

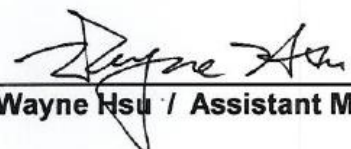
# FCC Test Report

Equipment : Personal Computer  
Brand Name : SONY  
Model No. : SVF15NB1GL  
FCC ID : AK8SVF15NB1GL  
Standard : 47 CFR FCC Part 15.225  
Operating Band : 13.553 – 13.567 MHz (channel freq. 13.56 MHz)  
Equipment Class : DXX  
Applicant : Sony Corporation  
Manufacturer : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan  
NFC Module : SONY / RC-S640/IC

The product sample received on Sep. 30, 2013 and completely tested on Oct. 16, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

  
Wayne Hsu / Assistant Manager

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### **APPENDIX A. TEST PHOTOS**

### **APPENDIX B. PHOTOGRAPHS OF EUT**

## Summary of Test Result

| Conformance Test Specifications |                  |                                                           |                                                                                                                   |                                                                            |          |
|---------------------------------|------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------|
| Report Clause                   | Ref. Std. Clause | Description                                               | Measured                                                                                                          | Limit                                                                      | Result   |
| 1.1.2                           | 15.203           | Antenna Requirement                                       | Antenna connector mechanism complied                                                                              | FCC 15.203                                                                 | Complied |
| 3.1                             | 15.207           | AC Power-line Conducted Emissions                         | [dBuV]: 13.560MHz<br>43.67 (Margin 6.33dB) - AV<br>44.98 (Margin 15.02dB) - QP                                    | FCC 15.207                                                                 | Complied |
| 3.2                             | 15.215(c)        | Emission Bandwidth                                        | 20dB Bandwidth 2.84 [kHz]<br>F <sub>L</sub> : 13.55855 MHz<br>F <sub>H</sub> : 13.56139 MHz                       | Fall in band<br>F <sub>L</sub> ≥ 13.553 MHz<br>F <sub>H</sub> ≤ 13.567 MHz | Complied |
| 3.3                             | 15.225(a)~(d)    | Field Strength of Fundamental Emissions and Spectrum Mask | Fundamental Emissions<br>quasi peak:53.69 dBuV/m at 3m<br>Device complies with spectrum mask – refer to test data | 124 dBuV/m at 3                                                            | Complied |
| 3.4                             | 15.225(d)        | Transmitter Radiated Unwanted Emissions                   | [dBuV/m at 3m]: 283.170MHz<br>44.41 (Margin 1.59dB) - QP                                                          | FCC 15.209                                                                 | Complied |
| 3.5                             | 15.225(e)        | Frequency Stability                                       | 22.12 ppm                                                                                                         | ± 0.01% (100ppm)                                                           | Complied |



SPORTON INTERNATIONAL INC.  
TEL : 886-3-327-3456  
FAX : 886-3-327-0973

# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| RF General Information                                   |                   |                     |                |                         |
|----------------------------------------------------------|-------------------|---------------------|----------------|-------------------------|
| Frequency Range                                          | Modulation        | Ch. Frequency (MHz) | Channel Number | Field Strength (dBuV/m) |
| 13.553 – 13.567 MHz                                      | ISO 14443-2 (ASK) | 13.56               | 1              | 53.69                   |
| Note 1: Field strength performed quasi peak level at 3m. |                   |                     |                |                         |

### 1.1.2 Antenna Information

| Antenna Category                    |                                                 |
|-------------------------------------|-------------------------------------------------|
| <input type="checkbox"/>            | Equipment placed on the market without antennas |
| <input checked="" type="checkbox"/> | Integral antenna (antenna permanently attached) |
| <input type="checkbox"/>            | External antenna (dedicated antennas)           |

### 1.1.3 Type of EUT

| Identify EUT                        |                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| EUT Serial Number                   | N/A                                                                                                                               |
| Presentation of Equipment           | <input type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input checked="" type="checkbox"/> Prototype     |
| Type of EUT                         |                                                                                                                                   |
| <input checked="" type="checkbox"/> | Stand-alone                                                                                                                       |
| <input type="checkbox"/>            | Combined (EUT where the radio part is fully integrated within another device)<br>Combined Equipment - Brand Name / Model No.: ... |
| <input type="checkbox"/>            | Plug-in radio (EUT intended for a variety of host systems)<br>Host System - Brand Name / Model No.: ...                           |
| <input type="checkbox"/>            | Other:                                                                                                                            |

### 1.1.4 Test Signal Duty Cycle

| Operated Mode for Worst Duty Cycle       |                                         |
|------------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/>      | Operated test mode for worst duty cycle |
| Test Signal Duty Cycle (x)               | Voltage Duty Factor [dB] – (20 log 1/x) |
| <input checked="" type="checkbox"/> 100% | 0                                       |

### 1.1.5 EUT Operational Condition

|                   |                                              |                                                         |                                                   |
|-------------------|----------------------------------------------|---------------------------------------------------------|---------------------------------------------------|
| Supply Voltage    | <input checked="" type="checkbox"/> AC mains | <input checked="" type="checkbox"/> DC                  |                                                   |
| Type of DC Source | <input type="checkbox"/> Internal DC supply  | <input checked="" type="checkbox"/> External DC adapter | <input checked="" type="checkbox"/> Li-on Battery |

## 1.2 Accessories

| Accessories Information |              |                                                                          |            |             |
|-------------------------|--------------|--------------------------------------------------------------------------|------------|-------------|
| AC Adapter              | Brand Name   | SONY                                                                     | Model Name | VGP-AC19V75 |
|                         | Power Rating | I/P: 100-240V ~ 1.2A 50/60Hz ; O/P: 19.5V $\overline{\overline{=}}$ 2.3A |            |             |
| Li-ion Battery          | Brand Name   | SONY                                                                     | Model Name | VGP-BPS40   |
|                         | Power Rating | 15.0V $\overline{\overline{=}}$ / 3 170 mAh / 48 Wh                      |            |             |

Reminder: Regarding to more detail and other information, please refer to user manual.

## 1.3 Support Equipment

| Support Equipment- AC Line Conducted Emission Test |                                           |               |            |             |
|----------------------------------------------------|-------------------------------------------|---------------|------------|-------------|
| No.                                                | Equipment                                 | Brand Name    | Model Name | FCC ID      |
| 1                                                  | iPod Nano                                 | Apple         | A1199      | DoC         |
| 2                                                  | (USB) Mouse                               | Microsoft     | 1004       | DoC         |
| 3                                                  | NFC CARD                                  | -             | -          | -           |
| 4                                                  | Wireless AP<br>(Remote Workstation)       | ASUS          | RT-AC66U   | MSQ-RTAC66U |
| 5                                                  | Bluetooth Headset<br>(Remote Workstation) | Sony Ericsson | Z354       | PY7DDA-2006 |

| Support Equipment- Radiated Emission Test |                |            |            |        |
|-------------------------------------------|----------------|------------|------------|--------|
| No.                                       | Equipment      | Brand Name | Model Name | FCC ID |
| 1                                         | Identity Badge | -          | -          | -      |

## 1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009
- ♦ FCC KDB 174176

## 1.5 Testing Location Information

| Testing Location                    |               |                                                                                                                    |                  |
|-------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------|------------------|
| <input checked="" type="checkbox"/> | HWA YA        | ADD : No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. |                  |
|                                     |               | TEL : 886-3-327-3456 FAX : 886-3-327-0973                                                                          |                  |
| Test Condition                      | Test Site No. | Test Engineer                                                                                                      | Test Environment |
| AC Conduction                       | CO04-HY       | Zeus                                                                                                               | 22°C / 55%       |
| RF Conducted                        | TH01-HY       | Wei                                                                                                                | 25°C / 65%       |
| Radiated Emission                   | 03CH02-HY     | Daniel                                                                                                             | 25°C / 57%       |

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Measurement Uncertainty           |               |             |       |
|-----------------------------------|---------------|-------------|-------|
| Test Item                         |               | Uncertainty | Limit |
| AC power-line conducted emissions |               | ±2.26 dB    | N/A   |
| Emission bandwidth                |               | ±1.42 %     | N/A   |
| Unwanted emissions, conducted     | 9 – 150 kHz   | ±0.38 dB    | N/A   |
|                                   | 0.15 – 30 MHz | ±0.42 dB    | N/A   |
|                                   | 30 – 1000 MHz | ±0.51 dB    | N/A   |
| All emissions, radiated           | 9 – 150 kHz   | ±2.49 dB    | N/A   |
|                                   | 0.15 – 30 MHz | ±2.28 dB    | N/A   |
|                                   | 30 – 1000 MHz | ±2.56 dB    | N/A   |
| Temperature                       |               | ±0.8 °C     | N/A   |
| Humidity                          |               | ±3 %        | N/A   |
| DC and low frequency voltages     |               | ±3 %        | N/A   |
| Time                              |               | ±1.42 %     | N/A   |
| Duty Cycle                        |               | ±1.42 %     | N/A   |

## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

| Modulation Used for Conformance Testing |                                |
|-----------------------------------------|--------------------------------|
| Modulation Mode                         | Field Strength (dBuV/m at 3 m) |
| NFC-Read/Write                          | 53.69                          |

### 2.2 Test Channel Frequencies Configuration

| Test Channel Frequencies Configuration |                                                                 |
|----------------------------------------|-----------------------------------------------------------------|
| Modulation Mode                        | Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations) |
| NFC-Read/Write                         | 13.56-(F1)                                                      |

