RADIO TEST REPORT

Test Report No.: 10016293S-A

Applicant	:	**GLORY AZ System Co.,Ltd**
Type of Equipment	:	**Non-contact type IC card reader/writer**
Model No.	:	**HW312CSM-AZ Reader/Writer UNIT**
FCC ID	:	**2AANKHW312CSM-AZ**
Test regulation	:	**FCC Part15 Subpart C: 2013**
Test result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: July 1 to 2, 2013

Tested by:

Tatsuya Arai
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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

RTL02610

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
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REVISION HISTORY

Original Test Report No.: 10016293S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10016293S-A	July 24, 2013	-	-

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SECTION 1: Customer information

Company Name	:	GLORY AZ System Co.,Ltd
Address	:	3-14-11, Kotobuki, Taito-ku, Tokyo, 111-0042 JAPAN
Telephone Number	:	+81-3-3847-9181
Facsimile Number	:	+81-3-3847-9277
Contact Person	:	Kazunari YATABE

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

2.1 Identification of E.U.T.

Type of Equipment	:	Non-contact type IC card reader/writer
Model Number	:	HW312CSM-AZ Reader/Writer UNIT
Serial Number	:	A1-121
Rating	:	DC 5V
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	July 1, 2013
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: HW312CSM-AZ Reader/Writer UNIT (referred to as the EUT in this report) is a Non-contact type IC card reader/writer.

Clock frequency(ies) in the system : 14.7456MHz (CPU)、13.56MHz (RF Clock)

<Radio part>

Equipment type	:	Transceiver
Frequency of operation	:	13.56MHz
Type of modulation	:	ASK
Antenna type	:	Loop
Antenna connector type	:	None
ITU code	:	A1D
Operation temperature range	:	-20 to +50 deg.C.
Card Type	:	Type A, Type B, TypeC (FeliCa)

FCC 15.31 (e)
This EUT provides stable voltage (DC4.4V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203
The antenna is not removable from the EUT. Therefore the equipment complies with the requirement.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2013, final revised on June 11, 2013 and effective July 11, 2013
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.215 Additional provisions to the general radiated emission limitations
Section 15.225 Operation within the band 13.110-14.010MHz

* The revision on June 11, 2013 does not affect the test specification applied to the EUT.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	4.7dB Freq.: 13.56000MHz Detector: Average Phase: N Card: Type B	Complied
Electric field strength of Fundamental emission	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (a)	Radiated	N/A	48.1dB Polarization: Vertical Card: Type B	Complied
Electric field strength of Spurious emission (within the 13.110-14.010MHz band)	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (b)(c)	Radiated	N/A	28.4dB Freq.: 13.553MHz Polarization: Vertical Card: Type B	Complied
Electric field strength of Spurious emission (outside of the 13.110-14.010MHz band)	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.209 FCC 15.225 (d)	Radiated	N/A	1.3dB Freq.: 40.68MHz Polarization: Vertical Card: Type C	Complied
20dB bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.215 (c)	Radiated	N/A	-	-
Frequency tolerance	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (e)	Radiated	N/A	-	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

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

3.4 Uncertainty

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

Item	Frequency range	No.1 SAC[*1]/SR[*2] (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

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

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

Frequency tolerance
Frequency (Normal condition) Measurement uncertainty for this test was: (±) 7.9 x 10^-8.
Frequency (Extreme condition) Measurement uncertainty for this test was: (±) 7.9 x 10^-8.

Other tests
Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☒ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☒ No.1 Shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 Shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☒ No.3 Shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 Shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 Shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 Shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test item	Operating mode	Tested frequency
All items	Transmitting	13.56MHz

Power settings: Setting is controlled by the firmware and cannot be changed.
Software: Rx371 Factory Ver2.3.0.1

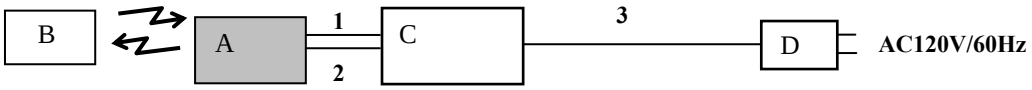
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.
The carrier level and noise levels were confirmed with and without Tag.

Combinations of the worst case

Test item / Antenna polarization	Conducted emission	Radiated emission (Carrier)	Radiated emission (Below 30MHz)	Radiated emission (Above 30MHz)
Horizontal	-	Z	Z	Z
Vertical	-	Y	Y	Z
Tag	With Tag	With Tag	With Tag	With Tag

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

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Non-contact type IC card reader/writer	HW312CSM-AZ Reader/Writer UNIT	A1-121	SAXA	EUT
B1	IC Card (Type A)	Mifare Classic	-	TOPPAN TDK LABEL	*1)
B2	IC Card (Type B)	-	-	-	*1)
B3	IC Card (Type C)	RC-S860	-	SONY	*1)
C	Jig	ETR-1 I/F	-	SAXA	-
D	AC Adaptor	HL-12/1-BE4SA-G	0627	Hirel	-

*1) Distance of the card from the EUT:
Type A : 50mm,
Type B : 40mm,
Type C : 40mm

List of cables used

No.	Item	Length(m)	Shield		Remarks
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	DC	0.1	Unshielded	Unshielded	-
3	DC	1.8	Unshielded	Unshielded	-

SECTION 5: Conducted emission

5.1 Operating environment

The test was carried out in No.1 and No.3 shielded room.

Temperature : See test data (APPENDIX 2)
Humidity : See test data (APPENDIX 2)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Each EUT current-carrying power lead was individually connected through a LISN to the input power source.
Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via AC Adaptor with in a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, an average detector.
The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass

SECTION 6: Radiated emission (Fundamental and Spurious emission)

6.1 Operating environment

The test was carried out in No.1 and No.3 semi-anechoic chamber.

Temperature : See test data (APPENDIX 2)
Humidity : See test data (APPENDIX 2)

6.2 Test configuration

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

6.3 Test conditions

Frequency range : 9kHz - 1GHz
Test distance : 3m
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m
Frequency: From 9kHz to 30MHz at distance 3m

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: 0deg.to 360deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 2.

Frequency: From 30MHz to 1GHz at distance 3m (Refer to Figure 1).

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 intensity.
The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP, PK, and AV detector.

The radiated emission measurements were made with the following detector function of the test receiver.

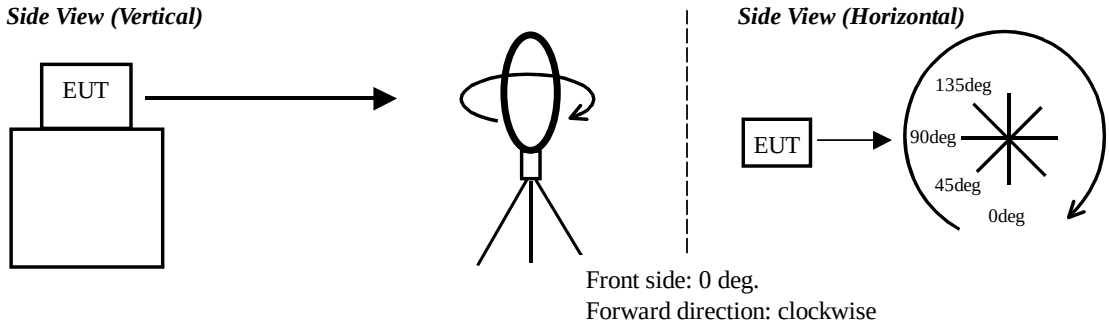
	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz	30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

* FCC 15 Section 15.31 (f)(2) (9kHz-30MHz)
9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])
490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

