



Test Report for CE

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|--|---|--|--|----------------------|
| Report Number | ESTECE1608-008 | | | |
| Applicant | Company Name | Suprema HQ Inc. | | |
| | Address | 16F Parkview office Tower, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do | | |
| | Contact Person | Park Su Yeol | | |
| | Factory address | 16F Parkview office Tower, 248, Jeongjail-ro, Bundang-gu, Seongnam-si, Gyeonggi-do | | |
| Product | Product type | BioMini Slim S | | |
| | Model Name | BioMini Slim S | Manufacturer | Suprema HQ Inc. |
| | Serial No. | NONE | Country of origin | Korea |
| Other | Receipt Date | 11-Aug-16 | Receipt Number | ESTE-16-08058 |
| | Issued Date | 30-Aug-16 | Tested Date | 16/Aug/16 ~17/Aug/16 |
| Test Result | Complied | | | |
| Standard | EMI Standard | | EMS Standard | |
| | EN 55022:2010+AC:2011 Class A | | EN 55024:2010 EN 61000-4-2:2009 EN 61000-4-3:2006+A1:2008+A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014 EN 61000-4-6:2014 EN 61000-4-11:2004 | |
| Tested by | S.Y.Lee / Senior Engineer (Signature) | | | |
| Approved by | J.M. Yang / Engineering Manager (Signature) | | | |
| ESTECH CO., LTD 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do 467-811, R. O. Korea. Tel:82-31-631-8037, Fax:82-31-631-8039 | | | | |
| * Note | | | | |
| o Basic model : BioMini Slim S , Additional model : BioMini S3 o Basic model and additional model are same product , only model name are different by requested a applicant. o This is certified that the above mentioned products have been tested for the sample provided by client. o No part of this document may not be duplicated or reproduced by any means without the express written permission of Estech Co., Ltd. | | | | |

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1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and tested in accordance with the measurement procedures as indicated in this report ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab. assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Suite 1015 World Meridian II, 123 Gasan Digital 2-ro,
Geumcheon-gu, Seoul 153-759, R. O. Korea

EMC Test Lab. : 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si,
Gyeonggi-do 467-811, R. O. Korea

1.3 Registration Information

Our Test lab has worked test lab system by ISO/IEC 17025:2005 and was registered the follows certification body

MSIP : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecom.

KOLAS : Granted Accreditation from Ministry of commerce, Industry & Energy for EMC, Safety and Telecom

EK : Granted Accreditation from Ministry of commerce, Industry & Energy for Safety

FCC : Conformity Assessment Body(CAB) with registration number 659627 under APECTEL MRA between the RRA and the FCC.

VCCI : Granted Accreditation from Voluntary Control Council for Interference by Information Technology Equipment

2. Description of EUT

2.1 Summary of Equipment Under Test

~ EUT Name : BioMini Slim S
 ~ Model Number : BioMini Slim S
 ~ Serial Number : NONE
 ~ Manufacturer : Suprema HQ Inc.
 ~ Power Rating : DC 5 V (USB PORT)
 ~ Testing Voltage : AC 230 V, 50 Hz
 ~ X-tallist(s) or
 Frequencies : 480 Mbps
 generated

2.2 General descriptions of EUT

| Section | Specification |
|-----------------------|-----------------------------------|
| Sensor technology | Optical |
| Sensing area | 17.0mm x 25.0mm |
| Image size(pixels) | 320 x 480 |
| Image resolution | 500 dpi |
| Interface | USB 2.0 high speed and full speed |
| Dimension | 82mm(W) X 57.7mm(L) X 27mm(H) |
| Weight | Approximately 120g |
| USB Cable Length | Approximately 1450mm |
| Operating temperature | -10 °C ~ 50 °C |
| Max Current | 5VDC / 320mA |

3. Measurement Condition

3.1 EUT Operation.

- The EUT was in the following operation mode during all testing.

1. Executing self test program fingerprint
2. Operational status monitoring via fingerprint recognition

3.2 Cable Connecting

| Start Equipment | | End Equipment | | Cable | | Remark |
|-------------------|----------|-------------------|----------|--------|----------|--------|
| Name | I/O port | Name | I/O port | Length | Shielded | |
| BioMini Slim S | USB | Notebook computer | USB | 2.0 | Shielded | |
| Notebook computer | POWER | Adapter | - | 2.0 | Shielded | |
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3.3 EUT Configurations

| Equipment Name | Model Name | S/N | Manufacturer | Remark (CE ID) |
|-------------------|----------------|----------------------------|--|-------------------|
| BioMini Slim S | BioMini Slim S | NONE | Suprema HQ Inc. | EUT |
| Notebook computer | LG15N54 | 410NZPW023936 | LG Electronics Nanjing Display Co., Ltd | |
| Adapter | PA-1900-14 | OEO7263348701V5 94(1.0) | LITE-ON TECHNOLOGY (CHANGZHOU) CO., LTD | |
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4. Electromagnetic Interference Test

4.1 Measurement of radiated emission (Below 1 GHz)

In the range 30 MHz to 1 GHz Electric Field strength was measured in accordance with EN 55022:2010+AC:2011 Class A. The test setup was made according to EN 55022:2010+AC:2011 Class A on an 10 m Semi-Anechoic Chamber, which allows a 10 m distance measurement. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

4.1.1 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|--|-----------|-------------------|------------------------|-----------------------|
| TEST Receiver | ESCI7 | ROHDE & SCHWARZ | 100916 | 7-Dec-16 |
| Logbicon Antenna | VULB 9168 | SCHWARZBECK | 9168-193 | 30-Sep-16 |
| Turn Table | DT3000-2t | Innco System GmbH | N/A | N/A |
| Antenna Mast | MA4000-EP | Innco System GmbH | N/A | N/A |
| Antenna Master & Turn table controller | CO2000-P | Innco System GmbH | CO2000/641 /28051111/L | N/A |

4.1.2 Environmental conditions

| Section | Temperature (°C) | Humidity (% R.H.) |
|-------------------|----------------------------|-------------------|
| Radiated emission | 23.6 | 51.7 |
| Test Place | 10 m Semi-Anechoic Chamber | |

