



document property name.

---

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR SUPERHETRODYNE RECEIVER

Test report file number : E027R-037

Applicant : SHINCHANG ELECTRICS CO., LTD.

Address : 734-2, Wonshi-Dong, Ansan-Si, Gyungki-Do, 425-090, Korea

Manufacturer : SHINCHANG ELECTRICS CO., LTD.

Address : 734-2, Wonshi-Dong, Ansan-Si, Gyungki-Do, 425-090, Korea

Type of Equipment : REMOTE KEYLESS ENTRY SYSTEM

FCC ID : NYOSEKS-02Rx

Model / Type No. : SEKS-02Rx

Serial number : N/A

Total page of Report : 9 pages (including this page)

Date of Incoming : June 27, 2002


Date of issuing : July 15, 2002

## SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART B §15.101**

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:   
 G. W. Lee/ Asst. Chief Engineer  
 EMC Dept.  
 ONETECH Corp.

Reviewed by:   
 Y. K. Kwon/ Chief Engineer  
 EMC Dept.  
 ONETECH Corp.

document property name.

---

document property name.

---

## CONTENTS

	Page
<b>1. VERIFICATION OF COMPLIANCE.....</b>	<b>4</b>
<b>2. GENERAL INFORMATION.....</b>	<b>5</b>
<b>2.1 PRODUCT DESCRIPTION .....</b>	<b>5</b>
<b>2.2 RELATED SUBMITTAL(S) / GRANT(S) .....</b>	<b>5</b>
<b>2.3 TEST SYSTEM DETAILS.....</b>	<b>6</b>
<b>2.4 TEST METHODOLOGY .....</b>	<b>6</b>
<b>2.5 TEST FACILITY .....</b>	<b>6</b>
<b>3. SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
<b>3.1 JUSTIFICATION.....</b>	<b>6</b>
<b>3.2 EUT EXERCISE SOFTWARE .....</b>	<b>6</b>
<b>3.3 EQUIPMENT MODIFICATIONS.....</b>	<b>6</b>
<b>3.4 CONFIGURATION OF TEST SYSTEM .....</b>	<b>7</b>
<b>4. PRELIMINARY TEST.....</b>	<b>7</b>
<b>4.1 AC POWER LINE CONDUCTED EMISSIONS TESTS .....</b>	<b>7</b>
<b>4.2 RADIATED EMISSIONS TESTS .....</b>	<b>7</b>
<b>5. FINAL RESULT OF MEASUREMENT.....</b>	<b>8</b>
<b>5.1 RADIATED EMISSION TEST .....</b>	<b>8</b>
<b>6. FIELD STRENGTH CALCULATION .....</b>	<b>9</b>
<b>7. LIST OF TEST EQUIPMENT .....</b>	<b>11</b>

document property name.

---

## 1. VERIFICATION OF COMPLIANCE

APPLICANT : SHINCHANG ELECTRICS CO., LTD.  
 ADDRESS : 734-2, Wonshi-Dong, Ansan-Si, Gyungki-Do, 425-090, Korea  
 CONTACT PERSON : Eui-Tae Kim / Research Engineer  
 TELEPHONE NO : 82-31-4904-526  
 FCC ID : NYOSEKS-02Rx  
 MODEL NO/NAME : SEKS-02Rx  
 SERIAL NUMBER : N/A  
 DATE : July 15, 2002

DEVICE TYPE	UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	REMOTE KEYLESS ENTRY SYSTEM -SUPERHETRODYNE RECEIVER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 § 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER 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.

document property name.

---

## 2. GENERAL INFORMATION

### 2.1 Product Description

The SHINCHANG ELECTRICS CO., LTD., Model SEKS-02Rx (referred to as the EUT in this report) is a receiver that is fixed inside the vehicle and receives the signal from the transmitter, Model: SEKS-02Tx, FCC ID: NYOSEKS-02Tx which was manufactured by Shinchang Co., Ltd and then decide locking and unlocking the door of the vehicle. The product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
RECEIVING FREQUENCY	315.00 MHz
SENSITIVITY	Min -98dBm
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	4.8970 MHz and 315.0MHz (RC Resonator)
RATED SUPPLY VOLTAGE	DC 12V
OPERATING VOLTAGE	DC 9 ~ 16V
NUMBER OF LAYERS	2 LAYERS

Model Differences:

-. No other model differences have been mentioned.

