KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER

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KEC
Corporate Juridical Person

IKOMA TESTING LABORATORY
12128 TAKAYAMA-CHO
IKOMA-CITY NARA 630-0101 JAPAN

TEST REPORT

Report No.A-013-04-C Date: 20 August 2004

This test report is to certify that the tested device properly complies with the requirements of:

FCC Rules and Regulations Part 15 Subpart C Intentional Radiators.

All the tests necessary to show compliance to the requirements were performed and these results met the specifications of requirement. The results of this report should not be construed to imply compliance of equipment other than that, which was tested. Unless the laboratory permission, this report should not be copied in part.

1. Applicant

Company Name : Hokuyo Automatic Co., LTD.

Mailing Address : 1-10-9, Nitaka, Yodogawa-ku, Osaka 532-0033 Japan

2. Identification of Tested Device

Type of Device : Transmitter
Kind of Equipment Authorization : ☐: DoC ☒: Certification ☐: Verification
FCC ID : BUKMBX301CANA
Device Name : Waveguide Type MICROMASTER
Trade Name : MICROMASTER
Model Number : MBX-301CA-NA
Serial Number : N0400299 ☐: Prototype ☐: Pre-production ☒: Production
Date of Manufacture : August 2004

3. Test Items and Procedure

☒: AC Power Line Conducted Emission Measurement
☒: Radiated Emission Measurement

Above all tests were performed under: ANSI C63.4 – 2001
☒: without deviation, ☐: with deviation(details are found inside of this report)

4. Date of Test

Receipt of Test Sample : 17 August 2004
Condition of Test Sample : ☒: Damage is not found on the set.
☐: Damage is found on the set. (Details are described in this report)
Test Completed on : 17 August 2004

S. Izumi

Seiichi Izumi
General Manager/ Ikoma Testing Laboratory

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0. LABORATORY ACCREDITATION AND MEASUREMENT UNCERTAINTY

0.1. Laboratory Accreditation

KEC is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for the specific scope of accreditation under Lab Code: 200207-0.

When the test report concerns with the NVLAP accreditation test, the first page of the test report is signed by NVLAP Approved Signatory accompanied by the NVLAP logo.

The report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

0.2. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity. And thus the measured is complete only when a statement of uncertainty is given.
KEC quotes Measurement Uncertainty (U)

of +/- 4.9 dB for Radiated Emissions
of +/- 2.2 dB for Conducted Emissions

1. CERTIFICATION OF THE COMPLIANCE

This test report is to certify that the tested device properly complies with the requirements of FCC Rules and Regulations Part 15 Subpart C Intentional Radiators.

2. GENERAL INFORMATION

2.1. Product Description

The MICROMASTER Model No. : MBX-301CA-NA (referred to as the EUT in this report) is a Waveguide type MICROMASTER.

This unit is a non-contact detection switch with microwave which had been developed for iron and steel manufacturing industry and is a suitable for detection of metal under severe condition with normal to extream high (red heat) temperature.
This unit consist of an antenna, control box(oscillator, detector & amplifier) and waveguide which is connected to both sections.

1) Technical Specifications

- Gunn oscillator : 10.525 GHz(MO86751A)
- Low frequency oscillation, amplification, detection : HA2103
- Microwave detector : MO86571

2) Contained Oscillators

- Gunn oscillator : 10.525 GHz(Joint housing)
- Modulation clock : 3 kHz(Main board)

3) Provided Terminals
- 11 pins terminal : for outside connection

4) Rated Power Supply : AC 115V, 60Hz

2.2. Description for Equipment Authorization

(1) Type of device	:	☒ Intentional Radiators
(2) Reference Rule and Specification	:	FCC Rule Part 15 Subpart C, Section 15.245 operation in the band 902-928MHz, 2435-2465MHz, 5785-5815MHz, 10.500-10.550MHz and 24.075-24.175-24.175MHz ☒ Section 15.207 ☒ Section 15.209 ☒ Section 15.245(a)(1)(i) ☒ Section 15.245(2)(3)(4)
(3) Kind of Equipment Authorization	:	☐ DoC ☒ Certification ☐ Verification
(4) Procedure of Application	:	☒ Original Equipment ☐ Modification
(5) Highest Frequency used in the Device	:	10.525 GHz
(6) Upper Frequency of Radiated Emission Measurement Range	:	☐ 1000 MHz ☐ 2000 MHz ☐ 5000 MHz ☒ At least fivth harmonics of the highest fundamental frequency

2.3. Test Facility

All tests described in this report were performed by:

Name: KANSAI ELECTRONIC INDUSTRY DEVELOPMENT CENTER (KEC)
IKOMA TESTING LABORATORY

Open Area Test Site	☐ No.1	☐ No.4				
Anechoic Chamber	☐ No.1	☒ No.3				
Shielded Room	☐ No.1	☒ No.2	☐ No.4	☐ No.5	☐ No.6	

Address: 12128, Takayama-cho Ikoma-city, Nara, 630-0101 Japan

These test facilities have been filed with the FCC under the criteria of ANSI C63.4-2001. The KEC has been accredited by the NVLAP (Lab. Code: 200207-0) based on ISO/IEC 17025.
Also the laboratory has been authorized by TUV Product Service (GER) and TUV Rheinland (GER) based on their criteria for testing laboratory (ISO/IEC 17025).
EMC M.C. Anechoic Chamber No.3 has been filed with the Industry Canada under the criteria of RSS212, issue 1. (File number : IC4149-3)

3. TESTED SYSTEM

3.1. Test Mode

The EUT system transmitted continuously the carrier（Modulated）.
The maximum emission is reported in the following mode.

(1)Test Mode 1 : The EUT system is set in the typical arrangement.

(2)Test Mode 2 : The transmitting antenna of EUT system is set in the center of non-conductive table, and the axis of the transmitting antenna is turned to the receiving antenna.

