



MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Subpart C

Issued: August 26, 2009

Name and Address of the Applicant: Maxell Seiki, Ltd
45-101, Kagamida, Oyamazaki, Otokuni, Kyoto, 618-8558 Japan

Test Item: RFID R/W Module / Antenna Module

Identification: ME-MR23M4-A-SG / ME-MS01M-B-ANT

Serial No.: 000102 / 000102-1, 000102-2, 000102-3, 000102-4

FCC ID: UOEME-M23

Sample Receipt Date: August 3, 2009

Test Specification: FCC Part 15 Subpart C, 15.225

Date of Testing: August 3, 4, 5 and 18, 2009

Test Result: PASS

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Notes:

1. This report should not be reproduced except in full, without the written approval of Cosmos Corporation.
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 : Maxell Seiki, Ltd.
 Model (referred to as the EUT) : ME-MR23xy-z-zz*
 Nominal Voltage : DC 12V
 Type of Modulation : Amplitude Modulation
 Mode of Operation : ☐ duplex ☐ 1/2 duplex ☒ simplex ☐ other
 The type of the equipment : ☐ Stand-alone ☒ Combined Equipment
 ☐ Plug-In Card ☐ Other
 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 Reader/Writer
 The bandwidth of the IF filters : N/A
 Method of Communication Link : RS-232C
 The operating frequency band : 13.56MHz ± 15ppm
 The thermal limitation : 60

Note

*: The suffix x can be M denotes multi-channel and y can be 1-4 denotes antenna number.
 The suffix z can be A-Z denotes the difference of customer etc., not safety relevant.

Equipment under test is as follows.

Description	Model	Rating
EUT1 (RFID R/W Module)	ME-MR23M4-A-SG	DC 12 V
EUT2 (Antenna Module)	ME-MS01M-B-ANT	Un-specified
EUT3 (Antenna Module)	ME-MS01M-B-ANT	Un-specified
EUT4 (Antenna Module)	ME-MS01M-B-ANT	Un-specified
EUT5 (Antenna Module)	ME-MS01M-B-ANT	Un-specified

1.2 Antenna Description

No.	Type Name	Gain	Antenna Type	Remarks
1	ME-MS01-M-B-ANT	- 58.143dB	Printed Loop	

1.3 Accompanied Peripherals Description

No	Equipment Name	Manufacturer	Type Name	Serial Number	Remarks
1	Personal Computer	DELL	PP17L	---	DC 19.5 V, 4.62 A
2	AC Adapter	DELL	HP-OQ065B83	CN-0N2765-47890-47D-8266	AC 100-240 V, 50/60 Hz, 1.5 A
3	Power Supply	Maxell Seiki, Ltd.	LDA150W-12	---	AC 100 V, 50/60 Hz, 1.5 A

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.

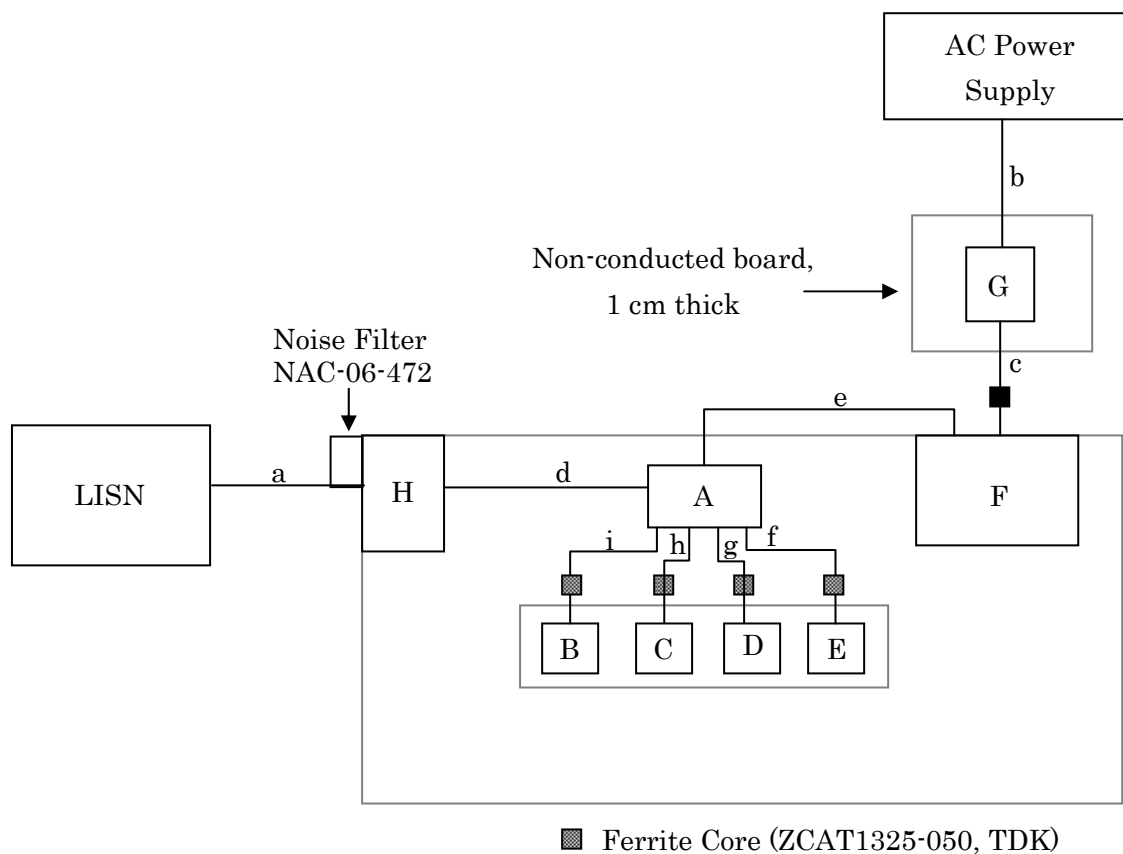
3. Summary of Test Results

No.	Requirement	RSS 210 Issue 7, RSS-Gen Issue 2 (Industry Canada)	CFR 47 Part. 15 (FCC)	Result
1	Frequency Tolerance	A2.6 – RSS 210	15.225 (e)	Pass
2	Maximum Output Power	A2.6 – RSS 210	15.225 (a)(b)(c)	Pass
3	Field Strength of Spurious Emission (Transmitter)	A2.6 – RSS 210	15.209, 15.225 (d)	Pass
4	AC Power lines Conducted Emission	7.2.2 – RSS-Gen	15.207	Pass
5	Spurious Emission (Receiver)	7.2.3 – RSS-Gen	N/A	N/A
6	Occupied Band Width(99%)	4.6.1 – RSS-Gen	N/A	N/A
7	20dB Bandwidth	N/A	15.215 (c)	Pass