6.5 Results

Summary of the test results : Pass

Figure 1. Direction of the Loop Antenna



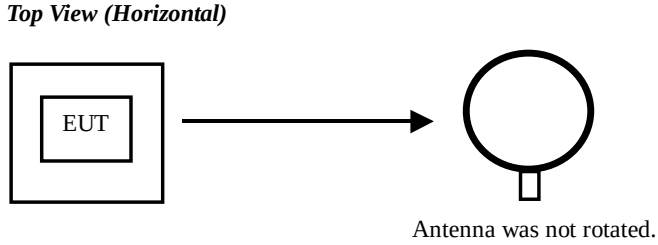
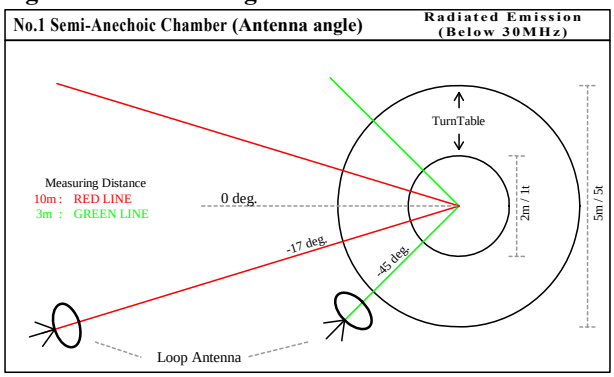
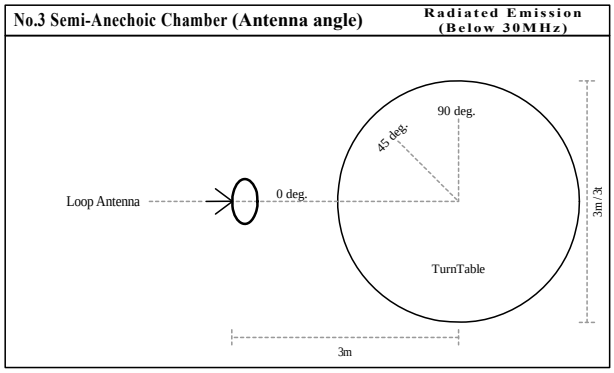
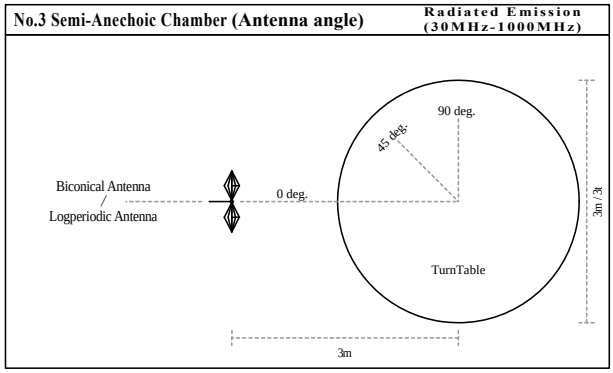


Figure 2. Antenna angle







SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The test was measured with a spectrum analyzer using a test fixture.

Summary of the test results: Pass

SECTION 8: Frequency tolerances

Test procedure

The test was measured with a spectrum analyzer using a test fixture.
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.

Summary of the test results: Pass

Contents of APPENDIXES

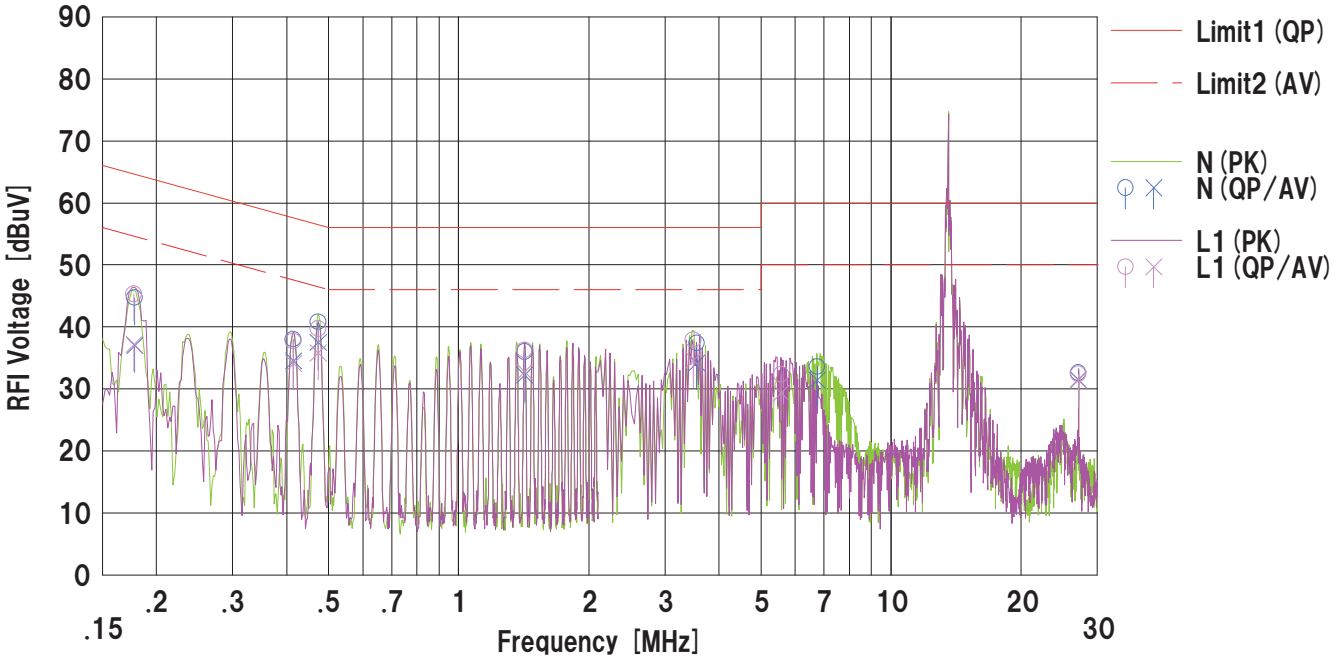
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2013/07/01

Company	: GLORY AZ System Co.,Ltd	Mode	: Transmitting (13.56MHz)
Kind of EUT	: Non-contact type IC card reader/writer	Order No.	: 10016293S
Model No.	: HW312CSM-AZ Reader/Writer UNIT	Power	: AC 120V/60Hz
Serial No.	: A1-121	Temp./Humi.	: 26deg.C. / 55%RH
Remarks	: Card : Type A		

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

Engineer : Shinichi Takano



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	0.17810	32.0	24.3	12.7	44.7	37.0	64.5	54.5	19.8	17.5	N	
2	0.41448	25.3	21.8	12.7	38.0	34.5	57.5	47.5	19.5	13.0	N	
3	0.47340	28.1	24.8	12.7	40.8	37.5	56.4	46.4	15.6	8.9	N	
4	1.42092	23.3	19.5	12.7	36.0	32.2	56.0	46.0	20.0	13.8	N	
5	3.55194	24.5	21.3	12.9	37.4	34.2	56.0	46.0	18.6	11.8	N	
6	6.74834	20.5	18.3	13.1	33.6	31.4	60.0	50.0	26.4	18.6	N	
7	27.12000	17.9	16.8	14.7	32.6	31.5	60.0	50.0	27.4	18.5	N	
8	0.17748	32.6	24.5	12.7	45.3	37.2	64.6	54.6	19.3	17.4	L1	
9	0.41448	25.0	21.4	12.7	37.7	34.1	57.5	47.5	19.8	13.4	L1	
10	0.47328	27.0	23.1	12.7	39.7	35.8	56.4	46.4	16.7	10.6	L1	
11	1.42010	23.6	20.0	12.7	36.3	32.7	56.0	46.0	19.7	13.3	L1	
12	3.49192	25.0	21.7	12.9	37.9	34.6	56.0	46.0	18.1	11.4	L1	
13	5.56330	19.2	16.2	13.1	32.3	29.3	60.0	50.0	27.7	20.7	L1	
14	27.12000	17.7	16.7	14.7	32.4	31.4	60.0	50.0	27.6	18.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-02 (E)