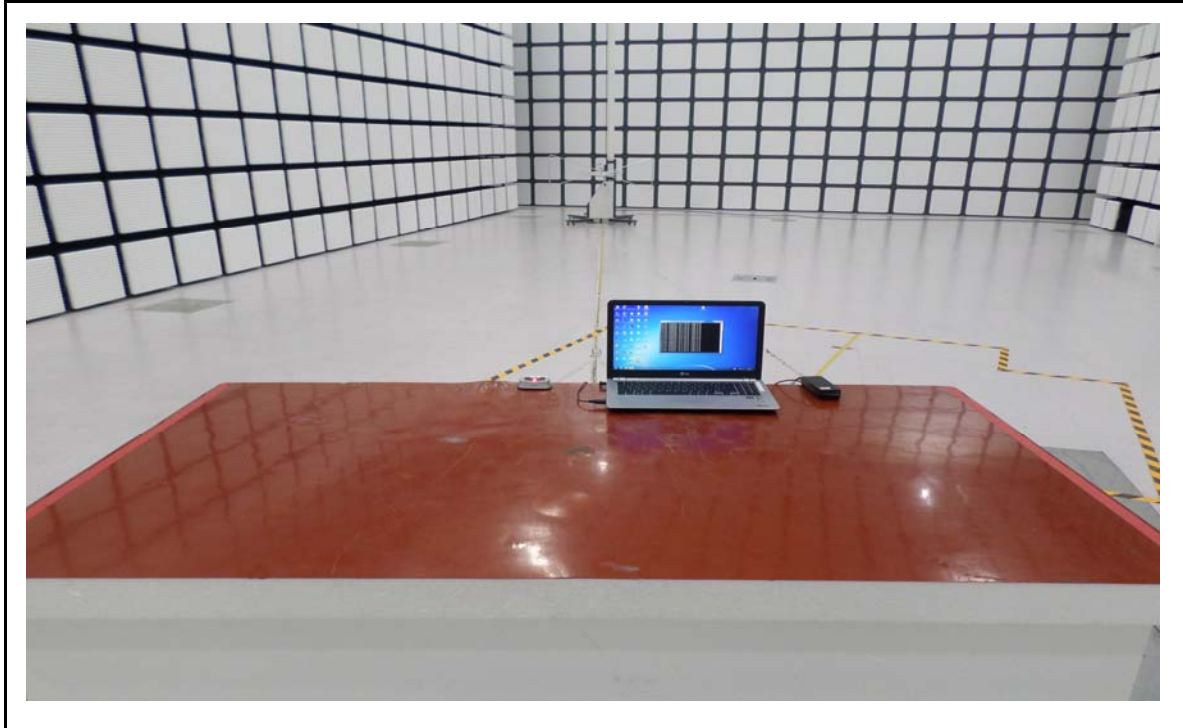
4.1.3 Test data

Test Date 16-Aug-16

| Frequency [MHz] | Reading [dBuV] | Position [V/H] | Height [m] | Correction Factor | | Result Value [dBuV/m] | | Margin [dB] |
|--------------------|---|-------------------|---------------|-------------------|--------------------|--------------------------|--------|----------------|
| | | | | Antenna [dB/m] | Cable etc. [dB] | Limit | Result | |
| 58.70 | 21.69 | V | 1.0 | 12.39 | 1.21 | 40.0 | 35.29 | 4.71 |
| 71.00 | 15.59 | V | 1.0 | 10.73 | 1.33 | 40.0 | 27.65 | 12.35 |
| 130.80 | 15.18 | V | 1.0 | 11.20 | 1.81 | 40.0 | 28.18 | 11.82 |
| 141.90 | 14.08 | V | 1.0 | 12.11 | 1.88 | 40.0 | 28.07 | 11.93 |
| 199.90 | 17.05 | V | 1.0 | 9.35 | 2.24 | 40.0 | 28.64 | 11.36 |
| 400.00 | 11.78 | H | 2.1 | 15.74 | 3.23 | 47.0 | 30.75 | 16.25 |
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| | | | | | | | | |
| Remark | H : Horizontal, V : Vertical Result Value = Reading + Antenna + Cable loss *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection | | | | | | | |

◆ Setup for Radiated Test

[Front]



[Rear]



4.2 Measurement of radiated emission(Above 1 GHz)

Above 1 GHz the radiated emission was measured in accordance with EN 55022:2010+AC:2011 Class B. The test setup was made according to EN 55022:2010+AC:2011 Class A on an 3 m Semi-Anechoic Chamber, which allows a 3 m distance measurement. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

4.2.1 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|--|--------------|-------------------|------------------------|-----------------------|
| Antenna Mast | MA4640-XP-ET | Innco System GmbH | N/A | N/A |
| Antenna Master & Turn table controller | CO3000 | Innco System GmbH | CO3000/931 /38240516/L | N/A |
| Turn Table | DT1500-S | Innco System GmbH | N/A | N/A |
| Horn Antenna | BBHA 9120D | SCHWARZBECK | 352 | 3-May-17 |
| PREAMPLIFIER | 8449B | AGILENT | 3008A00581 | 7-Dec-16 |
| Test Receiver | ESPI7 | Rohde & Schwarz | 100185 | 7-Dec-16 |

4.2.2 Environmental conditions

| Section | Temperature (°C) | Humidity (% R.H.) |
|-------------------|---------------------------|-------------------|
| Radiated emission | 23.3 | 54.1 |
| Test Place | 3 m Semi-Anechoic Chamber | |

