



## FCC PART 27

## FCC PART 22H, PART 24E

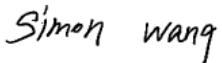
### TEST REPORT

For

### TECNO MOBILE LIMITED

ROOM 604 6/F SOUTH TOWER WORLD FINANCE CTR HARBOUR CITY 17 CANTON  
ROAD TST KL, Hong Kong

**FCC ID: 2ADYY-KC8**

|   |                                      |
|---|--------------------------------------|
| <b>Report Type:</b><br>Original Report  | <b>Product Type:</b><br>Mobile phone |
| <b>Report Number:</b> <u>RGMA190813001-00D</u>  |                                      |
| <b>Report Date:</b> <u>2019-09-16</u>   |                                      |
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

|                         |   |
|-------------------------|---|
| Product                 | Mobile phone  |
| Model                   | KC8   |
| Frequency Range         | Cellular: 824-849 MHz<br>PCS: 1850-1910 MHz<br>WCDMA B2/LTE B2: 1850-1910 MHz<br>WCDMA B5/LTE B5: 824-849 MHz<br>WCDMA B4/LTE B4: 1710- 1755 MHz<br>LTE B7: 2500-2570 MHz   |
| Conducted Average Power | GSM850: 32.71dBm(GMSK), 27.42dBm(8PSK)<br>PCS1900: 29.45dBm(GMSK), 25.72dBm(8PSK)<br>WCDMA Band 2: 21.74dBm<br>WCDMA Band 4: 21.64dBm<br>WCDMA Band 5: 22.69dBm<br>LTE Band 2: 21.75dBm<br>LTE Band 4: 21.81dBm<br>LTE Band 5: 21.77dBm<br>LTE Band 7: 21.84dBm |
| Modulation Technique    | 2G: GMSK,8PSK<br>3G: BPSK, QPSK, 16QAM<br>4G: QPSK, 16QAM   |
| Antenna Specification   | 2G/3G/4G: FPC Antennas  |
| Voltage Range           | DC 3.85V from battery or DC 5.0V from adapter   |
| Date of Test            | 2019-08-14 to 2019-08-19  |
| Sample serial number    | 190813001(Assigned by BACL, Shenzhen)   |
| Received date           | 2019-08-13  |
| Sample/EUT Status       | Good condition  |
| Adapter information     | Model:CU-52JT<br>Input: AC 100-240V, 50/60Hz,200mA<br>Output: DC 5.0V, 1.2A   |

### Objective

This test report is prepared on behalf of *TECNO MOBILE LIMITED* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS and Part 15.247 DTS submissions with FCC ID: 2ADYY-KC8.

## Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services  
Part 24 Subpart E - Personal Communication Services  
Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

| Parameter                    | Uncertainty              |                    |
|------------------------------|--------------------------|--------------------|
| Occupied Channel Bandwidth   | ±5%                      |                    |
| RF output power, conducted   | ±0.73dB                  |                    |
| Unwanted Emission, conducted | ±1.6dB                   |                    |
| Emissions,<br>Radiated       | Below 1GHz<br>Above 1GHz | ±4.75dB<br>±4.88dB |
| Temperature                  | ±1 °C                    |                    |
| Humidity                     | ±6%                      |                    |
| Supply voltages              | ±0.4%                    |                    |

*Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

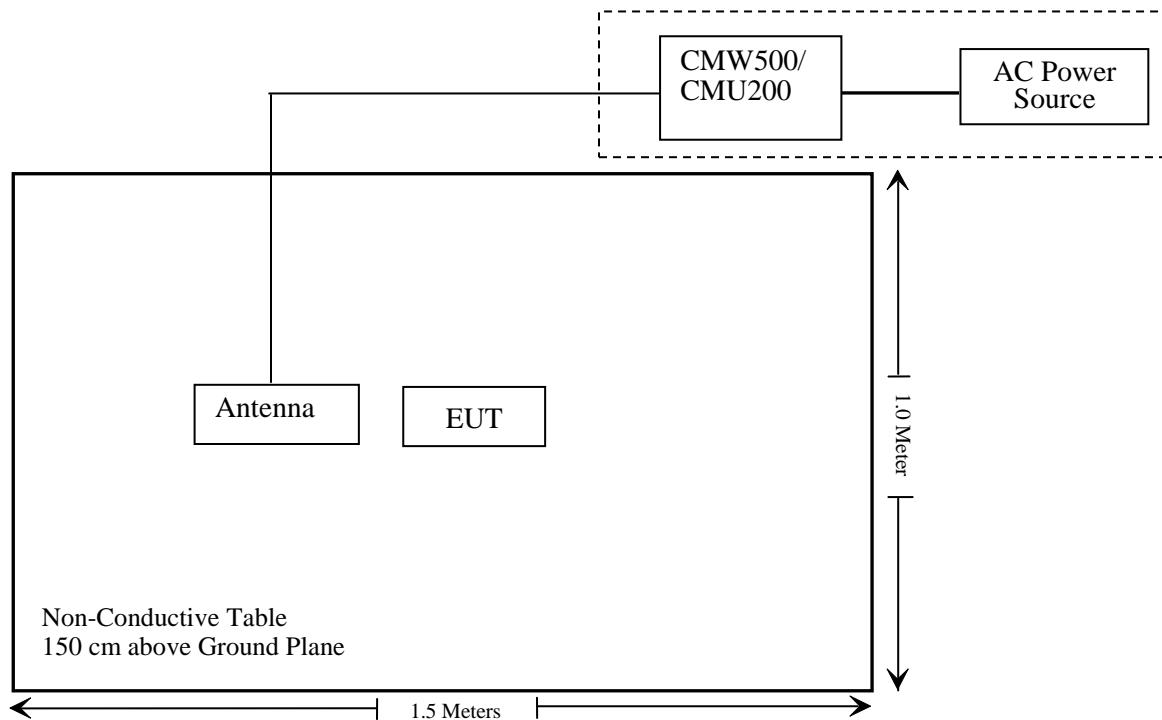
### Equipment Modifications

No modification was made to the EUT.

### Support Equipment List and Details

| Manufacturer    | Description                          | Model  | Serial Number         |
|-----------------|--------------------------------------|--------|-----------------------|
| Rohde & Schwarz | Wideband Radio Communication Tester  | CMW500 | 1201.002K50-116218-UY |
| Rohde & Schwarz | Universal Radio Communication Tester | CMU200 | 110605                |

### Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

| FCC Rules  | Description of Test                    | Result         |
|--|--|----------------|
| § 1.1307 , §2.1093                                     | RF Exposure (SAR)                      | Compliance*    |
| §2.1046; § 22.913 (a);<br>§ 24.232 (c); §27.50 (d) (h) | RF Output Power                        | Compliance     |
| § 2.1047   | Modulation Characteristics             | Not Applicable |
| § 2.1049; § 22.905;<br>§ 22.917; § 24.238; §27.53      | Occupied Bandwidth                     | Compliance     |
| § 2.1051; § 22.917 (a);<br>§ 24.238 (a); §27.53        | Spurious Emissions at Antenna Terminal | Compliance     |
| § 2.1053; § 22.917 (a);<br>§ 24.238 (a); §27.53        | Field Strength of Spurious Radiation   | Compliance     |
| § 22.917 (a);<br>§ 24.238 (a); §27.53(h) (m)           | Band Edge                              | Compliance     |
| § 2.1055; § 22.355;<br>§ 24.235; §27.54;               | Frequency stability                    | Compliance     |

Note: \* Please refer to SAR report released by BACL, report number: RGMA190813001-20.

## TEST EQUIPMENT LIST

| Manufacturer                  | Description       | Model               | Serial Number       | Calibration Date | Calibration Due Date |
|-------------------------------|-------------------|---------------------|---------------------|------------------|----------------------|
| <b>Radiated Emission Test</b> |                   |                     |                     |                  |                      |
| Sunol Sciences                | Horn Antenna      | DRH-118             | A052604             | 2017-12-22       | 2020-12-21           |
| Rohde & Schwarz               | Spectrum Analyzer | FSV40-N             | 102259              | 2019-07-22       | 2020-07-21           |
| Sunol Sciences                | Broadband Antenna | JB1                 | A040904-1           | 2017-12-22       | 2020-12-21           |
| COM-POWER                     | Pre-amplifier     | PA-122              | 181919              | 2018-11-12       | 2019-11-12           |
| Sonoma Instrument             | Amplifier         | 310N                | 186238              | 2018-11-12       | 2019-11-12           |
| Agilent                       | Signal Generator  | N5183A              | MY51040755          | 2018-12-03       | 2019-12-03           |
| Rohde & Schwarz               | EMI Test Receiver | ESR3                | 102455              | 2019-07-09       | 2020-07-08           |
| COM-POWER                     | Dipole Antenna    | AD-100              | 41000               | NCR              | NCR                  |
| A.H. System                   | Horn Antenna      | SAS-200/571         | 135                 | 2018-09-01       | 2021-08-31           |
| UTiFLEX MICRO-C0AX            | RF Cable          | UFA147A-2362-100100 | MFR64639 231029-003 | 2018-11-12       | 2019-11-12           |
| Ducommun Technologies         | RF Cable          | 104PEA              | 218124002           | 2018-11-12       | 2019-11-12           |
| Ducommun technologies         | RF Cable          | RG-214              | 1                   | 2018-11-12       | 2019-11-12           |
| Ducommun technologies         | RF Cable          | RG-214              | 2                   | 2018-11-12       | 2019-11-12           |
| Ducommun Technologies         | Horn Antenna      | ARH-2823-02         | 1007726-03          | 2016-11-18       | 2019-11-18           |
| Ducommun Technologies         | Horn Antenna      | ARH-4223-02         | 1007726-04          | 2017-12-29       | 2020-12-28           |
| Unknown                       | High Pass filter  | 2.8GHz              | Unknown             | 2019-04-20       | 2020-04-20           |
| Unknown                       | High Pass filter  | 1.3GHz              | Unknown             | 2019-04-20       | 2020-04-20           |

| Manufacturer             | Description                          | Model                          | Serial Number         | Calibration Date | Calibration Due Date |
|--------------------------|--------------------------------------|--------------------------------|-----------------------|------------------|----------------------|
| <b>RF Conducted Test</b> |                                      |                                |                       |                  |                      |
| Rohde & Schwarz          | Spectrum Analyzer                    | FSU26                          | 200120                | 2019-03-02       | 2020-03-01           |
| ESPEC                    | Temperature & Humidity Chamber       | EL-10KA                        | 9107726               | 2019-01-05       | 2020-01-05           |
| Long Wei                 | DC Power Supply                      | TPR-6420D                      | 398363                | NCR              | NCR                  |
| Fluke                    | Digital Multimeter                   | 287                            | 19000011              | 2019-04-12       | 2020-04-12           |
| Rohde & Schwarz          | Universal Radio Communication Tester | CMU200                         | 106891                | 2019-01-15       | 2020-01-15           |
| Rohde & Schwarz          | Wideband Radio Communication Tester  | CMW500                         | 1201.002K50-146520-wh | 2019-07-09       | 2020-07-09           |
| Wainwright Germany       | Band Reject Filter                   | WRCG1850/1910-1835/1925-40/8SS | 22                    | 2019-03-02       | 2020-03-01           |
| Wainwright Germany       | Band Reject Filter                   | WRCG1786-1689/1806             | 2                     | 2019-03-02       | 2020-03-01           |
| Chengdu Oulitong         | Band Reject Filter                   | OBSF-2500-2570-S               | OE01601523            | 2019-03-02       | 2020-03-01           |
| Unknown                  | High Pass filter                     | 1.3GHz                         | Unknown               | 2019-04-20       | 2020-04-20           |
| Ducommun Technologies    | RF Cable                             | RG-214                         | 3                     | Each Time        |                      |
| Ducommun technologies    | RF Cable                             | UFA210A-1-4724-30050U          | MFR64369 223410-001   | 2018-11-12       | 2019-11-12           |
| WEINSCHEL                | 3dB Attenuator                       | 6231                           | 666                   | Each Time        |                      |
| WEINSCHEL                | 10dB Attenuator                      | 5324                           | AU 3842               | Each Time        |                      |
| Unknown                  | Power Splitter                       | 1620                           | 129                   | Each Time        |                      |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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## FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

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### Applicable Standard

FCC§1.1310 and §2.1093.

### Test Result

Compliance, please refer to the SAR report: RGMA190813001-20.

**FCC §2.1047 - MODULATION CHARACTERISTIC**

According to FCC § 2.1047(d), Part 22H & 24E & 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC §2.1046, §22.913 (a) & §24.232 (c); §27.50 (d) (h) - RF OUTPUT POWER

### Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

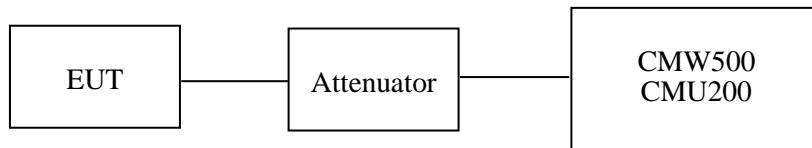
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

### Test Procedure

#### *Conducted method:*

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.



#### *Radiated method:*

TIA 603-D section 2.2.17

### Test Data

#### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Gerogre Zhong on 2019-08-18 and Kieron Luo on 2019-08-19.*

**Conducted Power****Cellular Band (Part 22H)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) | Limit (dBm) |
|------|---------|-----------------|----------------------------|-------------|
| GSM  | 128     | 824.2           | 32.53                      | 38.45       |
|      | 190     | 836.6           | 32.47                      | 38.45       |
|      | 251     | 848.8           | 32.62                      | 38.45       |

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|      |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| GPRS | 128     | 824.2           | 32.71                      | 28.84   | 28.27   | 27.31   | 38.45       |
|      | 190     | 836.6           | 32.58                      | 28.49   | 28.21   | 27.16   | 38.45       |
|      | 251     | 848.8           | 32.49                      | 28.57   | 28.34   | 27.31   | 38.45       |

| Mode  | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|-------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|       |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| EGPRS | 128     | 824.2           | 27.42                      | 24.12   | 22.86   | 20.19   | 38.45       |
|       | 190     | 836.6           | 27.29                      | 24.26   | 21.89   | 20.23   | 38.45       |
|       | 251     | 848.8           | 27.34                      | 24.41   | 21.96   | 20.17   | 38.45       |

| Mode           | Test Condition | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |                  |                |
|----------------|----------------|-----------|---------------|----------------------------|------------------|----------------|
|                |                |           |               | Low Frequency              | Middle Frequency | High Frequency |
| WCDMA (Band V) | Normal         | RMC12.2k  |               | 22.57                      | 22.62            | 22.69          |
|                |                | HSDPA     | 1             | 21.51                      | 21.57            | 21.64          |
|                |                |           | 2             | 21.37                      | 21.52            | 21.53          |
|                |                |           | 3             | 21.43                      | 21.59            | 21.49          |
|                |                |           | 4             | 21.48                      | 21.67            | 21.42          |
|                |                | HSUPA     | 1             | 21.42                      | 21.54            | 21.41          |
|                |                |           | 2             | 21.46                      | 21.34            | 21.28          |
|                |                |           | 3             | 21.53                      | 21.61            | 21.11          |
|                |                |           | 4             | 21.59                      | 21.48            | 21.43          |
|                |                |           | 5             | 21.65                      | 21.38            | 21.52          |
|                |                | HSPA+     | 1             | 21.43                      | 21.40            | 21.39          |

**PCS Band (Part 24E)**

| <b>Mode</b> | <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Average Output<br/>Power<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> |
|-------------|----------------|----------------------------|---|------------------------|
| GSM         | 512            | 1850.2                     | 29.38                                     | 33                     |
|             | 661            | 1880.0                     | 29.42                                     | 33                     |
|             | 810            | 1909.8                     | 29.45                                     | 33                     |

| <b>Mode</b> | <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Average Output Power<br/>(dBm)</b> |                |                |                | <b>Limit<br/>(dBm)</b> |
|-------------|----------------|----------------------------|---------------------------------------|----------------|----------------|----------------|------------------------|
|             |                |                            | <b>1 slot</b>                         | <b>2 slots</b> | <b>3 slots</b> | <b>4 slots</b> |                        |
| GPRS        | 512            | 1850.2                     | 28.48                                 | 27.13          | 25.87          | 24.19          | 33                     |
|             | 661            | 1880.0                     | 28.67                                 | 27.28          | 25.91          | 24.22          | 33                     |
|             | 810            | 1909.8                     | 28.58                                 | 27.16          | 25.96          | 24.29          | 33                     |

| <b>Mode</b> | <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Average Output Power (dBm)</b> |                |                |                | <b>Limit<br/>(dBm)</b> |
|-------------|----------------|----------------------------|-----------------------------------|----------------|----------------|----------------|------------------------|
|             |                |                            | <b>1 slot</b>                     | <b>2 slots</b> | <b>3 slots</b> | <b>4 slots</b> |                        |
| EGPRS       | 512            | 1850.2                     | 25.72                             | 23.46          | 21.15          | 19.62          | 33                     |
|             | 661            | 1880.0                     | 25.58                             | 23.65          | 21.34          | 19.52          | 33                     |
|             | 810            | 1909.8                     | 25.46                             | 23.51          | 21.21          | 19.49          | 33                     |

| <b>Mode</b>        | <b>Test<br/>Condition</b> | <b>Test<br/>Mode</b> | <b>3GPP<br/>Sub<br/>Test</b> | <b>Average Output Power<br/>(dBm)</b> |                             |                           |
|--------------------|---------------------------|----------------------|------------------------------|---------------------------------------|-----------------------------|---------------------------|
|                    |                           |                      |                              | <b>Low<br/>Frequency</b>              | <b>Middle<br/>Frequency</b> | <b>High<br/>Frequency</b> |
| WCDMA<br>(Band II) | Normal                    | RMC12.2k             |                              | 21.74                                 | 21.67                       | 21.55                     |
|                    |                           | HSDPA                | 1                            | 20.51                                 | 20.66                       | 20.67                     |
|                    |                           |                      | 2                            | 20.43                                 | 20.75                       | 20.57                     |
|                    |                           |                      | 3                            | 20.37                                 | 20.83                       | 20.45                     |
|                    |                           | HSUPA                | 4                            | 20.67                                 | 20.72                       | 20.52                     |
|                    |                           |                      | 1                            | 20.53                                 | 20.54                       | 20.47                     |
|                    |                           |                      | 2                            | 20.37                                 | 20.46                       | 20.69                     |
|                    |                           |                      | 3                            | 20.57                                 | 20.41                       | 20.42                     |
|                    |                           |                      | 4                            | 20.67                                 | 20.64                       | 20.30                     |
|                    |                           | HSPA+                | 5                            | 20.48                                 | 20.50                       | 20.44                     |
|                    |                           | HSPA+                | 1                            | 20.35                                 | 20.44                       | 20.38                     |

| Mode            | Test Condition | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |                  |                |
|-----------------|----------------|-----------|---------------|----------------------------|------------------|----------------|
|                 |                |           |               | Low Frequency              | Middle Frequency | High Frequency |
| WCDMA (Band IV) | Normal         | HSDPA     | RMC12.2k      | 21.57                      | 21.64            | 21.59          |
|                 |                |           | 1             | 20.46                      | 20.53            | 20.67          |
|                 |                |           | 2             | 20.52                      | 20.61            | 20.62          |
|                 |                |           | 3             | 20.43                      | 20.51            | 20.34          |
|                 |                |           | 4             | 20.48                      | 20.34            | 20.51          |
|                 |                | HSUPA     | 1             | 20.34                      | 20.53            | 20.55          |
|                 |                |           | 2             | 20.48                      | 20.49            | 20.50          |
|                 |                |           | 3             | 20.29                      | 20.42            | 20.41          |
|                 |                |           | 4             | 20.41                      | 20.58            | 20.38          |
|                 |                |           | 5             | 20.37                      | 20.54            | 20.57          |
|                 |                | HSPA+     | 1             | 20.42                      | 20.39            | 20.35          |

**Peak-to-average ratio (PAR)****Cellular Band**

| <b>Mode</b> | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|-------------|----------------|-----------------|-------------------|
| GSM         | Low            | 1.28            | 13                |
|             | Middle         | 1.42            | 13                |
|             | High           | 1.35            | 13                |

| <b>Mode</b> | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|-------------|----------------|-----------------|-------------------|
| EGPRS       | Low            | 1.15            | 13                |
|             | Middle         | 1.21            | 13                |
|             | High           | 1.03            | 13                |

| <b>Mode</b>      | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|------------------|----------------|-----------------|-------------------|
| RMC<br>(BPSK)    | Low            | 3.37            | 13                |
|                  | Middle         | 3.32            | 13                |
|                  | High           | 3.17            | 13                |
| HSDPA<br>(16QAM) | Low            | 3.34            | 13                |
|                  | Middle         | 3.04            | 13                |
|                  | High           | 3.51            | 13                |
| HSUPA<br>(BPSK)  | Low            | 3.37            | 13                |
|                  | Middle         | 3.24            | 13                |
|                  | High           | 3.18            | 13                |
| HSPA+            | Low            | 3.15            | 13                |
|                  | Middle         | 3.08            | 13                |
|                  | High           | 3.21            | 13                |

**PCS Band**

| <b>Mode</b> | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|-------------|----------------|-----------------|-------------------|
| GSM         | Low            | 1.43            | 13                |
|             | Middle         | 1.47            | 13                |
|             | High           | 1.46            | 13                |

| <b>Mode</b> | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|-------------|----------------|-----------------|-------------------|
| EGPRS       | Low            | 1.06            | 13                |
|             | Middle         | 1.25            | 13                |
|             | High           | 1.33            | 13                |

| <b>Mode</b>      | <b>Channel</b> | <b>PAR (dB)</b> | <b>Limit (dB)</b> |
|------------------|----------------|-----------------|-------------------|
| RMC<br>(BPSK)    | Low            | 3.57            | 13                |
|                  | Middle         | 3.34            | 13                |
|                  | High           | 3.37            | 13                |
| HSDPA<br>(16QAM) | Low            | 3.48            | 13                |
|                  | Middle         | 3.68            | 13                |
|                  | High           | 3.82            | 13                |
| HSUPA<br>(BPSK)  | Low            | 3.76            | 13                |
|                  | Middle         | 3.41            | 13                |
|                  | High           | 3.66            | 13                |
| HSPA+            | Low            | 3.49            | 13                |
|                  | Middle         | 3.55            | 13                |
|                  | High           | 3.43            | 13                |

**AWS Band**

| Mode             | Channel | PAR<br>(dB) | Limit<br>(dBm) |
|------------------|---------|-------------|----------------|
| WCDMA<br>(BPSK)  | Low     | 3.63        | 13             |
|                  | Middle  | 3.24        | 13             |
|                  | High    | 3.17        | 13             |
| HSDPA<br>(16QAM) | Low     | 3.51        | 13             |
|                  | Middle  | 3.36        | 13             |
|                  | High    | 3.43        | 13             |
| HSUPA<br>(BPSK)  | Low     | 3.22        | 13             |
|                  | Middle  | 3.29        | 13             |
|                  | High    | 3.45        | 13             |
| HSPA+            | Low     | 3.16        | 13             |
|                  | Middle  | 3.27        | 13             |
|                  | High    | 3.40        | 13             |

**Radiated Power****GSM Mode:**

| Frequency<br>(MHz)                               | Receiver<br>Reading<br>(dB $\mu$ V) | Turntable<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                              | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--|-------------------------------------|------------------------------|---------------|----------------|----------------|-----------------------|------------------------------|----------------------------|----------------|----------------|
|  |                                     |                              | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dBd/dBi) |                            |                |                |
| ERP for Cellular Band (Part 22H), Middle Channel |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 836.60   | 83.23                               | 251                          | 2.5           | H              | 23.9           | 1.90                  | 0.0                          | 22.00                      | 38.45          | 16.45          |
| 836.60   | 88.81                               | 318                          | 2.2           | V              | 28.8           | 1.90                  | 0.0                          | 26.90                      | 38.45          | 11.55          |
| EIRP for PCS Band (Part 24E), Middle Channel     |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 1880.00  | 91.42                               | 114                          | 2.2           | H              | 21.7           | 1.30                  | 9.40                         | 29.80                      | 33             | 3.2            |
| 1880.00  | 86.96                               | 1                            | 1.6           | V              | 17.1           | 1.30                  | 9.40                         | 25.20                      | 33             | 7.8            |

**EDGE Mode:**

| Frequency<br>(MHz)                            | Receiver<br>Reading<br>(dB $\mu$ V) | Turntable<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                              | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---|-------------------------------------|------------------------------|---------------|----------------|----------------|-----------------------|------------------------------|----------------------------|----------------|----------------|
|   |                                     |                              | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dBd/dBi) |                            |                |                |
| ERP, Cellular Band (Part 22H), Middle Channel |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 836.60  | 75.25                               | 286                          | 1.4           | H              | 15.9           | 1.90                  | 0.0                          | 14.00                      | 38.45          | 24.45          |
| 836.60  | 82.70                               | 331                          | 1.1           | V              | 22.7           | 1.90                  | 0.0                          | 20.80                      | 38.45          | 17.65          |
| EIRP, PCS Band (Part 24E), Middle Channel     |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 1880.00                                       | 86.31                               | 181                          | 2.5           | H              | 16.6           | 1.30                  | 9.40                         | 24.70                      | 33             | 8.30           |
| 1880.00                                       | 80.22                               | 277                          | 2.0           | V              | 10.3           | 1.30                  | 9.40                         | 18.40                      | 33             | 14.60          |

**WCDMA Mode:**

| Frequency<br>(MHz)                                | Receiver<br>Reading<br>(dB $\mu$ V) | Turntable<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                              | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---|-------------------------------------|------------------------------|---------------|----------------|----------------|-----------------------|------------------------------|----------------------------|----------------|----------------|
|   |                                     |                              | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dBd/dBi) |                            |                |                |
| ERP for WCDMA Band V (Part 22H), Middle Channel   |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 836.60  | 71.68                               | 147                          | 1.2           | H              | 12.3           | 1.90                  | 0.0                          | 10.40                      | 38.45          | 28.05          |
| 836.60  | 78.29                               | 176                          | 2.2           | V              | 18.3           | 1.90                  | 0.0                          | 16.40                      | 38.45          | 22.05          |
| EIRP for WCDMA Band II (Part 24E), Middle Channel |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 1880.00   | 81.42                               | 199                          | 2.1           | H              | 11.7           | 1.30                  | 9.40                         | 19.80                      | 33             | 13.2           |
| 1880.00   | 80.11                               | 326                          | 1.3           | V              | 10.2           | 1.30                  | 9.40                         | 18.30                      | 33             | 14.7           |
| EIRP for WCDMA Band IV (Part 27), Middle Channel  |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 1732.60   | 84.16                               | 79                           | 1.7           | H              | 10.8           | 1.30                  | 8.90                         | 18.40                      | 30             | 11.6           |
| 1732.60   | 85.33                               | 320                          | 1.9           | V              | 12.6           | 1.30                  | 8.90                         | 20.20                      | 30             | 9.8            |

**Note:**

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

**LTE Band 2:**  
Maximum Output Power

| Bandwidth (MHz) | Modulation | RB size/RB Offset       | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|-----------------|------------|-------------------------|-------------------|----------------------|--------------------|
| 1.4             | QPSK       | RB Size=1, RB Offset=0  | 21.23             | 21.38                | 21.46              |
|                 |            | RB Size=1, RB Offset=2  | 21.40             | 21.56                | 21.23              |
|                 |            | RB Size=1, RB Offset=5  | 21.45             | 21.13                | 21.58              |
|                 |            | RB Size=3, RB Offset=0  | 21.06             | 21.34                | 21.32              |
|                 |            | RB Size=3, RB Offset=1  | 20.96             | 21.54                | 21.14              |
|                 |            | RB Size=3, RB Offset=2  | 21.06             | 21.51                | 21.61              |
|                 |            | RB Size=6, RB Offset=0  | 21.04             | 21.53                | 21.26              |
|                 | 16QAM      | RB Size=1, RB Offset=0  | 21.28             | 21.38                | 21.55              |
|                 |            | RB Size=1, RB Offset=2  | 21.19             | 21.65                | 21.29              |
|                 |            | RB Size=1, RB Offset=5  | 21.5              | 21.62                | 21.39              |
|                 |            | RB Size=3, RB Offset=0  | 21.43             | 21.18                | 21.53              |
|                 |            | RB Size=3, RB Offset=1  | 20.96             | 21.13                | 21.59              |
|                 |            | RB Size=3, RB Offset=2  | 21.41             | 21.14                | 21.31              |
|                 |            | RB Size=6, RB Offset=0  | 21.3              | 21.32                | 21.62              |
| 3.0             | QPSK       | RB Size=1, RB Offset=0  | 21.25             | 21.33                | 21.44              |
|                 |            | RB Size=1, RB Offset=7  | 21.45             | 21.52                | 21.39              |
|                 |            | RB Size=1, RB Offset=14 | 21.25             | 21.08                | 21.40              |
|                 |            | RB Size=8, RB Offset=0  | 21.34             | 21.36                | 21.30              |
|                 |            | RB Size=8, RB Offset=4  | 21.22             | 21.27                | 21.37              |
|                 |            | RB Size=8, RB Offset=7  | 21.27             | 21.49                | 21.39              |
|                 |            | RB Size=15, RB Offset=0 | 21.55             | 21.36                | 21.29              |
|                 | 16QAM      | RB Size=1, RB Offset=0  | 21.23             | 21.39                | 21.68              |
|                 |            | RB Size=1, RB Offset=7  | 21.45             | 21.39                | 21.25              |
|                 |            | RB Size=1, RB Offset=14 | 21.46             | 21.45                | 21.15              |
|                 |            | RB Size=8, RB Offset=0  | 21.27             | 21.52                | 21.48              |
|                 |            | RB Size=8, RB Offset=4  | 20.99             | 21.13                | 21.45              |
|                 |            | RB Size=8, RB Offset=7  | 21.01             | 21.1                 | 21.56              |
|                 |            | RB Size=15, RB Offset=0 | 21.35             | 21.15                | 21.39              |

| <b>Bandwidth (MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low Channel (dBm)</b> | <b>Middle Channel (dBm)</b> | <b>High Channel (dBm)</b> |
|------------------------|-------------------|--------------------------|--------------------------|-----------------------------|---------------------------|
| 5.0                    | QPSK              | RB Size=1, RB Offset=0   | 21.29                    | 21.37                       | 21.49                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.43                    | 21.10                       | 21.59                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.55                    | 21.32                       | 21.25                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.27                    | 21.56                       | 21.56                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.49                    | 21.44                       | 21.30                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.36                    | 21.52                       | 21.50                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.07                    | 21.15                       | 21.15                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.45                    | 21.13                       | 21.62                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.54                    | 21.32                       | 21.4                      |
|                        |                   | RB Size=1, RB Offset=24  | 21.22                    | 21.07                       | 21.48                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.36                    | 21.4                        | 21.26                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.05                    | 21.19                       | 21.26                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.04                    | 21.5                        | 21.22                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.45                    | 21.64                       | 21.70                     |
| 10.0                   | QPSK              | RB Size=1, RB Offset=0   | 21.32                    | 21.42                       | 21.54                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.49                    | 21.56                       | 21.52                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.03                    | 21.35                       | 21.32                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.45                    | 21.38                       | 21.58                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.22                    | 21.59                       | 21.54                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.09                    | 21.18                       | 21.40                     |
|                        |                   | RB Size=50, RB Offset=0  | 21.42                    | 21.19                       | 21.29                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.27                    | 21.15                       | 21.36                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.15                    | 21.47                       | 21.39                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.11                    | 21.44                       | 21.51                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.32                    | 21.54                       | 21.33                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.53                    | 21.26                       | 21.59                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.09                    | 21.25                       | 21.5                      |
|                        |                   | RB Size=50, RB Offset=0  | 21.43                    | 21.57                       | 21.52                     |

| Bandwidth (MHz) | Modulation | RB size/RB Offset        | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|-----------------|------------|--------------------------|-------------------|----------------------|--------------------|
| 15.0            | QPSK       | RB Size=1, RB Offset=0   | 21.27             | 21.35                | 21.46              |
|                 |            | RB Size=1, RB Offset=37  | 21.51             | 21.55                | 21.11              |
|                 |            | RB Size=1, RB Offset=74  | 21.03             | 21.43                | 21.31              |
|                 |            | RB Size=36, RB Offset=0  | 21.54             | 21.43                | 21.56              |
|                 |            | RB Size=36, RB Offset=18 | 21.32             | 21.53                | 21.23              |
|                 |            | RB Size=36, RB Offset=37 | 21.20             | 21.52                | 21.12              |
|                 |            | RB Size=75, RB Offset=0  | 21.01             | 21.20                | 21.46              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.47             | 21.5                 | 21.17              |
|                 |            | RB Size=1, RB Offset=37  | 21.45             | 21.39                | 21.45              |
|                 |            | RB Size=1, RB Offset=74  | 21.13             | 21.23                | 21.69              |
|                 |            | RB Size=36, RB Offset=0  | 21.44             | 21.26                | 21.75              |
|                 |            | RB Size=36, RB Offset=18 | 21.35             | 21.21                | 21.3               |
|                 |            | RB Size=36, RB Offset=37 | 21.33             | 21.6                 | 21.34              |
|                 |            | RB Size=75, RB Offset=0  | 21.09             | 21.51                | 21.2               |
| 20.0            | QPSK       | RB Size=1, RB Offset=0   | 21.31             | 21.38                | 21.49              |
|                 |            | RB Size=1, RB Offset=49  | 21.49             | 21.27                | 21.33              |
|                 |            | RB Size=1, RB Offset=99  | 21.39             | 21.30                | 21.32              |
|                 |            | RB Size=50, RB Offset=0  | 21.20             | 21.24                | 21.24              |
|                 |            | RB Size=50, RB Offset=24 | 21.60             | 21.42                | 21.34              |
|                 |            | RB Size=50, RB Offset=49 | 21.56             | 21.24                | 21.41              |
|                 |            | RB Size=100, RB Offset=0 | 21.19             | 21.13                | 21.62              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.2              | 21.38                | 21.4               |
|                 |            | RB Size=1, RB Offset=49  | 21.24             | 21.67                | 21.47              |
|                 |            | RB Size=1, RB Offset=99  | 21.41             | 21.68                | 21.61              |
|                 |            | RB Size=50, RB Offset=0  | 21.33             | 21.52                | 21.25              |
|                 |            | RB Size=50, RB Offset=24 | 21.5              | 21.56                | 21.46              |
|                 |            | RB Size=50, RB Offset=49 | 21.24             | 21.47                | 21.45              |
|                 |            | RB Size=100, RB Offset=0 | 21.42             | 21.53                | 21.6               |

**Peak-to-average ratio (PAR)**

| Modulation         | Middle Channel (dB) | PAR Limit (dB) | Result |
|--------------------|---------------------|----------------|--------|
| QPSK (1RB Size)    | 4.48                | 13             | Pass   |
| QPSK (100RB Size)  | 4.56                | 13             | Pass   |
| 16QAM (1RB Size)   | 4.75                | 13             | Pass   |
| 16QAM (100RB Size) | 4.59                | 13             | Pass   |

**QPSK:**

| Frequency (MHz)   | Receiver Reading (dB $\mu$ V) | Turn table Angle Degree | Rx Antenna |             | Substituted |                 |                    | Absolute Level (dBm) | Limit (dBm) |  |  |  |  |
|-------------------|-------------------------------|-------------------------|------------|-------------|-------------|-----------------|--------------------|----------------------|-------------|--|--|--|--|
|                   |                               |                         | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBi) |                      |             |  |  |  |  |
| Middle Channel    |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1.4 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 82.23                         | 246                     | 1.2        | H           | 12.6        | 1.30            | 9.40               | 20.70                | 33          |  |  |  |  |
| 1880.00           | 82.64                         | 44                      | 2.2        | V           | 12.7        | 1.30            | 9.40               | 20.80                | 33          |  |  |  |  |
| 3 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 81.98                         | 277                     | 1.7        | H           | 12.3        | 1.30            | 9.40               | 20.40                | 33          |  |  |  |  |
| 1880.00           | 82.29                         | 284                     | 2.2        | V           | 12.4        | 1.30            | 9.40               | 20.50                | 33          |  |  |  |  |
| 5 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 81.73                         | 221                     | 2.3        | H           | 12.1        | 1.30            | 9.40               | 20.20                | 33          |  |  |  |  |
| 1880.00           | 81.85                         | 356                     | 1.2        | V           | 12.0        | 1.30            | 9.40               | 20.10                | 33          |  |  |  |  |
| 10 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 81.53                         | 312                     | 2.1        | H           | 11.9        | 1.30            | 9.40               | 20.00                | 33          |  |  |  |  |
| 1880.00           | 81.66                         | 127                     | 1.4        | V           | 11.8        | 1.30            | 9.40               | 19.90                | 33          |  |  |  |  |
| 15 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 81.32                         | 349                     | 1.4        | H           | 11.6        | 1.30            | 9.40               | 19.70                | 33          |  |  |  |  |
| 1880.00           | 81.45                         | 318                     | 1.1        | V           | 11.6        | 1.30            | 9.40               | 19.70                | 33          |  |  |  |  |
| 20 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1880.00           | 80.96                         | 72                      | 1.5        | H           | 11.3        | 1.30            | 9.40               | 19.40                | 33          |  |  |  |  |
| 1880.00           | 80.79                         | 197                     | 1.6        | V           | 10.9        | 1.30            | 9.40               | 19.00                | 33          |  |  |  |  |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dB $\mu$ V) | Turn<br>table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                          | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) |  |  |  |  |
|--------------------|-------------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|--------------------------|----------------------------|----------------|--|--|--|--|
|                    |                                     |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dBi) |                            |                |  |  |  |  |
| Middle Channel     |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1.4 MHz Bandwidth  |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.93                               | 80                               | 1.3           | H              | 12.3           | 1.30                  | 9.40                     | 20.40                      | 33             |  |  |  |  |
| 1880.00            | 82.66                               | 73                               | 1.7           | V              | 12.8           | 1.30                  | 9.40                     | 20.90                      | 33             |  |  |  |  |
| 3 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.60                               | 53                               | 1.0           | H              | 11.9           | 1.30                  | 9.40                     | 20.00                      | 33             |  |  |  |  |
| 1880.00            | 82.46                               | 16                               | 1.5           | V              | 12.6           | 1.30                  | 9.40                     | 20.70                      | 33             |  |  |  |  |
| 5 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.79                               | 179                              | 1.2           | H              | 12.1           | 1.30                  | 9.40                     | 20.20                      | 33             |  |  |  |  |
| 1880.00            | 82.33                               | 296                              | 1.6           | V              | 12.4           | 1.30                  | 9.40                     | 20.50                      | 33             |  |  |  |  |
| 10 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.42                               | 246                              | 2.1           | H              | 11.7           | 1.30                  | 9.40                     | 19.80                      | 33             |  |  |  |  |
| 1880.00            | 81.74                               | 334                              | 1.7           | V              | 11.8           | 1.30                  | 9.40                     | 19.90                      | 33             |  |  |  |  |
| 15 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.35                               | 285                              | 2.0           | H              | 11.7           | 1.30                  | 9.40                     | 19.80                      | 33             |  |  |  |  |
| 1880.00            | 81.49                               | 182                              | 1.4           | V              | 11.6           | 1.30                  | 9.40                     | 19.70                      | 33             |  |  |  |  |
| 20 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1880.00            | 81.14                               | 178                              | 2.3           | H              | 11.5           | 1.30                  | 9.40                     | 19.60                      | 33             |  |  |  |  |
| 1880.00            | 81.23                               | 349                              | 1.9           | V              | 11.3           | 1.30                  | 9.40                     | 19.40                      | 33             |  |  |  |  |

**LTE Band 4:****Maximum Output Power**

| <b>Bandwidth (MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low Channel (dBm)</b> | <b>Middle Channel (dBm)</b> | <b>High Channel (dBm)</b> |
|------------------------|-------------------|--------------------------|--------------------------|-----------------------------|---------------------------|
| 1.4                    | QPSK              | RB Size=1, RB Offset=0   | 21.08                    | 21.25                       | 21.36                     |
|                        |                   | RB Size=1, RB Offset=2   | 20.87                    | 21.24                       | 21.31                     |
|                        |                   | RB Size=1, RB Offset=5   | 21.10                    | 20.98                       | 21.46                     |
|                        |                   | RB Size=3, RB Offset=0   | 21.36                    | 21.43                       | 21.19                     |
|                        |                   | RB Size=3, RB Offset=1   | 21.07                    | 21.29                       | 21.18                     |
|                        |                   | RB Size=3, RB Offset=2   | 21.29                    | 21.27                       | 21.35                     |
|                        |                   | RB Size=6, RB Offset=0   | 21.09                    | 21.29                       | 21.40                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 20.95                    | 20.97                       | 21.24                     |
|                        |                   | RB Size=1, RB Offset=2   | 21.37                    | 21.45                       | 21.39                     |
|                        |                   | RB Size=1, RB Offset=5   | 21.24                    | 21.09                       | 21.11                     |
|                        |                   | RB Size=3, RB Offset=0   | 20.96                    | 21.01                       | 21.17                     |
|                        |                   | RB Size=3, RB Offset=1   | 21.08                    | 21.03                       | 21.08                     |
|                        |                   | RB Size=3, RB Offset=2   | 21.17                    | 20.95                       | 21.53                     |
|                        |                   | RB Size=6, RB Offset=0   | 20.84                    | 21.54                       | 21.46                     |
| 3.0                    | QPSK              | RB Size=1, RB Offset=0   | 21.13                    | 21.29                       | 21.38                     |
|                        |                   | RB Size=1, RB Offset=7   | 21.32                    | 21.42                       | 21.07                     |
|                        |                   | RB Size=1, RB Offset=14  | 21.04                    | 21.17                       | 21.37                     |
|                        |                   | RB Size=8, RB Offset=0   | 21.34                    | 21.38                       | 21.25                     |
|                        |                   | RB Size=8, RB Offset=4   | 20.93                    | 21.28                       | 21.21                     |
|                        |                   | RB Size=8, RB Offset=7   | 21.02                    | 21.34                       | 21.10                     |
|                        |                   | RB Size=15, RB Offset=0  | 21.03                    | 21.35                       | 21.24                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.06                    | 21.45                       | 21.32                     |
|                        |                   | RB Size=1, RB Offset=7   | 21.28                    | 21.21                       | 21.57                     |
|                        |                   | RB Size=1, RB Offset=14  | 20.89                    | 21.43                       | 21.68                     |
|                        |                   | RB Size=8, RB Offset=0   | 21.13                    | 21.05                       | 21.34                     |
|                        |                   | RB Size=8, RB Offset=4   | 20.97                    | 21.19                       | 21.11                     |
|                        |                   | RB Size=8, RB Offset=7   | 21.42                    | 21.54                       | 21.31                     |
|                        |                   | RB Size=15, RB Offset=0  | 21.34                    | 21.01                       | 21.35                     |

| <b>Bandwidth (MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low Channel (dBm)</b> | <b>Middle Channel (dBm)</b> | <b>High Channel (dBm)</b> |
|------------------------|-------------------|--------------------------|--------------------------|-----------------------------|---------------------------|
| 5.0                    | QPSK              | RB Size=1, RB Offset=0   | 21.28                    | 21.37                       | 21.54                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.11                    | 21.15                       | 21.35                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.10                    | 21.25                       | 21.40                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.42                    | 21.28                       | 21.43                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.21                    | 21.45                       | 21.53                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.19                    | 21.21                       | 21.33                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.55                    | 21.38                       | 21.22                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.35                    | 21.42                       | 21.26                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.51                    | 21.38                       | 21.71                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.45                    | 21.63                       | 21.55                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.08                    | 21.3                        | 21.75                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.23                    | 21.52                       | 21.56                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.01                    | 21.6                        | 21.36                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.58                    | 21.58                       | 21.48                     |
| 10.0                   | QPSK              | RB Size=1, RB Offset=0   | 21.33                    | 21.35                       | 21.49                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.15                    | 21.30                       | 21.38                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.45                    | 21.41                       | 21.23                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.39                    | 21.17                       | 21.57                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.56                    | 21.40                       | 21.42                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.21                    | 21.08                       | 21.64                     |
|                        |                   | RB Size=50, RB Offset=0  | 21.48                    | 21.08                       | 21.34                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.36                    | 21.68                       | 21.74                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.49                    | 21.6                        | 21.48                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.52                    | 21.66                       | 21.29                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.44                    | 21.32                       | 21.28                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.39                    | 21.16                       | 21.65                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.32                    | 21.31                       | 21.4                      |
|                        |                   | RB Size=50, RB Offset=0  | 21.48                    | 21.66                       | 21.81                     |

| Bandwidth (MHz) | Modulation | RB size/RB Offset        | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|-----------------|------------|--------------------------|-------------------|----------------------|--------------------|
| 15.0            | QPSK       | RB Size=1, RB Offset=0   | 21.35             | 21.46                | 21.43              |
|                 |            | RB Size=1, RB Offset=37  | 21.39             | 21.20                | 21.53              |
|                 |            | RB Size=1, RB Offset=74  | 21.23             | 21.27                | 21.45              |
|                 |            | RB Size=36, RB Offset=0  | 21.40             | 21.60                | 21.38              |
|                 |            | RB Size=36, RB Offset=18 | 21.29             | 21.37                | 21.10              |
|                 |            | RB Size=36, RB Offset=37 | 21.26             | 21.40                | 21.54              |
|                 |            | RB Size=75, RB Offset=0  | 21.49             | 21.16                | 21.41              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.14             | 21.21                | 21.41              |
|                 |            | RB Size=1, RB Offset=37  | 21.29             | 21.32                | 21.41              |
|                 |            | RB Size=1, RB Offset=74  | 21.28             | 21.24                | 21.3               |
|                 |            | RB Size=36, RB Offset=0  | 21.34             | 21.52                | 21.28              |
|                 |            | RB Size=36, RB Offset=18 | 21.4              | 21.55                | 21.56              |
|                 |            | RB Size=36, RB Offset=37 | 21.61             | 21.36                | 21.13              |
|                 |            | RB Size=75, RB Offset=0  | 21.28             | 21.31                | 21.25              |
| 20.0            | QPSK       | RB Size=1, RB Offset=0   | 21.25             | 21.33                | 21.49              |
|                 |            | RB Size=1, RB Offset=49  | 21.37             | 21.12                | 21.53              |
|                 |            | RB Size=1, RB Offset=99  | 21.10             | 21.49                | 21.15              |
|                 |            | RB Size=50, RB Offset=0  | 21.25             | 21.11                | 21.41              |
|                 |            | RB Size=50, RB Offset=24 | 21.18             | 21.39                | 21.59              |
|                 |            | RB Size=50, RB Offset=49 | 21.00             | 21.04                | 21.19              |
|                 |            | RB Size=100, RB Offset=0 | 21.03             | 21.18                | 21.34              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.55             | 21.49                | 21.77              |
|                 |            | RB Size=1, RB Offset=49  | 21.29             | 21.41                | 21.66              |
|                 |            | RB Size=1, RB Offset=99  | 21.32             | 21.11                | 21.71              |
|                 |            | RB Size=50, RB Offset=0  | 20.97             | 21.6                 | 21.53              |
|                 |            | RB Size=50, RB Offset=24 | 21.11             | 21.37                | 21.46              |
|                 |            | RB Size=50, RB Offset=49 | 21.25             | 21.11                | 21.46              |
|                 |            | RB Size=100, RB Offset=0 | 21.48             | 21.37                | 21.74              |

**Peak-to-average ratio (PAR)**

| Modulation         | Middle Channel (dB) | PAR Limit (dB) | Result |
|--------------------|---------------------|----------------|--------|
| QPSK (1RB Size)    | 4.31                | 13             | Pass   |
| QPSK (100RB Size)  | 4.44                | 13             | Pass   |
| 16QAM (1RB Size)   | 4.27                | 13             | Pass   |
| 16QAM (100RB Size) | 4.43                | 13             | Pass   |

**QPSK:**

| Frequency (MHz)   | Receiver Reading (dB $\mu$ V) | Turn table Angle Degree | Rx Antenna |             | Substituted |                 |                    | Absolute Level (dBm) | Limit (dBm) |  |  |  |  |
|-------------------|-------------------------------|-------------------------|------------|-------------|-------------|-----------------|--------------------|----------------------|-------------|--|--|--|--|
|                   |                               |                         | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBi) |                      |             |  |  |  |  |
| Middle Channel    |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1.4 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 85.33                         | 220                     | 1.6        | H           | 12.0        | 1.30            | 8.90               | 19.60                | 30          |  |  |  |  |
| 1732.50           | 85.71                         | 166                     | 1.2        | V           | 13.0        | 1.30            | 8.90               | 20.60                | 30          |  |  |  |  |
| 3 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 85.15                         | 170                     | 2.0        | H           | 11.8        | 1.30            | 8.90               | 19.40                | 30          |  |  |  |  |
| 1732.50           | 85.58                         | 80                      | 1.9        | V           | 12.9        | 1.30            | 8.90               | 20.50                | 30          |  |  |  |  |
| 5 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 85.01                         | 336                     | 1.6        | H           | 11.7        | 1.30            | 8.90               | 19.30                | 30          |  |  |  |  |
| 1732.50           | 85.29                         | 331                     | 1.9        | V           | 12.6        | 1.30            | 8.90               | 20.20                | 30          |  |  |  |  |
| 10 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 84.87                         | 155                     | 2.1        | H           | 11.5        | 1.30            | 8.90               | 19.10                | 30          |  |  |  |  |
| 1732.50           | 85.03                         | 312                     | 1.0        | V           | 12.3        | 1.30            | 8.90               | 19.90                | 30          |  |  |  |  |
| 15 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 84.62                         | 151                     | 1.7        | H           | 11.3        | 1.30            | 8.90               | 18.90                | 30          |  |  |  |  |
| 1732.50           | 84.85                         | 289                     | 1.1        | V           | 12.1        | 1.30            | 8.90               | 19.70                | 30          |  |  |  |  |
| 20 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1732.50           | 84.30                         | 263                     | 1.6        | H           | 11.0        | 1.30            | 8.90               | 18.60                | 30          |  |  |  |  |
| 1732.50           | 84.93                         | 97                      | 1.4        | V           | 12.2        | 1.30            | 8.90               | 19.80                | 30          |  |  |  |  |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dB $\mu$ V) | Turn<br>table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                          | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) |  |  |  |  |
|--------------------|-------------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|--------------------------|----------------------------|----------------|--|--|--|--|
|                    |                                     |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dBi) |                            |                |  |  |  |  |
| Middle Channel     |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1.4 MHz Bandwidth  |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 85.88                               | 290                              | 1.8           | H              | 12.6           | 1.30                  | 8.90                     | 20.20                      | 30             |  |  |  |  |
| 1732.50            | 86.10                               | 81                               | 2.0           | V              | 13.4           | 1.30                  | 8.90                     | 21.00                      | 30             |  |  |  |  |
| 3 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 85.60                               | 67                               | 2.0           | H              | 12.3           | 1.30                  | 8.90                     | 19.90                      | 30             |  |  |  |  |
| 1732.50            | 85.77                               | 148                              | 1.6           | V              | 13.0           | 1.30                  | 8.90                     | 20.60                      | 30             |  |  |  |  |
| 5 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 85.49                               | 36                               | 1.3           | H              | 12.2           | 1.30                  | 8.90                     | 19.80                      | 30             |  |  |  |  |
| 1732.50            | 85.63                               | 354                              | 1.9           | V              | 12.9           | 1.30                  | 8.90                     | 20.50                      | 30             |  |  |  |  |
| 10 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 85.33                               | 350                              | 1.1           | H              | 12.0           | 1.30                  | 8.90                     | 19.60                      | 30             |  |  |  |  |
| 1732.50            | 85.15                               | 244                              | 2.3           | V              | 12.4           | 1.30                  | 8.90                     | 20.00                      | 30             |  |  |  |  |
| 15 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 85.16                               | 333                              | 1.7           | H              | 11.8           | 1.30                  | 8.90                     | 19.40                      | 30             |  |  |  |  |
| 1732.50            | 84.69                               | 349                              | 2.2           | V              | 12.0           | 1.30                  | 8.90                     | 19.60                      | 30             |  |  |  |  |
| 20 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1732.50            | 84.71                               | 253                              | 1.7           | H              | 11.4           | 1.30                  | 8.90                     | 19.00                      | 30             |  |  |  |  |
| 1732.50            | 84.56                               | 330                              | 1.1           | V              | 11.8           | 1.30                  | 8.90                     | 19.40                      | 30             |  |  |  |  |

