



BUREAU
VERITAS

Test Report No.: RF141006N005-4



FCC TEST REPORT

(PART 24)

Product: LTE Smartphone

Model No.: Smart-Ex 01

FCC ID: XAM500055GR04

Applicant: ecom instruments GmbH

Address: Industriestraße. 2, 97959 Assamstadt, Germany

Manufacturer: ecom instruments GmbH

Address: Industriestraße. 2, 97959 Assamstadt, Germany

Prepared by: Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

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Report No.: RF141006N005-4

Received Date: Oct. 06, 2014

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Issued Date: Nov. 13, 2014

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RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|----------------|-------------------|---------------|
| RF141006N005-4 | Original release | Nov. 13, 2014 |

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1 CERTIFICATION

PRODUCT: LTE Smartphone

BRAND: ecom MOBILE SAFETY

MODEL NO.: Smart-Ex 01

APPLICANT: ecom instruments GmbH

TESTED: Oct. 06, 2014 ~ Nov. 11, 2014

TEST SAMPLE: Identical Prototype

STANDARDS: FCC Part 24, Subpart E

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan 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.

TESTED BY

: _____, DATE : Nov. 13, 2014

Glyn He/ Project Engineer

APPROVED BY

: _____, DATE : Nov. 13, 2014

Sam Tung / Technical Manager

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2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 24 & Part 2 | | | |
|--|-------------------------------------|--------|--|
| STANDARD SECTION | TEST TYPE | RESULT | REMARK |
| 2.1046 24.232 | Equivalent Isotropic Radiated Power | PASS | Meet the requirement of limit. |
| 2.1055 24.235 | Frequency Stability | PASS | Meet the requirement of limit. |
| 2.1049 24.238(b) | Occupied Bandwidth | PASS | Meet the requirement of limit. |
| 24.232(d) | Peak to average ratio | PASS | Meet the requirement of limit. |
| 24.238(b) | Band Edge Measurements | PASS | Meet the requirement of limit. |
| 2.1051 24.238 | Conducted Spurious Emissions | PASS | Meet the requirement of limit. |
| 2.1053 24.238 | Radiated Spurious Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -16.58dB at 7520MHz. |

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 | UNCERTAINTY |
|---------------------|---------------|-------------|
| Conducted emissions | 9kHz~30MHz | 2.66dB |
| Radiated emissions | 9KHz ~ 30MHz | 2.74dB |
| | 30MHz ~ 1GHz | 3.55dB |
| | 1GHz ~ 18GHz | 4.84dB |
| | 18GHz ~ 40GHz | 1.94dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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2.2 TEST SITE AND INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|----------------------------------|---------------|--------------------------|-------------|-------------|-------------|
| Spectrum Analyzer | Agilent | E7405A | MY45118807 | May 13,14 | May 12,15 |
| Spectrum Analyzer (10Hz~40GHz) | Rohde&Schwarz | FSV40 | 101003 | Apr. 09,14 | Apr. 08,15 |
| Signal Analyzer | Rohde&Schwarz | FSV7 | 102331 | Nov. 25,13 | Nov. 24,14 |
| EMI Test Receiver | Rohde&Schwarz | ESU 26 | 100005 | May 13,14 | May 12,15 |
| Loop antenna (9kHz~30MHz) | Daze | ZN30900A | 0708 | Dec. 05,13 | Dec. 05,14 |
| Bilog Antenna | Teseq | CBL 6111D | 27089 | Jun. 27, 14 | Jun. 26, 15 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062558 | May 30,14 | May 29,16 |
| Horn Antenna (15GHz-40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170242 | Feb. 13,14 | Feb. 12,17 |
| Signal Amplifier | Agilent | 8447D | 2944A10488 | Jun. 25,14 | Jun. 24,15 |
| Pre-Amplifier (100MHz-26.5GHz) | Agilent | 8449B | 3008A00409 | May 13,14 | May 12,15 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 03,14 | Nov. 02,15 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 29, 14 | Oct. 28, 15 |
| Peak and Avg Power Sensor | Anritsu | MA2411B | 1126068 | Feb. 21,14 | Feb. 20,15 |
| Power Meter | Anritsu | ML2495A | 1139001 | Feb. 21,14 | Feb. 20,15 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Apr. 19,14 | Apr. 18,15 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.04,14 | Sep. 03,15 |
| Signal Generator | Agilent | N5183A | MY50140980 | Nov. 03,14 | Nov. 02,15 |
| ESG Vector Signal Generator | Agilent | E4438C | MY49072505 | Mar.14, 14 | Mar.13, 15 |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |
| BLUETOOTH TESTER | Rohde&Schwarz | CBT32 | 100811 | Sep. 04,14 | Sep. 03,15 |

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in Dongguan 966 Chamber.
 3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 502831.

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3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | | |
|-----------------|--|-----------------------|
| PRODUCT | LTE Smartphone | |
| MODEL NO. | Smart-Ex 01 | |
| TYPE NUMBER | L12V012BB, L12V012AB, L13V012AB | |
| POWER SUPPLY | 5.0Vdc (adapter or host equipment) 3.7Vdc (battery) | |
| MODULATION TYPE | GSM, GPRS: GMSK EDGE: GMSK, 8PSK WCDMA : BPSK LTE Band 2: QPSK, 16QAM | |
| FREQUENCY RANGE | GSM, GPRS, EDGE: 1850.2MHz ~ 1909.8MHz | |
| | WCDMA: 1852.4MHz ~ 1907.6MHz | |
| | LTE Band 2 Channel Bandwidth: 1.4MHz | 1850.7MHz ~ 1909.3MHz |
| | LTE Band 2 Channel Bandwidth: 3MHz | 1851.5MHz ~ 1908.5MHz |
| | LTE Band 2 Channel Bandwidth: 5MHz | 1852.5MHz ~ 1907.5MHz |
| | LTE Band 2 Channel Bandwidth: 10MHz | 1855.0MHz ~ 1905.0MHz |
| | LTE Band 2 Channel Bandwidth: 15MHz | 1857.5MHz ~ 1902.5MHz |
| | LTE Band 2 Channel Bandwidth: 20MHz | 1860.0MHz ~ 1900.0MHz |
| MAX. EIRP POWER | GSM: 608mW | |
| | EDGE: 230mW | |
| | WCDMA: 163mW | |
| | LTE Band 2 Channel Bandwidth: 1.4MHz | 340mW |
| | LTE Band 2 Channel Bandwidth: 3MHz | 415mW |
| | LTE Band 2 Channel Bandwidth: 5MHz | 386mW |
| | LTE Band 2 Channel Bandwidth: 10MHz | 409mW |
| | LTE Band 2 Channel Bandwidth: 15MHz | 434mW |
| | LTE Band 2 Channel Bandwidth: 20MHz | 405mW |

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| | | |
|----------------------------|---|---------|
| EMISSION DESIGNATOR | GSM | 245KGXW |
| | EDGE | 245KG7W |
| | WCDMA | 4M16F9W |
| | LTE Band 2 Channel Bandwidth: 1.4MHz | 1M09W7D |
| | LTE Band 2 Channel Bandwidth: 3MHz | 2M69W7D |
| | LTE Band 2 Channel Bandwidth: 5MHz | 4M49W7D |
| | LTE Band 2 Channel Bandwidth: 10MHz | 8M97W7D |
| | LTE Band 2 Channel Bandwidth: 15MHz | 13M5G7D |
| | LTE Band 2 Channel Bandwidth: 20MHz | 17M9W7D |
| ANTENNA TYPE | Fixed Internal antenna with 2dBi gain | |
| HW VERSION | A | |
| SW VERSION | 7A.1.0-01-4.4.2-16.02.11 | |
| I/O PORTS | Refer to user's manual | |
| CABLE SUPPLIED | See note 3 | |

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

| ADAPTER | |
|----------------|--------------------|
| BRAND: | Sonim |
| MODEL: | S11C02 |
| INPUT: | AC 100-240V, 450mA |
| OUTPUT: | DC 5V, 2100mA |

3. The EUT matched the following USB cable:

| USB CABLE | |
|---------------------|--------------------|
| BRAND: | ecom MOBILE SAFETY |
| MODEL: | Safety Box SB S01 |
| SIGNAL LINE: | 1.1 METER |

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

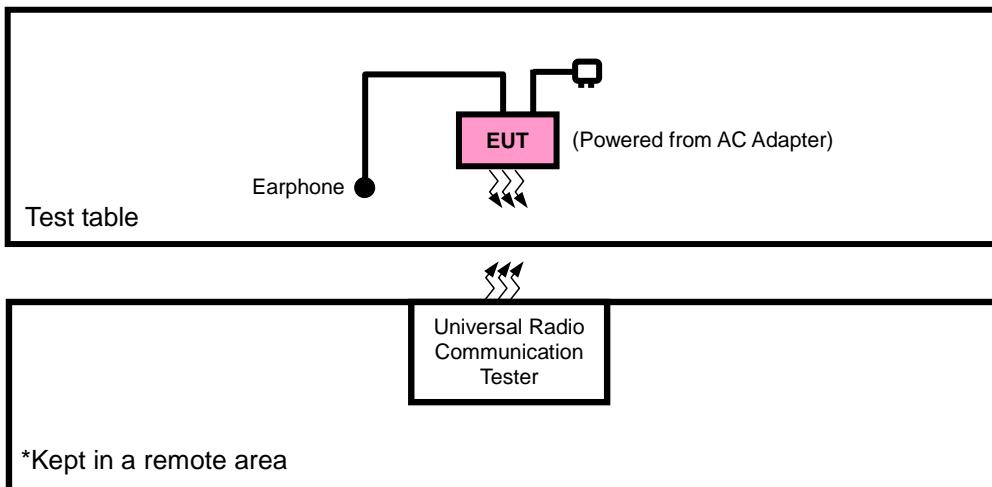


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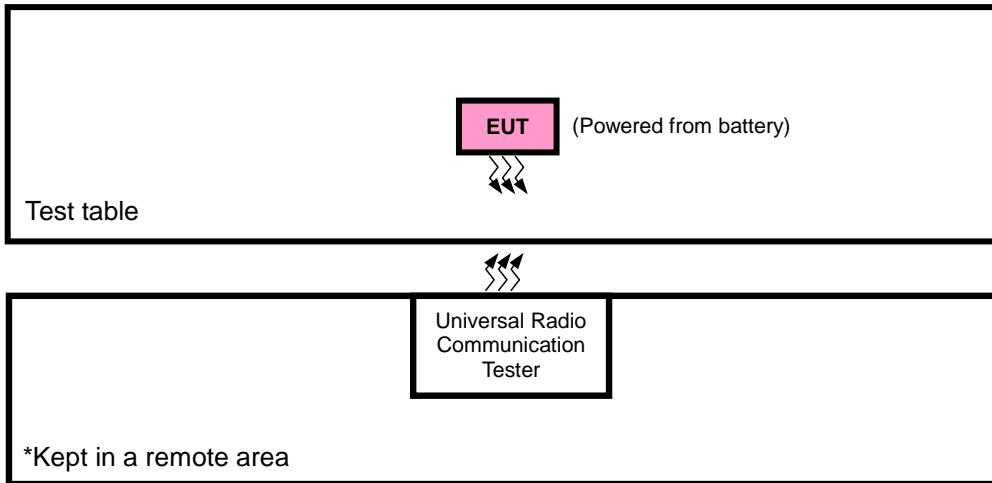
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3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR E.I.R.P. TEST



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3.3 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 | DC source | LONG WEI | PS-6403D | 010934269 | N/A |
| 2 | PC | HP | A6608CN | 3CR83825X3 | N/A |
| 3 | Earphone | Minami | ME-816B5-E | N/A | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1 | DC Line: Unshielded, Detachable 1.0m |
| 2 | AC Line: Unshielded, Detachable 1.5m |
| 3 | DC Line: Unshielded, Detachable 1.2m |

NOTE:

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

3.4 TEST ITEM AND TEST CONFIGURATION

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 on Y-plane for EIRP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

| EUT CONFIGURE MODE | DESCRIPTION |
|--------------------------|--|
| A | EUT + Adapter + Earphone with GSM ,WCDMA or LTE link |
| B | EUT + Battery+ Earphone with GSM ,WCDMA or LTE link |

GSM MODE

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | MODE |
|--------------------------|-----------------------|-------------------|----------------|-----------|
| B | EIRP | 512 to 810 | 512, 661, 810 | GSM, EDGE |
| B | FREQUENCY STABILITY | 512 to 810 | 661 | GSM, EDGE |
| B | OCCUPIED BANDWIDTH | 512 to 810 | 512, 661, 810 | GSM, EDGE |
| B | PEAK TO AVERAGE RATIO | 512 to 810 | 661 | GSM, EDGE |
| B | BAND EDGE | 512 to 810 | 512, 810 | GSM, EDGE |
| B | CONDUCDETED EMISSION | 512 to 810 | 661 | GSM, EDGE |
| A | RADIATED EMISSION | 512 to 810 | 661 | GSM, EDGE |

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WCDMA MODE

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | MODE |
|--------------------|-----------------------|-------------------|------------------|-------|
| B | EIRP | 9262 to 9538 | 9262, 9400, 9538 | WCDMA |
| B | FREQUENCY STABILITY | 9262 to 9538 | 9400 | WCDMA |
| B | OCCUPIED BANDWIDTH | 9262 to 9538 | 9262, 9400, 9538 | WCDMA |
| B | PEAK TO AVERAGE RATIO | 9262 to 9538 | 9400 | WCDMA |
| B | BAND EDGE | 9262 to 9538 | 9262, 9538 | WCDMA |
| B | CONDUCDETED EMISSION | 9262 to 9538 | 9400 | WCDMA |
| A | RADIATED EMISSION | 9262 to 9538 | 9400 | WCDMA |

LTE BAND 2

| EUT CONFIGURE MODE | TEST ITEM | AVAILABLE CHANNEL | TESTED CHANNEL | CHANNEL BANDWIDTH | MODULATION | MODE |
|--------------------|-----------------------|-------------------|---------------------|-------------------|-------------|----------------------|
| B | EIRP | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| B | FREQUENCY STABILITY | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18900 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18900 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18900 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18900 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18900 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| B | OCCUPIED BANDWIDTH | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 6 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 15 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 25 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 50 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 75 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 100 RB / 0 RB Offset |
| B | PEAK TO AVERAGE RATIO | 18607 to 19193 | 18607, 18900, 19193 | 1.4MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615, 18900, 19185 | 3MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625, 18900, 19175 | 5MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650, 18900, 19150 | 10MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675, 18900, 19125 | 15MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700, 18900, 19100 | 20MHz | QPSK, 16QAM | 1 RB / 0 RB Offset |

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| | | | | | | |
|---|-------------------|----------------|-------|--------|------|----------------------|
| B | BAND EDGE | 18607 to 19193 | 18607 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | | 19193 | 1.4MHz | QPSK | 6 RB / 0 RB Offset |
| | | 18615 to 19185 | 18615 | 3MHz | QPSK | 1 RB / 5 RB Offset |
| | | | 19185 | 3MHz | QPSK | 6 RB / 0 RB Offset |
| | | 18625 to 19175 | 18625 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | | 19175 | 5MHz | QPSK | 25 RB / 0 RB Offset |
| | | 18650 to 19150 | 18650 | 10MHz | QPSK | 1 RB / 24 RB Offset |
| | | | 19150 | 10MHz | QPSK | 50 RB / 0 RB Offset |
| | | 18675 to 19125 | 18675 | 15MHz | QPSK | 1 RB / 49 RB Offset |
| | | | 19125 | 15MHz | QPSK | 75 RB / 0 RB Offset |
| | | 18700 to 19100 | 18700 | 20MHz | QPSK | 1 RB / 74 RB Offset |
| | | | 19100 | 20MHz | QPSK | 100 RB / 0 RB Offset |
| B | CONDUCED EMISSION | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18900 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18900 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18900 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18900 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18900 | 20MHz | QPSK | 1 RB / 0 RB Offset |
| A | RADIATED EMISSION | 18607 to 19193 | 18900 | 1.4MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18615 to 19185 | 18900 | 3MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18625 to 19175 | 18900 | 5MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18650 to 19150 | 18900 | 10MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18675 to 19125 | 18900 | 15MHz | QPSK | 1 RB / 0 RB Offset |
| | | 18700 to 19100 | 18900 | 20MHz | QPSK | 1 RB / 0 RB Offset |

TEST CONDITION:

| TEST ITEM | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|-----------------------|--------------------------|---------------------|-------------|
| EIRP | 25deg. C, 57%RH | 5Vdc from adapter | Blue Zheng |
| FREQUENCY STABILITY | 23deg. C, 61%RH | 3.8Vdc from Battery | Yuqiang Yin |
| OCCUPIED BANDWIDTH | 23deg. C, 61%RH | 3.8Vdc from Battery | Yuqiang Yin |
| PEAK TO AVERAGE RATIO | 23deg. C, 61%RH | 3.8Vdc from Battery | Yuqiang Yin |
| BAND EDGE | 23deg. C, 61%RH | 3.8Vdc from Battery | Yuqiang Yin |
| CONDUCED EMISSION | 23deg. C, 61%RH | 3.8Vdc from Battery | Yuqiang Yin |
| RADIATED EMISSION | 25deg. C, 57%RH | 5Vdc from adapter | Blue Zheng |

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3.5 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

3.6 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 24

ANSI/TIA/EIA-603-C 2004

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 and portable stations are limited to 2 watts EIRP

4.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE and 5MHz for WCDMA mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m 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 1m to 4m 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.
$$\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$$

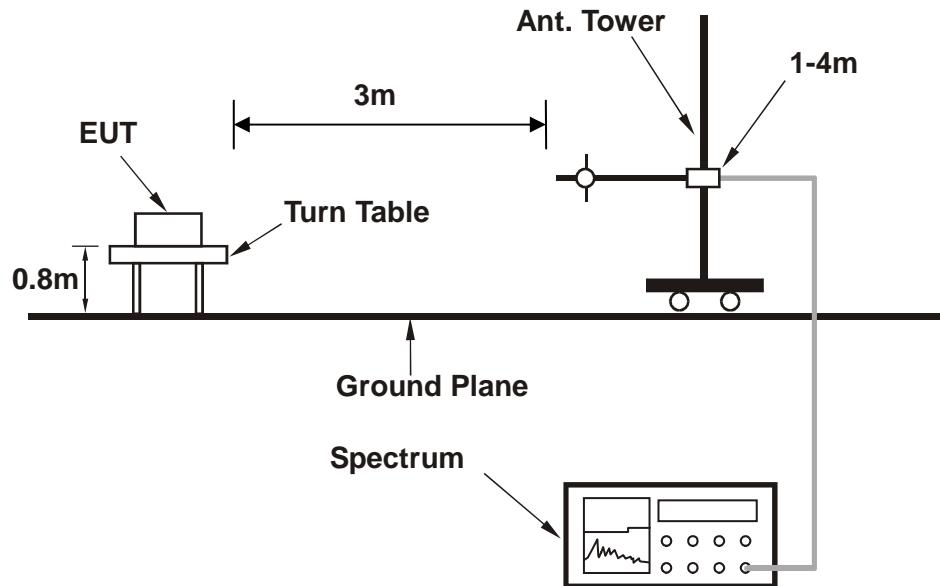
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GSM, GPRS, EDGE & WCDMA 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.



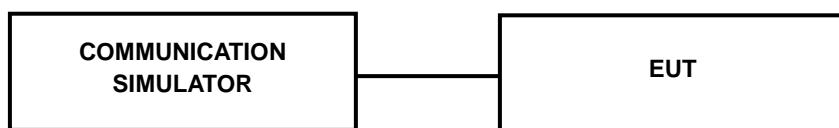
4.1.3 TEST SETUP

EIRP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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



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4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

| Band | GSM1900 | | |
|-----------------|---------|--------|--------|
| Channel | 512 | 661 | 810 |
| Frequency (MHz) | 1850.2 | 1880.0 | 1909.8 |
| GSM | 29.42 | 29.21 | 29.44 |
| GPRS 8 | 29.41 | 29.20 | 29.42 |
| GPRS 10 | 28.60 | 28.45 | 28.69 |
| EDGE 8 (MCS1) | 29.40 | 29.18 | 29.40 |
| EDGE 10 (MCS1) | 28.66 | 28.40 | 28.55 |
| EDGE 8 (MCS9) | 25.04 | 24.84 | 24.90 |
| EDGE 10 (MCS9) | 24.54 | 24.32 | 24.38 |

| Band | WCDMA II | | |
|-----------------|----------|--------|--------|
| Channel | 9262 | 9400 | 9538 |
| Frequency (MHz) | 1852.4 | 1880.0 | 1907.6 |
| RMC 12.2K | 23.55 | 23.47 | 23.79 |
| HSPA | | | |
| HSDPA Subtest-1 | 22.02 | 21.93 | 22.16 |
| HSDPA Subtest-2 | 21.96 | 21.96 | 22.14 |
| HSDPA Subtest-3 | 21.60 | 21.51 | 21.66 |
| HSDPA Subtest-4 | 21.62 | 21.50 | 21.63 |
| HSUPA Subtest-1 | 22.56 | 22.55 | 22.53 |
| HSUPA Subtest-2 | 20.46 | 20.52 | 20.58 |
| HSUPA Subtest-3 | 21.53 | 21.38 | 21.36 |
| HSUPA Subtest-4 | 20.42 | 20.46 | 20.47 |
| HSUPA Subtest-5 | 22.50 | 22.53 | 22.77 |



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| LTE Band 2 | | | | | | | |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|---------------------|
| BW | Modulation | RB Size | RB Offset | Low CH 18607 | Mid CH 18900 | High CH 19193 | 3GPP MPR (dB) |
| | | | | Frequency 1850.7 MHz | Frequency 1880 MHz | Frequency 1909.3 MHz | |
| 1.4MHz | QPSK | 1 | 0 | 22.88 | 22.92 | 22.87 | 0 |
| | | 1 | 2 | 22.81 | 22.87 | 22.82 | 0 |
| | | 1 | 5 | 22.76 | 22.79 | 22.73 | 0 |
| | | 3 | 0 | 22.86 | 22.9 | 22.85 | 0 |
| | | 3 | 1 | 22.79 | 22.85 | 22.8 | 0 |
| | | 3 | 3 | 22.74 | 22.77 | 22.71 | 0 |
| | | 6 | 0 | 21.88 | 21.92 | 21.87 | 1 |
| | 16QAM | 1 | 0 | 21.88 | 21.92 | 21.87 | 1 |
| | | 1 | 2 | 21.81 | 21.87 | 21.82 | 1 |
| | | 1 | 5 | 21.76 | 21.79 | 21.73 | 1 |
| | | 3 | 0 | 21.86 | 21.9 | 21.85 | 1 |
| | | 3 | 1 | 21.79 | 21.85 | 21.8 | 1 |
| | | 3 | 3 | 21.74 | 21.77 | 21.71 | 1 |
| | | 6 | 0 | 20.87 | 20.91 | 20.86 | 2 |

