



FCC RF Test Report

APPLICANT : Doro AB
EQUIPMENT : GSM/WCDMA/LTE Mobile Telephone
BRAND NAME : doro
MODEL NAME : DSB-0010
FCC ID : WS5DSB0010
STANDARD : 47 CFR Part 2, 27(M)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product testing was completed on Jul. 19, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-D-2010 and the testing has shown the tested sample to be in compliance with the applicable technical standards. The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



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REVISION HISTORY



SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|-------------------------|--|-------------------------------------|--------|--|
| 3.4 | §2.1046 | Conducted Output Power | Reporting Only | PASS | - |
| 3.5 | N/A | Peak-to-Average Ratio | Reporting Only | PASS | - |
| 3.6 | §2.1049 | 99% Occupied Bandwidth and 26dB Bandwidth | Reporting Only | PASS | - |
| 3.7 | §2.1051 §27.53(m)(4) | Conducted Band Edge Measurement (Band 7) | §27.53(m)(4) | PASS | - |
| 3.8 | §2.1051 §27.53(m)(4) | Conducted Spurious Emission (Band 7) | $< 55+10\log_{10}(P[\text{Watts}])$ | PASS | - |
| 3.9 | §2.1055 §27.54 | Frequency Stability Temperature & Voltage | Within Authorized Band | PASS | - |
| 4.4 | §27.50(h)(2) | Equivalent Isotropic Radiated Power (Band 7) | EIRP < 2Watt | PASS | - |
| 4.5 | §2.1053 §27.53(m)(4) | Radiated Spurious Emission (Band 7) | $< 55+10\log_{10}(P[\text{Watts}])$ | PASS | Under limit 14.35 dB at 7580.000 MHz |



1 General Description

1.1 Applicant

Doro AB

Magistratsvägen 10 SE-226 43 Lund Sweden

1.2 Manufacturer

BYD PRECISION MFR CO., LTD

No.3001, Baohe Road, Baolong Industrial, Longgang, Shenzhen, 518116, P.R.China

1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---------------------------------|--|
| Equipment | GSM/WCDMA/LTE Mobile Telephone |
| Brand Name | doro |
| Model Name | DSB-0010 |
| FCC ID | WS5DSB0010 |
| EUT supports Radios application | GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM is not supported)/DC-HSDPA/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0 + EDR/Bluetooth v4.1 LE |
| IMEI Code | Conducted: 351512080000861 Radiation: 351512080000630 EIRP: 351512080000671 |
| HW Version | DIVA-V2.1 |
| SW Version | DSB0010_EU_RET_02.16.00_USER_160705 |
| EUT Stage | Identical Prototype |

1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard | |
|---|--|
| Tx Frequency | LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz |
| Rx Frequency | LTE Band 7 : 2622.5MHz ~ 2687.5 MHz |
| Bandwidth | LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz |
| Maximum Output Power to Antenna | LTE Band 7 : 22.49 dBm |
| Type of Modulation | QPSK / 16QAM |



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum Emission Designator, Frequency Tolerance, and EIRP Power

| LTE Band 7 | QPSK | | | 16QAM | | | |
|------------|---------|------------------------------|---------------------------|-----------------|------------------------------|---------------------------|-----------------|
| | BW(MHz) | Emission Designator (99%OBW) | Frequency Tolerance (ppm) | Maximum EIRP(W) | Emission Designator (99%OBW) | Frequency Tolerance (ppm) | Maximum EIRP(W) |
| | | | | AVG. | | | AVG. |
| 5 | 4M51G7D | | - | 0.4093 | 4M51W7D | - | 0.3673 |
| 10 | 9M07G7D | | 0.0022 | 0.4375 | 9M03W7D | - | 0.4227 |
| 15 | 13M5G7D | | - | 0.3972 | 13M5W7D | - | 0.4198 |
| 20 | 18M5G7D | | - | 0.3908 | 18M4W7D | - | 0.4305 |



1.7 Testing Location

| | | | |
|---------------------------|---|-----------|-----------------------------|
| Test Site | SPORTON INTERNATIONAL (KUNSHAN) INC. | | |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958 | | |
| Test Site No. | Sporton Site No. | | FCC Registration No. |
| | TH01-KS | 03CH02-KS | 418269 |

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 27(M)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

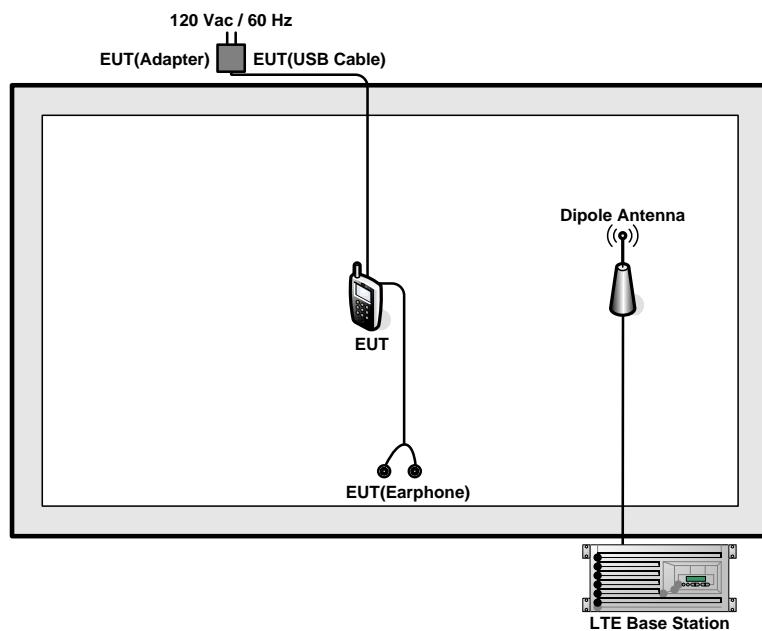
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

| Test Items | Band | Bandwidth (MHz) | | | | | | Modulation | | RB # | | | Test Channel | | |
|-----------------------------|------|--|---|---|----|----|----|------------|-------|------|------|------|--------------|---|---|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 1 | Half | Full | L | M | H |
| Max. Output Power | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Peak-to-Average Ratio | 7 | - | - | | | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 26dB and 99% Bandwidth | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| Conducted Band Edge | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ |
| Conducted Spurious Emission | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Frequency Stability | 7 | - | - | | ✓ | | | ✓ | | | | | ✓ | ✓ | |
| E.I.R.P. | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Radiated Spurious Emission | 7 | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | |
| Note | | 1. The mark "✓" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | |

2.2 Connection Diagram of Test System





2.3 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|-----------|--------|------------|-------------------|
| 1. | DC Power Supply | GW INSTEK | GPS-3030D | N/A | N/A | Unshielded, 1.8 m |
| 2. | LTE Base Station | Anritsu | MT8820C | N/A | N/A | Unshielded, 1.8 m |

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.0 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 5.0 (dB)



2.5 Frequency List of Low/Middle/High Channels

| LTE Band 7 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 20850 | 21100 | 21350 |
| | Frequency | 2510 | 2535 | 2560 |
| 15 | Channel | 20825 | 21100 | 21375 |
| | Frequency | 2507.5 | 2535 | 2562.5 |
| 10 | Channel | 20800 | 21100 | 21400 |
| | Frequency | 2505 | 2535 | 2565 |
| 5 | Channel | 20775 | 21100 | 21425 |
| | Frequency | 2502.5 | 2535 | 2567.5 |

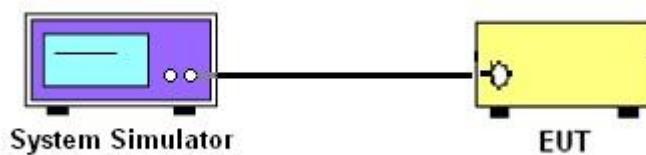
3 Conducted Test Items

3.1 Measuring Instruments

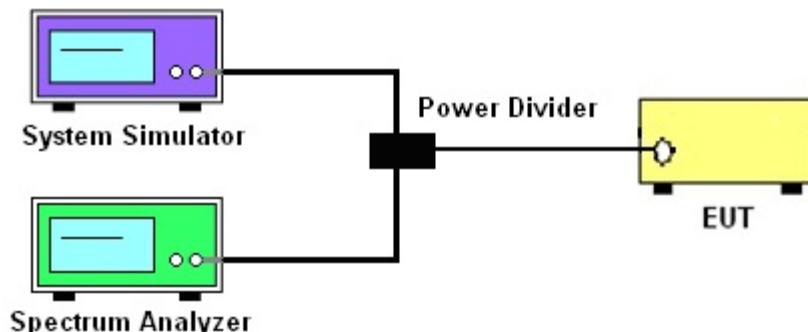
See list of measuring instruments of this test report.