**LTE Band 5:****Maximum Output Power**

| <b>Bandwidth (MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low Channel (dBm)</b> | <b>Middle Channel (dBm)</b> | <b>High Channel (dBm)</b> |
|------------------------|-------------------|--------------------------|--------------------------|-----------------------------|---------------------------|
| 1.4                    | QPSK              | RB Size=1, RB Offset=0   | 21.45                    | 21.35                       | 21.56                     |
|                        |                   | RB Size=1, RB Offset=2   | 21.59                    | 21.34                       | 21.43                     |
|                        |                   | RB Size=1, RB Offset=5   | 21.66                    | 21.49                       | 21.31                     |
|                        |                   | RB Size=3, RB Offset=0   | 21.64                    | 21.32                       | 21.25                     |
|                        |                   | RB Size=3, RB Offset=1   | 21.62                    | 21.34                       | 21.65                     |
|                        |                   | RB Size=3, RB Offset=2   | 21.43                    | 21.49                       | 21.59                     |
|                        |                   | RB Size=6, RB Offset=0   | 21.59                    | 21.24                       | 21.32                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.7                     | 21.64                       | 21.72                     |
|                        |                   | RB Size=1, RB Offset=2   | 21.71                    | 21.34                       | 21.61                     |
|                        |                   | RB Size=1, RB Offset=5   | 21.23                    | 21.30                       | 21.26                     |
|                        |                   | RB Size=3, RB Offset=0   | 21.73                    | 21.4                        | 21.74                     |
|                        |                   | RB Size=3, RB Offset=1   | 21.69                    | 21.51                       | 21.77                     |
|                        |                   | RB Size=3, RB Offset=2   | 21.63                    | 21.23                       | 21.69                     |
|                        |                   | RB Size=6, RB Offset=0   | 21.34                    | 21.55                       | 21.42                     |
| 3.0                    | QPSK              | RB Size=1, RB Offset=0   | 21.48                    | 21.37                       | 21.53                     |
|                        |                   | RB Size=1, RB Offset=7   | 21.67                    | 21.28                       | 21.38                     |
|                        |                   | RB Size=1, RB Offset=14  | 21.28                    | 21.43                       | 21.41                     |
|                        |                   | RB Size=8, RB Offset=0   | 21.51                    | 21.36                       | 21.41                     |
|                        |                   | RB Size=8, RB Offset=4   | 21.60                    | 21.37                       | 21.40                     |
|                        |                   | RB Size=8, RB Offset=7   | 21.55                    | 21.51                       | 21.25                     |
|                        |                   | RB Size=15, RB Offset=0  | 21.45                    | 21.25                       | 21.31                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.73                    | 21.27                       | 21.47                     |
|                        |                   | RB Size=1, RB Offset=7   | 21.2                     | 21.34                       | 21.43                     |
|                        |                   | RB Size=1, RB Offset=14  | 21.65                    | 21.43                       | 21.75                     |
|                        |                   | RB Size=8, RB Offset=0   | 21.54                    | 21.35                       | 21.74                     |
|                        |                   | RB Size=8, RB Offset=4   | 21.32                    | 21.54                       | 21.64                     |
|                        |                   | RB Size=8, RB Offset=7   | 21.6                     | 21.43                       | 21.28                     |
|                        |                   | RB Size=15, RB Offset=0  | 21.63                    | 21.35                       | 21.52                     |

| <b>Bandwidth (MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low Channel (dBm)</b> | <b>Middle Channel (dBm)</b> | <b>High Channel (dBm)</b> |
|------------------------|-------------------|--------------------------|--------------------------|-----------------------------|---------------------------|
| 5.0                    | QPSK              | RB Size=1, RB Offset=0   | 21.44                    | 21.42                       | 21.58                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.66                    | 21.18                       | 21.47                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.72                    | 21.19                       | 21.73                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.26                    | 21.59                       | 21.38                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.59                    | 21.33                       | 21.63                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.41                    | 21.34                       | 21.30                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.51                    | 21.17                       | 21.53                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.72                    | 21.58                       | 21.47                     |
|                        |                   | RB Size=1, RB Offset=12  | 21.67                    | 21.31                       | 21.51                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.47                    | 21.17                       | 21.41                     |
|                        |                   | RB Size=12, RB Offset=0  | 21.35                    | 21.12                       | 21.44                     |
|                        |                   | RB Size=12, RB Offset=6  | 21.64                    | 21.54                       | 21.68                     |
|                        |                   | RB Size=12, RB Offset=11 | 21.54                    | 21.13                       | 21.57                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.53                    | 21.13                       | 21.58                     |
| 10.0                   | QPSK              | RB Size=1, RB Offset=0   | 21.39                    | 21.38                       | 21.52                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.62                    | 21.44                       | 21.25                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.65                    | 21.13                       | 21.44                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.40                    | 21.14                       | 21.22                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.37                    | 21.39                       | 21.51                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.53                    | 21.26                       | 21.23                     |
|                        |                   | RB Size=50, RB Offset=0  | 21.41                    | 21.42                       | 21.40                     |
|                        | 16QAM             | RB Size=1, RB Offset=0   | 21.48                    | 21.39                       | 21.54                     |
|                        |                   | RB Size=1, RB Offset=24  | 21.19                    | 21.64                       | 21.57                     |
|                        |                   | RB Size=1, RB Offset=49  | 21.47                    | 21.54                       | 21.59                     |
|                        |                   | RB Size=25, RB Offset=0  | 21.35                    | 21.66                       | 21.26                     |
|                        |                   | RB Size=25, RB Offset=12 | 21.39                    | 21.64                       | 21.54                     |
|                        |                   | RB Size=25, RB Offset=24 | 21.52                    | 21.47                       | 21.33                     |
|                        |                   | RB Size=50, RB Offset=0  | 21.6                     | 21.56                       | 21.65                     |

**Peak-to-average ratio (PAR)**

| Modulation        | Middle Channel (dB) | PAR Limit (dB) | Result |
|-------------------|---------------------|----------------|--------|
| QPSK (1RB Size)   | 4.34                | 13             | Pass   |
| QPSK (50RB Size)  | 4.52                | 13             | Pass   |
| 16QAM (1RB Size)  | 4.28                | 13             | Pass   |
| 16QAM (50RB Size) | 4.14                | 13             | Pass   |

**QPSK:**

| Frequency (MHz)   | Receiver Reading (dB $\mu$ V) | Turn table Angle Degree | Rx Antenna |             | Substituted |                 |                    | Absolute Level (dBm) | Limit (dBm) |  |  |  |  |
|-------------------|-------------------------------|-------------------------|------------|-------------|-------------|-----------------|--------------------|----------------------|-------------|--|--|--|--|
|                   |                               |                         | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBd) |                      |             |  |  |  |  |
| Middle Channel    |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 1.4 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 836.50            | 72.12                         | 8                       | 2.1        | H           | 12.7        | 1.90            | 0.0                | 10.80                | 38.45       |  |  |  |  |
| 836.50            | 78.53                         | 111                     | 1.7        | V           | 18.5        | 1.90            | 0.0                | 16.60                | 38.45       |  |  |  |  |
| 3 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 836.50            | 71.63                         | 215                     | 1.8        | H           | 12.3        | 1.90            | 0.0                | 10.40                | 38.45       |  |  |  |  |
| 836.50            | 78.88                         | 275                     | 1.1        | V           | 18.9        | 1.90            | 0.0                | 17.00                | 38.45       |  |  |  |  |
| 5 MHz Bandwidth   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 836.50            | 71.36                         | 132                     | 2.1        | H           | 12.0        | 1.90            | 0.0                | 10.10                | 38.45       |  |  |  |  |
| 836.50            | 78.82                         | 297                     | 1.0        | V           | 18.8        | 1.90            | 0.0                | 16.90                | 38.45       |  |  |  |  |
| 10 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 836.50            | 71.59                         | 55                      | 1.6        | H           | 12.2        | 1.90            | 0.0                | 10.30                | 38.45       |  |  |  |  |
| 836.50            | 78.51                         | 240                     | 2.1        | V           | 18.5        | 1.90            | 0.0                | 16.60                | 38.45       |  |  |  |  |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dB $\mu$ V) | Turn<br>table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                          | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) |  |  |  |  |
|--------------------|-------------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|--------------------------|----------------------------|----------------|--|--|--|--|
|                    |                                     |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dBd) |                            |                |  |  |  |  |
| Middle Channel     |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 1.4 MHz Bandwidth  |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 836.50             | 71.34                               | 172                              | 1.5           | H              | 12.0           | 1.90                  | 0.0                      | 10.10                      | 38.45          |  |  |  |  |
| 836.50             | 78.07                               | 20                               | 1.5           | V              | 18.1           | 1.90                  | 0.0                      | 16.20                      | 38.45          |  |  |  |  |
| 3 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 836.50             | 71.26                               | 22                               | 1.8           | H              | 11.9           | 1.90                  | 0.0                      | 10.00                      | 38.45          |  |  |  |  |
| 836.50             | 78.27                               | 125                              | 1.0           | V              | 18.3           | 1.90                  | 0.0                      | 16.40                      | 38.45          |  |  |  |  |
| 5 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 836.50             | 71.9                                | 62                               | 1.5           | H              | 12.5           | 1.90                  | 0.0                      | 10.60                      | 38.45          |  |  |  |  |
| 836.50             | 78.19                               | 153                              | 1.7           | V              | 18.2           | 1.90                  | 0.0                      | 16.30                      | 38.45          |  |  |  |  |
| 10 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 836.50             | 71.52                               | 292                              | 1.4           | H              | 12.1           | 1.90                  | 0.0                      | 10.20                      | 38.45          |  |  |  |  |
| 836.50             | 78.35                               | 53                               | 2.2           | V              | 18.4           | 1.90                  | 0.0                      | 16.50                      | 38.45          |  |  |  |  |

**LTE Band 7:**

| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low<br/>Channel<br/>(dBm)</b> | <b>Middle<br/>Channel<br/>(dBm)</b> | <b>High<br/>Channel<br/>(dBm)</b> |
|----------------------------|-------------------|--------------------------|----------------------------------|-------------------------------------|-----------------------------------|
| 5                          | QPSK              | RB Size=1, RB Offset=0   | 21.46                            | 21.53                               | 21.49                             |
|                            |                   | RB Size=1, RB Offset=12  | 21.22                            | 21.52                               | 21.44                             |
|                            |                   | RB Size=1, RB Offset=24  | 21.46                            | 21.56                               | 21.28                             |
|                            |                   | RB Size=12, RB Offset=0  | 21.66                            | 21.34                               | 21.64                             |
|                            |                   | RB Size=12, RB Offset=6  | 21.42                            | 21.42                               | 21.35                             |
|                            |                   | RB Size=12, RB Offset=11 | 21.49                            | 21.37                               | 21.58                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.57                            | 21.46                               | 21.40                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.47                            | 21.35                               | 21.79                             |
|                            |                   | RB Size=1, RB Offset=12  | 21.52                            | 21.49                               | 21.73                             |
|                            |                   | RB Size=1, RB Offset=24  | 21.37                            | 21.74                               | 21.66                             |
|                            |                   | RB Size=12, RB Offset=0  | 21.72                            | 21.75                               | 21.46                             |
|                            |                   | RB Size=12, RB Offset=6  | 21.21                            | 21.66                               | 21.61                             |
|                            |                   | RB Size=12, RB Offset=11 | 21.47                            | 21.32                               | 21.44                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.27                            | 21.4                                | 21.59                             |
| 10                         | QPSK              | RB Size=1, RB Offset=0   | 21.42                            | 21.53                               | 21.46                             |
|                            |                   | RB Size=1, RB Offset=24  | 21.14                            | 21.54                               | 21.51                             |
|                            |                   | RB Size=1, RB Offset=49  | 21.32                            | 21.32                               | 21.39                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.67                            | 21.67                               | 21.20                             |
|                            |                   | RB Size=25, RB Offset=12 | 21.46                            | 21.46                               | 21.57                             |
|                            |                   | RB Size=25, RB Offset=24 | 21.62                            | 21.33                               | 21.20                             |
|                            |                   | RB Size=50, RB Offset=0  | 21.59                            | 21.49                               | 21.36                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.4                             | 21.48                               | 21.71                             |
|                            |                   | RB Size=1, RB Offset=24  | 21.17                            | 21.43                               | 21.43                             |
|                            |                   | RB Size=1, RB Offset=49  | 21.29                            | 21.30                               | 21.28                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.69                            | 21.29                               | 21.26                             |
|                            |                   | RB Size=25, RB Offset=12 | 21.18                            | 21.5                                | 21.49                             |
|                            |                   | RB Size=25, RB Offset=24 | 21.5                             | 21.61                               | 21.25                             |
|                            |                   | RB Size=50, RB Offset=0  | 21.13                            | 21.49                               | 21.64                             |

| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>RB size/RB Offset</b> | <b>Low<br/>Channel<br/>(dBm)</b> | <b>Middle<br/>Channel<br/>(dBm)</b> | <b>High<br/>Channel<br/>(dBm)</b> |
|----------------------------|-------------------|--------------------------|----------------------------------|-------------------------------------|-----------------------------------|
| 15                         | QPSK              | RB Size=1, RB Offset=0   | 21.48                            | 21.56                               | 21.49                             |
|                            |                   | RB Size=1, RB Offset=37  | 21.21                            | 21.35                               | 21.19                             |
|                            |                   | RB Size=1, RB Offset=74  | 21.66                            | 21.67                               | 21.48                             |
|                            |                   | RB Size=36, RB Offset=0  | 21.27                            | 21.56                               | 21.34                             |
|                            |                   | RB Size=36, RB Offset=18 | 21.20                            | 21.52                               | 21.53                             |
|                            |                   | RB Size=36, RB Offset=37 | 21.27                            | 21.36                               | 21.22                             |
|                            |                   | RB Size=75, RB Offset=0  | 21.36                            | 21.36                               | 21.51                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.68                            | 21.36                               | 21.63                             |
|                            |                   | RB Size=1, RB Offset=37  | 21.75                            | 21.61                               | 21.58                             |
|                            |                   | RB Size=1, RB Offset=74  | 21.35                            | 21.82                               | 21.47                             |
|                            |                   | RB Size=36, RB Offset=0  | 21.53                            | 21.27                               | 21.73                             |
|                            |                   | RB Size=36, RB Offset=18 | 21.52                            | 21.67                               | 21.28                             |
|                            |                   | RB Size=36, RB Offset=37 | 21.39                            | 21.42                               | 21.72                             |
|                            |                   | RB Size=75, RB Offset=0  | 21.33                            | 21.84                               | 21.31                             |
| 20                         | QPSK              | RB Size=1, RB Offset=0   | 21.41                            | 21.53                               | 21.47                             |
|                            |                   | RB Size=1, RB Offset=49  | 21.44                            | 21.57                               | 21.49                             |
|                            |                   | RB Size=1, RB Offset=99  | 21.22                            | 21.71                               | 21.30                             |
|                            |                   | RB Size=50, RB Offset=0  | 21.67                            | 21.28                               | 21.53                             |
|                            |                   | RB Size=50, RB Offset=24 | 21.14                            | 21.24                               | 21.17                             |
|                            |                   | RB Size=50, RB Offset=49 | 21.38                            | 21.41                               | 21.34                             |
|                            |                   | RB Size=100, RB Offset=0 | 21.34                            | 21.59                               | 21.20                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.45                            | 21.49                               | 21.27                             |
|                            |                   | RB Size=1, RB Offset=49  | 21.49                            | 21.6                                | 21.48                             |
|                            |                   | RB Size=1, RB Offset=99  | 21.63                            | 21.44                               | 21.46                             |
|                            |                   | RB Size=50, RB Offset=0  | 21.44                            | 21.5                                | 21.48                             |
|                            |                   | RB Size=50, RB Offset=24 | 21.13                            | 21.69                               | 21.44                             |
|                            |                   | RB Size=50, RB Offset=49 | 21.64                            | 21.51                               | 21.49                             |
|                            |                   | RB Size=100, RB Offset=0 | 21.32                            | 21.58                               | 21.59                             |

**Peak-to-average ratio (PAR)**

| Modulation        | Middle Channel (dB) | PAR Limit (dB) | Result |
|-------------------|---------------------|----------------|--------|
| QPSK (1RB Size)   | 4.71                | 13             | Pass   |
| QPSK (50RB Size)  | 4.83                | 13             | Pass   |
| 16QAM (1RB Size)  | 4.59                | 13             | Pass   |
| 16QAM (50RB Size) | 4.40                | 13             | Pass   |

**QPSK:**

| Frequency (MHz)  | Receiver Reading (dB $\mu$ V) | Turn table Angle Degree | Rx Antenna |             | Substituted |                 |                    | Absolute Level (dBm) | Limit (dBm) |  |  |  |  |
|------------------|-------------------------------|-------------------------|------------|-------------|-------------|-----------------|--------------------|----------------------|-------------|--|--|--|--|
|                  |                               |                         | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBi) |                      |             |  |  |  |  |
| Middle Channel   |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 5 MHz Bandwidth  |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 2535.00          | 81.56                         | 157                     | 2.0        | H           | 11.4        | 2.60            | 10.20              | 19.00                | 33          |  |  |  |  |
| 2535.00          | 82.22                         | 119                     | 1.8        | V           | 12.7        | 2.60            | 10.20              | 20.30                | 33          |  |  |  |  |
| 10 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 2535.00          | 80.61                         | 303                     | 1.1        | H           | 10.4        | 2.60            | 10.20              | 18.00                | 33          |  |  |  |  |
| 2535.00          | 81.77                         | 238                     | 1.1        | V           | 12.2        | 2.60            | 10.20              | 19.80                | 33          |  |  |  |  |
| 15 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 2535.00          | 80.24                         | 231                     | 1.2        | H           | 10.1        | 2.60            | 10.20              | 17.70                | 33          |  |  |  |  |
| 2535.00          | 81.30                         | 215                     | 1.5        | V           | 11.7        | 2.60            | 10.20              | 19.30                | 33          |  |  |  |  |
| 20 MHz Bandwidth |                               |                         |            |             |             |                 |                    |                      |             |  |  |  |  |
| 2535.00          | 80.01                         | 251                     | 1.6        | H           | 9.8         | 2.60            | 10.20              | 17.40                | 33          |  |  |  |  |
| 2535.00          | 81.12                         | 204                     | 1.2        | V           | 11.6        | 2.60            | 10.20              | 19.20                | 33          |  |  |  |  |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dB $\mu$ V) | Turn<br>table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                          | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) |  |  |  |  |
|--------------------|-------------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|--------------------------|----------------------------|----------------|--|--|--|--|
|                    |                                     |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dBi) |                            |                |  |  |  |  |
| Middle Channel     |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 5 MHz Bandwidth    |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 2535.00            | 81.66                               | 18                               | 2.4           | H              | 11.5           | 2.60                  | 10.20                    | 19.10                      | 33             |  |  |  |  |
| 2535.00            | 82.05                               | 198                              | 2.3           | V              | 12.5           | 2.60                  | 10.20                    | 20.10                      | 33             |  |  |  |  |
| 10 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 2535.00            | 80.55                               | 122                              | 2.5           | H              | 10.4           | 2.60                  | 10.20                    | 18.00                      | 33             |  |  |  |  |
| 2535.00            | 81.83                               | 275                              | 2.3           | V              | 12.3           | 2.60                  | 10.20                    | 19.90                      | 33             |  |  |  |  |
| 15 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 2535.00            | 80.39                               | 283                              | 2.4           | H              | 10.2           | 2.60                  | 10.20                    | 17.80                      | 33             |  |  |  |  |
| 2535.00            | 81.62                               | 79                               | 1.3           | V              | 12.1           | 2.60                  | 10.20                    | 19.70                      | 33             |  |  |  |  |
| 20 MHz Bandwidth   |                                     |                                  |               |                |                |                       |                          |                            |                |  |  |  |  |
| 2535.00            | 80.20                               | 225                              | 2.5           | H              | 10.0           | 2.60                  | 10.20                    | 17.60                      | 33             |  |  |  |  |
| 2535.00            | 81.46                               | 114                              | 1.4           | V              | 11.9           | 2.60                  | 10.20                    | 19.50                      | 33             |  |  |  |  |

**Note:**

All above data were tested with no amplifier

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

## FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH

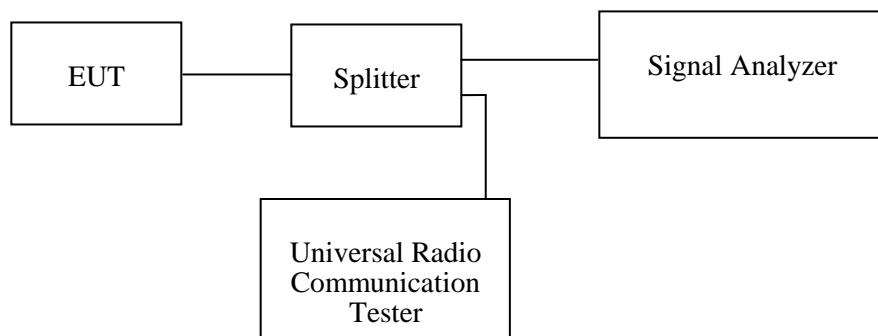
### Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

### Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



### Test Data

#### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Gerogre Zhong and Kieron Luo from 2019-08-16 to 2019-08-19.*

*EUT operation mode: Transmitting*

*Test Result: Compliance. Please refer to the following tables and plots.*

### Cellular Band (Part 22H)

| Mode        | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-------------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK)   | 836.6           | 243.59                       | 314.74                         |
| EGPRS(8PSK) | 836.6           | 250.00                       | 323.08                         |

| Mode          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---------------|-----------------|------------------------------|--------------------------------|
| RMC (BPSK)    | 836.6           | 4.18                         | 4.71                           |
| HSUPA (BPSK)  | 836.6           | 4.20                         | 4.78                           |
| HSDPA (16QAM) | 836.6           | 4.20                         | 4.73                           |

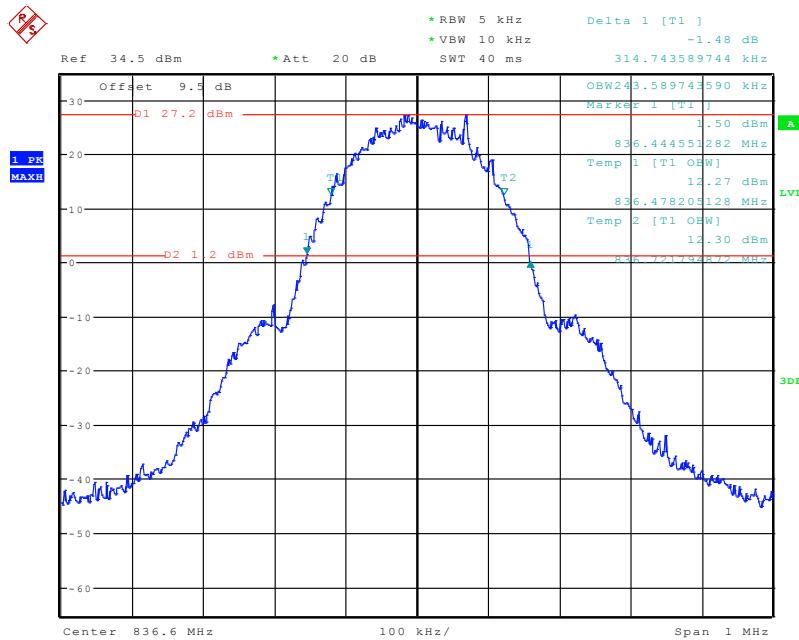
### PCS Band (Part 24E)

| Mode        | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-------------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK)   | 1880.0          | 243.59                       | 316.67                         |
| EGPRS(8PSK) | 1880.0          | 253.21                       | 325.00                         |

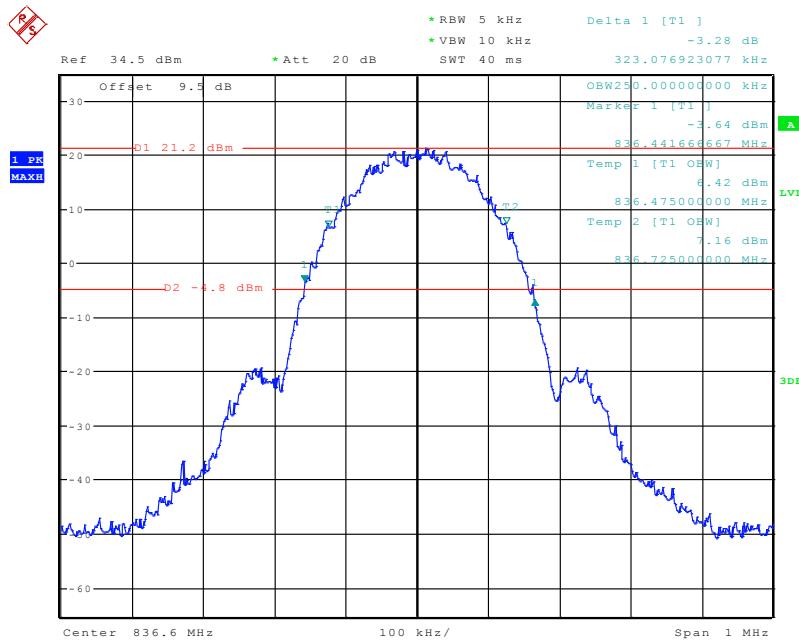
| Mode          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---------------|-----------------|------------------------------|--------------------------------|
| RMC (BPSK)    | 1880.0          | 4.18                         | 4.71                           |
| HSUPA (BPSK)  | 1880.0          | 4.18                         | 4.72                           |
| HSDPA (16QAM) | 1880.0          | 4.18                         | 4.74                           |

### AWS Band (Part 27)

| Mode          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---------------|-----------------|------------------------------|--------------------------------|
| RMC (BPSK)    | 1732.6          | 4.17                         | 4.71                           |
| HSUPA (BPSK)  | 1732.6          | 4.17                         | 4.73                           |
| HSDPA (16QAM) | 1732.6          | 4.17                         | 4.73                           |

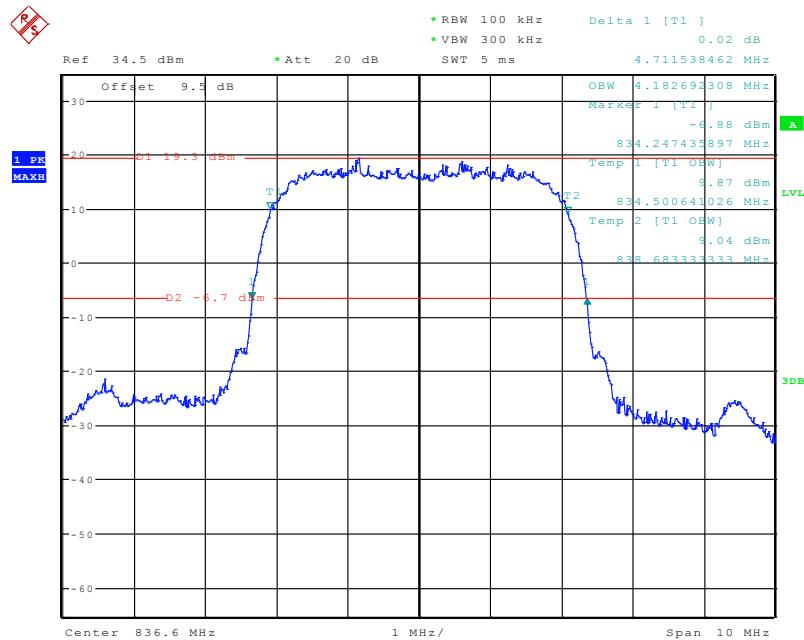
**Cellular Band (Part 22H)****26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode**

Date: 16.AUG.2019 16:38:36

**26 dB Emissions &99% Occupied Bandwidth for EDGE Mode**

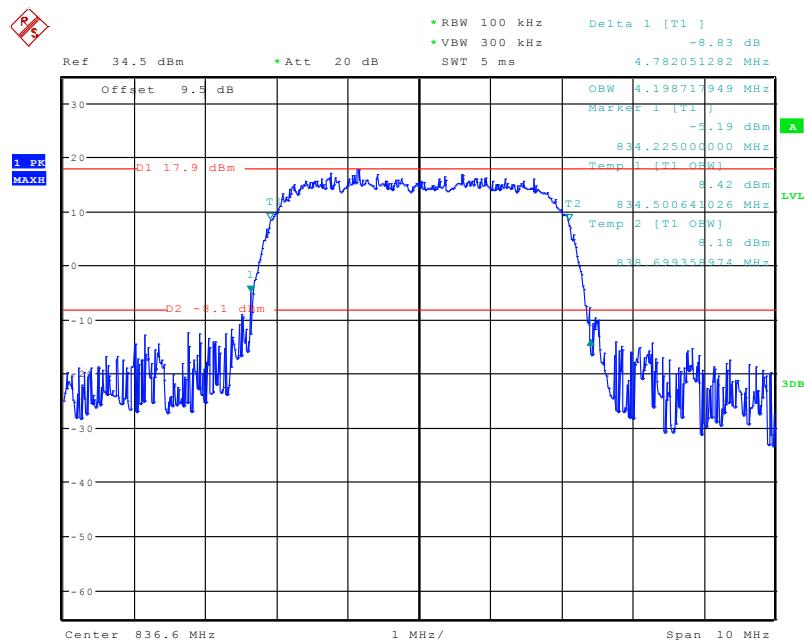
Date: 16.AUG.2019 17:11:02

### 26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode



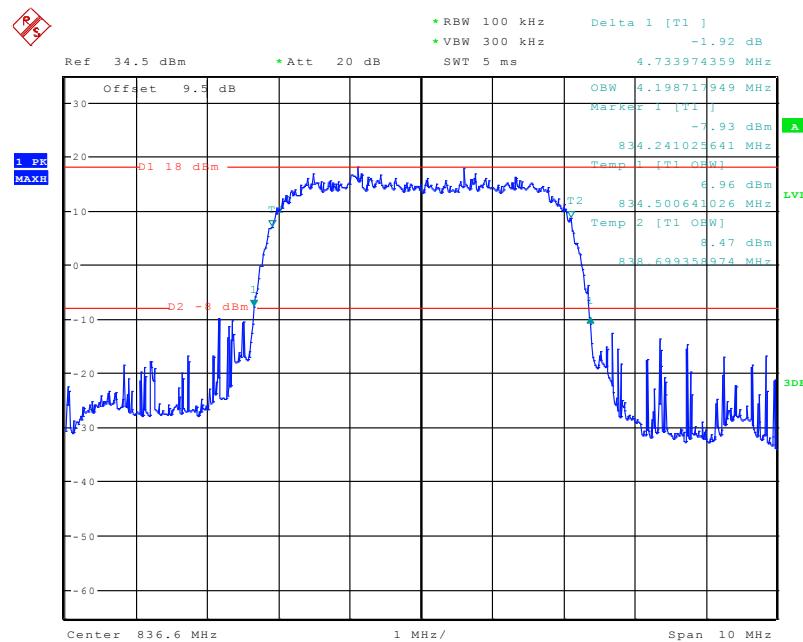
Date: 18.AUG.2019 12:53:42

### 26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 18.AUG.2019 13:01:36

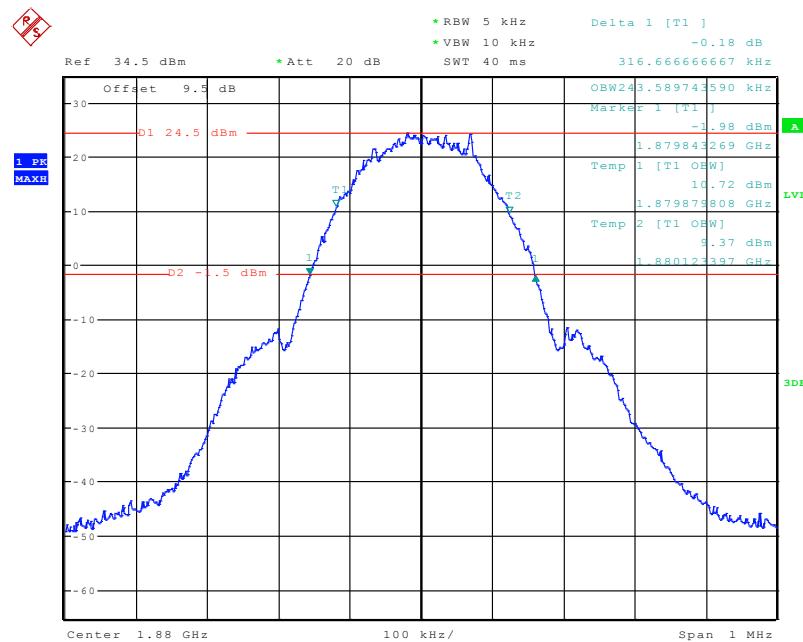
### 26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 18.AUG.2019 13:04:01

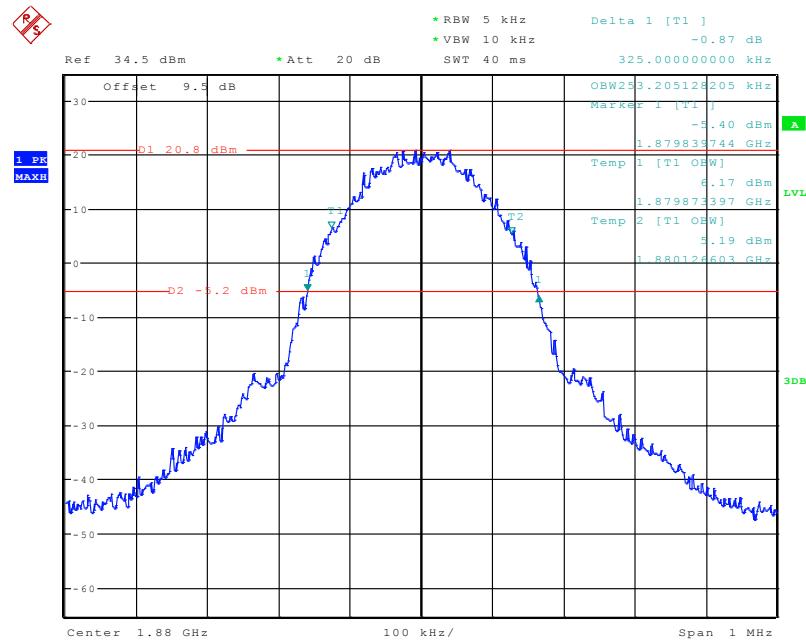
### PCS Band (Part 24E)

#### 26 dB Emissions &99% Occupied Bandwidth for GSM (GMSK) Mode



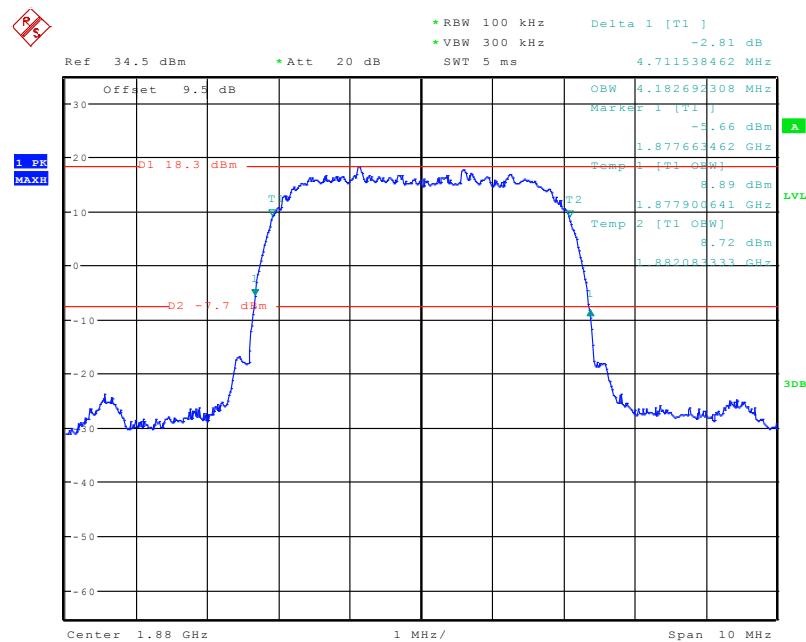
Date: 16.AUG.2019 16:59:59

### 26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



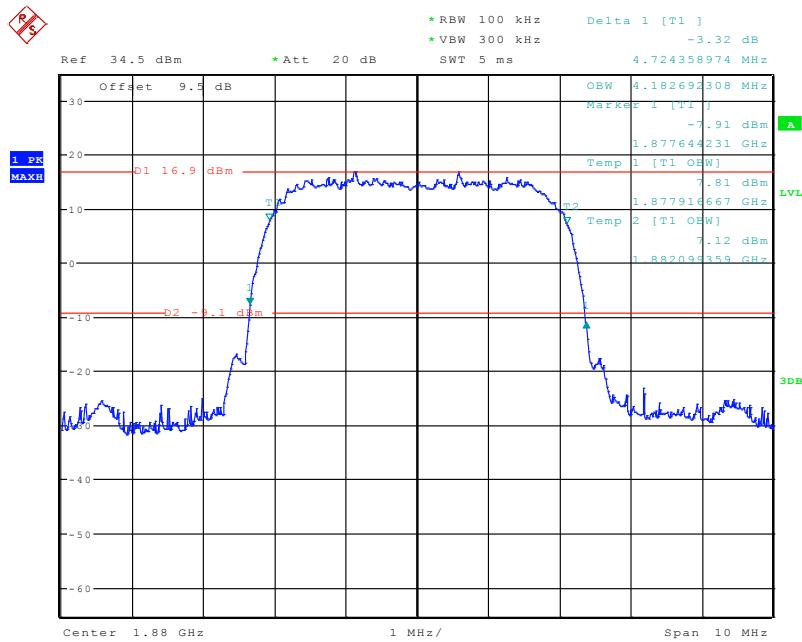
Date: 16.AUG.2019 17:16:56

### 26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode



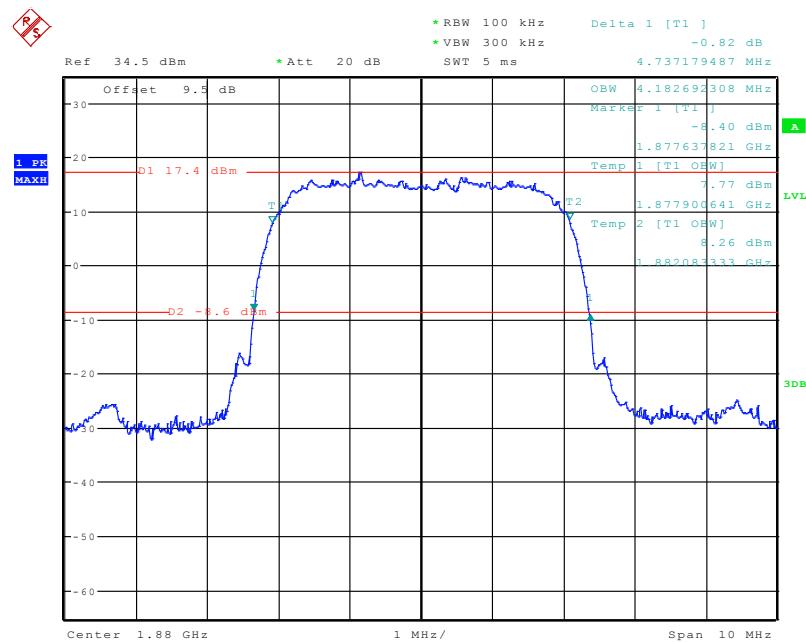
Date: 18.AUG.2019 12:37:28

## 26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode

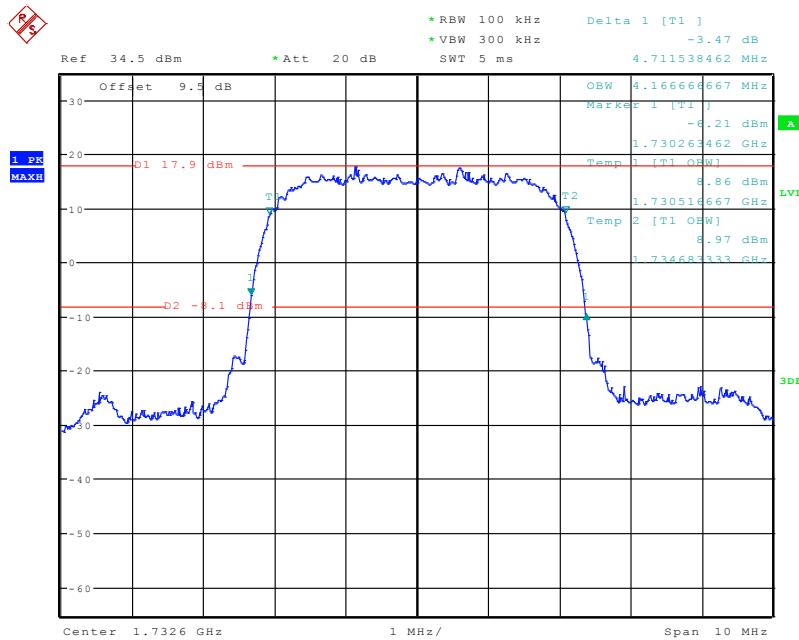


Date: 18.AUG.2019 12:28:03

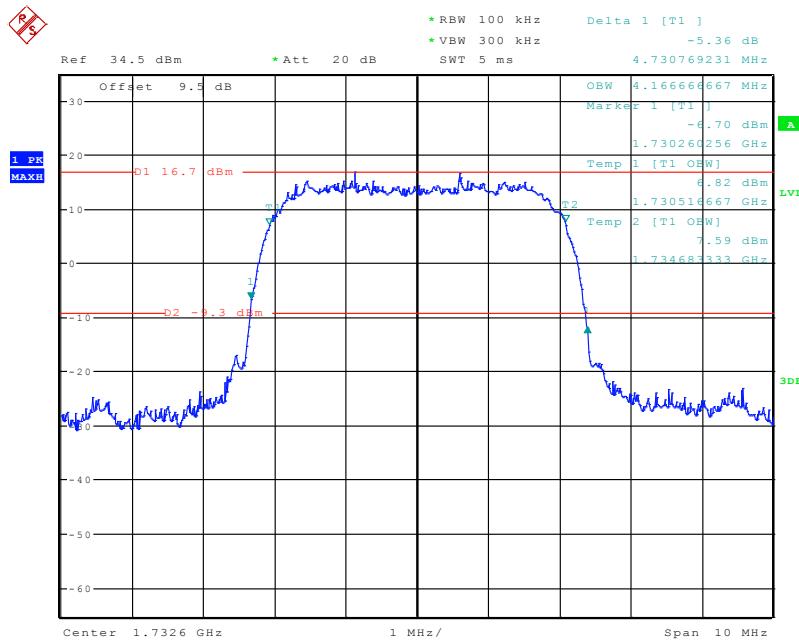
## 26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 18.AUG.2019 12:24:11

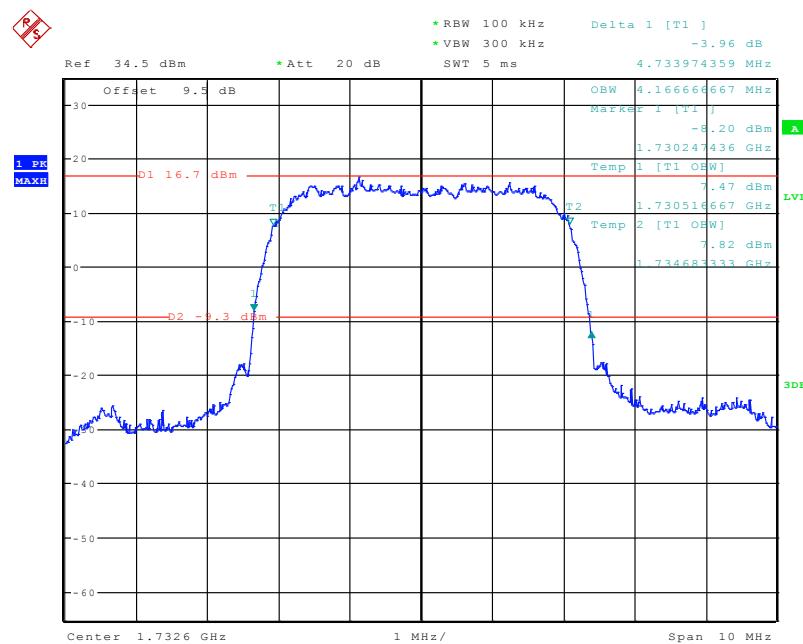
**AWS Band (Part 27)****26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode**

Date: 18.AUG.2019 13:19:14

**26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode**

Date: 18.AUG.2019 13:13:34

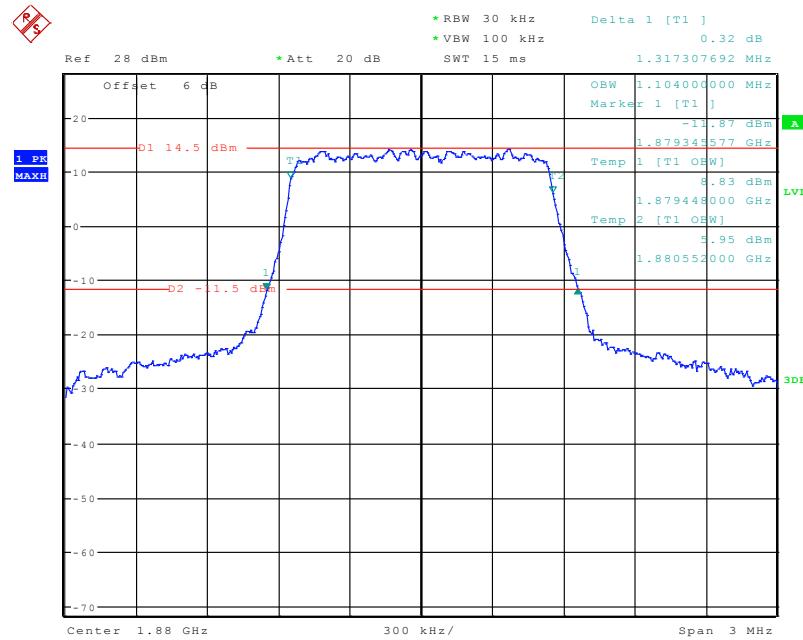
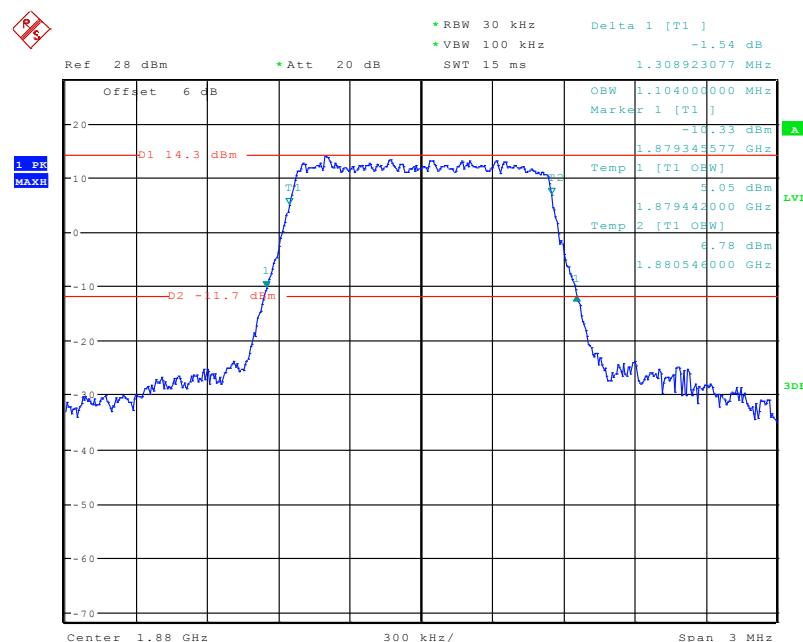
### 26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode

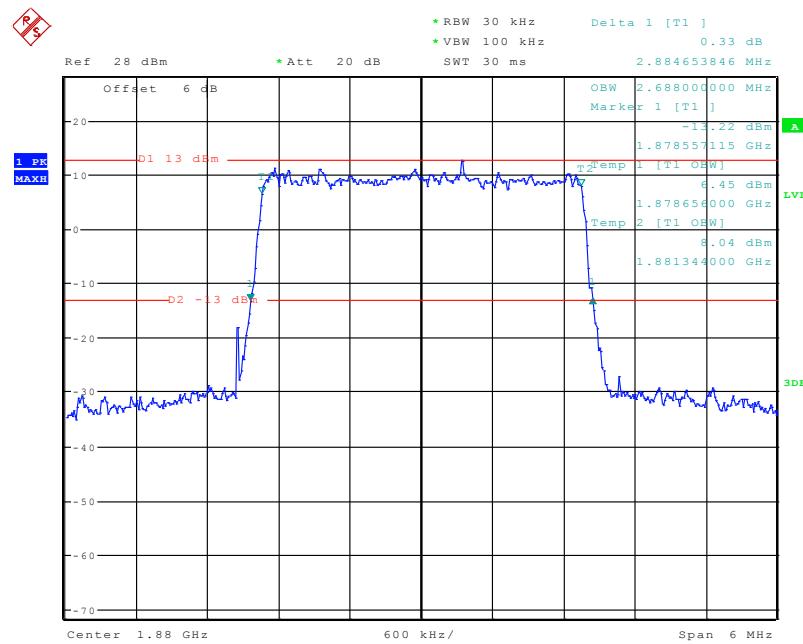


Date: 18.AUG.2019 13:11:50

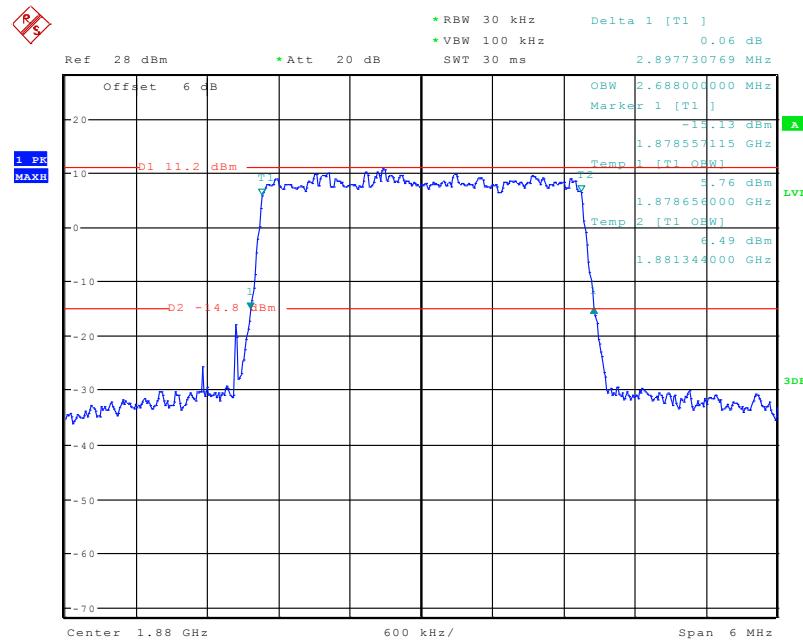
**LTE Band 2: (Middle Channel)**

| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>99% Occupied<br/>Bandwidth<br/>(MHz)</b> | <b>26 dB Emission<br/>Bandwidth<br/>(MHz)</b> |
|----------------------------|-------------------|---|---|
| 1.4                        | QPSK              | 1.104                                       | 1.317   |
|                            | 16QAM             | 1.104                                       | 1.309   |
| 3.0                        | QPSK              | 2.688                                       | 2.885   |
|                            | 16QAM             | 2.688                                       | 2.898   |
| 5.0                        | QPSK              | 4.520                                       | 4.983   |
|                            | 16QAM             | 4.500                                       | 4.949   |
| 10.0                       | QPSK              | 8.960                                       | 9.718   |
|                            | 16QAM             | 8.960                                       | 9.570   |
| 15.0                       | QPSK              | 13.500                                      | 14.623  |
|                            | 16QAM             | 13.500                                      | 14.542  |
| 20.0                       | QPSK              | 17.920                                      | 18.956  |
|                            | 16QAM             | 18.000                                      | 19.115  |

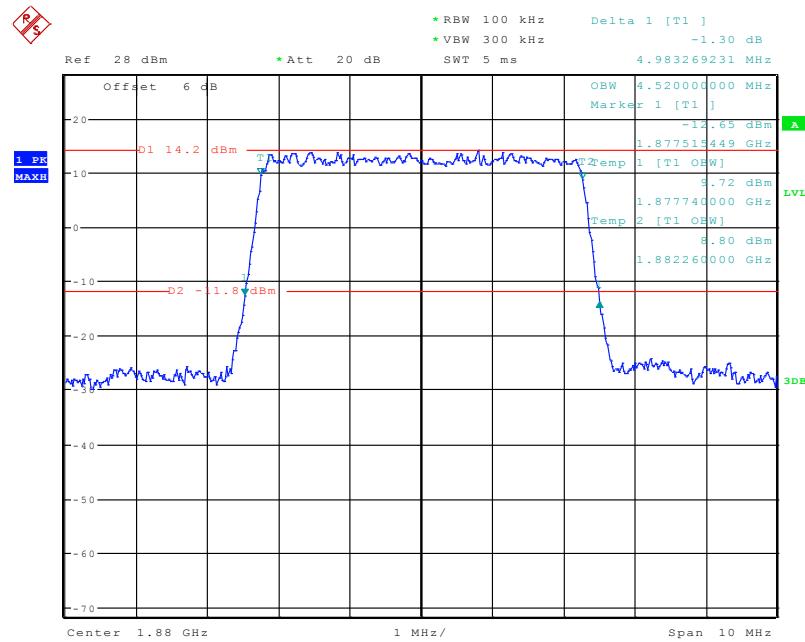
**QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel****16-QAM (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

**QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

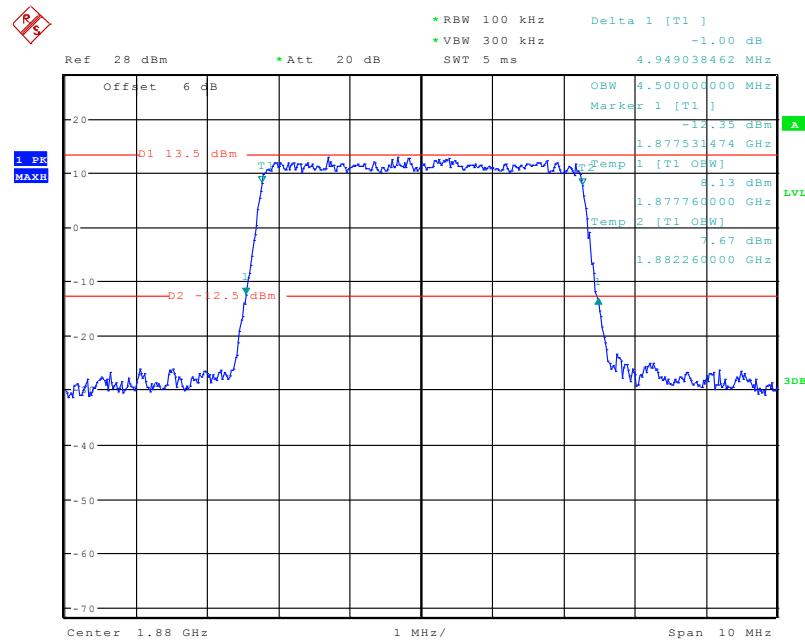
Date: 19.AUG.2019 12:27:18

**16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

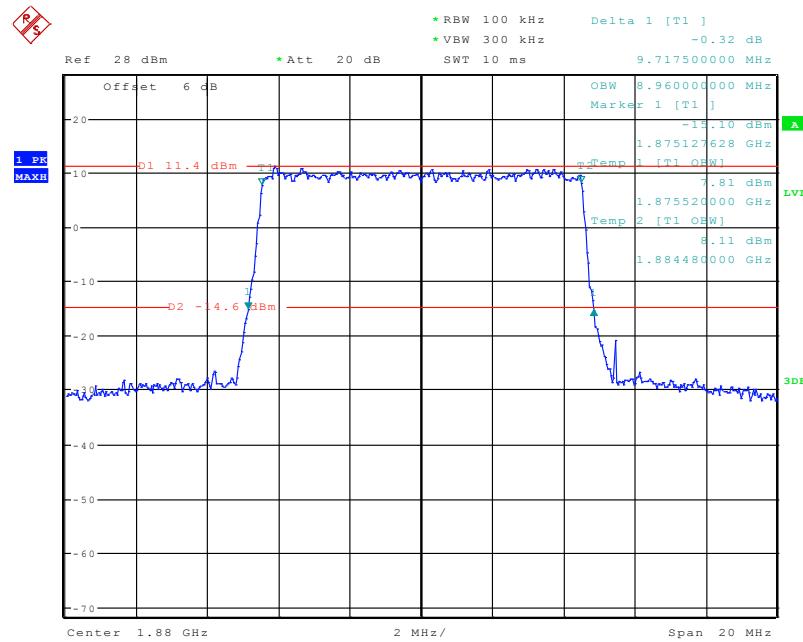
Date: 19.AUG.2019 12:28:28

**QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

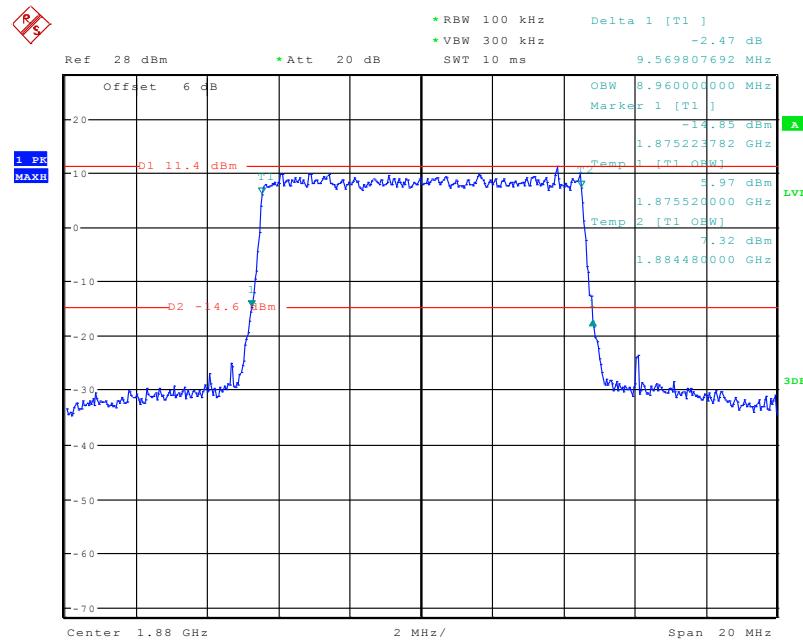
Date: 19.AUG.2019 12:29:40

**16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

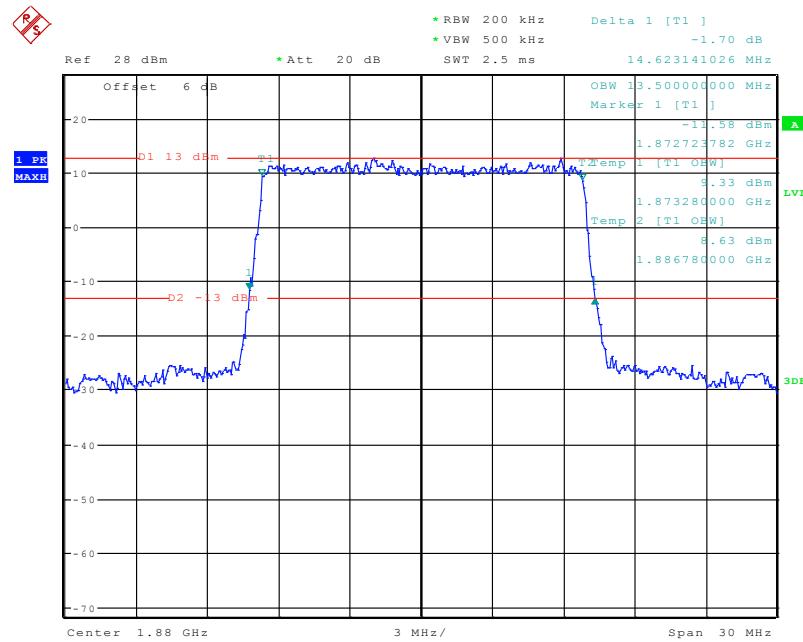
Date: 19.AUG.2019 12:30:28

**QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

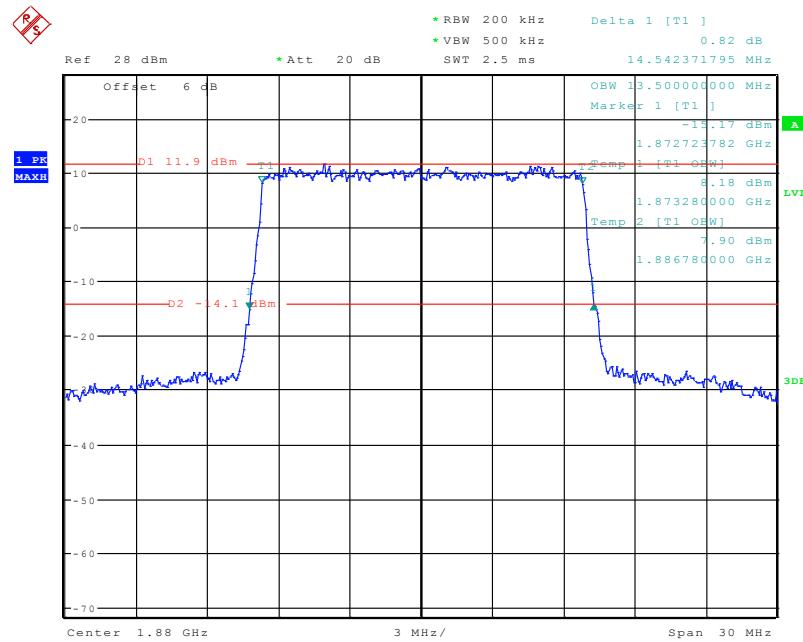
Date: 19.AUG.2019 12:32:13

**16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

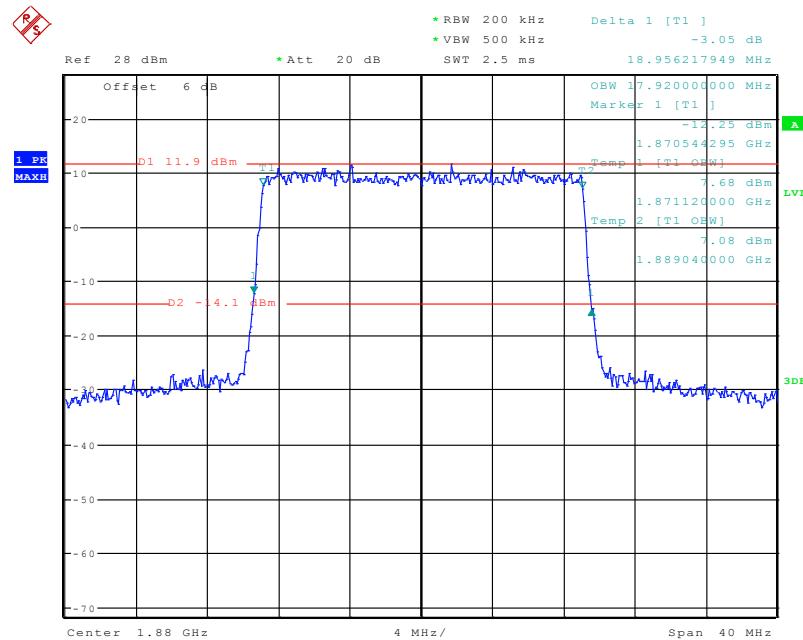
Date: 19.AUG.2019 12:33:05

**QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

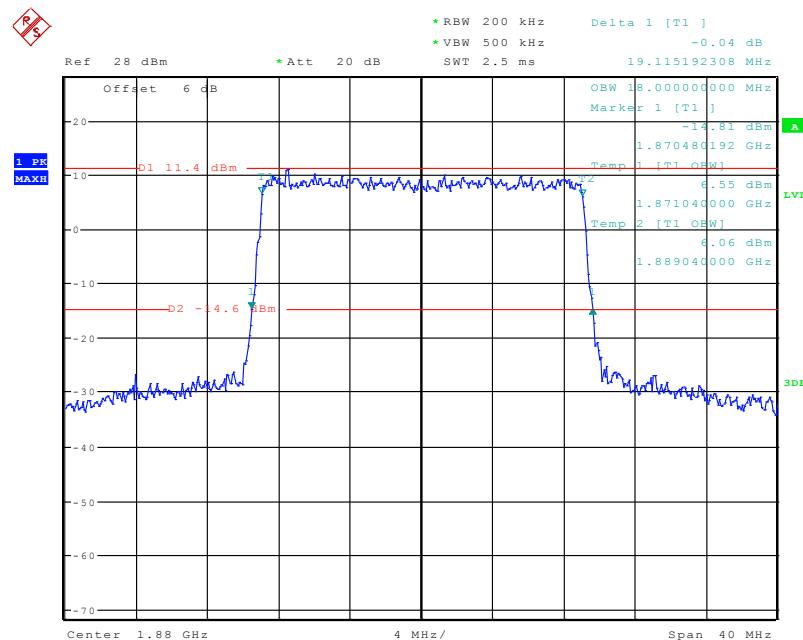
Date: 19.AUG.2019 12:34:43

**16-QAM (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 12:35:40

**QPSK (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

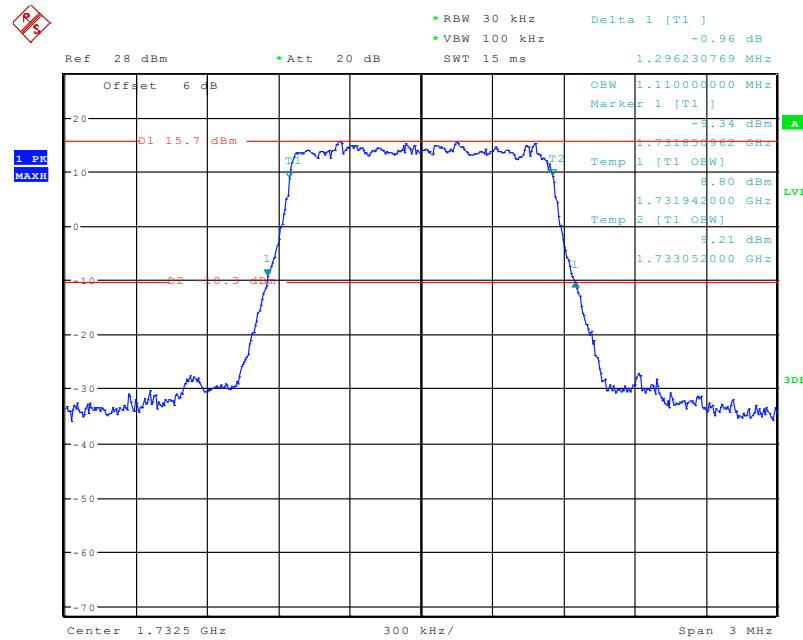
Date: 19.AUG.2019 12:36:55

**16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

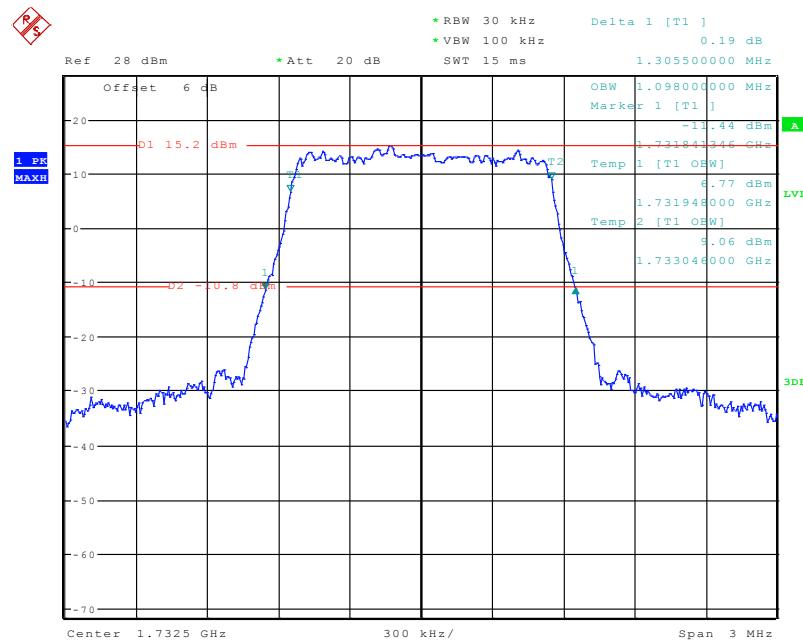
Date: 19.AUG.2019 12:37:43

**LTE Band 4: (Middle Channel)**

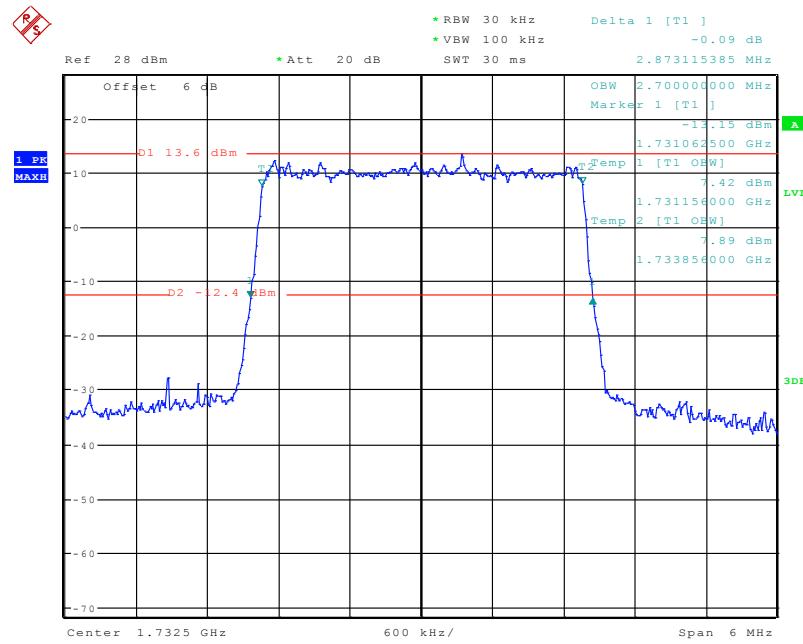
| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>99% Occupied<br/>Bandwidth<br/>(MHz)</b> | <b>26 dB Emission<br/>Bandwidth<br/>(MHz)</b> |
|----------------------------|-------------------|---|---|
| 1.4                        | QPSK              | 1.110                                       | 1.296   |
|                            | 16QAM             | 1.098                                       | 1.306   |
| 3.0                        | QPSK              | 2.700                                       | 2.873   |
|                            | 16QAM             | 2.689                                       | 2.902   |
| 5.0                        | QPSK              | 4.520                                       | 4.982   |
|                            | 16QAM             | 4.500                                       | 4.936   |
| 10.0                       | QPSK              | 8.960                                       | 9.694   |
|                            | 16QAM             | 8.960                                       | 9.613   |
| 15.0                       | QPSK              | 13.440                                      | 14.494  |
|                            | 16QAM             | 13.500                                      | 14.533  |
| 20.0                       | QPSK              | 18.000                                      | 19.031  |
|                            | 16QAM             | 18.000                                      | 19.126  |

**QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

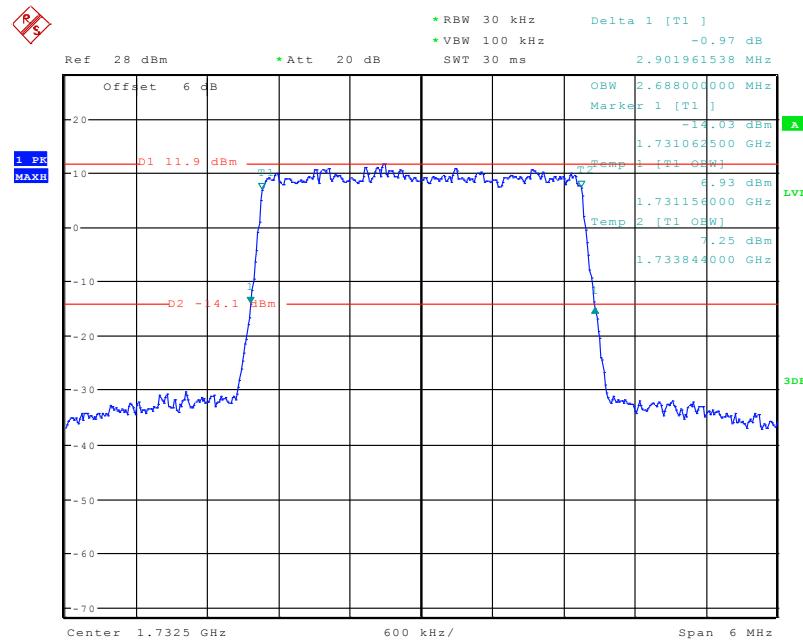
Date: 19.AUG.2019 12:40:20

**16-QAM (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

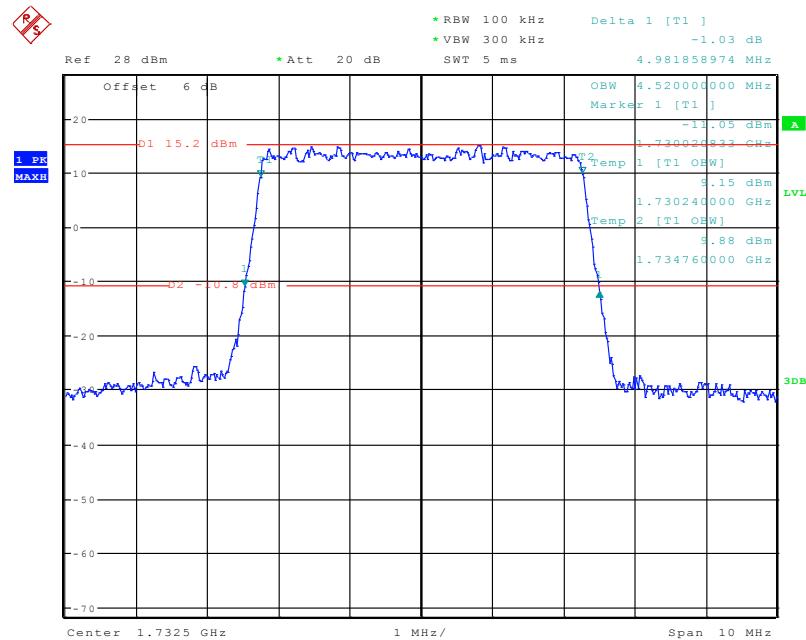
Date: 19.AUG.2019 12:39:20

**QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

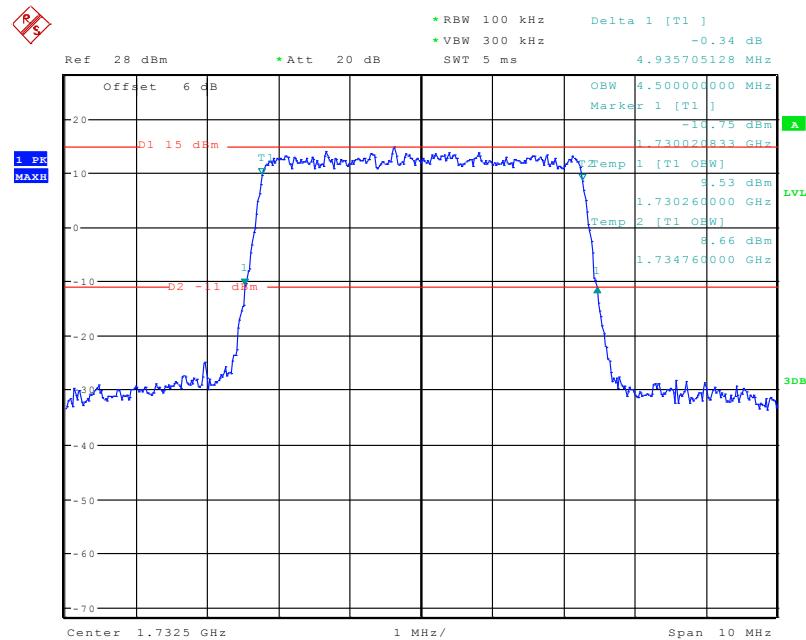
Date: 19.AUG.2019 12:42:35

**16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

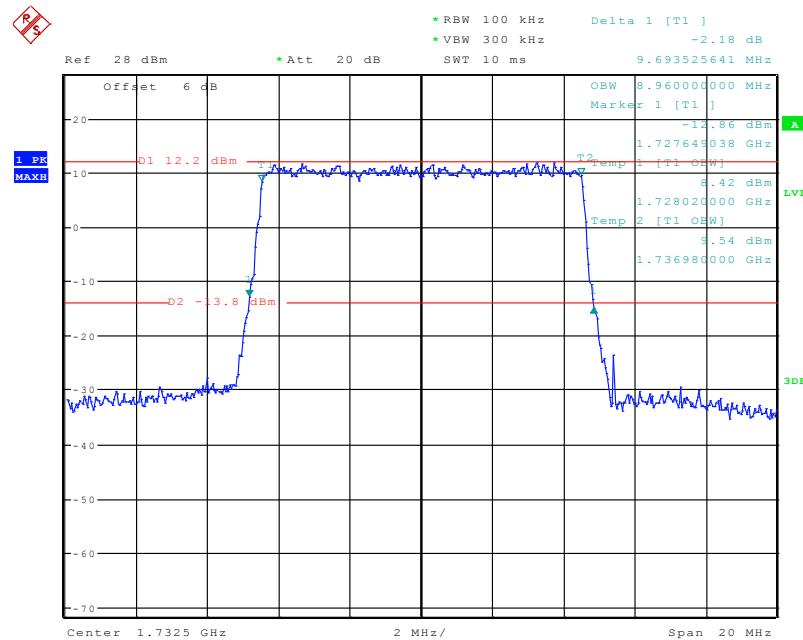
Date: 19.AUG.2019 12:41:48

**QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

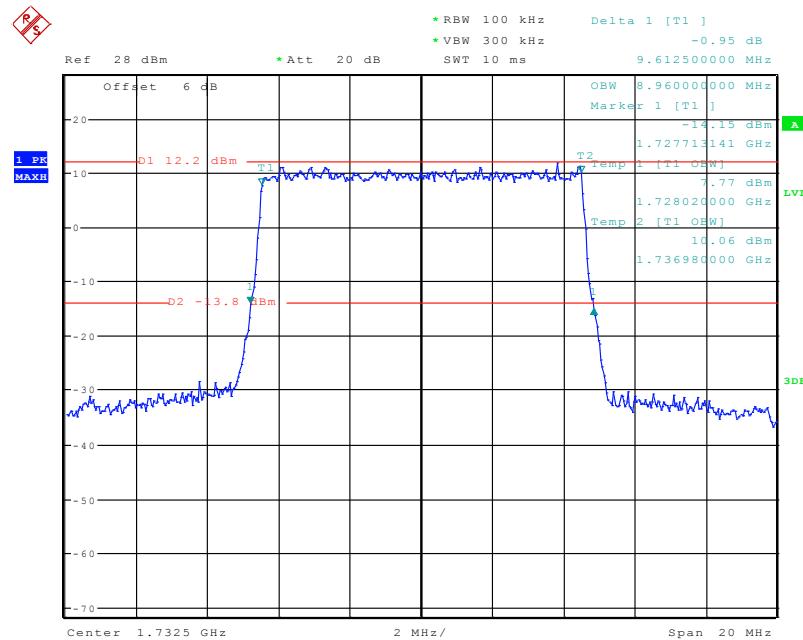
Date: 19.AUG.2019 12:44:41

**16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

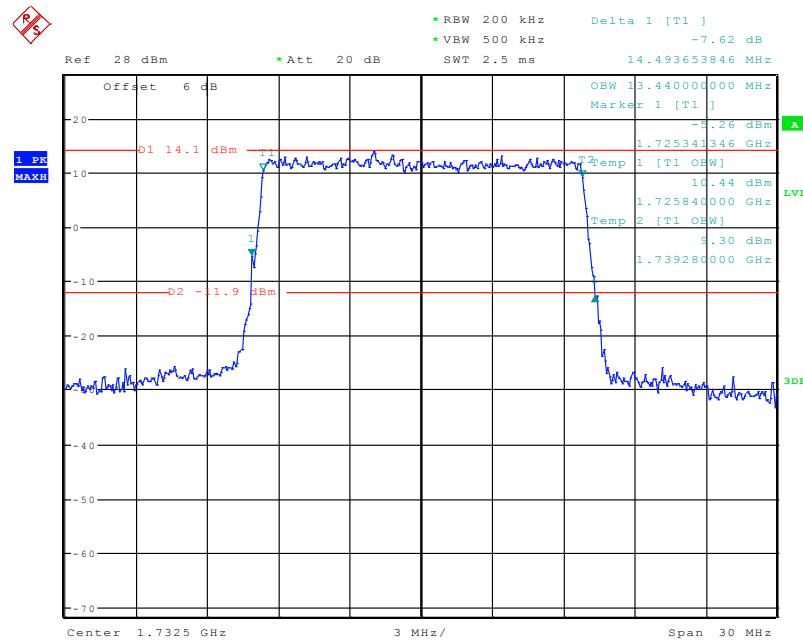
Date: 19.AUG.2019 12:43:43

**QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

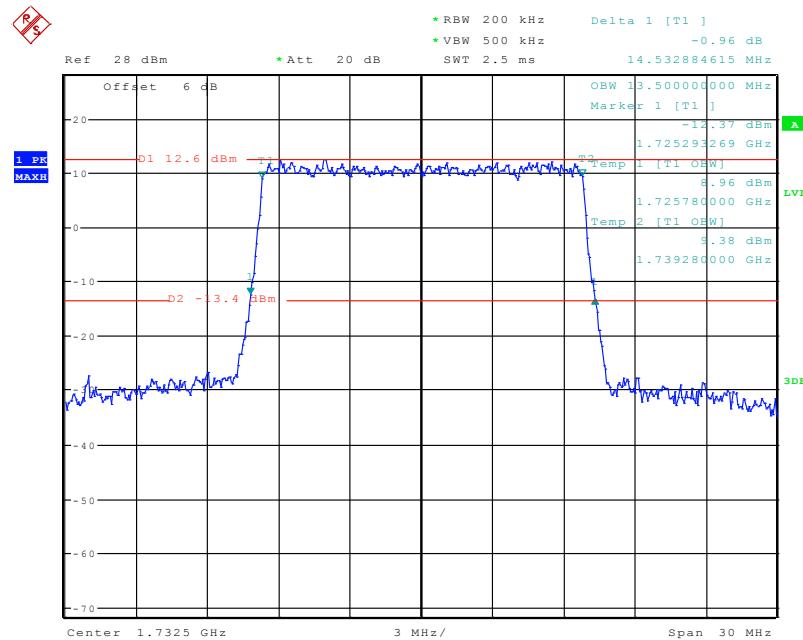
Date: 19.AUG.2019 12:46:31

**16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

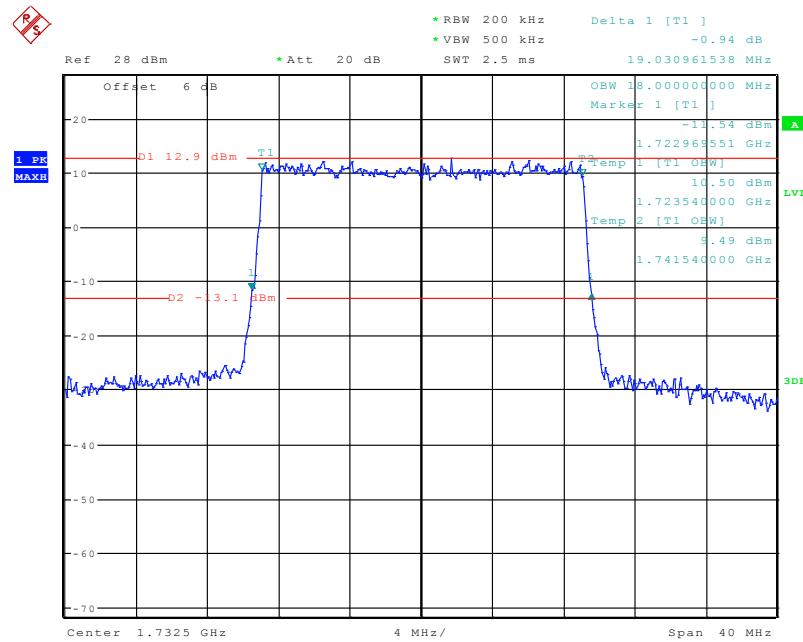
Date: 19.AUG.2019 12:45:54

**QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

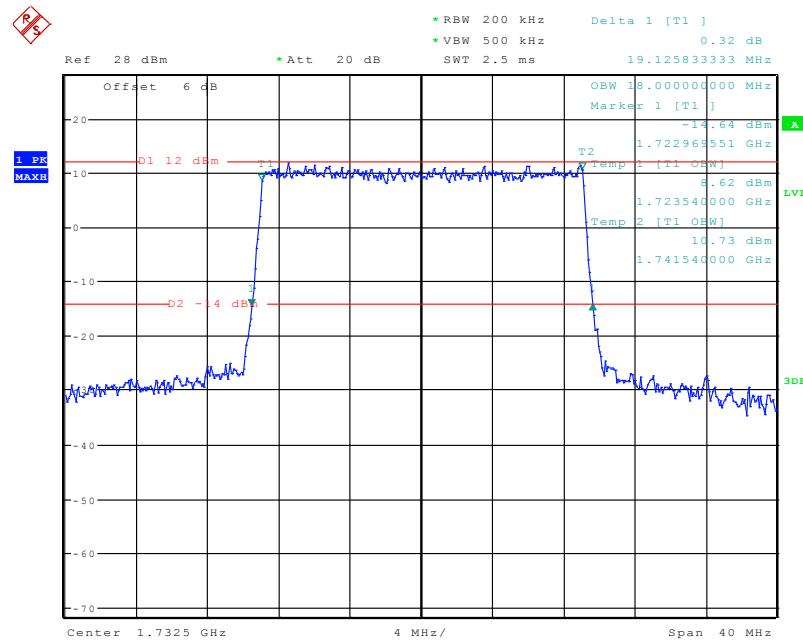
Date: 19.AUG.2019 12:49:02

**16-QAM (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 12:47:59

**QPSK (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

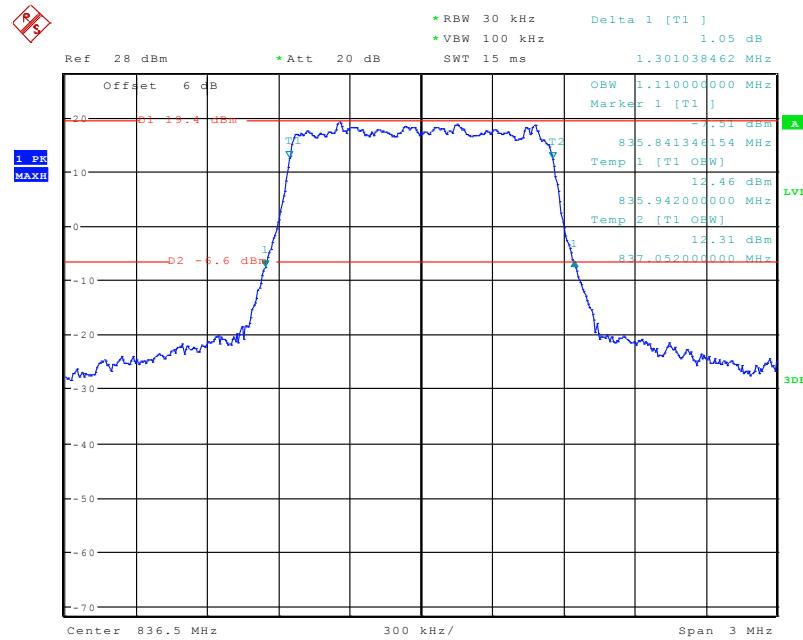
Date: 19.AUG.2019 12:51:24

**16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

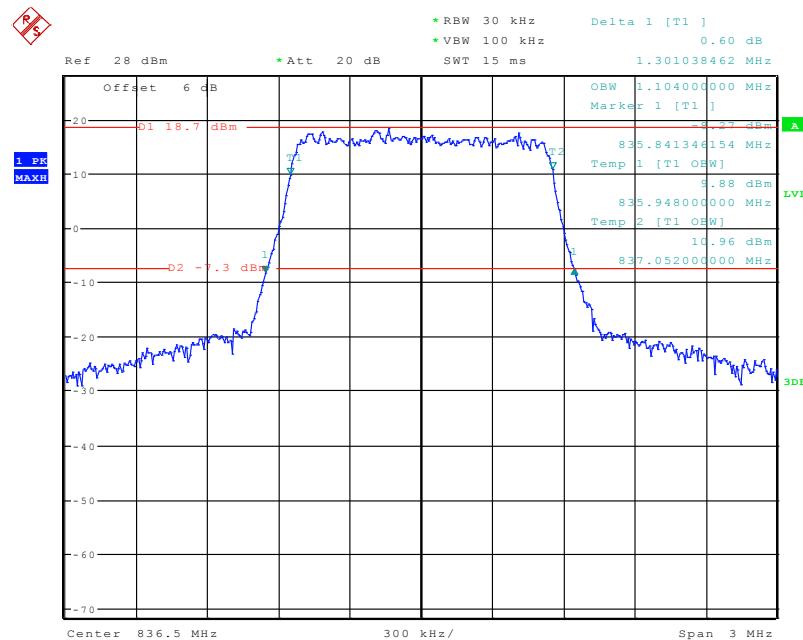
Date: 19.AUG.2019 12:50:19

**LTE Band 5: (Middle Channel)**

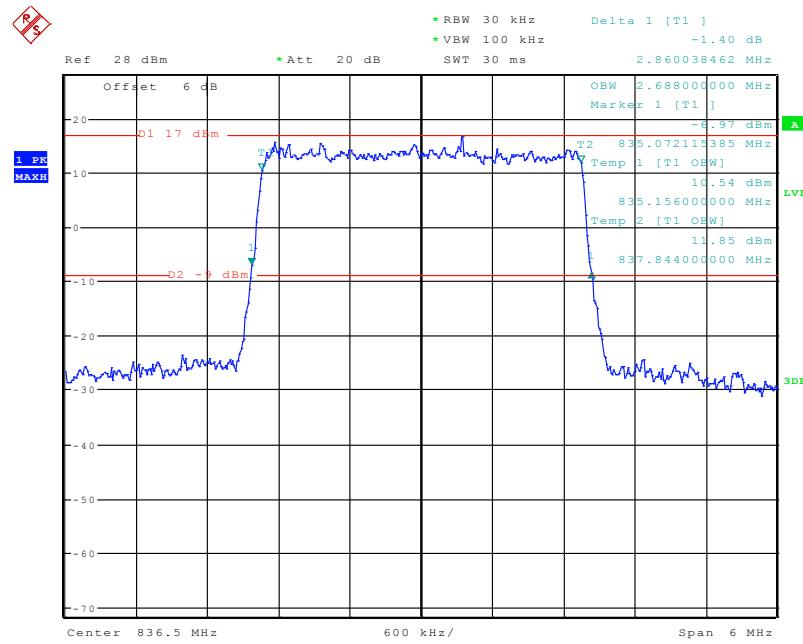
| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>99% Occupied<br/>Bandwidth<br/>(MHz)</b> | <b>26 dB Emission<br/>Bandwidth<br/>(MHz)</b> |
|----------------------------|-------------------|---|---|
| 1.4                        | QPSK              | 1.110                                       | 1.301   |
|                            | 16QAM             | 1.104                                       | 1.301   |
| 3.0                        | QPSK              | 2.688                                       | 2.860   |
|                            | 16QAM             | 2.688                                       | 2.879   |
| 5.0                        | QPSK              | 4.500                                       | 5.014   |
|                            | 16QAM             | 4.500                                       | 4.925   |
| 10.0                       | QPSK              | 8.960                                       | 9.697   |
|                            | 16QAM             | 8.960                                       | 9.600   |

**QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

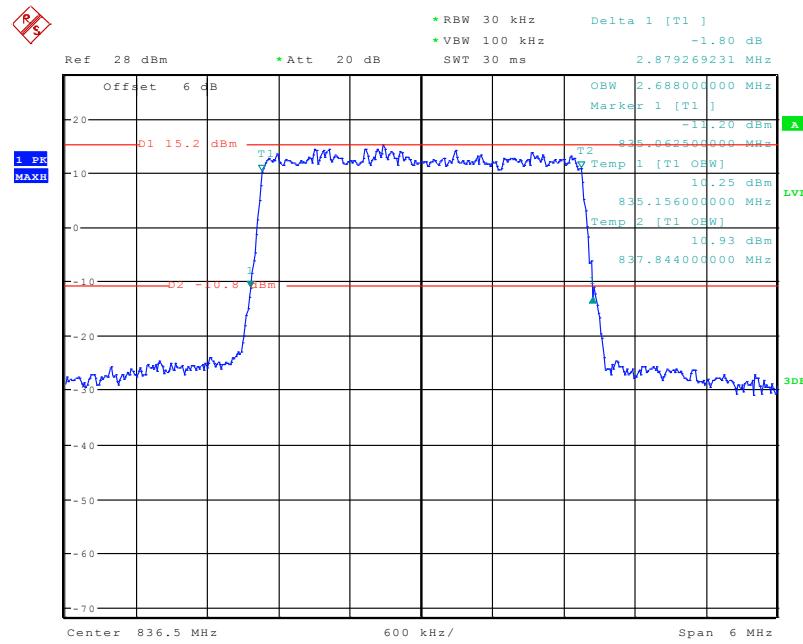
Date: 19.AUG.2019 12:56:26

**16-QAM (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

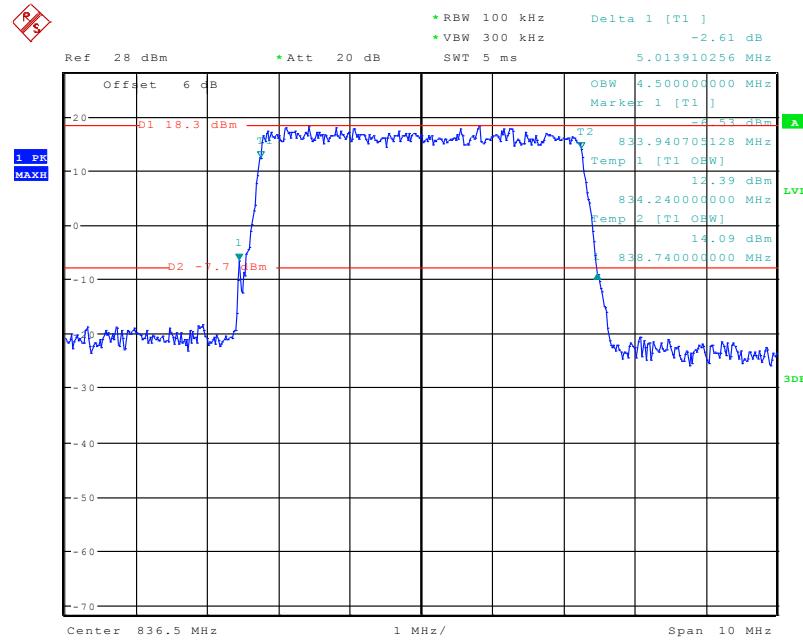
Date: 19.AUG.2019 12:57:20

**QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

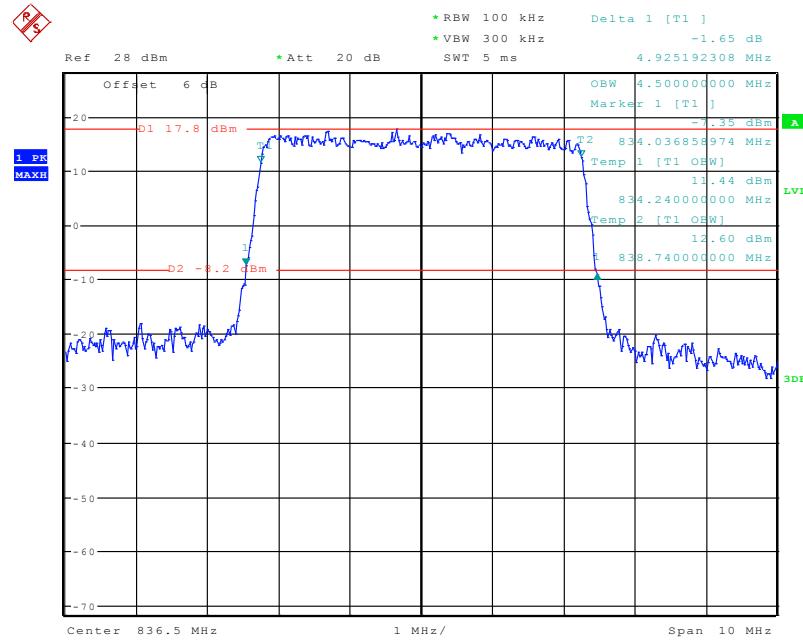
Date: 19.AUG.2019 12:58:07

**16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

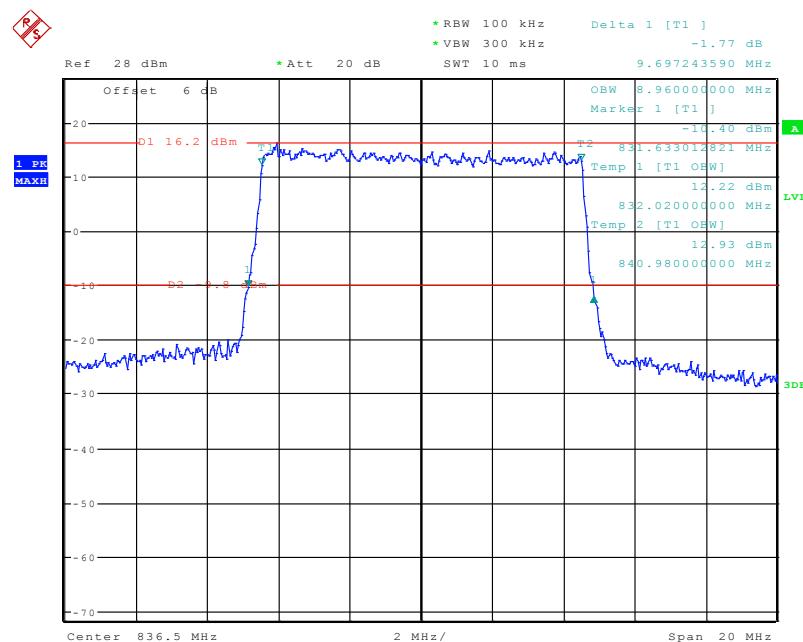
Date: 19.AUG.2019 12:59:05

**QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

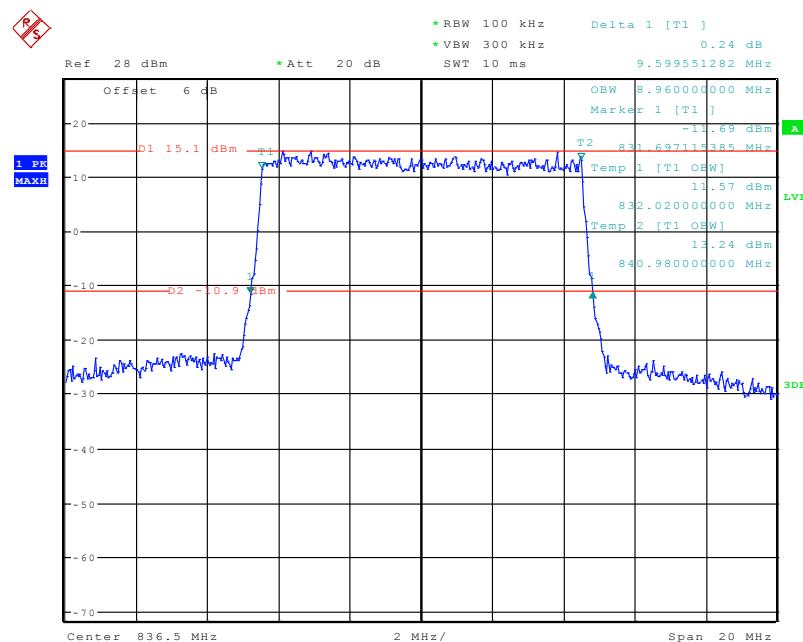
Date: 19.AUG.2019 13:00:10

**16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 13:01:17

**QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

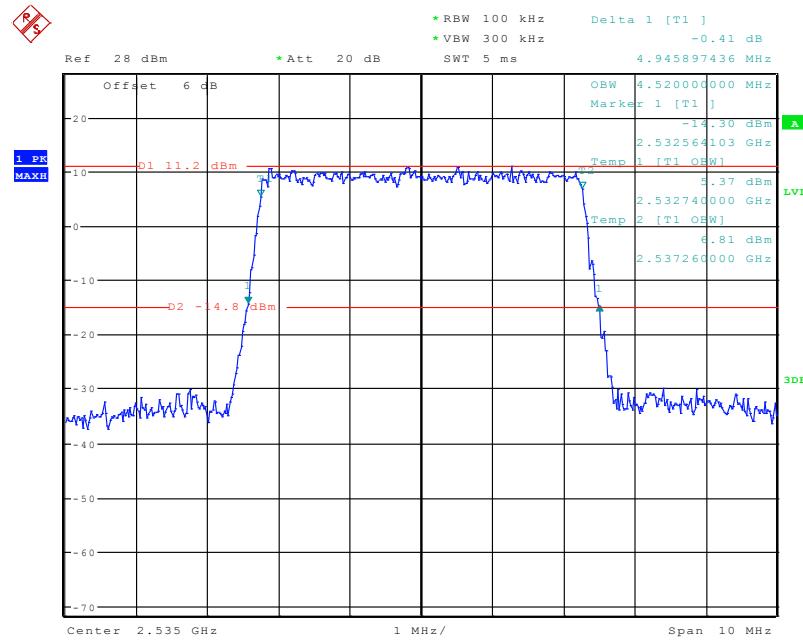
Date: 19.AUG.2019 13:02:35

**16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

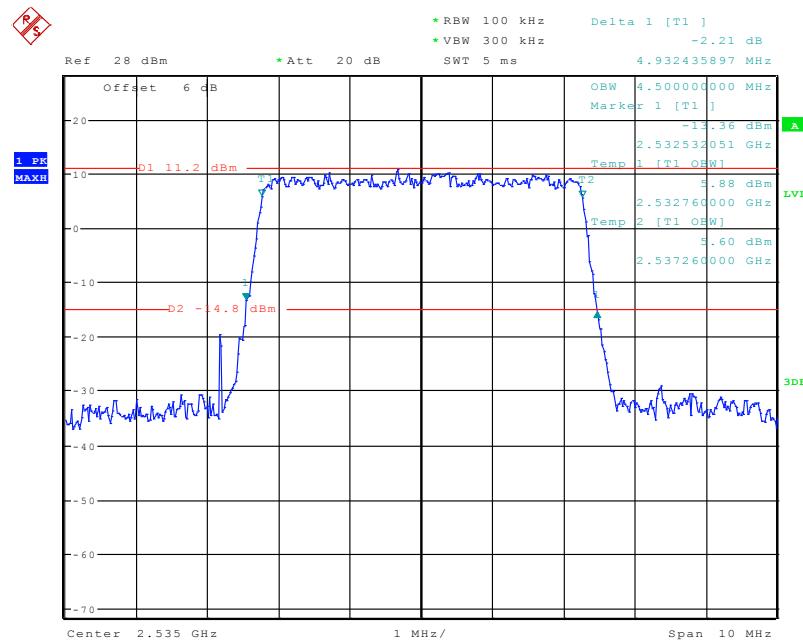
Date: 19.AUG.2019 13:03:46

**LTE Band 7: (Middle Channel)**

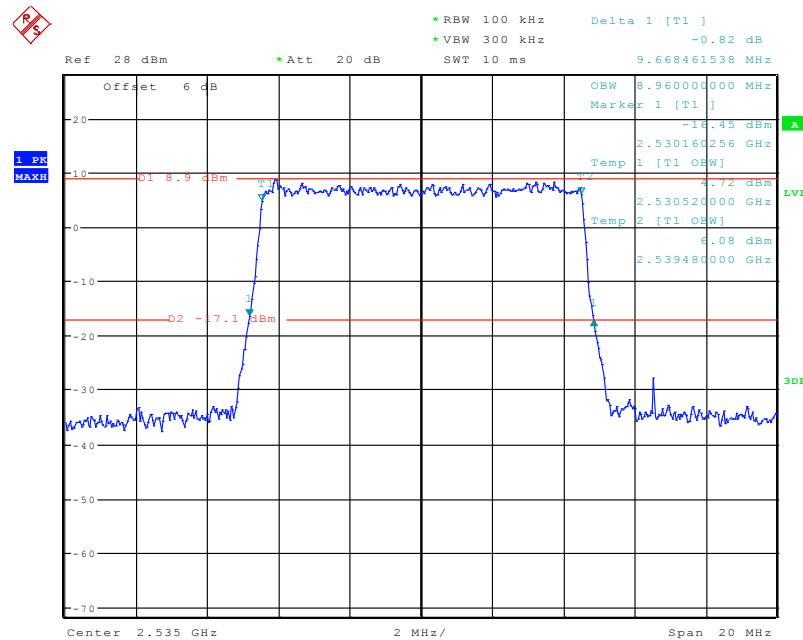
| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>99% Occupied<br/>Bandwidth<br/>(MHz)</b> | <b>26 dB Emission<br/>Bandwidth<br/>(MHz)</b> |
|----------------------------|-------------------|---|---|
| 5.0                        | QPSK              | 4.520                                       | 4.946   |
|                            | 16QAM             | 4.500                                       | 4.932   |
| 10.0                       | QPSK              | 8.960                                       | 9.668   |
|                            | 16QAM             | 8.960                                       | 9.604   |
| 15.0                       | QPSK              | 13.500                                      | 14.579  |
|                            | 16QAM             | 13.500                                      | 14.531  |
| 20.0                       | QPSK              | 17.920                                      | 19.109  |
|                            | 16QAM             | 18.000                                      | 19.074  |

**QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

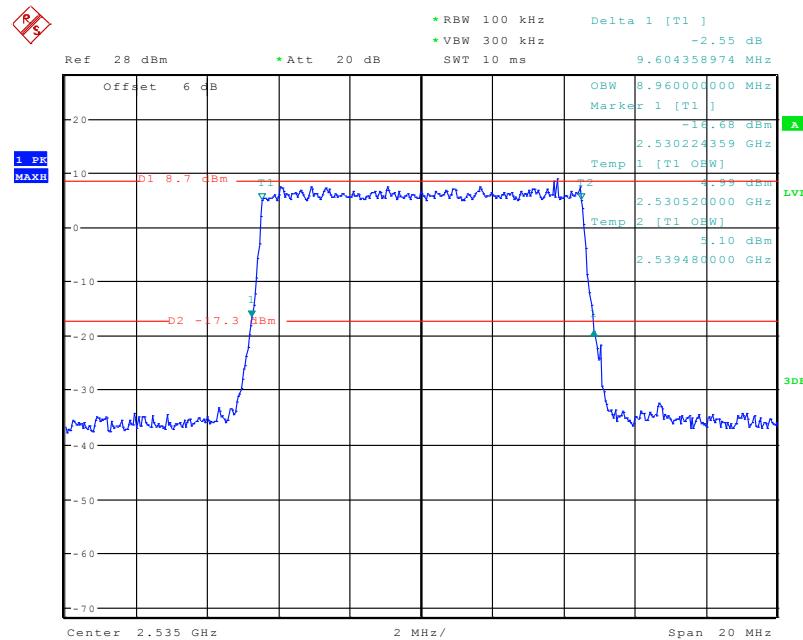
Date: 19.AUG.2019 13:05:42

**16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

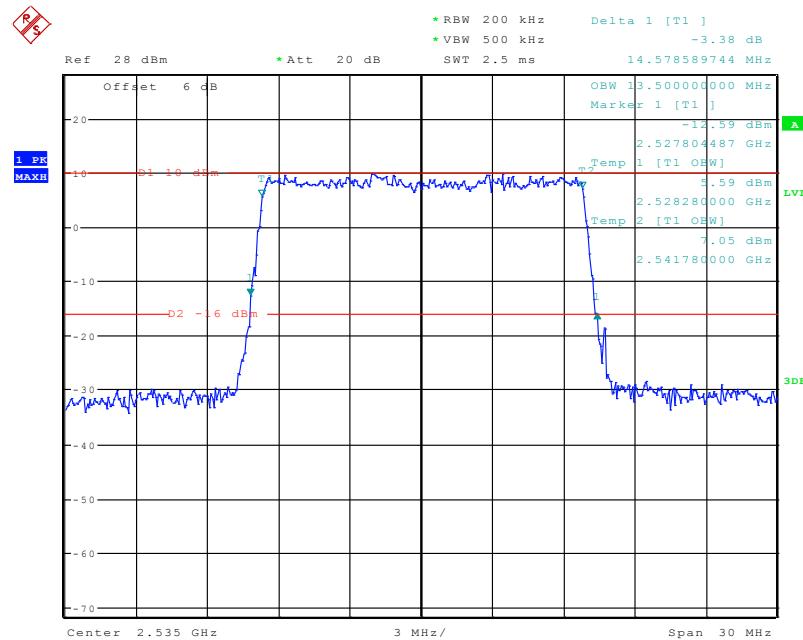
Date: 19.AUG.2019 13:05:06

**QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

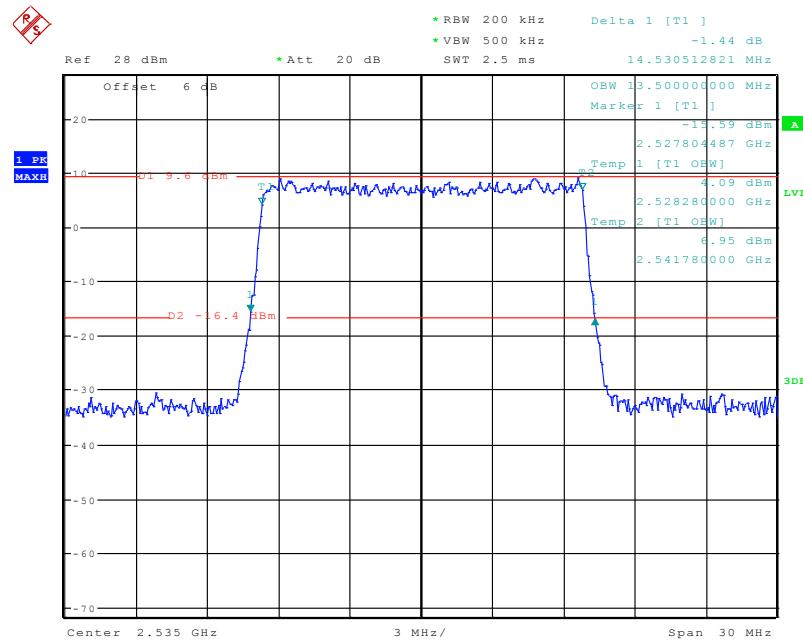
Date: 19.AUG.2019 13:08:02

**16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

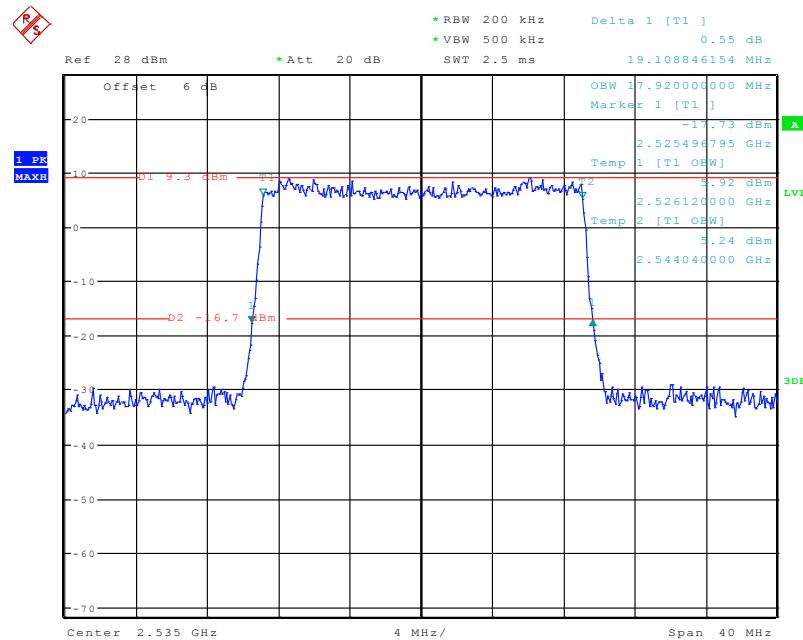
Date: 19.AUG.2019 13:06:53

**QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

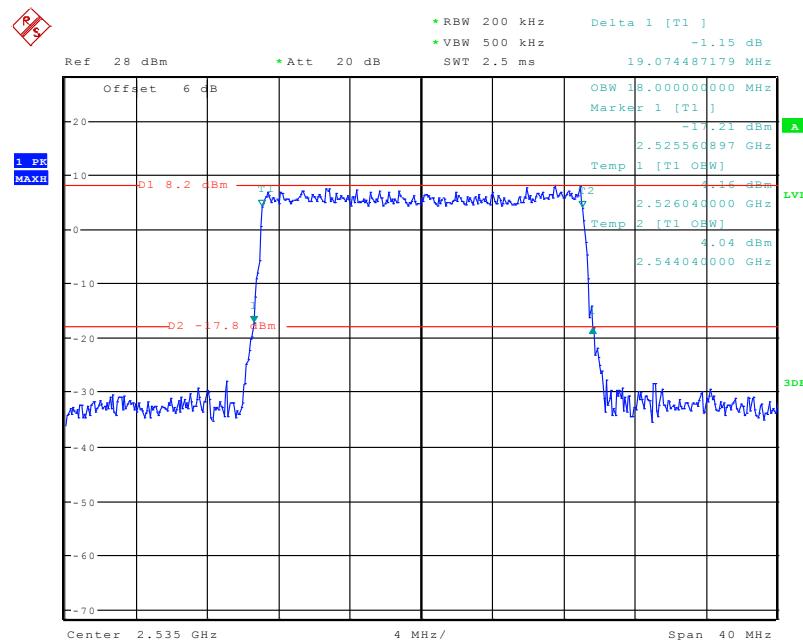
Date: 19.AUG.2019 13:09:26

**16-QAM (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 13:10:29

**QPSK (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 13:11:44

**16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel**

Date: 19.AUG.2019 13:12:34

## FCC §2.1051, §22.917(a) & §24.238(a); §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

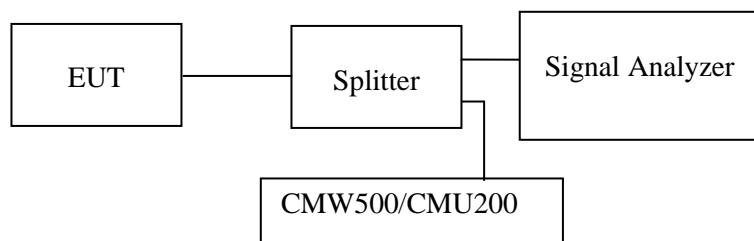
### Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a) and §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Data

