

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E101R-030

AGR No : A101A-026

Applicant : Shinchang Electrics Co., Ltd.
Address : 734-2, Wonshi-dong, Danwon-gu, Ansan-si, Kyungki-do, 425-090, Korea

Manufacturer : Shinchang Electrics Co., Ltd.
Address : 734-2, Wonshi-dong, Danwon-gu, Ansan-si, Kyungki-do, 425-090, Korea

Type of Equipment : Remote Keyless Entry System

FCC ID. : NYOSEKS-TF10ATX

Model Name : SEKS-TF10ATx

Serial number : None

Total page of Report : 13 pages (including this page)

Date of Incoming : January 07, 2010

Date of issue : January 18, 2010

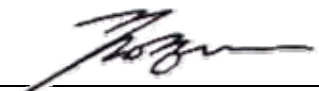
SUMMARY

The equipment complies with the regulation; **FCC Part 15 Subpart C Section 15.231.**

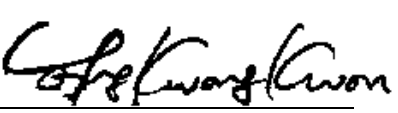
This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by:


Yeung-Min, Choi / Asst. Chief Engineer
EMC/RF Center
ONETECH Corp.

Reviewed by:


Y. K. Kwon / Managing Director
EMC/RF Center.
ONETECH Corp.

CONTENTS

PAGE

1. VERIFICATION OF COMPLIANCE	3
2. GENERAL INFORMATION	4
2.1 PRODUCT DESCRIPTION.....	4
2.2 MODEL DIFFERENCES	4
2.3 RELATED SUBMITTAL(S) / GRANT(S)	4
2.4 PURPOSE OF THE TEST	4
2.5 TEST METHODOLOGY	4
2.6 TEST FACILITY	4
3. SYSTEM TEST CONFIGURATION	5
3.1 JUSTIFICATION	5
3.2 PERIPHERAL EQUIPMENT	5
3.3 MODE OF OPERATION DURING THE TEST	5
3.4. EUT MODIFICATIONS	5
3.5 CONFIGURATION OF TEST SYSTEM	5
3.6 ANTENNA REQUIREMENT	6
4. PRELIMINARY TEST	6
4.1 AC POWER LINE CONDUCTED EMISSIONS TESTS	6
4.2 GENERAL RADIATED EMISSIONS TESTS	6
5. FINAL RESULT OF MEASUREMENT	7
5.1 FIELD STRENGTH OF THE CARRIER TEST	7
5.2 TRANSMITTER TRANSMISSION DURATION	8
5.3 SPURIOUS EMISSION TEST	9
5.4 BANDWIDTH OF THE OPERATING FREQUENCY	10
6. FIELD STRENGTH CALCULATION	12
7. LIST OF TEST EQUIPMENT	13

1. VERIFICATION OF COMPLIANCE

APPLICANT : Shinchang Electrics Co., Ltd.
 ADDRESS : 734-2, Wonshi-dong, Danwon-gu, Ansan-si, Kyungki-do, 425-090, Korea
 CONTACT PERSON : Mr. Jong Beom, Park / Quality Control Manager
 TELEPHONE NO : +82-41-901-0472
 FCC ID : NYOSEKS-TF10ATX
 MODEL NAME : SEKS-TF10ATx
 BRAND NAME : KIA
 SERIAL NUMBER : N/A
 DATE : January 18, 2010

EQUIPMENT CLASS	DSC - Part 15, Security/Remote Control Transmitter
KIND OF EQUIPMENT	Remote Keyless Entry System
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.231
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m open area test site

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The Shinchang Electrics Co., Ltd., Model: SEKS-TF10ATx (referred to as the EUT in this report) is a Remote Keyless Entry System that it controls locking and unlocking the door of a vehicle by wireless remote controller. The associated receiver is manufactured by Shinchang Electrics Co., Ltd, Model No: SEKS-TF10ARx., FCC ID: NYOSEKS-TF10ARX. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	315.00 MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>= 1 MHz)	9.841 75 MHz
ANTENNA TYPE	Built-in on the PCB in the EUT
CODE	Rolling Code (Hopping Algorithm)
RATED SUPPLY VOLTAGE	DC 3 V from a battery
NUMBER OF LAYERS	2 Layers
FUNCTION OF BUTTON	Door Lock/Unlock/Panic and Trunk Buttons

2.2 Model Differences

-. None

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 15.231.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Shinchang Electric Co., Ltd.	TF TX 4BUTTON V1.0TI	N/A

3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

3.3 Mode of operation during the test

To get a maximum radiated emission from the EUT, the button on the EUT was continuously pressed to transmit the signal. To activate continuous transmission, place a small plastic block between rubber band and the push button on the EUT. To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

3.4. EUT MODIFICATIONS

-. None

3.5 Configuration of Test System

- Line Conducted Test:** It is not need to test this requirement, because the EUT shall be operated by DC battery.
- Radiated Emission Test:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.
- The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.
- Occupied Bandwidth Measurement:**
- This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The plot is taken at 20 kHz/division frequency span, 10 kHz resolution bandwidth and 5 dB/division logarithmic display from the spectrum analyzer.