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| LTE Band 2 | | | | | | | |
|------------|------------|---------|-----------|-------------------------|-----------------------|-------------------------|---------------------|
| BW | Modulation | RB Size | RB Offset | Low CH 18615 | Mid CH 18900 | High CH 19185 | 3GPP MPR (dB) |
| | | | | Frequency 1851.5 MHz | Frequency 1880 MHz | Frequency 1908.5 MHz | |
| 3 MHz | QPSK | 1 | 0 | 22.98 | 23.02 | 22.97 | 0 |
| | | 1 | 7 | 22.91 | 22.97 | 22.92 | 0 |
| | | 1 | 14 | 22.86 | 22.89 | 22.83 | 0 |
| | | 8 | 0 | 21.98 | 22.12 | 22.07 | 1 |
| | | 8 | 3 | 21.88 | 22.09 | 22.05 | 1 |
| | | 8 | 7 | 21.82 | 21.91 | 22.02 | 1 |
| | | 15 | 0 | 21.91 | 22.1 | 22.01 | 1 |
| | 16QAM | 1 | 0 | 21.98 | 22.02 | 21.97 | 1 |
| | | 1 | 7 | 21.91 | 21.97 | 21.92 | 1 |
| | | 1 | 14 | 21.86 | 21.89 | 21.83 | 1 |
| | | 8 | 0 | 21 | 21.04 | 20.99 | 2 |
| | | 8 | 3 | 20.93 | 20.99 | 20.94 | 2 |
| | | 8 | 7 | 20.88 | 20.91 | 20.85 | 2 |
| | | 15 | 0 | 20.99 | 21.03 | 20.98 | 2 |
| 5 MHz | QPSK | RB Size | RB Offset | Low CH 18625 | Mid CH 18900 | High CH 19175 | 3GPP MPR (dB) |
| | | | | Frequency 1852.5 MHz | Frequency 1880 MHz | Frequency 1907.5 MHz | |
| | | 1 | 0 | 23.06 | 23.1 | 23.05 | 0 |
| | | 1 | 12 | 22.99 | 23.05 | 23 | 0 |
| | | 1 | 24 | 22.94 | 22.97 | 22.91 | 0 |
| | | 12 | 0 | 22.06 | 22.2 | 22.15 | 1 |
| | | 12 | 6 | 21.96 | 22.17 | 22.13 | 1 |
| | 16QAM | 12 | 13 | 21.9 | 21.99 | 22.1 | 1 |
| | | 25 | 0 | 21.99 | 22.18 | 22.09 | 1 |
| | | 1 | 0 | 22.06 | 22.1 | 22.05 | 1 |
| | | 1 | 12 | 21.99 | 22.05 | 22 | 1 |
| | | 1 | 24 | 21.94 | 21.97 | 21.91 | 1 |
| | | 12 | 0 | 21.08 | 21.12 | 21.07 | 2 |
| | | 12 | 6 | 21.01 | 21.07 | 21.02 | 2 |

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| LTE Band 2 | | | | | | | | | |
|------------|------------|---------|------------|-----------------------|-----------------------|-------------------------|-----------------------|-------------------------|---------------------|
| BW | Modulation | RB Size | RB Offset | Low CH 18650 | Mid CH 18900 | High CH 19150 | 3GPP MPR (dB) | | |
| | | | | Frequency 1855 MHz | Frequency 1880 MHz | Frequency 1905 MHz | | | |
| 10 MHz | QPSK | 1 | 0 | 23.08 | 23.12 | 23.07 | 0 | | |
| | | 1 | 24 | 23.01 | 23.07 | 23.02 | 0 | | |
| | | 1 | 49 | 22.96 | 22.99 | 22.93 | 0 | | |
| | | 25 | 0 | 22.08 | 22.22 | 22.17 | 1 | | |
| | | 25 | 12 | 21.98 | 22.19 | 22.15 | 1 | | |
| | | 25 | 25 | 21.92 | 22.01 | 22.12 | 1 | | |
| | | 50 | 0 | 22.01 | 22.2 | 22.11 | 1 | | |
| | 16QAM | 1 | 0 | 22.08 | 22.12 | 22.07 | 1 | | |
| | | 1 | 24 | 22.01 | 22.07 | 22.02 | 1 | | |
| | | 1 | 49 | 21.96 | 21.99 | 21.93 | 1 | | |
| | | 25 | 0 | 21.1 | 21.14 | 21.09 | 2 | | |
| | | 25 | 12 | 21.03 | 21.09 | 21.04 | 2 | | |
| | | 25 | 25 | 20.98 | 21.01 | 20.95 | 2 | | |
| | | 50 | 0 | 21.09 | 21.13 | 21.08 | 2 | | |
| 15 MHz | QPSK | BW | Modulation | RB Size | RB Offset | Low CH 18675 | Mid CH 18900 | High CH 19125 | 3GPP MPR (dB) |
| | | | | RB Size | RB Offset | Frequency 1857.5 MHz | Frequency 1880 MHz | Frequency 1902.5 MHz | |
| | | 1 | 0 | 23.12 | 23.16 | 23.11 | 0 | 0 | |
| | | 1 | 37 | 23.05 | 23.11 | 23.06 | 0 | 0 | |
| | | 1 | 74 | 23 | 23.03 | 22.97 | 0 | 0 | |
| | | 36 | 0 | 22.12 | 22.26 | 22.21 | 1 | 1 | |
| | | 36 | 19 | 22.02 | 22.23 | 22.19 | 1 | 1 | |
| | 16QAM | 36 | 39 | 21.96 | 22.05 | 22.16 | 1 | 1 | |
| | | 75 | 0 | 22.05 | 22.24 | 22.15 | 1 | 1 | |
| | | 1 | 0 | 22.12 | 22.16 | 22.11 | 1 | 1 | |
| | | 1 | 37 | 22.05 | 22.11 | 22.06 | 1 | 1 | |
| | | 1 | 74 | 22 | 22.03 | 21.97 | 1 | 1 | |
| | | 36 | 0 | 21.14 | 21.18 | 21.13 | 2 | 2 | |
| | | 36 | 19 | 21.07 | 21.13 | 21.08 | 2 | 2 | |
| | | 36 | 39 | 21.02 | 21.05 | 20.99 | 2 | 2 | |
| | | 75 | 0 | 21.13 | 21.17 | 21.12 | 2 | 2 | |



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| LTE Band 2 | | | | | | | |
|------------|------------|---------|-----------|-----------------------|-----------------------|-----------------------|---------------------|
| BW | Modulation | RB Size | RB Offset | Low CH 18700 | Mid CH 18900 | High CH 19100 | 3GPP MPR (dB) |
| | | | | Frequency 1860 MHz | Frequency 1880 MHz | Frequency 1900 MHz | |
| 20MHz | QPSK | 1 | 0 | 23.18 | 23.22 | 23.17 | 0 |
| | | 1 | 50 | 23.11 | 23.17 | 23.12 | 0 |
| | | 1 | 99 | 23.06 | 23.09 | 23.03 | 0 |
| | | 50 | 0 | 22.18 | 22.32 | 22.27 | 1 |
| | | 50 | 25 | 22.08 | 22.29 | 22.25 | 1 |
| | | 50 | 50 | 22.02 | 22.11 | 22.22 | 1 |
| | | 100 | 0 | 22.11 | 22.3 | 22.21 | 1 |
| | 16QAM | 1 | 0 | 22.18 | 22.22 | 22.17 | 1 |
| | | 1 | 50 | 22.11 | 22.17 | 22.12 | 1 |
| | | 1 | 99 | 22.06 | 22.09 | 22.03 | 1 |
| | | 50 | 0 | 21.2 | 21.24 | 21.19 | 2 |
| | | 50 | 25 | 21.13 | 21.19 | 21.14 | 2 |
| | | 50 | 50 | 21.08 | 21.11 | 21.05 | 2 |
| | | 100 | 0 | 21.19 | 21.23 | 21.18 | 2 |

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EIRP POWER (dBm)

GSM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|
| 512 | 1850.2 | -14.65 | 41.66 | 27.01 | 502.34 | H |
| 661 | 1880.0 | -14.50 | 42.34 | 27.84 | 608.14 | H |
| 810 | 1909.8 | -14.72 | 42.49 | 27.77 | 598.41 | H |
| 512 | 1850.2 | -17.74 | 44.28 | 26.54 | 450.82 | V |
| 661 | 1880.0 | -17.58 | 44.1 | 26.52 | 448.75 | V |
| 810 | 1909.8 | -17.65 | 44.42 | 26.77 | 475.34 | V |

EDGE

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|
| 512 | 1850.2 | -19.54 | 41.66 | 22.12 | 162.93 | H |
| 661 | 1880.0 | -19.87 | 42.34 | 22.47 | 176.60 | H |
| 810 | 1909.8 | -19.24 | 42.49 | 23.25 | 211.35 | H |
| 512 | 1850.2 | -21.68 | 44.24 | 22.56 | 180.30 | V |
| 661 | 1880.0 | -21.51 | 44.01 | 22.50 | 177.83 | V |
| 810 | 1909.8 | -21.18 | 44.79 | 23.61 | 229.61 | V |

WCDMA

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|
| 9262 | 1852.4 | -20.58 | 41.69 | 21.11 | 129.12 | H |
| 9400 | 1880.0 | -20.76 | 42.34 | 21.58 | 143.88 | H |
| 9538 | 1907.6 | -20.64 | 42.77 | 22.13 | 163.31 | H |
| 9262 | 1852.4 | -23.54 | 44.24 | 20.70 | 117.49 | V |
| 9400 | 1880.0 | -23.98 | 44.01 | 20.03 | 100.69 | V |
| 9538 | 1907.6 | -23.65 | 44.79 | 21.14 | 130.02 | V |

REMARKS: 1. EIRP Output Power (dBm) = LVL (dBm) + Correction Factor (dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

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LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18607 | 1850.7 | -21.04 | 43.71 | 22.67 | 184.93 | H | 1 |
| 18900 | 1880.0 | -20.89 | 43.25 | 22.36 | 172.19 | H | 1 |
| 19193 | 1909.3 | -20.67 | 42.98 | 22.31 | 170.22 | H | 1 |
| 18607 | 1850.7 | -19.96 | 45.23 | 25.27 | 336.51 | V | 1 |
| 18900 | 1880.0 | -19.79 | 45.11 | 25.32 | 340.41 | V | 1 |
| 19193 | 1909.3 | -19.68 | 44.48 | 24.80 | 302.00 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 1.4MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18607 | 1850.7 | -21.84 | 43.71 | 21.87 | 153.82 | H | 1 |
| 18900 | 1880.0 | -21.74 | 43.25 | 21.51 | 141.58 | H | 1 |
| 19193 | 1909.3 | -21.65 | 42.98 | 21.33 | 135.83 | H | 1 |
| 18607 | 1850.7 | -20.64 | 45.23 | 24.59 | 287.74 | V | 1 |
| 18900 | 1880.0 | -20.54 | 45.11 | 24.57 | 286.42 | V | 1 |
| 19193 | 1909.3 | -20.43 | 44.48 | 24.05 | 254.10 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)-2.15dB.

CHANNEL BANDWIDTH: 3MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18615 | 1851.5 | -21.47 | 43.73 | 22.26 | 168.27 | H | 1 |
| 18900 | 1880.0 | -21.49 | 43.25 | 21.76 | 149.97 | H | 1 |
| 19185 | 1908.5 | -21.56 | 42.99 | 21.43 | 139.00 | H | 1 |
| 18615 | 1851.5 | -19.21 | 45.39 | 26.18 | 414.95 | V | 1 |
| 18900 | 1880.0 | -19.44 | 45.11 | 25.67 | 368.98 | V | 1 |
| 19185 | 1908.5 | -19.46 | 44.70 | 25.24 | 334.20 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

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CHANNEL BANDWIDTH: 3MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18615 | 1851.5 | -22.39 | 43.73 | 21.34 | 136.14 | H | 1 |
| 18900 | 1880.0 | -21.86 | 43.25 | 21.39 | 137.72 | H | 1 |
| 19185 | 1908.5 | -21.70 | 42.99 | 21.29 | 134.59 | H | 1 |
| 18615 | 1851.5 | -20.22 | 45.39 | 25.17 | 328.85 | V | 1 |
| 18900 | 1880.0 | -19.82 | 45.11 | 25.29 | 338.06 | V | 1 |
| 19185 | 1908.5 | -19.54 | 44.70 | 25.16 | 328.10 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 5MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18625 | 1852.5 | -21.87 | 43.90 | 22.03 | 159.59 | H | 1 |
| 18900 | 1880.0 | -21.48 | 43.25 | 21.77 | 150.31 | H | 1 |
| 19175 | 1907.5 | -21.99 | 43.19 | 21.20 | 131.83 | H | 1 |
| 18625 | 1852.5 | -19.54 | 45.36 | 25.82 | 381.94 | V | 1 |
| 18900 | 1880.0 | -19.24 | 45.11 | 25.87 | 386.37 | V | 1 |
| 19175 | 1907.5 | -19.75 | 44.69 | 24.94 | 311.89 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 5MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18625 | 1852.5 | -22.55 | 43.90 | 21.35 | 136.46 | H | 1 |
| 18900 | 1880.0 | -22.02 | 43.25 | 21.23 | 132.74 | H | 1 |
| 19175 | 1907.5 | -22.75 | 43.19 | 20.44 | 110.66 | H | 1 |
| 18625 | 1852.5 | -20.88 | 45.36 | 24.48 | 280.54 | V | 1 |
| 18900 | 1880.0 | -20.65 | 45.11 | 24.46 | 279.25 | V | 1 |
| 19175 | 1907.5 | -20.00 | 44.69 | 24.69 | 294.44 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

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CHANNEL BANDWIDTH: 10MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18650 | 1855.0 | -21.48 | 43.73 | 22.25 | 167.88 | H | 1 |
| 18900 | 1880.0 | -21.57 | 43.25 | 21.68 | 147.23 | H | 1 |
| 19150 | 1905.0 | -21.54 | 43.34 | 21.80 | 151.36 | H | 1 |
| 18650 | 1855.0 | -19.24 | 45.36 | 26.12 | 409.26 | V | 1 |
| 18900 | 1880.0 | -19.33 | 45.11 | 25.78 | 378.44 | V | 1 |
| 19150 | 1905.0 | -19.29 | 44.60 | 25.31 | 339.63 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 10MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18650 | 1855.0 | -22.48 | 43.73 | 21.25 | 133.35 | H | 1 |
| 18900 | 1880.0 | -22.57 | 43.25 | 20.68 | 116.95 | H | 1 |
| 19150 | 1905.0 | -22.54 | 43.34 | 20.80 | 120.23 | H | 1 |
| 18650 | 1855.0 | -20.24 | 45.36 | 25.12 | 325.09 | V | 1 |
| 18900 | 1880.0 | -20.33 | 45.11 | 24.78 | 300.61 | V | 1 |
| 19150 | 1905.0 | -20.29 | 44.60 | 24.31 | 269.77 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 15MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18675 | 1857.5 | -21.54 | 44.17 | 22.63 | 183.23 | H | 1 |
| 18900 | 1880.0 | -21.20 | 43.25 | 22.05 | 160.32 | H | 1 |
| 19125 | 1902.5 | -21.47 | 43.24 | 21.77 | 150.31 | H | 1 |
| 18675 | 1857.5 | -19.22 | 45.59 | 26.37 | 433.51 | V | 1 |
| 18900 | 1880.0 | -19.47 | 45.11 | 25.64 | 366.44 | V | 1 |
| 19125 | 1902.5 | -19.20 | 44.78 | 25.58 | 361.41 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

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CHANNEL BANDWIDTH: 15MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18675 | 1857.5 | -22.54 | 44.17 | 21.63 | 145.55 | H | 1 |
| 18900 | 1880.0 | -22.20 | 43.25 | 21.05 | 127.35 | H | 1 |
| 19125 | 1902.5 | -22.47 | 43.24 | 20.77 | 119.40 | H | 1 |
| 18675 | 1857.5 | -20.22 | 45.59 | 25.37 | 344.35 | V | 1 |
| 18900 | 1880.0 | -20.47 | 45.11 | 24.64 | 291.07 | V | 1 |
| 19125 | 1902.5 | -20.20 | 44.78 | 24.58 | 287.08 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 20MHz QPSK

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|---------------|--------------------|-----------|
| 18700 | 1860.0 | -21.74 | 43.91 | 22.17 | 164.82 | H | 1 |
| 18900 | 1880.0 | -21.93 | 43.25 | 21.32 | 135.52 | H | 1 |
| 19100 | 1900.0 | -21.86 | 43.50 | 21.64 | 145.88 | H | 1 |
| 18700 | 1860.0 | -19.44 | 45.51 | 26.07 | 404.58 | V | 1 |
| 18900 | 1880.0 | -19.56 | 45.11 | 25.55 | 358.92 | V | 1 |
| 19100 | 1900.0 | -19.52 | 45.23 | 25.71 | 372.39 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)

CHANNEL BANDWIDTH: 20MHz 16QAM

| Channel | Frequency (MHz) | LVL (dBm) | Correction Factor(dB) | EIRP(dBm) | EIRP(mW) | Polarization (H/V) | LIMIT (W) |
|---------|-----------------|-----------|-----------------------|-----------|----------|--------------------|-----------|
| 18700 | 1860.0 | -22.74 | 43.91 | 21.17 | 130.92 | H | 1 |
| 18900 | 1880.0 | -22.93 | 43.25 | 20.32 | 107.65 | H | 1 |
| 19100 | 1900.0 | -22.86 | 43.50 | 20.64 | 115.88 | H | 1 |
| 18700 | 1860.0 | -20.44 | 45.51 | 25.07 | 321.37 | V | 1 |
| 18900 | 1880.0 | -20.56 | 45.11 | 24.55 | 285.10 | V | 1 |
| 19100 | 1900.0 | -20.52 | 45.23 | 24.71 | 295.80 | V | 1 |

NOTE: EIRP (dBm) = LVL (dBm) + Correction Factor (dB)



4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

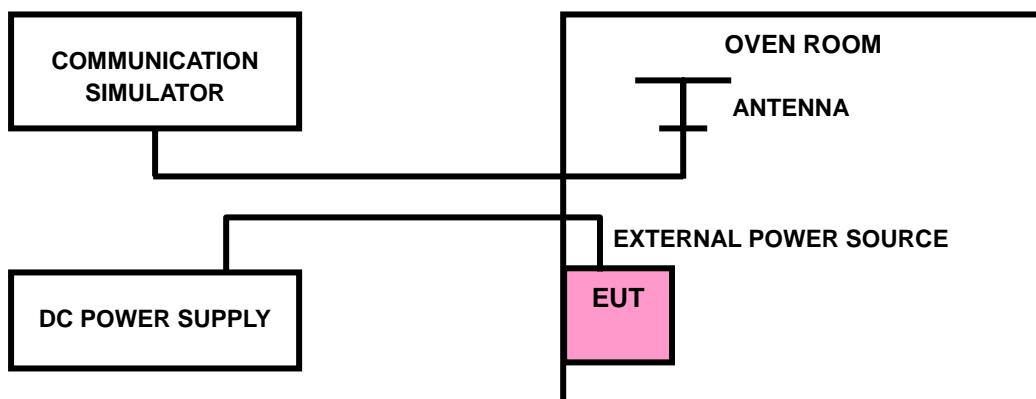
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 TEST PROCEDURE

- a. 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.
- b. 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.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ 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





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4.2.4 TEST RESULTS

FREQUENCY ERROR VS. VOLTAGE

| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) | | | LIMIT (ppm) |
|-----------------|-----------------------|--------|--------|-------------|
| | GSM | EDGE | WCDMA | |
| 3.8 | 0.001 | 0.000 | 0.001 | 2.5 |
| 3.5 | -0.002 | -0.002 | -0.002 | 2.5 |
| 4.35 | 0.003 | 0.003 | 0.002 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

| TEMP. (°C) | FREQUENCY ERROR (PPM) | | | LIMIT (PPM) |
|------------|-----------------------|--------|--------|-------------|
| | GSM | EDGE | WCDMA | |
| -30 | -0.007 | -0.007 | -0.006 | 2.5 |
| -20 | -0.006 | -0.006 | -0.005 | 2.5 |
| -10 | -0.005 | -0.005 | -0.004 | 2.5 |
| 0 | -0.004 | -0.004 | -0.003 | 2.5 |
| 10 | -0.003 | -0.002 | -0.002 | 2.5 |
| 20 | -0.001 | -0.001 | -0.001 | 2.5 |
| 30 | 0.000 | 0.000 | 0.000 | 2.5 |
| 40 | 0.002 | 0.002 | 0.001 | 2.5 |
| 50 | 0.002 | 0.002 | 0.003 | 2.5 |
| 60 | 0.003 | 0.004 | 0.003 | 2.5 |

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LTE BAND 2

| AFC FREQUENCY ERROR vs. VOLTAGE | | | | | | | |
|---------------------------------|-----------------------|--------|-------|--------|--------|-------|-------------|
| VOLTAGE (Volts) | FREQUENCY ERROR (ppm) | | | | | | LIMIT (ppm) |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz | |
| 3.8 | -0.010 | -0.018 | 0.017 | -0.010 | -0.019 | 0.015 | 2.5 |
| 3.5 | -0.006 | -0.016 | 0.015 | -0.015 | -0.015 | 0.014 | 2.5 |
| 4.35 | -0.007 | -0.015 | 0.012 | -0.017 | -0.013 | 0.010 | 2.5 |

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.35Vdc.

| AFC FREQUENCY ERROR vs. TEMPERATURE | | | | | | | |
|-------------------------------------|-----------------------|--------|--------|--------|--------|--------|-------------|
| TEMP. (°C) | FREQUENCY ERROR (ppm) | | | | | | LIMIT (ppm) |
| | 1.4MHz | 3MHz | 5MHz | 10MHz | 15MHz | 20MHz | |
| -30 | -0.010 | -0.010 | -0.010 | -0.011 | -0.003 | -0.012 | 2.5 |
| -20 | -0.008 | -0.009 | -0.008 | -0.010 | -0.005 | -0.010 | 2.5 |
| -10 | -0.008 | -0.008 | -0.007 | -0.009 | -0.007 | -0.009 | 2.5 |
| 0 | -0.006 | -0.006 | -0.005 | -0.007 | -0.006 | -0.007 | 2.5 |
| 10 | -0.004 | -0.004 | 0.004 | -0.006 | -0.005 | -0.003 | 2.5 |
| 20 | -0.003 | 0.005 | 0.006 | -0.006 | -0.007 | 0.000 | 2.5 |
| 30 | -0.003 | 0.005 | 0.008 | 0.001 | -0.004 | 0.002 | 2.5 |
| 40 | -0.008 | 0.007 | 0.009 | 0.003 | -0.007 | 0.005 | 2.5 |
| 50 | -0.010 | 0.008 | 0.009 | 0.003 | -0.002 | 0.005 | 2.5 |
| 60 | -0.008 | 0.009 | 0.010 | 0.004 | -0.004 | 0.006 | 2.5 |