#### Environmental Conditions

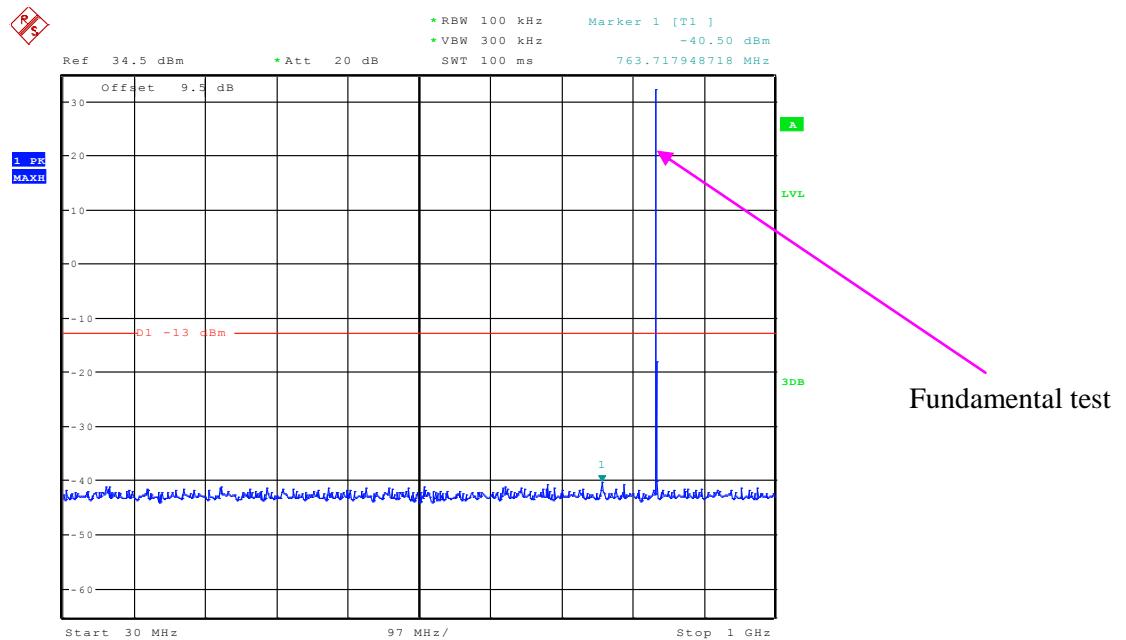
|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Gerogre Zhong and Kieron Luo from 2019-08-16 to 2019-08-19.*

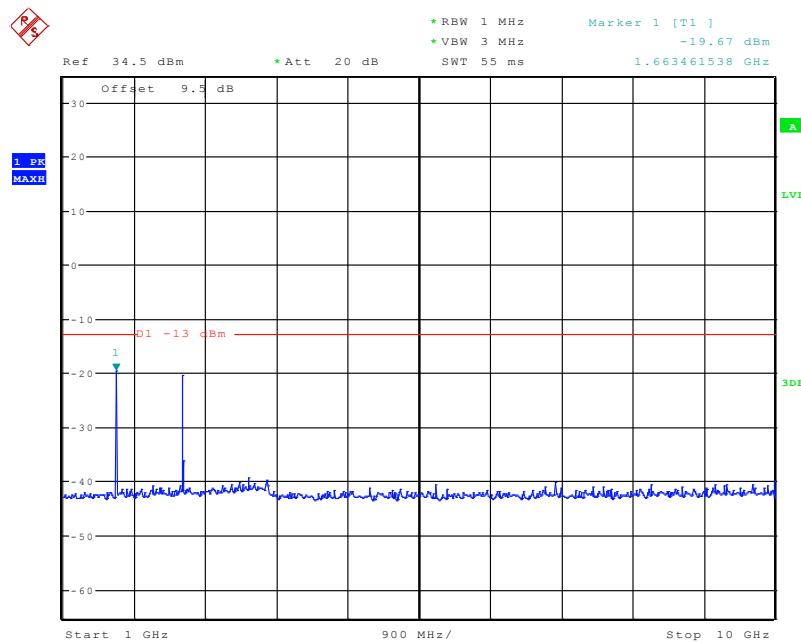
*Test result: Compliance.*

*EUT operation mode: transmitting*

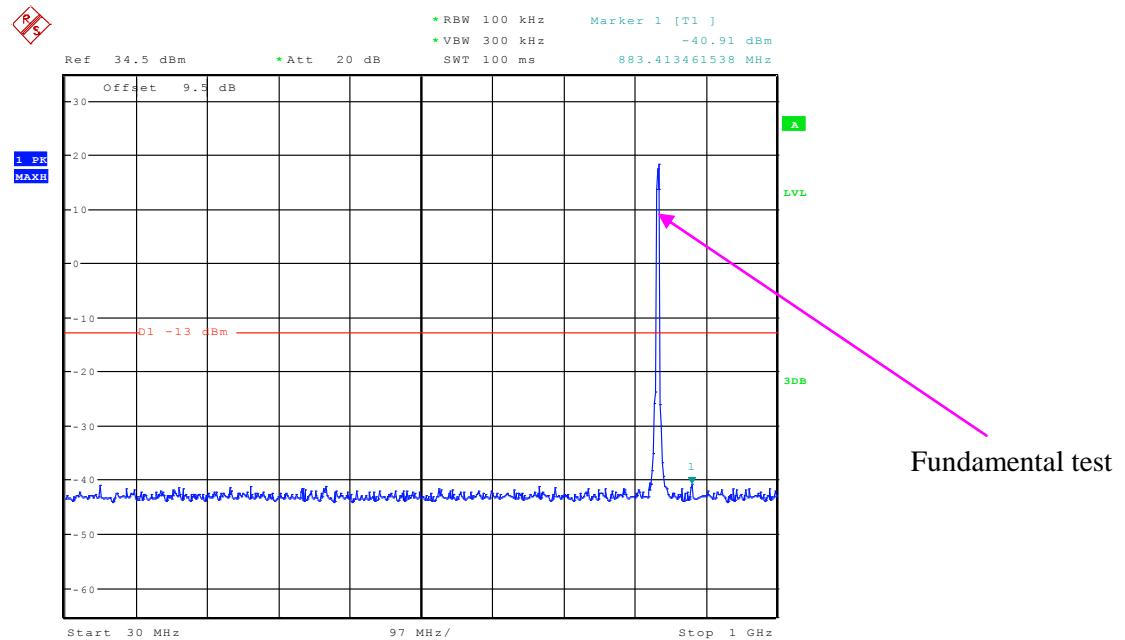
*Please refer to the following plots.*

**Cellular Band (Part 22H)****30 MHz – 1 GHz (GSM Mode)**

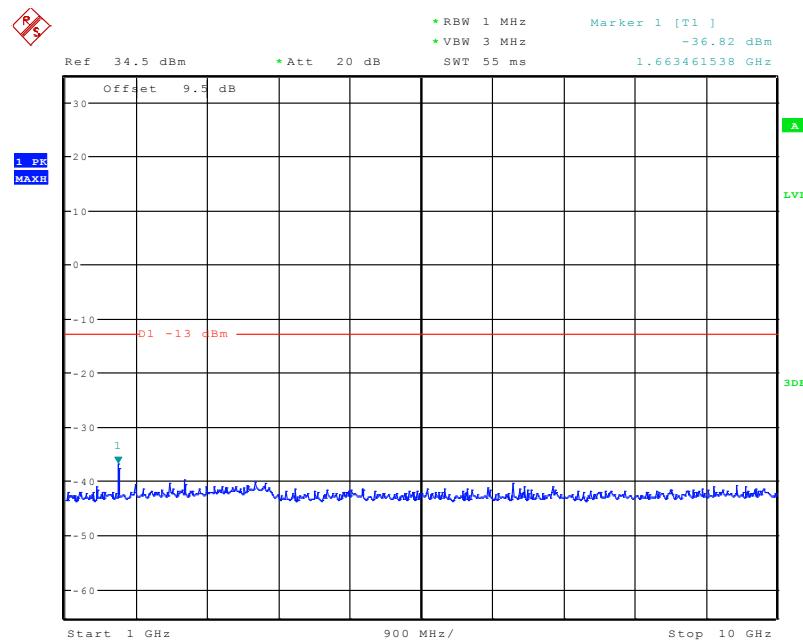
Date: 16.AUG.2019 16:40:43

**1 GHz – 10 GHz (GSM Mode)**

Date: 16.AUG.2019 16:41:46

**30 MHz – 1 GHz (WCDMA Mode)**

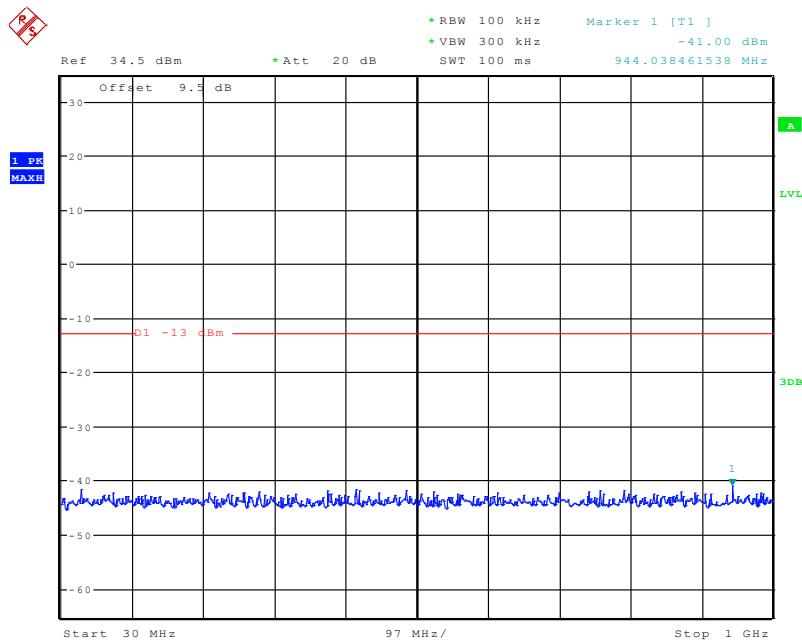
Date: 18.AUG.2019 12:48:59

**1 GHz – 10 GHz (WCDMA Mode)**

Date: 18.AUG.2019 12:48:03

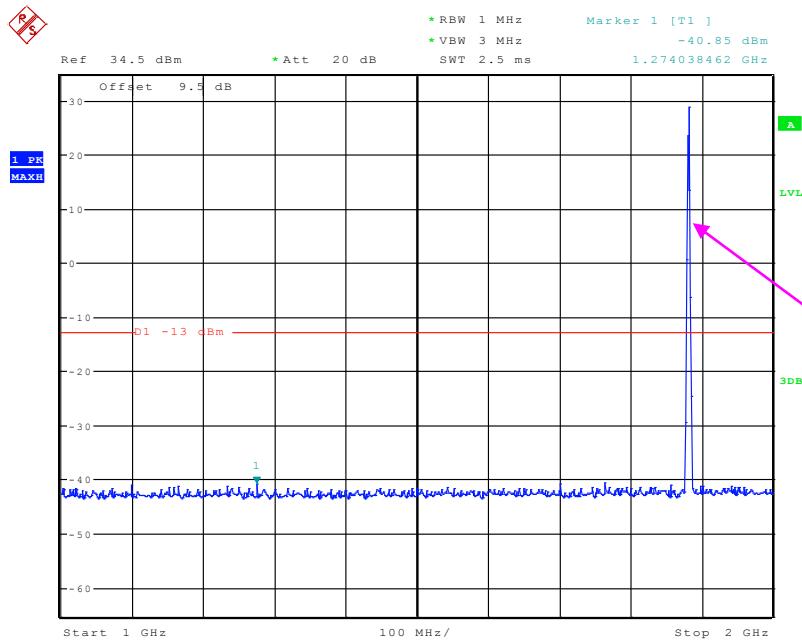
## PCS Band (Part 24E)

## 30 MHz – 1 GHz (GSM Mode)



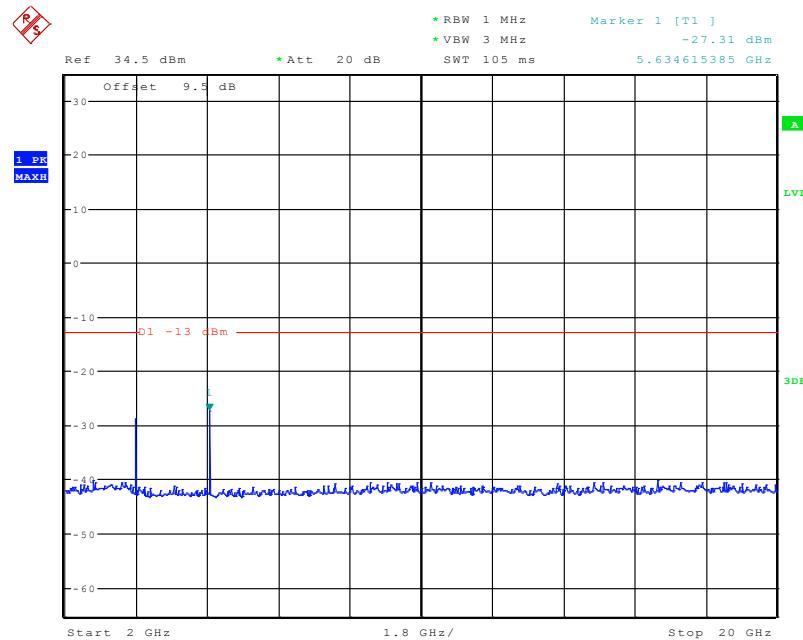
Date: 16.AUG.2019 16:46:13

## 1 GHz – 2 GHz (GSM Mode)

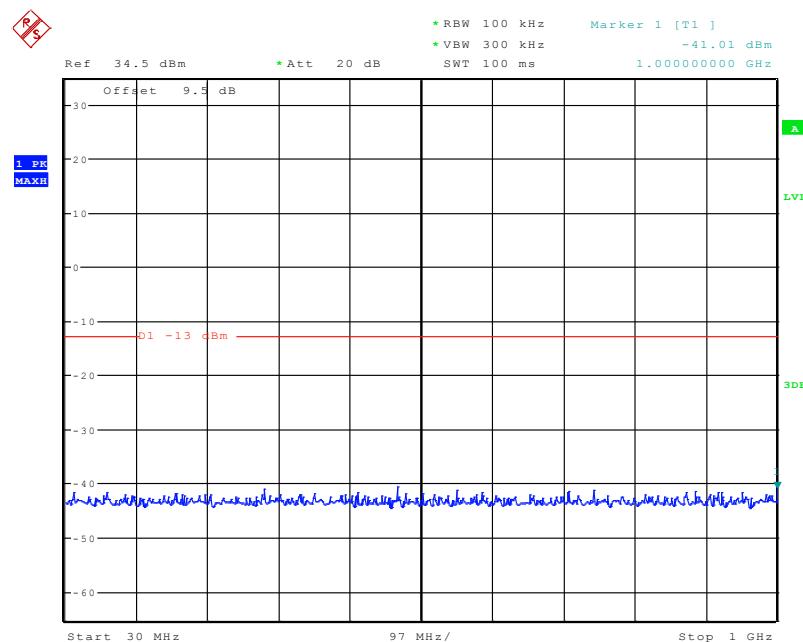


Fundamental test

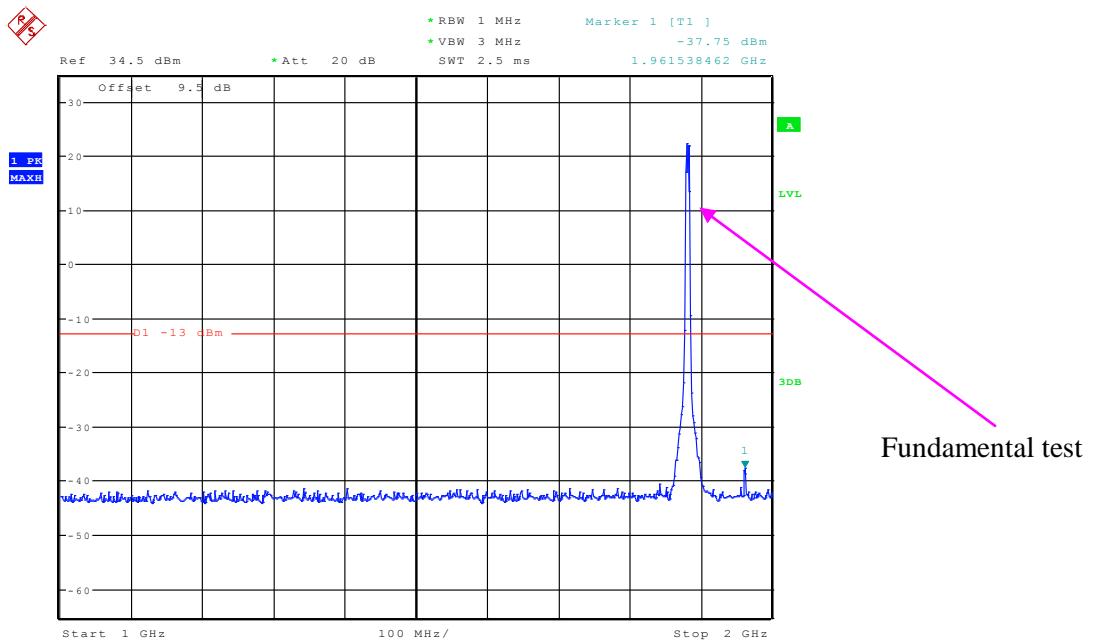
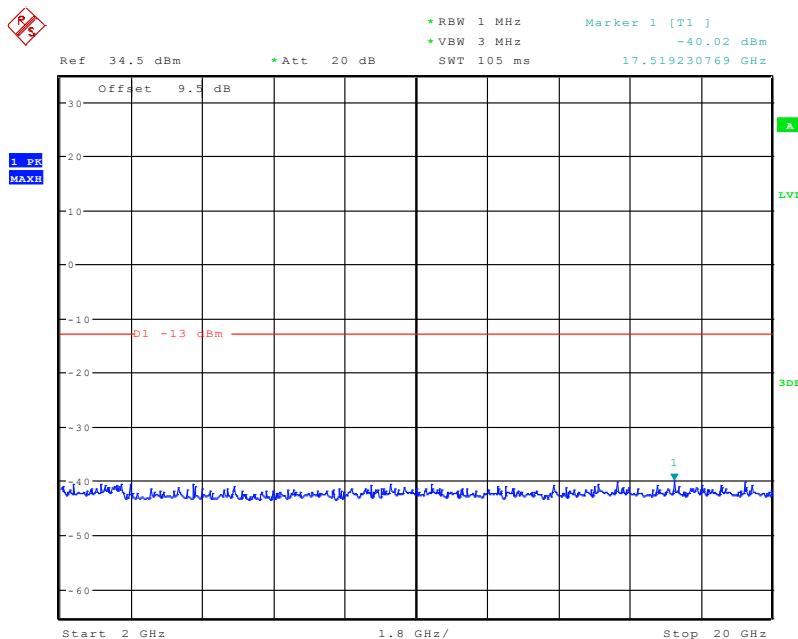
Date: 16.AUG.2019 16:45:10

**2 GHz – 20 GHz (GSM Mode)**

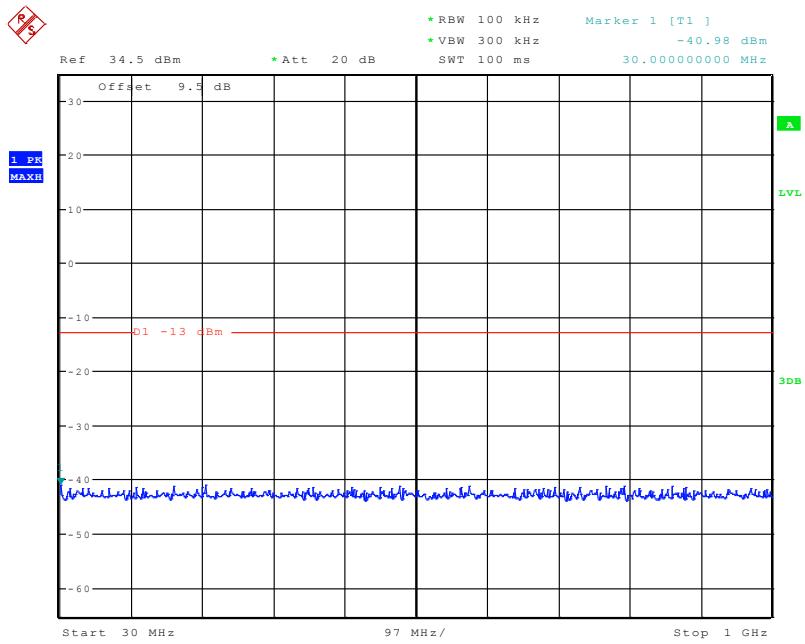
Date: 16.AUG.2019 16:45:49

**30 MHz – 1 GHz (WCDMA Mode)**

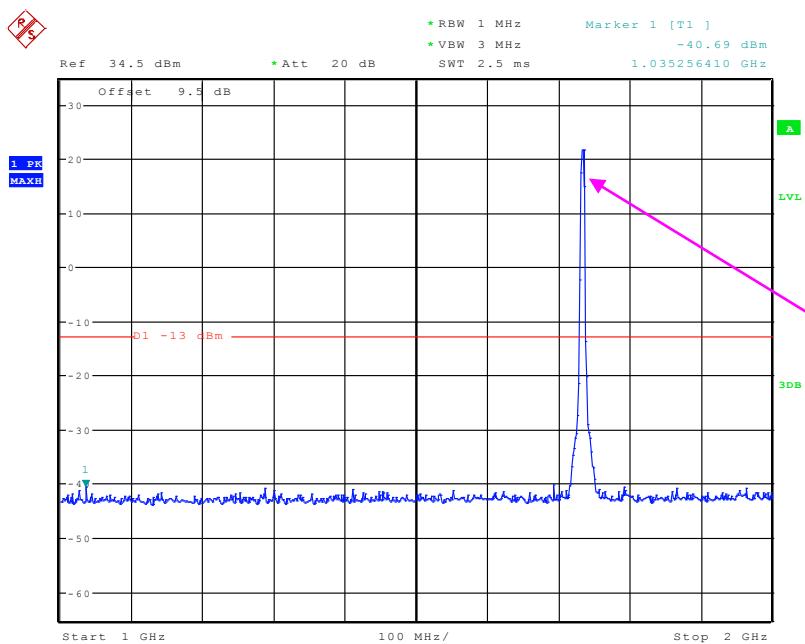
Date: 18.AUG.2019 12:39:50

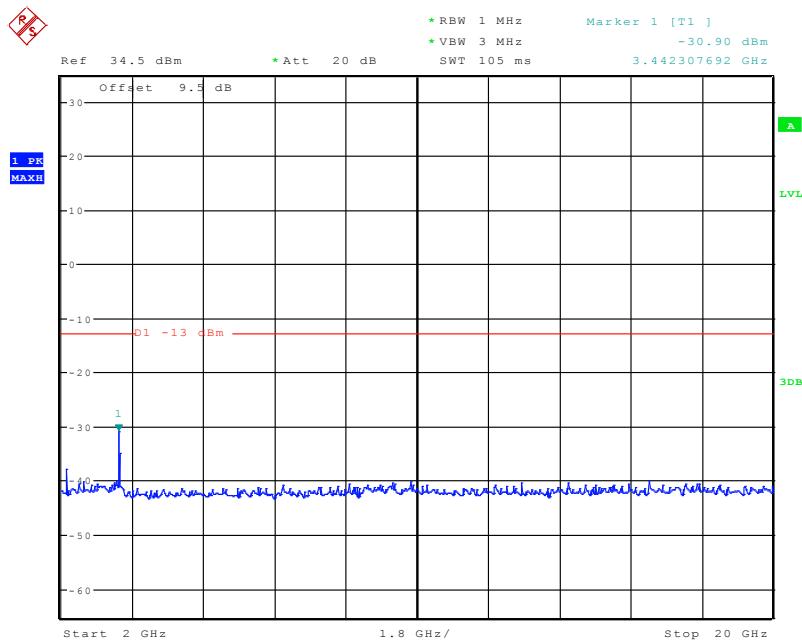
**1 GHz – 2 GHz (WCDMA Mode)****2 GHz – 20 GHz (WCDMA Mode)**

Date: 18.AUG.2019 12:41:46

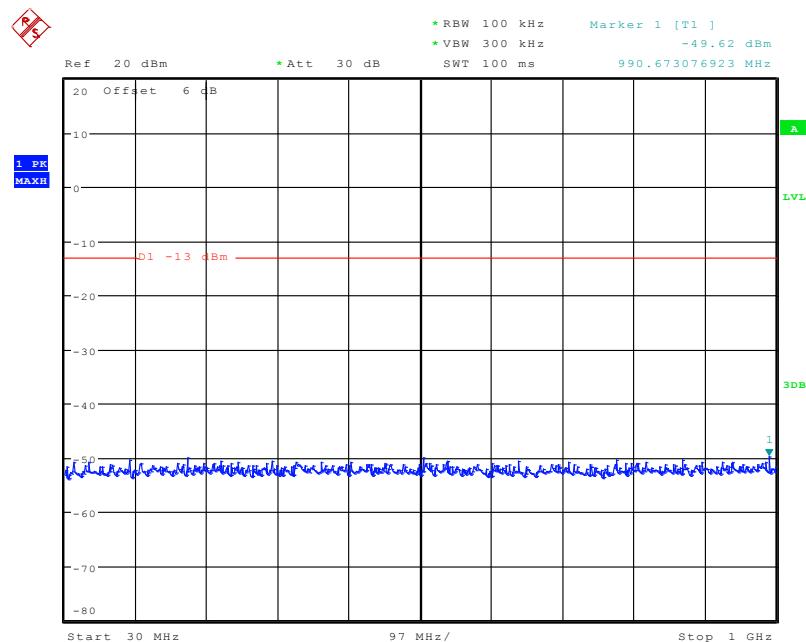
**AWS Band (Part 27)****30 MHz – 1 GHz (WCDMA Mode)**

