



# CE TEST REPORT

FOR

Photoelectric Beam Sensors

Model : BS-200RC-B, BS-400RC-B, BS-600RC-B, BS-800RC-B,  
BS-200RC-W, BS-400RC-W, BS-600RC-W, BS-800RC-W,  
BS-200SH-B, BS-400SH-B, BS-600SH-B, BS-800SH-B,  
BS-200SH-W, BS-400SH-W, BS-600SH-W, BS-800SH-W

Trade Name : SCS

Issued to

Yu Heng Electric Co., Ltd.

No. 8, Industry 2<sup>nd</sup> Road, Ren Wu Shiang, Kaohsiung County 814 Taiwan R.O.C.  
(Ren Wu Industry Park)

Issued by

**PEP Testing Laboratory.**

|                          |                                 |  |
|--------------------------|---------------------------------|--|
| <b>EMC<br/>Test Site</b> | <b>Xizhi Office<br/>and Lab</b> | <b>12F.-3, No.27-1, Ln. 169, Kangning St., Xizhi Dist.,<br/>New Taipei City 221, Taiwan (R.O.C.)</b> |
|--------------------------|---------------------------------|--|

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**1. GENERAL INFORMATION**

**Applicant** : Yu Heng Electric Co., Ltd.

**Address** : No. 8, Industry 2<sup>nd</sup> Road, Ren Wu Shiang, Kaohsiung County 814  
Taiwan R.O.C. (Ren Wu Industry Park)

**Manufacturer** : Yu Heng Electric Co., Ltd.

**Address** : No. 8, Industry 2<sup>nd</sup> Road, Ren Wu Shiang, Kaohsiung County 814  
Taiwan R.O.C. (Ren Wu Industry Park)

**EUT** : Photoelectric Beam Sensors

**Model Name** : BS-200RC-B, BS-400RC-B, BS-600RC-B, BS-800RC-B, BS-200RC-W,  
BS-400RC-W, BS-600RC-W, BS-800RC-W, BS-200SH-B, BS-400SH-B,  
BS-600SH-B, BS-800SH-B, BS-200SH-W, BS-400SH-W, BS-600SH-W,  
BS-800SH-W

**Model Differences** : The model BS-800RC-B and BS-800SH-B are the testing sample, and the  
final test data are shown on this test report. (Please refer to Page 5)

**Measurement procedure used:**

**EMI :**

EN55022 CLASS B: 2010

**EMS:**

EN50130-4:1995+A1:1998+A2:2003

IEC 61000-4-2 : 2008

IEC 61000-4-3 : 2006+A1: 2007+A2:2010

IEC 61000-4-4 : 2004+A1:2010

The above equipment was tested by PEP Testing Laboratory for compliance with the requirements set forth in the EUROPEAN COUNCIL Directive 2004/108/EC and the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance.

This test report shall not be reproducing in part without written approval of PEP Testing Laboratory.

**Tested By:**

**Reviewed by:**

*S.k chang*

*Alex Chou*

MAY 25, 2012

MAY 25, 2012

**Date**

S.K Chang / Engineer

**Date**

Alex Chou / Manager



|                 |  |            |            |            |
|-----------------|--|------------|------------|------------|
| Model           | BS-200RC-B   | BS-400RC-B | BS-600RC-B | BS-800RC-B |
|                 | BS-200RC-W   | BS-400RC-W | BS-600RC-W | BS-800RC-W |
| Color           | Black  | Black      | Black      | Black      |
|                 | White  | White      | White      | White      |
| Number of Beams | 2  | 4          | 6          | 8          |
| Dimensions(mm)  | 35×30×570  | 35×30×1050 | 35×30×1530 | 35×30×2010 |
| Range           | 8 meters (25 feet) max.-outdoor / 16 meters (50 feet) max.-indoor  |            |            |            |
| Model           | BS-200SH-B   | BS-400SH-B | BS-600SH-B | BS-800SH-B |
|                 | BS-200SH-W   | BS-400SH-W | BS-600SH-W | BS-800SH-W |
| Color           | Black  | Black      | Black      | Black      |
|                 | White  | White      | White      | White      |
| Number of Beams | 2  | 4          | 6          | 8          |
| Dimensions(mm)  | 35×30×570  | 35×30×1050 | 35×30×1530 | 35×30×2010 |
| Range           | 12 meters (39 feet) max.-outdoor / 24 meters (78 feet) max.-indoor |            |            |            |



### 1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT

EUT Type :  Engineer Type  
Condition when received :  Good  
EUT Name : Photoelectric Beam Sensors  
Model Number : BS-800RC-B, BS-800SH-B  
Receipt Date : 05/21/2012  
EUT Power Rating :  AC Power  
 DC Power  
 DCV from PC  
 DCV from DC Power Supply  
DC Power Rating : DC 10-24V  
AC Power Cord Type : N/A

### 1.2 I/O PORT OF THE EUT

| I/O port type | Q'ty | Tested with |
|---------------|------|-------------|
| N/A           | N/A  | N/A         |



### **1.3 TEST METHODOLOGY**

#### **EUT SYSTEM OPERATION**

1. The EUT was configured according to EN50130-4.
2. All I/O ports are connected to the appropriate peripherals.
3. Photos of test configuration please refer to appendix 1.
4. Turn on the power of all peripherals.
5. Plug the EUT in.
6. Perform the EMC testing procedures.
7. Measure the maximum emission noise.



**1.4 DESCRIPTION OF THE SUPPORT EQUIPMENT**

**Setup Diagram**

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

**Support Equipment**

Peripherals Devices:

| OUTSIDE SUPPORT EQUIPMENT |                 |            |            |                    |             |            |            |
|---------------------------|-----------------|------------|------------|--------------------|-------------|------------|------------|
| No.                       | Equipment       | Model      | Serial No. | FCC ID/<br>BSMI ID | Trade name  | Data Cable | Power Cord |
| 1.                        | DC Power Supply | TPR3003-2D | N/A        | N/A                | INSTRUMENTS | N/A        | N/A        |
| EUT                       |                 |            |            |                    |             |            |            |
| No.                       | Equipment       | Model      | Serial No. | FCC ID/<br>BSMI ID | Trade name  | Data Cable | Power Cord |
| BS-800RC-B                |                 |            |            |                    |             |            |            |
| 1.                        | PCB-1(RX)       | P-182V1.1  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 2.                        | PCB-2(RX)       | P-178V2    | N/A        | N/A                | N/A         | N/A        | N/A        |
| 3.                        | PCB-3(RX)       | P-180      | N/A        | N/A                | N/A         | N/A        | N/A        |
| 4.                        | PCB-1(TX)       | P-182V1.1  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 5.                        | PCB-2(TX)       | P-181      | N/A        | N/A                | N/A         | N/A        | N/A        |
| 6.                        | PCB-3(TX)       | P-179V1.2  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 7.                        | PCB-4(TX)       | P-183V2    | N/A        | N/A                | N/A         | N/A        | N/A        |
| BS-800SH-B                |                 |            |            |                    |             |            |            |
| 1.                        | PCB-1(RX)       | P-182V1.1  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 2.                        | PCB-2(RX)       | P-180V2    | N/A        | N/A                | N/A         | N/A        | N/A        |
| 3.                        | PCB-3(RX)       | P-178V2    | N/A        | N/A                | N/A         | N/A        | N/A        |
| 4.                        | PCB-1(TX)       | P-182V1.1  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 5.                        | PCB-2(TX)       | P-181V1.1  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 6.                        | PCB-3(TX)       | P-179V1.2  | N/A        | N/A                | N/A         | N/A        | N/A        |
| 7.                        | PCB-4(TX)       | P-183V2    | N/A        | N/A                | N/A         | N/A        | N/A        |

**Note:** All the above equipment/cable were placed in worse case position to maximize emission signals during emission test.

**Grounding:** Grounding was in accordance with the manufacturer’s requirement and conditions for the intended use.

**1.5 FEATURES OF EUT: PLEASE REFER TO USER MANUAL OR PRODUCT SPECIFICATION.**





## 2. INSTRUMENT AND CALIBRATION

### 2.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 2.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

※ **TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT**

| Conducted Emission Measurement   |              |           |            |                      |                  |
|----------------------------------|--------------|-----------|------------|----------------------|------------------|
| Instrument                       | Manufacturer | Model No. | Serial No. | Calibration Due Date | Note             |
| EMC Test Receiver                | R&S          | ESCI      | 100438     | 6-Jul-12             |                  |
| LISN                             | EMCO         | 3825/2    | 03/10026   | 6-Nov-12             | For EUT          |
| LISN                             | EMCO         | Feb-25    | 9001-1589  | 6-Nov-12             | For Support Unit |
| RF Cable                         | Huber+Suhner | RG223/U   | 1          | 1-Nov-12             |                  |
| 50ohm Terminal                   | N/A          | 50Ω       | QC-TM001   | 6-Nov-12             |                  |
| Impedance Stabilization          | Teseq GmbH   | ISN T8    | 23334      | 26-Jun-12            |                  |
| Radiated Emission Measurement    |              |           |            |                      |                  |
| Instrument                       | Manufacturer | Model No. | Serial No. | Calibration Due Date | Note             |
| EMC Test Receiver                | LIG NEx1     | ER-265    | L0907B006  | 7-Nov-12             |                  |
| Bilog Antenna                    |              |           |            |                      |                  |
| Turn table                       | EMCO         | 2080      | 9508-1805  | N/A                  |                  |
| Controller                       | EMCO         | 2090      | 9804-1328  | N/A                  |                  |
| Preamplifier                     | WIRELESS     | FPA6592G  | 60017      | 11-Aug-12            |                  |
| RF Cable                         | JYE BAO      | RG214/U   | 25M-002    | 1-Nov-12             |                  |
| Thermo-Hygro meter               | WISEWIND     | 4-INU-1   | 50100378   | 2-Nov-12             |                  |
| Double Ridged Guide HORN ANTENNA | SCHWADZBECK  | BBHA9120D | 491        | 31-Oct-12            |                  |



