

# Test Report for FCC

FCC ID :TKWBSA2-OEPW

|                                                                                                                                                                                                                                                                                                                      |                                                                                             |                                                                                        |                                             |             |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------|-------------|----|
| Report Number                                                                                                                                                                                                                                                                                                        |                                                                                             | ESTEFC1603-004                                                                         |                                             |             |    |
| Applicant                                                                                                                                                                                                                                                                                                            | Company name                                                                                | SUPREMA INC                                                                            |                                             |             |    |
|                                                                                                                                                                                                                                                                                                                      | Address                                                                                     | 16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea |                                             |             |    |
|                                                                                                                                                                                                                                                                                                                      | Telephone                                                                                   | 82-31-710-4908                                                                         |                                             |             |    |
|                                                                                                                                                                                                                                                                                                                      | Contact Person                                                                              | Kyung-Jin Hong                                                                         |                                             |             |    |
|                                                                                                                                                                                                                                                                                                                      | Factory address                                                                             | 16F Parkview Office Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea |                                             |             |    |
| Product                                                                                                                                                                                                                                                                                                              | Product name                                                                                | Biostation A2                                                                          |                                             |             |    |
|                                                                                                                                                                                                                                                                                                                      | Model No.                                                                                   | BSA2-OEPW                                                                              | Manufacturer                                | SUPREMA INC |    |
|                                                                                                                                                                                                                                                                                                                      | Serial No.                                                                                  | NONE                                                                                   | Country of origin                           | KOREA       |    |
| Test date                                                                                                                                                                                                                                                                                                            | 8/Mar/16 ~ 9/Mar/16                                                                         |                                                                                        | Date of issued                              | 23-Mar-16   |    |
| Test location                                                                                                                                                                                                                                                                                                        | 347-69, Jungbu-daero 147beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do 467-811, R. O. Korea |                                                                                        |                                             |             |    |
| Standard                                                                                                                                                                                                                                                                                                             | FCC PART 15 Subpart B, ANSI C 63.4(2009)                                                    |                                                                                        |                                             |             |    |
| Test item                                                                                                                                                                                                                                                                                                            | <input checked="" type="checkbox"/> Conducted Emission                                      | <input type="checkbox"/> Class A                                                       | <input checked="" type="checkbox"/> Class B | Test result | OK |
|                                                                                                                                                                                                                                                                                                                      | <input checked="" type="checkbox"/> Radiated Emission                                       | <input type="checkbox"/> Class A                                                       | <input checked="" type="checkbox"/> Class B | Test result | OK |
| Measurement facility registration number                                                                                                                                                                                                                                                                             |                                                                                             | 659627                                                                                 |                                             |             |    |
| Tested by                                                                                                                                                                                                                                                                                                            | Senior Engineer S.S. An (Signature)                                                         |                                                                                        |                                             |             |    |
| Reviewed by                                                                                                                                                                                                                                                                                                          | Engineering Manager J.M. Yang (Signature)                                                   |                                                                                        |                                             |             |    |
| Abbreviation                                                                                                                                                                                                                                                                                                         | OK, Pass = Complied, Fail = Failed, N/A = not applicable                                    |                                                                                        |                                             |             |    |
| * Note<br>- Basic Model Number : BSA2-OEPW<br>- Additional Model(s) : BSA2-OHPW<br>- This test report is not permitted to copy partly without our permission<br>- This test result is dependent on only equipment to be used<br>- This test result based on a single evaluation of one sample of the above mentioned |                                                                                             |                                                                                        |                                             |             |    |

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Appendix 1. Special diagram

## 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 is 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 Official Qualification(s)

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

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC  
requirements

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

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

## 2. Description of EUT

### 2.1 Summary of Equipment Under Test

|                                               |                                                |
|-----------------------------------------------|------------------------------------------------|
| Product                                       | : Biostation A2                                |
| Model Number                                  | : BSA2-OEPW                                    |
| Serial Number                                 | : NONE                                         |
| Manufacturer                                  | : SUPREMA INC                                  |
| Country of origin                             | : Korea                                        |
| Sample Receipt Date                           | : 11-Feb-16                                    |
| Rating                                        | : DC 12 V                                      |
| Testing Voltage                               | : AC 120 V , 60 Hz                             |
| " X-tallist(s) or<br>Frequencies<br>generated | : The highest operating frequency is 2 462 MHz |