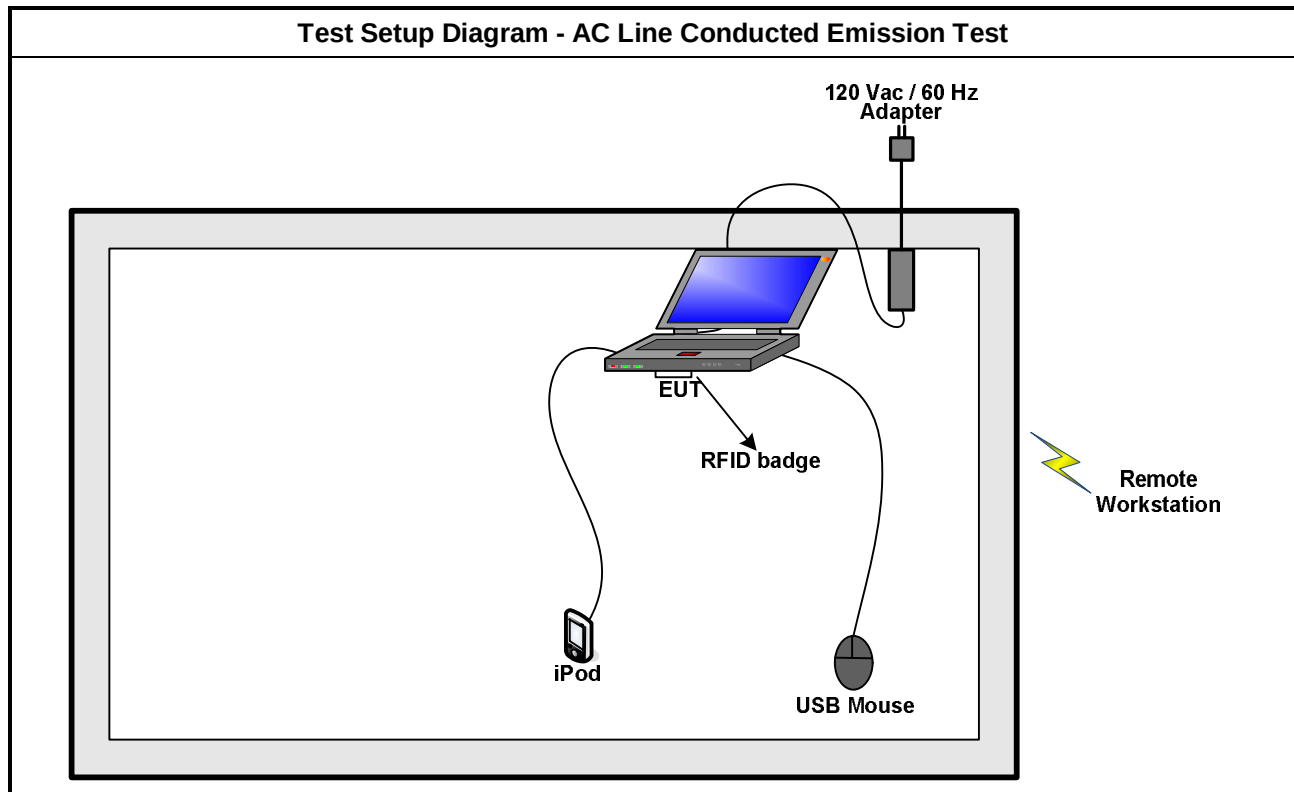
### 2.3 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests |                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Tests Item</b>                                   | AC power-line conducted emissions                                                       |
| <b>Condition</b>                                    | AC power-line conducted measurement for line and neutral<br>Test Voltage: 120Vac / 60Hz |
| <b>Operating Mode</b>                               | Operating Mode Description                                                              |
| 1                                                   | AC Power & Radio link                                                                   |

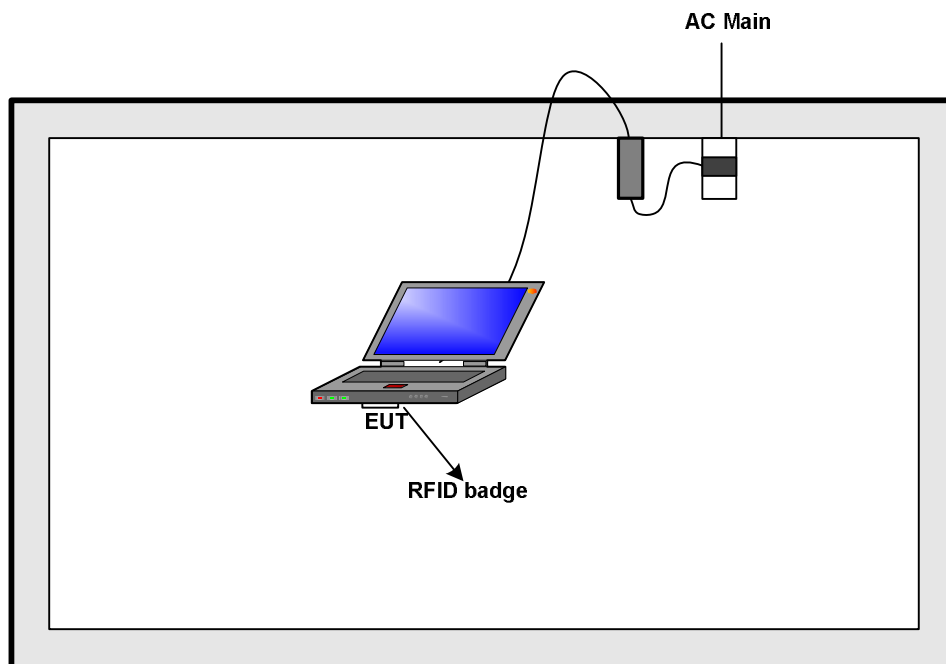
| The Worst Case Mode for Following Conformance Tests |                                                                                                                                                                                |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tests Item</b>                                   | Emission Bandwidth, Field Strength of Fundamental Emissions<br>Spectrum Mask, Transmitter Radiated Unwanted Emissions<br>Frequency Stability                                   |
| <b>Test Condition</b>                               | Radiated measurement                                                                                                                                                           |
| <b>User Position</b>                                | <input checked="" type="checkbox"/> EUT will be placed in fixed position.                                                                                                      |
|                                                     | <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two orthogonal planes.                                 |
|                                                     | <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes. |
| <b>Operating Mode &lt; 1GHz</b>                     | <input checked="" type="checkbox"/> 1. AC Power & Radio link                                                                                                                   |
| <b>Modulation Mode</b>                              | NFC-Read/Write                                                                                                                                                                 |



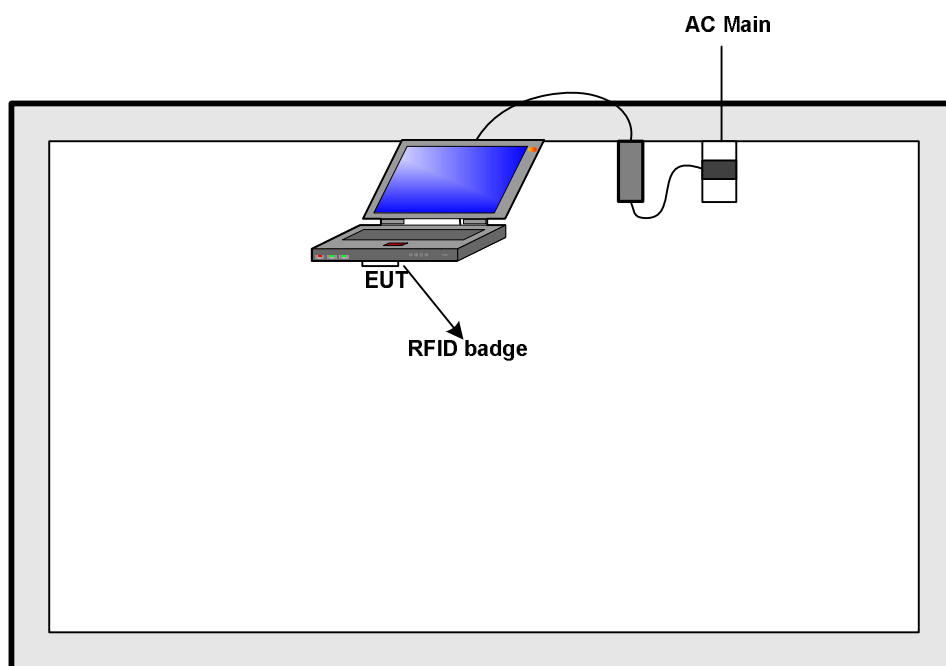
## 2.4 Test Setup Diagram



**Test Setup Diagram - Radiated Below 30MHz Test**



**Test Setup Diagram - Radiated Above 30MHz Test**



### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line Conducted Emissions Limit |            |           |
|-----------------------------------------|------------|-----------|
| Frequency Emission (MHz)                | Quasi-Peak | Average   |
| 0.15-0.5                                | 66 - 56 *  | 56 - 46 * |
| 0.5-5                                   | 56         | 46        |
| 5-30                                    | 60         | 50        |

Note 1: \* Decreases with the logarithm of the frequency.

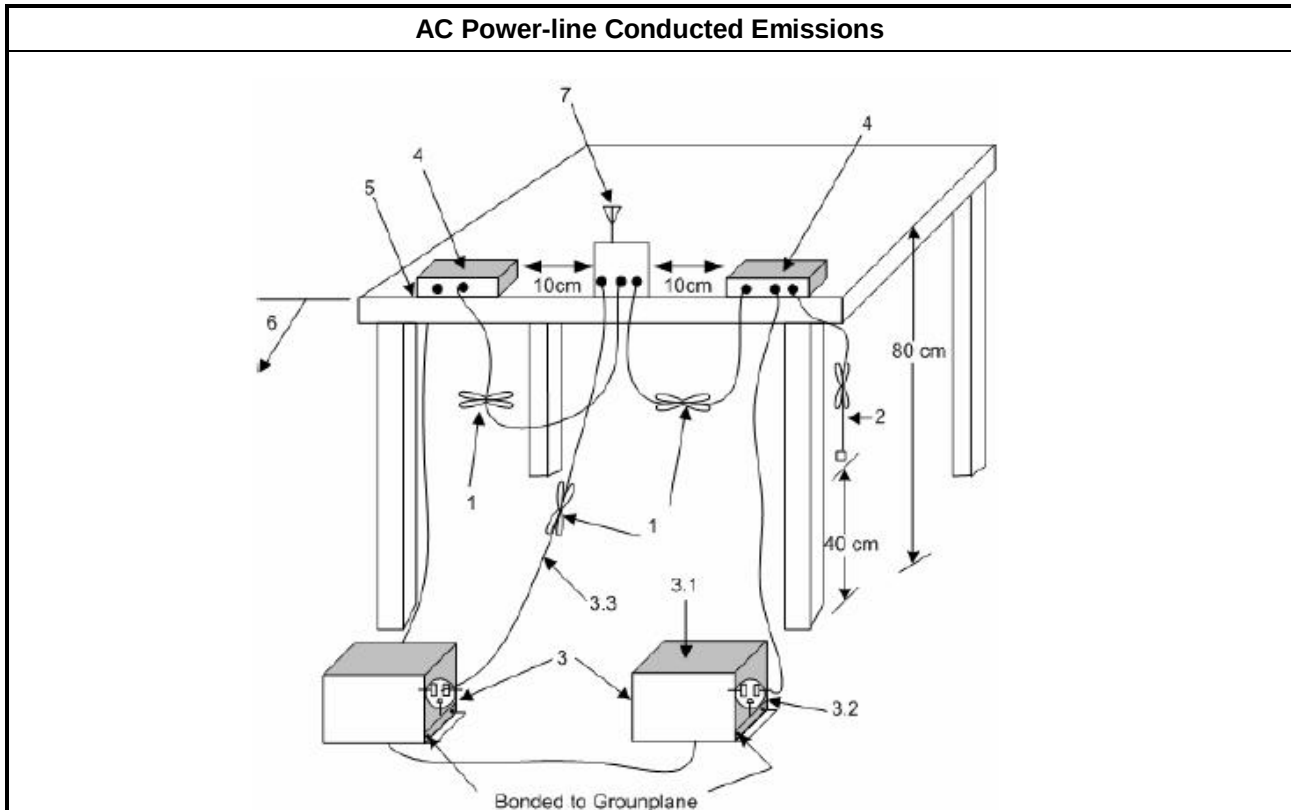
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

