

EMI TEST REPORT

Test Report No. : 26DE0191-HO-2b

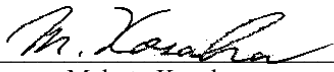
Applicant : **DENSO CORPORATION**
Type of Equipment : **Remote Keyless Entry System (Receiver)**
Model No. : **13BZT**
Test standard : **FCC Part 15 Subpart B : 2005
Section 15.109 (Certification)**
FCC ID : **HYQ13BZT**
Test Result : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.

Date of test:

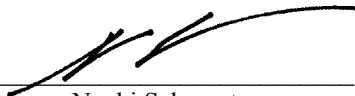
December 4, 2005

Tested by:



Makoto Kosaka
EMC Services

Approved by :



Naoki Sakamoto
Group Leader of EMC Services

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(01.06.05)

CONTENTS **PAGE**

SECTION 1: Client information3
SECTION 2: Equipment under test (E.U.T.).....3
SECTION 3: Test specification, procedures & results4
SECTION 4: Operation of E.U.T. during testing.....5
SECTION 5: Radiated emission (Fundamental and Spurious Emission).....6
APPENDIX 1: Photographs of test setup7
Radiated emission.....7
Worst Case Position: Receiver (Y-axis), Antenna(Y-axis).....8
APPENDIX 2: Test instruments9
APPENDIX 3: Data of EMI test.....10
Radiated Emission (Receiving) Glass antenna.....10
APPENDIX 4: Label14

SECTION 1: Client information

Company Name : DENSO CORPORATION
Address : 1-1 Showa-cho Kariya-shi Aichi-ken, 448-8661 Japan
Telephone Number : +81-566-61-7934
Facsimile Number : +81-566-25-4915
Contact person : Mitsugi Ohtsuka

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Remote Keyless Entry System (Receiver)
Model No. : 13BZT
Serial No. : 001
Country of Manufacture : Japan
Receipt Date of Sample : November 30, 2005
Condition of EUT : Production prototype
(Not for Sale: this sample is equivalent to mass-produced items.)

2.2 Product Description

Model No. 13BZT is a Remote Keyless Entry System (Receiver).

Receiver

Type of Receiver	Super Heterodyne
Receiving Frequency	312.15MHz
Local Oscillator frequency	301.45MHz
Intermediate frequency	10.7MHz
Other clock frequency	37.68125MHz (Crystal)
Operating voltage (inner)	DC5V
Antenna Type	Antenna 1: Built-in (Receiver) Antenna 2: Printed antenna on the glass (Fixed)

EUT has both Antenna 1 and 2, which are unremovable permanently.
The test was made only for Radiated emission test item.
This EUT complies with the requirement in section 15.111(b).

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(01.06.05)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B : 2005
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators
Section 15.109 Radiated emission limits

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Result
1	Radiated emission	ANSI C63.4:2003	FCC Section 15.109(a)	N/A	11.4dB 386.412MHz QP, Horizontal	Complied
2	Conducted Emission	ANSI C63.4:2003	FCC Section 15.107(a) and 207	N/A	N/A*1)	N/A

Note: UL Apex's EMI Work procedures No. QPM05 and QPM15.

*1) This test is not applicable since the EUT does not have AC power port.

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.5 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 5.2 dB.
The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is ± 6.6 dB.
The data listed in this test report has enough margin, more than the site margin.

3.4 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

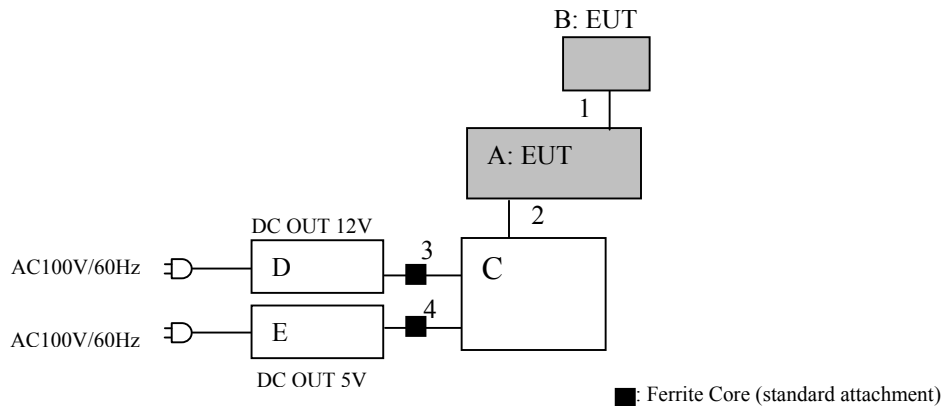
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : 312.15MHz Compulsory Receiving mode (by checker)
1) Antenna 1 (built in receiver)
2) Antenna 2 (Glass Antenna)
*This mode was performed for Antenna 1 and Glass antenna in the same configuration (section 4.2).

Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and Support Equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Remote Keyless Entry System (Receiver)	13BZT	001	DENSO	EUT (FCC ID : HYQ13BZT)
B	Glass antenna	-	-	DENSO	EUT
C	Checker Bench	-	-	-	-
D	DC Power Supply	PW18-1.3AT	08016530	KENWOOD TMI	-
E	DC Power Supply	PW8-3ATP	09067054	KENWOOD TMI	-

List of cables used

No.	Name	Length (m)	Shield
1	Antenna Cable	2.0	Y
2	Extended Harness Cable	1.8	N
3	DC Harness Cable	1.0	N
4	DC Harness Cable	1.0	N

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(01.06.05)

SECTION 5: Radiated emission (Fundamental and Spurious Emission)

5.1 Operating environment

Test place : No.1 semi anechoic chamber
Temperature : See data
Humidity : See data

Test Procedure

The Radiated Electric Field Strength intensity has been measured on No.1 semi anechoic chamber with a ground plane and at a distance of 3m.

1) Frequency : From 30MHz to 2GHz at distance 3m

The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with a QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz

Frequency	Above 1GHz
Instrument used	Spectrum Analyzer
Detector	PK: RBW:1MHz/VBW: 1MHz
IF Bandwidth	AV: RBW:1MHz/VBW:10Hz

5.5 Results

Summary of the test results: Pass

Date: December 4, 2005

Tested by: Makoto Kosaka

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

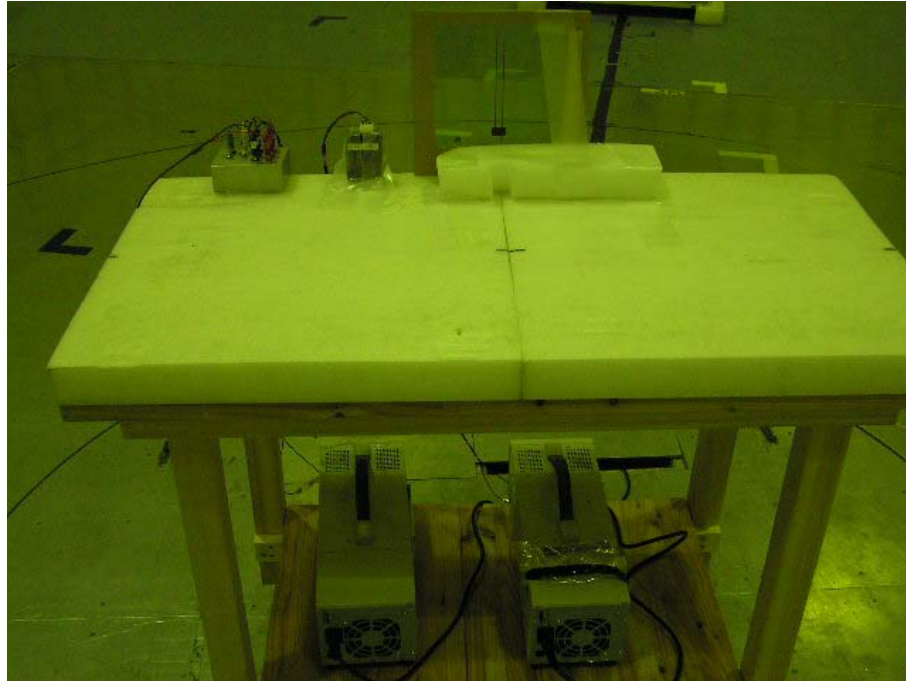
Facsimile : +81 596 24 8124

MF060b(01.06.05)