3.2. Characteristics of Emission wave form

Figure 1. is indicated the emission bandwidth of the EUT
(Operating frequency range from 10.500GHz up to 10.550GHz)

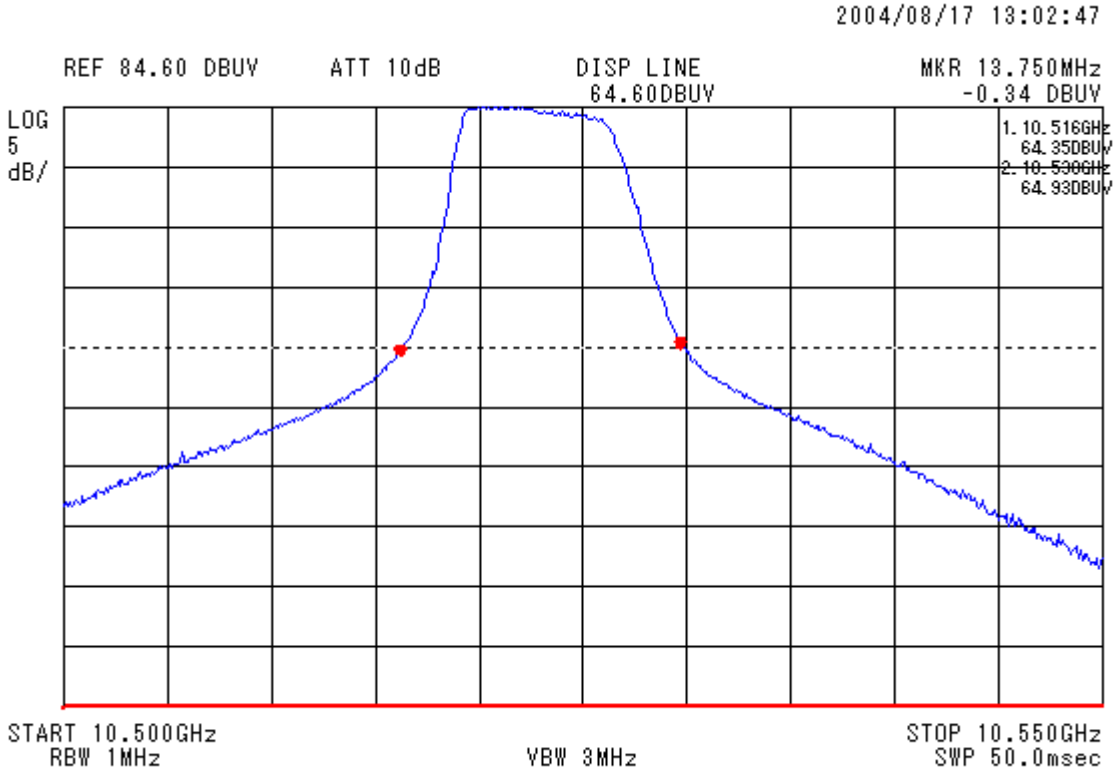
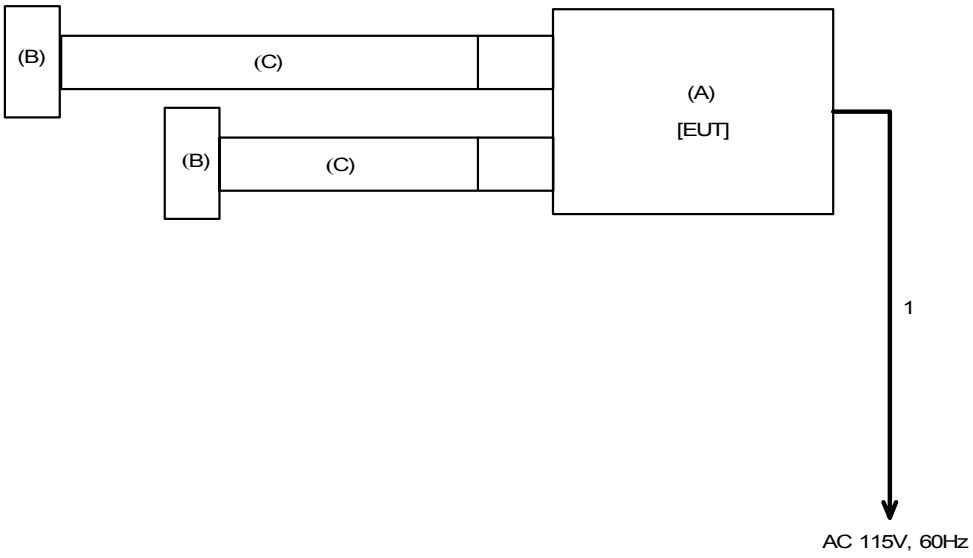


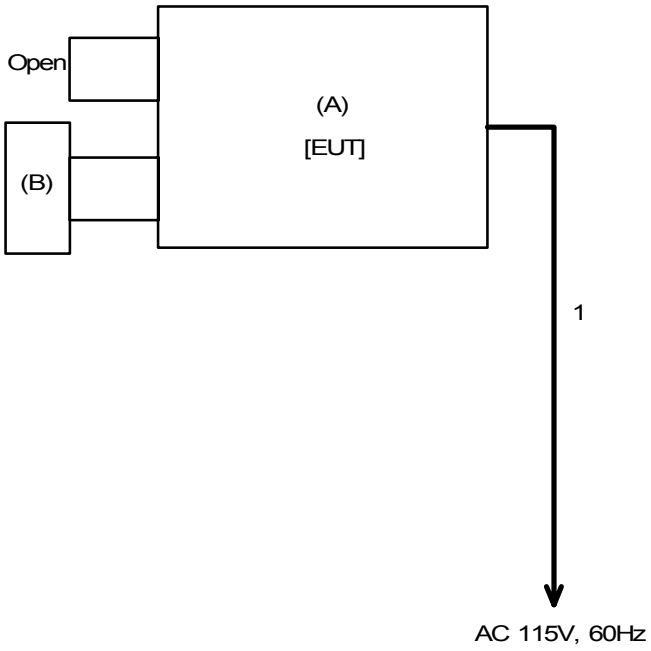
Figure 1. Radiated Wave Form (Bandwidth)

3.3. Block Diagram of EUT System

1) The EUT system is set in the typical arrangement.