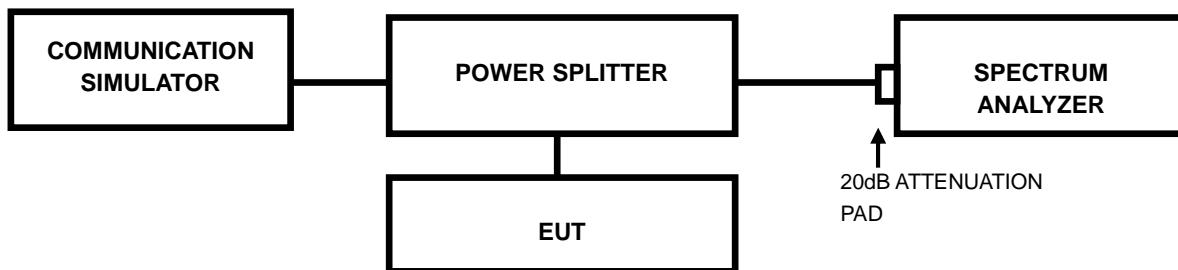


4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

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



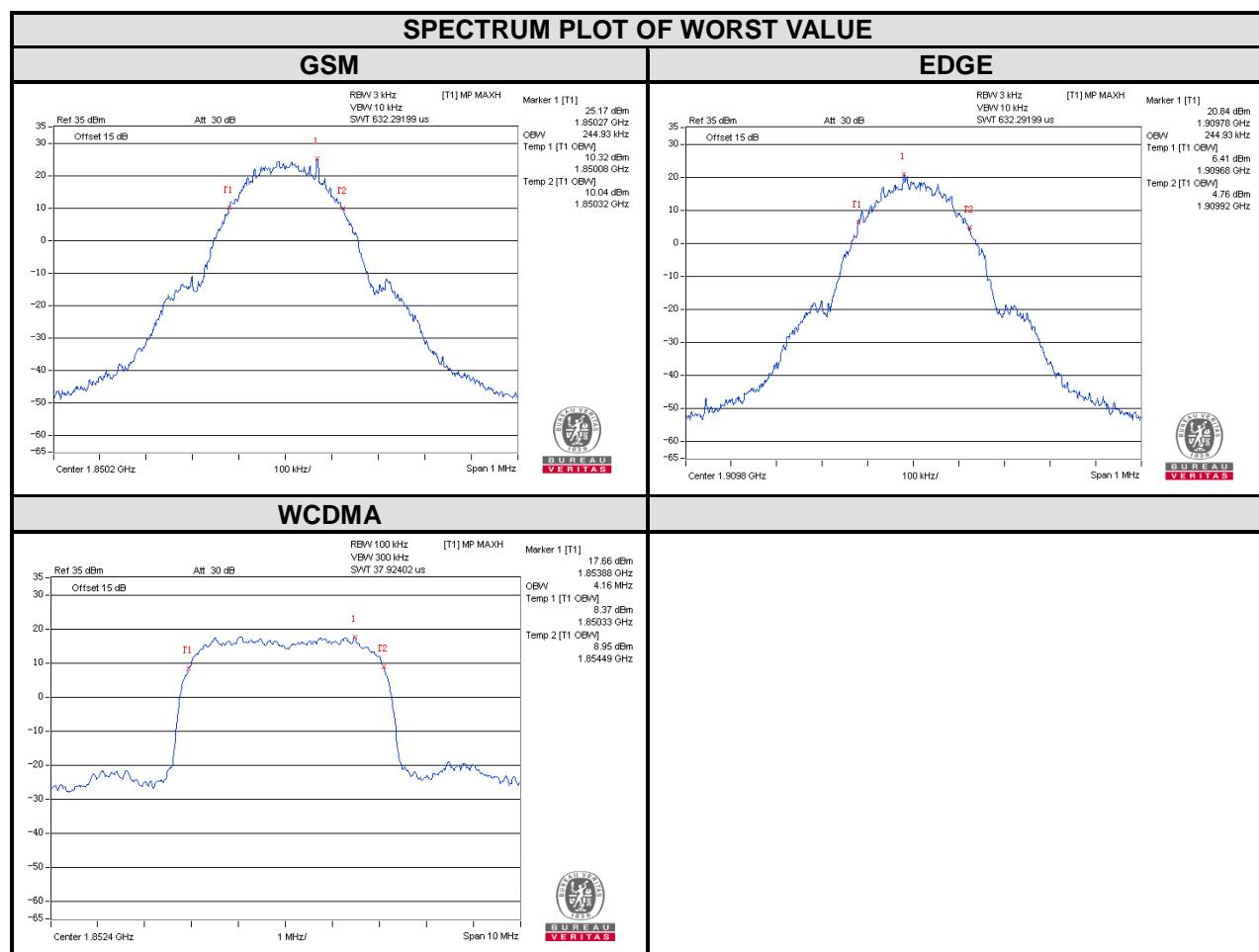


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4.3.3 TEST RESULTS

| CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (kHz) | | CHANNEL | FREQUENCY (MHz) | 99% OCCUPIED BANDWIDTH (MHz) | |
|---------|--------------------|---------------------------------|--------|---------|--------------------|---------------------------------|--|
| | | GSM | EDGE | | | WCDMA | |
| 512 | 1850.2 | 244.93 | 243.48 | 9262 | 1852.4 | 4.16 | |
| 661 | 1880.0 | 244.93 | 243.48 | 9400 | 1880.0 | 4.16 | |
| 810 | 1909.8 | 244.93 | 244.93 | 9538 | 1907.6 | 4.16 | |



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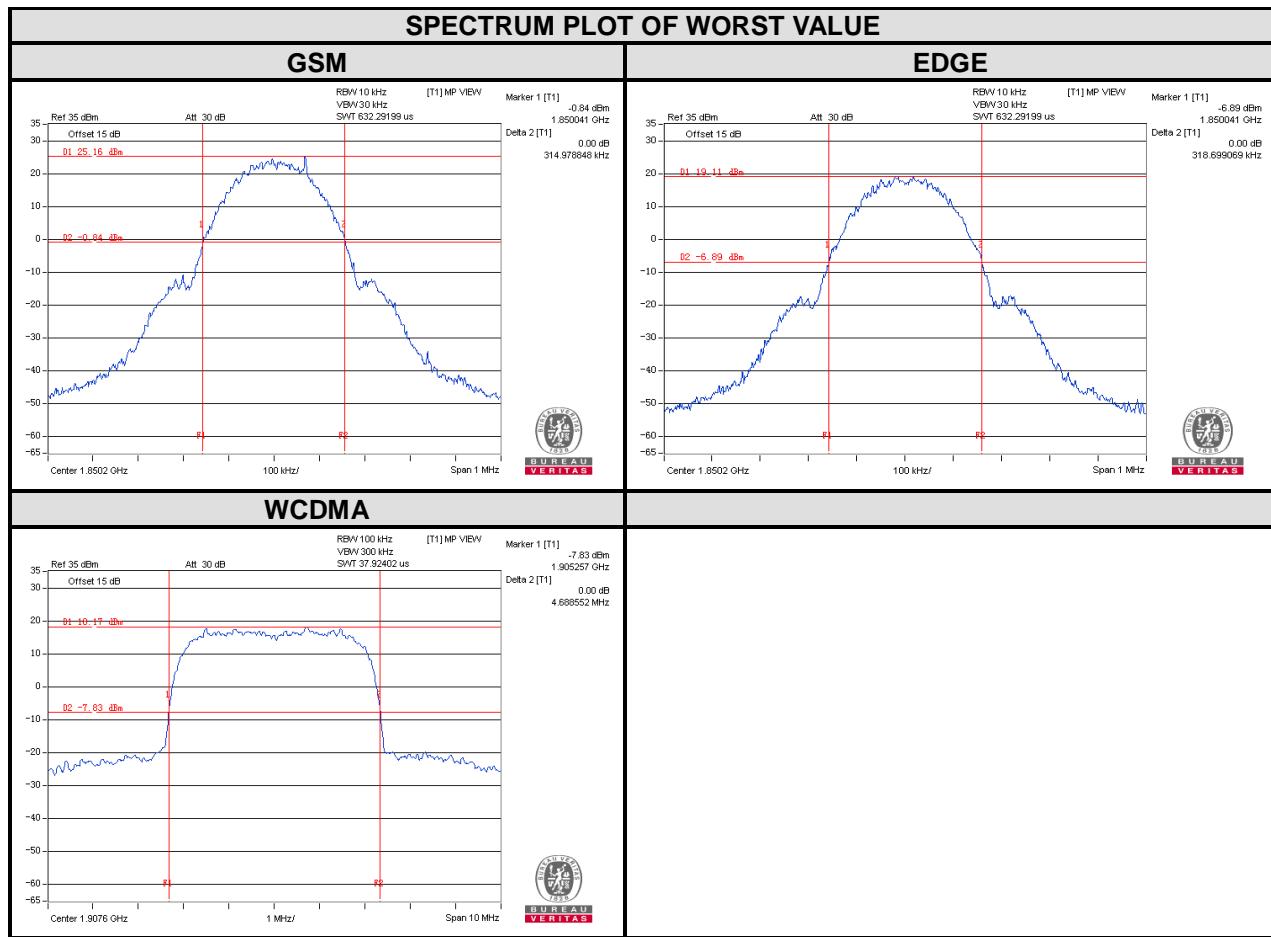
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| CHANNEL | FREQUENCY (MHz) | 26dB BANDWIDTH (kHz) | | CHANNEL | FREQUENCY (MHz) | 26dB BANDWIDTH (MHz) | |
|---------|--------------------|-------------------------|--------|---------|--------------------|-------------------------|--|
| | | GSM | EDGE | | | WCDMA | |
| 512 | 1850.2 | 314.98 | 318.7 | 9262 | 1852.4 | 4.67 | |
| 661 | 1880.0 | 313.82 | 316.67 | 9400 | 1880.0 | 4.66 | |
| 810 | 1909.8 | 311.95 | 317.74 | 9538 | 1907.6 | 4.69 | |



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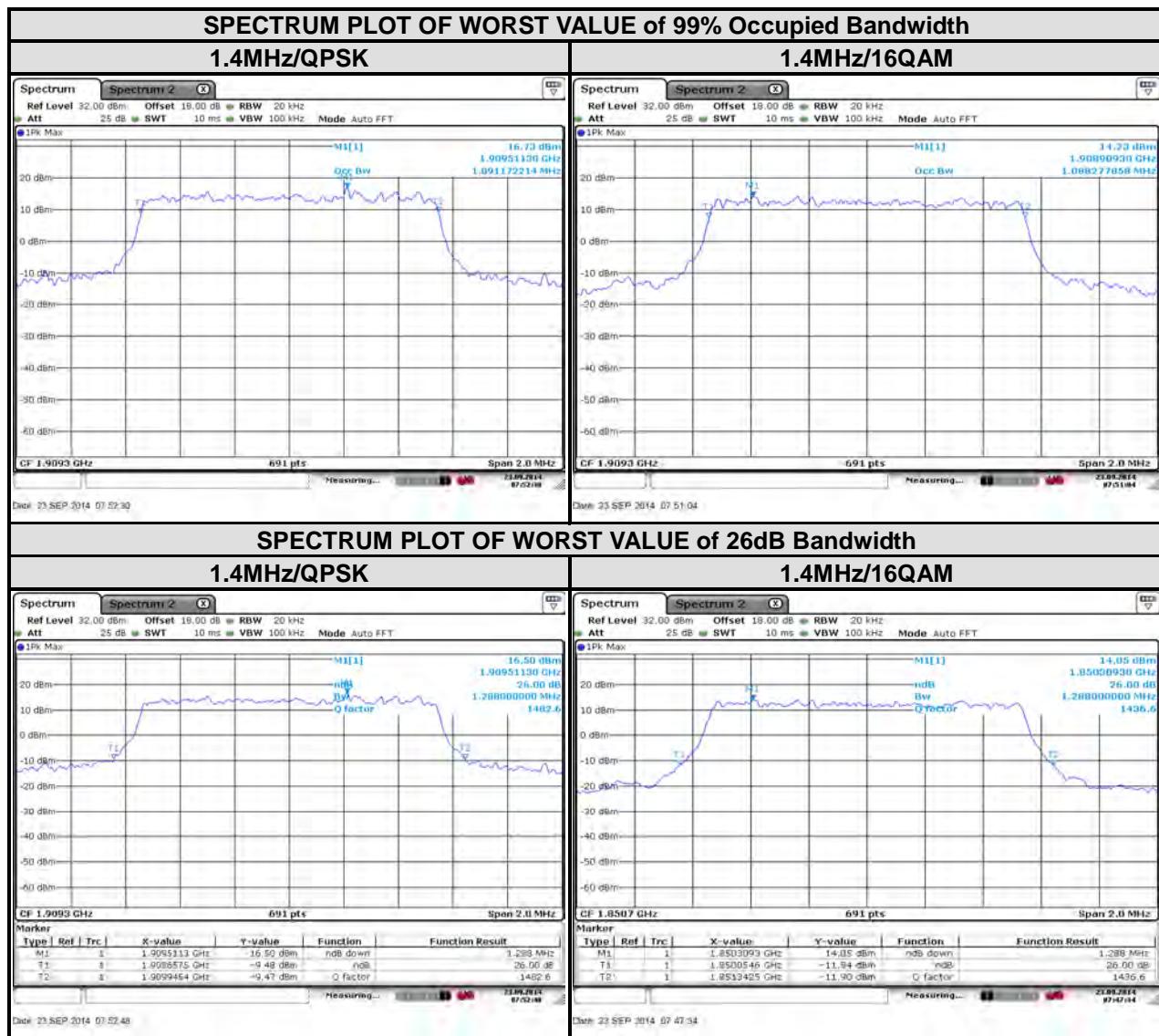
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| LTE band 2 | | | | | | | |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|-----------------------|-------|
| Channel Bandwidth : 1.4MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18607 | 1850.7 | 1.09 | 1.08 | 18607 | 1850.7 | 1.28 | 1.29 |
| 18900 | 1880 | 1.09 | 1.09 | 18900 | 1880 | 1.27 | 1.29 |
| 19193 | 1909.3 | 1.09 | 1.09 | 19193 | 1909.3 | 1.29 | 1.34 |



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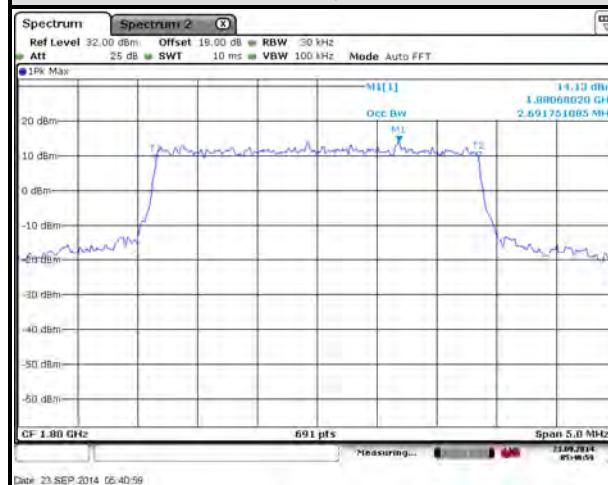
LTE band 2

Channel Bandwidth : 3MHz

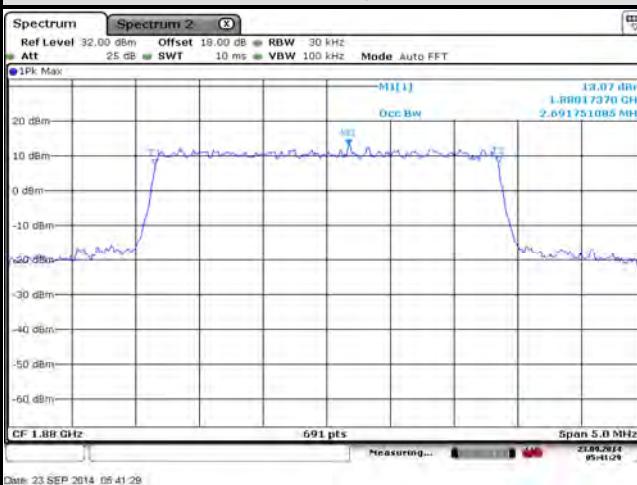
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
|---------|--------------------|---------------------------------|-------|---------|--------------------|--------------------------|-------|
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18615 | 1851.5 | 2.68 | 2.69 | 18615 | 1851.5 | 2.96 | 2.98 |
| 18900 | 1880 | 2.69 | 2.69 | 18900 | 1880 | 2.98 | 2.92 |
| 19185 | 1908.5 | 2.69 | 2.69 | 19185 | 1908.5 | 2.99 | 2.97 |

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

3MHz/QPSK

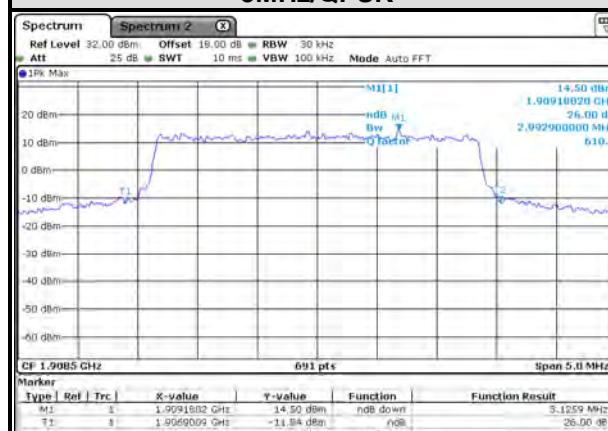


3MHz/16QAM

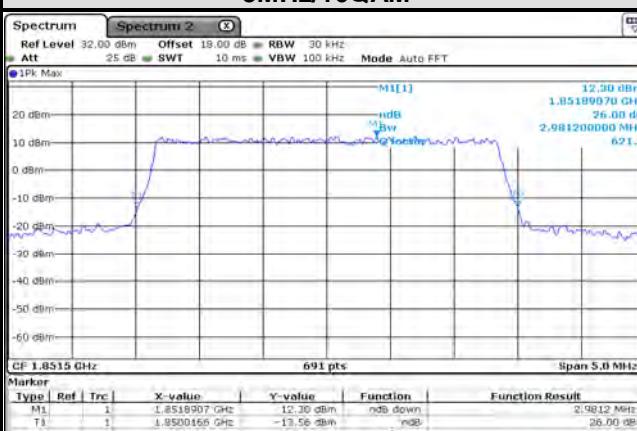


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

3MHz/QPSK



3MHz/16QAM



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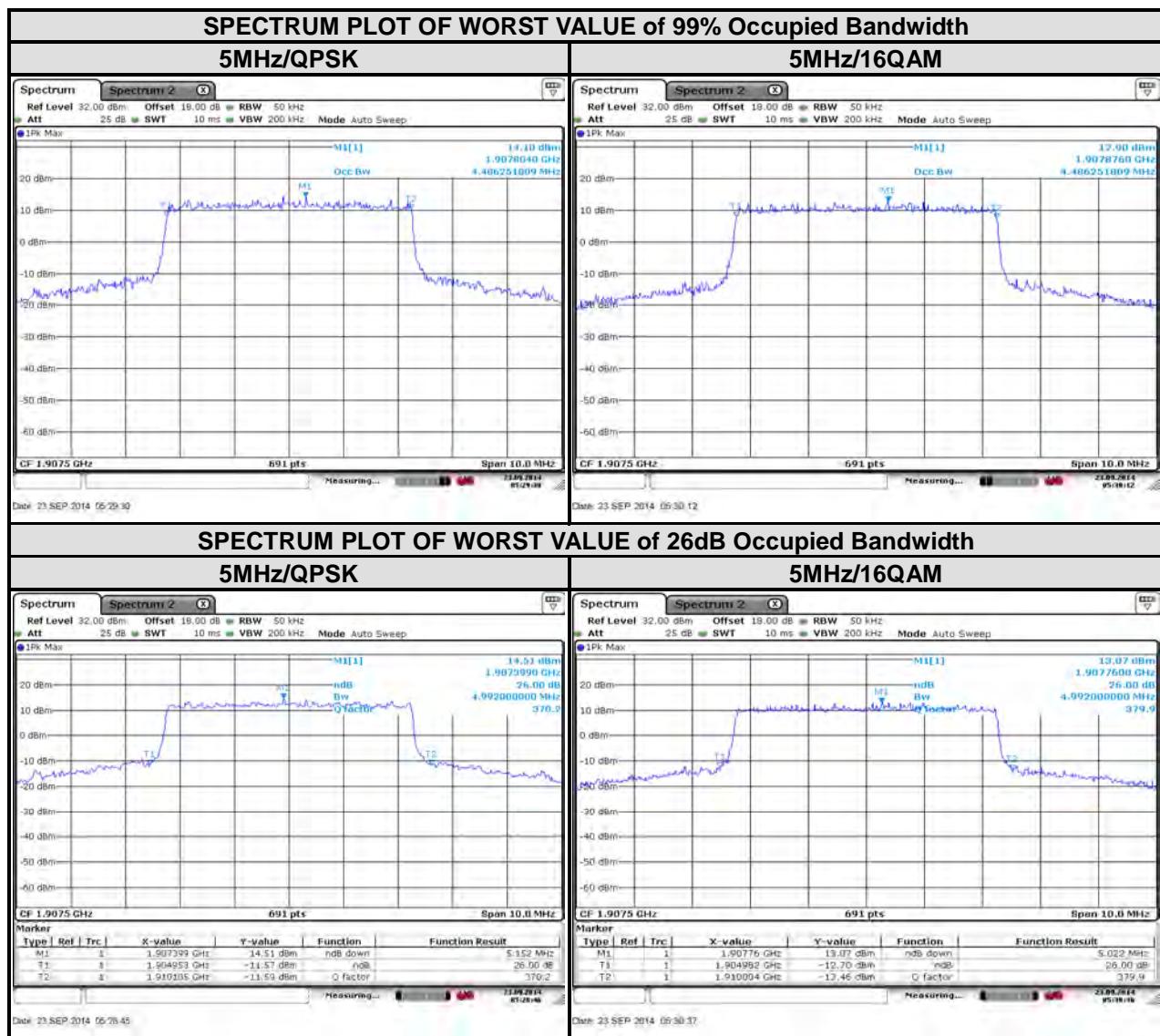
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| LTE band 2 | | | | | | | |
|---------------------------|-----------------|------------------------------|-------|---------|-----------------|-----------------------|-------|
| Channel Bandwidth : 5 MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18625 | 1852.5 | 4.49 | 4.47 | 18625 | 1852.5 | 4.91 | 4.92 |
| 18900 | 1880 | 4.49 | 4.47 | 18900 | 1880 | 4.94 | 4.92 |
| 19175 | 1907.5 | 4.49 | 4.49 | 19175 | 1907.5 | 4.99 | 4.99 |



