




RADIO TEST REPORT

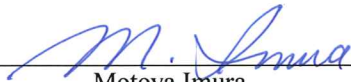
Test Report No. : 10666776H

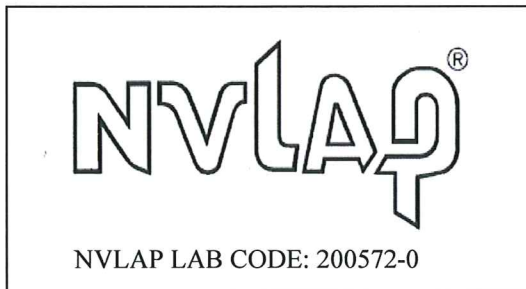
Applicant : DENSO CORPORATION
Type of Equipment : Electronic Key
Model No. : 14FHF
Test regulation : FCC Part 15 Subpart C: 2015
FCC ID : HYQ14FHF
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. 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.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

Date of test: February 12 and 13, 2015

Representative test engineer: 
Masatoshi Nishiguchi
Engineer
Consumer Technology Division

Approved by: 
Motoya Imura
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. *As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

CONTENTS	PAGE
SECTION 1: Customer information	4
SECTION 2: Equipment under test (E.U.T.)	4
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission) 9	
SECTION 6: Automatically deactivate	10
SECTION 7: -20dB and 99% Occupied Bandwidth	10
APPENDIX 1: Data of EMI test	11
Automatically deactivate.....	11
Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission).....	13
-20dB and 99% Occupied Bandwidth.....	16
APPENDIX 2: Test Instruments	16
APPENDIX 3: Photographs of test setup	18
Radiated emission	18
Worst case position	19

SECTION 1: Customer information

Company Name : DENSO CORPORATION
Address : 1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan
Telephone Number : +81-566-61-5242
Facsimile Number : +81-566-25-4837
Contact Person : MASAYUKI YAMAMOTO

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

2.1 Identification of E.U.T.

Type of Equipment : Electronic Key
Model No. : 14FHF
Serial No. : Refer to Clause 4.2
Rating : DC 3.0V
Receipt Date of Sample : February 5, 2015
Country of Mass-production : Japan, United States of America, and China
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: 14FHF (referred to as the EUT in this report) is the Electronic Key.

General Specification

Clock frequency(ies) in the system : 8 MHz (IC Clock), 18.37MHz (RF)

Radio Specification

Radio Type : Transceiver
Frequency of Operation : 315.10 MHz / 314.00 MHz *1)
Modulation : FSK (F1D)
Power Supply (radio part input) : DC 3.0V
Type of Battery : One lithium battery
Antenna type : Built-in type (Fixed)
Receiving frequency of Operation : 134.2kHz *2)

*1) These two different frequencies are not emitted simultaneously.

*2) The test of receiver part was performed separately from this test report, and the conformability is confirmed.

* Original model No.: 14FHF has 4 switches.

Variation models have 3 switches (Type A and Type B) and 2 switches.

The difference of Original model and Variation models is only the number of switch.

They are completely identical in RF characteristics.

Therefore the test was performed with the representative original type which was the worst one.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 2015

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.231 Periodic operation in the band 40.66 - 40.70MHz
and above 70MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	FCC: ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC: Section 15.207	N/A	N/A*1)	-
	IC: RSS-Gen 8.8	IC: RSS-Gen 8.8			
Automatically Deactivate	FCC: ANSI C63.4:2009 13. Measurement of intentional radiators	FCC: Section 15.231(a)(1)	N/A	Complied	Radiated
	IC: -	IC: RSS-210 A1.1.1			
Electric Field Strength of Fundamental Emission	FCC: ANSI C63.4:2009 13. Measurement of intentional radiators	FCC: Section 15.231(b)	10.1dB Horizontal PK with Duty factor (Tx 314.00MHz)	Complied	Radiated
	IC: RSS-Gen 6.12	IC: RSS-210 A1.1.2			
Electric Field Strength of Spurious Emission	FCC: ANSI C63.4:2009 13. Measurement of intentional radiators	FCC: Section 15.205 Section 15.209 Section 15.231(b)	3.3dB 3140.000MHz Vertical PK with Duty factor (Tx 314.00MHz)	Complied	Radiated
	IC: RSS-Gen 6.13	IC: RSS-210 A1.1.2, 2.5.1 RSS-Gen 8.9			
-20dB Bandwidth	FCC: ANSI C63.4:2009 13. Measurement of intentional radiators	FCC: Section 15.231(c)	N/A	Complied	Radiated
	IC: -	IC: Reference data			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

*1) The test is not applicable since the EUT does not have AC Mains.

