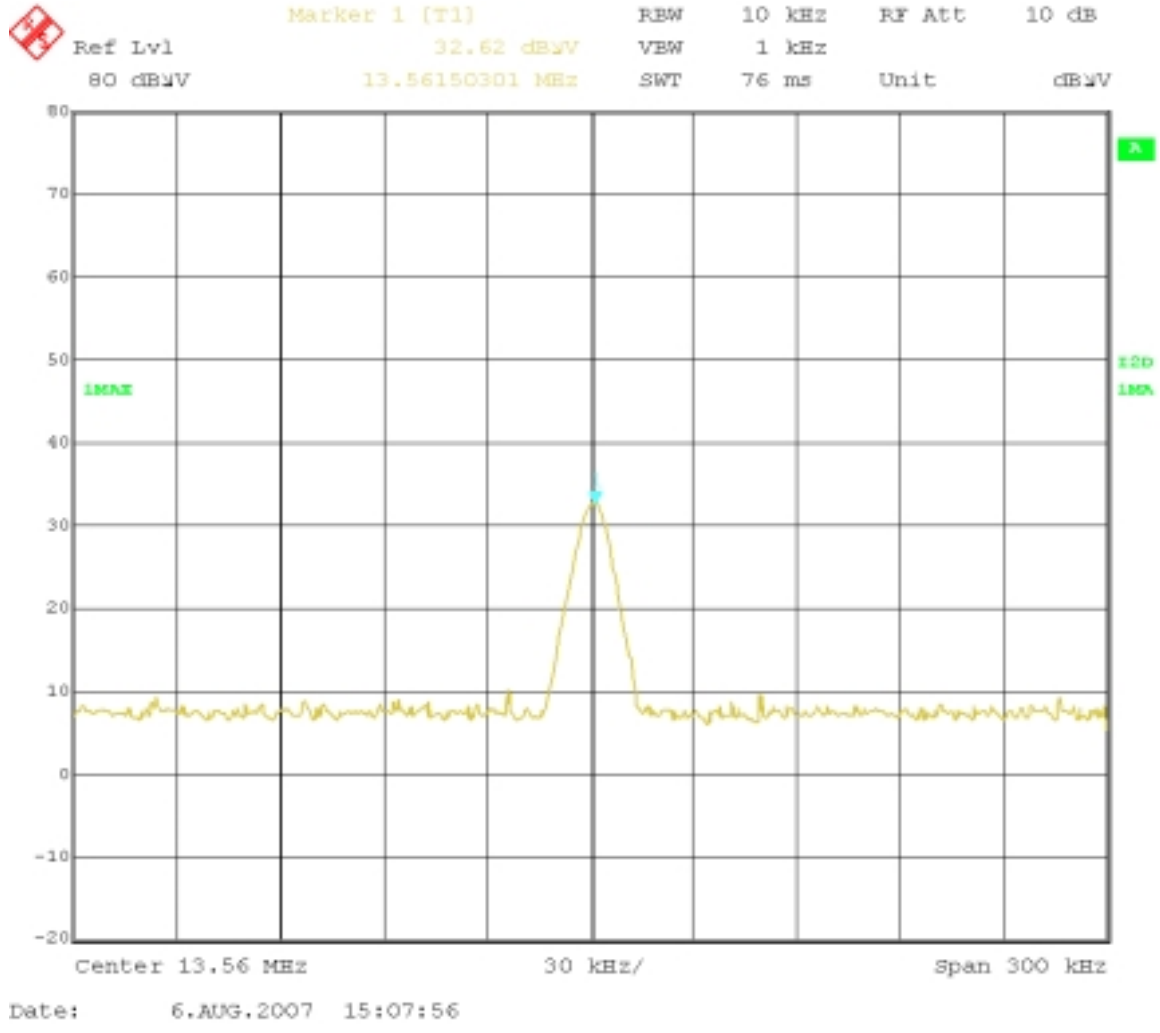
Frequency (MHz)	Polarization (°)	Correction Factor (dB)	Reading (dBuV)	Peak Power (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.11	0	18.5	14.2	32.7	80.5	47.8
13.41	0	18.4	13.9	32.3	80.5	48.2
13.553	0	18.4	12.7	31.1	90.47	59.37
13.560 (Carrier)	0	18.4	21.09	39.49	124	84.51
13.567	0	18.4	14.6	33	90.47	57.47
13.71	0	18.4	14.1	32.5	80.5	48
14.01	0	18.4	13.4	31.8	80.5	48.7

(138 VAC)