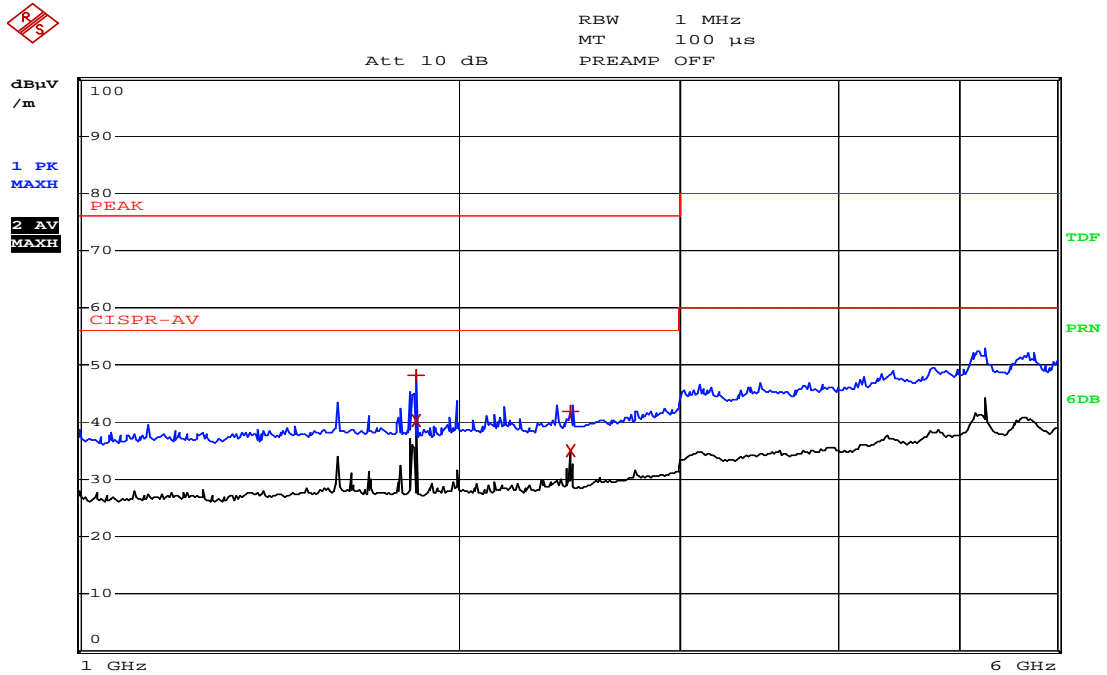
4.2.3 Test data

Test Date 16-Aug-16

| Frequency [MHz] | Reading [dBuV] | Position [V/H] | Height [m] | Correction Factor | | Result Value [dBuV/m] | | Margin [dB] |
|--------------------|---|-------------------|---------------|-------------------|--------------------|--------------------------|--------|----------------|
| | | | | Antenna [dB/m] | Cable etc. [dB] | Limit | Result | |
| Peak | | | | | | | | |
| 1848.00 | 52.11 | H | 1.0 | 26.35 | -30.25 | 76.0 | 48.21 | 27.79 |
| 1848.00 | 50.61 | V | 1.0 | 26.35 | -30.25 | 76.0 | 46.71 | 29.29 |
| 2464.00 | 43.39 | H | 1.0 | 27.89 | -29.30 | 76.0 | 41.98 | 34.02 |
| 2464.00 | 45.28 | V | 1.0 | 27.89 | -29.30 | 76.0 | 43.87 | 32.13 |
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| Cispr Average | | | | | | | | |
| 1848.00 | 44.18 | H | 1.0 | 26.35 | -30.25 | 56.0 | 40.28 | 15.72 |
| 1848.00 | 40.11 | V | 1.0 | 26.35 | -30.25 | 56.0 | 36.21 | 19.79 |
| 2464.00 | 36.37 | H | 1.0 | 27.89 | -29.30 | 56.0 | 34.96 | 21.04 |
| 2464.00 | 39.04 | V | 1.0 | 27.89 | -29.30 | 56.0 | 37.63 | 18.37 |
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| Remark | H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss-Amplifier Gain | | | | | | | |
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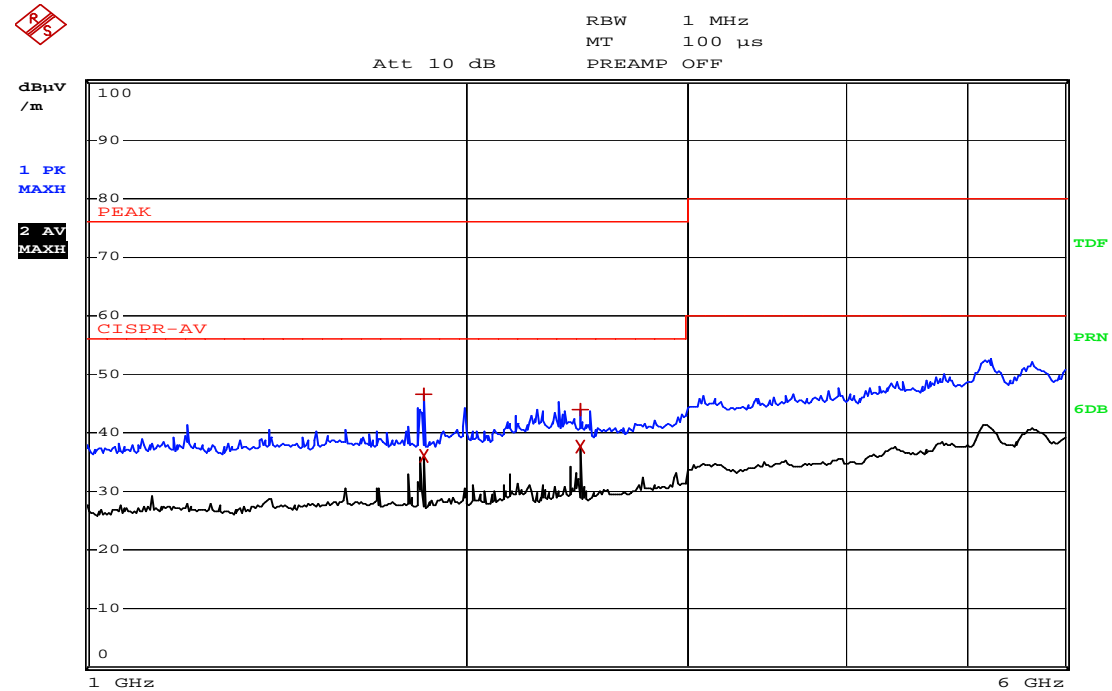
4.2.4 Test data graph

Horizontal (1 GHz to 6 GHz)



Comment: ESTE-16-08058_HOR
Date: 16.AUG.2016 11:26:38

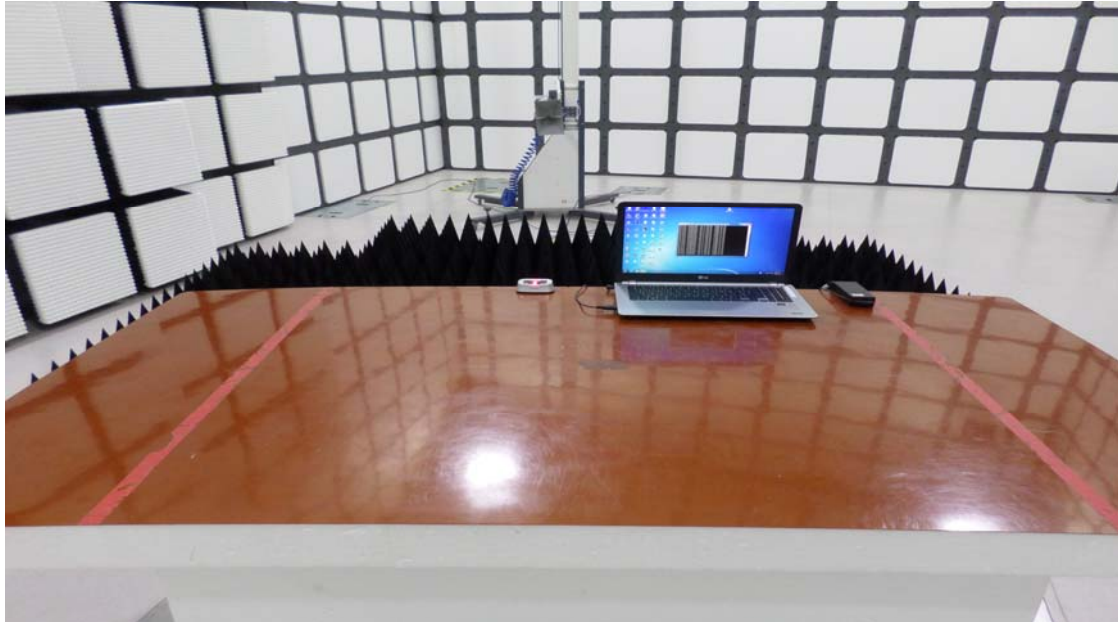
Vertical (1 GHz to 6 GHz)