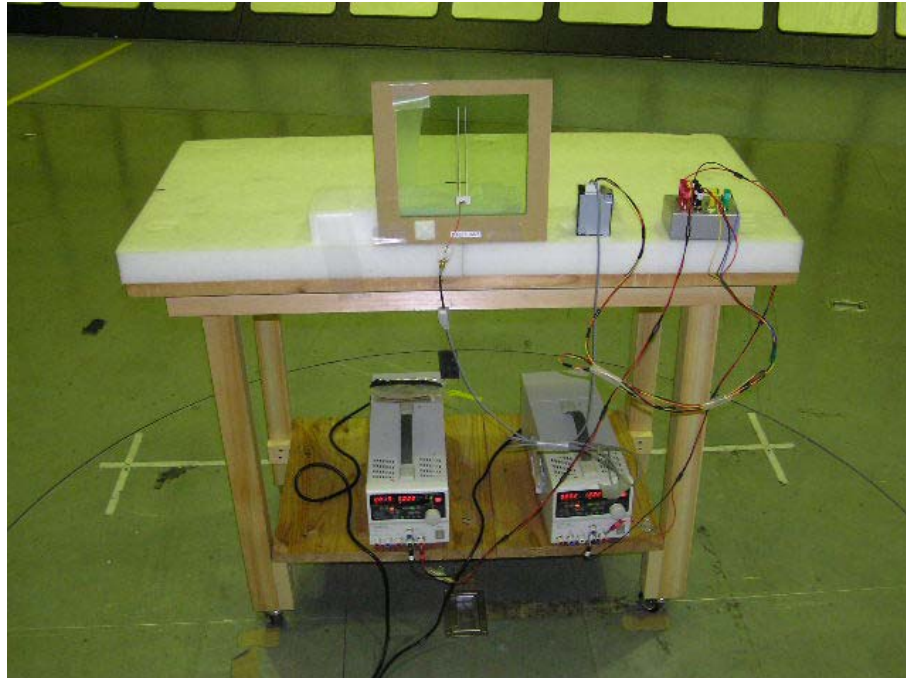
APPENDIX 1: Photographs of test setup

Radiated emission

Front



Rear



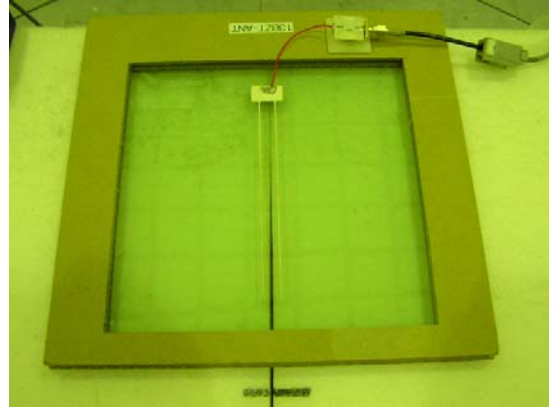
Worst Case Position: Receiver (Y-axis), Antenna(Y-axis)

Receiver

Antenna

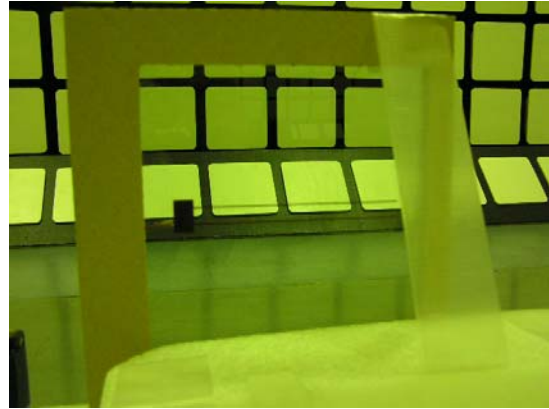
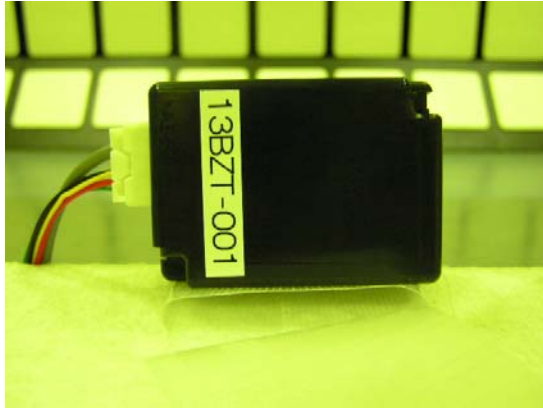
Axis X

