

FCC PART 15 CLASS B EMI MEASUREMENT AND TEST REPORT

FOR

**Lee Technology Korea Co., Ltd.
#24-2 Samjeong-dong, Ojeong-gu,
Puchon-city, Kyunggi-do, Koera**

Model Number :LTK-2002

Issued Date: April 14, 2002
Report No.: THRU-F0200414B

This Report Concerns: ☒ Original Report	Equipment Type: Parent Seeker LTK-2002
Test Date: April 13, 2002	
Tested By: <u>Kyung Moon Choi</u> K. M. Choi - Test Engineer	
Certified By: <u>Hae Woon Park</u> H.W. Park - M. Director, Compliance Engineering	
Prepared By: Thru Lab. & Engineering 1367-1, ShinKil-Dong, YoungDeungPo-Ku, Seoul 150-855, KOREA TEL: 82-(2)-846-5002 / FAX: 82-(2)-834-0969	

Note: This report may not be duplicated except in full without prior written consent of Thru Lab. & Engineering.

Table of Contents

1. General Information

1.1	Test Facility	4
1.2	Test Methodology.	4
1.3	Test Equipment List	4
1.4	Product Description for Equipment Under Test (EUT)	5
1.5	Equipment Under Test	5
1.6	Support Equipment	5
1.7	External I/O Cabling	5

2. System Test Configuration

2.1	Justification	6
2.2	EUT Exercise	6
2.3	Special Accessories.	6
2.4	Schematics/Block Diagram	6
2.5	Configuration of Test System	6
2.6	Conducted Emission Test Setup Block Diagram	6

3. Conducted Emission Test

3.1	EUT Setup	7
3.2	Test Equipment Setup	7
3.3	Test Procedure	7
3.4	Summary of Test Results	7
3.5	Conducted Emission Test Result Data	7
3.6	Plot of Conducted Emission Test Data	7

4. Radiated Emission Test

4.1	EUT Setup	8
4.2	Test Equipment Setup	8
4.3	Test Procedure	8
4.4	Corrected Amplitude and Margin Calculation	8
4.5	Summary of Test Results	9
4.6	Radiated Emission Test Result Data	9

Table of Contents(cont'd)

5. FCC Labelling Requirement

5.1	FCC Statement.	10
5.2	Label Location.	10

6. Test Setup Photographs

6.1	Radiated Emission: Front View	11
6.2	Radiated Emission: Rear View.	11

7. Photographs

7.1	EUT: Front View	12
7.2	EUT: Rear View	12
7.3	EUT: Label View	13
7.4	EUT: Internal View.	13
7.5	EUT: Main Board, Component View	14
7.6	EUT: Main Board, Circuit View.	15
7.7	EUT: Main Board, Component View.	16
7.8	EUT: Main Board, Circuit View.	17

Appendix A - EUT Schematics/Block Diagram

Appendix B - User's Manual

1. General Information

1.1 Test Facility

The open area test site (OATS) used by Thru Lab. & Engineering to collect radiated and conducted emissions measurement data is located in the 389 JeArm-Rhi, HyangNam-Myun, HwaSung-Gun, KyungKi-Do, Korea.

Test sites at Thru Lab. & Engineering has been fully described in reports submitted to the Federal Communication Commission and the details of the reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The test facility also complies with the radiated and AC line conducted test site criterion in ANSI C63.4-1992. The Federal Communications Commission has the reports on file and is listed under Registration Number 92583. The scope of the accreditation covers the FCC Method - 47 CFR Part 15 or 18 of the Commission's Rules.

1.2 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-1992. All radiated and conducted emission measurements were performed at Thru Lab. & Engineering. The radiated testing was performed at an antenna-to-EUT distance of 10 meters for Class A devices and 3 meters for Class B devices.

1.3 Test Equipment List

Description	Model No.	Serial No.	Manufacturer	Cal. Due	Used
EMI Test Receiver	ESVS 10	830489/001	Rodhe&Schwarz	04/25/2002	RE
Biconical Antenna	94455-1	0977	Eaton	04/25/2002	RE
Log Periodic Antenna	3146	2051	EMCO	04/25/2002	RE
Horn Antenna	SAS-571	414	A.H. Systems	05/09/2002	
Dipole Antenna Set	TDA25/.1/.2	176/200/200	Electro Metrics	10/04/2001	
Signal Generator	SMS	872165/100	Rodhe&Schwarz	04/25/2002	
Spectrum Analyzer	R3261C	71720189	Advantest	04/25/2002	
LISN	KNW-242	8-923-2	Kyoritsu	N/A	
LISN	8012-50-R-24	8379121	Solar	N/A	
Plotter	7475A	2210A02802	Hewlett Packard	N/A	
Positioner Set	N/A	N/A	Dongsung Prec.	N/A	RE

1.4 Product Description for Equipment Under Test (EUT)

Lee Technology Korea Co., Ltd.'s LTK-2002 or the "EUT" as referred to in this report is Parent Seeker vibrate Pager. By using a vibrator and LED, it's alarmed the state of group call or individual call or out of range.