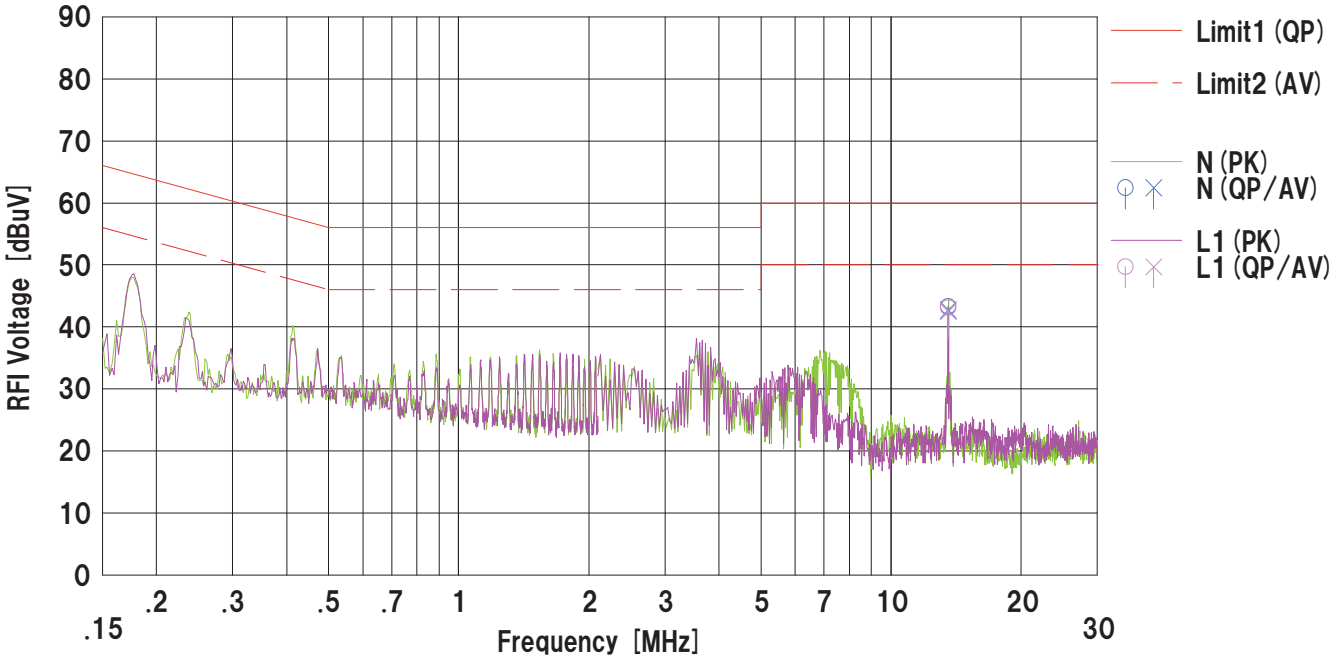
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2013/07/02

Company	:	GLORY AZ System Co.,Ltd	Mode	:	Transmitting (13.56MHz)
Kind of EUT	:	Non-contact type IC card reader/writer	Order No.	:	10016293S
Model No.	:	HW312CSM-AZ Reader/Writer UNIT	Power	:	AC 120V / 60Hz
Serial No.	:	A1-121	Temp./Humi.	:	26deg.C. / 51%RH
Remarks	:	Card : TypeA, Antenna is terminated in antenna port.			

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

Engineer : Shinichi Takano



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	29.5	28.9	13.8	43.3	42.7	60.0	50.0	16.7	7.3	N	
2	13.56000	29.3	28.6	13.8	43.1	42.4	60.0	50.0	16.9	7.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-02 (E)

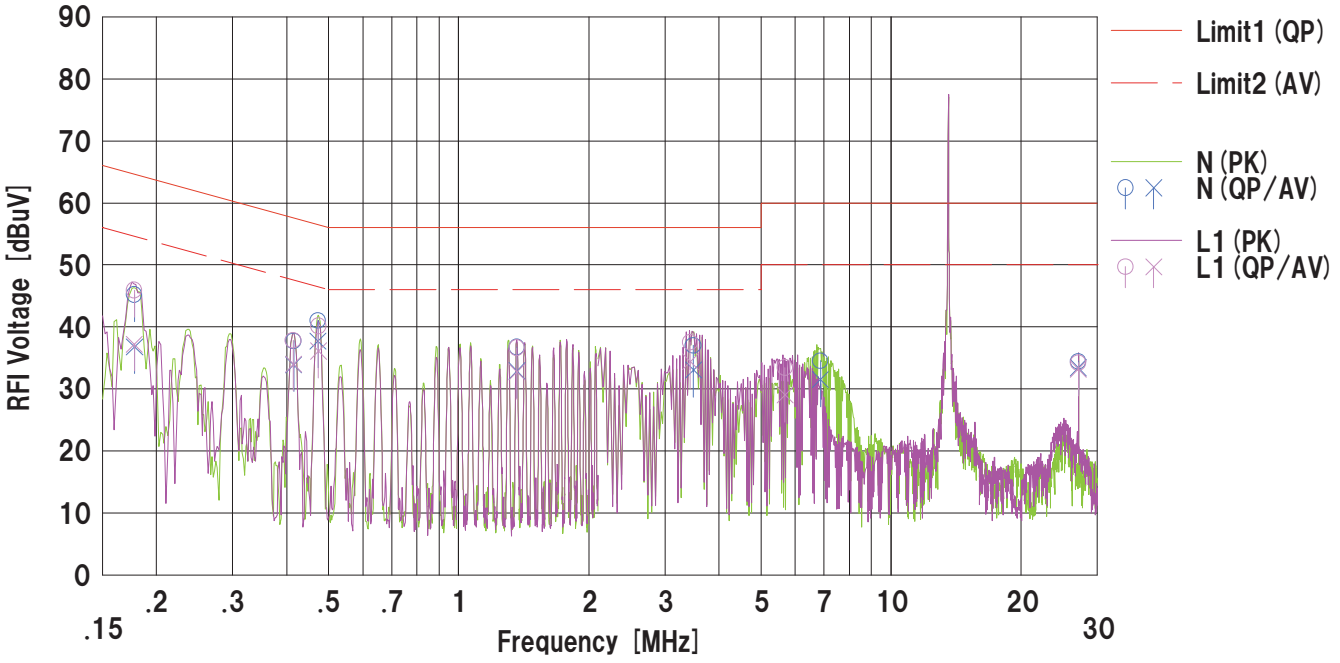
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2013/07/01

Company	: GLORY AZ System Co.,Ltd	Mode	: Transmitting (13.56MHz)
Kind of EUT	: Non-contact type IC card reader/writer	Order No.	: 10016293S
Model No.	: HW312CSM-AZ Reader/Writer UNIT	Power	: AC 120V/60Hz
Serial No.	: A1-121	Temp./Humi.	: 26deg.C. / 55%RH
Remarks	: Card : Type B		

