# TEST REPORT

## No. I19Z62374-WMD21

**for**

**SAMSUNG Electronics Co., Ltd.**

**Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN**

**Model Name: SM-A215U1**

**FCC ID: ZCASMA215U**

**with**

**Hardware Version: REV1.0**

**Software Version: A215U1.001**

**Issued Date: 2020-04-17**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

**Test Laboratory:**

**CTTL, Telecommunication Technology Labs, CAICT**

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

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Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

# REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| I19Z62374-WMD21 | Rev.0 | 1st edition | 2020-03-23 |
| I19Z62374-WMD21 | Rev.1 | Changed the Client Information and EUT Software version | 2020-04-17 |

Note: the latest revision of the test report supersedes all previous version.

# CONTENTS

# 1. Test Laboratory

## 1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

## 1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL (Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

Location 3: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

## 1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

## 1.4. Project data

Testing Start Date: 2020-01-10

Testing End Date: 2020-03-17

## 1.5. Signature

**Dong Yuan**

**(Prepared this test report)**

**Zhou Yu**

**(Reviewed this test report)**

**Zhao Hui Lin**

**Deputy Director of the laboratory**

**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | SAMSUNG Electronics Co., Ltd. |
| Address /Post: | 19 Chapin Road, Building D, Pine Brook New Jersey United States, 07058 |
| Contact: | Jenni Chun |
| Email: | j1.chun@samsung.com |
| Telephone: | 1-973-808-6375 |
| Fax: | NA |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | SAMSUNG Electronics Co., Ltd. |
| Address /Post: | 19 Chapin Road, Building D, Pine Brook New Jersey United States, 07058 |
| Contact: | Jenni Chun |
| Email: | j1.chun@samsung.com |
| Telephone: | 1-973-808-6375 |
| Fax: | NA |

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| Description | Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN |
| Model Name | SM-A215U1 |
| FCC ID | ZCASMA215U |
| Antenna | Embedded |
| Output power | 21.44dBm maximum EIRP measured for LTE Band 41 |
| Extreme vol. Limits | 3.5VDC to 4.4VDC (nominal: 3.8VDC) |
| Extreme temp. Tolerance | -10°C to +55°C |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| UT07a | 354230110026502 | REV1.0 | A215U1.001 | 2019-12-27 |
| UT19a | 354230110009631 | REV1.0 | A215U1.001 | 2020-01-13 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description |
|---|---|
| AE1 | Battery |

AE1

| | |
|---|---|
| Model | NVT-WT-N6 |
| Manufacturer | Dongguan NVT Technology Co., Ltd. |
| Capacitance | 3900mAh |

*AE ID: is used to identify the test sample in the lab internally.

# 4. Reference Documents

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 27 | MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES | 10-1-19 Edition |
| ANSI/TIA-603-E | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2016 |
| ANSI/TIA-102.CAAA-E | DIGITAL C4FMCQPSK TRANSCEIVER MEASUREMENT METHODS | 2016 |
| ANSI C63.26 | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services | 2015 |
| KDB 971168 D01 | MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS | v03r01 |

# 5. LABORATORY ENVIRONMENT

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C, Max. = 35 ˚C |
| Relative humidity | Min. =20 %, Max. = 80 % |
| Shielding effectiveness | > 110 dB |
| Electrical insulation | >2 MΩ |
| Ground system resistance | < 0.5 Ω |

**Fully-anechoic chamber 2** (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C, Max. = 30 ˚C |
| Relative humidity | Min. = 35 %, Max. = 60 % |
| Shielding effectiveness | > 110 dB |
| Electrical insulation | >2 MΩ |
| Ground system resistance | < 1 Ω |
| Site voltage standing-wave ratio ($S_{VSWR}$) | Between 0 and 6 dB, from 1GHz to 18GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 4000 MHz |

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ˚C, Max. = 30 ˚C |
| Relative humidity | Min. = 35 %, Max. = 60 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | >2 MΩ |
| Ground system resistance | < 0.5 Ω |
| Normalised site attenuation (NSA) | <±3.5 dB, 3 m distance |
| Site voltage standing-wave ratio ($S_{VSWR}$) | Between 0 and 6 dB, from 1GHz to 18GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 3000 MHz |

# 6. SUMMARY OF TEST RESULT

## 6.1. Summary of test results

**LTE Band 41**

| Items | Test Name | Clause in FCC rules | Verdict |
|---|---|---|---|
| 1 | Output Power | 27.50 | BR |
| 2 | Emission Limit | 2.1051/27.53 | BR |
| 3 | Frequency Stability | 2.1055 | BR |
| 4 | Occupied Bandwidth | 2.1049 | BR |
| 5 | Emission Bandwidth | 27.53 | BR |
| 6 | Band Edge Compliance | 27.53 | BR |
| 7 | Conducted Spurious Emission | 27.53 | BR |
| 8 | Peak-to-Average Power Ratio | 27.50 | BR |

Terms used in Verdict column

| | |
|---|---|
| P | Pass. The EUT complies with the essential requirements in the standard. |
| NP | Not Performed. The test was not performed by CTTL. |
| NA | Not Applicable. The test was not applicable. |
| BR | Re-use test data from basic model report. |
| F | Fail. The EUT does not comply with the essential requirements in the standard. |

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK,16QAM and 64QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

## 6.2. Explanation of re-use of test data

The Equipment Under Test (EUT) model SM-A215U1 (FCC ID: ZCASMA215U) is a variant product of SM-A215U (ZCASMA215U). According to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01, all the test results are derived from test report No. I19Z62374-WMD06.

For detail differences between two models please refer the Declaration of Changes document.

## 7. Test Equipment Utilized

| NO. | Description | Type | Series Number | Manufacture | Cal Due Date | Calibration Interval |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | FSU26 | 200030 | R&S | 2020-06-03 | 1 year |
| 2 | Climate chamber | SH-242 | 93008556 | ESPEC | 2020-12-21 | 3 year |
| 3 | Radio Communication Analyzer | MT8821C | 6201763159 | Anritsu | 2020-07-23 | 1 year |
| 4 | EMI Antenna | VULB9163 | 9163-483 | Schwarzbeck | 2020-09-16 | 1 year |
| 5 | EMI Antenna | 3117 | 00058889 | ETS-Lindgren | 2020-11-18 | 1 year |
| 6 | EMI Antenna | 3117 | 00139065 | ETS-Lindgren | 2020-10-15 | 1 year |
| 7 | EMI Antenna | 9117 | 167 | Schwarzbeck | 2020-05-27 | 1 year |
| 8 | Signal Generator | N5183A | MY49060052 | R&S | 2020-06-24 | 1 year |
| 9 | Test Receiver | E4440A | MY48250642 | Agilent | 2020-03-18 | 1 year |
| 10 | Universal Radio Communication Tester | CMW500 | 143008 | R&S | 2020-11-26 | 1 year |
| 11 | Power Amplifier | 5S1G4 | 0341863 | AR | / | |
| 12 | Universal Radio Communication Tester | MT8821C | 6201623363 | Anritsu | 2020-07-11 | 1 year |

# ANNEX A: MEASUREMENT RESULTS

## A.1 OUTPUT POWER

### A.1.1 Summary

During the process of testing, the EUT was controlled via Anritsu Radio Communication Analyzer (MT8821C) to ensure max power transmission and proper modulation.
In all cases, output power is within the specified limits.

### A.1.2 Conducted

#### A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.
These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

#### A.1.2.2 Measurement result

The conducted power measurement results of uplink LTE CA are as below HPUE:

| DL LTE CA Class | PCC | | | | | | | | SCC | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth(MHz) | PCC ULRB size | PCC ULRB offset | PCC DLRB size | PCC DLRB offset | PCC UL Channel | PCC DL Channel | SCC Band | SCC Bandwidth (MHz) | SCC DL Channel | Rel 8 LTETx Power(dBm) | Rel 10 DL LTE CATx Power(dBm) Tune-up |
| 41C | 41 | 20 | 1 | 50 | 100 | 0 | 39750 | 39750 | 41 | 20 | 39948 | 26.21 | 23.28 |

Note: Testing is not required in bands or modes not intended/allowed for US operation.

The conducted power measurement results of uplink LTE CA are as below Normal Power:

| DL LTE CA Class | PCC | | | | | | | | SCC | | | Power | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth(MHz) | PCC ULRB size | PCC ULRB offset | PCC DLRB size | PCC DLRB offset | PCC UL Channel | PCC DL Channel | SCC Band | SCC Bandwidth (MHz) | SCC DL Channel | Rel 8 LTETx Power(dBm) | Rel 10 DL LTE CATx Power(dBm) Tune-up |
| 41C | 41 | 20 | 1 | 50 | 100 | 0 | 39750 | 39750 | 41 | 20 | 39948 | 24.02 | 21.16 |

Note: Testing is not required in bands or modes not intended/allowed for US operation.

### A.1.3 Radiated

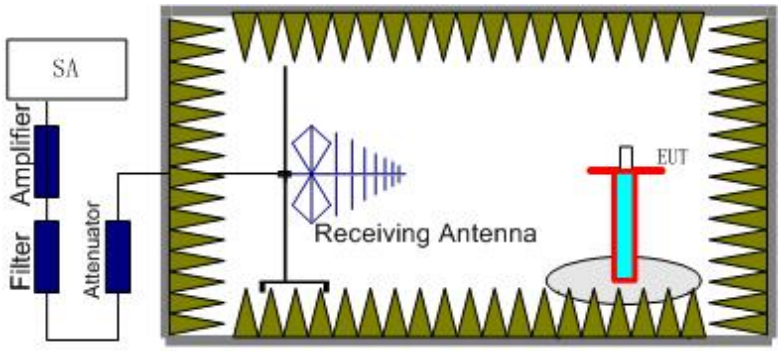
#### A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.
Rule Part 27.50(h)(2) specifies "Mobilestations are limited to 2.0 wattsEIRP."

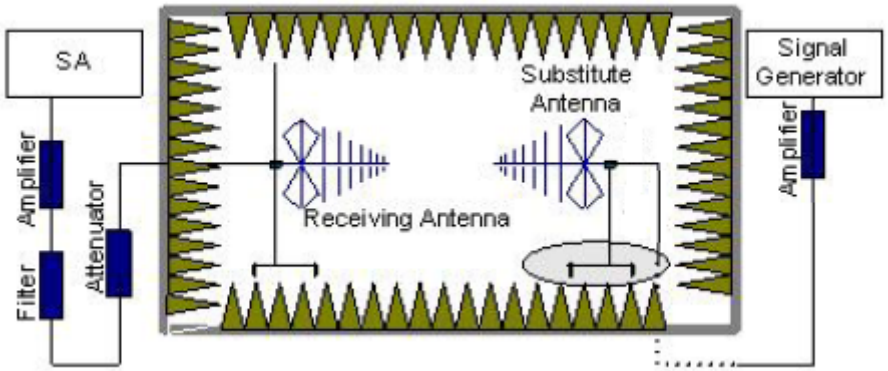
#### A.1.3.2 Method of Measurement

The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360 and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with rms detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna

polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.
   The cable loss ($P_{cl}$), the substitution antenna Gain ($G_a$) and the amplifier Gain ($P_{Ag}$) should be recorded after test.
   The measurement results are obtained as described below:
   Power (EIRP) = $P_{Mea}$ +$P_{Ag}$ - $P_{cl}$ + $G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP - 2.15.

### A.1.3.3 Measurement result

**LTE band 41-HPUE- EIRP**

**Limits:** ≤33dBm (2W)

**LTE_B41C_5MHz+20MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -33.92 | 3.58 | 45.61 | 6.10 | 21.37 | 33.00 | 11.63 | H |
| 2583.80 | 2595.50 | -34.11 | 3.67 | 44.92 | 6.25 | 20.73 | 33.00 | 12.27 | H |
| 2668.30 | 2680.00 | -34.38 | 3.74 | 44.96 | 6.41 | 20.73 | 33.00 | 12.27 | H |

**LTE_B41C_10MHz+20MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -33.90 | 3.58 | 45.66 | 6.10 | 21.44 | 33.00 | 11.56 | H |
| 2583.60 | 2598.00 | -34.13 | 3.67 | 44.92 | 6.24 | 20.70 | 33.00 | 12.30 | H |
| 2665.60 | 2680.00 | -34.57 | 3.73 | 44.96 | 6.40 | 20.52 | 33.00 | 12.48 | H |

**LTE_B41C_15MHz+20MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -26.78 | 3.58 | 45.65 | 6.11 | 21.40 | 33.00 | 11.60 | H |
| 2583.30 | 2595.50 | -26.90 | 3.67 | 44.92 | 6.24 | 20.59 | 33.00 | 12.41 | H |
| 2662.90 | 2680.00 | -27.17 | 3.72 | 44.96 | 6.40 | 20.47 | 33.00 | 12.53 | H |

**LTE_B41C_20MHz+5MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -26.53 | 3.59 | 45.15 | 6.11 | 21.14 | 33.00 | 11.86 | H |
| 2590.50 | 2602.50 | -27.45 | 3.69 | 44.93 | 6.26 | 20.05 | 33.00 | 12.95 | H |
| 2675.00 | 2686.70 | -27.41 | 3.74 | 44.97 | 6.42 | 20.24 | 33.00 | 12.76 | H |

**LTE_B41C_20MHz+10MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -26.56 | 3.59 | 45.15 | 6.11 | 21.11 | 33.00 | 11.89 | H |
| 2588.10 | 2602.50 | -27.23 | 3.69 | 44.93 | 6.26 | 20.27 | 33.00 | 12.73 | H |
| 2670.10 | 2684.50 | -27.25 | 3.74 | 44.97 | 6.41 | 20.39 | 33.00 | 12.61 | H |

**LTE_B41C_20MHz+15MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2523.00 | -26.61 | 3.59 | 45.15 | 6.11 | 21.06 | 33.00 | 11.94 | H |
| 2585.60 | 2602.70 | -27.44 | 3.68 | 44.92 | 6.25 | 20.05 | 33.00 | 12.95 | H |
| 2665.10 | 2682.20 | -27.43 | 3.73 | 44.96 | 6.40 | 20.20 | 33.00 | 12.80 | H |

**LTE_B41C_15MHz+15MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -26.96 | 3.58 | 45.65 | 6.11 | 21.22 | 33.00 | 11.78 | H |
| 2585.50 | 2600.50 | -26.86 | 3.68 | 44.92 | 6.25 | 20.63 | 33.00 | 12.37 | H |
| 2667.50 | 2682.50 | -27.02 | 3.74 | 44.96 | 6.41 | 20.61 | 33.00 | 12.39 | H |

**LTE_B41C_20MHz+20MHz_HP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -26.56 | 3.59 | 45.15 | 6.11 | 21.11 | 33.00 | 11.89 | H |
| 2583.10 | 2602.90 | -26.99 | 3.67 | 44.92 | 6.24 | 20.50 | 33.00 | 12.50 | H |
| 2660.20 | 2680.00 | -26.92 | 3.71 | 44.96 | 6.39 | 20.72 | 33.00 | 12.28 | H |

**LTE_B41C_5MHz+20MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -33.95 | 3.58 | 45.61 | 6.10 | 21.34 | 33.00 | 11.66 | H |
| 2583.80 | 2595.50 | -34.14 | 3.67 | 44.92 | 6.25 | 20.70 | 33.00 | 12.30 | H |
| 2668.30 | 2680.00 | -34.41 | 3.74 | 44.96 | 6.41 | 20.70 | 33.00 | 12.30 | H |

**LTE_B41C_10MHz+20MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -33.93 | 3.58 | 45.66 | 6.10 | 21.41 | 33.00 | 11.59 | H |
| 2583.60 | 2598.00 | -34.17 | 3.67 | 44.92 | 6.24 | 20.66 | 33.00 | 12.34 | H |
| 2665.60 | 2680.00 | -34.61 | 3.73 | 44.96 | 6.40 | 20.48 | 33.00 | 12.52 | H |

**LTE_B41C_15MHz+20MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -26.84 | 3.58 | 45.65 | 6.11 | 21.34 | 33.00 | 11.66 | H |
| 2583.30 | 2595.50 | -26.96 | 3.67 | 44.92 | 6.24 | 20.53 | 33.00 | 12.47 | H |
| 2662.90 | 2680.00 | -27.20 | 3.72 | 44.96 | 6.40 | 20.44 | 33.00 | 12.56 | H |

**LTE_B41C_20MHz+5MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -26.57 | 3.59 | 45.15 | 6.11 | 21.10 | 33.00 | 11.90 | H |
| 2590.50 | 2602.50 | -27.52 | 3.69 | 44.93 | 6.26 | 19.98 | 33.00 | 13.02 | H |
| 2675.00 | 2686.70 | -27.46 | 3.74 | 44.97 | 6.42 | 20.19 | 33.00 | 12.81 | H |

**LTE_B41C_20MHz+10MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -26.59 | 3.59 | 45.15 | 6.11 | 21.08 | 33.00 | 11.92 | H |
| 2588.10 | 2602.50 | -27.26 | 3.69 | 44.93 | 6.26 | 20.24 | 33.00 | 12.76 | H |
| 2670.10 | 2684.50 | -27.28 | 3.74 | 44.97 | 6.41 | 20.36 | 33.00 | 12.64 | H |

**LTE_B41C_20MHz+15MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2523.00 | -26.64 | 3.59 | 45.15 | 6.11 | 21.03 | 33.00 | 11.97 | H |
| 2585.60 | 2602.70 | -27.47 | 3.68 | 44.92 | 6.25 | 20.02 | 33.00 | 12.98 | H |
| 2665.10 | 2682.20 | -27.48 | 3.73 | 44.96 | 6.40 | 20.15 | 33.00 | 12.85 | H |

**LTE_B41C_15MHz+15MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -26.99 | 3.58 | 45.65 | 6.11 | 21.19 | 33.00 | 11.81 | H |
| 2585.50 | 2600.50 | -26.89 | 3.68 | 44.92 | 6.25 | 20.60 | 33.00 | 12.40 | H |
| 2667.50 | 2682.50 | -27.05 | 3.74 | 44.96 | 6.41 | 20.58 | 33.00 | 12.42 | H |

**LTE_B41C_20MHz+20MHz_HP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -26.58 | 3.59 | 45.15 | 6.11 | 21.09 | 33.00 | 11.91 | H |
| 2583.10 | 2602.90 | -27.02 | 3.67 | 44.92 | 6.24 | 20.47 | 33.00 | 12.53 | H |
| 2660.20 | 2680.00 | -26.96 | 3.71 | 44.96 | 6.39 | 20.68 | 33.00 | 12.32 | H |

**LTE_B41C_5MHz+20MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -34.77 | 3.58 | 45.61 | 6.10 | 20.52 | 33.00 | 12.48 | H |
| 2583.80 | 2595.50 | -34.95 | 3.67 | 44.92 | 6.25 | 19.89 | 33.00 | 13.11 | H |
| 2668.30 | 2680.00 | -35.25 | 3.74 | 44.96 | 6.41 | 19.86 | 33.00 | 13.14 | H |

**LTE_B41C_10MHz+20MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -34.77 | 3.58 | 45.66 | 6.10 | 20.57 | 33.00 | 12.43 | H |
| 2583.60 | 2598.00 | -34.99 | 3.67 | 44.92 | 6.24 | 19.84 | 33.00 | 13.16 | H |
| 2665.60 | 2680.00 | -35.45 | 3.73 | 44.96 | 6.40 | 19.64 | 33.00 | 13.36 | H |

**LTE_B41C_15MHz+20MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -27.68 | 3.58 | 45.65 | 6.11 | 20.50 | 33.00 | 12.50 | H |
| 2583.30 | 2595.50 | -27.69 | 3.67 | 44.92 | 6.24 | 19.80 | 33.00 | 13.20 | H |
| 2662.90 | 2680.00 | -28.04 | 3.72 | 44.96 | 6.40 | 19.60 | 33.00 | 13.40 | H |

**LTE_B41C_20MHz+5MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -27.50 | 3.59 | 45.15 | 6.11 | 20.17 | 33.00 | 12.83 | H |
| 2590.50 | 2602.50 | -28.30 | 3.69 | 44.93 | 6.26 | 19.20 | 33.00 | 13.80 | H |
| 2675.00 | 2686.70 | -28.29 | 3.74 | 44.97 | 6.42 | 19.36 | 33.00 | 13.64 | H |

**LTE_B41C_20MHz+10MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -27.48 | 3.59 | 45.15 | 6.11 | 20.19 | 33.00 | 12.81 | H |
| 2588.10 | 2602.50 | -28.11 | 3.69 | 44.93 | 6.26 | 19.39 | 33.00 | 13.61 | H |
| 2670.10 | 2684.50 | -28.21 | 3.74 | 44.97 | 6.41 | 19.43 | 33.00 | 13.57 | H |

**LTE_B41C_20MHz+15MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2523.00 | -27.52 | 3.59 | 45.15 | 6.11 | 20.15 | 33.00 | 12.85 | H |
| 2585.60 | 2602.70 | -28.32 | 3.68 | 44.92 | 6.25 | 19.17 | 33.00 | 13.83 | H |
| 2665.10 | 2682.20 | -28.44 | 3.73 | 44.96 | 6.40 | 19.19 | 33.00 | 13.81 | H |

**LTE_B41C_15MHz+15MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -27.90 | 3.58 | 45.65 | 6.11 | 20.28 | 33.00 | 12.72 | H |
| 2585.50 | 2600.50 | -27.77 | 3.68 | 44.92 | 6.25 | 19.72 | 33.00 | 13.28 | H |
| 2667.50 | 2682.50 | -27.96 | 3.74 | 44.96 | 6.41 | 19.67 | 33.00 | 13.33 | H |

**LTE_B41C_20MHz+20MHz_HP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -27.51 | 3.59 | 45.15 | 6.11 | 20.16 | 33.00 | 12.84 | H |
| 2583.10 | 2602.90 | -27.79 | 3.67 | 44.92 | 6.24 | 19.70 | 33.00 | 13.30 | H |
| 2660.20 | 2680.00 | -27.83 | 3.71 | 44.96 | 6.39 | 19.81 | 33.00 | 13.19 | H |

**LTE band 41-Normal Power- EIRP**

**Limits:** ≤33dBm (2W)

**LTE_B41C_5MHz+20MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -36.77 | 3.58 | 45.61 | 6.10 | 18.52 | 33.00 | 14.48 | H |
| 2583.80 | 2595.50 | -37.37 | 3.67 | 44.92 | 6.25 | 17.47 | 33.00 | 15.53 | H |
| 2668.30 | 2680.00 | -37.41 | 3.74 | 44.96 | 6.41 | 17.70 | 33.00 | 15.30 | H |

