



# CONFORMANCE TEST REPORT FOR FCC 47 CFR, Part 15 Subpart C

**Report No.: ET94S-08-207-02**

Client: Shuttle Inc.  
Product: Wireless Keyboard  
Model: KB10  
FCC ID: S8C-KB10  
Manufacturer/supplier: GoodNice International Ltd.

Date test item received: 2005/08/26  
Date test campaign completed: 2005/09/09  
Date of issue: 2005/09/22

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*Total number of pages of this test report: 16 pages*

*Total number of pages of photos: External photos 1 page  
Internal photos 3 pages  
Setup photos 2 pages*

| Test Engineer                                                                       | Checked By                                                                          | Approved By                                                                           |
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Client : Shuttle Inc.  
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Manufacturer : GoodNice International Ltd.  
Address : Fushi Industrial zone, Qinghu Industrial Park, QingXi Town, Dong Guan, Guang Dong, China.  
EUT : Wireless Keyboard  
Trade name : Shuttle  
Model No. : KB10  
Power Source : DC 1.5V\*4  
Regulations applied : FCC 47 CFR, Part 15 Subpart C (2005)

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## **1. GENERAL INFORMATION**

### **1.1 Product Description**

- a) Type of EUT : Wireless Keyboard
- b) Model No. : KB10
- c) Trade Name : Shuttle
- d) FCC ID : S8C-KB10
- e) Working Frequency : 27.14 MHz
- f) Power Supply : DC 1.5V\*4

### **1.2 Characteristics of Device:**

The EUT is a wireless keyboard. It operates at 27.14 MHz.

### **1.3 Test Methodology**

Both Conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 and FCC 47 CFR Part 15.

### **1.4 Test Facility**

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.  
This site has been accreditation as a FCC filing site.

## 2. TEST SYSTEM AND LIMITATION

### 2.1 Device for Tested System

| Device             | Manufacture                 | Model No. | S/N No. | Cable Description |
|--------------------|-----------------------------|-----------|---------|-------------------|
| Wireless Keyboard* | GoodNice International Ltd. | KB10      | ----    | ----              |

Remark “\*” means equipment under test.

### 2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz               | MHz                   | MHz           | GHz         |
|-------------------|-----------------------|---------------|-------------|
| 0.090 - 0.110     | 16.42-16.423          | 399.9-410     | 4.5-5.25    |
| 0.495 - 0.505 **  | 16.69475 - 16.69525   | 608-614       | 5.35-5.46   |
| 2.1735 - 2.1905   | 16.80425 - 16.80475   | 960-1240      | 7.25-7.75   |
| 4.125-4.128       | 25.5-25.67            | 1300-1427     | 8.025-8.5   |
| 4.17725-4.17775   | 37.5-38.25            | 1435-1626.5   | 9.0-9.2     |
| 4.20725-4.20775   | 73-74.6               | 1645.5-1646.5 | 9.3-9.5     |
| 6.215-6.218       | 74.8-75.2             | 1660-1710     | 10.6-12.7   |
| 6.26775-6.26825   | 108-121.94            | 1718.8-1722.2 | 13.25-13.4  |
| 6.31175-6.31225   | 123-138               | 2200-2300     | 14.47-14.5  |
| 8.291-8.294       | 149.9-150.05          | 2310-2390     | 15.35-16.2  |
| 8.362-8.366       | 156.52475 - 156.52525 | 2483.5-2500   | 17.7-21.4   |
| 8.37625-8.38675   | 156.7-156.9           | 2655-2900     | 22.01-23.12 |
| 8.41425-8.41475   | 162.0125-167.17       | 3260-3267     | 23.6-24.0   |
| 12.29-12.293      | 167.72-173.2          | 3332-3339     | 31.2-31.8   |
| 12.51975-12.52025 | 240-285               | 3345.8-3358   | 36.43-36.5  |
| 12.57675-12.57725 | 322-335.4             | 3600-4400     | Above 38.6  |
| 13.36-13.41       |                       |               |             |

Remark “\*\*” : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

## 2.3 Limitation

### (1) Conducted Emission Limits :

According to §15.207 Conducted limits.

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

| Frequency<br>MHz | Quasi Peak<br>dB $\mu$ V | Average<br>dB $\mu$ V |
|------------------|--------------------------|-----------------------|
| 0.15 - 0.5       | 66-56                    | 56-46                 |
| 0.5 - 5.0        | 56                       | 46                    |
| 5.0 - 30.0       | 60                       | 50                    |

### (2) Radiated Emission Limits :

According to §15.227 Operation within the band 26.96 – 27.28 MHz.

(a) The field strength of any emissions within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

(b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

According to § 15.209 Radiated emission limits, general requirements.