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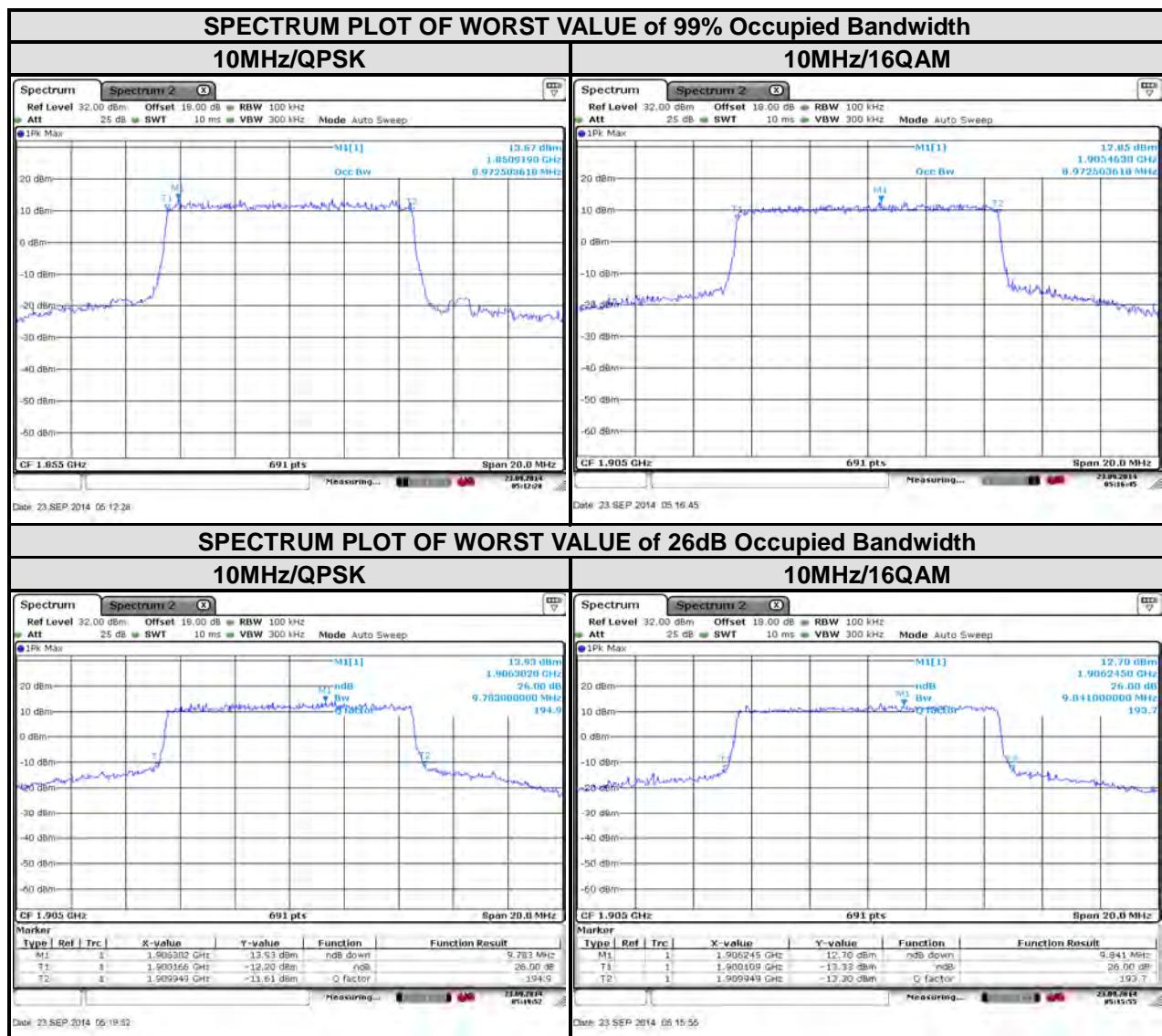
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| LTE band 2 | | | | | | | |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|-----------------------|-------|
| Channel Bandwidth : 10 MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18650 | 1855 | 8.97 | 8.91 | 18650 | 1855 | 9.75 | 9.75 |
| 18900 | 1880 | 8.94 | 8.91 | 18900 | 1880 | 9.75 | 9.78 |
| 19150 | 1905 | 8.94 | 8.97 | 19150 | 1905 | 9.78 | 9.84 |



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LTE band 2

Channel Bandwidth : 15 MHz

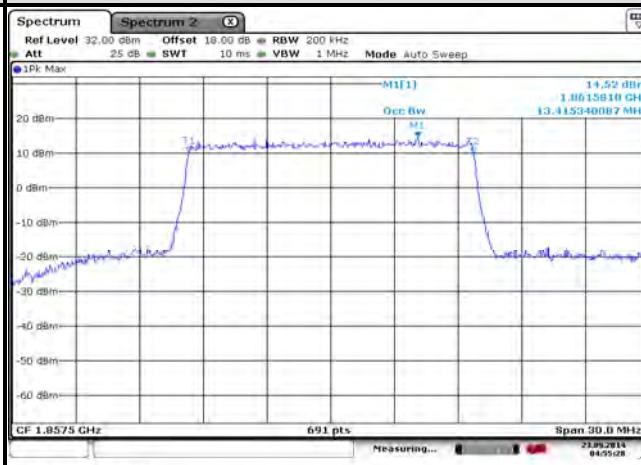
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
|---------|-----------------|------------------------------|-------|---------|-----------------|-----------------------|-------|
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18675 | 1857.5 | 13.46 | 13.42 | 18675 | 1857.5 | 14.63 | 14.54 |
| 18900 | 1880 | 13.37 | 13.37 | 18900 | 1880 | 14.59 | 14.54 |
| 19125 | 1902.5 | 13.42 | 13.42 | 19125 | 1902.5 | 14.67 | 14.54 |

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

15MHz/QPSK

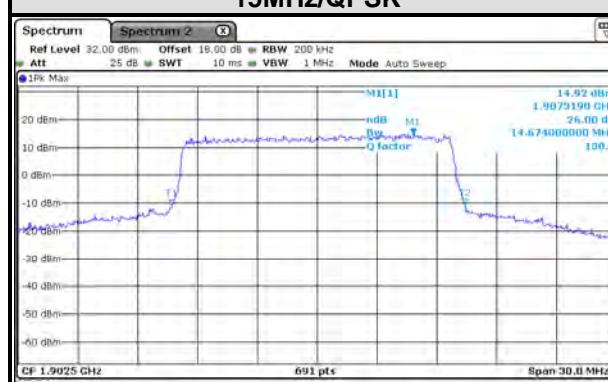


15MHz/16QAM

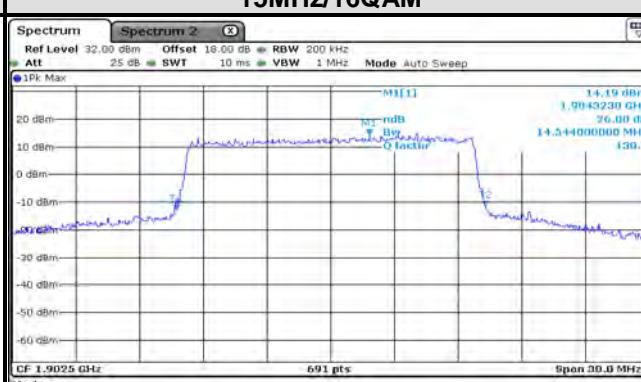


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

15MHz/QPSK



15MHz/16QAM



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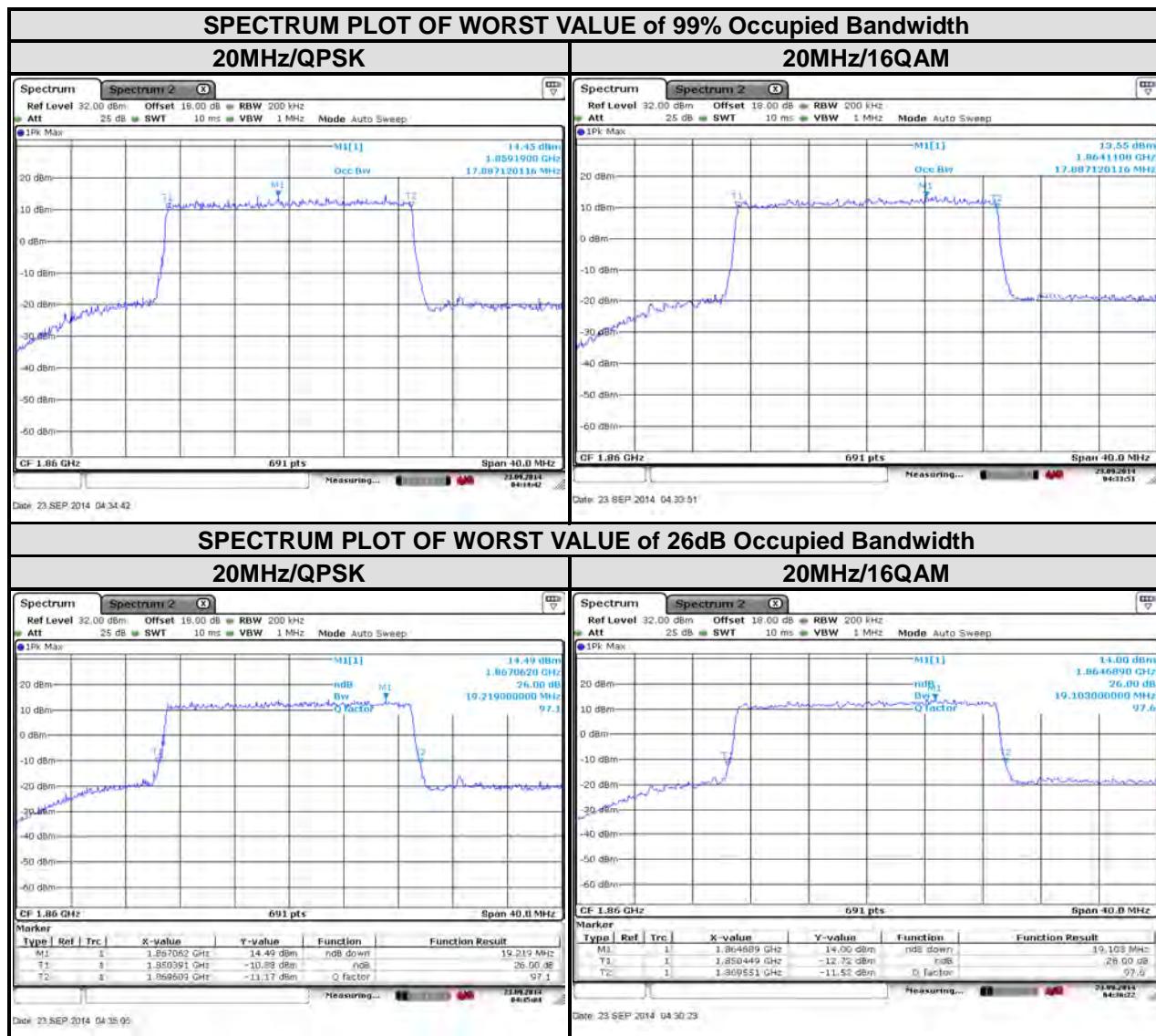
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| LTE band 2 | | | | | | | |
|----------------------------|-----------------|------------------------------|-------|---------|-----------------|-----------------------|-------|
| Channel Bandwidth : 20 MHz | | | | | | | |
| Channel | Frequency (MHz) | 99% Occupied bandwidth (MHz) | | Channel | Frequency (MHz) | 26 dB bandwidth (MHz) | |
| | | QPSK | 16QAM | | | QPSK | 16QAM |
| 18700 | 1860 | 17.89 | 17.89 | 18700 | 1860 | 19.22 | 19.10 |
| 18900 | 1880 | 17.83 | 17.83 | 18900 | 1880 | 18.87 | 18.87 |
| 19100 | 1900 | 17.83 | 17.89 | 19100 | 1900 | 18.99 | 19.10 |



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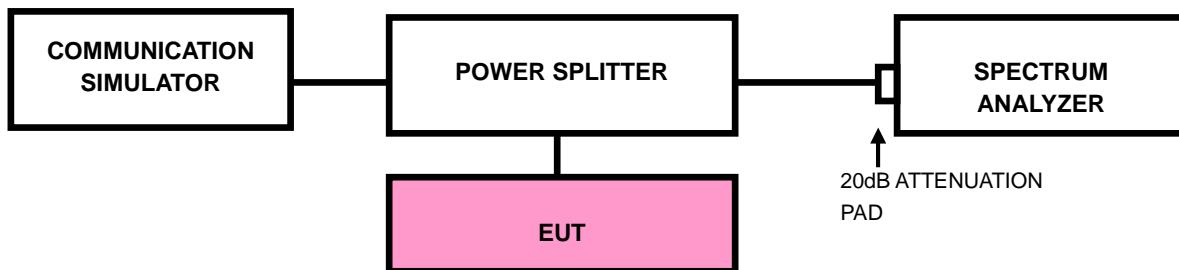


4.4 BAND EDGE MEASUREMENT

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 1.5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).
- d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 20kHz and VB of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz)
- e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz. (LTE bandwidth 3MHz)
- f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz.



RB of the spectrum is 50kHz and VB of the spectrum is 200kHz. (LTE bandwidth 5MHz)

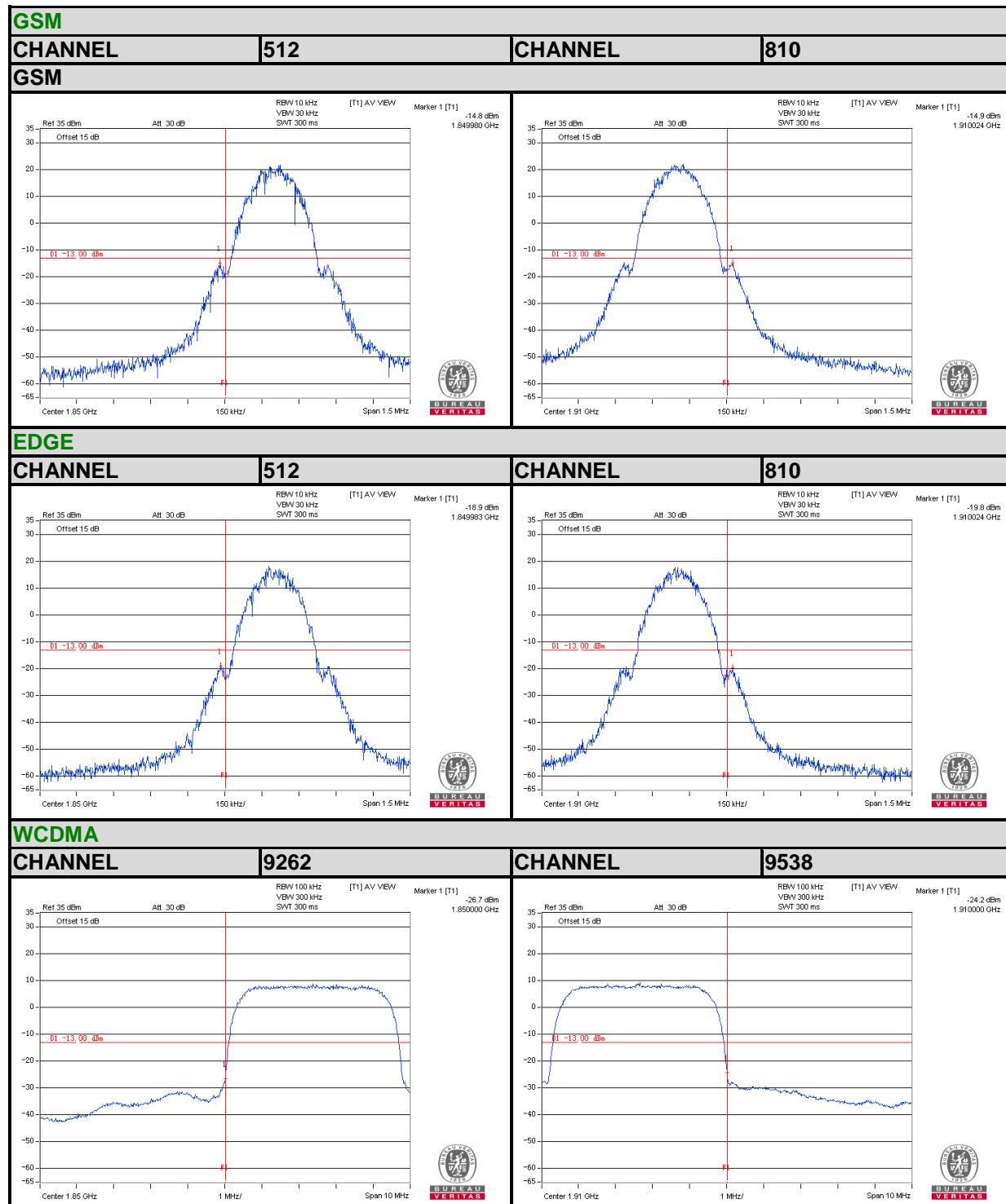
- g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz.
RB of the spectrum is 100kHz and VB of the spectrum is 300kHz. (LTE bandwidth 10MHz)
- h. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz.
RB of the spectrum is 200kHz and VB of the spectrum is 1MHz. (LTE bandwidth 15MHz)
- i. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz.
RB of the spectrum is 200kHz and VB of the spectrum is 1MHz. (LTE bandwidth 20MHz)
- j. Record the max trace plot into the test report.



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4.4.4. TEST RESULTS



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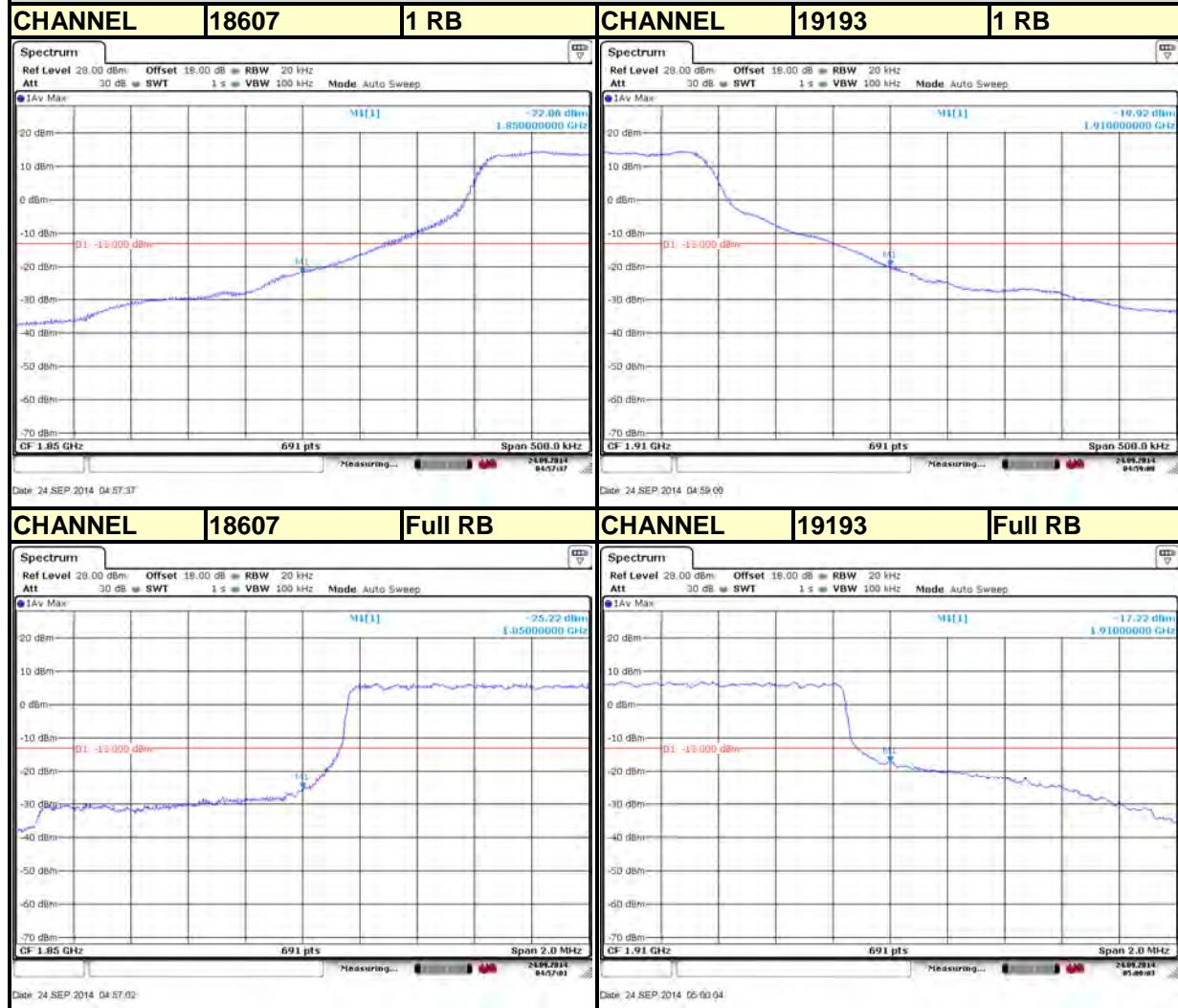