**LTE_B41C_10MHz+20MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -36.87 | 3.58 | 45.66 | 6.10 | 18.47 | 33.00 | 14.53 | H |
| 2583.60 | 2598.00 | -37.48 | 3.67 | 44.92 | 6.24 | 17.35 | 33.00 | 15.65 | H |
| 2665.60 | 2680.00 | -37.57 | 3.73 | 44.96 | 6.40 | 17.52 | 33.00 | 15.48 | H |

**LTE_B41C_15MHz+20MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -29.80 | 3.58 | 45.65 | 6.11 | 18.38 | 33.00 | 14.62 | H |
| 2583.30 | 2595.50 | -30.15 | 3.67 | 44.92 | 6.24 | 17.34 | 33.00 | 15.66 | H |
| 2662.90 | 2680.00 | -30.32 | 3.72 | 44.96 | 6.40 | 17.32 | 33.00 | 15.68 | H |

**LTE_B41C_20MHz+5MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -29.47 | 3.59 | 45.15 | 6.11 | 18.20 | 33.00 | 14.80 | H |
| 2590.50 | 2602.50 | -30.57 | 3.69 | 44.93 | 6.26 | 16.93 | 33.00 | 16.07 | H |
| 2675.00 | 2686.70 | -31.19 | 3.74 | 44.97 | 6.42 | 16.46 | 33.00 | 16.54 | H |

**LTE_B41C_20MHz+10MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -29.53 | 3.59 | 45.15 | 6.11 | 18.14 | 33.00 | 14.86 | H |
| 2588.10 | 2602.50 | -30.34 | 3.69 | 44.93 | 6.26 | 17.16 | 33.00 | 15.84 | H |
| 2670.10 | 2684.50 | -31.01 | 3.74 | 44.97 | 6.41 | 16.63 | 33.00 | 16.37 | H |

**LTE_B41C_20MHz+15MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2523.00 | -29.49 | 3.59 | 45.15 | 6.11 | 18.18 | 33.00 | 14.82 | H |
| 2585.60 | 2602.70 | -30.45 | 3.68 | 44.92 | 6.25 | 17.04 | 33.00 | 15.96 | H |
| 2665.10 | 2682.20 | -31.15 | 3.73 | 44.96 | 6.40 | 16.48 | 33.00 | 16.52 | H |

**LTE_B41C_15MHz+15MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -29.90 | 3.58 | 45.65 | 6.11 | 18.28 | 33.00 | 14.72 | H |
| 2585.50 | 2600.50 | -30.39 | 3.68 | 44.92 | 6.25 | 17.10 | 33.00 | 15.90 | H |
| 2667.50 | 2682.50 | -30.98 | 3.74 | 44.96 | 6.41 | 16.65 | 33.00 | 16.35 | H |

**LTE_B41C_20MHz+20MHz_NP_QPSK**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -29.42 | 3.59 | 45.15 | 6.11 | 18.25 | 33.00 | 14.75 | H |
| 2583.10 | 2602.90 | -30.65 | 3.67 | 44.92 | 6.24 | 16.84 | 33.00 | 16.16 | H |
| 2660.20 | 2680.00 | -30.99 | 3.71 | 44.96 | 6.39 | 16.65 | 33.00 | 16.35 | H |

**LTE_B41C_5MHz+20MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -36.80 | 3.58 | 45.61 | 6.10 | 18.49 | 33.00 | 14.51 | H |
| 2583.80 | 2595.50 | -37.43 | 3.67 | 44.92 | 6.25 | 17.41 | 33.00 | 15.59 | H |
| 2668.30 | 2680.00 | -37.43 | 3.74 | 44.96 | 6.41 | 17.68 | 33.00 | 15.32 | H |

**LTE_B41C_10MHz+20MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -36.90 | 3.58 | 45.66 | 6.10 | 18.44 | 33.00 | 14.56 | H |
| 2583.60 | 2598.00 | -37.50 | 3.67 | 44.92 | 6.24 | 17.33 | 33.00 | 15.67 | H |
| 2665.60 | 2680.00 | -37.60 | 3.73 | 44.96 | 6.40 | 17.49 | 33.00 | 15.51 | H |

**LTE_B41C_15MHz+20MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -29.83 | 3.58 | 45.65 | 6.11 | 18.35 | 33.00 | 14.65 | H |
| 2583.30 | 2595.50 | -30.18 | 3.67 | 44.92 | 6.24 | 17.31 | 33.00 | 15.69 | H |
| 2662.90 | 2680.00 | -30.35 | 3.72 | 44.96 | 6.40 | 17.29 | 33.00 | 15.71 | H |

**LTE_B41C_20MHz+5MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -29.52 | 3.59 | 45.15 | 6.11 | 18.15 | 33.00 | 14.85 | H |
| 2590.50 | 2602.50 | -30.11 | 3.69 | 44.93 | 6.26 | 17.39 | 33.00 | 15.61 | H |
| 2675.00 | 2686.70 | -31.23 | 3.74 | 44.97 | 6.42 | 16.42 | 33.00 | 16.58 | H |

**LTE_B41C_20MHz+10MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -29.58 | 3.59 | 45.15 | 6.11 | 18.09 | 33.00 | 14.91 | H |
| 2588.10 | 2602.50 | -30.42 | 3.69 | 44.93 | 6.26 | 17.08 | 33.00 | 15.92 | H |
| 2670.10 | 2684.50 | -31.05 | 3.74 | 44.97 | 6.41 | 16.59 | 33.00 | 16.41 | H |

**LTE_B41C_20MHz+15MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2523.00 | -29.52 | 3.59 | 45.15 | 6.11 | 18.15 | 33.00 | 14.85 | H |
| 2585.60 | 2602.70 | -30.48 | 3.68 | 44.92 | 6.25 | 17.01 | 33.00 | 15.99 | H |
| 2665.10 | 2682.20 | -31.19 | 3.73 | 44.96 | 6.40 | 16.44 | 33.00 | 16.56 | H |

**LTE_B41C_15MHz+15MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -29.97 | 3.58 | 45.65 | 6.11 | 18.21 | 33.00 | 14.79 | H |
| 2585.50 | 2600.50 | -30.43 | 3.68 | 44.92 | 6.25 | 17.06 | 33.00 | 15.94 | H |
| 2667.50 | 2682.50 | -31.00 | 3.74 | 44.96 | 6.41 | 16.63 | 33.00 | 16.37 | H |

**LTE_B41C_20MHz+20MHz_NP_16QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -29.44 | 3.59 | 45.15 | 6.11 | 18.23 | 33.00 | 14.77 | H |
| 2583.10 | 2602.90 | -30.67 | 3.67 | 44.92 | 6.24 | 16.82 | 33.00 | 16.18 | H |
| 2660.20 | 2680.00 | -31.03 | 3.71 | 44.96 | 6.39 | 16.61 | 33.00 | 16.39 | H |

**LTE_B41C_5MHz+20MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2499.30 | 2511.00 | -37.54 | 3.58 | 45.61 | 6.10 | 17.75 | 33.00 | 15.25 | H |
| 2583.80 | 2595.50 | -38.07 | 3.67 | 44.92 | 6.25 | 16.77 | 33.00 | 16.23 | H |
| 2668.30 | 2680.00 | -38.15 | 3.74 | 44.96 | 6.41 | 16.96 | 33.00 | 16.04 | H |

**LTE_B41C_10MHz+20MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2501.50 | 2515.90 | -37.55 | 3.58 | 45.66 | 6.10 | 17.79 | 33.00 | 15.21 | H |
| 2583.60 | 2598.00 | -38.12 | 3.67 | 44.92 | 6.24 | 16.71 | 33.00 | 16.29 | H |
| 2665.60 | 2680.00 | -38.36 | 3.73 | 44.96 | 6.40 | 16.73 | 33.00 | 16.27 | H |

**LTE_B41C_15MHz+20MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.80 | 2520.90 | -30.51 | 3.58 | 45.65 | 6.11 | 17.67 | 33.00 | 15.33 | H |
| 2583.30 | 2595.50 | -30.88 | 3.67 | 44.92 | 6.24 | 16.61 | 33.00 | 16.39 | H |
| 2662.90 | 2680.00 | -31.10 | 3.72 | 44.96 | 6.40 | 16.54 | 33.00 | 16.46 | H |

**LTE_B41C_20MHz+5MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2517.70 | -30.26 | 3.59 | 45.15 | 6.11 | 17.41 | 33.00 | 15.59 | H |
| 2590.50 | 2602.50 | -31.27 | 3.69 | 44.93 | 6.26 | 16.23 | 33.00 | 16.77 | H |
| 2675.00 | 2686.70 | -31.90 | 3.74 | 44.97 | 6.42 | 15.75 | 33.00 | 17.25 | H |

**LTE_B41C_20MHz+10MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2520.40 | -30.31 | 3.59 | 45.15 | 6.11 | 17.36 | 33.00 | 15.64 | H |
| 2588.10 | 2602.50 | -31.04 | 3.69 | 44.93 | 6.26 | 16.46 | 33.00 | 16.54 | H |
| 2670.10 | 2684.50 | -31.83 | 3.74 | 44.97 | 6.41 | 15.81 | 33.00 | 17.19 | H |

**LTE_B41C_20MHz+15MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2523.00 | -30.28 | 3.59 | 45.15 | 6.11 | 17.39 | 33.00 | 15.61 | H | 2523.00 |
| 2602.70 | -31.11 | 3.68 | 44.92 | 6.25 | 16.38 | 33.00 | 16.62 | H | 2602.70 |
| 2682.20 | -31.97 | 3.73 | 44.96 | 6.40 | 15.66 | 33.00 | 17.34 | H | 2682.20 |

**LTE_B41C_15MHz+15MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2503.50 | 2518.50 | -30.61 | 3.58 | 45.65 | 6.11 | 17.57 | 33.00 | 15.43 | H |
| 2585.50 | 2600.50 | -31.09 | 3.68 | 44.92 | 6.25 | 16.40 | 33.00 | 16.60 | H |
| 2667.50 | 2682.50 | -31.66 | 3.74 | 44.96 | 6.41 | 15.97 | 33.00 | 17.03 | H |

**LTE_B41C_20MHz+20MHz_NP_64QAM**

| Frequency(MHz) | Frequency(MHz) | Pmea(dBm) | Cable Loss(dB) | PAg(dB) | Antenna Gain(dBi) | RMS EIRP(dBm) | Limit(dBm) | Margin(dB) | Polarization |
|---|---|---|---|---|---|---|---|---|---|
| 2506.00 | 2525.80 | -30.31 | 3.59 | 45.15 | 6.11 | 17.36 | 33.00 | 15.64 | H |
| 2583.10 | 2602.90 | -31.38 | 3.67 | 44.92 | 6.24 | 16.11 | 33.00 | 16.89 | H |
| 2660.20 | 2680.00 | -31.89 | 3.71 | 44.96 | 6.39 | 15.75 | 33.00 | 17.25 | H |

Peak EIRP(dBm) = $P_{Mea}$(-33.90dBm) + $G_a$ (6.10dBi) + $P_{Ag}$ (45.66dB) - $P_{cl}$ (3.58dB) = 21.44dBm

Note: Expanded measurement uncertainty is $U$ = 2.84 dB, $k$ = 2.

## A.2 EMISSION LIMIT

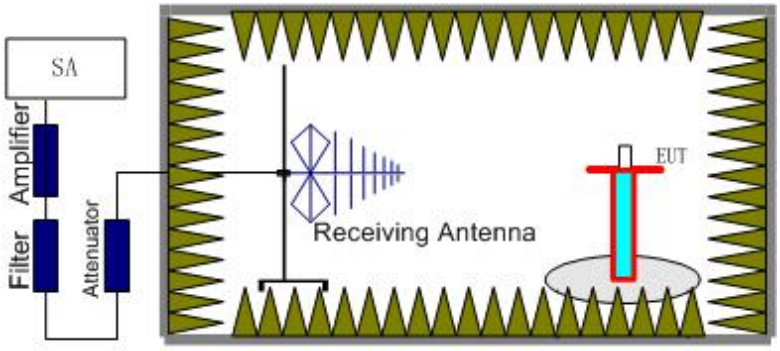
### A.2.1 Measurement Method

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully anechoic chamber.

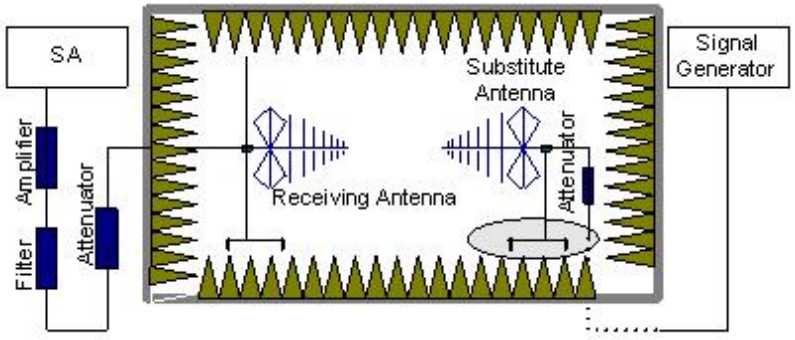
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Band 41.

**The procedure of radiated spurious emissions is as follows:**

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360 and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.




2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.




In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

with the radiation pattern of the antenna. A power ($P_{Mea}$) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ($P_r$). The power of signal source ($P_{Mea}$) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ($P_{pl}$) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ($G_a$) should be recorded after test.
   An amplifier should be connected in for the test.
   The Path loss ($P_{pl}$) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power (EIRP)=$P_{Mea}$+ $P_{pl}$ + $G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP - 2.15dB.

### A.2.2 Measurement Limit

Part 27.53(m)(4) specifies 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 that 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.

### A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Band 41. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Band 41 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 30MHz to 26GHz.

**LTE band 41-HPUE**

RSE1_S30_LB41C_20MHz+5MHz_CH39750_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5007.02 | -57.95 | 6.59 | 9.91 | -54.63 | -13.00 | 41.63 | V |
| 7532.01 | -55.74 | 8.26 | 12.23 | -51.77 | -13.00 | 38.77 | V |
| 10011.01 | -53.52 | 9.21 | 12.90 | -49.83 | -13.00 | 36.83 | V |
| 12537.01 | -50.24 | 10.28 | 13.22 | -47.30 | -13.00 | 34.30 | V |
| 15038.00 | -46.36 | 11.27 | 13.98 | -43.65 | -13.00 | 30.65 | V |
| 17553.00 | -43.74 | 12.93 | 14.97 | -41.70 | -13.00 | 28.70 | H |

RSE1_S30_LB41C_20MHz+5MHz_CH40595_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5175.02 | -57.15 | 6.92 | 10.15 | -53.92 | -13.00 | 40.92 | V |
| 7762.01 | -55.90 | 8.34 | 12.41 | -51.83 | -13.00 | 38.83 | H |
| 10369.01 | -52.05 | 9.75 | 13.05 | -48.75 | -13.00 | 35.75 | H |
| 12952.01 | -50.46 | 10.49 | 13.47 | -47.48 | -13.00 | 34.48 | H |
| 15538.00 | -46.05 | 11.52 | 13.70 | -43.87 | -13.00 | 30.87 | V |
| 16838.00 | -42.10 | 12.07 | 13.74 | -40.43 | -13.00 | 27.43 | H |

RSE1_S30_LB41C_20MHz+5MHz_CH41440_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5343.02 | -57.74 | 6.95 | 10.38 | -54.31 | -13.00 | 41.31 | V |
| 8025.01 | -56.07 | 8.32 | 12.62 | -51.77 | -13.00 | 38.77 | V |
| 10697.01 | -52.71 | 9.30 | 13.14 | -48.87 | -13.00 | 35.87 | H |
| 13365.01 | -48.82 | 10.57 | 14.01 | -45.38 | -13.00 | 32.38 | H |
| 16040.00 | -47.02 | 11.84 | 13.69 | -45.17 | -13.00 | 32.17 | H |
| 17366.00 | -43.64 | 12.46 | 14.61 | -41.49 | -13.00 | 28.49 | V |

RSE1_S30_LB41C_20MHz+20MHz_CH39750_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5012.02 | -58.24 | 6.58 | 9.92 | -54.90 | -13.00 | 41.90 | V |
| 7512.01 | -55.09 | 8.34 | 12.21 | -51.22 | -13.00 | 38.22 | H |
| 10025.01 | -53.88 | 9.25 | 12.91 | -50.22 | -13.00 | 37.22 | H |
| 12529.01 | -50.66 | 10.26 | 13.22 | -47.70 | -13.00 | 34.70 | V |
| 15043.00 | -46.05 | 11.27 | 13.97 | -43.35 | -13.00 | 30.35 | V |
| 17528.00 | -43.69 | 12.83 | 14.94 | -41.58 | -13.00 | 28.58 | H |

RSE1_S30_LB41C_20MHz+20MHz_CH40521_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5182.02 | -57.66 | 6.93 | 10.15 | -54.44 | -13.00 | 41.44 | H |
| 7742.01 | -56.10 | 8.37 | 12.39 | -52.08 | -13.00 | 39.08 | V |
| 10350.01 | -52.38 | 9.72 | 13.04 | -49.06 | -13.00 | 36.06 | H |
| 12924.01 | -50.61 | 10.50 | 13.45 | -47.66 | -13.00 | 34.66 | H |
| 15505.00 | -46.62 | 11.53 | 13.70 | -44.45 | -13.00 | 31.45 | V |
| 16800.00 | -43.20 | 12.11 | 13.72 | -41.59 | -13.00 | 28.59 | H |

RSE1_S30_LB41C_20MHz+20MHz_CH41292_QPSK_1P

| Frequency (MHz) | SG (dBm) | CableLoss (dB) | AntennaGain (dBi) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polorization |
|---|---|---|---|---|---|---|---|
| 5330.02 | -58.08 | 6.98 | 10.36 | -54.70 | -13.00 | 41.70 | V |
| 7978.01 | -55.52 | 8.35 | 12.58 | -51.29 | -13.00 | 38.29 | V |
| 10633.01 | -51.81 | 9.29 | 13.13 | -47.97 | -13.00 | 34.97 | V |
| 13307.01 | -49.57 | 10.58 | 13.93 | -46.22 | -13.00 | 33.22 | H |
| 15972.00 | -45.65 | 11.76 | 13.70 | -43.71 | -13.00 | 30.71 | V |
| 17284.00 | -42.92 | 12.37 | 14.42 | -40.87 | -13.00 | 27.87 | V |

Note: The maximum value of expanded measurement uncertainty for this test item is $U$ = 5.16 dB, $k$ = 2.

## A.3 FREQUENCY STABILITY

### A.3.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of Anritsu Radio Communication Analyzer (MT8821C).

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for LTE band 41, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC and 4.4VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

### A.3.2 Measurement results

**LTE band 41-HPUE, 20MHz+20MHz bandwidth QPSK(worst case of all bandwidths)**

**Frequency Error vs Temperature**

| Temperature(℃) | Voltage(V) | $F_L$(MHz) | $F_H$(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 20 | 3.8 | 2496.122 | 2689.843 | -4.40 | 0.0017 |
| 50 | | | | -1.20 | 0.0005 |
| 40 | | | | 0.90 | 0.0003 |
| 30 | | | | -4.80 | 0.0019 |
| 10 | | | | -7.90 | 0.0030 |
| 0 | | | | 0.50 | 0.0002 |
| -10 | | | | -2.20 | 0.0008 |
| -20 | | | | 2.20 | 0.0008 |
| -30 | | | | | |

**Frequency Error vs Voltage**

| Voltage(V) | Temperature(℃) | $F_L$(MHz) | $F_H$(MHz) | Offset(Hz) | Frequency error(ppm) |
|---|---|---|---|---|---|
| 3.5 | 20 | 2496.122 | 2689.843 | -9.30 | 0.0036 |
| 4.4 | | | | -0.30 | 0.0001 |

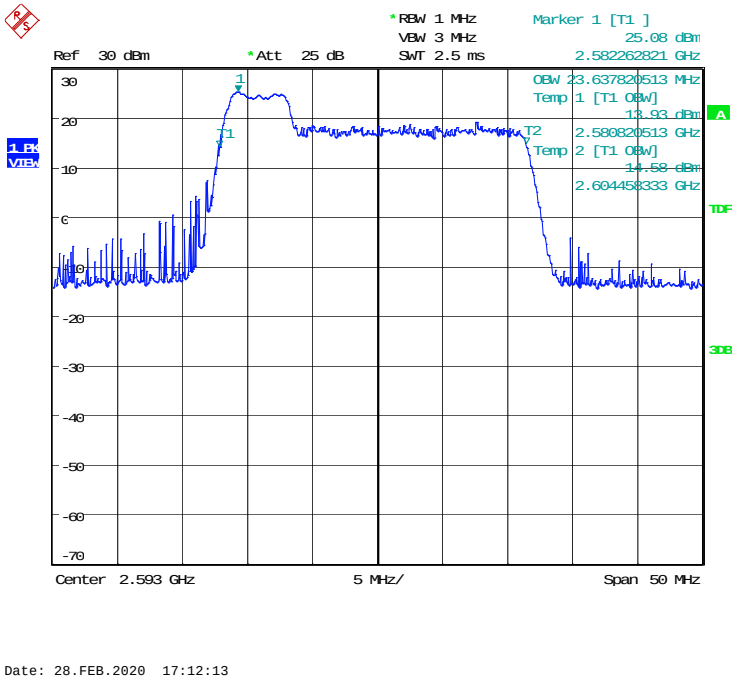
## A.4 OCCUPIED BANDWIDTH

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. Thefrequency span for the spectrum analyzer shall be set wide enough to capture all modulationproducts including the emission skirts.
b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipatedOBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceedingthe maximum spectrum analyzer input mixer level for linear operation.
d) Set the detection mode to peak, and the trace mode to max-hold.

