**SGS-CSTC Standards Technical Services Co., Ltd.**
**Shenzhen Branch**

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com



# *TEST REPORT*

| | |
|---|---|
| **Application No.:** | ZR/2018/A0011 |
| **Applicant:** | Sony Mobile Communications INC |
| **Address of Applicant:** | 4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan |
| **Manufacturer:** | Sony Mobile Communications INC |
| **Address of Manufacturer:** | 4-12-3 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan |
| **Factory:** | Dong Guan Huabel Electronic Technology Co., Ltd |
| **Address of Factory:** | No.9 Industrial Northern Road, National High-Tech Industrial Development Zone, SongShan Lake,Dong Guan City |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Mobile Phone |
| **FCC ID:** | PY7-04605A |
| **Trade mark:** | Sony |
| **Standard(s) :** | 47 CFR Part 15, Subpart B |
| **Date of Receipt:** | 2018-10-24 |
| **Date of Test:** | 2018-10-25 |
| **Date of Issue:** | 2018-11-09 |
| **Test Result:** | **Pass*** |

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 00 | | 2018-11-09 | | Original |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| | |  | | |
| | | **Leo Lai /Project Engineer** | | |
| | |  | | |
| | | **Eric Fu /Reviewer** | | |

# 2 Test Summary

| Emission Part | | | | |
|---|---|---|---|---|
| **Item** | **Standard** | **Method** | **Requirement** | **Result** |
| Conducted Emissions at Mains Terminals (150kHz-30MHz) | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B | Pass |
| Radiated Emissions (30MHz-1GHz) | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B | Pass |
| Radiated Emissions (above 1GHz) | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B | Pass |

| Internal Source | Upper Frequency |
|---|---|
| Below 1.705MHz | 30MHz |
| 1.705MHz to 108MHz | 1GHz |
| 108MHz to 500MHz | 2GHz |
| 500MHz to 1GHz | 5GHz |
| Above 1GHz | 5th harmonic of the highest frequency or 40GHz, whichever is lower |

# 3 Contents

# 4 General Information

## 4.1 Details of E.U.T.

| | |
|---|---|
| Power supply: | DC 3.85V from internal battery or AC/DC adapter<br>1. AC Adaptor: UCH20<br>2. Car Charger: AN430 |
| Cable: | Type C USB cable: Sony, AI-0162, 100cm shielded<br>Earphone cable: Sony, 110cm unshielded. |

## 4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| Laptop | Lenovo | T430u | REF. No.SEA1800 |
| Mouse | Lenovo | M-U0025-O | REF. No.:SEA2400 |
| Router | NETGEAR | DGN2200 | REF. No.SEA2200 |

## 4.3 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Conduction Emission | ± 3.0dB (150kHz to 30MHz) |
| 2 | Radiated Emission | ± 4.5dB (30MHz-1GHz) |
| | | ± 4.8dB (1GHz-6GHz) |
| 3 | Temperature test | ± 1℃ |
| 4 | Humidity test | ± 3% |

## 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

## 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.6 Deviation from Standards

None

## 4.7 Abnormalities from Standard Conditions

None

# 5 Equipment List

| Conducted Emissions at Mains Terminals (150kHz-30MHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| Shielding Room | ChangZhou ZhongYu | GB-88 | SEM001-06 | 2017-05-10 | 2020-05-09 |
| Measurement Software | AUDIX | e3 V5.4.1221d | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM024-01 | 2018-07-12 | 2019-07-11 |
| LISN | Rohde & Schwarz | ENV216 | SEM007-01 | 2018-09-25 | 2019-09-24 |
| LISN | ETS-LINDGREN | 3816/2 | SEM007-02 | 2018-04-02 | 2019-04-01 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | SEM004-02 | 2018-04-02 | 2019-04-01 |

| Radiated Emissions (30MHz-1GHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| 10m Semi-Anechoic Chamber | SAEMC | FSAC1018 | SEM001-03 | 2018-03-31 | 2021-03-30 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM029-01 | 2018-07-12 | 2019-07-11 |
| EMI Test Receiver (9kHz-7GHz) | Rohde & Schwarz | ESR | SEM004-03 | 2018-04-02 | 2019-04-01 |
| Trilog-Broadband Antenna (30MHz-1GHz) | Schwarzbeck | VULB9168 | SEM003-18 | 2016-06-29 | 2019-06-28 |
| Pre-amplifier | Sonoma Instrument Co | 310N | SEM005-04 | 2018-04-13 | 2019-04-12 |

| Radiated Emissions (above 1GHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| 3m Semi-Anechoic Chamber | AUDIX | N/A | SEM001-02 | 2018-03-13 | 2021-03-12 |
| Measurement Software | AUDIX | e3 V8.2014-6-27 | N/A | N/A | N/A |
| Coaxial Cable | SGS | N/A | SEM026-01 | 2018-07-12 | 2019-07-11 |
| EXA Spectrum Analyzer | AgilentTechnologies Inc | N9010A | SEM004-09 | 2018-04-13 | 2019-04-12 |
| Horn Antenna (1-18GHz) | Rohde & Schwarz | HF907 | SEM003-07 | 2018-04-13 | 2021-04-12 |
| Pre-Amplifier (0.1-26.5GHz) | Compliance Directions Systems Inc. | PAP-0126 | SEM004-11 | 2018-09-27 | 2019-09-26 |

| General used equipment | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory | ZJ1-2B | SEM002-03 | 2018-09-27 | 2019-09-26 |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory | ZJ1-2B | SEM002-04 | 2018-09-27 | 2019-09-26 |
| Humidity/ Temperature Indicator | Mingle | N/A | SEM002-08 | 2018-09-27 | 2019-09-26 |
| Barometer | Changchun Meteorological Industry Factory | DYM3 | SEM002-01 | 2018-04-08 | 2019-04-07 |

