

# TEST REPORT

Reference No..... : WTX23X05101641W001  
FCC ID ..... : 2BAQOSC55G  
Applicant ..... : Beijing Speedata Technology Co.,Ltd  
Address ..... : Office 01-2 08, Block D, 8 / F, Building 1-4, Yard A, 18 Zhongguancun South  
Street, Haidian District, Beijing.  
Manufacturer ..... : The same as Applicant  
Address ..... : The same as Applicant  
Product Name ..... : Wireless data terminal  
Model No..... : SC55G  
Standards ..... : FCC Part 22H, FCC Part 24E  
Date of Receipt sample .... : 2023-05-10  
Date of Test..... : 2023-05-10 to 2023-10-24  
Date of Issue ..... : 2023-10-24  
Test Report Form No. .... : WTX\_Part 22\_ Part 24W  
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

**Prepared By:**

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Silin Chen

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Report version

| Version No. | Date of issue | Description |
|-------------|---------------|-------------|
| Rev.00      | 2023-10-24    | Original    |
| /           | /             | /           |

## 1. GENERAL INFORMATION

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### 1.1 Product Description for Equipment Under Test (EUT)

| General Description of EUT:                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:                                                                                                                                                                                                                                                                                                                                                                                      | Wireless data terminal                                                                                                                                                                           |
| Trade Name:                                                                                                                                                                                                                                                                                                                                                                                        | /                                                                                                                                                                                                |
| Model No.:                                                                                                                                                                                                                                                                                                                                                                                         | SC55G                                                                                                                                                                                            |
| Adding Model(s):                                                                                                                                                                                                                                                                                                                                                                                   | SC40G, ST55G, SC55PCM, SC55GMD, ST55RT, FG50RT, SC55, SC40, SC35, SD35, SC35G, HT35, FG40, FG50, HC01, GT100, GT100-TY, GT100-HC, GT100-PD, iCT100, SD100, GT55, GT50, GT56, GT60, SC80G, SD100G |
| Rated Voltage:                                                                                                                                                                                                                                                                                                                                                                                     | DC3.85V                                                                                                                                                                                          |
| Battery:                                                                                                                                                                                                                                                                                                                                                                                           | 5000mAh                                                                                                                                                                                          |
| Adapter Model:                                                                                                                                                                                                                                                                                                                                                                                     | HYX024-U012125XYE<br>Input:AC100-240v~50/60Hz 0.5A<br>Output:DC5V/7V/9V 1.67A; DC12V1.25A                                                                                                        |
| <p><i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i></p> <p><i>The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model SC55G, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p> |                                                                                                                                                                                                  |

| Technical Characteristics of EUT: |                                                                              |
|-----------------------------------|------------------------------------------------------------------------------|
| <b>2G</b>                         |                                                                              |
| Support Networks:                 | GSM, GPRS, EDGE                                                              |
| Support Band:                     | GSM850/PCS1900                                                               |
| Uplink Frequency:                 | GSM/GPRS/EDGE 850: 824~849MHz<br>GSM/GPRS/EDGE 1900: 1850~1910MHz            |
| Downlink Frequency:               | GSM/GPRS/EDGE 850: 869~894MHz<br>GSM/GPRS/EDGE 1900: 1930~1990MHz            |
| Max RF Output Power:              | GSM850: 32.88dBm, GSM1900: 29.42dBm<br>EDGE850: 27.29dBm, EDGE1900: 26.90dBm |
| Type of Emission:                 | GSM850: 245KGXW, GSM1900: 245KGXW<br>EDGE850: 260KG7W, EDGE1900: 251KG7W     |
| Type of Modulation:               | GMSK, 8PSK                                                                   |
| Type of Antenna:                  | Integral Antenna                                                             |
| Antenna Gain:                     | GSM850: -0.63dBi; GSM1900: -0.42dBi                                          |
| GPRS/EDGE Class:                  | Class 12                                                                     |
| <b>3G</b>                         |                                                                              |
| Support Networks:                 | WCDMA, HSDPA, HSUPA                                                          |
| Support Band:                     | WCDMA Band 2, WCDMA Band 5                                                   |
| Uplink Frequency:                 | WCDMA Band 2: 1850~1910MHz<br>WCDMA Band 5: 824~849MHz                       |
| Downlink Frequency:               | WCDMA Band 2: 1930~1990MHz<br>WCDMA Band 5: 869~894MHz                       |
| RF Output Power:                  | WCDMA Band 2: 22.10dBm,<br>WCDMA Band 5: 23.54dBm                            |
| Type of Emission:                 | WCDMA Band 2: 4M19F9W<br>WCDMA Band 5: 4M23F9W                               |
| Type of Modulation:               | BPSK, QPSK, 16QAM                                                            |
| Antenna Type:                     | Integral Antenna                                                             |
| Antenna Gain:                     | WCDMA Band 2: -0.42dBi, WCDMA Band 5: -0.63dBi                               |

## 1.2 Test Standards

The tests were performed according to following standards:

**FCC Rules Part 2:** Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.

**FCC Rules Part 22:** Private Land Mobile Radio Services.

**FCC Rules Part 24:** Public Mobile Services.

**TIA/EIA 603 E March 2016:** Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

**ANSI C63.26-2015:** American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

**KDB 971168 D01 Power Measurement License Digital Systems v03r01:** Measurement Guidance for Certification of Licensed Digital Transmitters.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

## 1.4 Test Facility

### Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

### FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

### Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

| Test Mode List |              |                            |
|----------------|--------------|----------------------------|
| Test Mode      | Description  | Remark                     |
| TM1            | GSM 850      | Low, Middle, High Channels |
| TM2            | GPRS 850     | Low, Middle, High Channels |
| TM3            | EDGE 850     | Low, Middle, High Channels |
| TM4            | GSM 1900     | Low, Middle, High Channels |
| TM5            | GPRS 1900    | Low, Middle, High Channels |
| TM6            | EDGE 1900    | Low, Middle, High Channels |
| TM7            | WCDMA Band 5 | Low, Middle, High Channels |
| TM8            | HSDPA Band 5 | Low, Middle, High Channels |
| TM9            | HSUPA Band 5 | Low, Middle, High Channels |
| TM10           | WCDMA Band 2 | Low, Middle, High Channels |
| TM11           | HSDPA Band 2 | Low, Middle, High Channels |
| TM12           | HSUPA Band 2 | Low, Middle, High Channels |

| Testing Configure                                                                                                                                   |                   |                        |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------|----------------|
| Support Band                                                                                                                                        | Support Standard  | Channel Frequency(MHz) | Channel Number |
| GSM 850                                                                                                                                             | GSM/GPRS/EDGE     | 824.2                  | 128            |
|                                                                                                                                                     |                   | 836.6                  | 190            |
|                                                                                                                                                     |                   | 848.8                  | 251            |
| PCS 1900                                                                                                                                            | GSM/GPRS/EDGE     | 1850.2                 | 512            |
|                                                                                                                                                     |                   | 1880.0                 | 661            |
|                                                                                                                                                     |                   | 1909.8                 | 810            |
| WCDMA Band 5                                                                                                                                        | WCDMA/HSDPA/HSUPA | 826.4                  | 4132           |
|                                                                                                                                                     |                   | 836.6                  | 4183           |
|                                                                                                                                                     |                   | 846.6                  | 4233           |
| WCDMA Band 2                                                                                                                                        | WCDMA/HSDPA/HSUPA | 1852.4                 | 9262           |
|                                                                                                                                                     |                   | 1880.0                 | 9400           |
|                                                                                                                                                     |                   | 1907.6                 | 9538           |
| Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case. |                   |                        |                |

| Test Conditions    |           |
|--------------------|-----------|
| Temperature:       | 22~25 °C  |
| Relative Humidity: | 50~55 %.  |
| ATM Pressure:      | 1019 mbar |

| EUT Cable List and Details |            |                     |                        |
|----------------------------|------------|---------------------|------------------------|
| Cable Description          | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| USB Cable                  | 1.0        | Shielded            | Without Ferrite        |

| Special Cable List and Details |            |                     |                        |
|--------------------------------|------------|---------------------|------------------------|
| Cable Description              | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| /                              | /          | /                   | /                      |

| Auxiliary Equipment List and Details |              |         |               |
|--------------------------------------|--------------|---------|---------------|
| Description                          | Manufacturer | Model   | Serial Number |
| Notebook                             | ASUS         | FA5061C | /             |

