JQA APPLICATION NO.: 441-30316 Issue Date : July 16, 2003

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EMI TEST REPORT

JQA APPLICATION NO. : 441-30316

Model No. : RI-25LKW

Type of Equipment : Immobilizer

Regulations Applied : CFR 47 FCC Rules and Regulations Part 15

FCC ID : MOZRI-25LKW

Applicant : Tokai Rika Co., Ltd.

Address : 260, Toyota 3-chome, Oguchi-cho, Niwa-gun,

Aichi-ken 480-0195, Japan

Manufacture : Tokai Rika Co., Ltd.

Address : 260, Toyota 3-chome, Oguchi-cho, Niwa-gun,

Aichi-ken 480-0195, Japan

Received date of EUT : July 1, 2003

Final Judgment : Passed

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and Communication Research Laboratory (CRL) of Japan.

The test results only responds to the tested sample.

THIS REPORT should not be reproduced, except in full, without the approval of the JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch.



Standard :CFR 47 FCC Rules Part 15 Page 2 of 25

FCC ID : MOZRI-25LKW Issue Date :July 16, 2003

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1 DOCUMENTATION

1.1 TEST REGULATION

FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) Intentional Radiators

Test procedure :

AC power line conducted emission, radiated emission, frequency stability and occupied bandwidth tests were performed according to the procedures in ANSI C63.4-1992.

1.2 GENERAL INFORMATION

1.2.1 Test facility:

1) Test Facility located at JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch:

Open Site No.1, No.2, An Anechoic Chamber (3 m and 10 m, on common plane) and a Shielded Room

FCC Registration Number: 90728 (Date of Listing: April 2, 2002)

2) JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in title 15, Part 285 Code of Federal Regulations.

NVLAP Lab Code: 200192-0 (Effective through: June 30, 2003)

1.2.2 Description of the Equipment Under Test (EUT) :

1) Type of Equipment2) Product Type3: Immobilizer4: Production

3) Category : Low Power Communication Device

Transmitter

4) EUT Authorization : Certification 5) FCC ID : MOZRI-25LKW

6) Trade Name :

7) Model No. : RI-25LKW
8) Operating Frequency Range : 134.2 kHz
9) Highest Frequency Used in the EUT : 134.2 kHz

10) Serial No. : 11) Date of Manufacture : -

12) Power Rating : 12.0 VDC 13) EUT Grounding : None

1.2.3 Definitions for symbols used in this test report :

- $\underline{\mathbf{x}}$ indicates that the listed condition, standard or equipment is applicable for this report.
- indicates that the listed condition, standard or equipment is not applicable for this report.



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1.3 TEST CONDITION

1.3.1 The measurement of the AC Power Line Conducted Emission ___ - was performed in the following test site. \underline{x} - was not applicable. Test location:

JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch 2096 Ohata, Tsuru-shi Yamanashi-ken 402-0045, JAPAN

 -	Shiel	Lded	Room	A
 -	Shiel	Lded	Room	В
-	Anech	noic	Chamk	oe:
-	Open	Site	No.1	L
 -	Open	Site	No.2	2

Type	Model No.	Manufacturer	Serial No.	Last C	Cal.	Interval
Test Receiver	ESI7	Rohde & Schwarz	100059	Oct. 2	2003	1 Year
Test Receiver	ESH-3	Rohde & Schwarz	881460/016	May. 2	2003	1 Year
LISN(for Peripheral)	KNW-407	Kyoritsu Electrical	8-833-5	May. 2	2003	1 Year
LISN(for EUT)	KNW-407	Kyoritsu Electrical	8-680-14	May. 2	2003	1 Year
LISN	KNW-243C	Kyoritsu Electrical	8-831-1	May. 2	2003	1 Year
LISN	KNW-243C	Kyoritsu Electrical	8-831-2	May. 2	2003	1 Year
LISN	KNW-243C	Kyoritsu Electrical	8-831-3	May. 2	2003	1 Year
LISN	KNW-243C	Kyoritsu Electrical	8-831-4	May. 2	2003	1 Year
LISN	ESH 2-Z5	Rohde & Schwarz	879341/007	May. 2	2003	1 Year
RF Cable	3D-2W	Fujikura	No.1	May. 2	2003	1 Year
RF Cable	3D-2W	Fujikura	No.2	May. 2	2003	1 Year
RF Cable	3D-2W	Fujikura	No.3	May. 2	2003	1 Year
50ohm Termination	-	TDC	15406501E1	Mar. 2	2003	1 Year
50ohm Termination	-	-	15406502E1	Mar. 2	2003	1 Year



