

TEST REPORT

Report No.: Z071C-07532

Issue Date: March 27, 2008

The device, as described herewith, was tested pursuant to applicable test procedure indicated below and complies with the requirements of;

FCC Part15 Subpart C

The test results are traceable to the international or national standards.

Applicant	:	MIWA LOCK CO., LTD. 3-1-12, SHIBA, MINATO-KU, TOKYO 105-8510, JAPAN Phone: +81-3-3452-1463 Fax.: +81-3-3452-3662
Equipment under test (EUT)	:	ALVH ENTRANCE READER
FCC ID	:	VBU-ALVHDCU
Model Number	:	ALVHDCU·DP
Serial Number	:	N/A
EUT Condition	:	Pre-production


Test procedure	:	ANSI C63.4-2003
Date of test	:	March 17,26 2008
Test place	:	3m Semi-anechoic chamber, Site 2
Test results	:	Complied

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988,21U.S.C. 853(a).


The results in this report are applicable only to the samples tested.
This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Tested by:


Hiroaki Suzuki

Authorized by:


Jun Shimanuki

General Manager of Technical Division

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 15 Subpart C rules listed in Table A.

1.2 Summary of test results

Table-A: List of the measurements

Test Items Section	Transmit mode [Tx]:	Test Items			Condition	Result
		MHz	Limits[uV]	Distance[m]		
15.209	Transmitter radiated spurious emissions	0.009-0.490	2400/F(kHz)	300	Radiated	Pass
		0.490-1.705	24000/F(kHz)	30		
		1.705-30.0	30	30		
		30-88	100	3		
		88-216	150	3		
		216-960	200	3		
		Above 960	500	3		
15.207	AC power line conducted emissions	MHz	QP[dBuV]	AV[dBuV]	Conducted	Pass
		0.15-0.50	66-56	56-46		
		0.50-5	56	46		
		5-30	60	50		

2. Equipment description

2.1 EUT information

No.	EUT	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	ALVH ENTRANCE READER	MIWA LOCK	ALVHDCU·DP	N/A	VBU-ALVHDCU	EUT

Oscillator(s)/Crystal(s) : 14.7456MHz

Power ratings : DC 3.0V

Port(s) : DC in
I/O

Size : (W) 120 x (H) 162 x (D) 58.8 mm

Operating mode : Transmit mode

Variation of model(s) : Not applicable

[RF Specification]

Frequency Range : 14.7456MHz

Antenna (Rx and Tx) : Integral antenna

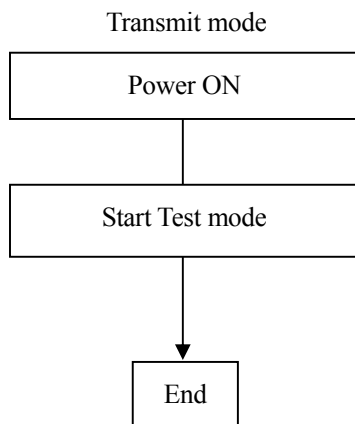
2.2 Operating flow

2.2.1 Operating condition

The test was carried out under the following conditions during the test.

2.2.2 Test mode

Following programs were performed continuously.



3. Configuration information

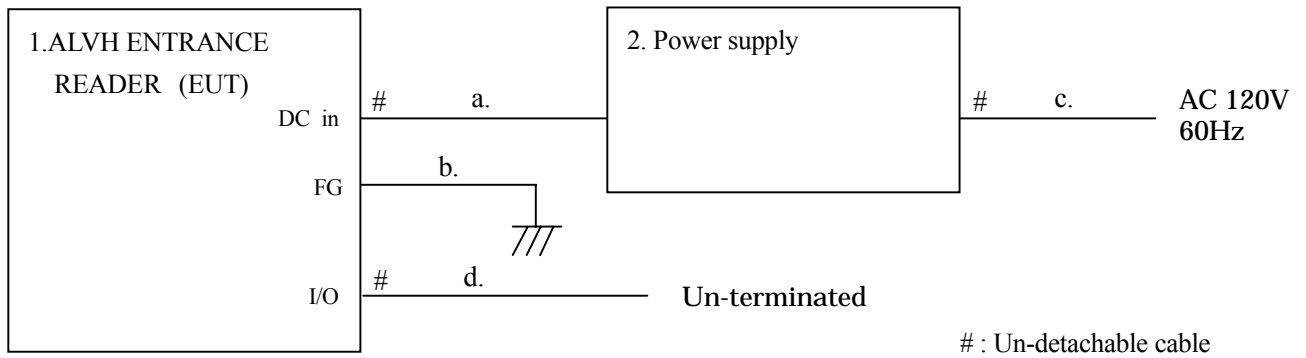
3.1 Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
2	Power supply	Agilent Technologies	6236B	02140320	N/A	-

3.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	From	To	Comment
a	DC cable	1.2	Unshielded	Plastic	EUT	Power supply	-
b	FG cable	3.5	Unshielded	Plastic	EUT	Ground plane	Accessory
c	AC cable	2.0	Unshielded	Plastic	Power supply	AC outlet	-
d	Control cable	0.06	Unshielded	Plastic	EUT	-	-

3.3 System configuration



Note 1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in "2.1 EUT information", "3.1 Peripheral(s) used" and "3.2 Cable(s) information".

