JAPAN QUALITY ASSURANCE ORGANIZATION
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REPORT OF MEASUREMENTS

JQA APPLICATION NO.: 400-00042

1. Applicant	: TOKAI RIKA CO., LTD. 260, Toyota 3-chome, Oguchi-cho Niwa-gun, Aichi-ken 480-0195 Japan
2. Manufacturer	: TOKAI RIKA CO., LTD. 260, Toyota 3-chome, Oguchi-cho Niwa-gun, Aichi-ken 480-0195 Japan
3. Description of Equipment	: Car Immobilizer
a) FCC ID	: MOZRI-9BTY-1
b) Trade Name	: -
c) Model No.	: RI-9BTY-1
d) Power Supply	: 12.0 VDC
4. Applicable Rule	: FCC Rules & Regulations Part 15 Subpart C (June 23, 1989)
5. Place of Measurement	: JQA EMC Engineering Dept. Testing Div.
6. Date of Measurement	: April 18, 2000
7. Total Pages of This Report	: 9 (including this page)

I certify that I am authorized to sign for the report and that all the statement in this report and in the exhibits hereto are true and correct to the best my knowledge and belief.

M. Takahashi

Masaaki Takahashi, Manager
Testing Div.
JQA EMC Engineer Dept.

1. Radiated Field Strength and Harmonic Emission: [Section 15.209]

Measurement Method Employed: **The field strength measurements of the immobilizer system fundamental and harmonics radiation were made at the distance of 30 meters away from the system under test which was placed on the wooden turntable 0.8 meter in height.**
The receiving loop antenna was positioned with its plane vertical at 30 meters from the system and rotated about its vertical axis for maximum response at each azimuth about the system.
The center of loop antenna was set to 1 meter above ground. The wooden turntable was rotated through 360 degrees and the system under test was tested by positioned three orthogonal planes, to obtain the highest reading on the field strength meter.
The results were shown the maximum value.

Measurement Results:

Operating Frequency : 134.2 kHz
Distance of Measurement : 30 meters

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dB/uV)	Field Strength (dB/uV/m)
0.1342	10.7	< 20.0	< 30.7
0.2684	10.6	< 20.0	< 30.6
0.4026	10.6	< 20.0	< 30.6
0.5368	10.6	< 20.0	< 30.6
0.6710	10.6	< 20.0	< 30.6
0.8052	10.5	< 20.0	< 30.5
0.9394	10.4	< 20.0	< 30.4
1.0736	10.4	< 20.0	< 30.4
1.2078	10.5	< 20.0	< 30.5
1.3420	10.5	< 20.0	< 30.5

Since, the fundamental field strength was found undetectable weak of the field strength meter.

The distance of measurements was reduced to 10 meters.

Operating Frequency : 134.2 kHz
Distance of Measurement : 10 meters

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dB/uV)	Field Strength (dB/uV/m)
0.1342	10.7	37.1	47.6
0.2684	10.6	< 20.0	< 30.6
0.4026	10.6	< 20.0	< 30.6
0.5368	10.6	< 20.0	< 30.6
0.6710	10.6	< 20.0	< 30.6
0.8052	10.5	< 20.0	< 30.5
0.9394	10.4	< 20.0	< 30.4
1.0736	10.4	< 20.0	< 30.4
1.2078	10.5	< 20.0	< 30.5
1.3420	10.5	< 20.0	< 30.5

For fundamental, 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 :

47.6 dB/uV/m - $20\log_{10}((300/10)^2)$ =
47.6 dB/uV/m - 59.1 dB = -11.5 dB/uV/m at 300 meters

Limits for fundamental = $20\log_{10}(2400/F)$ F = Frequency in kHz
= $20\log_{10}(2400/134)$ = 25.1 dB/uV/m

Measuring Instruments Setting :

Frequency Range : 110 kHz to 490 kHz
Detector Function : Average
IF Bandwidth : 10 kHz

Frequency Range : 536.8 kHz to 1340 kHz
Detector Function : CISPR QP
IF Bandwidth : 9 kHz

