

**Date: 2000-12-31**

# **TEST REPORT**

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**No.: HM103361**

**APPLICANT:** (CODE : SKC001)

SKY CITY INTERNATIONAL LIMITED.

25/F., North Point Asia-Pacific Centre, 10 North Point Road, North Point, Hong Kong.

**DATE OF SAMPLE(S) RECEIVED:** 2000-09-27

**SUBMITTED SAMPLE(S):** 2 samples per model

**DATE OF TESTING:** 2000-12-02

**DESCRIPTION OF SAMPLE(S):**

A sample of product said to be:

Product: MULTI-FUNCTION LANTERN

Manufacturer: SKY CITY INTERNATIONAL LIMITED.

Model Number: SL9100WRC

Brand Name: N/A

Rating: 9Vd.c. ("6F22" size battery x 1)

Origin: CHINA

**INVESTIGATIONS REQUESTED:**

Measurement to the relevant clauses of F.C.C. Rules and Regulations Part 15 Subpart C - Intentional Radiator.

**RESULT/ REMARK:**

Please see attached sheet(s).

**CONCLUSION:**

From the measurement data obtained, the tested sample was considered to have COMPLIED after modification with the clause 15.231a for the Transmitter Section of Federal Communications Commission Rules. Clause 15.231 (1),(2) & (3).

**TEST EQUIPMENT AUDIT:**

Please see Appendix A

**MODIFICATION METHOD:**

Please see Appendix B

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Law Man Kit  
Testing Engineer

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Steven Tsang  
Verify by

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Patrick Wong  
Patrick Wong  
for Managing Director

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### **TEST SUMMARY**

- (1) Measurement of Emission of RF energy on the carrier frequency ..... Satisfactory
- (2) Measurement of the out-of band emission including harmonics ..... Satisfactory
- (3) Measurement of Emission Within Band Edges ..... Satisfactory
- (4) Measurement of Radiated Emissions ..... Satisfactory
- (5) Measurement of Line-Conducted Voltage onto AC Power Line ..... Not applicable
- (6) FCC rule clause 15.231 (1),(2) and (3) subpart C-Intentional-radiator .... Satisfactory

### **TEST DATA**

Please refer to the attached result sheets.

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference

TEST REFERENCE : FCC Rules Part 15 Subpart Section 15.231a (320.594MHz)

TEST CONDITION : Normal

TEST DATE : 2000-12-02

#### **Emission of RF energy on the carrier frequency -- 320.594 MHz (PEAK VALUE)**

| Emission<br>Frequency | Meter<br>Reading | Polarization | Antenna<br>Factor | Field Strength<br>(at 3m) | FCC Limit |
|-----------------------|------------------|--------------|-------------------|---------------------------|-----------|
| MHz                   | dB(μV)           | H-V          | dB                | dB(μV/m)    μV/m          | μV/m      |
| 320.6                 | 55.6             | H            | + 20.1            | 75.7    6095.4            | 62850.0   |

#### **Emission of RF energy on the carrier frequency -- 320.594 MHz (AVERAGE VALUE)**

| Emission<br>Frequency | Meter<br>Reading | Polarization | Antenna<br>Factor | Field Strength<br>(at 3m) | FCC Limit |
|-----------------------|------------------|--------------|-------------------|---------------------------|-----------|
| MHz                   | dB(μV)           | H-V          | dB                | dB(μV/m)    μV/m          | μV/m      |
| 320.6                 | 20.9             | H            | + 20.1            | 41.0    112.2             | 6285.0    |

\* Adjusted by duty cycle = -5dB

... to be continued

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE : FCC Rules Part 15 Subpart Section 15.231a(320.594MHz)

TEST CONDITION : Normal

TEST DATE : 2000-12-02

#### Field strength of spurious emissions

(PEAK VALUE)

| Emission  |   | Meter   | Polarization | Antenna | Field Strength |      |        |   | FCC Limit |
|-----------|---|---------|--------------|---------|----------------|------|--------|---|-----------|
| Frequency |   | Reading |              | Factor  | (at 3m)        |      |        |   |           |
| MHz       |   | dB(μV)  | H-V          | dB      | dB(μV/m)       |      | μV/m   |   | μV/m      |
| 641.2     |   | 37.5    | H            | +       | 26.6           | 64.1 | 1603.2 |   | 6285.0    |
| * 961.8   | < | 1.0     |              | +       | 32.8           | <    | 33.8   | < | 49.0      |
| 1282.4    | < | 1.0     |              | +       | 28.3           | <    | 29.3   | < | 29.2      |
| 1603.0    | < | 1.0     |              | +       | 32.1           | <    | 33.1   | < | 45.2      |
| 1923.6    | < | 1.0     |              | +       | 26.2           | <    | 27.2   | < | 22.9      |
| * 2244.2  | < | 1.0     |              | +       | 28.0           | <    | 29.0   | < | 28.2      |
| 2564.8    | < | 1.0     |              | +       | 28.5           | <    | 29.5   | < | 29.9      |
| * 2885.3  | < | 1.0     |              | +       | 30.6           | <    | 31.6   | < | 38.0      |
| 3205.9    | < | 1.0     |              | +       | 32.0           | <    | 33.0   | < | 44.7      |
| 3526.5    | < | 1.0     |              | +       | 33.0           | <    | 34.0   | < | 50.1      |

Remark : \* - Denotes restricted band of operation.

