

## Test Report

**Report No.:** CEBCAE-WTW-P21050859

**Test Model:** TRI 1-0511SM, TRI 1-0523SM, TRI 1-1211SM, TRI 1-1223SM, TRI 1-2411SM

**Series Model:** TRI 1-0512SM etc. - *Multiple listing see item 3.1*

**Received Date:** Oct. 29, 2020

**Test Date:** Nov. 2 to Dec. 16, 2020

**Issued Date:** Jan. 13, 2022

**Applicant:** TRACO ELECTRONIC AG

**Address:** SIHLBRUGGSTRASS 111 CH-6340 BAAR, SWITZERLAND

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

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**Test Location (1):** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location (2):** No. 49, Lane 206, Wende Rd., Chiung Lin Township, Hsinchu County, Taiwan



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### Release Control Record

| Issue No.            | Description       | Date Issued   |
|----------------------|-------------------|---------------|
| CEBCAE-WTW-P21050859 | Original release. | Jan. 13, 2022 |

## 1 Certificate of Conformity

**Product:** DC to DC Converter

**Brand:**



**Test Model:** TRI 1-0511SM, TRI 1-0523SM, TRI 1-1211SM, TRI 1-1223SM, TRI 1-2411SM

**Series Model:** TRI 1-0512SM etc. - *Multiple listing see item 3.1*

**Sample Status:** Engineering sample

**Applicant:** TRACO ELECTRONIC AG

**Test Date:** Nov. 2 to Dec. 16, 2020

**Standards:** **EN 55032:2015 +A11:2020, Class A**  
**EN 61000-3-2:2014 (Not applicable)**  
**EN 61000-3-3:2013 (Not applicable)**  
**EN 55024:2010 / EN 55024:2010 +A1:2015**  
 EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0  
 EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2  
 EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0  
 EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0  
 EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0  
 EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0  
 EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0 (Not applicable)  
**EN 55035:2017 +A11:2020**  
 EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0  
 EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2  
 EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0  
 EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0  
 EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0  
 EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0  
 EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0 (Not applicable)  
 Broadband impulse noise disturbances (Not applicable)

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report

**Prepared by :**

*Albee Chu*

**Date:** Jan. 13, 2022

Albee Chu / Specialist

**Approved by :**

*Jim Hsiang*

**Date:** Jan. 13, 2022

Jim Hsiang / Associate Technical Manager

## 2 Summary of Test Results

| Emission                |   |   |         |
|-------------------------|---|---|---------|
| Standard                | Test Item   | Result/Remarks  | Verdict |
| EN 55032:2015 +A11:2020 | Conducted emission from the AC mains power port               | Minimum passing Class A margin is -6.24 dB at 0.18249 MHz           | Pass    |
|                         | Asymmetric mode conducted emission at telecommunication ports | Without telecom port of the EUT.                                    | N/A     |
|                         | Radiated emission 30-1000 MHz                                 | Minimum passing Class A margin is -9.25 dB at 225.09 MHz            | Pass    |
|                         | Radiated emission above 1GHz                                  | Not applicable because the EUT's highest frequency is below 108MHz. | N/A     |
|                         | Conducted differential voltage emissions                      | Without tuner port of the EUT.                                      | N/A     |
| EN 61000-3-2:2014       | Harmonic current emissions                                    | Test not applicable because port does not exist.                    | N/A     |
| EN 61000-3-3:2013       | Voltage fluctuations and flicker                              | Test not applicable because port does not exist.                    | N/A     |

| Immunity        |  |  |   |         |
|-----------------|--|--|---|---------|
| EN 55024 Clause | Basic standard   | Test Item                              | Result/Remarks  | Verdict |
| 4.2.1           | EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0                     | Electrostatic discharge (ESD)          | Performance Criterion A                                   | Pass    |
| 4.2.3.2         | EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2   | Continuous radiated disturbances (RS)  | Performance Criterion A                                   | Pass    |
| 4.2.2           | EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0                     | Electrical fast transients (EFT)       | Performance Criterion A                                   | Pass    |
| 4.2.5           | EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0   | Surges                                 | Performance Criterion A                                   | Pass    |
| 4.2.3.3         | EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0            | Continuous conducted disturbances (CS) | Performance Criterion A                                   | Pass    |
| 4.2.4           | EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0                     | Power-frequency magnetic fields (PFMF) | Performance Criterion A                                   | Pass    |
| 4.2.6           | EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0 | Voltage dips and interruptions         | Test not applicable because AC power port does not exist. | N/A     |

| Immunity        |  |  |   |         |
|-----------------|--|--|---|---------|
| EN 55035 Clause | Basic standard   | Test Item  | Result/Remarks  | Verdict |
| 4.2.1           | EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0                     | Electrostatic discharge (ESD)  | Performance Criterion A                                   | Pass    |
| 4.2.2.2         | EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2   | Continuous radiated disturbances (RS)  | Performance Criterion A                                   | Pass    |
| 4.2.4           | EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0                     | Electrical fast transients (EFT)   | Performance Criterion A                                   | Pass    |
| 4.2.5           | EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0   | Surges   | Performance Criterion A                                   | Pass    |
| 4.2.2.3         | EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0            | Continuous conducted disturbances (CS)   | Performance Criterion A                                   | Pass    |
| 4.2.3           | EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0                     | Power-frequency magnetic fields (PFMF)   | Performance Criterion A                                   | Pass    |
| 4.2.6           | EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0 | Voltage dips and interruptions   | Test not applicable because AC power port does not exist. | N/A     |
| 4.2.7           | -  | Broadband impulse noise disturbances, <b>Repetitive</b> (Applicable only to xDSL ports.) | Without CPE xDSL port of the EUT.                         | N/A     |
| 4.2.7           | -  | Broadband impulse noise disturbances, <b>Isolated</b> (Applicable only to xDSL ports.)   | Without CPE xDSL port of the EUT.                         | N/A     |

Note:

1. There is no deviation to the applied test methods and requirements covered by the scope of this report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
3. The above EN/IEC basic standards are applied with latest version if customer has no special requirement.
4. N/A: Not Applicable.

## 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement  | Expanded Uncertainty<br>(k=2) ( $\pm$ ) | Maximum allowable<br>uncertainty ( $\pm$ ) |
|--|---|--|
| Conducted disturbance at mains port using AMN,<br>150kHz ~ 30MHz | 2.94 dB                                 | 3.4 dB ( $U_{\text{CISPR}}$ )              |
| Radiated disturbance, 30MHz ~ 1GHz                               | 4.08 dB                                 | 6.3 dB ( $U_{\text{CISPR}}$ )              |

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.


## 2.2 Modification Record

There were no modifications required for compliance.



### 3 General Information

#### 3.1 Description of EUT

|                     |   |
|---------------------|---|
| Product             | DC to DC Converter  |
| Brand               |  |
| Test Model          | TRI 1-0511SM, TRI 1-0523SM, TRI 1-1211SM, TRI 1-1223SM, TRI 1-2411SM              |
| Series Model        | TRI 1-0512SM etc. - <b>Multiple listing see below</b>                             |
| Model Difference    | Refer to note as below  |
| Sample Status       | Engineering sample  |
| Operating Software  | N/A   |
| Power Supply Rating | Refer to note as below  |
| Accessory Device    | N/A   |
| Data Cable Supplied | N/A   |

**Note:**

1. This report is issued as a duplicate report of BV CPS report no.: CEBCAE-WTW-P20100780. The difference compared with original report are changing applicant, brand and model for marketing purpose and upgrading EN 55035 standard to latest version; therefore all test data was copied from the original test report and verified to meet the new standard version.
2. The EUT is a DC to DC Converter, the specifications of standard models were listed as below:

| Model Number | Input Voltage (Range) | Output Voltage |
|--------------|-----------------------|----------------|
|              | VDC                   | VDC            |
| TRI 1-0511SM | 5<br>(4.5 ~ 5.5)      | 5              |
| TRI 1-0512SM |                       | 12             |
| TRI 1-0513SM |                       | 15             |
| TRI 1-0522SM |                       | ±12            |
| TRI 1-0523SM |                       | ±15            |
| TRI 1-1211SM | 12<br>(10.8 ~ 13.2)   | 5              |
| TRI 1-1212SM |                       | 12             |
| TRI 1-1213SM |                       | 15             |
| TRI 1-1222SM |                       | ±12            |
| TRI 1-1223SM |                       | ±15            |
| TRI 1-2411SM | 24<br>(21.6 ~ 26.4)   | 5              |
| TRI 1-2412SM |                       | 12             |
| TRI 1-2413SM |                       | 15             |
| TRI 1-2422SM |                       | ±12            |
| TRI 1-2423SM |                       | ±15            |

During the test, the **Model No.: TRI 1-0511SM, TRI 1-0523SM, TRI 1-1211SM, TRI 1-1223SM, TRI 1-2411SM** were selected as the representative models for the test and therefore only their test data were recorded in this report.

#### 3.2 Features of EUT

The tests reported herein were performed according to the method specified by TRACO ELECTRONIC AG, for detailed feature description, please refer to the manufacturer's specifications or user's manual.

### 3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

1. The EUT was pre-tested under operating and standby condition and the worst emission level was found under **operating condition**.
2. As client's requirement, test modes are presented in the report as below.

| Mode                                 | Model No.    | Input Voltage | Output Voltage | Test Condition                            |
|--------------------------------------|--------------|---------------|----------------|---|
| Conducted emission test              |              |               |                |   |
| 1                                    | TRI 1-0511SM | 5Vdc          | 5              | Full Load without<br>Solution Fixed Board |
| 2                                    | TRI 1-0523SM | 5Vdc          | 15             |   |
| 3                                    | TRI 1-1211SM | 12Vdc         | 5              |   |
| 4                                    | TRI 1-1223SM | 12Vdc         | 15             |   |
| 5                                    | TRI 1-2411SM | 24Vdc         | 5              |   |
| Radiated emission, EFT & Surge tests |              |               |                |   |
| 1                                    | TRI 1-0511SM | 5Vdc          | 5              | Full Load with Solution<br>Fixed Board    |
| 2                                    | TRI 1-0523SM | 5Vdc          | 15             |   |
| 3                                    | TRI 1-1211SM | 12Vdc         | 5              |   |
| 4                                    | TRI 1-1223SM | 12Vdc         | 15             |   |
| 5                                    | TRI 1-2411SM | 24Vdc         | 5              |   |
| ESD, RS, CS, Magnetic tests          |              |               |                |   |
| 3                                    | TRI 1-1211SM | 12Vdc         | 5              | Full Load without<br>Solution Fixed Board |

### 3.4 Test Program Used and Operation Descriptions

#### ◆ For Conducted & Radiated tests:

Set the EUT under full load.

#### ◆ For Immunity tests:

Connected a resistor load to DC output port of EUT to make EUT have maximum power consumption and a multimeter was used to monitor voltage of output.

### 3.5 Primary Clock Frequencies of Internal Source

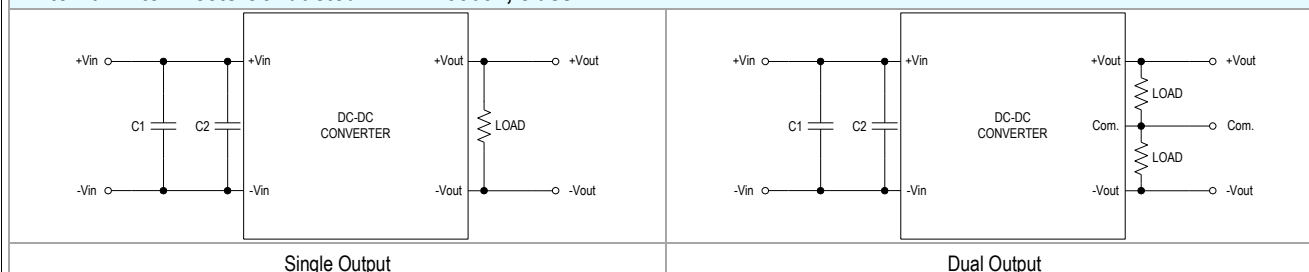
The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 110kHz, provided by TRACO ELECTRONIC AG, for detailed internal source, please refer to the manufacturer's specifications.

### 3.6 Package Specifications by Manufacturer

#### ➤ Conduction Solution

**TRI 1-SM Series meet EN 55032 Radiated Emissions Class A without external components.**

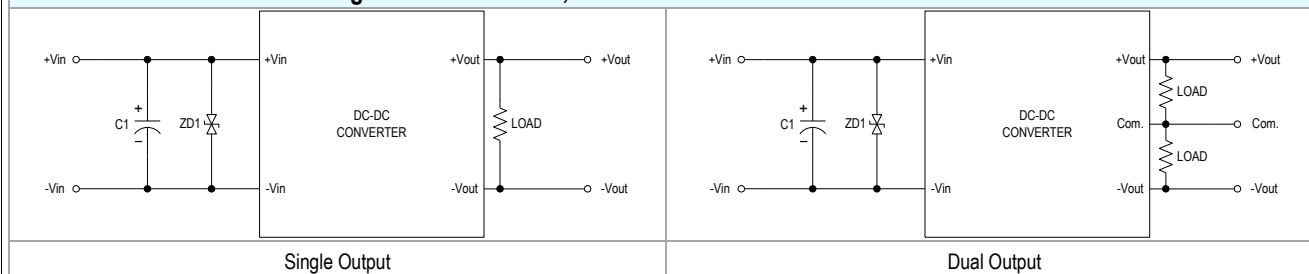
**External Filter meets Conducted EMI EN 55032, class A**



| Model   | Class A              |                      |
|---|----------------------|----------------------|
|   | C1                   | C2                   |
| TRI 1-0511SM, TRI 1-0512SM, TRI 1-0513SM,<br>TRI 1-0522SM, TRI 1-0523SM | 68μF/10V<br>1206 NPO | ---                  |
| TRI 1-1211SM, TRI 1-1212SM, TRI 1-1213SM,<br>TRI 1-1222SM, TRI 1-1223SM | 47μF/25V<br>1206 X5R | 47μF/25V<br>1206 X5R |
| TRI 1-2411SM, TRI 1-2412SM, TRI 1-2413SM,<br>TRI 1-2422SM, TRI 1-2423SM | 22μF/35V<br>1206 X5R | 22μF/35V<br>1206 X5R |

#### ➤ EFT & Surge Solution

**External Filter meets EFT & Surge EMS EN 55024/35, criteria A**

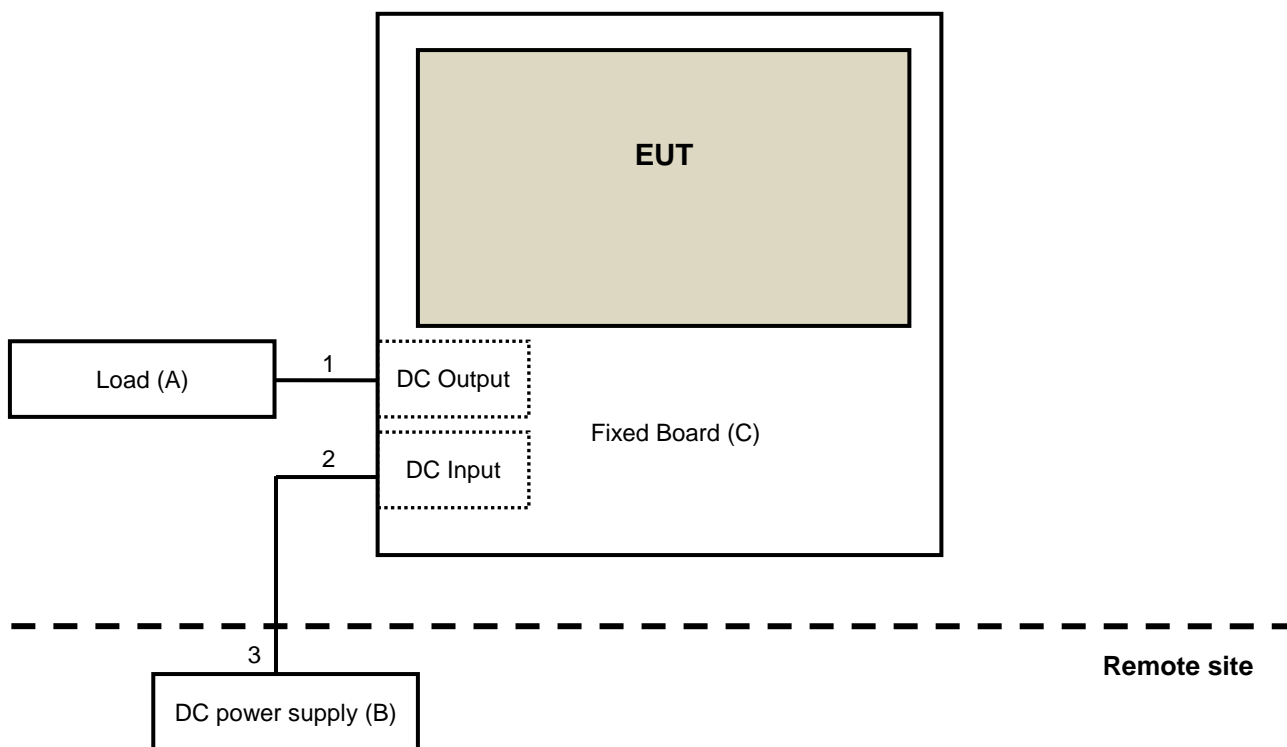


| Model   | Criteria A                        |                        |
|---|-----------------------------------|------------------------|
|   | C1                                | ZD1                    |
| TRI 1-0511SM, TRI 1-0512SM, TRI 1-0513SM,<br>TRI 1-0522SM, TRI 1-0523SM | 3900μF/10V<br>CHEMI-CON KY Series | 1.5KE7.5CA (TVS Diode) |
| TRI 1-1211SM, TRI 1-1212SM, TRI 1-1213SM,<br>TRI 1-1222SM, TRI 1-1223SM | 2200μF/16V<br>CHEMI-CON KY Series | 1.5KE18CA (TVS Diode)  |
| TRI 1-2411SM, TRI 1-2412SM, TRI 1-2413SM,<br>TRI 1-2422SM, TRI 1-2423SM | 470μF/50V<br>CHEMI-CON KY Series  | ---                    |

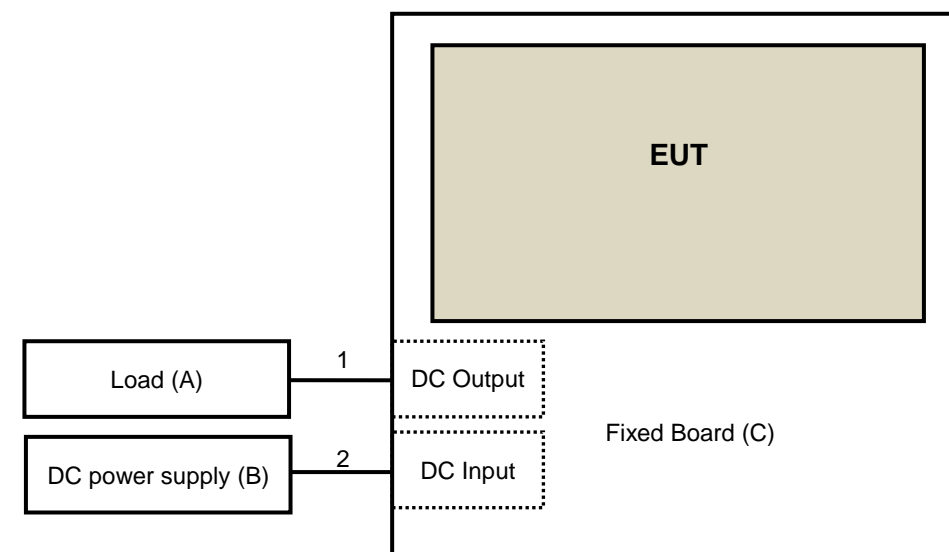
## 4 Configuration and Connections with EUT