2. Radiated Spurious Emissions [Section 15.209]

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dBuV) Horiz.	Meter Reading (dBuV) Vert.	Limits (dBuV/m)	Emission Levels (dBuV/m) Horiz.	Emission Levels (dBuV/m) Vert.	Margins (dB) Horiz.	Margins (dB) Vert.
30.1	15.4	< 0.0	13.4	40.0	< 15.4	28.8	> 24.6	11.2
44.7	13.4	< 0.0	3.8	40.0	< 13.4	17.2	> 26.7	22.9
51.4	11.0	4.8	17.0	40.0	15.8	28.0	24.2	12.0
68.6	6.5	9.0	16.0	40.0	15.5	22.5	24.5	17.5
88.8	9.2	5.2	13.1	43.5	14.4	22.3	29.1	21.2
120.1	13.6	20.7	15.5	43.5	34.3	29.1	9.2	14.4
137.2	15.1	26.9	28.0	43.5	42.0	43.1	1.5	0.4
154.4	16.1	27.0	24.4	43.5	43.1	40.5	0.4	3.0
171.5	16.8	16.8	15.6	43.5	33.6	32.4	9.9	11.1
223.0	18.7	12.4	10.2	46.0	31.1	28.9	14.9	17.1
257.3	19.8	9.4	3.2	46.0	29.2	23.0	16.8	23.0
300.2	18.3	5.0	1.0	46.0	23.3	19.3	22.7	26.7
334.5	18.1	3.9	1.2	46.0	22.0	19.3	24.0	26.7
463.2	20.5	0.5	< 0.0	46.0	21.0	< 20.5	25.0	> 25.5
600.0	23.3	< 0.0	< 0.0	46.0	< 23.3	< 23.3	> 22.7	> 22.7
700.0	24.5	< 0.0	< 0.0	46.0	< 24.5	< 24.5	> 21.5	> 21.5
800.0	25.6	< 0.0	< 0.0	46.0	< 25.6	< 25.6	> 20.5	> 20.5
1000.0	27.9	< 0.0	< 0.0	54.0	< 27.9	< 27.9	> 26.1	> 26.1

Note: 1. The spectrum was checked from 30 MHz to 1000 MHz.
All emissions not listed were found to be more than 20 dB below the limits.
2. The symbol of “<” means “or less”.
3. The symbol of “<” means “or greater ”.
4. The cable loss was included in the antenna factor.
5. Sample calculation :

at 137.2 MHz
AF + Mr = 15.1 + 28.0 = 43.1 dB/uV/m
Where,
Af = Antenna Factor including the cable loss.
Mr = Meter Reading