4. Test Instruments

List of Measuring Instruments

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
Spectrum Analyzer (9kHz – 3.0GHz)	Agilent Technologies	E4403B	MY44212805	Oct. 2008	Oct. 3, 2007
Preamplifier (100kHz-1.2GHz)	ANRITSU	MH648A	M96057	Jun. 2008	Jun. 25, 2007
Preamplifier (1GHz-26.5GHz)	Agilent Technologies	8449B	3008A01008	Dec. 2009	Dec. 11, 2007
EMI Receiver	ROHDE&SCHWARZ	ESCI	100451	May. 2008	May. 10, 2007
Loop Antenna	ROHDE&SCHWARZ	HFH2-Z2	891847/17	Feb. 2009	Feb. 14, 2008
Biconical Antenna	Schwarzbeck	VHA9103/BBA9106	2323	Jun. 2008	Jun. 16, 2007
Attenuator(6dB)	TDC	TAT-43B-06	N/A	Jun. 2008	Jun. 22, 2007
Log Periodic Antenna	Schwarzbeck	UHALP9108A	0589	Jun. 2008	Jun. 16, 2007
Attenuator(3dB)	TDC	TAT-43B-03	N/A	Aug. 2008	Aug. 8, 2007
Coaxial cable	Fujikura	5D-2W/10m	#AEC3R-001	Feb. 2009	Feb. 14, 2008
		5D-2W/1.5m	#AEC3RC-001	Feb. 2009	Feb. 14, 2008
		5D-2W/1m	#AEC3RC-002	Feb. 2009	Feb. 14, 2008
		5D-2W/1m	#AEC3RC-003	Feb. 2009	Feb. 14, 2008
Coaxial cable	N/A	N/A	N/A	Apr. 2008	Apr. 1, 2007
Coaxial Switch	ANRITSU	MP59B	6200611581	Feb. 2009	Feb. 14, 2008
Site attenuation	ZACTA Technology Corp.	3m Semi-anechoic chamber	N/A	May. 2008	May. 12, 2007

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

5. Test Type and Results

5.1 Transmitter Radiated Spurious Emissions (9kHz-1000MHz)

5.1.1 Test Procedure [FCC 15.209]

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, Biconical antenna, log-periodic antenna.). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop is 1.0meter above the ground plane. Frequency Range: 9kHz –1GHz is scanned and investigated with the test receiver, and above 1GHz, with the spectrum analyzer. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 9kHz (below 30MHz) and 120kHz (above 30MHz).

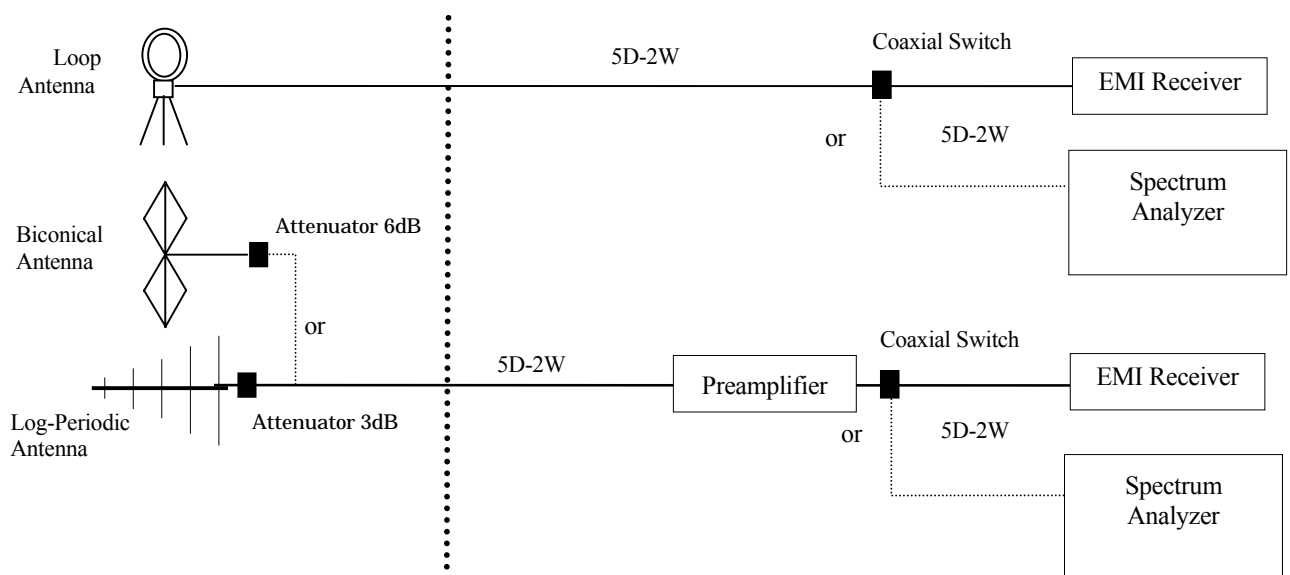
The EUT and support equipment are placed on a 1 meter x 2.0 meter surface, 0.8 meter height FRP table. The turntable and the loop antenna are rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