Measurement were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

=====SUMMARY=====

data is within limits

Broad-band Antennas were used and both polarizations of emissions were measured.  
polarizations at highest reading indicated as:

H -- Horizontal                      V -- Vertical

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\*\*\* INTENTIONAL RADIATOR \*\*\*

### (1) Measurement of Radiated Interference . . Continued ..

TEST REFERENCE : FCC Rules Part 15 Subpart Section 15.231a (320.594MHz)

TEST CONDITION : Normal

TEST DATE : 2000-12-02

### Field strength of spurious emissions (AVERAGE VALUE)

| Emission  |        | Meter   | Polarization | Antenna |      | Field Strength |        | FCC Limit |
|-----------|--------|---------|--------------|---------|------|----------------|--------|-----------|
| Frequency |        | Reading |              | Factor  |      | (at 3m)        |        |           |
| MHz       |        | dB(μV)  | H-V          | dB      |      | dB(μV/m)       | μV/m   | μV/m      |
|           | 641.2  | 15.4    | H            | +       | 26.6 | 42.0           | 125.9  | 628.5     |
| *         | 961.8  | < 1.0   |              | +       | 32.8 | < 33.8         | < 49.0 | 500.0     |
|           | 1282.4 | < 1.0   |              | +       | 28.3 | < 29.3         | < 29.2 | 628.5     |
|           | 1603.0 | < 1.0   |              | +       | 32.1 | < 33.1         | < 45.2 | 628.5     |
|           | 1923.6 | < 1.0   |              | +       | 26.2 | < 27.2         | < 22.9 | 628.5     |
| *         | 2244.2 | < 1.0   |              | +       | 28.0 | < 29.0         | < 28.2 | 500.0     |
|           | 2564.8 | < 1.0   |              | +       | 28.5 | < 29.5         | < 29.9 | 628.5     |
| *         | 2885.3 | < 1.0   |              | +       | 30.6 | < 31.6         | < 38.0 | 500.0     |
|           | 3205.9 | < 1.0   |              | +       | 32.0 | < 33.0         | < 44.7 | 628.5     |
|           | 3526.5 | < 1.0   |              | +       | 33.0 | < 34.0         | < 50.1 | 628.5     |

Remark : \* - Denotes restricted band of operation.

Measurement were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limit of FCC Rules Part 15 Section 15.209 were applied

### =====SUMMARY=====

data is within limits

Broad-band Antennas were used and both polarizations of emissions were measured.

polarizations at highest reading indicated as:

H -- Horizontal

V -- Vertical

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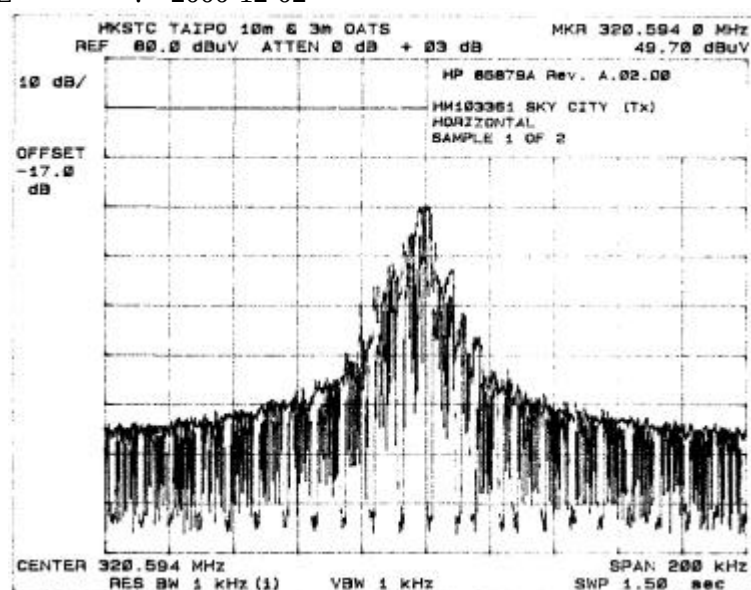
\*\*\* INTENTIONAL RADIATOR \*\*\*

### (2) Measurement of Emissions Within Band Edges.

TEST REFERENCE : FCC Rules Part 15 Subpart Section 15.231a (320.594MHz)

TEST CONDITION : Normal

TEST DATE : 2000-12-02



### RESULTS AND NOTES

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz . The bandwidth is determined at the points 20dB down from the modulated carrier.

@ 320.594 MHz

$$320.594 \text{ MHz} * 0.0025 = 0.801 \text{ MHz}$$

The bandwidth at 20dB down is 36.2kHz which is within the allowable limit of 36.2KHz at 320.594MHz.

