# Declaration of Conformity

We, Manufacturer

ZIPPY TECHNOLOGY CORP.
10F,No.50,MIN CHYUAN RD.
SHIN-TIEN, TAIPEI HSIEN
TAIWAN, R.O.C.

declare that the product
(description of the apparatus, system, installation to which it refers)

SWITCHING POWER SUPPLY

**DR2G-5800V**

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2014/30/EU-EMC Directive

■EN 55032：2012/AC:2013
Information technology equipment
-Radio disturbance characteristics
-Limits and methods of measurement

■EN 55024：2010
Information technology equipment
-Immunity characteristics
-Limits and methods of measurement

■EN 61000-4-2：2009 Criteria B
Electrostatic discharge
requirements "ESD"

■EN 61000-4-3：2006+A1:2008+A2:2010
Criteria A
Radiated, radio frequency
electromagnetic field

■EN 61000-4-4：2012 Criteria B
Electrical fast transient
requirements "EFT"

■EN 61000-4-5：2014 Criteria B
Surge Immunity
requirements

■EN 61000-4-6：2014 Criteria A
Conducted Immunity

■EN 61000-4-8：2010 Criteria A
Power Frequency Magnetic
Field Immunity

Checked by : Karen ，Date : NOV,20,2017
(Karen Ma / Engineer)

Approved by : Jeff Huang ，Date : NOV,20,2017
(Jeff Huang / Director)

# APPLICATION FOR CERTIFICATION

ON Behalf Of

ZIPPY TECHNOLOGY CORP.

SWITCHING POWER SUPPLY

Model#： **DR2G-5800V**

PREPARED FOR：

ZIPPY TECHNOLOGY CORP.
10F., No.50, MINQUAN RD.,
XINDIAN DIST., NEW TAIPEI CITY
TAIWAN, R.O.C

Report By：

ZIPPY TECHNOLOGY CORP.
10F., No.50, MINQUAN RD.,
XINDIAN DIST., NEW TAIPEI CITY
TAIWAN, R.O.C
TEL： (02)2918-8512
FAX：(02)2913-4969

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Description Page

# TABLE OF CONTENTS

# 1. Test Report Certification

| | | |
|---|---|---|
| Applicant | : | ZIPPY TECHNOLOGY CORP. |
| Manufacturer | : | ZIPPY TECHNOLOGY CORP. |
| EUT Description | : | Switching Power Supply |

| | | |
|---|---|---|
| (A) Model No. | : | **DR2G-5800V** |
| (B) Serial No. | : | N/A |
| (C) Power Supply | : | -39VDC ~ -72VDC |

MEASUREMENT PROCEDURE USED :

EN 55024 RULES
EN 55032 RULES

THE DEVICE DESCRIBED ABOVE WAS TESTED BY ZIPPY SHIN JIUH CORP. TO DETERMINE THE SEVERITY LEVELS THE DEVICE CAN ENDURE AND ITS PERFORMANCE CRITERION.
THE MEASUREMENT RESULTS ARE CONTAINED IN THIS TEST REPORT AND ZIPPY SHIN JIUH CORP. IS ASSUMED FULL RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS OF THESE MEASUREMENT.
ALSO, THIS REPORT SHOWS THAT THE EUT TO BE TECHNICALLY COMPLIANT WITH THE EN STANDARD.

# 2. General Information

## 2.1 Production Description

| | | |
|---|---|---|
| Description | : | Switching Power Supply |
| Model Number | : | **DR2G-5800V** |
| Applicant | : | ZIPPY TECHNOLOGY CORP. |
| Address | : | 10F., No.50, MINQUAN RD.,XINDIAN DIST., NEW TAIPEI CITY TAIWAN, R.O.C |
| Data Cable | : | N/A |
| PowerCord | : | Non-Shielded, detachable, 1.5m |

## 2.2 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

### 2.2.1 Resistor Load

| | | |
|---|---|---|
| Model Number | : | ELECTRONIC LOAD |
| Serial Number | : | N/A |
| Manufacturer | : | ZIPPY |
| Power | : | 800W |

## 2.3 Test Methodology

EMI Test:
Both conducted and radiated testing were performed according to the procedures in EN 55032
Radiated testing was performed at an antenna to EUT distance of 10 meters.

EMS Test:
Performed according to procedures in EN 61000 series regulations.

## 2.4 Test Facility

ZIPPY TECHNOLOGY CORP.
10F., No.50, MINQUAN RD.,
XINDIAN DIST., NEW TAIPEI CITY
TAIWAN, R.O.C

# 3. Electronic-Magnetic Interference Test

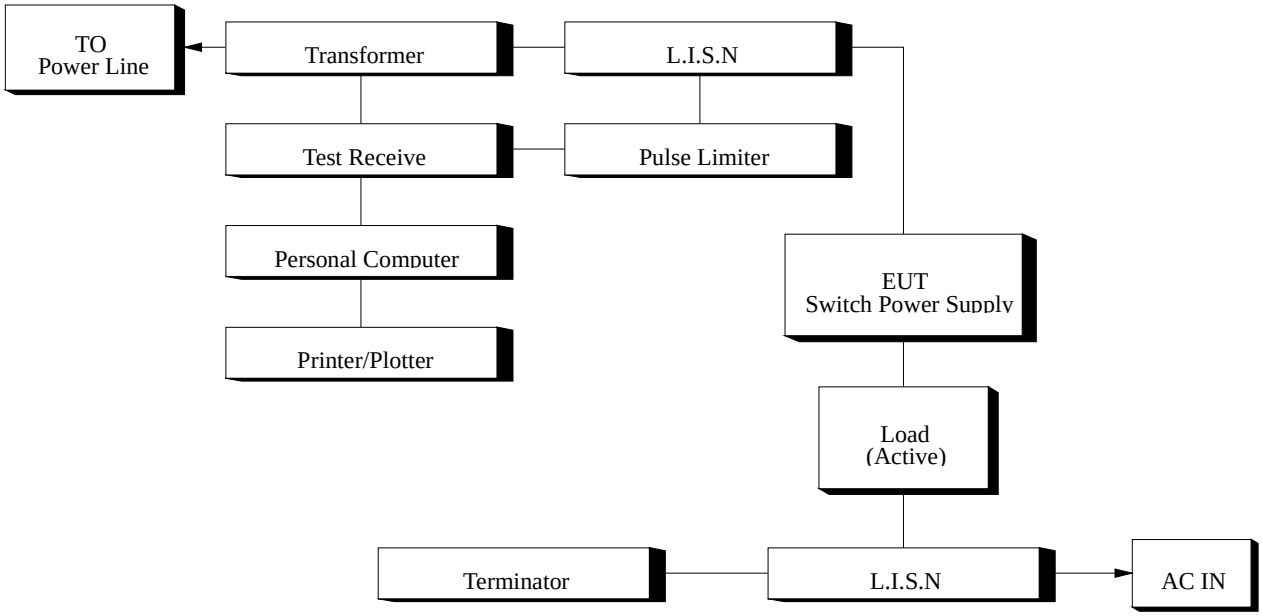
## 3.1 Conducted Power Line Test

### 3.1.1 TEST Equipment's

The following test equipment's are used during the conducted power line tests:

| Item | Instrument | Manufacture | Type No: | Last Calibration |
|---|---|---|---|---|
| 1 | TEST RECEIVER | ROHDE & SCHWARZ | ESL | Mar.,2017 |
| 2 | LISN | ROHDE & SCHWARZ | ENV4200 | Apr.,2017 |
| | | ROHDE & SCHWARZ | ENV216 | Apr.,2017 |
| 3 | SHIELDED ROOM 4.0M*3.0M*3M | | | N/A |

### 3.1.2 Block Diagram of Test Setup



### 3.1.3 Conducted Powerline Emission Limit

| Maximum RF Line Voltage dB(uV) | | |
|---|---|---|
| Frequency | Class A | |
| MHz | QUASI-PEAK | AVERAGE |
| 0.15 - 0.50 | 79 | 66 |
| 0.50 - 5.0 | 73 | 60 |
| 5.0 - 30 | 73 | 60 |

Remarks : In the Above Table, the tighter limit applies at the band edges.