### 4.1 Connection Diagram of EUT and Peripheral Devices

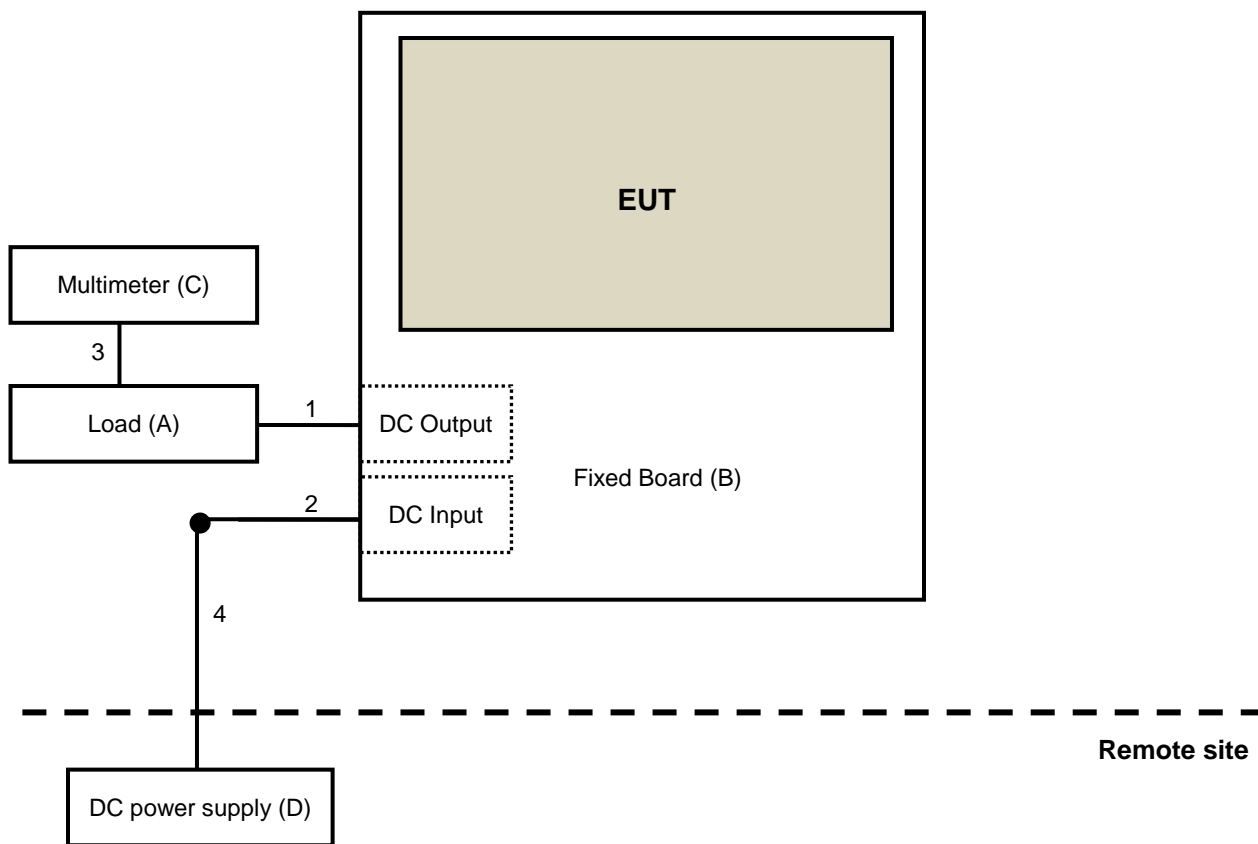
For Conducted emission test



For Radiated emission



Immunity tests:



## 4.2 Configuration of Peripheral Devices and Cable Connections

### Emission tests:

| ID | Product         | Brand    | Model No. | Serial No. | FCC ID | Remarks            |
|----|-----------------|----------|-----------|------------|--------|--------------------|
| A. | Load            | N/A      | N/A       | N/A        | N/A    | Supplied by client |
| B. | DC Power Supply | GWINSTEK | GPC-6030D | N/A        | N/A    | Supplied by client |
| C. | Fixed Board     | N/A      | N/A       | N/A        | N/A    | Supplied by client |

Note: All power cords of the above support units are non-shielded (1.8m).

| ID | Cable Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|--------------------|------|------------|--------------------|--------------|--------------------|
| 1. | DC power cable     | 1    | 0.2        | N                  | 0            | Supplied by client |
| 2. | DC power cable     | 1    | 0.25       | N                  | 0            | Supplied by client |
| 3. | DC power cable     | 1    | 10         | N                  | 0            | Provided by Lab    |

Note: The core(s) is(are) originally attached to the cable(s).

### Immunity tests:

| ID | Product         | Brand  | Model No.   | Serial No.   | FCC ID | Remarks            |
|----|-----------------|--------|-------------|--------------|--------|--------------------|
| A. | Load            | N/A    | N/A         | N/A          | N/A    | Supplied by client |
| B. | Fixed Board     | N/A    | N/A         | N/A          | N/A    | Supplied by client |
| C. | Multimeter      | YFE    | YF-370A     | N/A          | N/A    | Provided by Lab    |
| D. | DC Power Supply | CHROMA | 62150H-600S | 62150EC00672 | N/A    | Supplied by client |

Note: All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions   | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|----------------|------|------------|--------------------|--------------|--------------------|
| 1. | DC power cable | 1    | 0.2        | N                  | 0            | Supplied by client |
| 2. | DC power cable | 1    | 0.25       | N                  | 0            | Supplied by client |
| 3. | Data cable     | 1    | 0.6        | N                  | 0            | Provided by Lab    |
| 4. | DC power cable | 1    | 10         | N                  | 0            | Provided by Lab    |

Note: The core(s) is(are) originally attached to the cable(s).

## 5 Conducted Emission from the Mains Power Port

### 5.1 Limits

| Class A               |                 |                           |               |
|-----------------------|-----------------|---------------------------|---------------|
| Frequency range (MHz) | Coupling device | Detector type / bandwidth | Limits (dBuV) |
| 0.15 - 0.5            | AMN             | Quasi-peak / 9kHz         | 79            |
| 0.5 - 30.0            |                 |                           | 73            |
| 0.15 - 0.5            |                 | Average / 9kHz            | 66            |
| 0.5 - 30.0            |                 |                           | 60            |
| Class B               |                 |                           |               |
| Frequency range (MHz) | Coupling device | Detector type / bandwidth | Limits (dBuV) |
| 0.15 - 0.5            | AMN             | Quasi-peak / 9kHz         | 66 - 56       |
| 0.5 - 5               |                 |                           | 56            |
| 5 - 30.0              |                 |                           | 60            |
| 0.15 - 0.5            |                 | Average / 9kHz            | 56 - 46       |
| 0.5 - 5               |                 |                           | 46            |
| 5 - 30.0              |                 |                           | 50            |

Notes: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 5.2 Test Instruments

| Description & Manufacturer                                       | Model No.     | Serial No.   | Cal. Date     | Cal. Due      |
|--|---------------|--------------|---------------|---------------|
| ROHDE & SCHWARZ<br>TEST RECEIVER                                 | ESCS 30       | 100288       | Dec. 30, 2019 | Dec. 29, 2020 |
| ROHDE & SCHWARZ<br>Artificial Mains Network (for EUT)            | ENV216        | 101197       | Jun. 10, 2020 | Jun. 9, 2021  |
| LISN With Adapter (for EUT)                                      | 101197        | NA           | Jun. 10, 2020 | Jun. 9, 2021  |
| ROHDE & SCHWARZ<br>Artificial Mains Network<br>(for peripherals) | ESH3-Z5       | 100218       | Nov. 24, 2019 | Nov. 23, 2020 |
| SCHWARZBECK<br>Artificial Mains Network (For EUT)                | NNLK8129      | 8129229      | May 14, 2020  | May 13, 2021  |
| SCHWARZBECK<br>Artificial Mains Network<br>(for EUT)             | NNLK 8121     | 8121-808     | Apr. 10, 2020 | Apr. 9, 2021  |
| Software   | Cond_V7.3.7.4 | NA           | NA            | NA            |
| RF cable (JYEBAO)<br>With 10dB PAD                               | 5D-FB         | Cable-C10.01 | Feb. 12, 2020 | Feb. 11, 2021 |
| LYNICS Terminator<br>(For ROHDE & SCHWARZ LISN)                  | 0900510       | E1-011484    | May 26, 2020  | May 25, 2021  |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in Shielded Room No. 10. (Conduction 10)

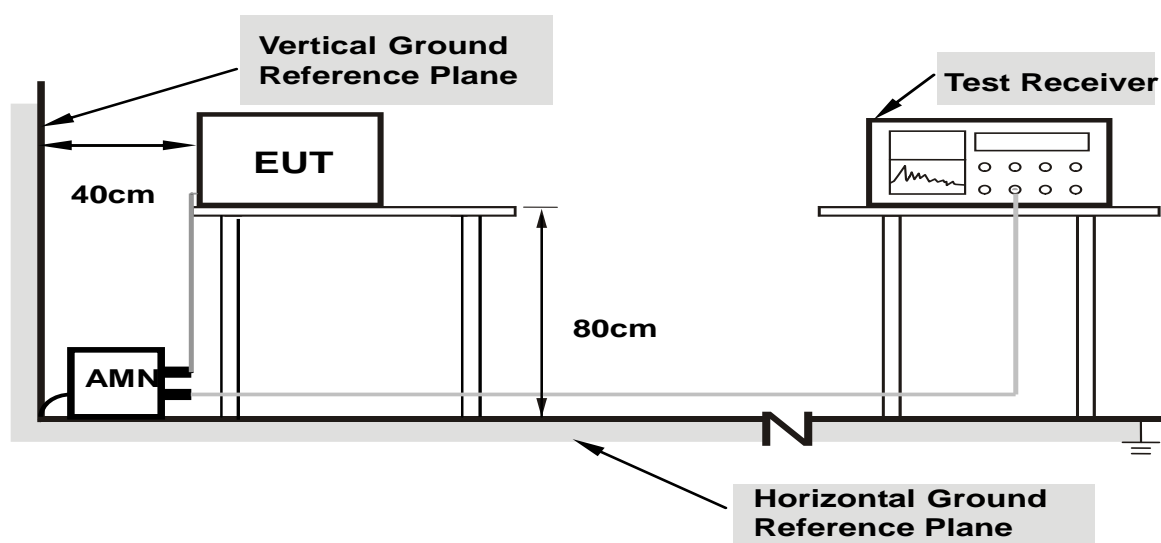
3. The VCCI Site Registration No. C-11852.

4. Tested Date: Nov. 2, 2020

### 5.3 Test Arrangement

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through an Artificial Mains Network (AMN). Other support units were connected to the power mains through another AMN. The two AMNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



- Note:**
1. Support units were connected to second AMN.
  2. The distance specified between EUT/AE and other metallic objects is  $\geq 0.8$  m in the measurement arrangement for table-top EUT.
  3. Cable on the RGP must to be insulated.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



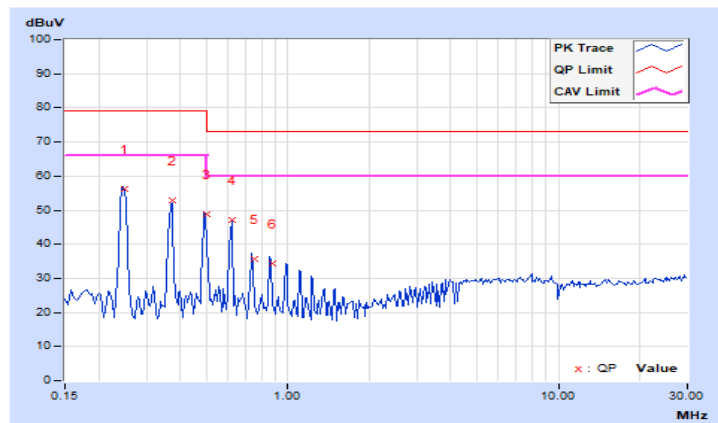
#### 5.4 Test Results

|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 5Vdc           | Environmental Conditions                 | 24°C, 74%RH, 1006mbar                |
| Tested by       | ED. Lin        | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 1         |  |                                      |

| Phase Of Power : Positive (+) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.25021         | 10.03                  | 46.12                | 46.06 | 56.15                 | 56.09 | 79.00        | 66.00 | -22.85      | -9.91  |
| 2                             | 0.37521         | 10.04                  | 42.71                | 42.43 | 52.75                 | 52.47 | 79.00        | 66.00 | -26.25      | -13.53 |
| 3                             | 0.50355         | 10.05                  | 38.66                | 38.36 | 48.71                 | 48.41 | 73.00        | 60.00 | -24.29      | -11.59 |
| 4                             | 0.62492         | 10.06                  | 36.96                | 36.64 | 47.02                 | 46.70 | 73.00        | 60.00 | -25.98      | -13.30 |
| 5                             | 0.75554         | 10.07                  | 25.71                | 25.47 | 35.78                 | 35.54 | 73.00        | 60.00 | -37.22      | -24.46 |
| 6                             | 0.88171         | 10.08                  | 24.25                | 24.11 | 34.33                 | 34.19 | 73.00        | 60.00 | -38.67      | -25.81 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

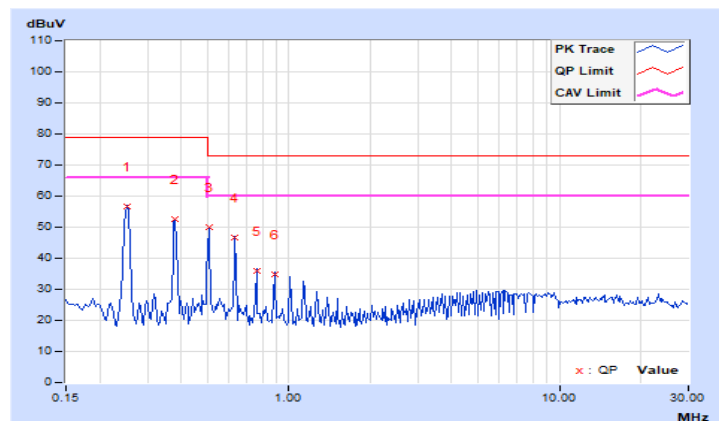


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 5Vdc           | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | ED. Lin        | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 1         |  |                                      |

| Phase Of Power : Negative (-) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.25404         | 10.01                  | 46.62                | 46.60 | 56.63                 | 56.61 | 79.00        | 66.00 | -22.37      | -9.39  |
| 2                             | 0.38047         | 10.02                  | 42.43                | 42.07 | 52.45                 | 52.09 | 79.00        | 66.00 | -26.55      | -13.91 |
| 3                             | 0.50547         | 10.03                  | 39.98                | 39.84 | 50.01                 | 49.87 | 73.00        | 60.00 | -22.99      | -10.13 |
| 4                             | 0.63302         | 10.04                  | 36.80                | 36.78 | 46.84                 | 46.82 | 73.00        | 60.00 | -26.16      | -13.18 |
| 5                             | 0.75938         | 10.06                  | 25.77                | 25.57 | 35.83                 | 35.63 | 73.00        | 60.00 | -37.17      | -24.37 |
| 6                             | 0.88692         | 10.07                  | 24.85                | 24.73 | 34.92                 | 34.80 | 73.00        | 60.00 | -38.08      | -25.20 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

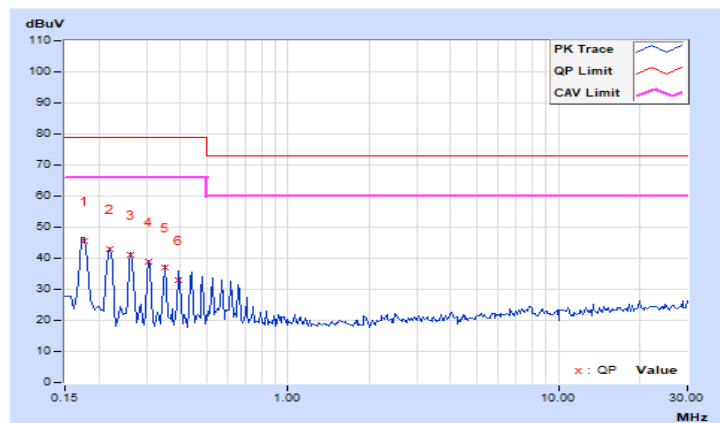


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 5Vdc           | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | Borg Wang      | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 2         |  |                                      |

| Phase Of Power : Positive (+) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.17734         | 10.02                  | 35.55                | 35.43 | 45.57                 | 45.45 | 79.00        | 66.00 | -33.43      | -20.55 |
| 2                             | 0.22031         | 10.02                  | 32.99                | 32.91 | 43.01                 | 42.93 | 79.00        | 66.00 | -35.99      | -23.07 |
| 3                             | 0.26328         | 10.03                  | 30.96                | 30.85 | 40.99                 | 40.88 | 79.00        | 66.00 | -38.01      | -25.12 |
| 4                             | 0.30625         | 10.03                  | 28.81                | 28.78 | 38.84                 | 38.81 | 79.00        | 66.00 | -40.16      | -27.19 |
| 5                             | 0.34922         | 10.03                  | 27.15                | 27.11 | 37.18                 | 37.14 | 79.00        | 66.00 | -41.82      | -28.86 |
| 6                             | 0.39609         | 10.04                  | 22.75                | 22.64 | 32.79                 | 32.68 | 79.00        | 66.00 | -46.21      | -33.32 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

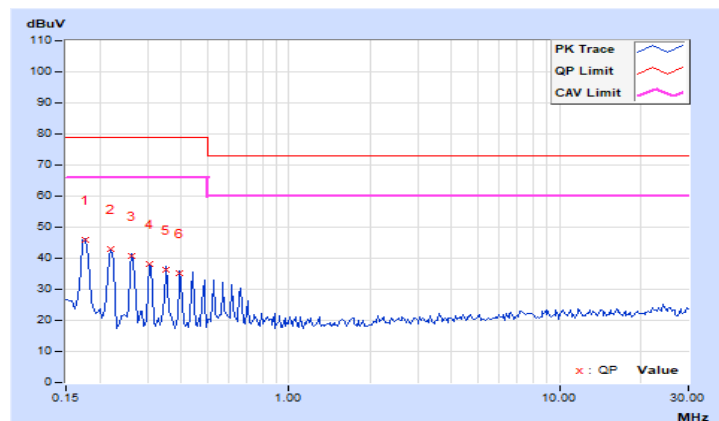


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 5Vdc           | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | Borg Wang      | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 2         |  |                                      |

| Phase Of Power : Negative (-) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.17734         | 10.01                  | 35.93                | 35.69 | 45.94                 | 45.70 | 79.00        | 66.00 | -33.06      | -20.30 |
| 2                             | 0.22031         | 10.01                  | 33.03                | 32.99 | 43.04                 | 43.00 | 79.00        | 66.00 | -35.96      | -23.00 |
| 3                             | 0.26328         | 10.01                  | 30.79                | 30.71 | 40.80                 | 40.72 | 79.00        | 66.00 | -38.20      | -25.28 |
| 4                             | 0.30625         | 10.02                  | 28.12                | 28.00 | 38.14                 | 38.02 | 79.00        | 66.00 | -40.86      | -27.98 |
| 5                             | 0.35313         | 10.02                  | 26.43                | 26.41 | 36.45                 | 36.43 | 79.00        | 66.00 | -42.55      | -29.57 |
| 6                             | 0.39609         | 10.02                  | 25.16                | 25.04 | 35.18                 | 35.06 | 79.00        | 66.00 | -43.82      | -30.94 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

