

# DATA OF CONDUCTION TEST

UL Japan, Inc.  
YAMAKITA No.1 SHIELD ROOM  
Report No. : 281E0227-YK-B-R2

Applicant : ART Technology Co., Ltd.  
Kind of Equipment : RFID Reader/Writer Unit ASI4000  
Model No. : ASI4000-98-BS1  
Serial No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)  
Remarks :  
Date : 6/20/2008  
Phase : Single Phase  
Temperature : 21 °C Engineer : Go Ishiwata  
Humidity : 64 %  
Regulation : FCC Part15C § 15.207. (CISPR Pub. 22 )

No.	FREQ. [MHz]	READING(N)		READING(L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP	AV	QP	AV				QP	AV	QP	AV	QP	AV
		[dB μ V]		[dB μ V]					[dB]	[dB μ V]	[dB μ V]		[dB]	
1.	0.1500	25.7	—	26.6	—	0.1	0.1	0.0	26.8	—	66.0	56.0	39.2	—
2.	0.1815	23.6	—	24.7	—	0.1	0.1	0.0	24.9	—	64.4	54.4	39.5	—
3.	0.2270	26.3	—	26.0	—	0.1	0.1	0.0	26.5	—	62.6	52.6	36.1	—
4.	10.2599	24.8	—	22.8	—	0.3	1.1	0.0	26.2	—	60.0	50.0	33.8	—
5.	17.1871	26.0	—	25.3	—	0.5	1.5	0.0	28.0	—	60.0	50.0	32.0	—
6.	18.4430	24.1	—	24.5	—	0.5	1.6	0.0	26.6	—	60.0	50.0	33.4	—

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

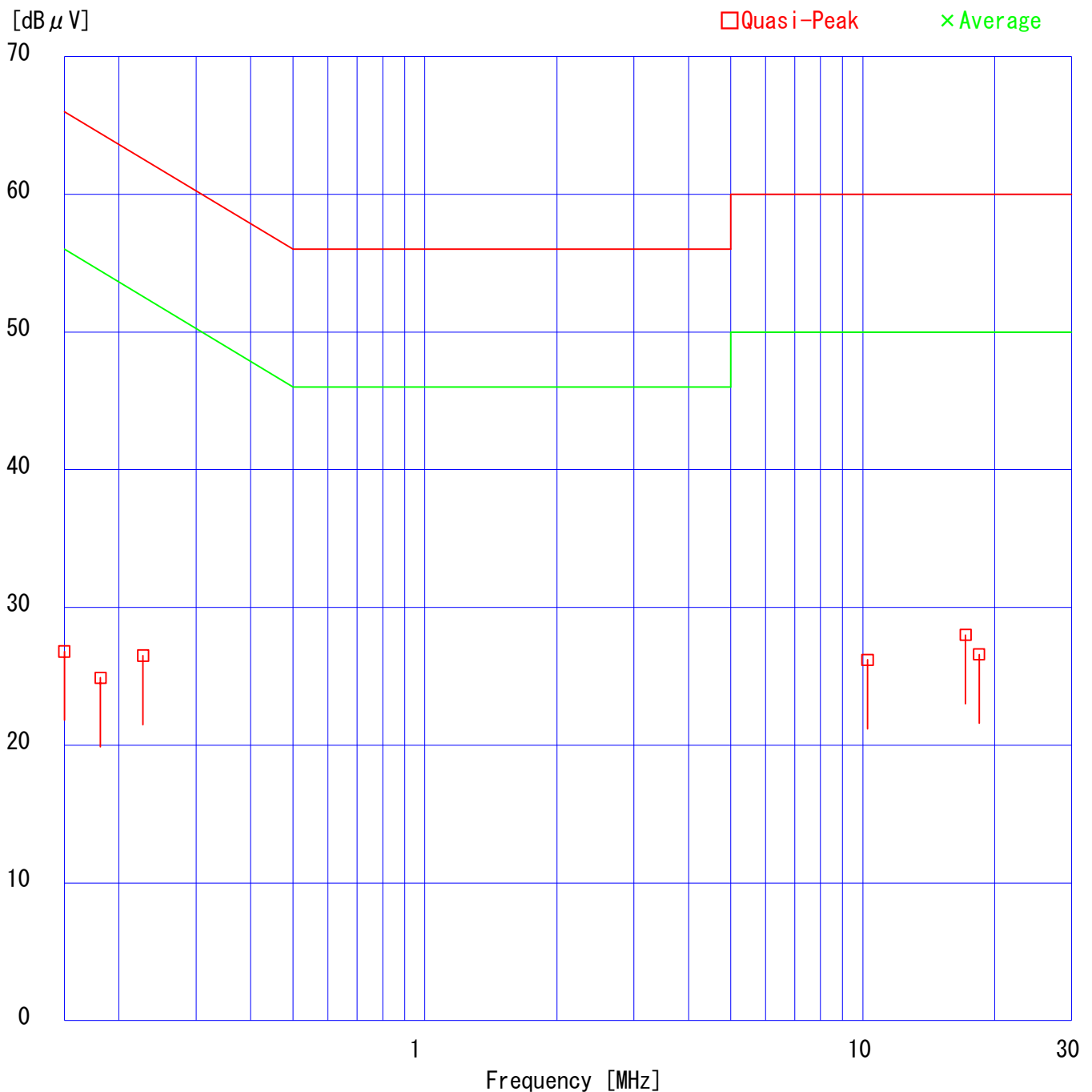
■ LISN: KLS-02 (NSLK8127) ■ COAXIAL CABLE: KCC-14/15/16/18  
■ PULSE LIMITTER: KPL-01 (PLO1) ■ EMI RECEIVER: KTR-02 (ESCS30)