Date: 18.AUG.2019 13:21:05

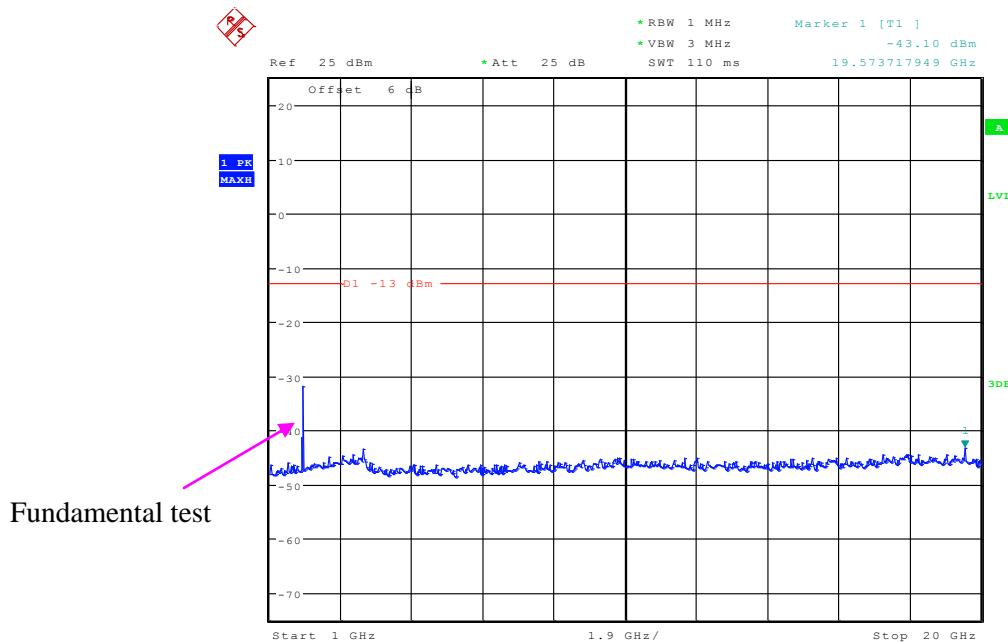
**1 GHz – 2 GHz (WCDMA Mode)**

**2 GHz – 20 GHz (WCDMA Mode)**

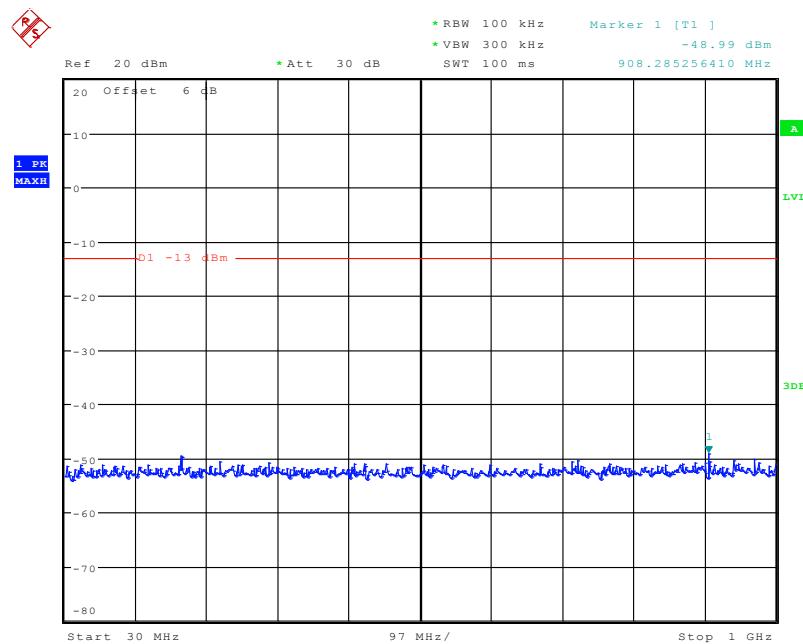
Date: 18.AUG.2019 13:22:44

**LTE Band 2:****30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

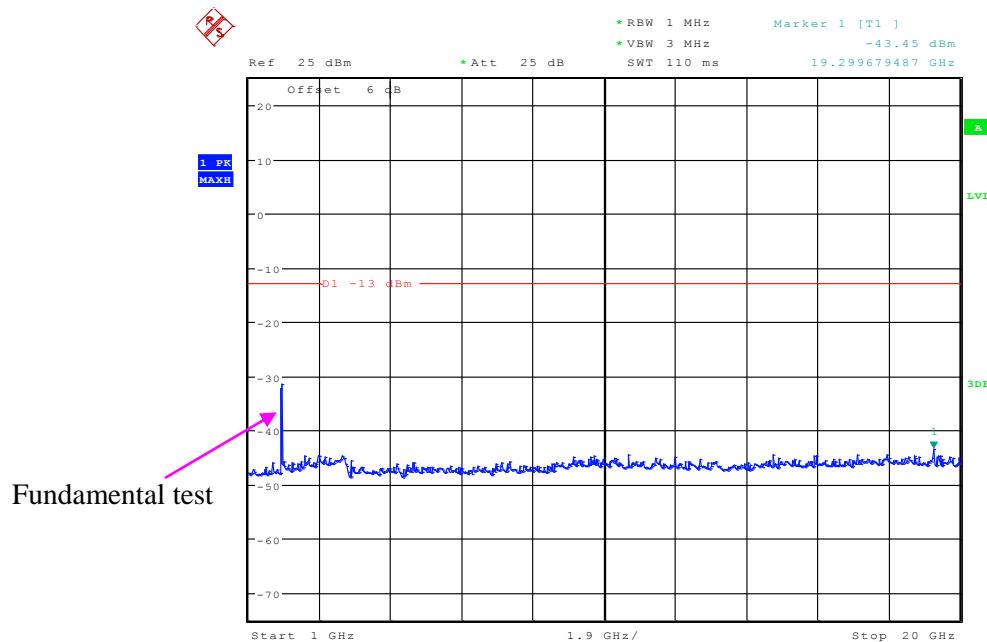
Date: 19.AUG.2019 11:47:54

**1 GHz – 20 GHz (1.4 MHz, Middle Channel)**

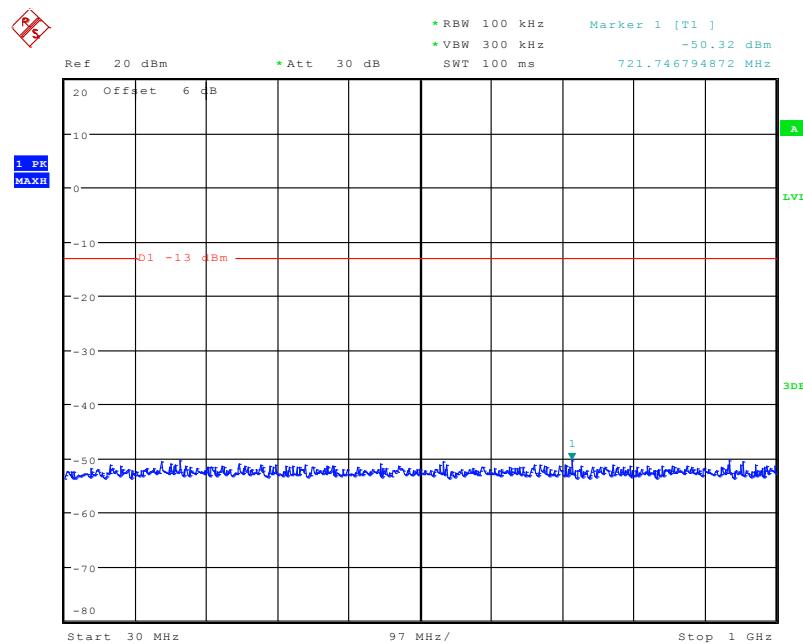
Date: 19.AUG.2019 11:48:03

**30 MHz - 1 GHz (3.0 MHz, Middle Channel)**

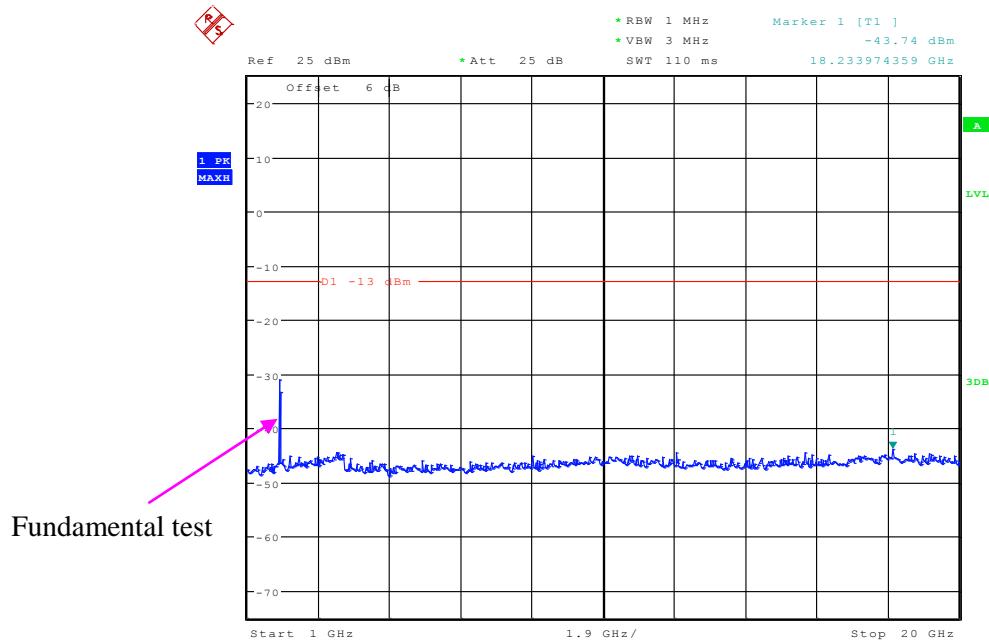
Date: 19.AUG.2019 11:48:18

**1 GHz – 20 GHz (3.0 MHz, Middle Channel)**

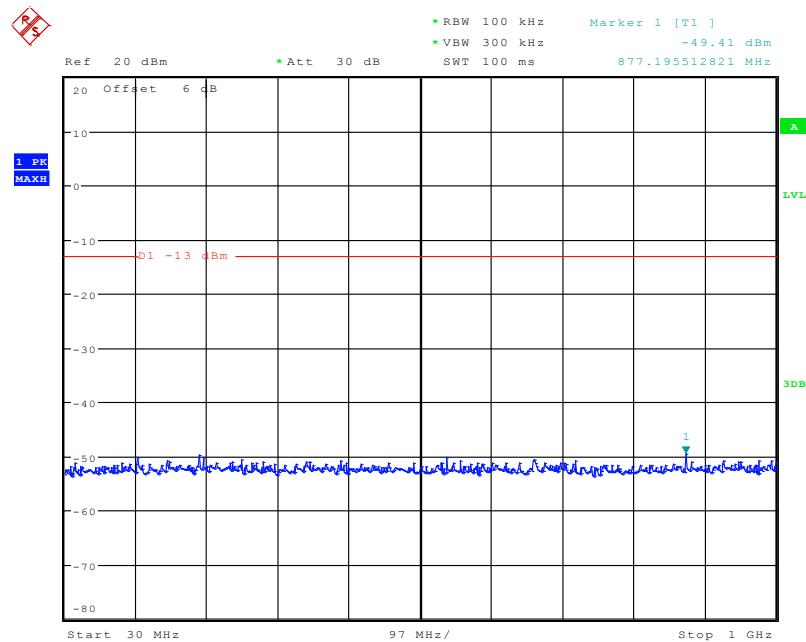
Date: 19.AUG.2019 11:48:27

**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**

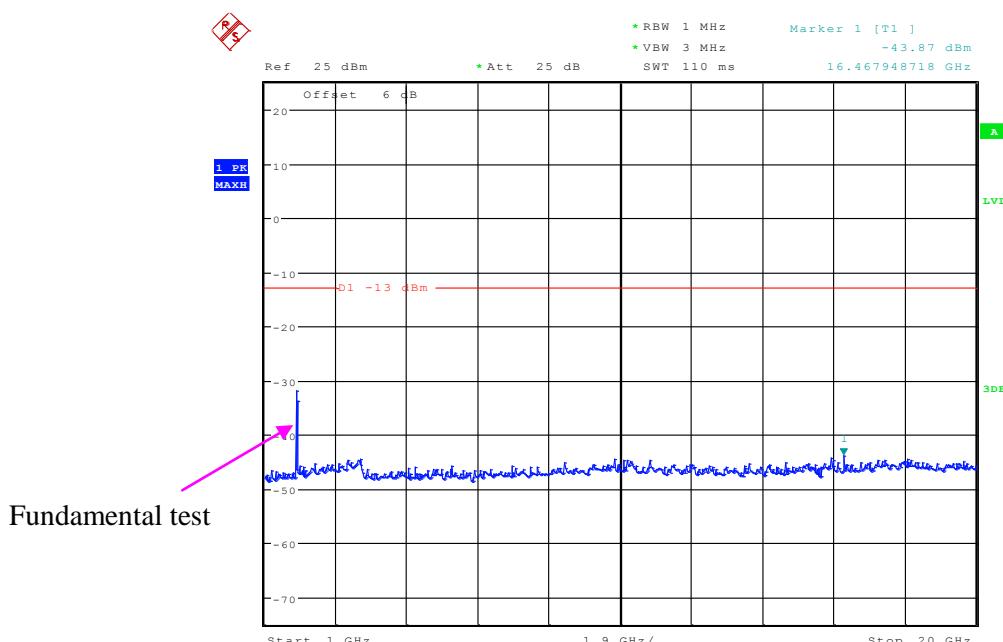
Date: 19.AUG.2019 11:48:43

**1 GHz – 20 GHz (5.0 MHz, Middle Channel)**

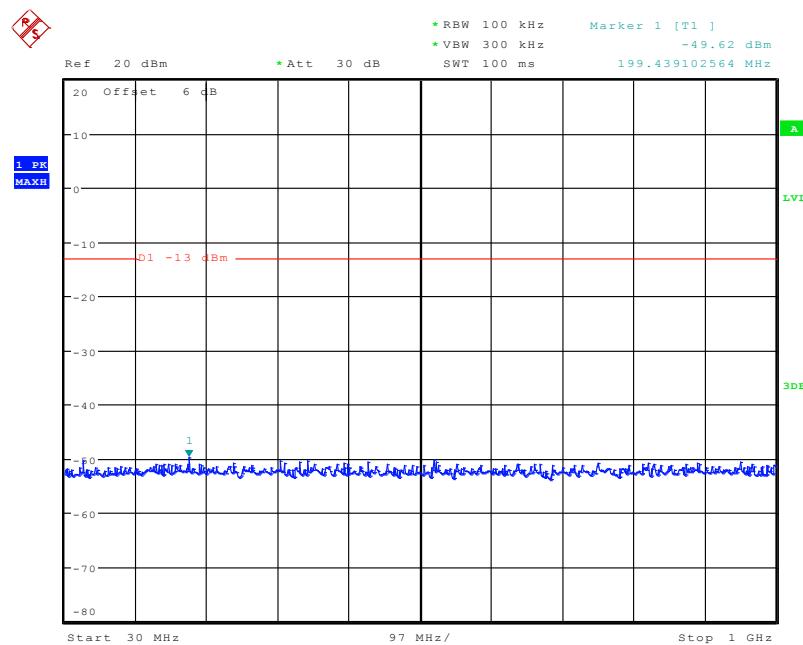
Date: 19.AUG.2019 11:48:52

**30 MHz - 1 GHz (10.0 MHz, Middle Channel)**

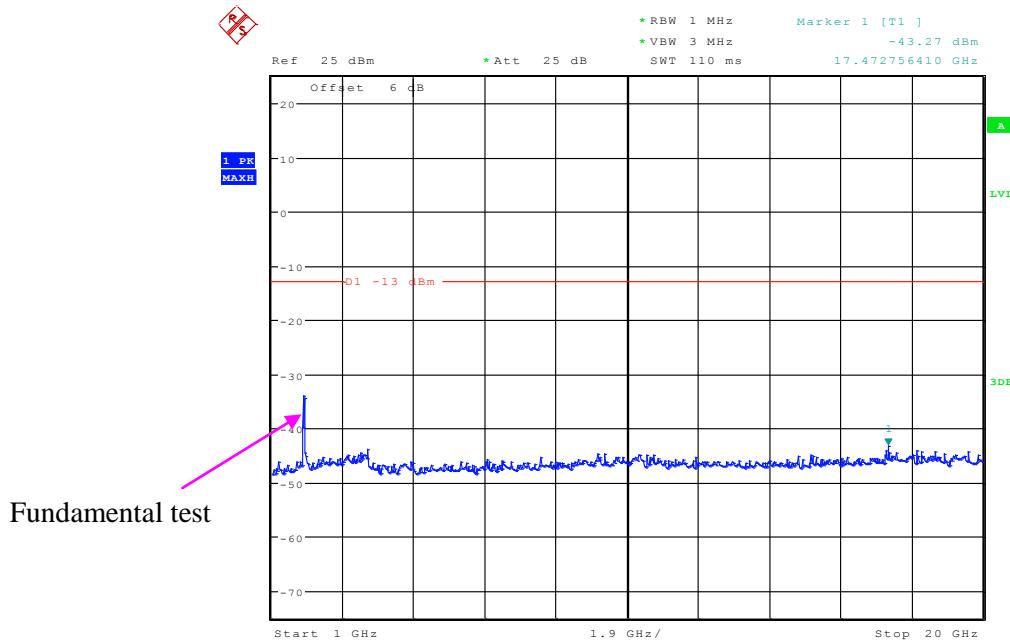
Date: 19.AUG.2019 11:49:11

**1 GHz – 20 GHz (10.0 MHz, Middle Channel)**

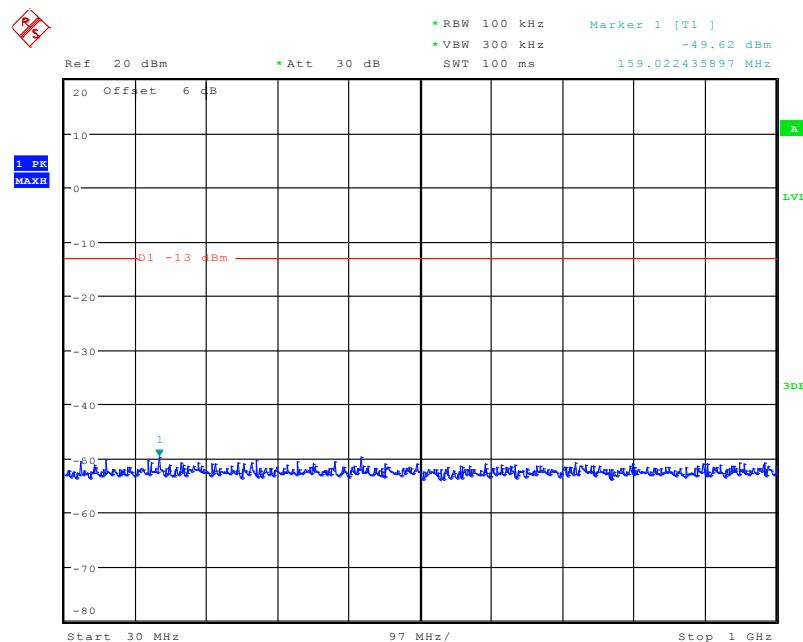
Date: 19.AUG.2019 11:49:20

**30 MHz - 1 GHz (15.0 MHz, Middle Channel)**

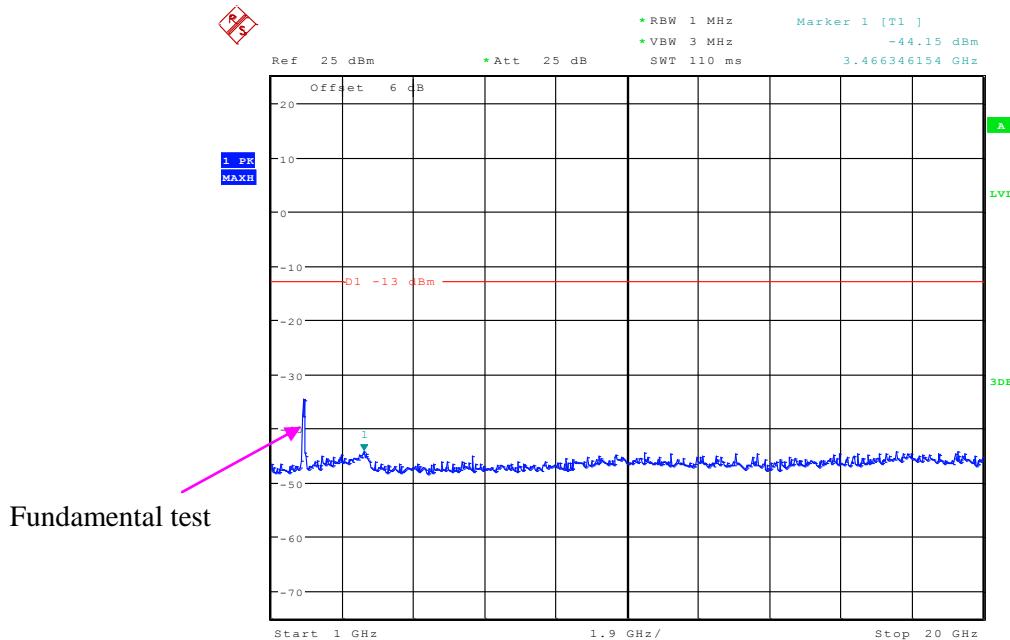
Date: 19.AUG.2019 11:49:40

**1 GHz – 20 GHz (15.0 MHz, Middle Channel)**

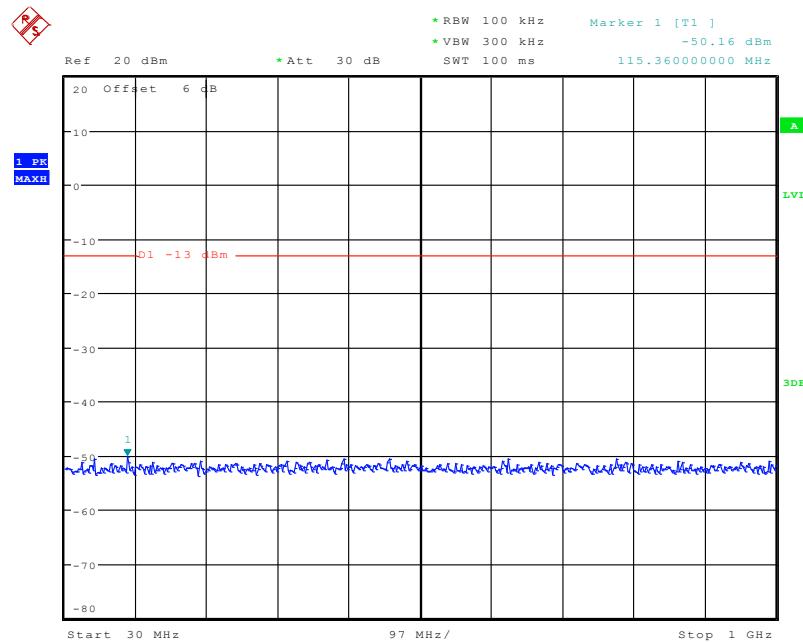
Date: 19.AUG.2019 11:49:49

**30 MHz - 1 GHz (20.0 MHz, Middle Channel)**

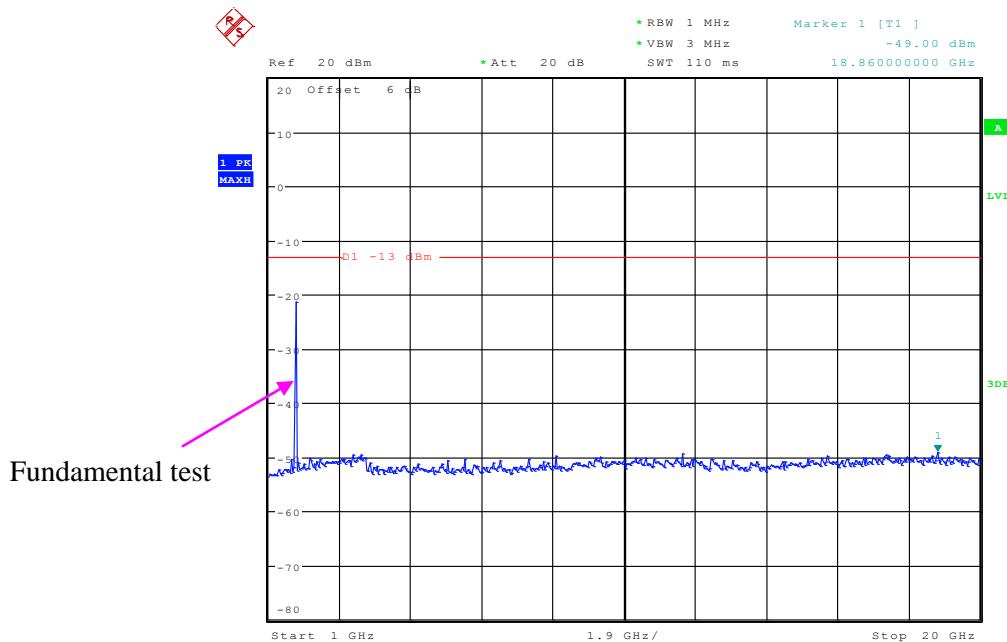
Date: 19.AUG.2019 11:50:07

**1 GHz – 20 GHz (20.0 MHz, Middle Channel)**

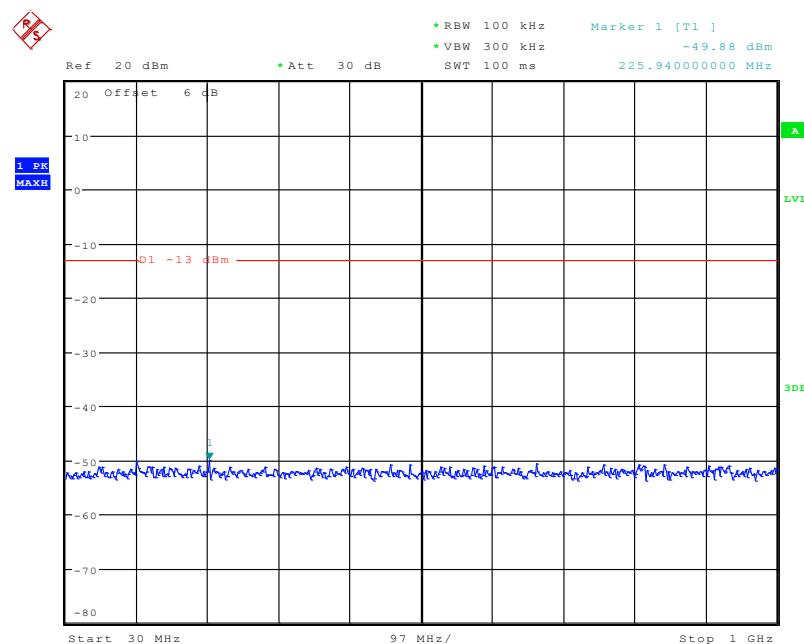
Date: 19.AUG.2019 11:50:16

**LTE Band 4:****30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

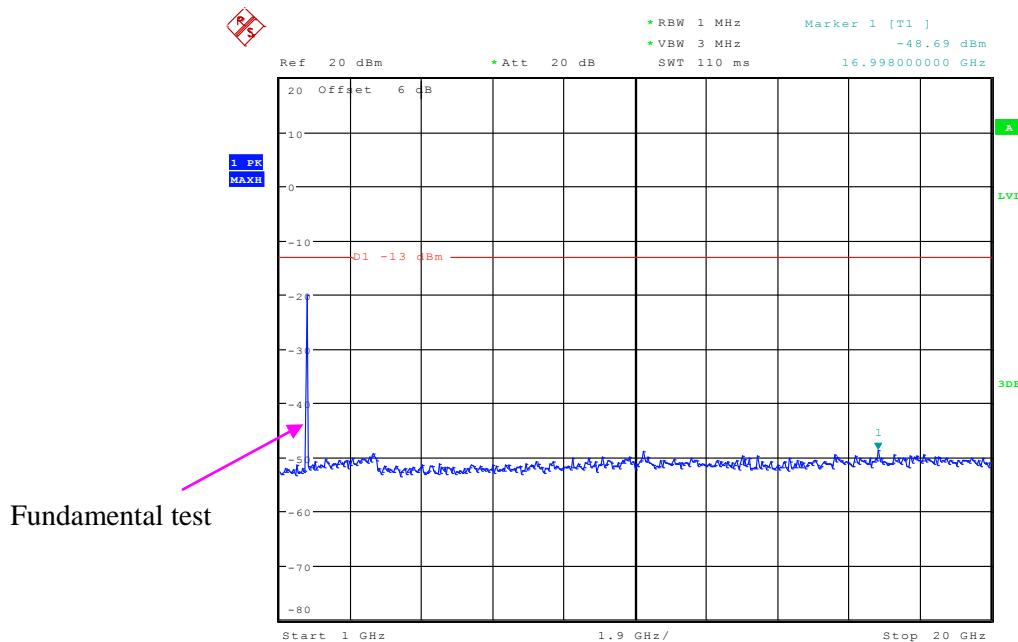
Date: 19.AUG.2019 11:59:38

**1 GHz – 20 GHz (1.4 MHz, Middle Channel)**

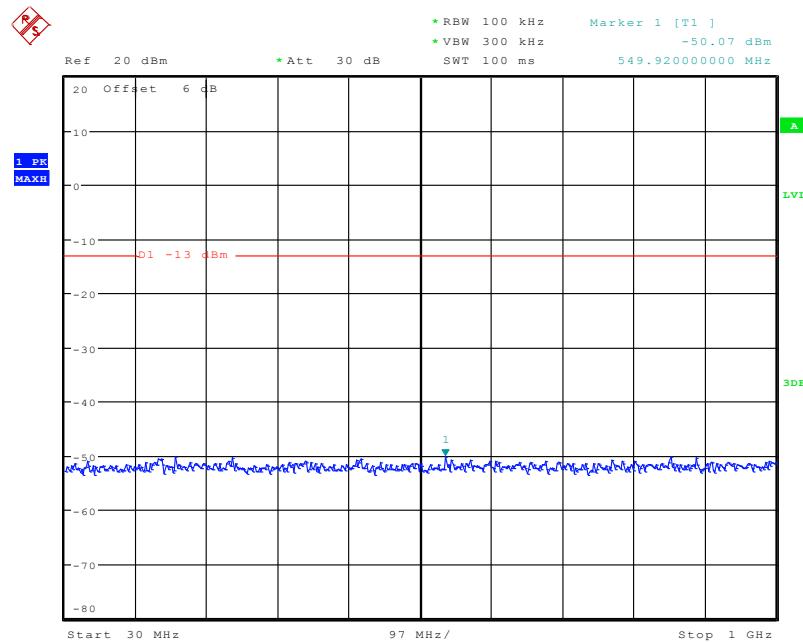
Date: 19.AUG.2019 11:59:47

**30 MHz - 1 GHz (3.0 MHz, Middle Channel)**

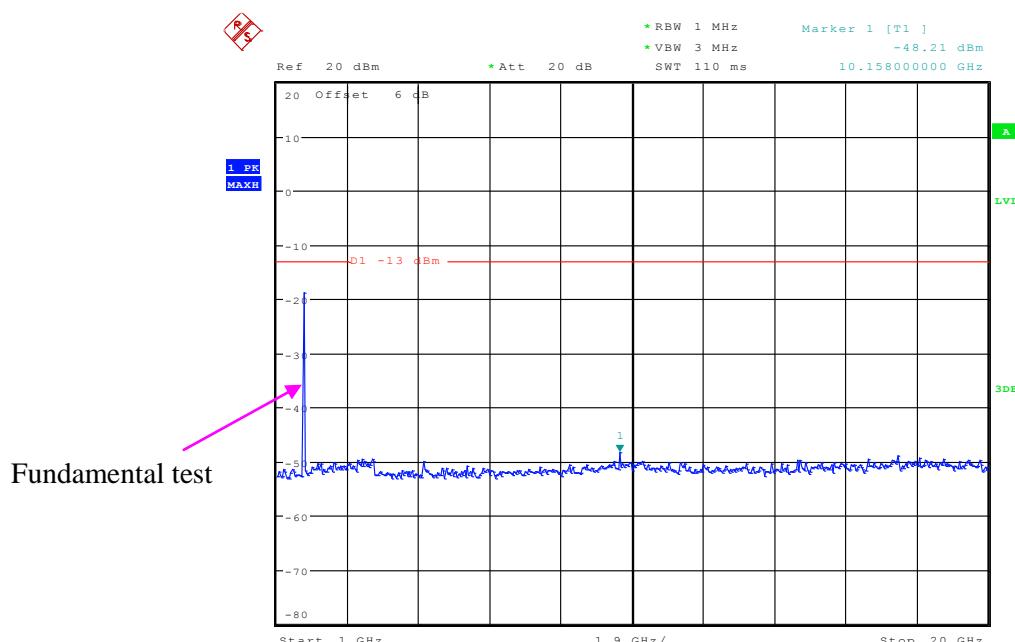
Date: 19.AUG.2019 12:00:02

**1 GHz – 20 GHz (3.0 MHz, Middle Channel)**

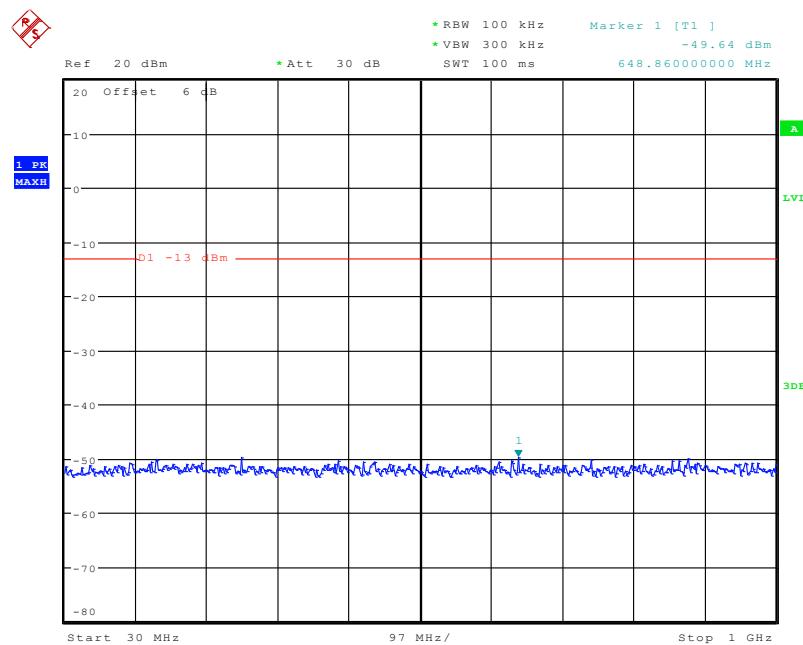
Date: 19.AUG.2019 12:00:11

**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**

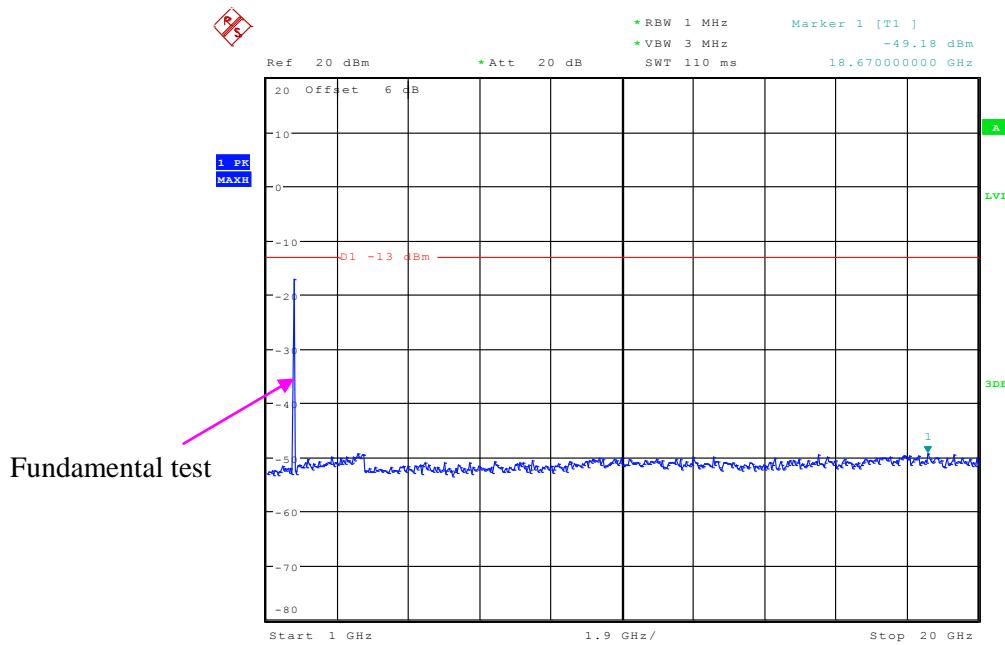
Date: 19.AUG.2019 12:00:29

**1 GHz – 20 GHz (5.0 MHz, Middle Channel)**

Date: 19.AUG.2019 12:00:38

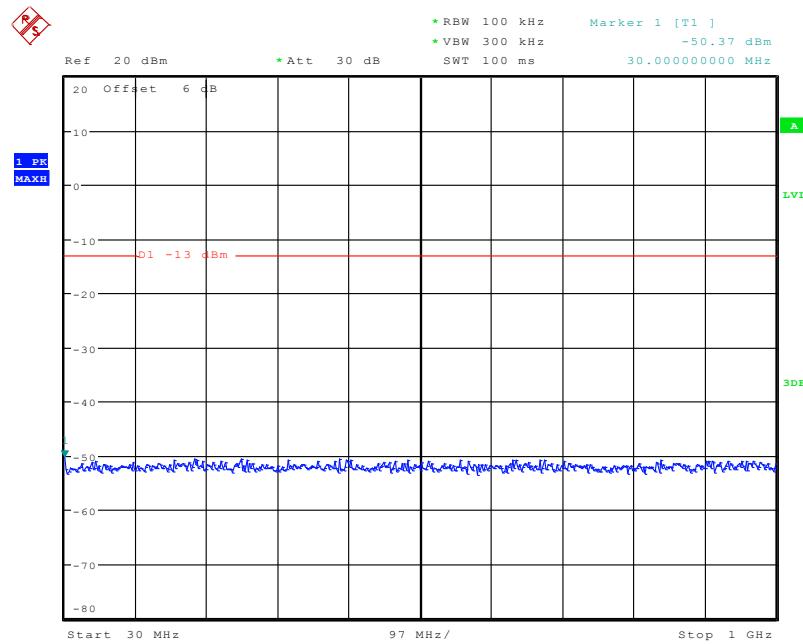
**30 MHz - 1 GHz (10.0 MHz, Middle Channel)**

Date: 19.AUG.2019 12:00:57

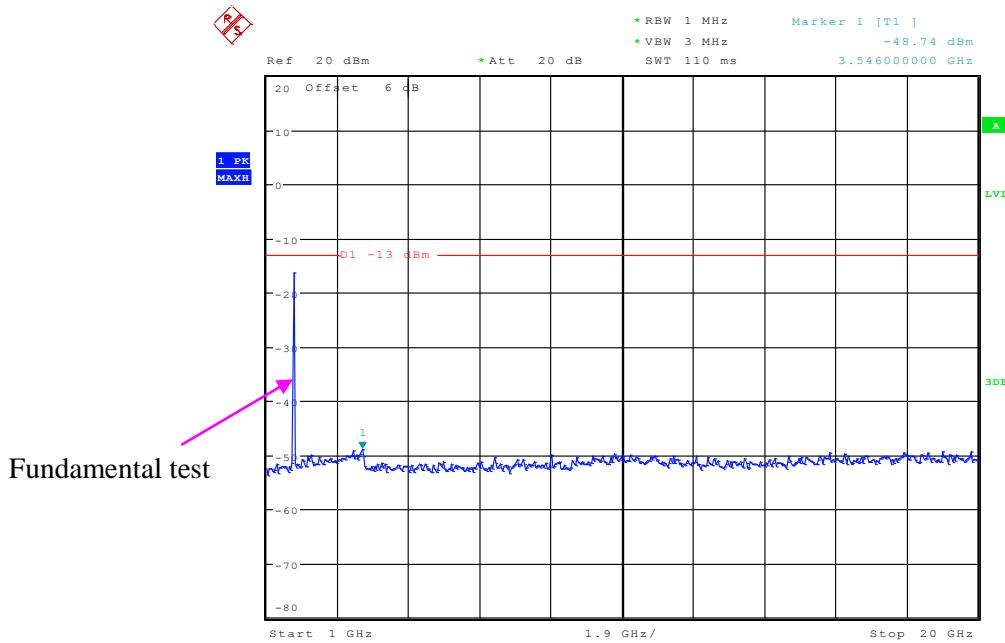
**1 GHz – 20 GHz (10.0 MHz, Middle Channel)**

Fundamental test

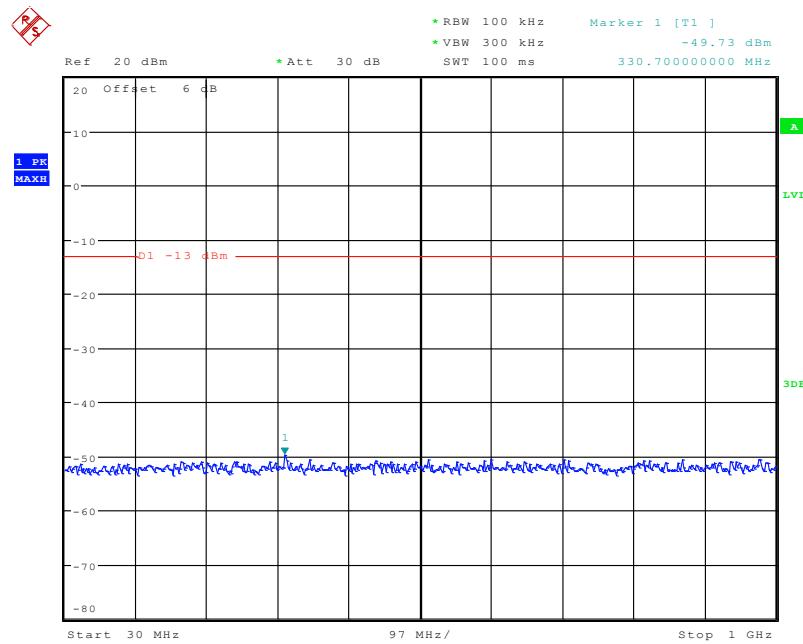
Date: 19.AUG.2019 12:01:06

**30 MHz - 1 GHz (15.0 MHz, Middle Channel)**

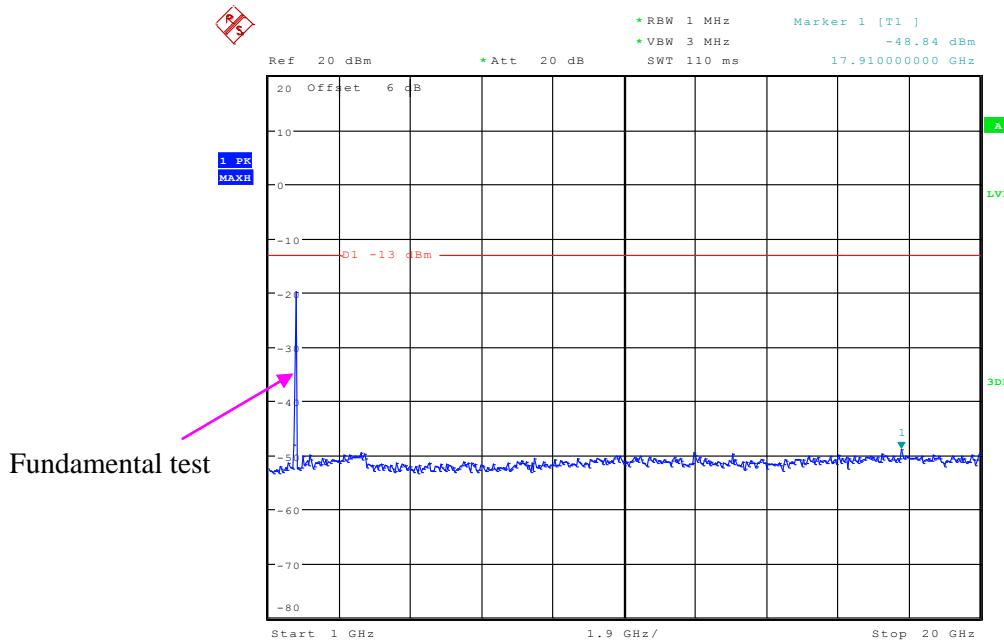
Date: 19.AUG.2019 12:01:25

**1 GHz – 20 GHz (15.0 MHz, Middle Channel)**

Date: 19.AUG.2019 12:01:35

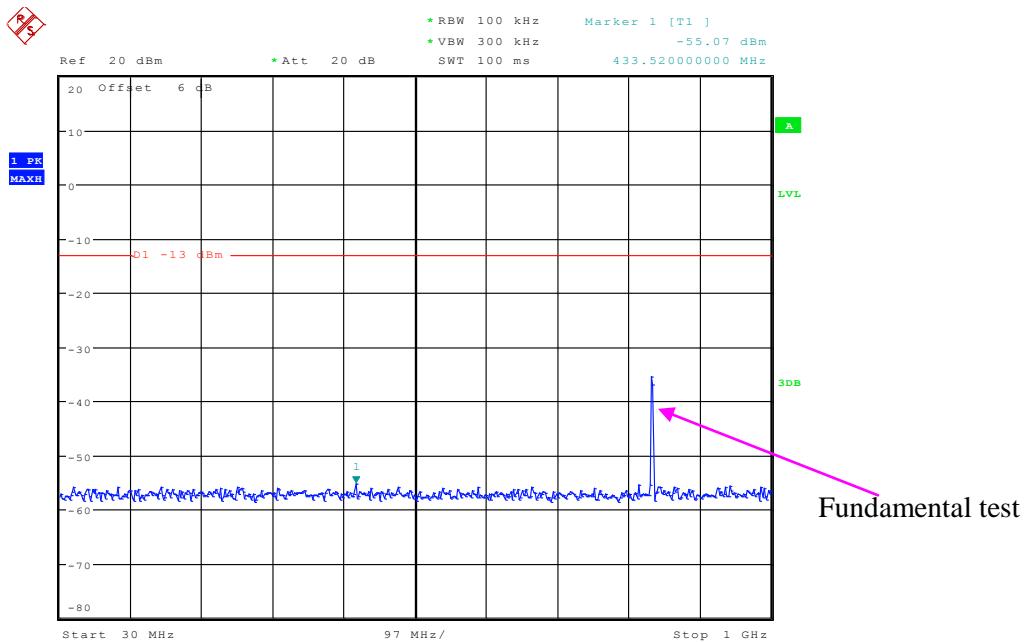
**30 MHz - 1 GHz (20.0 MHz, Middle Channel)**

Date: 19.AUG.2019 12:01:55

**1 GHz – 20 GHz (20.0 MHz, Middle Channel)**

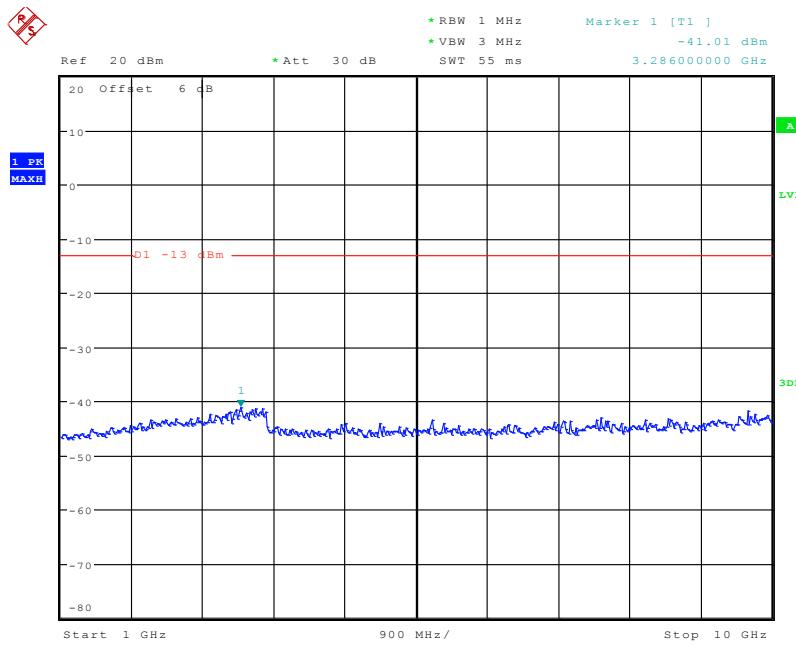
Fundamental test

Date: 19.AUG.2019 12:02:04

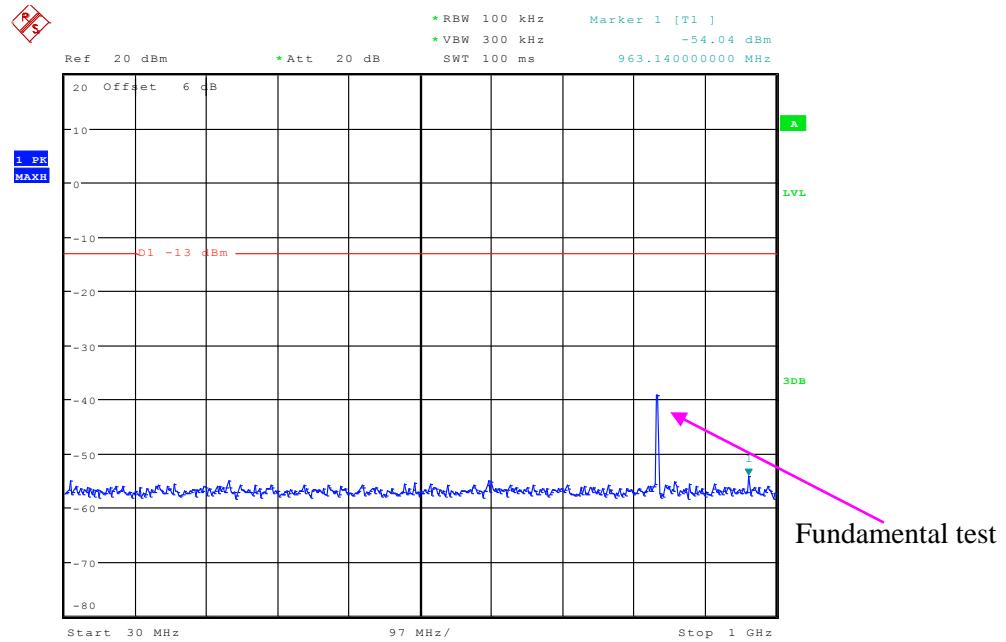
**LTE Band 5:****30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Fundamental test

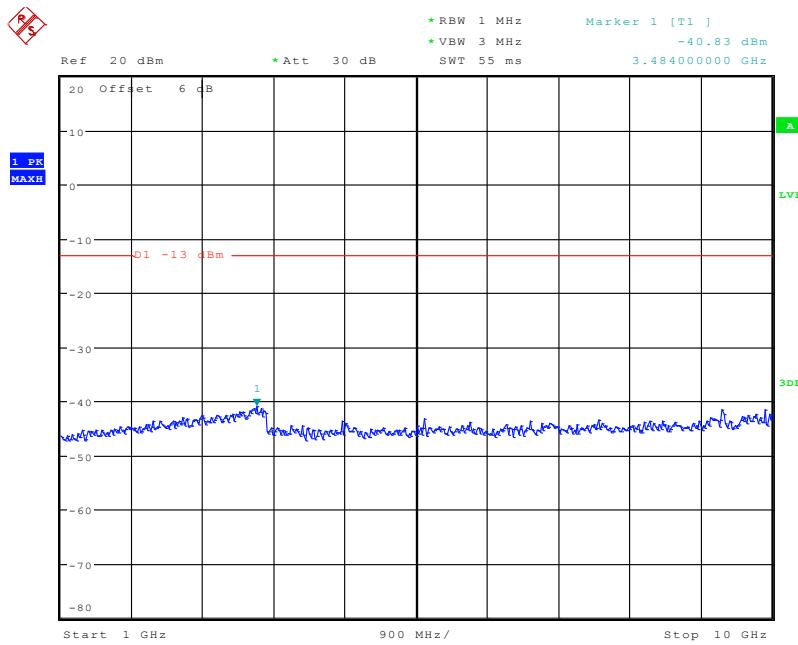
Date: 19.AUG.2019 12:05:16

**1 GHz – 10 GHz (1.4 MHz, Middle Channel)**

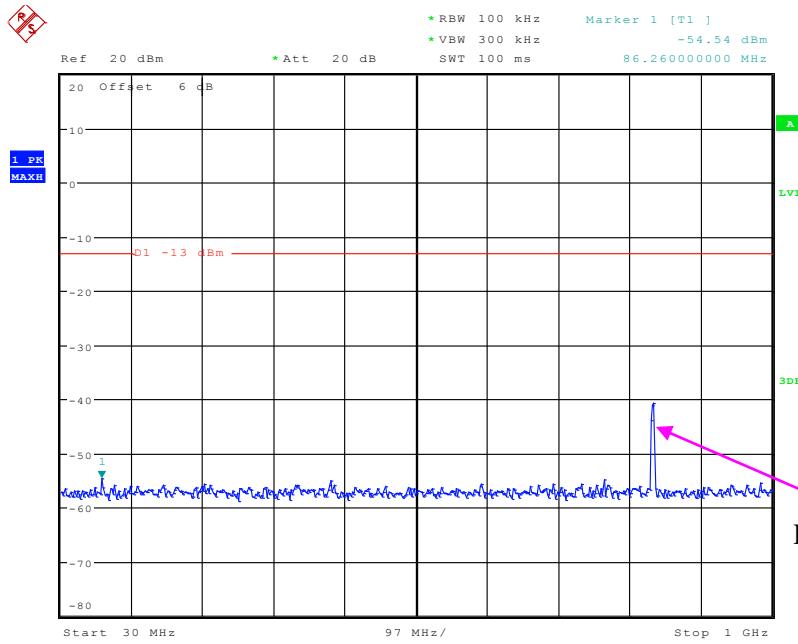
Date: 19.AUG.2019 12:05:25

**30 MHz - 1 GHz (3.0 MHz, Middle Channel)**

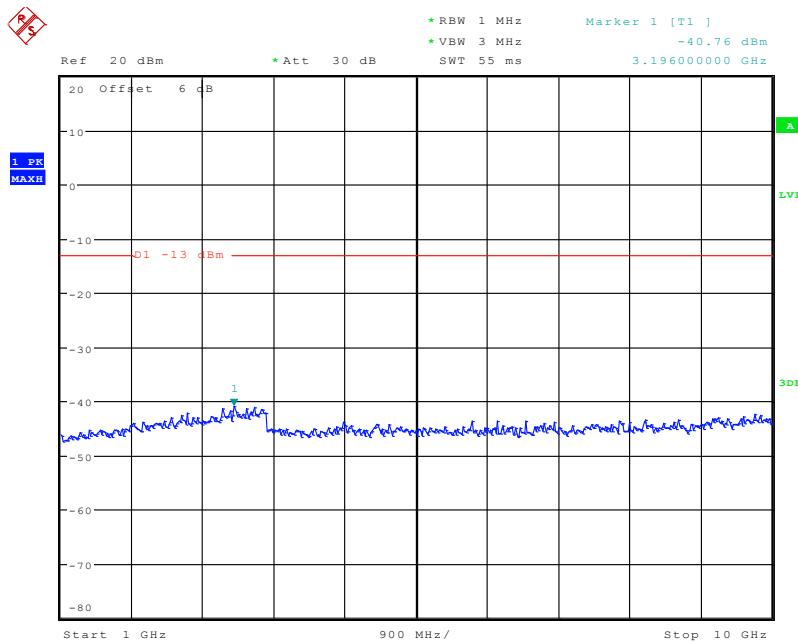
Date: 19.AUG.2019 12:05:45

**1 GHz – 10 GHz (3.0 MHz, Middle Channel)**

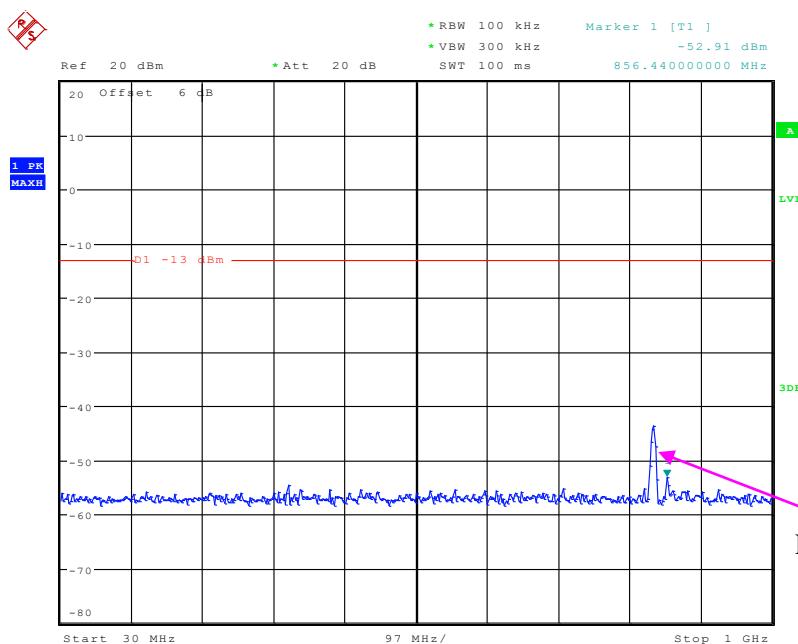
Date: 19.AUG.2019 12:05:54

**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**

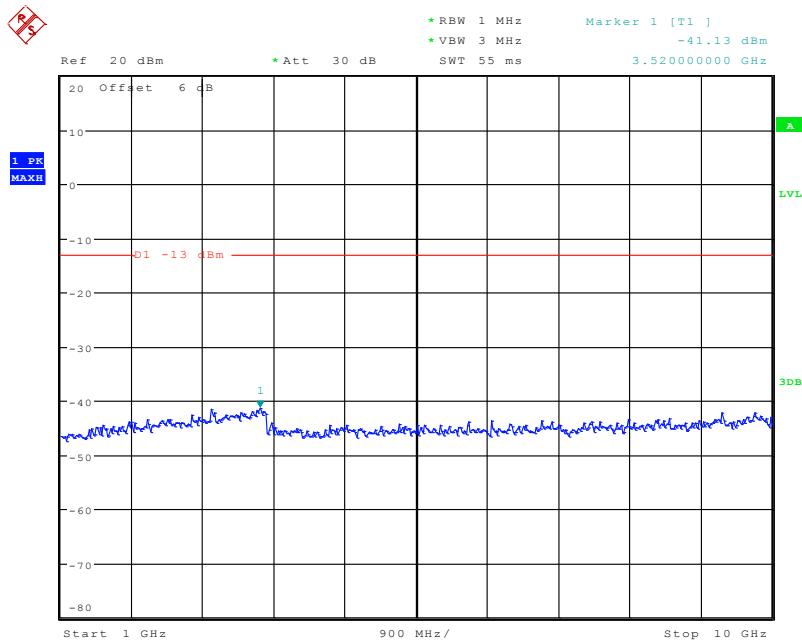
Date: 19.AUG.2019 12:06:10

**1 GHz – 10 GHz (5.0 MHz, Middle Channel)**

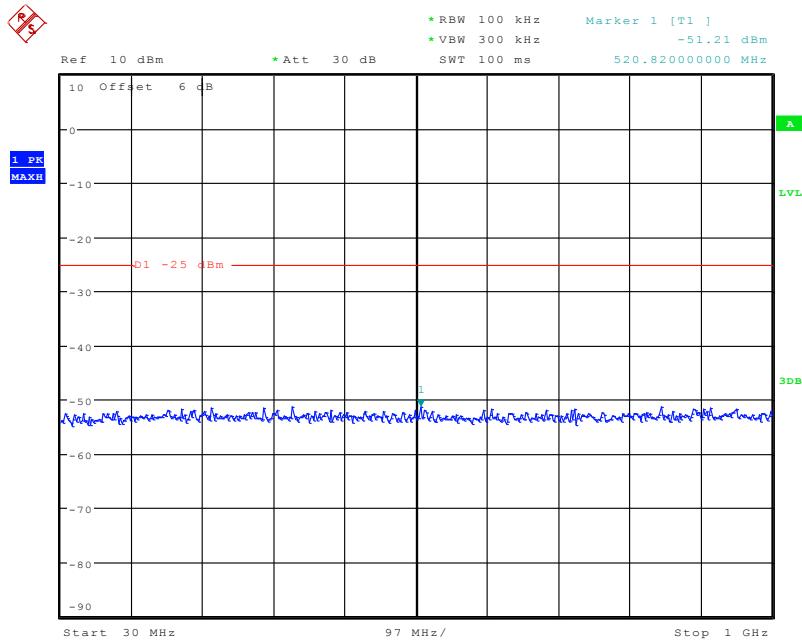
Date: 19.AUG.2019 12:06:19

**30 MHz - 1 GHz (10.0 MHz, Middle Channel)**

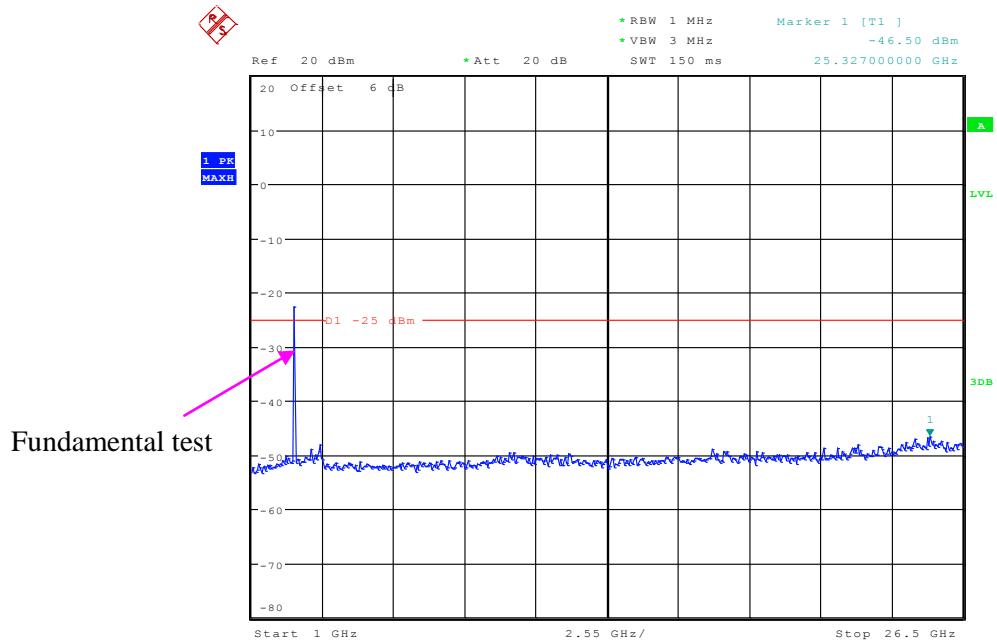
Date: 19.AUG.2019 12:06:39

**1 GHz – 10 GHz (10.0 MHz, Middle Channel)**

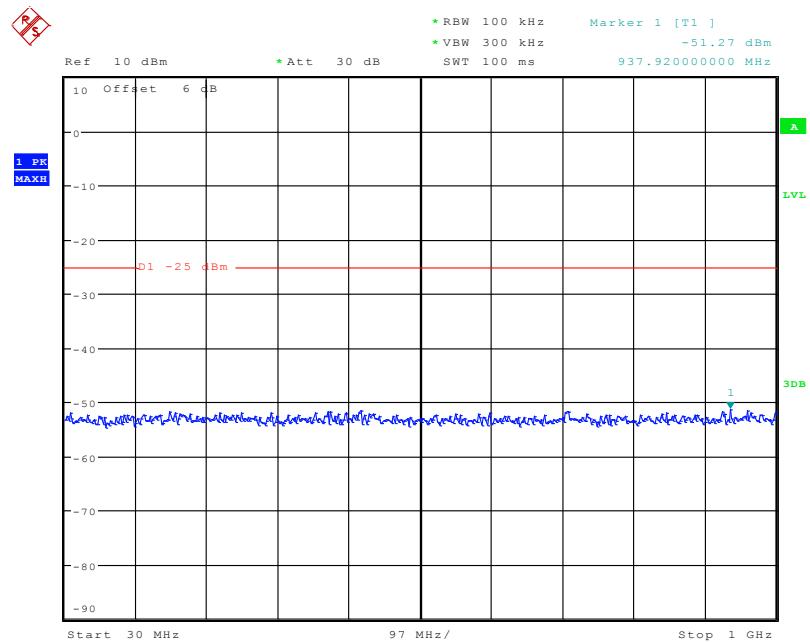
Date: 19.AUG.2019 12:06:48

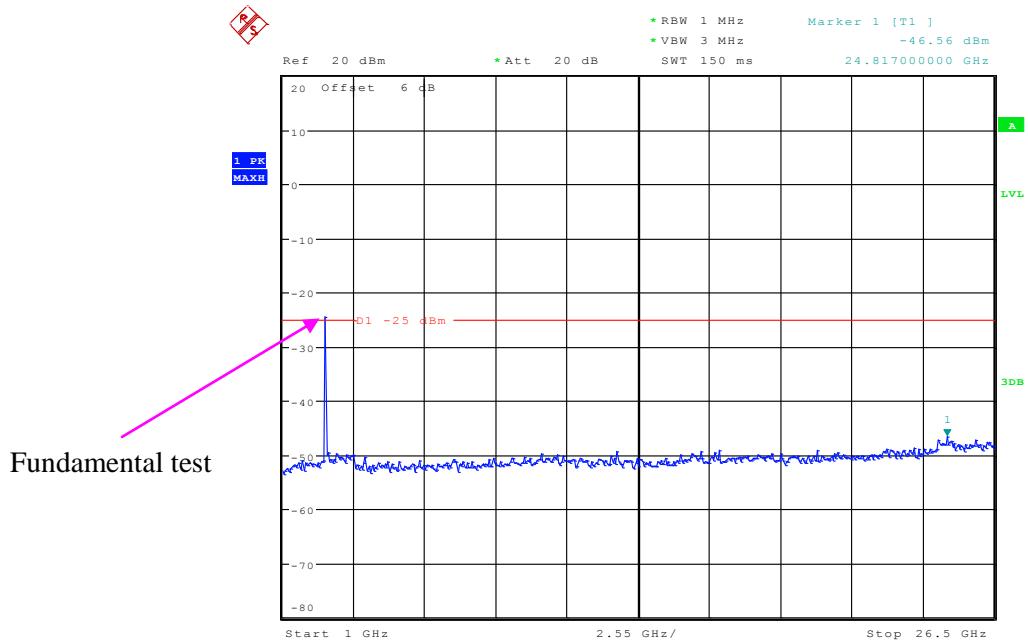
**LTE Band 7:****30 MHz - 1 GHz (5 MHz, Middle Channel)**

Date: 19.AUG.2019 12:09:30

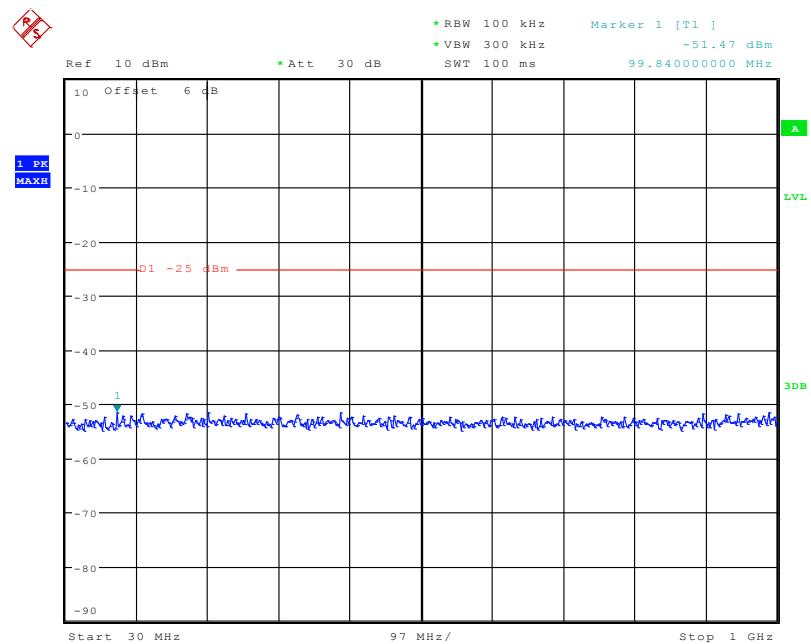
**1 GHz – 26.5 GHz (5 MHz, Middle Channel)**

Date: 19.AUG.2019 12:09:39

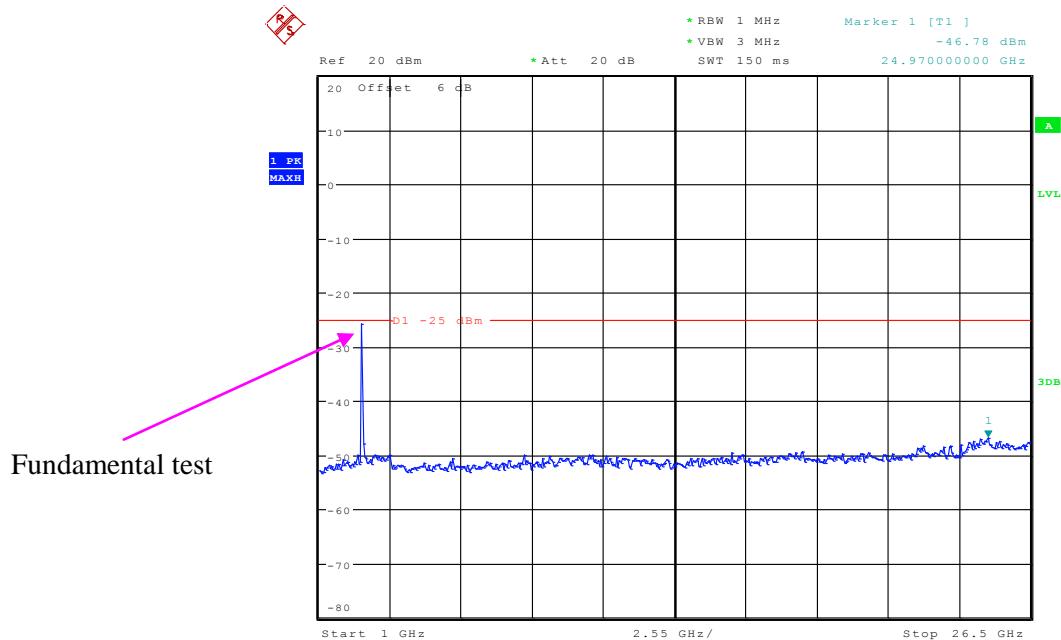
**30 MHz - 1 GHz (10 MHz, Middle Channel)**

**1 GHz – 26.5 GHz (10 MHz, Middle Channel)**

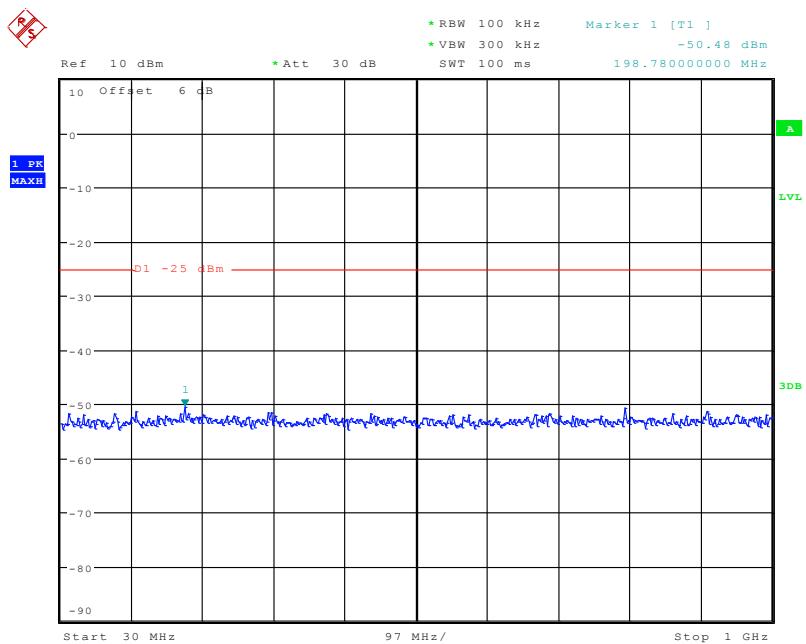
Date: 19.AUG.2019 12:10:07

**30 MHz - 1 GHz (15 MHz, Middle Channel)**

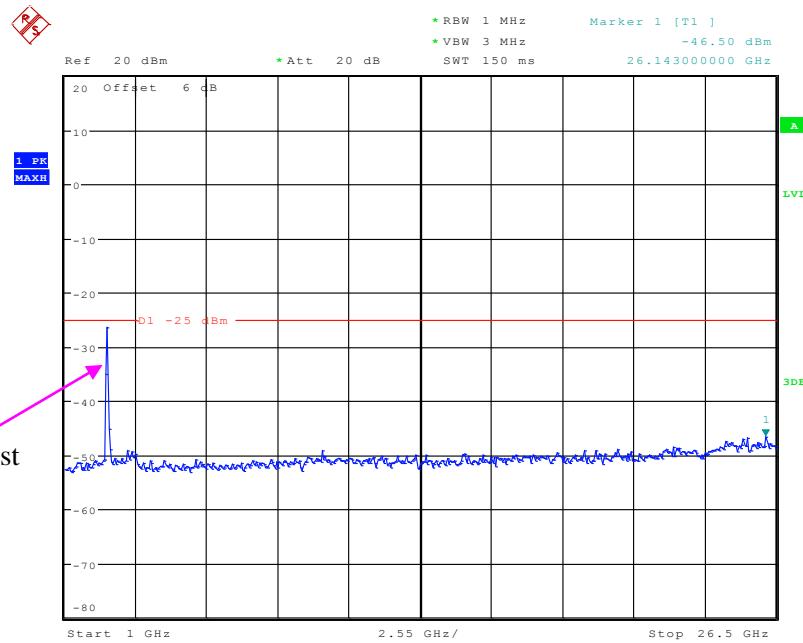
Date: 19.AUG.2019 12:10:23

**1 GHz – 26.5 GHz (15 MHz, Middle Channel)**

Date: 19.AUG.2019 12:10:32

**30 MHz - 1 GHz (20 MHz, Middle Channel)**

Date: 19.AUG.2019 12:10:53

**1 GHz – 26.5 GHz (20 MHz, Middle Channel)**

**FCC §2.1053; §22.917 (a); §24.238 (a); §27.53 SPURIOUS RADIATED EMISSIONS****Applicable Standard**

FCC §2.1053, §22.917(a) and §24.238(a) and §27.53

**Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Curry Xiang from 2019-08-14 to 2019-08-16.*

*EUT operation mode: Transmitting*

*Pre-scan with Low, Middle and High channel, the worst case as below:*

**30 MHz ~ 10 GHz:**

**Cellular Band (Part 22H)**

| Frequency<br>(MHz)         | Receiver<br>Reading<br>(dB $\mu$ V) | Turntable<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                              | Absolute<br>Level<br>(dBm) | FCC Part 22H   |                |
|----------------------------|-------------------------------------|------------------------------|---------------|----------------|----------------|-----------------------|------------------------------|----------------------------|----------------|----------------|
|                            |                                     |                              | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dBd/dBi) |                            | Limit<br>(dBm) | Margin<br>(dB) |
| GSM Mode, middle channel   |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 936.81                     | 37.30                               | 313                          | 2.5           | H              | -63.3          | 1.37                  | 0                            | -64.67                     | -13            | 51.67          |
| 936.81                     | 36.14                               | 126                          | 2.2           | V              | -63.2          | 1.37                  | 0                            | -64.57                     | -13            | 51.57          |
| 1673.20                    | 47.86                               | 89                           | 1.5           | H              | -58.5          | 1.30                  | 8.90                         | -50.90                     | -13            | 37.90          |
| 1673.20                    | 46.74                               | 39                           | 1.3           | V              | -59.0          | 1.30                  | 8.90                         | -51.40                     | -13            | 38.40          |
| 2509.80                    | 49.54                               | 353                          | 2.1           | H              | -53.8          | 2.60                  | 10.20                        | -46.20                     | -13            | 33.20          |
| 2509.80                    | 48.79                               | 155                          | 1.0           | V              | -54.0          | 2.60                  | 10.20                        | -46.40                     | -13            | 33.40          |
| 3346.40                    | 43.08                               | 172                          | 2.2           | H              | -57.8          | 1.50                  | 11.70                        | -47.60                     | -13            | 34.60          |
| 3346.40                    | 42.70                               | 103                          | 2.4           | V              | -58.2          | 1.50                  | 11.70                        | -48.00                     | -13            | 35.00          |
| WCDMA Mode, Middle channel |                                     |                              |               |                |                |                       |                              |                            |                |                |
| 942.33                     | 37.58                               | 193                          | 1.0           | H              | -63.0          | 1.37                  | 0                            | -64.37                     | -13            | 51.37          |
| 942.33                     | 37.60                               | 241                          | 2.2           | V              | -61.7          | 1.37                  | 0                            | -63.07                     | -13            | 50.07          |
| 1673.20                    | 45.24                               | 290                          | 1.8           | H              | -61.1          | 1.30                  | 8.90                         | -53.50                     | -13            | 40.50          |
| 1673.20                    | 44.26                               | 94                           | 2.2           | V              | -61.5          | 1.30                  | 8.90                         | -53.90                     | -13            | 40.90          |
| 2509.80                    | 48.35                               | 330                          | 1.4           | H              | -55.0          | 2.60                  | 10.20                        | -47.40                     | -13            | 34.40          |
| 2509.80                    | 46.31                               | 182                          | 1.1           | V              | -56.4          | 2.60                  | 10.20                        | -48.80                     | -13            | 35.80          |
| 3346.40                    | 43.88                               | 255                          | 1.0           | H              | -57.0          | 1.50                  | 11.70                        | -46.80                     | -13            | 33.80          |
| 3346.40                    | 43.17                               | 134                          | 1.4           | V              | -57.8          | 1.50                  | 11.70                        | -47.60                     | -13            | 34.60          |

**30 MHz ~ 20 GHz:**  
**PCS Band (Part 24E)**

| Frequency (MHz)                    | Receiver Reading (dB $\mu$ V) | Turntable Angle Degree | Rx Antenna |             | Substituted |                 |                        | Absolute Level (dBm) | FCC Part 24E |             |
|------------------------------------|-------------------------------|------------------------|------------|-------------|-------------|-----------------|------------------------|----------------------|--------------|-------------|
|                                    |                               |                        | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBd/dBi) |                      | Limit (dBm)  | Margin (dB) |
| GSM Mode, middle channel           |                               |                        |            |             |             |                 |                        |                      |              |             |
| 245.12                             | 35.76                         | 33                     | 2.4        | H           | -61.2       | 0.31            | 0                      | -61.51               | -13          | 48.51       |
| 245.12                             | 32.73                         | 359                    | 1.9        | V           | -64.3       | 0.31            | 0                      | -64.61               | -13          | 51.61       |
| 3760.00                            | 57.76                         | 9                      | 1.6        | H           | -44.3       | 1.50            | 11.80                  | -34.00               | -13          | 21.00       |
| 3760.00                            | 52.81                         | 223                    | 2.0        | V           | -48.8       | 1.50            | 11.80                  | -38.50               | -13          | 25.50       |
| WCDMA Mode Band II, Middle channel |                               |                        |            |             |             |                 |                        |                      |              |             |
| 942.33                             | 36.24                         | 225                    | 2.0        | H           | -64.3       | 1.37            | 0                      | -65.67               | -13          | 52.67       |
| 942.33                             | 36.16                         | 217                    | 2.0        | V           | -63.2       | 1.37            | 0                      | -64.57               | -13          | 51.57       |
| 3760.00                            | 46.94                         | 191                    | 2.0        | H           | -55.1       | 1.50            | 11.80                  | -44.80               | -13          | 31.80       |
| 3760.00                            | 46.39                         | 107                    | 2.4        | V           | -55.2       | 1.50            | 11.80                  | -44.90               | -13          | 31.90       |
| 7520.00                            | 48.41                         | 195                    | 1.4        | H           | -47.5       | 1.90            | 10.70                  | -38.70               | -13          | 25.70       |
| 7520.00                            | 48.99                         | 87                     | 1.3        | V           | -46.5       | 1.90            | 10.70                  | -37.70               | -13          | 24.70       |