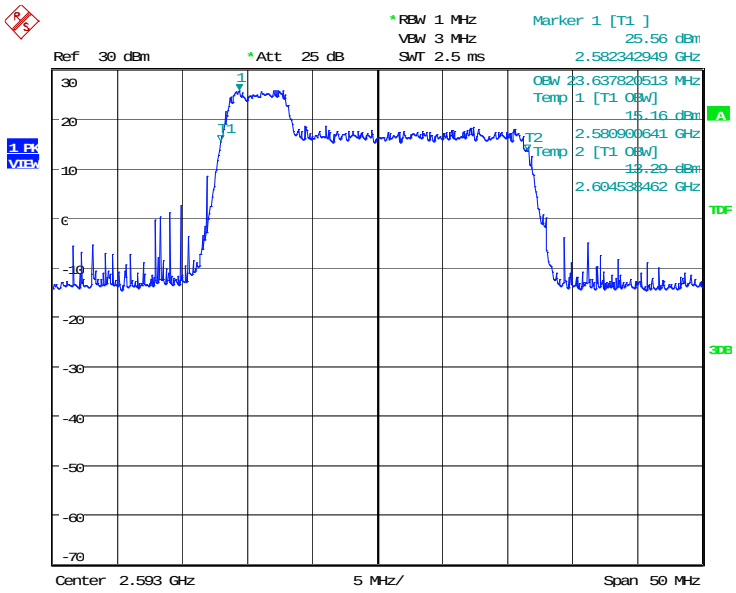
**LTE band 41 HPUE, 5MHz+20MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 23.638 | 23.638 | 23.558 |

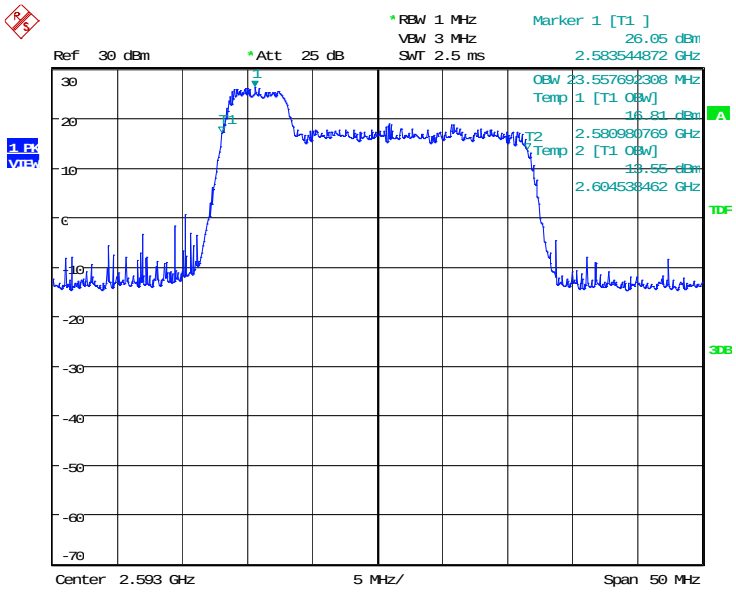
**LTE band 41 HPUE, 5MHz+20MHz Bandwidth, QPSK (99% BW)**



## LTE band 41 HPUE, 5MHz+20MHz Bandwidth,16QAM (99% BW)



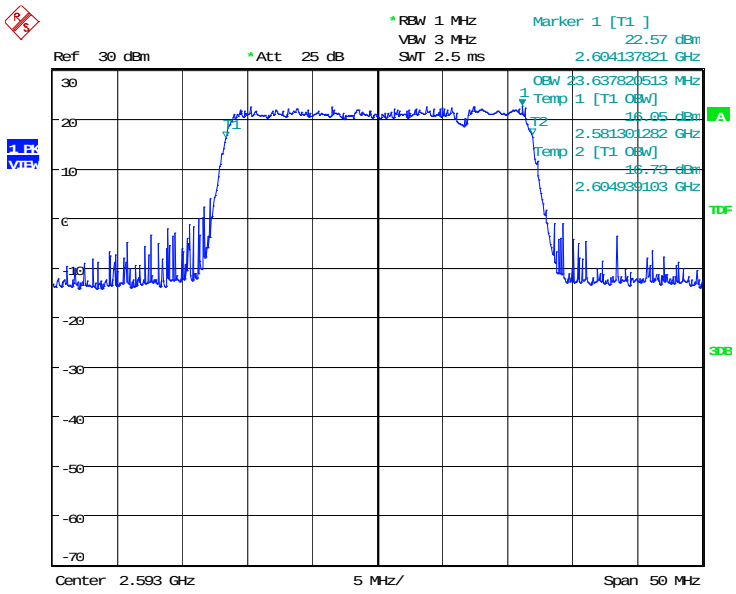

## LTE band 41 HPUE, 5MHz+20MHz Bandwidth,64QAM (99% BW)



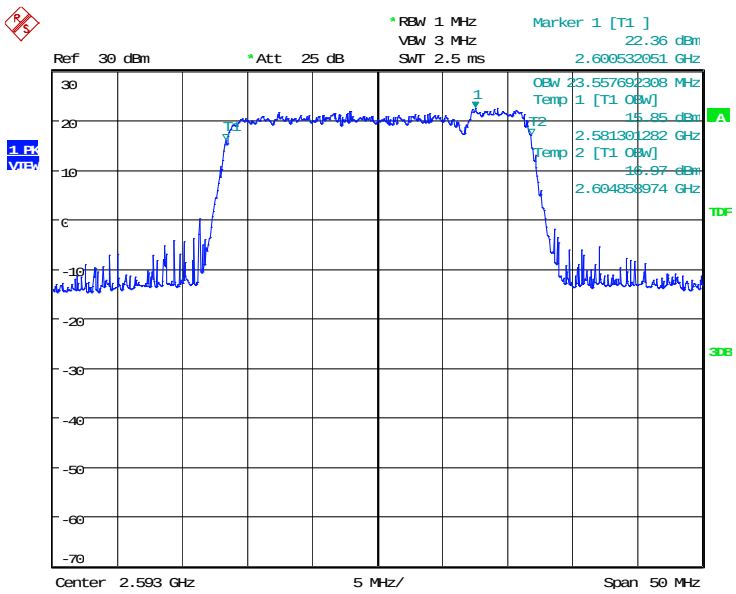
**LTE band 41 HPUE, 20MHz+5MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 23.638 | 23.558 | 23.478 |

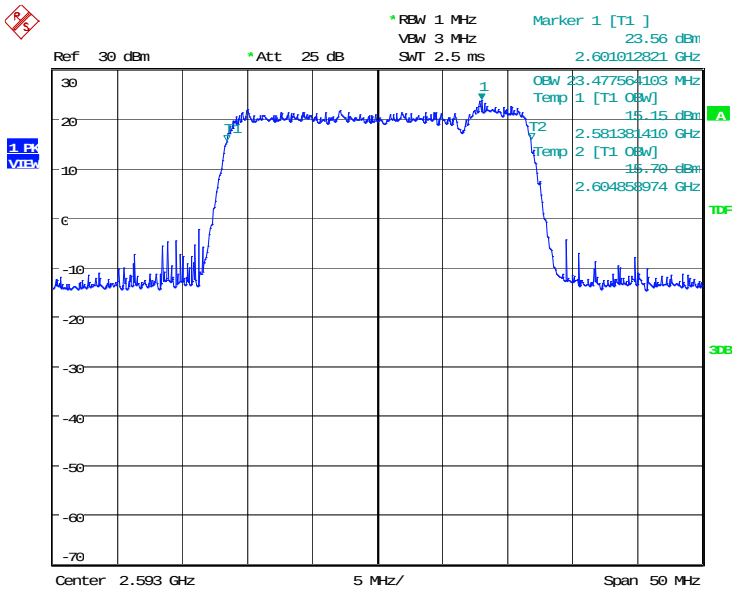
**LTE band 41 HPUE, 20MHz+5MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 HPUE, 20MHz+5MHz Bandwidth,16QAM (99% BW)**



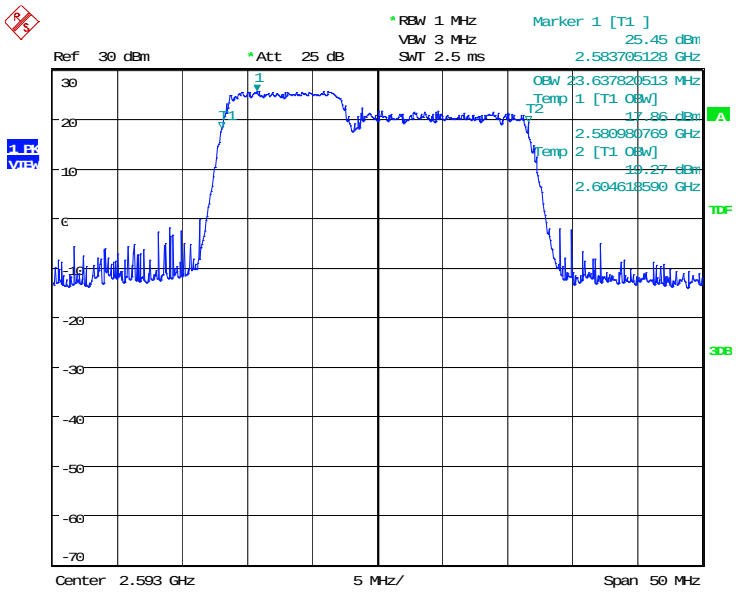
**LTE band 41 HPUE, 20MHz+5MHz Bandwidth,64QAM (99% BW)**



**LTE band 41 HPUE, 10MHz+15MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 23.638 | 23.718 | 23.638 |

**LTE band 41 HPUE, 10MHz+15MHz Bandwidth, QPSK (99% BW)**

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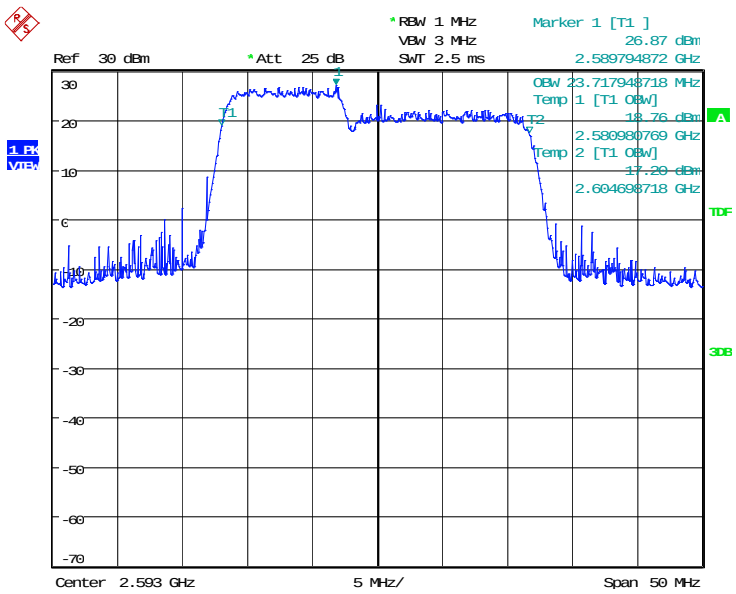
**LTE band 41 HPUE, 10MHz+15MHz Bandwidth,16QAM (99% BW)**

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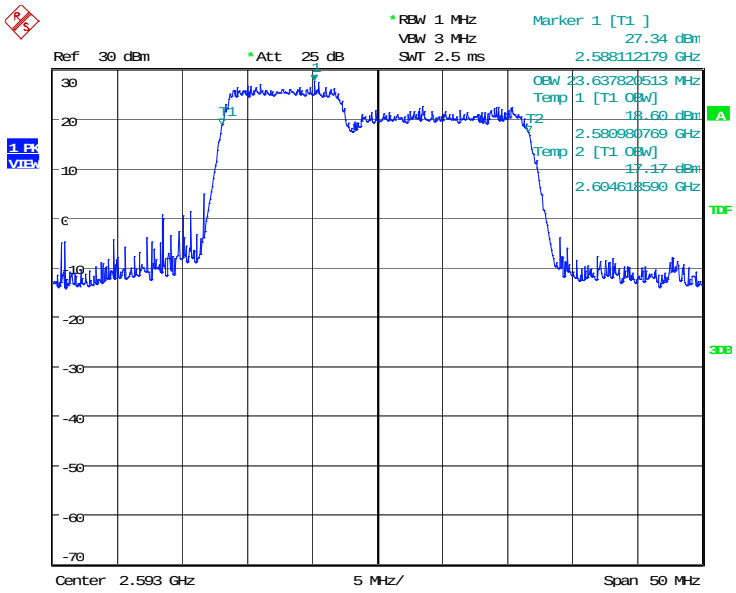
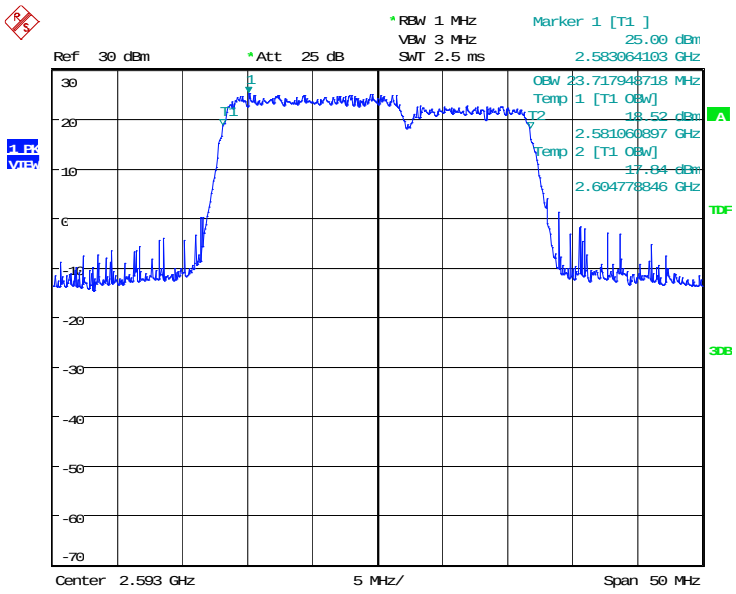
**LTE band 41 HPUE, 10MHz+15MHz Bandwidth,64QAM (99% BW)**



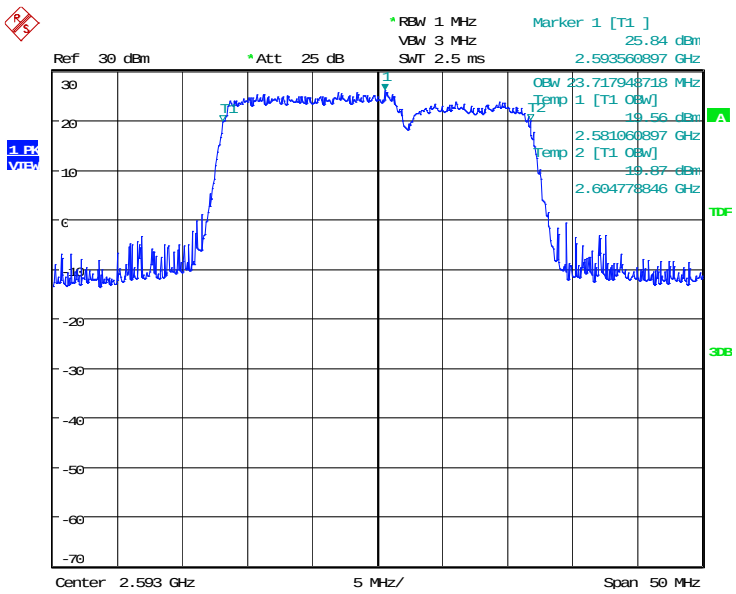
**LTE band 41 HPUE, 15MHz+10MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 23.718 | 23.718 | 23.718 |

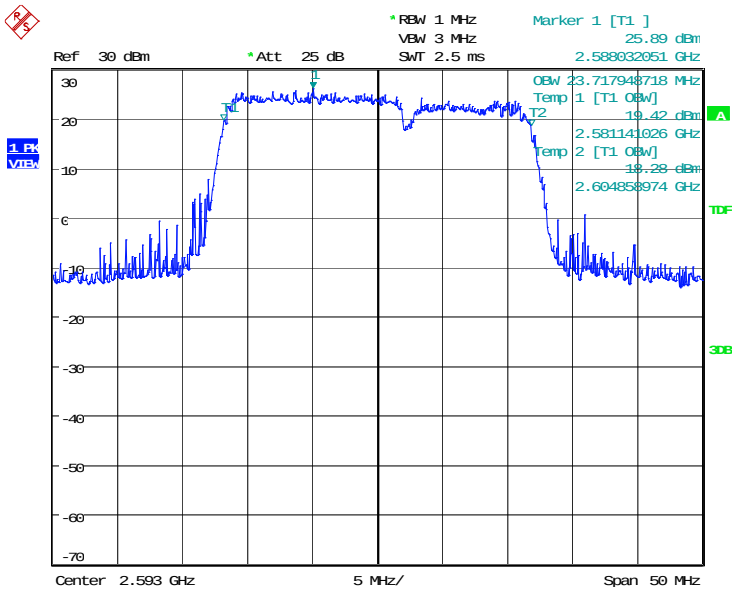
**LTE band 41 HPUE, 15MHz+10MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 HPUE, 15MHz+10MHz Bandwidth,16QAM (99% BW)**



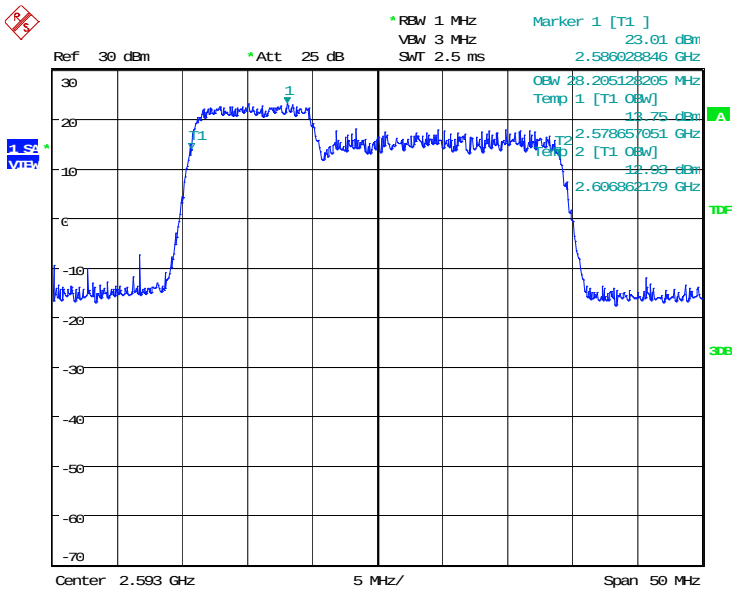
**LTE band 41 HPUE, 15MHz+10MHz Bandwidth,64QAM (99% BW)**



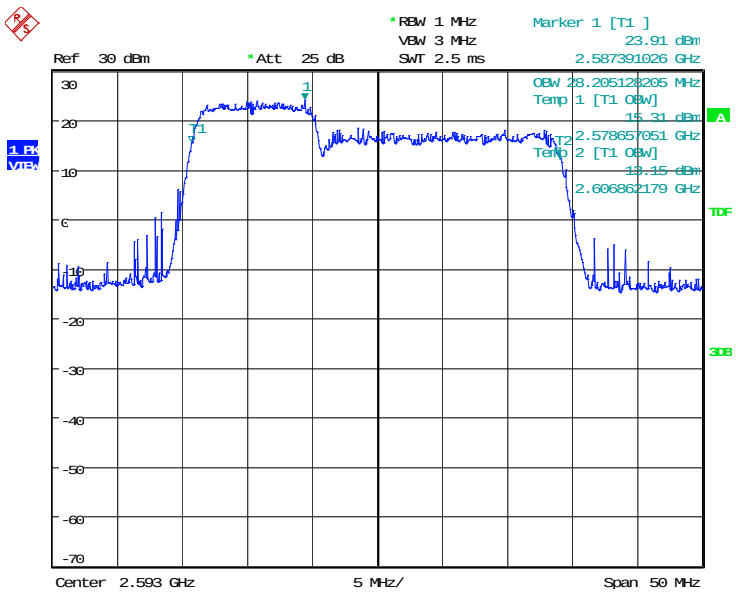
**LTE band 41 HPUE, 10MHz+20MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 28.205 | 28.205 | 28.205 |

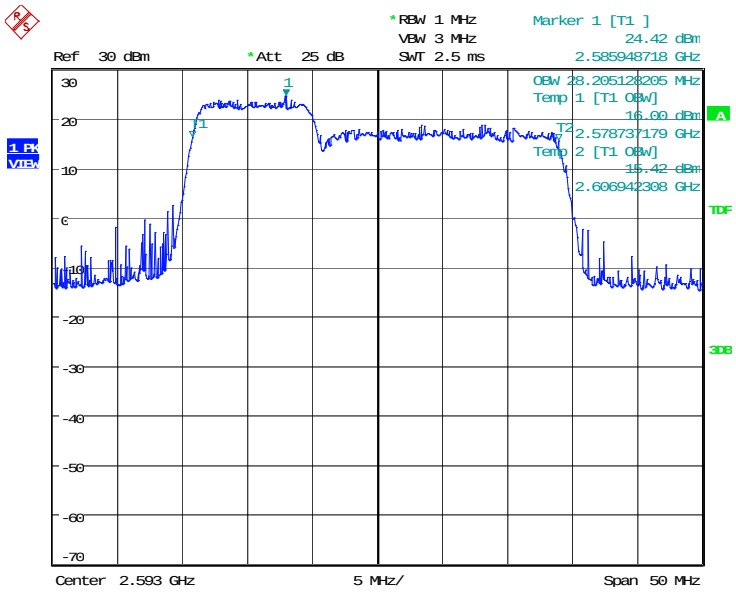
**LTE band 41 HPUE, 10MHz+20MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 HPUE, 10MHz+20MHz Bandwidth,16QAM (99% BW)**



**LTE band 41 HPUE, 10MHz+20MHz Bandwidth,64QAM (99% BW)**

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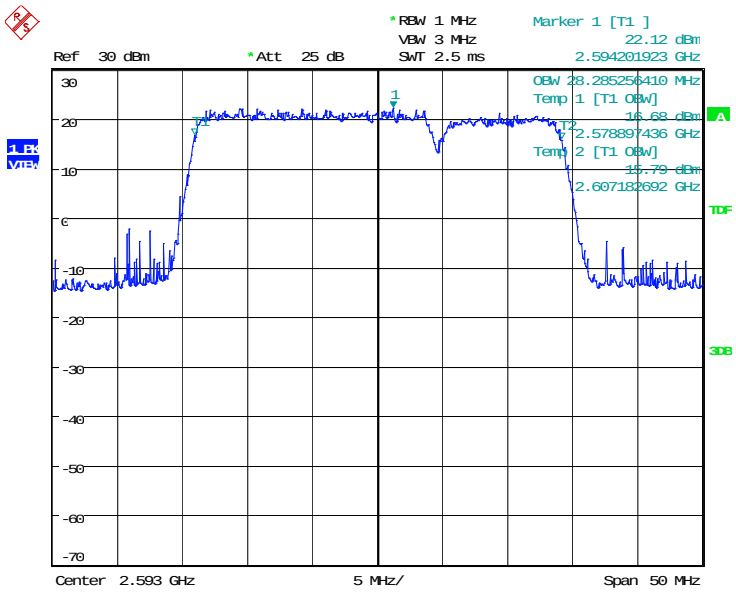
**LTE band 41 HPUE, 20MHz+10MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 28.285 | 28.285 | 28.125 |