# 6 Emission Test Results

## 6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15, Subpart B |
| Test Method: | ANSI C63.4:2014 |
| Frequency Range: | 150kHz to 30MHz |
| Limit: | |
| 0.15M-0.5MHz | 66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average |
| 0.5M-5MHz | 56dB(μV) quasi-peak, 46dB(μV) average |
| 5M-30MHz | 60dB(μV) quasi-peak, 50dB(μV) average |
| Detector: | Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz |

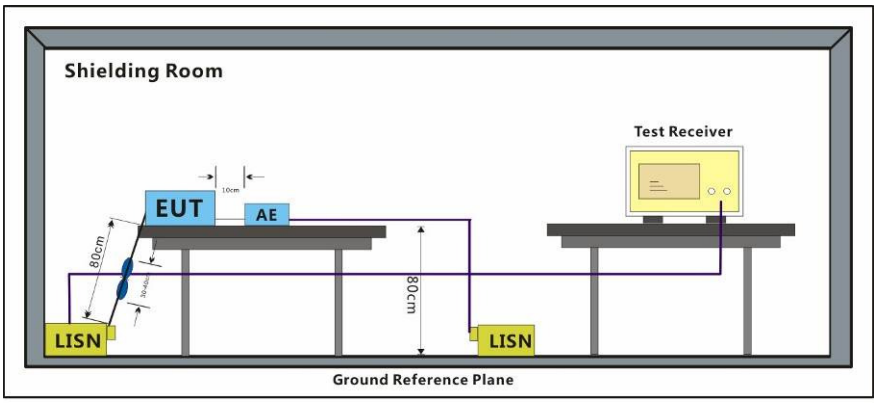
### 6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 45.9 % RH Atmospheric Pressure: 1010 mbar

| | |
|---|---|
| Pretest these modes to find the worst case: | a: Transfer data between the EUT and the PC |
| | b: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+playing MP4+earphone+adapter |
| | c: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Front)+earphone+adapter |
| | d: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Back)+earphone+adapter |
| | e: GSM 850+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter |
| | g: WCDMA Band II+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter |
| | i: LTE band 2+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter |
| The worst case for final test: | a: Transfer data between the EUT and the PC |
| | c: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Front)+earphone+adapter |