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Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)  
Remarks :  
Date : 6/20/2008  
Phase : Single Phase  
Temperature : 21 °C  
Humidity : 64 %  
Regulation : FCC Part15C § 15.207. (CISPR Pub. 22 )

Engineer : Go Ishiwata



# DATA OF CONDUCTION TEST CHART

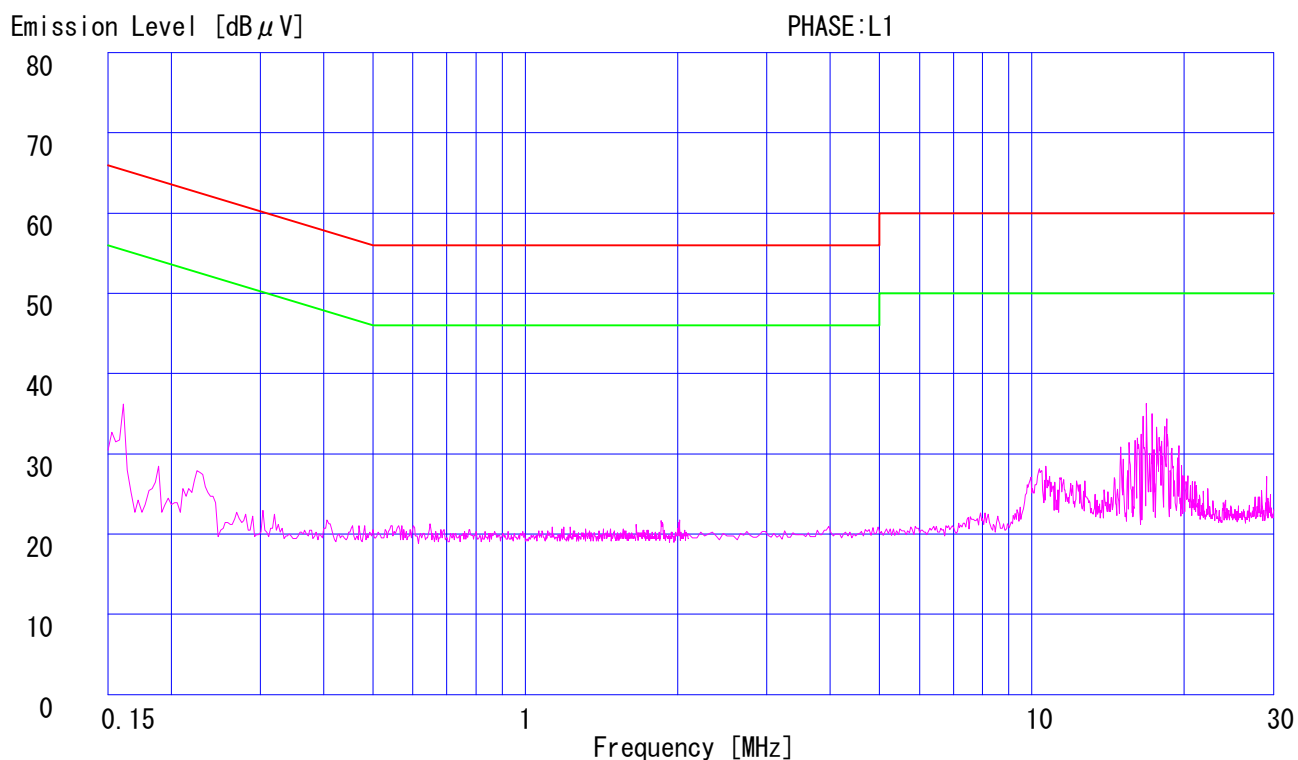
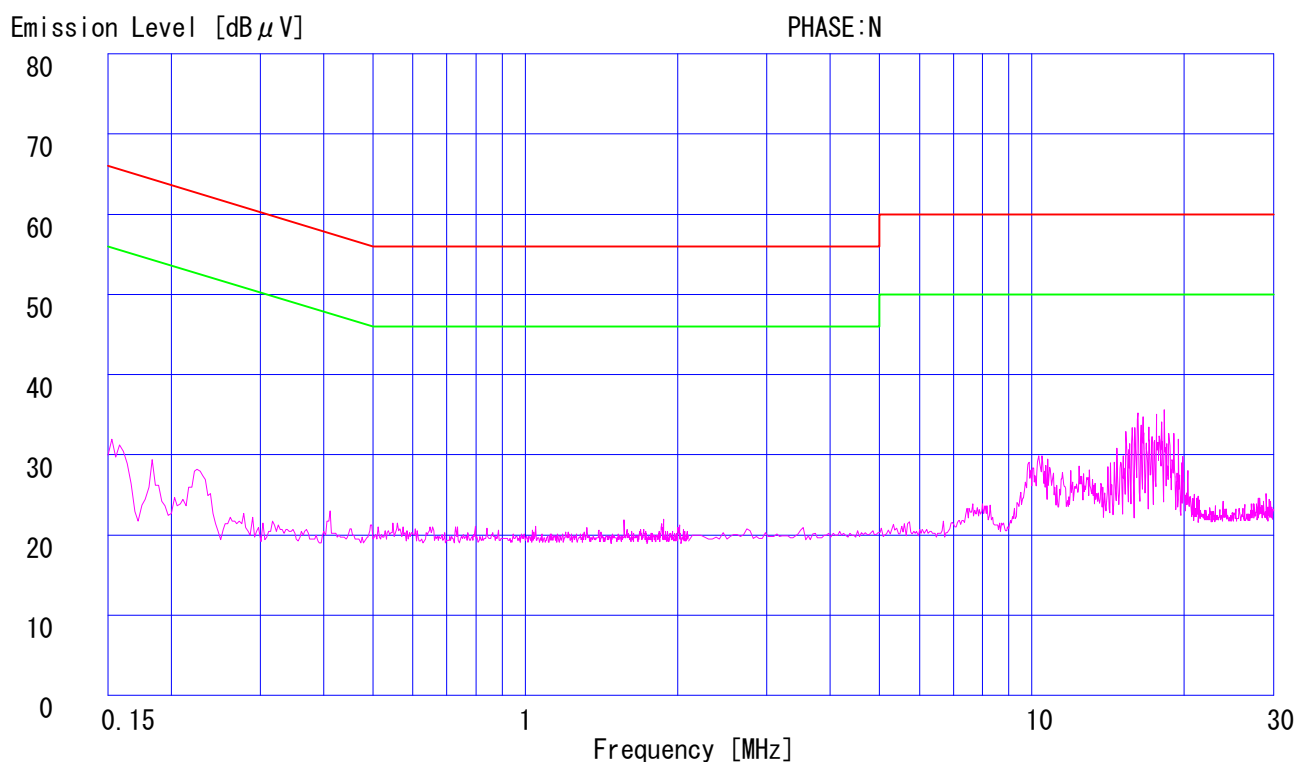
UL Japan, Inc.

