# FCC/IC RF TEST REPORT

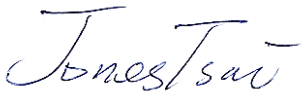
47 CFR FCC Part 15 Subpart C § 15.249

IC RSS-210 A2.9

| | | |
|---|---|---|
| **Equipment** | **:** | **Smart phone** |
| **BRAND NAME** | **:** | **SONY** |
| **Type NAME** | **:** | **PM-0385-BV** |
| **FCC ID** | **:** | **PY7PM-0385** |

**We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor**



**Approved by: Jones Tsai / Manager**

***SPORTON INTERNATIONAL INC.***

***No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.***

# Table of Contents

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR450249E | Rev. 01 | Initial issue of report | Jul. 14, 2014 |
| FR450249E | Rev. 02 | Update EUT Information List for SW version change as 18.4.C.1.10 | Aug. 01, 2014 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# 1. SUMMARY OF THE TEST RESULT

| Applied Standard: \| | | | | | |
|---|---|---|---|---|---|
| **Part** | **FCC Rule** | **IC Rule** | **Description of Test** | **Result** | **Under Limit** |
| 3.1 | 15.207 | RSS-GEN 7.2.4 | AC Power Line Conducted Emissions | Complies | 11.90 dB at 2.630MHz |
| 3.2 | 2.1049 | RSS-GEN 4.6.1 | 20dB & 99% Occupied Bandwidth | Complies | - |
| 3.3 | 15.249(a) | RSS-210 A2.9 | Field Strength of Fundamental Emissions | Complies | 16.31 dB at 2402.000MHz |
| 3.4 | 15.249(a)(d) | RSS-210 A2.9 | Radiated Spurious Emissions | Complies | 9.93 dB at 30.540MHz |
| 3.5 | 15.203 | - | Antenna Requirements | Complies | - |

# 2. GENERAL INFORMATION

## 2.1 Applicant

**Sony Mobile Communications Inc.**

Nya Vattentornet, 22188 Lund, Sweden

## 2.2 Manufacturer

**Arima Communication Corp.**

6F, No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

## 2.3 Product Details

For more detailed features description, please refer to the manufacturer's specifications or user's manual.

| Items | Description |
|---|---|
| Modulation | GFSK |
| Channel Bandwidth (99%) | 1.011MHz |
| Max. Field Strength (Peak) | 97.69dBμV/m |
| Max. Field Strength (Average) | 61.21dBμV/m |
| ANT+ Channel Number | 79 |
| ANT+ Frequency Range | 2402-2480MHz |

| EUT Information List | | | | |
|---|---|---|---|---|
| IMEI | HW Version | SW Version | S/N | Performed Test Item |
| IMEI : 004402452636586 | A | 18.4.C.1.10 | ZL4416D28274 | RF conducted measurement |
| IMEI : 004402452638509 | | | WUJ01AYKJ8 | Radiated Spurious Emission |
| IMEI : 004402452636123 | | | ZL4416D28653 | Conducted Emission |

| Accessory List | |
|---|---|
| **AC Adapter** | Model No. : EP800 |
| | Type No. : CAA-0002016-US B |
| | S/N :<br>3113W45408465 (for Radiated Spurious Emission)<br>3113W45408551 (for AC Conducted Emission) |
| **Battery** | Model No. : LIS1551ERPC |
| **Earphone** | Model No. : MH410c |
| | Type No. : AG-1100 |
| | S/N :<br>13511E5B0076390 (for Radiated Spurious Emission)<br>13511E5B00763EC (for AC Conducted Emission) |
| **USB Cable** | Model No. : EC450 |
| | Type No. : AI-0700 |
| | S/N :<br>134912DC0004380 (for Radiated Spurious Emission)<br>134912D80008076 (for AC Conducted Emission) |

**Note:**

1. Above EUT list and accessory list used are electrically identical per declared by manufacturer.
2. Above the accessories list are used to exercise the EUT during test.
3. For other wireless features of this EUT, test report will be issued separately.

## 2.4 Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

| Test Items | Mode |
|---|---|
| AC Power Line Conducted Emissions | CTX |
| Field Strength of Fundamental Emissions | CTX |
| Bandwidth | CTX |
| Radiated Emissions | CTX |

Note:

1. CTX=continuously transmitting.
2. The programmed RF utility, “QRCT Tool” installed in the notebook to make the EUT get into the engineering modes to continuously transmit.

## 2.5 Table for Testing Locations

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

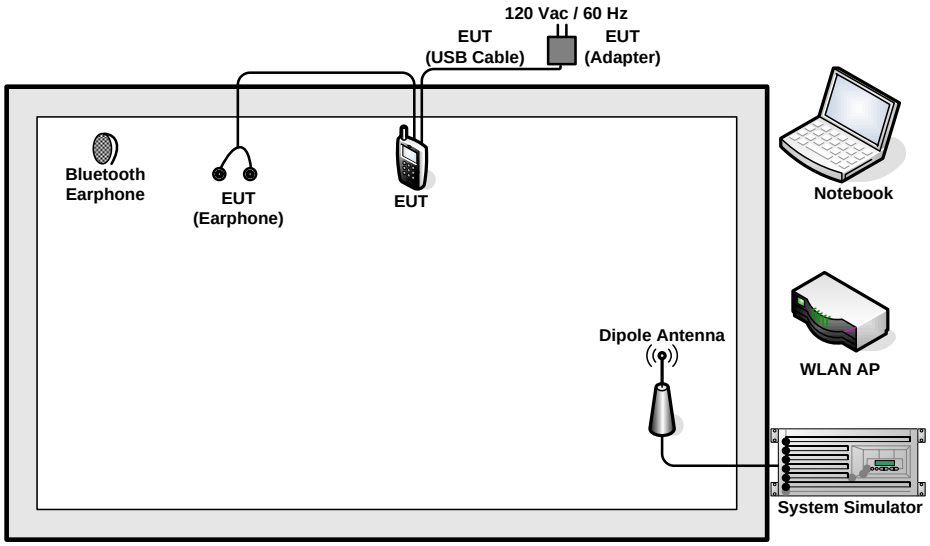
| **Test Site** | SPORTON INTERNATIONAL INC. | | | |
|---|---|---|---|---|
| **Test Site Location** | No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-3273456 / FAX: +886-3-3284978 | | | |
| **Test Site No.** | **Sporton Site No.** | | | **IC Registration No.** |
| | TH02-HY | CO05-HY | 03CH07-HY | 4086B-1 |

## 2.6 Table for Supporting Units

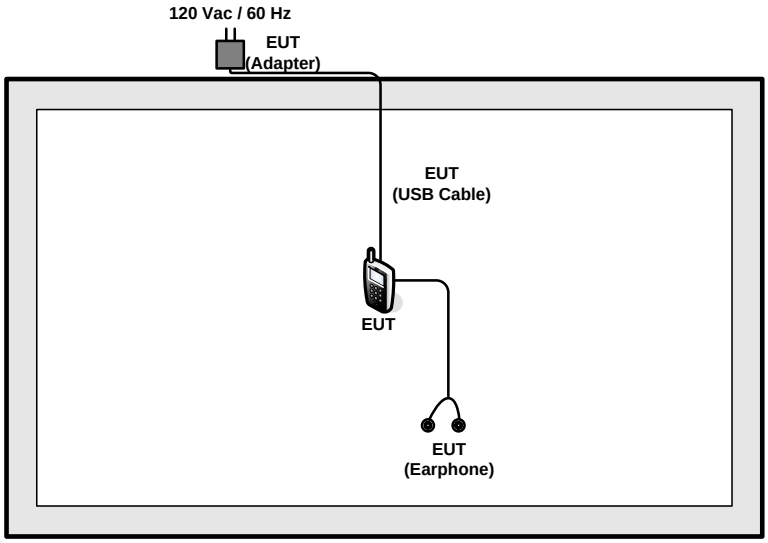
| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | System Simulator | R&S | CMU 200 | N/A | N/A | Unshielded, 1.8 m |
| 2. | WLAN AP | D-Link | DIR-628 | KA2DIR628A2 | N/A | Unshielded, 1.8 m |
| 3. | Bluetooth Earphone | Sony | SBH20 | PY7-RD0010 | Unshielded, 0.75m | N/A |
| 4. | Notebook | DELL | Latitude E6320 | FCC DoC/ Contains FCC ID: QDS-BRCM1054 | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 5. | SD Card | SanDisk | MicroSD HC | FCC DoC | N/A | N/A |