### 2.2 General descriptions of EUT

## Product specifications

| Category         | Feature             | Specification                                                             |
|------------------|---------------------|---------------------------------------------------------------------------|
| General          | Biometric           | Fingerprint                                                               |
|                  | LFD                 | Supported                                                                 |
|                  | RF Option           | 2.4 GHz, 125 kHz Mifare/DesFire/DesFire EV1/Felica/NFC, 125 kHz iClass SE |
| Storage capacity | Max. User (1:1)     | 500,000                                                                   |
|                  | Max. User (1:N)     | 100,000                                                                   |
|                  | Max. Template (1:1) | 1,000,000                                                                 |
|                  | Max. Template (1:N) | 200,000                                                                   |
|                  | Max. Text Log       | 5,000,000                                                                 |
|                  | Max. Image Log      | 50,000                                                                    |
| Interface        | Wi-Fi               | Supported                                                                 |
|                  | TCP/IP              | Supported                                                                 |
|                  | RS-485              | 1ch Host or Slave (Selectable)                                            |
|                  | RS-232              | Supported                                                                 |
|                  | Wiegand             | 1ch Input, 1ch Output                                                     |
|                  | TTL input           | 1ch Input                                                                 |
|                  | Relay               | 2 Relay                                                                   |
|                  | USB                 | USB 2.0 (Host)                                                            |

### 3. Test Standards

#### Test Standard : FCC PART 15 Subpart B

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

#### Test Method : ANSI C 63.4 (2009)

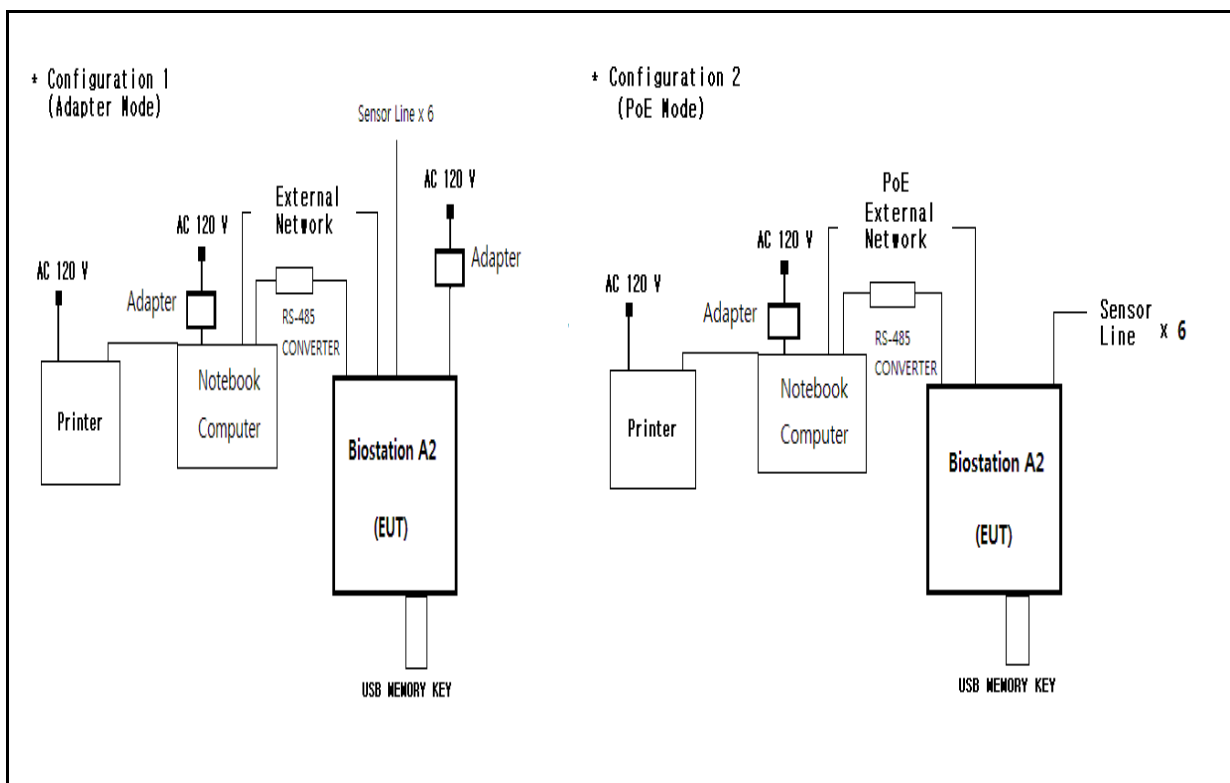
This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

## 4. Measurement Condition

### 4.1 EUT Operation.

- The EUT was in the following operation mode during all testing.
1. Connect the EUT to External Network / LAN port of the Note PC.
  2. Install the provided test program by the manufacturer.
  3. Execute the test program and check the operating status of the EUT.  
(Check fingerprint detection and RFID Card display on the note pc continuously.)
  4. Configuration 1(Adapter – Mode1) / Configuration 2(PoE – Mode2)

