RADIO TEST REPORT

Test Report No. : 10121851H-R2

Applicant	:	**DENSO CORPORATION**
Type of Equipment	:	**Smart Card Key**
Model No.	:	**14CCB**
Test regulation	:	**FCC Part 15 Subpart C: 2013**
FCC ID	:	**HYQ14CCB**
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 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 report is a revised version of 10121851H-R1. 10121851H-R1 is replaced with this report.

Date of test: November 21, 2013

Representative test engineer:
Masatoshi Nishiguchi
Engineer of WiSE Japan,
UL Verification Service

Approved by:
Masanori Nishiyama
Manager of WiSE Japan,
UL Verification Service

NVLAP LAB CODE: 200572-0

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

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REVISION HISTORY

Original Test Report No.: 10121851H

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10121851H	December 2, 2013	-	-
1	10121851H-R1	January 15, 2014	P. 5	Correction of Worst margin
1	10121851H-R1	January 15, 2014	P.13, 14	Correction of Duty factor
1	10121851H-R1	January 15, 2014	P.15, 16	Correction of ON time and Duty in duty
1	10121851H-R1	January 15, 2014	P.15, 16	Addition of following sentence; + the first short pulse transmittions time of the second try. Transmition timing is shown in "UHF transmission specification"
2	10121851H-R2	January 16, 2014	P. 5	Correction of Worst margin
2	10121851H-R2	January 16, 2014	P.13, 14	Correction of Duty factor
2	10121851H-R2	January 16, 2014	P.15, 16	Correction of ON time and Duty in duty
2	10121851H-R2	January 16, 2014	P.15, 16	Correction of note sentence

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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	:	+81-566-61-4721
Facsimile Number	:	+81-566-25-4837
Contact Person	:	MITSURU NAKAGAWA

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

2.1 Identification of E.U.T.

Type of Equipment	:	Smart Card Key
Model No.	:	14CCB
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 3.0V
Receipt Date of Sample	:	November 19, 2013
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering 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: 14CCB (referred to as the EUT in this report) is the Smart Card Key.

General Specification

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

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	433.58 MHz / 434.30 MHz *
Modulation	:	FSK (F1D)
Power Supply (radio part input)	:	DC 3.0V
Type of Battery	:	One lithium battery
Antenna type	:	Built-in type (Fixed)

*These two different frequencies are not emitted simultaneously. For one transmitting sequence which is triggered by 134.2kHz radio receiving signal, after one transmitting frequency stops, another frequency is not transmitted.
Only when a person with a key approaches a vehicle, this device receives a trigger (134.2kHz) and transmits one sequence automatically (one sequence is shown in (b) of ”UHF transmission specification” of the application documents.), but not periodic transmission and also two frequencies are not transmitted continuously.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2013, final revised on September 30, 2013 and effective October 30, 2013
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 C63.4:2003 7. AC powerline conducted emission measurements	**FCC:** Section 15.207	N/A	N/A*1)	-
	IC: RSS-Gen 7.2.4	**IC:** RSS-Gen 7.2.4			
Automatically Deactivate	**FCC:** ANSI C63.4:2003 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 C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.231(b)	15.7dB Horizontal PK with Duty factor (Tx 434.30MHz)	Complied	Radiated
	IC: RSS-Gen 4.8	**IC:** RSS-210 A1.1.2			
Electric Field Strength of Spurious Emission	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.205 Section 15.209 Section 15.231(b)	8.4dB 3902.220MHz Horizontal PK with Duty factor (Tx 433.58MHz)	Complied	Radiated
	IC: RSS-Gen 4.9	**IC:** RSS-210 A1.1.2, 2.5.1 RSS-Gen 7.2.5			
-20dB Bandwidth	**FCC:** ANSI C63.4:2003 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 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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 4.6.1	**IC:** RSS-Gen 4.6.1	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)
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

UL Japan, Inc. Head Office 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

	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	-	-	8.8 x 4.6 x 2.8m	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 Data of EMI, Test instruments, and Test set up.