3.6 Antenna Requirement

According to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The transmitter antenna of the EUT is a pattern antenna on the main board in the EUT, so no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.	

4.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX Mode	X

5. FINAL RESULT OF MEASUREMENT

5.1 Field Strength of the Carrier Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 37 % R.H. Temperature: 16 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
Type of Test : INTENTIONAL RADIATOR
Result : PASSED BY -21.61 dB under average mode

EUT : Remote Keyless Entry System Date: January 11, 2010
Operating Condition : TX mode
Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
315.00	37.30	H(P)	1.25	85.00	14.41	3.60	55.31	95.62	-40.31
	19.40	V(P)	1.40	140.00	14.41	3.60	37.41	95.62	-58.21
315.00	36.00	H(A)	1.25	85.00	14.41	3.60	54.01	75.62	-21.61
	18.10	V(A)	1.40	140.00	14.41	3.60	36.11	75.62	-39.51

* Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

“P”: Peak, “A”: Average, “H”: Horizontal Polarization, “V”: Vertical Polarization



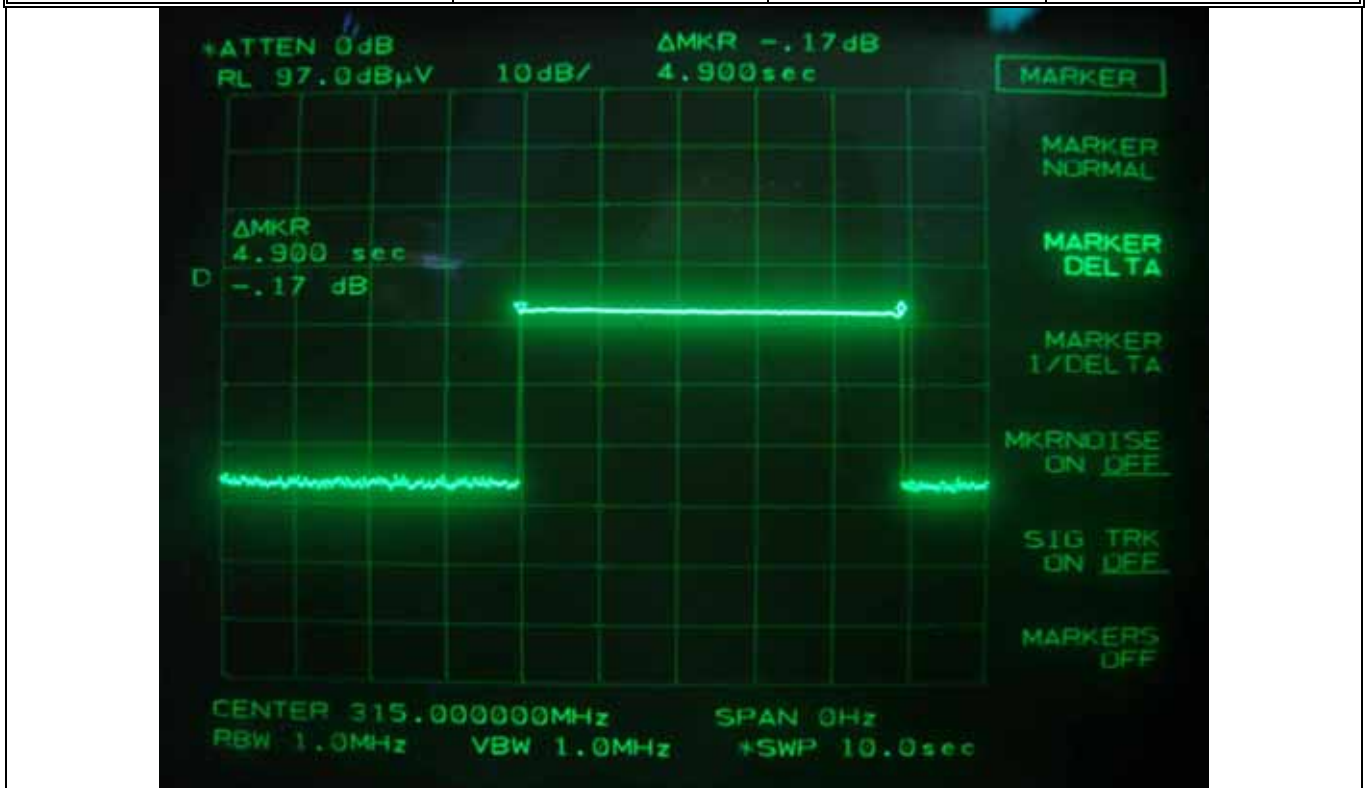
Tested by: In-Sub, Youn / Project Engineer