3.2 Test Setup

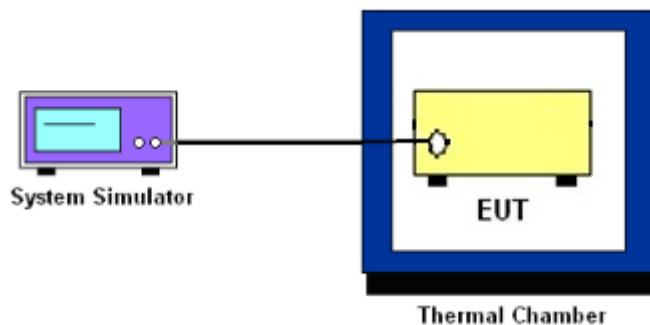
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.



3.4 Conducted Output Power

3.4.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.



3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

3.5.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.7.1.
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.



3.6 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.6.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.



3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.



3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P (Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
<For Band 7>
 - 1) The limit line is derived from $40 + 10\log(P)$ dB below the transmitter power P (Watts)
 $= P(W) - [40 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[40 + 10\log(P)]$ (dB)
 $= -10$ dBm.
 - 2) The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P (Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
 - 3) The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P (Watts)
 $= P(W) - [55 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm.



3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log(P)$ dB.

For Band 7:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log(P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
9. For Band 7

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(W) - [55 + 10\log(P)] \text{ (dB)} \\ &= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)} \\ &= -25 \text{ dBm} \end{aligned}$$



3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at $25\pm 5^\circ\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

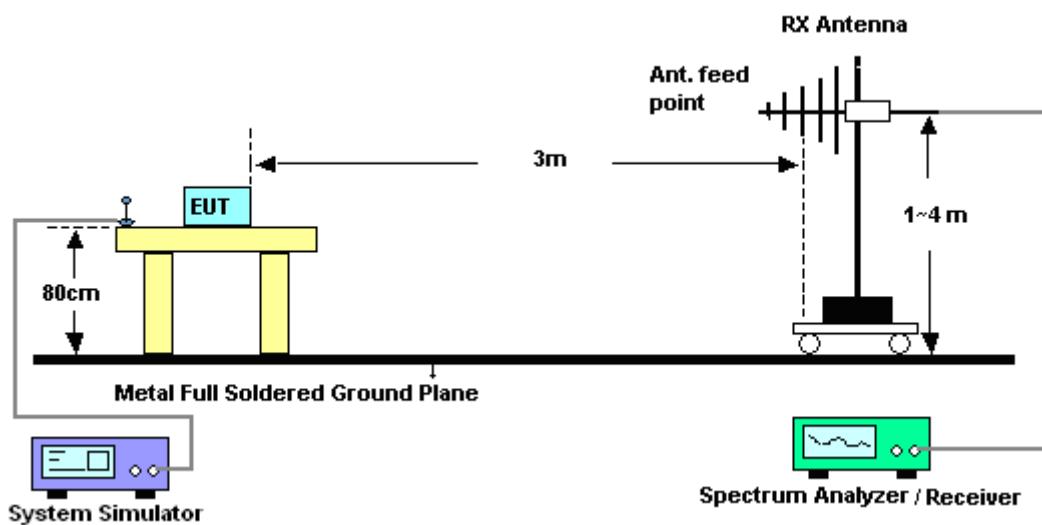
4 Radiated Test Items

4.1 Measuring Instruments

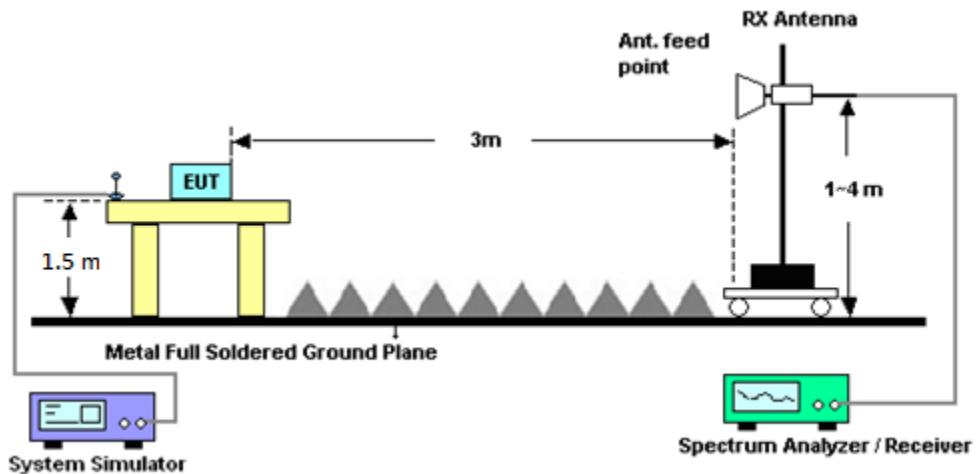
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.



4.4 Effective Isotropic Radiated Power

4.4.1 Description of the EIRP Measurement

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 7.

4.4.2 Test Procedures

1. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
2. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$. Take the record of the output power at substitution antenna.



| | LTE Average | | | | | |
|--------------|-------------|---------|---------|---------|---------|---------|
| LTE BW | 1.4M | 3M | 5M | 10M | 15M | 20M |
| Span | 3MHz | 6MHz | 10MHz | 20MHz | 30MHz | 40MHz |
| RBW | 30kHz | 100kHz | 100kHz | 300kHz | 300kHz | 300kHz |
| VBW | 100kHz | 300kHz | 300kHz | 1MHz | 1MHz | 1MHz |
| Detector | RMS | RMS | RMS | RMS | RMS | RMS |
| Trace | Average | Average | Average | Average | Average | Average |
| Average Type | Power | Power | Power | Power | Power | Power |
| Sweep Count | 100 | 100 | 100 | 100 | 100 | 100 |



4.5 Radiated Spurious Emission

4.5.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-D-2010. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.



4.5.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(W) - [43 + 10\log(P)] \text{ (dB)} \\ &= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} \\ &= -13 \text{ dBm.} \end{aligned}$$

For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$\begin{aligned} &= P(W) - [55 + 10\log(P)] \text{ (dB)} \\ &= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)} \\ &= -25 \text{ dBm} \end{aligned}$$

12. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
13. ERP (dBm) = EIRP - 2.15



