RADIO TEST REPORT

Test Report No. : 11242579M-E-R2

Applicant	:	**CASIO COMPUTER CO., LTD.**
Type of Equipment	:	**Handheld Terminal**
Model No.	:	**IT-G500-C21E-US**
Test regulation	:	**FCC Part 15 Subpart C: 2016 (RFID part)**
FCC ID	:	**BBQITG500**
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 covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. This report is a revised version of 11242579M-E-R1. 11242579M-E-R1 is replaced with this report.

Date of test: April 19, May 18, 21, 22, 26, 30, June 3, 23, 28, 2016

Representative test engineer:

Kazuhiro Ando
Engineer
Consumer Technology Division

Approved by:

Masanori Nishiyama
Manager
Consumer Technology Division

CERTIFICATE 1266.01

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

REVISION HISTORY

Original Test Report No.: 11242579M-E

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11242579M-E	June 17, 2016	-	-
1	11242579M-E-R1	June 23, 2016	P.1	Add a test date
1	11242579M-E-R1	June 23, 2016	P.9	Change of the specifications
1	11242579M-E-R1	June 23, 2016	P.44	Additional test
2	11242579M-E-R2	June 28, 2016	P.1	Add a test date
2	11242579M-E-R2	June 28, 2016	P.9	Modification of the specifications
2	11242579M-E-R2	June 28, 2016	P.10	Add a description of supported equipment
2	11242579M-E-R2	June 28, 2016	P.14	Add a description of temperature test
2	11242579M-E-R2	June 28, 2016	P.43	Additional test

UL Japan, Inc.
Kashima EMC Lab.
1614, Mushihata, Katori-shi, Chiba-ken, 289-0341 Japan
Telephone : +81-478-88-6500
Facsimile: +81-478-82-3373

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SECTION 1: Customer information

Company Name	:	CASIO COMPUTER CO., LTD.
Address	:	2951-5, Ishikawa-Machi, Hachioji-shi Tokyo 192-8556, Japan
Telephone Number	:	+81-42-639-5188
Facsimile Number	:	+81-42-639-5046
Contact Person	:	KATSUMASA MOTOKI

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

2.1 Identification of E.U.T.

Type of Equipment	:	Handheld Terminal
Model No.	:	IT-G500-C21E-US
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	Li-ion battery DC3.7V 1850mAh/6.9Wh, M/N:HA-D20BAT-A
Option Battery	:	Li-ion battery DC3.7V 3700mAh/14Wh, M/N:HA-D21LBAT-A
Receipt Date of Sample	:	April 18, 2016
Country of Mass-production	:	Japan
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: IT-G500-C21E-US (referred to as the EUT in this report) is a Handheld Terminal.

General Specification

Clock frequency(ies) in the system	CPU: 1.5 GHz
Power Supply (inner)	DC 3.3 V / 1.8 V

Radio Specification

WLAN (IEEE802.11b/g/a/n-20)

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz, 5180-5825MHz
Type of Modulation	DSSS, OFDM
Antenna type	Inverted F antenna (IEEE802.11b/g/n) Dipole antenna (IEEE802.11a/n)
Antenna Gain	0.79dBi (2412-2462MHz) 1.05dBi (5180-5825MHz)

BT

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Antenna type	Inverted F antenna
Antenna Gain	0.79dBi

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna type	Loop antenna

* Refer to the test reports: 11242579M-A for 2.4 GHz band (Wireless LAN part).
* Refer to the test reports: 11242579M-B for 2.4 GHz band (Bluetooth part).
* Refer to the test reports: 11242579M-C and 11242579M-D for 5 GHz band.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C. FCC part 15 final revised on April 6, 2016.
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.225 : Operation within the band 13.110-14.010MHz

* The revision on April 6, 2016, does not affect the test specification applied to the EUT.
* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.10:2013 6 Standard test methods	Section 15.207	[QP] 11.3 dB, 13.56000 MHz,N [AV] 10.4 dB, 0.50000 MHz,N	Complied	-
	<IC>RSS-Gen 8.8	<IC>RSS-Gen 8.8			
Electric Field Strength of Fundamental Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.225(a)	60.8 dB, 13.56000 MHz, QP, 0 deg.	Complied	Radiated
	<IC> RSS-Gen 6.4, 6.12	<IC>RSS-210 A2.6			
Spectrum Mask	ANSI C63.10:2013 6 Standard test methods	Section 15.225(b)(c)	32.3 dB, 13.03056 MHz, QP, 0 deg.	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC> RSS-210 A2.6			
20dB Bandwidth	ANSI C63.10:2013 6 Standard test methods	Section15.215(c)	See data	Complied	Radiated
	<IC> -	<IC> -			
Electric Field Strength of Spurious Emission	ANSI C63.10:2013 6 Standard test methods	Section 15.209, Section 15.225 (d)	4.5 dB 536.383 MHz, Horizontal, QP	Complied	Radiated
	<IC>RSS-Gen 6.4, 6.13	<IC>RSS-210 A2.6			
Frequency Tolerance	ANSI C63.10:2013 6 Standard test methods	Section 15.225(e)	See data	Complied	Radiated
	<IC>RSS-Gen 6.11, 8.11	<IC> RSS-210 A2.6			
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

FCC Part 15.31 (e)
This EUT provides stable voltage (DC 1.8 V) constantly to RF Part regardless of input voltage. Therefore, this 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

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99 % Occupied Band Width	RSS-Gen 6.6	-	Radiated	N/A	N/A	N/A

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 Items	Frequency range	Uncertainty
Conducted emission (AC Mains) AMN	0.15 MHz-30 MHz	2.8 dB
Radiated emission (Measurement distance: 3 m)	0.009 MHz-30 MHz	2.7 dB
	30 MHz-1000 MHz	6.3 dB

Conducted emission test

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

Radiated emission test

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

Frequency tolerance

Frequency Measurement uncertainty for this test was: (±) 5.3 x 10^-6

3.5 Test Location

UL Japan, Inc.
Kashima EMC Lab.
1614 Mushihata, Katori-shi, Chiba-ken, 289-0341 JAPAN
Telephone number : +81 478 88 6500
Facsimile number : +81 478 82 3373
A2LA Accreditation No. : 1266-01

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane/horizontal conducting plane (m)	Maximum measurement distance
No.1 Open site	IC 4659A-1	6.0 x 5.5 x 2.5	20 x 40	10 m
No.2 Open site	IC 4659A-2	4.4 x 4.4 x 2.15	18 x 20	10 m
No.5 Open site	IC 4659A-5	8.6 x 7.1 x 2.4	18 x 23	10 m
No.1 Shielded room	IC 4659A-1	5.4 x 4.5 x 2.3	-	-
No.2 Shielded room	IC 4659A-2	3.6 x 2.7 x 2.3	-	-
No.3 Shielded room	-	5.4 x 3.6 x 2.3	-	-
No.4 Shielded Room	-	6.1 x 6.1 x 3.1	-	-
No.5 Shielded Room	IC 4659A-5	4.2 x 3.1 x 2.5	-	-
No.3 Fully Anechoic Chamber	-	7.0 x 3.5 x 3.5	-	-
No.6 Semi-anechoic Chamber	IC 4659A-6	8.5 x 5.5 x 5.2	-	3 m
No.10 Semi-anechoic Chamber	IC 4659A-10	18.4 x 9.9 x 7.7	-	10 m
No.11 Semi-anechoic Chamber	IC 4659A-7	9.0 x 6.5 x 5.2	-	3 m
No.1 Measurement room	-	5.0 x 3.7 x 2.6	-	-
No.2 Measurement room	-	4.3 x 4.4 x 2.7	-	-
No.3 Measurement room	-	4.5 x 5.3 x 2.7	-	-

3.6 Test set up, Test data, and Test instruments

Refer to APPENDIX.

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

4.1 Operating Modes

The mode is used :

Mode	Remarks*
Transmitting (Tx) -TypeA -TypeB -FeliCa (212kbps) -FeliCa (424kbps) -ISO15693	Modulated on (Mod on)
*Power of the EUT was set by the software as follows; Software: NFCTest V1.13u *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product	

Test Item	Operating mode*
Conducted emission	Tx Mod on, with cradle, with Tag
Electric Field Strength of Fundamental Emission	Tx Mod on, without cradle, without Tag
Spectrum Mask	Tx Mod on, without cradle, without Tag
20 dB Bandwidth 99 % OccupiedBandwidth	Tx Mod on, without cradle, with Tag / without Tag
Electric Field Strength of Spurious Emission	Tx Mod on, without cradle, without Tag
Frequency Tolerance	Tx Mod off

* After the comparison of the test data between with Tag and without Tag, also between with Cradle and without Cradle, The tests were performed with the worst case.

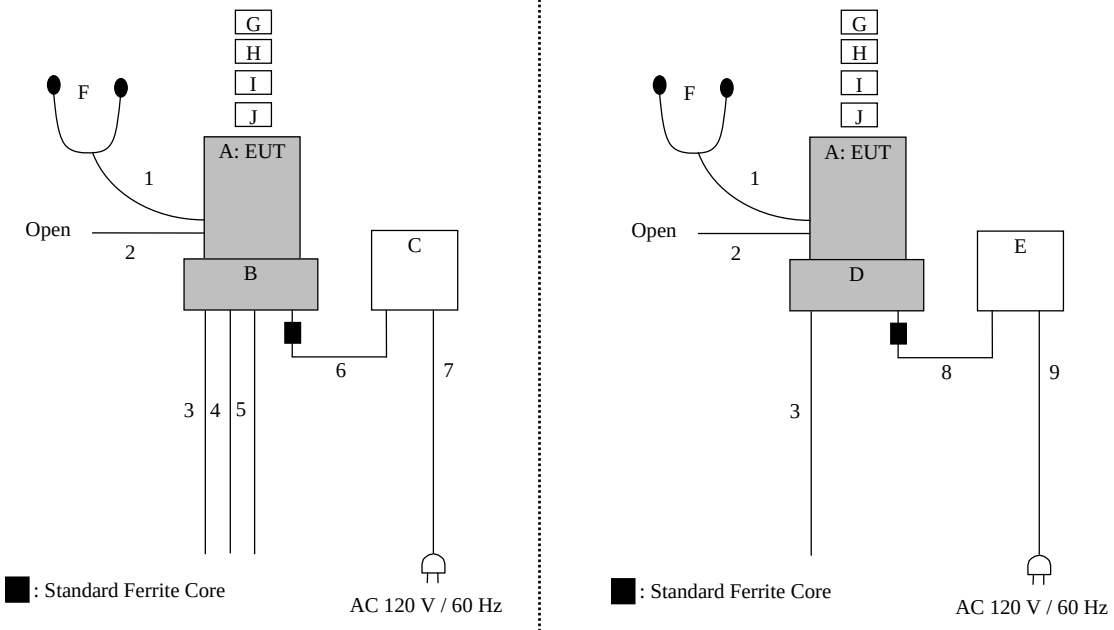
Justification: The system was configured in typical fashion (as a user would normally use it) for testing.

Frequency Tolerance:

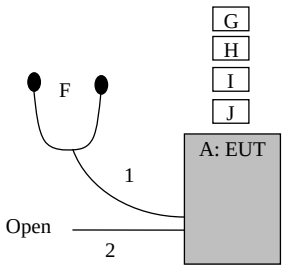
Temperature : -30 deg. C to +50 deg. C Step 10 deg. C
Voltage : Normal Voltage 5V
(The specific DC adopter supplies DC 5 V power to a Handheld Terminal)
Maximum Voltage DC 5.75 V, Minimum Voltage DC 4.25 V (DC 5 V ±15 %)
Normal Voltage 3.7 V (Power Supply Battery Port)
Maximum Voltage DC 4.2 V*, Minimum Voltage DC 3.7 V*
*Specifications of the manufacturer

4.2 Configuration and peripherals

For Conduction



For Radiation



* 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	Handheld Terminal	IT-G500-C21E-US	024SE LG6100692IAAC1	CASIO COMPUTER CO., LTD.	EUT
B	Cradle	HA-P62IO	244AA JX4B00502 GAAA1	CASIO COMPUTER CO., LTD.	EUT
C	AC Adapter	AD-S42120C	0915C	CASIO COMPUTER CO., LTD.	-
D	Cradle	HA-P60IO	241AA JW4B00501 GAAA1	CASIO COMPUTER CO., LTD.	EUT
E	AC Adapter	AD-S15050B	0711C	CASIO COMPUTER CO., LTD.	-
F	Ear phone	-	-	-	-
G	TypeA Card	SLE 66R01P	No.2	infineon	-
H	TypeB Card	-	-	-	-
I	Type FeliCa	RC-S886	No.2	-	-
J	ISO15693	-	No.2	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Ear phone	1.2	Unshielded	Unshielded	-
2	USB	1.8	Shielded	Shielded	-
3	USB	1.8	Shielded	Shielded	-
4	USB	2.0	Shielded	Shielded	-
5	LAN	1.0	Unshielded	Unshielded	-
6	DC	1.5	Unshielded	Unshielded	-
7	AC	2.0	Unshielded	Unshielded	-
8	DC	1.5	Unshielded	Unshielded	-
9	AC	2.0	Unshielded	Unshielded	-

SECTION 5: Conducted emission

Test Procedure and conditions

EUT was placed on a wooden table of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	**: QP and CISPR AV**
Measurement range	**: 0.15 MHz - 30 MHz**
Test data	**: APPENDIX**
Test result	**: Pass**

SECTION 6: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

Frequency: From 9 kHz to 30 MHz
The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical polarization (antenna angle: 0 deg., 45 deg., 90 deg., and 135 deg.) and horizontal polarization.
*Refer to Figure 1 about Direction of the Loop Antenna.

