



EMI TEST REPORT

Test Report No. : 12266561H-B

Applicant : OMRON Automotive Electronics Co. Ltd.
Type of Equipment : Body Control Module
Model No. : S79M0
FCC ID : OUCS79M0
Test regulation : FCC Part 15 Subpart B: 2018
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: May 15, 2018

Representative test engineer:

Hiroyuki Furutaka

Engineer

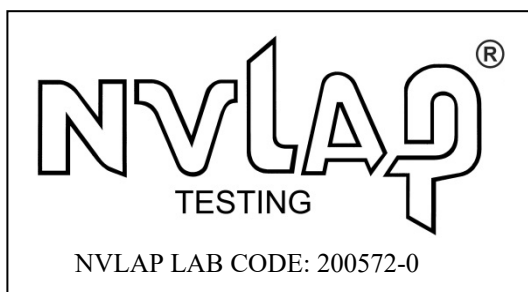
Consumer Technology Division

Approved by:

Shinichi Miyazono

Engineer

Consumer Technology Division



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 12266561H-B

[illegible]

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SECTION 1: Customer information

Company Name : OMRON Automotive Electronics Co. Ltd.
Address : 6368 NENJOZAKA OKUSA KOMAKI AICHI, 485-0802 JAPAN
Telephone Number : +81-568-78-6159
Facsimile Number : +81-568-78-7659
Contact Person : Takashi Betsui

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

2.1 Identification of E.U.T.

Type of Equipment : Body Control Module
Model No. : S79M0
Serial No. : Refer to Clause 4.2
Rating : DC 12.0 V
Receipt Date of Sample : May 9, 2018
Country of Mass-production : China and India
Condition of EUT : Production model
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No: S79M0 (referred to as the EUT in this report) is the Body Control Module.

Radio Specification

<Transmitter>

Radio Type : Transceiver
Frequency of Operation : 125 kHz
Modulation : ASK
Antenna type : External Antenna
Clock Frequency (maximum) : 16 MHz

<Receiver>

Radio Type : Receiver
Frequency of Operation : 433.92 MHz
Operating temperature range : -40 deg. C to +80 deg. C

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B
FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018

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: 2014 7. AC power - line conducted emission measurements	FCC:Part 15 Subpart B 15.107(a)	N/A	N/A	N/A
	IC: RSS-Gen 8.8	IC: RSS-Gen 8.8			
Radiated emission	FCC: ANSI C63.4: 2014 8. Radiated emission measurements	FCC: Part 15 Subpart B 15.109(a)	N/A	17.3 dB 160.010 MHz, Vertical, QP	Complied
	IC: RSS-Gen 7	IC: RSS-Gen 7.1.2			
*Note: UL Japan, Inc's EMI Work Procedure 13-EM-W0420. *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

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 $k = 2$.

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*)(+/-)		(10 m*)(+/-)	
	30 MHz to 200 MHz	200 MHz to 1000 MHz	30 MHz to 200 MHz	200 MHz to 1000 MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	5.0 dB	6.3 dB	4.9 dB	5.0 dB

Radiated emission (Above 1 GHz)				
(3 m*)(+/-)		(1 m*)(+/-)		(10 m*)(+/-)
1 GHz to 6 GHz	6 GHz to 18 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz	1 GHz to 18 GHz
5.0 dB	5.3 dB	5.8 dB	5.8 dB	5.2 dB

* Measurement distance

Radiated emission test (3 m)

The data listed in this test report has enough margin, more than the site margin.