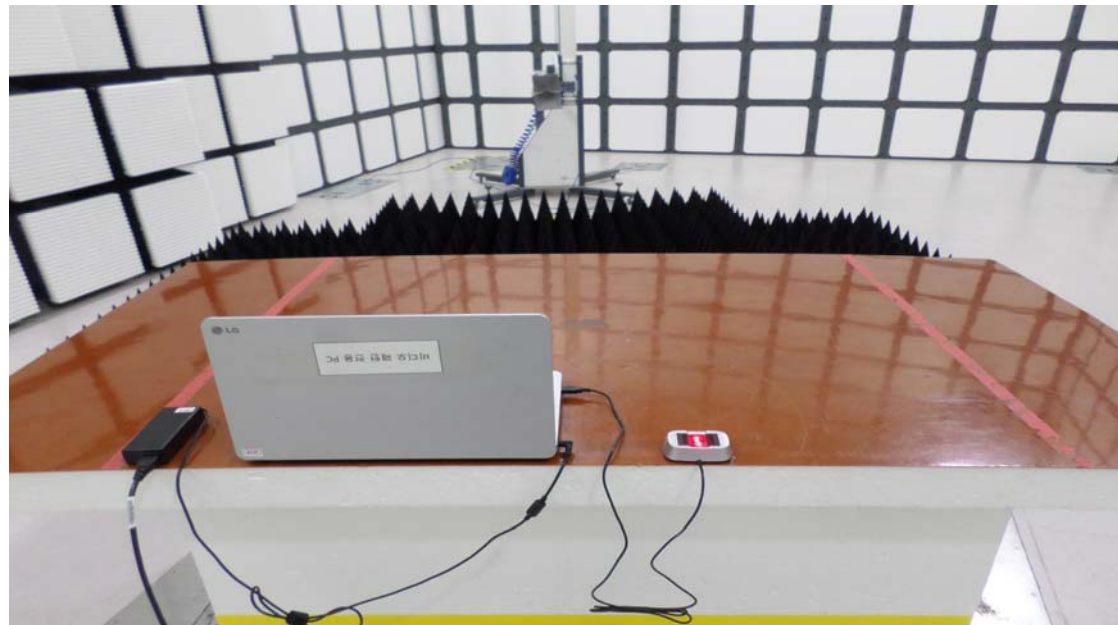
Comment: ESTE-16-08058_VER
Date: 16.AUG.2016 11:23:47

◆ Setup for Radiated Test

[Front]



[Rear]



4.3 Conducted emission test

The continuous disturbance voltage of AC Mains was measured in accordance to EN 55022:2010+AC:2011 Class A. The test setup was made according to EN 55022:2010+AC:2011 Class A in a shielded Room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plane. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi peak detector.

4.3.1 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|----------------|---------|-----------------|------------|-----------------------|
| Pulse Limiter | ESH3-Z2 | ROHDE & SCHWARZ | NONE | 7-Dec-16 |
| TEST Receiver | ESPI | ROHDE & SCHWARZ | 100005 | 7-Dec-16 |
| LISN | ESH3-Z5 | ROHDE & SCHWARZ | 836679/025 | 7-Dec-16 |

4.3.2 Environmental conditions

| Section | Temperature (°C) | Humidity (% R.H.) |
|--------------------|------------------|-------------------|
| Conducted emission | 23.5 | 51.4 |
| Test Place | Shielded Room | |

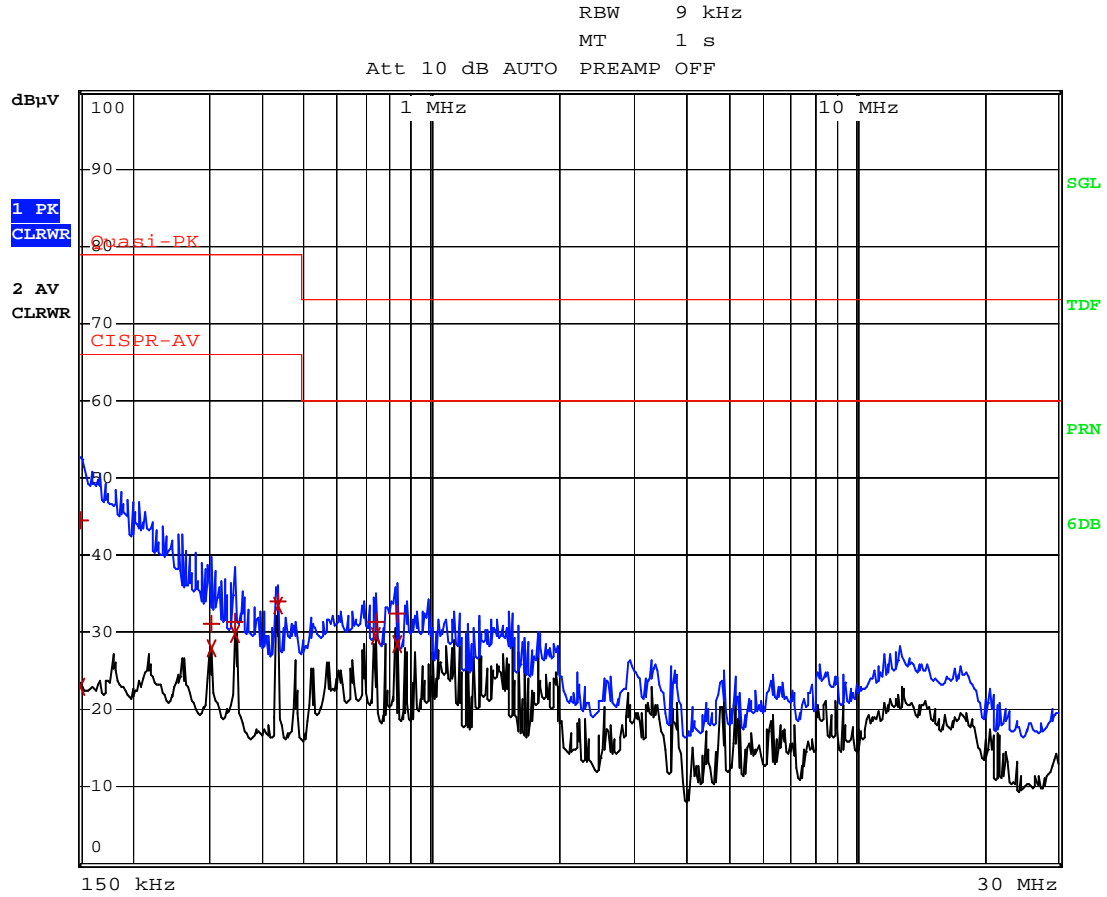
4.3.3 Test data

Test Date 16-Aug-16

| Frequency (MHz) | Correction Factor (dB) | | Line (H/N) | Quasi-peak Value (dBuV) | | | Average Value (dBuV) | | |
|--------------------|---|------------|---------------|----------------------------|---------|--------|-------------------------|---------|--------|
| | LISN | Cable etc. | | Limit | Reading | Result | Limit | Reading | Result |
| 0.15 | 0.13 | 0.12 | N | 79.0 | 44.55 | 44.80 | 66.0 | | |
| 0.18 | 0.13 | 0.13 | N | 79.0 | 40.95 | 41.21 | 66.0 | | |
| 0.39 | 0.14 | 0.16 | N | 79.0 | 35.19 | 35.49 | 66.0 | | |
| 0.74 | 0.14 | 0.18 | H | 73.0 | 31.43 | 31.75 | 60.0 | | |
| 0.83 | 0.14 | 0.18 | N | 73.0 | 33.08 | 33.41 | 60.0 | | |
| 0.87 | 0.15 | 0.19 | N | 73.0 | 31.75 | 32.08 | 60.0 | | |
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| Remark | * H : HOT, N : NEUTRAL * Correction factor=LISN factor + Cable loss * According to Clause9, EN 55022, Average data do not require because Quasi-peak value is less than average limit | | | | | | | | |