Frequency: From 30 MHz to 1 GHz
The measuring antenna height 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.

The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	Below 30 MHz	30 MHz to 1 GHz
Antenna Type	Loop	Hybrid

Frequency	From 9 kHz to 90 kHz and From 110 kHz to 150 kHz	From 90 kHz to 110 kHz	From 150 kHz to 490 kHz	From 490 kHz to 30 MHz	From 30 MHz to 1 GHz
Instrument used	Test Receiver				
Detector	PK / AV	QP	PK / AV	QP	QP
IF Bandwidth	200 Hz	200 Hz	9 kHz	9 kHz	120 kHz
Test Distance	3 m *1)	3 m *1)	3 m *1)	3 m *2)	3 m

*1) Distance Factor: 40 x log (3 m / 300 m) = -80 dB
*2) Distance Factor: 40 x log (3 m / 30 m) = -40 dB

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

These tests were performed in semi anechoic chamber. Therefore the measured level of emissions may be higher than if measurements were made without a ground plane.
However test results were confirmed to pass against standard limit.

- The carrier level and 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.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range : **9 kHz - 1 GHz**
Test data : **APPENDIX 1**
Test result : **Pass**

SECTION 7: Other test

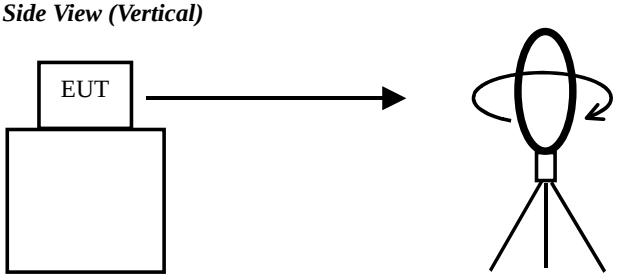
Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20 dB Bandwidth	50 kHz	1 kHz	3 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak *1)	Max Hold *2)	Spectrum Analyzer
Frequency Tolerance*3)	-	-	-	-	-	-	Frequency counter

*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100 %.
*2) The measurement was performed with Max Hold since the duty cycle was not 100 %.
*3) The temperature test was started after the temperature stabilization time of 30 minutes.
The test was begun from 50 deg.C and the temperature was lowered each 10 deg.C.

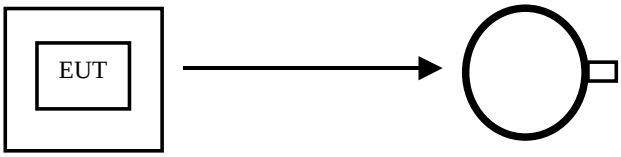
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

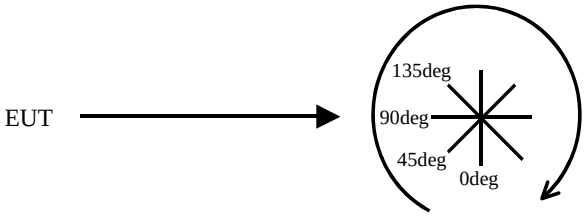


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



Front side: 0 deg.
Forward direction: clockwise

APPENDIX 1: Test data

Conducted emission

(Type A, with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

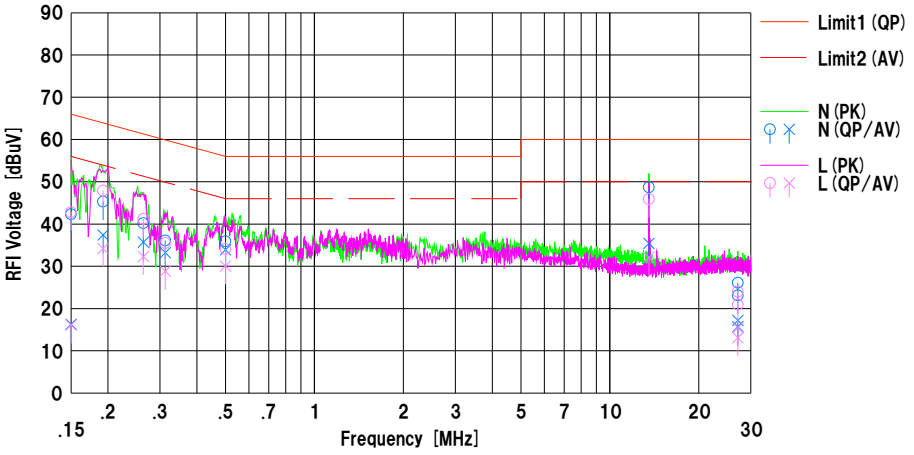
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (ISO14443 TypeA), With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	32.6	6.6	9.7	42.3	16.3	66.0	56.0	23.7	39.7	N	
2	0.19255	35.6	27.7	9.7	45.3	37.4	63.9	53.9	18.6	16.5	N	
3	0.26360	30.5	26.0	9.7	40.2	35.7	61.3	51.3	21.1	15.6	N	
4	0.31280	26.4	23.5	9.7	36.1	33.2	59.9	49.9	23.8	16.7	N	
5	0.50000	26.2	24.2	9.7	35.9	33.9	56.0	46.0	20.1	12.1	N	
6	13.56000	38.4	25.1	10.3	48.7	35.4	60.0	50.0	11.3	14.6	N	
7	27.12000	15.6	6.7	10.5	26.1	17.2	60.0	50.0	33.9	32.8	N	
8	27.12000	12.6	5.2	10.5	23.1	15.7	60.0	50.0	36.9	34.3	N	without tag
9	0.15000	33.1	6.4	9.7	42.8	16.1	66.0	56.0	23.2	39.9	L	
10	0.19255	38.2	24.5	9.7	47.9	34.2	63.9	53.9	16.0	19.7	L	
11	0.26360	31.5	22.6	9.7	41.2	32.3	61.3	51.3	20.1	19.0	L	
12	0.31280	25.8	19.1	9.7	35.5	28.8	59.9	49.9	24.4	21.1	L	
13	0.50000	24.4	20.4	9.7	34.1	30.1	56.0	46.0	21.9	15.9	L	
14	13.56000	35.6	21.8	10.3	45.9	32.1	60.0	50.0	14.1	17.9	L	
15	27.12000	13.5	5.0	10.5	24.0	15.5	60.0	50.0	36.0	34.5	L	
16	27.12000	10.4	2.6	10.5	20.9	13.1	60.0	50.0	39.1	36.9	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(Type B, with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

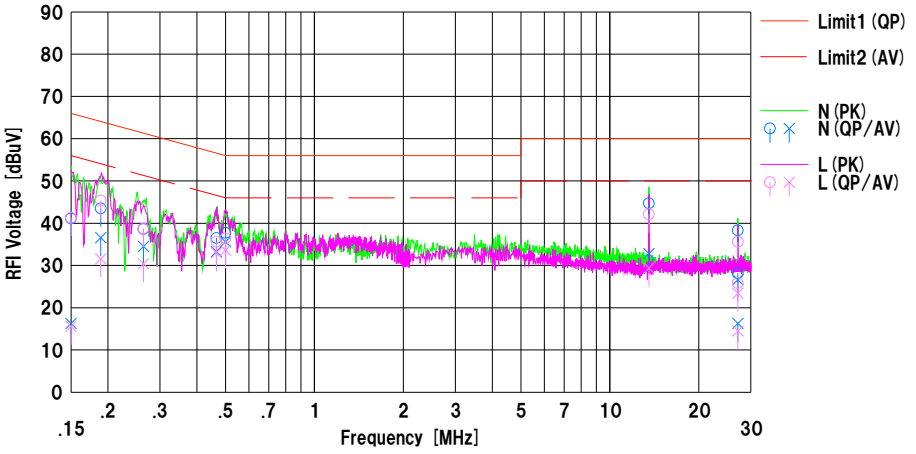
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (ISO14443 TypeB), With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	31.4	6.6	9.7	41.1	16.3	66.0	56.0	24.9	39.7	N	
2	0.18918	33.8	26.9	9.7	43.5	36.6	64.1	54.1	20.6	17.5	N	
3	0.26400	28.9	24.8	9.7	38.6	34.5	61.3	51.3	22.7	16.8	N	
4	0.46610	26.8	23.6	9.7	36.5	33.3	56.6	46.6	20.1	13.3	N	
5	0.50000	28.0	25.9	9.7	37.7	35.6	56.0	46.0	18.3	10.4	N	
6	13.56000	34.4	22.5	10.3	44.7	32.8	60.0	50.0	15.3	17.2	N	
7	27.12000	27.8	16.1	10.5	38.3	26.6	60.0	50.0	21.7	23.4	N	
8	27.12000	17.6	5.8	10.5	28.1	16.3	60.0	50.0	31.9	33.7	N	without tag
9	0.15000	31.6	5.9	9.7	41.3	15.6	66.0	56.0	24.7	40.4	L	
10	0.18918	35.7	21.9	9.7	45.4	31.6	64.1	54.1	18.7	22.5	L	
11	0.26400	29.0	20.7	9.7	38.7	30.4	61.3	51.3	22.6	20.9	L	
12	0.46610	25.9	23.3	9.7	35.6	33.0	56.6	46.6	21.0	13.6	L	
13	0.50000	26.7	23.9	9.7	36.4	33.6	56.0	46.0	19.6	12.4	L	
14	13.56000	31.8	19.1	10.3	42.1	29.4	60.0	50.0	17.9	20.6	L	
15	27.12000	25.1	12.9	10.5	35.6	23.4	60.0	50.0	24.4	26.6	L	
16	27.12000	15.3	4.0	10.5	25.8	14.5	60.0	50.0	34.2	35.5	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(FeliCa (212kbps), with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

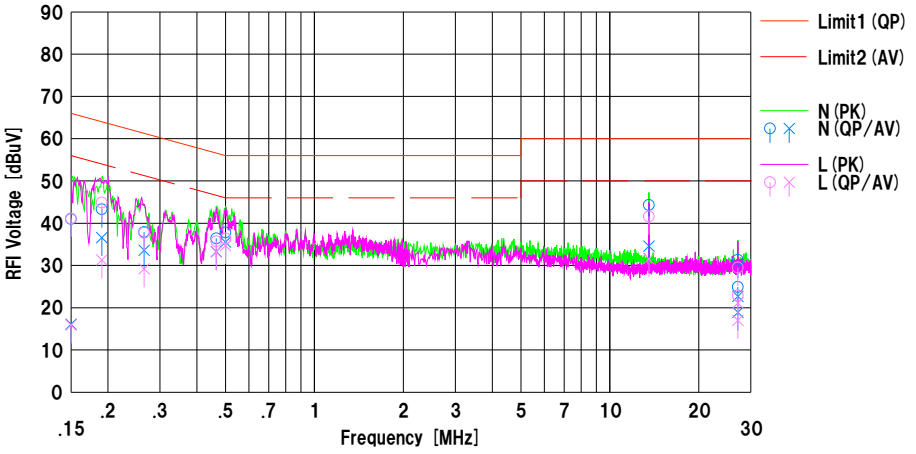
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (Felica 212kbps), With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	31.3	6.4	9.7	41.0	16.1	66.0	56.0	25.0	39.9	N	
2	0.19065	33.6	26.9	9.7	43.3	36.6	64.0	54.0	20.7	17.4	N	
3	0.26530	28.2	23.9	9.7	37.9	33.6	61.3	51.3	23.4	17.7	N	
4	0.46535	26.7	23.6	9.7	36.4	33.3	56.6	46.6	20.2	13.3	N	
5	0.50000	28.1	25.8	9.7	37.8	35.5	56.0	46.0	18.2	10.5	N	
6	13.56000	34.0	24.3	10.3	44.3	34.6	60.0	50.0	15.7	15.4	N	
7	27.12000	20.8	12.2	10.5	31.3	22.7	60.0	50.0	28.7	27.3	N	
8	27.12000	14.4	8.4	10.5	24.9	18.9	60.0	50.0	35.1	31.1	N	without tag
9	0.15000	31.4	6.2	9.7	41.1	15.9	66.0	56.0	24.9	40.1	L	
10	0.19065	35.2	21.6	9.7	44.9	31.3	64.0	54.0	19.1	22.7	L	
11	0.26530	28.0	19.5	9.7	37.7	29.2	61.3	51.3	23.6	22.1	L	
12	0.46535	26.0	23.5	9.7	35.7	33.2	56.6	46.6	20.9	13.4	L	
13	0.50000	26.7	25.0	9.7	36.4	34.7	56.0	46.0	19.6	11.3	L	
14	13.56000	31.3	21.3	10.3	41.6	31.6	60.0	50.0	18.4	18.4	L	
15	27.12000	19.0	10.6	10.5	29.5	21.1	60.0	50.0	30.5	28.9	L	
16	27.12000	12.4	6.5	10.5	22.9	17.0	60.0	50.0	37.1	33.0	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(FeliCa (424kbps), with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