## 2.7 Test Configurations

### <AC Conducted Emissions>




### <Radiated Spurious Emissions>



# 3. TEST RESULT

## 3.1 AC Power Line Conducted Emissions Measurement

### 3.1.1 Limit

For a Low-power Radio-frequency device which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

| Frequency (MHz) | QP Limit (dBμV) | AV Limit (dBμV) |
|---|---|---|
| 0.15~0.5 | 66~56 | 56~46 |
| 0.5~5 | 56 | 46 |
| 5~30 | 60 | 50 |

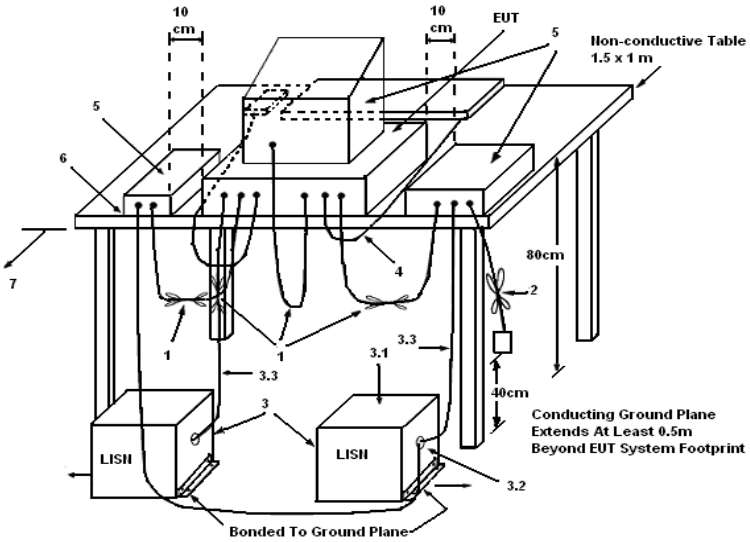
### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

### 3.1.4 Test Setup Layout




LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

### 3.1.5 Test Deviation

There is no deviation with the original standard.

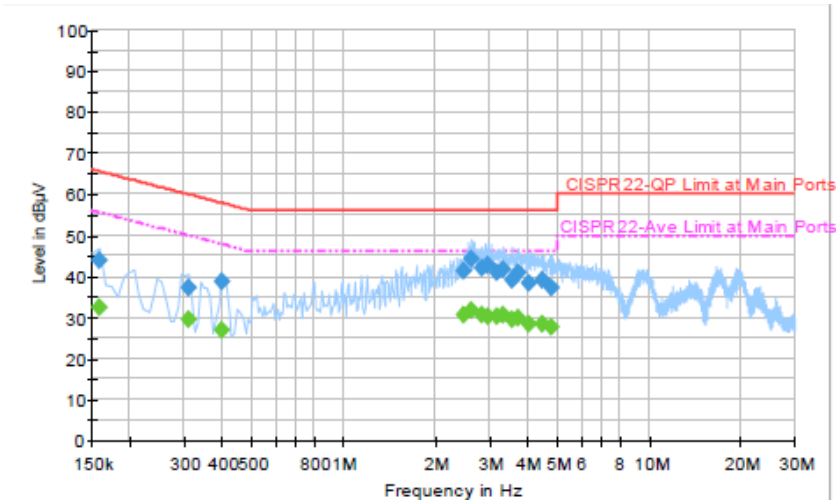
### 3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in transmitting function.

### 3.1.7 Results of AC Power Line Conducted Emissions Measurement

| Test Date | May 20, 2014 | Test Site No. | CO05-HY |
|---|---|---|---|
| Temperature | 20~22°C | Humidity | 46~48% |
| Test Engineer | Kai-Chun Chu | Configuration | ANT+ Transmitting Mode |
| Mode | GSM850 Idle + Bluetooth Link + WLAN Link + ANT+ Tx + Earphone + USB Cable (Charging from Adapter) + Battery | | |

***Line***

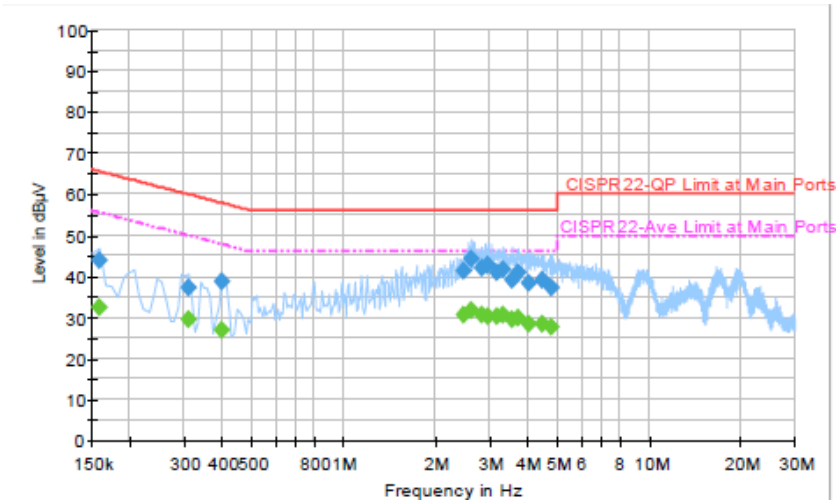



**Final Result: Quasi-Peak**

| Frequency (MHz) | Quasi-Peak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 43.8 | Off | L1 | 19.3 | 21.8 | 65.6 |
| 0.310000 | 37.3 | Off | L1 | 19.3 | 22.7 | 60.0 |
| 0.398000 | 38.6 | Off | L1 | 19.3 | 19.3 | 57.9 |
| 2.478000 | 41.4 | Off | L1 | 19.5 | 14.6 | 56.0 |
| 2.630000 | 44.1 | Off | L1 | 19.5 | 11.9 | 56.0 |
| 2.822000 | 42.0 | Off | L1 | 19.6 | 14.0 | 56.0 |
| 2.974000 | 42.8 | Off | L1 | 19.6 | 13.2 | 56.0 |
| 3.166000 | 41.1 | Off | L1 | 19.6 | 14.9 | 56.0 |
| 3.318000 | 41.6 | Off | L1 | 19.6 | 14.4 | 56.0 |
| 3.574000 | 39.0 | Off | L1 | 19.6 | 17.0 | 56.0 |
| 3.718000 | 41.1 | Off | L1 | 19.6 | 14.9 | 56.0 |
| 4.046000 | 38.3 | Off | L1 | 19.6 | 17.7 | 56.0 |
| 4.462000 | 38.9 | Off | L1 | 19.6 | 17.1 | 56.0 |
| 4.814000 | 37.3 | Off | L1 | 19.6 | 18.7 | 56.0 |

| Test Date | May 20, 2014 | Test Site No. | CO05-HY |
|---|---|---|---|
| Temperature | 20~22°C | Humidity | 46~48% |
| Test Engineer | Kai-Chun Chu | Configuration | ANT+ Transmitting Mode |
| Mode | GSM850 Idle + Bluetooth Link + WLAN Link + ANT+ Tx + Earphone + USB Cable (Charging from Adapter) + Battery | | |

