

FCC Test Report

(PART 22)

Report No.: RF160513C20

FCC ID: V65E6820

Test Model: E6820/E6820TM

Received Date: Apr. 19, 2016

Test Date: May 30, 2016 ~ Jun. 04, 2016

Issued Date: Jun. 16, 2016

Applicant: Kyocera Corporation c/o Kyocera Communications, Inc.

Address: 8611 Balboa Avenue, San Diego, CA 92123

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C)

Test Location (1): No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan
Hsien 333, Taiwan, R.O.C.



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Release Control Record

| Issue No. | Description | Date Issued |
|-------------|------------------|---------------|
| RF160513C20 | Original Release | Jun. 16, 2016 |



1 Certificate of Conformity

Product: PDA Phone

Brand: KYOCERA

Test Model: E6820/E6820TM


Sample Status: Identical Prototype

Applicant: Kyocera Corporation c/o Kyocera Communications, Inc.

Test Date: May 30, 2016 ~ Jun. 04, 2016

Standards: FCC Part 22, Subpart H

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Jun. 16, 2016
Ivonne Wu / Supervisor

Approved by :  , **Date:** Jun. 16, 2016
Stanley Wu / Assistant Manager

2 Summary of Test Results

| Applied Standard: FCC Part 22 & Part 2 | | | |
|--|------------------------------|--------|---|
| FCC Clause | Test Item | Result | Remarks |
| 2.1046 22.913 (a) | Effective Radiated Power | Pass | Meet the requirement of limit. |
| --- | Peak to Average Ratio | Pass | Meet the requirement of limit. |
| 2.1055 22.355 | Frequency Stability | Pass | Meet the requirement of limit. |
| 2.1049 | Occupied Bandwidth | Pass | Meet the requirement of limit. |
| 22.917 | Band Edge Measurements | Pass | Meet the requirement of limit. |
| 2.1051 22.917 | Conducted Spurious Emissions | Pass | Meet the requirement of limit. |
| 2.1053 22.917 | Radiated Spurious Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -11.25 dB at 2509.20 MHz. |

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 30 MHz ~ 200 MHz | 2.93 dB |
| | 200 MHz ~ 1000 MHz | 2.95 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 2.26 dB |
| | 18 GHz ~ 40 GHz | 1.94 dB |

2.2 Test Site and Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|--|----------------|---------------------|---------------------|-------------------------|
| Test Receiver Agilent | N9038A | MY51210203 | Jan. 21, 2016 | Jan. 20, 2017 |
| Spectrum Analyzer Agilent | N9010A | MY52220314 | Sep. 03, 2015 | Sep. 02, 2016 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSU43 | 101261 | Dec. 17, 2015 | Dec. 16, 2016 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-472 | Jan. 07, 2016 | Jan. 06, 2017 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-969 | Jan. 04, 2016 | Jan. 03, 2017 |
| Double Ridge Guide Horn Antenna EMCO | 3115 | 5619 | Jan. 04, 2016 | Jan. 03, 2017 |
| BILOG Antenna SCHWARZBECK | VULB 9168 | 9168-153 | Jan. 07, 2016 | Jan. 06, 2017 |
| Loop Antenna | EM-6879 | 269 | Jul. 31, 2015 | Jul. 30, 2016 |
| Bluetooth Tester | CBT | 100980 | Apr. 27, 2015 | Apr. 26, 2017 |
| Agilent Communications Tester-Wireless | 8960 Series 10 | MY53201073 | Jul. 03, 2015 | Jul. 02, 2017 |
| Preamplifier EMCI | EMC 012645 | 980115 | Dec. 21, 2015 | Dec. 20, 2016 |
| Preamplifier EMCI | EMC 184045 | 980116 | Dec. 21, 2015 | Dec. 20, 2016 |
| Preamplifier EMCI | EMC 330H | 980112 | Dec. 28, 2015 | Dec. 27, 2016 |
| Power Meter Anritsu | ML2495A | 1232002 | Sep. 21, 2015 | Sep. 20, 2016 |
| Power Sensor Anritsu | MA2411B | 1207325 | Sep. 21, 2015 | Sep. 20, 2016 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 309219/4 2950114 | Oct. 12, 2015 | Oct. 11, 2016 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 250130/4 | Oct. 12, 2015 | Oct. 11, 2016 |
| RF Coaxial Cable Worken | 8D-FB | Cable-Ch10-01 | Oct. 12, 2015 | Oct. 11, 2016 |
| Software BV ADT | E3 6.120103 | NA | NA | NA |
| Antenna Tower MF | MFA-440H | NA | NA | NA |
| Turn Table MF | MFT-201SS | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | MF-7802 | NA | NA | NA |
| Radio Communication Analyzer | MT8820C | 6201300640 | Aug. 10, 2015 | Aug. 09, 2017 |
| Communications Tester-Wireless Agilent | 8960 Series 10 | MY53201073 | Jul. 03, 2015 | Jul. 02, 2017 |

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The FCC Site Registration No. is 690701.
 5. The IC Site Registration No. is IC7450F-10.

3 General Information

3.1 General Description of EUT

| | | |
|----------------------------|--|-------------------|
| Product | PDA Phone | |
| Brand | KYOCERA | |
| Test Model | E6820/E6820TM | |
| Status of EUT | Identical Prototype | |
| Power Supply Rating | 5.0 Vdc or 9.0 Vdc (adapter) 5.0 Vdc (host equipment) 3.8 Vdc (Li-ion battery) | |
| Modulation Type | GSM/GPRS | GMSK |
| | EDGE | GMSK, 8PSK |
| | WCDMA | BPSK |
| | LTE | QPSK, 16QAM |
| Frequency Range | GSM/GPRS/EDGE | 824.2 ~ 848.8 MHz |
| | WCDMA | 826.4 ~ 846.6 MHz |
| | LTE 5 (Channel Bandwidth: 1.4 MHz) | 824.7 ~ 848.3 MHz |
| | LTE 5 (Channel Bandwidth: 3 MHz) | 825.5 ~ 847.5 MHz |
| | LTE 5 (Channel Bandwidth: 5 MHz) | 826.5 ~ 846.5 MHz |
| | LTE 5 (Channel Bandwidth: 10 MHz) | 829 ~ 844 MHz |
| Max. ERP Power | GSM/GPRS | 872.97 mW |
| | EDGE | 174.58 mW |
| | WCDMA | 66.99 mW |
| | LTE 5 (Channel Bandwidth: 1.4 MHz) | 63.53 mW |
| | LTE 5 (Channel Bandwidth: 3 MHz) | 63.83 mW |
| | LTE 5 (Channel Bandwidth: 5 MHz) | 65.16 mW |
| | LTE 5 (Channel Bandwidth: 10 MHz) | 65.77 mW |
| Emission Designator | GSM/GPRS | 246KGXW |
| | EDGE | 245KG7W |
| | WCDMA | 4M14F9W |
| | LTE 5 (Channel Bandwidth: 1.4 MHz) | 1M10G7D |
| | LTE 5 (Channel Bandwidth: 3 MHz) | 2M70G7D |
| | LTE 5 (Channel Bandwidth: 5 MHz) | 4M49G7D |
| | LTE 5 (Channel Bandwidth: 10 MHz) | 8M97W7D |
| Antenna Type | Fixed Internal Antenna | |
| Accessory Device | Refer to Note as below | |
| Data Cable Supplied | Refer to Note as below | |

Note:

1. All models are listed as below.

| Brand | Model | Difference |
|---------|---------|---|
| KYOCERA | E6820 | E6820 and E6820TM are the same with electrically identical. |
| | E6820TM | The difference between E6820 and E6820TM are minor cosmetic changes and changes to the UI (software). |

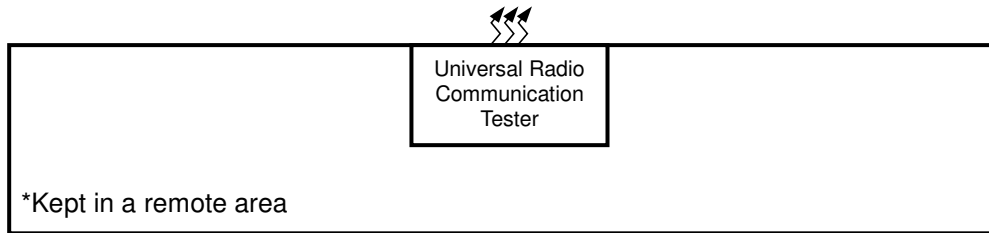
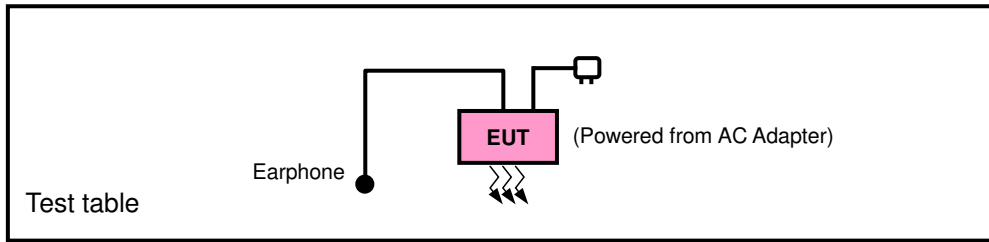
2. The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|-----------|---------|------------|---|
| Adapter | KYOCERA | SCP-49ADT | I/P: 100-240 Vac, 50/60 Hz, 400 mA O/P: 5.0 Vdc, 1800 mA or 9.0 Vdc, 1800 mA |
| Battery | KYOCERA | SCP-67LBPS | 3.8 Vdc, 3240 mAh |
| USB Cable | KYOCERA | SCP-22SDC | 1.0 m shielded cable w/o core |

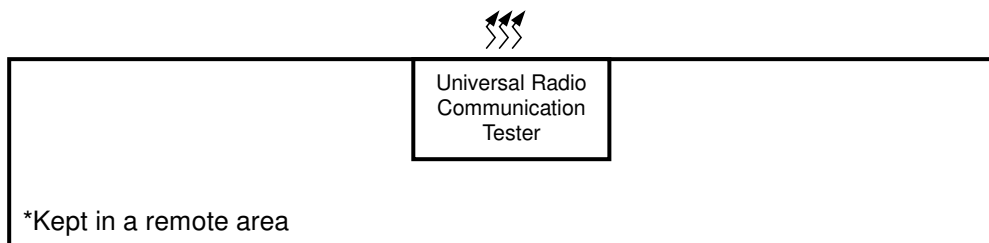
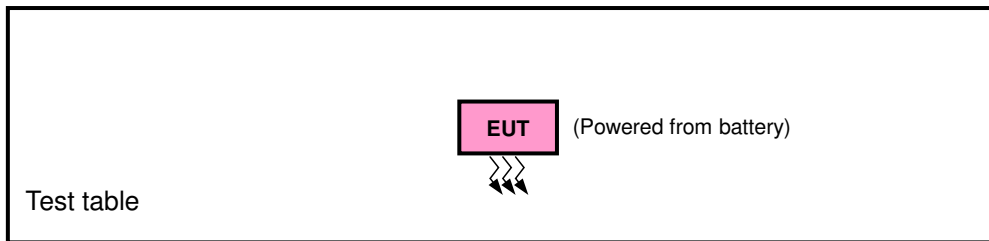
3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Product | Brand | Model No. | Serial No. | FCC ID |
|-----|----------|-----------------|-----------|------------|--------|
| 1. | Earphone | GaLien Electron | HF-HB05D | N/A | N/A |

| No. | Signal Cable Description Of The Above Support Units |
|-----|---|
| 1. | N/A |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

| Band | ERP | Radiated Emission |
|------------|---------|-------------------|
| GSM | Y-plane | X-axis |
| EDGE | Y-plane | X-axis |
| WCDMA | Y-plane | X-axis |
| LTE Band 5 | X-plane | X-axis |

GSM

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Mode |
|--------------------|-----------------------|-------------------|----------------|-----------|
| - | ERP | 128 to 251 | 128, 189, 251 | GSM, EDGE |
| - | Frequency Stability | 128 to 251 | 189 | GSM, EDGE |
| - | Occupied Bandwidth | 128 to 251 | 128, 189, 251 | GSM, EDGE |
| - | Band Edge | 128 to 251 | 128, 251 | GSM, EDGE |
| - | Peak to Average Ratio | 128 to 251 | 128, 189, 251 | GSM, EDGE |
| - | Condcudeted Emission | 128 to 251 | 189 | GSM, EDGE |
| - | Radiated Emission | 128 to 251 | 189 | GSM, EDGE |

WCDMA

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Mode |
|--------------------|-----------------------|-------------------|------------------|-------|
| - | ERP | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| - | Frequency Stability | 4132 to 4233 | 4182 | WCDMA |
| - | Occupied Bandwidth | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| - | Band Edge | 4132 to 4233 | 4132, 4233 | WCDMA |
| - | Peak to Average Ratio | 4132 to 4233 | 4132, 4182, 4233 | WCDMA |
| - | Condcudeted Emission | 4132 to 4233 | 4182 | WCDMA |
| - | Radiated Emission | 4132 to 4233 | 4182 | WCDMA |