=====SUMMARY=====

All data is within limits

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**NOTES FOR THE RADIATION MEASUREMENT**

- (1) Test site facility:  
Open field test site located at Taipo (Hong Kong) with a metal ground plane on filed with the FCC pursuant to section 2.948 of the FCC rules.
- (2) Distance between the EUT and measuring antenna:  
3 meters.
- (3) Measuring instrumentations:  
CISPR Quasi-peak type field strength meter (25 MHz - 1000 MHz and 1GHz-18GHz ). 6 dB bandwidth set at 120KHz. Also, peak level of the fundamental emissions was measured in order to determine compliance with the 20dB peak to average limit specified in Section 15.231 of the FCC new Rules.
- (4) Measuring antenna:  
Broad band antenna for the frequency range 25-1000 MHz, connected with 10 meters coaxial cable. Horn antenna for the frequency range 1-18 GHz, connected with high frequency coaxial cable. Cable loss of the coaxial cable. included in the Antenna Factor for measurement data. The antenna are capable of measuring both horizontal and vertical polarizations.
- (5) Frequency range scanned:  
The frequency range from 25 MHz to 1000 MHz and 1GHz to 18GHz had been searched. Readings of the highest emissions relating to the limit were reported as above.
- (6) Arrangement of EUT:  
During the test, the sample was operated at rated supply voltage and arranged for maximum emissions.
- (7) Measuring Procedure:  
In accordance with the relevant clauses of the FCC Rules Part 15 section 15.231. For superregenerative receivers, an independent signal generator had been used to radiated an unmodulated were (cw) signal to the receiver at its operating frequency in order to “cohere” or resolve the individual components of the characteristic broadband emission from such a receiver. The level of such signal may need to be adjusted in order to accomplish this.
- (8) Measuring Uncertainty:  
The calculated uncertainty for measurement performed at 3M test distance are:-  
30MHz to 300MHz =  $\pm 3.7\text{dB}$ , 300MHz to 1000MHz =  $+ 3.0\text{dB}/-2.7\text{dB}$ .  
1GHz to 18GHz =  $+3.3\text{dB}/-3.4\text{dB}$ .

Remark: Purpose of this test is to provide the Applicant with the necessary test data of their device for the submission to FCC with application for Equipment Authorization under FCC's Equipment Authorization Program. This test itself is not an Approval Test.

\*\*\*End of Document\*\*\*

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### **TEST EQUIPMENT AUDIT**

#### **Radiated Emission**

| EQP NO. | DESCRIPTION                                                                  | MANUFACTURER                                          | MODEL NO.                      | SERIAL NO.                             | LAST CAL. |
|---------|------------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------|----------------------------------------|-----------|
| EM007   | SPECTRUM ANALYZER                                                            | HEWLETT PACKARD                                       | HP85660B                       | 3144A21192                             | 18/07/00  |
| EM008   | SPECTRUM ANALYZER DISPLAY                                                    | HEWLETT PACKARD                                       | HP85662A                       | 3144A20514                             | 18/07/00  |
| EM009   | QUASI PEAK ADAPTOR                                                           | HEWLETT PACKARD                                       | HP85650A                       | 3303A01702                             | 18/07/00  |
| EM010   | RF PRESELECTOR                                                               | HEWLETT PACKARD                                       | HP85685A                       | 3221A01410                             | 18/07/00  |
| EM011   | ATTENUATOR/SWITCH                                                            | HEWLETT PACKARD                                       | HP11713A                       | 2508A10595                             | 18/07/00  |
| EM012   | PRE-AMPLIFIER                                                                | HEWLETT PACKARD                                       | HP8449B                        | 3008A00262                             | 18/07/00  |
| EM013   | CONTROLLER (COMPUTER),<br>COLOR MONITOR, KEYBOARD &<br>MOUSE<br>FLOPPY DRIVE | HEWLETT PACKARD<br>HEWLETT PACKARD<br>HEWLETT PACKARD | HP9000<br>HP A1097C<br>HP9133L | 6226A60314<br>3151J39517<br>2623A02468 | CM        |
| EM131   | PORTABLE SPECTRUM ANALYSER                                                   | HEWLETT PACKARD                                       | 8595EM                         | 3710A00155                             | 25/11/99  |
| EM017   | ANTENNA                                                                      | ARA INC.                                              | LPB-2513/A                     | 1069                                   | 17/02/00  |
| EM020   | HORN ANTENNA                                                                 | EMCO                                                  | 3115                           | 4032                                   | 09/08/00  |
| EM072   | SIGNAL GENERATOR                                                             | HEWLETT PACKARD                                       | 8640B                          | 1948A11892                             | 30/03/98  |
| EM083   | HKSTC OPEN AREA TEST SITE                                                    | HKSTC                                                 | N/A                            | N/A                                    | 15/02/01  |
| EM145   | EMI TEST RECEIVER                                                            | R & S                                                 | ESCS 30                        | 830245/021                             | 31/05/00  |

#### **Remarks:-**

CM      Corrective Maintenance  
N/A     Not Applicable or Not Available  
TBD     To Be Determined