| Microwave Preamplifier                              | SCHWADZBECK   | BBV 9718     | 9718-008   | 7-Nov-12             |      |
|---|---------------|--------------|------------|----------------------|------|
| Microflex Cable                                     | HUBER SUHNER  | SUCOFLEX 104 | 302339/4   | 7-Nov-12             |      |
| Microflex Cable                                     | HUBER SUHNER  | SUCOFLEX 104 | N/A        | 7-Nov-12             |      |
| Power Harmonic Measurement and Voltage Fluctuations |               |              |            |                      |      |
| Instrument  | Manufacturer  | Model No.    | Serial No. | Calibration Due Date | Note |
| 5KV AC Power Source                                 | SCHAFFNER     | NSG1007      | 55869      | 24-Jun-12            |      |
| Signal  | SCHAFFNER     | CCN1000-1    | 72281      | 24-Jun-12            |      |
| Conditioning  |               |              |            |                      |      |
| EMS   |               |              |            |                      |      |
| Instrument  | Manufacturer  | Model No.    | Serial No. | Calibration Due Date | Note |
| EN61000-4-2   |               |              |            |                      |      |
| ESD Generator                                       | TESEQ         | NSG437       | 313        | 30-May-12            |      |
| EN61000-4-3   |               |              |            |                      |      |
| Power Meter   | BOONTON       | 4231A        | 110602     | 15-May-12            |      |
| Signal Generator                                    | R & S         | SM300        | 101722     | 22-Jun-12            |      |
| Electric Field probe                                | ETS-LINDGREN  | HI-6005      | 29837      | N/A                  |      |
| Power Amplifier                                     | SCHAFFNER     | CBA9413B     | 4039       | N/A                  |      |
| Power Amplifier                                     | TESEQ         | CBA3G-050    | T43752     | N/A                  |      |
| SWITCH NETWORK                                      | TESEQ         | RFB2000      | 26336      | N/A                  |      |
| EN61000-4-4/ EN61000-4-5/ EN61000-4-11              |               |              |            |                      |      |
| EMC Immunity Test system                            | EMC PARTNERAG | TRA200IN6    | 739        | 22-Jun-12            |      |
| Conducted disturbances generator                    | FRANKONIA     | CIT10/75     | 102D3233   | 29-Aug-12            |      |
| CDN   | SCHAFFNER     | CDN M316     | 20653      | 11-Aug-12            |      |
| CDN   | SCHAFFNER     | CDN M316     | 19286      | 11-Aug-12            |      |
| CDN   | FRANKONIA     | RJ45         | 60050134   | 26-Jun-12            |      |
| 6dB Attenuator                                      | FRANKONIA     | 75-A-FFN-06  | 102D3233   | N/A                  |      |
| Induction Coil Interface                            | SCHAFFNER     | 2141         | 6019       | N/A                  |      |
| EM Injection Clamp                                  | FCC           | F-203I-23MM  | 471        | 24-Jun-12            |      |



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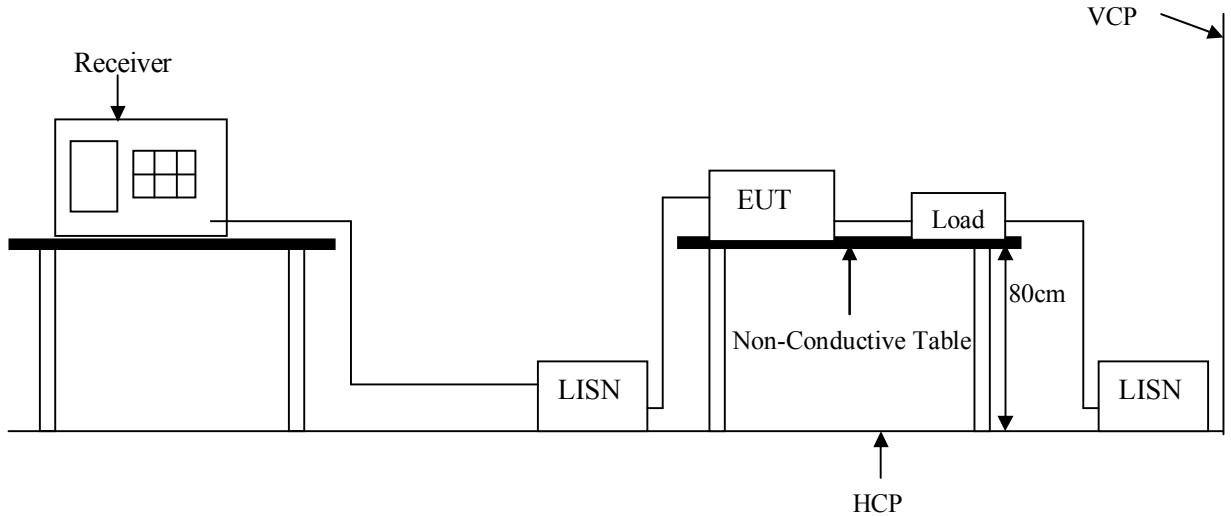
|                                      |        |      |            |           |  |
|--------------------------------------|--------|------|------------|-----------|--|
| TTIAXIAL ELF Magnetic<br>Field Meter | SYPRIS | 4090 | 4090070316 | 24-Aug-12 |  |
|--------------------------------------|--------|------|------------|-----------|--|

※

※ Calibration interval of instruments listed above is one year

### 3. CONDUCTED EMISSION MEASUREMENT

#### 3.1 TEST SET-UP



#### 3.2 LIMIT

| Frequency range (MHz) | CLASS A   |                | CLASS B      |                |
|-----------------------|-----------|----------------|--------------|----------------|
|                       | QP dB(uV) | Average dB(uV) | QP dB(uV)    | Average dB(uV) |
| 0.15-0.5              | 79 dBuV   | 66 dBuV        | 66 - 56 dBuV | 56 - 46 dBuV   |
| 0.5-5.0               | 73 dBuV   | 60 dBuV        | 56 dBuV      | 46 dBuV        |
| 5.0-30.0              | 73 dBuV   | 60 dBuV        | 60 dBuV      | 50 dBuV        |

Remark: In the above table, the tighter limit applies at the band edges.

#### 3.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μH coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022 regulations: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz.



**3.4 TEST SPECIFICATION**

According to EN 55022 Class B

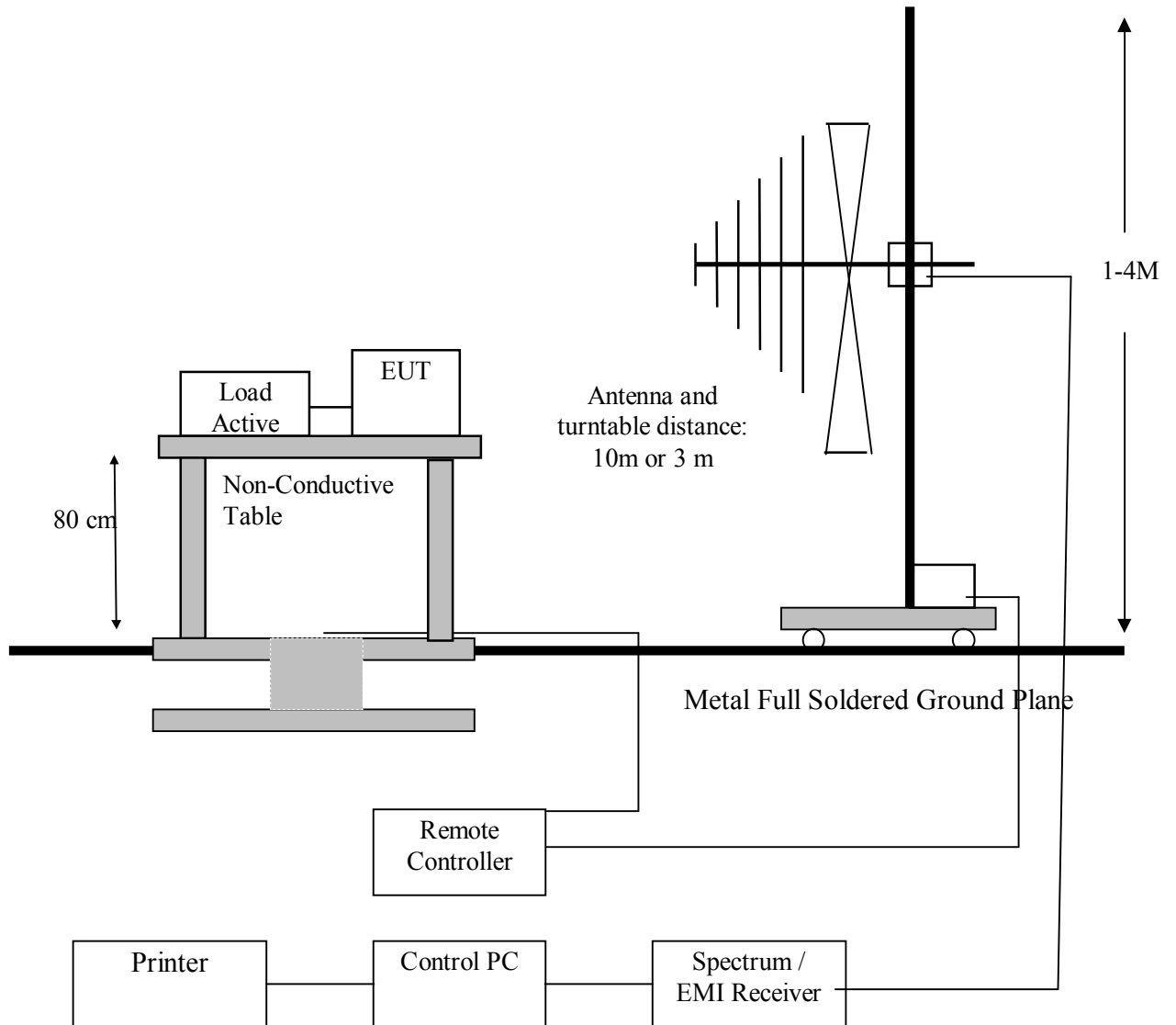
(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