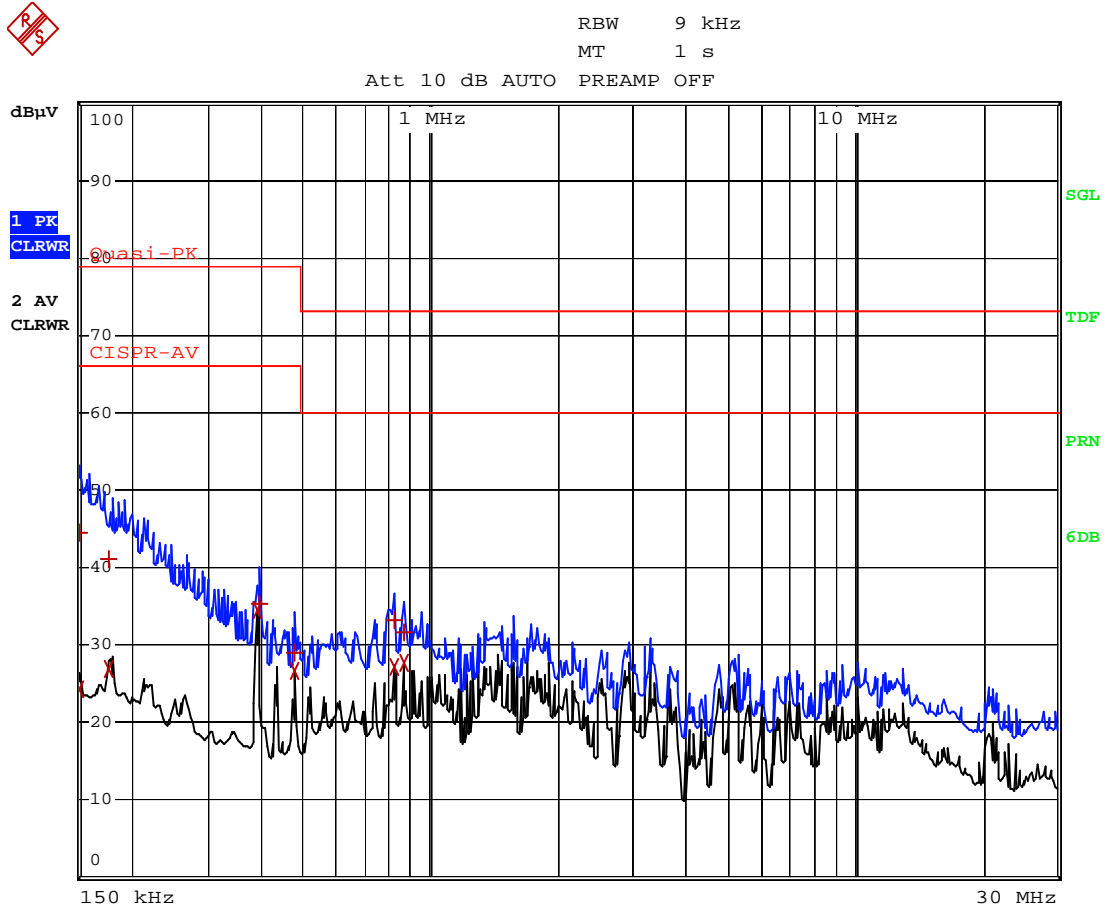
4.3.4 Spectral Diagram

◆ HOT Line



Comment: ESTE-16-08058_HOT
Date: 16.AUG.2016 09:38:14

◆ NEUTRAL Line



Comment: ESTE-16-08058_NEUTRAL
Date: 16.AUG.2016 09:40:42

◆ Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]



[Rear]



4.3.5 Test data (Telecommunication Port)-(N/A)

Test Date :

| Frequency (MHz) | Correction Factor (dB) | | Line (T) | Quasi-peak Value (dBuV) | | | Average Value (dBuV) | | |
|--------------------|---|------------|-------------|----------------------------|---------|--------|-------------------------|---------|--------|
| | ISN | Cable etc. | | Limit | Reading | Result | Limit | Reading | Result |
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| Remark | T : Telecommunication port *Result Value=Reading+Correction Factor *Correction Factor=ISN factor+Cable loss | | | | | | | | |

4.3.6 Spectral Diagram

N/A



◆ Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]

N/A

[Rear]

N/A

4.4 Limits concerning harmonic current test-(N/A)

The harmonics on AC Mains in the frequency from 0 kHz to 2 kHz were measured in accordance to EN 61000-3-2:2014

The objective of this standard is to set limits for harmonic emissions of equipment within its scope, so that, with due allowance for the emissions from other equipment, compliance with the limits ensures that harmonic disturbance do not exceed the compatibility levels defined in EN 61000-3-2.

For the purpose of harmonic current limitation, equipment is classified as follows.

Class A : - Balanced three-phase equipment;

- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Equipment not specified in one of the three other classes shall be considered as Class B equipment.

Class B : - Portable tools;

- Arc welding equipment which is not professional equipment.

Class C : - Lighting equipment.

Class D : Equipment having a specified power less than or equal to 600 W, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.

4.4.1 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|--------------------------------|----------|--------------|-------------|-----------------------|
| Test System | PHF555 | HAEFELY | 080419-11 | 9-Sep-16 |
| Harmonic & Flicker Test System | DPA 550N | EM Test AG | V1033107193 | 9-Sep-16 |

4.4.2 Environmental Conditions

| Section | Temperature (°C) | Humidity (% R.H.) |
|---------------|------------------|-------------------|
| Harmonic test | | |



◆ Setup Figure

N/A

4.4.3 Test data

Test Date :

**This test does not require because the EUT
supplied by powered DC voltage.**

4.5 Limits Concerning Voltage Fluctuations & Flicker test-(N/A)

The voltage fluctuations on AC mains in the frequency range from 0 kHz to 2 kHz were measured in accordance to EN 61000-3-3:2013

4.5.1 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|--------------------------------|----------|--------------|-------------|-----------------------|
| Test System | PHF555 | HAEFELY | 080419-11 | 9-Sep-16 |
| Harmonic & Flicker Test System | DPA 550N | EM Test AG | V1033107193 | 9-Sep-16 |

4.5.2 Environmental Conditions

| Section | Temperature (°C) | Humidity (% R.H.) |
|--------------|------------------|-------------------|
| Flicker test | | |



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◆ Setup Figure

N/A

4.5.3 Test data

Test Date :

**This test does not require because the EUT
supplied by powered DC voltage.**

5. Electromagnetic Susceptibility Test

5.1 Electrostatic Discharge test

5.1.1 Test Standard

- Standard : EN 61000-4-2:2009
- Performance appraisal standard : B
- Energy storage capacitance : 150 pF ($\pm 10\%$)
- Discharge resistance : 330 Ω ($\pm 10\%$)
- Charging resistance : 50 M Ω (50 M Ω ~ 100 M Ω)
- Tolerance of the output voltage indication : $\pm 5\%$
- Polarity of the output voltage : Positive(+) and Negative(-)
- Holding time : at least 5 s
- Discharge, Mode of operation : Single discharge
- Interval discharge time : At least 1 s
- Repetition time : At least 200 discharges. 100 each at negative and positive polarity of four test points (a minimum of 50 discharges of each point)
 - At least 50 indirect discharge(contact) to the center of the front edge of the horizontal coupling plane
 - At least 200 indirect discharges shall be applied in the indirect mode use of the vertical conducting plane.