### 4.2 Configuration and Peripherals



### 4.3 EUT and Support equipment

(Mode 1)

| Equipment Name    | Model Name      | S/N             | Manufacturer           | Remark (FCC ID) |
|-------------------|-----------------|-----------------|------------------------|-----------------|
| Biostation A2     | BSA2-OEPW       | NONE            | SUPREMA INC            | EUT             |
| USB Memory Key    | NONE            | NONE            | NONE                   |                 |
| Adapter           | JPW128KA1200N05 | NONE            | BridgePower Corp.      |                 |
| RS-485 CONVERTER  | NONE            | NONE            | NONE                   |                 |
| Notebook Computer | GW687AV         | CNU0295RBD      | HEWLETT-PACKARD        |                 |
| Adapter           | Series PPP009H  | F1-09031504151D | Hipro                  |                 |
| Printer           | K10229          | NONE            | CANON VIETNAM CO.,LTD. |                 |

(Mode 2)

| Equipment Name    | Model Name     | S/N             | Manufacturer           | Remark (FCC ID) |
|-------------------|----------------|-----------------|------------------------|-----------------|
| Biostation A2     | BSA2-OEPW      | NONE            | SUPREMA INC            | EUT             |
| USB Memory Key    | NONE           | NONE            | NONE                   |                 |
| RS-485 CONVERTER  | NONE           | NONE            | NONE                   |                 |
| Notebook Computer | GW687AV        | CNU0295RBD      | HEWLETT-PACKARD        |                 |
| Adapter           | Series PPP009H | F1-09031504151D | Hipro                  |                 |
| Printer           | K10229         | NONE            | CANON VIETNAM CO.,LTD. |                 |

### 4.4 Cable Connecting

(Mode 1)

| Start Equipment   |           | End Equipment        |          | Cable Standard |            | Remark |
|-------------------|-----------|----------------------|----------|----------------|------------|--------|
| Name              | I/O port  | Name                 | I/O port | Length         | Shielded   |        |
| Biostation A2     | USB       | USB MEMORY KEY       | USB      | -              | -          |        |
| Biostation A2     | Power     | Adapter              | -        | 1.8            | Unshielded |        |
| Biostation A2     | LAN       | External Network Hub | LAN      | 20.0           | Unshielded |        |
| Biostation A2     | Jack Line | Sensor Line x 6      | -        | 3.0            | Shielded   |        |
| Biostation A2     | RS-485    | RS-485 CONVERTER     | USB      | 3.0            | Unshielded |        |
| Notebook Computer | Power     | Adapter              | -        | 2.0            | Shielded   |        |
| Notebook Computer | LAN       | External Network Hub | LAN      | 20.0           | Unshielded |        |
| Notebook Computer | USB       | Printer              | USB      | 2.0            | Shielded   |        |

(Mode 2)

| Start Equipment   |           | End Equipment                        |          | Cable Standard |            | Remark |
|-------------------|-----------|--------------------------------------|----------|----------------|------------|--------|
| Name              | I/O port  | Name                                 | I/O port | Length         | Shielded   |        |
| Biostation A2     | USB       | USB MEMORY KEY                       | USB      | -              | -          |        |
| Biostation A2     | LAN       | External Network Hub (With PoE Port) | LAN      | 20.0           | Unshielded |        |
| Biostation A2     | Jack Line | Sensor Line x 6                      | -        | 3.0            | Shielded   |        |
| Biostation A2     | RS-485    | RS-485 CONVERTER                     | USB      | 3.0            | Unshielded |        |
| Notebook Computer | Power     | Adapter                              | -        | 2.0            | Shielded   |        |
| Notebook Computer | LAN       | External Network Hub                 | LAN      | 20.0           | Unshielded |        |
| Notebook Computer | USB       | Printer                              | USB      | 2.0            | Shielded   |        |

## 5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15 Subpart B. The test setup was made according to ANSI C 63.4 (2009) on an 10 m semi-anechoic chamber, which allows a 3 m distance measurement. The EUT was placed in the center of Plastic table. 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.

### 5.1 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                    | -                     |
| Antenna Mast                           | MA4000-EP  | Innco System GmbH | N/A                    | -                     |
| PREAMPLIFIER                           | 8449B      | AGILENT           | 3008A00581             | 7-Dec-16              |
| Test Receiver                          | ESPI7      | ROHDE & SCHWARZ   | 100185                 | 7-Dec-16              |
| Horn Antenna                           | BBHA 9120D | SCHWARZBECK       | 469                    | 3-Sep-16              |
| Turn Table                             | DT1500-S   | Innco System GmbH | N/A                    | -                     |
| Antenna Mast                           | MA4000-EP  | Innco System GmbH | N/A                    | -                     |
| Antenna Master & Turn table controller | C02000-P   | Innco System GmbH | CO2000/642 /28051111/L | -                     |

### 5.2 Environmental Condition

**Below 1 GHz –Test Place : 10 m Semi-anechoic chamber**

#### (Mode 1)

Temperature (°C) : 19.6 °C  
 Humidity (% R.H.) : 48.8 % R.H.