5.1.2 Test Instruments and Measurement Setup

Test configuration for Spurious emissions



5.1.3 Limit of Spurious Emission Measurement

Frequency [MHz]	Field Strength	
	[uV/m]	[dBuV/m]
0.009 – 0.490	2400 / F [kHz]	20logE [uV/m]
0.490 – 1.705	24000 / F [kHz]	20logE [uV/m]
1.705-30	30	29.5
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20 log Emission [uV/m]

5.1.4 Sample of field strength calculation

Spurious Emission $\text{dB}\mu\text{V/m} = 20\log_{10}(\mu\text{V/m})$

Limit @147.6MHz = 150μV/m = 43.5dBμV/m
Reading = 42.8dBμV
Ant. Factor + Cable Loss - Amp. Gain = 14.2 + 3.0 - 30.0 = -12.8dB
Total = 42.8 - 12.8 = 30.0dBμV/m
Margin = 43.5 - 30.0 = <u>13.5dB</u>

5.1.5 Measurement Result

Test Personnel:

Tested by: Hiroaki Suzuki

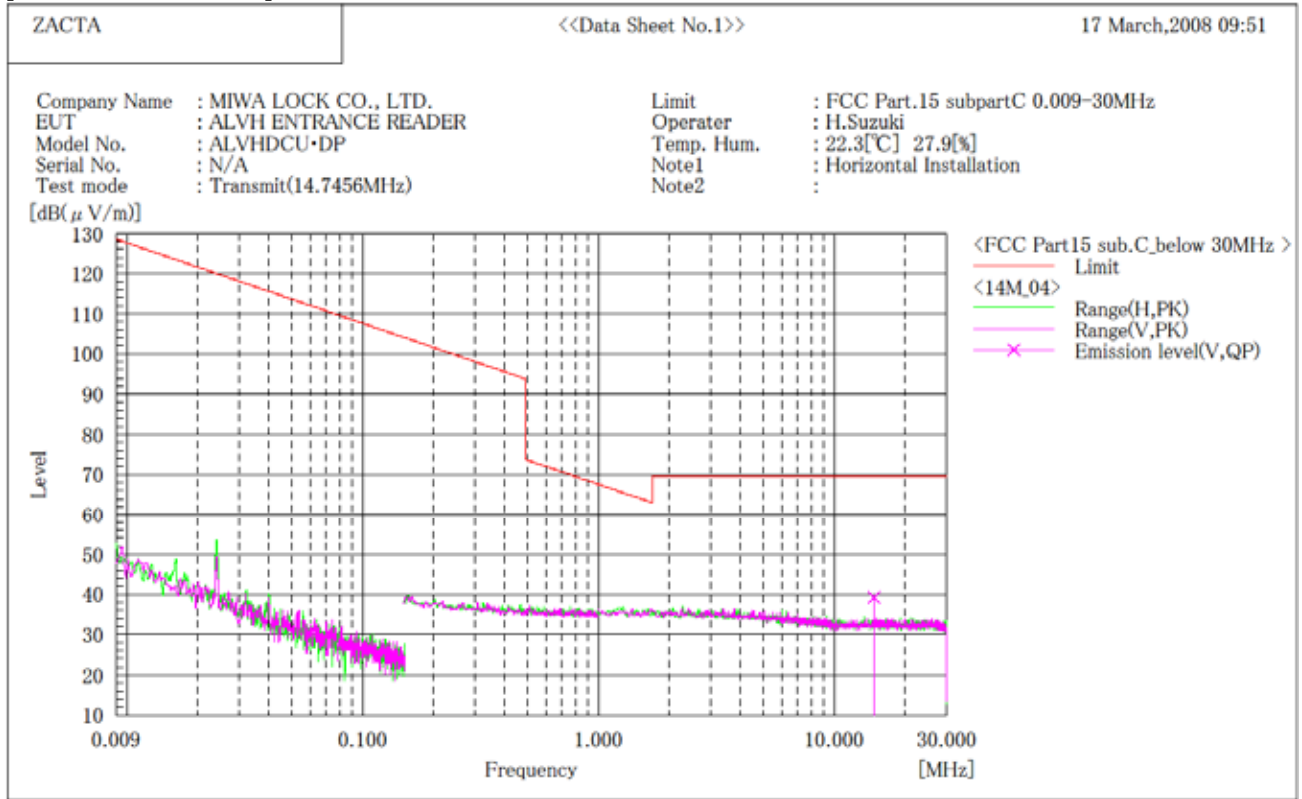
Date : Mar. 17, 2008
 Temperature : 22.3 [°C]
 Humidity : 27.9 [%]
 Test place : 3m Semi-anechoic chamber