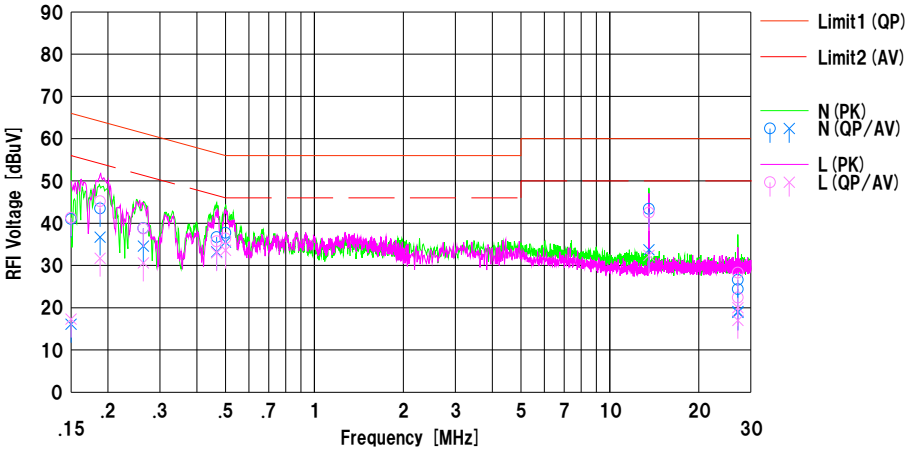
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (Felica 424kbps), With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	31.3	6.4	9.7	41.0	16.1	66.0	56.0	25.0	39.9	N	
2	0.18810	33.8	27.0	9.7	43.5	36.7	64.1	54.1	20.6	17.4	N	
3	0.26350	29.1	24.9	9.7	38.8	34.6	61.3	51.3	22.5	16.7	N	
4	0.46665	27.0	23.5	9.7	36.7	33.2	56.6	46.6	19.9	13.4	N	
5	0.50000	28.0	25.8	9.7	37.7	35.5	56.0	46.0	18.3	10.5	N	
6	13.56000	33.1	23.4	10.3	43.4	33.7	60.0	50.0	16.6	16.3	N	
7	27.12000	16.1	8.6	10.5	26.6	19.1	60.0	50.0	33.4	30.9	N	
8	27.12000	13.9	8.4	10.5	24.4	18.9	60.0	50.0	35.6	31.1	N	without tag
9	0.15000	31.6	7.6	9.7	41.3	17.3	66.0	56.0	24.7	38.7	L	
10	0.18810	35.5	22.0	9.7	45.2	31.7	64.1	54.1	18.9	22.4	L	
11	0.26350	29.0	20.9	9.7	38.7	30.6	61.3	51.3	22.6	20.7	L	
12	0.46665	26.0	23.3	9.7	35.7	33.0	56.6	46.6	20.9	13.6	L	
13	0.50000	26.7	23.9	9.7	36.4	33.6	56.0	46.0	19.6	12.4	L	
14	13.56000	32.2	22.1	10.3	42.5	32.4	60.0	50.0	17.5	17.6	L	
15	27.12000	17.8	9.5	10.5	28.3	20.0	60.0	50.0	31.7	30.0	L	
16	27.12000	11.9	6.5	10.5	22.4	17.0	60.0	50.0	37.6	33.0	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(ISO 15693, with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

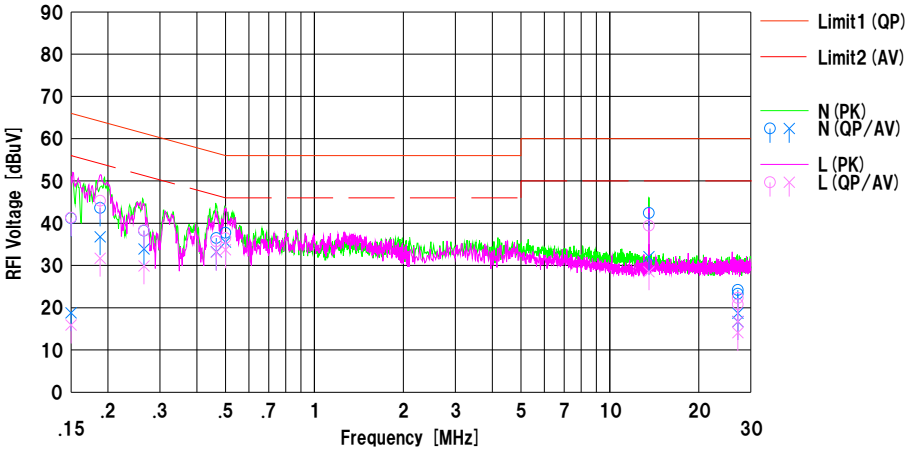
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (ISO15693), With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	31.5	9.1	9.7	41.2	18.8	66.0	56.0	24.8	37.2	N	
2	0.18820	33.9	27.1	9.7	43.6	36.8	64.1	54.1	20.5	17.3	N	
3	0.26485	28.5	24.2	9.7	38.2	33.9	61.3	51.3	23.1	17.4	N	
4	0.46570	26.8	23.5	9.7	36.5	33.2	56.6	46.6	20.1	13.4	N	
5	0.50000	28.0	25.8	9.7	37.7	35.5	56.0	46.0	18.3	10.5	N	
6	13.56000	32.1	21.8	10.3	42.4	32.1	60.0	50.0	17.6	17.9	N	
7	27.12000	12.8	6.2	10.5	23.3	16.7	60.0	50.0	36.7	33.3	N	
8	27.12000	13.7	8.2	10.5	24.2	18.7	60.0	50.0	35.8	31.3	N	without tag
9	0.15000	31.6	6.2	9.7	41.3	15.9	66.0	56.0	24.7	40.1	L	
10	0.18820	35.6	22.0	9.7	45.3	31.7	64.1	54.1	18.8	22.4	L	
11	0.26485	28.6	20.2	9.7	38.3	29.9	61.3	51.3	23.0	21.4	L	
12	0.46570	26.0	23.4	9.7	35.7	33.1	56.6	46.6	20.9	13.5	L	
13	0.50000	26.8	24.0	9.7	36.5	33.7	56.0	46.0	19.5	12.3	L	
14	13.56000	29.1	18.2	10.3	39.4	28.5	60.0	50.0	20.6	21.5	L	
15	27.12000	10.3	3.6	10.5	20.8	14.1	60.0	50.0	39.2	35.9	L	
16	27.12000	11.8	6.3	10.5	22.3	16.8	60.0	50.0	37.7	33.2	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(Antenna Termination, with Cradle: HA-P60IO)

DATA OF CONDUCTED EMISSION TEST

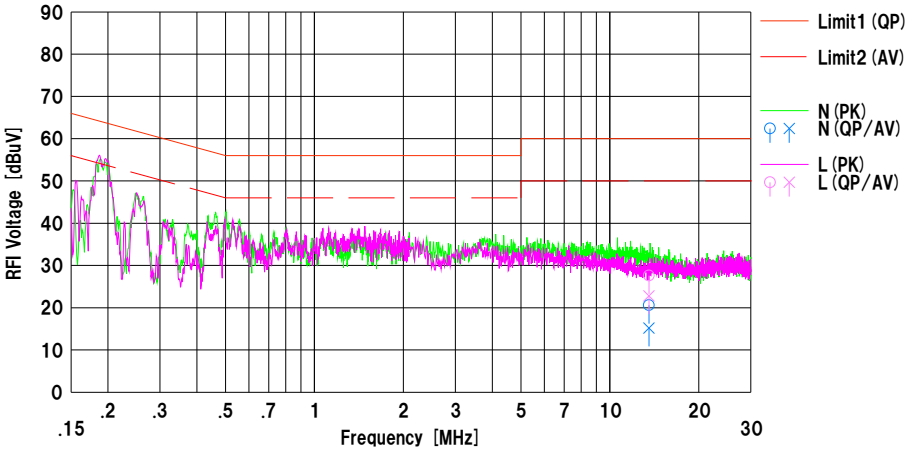
UL Japan, Inc. Kashima EMC Lab. No.2 Shield Room
Date : 2016/04/19

Mode : Tx 13.56MHz Read/Write
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 21deg.C / 38%RH

Remarks : Antenna Termination / With Cradle : HA-P60IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	13.56000	10.3	4.9	10.3	20.6	15.2	60.0	50.0	39.4	34.8	N	
2	13.56000	17.3	12.5	10.3	27.6	22.8	60.0	50.0	32.4	27.2	L	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(Type B, with Cradle: HA-P62IO)

DATA OF CONDUCTED EMISSION TEST

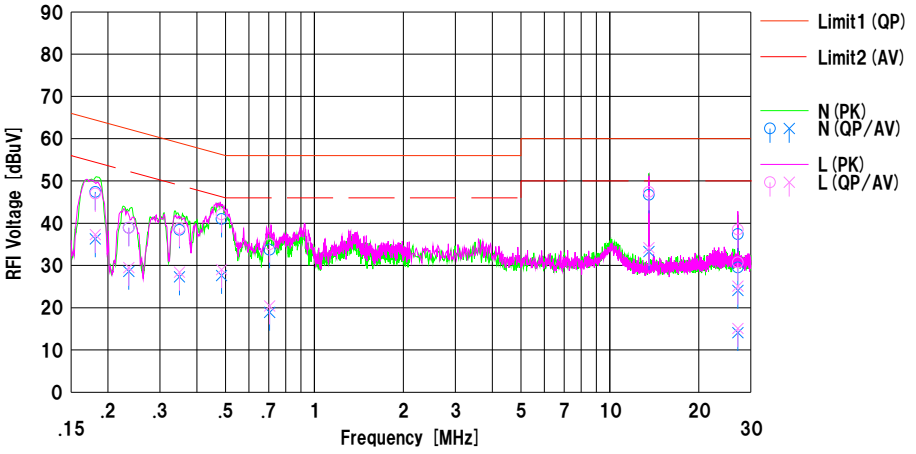
UL Japan, Inc. Kashima EMC Lab. No.2 Shielded Room
Date : 2016/05/26

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 22deg.C / 59%RH

Remarks : With Tag (ISO14443 TypeB), With Cradle : HA-P62IO

Limit1 : FCC 15C (15.207) ClassB QP
Limit2 : FCC 15C (15.207) ClassB AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.18130	37.7	26.6	9.7	47.4	36.3	64.4	54.4	17.0	18.1	N	
2	0.23540	29.2	18.9	9.7	38.9	28.6	62.3	52.3	23.4	23.7	N	
3	0.34930	28.7	17.6	9.7	38.4	27.3	59.0	49.0	20.6	21.7	N	
4	0.48485	31.3	17.9	9.7	41.0	27.6	56.3	46.3	15.3	18.7	N	
5	0.70540	24.0	9.2	9.7	33.7	18.9	56.0	46.0	22.3	27.1	N	
6	13.56000	36.4	23.0	10.3	46.7	33.3	60.0	50.0	13.3	16.7	N	
7	27.12000	26.9	13.6	10.5	37.4	24.1	60.0	50.0	22.6	25.9	N	
8	27.12000	19.0	3.6	10.5	29.5	14.1	60.0	50.0	30.5	35.9	N	without tag
9	0.18130	37.3	27.6	9.7	47.0	37.3	64.4	54.4	17.4	17.1	L	
10	0.23540	29.2	19.8	9.7	38.9	29.5	62.3	52.3	23.4	22.8	L	
11	0.34930	29.1	18.7	9.7	38.8	28.4	59.0	49.0	20.2	20.6	L	
12	0.48485	32.4	19.3	9.7	42.1	29.0	56.3	46.3	14.2	17.3	L	
13	0.70540	25.3	10.7	9.7	35.0	20.4	56.0	46.0	21.0	25.6	L	
14	13.56000	37.1	23.9	10.3	47.4	34.2	60.0	50.0	12.6	15.8	L	
15	27.12000	28.0	14.6	10.5	38.5	25.1	60.0	50.0	21.5	24.9	L	
16	27.12000	20.2	4.6	10.5	30.7	15.1	60.0	50.0	29.3	34.9	L	without tag

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Conducted emission

(Antenna Termination, with Cradle: HA-P62IO)

DATA OF CONDUCTED EMISSION TEST

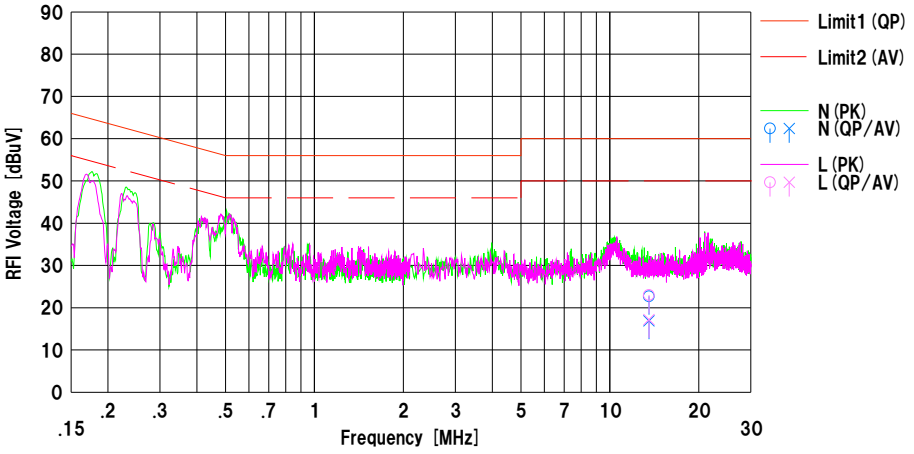
UL Japan, Inc. Kashima EMC Lab. No.2 Shield Room
Date : 2016/04/19

