

Prüfbericht-Nr.: Test Report No.:	50087047 001	Auftrags-Nr.: Order No.:	114063843	Seite 1 von 18 Page 1 of 18
Kunden-Referenz-Nr.: Client Reference No.:	N/A	Auftragsdatum: Order date:	12-Apr-2017	
Auftraggeber: Client:	Tong Lung Metal Industry Co., Ltd No. 82, Zhonghua Rd., Minxiong Industrial Park, TW-62157 Chiayi County, Taiwan, R.O.C.			
Prüfgegenstand: Test item:	Proximity Electronic Deadbolt			
Bezeichnung / Typ-Nr.: Identification / Type No.:	PL2-RF			
Auftrags-Inhalt: Order content:	FCC Part 15C Test report			
Prüfgrundlage: Test specification:	FCC 47CFR Part 15: Subpart C Section 15.225			
Wareneingangsdatum: Date of receipt:	05-Jun-2017			
Prüfmuster-Nr.: Test sample No.:	A000393528			
Prüfzeitraum: Testing period:	07-Jun-2017 - 16-Jun-17			
Ort der Prüfung: Place of testing:	EMC/RF Laboratory Taipei			
Prüflaboratorium: Testing laboratory:	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: Test result*:	Pass			
Report date / tested by:		kontrolliert von / reviewed by:		
2017-07-14 Amy Hsu/Project Engineer		2017-07-14 Rene Charton/Senior Project Manager		
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung Name / Position
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>				
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

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Test Report No.

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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Passed

5.1.3 FREQUENCY STABILITY

RESULT: Passed

5.1.4 SPURIOUS EMISSION

RESULT: Passed

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: Photo Documentation

(File Name: 50087047APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File Name: 50087047APPENDIX D)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.225 ANSI C63.10:2013

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC Registration No.: 365730
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th



Testing Laboratory
0759

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Last Calibration	Next Calibration
EMI Test Receiver	R&S	ESR7	101062	12-Sep-16	12-Sep-17
Bilog Antenna	TESEQ	CBL6111D	29804	23-Jun-16	23-Jun-17
Spectrum Analyzer	R&S	FSV 40	100921	2-May-17	2-May-18
Spectrum Analyzer	Agilent	N9010A	MY53470241	23-Feb-17	23-Mar-18
Horn Antenna	ETS-Lindgren	3117	138160	12-Aug-16	12-Aug-17
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101029	11-Oct-16	11-Oct-17
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	29-Jul-16	29-Jul-17
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	01-Dec-16	01-Dec-17
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60558	17-Nov-16	17-Nov-17
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	11-May-16	24-Jun-17
EMI Test Receiver	R&S	ESC17	100797	30-Dec-16	30-Dec-17
Spectrum Analyzer	R&S	FSL3	101943	7-Sep-15	7-Sep-17
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-Jul-15	12-Jul-17
Power sensor	Agilent	U2021XA	MY53480013	8-Mar-17	7-Mar-18

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1.5 \text{ dB}$
Adjacent channel power	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6 \text{ dB}$
Radiated emission of receiver, valid up to 26 GHz	$\pm 6 \text{ dB}$
Temperature	$\pm 2 \text{ }^{\circ}\text{C}$
Humidity	$\pm 10 \text{ } \%$

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Induction electronic auxiliary lock, working at 13.56 MHz with RFID function. For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Proximity Electronic Deadbolt
Type Designation	PL2-RF
FCC ID	YLK-PL2-RF

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	13.56 MHz
Operation Voltage	6Vdc
Modulation	ASK
Antenna Type	Loop Antenna

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: The EUT is a set up into reading mode. Then it is placed onto the test site transmitting the carrier continuously