**3.5 RESULT: Not available, because the EUT doesn't connect with the AC power source.**

**3.6 TEST DATA: N/A**

## 4. RADIATED EMISSION MEASUREMENT

### 4.1 TEST SETUP





## 4.2 LIMIT

| Frequency<br>MHz | Class A             |                       | Class B             |                       |
|------------------|---------------------|-----------------------|---------------------|-----------------------|
|                  | Distance<br>(Meter) | Limit<br>dB $\mu$ V/m | Distance<br>(Meter) | Limit<br>dB $\mu$ V/m |
| 30 ~ 230         | 10                  | 40                    | 10                  | 30                    |
| 230 ~ 1000       | 10                  | 47                    | 10                  | 37                    |

For Class A

| Frequency range<br>GHz                                    | Average limit<br>dB( $\mu$ V/m) | Peak limit<br>dB( $\mu$ V/m) |
|---|---------------------------------|------------------------------|
| 1 to 3  | 56                              | 76                           |
| 3 to 6  | 60                              | 80                           |
| NOTE The lower limit applies at the transition frequency. |                                 |                              |

For Class B

| Frequency range<br>GHz                                    | Average limit<br>dB( $\mu$ V/m) | Peak limit<br>dB( $\mu$ V/m) |
|---|---------------------------------|------------------------------|
| 1 to 3  | 50                              | 70                           |
| 3 to 6  | 54                              | 74                           |
| NOTE The lower limit applies at the transition frequency. |                                 |                              |

Remark: In the above table, the tighter limit applies at the band edges

## 4.3 TEST PROCEDURE

The EUT and its simulators are placed on turn table, non-conductive and wooden table, which is 0.8 meter above ground. The turn table rotates 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that distance from antenna to the EUT is 10 meters. For the frequency range is above 1 GHz, the EUT was positioned such that distance from antenna to the EUT is 3 meters.

The antenna is moved up and down between 1 meter and 4 meters to receive the maximum emission level.

Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission, all of the interference cables must be manipulated according to EN 55022/1998 regulation: the test procedure of the radiated emission measurement.

The bandwidth set on the field strength is 120 KHz when the frequency range is below 1GHz. The bandwidth set on the field strength is 1 MHz when the frequency range is above 1GHz..



**4.4 TEST SPECIFICATION**

According to EN 55022 Class B

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

**4.5 RESULT: PASSED**

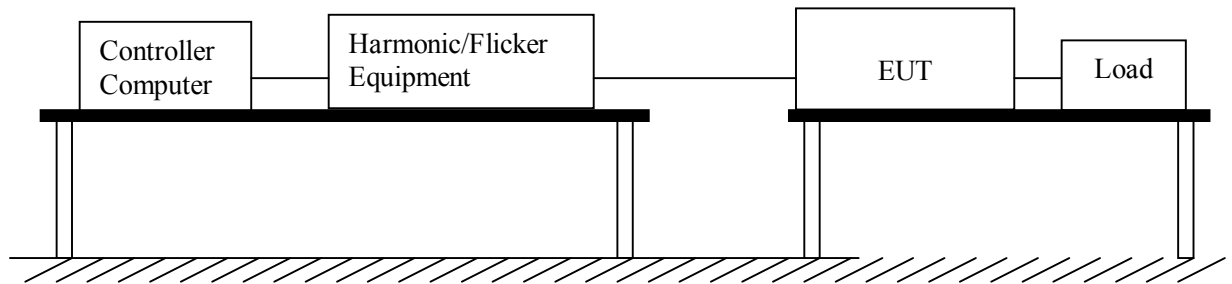
**4.6 TEST DATA:**

**Please refer to appendix 2.**



## 5. POWER HARMONIC MEASUREMENT

### 5.1 TEST SETUP



### 5.2 LIMIT OF HARMONIC CURRENT

Limit of Harmonic Currents

| Harmonic Order      | Maximum Permissible Harmonic Current (Ampere) | Harmonic Order     | Maximum Permissible Harmonic Current (Ampere) |
|---------------------|---|--------------------|---|
| Odd Harmonic        |   | Even Harmonic      |   |
| 3                   | 2.30  | 2                  | 1.08  |
| 5                   | 1.14  | 4                  | 0.43  |
| 7                   | 0.77  | 6                  | 0.30  |
| 9                   | 0.40  | $8 \leq n \leq 40$ | $0.23 \times 8/n$                             |
| 11                  | 0.33  |                    |   |
| 13                  | 0.21  |                    |   |
| $15 \leq n \leq 39$ | $0.15 \times 15/n$                            |                    |   |

### 5.3 TEST PROCEDURE

The EUT is supplied in series with power analyzer from a power source has the same normal voltage and frequency as the rated supply voltage and the equipment under test. The rated voltage at the supply voltage of EUT of 0.94 time and 1.06 times shall be performed.

### 5.4 TEST SPECIFICATION

According to EN 61000-3-2

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

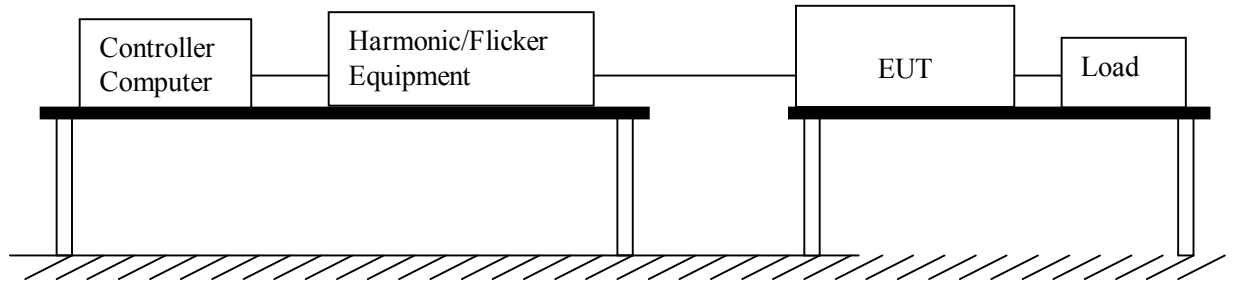


**5.5 RESULT:** Not available, because the EUT doesn't connect with the AC power source.

**5.6 TEST DATA:** N/A

## 6. VOLTAGE FLUCTUATIONS

### 6.1 TEST SETUP



### 6.2 VOLTAGE FLUCTUATIONS TEST

|                     |                        |
|---------------------|------------------------|
| Port:               | AC mains               |
| Basic Standard:     | EN61000-3-3            |
| Test Procedure      | Refer to paragraph 6.3 |
| Observation period: | For Pst 10min          |
|                     | For Plt 2 hours        |

### 6.3 TEST PROCEDURE

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

### 6.4 TEST SPECIFICATION

EN 61000-3-3

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

**6.5 RESULT: Not available, because the EUT doesn't connect with the AC power source.**

**6.6 TEST DATA: N/A**

## 7. ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

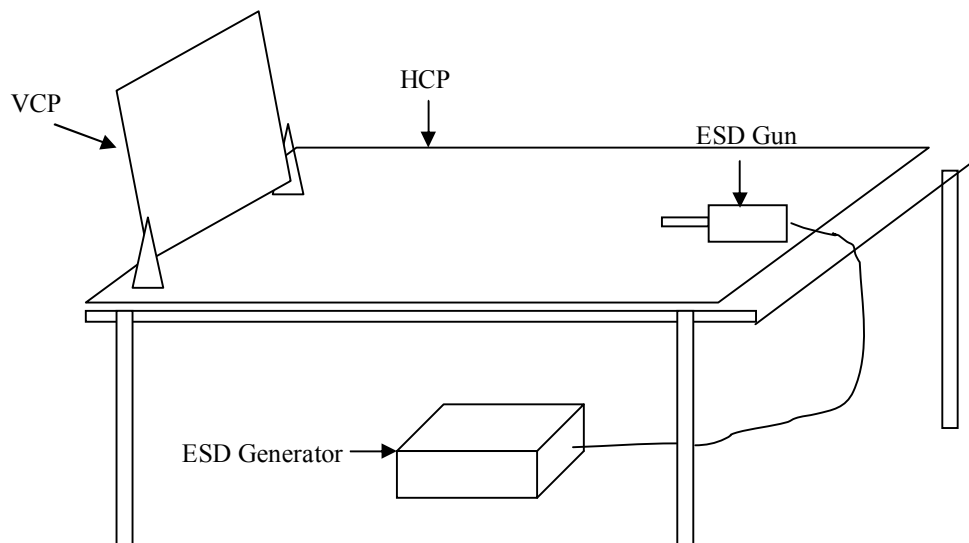
### 7.1 TEST PROCEDURE

According To EN 61000-4-2

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

### 7.2 TEST SETUP



### 7.3 TEST LEVEL

| Item                     | Test Specification         | Unit                   | Performance Criteria |
|--------------------------|----------------------------|------------------------|----------------------|
| Enclosure Room           | ±2, 4, 8 (Air Discharge)   | KV<br>(Charge Voltage) | Refer to*            |
| Electrostatic Discharge  | ±2,4,6 (Contact Discharge) |                        |                      |
| <b>Time between test</b> | <u>1</u>                   | sec                    |                      |

\*: No damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT.

Number of test: 10 Discharges / Test point / Polarity / Level

When the measurement was taken, The ESD discharger was performed in single discharge. For the single discharge time between successive single discharges will keep on one second. It was at least ten single discharges with positive and negative at the same selected pointed. The selected pointed, which was performed with electrostatic discharge, was marked on the red label on the EUT

Indirect applicant of discharge to the EUT

Vertical Coupling Plane (VCP)



The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the discharge electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten singles discharges with positive and negative at the same selected point.

Horizontal Coupling Plane (HCP)

The coupling plane is placed under the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the discharge electrode touching the coupling.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected pointed.