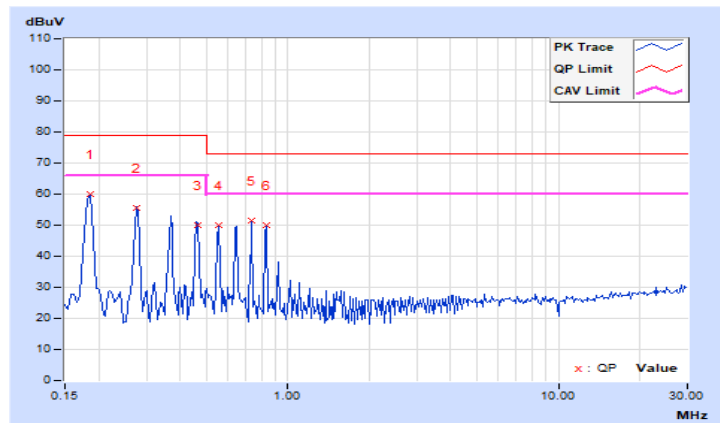


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 12Vdc          | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | ED. Lin        | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 3         |  |                                      |

| Phase Of Power : Positive (+) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.18516         | 10.02                  | 49.85                | 49.71 | 59.87                 | 59.73 | 79.00        | 66.00 | -19.13      | -6.27  |
| 2                             | 0.27500         | 10.03                  | 45.64                | 45.30 | 55.67                 | 55.33 | 79.00        | 66.00 | -23.33      | -10.67 |
| 3                             | 0.46250         | 10.05                  | 39.87                | 39.49 | 49.92                 | 49.54 | 79.00        | 66.00 | -29.08      | -16.46 |
| 4                             | 0.55234         | 10.05                  | 39.96                | 39.62 | 50.01                 | 49.67 | 73.00        | 60.00 | -22.99      | -10.33 |
| 5                             | 0.73849         | 10.07                  | 41.38                | 41.00 | 51.45                 | 51.07 | 73.00        | 60.00 | -21.55      | -8.93  |
| 6                             | 0.82969         | 10.08                  | 39.93                | 39.63 | 50.01                 | 49.71 | 73.00        | 60.00 | -22.99      | -10.29 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

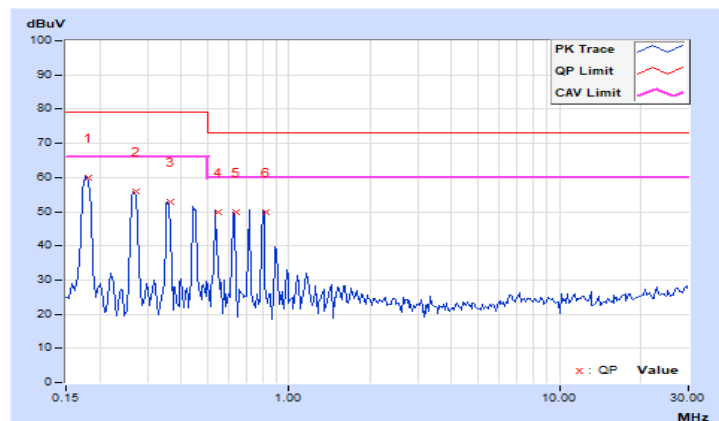


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 12Vdc          | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | ED. Lin        | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 3         |  |                                      |

| Phase Of Power : Negative (-) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.18249         | 10.01                  | 49.85                | 49.75 | 59.86                 | 59.76 | 79.00        | 66.00 | -19.14      | -6.24  |
| 2                             | 0.27355         | 10.01                  | 45.82                | 45.80 | 55.83                 | 55.81 | 79.00        | 66.00 | -23.17      | -10.19 |
| 3                             | 0.36393         | 10.02                  | 42.93                | 42.91 | 52.95                 | 52.93 | 79.00        | 66.00 | -26.05      | -13.07 |
| 4                             | 0.55060         | 10.04                  | 39.80                | 39.66 | 49.84                 | 49.70 | 73.00        | 60.00 | -23.16      | -10.30 |
| 5                             | 0.64099         | 10.04                  | 39.72                | 39.68 | 49.76                 | 49.72 | 73.00        | 60.00 | -23.24      | -10.28 |
| 6                             | 0.82312         | 10.06                  | 39.91                | 39.09 | 49.97                 | 49.15 | 73.00        | 60.00 | -23.03      | -10.85 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

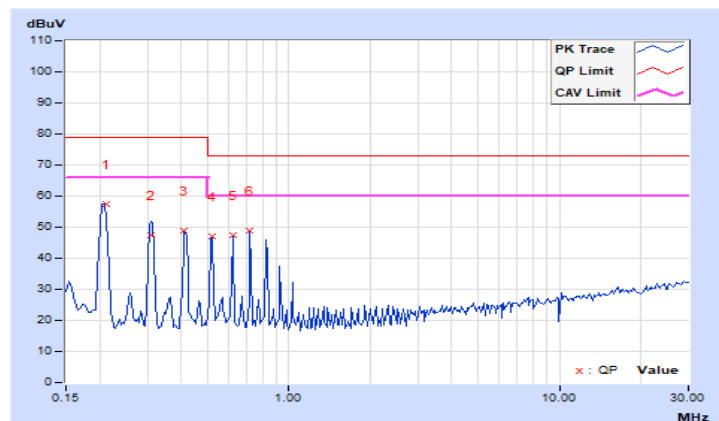


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 12Vdc          | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | Borg Wang      | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 4         |  |                                      |

| Phase Of Power : Positive (+) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.21114         | 10.02                  | 47.42                | 47.14 | 57.44                 | 57.16 | 79.00        | 66.00 | -21.56      | -8.84  |
| 2                             | 0.31016         | 10.03                  | 37.54                | 37.49 | 47.57                 | 47.52 | 79.00        | 66.00 | -31.43      | -18.48 |
| 3                             | 0.41188         | 10.04                  | 38.71                | 38.37 | 48.75                 | 48.41 | 79.00        | 66.00 | -30.25      | -17.59 |
| 4                             | 0.52168         | 10.05                  | 37.14                | 36.86 | 47.19                 | 46.91 | 73.00        | 60.00 | -25.81      | -13.09 |
| 5                             | 0.61908         | 10.06                  | 37.28                | 37.00 | 47.34                 | 47.06 | 73.00        | 60.00 | -25.66      | -12.94 |
| 6                             | 0.71826         | 10.07                  | 38.96                | 38.86 | 49.03                 | 48.93 | 73.00        | 60.00 | -23.97      | -11.07 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

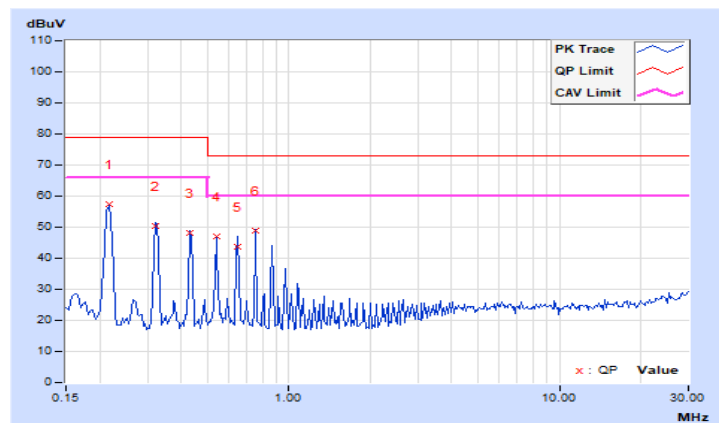


|                 |                |  |                                      |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 12Vdc          | Environmental Conditions                 | 23°C, 63%RH, 1006mbar                |
| Tested by       | Borg Wang      | Test Date                                | 2020/11/2                            |
| Test Mode       | Mode 4         |  |                                      |

| Phase Of Power : Negative (-) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.21641         | 10.01                  | 47.33                | 47.24 | 57.34                 | 57.25 | 79.00        | 66.00 | -21.66      | -8.75  |
| 2                             | 0.32188         | 10.02                  | 40.37                | 40.29 | 50.39                 | 50.31 | 79.00        | 66.00 | -28.61      | -15.69 |
| 3                             | 0.43125         | 10.02                  | 38.04                | 38.00 | 48.06                 | 48.02 | 79.00        | 66.00 | -30.94      | -17.98 |
| 4                             | 0.54063         | 10.03                  | 37.01                | 36.88 | 47.04                 | 46.91 | 73.00        | 60.00 | -25.96      | -13.09 |
| 5                             | 0.64609         | 10.04                  | 33.57                | 33.51 | 43.61                 | 43.55 | 73.00        | 60.00 | -29.39      | -16.45 |
| 6                             | 0.75547         | 10.06                  | 38.98                | 38.72 | 49.04                 | 48.78 | 73.00        | 60.00 | -23.96      | -11.22 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



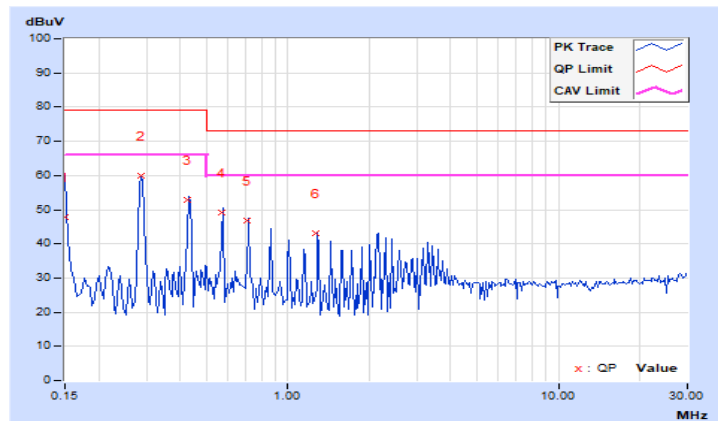


|                        |                |   |                                      |
|------------------------|----------------|---|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
| <b>Input Power</b>     | 24Vdc          | <b>Environmental Conditions</b>                     | 24°C, 74%RH, 1006mbar                |
| <b>Tested by</b>       | ED. Lin        | <b>Test Date</b>                                    | 2020/11/2                            |
| <b>Test Mode</b>       | Mode 5         |   |                                      |

| Phase Of Power : Positive (+) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.15000         | 10.01                  | 37.77                | 37.35 | 47.78                 | 47.36 | 79.00        | 66.00 | -31.22      | -18.64 |
| 2                             | 0.28672         | 10.03                  | 49.80                | 49.54 | 59.83                 | 59.57 | 79.00        | 66.00 | -19.17      | -6.43  |
| 3                             | 0.42743         | 10.04                  | 42.68                | 42.28 | 52.72                 | 52.32 | 79.00        | 66.00 | -26.28      | -13.68 |
| 4                             | 0.56815         | 10.05                  | 39.08                | 38.74 | 49.13                 | 48.79 | 73.00        | 60.00 | -23.87      | -11.21 |
| 5                             | 0.71078         | 10.07                  | 36.73                | 36.37 | 46.80                 | 46.44 | 73.00        | 60.00 | -26.20      | -13.56 |
| 6                             | 1.27583         | 10.09                  | 32.85                | 32.45 | 42.94                 | 42.54 | 73.00        | 60.00 | -30.06      | -17.46 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

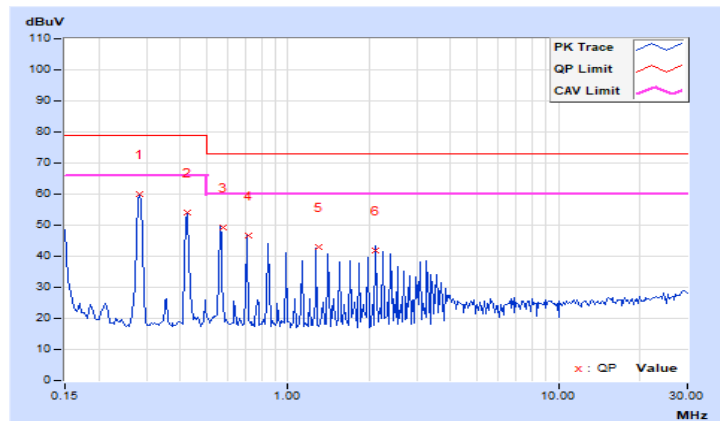


|                        |                |   |                                      |
|------------------------|----------------|---|--------------------------------------|
| <b>Frequency Range</b> | 150kHz ~ 30MHz | <b>Detector Function &amp; Resolution Bandwidth</b> | Quasi-Peak (QP) / Average (AV), 9kHz |
| <b>Input Power</b>     | 24Vdc          | <b>Environmental Conditions</b>                     | 23°C, 63%RH, 1006mbar                |
| <b>Tested by</b>       | ED. Lin        | <b>Test Date</b>                                    | 2020/11/2                            |
| <b>Test Mode</b>       | Mode 5         |   |                                      |

| Phase Of Power : Negative (-) |                 |                        |                      |       |                       |       |              |       |             |        |
|-------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                            | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                               |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                             | 0.28463         | 10.01                  | 49.96                | 49.70 | 59.97                 | 59.71 | 79.00        | 66.00 | -19.03      | -6.29  |
| 2                             | 0.42781         | 10.02                  | 43.96                | 43.62 | 53.98                 | 53.64 | 79.00        | 66.00 | -25.02      | -12.36 |
| 3                             | 0.57350         | 10.04                  | 39.14                | 39.02 | 49.18                 | 49.06 | 73.00        | 60.00 | -23.82      | -10.94 |
| 4                             | 0.71848         | 10.05                  | 36.60                | 36.35 | 46.65                 | 46.40 | 73.00        | 60.00 | -26.35      | -13.60 |
| 5                             | 1.30510         | 10.09                  | 32.98                | 32.63 | 43.07                 | 42.72 | 73.00        | 60.00 | -29.93      | -17.28 |
| 6                             | 2.10575         | 10.10                  | 31.92                | 31.74 | 42.02                 | 41.84 | 73.00        | 60.00 | -30.98      | -18.16 |

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



## 6 Radiated Emission at Frequencies up to 1GHz

### 6.1 Limits

| Class A                  |                 |                            |           |
|--------------------------|-----------------|----------------------------|-----------|
| Frequency range<br>(MHz) | Distance<br>(m) | Limits<br>(dBuV/m)         |           |
| 30 - 230                 | 10              | 40                         |           |
| 230 - 1000               |                 | 47                         |           |
| 30 - 230                 | 3               | 50                         |           |
| 230 - 1000               |                 | 57                         |           |
| Class B                  |                 |                            |           |
| Frequency range<br>(MHz) | Distance<br>(m) | Limits<br>(dBuV/m)         |           |
| 30 - 230                 | 10              | 30                         |           |
| 230 - 1000               |                 | 37                         |           |
| 30 - 230                 | 3               | 40                         |           |
| 230 - 1000               |                 | 47                         |           |
| FM Receivers             |                 |                            |           |
| Frequency range<br>(MHz) | Distance<br>(m) | Class B limits<br>(dBuV/m) |           |
|                          |                 | Fundamental                | Harmonics |
| 30 - 230                 | 10              | 50                         | 42        |
| 230 - 300                |                 |                            | 42        |
| 300 - 1000               |                 |                            | 46        |
| 30 - 230                 | 3               | 60                         | 52        |
| 230 - 300                |                 |                            | 52        |
| 300 - 1000               |                 |                            | 56        |

These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4 of EN 55032.

Note: The lower limit shall apply at the transition frequencies.

## 6.2 Test Instruments

| Description & Manufacturer      | Model No.        | Serial No.      | Cal. Date     | Cal. Due      |
|---------------------------------|------------------|-----------------|---------------|---------------|
| EMCI Preamplifier               | EMC9135          | 980326          | Feb. 19, 2020 | Feb. 18, 2021 |
| EMCI Preamplifier               | EMC9135          | 980327          | Feb. 19, 2020 | Feb. 18, 2021 |
| Agilent Test Receiver           | N9038A           | MY51210137      | Jun. 4, 2020  | Jun. 3, 2021  |
| Agilent Test Receiver           | N9038A           | MY51210114      | Jan. 20, 2020 | Jan. 19, 2021 |
| Schwarzbeck Antenna             | VULB9168         | 9168-316        | Nov. 11, 2019 | Nov. 10, 2020 |
| Schwarzbeck Antenna             | VULB9168         | 9168-317        | Nov. 11, 2019 | Nov. 10, 2020 |
| Max Full. Turn Table & Tower    | MF7802           | MF7802121       | NA            | NA            |
| Max Full. Tower                 | MF7802           | MF780208105     | NA            | NA            |
| Software                        | Radiated_V8.7.08 | NA              | NA            | NA            |
| JYEBAO RF cable<br>With 5dB PAD | LMR-600          | CABLE-CH8-01.V  | Sep. 25, 2020 | Sep. 24, 2021 |
| JYEBAO RF cable<br>With 5dB PAD | LMR-600          | CABLE-CH8-02.H  | Sep. 25, 2020 | Sep. 24, 2021 |
| WOKEN RF cable<br>With 5dB PAD  | 8D               | CABLE-CH8-03.3M | Sep. 25, 2020 | Sep. 24, 2021 |

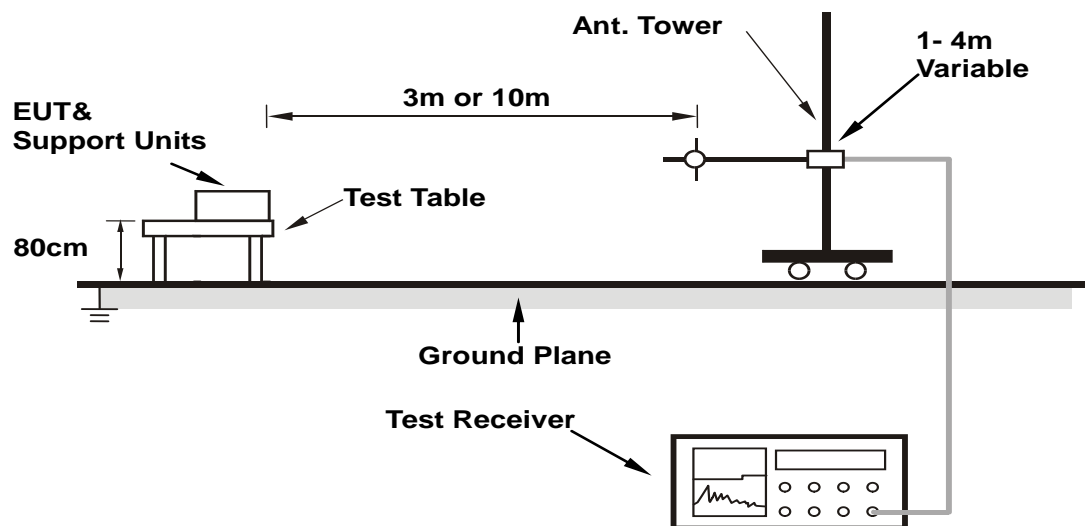
Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in Chamber No. 8.  
3. The VCCI Site Registration No. R-12946.  
4. Tested Date: Nov. 3, 2020

### 6.3 Test Arrangement

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.
- The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