YAMAKITA No.1 SHIELD ROOM

Report No. : 281E0227-YK-B-R2

Applicant : ART Technology Co., Ltd.  
Kind of Equipment : RFID Reader/Writer Unit ASI4000  
Model No. : ASI4000-98-BS1  
Serial No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)  
Remarks :  
Date : 6/20/2008  
Phase : Single Phase  
Temperature : 21 °C  
Humidity : 64 %  
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub. 22 )  
Regulation 2 : None

Engineer : Go Ishiwata



# Data of Field Strength and Outside Filed Strength: FCC15.225

UL Japan, Inc.  
YAMAKITA No1 Anechoic Chamber

Company	: ART Technology Co.,Ltd.	Report No.	: 28IE0227-YK-B-R2
Equipment	: RFID Reader/Writer Unit ASI4000	Regulation	: FCC Part15 SupartC 15.225
Model	: ASI4000-98-BS1	Test Distance	: 3m
Sample No.	: 7D8610001	Date	: 2008/06/27
Power	: AC120V/60Hz	Temperature	: 23deg.C
Mode	: Transmitting (13.56MHz)	Humidity	: 66%
Remarks: Module built-in			

ENGINEER : Akira Sato

## Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	47.3	42.2	19.7	6.0	0.7	27.7	46.0	40.9	124.0	78.0	83.1

Field strength of 13.553MHz to 13.567MHz Limit(3m) = 84dBuV/m + 40log 30m/3m  
= 124dBuV/m (FCC15.225(a))

## Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	26.2	26.3	19.7	6.0	0.7	27.7	24.9	25.0	69.5	44.60	44.50
2	13.410	26.1	26.3	19.7	6.0	0.7	27.7	24.8	25.0	80.5	55.70	55.50
3	13.553	34.5	30.0	19.7	6.0	0.7	27.7	33.2	28.7	90.5	57.30	61.80
4	13.567	35.1	30.3	19.7	6.0	0.7	27.7	33.8	29.0	90.5	56.70	61.50
5	13.710	26.1	26.5	19.8	6.0	0.7	27.7	24.9	25.3	80.5	55.60	55.20
6	14.010	26.3	26.3	19.8	6.0	0.7	27.7	25.1	25.1	69.5	44.40	44.40

### Outside filed strength frequencies

- filed strength band  $F_c \pm 7\text{kHz}$ : 13.553MHz to 13.567MHz
  - Outside filde strength  $F_c \pm 150\text{kHz}$ : 13.410MHz to 13.710MHz
  - Outside filde strength  $F_c \pm 450\text{kHz}$ : 13.110MHz to 14.010MHz
- $F_c = 13.56\text{MHz}$

### Limits (3m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz :  $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$  (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz :  $40.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 80.5\text{dBuV/m}$  (15.225(c))
- Below 13.110MHz and Above 14.010MHz :  $29.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 69.5\text{dBuV/m}$  (FCC15.225(d)and FCC15.209)

# Data of Field Strength and Outside Filed Strength: FCC15.225

UL Japan, Inc.  
YAMAKITA No1 Anechoic Chamber

Company : ART Technology Co.,Ltd.  
Equipment : RFID Reader/Writer Unit ASI4000  
Model : ASI4000-98-BS1  
Sample No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting (13.56MHz)

Report No. : 28IE0227-YK-B-R2  
Regulation : FCC Part15 SupartC 15.225  
Test Distance : 3m  
Date : 2008/06/25  
Temperature : 21deg.C  
Humidity : 66%

Remarks: Module alone

ENGINEER : Takahiro Suzuki

## Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	56.4	61.3	19.7	6.0	0.7	27.7	55.1	60.0	124.0	68.9	64.0

Field strength of 13.553MHz to 13.567MHz Limit(3m) = 84dBuV/m + 40log 30m/3m  
= 124dBuV/m (FCC15.225(a))

## Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]					Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	26.6	27.3	19.7	6.0	0.7	27.7	25.3	26.0	69.5	44.20	43.50
2	13.410	25.6	25.7	19.7	6.0	0.7	27.7	24.3	24.4	80.5	56.20	56.10
3	13.553	32.1	37.3	19.7	6.0	0.7	27.7	30.8	36.0	90.5	59.70	54.50
4	13.567	32.9	38.1	19.7	6.0	0.7	27.7	31.6	36.8	90.5	58.90	53.70
5	13.710	25.6	25.6	19.8	6.0	0.7	27.7	24.4	24.4	80.5	56.10	56.10
6	14.010	25.8	26.9	19.8	6.0	0.7	27.7	24.6	25.7	69.5	44.90	43.80

Outside filed strength frequencies

- filed strength band  $F_c \pm 7\text{kHz}$ : 13.553MHz to 13.567MHz
  - Outside filde strength  $F_c \pm 150\text{kHz}$ : 13.410MHz to 13.710MHz
  - Outside filde strength  $F_c \pm 450\text{kHz}$ : 13.110MHz to 14.010MHz
- $F_c = 13.56\text{MHz}$

Limits (3m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz :  $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$  (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz :  $40.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 80.5\text{dBuV/m}$  (15.225(c))
- Below 13.110MHz and Above 14.010MHz :  $29.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 69.5\text{dBuV/m}$  (FCC15.225(d)and FCC15.209)

# DATA OF RADIATION TEST

UL Japan, Inc.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 281E0227-YK-B-R2

Applicant : ART Technology Co., Ltd.  
Kind of Equipment : RFID Reader/Writer Unit ASI4000  
Model No. : ASI4000-98-BS1  
Serial No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting(13.56MHz)  
Remarks : Module built-in  
Date : 6/27/2008  
Test Distance : 3 m  
Temperature : 23 °C Engineer : Akira Sato  
Humidity : 66 %  
Regulation : FCC Part15C § 15.209 9KHz-30MHz (3m)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB $\mu$ V/m]	MARGIN	
			HOR [dB $\mu$ V]	VER [dB $\mu$ V]					HOR [dB $\mu$ V/m]	VER [dB $\mu$ V/m]		HOR [dB]	VER [dB]
1.	0.73	BB	28.6	31.9	19.6	28.3	0.2	6.0	26.1	29.4	70.3	44.2	40.9
2.	1.84	BB	26.6	26.7	19.6	28.4	0.3	6.0	24.1	24.2	69.5	45.4	45.3
3.	27.12	BB	24.8	25.4	21.4	28.4	1.0	6.0	24.8	25.4	69.5	44.7	44.1

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KLP-01 (HFH2-Z2) 0.009-30MHz

■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-01 (ES140)

# DATA OF RADIATION TEST

UL Japan, Inc.