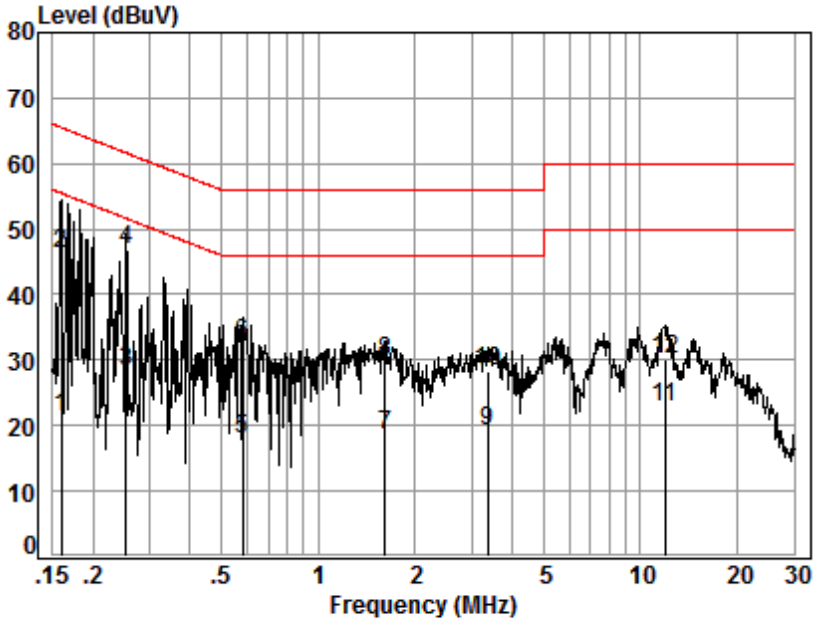
### 6.1.2 Test Setup Diagram




### 6.1.3 Measurement Data

An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

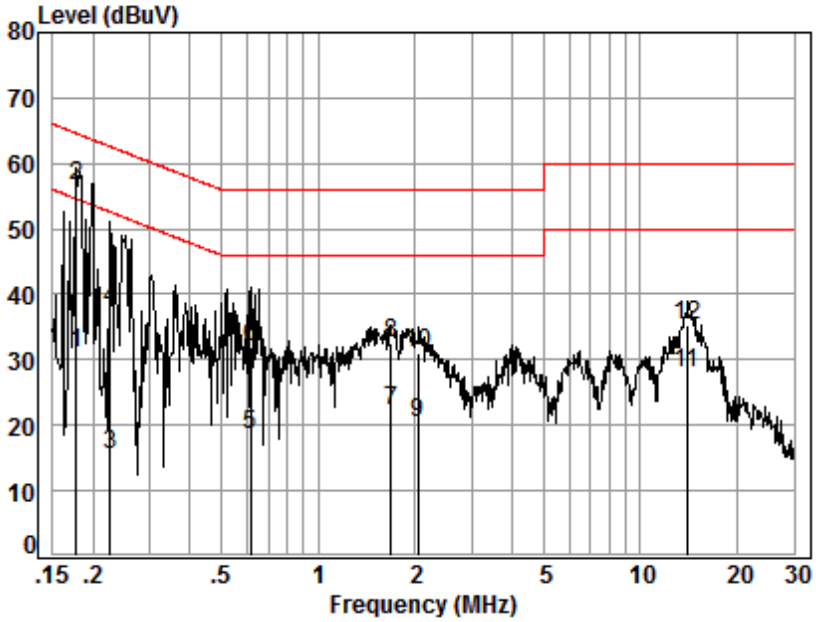
Mode:a; Line:Live Line




Site : Shielding Room
Condition: Line
Job No. : A0011
Test mode: a

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.16 | 0.01 | 9.66 | 11.65 | 21.32 | 55.52 | -34.20 | Average |
| 2 | 0.16 | 0.01 | 9.66 | 36.67 | 46.34 | 65.52 | -19.18 | QP |
| 3 | 0.25 | 0.03 | 9.67 | 18.56 | 28.26 | 51.64 | -23.38 | Average |
| 4 | 0.25 | 0.03 | 9.67 | 37.10 | 46.80 | 61.64 | -14.84 | QP |
| 5 | 0.58 | 0.07 | 9.67 | 8.31 | 18.05 | 46.00 | -27.95 | Average |
| 6 | 0.58 | 0.07 | 9.67 | 22.68 | 32.42 | 56.00 | -23.58 | QP |
| 7 | 1.61 | 0.14 | 9.73 | 8.61 | 18.48 | 46.00 | -27.52 | Average |
| 8 | 1.61 | 0.14 | 9.73 | 19.80 | 29.67 | 56.00 | -26.33 | QP |
| 9 | 3.35 | 0.16 | 9.71 | 9.29 | 19.16 | 46.00 | -26.84 | Average |
| 10 | 3.35 | 0.16 | 9.71 | 18.51 | 28.38 | 56.00 | -27.62 | QP |
| 11 | 11.93 | 0.19 | 10.07 | 12.41 | 22.67 | 50.00 | -27.33 | Average |
| 12 | 11.93 | 0.19 | 10.07 | 19.76 | 30.02 | 60.00 | -29.98 | QP |