### 3.1.4 EUT Configuration on Measurement

The equipment's which is listed 3.2 are installed on Conducted Power Line Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 3.1.5 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below :

3.1.5.1 Setup the EUT and simulators as shown on 3.2.

3.1.5.2 Turn on the power of all equipment's.

### 3.1.6 Conducted Emission Data

The measurement range of conducted emission which is from 0.15 MHz to 30 MHz was investigated. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

| MODEL： DR2G-5800V | REPORT NO.： 17112009 |
|---|---|

## Conducted Emission Data

EUT ：SWITCH POWER SUPPLY　　TEMPERATURE ：26℃

TEST MODE ：**DR2G-5800V**　　HUMIDITY ：65%

| Frequency | Reading Level dBuV | | Limites |
|---|---|---|---|
| MHz | Line 1 | Line 2 | DBuV |
| 29.08 | 44.29 | 50.58 | 73.00 |
| 29.28 | 45.13 | 51.69 | 73.00 |
| | | | |
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| | | | |

Remark：All readings are Quasi-Peak values.

ZIPPY EMC LAB

conduction test

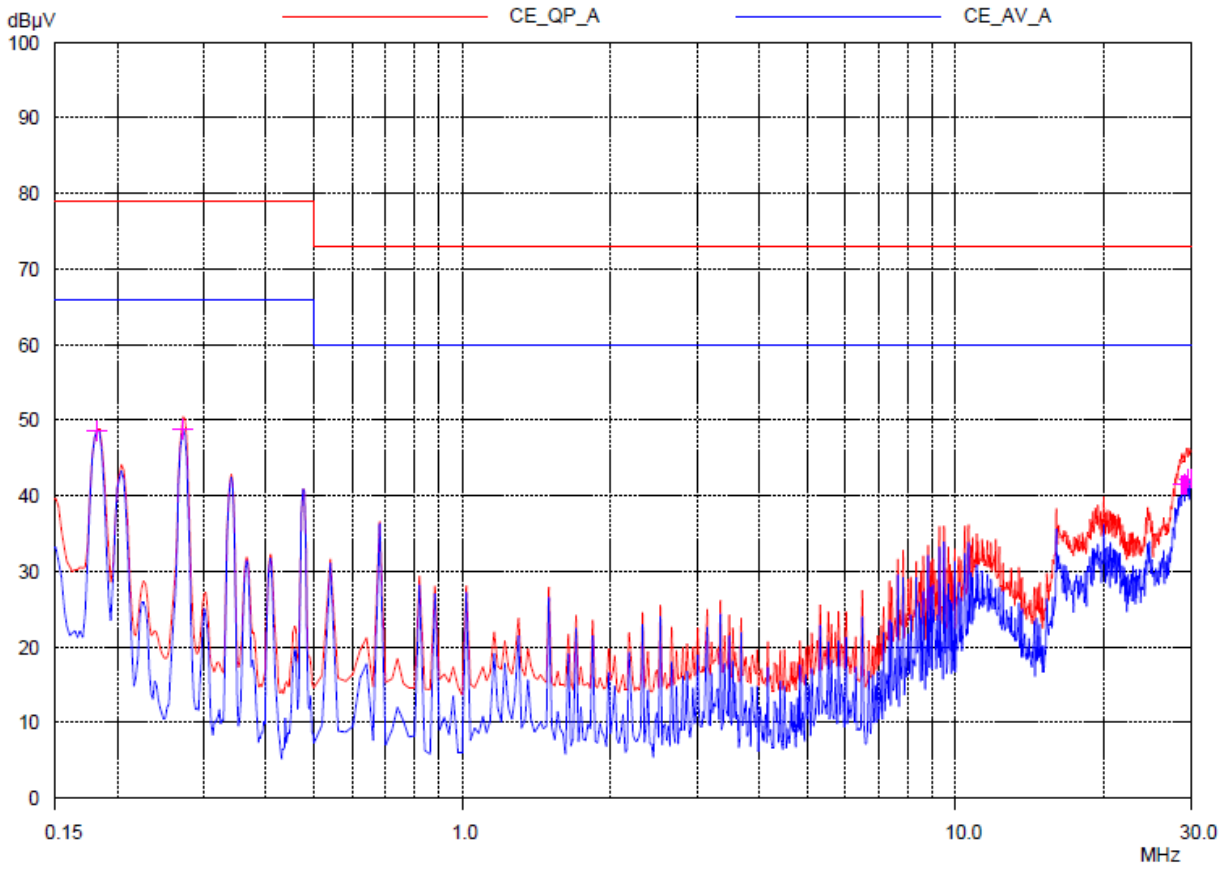
| | |
|---|---|
| EUT: | DR2G-5800V SPS |
| Manuf: | ZIPPY TECH CO..LTD |
| Op Cond: | FULL LOAD |
| Operator: | |
| Test Spec: | EN 55032-- Class A |
| Comment: | Load Condition (49 24 0.8 20 3.5) |
| | L-48VDC |

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 500kHz | 2kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 500kHz | 5MHz | 20kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 5MHz | 30MHz | 40kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |

| Transducer | No. | Start | Stop | Name |
|---|---|---|---|---|
| | 1 | 9kHz | 30MHz | CEB |

| | | |
|---|---|---|
| Prescan Measurement: | Detectors: | X QP / + AV |
| | Meas Time: | see scan settings |
| | Peaks: | 8 |
| | Acc Margin: | 25 dB |



## ZIPPY EMC LAB

### conduction test

EUT: DR2G-5800V SPS
Manuf: ZIPPY TECH CO..LTD
Op Cond: FULL LOAD
Operator:
Test Spec: EN 55032-- Class A
Comment: Load Condition (49 24 0.8 20 3.5)
L-48VDC

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 500kHz | 2kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 500kHz | 5MHz | 20kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 5MHz | 30MHz | 40kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |

| Transducer | No. | Start | Stop | Name |
|---|---|---|---|---|
| | 1 | 9kHz | 30MHz | CEB |

Prescan Measurement:
Detectors: X QP / + AV
Meas Time: see scan settings
Peaks: 8
Acc Margin: 25 dB

Peak Search Results

| Frequency MHz | QP Level dBµV | QP Limit dBµV | QP Delta dB | Phase - | PE - |
|---|---|---|---|---|---|