LTE Band 5

| EUT Configure Mode | Test Item | Available Channel | Tested Channel | Channel Bandwidth | Modulation | Mode | | |
|--------------------|---------------------|-------------------|-----------------------|-------------------|---------------------|--|-------------|---------------------|
| - | ERP | 20407 to 20643 | 20407, 20525, 20643 | 1.4 MHz | QPSK, 16QAM | 1 RB / 5 RB Offset | | |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3 MHz | QPSK, 16QAM | 1 RB / 14 RB Offset | | |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5 MHz | QPSK, 16QAM | 1 RB / 24 RB Offset | | |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10 MHz | QPSK, 16QAM | 1 RB / 49 RB Offset | | |
| - | Frequency Stability | 20407 to 20643 | 20525 | 1.4 MHz | QPSK | 1 RB / 5 RB Offset | | |
| | | 20415 to 20635 | 20525 | 3 MHz | QPSK | 1 RB / 14 RB Offset | | |
| | | 20425 to 20625 | 20525 | 5 MHz | QPSK | 1 RB / 24 RB Offset | | |
| | | 20450 to 20600 | 20525 | 10 MHz | QPSK | 1 RB / 49 RB Offset | | |
| - | Occupied Bandwidth | 20407 to 20643 | 20407, 20525, 20643 | 1.4 MHz | QPSK, 16QAM | 6 RB / 0 RB Offset | | |
| | | 20415 to 20635 | 20415, 20525, 20635 | 3 MHz | QPSK, 16QAM | 15 RB / 0 RB Offset | | |
| | | 20425 to 20625 | 20425, 20525, 20625 | 5 MHz | QPSK, 16QAM | 25 RB / 0 RB Offset | | |
| | | 20450 to 20600 | 20450, 20525, 20600 | 10 MHz | QPSK, 16QAM | 50 RB / 0 RB Offset | | |
| - | Band Edge | 20407 to 20643 | 20407 | 1.4MHz | QPSK | 1 RB / 0 RB Offset 6 RB / 0 RB Offset | | |
| | | | 20643 | 1.4MHz | QPSK | 1 RB / 5 RB Offset 6 RB / 0 RB Offset | | |
| | | 20415 to 20635 | 20415 | 3 MHz | QPSK | 1 RB / 0 RB Offset 15 RB / 0 RB Offset | | |
| | | | 20635 | 3 MHz | QPSK | 1 RB / 14 RB Offset 15 RB / 0 RB Offset | | |
| | | 20425 to 20625 | 20425 | 5 MHz | QPSK | 1 RB / 0 RB Offset 25 RB / 0 RB Offset | | |
| | | | 20625 | 5 MHz | QPSK | 1 RB / 24 RB Offset 25 RB / 0 RB Offset | | |
| | | 20450 to 20600 | 20450 | 10 MHz | QPSK | 1 RB / 0 RB Offset 50 RB / 0 RB Offset | | |
| | | | 20600 | 10 MHz | QPSK | 1 RB / 49 RB Offset 50 RB / 0 RB Offset | | |
| | | - | Peak to Average Ratio | 20407 to 20643 | 20407, 20525, 20643 | 1.4 MHz | QPSK, 16QAM | 1 RB / 5 RB Offset |
| | | | | 20415 to 20635 | 20415, 20525, 20635 | 3 MHz | QPSK, 16QAM | 1 RB / 14 RB Offset |
| | | | | 20425 to 20625 | 20425, 20525, 20625 | 5 MHz | QPSK, 16QAM | 1 RB / 24 RB Offset |
| | | | | 20450 to 20600 | 20450, 20525, 20600 | 10 MHz | QPSK, 16QAM | 1 RB / 49 RB Offset |
| - | Conducted Emission | 20407 to 20643 | 20525 | 1.4 MHz | QPSK | 1 RB / 5 RB Offset | | |
| | | 20415 to 20635 | 20525 | 3 MHz | QPSK | 1 RB / 14 RB Offset | | |
| | | 20425 to 20625 | 20525 | 5 MHz | QPSK | 1 RB / 24 RB Offset | | |
| | | 20450 to 20600 | 20525 | 10 MHz | QPSK | 1 RB / 49 RB Offset | | |
| - | Radiated Emission | 20450 to 20600 | 20525 | 10 MHz | QPSK | 1 RB / 49 RB Offset | | |

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

| Test Item | Environmental Conditions | Input Power | Tested By |
|-----------------------|--------------------------|----------------|-------------|
| ERP | 25 deg. C, 65 % RH | 3.8 Vdc | Toby Tian |
| Frequency Stability | 25 deg. C, 65 % RH | 3.8 Vdc | Carlos Chen |
| Occupied Bandwidth | 25 deg. C, 65 % RH | 3.8 Vdc | Carlos Chen |
| Band Edge | 25 deg. C, 65 % RH | 3.8 Vdc | Carlos Chen |
| Peak to Average Ratio | 25 deg. C, 65 % RH | 3.8 Vdc | Carlos Chen |
| Condcudeted Emission | 25 deg. C, 65 % RH | 3.8 Vdc | Carlos Chen |
| Radiated Emission | 25 deg. C, 65 % RH | 120 Vac, 60 Hz | Toby Tian |

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-D 2010

Note: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Mobile / Portable station are limited to 7 watts e.r.p.

4.1.2 Test Procedures

EIRP / ERP Measurement:

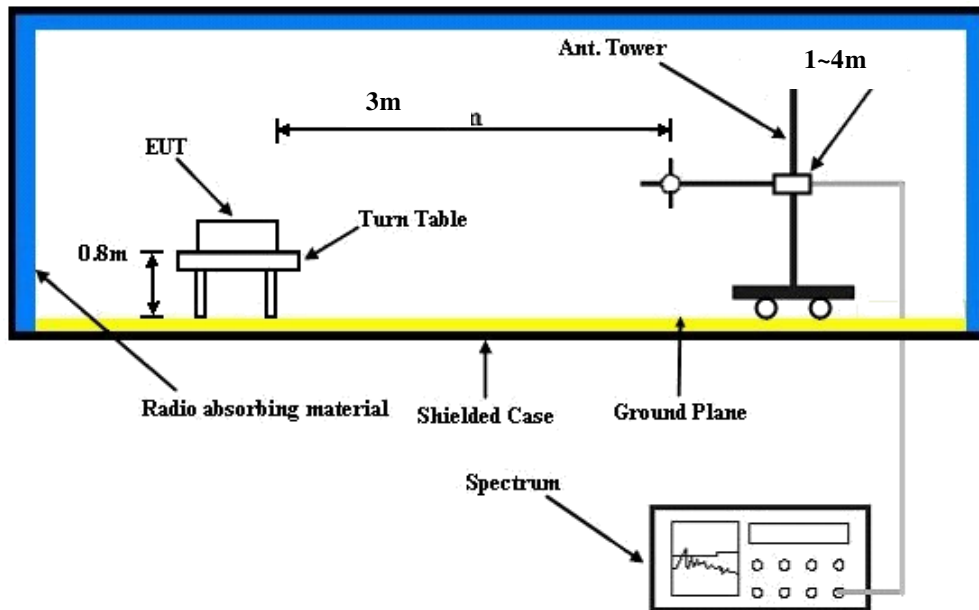
- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1 MHz for GSM, GPRS & EDGE, 5 MHz for WCDMA, and 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G.
- d. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}$. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}$.

Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

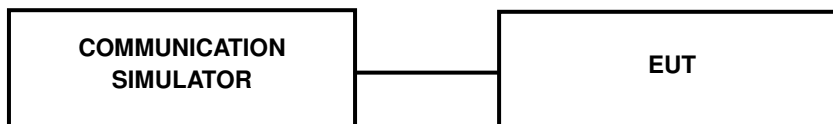
4.1.3 Test Setup

EIRP / ERP Measurement:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

| Band | GSM850 | | |
|-----------------------|--------|-------|-------|
| Channel | 128 | 189 | 251 |
| Frequency (MHz) | 824.2 | 836.4 | 848.8 |
| GSM (GMSK, 1Tx-slot) | 32.22 | 32.34 | 32.48 |
| GPRS (GMSK, 1Tx-slot) | 32.25 | 32.36 | 32.50 |
| GPRS (GMSK, 2Tx-slot) | 28.92 | 29.11 | 29.33 |
| GPRS (GMSK, 3Tx-slot) | 27.10 | 27.16 | 27.30 |
| GPRS (GMSK, 4Tx-slot) | 25.71 | 25.90 | 26.02 |
| EDGE (8PSK, 1Tx-slot) | 26.38 | 26.44 | 26.56 |
| EDGE (8PSK, 2Tx-slot) | 26.23 | 26.36 | 26.47 |
| EDGE (8PSK, 3Tx-slot) | 26.15 | 26.25 | 26.36 |
| EDGE (8PSK, 4Tx-slot) | 26.07 | 26.17 | 26.31 |

| Band | WCDMA V | | |
|-----------------|---------|-------|-------|
| Channel | 4132 | 4182 | 4233 |
| Frequency (MHz) | 826.4 | 836.4 | 846.6 |
| RMC 12.2K | 24.08 | 24.10 | 24.15 |
| HSDPA Subtest-1 | 23.05 | 23.08 | 23.17 |
| HSDPA Subtest-2 | 22.99 | 23.02 | 23.08 |
| HSDPA Subtest-3 | 22.50 | 22.51 | 22.55 |
| HSDPA Subtest-4 | 22.58 | 22.59 | 22.73 |
| HSUPA Subtest-1 | 22.93 | 22.98 | 23.01 |
| HSUPA Subtest-2 | 21.05 | 21.06 | 21.20 |
| HSUPA Subtest-3 | 21.93 | 21.96 | 21.99 |
| HSUPA Subtest-4 | 21.00 | 21.02 | 21.08 |
| HSUPA Subtest-5 | 22.93 | 22.98 | 23.01 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 20407 | Mid Ch 20525 | High Ch 20643 | | Low Ch 20407 | Mid Ch 20525 | High Ch 20643 | |
| | | | 824.7 MHz | 836.5 MHz | 848.3 MHz | | 824.7 MHz | 836.5 MHz | 848.3 MHz | |
| 5 / 1.4M | 1 | 0 | 24.04 | 23.89 | 24.12 | 0 | 23.10 | 22.92 | 23.19 | 1 |
| | 1 | 2 | 24.07 | 23.92 | 24.16 | 0 | 23.13 | 22.95 | 23.21 | 1 |
| | 1 | 5 | 24.10 | 23.94 | 24.18 | 0 | 23.16 | 22.98 | 23.22 | 1 |
| | 3 | 0 | 23.12 | 23.13 | 23.26 | 0 | 22.14 | 22.15 | 22.26 | 1 |
| | 3 | 1 | 23.12 | 23.11 | 23.17 | 0 | 22.17 | 22.13 | 22.11 | 1 |
| | 3 | 3 | 23.15 | 23.14 | 23.11 | 0 | 22.14 | 22.13 | 22.15 | 1 |
| | 6 | 0 | 23.07 | 22.87 | 23.11 | 1 | 22.01 | 21.89 | 22.12 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 20415 | Mid Ch 20525 | High Ch 20635 | | Low Ch 20415 | Mid Ch 20525 | High Ch 20635 | |
| | | | 825.5 MHz | 836.5 MHz | 847.5 MHz | | 825.5 MHz | 836.5 MHz | 847.5 MHz | |
| 5 / 3M | 1 | 0 | 24.12 | 23.99 | 24.19 | 0 | 23.14 | 22.98 | 23.23 | 1 |
| | 1 | 7 | 24.15 | 24.01 | 24.22 | 0 | 23.17 | 23.03 | 23.26 | 1 |
| | 1 | 14 | 24.17 | 24.02 | 24.23 | 0 | 23.20 | 23.04 | 23.28 | 1 |
| | 8 | 0 | 23.24 | 23.05 | 23.27 | 1 | 22.27 | 22.03 | 22.25 | 2 |
| | 8 | 3 | 23.12 | 22.93 | 23.16 | 1 | 22.11 | 21.93 | 22.20 | 2 |
| | 8 | 7 | 22.99 | 22.85 | 23.10 | 1 | 21.92 | 21.84 | 22.05 | 2 |
| | 15 | 0 | 23.12 | 23.01 | 23.20 | 1 | 22.12 | 21.98 | 22.20 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 20425 | Mid Ch 20525 | High Ch 20625 | | Low Ch 20425 | Mid Ch 20525 | High Ch 20625 | |
| | | | 826.5 MHz | 836.5 MHz | 846.5 MHz | | 826.5 MHz | 836.5 MHz | 846.5 MHz | |
| 5 / 5M | 1 | 0 | 24.19 | 24.06 | 24.25 | 0 | 23.22 | 23.07 | 23.29 | 1 |
| | 1 | 12 | 24.21 | 24.08 | 24.27 | 0 | 23.24 | 23.10 | 23.31 | 1 |
| | 1 | 24 | 24.22 | 24.09 | 24.28 | 0 | 23.26 | 23.11 | 23.33 | 1 |
| | 12 | 0 | 23.29 | 23.14 | 23.37 | 1 | 22.26 | 22.13 | 22.38 | 2 |
| | 12 | 6 | 23.21 | 23.04 | 23.27 | 1 | 22.20 | 22.02 | 22.23 | 2 |
| | 12 | 13 | 23.10 | 22.96 | 23.15 | 1 | 22.01 | 21.94 | 22.11 | 2 |
| | 25 | 0 | 23.19 | 23.10 | 23.29 | 1 | 22.20 | 22.07 | 22.29 | 2 |

| Band / BW | RB Size | RB Offset | QPSK | | | 3GPP MPR (dB) | 16QAM | | | 3GPP MPR (dB) |
|-----------|---------|-----------|--------------|--------------|---------------|---------------|--------------|--------------|---------------|---------------|
| | | | Low Ch 20450 | Mid Ch 20525 | High Ch 20600 | | Low Ch 20450 | Mid Ch 20525 | High Ch 20600 | |
| | | | 829.0 MHz | 836.5 MHz | 844.0 MHz | | 829.0 MHz | 836.5 MHz | 844.0 MHz | |
| 5 / 10M | 1 | 0 | 24.25 | 24.12 | 24.30 | 0 | 23.28 | 23.14 | 23.34 | 1 |
| | 1 | 24 | 24.27 | 24.14 | 24.32 | 0 | 23.30 | 23.16 | 23.36 | 1 |
| | 1 | 49 | 24.28 | 24.15 | 24.33 | 0 | 23.32 | 23.18 | 23.38 | 1 |
| | 25 | 0 | 23.42 | 23.23 | 23.50 | 1 | 22.34 | 22.22 | 22.50 | 2 |
| | 25 | 12 | 23.23 | 23.14 | 23.30 | 1 | 22.32 | 22.12 | 22.32 | 2 |
| | 25 | 25 | 23.22 | 23.06 | 23.23 | 1 | 22.20 | 22.04 | 22.25 | 2 |
| | 50 | 0 | 23.32 | 23.19 | 23.36 | 1 | 22.29 | 22.17 | 22.38 | 2 |