5 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---------------------------|--------------|-------------------------|---------------|----------------------|------------------|---------------|---------------|-----------------------|
| Spectrum Analyzer | R&S | FSV30 | 101338 | 9kHz~30GHz | May 04, 2015 | Aug. 30, 2015 | May 03, 2016 | Conducted (TH01-KS) |
| Thermal Chamber | Ten Billion | TTC-B3S | TBN-960502 | -40~+150°C | Oct. 25, 2014 | Aug. 30, 2015 | Oct. 24, 2015 | Conducted (TH01-KS) |
| EMI Test Receiver | R&S | ESR7 | 101403 | 9kHz~7GHz; Max 30dBm | Sep. 10, 2015 | Jul. 19, 2016 | Sep. 09, 2016 | Radiation (03CH02-KS) |
| EXA Spectrum Analyzer | Keysight | N9010A | MY5515020 | 10Hz~44GHz; Max 30dB | Apr. 22, 2016 | Jul. 19, 2016 | Apr. 21, 2017 | Radiation (03CH02-KS) |
| Bilog Antenna | TeseQ | CBL6112D | 37879 | 30MHz~2GHz | Sep. 12, 2015 | Jul. 19, 2016 | Sep. 11, 2016 | Radiation (03CH02-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 75957 | 1GHz~18GHz | Nov. 07, 2015 | Jul. 19, 2016 | Nov. 06, 2016 | Radiation (03CH02-KS) |
| SHF-EHF Horn | com-power | AH-840 | 101070 | 18GHz~40GHz | Oct. 10, 2015 | Jul. 19, 2016 | Oct. 09, 2016 | Radiation (03CH02-KS) |
| Amplifier | com-power | PA-103A | 161069 | 1kHz~1000MHz / 32 dB | Apr. 22, 2016 | Jul. 19, 2016 | Apr. 21, 2017 | Radiation (03CH02-KS) |
| High Gain Amplifier | MITEQ | AMF-7D-00101 800-30-10P | 1865802 | 1GHz~18GHz | Jan. 20, 2016 | Jul. 19, 2016 | Jan. 19, 2017 | Radiation (03CH02-KS) |
| Amplifier | Agilent | 8449B | 3008A02384 | 1~26.5GHz Gain 30dB | Oct. 24, 2015 | Jul. 19, 2016 | Oct. 23, 2016 | Radiation (03CH02-KS) |
| Amplifier | MITEQ | TTA1840-35-H G | 1887435 | 18GHz~40GHz | Jan. 20, 2016 | Jul. 19, 2016 | Jan. 19, 2017 | Radiation (03CH02-KS) |
| AC Power Source | Chroma | 61601 | 6160100024 73 | N/A | NCR | Jul. 19, 2016 | NCR | Radiation (03CH02-KS) |
| Turn Table | MF | MF7802 | N/A | 0~360 degree | NCR | Jul. 19, 2016 | NCR | Radiation (03CH02-KS) |
| Antenna Mast | MF | MF7802 | N/A | 1 m~4 m | NCR | Jul. 19, 2016 | NCR | Radiation (03CH02-KS) |



6 Uncertainty of Evaluation

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

| | |
|---|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.1dB |
|---|-------|

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

| | |
|---|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 4.5dB |
|---|-------|

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

| | |
|---|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.1dB |
|---|-------|



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

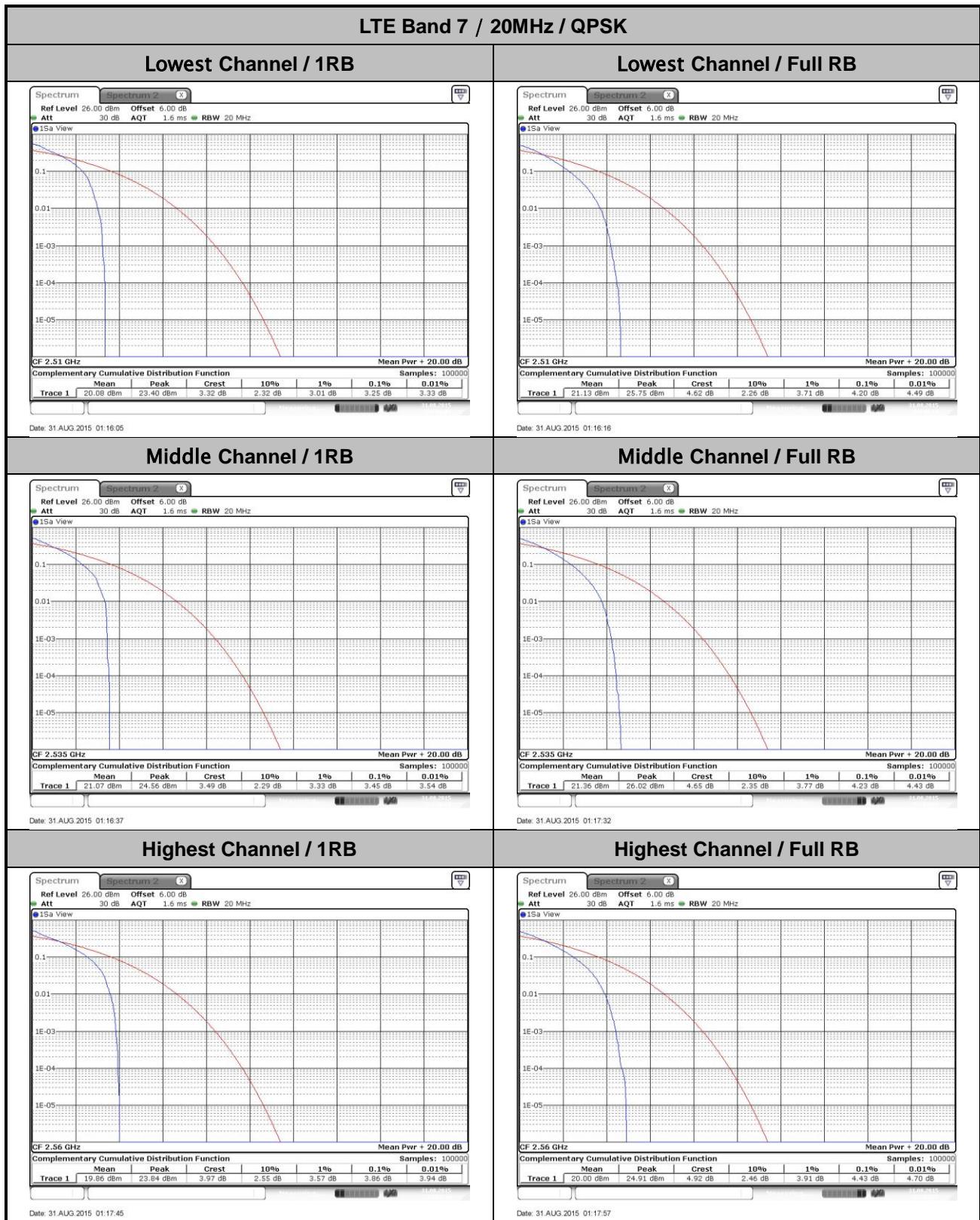
| LTE Band 7 Maximum Average Power [dBm] | | | | | | |
|--|---------|-----------|--------|--------|--------|---------|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 5 | 1 | 0 | QPSK | 22.38 | 22.38 | 22.35 |
| | 1 | 12 | | 22.40 | 22.44 | 22.42 |
| | 1 | 24 | | 22.14 | 22.22 | 22.22 |
| | 12 | 0 | | 21.44 | 21.36 | 21.42 |
| | 12 | 6 | | 21.18 | 21.28 | 21.40 |
| | 12 | 11 | | 21.18 | 21.29 | 21.30 |
| | 25 | 0 | | 21.34 | 21.34 | 21.43 |
| 5 | 1 | 0 | 16-QAM | 21.70 | 21.70 | 21.93 |
| | 1 | 12 | | 21.47 | 21.55 | 21.58 |
| | 1 | 24 | | 21.37 | 21.56 | 21.51 |
| | 12 | 0 | | 20.38 | 20.26 | 20.33 |
| | 12 | 6 | | 20.26 | 20.26 | 20.43 |
| | 12 | 11 | | 20.26 | 20.19 | 20.34 |
| | 25 | 0 | | 20.26 | 20.33 | 20.41 |
| 10 | 1 | 0 | QPSK | 22.34 | 21.93 | 22.15 |
| | 1 | 24 | | 22.15 | 22.48 | 22.31 |
| | 1 | 49 | | 22.17 | 22.45 | 22.09 |
| | 25 | 0 | | 21.27 | 21.40 | 21.31 |
| | 25 | 12 | | 21.18 | 21.40 | 21.39 |
| | 25 | 24 | | 21.21 | 21.29 | 21.41 |
| | 50 | 0 | | 21.24 | 21.28 | 21.42 |
| 10 | 1 | 0 | 16-QAM | 21.28 | 21.88 | 21.48 |
| | 1 | 24 | | 21.10 | 21.94 | 21.59 |
| | 1 | 49 | | 21.05 | 21.53 | 21.02 |
| | 25 | 0 | | 20.36 | 20.48 | 20.50 |
| | 25 | 12 | | 20.38 | 20.49 | 20.43 |
| | 25 | 24 | | 20.18 | 20.43 | 20.47 |
| | 50 | 0 | | 20.29 | 20.44 | 20.38 |