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LTE BAND 2

Channel Bandwidth: 1.4MHz



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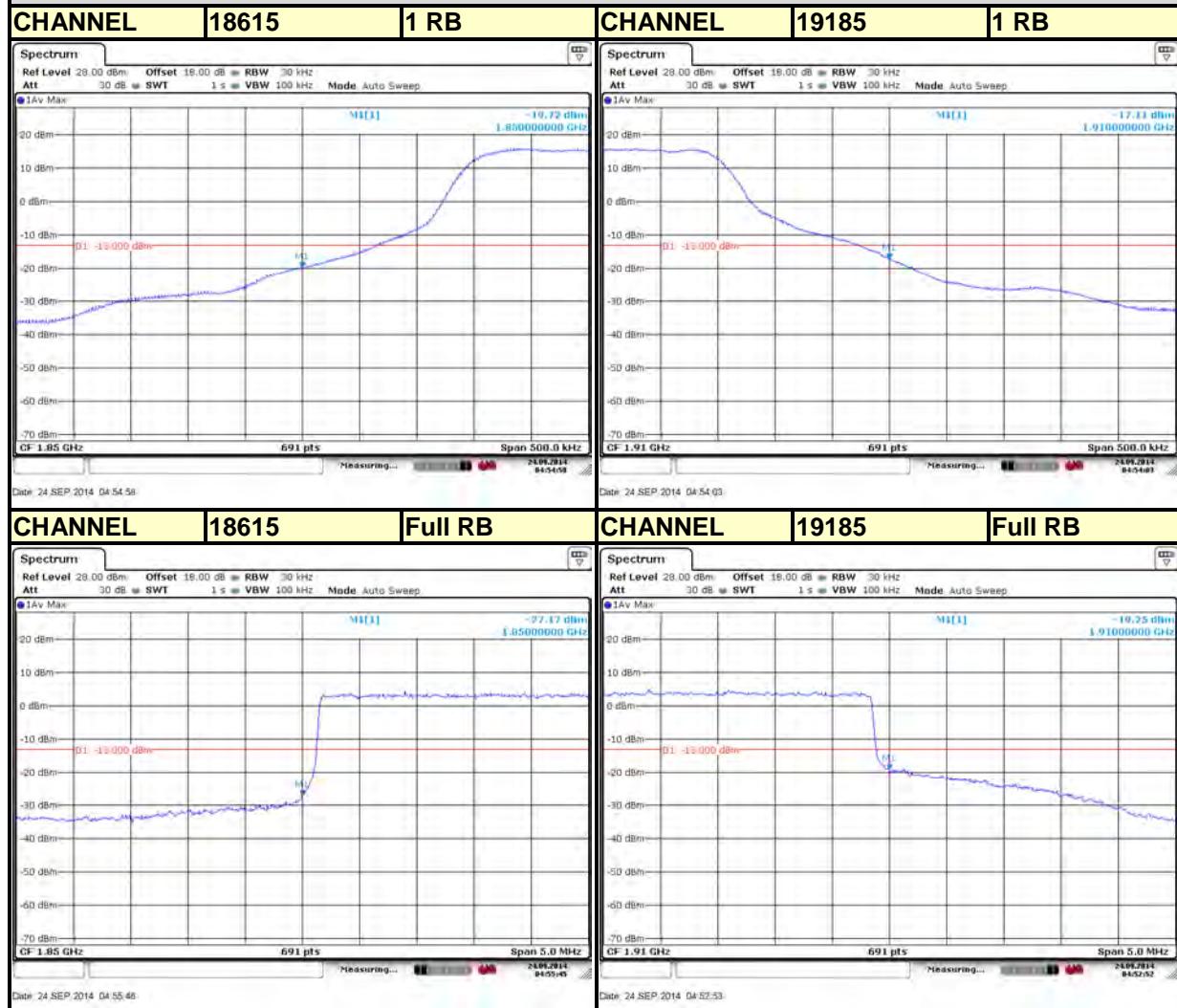


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LTE BAND 2

Channel Bandwidth: 3MHz



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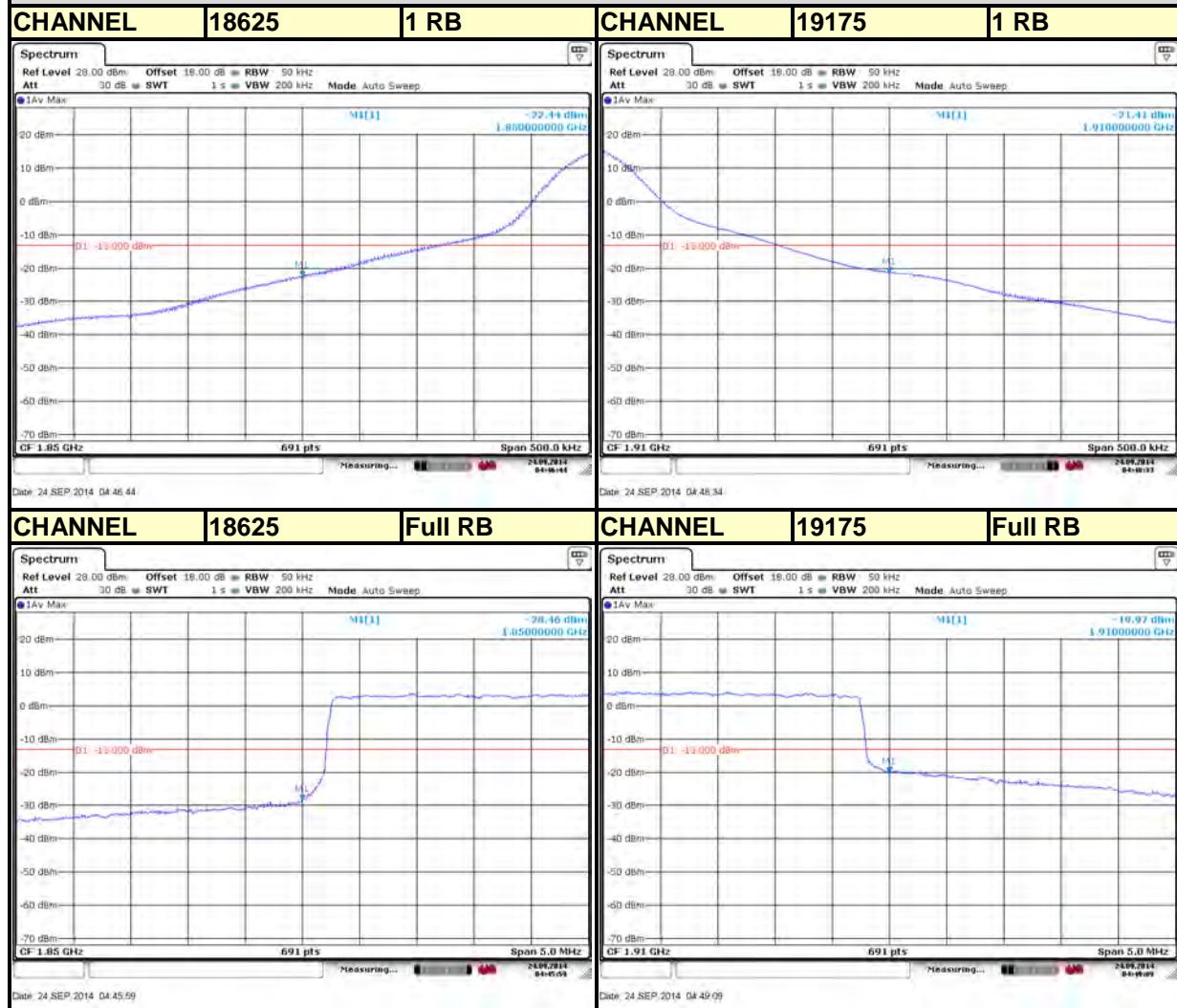


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LTE BAND 2

Channel Bandwidth: 5MHz



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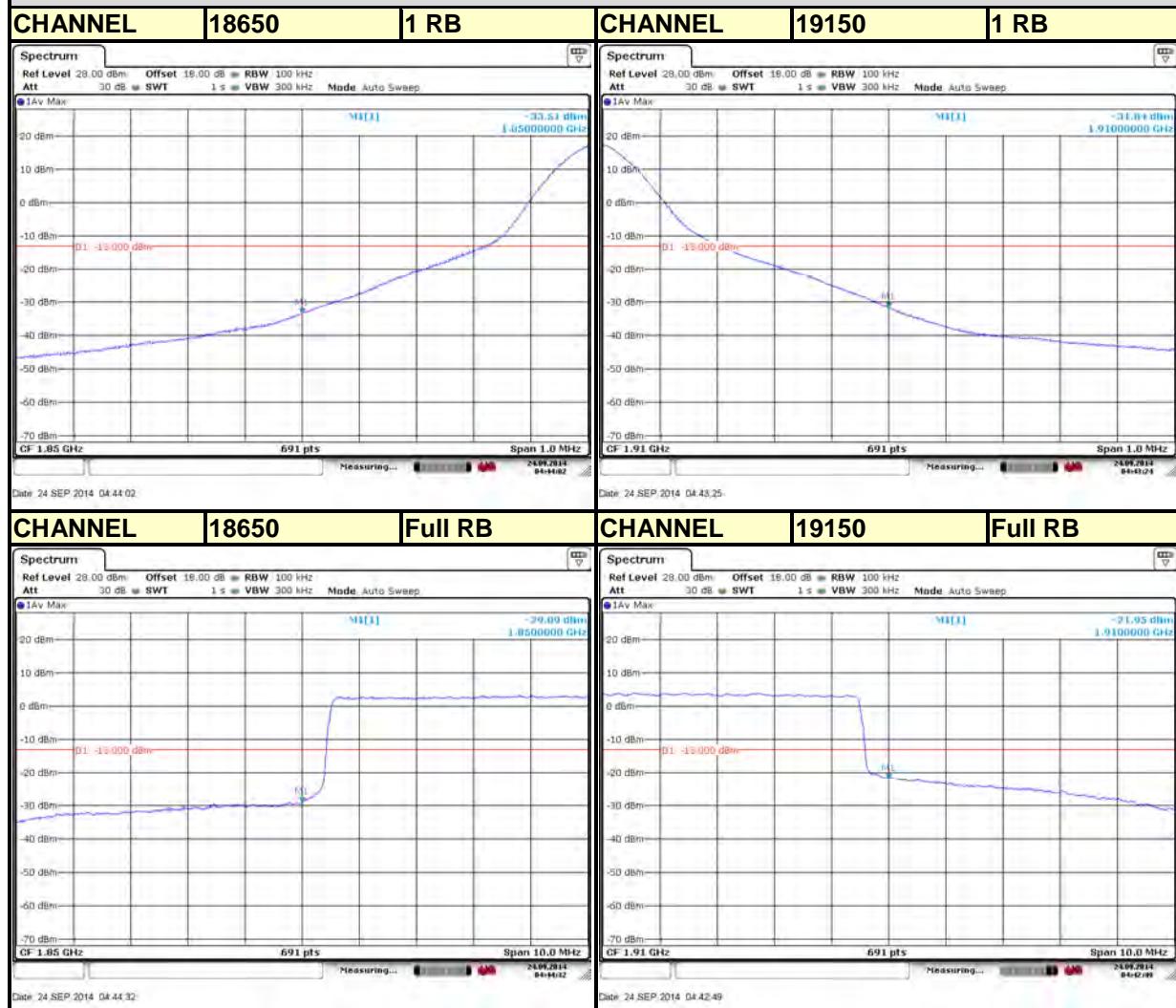


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LTE BAND 2

Channel Bandwidth: 10MHz



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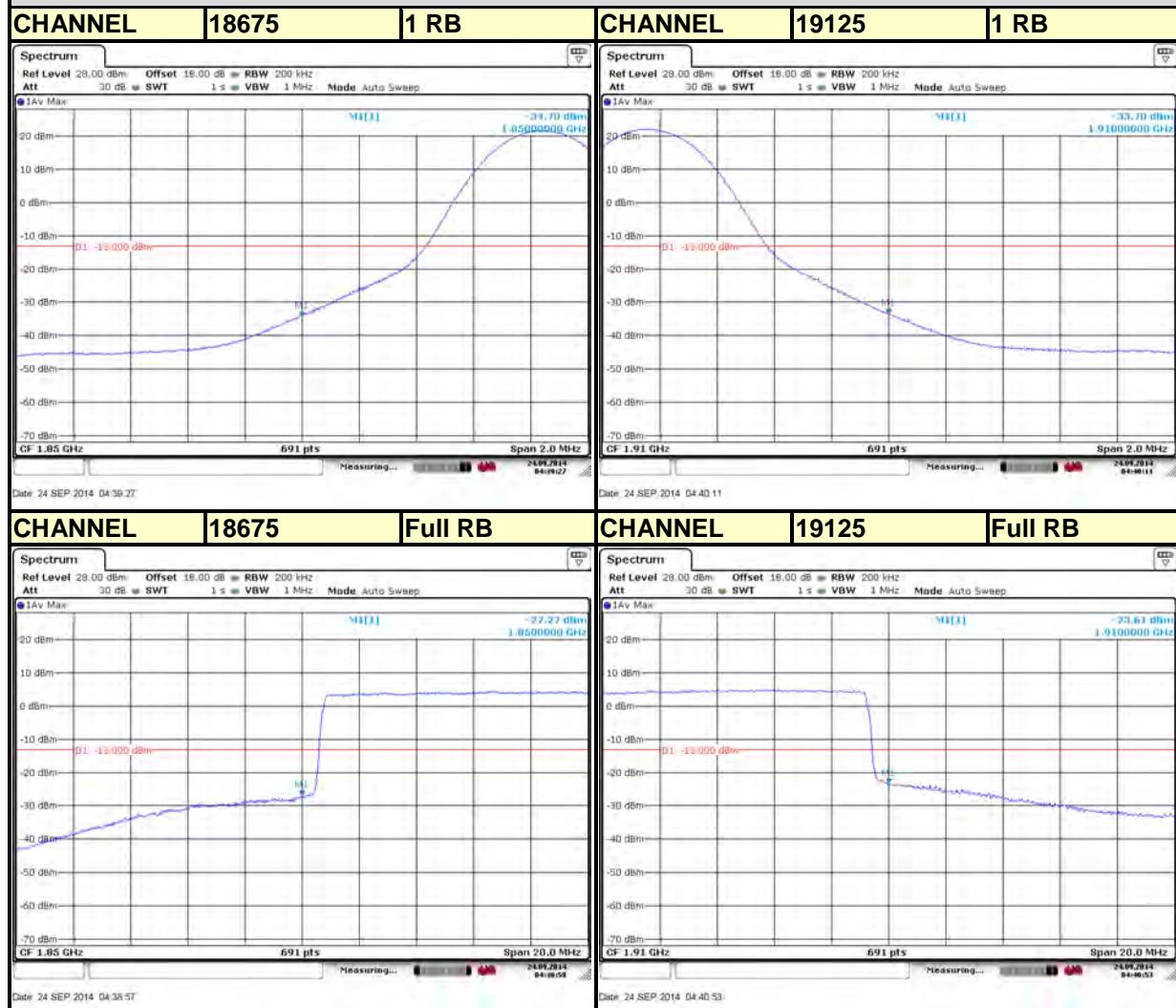


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LTE BAND 2

Channel Bandwidth: 15MHz



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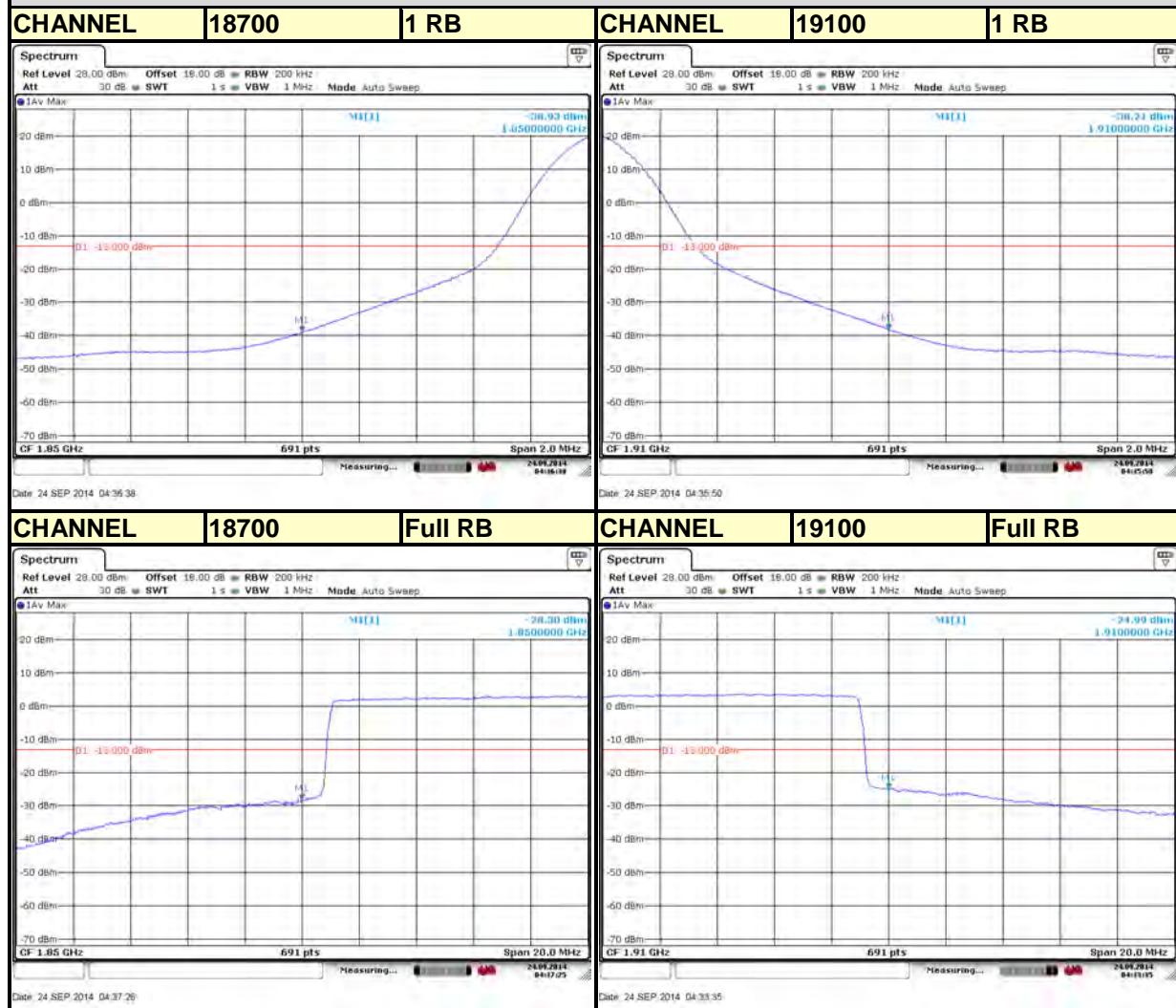


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LTE BAND 2

Channel Bandwidth: 20MHz



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4.5 CONDUCTED SPURIOUS EMISSIONS

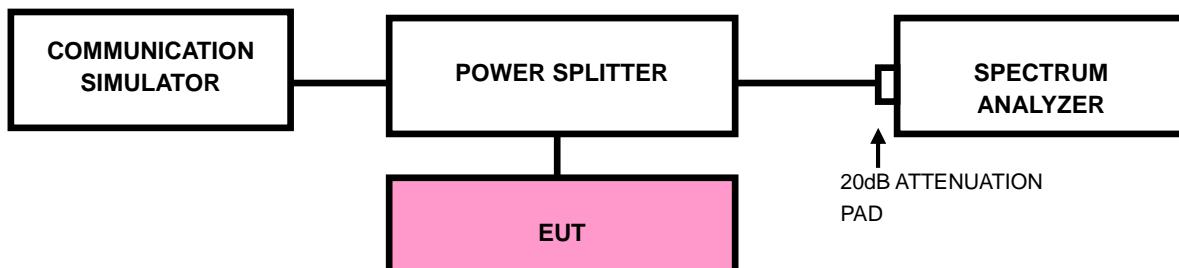
4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 -13dBm .

4.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 9 kHz to 19.1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.3 TEST SETUP





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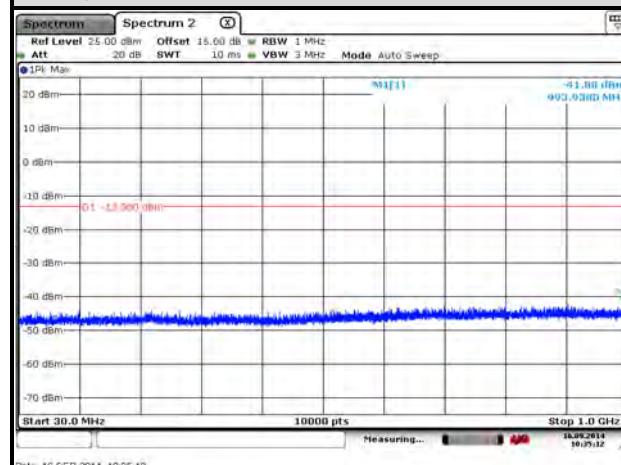
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4.5.4 TEST RESULTS

GSM

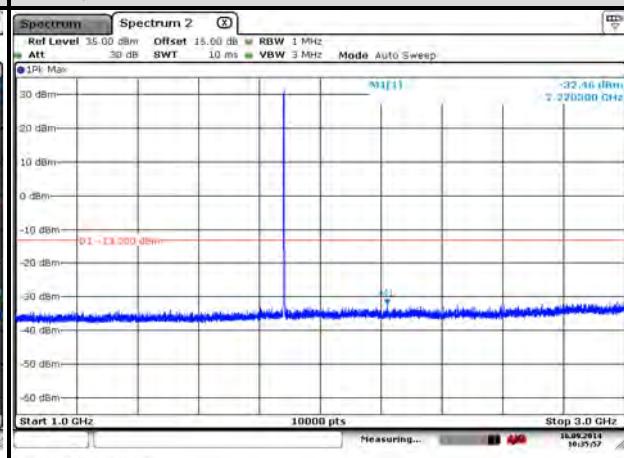
CHANNEL 661

FREQUENCY RANGE : 30MHz~1GHz



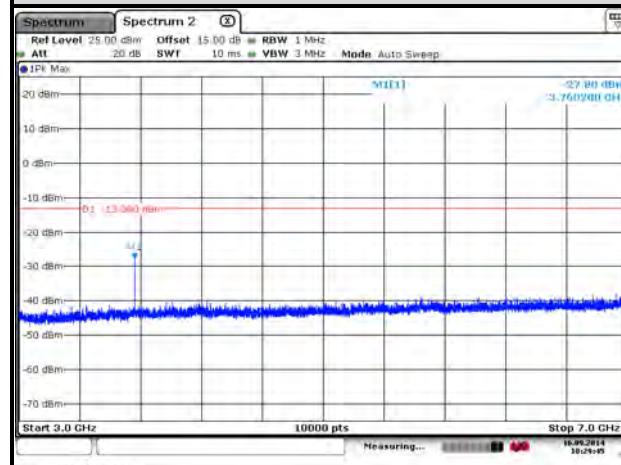
Date: 16 SEP 2014 10:35:15

FREQUENCY RANGE : 1GHz~3GHz



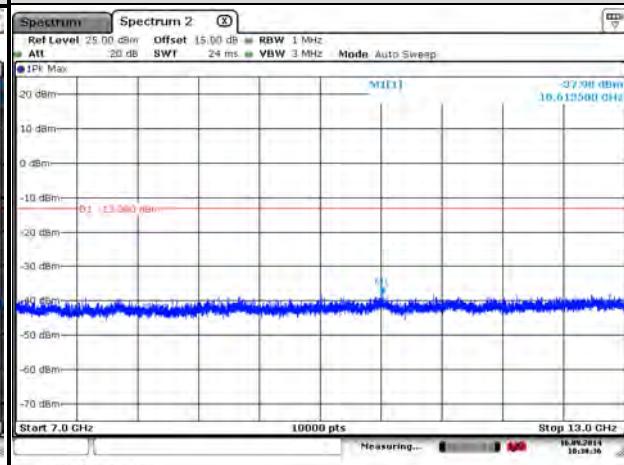
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FREQUENCY RANGE : 3GHz~7GHz