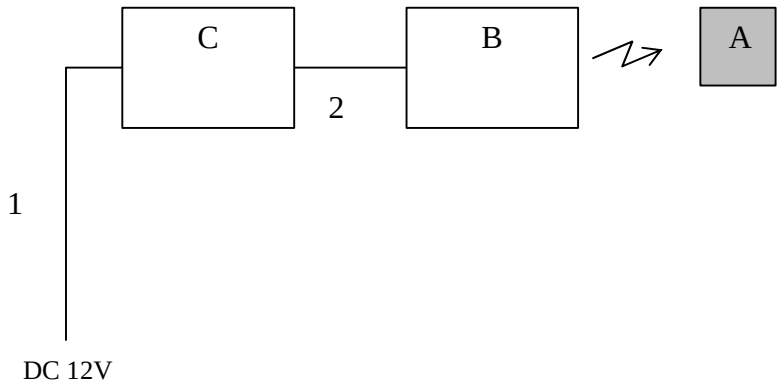
Refer to APPENDIX.

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

4.1 Operating Modes

Test Item	Mode
Automatically Deactivate *1) Duty Cycle *1)	Normal use mode, 433.58MHz Normal use mode, 434.30MHz
Electric Field Strength of Fundamental Emission Electric Field Strength of Spurious Emission -20dB & 99% Occupied Bandwidth	Transmitting mode (Tx), 433.58MHz Transmitting mode (Tx), 434.30MHz
*1) The system was configured in typical fashion (as a customer would normally use it) for testing. * 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 only when it receives 134.2kHz radio signal.) End users cannot change the settings of the output power of the product.	

4.2 Configuration and peripherals



* Cabling and setup(s) 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	Smart Card Key	14CCB	002 *1) 001 *2)	DENSO CORPORATION	EUT
B	Door handle unit	-	-	DENSO CORPORATION	*1)
C	Test bench	-	-	DENSO CORPORATION	*1)

*1) Used for Normal use mode only.
*2) Used for Transmitting mode only.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	0.4	Unshielded	Unshielded	*1)
2	DC and Signal Cable	1.4	Unshielded	Unshielded	*1)

*1) Used for Normal use mode only.

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

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	300kHz	3kHz	9.1kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 % of Span	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.							

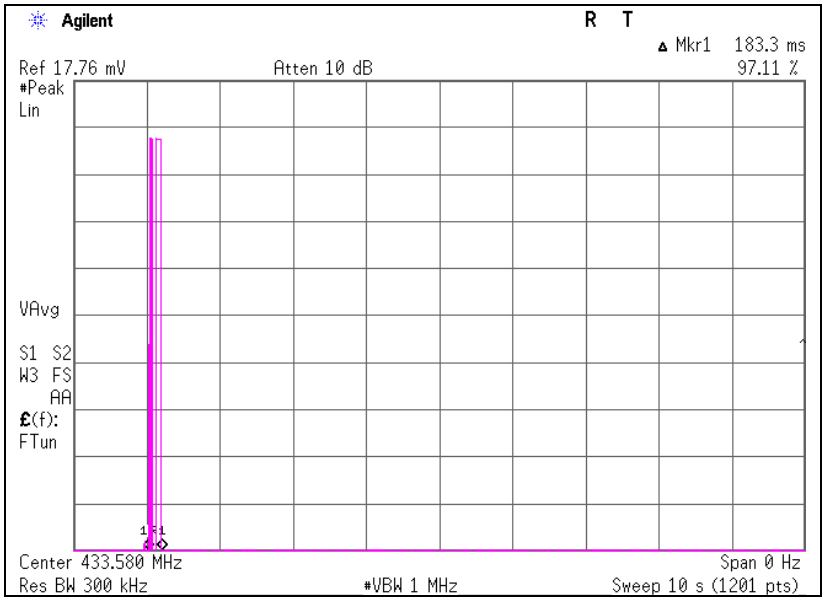
Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Automatically deactivate

Test place	No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Normal use mode 433.58MHz