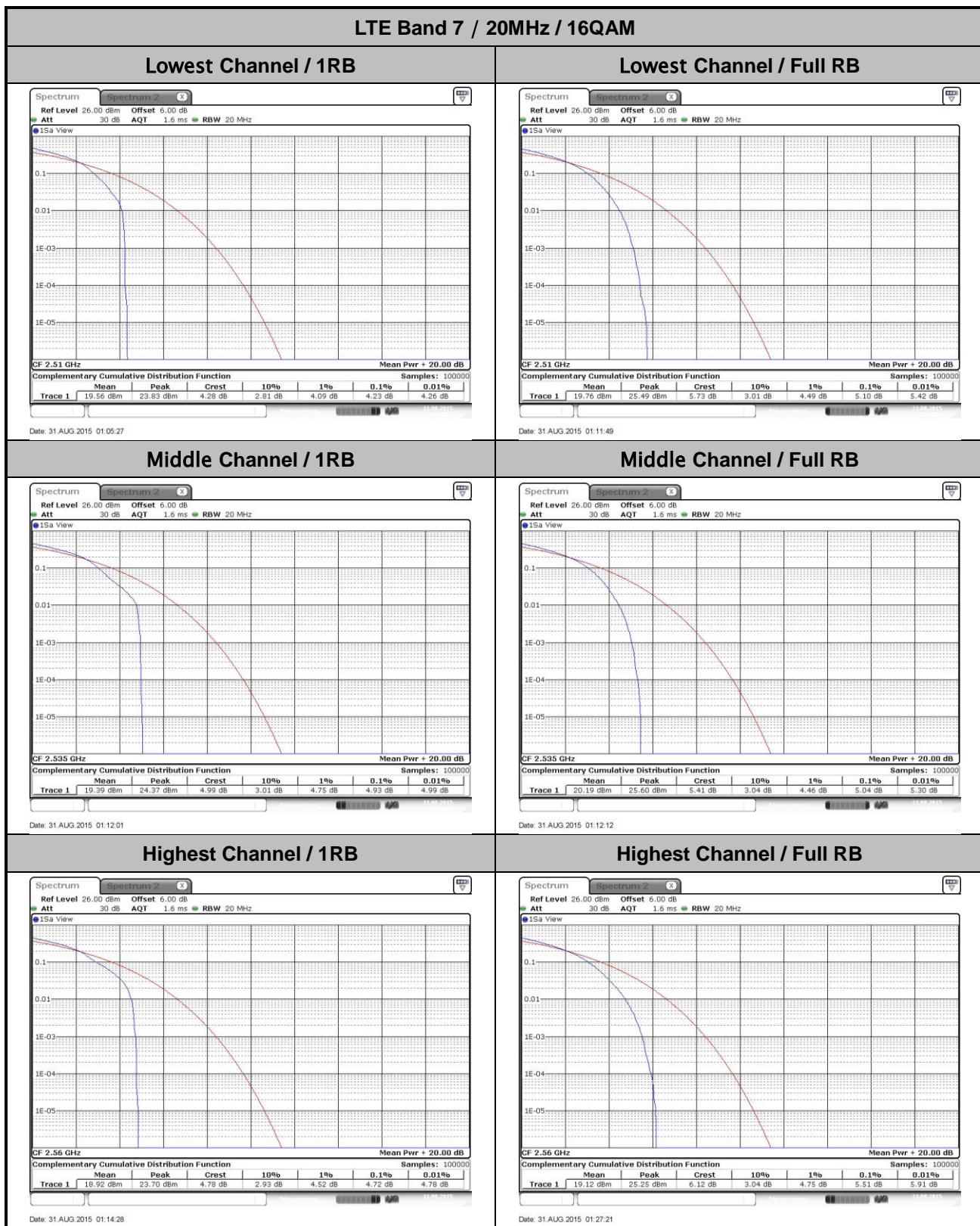


| LTE Band 7 Maximum Average Power [dBm] | | | | | | |
|--|---------|-----------|--------|--------|--------|---------|
| BW [MHz] | RB Size | RB Offset | Mod | Lowest | Middle | Highest |
| 15 | 1 | 0 | QPSK | 22.48 | 22.45 | 22.49 |
| | 1 | 37 | | 22.28 | 22.49 | 22.41 |
| | 1 | 74 | | 22.33 | 22.35 | 22.30 |
| | 36 | 0 | | 21.38 | 21.45 | 21.45 |
| | 36 | 18 | | 21.37 | 21.40 | 21.32 |
| | 36 | 37 | | 21.29 | 21.39 | 21.39 |
| | 75 | 0 | | 21.39 | 21.49 | 21.48 |
| 15 | 1 | 0 | 16-QAM | 21.89 | 21.96 | 21.78 |
| | 1 | 37 | | 21.59 | 21.68 | 21.60 |
| | 1 | 74 | | 21.64 | 21.34 | 21.66 |
| | 36 | 0 | | 20.36 | 20.48 | 20.39 |
| | 36 | 18 | | 20.38 | 20.30 | 20.38 |
| | 36 | 37 | | 20.35 | 20.40 | 20.36 |
| | 75 | 0 | | 20.45 | 20.40 | 20.41 |
| 20 | 1 | 0 | QPSK | 22.32 | 22.39 | 22.36 |
| | 1 | 49 | | 22.30 | 22.33 | 22.30 |
| | 1 | 99 | | 21.88 | 22.22 | 22.20 |
| | 50 | 0 | | 21.20 | 21.38 | 21.35 |
| | 50 | 24 | | 21.12 | 21.31 | 21.25 |
| | 50 | 49 | | 21.05 | 21.21 | 21.32 |
| | 100 | 0 | | 21.13 | 21.28 | 21.27 |
| 20 | 1 | 0 | 16-QAM | 21.48 | 21.86 | 21.69 |
| | 1 | 49 | | 21.31 | 21.46 | 21.70 |
| | 1 | 99 | | 21.24 | 21.47 | 21.36 |
| | 50 | 0 | | 20.22 | 20.38 | 20.33 |
| | 50 | 24 | | 20.14 | 20.24 | 20.22 |
| | 50 | 49 | | 20.17 | 20.25 | 20.24 |
| | 100 | 0 | | 20.14 | 20.39 | 20.26 |