Mode : Tx 13.56MHz Read/Write
Order No. : 11242579M
Power : AC 120V / 60Hz
Temp./Humi. : 21deg.C / 38%RH

Remarks : Antenna Termination / With Cradle : HA-P62IO

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	13.56000	12.4	6.6	10.3	22.7	16.9	60.0	50.0	37.3	33.1	N	
2	13.56000	12.7	6.9	10.3	23.0	17.2	60.0	50.0	37.0	32.8	L	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable) [dB]
LISN:CLS-25

Fundamental emission and Spectrum Mask

(Type A)

DATA OF RADIATED EMISSION (below 30MHz) TEST

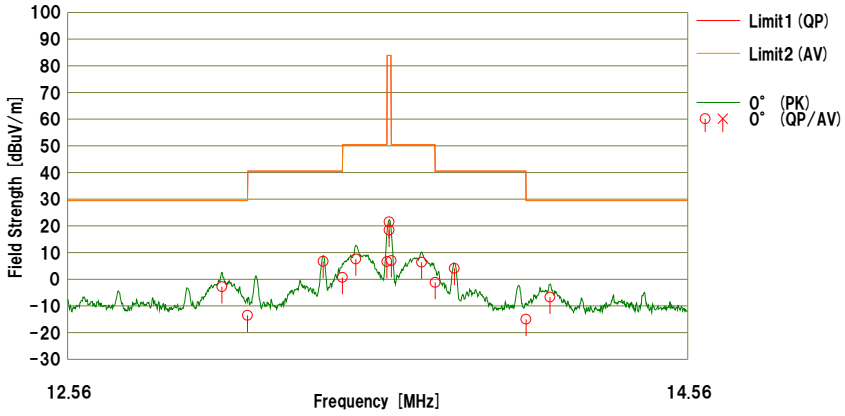
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO14443 Type A), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	13.03056	49.2	---	19.7	-39.4	32.3	-2.8	---	29.5	29.5	32.3	---	0°	0	
2	13.11000	38.5	---	19.7	-39.4	32.3	-13.5	---	29.5	29.5	43.0	---	0°	0	
3	13.34878	58.7	---	19.7	-39.4	32.3	6.7	---	40.5	40.5	33.8	---	0°	0	
4	13.41000	52.7	---	19.7	-39.4	32.3	0.7	---	40.5	40.5	39.8	---	0°	0	
5	13.45283	59.6	---	19.7	-39.4	32.3	7.6	---	50.4	50.4	42.8	---	0°	0	
6	13.55300	58.6	---	19.7	-39.4	32.3	6.6	---	50.4	50.4	43.8	---	0°	0	
7	13.56000	73.5	---	19.7	-39.4	32.3	21.5	---	83.9	83.9	62.4	---	0°	0	
8	13.56000	70.4	---	19.7	-39.4	32.3	18.4	---	83.9	83.9	65.5	---	0°	0	with tag
9	13.56700	59.0	---	19.7	-39.4	32.3	7.0	---	50.4	50.4	43.4	---	0°	0	
10	13.66542	58.4	---	19.7	-39.4	32.3	6.4	---	50.4	50.4	44.0	---	0°	0	
11	13.71000	50.8	---	19.7	-39.4	32.3	-1.2	---	40.5	40.5	41.7	---	0°	0	
12	13.77273	56.1	---	19.7	-39.4	32.3	4.1	---	40.5	40.5	36.4	---	0°	0	
13	14.01000	37.0	---	19.7	-39.4	32.3	-15.0	---	29.5	29.5	44.5	---	0°	0	
14	14.08985	45.3	---	19.7	-39.4	32.3	-6.7	---	29.5	29.5	36.2	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	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
0	13.56000	QP	73.5	19.7	0.6	32.3	-	61.5	-	-	Fundamental

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

Fundamental emission and Spectrum Mask

(Type B)

DATA OF RADIATED EMISSION (below 30MHz) TEST

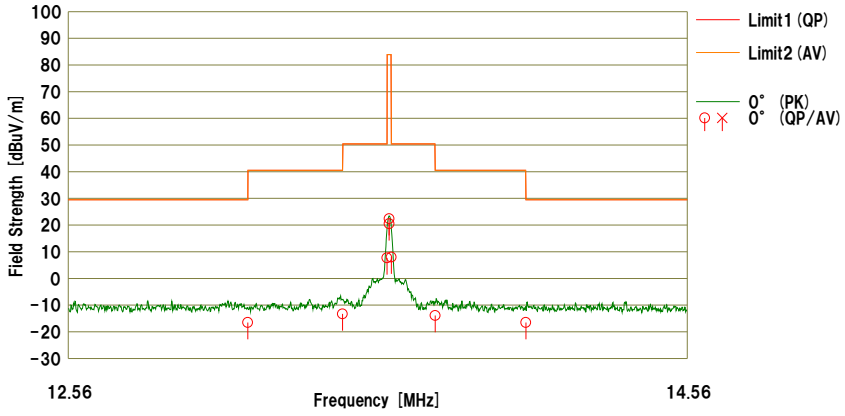
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO14443 Type B), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	13.11000	35.5	---	19.7	-39.4	32.3	-16.5	---	29.5	29.5	46.0	---	0"	0	
2	13.41000	38.7	---	19.7	-39.4	32.3	-13.3	---	40.5	40.5	53.8	---	0"	0	
3	13.55300	59.7	---	19.7	-39.4	32.3	7.7	---	50.4	50.4	42.7	---	0"	0	
4	13.56000	74.4	---	19.7	-39.4	32.3	22.4	---	83.9	83.9	61.5	---	0"	0	
5	13.56000	72.5	---	19.7	-39.4	32.3	20.5	---	83.9	83.9	63.4	---	0"	0	with tag
6	13.56700	60.0	---	19.7	-39.4	32.3	8.0	---	50.4	50.4	42.4	---	0"	0	
7	13.71000	38.1	---	19.7	-39.4	32.3	-13.9	---	40.5	40.5	54.4	---	0"	0	
8	14.01000	35.5	---	19.7	-39.4	32.3	-16.5	---	29.5	29.5	46.0	---	0"	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	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
0	13.56000	QP	74.4	19.7	0.6	32.3	-	62.4	-	-	Fundamental

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

Fundamental emission and Spectrum Mask

(Felica 212kbps)

DATA OF RADIATED EMISSION (below 30MHz) TEST

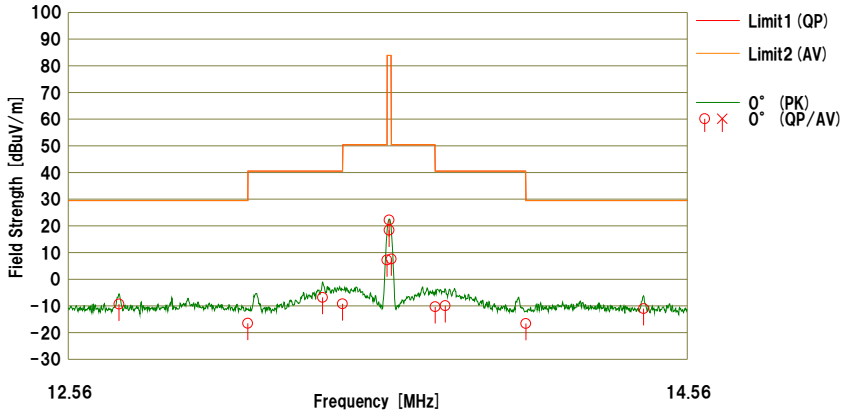
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (Felica 212kbps), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	12.71348	42.7	---	19.7	-39.4	32.3	-9.3	---	29.5	29.5	38.8	---	0°	0	
2	13.11000	35.5	---	19.7	-39.4	32.3	-16.5	---	29.5	29.5	46.0	---	0°	0	
3	13.34643	45.2	---	19.7	-39.4	32.3	-6.8	---	40.5	40.5	47.3	---	0°	0	
4	13.41000	42.8	---	19.7	-39.4	32.3	-9.2	---	40.5	40.5	49.7	---	0°	0	
5	13.55300	59.2	---	19.7	-39.4	32.3	7.2	---	50.4	50.4	43.2	---	0°	0	
6	13.56000	74.2	---	19.7	-39.4	32.3	22.2	---	83.9	83.9	61.7	---	0°	0	
7	13.56000	70.4	---	19.7	-39.4	32.3	18.4	---	83.9	83.9	65.5	---	0°	0	with tag
8	13.56700	59.6	---	19.7	-39.4	32.3	7.6	---	50.4	50.4	42.8	---	0°	0	
9	13.71000	41.7	---	19.7	-39.4	32.3	-10.3	---	40.5	40.5	50.8	---	0°	0	
10	13.74293	42.1	---	19.7	-39.4	32.3	-9.9	---	40.5	40.5	50.4	---	0°	0	
11	14.01000	35.4	---	19.7	-39.4	32.3	-16.6	---	29.5	29.5	46.1	---	0°	0	
12	14.40910	41.0	---	19.7	-39.4	32.3	-11.0	---	29.5	29.5	40.5	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	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
0	13.56000	QP	74.2	19.7	0.6	32.3	-	62.2	-	-	Fundamental

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

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Fundamental emission and Spectrum Mask

(Felica 424kbps)

DATA OF RADIATED EMISSION (below 30MHz) TEST

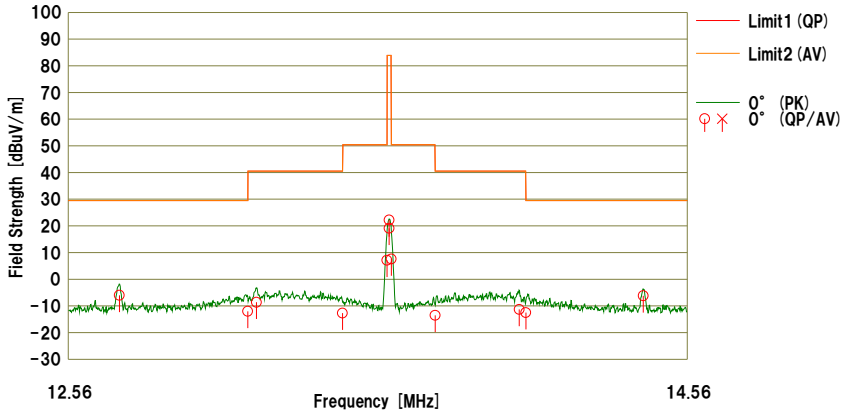
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (Felica 424kbps), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	12.71476	46.0	---	19.7	-39.4	32.3	-6.0	---	29.5	29.5	35.5	---	0°	0	
2	13.11000	40.0	---	19.7	-39.4	32.3	-12.0	---	29.5	29.5	41.5	---	0°	0	
3	13.13754	43.4	---	19.7	-39.4	32.3	-8.6	---	40.5	40.5	49.1	---	0°	0	
4	13.41000	39.3	---	19.7	-39.4	32.3	-12.7	---	40.5	40.5	53.2	---	0°	0	
5	13.55300	59.1	---	19.7	-39.4	32.3	7.1	---	50.4	50.4	43.3	---	0°	0	
6	13.56000	74.2	---	19.7	-39.4	32.3	22.2	---	83.9	83.9	61.7	---	0°	0	
7	13.56000	71.1	---	19.7	-39.4	32.3	19.1	---	83.9	83.9	64.8	---	0°	0	with tag
8	13.56700	59.6	---	19.7	-39.4	32.3	7.6	---	50.4	50.4	42.8	---	0°	0	
9	13.71000	38.5	---	19.7	-39.4	32.3	-13.5	---	40.5	40.5	54.0	---	0°	0	
10	13.98775	40.7	---	19.7	-39.4	32.3	-11.3	---	40.5	40.5	51.8	---	0°	0	
11	14.01000	39.5	---	19.7	-39.4	32.3	-12.5	---	29.5	29.5	42.0	---	0°	0	
12	14.40810	45.8	---	19.7	-39.4	32.3	-6.2	---	29.5	29.5	35.7	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	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
0	13.56000	QP	74.2	19.7	0.6	32.3	-	62.2	-	-	Fundamental

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

Fundamental emission and Spectrum Mask

(ISO 15693)