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

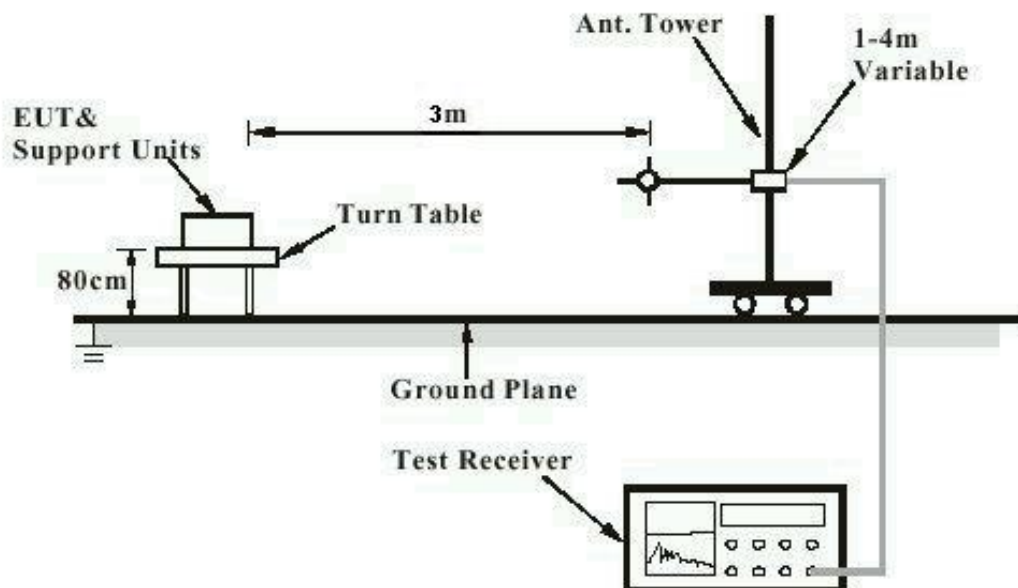
N/A

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Standard : Part 15.203 and RSS-Gen 7.1.4

Requirement : use of approved antennas only

The antenna is loop Antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Field strength of fundamental

RESULT:

Passed

Test standard : FCC Part 15.225
RSS-210 A2.6

Basic standard : ANSI C63.10:2013

Test setup

Test Frequency : 13.56 MHz
Operation Mode : A

Table 6: Test result of Field strength of fundamental and modulation sidebands

Frequency (MHz)	Test Result	Detector	Limits		Pass/Fail
	dBµV/m @ 1.2m		dBµV/@ 1.2m	dBµV/m@ 30m	
13.110–13.410	<30.9	peak	96.5	40.5	Pass
13.410–13.553	< 74.40	peak	106.5	50.5	Pass
13.560	74.40	QP	140	84.0	Pass
13.567–13.710	<74.40	peak	106.5	50.5	Pass
13.710–14.010	<30.9	peak	96.5	40.5	Pass

For details refer to Appendix D.

5.1.3 Frequency Stability

RESULT:
Passed

Test standard : FCC Part 15. 225(e)
RSS-210 A2.6

Basic standard : ANSI C63.10:2013

Kind of test site : Shielded room

Test setup

Test Frequency : 13.56 MHz

Operation Mode : A

Relative humidity : 50-65 %

Atmospheric pressure : 100-103 kPa

Table 7: Test result of Frequency Stability

Fundamental frequency (MHz)	Temperature (°C)	Voltage	Measurement frequency (MHz)	Frequency Error (ppm)	Limit ±0.01%
13.56	-20	Normal	13.561110	81.86	±100ppm
	-10	Normal	13.561090	80.38	
	0	Normal	13.561040	76.70	
	10	Normal	13.561030	75.96	
	20	85%	13.561010	74.48	
	20	Normal	13.561020	75.22	
	20	115%	13.561010	74.48	
	30	Normal	13.561040	76.70	
	40	Normal	13.561060	78.17	
	50	Normal	13.561010	74.48	

5.1.4 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.209 FCC part 15.225 RSS-210 B.6
Basic standard	:	ANSI C63.10: 2013
Limits	:	The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209. RSS-210: 30 microvolts/m (29.5 dBµV/m) at 30 m, outside the band 13.110-14.010 MHz.
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Operation mode	:	A
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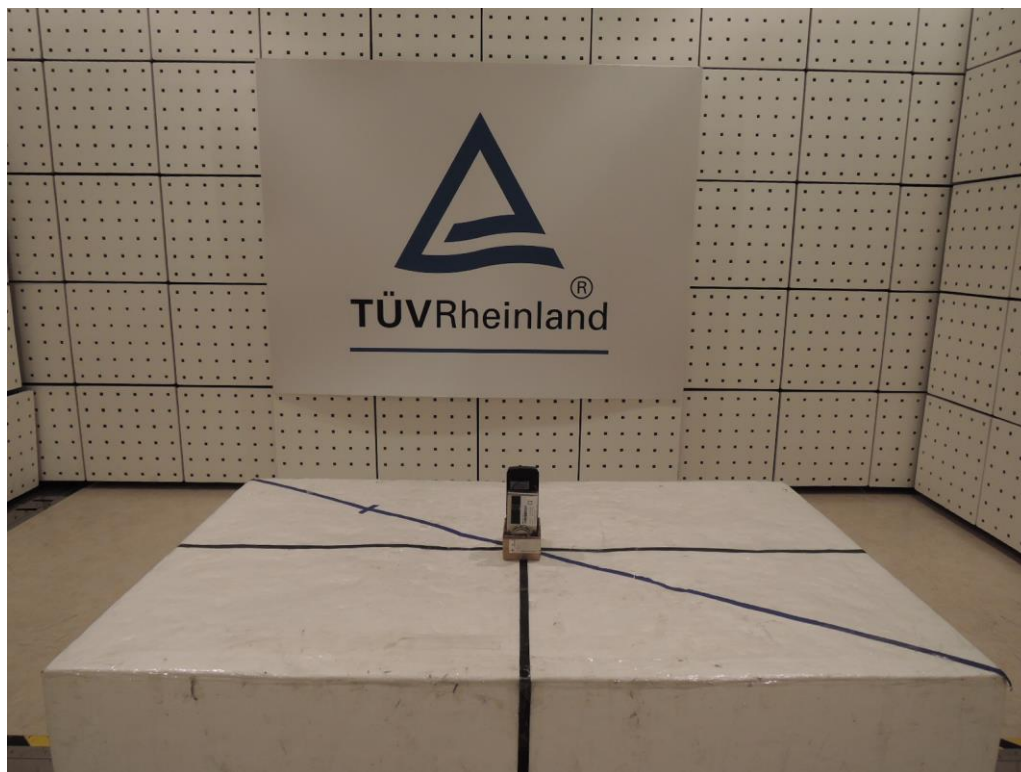
Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix D.