YAMAKITA No.1 ANECHOIC CHAMBER

Report No. : 281E0227-YK-B-R2

Applicant : ART Technology Co., Ltd.  
 Kind of Equipment : RFID Reader/Writer Unit ASI4000  
 Model No. : ASI4000-98-BS1  
 Serial No. : 7D8610001  
 Power : AC120V/60Hz  
 Mode : Transmitting(13.56MHz)  
 Remarks : Module built-in  
 Date : 6/27/2008  
 Test Distance : 3 m  
 Temperature : 23 °C  
 Humidity : 66 %  
 Regulation : FCC Part15C § 15.209

Engineer : Akira Sato

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	34.32	BB	21.7	29.3	16.9	28.5	1.2	6.0	17.3	24.9	40.0	22.7	15.1
2.	40.72	BB	24.8	29.7	13.5	28.5	1.3	6.0	17.1	22.0	40.0	22.9	18.0
3.	54.32	BB	27.0	29.4	9.2	28.4	1.5	6.0	15.3	17.7	40.0	24.7	22.3
4.	67.75	BB	30.4	27.5	6.7	28.3	1.7	6.0	16.5	13.6	40.0	23.5	26.4
5.	81.29	BB	30.8	34.7	6.6	28.3	1.9	6.0	17.0	20.9	40.0	23.0	19.1
6.	94.82	BB	28.4	29.0	9.2	28.2	2.0	6.0	17.4	18.0	43.5	26.1	25.5
7.	108.37	BB	34.1	37.4	11.3	28.2	2.2	6.0	25.4	28.7	43.5	18.1	14.8
8.	121.90	BB	29.3	32.5	13.0	28.2	2.3	6.0	22.4	25.6	43.5	21.1	17.9
9.	135.46	BB	28.3	28.1	13.9	28.2	2.5	6.0	22.5	22.3	43.5	21.0	21.2
10.	148.29	BB	27.5	28.4	14.6	28.1	2.6	6.0	22.6	23.5	43.5	20.9	20.0
11.	189.65	BB	22.2	20.3	16.5	27.8	3.0	6.0	19.9	18.0	43.5	23.6	25.5
12.	298.02	BB	20.1	22.3	20.2	27.6	3.8	6.0	22.5	24.7	46.0	23.5	21.3
13.	311.54	BB	29.3	28.4	14.9	27.6	3.9	6.0	26.5	25.6	46.0	19.5	20.4
14.	392.81	BB	23.4	26.6	17.0	28.3	4.4	6.0	22.5	25.7	46.0	23.5	20.3

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KBA-03 (BBA9106) 30-299.99MHz/KLA-03 (USLP9143) 300-1000MHz  
 ■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-01 (ES140)

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# DATA OF RADIATION TEST

UL Japan, Inc.

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Report No. : 281E0227-YK-B-R2

Applicant : ART Technology Co., Ltd.  
Kind of Equipment : RFID Reader/Writer Unit ASI4000  
Model No. : ASI4000-98-BS1  
Serial No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting(13.56MHz)  
Remarks : Module alone  
Date : 6/10/2008  
Test Distance : 3 m  
Temperature : 22 °C Engineer : Makoto Hosaka  
Humidity : 62 %  
Regulation : FCC Part15C § 15.209 9KHz-30MHz (3m)

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	0.73	BB	41.5	38.7	19.1	28.3	0.2	6.0	38.5	35.7	70.3	31.8	34.6
2.	1.83	BB	37.0	31.5	19.1	28.4	0.3	6.0	34.0	28.5	69.5	35.5	41.0
3.	27.09	BB	36.4	45.0	20.4	28.4	1.0	6.0	35.4	44.0	69.5	34.1	25.5

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KLP-01 (HFH2-Z2) 0.009-30MHz

■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-03 (ESHS10)



# DATA OF RADIATION TEST

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Kind of Equipment : RFID Reader/Writer Unit ASI4000  
Model No. : ASI4000-98-BS1  
Serial No. : 7D8610001  
Power : AC120V/60Hz  
Mode : Transmitting(13.56MHz)  
Remarks : Module alone  
Date : 6/10/2008  
Test Distance : 3 m  
Temperature : 22 °C  
Humidity : 62 %  
Regulation : FCC Part15C § 15.209

