



Test Report

Test Report No.:	KTI05EF07004		
Registration No.:	99058		
Applicant:	MIRERO TECHNOLOGY CO., LTD.		
Applicant Address:	6F Greenhill B/D 538-4, Sang-Dong, Bucheon-Si, Wonmi-Gu, Gyeonggi-Do, Korea		
Product:	Digital door lock Receiver		
FCC ID:	TH4WT-447RM	Model No.	WT-447RM
Receipt No.:	05-0716	Date of receipt:	July 11, 2005
Date of Issue:	July 25, 2005		
Testing location	Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeungki-Do, Korea		
Test Standards:	FCC/ANSI. C63.4: 2003		
Rule Parts: FCC	Part 15, Class B		
Equipment Class:	Low Power Transceiver, Rx Verified		
Test Result:	The above-mentioned product has been tested with compliance.		

Tested by: Y.M. Lee
/ Engineer

Approved by: G. C. Min
/President

Signature

Date

Signature

Date

Other Aspects:	
Abbreviations:	* OK, Pass=passed * Fail=failed * N/A=not applicable

- This test report is not permitted to copy partly without our permission.
- This test result is dependent on only equipment to be used.
- This test result is based on a single evaluation of one sample of the above mentioned.
- This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government.
- We certify this test report has been based on the measurement standards that is traceable to the national or international standards.

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. Korea Technology Institute Co., Ltd. performed all measurements reported herein. And were made under Chief Engineer's supervisor.

We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., Ltd.

2.1 Location

51-19, Sanglim3-Ri, Docheok-Myeon, Gwangju-Shi, Gyeungki-Do, Korea

The Test Site is in compliance with ANSI C63.4/2003 for measurement of radio Interference.



2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

- Conducted Emissions

Kind of Equipment	Type	S/N	Calibrated until
Spectrum Analyzer	R3261C	61720417	01.2006
Field Strength Meter	ESPC	832827/011	06.2006
LISN	KNW407	8-1157-2	01.2006
LISN	EM-7823	115019	04.2006
Conducted Cable	N/A	N/A	11.2005

- Radiated Emissions

Kind of Equipment	Type	S/N	Calibrated until
Field Strength Meter	ESPC	832827/011	06.2006
Spectrum Analyzer	R3261C	61720417	01.2006
Pre Amplifier	8447D	2944A06874	11.2005
Biconical Antenna	VHA9103	1111	01.2006
Logperiodic Antenna	UHALP9107	1568	01.2006
Horn Antenna	3115	6443	06.2006
Open Site Cable	N/A	N/A	11.2005
Antenna Mast	DETT-03	N/A	N/A
Antenna & Turntable controller	DETT-04	91X519	N/A

2.3 Test Date

Date of Application: July 11, 2005

Date of Test: July 20, 2005

2.4 Test Environment

24°C/50%/989mbar



3. Description of the tested samples

The EUT is Digital door lock Receiver

3.1 Rating and Physical Characteristics

- **4Way Type**

You can use voice, secret number, remote controller(optional) and a key to open your door.

- **Perfect Security**

Four way method by Remote controller, Emergency Key, Password, voice Recognition.

- **Extended Voice and Secret Number Memory**

Max 30 persons' voice and secret numbers are recordable.

- **Fuzzy Learning System**

Much smarter and smarter again as you use it more and more again.

- **Automatic Door Lock**

The door will be locked automatically when you close the door.

- **Superior Metal Gear**

Metal gear guarantees long life execute some function.

- **Detailed Voice Notification**

Voice notification will follow after you execute some function.

- **Family Message recording**

You can leave some voice message for your family be fore you go out.

- **Visitor's Message Recording**

Visitors can leave some voice message whenever they want.

- **Welcome Message Creating**

You can make your own unique welcome message.

It can play when someone press the door bellbutton.