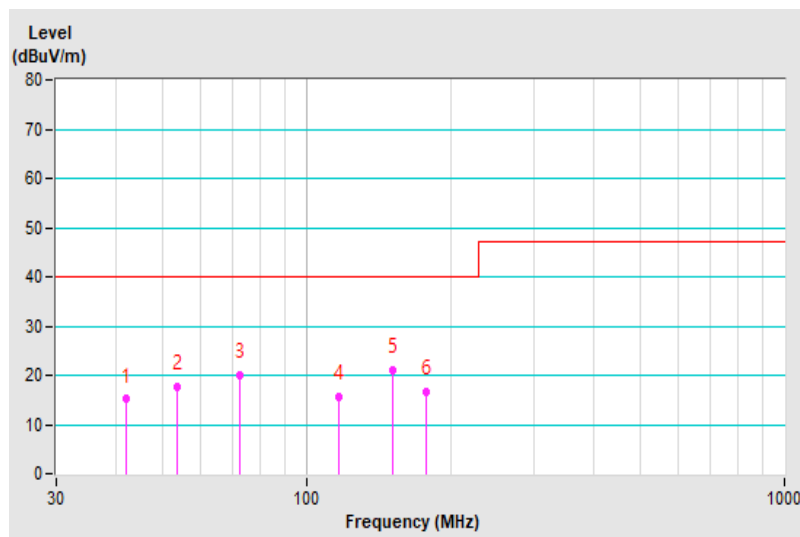
#### 6.4 Test Results

|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 5Vdc         | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 1       |  |                           |

| Antenna Polarity & Test Distance : Horizontal at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 41.86           | 15.09 QP                | 40.00          | -24.91      | 2.96 H             | 74                   | 32.37            | -17.28                   |
| 2   | 53.74           | 17.70 QP                | 40.00          | -22.30      | 1.56 H             | 73                   | 34.65            | -16.95                   |
| 3   | 72.41           | 20.06 QP                | 40.00          | -19.94      | 3.84 H             | 250                  | 39.52            | -19.46                   |
| 4   | 117.30          | 15.72 QP                | 40.00          | -24.28      | 3.96 H             | 56                   | 33.98            | -18.26                   |
| 5   | 151.25          | 20.95 QP                | 40.00          | -19.05      | 1.11 H             | 54                   | 36.55            | -15.60                   |
| 6   | 177.85          | 16.76 QP                | 40.00          | -23.24      | 2.20 H             | 80                   | 33.50            | -16.74                   |

#### Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

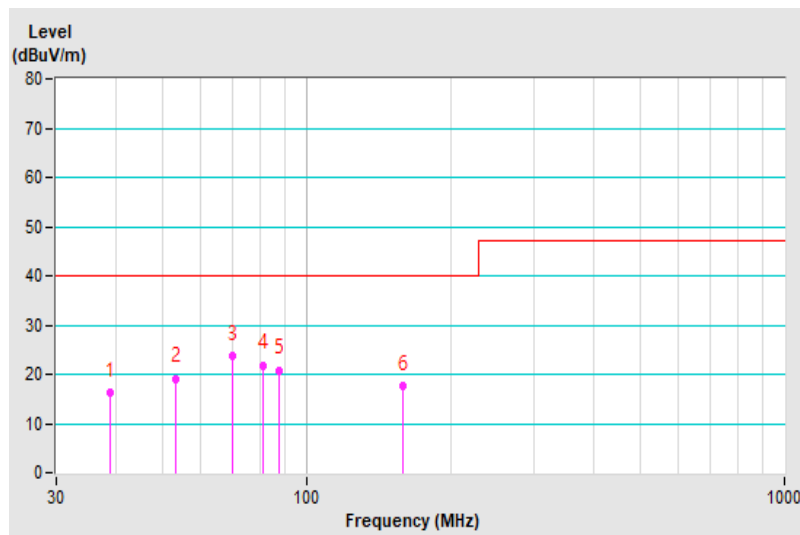


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 5Vdc         | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 1       |  |                           |

| Antenna Polarity & Test Distance : Vertical at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 38.92           | 16.17 QP                | 40.00          | -23.83      | 1.05 V             | 54                   | 34.72            | -18.55                   |
| 2   | 53.28           | 18.97 QP                | 40.00          | -21.03      | 2.74 V             | 282                  | 36.62            | -17.65                   |
| 3   | 70.33           | 23.61 QP                | 40.00          | -16.39      | 2.35 V             | 336                  | 43.31            | -19.70                   |
| 4   | 81.14           | 21.66 QP                | 40.00          | -18.34      | 3.58 V             | 260                  | 43.87            | -22.21                   |
| 5   | 87.72           | 20.60 QP                | 40.00          | -19.40      | 2.00 V             | 244                  | 43.50            | -22.90                   |
| 6   | 159.47          | 17.49 QP                | 40.00          | -22.51      | 1.93 V             | 104                  | 33.83            | -16.34                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

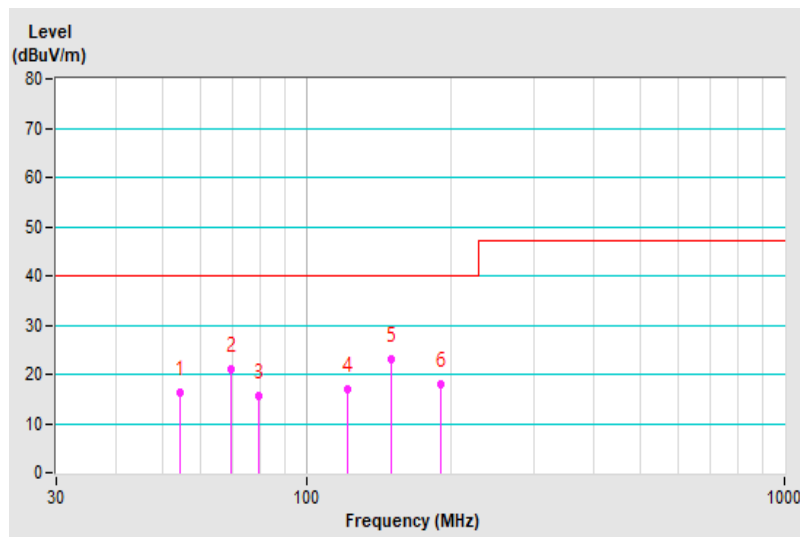


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 5Vdc         | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 2       |  |                           |

| Antenna Polarity & Test Distance : Horizontal at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 54.44           | 16.43 QP                | 40.00          | -23.57      | 4.00 H             | 91                   | 33.44            | -17.01                   |
| 2   | 69.70           | 21.15 QP                | 40.00          | -18.85      | 2.58 H             | 284                  | 40.03            | -18.88                   |
| 3   | 79.47           | 15.52 QP                | 40.00          | -24.48      | 1.03 H             | 241                  | 36.56            | -21.04                   |
| 4   | 122.32          | 16.92 QP                | 40.00          | -23.08      | 3.40 H             | 253                  | 34.72            | -17.80                   |
| 5   | 150.43          | 23.06 QP                | 40.00          | -16.94      | 2.70 H             | 74                   | 38.66            | -15.60                   |
| 6   | 191.34          | 18.03 QP                | 40.00          | -21.97      | 3.97 H             | 60                   | 36.25            | -18.22                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



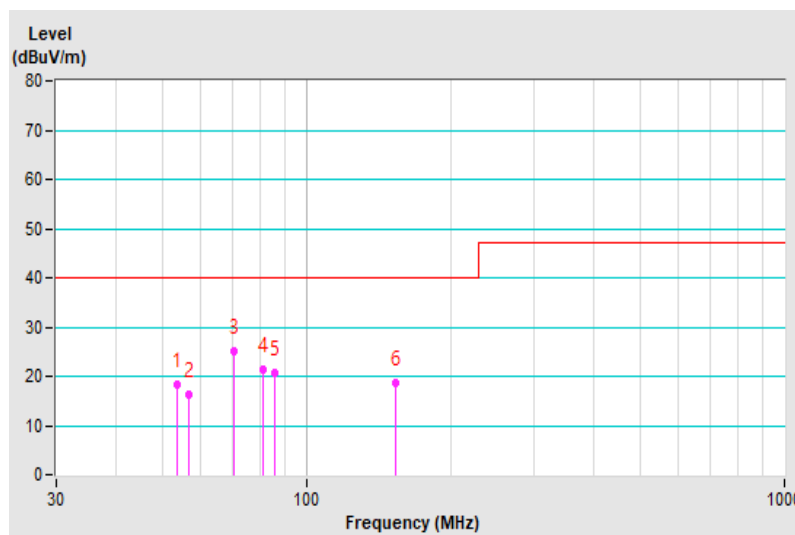


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 5Vdc         | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 2       |  |                           |

| Antenna Polarity & Test Distance : Vertical at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 53.69           | 18.32 QP                | 40.00          | -21.68      | 1.05 V             | 297                  | 36.03            | -17.71                   |
| 2   | 56.72           | 16.30 QP                | 40.00          | -23.70      | 2.11 V             | 142                  | 34.22            | -17.92                   |
| 3   | 70.69           | 25.20 QP                | 40.00          | -14.80      | 3.54 V             | 356                  | 44.94            | -19.74                   |
| 4   | 81.26           | 21.28 QP                | 40.00          | -18.72      | 1.82 V             | 332                  | 43.51            | -22.23                   |
| 5   | 86.07           | 20.71 QP                | 40.00          | -19.29      | 2.76 V             | 332                  | 43.62            | -22.91                   |
| 6   | 153.97          | 18.76 QP                | 40.00          | -21.24      | 1.00 V             | 140                  | 35.08            | -16.32                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

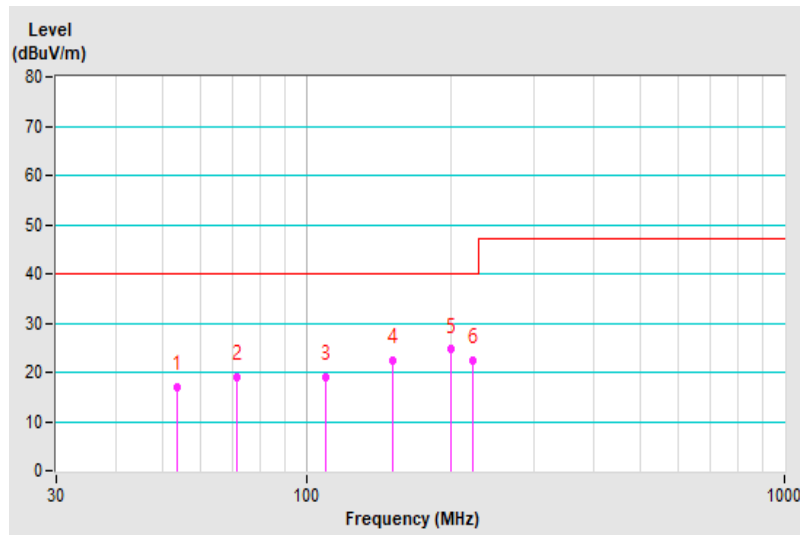


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 12Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 3       |  |                           |

| Antenna Polarity & Test Distance : Horizontal at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 53.77           | 16.91 QP                | 40.00          | -23.09      | 2.87 H             | 79                   | 33.86            | -16.95                   |
| 2   | 71.69           | 18.97 QP                | 40.00          | -21.03      | 3.35 H             | 259                  | 38.22            | -19.25                   |
| 3   | 109.78          | 19.14 QP                | 40.00          | -20.86      | 3.81 H             | 58                   | 38.28            | -19.14                   |
| 4   | 151.15          | 22.48 QP                | 40.00          | -17.52      | 1.23 H             | 62                   | 38.09            | -15.61                   |
| 5   | 200.26          | 24.66 QP                | 40.00          | -15.34      | 3.94 H             | 210                  | 43.39            | -18.73                   |
| 6   | 223.35          | 22.46 QP                | 40.00          | -17.54      | 1.87 H             | 81                   | 40.94            | -18.48                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

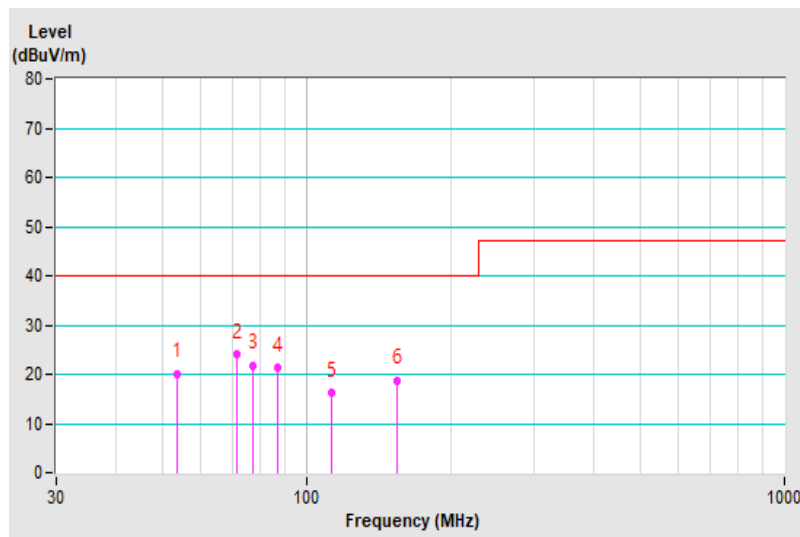


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 12Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 3       |  |                           |

| Antenna Polarity & Test Distance : Vertical at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 53.52           | 20.03 QP                | 40.00          | -19.97      | 1.07 V             | 204                  | 37.72            | -17.69                   |
| 2   | 71.76           | 23.92 QP                | 40.00          | -16.08      | 1.66 V             | 332                  | 43.95            | -20.03                   |
| 3   | 77.26           | 21.69 QP                | 40.00          | -18.31      | 2.73 V             | 82                   | 42.97            | -21.28                   |
| 4   | 87.30           | 21.21 QP                | 40.00          | -18.79      | 3.57 V             | 211                  | 44.14            | -22.93                   |
| 5   | 113.01          | 16.15 QP                | 40.00          | -23.85      | 3.81 V             | 332                  | 35.83            | -19.68                   |
| 6   | 155.18          | 18.79 QP                | 40.00          | -21.21      | 1.07 V             | 336                  | 35.16            | -16.37                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

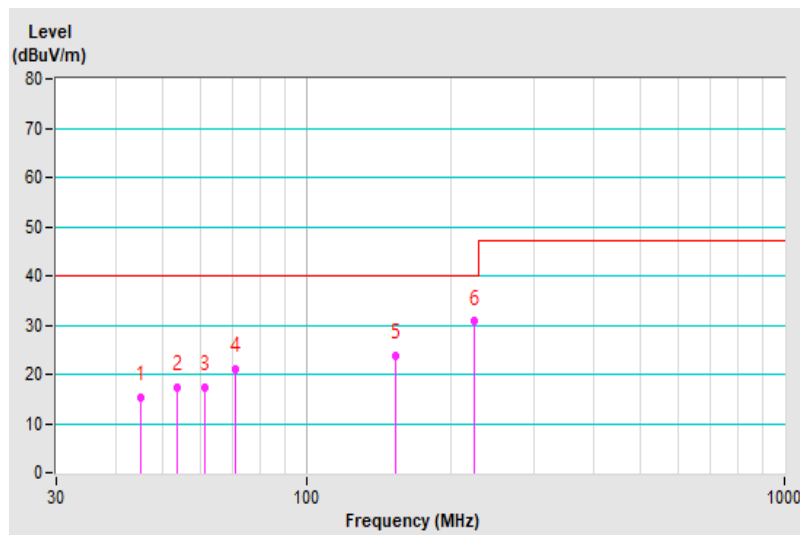


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 12Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 4       |  |                           |

| Antenna Polarity & Test Distance : Horizontal at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 45.01           | 15.40 QP                | 40.00          | -24.60      | 3.95 H             | 131                  | 32.39            | -16.99                   |
| 2   | 53.60           | 17.32 QP                | 40.00          | -22.68      | 2.69 H             | 98                   | 34.25            | -16.93                   |
| 3   | 61.52           | 17.30 QP                | 40.00          | -22.70      | 3.88 H             | 238                  | 34.81            | -17.51                   |
| 4   | 71.01           | 21.15 QP                | 40.00          | -18.85      | 2.26 H             | 236                  | 40.21            | -19.06                   |
| 5   | 153.92          | 23.82 QP                | 40.00          | -16.18      | 1.87 H             | 86                   | 39.25            | -15.43                   |
| 6   | 225.09          | 30.75 QP                | 40.00          | -9.25       | 2.40 H             | 73                   | 49.24            | -18.49                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

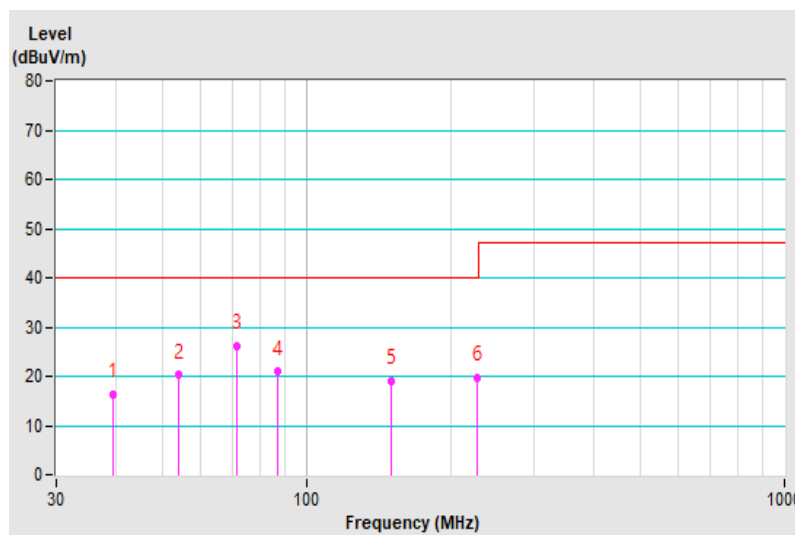


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 12Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 4       |  |                           |

| Antenna Polarity & Test Distance : Vertical at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 39.36           | 16.42 QP                | 40.00          | -23.58      | 1.04 V             | 342                  | 34.92            | -18.50                   |
| 2   | 53.93           | 20.24 QP                | 40.00          | -19.76      | 1.64 V             | 144                  | 37.98            | -17.74                   |
| 3   | 71.35           | 26.11 QP                | 40.00          | -13.89      | 2.80 V             | 223                  | 46.01            | -19.90                   |
| 4   | 86.91           | 20.85 QP                | 40.00          | -19.15      | 2.00 V             | 26                   | 43.79            | -22.94                   |
| 5   | 150.35          | 18.95 QP                | 40.00          | -21.05      | 3.70 V             | 97                   | 35.44            | -16.49                   |
| 6   | 228.03          | 19.63 QP                | 40.00          | -20.37      | 3.37 V             | 70                   | 38.48            | -18.85                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

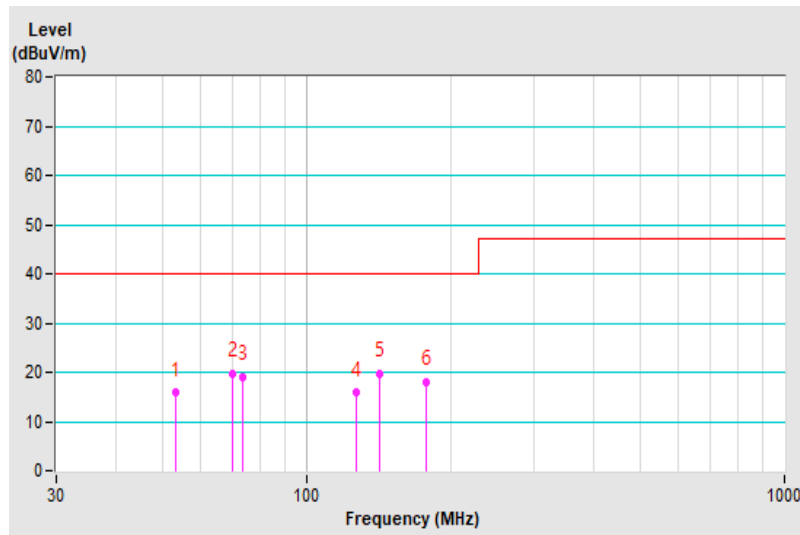


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 24Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 5       |  |                           |

| Antenna Polarity & Test Distance : Horizontal at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 53.40           | 15.83 QP                | 40.00          | -24.17      | 2.88 H             | 226                  | 32.73            | -16.90                   |
| 2   | 69.87           | 19.76 QP                | 40.00          | -20.24      | 3.77 H             | 253                  | 38.66            | -18.90                   |
| 3   | 73.36           | 18.95 QP                | 40.00          | -21.05      | 1.58 H             | 283                  | 38.64            | -19.69                   |
| 4   | 127.61          | 15.77 QP                | 40.00          | -24.23      | 1.44 H             | 98                   | 33.05            | -17.28                   |
| 5   | 142.33          | 19.82 QP                | 40.00          | -20.18      | 3.95 H             | 54                   | 35.80            | -15.98                   |
| 6   | 177.76          | 18.05 QP                | 40.00          | -21.95      | 2.22 H             | 221                  | 34.79            | -16.74                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