#### (Mode 2)

Temperature (°C) : 19.3 °C  
 Humidity (% R.H.) : 49.1 % R.H.

**Above 1 GHz–Test Place : 3 m Semi-anechoic chamber**

#### (Mode 1)

Temperature (°C) : 19.4 °C  
 Humidity (% R.H.) : 49.2 % R.H.

#### (Mode 2)

Temperature (°C) : 19.8 °C  
 Humidity (% R.H.) : 49.5 % R.H.

### 5.3 Test data (Below 1 GHz) (Mode 1)

Test Date : 8-Mar-16

Measurement Distance : 3 m

| Frequency<br>(MHz) | Reading<br>(dB $\mu$ V)                                                                                                                                                                                                              | Position<br>(V/H) | Height<br>(m) | Correction Factor  |               | Result Value(Quasi-peak) |                          |                |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|--------------------|---------------|--------------------------|--------------------------|----------------|
|                    |                                                                                                                                                                                                                                      |                   |               | Ant Factor<br>(dB) | Cable<br>(dB) | Limit<br>(dB $\mu$ V/m)  | Result<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 32.90              | 20.08                                                                                                                                                                                                                                | V                 | 2.3           | 11.72              | 0.92          | 40.00                    | 32.72                    | 7.28           |
| 165.30             | 20.06                                                                                                                                                                                                                                | V                 | 2.5           | 12.55              | 2.03          | 43.50                    | 34.65                    | 8.85           |
| 250.00             | 27.58                                                                                                                                                                                                                                | V                 | 2.4           | 11.67              | 2.52          | 46.00                    | 41.77                    | 4.23           |
| 375.00             | 18.91                                                                                                                                                                                                                                | H                 | 1.9           | 15.18              | 3.12          | 46.00                    | 37.20                    | 8.80           |
| 550.00             | 17.54                                                                                                                                                                                                                                | H                 | 1.8           | 19.07              | 3.82          | 46.00                    | 40.42                    | 5.58           |
| 800.00             | 10.81                                                                                                                                                                                                                                | H                 | 1.6           | 22.72              | 4.69          | 46.00                    | 38.22                    | 7.78           |
| 850.00             | 13.75                                                                                                                                                                                                                                | H                 | 1.3           | 23.25              | 4.85          | 46.00                    | 41.84                    | 4.16           |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
| Remark             | H : Horizontal, V : Vertical<br>*Result Value = Reading + Ant Factor + Cable loss<br>*Margin= Limit - Result<br>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection |                   |               |                    |               |                          |                          |                |

## (Mode 2)

Test Date : 9-Mar-16

Measurement Distance : 3 m

| Frequency<br>(MHz) | Reading<br>(dB $\mu$ V)                                                                                                                                                                                                              | Position<br>(V/H) | Height<br>(m) | Correction Factor  |               | Result Value(Quasi-peak) |                          |                |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|--------------------|---------------|--------------------------|--------------------------|----------------|
|                    |                                                                                                                                                                                                                                      |                   |               | Ant Factor<br>(dB) | Cable<br>(dB) | Limit<br>(dB $\mu$ V/m)  | Result<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| 72.50              | 22.49                                                                                                                                                                                                                                | V                 | 1.6           | 10.46              | 1.34          | 40.00                    | 34.29                    | 5.71           |
| 250.00             | 26.92                                                                                                                                                                                                                                | H                 | 2.3           | 11.67              | 2.52          | 46.00                    | 41.11                    | 4.89           |
| 405.30             | 16.27                                                                                                                                                                                                                                | V                 | 1.6           | 15.86              | 3.25          | 46.00                    | 35.38                    | 10.62          |
| 540.00             | 14.55                                                                                                                                                                                                                                | V                 | 1.3           | 18.87              | 3.78          | 46.00                    | 37.20                    | 8.80           |
| 550.00             | 17.35                                                                                                                                                                                                                                | H                 | 1.6           | 19.07              | 3.82          | 46.00                    | 40.23                    | 5.77           |
| 800.00             | 12.54                                                                                                                                                                                                                                | H                 | 1.3           | 22.72              | 4.69          | 46.00                    | 39.95                    | 6.05           |
| 850.00             | 13.28                                                                                                                                                                                                                                | H                 | 1.5           | 23.25              | 4.85          | 46.00                    | 41.37                    | 4.63           |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
|                    |                                                                                                                                                                                                                                      |                   |               |                    |               |                          |                          |                |
| Remark             | H : Horizontal, V : Vertical<br>*Result Value = Reading + Ant Factor + Cable loss<br>*Margin= Limit - Result<br>*The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection |                   |               |                    |               |                          |                          |                |