No results

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB | Phase - | PE - |
|---|---|---|---|---|---|
| 0.182 | 48.67 | 66.00 | 17.33 | N | gnd |
| 0.272 | 48.77 | 66.00 | 17.23 | N | gnd |
| 28.8 | 41.52 | 60.00 | 18.48 | N | gnd |
| 29.0 | 41.44 | 60.00 | 18.56 | N | gnd |
| 29.2 | 41.55 | 60.00 | 18.45 | N | gnd |
| 29.48 | 41.48 | 60.00 | 18.52 | N | gnd |
| 29.68 | 42.25 | 60.00 | 17.75 | N | gnd |
| 29.96 | 42.25 | 60.00 | 17.75 | N | gnd |

* limit exceeded

Indicated Phase/PE shows Configuration of max. Emission

ZIPPY EMC LAB

conduction test

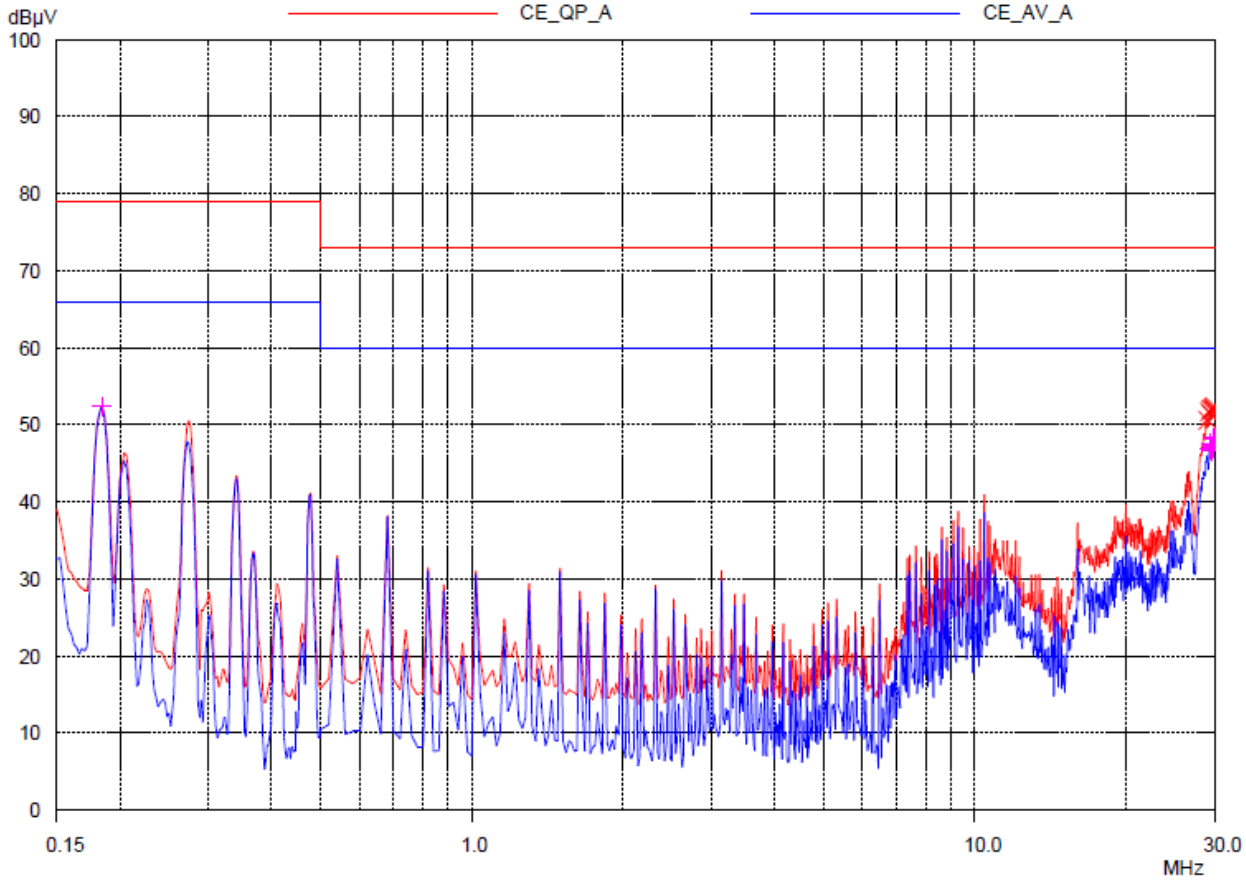
| | |
|---|---|
| EUT: | DR2G-5800V SPS |
| Manuf: | ZIPPY TECH CO..LTD |
| Op Cond: | FULL LOAD |
| Operator: | |
| Test Spec: | EN 55032-- Class A |
| Comment: | Load Condition (49 24 0.8 20 3.5) |
| | N-48VDC |

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 500kHz | 2kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 500kHz | 5MHz | 20kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 5MHz | 30MHz | 40kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |

| Transducer | No. | Start | Stop | Name |
|---|---|---|---|---|
| | 1 | 9kHz | 30MHz | CEB |

| Prescan Measurement: | | |
|---|---|---|
| | Detectors: | X QP / + AV |
| | Meas Time: | see scan settings |
| | Peaks: | 8 |
| | Acc Margin: | 25 dB |



## ZIPPY EMC LAB

### conduction test

EUT: DR2G-5800V SPS
Manuf: ZIPPY TECH CO..LTD
Op Cond: FULL LOAD
Operator:
Test Spec: EN 55032-- Class A
Comment: Load Condition (49 24 0.8 20 3.5)
N-48VDC

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | | |
|---|---|---|---|---|---|---|---|---|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp | OpRge |
| 150kHz | 500kHz | 2kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 500kHz | 5MHz | 20kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |
| 5MHz | 30MHz | 40kHz | 10kHz | QP+AV | 1msec | Auto | OFF | 60dB |

| Transducer | No. | Start | Stop | Name |
|---|---|---|---|---|
| | 1 | 9kHz | 30MHz | CEB |

Prescan Measurement:
Detectors: X QP / + AV
Meas Time: see scan settings
Peaks: 8
Acc Margin: 25 dB

Peak Search Results

| Frequency MHz | QP Level dBµV | QP Limit dBµV | QP Delta dB | Phase - | PE - |
|---|---|---|---|---|---|
| 29.08 | 50.58 | 73.00 | 22.42 | N | gnd |
| 29.28 | 51.69 | 73.00 | 21.31 | N | gnd |
| 29.48 | 51.97 | 73.00 | 21.03 | N | gnd |
| 29.56 | 51.28 | 73.00 | 21.72 | N | gnd |
| 29.68 | 52.07 | 73.00 | 20.93 | N | gnd |
| 29.76 | 51.95 | 73.00 | 21.05 | N | gnd |
| 29.88 | 52.15 | 73.00 | 20.85 | N | gnd |
| 29.96 | 52.42 | 73.00 | 20.58 | N | gnd |