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 – 0.490        | 2400/F(kHz)                          | 300                              |
| 0.490 – 1.705        | 24000/F(kHz)                         | 30                               |
| 1.705 – 30.0         | 30                                   | 30                               |
| 30 – 88              | 100 **                               | 3                                |
| 88 – 216             | 150 **                               | 3                                |
| 216 – 960            | 200 **                               | 3                                |
| Above 960            | 500                                  | 3                                |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

According to §15.215 Additional provisions to the general radiated emission limitations.

- (a) The regulations in §§ 15.217-15.257 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.
- (b) In most cases, unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in Section 15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission.
- (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## 2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## 2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. To comply with the FCC RF exposure compliance requirement, the device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

### 3. RADIATED EMISSION MEASUREMENT

#### 3.1 Applicable Standard

According to §15.227 Operation within the band 26.96 – 27.28 MHz.

- (a) The field strength of any emissions within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.
- (b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

According to § 15.209 Radiated emission limits, general requirements.

- (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement<br>Distance<br>(meters) |
|----------------------|--------------------------------------|-------------------------------------|
| 0.009 – 0.490        | 2400/F(kHz)                          | 300                                 |
| 0.490 – 1.705        | 24000/F(kHz)                         | 30                                  |
| 1.705 – 30.0         | 30                                   | 30                                  |
| 30 – 88              | 100 **                               | 3                                   |
| 88 – 216             | 150 **                               | 3                                   |
| 216 – 960            | 200 **                               | 3                                   |
| Above 960            | 500                                  | 3                                   |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

According to §15.215 Additional provisions to the general radiated emission limitations.

- (a) The regulations in §§ 15.217-15.257 provide alternatives to the general radiated emission limits for intentional radiators operating in specified frequency bands. Unless otherwise stated, there are no restrictions as to the types of operation permitted under these sections.
- (b) In most cases, unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in Section 15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission.

- (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 3.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 30 MHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission measured below 30 MHz, set the EMI Test Receiver on a 10 kHz and 30 kHz resolution bandwidth respectively for each frequency measured in step 2.
3. For emission measured above 30 MHz, set the EMI Test Receiver on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

Figure 1 : Frequencies measured below 30 MHz configuration

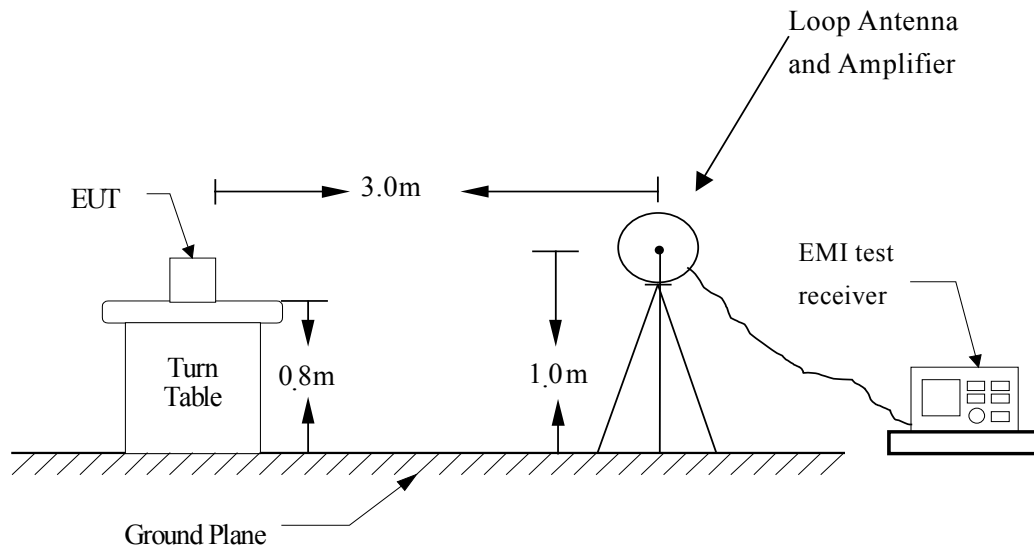
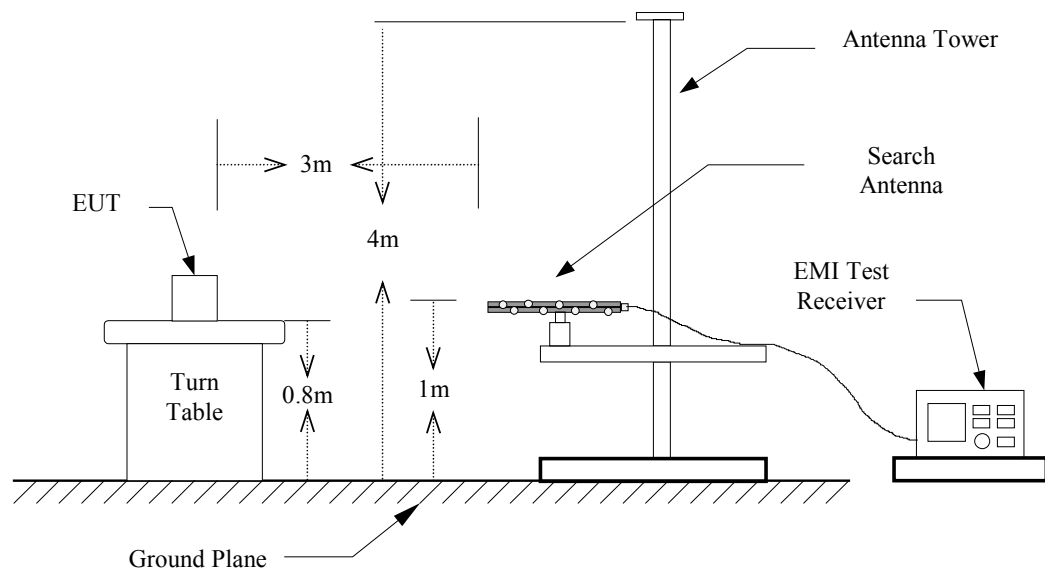