3.2 Submitted Documents

- User's Guide

- Block Diagram



4. Measurement Conditions

Testing Input Voltage: DC 9V

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

- 1) Verify fingerprint.
- 2) Normal receiving mode

4.2 Additional Equipment

DEVICE TYPE	Manufacturer	M/N	S/N	FCC ID
-	-	-	-	-

4.3 Uncertainty

1) Radiated disturbance

U_c (Combined standard Uncertainty) = $\pm 1.8\text{dB}$

Expanded uncertainty $U=KU_c$

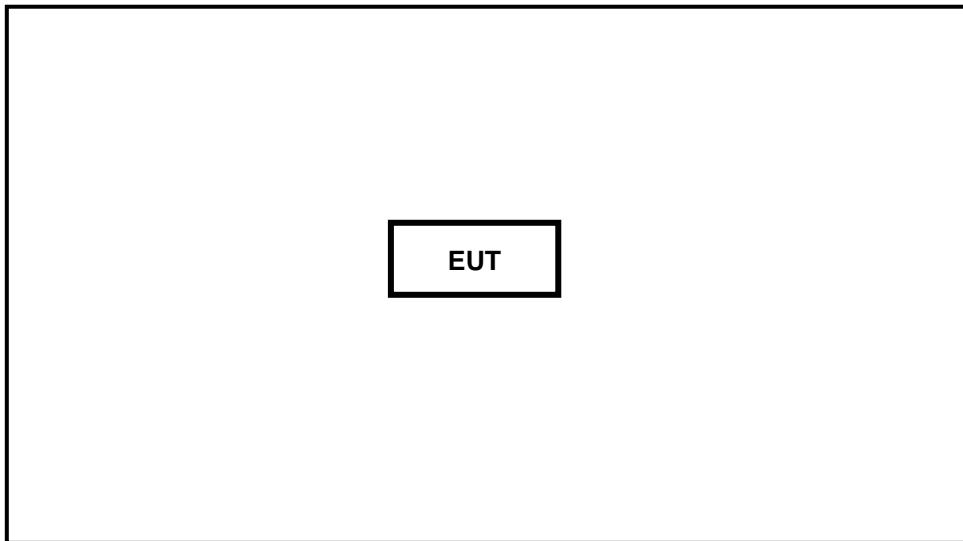
$K = 2$

$\therefore U = \pm 3.6\text{dB}$

2) Conducted disturbance

$U_c = \pm 0.88\text{dB}$

$U = KU_c = 2 \times U_c = \pm 1.8\text{dB}$

**18.1. Test Setup**



5. EMISSION Test

5.1. Radiated Emissions

Result:

Pass

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using Biconical Antenna and LogPeriodic Antenna. About 1GHz, Double ridged horn Antenna was used.

Final measurements were made outdoors at 3-meter test range using Schwarz antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMIField Intensity Meter (ESIB40) R & S. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated Measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 x 1.5 meter table.

The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of radiated emission test. Each EME reported was calibrated using self-calibrating mode.



Table 3: Test Data, Radiated Emissions

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dB μ V)	(2) AFCL (dB/m)	(3) Actual (dB μ V/m)	(4) Limit (dB μ V/m)	(5) Margin (dB)
85.92	V	1.38	7	9.7	10.62	20.32	40.0	19.68
164.80	V	1.50	33	4.6	17.94	22.54	43.5	20.96
206.12	H	3.39	117	9.8	19.34	22.24	43.5	21.26
222.60	H	3.05	19	2.9	20.41	25.11	46.0	20.89
243.48	V	1.93	10	6.8	21.08	27.88	46.0	18.12
447.36	V	2.10	210	4.2	22.72	26.92	46.0	19.08

Table. Radiated Measurements at 3-meters

Notes: 1. All modes of operation were investigated.

And the worst-case emissions are reported.

2. All other emission is non-significant.

3. All readings are calibrated by self-mode in receiver.

4. Measurements using CISPR quasi-peak mode.

5. AFCL = Antenna factor and cable loss

6. H = Horizontal, V = Vertical Polarization

7. The limit for Class B digital device is 100uV(40dB μ V) from 30MHz to 88MHz,

150 uV (43.5dB μ V) from 88MHz to 216MHz, 200uV(46dB μ V) from 216MHz to 960MHz

and 500 uV (54dB μ V) from above 960MHz.

♠ Margin Calculation

(5) Margin = (4) Limit – (3) Actual

$$[(3) \text{ Actual} = (1) \text{ Reading} + (2) \text{ AFCL}]$$