## 5.4 Test data (Above 1 GHz) (Mode 1)

Test Date : 8-Mar-16

Measurement Distance : 3 m

| Frequency<br>(MHz)           | Reading<br>(dB $\mu$ V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Position<br>(V/H) | Height<br>(m) | Correction Factor  |               | Result Value            |                          |                |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|--------------------|---------------|-------------------------|--------------------------|----------------|
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               | Ant Factor<br>(dB) | Cable<br>(dB) | Limit<br>(dB $\mu$ V/m) | Result<br>(dB $\mu$ V/m) | Margin<br>(dB) |
| Peak(RBW:1 MHz VBW:1 MHz)    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
| 1056.00                      | 46.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.20              | -31.89        | 74.00                   | 40.02                    | 33.98          |
| 1056.00                      | 48.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.20              | -31.89        | 74.00                   | 41.64                    | 32.36          |
| 1196.00                      | 47.22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.45              | -31.67        | 74.00                   | 41.00                    | 33.00          |
| 1196.00                      | 49.71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.45              | -31.67        | 74.00                   | 43.49                    | 30.51          |
| 2112.00                      | 44.66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.69              | -29.83        | 74.00                   | 40.52                    | 33.48          |
| 2112.00                      | 45.55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.69              | -29.83        | 74.00                   | 41.41                    | 32.59          |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
| Average(RBW:1 MHz VBW:10 Hz) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
| 1056.00                      | 38.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.20              | -31.89        | 54.00                   | 31.64                    | 22.36          |
| 1056.00                      | 42.60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.20              | -31.89        | 54.00                   | 35.92                    | 18.08          |
| 1196.00                      | 34.65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.45              | -31.67        | 54.00                   | 28.43                    | 25.57          |
| 1196.00                      | 38.31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.45              | -31.67        | 54.00                   | 32.09                    | 21.91          |
| 2112.00                      | 38.75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | H                 | 1.0           | 25.69              | -29.83        | 54.00                   | 34.61                    | 19.39          |
| 2112.00                      | 40.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | V                 | 1.0           | 25.69              | -29.83        | 54.00                   | 36.76                    | 17.24          |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
| Remark                       | H : Horizontal, V : Vertical<br>* Result Value = Reading + Ant Factor + Cable loss - Amplifier Gain<br>* Margin= Limit - Result<br>* The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.<br>*The highest operating frequency of the EUT is 1.0 GHz , so the radiated emission measurement was performed up to 6 GHz by requested applicant.<br>*Application method of the highest frequency is in the following<br>*Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.<br>*Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.<br>*Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.<br>*Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |               |                    |               |                         |                          |                |

## (Mode 2)

Test Date : 9-Mar-16

Measurement Distance : 3 m

| Frequency<br>(MHz)            | Reading<br>(dBμV)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Position<br>(V/H) | Height<br>(m) | Correction Factor  |               | Result Value      |                    |                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|--------------------|---------------|-------------------|--------------------|----------------|
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               | Ant Factor<br>(dB) | Cable<br>(dB) | Limit<br>(dBμV/m) | Result<br>(dBμV/m) | Margin<br>(dB) |
| Peak(RBW:1 MHz  VBW:1 MHz)    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
| 1056.00                       | 45.39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.20              | −31.89        | 74.00             | 38.71              | 35.29          |
| 1056.00                       | 47.16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.20              | −31.89        | 74.00             | 40.48              | 33.52          |
| 1152.00                       | 46.38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.37              | −31.67        | 74.00             | 40.08              | 33.92          |
| 1152.00                       | 46.31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.37              | −31.67        | 74.00             | 40.01              | 33.99          |
| 1200.00                       | 48.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.46              | −31.67        | 74.00             | 42.14              | 31.86          |
| 1200.00                       | 49.59                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.46              | −31.67        | 74.00             | 43.38              | 30.62          |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
| Average(RBW:1 MHz  VBW:10 Hz) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
| 1056.00                       | 36.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.20              | −31.89        | 54.00             | 29.64              | 24.36          |
| 1056.00                       | 39.77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.20              | −31.89        | 54.00             | 33.09              | 20.91          |
| 1152.00                       | 35.22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.37              | −31.67        | 54.00             | 28.92              | 25.08          |
| 1152.00                       | 38.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.37              | −31.67        | 54.00             | 32.68              | 21.32          |
| 1200.00                       | 34.85                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | H                 | 1.0           | 25.46              | −31.67        | 54.00             | 28.64              | 25.36          |
| 1200.00                       | 38.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | V                 | 1.0           | 25.46              | −31.67        | 54.00             | 31.84              | 22.16          |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
| Remark                        | H : Horizontal,   V : Vertical<br>* Result Value = Reading + Ant Factor + Cable loss − Amplifier Gain<br>* Margin= Limit − Result<br>* The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.<br>*The highest operating frequency of the EUT is 1.0 GHz , so the radiated emission measurement  was performed up to 6 GHz by requested applicant.<br>*Application method of the highest frequency  is in the following<br>*Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.<br>*Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.<br>*Highest frequency of the EUT is between 500 MHz and 1 GHz,  the measurement shall only be made up to 5 GHz.<br>*Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |
|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |               |                    |               |                   |                    |                |

## 6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15 Subpart B . The test setup was made according to ANSI C 63.4 (2009) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. 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 complies with CISPR 16.