:RI-25LKW Model No.

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1.3.2	The 1	measurement	οf	the	Radiated	Emission(9	$_{ m kHz}$	_	30	MHz)
-------	-------	-------------	----	-----	----------	-----------	---	-------------	---	----	-----	---

- \underline{X} was performed in the following test site.
- ___ was not applicable.

Test location:

JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch 2096 Ohata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

- _____- Open Site No. 1 (3, 10 or 30 meters)
- Open Site No. 2 (3 or 10 meters)
- X Anechoic Chamber(3 or 10 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A 2) Interval : N/A

	Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
-	X - Test Receiver	ESI7	Rohde & Schwarz	100059	Oct. 2003	1 Year
_	- Test Receiver	ESH3	Rohde & Schwarz	881460/016	May. 2003	1 Year
-	X - Loop Antenna	HFH2-Z2	Rohde & Schwarz	872994/043	May. 2003	1 Year
-	- Loop Antenna	6502	EMCO	8905-2347	May. 2003	1 Year
_	X - RF Cable	5D-2W	Fujikura	155-21-002E0	May. 2003	1 Year



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1.3.3 The measurement of the Radiated Emission(30 MHz - 1000 MHz)

 $\underline{\mathbf{X}}$ - was performed in the following test site.

___ - was not applicable.

Test location:

JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch 2096 Ohata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

- _____- Open Site No. 1 (3, 10 or 30 meters)
- Open Site No. 2 (3 or 10 meters)
- X Anechoic Chamber(3 or 10 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : May, 2003

2) Interval :1 year

Туре	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
X - Test Receiver	ESI7	Rohde & Schwarz	100059	Oct. 2003	1 Year
Test Receiver	ESVS10	Rohde & Schwarz	843744/018	Mar. 2003	1 Year
Test Receiver	ESVS10	Rohde & Schwarz	84231/004	Apr. 2003	1 Year
Biconical Antenna	BBA9106	Schwarzbeck	11905065-2	May. 2003	1 Year
Biconical Antenna	BBA9106	Schwarzbeck	11905065-3	May. 2003	1 Year
X - Biconical Antenna	BBA9106	Schwarzbeck	G4397001	May. 2003	1 Year
Log-Periodic Antenna	UHALP9107	Schwarzbeck	91071212	May. 2003	1 Year
Log-Periodic Antenna	UHALP9107	Schwarzbeck	9107915	May. 2003	1 Year
X - Log-Periodic Antenna	UHALP9108	Schwarzbeck	G43599003	May. 2003	1 Year
Dipole Antenna	KBA-511A	Kyoritsu Electrical	0-195-5	May. 2003	1 Year
Dipole Antenna	KBA-511A	Kyoritsu Electrical	0-230-6	May. 2003	1 Year
Dipole Antenna	KBA-611	Kyoritsu Electrical	0-196-8	May. 2003	1 Year
Dipole Antenna	KBA-611	Kyoritsu Electrical	0-228-13	May. 2003	1 Year
RF Cable	20D/5D-2W	Fujikura	No.1	May. 2003	1 Year
RF Cable	20D/5D-2W	Fujikura	No.2	May. 2003	1 Year
X - RF Cable	20D/5D-2W	Fujikura	No.3	May. 2003	1 Year



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1.3.4 The measurement of the Radiated Emission(Above 1000 MHz)

- ___ was performed in the following test site.
- X was not applicable.