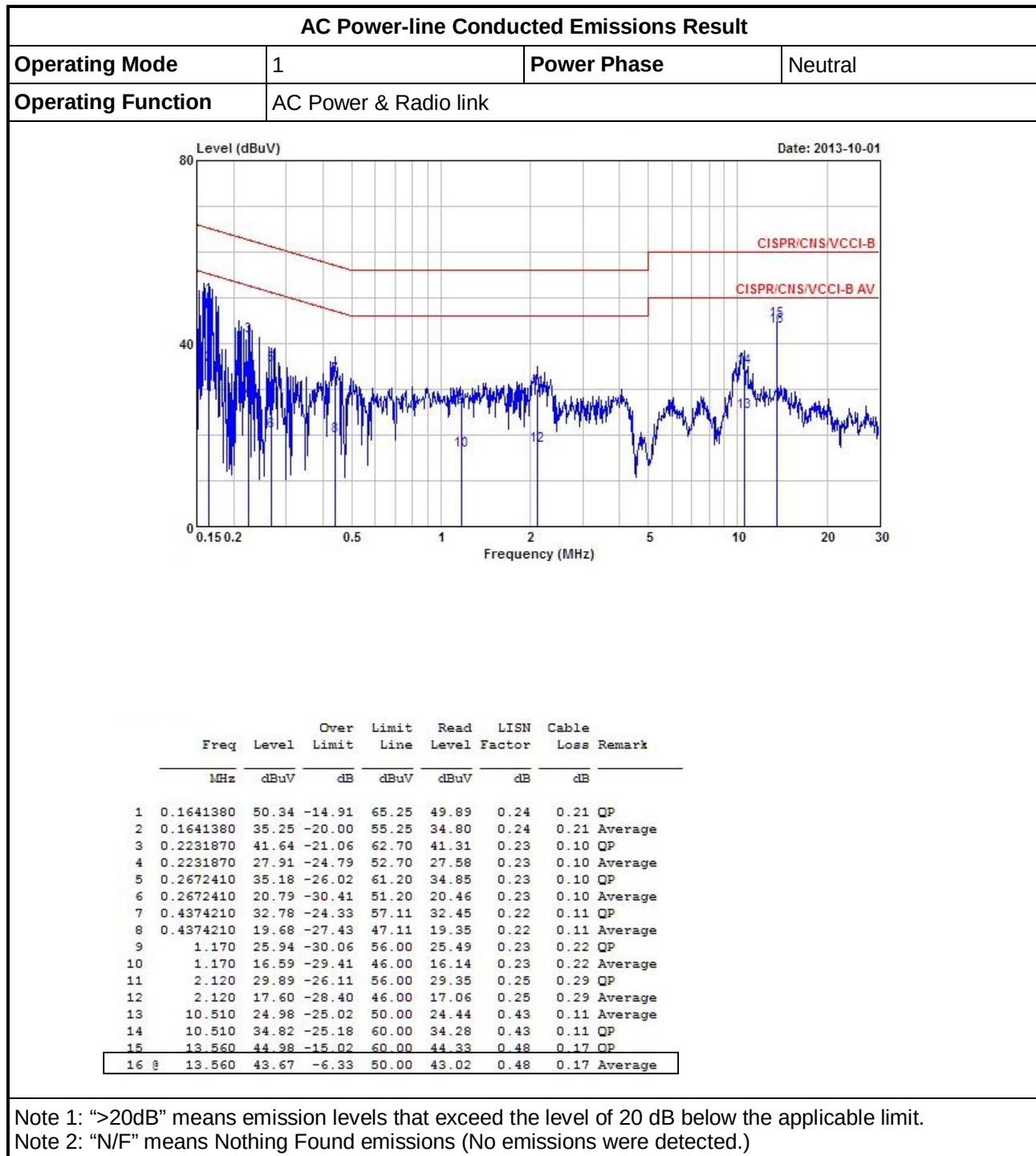
##### 3.1.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | If AC conducted emissions fall in operating band, then following below test method confirm final result.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <input type="checkbox"/>            | Accept measurements done with a suitable dummy load replacing the antenna under the following conditions:<br>(1) Perform the AC line conducted tests with the antenna connected to determine compliance with FCC 15.207 limits outside the transmitter's fundamental emission band;<br>(2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band.                                                                                                                          |
| <input checked="" type="checkbox"/> | For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions:<br>(1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the FCC 15.207 limits outside the transmitter's fundamental emission band;<br>(2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the FCC 15.207 limits within the transmitter's fundamental emission band. |

### 3.1.4 Test Setup

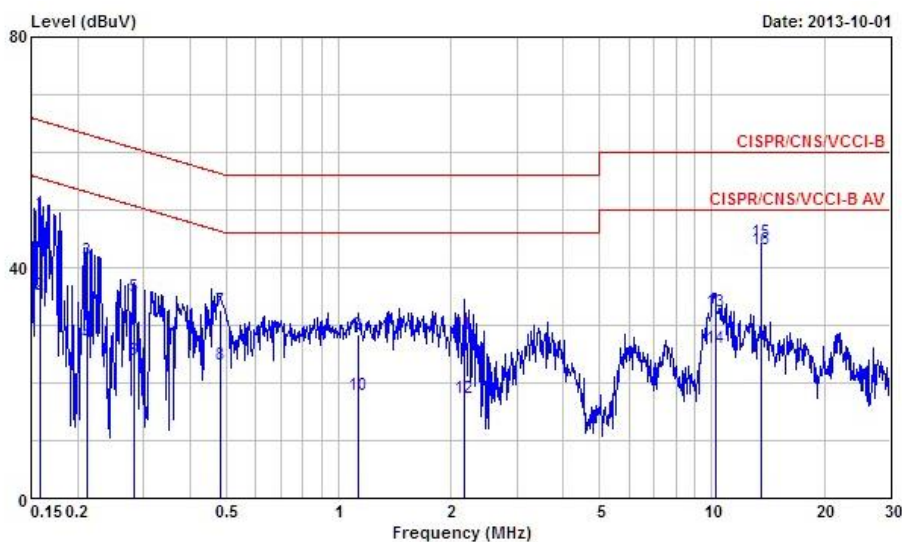


### 3.1.5 Test Result of AC Power-line Conducted Emissions



### AC Power-line Conducted Emissions Result

|                    |                       |             |      |
|--------------------|-----------------------|-------------|------|
| Operating Mode     | 1                     | Power Phase | Line |
| Operating Function | AC Power & Radio link |             |      |



|    | Freq      | Level | Over   | Limit | Read  | LISN   | Cable |         |
|----|-----------|-------|--------|-------|-------|--------|-------|---------|
|    | MHz       | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|    |           |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1  | 0.1590020 | 49.59 | -15.93 | 65.52 | 49.25 | 0.11   | 0.23  | QP      |
| 2  | 0.1590020 | 35.39 | -20.13 | 55.52 | 35.05 | 0.11   | 0.23  | Average |
| 3  | 0.2116700 | 41.24 | -21.90 | 63.14 | 41.03 | 0.11   | 0.10  | QP      |
| 4  | 0.2116700 | 26.78 | -26.36 | 53.14 | 26.57 | 0.11   | 0.10  | Average |
| 5  | 0.2832790 | 35.04 | -25.68 | 60.72 | 34.83 | 0.11   | 0.10  | QP      |
| 6  | 0.2832790 | 24.04 | -26.68 | 50.72 | 23.83 | 0.11   | 0.10  | Average |
| 7  | 0.4811910 | 32.65 | -23.67 | 56.32 | 32.43 | 0.10   | 0.12  | QP      |
| 8  | 0.4811910 | 23.22 | -23.10 | 46.32 | 23.00 | 0.10   | 0.12  | Average |
| 9  | 1.130     | 28.46 | -27.54 | 56.00 | 28.13 | 0.11   | 0.22  | QP      |
| 10 | 1.130     | 17.87 | -28.13 | 46.00 | 17.54 | 0.11   | 0.22  | Average |
| 11 | 2.170     | 28.36 | -27.64 | 56.00 | 27.94 | 0.13   | 0.29  | QP      |
| 12 | 2.170     | 17.32 | -28.68 | 46.00 | 16.90 | 0.13   | 0.29  | Average |
| 13 | 10.230    | 32.29 | -27.71 | 60.00 | 31.95 | 0.24   | 0.10  | QP      |
| 14 | 10.230    | 25.94 | -24.06 | 50.00 | 25.60 | 0.24   | 0.10  | Average |
| 15 | 13.560    | 44.45 | -15.55 | 60.00 | 44.01 | 0.27   | 0.17  | QP      |
| 16 | 13.560    | 43.07 | -6.93  | 50.00 | 42.63 | 0.27   | 0.17  | Average |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

## 3.2 Emission Bandwidth

### 3.2.1 Emission Bandwidth Limit

| 20dB Bandwidth Limit                |                                                                                                                                        |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567 MHz). |