**1.6 Measurement Uncertainty**

| <b>Measurement uncertainty</b> |            |                               |
|--------------------------------|------------|-------------------------------|
| Parameter                      | Conditions | Uncertainty                   |
| RF Output Power                | Conducted  | $\pm 0.42\text{dB}$           |
| Occupied Bandwidth             | Conducted  | $\pm 1.5\%$                   |
| Frequency Stability            | Conducted  | $2.3\%$                       |
| Transmitter Spurious Emissions | Conducted  | $\pm 0.42\text{dB}$           |
| Transmitter Spurious Emissions | Radiated   | 30-200MHz $\pm 4.52\text{dB}$ |
|                                |            | 0.2-1GHz $\pm 5.56\text{dB}$  |
|                                |            | 1-6GHz $\pm 3.84\text{dB}$    |
|                                |            | 6-18GHz $\pm 3.92\text{dB}$   |

**1.7 Test Equipment List and Details**

| Fixed asset Number                             | Description                 | Manufacturer    | Model     | Serial No.  | Cal Date   | Due. Date  |
|------------------------------------------------|-----------------------------|-----------------|-----------|-------------|------------|------------|
| WTXE1041A<br>1001                              | Communication Tester        | Rohde & Schwarz | CMW500    | 148650      | 2023-02-25 | 2024-02-24 |
| WTXE1022A<br>1002                              | GSM Tester                  | Rohde & Schwarz | CMU200    | 114403      | 2023-02-25 | 2024-02-24 |
| WTXE1104A<br>1001                              | MXG Vector Signal Generator | Agilent         | N5182A    | MY47420108  | 2023-02-25 | 2024-02-24 |
| WTXE1104A<br>1002                              | DC Power Supply             | Agilent         | E3634A    | MY40009294  | 2023-02-25 | 2024-02-24 |
| WTXE1104A<br>1003                              | EXG Analog Signal Generator | KEYSIGHT        | N5173B    | MY61252892  | 2023-02-25 | 2024-02-24 |
| WTXE1104A<br>1004                              | Spectrum Analyzer           | Rohde&Schwarz   | FSV40-N   | 101559      | 2023-02-25 | 2024-02-24 |
| WTXE1104A<br>1005-2                            | Band Reject Filter Group    | Tonscend        | JS0806-F  | 23A806F0658 | 2023-02-25 | 2024-02-24 |
| <input type="checkbox"/> Chamber A: Below 1GHz |                             |                 |           |             |            |            |
| WTXE1005A<br>1003                              | Spectrum Analyzer           | Rohde & Schwarz | FSP30     | 836079/035  | 2023-02-25 | 2024-02-24 |
| WTXE1007A<br>1001                              | EMI Test Receiver           | Rohde & Schwarz | ESVB      | 825471/005  | 2023-02-25 | 2024-02-24 |
| WTXE1007A<br>1001                              | Amplifier                   | HP              | 8447F     | 2805A03475  | 2023-02-25 | 2024-02-24 |
| WTXE1010A<br>1007                              | Loop Antenna                | Schwarz beck    | FMZB 1516 | 9773        | 2021-03-20 | 2024-03-19 |
| WTXE1010A<br>1006                              | Broadband Antenna           | Schwarz beck    | VULB9163  | 9163-333    | 2023-03-20 | 2026-03-19 |
| <input type="checkbox"/> Chamber A: Above 1GHz |                             |                 |           |             |            |            |
| WTXE1005A<br>1003                              | Spectrum Analyzer           | Rohde & Schwarz | FSP30     | 836079/035  | 2023-02-25 | 2024-02-24 |
| WTXE1007A<br>1001                              | EMI Test Receiver           | Rohde & Schwarz | ESVB      | 825471/005  | 2023-02-25 | 2024-02-24 |
| WTXE1065A<br>1001                              | Amplifier                   | C&D             | PAP-1G18  | 14918       | 2023-02-25 | 2024-02-24 |
| WTXE1010A<br>1005                              | Horn Antenna                | ETS             | 3117      | 00086197    | 2021-03-19 | 2024-03-18 |
| WTXE1010A<br>1010                              | DRG Horn Antenna            | A.H. SYSTEMS    | SAS-574   | 571         | 2021-03-19 | 2024-03-18 |
| WTXE1003A                                      | Pre-amplifier               | Schwarzbeck     | BBV 9721  | 9721-031    | 2023-02-25 | 2024-02-24 |

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|                                                           |                                |                    |             |                 |            |            |
|-----------------------------------------------------------|--------------------------------|--------------------|-------------|-----------------|------------|------------|
| 1001                                                      |                                |                    |             |                 |            |            |
| WTXE1004A<br>1-001                                        | Spectrum<br>Analyzer           | Rohde &<br>Schwarz | FSP40       | 100612          | 2023-02-25 | 2024-02-24 |
| <input type="checkbox"/> Chamber B:Below 1GHz             |                                |                    |             |                 |            |            |
| WTXE1010A<br>1006                                         | Trilog<br>Broadband<br>Antenna | Schwarz beck       | VULB9163(B) | 9163-635        | 2021-04-09 | 2024-04-08 |
| WTXE1038A<br>1001                                         | Amplifier                      | Agilent            | 8447D       | 2944A101<br>79  | 2023-02-25 | 2024-02-24 |
| WTXE1001A<br>1002                                         | EMI Test<br>Receiver           | Rohde &<br>Schwarz | ESPI        | 101391          | 2023-02-25 | 2024-02-24 |
| <input checked="" type="checkbox"/> Chamber C:Below 1GHz  |                                |                    |             |                 |            |            |
| WTXE1093A<br>1001                                         | EMI Test<br>Receiver           | Rohde &<br>Schwarz | ESIB 26     | 100401          | 2023-02-25 | 2024-02-24 |
| WTXE1010A<br>1013-1                                       | Trilog<br>Broadband<br>Antenna | Schwarz beck       | VULB 9168   | 1194            | 2021-05-28 | 2024-05-27 |
| WTXE1010A<br>1007                                         | Loop Antenna                   | Schwarz beck       | FMZB 1516   | 9773            | 2021-03-20 | 2024-03-19 |
| WTXE1007A<br>1002                                         | Amplifier                      | HP                 | 8447F       | 2944A038<br>69  | 2023-02-25 | 2024-02-24 |
| <input checked="" type="checkbox"/> Chamber C: Above 1GHz |                                |                    |             |                 |            |            |
| WTXE1093A<br>1001                                         | EMI Test<br>Receiver           | Rohde &<br>Schwarz | ESIB 26     | 100401          | 2023-02-25 | 2024-02-24 |
| WTXE1103A<br>1005                                         | Horn Antenna                   | POAM               | RTF-11A     | LP228060<br>221 | 2023-03-10 | 2026-03-09 |
| WTXE1103A<br>1006                                         | Amplifier                      | Tonscend           | TAP01018050 | AP22E806<br>235 | 2023-02-25 | 2024-02-24 |
| WTXE1010A<br>1010                                         | DRG Horn<br>Antenna            | A.H. SYSTEMS       | SAS-574     | 571             | 2021-03-19 | 2024-03-18 |
| WTXE1003A<br>1001                                         | Pre-amplifier                  | Schwarzbeck        | BBV 9721    | 9721-031        | 2023-02-25 | 2024-02-24 |

| Software List                             |              |        |         |
|-------------------------------------------|--------------|--------|---------|
| Description                               | Manufacturer | Model  | Version |
| EMI Test Software<br>(Radiated Emission)* | Farad        | EZ-EMC | RA-03A1 |

\*Remark: indicates software version used in the compliance certification testing.

## 2. SUMMARY OF TEST RESULTS

---

| FCC Rules              | Description of Test Item                   | Result    |
|------------------------|--------------------------------------------|-----------|
| §22.913(a), §24.232(c) | RF Output Power                            | Compliant |
| §24.51                 | Peak-to-average Ratio (PAR) of Transmitter | Compliant |
| §22.917(b), §24.238(b) | Emission Bandwidth                         | Compliant |
| §22.917(a), §24.238(a) | Spurious Emissions at Antenna Terminal     | Compliant |
| §22.917(a), §24.238(a) | Spurious Radiation Emissions               | Compliant |
| §22.917(a), §24.238(a) | Out of Band Emissions                      | Compliant |
| §22.355, §24.235       | Frequency Stability                        | Compliant |
| §2.1047                | Modulation characteristics                 | Compliant |

N/A: Not applicable.