2) The transmitting antenna of EUT system is set in the center of non-conductive table, and The axis of the transmitting antenna is turned to the receiving antenna.



3.4. Characterization and condition of EUT System

☒ : normal , ☐ : not normal (that is)

3.5. List of EUT System

No	Device Name (Interface)	Model Number (Serial Number)	FCC ID (Trade Name)	Note	Remark
A	Waveguide Type MICROMASTER	MBX-301CA-NA (N0400299)	BUKMBX301CANA (MICROMASTER)	EUT	
B	Antenna	MAT-81DA		Accessory of EUT	
C	Waveguide	MWG-20X5			

3.6. List of Cables

No	Cable Name	Shielded (Y/N)	Length (m)	Note	Remark
1	DC Output Cord of AC Adaptor (B)	N	1.6		

4. AC POWER LINE CONDUCTED EMISSION MEASUREMENT

4.1. Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-2001) section 7.
☒: without deviation, ☐: with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.
☒: use the test table (2.0m × 1.0m, height 0.8m material : wooden), ☐: not use the test table

(2) Connect the EUT's AC power cord to one Line Impedance Stabilization Network (LISN).

(3) Any other power cord of other equipment is connected to a LISN different from the LISN used for the EUT. The measuring port of 2nd LISN shall be terminated by the 50Ω terminator (resistor).

(4) Warm up the EUT System.

(5) Activate the EUT System and run the software prepared for the test, if necessary.

(6) Preliminary Measurement

a) Connect the spectrum analyzer (*1) to the measuring port of the LISN for the EUT, using a calibrated coaxial cable.

b) To find out the EUT System condition for the final test, which produces the maximum emission, the configuration of the EUT System, manipulated the position of the cables, and the operation mode, are changed under normal usage of the EUT.

c) The spectrums are scanned from 150 kHz to 30 MHz and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.

(7) Final Measurement
The EUT is operated in the worst-case condition where maximum emission is detected by the preliminary test. The test receiver (*2) is connected to the LISN for the EUT, and the six highest emissions minimum recorded above are measured.

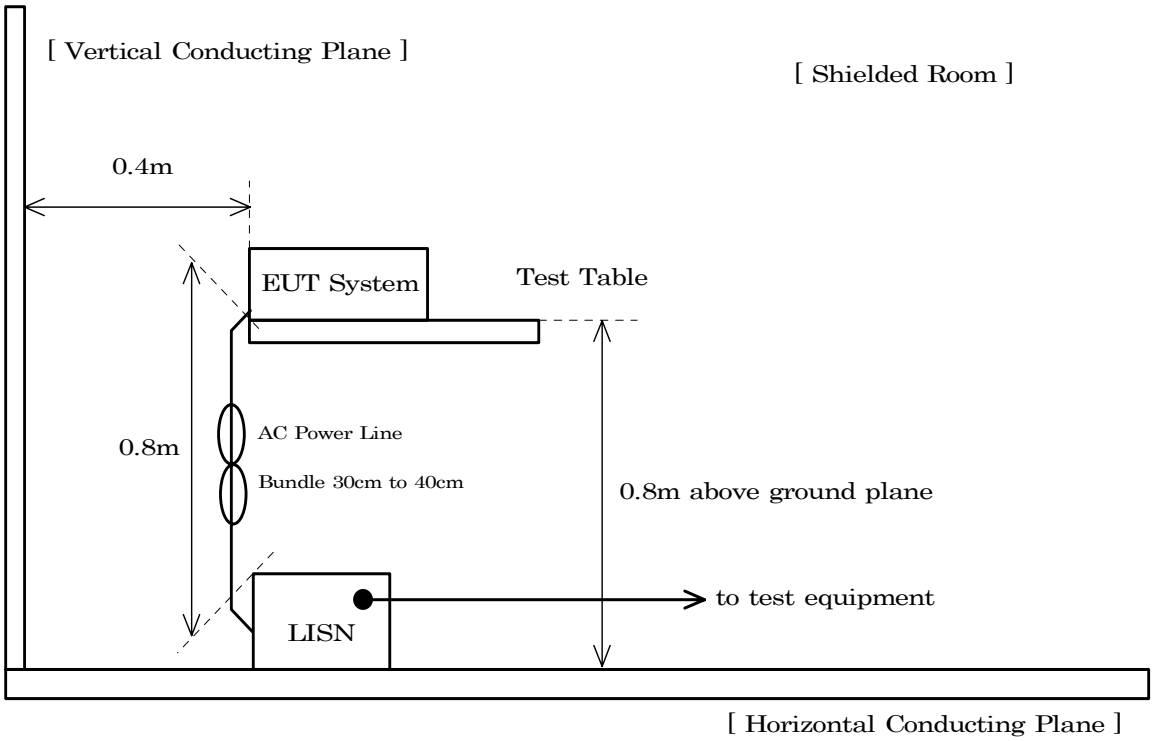
[Note]

(*1) Spectrum Analyzer Set Up Conditions
- Frequency range : 150 kHz - 30 MHz
- Resolution bandwidth : 10 kHz
- Video bandwidth : 1 MHz
- Detector function : Peak mode

(*2) Test Receiver Set Up Conditions
- Detector function : Quasi-Peak/ Average (if necessary)
- IF bandwidth : 10 kHz

The test receiver is complied with the specification of the CISPR Publication 16.

4.2. Test Configuration



[Note]

Test Table size : 2.0m × 1.0m, Height 0.8m, Material : Wooden

LISN : All LISN are bounded on the conducting plane by using the screw. 2nd LISN RF connector is terminated in 50Ω load.