FCC Part 15.31 (e)

This test was performed with the New Battery (DC 3.0V) and the constant voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 6.6	IC: RSS-210 A1.1.3	N/A	Complied	Radiated

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						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

*3m/1m/0.5m = Measurement distance

Radiated emission test (3m)

[Electric Field Strength of Fundamental Emission]

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

[Electric Field Strength of Spurious Emission]

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

3.5 Test Location

UL Japan, Inc. Ise HQ EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

	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	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	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	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	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	-	8.8 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	3.1 x 3.4 x 3.0m	4.8 x 4.6m	-

* 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 Data of EMI, Test instruments, and Test set up.

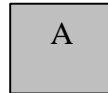
Refer to APPENDIX.

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

4.1 Operating Modes

Test Item	Mode
Automatically Deactivate	Normal use mode, 315.10 MHz Normal use mode, 314.00 MHz
Electric Field Strength of Fundamental Emission Electric Field Strength of Spurious Emission -20dB & 99% Occupied Bandwidth	Transmitting mode (Tx), 315.10 MHz *1) Transmitting mode (Tx), 314.00 MHz *1)
<p>* The system was configured in typical fashion (as a customer would normally use it) for testing. *1) The software of this mode is the same as one of normal product, except that EUT continues to transmit when transmitter button is being pressed (For Normal use mode, the EUT transmits when it receives 134.2kHz radio signal and transmitter button is being pressed.) End users cannot change the settings of the output power of the product.</p>	

4.2 Configuration and peripherals



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Electronic Key	14FHF	001 *1) 002 *2)	DENSO CORPORATION	EUT

*1) Used for Normal use mode only.

*2) Used for Transmitting mode only.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

SECTION 5: Radiated emission (Electric Field Strength of Fundamental and Spurious Emission)

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane. The EUT was set on the center 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 3.

[Transmitting mode]

(Below 30MHz)

The noise level was checked by moving a search-coil (Loop Antenna) close to the EUT.

(Above 30MHz)

The Radiated Electric Field Strength has been measured on Semi anechoic chamber with a ground plane and at a distance of 3m.

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

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/spectrum analyzer.

Test Antennas are used as below;

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

	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	Above 1GHz
Detector Type	Peak	Peak	Peak	Peak	Peak and Peak with Duty factor	Peak and Peak with Duty factor
IF Bandwidth	200Hz	200Hz	9.1kHz	9.1kHz	120kHz	PK: S/A:RBW 1MHz, VBW 3MHz

- The carrier level was measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.

Noise levels of all the frequencies were measured at the position.

This EUT has two modes which mechanical key is inserted or not. The worst case was confirmed with and without mechanical key, as a result, the test with mechanical key was the worst case. Therefore the test with mechanical key was performed only.

*The result is rounded off to the second decimal place, so some differences might be observed.

Measurement range : 9kHz-3.2GHz
Test data : APPENDIX
Test result : Pass

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

SECTION 6: Automatically deactivate

Test Procedure

The measurement was performed with Electric field strength using a spectrum analyzer.