Figure 2 : Frequencies measured above 30 MHz configuration



**3.3 Test Data****3.3.1 Fundamental and Harmonic**Operated mode : Continue TransmittingTest Date : Sep. 09, 2005      Temperature : 23 °C      Humidity : 70 %

| Frequency<br>(MHz) | Result<br>@3m<br>(dBuV/m) |    |     |    | Limit<br>@3m<br>(dBuV/m) |    |      |    | Margin<br>(dB) |
|--------------------|---------------------------|----|-----|----|--------------------------|----|------|----|----------------|
| 27.140             | 65.4                      | PK | *** | AV | 100.0                    | PK | 80.0 | AV | -14.6          |
| 54.280             | 34.9                      |    |     | QP | 40.0                     |    |      | QP | -5.1           |
| 81.420             | 27.2                      |    |     | QP | 40.0                     |    |      | QP | -12.8          |
| 108.560            | 25.4                      |    |     | QP | 43.5                     |    |      | QP | -18.1          |
| 135.700            | 28.6                      |    |     | QP | 43.5                     |    |      | QP | -14.9          |
| 162.840            | 25.3                      |    |     | QP | 43.5                     |    |      | QP | -18.2          |
| 189.980            | 24.5                      |    |     | QP | 43.5                     |    |      | QP | -19.0          |
| 217.120            | 34.2                      |    |     | QP | 46.0                     |    |      | QP | -11.8          |
| 244.260            | 29.6                      |    |     | QP | 46.0                     |    |      | QP | -16.4          |
| 271.400            | 28.2                      |    |     | QP | 46.0                     |    |      | QP | -17.8          |

**Note:**

1. Place of Measurement: Measuring site of the ETC.
2. Test Result = Meter Reading + Correct Factor
3. If the result of peak value is under the limit of Average, the Average value doesn't need to be measured.
4. Item "Margin" referred to Average limit while there is only Peak result.

## 3.3.2 Other Emission

Operated mode : Continue TransmittingTest Date : Sep. 09, 2005      Temperature : 23 °C      Humidity : 70 %