***Line***

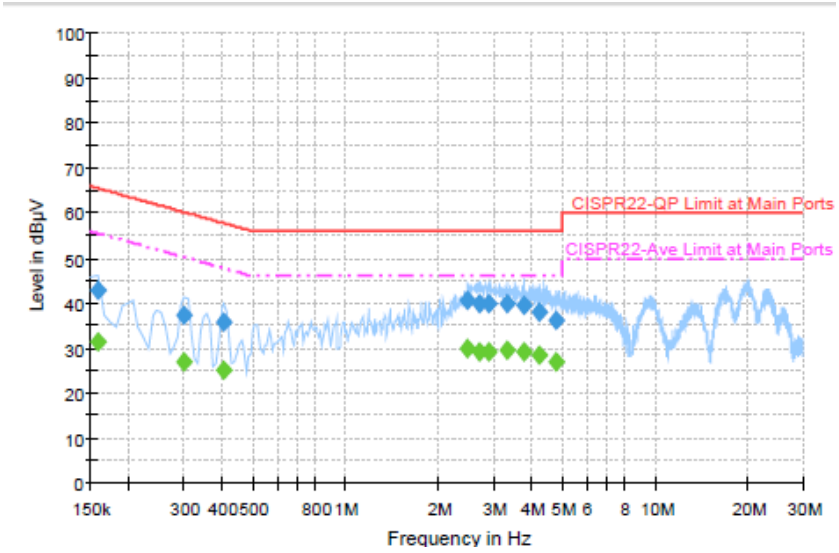



**Final Result: Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 32.6 | Off | L1 | 19.3 | 23.0 | 55.6 |
| 0.310000 | 29.7 | Off | L1 | 19.3 | 20.3 | 50.0 |
| 0.398000 | 26.9 | Off | L1 | 19.3 | 21.0 | 47.9 |
| 2.478000 | 30.7 | Off | L1 | 19.5 | 15.3 | 46.0 |
| 2.630000 | 31.8 | Off | L1 | 19.5 | 14.2 | 46.0 |
| 2.822000 | 30.5 | Off | L1 | 19.6 | 15.5 | 46.0 |
| 2.974000 | 30.3 | Off | L1 | 19.6 | 15.7 | 46.0 |
| 3.166000 | 30.1 | Off | L1 | 19.6 | 15.9 | 46.0 |
| 3.318000 | 30.7 | Off | L1 | 19.6 | 15.3 | 46.0 |
| 3.574000 | 29.4 | Off | L1 | 19.6 | 16.6 | 46.0 |
| 3.718000 | 29.9 | Off | L1 | 19.6 | 16.1 | 46.0 |
| 4.046000 | 28.3 | Off | L1 | 19.6 | 17.7 | 46.0 |
| 4.462000 | 28.4 | Off | L1 | 19.6 | 17.6 | 46.0 |
| 4.814000 | 27.7 | Off | L1 | 19.6 | 18.3 | 46.0 |

| Test Date | May 20, 2014 | Test Site No. | CO05-HY |
|---|---|---|---|
| Temperature | 20~22°C | Humidity | 46~48% |
| Test Engineer | Kai-Chun Chu | Configuration | ANT+ Transmitting Mode |
| Mode | GSM850 Idle + Bluetooth Link + WLAN Link + ANT+ Tx + Earphone + USB Cable (Charging from Adapter) + Battery | | |

***Neutral***

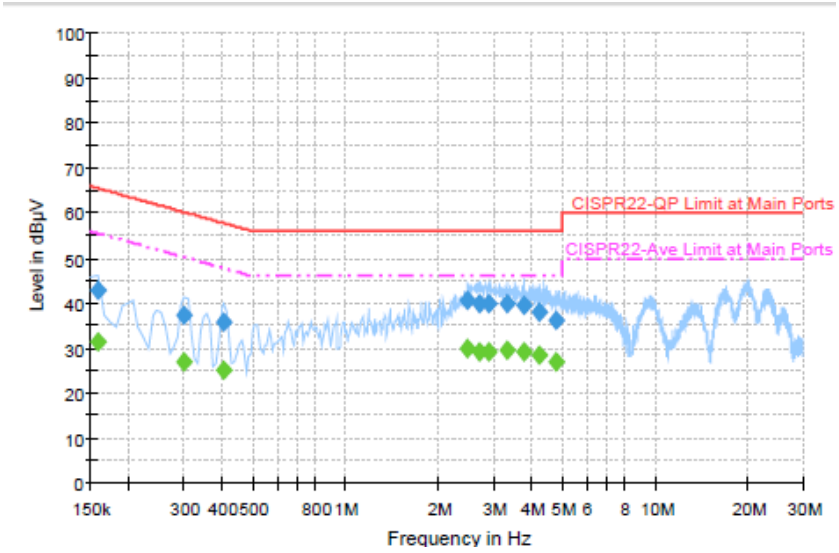



**Final Result: Quasi-Peak**

| Frequency (MHz) | Quasi-Peak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 42.8 | Off | N | 19.3 | 22.8 | 65.6 |
| 0.302000 | 37.3 | Off | N | 19.4 | 22.9 | 60.2 |
| 0.406000 | 35.6 | Off | N | 19.4 | 22.1 | 57.7 |
| 2.486000 | 40.5 | Off | N | 19.6 | 15.5 | 56.0 |
| 2.702000 | 40.0 | Off | N | 19.6 | 16.0 | 56.0 |
| 2.910000 | 39.8 | Off | N | 19.6 | 16.2 | 56.0 |
| 3.318000 | 39.9 | Off | N | 19.6 | 16.1 | 56.0 |
| 3.782000 | 39.4 | Off | N | 19.6 | 16.6 | 56.0 |
| 4.246000 | 37.9 | Off | N | 19.6 | 18.1 | 56.0 |
| 4.814000 | 36.3 | Off | N | 19.6 | 19.7 | 56.0 |

| Test Date | May 20, 2014 | Test Site No. | CO05-HY |
|---|---|---|---|
| Temperature | 20~22°C | Humidity | 46~48% |
| Test Engineer | Kai-Chun Chu | Configuration | ANT+ Transmitting Mode |
| Mode | GSM850 Idle + Bluetooth Link + WLAN Link + ANT+ Tx + Earphone + USB Cable (Charging from Adapter) + Battery | | |

***Neutral***




**Final Result: Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 31.3 | Off | N | 19.3 | 24.3 | 55.6 |
| 0.302000 | 27.0 | Off | N | 19.4 | 23.2 | 50.2 |
| 0.406000 | 25.1 | Off | N | 19.4 | 22.6 | 47.7 |
| 2.486000 | 29.8 | Off | N | 19.6 | 16.2 | 46.0 |
| 2.702000 | 29.0 | Off | N | 19.6 | 17.0 | 46.0 |
| 2.910000 | 29.1 | Off | N | 19.6 | 16.9 | 46.0 |
| 3.318000 | 29.6 | Off | N | 19.6 | 16.4 | 46.0 |
| 3.782000 | 29.0 | Off | N | 19.6 | 17.0 | 46.0 |
| 4.246000 | 28.5 | Off | N | 19.6 | 17.5 | 46.0 |
| 4.814000 | 26.8 | Off | N | 19.6 | 19.2 | 46.0 |

## 3.2 20dB and & 99% Occupied Bandwidth

### 3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band.

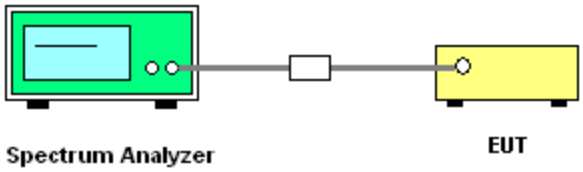
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.2.3 Test Procedures

1. The transmitter output port was connected to the spectrum analyzer.
2. Measured the spectrum width with highest power setting.

### 3.2.4 Test Setup Layout




### 3.2.5 Test Deviation

There is no deviation with the original standard.