ERP Power (dBm)

| GSM | | | | | | | |
|-------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y | 128 | 824.2 | -1.25 | 32.62 | 29.22 | 835.60 | H |
| | 189 | 836.4 | -0.96 | 32.52 | 29.41 | 872.97 | |
| | 251 | 848.8 | -1.38 | 32.65 | 29.12 | 816.58 | |
| | 128 | 824.2 | -6.52 | 32.76 | 24.09 | 256.45 | V |
| | 189 | 836.4 | -6.14 | 32.39 | 24.10 | 257.04 | |
| | 251 | 848.8 | -6.55 | 32.54 | 23.84 | 242.10 | |

| EDGE | | | | | | | |
|-------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y | 128 | 824.2 | -8.32 | 32.62 | 22.15 | 164.06 | H |
| | 189 | 836.4 | -7.95 | 32.52 | 22.42 | 174.58 | |
| | 251 | 848.8 | -8.43 | 32.65 | 22.07 | 161.06 | |
| | 128 | 824.2 | -18.99 | 32.76 | 11.62 | 14.52 | V |
| | 189 | 836.4 | -18.70 | 32.39 | 11.54 | 14.26 | |
| | 251 | 848.8 | -18.64 | 32.54 | 11.75 | 14.96 | |

| WCDMA | | | | | | | |
|-------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| Y | 4132 | 826.4 | -12.52 | 32.62 | 17.95 | 62.37 | H |
| | 4182 | 836.4 | -12.11 | 32.52 | 18.26 | 66.99 | |
| | 4233 | 846.6 | -12.40 | 32.65 | 18.10 | 64.57 | |
| | 4132 | 826.4 | -20.32 | 32.76 | 10.29 | 10.69 | V |
| | 4182 | 836.4 | -20.01 | 32.39 | 10.23 | 10.54 | |
| | 4233 | 846.6 | -20.24 | 32.54 | 10.15 | 10.35 | |

| LTE Band 5 | | | | | | | |
|------------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 1.4 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| X | 20407 | 824.7 | -12.53 | 32.62 | 17.94 | 62.23 | H |
| | 20525 | 836.5 | -12.34 | 32.52 | 18.03 | 63.53 | |
| | 20643 | 848.3 | -12.54 | 32.65 | 17.96 | 62.52 | |
| | 20407 | 824.7 | -20.01 | 32.76 | 10.60 | 11.48 | V |
| | 20525 | 836.5 | -19.56 | 32.39 | 10.68 | 11.69 | |
| | 20643 | 848.3 | -19.78 | 32.54 | 10.61 | 11.51 | |
| Channel Bandwidth: 1.4 MHz / 16QAM | | | | | | | |
| X | 20407 | 824.7 | -13.93 | 32.62 | 16.54 | 45.08 | H |
| | 20525 | 836.5 | -13.59 | 32.52 | 16.78 | 47.64 | |
| | 20643 | 848.3 | -13.74 | 32.65 | 16.76 | 47.42 | |
| | 20407 | 824.7 | -21.52 | 32.76 | 9.09 | 8.11 | V |
| | 20525 | 836.5 | -21.06 | 32.39 | 9.18 | 8.28 | |
| | 20643 | 848.3 | -21.24 | 32.54 | 9.15 | 8.22 | |

| LTE Band 5 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 3 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| X | 20415 | 825.5 | -12.50 | 32.62 | 17.97 | 62.66 | H |
| | 20525 | 836.5 | -12.32 | 32.52 | 18.05 | 63.83 | |
| | 20635 | 847.5 | -12.48 | 32.65 | 18.02 | 63.39 | |
| | 20415 | 825.5 | -19.98 | 32.76 | 10.63 | 11.56 | V |
| | 20525 | 836.5 | -19.52 | 32.39 | 10.72 | 11.80 | |
| | 20635 | 847.5 | -19.74 | 32.54 | 10.65 | 11.61 | |
| Channel Bandwidth: 3 MHz / 16QAM | | | | | | | |
| X | 20415 | 825.5 | -13.80 | 32.62 | 16.67 | 46.45 | H |
| | 20525 | 836.5 | -13.51 | 32.52 | 16.86 | 48.53 | |
| | 20635 | 847.5 | -13.70 | 32.65 | 16.80 | 47.86 | |
| | 20415 | 825.5 | -21.46 | 32.76 | 9.15 | 8.22 | V |
| | 20525 | 836.5 | -20.98 | 32.39 | 9.26 | 8.43 | |
| | 20635 | 847.5 | -21.18 | 32.54 | 9.21 | 8.34 | |

| LTE Band 5 | | | | | | | |
|----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 5 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| X | 20425 | 826.5 | -12.42 | 32.62 | 18.05 | 63.83 | H |
| | 20525 | 836.5 | -12.23 | 32.52 | 18.14 | 65.16 | |
| | 20625 | 846.5 | -12.44 | 32.65 | 18.06 | 63.97 | |
| | 20425 | 826.5 | -19.91 | 32.76 | 10.70 | 11.75 | V |
| | 20525 | 836.5 | -19.43 | 32.39 | 10.81 | 12.05 | |
| | 20625 | 846.5 | -19.70 | 32.54 | 10.69 | 11.72 | |
| Channel Bandwidth: 5 MHz / 16QAM | | | | | | | |
| X | 20425 | 826.5 | -13.72 | 32.62 | 16.75 | 47.32 | H |
| | 20525 | 836.5 | -13.43 | 32.52 | 16.94 | 49.43 | |
| | 20625 | 846.5 | -13.65 | 32.65 | 16.85 | 48.42 | |
| | 20425 | 826.5 | -21.37 | 32.76 | 9.24 | 8.39 | V |
| | 20525 | 836.5 | -20.76 | 32.39 | 9.48 | 8.87 | |
| | 20625 | 846.5 | -21.11 | 32.54 | 9.28 | 8.47 | |

| LTE Band 5 | | | | | | | |
|-----------------------------------|---------|-----------------|-----------|------------------------|-----------|----------|--------------------|
| Channel Bandwidth: 10 MHz / QPSK | | | | | | | |
| Plane | Channel | Frequency (MHz) | LVL (dBm) | Correction Factor (dB) | ERP (dBm) | ERP (mW) | Polarization (H/V) |
| X | 20450 | 829.0 | -12.36 | 32.62 | 18.11 | 64.71 | H |
| | 20525 | 836.5 | -12.19 | 32.52 | 18.18 | 65.77 | |
| | 20600 | 844.0 | -12.38 | 32.65 | 18.12 | 64.86 | |
| | 20450 | 829.0 | -19.85 | 32.76 | 10.76 | 11.91 | V |
| | 20525 | 836.5 | -19.38 | 32.39 | 10.86 | 12.19 | |
| | 20600 | 844.0 | -19.57 | 32.54 | 10.82 | 12.08 | |
| Channel Bandwidth: 10 MHz / 16QAM | | | | | | | |
| X | 20450 | 829.0 | -13.62 | 32.62 | 16.85 | 48.42 | H |
| | 20525 | 836.5 | -13.38 | 32.52 | 16.99 | 50.00 | |
| | 20600 | 844.0 | -13.52 | 32.65 | 16.98 | 49.89 | |
| | 20450 | 829.0 | -21.30 | 32.76 | 9.31 | 8.53 | V |
| | 20525 | 836.5 | -20.63 | 32.39 | 9.61 | 9.14 | |
| | 20600 | 844.0 | -21.03 | 32.54 | 9.36 | 8.63 | |

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

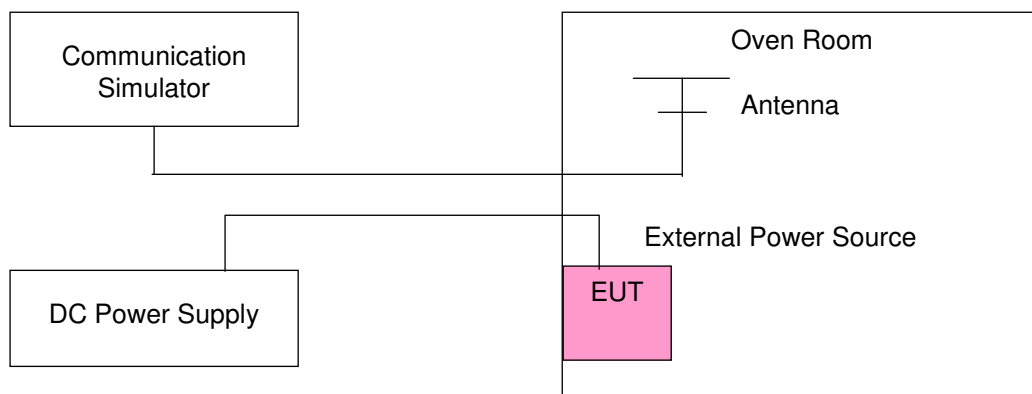
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ± 0.5 °C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

| Voltage (Volts) | Frequency Error (ppm) | | | | | | | Limit (ppm) |
|-----------------|-----------------------|-------|-------|------------|-------|-------|--------|-------------|
| | GSM | EDGE | WCDMA | LTE Band 5 | | | | |
| | | | | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | |
| 3.8 | 0.002 | 0.002 | 0.004 | 0.004 | 0.004 | 0.003 | 0.005 | 2.5 |
| 3.3 | 0.005 | 0.005 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 2.5 |
| 4.35 | 0.004 | 0.003 | 0.004 | 0.003 | 0.002 | 0.003 | 0.003 | 2.5 |

Note: The applicant defined the normal working voltage of the battery is from 3.3 Vdc to 4.35 Vdc.

Frequency Error vs. Temperature

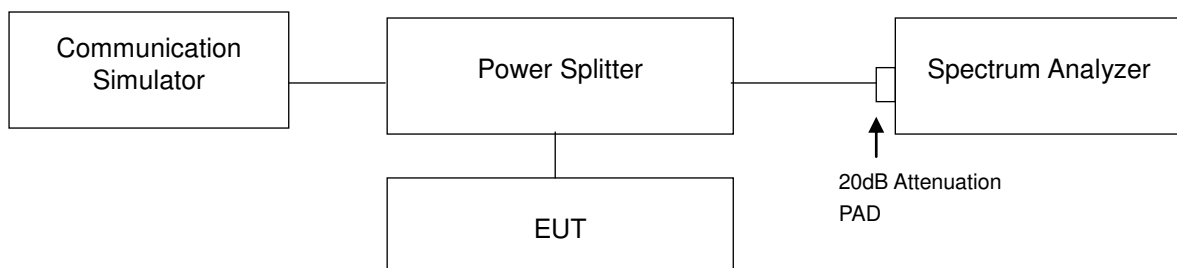
| Temp. (°C) | Frequency Error (ppm) | | | | | | | Limit (ppm) |
|------------|-----------------------|--------|--------|------------|--------|--------|--------|-------------|
| | GSM | EDGE | WCDMA | LTE Band 5 | | | | |
| | | | | 1.4 MHz | 3 MHz | 5 MHz | 10 MHz | |
| -30 | 0.003 | 0.003 | 0.001 | 0.004 | 0.005 | 0.003 | 0.001 | 2.5 |
| -20 | 0.002 | 0.002 | -0.003 | 0.005 | 0.002 | 0.002 | 0.004 | 2.5 |
| -10 | 0.004 | 0.003 | -0.004 | 0.004 | 0.002 | 0.001 | 0.002 | 2.5 |
| 0 | 0.004 | -0.002 | -0.004 | 0.001 | 0.002 | 0.003 | 0.001 | 2.5 |
| 10 | -0.004 | -0.004 | -0.004 | 0.002 | 0.003 | 0.002 | 0.002 | 2.5 |
| 20 | -0.004 | -0.003 | -0.004 | -0.004 | -0.002 | -0.002 | -0.002 | 2.5 |
| 30 | -0.003 | -0.003 | -0.002 | -0.003 | -0.004 | -0.002 | -0.004 | 2.5 |
| 40 | -0.001 | -0.003 | 0.002 | -0.004 | -0.002 | -0.004 | -0.004 | 2.5 |
| 50 | -0.003 | 0.002 | 0.002 | -0.003 | -0.002 | -0.001 | -0.005 | 2.5 |
| 55 | 0.002 | 0.002 | 0.002 | -0.001 | -0.003 | -0.002 | -0.004 | 2.5 |

4.3 Occupied Bandwidth Measurement

4.3.1 Test Procedure

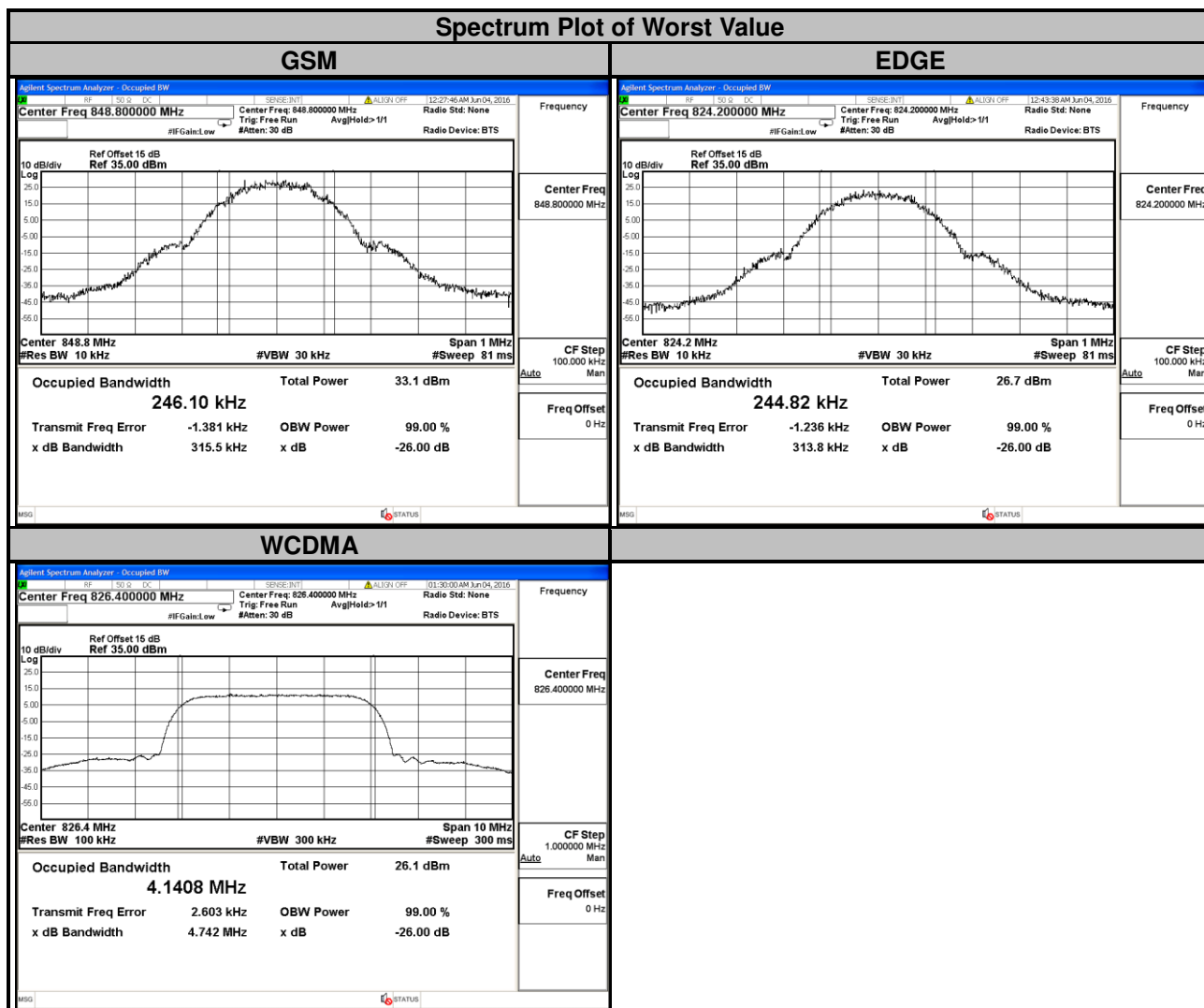
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.2 Test Setup