**7.4 TEST RESULT.**

Model: BS-800RC-B, BS-800SH-B

Temperature: 25°C , Humidity: 40 % RH

| Test Point | Air Discharge | Contact Discharge | Performance Criteria         |
|------------|---------------|-------------------|------------------------------|
| HCP        | ----          | ±2, 4, 6KV        | Complied with * stated above |
| VCP        | ----          | ±2, 4, 6KV        | Complied with * stated above |
| SCREW      | ----          | ±2, 4, 6KV        | Complied with * stated above |
| CASE       | ±2, 4, 8KV    | -----             | Complied with * stated above |

Red Dot: Contact

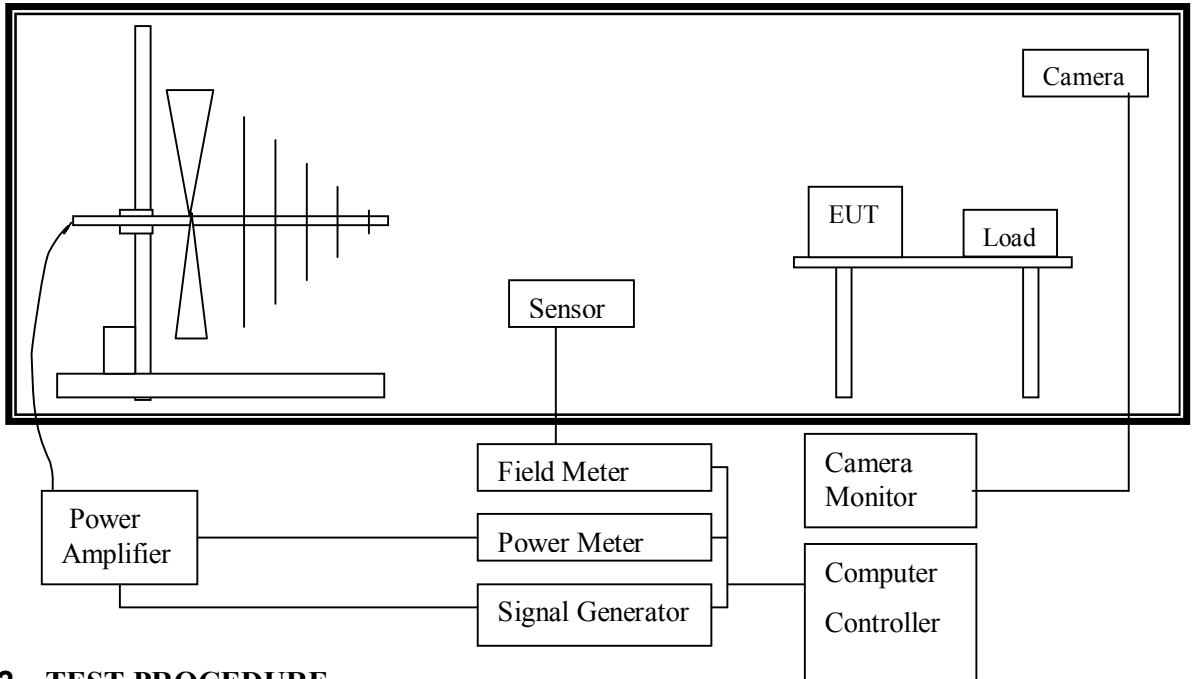
Final Result: **PASSED**

Remark:

**Photos of test configuration please refer to appendix 1.**

## 8. RADIATED SUSCEPTIBILITY MEASUREMENT (RS)

### 8.1 TEST SETUP



### 8.2 TEST PROCEDURE

According To EN 61000-4-3

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

### 8.3 TEST LEVEL

| Item                  | Test Specification | Unit                   | Performance Criteria |
|-----------------------|--------------------|------------------------|----------------------|
| Radio –Frequency      | 80~2000            | MHz                    | Refer to *           |
| Electromagnetic Field | <b>10</b>          | V/m (unmodulated, rms) |                      |
| Amplitude Modulated   | 80                 | %AM (1KHz)             |                      |
| Pulse modulation      | 1Hz                | 0.5 s ON: 0.5 s OFF    |                      |

\*: No damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs.



**8.4 TEST PROCEDURE**

The EUT and load, which are placed on a wooden table whose height is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT is 3 meters.

Both horizontal and vertical polarization of the antenna position and four sides of the EUT are set on measurement. In order to judge the EUT performance, a CCD camera is used to monitor the situation of EUT.

All the scanning conditions are as follows:

| Condition of Test                   | Remarks   |
|-------------------------------------|---|
| 1. Field Strength                   | 10 V/m; Level 3   |
| 2. Radiated Signal                  | AM 80% modulated with 1KHz<br>1Hz (0.5 s ON: 0.5 s OFF) |
| 3. Scanning Frequencies             | 80MHz ~ 2000MHz   |
| 4. Dwell Time                       | 3 seconds   |
| 5. Frequency step size              | 1%  |
| 6. The rate of swept of frequency   | $1.5 \times 10^{-3}$ decades/s                          |
| 7. Antenna Polarity                 | HORIZONTAL & VERTICAL                                   |
| 8. The four sides of EUT are tested | FRONT, REAR, RIGHT, LEFT                                |

**8.5 TEST RESULT**

Model: BS-800RC-B, BS-800SH-B

Temperature: 25 °C , Humidity: 40 % RH

Power Line

| ANT<br>SIDE | HORIZONTAL                   | VERTICAL                     |
|-------------|------------------------------|------------------------------|
| FRONT       | Complied with * stated above | Complied with * stated above |
| REAR        | Complied with * stated above | Complied with * stated above |
| RIGHT       | Complied with * stated above | Complied with * stated above |
| LEFT        | Complied with * stated above | Complied with * stated above |

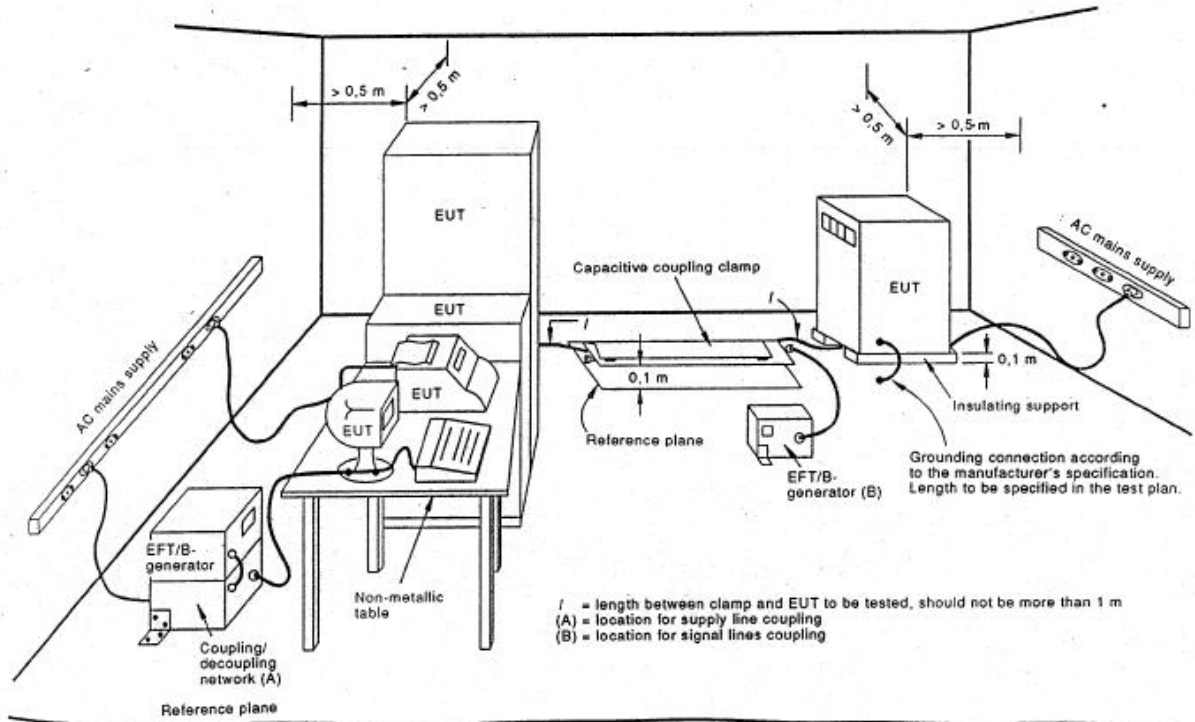
Final Result: **PASSED**

Remark:

**Photos of test configuration please refer to appendix 1.**

## 9. ELECTRICAL FAST TRANSIENT/BURST (EFT)

### 9.1 TEST SETUP



IEC 54594

### 9.2 TEST PROCEDURE

According To EN 61000-4-4

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

### 9.3 TEST PROCEDURE

The EUT and load are placed on a ground reference plane and insulated from it by an insulating support  $0,1 \text{ m} \pm 0,01 \text{ m}$  thick. The minimum area of the ground reference plane is  $1 \text{ m} \times 1 \text{ m}$ . It also projected beyond the EUT by at least 0.1meter on all sides.

For Input and Output AC power or DC Input and DC Output Power Ports:

The EUT is connected with the power mains through a coupling device that directly couples the EFT interference signal.

Each of the line and nature conductors is impressed with burst noise for 1 minute.

For Protective Earth Port:

The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal. The protective earth line (PE) is impressed with burst noise for 1 minute.

The length of power cord between the coupling device and the EUT shall be less than 1 m.

For signal Lines and Control Lines Test:

The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 1 minute.





**9.4 TEST LEVEL**

| Item                       | Test Specification                | Unit                 | Performance Criteria |
|----------------------------|-----------------------------------|----------------------|----------------------|
| Test Voltage               | ±1, ±2                            | KV (Peak)            | Refer to *           |
| Pulse Rise time & Duration | 5/50                              | Tr/Ts (ns)           |                      |
| Pulse Repetition           | 5                                 | Rep. Frequency (KHz) |                      |
| Coupling of power line     | L, N, PE, L+N, L+PE, N+PE, L+N+PE |                      |                      |

\*: No damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT.