### 3.2.6 EUT Operation during Test

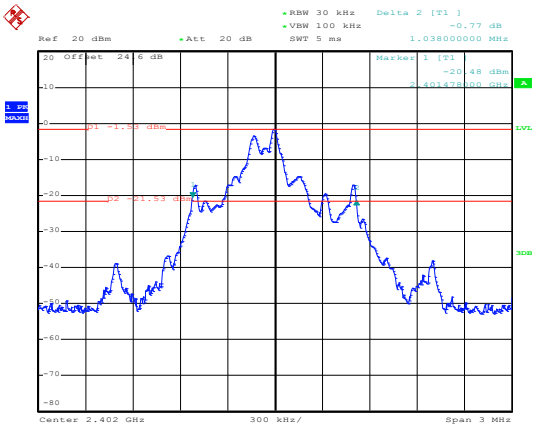
The EUT was programmed to be in continuously transmitting mode.

### 3.2.7 Test Result of 20dB Spectrum Bandwidth

| Final Test Date | May 07, 2014 | Test Site No. | TH02-HY |
|---|---|---|---|
| Temperature | 24~26°C | Humidity | 48~51% |
| Test Engineer | Osolemio Chang | | |

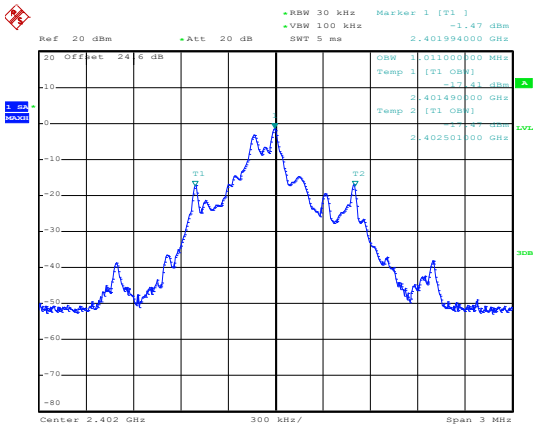
| Frequency | 20dB BW (MHz) | 99% OBW (MHz) |
|---|---|---|
| 2402MHz | 1.038 | 1.011 |
| 2441MHz | 1.032 | 1.008 |
| 2480MHz | 1.038 | 1.008 |

**20 dB Bandwidth Plot on 2402MHz**



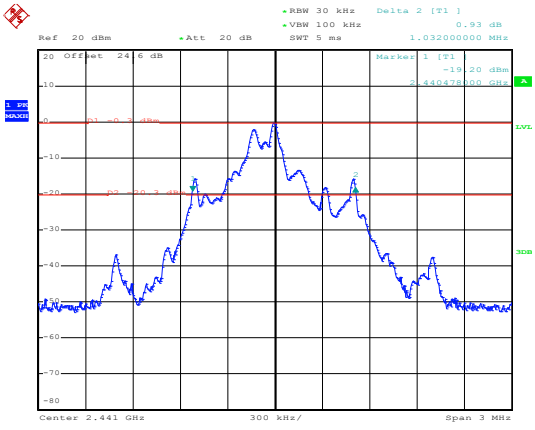

Date: 7.MAY.2014 02:13:41

**99% Bandwidth Plot on 2402MHz**



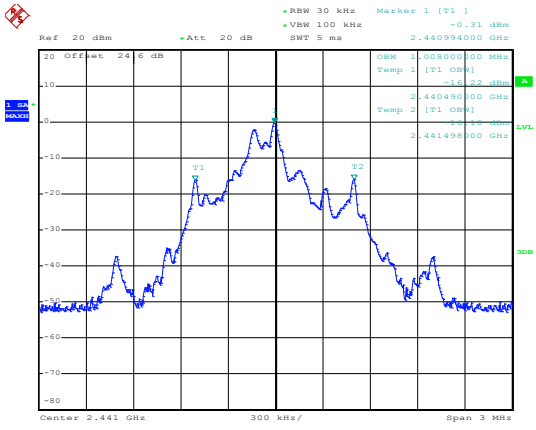

Date: 7.MAY.2014 02:43:37

**20 dB Bandwidth Plot on 2441MHz**



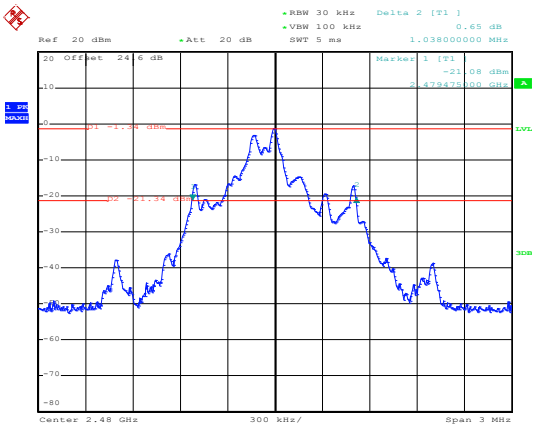

Date: 7.MAY.2014 02:20:44

**99% Bandwidth Plot on 2441MHz**



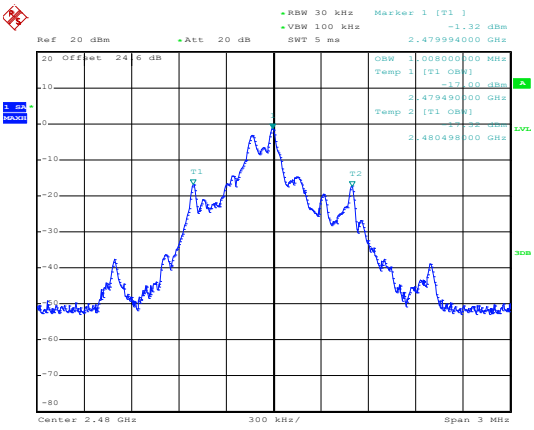

Date: 7.MAY.2014 02:47:20

## 20 dB Bandwidth Plot on 2480MHz




Date: 7.MAY.2014 02:27:17

## 99% Bandwidth Plot on 2480MHz




Date: 7.MAY.2014 03:04:16

## 3.3 Field Strength of Fundamental Emissions and Radiated Spurious Emissions

### 3.3.1 Limit

The field strength measured at 3 meters shall not exceed the limits in the following table:

| Fundamental Frequencies(MHz) | Field Strength(millivolts/m) | |
|---|---|---|
| | Fundamental | Harmonics |
| 902~928 | 50 | 0.5 |
| 2400~2483.5 | 50 | 0.5 |
| 5725~5875 | 50 | 0.5 |

**Note:** The limits shown in the above table are based on measurements using an average detector, except for the fundamental emission in the frequency band 902-928 MHz, which is based on measurements using a CISPR quasi-peak detector.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in 15.209 as below, whichever is less stringent.

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 – 88 | 100 | 3 |
| 88 – 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.3.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.

**Remark:**

1. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
2. For average measurement: use duty cycle correction factor method per 15.35(c).

   Duty cycle = On time/100 milliseconds

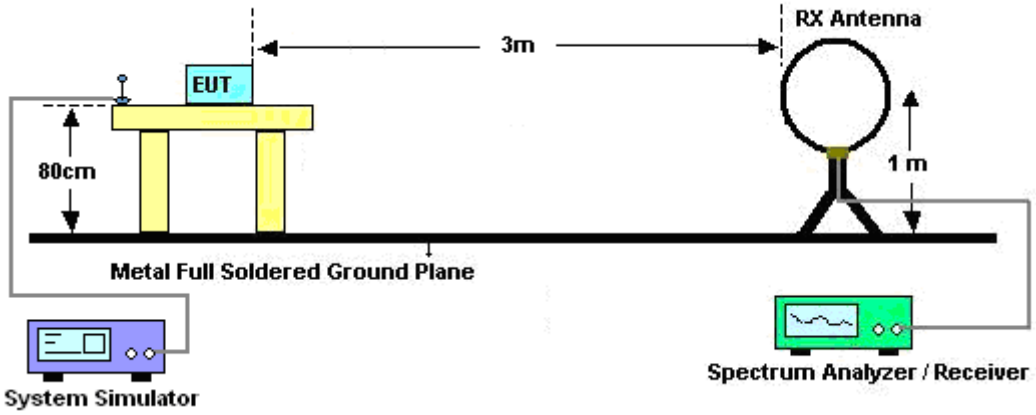
   On time = N1*L1+N2*L2+...+Nn-1*LNn-1+Nn*Ln

   Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.