Test location:

JQA Safety & EMC Center EMC Engineering Department TSURU EMC Branch 2096 Ohata, Tsuru-shi, Yamanashi-ken 402-0045, JAPAN

- _____ Open Site No. 1 (3, 10 or 30 meters)
- _____ Open Site No. 2 (3 or 10 meters)
- _____- Anechoic Chamber(3 or 10 meters)

Validation of Site Attenuation :

1) Last Confirmed Date : N/A
2) Interval : N/A

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
Spectrum Analyzer	8563E	Hewlett Packard	3438A00756	May. 2003	1 Year
Spectrum Analyzer	R4131C	Advantest	717201249	May. 2003	1 Year
Log-Periodic Antenna	94612-1	Rohde & Schwarz	97062301	May. 2003	1 Year
RF Amplifier	WJ-6611-513	Watkins-Johnson	0288	May. 2003	1 Year
RF Amplifier	WJ-6682-834	Watkins-Johnson	0052	May. 2003	1 Year
RF Amplifier	WJ-6870-506	Watkins-Johnson	0018	May. 2003	1 Year
RF Cable(7m)	SUCOFLEX 104	Suhner	52146/4	May. 2003	1 Year
RF Cable(3m)	SUCOFLEX 104	Suhner	52053/4	May. 2003	1 Year
RF Cable(2m)	SUCOFLEX 104	Suhner	39934/4	May. 2003	1 Year
RF Cable(1m)	SUCOFLEX 104	Suhner	35687/4	May. 2003	1 Year



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FCC ID : MOZRI-25LKW Issue Date :July 16, 2003

1.3.5 T	ľhe	measurement	ο£	the	Frequency	[,] Stabil:	Ĺtу
---------	-----	-------------	----	-----	-----------	----------------------	-----

___ - was performed.

 \underline{x} - was not applicable.

Used test instruments:

Type	Model No	. Manufacturer	Serial No.	Last Cal.	Interval
Frequency Counter	53131A	Hewlett Packard	3546A11807	May 2003	1 Year
Oven	-	Ohnishi Co. Ltd.	-	Aug. 2003	1 Year
DC Power Supply	6628A	Hewlett Packard	3224A00284	July 2003	1 Year

1.3.6 The measurement of the Occupied Bandwidth

___ - was performed.

 \underline{x} - was not applicable.

Type	Model No.	Manufacturer	Serial No.	Last Cal.	Interval
Spectrum Analyzer	8560E	Hewlett Packard	3240A00189	Sep. 2003	1 Year
Spectrum Analyzer	8563E	Hewlett Packard	3221A00201	May. 2003	1 Year
Spectrum Analyzer	8566B	Hewlett Packard	2140A01091	Apr. 2003	1 Year
Spectrum Analyzer	8566B	Hewlett Packard	2747A05855	May. 2003	1 Year
Function Generator	3325A	Hewlett Packard	2512A21776	May. 2003	1 Year
FM Linear Detector	MS61A	Anritsu Corp.	M77486	Sep. 2003	1 Year
Level Meter	ML422C	Anritsu Corp.	M87571	June 2003	1 Year



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EUT MODIFICATION / Deviation from Standard 1.4

1	41	पास	MODIFICATION
_	• • •	1101	TIODAL TON

	No modifications were conducted by JQA to a To achieve compliance to Class B levels, the during the compliance test.	
	The modifications will be implemented in all productions	oduction models of this equipment.
	Applicant :	Date :
	Typed Name :	Position:
_x	Deviation from Standard: No deviations from the standard described The following deviations were employed from t	



Model No. :RI-25LKW

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1.5 TEST RESULTS

Remarks:

AC Power Line Conducted Emission	Applicable	$\underline{\mathbf{x}}$ - NOT Applicable
The requirements are	PASSED	NOT PASSED
Remarks:		
Radiated Emission [§15.209(a)(b)]	$\underline{\mathbf{x}}$ - Applicable	NOT Applicable
The requirements are	x - PASSED	NOT PASSED
Remarks:		
Frequency Stability	Applicable	_x NOT Applicable
The requirements are	PASSED	NOT PASSED
Remarks:		
Occupied Bandwidth	Applicable	x - NOT Applicable
The requirements are	PASSED	NOT PASSED



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1.6 SUMMARY

General Remarks:

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (June 23, 1989) under the test configuration, as shown in clause 1.7 to 1.10.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgment.

Final Judgment:

The "as received" sample;

x - fulfill the test requirements of the regulation mentioned on clause 1.1.

__ - fulfill the test requirements of the regulation mentioned on clause 1.1, but with certain qualifications.

- doesn't fulfill the test regulation mentioned on clause 1.1.

Begin of testing: July 12, 2003

End of testing : July 12, 2003

- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved/Issued by:

Takaharu Hada

Director

TSURU EMC Branch

JQA EMC Engineering Dept.



:RI-25LKW

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1.7 TEST CONFIGURATION / OPERATION OF EUT

1.7.1 Test Configuration

Model No.

The equipment under test (EUT) consists of :

Symbol	Item	Manufacturer	Model No.	FCC ID	Serial No.
A	Immobilizer	Tokai Rika Co.,Ltd	RI-25LKW	MOZRI-25LKW	_

The measurement was carried out with the following support equipment connected:

None.

Type of Cable :

Symbol	Description	Identification (Manufacturer etc.)	Shielded YES / NO	Ferrite Core	Connector type Shielded YES / NO	Length (m)
1	DC Power Cable(for EUT)	-	NO	NO	NO	2.0

1.7.2 Operating condition

Power supply Voltage : 12.0 VDC(from Battery)

The tests have been carried out under the transmitting condition.

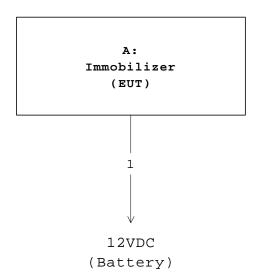
Model No. :RI-25LKW

Standard : CFR 47 FCC Rules Part 15

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1.8 EUT ARRANGEMENT (DRAWINGS)





Model No. :RI-25LKW

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1.9 PRELIMINARY TEST AND TEST-SETUP (DRAWINGS)

1.9.1 AC Power Line Conducted Emission (150 kHz - 30 MHz) :

According to description of ANSI C63.4-1992 sec.13.1.3.1, the AC power line preliminary conducted emissions measurements were carried out.

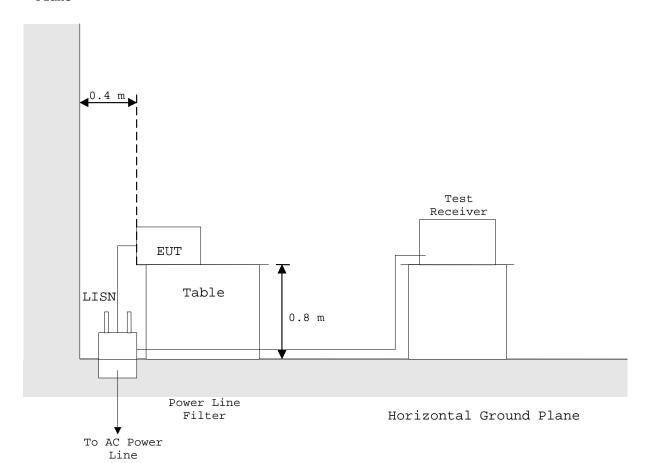
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