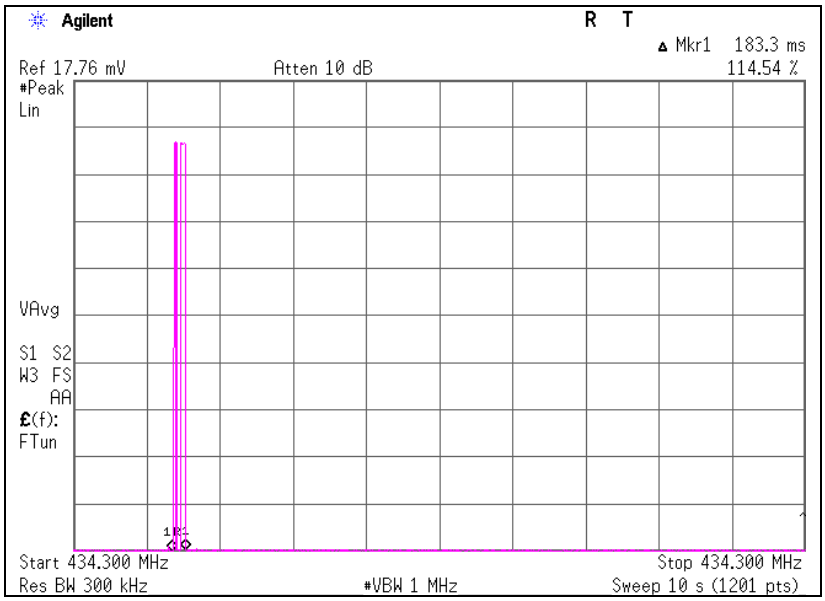
Time of Transmitting [sec]	Limit [sec]	Result
0.1833	5.00	Pass



Automatically deactivate

Test place	No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Normal use mode 434.30MHz

Time of Transmitting [sec]	Limit [sec]	Result
0.1833	5.00	Pass



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

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10121851H	
Date	11/21/2013	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH	25 deg. C / 41% RH
Engineer	Shinya Watanabe (Below 1GHz)	Nishiguchi Masatoshi (Above 1GHz)
Mode	Transmitting mode 433.58MHz	

PK

Frequency [MHz]	Detector	Reading [dBuV] Hor	Reading [dBuV] Ver	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m] Hor	Result [dBuV/m] Ver	Limit [dBuV/m]	Margin [dB] Hor	Margin [dB] Ver	Remark Inside or Outside of Restricted Bands
433.580	PK	71.8	71.1	17.7	10.8	32.0	-	68.3	67.6	100.8	32.5	33.2	Carrier
867.160	PK	39.4	33.6	22.2	13.1	31.1	-	43.6	37.8	80.8	37.2	43.0	Outside
1300.740	PK	50.0	51.7	25.0	1.9	34.1	-	42.8	44.5	73.9	31.1	29.4	Inside
1734.320	PK	50.7	50.1	26.4	2.1	33.1	-	46.1	45.5	80.8	34.7	35.3	Outside
2167.900	PK	48.2	47.3	27.5	2.4	32.5	-	45.6	44.7	80.8	35.2	36.1	Outside
2601.480	PK	47.7	47.1	28.6	2.6	32.3	-	46.6	46.0	80.8	34.2	34.8	Outside
3035.060	PK	50.5	49.0	29.2	2.8	32.1	-	50.4	48.9	80.8	30.4	31.9	Outside
3468.640	PK	48.7	47.2	29.0	3.1	31.9	-	48.9	47.4	80.8	31.9	33.4	Outside
3902.220	PK	47.7	46.3	29.5	3.3	31.7	-	48.8	47.4	73.9	25.1	26.5	Inside
4335.800	PK	43.6	42.8	29.9	3.5	31.5	-	45.5	44.7	73.9	28.4	29.2	Inside

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

PK with Duty factor

Frequency [MHz]	Detector	Reading [dBuV] Hor	Reading [dBuV] Ver	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m] Hor	Result [dBuV/m] Ver	Limit [dBuV/m]	Margin [dB] Hor	Margin [dB] Ver	Remark
433.580	PK	71.8	71.1	17.7	10.8	32.0	-3.3	65.0	64.3	80.8	15.8	16.5	Carrier
867.160	PK	39.4	33.6	22.2	13.1	31.1	-3.3	40.3	34.5	60.8	20.5	26.3	Outside
1300.740	PK	50.0	51.7	25.0	1.9	34.1	-3.3	39.5	41.2	53.9	14.4	12.7	Inside
1734.320	PK	50.7	50.1	26.4	2.1	33.1	-3.3	42.8	42.2	60.8	18.0	18.6	Outside
2167.900	PK	48.2	47.3	27.5	2.4	32.5	-3.3	42.3	41.4	60.8	18.5	19.4	Outside
2601.480	PK	47.7	47.1	28.6	2.6	32.3	-3.3	43.3	42.7	60.8	17.5	18.1	Outside
3035.060	PK	50.5	49.0	29.2	2.8	32.1	-3.3	47.1	45.6	60.8	13.7	15.2	Outside
3468.640	PK	48.7	47.2	29.0	3.1	31.9	-3.3	45.6	44.1	60.8	15.2	16.7	Outside
3902.220	PK	47.7	46.3	29.5	3.3	31.7	-3.3	45.5	44.1	53.9	8.4	9.8	Inside
4335.800	PK	43.6	42.8	29.9	3.5	31.5	-3.3	42.2	41.4	53.9	11.7	12.5	Inside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier) + Duty factor (Refer to Duty factor data sheet)