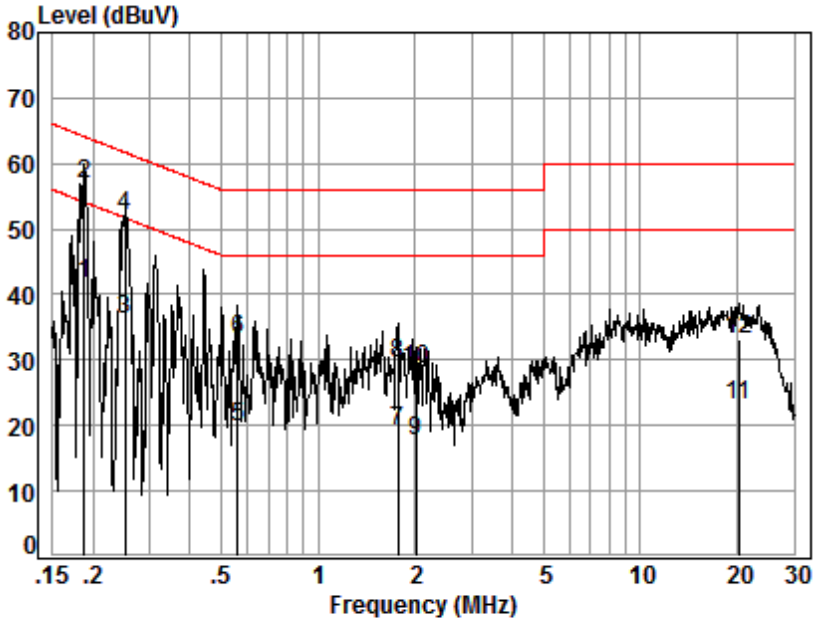
Mode:a; Line:Neutral Line




Site : Shielding Room
Condition: Neutral
Job No. : A0011
Test mode: a

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.18 | 0.02 | 9.64 | 21.34 | 31.00 | 54.59 | -23.59 | Average |
| 2 | 0.18 | 0.02 | 9.64 | 46.93 | 56.59 | 64.59 | -8.00 | QP |
| 3 | 0.23 | 0.03 | 9.64 | 5.75 | 15.42 | 52.61 | -37.19 | Average |
| 4 | 0.23 | 0.03 | 9.64 | 28.18 | 37.85 | 62.61 | -24.76 | QP |
| 5 | 0.62 | 0.07 | 9.64 | 8.85 | 18.56 | 46.00 | -27.44 | Average |
| 6 | 0.62 | 0.07 | 9.64 | 22.25 | 31.96 | 56.00 | -24.04 | QP |
| 7 | 1.68 | 0.14 | 9.70 | 12.36 | 22.20 | 46.00 | -23.80 | Average |
| 8 | 1.68 | 0.14 | 9.70 | 22.70 | 32.54 | 56.00 | -23.46 | QP |
| 9 | 2.04 | 0.16 | 9.69 | 10.49 | 20.34 | 46.00 | -25.66 | Average |
| 10 | 2.04 | 0.16 | 9.69 | 21.27 | 31.12 | 56.00 | -24.88 | QP |
| 11 | 13.99 | 0.20 | 10.29 | 17.56 | 28.05 | 50.00 | -21.95 | Average |
| 12 | 13.99 | 0.20 | 10.29 | 24.73 | 35.22 | 60.00 | -24.78 | QP |

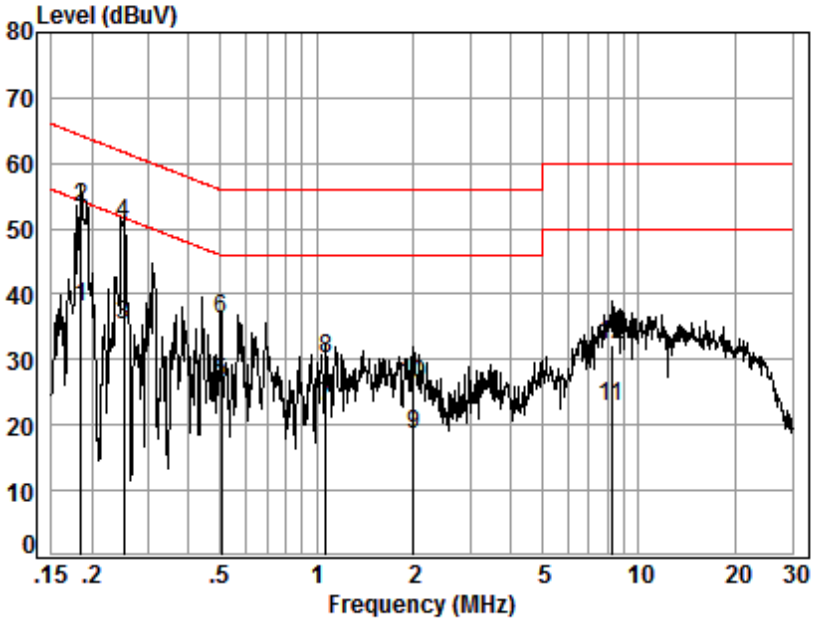
Mode:c; Line:Live Line




Site : Shielding Room
Condition: Line
Job No. : A0011
Test mode: c

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.19 | 0.02 | 9.66 | 32.06 | 41.74 | 54.15 | -12.41 | Average |
| 2 | 0.19 | 0.02 | 9.66 | 47.27 | 56.95 | 64.15 | -7.20 | QP |
| 3 | 0.25 | 0.03 | 9.67 | 26.41 | 36.11 | 51.69 | -15.58 | Average |
| 4 | 0.25 | 0.03 | 9.67 | 42.26 | 51.96 | 61.69 | -9.73 | QP |
| 5 | 0.56 | 0.07 | 9.67 | 10.12 | 19.86 | 46.00 | -26.14 | Average |
| 6 | 0.56 | 0.07 | 9.67 | 23.50 | 33.24 | 56.00 | -22.76 | QP |
| 7 | 1.77 | 0.15 | 9.72 | 9.20 | 19.07 | 46.00 | -26.93 | Average |
| 8 | 1.77 | 0.15 | 9.72 | 19.74 | 29.61 | 56.00 | -26.39 | QP |
| 9 | 2.01 | 0.16 | 9.72 | 7.77 | 17.65 | 46.00 | -28.35 | Average |
| 10 | 2.01 | 0.16 | 9.72 | 18.70 | 28.58 | 56.00 | -27.42 | QP |
| 11 | 20.16 | 0.24 | 10.07 | 12.94 | 23.25 | 50.00 | -26.75 | Average |
| 12 | 20.16 | 0.24 | 10.07 | 23.00 | 33.31 | 60.00 | -26.69 | QP |

Mode:c; Line:Neutral Line




Site : Shielding Room
Condition: Neutral
Job No. : A0011
Test mode: c

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.19 | 0.02 | 9.64 | 28.40 | 38.06 | 54.24 | -16.18 | Average |
| 2 | 0.19 | 0.02 | 9.64 | 43.43 | 53.09 | 64.24 | -11.15 | QP |
| 3 | 0.25 | 0.03 | 9.64 | 25.48 | 35.15 | 51.69 | -16.54 | Average |
| 4 | 0.25 | 0.03 | 9.64 | 41.04 | 50.71 | 61.69 | -10.98 | QP |
| 5 | 0.50 | 0.06 | 9.64 | 16.78 | 26.48 | 46.00 | -19.52 | Average |
| 6 | 0.50 | 0.06 | 9.64 | 26.58 | 36.28 | 56.00 | -19.72 | QP |
| 7 | 1.07 | 0.10 | 9.71 | 13.12 | 22.93 | 46.00 | -23.07 | Average |
| 8 | 1.07 | 0.10 | 9.71 | 20.43 | 30.24 | 56.00 | -25.76 | QP |
| 9 | 2.00 | 0.16 | 9.69 | 8.58 | 18.43 | 46.00 | -27.57 | Average |
| 10 | 2.00 | 0.16 | 9.69 | 16.24 | 26.09 | 56.00 | -29.91 | QP |
| 11 | 8.24 | 0.17 | 9.80 | 12.90 | 22.87 | 50.00 | -27.13 | Average |
| 12 | 8.24 | 0.17 | 9.80 | 22.16 | 32.13 | 60.00 | -27.87 | QP |