Interconnecting cables : Excess part of the interconnecting cables longer than 1meter are bundled in the center. Cables that hang closer than 40cm to the ground plane is folded back and forth forming bundled 30 to 40 cm long, hanging approx, in the middle between the ground plane and table.

AC Power Cables : AC Power cord of EUT is connected to one LISN which is placed on the ground plane. The LISN place in 80cm from the nearest part of EUT chassis. The excess power cord is bundled in the center, or shortened to appropriate length. AC power cord except from the EUT are connected second LISN.

Floor-Standing Equipment : EUT and all cables are insulated from the ground plane by 3mm to 12mm of insulating material

Horizontal and vertical conducting plane (minimum 2.0m×2.0m) extends at least 0.5m beyond the EUT system footprint.

4.3. Test Results

(1) Test Mode 1

Measurement with the Quasi-peak (Q-Peak) Detector

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading Va (dB μ V)	Meter Reading Vb (dB μ V)	Maximum RF Voltage (dB μ V)	Limits Q-Peak (dB μ V)	Limits Average (dB μ V)	Margin for Limit (dB)
0.150	0.3	6.6	6.6	6.9	66.0	56.0	59.1
0.156	0.3	7.8	7.7	8.1	65.7	55.7	57.6
0.192	0.3	5.7	5.6	6.0	63.9	53.9	57.9
0.450	0.2	<-5.0	<-5.0	<-4.8	56.9	46.9	>61.7
0.500	0.2	<-5.0	<-5.0	<-4.8	56.0	46.0	>60.8
1.000	0.2	<-5.0	<-5.0	<-4.8	56.0	46.0	>60.8
5.000	0.3	<-5.0	<-5.0	<-4.7	56.0	46.0	>60.7
10.000	0.5	<-5.0	<-5.0	<-4.5	60.0	50.0	>64.5
30.000	1.5	<-5.0	<-5.0	<-3.5	60.0	50.0	>63.5

[Note]
(1) LISN Correction Factor includes the cable loss.
(2) If the measurement value with the Q-peak detector meets the averate limits, the measurement with the average detector is omitted.

[Calculation method]
Maximum RF Voltage (dBuV)
= Meter Reading (at maximum level of Va or Vb) + LISN Factor (dB)

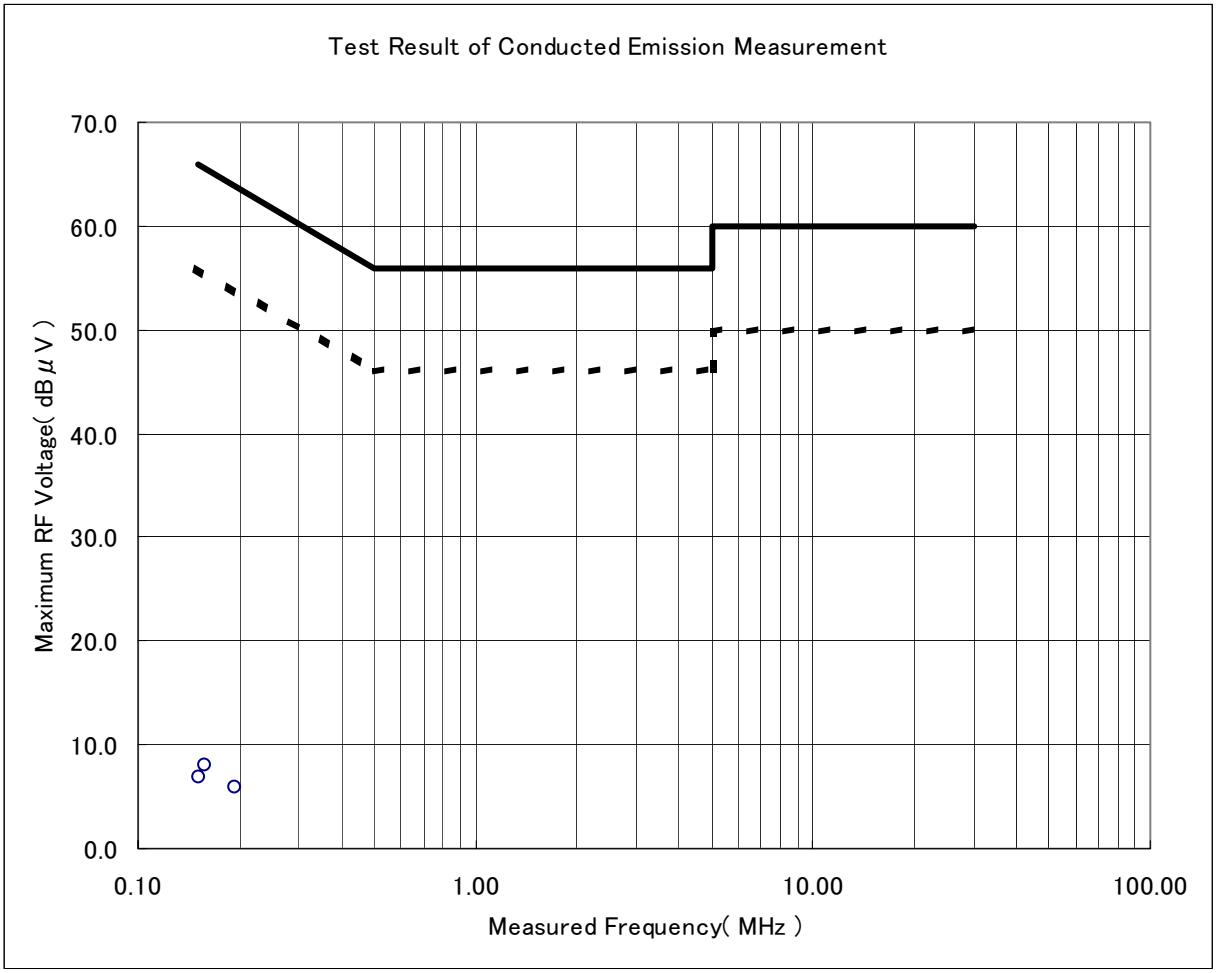
[Environment]
Temperature: 24℃ Humidity: 47%