**AWS Band (Part 27)**

| Frequency (MHz)                    | Receiver Reading (dB $\mu$ V) | Turntable Angle Degree | Rx Antenna |             | Substituted |                 |                        | Absolute Level (dBm) | FCC Part 27 |             |
|------------------------------------|-------------------------------|------------------------|------------|-------------|-------------|-----------------|------------------------|----------------------|-------------|-------------|
|                                    |                               |                        | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBd/dBi) |                      | Limit (dBm) | Margin (dB) |
| WCDMA Mode Band IV, Middle channel |                               |                        |            |             |             |                 |                        |                      |             |             |
| 942.33                             | 36.32                         | 334                    | 2.3        | H           | -64.3       | 1.37            | 0                      | -65.67               | -13         | 52.67       |
| 942.33                             | 37.21                         | 103                    | 2.3        | V           | -62.1       | 1.37            | 0                      | -63.47               | -13         | 50.47       |
| 3465.20                            | 47.77                         | 98                     | 1.0        | H           | -53.0       | 1.50            | 12.00                  | -42.50               | -13         | 29.50       |
| 3465.20                            | 48.42                         | 277                    | 1.4        | V           | -53.1       | 1.50            | 12.00                  | -42.60               | -13         | 29.60       |

**LTE Band:** (Pre-scan with all the bandwidth, and worse case as below)

| Frequency                                     | Receiver             | Turntable    | Rx Antenna |             | Substituted |                 |                        | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |  |  |  |
|---|----------------------|--------------|------------|-------------|-------------|-----------------|------------------------|----------------------|-------------|-------------|--|--|--|
| (MHz)   | Reading (dB $\mu$ V) | Angle Degree | Height (m) | Polar (H/V) | Level (dBm) | Cable Loss (dB) | Antenna Gain (dBd/dBi) |                      |             |             |  |  |  |
| <b>Band 2 (1.4 MHz, Middle Channel)</b>       |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| <b>Test frequency range:30 MHz ~ 20 GHz</b>   |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| 938.91  | 37.3                 | 337          | 1.1        | H           | -63.3       | 1.37            | 0.0                    | -64.67               | -13         | 51.67       |  |  |  |
| 938.91  | 36.75                | 354          | 2.3        | V           | -62.6       | 1.37            | 0.0                    | -63.97               | -13         | 50.97       |  |  |  |
| 3760.00                                       | 44.26                | 26           | 2.5        | H           | -57.8       | 1.50            | 11.80                  | -47.50               | -13         | 34.50       |  |  |  |
| 3760.00                                       | 43.45                | 210          | 1.3        | V           | -58.1       | 1.50            | 11.80                  | -47.80               | -13         | 34.80       |  |  |  |
| <b>Band 4 (1.4 MHz, Middle Channel)</b>       |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| <b>Test frequency range:30 MHz ~ 20 GHz</b>   |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| 938.91  | 36.48                | 177          | 1.5        | H           | -64.1       | 1.37            | 0.0                    | -65.47               | -13         | 52.47       |  |  |  |
| 938.91  | 35.97                | 36           | 1.9        | V           | -63.4       | 1.37            | 0.0                    | -64.77               | -13         | 51.77       |  |  |  |
| 3465.00                                       | 43.24                | 61           | 1.6        | H           | -57.5       | 1.50            | 12.00                  | -47.00               | -13         | 34.00       |  |  |  |
| 3465.00                                       | 43.63                | 148          | 2.2        | V           | -57.9       | 1.50            | 12.00                  | -47.40               | -13         | 34.40       |  |  |  |
| <b>Band 5(1.4 MHz, Middle Channel)</b>        |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| <b>Test frequency range: 30 MHz ~ 10GHz</b>   |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| 938.91  | 37.08                | 266          | 2.2        | H           | -63.5       | 1.37            | 0.0                    | -64.87               | -13         | 51.87       |  |  |  |
| 938.91  | 37.34                | 90           | 2.1        | V           | -62.0       | 1.37            | 0.0                    | -63.37               | -13         | 50.37       |  |  |  |
| 1673.00                                       | 43.09                | 359          | 1.9        | H           | -63.2       | 1.30            | 8.90                   | -55.60               | -13         | 42.60       |  |  |  |
| 1673.00                                       | 42.95                | 89           | 2.3        | V           | -62.8       | 1.30            | 8.90                   | -55.20               | -13         | 42.20       |  |  |  |
| 2509.50                                       | 46.03                | 312          | 2.0        | H           | -57.3       | 2.60            | 10.20                  | -49.70               | -13         | 36.70       |  |  |  |
| 2509.50                                       | 45.74                | 334          | 1.8        | V           | -57.0       | 2.60            | 10.20                  | -49.40               | -13         | 36.40       |  |  |  |
| 3346.00                                       | 43.61                | 185          | 2.2        | H           | -57.3       | 1.50            | 11.70                  | -47.10               | -13         | 34.10       |  |  |  |
| 3346.00                                       | 43.01                | 341          | 1.8        | V           | -57.9       | 1.50            | 11.70                  | -47.70               | -13         | 34.70       |  |  |  |
| <b>Band 7 (5 MHz, Middle Channel)</b>         |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| <b>Test frequency range: 30 MHz ~ 26.5GHz</b> |                      |              |            |             |             |                 |                        |                      |             |             |  |  |  |
| 938.91  | 36.79                | 136          | 2.3        | H           | -63.8       | 1.37            | 0.0                    | -65.17               | -25         | 40.17       |  |  |  |
| 938.91  | 37.58                | 145          | 2.3        | V           | -61.8       | 1.37            | 0.0                    | -63.17               | -25         | 38.17       |  |  |  |
| 5070.00                                       | 43.47                | 98           | 1.3        | H           | -56.5       | 1.60            | 12.10                  | -46.00               | -25         | 21.00       |  |  |  |
| 5070.00                                       | 42.88                | 35           | 1.9        | V           | -57.1       | 1.60            | 12.10                  | -46.60               | -25         | 21.60       |  |  |  |

**Note:**

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

**FCC §22.917 (a); §24.238 (a); §27.53 (h)(m) - BAND EDGES****Applicable Standard**

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

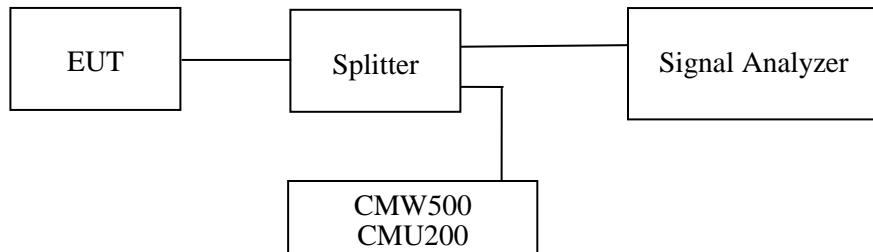
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

According to FCC §27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

**Test Procedure**

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency

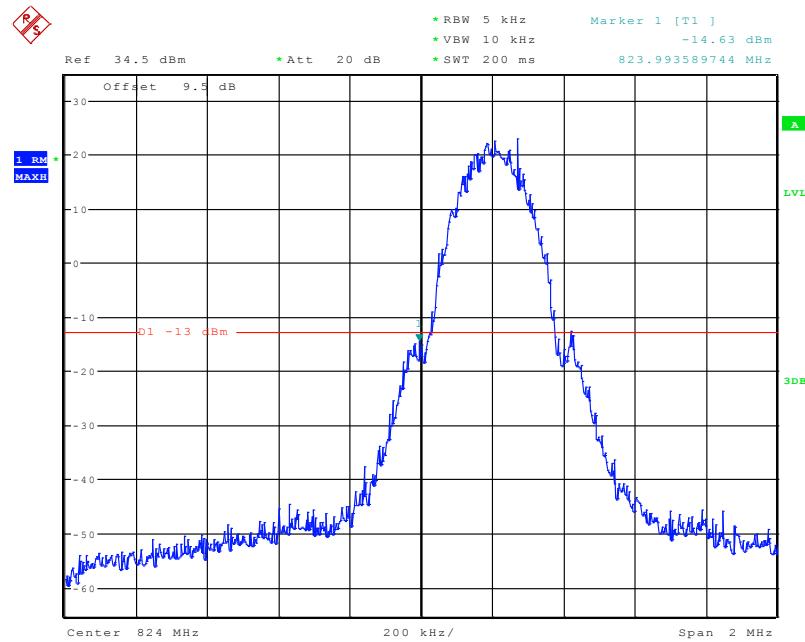
**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

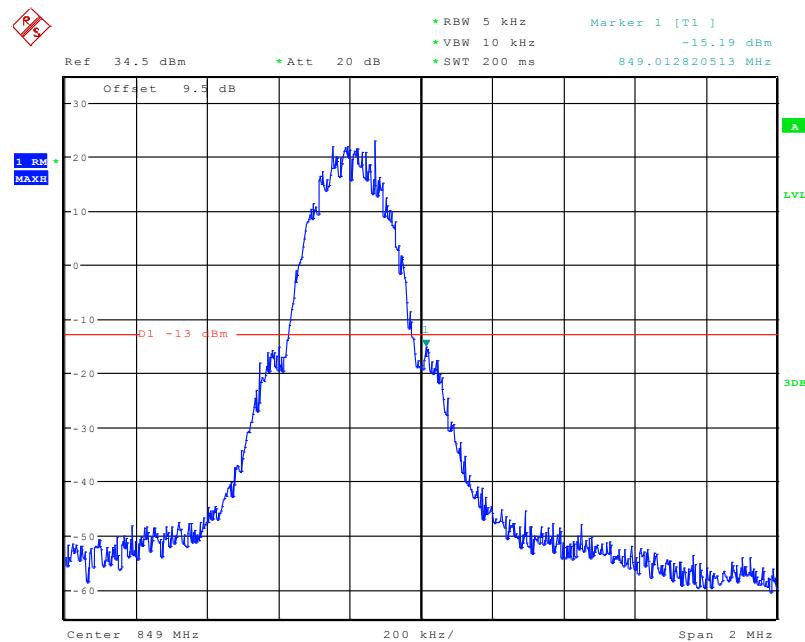
*The testing was performed by George Zhong from 2019-08-16 to 2019-08-19.*

*EUT operation mode: Transmitting*

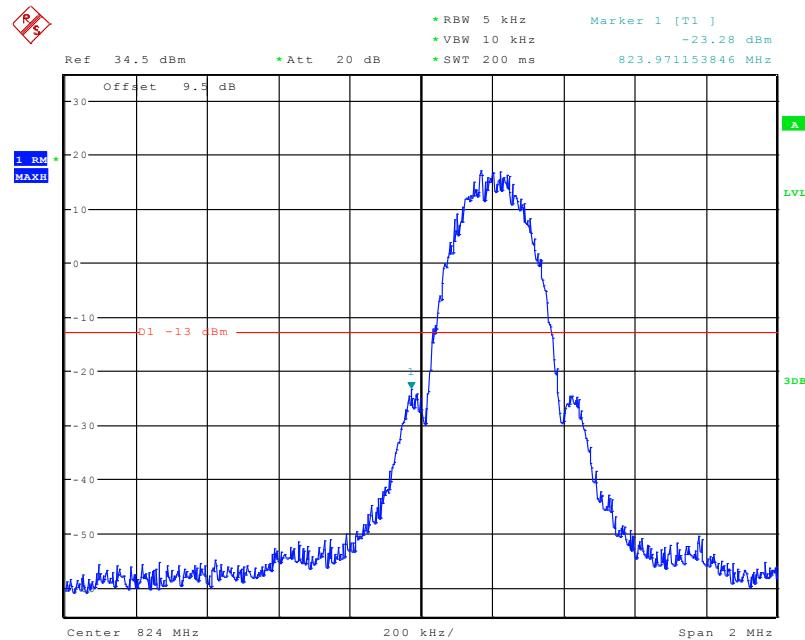
*Test Result: Compliance. Please refer to the following plots.*

**Cellular Band, Left Band Edge for GSM (GMSK) Mode**

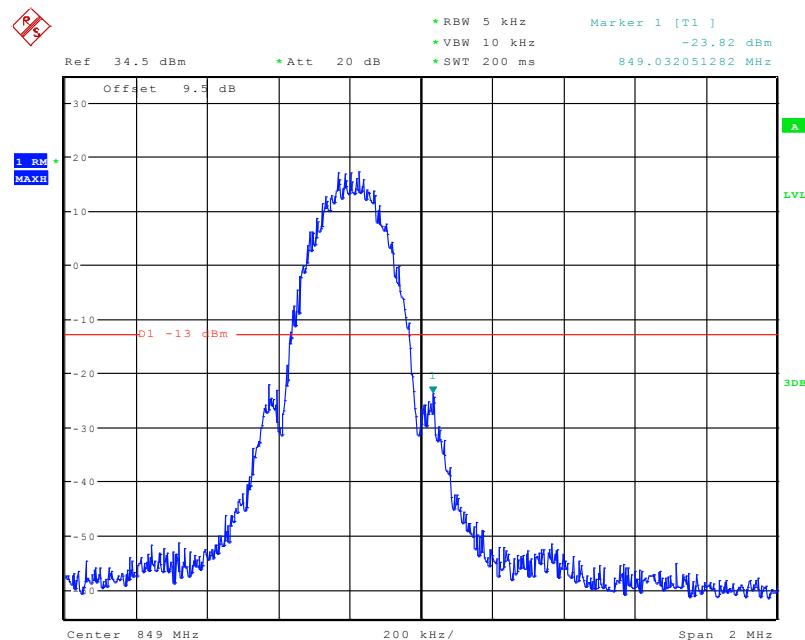
Date: 16.AUG.2019 16:35:22

**Cellular Band, Right Band Edge for GSM (GMSK) Mode**

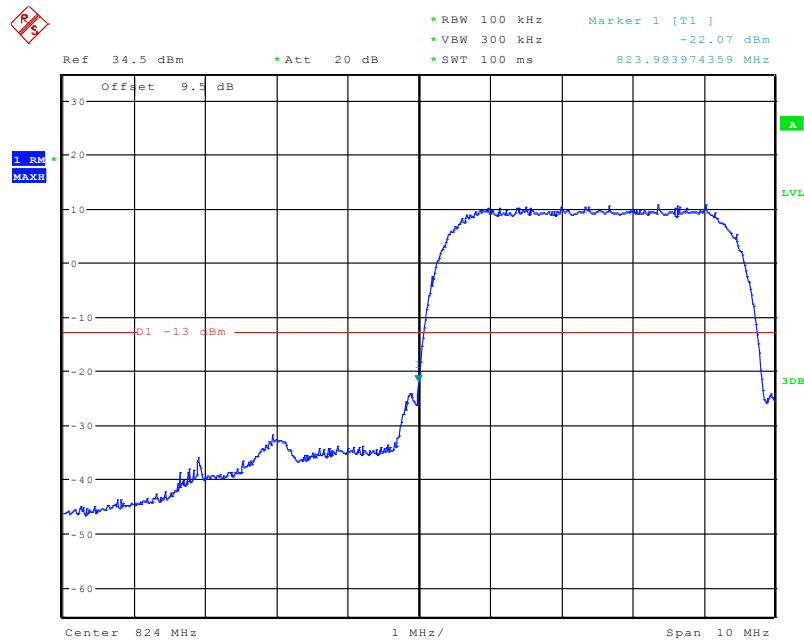
Date: 16.AUG.2019 16:36:05

**Cellular Band, Left Band Edge for EDGE Mode**

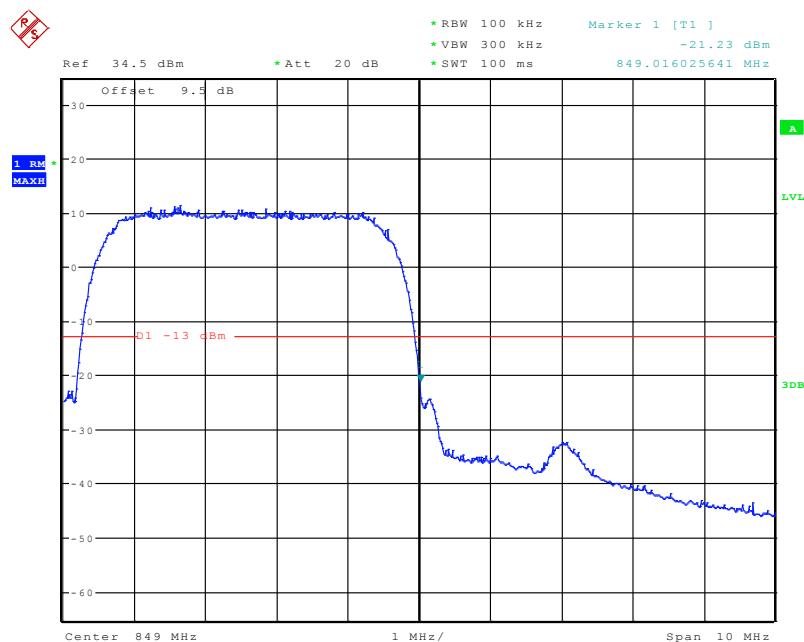
Date: 16.AUG.2019 17:07:33

**Cellular Band, Right Band Edge for EDGE Mode**

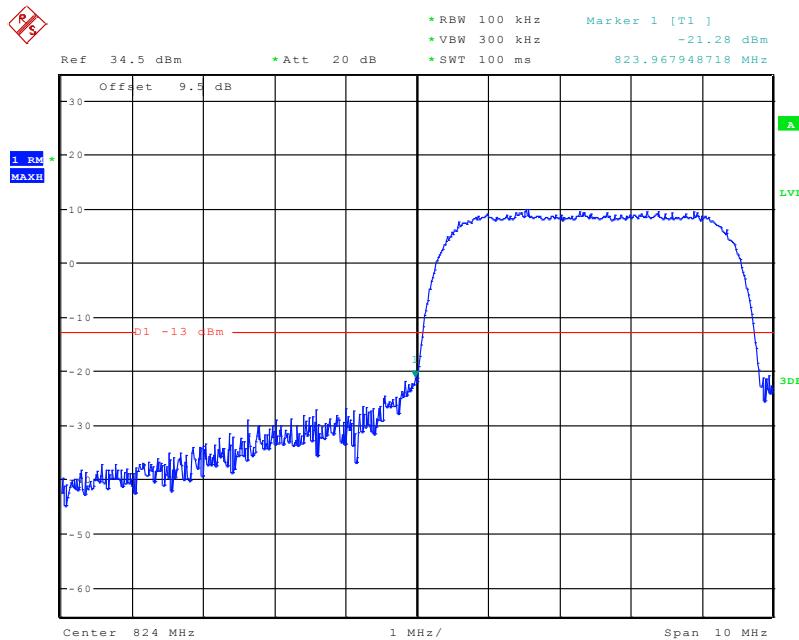
Date: 16.AUG.2019 17:08:26

**Cellular Band, Left Band Edge for WCDMA (BPSK) Mode**

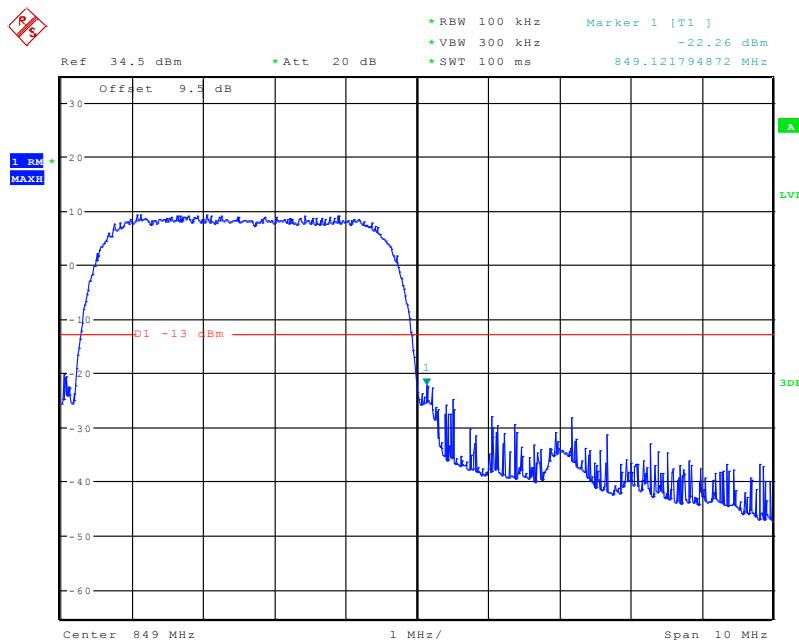
Date: 18.AUG.2019 12:54:44

**Cellular Band, Right Band Edge for WCDMA (BPSK) Mode**

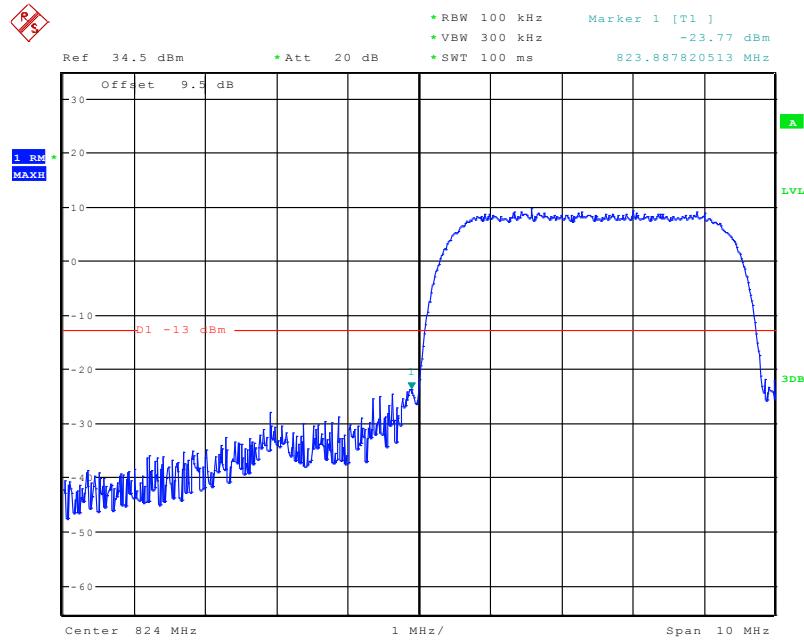
Date: 18.AUG.2019 12:55:19

**Cellular Band, Left Band Edge for HSDPA (16QAM) Mode**

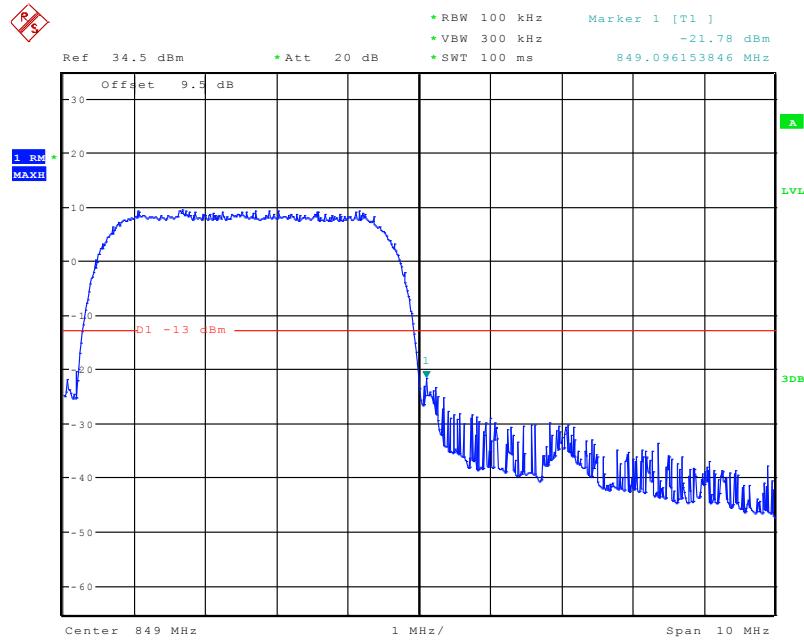
Date: 18.AUG.2019 13:05:02

**Cellular Band, Right Band Edge for HSDPA (16QAM) Mode**

Date: 18.AUG.2019 13:05:50

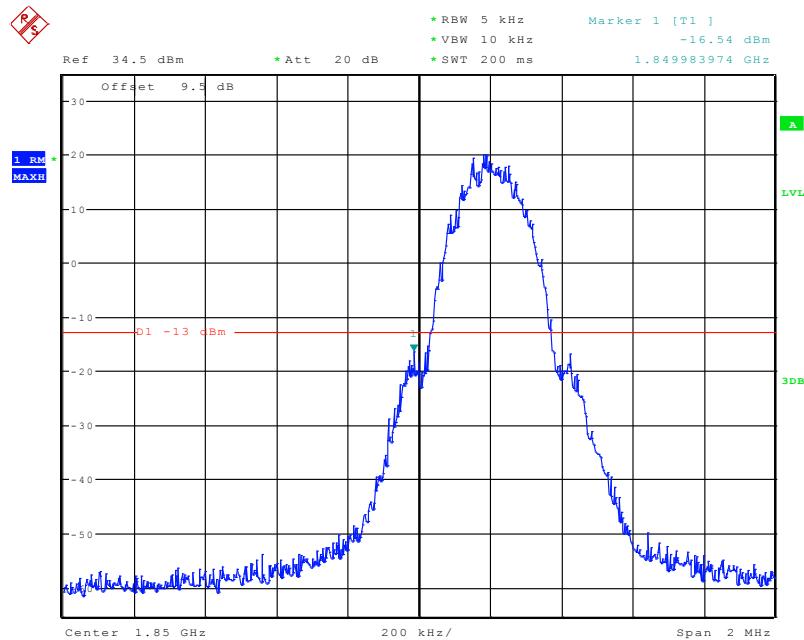
**Cellular Band, Left Band Edge for HSUPA (BPSK) Mode**

Date: 18.AUG.2019 12:57:10

**Cellular Band, Right Band Edge for HSUPA (BPSK) Mode**

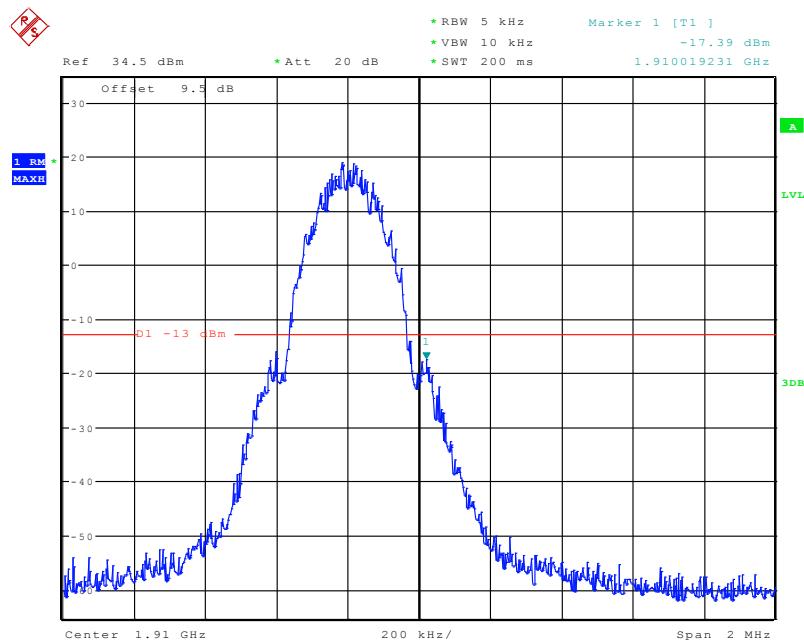
Date: 18.AUG.2019 12:56:02

### PCS Band, Left Band Edge for GSM (GMSK) Mode

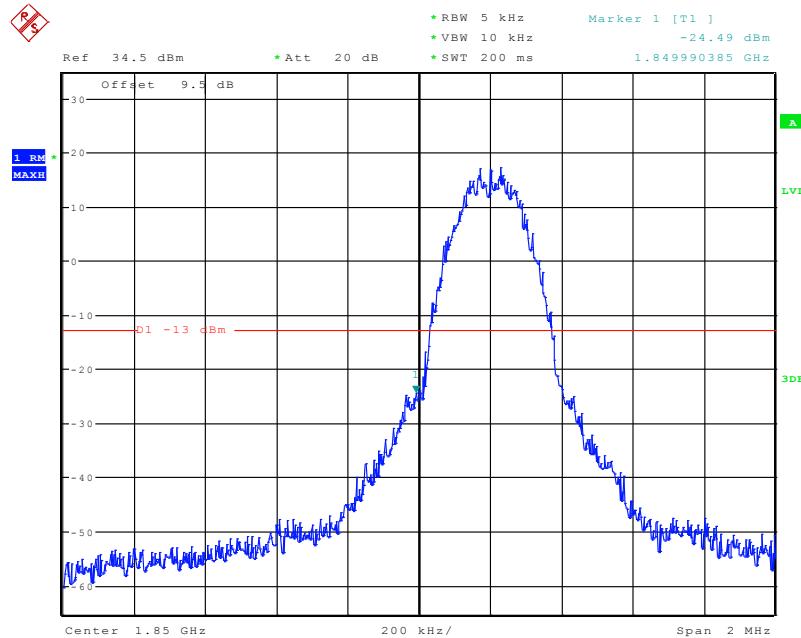


Date: 16.AUG.2019 17:01:48

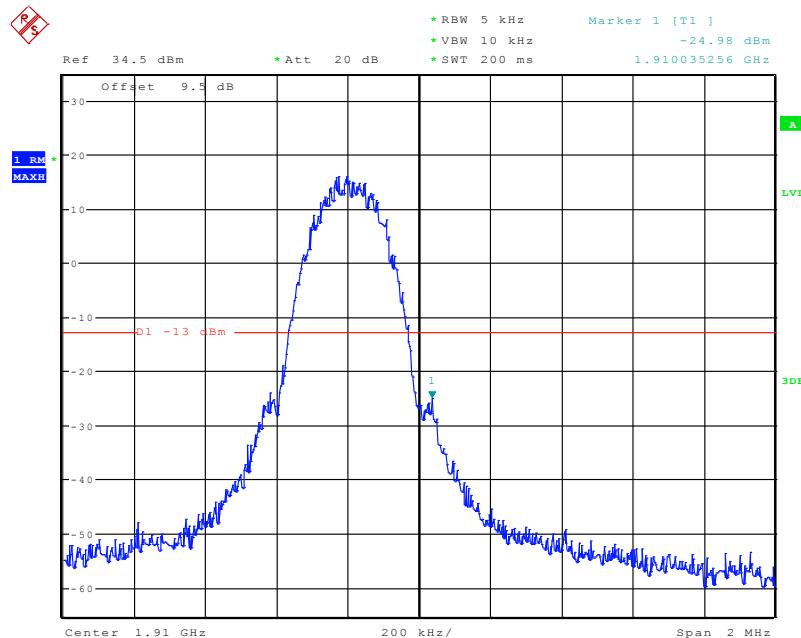
### PCS Band, Right Band Edge for GSM (GMSK) Mode



Date: 16.AUG.2019 17:02:22

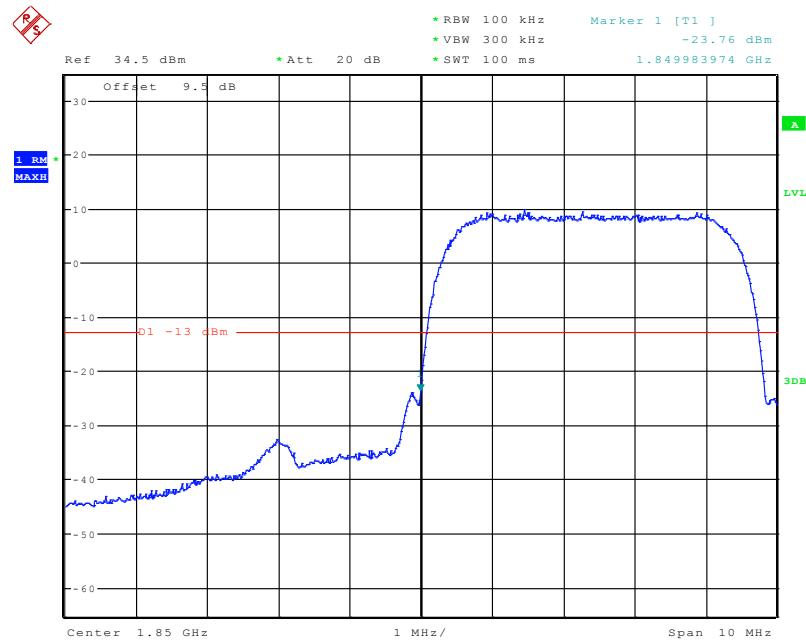
**PCS Band, Left Band Edge for EDGE Mode**

Date: 16.AUG.2019 17:17:58

**PCS Band, Right Band Edge for EDGE Mode**

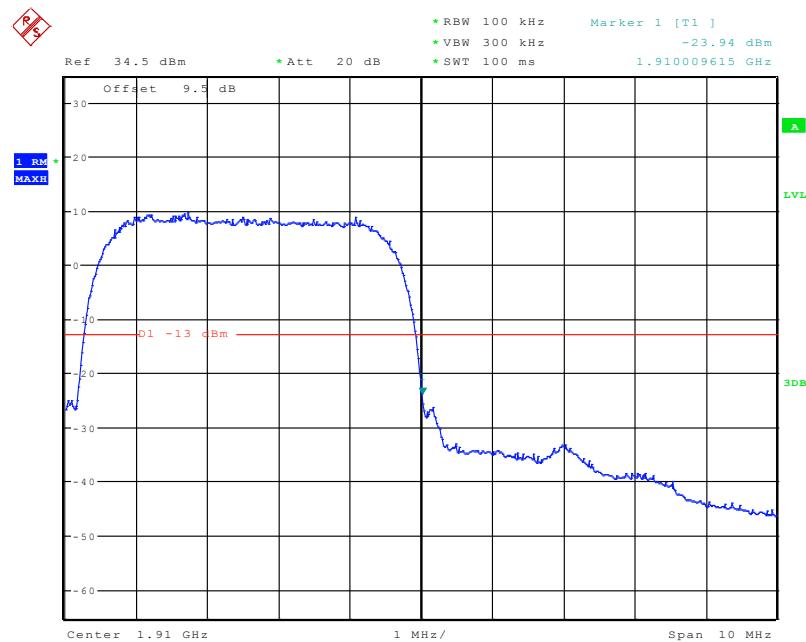
Date: 16.AUG.2019 17:18:50

### PCS Band, Left Band Edge for WCDMA (BPSK) Mode

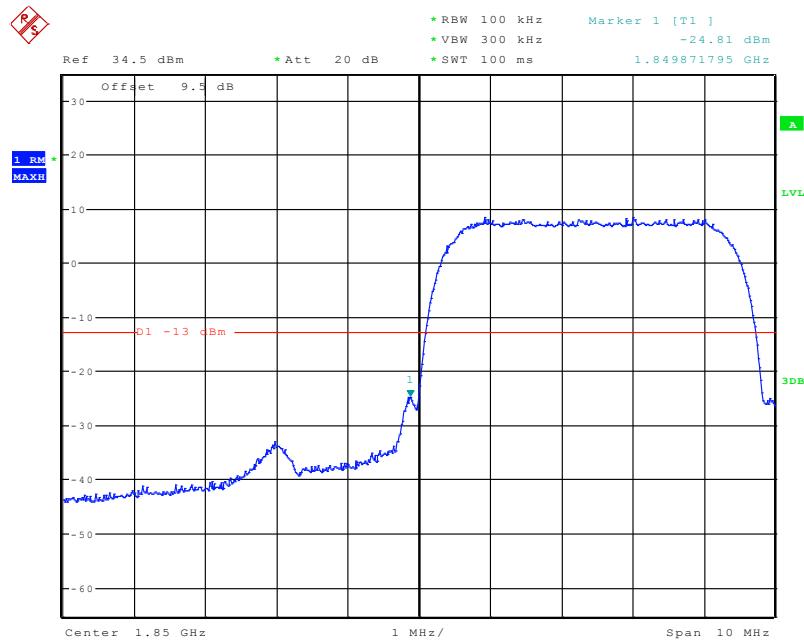


Date: 18.AUG.2019 12:33:04

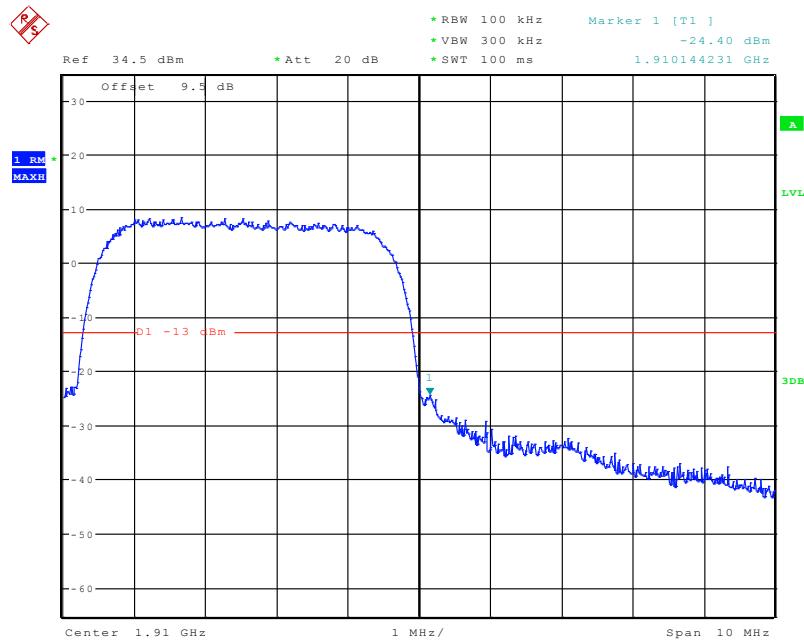
### PCS Band, Right Band Edge for WCDMA (BPSK) Mode



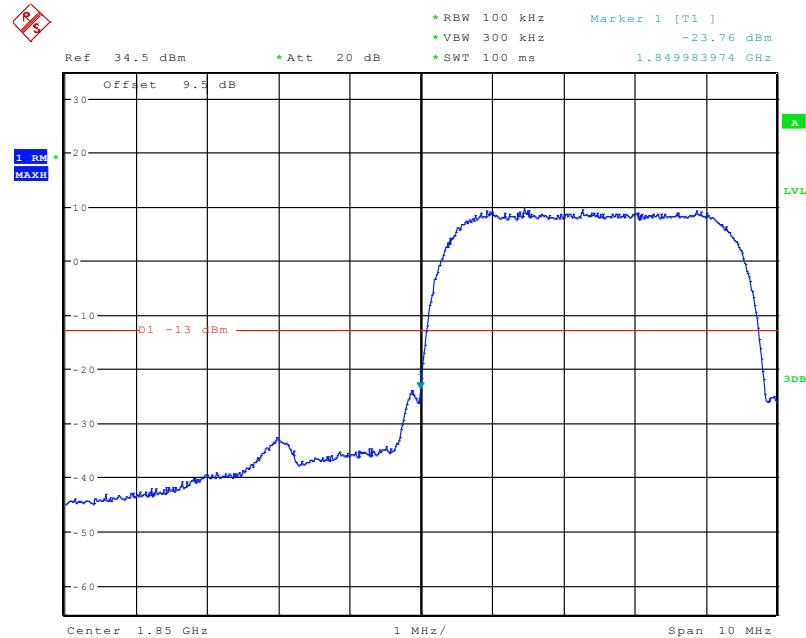
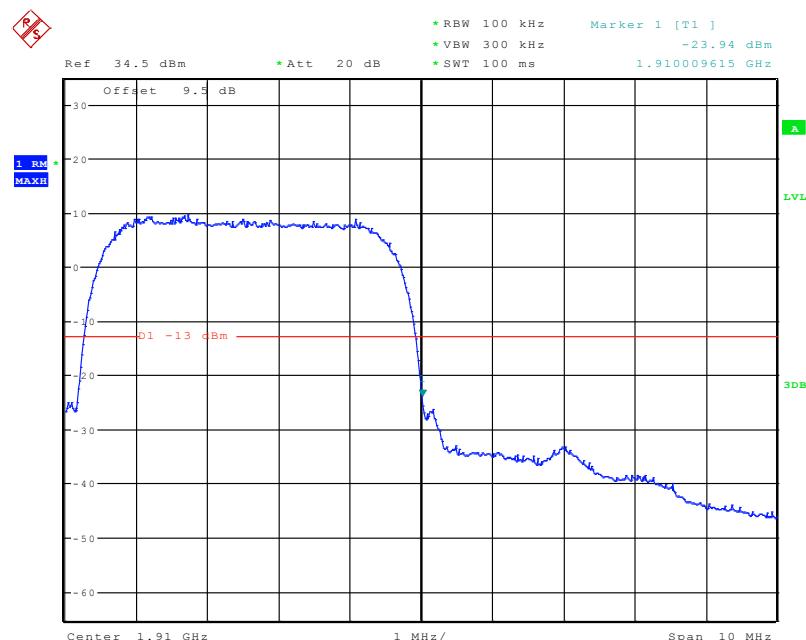
Date: 18.AUG.2019 12:34:07

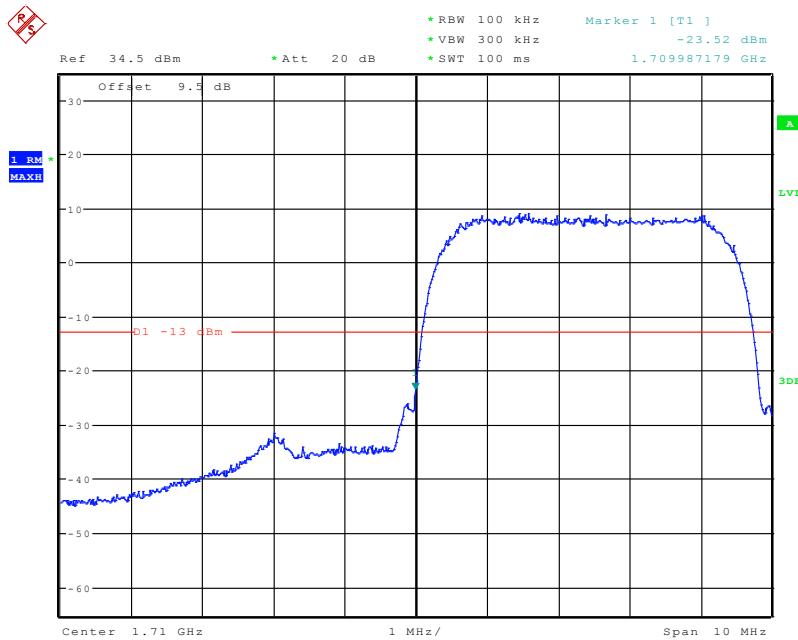
**PCS Band, Left Band Edge for HSDPA (16QAM) Mode**

Date: 18.AUG.2019 12:19:14

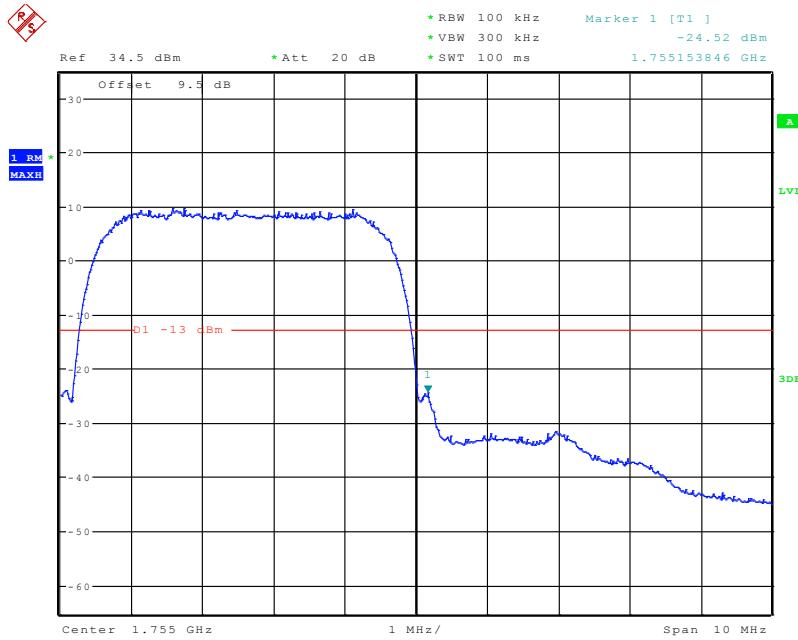
**PCS Band, Right Band Edge for HSDPA (16QAM) Mode**

Date: 18.AUG.2019 12:20:18

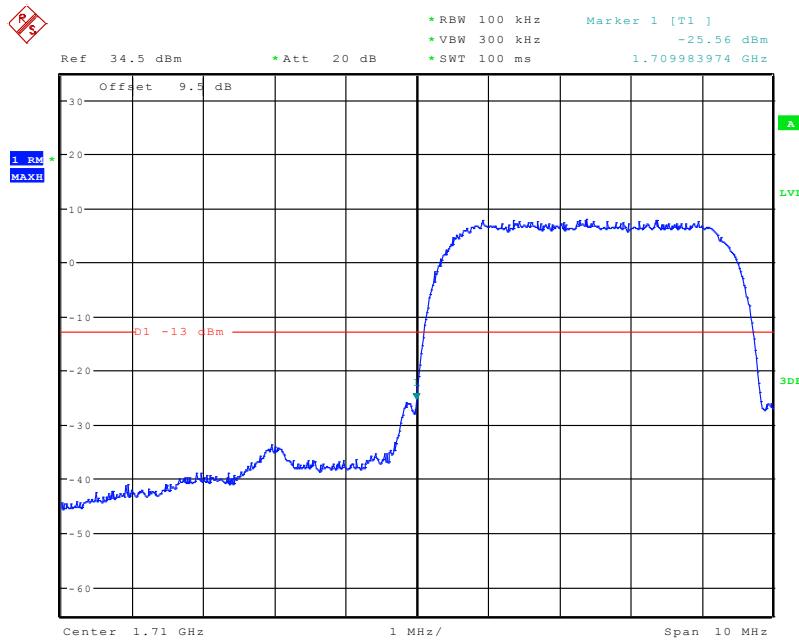
**PCS Band, Left Band Edge for HSUPA (BPSK) Mode****PCS Band, Right Band Edge for HSUPA (BPSK) Mode**