Engineer : Makoto Hosaka

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	34.32	BB	21.7	36.2	16.9	28.5	1.2	6.0	17.3	31.8	40.0	22.7	8.2
2.	40.64	BB	24.1	32.2	13.5	28.5	1.3	6.0	16.4	24.5	40.0	23.6	15.5
3.	54.24	BB	23.7	27.0	9.3	28.4	1.5	6.0	12.1	15.4	40.0	27.9	24.6
4.	67.73	BB	22.5	24.0	6.7	28.3	1.7	6.0	8.6	10.1	40.0	31.4	29.9
5.	81.27	BB	28.4	26.1	6.6	28.3	1.9	6.0	14.6	12.3	40.0	25.4	27.7
6.	94.82	BB	27.9	30.7	9.2	28.2	2.0	6.0	16.9	19.7	43.5	26.6	23.8
7.	108.37	BB	28.6	29.8	11.3	28.2	2.2	6.0	19.9	21.1	43.5	23.6	22.4
8.	121.90	BB	28.5	29.1	13.0	28.2	2.3	6.0	21.6	22.2	43.5	21.9	21.3
9.	121.92	BB	28.8	29.4	13.0	28.2	2.3	6.0	21.9	22.5	43.5	21.6	21.0
10.	135.46	BB	34.2	38.1	13.9	28.2	2.5	6.0	28.4	32.3	43.5	15.1	11.2
11.	149.00	BB	37.9	42.7	14.7	28.1	2.6	6.0	33.1	37.9	43.5	10.4	5.6
12.	189.65	BB	29.0	30.1	16.5	27.8	3.0	6.0	26.7	27.8	43.5	16.8	15.7
13.	298.02	BB	33.3	28.2	20.2	27.6	3.8	6.0	35.7	30.6	46.0	10.3	15.4
14.	311.55	BB	42.9	34.1	14.9	27.6	3.9	6.0	40.1	31.3	46.0	5.9	14.7
15.	392.82	BB	36.1	32.8	17.0	28.3	4.4	6.0	35.2	31.9	46.0	10.8	14.1

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA: KBA-03 (BBA9106) 30-299.99MHz/KLA-03 (USLP9143) 300-1000MHz

■ CABLE: KCC-30/31/32/34 ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-04 (ESVS10)

Page:

Bandwidth: FCC 15.215(c)

COMPANY : ART Technology Co., Ltd.

Equipment : RFID Reader/Writer Unit ASI4000

MODEL NUMBER: ASI4000-98-BS1

SERIAL NUMBER: 7D8610001

POWER : DC5V

UL Japan. Inc. Yamakita No2 Shield room

REPORT No. : 28IE0227-YK-B -R2

REGULATION : FCC Part15SubpartC 215(c)