**9.5 TEST RESULT**

Model: BS-800RC-B, BS-800SH-B

Temperature: 25 °C , Humidity: 40 % RH

| Power Line   |           |           |           |           |           |           |           |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| TEST VOLTAGE | L         | N         | PE        | L+N       | L+PE      | N+PE      | L+N+PE    |
| ±1KV         | Complied* | Complied* | Complied* | Complied* | Complied* | Complied* | Complied* |
| ±2KV         | Complied* | Complied* | Complied* | Complied* | Complied* | Complied* | Complied* |

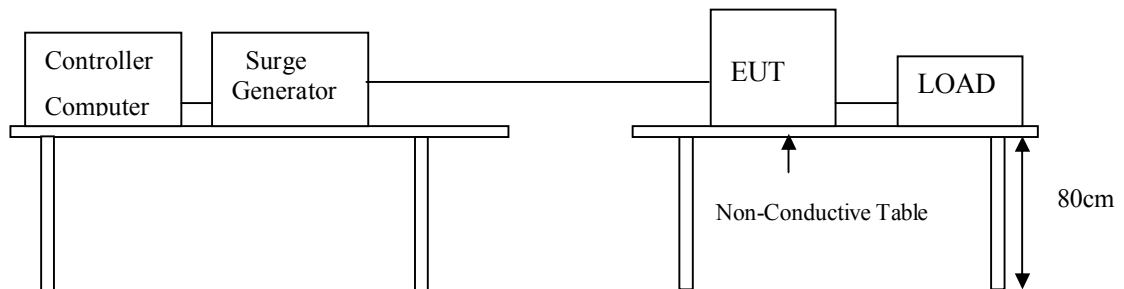
Final Result: **PASSED**

Remark:

**Photos of test configuration please refer to appendix 1.**

## 10. SURGE

### 10.1 TEST SETUP



### 10.2 TEST PROCEDURE

According To EN 61000-4-5

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

### 10.3 TEST LEVEL

| Item   | Test Specification  | Unit       | Performance Criteria |
|--|---------------------|------------|----------------------|
| DC Input and DC Output Power Ports           |                     |            |                      |
| Surge  | 1.2/50(8/20)        | Tr/Ts (μs) | Refer to *           |
| Line to Ground                               | ±0.5, ±1            | KV         |                      |
| AC Input and AC Output Power Ports           |                     |            |                      |
| Surge  | 1.2/50(8/20)        | Tr/Ts (μs) | Refer to *           |
| Line to Ground                               | ±0.5, ±1, ±2        | KV         |                      |
| Line to Line                                 | ±0.5, ±1            | KV         |                      |
| Polarity                                     | POSITIVE / NEGATIVE |            |                      |
| Phase shifting in a range between 0° to 360° |                     |            |                      |

\*: No damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT.



#### **10.4 TEST PROCEDURE**

The EUT and its load are placed on a table which is 0.8 meter height. The length of power cord between the coupling device and the EUT shall be 2 meters or less.

For Input and Output AC Power or DC Input and DC Output Power Ports:

The EUT is connected to the power mains through a coupling device that directly couples the Surge interference signal.

The Surge noise shall be applied synchronized to the voltage phase at 0°, 90°, 180°, 270° and the peak value of the AC voltage wave. (5 Positive and 5 Negative)

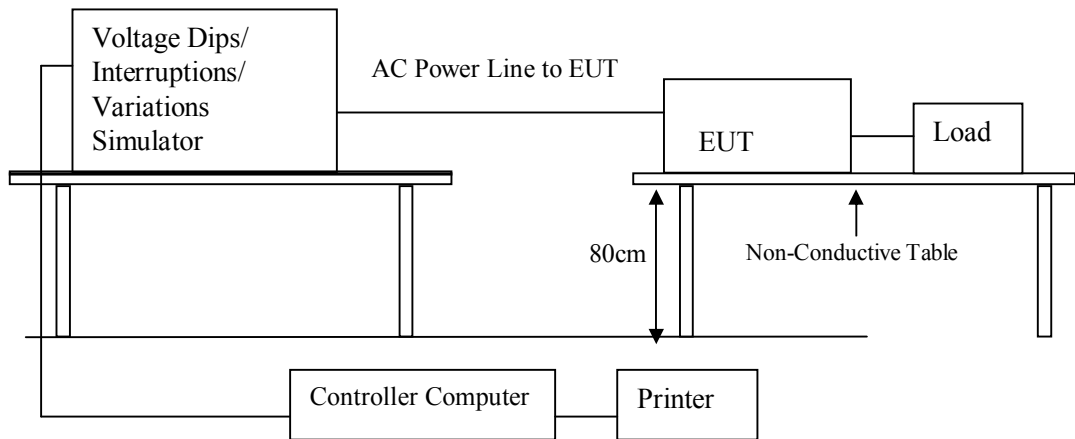
Each of line-earth and line-line is impressed with a sequence of five surge voltages with interval of 1 minute.

#### **10.5 TEST RESULT : N/A**

.

## **11. VOLTAGE DIPS AND INTERRUPTION MEASUREMENT**

### **11.1 TEST SETUP**



### **11.2 TEST PROCEDURE**

According To EN 61000-4-11

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)



### 11.3 TEST LEVEL

|  |                  |                  |                |
|--|------------------|------------------|----------------|
| <b>A2</b> Voltage reduction (%)  | 30               | 60               | 100            |
| Duration of reduction (No. of periods) (i.e. cycles of the voltage wave) | 0,5; 1; 5 and 10 | 0,5; 1; 5 and 10 | 0,5; 1 and 5   |
| Number of reductions at each duration                                    | 3                | 3                | 3              |
| Interval between reductions (s)  | ≥ 10             | ≥ 10             | ≥ 10 <b>A2</b> |

### 11.4 CRITERIA FOR COMPLIANCE

No damage, malfunction or change of status due to the conditioning.  
Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.

### 11.5 TEST PROCEDURE

The EUT and its load are placed on a wooden table which is 0.8 meter above a metal ground plane which dimension is 1 meter x 1 meter, the thickness is 0.65mm. It projected beyond the EUT by at least 0.1 meter on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage Dips / Interruption Test:

The EUT is connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

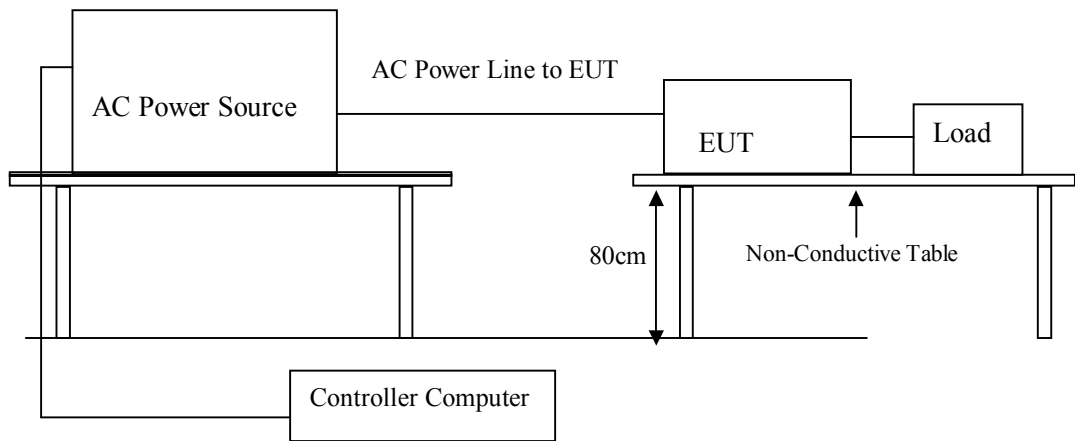
The EUT shall be tested for 30% voltage dips of supplied voltage and duration time is 10ms, for 60% voltage dips of supplied voltage and duration time is 100ms with a sequence of three voltage dips with intervals of 10 seconds, and for 95% voltage interruption of supplied voltage and the duration time is 5000ms with a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage phase shifting are shall occur at 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° of the voltage.

### 11.6 TEST RESULT: N/A

## **12. ENV 50141 MAINS SUPPLY VOLTAGE VARIATIONS**

### **12.1 TEST SETUP**



### **12.2 TEST PROCEDURE**

According To EN 50130-4

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)



### 12.3 TEST LEVEL

|  |              |                            |
|--|--------------|----------------------------|
| Supply voltage max.  | $(U_{\max})$ | $U_{\text{nom}}^1 + 10 \%$ |
| Supply voltage min.  | $(U_{\min})$ | $U_{\text{nom}}^1 - 15 \%$ |
| <sup>1</sup> $U_{\text{nom}}$ = Nominal mains voltage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240 V) without adaptation, $U_{\max} = (\text{Maximum } U_{\text{nom}}) + 10 \%$ , and $U_{\min} = (\text{Minimum } U_{\text{nom}}) - 15 \%$ . In any case the range of $U_{\text{nom}}$ must include the European nominal mains voltage of 230 V. |              |                            |

### 12.4 CRITERIA FOR COMPLIANCE

There shall be no damage, malfunction or change of status due to the different supply voltage conditions.

### 12.5 TEST RESULT : N/A



### **13. PERFORMANCE CRITERIA**

- A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.





## 14. MEASUREMENT UNCERTAINTY

The modification is solely made by the applicant.