Axis X



Axis Y

Axis Y



Axis Z

Axis Z



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2005/11/12 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2004/12/16 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	RE	2004/12/19 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2005/05/24 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2005/01/10 * 12
MPA-10	Pre Amplifier	Agilent	8449B	RE	2005/09/07 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2005/02/03 * 12
MCC-26	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2005/08/30 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2005/11/10 * 12
MDPS-04	DC Power Supply	KENWOOD TMI	PW18-1.3AT	RE	Pre Check
MDPS-05	DC Power Supply	KENWOOD TMI	PW8-3ATP	RE	Pre Check

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

RE: Radiated Spurious Emission

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

MF060b(01.06.05)

APPENDIX 3: Data of EMI test
Radiated Emission (Receiving) Glass antenna

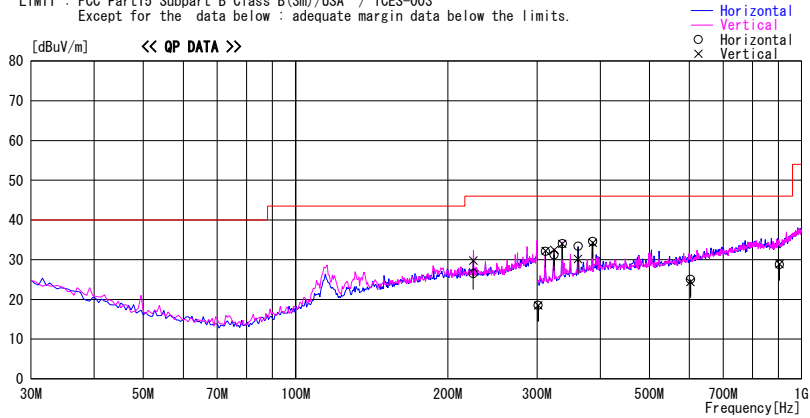
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No. 1 Semi Anechoic Chamber
2005/12/04

Company : DENSO Corporation Report No. : 26DE0191-HO
Kind of EUT : Remote Keyless Entry System(Rx) Power : DC 12.0V and 5.0V
Model No. : 13BZT Temp./Humi. : 22deg.C / 39%
Serial No. : 001 Operator : Makoto Kosaka

Mode / Remarks : Rx 312.15MHz(Glass antenna) Receiver and Glass antenna Y-axis worst

LIMIT : FCC Part15 Subpart B Class B(3m)/USA / ICES-003
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss& Gain [dB]						
224.494	27.0	QP	17.2	-17.7	26.5	320	271	Hori.	46.0	19.5
224.494	30.3	QP	17.2	-17.7	29.8	5	100	Vert.	46.0	16.2
301.450	21.5	QP	14.2	-17.2	18.5	0	100	Hori.	46.0	27.5
301.450	21.5	QP	14.2	-17.2	18.5	0	100	Vert.	46.0	27.5
311.801	34.6	QP	14.6	-17.1	32.1	243	239	Hori.	46.0	13.9
311.801	34.7	QP	14.6	-17.1	32.2	247	100	Vert.	46.0	13.8
324.277	33.1	QP	15.1	-17.0	31.2	290	232	Hori.	46.0	14.8
324.277	34.4	QP	15.1	-17.0	32.5	68	100	Vert.	46.0	13.5
336.752	35.6	QP	15.5	-17.0	34.1	302	171	Hori.	46.0	11.9
336.752	35.5	QP	15.5	-17.0	34.0	358	100	Vert.	46.0	12.0
361.694	34.0	QP	16.4	-17.0	33.4	30	147	Hori.	46.0	12.6
361.694	30.8	QP	16.4	-17.0	30.2	153	100	Vert.	46.0	15.8
386.412	34.4	QP	17.3	-17.1	34.6	126	180	Hori.	46.0	11.4
386.412	34.1	QP	17.3	-17.1	34.3	321	100	Vert.	46.0	11.7
602.900	22.8	QP	19.1	-16.8	25.1	126	180	Hori.	46.0	20.9
602.900	22.1	QP	19.1	-16.8	24.4	321	100	Vert.	46.0	21.6
904.350	23.0	QP	21.0	-15.2	28.8	126	180	Hori.	46.0	17.2
904.350	23.1	QP	21.0	-15.2	28.9	321	100	Vert.	46.0	17.1

CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

Radiated Emission (Receiving) Glass antenna

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
2005/12/04

Company	: DENSO Corporation	Report No.	: 26DE0191-HO
Kind of EUT	: Remote Keyless Entry System(Rx)	Power	: DC 12.0V and 5.0V
Model No.	: 13BZT	Temp./Humi.	: 22deg. C. / 39%
Serial No.	: 001	Operator	: Makoto Kosaka

Mode / Remarks : Rx 312.15MHz(Glass antenna) Receiver and Glass antenna Y-axis worst

LIMIT : FCC Part15 Subpart B Class B(3m)/USA. above1GHz:AV / RSS-Gen / RSS-210
Except for the data below : adequate margin data below the limits.

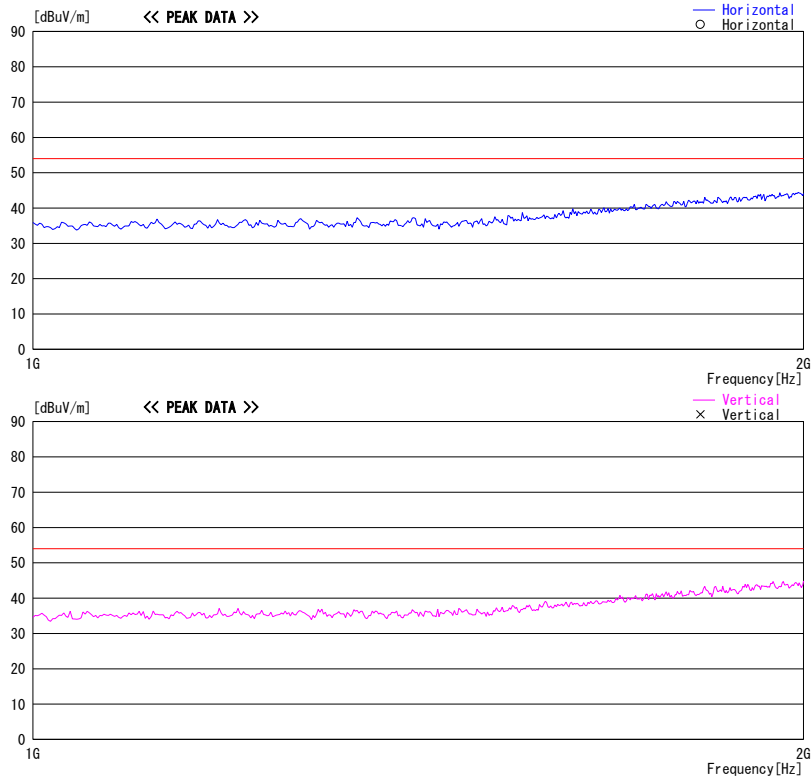


CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

Radiated Emission (Receiving) Built-in antenna

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
2005/12/04

Company	: DENSO Corporation	Report No.	: 26DE0191-H0
Kind of EUT	: Remote Keyless Entry System(Rx)	Power	: DC 12.0V and 5.0V
Model No.	: 13BZT	Temp./Humi.	: 22deg.C / 39%
Serial No.	: 001	Operator	: Makoto Kosaka

Mode / Remarks : Rx 312.15MHz (Built-in antenna) Receiver and Glass antenna Y-axis worst

LIMIT : FCC Part15 Subpart B Class B(3m)/USA / ICES-003
 Except for the data below : adequate margin data below the limits.