**Peak-to-Average Ratio**

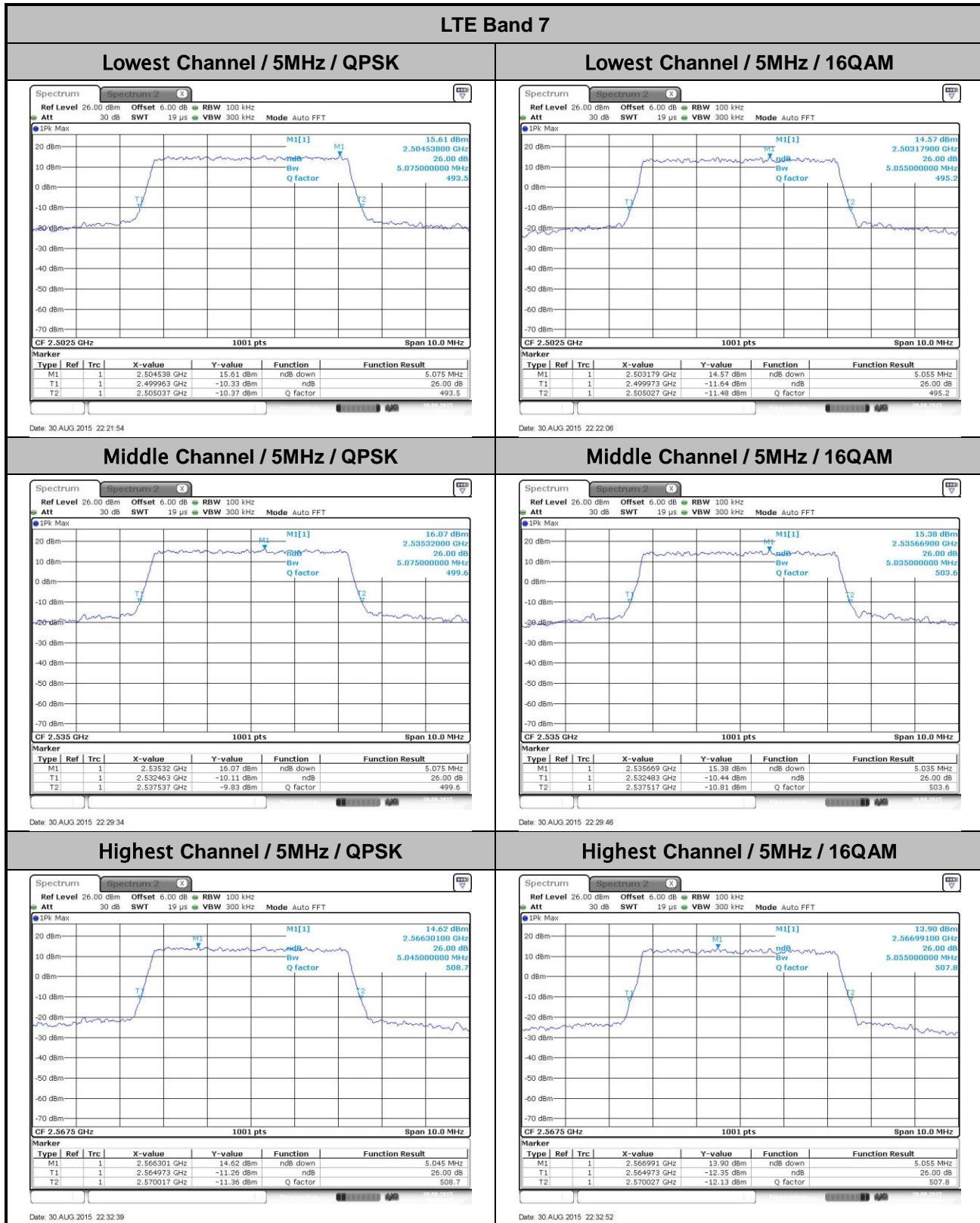
| Mode | LTE Band 7 / 20MHz | | | | |
|------------|--------------------|---------|-------|---------|-------------|
| Mod. | QPSK | | 16QAM | | Limit: 13dB |
| RB Size | 1RB | Full RB | 1RB | RB Size | Result |
| Lowest CH | 3.25 | 4.2 | 4.23 | 5.1 | PASS |
| Middle CH | 3.45 | 4.23 | 4.93 | 5.04 | |
| Highest CH | 3.86 | 4.43 | 4.72 | 5.51 | |