**AWS Band, Left Band Edge for WCDMA (BPSK) Mode**

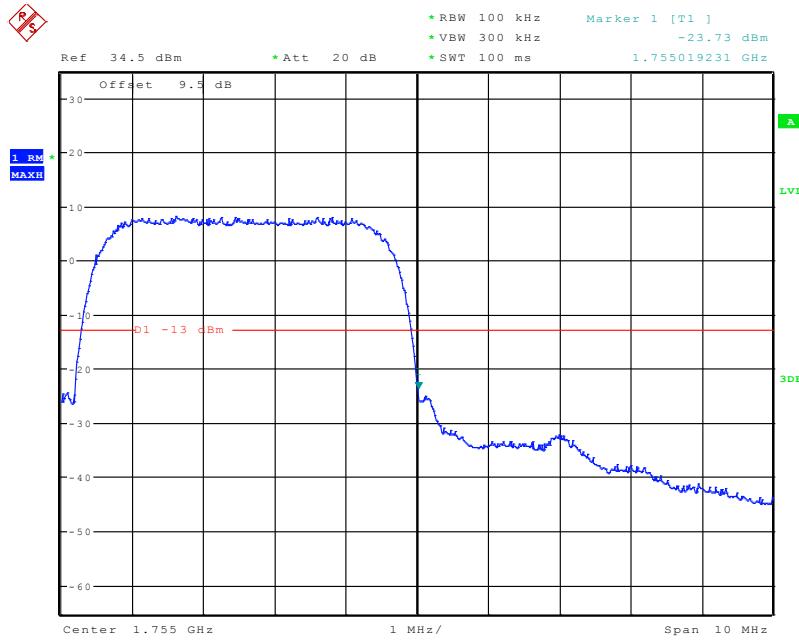
Date: 18.AUG.2019 13:17:24

**AWS Band, Right Band Edge for WCDMA (BPSK) Mode**

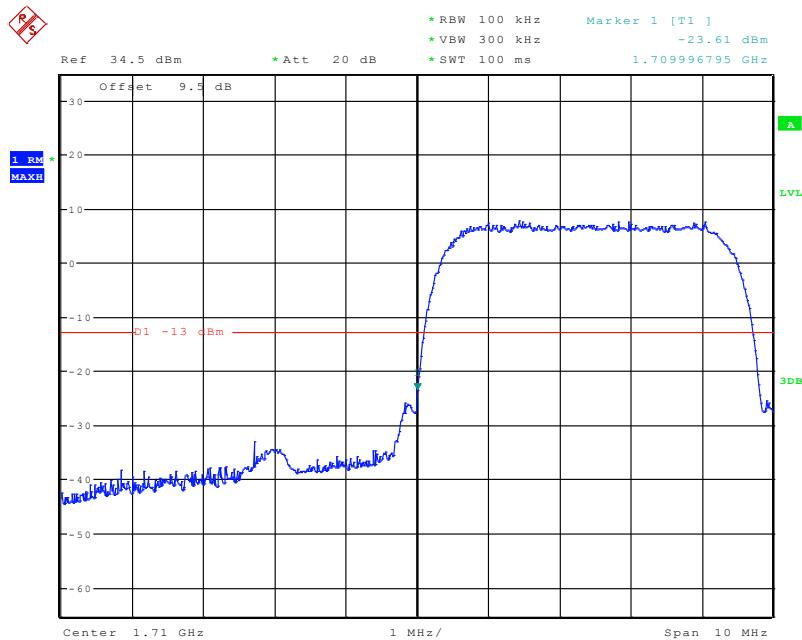
Date: 18.AUG.2019 13:16:54

**AWS Band, Left Band Edge for HSDPA (16QAM) Mode**

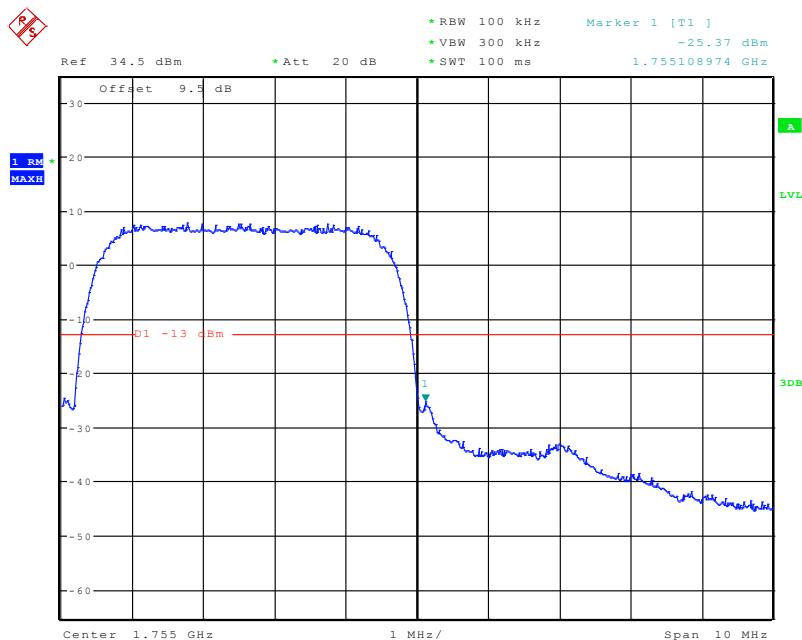
Date: 18.AUG.2019 13:09:04

**AWS Band, Right Band Edge for HSDPA (16QAM) Mode**

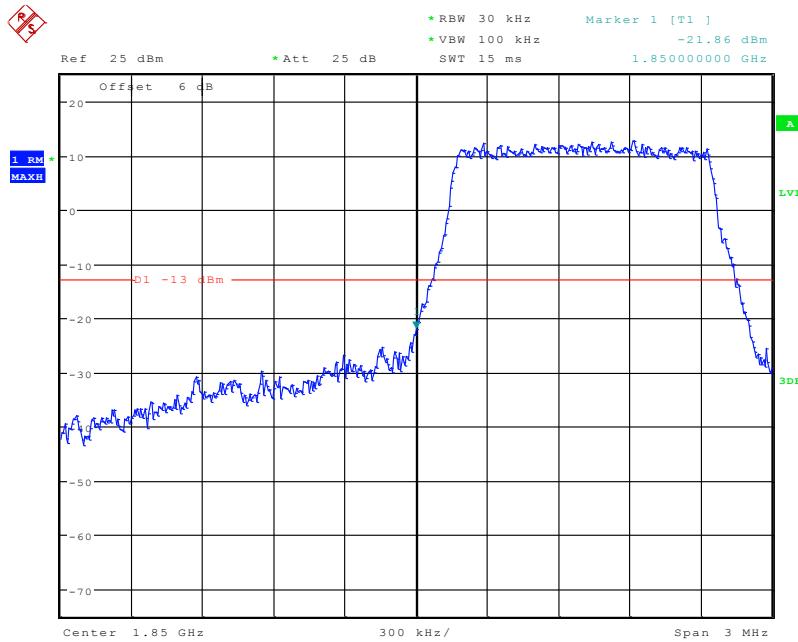
Date: 18.AUG.2019 13:10:01

**AWS Band, Left Band Edge for HSUPA (BPSK) Mode**

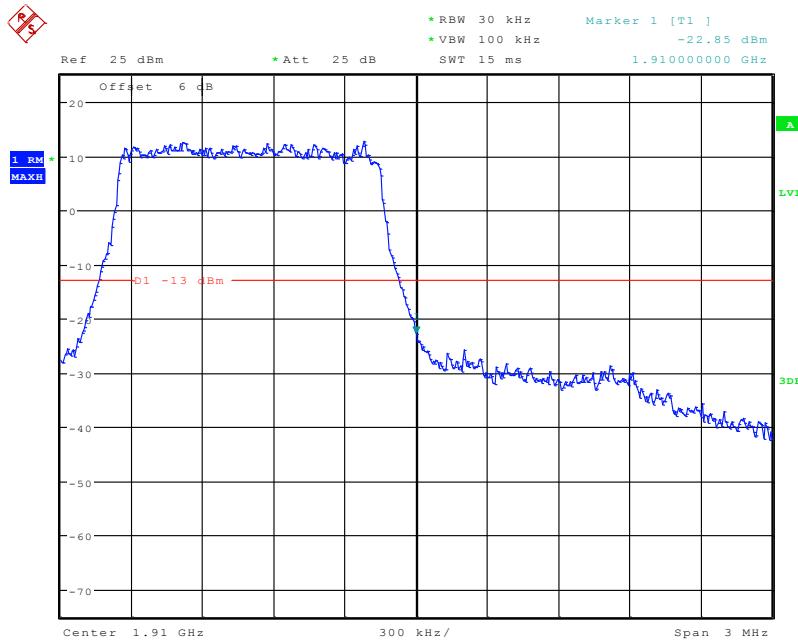
Date: 18.AUG.2019 13:14:44

**AWS Band, Right Band Edge for HSUPA (BPSK) Mode**

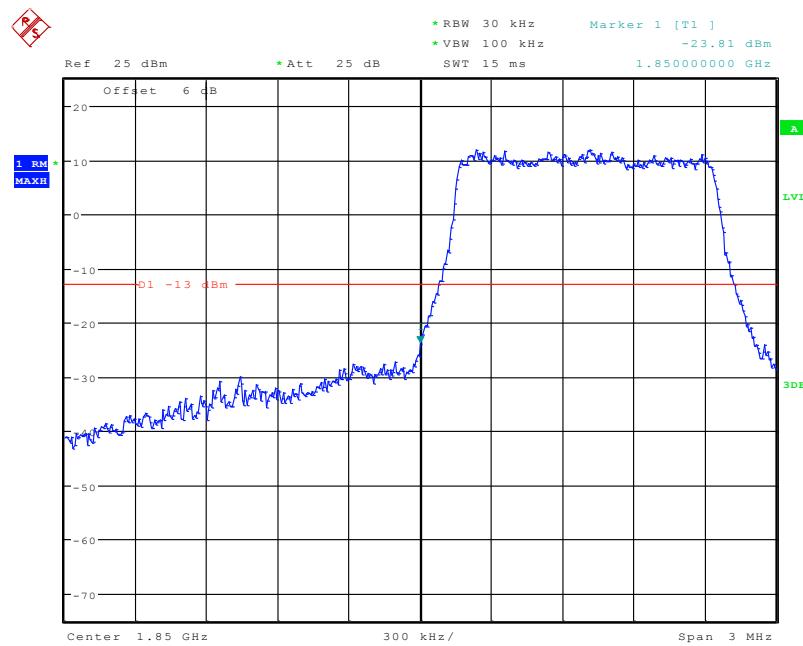
Date: 18.AUG.2019 13:15:30

**Band 2:****QPSK (1.4 MHz, FULL RB) - Left Band Edge**

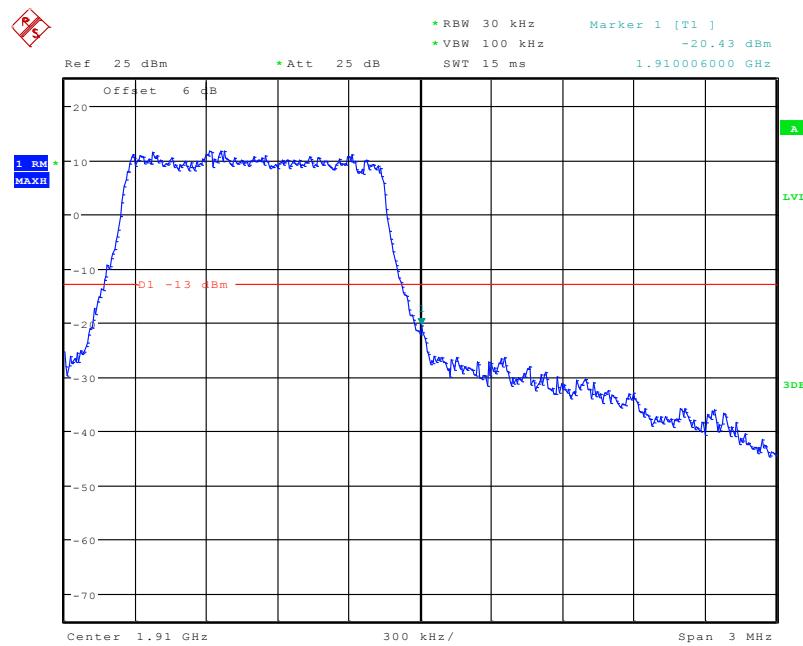
Date: 19.AUG.2019 07:00:34

**QPSK (1.4 MHz, FULL RB) - Right Band Edge**

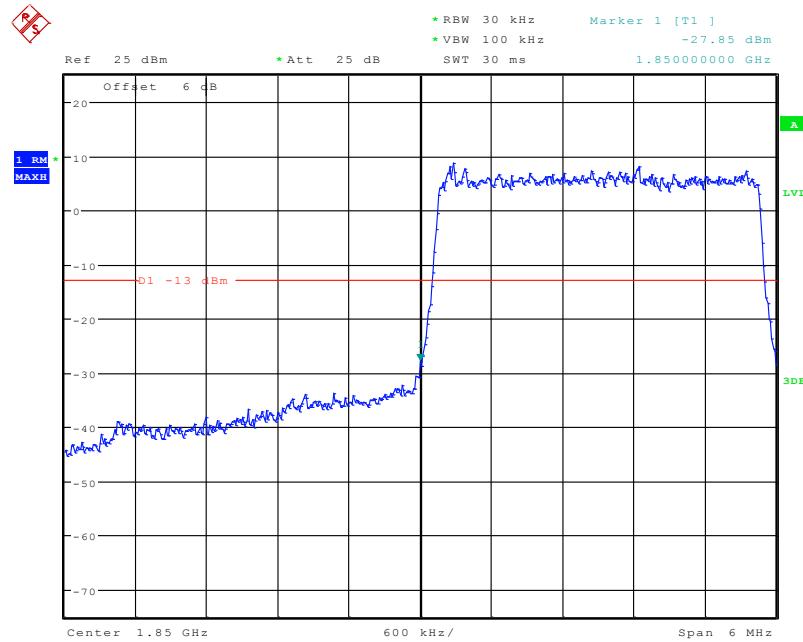
Date: 19.AUG.2019 07:01:36

**16-QAM (1.4 MHz, FULL RB) - Left Band Edge**

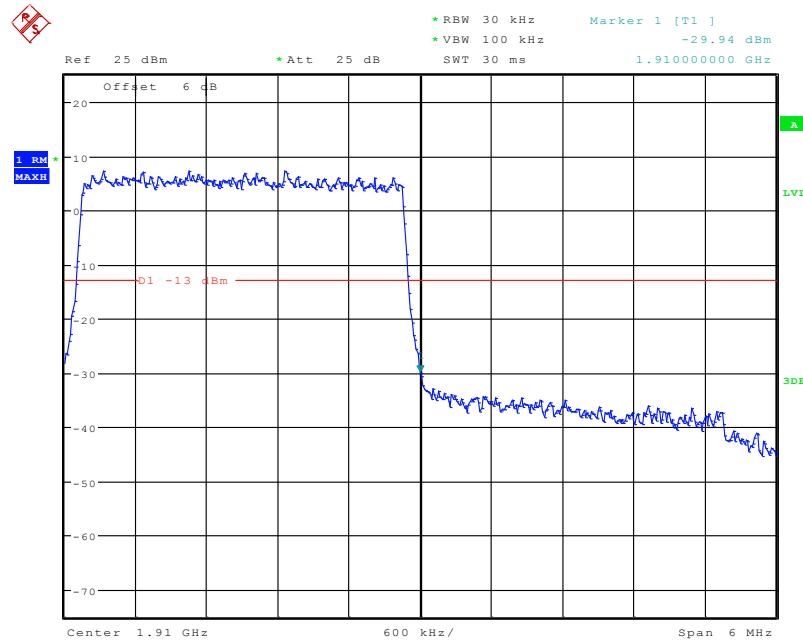
Date: 19.AUG.2019 07:01:03

**16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

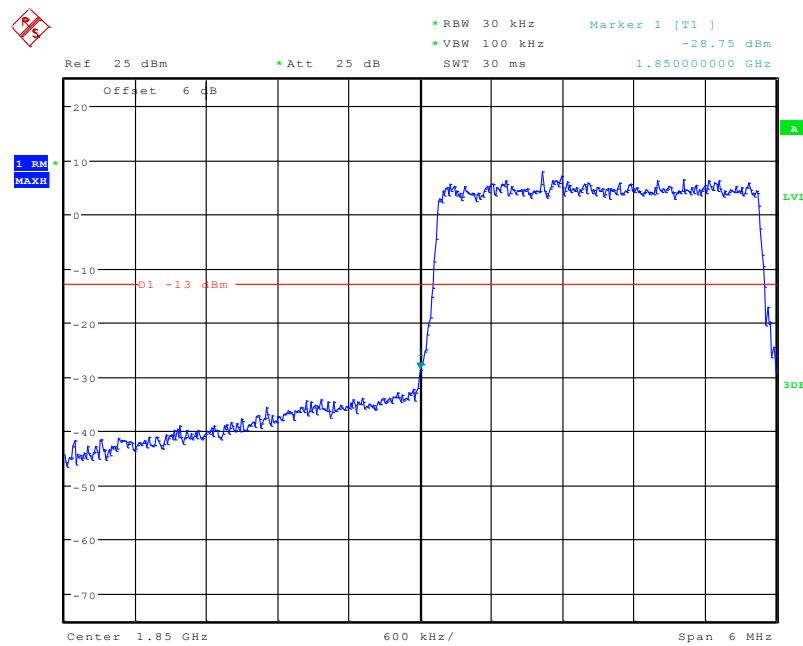
Date: 19.AUG.2019 07:02:08

**QPSK (3.0 MHz, FULL RB) - Left Band Edge**

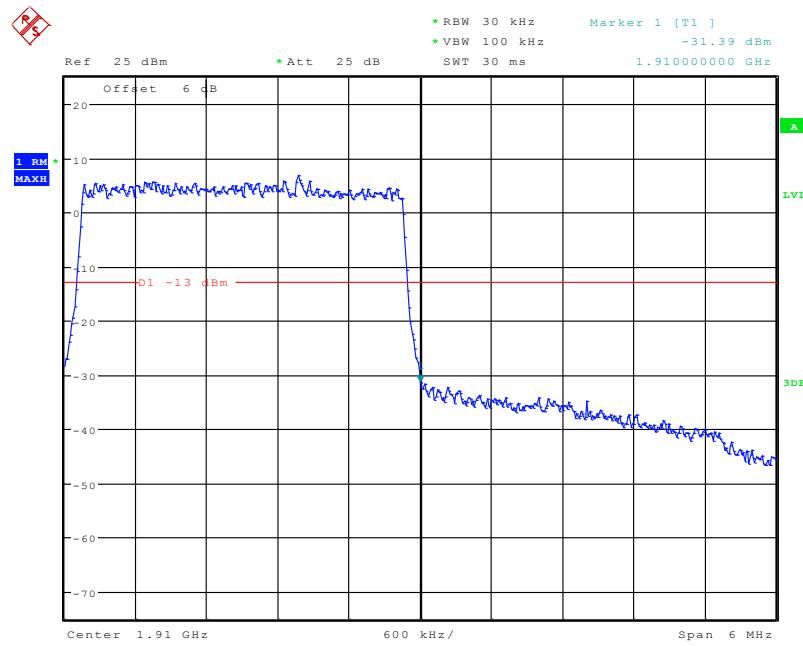
Date: 19.AUG.2019 07:02:36

**QPSK (3.0 MHz, FULL RB) - Right Band Edge**

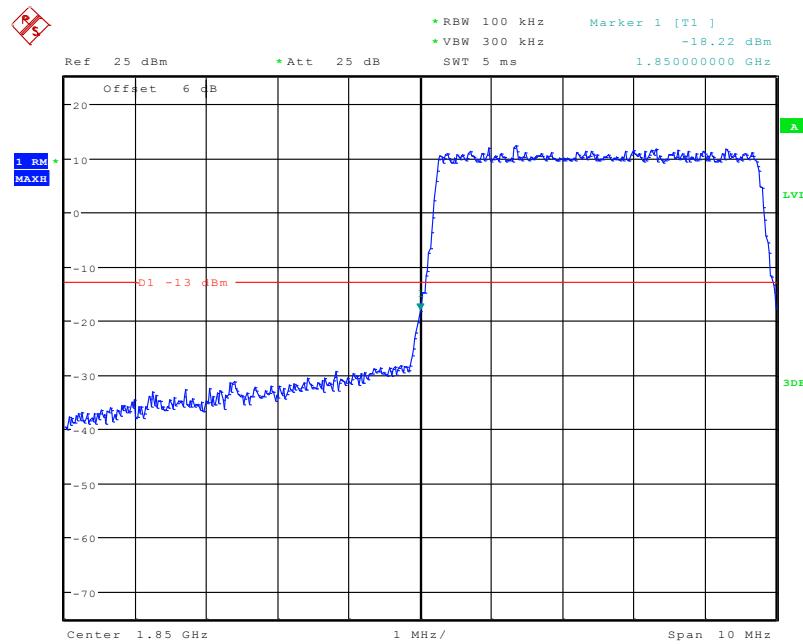
Date: 19.AUG.2019 07:03:34

**16-QAM (3.0 MHz, FULL RB) - Left Band Edge**

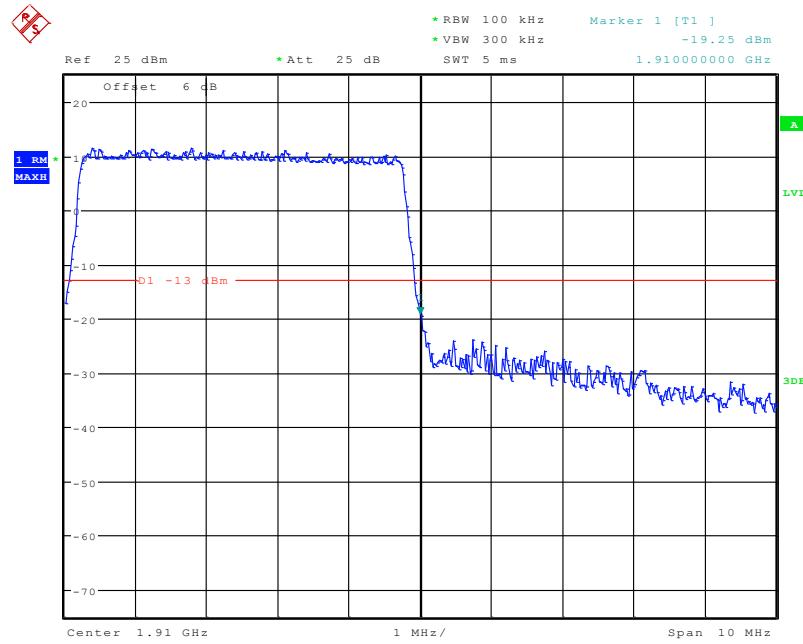
Date: 19.AUG.2019 07:03:05

**16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

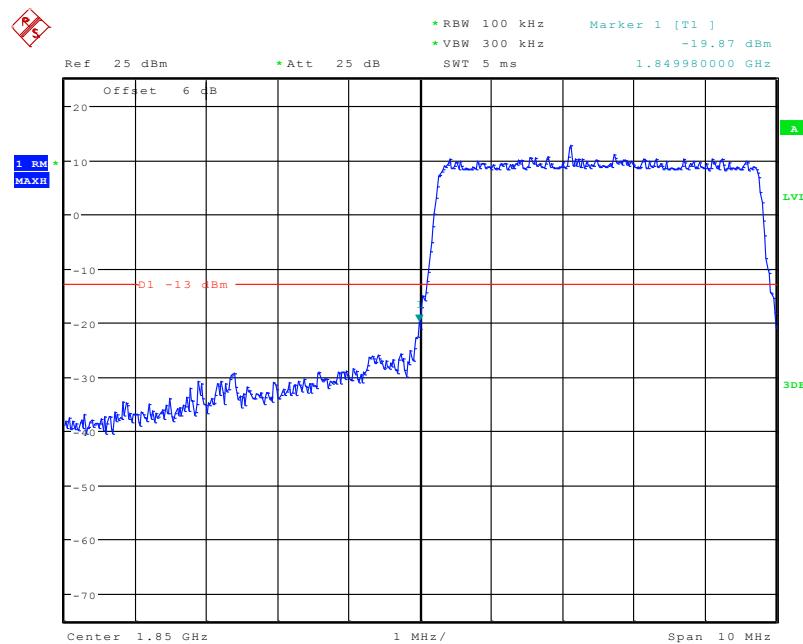
Date: 19.AUG.2019 07:04:09

**QPSK (5.0 MHz, FULL RB) - Left Band Edge**

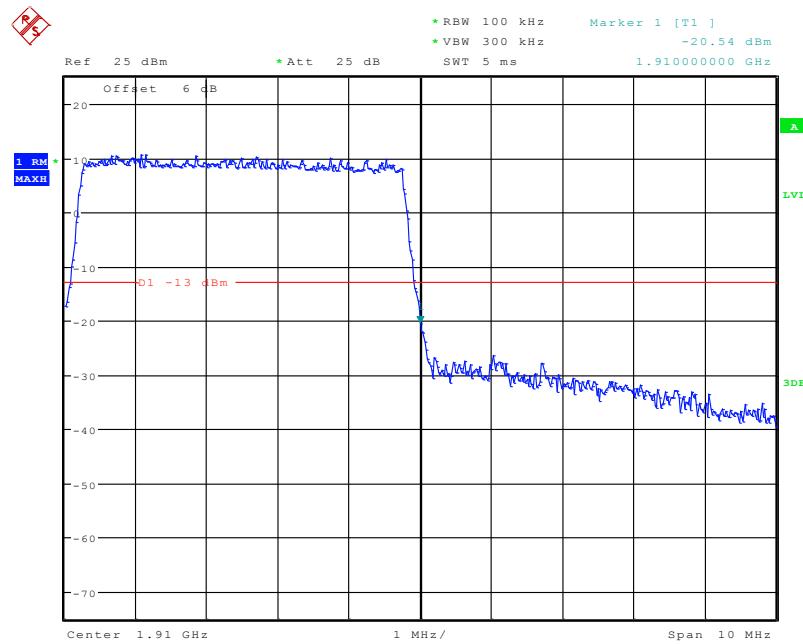
Date: 19.AUG.2019 07:04:49

**QPSK (5.0 MHz, FULL RB) - Right Band Edge**

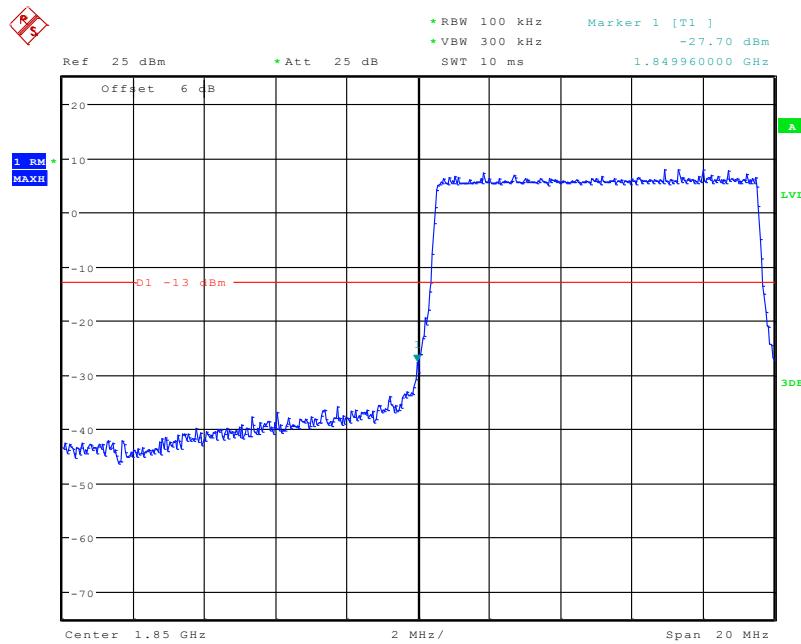
Date: 19.AUG.2019 07:05:56

**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**

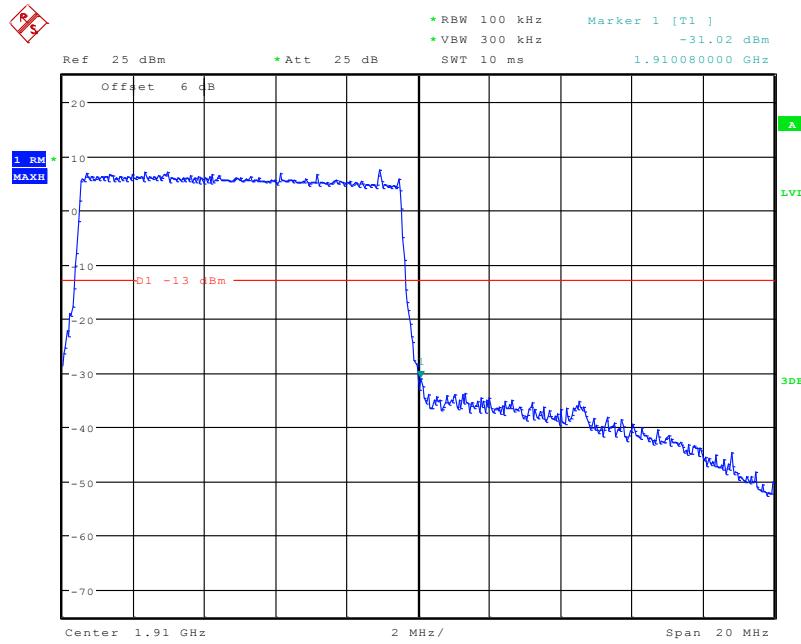
Date: 19.AUG.2019 07:05:12

**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

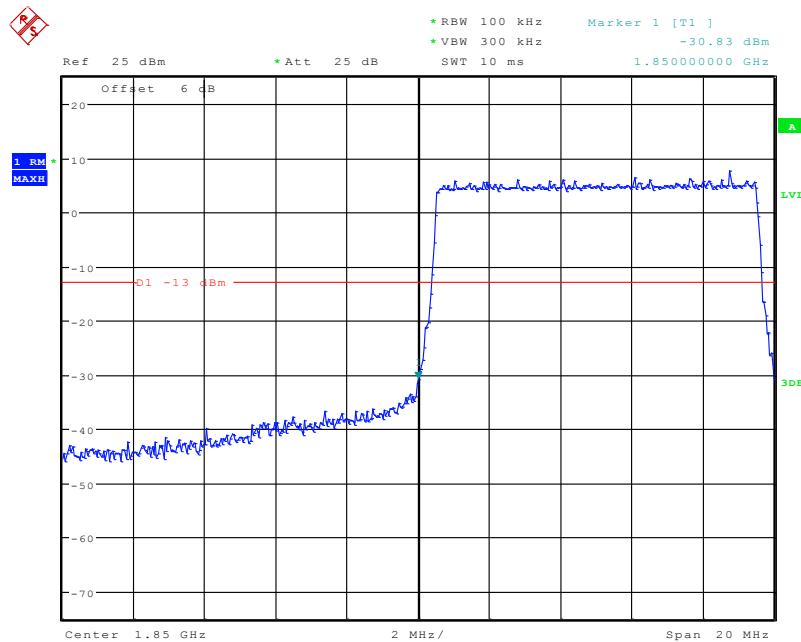
Date: 19.AUG.2019 07:06:37

**QPSK (10.0 MHz, FULL RB) - Left Band Edge**

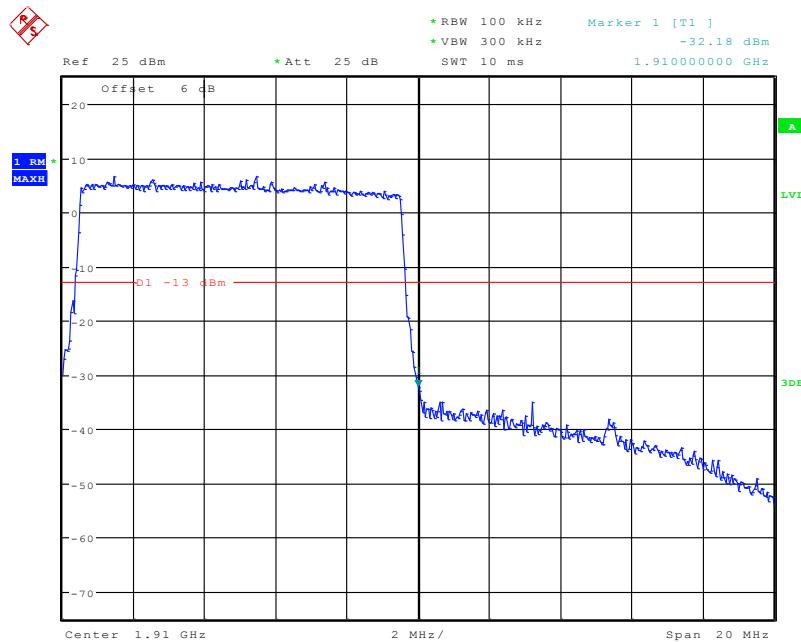
Date: 19.AUG.2019 07:07:08

**QPSK (10.0 MHz, FULL RB) - Right Band Edge**

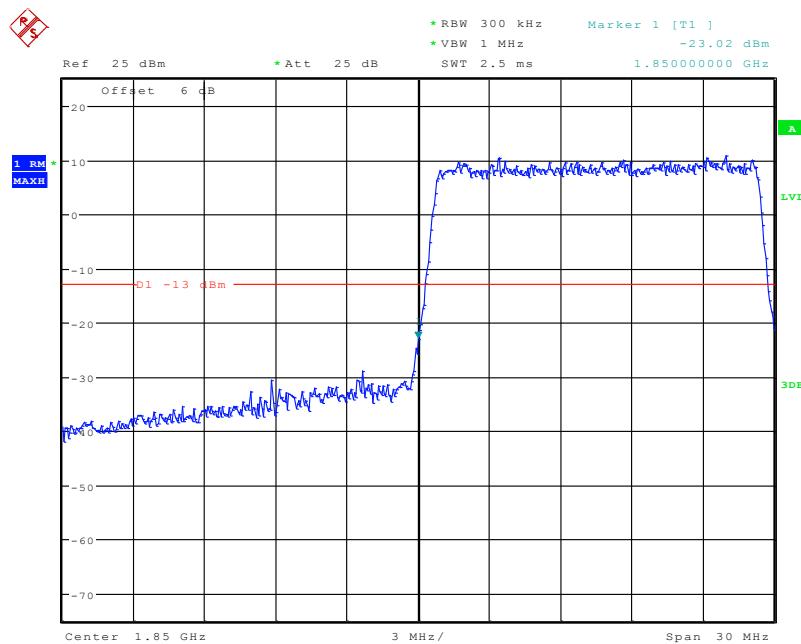
Date: 19.AUG.2019 07:08:02

**16-QAM (10.0 MHz, FULL RB) - Left Band Edge**

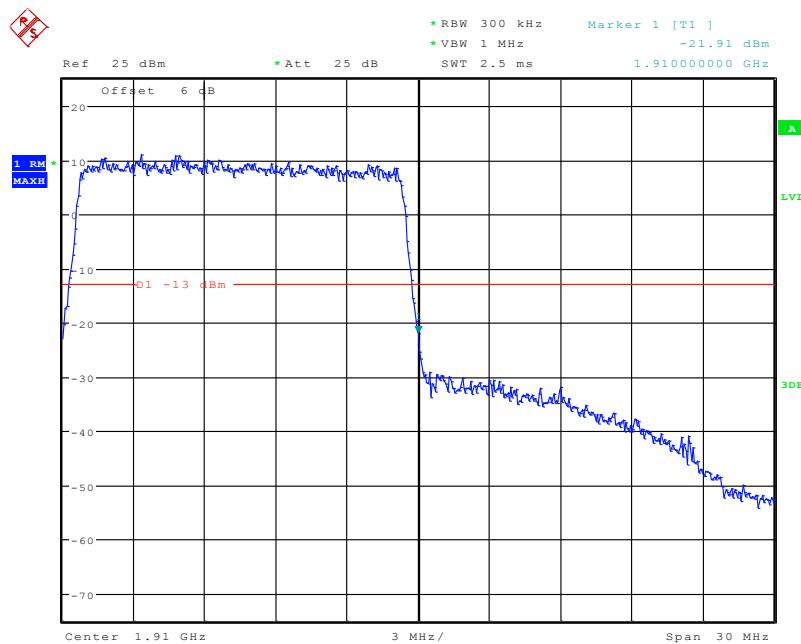
Date: 19.AUG.2019 07:07:33

**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

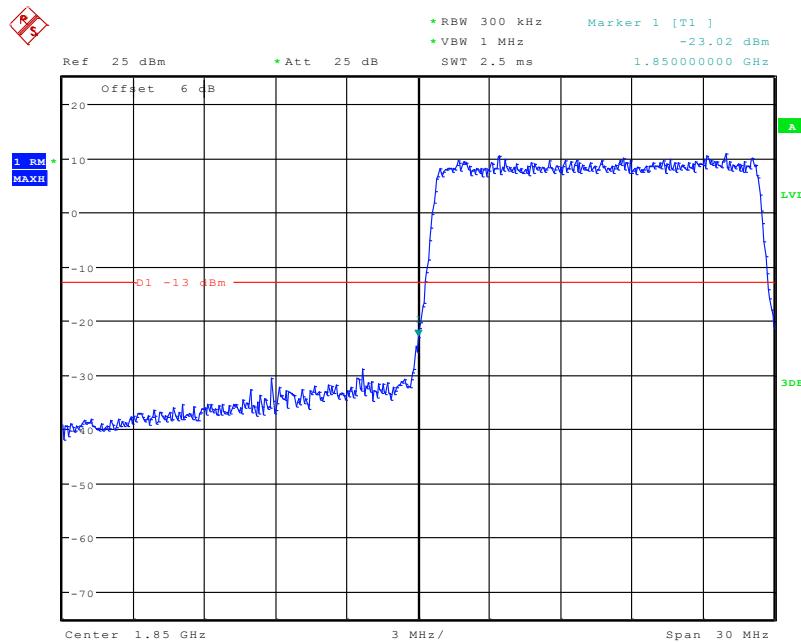
Date: 19.AUG.2019 07:08:25

**QPSK (15.0 MHz, FULL RB) - Left Band Edge**

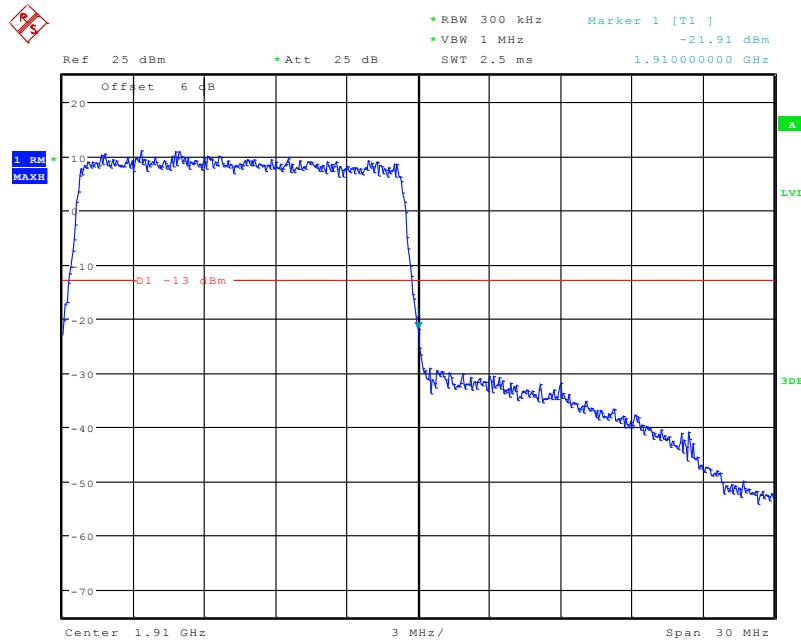
Date: 19.AUG.2019 07:09:34

**QPSK (15.0 MHz, FULL RB) - Right Band Edge**

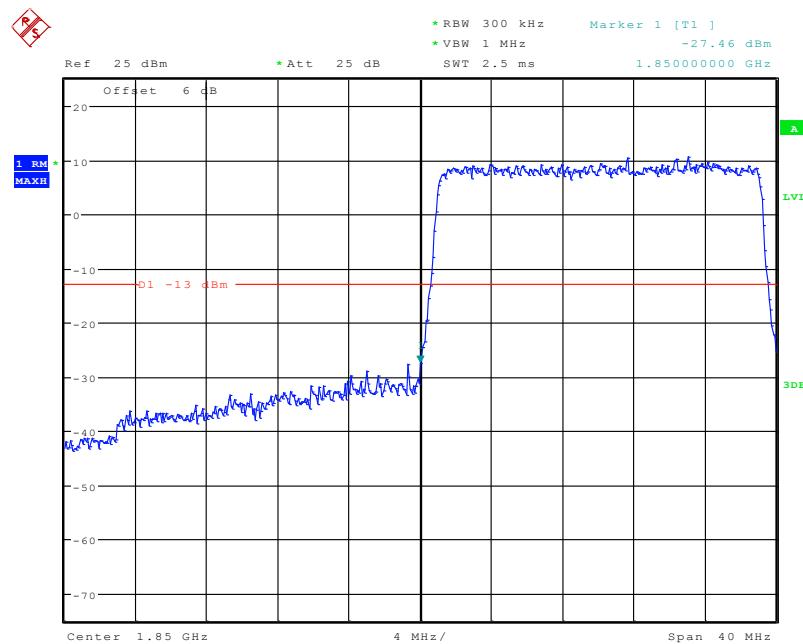
Date: 19.AUG.2019 07:10:41

**16-QAM (15.0 MHz, FULL RB) - Left Band Edge**

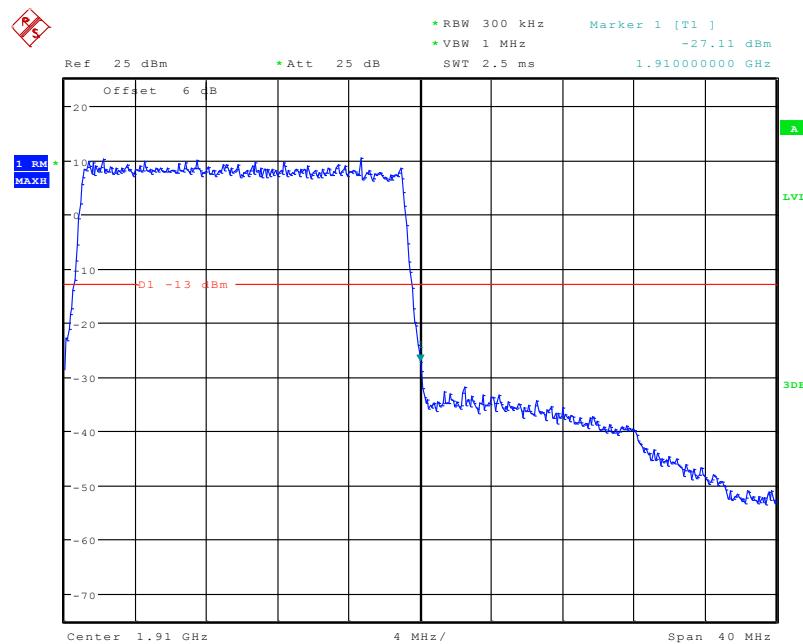
Date: 19.AUG.2019 07:09:34

**16-QAM (15.0 MHz, FULL RB) - Right Band Edge**

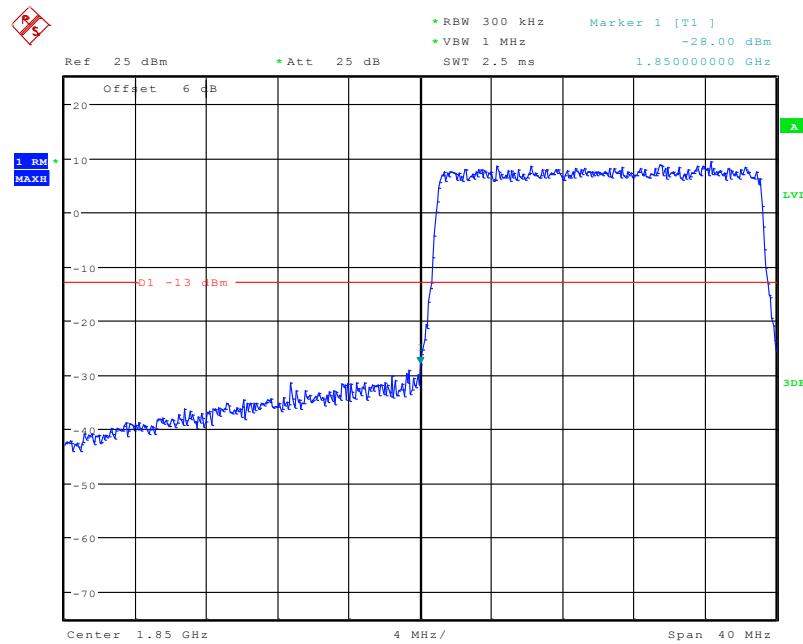
Date: 19.AUG.2019 07:10:41

**QPSK (20.0 MHz, FULL RB) - Left Band Edge**

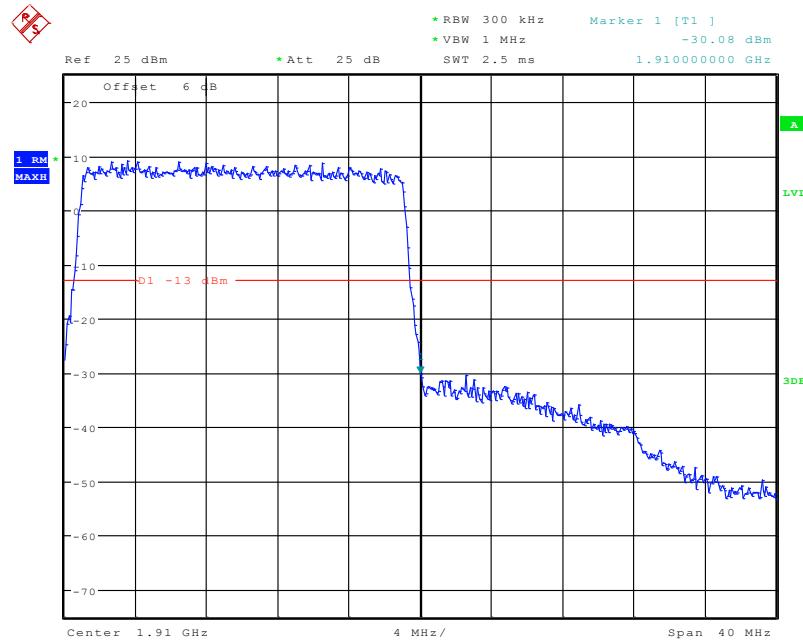
Date: 19.AUG.2019 07:11:20

**QPSK (20.0 MHz, FULL RB) - Right Band Edge**

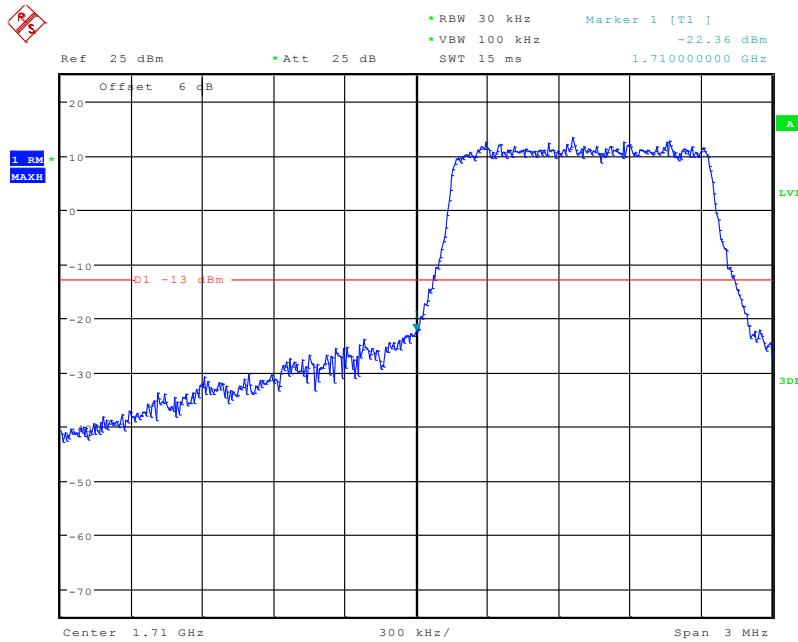
Date: 19.AUG.2019 07:12:23

**16-QAM (20.0 MHz, FULL RB) - Left Band Edge**

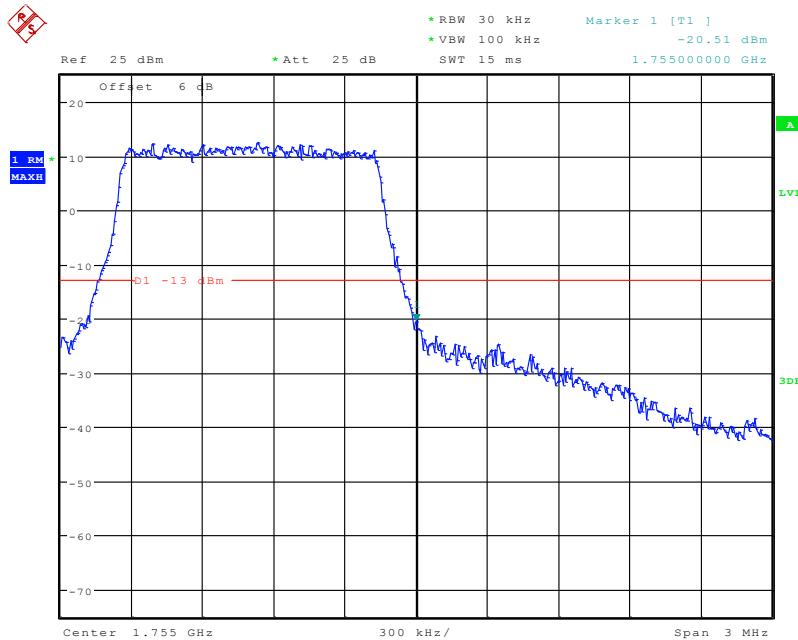
Date: 19.AUG.2019 07:11:54

**16-QAM (20.0 MHz, FULL RB) - Right Band Edge**

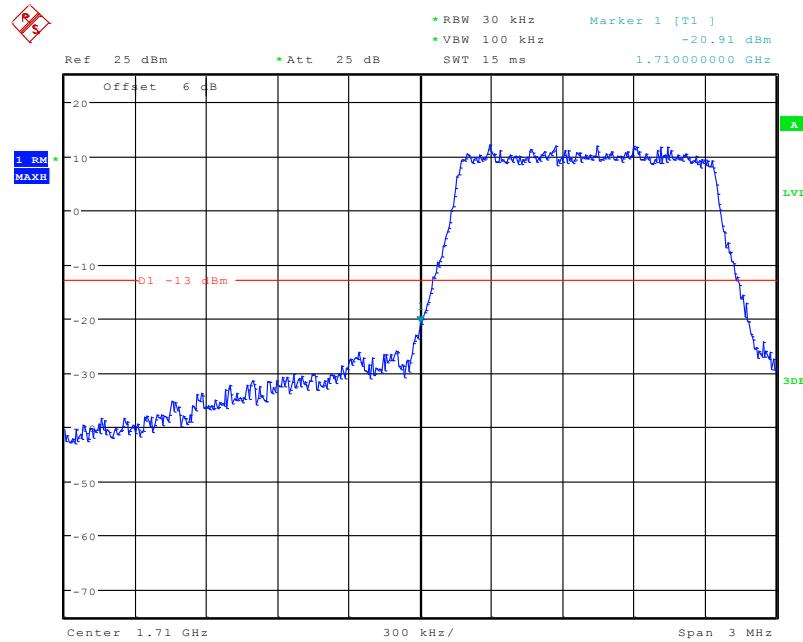
Date: 19.AUG.2019 07:12:54

**Band 4:****QPSK (1.4 MHz, FULL RB) - Left Band Edge**

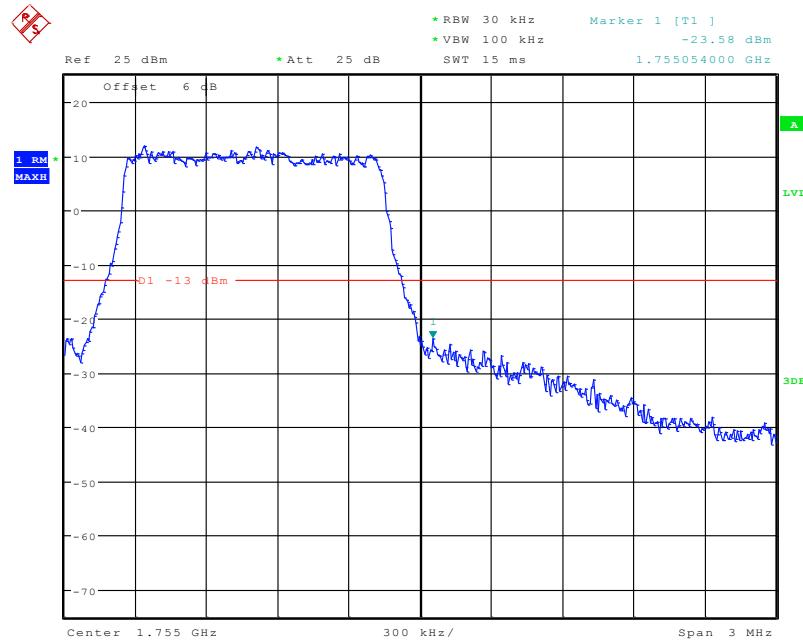
Date: 19.AUG.2019 07:13:26

**QPSK (1.4 MHz, FULL RB) - Right Band Edge**

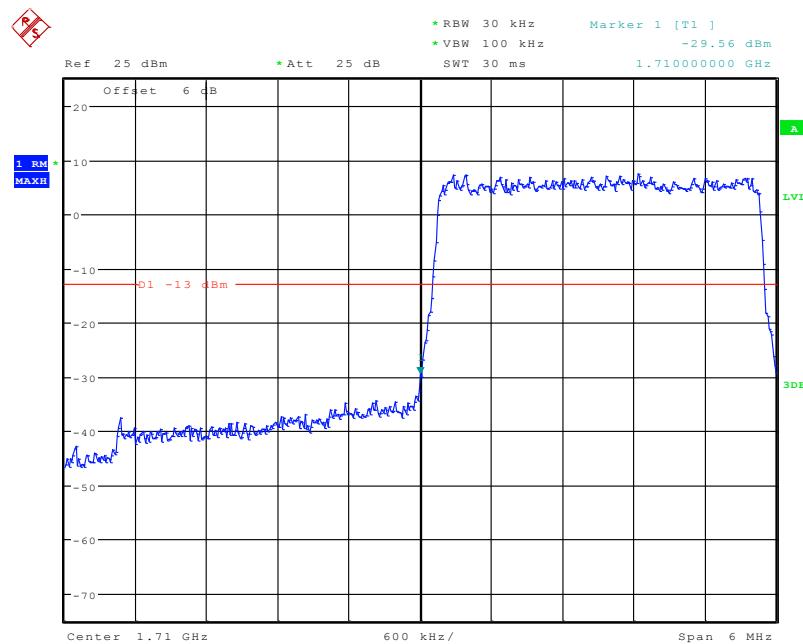
Date: 19.AUG.2019 07:14:27

**16-QAM (1.4 MHz, FULL RB) - Left Band Edge**

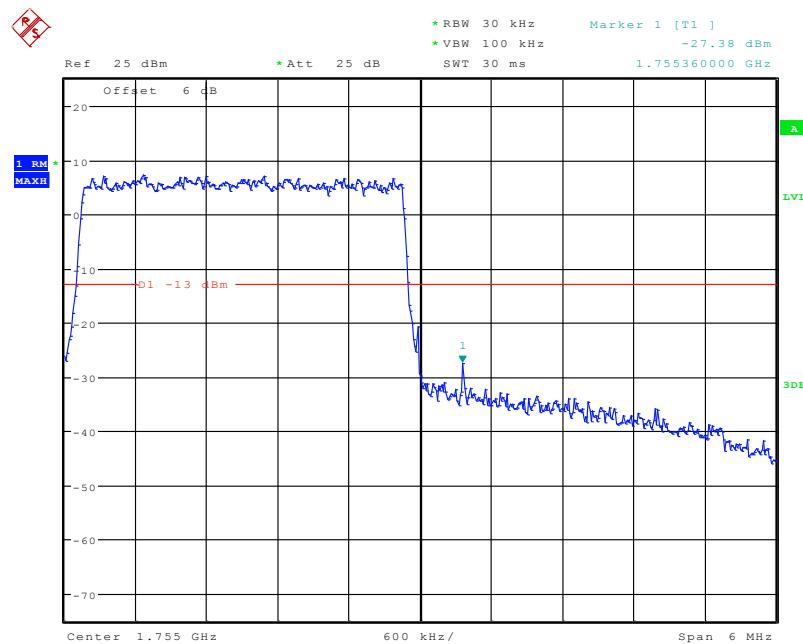
Date: 19.AUG.2019 07:14:00

**16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

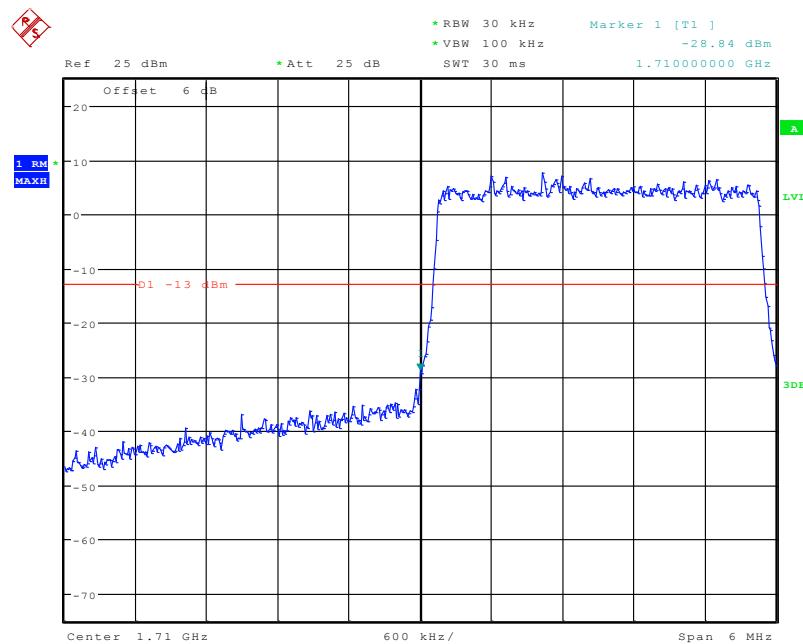