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB | Phase - | PE - |
|---|---|---|---|---|---|
| 0.184 | 52.36 | 66.00 | 13.64 | N | gnd |
| 29.28 | 46.89 | 60.00 | 13.11 | N | gnd |
| 29.48 | 47.56 | 60.00 | 12.44 | N | gnd |
| 29.56 | 46.66 | 60.00 | 13.34 | N | gnd |
| 29.68 | 47.22 | 60.00 | 12.78 | N | gnd |
| 29.76 | 46.99 | 60.00 | 13.01 | N | gnd |
| 29.88 | 48.34 | 60.00 | 11.66 | N | gnd |
| 29.96 | 48.13 | 60.00 | 11.87 | N | gnd |

* limit exceeded

Indicated Phase/PE shows Configuration of max. Emission

## 3.2 Radiation Emission Test

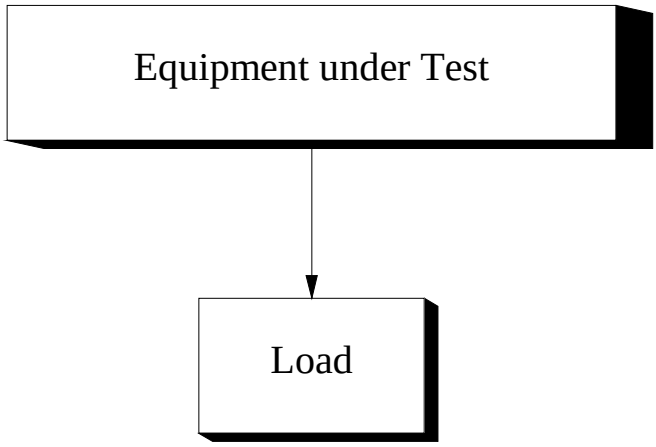
### 3.2.1 Test Equipment

The following test equipment's are used during the radiated emission test :

| Instrument | Manufacture | Type No: | Last Calibration |
|---|---|---|---|
| Spectrum Analyzer | H.P | 8594A | May.,2017 |
| Test Receiver | IFR System | A-7550 | Jun.,2017 |
| Preamplifier | H.P | 8447D | May.,2017 |
| Biconical Ant. | Emco | 3110 | Jun.,2017 |
| Log-Periodic Ant. | Emco | 3146 | Jun.,2017 |
| Dipole Antenna | Emco | 3121C | May.,2017 |

### 3.2.2 Test Setup

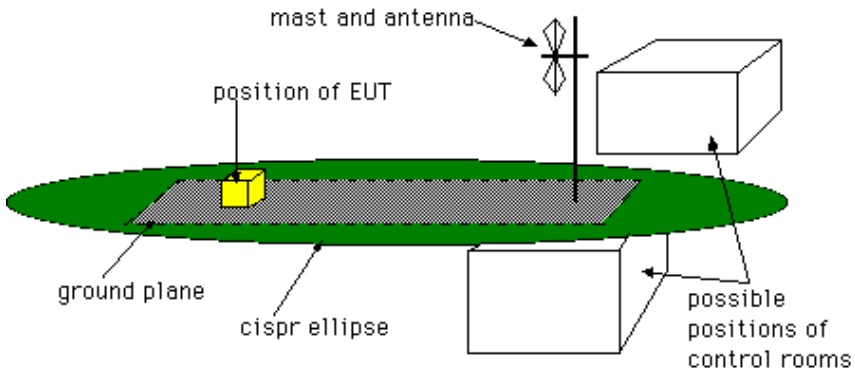
3.2.2.1 Block Diagram of Connection between EUT and simulators




EUT: SWITCHING POWER SUPPLY

3.2.2.2 Open Field Test Site - description

The open field test site (OFTS) is designed to provide an environment in which repeatable tests of radiated emissions can be carried out.
It consists of a flat elliptical area as shown in the diagram below.
The equipment under test and the antenna are placed at the foci of the ellipse.




The antenna height should be remotely adjustable from 1m to 4m. Measuring instrumentation should be outside the ellipse at the position shown or in a room under the ground plane.
The whole or part of the site may be enclosed in an RF transparent building.
For precompliance testing a 3m test site with a fixed height antenna (at 1.5-2m height) and no metallic ground plane may be used. This may be a clear area on a car park or a grass area but should be away from large metallic structures.

## 3.2.3 Radiated Emission Limit

### Class A Limits

| Frequency | Distance | Field Strength |
|---|---|---|
| MHz | Meter | DB(uV/M) |
| 30-230 | 10 | 40 |
| 230-1000 | 10 | 47 |

Remarks :
1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrumentantenna and the closed point of any part of the device or system.

### 3.2.4 EUT Configuration

The equipment's which is listed 4.2.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

### 3.2.5 Operation Condition of EUT

Same as Conducted Power Line Test which is listed in 3.1.5 .

### 3.2.6 Radiated Emission Data

The measurement range of radiated emission which is from 30 MHz to 1000 MHz was investigated. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

## Radiated Emission Data

EUT : SWITCH POWER SUPPLY TEMPERATURE : 26℃

TEST MODE : **DR2G-5800V** HUMIDITY : 57%

| Frequency | Emission Level | Limits | Remark |
|---|---|---|---|
| | Horizontal | | |
| (MHz) | dBuV/m | dBuV/m | |
| 30.00 | 24.88 | 40.00 | |
| 78.50 | 33.21 | 40.00 | |
| 138.64 | 27.51 | 40.00 | |
| 225.94 | 25.98 | 40.00 | |
| 270.56 | 26.07 | 47.00 | |
| 336.52 | 27.66 | 47.00 | |
| 544.10 | 29.72 | 47.00 | |
| 580.96 | 30.23 | 47.00 | |
| | | | |
| | | | |
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| | | | |
| | | | |

| MODEL : DR2G-5800V | REPORT NO. : 17112009 |
|---|---|

## Radiated Emission Data

| | | | |
|---|---|---|---|
| EUT | : SWITCH POWER SUPPLY | TEMPERATURE | : 26℃ |
| TEST MODE | : **DR2G-5800V** | HUMIDITY | : 57% |