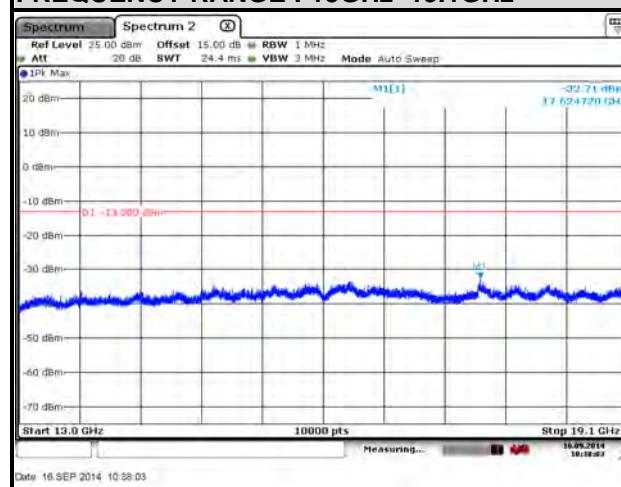
Date: 16 SEP 2014 10:29:45

FREQUENCY RANGE : 7GHz~13GHz



Date: 16 SEP 2014 10:38:36

FREQUENCY RANGE : 13GHz~19.1GHz



Date: 16 SEP 2014 10:38:03

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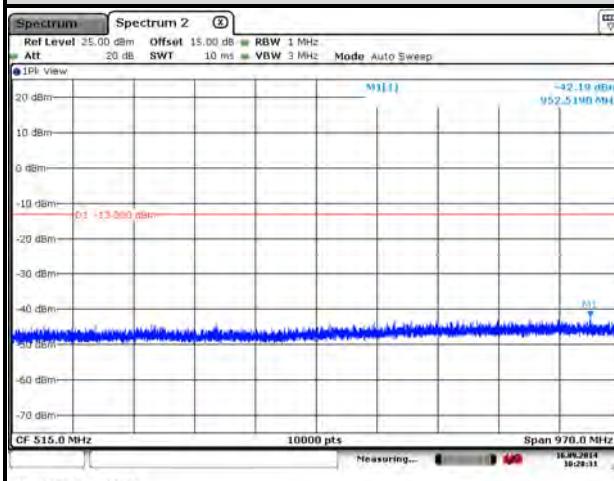
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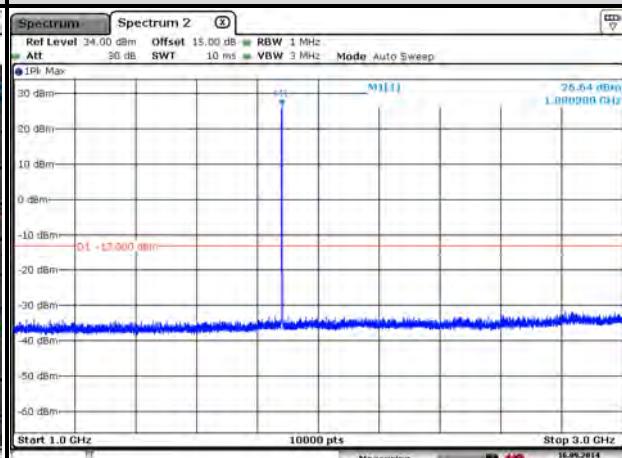
EDGE

CHANNEL 512

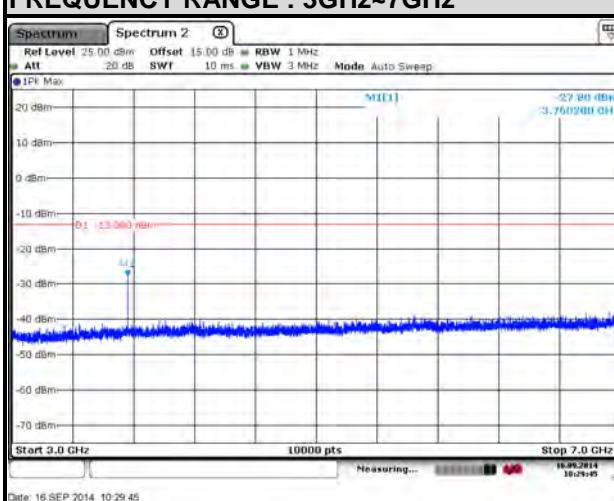
FREQUENCY RANGE : 30MHz~1GHz



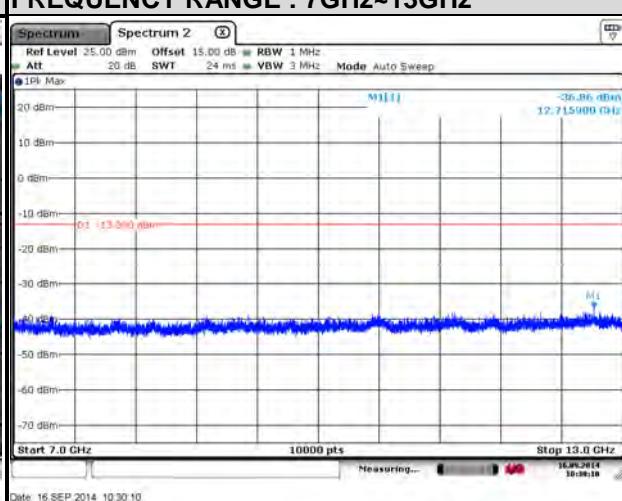
FREQUENCY RANGE : 1GHz~3GHz



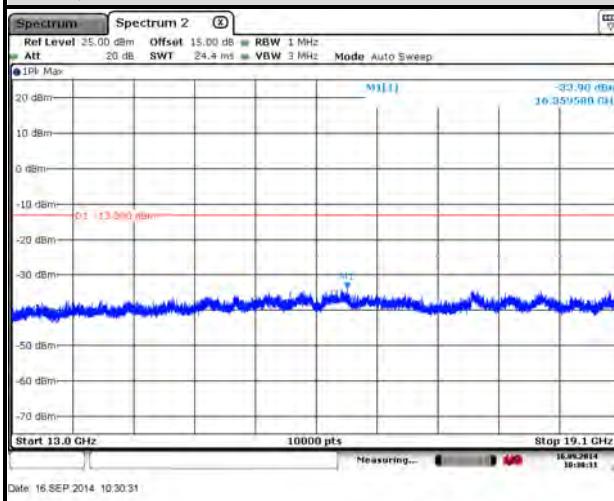
FREQUENCY RANGE : 3GHz~7GHz



FREQUENCY RANGE : 7GHz~13GHz



FREQUENCY RANGE : 13GHz~19.1GHz



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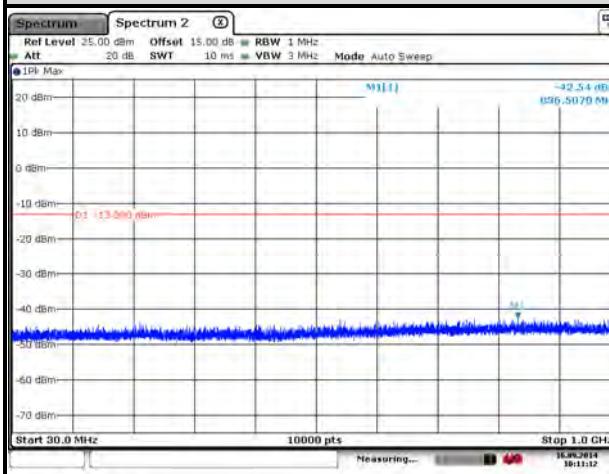
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Test Report No.: 141006N005-4

WCDMA

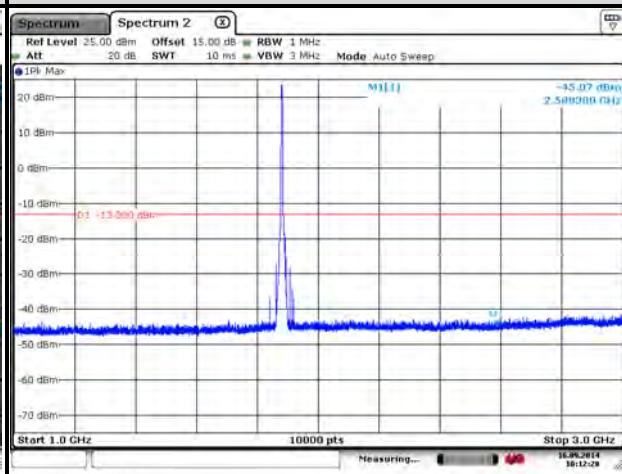
CHANNEL 9400

FREQUENCY RANGE : 30MHz~1GHz



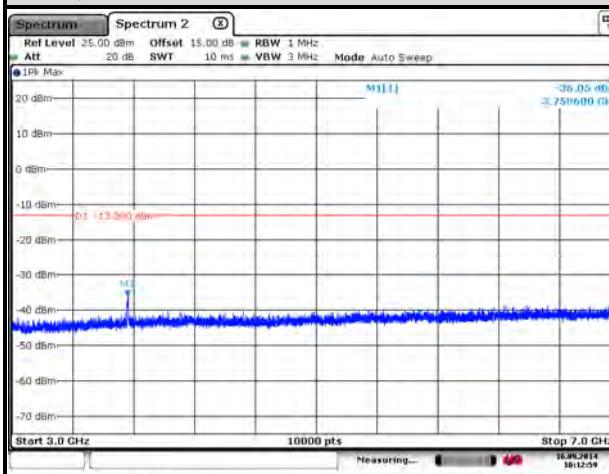
Date: 16 SEP 2014 10:11:12

FREQUENCY RANGE : 1GHz~3GHz



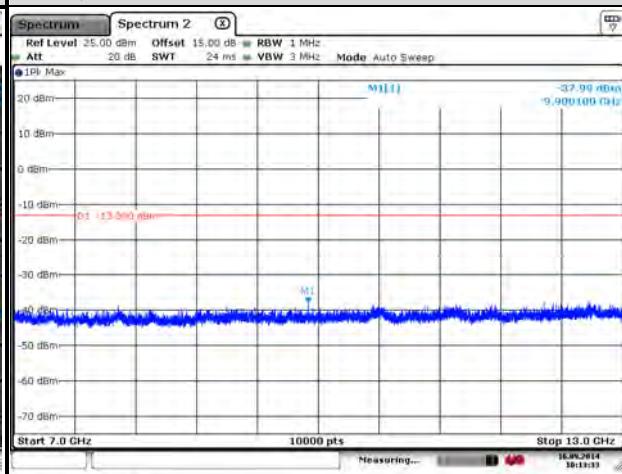
Date: 16 SEP 2014 10:12:28

FREQUENCY RANGE : 3GHz~7GHz



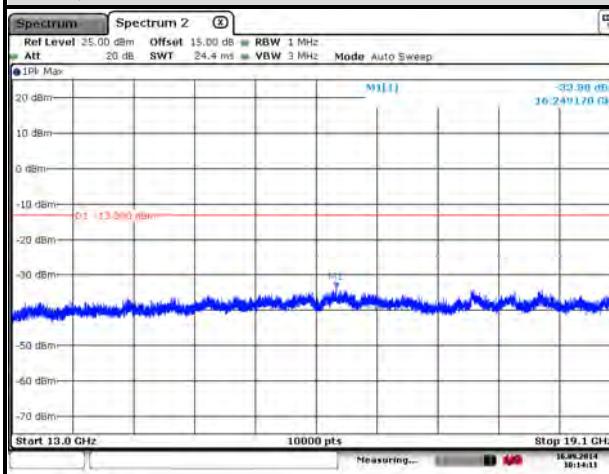
Date: 16 SEP 2014 10:12:58

FREQUENCY RANGE : 7GHz~13GHz



Date: 16 SEP 2014 10:13:33

FREQUENCY RANGE : 13GHz~19.1GHz



Date: 16 SEP 2014 10:14:10

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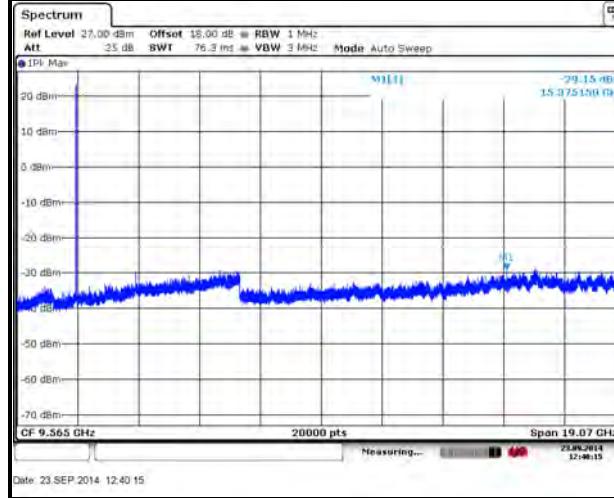
Test Report No.: 141006N005-4

LTE BAND 2

CHANNEL 18900

1.4MHz / QPSK

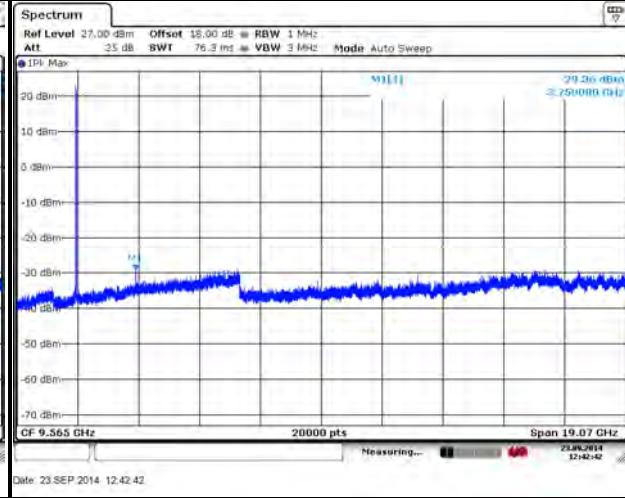
FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 18900

3MHz / QPSK

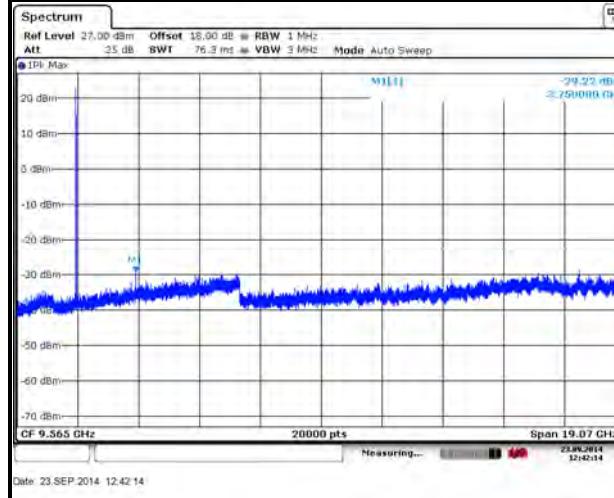
FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 18900

5MHz / QPSK

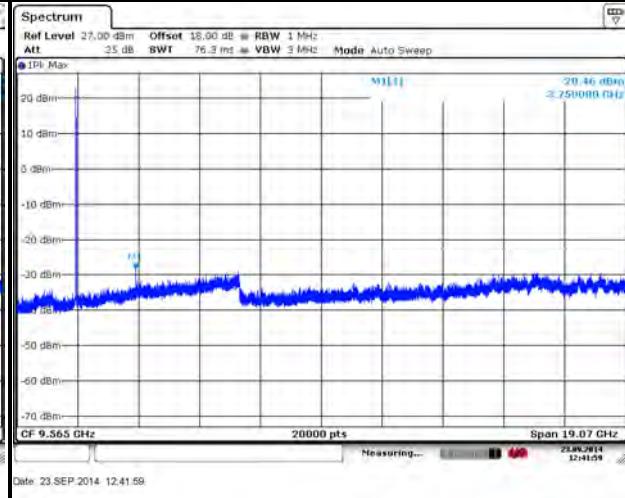
FREQUENCY RANGE : 30MHz~19.1GHz



CHANNEL 18900

10MHz / QPSK

FREQUENCY RANGE : 30MHz~19.1GHz



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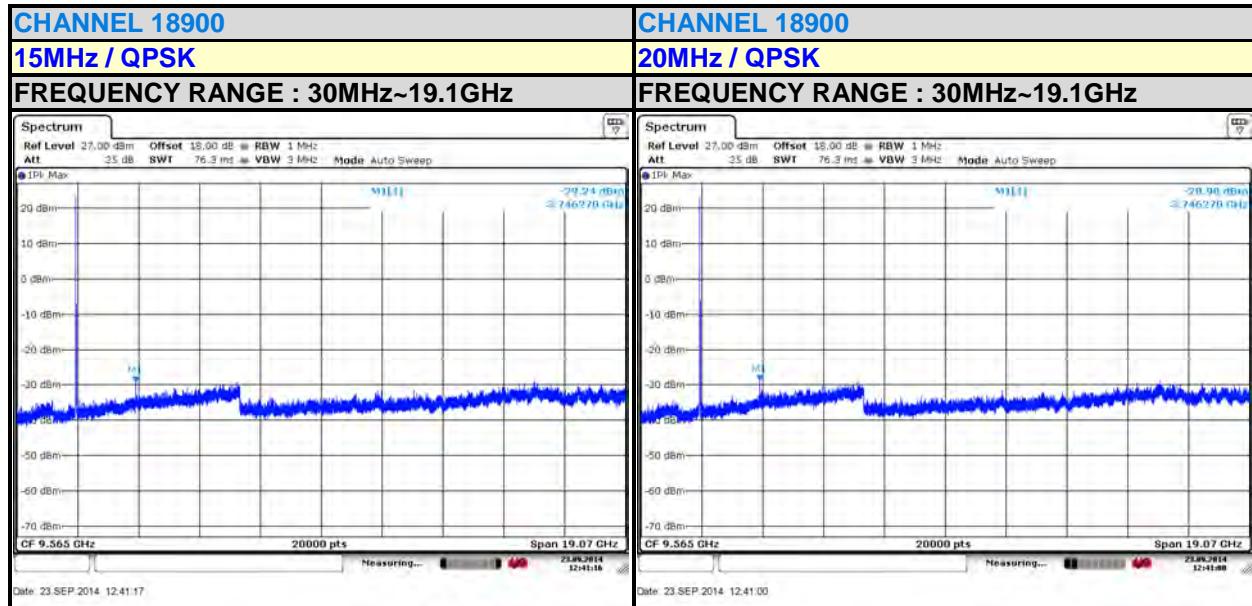
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4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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 equal to -13dBm .

4.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m 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 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- b. 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
- c. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$

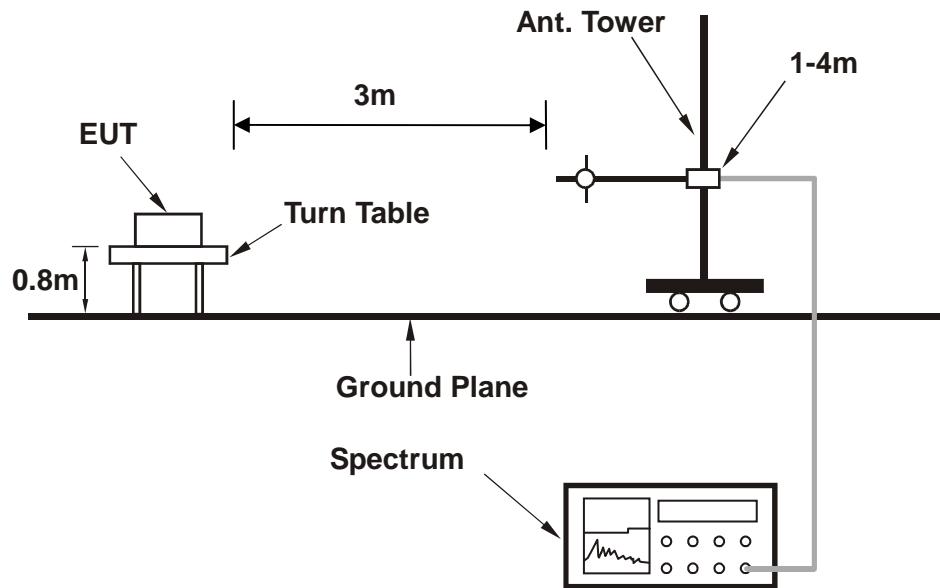
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.6.3 DEVIATION FROM TEST STANDARD

No deviation



4.6.4 TEST SETUP



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



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Test Report No.: 141006N005-4

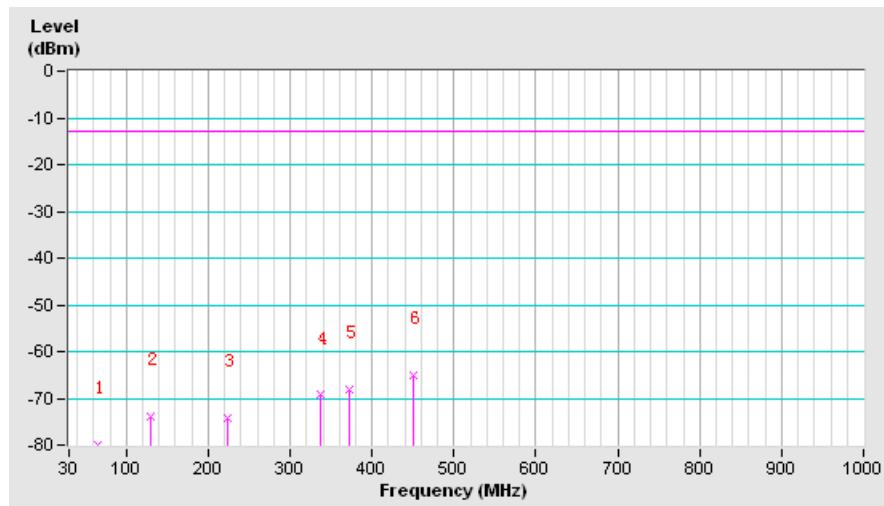
4.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA : LTE BAND 2

| SPURIOUS EMISSION FREQUENCY RANGE | Below 1000MHz | OPERATING CHANNEL | Channel 18900 |
|-----------------------------------|---------------|-------------------|---------------|
|-----------------------------------|---------------|-------------------|---------------|

| SPURIOUS EMISSION LEVEL | | | | |
|-------------------------|----------------------|-------------|-------------|-------------|
| Frequency (MHz) | Antenna Polarization | Level (dBm) | Limit (dBm) | Margin (dB) |
| 65.75 | H | -80.05 | -13.00 | -67.05 |
| 129.49 | H | -73.77 | -13.00 | -60.77 |
| 224.31 | H | -74.19 | -13.00 | -61.19 |
| 336.23 | H | -69.29 | -13.00 | -56.29 |
| 371.99 | H | -68.03 | -13.00 | -55.03 |
| 449.71 | H | -64.94 | -13.00 | -51.94 |

NOTE: The emission behavior belongs to narrowband spurious emission.





