ADDENDUM TEST REPORT

Test Report No. : 22HE0022-HO-2A

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Remote Keyless Entry System (Receiver)**
Model No.	:	**13BBT**
Test standard	:	**FCC Part 15 Subpart B Section 15.109(a)**
FCC ID	:	**HYQ13BBT**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of A-PEX International Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with 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.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : April 19, 2002

Issued date : May 20, 2002

Tested by : Hiroka Umeyama

Approved by : Tetsuya Hashimoto
Site Manager of Head Office EMC Division

A-PEX International Co., Ltd. EMC Head Office Division.

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

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

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SECTION 1: Client information

Company name	:	DENSO CORPORATION
Trade name	:	DENSO CORPORATION
Address	:	1-1 syowa-cho, kariya-shi, Aichi-ken. 448-8661 Japan
Telephone Number	:	+81-566-61-4720
Facsimile Number	:	+81-566-25-4915
Contact Person	:	KUNIHIRO MIYAUCHI

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.	:	13BBT
Serial No.	:	013
Rating	:	12V DC (Vehicle Battery)
Country of Manufacture	:	JAPAN
Receipt Date of Sample	:	April 19, 2002
Condition of EUT	:	Engineering prototype

2.2 Product Description

Model: 13BBT Remote Keyless Entry System (Receiver) is mainly used for locking or unlocking the doors of the vehicle.
They are referred to as the EUT in this report.

Type of receiver	: Super Heterodyne
Receiving Frequency	: 314.35MHz
Local Oscillator Frequency	: 303.65MHz
Intermediate Frequency	: 10.7MHz
Other Clock Frequency	: 3.86MHz
Information antenna	: Built-in Type (Fixed)
Operation Voltage	: DC 12V

SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart B

Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

3.2 Procedures and results

Item	Test Procedure	Specification	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4:2000	Section 15.107(a)	Excluded *	N/A	N/A
Radiated emission	ANSI C63.4:2000	Section 15.109 (a) Class B	N/A	6.4dB 60.73MHz Horizontal	Complied
* The test is not applicable since the EUT does not have AC Mains					

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

3.3 Confirmation

A-PEX INTERNATIONAL hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart B Section 15.109 (a).

3.4 Uncertainty

Radiated Emission Test
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.4dB.
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.0dB.
☐The data listed in this test report may exceed the test limit because it does not have enough margin.
■The data listed in this test report has enough margin.

3.5 Test location

A-PEX International Co., Ltd. Head Office EMC Division. No.1 semi Anechoic Chamber, 19.2 x 11.2 x 7.7 m
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124
This site has been fully described in a report submitted to FCC office, and listed on February, 2002 (Registration number: 313583).
*NVLAP Lab. code: 200572-0

3.6 Test Setup, Data of EMI & Test instruments,

Refer to Appendix 1 to 3.

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

4.1 Operating Modes

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

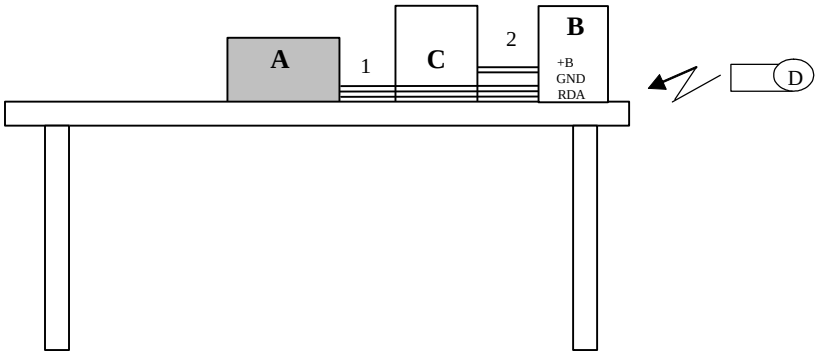
The operating mode/system was as follows:

Operation mode ：Receiving (transmitting by exclusive used key)

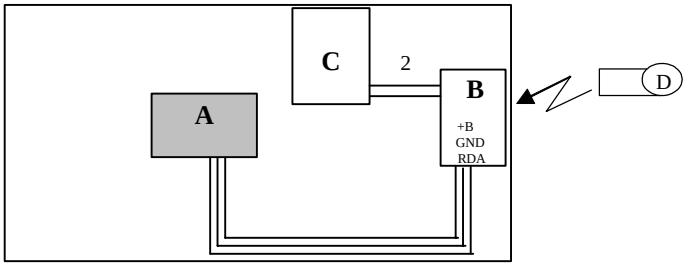
Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals

Front view



Top view



Description of EUT

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Receiver	13BBT	013	DENSO	HYQ13BBT

Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
B	Check bench	-	001	DENSO	N/A
C	Car Battery	B19L	161001C	Panasonic	N/A
D	Transmitter	12BBT	002	DENSO	HYQ12BBT

List of cables used

No.	Name	Length (m)	Shield	Remark
①	Extended harness	2.0	N	Polyvinyl chloride
②	DC Power Cable	1.0	N	Polyvinyl chloride

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in a No.1 semi Anechoic Chamber, 19.2 x 11.2 x 7.7 m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The EUT was set on the center of the tabletop and the rear the peripheral was aligned and flushed with rear of tabletop.
Test was made with the antenna positioned in both the horizontal
and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 30MHz-1000MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Receiving

5.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 3m.
Measurements were performed with a quasi-peak detector.
The measuring antenna height was varied between 1 to 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.
The radiated emission measurements were made with the following detector function of the test receiver.

Detector Type : Quasi-Peak
IF Bandwidth : 120 kHz

The EUT was measured in the direction to be its worst level condition.

5.5 Results

Summary of the test results: Pass

Date: April 19, 2002 Tested by: H. Umeyama

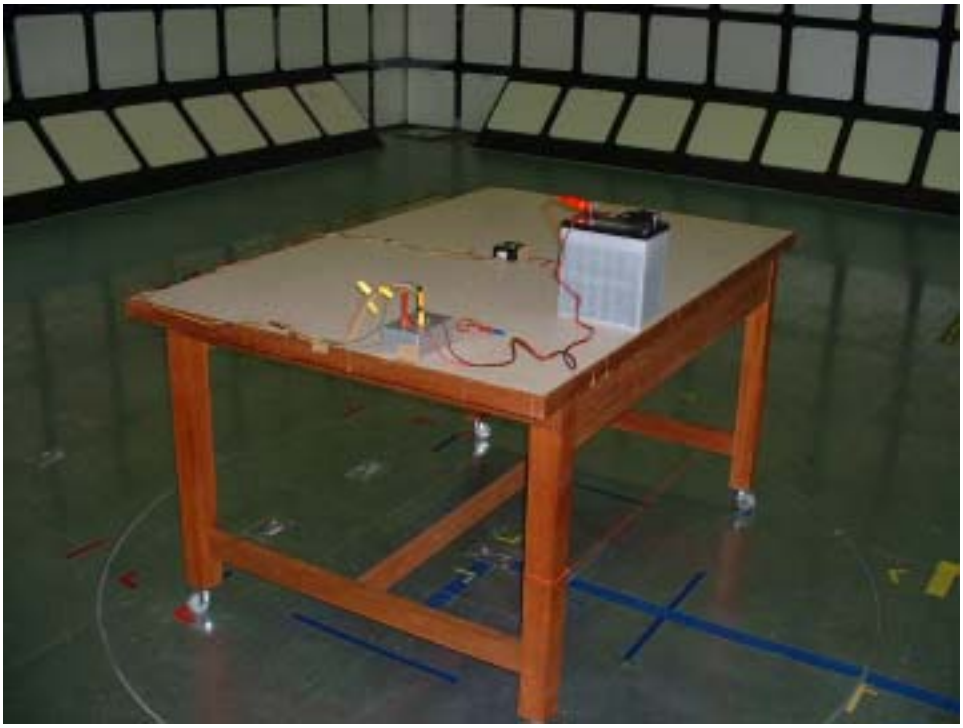
APPENDIX 1: Photographs of test setup

APPENDIX 2: Test instruments

APPENDIX 3: Data of EMI test

APPENDIX 1: Photographs of test setup

Radiated emission



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2001/12/27 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2001/12/01 * 12
MCC-01	Coaxial Cable	Suhner/storm/Agilent	421-014-10m,421-014-16m,421-014-7.5m,SFM86PE-15cm,8765C,SFM141-15cm,SFM141-15cm,8765C,SFM141-10cm,8765C,421-010-1m	RE	2001/12/27 * 12
MAEC-01	Anechoic Chamber	TDK	Semi Anechioc Chamber 10m	RE	2001/12/29 * 12
MLA-01	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2001/12/01 * 12
MTR-01	EMI TEST RECEIVER	Rohde & Schwarz	ESI40	RE	2001/11/13 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2001/12/27 * 12
	EMI TEST RECEIVER	Rohde & Schwarz	ESI40		
	Anechoic Chamber	TDK	Semi Anechioc Chamber 10m		