### 3. RF Output Power

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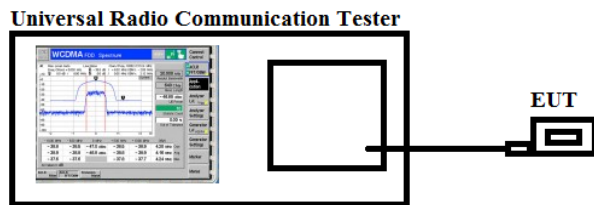
#### 3.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

According to §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

#### 3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

#### 3.3 Summary of Test Results/Plots

➤ **Max. Radiated Power**

| Mode     | Channel | Antenna Polar | ERP (dBm) | Limit (dBm) | Result |
|----------|---------|---------------|-----------|-------------|--------|
| GSM850   | 128     | V             | 31.58     | <38.45      | Pass   |
|          |         | H             | 24.25     |             |        |
|          | 190     | V             | 32.15     |             |        |
|          |         | H             | 24.02     |             |        |
|          | 251     | V             | 32.25     |             |        |
|          |         | H             | 25.13     |             |        |
| GPRS850  | 128     | V             | 30.98     | <38.45      | Pass   |
|          |         | H             | 24.25     |             |        |
|          | 190     | V             | 30.47     |             |        |
|          |         | H             | 25.05     |             |        |
|          | 251     | V             | 30.32     |             |        |
|          |         | H             | 25.12     |             |        |
| EGPRS850 | 128     | V             | 26.12     | <38.45      | Pass   |
|          |         | H             | 22.19     |             |        |
|          | 190     | V             | 26.35     |             |        |
|          |         | H             | 22.64     |             |        |
|          | 251     | V             | 26.47     |             |        |
|          |         | H             | 21.77     |             |        |

| Mode      | Channel | Antenna Polar | EIRP (dBm) | Limit (dBm) | Result |
|-----------|---------|---------------|------------|-------------|--------|
| PCS1900   | 512     | V             | 28.15      | <33.00      | Pass   |
|           |         | H             | 23.28      |             |        |
|           | 661     | V             | 28.41      |             |        |
|           |         | H             | 23.64      |             |        |
|           | 810     | V             | 28.12      |             |        |
|           |         | H             | 23.32      |             |        |
| GPRS1900  | 512     | V             | 28.41      | <33.00      | Pass   |
|           |         | H             | 23.68      |             |        |
|           | 661     | V             | 28.35      |             |        |
|           |         | H             | 23.12      |             |        |
|           | 810     | V             | 28.69      |             |        |
|           |         | H             | 23.41      |             |        |
| EGPRS1900 | 512     | V             | 25.13      | <33.00      | Pass   |
|           |         | H             | 23.02      |             |        |
|           | 661     | V             | 25.10      |             |        |
|           |         | H             | 22.25      |             |        |
|           | 810     | V             | 25.41      |             |        |
|           |         | H             | 22.01      |             |        |

| Mode         | Channel | Antenna Polar | ERP   | Limit (dBm) | Result |
|--------------|---------|---------------|-------|-------------|--------|
| WCDMA Band V | 4132    | V             | 23.58 | <38.45      | Pass   |
|              |         | H             | 19.25 |             |        |
|              | 4183    | V             | 23.35 |             |        |
|              |         | H             | 19.47 |             |        |
|              | 4233    | V             | 23.13 |             |        |
|              |         | H             | 19.69 |             |        |

| Mode          | Channel | Antenna Polar | EIRP  | Limit (dBm) | Result |
|---------------|---------|---------------|-------|-------------|--------|
| WCDMA Band II | 9262    | V             | 22.74 | <33.00      | Pass   |
|               |         | H             | 18.32 |             |        |
|               | 9400    | V             | 22.17 |             |        |
|               |         | H             | 18.58 |             |        |
|               | 9538    | V             | 22.42 |             |        |
|               |         | H             | 18.69 |             |        |

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

➤ **Max. Conducted Power (Average power)**

**Please refer to Appendix A**

## 4. Peak-to-average Ratio (PAR) of Transmitter

---

### 4.1 Standard Applicable

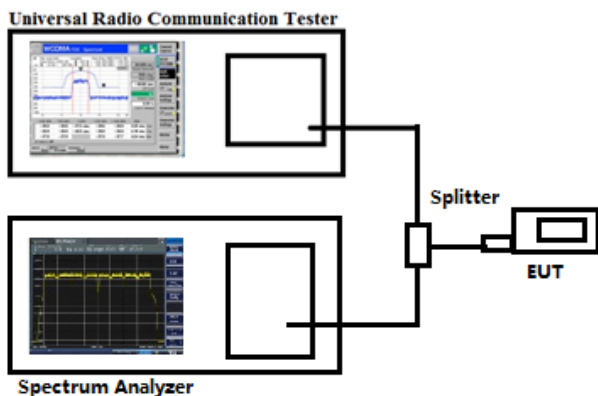
According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

### 4.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled.
2. Frequency = carrier center frequency.
3. Measurement BW > Emission bandwidth of signal.
4. The signal analyzer was set to collect one million samples to generate the CCDF curve.
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

Test Configuration for the emission bandwidth testing:



### 4.3 Summary of Test Results

Please refer to Appendix B.

## 5. Emission Bandwidth

---

### 5.1 Standard Applicable

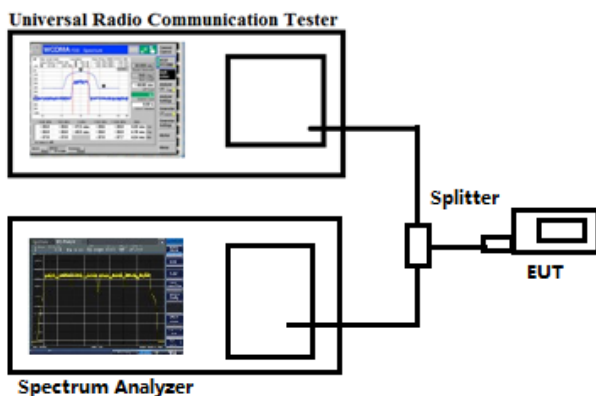
According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

### 5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



### 5.3 Summary of Test Results/Plots

Please refer to Appendix C

## 6. Out of Band Emissions at Antenna Terminal

---

### 6.1 Standard Applicable

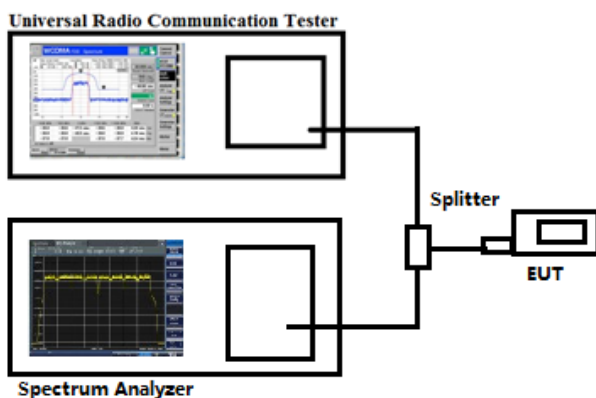
According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10<sup>th</sup> harmonic.

Test Configuration for the out of band emissions testing:



### 6.3 Summary of Test Results/Plots

Note: Pre-scan mode WCDMA/HSDPA/HSUPA find the worst case at WCDMA mode and recorded in the test report.