Test data : APPENDIX
Test result : Pass

SECTION 7: -20dB and 99% Occupied Bandwidth

Test Procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	150MHz	1.5kHz	5.1kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 % of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer

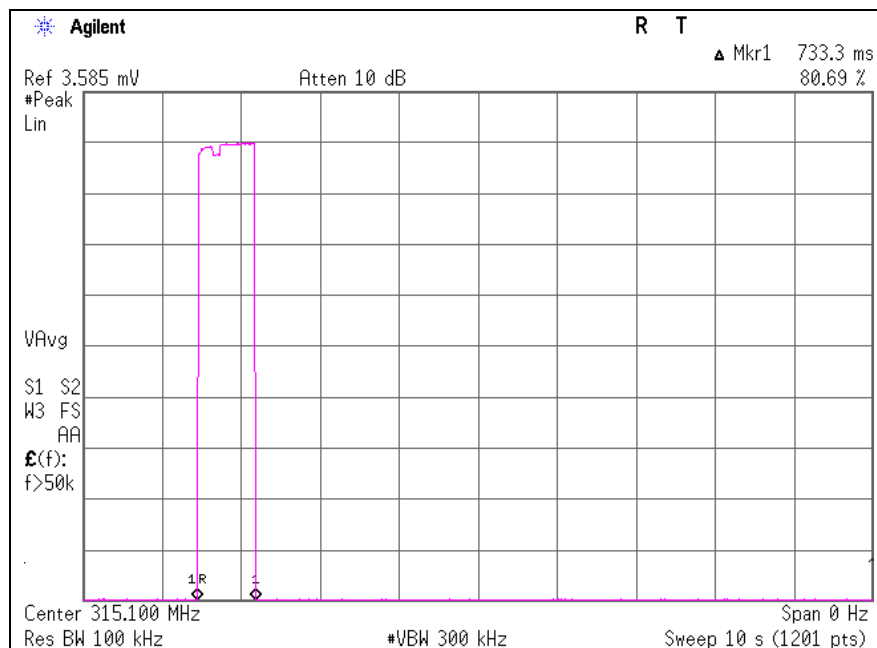
Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Automatically deactivate
315.10 MHz

Test place Ise EMC Lab. No.11 measurement room
 Report No. 10666776H
 Date 02/12/2015
 Temperature/ Humidity 25 deg. C / 24% RH
 Engineer Yuta Moriya
 Mode Normal use mode 315.10MHz

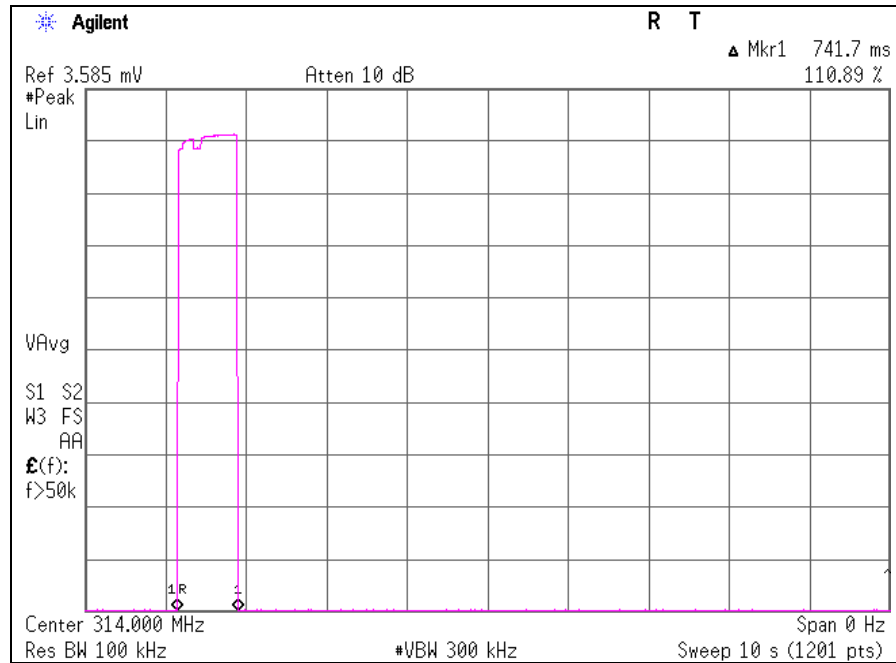
Time of Transmitting [sec]	Limit [sec]	Result
0.7333	5.00	Pass



Automatically deactivate
314.00 MHz

Test place	Ise EMC Lab. No.11 measurement room
Report No.	10666776H
Date	02/12/2015
Temperature/ Humidity	25 deg. C / 24% RH
Engineer	Yuta Moriya
Mode	Normal use mode 314.00MHz