1) 0.009-30MHz

Frequency [MHz]	Level		Limit [dBuV/m]	Margin [dBuV/m]	Result
	Measured at 3m [dBuV/m]	Measured at 30m [dBuV/m]			
14.750	39.9	-0.1	29.5	29.6	PASS

Note. Measurements were corrected to 30m using $40\log(3/30) = -40.0\text{dB}$

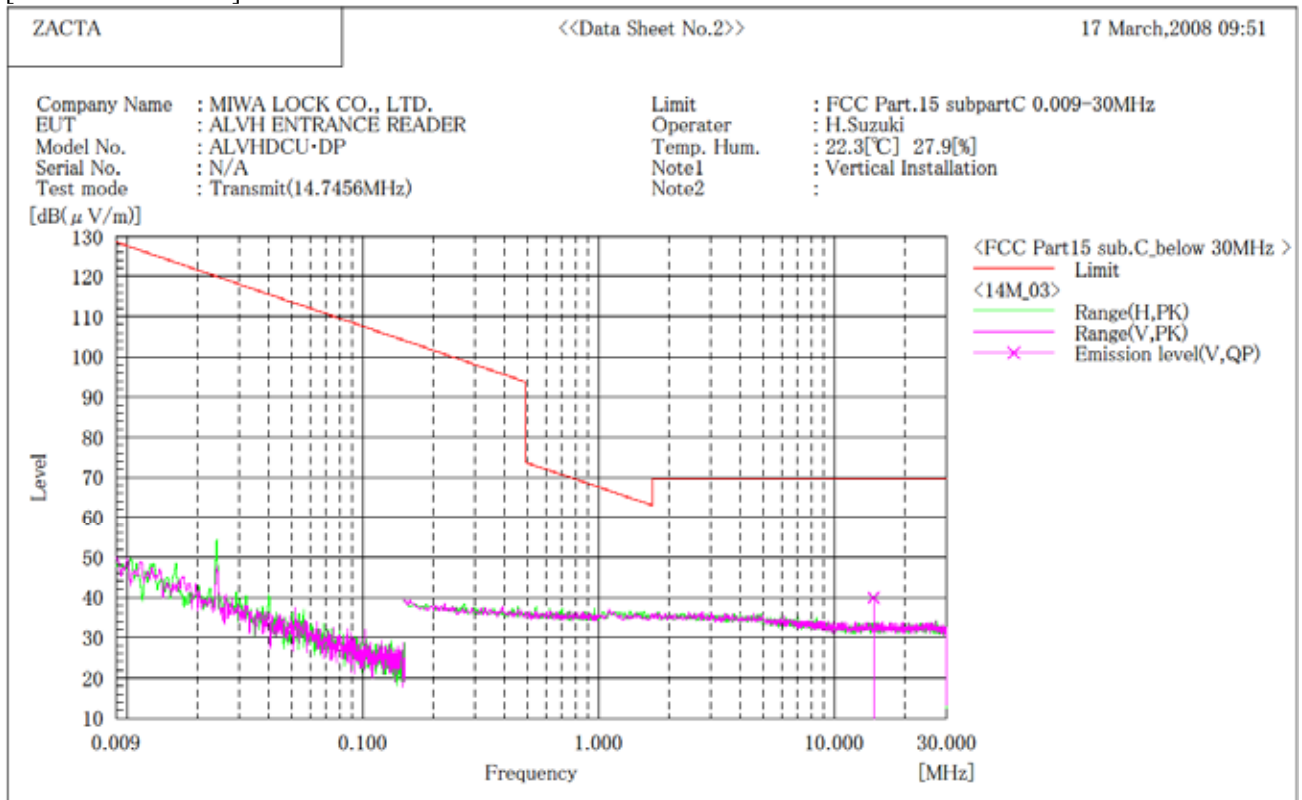
[Horizontal Installation] 0.009-30MHz



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	14.750	V	19.8	19.5	39.3	69.5	30.2	100.0	242.0

