EMI TEST REPORT

Test Report No. : 30HE0023-HO-01-A-R2

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Tire Pressure Monitoring System (Receiver)**
Model No.	:	**13BCX**
FCC ID	:	**HYQ13BCX**
Test standard	:	**FCC Part 15 Subpart B 2010 Receiver Class II Permissive Change**
Test Result	:	**Complied**

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6. This report is a revised version of 30HE0023-HO-01-A-R1. 30HE0023-HO-01-A-R1 is replaced with this report.

Date of test: March 5 and 6, 2010

Tested by: Kazuya Yoshioka
Engineer of EMC Service

Approved by: Shinya Watanabe
Leader of EMC Service

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SECTION 1: Customer information

Company Name	:	DENSO CORPORATION
Address	:	1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661, Japan
Telephone Number	:	+81-566-61-7086
Facsimile Number	:	+81-566-25-4837
Contact Person	:	Nobuya Watabe

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

2.1 Identification of E.U.T.

Type of Equipment	:	Tire Pressure Monitoring System (Receiver)
Model No.	:	13BCX
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	March 4, 2010
Country of Mass-production	:	Japan and United States of America
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model No: 13BCX (referred to as the EUT in this report) is the Tire Pressure Monitoring System (Receiver).

Feature of EUT	:	Tire Pressure Monitoring System is used for monitoring and indicating information of air pressure in vehicle's tires. Transmitter sends receiver the data that are information of air pressure in vehicle's tire. The data also include temperature, battery voltage and identity code of transmitter. The receiver judges the data. If the data of air pressure and others are not normal condition, the receiver sends signal to a warming lamp through control ECU. Then, the warning lamp warns drivers.
Type of receiving system	:	Super-heterodyne
Frequency of Operation	:	314.98MHz
Oscillator Frequency	:	38.035MHz (Crystal)
Type of Modulation	:	FSK (F2D) for receiving
Power Supply	:	DC5.0V (from ECU)
Antenna Type	:	Internal type (Fixed)

FCC15.111(b)
The receiving antenna (of this EUT) is installed on the Tire Pressure Monitoring System (Receiver), which is not removable. Therefore, this EUT complies with the requirement in section 15.111(b).

2.2.1 Variant type

There are Type 1 to Type 4 for this model.
For the difference among these types (from Type 1 to 4), please see Appendix 4.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B 2010, final revised on January 22, 2010 and effective March 1, 2010

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

3.2 Procedures and results

Item	Test Procedure	Limits	Deviation	Worst margin	Result
Conducted emission	**FCC:** ANSI C63.4: 2003 7. AC powerline conducted emission measurements RSS-Gen 7.2.2	Receiver	N/A	N/A *1)	N/A
Radiated emission	**FCC:** ANSI C63.4: 2003 8. Radiated emission measurements RSS-Gen 4.10	Receiver	N/A	12.5dB 304.280MHz Vertical (Type 4)	Complied
*Note: UL Japan, Inc's EMI Work Procedure QPM05. *1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.					

3.3 Addition to standard

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	**Radiated emission (10m*)(±dB)**			**Radiated emission**					
				(3m*)(±dB)					**(1m*)(±dB)**
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	2.7dB	4.8dB	5.0dB	2.9dB	4.8dB	5.0dB	3.9dB	4.5dB	4.4dB
No.2	-	-	-	3.5dB	4.8dB	5.1dB	4.0dB	4.3dB	4.2dB
No.3	-	-	-	3.8dB	4.6dB	4.7dB	4.0dB	4.5dB	4.4dB
No.4	-	-	-	3.5dB	4.4dB	4.9dB	4.0dB	4.6dB	4.5dB

*10m/3m/1m = Measurement distance

Radiated emission test(3m)
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

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	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	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Data of EMI, and Test instrument

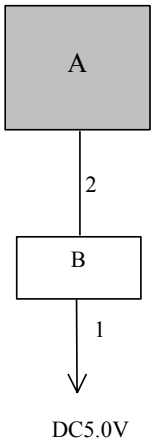
Refer to APPENDIX 1 to 3.

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

4.1 Operating modes

The mode is used : Receiving mode

4.2 Configuration and peripherals



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Tire Pressure Monitoring System (Receiver)	13BCX	004 (for Type 4)	DENSO CORPORATION	EUT (*Type 4 only)
			001 (for Type 1) Reference data		
			002 (for Type 2) Reference data		
			003 (for Type 3) Reference data		
B	Checker	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.0 *1) 1.5 *2)	Unshielded	Unshielded	-
2	Signal Cable	2.0 *1) 1.9 *2)	Unshielded	Unshielded	-

*1) Used for Type 1 and 3
*2) Used for Type 2 and 4

SECTION 5: Radiated Emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, raised 0.8m above the conducting ground plane.
The EUT was set on the edge of the 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.
Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 30MHz-300MHz (Biconical antenna) / 300MHz-1000MHz (Logperiodic antenna)
1000MHz -2000MHz (Horn antenna)
Test distance : 3m
EUT position : Table top
EUT operation mode : See Clause 4.1

5.4 Test procedure

The height of the measuring antenna 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 with the Test Receiver, or the Spectrum Analyzer.
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 3MHz AV *1): RBW:1MHz/VBW:10Hz

*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

- The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

5.5 Test result

Summary of the test results: Pass
*The limit is rounded down to one decimal place.
*The test result is rounded off to one or two decimal places, so some differences might be observed.

Date: March 5 and 6, 2010 Test engineer: Kazuya Yoshioka