Appendix

Appendix A: Summary of Test Result

\*\*\*\* EMC Test Result: The EUT has been passed the all measurements. \*\*\*\*

The uncertainty is calculated in accordance with CISPR16-4-2, the total uncertainty for this test is as follows:

### Uncertainty of Conducted Emission Measurement

| Contribution  | Probability Distribution | 150KHz – 30MHz |
|---|--------------------------|----------------|
| Receiver reading  | Normal (k=2)             | ±0.2           |
| Cable loss  | Normal (k=2)             | ±0.1           |
| AMN insertion loss  | Rectangular              | ±0.2           |
| RCV/SPA specification   | Rectangular              | ±0.9           |
| combined standard uncertainty $U_e(y)$                                | normal                   | ±1.0           |
| Measuring uncertainty for a level of confidence of 95%<br>$U=2U_e(y)$ | normal (k=2)             | ±2.0           |

### Uncertainty of Radiated Emission Measurement

| Contribution  | Probability Distribution | 30MHz~1GHz |
|---|--------------------------|------------|
| Receiver reading  | Normal (k=2)             | ±0.2       |
| Cable loss calibration  | Normal (k=2)             | ±0.1       |
| Antenna factor calibration  | Rectangular              | ±0.4       |
| Pre Amplifier Gain calibration  | Rectangular              | ±0.3       |
| RCV/SPA specification   | Rectangular              | ±0.9       |
| combined standard uncertainty $U_e(y)$                                | normal                   | ±1.1       |
| Measuring uncertainty for a level of confidence of 95%<br>$U=2U_e(y)$ | normal (k=2)             | ±2.2       |

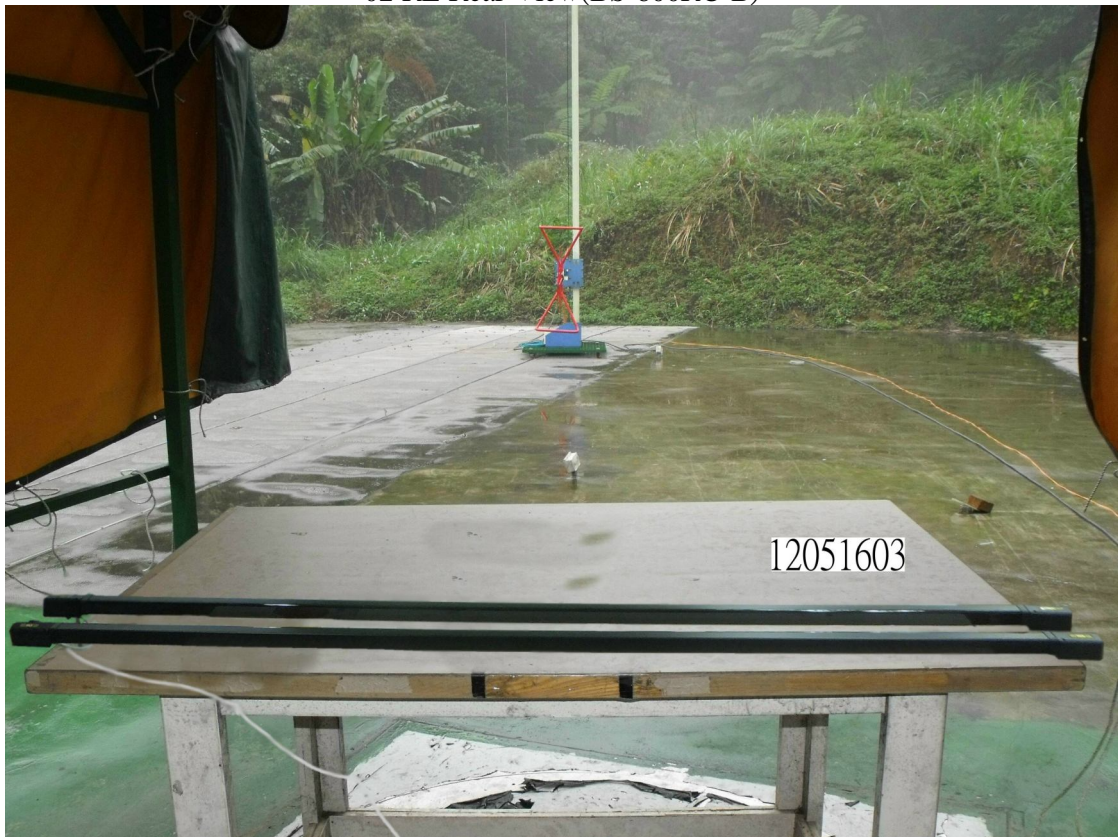
## **Appendix 1**

### **PHOTOS OF TEST CONFIGURATION**

01 RE Front View(BS-800RC-B)



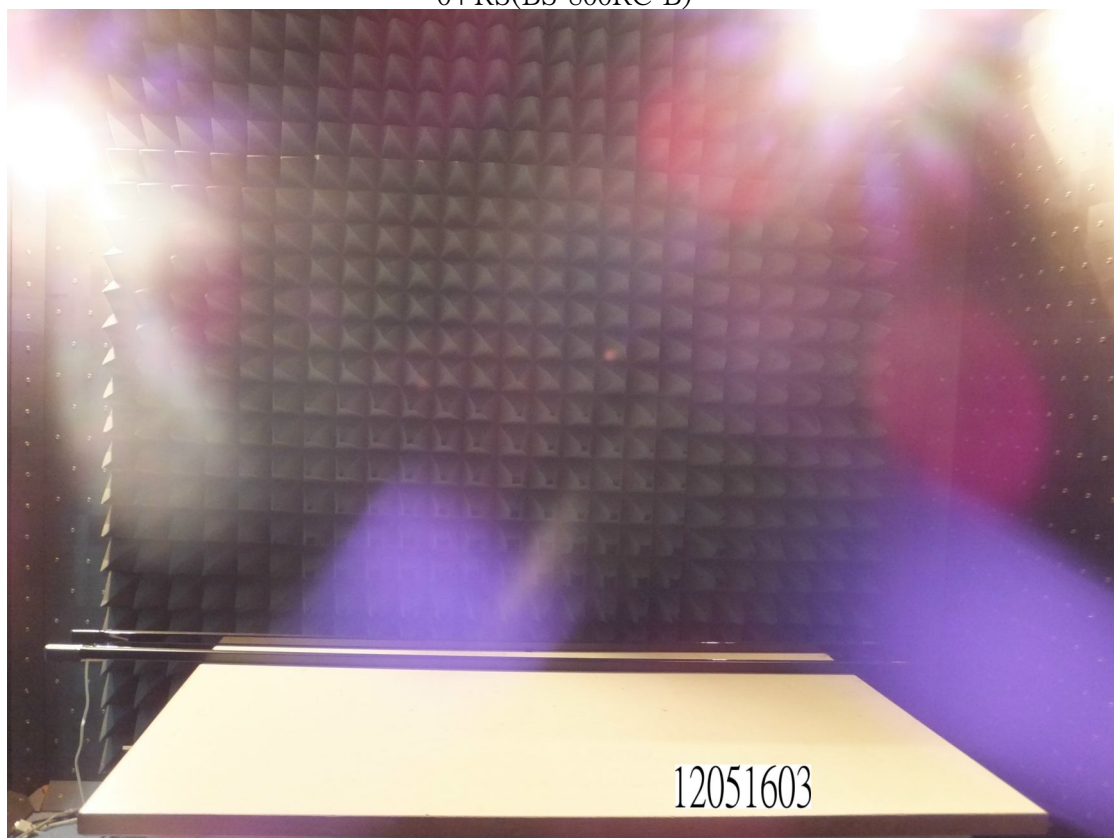
02 RE Rear View(BS-800RC-B)



03 ESD(BS-800RC-B)



04 RS(BS-800RC-B)



05 EFT(BS-800RC-B)

Report No. : E12051603



01 RE Front View(BS-800SH-B)



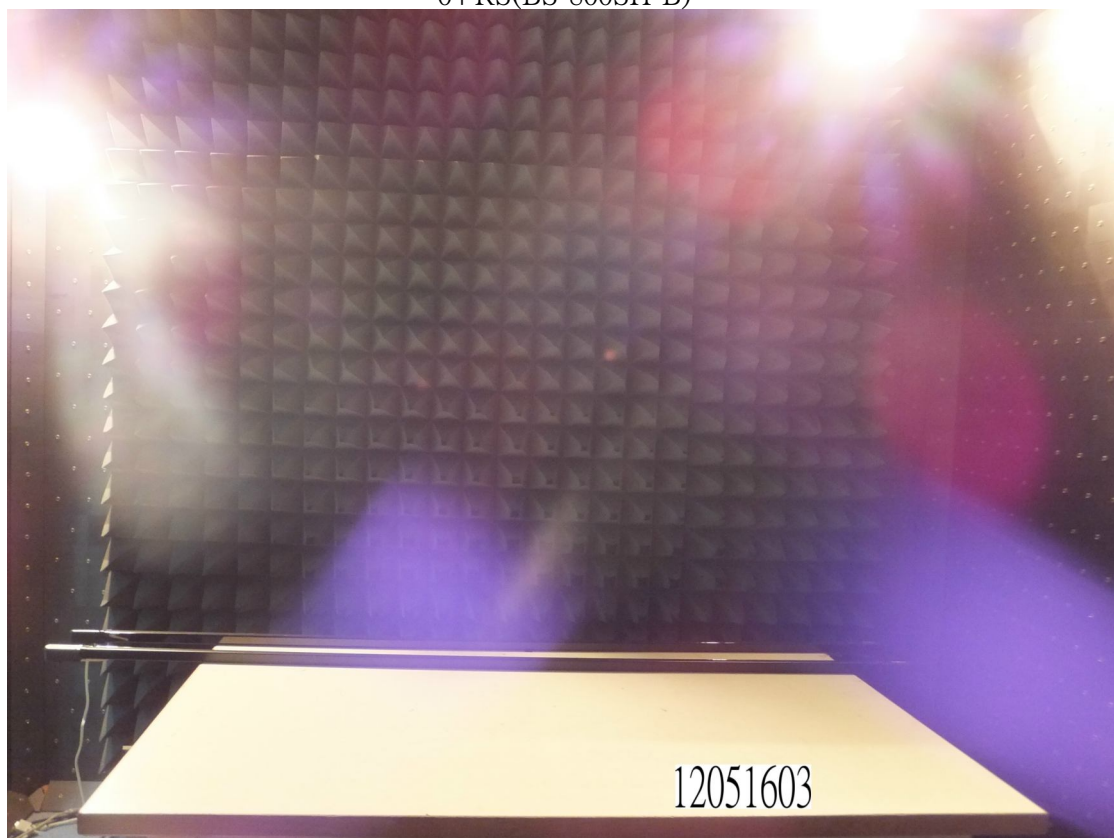
02 RE Rear View(BS-800SH-B)