6. Measuring Instrument Setting:

(1) Below 1000 MHz
Detector function : CISPR quasi-peak
IF Bandwidth : 120 kHz

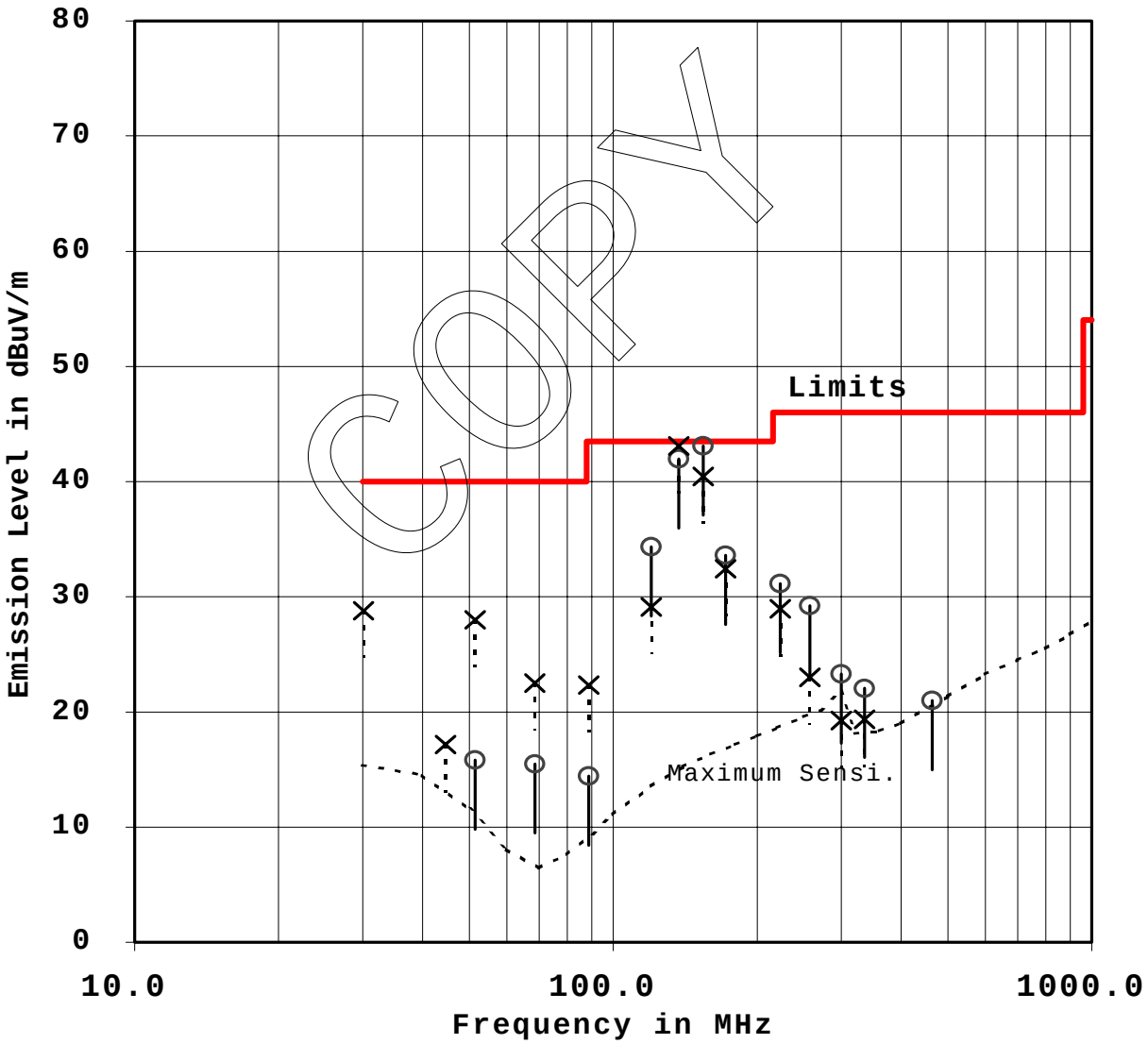
RADIATED EMISSION MEASUREME

Model No. : RI-9BTY-1

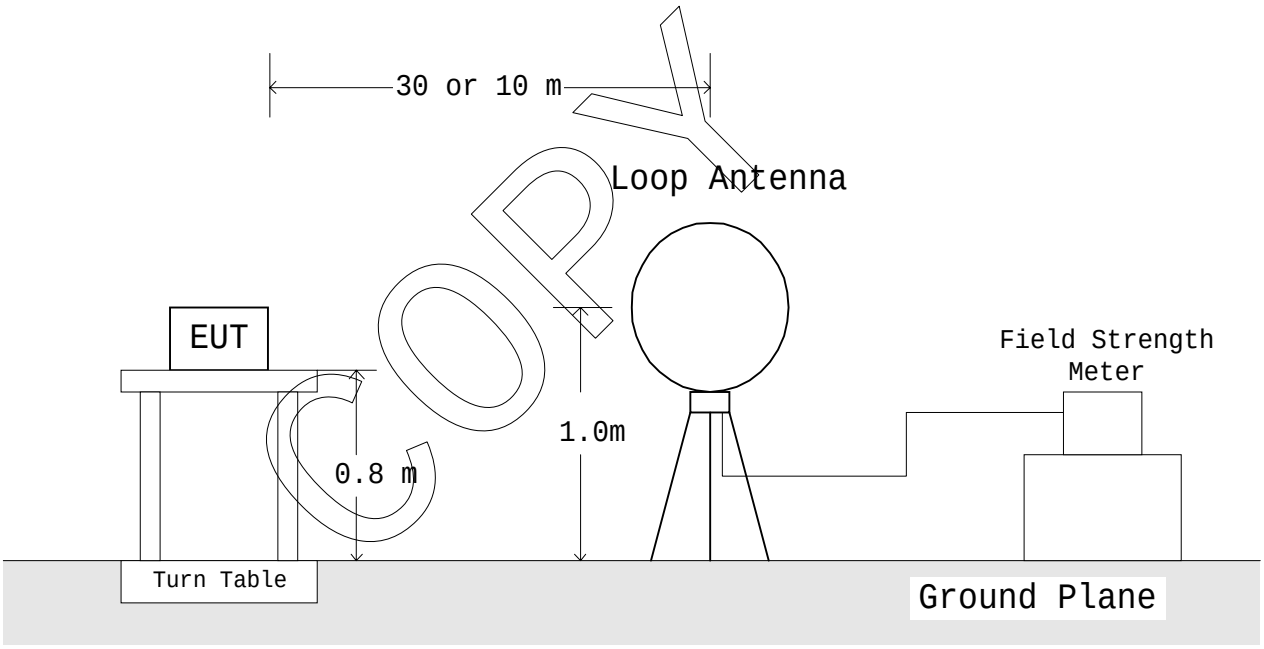
Standard : CFR 47 FCC Rules Part Subpart C 15.209