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

Engineer : Shinichi Takano



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	0.17790	32.5	24.1	12.7	45.2	36.8	64.5	54.5	19.3	17.7	N	
2	0.41510	25.0	21.2	12.7	37.7	33.9	57.5	47.5	19.8	13.6	N	
3	0.47313	28.3	25.0	12.7	41.0	37.7	56.4	46.4	15.4	8.7	N	
4	1.36140	24.0	20.2	12.7	36.7	32.9	56.0	46.0	19.3	13.1	N	
5	3.49116	24.1	20.1	12.9	37.0	33.0	56.0	46.0	19.0	13.0	N	
6	6.86616	21.4	18.4	13.1	34.5	31.5	60.0	50.0	25.5	18.5	N	
7	27.12000	19.7	18.7	14.7	34.4	33.4	60.0	50.0	25.6	16.6	N	
8	0.17768	33.2	24.5	12.7	45.9	37.2	64.5	54.5	18.6	17.3	L1	
9	0.41450	25.1	21.3	12.7	37.8	34.0	57.5	47.5	19.7	13.5	L1	
10	0.47394	27.4	23.4	12.7	40.1	36.1	56.4	46.4	16.3	10.3	L1	
11	1.36186	23.9	20.0	12.7	36.6	32.7	56.0	46.0	19.4	13.3	L1	
12	3.43266	24.6	21.5	12.9	37.5	34.4	56.0	46.0	18.5	11.6	L1	
13	5.68282	20.3	15.9	13.1	33.4	29.0	60.0	50.0	26.6	21.0	L1	
14	27.12000	19.5	18.5	14.7	34.2	33.2	60.0	50.0	25.8	16.8	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-02 (E)

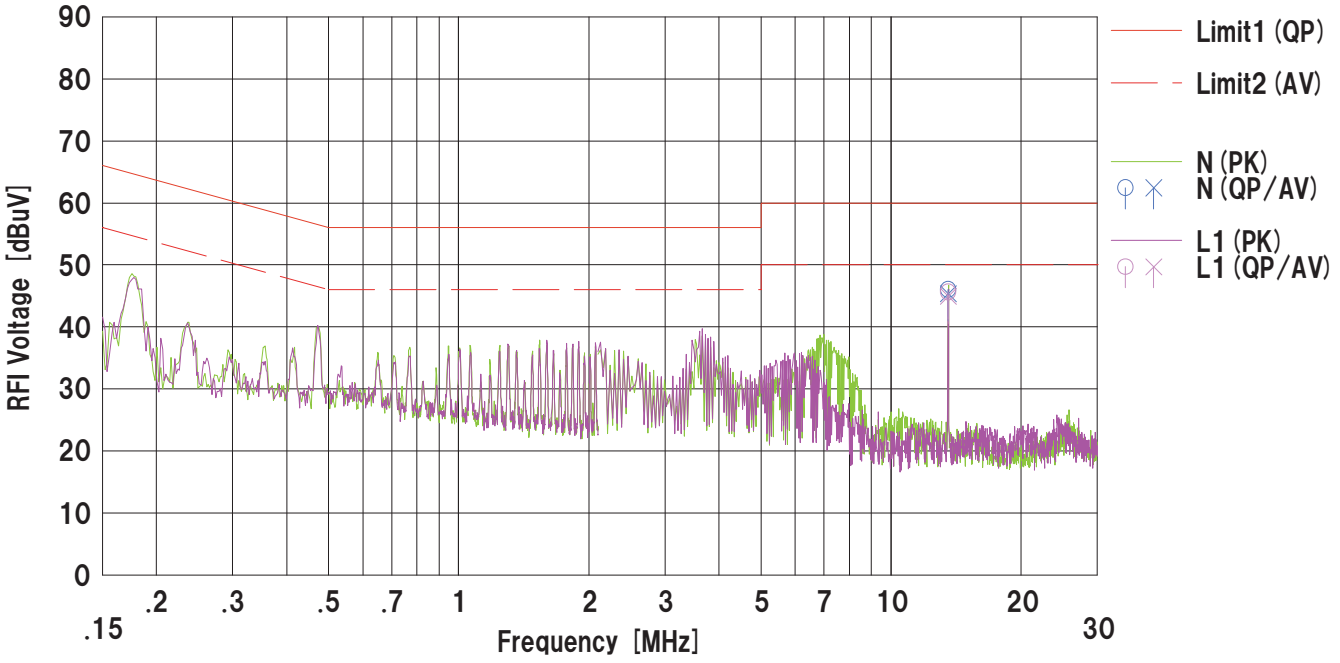
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2013/07/02

Company	:	GLORY AZ System Co.,Ltd	Mode	:	Transmitting (13.56MHz)
Kind of EUT	:	Non-contact type IC card reader/writer	Order No.	:	10016293S
Model No.	:	HW312CSM-AZ Reader/Writer UNIT	Power	:	AC 120V / 60Hz
Serial No.	:	A1-121	Temp./Humi.	:	26deg.C. / 51%RH
Remarks	:	Card : TypeB, Antenna is terminated in antenna port.			

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

Engineer : Shinichi Takano



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	32.2	31.5	13.8	46.0	45.3	60.0	50.0	14.0	4.7	N	
2	13.56000	31.8	31.1	13.8	45.6	44.9	60.0	50.0	14.4	5.1	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-02 (E)

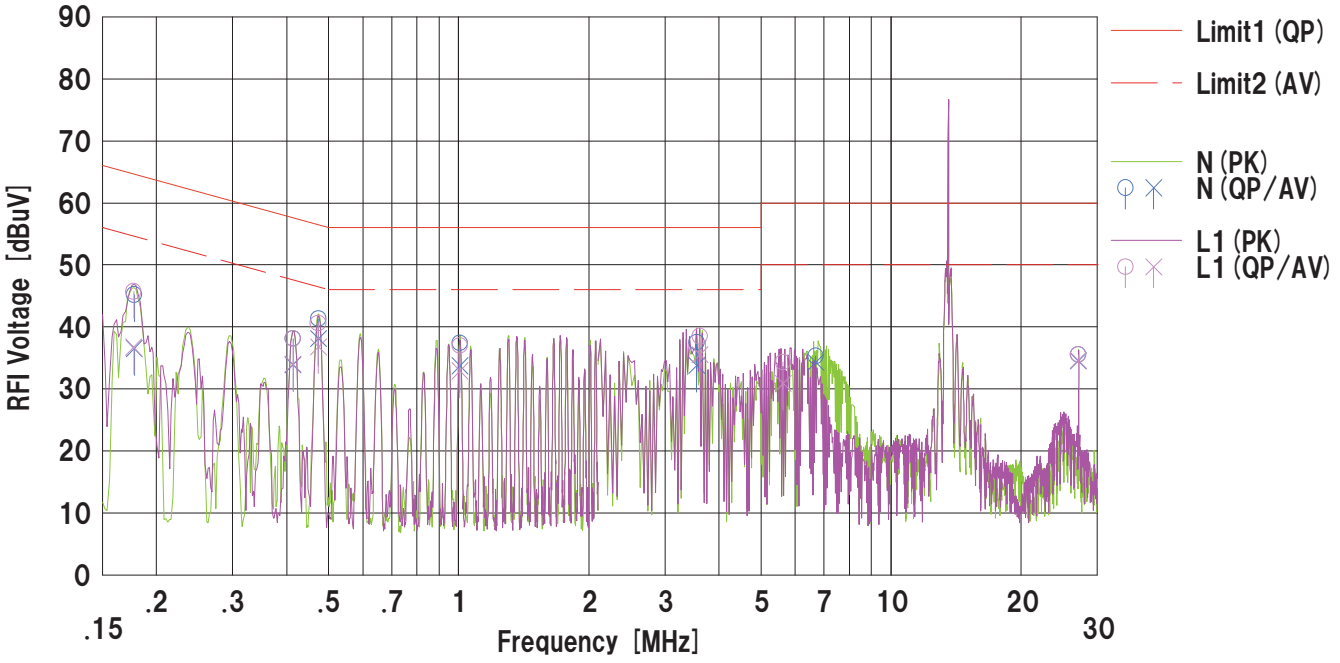
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2013/07/01

Company	: GLORY AZ System Co.,Ltd	Mode	: Transmitting (13.56MHz)
Kind of EUT	: Non-contact type IC card reader/writer	Order No.	: 10016293S
Model No.	: HW312CSM-AZ Reader/Writer UNIT	Power	: AC 120V/60Hz
Serial No.	: A1-121	Temp./Humi.	: 26deg.C. / 55%RH
Remarks	: Card : TypeC		