DATA OF RADIATED EMISSION (below 30MHz) TEST

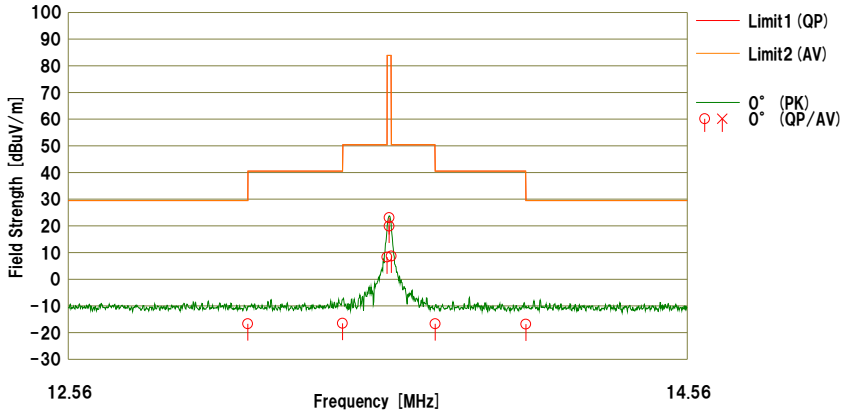
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO15693), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	13.11000	35.3	---	19.7	-39.4	32.3	-16.7	---	29.5	29.5	46.2	---	0°	0	
2	13.41000	35.5	---	19.7	-39.4	32.3	-16.5	---	40.5	40.5	57.0	---	0°	0	
3	13.55300	60.3	---	19.7	-39.4	32.3	8.3	---	50.4	50.4	42.1	---	0°	0	
4	13.56000	75.1	---	19.7	-39.4	32.3	23.1	---	83.9	83.9	60.8	---	0°	0	
5	13.56000	71.9	---	19.7	-39.4	32.3	19.9	---	83.9	83.9	64.0	---	0°	0	with tag
6	13.56700	60.7	---	19.7	-39.4	32.3	8.7	---	50.4	50.4	41.7	---	0°	0	
7	13.71000	35.3	---	19.7	-39.4	32.3	-16.7	---	40.5	40.5	57.2	---	0°	0	
8	14.01000	35.2	---	19.7	-39.4	32.3	-16.8	---	29.5	29.5	46.3	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Result of the fundamental emission at 3 m without Distance factor

QP

Ant Deg [deg]	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
0	13.56000	QP	75.1	19.7	0.6	32.3	-	63.1	-	-	Fundamental

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

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Spurious emission (Below 30MHz)

(Type A)

DATA OF RADIATED EMISSION (below 30MHz) TEST

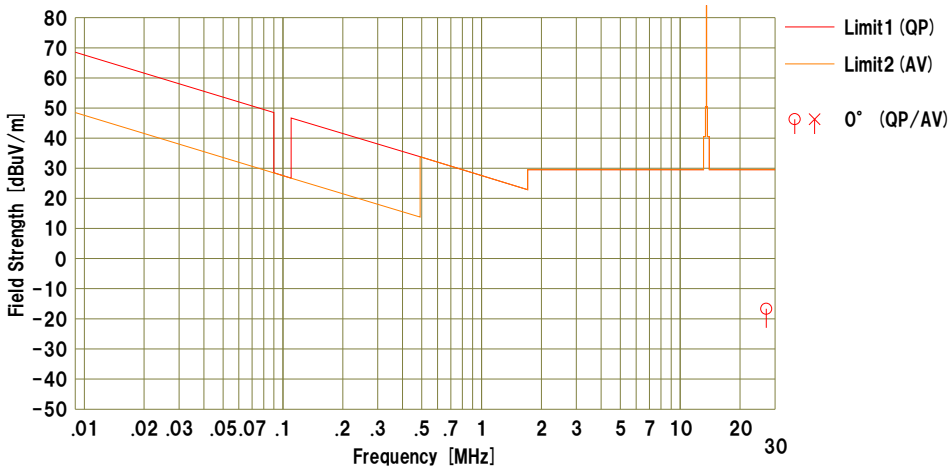
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO14443 Type A), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	34.3	---	20.5	-39.2	32.3	-16.7	---	29.5	29.5	46.2	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Spurious emission (Below 30MHz)

(Type B)

DATA OF RADIATED EMISSION (below 30MHz) TEST

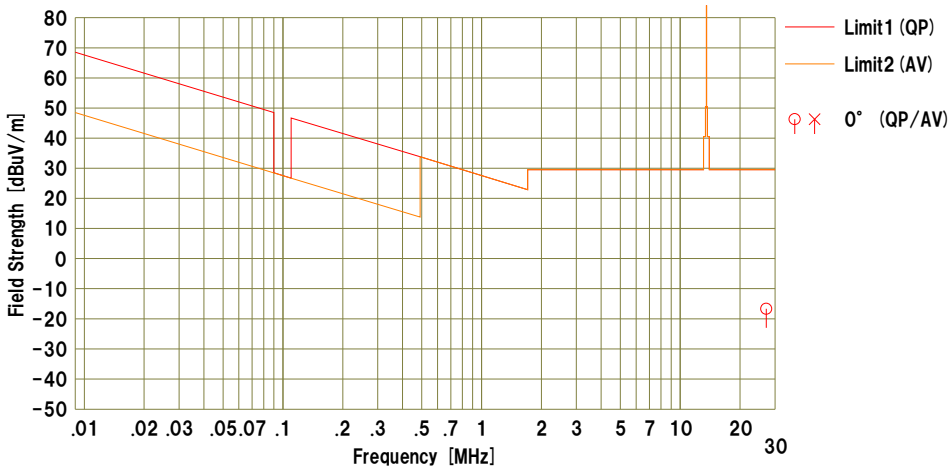
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO14443 Type B), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	34.3	---	20.5	-39.2	32.3	-16.7	---	29.5	29.5	46.2	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Spurious emission (Below 30MHz)

(Felica 212kbps)

DATA OF RADIATED EMISSION (below 30MHz) TEST

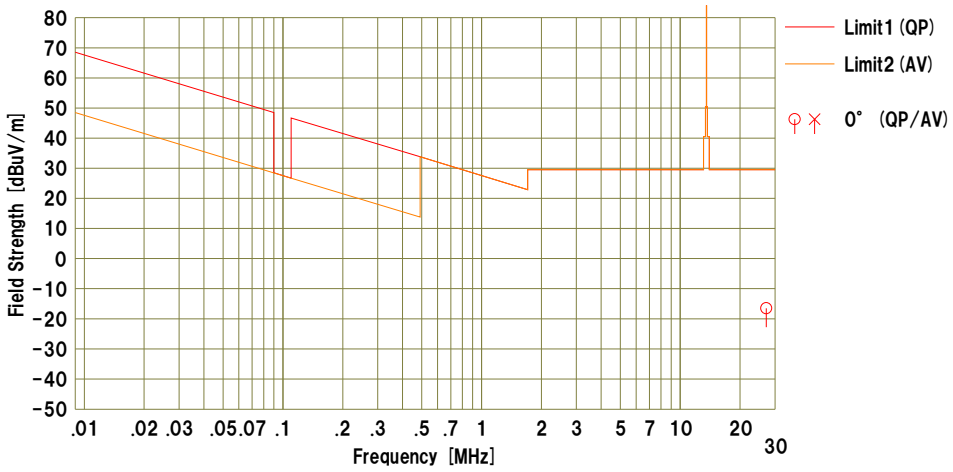
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (Felica 212kbps), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	34.5	---	20.5	-39.2	32.3	-16.5	---	29.5	29.5	46.0	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Spurious emission (Below 30MHz)

(Felica 424kbps)

DATA OF RADIATED EMISSION (below 30MHz) TEST

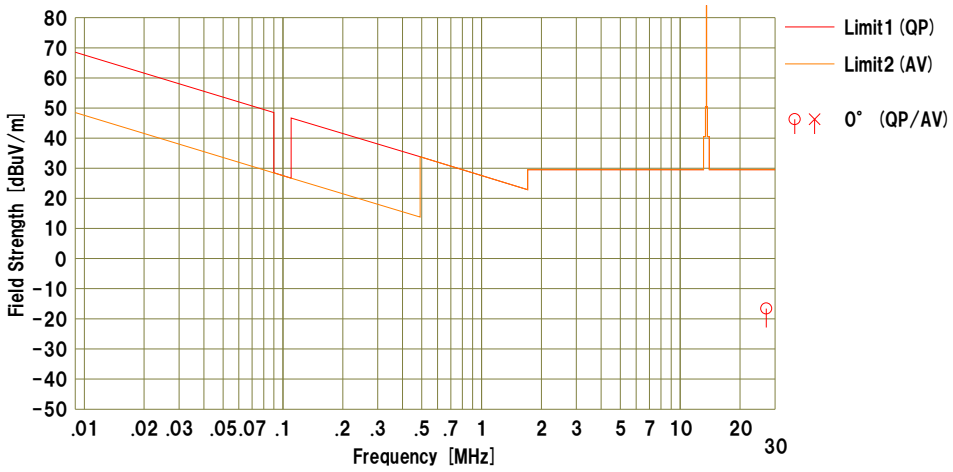
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (Felica 424kbps), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	34.4	---	20.5	-39.2	32.3	-16.6	---	29.5	29.5	46.1	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Spurious emission (Below 30MHz)

(ISO 15693)

DATA OF RADIATED EMISSION (below 30MHz) TEST

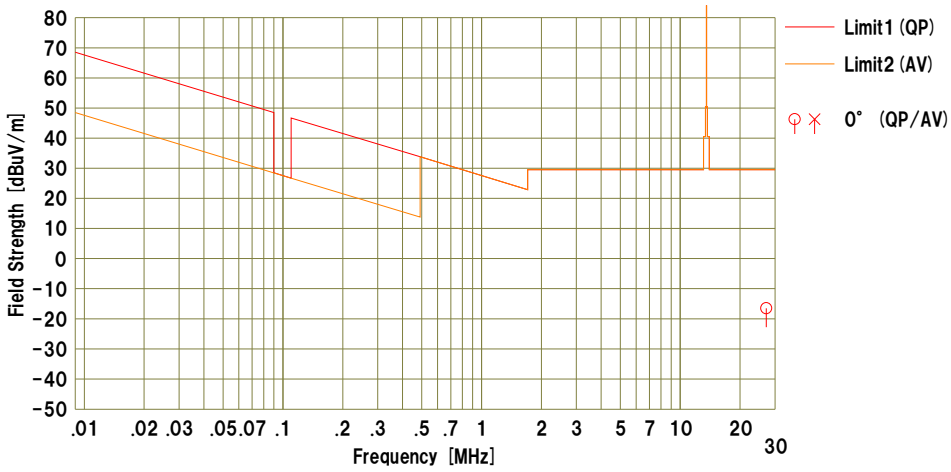
UL Japan, Inc. Kashima EMC Lab. No.11 Semi-Anechoic Chamber
Date : 2016/05/21

Mode : Tx 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without Cradle, without Tag (ISO15693), X-axis

Limit1 : FCC15_225_PKQP, 9-90kHz:PK, 110-490kHz:PK
Limit2 : FCC15_225_AVQP, 9-90kHz:AV, 110-490kHz:AV

Tested by : Kazuhiro Ando



No.	Freq.	Reading <QP>	Reading <AV>	Ant.Fac	Loss	Gain	Result <QP>	Result <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Antenna	Table	Comment
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]		[deg]	
1	27.12000	34.5	---	20.5	-39.2	32.3	-16.5	---	29.5	29.5	46.0	---	0°	0	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] +D.Fac [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

Spurious emission (Above 30MHz)

(Type A)

DATA OF RADIATED EMISSION TEST

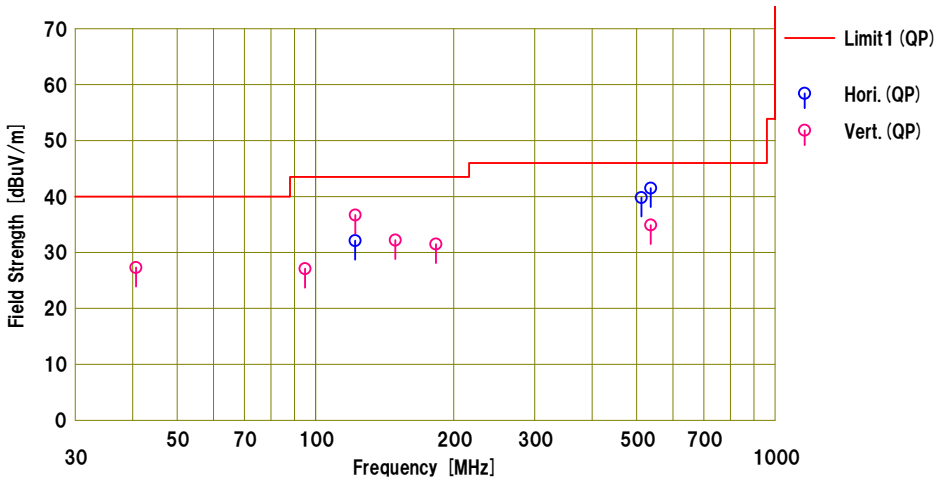
UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber
Date : 2016/05/18

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 23deg.C / 50%RH

Remarks : without cradre, with Tag (TypeA)
Hor:X, Ver:X

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Tested by : Kazuhiro Ando



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	122.029	41.5	11.7	5.5	26.6	32.1	43.5	11.4	Hori.	265	50	HB	
2	511.993	40.2	18.1	8.9	27.4	39.8	46.0	6.2	Hori.	185	85	HB	
3	536.383	41.7	18.3	9.0	27.5	41.5	46.0	4.5	Hori.	167	82	HB	
4	40.682	36.3	13.4	4.4	26.8	27.3	40.0	12.7	Vert.	100	81	HB	
5	94.922	40.4	8.2	5.2	26.7	27.1	43.5	16.4	Vert.	100	281	HB	
6	122.041	46.1	11.7	5.5	26.6	36.7	43.5	6.8	Vert.	100	317	HB	
7	149.167	39.5	13.4	5.8	26.5	32.2	43.5	11.3	Vert.	100	280	HB	
8	182.869	40.0	11.6	6.2	26.3	31.5	43.5	12.0	Vert.	100	180	HB	
9	536.385	35.1	18.3	9.0	27.5	34.9	46.0	11.1	Vert.	190	210	HB	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=HB:Hybrid Antenna

Spurious emission (Above 30MHz)

(Type B)