| Frequency | Emission Level | Limits | Remark |
|---|---|---|---|
| | Vertical | | |
| (MHz) | dBuV/m | dBuV/m | |
| 30.00 | 37.44 | 40.00 | Quasi-Peak |
| 41.64 | 36.81 | 40.00 | |
| 76.56 | 31.40 | 40.00 | |
| 121.18 | 32.27 | 40.00 | |
| 233.70 | 30.78 | 47.00 | |
| 361.74 | 25.14 | 47.00 | |
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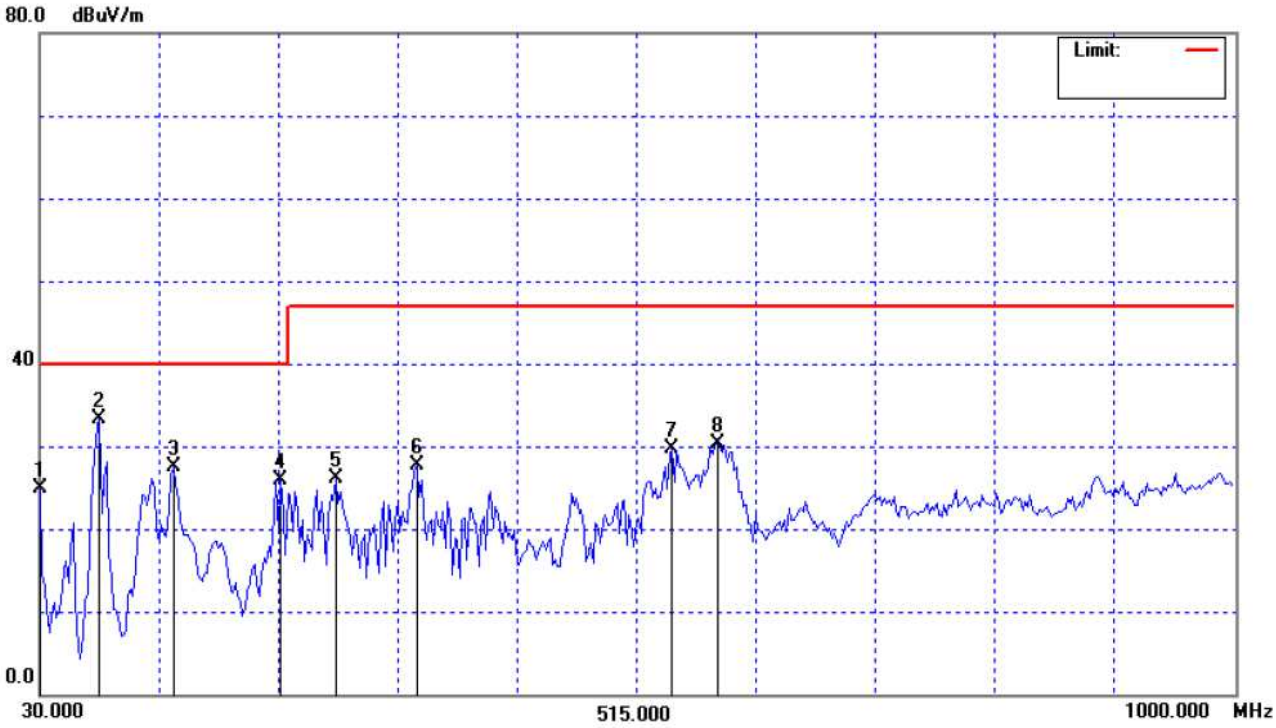
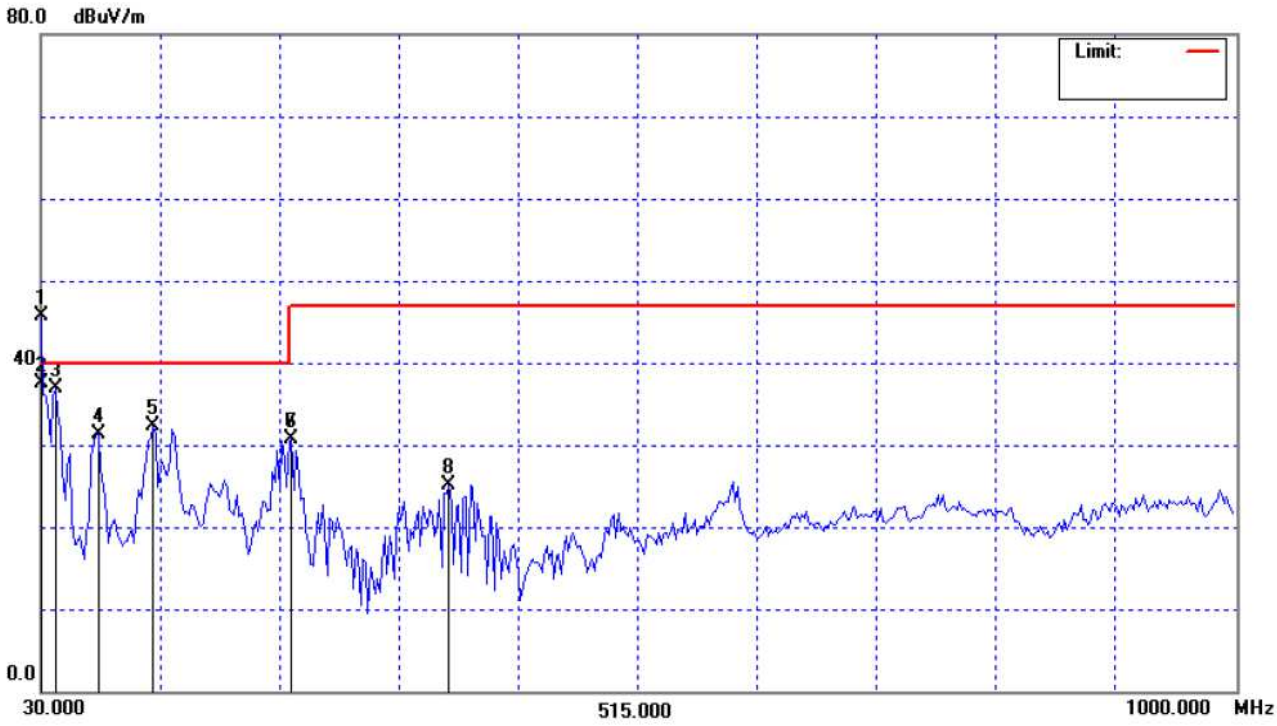
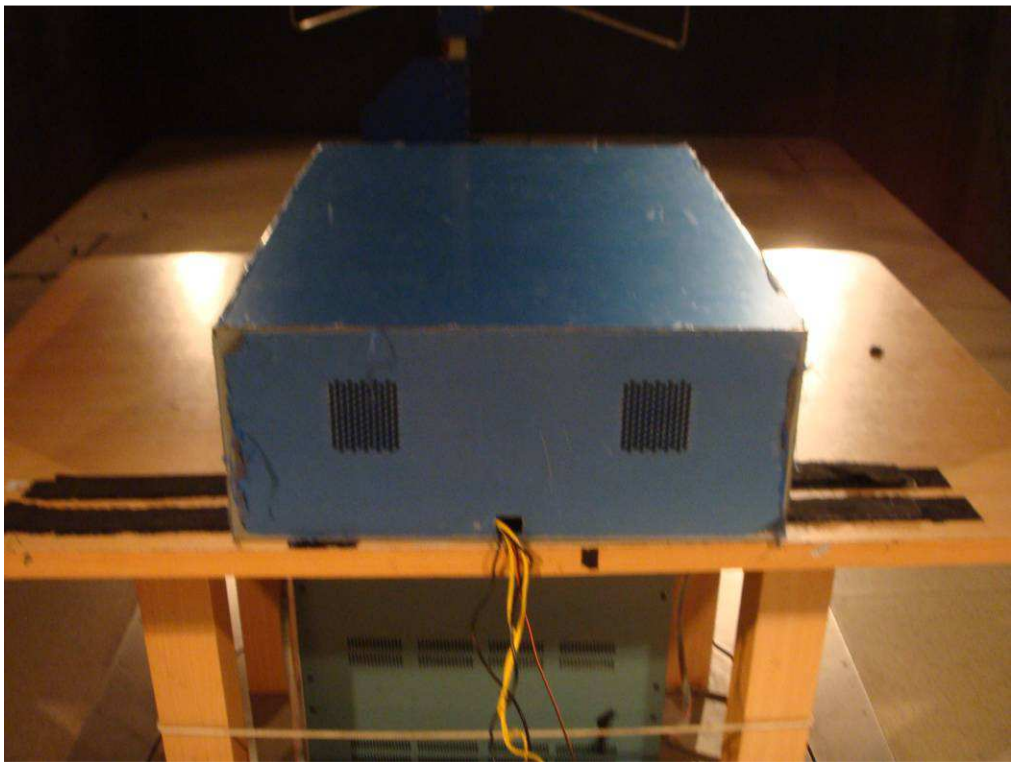
Horizontal Curve




Vertical Curve



3.2.7 Test Photo and Setup



※During the radiated test, the power-supply has to test with chassis, which is not allowed to be operated stand-alone. (For user, final assembly has to comply with corresponding EMC-and safety-regulations.)

