



# TEST REPORT

Ref. Report No.

99-341-020

*This test report only responds to the tested sample and shall not be reproduced except*

**Name and address of the applicant**

Korea KDK Co., Ltd.  
60-17, Kasan-Dong, Kumchun-Ku, Seoul, Korea 153-023

**Standard / Test regulation**

FCC Part 15, Subpart B

**Test result**

Pass

Incoming date : April 7, 1999

Test date : April 30, 1999

**Test item(s) ;**

Communications Receiver  
(Pager Receiver)

**Model/type ref. ;**

SH770

**Manufacturer ;**

Korea KDK Co., Ltd.

**Additional information ;**

FCC ID. : OHXSH770E1

Issue date : May 7, 1999

*in full without written approval of the Korea Testing Laboratory.*

**Tested and reported by**

**Reviewed by**

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# KOREA TESTING LABORATORY

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**. GENERAL INFORMATION**

1. Grantee Name and : Korea KDK Co., Ltd.  
Mailing Address 60-17, Kasan-Dong, Kumchun-Ku, Seoul, Korea 153-023

2. Manufacturer's Name and : Korea KDK Co., Ltd.  
Mailing Address 60-17, Kasan-Dong, Kumchun-Ku, Seoul, Korea 153-023

3. Equipment Descriptions

3.1 Tuning Frequency : 139.050MHz ~ 169.800MHz (25kHz Spacing)  
3.2 Detect Method : Superheterodyne Detector  
3.3 Local Oscillator : 1st Local Osc. Frequency = Tuning Frequency - 21.4MHz(1st IF)  
2nd Local Osc. Frequency = 20.945MHz (2nd IF : 455kHz)  
3.4 Used Crystal : 1st Local Crystal = 1st Local Osc. Frequency/2  
2nd Local Crystal = 20.945MHz  
3.5 Power Supply : DC 1.5V (Battery)

4. Rules and Regulations : FCC Part 15, Subpart B

5. Measuring Procedure : ANSI C63.4-1992

6. Date of Measurement

6.1 Line Conducted : Not Applicable  
6.2 Radiated Emission : April 30, 1999

**. GENERAL REQUIREMENTS OF THE EUT**

## 1. Labelling Requirement (Section 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

1.1 Location on Enclosure : Manual for Installation and Operating Instruction

1.2 How Applied : Printing

## 2. Information to User (Section 15.21)

The following or similar statements were provided in the manual for user instruction.

Please refer page 1 of the attached manual for details.

CAUTION : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 3. Special Accessories (Section 15.27)

3.1 Were the special Accessories provided?            ☐ yes, ☒ no

3.2 If yes, details for the special accessories are as follows :

3.3 If yes, were the appropriate instructions provided on the first page of the text concerned with the device?

☐ yes, ☐ no

3.4 Are these accessories provided of the type which can be readily obtained from multiple retail outlets ?

☐ yes, ☐ no

And therefore does the manual specify what additional components or accessories are required to used in order to comply with the Rules?

☐ yes, ☐ no

### **. RADIATED EMISSION MEASUREMENT (Section 15.109)**

#### 1. Test Procedure

##### 1.1 Preliminary Testing for Reference

This pager receiver(EUT) is designed to operate in the band 139.050MHz to 169.800MHz by changing a local oscillator installed in internal PCB. According to section 15.31(m), the measurements were performed with three equipments which were selected as bottom, middle, and top frequency in the operating band.

Preliminary testing was performed in a KTL absorber-lined room to determine the emission characteristics of the EUT. The EUT was placed on the wooden table which has dimensions of 0.8 meters in height, 1 meter in length and 1.5 meters in width. Receiving antenna(Biconical antenna : 30 to 300MHz, Log-periodic antenna : 200 to 1000MHz or Horn Antenna : 1 to 18GHz) was placed at the distance of 1 meter from the EUT.

An attempt was made to maximize the emission level with the various configurations of the EUT while rotating the table and varying antenna height.

Emissions level from the EUT with various configurations were examined on a Spectrum Analyzer connected with a RF amplifier and graphed by a plotter.

##### 1.2 Final Radiated Emission Test at a Absorber-Lined Room

The final measurement of radiated field strength was carried out in a KTL Absorber-Lined Room that was listed up at FCC according to the "Radiated Emissions Testing" procedure specified by ANSI C63.4.