03 ESD(BS-800SH-B)



04 RS(BS-800SH-B)



05 EFT(BS-800SH-B)

Report No. : E12051603

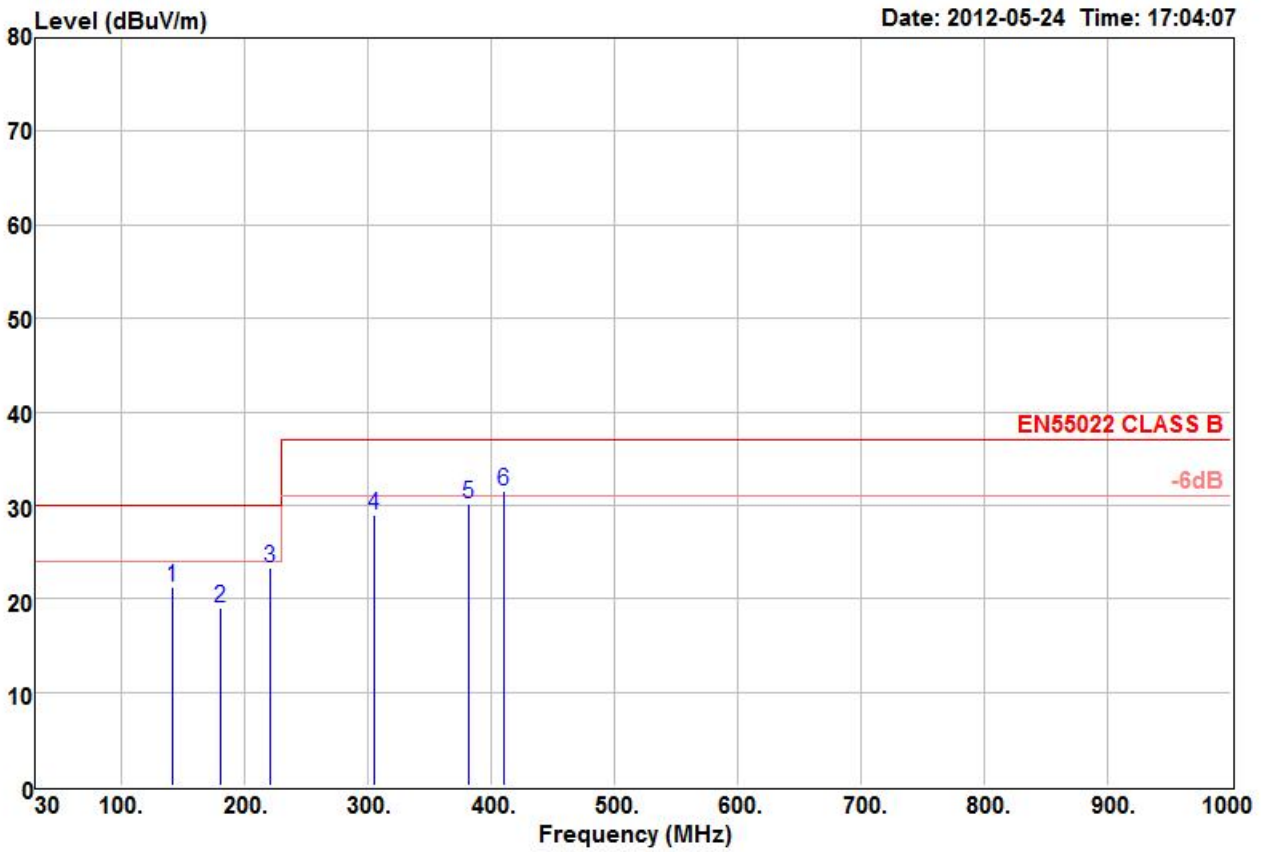




**Appendix 2**  
**TEST DATA**

Data: 3

File: C:\Program Files\le3\客户 DATA\字位\12051603 .EM6 (4)



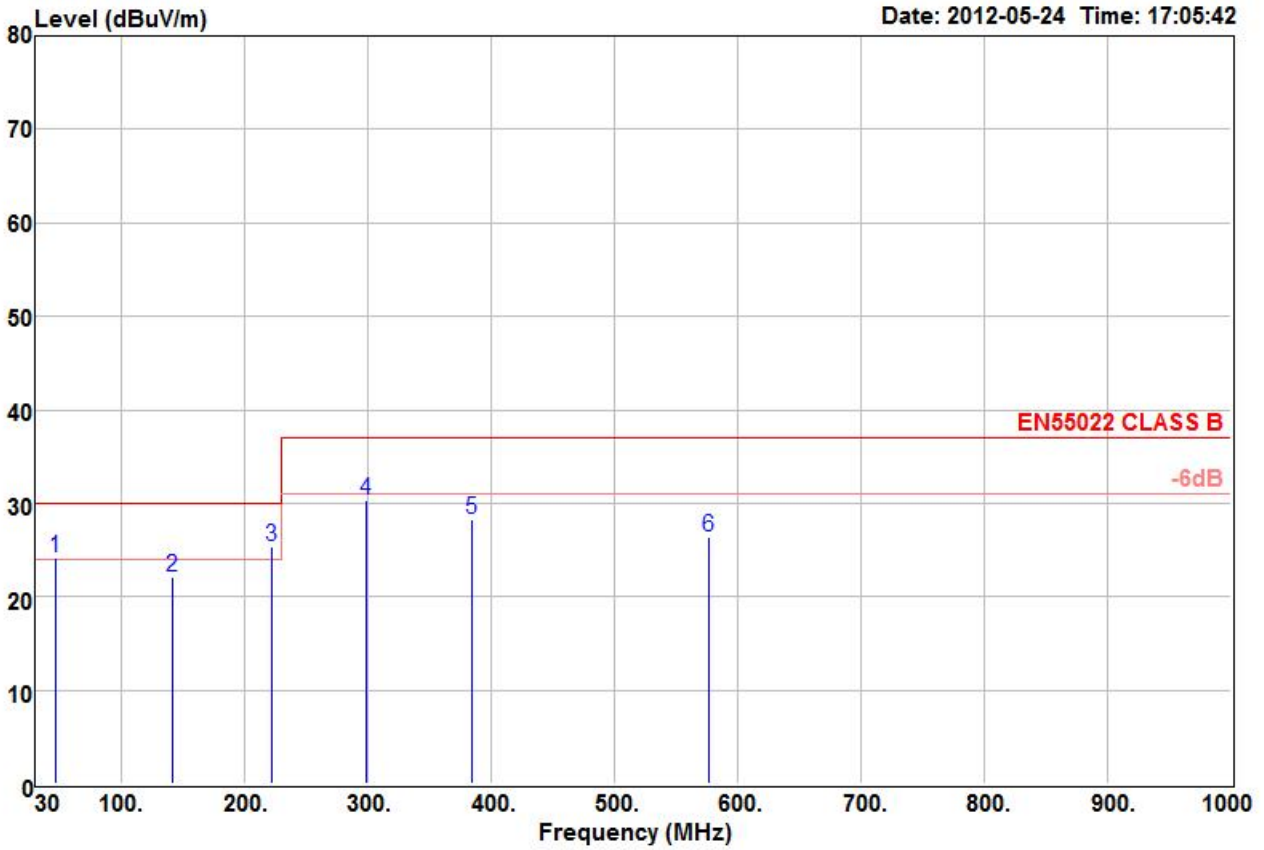
Site : OPEN SITE  
 Condition: EN55022 CLASS B 10m JB1(30M-1G)-101 HORIZONTAL  
 out : Please refer to page 1 of report  
 mode : Please refer to page 1 of report  
 memo : BS-800RC-B  
 T/H :

|     | Freq   | Level  | Read  | Over   | Limit  | Remark   |
|-----|--------|--------|-------|--------|--------|----------|
|     | MHz    | dBuV/m | Level | Factor | Limit  | Line     |
|     |        |        | dBuV  | dB/m   | dB     | dBuV/m   |
| 1   | 141.36 | 21.30  | 34.34 | -13.04 | -8.70  | 30.00 QP |
| 2   | 180.22 | 19.04  | 33.79 | -14.75 | -10.96 | 30.00 QP |
| 3   | 220.25 | 23.30  | 38.29 | -14.99 | -6.70  | 30.00 QP |
| 4   | 305.38 | 28.98  | 40.96 | -11.98 | -8.02  | 37.00 QP |
| 5   | 381.73 | 30.10  | 40.02 | -9.92  | -6.90  | 37.00 QP |
| 6 ! | 410.40 | 31.60  | 40.64 | -9.04  | -5.40  | 37.00 QP |

Data: 4

File: C:\Program Files\le3\客户 DATA\字值\12051603.EM6 (4)