**LTE band 41 HPUE, 20MHz+10MHz Bandwidth, QPSK (99% BW)**

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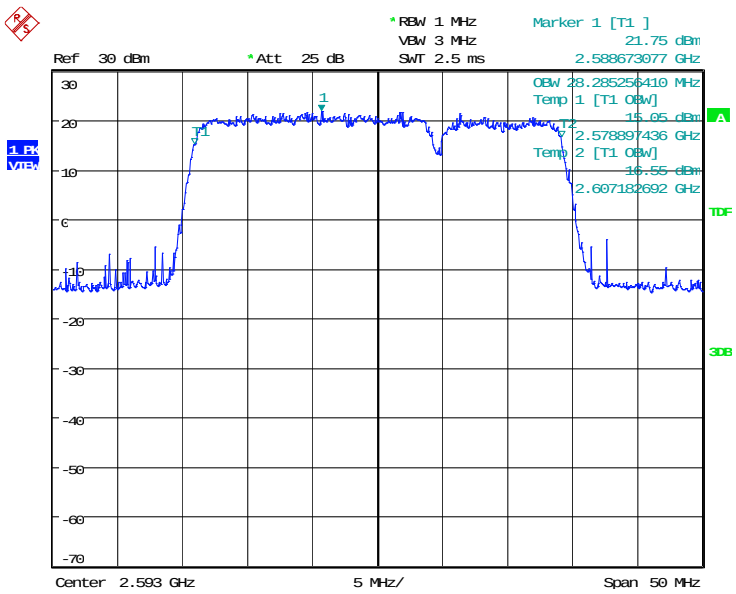
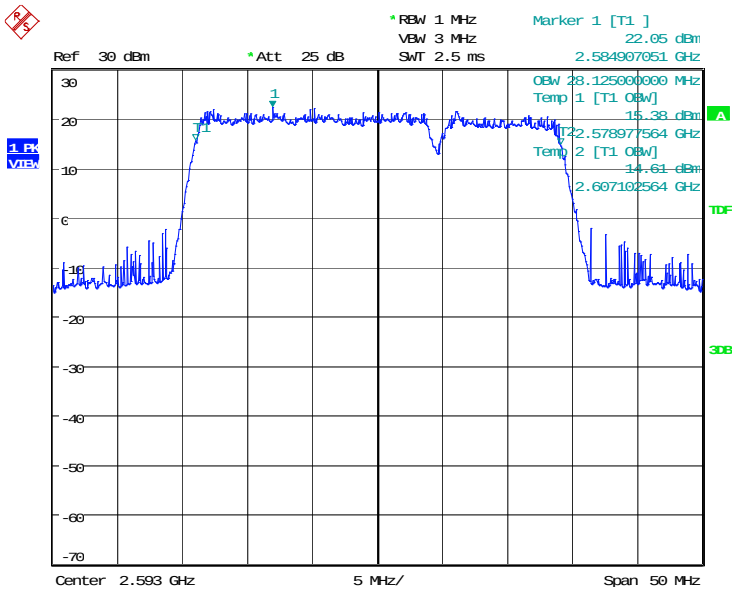
**LTE band 41 HPUE, 20MHz+10MHz Bandwidth,16QAM (99% BW)**




Date: 28.FEB.2020 17:38:30

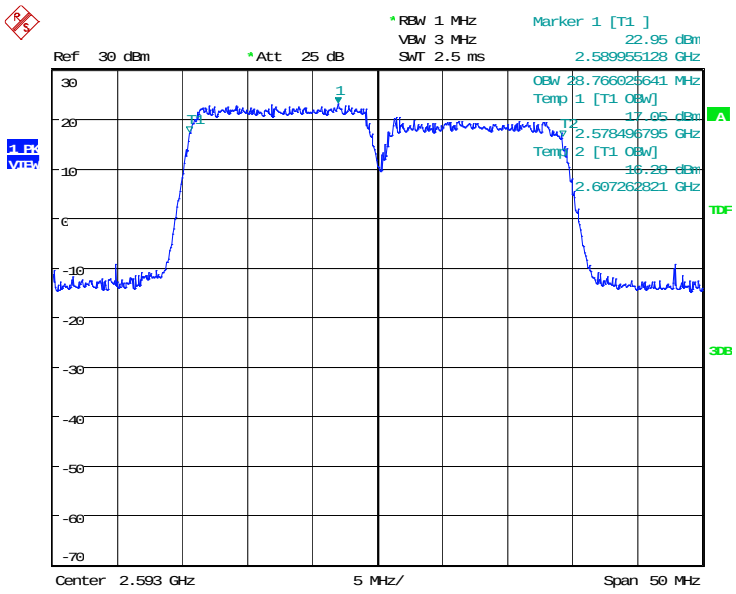
**LTE band 41 HPUE, 20MHz+10MHz Bandwidth,64QAM (99% BW)**



**LTE band 41 HPUE, 15MHz+15MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 28.766 | 28.766 | 28.766 |

**LTE band 41 HPUE, 15MHz+15MHz Bandwidth, QPSK (99% BW)**

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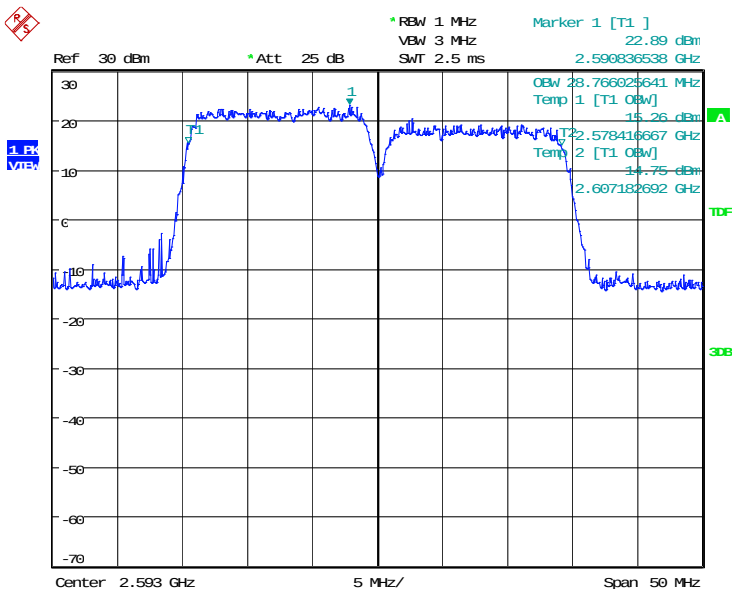
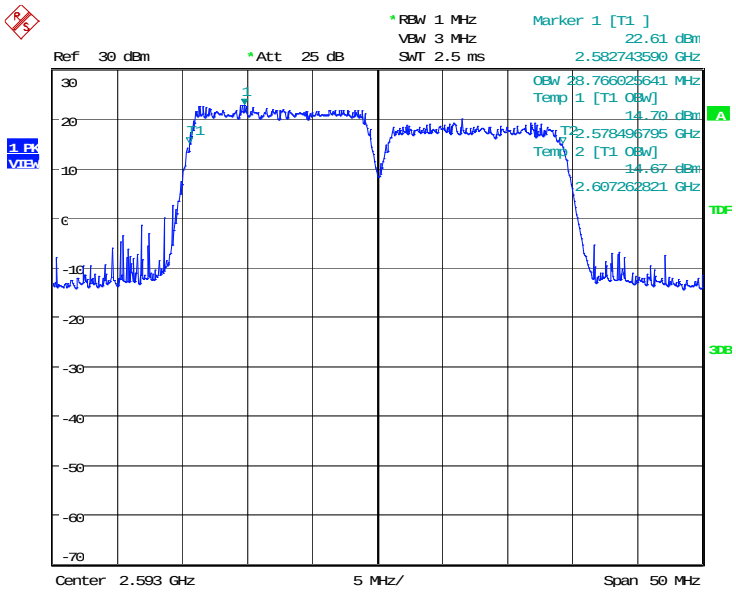
**LTE band 41 HPUE, 15MHz+15MHz Bandwidth,16QAM (99% BW)**




Date: 28.FEB.2020 17:47:26

**LTE band 41 HPUE, 15MHz+15MHz Bandwidth,64QAM (99% BW)**

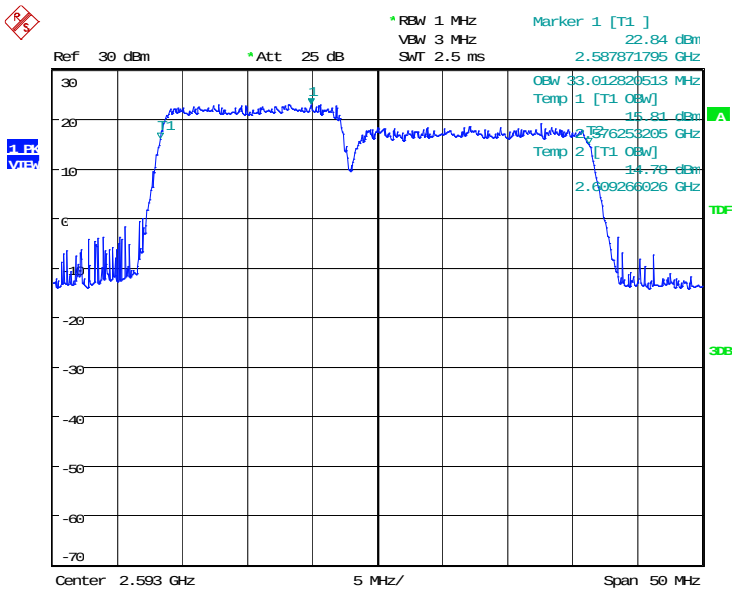



Date: 28.FEB.2020 17:46:03

**LTE band 41 HPUE, 15MHz+20MHz (99%)**

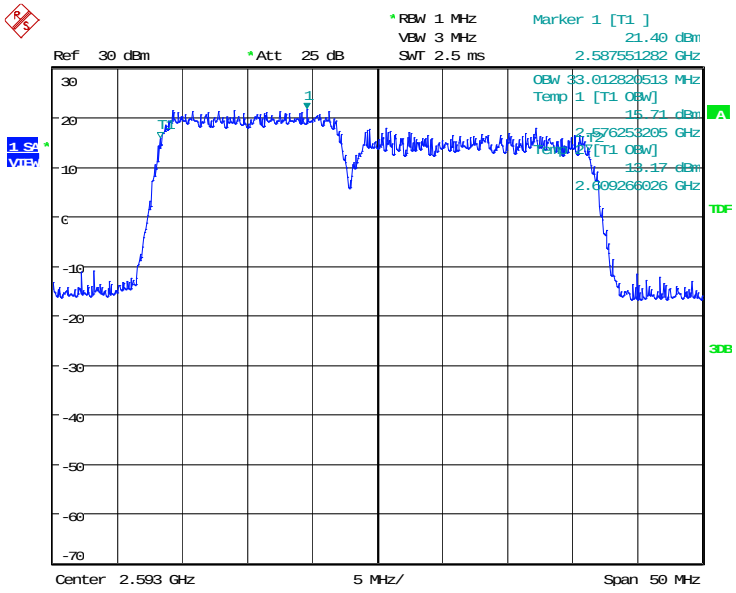
| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 33.013 | 33.013 | 33.013 |

**LTE band 41 HPUE, 15MHz+20MHz Bandwidth, QPSK (99% BW)**



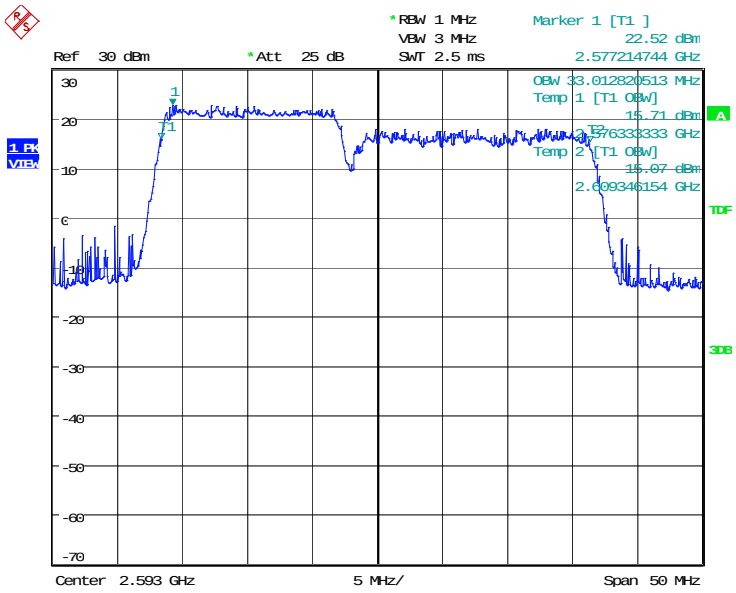

Date: 28.FEB.2020 17:50:48

**LTE band 41 HPUE, 15MHz+20MHz Bandwidth,16QAM (99% BW)**




Date: 28.FEB.2020 17:51:51

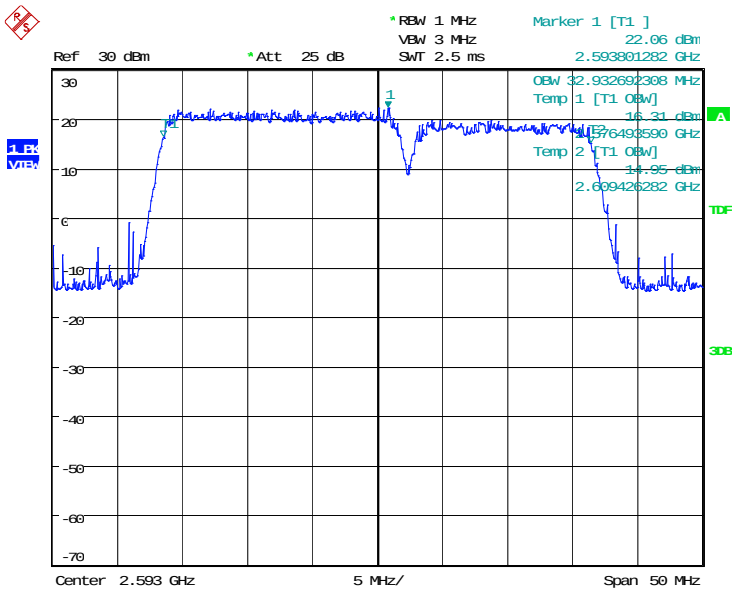
**LTE band 41 HPUE, 15MHz+20MHz Bandwidth,64QAM (99% BW)**



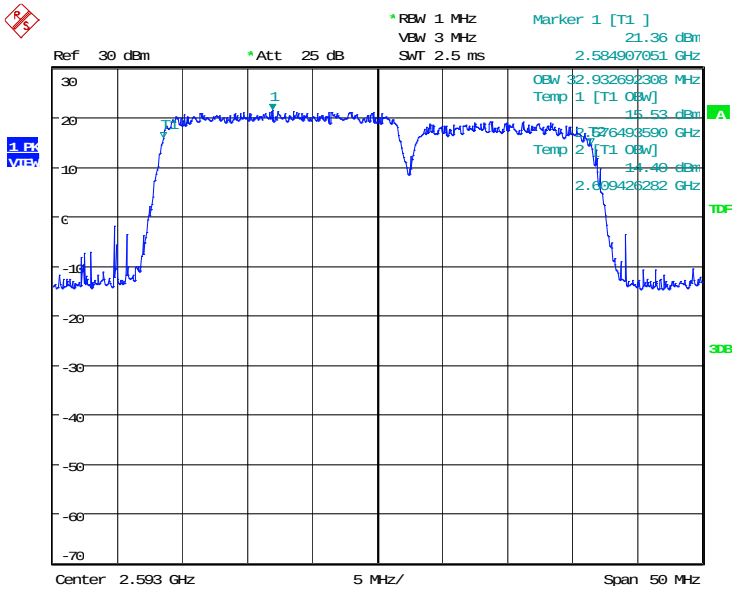
**LTE band 41 HPUE, 20MHz+15MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 32.933 | 32.933 | 32.933 |

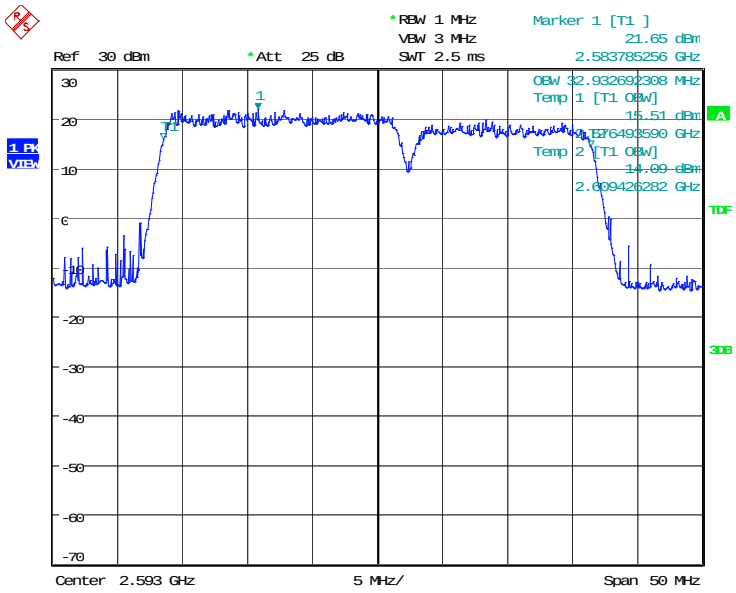
**LTE band 41 HPUE, 20MHz+15MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 HPUE, 20MHz+15MHz Bandwidth,16QAM (99% BW)**



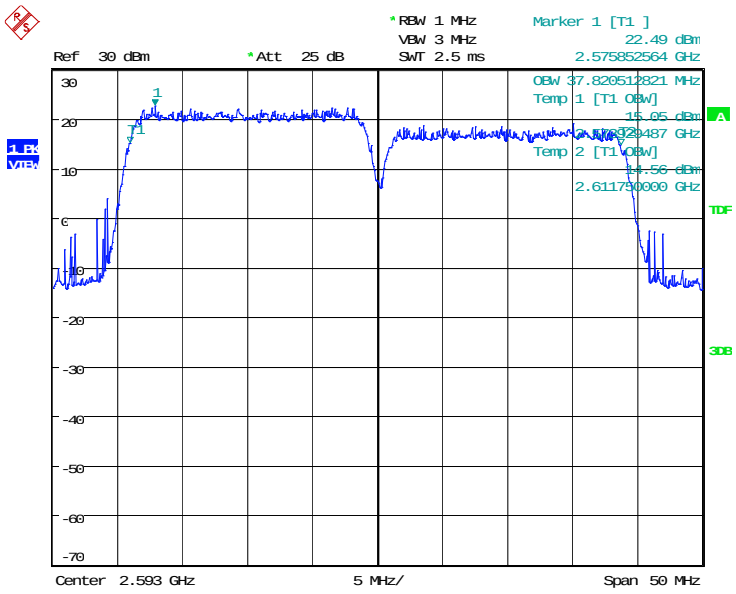
**LTE band 41 HPUE, 20MHz+15MHz Bandwidth,64QAM (99% BW)**



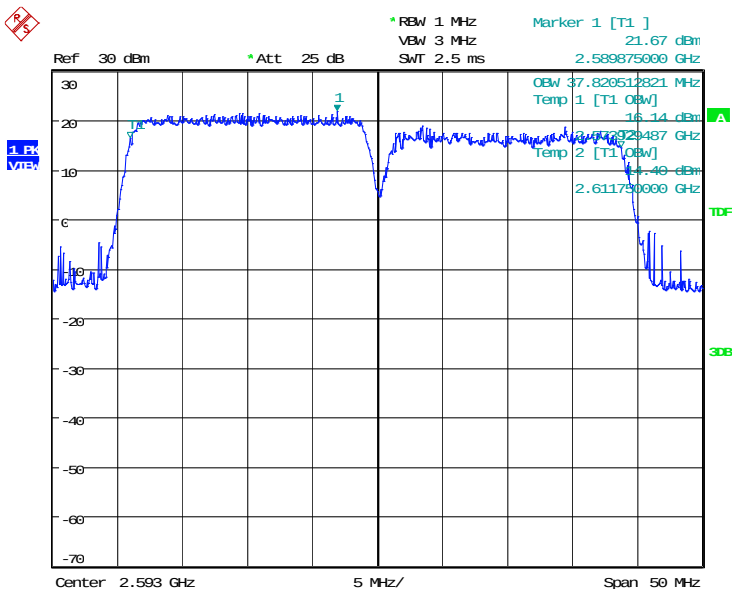
**LTE band 41 HPUE, 20MHz+20MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 37.821 | 37.821 | 37.821 |

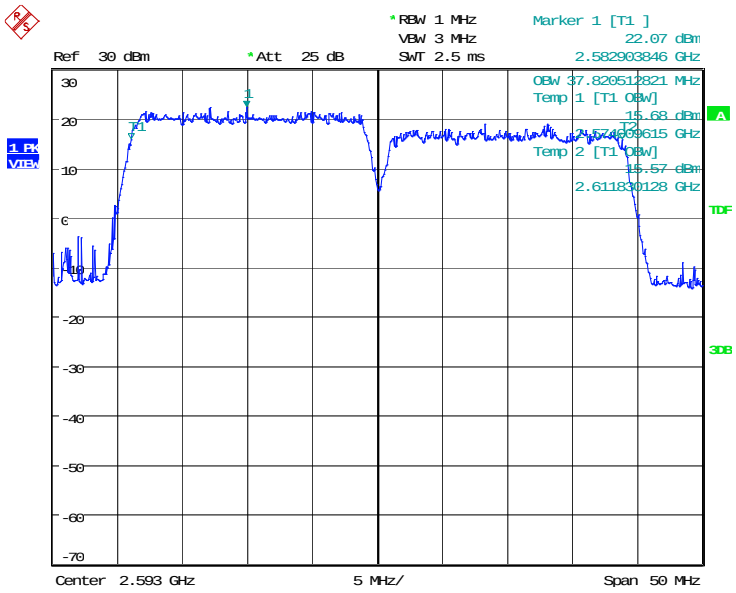
**LTE band 41 HPUE, 20MHz+20MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 HPUE, 20MHz+20MHz Bandwidth,16QAM (99% BW)**