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

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

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10121851H	
Date	11/21/2013	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH	25 deg. C / 41% RH
Engineer	Shinya Watanabe	Nishiguchi Masatoshi
	(Below 1GHz)	(Above 1GHz)
Mode	Transmitting mode 434.30MHz	

PK

Frequency	Detector	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark Inside or Outside
[MHz]		Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	of Restricted Bands
434.300	PK	71.9	70.8	17.7	10.8	32.0	-	68.4	67.3	100.8	32.4	33.5	Carrier
868.600	PK	39.1	32.7	22.2	13.1	31.1	-	43.3	36.9	80.8	37.5	43.9	Outside
1302.900	PK	49.6	51.4	25.0	1.9	34.1	-	42.4	44.2	73.9	31.5	29.7	Inside
1737.200	PK	50.2	48.7	26.4	2.1	33.1	-	45.6	44.1	80.8	35.2	36.7	Outside
2171.500	PK	47.3	46.9	27.5	2.4	32.5	-	44.7	44.3	80.8	36.1	36.5	Outside
2605.800	PK	47.1	47.2	28.6	2.6	32.3	-	46.0	46.1	80.8	34.8	34.7	Outside
3040.100	PK	50.2	48.6	29.1	2.8	32.1	-	50.0	48.4	80.8	30.8	32.4	Outside
3474.400	PK	47.7	47.4	29.0	3.1	31.9	-	47.9	47.6	80.8	32.9	33.2	Outside
3908.700	PK	46.2	45.9	29.5	3.3	31.7	-	47.3	47.0	73.9	26.6	26.9	Inside
4343.000	PK	42.8	41.3	29.9	3.5	31.5	-	44.7	43.2	73.9	29.2	30.7	Inside

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

PK with Duty factor

Frequency	Detector	Reading [dBuV]		Ant Factor	Loss	Gain	Duty Factor	Result [dBuV/m]		Limit	Margin [dB]		Remark
[MHz]		Hor	Ver	[dB/m]	[dB]	[dB]	[dB]	Hor	Ver	[dBuV/m]	Hor	Ver	
434.300	PK	71.9	70.8	17.7	10.8	32.0	-3.3	65.1	64.0	80.8	15.7	16.8	Carrier
868.600	PK	39.1	32.7	22.2	13.1	31.1	-3.3	40.0	33.6	60.8	20.8	27.2	Outside
1302.900	PK	49.6	51.4	25.0	1.9	34.1	-3.3	39.1	40.9	53.9	14.8	13.0	Inside
1737.200	PK	50.2	48.7	26.4	2.1	33.1	-3.3	42.3	40.8	60.8	18.5	20.0	Outside
2171.500	PK	47.3	46.9	27.5	2.4	32.5	-3.3	41.4	41.0	60.8	19.4	19.8	Outside
2605.800	PK	47.1	47.2	28.6	2.6	32.3	-3.3	42.7	42.8	60.8	18.1	18.0	Outside
3040.100	PK	50.2	48.6	29.1	2.8	32.1	-3.3	46.7	45.1	60.8	14.1	15.7	Outside
3474.400	PK	47.7	47.4	29.0	3.1	31.9	-3.3	44.6	44.3	60.8	16.2	16.5	Outside
3908.700	PK	46.2	45.9	29.5	3.3	31.7	-3.3	44.0	43.7	53.9	9.9	10.2	Inside
4343.000	PK	42.8	41.3	29.9	3.5	31.5	-3.3	41.4	39.9	53.9	12.5	14.0	Inside

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier) + Duty factor (Refer to Duty factor data sheet)

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

Duty Cycle

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Normal use mode 433.58MHz

433.58MHz

(pulse length)

Type	[ms]
short pluse	7.75
long pulse	53.00

(duty)