Please refer to Appendix D

## 7. Spurious Radiated Emissions

---

### 7.1 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 7.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

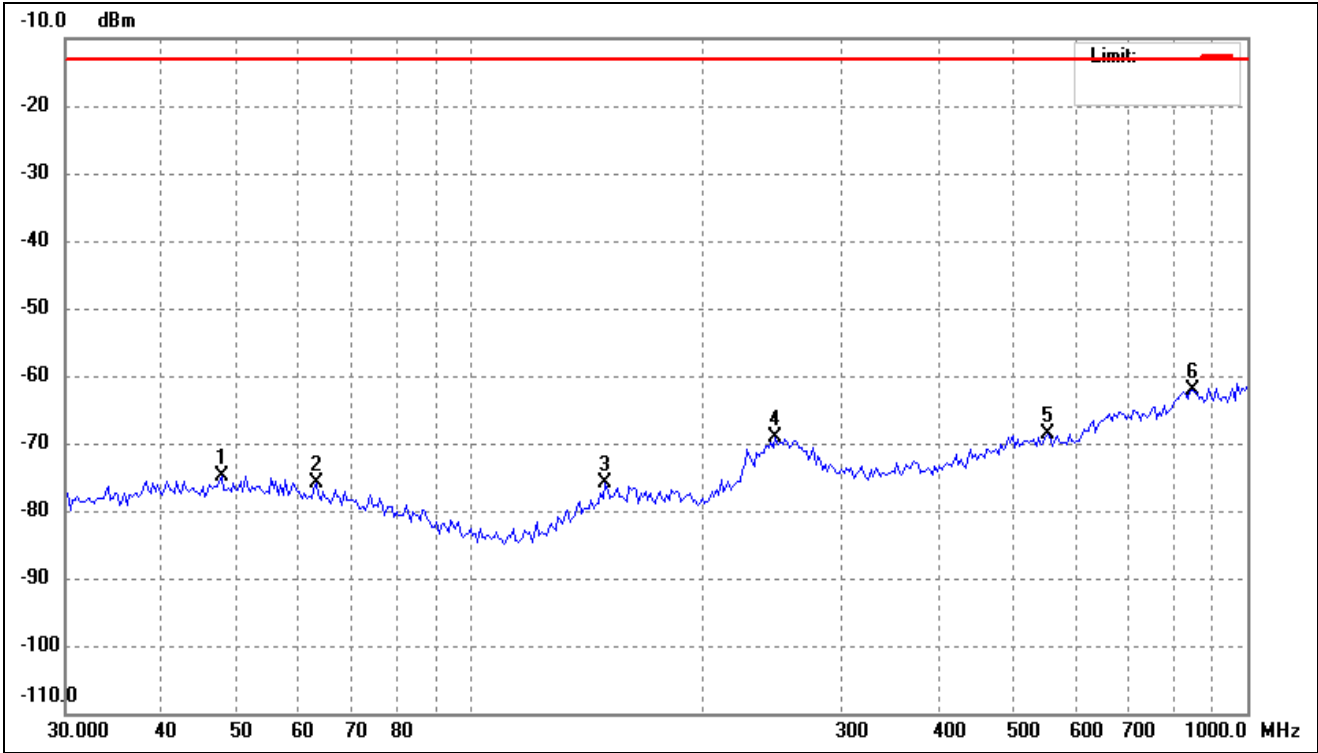
Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

### 7.3 Summary of Test Results/Plots

*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

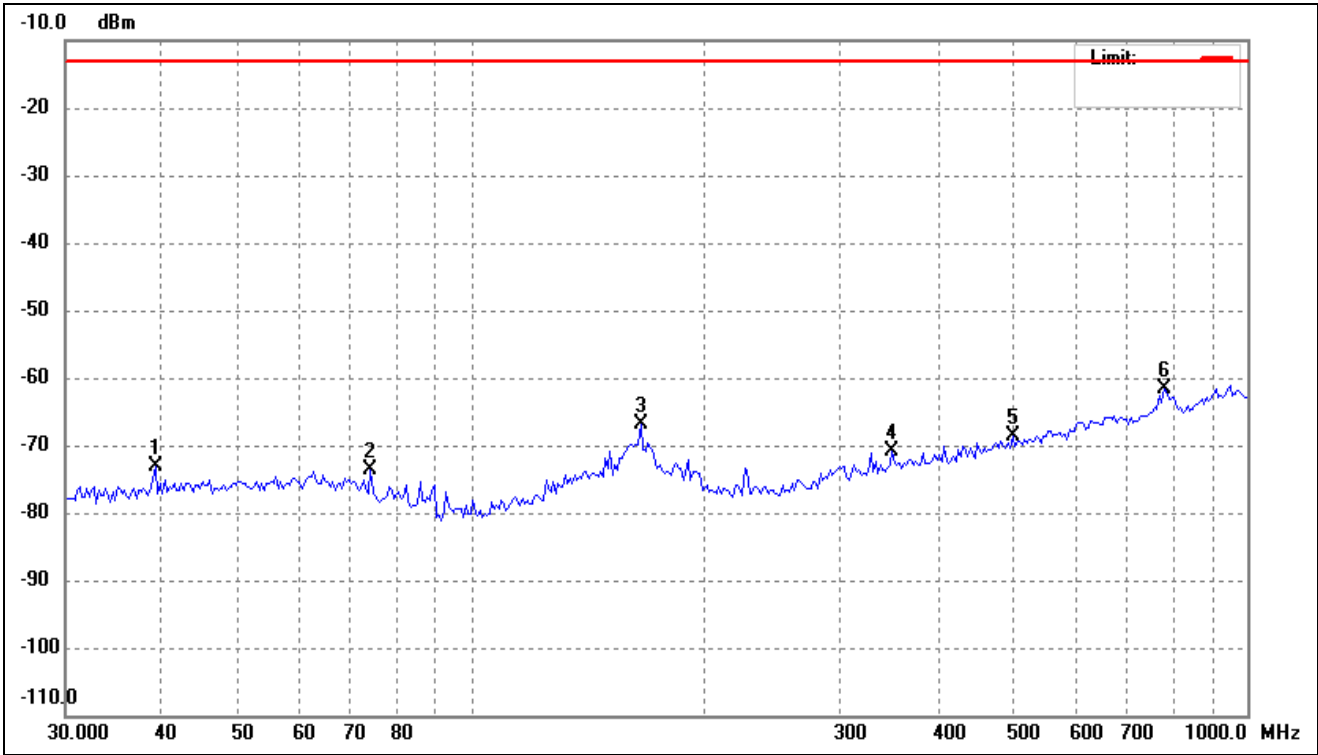
➤ Spurious Emissions Below 1GHz

|                   |        |           |            |
|-------------------|--------|-----------|------------|
| For Cellular Band |        |           |            |
| Test Channel      | GSM850 | Polarity: | Horizontal |



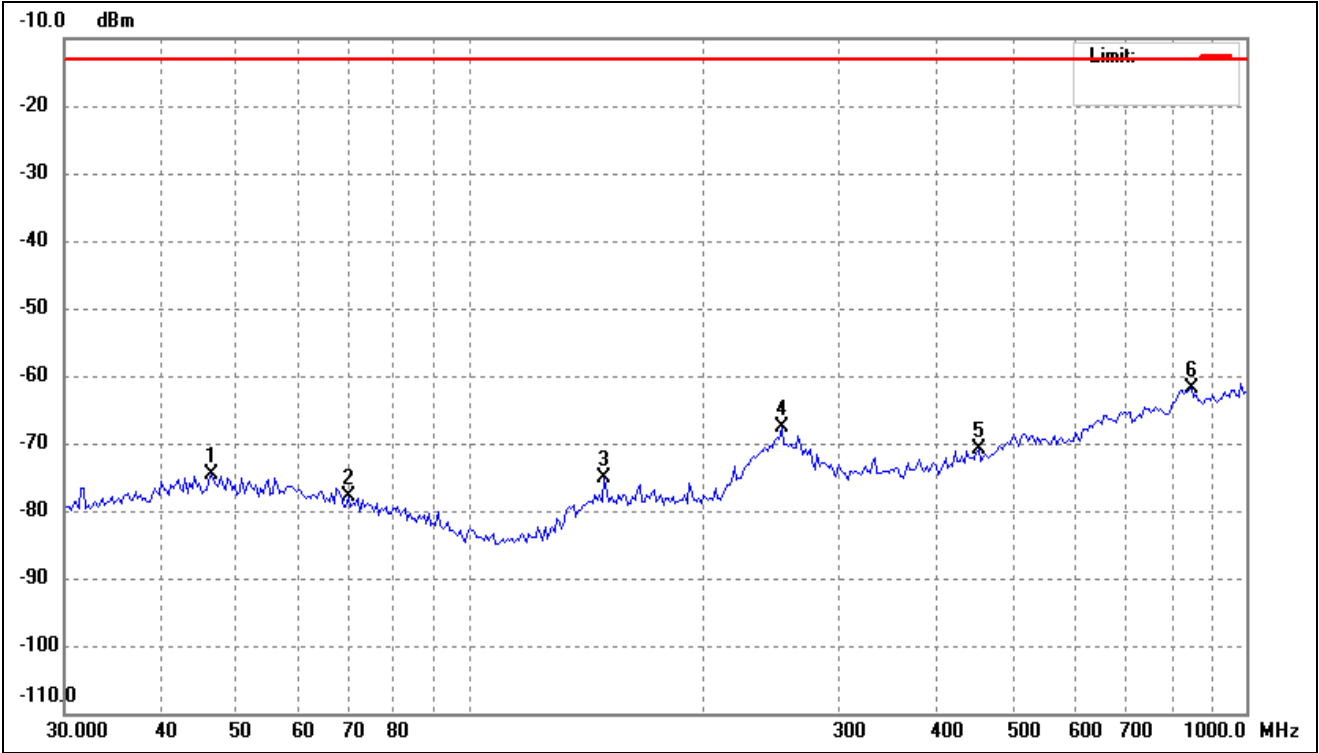
| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 47.7028            | -78.14           | 3.28          | -74.86          | -13.00         | -61.86         | -             | -              | peak   |
| 2   | 63.1857            | -77.79           | 1.90          | -75.89          | -13.00         | -62.89         | -             | -              | peak   |
| 3   | 148.9175           | -76.52           | 0.75          | -75.77          | -13.00         | -62.77         | -             | -              | peak   |
| 4   | 246.9901           | -77.15           | 8.03          | -69.12          | -13.00         | -56.12         | -             | -              | peak   |
| 5   | 554.1708           | -76.46           | 7.78          | -68.68          | -13.00         | -55.68         | -             | -              | peak   |
| 6   | 850.7603           | -75.73           | 13.61         | -62.12          | -13.00         | -49.12         | -             | -              | peak   |