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3.5 Test Location

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NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

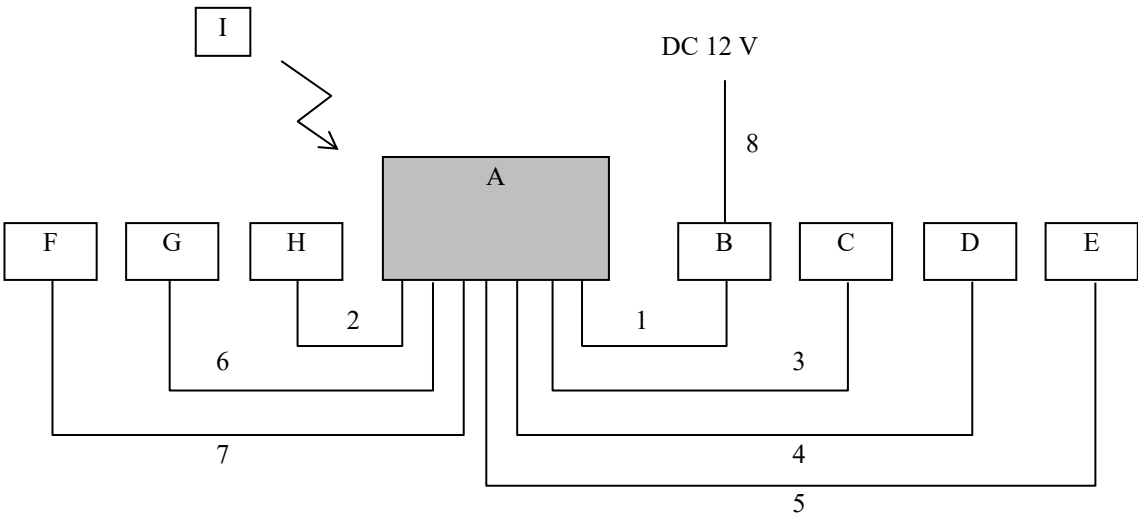
SECTION 4: Operation of E.U.T. during testing

4.1 Operating modes

Mode	Remarks
Receiving mode (433.92 MHz)	-

*The test signal level was confirmed to be sufficient to stabilize the local oscillator of the EUT.
 *It was confirmed by using checker that the EUT receives the signal from the transmitter (pair of EUT).

4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.
 *Item No. A includes Receiver Antenna.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Body Control Module	S79M0	S79YL1-180510-001	OMRON Automotive Electronics Co. Ltd.	EUT
B	Switch and Load Board	-	-	-	-
C	LF Antenna (DR)	CGF-S001-0010	CGF-S001-0010-001	OMRON Automotive Electronics Co. Ltd.	-
D	LF Antenna (AS)	CGF-S001-0010	CGF-S001-0010-002	OMRON Automotive Electronics Co. Ltd.	-
E	LF Antenna (T/G)	CGF-S001-0040	CGF-S001-0040-001	OMRON Automotive Electronics Co. Ltd.	-
F	LF Antenna (InF)	CGF-S001-0020	CGF-S001-0020-001	OMRON Automotive Electronics Co. Ltd.	-
G	LF Antenna (InR)	CGF-S001-0030	CGF-S001-0030-001	OMRON Automotive Electronics Co. Ltd.	-
H	Push Start Switch	37290-79M0	P79-180510-001	OMRON Automotive Electronics Co. Ltd.	-
I	Transmitter	R79M0	R79YL1-180510-001	OMRON Automotive Electronics Co. Ltd.	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC & Signal Cable	2.4	Unshielded	Unshielded	-
2	DC & Signal Cable	2.4	Unshielded	Unshielded	-
3	LF Antenna Cable	2.7	Unshielded	Unshielded	-
4	LF Antenna Cable	2.7	Unshielded	Unshielded	-
5	LF Antenna Cable	2.7	Unshielded	Unshielded	-
6	LF Antenna Cable	2.7	Unshielded	Unshielded	-
7	LF Antenna Cable	2.7	Unshielded	Unshielded	-
8	DC Cable	2.0	Unshielded	Unshielded	-

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SECTION 5: Radiated Emission

5.1 Operating environment

Test place : No.4 semi anechoic chamber
Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The EUT was set on the center 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 3.