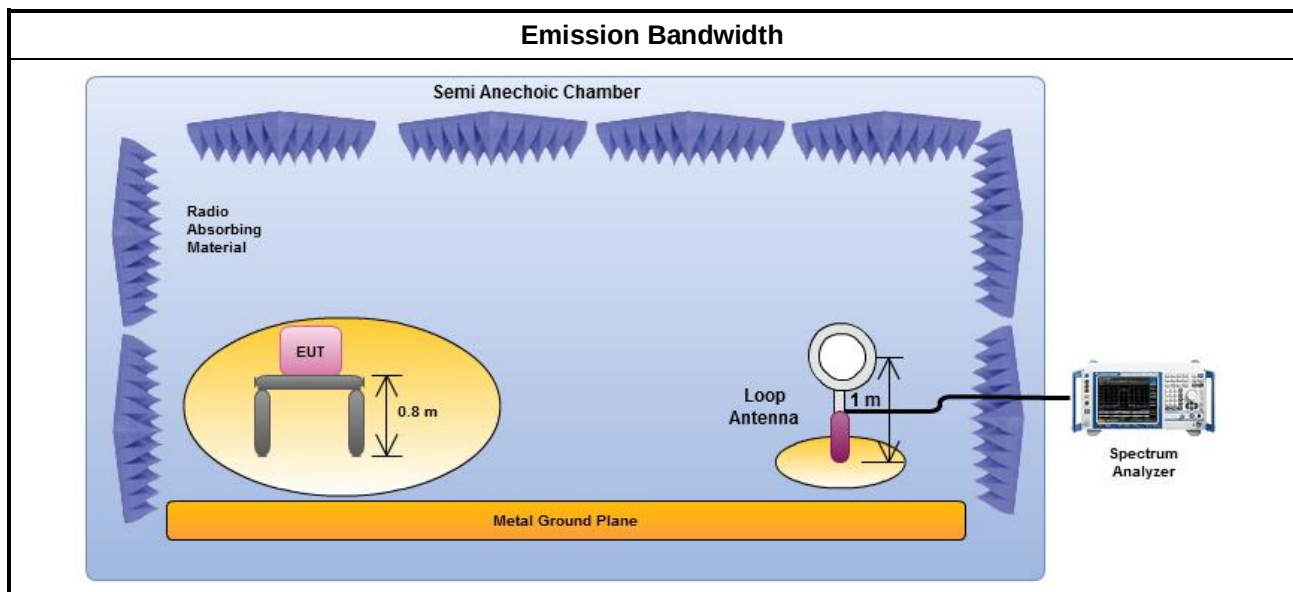
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

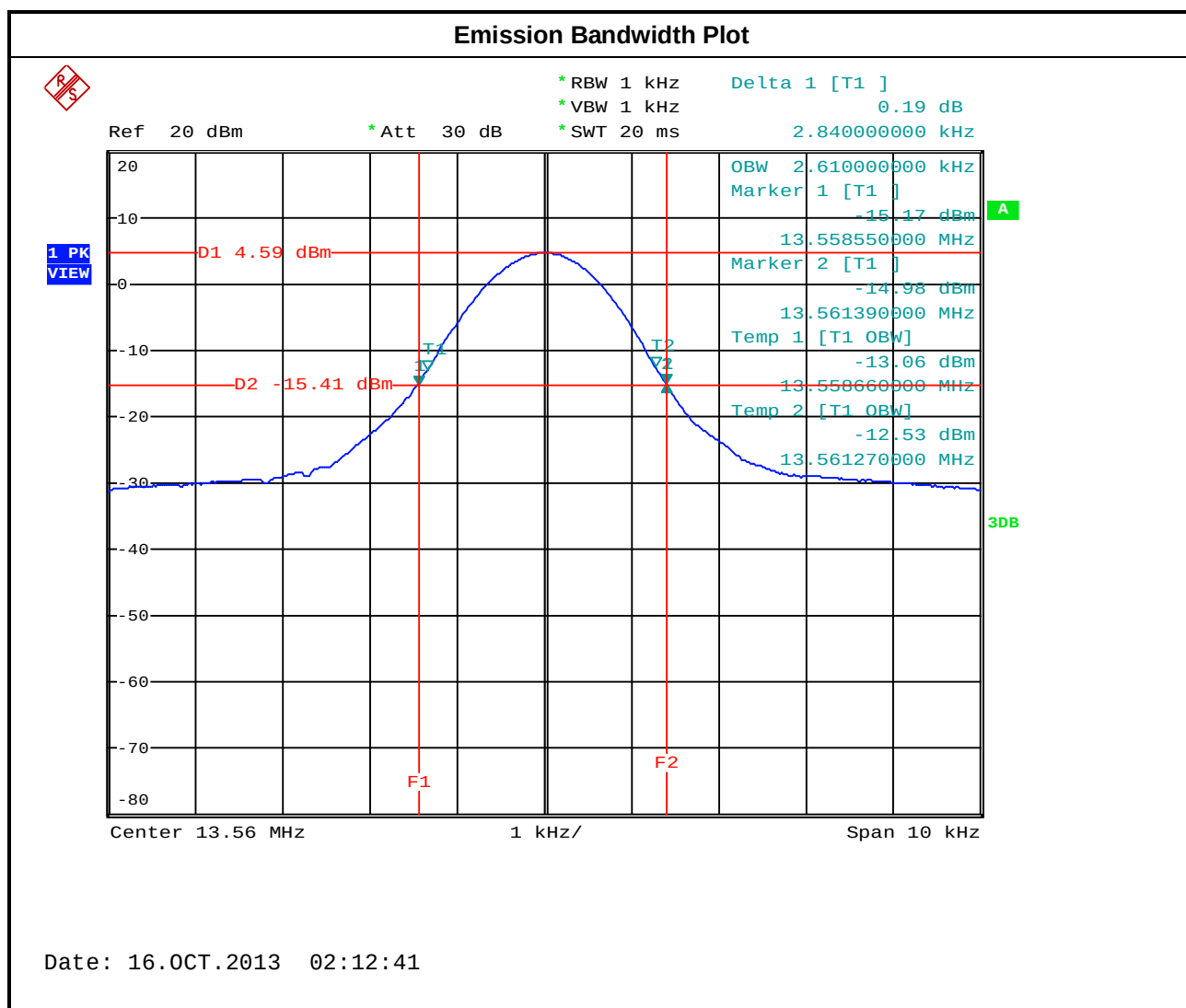
| Test Method                         |                                                                                                                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | For the emission bandwidth refer ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.                                                                                                                            |
| <input checked="" type="checkbox"/> | For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level. |

### 3.2.4 Test Setup



### 3.2.5 Test Result of Emission Bandwidth

| Occupied Channel Bandwidth Result |                 |                      |                                 |                                 |                     |
|-----------------------------------|-----------------|----------------------|---------------------------------|---------------------------------|---------------------|
| Modulation Mode                   | Frequency (MHz) | 20dB Bandwidth (kHz) | F <sub>L</sub> at 20dB BW (kHz) | F <sub>H</sub> at 20dB BW (MHz) | 99% Bandwidth (kHz) |
| NFC-Read/Write                    | 13.56           | 2.84                 | 13.55855                        | 13.56139                        | 2.61                |
| Limit                             |                 | N/A                  | 13.553                          | 13.567                          | N/A                 |
| Result                            |                 | Complied             |                                 |                                 |                     |





### 3.3 Field Strength of Fundamental Emissions and Spectrum Mask

#### 3.3.1 Field Strength of Fundamental Emissions and Spectrum Mask Limit

| Field Strength of Fundamental Emissions    |            |              |              |             |             |
|--------------------------------------------|------------|--------------|--------------|-------------|-------------|
| Emissions                                  | (uV/m)@30m | (dBuV/m)@30m | (dBuV/m)@10m | (dBuV/m)@3m | (dBuV/m)@1m |
| Fundamental                                | 15848      | 84.0         | 103.1        | 124.0       | 143.1       |
| Quasi peak measurement of the fundamental. |            |              |              |             |             |

| Spectrum Mask           |            |              |              |             |             |
|-------------------------|------------|--------------|--------------|-------------|-------------|
| Freq. of Emission (MHz) | (uV/m)@30m | (dBuV/m)@30m | (dBuV/m)@10m | (dBuV/m)@3m | (dBuV/m)@1m |
| 1.705~13.110            | 30         | 29.5         | 48.6         | 69.5        | 88.6        |
| 13.110~13.410           | 106        | 40.5         | 59.6         | 80.5        | 99.6        |
| 13.410~13.553           | 334        | 50.5         | 69.6         | 90.5        | 109.6       |
| 13.553~13.567           | 15848      | 84.0         | 103.1        | 124.0       | 143.1       |
| 13.567~13.710           | 334        | 50.5         | 69.6         | 90.5        | 109.6       |
| 13.710~14.010           | 106        | 40.5         | 59.6         | 80.5        | 99.6        |
| 14.010~30.000           | 30         | 29.5         | 48.6         | 69.5        | 88.6        |