|                   |        |           |          |
|-------------------|--------|-----------|----------|
| For Cellular Band |        |           |          |
| Test Channel      | GSM850 | Polarity: | Vertical |



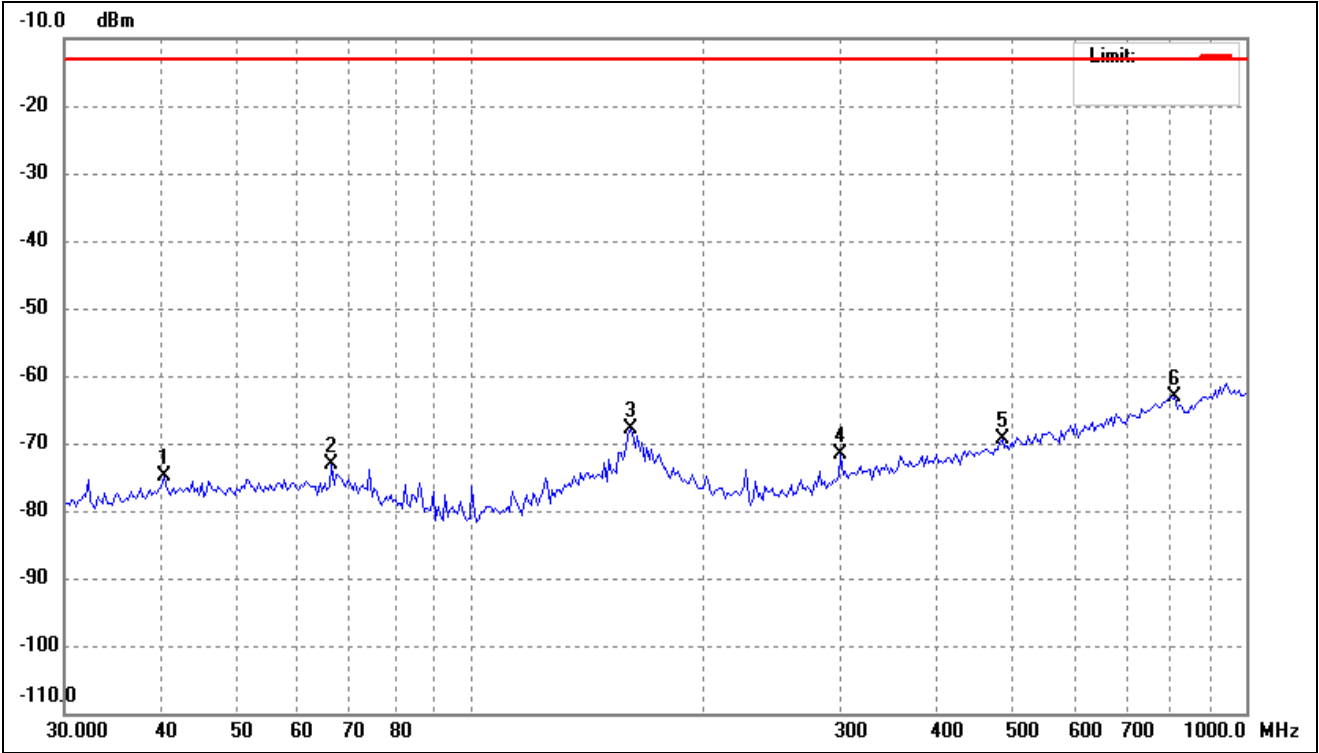
| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 39.1825            | -75.66           | 2.47          | -73.19          | -13.00         | -60.19         | -             | -              | peak   |
| 2   | 74.2696            | -75.53           | 1.94          | -73.59          | -13.00         | -60.59         | -             | -              | peak   |
| 3   | 165.4716           | -73.85           | 6.96          | -66.89          | -13.00         | -53.89         | -             | -              | peak   |
| 4   | 348.5145           | -75.30           | 4.31          | -70.99          | -13.00         | -57.99         | -             | -              | peak   |
| 5   | 498.7303           | -75.79           | 7.15          | -68.64          | -13.00         | -55.64         | -             | -              | peak   |
| 6   | 781.9606           | -73.94           | 12.20         | -61.74          | -13.00         | -48.74         | -             | -              | peak   |

|                   |         |           |            |
|-------------------|---------|-----------|------------|
| For Cellular Band |         |           |            |
| Test Channel      | GSM1900 | Polarity: | Horizontal |



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 46.3806            | -77.77           | 3.16          | -74.61          | -13.00         | -61.61         | -             | -              | peak   |
| 2   | 69.7179            | -79.06           | 1.10          | -77.96          | -13.00         | -64.96         | -             | -              | peak   |
| 3   | 148.9175           | -75.93           | 0.75          | -75.18          | -13.00         | -62.18         | -             | -              | peak   |
| 4   | 252.2523           | -75.99           | 8.36          | -67.63          | -13.00         | -54.63         | -             | -              | peak   |
| 5   | 452.0013           | -76.80           | 6.02          | -70.78          | -13.00         | -57.78         | -             | -              | peak   |
| 6   | 850.7603           | -75.52           | 13.61         | -61.91          | -13.00         | -48.91         | -             | -              | peak   |