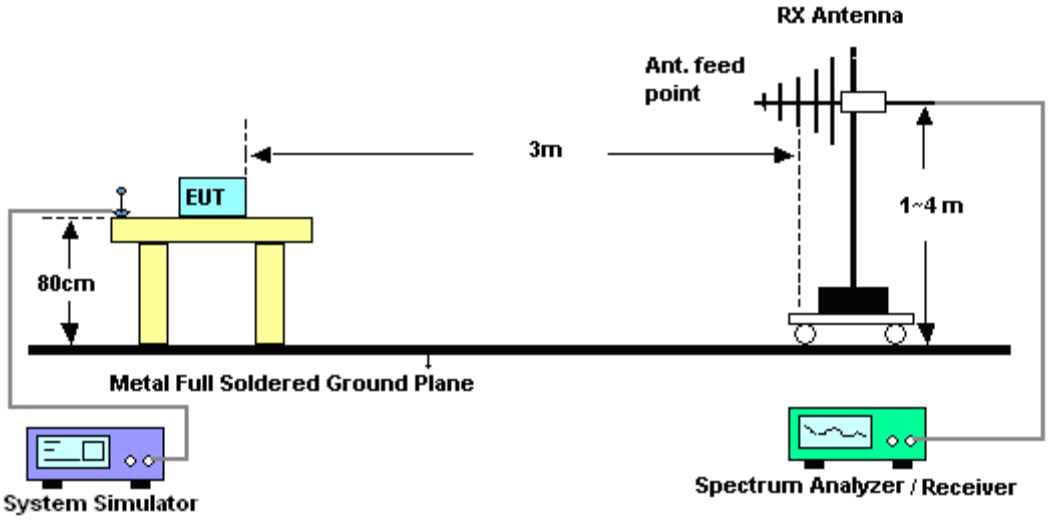
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)

### 3.3.4 Test Setup Layout

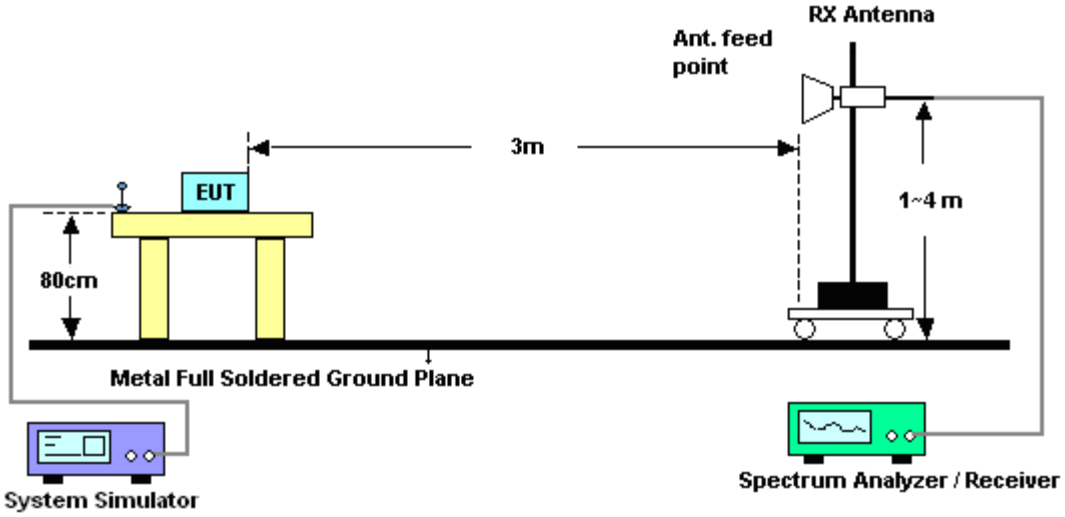
**For radiated emissions below 30MHz**




**For radiated emissions from 30MHz to 1GHz**



**For radiated emissions above 1GHz**




### 3.3.5 Test Deviation

There is no deviation with the original standard.

### 3.3.6 EUT Operation during Test

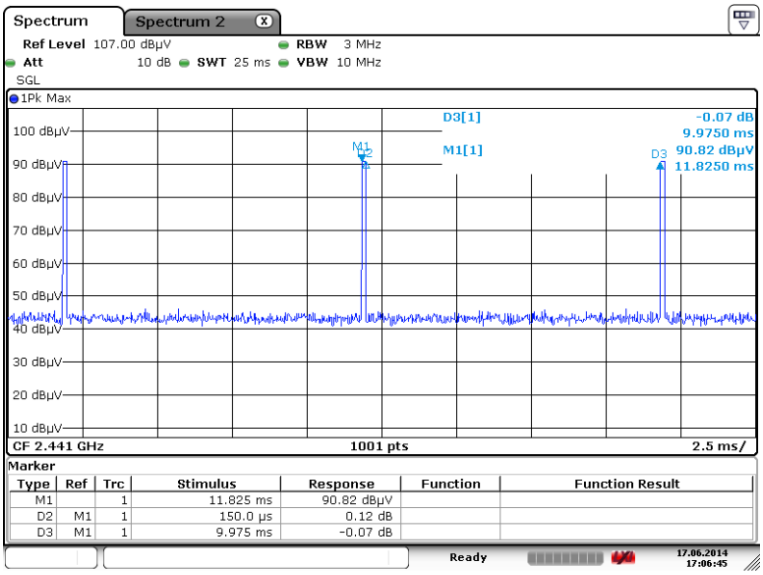
The EUT was programmed to be in continuously transmitting mode.

### 3.3.7 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

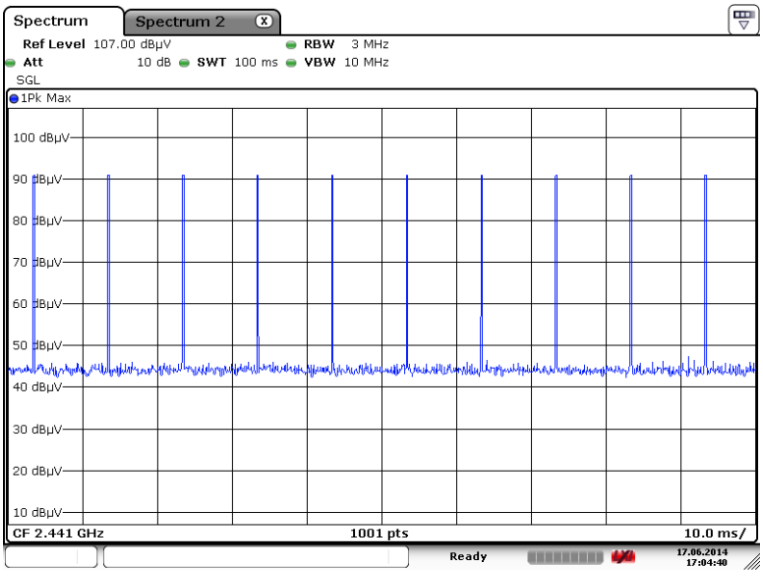
### 3.3.8 Duty cycle correction factor for average measurement