4. Test Configuration

	Instrument	Model		Cable	Length	Shield
A	EUT1	ME-MR23M4-A-SG	a	AC Power Cord	1.9 m	×
B	EUT2	ME-MS01M-B-ANT	b	AC Power Cord	0.6 m	×
C	EUT3	ME-MS01M-B-ANT	c	DC Power Cord	1.8 m	×
D	EUT4	ME-MS01M-B-ANT	d	DC Power Cord	0.7 m	×
E	EUT5	ME-MS01M-B-ANT	e	Host Cable	3.0 m	
F	PC	PP17L	f	Antenna Cable	0.5 m	×
G	AC Adapter	HP-OQ065B83	g	Antenna Cable	0.5 m	×
H	Power Supply	LDA150W-12	h	Antenna Cable	0.5 m	×
			i	Antenna Cable	0.5 m	×

4.1 Conducted Emission Measurement

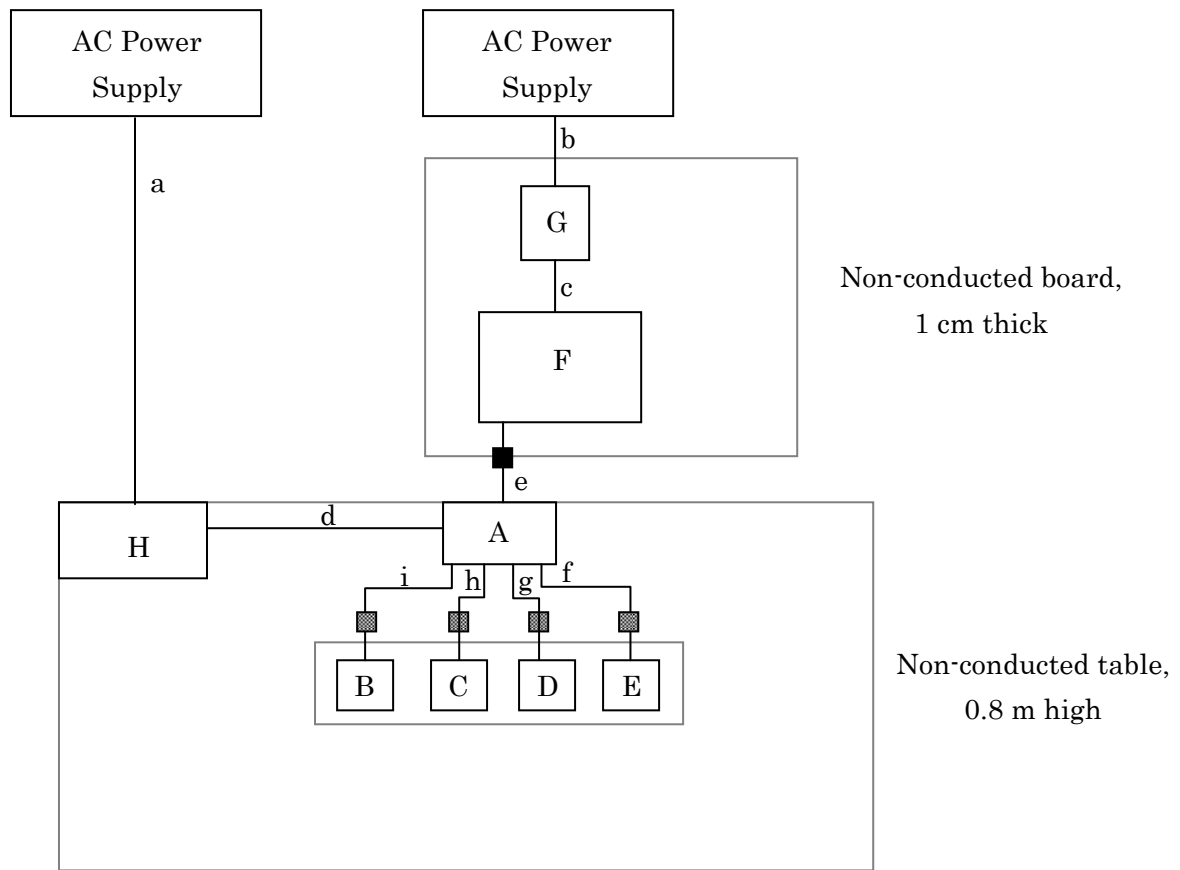


Excess cable arrangement (Conducted Emission)

Sym.	Bundle (Length / Position)	Hung
e	0.4 m / center	

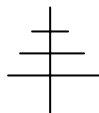
4. Test Configuration (Continued)

4.2 Radiated Measurement in 3m Anechoic Chamber



■ Ferrite Core (ZCAT1518-0730, TDK)

■ Ferrite Core (ZCAT1325-0530, TDK)



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%.

Frequency Tolerance and Maximum Output Power measurements are performed under the following condition:

Temperature: - 20 to +50

Voltage: DC 12 V \pm 15%

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 / 40%

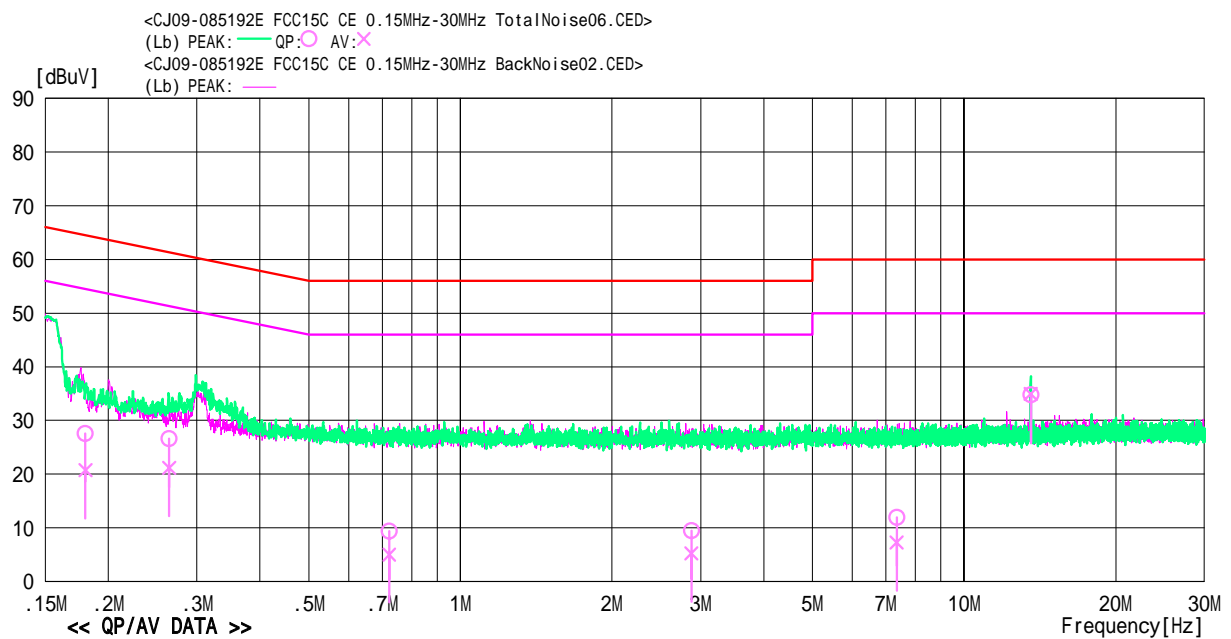
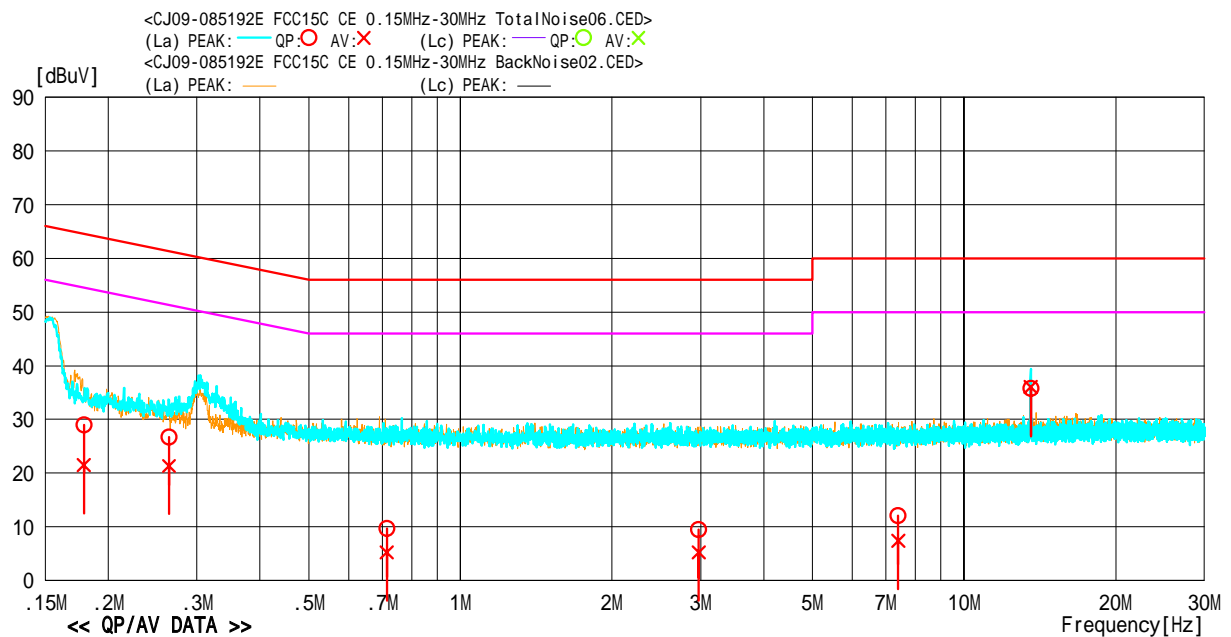
5.1.4 Measured Data

Measured Value Table

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O. Itogawa
Power Supply : AC 120V, 60Hz (DC12V)
Memo : RBW:9kHz (150k-30MHz)

Job No : CJ09-085192E
Temp/Humi : 24 / 40%
Condition : Operated
Remark :

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



5.1.4 Measured Data (Continued)

Measured Value Table

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O. Itogawa
Power Supply : AC 120V, 60Hz (DC12V)

Job No : CJ09-085192E
Temp/Humi : 24 /40%
Condition : Operated
Remark :

Memo : RBW:9kHz(150k-30MHz)

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

<< QP/AV DATA >>

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	0.17901	18.9	11.4	10.1	29.0	21.5	64.5	54.5	35.5	33.0	La	
2	0.26408	16.6	11.2	10.1	26.7	21.3	61.3	51.3	34.6	30.0	La	
3	0.71470	-0.4	-4.9	10.1	9.7	5.2	56.0	46.0	46.3	40.8	La	
4	2.97472	-0.7	-5.0	10.2	9.5	5.2	56.0	46.0	46.5	40.8	La	
5	7.40079	1.5	-3.2	10.5	12.0	7.3	60.0	50.0	48.0	42.7	La	
6	13.56162	25.0	25.2	10.8	35.8	36.0	60.0	50.0	24.2	14.0	La	
7	0.18010	17.5	10.6	10.1	27.6	20.7	64.5	54.5	36.9	33.8	Lb	
8	0.26412	16.5	11.1	10.1	26.6	21.2	61.3	51.3	34.7	30.1	Lb	
9	0.72284	-0.7	-5.0	10.1	9.4	5.1	56.0	46.0	46.6	40.9	Lb	
10	2.87581	-0.7	-5.0	10.2	9.5	5.2	56.0	46.0	46.5	40.8	Lb	
11	7.34835	1.5	-3.1	10.4	11.9	7.3	60.0	50.0	48.1	42.7	Lb	
12	13.56090	24.0	24.3	10.7	34.7	35.0	60.0	50.0	25.3	15.0	Lb	

-TEPT0-DV/CE Ver1.50.0128

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.
- 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