[Vertical Installation] 0.009-30MHz

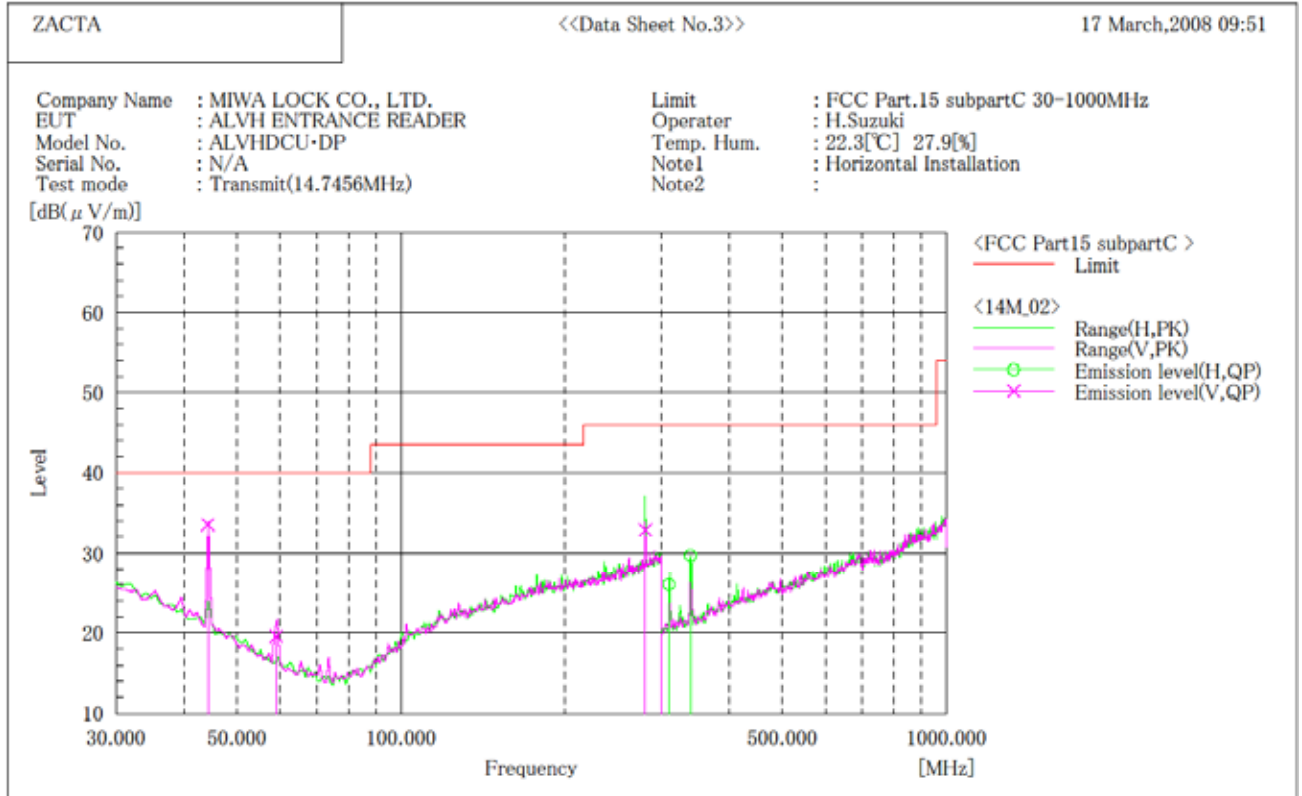


Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	14.750	V	20.4	19.5	39.9	69.5	29.6	100.0	148.0