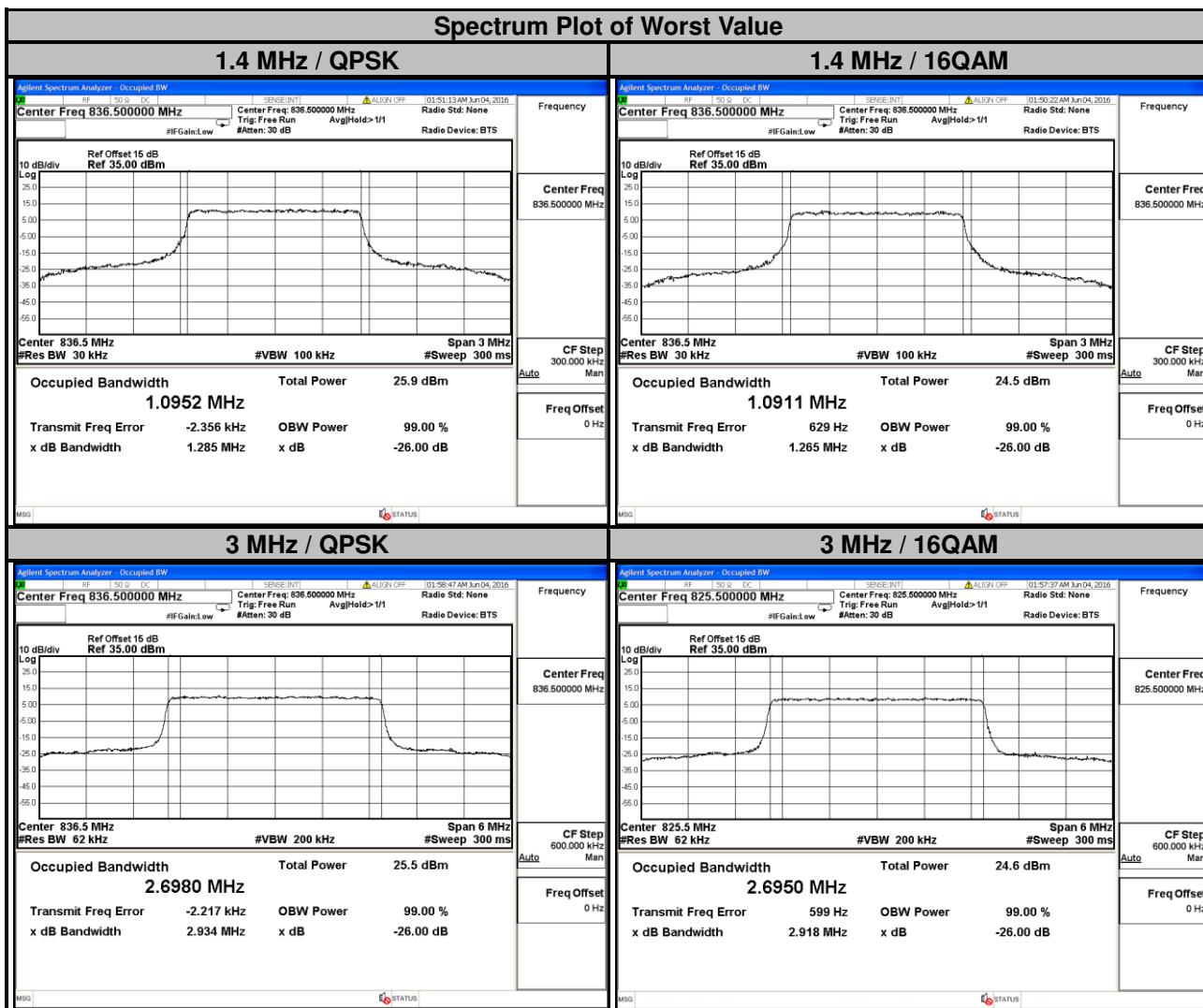


4.3.3 Test Result

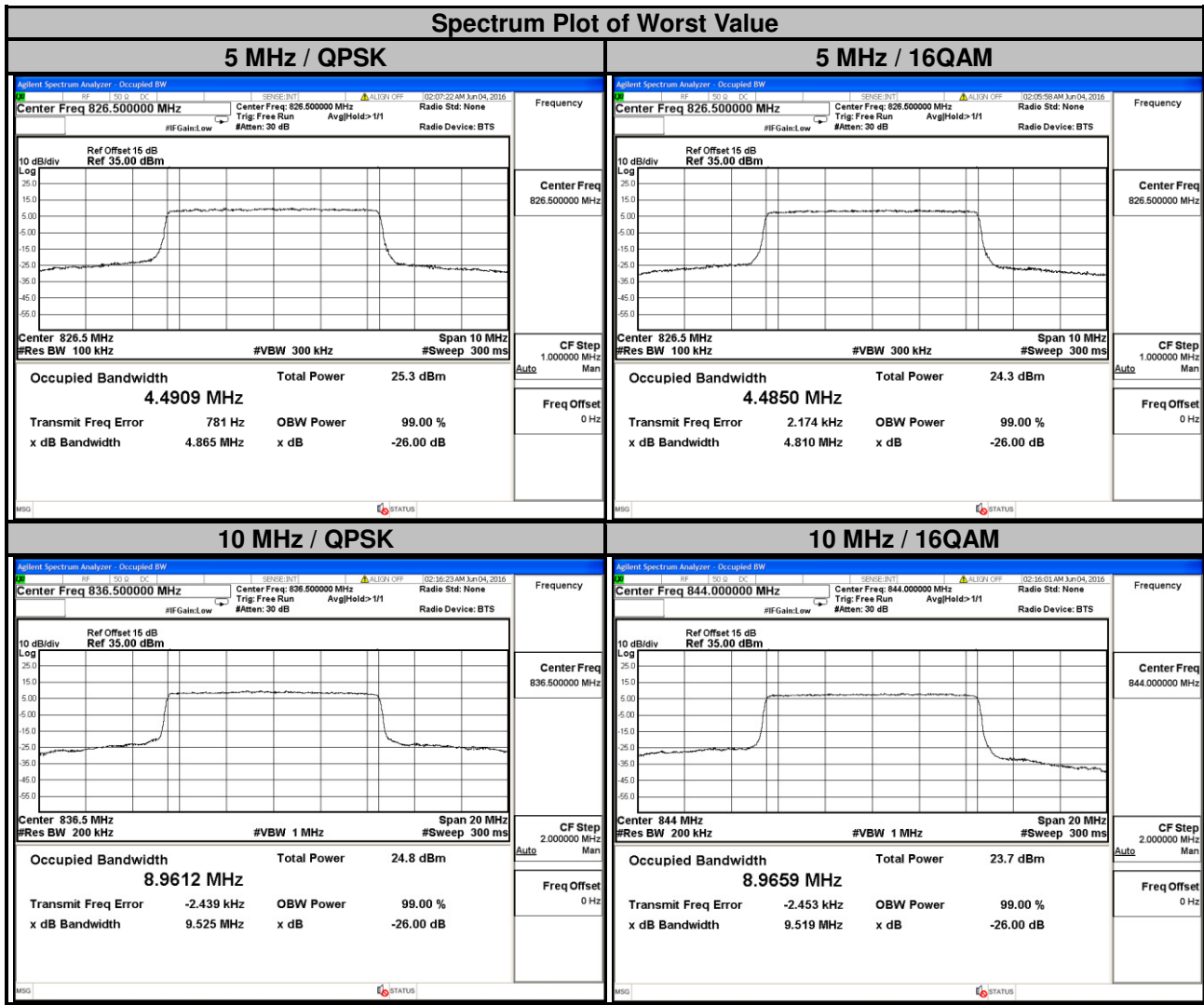
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (kHz) | | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) |
|---------|-----------------|-------------------------------|--------|---------|-----------------|-------------------------------|
| | | GSM | EDGE | | | WCDMA |
| 128 | 824.2 | 244.96 | 244.82 | 4132 | 826.4 | 4.1408 |
| 189 | 836.4 | 245.94 | 244.25 | 4182 | 836.4 | 4.1358 |
| 251 | 848.8 | 246.10 | 244.45 | 4233 | 846.6 | 4.1256 |



| LTE Band 5 | | | | | | | |
|----------------------------|-----------------|-------------------------------|--------|--------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 1.4 MHz | | | | Channel Bandwidth: 3 MHz | | | |
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20407 | 824.7 | 1.0939 | 1.0901 | 20415 | 825.5 | 2.6974 | 2.6950 |
| 20525 | 836.5 | 1.0952 | 1.0911 | 20525 | 836.5 | 2.6980 | 2.6944 |
| 20643 | 848.3 | 1.0913 | 1.0886 | 20635 | 847.5 | 2.6964 | 2.6947 |



| LTE Band 5 | | | | | | | |
|--------------------------|-----------------|-------------------------------|--------|---------------------------|-----------------|-------------------------------|--------|
| Channel Bandwidth: 5 MHz | | | | Channel Bandwidth: 10 MHz | | | |
| Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | | Channel | Frequency (MHz) | 99 % Occupied Bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20425 | 826.5 | 4.4909 | 4.4850 | 20450 | 829.0 | 8.9567 | 8.9545 |
| 20525 | 836.5 | 4.4879 | 4.4823 | 20525 | 836.5 | 8.9612 | 8.9529 |
| 20625 | 846.5 | 4.4855 | 4.4808 | 20600 | 844.0 | 8.9585 | 8.9659 |