**On time (One Pulse) Plot on 2441MHz**




Date: 17.JUN.2014 17:06:45

**On time (Count Pulses) Plot on 2441MHz**




Date: 17.JUN.2014 17:04:40

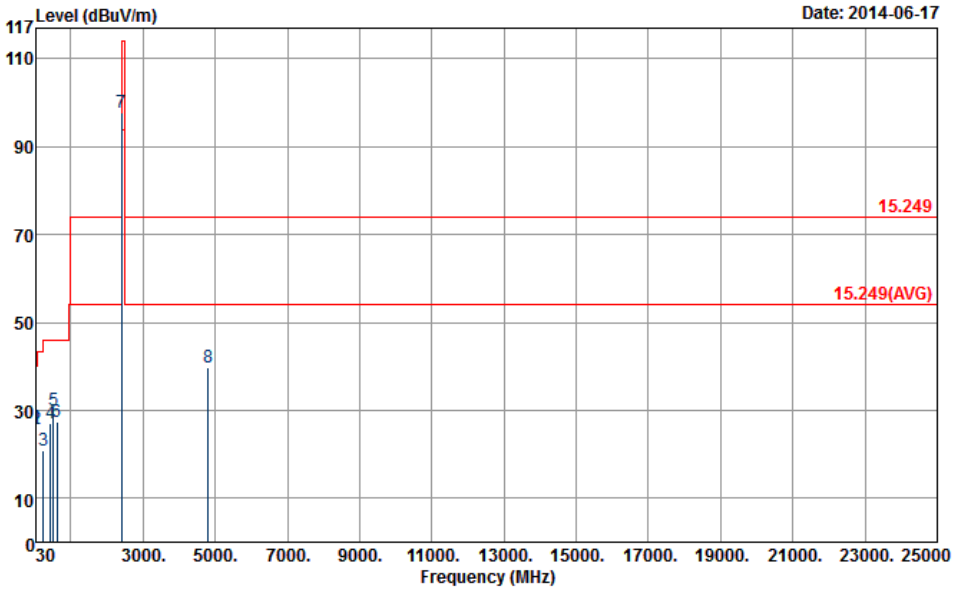
**Note:**

1. Worst case Duty cycle = on time/100 milliseconds = 10 * 0.15 / 100 = 1.50 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -36.48 dB

### 3.3.9 Test Result of Field Strength of Fundamental Emissions and Spurious Emissions

| Test Date | Jun. 17, 2014 | Test Engineer | Kai Wang |
|---|---|---|---|
| Temperature | 21~23°C | Humidity | 45~47% |

**2402MHz**




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 HORIZONTAL

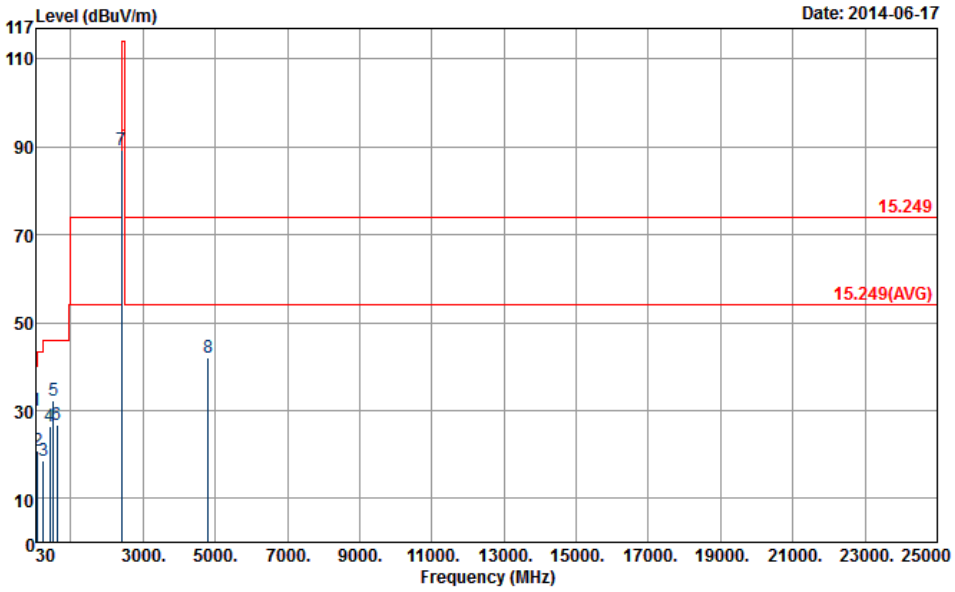
| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 31.89 | 26.08 | -13.92 | 40.00 | 39.19 | 17.76 | 0.55 | 31.42 | 100 | 345 | Peak |
| 2 | 48.36 | 25.87 | -14.13 | 40.00 | 47.29 | 9.10 | 0.68 | 31.20 | --- | --- | Peak |
| 3 | 236.82 | 20.71 | -25.29 | 46.00 | 39.26 | 10.94 | 1.51 | 31.00 | --- | --- | Peak |
| 4 | 428.80 | 26.94 | -19.06 | 46.00 | 38.58 | 16.88 | 2.24 | 30.76 | --- | --- | Peak |
| 5 | 521.20 | 30.06 | -15.94 | 46.00 | 40.14 | 18.12 | 2.49 | 30.69 | --- | --- | Peak |
| 6 | 617.80 | 27.21 | -18.79 | 46.00 | 34.89 | 20.14 | 2.74 | 30.56 | --- | --- | Peak |
| 7 | 2402.00 | 97.69 | -16.31 | 114.00 | 92.90 | 32.18 | 6.91 | 34.30 | 120 | 335 | Peak |
| 8 | 4803.00 | 39.91 | -34.09 | 74.00 | 55.87 | 34.25 | 8.75 | 58.96 | 100 | 0 | Peak |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2402 | 97.69 | -16.31 | 114 | 92.9 | 32.18 | 6.91 | 34.3 | 120 | 335 | Peak |
| 2402 | 61.21 | -32.79 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 VERTICAL

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 30.54 | 30.07 | -9.93 | 40.00 | 42.71 | 18.28 | 0.54 | 31.46 | 117 | 55 | Peak |
| 2 | 76.17 | 20.85 | -19.15 | 40.00 | 44.32 | 6.87 | 0.86 | 31.20 | --- | --- | Peak |
| 3 | 236.82 | 18.60 | -27.40 | 46.00 | 37.15 | 10.94 | 1.51 | 31.00 | --- | --- | Peak |
| 4 | 425.30 | 26.52 | -19.48 | 46.00 | 38.24 | 16.82 | 2.23 | 30.77 | --- | --- | Peak |
| 5 | 521.20 | 32.18 | -13.82 | 46.00 | 42.26 | 18.12 | 2.49 | 30.69 | --- | --- | Peak |
| 6 | 617.80 | 26.75 | -19.25 | 46.00 | 34.43 | 20.14 | 2.74 | 30.56 | --- | --- | Peak |
| 7 | 2402.00 | 89.33 | -24.67 | 114.00 | 84.54 | 32.18 | 6.91 | 34.30 | 100 | 268 | Peak |
| 8 | 4803.00 | 42.17 | -31.83 | 74.00 | 58.13 | 34.25 | 8.75 | 58.96 | 100 | 0 | Peak |

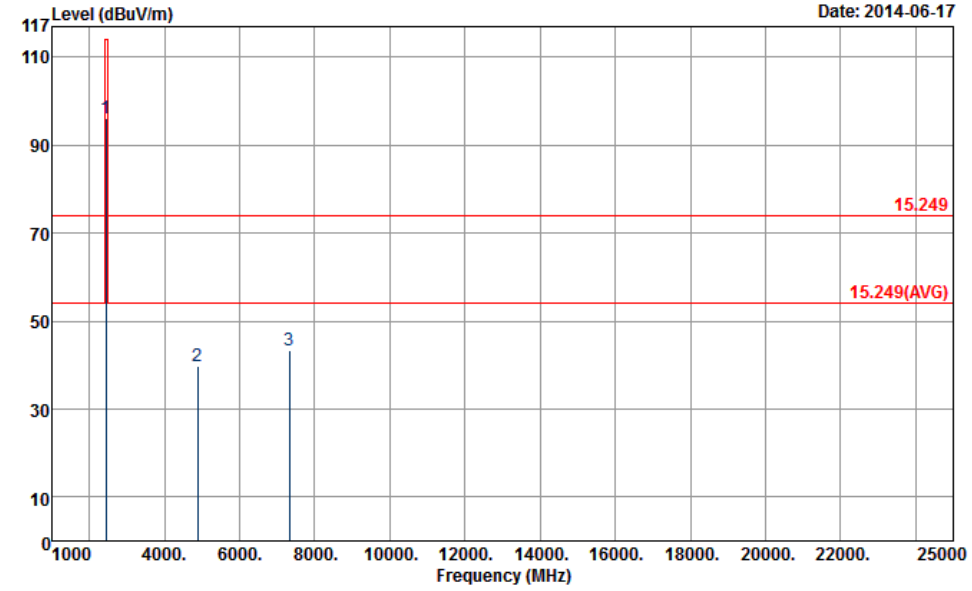
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2402 | 89.33 | -24.67 | 114 | 84.54 | 32.18 | 6.91 | 34.3 | 100 | 268 | Peak |
| 2402 | 52.85 | -41.15 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