[Tested Date / Tester]
17 August 2004 Signature

Ikuya Minematsu

Test Results in Graph

Transmitting mode : Test Mode 1



[Note]

○ : Q-Peak Value △ : Average Value

——— : Q-Peak Limit Line - - - - : Average Limit Line

(2) Test Mode 2

Measurement with the Quasi-peak (Q-Peak) Detector

Measured Frequency (MHz)	LISN Factor (dB)	Meter Reading Va (dB μ V)	Meter Reading Vb (dB μ V)	Maximum RF Voltage (dB μ V)	Limits Q-Peak (dB μ V)	Limits Average (dB μ V)	Margin for Limit (dB)
0.150	0.3	6.1	6.0	6.4	66.0	56.0	59.6
0.156	0.3	7.2	7.0	7.5	65.7	55.7	58.2
0.192	0.3	5.0	5.1	5.4	63.9	53.9	58.5
0.450	0.2	<-5.0	<-5.0	<-4.8	56.9	46.9	>61.7
0.500	0.2	<-5.0	<-5.0	<-4.8	56.0	46.0	>60.8
1.000	0.2	<-5.0	<-5.0	<-4.8	56.0	46.0	>60.8
5.000	0.3	<-5.0	<-5.0	<-4.7	56.0	46.0	>60.7
10.000	0.5	<-5.0	<-5.0	<-4.5	60.0	50.0	>64.5
30.000	1.5	<-5.0	<-5.0	<-3.5	60.0	50.0	>63.5

[Note]
(1) LISN Correction Factor includes the cable loss.
(2) If the measurement value with the Q-peak detector meets the averate limits, the measurement with the average detector is omitted.

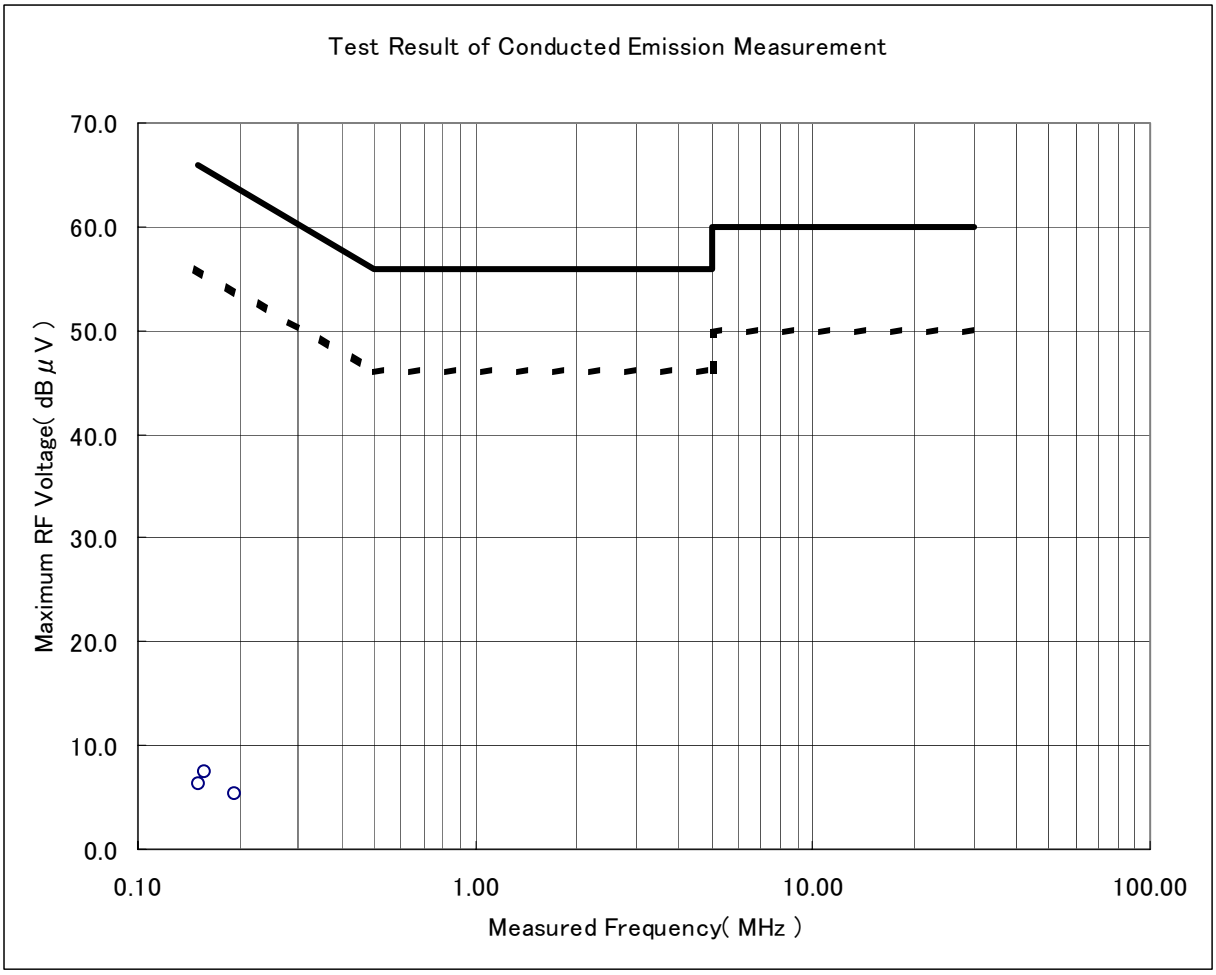
[Calculation method]
Maximum RF Voltage (dBuV)
= Meter Reading (at maximum level of Va or Vb) + LISN Factor (dB)

[Environment]
Temperature: 24℃ Humidity: 47%

[Tested Date / Tester]
17 August 2004 Signature

Ikuya Minematsu

Test Results in Graph



[Note]

○ : Q-Peak Value △ : Average Value

——— : Q-Peak Limit Line - - - - : Average Limit Line

5. RADIATED EMISSION MEASUREMENT

5.1. Test Procedure

(1) Configure the EUT System in accordance with ANSI C63.4-2001 section 8.
☒: without deviation, ☐: with deviation(details are found below)
See also the block diagram and the photographs of EUT System configuration in this report.