Time of Transmitting [sec]	Limit [sec]	Result
0.7417	5.00	Pass



Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)
315.10 MHz

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10666776H
Date : 02/13/2015
Temperature/ Humidity : 22 deg. C / 23% RH
Engineer : Yuta Moriya
(Below 1GHz) (Above 1GHz)
Mode : Transmitting mode 315.10MHz

PK

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark Inside or Outside of Restricted Bands
		Hor	Ver					Hor	Ver		Hor	Ver	
315.100	PK	68.7	67.7	15.0	8.9	27.5	-	65.1	64.1	95.6	30.5	31.5	Carrier
630.200	PK	27.3	27.3	20.0	10.4	28.3	-	29.4	29.4	75.6	46.2	46.2	Outside
945.300	PK	27.2	27.2	23.0	11.5	27.1	-	34.6	34.6	75.6	41.0	41.0	Outside
1260.400	PK	46.7	46.9	25.7	2.0	35.8	-	38.6	38.8	75.6	37.0	36.8	Outside
1575.500	PK	44.5	45.9	26.5	2.3	35.4	-	37.9	39.3	73.9	36.0	34.6	Inside
1890.600	PK	45.2	44.4	27.3	2.5	35.2	-	39.8	39.0	75.6	35.8	36.6	Outside
2205.700	PK	45.9	45.9	27.2	2.7	35.0	-	40.8	40.8	73.9	33.1	33.1	Inside
2520.800	PK	47.3	48.0	26.9	2.8	34.9	-	42.1	42.8	75.6	33.5	32.8	Outside
2835.900	PK	47.5	47.3	27.6	3.0	34.8	-	43.3	43.1	73.9	30.6	30.8	Inside
3151.000	PK	54.4	54.9	28.3	3.2	34.6	-	51.3	51.8	75.6	24.3	23.8	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark
		Hor	Ver					Hor	Ver		Hor	Ver	
315.100	PK	68.7	67.7	15.0	8.9	27.5	0.0	65.1	64.1	75.6	10.5	11.5	Carrier
630.200	PK	27.3	27.3	20.0	10.4	28.3	0.0	29.4	29.4	55.6	26.2	26.2	Outside
945.300	PK	27.2	27.2	23.0	11.5	27.1	0.0	34.6	34.6	55.6	21.0	21.0	Outside
1260.400	PK	46.7	46.9	25.7	2.0	35.8	0.0	38.6	38.8	55.6	17.0	16.8	Outside
1575.500	PK	44.5	45.9	26.5	2.3	35.4	0.0	37.9	39.3	53.9	16.0	14.6	Inside
1890.600	PK	45.2	44.4	27.3	2.5	35.2	0.0	39.8	39.0	55.6	15.8	16.6	Outside
2205.700	PK	45.9	45.9	27.2	2.7	35.0	0.0	40.8	40.8	53.9	13.1	13.1	Inside
2520.800	PK	47.3	48.0	26.9	2.8	34.9	0.0	42.1	42.8	55.6	13.5	12.8	Outside
2835.900	PK	47.5	47.3	27.6	3.0	34.8	0.0	43.3	43.1	53.9	10.6	10.8	Inside
3151.000	PK	54.4	54.9	28.3	3.2	34.6	0.0	51.3	51.8	55.6	4.3	3.8	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Since the peak emission result satisfied the average limit, duty factor was omitted.

Although Duty of this product was 100% or less, the result of AV (PK with Duty factor) was calculated by applying Duty 100% as worst.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Emission (Electric Field Strength of Fundamental and Spurious Emission)
314.00 MHz

Test place : Ise EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10666776H
Date : 02/13/2015
Temperature/ Humidity : 22 deg. C / 23% RH
Engineer : Yuta Moriya
(Below 1GHz) (Above 1GHz)
Mode : Transmitting mode 314.00MHz