Date: 2012-05-24 Time: 17:05:42



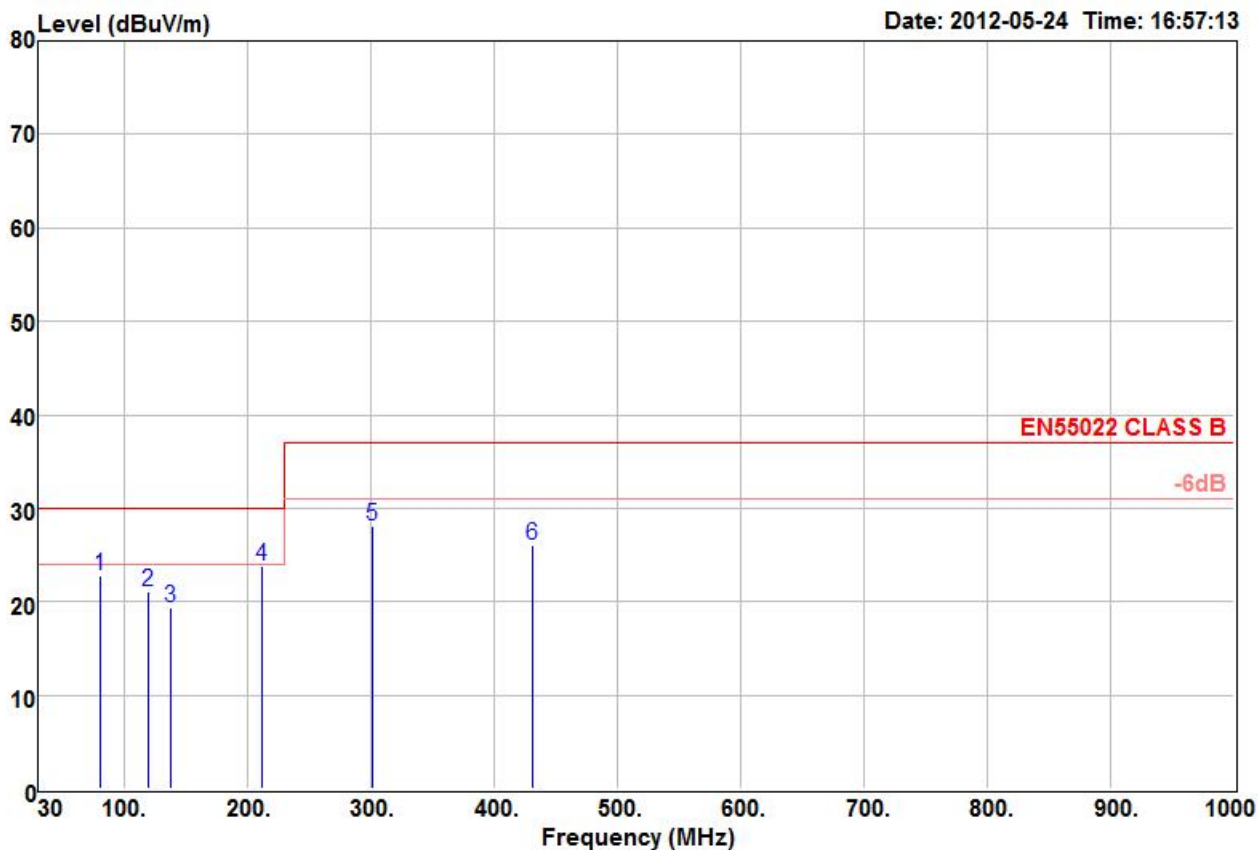
Site : OPEN SITE  
 Condition: EN55022 CLASS B 10m JB1(30M-1G)-101 VERTICAL  
 out : Please refer to page 1 of report  
 mode : Please refer to page 1 of report  
 memo : BS-800RC-B  
 T/H :

|     | Freq   | Level  | Read  | Over   | Limit  | Remark   |
|-----|--------|--------|-------|--------|--------|----------|
|     | MHz    | dBuV/m | Level | Factor | Limit  | Line     |
|     |        |        | dBuV  | dB/m   | dB     | dBuV/m   |
| 1 ! | 46.27  | 24.23  | 41.76 | -17.53 | -5.77  | 30.00 QP |
| 2   | 141.33 | 22.13  | 35.17 | -13.04 | -7.87  | 30.00 QP |
| 3 ! | 221.90 | 25.30  | 40.22 | -14.92 | -4.70  | 30.00 QP |
| 4   | 298.68 | 30.29  | 42.41 | -12.12 | -6.71  | 37.00 QP |
| 5   | 384.98 | 28.32  | 38.14 | -9.82  | -8.68  | 37.00 QP |
| 6   | 576.76 | 26.40  | 31.96 | -5.56  | -10.60 | 37.00 QP |

Data: 1

File: C:\Program Files\le3\客户 DATA\字位\12051603 .EM6 (4)

Date: 2012-05-24 Time: 16:57:13



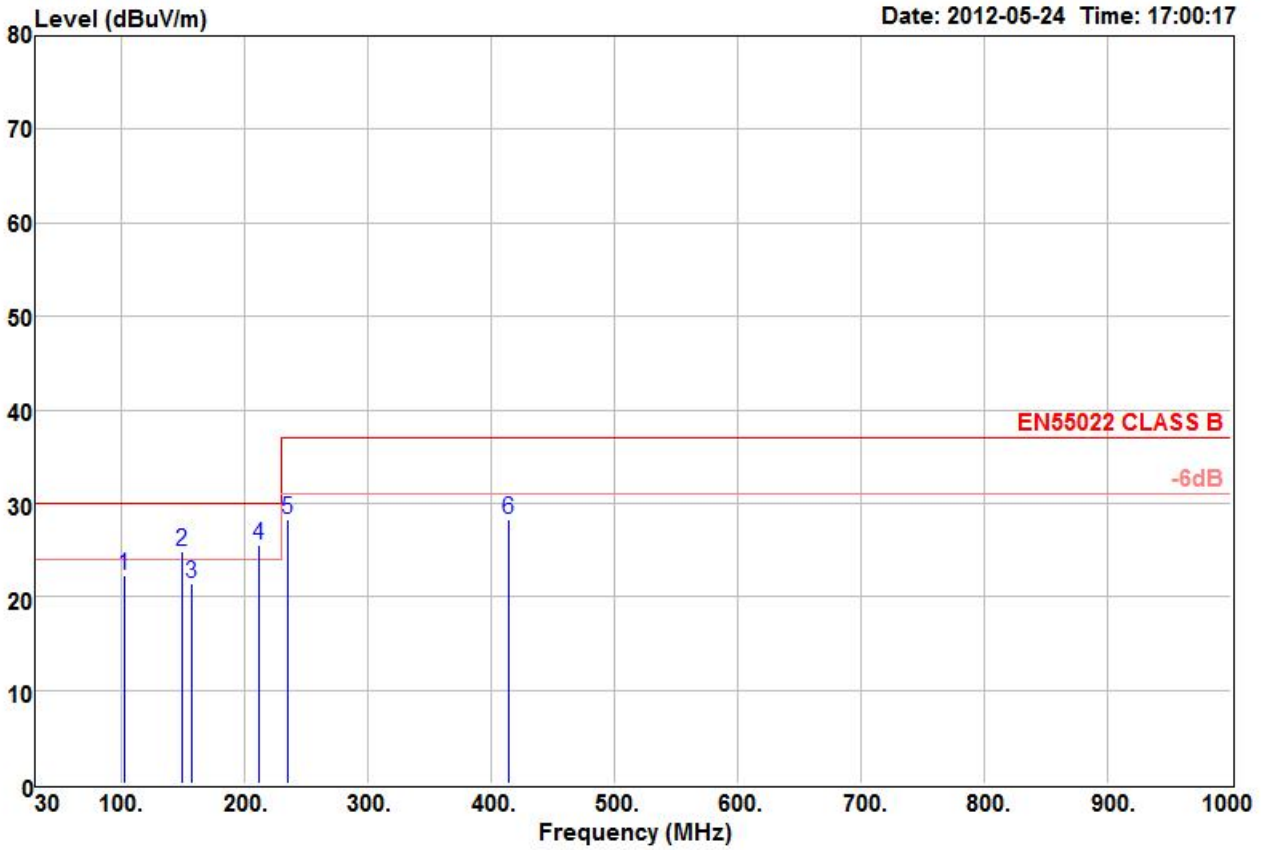
Site : OPEN SITE  
 Condition: EN55022 CLASS B 10m JB1(30M-1G)-101 HORIZONTAL  
 out : Please refer to page 1 of report  
 mode : Please refer to page 1 of report  
 memo : BS-800SH-B  
 T/H :

|   | Freq   | Level  | Read Level | Factor | Over Limit | Limit Line | Remark |
|---|--------|--------|------------|--------|------------|------------|--------|
|   | MHz    | dBuV/m | dBuV       | dB/m   | dB         | dBuV/m     |        |
| 1 | 81.17  | 22.80  | 41.90      | -19.10 | -7.20      | 30.00      | QP     |
| 2 | 119.29 | 21.01  | 33.41      | -12.40 | -8.99      | 30.00      | QP     |
| 3 | 137.76 | 19.30  | 32.07      | -12.77 | -10.70     | 30.00      | QP     |
| 4 | 211.68 | 23.80  | 39.10      | -15.30 | -6.20      | 30.00      | QP     |
| 5 | 301.11 | 28.16  | 40.24      | -12.08 | -8.84      | 37.00      | QP     |
| 6 | 431.76 | 25.98  | 34.39      | -8.41  | -11.02     | 37.00      | QP     |

Data: 2

File: C:\Program Files\le3\客户 DATA\字位\12051603 .EM6 (4)

Date: 2012-05-24 Time: 17:00:17



Site : OPEN SITE  
 Condition: EN55022 CLASS B 10m JB1(30M-1G)-101 VERTICAL  
 out : Please refer to page 1 of report  
 mode : Please refer to page 1 of report  
 memo : BS-800SH-B  
 T/H :

|     | Freq   | Level  | Read Level | Factor | Over Limit | Limit Line | Remark |
|-----|--------|--------|------------|--------|------------|------------|--------|
|     | MHz    | dBuV/m | dBuV       | dB/m   | dB         | dBuV/m     |        |
| 1   | 102.90 | 22.32  | 37.74      | -15.42 | -7.68      | 30.00      | QP     |
| 2 ! | 148.98 | 24.90  | 38.49      | -13.59 | -5.10      | 30.00      | QP     |
| 3   | 157.32 | 21.45  | 35.49      | -14.04 | -8.55      | 30.00      | QP     |
| 4 ! | 212.33 | 25.59  | 40.87      | -15.28 | -4.41      | 30.00      | QP     |
| 5   | 234.94 | 28.29  | 42.71      | -14.42 | -8.71      | 37.00      | QP     |
| 6   | 413.82 | 28.30  | 37.24      | -8.94  | -8.70      | 37.00      | QP     |