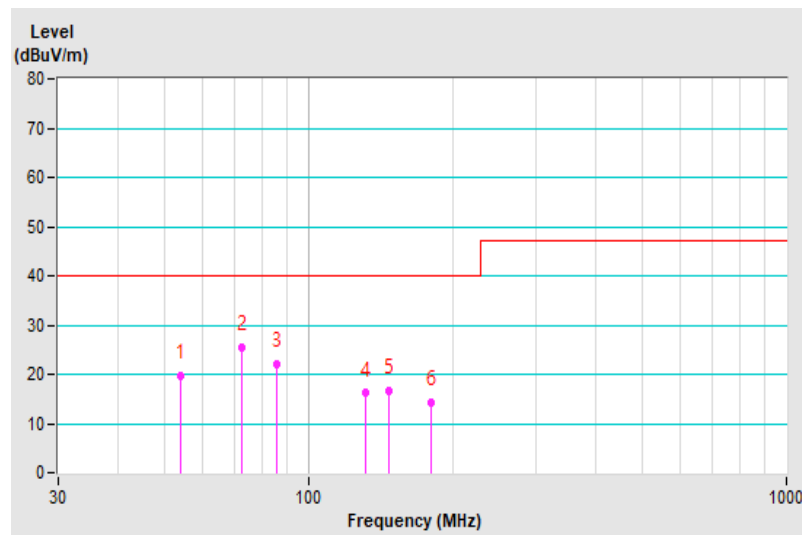


|                 |              |  |                           |
|-----------------|--------------|--|---------------------------|
| Frequency Range | 30MHz ~ 1GHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP), 120kHz   |
| Input Power     | 24Vdc        | Environmental Conditions                 | 25.0°C, 75.0%RH, 1008mbar |
| Tested By       | Chenghan Wu  | Test Date                                | 2020/11/3                 |
| Test Mode       | Mode 5       |  |                           |

| Antenna Polarity & Test Distance : Vertical at 10 m |                 |                         |                |             |                    |                      |                  |                          |
|---|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No  | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1   | 54.08           | 19.64 QP                | 40.00          | -20.36      | 1.09 V             | 24                   | 37.40            | -17.76                   |
| 2   | 72.63           | 25.51 QP                | 40.00          | -14.49      | 2.61 V             | 332                  | 45.77            | -20.26                   |
| 3   | 85.63           | 21.99 QP                | 40.00          | -18.01      | 3.69 V             | 258                  | 44.83            | -22.84                   |
| 4   | 132.21          | 16.13 QP                | 40.00          | -23.87      | 1.89 V             | 356                  | 33.76            | -17.63                   |
| 5   | 147.03          | 16.64 QP                | 40.00          | -23.36      | 2.92 V             | 91                   | 33.17            | -16.53                   |
| 6   | 180.93          | 14.27 QP                | 40.00          | -25.73      | 3.81 V             | 332                  | 32.32            | -18.05                   |

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)  
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



## 7 General Immunity Requirements

| EN 55024:2010/ EN 55024:2010 +A1:2015, Immunity requirements |                        |       |  |                       |
|--|------------------------|-------|--|-----------------------|
| Clause   | Reference standard     | Table | Test specification   | Performance Criterion |
| 4.2.1  | EN/IEC 61000-4-2 ESD   | 1.3   | Enclosure port:<br>±8kV Air discharge, ±4kV Contact discharge  | B                     |
| 4.2.3.2  | EN/IEC 61000-4-3 RS    | 1.2   | Enclosure port:<br>80-1000 MHz, 3V/m, 80% AM (1kHz)  | A                     |
| 4.2.2  | EN/IEC 61000-4-4 EFT   | 2.3   | Signal ports and telecommunication ports:<br>xDSL equipment: ±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 100kHz<br>others: ±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz      | B                     |
|  |                        | 3.3   | Input DC power port: ±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz   |                       |
|  |                        | 4.5   | Input AC Power ports: ±1kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz  |                       |
| 4.2.5  | EN/IEC 61000-4-5 Surge | 2.2   | Signal and telecommunication ports (direct to outdoor cables): 10/700 (5/320) (T <sub>r</sub> /T <sub>d</sub> ) µs<br>w/o primary protectors: ±1kV, or<br>with primary protectors fitted: ±4kV | C                     |
|  |                        | 3.2   | Input DC power port (direct to outdoor cables):<br>1.2/50 (8/20) (T <sub>r</sub> /T <sub>d</sub> ) µs<br>Line to earth: ±0.5kV   | B                     |
|  |                        | 4.4   | Input AC Power ports: 1.2/50 (8/20) (T <sub>r</sub> /T <sub>d</sub> ) µs,<br>Line to line: ±1kV<br>Line to earth: ±2kV   |                       |
| 4.2.3.3  | EN/IEC 61000-4-6 CS    | 2.1   | Signal and telecommunication ports(cable length > 3m): 0.15-80 MHz, 3V, 80% AM (1kHz)  | A                     |
|  |                        | 3.1   | Input DC power port: 0.15-80 MHz, 3V, 80% AM (1kHz)  |                       |
|  |                        | 4.1   | Input AC Power ports: 0.15-80 MHz, 3V, 80% AM (1kHz)   |                       |
| 4.2.4  | EN/IEC 61000-4-8 PFMF  | 1.1   | Enclosure port:<br>50 or 60 Hz, 1A/m   | A                     |



| EN 55035:2017 +A11:2020, Immunity requirements |   |                       |
|--|---|-----------------------|
| Reference standard                             | Test specification  | Performance Criterion |
| EN/IEC 61000-4-2<br>ESD                        | Enclosure port:<br>±8kV Air discharge, ±4kV Contact discharge   | B                     |
| EN/IEC 61000-4-3<br>RS                         | Enclosure port:<br>Swept freq. test :<br>80-1000 MHz, 3V/m, 80% AM (1kHz),<br>Spot freq. test :<br>1800, 2600, 3500, 5000 MHz (±1 %),<br>3V/m, 80% AM (1kHz)  | A                     |
| EN/IEC 61000-4-4<br>EFT                        | Analogue/digital data ports (cable length > 3m):<br>xDSL equipment: ±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 100kHz<br>others: ±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz  | B                     |
|  | DC network power port(cable length > 3m):<br>±0.5kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz  |                       |
|  | AC mains power ports:<br>±1.0kV, 5/50 (t <sub>r</sub> /t <sub>w</sub> ) ns, 5kHz  |                       |
| EN/IEC 61000-4-5<br>Surge                      | Analogue/digital data ports (direct to outdoor cables):<br>Port type: unshielded symmetrical<br>10/700(5/320) (T <sub>f</sub> /T <sub>d</sub> ) µs,<br>w/o primary protectors (line to ground): ±1.0kV, or<br>with primary protectors (line to ground): ±1.0kV, ±4.0kV<br>Port type: coaxial or shielded<br>1.2/50 (8/20) (T <sub>f</sub> /T <sub>d</sub> ) µs,<br>shield to ground: ±0.5kV | C                     |
|  | DC network power port (direct to outdoor cables):<br>1.2/50(8/20) (T <sub>f</sub> /T <sub>d</sub> ) µs,<br>Line to ground: ±0.5kV   | B                     |
|  | AC mains power ports: 1.2/50(8/20) (T <sub>f</sub> /T <sub>d</sub> ) µs,<br>Line to line: ±1kV,<br>Line to ground: ±2kV   | B                     |
| EN/IEC 61000-4-6<br>CS                         | Analogue/digital data ports (cable length > 3m) ;<br>DC network power ports (cable length > 3m) ;<br>AC mains power ports<br>0.15-10 MHz, 3V, 80% AM (1kHz),<br>10-30 MHz, 3V-1V, 80% AM (1kHz),<br>30-80 MHz, 1V, 80% AM (1kHz)  | A                     |
| EN/IEC 61000-4-8<br>PFMF                       | Enclosure port:<br>50 or 60 Hz, 1A/m  | A                     |

## 7.1 Specific Immunity Requirements by Manufacturer

| Reference standard        | Test specification   | Performance Criterion |
|---------------------------|--|-----------------------|
| EN/IEC 61000-4-2<br>ESD   | Enclosure port:<br>±15kV Air discharge, ±8kV Contact discharge   | A                     |
| EN/IEC 61000-4-3<br>RS    | Enclosure port:<br>80-1000 MHz, 10V/m, 80% AM (1kHz),<br>Spot freq. test :<br>1800, 2600, 3500, 5000 MHz (±1 %),<br>10V/m, 80% AM (1kHz) | A                     |
| EN/IEC 61000-4-4<br>EFT   | DC network power port(cable length > 3m):<br>±2kV, 5/50 (tr/tw) ns, 5kHz   | A                     |
| EN/IEC 61000-4-5<br>Surge | DC network power port (direct to outdoor cables):<br>1.2/50(8/20) (Ti/Td) µs,<br>Line to ground: ±1kV                                    | A                     |
| EN/IEC 61000-4-6<br>CS    | DC network power ports (cable length > 3m)<br>0.15-80 MHz, 10V, 80% AM (1kHz)  | A                     |
| EN/IEC 61000-4-8<br>PFMF  | Enclosure port:<br>50Hz, 100A/m & 1000A/m  | A                     |

## 7.2 Performance Criteria

### General Performance Criteria

#### Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

### Product Specific Performance Criteria

The particular performance criteria which are specified in the normative annexes of EN 55024 & EN 55035 take precedence over the corresponding parts of the general performance criteria. Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

## 8 Electrostatic Discharge Immunity Test (ESD)

### 8.1 Test Specification

|                      |   |
|----------------------|---|
| Product Standard:    | EN 55024  |
| Basic Standard:      | EN/IEC 61000-4-2  |
| Discharge Impedance: | 330 ohm / 150 pF  |
| Discharge Voltage:   | Air Discharge: $\pm 2, \pm 4, \pm 8, \pm 15$ kV (Direct)<br>Contact Discharge: $\pm 2, \pm 4, \pm 6, \pm 8$ kV (Indirect)                                       |
| Number of Discharge: | Air – Direct: 10 discharges per location (each polarity)<br>Contact – Direct & Indirect: 25 discharges per location (each polarity) and min. 200 times in total |
| Discharge Mode:      | Single Discharge  |
| Discharge Period:    | 1-second minimum  |

|                      |   |
|----------------------|---|
| Product Standard:    | EN 55035  |
| Basic Standard:      | EN/IEC 61000-4-2  |
| Discharge Impedance: | 330 ohm / 150 pF  |
| Discharge Voltage:   | Air Discharge: $\pm 2, \pm 4, \pm 8, \pm 15$ kV (Direct)<br>Contact Discharge: $\pm 2, \pm 4, \pm 6, \pm 8$ kV (Indirect)           |
| Number of Discharge: | Air – Direct: 10 discharges per location (each polarity)<br>Contact – Direct & Indirect: 10 discharges per location (each polarity) |
| Discharge Mode:      | Single Discharge  |
| Discharge Period:    | 1-second minimum  |

### 8.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date    | Cal. Due     |
|----------------------------|-----------|------------|--------------|--------------|
| NOISEKEN, ESD Simulator    | ESS-2000  | ESS0382041 | Oct. 7, 2020 | Oct. 6, 2021 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in ESD Room No. 2.  
3. Tested Date: Nov. 6, 2020

### 8.3 Test Arrangement

The discharges shall be applied in two ways: (For EN 55024 only)

- a. Contact discharges to the conductive surfaces and coupling planes:

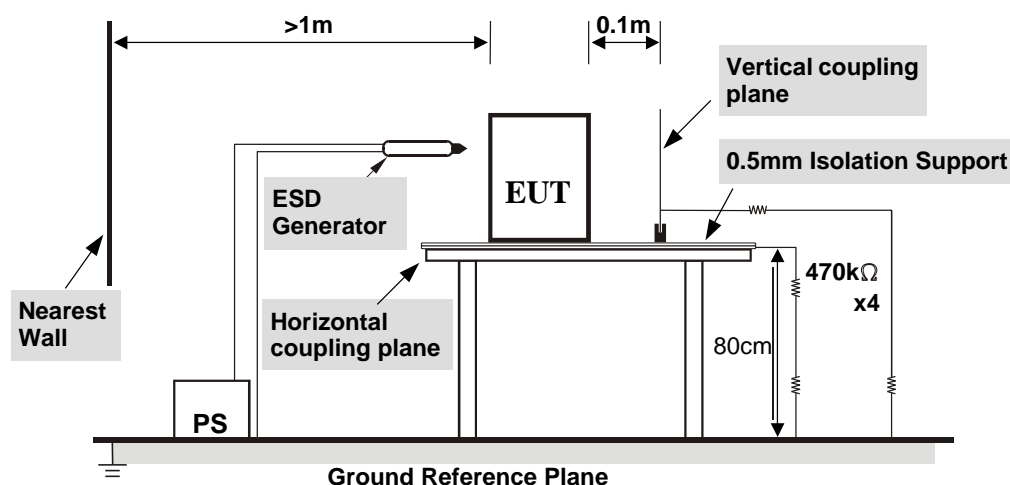
The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with EN/IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



#### TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN/IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 8.4 Supplementary Information

The requirement followed by the client's specification. (Refer to item 7.1)

## 8.5 Test Results

### For EN 55024 & EN 55035

|                          |                           |           |           |
|--------------------------|---------------------------|-----------|-----------|
| Input Voltage            | 12Vdc                     | Tested by | Eric Liao |
| Environmental Conditions | 23 °C, 43% RH<br>1001mbar | Test Date | 2020/11/6 |
| Test mode                | Mode 3                    |           |           |

| Test Results of Direct Application |                |            |                   |               |                       |
|------------------------------------|----------------|------------|-------------------|---------------|-----------------------|
| Discharge Level (kV)               | Polarity (+/-) | Test Point | Contact Discharge | Air Discharge | Performance Criterion |
| 2, 4, 8, 15                        | +/-            | 1          | NA                | Note          | A                     |

Description of test points of direct application: Please refer to following page for representative mark only.

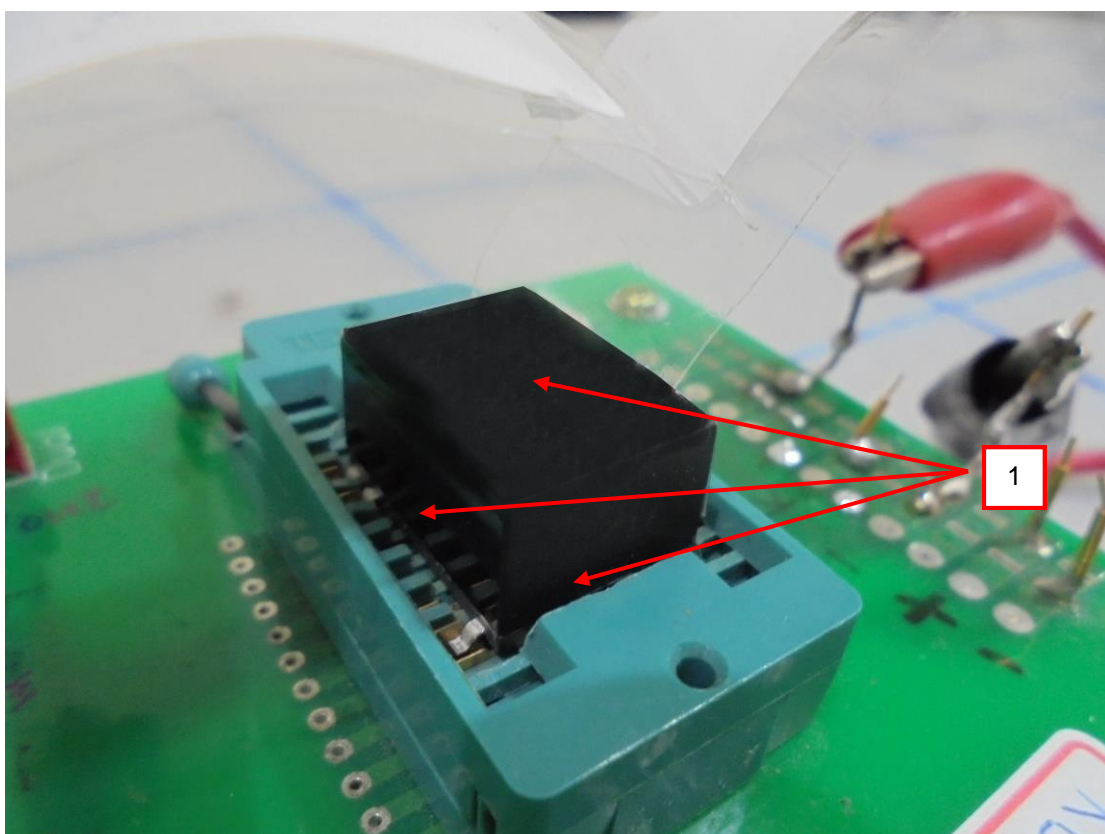
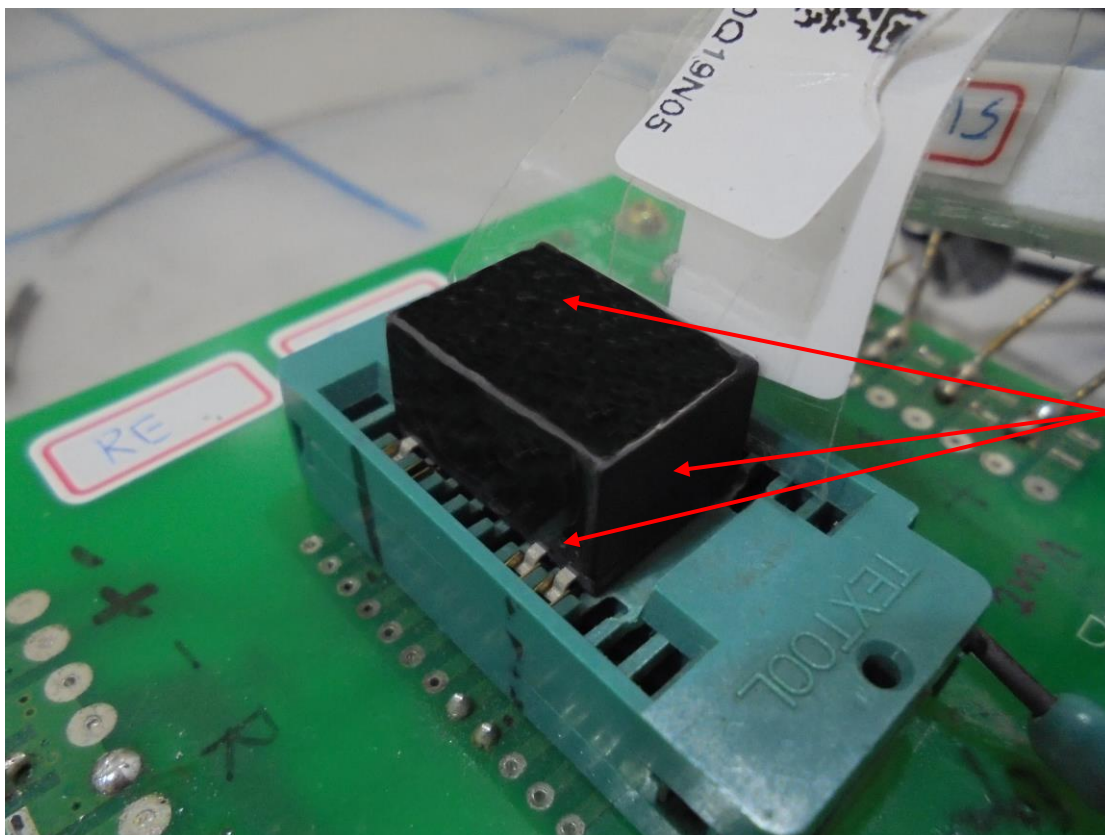
| Test Results of Indirect Application |                |            |                           |                         |                       |
|--------------------------------------|----------------|------------|---------------------------|-------------------------|-----------------------|
| Discharge Level (kV)                 | Polarity (+/-) | Test Point | Horizontal Coupling Plane | Vertical Coupling Plane | Performance Criterion |
| 2, 4, 6, 8                           | +/-            | Four Sides | Note                      | Note                    | A                     |

Description of test points of indirect application:

1. Front side
2. Rear side
3. Right side
4. Left side

Note: The EUT function was correct during the test.