PK

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark Inside or Outside of Restricted Bands
		Hor	Ver					Hor	Ver		Hor	Ver	
314.000	PK	69.0	66.2	15.0	8.9	27.5	-	65.4	62.6	95.5	30.1	32.9	Carrier
628.000	PK	27.2	27.2	20.0	10.3	28.3	-	29.2	29.2	75.5	46.3	46.3	Outside
942.000	PK	27.4	27.4	23.0	11.5	27.1	-	34.8	34.8	75.5	40.7	40.7	Outside
1256.000	PK	45.2	44.6	25.7	2.0	35.8	-	37.1	36.5	75.5	38.4	39.0	Outside
1570.000	PK	45.1	46.1	26.5	2.3	35.4	-	38.5	39.5	73.9	35.4	34.4	Inside
1884.000	PK	44.3	45.1	27.3	2.5	35.2	-	38.9	39.7	75.5	36.6	35.8	Outside
2198.000	PK	45.7	45.5	27.2	2.7	35.0	-	40.6	40.4	75.5	34.9	35.1	Outside
2512.000	PK	46.6	46.9	26.9	2.8	34.9	-	41.4	41.7	75.5	34.1	33.8	Outside
2826.000	PK	48.1	47.5	27.6	3.0	34.8	-	43.9	43.3	73.9	30.0	30.6	Inside
3140.000	PK	53.9	55.3	28.3	3.2	34.6	-	50.8	52.2	75.5	24.7	23.3	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV]		Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]		Limit [dBuV/m]	Margin [dB]		Remark
		Hor	Ver					Hor	Ver		Hor	Ver	
314.000	PK	69.0	66.2	15.0	8.9	27.5	0.0	65.4	62.6	75.5	10.1	12.9	Carrier
628.000	PK	27.2	27.2	20.0	10.3	28.3	0.0	29.2	29.2	55.5	26.3	26.3	Outside
942.000	PK	27.4	27.4	23.0	11.5	27.1	0.0	34.8	34.8	55.5	20.7	20.7	Outside
1256.000	PK	45.2	44.6	25.7	2.0	35.8	0.0	37.1	36.5	55.5	18.4	19.0	Outside
1570.000	PK	45.1	46.1	26.5	2.3	35.4	0.0	38.5	39.5	53.9	15.4	14.4	Inside
1884.000	PK	44.3	45.1	27.3	2.5	35.2	0.0	38.9	39.7	55.5	16.6	15.8	Outside
2198.000	PK	45.7	45.5	27.2	2.7	35.0	0.0	40.6	40.4	55.5	14.9	15.1	Outside
2512.000	PK	46.6	46.9	26.9	2.8	34.9	0.0	41.4	41.7	55.5	14.1	13.8	Outside
2826.000	PK	48.1	47.5	27.6	3.0	34.8	0.0	43.9	43.3	53.9	10.0	10.6	Inside
3140.000	PK	53.9	55.3	28.3	3.2	34.6	0.0	50.8	52.2	55.5	4.7	3.3	Outside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Duty factor

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Since the peak emission result satisfied the average limit, duty factor was omitted.

Although Duty of this product was 100% or less, the result of AV (PK with Duty factor) was calculated by applying Duty 100% as worst.

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

-20dB and 99% Occupied Bandwidth
315.10 MHz / 314.00 MHz

Test place : Ise EMC Lab. No.11 measurement room
Report No. : 10666776H
Date : 02/12/2015
Temperature/ Humidity : 25 deg. C / 24% RH
Engineer : Yuta Moriya
Mode : Transmitting mode 315.10MHz / 314.00MHz

Bandwidth Limit : Fundamental Frequency **314.00** MHz x 0.25% = 785.00 kHz

* The above limit was calculated from more stringent nominal frequency.

* Method of KDB 926416 for systems employing non sweeping frequencies was referred.