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

Engineer : Shinichi Takano



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	0.17766	32.5	23.8	12.7	45.2	36.5	64.5	54.5	19.3	18.0	N	
2	0.41400	25.4	21.2	12.7	38.1	33.9	57.5	47.5	19.4	13.6	N	
3	0.47390	28.6	25.4	12.7	41.3	38.1	56.4	46.4	15.1	8.3	N	
4	1.00610	24.7	21.0	12.7	37.4	33.7	56.0	46.0	18.6	12.3	N	
5	3.55248	24.6	20.9	12.9	37.5	33.8	56.0	46.0	18.5	12.2	N	
6	6.69010	22.2	21.2	13.1	35.3	34.3	60.0	50.0	24.7	15.7	N	
7	27.12000	20.8	19.8	14.7	35.5	34.5	60.0	50.0	24.5	15.5	N	
8	0.17710	33.0	24.0	12.7	45.7	36.7	64.6	54.6	18.9	17.9	L1	
9	0.41428	25.4	21.3	12.7	38.1	34.0	57.5	47.5	19.4	13.5	L1	
10	0.47368	27.9	24.1	12.7	40.6	36.8	56.4	46.4	15.8	9.6	L1	
11	1.00640	24.3	20.2	12.7	37.0	32.9	56.0	46.0	19.0	13.1	L1	
12	3.61214	25.6	22.6	12.9	38.5	35.5	56.0	46.0	17.5	10.5	L1	
13	5.62430	21.2	17.8	13.1	34.3	30.9	60.0	50.0	25.7	19.1	L1	
14	27.12000	20.8	19.9	14.7	35.5	34.6	60.0	50.0	24.5	15.4	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-02 (E)

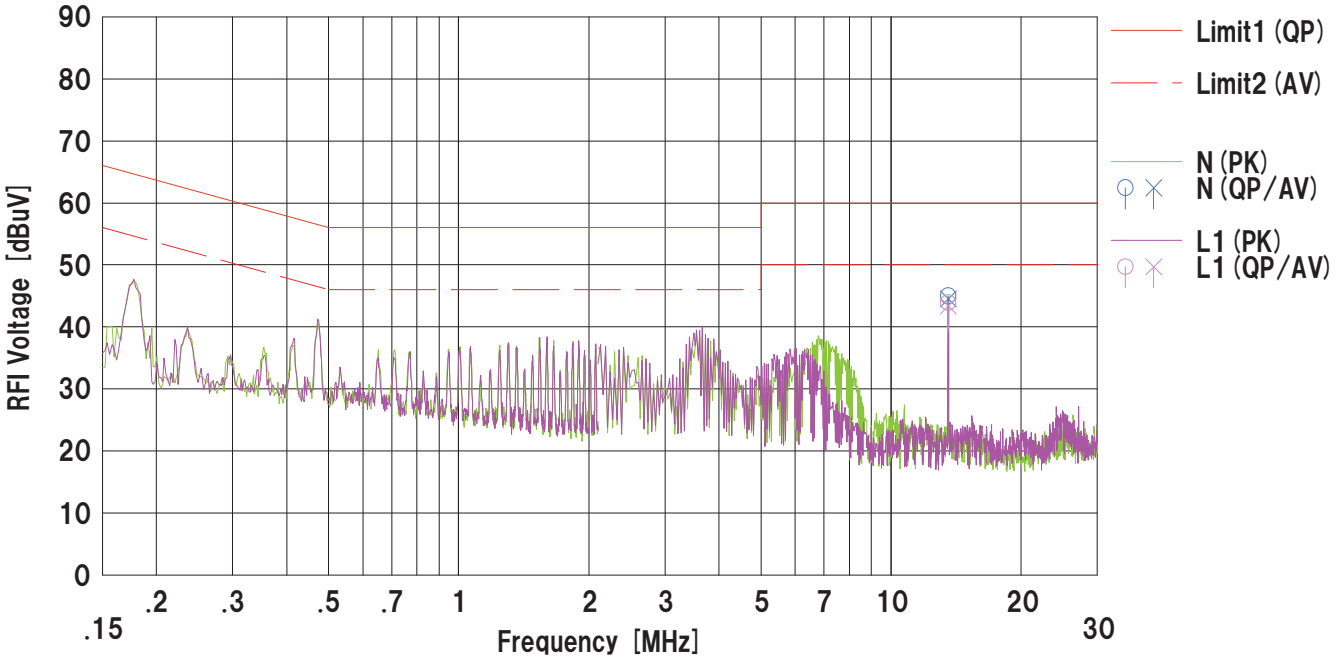
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2013/07/02

Company	:	GLORY AZ System Co.,Ltd	Mode	:	Transmitting (13.56MHz)
Kind of EUT	:	Non-contact type IC card reader/writer	Order No.	:	10016293S
Model No.	:	HW312CSM-AZ Reader/Writer UNIT	Power	:	AC 120V / 60Hz
Serial No.	:	A1-121	Temp./Humi.	:	26deg.C. / 51%RH
Remarks	:	Card : TypeC, Antenna is terminated in antenna port.			

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

Engineer : Shinichi Takano



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	31.2	30.7	13.8	45.0	44.5	60.0	50.0	15.0	5.5	N	
2	13.56000	30.1	29.6	13.8	43.9	43.4	60.0	50.0	16.1	6.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-02 (E)

Data of Electric field strength of Fundamental emission and Spurious emission within the band: FCC15.225(a)(b)(c)

UL Japan, Inc.
Shonan EMC Lab., No.3 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 1, 2013
Sample No.:	A1-121	Temperature:	25deg.C
Power:	DC5V	Humidity:	59% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai

Remarks: : Card Type A (Axis:Hor_Z / Ver_Y) , Vertical polarization (antenna angle) of the worst case: 135deg

Fundamental emission

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.560	72.0	80.2	18.9	6.3	32.2	65.0	73.2	123.9	58.9	50.7

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]
Field strength of 13.553MHz to 13.567MHz Limit(3m) = 83.9dBuV/m + 40log 30m/3m
= 123.9dBuV/m (FCC15.225(a))

Spurious emission within the band

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.110	32.6	38.1	18.9	6.3	32.2	25.6	31.1	69.5	43.9	38.4
2	13.410	48.8	57.5	18.9	6.3	32.2	41.8	50.5	80.5	38.7	30.0
3	13.553	57.4	66.0	18.9	6.3	32.2	50.4	59.0	90.4	40.0	31.4
4	13.567	57.2	65.9	18.9	6.3	32.2	50.2	58.9	90.4	40.2	31.5
5	13.710	47.7	56.2	18.9	6.3	32.2	40.7	49.2	80.5	39.8	31.3
6	14.010	32.3	37.2	18.9	6.3	32.2	25.3	30.2	69.5	44.2	39.3

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

Outside filed strength frequencies
・Fc±7kHz:13.553MHz to 13.567MHz
・Fc±150kHz:13.410MHz to 13.710MHz
・Fc±450kHz:13.110MHz to 14.010MHz
Fc = 13.56MHz

Limits (3m)
・13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m + 40log30m/3m = 90.4dBuV/m (FCC15.225(b))
・13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m + 40log30m/3m = 80.5dBuV/m (15.225(c))
・Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m + 40log30m/3m = 69.5dBuV/m (FCC15.225(d)and FCC15.209)

Data of Electric field strength of Fundamental emission and Spurious emission within the band: FCC15.225(a)(b)(c)

UL Japan, Inc.
Shonan EMC Lab., No.1 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	66% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Shinichi Takano

Remarks: : Card Type B (Axis:Hor_Z / Ver_Y) , Vertical polarization (antenna angle) of the worst case: 135deg

Fundamental emission

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.560	72.7	82.2	18.9	6.5	31.8	66.3	75.8	123.9	57.6	48.1

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]
Field strength of 13.553MHz to 13.567MHz Limit(3m) = 83.9dBuV/m + 40log 30m/3m
= 123.9dBuV/m (FCC15.225(a))