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
CE: Conducted emission,
RE: Radiated emission,
H/F: Harmonics and voltage fluctuation
RFI: RFI Power test,
AT: Antenna terminal disturbance voltage

EMS test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
ESD: Electrostatic discharge,
RS: Radiated RF electromagnetic field,
EFT/B: Electrical fast transient burst,
SG: Surge,
CS: Radio-frequency conducted disturbances,
MF: Power frequency magnetic field,
Dip: Voltage dips and short interruptions

DATA OF RADIATED EMISSION TEST

A-PEX INTERNATIONAL EMC HEAD OFFICE DIVISION No.1 SEMI ANECHOIC CHAMBER
Date : 2002/04/19 15:35:25

Applicant : DENSO CORPORATION
Kind of EUT : Keyless Entry System
Model No. : 13BBT(Receiver)
Serial No. : 013

Report No. : 22HE0022-H0
Power : DC 12V
Temp℃/Humi% : 19 / 37
Operator : HIROKA UMEYAMA

Mode / Remarks : Receiving

LIMIT : FCC Part15 Class B(3m)/USA
Except for the above table : adeauate margin data below the limits.

No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	60.730	43.0	7.3	7.4	24.1	33.6	40.0	6.4	198	219
2	75.770	19.2	6.2	7.7	24.1	9.0	40.0	31.0	105	359
3	101.040	19.9	10.1	8.0	24.0	14.0	43.5	29.5	105	359
4	119.800	19.4	13.2	8.3	24.0	16.9	43.5	26.6	105	359
5	126.280	19.6	13.5	8.4	24.0	17.5	43.5	26.0	105	359
6	303.650	36.4	14.4	9.7	23.8	36.7	46.0	9.3	5	100
7	607.300	19.4	19.2	11.5	24.0	26.1	46.0	19.9	359	112
----- Vertical -----										
8	60.730	30.9	7.3	7.4	24.1	21.5	40.0	18.5	100	231
9	75.770	19.2	6.2	7.7	24.1	9.0	40.0	31.0	100	0
10	101.040	19.9	10.1	8.0	24.0	14.0	43.5	29.5	100	359
11	117.100	19.4	12.7	8.3	24.0	16.4	43.5	27.1	100	359
12	126.280	19.6	13.5	8.4	24.0	17.5	43.5	26.0	100	359
13	303.650	26.3	14.4	9.7	23.8	26.6	46.0	19.4	22	100
14	607.300	19.7	19.2	11.5	24.0	26.4	46.0	19.6	359	116

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP. GAIN

DATA OF RADIATED EMISSION TEST

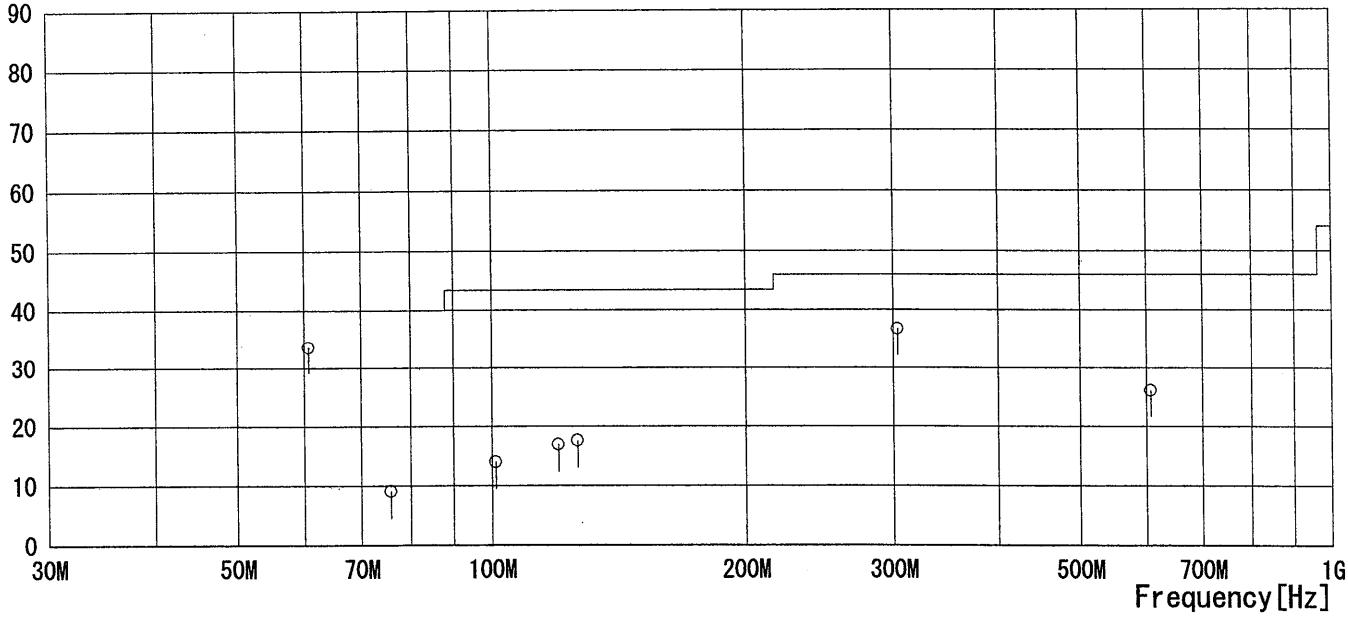
A-PEX INTERNATIONAL EMC HEAD OFFICE DIVISION No.1 SEMI ANECHOIC CHAMBER
Date : 2002/04/19 15:35:25