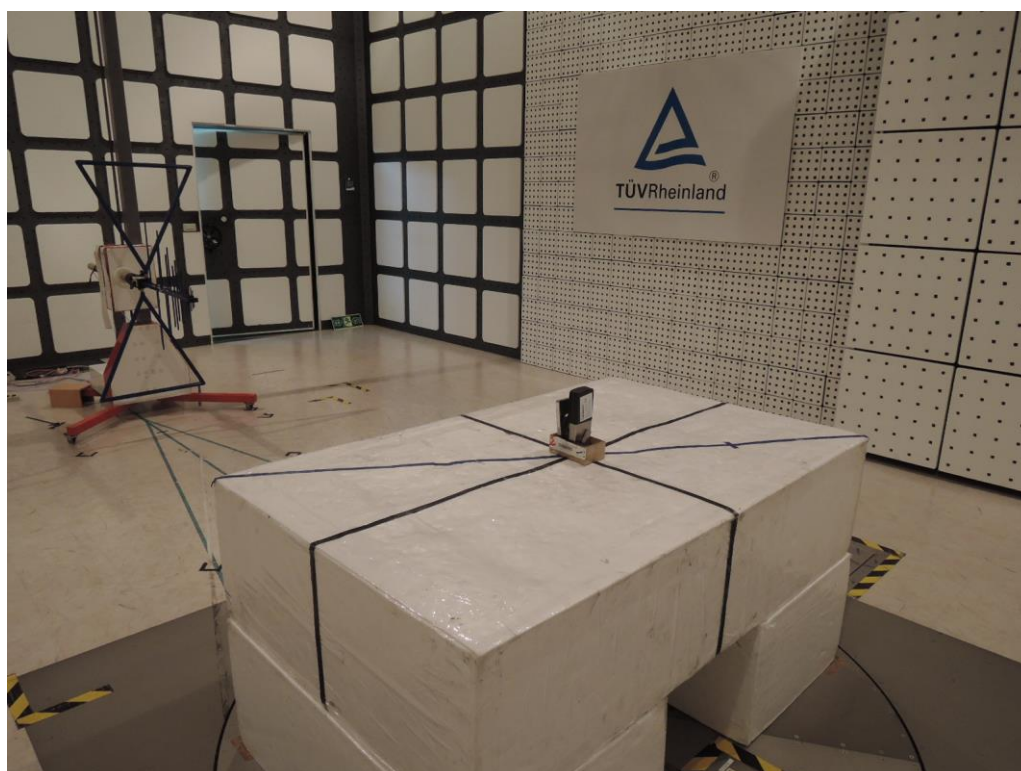
The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