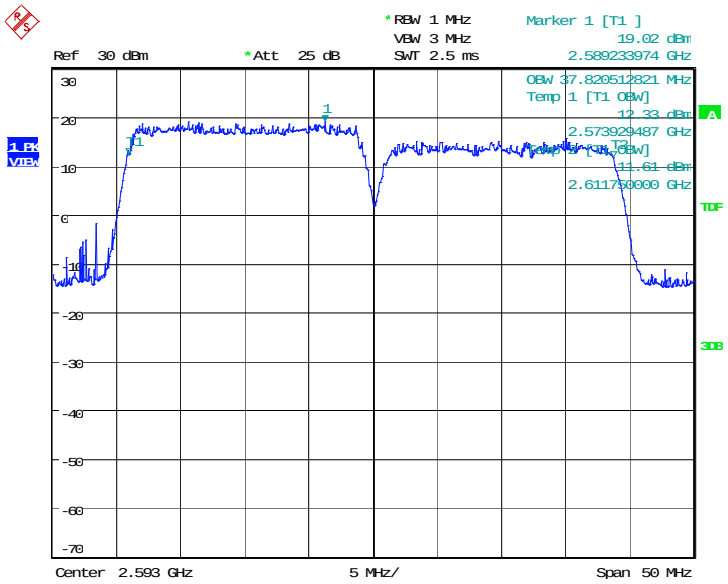
**LTE band 41 HPUE, 20MHz+20MHz Bandwidth,64QAM (99% BW)**



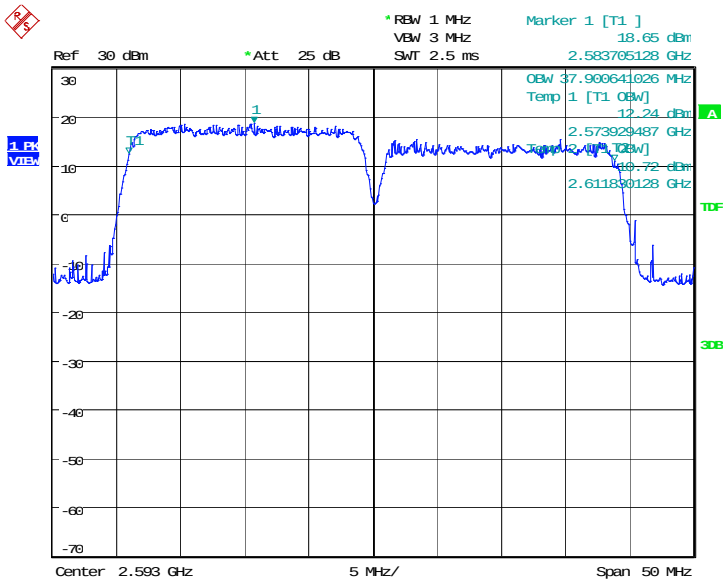
**LTE band 41 normal, 20MHz+20MHz (99%)**

| Frequency(MHz) | Occupied Bandwidth (99%)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 37.821 | 37.901 | 37.981 |

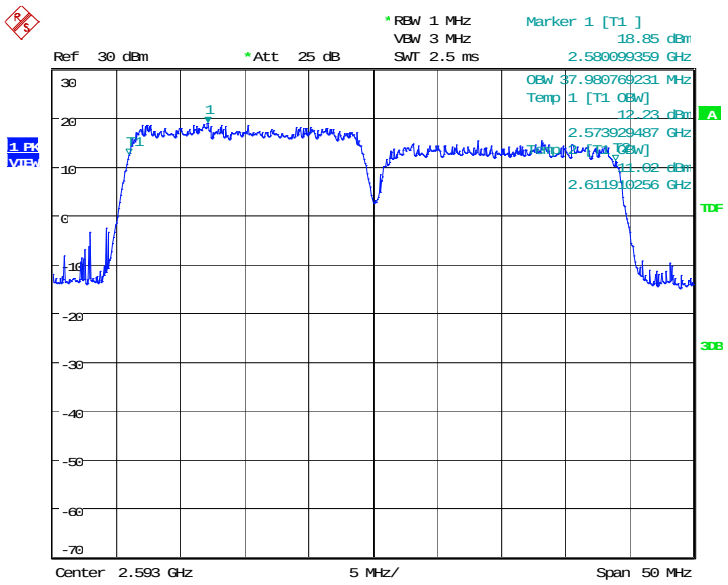
**LTE band 41 normal, 20MHz+20MHz Bandwidth, QPSK (99% BW)**




**LTE band 41 normal, 20MHz+20MHz Bandwidth,16QAM (99% BW)**



**LTE band 41 normal, 20MHz+20MHz Bandwidth,64QAM (99% BW)**

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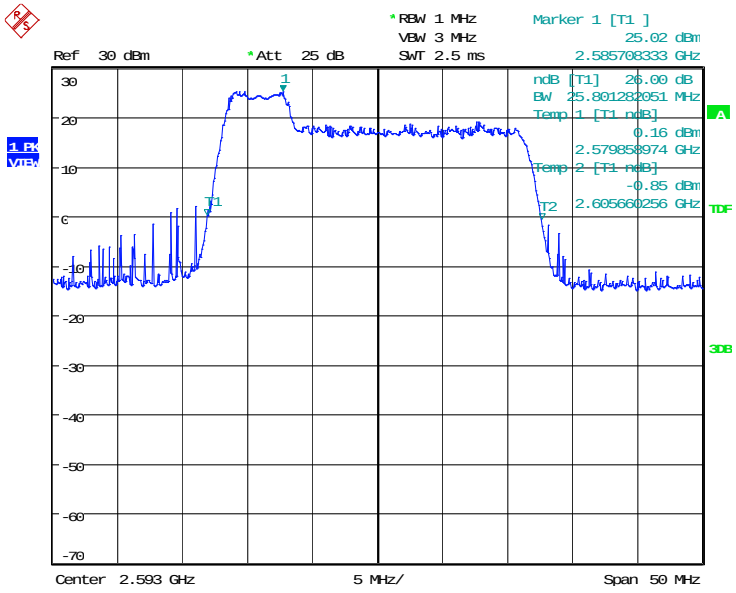
## A.5 EMISSION BANDWIDTH

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

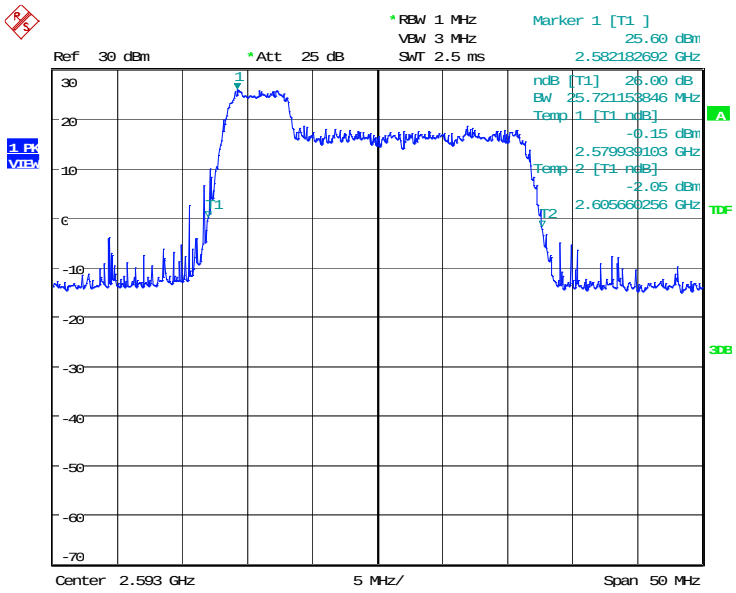
**LTE band 41 HPUE, 5MHz+20MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW)(MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 25.801 | 25.721 | 25.561 |

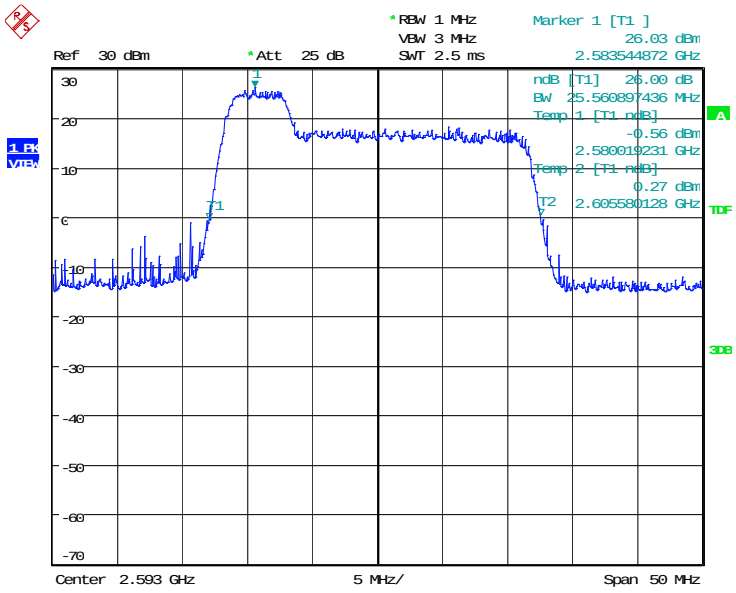
**LTE band 41 HPUE, 5MHz+20MHz Bandwidth, QPSK (-26dBc BW)**



## LTE band 41 HPUE, 5MHz+20MHz Bandwidth,16QAM (-26dBc BW)



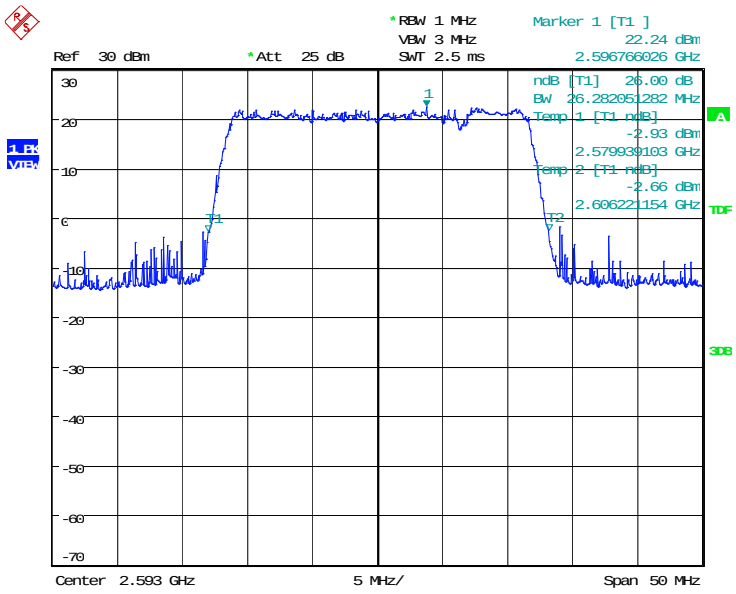

## LTE band 41 HPUE, 5MHz+20MHz Bandwidth,64QAM (-26dBc BW)



**LTE band 41 HPUE, 20MHz+5MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 26.282 | 26.042 | 26.122 |

**LTE band 41 HPUE, 20MHz+5MHz Bandwidth, QPSK (-26dBc BW)**

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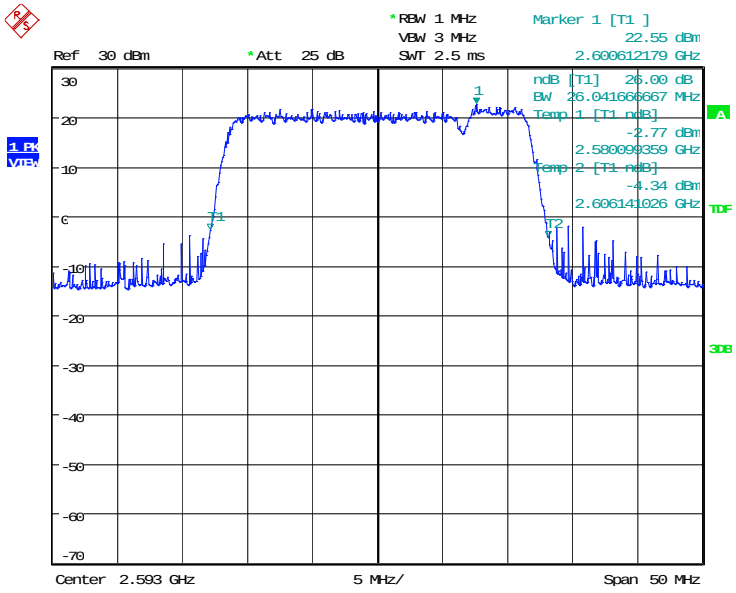
**LTE band 41 HPUE, 20MHz+5MHz Bandwidth,16QAM (-26dBc BW)**

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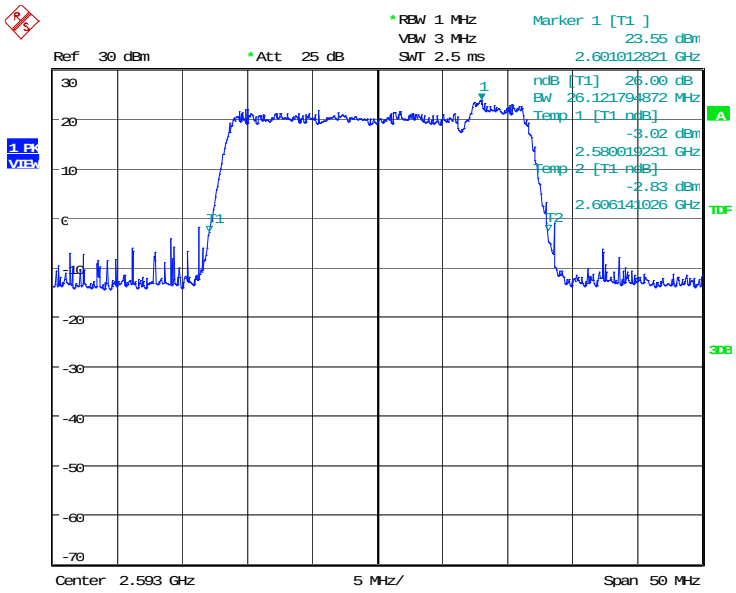
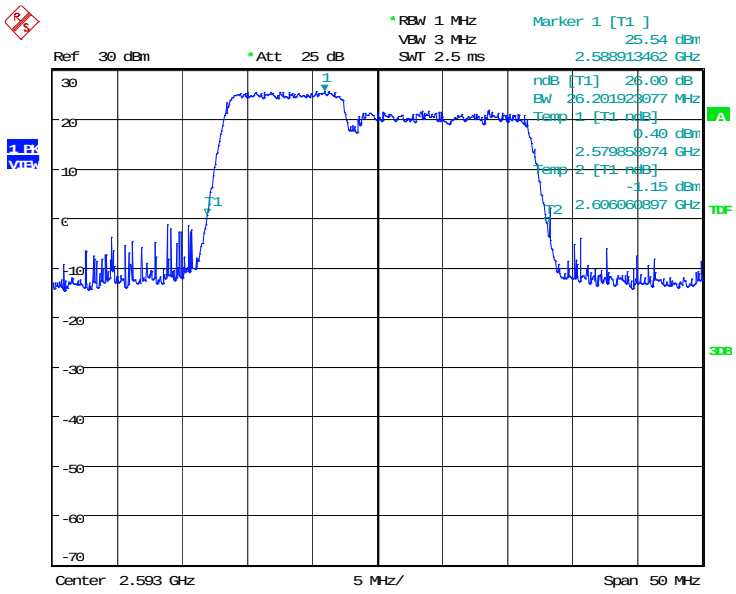
**LTE band 41 HPUE, 20MHz+5MHz Bandwidth,64QAM (-26dBc BW)**



**LTE band 41 HPUE, 10MHz+15MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 26.202 | 26.042 | 25.962 |

**LTE band 41 HPUE, 10MHz+15MHz Bandwidth, QPSK (-26dBc BW)**

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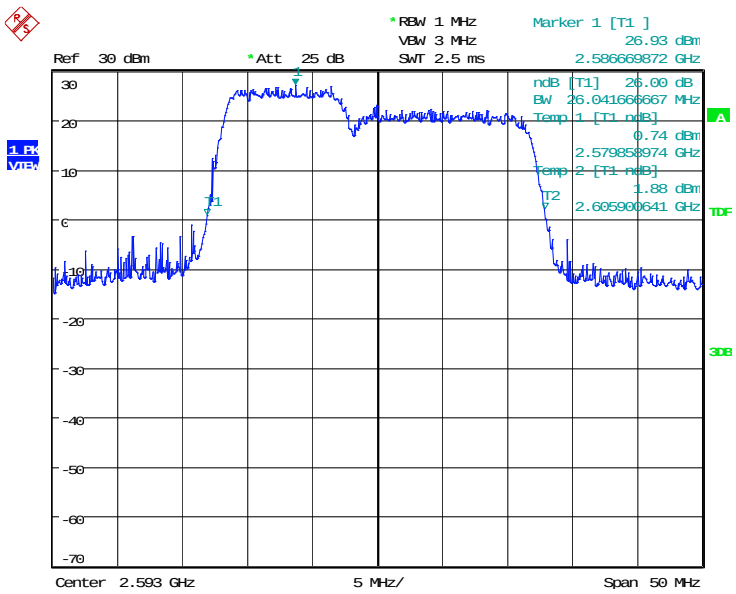
**LTE band 41 HPUE, 10MHz+15MHz Bandwidth,16QAM (-26dBc BW)**

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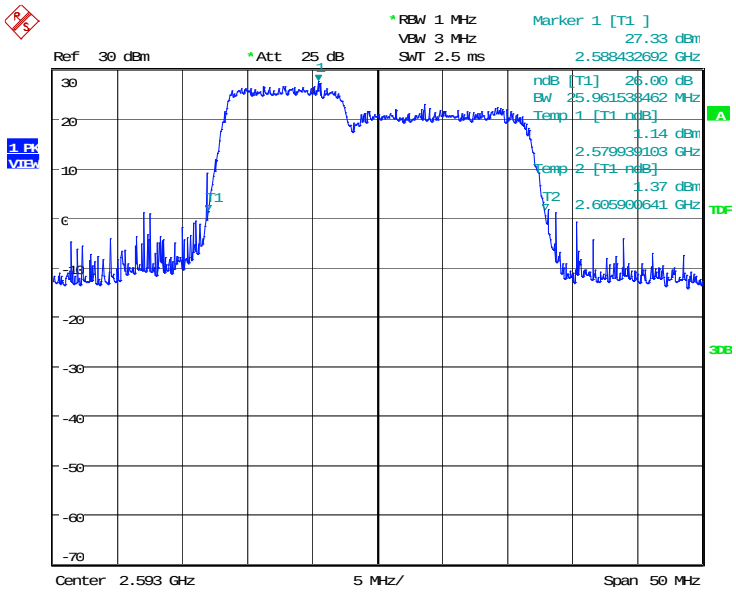
**LTE band 41 HPUE, 10MHz+15MHz Bandwidth,64QAM (-26dBc BW)**

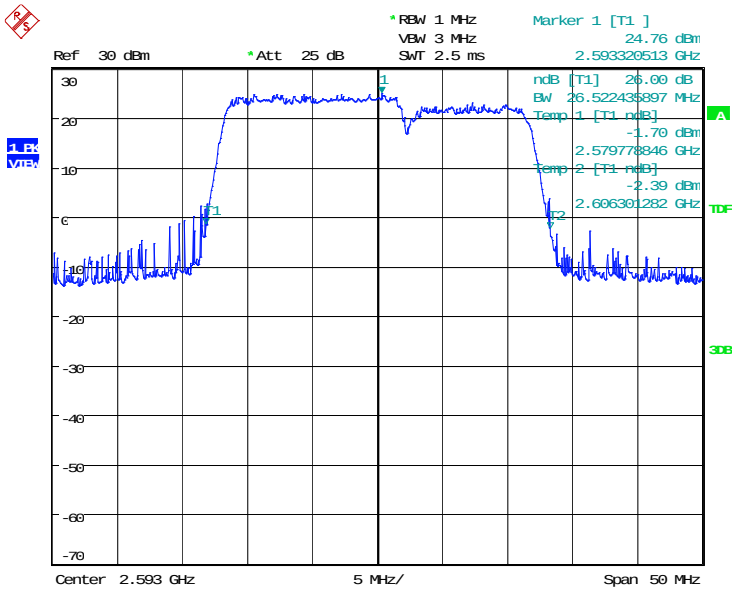



Date: 28.FEB.2020 17:22:09

**LTE band 41 HPUE, 15MHz+10MHz (-26dBc BW)**

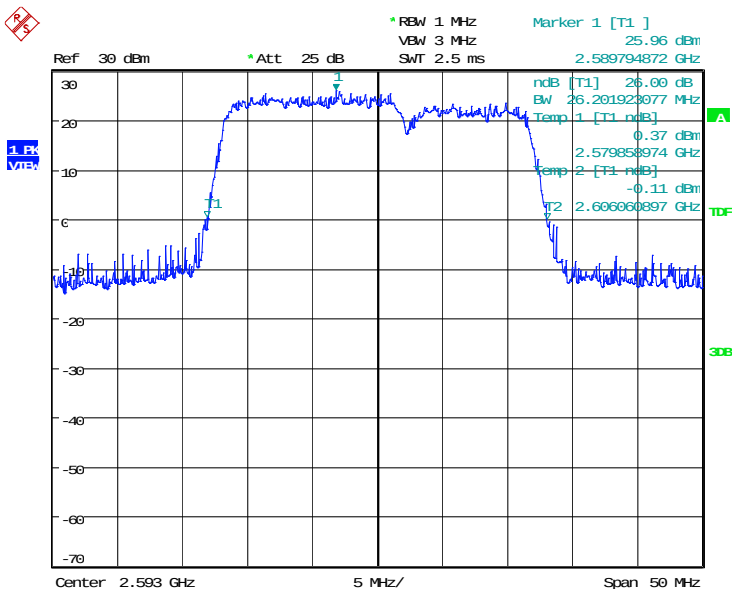
| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 26.522 | 26.202 | 26.362 |