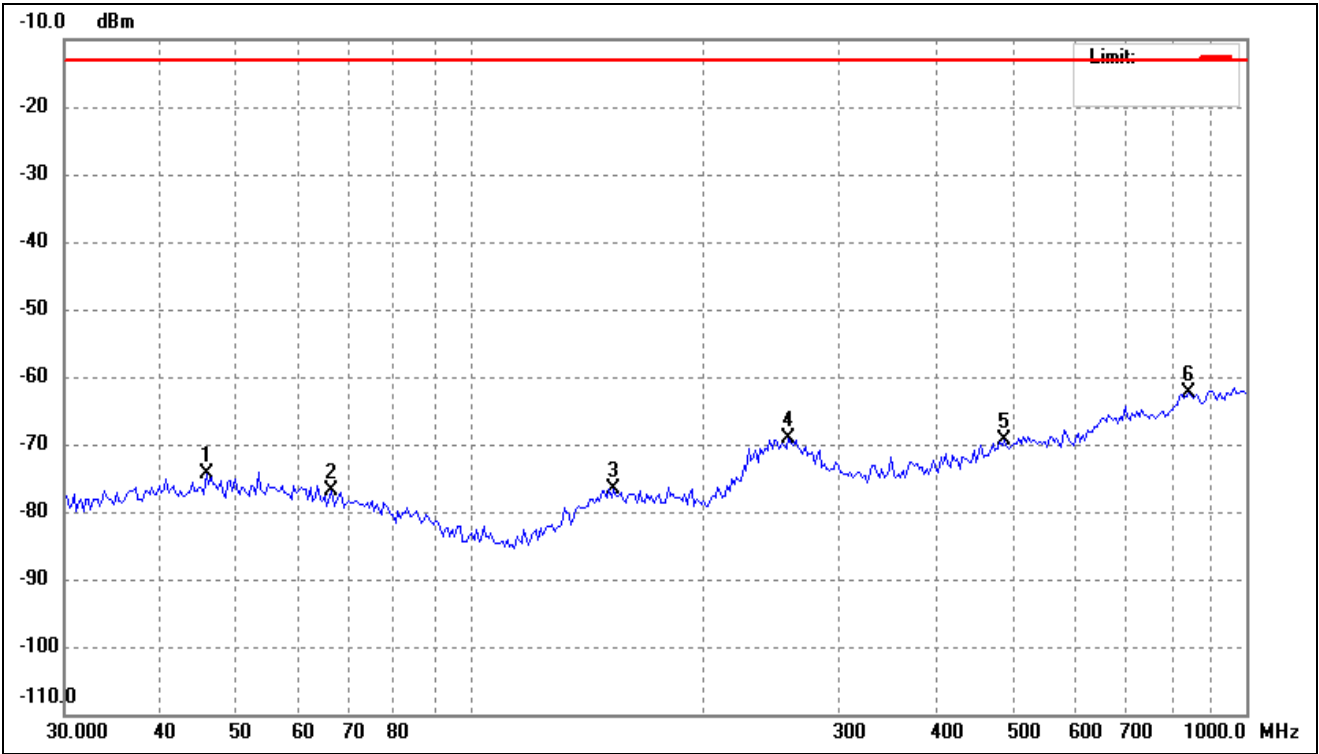
|                   |         |           |          |
|-------------------|---------|-----------|----------|
| For Cellular Band |         |           |          |
| Test Channel      | GSM1900 | Polarity: | Vertical |



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 40.2995            | -77.40           | 2.58          | -74.82          | -13.00         | -61.82         | -             | -              | peak   |
| 2   | 66.3715            | -76.29           | 3.16          | -73.13          | -13.00         | -60.13         | -             | -              | peak   |
| 3   | 160.8852           | -75.76           | 7.77          | -67.99          | -13.00         | -54.99         | -             | -              | peak   |
| 4   | 300.6988           | -74.86           | 3.32          | -71.54          | -13.00         | -58.54         | -             | -              | peak   |
| 5   | 484.9068           | -76.35           | 6.90          | -69.45          | -13.00         | -56.45         | -             | -              | peak   |
| 6   | 809.9238           | -75.14           | 12.13         | -63.01          | -13.00         | -50.01         | -             | -              | peak   |

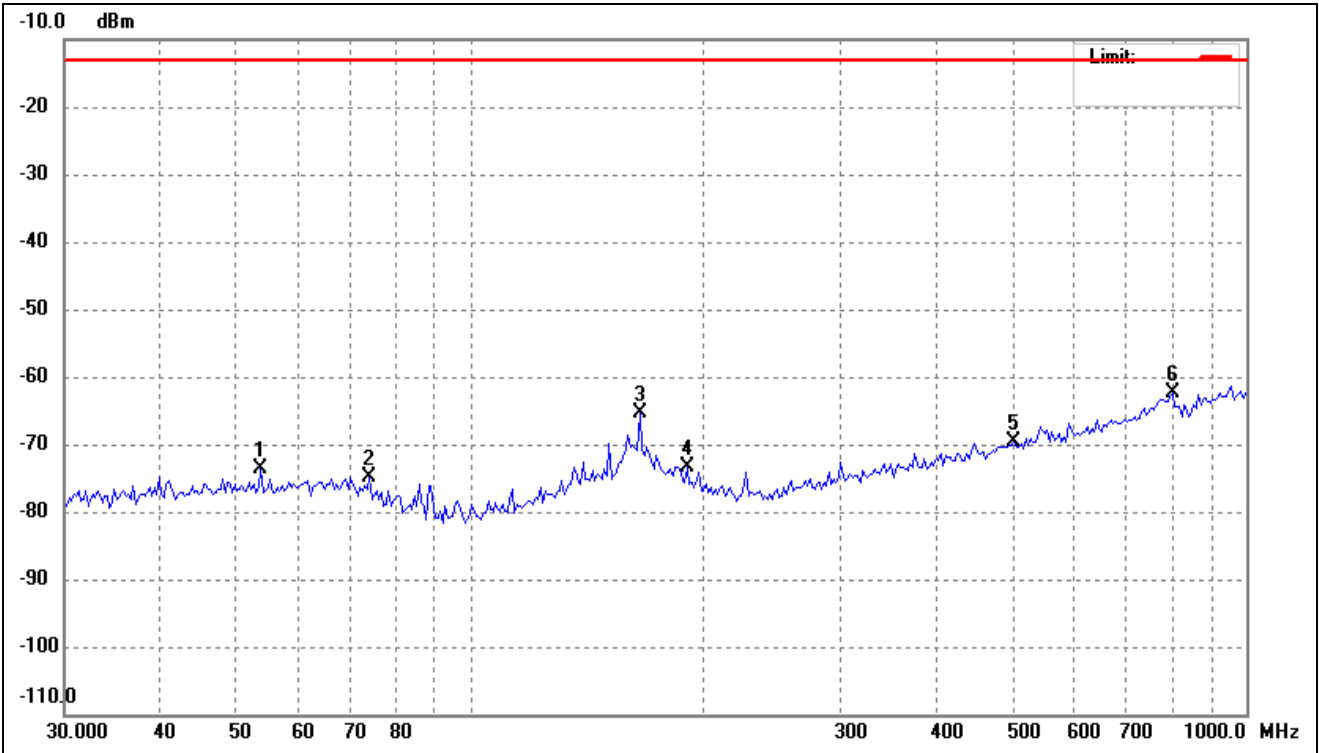
Note: Margin= (Reading+ Correct)- Limit

|              |        |           |            |
|--------------|--------|-----------|------------|
| Test Channel | band 5 | Polarity: | Horizontal |
|--------------|--------|-----------|------------|



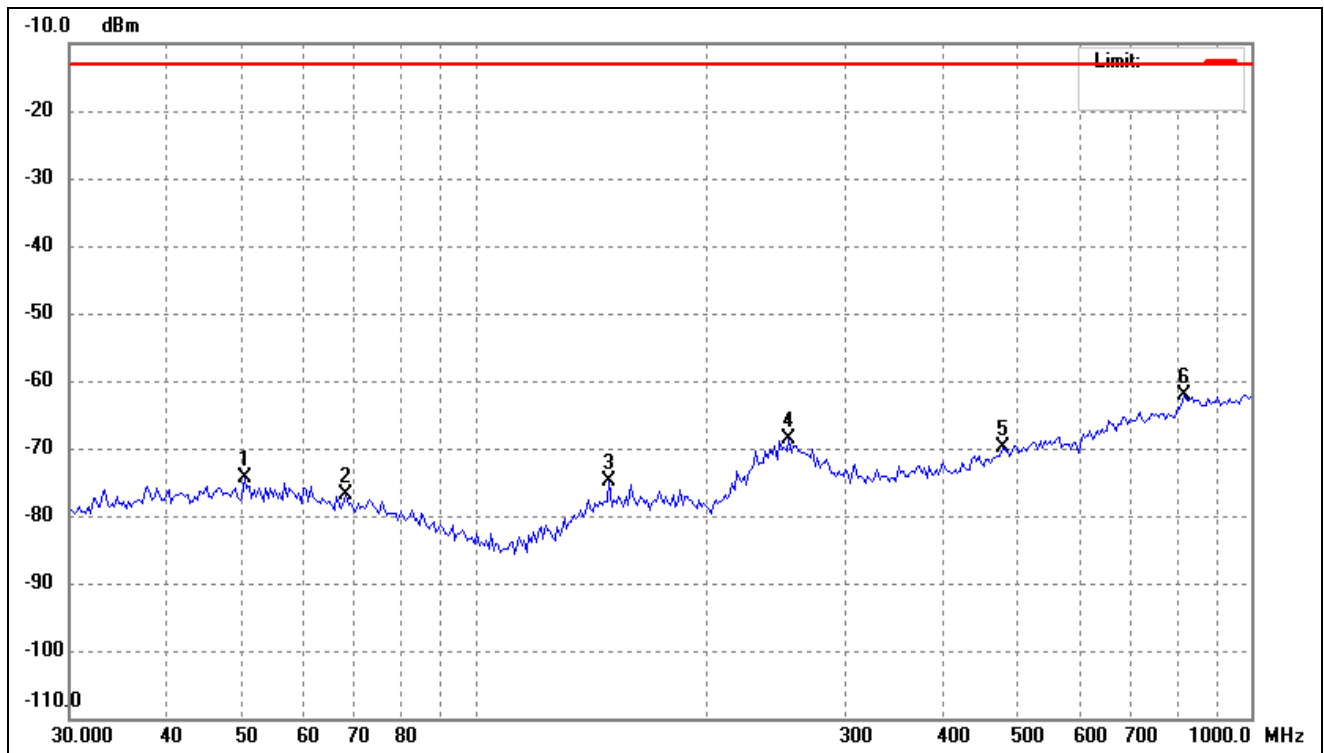
| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 45.7333            | -77.47           | 3.09          | -74.38          | -13.00         | -61.38         | -             | -              | peak   |
| 2   | 66.3715            | -78.31           | 1.51          | -76.80          | -13.00         | -63.80         | -             | -              | peak   |
| 3   | 153.1627           | -77.51           | 0.91          | -76.60          | -13.00         | -63.60         | -             | -              | peak   |
| 4   | 257.6266           | -77.15           | 7.92          | -69.23          | -13.00         | -56.23         | -             | -              | peak   |
| 5   | 488.3263           | -76.24           | 6.98          | -69.26          | -13.00         | -56.26         | -             | -              | peak   |
| 6   | 844.8028           | -76.07           | 13.63         | -62.44          | -13.00         | -49.44         | -             | -              | peak   |