### 6.1 Measurement equipments

| Equipment Name | Type    | Manufacturer    | Serial No. | Next Calibration date |
|----------------|---------|-----------------|------------|-----------------------|
| Test Receiver  | ESPI    | Rohde & Schwarz | 100005     | 7-Dec-16              |
| LISN           | ENV 216 | ROHDE & SCHWARZ | 101231     | 7-Dec-16              |
| LISN           | ESH3-Z5 | Rohde & Schwarz | 836679/025 | 7-Dec-16              |
| Pulse Limiter  | ESH3-Z2 | Rohde & Schwarz | NONE       | 7-Dec-16              |
|                |         |                 |            |                       |

### 6.2 Environmental Condition

Test Place : Shielded Room

**(Mode 1)**

Temperature (°C) : 19.5 °C

Humidity (% R.H.) : 48.6 % R.H.

## 6.3 Test data

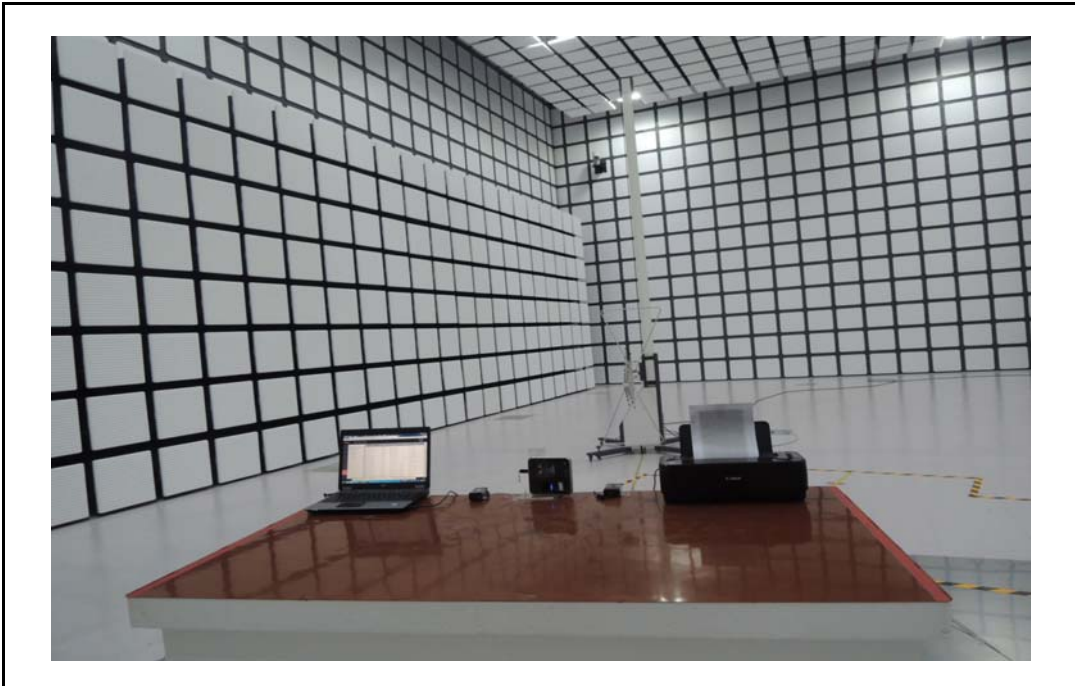
Test Date : 8-Mar-16

| Frequency<br>(MHz) | Correction Factor                                                                                            |               | Line<br>(H/N) | Quasi-peak Value      |                         |                        | Cispr Average Value   |                         |                |
|--------------------|--------------------------------------------------------------------------------------------------------------|---------------|---------------|-----------------------|-------------------------|------------------------|-----------------------|-------------------------|----------------|
|                    | Lisn<br>(dB)                                                                                                 | Cable<br>(dB) |               | Limit<br>(dB $\mu$ V) | Reading<br>(dB $\mu$ V) | Result<br>(dB $\mu$ V) | Limit<br>(dB $\mu$ V) | Reading<br>(dB $\mu$ V) | Result<br>(dB) |
| 0.20               | 0.13                                                                                                         | 0.14          | N             | 63.61                 | 43.13                   | 43.40                  | 53.61                 |                         |                |
| 0.60               | 0.14                                                                                                         | 0.17          | N             | 56.00                 | 36.83                   | 37.15                  | 46.00                 |                         |                |
| 0.66               | 0.14                                                                                                         | 0.18          | N             | 56.00                 | 37.69                   | 38.01                  | 46.00                 |                         |                |
| 11.08              | 0.42                                                                                                         | 0.35          | N             | 60.00                 | 44.76                   | 45.53                  | 50.00                 |                         |                |
| 12.02              | 0.46                                                                                                         | 0.36          | N             | 60.00                 | 45.42                   | 46.25                  | 50.00                 |                         |                |
| 13.34              | 0.62                                                                                                         | 0.38          | H             | 60.00                 | 45.20                   | 46.20                  | 50.00                 |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
|                    |                                                                                                              |               |               |                       |                         |                        |                       |                         |                |
| Remark             | H : Hot Line, N : Neutral Line<br>*Correction Factor = Lisn + Cable<br>*Result = Correction Factor + Reading |               |               |                       |                         |                        |                       |                         |                |

## 7. Photographs of test setup

### 7.1 Setup for Radiated Test : (30 ~ 1 000) MHz (Mode 1)

[ Front ]



[ Rear ]



## 7. Photographs of test setup

(Mode 2)

[ Front ]



[ Rear ]



## 7.2 Setup for Radiated Test : above 1 GHz (Mode 1)

[ Front ]



[ Rear ]



(Mode 2)

[ Front ]



[ Rear ]



### 7.3 Setup for Conducted Test : (0.15 ~ 30) MHz

[ Front ]



[ Rear ]



## 8. Photographs of EUT

[ Front ]