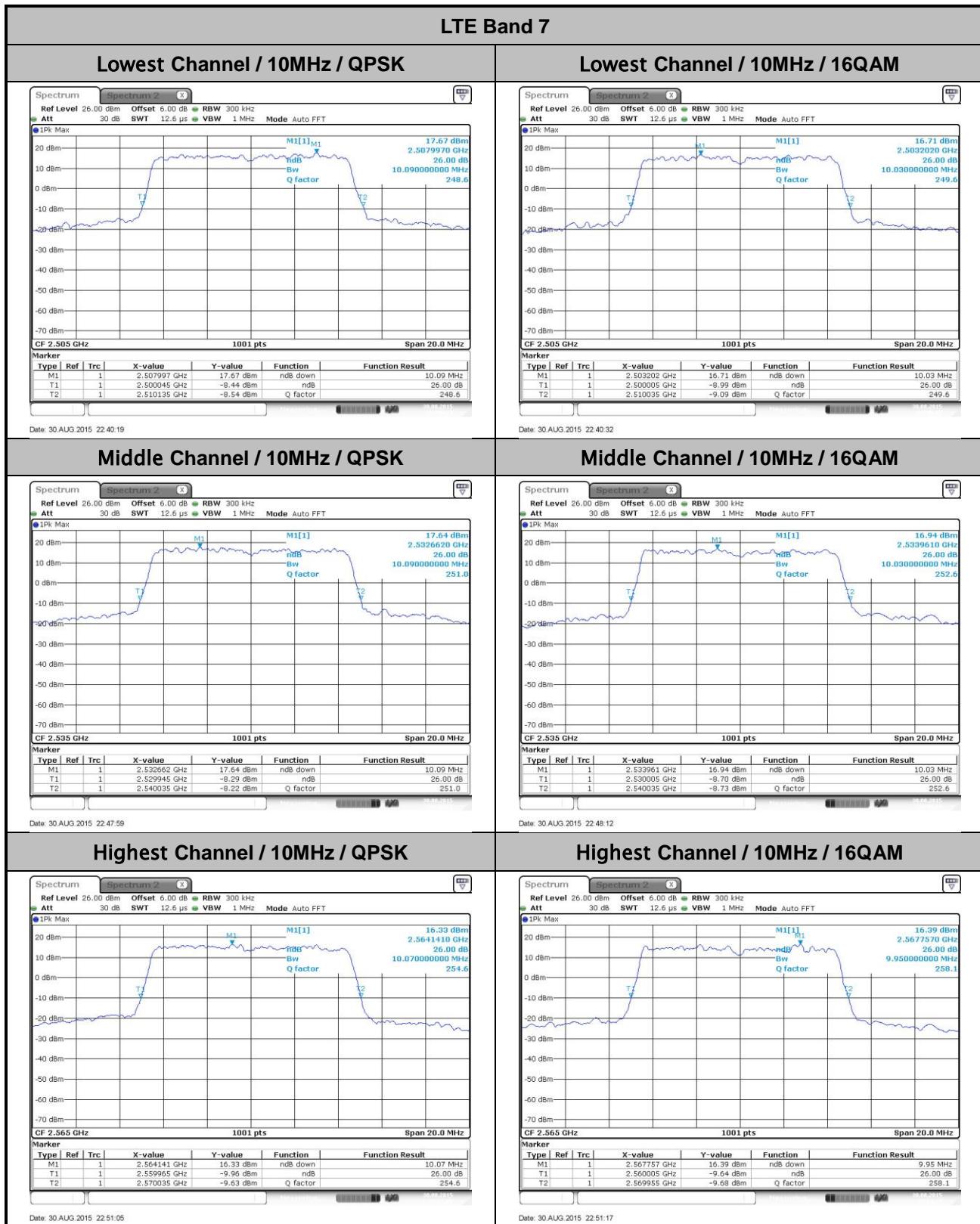


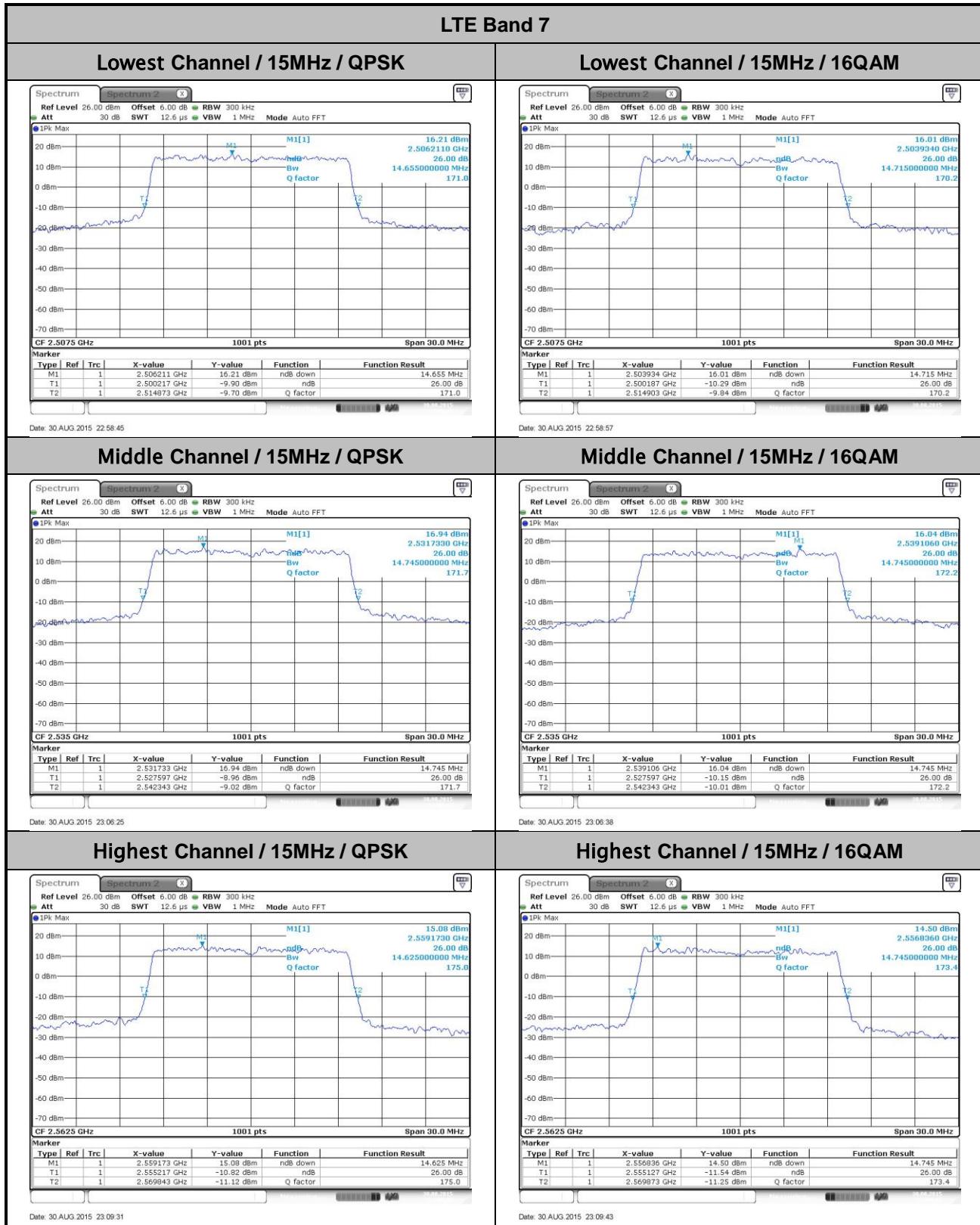


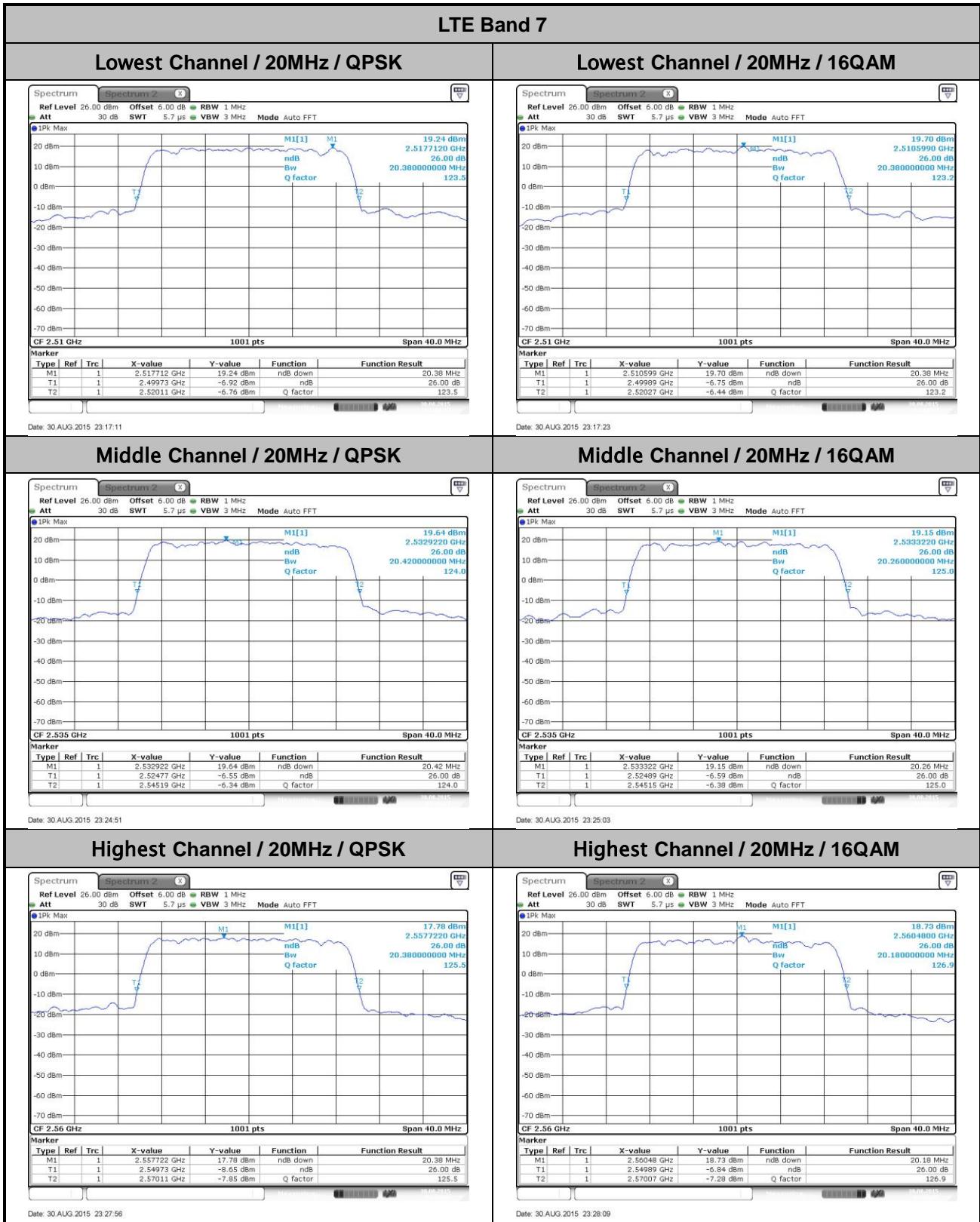
**26dB Bandwidth**

| Mode | LTE Band 7 : 26dB BW(MHz) | | | | | | | | | | | |
|------------|---------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| | 1.4MHz | | 3MHz | | 5MHz | | 10MHz | | 15MHz | | 20MHz | |
| Mod. | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM |
| Lowest CH | - | - | - | - | 5.08 | 5.06 | 10.09 | 10.03 | 14.66 | 14.72 | 20.38 | 20.38 |
| Middle CH | - | - | - | - | 5.08 | 5.04 | 10.09 | 10.03 | 14.75 | 14.75 | 20.42 | 20.26 |
| Highest CH | - | - | - | - | 5.05 | 5.06 | 10.07 | 9.95 | 14.63 | 14.75 | 20.38 | 20.18 |