Shielded Enclosure

- Side View -

Vertical Ground Plane





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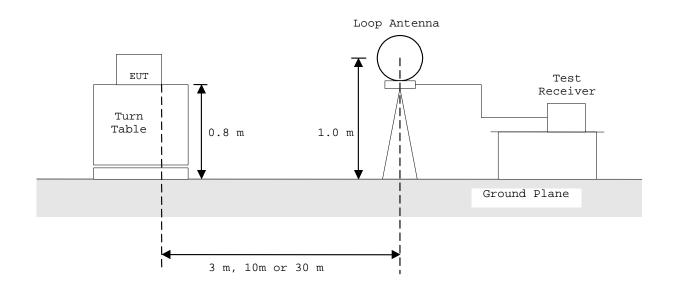
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1.9.2 Radiated Emission (9 kHz - 30 MHz):

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -



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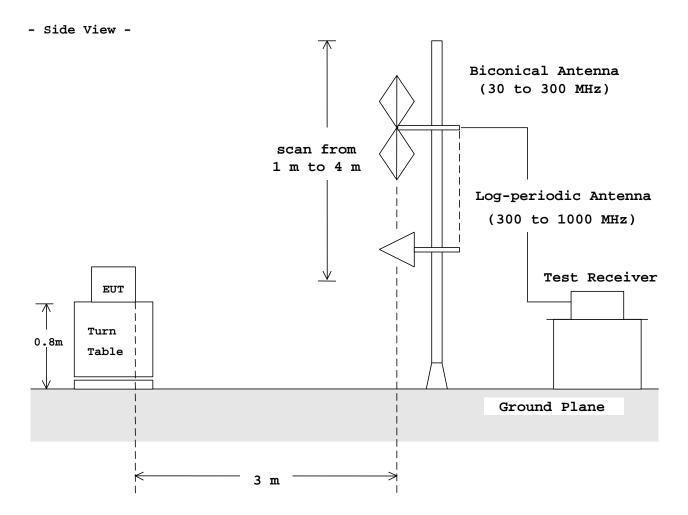
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1.9.3 Radiated Emission (30 MHz - 1000 MHz):

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber



Model No. :RI-25LKW

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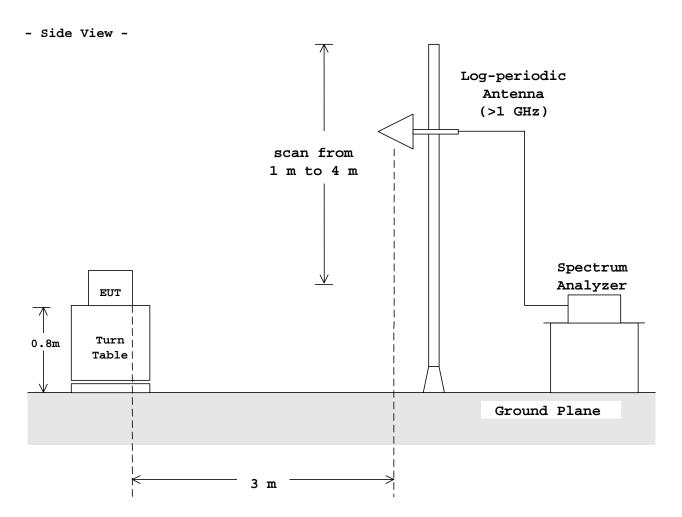
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1.9.4 Radiated Emission (Above 1 GHz):

According to description of ANSI C63.4-1992 sec.13.1.4.1, the preliminary radiated emissions measurements were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