15. 225 (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: ± 3.64 dB

Temperature, Humidity : Refer to each data table

5.2.4 Measured Data

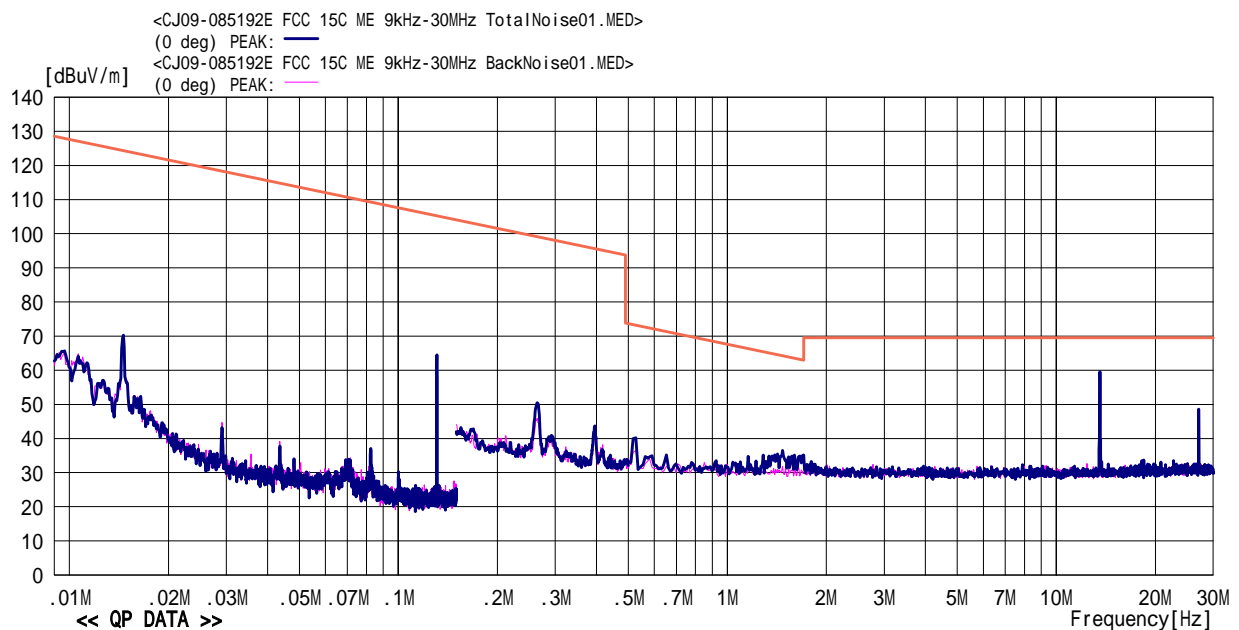
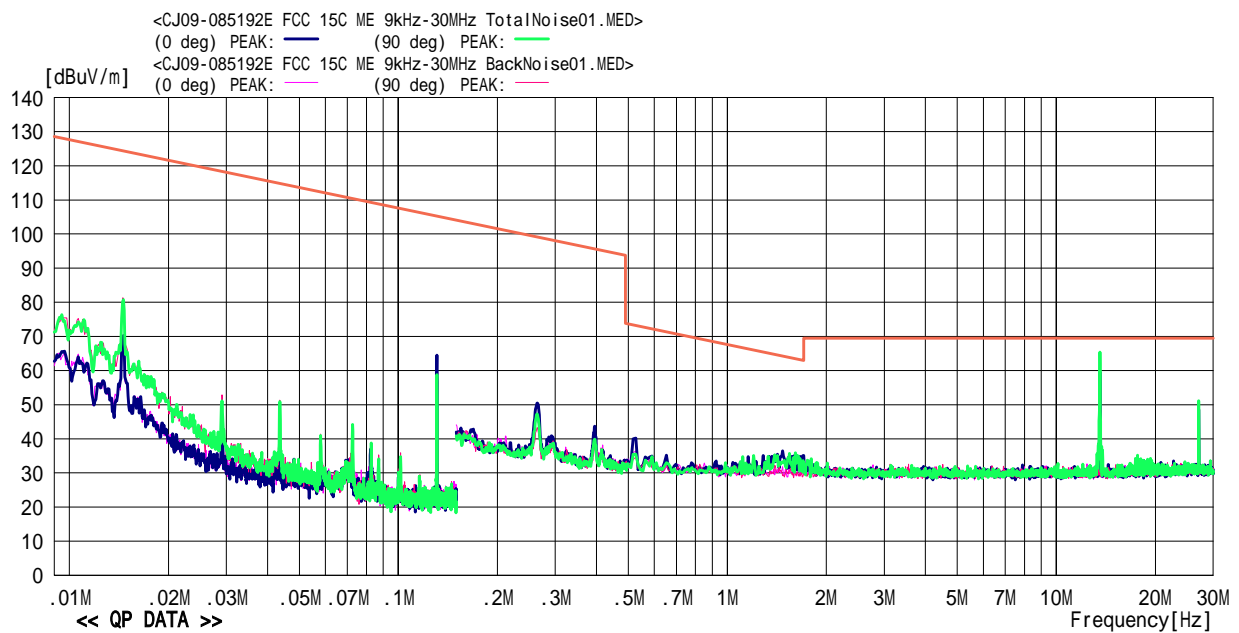
9kHz to 30MHz

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O. Itogawa
Power Supply : AC120V,60Hz

Job No. : CJ09-085192E
Temp./Humi. : 25 /41%
Condition : Operated
Remark :

Memo : RBW:200Hz(9k-150kHz) ,9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz



5.2.4 Measured Data (Continued)

9kHz to 30MHz

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O. Itogawa
Power Supply : AC120V, 60Hz

Job No. : CJ09-085192E
Temp./Humi. : 25 /41%
Condition : Operated
Remark :

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz

<< QP DATA >>

No	Freq.	Reading	Ant.Fac	Loss	Result	Limit	Margin	Antenna	Angle	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
1	13.56114	40.7	18.4	0.8	59.9	69.5	9.6	0deg	314	QP Fundamental Frequency
2	13.56114	40.9	18.4	0.8	60.1	69.5	9.4	0deg	314	PK Fundamental Frequency
3	27.12099	28.3	19.1	1.1	48.5	69.5	21.0	0deg	282	QP
4	27.12099	29.2	19.1	1.1	49.4	69.5	20.1	0deg	282	PK
5	13.56124	46.4	18.4	0.8	65.6	69.5	3.9	90deg	186	QP Fundamental Frequency
6	13.56124	46.5	18.4	0.8	65.7	69.5	3.8	90deg	186	PK Fundamental Frequency
7	27.12059	31.8	19.1	1.1	52.0	69.5	17.5	90deg	0	PK
8	27.12059	31.1	19.1	1.1	51.3	69.5	18.2	90deg	0	QP