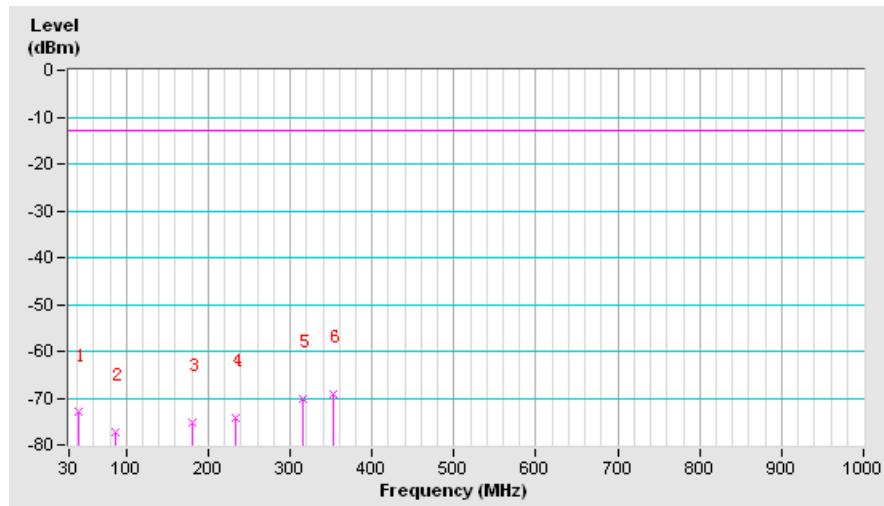
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| | | | |
|--|---------------|--------------------------|---------------|
| SPURIOUS EMISSION FREQUENCY RANGE | Below 1000MHz | OPERATING CHANNEL | Channel 18900 |
|--|---------------|--------------------------|---------------|

| SPURIOUS EMISSION LEVEL | | | | |
|-------------------------|----------------------|-------------|-------------|-------------|
| Frequency (MHz) | Antenna Polarization | Level (dBm) | Limit (dBm) | Margin (dB) |
| 42.44 | V | -73.03 | -13.00 | -60.03 |
| 87.52 | V | -77.22 | -13.00 | -64.22 |
| 180.79 | V | -75.11 | -13.00 | -62.11 |
| 233.64 | V | -74.23 | -13.00 | -61.23 |
| 316.03 | V | -70.09 | -13.00 | -57.09 |
| 353.33 | V | -69.11 | -13.00 | -56.11 |

NOTE: The emission behavior belongs to narrowband spurious emission.





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Test Report No.: 141006N005-4

ABOVE 1GHz DATA

GSM:

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|-------------------|-------------|-----------------------|------------------------|---------------|---------------|
| No. | Freq. (MHz) | SPA READING (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -48.55 | -13 | -36.17 | 2.59 | -33.58 | -20.58 |
| 2 | 5640 | -52.64 | -13 | -34.30 | 3.28 | -31.02 | -18.02 |
| 3 | 7520 | -54.74 | -13 | -34.26 | 4.51 | -29.75 | -16.75 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
| No. | Freq. (MHz) | SPA READING (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -50.37 | -13 | -36.50 | 2.59 | -33.91 | -20.91 |
| 2 | 5640 | -52.47 | -13 | -34.52 | 3.28 | -31.24 | -18.24 |
| 3 | 7520 | -53.77 | -13 | -34.09 | 4.51 | -29.58 | -16.58 |

REMARKS:

1. EIRP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB)

EDGE:

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|-----------------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Emission Level (dBuV) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -50.74 | -13 | -38.37 | 2.59 | -35.78 | -22.78 |
| 2 | 5640 | -52.41 | -13 | -34.04 | 3.28 | -30.76 | -17.76 |
| 3 | 7520 | -55.22 | -13 | -34.74 | 4.51 | -30.23 | -17.23 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
| No. | Freq. (MHz) | Emission Level (dBuV) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -51.24 | -13 | -37.38 | 2.59 | -34.79 | -21.79 |
| 2 | 5640 | -54.47 | -13 | -36.53 | 3.28 | -33.25 | -20.25 |
| 3 | 7520 | -56.88 | -13 | -37.19 | 4.51 | -32.68 | -19.68 |

REMARKS:

1. EIRP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB)



Test Report No.: 141006N005-4

WCDMA:

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|-------------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | SPA READING (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -50.25 | -13 | -37.88 | 2.59 | -35.29 | -22.29 |
| 2 | 5640 | -53.47 | -13 | -35.22 | 3.28 | -31.94 | -18.94 |
| 3 | 7520 | -55.14 | -13 | -34.66 | 4.51 | -30.15 | -17.15 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|-------------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | SPA READING (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -50.78 | -13 | -36.92 | 2.59 | -34.33 | -21.33 |
| 2 | 5640 | -54.39 | -13 | -36.45 | 3.28 | -33.17 | -20.17 |
| 3 | 7520 | -56.28 | -13 | -36.59 | 4.51 | -32.08 | -19.08 |

REMARKS:

1. EIRP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB)



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Test Report No.: 141006N005-4

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz / QPSK

| | | | |
|--------------------------|------------------|-----------------|--------------------|
| MODE | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Blue Zheng | | |

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
|-----|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| 1 | 3760 | -66.85 | -13 | -56.75 | 2.59 | -54.16 | -41.16 |
| 2 | 5640 | -69.54 | -13 | -55.62 | 3.28 | -52.34 | -39.34 |
| 3 | 7520 | -69.22 | -13 | -53.08 | 4.51 | -48.57 | -35.57 |

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
|-----|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| 1 | 3760 | -67.51 | -13 | -57.37 | 2.59 | -54.78 | -41.78 |
| 2 | 5640 | -68.27 | -13 | -54.93 | 3.28 | -51.65 | -38.65 |
| 3 | 7520 | -68.02 | -13 | -52.47 | 4.51 | -47.96 | -34.96 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: 141006N005-4

CHANNEL BANDWIDTH: 3MHz / QPSK

| | | | | | | |
|--------------------------|------------------|--|-----------------|--|--------------------|--|
| MODE | TX channel 18900 | | FREQUENCY RANGE | | Above 1000MHz | |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | | INPUT POWER | | DC 5V from adapter | |
| TESTED BY | Blue Zheng | | | | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -66.19 | -13 | -56.09 | 2.59 | -53.50 | -40.50 |
| 2 | 5640 | -69.27 | -13 | -55.34 | 3.28 | -52.06 | -39.06 |
| 3 | 7520 | -69.84 | -13 | -53.71 | 4.51 | -49.20 | -36.20 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -67.54 | -13 | -57.41 | 2.59 | -54.82 | -41.82 |
| 2 | 5640 | -68.45 | -13 | -55.11 | 3.28 | -51.83 | -38.83 |
| 3 | 7520 | -68.47 | -13 | -52.92 | 4.51 | -48.41 | -35.41 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: 141006N005-4

CHANNEL BANDWIDTH: 5MHz / QPSK

| | | | |
|--------------------------|------------------|-----------------|--------------------|
| MODE | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Blue Zheng | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -66.25 | -13 | -56.15 | 2.59 | -53.56 | -40.56 |
| 2 | 5640 | -69.24 | -13 | -55.31 | 3.28 | -52.03 | -39.03 |
| 3 | 7520 | -69.52 | -13 | -53.38 | 4.51 | -48.87 | -35.87 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -67.65 | -13 | -57.52 | 2.59 | -54.93 | -41.93 |
| 2 | 5640 | -68.14 | -13 | -54.80 | 3.28 | -51.52 | -38.52 |
| 3 | 7520 | -68.22 | -13 | -52.67 | 4.51 | -48.16 | -35.16 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: 141006N005-4

CHANNEL BANDWIDTH: 10MHz / QPSK

| | | | |
|--------------------------|------------------|-----------------|--------------------|
| MODE | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Blue Zheng | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -66.55 | -13 | -56.45 | 2.59 | -53.86 | -40.86 |
| 2 | 5640 | -69.1 | -13 | -55.17 | 3.28 | -51.89 | -38.89 |
| 3 | 7520 | -69.23 | -13 | -53.09 | 4.51 | -48.58 | -35.58 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -67.14 | -13 | -57.00 | 2.59 | -54.41 | -41.41 |
| 2 | 5640 | -68.22 | -13 | -54.88 | 3.28 | -51.60 | -38.60 |
| 3 | 7520 | -68.12 | -13 | -52.57 | 4.51 | -48.06 | -35.06 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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VERITAS

Test Report No.: 141006N005-4

CHANNEL BANDWIDTH: 15MHz / QPSK

| | | | |
|--------------------------|------------------|-----------------|--------------------|
| MODE | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Blue Zheng | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -66.54 | -13 | -56.44 | 2.59 | -53.85 | -40.85 |
| 2 | 5640 | -69.14 | -13 | -55.21 | 3.28 | -51.93 | -38.93 |
| 3 | 7520 | -69.22 | -13 | -53.08 | 4.51 | -48.57 | -35.57 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -67.14 | -13 | -57.00 | 2.59 | -54.41 | -41.41 |
| 2 | 5640 | -68.12 | -13 | -54.78 | 3.28 | -51.50 | -38.50 |
| 3 | 7520 | -68.02 | -13 | -52.47 | 4.51 | -47.96 | -34.96 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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CHANNEL BANDWIDTH: 20MHz / QPSK

| | | | |
|--------------------------|------------------|-----------------|--------------------|
| MODE | TX channel 18900 | FREQUENCY RANGE | Above 1000MHz |
| ENVIRONMENTAL CONDITIONS | 24deg. C, 60%RH | INPUT POWER | DC 5V from adapter |
| TESTED BY | Blue Zheng | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -66.68 | -13 | -56.58 | 2.59 | -53.99 | -40.99 |
| 2 | 5640 | -69.78 | -13 | -55.86 | 3.28 | -52.58 | -39.58 |
| 3 | 7520 | -69.31 | -13 | -53.17 | 4.51 | -48.66 | -35.66 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | |
|---|-------------|---------------|-------------|-----------------------|------------------------|------------|-------------|
| No. | Freq. (MHz) | Reading (dBm) | Limit (dBm) | S.G Power Value (dBm) | Correction Factor (dB) | EIRP (dBm) | Margin (dB) |
| 1 | 3760 | -67 | -13 | -56.86 | 2.59 | -54.27 | -41.27 |
| 2 | 5640 | -68.9 | -13 | -55.56 | 3.28 | -52.28 | -39.28 |
| 3 | 7520 | -68.03 | -13 | -52.48 | 4.51 | -47.97 | -34.97 |

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

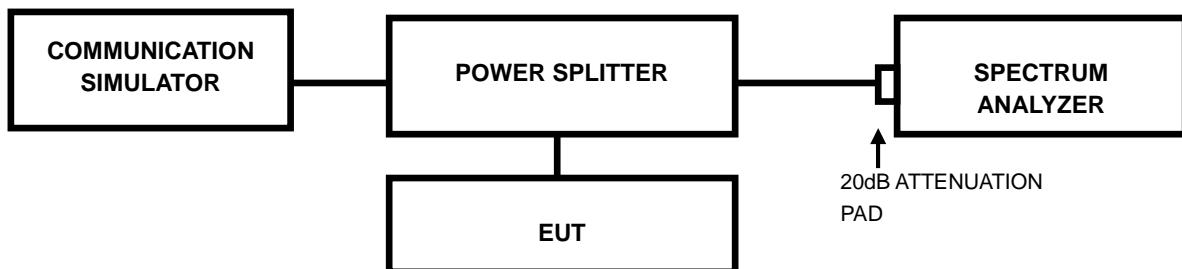


4.7 PEAK TO AVERAGE RATIO

4.7.1 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

4.7.2 TEST SETUP



4.7.3 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%.



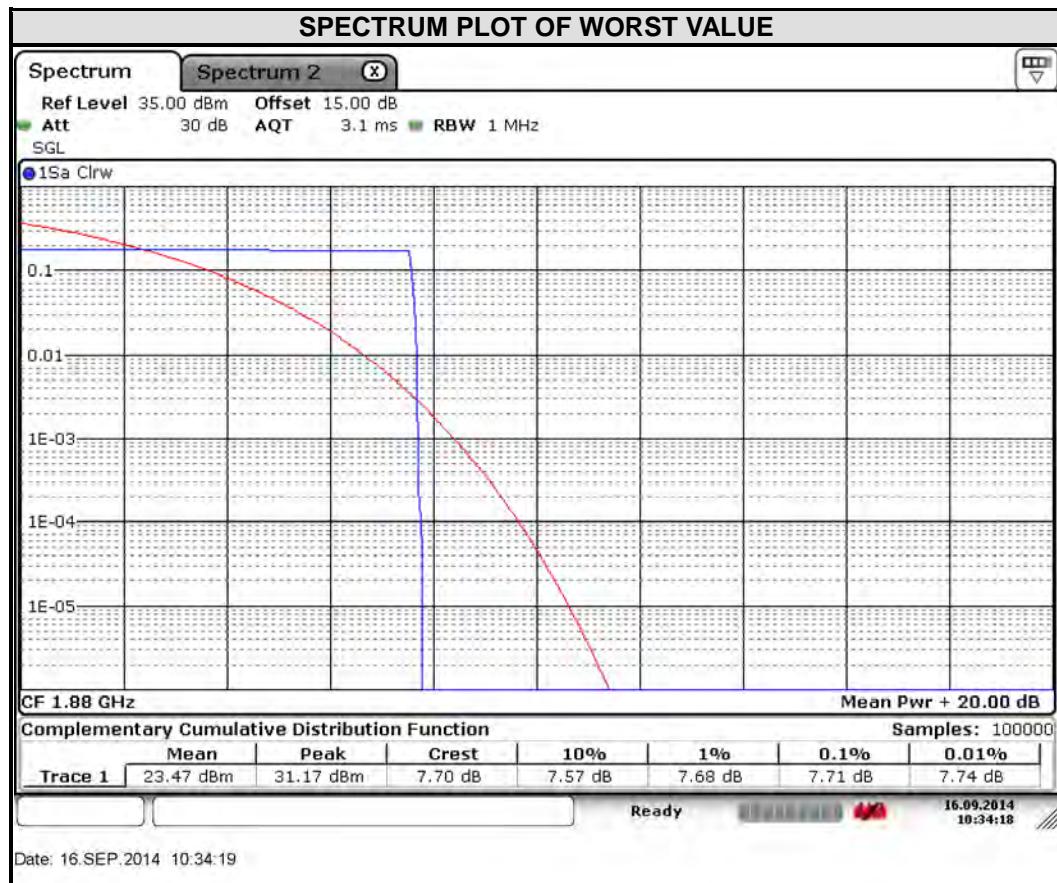
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4.7.4 TEST RESULTS

GSM

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 661 | 1880 | 7.71 |



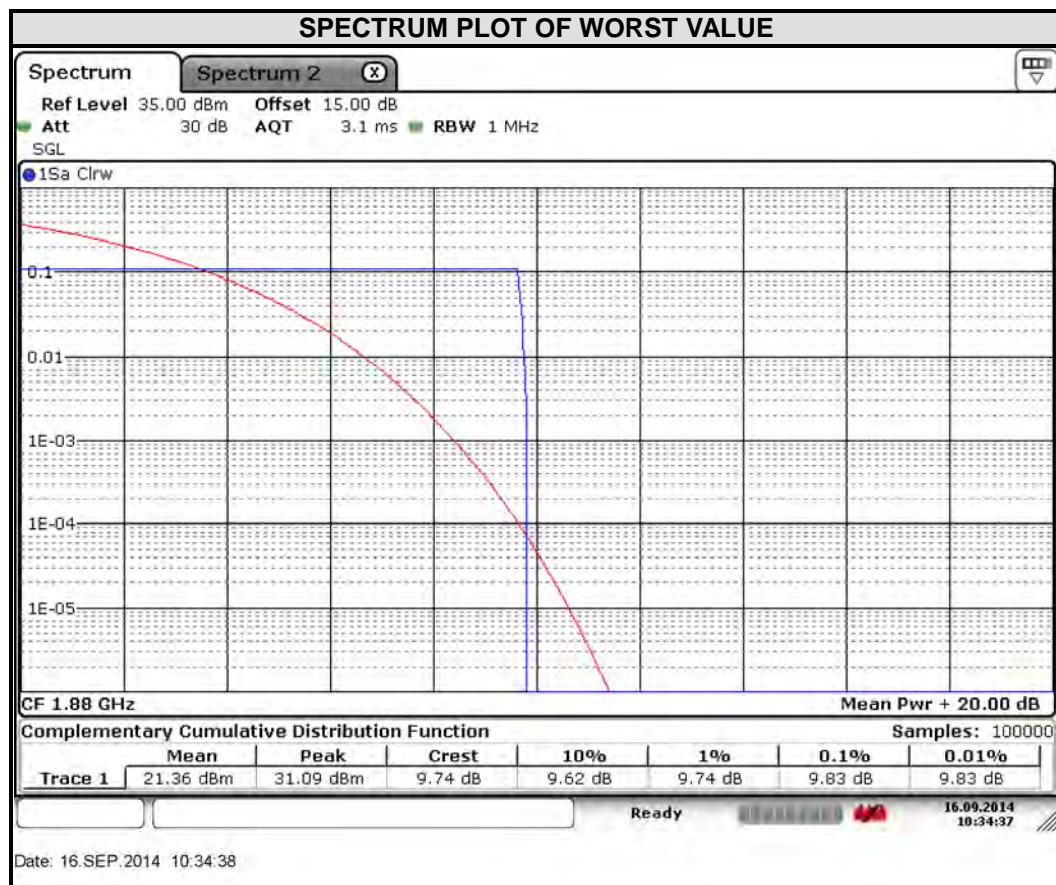


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EDGE

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 661 | 1880 | 9.83 |



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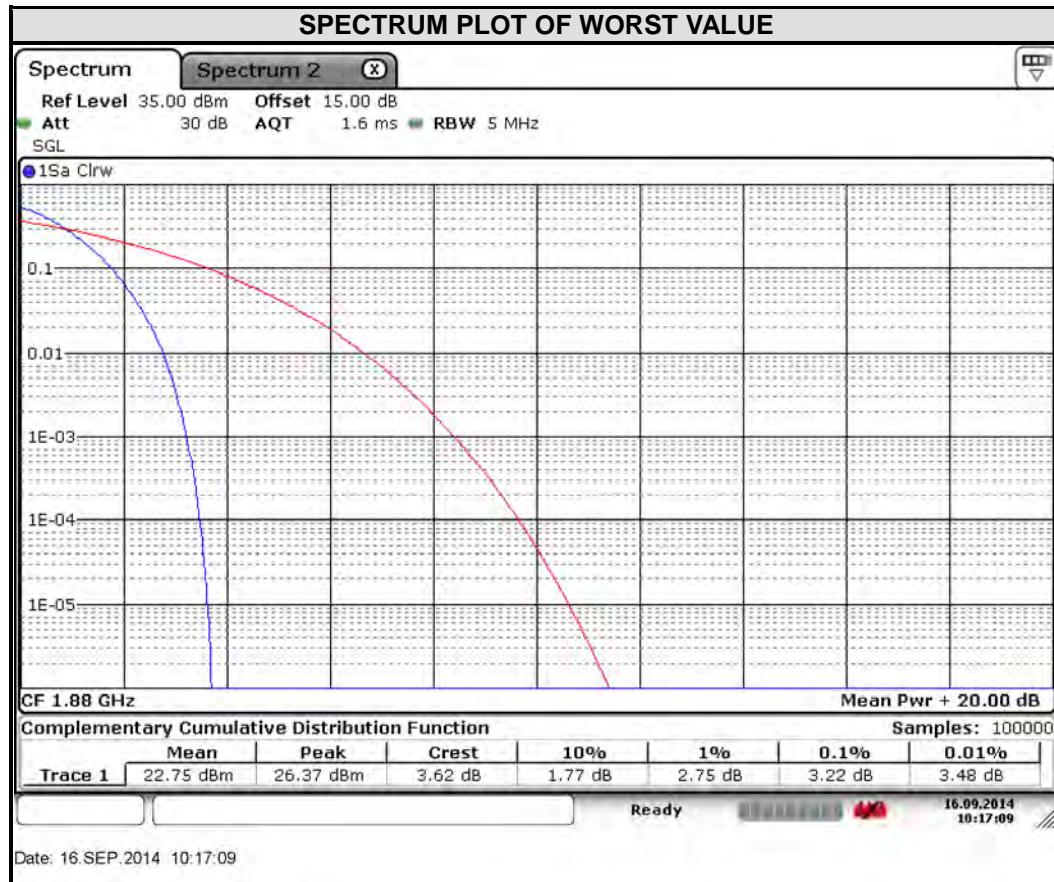


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WCDMA

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) |
|---------|-----------------|----------------------------|
| 9400 | 1880 | 3.22 |