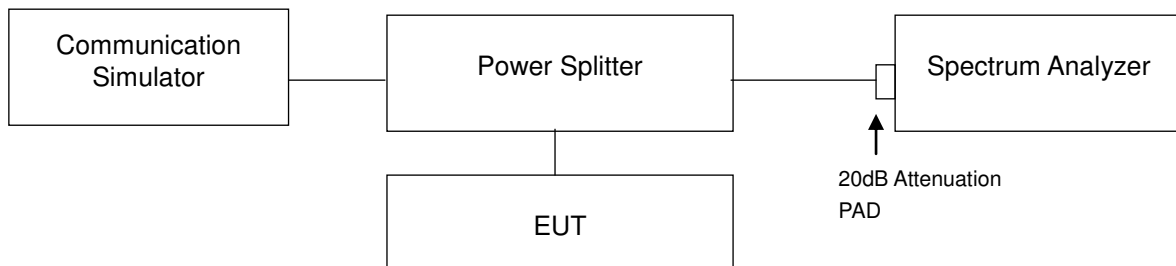


4.4 Band Edge Measurement

4.4.1 Limits of Band Edge Measurement

Power of any emission 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

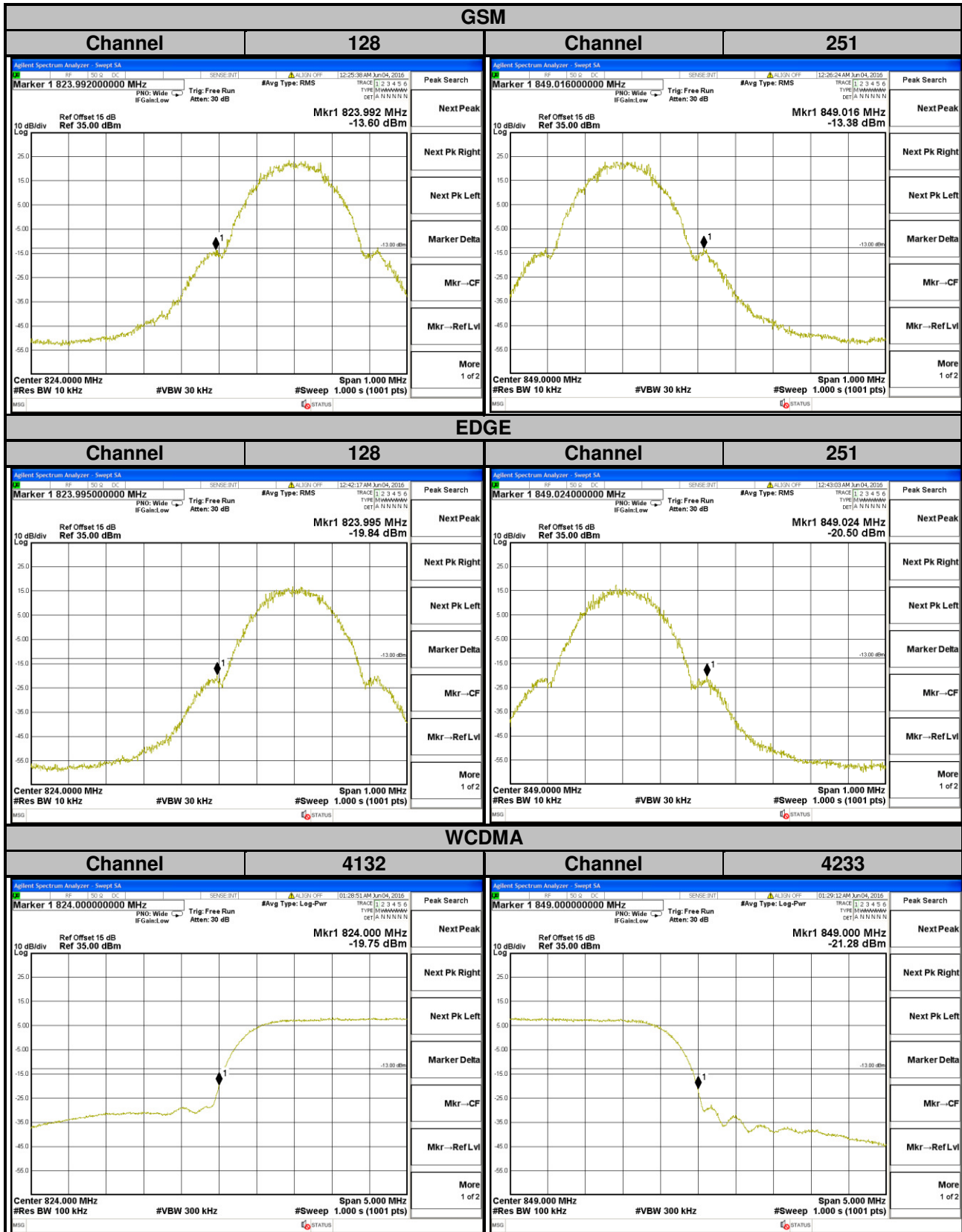
4.4.2 Test Setup



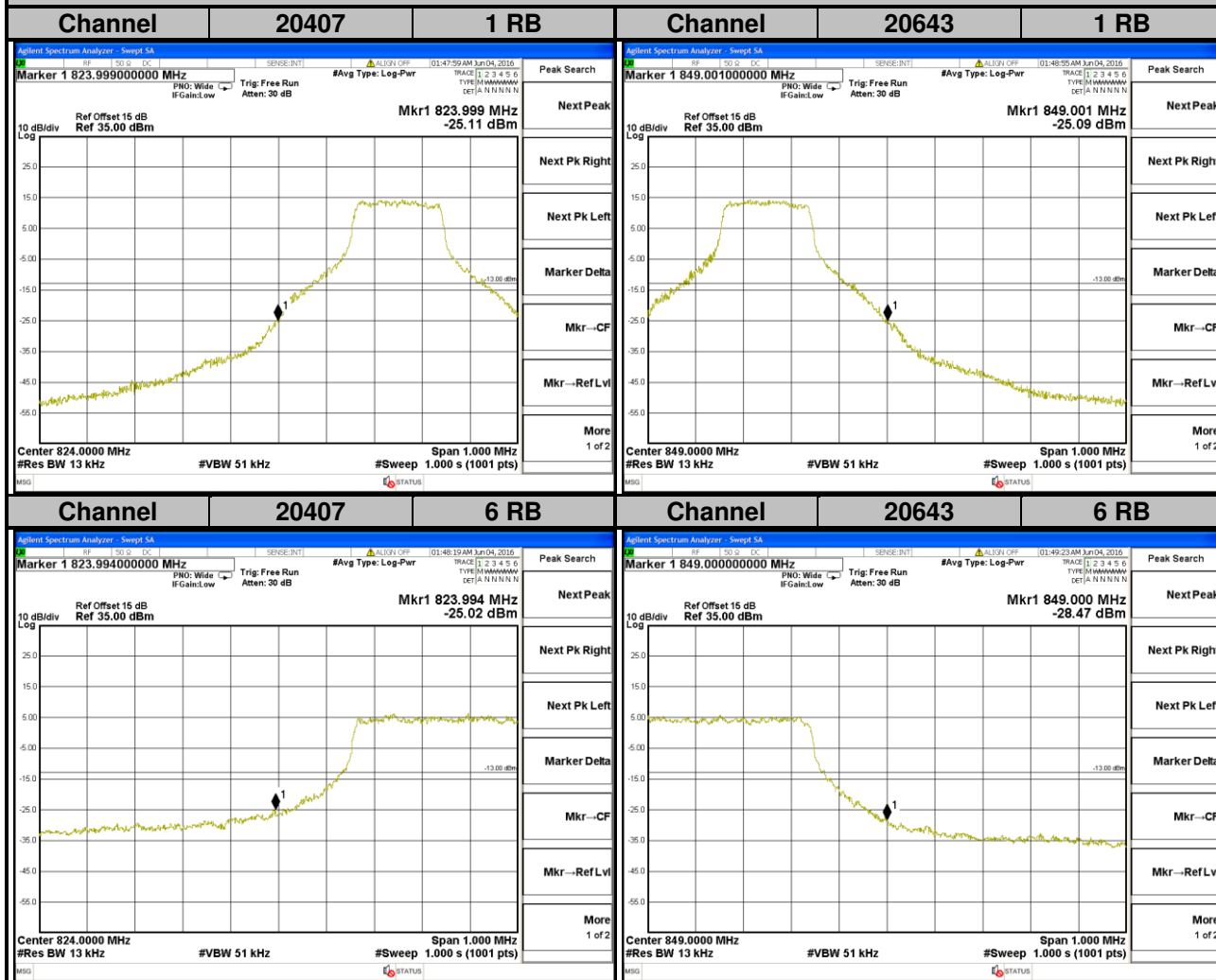
4.4.3 Test Procedures

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 10 kHz and VB of the spectrum is 30 kHz (GSM/GPRS/EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 13 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 5 MHz/10 MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- h. Record the max trace plot into the test report.