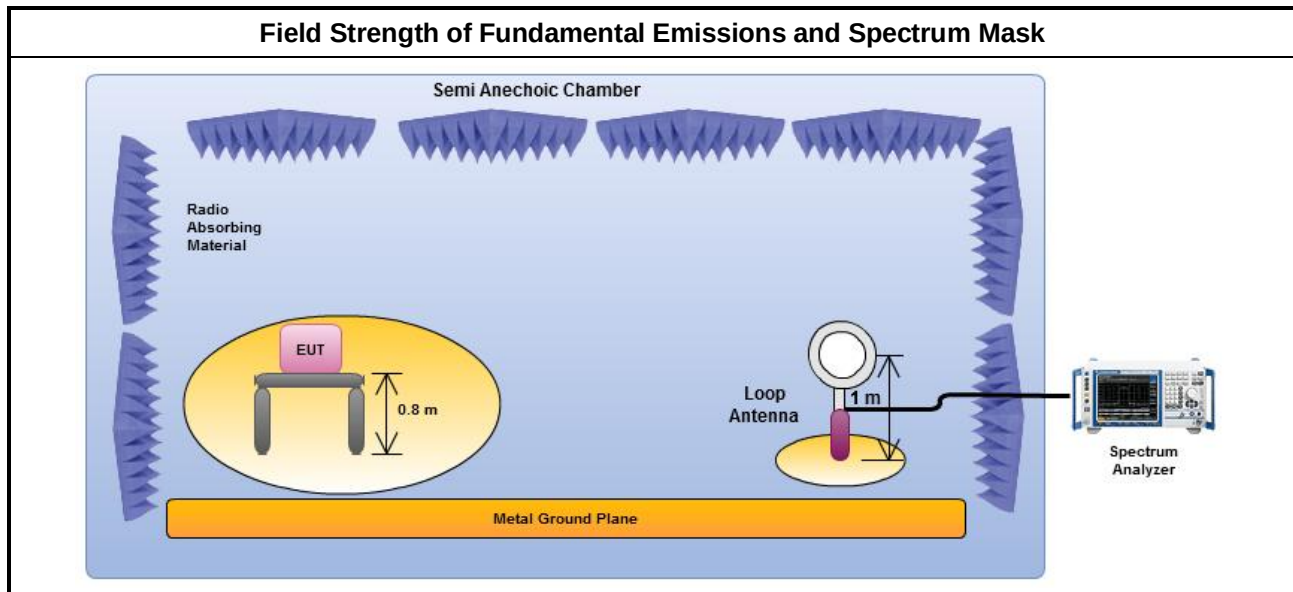
#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.3.3 Test Procedures

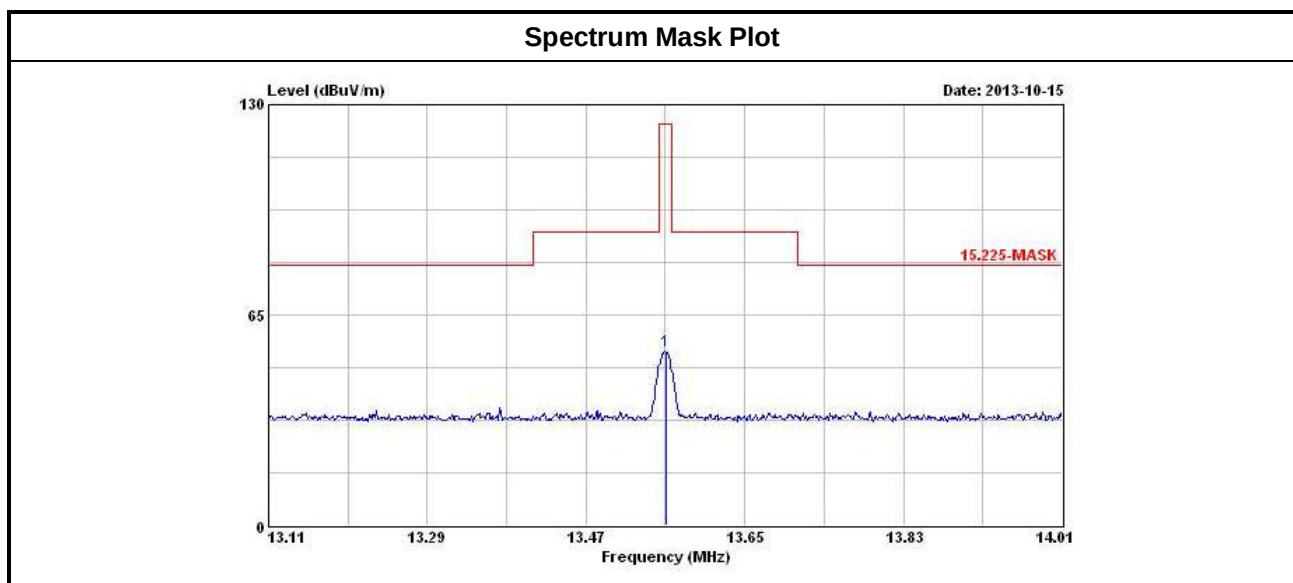
| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods. |
| <input type="checkbox"/>            | The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).                                                                                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.                                                                                                                                                                                                                |

### 3.3.4 Test Setup



### 3.3.5 Test Result of Field Strength of Fundamental Emissions and Spectrum Mask

| Field Strength of Fundamental Emissions Result                                     |                 |                         |              |             |                   |
|------------------------------------------------------------------------------------|-----------------|-------------------------|--------------|-------------|-------------------|
| Modulation Mode                                                                    | Frequency (MHz) | Fundamental (dBuV/m)@3m | Polarization | Margin (dB) | Limit (dBuV/m)@3m |
| NFC-Read/Write                                                                     | F1              | 53.69                   | H            | 70.31       | 124               |
| Result                                                                             |                 | Complied                |              |             |                   |
| Note 1: Measurement worst emissions of receive antenna polarization: V (Vertical). |                 |                         |              |             |                   |



### 3.4 Transmitter Radiated Unwanted Emissions

#### 3.4.1 Transmitter Radiated Unwanted Emissions Limit

| Transmitter Radiated Unwanted Emissions Limit |                       |                         |                      |
|-----------------------------------------------|-----------------------|-------------------------|----------------------|
| Frequency Range (MHz)                         | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) |
| 0.009~0.490                                   | 2400/F(kHz)           | 48.5 - 13.8             | 300                  |
| 0.490~1.705                                   | 24000/F(kHz)          | 33.8 - 23               | 30                   |
| 1.705~30.0                                    | 30                    | 29                      | 30                   |
| 30~88                                         | 100                   | 40                      | 3                    |
| 88~216                                        | 150                   | 43.5                    | 3                    |
| 216~960                                       | 200                   | 46                      | 3                    |
| Above 960                                     | 500                   | 54                      | 3                    |

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

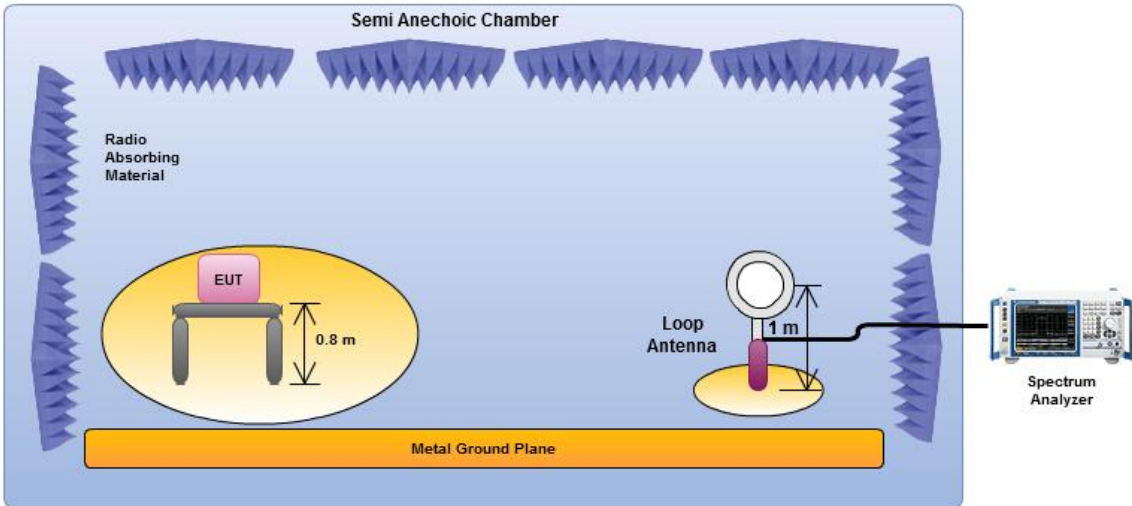
#### 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

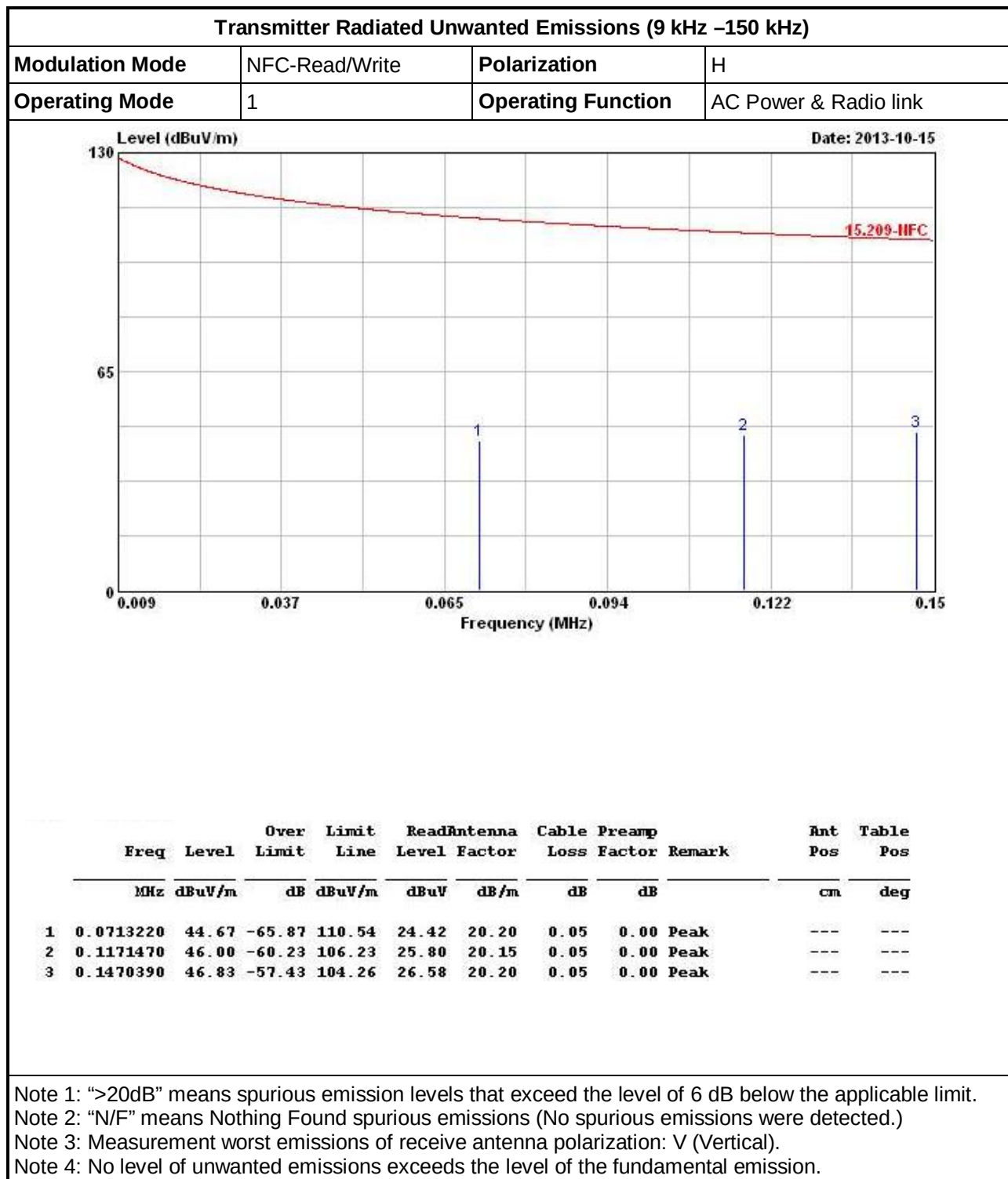
### 3.4.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods. |
| <input type="checkbox"/>            | The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.                                                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).                                                                                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.                                                                                                                                                                                                                |
| <input checked="" type="checkbox"/> | The any unwanted emissions level shall not exceed the fundamental emission level.                                                                                                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.                                                                                                                                                                                                                                                                                                   |