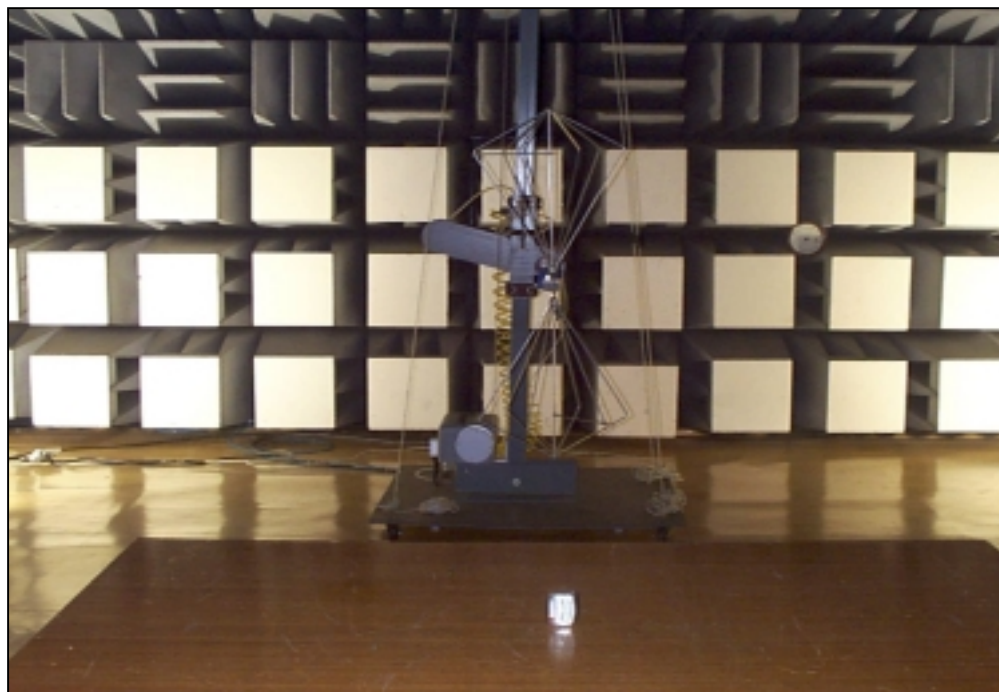
Based on the test results in preliminary test, measurement was made in same test set up and configuration which produced maximum emission level. Receiving antenna was installed at 3-meter distance from the EUT, and was connected to an EMI receiver or spectrum analyzer(for above 1GHz) with a RF amplifier.

Turntable was rotated through 360 degrees and receiving antenna height was varied from 1 to 4 meters above the ground plane to read maximum emission level.

If necessary, the radiated emission measurements could be performed at a closer distance than specified distance to ensure higher accuracy and their results were extrapolated to the specified distance using an inverse linear distance extrapolation factor(20dB/decade) as per Section 15.31(f).

The maximum emission level from the EUT occurred in such configuration as shown in the following photograph.

## 2. Photograph for the worst case configuration



## 3. Sample Calculation

The emission level measured in decibels above one microvolt (dB  $\mu$ V/m) was converted into microvolt per meter ( $\mu$ V/m) as shown in following sample calculation.

For example :

|                                |           |                   |
|--------------------------------|-----------|-------------------|
| Measured Value at              | 117.64MHz | 2.0 dB            |
| + Antenna Factor               | 11.6 dB   |                   |
| + Cable Loss                   |           | 2.0 dB            |
| - Preamplifier                 |           | 0.0 dB            |
| - Distance Correction Factor * |           | 0.0 dB            |
| -----                          |           |                   |
| = Radiated Emission            |           | 15.6 dB $\mu$ V/m |
| ( =                            |           | 6.0 $\mu$ V/m)    |

\* Extrapolated from the measured distance(1.5m) to the specified distance(3m) by an inverse linear distance extrapolation.

## 4. Measurement Data

## 4.1 Operating Frequency (Bottom : 139.050MHz Tuning)

- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz)  
       \_\_\_\_\_ Peak (3dB Bandwidth : 300kHz)
- Measurement Distance : 3 Meter

| Frequency<br>(MHz) | *<br>D.M. | *<br>A.P. | Measured<br>Value<br>(dB ) | *<br>A.F.<br>+<br>C.L.<br>(dB) | *<br>A.G.<br>(dB) | *<br>D.C.F.<br>(dB) | Emission<br>Level |       | Limit<br>( /m) | **<br>Margin<br>(dB) |
|--------------------|-----------|-----------|----------------------------|--------------------------------|-------------------|---------------------|-------------------|-------|----------------|----------------------|
|                    |           |           |                            |                                |                   |                     | (dB /m)           | ( /m) |                |                      |
| ***<br>58.82       | Q         | V         | 2.0                        | 9.4                            | -                 | -                   | 11.4              | 3.7   | 100            | -28.6                |
| ***<br>117.64      | Q         | V         | 2.0                        | 13.6                           | -                 | -                   | 15.6              | 6.0   | 150            | -27.9                |
| -                  | -         | -         | -                          | -                              | -                 | -                   | -                 | -     | -              | -                    |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |

Note

The observed EMI receiver(ESVS30) noise floor level was 2.0dB . And all other emissions not reported on data were more than 25dB below the permitted level.

\* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)  
 A.P. : Antenna Polarization (H : Horizontal, V : Vertical)  
 A.F. : Antenna Factor  
 C.L. : Cable Loss  
 A.G. : Amplifier Gain  
 D.C.F. : Distance Correction Factor

\*\* Margin (dB) = Emission Level (dB) - Limit (dB)

\*\*\* Reference Data

## 4.2 Operating Frequency (Middle : 156.000MHz Tuning)

- Resolution Bandwidth : x CISPR Quasi-Peak (6dB Bandwidth : 120kHz)  
       \_\_\_\_\_ Peak (3dB Bandwidth : 300kHz)
- Measurement Distance : 3 Meter

| Frequency<br>(MHz) | *<br>D.M. | *<br>A.P. | Measured<br>Value<br>(dB ) | *<br>A.F.<br>+<br>C.L.<br>(dB) | *<br>A.G.<br>(dB) | *<br>D.C.F.<br>(dB) | Emission<br>Level |       | Limit<br>( /m) | **<br>Margin<br>(dB) |
|--------------------|-----------|-----------|----------------------------|--------------------------------|-------------------|---------------------|-------------------|-------|----------------|----------------------|
|                    |           |           |                            |                                |                   |                     | (dB /m)           | ( /m) |                |                      |
| ***<br>67.30       | Q         | V         | 2.0                        | 7.3                            | -                 | -                   | 9.3               | 2.9   | 100            | -30.7                |
| ***<br>134.60      | Q         | V         | 2.0                        | 15.3                           | -                 | -                   | 17.3              | 7.3   | 150            | -26.2                |
| -                  | -         | -         | -                          | -                              | -                 | -                   | -                 | -     | -              | -                    |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |
|                    |           |           |                            |                                |                   |                     |                   |       |                |                      |

Note

The observed EMI receiver(ESVS30) noise floor level was 2.0dB . And all other emissions not reported on data were more than 25dB below the permitted level.

\* D.M. : Detect Mode (P : Peak, Q : Quasi-Peak, A : Average)  
 A.P. : Antenna Polarization (H : Horizontal, V : Vertical)  
 A.F. : Antenna Factor  
 C.L. : Cable Loss  
 A.G. : Amplifier Gain  
 D.C.F. : Distance Correction Factor

\*\* Margin (dB) = Emission Level (dB) - Limit (dB)

\*\*\* Reference Data



**. TEST EQUIPMENT USED FOR MEASUREMENTS**

| <u>Equipment</u>                         | <u>Model No.</u> | <u>Manufacturer</u> | <u>Serial No.</u> | <u>Effective Cal.</u> | <u>Duration</u>   |
|------------------------------------------|------------------|---------------------|-------------------|-----------------------|-------------------|
| [x] EMI Receiver<br>(20MHz-1GHz)         | ESVS30           | R & S               |                   | 830516/002            | 06/29/98-06/29/99 |
| [x] Spectrum Analyzer<br>(9kHz-26.5GHz)  | 8563A            | H. P.               |                   | 3222A02069            | 02/10/99-02/10/00 |
| [x] Spectrum Analyzer<br>(100Hz-22GHz)   | 8566B            | H. P.               |                   | 3014A07057            | 05/29/98-05/29/99 |
| [x] Quasi-Peak Adapter<br>(10kHz-1GHz)   | 85650A           | H. P.               |                   | 3107A01511            | 05/29/98-05/29/99 |
| [x] RF-Preselector<br>(20Hz-2GHz)        | 85685A           | H. P.               |                   | 3010A01181            | 05/29/98-05/29/99 |
| [ ] Test Receiver<br>(9kHz-30MHz)        | ESH3             | R & S               |                   | 860905/001            | 06/29/98-06/29/99 |
| [x] Pre-Amplifier<br>(0.1-3000MHz, 30dB) | 8347A            | H. P.               |                   | 2834A00543            | 05/29/98-05/29/99 |
| [ ] Pre-Amplifier<br>(1-26.5GHz, 35dB)   | 8449B            | H. P.               |                   | 3008A00302            | 06/29/98-06/29/99 |
| [ ] LISN(50 , 50 H)<br>(10kHz-100MHz)    | 3825/2           | EMCO                |                   | 9010-1710             | -                 |
| [ ] LISN(50 , 50 H)<br>(10kHz-100MHz)    | 3825/2           | EMCO                |                   | 9011-1720             | -                 |
| [x] Plotter                              | 7470A            | H. P.               |                   | 3104A21292            | -                 |
| [x] Tuned Dipole Ant.<br>(30MHz-300MHz)  | VHA 9103         | Schwarzbeck         |                   | -                     | *                 |
| [ ] Tuned Dipole Ant.<br>(300MHz-1GHz)   | UHA 9105         | Schwarzbeck         |                   | -                     | *                 |
| [x] Biconical Ant.<br>(30MHz-300MHz)     | BBA 9106         | Schwarzbeck         |                   | -                     | *                 |
| [x] Log Periodic Ant.<br>(200MHz-1GHz)   | 3146             | EMCO                |                   | -                     | *                 |
| [x] Horn Ant.<br>(1GHz-18GHz)            | 3115             | EMCO                |                   | -                     | *                 |
| [ ] DC Power Supply                      | 6260B            | H.P.                |                   | 1145A04822            | -                 |
| [ ] Shielded Room<br>(5.0m x 4.5m)       | -                | SIN-MYUNG           |                   | -                     | -                 |

\* Each set of antennas has been calibrated to ensure correlation with ANSI C63.5 standard. The calibration of antennas is traceable to Korea Standard Research Institute(KSRI).