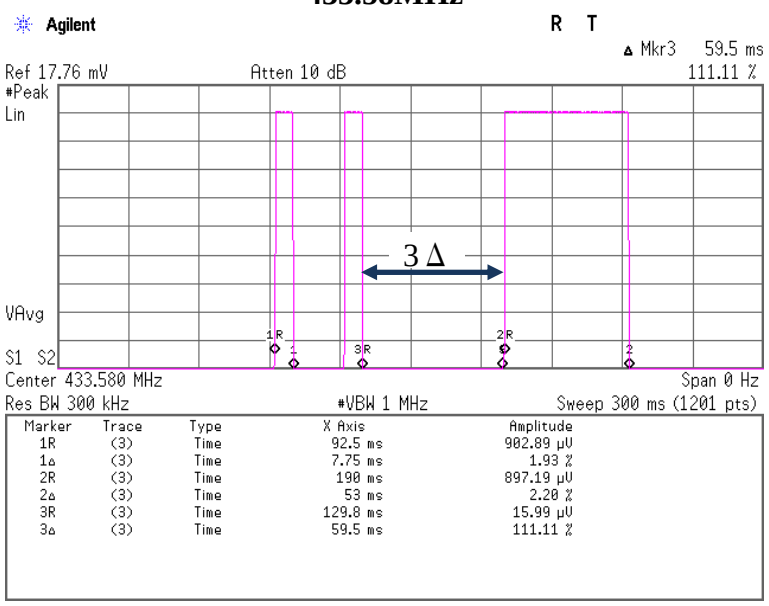
ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
68.50	100.00	0.69	-3.3

*The sampled 100 msec was the worst case that is included in long pulse transmittions time
+ the first short pulse transmittions time + the second short pulse transmittions of the second try.

Transmition timing is shown in "UHF transmission specification".

*Duty = $20\log_{10}$(ON time/Cycle)

433.58MHz



3 Δ :59.50mS is intentional off time

Duty Cycle

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Normal use mode 434.30MHz

434.30MHz

(pulse length)

Type	[ms]
short pluse	7.50
long pulse	53.00

(duty)

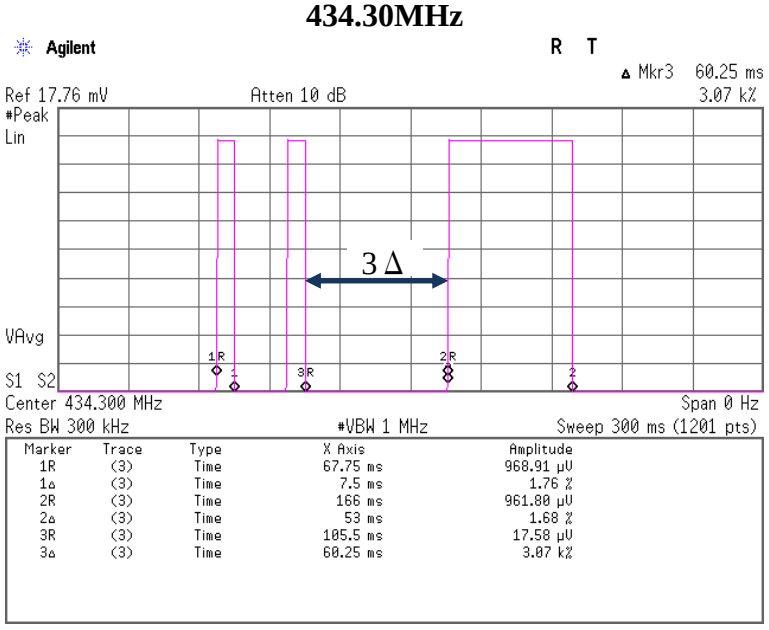
ON time [ms]	Cycle [ms]	Duty (On time/Cycle)	Duty [dB]
68.00	100.00	0.68	-3.3

*The sampled 100 msec was the worst case that is included in long pulse transmittions time
+ the first short pulse transmittions time + the second short pulse transmittions of the second try.

Transmition timing is shown in "UHF transmission specification".