**2441MHz**




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 HORIZONTAL

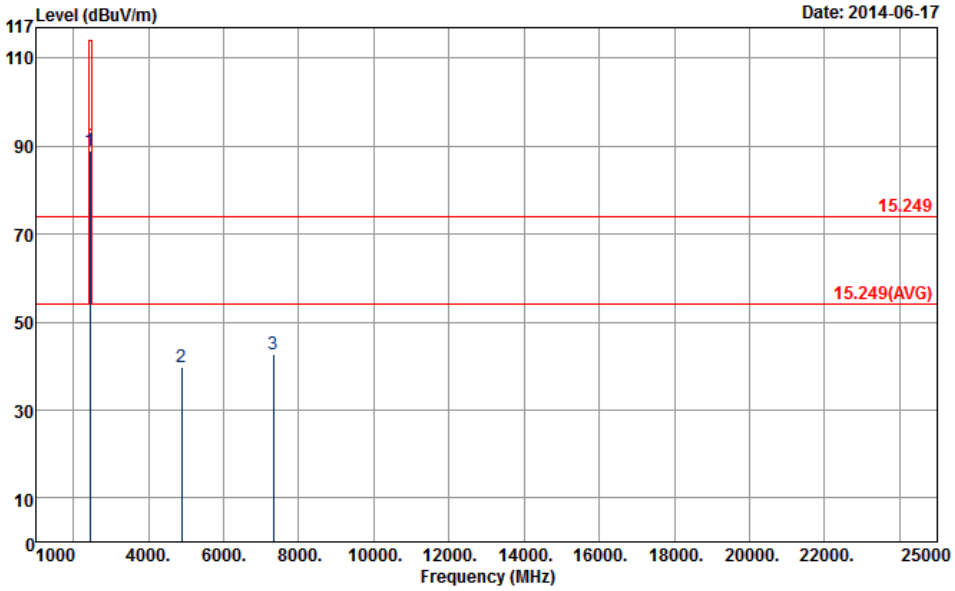
| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 2442.00 | 96.05 | -17.95 | 114.00 | 91.21 | 32.24 | 6.99 | 34.39 | 117 | 317 | Peak |
| 2 | 4881.00 | 39.60 | -34.40 | 74.00 | 55.28 | 34.30 | 8.85 | 58.83 | 100 | 0 | Peak |
| 3 | 7323.00 | 43.48 | -30.52 | 74.00 | 54.71 | 35.60 | 10.91 | 57.74 | 100 | 0 | Peak |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2442 | 96.05 | -17.95 | 114 | 91.21 | 32.24 | 6.99 | 34.39 | 117 | 317 | Peak |
| 2442 | 59.57 | -34.43 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 VERTICAL

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 2442.00 | 89.10 | -24.90 | 114.00 | 84.26 | 32.24 | 6.99 | 34.39 | 100 | 268 | Peak |
| 2 | 4881.00 | 39.77 | -34.23 | 74.00 | 55.45 | 34.30 | 8.85 | 58.83 | 100 | 0 | Peak |
| 3 | 7323.00 | 42.82 | -31.18 | 74.00 | 54.05 | 35.60 | 10.91 | 57.74 | 100 | 0 | Peak |

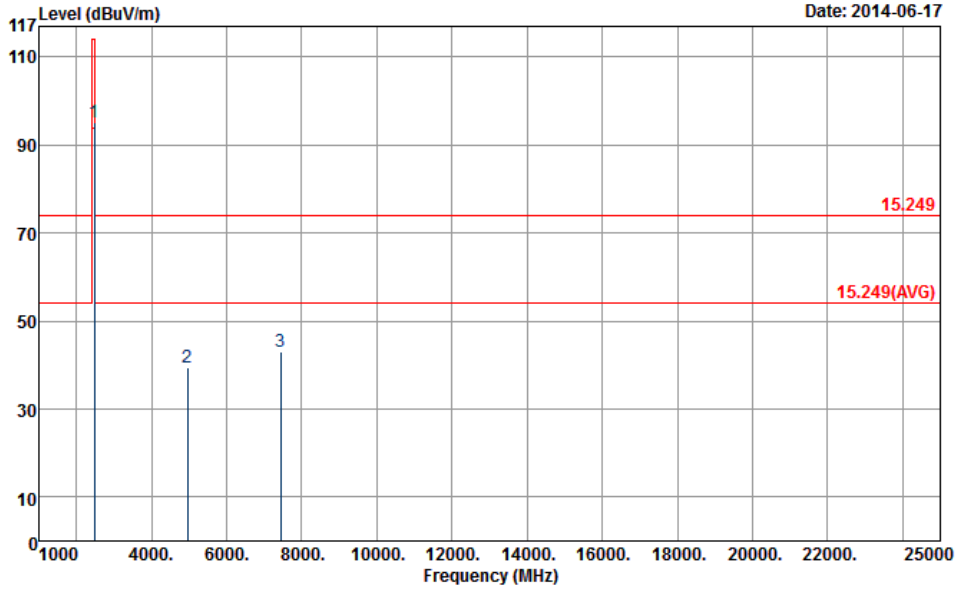
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2442 | 89.1 | -24.9 | 114 | 84.26 | 32.24 | 6.99 | 34.39 | 100 | 268 | Peak |
| 2442 | 52.62 | -41.38 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

**2480MHz**




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 HORIZONTAL

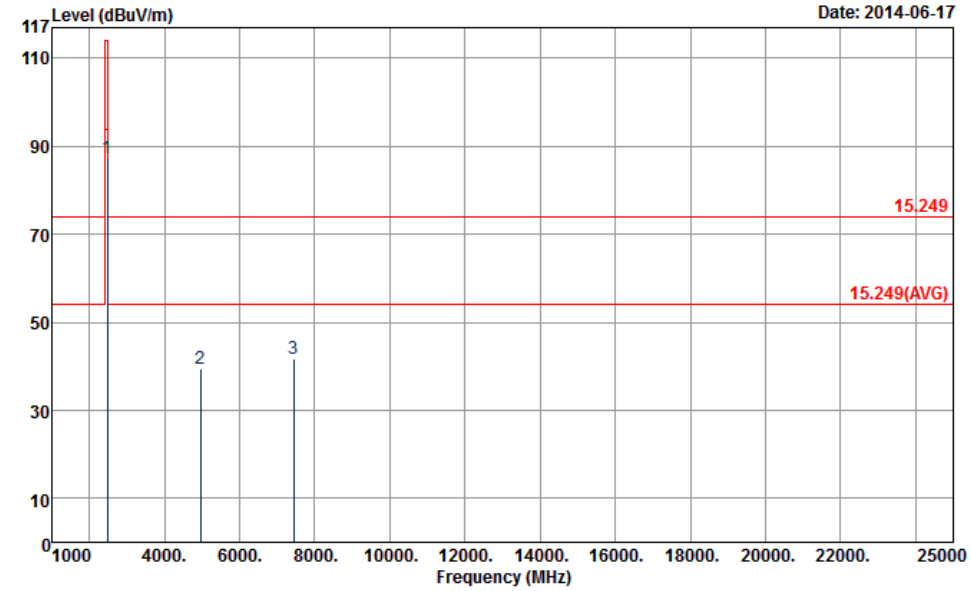
| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 2482.00 | 95.23 | -18.77 | 114.00 | 90.32 | 32.28 | 7.06 | 34.43 | 112 | 339 | Peak |
| 2 | 4959.00 | 39.34 | -34.66 | 74.00 | 54.71 | 34.37 | 8.92 | 58.66 | 100 | 0 | Peak |
| 3 | 7440.00 | 42.90 | -31.10 | 74.00 | 54.11 | 35.60 | 11.04 | 57.85 | 100 | 0 | Peak |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2482 | 95.23 | -18.77 | 114 | 90.32 | 32.28 | 7.06 | 34.43 | 112 | 339 | Peak |
| 2482 | 58.75 | -35.25 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.