### 3.4.4 Test Setup

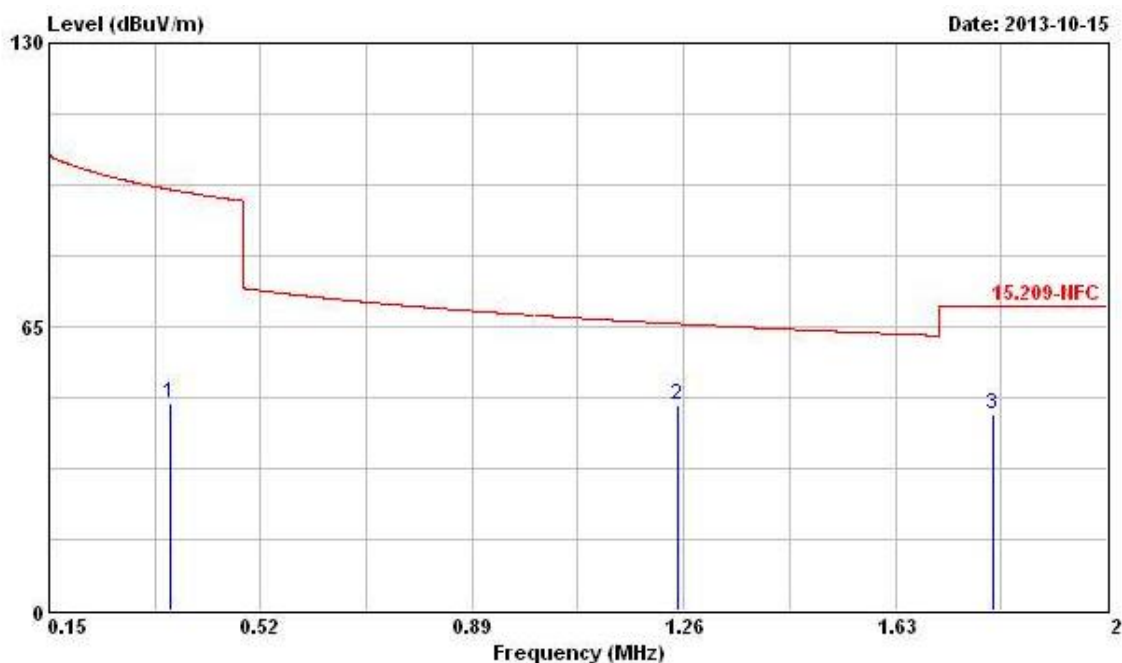
| Transmitter Radiated Unwanted Emissions                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. The center of the loop shall be 1 m above the ground. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna. the antenna height shall be varied from 1 m to 4 m.</p> |

### 3.4.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)



### Transmitter Radiated Unwanted Emissions (150 kHz – 2 MHz)

|                 |                |                    |                       |
|-----------------|----------------|--------------------|-----------------------|
| Modulation Mode | NFC-Read/Write | Polarization       | H                     |
| Operating Mode  | 1              | Operating Function | AC Power & Radio link |



|   | Freq      | Level  | Over   | Limit  | ReadAntenna | Cable  | Preamp |        | Ant  | Table |
|---|-----------|--------|--------|--------|-------------|--------|--------|--------|------|-------|
|   | MHz       | dBuV/m | Limit  | Line   | Level       | Factor | Loss   | Factor | Pos  | Pos   |
|   | MHz       | dBuV/m | dB     | dBuV/m | dBuV        | dB/m   | dB     | dB     | cm   | deg   |
| 1 | 0.3609000 | 47.47  | -48.99 | 96.46  | 27.32       | 20.10  | 0.05   | 0.00   | Peak | ---   |
| 2 | 1.250     | 46.83  | -18.84 | 65.67  | 26.78       | 19.95  | 0.10   | 0.00   | Peak | ---   |
| 3 | 1.800     | 44.79  | -24.75 | 69.54  | 24.63       | 20.00  | 0.16   | 0.00   | Peak | ---   |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

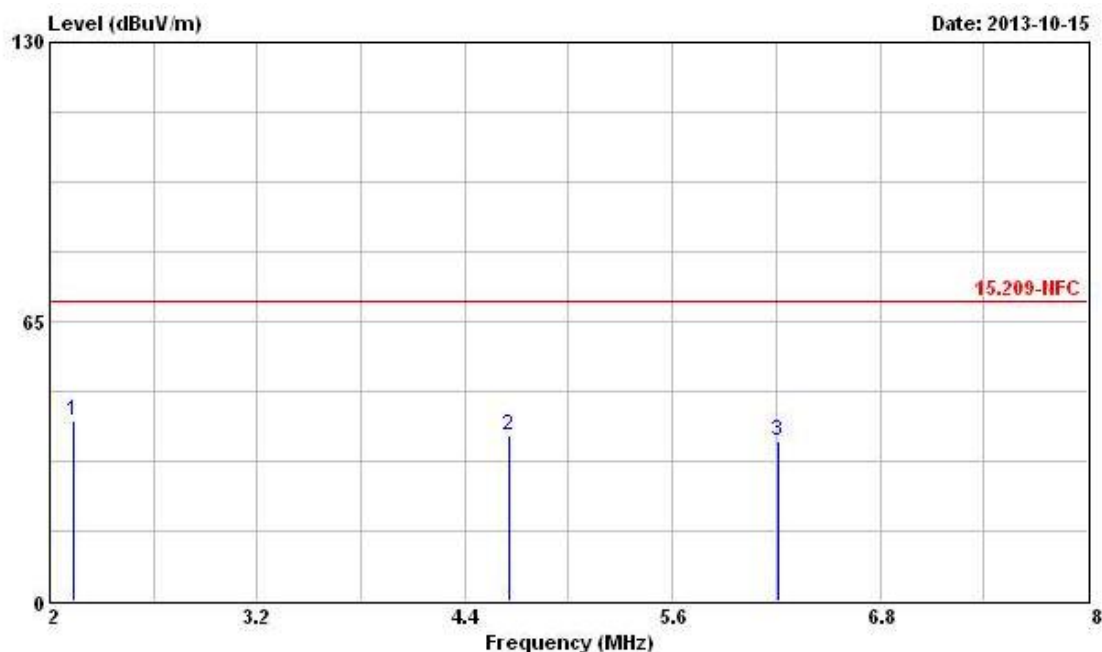
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

**Transmitter Radiated Unwanted Emissions (2 MHz – 8 MHz)**

|                        |                |                           |                       |
|------------------------|----------------|---------------------------|-----------------------|
| <b>Modulation Mode</b> | NFC-Read/Write | <b>Polarization</b>       | H                     |
| <b>Operating Mode</b>  | 1              | <b>Operating Function</b> | AC Power & Radio link |



|   | Freq  | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|-------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz   | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 2.140 | 41.89  | -27.65     | 69.54      | 21.73             | 20.00          | 0.16       | 0.00          | Peak   | ---     | ---       |
| 2 | 4.660 | 38.55  | -30.99     | 69.54      | 18.29             | 20.04          | 0.22       | 0.00          | Peak   | ---     | ---       |
| 3 | 6.210 | 37.17  | -32.37     | 69.54      | 16.81             | 20.08          | 0.28       | 0.00          | Peak   | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

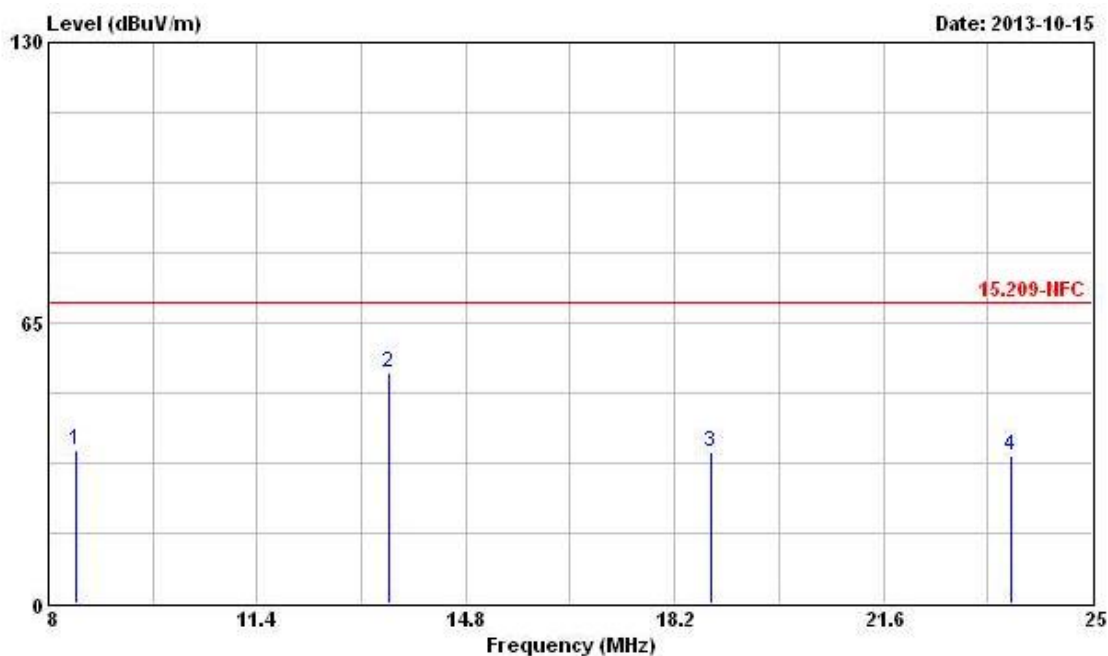
Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