## 6.2 Radiated Emissions (30MHz-1GHz)

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15, Subpart B |
| Test Method: | ANSI C63.4:2014 |
| Frequency Range: | 30MHz to 1GHz |
| Measurement Distance: | 10m |
| Limit of 3m: | |
| 30MHz -88MHz | 40(dBμV/m) quasi-peak |
| 88MHz-216MHz | 43.5(dBμV/m) quasi-peak |
| 216MHz-960MHz | 46(dBμV/m) quasi-peak |
| 960MHz-1000MHz | 54(dBμV/m) quasi-peak |
| Detector: | Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz |

### 6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25 °C Humidity: 51 % RH Atmospheric Pressure: 1010 mbar

Pretest these modes to find the worst case:

a: Transfer data between the EUT and the PC

b: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+playing MP4+earphone+adapter

c: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Front)+earphone+adapter

d: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Back)+earphone+adapter

e: GSM 850+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

f: GSM 1900+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

g: WCDMA Band II+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

h: WCDMA Band V+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

i: LTE band 2+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

j: LTE band 5+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

k: LTE band 7+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

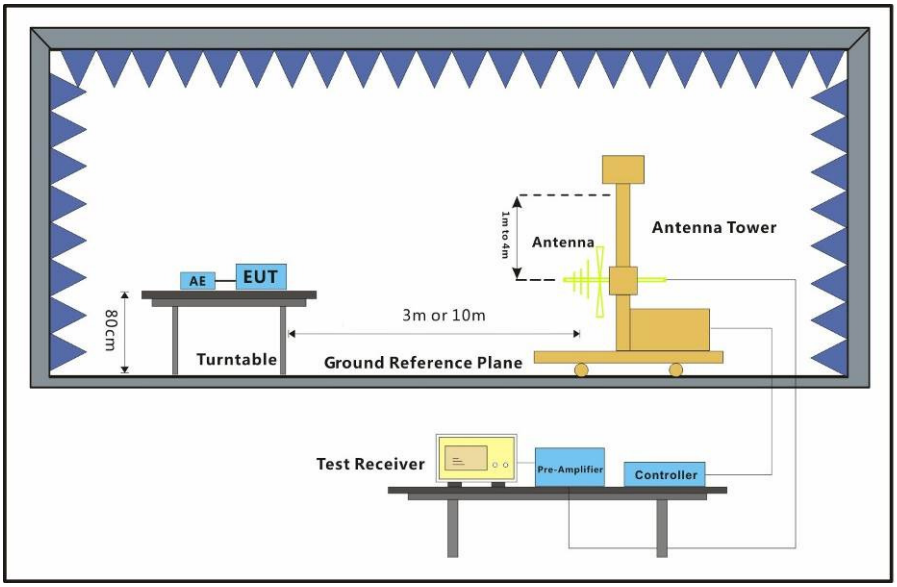
l: LTE band 41+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter

The worst case for final test:

a: Transfer data between the EUT and the PC

d: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Back)+earphone+adapter

### 6.2.2 Test Setup Diagram




### 6.2.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:a

**Radiated Emissions**

| Polarization | Frequency (MHz) | Cable_ Loss (dB) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Reading at 10m (dBμV) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| Horizontal | 40.988 | 6.83 | 13.23 | 32.46 | 26.15 | 24.21 | 40.00 | -15.79 |
| Horizontal | 151.067 | 7.45 | 13.41 | 32.43 | 27.39 | 26.28 | 43.50 | -17.22 |
| Horizontal | 299.316 | 8.01 | 12.64 | 32.36 | 27.79 | 26.54 | 46.00 | -19.46 |
| Horizontal | 399.030 | 8.31 | 14.84 | 32.34 | 27.82 | 29.09 | 46.00 | -16.91 |
| Horizontal | 642.861 | 8.97 | 19.45 | 32.34 | 27.85 | 34.39 | 46.00 | -11.61 |
| Horizontal | 919.287 | 9.51 | 22.48 | 31.42 | 26.64 | 37.67 | 46.00 | -8.33 |
| Vertical | 43.202 | 6.85 | 13.05 | 32.46 | 33.81 | 31.71 | 40.00 | -8.29 |
| Vertical | 88.342 | 7.18 | 8.67 | 32.47 | 31.36 | 25.20 | 43.50 | -18.30 |
| Vertical | 138.387 | 7.39 | 12.65 | 32.44 | 29.76 | 27.82 | 43.50 | -15.68 |
| Vertical | 201.393 | 7.63 | 9.32 | 32.40 | 33.52 | 28.53 | 43.50 | -14.97 |
| Vertical | 238.310 | 7.79 | 11.02 | 32.38 | 31.28 | 28.17 | 46.00 | -17.83 |
| Vertical | 400.432 | 8.31 | 14.87 | 32.34 | 29.43 | 30.73 | 46.00 | -15.27 |