# 4. ESD Measurement

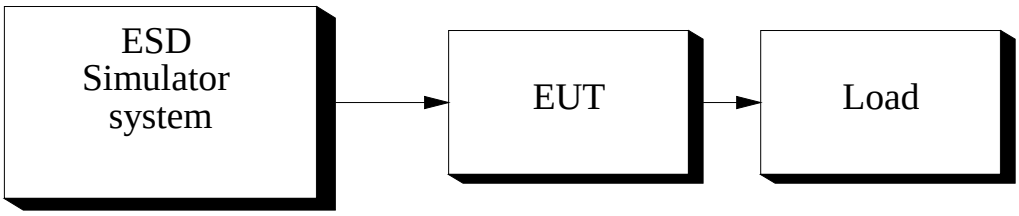
## 4.1 Test Equipment

The following test equipment's are used during the ESD test :

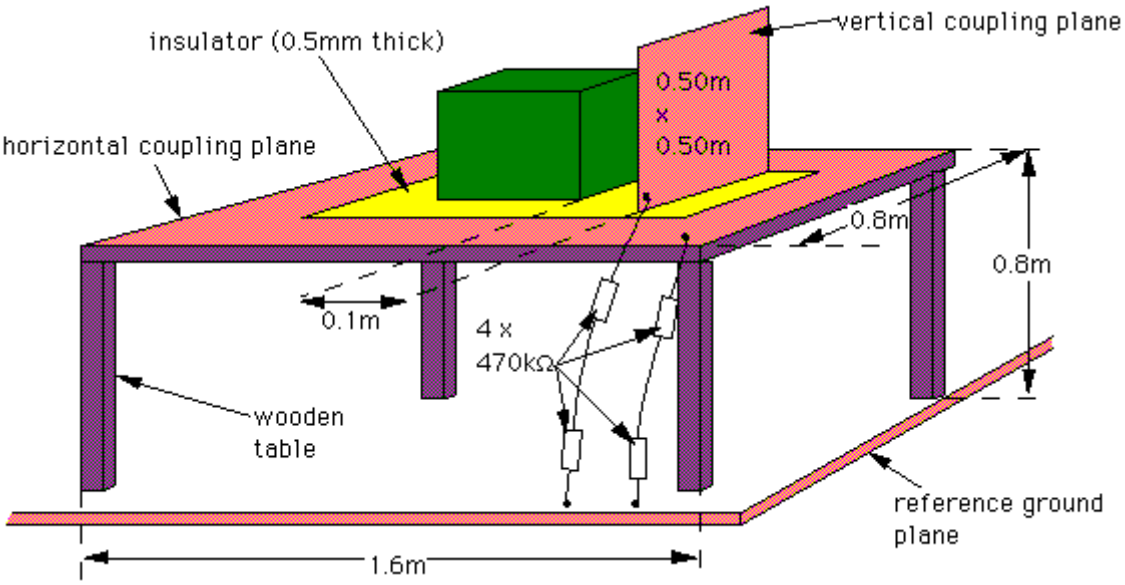
| Instrument | Manufacture | Type No: | Last Calibration |
|---|---|---|---|
| ESD Simulator system | Keytek | MZ-15/EC | May.,2017 |
| Electronic Load | D-RAM | Load-2000 | N/A |

## 4.2 Test Setup

### 4.2.1 Block Diagram of Connections between EUT and simulators




### 4.2.2 Test Setup of EUT



## 4.3 Severity Levels

| LEVEL | TEST VOLTAGE CONTACT DISCHARGE | TEST VOLTAGE AIR DISCHARGE |
|---|---|---|
| 1 | 2KV | 2KV |
| 2 | 4KV | 4KV |
| 3 | 6KV | 6KV |
| 4 | 8KV | 8KV |
| X | SPECIAL | SPECIAL |

## 4.4 EUT Operating Condition

1. Setup the EUT and Test Equipment as shown on 4.2
2. power on.

## 4.5 Test Procedure

Air Discharge:

This test was done above a non-conductive surfaces. The round discharge electrode about 30cm away will approach as fast as possible to touch test points of the EUT.
Discharge happens before the contact. This procedure is repeated ten times on one selected location.

## 4.6 Test Method

According to IEC 61000-4-2

## 4.7 Test Result

| | | | |
|---|---|---|---|
| EUT | : SWITCH POWER SUPPLY | TEMPERATURE | : 26℃ |
| TEST MODE | : **DR2G-5800V** | HUMIDITY | : 65% |

| Item | Amount of discharge | Voltage | Results |
|---|---|---|---|
| Contact discharge | 500 | +2KV<br>-2KV | Pass<br>Pass |
| Contact discharge | 500 | +4KV<br>-4KV | Pass<br>Pass |
| Air discharge | 500 | +2KV<br>-2KV | Pass<br>Pass |
| Air discharge | 500 | +4KV<br>-4KV | Pass<br>Pass |
| Air discharge | 500 | +6KV<br>-6KV | Pass<br>Pass |
| Air discharge | 500 | +8KV<br>-8KV | Pass<br>Pass |

※Input Voltage：-48VDC

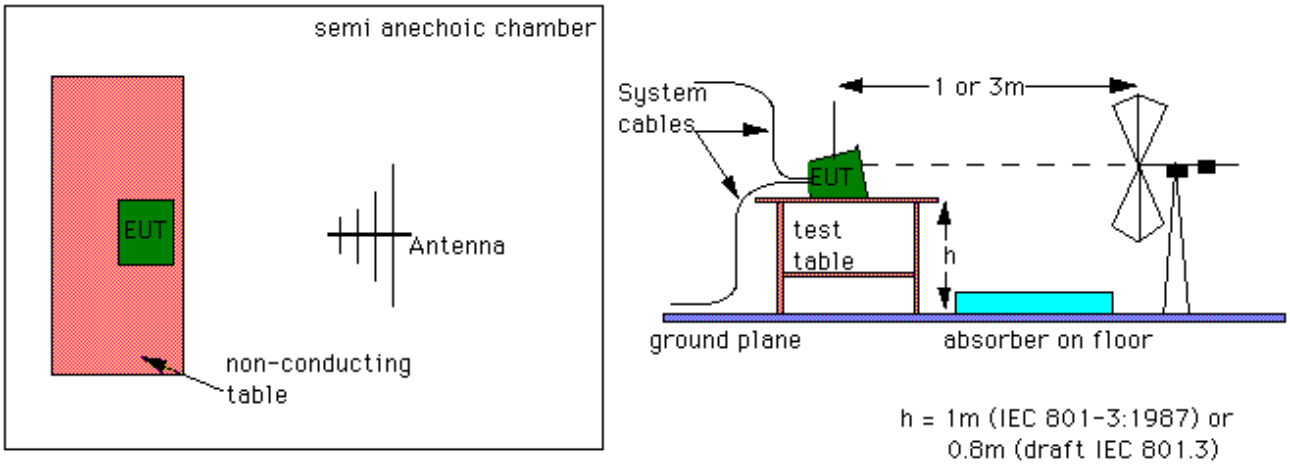
# 5. Radiated Susceptibility Measurement