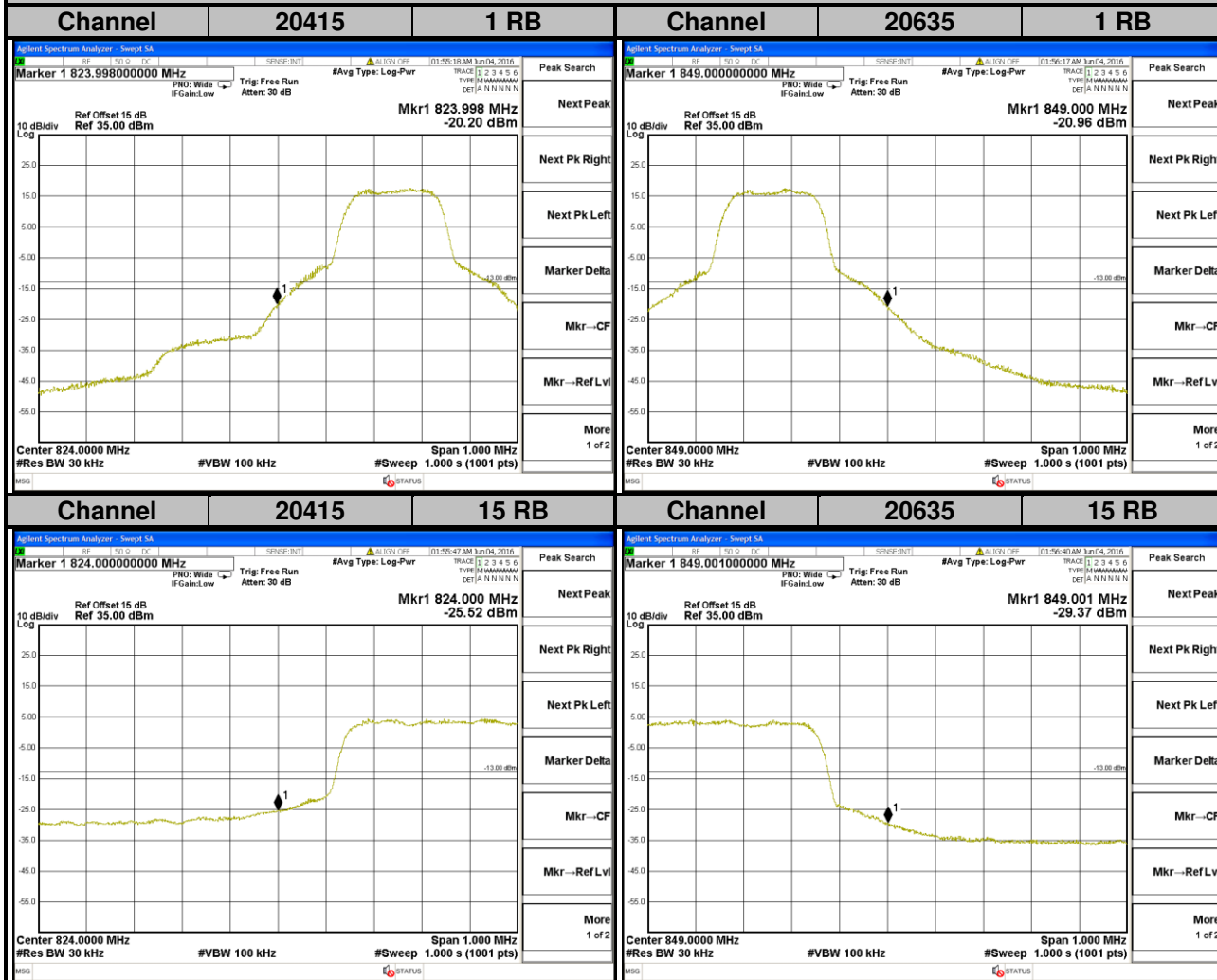
4.4.4 Test Results



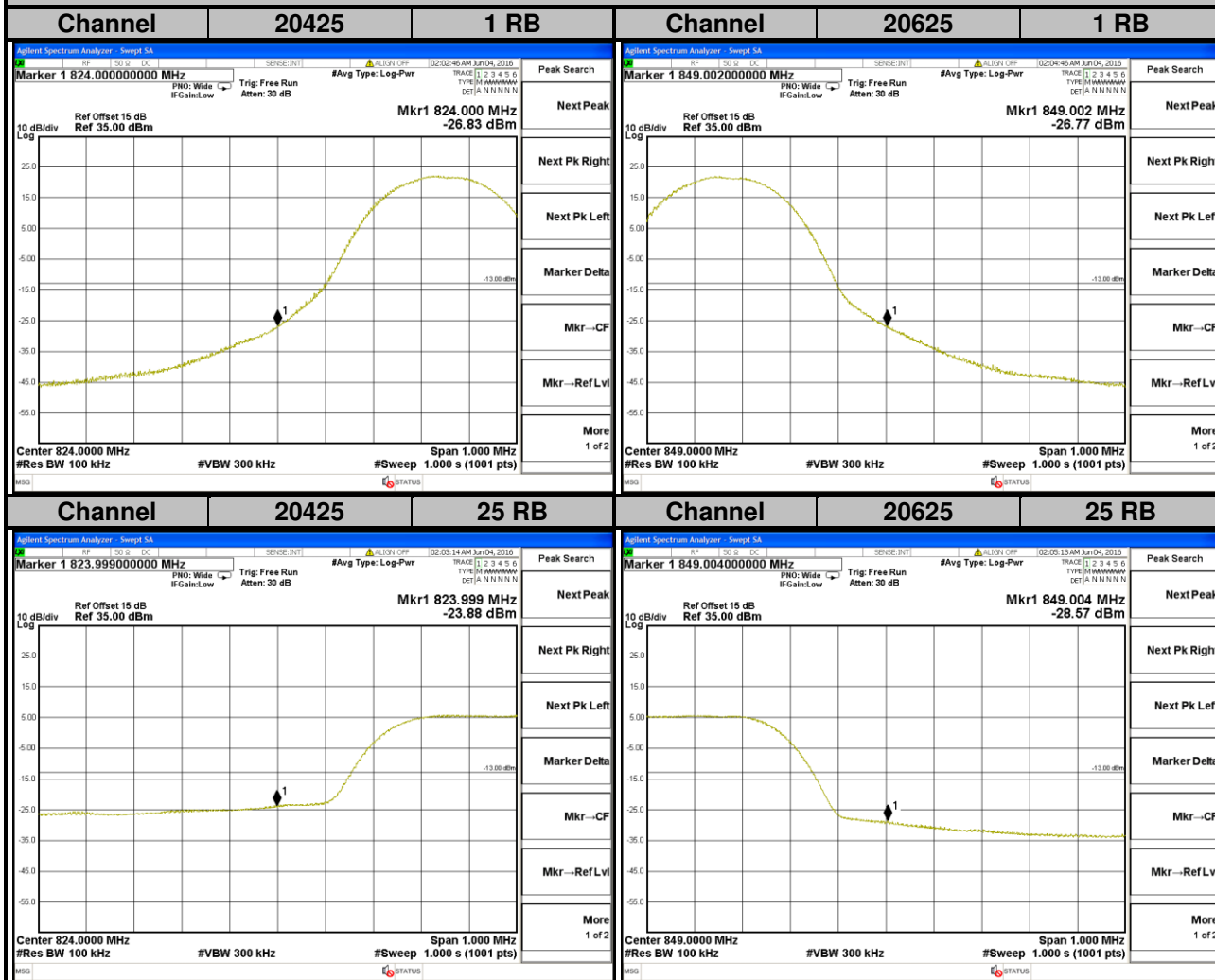
LTE Band 5 Channel Bandwidth: 1.4 MHz



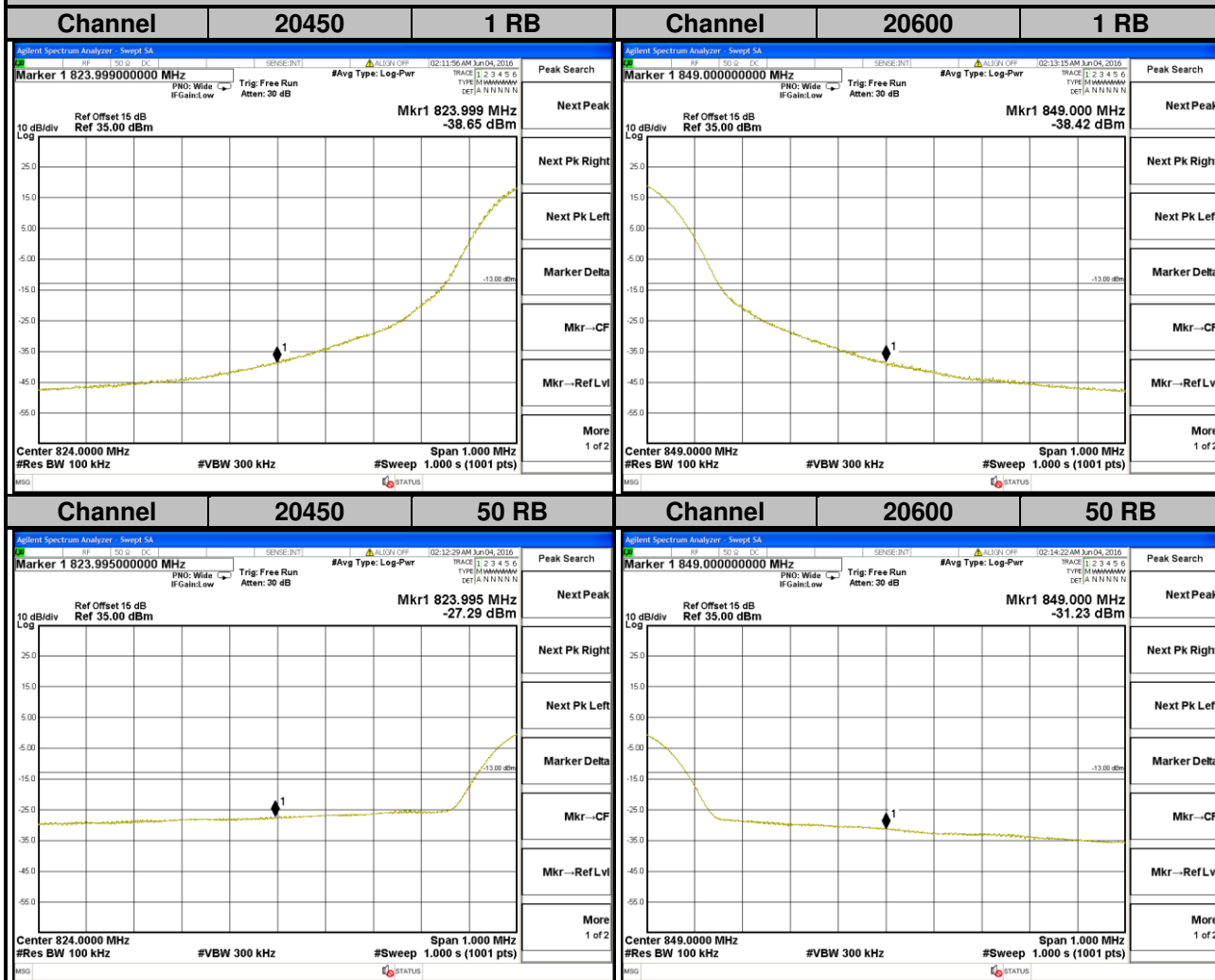
LTE Band 5
Channel Bandwidth: 3 MHz



LTE Band 5
Channel Bandwidth: 5 MHz



LTE Band 5
Channel Bandwidth: 10 MHz

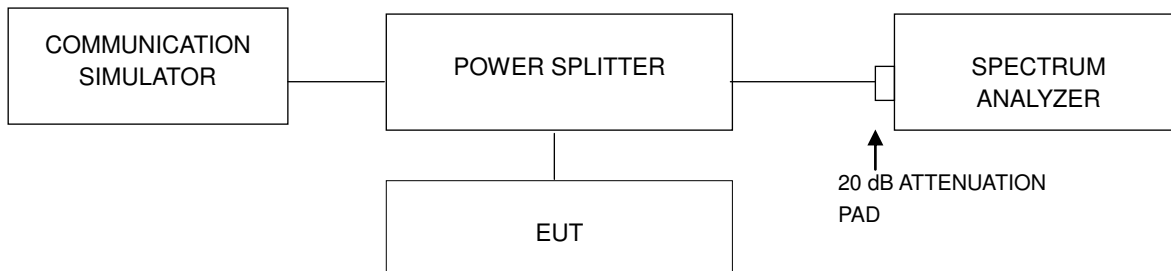


4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

4.5.2 Test Setup

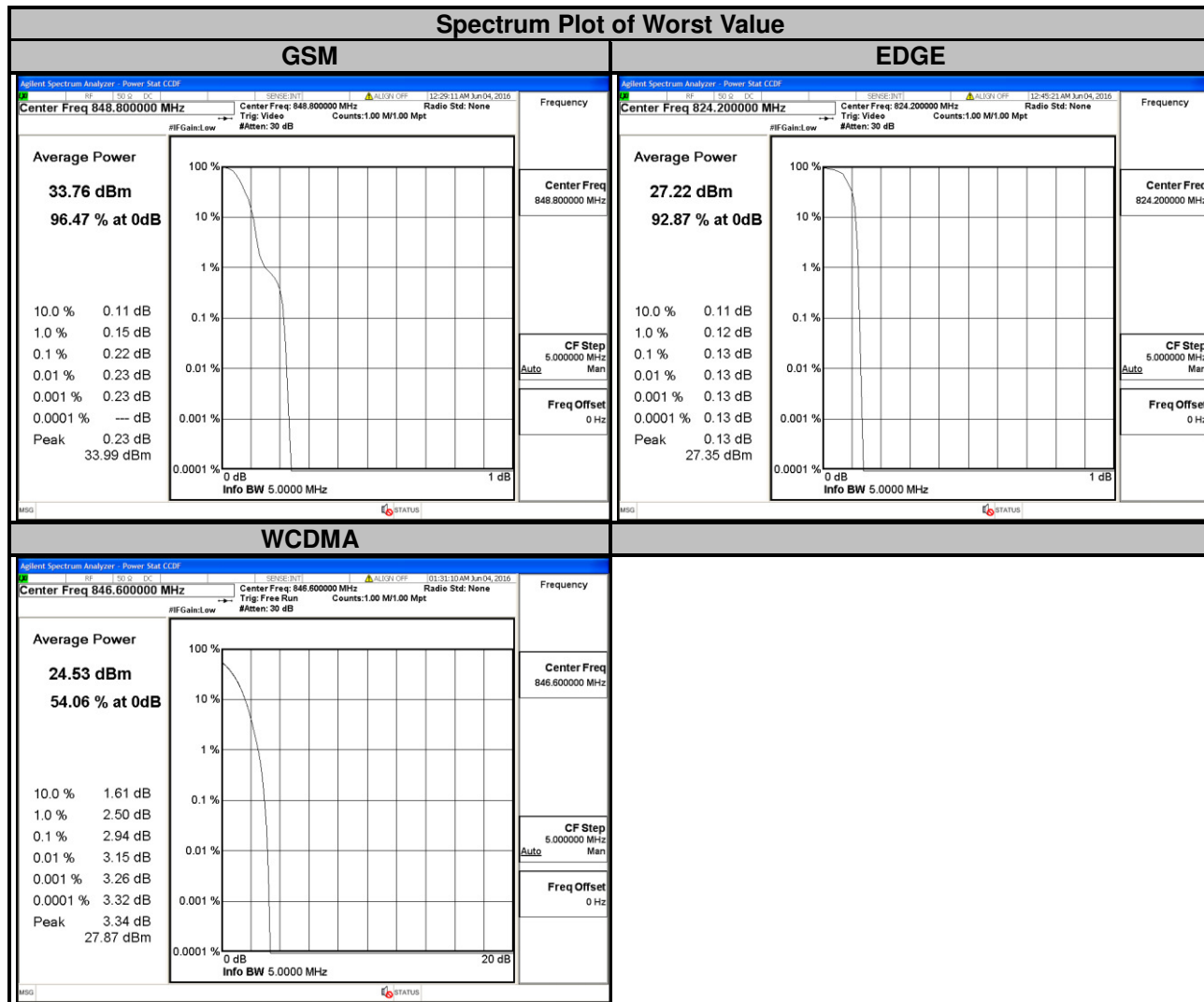


4.5.3 Test Procedures

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.5.4 Test Results

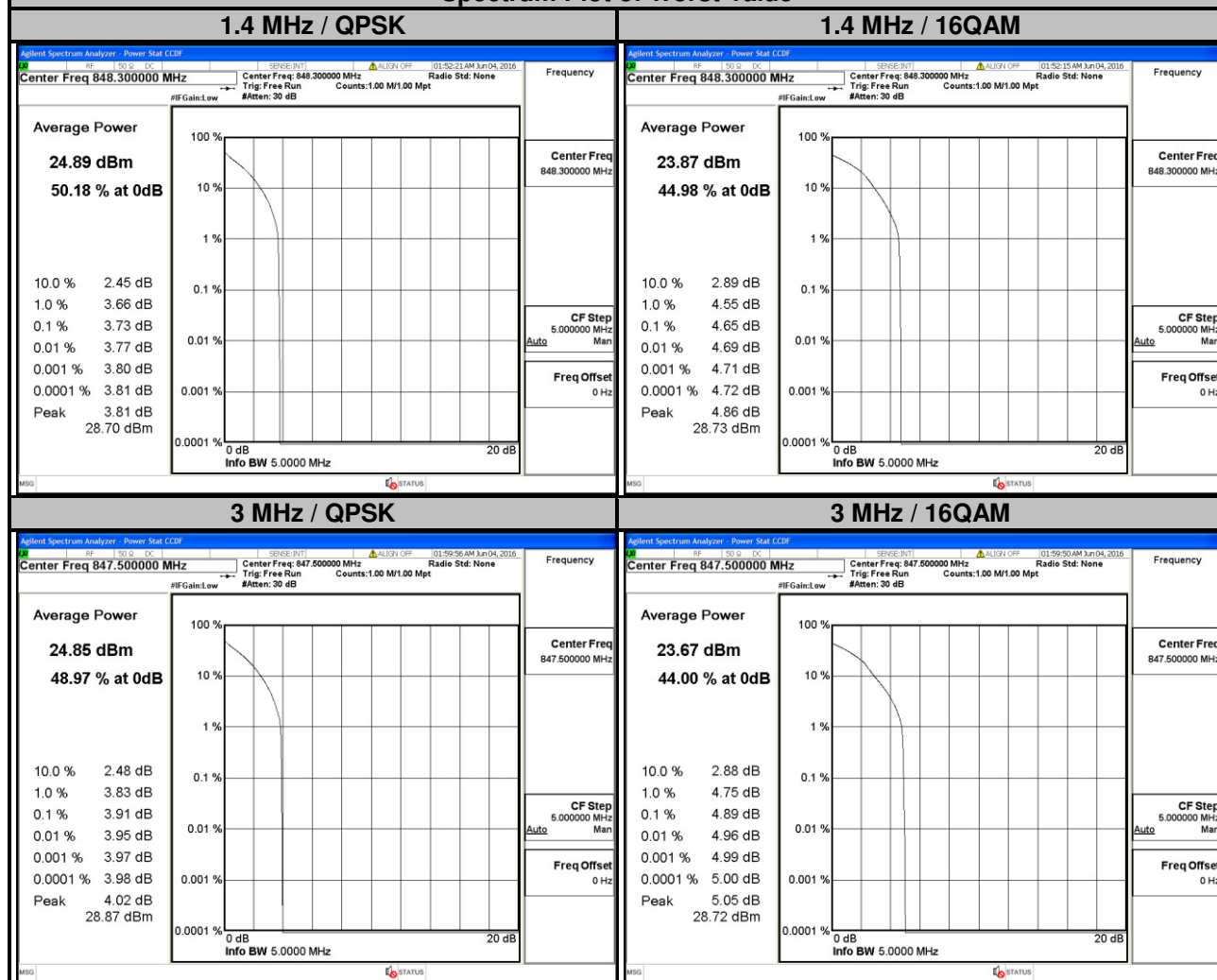
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) |
|---------|-----------------|----------------------------|------|---------|-----------------|----------------------------|
| | | GSM | EDGE | | | |
| 128 | 824.2 | 0.21 | 0.13 | 4132 | 826.4 | 2.80 |
| 189 | 836.4 | 0.22 | 0.13 | 4182 | 836.4 | 2.56 |
| 251 | 848.8 | 0.22 | 0.12 | 4233 | 846.6 | 2.94 |



LTE Band 5

| Channel Bandwidth: 1.4 MHz | | | | Channel Bandwidth: 3 MHz | | | |
|----------------------------|-----------------|----------------------------|-------|--------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20407 | 824.7 | 3.47 | 4.25 | 20415 | 825.5 | 3.28 | 4.28 |
| 20525 | 836.5 | 3.32 | 4.14 | 20525 | 836.5 | 3.24 | 4.40 |
| 20643 | 848.3 | 3.73 | 4.65 | 20635 | 847.5 | 3.91 | 4.89 |

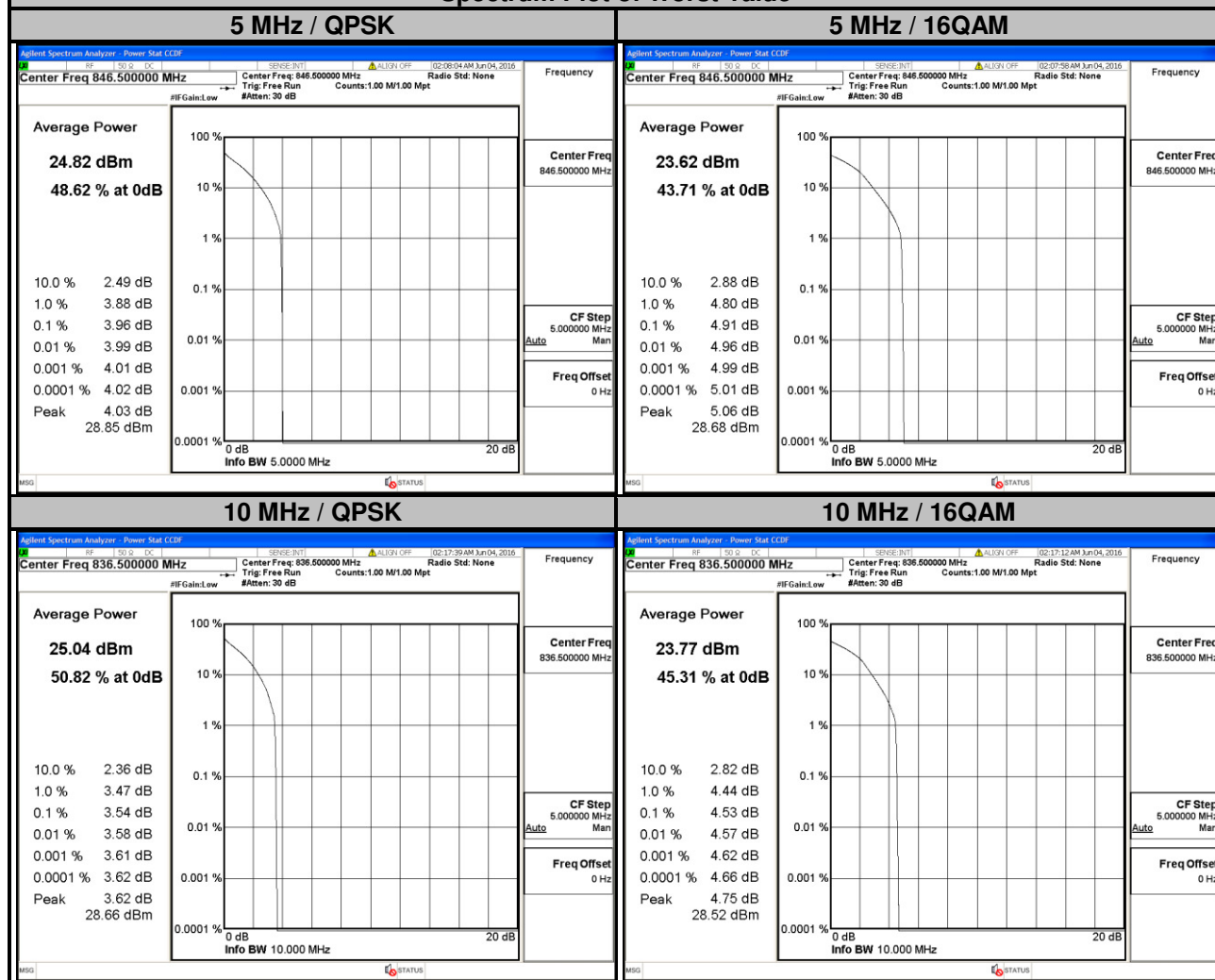
Spectrum Plot of Worst Value



LTE Band 5

| Channel Bandwidth: 5 MHz | | | | Channel Bandwidth: 10 MHz | | | |
|--------------------------|-----------------|----------------------------|-------|---------------------------|-----------------|----------------------------|-------|
| Channel | Frequency (MHz) | Peak to Average Ratio (dB) | | Channel | Frequency (MHz) | Peak to Average Ratio (dB) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 20425 | 826.5 | 3.28 | 4.44 | 20450 | 829.0 | 3.30 | 4.30 |
| 20525 | 836.5 | 3.31 | 4.27 | 20525 | 836.5 | 3.54 | 4.53 |
| 20625 | 846.5 | 3.96 | 4.91 | 20600 | 844.0 | 3.30 | 4.31 |

Spectrum Plot of Worst Value

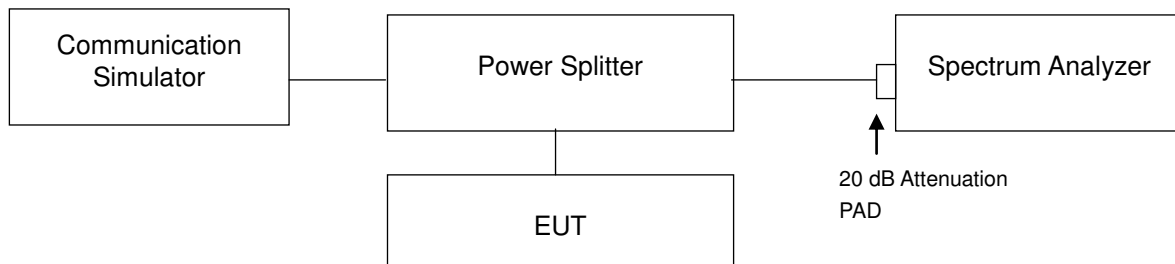


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission 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. The emission limit equal to -13 dBm.