**Transmitter Radiated Unwanted Emissions (8 MHz – 25 MHz)**

|                        |                |                           |                       |
|------------------------|----------------|---------------------------|-----------------------|
| <b>Modulation Mode</b> | NFC-Read/Write | <b>Polarization</b>       | H                     |
| <b>Operating Mode</b>  | 1              | <b>Operating Function</b> | AC Power & Radio link |



|     | Freq   | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|-----|--------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|     | MHz    | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 @ | 8.460  | 35.66  | -33.88     | 69.54      | 15.23             | 20.10          | 0.33       | 0.00          | Peak   | ---     | ---       |
| 2 @ | 13.540 | 53.33  | -16.21     | 69.54      | 32.75             | 20.10          | 0.48       | 0.00          | Peak   | ---     | ---       |
| 3 @ | 18.780 | 34.92  | -34.62     | 69.54      | 14.16             | 20.18          | 0.58       | 0.00          | Peak   | ---     | ---       |
| 4   | 23.670 | 34.40  | -35.14     | 69.54      | 13.61             | 20.13          | 0.66       | 0.00          | Peak   | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

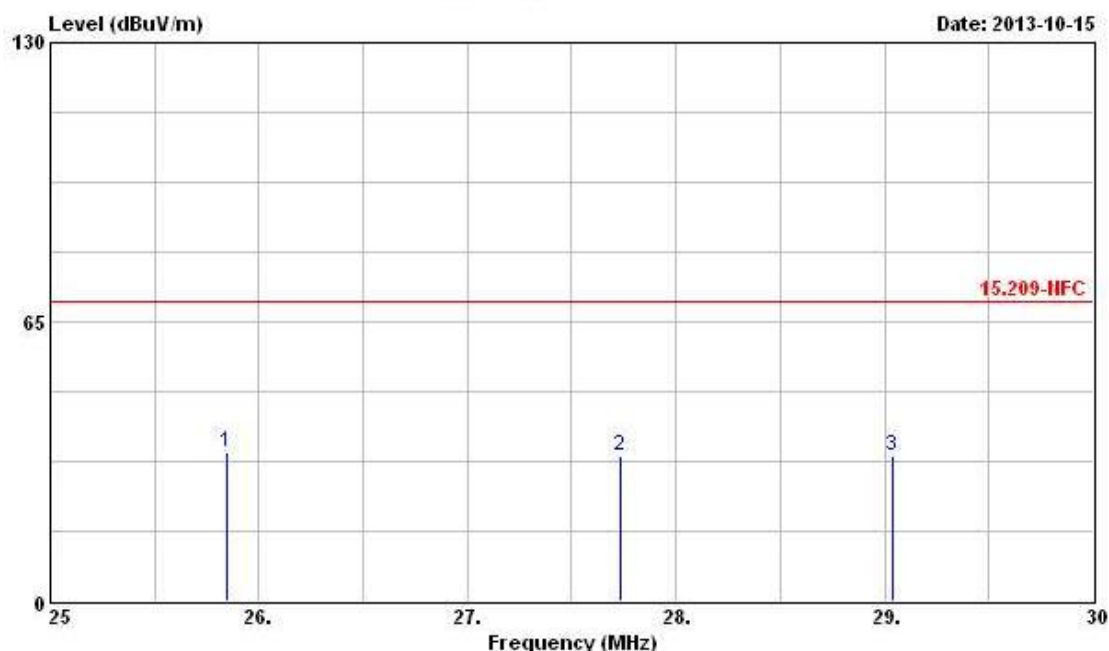
Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.



**Transmitter Radiated Unwanted Emissions (25 MHz – 30 MHz)**

|                        |                |                           |                       |
|------------------------|----------------|---------------------------|-----------------------|
| <b>Modulation Mode</b> | NFC-Read/Write | <b>Polarization</b>       | H                     |
| <b>Operating Mode</b>  | 1              | <b>Operating Function</b> | AC Power & Radio link |



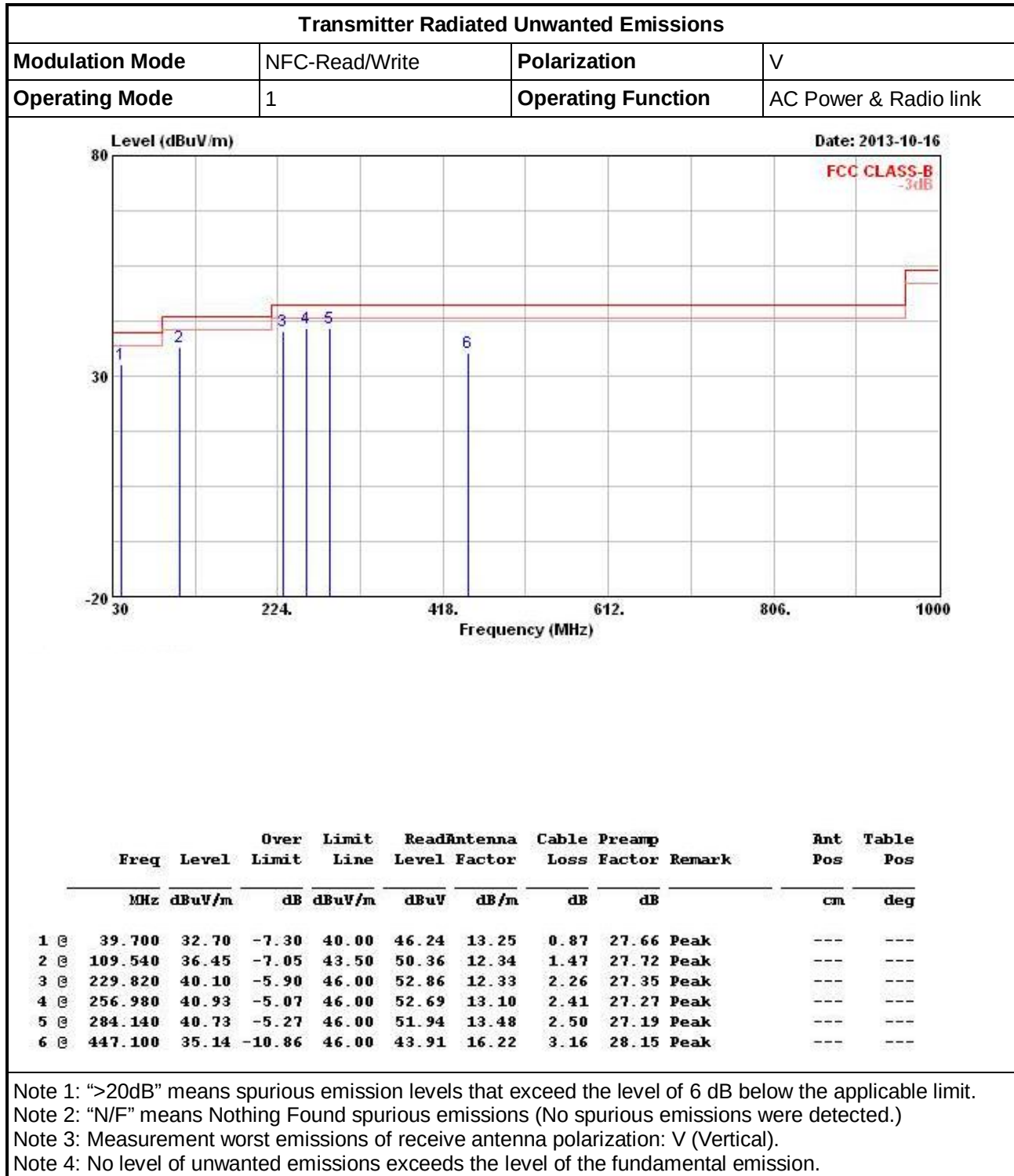
|   | Freq   | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|--------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz    | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 25.850 | 34.46  | -35.08     | 69.54      | 13.66             | 20.10          | 0.70       | 0.00          | Peak   | ---     | ---       |
| 2 | 27.730 | 33.66  | -35.88     | 69.54      | 12.84             | 20.10          | 0.72       | 0.00          | Peak   | ---     | ---       |
| 3 | 29.040 | 33.92  | -35.62     | 69.54      | 13.06             | 20.10          | 0.76       | 0.00          | Peak   | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

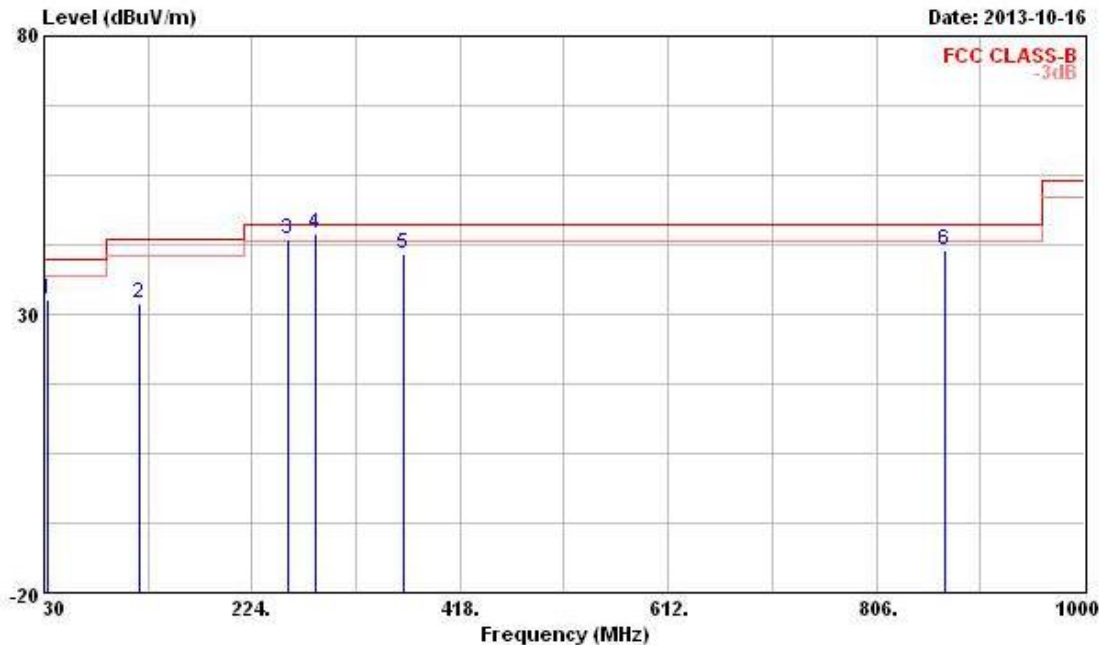
Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