|              |        |           |          |
|--------------|--------|-----------|----------|
| Test Channel | band 5 | Polarity: | Vertical |
|--------------|--------|-----------|----------|



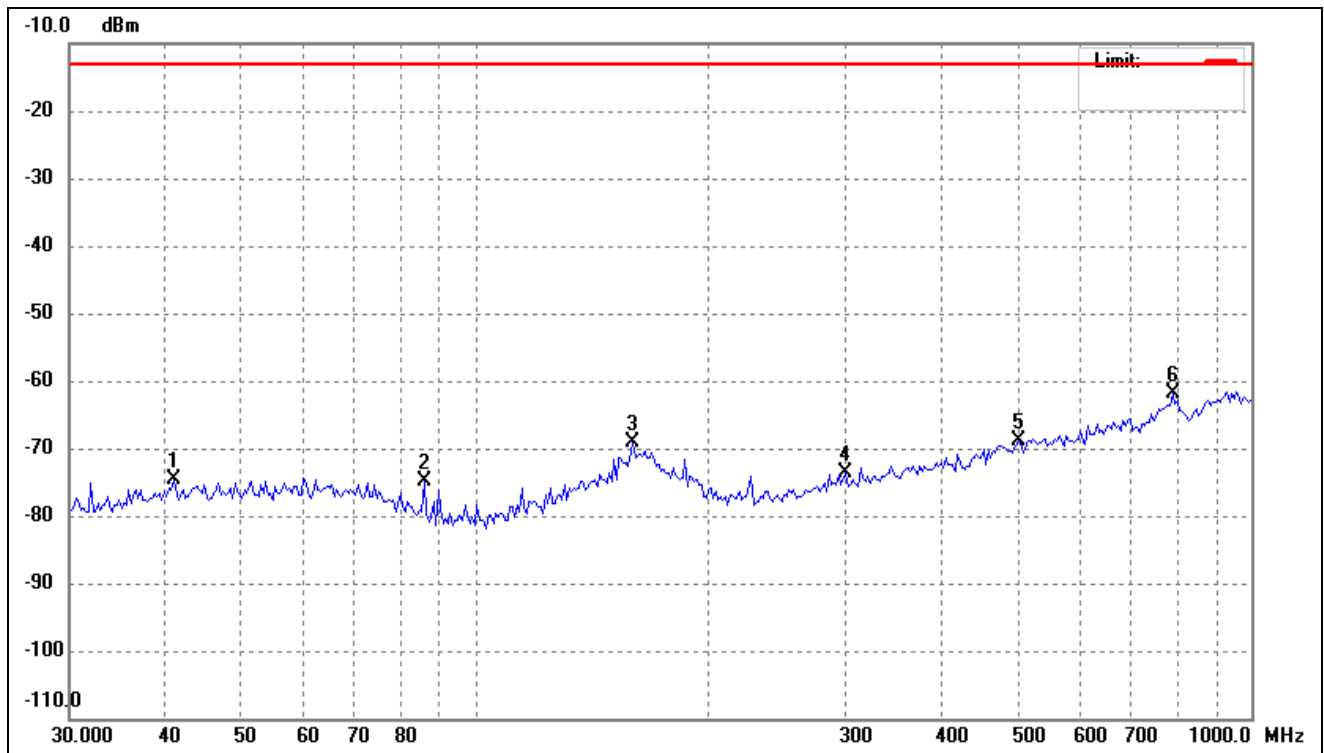
| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 53.7559            | -77.15           | 3.42          | -73.73          | -13.00         | -60.73         | -             | -              | peak   |
| 2   | 74.2696            | -76.85           | 1.94          | -74.91          | -13.00         | -61.91         | -             | -              | peak   |
| 3   | 165.4716           | -72.25           | 6.96          | -65.29          | -13.00         | -52.29         | -             | -              | peak   |
| 4   | 190.4411           | -76.04           | 2.76          | -73.28          | -13.00         | -60.28         | -             | -              | peak   |
| 5   | 502.2473           | -76.76           | 7.21          | -69.55          | -13.00         | -56.55         | -             | -              | peak   |
| 6   | 804.2523           | -74.80           | 12.43         | -62.37          | -13.00         | -49.37         | -             | -              | peak   |

|              |        |           |            |
|--------------|--------|-----------|------------|
| Test Channel | band 2 | Polarity: | Horizontal |
|--------------|--------|-----------|------------|



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 50.4614            | -77.89           | 3.44          | -74.45          | -13.00         | -61.45         | -             | -              | peak   |
| 2   | 68.2636            | -78.24           | 1.28          | -76.96          | -13.00         | -63.96         | -             | -              | peak   |
| 3   | 148.9175           | -75.66           | 0.75          | -74.91          | -13.00         | -61.91         | -             | -              | peak   |
| 4   | 254.0312           | -76.73           | 8.21          | -68.52          | -13.00         | -55.52         | -             | -              | peak   |
| 5   | 478.1394           | -76.50           | 6.71          | -69.79          | -13.00         | -56.79         | -             | -              | peak   |
| 6   | 821.3871           | -75.11           | 12.97         | -62.14          | -13.00         | -49.14         | -             | -              | peak   |

|              |        |           |          |
|--------------|--------|-----------|----------|
| Test Channel | band 2 | Polarity: | Vertical |
|--------------|--------|-----------|----------|



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 40.8699            | -77.30           | 2.63          | -74.67          | -13.00         | -61.67         | -             | -              | peak   |
| 2   | 86.0796            | -73.64           | -1.23         | -74.87          | -13.00         | -61.87         | -             | -              | peak   |
| 3   | 159.7586           | -76.92           | 7.83          | -69.09          | -13.00         | -56.09         | -             | -              | peak   |
| 4   | 300.6988           | -76.84           | 3.32          | -73.52          | -13.00         | -60.52         | -             | -              | peak   |
| 5   | 502.2473           | -76.06           | 7.21          | -68.85          | -13.00         | -55.85         | -             | -              | peak   |
| 6   | 793.0281           | -74.27           | 12.48         | -61.79          | -13.00         | -48.79         | -             | -              | peak   |