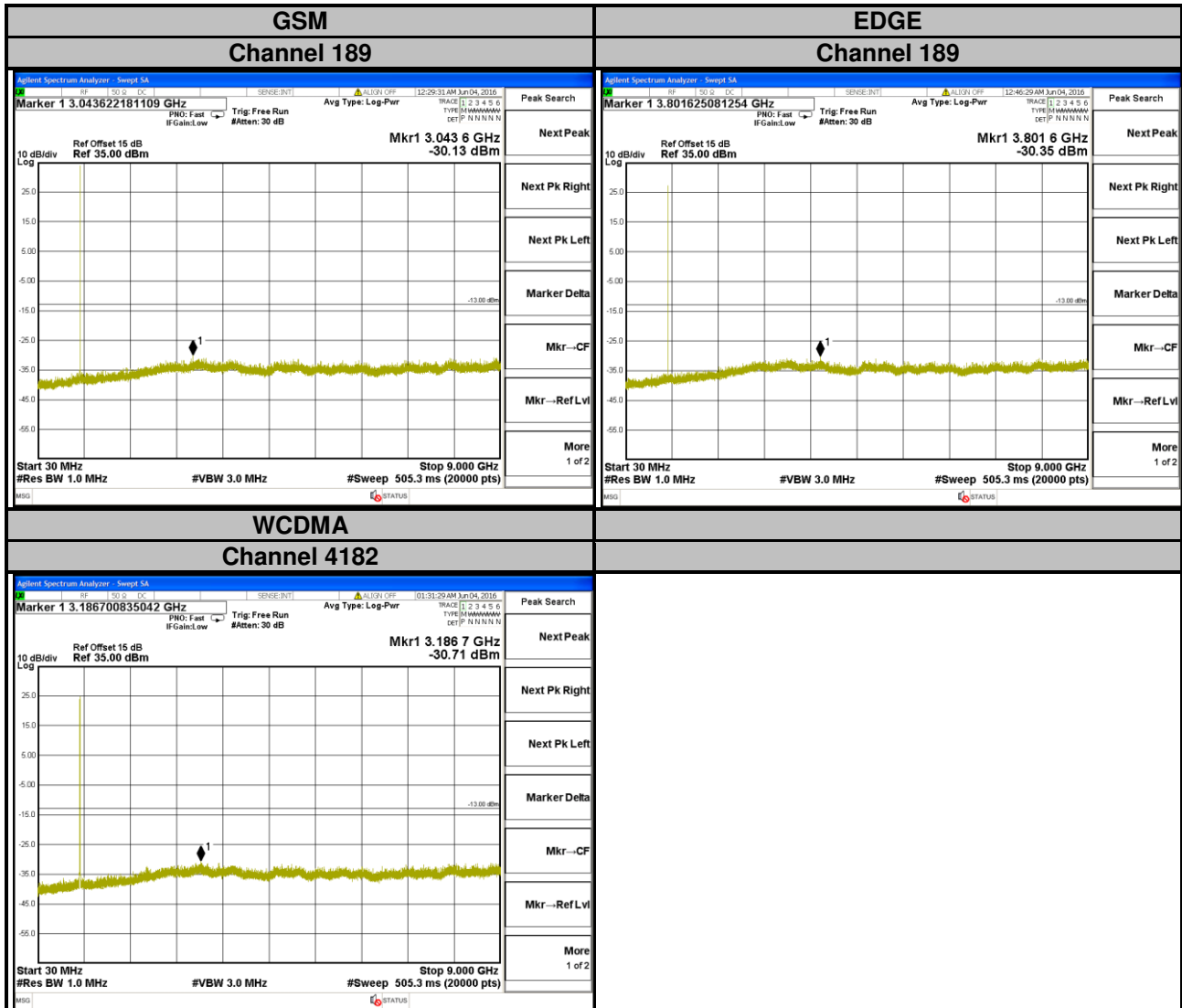
4.6.2 Test Setup



4.6.3 Test Procedure

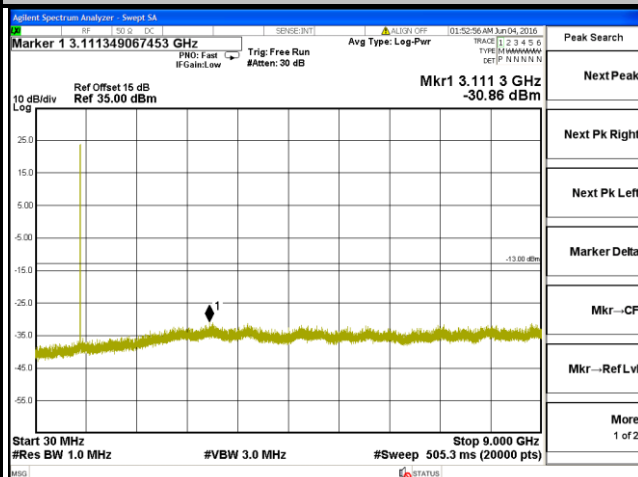
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 kHz to 9 GHz. 20 dB attenuation pad is connected with spectrum. RBW=1 MHz and VBW=3 MHz is used for conducted emission measurement.

4.6.4 Test Results

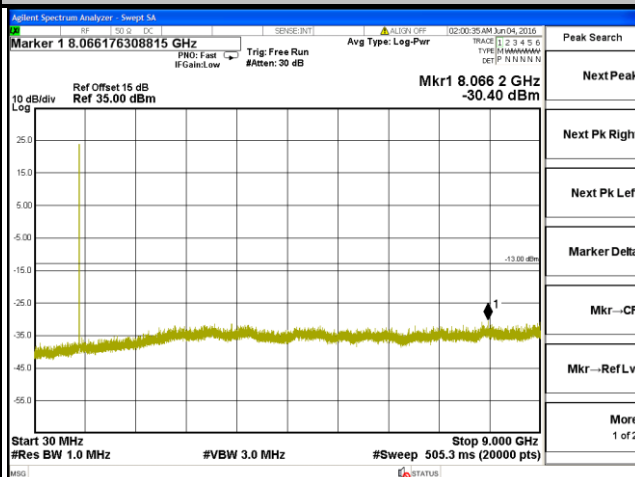


LTE Band 5 Channel 20525

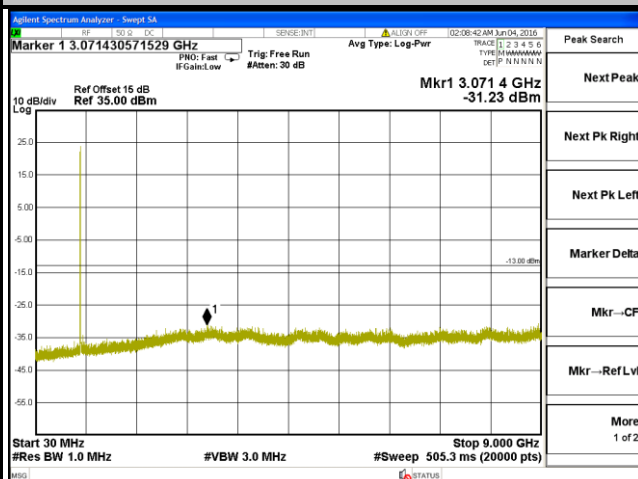
Channel Bandwidth: 1.4 MHz



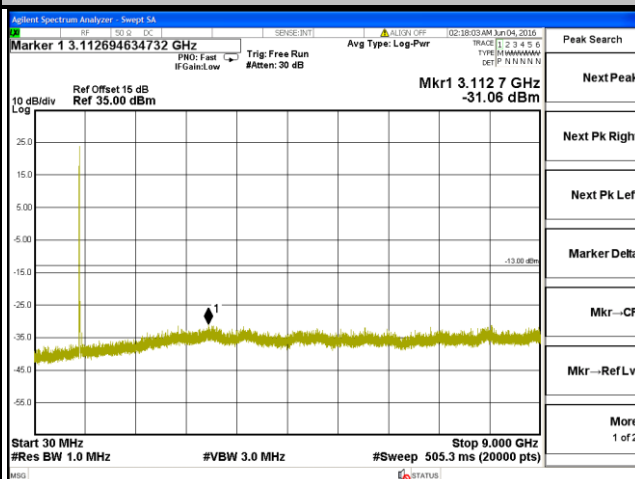
Channel Bandwidth: 3 MHz



Channel Bandwidth: 5 MHz



Channel Bandwidth: 10 MHz



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emission 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. The emission limit is equal to -13 dBm.

4.7.2 Test Procedure

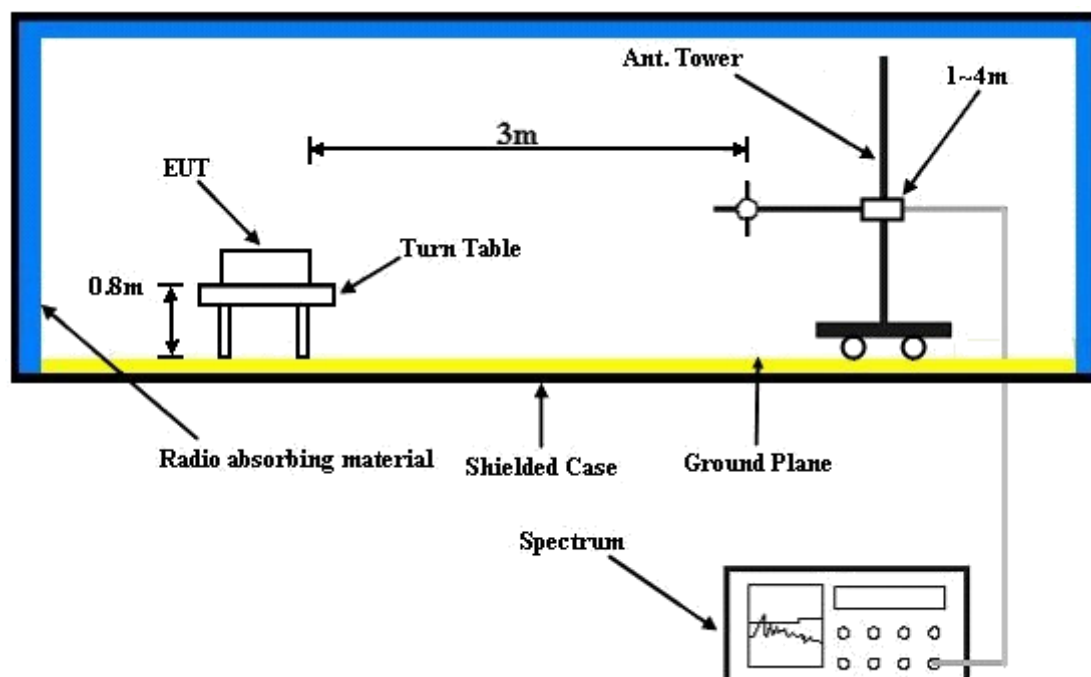
- Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G
- $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$
- E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi.}$

NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.

4.7.3 Deviation from Test Standard

No deviation.

4.7.4 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

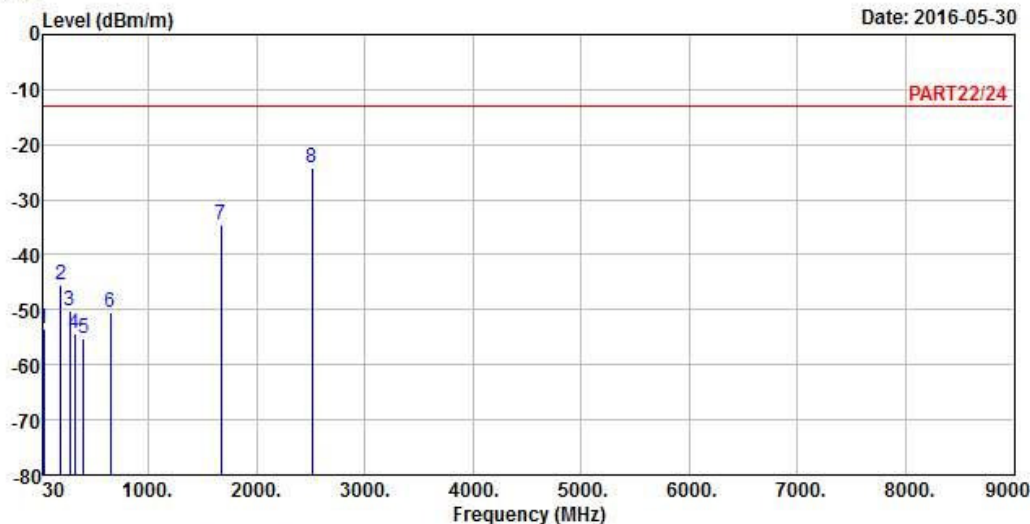
GSM:



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Data: 7



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : GSM 850 Link
 Tested by: Getaz Yang

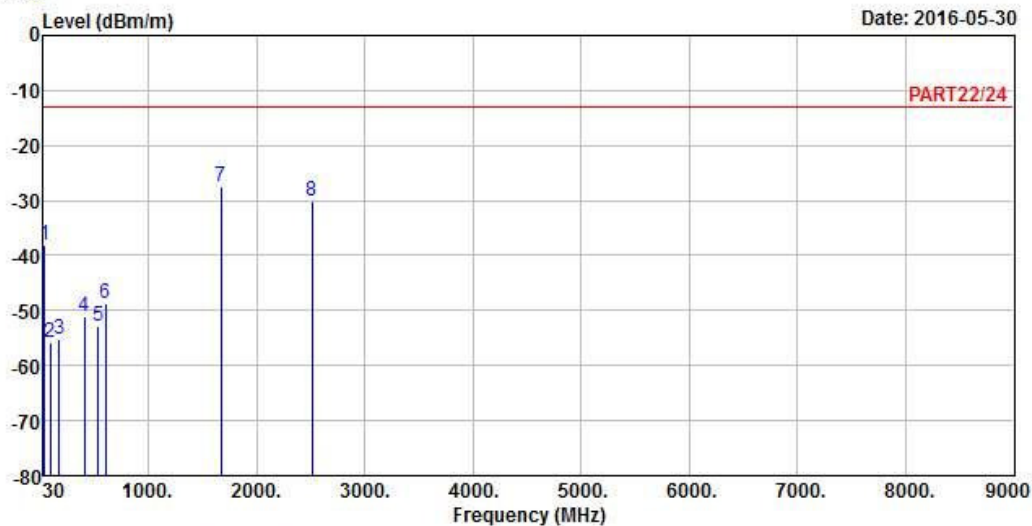
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 | 32.70 | -53.29 | -52.20 | -13.00 | -40.29 | -1.09 | Peak |
| 2 | 191.73 | -45.39 | -38.11 | -13.00 | -32.39 | -7.28 | Peak |
| 3 | 270.30 | -50.25 | -43.84 | -13.00 | -37.25 | -6.41 | Peak |
| 4 | 317.50 | -54.21 | -47.46 | -13.00 | -41.21 | -6.75 | Peak |
| 5 | 403.60 | -55.33 | -49.41 | -13.00 | -42.33 | -5.92 | Peak |
| 6 | 645.10 | -50.52 | -49.65 | -13.00 | -37.52 | -0.87 | Peak |
| 7 | 1672.80 | -34.52 | -19.84 | -13.00 | -21.52 | -14.68 | Peak |
| 8 pp | 2509.20 | -24.25 | -13.34 | -13.00 | -11.25 | -10.91 | Peak |