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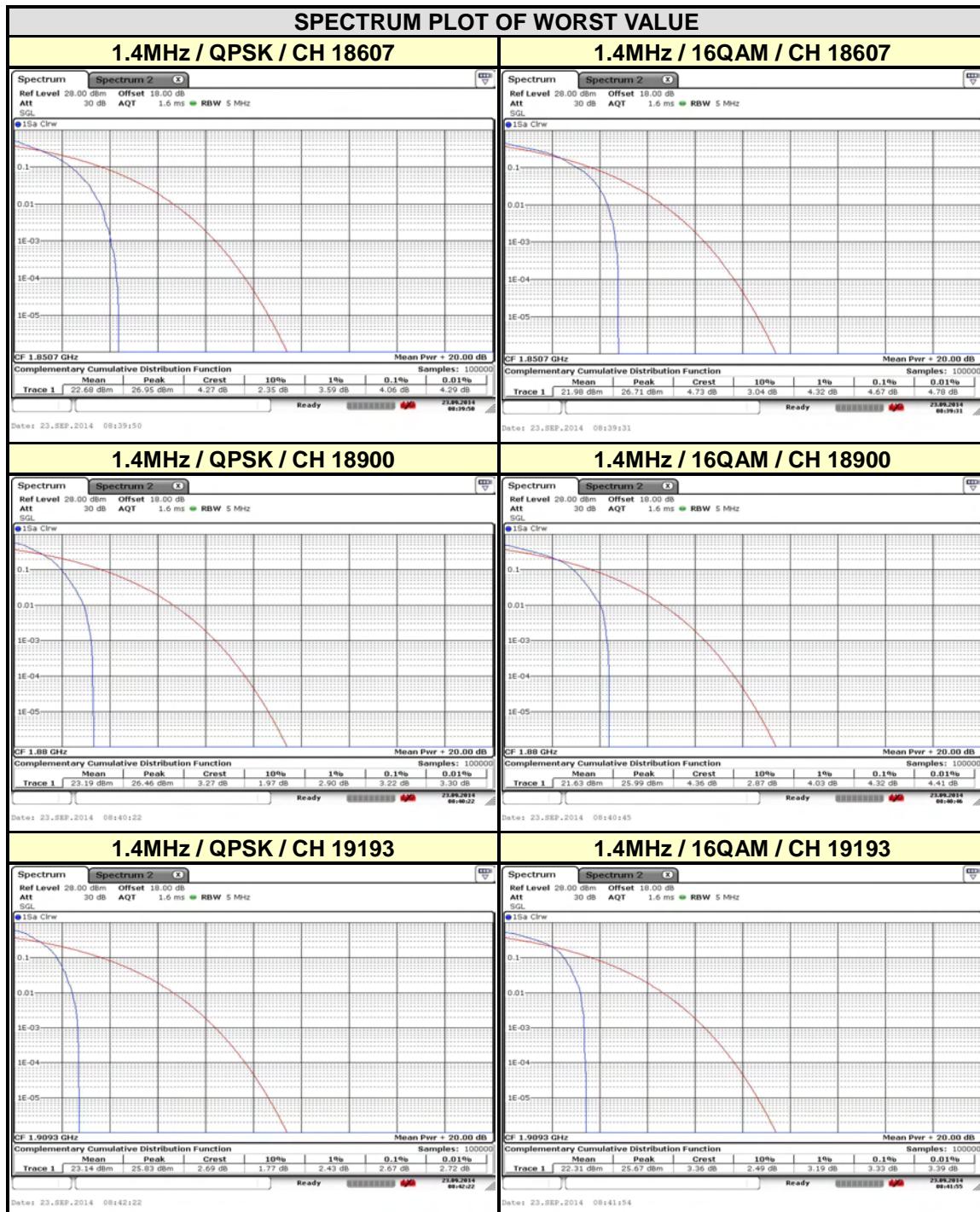
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LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
|---------|-----------------|----------------------------|-------|
| | | QPSK | 16QAM |
| 18607 | 1850.7 | 4.06 | 4.67 |
| 18900 | 1880 | 3.22 | 4.32 |
| 19193 | 1909.3 | 2.67 | 3.33 |



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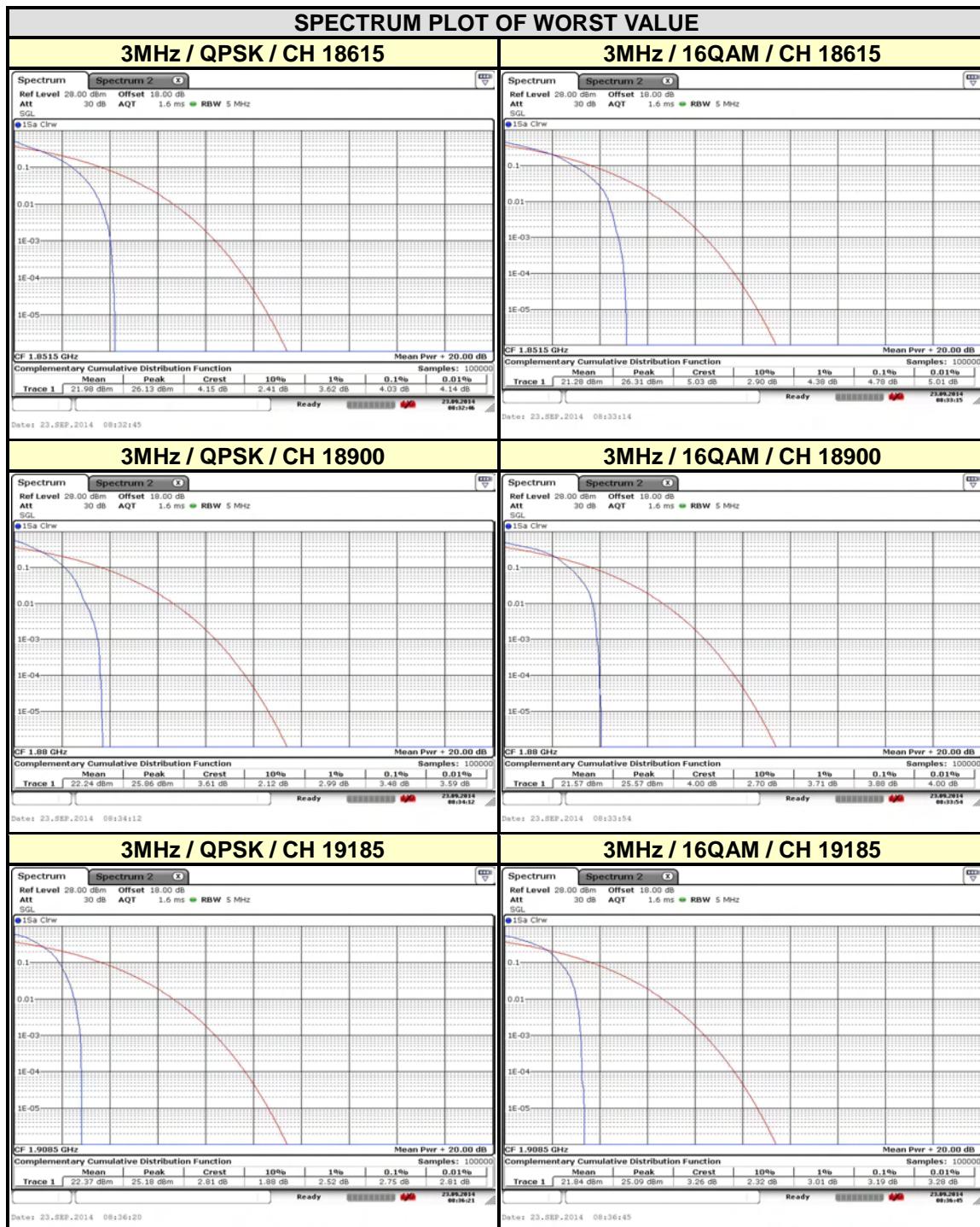
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| CHANNEL BANDWIDTH: 3MHz | | | |
|-------------------------|-----------------|----------------------------|-------|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM |
| 18615 | 1851.5 | 4.03 | 4.78 |
| 18900 | 1880 | 3.48 | 3.88 |
| 19185 | 1908.5 | 2.75 | 3.19 |



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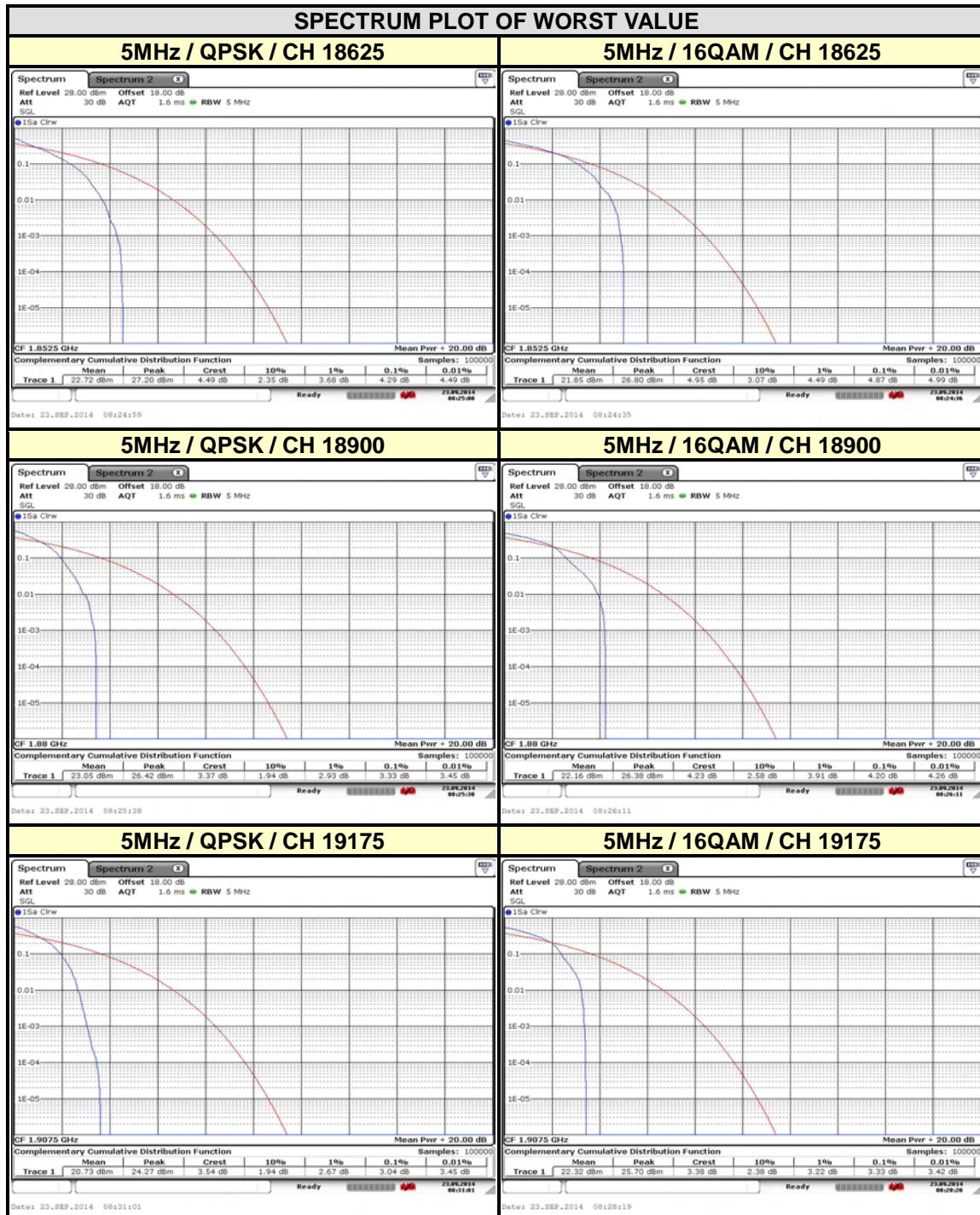
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| CHANNEL BANDWIDTH: 5MHz | | | |
|-------------------------|-----------------|----------------------------|-------|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM |
| 18625 | 1852.5 | 4.29 | 4.87 |
| 18900 | 1880 | 3.33 | 4.20 |
| 19175 | 1907.5 | 3.04 | 3.33 |



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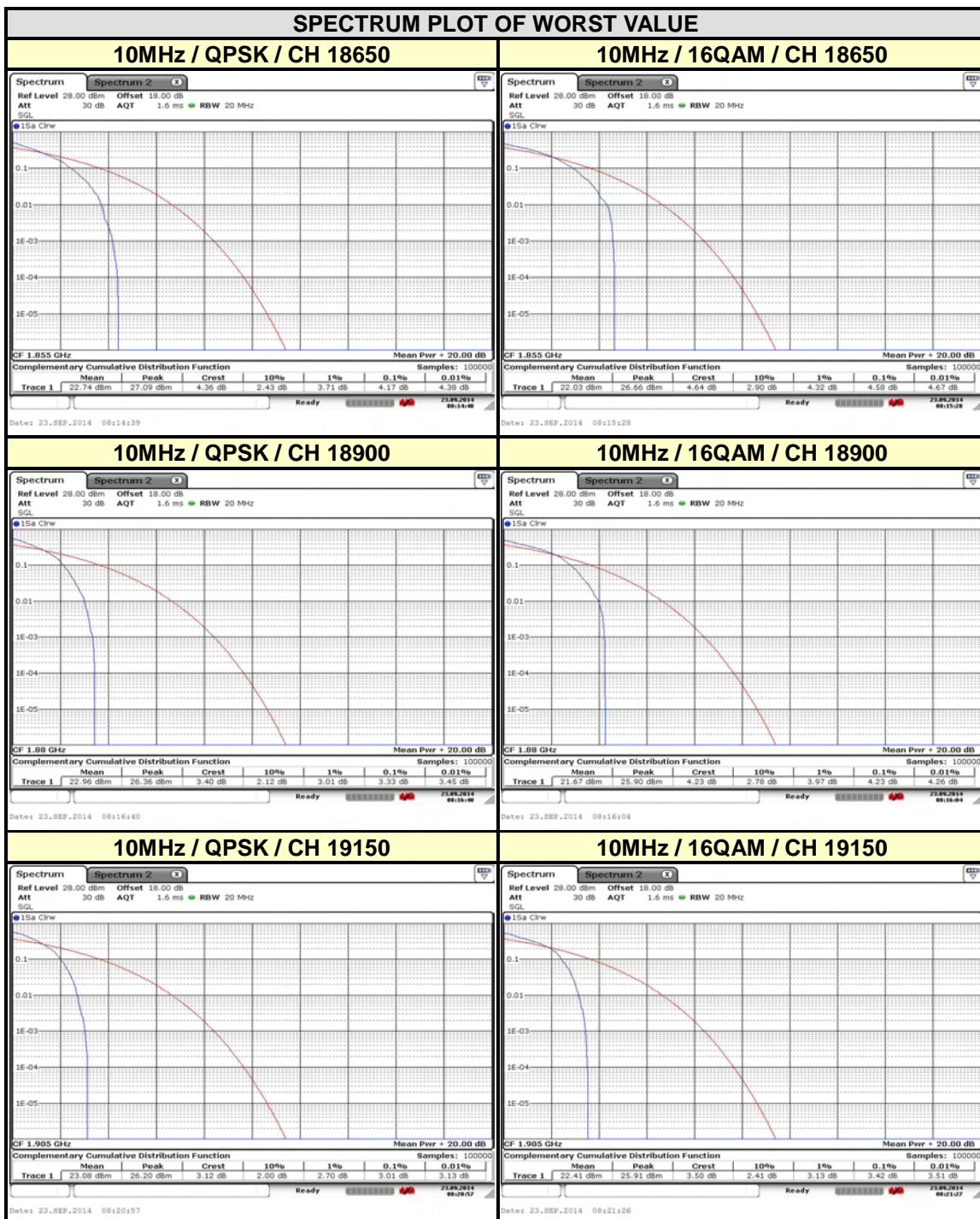
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| CHANNEL BANDWIDTH: 10MHz | | | |
|--------------------------|-----------------|----------------------------|-------|
| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
| | | QPSK | 16QAM |
| 18650 | 1855 | 4.17 | 4.58 |
| 18900 | 1880 | 3.33 | 4.23 |
| 19150 | 1905 | 3.01 | 3.42 |



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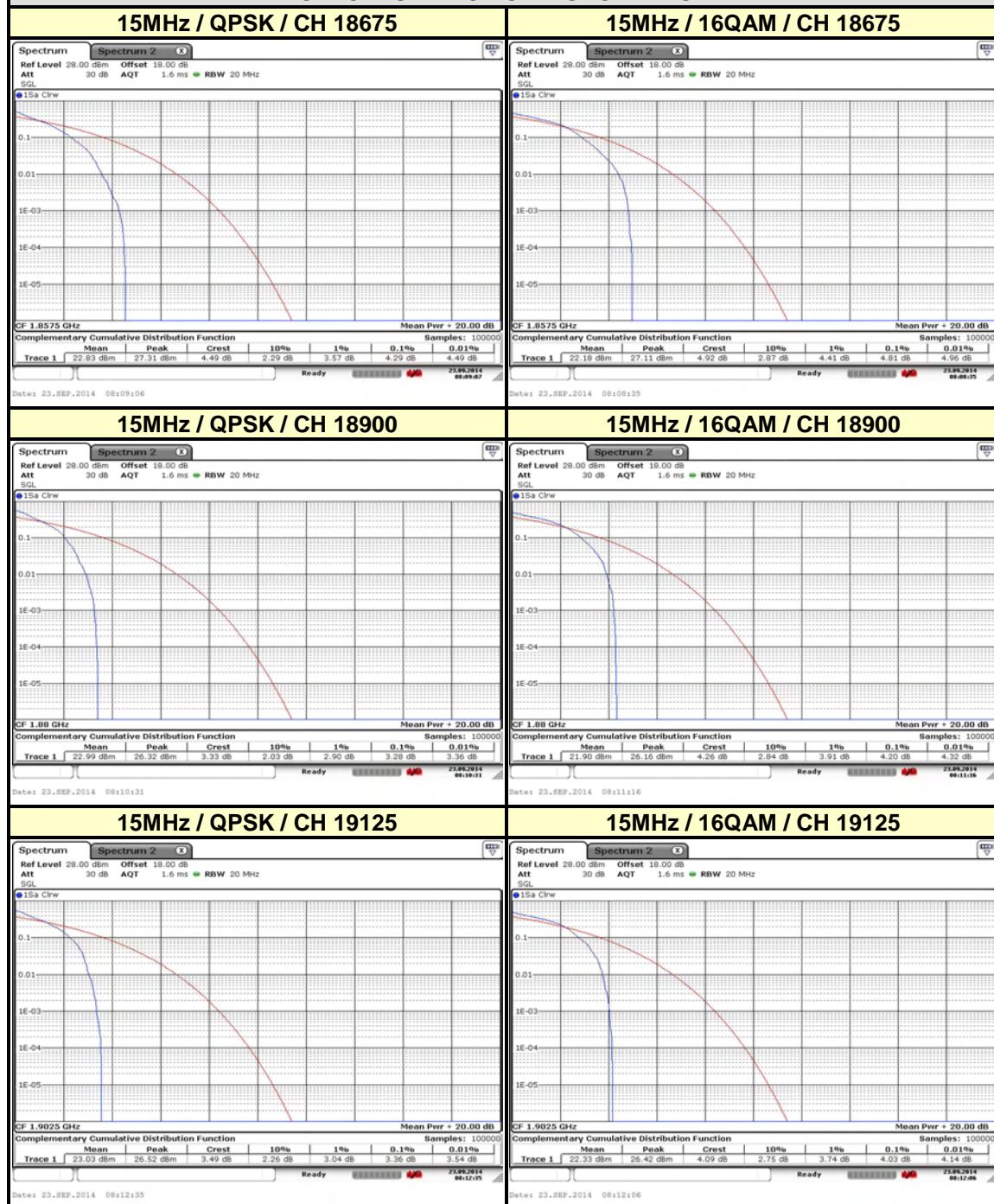
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CHANNEL BANDWIDTH: 15MHz

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
|---------|-----------------|----------------------------|-------|
| | | QPSK | 16QAM |
| 18675 | 1857.5 | 4.29 | 4.81 |
| 18900 | 1880 | 3.28 | 4.20 |
| 19125 | 1902.5 | 3.36 | 4.03 |

SPECTRUM PLOT OF WORST VALUE



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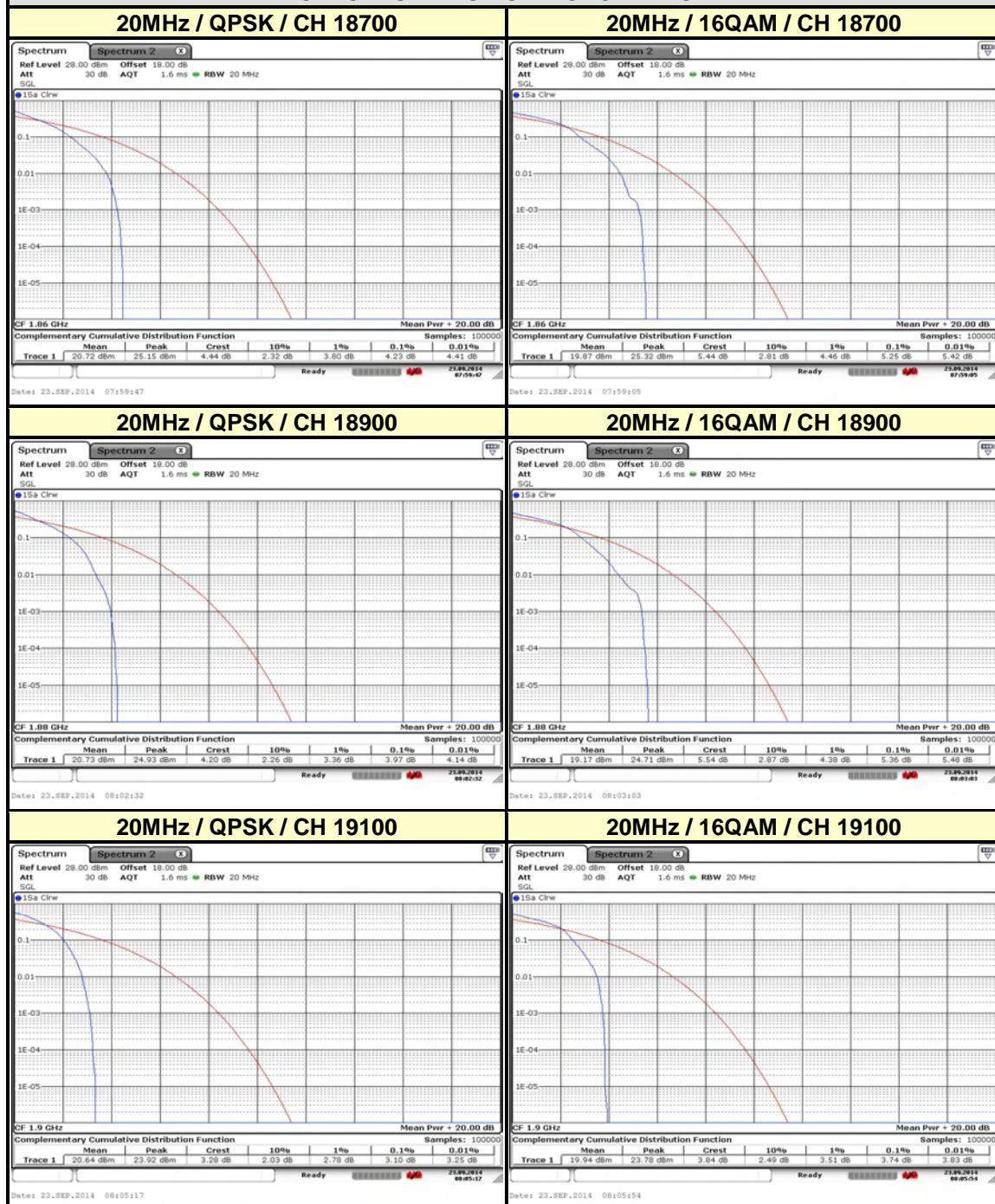
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CHANNEL BANDWIDTH: 20MHz

| CHANNEL | FREQUENCY (MHz) | PEAK TO AVERAGE RATIO (dB) | |
|---------|-----------------|----------------------------|-------|
| | | QPSK | 16QAM |
| 18700 | 1860 | 4.23 | 5.25 |
| 18900 | 1880 | 3.97 | 5.36 |
| 19100 | 1900 | 3.10 | 3.74 |

SPECTRUM PLOT OF WORST VALUE



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5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 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:

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Web Site: www.adt.com.tw

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



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6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---