NOTES:

1. Quasi-Peak detector is used except for others stated.
2. All measurements were made at 10 meters.
3. Negative value in the margin column shows emission below limit.
4. Final Test Leve l (Net at 3m) =Receiver Reading + Antenna Factor + Cable Factor + F1 – Preamplifier Factor

The calculation of field strength between 10m and 3m test distance.

$$FS_{\text{limit}} = FS_{\max} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

F1: is the factor of distance 10m to 3m = 20log(10/3) =10.458

Mode:d

**Radiated Emissions**

| Polarization | Frequency (MHz) | Cable_ Loss (dB) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Reading at 10m (dBμV) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| Horizontal | 42.750 | 6.85 | 13.08 | 32.46 | 26.49 | 24.42 | 40.00 | -15.58 |
| Horizontal | 162.041 | 7.49 | 13.19 | 32.42 | 25.61 | 24.33 | 43.50 | -19.17 |
| Horizontal | 284.977 | 7.96 | 12.29 | 32.37 | 26.11 | 24.45 | 46.00 | -21.55 |
| Horizontal | 429.523 | 8.40 | 15.67 | 32.34 | 26.78 | 28.97 | 46.00 | -17.03 |
| Horizontal | 576.644 | 8.82 | 18.22 | 32.37 | 26.73 | 31.86 | 46.00 | -14.14 |
| Horizontal | 945.440 | 9.53 | 22.70 | 31.21 | 26.34 | 37.82 | 46.00 | -8.18 |
| Vertical | 49.187 | 6.90 | 12.80 | 32.45 | 28.15 | 25.86 | 40.00 | -14.14 |
| Vertical | 156.458 | 7.47 | 13.40 | 32.42 | 26.02 | 24.93 | 43.50 | -18.57 |
| Vertical | 321.061 | 8.08 | 13.26 | 32.36 | 30.64 | 30.08 | 46.00 | -15.92 |
| Vertical | 463.970 | 8.50 | 16.33 | 32.35 | 27.48 | 30.42 | 46.00 | -15.58 |
| Vertical | 647.386 | 8.98 | 19.50 | 32.34 | 26.86 | 33.46 | 46.00 | -12.54 |
| Vertical | 903.309 | 9.49 | 22.27 | 31.56 | 27.00 | 37.66 | 46.00 | -8.34 |

NOTES:

1. Quasi-Peak detector is used except for others stated.
2. All measurements were made at 10 meters.
3. Negative value in the margin column shows emission below limit.
4. Final Test Leve l (Net at 3m) =Receiver Reading + Antenna Factor + Cable Factor + F1 – Preamplifier Factor

The calculation of field strength between 10m and 3m test distance.

$$FS_{\text{limit}} = FS_{\max} - 20\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right)$$

F1: is the factor of distance 10m to 3m = 20log(10/3) =10.458

## 6.3 Radiated Emissions (above 1GHz)

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15, Subpart B |
| Test Method: | ANSI C63.4:2014 |
| Frequency Range: | Above 1GHz |
| Measurement Distance: | 3m |
| Limit: | |
| Above 1GHz | 74(dBμV/m) peak, 54(dBμV/m) average |
| Detector: | Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz |

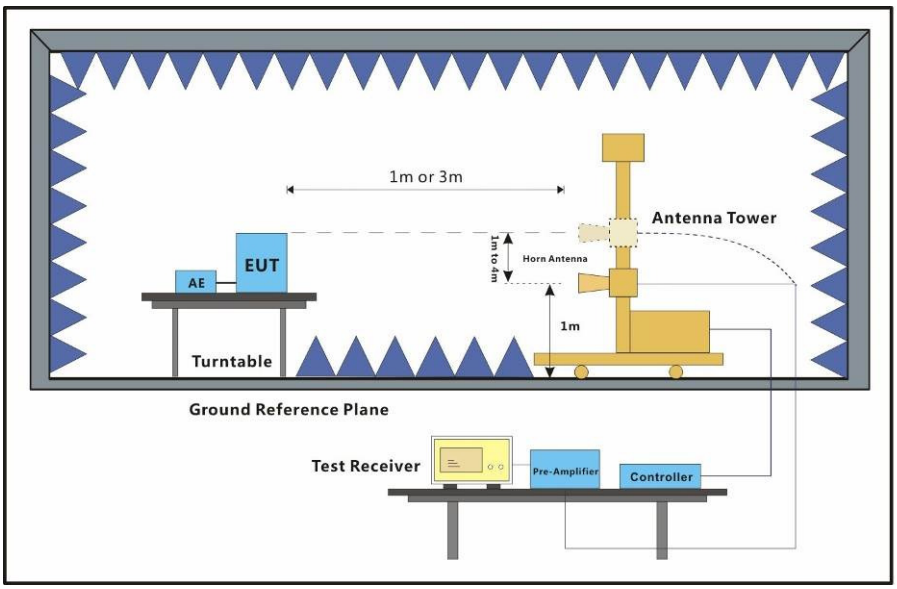
### 6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C Humidity: 65.2 % RH Atmospheric Pressure: 1010 mbar