## Description of Test Points





## 9 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

### 9.1 Test Specification

|                      |                                    |
|----------------------|------------------------------------|
| Product Standard:    | EN 55024                           |
| Basic Standard:      | EN/IEC 61000-4-3                   |
| Frequency Range:     | 80 MHz - 1000 MHz                  |
| Field Strength:      | 3 V/m, 10 V/m,                     |
| Modulation:          | 1kHz Sine Wave, 80%, AM Modulation |
| Frequency Step:      | 1 % of preceding frequency value   |
| Polarity of Antenna: | Horizontal and Vertical            |
| Antenna Height:      | 1.5m                               |
| Dwell Time:          | 3 seconds                          |

|                        |   |
|------------------------|---|
| Product Standard:      | EN 55035                                |
| Basic Standard:        | EN/IEC 61000-4-3                        |
| Swept Frequency Range: | 80 MHz - 1000 MHz                       |
| Spot Frequencies:      | 1800, 2600, 3500, 5000 MHz ( $\pm 1$ %) |
| Field Strength:        | 3 V/m, 10 V/m                           |
| Modulation:            | 1kHz Sine Wave, 80%, AM Modulation      |
| Frequency Step:        | 1 % of preceding frequency value        |
| Polarity of Antenna:   | Horizontal and Vertical                 |
| Antenna Height:        | 1.5m                                    |
| Dwell Time:            | 3 seconds                               |



## 9.2 Test Instruments

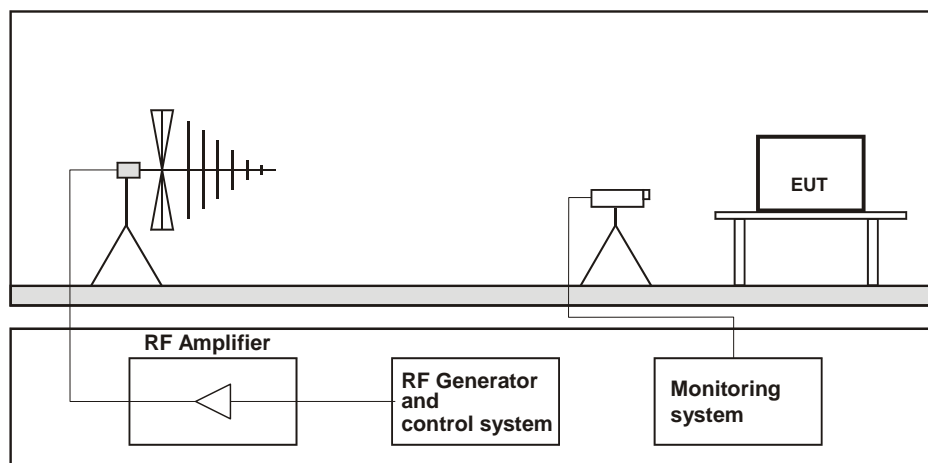
| Description & Manufacturer                       | Model No.    | Serial No. | Cal. Date    | Cal. Due     |
|--|--------------|------------|--------------|--------------|
| AgilentSignal Generator                          | E8257D       | MY48050465 | Jun. 8, 2020 | Jun. 7, 2021 |
| BONN<br>RF Amplifier                             | BSA 0125-800 | 1912556    | NA           | NA           |
| TESTQAmplifier                                   | CBA 1G-275   | T44344     | NA           | NA           |
| AR RF Amplifier                                  | 35S4G8AM4    | 0326094    | NA           | NA           |
| AR RF Amplifier                                  | 100S1G4M3    | 0329249    | NA           | NA           |
| AR Controller                                    | SC1000M3     | 305910     | NA           | NA           |
| ARLog-Periodic Antenna                           | AT6080       | 0329465    | NA           | NA           |
| BOONTON<br>RF Voltage Meter                      | 4232A        | 10180      | May 29, 2020 | May 28, 2021 |
| BOONTON Power Sensor                             | 51011-EMC    | 34152      | May 29, 2020 | May 28, 2021 |
| BOONTON Power Sensor                             | 51011-EMC    | 34153      | May 29, 2020 | May 28, 2021 |
| EMCO BiconiLog Antenna                           | 3141         | 1001       | NA           | NA           |
| ARHigh Gain Antenna                              | AT4010       | 0329800    | NA           | NA           |
| SchwarzbeckLOG ANTENNA                           | Stlp 9149    | 9149-260   | NA           | NA           |
| CHANCE MOST<br>Full Anechoic<br>Chamber (9x5x3m) | Chance Most  | RS-002     | Feb. 5, 2020 | Feb. 4, 2021 |
| Software   | RS_V7.6      | NA         | NA           | NA           |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in RS Room No.2.  
3. The transmit antenna was located at a distance of 3 meters from the EUT.  
4. Tested Date: Nov. 5, 2020

### 9.3 Test Arrangement

The test procedure was in accordance with EN/IEC 61000-4-3.

- The testing was performed in a fully anechoic chamber.
- The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave. **(For EN 55024)**
- The swept frequency range is from 80 MHz to 1000 MHz and the spot frequencies are 1800, 2600, 3500, 5000 MHz ( $\pm 1\%$ ), with the signal 80% amplitude modulated with a 1kHz sine wave. **(For EN 55035)**
- The dwell time of the amplitude modulated carrier was applied in 3 s at each of the frequencies during the scan. The sensitive frequencies (e.g. clock frequencies or frequencies identified by the manufacturer or obtained as outcome of the test) shall be analyzed in addition to the stepped frequencies. **(For EN 55035)**
- The field strength level was 3 V/m, 10 V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.



#### Table-top Equipment

The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 9.4 Supplementary Information

The requirement followed by the client's specification. (Refer to item 7.1)

## 9.5 Test Results

### For EN 55024

|                          |               |           |           |
|--------------------------|---------------|-----------|-----------|
| Input Voltage            | 12Vdc         | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH | Test Date | 2020/11/5 |
| Test mode                | Mode 3        |           |           |

| Frequency (MHz) | Polarity | Azimuth (°) | Test Distance (m) | Applied Field Strength |               | Observation | Performance Criterion |
|-----------------|----------|-------------|-------------------|------------------------|---------------|-------------|-----------------------|
|                 |          |             |                   | (V/m)                  | Modulation    |             |                       |
| 80 -1000        | V&H      | 0           | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 90          | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 180         | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 270         | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 0           | 3                 | 10                     | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 90          | 3                 | 10                     | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 180         | 3                 | 10                     | 80% AM (1kHz) | Note        | A                     |
| 80 -1000        | V&H      | 270         | 3                 | 10                     | 80% AM (1kHz) | Note        | A                     |

Note: The EUT function was correct during the test.

### For EN 55035

|                          |               |           |           |
|--------------------------|---------------|-----------|-----------|
| Input Voltage            | 12Vdc         | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH | Test Date | 2020/11/5 |
| Test mode                | Mode 3        |           |           |

| Frequency (MHz)                   | Polarity | Azimuth(°) | Test Distance (m) | Applied Field Strength |               | Observation | Performance Criterion |
|-----------------------------------|----------|------------|-------------------|------------------------|---------------|-------------|-----------------------|
|                                   |          |            |                   | (V/m)                  | Modulation    |             |                       |
| 80 - 1000                         | V&H      | 0          | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 90         | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 180        | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 270        | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 1800, 2600, 3500, 5000 MHz (±1 %) | V&H      | 0          | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 90         | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 180        | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 270        | 3                 | 3                      | 80% AM (1kHz) | Note        | A                     |
| 80 - 1000                         | V&H      | 0          | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 90         | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 180        | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 270        | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
| 1800, 2600, 3500, 5000 MHz (±1 %) | V&H      | 0          | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 90         | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 180        | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |
|                                   |          | 270        | 1.5               | 10                     | 80% AM (1kHz) | Note        | A                     |

Note: The EUT function was correct during the test.

## 10 Electrical Fast Transient/Burst Immunity Test (EFT)

### 10.1 Test Specification

|                               |   |
|-------------------------------|---|
| Product Standard:             | EN 55024  |
| Basic Standard:               | EN/IEC 61000-4-4  |
| Test Voltage:                 | Signal / telecommunication port: N/A<br>Input DC power port: $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , $\pm 2\text{kV}$<br>Input AC power port: N/A |
| Impulse Repetition Frequency: | xDSL telecommunication port: 100kHz<br>others: 5kHz   |
| Impulse Wave Shape:           | 5/50 ns   |
| Burst Duration:               | 0.75 ms for 100kHz Repetition Frequency<br>15 ms for 5kHz Repetition Frequency  |
| Burst Period:                 | 300 ms  |
| Test Duration:                | 1 min.  |

|                               |  |
|-------------------------------|--|
| Product Standard:             | EN 55035   |
| Basic Standard:               | EN/IEC 61000-4-4   |
| Test Voltage:                 | Analogue/digital data port (cable length > 3m): N/A<br>DC network power port (cable length > 3m): $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , $\pm 2\text{kV}$<br>AC mains power port: N/A |
| Impulse Repetition Frequency: | 100kHz : applicable only to xDSL port<br>5kHz : others   |
| Impulse Wave Shape :          | 5/50 ns  |
| Burst Duration:               | 0.75 ms for 100kHz Repetition Frequency<br>15 ms for 5kHz Repetition Frequency,  |
| Burst Period:                 | 300 ms   |
| Test Duration:                | 1 min.   |

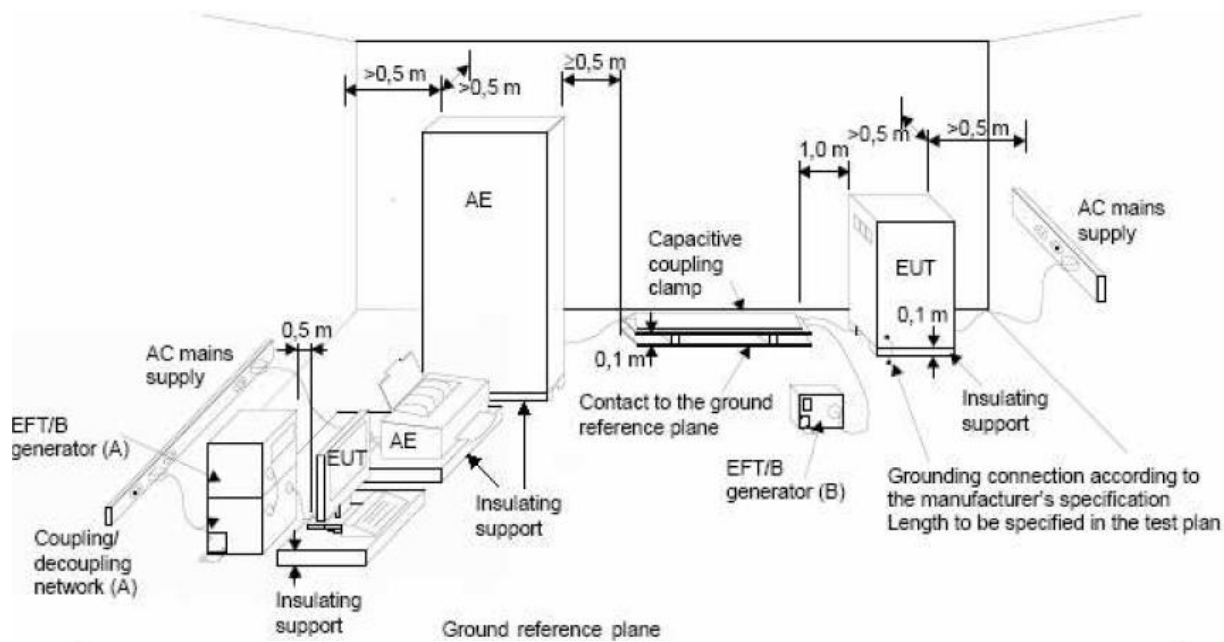
### 10.2 Test Instruments

| Description & Manufacturer | Model No.     | Serial No. | Cal. Date     | Cal. Due      |
|----------------------------|---------------|------------|---------------|---------------|
| TESEQ, EFT Simulator       | NSG 3060      | 1572       | May 12, 2020  | May 11, 2021  |
| TESEQ, CDN                 | CDN 3083-B100 | 303        | May 12, 2020  | May 11, 2021  |
| Haefely, Capacitive Clamp  | IP4A          | 155173     | Apr. 20, 2020 | Apr. 19, 2021 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS Room No. 2.  
3. Tested Date: Nov. 4, 2020

### 10.3 Test Arrangement

- Both positive and negative polarity discharges were applied.
- The distance between any coupling devices and the EUT should be  $(0.5 - 0/+0.1)$  m for table-top equipment testing, and  $(1.0 \pm 0.1)$  m for floor standing equipment.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with EN/IEC 61000-4-4, 5/50 ns.



#### NOTE:

- location for supply line coupling
- location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 10.4 Supplementary Information

The requirement followed by the client's specification. (Refer to item 7.1)

## 10.5 Test Results

### For EN 55024 & EN 55035

|                          |                |           |           |
|--------------------------|----------------|-----------|-----------|
| Input Voltage            | 5Vdc           | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH  | Test Date | 2020/11/4 |
| Test mode                | Mode 1, Mode 2 |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1, 2    | (+)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (-)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

|                          |                |           |           |
|--------------------------|----------------|-----------|-----------|
| Input Voltage            | 12Vdc          | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH  | Test Date | 2020/11/4 |
| Test mode                | Mode 3, Mode 4 |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1, 2    | (+)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (-)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

|                          |               |           |           |
|--------------------------|---------------|-----------|-----------|
| Input Voltage            | 24Vdc         | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH | Test Date | 2020/11/4 |
| Test mode                | Mode 5        |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1, 2    | (+)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (-)        | +/-            | Note        | A                     |
| 0.5, 1, 2    | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

## 11 Surge Immunity Test

### 11.1 Test Specification

|                          |  |
|--------------------------|--|
| Product Standard:        | EN 55024   |
| Basic Standard:          | EN/IEC 61000-4-5   |
| Wave-Shape:              | Signal / telecommunication port (direct to outdoor cables*):<br>10/700 $\mu$ s Open Circuit Voltage<br>5/320 $\mu$ s Short Circuit Current<br><br>Input DC power port (direct to outdoor cables*):<br>1.2/50 $\mu$ s Open Circuit Voltage<br>8/20 $\mu$ s Short Circuit Current<br><br>Input AC power port:<br>1.2/50 $\mu$ s Open Circuit Voltage<br>8/20 $\mu$ s Short Circuit Current |
| Test Voltage:            | Signal and telecommunication ports**:<br>w/o primary protectors: N/A<br>with primary protectors fitted: N/A<br><br>Input DC power port:<br>Line to earth or ground: $\pm 0.5$ kV, $\pm 1$ kV<br><br>Input AC power ports:<br>Line to line: N/A<br>Line to earth or ground: N/A   |
| AC Phase Angle (degree): | 0°, 90°, 180°, 270°  |
| Pulse Repetition Rate:   | 1 time / 20 sec.   |
| Number of Tests:         | 5 positive and 5 negative at selected points   |

\* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

\*\* For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.

|                          |  |
|--------------------------|--|
| Product Standard:        | EN 55035   |
| Basic Standard:          | EN/IEC 61000-4-5   |
| Wave-Shape:              | Analogue/digital data ports (direct to outdoor cables*):<br>Port type: unshielded symmetrical<br>10/700 $\mu$ s Open Circuit Voltage<br>5/320 $\mu$ s Short Circuit Current<br><br>Port type: coaxial or shielded<br>1.2/50 $\mu$ s Open Circuit Voltage<br>8/20 $\mu$ s Short Circuit Current<br><br>DC network power port (direct to outdoor cables*):<br>1.2/50 $\mu$ s Open Circuit Voltage<br>8/20 $\mu$ s Short Circuit Current<br><br>AC mains power port:<br>1.2/50 $\mu$ s Open Circuit Voltage<br>8/20 $\mu$ s Short Circuit Current |
| Test Voltage:            | Analogue/digital data ports:<br>Port type: unshielded symmetrical**<br>w/o primary protectors (line to ground): N/A<br>with primary protectors (line to ground): N/A<br>Port type: coaxial or shielded<br>shield to ground: N/A<br><br>DC network power port: $\pm 0.5$ kV, $\pm 1$ kV<br><br>AC mains power ports:<br>Line to line : N/A<br>Line to ground : N/A  |
| AC Phase Angle (degree): | 90° / 270°   |
| Pulse Repetition Rate:   | 1 time / 20 sec.   |
| Number of Tests:         | 5 positive and 5 negative at selected points   |

\* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

\*\* For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors. Otherwise the 1 kV test level is applied without primary protection in place.

## 11.2 Test Instruments

| Description & Manufacturer                                    | Model No.       | Serial No. | Cal. Date     | Cal. Due      |
|---|-----------------|------------|---------------|---------------|
| TESEQ, Surge Simulator  | NSG 3060        | 1572       | May 12, 2020  | May 11, 2021  |
| TESEQ, CDN  | CDN<br>3083-100 | 1215       | May 12, 2020  | May 11, 2021  |
| Coupling Decoupling Network                                   | CDN-UTP8        | 045        | Aug. 18, 2020 | Aug. 17, 2021 |
| TESEQ Coupling Decoupling Network                             | CDN HSS-2       | 41009      | May 12, 2020  | May 11, 2021  |
| TESEQ Coupling Decoupling Network                             | CDN 118-T8      | 40386      | Sep. 8, 2020  | Sep. 7, 2021  |
| TESEQ CDN for Unshielded<br>Unsymmetrical Signal & Data Lines | CDN117          | 40144      | Sep. 8, 2020  | Sep. 7, 2021  |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in EMS Room No. 2.  
3. Tested Date: Nov. 4 to Dec. 7, 2020



### 11.3 Test Arrangement

a. EUT Power ports:

The surge shall be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling network shall not exceed 2 meters in length.

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.

b. Analogue/digital data ports:

- Unshielded unsymmetrical interconnection lines:

The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling network shall not exceed 2 meters in length.

- Unshielded symmetrical interconnection lines:

For symmetrical interconnection lines and high-speed interconnection lines, the CDN shall be selected to match the number of lines/pairs existing in the cable. If coupling arrestors are used, test levels below the ignition point of the coupling arrestor cannot be specified.

The interconnection line between the EUT and the coupling/decoupling networks shall not exceed 2 meters in length.

In order to avoid the coupling and decoupling capacitors having a filtering effect on the data transfer, a balanced high frequency design associating the coupling capacitors with coupling chokes is required. Where normal functioning of high speed communications lines cannot be achieved because of the impact of the CDN on the EUT, product committees should specify appropriate operation or that no surge immunity test is required.

- Shielded lines:

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with one or more shielded cables.

The length of the cable between the port(s) under test and the device attached to the other end of the cable shall be:

- 20 m (preferred length) or,
- the shortest length over 10 m, where the manufacturer provides pre-assembled cables used in actual installations.

No test shall be required for cables which according to the manufacturer's specification are  $\leq 10$  m.