### 2.2 Related Submittal(s) / Grant(s)

Original submittal only.

document property name.

---

### 2.3 Test System Details

The EUT was tested with the following all equipment used in the tested systems are:

Model	Manufacturer	FCC ID	Description	Connected to
SEKS-02Rx	SHINCHANG ELECTRICS CO., LTD.	NYOSKS-005Rx	RECEIVER	BATTERY
N/A	N/A	N/A	BATTERY	EUT
8657A	HP	N/A	Signal Generator	N/A

### 2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

### 2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)

## 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 ELECTRICS CO., LTD.	326872-1300	N/A

### 3.2 EUT exercise Software

Set the signal generator to transmit at 315MHz and then the EUT receives the signal.

Used battery for the EUT was fully charged.

To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

### 3.3 Equipment Modifications

None

document property name.

---

### 3.4 Configuration of Test System

Line Conducted Emission Test:

It is not need to test this requirement, because the power of the EUT supplies from a car battery.

Radiated Emission Test:

Preliminary radiated emissions tests were conducted using the procedure in ANSI C63.4/1992, 8.3.1.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meters open area test site.

Coherent Test:

During Radiated Emission Tests, H.P. signal generator model no: 8657A was used to radiate an unmodulated CW signal to EUT at 315.00 MHz in order to cohere the individual components of the characteristic broadband emissions from EUT.

Antenna Power Conduction Test:

This equipment was only with a permanently attached antenna, so the radiated emission measurement was performed with the antenna attached.

## 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)
N/A	N/A
It is not need to test this requirement, because the power of the EUT is supplied from a car battery.	

### 4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

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

document property name.

---

## 5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 Radiated Emission Test

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

Humidity Level : 51 % Temperature : 26 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B (Section: 15.109)  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)  
 Type of Test : Unintentional Radiator  
 Result : PASSED BY -14.42 dB at 695.10 MHz

EUT : REMOTE KEYLESS ENTRY SYSTEM

Date: July 3, 2002

Operating Condition : RX mode

Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC LIMIT	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (Db)
116.31	11.20	H	13.25	1.22	25.67	43.50	-17.83
122.52	8.9	H	13.33	1.24	23.47	43.50	-20.03
225.28	9.6	H	10.94	1.70	22.24	46.00	-23.76
314.60	9.2	H	14.56	2.09	25.85	46.00	-20.15
314.80	9.1	H	14.55	2.09	25.74	46.00	-20.26
695.10	7.5	H	20.80	3.28	31.58	46.00	-14.42
Other frequencies are more than 30dB below the limit up to 2GHz.							

Radiated Emission Tabulated Data



**Tested by: Young-Min, Choi / Project Engineer**

This report shall not be reproduced except in full without our written approval.

FCC-004 (Rev.0)

**HEAD OFFICE** : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea  
 (TEL: 82-31-746-8500 FAX: 82-31-746-8700)

**EMC Testing Dept** : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



document property name.

---

## 6. FIELD STRENGTH CALCULATION

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

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

---

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

document property name.

---

document property name.

## 7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	SEP/01	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/02	12MONTH	
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/01	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/01	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/01	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/02	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/02	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/02	12MONTH	■
10.	Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D294	JUNE/02	12MONTH	■
11.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/02	12MONTH	
12.	RF Amplifier	HP	8447F	3113A04554	JUN/02	N/A	
13.	Spectrum Analyzer	HP	8561E	3350A00546	SEP/01	12MONTH	■
14.	Spectrum Analyzer	HP	8591A	3131A02312	APR/02	12MONTH	
15.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
16.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
17.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
18.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
19.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■