| | |
|---|---|
| Pretest these modes to find the worst case: | a: Transfer data between the EUT and the PC<br>b: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+playing MP4+earphone+adapter<br>c: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Front)+earphone+adapter<br>d: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Back)+earphone+adapter<br>e: GSM 850+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>f: GSM 1900+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>g: WCDMA Band II+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>h: WCDMA Band V+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>i: LTE band 2+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>j: LTE band 5+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>k: LTE band 7+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter<br>l: LTE band 41+BT+FM+NFC+WLAN+GPS Rx+earphone+adapter |
| The worst case for final test: | a: Transfer data between the EUT and the PC<br>c: Telecom Idle+BT+FM+NFC+WLAN+GPS Rx+camera(Front)+earphone+adapter |

### 6.3.2 Test Setup Diagram

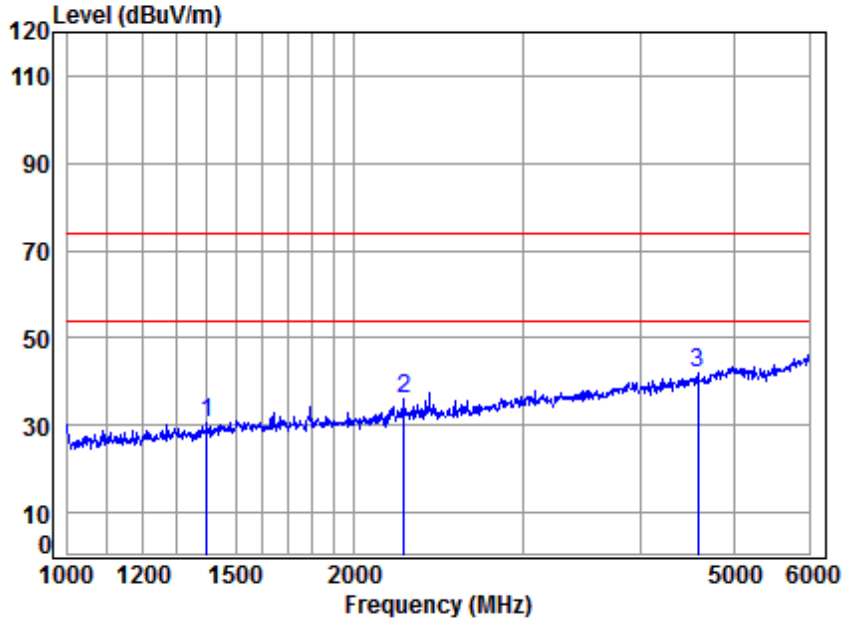



### 6.3.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Scan from 1GHz to 18GHz, the disturbance above 6GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed.

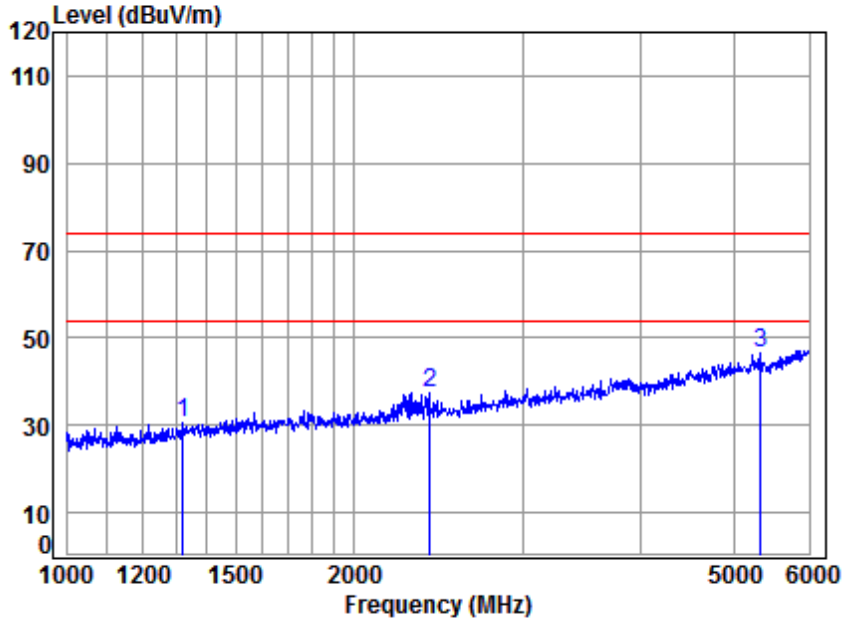
Mode:a; Polarization:Horizontal




Site : chamber
Condition: 3m Horizontal
Job No : A0011
Mode : a

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1398.023 | 5.14 | 25.42 | 41.34 | 41.23 | 30.45 | 74.00 | -43.55 | Peak |
| 2 | 2255.697 | 5.29 | 28.29 | 41.81 | 44.36 | 36.13 | 74.00 | -37.87 | Peak |
| 3 | 4585.942 | 7.66 | 33.71 | 42.43 | 43.21 | 42.15 | 74.00 | -31.85 | Peak |