Note:  $\text{Margin} = (\text{Reading} + \text{Correct}) - \text{Limit}$

Remark: '-' Means the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

- Spurious Emissions Above 1GHz
- For Cellular Band\_GSM850 Mode

| Frequency<br>(MHz)        | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Polar<br>H/V |
|---------------------------|------------------|---------------|-----------------|----------------|----------------|--------------|
| Low Channel (824.2MHz)    |                  |               |                 |                |                |              |
| 1648.4                    | -34.33           | 4.94          | -29.39          | -13            | -16.39         | H            |
| 2472.6                    | -43.77           | 8.46          | -35.31          | -13            | -22.31         | H            |
| 1648.4                    | -36.77           | 4.94          | -31.83          | -13            | -18.83         | V            |
| 2472.6                    | -43.77           | 8.46          | -35.31          | -13            | -22.31         | V            |
| Middle Channel (836.6MHz) |                  |               |                 |                |                |              |
| 1673.2                    | -34.67           | 5.11          | -29.56          | -13            | -16.56         | H            |
| 2509.8                    | -43.86           | 8.54          | -35.32          | -13            | -22.32         | H            |
| 1673.2                    | -34.29           | 5.11          | -29.18          | -13            | -16.18         | V            |
| 2509.8                    | -43.01           | 8.54          | -34.47          | -13            | -21.47         | V            |
| High Channel (848.8MHz)   |                  |               |                 |                |                |              |
| 1697.6                    | -35.58           | 5.25          | -30.33          | -13            | -17.33         | H            |
| 2546.4                    | -43.34           | 8.57          | -34.77          | -13            | -21.77         | H            |
| 1697.6                    | -34.14           | 5.25          | -28.89          | -13            | -15.89         | V            |
| 2546.4                    | -43.98           | 8.57          | -35.41          | -13            | -22.41         | V            |

- For PCS Band\_GSM1900 Mode

| Frequency<br>(MHz)       | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Polar<br>H/V |
|--------------------------|------------------|---------------|-----------------|----------------|----------------|--------------|
| Low Channel (1850.2MHz)  |                  |               |                 |                |                |              |
| 3700.4                   | -39.86           | 10.54         | -29.32          | -13            | -16.32         | H            |
| 5550.6                   | -47.91           | 13.37         | -34.54          | -13            | -21.54         | H            |
| 3700.4                   | -38.11           | 10.54         | -27.57          | -13            | -14.57         | V            |
| 5550.6                   | -47.18           | 13.37         | -33.81          | -13            | -20.81         | V            |
| Middle Channel (1880MHz) |                  |               |                 |                |                |              |
| 3760.0                   | -40.76           | 10.64         | -30.12          | -13            | -17.12         | H            |
| 5640.0                   | -48.34           | 13.54         | -34.8           | -13            | -21.8          | H            |
| 3760.0                   | -38.89           | 10.64         | -28.25          | -13            | -15.25         | V            |
| 5640.0                   | -49.36           | 13.54         | -35.82          | -13            | -22.82         | V            |
| High Channel (1909.8MHz) |                  |               |                 |                |                |              |
| 3819.6                   | -39.83           | 10.74         | -29.09          | -13            | -16.09         | H            |
| 5729.4                   | -46.68           | 13.71         | -32.97          | -13            | -19.97         | H            |
| 3819.6                   | -40.12           | 10.74         | -29.38          | -13            | -16.38         | V            |
| 5729.4                   | -46.25           | 13.71         | -32.54          | -13            | -19.54         | V            |

## ➤ For WCDMA Band V Mode

| Frequency                 | Reading | Correct | Result | Limit | Margin | Polar |
|---------------------------|---------|---------|--------|-------|--------|-------|
| (MHz)                     | (dBm)   | dB      | (dBm)  | (dBm) | (dB)   | H/V   |
| Low Channel (826.4MHz)    |         |         |        |       |        |       |
| 1652.8                    | -34.75  | 4.94    | -29.81 | -13   | -16.81 | H     |
| 2479.2                    | -43.17  | 8.46    | -34.71 | -13   | -21.71 | H     |
| 1652.8                    | -34.59  | 4.94    | -29.65 | -13   | -16.65 | V     |
| 2479.2                    | -42.66  | 8.46    | -34.2  | -13   | -21.2  | V     |
| Middle Channel (836.6MHz) |         |         |        |       |        |       |
| 1672.8                    | -36.49  | 5.11    | -31.38 | -13   | -18.38 | H     |
| 2509.2                    | -42.57  | 8.54    | -34.03 | -13   | -21.03 | H     |
| 1672.8                    | -37.91  | 5.11    | -32.8  | -13   | -19.8  | V     |
| 2509.2                    | -43.67  | 8.54    | -35.13 | -13   | -22.13 | V     |
| High Channel (846.6MHz)   |         |         |        |       |        |       |
| 1693.2                    | -36.84  | 5.25    | -31.59 | -13   | -18.59 | H     |
| 2539.8                    | -44.75  | 8.57    | -36.18 | -13   | -23.18 | H     |
| 1693.2                    | -34.02  | 5.25    | -28.77 | -13   | -15.77 | V     |
| 2539.8                    | -42.36  | 8.57    | -33.79 | -13   | -20.79 | V     |

## ➤ For WCDMA Band II Mode

| Frequency                | Reading | Correct | Result | Limit | Margin | Polar |
|--------------------------|---------|---------|--------|-------|--------|-------|
| (MHz)                    | (dBm)   | dB      | (dBm)  | (dBm) | (dB)   | H/V   |
| Low Channel (1852.4MHz)  |         |         |        |       |        |       |
| 3704.8                   | -40.52  | 10.54   | -29.98 | -13   | -16.98 | H     |
| 5557.2                   | -49.49  | 13.37   | -36.12 | -13   | -23.12 | H     |
| 3704.8                   | -38.78  | 10.54   | -28.24 | -13   | -15.24 | V     |
| 5557.2                   | -48.15  | 13.37   | -34.78 | -13   | -21.78 | V     |
| Middle Channel (1880MHz) |         |         |        |       |        |       |
| 3760.8                   | -40.22  | 10.64   | -29.58 | -13   | -16.58 | H     |
| 5640.0                   | -48.72  | 13.54   | -35.18 | -13   | -22.18 | H     |
| 3760.8                   | -41.65  | 10.64   | -31.01 | -13   | -18.01 | V     |
| 5640.0                   | -48.59  | 13.54   | -35.05 | -13   | -22.05 | V     |
| High Channel (1907.6MHz) |         |         |        |       |        |       |
| 3815.2                   | -38.61  | 10.74   | -27.87 | -13   | -14.87 | H     |
| 5722.8                   | -49.20  | 13.71   | -35.49 | -13   | -22.49 | H     |
| 3815.2                   | -41.16  | 10.74   | -30.42 | -13   | -17.42 | V     |
| 5722.8                   | -46.08  | 13.71   | -32.37 | -13   | -19.37 | H     |

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## **8. Frequency Stability**

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### **8.1 Standard Applicable**

According to §22.355, §24.235 the limit is 2.5ppm.

### **8.2 Test Procedure**

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

### **8.3 Summary of Test Results/Plots**

**Please refer to Appendix E**

## 9. Modulation characteristics

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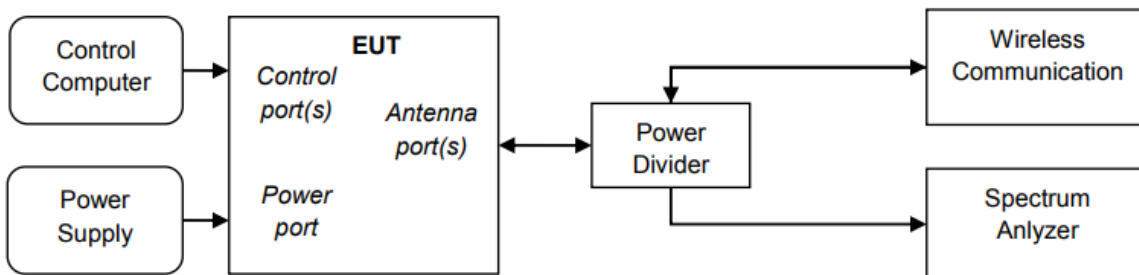
### 9.1 Standard Applicable

According to §2.1047, measurements required: Modulation characteristics is given below:

- (a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
- (b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.
- (c) Single sideband and independent sideband radiotelephone transmitters which employ a device or circuit to limit peak envelope power. A curve showing the peak envelope power output versus the modulation input voltage shall be supplied. The modulating signals shall be the same in frequency as specified in paragraph (c) of §2.1049 for the occupied bandwidth tests.
- (d) Other types of equipment. A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

### 9.2 Test Procedure

According to ANSI C63.26-2015 section 5.3.2, the following test setup was performed.



### 9.3 Summary of Test Results/Plots

Only the worst case was selected to record.

Please refer to Appendix F

## APPENDIX PHOTOGRAPHS

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Please refer to “ANNEX”

\*\*\*\*\* END OF REPORT \*\*\*\*\*