5.2.4 Measured Data (Continued)

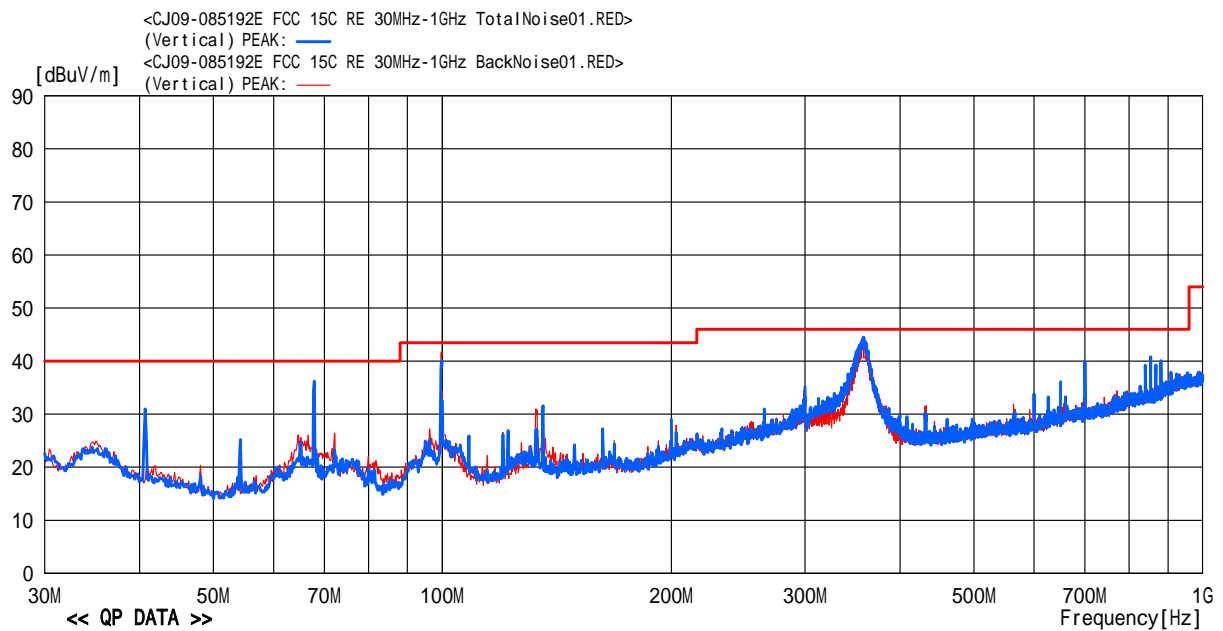
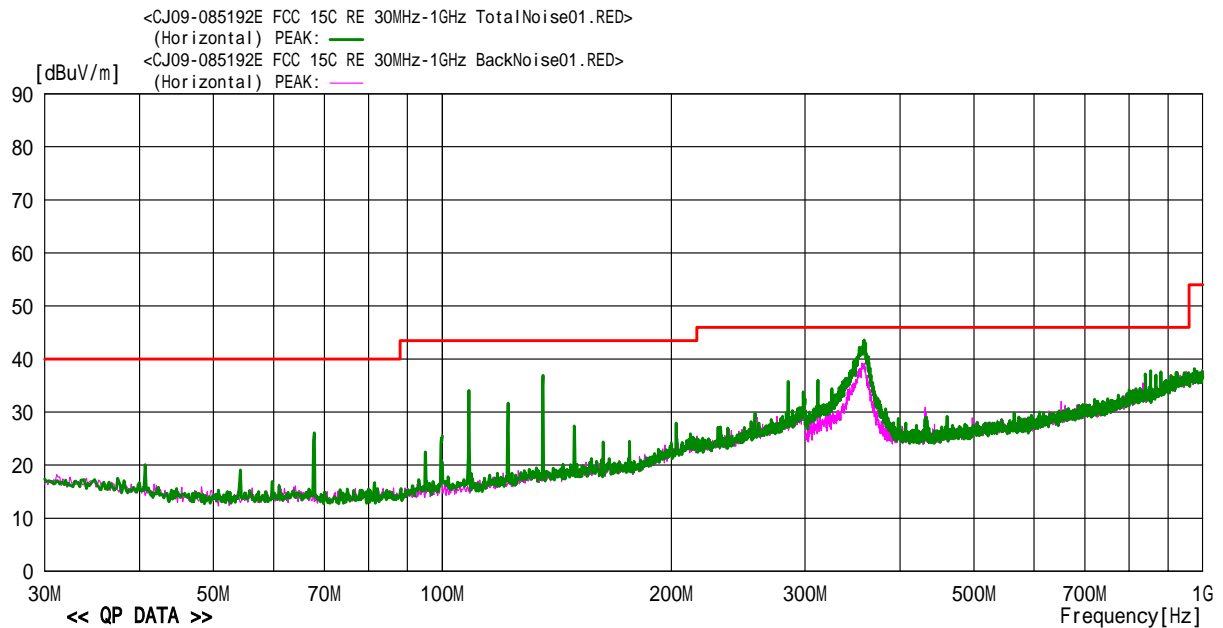
30MHz to 1GHz

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O.Itogawa
Power Supply : AC 120V, 60Hz

Job No : CJ09-085192E
Temp./Humi. : 25 /48%
Condition : Operated
Remark :

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

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



5.2.4 Measured Data (Continued)

30MHz to 1GHz

Model Name : ME-MR23M4-A-SG
Serial No. : 000102
Operator : O.Itogawa
Power Supply : AC 120V, 60Hz

Job No : CJ09-085192E
Temp./Humi. : 25 /48%
Condition : Operated
Remark :

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

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

<< QP DATA >>

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	67.796	41.1	9.0	4.6	28.2	26.5	40.0	13.5	Hori.	207	116	BC	QP
2	67.796	42.5	9.0	4.6	28.2	27.9	40.0	12.1	Hori.	207	116	BC	PK
3	108.472	52.2	9.8	5.0	28.1	38.9	43.5	4.6	Hori.	176	292	BC	PK
4	108.472	51.5	9.8	5.0	28.1	38.2	43.5	5.3	Hori.	176	292	BC	QP
5	122.039	47.9	10.3	5.2	28.1	35.3	43.5	8.2	Hori.	260	297	BC	QP
6	122.039	48.5	10.3	5.2	28.1	35.9	43.5	7.6	Hori.	260	297	BC	PK
7	135.586	51.4	11.3	5.3	28.0	40.0	43.5	3.5	Hori.	137	303	BC	PK
8	135.586	50.0	11.3	5.3	28.0	38.6	43.5	4.9	Hori.	137	303	BC	QP
9	284.755	37.8	19.3	6.5	27.4	36.2	46.0	9.8	Hori.	118	166	BC	QP
10	284.755	40.1	19.3	6.5	27.4	38.5	46.0	7.5	Hori.	118	166	BC	PK
11	311.854	44.8	14.7	6.7	27.5	38.7	46.0	7.3	Hori.	100	165	LP	PK
12	311.854	42.2	14.7	6.7	27.5	36.1	46.0	9.9	Hori.	100	165	LP	QP
13	854.273	37.8	20.3	9.7	28.0	39.8	46.0	6.3	Hori.	100	202	LP	PK
14	854.273	35.1	20.3	9.7	28.0	37.1	46.0	8.9	Hori.	100	202	LP	QP
15	881.387	34.1	20.6	9.8	27.9	36.6	46.0	9.4	Hori.	100	223	LP	QP
16	881.387	37.0	20.6	9.8	27.9	39.5	46.0	6.5	Hori.	100	223	LP	PK
17	40.678	42.8	11.5	4.2	28.4	30.1	40.0	9.9	Vert.	100	32	BC	QP
18	40.678	44.3	11.5	4.2	28.4	31.6	40.0	8.4	Vert.	100	32	BC	PK
19	54.227	37.7	9.6	4.4	28.3	23.4	40.0	16.6	Vert.	100	57	BC	QP
20	54.227	40.0	9.6	4.4	28.3	25.7	40.0	14.3	Vert.	100	57	BC	PK
21	67.786	50.0	9.0	4.6	28.2	35.4	40.0	4.6	Vert.	100	114	BC	QP
22	67.786	52.1	9.0	4.6	28.2	37.5	40.0	2.5	Vert.	100	114	BC	PK
23	108.482	40.8	9.8	5.0	28.1	27.5	43.5	16.0	Vert.	315	236	BC	QP
24	108.482	42.4	9.8	5.0	28.1	29.1	43.5	14.4	Vert.	315	236	BC	PK
25	122.029	38.5	10.3	5.2	28.1	25.9	43.5	17.6	Vert.	100	318	BC	QP
26	122.029	41.9	10.3	5.2	28.1	29.3	43.5	14.2	Vert.	100	318	BC	PK
27	135.586	42.2	11.3	5.3	28.0	30.8	43.5	12.7	Vert.	100	57	BC	QP
28	135.586	44.0	11.3	5.3	28.0	32.6	43.5	10.9	Vert.	100	57	BC	PK
29	854.283	39.3	20.3	9.7	28.0	41.3	46.0	4.7	Vert.	100	359	LP	PK
30	854.283	36.8	20.3	9.7	28.0	38.8	46.0	7.2	Vert.	100	359	LP	QP
31	881.407	37.9	20.6	9.8	27.9	40.4	46.0	5.6	Vert.	100	12	LP	PK
32	881.407	34.9	20.6	9.8	27.9	37.4	46.0	8.6	Vert.	100	12	LP	QP