Main Features of EUT are:

- Frequency Range 457.5750MHz
- Channel Spacing 25kHz
- Sensitivity $5\mu V/m$
- Selectivity 60dB@ $\pm 25kHz$
- Spurious Rejection 60dB Below Carrier

- Modulation Scheme F S K

- Baud Rate 512/1200/2400 BPS
- Power Supply AA Battery 1pcs.
- Battery Life 3.5month
- Low Battery Level 1.1 Volts
- Dimensions(H.W.D) 68.5 x 48.5 x 20 mm
- Frequency stability ± 10 PPM
- Code Format POCSAG

1.5 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
Parent Seeker	LTK-2002	none	Lee Technology Co., LTD.	EUT

1.6 Support Equipment

Description	Model Number	Serial Number	Manufacturer	Remarks
none	-	-	-	-
none	-	-	-	-

1.7 External I/O Cabling

Description	Length (m)	Port/From	Port/To	Remarks
none	-	-	-	-
none	-	-	-	-
none	-	-	-	-

2. System Test Configuration

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user). Worst case conducted and radiated emissions are presented in section 4.6 of this report.

The test was performed with Tuned Frequency 457.5750 MHz of Parent Seeker Pager(EUT) on the Wooden turn Table.

2.2 EUT Exercise

No EUT exercising program was used during testing.

2.3 Special Accessories

As shown in section 2.5, all interface cables used for compliance testing are non-shielded as normally supplied or by use respective component manufacturers.

2.4 Schematics/Block Diagram

The EUT schematic or block diagram is presented in Appendix B as reference.

2.5 Configuration of Test System



2.6 Conducted Emission Test Setup Block Diagram

N/A

3. Conducted Emission Test

3.1 EUT Setup

The measurement was performed in the screen room of test site, using the setup in accordance with ANSI C63.4-1992 conducted emission measurement procedure.

Due to the EUT is operated only from 12 volts vehicle battery, which no provisions for connection to the public AC powerlines to operate the EUT, AC powerline conducted emission test are not applicable according to Part 15.107(f) of the FCC Rules.

3.2 Test Equipment Setup

The spectrum analyzer was configured during the conduction test in as follows:

Start Frequency	450kHz
Stop Frequency	30MHz
Resolution Bandwidth	9kHz
Sweep Time	Auto
Detector Mode	QP

3.3 Test Procedure

N/A

3.4 Summary of Test Results

N/A

3.5 Conducted Emission Test Data

N/A

3.6 Plot of Conducted Emission Test Data

N/A

4. Radiated Emission Test

4.1 EUT Setup

The radiated emission tests were performed in the open area test site, using the setup in accordance with ANSI C63.4-1992 radiated emission measurement procedure.

The EUT was placed on the center of the test table.

4.2 Test Equipment Setup

During the radiated emission test, the EMI test receiver was set with the following configurations:

Start Frequency	30MHz
Stop Frequency	1000MHz
IF Bandwidth	120kHz
Sweep Time	10msec
Detector Mode	QP

4.3 Test Procedure

For the radiated emission test, Tuned Frequency 457.5750 MHz of Parent Seeker Pager(EUT) on the Wooden turn Table.

Maximizing procedure was performed on the six (6) highest emissions to verify that the EUT complied with all installation combination.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30MHz to 1000MHz. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum emission levels. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization. The final test data for this test configuration is recorded in the table listed under section 4.6 of this report.

4.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude is calculated by adding the antenna and cable Correction Factor from the Indicated Amplitude reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Indicated Amplitude} + \text{Antenna Factor} + \text{Cable Factor}$$

The Margin column of the data table in section 4.6 indicates the degree of compliance with the applicable limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Applicable Limit}$$

4.5 Summary of Test Results

According to the data in section 4.6, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin of:

-15.4dB at 140.03MHz in the HORIZONTAL polarization at an antenna-to-EUT distance of 3 meters.

4.6 Radiated Emission Test Result Data

Indicated		Antenna		Table	Correction Factor		Corrected Amplitude	FCC Part15 Class B		
Freq. (MHz)	Ampl. (dBuV/m)	Polar. (H/V)	Height (m)	Angle (deg.)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit		Margin (dB)
								(dBuV/m)	(uV/m)	
36.16	3.4	H	3.0	130	12.9	0.5	16.8	40.0	100	-23.2
40.56	4.5	H	3.4	360	12.9	0.6	18.0	40.0	100	-22.0
46.09	13.2	H	3.2	170	12.0	0.7	25.9	40.0	100	-14.1
49.70	6.3	H	3.4	200	11.2	0.8	18.3	40.0	100	-21.7
51.17	12.0	H	2.6	160	11.2	0.8	24.0	40.0	100	-16.0
70.26	13.5	H	2.9	150	5.1	1.0	19.6	40.0	100	-20.4
136.43	11.9	H	2.8	100	14.1	1.6	27.6	43.5	150	-15.9
140.03	11.3	H	2.4	210	15.2	1.6	28.1	43.5	150	-15.4
153.42	7.0	H	2.7	300	16.5	1.7	25.2	43.5	150	-18.3
186.14	4.2	V	2.6	130	14.1	2.3	20.6	43.5	150	-22.9
192.01	6.5	H	3.0	200	13.9	2.0	22.4	43.5	150	-21.1
209.76	5.7	H	2.8	100	12.5	2.2	20.4	43.5	150	-23.1
334.11	5.6	V	1.0	220	15.9	3.4	24.9	46.0	200	-21.1
360.05	2.2	H	2.5	310	15.3	3.6	21.1	46.0	200	-24.9
393.21	3.8	H	2.6	260	15.8	3.8	23.4	46.0	200	-22.6
423.93	4.0	H	3.0	200	16.2	3.4	23.6	46.0	200	-22.4
470.50	5.6	H	2.1	270	17.9	4.3	27.8	46.0	200	-18.2
663.57	5.5	H	2.9	360	20.2	3.6	29.3	46.0	200	-16.7