6. Photographs of the Test Set-Up

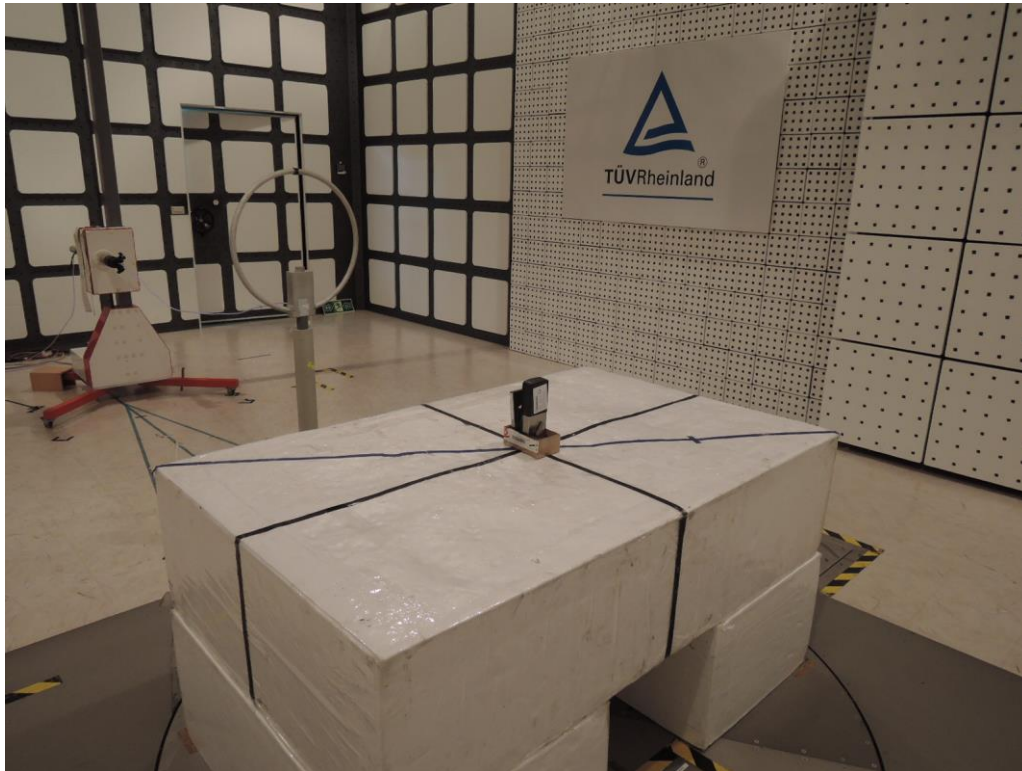
Photograph 1: Set-up for Radiated Emissions (Front View)



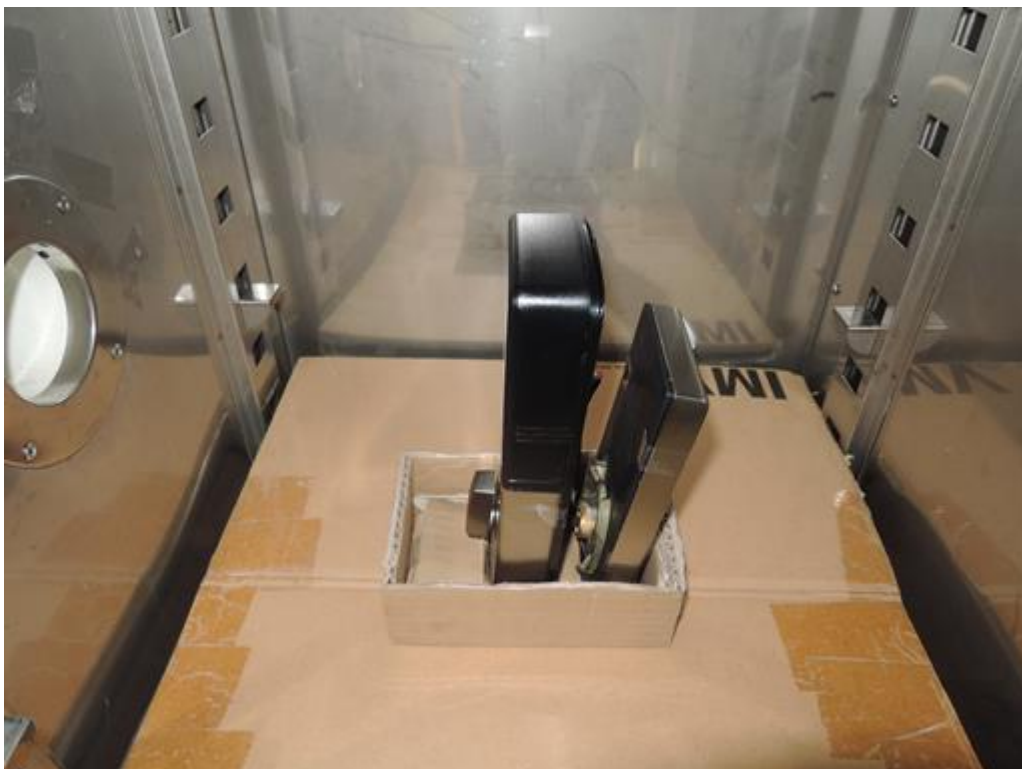
Photograph 2: Set-up for Fundamental Emissions (Back View)



Photograph 3: Set-up for Spurious Emissions (Back View 1)



Photograph 4: Set-up for Conducted testing



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