5.1.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|----------------|-----------|--------------|------------|-----------------------|
| ESD Generator | PESD 1600 | HAEFELY | H605105 | 21-May-17 |

5.1.3 Environmental Conditions

| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 23.5 | 51.4 | 100.1 |

5.1.4 Test data

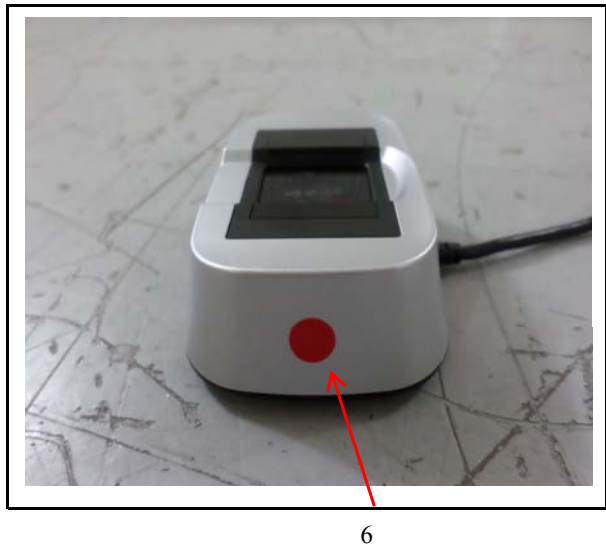
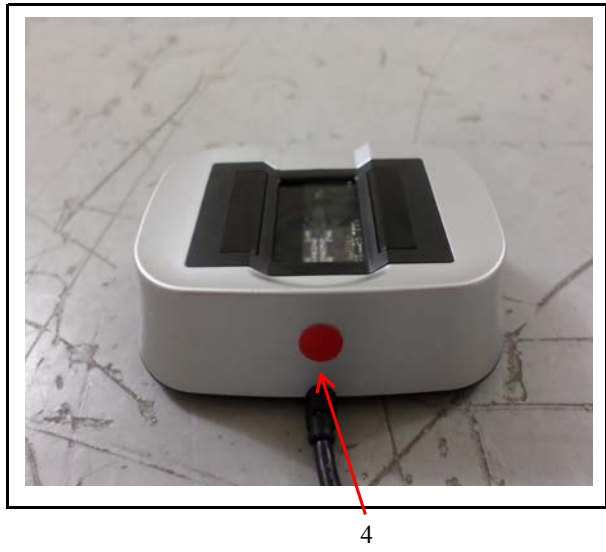
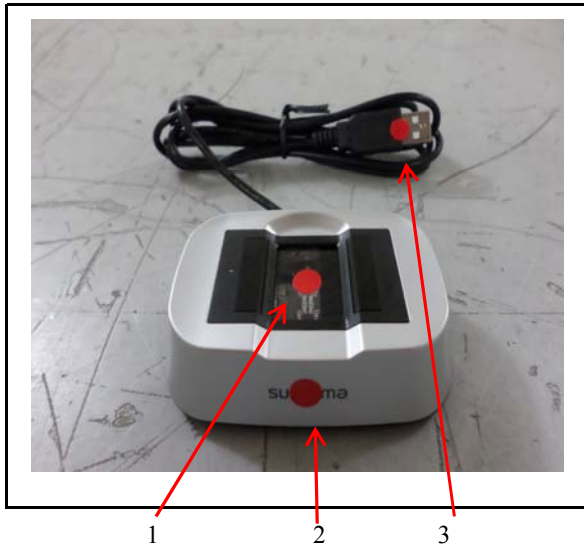
Test Date 16-Aug-16

| Point | Test Method | Test Voltage (+/-) | Criterion | Result | Remark |
|-----------|-----------------------------------|--------------------|-----------|--------|--------|
| HCP | Horizontal Coupling | 4 kV | B | A | |
| VCP | Vertical Coupling | 4 kV | B | A | |
| 1 | Air discharge | 2,4,8 kV | B | A | |
| 2 | Air discharge | 2,4,8 kV | B | A | |
| 3 | Air discharge | 2,4,8 kV | B | A | |
| 4 | Air discharge | 2,4,8 kV | B | A | |
| 5 | Air discharge | 2,4,8 kV | B | A | |
| 6 | Air discharge | 2,4,8 kV | B | A | |
| Reference | Line color : RED-Air BLUE-Contact | | | | |

◆ Setup Figure



◆ Test Point



1. The front fingerprint cover part
3. The USB port part
5. The left cover part

2. The front cover part
4. The rear cover part
6. The right cover part

HCP: Indirect Discharge

VCP : Indirect Discharge

5.2 Radiated Electromagnetic Fields test

5.2.1 Test Standard

- Standard : EN 61000-4-3:2006+A1:2008+A2:2010
- Criterion standard : A
- Frequency Range : 80 MHz ~ 1000 MHz
- Test Angle : 0°, 90°, 180°, 270°
- Sweep Capability : 1.5×10^{-3} decade/s
- Step Size : 1% of Fundamental
- Antenna Polarity : Horizontally/Vertically
- Measurement Distance : 3 m
- Modulation : AM 80% with 1 kHz sine wave
- Dwell time : 3 s
- Field Strength: 3 V/m

5.2.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|--------------------------------------|----------|--------------|---------------|-----------------------|
| TEST System (SIGNAL GENERATOR) | RGN6000B | DARE | 15I00075SNO01 | 16-Nov-16 |
| TEST System (RADIFIELD Amplifier) | RFS1006N | DARE | 15I00045SNO16 | 16-Nov-16 |
| Logbicon Antenna | VULB9166 | Schwarzbeck | 9166 1066 | N/A |
| POWER AMPLIFIER | MT400 | PRANA | 1601-1800 | 18-Mar-17 |