Applicant	: DENSO CORPORATION	Report No.	: 22HE0022-H0
Kind of EUT	: Keyless Entry System	Power	: DC 12V
Model No.	: 13BBT(Receiver)	Temp℃/Humi%	: 19 / 37
Serial No.	: 013	Operator	: HIROKA UMEYAMA

Mode / Remarks : Receiving

LIMIT : FCC Part15 Class B(3m)/USA
Except for the above table : adeauate margin data below the limits.

×:Ver. (QP)
○:Hor. (QP)
HORIZONTAL : ○



VERTICAL : ×

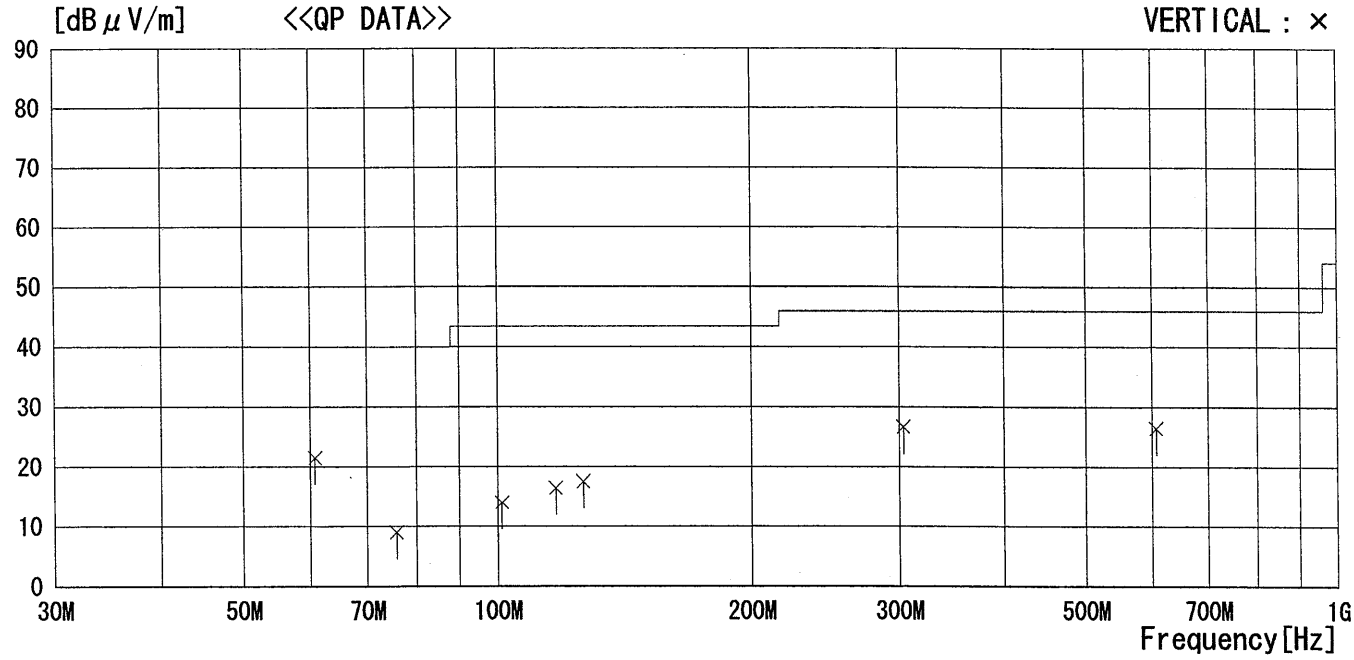


CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP. GAIN