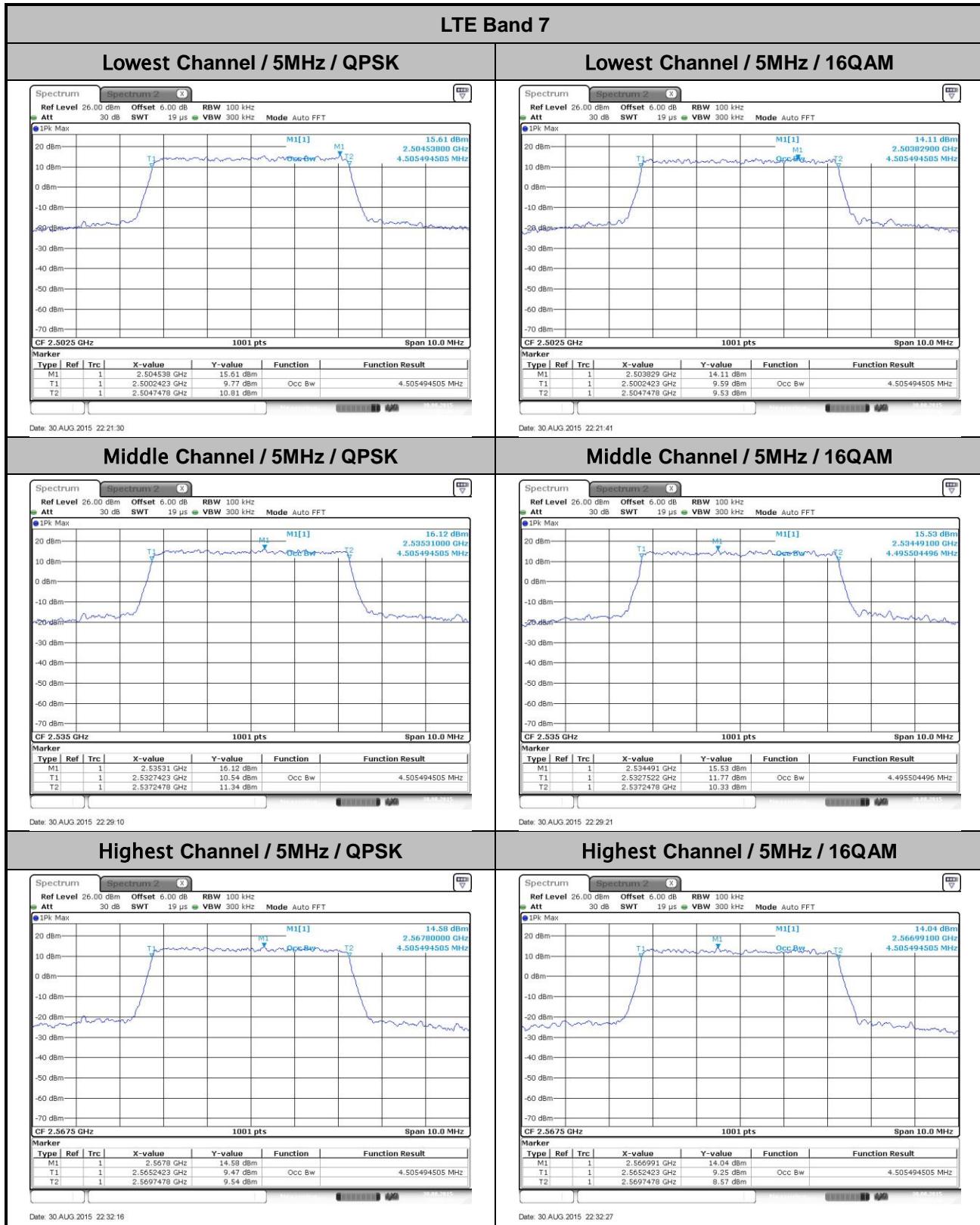


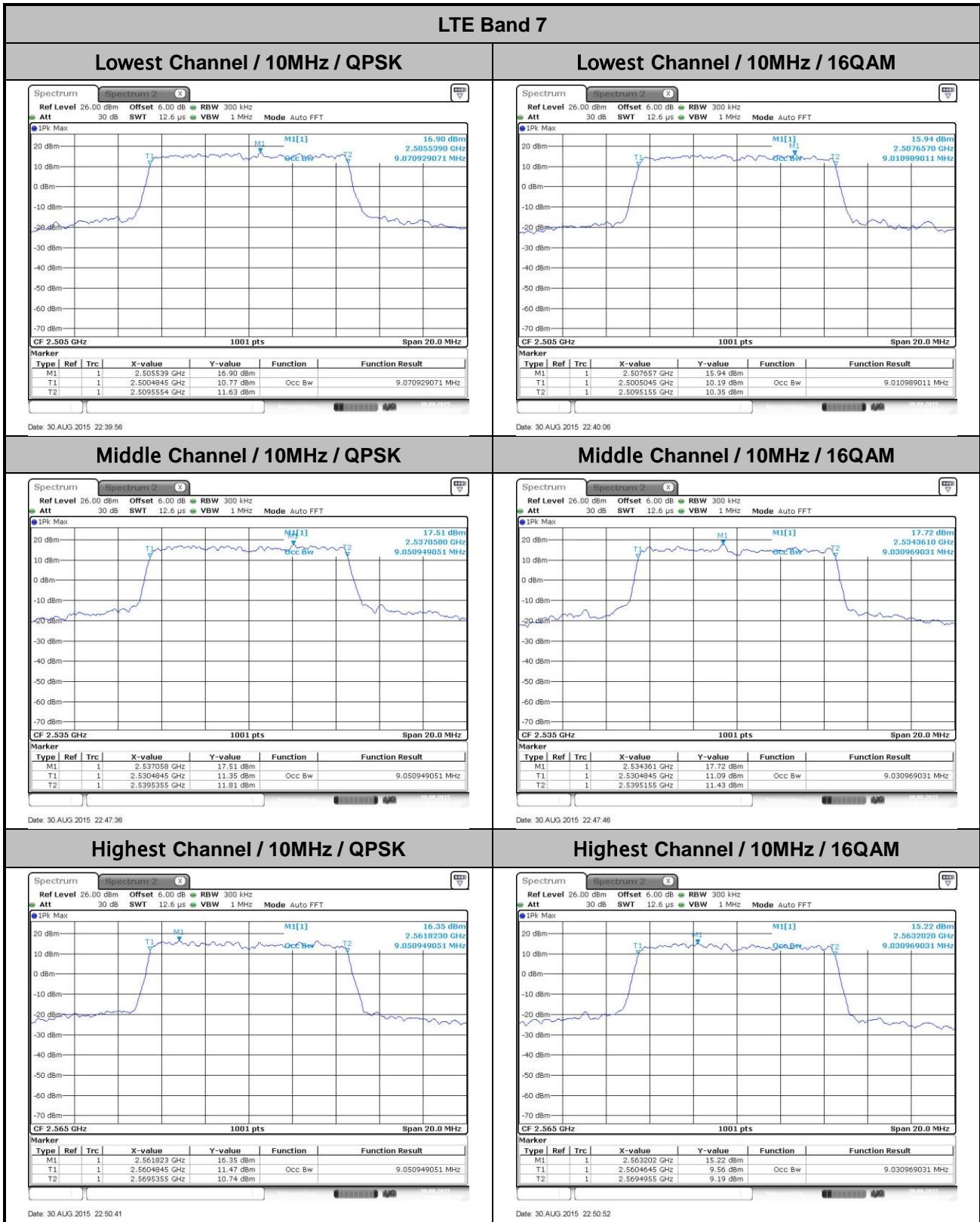


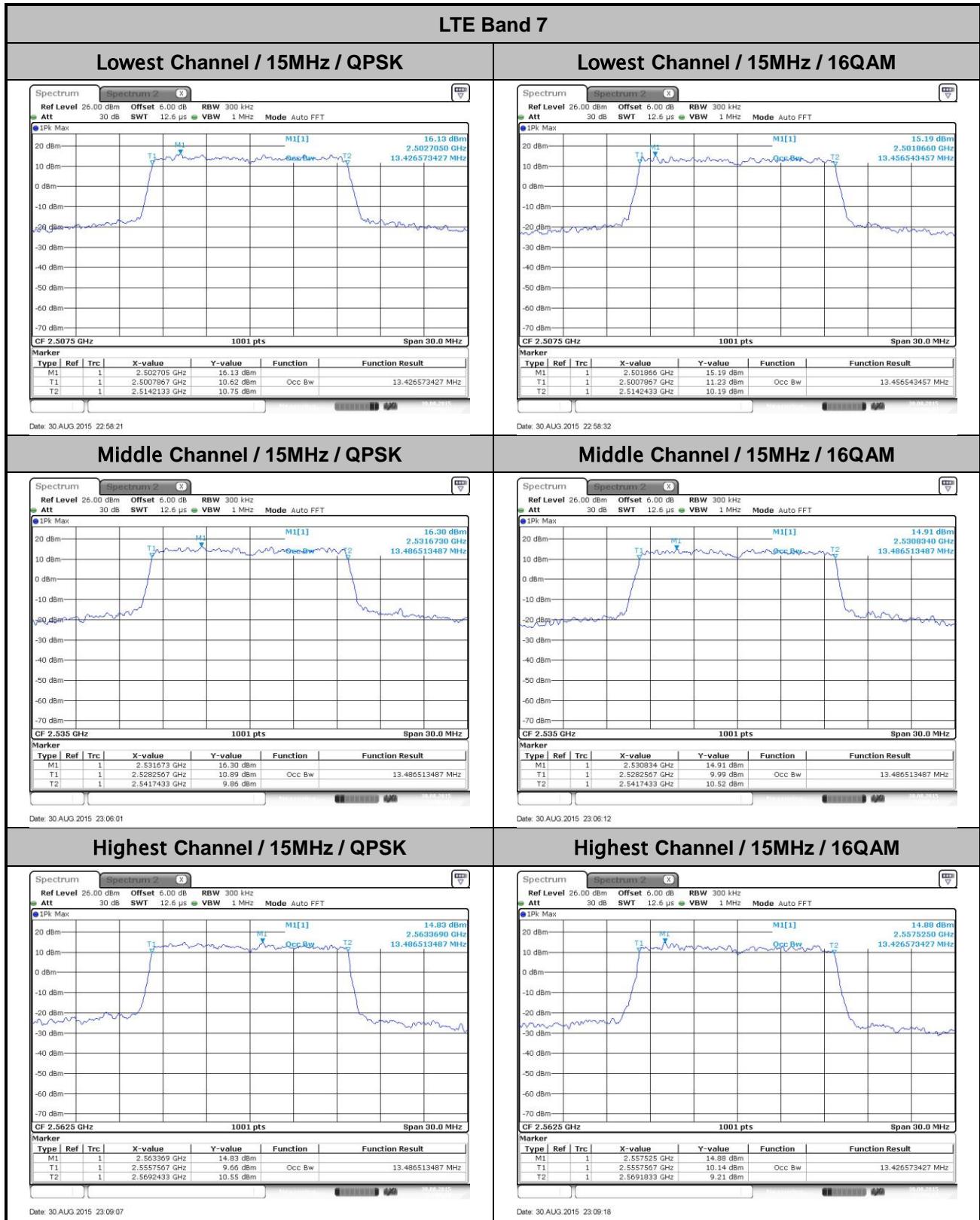


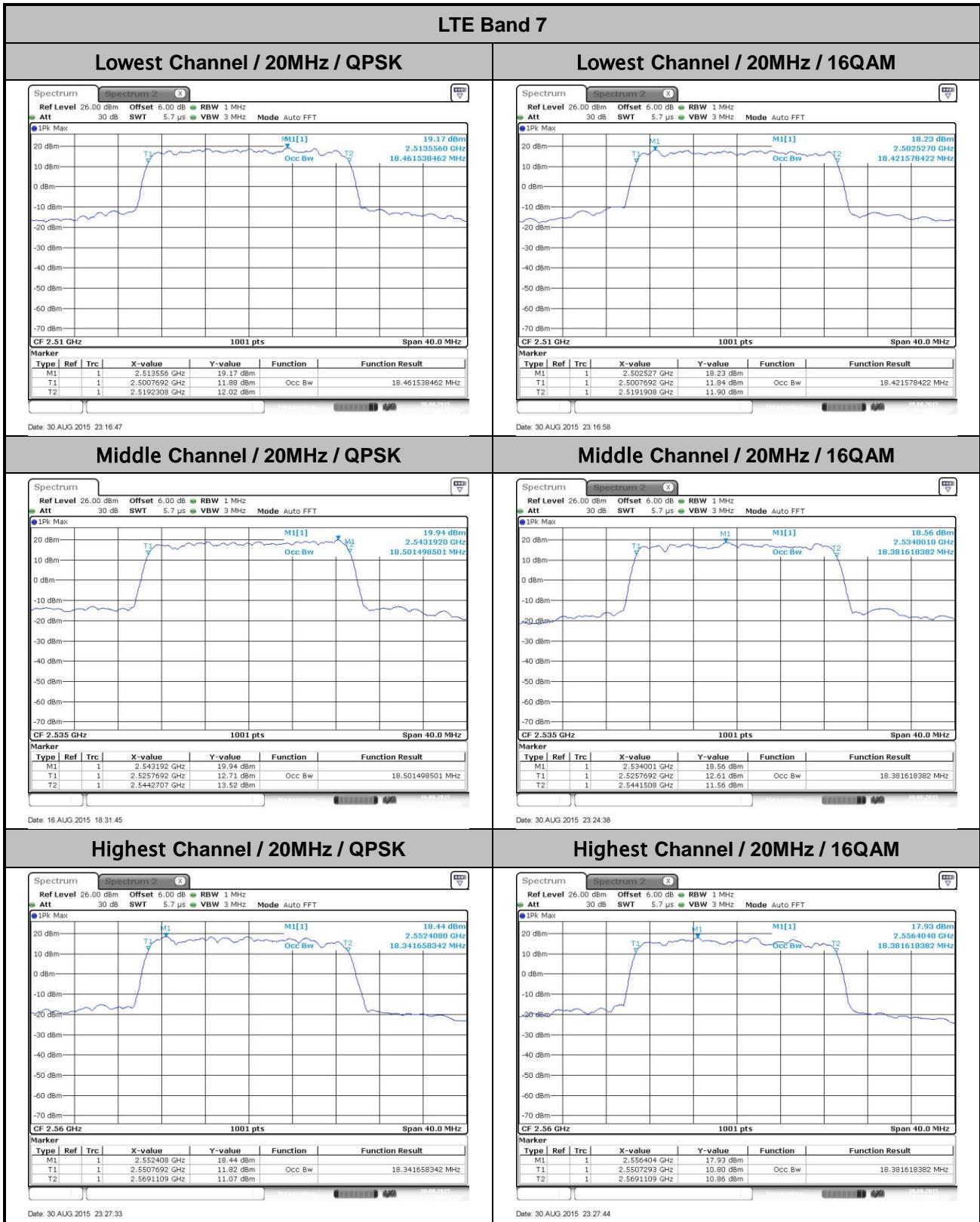
**Occupied Bandwidth**

| Mode | LTE Band 7 : 99%OBW(MHz) | | | | | | | | | | | |
|------------|--------------------------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| | 1.4MHz | | 3MHz | | 5MHz | | 10MHz | | 15MHz | | 20MHz | |
| Mod. | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM | QPSK | 16QAM |
| Lowest CH | - | - | - | - | 4.51 | 4.51 | 9.07 | 9.01 | 13.43 | 13.46 | 18.46 | 18.42 |
| Middle CH | - | - | - | - | 4.51 | 4.50 | 9.05 | 9.03 | 13.49 | 13.49 | 18.50 | 18.38 |
| Highest CH | - | - | - | - | 4.51 | 4.51 | 9.05 | 9.03 | 13.49 | 13.43 | 18.34 | 18.38 |











Conducted Band Edge