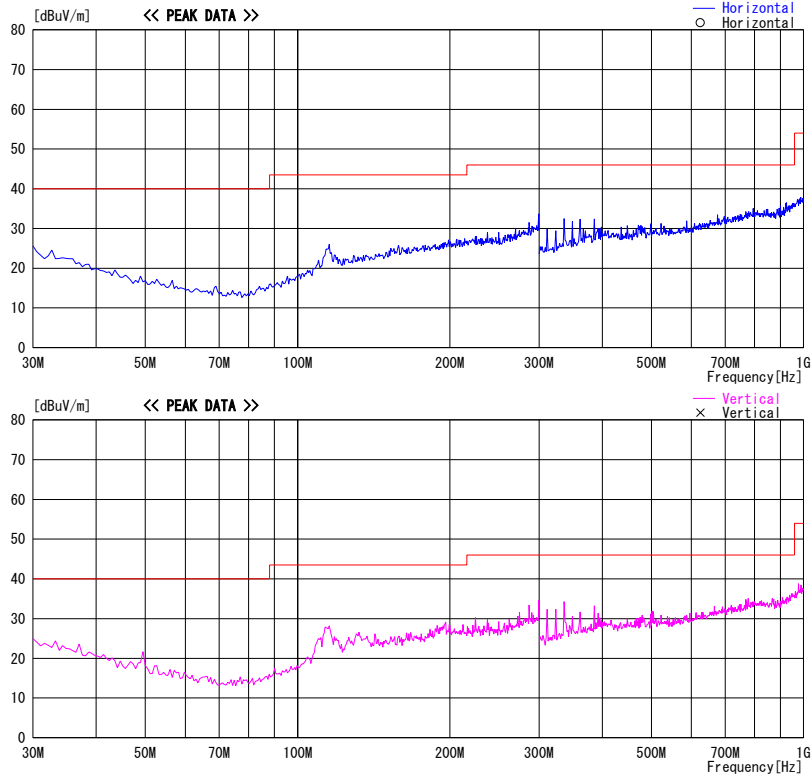


CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

Radiated Emission (Receiving) Built-in antenna

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
2005/12/04

Company	: DENSO Corporation	Report No.	: 26DE0191-HO
Kind of EUT	: Remote Keyless Entry System(Rx)	Power	: DC 12.0V and 5.0V
Model No.	: 13BZT	Temp./Humi.	: 22deg.C / 39%
Serial No.	: 001	Operator	: Makoto Kosaka

Mode / Remarks : Rx 312.15MHz (Built-in antenna) Receiver and Glass antenna Y-axis worst

LIMIT : FCC Part15 Subpart B Class B(3m)/USA. above1GHz:AV / RSS-Gen / RSS-210
Except for the data below : adequate margin data below the limits.

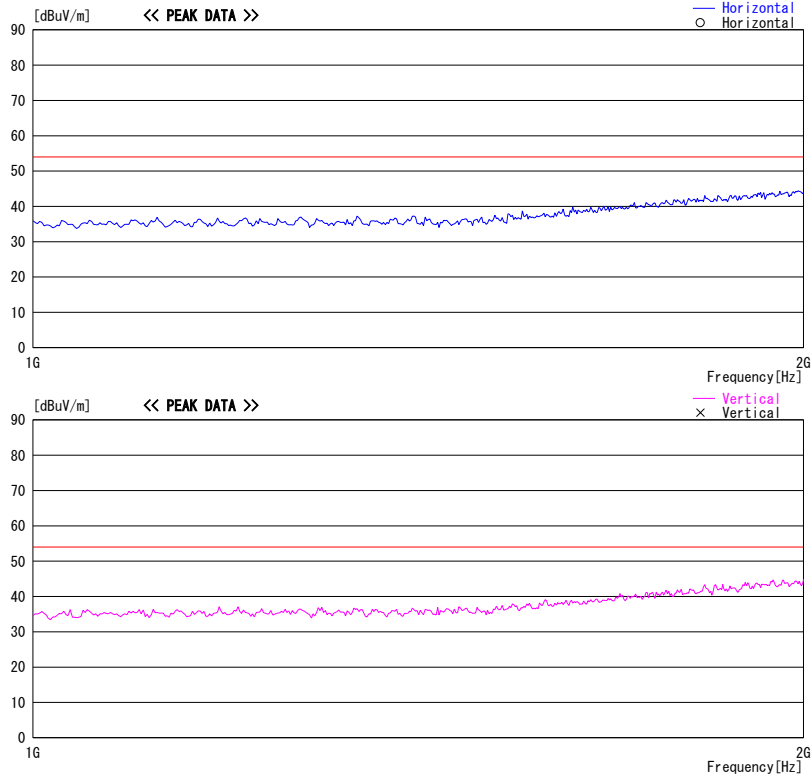


CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

APPENDIX 4: Label