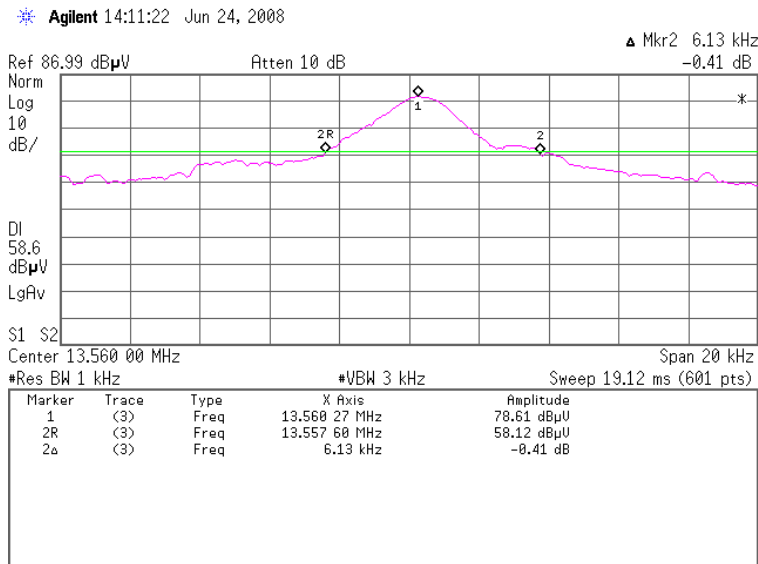
DATE : 2008/06/24

TEMP./HUMI : 24°C/52%

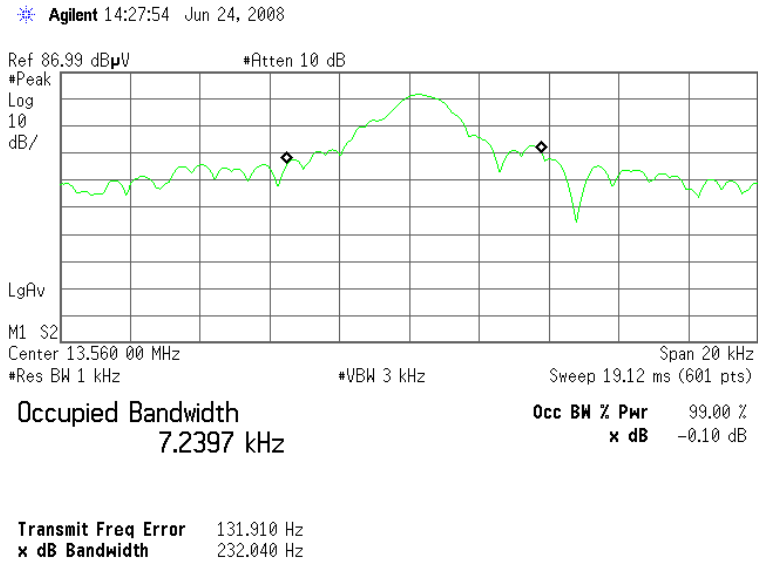
TEST MODE : Transmitting

ENGINEER : Tatsuya Arai

20dB Bandwidth: 6.13kHz



OBW(99%): 7.24kHz



## **Data of Frequency Tolerance: FCC 15.225(e)**

UL Japan, Inc.

YAMAKITA No4 Shield room

Company	: ART Technology Co., Ltd.	Report No.	: 28IE0227-YK-B-R2
Equipment	: RFID Reader/Writer Unit ASI4000	Regulation	: FCC Part15 SupartC 15.225 (e)
Model	: ASI4000-98-BS1		
Sample No.	: 7D8610001	Date	: 2008/6/18
Power	: DC5V	Temperature	: 25deg.C
Mode	: Transmitting (13.56MHz)	Humidity	: 46%

ENGINEER : Tatsuya Arai

### **Temperature Variation: -20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560487	0.000487	0.00359	0.01
after 2minutes	13.56	13.560493	0.000493	0.00364	0.01
after 5minutes	13.56	13.560493	0.000493	0.00364	0.01
after 10minutes	13.56	13.560492	0.000492	0.00363	0.01

### **Temperature Variation: -10deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560490	0.000490	0.00361	0.01
after 2minutes	13.56	13.560481	0.000481	0.00355	0.01
after 5minutes	13.56	13.560470	0.000470	0.00347	0.01
after 10minutes	13.56	13.560471	0.000471	0.00347	0.01

### **Temperature Variation: 0deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560461	0.000461	0.00340	0.01
after 2minutes	13.56	13.560426	0.000426	0.00314	0.01
after 5minutes	13.56	13.560426	0.000426	0.00314	0.01
after 10minutes	13.56	13.560425	0.000425	0.00313	0.01

### **Temperature Variation: 10deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560409	0.000409	0.00302	0.01
after 2minutes	13.56	13.560355	0.000355	0.00262	0.01
after 5minutes	13.56	13.560354	0.000354	0.00261	0.01
after 10minutes	13.56	13.560354	0.000354	0.00261	0.01

## **Data of Frequency Tolerance: FCC 15.225(e)**

UL Japan, Inc.

YAMAKITA No4 Shield room

Company	: ART Technology Co., Ltd.	Report No.	: 28IE0227-YK-B-R2
Equipment	: RFID Reader/Writer Unit ASI4000	Regulation	: FCC Part15 SupartC 15.225 (e)
Model	: ASI4000-98-BS1		
Sample No.	: 7D8610001	Date	: 2008/6/18
Power	: DC5V	Temperature	: 25deg.C
Mode	: Transmitting (13.56MHz)	Humidity	: 46%

ENGINEER : Tatsuya Arai

### **Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560349	0.000349	0.00257	0.01
after 2minutes	13.56	13.560288	0.000288	0.00212	0.01
after 5minutes	13.56	13.560278	0.000278	0.00205	0.01
after 10minutes	13.56	13.560277	0.000277	0.00204	0.01

### **Temperature Variation: 30deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560267	0.000267	0.00197	0.01
after 2minutes	13.56	13.560211	0.000211	0.00156	0.01
after 5minutes	13.56	13.560195	0.000195	0.00144	0.01
after 10minutes	13.56	13.560193	0.000193	0.00142	0.01

### **Temperature Variation: 40deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560196	0.000196	0.00145	0.01
after 2minutes	13.56	13.560123	0.000123	0.00091	0.01
after 5minutes	13.56	13.560118	0.000118	0.00087	0.01
after 10minutes	13.56	13.560117	0.000117	0.00086	0.01

### **Temperature Variation: 50deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560119	0.000119	0.00088	0.01
after 2minutes	13.56	13.560065	0.000065	0.00048	0.01
after 5minutes	13.56	13.560063	0.000063	0.00046	0.01
after 10minutes	13.56	13.560063	0.000063	0.00046	0.01

## **Data of Frequency Tolerance: FCC 15.225(e)**

UL Japan, Inc.