(2) If the EUT system is connected to a public power network, all power cords for the EUT System are connected the receptacle on the turntable.

(3) Warm up the EUT System.

(4) Activate the EUT System and run the prepared software for the test, if necessary.

(5) To find out the emissions of the EUT System, preliminary radiated measurement are performed at a closer distance than that specified for final radiated measurement using the spectrum analyzer (*1) and the broad band antenna.
In the frequency above 1 GHz, it is performed using the spectrum analyzer (*2) and the horn antenna.

(6) To find out an EUT System condition, which produces the maximum emission, the configuration of EUT System, the position of the cables, and the operation mode, are changed under normal usage of the EUT.

(7) The spectrums are scanned from 30 MHz to the upper frequency of measurement range, and collect the six highest emissions minimum on the spectrum analyzer relative to the limits in the whole range.

(8) In final compliance test, the six highest emissions minimum, recorded above, are measured at the specified distance using the broad band antenna or the tuned dipole antenna and the test receiver (*3).
In the frequency above 1 GHz, the measurements are performed by the horn antenna and
☐ the test receiver (*4).
☒ the spectrum analyzer(*2) with pre-amplifier.

[Note]

(*1) Spectrum Analyzer Set Up Conditions
- Frequency range : 30 - 1000 MHz
- Resolution bandwidth : 100 kHz
- Detector function : Peak mode

(*2) Spectrum Analyzer Set Up Conditions (Peak detector Measurement)
- Frequency range : 1 GHz - Upper frequency of measurement range
- Resolution bandwidth : 1 MHz
- Video bandwidth : 1 MHz
- Attenuator : 10 dB
- Detector function : Peak mode

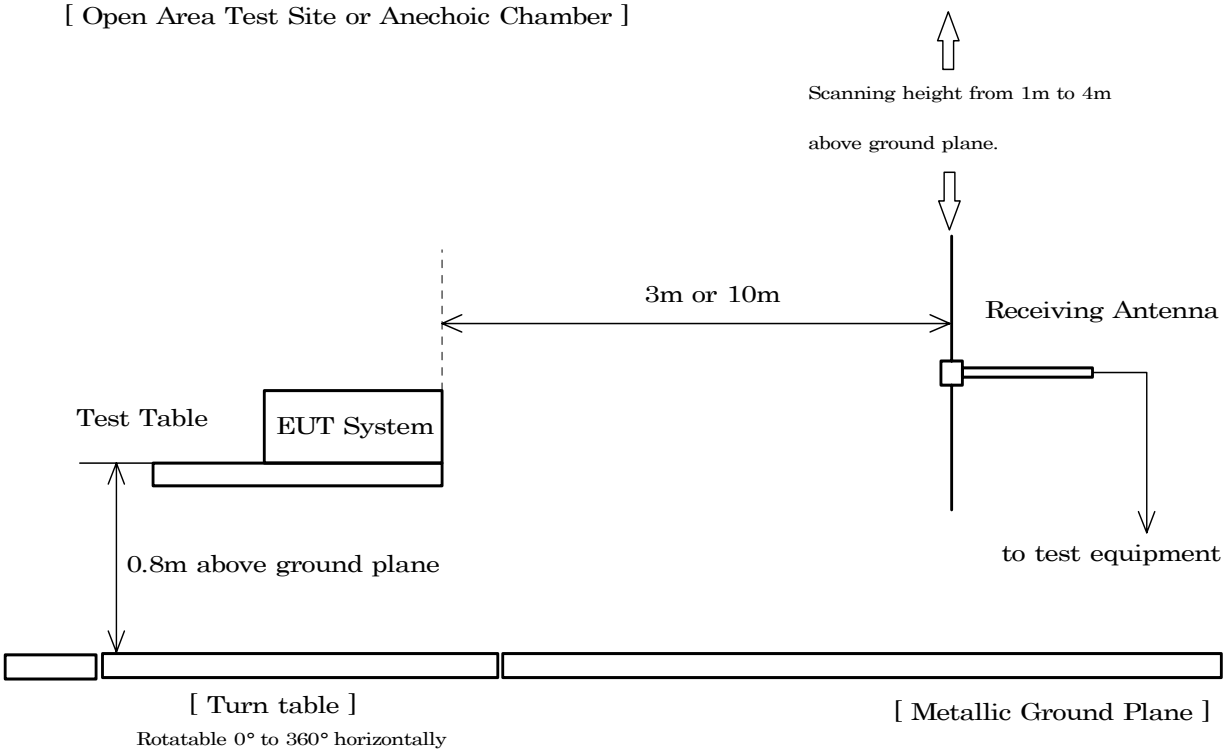
(*3) Test Receiver Set Up Conditions
- Detector function : Quasi-Peak
- IF bandwidth : 120 kHz

The test receiver is complied with the specification of CISPR Publication 16.

(*4) Test Receiver Set Up Conditions
- Detector function : Average
- IF bandwidth : 1 MHz

(*5) Spectrum Analyzer Set Up Conditions (Average detector Measurement)
- Frequency range : 1 GHz - Upper frequency of measurement range
- Resolution bandwidth : 1 MHz
- Video bandwidth : 10 Hz or 30 Hz
- Attenuator : 10 dB
- Y axis : Liner

5.2. Test Configuration



[Note]

Test Table size : 2.0m × 1.0m, Height 0.8m, Material : FRP

Receiving Antenna : Tuned dipole antenna, Biconical(30-300MHz) antenna or Logperiodic antenna (30-1000MHz) or Standard gain horn antenna (Above 1GHz)

Scan from 1.0m to 4.0m above ground plane expect for vertical polarization the minimum height of center of antenna is increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25cm.