## 5.1 Test Equipment

The following test equipment's are used during the RS test :

| Instrument | Manufacture | Type No: | Last Calibration |
|---|---|---|---|
| Signal generator | H.P | 8657A | Dec.,2016 |
| Power amplifier | A&R | 100A100 | Dec.,2016 |
| Field strength meter | A&R | FM2000 | Oct.,2017 |
| Field strength sensor | A&R | EP2000 | Oct.,2017 |
| Power antenna | A&R | AT1080 | Oct.,2017 |

## 5.2 Block Diagram of Test Setup




Antennas-layout

For the upper frequency range of 200 to 1000 MHz, antennas are the normal method of producing the required field strength. This is also carried out in an anechoic chamber or a screened room. If a screened room is used it must be damped . The anechoic chamber should be used for compliance testing, the screened room may be used for precompliance testing. The fields in the screened room will not be as uniform as those obtainable in an anechoic chamber and will also not be as repeatable. The EUT is placed on a non-conductive table, 0.8 m above the reference ground plane, which in many cases will be the floor of a screened room. According to the standards, the EUT should be oriented so that its most sensitive side is facing the antenna. In practice it can be difficult to decide beforehand which is the most sensitive side, and in most cases, a series of tests will be required with the EUT in several orientations.

## 5.3 Severity Levels

| LEVEL | FIELD STRENGTH V/M |
|---|---|
| 1 | 1 |
| 2 | 3 |
| 3 | 10 |
| X | SPECIAL |

## 5.4 EUT Operating Condition

Same as section 4.4.

## 5.5 Test Procedure

The EUT and load are placed on a table which is 0.8 meter above ground. The field sensor is also placed on the same table to monitor field strength from transmitting antenna.

EUT is set 1 meter away from the transmitting antenna which is mounted on an antenna each time.

The antenna is fixed 1 meter above ground. Both horizontal and vertical polarization of the antenna are set on measurement. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

All the scanning conditions are as follows :

| Condition of Test | Remarks |
|---|---|
| 1. Field Strength | 3 V/M Level 2 |
| 2. Radiated Signal | 80% Amplitude Modulated with a 1KHz Tone |
| 3. Scanning Frequency | 80 MHz-1 GHz |
| 4. Sweep Time of Radiated | 0.0015 Decade/s |

## 5.6 Test Method

According to IEC 61000-4-3

## 5.7 Test Result

| | | | |
|---|---|---|---|
| EUT | ：SWITCH POWER SUPPLY | TEMPERATURE | ：26℃ |
| TEST MODE | ：**DR2G-5800V** | HUMIDITY | ：65% |

| Frequency Range (MHz) | Position (Angle) | Polarity (HorV) | Field Strength (V/M) | Results |
|---|---|---|---|---|
| 80-1000 | 0° (Front) | H | 3 | Pass |
| 80-1000 | 90° (Right) | H | 3 | Pass |
| 80-1000 | 180° (Back) | H | 3 | Pass |
| 80-1000 | 270° (Left) | H | 3 | Pass |
| 80-1000 | 0° (Front) | V | 3 | Pass |
| 80-1000 | 90° (Right) | V | 3 | Pass |
| 80-1000 | 180° (Back) | V | 3 | Pass |
| 80-1000 | 270° (Left) | V | 3 | Pass |

Test Result：Criteria A

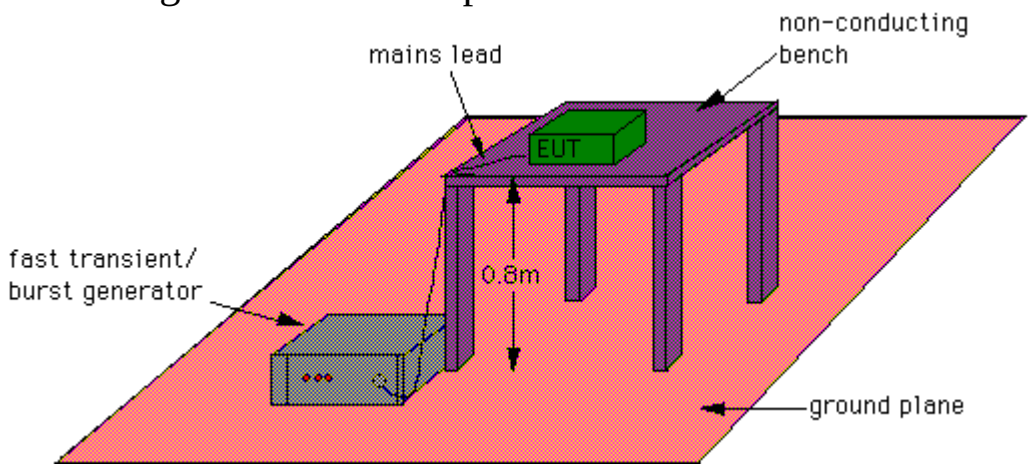
# 6. Electrical Fast Transient / Burst Measurement

## 6.1 Test Equipment

The following test equipment's are used during the EFT tests :

| Instrument | Manufacturer | Type No. | Last Calibration |
|---|---|---|---|
| Fast Transient / Burst enerator | Keytek | EMCpro | May.,2017 |

## 6.2 Block Diagram of Test Setup




## 6.3 Severity Levels

| Open Circuit Output Test Voltage ±10% | |
|---|---|
| Level | On power supply lines |
| 1 | 0.5KV |
| 2 | 1KV |
| 3 | 2KV |
| 4 | 4KV |
| X | SPECIAL |

## 6.4 EUT Operation Condition

Same as section 4.4.

## 6.5 Test Procedure

The EUT and its load are placed on a table which is 0.8 meter above a metal ground plane measured 1m*1m min. And 0.65 mm thick min. And projected beyond the EUT by at least 0.1m on all sides.
The EUT is away from the walls of the test AC power line test is as follows:

For Ac power line test:
The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal.
Each of the Line and Neutral conductor is impressed with burst noise for 1 min.

## 6.6 Test Method

According to IEC 61000-4-4.