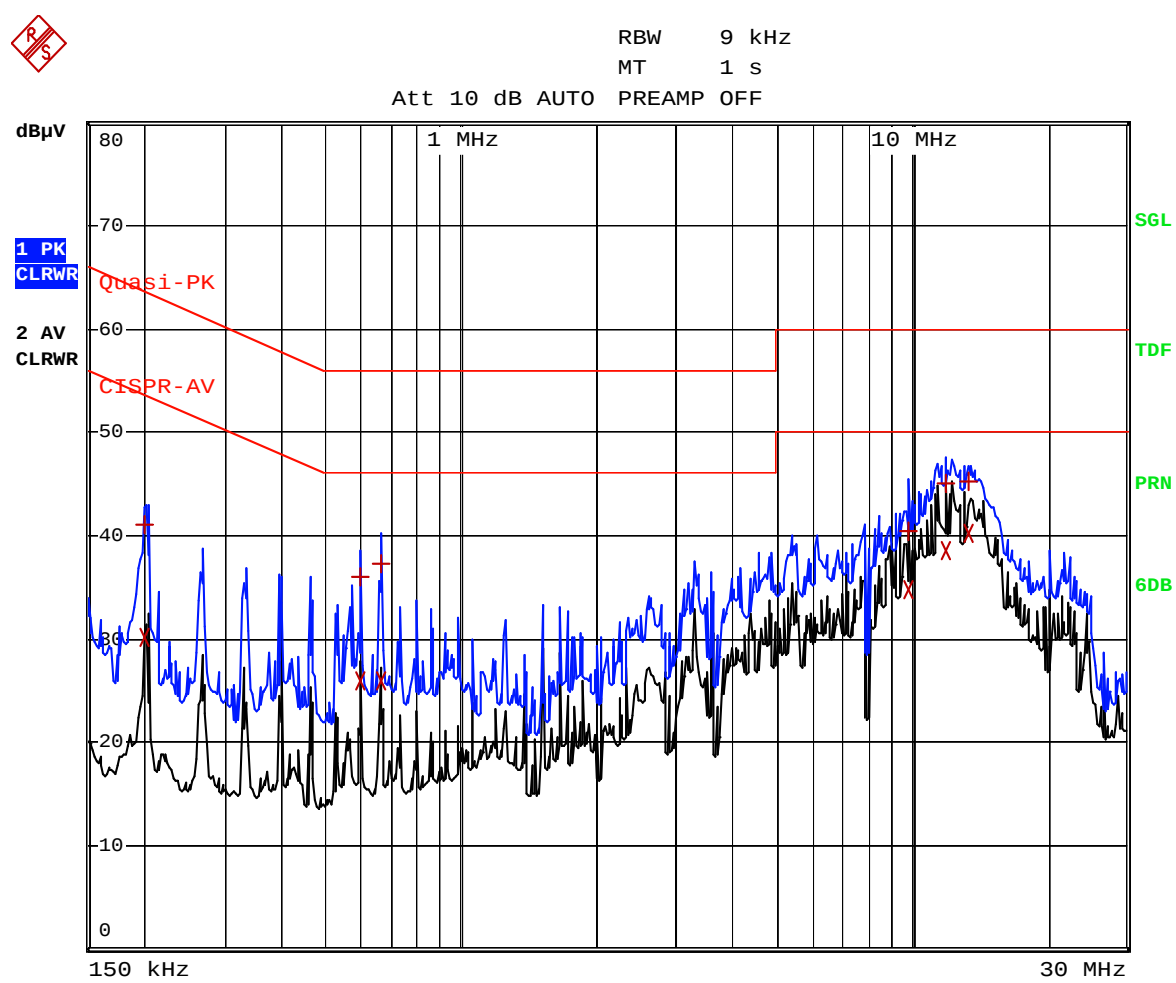


[ Rear ]



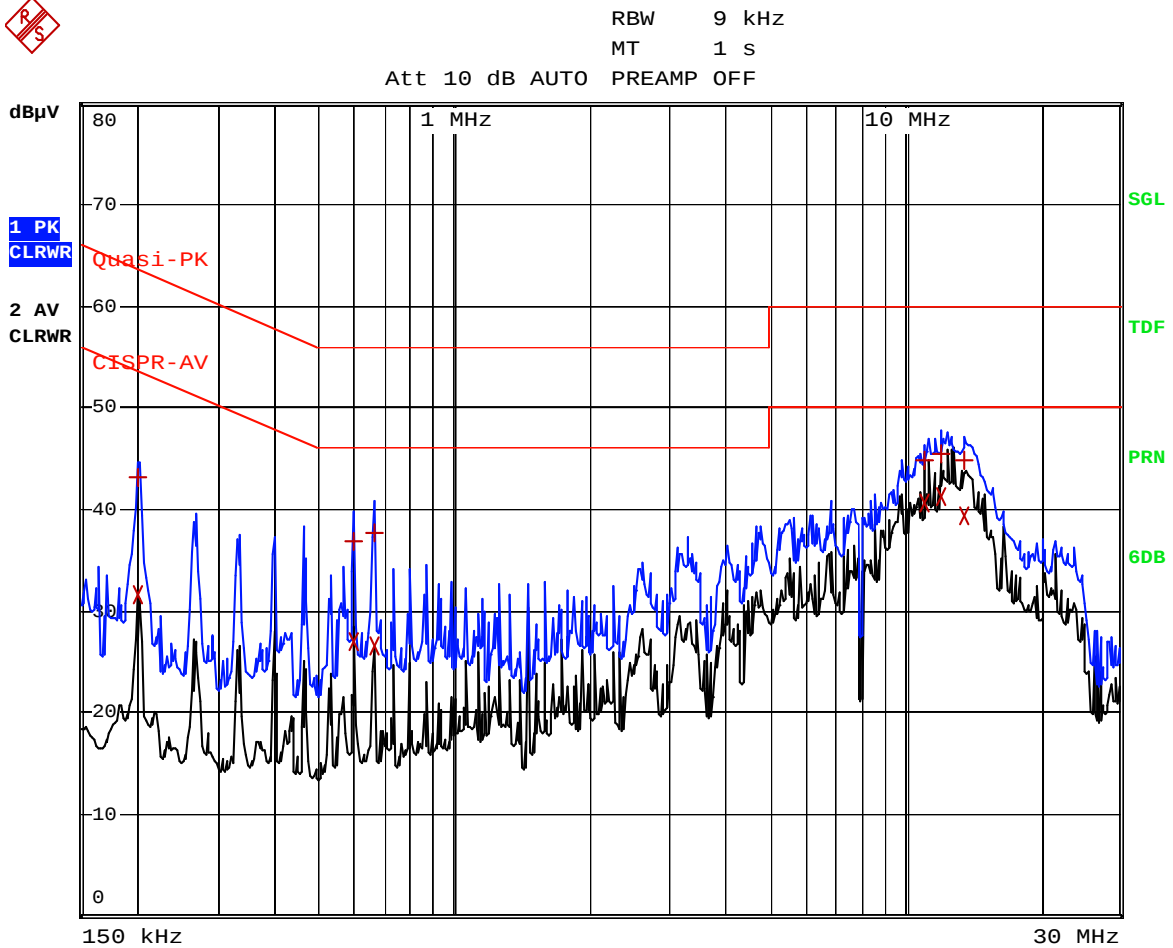
Appendix 1. Special diagram

\*HOT



Comment: 16-02122\_HOT  
Date: 8.MAR.2016 10:10:09

\*NEUTRAL



Comment: 16-02122\_NEUTRAL

Date: 8.MAR.2016 10:12:56