Anechoic Chamber





Model No. :RI-25LKW

Standard : CFR 47 FCC Rules Part 15

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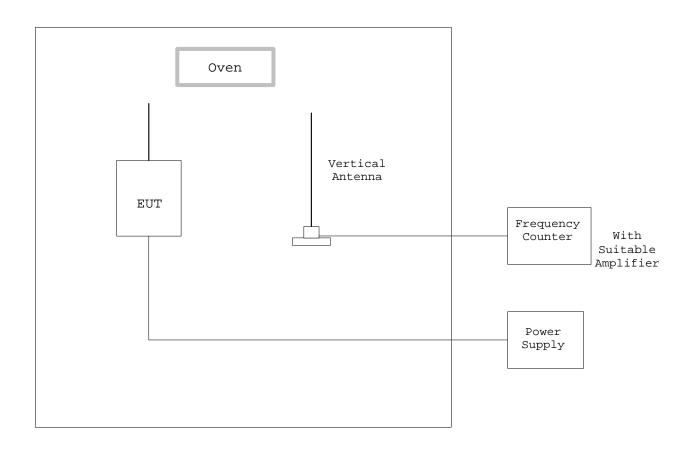
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1.9.5 Frequency Stability:

According to description of ANSI C63.4-1992 sec.13.1.5 and sec.13.1.6, the frequency stability measurements were carried out. By using frequency counter with suitable RF amplifier, the carrier frequency of the transmitter under test was measured with a temperature variation of $-20\,^{\circ}\text{C}$ to $+50\,^{\circ}\text{C}$ at the normal supply voltage, and if required , with a variation in the primary voltage from 85 % to 115 % the rated supply voltage at the temperature of $+20\,^{\circ}\text{C}$.

These measurements were carried out after allow sufficient time (approximately 1 hour) for the temperature of the chamber to stabilize.





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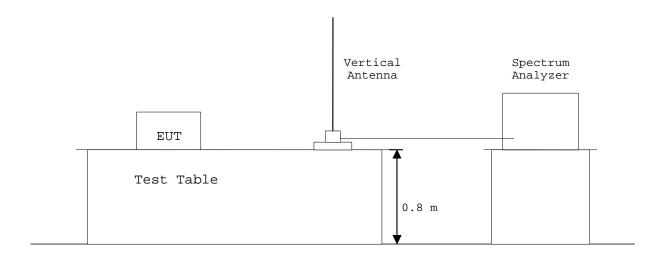
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1.9.6 Occupied Bandwidth:

According to description of ANSI C63.4-1992 sec.13.1.7, the occupied bandwidth measurements were carried out. By using a spectrum analyzer with a vertical antenna for picking up the signal, the measurements of the emission were made under the transmitting modes of the EUT.

The resolution bandwidth of spectrum analyzer was set to the value specified in sec.13.1.7.





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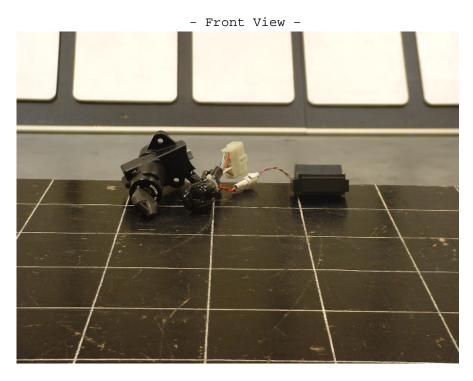
:CFR 47 FCC Rules Part 15 Page 20 of 25 Standard

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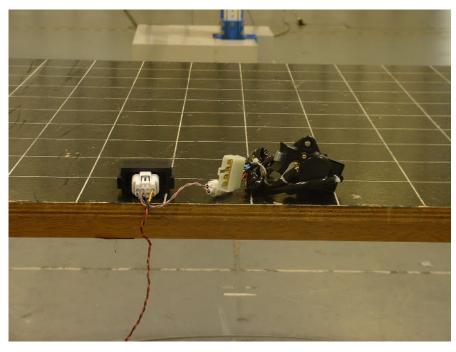
1.10 TEST ARRANGEMENT (PHOTOGRAPHS)

PHOTOGRAPHS OF EUT CONFIGURATION FOR RADIATED EMISSIONS MEASUREMENT

Photograph present configuration with maximum emission



- Rear View -





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TEST DATA

2.1 AC Power Line Conducted Emission Measurement(0.45 MHz - 30 MHz)

Note: This test was not applicable.