**3.4.6 Transmitter Radiated Unwanted Emissions (Above 30MHz)**


**Transmitter Radiated Unwanted Emissions**

|                        |                |                           |                       |
|------------------------|----------------|---------------------------|-----------------------|
| <b>Modulation Mode</b> | NFC-Read/Write | <b>Polarization</b>       | H                     |
| <b>Operating Mode</b>  | 1              | <b>Operating Function</b> | AC Power & Radio link |



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 32.910  | 32.62  | -7.38      | 40.00      | 44.47             | 15.11          | 0.79       | 27.75         | Peak   | ---     | ---       |
| 2 | 118.270 | 32.11  | -11.39     | 43.50      | 44.88             | 13.38          | 1.54       | 27.69         | Peak   | ---     | ---       |
| 3 | 256.980 | 43.41  | -2.59      | 46.00      | 55.17             | 13.10          | 2.41       | 27.27         | QP     | ---     | ---       |
| 4 | 283.170 | 44.41  | -1.59      | 46.00      | 55.64             | 13.47          | 2.50       | 27.20         | QP     | ---     | ---       |
| 5 | 365.620 | 41.01  | -4.99      | 46.00      | 51.07             | 14.72          | 2.87       | 27.65         | Peak   | ---     | ---       |
| 6 | 870.020 | 41.52  | -4.48      | 46.00      | 44.72             | 20.10          | 4.56       | 27.86         | Peak   | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

### 3.5 Frequency Stability

#### 3.5.1 Frequency Stability Limit

| Frequency Stability Limit           |                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Carrier frequency stability shall be maintained to $\pm 0.01\%$ ( $\pm 100$ ppm). |

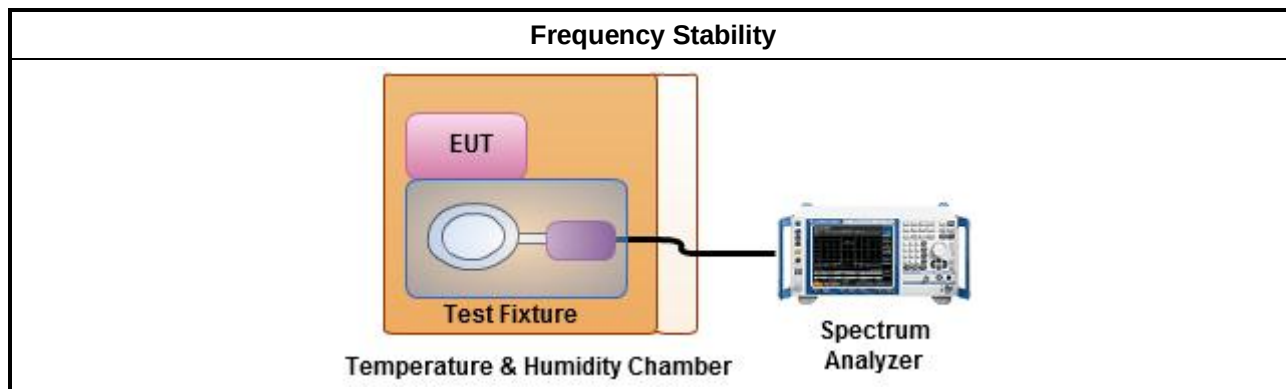
#### 3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.5.3 Test Procedures

| Test Method                         |                                                                                                                                          |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.8 for frequency stability tests                                                                           |
| <input checked="" type="checkbox"/> | Frequency stability with respect to ambient temperature                                                                                  |
| <input checked="" type="checkbox"/> | Frequency stability when varying supply voltage                                                                                          |
| <input type="checkbox"/>            | For conducted measurement.                                                                                                               |
| <input checked="" type="checkbox"/> | For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level. |

#### 3.5.4 Test Setup



**3.5.5 Test Result of Frequency Stability**

| Frequency Stability Result                                                                                                                                                                              |             |                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------|
| Power Level                                                                                                                                                                                             | 1           | Frequency Stability<br>Max. Deviation Limit < 100 ppm |
| Condition                                                                                                                                                                                               | Freq. (MHz) | 10 min                                                |
| T <sub>20°C</sub> V <sub>max</sub>                                                                                                                                                                      | 13.56       | 0.00                                                  |
| T <sub>20°C</sub> V <sub>min</sub>                                                                                                                                                                      | 13.56       | 0.00                                                  |
| T <sub>50°C</sub> V <sub>nom</sub>                                                                                                                                                                      | 13.56       | -22.12                                                |
| T <sub>40°C</sub> V <sub>nom</sub>                                                                                                                                                                      | 13.56       | -22.12                                                |
| T <sub>30°C</sub> V <sub>nom</sub>                                                                                                                                                                      | 13.56       | 0.00                                                  |
| T <sub>20°C</sub> V <sub>nom</sub>                                                                                                                                                                      | 13.56       | 0.00                                                  |
| T <sub>10°C</sub> V <sub>nom</sub>                                                                                                                                                                      | 13.56       | 0.00                                                  |
| T <sub>0°C</sub> V <sub>nom</sub>                                                                                                                                                                       | 13.56       | 22.12                                                 |
| T <sub>-10°C</sub> V <sub>nom</sub>                                                                                                                                                                     | 13.56       | 22.12                                                 |
| T <sub>-20°C</sub> V <sub>nom</sub>                                                                                                                                                                     | 13.56       | 22.12                                                 |
| <b>Result</b>                                                                                                                                                                                           |             | <b>Complied</b>                                       |
| Note 1: Measure at 85 % [V <sub>min</sub> ] and 115 % [V <sub>max</sub> ] of the nominal voltage [V <sub>nom</sub> ]. The nominal voltage refer test report clause 1.1.5 for EUT operational condition. |             |                                                       |

## 4 Test Equipment and Calibration Data

| Instrument             | Manufacturer                   | Model No. | Serial No.      | Characteristics | Calibration Date | Remark               |
|------------------------|--------------------------------|-----------|-----------------|-----------------|------------------|----------------------|
| EMC Receiver           | R&S                            | ESCS 30   | 100174          | 9kHz ~ 2.75GHz  | Mar. 26, 2013    | Conduction (CO04-HY) |
| LISN                   | SCHWARZBECK<br>MESS-ELEKTRONIK | NSLK 8127 | 8127-477        | 9kHz ~ 30MHz    | Jan. 21, 2013    | Conduction (CO04-HY) |
| LISN<br>(Support Unit) | EMCO                           | 3810/2NM  | 9703-1839       | 9kHz ~ 30MHz    | Apr. 18, 2013    | Conduction (CO04-HY) |
| RF Cable-CON           | HUBER+SUHNER                   | RG213/U   | 7.61183201e+012 | 9kHz ~ 30MHz    | Nov. 09, 2012    | Conduction (CO04-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument                 | Manufacturer | Model No.        | Serial No.  | Characteristics | Calibration Date | Remark              |
|----------------------------|--------------|------------------|-------------|-----------------|------------------|---------------------|
| Spectrum Analyzer          | R&S          | FSV 40           | 101013      | 9KHz ~ 40GHz    | Jan. 29, 2013    | Conducted (TH01-HY) |
| Temp. and Humidity Chamber | Giant Force  | GTH-225-20-SP-SD | MAA1112-007 | -20 ~ 100℃      | Nov. 21, 2012    | Conducted (TH01-HY) |
| AC Power Source            | G.W          | APS-9102         | EL920581    | AC 0V ~ 300V    | Jul. 16, 2013    | Conducted (TH01-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument               | Manufacturer         | Model No. | Serial No.   | Characteristics    | Calibration Date | Remark                |
|--------------------------|----------------------|-----------|--------------|--------------------|------------------|-----------------------|
| 3m Semi Anechoic Chamber | SIDT FRANKONIA       | SAC-3M    | 03CH02-HY    | 30MHz ~ 1GHz<br>3m | May 11, 2013     | Radiation (03CH02-HY) |
| Amplifier                | Agilent              | 8447D     | 2944A11146   | 100kHz ~ 1.3GHz    | Jul. 17, 2013    | Radiation (03CH02-HY) |
| Spectrum Analyzer        | R&S                  | FSP40     | 100593       | 9kHz ~ 40GHz       | Oct. 03, 2013    | Radiation (03CH02-HY) |
| Receiver                 | R&S                  | ESU26     | 1302.6005.26 | 20Hz ~ 26.5GHz     | Apr. 02, 2013    | Radiation (03CH02-HY) |
| Bilog Antenna            | SCHAFFNER            | CBL61128  | 2723         | 30MHz ~ 2GHz       | Oct. 22, 2012    | Radiation (03CH02-HY) |
| RF Cable-R03m            | Jye Bao              | RG142     | CB021        | 9kHz ~ 1GHz        | Nov. 10, 2012    | Radiation (03CH02-HY) |
| Turn Table               | Chaintek Instruments | 3000      | MF7802058    | 0~ 360 degree      | N/A              | Radiation (03CH02-HY) |
| Antenna Mast             | MF                   | MF7802    | MF780208205  | 1 ~ 4 m            | N/A              | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument   | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark                |
|--------------|--------------|-----------|------------|-----------------|------------------|-----------------------|
| Loop Antenna | TESEQ        | HLA 6120  | 31244      | 9 kHz ~ 30 MHz  | Dec. 02, 2012    | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is two year.