Interconnecting cables : Excess part of the interconnecting cables longer than 1meter are bundled in the center. Cables that hang closer than 40cm to the ground plane is folded back and forth forming bundled 30 to 40 cm long, hanging approx, in the middle between the ground plane and table.

AC Power Cables : All AC Power cord drape to the floor and are routed over the receptacle. In case of floor-Standing Equipment, Excess power cords are bundled in the center or shortened to appropriate length.

Floor-Standing Equipment : EUT and all cables are insulated from the ground plane by 3mm to 12mm of insulating material

5.3. Test Results

Measurement Distance ☒: 3m ☐: 10m

(1) Test Mode 1

Measured Frequency [GHz]	Correction Factor (*1) [dB/m]	Pre Amp. Gain [dB]	Meter Reading Horizontal Polarization [dBμV]	Meter Reading Vertical Polarization [dBμV]	Maximum Field Strength [dBμV/m]	Limits [dBμV/m]	Margin For Limits [dB]
[Fundamental (Peak Detector Measurement)]							
10.525	36.3	-	53.2	60.8	97.1	128.0	30.9
[Harmonics (Peak Detector Measurement)]							
21.050	37.7	32.6	54.0	60.3	65.4	-	
31.575	42.0	23.0	<48.0	59.0	78.0	-	
42.100	45.3	-	<34.5	<34.5	<79.8	-	
52.625	45.2	-	<32.5	<32.5	<77.7	-	
[Harmonics (Average Detector Measurement)(*2)]							
21.050	37.7	32.6	30.0	36.0	41.1	77.5	36.4
31.575	42.0	23.0	<27.0	36.6	55.6	77.5	21.9
42.100	45.3	-	<21.8	<21.8	<67.1	77.5	>10.4
52.625	45.2	-	<20.8	<20.8	<66.0	77.5	>11.5

(2) Test Mode 2

Measured Frequency [GHz]	Correction Factor (*1) [dB/m]	Pre Amp. Gain [dB]	Meter Reading Horizontal Polarization [dBμV]	Meter Reading Vertical Polarization [dBμV]	Maximum Field Strength [dBμV/m]	Limits [dBμV/m]	Margin For Limits [dB]
[Fundamental (Peak Detector Measurement)]							
10.525	36.3	-	64.0	86.4	122.7	128.0	5.3
[Harmonics (Peak Detector Measurement)]							
21.050	37.7	32.6	81.1	90.8	95.9	-	
31.575	42.0	23.0	80.0	71.6	99.0	-	
42.100	45.3	-	<34.5	<34.5	<79.8	-	
52.625	45.2	-	<32.5	<32.5	<77.7	-	
[Harmonics (Average Detector Measurement)(*2)]							
21.050	37.7	32.6	49.0	59.3	64.4	77.5	13.1
31.575	42.0	23.0	46.0	41.3	65.0	77.5	12.5
42.100	45.3	-	<21.8	<21.8	<67.1	77.5	>10.4
52.625	45.2	-	<20.8	<20.8	<66.0	77.5	>11.5

RADIATED EMISSION

KEC No. : A-013-04-C
Model No. : MBX-301CA-NA
Serial No. : N0400299
Test Condition : Other Emission

Reference No. : FCC Part15 C
Power Supply : AC115V, 60Hz
Temp/Humi : 24℃, 47%
Operator : Ikuya Minematsu

Memo :

LIMIT :