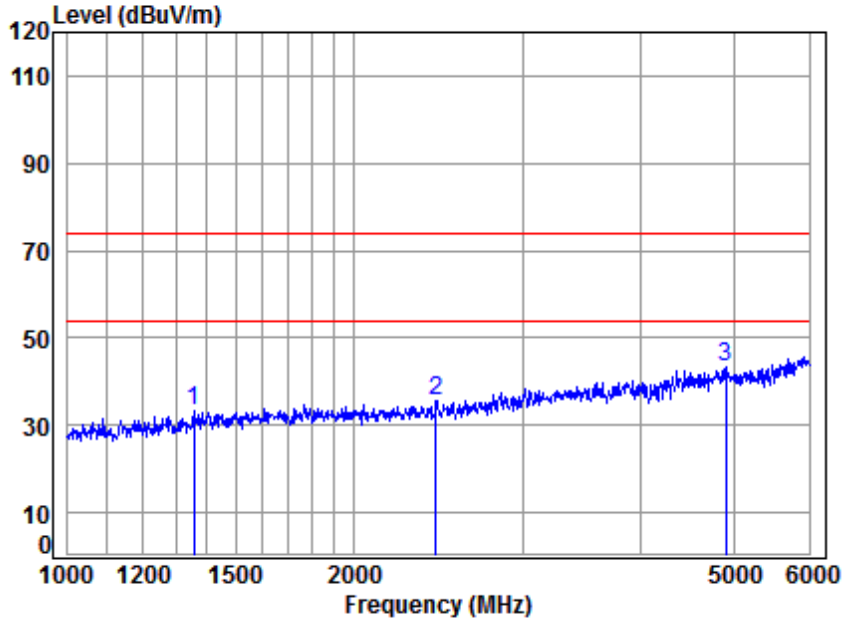
Mode:a; Polarization:Vertical




Site : chamber
Condition: 3m VERTICAL
Job No : A0011
Mode : a

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1320.120 | 4.87 | 25.11 | 41.28 | 41.89 | 30.59 | 74.00 | -43.41 | Peak |
| 2 | 2397.385 | 5.48 | 28.53 | 41.88 | 45.46 | 37.59 | 74.00 | -36.41 | Peak |
| 3 | 5340.371 | 8.62 | 34.48 | 42.18 | 45.53 | 46.45 | 74.00 | -27.55 | Peak |

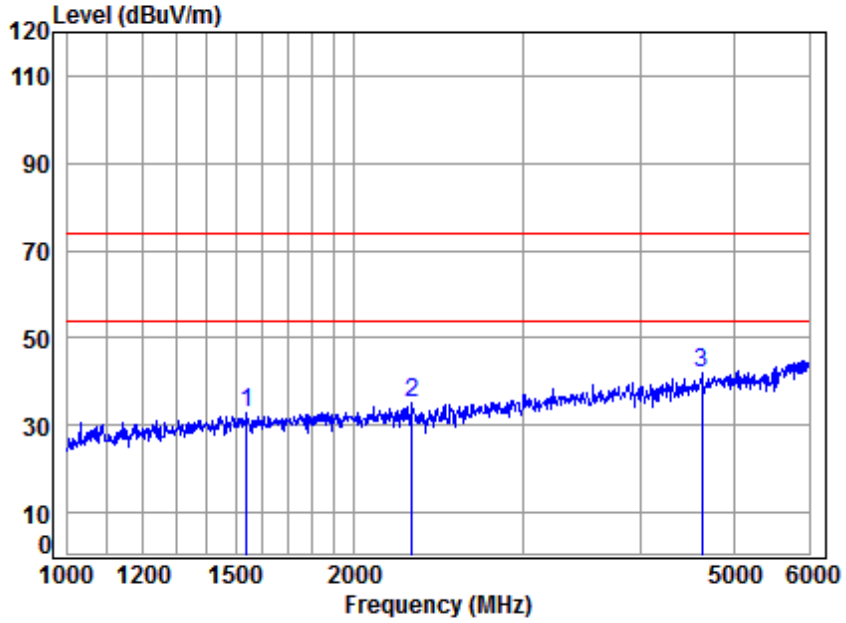
Mode:c; Polarization:Horizontal




Site : chamber
Condition: 3m HORIZONTAL
Job No : A0011
Mode : c

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1356.081 | 5.00 | 25.25 | 41.30 | 44.55 | 33.50 | 74.00 | -40.50 | Peak |
| 2 | 2436.358 | 5.54 | 28.60 | 41.89 | 43.39 | 35.64 | 74.00 | -38.36 | Peak |
| 3 | 4900.271 | 7.99 | 34.09 | 42.48 | 43.58 | 43.18 | 74.00 | -30.82 | Peak |

Mode:c; Polarization:Vertical




Site : chamber
Condition: 3m VERTICAL
Job No : A0011
Mode : c

| | Freq | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB | |
| 1 | 1540.049 | 5.43 | 25.98 | 41.43 | 42.86 | 32.84 | 74.00 | -41.16 | Peak |
| 2 | 2296.478 | 5.35 | 28.36 | 41.83 | 43.39 | 35.27 | 74.00 | -38.73 | Peak |
| 3 | 4627.211 | 7.70 | 33.76 | 42.44 | 43.08 | 42.10 | 74.00 | -31.90 | Peak |

# 7 Photographs

## 7.1 Test Setup

Please refer to setup photos.

## 7.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.

- End of the Report -