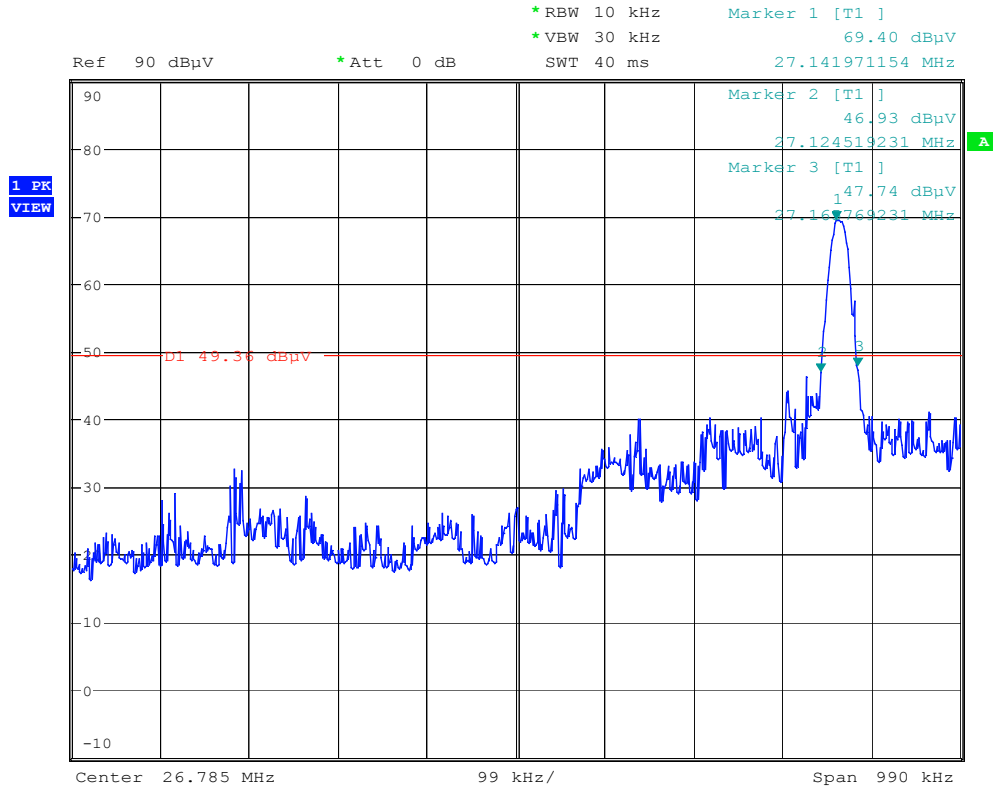
| Frequency (MHz) | Ant-Pol H/V | Meter Reading (dBuV) Q.P. | Corrected Factor (dB) | Result @3m (dBuV/m) Q.P. | Limit @3m (dBuV/m) Q.P. | Margin (dB) |
|-----------------|-------------|---------------------------|-----------------------|--------------------------|-------------------------|-------------|
| 32.000          | V           | 12.1                      | 13.1                  | 25.2                     | 40.0                    | -14.8       |
| 40.620          | H           | 21.9                      | 13.2                  | 35.1                     | 40.0                    | -4.9        |
| 40.620          | V           | 12.0                      | 13.2                  | 25.2                     | 40.0                    | -14.8       |
| 64.910          | V           | 12.6                      | 13.2                  | 25.8                     | 40.0                    | -14.2       |
| 203.210         | H           | 12.1                      | 13.0                  | 25.1                     | 43.5                    | -18.4       |
| 259.140         | H           | 12.7                      | 14.6                  | 27.3                     | 46.0                    | -18.7       |
| 314.210         | H           | 8.8                       | 17.5                  | 26.3                     | 46.0                    | -19.7       |
| 331.280         | H           | 9.8                       | 17.5                  | 27.3                     | 46.0                    | -18.7       |
| 339.810         | H           | 10.1                      | 18.1                  | 28.2                     | 46.0                    | -17.8       |

**Note:**

1. Place of Measurement: Measuring site of the ETC.
2. Peak Result = Peak Reading + Correct Factor
3. AVG Result = Peak Result + Duty Factor
4. If the result of peak value is under the limit of Quasi-Peak, the Quasi-Peak value doesn't need to be measured.

### 3.3.3 Bandedge Emission Measurement

The 20dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.



### 3.4 Calculation

Field Strength:

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$\text{RESULT} = \text{READING} + \text{CORR. FACTOR}$$

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

Assume a receiver reading of 62.4 dB  $\mu$  V is obtained. The Antenna Factor of 14.1 and a Cable Factor of 3.4 is added. The total of field strength is 79.9 dB  $\mu$  V/m.

$$\text{RESULT} = 62.4 + 14.1 + 3.4 = 79.9 \text{ dB } \mu \text{ V/m}$$

$$\text{Level in } \mu \text{ V/m} = \text{Common Antilogarithm}[(79.9 \text{ dB } \mu \text{ V/m})/20] = 9885.5 \mu \text{ V/m}$$

### 3.5 Radiated Test Equipment

The following instrument are used for radiated emissions measurement :

| Equipment         | Manufacturer    | Model No. | Calibrated until |
|-------------------|-----------------|-----------|------------------|
| EMI Test Receiver | HP              | 8546A     | Sep. 06, 2006    |
| Amplifier         | ADVANTEST       | BB525C    | Aug. 17, 2006    |
| BiconiLog Antenna | Schwarzbeck     | VULB 9160 | Nov. 24, 2005    |
| Loop Antenna      | EMCO            | 6512      | Jul. 15, 2007    |
| Spectrum Analyzer | Rohde & Schwarz | FSU46     | Oct. 03, 2005    |

Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL.

### 3.6 Measuring Instrument Setup

Measuring instrument setup in measured frequency band when specified detector function is used :

| Frequency Band (MHz) | Instrument        | Function | Resolution Bandwidth | Video Bandwidth |
|----------------------|-------------------|----------|----------------------|-----------------|
| 0.009 to 30          | EMI Test Receiver | Peak     | 10 kHz               | 30 kHz          |
| 30 to 1000           | EMI Test Receiver | Peak     | 120 kHz              | 300 kHz         |

#### **4. CONDUCTED EMISSION MEASUREMENT**

This EUT is excused from investigation of conducted emission, for it is powered by DC power only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.