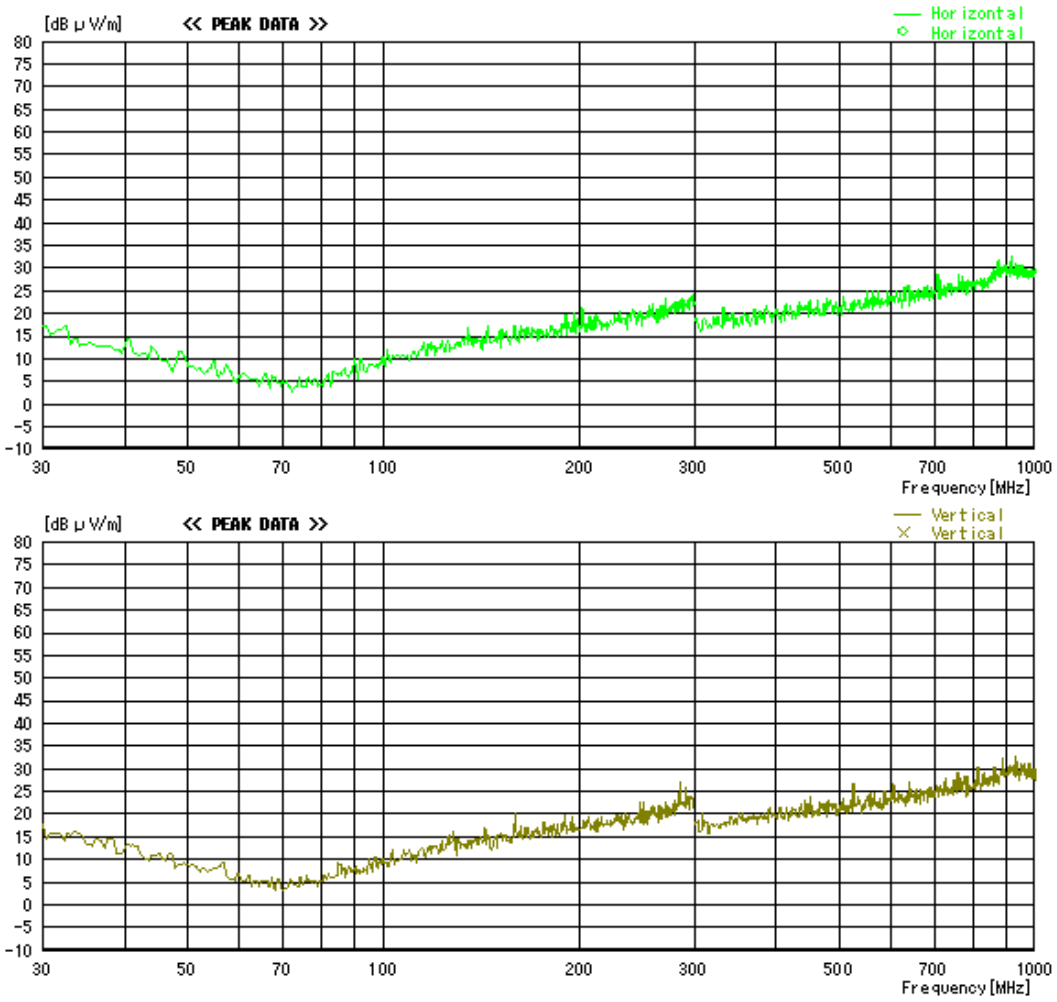


Figure 2.

The spurious emission frequency range from 30MHz up to 1000MHz were not detected.

- Continued -

[Remark]

(*1) : Correction factor includes both of the antenna factor and cable loss.
both of the cable loss and pre-amplifier gain.

(*2) : If the measurement value with the peak detector meets the average limits, the measurement with average detector is omitted.
In FCC rule, the limit of measurement of radiated emission above 1GHz is regulated on the average value. Therefore, the average value above 1GHz was determined by using a reduced the video bandwidth of spectrum analyzer to obtain the average value in this case spectrum analyzer set up condition.

Resolution Bandwidth : 1 MHz
Video Bandwidth : 30Hz
Detector function : Peak detector

[Note]

(1) * mark in Measured Frequency : Measured with the tuned dipole antenna.
No mark in Measured Frequency : Measured with the broadband antenna.

(2) Above 4th harmonics spurious emission, the meter readings were reduced the conversion for a distance from -.5m to 3m (≒-15dB)

[Calculation method]

Maximum Field Strength (dBμV/m)
= Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Correction Factor (dB/m) – Pre Amp.Gain (dB)

[Environment]

Temperature: 24°C Humidity: 47%

[Tested Date/ Tester]

17 August 2004 Signature

Ikuya Minematsu

6. USED TEST EQUIPMENTS AND CALIBRATION STATUS

Equipment	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
Test Receiver	Rohde & Schwarz	ESHS10	Frequency Range 9kHz-30MHz	FS-83	1	2004/2	2005/2
		ESVS10	Frequency Range 20MHz-1.0GHz	FS-66	2	2003/12	2004/12
Spectrum Analyzer	Hewlett Packard	8564E	Frequency Range 30 Hz-40 GHz	SA-39	3	2004/2	2005/2
	Agilent Technology	E4403B	Frequency Range 1 kHz-1.5 GHz	SA-48	1	2004/6	2005/6
	Anritsu	MS88608A	Frequency Range 10 kHz-7.8GHz	SA-46	2	2004/8	2005/8
Pre-amplifier	Hewlett Packard	8449B	Frequency Range 1 GHz-26.5 GHz	AM-52	3	2004/2	2005/2
	SONOMA	310N	Frequency Range 0.1MHz-1GHz	AM-69	2	2004/8	2005/8
	ATI	DBP-1840N622	Frequency Range 18 GHz-40 GHz	AM-66	3	2004/8	2005/8
Biconical Antenna	Schwarzbeck	BBA9106	Frequency Range 30MHz-300MHz	AN-180	2	2004/2	2005/2
Log-Periodic Antenna	Schwarzbeck	UHALP9108A	Frequency Range 300MHz-1GHz	AN-215	2	2004/2	2005/2
Tuned Dipole Antenna	Kyoritsu	KBA-511AS	Frequency Range 25MHz-500MHz	AN-135	N/A	2003/2	2005/2
		KBA-611S	Frequency Range 500MHz-1GHz	AN-137	N/A	2003/2	2005/2
Horn Antenna	Raven	92888-2	Frequency Range 1 GHz- 2GHz	AN-211	2	2003/9	2005/9
		91889-2	Frequency Range 2 GHz- 5GHz	AN-212	2	2003/9	2005/9
Standard Gain Horn Antena	Scientific Atlanta	12-3.9	Frequency Range 2 GHz- 5GHz	AN-142	3	2003/9	2005/9
		12-5.8	Frequency Range 5.8 GHz- 8.2GHz	AN-104	3	2003/9	2005/9
		12-8.2	Frequency Range 8.2 GHz- 12.4GHz	AN-161	3	2003/9	2005/9
		12-12.0	Frequency Range 12.0 GHz- 18GHz	AN-145	3	2003/9	2005/9
		12A-18.0	Frequency Range 18.0 GHz- 26.5GHz	AN-200	3	2002/8	2005/8
		12A-26.5	Frequency Range 26.0 GHz- 40GHz	AN-109	3	2002/8	2005/8
	CTEC	261U-20/383	Frequency Range 40-60GHz	—	3	—	—
Preselected RF Section	Hewlett Packard	11974U	Frequency Range 40GHz-60GHz	—	3	2004/5	2005/5
		11974-60028	—	—	3	—	—

Equipment	Manufacturer	Model No.	Specifications	KEC Control No.	Test Item (*)	Last Cal.	Next Cal.
LISN for EUT	Kyoritsu	KNW-407	Frequency Range 150kHz- 30MHz	FL-107	2	2004/5	2005/5
LISN for Peripheral	Kyoritsu	KNW-242	Frequency Range 10kHz- 30MHz	FL-110	2	2004/5	2005/5

[Note]

Test Item (*): 1: Conducted Emission Measurement
2: Radiated Emission Measurement
3: Radiated Emission Measurement above 1GHz.
N/A: Not Applicable

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.