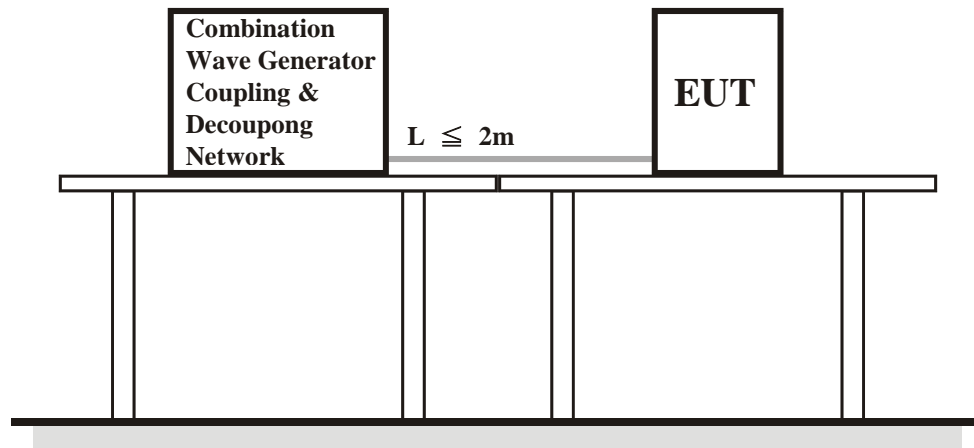
Rules for application of the surge to shielded lines:

- a) Shields grounded at both ends:
- the test shall be carried out.

The test level is applied on shields with a  $2 \Omega$  generator source impedance and with the  $18 \mu\text{F}$  capacitor.

- b) Shields grounded at one end:
- the test shall be carried out according to unshielded unsymmetrical interconnection lines or unshielded symmetrical interconnection lines because the shield does not provide any protection against surges induced by magnetic fields.

For EUTs which do not have metallic enclosures, the surge is applied directly to the shielded cable at the EUT side.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 11.4 Supplementary Information

The requirement followed by the client's specification. (Refer to item 7.1)

## 11.5 Test Results

### For EN 55024 & EN 55035

|                          |                |           |           |
|--------------------------|----------------|-----------|-----------|
| Input Voltage            | 5Vdc           | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH  | Test Date | 2020/11/4 |
| Test mode                | Mode 1, Mode 2 |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1       | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

|                          |                |           |           |
|--------------------------|----------------|-----------|-----------|
| Input Voltage            | 12Vdc          | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH  | Test Date | 2020/11/4 |
| Test mode                | Mode 3, Mode 4 |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1       | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

|                          |               |           |           |
|--------------------------|---------------|-----------|-----------|
| Input Voltage            | 24Vdc         | Tested by | Xun Lee   |
| Environmental Conditions | 22 °C, 62% RH | Test Date | 2020/11/4 |
| Test mode                | Mode 5        |           |           |

#### Input DC power port

| Voltage (kV) | Test Point | Polarity (+/-) | Observation | Performance Criterion |
|--------------|------------|----------------|-------------|-----------------------|
| 0.5, 1       | (+)-(-)    | +/-            | Note        | A                     |

Note: The EUT function was correct during the test.

## 12 Immunity to Conducted Disturbances Induced by RF Fields (CS)

### 12.1 Test Specification

|                   |                                    |
|-------------------|------------------------------------|
| Product Standard: | EN 55024                           |
| Basic Standard:   | EN/IEC 61000-4-6                   |
| Frequency Range:  | 0.15 MHz - 80 MHz                  |
| Voltage Level:    | 3 V, 10 V                          |
| Modulation:       | 1kHz Sine Wave, 80%, AM Modulation |
| Frequency Step:   | 1 % of preceding frequency value   |
| Dwell Time        | 3 seconds                          |

|                   |  |
|-------------------|--|
| Product Standard: | EN 55035   |
| Basic Standard:   | EN/IEC 61000-4-6   |
| Frequency Range:  | 0.15 MHz - 80 MHz  |
| Voltage Level:    | 0.15 MHz - 80 MHz: 10V<br>0.15 MHz - 10 MHz: 3V<br>10 MHz - 30 MHz: 3-1 V<br>30 MHz - 80 MHz: 1V |
| Additional Test:  | 0.15 MHz - 80 MHz: 10V   |
| Modulation:       | 1kHz Sine Wave, 80%, AM Modulation   |
| Frequency Step:   | 1 % of preceding frequency value   |
| Dwell Time        | 3 seconds  |

## 12.2 Test Instruments

| Description & Manufacturer                                  | Model No.      | Serial No. | Cal. Date     | Cal. Due      |
|---|----------------|------------|---------------|---------------|
| ROHDE & SCHWARZ<br>Signal Generator                         | SML03          | 101801     | Jan. 17, 2020 | Jan. 16, 2021 |
| Digital Sweep Function Generator                            | 8120           | 984801     | NA            | NA            |
| AR Power Amplifier  | 75A250AM1      | 306331     | NA            | NA            |
| FCC Coupling Decoupling Network                             | FCC-801-M2-16A | 01047      | Jun. 18, 2020 | Jun. 17, 2021 |
| FISCHER CUSTOM<br>COMMUNICATIONS<br>EM Injection Clamp      | F-203I-23mm    | 455        | NA            | NA            |
| FISCHER CUSTOM<br>COMMUNICATIONS<br>Current Injection Clamp | F-120-9A       | 361        | Jul. 30, 2020 | Jul. 29, 2021 |
| B&K Ear Simulator   | 4185           | 2553594    | NA            | NA            |
| EM TEST Coupling<br>Decoupling Network                      | CDN M1/32A     | 306508     | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T800       | 34428      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T800       | 29459      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T8-230     | 56641      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T8-230     | 56642      | Feb. 26, 2020 | Feb. 25, 2021 |
| R&S Power Sensor  | NRV-Z5         | 837878/039 | Nov. 10, 2020 | Nov. 9, 2021  |
| R&S Power Meter   | NRVD           | 837794/040 | Nov. 10, 2020 | Nov. 9, 2021  |
| TESEQ Coupling Decoupling Network                           | CDN M232       | 37702      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN M332       | 41258      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN M332       | 41256      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T8-10      | 40376      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T8-230     | 56643      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN S200       | 53490      | May 27, 2020  | May 26, 2021  |
| TESEQ Coupling Decoupling Network                           | CDN S400       | 52115      | Jun. 18, 2020 | Jun. 17, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T400A      | 49918      | Feb. 26, 2020 | Feb. 25, 2021 |
| FCC Coupling Decoupling Network                             | FCC-801-M5-50A | 100018     | Jan. 20, 2020 | Jan. 19, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN T2A-10     | 54942      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN S751A      | 56435      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN ST08A      | 56527      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN ST08A      | 56525      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN M432S      | 56519      | Feb. 26, 2020 | Feb. 25, 2021 |
| TESEQ Coupling Decoupling Network                           | CDN S751A      | 56436      | Apr. 13, 2020 | Apr. 12, 2021 |
| Software  | CS_V7.4.2      | NA         | NA            | NA            |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in CS Room No. 1.  
3. Tested Date: Nov. 23, 2020



## 12.5 Test Results

### For EN 55024

|                          |               |           |               |
|--------------------------|---------------|-----------|---------------|
| Input Voltage            | 12Vdc         | Tested by | Michael Cheng |
| Environmental Conditions | 22 °C, 65% RH | Test Date | 2020/11/23    |
| Test mode                | Mode 3        |           |               |

| Frequency (MHz) | Level (Vrms) | Tested Line | Injection Method | Return Path | Observation | Performance Criterion |
|-----------------|--------------|-------------|------------------|-------------|-------------|-----------------------|
| 0.15 – 80       | 3, 10        | DC power    | CDN-M2           | N/A         | Note        | A                     |

Note: The EUT function was correct during the test.

### For EN 55035

|                          |               |           |               |
|--------------------------|---------------|-----------|---------------|
| Input Voltage            | 12Vdc         | Tested by | Michael Cheng |
| Environmental Conditions | 22 °C, 65% RH | Test Date | 2020/11/23    |
| Test mode                | Mode 3        |           |               |

| Frequency (MHz) | Level (Vrms) | Tested Line | Injection Method | Return Path | Observation | Performance Criterion |
|-----------------|--------------|-------------|------------------|-------------|-------------|-----------------------|
| 0.15 – 10       | 3            | DC power    | CDN-M2           | N/A         | Note        | A                     |
| 10 – 30         | 3 – 1        | DC power    | CDN-M2           | N/A         | Note        | A                     |
| 30 – 80         | 1            | DC power    | CDN-M2           | N/A         | Note        | A                     |
| 0.15 – 80       | 10           | DC power    | CDN-M2           | N/A         | Note        | A                     |

Note: The EUT function was correct during the test.

### 13 Power Frequency Magnetic Field Immunity Test

#### 13.1 Test Specification

|                   |   |
|-------------------|---|
| Product Standard: | EN 55024  |
| Basic Standard:   | EN/IEC 61000-4-8  |
| Frequency Range:  | 50Hz  |
| Field Strength:   | 1A/m, 100A/m, 1000A/m   |
| Observation Time: | 1 minute for Field Strength 1A/m, 100A/m<br>1 second for Field Strength 1000A/m |
| Inductance Coil:  | Rectangular type, 1 m x 1 m   |

|                   |   |
|-------------------|---|
| Product Standard: | EN 55035  |
| Basic Standard:   | EN/IEC 61000-4-8  |
| Frequency Range:  | 50Hz  |
| Field Strength:   | 1A/m, 100A/m, 1000A/m   |
| Observation Time: | 1 minute for Field Strength 1A/m, 100A/m<br>1 second for Field Strength 1000A/m |
| Inductance Coil:  | Rectangular type, 1 m x 1 m   |

#### 13.2 Test Instruments

##### For Field Strength: 1A/m

| Description & Manufacturer     | Model No. | Serial No. | Cal. Date   | Cal. Due    |
|--------------------------------|-----------|------------|-------------|-------------|
| HAEFELY Magnetic Field Tester  | MAG 100   | 083794-06  | NA          | NA          |
| COMBINOVA Magnetic Field Meter | MFM10     | 224        | May 7, 2020 | May 6, 2021 |

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in EMS Room No. 1
  3. Tested Date: Nov. 6, 2020

##### For Field Strength: 100A/m, 1000A/m

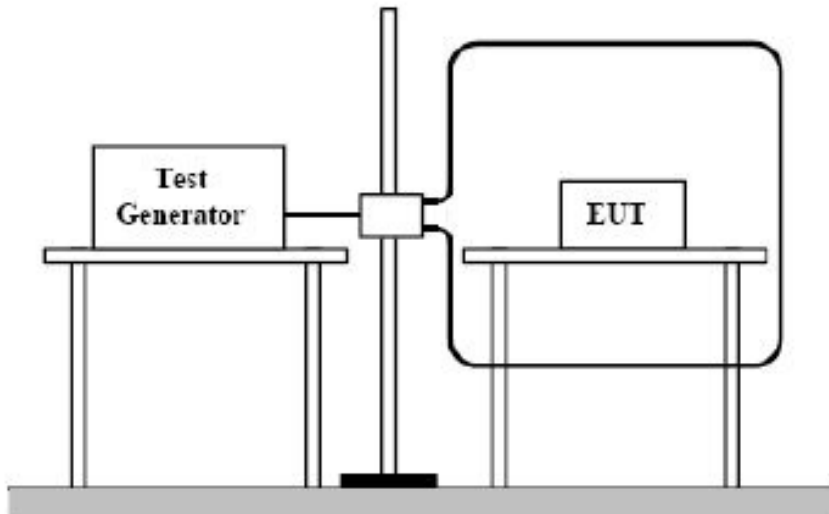
| Description & Manufacturer                         | Model No.  | Serial No. | Cal. Date     | Cal. Due      |
|--|------------|------------|---------------|---------------|
| Triaxial Elf Magnetic Field Meter<br>BELL          | 4090       | NA         | Apr. 10, 2020 | Apr. 09, 2021 |
| Power frequency magnetic filed coil<br>3ctest      | TCX30      | EC1281401  | Apr. 22, 2020 | Apr. 21, 2021 |
| Power frequency magnetic filed generator<br>3ctest | PFMF-1200G | EC0111401  | Apr. 22, 2020 | Apr. 21, 2021 |

- Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in EMS-1 room. (TAF No.: 2022)
  3. Tested Date: Dec. 16, 2020



### 13.3 Test Arrangement

- The equipment is configured and connected to satisfy its functional requirements.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.



#### TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 13.4 Supplementary Information

The requirement followed by the client's specification. (Refer to item 7.1)

### 13.5 Test Results

#### For EN 55024 & EN 55035

|                          |               |           |           |
|--------------------------|---------------|-----------|-----------|
| Input Voltage            | 12Vdc         | Tested by | Eric Liao |
| Environmental Conditions | 24 °C, 68% RH | Test Date | 2020/11/6 |
| Test mode                | Mode 3        |           |           |

| Field Strength: 1A/m |                |               |                      |             |                       |
|----------------------|----------------|---------------|----------------------|-------------|-----------------------|
| Application          | Frequency (Hz) | Test Duration | Field Strength (A/m) | Observation | Performance Criterion |
| X - Axis             | 50             | 1 min.        | 1                    | Note        | A                     |
| Y - Axis             | 50             | 1 min.        | 1                    | Note        | A                     |
| Z - Axis             | 50             | 1 min.        | 1                    | Note        | A                     |

Note: The EUT function was correct during the test.

#### For EN 55024 & EN 55035

|                          |               |           |             |
|--------------------------|---------------|-----------|-------------|
| Input Voltage            | 12Vdc         | Tested by | Duncan Wang |
| Environmental Conditions | 23 °C, 58% RH | Test Date | 2020/12/16  |
| Test mode                | Mode 3        |           |             |

| Field Strength: 100A/m, 1000A/m |                |               |                      |             |                       |
|---------------------------------|----------------|---------------|----------------------|-------------|-----------------------|
| Application                     | Frequency (Hz) | Test Duration | Field Strength (A/m) | Observation | Performance Criterion |
| X - Axis                        | 50             | 1 min.        | 100                  | Note        | A                     |
| Y - Axis                        | 50             | 1 min.        | 100                  | Note        | A                     |
| Z - Axis                        | 50             | 1 min.        | 100                  | Note        | A                     |
| X - Axis                        | 50             | 1 sec.        | 1000                 | Note        | A                     |
| Y - Axis                        | 50             | 1 sec.        | 1000                 | Note        | A                     |
| Z - Axis                        | 50             | 1 sec.        | 1000                 | Note        | A                     |

Note: The EUT function was correct during the test.

Remark: The test, calibration and test results are compliance with the TAF (TAF code: 2022).

## 14 Pictures of Test Arrangements

### 14.1 Conducted Emission from the Mains Power Port

For Mode 1, Mode 3

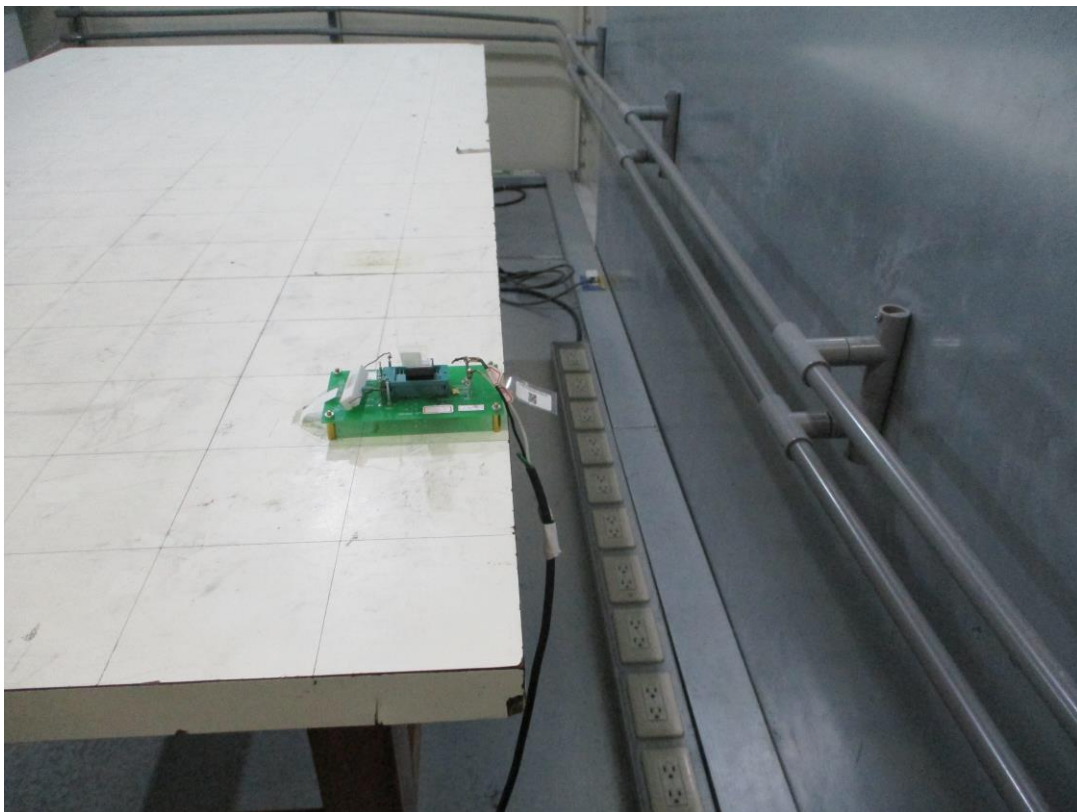


For Mode 2, Mode 4





For Mode 5



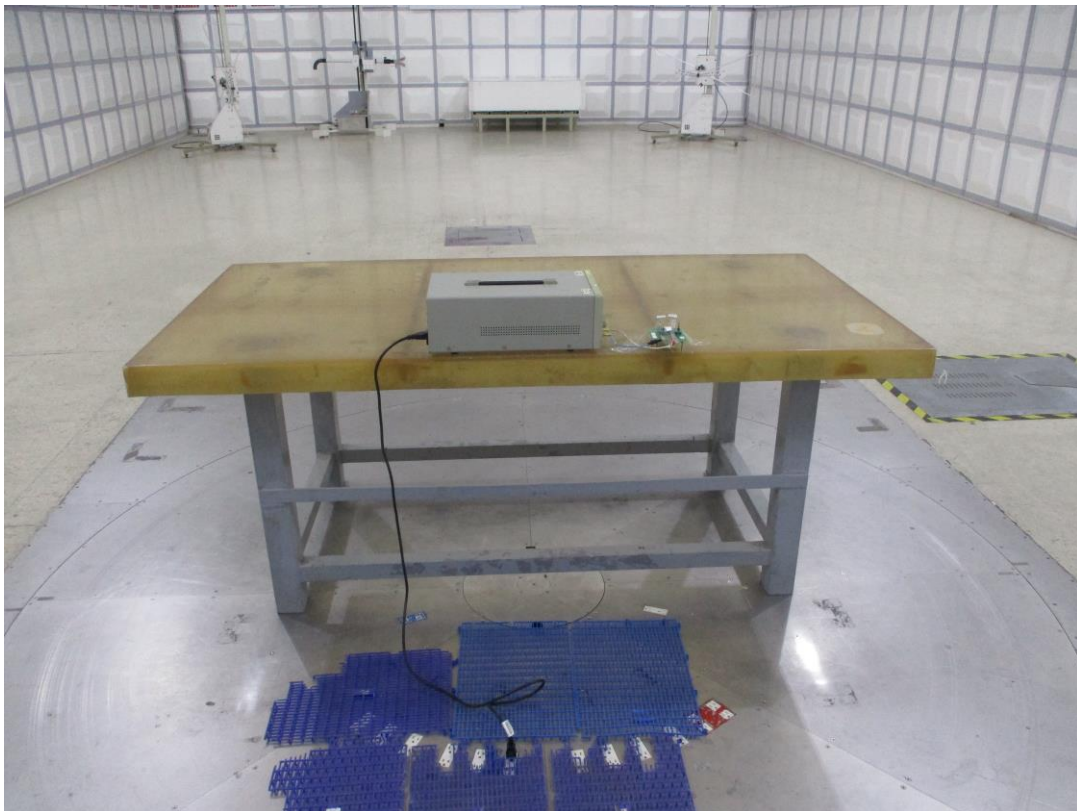
## 14.2 Radiated Emission at Frequencies up to 1GHz