DATA OF RADIATED EMISSION TEST

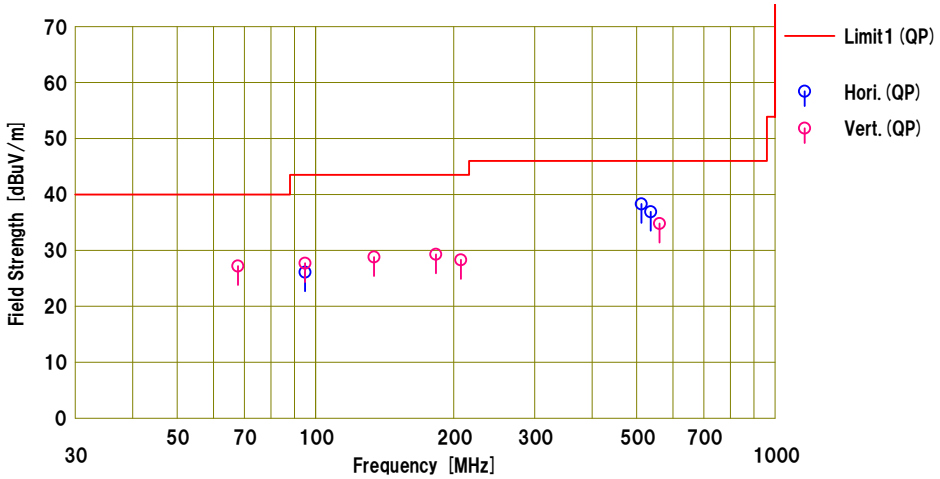
UL Japan, Inc. Kashima EMC Lab. No.6 Semi-Anechoic Chamber
Date : 2016/05/22

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without cradre, with Tag (TypeB)
Hor:X, Ver:X

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Tested by : Kazuhiro Ando



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	94.920	45.5	8.4	4.6	32.4	26.1	43.5	17.4	Hori.	190	0	HB	
2	512.000	45.6	18.1	6.9	32.3	38.3	46.0	7.7	Hori.	210	100	HB	
3	536.382	43.5	18.6	7.1	32.3	36.9	46.0	9.1	Hori.	210	100	HB	
4	67.800	43.5	11.9	4.3	32.5	27.2	40.0	12.8	Vert.	100	275	HB	
5	94.920	47.1	8.4	4.6	32.4	27.7	43.5	15.8	Vert.	100	275	HB	
6	134.071	43.8	12.5	4.9	32.4	28.8	43.5	14.7	Vert.	100	95	HB	
7	182.832	45.1	11.3	5.3	32.4	29.3	43.5	14.2	Vert.	100	180	HB	
8	207.214	45.2	10.1	5.4	32.4	28.3	43.5	15.2	Vert.	100	200	HB	
9	560.761	40.8	19.1	7.2	32.3	34.8	46.0	11.2	Vert.	220	150	HB	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=HB:Hybrid Antenna

Spurious emission (Above 30MHz)

(Felica 212kbps)

DATA OF RADIATED EMISSION TEST

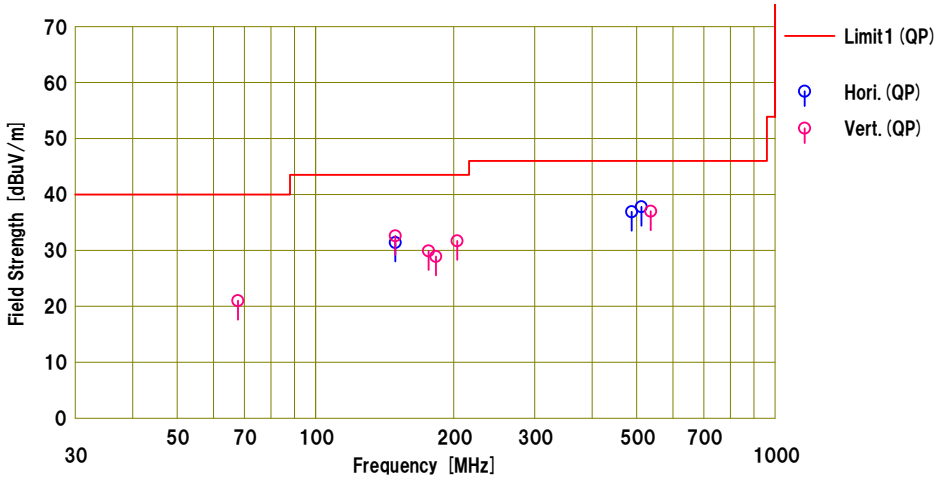
UL Japan, Inc. Kashima EMC Lab. No.6 Semi-Anechoic Chamber
Date : 2016/05/22

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without cradre, with Tag (Felica 212kbps)
Hor:X, Ver:X

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Tested by : Kazuhiro Ando



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	149.159	45.4	13.4	5.0	32.4	31.4	43.5	12.1	Hori.	220	60	HB	]
2	487.619	44.9	17.5	6.8	32.3	36.9	46.0	9.1	Hori.	210	90	HB	
3	512.000	45.1	18.1	6.9	32.3	37.8	46.0	8.2	Hori.	210	90	HB	
4	67.800	37.3	11.9	4.3	32.5	21.0	40.0	19.0	Vert.	100	0	HB	
5	149.159	46.6	13.4	5.0	32.4	32.6	43.5	10.9	Vert.	100	270	HB	
6	176.280	45.1	12.0	5.2	32.4	29.9	43.5	13.6	Vert.	100	270	HB	
7	182.832	44.7	11.3	5.3	32.4	28.9	43.5	14.6	Vert.	100	180	HB	
8	203.400	48.7	10.0	5.4	32.4	31.7	43.5	11.8	Vert.	100	220	HB	
9	536.382	43.6	18.6	7.1	32.3	37.0	46.0	9.0	Vert.	220	130	HB	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=HB:Hybrid Antenna

Spurious emission (Above 30MHz)

(Felica 424kbps)

DATA OF RADIATED EMISSION TEST

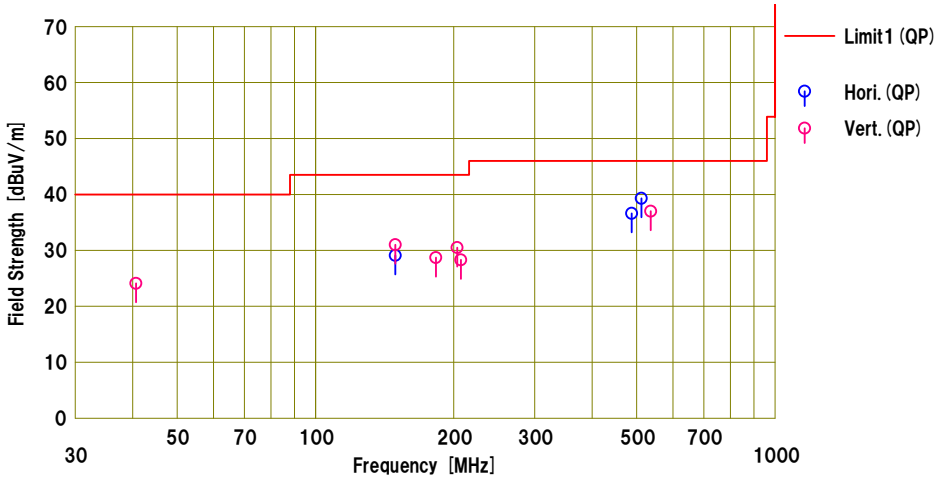
UL Japan, Inc. Kashima EMC Lab. No.6 Semi-Anechoic Chamber
Date : 2016/05/22

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 22deg.C / 45%RH

Remarks : without cradre, with Tag (Felica 424kbps)
Hor:X, Ver:X

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Tested by : Kazuhiro Ando



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	149.159	43.1	13.4	5.0	32.4	29.1	43.5	14.4	Hori.	220	60	HB	]
2	487.619	44.6	17.5	6.8	32.3	36.6	46.0	9.4	Hori.	200	90	HB	
3	512.000	46.6	18.1	6.9	32.3	39.3	46.0	6.7	Hori.	190	90	HB	
4	40.680	39.3	13.3	4.0	32.5	24.1	40.0	15.9	Vert.	100	90	HB	
5	149.159	45.0	13.4	5.0	32.4	31.0	43.5	12.5	Vert.	100	295	HB	
6	182.832	44.5	11.3	5.3	32.4	28.7	43.5	14.8	Vert.	100	180	HB	
7	203.400	47.5	10.0	5.4	32.4	30.5	43.5	13.0	Vert.	100	220	HB	
8	207.216	45.2	10.1	5.4	32.4	28.3	43.5	15.2	Vert.	100	200	HB	
9	536.382	43.6	18.6	7.1	32.3	37.0	46.0	9.0	Vert.	220	130	HB	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=HB:Hybrid Antenna

Spurious emission (Above 30MHz)

(ISO 15693)

DATA OF RADIATED EMISSION TEST

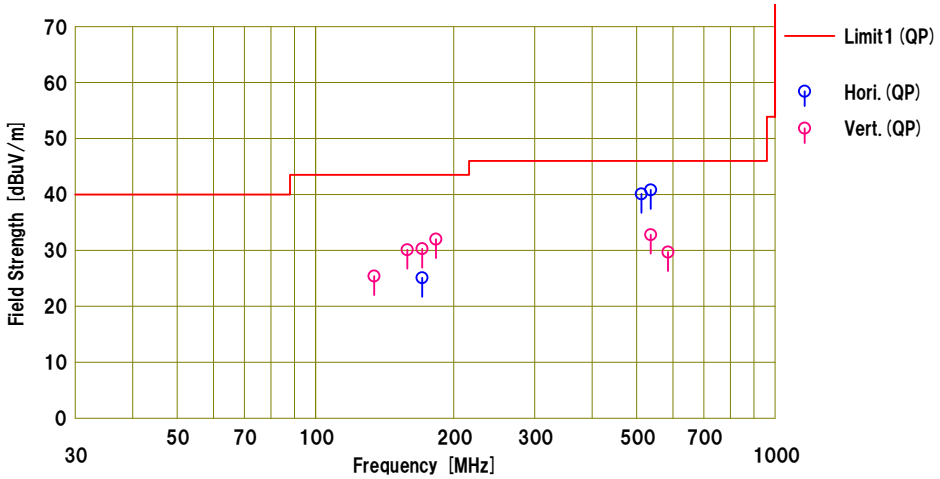
UL Japan, Inc. Kashima EMC Lab. No.10 Semi-Anechoic Chamber
Date : 2016/05/18

Mode : Tx, 13.56MHz
Order No. : 11242579M
Power : DC 3.7V
Temp./Humi. : 23deg.C / 50%RH

Remarks : without cradre, with Tag (ISO15693)
Hor:X, Ver:X

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Tested by : Kazuhiro Ando



No.	Freq. [MHz]	Reading <QP> [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP> [dBuV/m]	Limit <QP> [dBuV/m]	Margin <QP> [dB]	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
1	170.648	32.5	13.0	6.0	26.4	25.1	43.5	18.4	Hori.	165	93	HB	
2	511.974	40.5	18.1	8.9	27.4	40.1	46.0	5.9	Hori.	173	87	HB	
3	536.384	41.0	18.3	9.0	27.5	40.8	46.0	5.2	Hori.	156	80	HB	
4	134.155	33.5	12.8	5.6	26.5	25.4	43.5	18.1	Vert.	100	250	HB	
5	158.473	37.1	13.5	5.9	26.4	30.1	43.5	13.4	Vert.	100	135	HB	
6	170.663	37.7	13.0	6.0	26.4	30.3	43.5	13.2	Vert.	100	210	HB	
7	182.901	40.5	11.6	6.2	26.3	32.0	43.5	11.5	Vert.	100	137	HB	
8	536.381	33.0	18.3	9.0	27.5	32.8	46.0	13.2	Vert.	145	67	HB	
9	585.082	28.7	19.4	9.2	27.6	29.7	46.0	16.3	Vert.	240	330	HB	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=HB:Hybrid Antenna

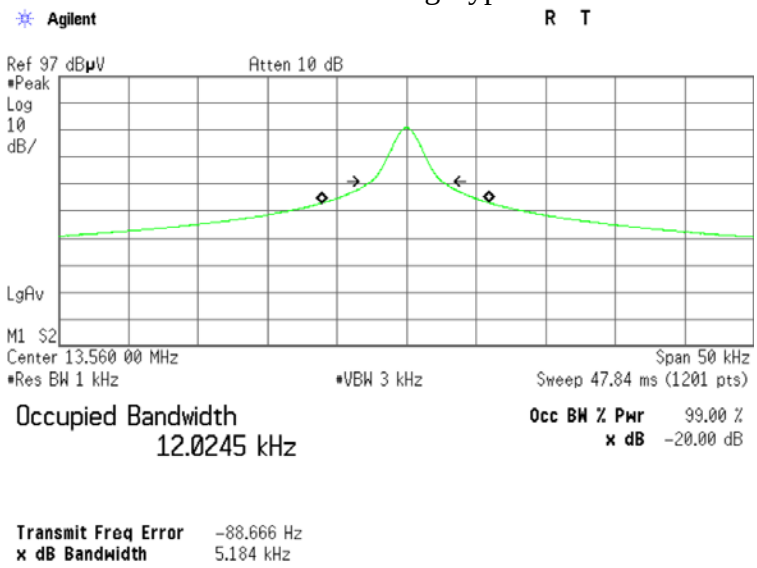
20dB Bandwidth and 99% Occupied Bandwidth