5.2.3 Environmental Conditions

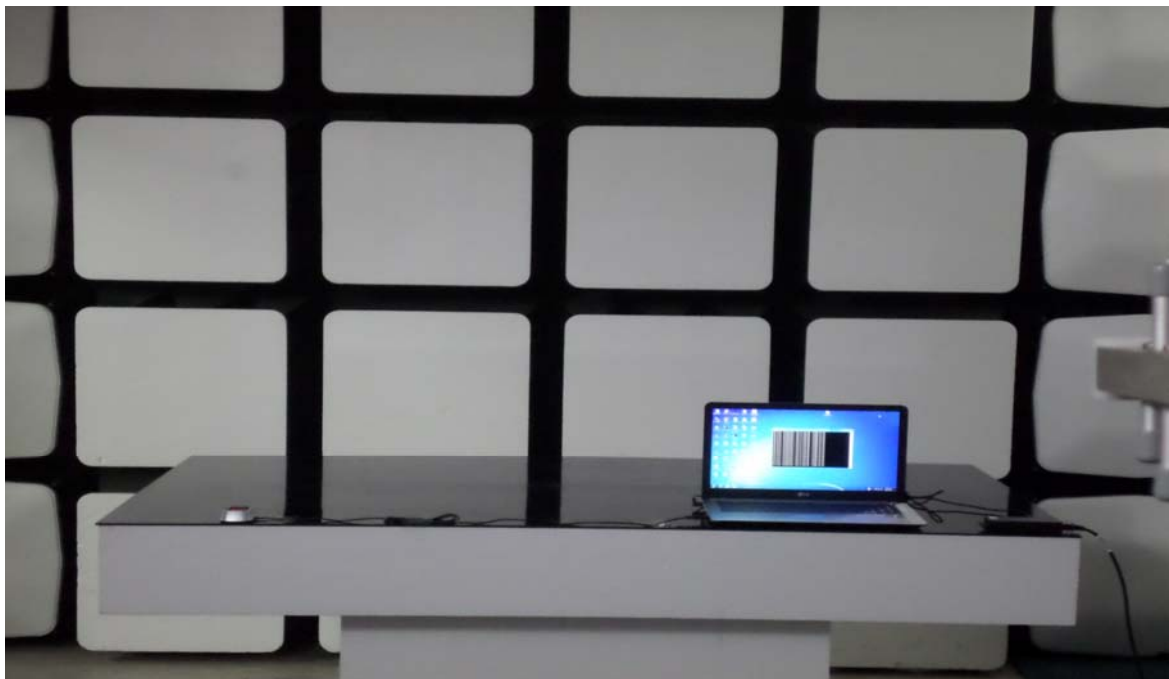
| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 22.9 | 48.6 | 100.1 |

5.2.4 Test data

Test Date : 16-Aug-16

| Range of Frequency (MHz) | Position | Polarity | Electromagnetic Intensity (V/m) | Criterion | Result |
|--------------------------|------------|------------------------------------|---------------------------------|-----------|--------|
| 80 MHz ~ 1 GHz | Front side | H | 3 | A | A |
| | | V | 3 | A | A |
| | Right side | H | 3 | A | A |
| | | V | 3 | A | A |
| | Left side | H | 3 | A | A |
| | | V | 3 | A | A |
| | Rear side | H | 3 | A | A |
| | | V | 3 | A | A |
| Reference | | H : Horizontality, V : Verticality | | | |

◆ Setup Figure



5.3 Electrical Fast Transients/Burst test

5.3.1 Test Standard

- Standard : EN 61000-4-4:2012
- Performance appraisal standard : B
- Test voltage : AC power : ± 1 kV , other port : 0.5 kV
- Polarity : Positive(+), Negative(-)
- Repetition Frequency : 5 kHz
- Duration Time : 60 s

5.3.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|---------------------|------------|-----------------------|------------|-----------------------|
| Compact Test System | ECOMPACT 4 | Haefely Test AG.Basel | 153528 | 7-Dec-16 |
| | | | | |
| | | | | |

5.3.3 Environmental Conditions

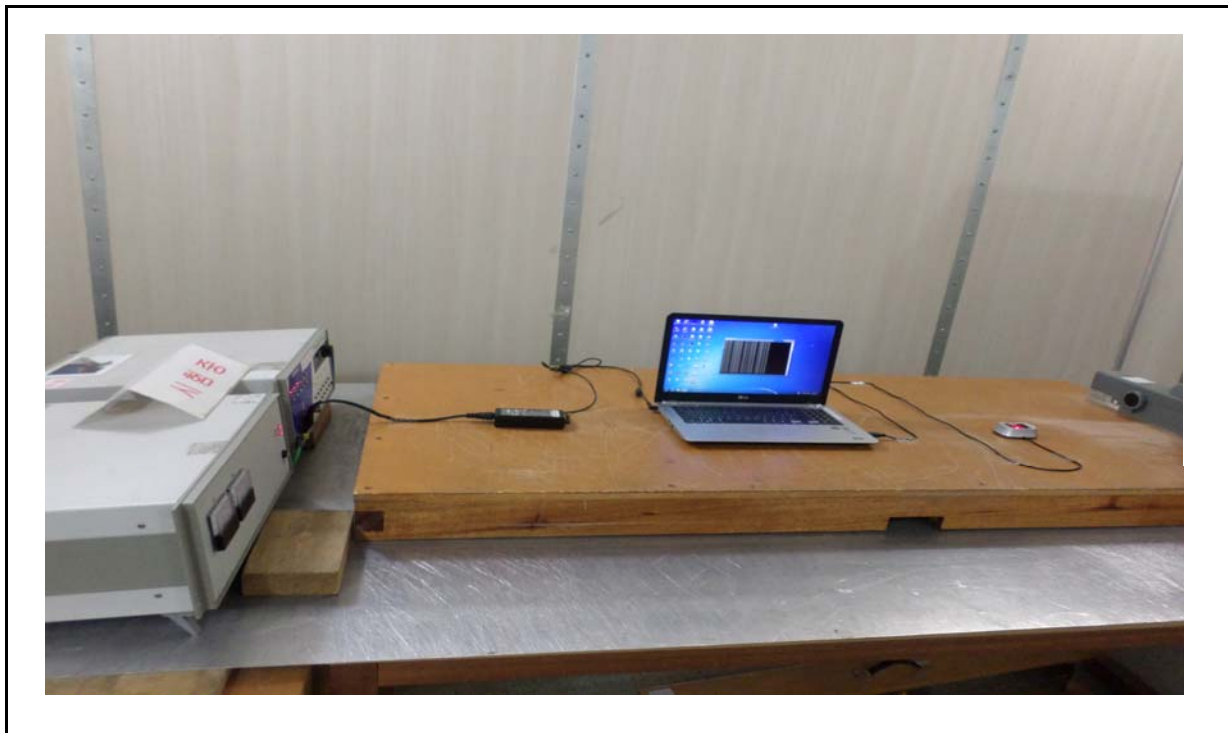
| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 23.1 | 51.4 | 100.3 |

5.3.4 Test data

Test Date : 17-Aug-16

| Tested Point | | Test Voltage | Duration Time (s) | Criterion | Result | Remark |
|--------------|--|--------------|-------------------|-----------|--------|--------|
| Input CC | L1-L2-PE | ± 1 kV | 60 s | B | A | |
| | | | | | | |
| Reference | L1: Line, L2: Neutral, PE: Protective earth (Ground) | | | | | |

◆ Setup Figure



5.4 Surge Test

5.4.1 Test Standard

- Standard : EN 61000-4-5:2014
- Performance appraisal standard : B
- Test voltage AC : line-earth : ± 2 kV, line-line : ± 1 kV,
Telecom. & signal : Line-earth : ± 1 kV, DC port : ± 0.5 kV
- Polarity : Positive(+), Negative(-)
- Repetition rate: max 1/min.
- Number of tests: at least five positive and five negative at the selected points.
- Phase shifting: in a range between 0 to 360 versus the a.c. line phase angle.