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 highest radiation from the equipment was recorded.
- The test receiver with Quasi Peak is in compliance with CISPR 16-1.
- The measurement was carried out in a thermostatic chamber. (-20 ~ +50)
- 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

15.225(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

-20

Date of testing : August 5, 2009

Room temperature : 25

Relative humidity : 42%

【-15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.26	23.560	80.50	56.940
13.410	90	19.2	6.03	25.230	80.50	55.270
13.553	90	19.2	28.41	47.610	90.47	42.860
13.560	90	19.2	41.24	60.440	124.00	63.560
13.567	90	19.2	28.72	47.920	90.47	42.550
13.710	90	19.2	6.48	25.680	80.50	54.820
14.010	90	19.3	4.26	23.560	80.50	56.940

【±0%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	6.26	25.460	80.50	55.040
13.553	90	19.2	28.47	47.670	90.47	42.800
13.560	90	19.2	41.37	60.570	124.00	63.430
13.567	90	19.2	28.59	47.790	90.47	42.680
13.710	90	19.2	6.48	25.680	80.50	54.820
14.010	90	19.3	4.54	23.840	80.50	56.660

【+15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.26	23.560	80.50	56.940
13.410	90	19.2	7.10	26.300	80.50	54.200
13.553	90	19.2	28.47	47.670	90.47	42.800
13.560	90	19.2	41.25	60.450	124.00	63.550
13.567	90	19.2	28.60	47.800	90.47	42.670
13.710	90	19.2	5.56	24.760	80.50	55.740
14.010	90	19.3	4.26	23.560	80.50	56.940

5.3.4 Measured Data (Continued)
3m distance

20

Date of testing : August 5, 2009

Room temperature : 25

Relative humidity : 42%

【-15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	5.56	24.860	80.50	55.640
13.410	90	19.2	11.46	30.660	80.50	49.840
13.553	90	19.2	32.94	52.140	90.47	38.330
13.560	90	19.2	45.91	65.110	124.00	58.890
13.567	90	19.2	33.68	52.880	90.47	37.590
13.710	90	19.2	9.85	29.050	80.50	51.450
14.010	90	19.3	4.54	23.840	80.50	56.660

【±0%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	6.26	25.560	80.50	54.940
13.410	90	19.2	12.50	31.700	80.50	48.800
13.553	90	19.2	34.02	53.220	90.47	37.250
13.560	90	19.2	46.93	66.130	124.00	57.870
13.567	90	19.2	34.24	53.440	90.47	37.030
13.710	90	19.2	11.21	30.410	80.50	50.090
14.010	90	19.3	5.56	24.860	80.50	55.640

【+15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.54	23.840	80.50	56.660
13.410	90	19.2	4.26	23.460	80.50	57.040
13.553	90	19.2	33.15	52.350	90.47	38.120
13.560	90	19.2	46.03	65.230	124.00	58.770
13.567	90	19.2	33.40	52.600	90.47	37.870
13.710	90	19.2	4.54	23.740	80.50	56.760
14.010	90	19.3	4.54	23.840	80.50	56.660

5.3.4 Measured Data (Continued)

3m distance

+50

Date of testing : August 5, 2009

Room temperature : 25

Relative humidity : 42%

【-15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.26	23.560	80.50	56.940
13.410	90	19.2	6.90	26.100	80.50	54.400
13.553	90	19.2	28.72	47.920	90.47	42.550
13.560	90	19.2	41.61	60.810	124.00	63.190
13.567	90	19.2	29.23	48.430	90.47	42.040
13.710	90	19.2	6.03	25.230	80.50	55.270
14.010	90	19.3	4.54	23.840	80.50	56.660

【±0%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.26	23.560	80.50	56.940
13.410	90	19.2	7.10	26.300	80.50	54.200
13.553	90	19.2	28.75	47.950	90.47	42.520
13.560	90	19.2	41.62	60.820	124.00	63.180
13.567	90	19.2	29.21	48.410	90.47	42.060
13.710	90	19.2	6.03	25.230	80.50	55.270
14.010	90	19.3	4.26	23.560	80.50	56.940

【+15%V】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	4.26	23.560	80.50	56.940
13.410	90	19.2	6.69	25.890	80.50	54.610
13.553	90	19.2	29.23	48.430	90.47	42.040
13.560	90	19.2	41.66	60.860	124.00	63.140
13.567	90	19.2	28.82	48.020	90.47	42.450
13.710	90	19.2	6.26	25.460	80.50	55.040
14.010	90	19.3	4.54	23.840	80.50	56.660

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 or DC voltage.