(Type A)

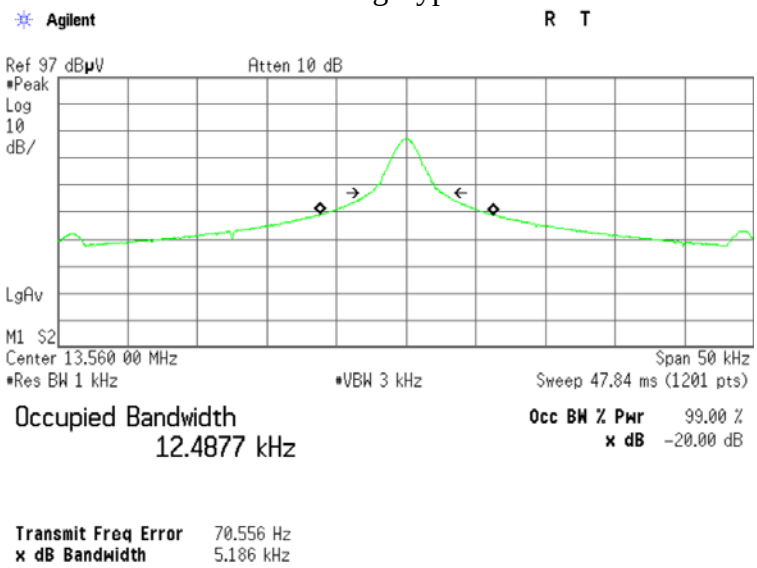
Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	05/30/2016
Temperature/ Humidity	23 deg. C / 49 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod on (Type A)

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	Without Tag	5.18	12.02
	With Tag	5.19	12.49

Without Tag Type A



With Tag Type A



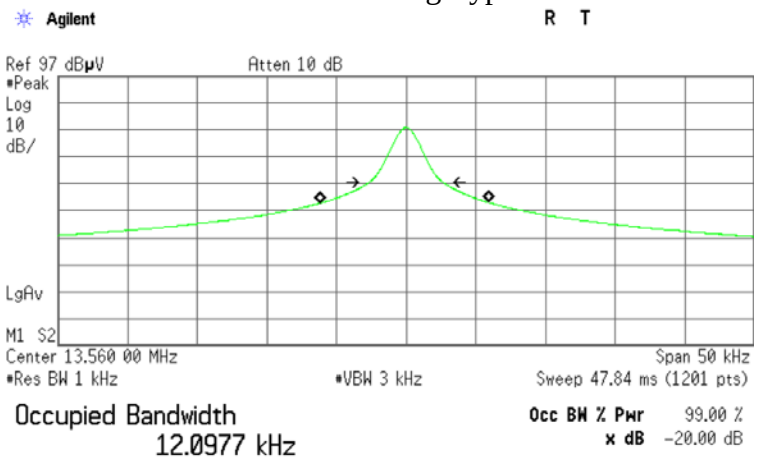
20dB Bandwidth and 99% Occupied Bandwidth

(Type B)

Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	05/30/2016
Temperature/ Humidity	23 deg. C / 49 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod on (Type B)

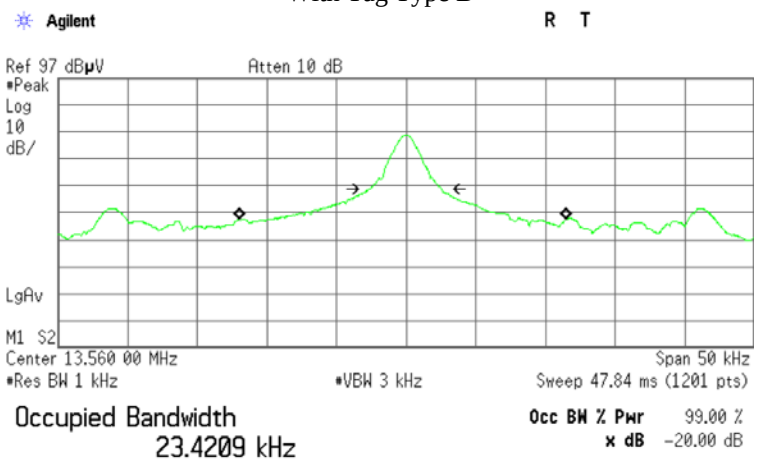
FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	Without Tag	5.20	12.10
	With Tag	5.08	23.42

Without Tag Type B



Transmit Freq Error −107.431 Hz
x dB Bandwidth 5.196 kHz

With Tag Type B



Transmit Freq Error −242.878 Hz
x dB Bandwidth 5.075 kHz

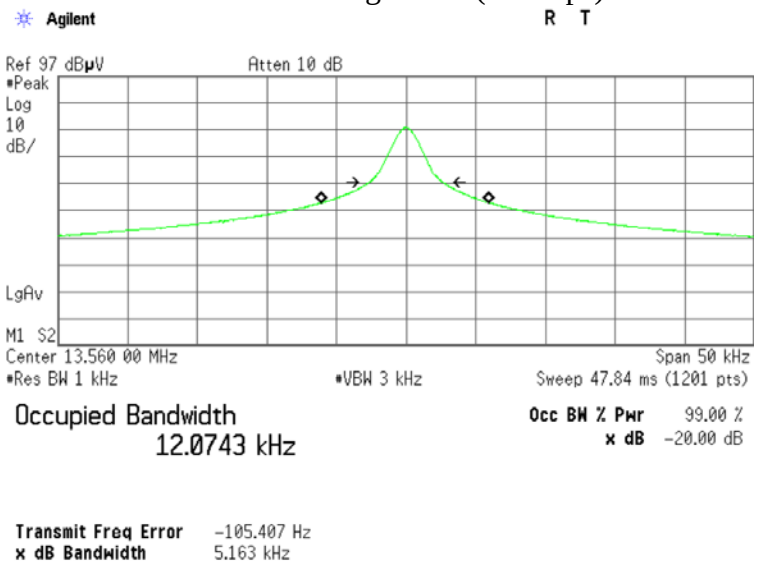
20dB Bandwidth and 99% Occupied Bandwidth

(Felica 212kbps)

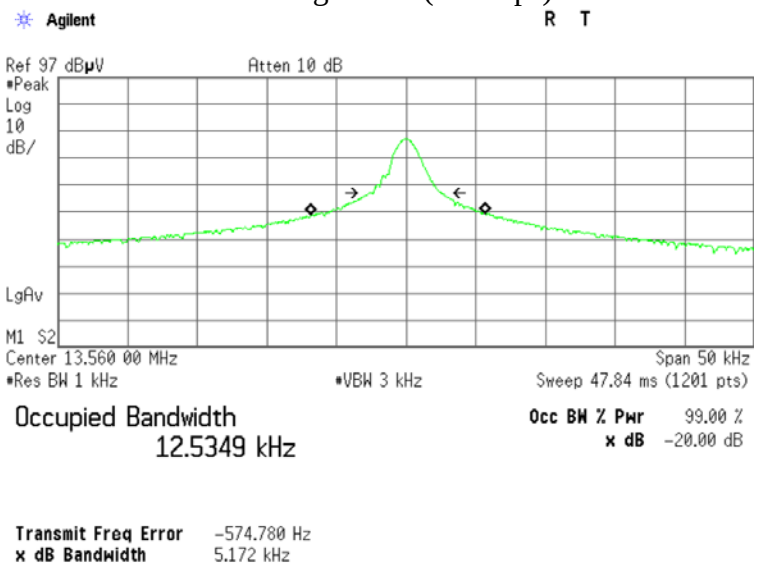
Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	05/30/2016
Temperature/ Humidity	23 deg. C / 49 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod on (Felica 212kbps)

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	Without Tag	5.16	12.07
	With Tag	5.17	12.53

Without Tag Felica (212kbps)



With Tag Felica (212kbps)



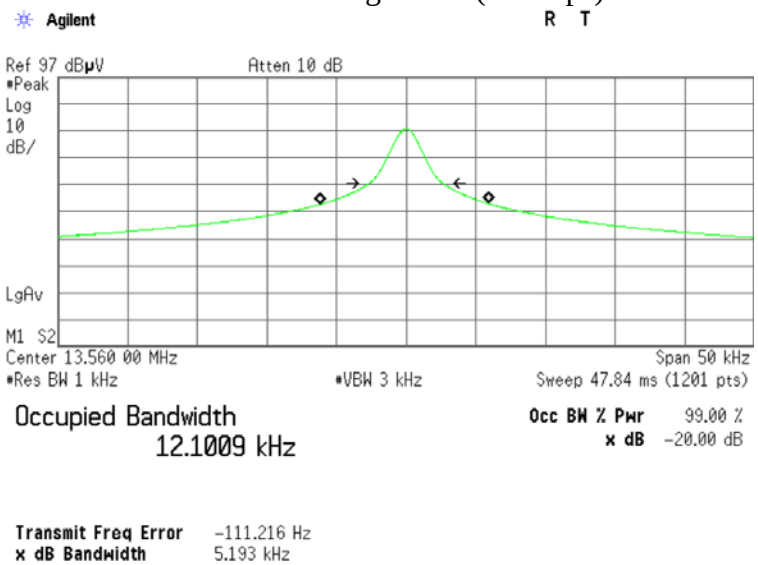
20dB Bandwidth and 99% Occupied Bandwidth

(Felica 424kbps)

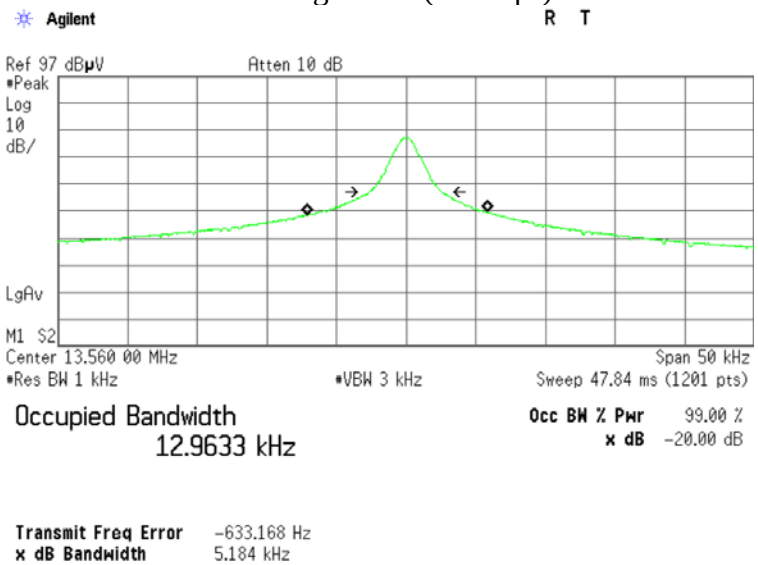
Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	05/30/2016
Temperature/ Humidity	23 deg. C / 49 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod on (Felica 424kbps)

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	Without Tag	5.19	12.10
	With Tag	5.18	12.96

Without Tag Felica (424kbps)



With Tag Felica (424kbps)



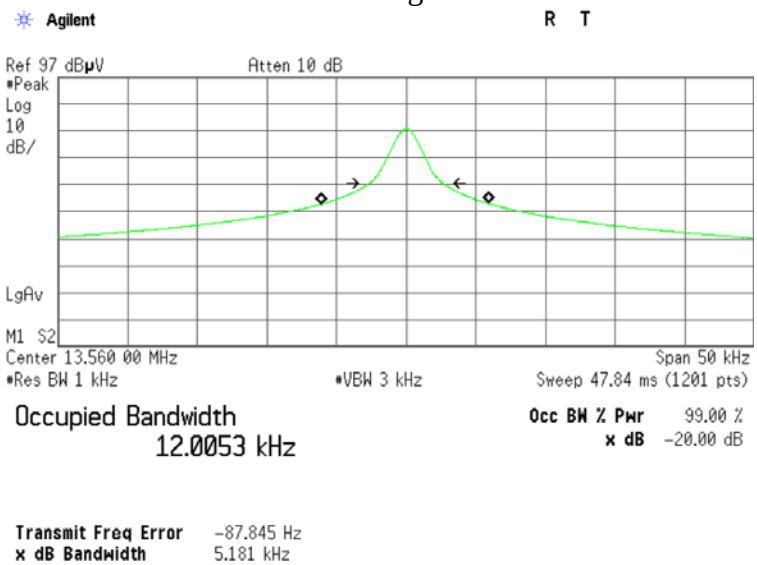
20dB Bandwidth and 99% Occupied Bandwidth

(ISO15693)