5.2 Transmitter Transmission Duration

Humidity Level : 37 % R.H. Temperature: 16 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (a)
Type of Test : INTENTIONAL RADIATOR

EUT : Remote Keyless Entry System Date: January 11, 2010
Operating Condition : Switch on the EUT was continuously pushed

Manually Activated Duration (s)	Limit (s)	Margin (s)	Result
4.900	5.0	0.100	Pass



[Handwritten Signature]

Tested by: In-Sub, Youn / Project Engineer

5.3 Spurious Emission Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 39 % R.H. Temperature: 15 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b)
 Type of Test : INTENTIONAL RADIATOR
 Result : PASSED BY -18.64 dB at 945.00 MHz

EUT : Remote Keyless Entry System Date: January 12, 2010
 Operating Condition : TX mode
 Detector mode : Peak mode
 Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
120.98	10.30	H	1.20	80.0	13.09	2.41	25.80	55.62	-29.82
155.47	12.30	H	1.00	280.0	15.06	2.65	30.01	55.62	-25.61
254.36	9.40	H	1.00	130.0	17.58	3.37	30.35	55.62	-25.27
453.21	10.80	H	1.50	290.0	18.73	4.32	33.85	55.62	-21.77
512.32	6.20	H	1.80	160.0	19.32	4.77	30.29	55.62	-25.33
550.26	7.10	H	2.10	300.0	18.85	5.30	31.25	55.62	-24.37
630.00	5.30	H	1.50	230.0	20.46	5.24	31.00	55.62	-24.62
945.00	7.10	H	1.40	270.0	22.53	7.35	36.98	55.62	-18.64
Other spurious frequencies were not found up to 4 000 MHz.									

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

“H”: Horizontal Polarization, “V”: Vertical Polarization



Tested by: In-Sub, Youn / Project Engineer

5.4 Bandwidth of the operating frequency

Humidity Level : 39 %R.H. Temperature: 15 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231 (c)
Type of Test : INTENTIONAL RADIATOR
Result : PASSED

EUT : Remote Keyless Entry System Date: January 12, 2010
Operating Condition : TX mode
Minimum Resolution
Bandwidth : 10 kHz

Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
315.00	141.7	787.5	<u>The point 20 dB down from the modulated carrier</u>

Remark: Please refer to photo data for bandwidth for test data.



Tested by: In-Sub, Youn / Project Engineer

EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dB μ V)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/m)

= Corrected Reading (dB μ V/m)

- Specification Limit (dB μ V/m)

= dB Relative to Spec ($\pm$ dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVD	838453/018	NOV/09	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/09	12MONTH	
3.	Spectrum analyzer	HP	8566B	3407A08547	JUN/09	12MONTH	■
4.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 202	APR/08	24MONTH	
5.	Biconical antenna	EMCO	3110	9003-1121	JAN/08	24MONTH	
		Schwarzbeck	VHA9103	91031852	FEB/08		■
6.	Log Periodic antenna	Schwarzbeck	9108-A(494)	62281001	FEB/08	24MONTH	■
7.	LISN	EMCO	3825/2	9109-1867	JUN/09	12MONTH	
				9109-1869	JUN/09		
		Schwarzbeck	NSLK 8128	8128-216	JUN/09		
8.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
9.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
10.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■
11.	RF Amplifier	HP	8447D	2944A06539	JUN/09	12MONTH	■
12.	Horn Antenna	Schwarzbeck	BBHA9120D	BBHA9120D294	JUN/09	24MONTH	■
13.	Spectrum Analyzer	HP	8564E	3650A00756	JUN/09	12MONTH	■
14.	Isolation Transformer	Digitel Power	DPT	DPF-22027	N/A	N/A	■
15.	Isolation Transformer	Digitel Power	DPT	DPF-22028	N/A	N/A	■
16.	Frequency Converter	Digitel Power	VFS/DEFC	N/A	N/A	N/A	■