5.4.2 Minimum Standard

15.225(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

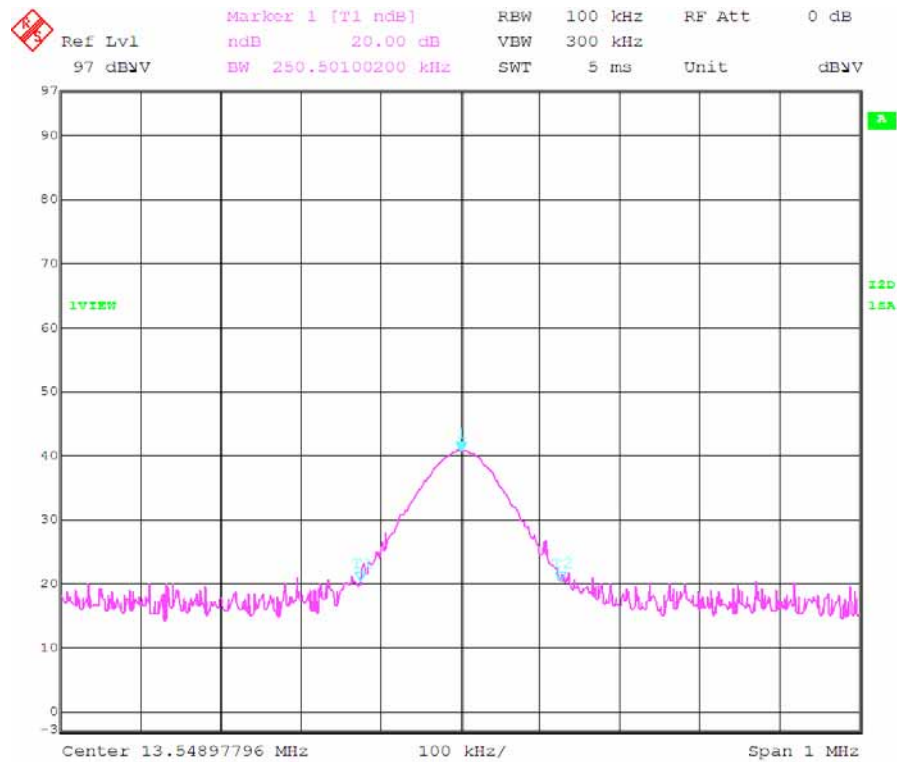
Date of testing : August 5, 2009

Room temperature : 20

Relative humidity : 42%

Temp [°C]	P/S [VAC]	Frequency [Hz]	Limit [\pm Hz]	Offset from the CF [Hz]	Limit [%]	Error[%]
Center Frequency		13,560,000				
20	10.2	13560089	1356.00	89	± 0.01	0.001
20	12.0	13560149	1356.00	149	± 0.01	0.001
20	13.2	13560329	1356.00	329	± 0.01	0.002
-20	10.2	13560190	1356.00	190	± 0.01	0.001
-20	12.0	13560230	1356.00	230	± 0.01	0.002
-20	13.2	13560230	1356.00	230	± 0.01	0.002
50	10.2	13560370	1356.00	370	± 0.01	0.003
50	12.0	13560290	1356.00	290	± 0.01	0.002
50	13.2	13560170	1356.00	170	± 0.01	0.001