2.2 Radiated Emissions Measurement(9 kHz - 30 MHz)

Date: July 12, 2003

Temp.: ___20 °C Humi.: 62 %

Operating Frequency : 134.5 kHz
Distance of Measurement : 30 meters

Frequency	Meter Reading	Field Strength
(MHz)	$(dB\mu V/m)$	$(dB\mu V/m)$
Fundamental		
0.1342	< 30.0	< 30.0
Harmonic Frequ	ency	
0.2684	< 33.2	< 33.2
0.4026	< 31.4	< 31.4
0.5368	< 30.1	< 30.1
0.671	< 29.0	< 29.0
0.8052	< 28.1	< 28.1
0.9394	< 27.3	< 27.3
1.0736	< 27.0	< 27.0
1.2078	< 27.0	< 27.0
1.342	< 27.0	< 27.0

Note: The fundamental field strength was found undetectable weak of the field strength meter.

Tested by

Kazuhisa Fakagawa

Testing Engineer



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The distance of measurements was reduced to 10 meters.

Date: July 12, 2003

Temp.: 20 °C Humi.: 62 %

Operating Frequency : 134.5 kHz Distance of Measurement : 10 meters

Frequency	Meter Reading	Field Strength
(MHz)	$(dB\mu V/m)$	$(dB\mu V/m)$
Fundamental		
0.1342	12.8	12.8(Average)
0.1342	23.7	23.7(Peak)
Harmonic Frequ	ency	
0.2684	< 33.2	< 33.2(Average)
0.2684	< 39.4	< 39.4(Peak)
0.4026	< 31.4	< 31.4(Average)
0.4026	< 36.6	< 36.6(Peak)
0.5368	< 30.1	< 30.1
0.671	< 29.0	< 29.0
0.8052	< 28.1	< 28.1
0.9394	< 27.3	< 27.3
1.0736	< 27.0	< 27.0
1.2078	< 27.0	< 27.0
1.342	< 27.0	< 27.0

Note: 1. Meter reading value shows field strength, because the value includes antenna factor

- 2. The symbol of "<" means "or less".
- 3. Measuring Instrument Setting:

Frequency Range : 110 kHz to 403.5 kHz

Detector Function : Average/Peak, IF Band width : 10 kHz

Frequency Range : 538.0 kHz to 1345 kHz

Detector Function : CISPR Quasi-peak Peak, IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 300 meters, using the formula that field strength varies as the inverse distance square(40 dB per decade of distance).

Calculation :

Average: $12.8 \text{ dB}\mu\text{V/m} - 20\log_{10}((300/10)^2) = 12.8 - 59.1 = -46.3 \text{ dB}\mu\text{V/m}$ at 300 meters

Limits for fundamental(§15.209(a)) = $20\log_{10}(2400/125)$ = 25.7 dB μ V/m

Peak: 23.7 dB μ V/m - 20log₁₀((300/10)²)= 23.7 - 59.1 = -35.4 dB μ V/m at 300 meters

Limits for fundamental(§15.209(a)) = $20\log_{10}(2400/125)+20$ = $45.7~dB\mu V/m$

Tested by

Kazunisa Fukagawa

Testing Engineer



Model No. :RI-25LKW

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2.3. Radiated Emissions Measurements (30 MHz - 1000 MHz)