Spurious emission within the band

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.110	30.4	32.6	18.9	6.5	31.8	24.0	26.2	69.5	45.5	43.3
2	13.410	36.6	44.9	18.9	6.5	31.8	30.2	38.5	80.5	50.3	42.0
3	13.553	59.0	68.4	18.9	6.5	31.8	52.6	62.0	90.4	37.8	28.4
4	13.567	58.4	67.9	18.9	6.5	31.8	52.0	61.5	90.4	38.4	28.9
5	13.710	35.6	43.8	18.9	6.5	31.8	29.2	37.4	80.5	51.3	43.1
6	14.010	30.3	32.5	18.9	6.5	31.8	23.9	26.1	69.5	45.6	43.4

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

Outside filed strength frequencies
・Fc±7kHz:13.553MHz to 13.567MHz
・Fc±150kHz:13.410MHz to 13.710MHz
・Fc±450kHz:13.110MHz to 14.010MHz
Fc = 13.56MHz

Limits (3m)
・13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m + 40log30m/3m = 90.4dBuV/m (FCC15.225(b))
・13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m + 40log30m/3m = 80.5dBuV/m (15.225(c))
・Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m + 40log30m/3m = 69.5dBuV/m (FCC15.225(d)and FCC15.209)

Data of Electric field strength of Fundamental emission and Spurious emission within the band: FCC15.225(a)(b)(c)

UL Japan, Inc.
Shonan EMC Lab., No.1 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	66% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Shinichi Takano

Remarks: : Card Type C (Axis:Hor_Z / Ver_Y) , Vertical polarization (antenna angle) of the worst case: 135deg

Fundamental emission

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.560	69.7	79.5	18.9	6.5	31.8	63.3	73.1	123.9	60.6	50.8

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]
Field strength of 13.553MHz to 13.567MHz Limit(3m) = 83.9dBuV/m + 40log 30m/3m
= 123.9dBuV/m (FCC15.225(a))

Spurious emission within the band

No.	FREQ	Test Receiver Reading		Antenna Factor	LOSS	AMP GAIN	RESULT		LIMIT (3m)	MARGIN	
		Hor	Ver				Hor	Ver		Hor	Ver
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
1	13.110	30.1	30.3	18.9	6.5	31.8	23.7	23.9	69.5	45.8	45.6
2	13.410	40.2	49.5	18.9	6.5	31.8	33.8	43.1	80.5	46.7	37.4
3	13.553	55.6	65.5	18.9	6.5	31.8	49.2	59.1	90.4	41.2	31.3
4	13.567	55.1	64.9	18.9	6.5	31.8	48.7	58.5	90.4	41.7	31.9
5	13.710	39.2	48.4	18.9	6.5	31.8	32.8	42	80.5	47.7	38.5
6	14.010	30.0	30.1	18.9	6.5	31.8	23.6	23.7	69.5	45.9	45.8

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

Outside filed strength frequencies
・Fc±7kHz:13.553MHz to 13.567MHz
・Fc±150kHz:13.410MHz to 13.710MHz
・Fc±450kHz:13.110MHz to 14.010MHz
Fc = 13.56MHz

Limits (3m)
・13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.4dBuV/m + 40log30m/3m = 90.4dBuV/m (FCC15.225(b))
・13.110MHz to 13.410MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m + 40log30m/3m = 80.5dBuV/m (15.225(c))
・Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m + 40log30m/3m = 69.5dBuV/m (FCC15.225(d)and FCC15.209)

Radiated Emission

UL Japan, Inc.
Shonan EMC Lab., No.3 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 1, 2013
Sample No.:	A1-121	Temperature:	25deg.C
Power:	DC5V	Humidity:	59% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai
EUT axis:	Below 30MHz(Horizontal Z-axis, Vertical Y-axis), Above 30MHz(Horizontal: Z-axis, Vertical: Z-axis)		
Remarks:	Card TypeA		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	27.12	QP	35.2	19.0	6.5	32.2	28.5	69.5	41.0	-	172	
Hori.	40.68	QP	41.6	14.3	6.6	32.2	30.3	40.0	9.7	359	359	
Hori.	54.24	QP	27.3	9.6	6.7	32.2	11.4	40.0	28.6	376	1	
Hori.	67.80	QP	49.3	6.8	6.5	32.1	30.5	40.0	9.5	264	359	
Hori.	81.36	QP	29.5	6.7	7.5	32.1	11.6	40.0	28.4	236	74	
Hori.	94.92	QP	28.5	9.2	7.4	32.1	13.0	43.5	30.5	320	116	
Hori.	108.48	QP	26.3	11.4	7.2	32.1	12.8	43.5	30.7	288	247	
Hori.	122.04	QP	26.9	13.1	7.2	32.1	15.1	43.5	28.4	164	83	
Hori.	135.60	QP	25.1	14.2	7.4	32.1	14.6	43.5	28.9	222	283	
Hori.	474.60	QP	43.4	17.2	9.4	31.9	38.1	46.0	7.9	219	228	
Hori.	501.72	QP	46.2	17.5	9.5	32.0	41.2	46.0	4.8	204	78	
Vert.	27.12	QP	40.7	19.0	6.5	32.2	34.0	69.5	35.5	-	105	Antenna angle: 135deg
Vert.	40.68	QP	48.2	14.3	6.6	32.2	36.9	40.0	**3.1**	100	252	
Vert.	54.24	QP	34.6	9.6	6.7	32.2	18.7	40.0	21.3	100	279	
Vert.	67.80	QP	48.1	6.8	6.5	32.1	29.3	40.0	10.7	100	267	
Vert.	81.36	QP	47.4	6.7	7.5	32.1	29.5	40.0	10.5	112	141	
Vert.	94.92	QP	45.8	9.2	7.4	32.1	30.3	43.5	13.2	100	140	
Vert.	108.48	QP	34.7	11.4	7.2	32.1	21.2	43.5	22.3	100	156	
Vert.	122.04	QP	30.8	13.1	7.2	32.1	19.0	43.5	24.5	100	92	
Vert.	135.60	QP	31.3	14.2	7.4	32.1	20.8	43.5	22.7	100	149	
Vert.	501.72	QP	39.4	17.5	9.5	32.0	34.4	46.0	11.6	100	351	

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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Radiated Emission