**LTE band 41 HPUE, 15MHz+10MHz Bandwidth, QPSK (-26dBc BW)**



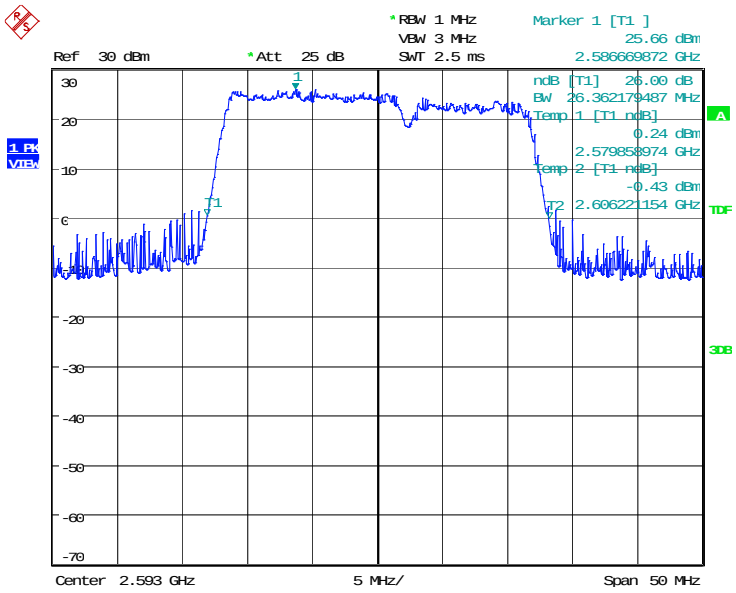

Date: 28.FEB.2020 17:26:23

**LTE band 41 HPUE, 15MHz+10MHz Bandwidth,16QAM (-26dBc BW)**




Date: 28.FEB.2020 17:28:24

**LTE band 41 HPUE, 15MHz+10MHz Bandwidth,64QAM (-26dBc BW)**

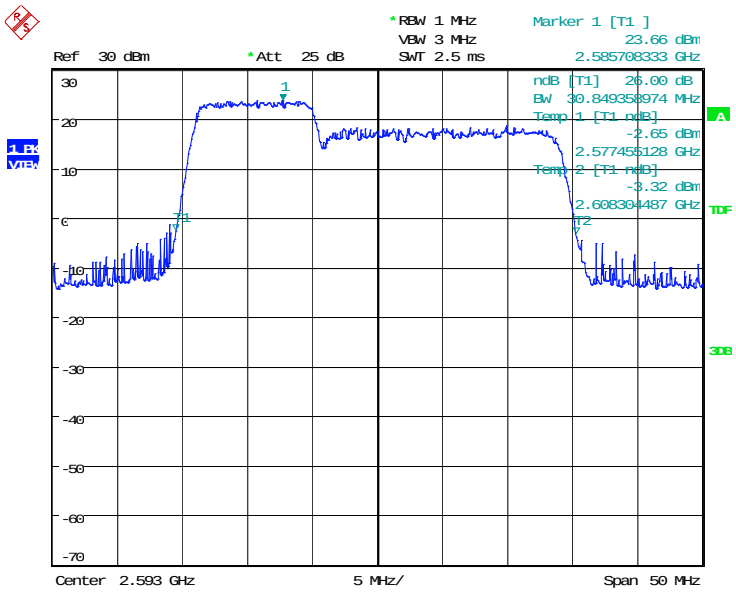



Date: 28.FEB.2020 17:29:30

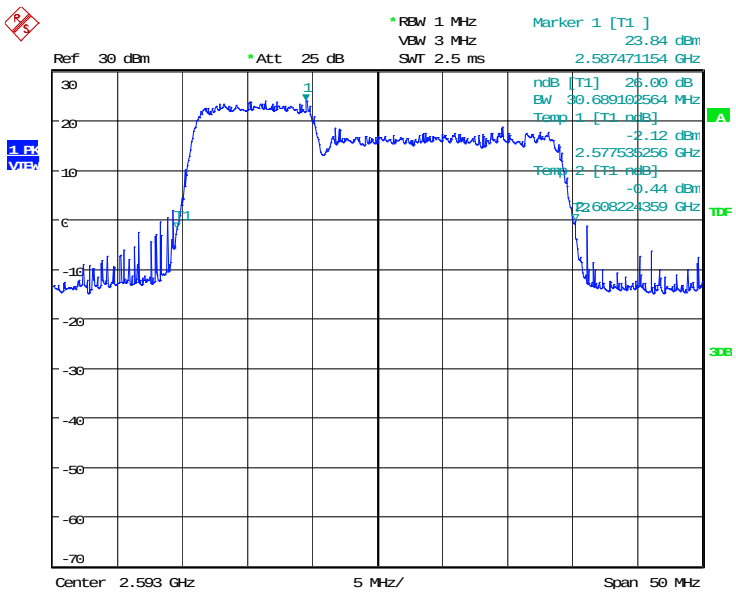
**LTE band 41 HPUE, 10MHz+20MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 30.849 | 30.689 | 30.689 |

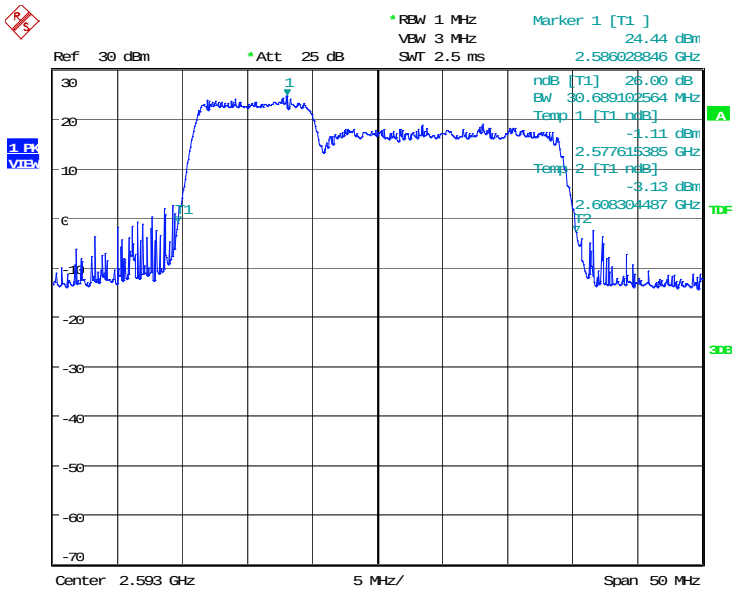
**LTE band 41 HPUE, 10MHz+20MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 10MHz+20MHz Bandwidth,16QAM (-26dBc BW)**



**LTE band 41 HPUE, 10MHz+20MHz Bandwidth,64QAM (-26dBc BW)**

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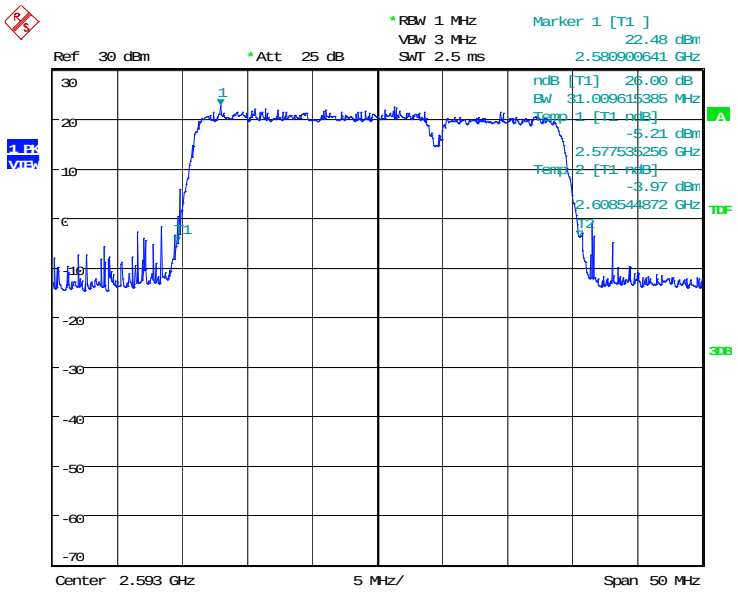
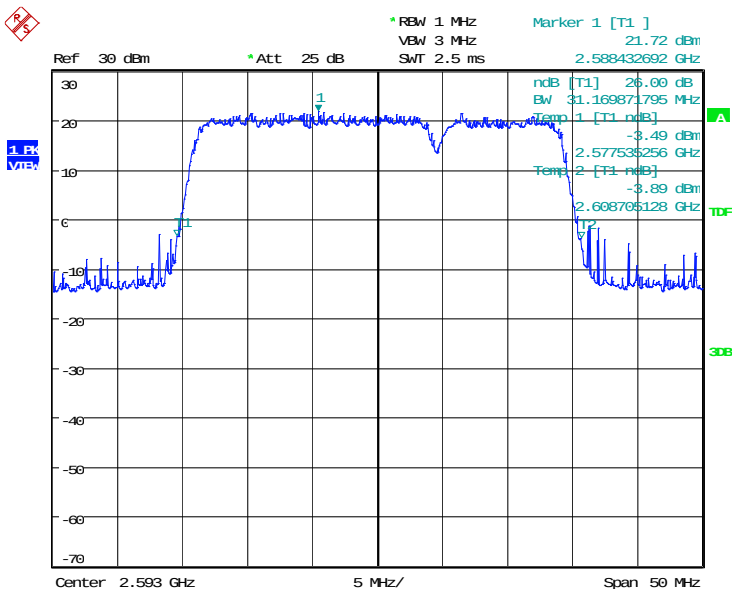
**LTE band 41 HPUE, 20MHz+10MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 31.010 | 31.170 | 30.929 |

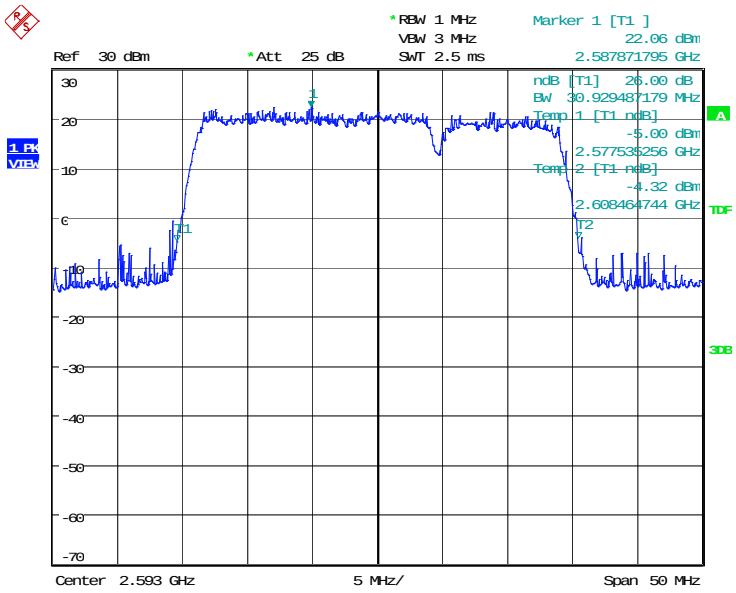
**LTE band 41 HPUE, 20MHz+10MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 20MHz+10MHz Bandwidth,16QAM (-26dBc BW)**



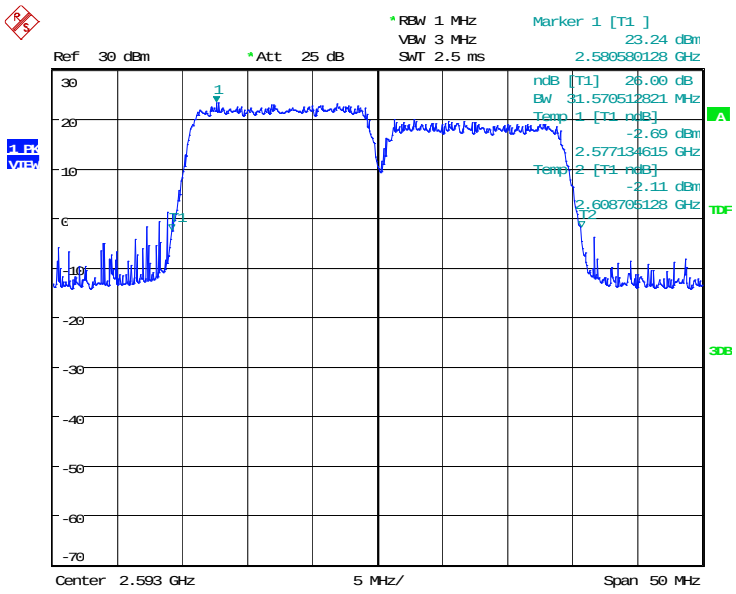
**LTE band 41 HPUE, 20MHz+10MHz Bandwidth,64QAM (-26dBc BW)**



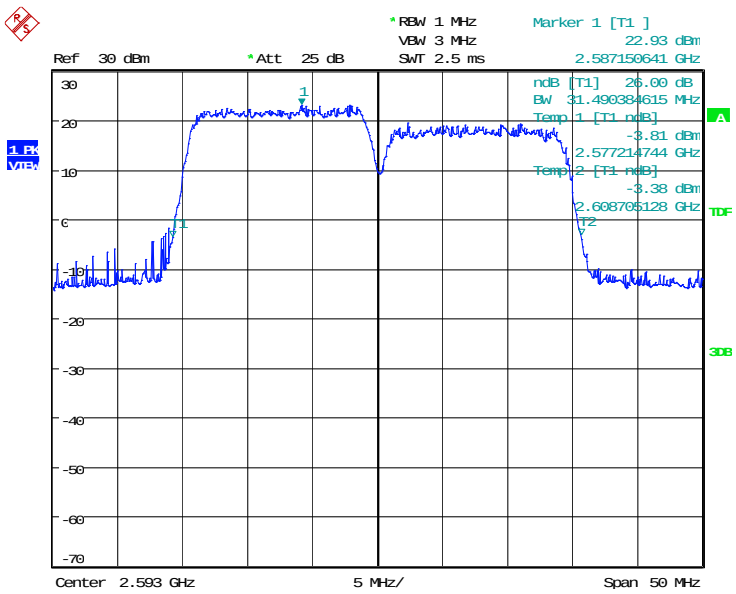
**LTE band 41 HPUE, 15MHz+15MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 31.571 | 31.490 | 31.410 |

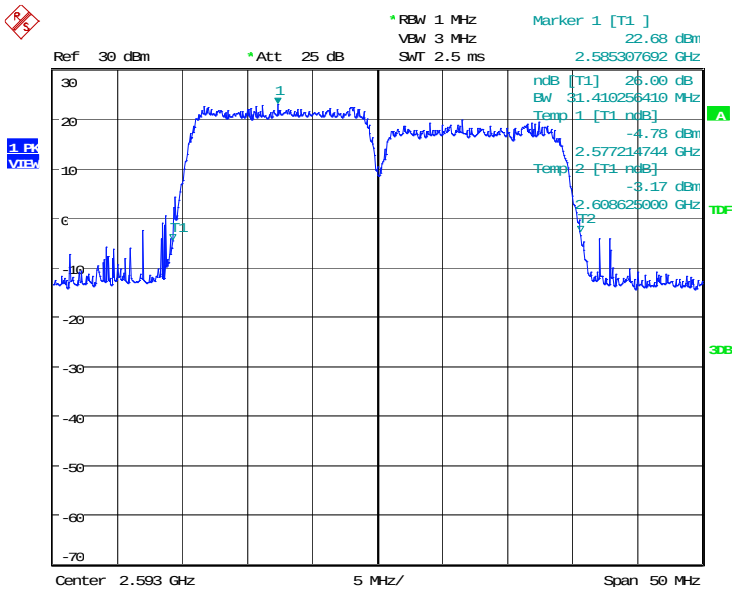
**LTE band 41 HPUE, 15MHz+15MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 15MHz+15MHz Bandwidth,16QAM (-26dBc BW)**



**LTE band 41 HPUE, 15MHz+15MHz Bandwidth,64QAM (-26dBc BW)**

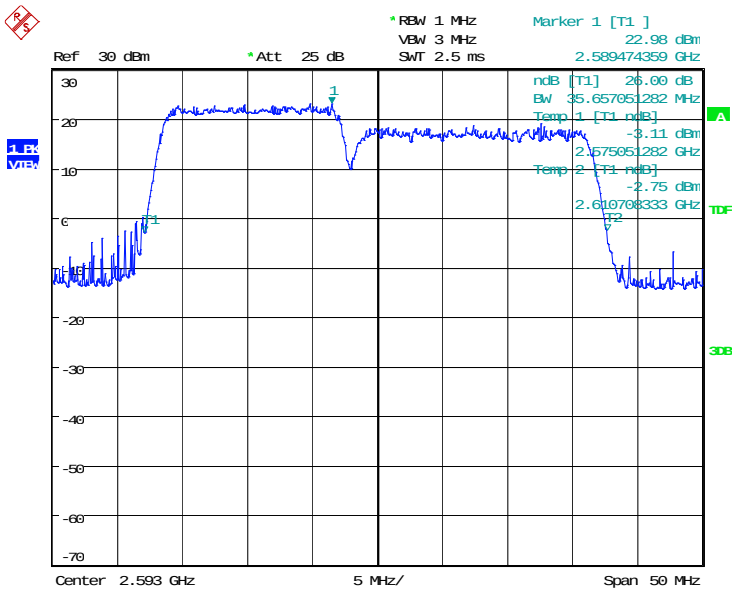



Date: 28.FEB.2020 17:46:26

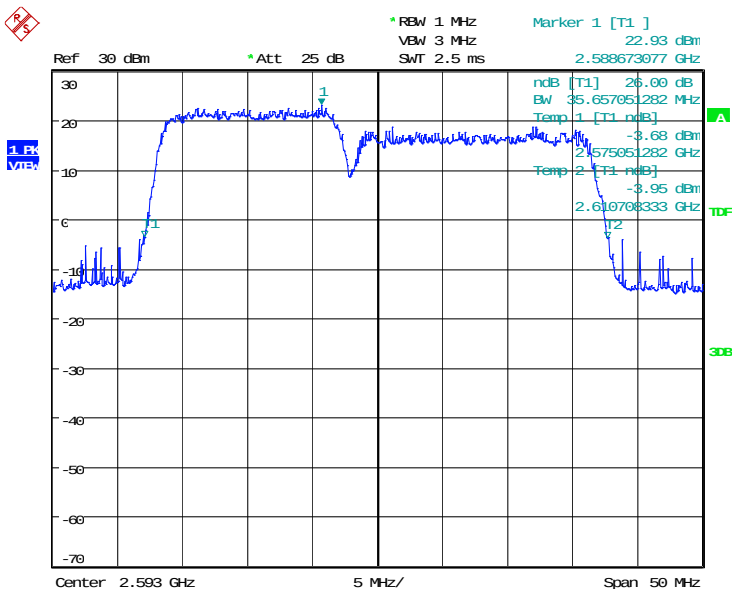
**LTE band 41 HPUE, 15MHz+20MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 35.657 | 35.657 | 35.737 |

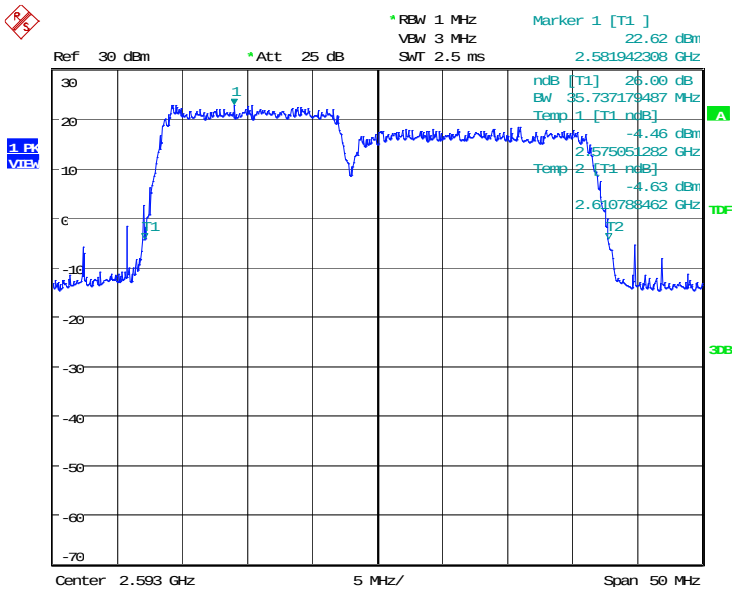
**LTE band 41 HPUE, 15MHz+20MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 15MHz+20MHz Bandwidth,16QAM (-26dBc BW)**



**LTE band 41 HPUE, 15MHz+20MHz Bandwidth,64QAM (-26dBc BW)**

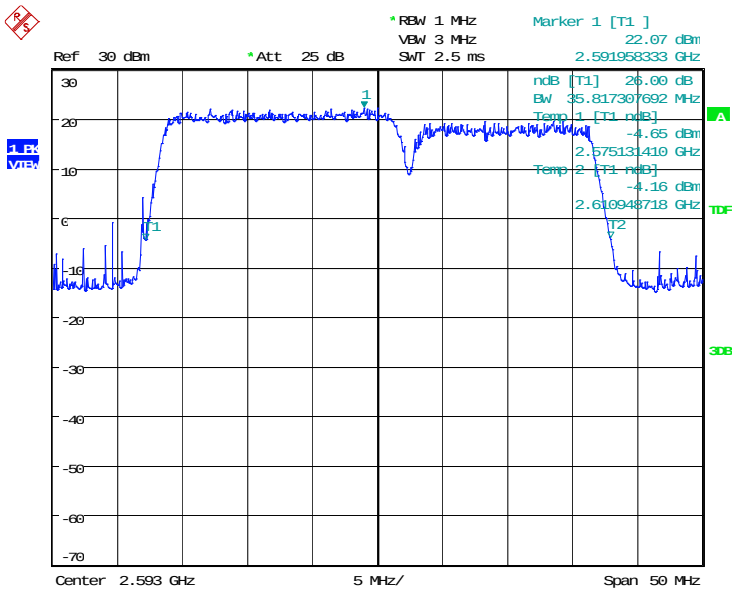



Date: 28.FEB.2020 17:53:02

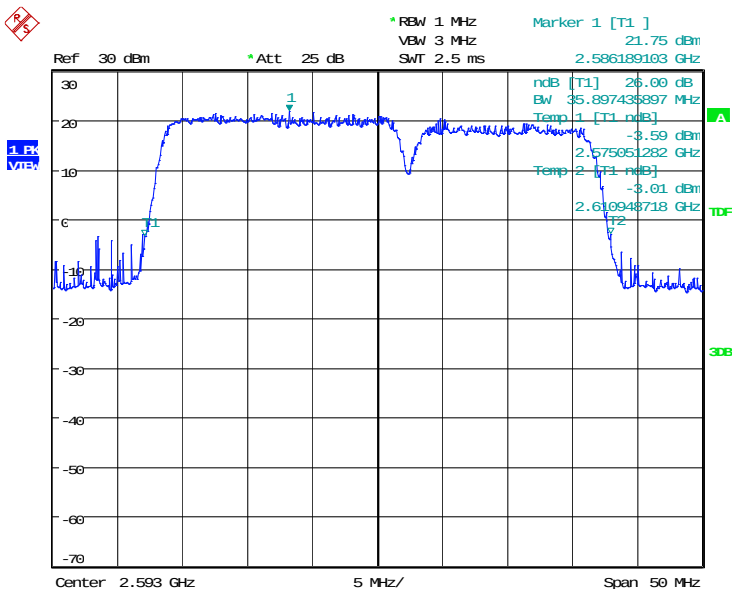
**LTE band 41 HPUE, 20MHz+15MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 35.817 | 35.897 | 35.897 |