O Horizontal

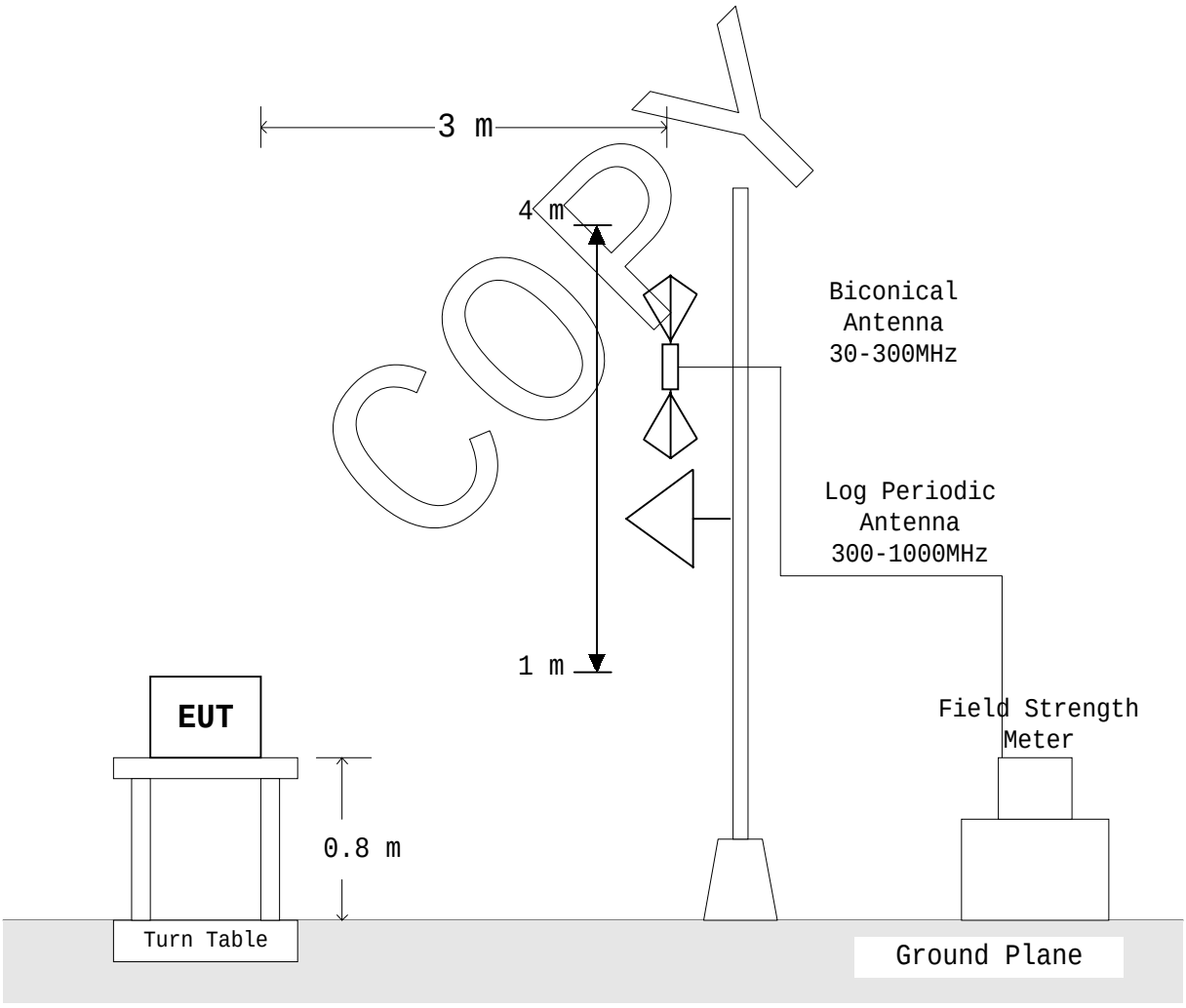
X Vertical



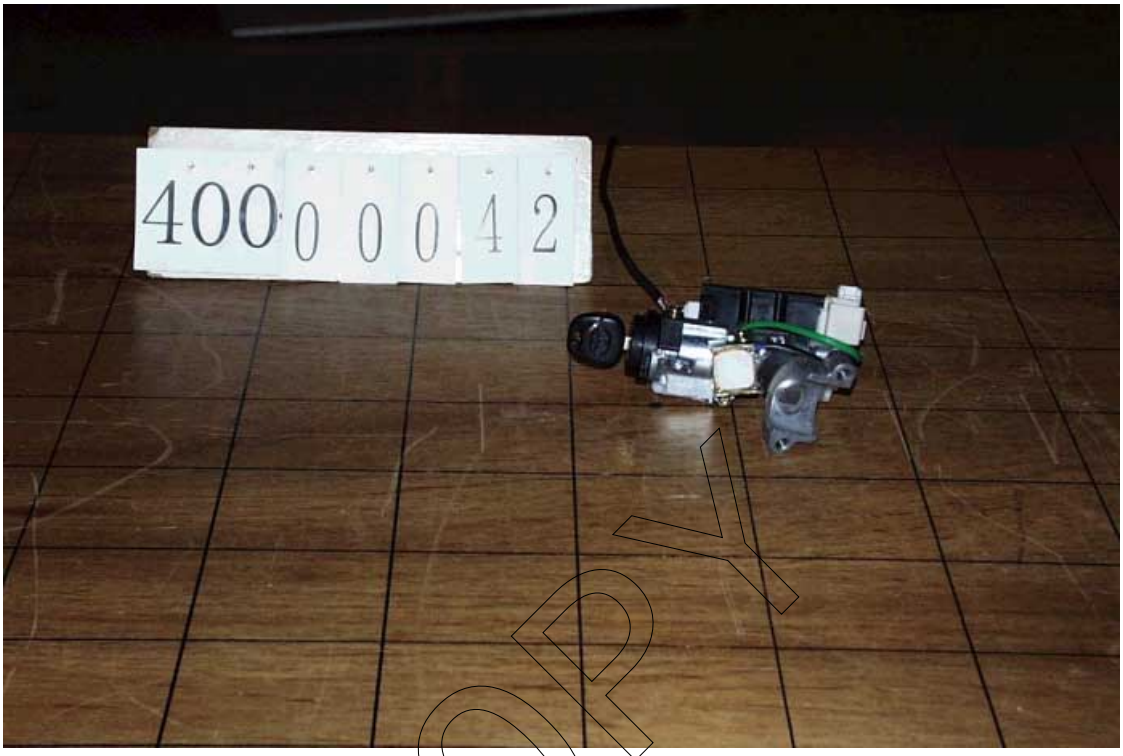
Measuement Set Up for up to 30 MHz



MEASUREMENT SET-UP FOR RADIATED EMISSIONS



– Front View –



Rear View –

LIST OF MEASUREMENT EQUIPMENT

Equipment (Model No.)	Manufacturer	Date of Cal.
1. Field Strength Meter		
ESH3(10KHz-30MHz)	Rohde & Schwarz	May 1999
2. Field Strength Meter		
ESV(25MHz-1000MHz)	Rohde & Schwarz	May 1999
3. DC Power Supply		
PAB 18-2.5DU	KIKUSUI ELECTRONICS CORP	May 1999
4. Loop Antenna		
6502(10KHz-30MHz)	Electro-Mechanics	Sep. 1999
5. Biconical Antenna		
BBA9106(30-300MHz)	Schwarzbeck	May 1999
6. Log-periodic Antenna		
UHALP9107(300-1000MHz)	Schwarzbeck	May 1999