*Duty = $20\log_{10}$(ON time/Cycle)

434.30MHz



3 Δ :60.25mS is intentional off time

-20dB and 99% Occupied Bandwidth

Test place	No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Transmitting mode 433.58MHz / 434.30MHz

Bandwidth Limit : Fundamental Frequency **433.58** MHz x 0.25% = 1083.95 kHz

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

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

433.58MHz

-20dB Bandwidth [kHz]
45.10

434.30MHz

-20dB Bandwidth [kHz]
45.14

-20dB Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
45.10+45.14=90.24	1083.95	Pass

Bandwidth Limit : Fundamental Frequency **433.58** MHz x 0.25% = 1083.95 kHz

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
43.34	1083.95	Pass

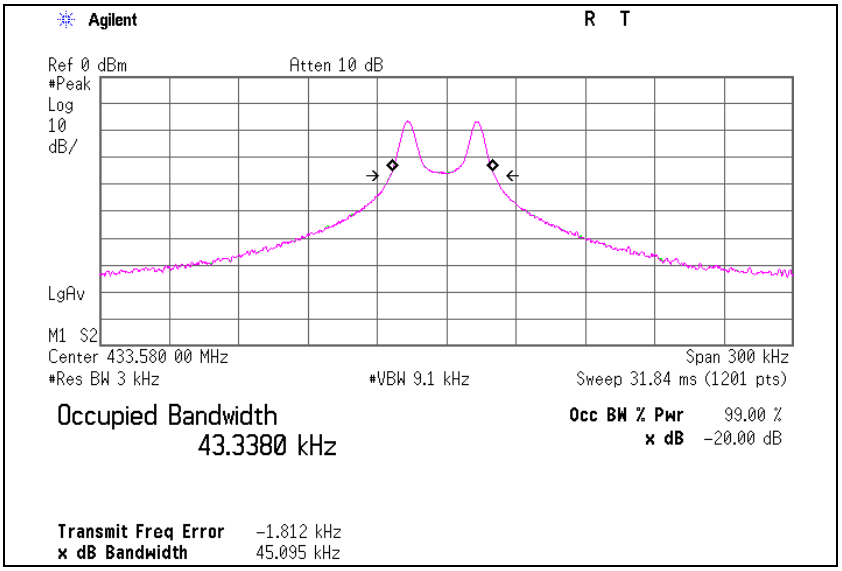
Bandwidth Limit : Fundamental Frequency **434.30** MHz x 0.25% = 1085.75 kHz

99% Occupied Bandwidth [kHz]	Bandwidth Limit [kHz]	Result
43.41	1085.75	Pass

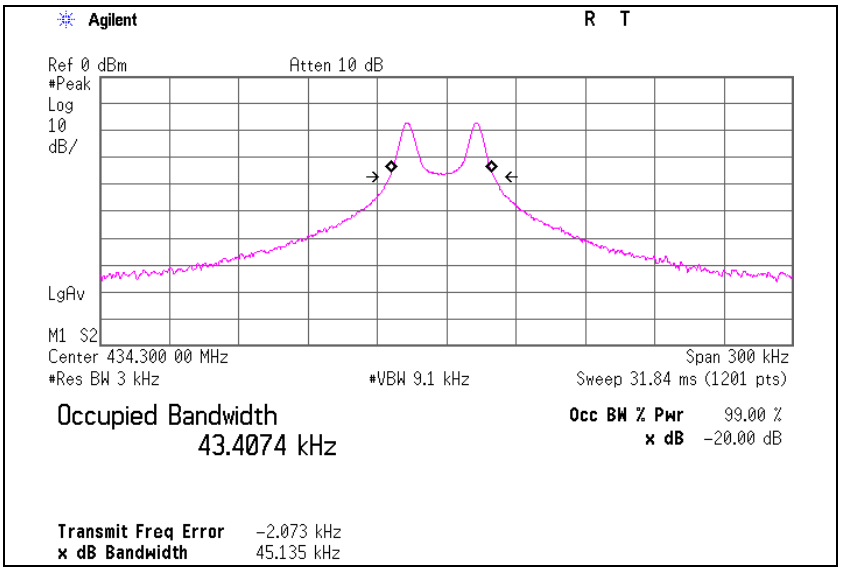
-20dB and 99% Occupied Bandwidth

Test place	No.3 Semi Anechoic Chamber
Report No.	10121851H
Date	11/21/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Shinya Watanabe
Mode	Transmitting mode 433.58MHz / 434.30MHz

【433.58MHz】



【434.30MHz】



APPENDIX 2:Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2013/02/28 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2013/02/26 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2013/08/20 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2013/10/13 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2013/10/13 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2013/07/23 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2013/04/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2013/03/12 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2013/06/14 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2013/05/17 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2013/09/27 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2013/03/12 * 12
MLPA-06	Loop Antenna	UL Japan	-	-	RE	Pre Check

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