5.3 Test conditions

Frequency range : 30 MHz - 200 MHz (Biconical antenna) / 200 MHz - 1000 MHz (Logperiodic antenna)
1000 MHz - 2000 MHz (Horn antenna)
Test distance : 3 m
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 4 m 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.

The radiated emission measurements were made with the following detector function of the Test Receiver.

Frequency	Below 1GHz	Above 1GHz *1)
Instrument used	Test Receiver	Test Receiver
IF Bandwidth	QP: BW 120 kHz	PK: BW 1 MHz, CISPR AV: BW 1 MHz

*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.

Distance Factor: $20 \times \log(4.0 \text{ m} / 3 \text{ m}) = 2.50 \text{ dB}$

- 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

Date: May 15, 2018

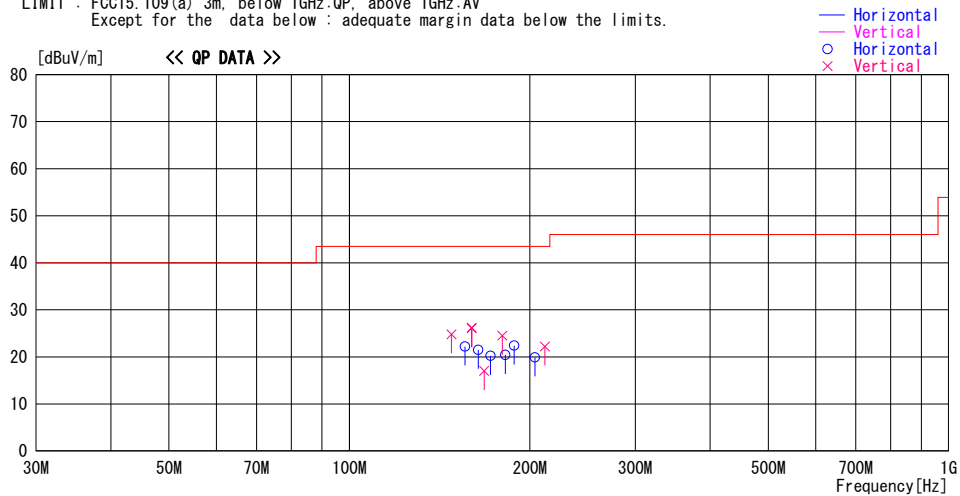
Test engineer: Hiroyuki Furutaka

APPENDIX 1: Test data

Radiated Emission

Report No. 12266561H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 15, 2018
Temperature / Humidity 23 deg. C / 45% RH
Engineer Hiroyuki Furutaka
(Below 1GHz)
Mode Rx

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



Frequency	Reading	DET	Antenna Factor	Loss & Gain	Level	Angle	Height	Polar.	Limit	Margin	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
148.020	33.1	QP	15.0	-23.3	24.8	233	100	Vert.	43.5	18.7	
155.993	30.0	QP	15.4	-23.2	22.2	359	269	Hori.	43.5	21.3	
159.999	33.7	QP	15.6	-23.2	26.1	234	100	Vert.	43.5	17.4	
160.010	33.8	QP	15.6	-23.2	26.2	355	100	Vert.	43.5	17.3	
163.991	28.9	QP	15.8	-23.2	21.5	200	287	Hori.	43.5	22.0	
167.791	24.2	QP	15.9	-23.1	17.0	22	100	Vert.	43.5	26.5	
172.010	27.3	QP	16.0	-23.1	20.2	353	290	Hori.	43.5	23.3	
180.001	31.2	QP	16.3	-23.0	24.5	279	100	Vert.	43.5	19.0	
182.001	27.1	QP	16.3	-23.0	20.4	4	300	Hori.	43.5	23.1	
188.418	29.0	QP	16.3	-22.9	22.4	350	300	Hori.	43.5	21.1	
204.006	31.3	QP	11.4	-22.8	19.9	189	180	Hori.	43.5	23.6	
212.015	33.4	QP	11.5	-22.7	22.2	210	100	Vert.	43.5	21.3	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE + ATT - GAIN(AMP))

*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.