Date : July 12, 2003

Temp.: 20°C Humi.: 62%

Frequency	Antenna Factor	Meter Rea (dBuV)	_	Emission Level (dBµV/m)	Margi: (dB)	
(MHz)				Horiz. Ver.	, ,	
30.0	19.8	< -2.0 < -	2.0 40.0	< 17.8 < 17.8	> 22.2 >	22.2
43.5	14.7	0.4 1	6.0 40.0	15.1 30.7	24.9	9.3
67.0	8.2	3.2 1	0.2 40.0	11.4 18.4	28.6	21.6
98.5	11.3	21.1 2	4.2 43.5	32.4 35.5	11.1	8.0
102.9	12.0	17.7 2	0.2 43.5	29.7 32.2	13.8	11.3
120.0	13.8	3.4	9.9 43.5	17.2 23.7	26.3	19.8
136.9	15.3	2.4 1	2.9 43.5	17.7 28.2	25.8	15.3
200.8	17.8	9.4	7.1 43.5	27.2 24.9	16.3	18.6
222.6	18.5	7.9	5.8 46.0	26.4 24.3	19.6	21.7
256.9	19.7	3.8	4.2 46.0	23.5 23.9	22.5	22.1
300.0	21.6	< -2.0 < -	2.0 46.0	< 19.6 < 19.6	> 26.4 >	26.4
500.0	21.1	< -2.0 < -1	2.0 46.0	< 19.1 < 19.1	> 26.9 >	26.9
700.0	24.4	< -2.0 < -	2.0 46.0	< 22.4 < 22.4	> 23.6 >	23.6
1000.0	28.5	< -2.0 < -	2.0 54.0	< 26.5 < 26.5	> 27.5 >	27.5

Notes: 1) Test Location : Anechoic Chamber

- 2) Test Distance : 3 m
- 3) The spectrum was checked from 30 MHz to 1000 MHz.
- 4) Antenna factor includes the cable loss for 33 meter.
- 5) The symbol of "<" means "or less".6) The symbol of ">" means "more than".
- 7) A sample calculation was made at 30.0 MHz

 $Af + Mr = 19.8 + -2.0 = 17.8 dB\mu V/m$

Af : Antenna Factor Mr : Meter Reading

8) Setting of measuring instrument :

Detector Function : CISPR Quasi-Peak

IF Bandwidth

Tested by :

Kazuhisa Fukagawa

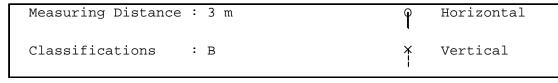
Standard : CFR 47 FCC Rules Part 15

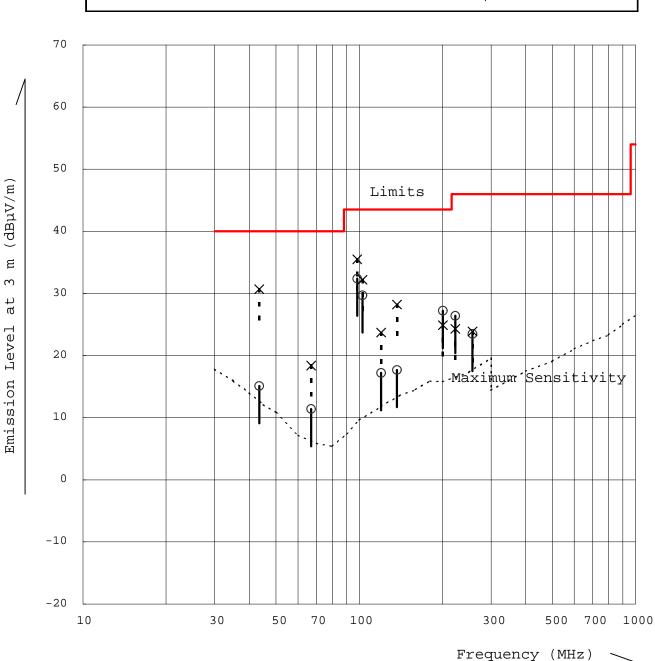
FCC ID : MOZRI-25LKW

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Radiated Emissions Measurements (30 MHz - 1000 MHz)





Model No. :RI-25LKW

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2.4 Radiated Emissions Measurement(Above 1 GHz)

Note: This test was not applicable.

2.5 Frequency Stability Measurement

Note: This test was not applicable.

2.6 Occupied Bandwidth Measurement

Note: This test was not applicable.