315.10MHz

-20dB Bandwidth [kHz]
36.98

314.00MHz

-20dB Bandwidth [kHz]
37.10

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
36.98+37.10=74.08	785.00	Pass

Bandwidth Limit : Fundamental Frequency **315.10** MHz x 0.25% = 787.75 kHz

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
36.27	787.75	Pass

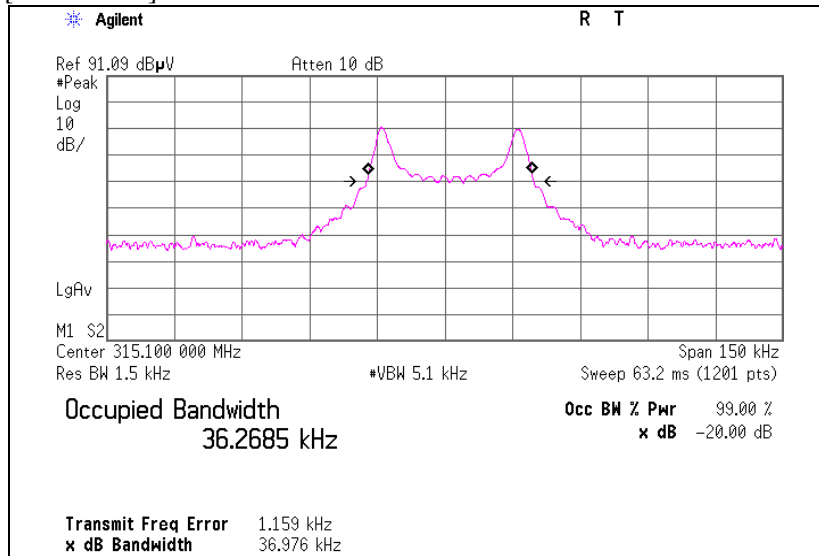
Bandwidth Limit : Fundamental Frequency **314.00** MHz x 0.25% = 785.00 kHz

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
36.31	785.00	Pass

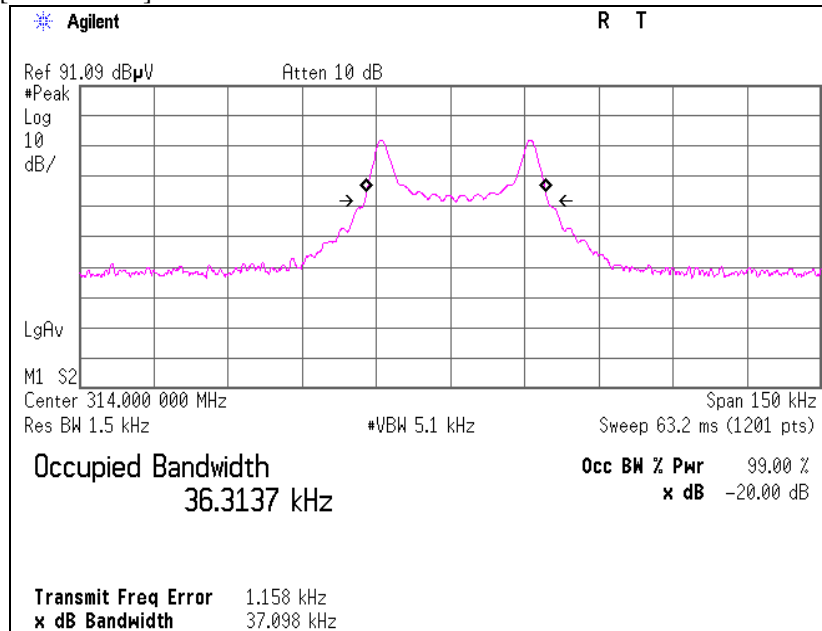
-20dB and 99% Occupied Bandwidth
315.10 MHz / 314.00 MHz

Test place	Ise EMC Lab. No.11 measurement room
Report No.	10666776H
Date	02/12/2015
Temperature/ Humidity	25 deg. C / 24% RH
Engineer	Yuta Moriya
Mode	Transmitting mode 315.10MHz / 314.00MHz

[315.10MHz]



[314.00MHz]



APPENDIX 2: Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	RE	2014/12/22 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	RE	2014/02/28 * 12
MLPA-07	Loop Antenna	UL Japan	-	-	RE	Pre Check
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2014/06/25 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2014/11/12 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2014/06/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2015/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2014/11/11 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2014/09/26 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2014/02/21 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2014/09/24 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2015/01/28 * 12

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, 99% Occupied Bandwidth, -20dB bandwidth , Automatically deactivate and Duty cycle tests

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124