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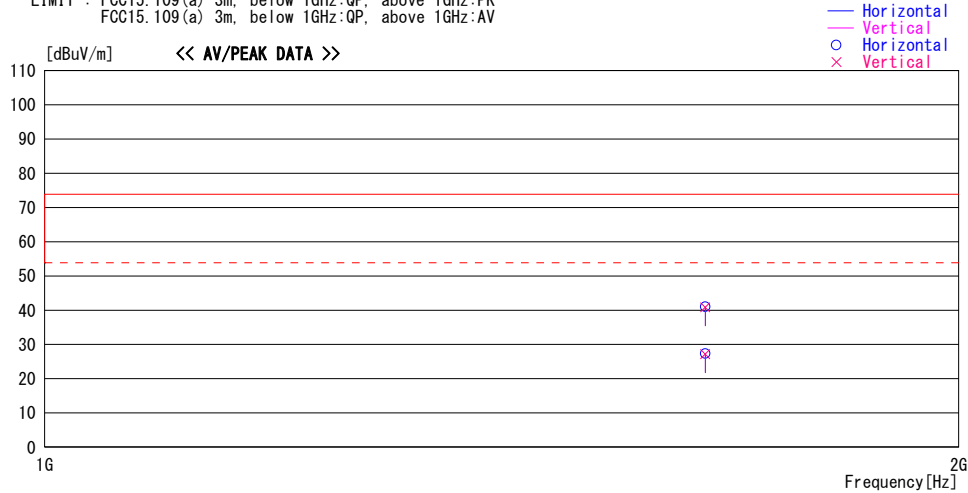
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Radiated Emission

Report No. 12266561H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date May 15, 2018
Temperature / Humidity 23 deg. C / 45% RH
Engineer Hiroyuki Furutaka
(Above 1GHz)
Mode Rx

LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1650.000	43.6	PK	25.6	-28.3	40.9	0	100	Vert.	73.9	33.0	
1650.000	43.7	PK	25.6	-28.3	41.0	0	100	Hori.	73.9	32.9	
1650.000	29.9	AV	25.6	-28.3	27.2	0	100	Vert.	53.9	26.7	
1650.000	30.0	AV	25.6	-28.3	27.3	0	100	Hori.	53.9	26.6	

CHART: WITH FACTOR

ANT TYPE: - 30 MHz: LOOP, 30 MHz - 200 MHz: BICONICAL, 200 MHz - 1000 MHz: LOGPERIODIC, 1000 MHz -: HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS & GAIN (CABLE - GAIN(AMP) + D-factor)

*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.

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APPENDIX 2: Test instruments

Test equipment

Test item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	141545	DIGITAL HiTESTER	HIOKI	3805	51201148	1/9/2018	1/31/2019	12
RE	141562	Thermo-Hygrometer	CUSTOM	CTH-180	1501	1/24/2018	1/31/2019	12
RE	148898	Attenuator	KEYSIGHT	8491A	MY52462282	10/12/2017	10/31/2018	12
RE	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	10/30/2017	10/31/2018	12
RE	141425	Biconical Antenna	Schwarzbeck	BBA9106	1302	11/23/2017	11/30/2018	12
RE	141397	Coaxial Cable	UL Japan	-	-	6/22/2017	6/30/2018	12
RE	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	1/30/2018	1/31/2019	12
RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE	141267	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	12/10/2017	12/31/2018	12
RE	142227	Measure	KOMELON	KMC-36	-	-	-	-
RE	141583	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260833	2/27/2018	2/28/2019	12
RE	141508	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	9/14/2017	9/30/2018	12
RE	141412	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	6/23/2017	6/30/2018	12
RE	141581	MicroWave System Amplifier	AGILENT	83017A	650	10/6/2017	10/31/2018	12

*Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test item:

RE: Radiated emission

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