5.4.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|---------------------|------------|-----------------------|------------|-----------------------|
| Compact Test System | ECOMPACT 4 | Haefely Test AG.Basel | 153528 | 7-Dec-16 |
| | | | | |
| | | | | |

5.4.3 Environmental Conditions

| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 23.1 | 51.4 | 100.3 |

5.4.4 Test data

Test Date : 17-Aug-16

| Tested Point | | Test Voltage | Criterion | Result | Remark |
|--------------|-------|--|-----------|--------|--------|
| Input CC | L1-L2 | $\pm 1 \text{ kV}$ | B | A | |
| | L1-PE | $\pm 2 \text{ kV}$ | B | A | |
| | L2-PE | $\pm 2 \text{ kV}$ | B | A | |
| Reference | | L1: Line, L2: Neutral, PE: Protective earth (Ground) | | | |

◆ Setup Figure



5.5 Conducted Disturbance test

5.5.1 Test Standard

- Standard : EN 61000-4-6:2014
- Performance appraisal standard : A
- Frequency Range : (0.15 ~ 80) MHz
- Field Strength : 3.0 V
- Modulation : AM 80 % with 1 kHz sine wave
- Dwell time : 3 s
- Sweep Capability : 1.5×10^{-3} decade/s
- Step Size : 1 % of Fundamental

5.5.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|-----------------------------------|----------------|----------------------|---------------|-----------------------|
| TEST System (SIGNAL GENERATOR) | RGN6000B | DARE | 15I00075SNO01 | 16-Nov-16 |
| AMPLIFIER | 75A250AM1 | AMPLIFIER RESERCH | 312197 | 7-Dec-16 |
| Attenuator | 50FH-006-300-2 | AMPLIFIER RESERCH | N/A | 7-Dec-16 |
| Coupling Decoupling Network | CDN M016 | Teseq GmbH | 27445 | 7-Dec-16 |

5.5.3 Environmental Conditions

| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 23.4 | 50.9 | 100.3 |

5.5.4 Test data

Test Date : 17-Aug-16

| Freq [MHz] | Level [V] | Tested point | Criterion | Result | Remark |
|------------|-----------|--------------|-----------|--------|--------|
| 0.15 ~ 80 | 3 | Mains(M3) | A | A | |
| | | | | | |
| Reference | | | | | |

◆ Setup Figure



5.6 Voltage Dips and Interruptions test

5.6.1 Test Standard

- Standard : EN 61000-4-11:2004
- Performance appraisal standard and Voltage Reduction
 - >95 % 250 cycles : C , >95 % 0.5cycles : B, 30 % 25 cycles : C
- Number of pulses : 3 at each level
- Recovery time between pulses : 10 s
- Additional angles : 45°, 90° , 135° , 180° , 225° , 270° , 315°

5.6.2 Measurement equipments

| Equipment Name | Type | Manufacturer | Serial No. | Next Calibration date |
|---------------------|------------|-----------------------|------------|-----------------------|
| Compact Test System | ECOMPACT 4 | Haefely Test AG.Basel | 153528 | 7-Dec-16 |
| Motorized Variac | PEV 1610 | Haefely Test AG.Basel | 154005 | N/A |

5.6.3 Environmental Conditions

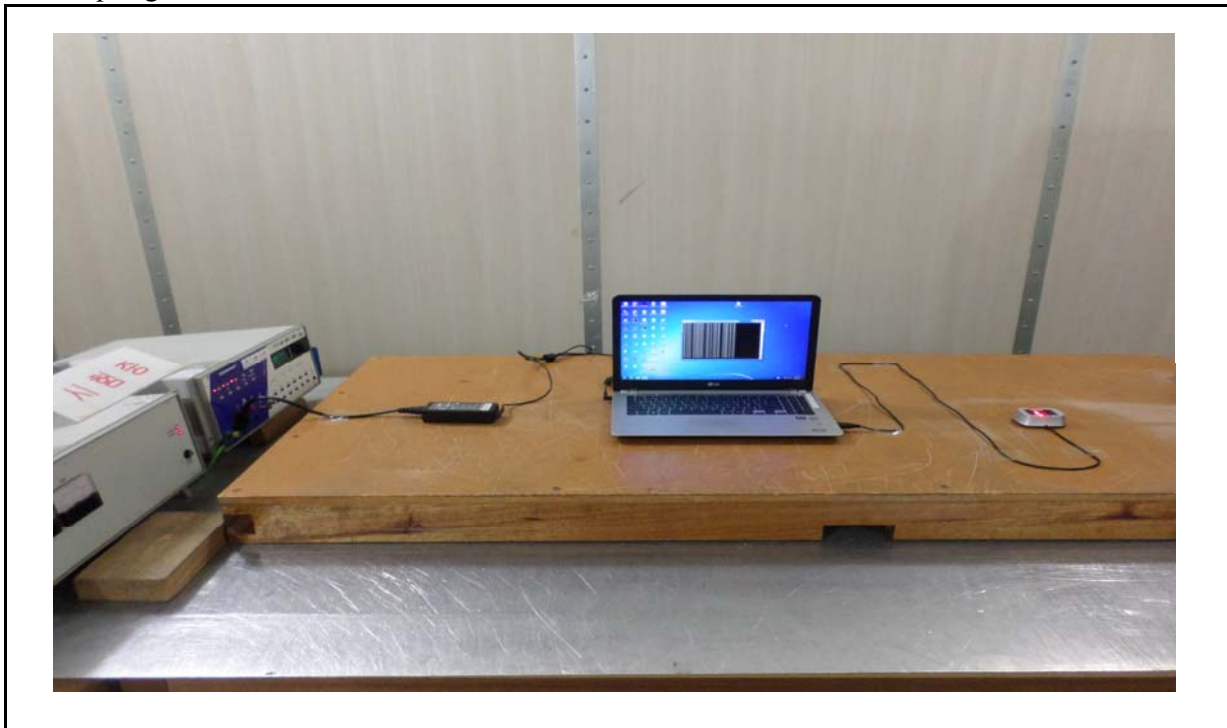
| Temperature (°C) | Relative Humidity (% R.H.) | Pressure (kPa) |
|------------------|----------------------------|----------------|
| 23.1 | 51.4 | 100.3 |

5.6.4 Test data

Test Date : 17-Aug-16

| Voltage Reduction | Duration Cycles | criteria | Result | Remark |
|-------------------|-----------------|----------|--------|--------|
| > 95 % | 0.5 | B | A | |
| 30% | 25 | C | A | |
| > 95 % | 250 | C | A | |
| Reference | | | | |

◆ Setup Figure



6. EUT Photographs

[Front]



[Rear]





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[In side]