Site : 03CH07-HY
Condition : 15.249 3m SHF-EHF_131029 VERTICAL

| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | A/Pos | T/Pos | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | cm | deg | |
| 1 | 2482.00 | 87.31 | -26.69 | 114.00 | 82.40 | 32.28 | 7.06 | 34.43 | 100 | 270 | Peak |
| 2 | 4959.00 | 39.37 | -34.63 | 74.00 | 54.74 | 34.37 | 8.92 | 58.66 | 100 | 0 | Peak |
| 3 | 7440.00 | 41.82 | -32.18 | 74.00 | 53.03 | 35.60 | 11.04 | 57.85 | 100 | 0 | Peak |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2482 | 87.31 | -26.69 | 114 | 82.4 | 32.28 | 7.06 | 34.43 | 100 | 270 | Peak |
| 2482 | 50.83 | -43.17 | 94 | - | - | - | - | - | - | Average |

**Note:** For average measurement: use duty cycle correction factor method per 15.35(c).

Average measurement was not performed if peak level went lower than the average limit.

Test result of emissions which are 20 dB lower than the limit is not reported per15.31.

## 3.4 Antenna Requirements

### 3.4.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

### 3.4.2 Antenna Connector Construction

Enbedded in Antenna.

# 4. LIST OF MEASURING EQUIPMENT

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100055 | 9kHz~40GHz | Jun. 07, 2013 | May 07, 2014 | Jun. 06, 2014 | Conducted (TH02-HY) |
| Power Meter | Agilent | E4416A | GB41292344 | 300MHz~40GHz | Jan. 28, 2014 | May 07, 2014 | Jan. 27, 2015 | Conducted (TH02-HY) |
| Power Sensor | Agilent | E9327A | US40441548 | 300MHz~40GHz | Jan. 28, 2014 | May 07, 2014 | Jan. 27, 2015 | Conducted (TH02-HY) |
| Hygrometer | Testo | 608-H1 | 34897199 | N/A | May 06, 2014 | May 07, 2014 | May 05, 2015 | Conducted (TH02-HY) |
| RF cable | WOKEN | S05 | S05-130708-038 | N/A | Jan. 22, 2014 | May 07, 2014 | Jan. 21, 2015 | Conducted (TH02-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESCI 7 | 100724 | 9 kHz~7 GHz | Sep. 06, 2013 | Jun. 17, 2014 | Sep. 05, 2014 | Radiation (03CH07-HY) |
| Spectrum Analyzer | Rohde & Schwarz | FSV30 | 101749 | 10Hz ~ 30GHz | Feb. 10, 2014 | Jun. 17, 2014 | Feb. 09, 2015 | Radiation (03CH07-HY) |
| Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 860004/0001 | 9 kHz~30 MHz | Jul. 03, 2012 | Jun. 17, 2014 | Jul. 02, 2014 | Radiation (03CH07-HY) |
| Bilog Antenna | Schaffner | CBL6111C | 2726 | 30 MHz ~ 1 GHz | Oct. 10, 2013 | Jun. 17, 2014 | Oct. 09, 2014 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO | 3117 | 75962 | 1 GHz~18 GHz | Aug. 22, 2013 | Jun. 17, 2014 | Aug. 21, 2014 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170251 | 15 GHz- 40 GHz | Oct. 03, 2013 | Jun. 17, 2014 | Oct. 02, 2014 | Radiation (03CH07-HY) |
| Preamplifier | COM-POWER | PA-103A | 161241 | 10 MHz ~ 1000MHz | Mar. 17, 2014 | Jun. 17, 2014 | Mar. 16, 2015 | Radiation (03CH07-HY) |
| Preamplifier | Agilent | 8449B | 3008A02362 | 1 GHz~26.5 GHz | Nov. 29, 2013 | Jun. 17, 2014 | Nov. 28, 2014 | Radiation (03CH07-HY) |
| Preamplifier | MITEQ | AMF-7D-00101800-30-10P | 1590074 | DC~18 G | Jul. 09, 2013 | Jun. 17, 2014 | Jul. 08, 2014 | Radiation (03CH07-HY) |
| Turn Table | ChainTek | ChainTek 3000 | N/A | 0 ~ 360 degree | N/A | Jun. 17, 2014 | N/A | Radiation (03CH07-HY) |
| Antenna Mast | ChainTek | ChainTek 3000 | N/A | N/A | N/A | Jun. 17, 2014 | N/A | Radiation (03CH07-HY) |
| LF RF Cable | Warison+HUBER SUHNER | WCBA-WC04NM.NM2 | N/A | 30MHz~1GHz | Nov. 28, 2013 | Jun. 17, 2014 | Nov. 27, 2014 | Radiation (03CH07-HY) |
| HF RF Cable | HUBER SUHNER | SUCOFLEX 104 | 38411/6 | 1GHz~26.5GHz | Nov. 28, 2013 | Jun. 17, 2014 | Nov. 27, 2014 | Radiation (03CH07-HY) |
| High Pass Filter | Microwave Circuits | H3G018G1 | SN477220 | 3G HPF | Nov. 28, 2013 | Jun. 17, 2014 | Nov. 27, 2014 | Radiation (03CH07-HY) |
| Low Pass Filter | Wainwright Instruments Gmbh | WLKS1200-8SS | SN3 | 1.5G LPF | Nov. 28, 2013 | Jun. 17, 2014 | Nov. 27, 2014 | Radiation (03CH07-HY) |
| Hygrometer | Testo | 608-H1 | 34897197 | N/A | May 06, 2014 | Jun. 17, 2014 | May 05, 2015 | Radiation (03CH07-HY) |
| Test Software | Audix | E3 V6.0 | N/A | N/A | N/A | Jun. 17, 2014 | N/A | Radiation (03CH07-HY) |

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESCS 30 | 100356 | 9kHz ~ 2.75GHz | Nov. 15, 2013 | May 20, 2014 | Nov. 14, 2014 | Conduction (CO05-HY) |
| LISN | Rohde & Schwarz | ENV216 | 100081 | 9kHz ~ 30MHz | Dec. 12, 2013 | May 20, 2014 | Dec. 11, 2014 | Conduction (CO05-HY) |
| LISN (for auxiliary equipment) | Rohde & Schwarz | ENV216 | 100080 | 9kHz ~ 30MHz | Dec. 04, 2013 | May 20, 2014 | Dec. 03, 2014 | Conduction (CO05-HY) |
| AC Power Source | APC | APC-1000W | N/A | N/A | N/A | May 20, 2014 | N/A | Conduction (CO05-HY) |
| Test Software | N/A | EMC32 | 8.40.0 | N/A | N/A | May 20, 2014 | N/A | Conduction (CO05-HY) |
| Hygrometer | Testo | 608-H1 | 34913912 | N/A | Apr. 23, 2014 | May 20, 2014 | Apr. 22, 2015 | Conduction (CO05-HY) |
| LF Cable | Shuner | RG-402 | N/A | N/A | Oct. 17, 2013 | May 20, 2014 | Oct. 16, 2014 | Conduction (CO05-HY) |

**Note:** Test equipment calibration is traceable to the procedure of ISO17025.

# 5. UNCERTAINTY OF EVALUATION

**Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.26** |

**Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.50** |