2) 30-1000MHz

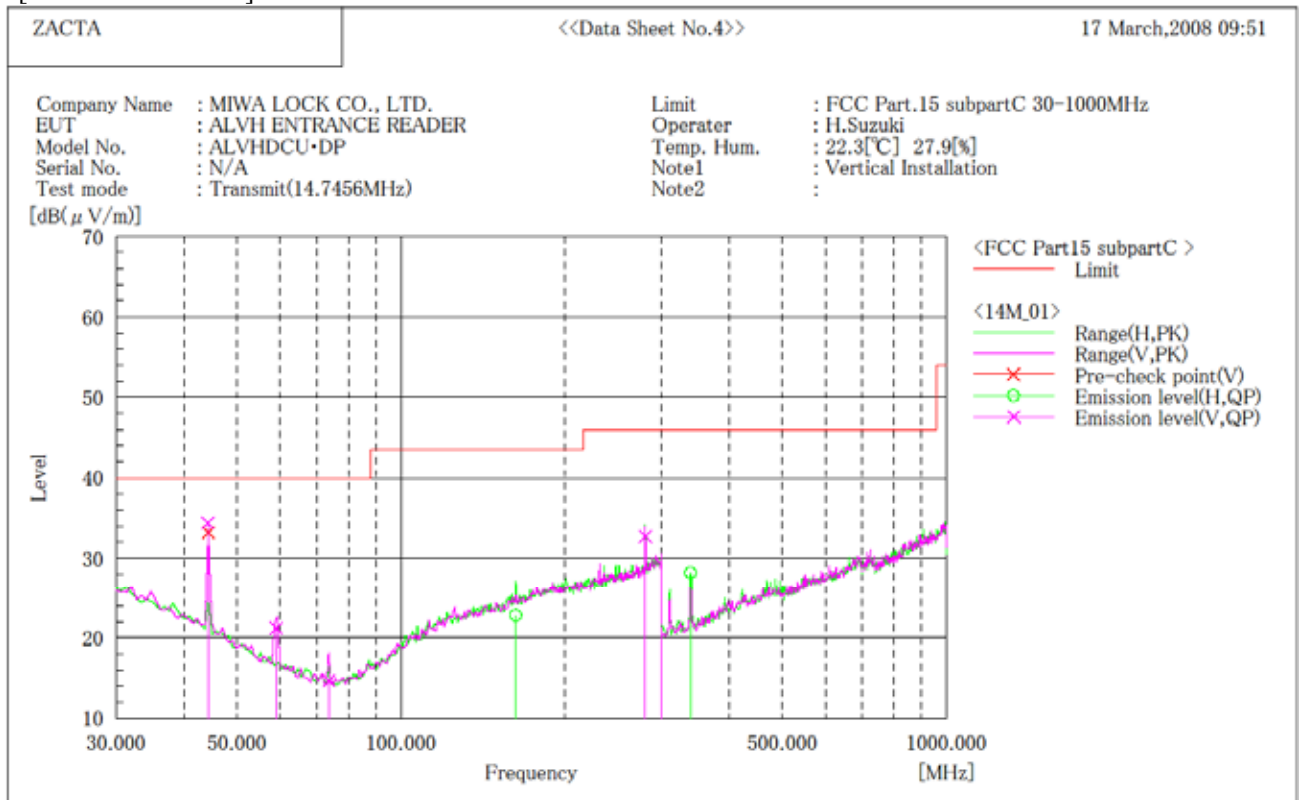
[Horizontal Installation] 30-1000MHz



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.240	V	43.3	-9.8	33.5	40.0	6.5	100.0	0.0
2	58.970	V	33.9	-14.3	19.6	40.0	20.4	100.0	2.0
3	280.160	V	35.4	-2.5	32.9	46.0	13.1	100.0	105.0
4	309.650	H	36.2	-10.2	26.0	46.0	20.0	100.0	114.0
5	339.130	H	39.2	-9.5	29.7	46.0	16.3	100.0	122.0

[Vertical Installation] 30-1000MHz



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c. f [dB(1/m)]	Result QP [dB(μV/m)]	Limit [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	44.240	V	44.2	-9.8	34.4	40.0	5.6	100.0	4.0
2	58.980	V	35.5	-14.3	21.2	40.0	18.8	100.0	0.0
3	73.730	V	31.0	-16.3	14.7	40.0	25.3	100.0	135.0
4	162.200	H	29.4	-6.6	22.8	43.5	20.7	108.0	88.0
5	280.170	V	35.2	-2.5	32.7	46.0	13.3	100.0	35.0
6	339.150	H	37.7	-9.5	28.2	46.0	17.8	100.0	133.0

5.2 AC Power Line Conducted Emissions

5.2.1 Test Procedure [FCC 15.207]

Conducted emission at AC mains port measurements are performed at open area test site according to ANSI C63.4 section 7.

EUT and support equipment are placed on wooden table of 2.3m(W) × 1.0m(D) × 0.8m(H) in size. EUT is connected to 50Ω/50μH Line Impedance Stabilization Network (LISN) which is placed on reference ground plane, and was placed 80cm away from EUT. Excess of AC power cable is bundled in center. Vertical Metal Reference Plane 2.4m (W) × 2.7m (H) in size is placed 0.4m away from EUT. LISN for peripheral is terminated in 50Ω.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, support equipment, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, support equipment and test equipment are provided in order for them to warm up to their normal operating condition.

Frequency range:

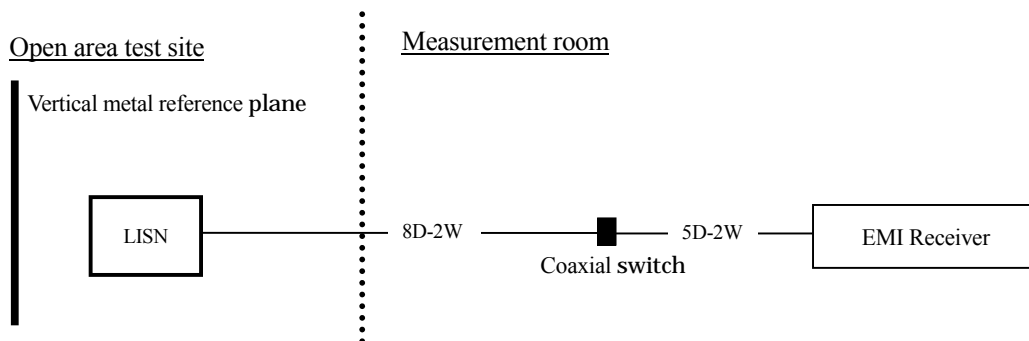
- 0.15MHz to 30MHz

The Test receiver is set to:

- Detector: Quasi-peak, Average
Bandwidth: 9kHz

5.2.2 Test Instruments and Measurement Setup

Test configuration for AC power line Conducted Emissions



5.2.3 Test equipment for AC power line Conducted Emissions

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100451	May. 2008	Mar. 10, 2007
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407	8-693-20	Mar. 2009	Mar. 13, 2008
Coaxial cable	FUJIKURA	8D-2W/15m	YTCRFC#2C	Jun. 2008	Jun. 23, 2007
Coaxial cable	FUJIKURA	5D-2W/1m	YTCRFC#2R,2C-001	Jun. 2008	Jun. 23, 2007
Coaxial switch	ANRITSU	MP59B	6200331882	Jun. 2008	Jun. 23, 2007
PC	IBM	6892-44J	97-42089	N/A	N/A
Software	ZACTA	EMI Data Sheet	Ver.2.81	N/A	N/A

5.2.4 Limit of AC power line Conducted Emission Measurement (Sample calculation)

Frequency	Limit		Sample of field strength calculation
	QP(dBμV)	AV(dBμV)	
0.15MHz to 0.5MHz	66 to 56*	56 to 46*	$dB\mu V = 20\log_{10}(\mu V)$ Limit @ : 60.0dBμV(Quasi-peak) 6.770MHz : 50.0dBμV(Average) (Quasi peak) Reading = 51.2dBμV Cable loss + AMN factor = 0.3dB Total = 51.2 + 0.3 = 51.5dBμV Margin = 60.0 – 51.5 = 8.5dB (Average) Reading = 45.0dBμV Cable loss + AMN factor = 0.3dB Total = 45.0 + 0.3 = 45.3dBμV Margin = 50.0 – 45.3 = 4.7dB
0.5MHz to 5MHz	56	46	
5MHz to 30MHz	60	50	

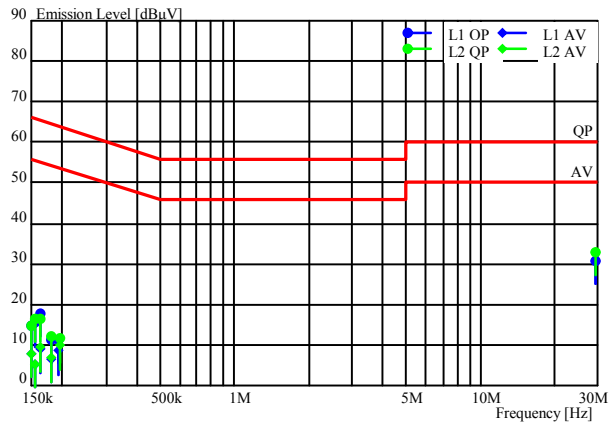
*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

5.2.5 Measurement Result

***** CONDUCTED EMISSION at MAINS PORT *****

Sheet number : 1

Standard : FCC Part 15 Subpart C
 Class : N/A
 Terminal : Mains
 Date of test : 2008/3/26
 Test site : 2
 Temperature [] : 16.5
 Humidity [%] : 34.2
 Operator : H.Suzuki
 Company name : MIWA LOCK CO., LTD.
 EUT : ALVH ENTRANCE READER
 Model number : ALVHDCU · DP
 Serial number : N/A
 Test mode : Transmit mode
 Comment : 14M



Phase	Frequency [MHz]	Reading		Factor [dB]	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.150	14.5	7.8	0.2	14.7	8.0	66.0	56.0	51.3	48.0	
L1	0.155	15.3	5.0	0.2	15.5	5.2	65.7	55.7	50.2	50.5	
L1	0.161	17.7	8.8	0.2	17.9	9.0	65.4	55.4	47.5	46.4	
L1	0.180	11.1	6.3	0.2	11.3	6.5	64.5	54.5	53.2	48.0	
L1	0.193	11.0	8.3	0.2	11.2	8.5	63.9	53.9	52.7	45.4	
L1	29.490	28.8	29.0	1.9	30.7	30.9	60.0	50.0	29.3	19.1	
L2	0.150	14.4	7.8	0.2	14.6	8.0	66.0	56.0	51.4	48.0	
L2	0.155	16.4	5.1	0.2	16.6	5.3	65.7	55.7	49.1	50.4	
L2	0.161	16.2	9.2	0.2	16.4	9.4	65.4	55.4	49.0	46.0	
L2	0.180	11.9	6.6	0.2	12.1	6.8	64.5	54.5	52.4	47.7	
L2	0.194	11.4	9.6	0.2	11.6	9.8	63.9	53.9	52.3	44.1	
L2	29.491	30.9	31.0	1.9	32.8	32.9	60.0	50.0	27.2	17.1	*

* : The worst emission.