YAMAKITA No.4 Shield room

Company	: ART Technology Co., Ltd.	Report No.	: 28IE0227-YK-B-R2
Equipment	: RFID Reader/Writer Unit ASI4000	Regulation	: FCC Part15 SupartC 15.225 (e)
Model	: ASI4000-98-BS1		
Sample No.	: 7D8610001	Date	: 2008/6/18
Power	: DC5V	Temperature	: 25deg.C
Mode	: Transmitting (13.56MHz)	Humidity	: 46%

ENGINEER : Tatsuya Arai

**Input Voltage:DC4.25V (85%)**

**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560330	0.000330	0.00243	0.01
after 2minutes	13.56	13.560277	0.000277	0.00204	0.01
after 5minutes	13.56	13.560276	0.000276	0.00204	0.01
after 10minutes	13.56	13.560277	0.000277	0.00204	0.01

**Input Voltage:DC5.75V(115%)**

**Temperature Variation: 20deg.C**

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560342	0.000342	0.00252	0.01
after 2minutes	13.56	13.560272	0.000272	0.00201	0.01
after 5minutes	13.56	13.560269	0.000269	0.00198	0.01
after 10minutes	13.56	13.560268	0.000268	0.00198	0.01

### APPENDIX 3 Test Instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
CUST-YA-RE	Radiated emission(software)	UL Japan	RE(Ver.1.5)	-	RE	-
KAEC-01	Anechoic Chamber	JSE	Semi 3m	1	RE	2008/08/06 * 12
KAF-05	Pre Amplifier	Agilent	8447D	2944A10150	RE	2008/04/08 * 12
KAT6-01	Attenuator	INMET	18N-6dB	-	RE	2008/03/17 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1926	RE	2007/12/27 * 12
KCC-30/31/32 /34/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/S04272B/ RFM-E421	-/01055	RE	2008/10/22 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	170	RE	2007/12/27 * 12
KOS-02	Humidity Indicator	Custom	CTH-190	K-02	RE	2008/07/07 * 12
KTR-01	Test Receiver	Rohde & Schwarz	ES140	100054/040	RE	2008/04/18 * 12
KJM-07	Measure	KOMELON	KMC-36	-	RE	-
KTR-03	Test Receiver	Rohde & Schwarz	ESHS10	839698/014	RE	2008/02/18 * 12
KTR-04	Test Receiver	Rohde & Schwarz	ESVS10	825475/006	RE	2008/10/20 * 12
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	827779/008	RE	2008/12/05 * 12
KDA-05	Dipole Antenna	Schwarzbeck	VHAP	1065	RE	2008/10/18 * 12
KDA-06	Dipole Antenna	Schwarzbeck	UHAP	1049	RE	2008/10/18 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	BW	2008/01/11 * 12
KSCA-01	Search coil	TSJ	SC01	-	BW/FT	Pre Check
KCC-A7	Coaxial Cable	Fujikura	5D-2W	-	FT	2008/10/22 * 12
KCH-01	Temperature and Humidity Chamber	Tabai Spec	PL-1KT	14007630	FT	2007/12/26 * 12
KFC-01	Microwave Counter	Advantest	R5373	120100309	FT	2008/04/23 * 12
CUST-YA-CE	Conducted emission(software)	UL Japan	CE(Ver.1.6)	-	CE	-
KCC-14/15/16 /18/KPL-01/K RM-01	Coaxial Cable/Pulse Limiter/RF Relay Matrix	Fujikura/Suhner/PMM/ TSJ	5D-2W/8D-2W/S0 4272B/S04272B/P L01/-	-/9909017	CE	2008/05/15 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	8126354	CE	2008/04/07 * 12
KLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	8127344	CE	2008/08/01 * 12
KTM-01	Terminator	TME	CT-01BP	-	CE	2008/10/16 * 12
KOS-04	Humidity Indicator	SATO	PC-5000TRH	B-08	CE	2008/07/07 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	95060087	CE	2008/09/29 * 12
KTR-02	Test Receiver	Rohde & Schwarz	ESCS30	830986/017	CE	2008/09/12 * 12
KJM-03	Measure	TAJIMA	GL19-55	-	CE	-
APSPA04	Spectrum Analyzer	Advantest	R3265	35060052	CE	2008/07/28 * 12

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

All equipment is calibrated with traceable calibrations . Each calibration is traceable to the national or international standards .

Test Item :

CE: Conducted emission,

RE: Radiated emission,

BW: Bandwidth,

FT: Frequency tolerance

\*Some calibrations were performed after the tested dates , however those EMI test equipment have been controlled by means of an unbroken chains of calibrations .