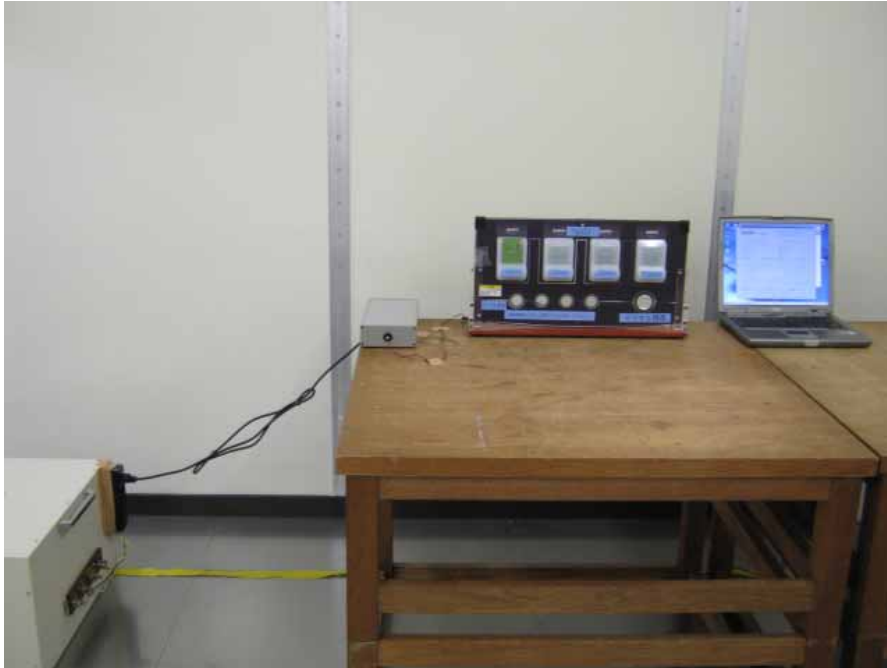
5.5 20 dB bandwidth



6. Photos

6.1 Setup Photo (Conducted Emission)

Front View



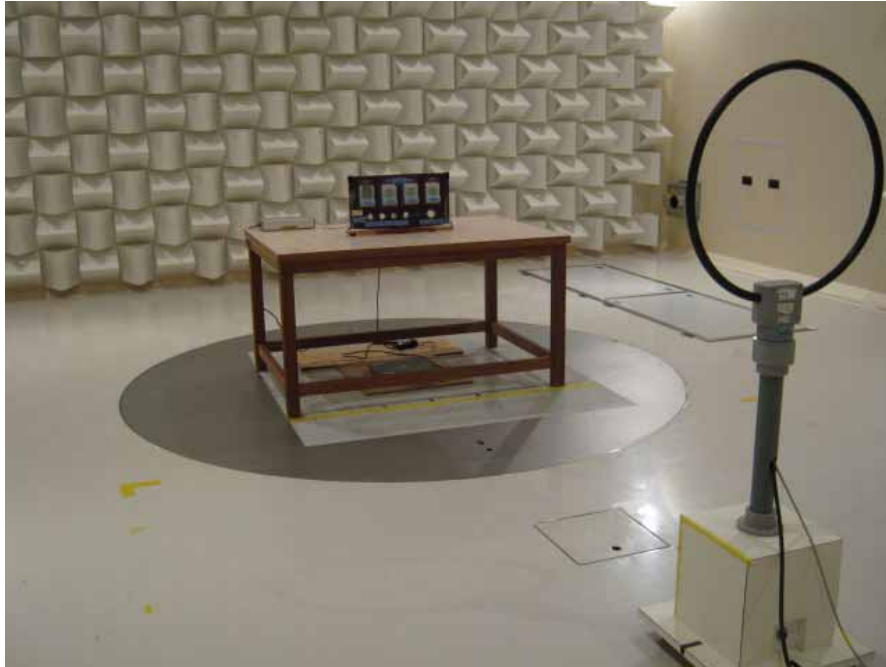
Side View



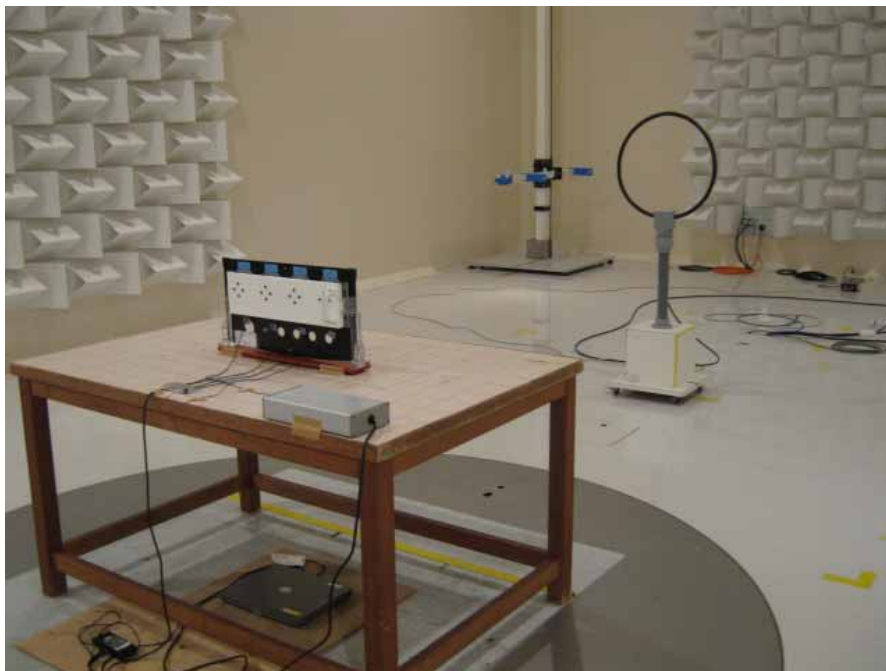
6.2 Setup Photo

(Radiated Emission, Maximum Carrier Output power, Frequency Tolerance)

Front View (9kHz - 30MHz)



Rear View (9kHz - 30MHz)



(Radiated Emission)

Front View (Above 30MHz)

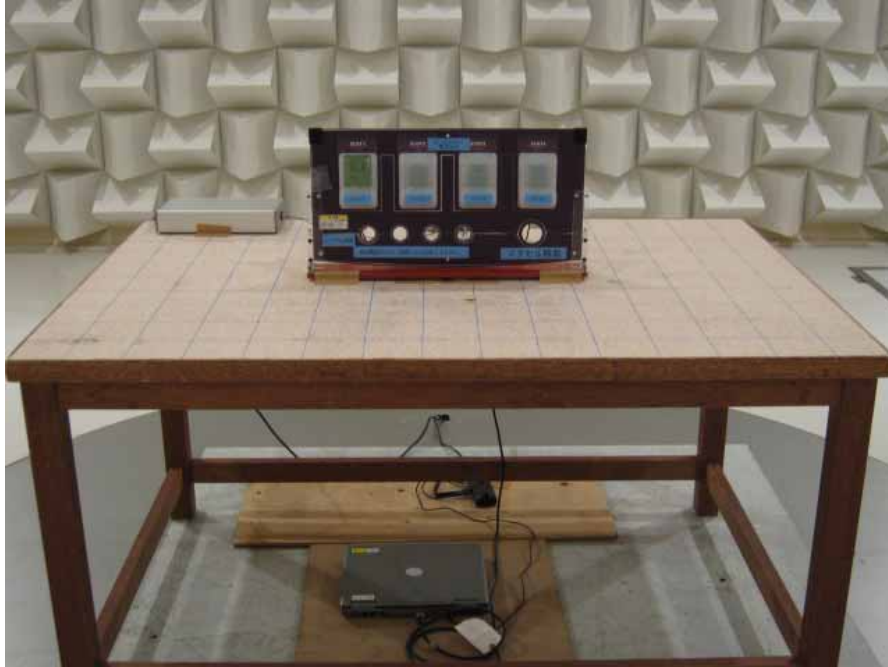


Rear View (Above 30MHz)

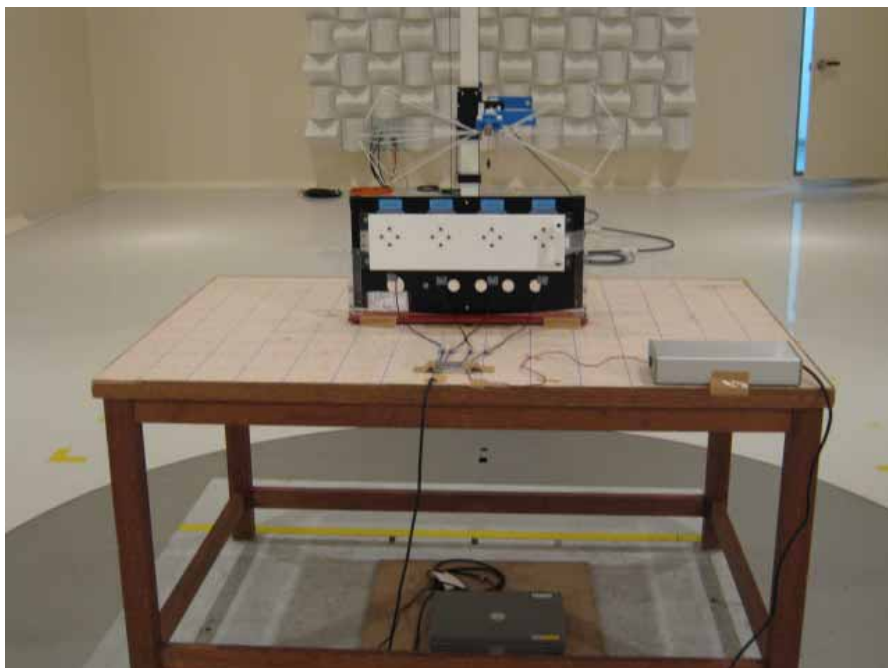


6.2 Setup Photo (Continued)

Closeup



Closeup



7. List of Test Measurement Instruments

7.1 AC Conducted Emission Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibrated Date/Until
Spectrum Analyzer	ADVANTEST CORPORATION	R3132	140501174	July,2009 July,2010
EMI Test Receiver	ROHDE& SCHWARZ	ESCS30	100335	August,2008 August,2009
Artificial-Mains Network	KYORITSU CORPORATION	KNW-341C	8-1659-1	July,2009 July,2010
Transient Limiter	AGILENT TECHNOLOGIES	11947A	3107A03745	October,2008 October,2009
RF Selector	Techno Science Japan Corp.	RFM-E221	3148	Confirmed Before Test

7.2 Radiated Emission, Maximum Carrier Output power, Frequency Tolerance Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibrated Date/Until
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	Confirmed Before Test
EMI Test Receiver	ROHDE& SCHWARZ	ESIB40	100211	February,2009 February,2010
Biconical Antenna (30to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	9124-311	September,2008 September,2009
Log.-Periodic Antenna (300MHz to1GHz)	SCHWARZBECK	UHALP9108A	645	September,2008 September,2009
Horn Antenna	SCHWARZBECK	BBHA9120D	443	September,2008 September,2009
Loop Antenna (0.15 to 30 MHz)	ROHDE & SCHWARZ	HFH2-Z2	131	August, 2008 August, 2009