For Mode 1, Mode 3, Mode 5





For Mode 2, Mode 4

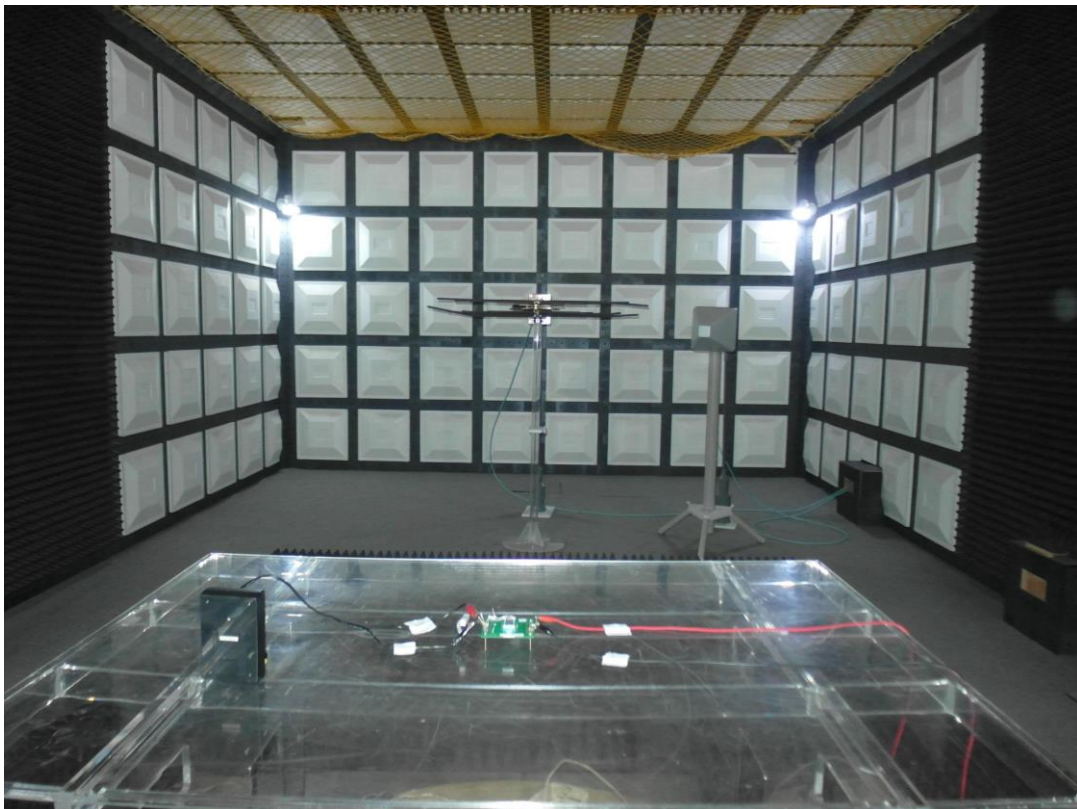
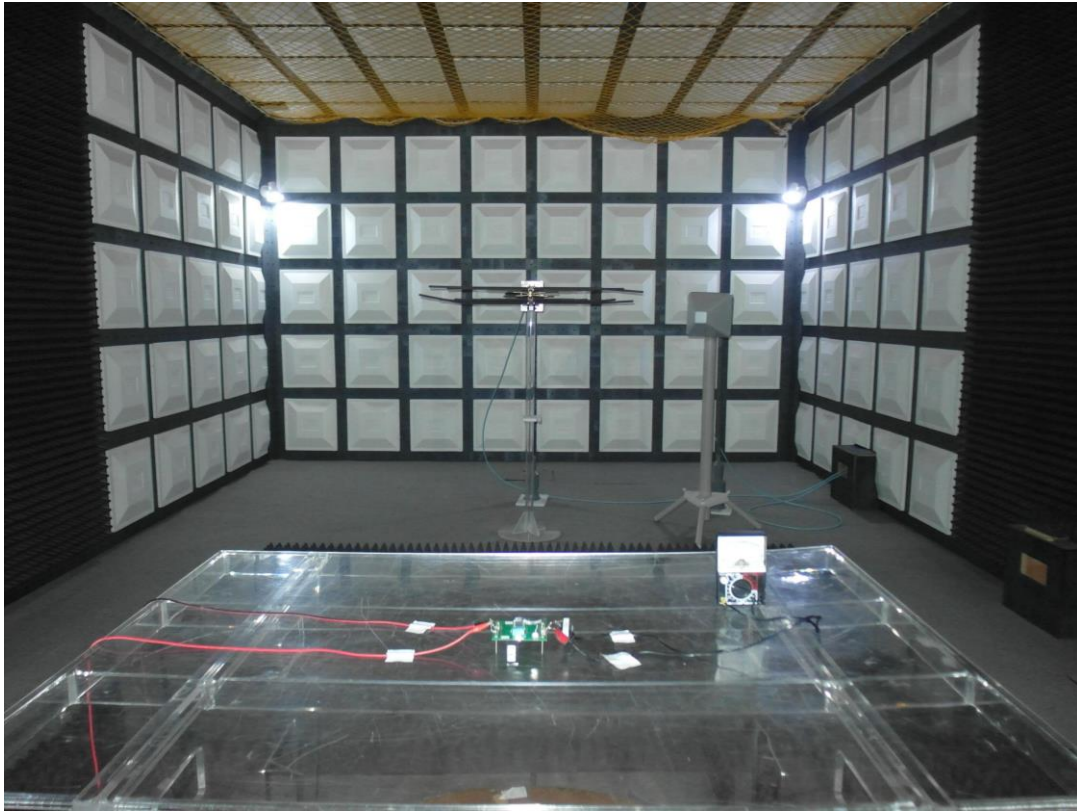


### 14.3 Electrostatic Discharge Immunity Test (ESD)

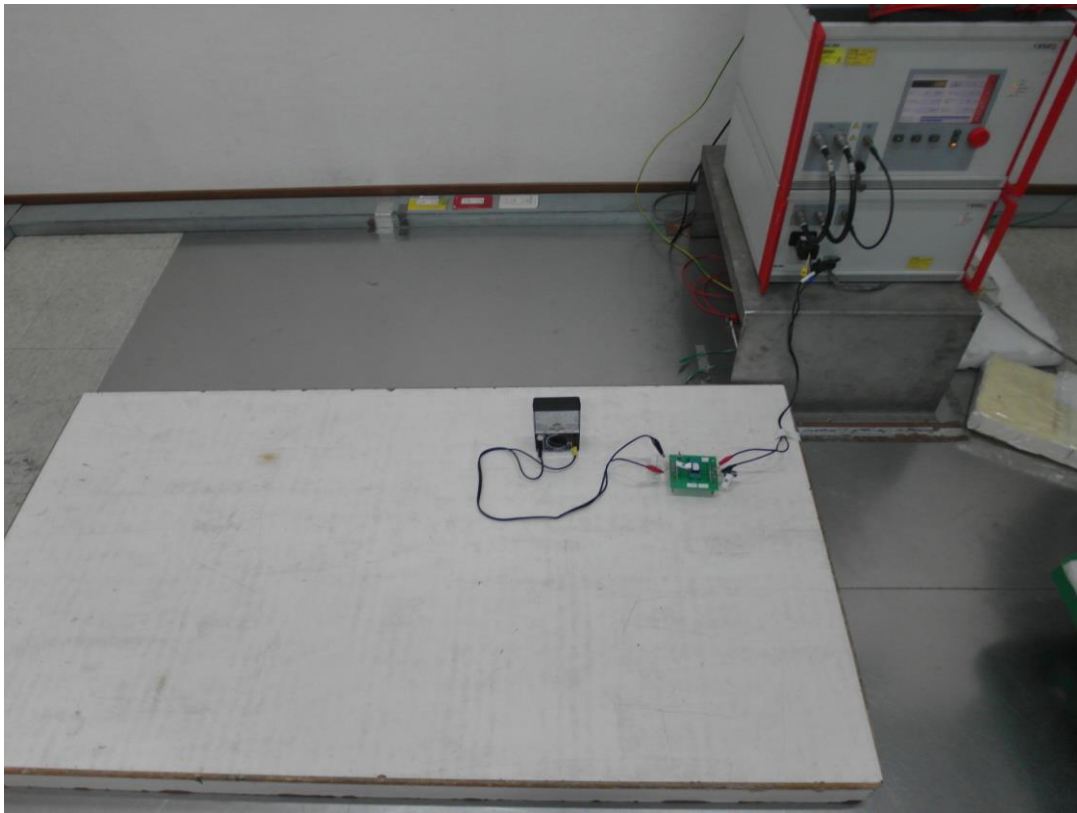




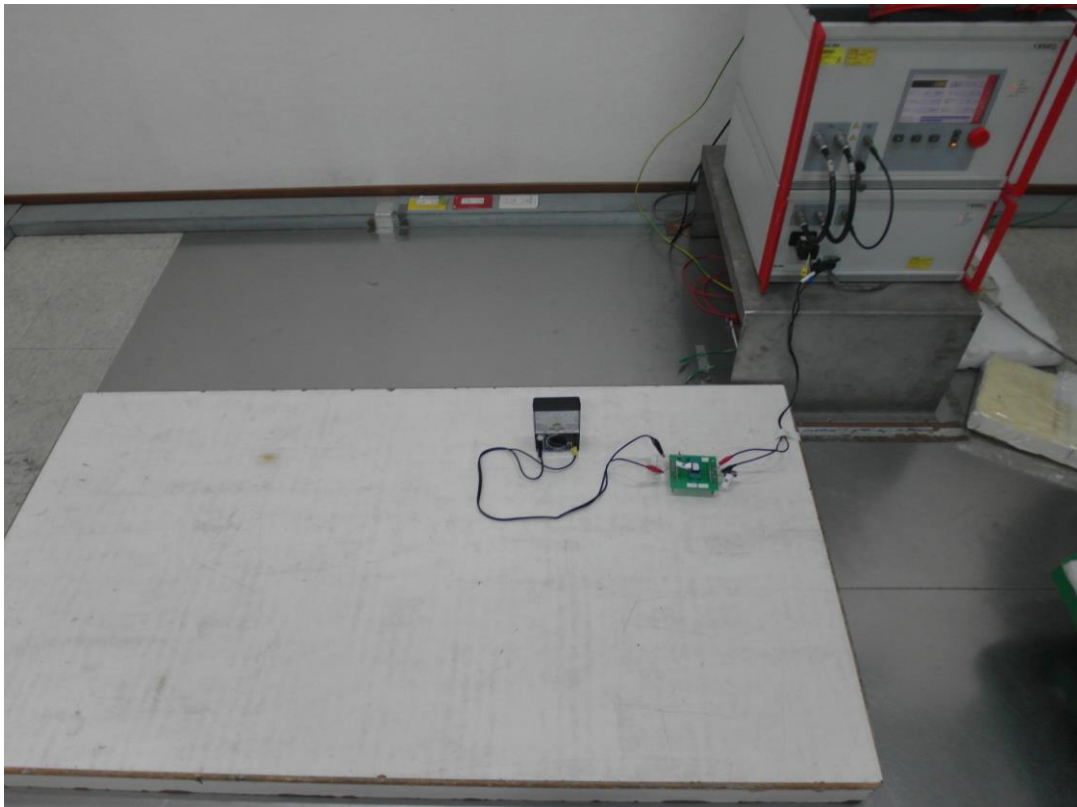
#### 14.4 Radio-frequency, Electromagnetic Field Immunity Test (RS)



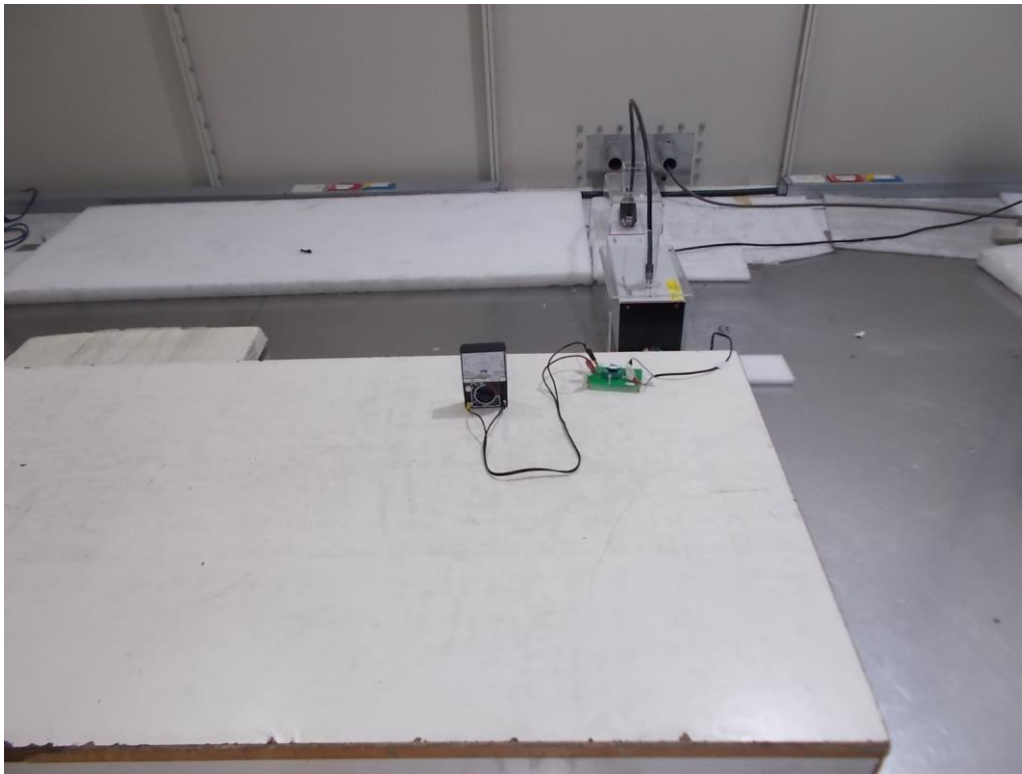
#### 14.5 Electrical Fast Transient/Burst Immunity Test (EFT)



#### 14.6 Surge Immunity Test



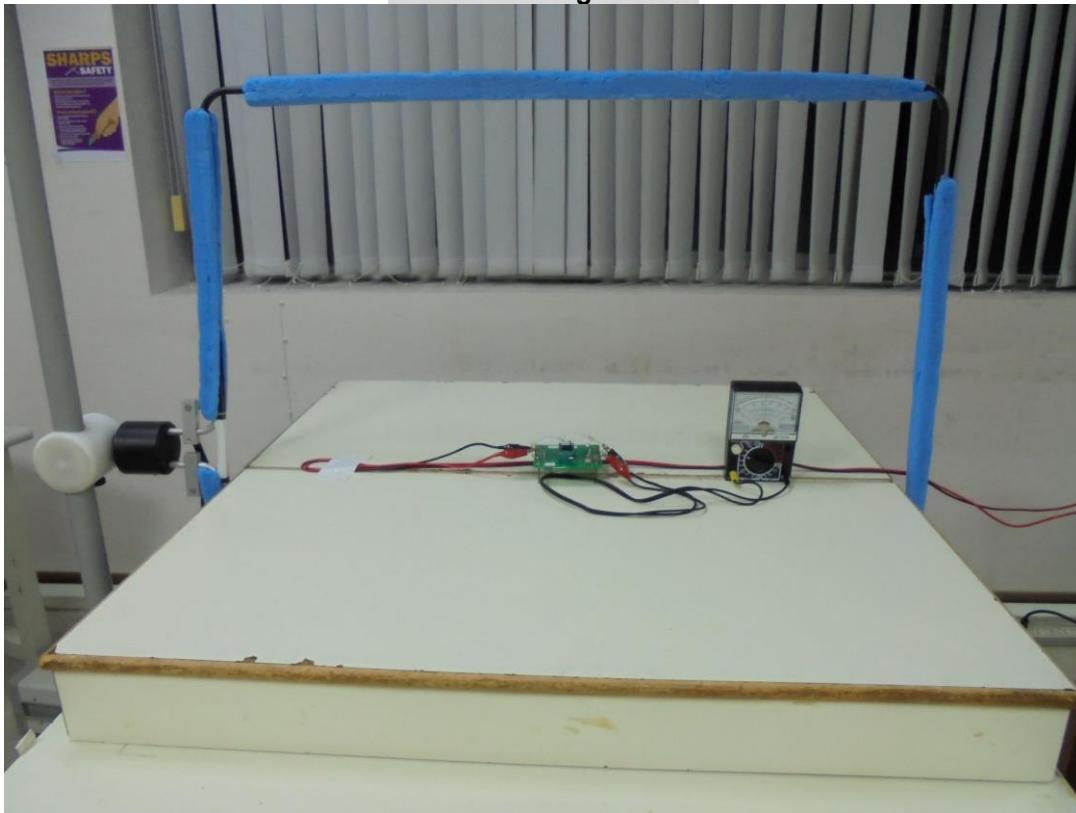
#### 14.7 Conducted Disturbances Induced by RF Fields (CS)



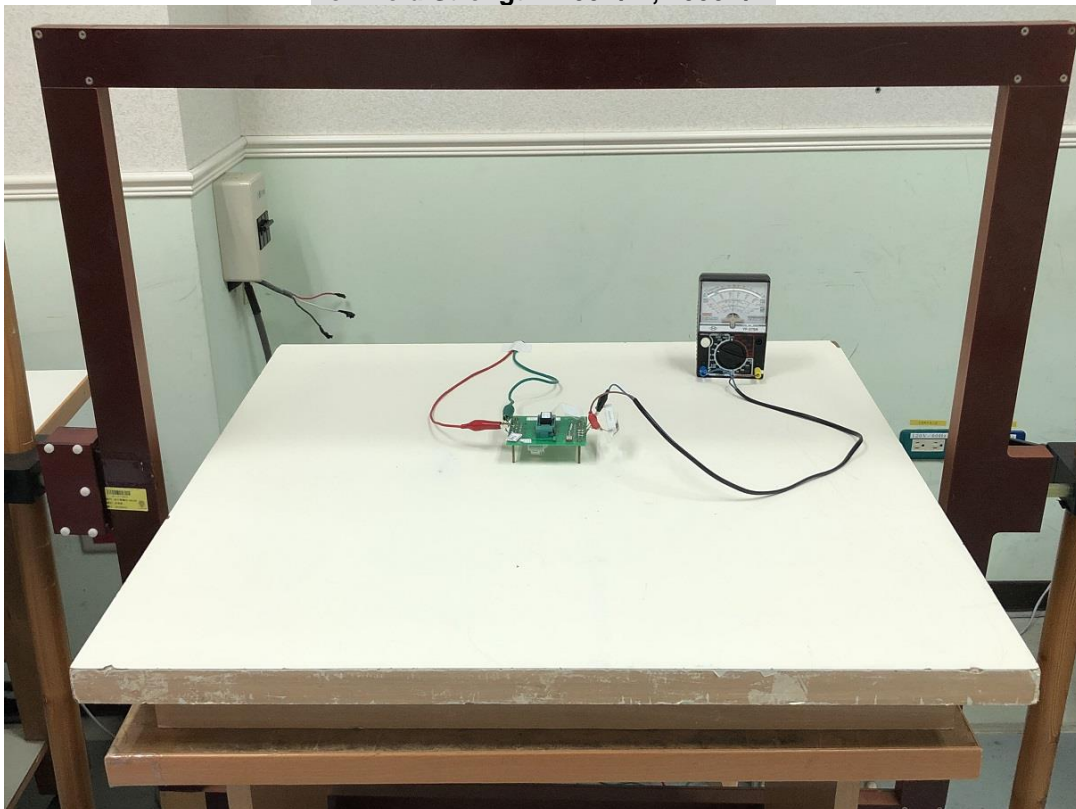


#### 14.8 Power Frequency Magnetic Field Immunity Test (PFMF)

For Field Strength: 1 A/m



For Field Strength: 100A/m, 1000A/m



## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

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