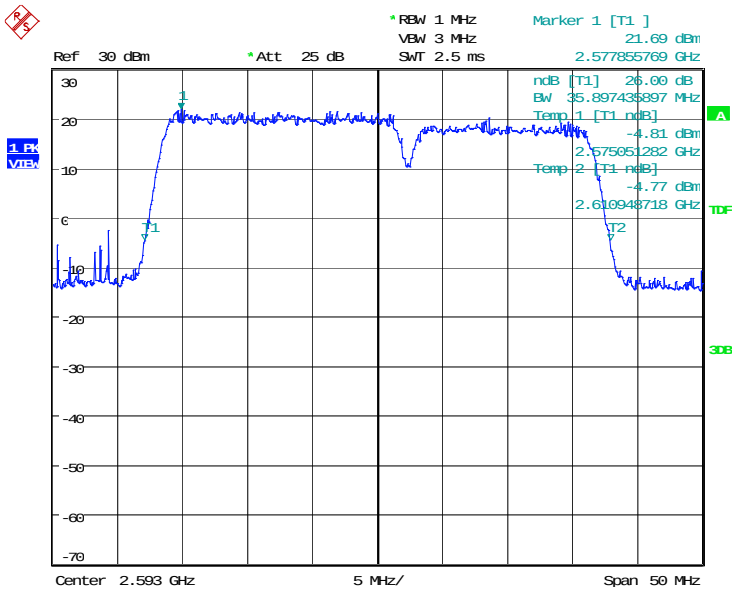
**LTE band 41 HPUE, 20MHz+15MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 20MHz+15MHz Bandwidth,16QAM (-26dBc BW)**



**LTE band 41 HPUE, 20MHz+15MHz Bandwidth,64QAM (-26dBc BW)**

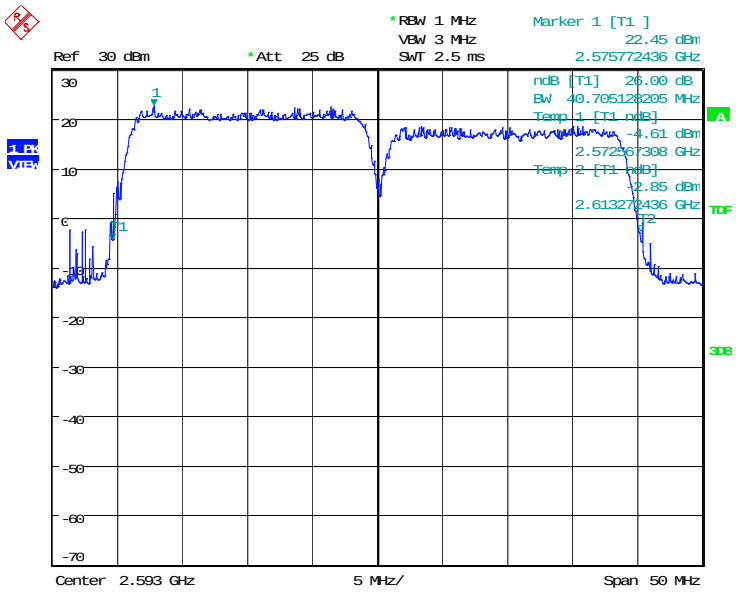



Date: 28.FEB.2020 17:56:56

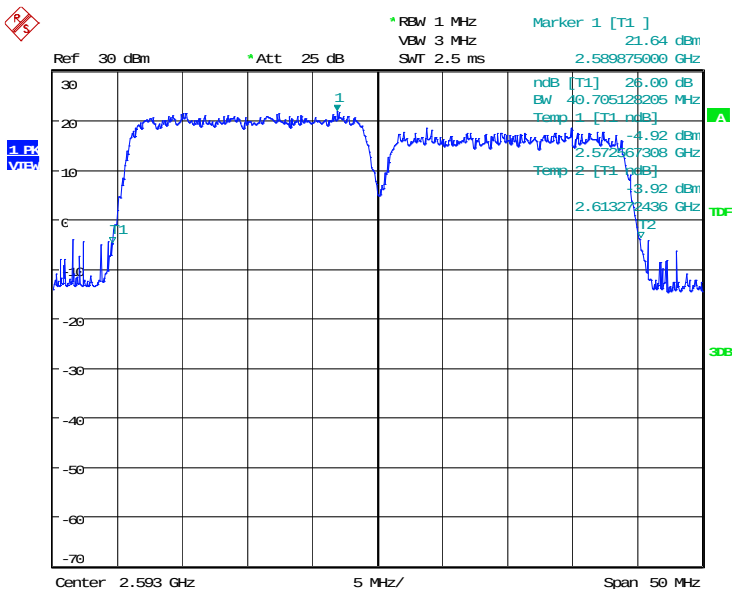
**LTE band 41 HPUE, 20MHz+20MHz (-26dBc BW)**

| Frequency(MHz) | Emission Bandwidth (-26dBc BW) (MHz) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 40.705 | 40.705 | 40.705 |

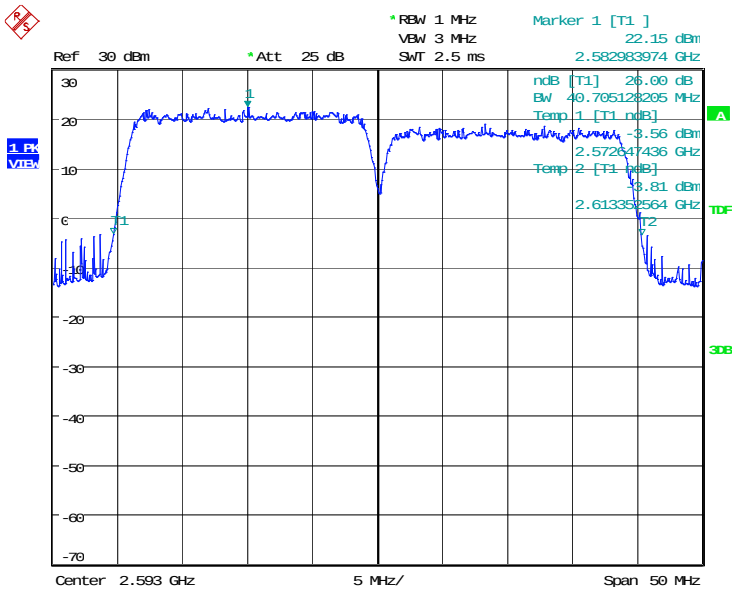
**LTE band 41 HPUE, 20MHz+20MHz Bandwidth, QPSK (-26dBc BW)**




**LTE band 41 HPUE, 20MHz+20MHz Bandwidth,16QAM (-26dBc BW)**



**LTE band 41 HPUE, 20MHz+20MHz Bandwidth,64QAM (-26dBc BW)**



## A.6 BAND EDGE COMPLIANCE

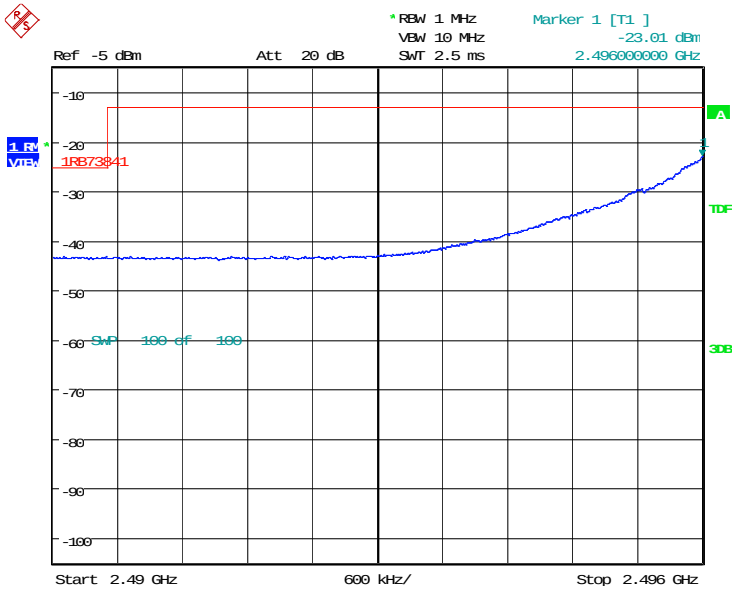
### A.6.1 Measurement limit

Part 27.53(m)(4) specifies 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 that 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.