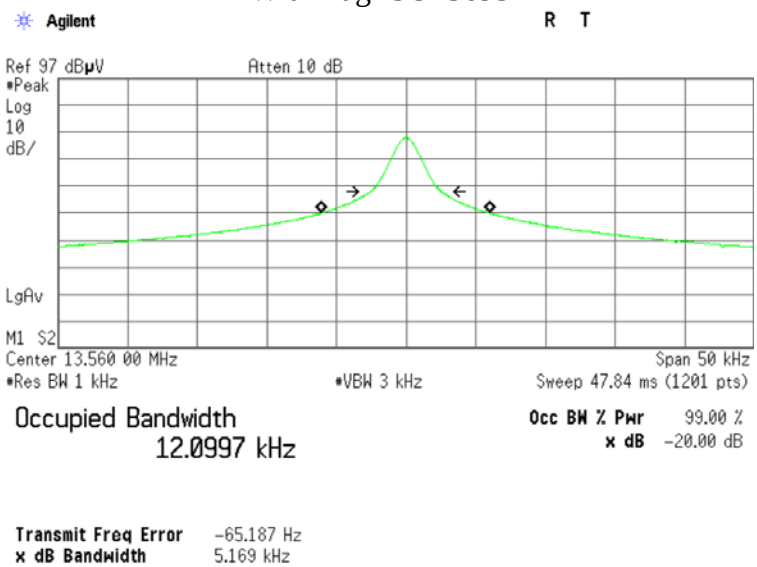
Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	05/30/2016
Temperature/ Humidity	23 deg. C / 49 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod on (ISO15693)

FREQ [MHz]	Mode	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	Without Tag	5.18	12.01
	With Tag	5.17	12.10

Without Tag ISO15693



With Tag ISO15693



Frequency Tolerance

Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	06/03/2016, 06/28/2016
Temperature/ Humidity	21, 23 deg. C / 48, 47 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod off

Test condition		Tested	Measured	Frequency	Result		Limit
Temp.	Voltage	timing	frequency	error			
[deg. C]	[V]		[MHz]	[MHz]	[%]	[ppm]	[+/- %]
50	5	Power on	13.559953	-0.000047	-0.00035	-3.5	0.01
		+ 2 min.	13.559950	-0.000050	-0.00037	-3.7	0.01
		+ 5 min.	13.559949	-0.000051	-0.00038	-3.8	0.01
		+ 10 min.	13.559949	-0.000051	-0.00038	-3.8	0.01
40	5	Power on	13.559978	-0.000022	-0.00016	-1.6	0.01
		+ 2 min.	13.559974	-0.000026	-0.00019	-1.9	0.01
		+ 5 min.	13.559973	-0.000027	-0.00020	-2.0	0.01
		+ 10 min.	13.559972	-0.000028	-0.00021	-2.1	0.01
30	5	Power on	13.560016	0.000016	0.00012	1.2	0.01
		+ 2 min.	13.560011	0.000011	0.00008	0.8	0.01
		+ 5 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 10 min.	13.560008	0.000008	0.00006	0.6	0.01
20	5	Power on	13.560037	0.000037	0.00027	2.7	0.01
		+ 2 min.	13.560031	0.000031	0.00023	2.3	0.01
		+ 5 min.	13.560027	0.000027	0.00020	2.0	0.01
		+ 10 min.	13.560026	0.000026	0.00019	1.9	0.01
20	4.25	Power on	13.560036	0.000036	0.00027	2.7	0.01
	(5V -15%)	+ 2 min.	13.560032	0.000032	0.00024	2.4	0.01
		+ 5 min.	13.560029	0.000029	0.00021	2.1	0.01
		+ 10 min.	13.560028	0.000028	0.00021	2.1	0.01
20	5.75	Power on	13.560037	0.000037	0.00027	2.7	0.01
	(5V +15%)	+ 2 min.	13.560031	0.000031	0.00023	2.3	0.01
		+ 5 min.	13.560027	0.000027	0.00020	2.0	0.01
		+ 10 min.	13.560025	0.000025	0.00018	1.8	0.01
10	5	Power on	13.560095	0.000095	0.00070	7.0	0.01
		+ 2 min.	13.560090	0.000090	0.00066	6.6	0.01
		+ 5 min.	13.560089	0.000089	0.00066	6.6	0.01
		+ 10 min.	13.560087	0.000087	0.00064	6.4	0.01
0	5	Power on	13.560121	0.000121	0.00089	8.9	0.01
		+ 2 min.	13.560118	0.000118	0.00087	8.7	0.01
		+ 5 min.	13.560117	0.000117	0.00086	8.6	0.01
		+ 10 min.	13.560117	0.000117	0.00086	8.6	0.01
-10	5	Power on	13.560129	0.000129	0.00095	9.5	0.01
		+ 2 min.	13.560130	0.000130	0.00096	9.6	0.01
		+ 5 min.	13.560130	0.000130	0.00096	9.6	0.01
		+ 10 min.	13.560130	0.000130	0.00096	9.6	0.01
-20	5	Power on	13.560111	0.000111	0.00082	8.2	0.01
		+ 2 min.	13.560117	0.000117	0.00086	8.6	0.01
		+ 5 min.	13.560118	0.000118	0.00087	8.7	0.01
		+ 10 min.	13.560119	0.000119	0.00088	8.8	0.01
-30	5	Power on	13.560060	0.000060	0.00044	4.4	0.01
		+ 2 min.	13.560073	0.000073	0.00054	5.4	0.01
		+ 5 min.	13.560077	0.000077	0.00057	5.7	0.01
		+ 10 min.	13.560078	0.000078	0.00058	5.8	0.01

Calculation formula: Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Tested frequency: 13.56 MHz
Limit (+/-): 0.01 % (+/- 100ppm)

Frequency Tolerance

Test place	Kashima EMC Lab. No.2 measurement room
Report No.	11242579M
Date	06/23/2016
Temperature/ Humidity	24 deg. C / 45 % RH
Engineer	Kazuhiro Ando
Mode	Tx Mod off

Test condition		Tested	Measured	Frequency	Result		Limit
Temp.	Voltage	timing	frequency	error			
[deg. C]	[V]		[MHz]	[MHz]	[%]	[ppm]	[+/- %]
50	3.7	Power on	13.559953	-0.000047	-0.00035	-3.5	0.01
		+ 2 min.	13.559949	-0.000051	-0.00038	-3.8	0.01
		+ 5 min.	13.559949	-0.000051	-0.00038	-3.8	0.01
		+ 10 min.	13.559949	-0.000051	-0.00038	-3.8	0.01
40	3.7	Power on	13.559978	-0.000022	-0.00016	-1.6	0.01
		+ 2 min.	13.559973	-0.000027	-0.00020	-2.0	0.01
		+ 5 min.	13.559972	-0.000028	-0.00021	-2.1	0.01
		+ 10 min.	13.559972	-0.000028	-0.00021	-2.1	0.01
30	3.7	Power on	13.560017	0.000017	0.00013	1.3	0.01
		+ 2 min.	13.560011	0.000011	0.00008	0.8	0.01
		+ 5 min.	13.560009	0.000009	0.00007	0.7	0.01
		+ 10 min.	13.560008	0.000008	0.00006	0.6	0.01
20	3.7	Power on	13.560058	0.000058	0.00043	4.3	0.01
	(Normal and	+ 2 min.	13.560051	0.000051	0.00038	3.8	0.01
	Min. Spec.)	+ 5 min.	13.560050	0.000050	0.00037	3.7	0.01
		+ 10 min.	13.560049	0.000049	0.00036	3.6	0.01
20	4.2	Power on	13.560058	0.000058	0.00043	4.3	0.01
	(Max. Spec.)	+ 2 min.	13.560051	0.000051	0.00038	3.8	0.01
		+ 5 min.	13.560050	0.000050	0.00037	3.7	0.01
		+ 10 min.	13.560049	0.000049	0.00036	3.6	0.01
10	3.7	Power on	13.560096	0.000096	0.00071	7.1	0.01
		+ 2 min.	13.560090	0.000090	0.00066	6.6	0.01
		+ 5 min.	13.560089	0.000089	0.00066	6.6	0.01
		+ 10 min.	13.560088	0.000088	0.00065	6.5	0.01
0	3.7	Power on	13.560122	0.000122	0.00090	9.0	0.01
		+ 2 min.	13.560118	0.000118	0.00087	8.7	0.01
		+ 5 min.	13.560117	0.000117	0.00086	8.6	0.01
		+ 10 min.	13.560117	0.000117	0.00086	8.6	0.01
-10	3.7	Power on	13.560129	0.000129	0.00095	9.5	0.01
		+ 2 min.	13.560130	0.000130	0.00096	9.6	0.01
		+ 5 min.	13.560130	0.000130	0.00096	9.6	0.01
		+ 10 min.	13.560130	0.000130	0.00096	9.6	0.01
-20	3.7	Power on	13.560109	0.000109	0.00080	8.0	0.01
		+ 2 min.	13.560115	0.000115	0.00085	8.5	0.01
		+ 5 min.	13.560117	0.000117	0.00086	8.6	0.01
		+ 10 min.	13.560117	0.000117	0.00086	8.6	0.01
-30	3.7	Power on	13.560058	0.000058	0.00043	4.3	0.01
		+ 2 min.	13.560073	0.000073	0.00054	5.4	0.01
		+ 5 min.	13.560077	0.000077	0.00057	5.7	0.01
		+ 10 min.	13.560077	0.000077	0.00057	5.7	0.01

Calculation formula: Frequency error = Measured frequency - Tested frequency
Result [%] = Frequency error / Tested frequency * 100

Tested frequency: 13.56 MHz
Limit (+/-): 0.01 % (+/- 100ppm)

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
CLS-25	A.M.N.	Rohde & Schwarz	ENV216	101042	CE	2015/08/06 * 12
CCC-S2-C(2/6/7/8)	Coaxial Cable	Fujikura,Fujikura,Fujikura,Fujikura	5D-2W,5D-2W,5D-2W,5D-2W	-	CE	2015/07/14 * 12
CTM-32	Terminator	Suhner	65_BNC-50-0-2/133_NE	none	CE	2015/11/19 * 12
CTR-05	Test Receiver	Rohde & Schwarz	ESCI	100608 Rev 4.32	CE	2015/09/24 * 12
CSCL-02	Ruler	Tajima	L19-55	none	CE	2016/02/22 * 12
COS-02	Temperature & Humidity Indicator	A&D	AD-5681	6878345	CE	2015/07/13 * 12
CTS-06	Digital Multimeter	FLUKE	112	89790159	CE	2015/09/08 * 12
CTR-09	Test Receiver	Agilent	N9038A	MY53290016 Version A.14.03	RE	2015/06/28 * 12
CBL-08	LOGBICON	Schwarzbeck	VULB 9168	343	RE	2015/11/15 * 12
CAT3-04	3dB Fixed Atten.	TAMAGAWA	UFA-01	none	RE	2015/09/03 * 12
CCC-S10-R(2/4/CATS-11/5/6/7/8/11/12)	Coaxial Cable	Fujikura,Fujikura,Agilent,Fujikura,Fujikura,Fujikura,Fuhjikura,Fujikura,Fujikura	5D-2W,5D-2W,8494A,5D-2W,5D-2W,5D-2W,5D-2W,5D-2W,5D-2W	MY41110200(Step Att)	RE	2015/08/11 * 12
CAF-08	Pre-Amplifier	Hewlett Packard	8447D	2944A09041	RE	2015/08/11 * 12
CSCL-13	Ruler	Tajima	L19-55	none	RE	2016/02/22 * 12
COS-10	Temperature & Humidity Indicator	HIOKI	3641/9680-50	090999895/090905406	RE	2015/05/17 * 12
CTS-14	Digital Multimeter	FLUKE	115	994460954	RE	2015/10/01 * 12
COTS-CEMI-02	EMI Software	TSJ	TEPTO-DV(RE,CE,MF,PE)	Ver, RE: 2.5.0131, CE: 2.5.0131 ME: 2.5.0129,	CE/RE/ME	-
CTR-06	Test Receiver	Rohde & Schwarz	ESCI	100107 Rev 4.32	RE/ME	2015/09/01 * 12
CCC-S11-R(1/4/5/CATS12-13/6/7/8/10)	Coaxial Cable	Fujikura,Suhner,Suhner,Agilent,Suhner,-,Suhner	5D-2W,SF106,SF104,8496B+8494B,SF106,-,SF106	MY42143380,US00431042(Step Att)	RE/ME	2015/11/24 * 12
CAT3-06	3dB Fixed Atten.	TAMAGAWA	UFA-01	none	RE	2016/04/07 * 12
CBL-09	LOGBICON	Schwarzbeck	VULB 9168	508	RE	2016/04/11 * 12
CAF-16	Pre-Amplifier	Sonoma Instrument	310N	325015	RE/ME	2015/05/22 * 12
CSCL-16	Ruler	Tajima	G3 gold	none	RE/ME	2016/02/18 * 12
COS-11	Temperature, Humidity & Atmospheric Logger	T&D	TR-73U	F8060468	RE/ME	2015/05/17 * 12
CTS-13	Digital Multimeter	FLUKE	FLK-83-V	14610320	RE/ME	2015/09/08 * 12
CSA-07	Spectrum Analyzer	Agilent	E4448A	MY52490024 Version A.11.21	ME	2015/05/28 * 12

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	827779/008	ME	2015/08/28 * 12
CMS-07	Near Field Probe	Langer	LF-R400	02-0815	FT	Pre Check
CCH-04	Temperature and Humidity Chamber	ESPEC	PL-1J	15004059	FT	2015/06/01 * 12
CFC-02	Frequency Counter	Agilent	53151A	US40511823	FT	2016/04/08 * 12
CCC-W06	Micro Wave Cable	Junkosha	MWX241	MRA-12-14-146	FT	2016/05/12 * 12
CTS-18	Digital Multimeter	FLUKE	87-3	85220051	FT	2015/10/01 * 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: CE: Conducted Emission
ME: Magnetic Emission
RE: Radiated Emission
FT: Frequency Tolerance