UL Japan, Inc.
Shonan EMC Lab., No.1 and No.3 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225	
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m	
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 1, 2013	July 2, 2013
Sample No.:	A1-121	Temperature:	25deg.C	24deg.C
Power:	DC5V	Humidity:	59% RH	66% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Shinichi Takano	Shinichi Takano
EUT axis:	Below 30MHz(Horizontal Z-axis, Vertical Y-axis),		(No.3 SAC)	(No.1 SAC)
	Above 30MHz(Horizontal: Z-axis, Vertical: Z-axis)			
Remarks:	Card TypeB			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	27.12	QP	34.2	19.0	6.8	31.8	28.2	69.5	41.3	-	279	
Hori.	40.68	QP	41.3	14.3	6.6	32.2	30.0	40.0	10.0	329	359	
Hori.	54.24	QP	26.0	9.6	6.7	32.2	10.1	40.0	29.9	400	33	
Hori.	67.80	QP	34.9	6.8	6.5	32.1	16.1	40.0	23.9	250	184	
Hori.	81.36	QP	31.4	6.7	7.5	32.1	13.5	40.0	26.5	227	259	
Hori.	94.92	QP	32.7	9.2	7.4	32.1	17.2	43.5	26.3	293	290	
Hori.	108.48	QP	27.9	11.4	7.2	32.1	14.4	43.5	29.1	168	250	
Hori.	122.04	QP	30.7	13.1	7.2	32.1	18.9	43.5	24.6	147	255	
Hori.	135.60	QP	24.6	14.2	7.4	32.1	14.1	43.5	29.4	245	81	
Hori.	393.24	QP	44.4	16.0	9.0	32.0	37.4	46.0	8.6	100	98	
Hori.	474.60	QP	45.3	17.2	9.4	31.9	40.0	46.0	6.0	216	89	
Hori.	488.16	QP	44.9	17.3	9.4	31.9	39.7	46.0	6.3	203	247	
Hori.	501.72	QP	46.3	17.5	9.5	32.0	41.3	46.0	4.7	204	89	
Hori.	515.28	QP	42.4	17.7	9.5	32.0	37.6	46.0	8.4	183	240	
Vert.	27.12	QP	41.6	19.0	6.8	31.8	35.6	69.5	33.9	-	141	Antenna angle: 135deg
Vert.	40.68	QP	48.6	14.3	6.6	32.2	37.3	40.0	**2.7**	100	87	
Vert.	54.24	QP	34.7	9.6	6.7	32.2	18.8	40.0	21.2	100	111	
Vert.	67.80	QP	46.6	6.8	6.5	32.1	27.8	40.0	12.2	100	86	
Vert.	81.36	QP	47.9	6.7	7.5	32.1	30.0	40.0	10.0	100	167	
Vert.	82.64	QP	50.1	6.9	7.5	32.1	32.4	40.0	7.6	100	177	
Vert.	86.08	QP	49.9	7.5	7.5	32.1	32.8	40.0	7.2	100	181	
Vert.	94.92	QP	47.4	9.2	7.4	32.1	31.9	43.5	11.6	100	268	
Vert.	108.48	QP	35.6	11.4	7.2	32.1	22.1	43.5	21.4	100	359	
Vert.	122.04	QP	36.0	13.1	7.2	32.1	24.2	43.5	19.3	100	83	
Vert.	135.60	QP	33.7	14.2	7.4	32.1	23.2	43.5	20.3	100	182	
Vert.	501.72	QP	39.1	17.5	9.5	32.0	34.1	46.0	11.9	100	359	

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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Radiated Emission

UL Japan, Inc.
Shonan EMC Lab., No.1 and No.3 Semi-Anechoic Chamber

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225	
Equipment:	Non-contact type IC card reader/writer	Test Distance:	3m	
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 1, 2013	July 2, 2013
Sample No.:	A1-121	Temperature:	25deg.C	24deg.C
Power:	DC5V	Humidity:	59% RH	66% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Shinichi Takano	Shinichi Takano
EUT axis:	Below 30MHz(Horizontal Z-axis, Vertical Y-axis),		(No.3 SAC)	(No.1 SAC)
	Above 30MHz(Horizontal: Z-axis, Vertical: Z-axis)			
Remarks:	Card Type C			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	27.12	QP	40.8	19.0	6.8	31.8	34.8	69.5	34.7	-	220	
Hori.	40.68	QP	42.5	14.3	6.6	32.2	31.2	40.0	8.8	343	359	
Hori.	54.24	QP	39.2	9.6	6.7	32.2	23.3	40.0	16.7	400	175	
Hori.	67.80	QP	36.3	6.8	6.5	32.1	17.5	40.0	22.5	262	165	
Hori.	81.36	QP	36.5	6.7	7.5	32.1	18.6	40.0	21.4	209	0	
Hori.	94.92	QP	33.1	9.2	7.4	32.1	17.6	43.5	25.9	171	159	
Hori.	108.48	QP	28.2	11.4	7.2	32.1	14.7	43.5	28.8	151	155	
Hori.	122.04	QP	26.7	13.1	7.2	32.1	14.9	43.5	28.6	152	265	
Hori.	135.60	QP	25.3	14.2	7.4	32.1	14.8	43.5	28.7	239	313	
Hori.	393.24	QP	44.2	16.0	9.0	32.0	37.2	46.0	8.8	100	93	
Hori.	474.60	QP	44.8	17.2	9.4	31.9	39.5	46.0	6.5	218	83	
Hori.	488.16	QP	44.8	17.3	9.4	31.9	39.6	46.0	6.4	201	254	
Hori.	501.72	QP	46.2	17.5	9.5	32.0	41.2	46.0	4.8	208	84	
Hori.	515.28	QP	42.1	17.7	9.5	32.0	37.3	46.0	8.7	184	248	
Vert.	27.12	QP	48.7	19.0	6.8	31.8	42.7	69.5	26.8	-	133	Antenna angle: 135deg
Vert.	40.68	QP	50.0	14.3	6.6	32.2	38.7	40.0	**1.3**	100	91	
Vert.	54.24	QP	47.7	9.6	6.7	32.2	31.8	40.0	8.2	100	86	
Vert.	67.80	QP	47.1	6.8	6.5	32.1	28.3	40.0	11.7	100	93	
Vert.	79.41	QP	48.5	6.4	7.4	32.1	30.2	40.0	9.8	100	172	
Vert.	81.36	QP	47.3	6.7	7.5	32.1	29.4	40.0	10.6	100	109	
Vert.	86.29	QP	49.9	7.5	7.5	32.1	32.8	40.0	7.2	100	163	
Vert.	94.92	QP	42.9	9.2	7.4	32.1	27.4	43.5	16.1	100	267	
Vert.	108.48	QP	36.8	11.4	7.2	32.1	23.3	43.5	20.2	100	95	
Vert.	122.04	QP	30.7	13.1	7.2	32.1	18.9	43.5	24.6	100	266	
Vert.	135.60	QP	31.0	14.2	7.4	32.1	20.5	43.5	23.0	100	286	
Vert.	501.72	QP	38.0	17.5	9.5	32.0	33.0	46.0	13.0	100	359	

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559884	-0.000116	-0.00086	0.01
after 2minutes	13.56	13.559852	-0.000148	-0.00109	0.01
after 5minutes	13.56	13.559852	-0.000148	-0.00109	0.01
after 10minutes	13.56	13.559850	-0.000150	-0.00111	0.01

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559943	-0.000057	-0.00042	0.01
after 2minutes	13.56	13.559924	-0.000076	-0.00056	0.01
after 5minutes	13.56	13.559923	-0.000077	-0.00057	0.01
after 10minutes	13.56	13.559923	-0.000077	-0.00057	0.01

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560033	0.000033	0.00024	0.01
after 2minutes	13.56	13.560000	0.000000	0.00000	0.01
after 5minutes	13.56	13.560005	0.000005	0.00004	0.01
after 10minutes	13.56	13.560003	0.000003	0.00002	0.01

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560111	0.000111	0.00082	0.01
after 2minutes	13.56	13.560084	0.000084	0.00062	0.01
after 5minutes	13.56	13.560082	0.000082	0.00060	0.01
after 10minutes	13.56	13.560081	0.000081	0.00060	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560173	0.000173	0.00128	0.01
after 2minutes	13.56	13.560152	0.000152	0.00112	0.01
after 5minutes	13.56	13.560150	0.000150	0.00111	0.01
after 10minutes	13.56	13.560150	0.000150	0.00111	0.01

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560223	0.000223	0.00164	0.01
after 2minutes	13.56	13.560210	0.000210	0.00155	0.01
after 5minutes	13.56	13.560211	0.000211	0.00156	0.01
after 10minutes	13.56	13.560211	0.000211	0.00156	0.01

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560256	0.000256	0.00189	0.01
after 2minutes	13.56	13.560250	0.000250	0.00184	0.01
after 5minutes	13.56	13.560250	0.000250	0.00184	0.01
after 10minutes	13.56	13.560250	0.000250	0.00184	0.01

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560252	0.000252	0.00186	0.01
after 2minutes	13.56	13.560258	0.000258	0.00190	0.01
after 5minutes	13.56	13.560258	0.000258	0.00190	0.01
after 10minutes	13.56	13.560259	0.000259	0.00191	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai

Input Voltage:DC4.25V (85%)
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560048	0.000048	0.00035	0.01
after 2minutes	13.56	13.560010	0.000010	0.00007	0.01
after 5minutes	13.56	13.559986	-0.000014	-0.00010	0.01
after 10minutes	13.56	13.559976	-0.000024	-0.00018	0.01

Input Voltage:DC5.75V (115%)
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.559983	-0.000017	-0.00013	0.01
after 2minutes	13.56	13.559920	-0.000080	-0.00059	0.01
after 5minutes	13.56	13.559893	-0.000107	-0.00079	0.01
after 10minutes	13.56	13.559874	-0.000126	-0.00093	0.01

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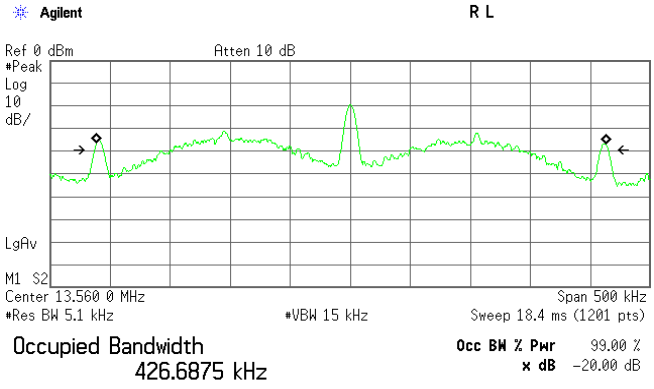
20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

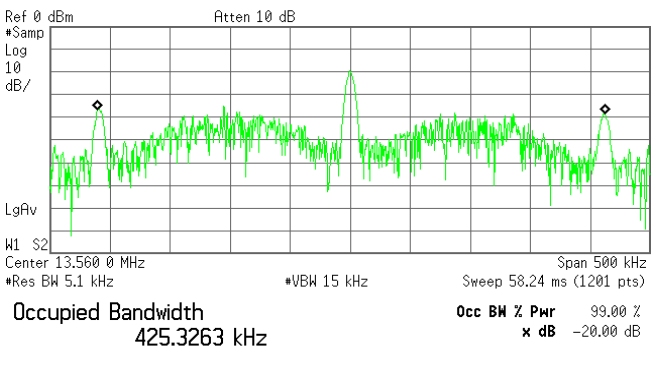
Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 Subpart C 15.215
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai
Remarks:	Card Type A		

20dB Bandwidth: 430.673 kHz



Transmit Freq Error	732.652 Hz
Occupied Bandwidth	430.673 kHz

99% Occupied Bandwidth: 425.326 kHz



Transmit Freq Error	795.574 Hz
x dB Bandwidth	427.127 kHz*

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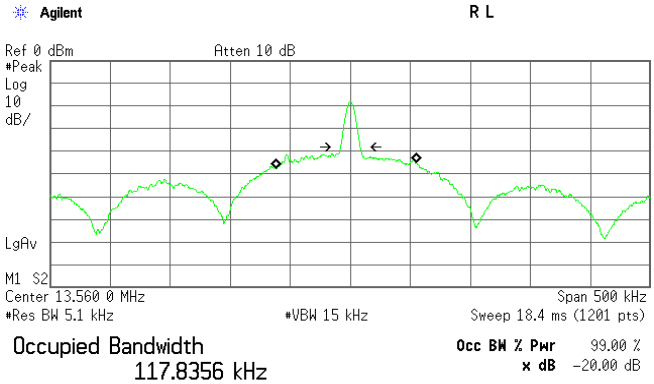
20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

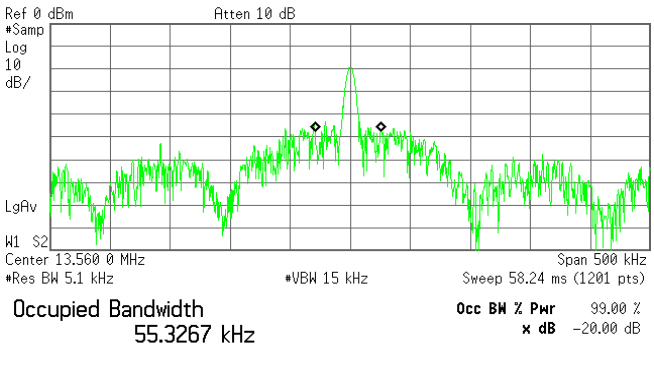
Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 Subpart C 15.215
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai
Remarks:	Card Typr B		

20dB Bandwidth: 16.811 kHz



Transmit Freq Error	-3.273 kHz
Occupied Bandwidth	16.811 kHz

99% Occupied Bandwidth: 55.327 kHz



Transmit Freq Error	-1.854 kHz
x dB Bandwidth	13.628 kHz*

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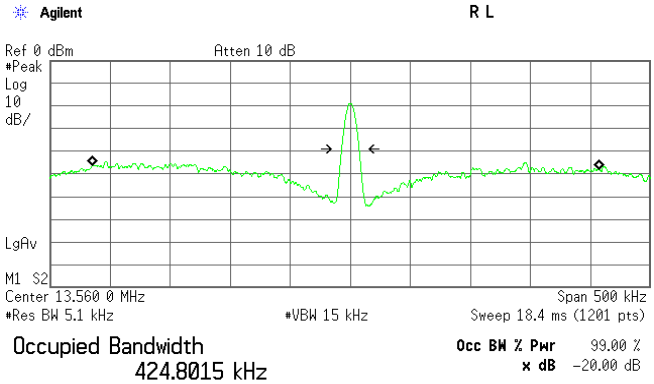
20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

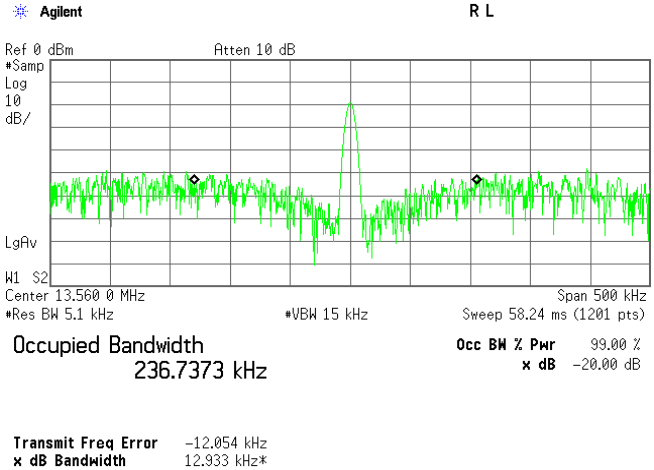
UL Japan, Inc.
Shonan EMC Lab. No.5 Shield room

Company:	GLORY AZ System Co.,Ltd	Regulation:	FCC Part15 Subpart C 15.215
Equipment:	Non-contact type IC card reader/writer		
Model:	HW312CSM-AZ Reader/Writer UNIT	Date:	July 2, 2013
Sample No.:	A1-121	Temperature:	24deg.C
Power:	DC5V	Humidity:	45%RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Tatsuya Arai
Remarks:	Card Type C		

20dB Bandwidth: 14.914 kHz



99% Occupied Bandwidth: 236.737 kHz



APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE,CE	2013/02/27 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE,CE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE,CE	-
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2012/10/31 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2013/04/03 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2013/02/21 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2013/03/07 * 12
SSP-01	Search Probe	Nisshin Electric	NSP-01	-	BW/FT	-
SFC-01	Microwave Counter	Agilent	53151A	US40511493	FT	2013/03/26 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	BW	2013/01/08 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	FT	2013/04/17 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2013/02/12 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2013/04/04 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2013/02/27 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE,CE	2012/10/04 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE,CE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2012/09/11 * 12
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2013/04/04 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	CE	2013/03/07 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission ,
RE: Radiated emission ,
BW: Bandwidth ,
FT: Frequency tolerance