### A.6.2 Measurement result

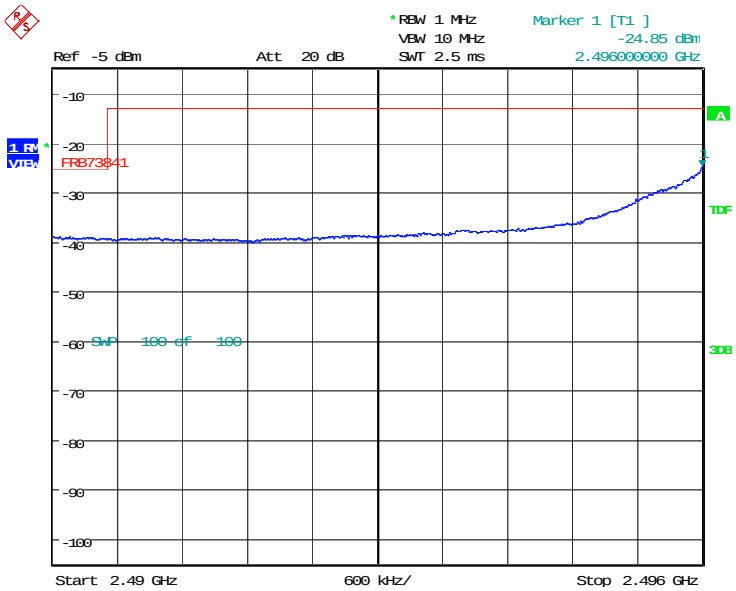
### LTE band 41-HPUE

### LOW BAND EDGE BLOCK-5MHz+20MHz-1RB



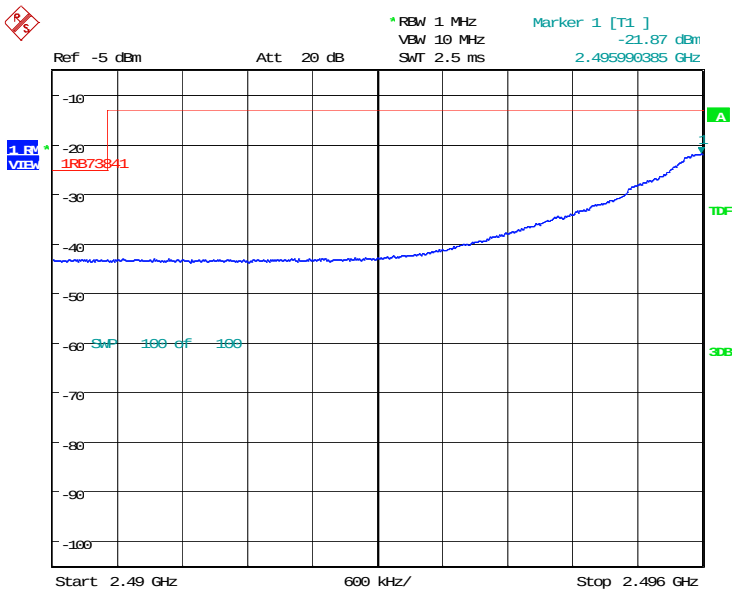

Date: 3.FEB.2020 16:35:01

### LOW BAND EDGE BLOCK-5MHz+20MHz -100%RB



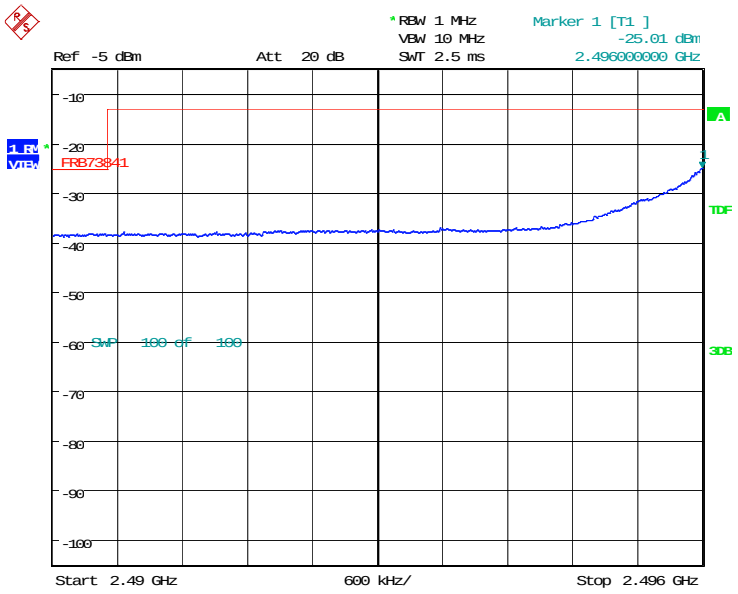

Date: 3.FEB.2020 16:40:01

## LOW BAND EDGE BLOCK-10MHz+20MHz-1RB



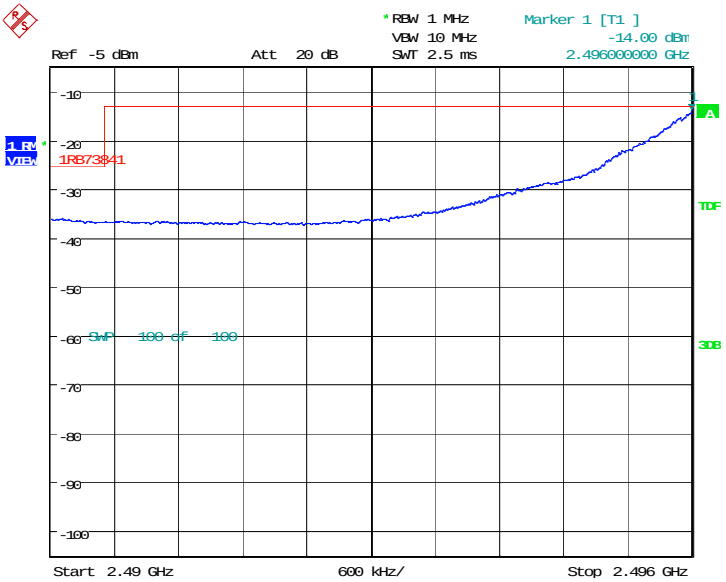

Date: 3.FEB.2020 17:01:05

## LOW BAND EDGE BLOCK-10MHz+20MHz -100%RB



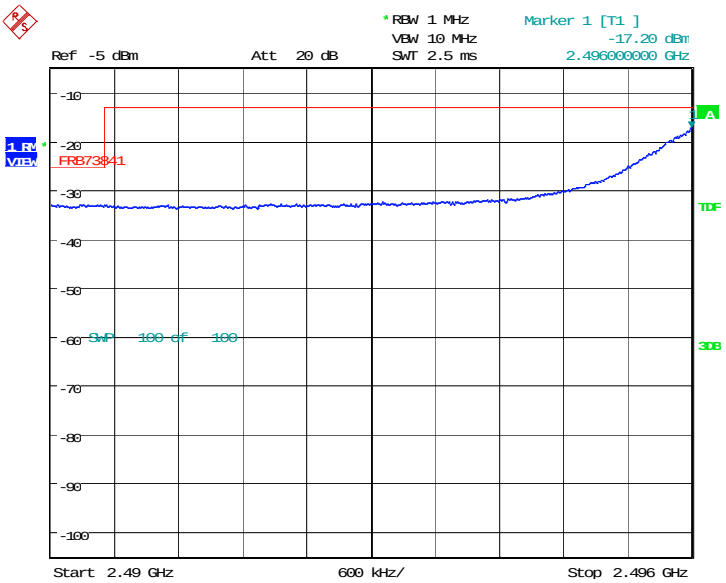

Date: 3.FEB.2020 17:00:09

## LOW BAND EDGE BLOCK-15MHz+15MHz-1RB



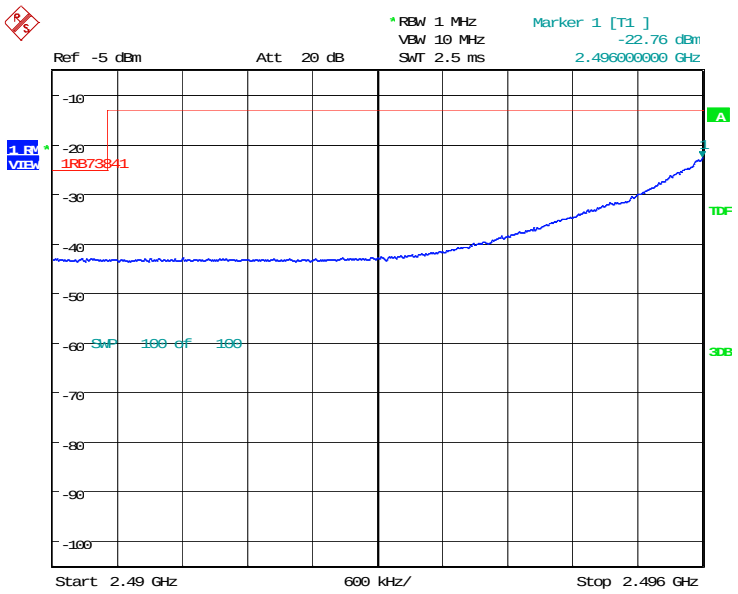

Date: 28.FEB.2020 16:45:17

## LOW BAND EDGE BLOCK-15MHz+15MHz -100%RB



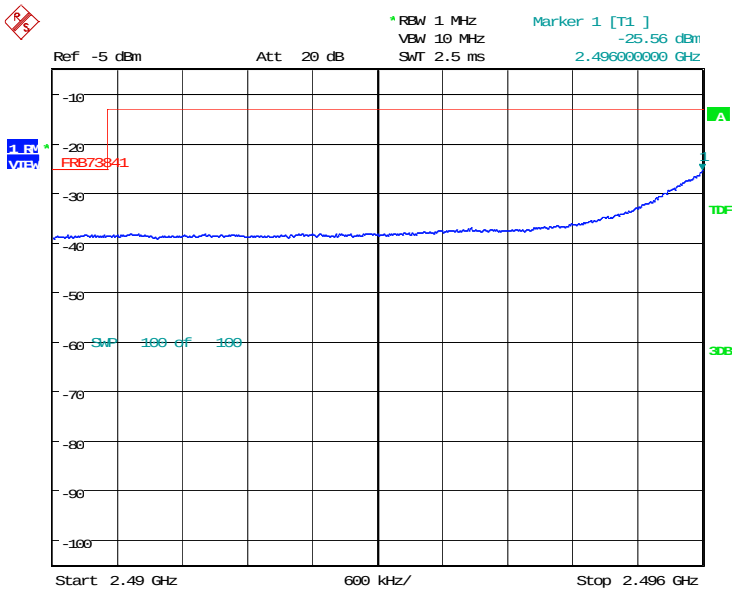

Date: 28.FEB.2020 16:46:11

## LOW BAND EDGE BLOCK-15MHz+20MHz-1RB



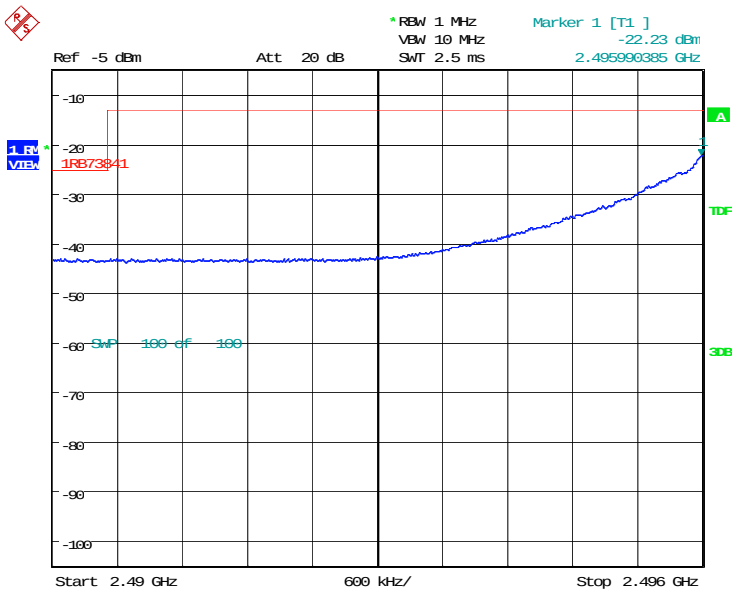

Date: 3.FEB.2020 17:02:27

## LOW BAND EDGE BLOCK-15MHz+20MHz -100%RB



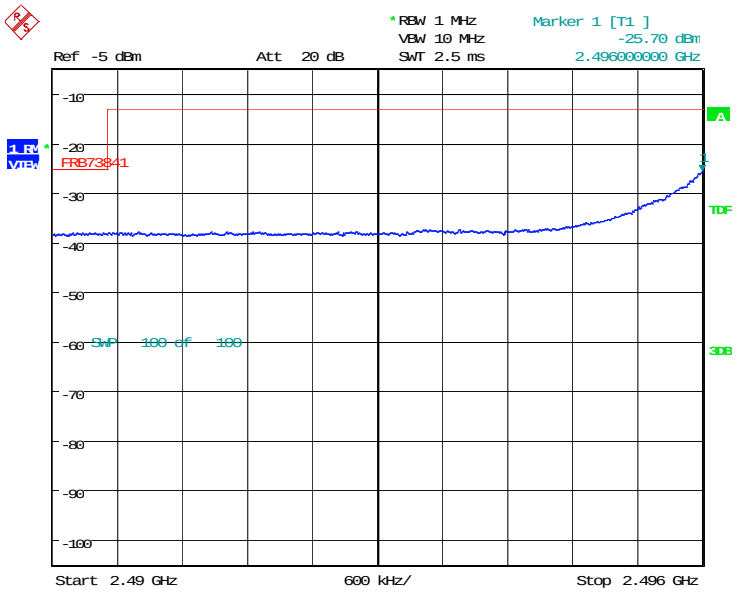

Date: 3.FEB.2020 17:03:26

## LOW BAND EDGE BLOCK-20MHz+20MHz-1RB



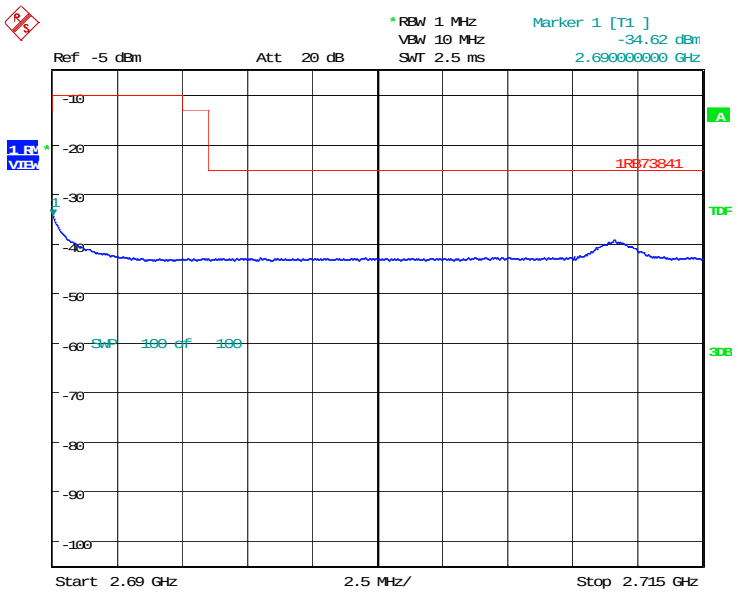

Date: 3.FEB.2020 17:07:48

## LOW BAND EDGE BLOCK-20MHz+20MHz -100%RB



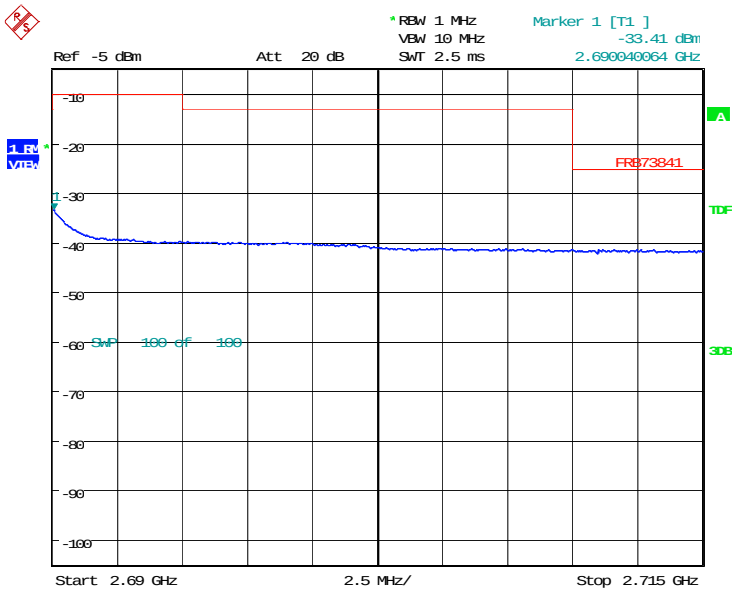

Date: 3.FEB.2020 17:06:53

## HIGH BAND EDGE BLOCK-20MHz+5MHz-1RB



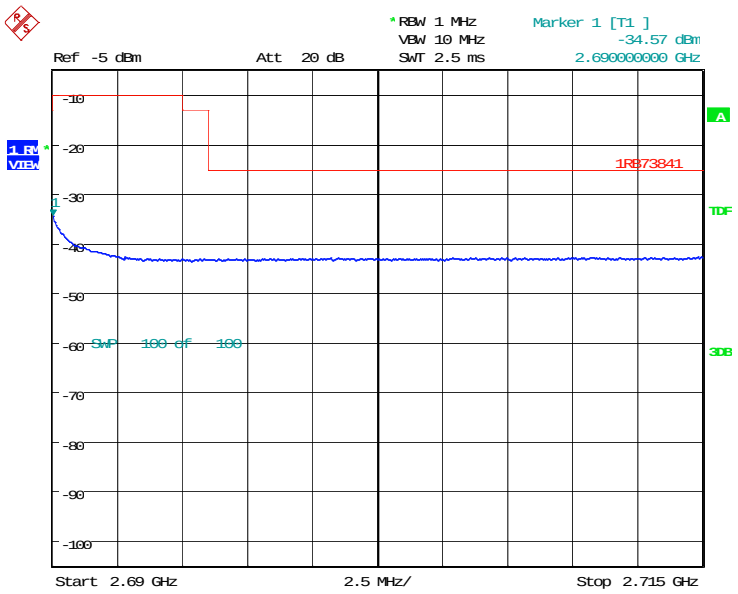

Date: 3.FEB.2020 17:13:02

## HIGH BAND EDGE BLOCK-20MHz+5MHz -100%RB



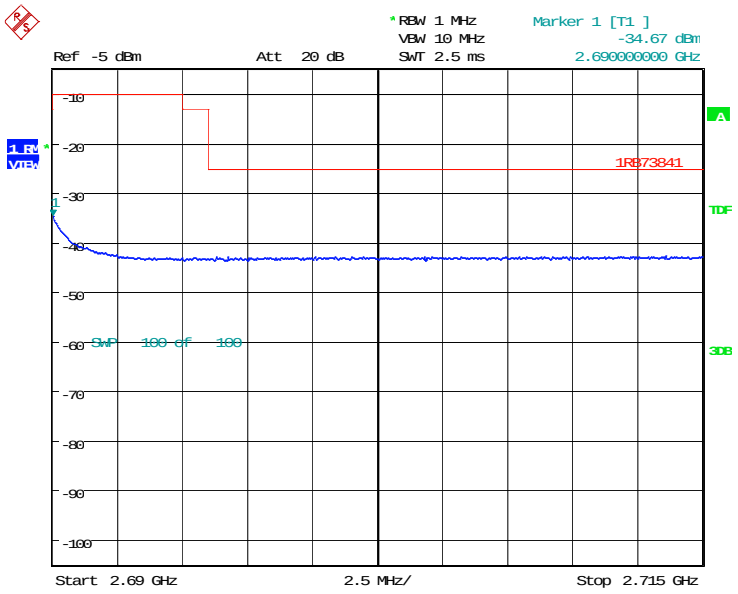

Date: 3.FEB.2020 17:14:12

## HIGH BAND EDGE BLOCK-20MHz+10MHz-1RB



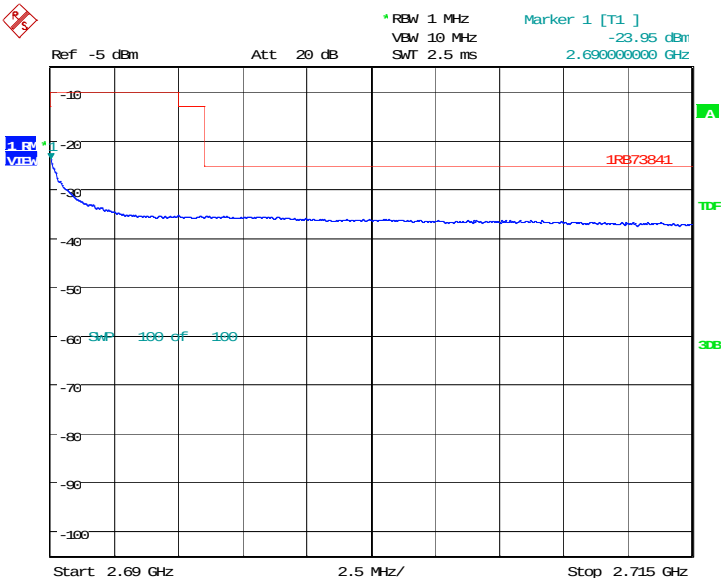

Date: 3.FEB.2020 17:24:15

## HIGH BAND EDGE BLOCK-20MHz+10MHz -100%RB



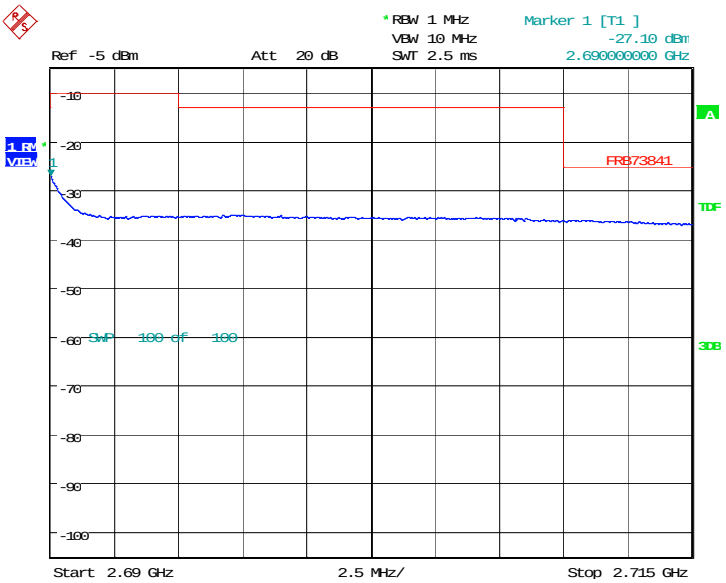

Date: 3.FEB.2020 17:25:39

## HIGH BAND EDGE BLOCK-15MHz+15MHz-1RB



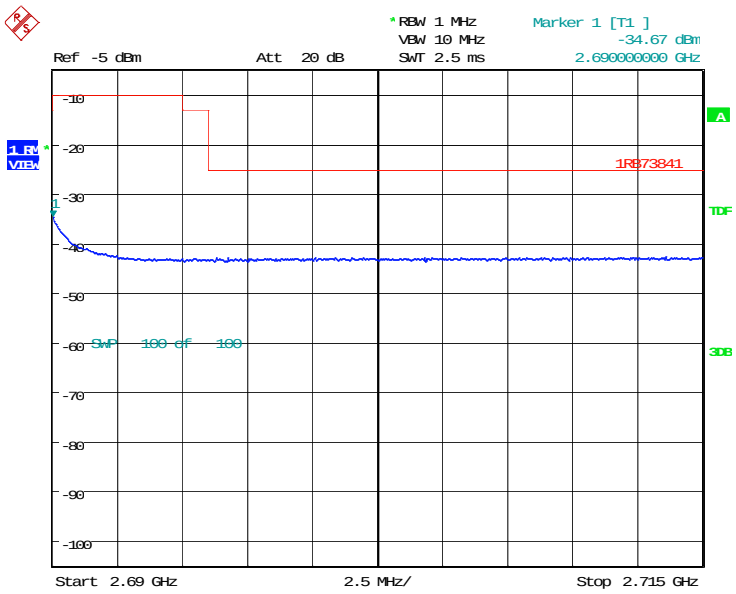

Date: 28.FEB.2020 16:49:46

## HIGH BAND EDGE BLOCK-15MHz+15MHz -100%RB



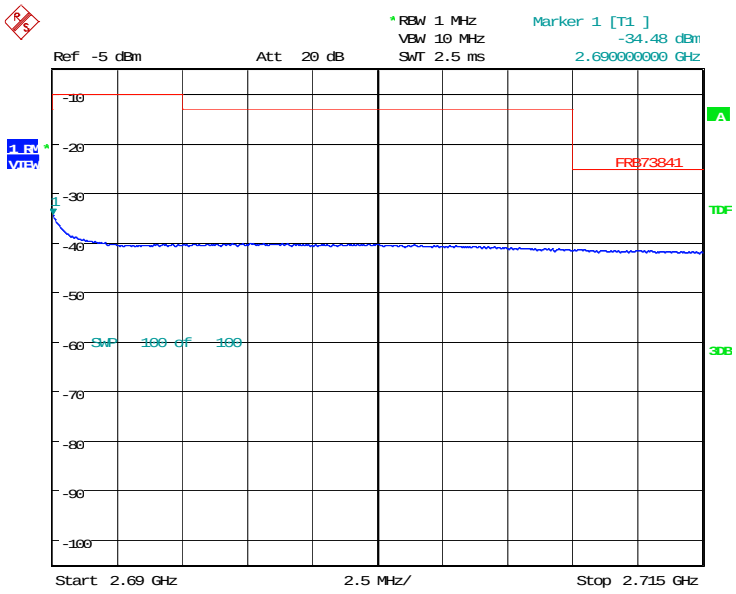

Date: 28.FEB.2020 16:49:05

## HIGH BAND EDGE BLOCK-20MHz+15MHz-1RB



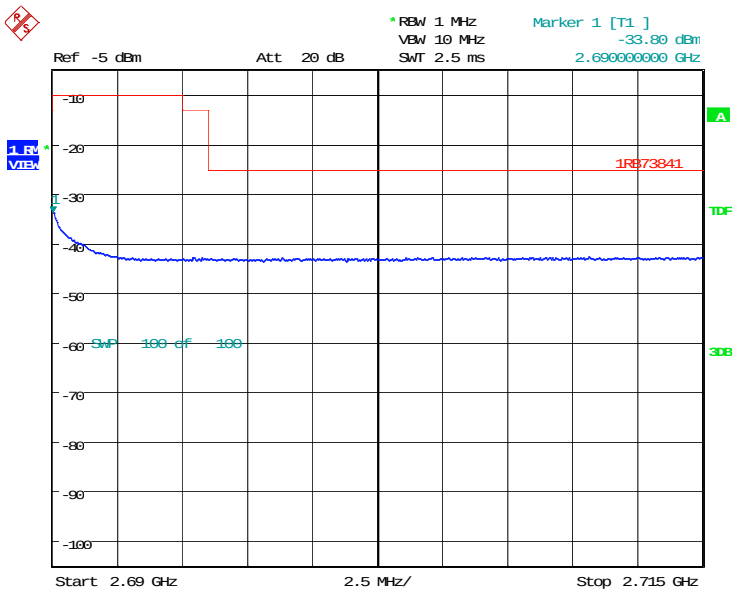

Date: 3.FEB.2020 17:25:39

## HIGH BAND EDGE BLOCK-20MHz+15MHz -100%RB



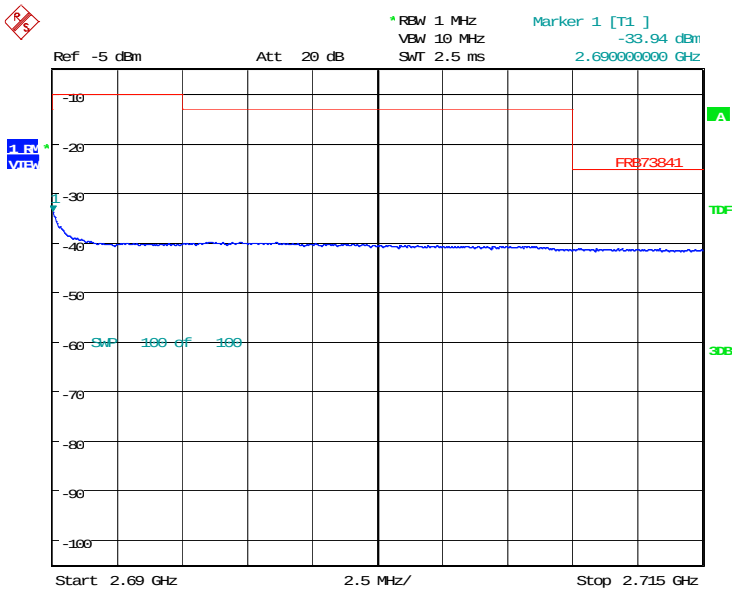

Date: 3.FEB.2020 17:26:43

## HIGH BAND EDGE BLOCK-20MHz+20MHz-1RB




Date: 3.FEB.2020 17:28:53

## HIGH BAND EDGE BLOCK-20MHz+20MHz -100%RB




Date: 3.FEB.2020 17:27:59

## A.7 CONDUCTED SPURIOUS EMISSION

### A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
   (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
   (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

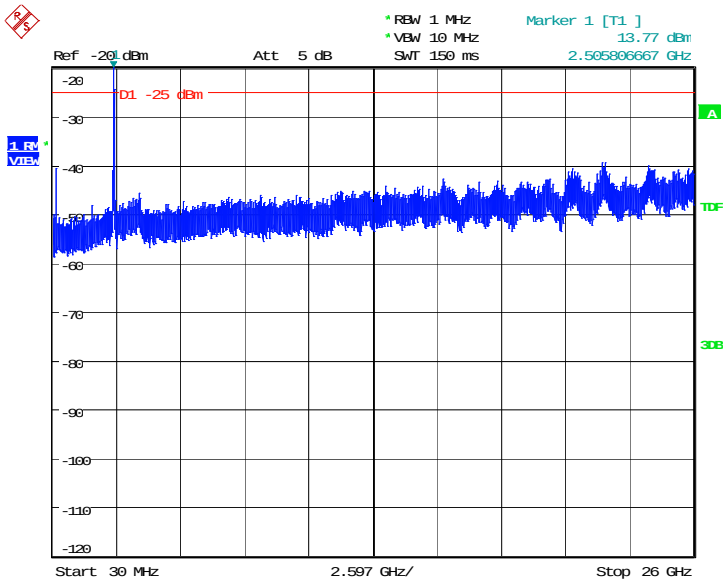
### A. 7.2 Measurement Limit

Part 27.53(m)(4) specifies 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 that 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.

## A. 7.3 Measurement result

**Only worst case result is given below**

**LTE band 41-HPUE: 30MHz – 26.5GHz**



## A.8 PEAK-TO-AVERAGE POWER RATIO

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1ms;

e) Record the maximum PAPR level associated with a probability of 0.1%.

### A.8.1 Measurement limit

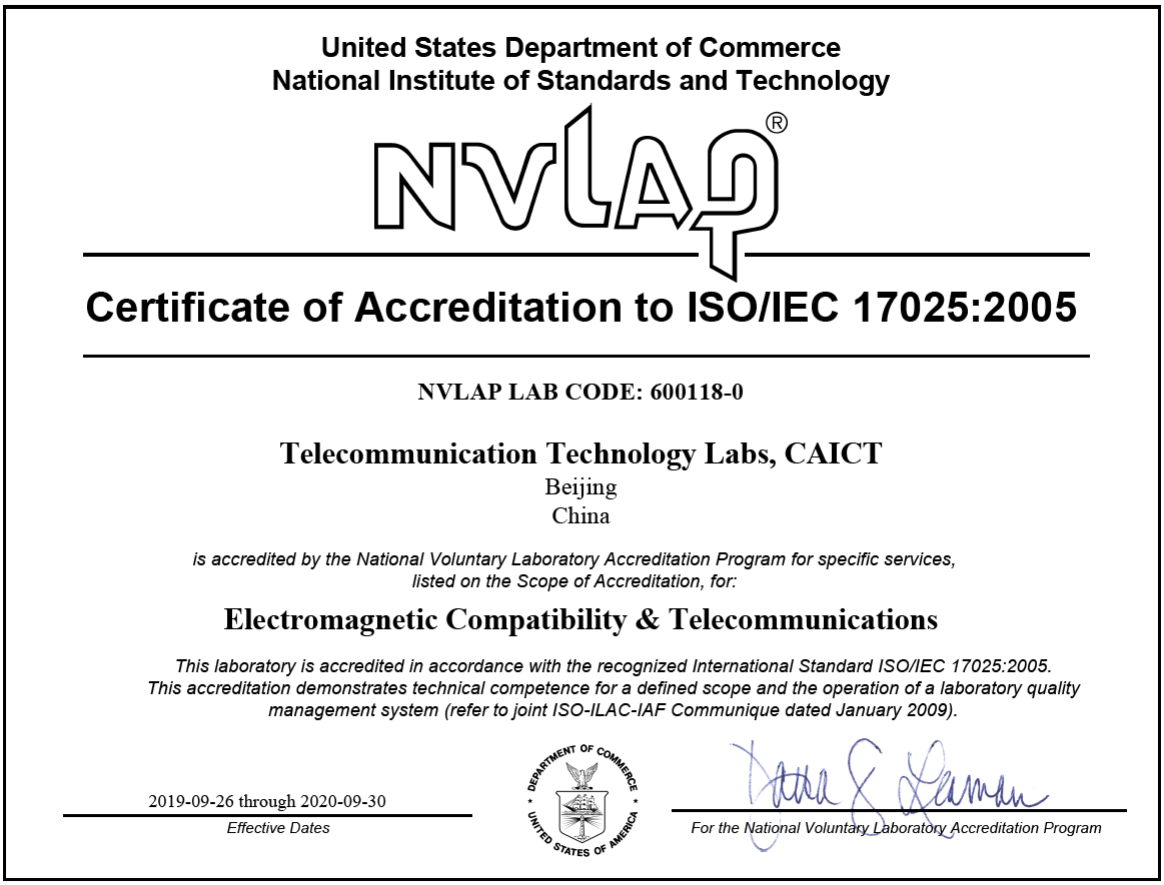
not exceed 13 dB

### A.8.2 Measurement results

**LTE band 41-HPUE, 20MHz+20MHz**

| Frequency(MHz) | PAPR(dB) | | |
|---|---|---|---|
| 2593.0 | QPSK | 16QAM | 64QAM |
| | 8.91 | 9.36 | 9.42 |

## ANNEX B: Accreditation Certificate



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:*

Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2019-09-26 through 2020-09-30
*Effective Dates*

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

*For the National Voluntary Laboratory Accreditation Program*

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