## 6.7 Test Result

| | | | |
|---|---|---|---|
| EUT | : SWITCH POWER SUPPLY | TEMPERATURE | : 26℃ |
| TEST MODE | : **DR2G-5800V** | HUMIDITY | : 65% |

| Inject Line | Voltage KV | Frequency (KHz) | Inject time (sec) | Inject Method | Result |
|---|---|---|---|---|---|
| L1 | ±1 | 5 | 60 | Direct | Pass |
| L2 | ±1 | 5 | 60 | Direct | Pass |
| PE | ±1 | 5 | 60 | Direct | Pass |
| L1-L2 | ±1 | 5 | 60 | Direct | Pass |
| L1-PE | ±1 | 5 | 60 | Direct | Pass |
| L2-PE | ±1 | 5 | 60 | Direct | Pass |
| L1,L2-PE | ±1 | 5 | 60 | Direct | Pass |

※Input Voltage：-48VDC

# 7. Surge Immunity Test

EUT : SWITCH POWER SUPPLY TEMPERATURE : 26℃

TEST MODE : **DR2G-5800V** HUMIDITY : 65%

| Waveform | Voltage | Output:LC | Phs Ref | Test | Delay | Result |
|---|---|---|---|---|---|---|
| 12 Ohm | -2000V | MAINS:L1/PE | RND | 5 | 60 sec | Pass |
| 12 Ohm | 2000V | MAINS:L1/PE | RND | 5 | 60 sec | Pass |
| 12 Ohm | -2000V | MAINS:L2/PE | RND | 5 | 60 sec | Pass |
| 12 Ohm | 2000V | MAINS:L2/PE | RND | 5 | 60 sec | Pass |
| 2 Ohm | -1000V | MAINS:L1/L2 | RND | 5 | 60 sec | Pass |
| 2 Ohm | 1000V | MAINS:L1/L2 | RND | 5 | 60 sec | Pass |
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# 8. Conducted Immunity Test

| | | | |
|---|---|---|---|
| EUT | : SWITCH POWER SUPPLY | TEMPERATURE | : 26℃ |
| TEST MODE | : **DR2G-5800V** | HUMIDITY | : 65% |

Test frequency Range : 150kHz ~ 80MHz
Frequency Step : 1% of the momentary frequency
Dwell Time : Minimum 3 sec. per frequency
Modulation : 1kHz Sine Wave with 80% Amplitude Modulation

| Frequency Range (MHz) | Polarity (HorV) | Field Strength (V/M) | Performance | | Result |
|---|---|---|---|---|---|
| | | | Required | Observation | |
| 0.15-80 | H | 3 | A | A | Pass |

# 9. Power Frequency Magnetic Field (PFM) Immunity Test

EUT : SWITCH POWER SUPPLY TEMPERATURE : 26℃

TEST MODE : **DR2G-5800V** HUMIDITY : 65%

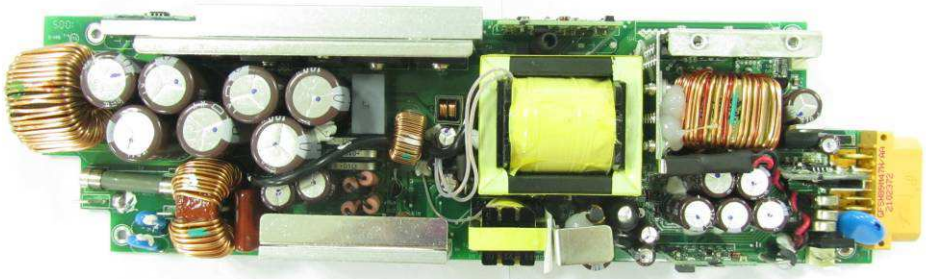
| Magnetic Field Orientation | Magnetic Field (A/m) | Performance | | Result (Pass/Fail) |
|---|---|---|---|---|
| | | Required | Observation | |
| X-axis | 1A | A | A | Pass |
| Y-axis | 1A | A | A | Pass |
| Z-axis | 1A | A | A | Pass |

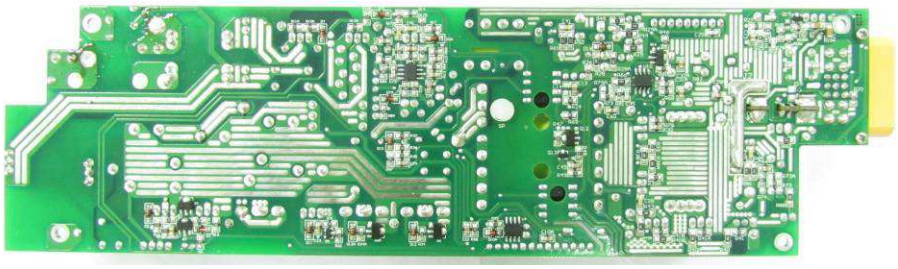
# 10. Photographs

1.Front view of Power Supply
2.Back view of Power Supply

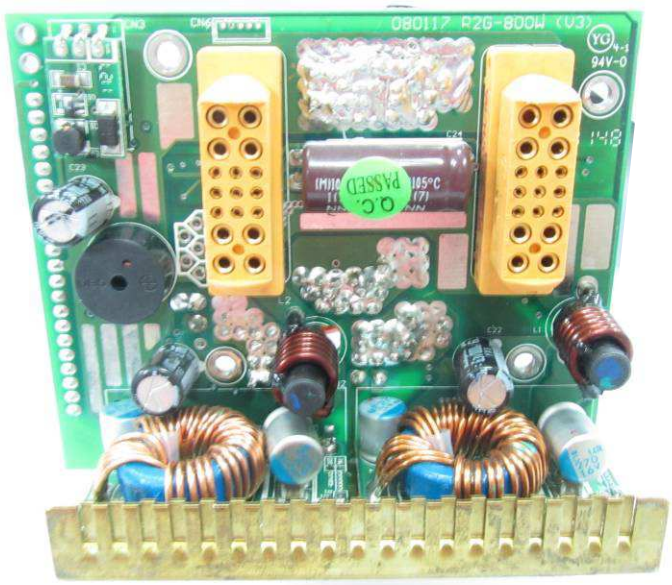
3.Front view of Power Supply
4.Back view of Power Supply

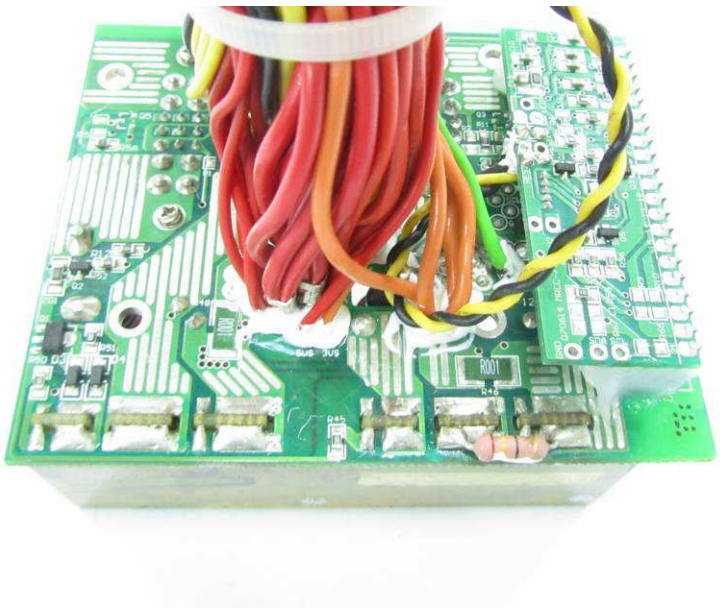
5.Component side of Mainboard
6.Solder side of Mainboard





7.Component side of Mainboard
8.Solder side of Mainboard





9. Inside view of Power Supply
10. Inside view of Power Supply

11.Inside view of Power Supply
12.Test view

# 11. EMI Reduction Method During Compliance Testing

1.No modification was made during test.