Frequency (MHz)	Polarization (°)	Correction Factor (dB)	Reading (dBuV)	Peak Power (dBuV/m)	Limit (dBuV/m)	Margin (dB)
13.11	0	18.5	15.6	34.1	80.5	46.4
13.41	0	18.4	15.4	33.8	80.5	46.7
13.553	0	18.4	16.2	34.6	90.47	55.87
13.560 (Carrier)	0	18.4	22.06	40.46	124	83.54
13.567	0	18.4	16	34.4	90.47	56.07
13.71	0	18.4	15.8	34.2	80.5	46.3
14.01	0	18.4	15.4	33.8	80.5	46.7

\* Correction Factor = Cable Loss (dB) + Antenna Factor (dB)

Carrier Spectrum





**5.4 Frequency Tolerance**

**5.4.1 Setting Remarks**

- Refer to setting remarks 5.3.1.
- Refer to test configuration figure 4.2.
- With an environmental test chamber, EUT is exposed in extreme temperatures until its temperature is stabilized. (Approximately 30 minutes) Then EUT is on with nominal AC voltage, or installed a fully charged battery.

**5.4.2 Minimum Standard**

(e) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

**5.4.3 Result**

**EUT complies with the requirement.**

Uncertainty of measurement result: ± 1 Hz

**5.4.4 Measured Data**

Temp. (°C)	P/S Voltage (VAC)	Frequency (Hz)	Limit (±Hz)	Offset from the CF (Hz)	Limit (%)	Error (%)
<b>Center Freq.</b>		<b>13,560,000</b>				
25	102.00	13,559,930	1356.00	-70	0.01	-0.001
25	120.00	13,559,930	1356.00	-70	0.01	-0.001
25	138.00	13,559,930	1356.00	-70	0.01	-0.001
-20	102.00	13,559,950	1356.00	-50	0.01	0.000
-20	120.00	13,559,950	1356.00	-50	0.01	0.000
-20	138.00	13,559,950	1356.00	-50	0.01	0.000
50	102.00	13,559,910	1356.00	-90	0.01	-0.001
50	120.00	13,559,910	1356.00	-90	0.01	-0.001
50	138.00	13,559,920	1356.00	-80	0.01	-0.001