Factor : LISN Factor + Cable Loss

Ver.2.81 F2#031

6. Uncertainty of measurement

Expanded uncertainties stated were calculated with a coverage Factor $k=2$.

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port (150kHz - 30MHz)	$\pm 2.9\text{dB}$
Radiated emission (9kHz - 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 300MHz)	$\pm 4.6\text{dB}$
Radiated emission (300MHz – 1000MHz)	$\pm 3.9\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.6\text{dB}$

7. Laboratory description

7.1 Location: ZACTA Technology Corporation Yonezawa Testing Center
4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

7.2 Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) FCC filing: Pursuant to Section 2.948 of the FCC rules.

Site name	Registration Number	Expiry Date
Site 1, Site 2, Site3	91065	November 16, 2008
3m Semi-anechoic chamber 10m Semi-anechoic chamber	540072	March 12, 2010

3) Industry Canada Oats site filing: Pursuant to RSS 212, Issue 1(Provisional).

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 2	4224A-2	January 24, 2010
Site 3	4224A-3	January 24, 2010
3m Semi-anechoic chamber	4224A-4	January 24, 2010
10m Semi-anechoic chamber	4224A-5	January 24, 2010

4) VCCI site filing: Pursuant to V-5/2006.04 VCCI regulations for registration of measurement facilities.

Site name	Radiated emission registration No.	Conducted emission registration No.	Duration of registration
Site 1	R-136	C-132	November 16, 2008
Site 2	R-137	C-133	November 16, 2008
Site 3	R-138	C-134	November 16, 2008
10m Semi-anechoic chamber	R-2480	C-2722	December 19, 2009
3m Semi-anechoic chamber	R-2481	C-2723	December 19, 2009
Shielded room No.1	-	C-2724	December 19, 2009

5) ETL SEMKO authorization:

Authorized as an EMC test laboratory.

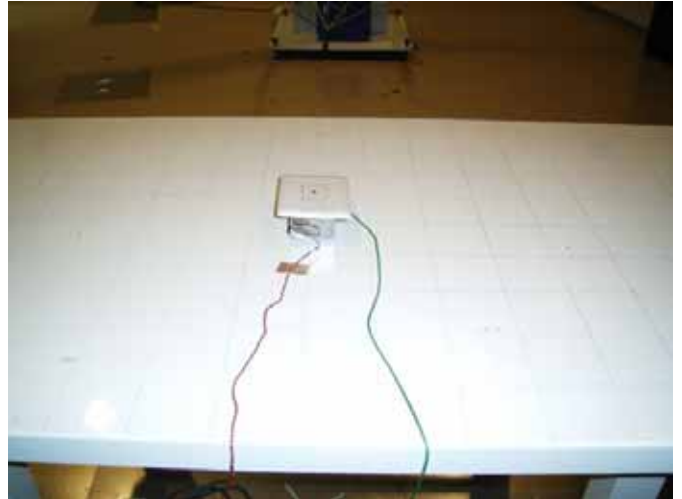
6) TUV Rheinland authorization:

Authorized as an EMC test laboratory.

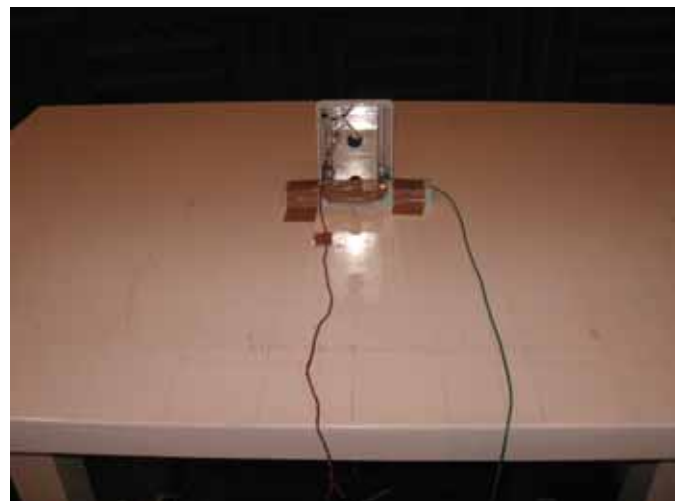
8. Test photographs

Transmitter Radiated Spurious Emissions

[Horizontal Installation]



[Vertical Installation]



AC Power Line Conducted Emissions