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Data: 8



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : GSM 850 Link
 Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 | 39.45 | -38.05 | -38.69 | -13.00 | -25.05 | 0.64 | Peak |
| 2 | 92.10 | -55.72 | -44.72 | -13.00 | -42.72 | -11.00 | Peak |
| 3 | 175.80 | -55.25 | -48.70 | -13.00 | -42.25 | -6.55 | Peak |
| 4 | 409.20 | -50.99 | -45.12 | -13.00 | -37.99 | -5.87 | Peak |
| 5 | 538.00 | -52.96 | -49.70 | -13.00 | -39.96 | -3.26 | Peak |
| 6 | 600.30 | -48.78 | -48.03 | -13.00 | -35.78 | -0.75 | Peak |
| 7 pp | 1672.80 | -27.33 | -12.65 | -13.00 | -14.33 | -14.68 | Peak |
| 8 | 2509.20 | -30.14 | -19.23 | -13.00 | -17.14 | -10.91 | Peak |

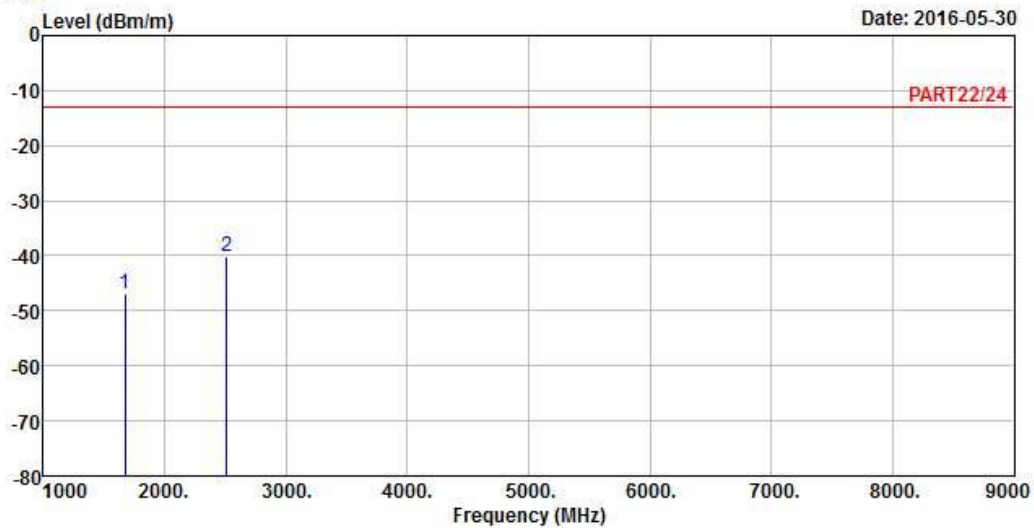
EDGE:



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Data: 3



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : EDGE 850 Link
 Tested by: Getaz Yang

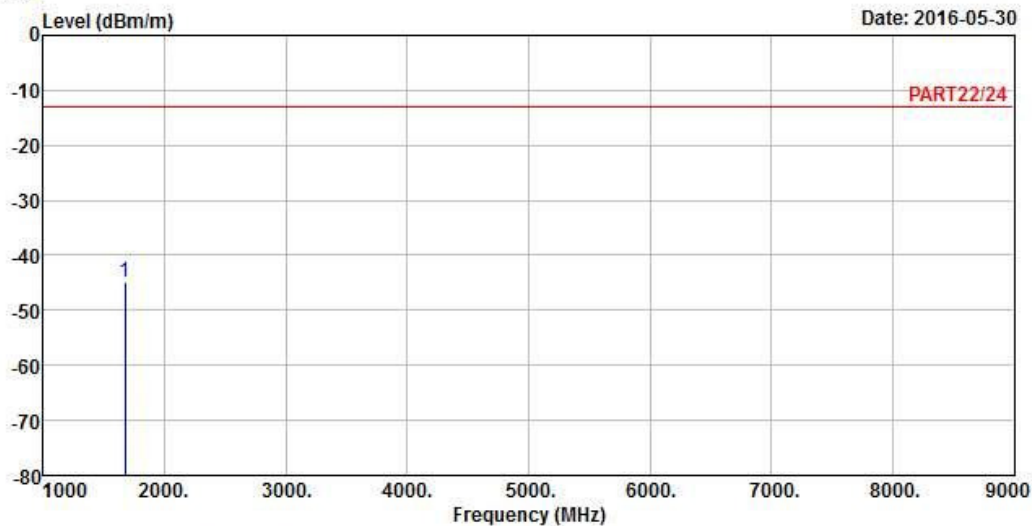
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 | 1672.80 | -46.90 | -32.22 | -13.00 | -33.90 | -14.68 | Peak |
| 2 pp | 2509.20 | -40.16 | -29.25 | -13.00 | -27.16 | -10.91 | Peak |



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Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : EDGE 850 Link
 Tested by: Getaz Yang

| Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|--------------|--------|------------|------------|------------|--------|--------|
| MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 pp 1672.80 | -44.98 | -30.30 | -13.00 | -31.98 | -14.68 | Peak |

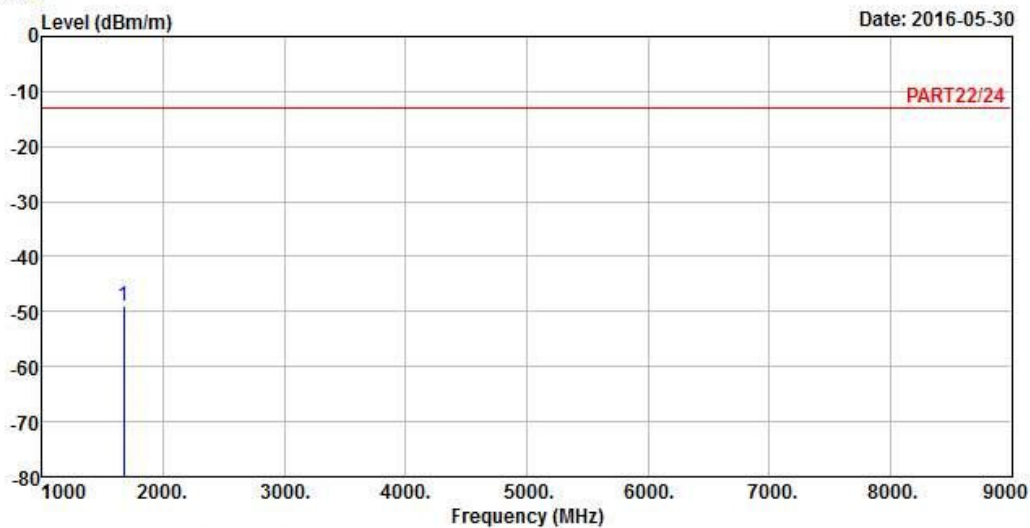
WCDMA:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

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Data: 3



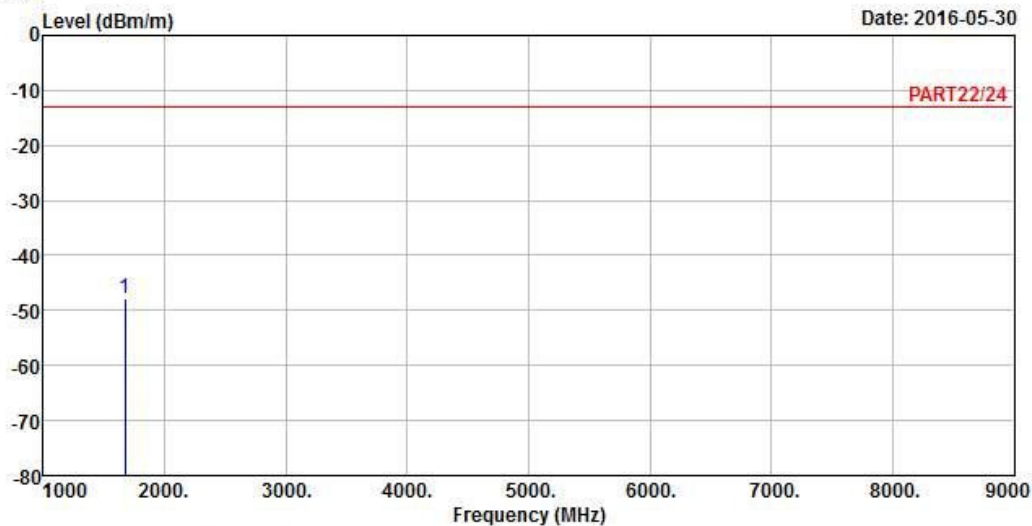
Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : WCDMA Band 5 Link
 Tested by: Getaz Yang

| | Read | Limit | Over | | | |
|--------------|--------|--------|--------|--------|--------|--------|
| Freq | Level | Level | Line | Limit | Factor | Remark |
| MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 pp 1672.80 | -49.07 | -34.39 | -13.00 | -36.07 | -14.68 | Peak |



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Data: 4



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : WCDMA Band 5 Link
 Tested by: Getaz Yang

| Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|--------------|--------|------------|------------|------------|--------|--------|
| MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 pp 1672.00 | -47.68 | -33.00 | -13.00 | -34.68 | -14.68 | Peak |

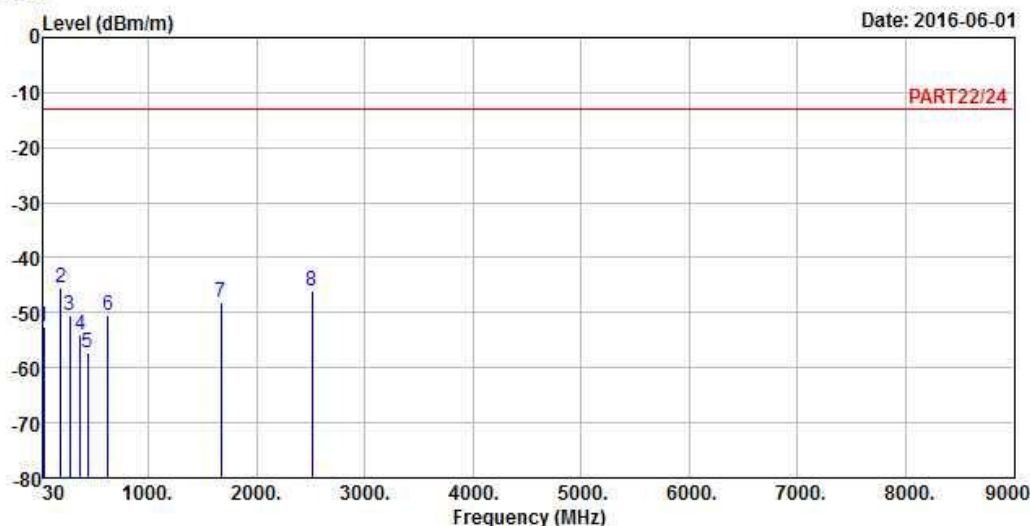
LTE Band 5
Channel Bandwidth: 10 MHz / QPSK



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

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Data: 5



Site : 966 Chamber 5
 Condition: PART22/24 HORIZONTAL
 Remak : LTE Band V_QPSK_10M Link
 Tested by: Toby Tian

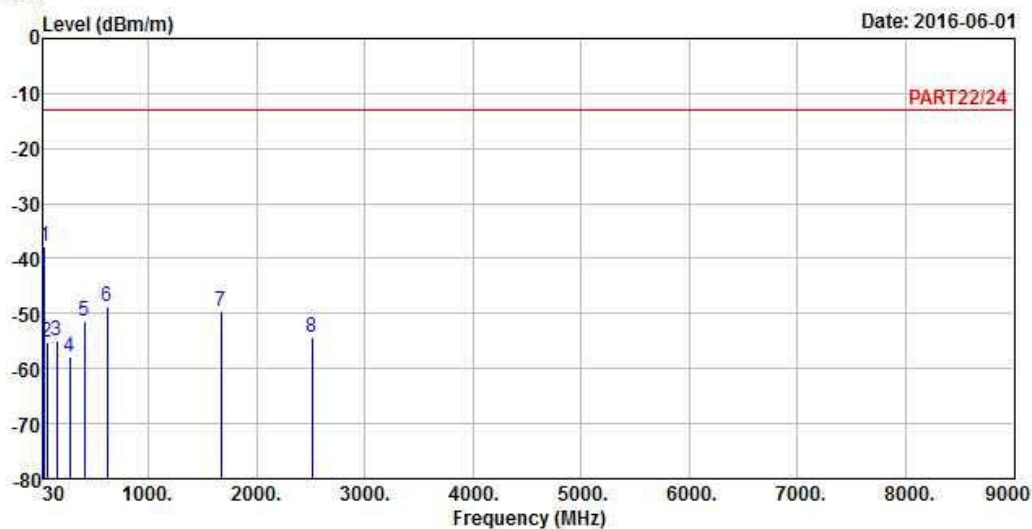
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 | 32.91 | -52.64 | -51.55 | -13.00 | -39.64 | -1.09 | Peak |
| 2 pp | 191.99 | -45.59 | -38.31 | -13.00 | -32.59 | -7.28 | Peak |
| 3 | 274.44 | -50.41 | -43.92 | -13.00 | -37.41 | -6.49 | Peak |
| 4 | 368.53 | -54.16 | -48.03 | -13.00 | -41.16 | -6.13 | Peak |
| 5 | 439.34 | -57.21 | -51.58 | -13.00 | -44.21 | -5.63 | Peak |
| 6 | 629.46 | -50.57 | -49.74 | -13.00 | -37.57 | -0.83 | Peak |
| 7 | 1673.00 | -48.25 | -33.57 | -13.00 | -35.25 | -14.68 | Peak |
| 8 | 2509.50 | -46.10 | -35.19 | -13.00 | -33.10 | -10.91 | Peak |



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A D T

Data: 6



Site : 966 Chamber 5
 Condition: PART22/24 VERTICAL
 Remak : LTE Band V_QPSK_10M Link
 Tested by: Toby Tian

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|------|---------|--------|------------|------------|------------|--------|--------|
| | MHz | dBm/m | dBm | dBm/m | dB | dB/m | |
| 1 pp | 39.70 | -37.93 | -38.57 | -13.00 | -24.93 | 0.64 | Peak |
| 2 | 65.89 | -55.30 | -47.20 | -13.00 | -42.30 | -8.10 | Peak |
| 3 | 151.25 | -54.92 | -47.62 | -13.00 | -41.92 | -7.30 | Peak |
| 4 | 270.56 | -57.94 | -51.53 | -13.00 | -44.94 | -6.41 | Peak |
| 5 | 404.42 | -51.41 | -45.50 | -13.00 | -38.41 | -5.91 | Peak |
| 6 | 616.85 | -48.68 | -47.88 | -13.00 | -35.68 | -0.80 | Peak |
| 7 | 1673.00 | -49.52 | -34.84 | -13.00 | -36.52 | -14.68 | Peak |
| 8 | 2509.50 | -54.41 | -43.50 | -13.00 | -41.41 | -10.91 | Peak |

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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