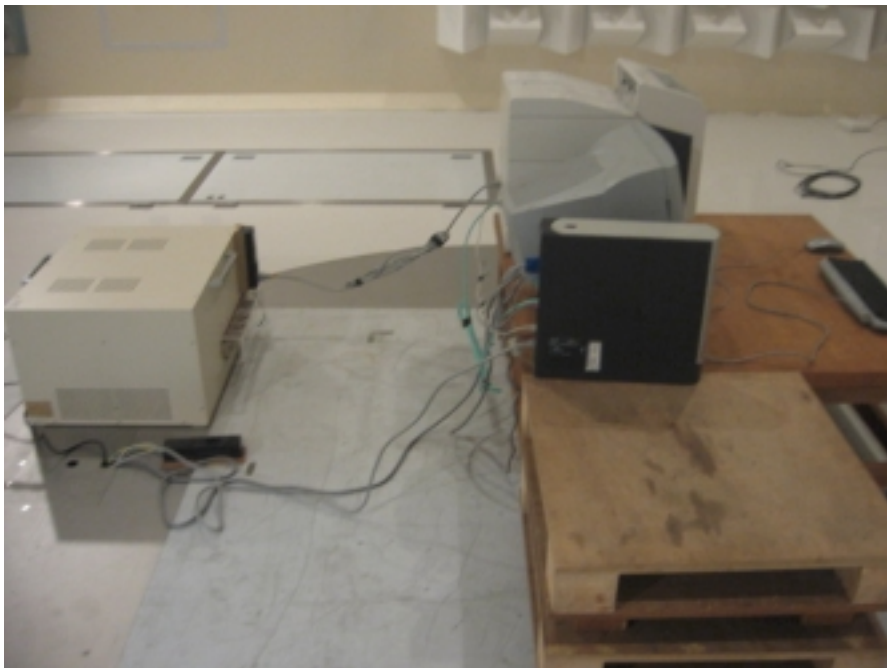
**6. Photos**

6.1 Setup Photo (Conducted Emission)

Front View



Side View

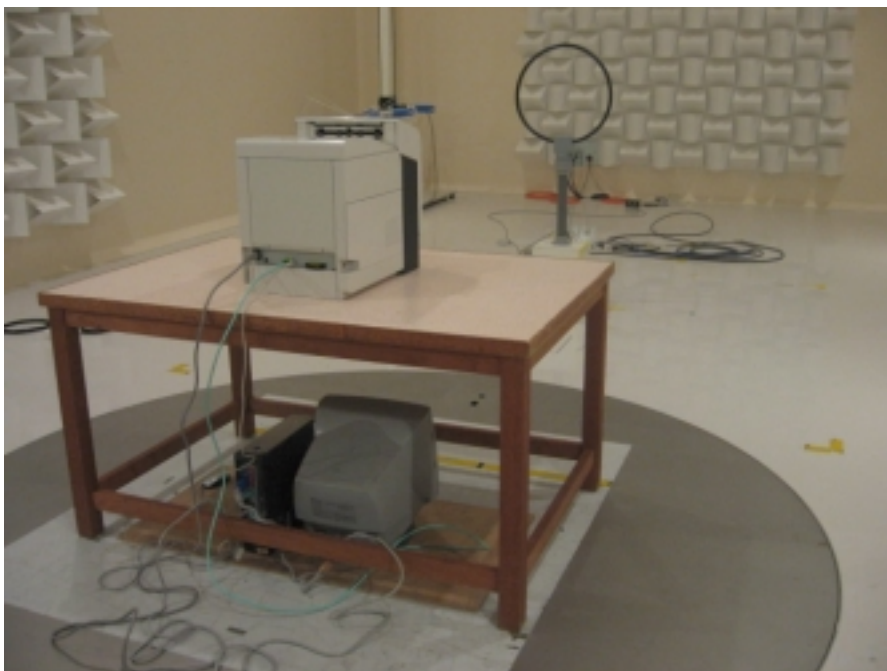


6.2 Setup Photo (Radiated Emission)

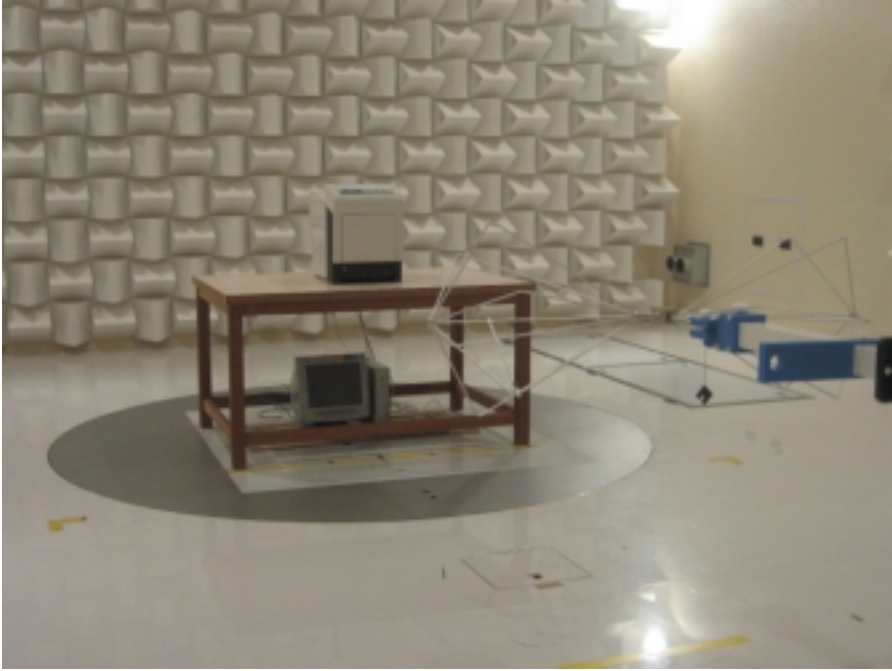
Front View (9kHz - 30MHz)



Rear View (9kHz - 30MHz)



Front View (Above 30MHz)



Rear View (Above 30MHz)



**7. List of Test Measurement Instruments**

7.1 Conducted Emission Measurement

<b>Instruments</b>	<b>Manufacturer</b>	<b>Model Serial No.</b>	<b>Calibrated Date/Until</b>
Spectrum Analyzer	HEWLETT PACKARD	8563E 3846A10015	July, 2007 July, 2009
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30 830245/014	April, 2007 April, 2009
Artificial-Mains Network (for EUT)	KYORITSU CORPORATION	KNW-243C 8-1238-3	September, 2006 September, 2007
Artificial-Mains Network (for Peripheral)	ROHDE & SCHWARZ	ESH2-Z5 828739/005	June, 2007 June, 2008
RF cable	SUHNER	RG223/U (4m)	May, 2007 May, 2008
RF Selector	TOYO Corporation	NS4901DR 9904011	Confirmed before Test
Transient Limiter	CHASE Electronics Limited	CFL9206 1662	Confirmed before Test

7.2 Radiated Emission Measurement

<b>Instruments</b>	<b>Manufacturer</b>	<b>Model / Type</b>	<b>Serial No.</b>	<b>Calibration Date Next Calibration</b>
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	---
EMI Test Receiver	ROHDE & SCHWARZ	ESIB40	100211	April, 2007 April, 2008
Biconical Antenna (30 to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	311	September, 2006 September, 2007
Log.-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP 9108 A	645	September, 2006 September, 2007
Loop Antenna (0.15 to 30 MHz)	ROHDE & SCHWARZ	HFH2-Z2	131	August, 2006 August, 2007
Environment Chamber	ISUZU	HPAV-48-40	0092986-0 1	---