Date: 19.AUG.2019 07:14:53

**QPSK (3.0 MHz, FULL RB) - Left Band Edge**

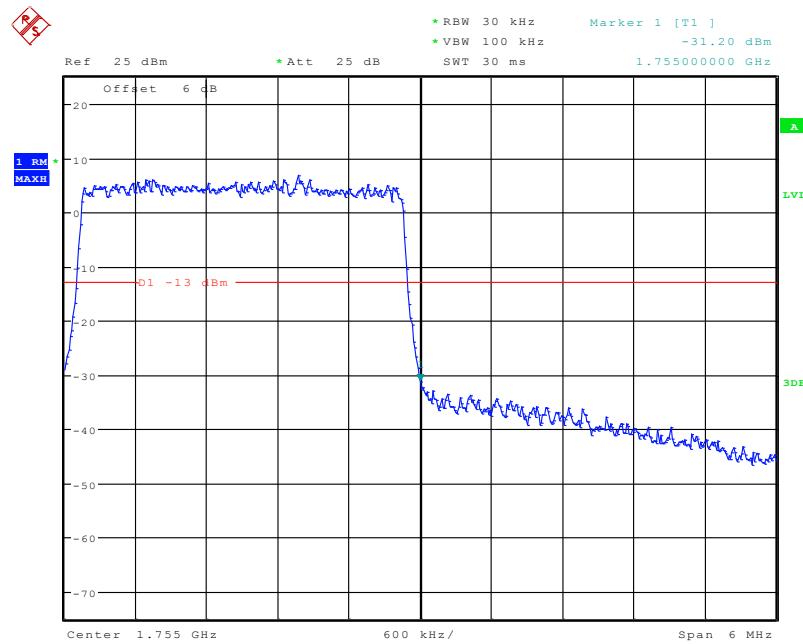
Date: 19.AUG.2019 07:15:22

**QPSK (3.0 MHz, FULL RB) - Right Band Edge**

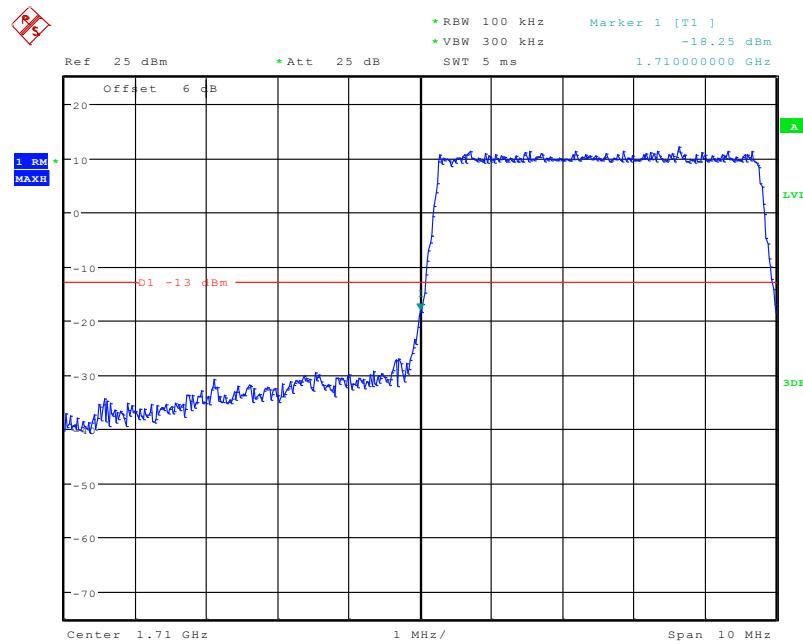
Date: 19.AUG.2019 07:16:17

**16-QAM (3.0 MHz, FULL RB) - Left Band Edge**

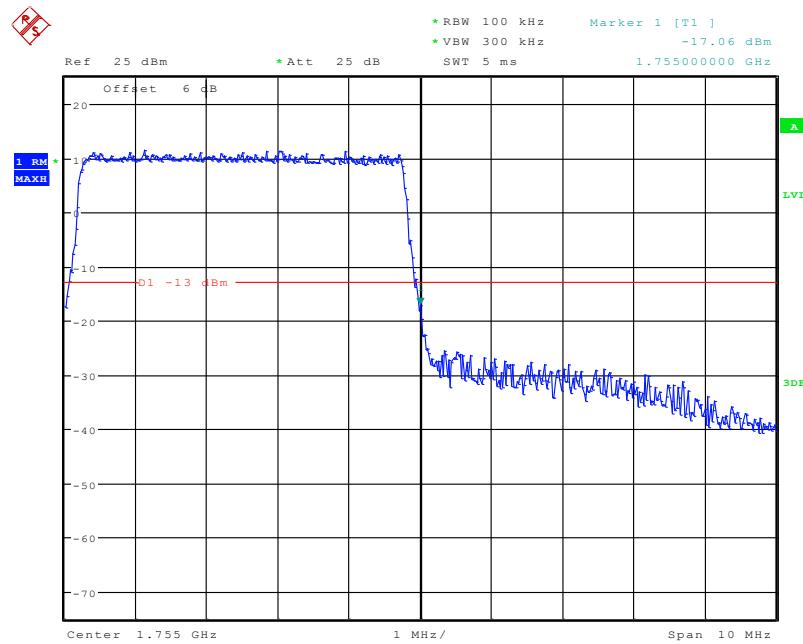
Date: 19.AUG.2019 07:15:50

**16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

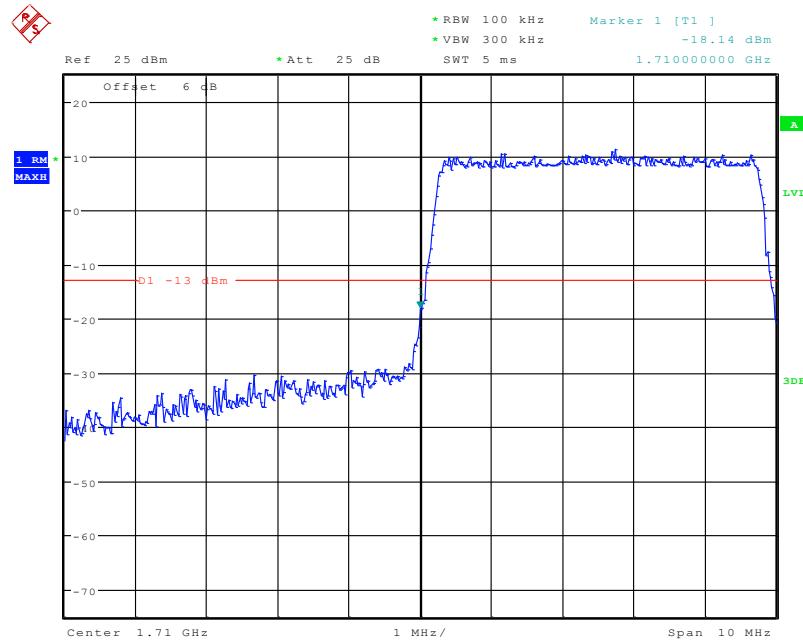
Date: 19.AUG.2019 07:16:42

**QPSK (5.0 MHz, FULL RB) - Left Band Edge**

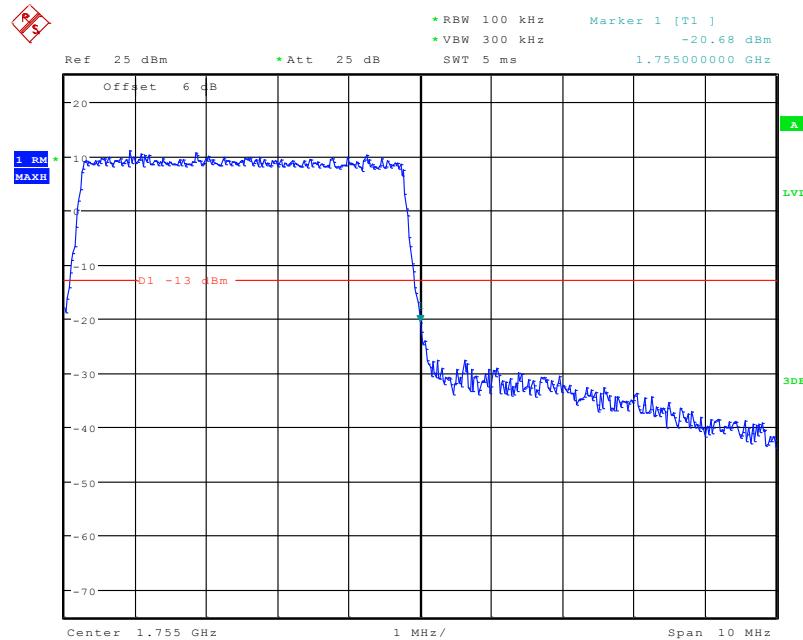
Date: 19.AUG.2019 07:17:23

**QPSK (5.0 MHz, FULL RB) - Right Band Edge**

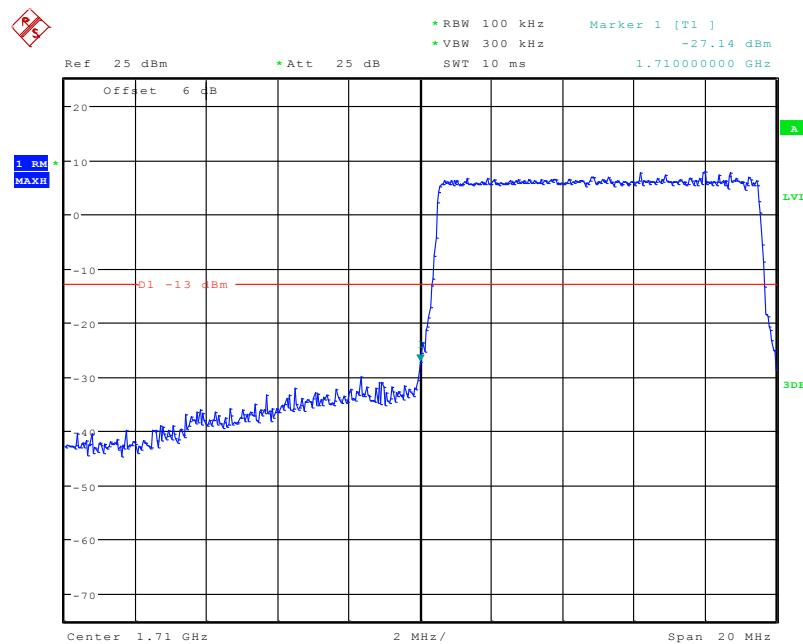
Date: 19.AUG.2019 07:18:36

**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**

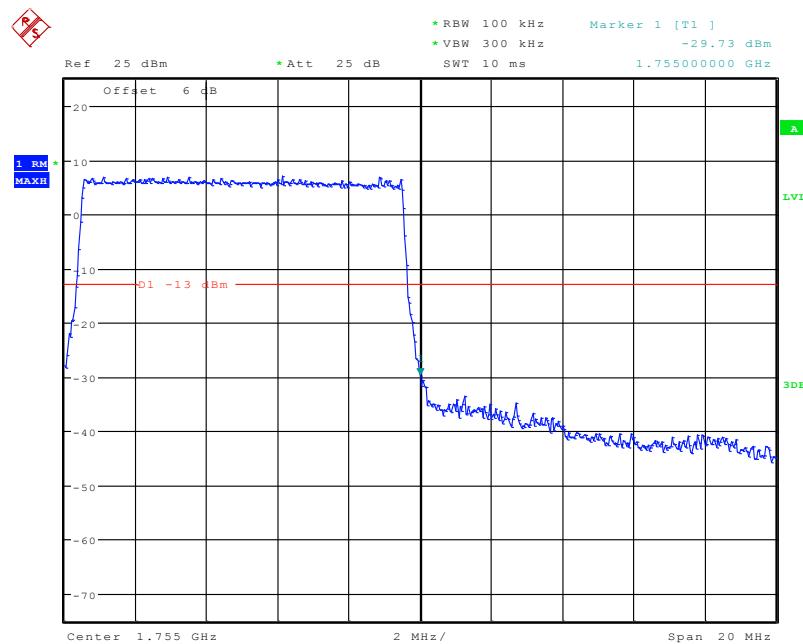
Date: 19.AUG.2019 07:17:58

**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

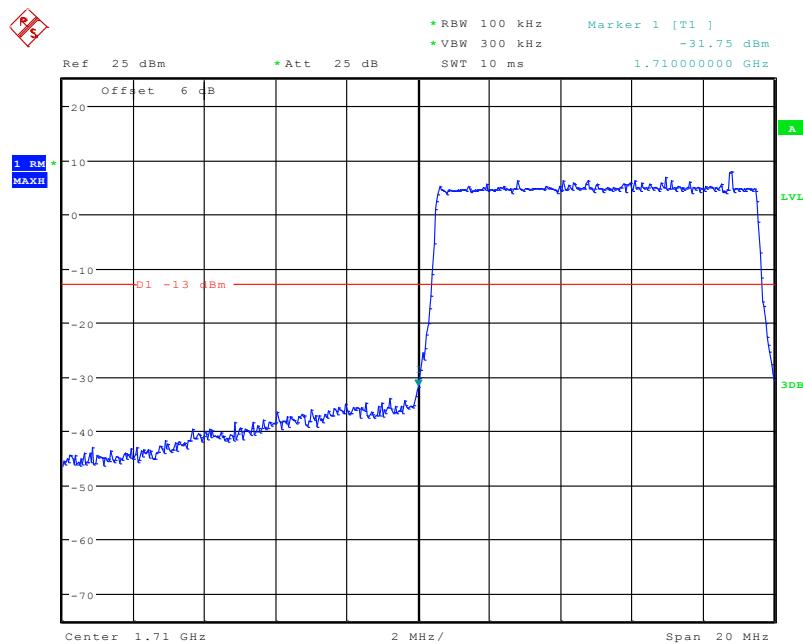
Date: 19.AUG.2019 07:19:11

**QPSK (10.0 MHz, FULL RB) - Left Band Edge**

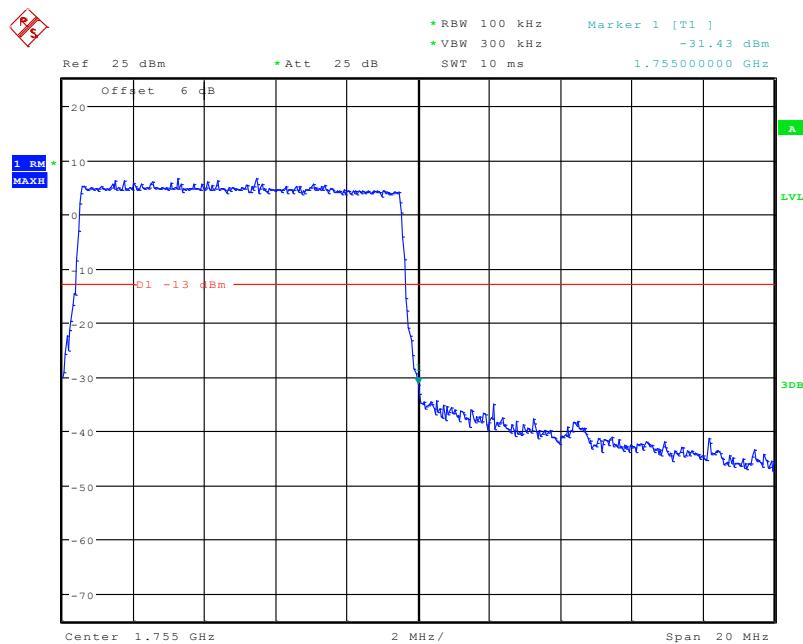
Date: 19.AUG.2019 07:19:40

**QPSK (10.0 MHz, FULL RB) - Right Band Edge**

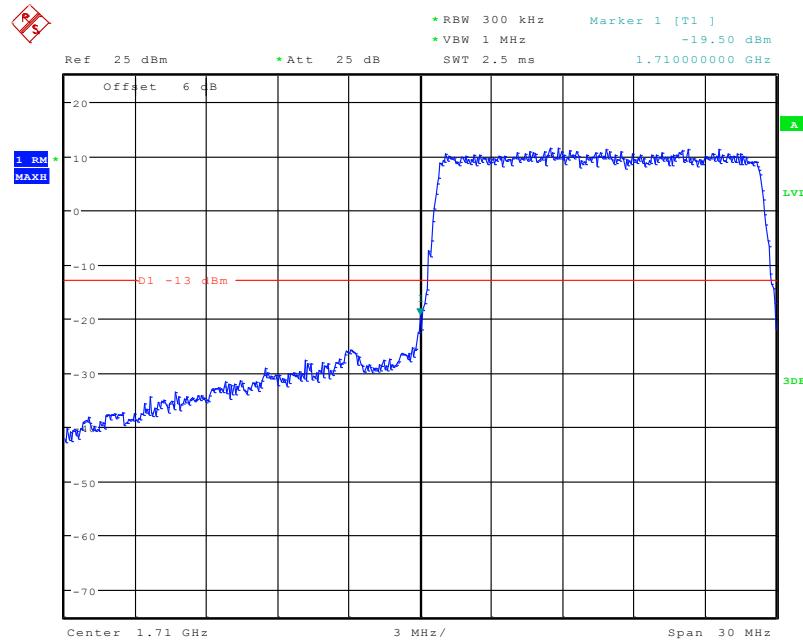
Date: 19.AUG.2019 07:20:32

**16-QAM (10.0 MHz, FULL RB) - Left Band Edge**

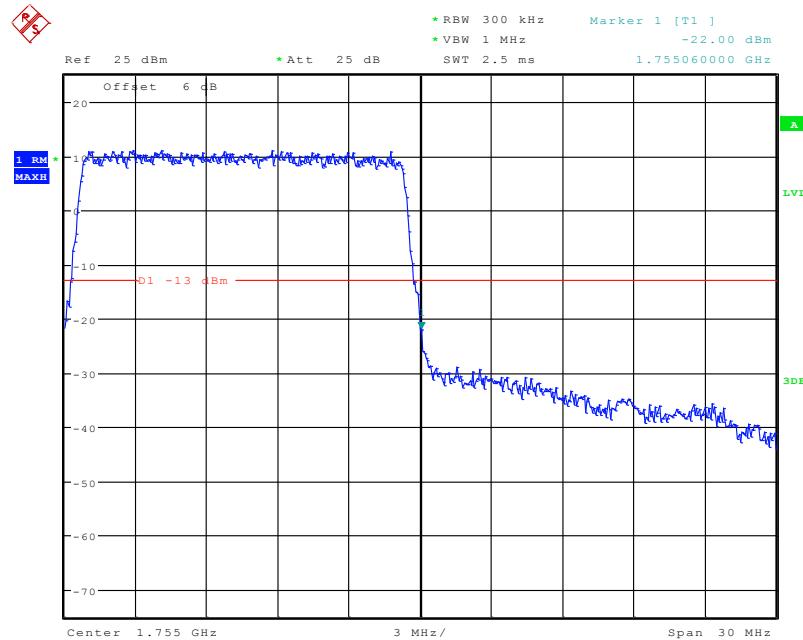
Date: 19.AUG.2019 07:20:03

**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

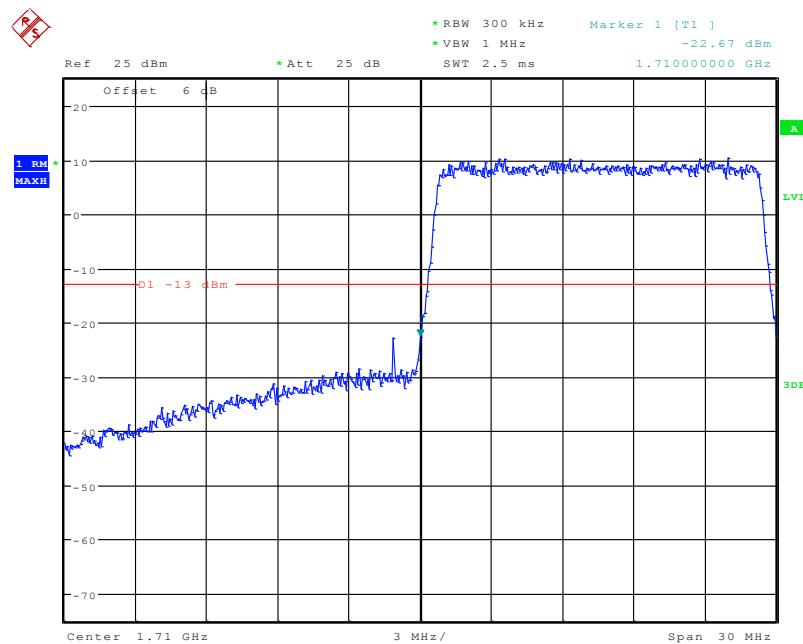
Date: 19.AUG.2019 07:20:58

**QPSK (15.0 MHz, FULL RB) - Left Band Edge**

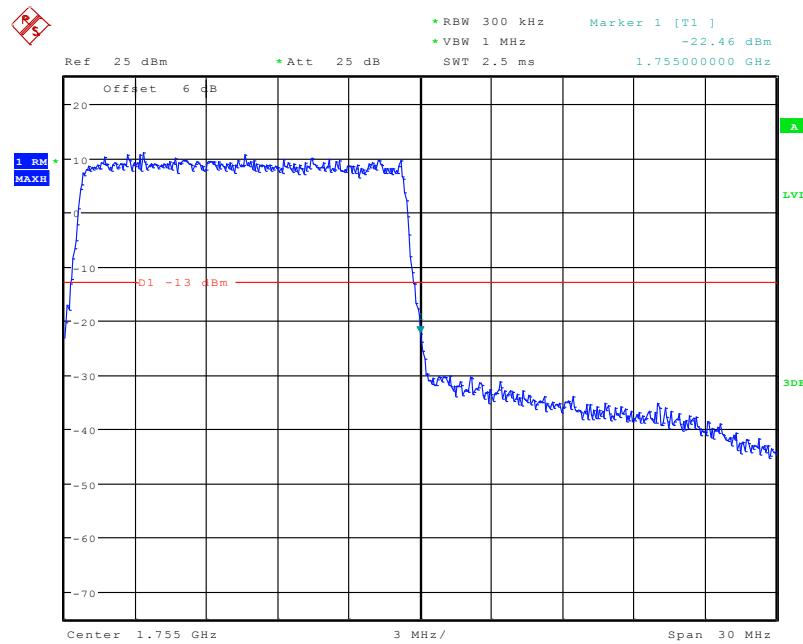
Date: 19.AUG.2019 07:21:31

**QPSK (15.0 MHz, FULL RB) - Right Band Edge**

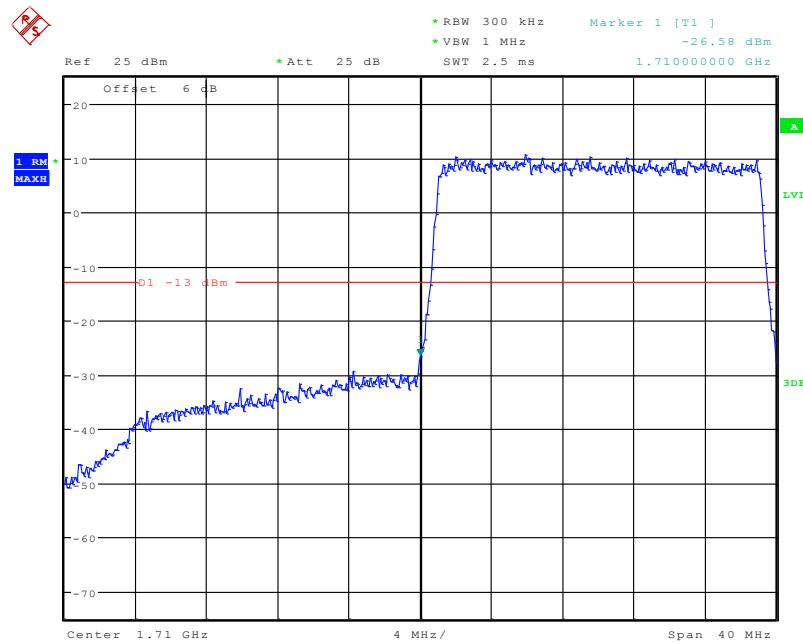
Date: 19.AUG.2019 07:22:39

**16-QAM (15.0 MHz, FULL RB) - Left Band Edge**

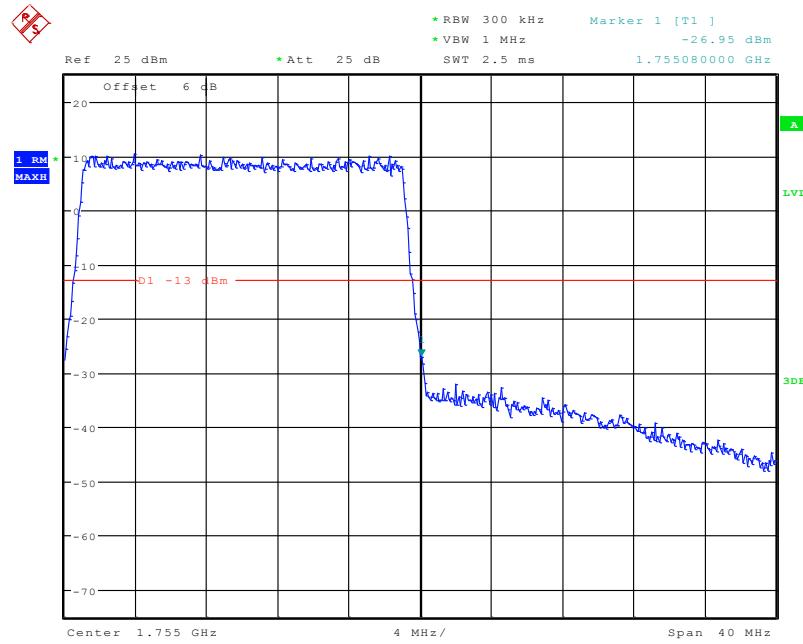
Date: 19.AUG.2019 07:22:05

**16-QAM (15.0 MHz, FULL RB) - Right Band Edge**

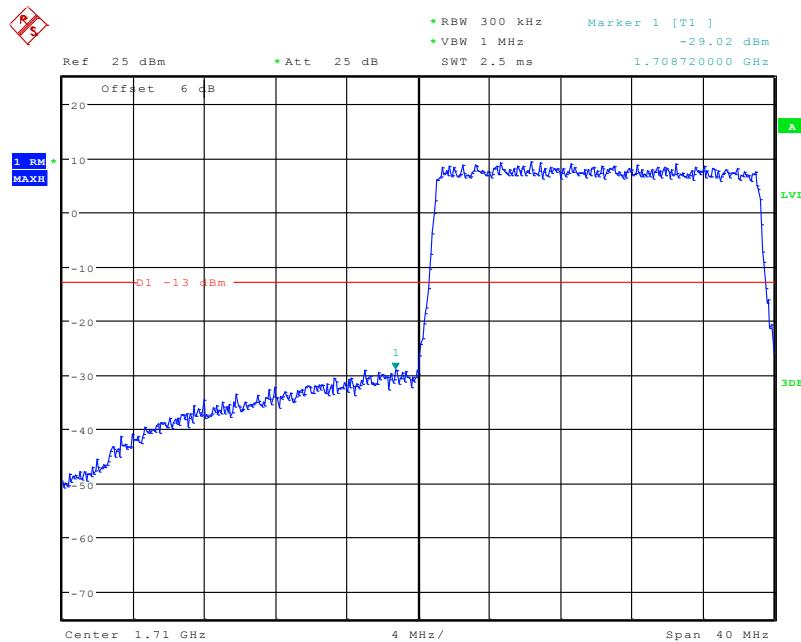
Date: 19.AUG.2019 07:23:15

**QPSK (20.0 MHz, FULL RB) - Left Band Edge**

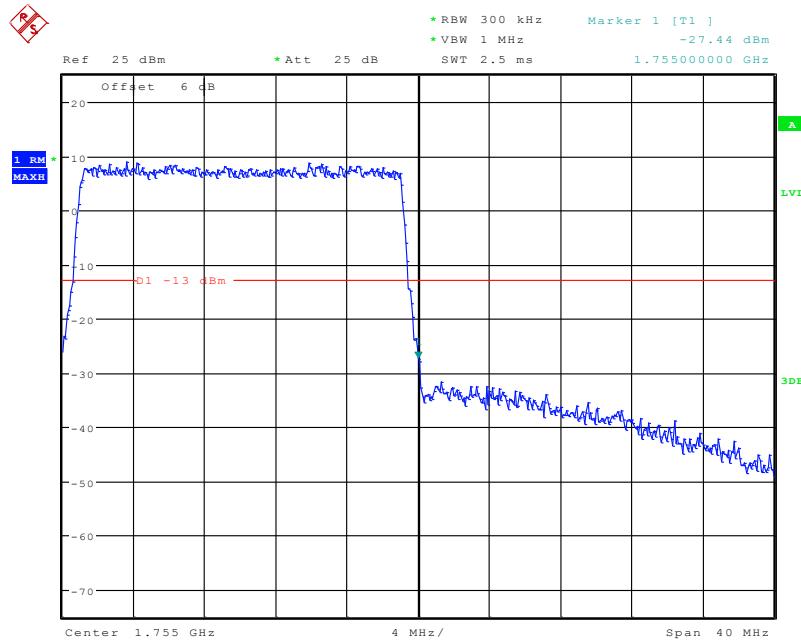
Date: 19.AUG.2019 07:23:54

**QPSK (20.0 MHz, FULL RB) - Right Band Edge**

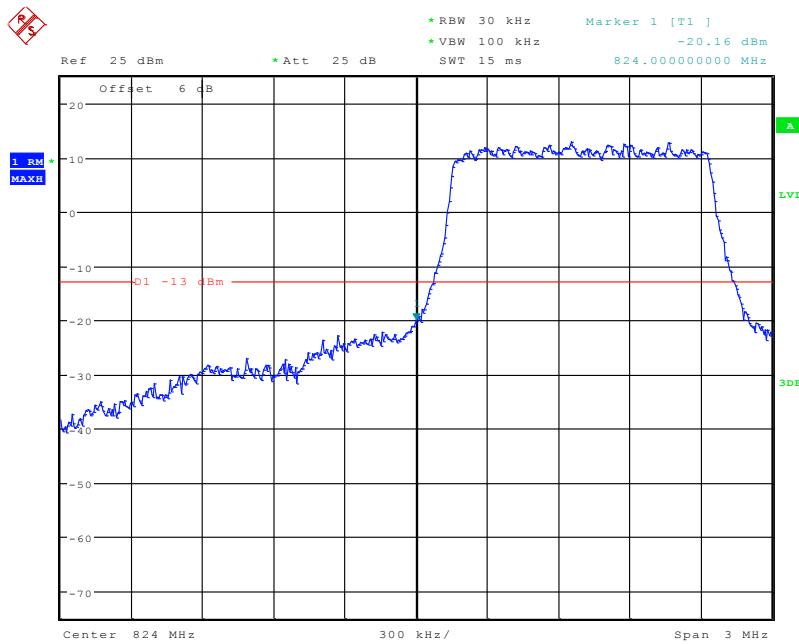
Date: 19.AUG.2019 07:25:10

**16-QAM (20.0 MHz, FULL RB) - Left Band Edge**

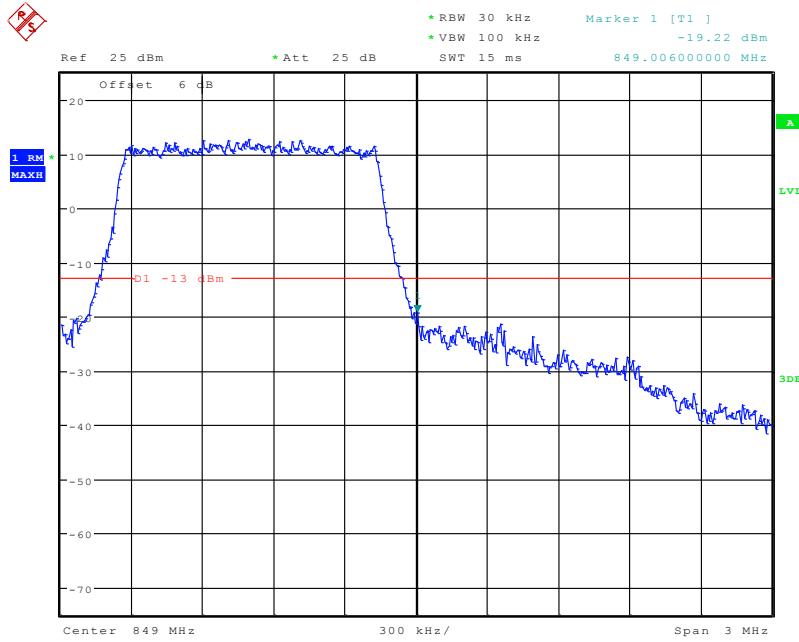
Date: 19.AUG.2019 07:24:35

**16-QAM (20.0 MHz, FULL RB) - Right Band Edge**

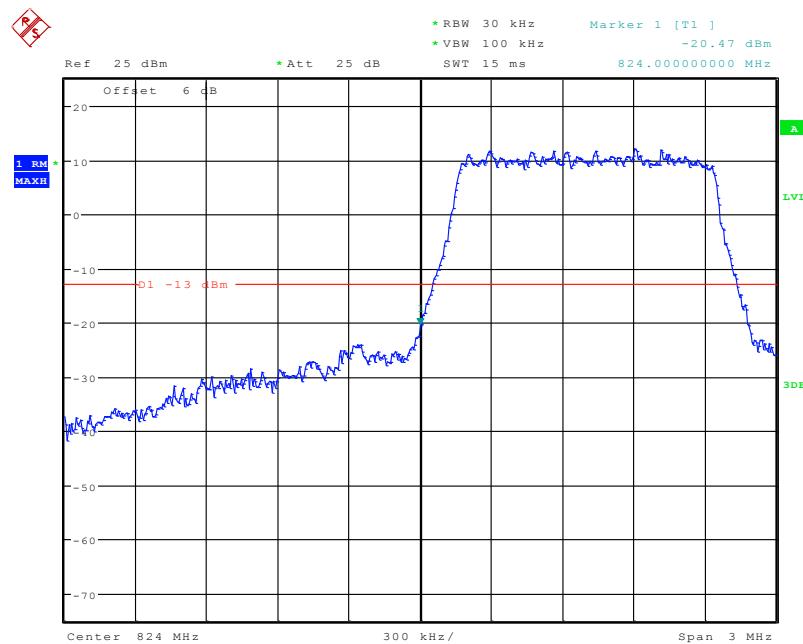
Date: 19.AUG.2019 07:25:44

**Band 5:****QPSK (1.4 MHz, FULL RB) - Left Band Edge**

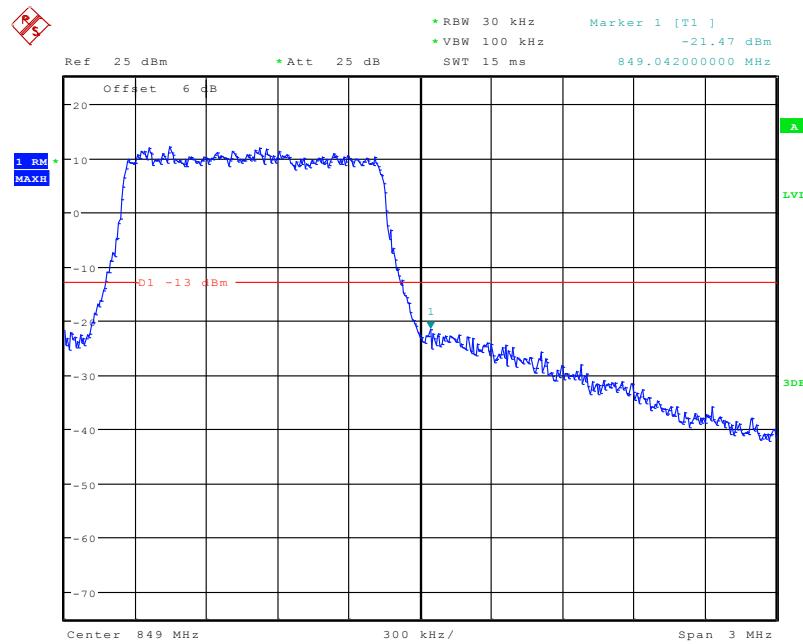
Date: 19.AUG.2019 07:26:25

**QPSK (1.4 MHz, FULL RB) - Right Band Edge**

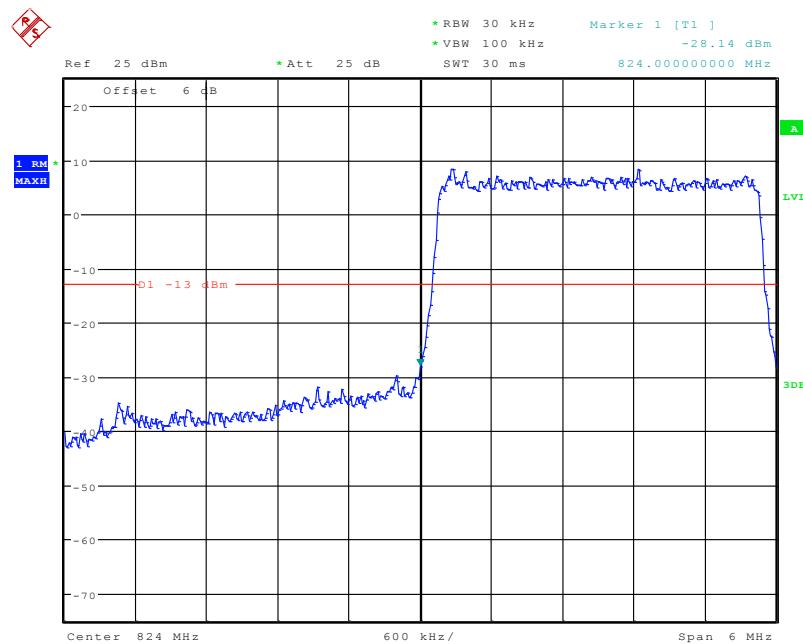
Date: 19.AUG.2019 07:27:23

**16-QAM 1.4 MHz, FULL RB) - Left Band Edge**

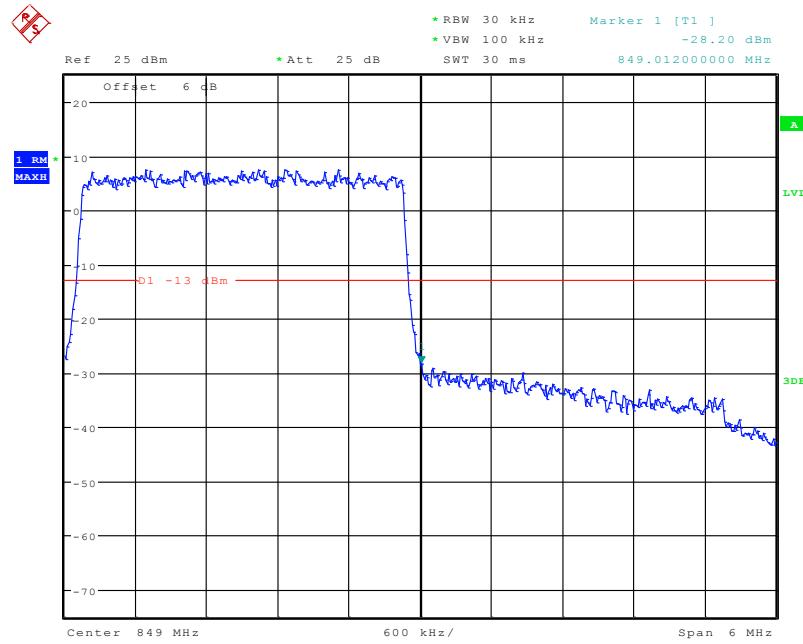
Date: 19.AUG.2019 07:27:00

**16-QAM (1.4MHz, FULL RB) - Right Band Edge**

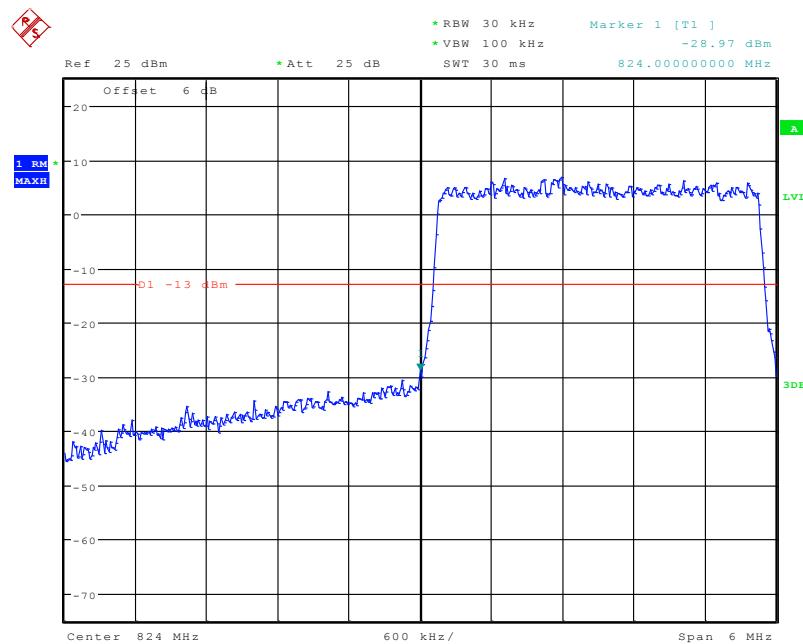
Date: 19.AUG.2019 07:27:49

**QPSK (3.0 MHz, FULL RB) - Left Band Edge**

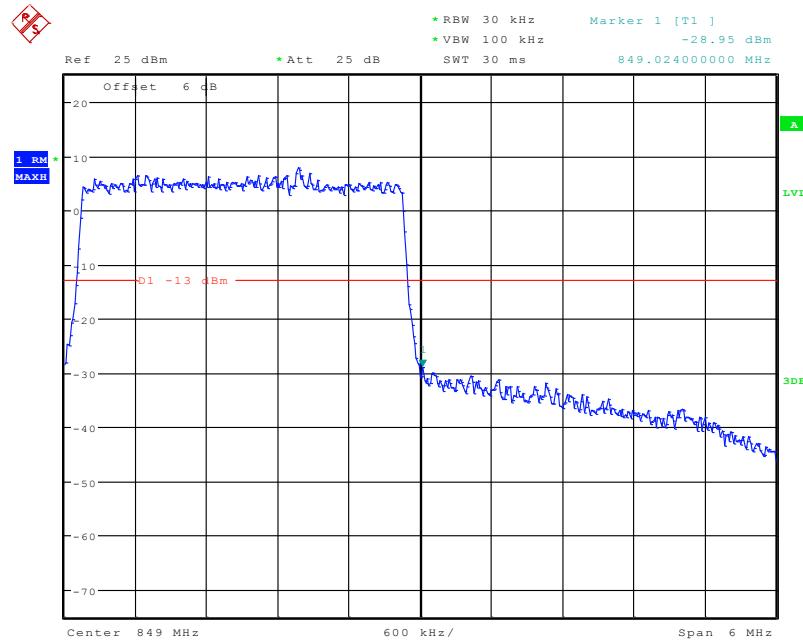
Date: 19.AUG.2019 07:28:26

**QPSK (3.0 MHz, FULL RB) - Right Band Edge**

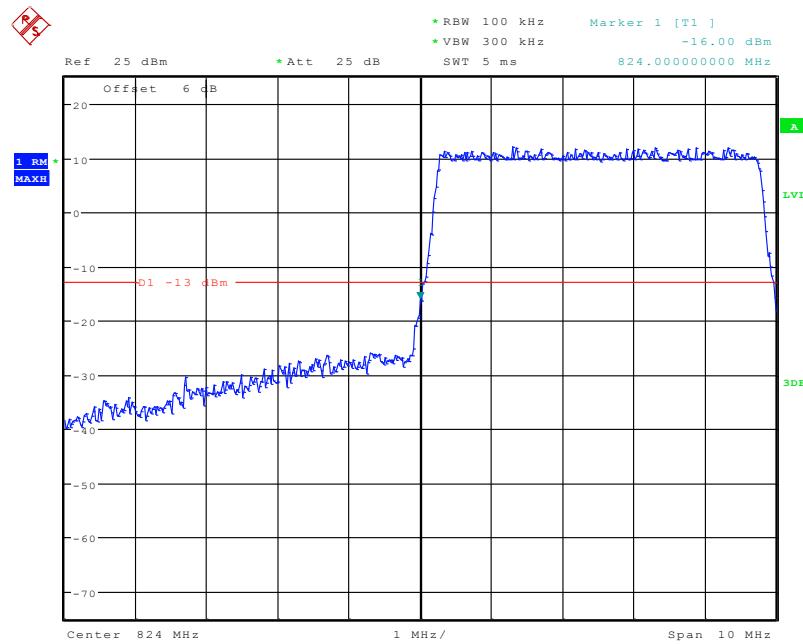
Date: 19.AUG.2019 07:29:14

**16-QAM (3.0 MHz, FULL RB) - Left Band Edge**

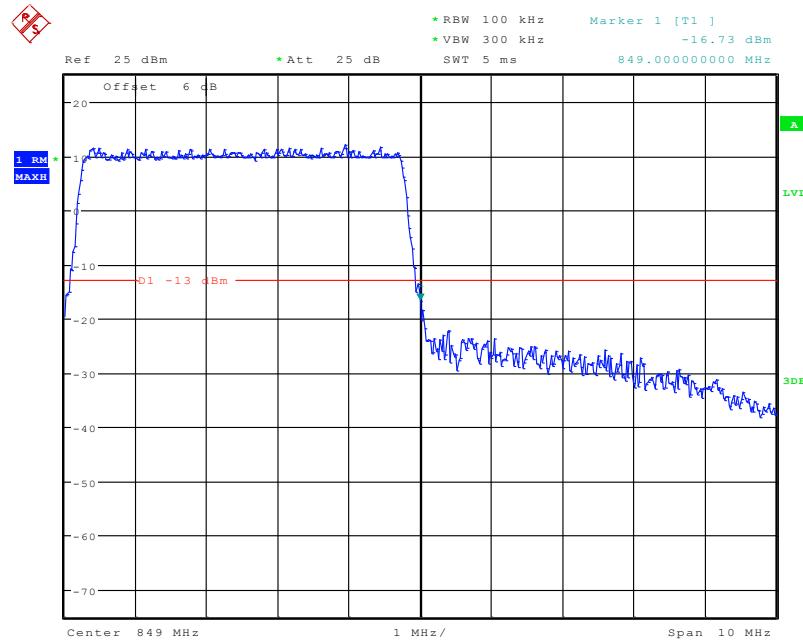
Date: 19.AUG.2019 07:28:48

**16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

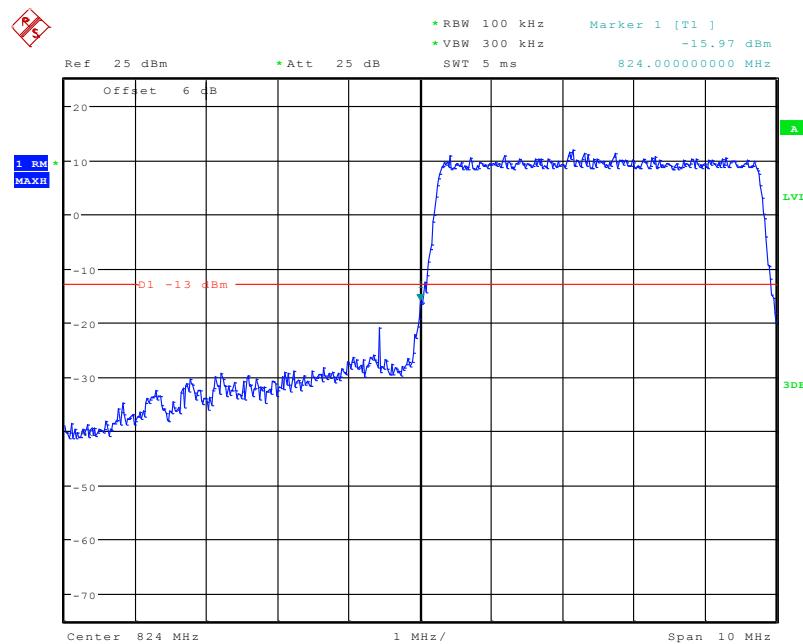
Date: 19.AUG.2019 07:29:46

**QPSK (5.0 MHz, FULL RB) - Left Band Edge**

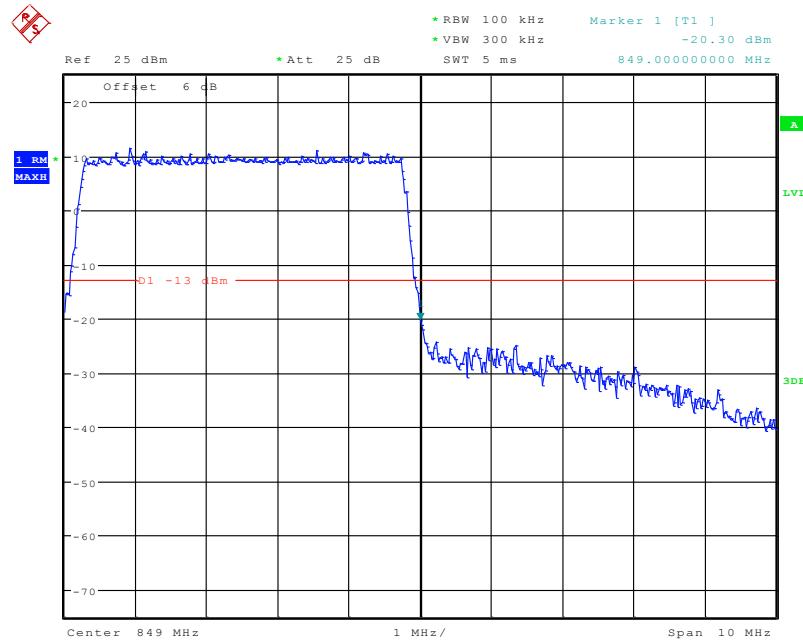
Date: 19.AUG.2019 07:30:20

**QPSK (5.0 MHz, FULL RB) - Right Band Edge**

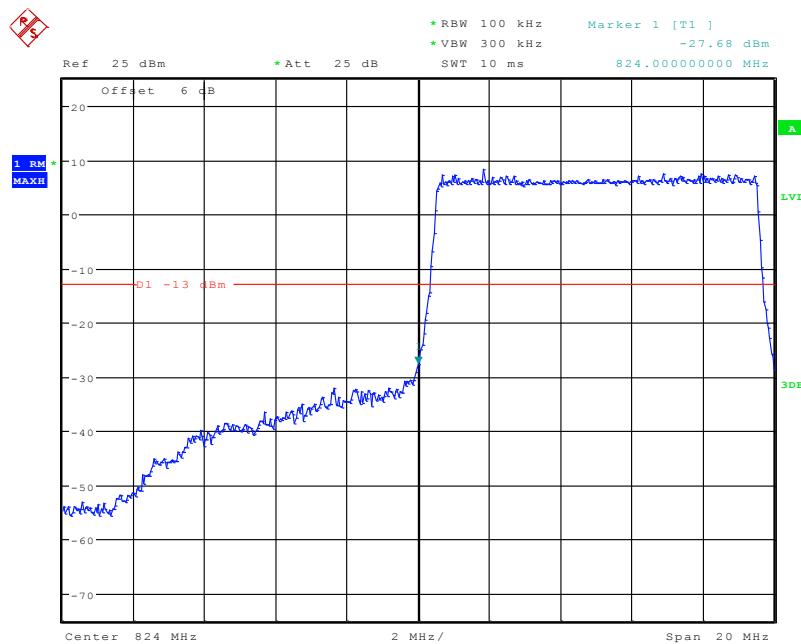
Date: 19.AUG.2019 07:31:27

**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**

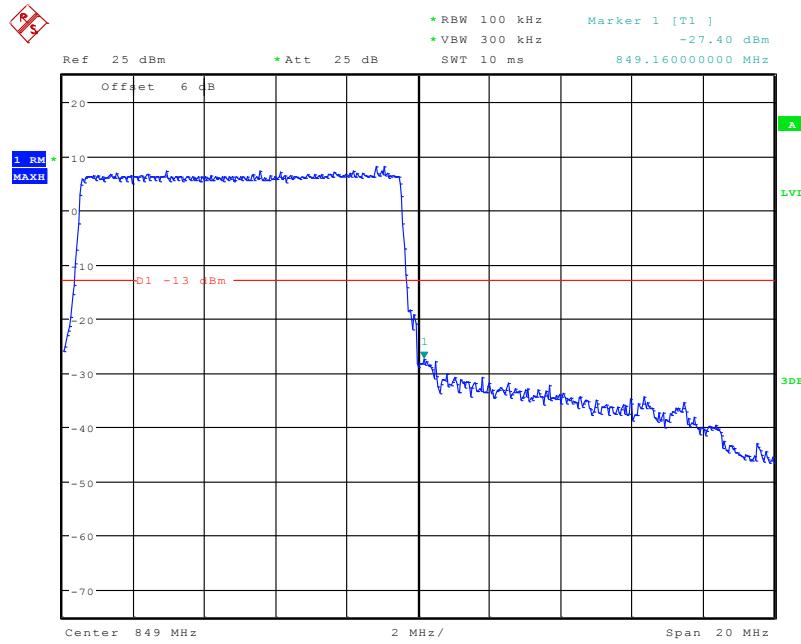
Date: 19.AUG.2019 07:30:52

**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

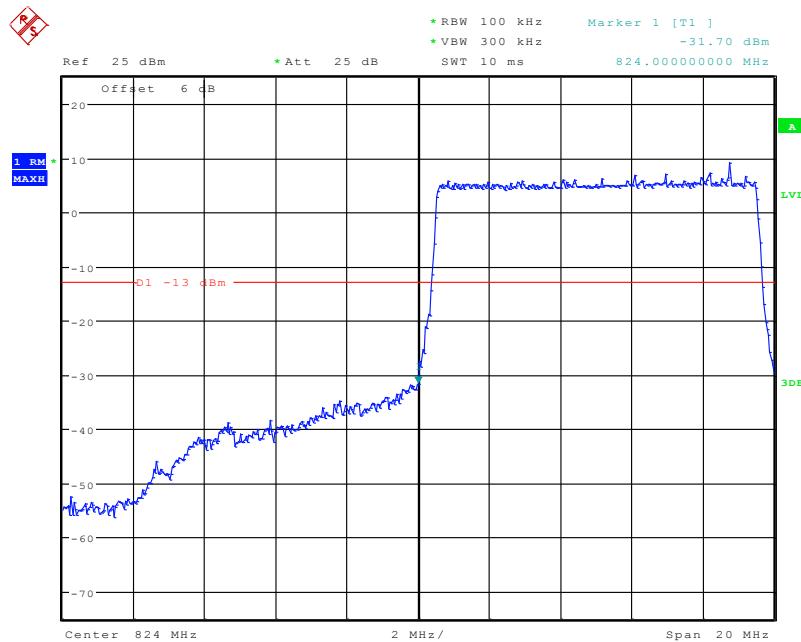
Date: 19.AUG.2019 07:31:50

**QPSK (10.0 MHz, FULL RB) - Left Band Edge**

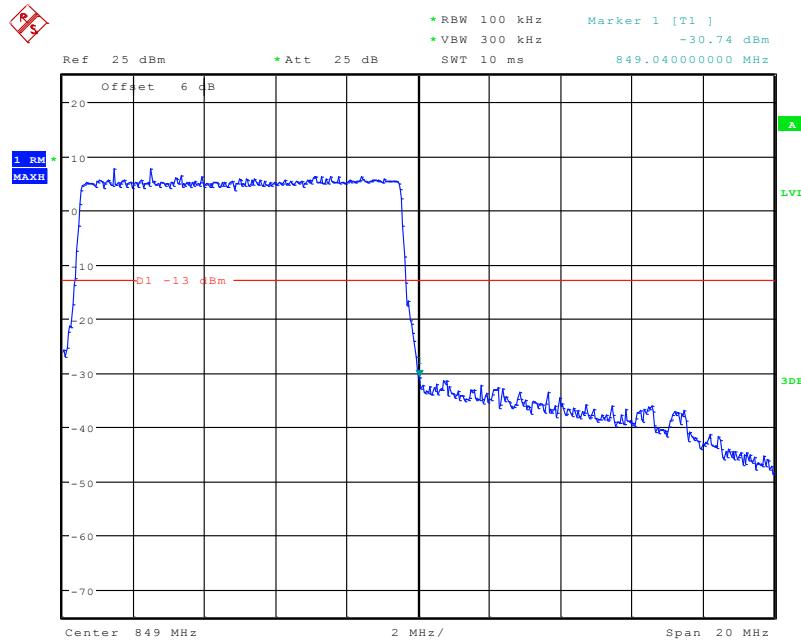
Date: 19.AUG.2019 07:32:21

**QPSK (10.0 MHz, FULL RB) - Right Band Edge**

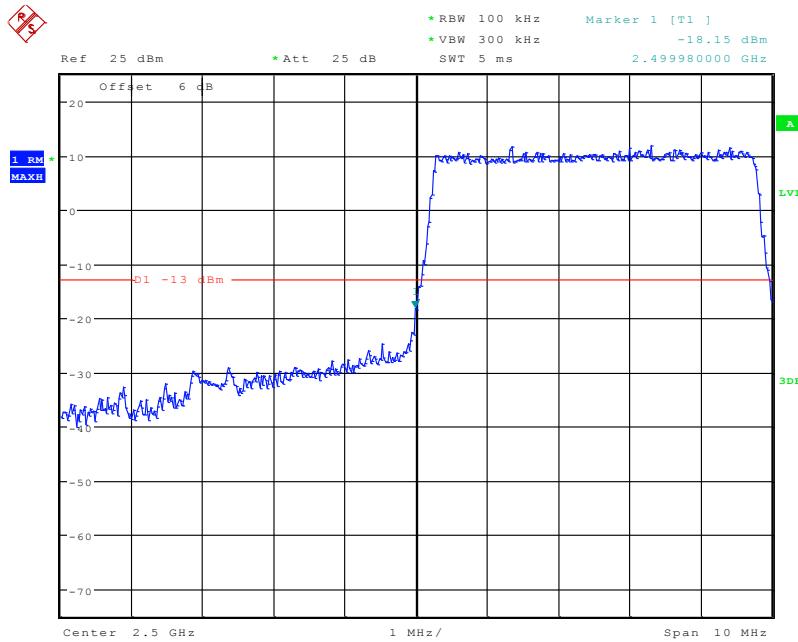
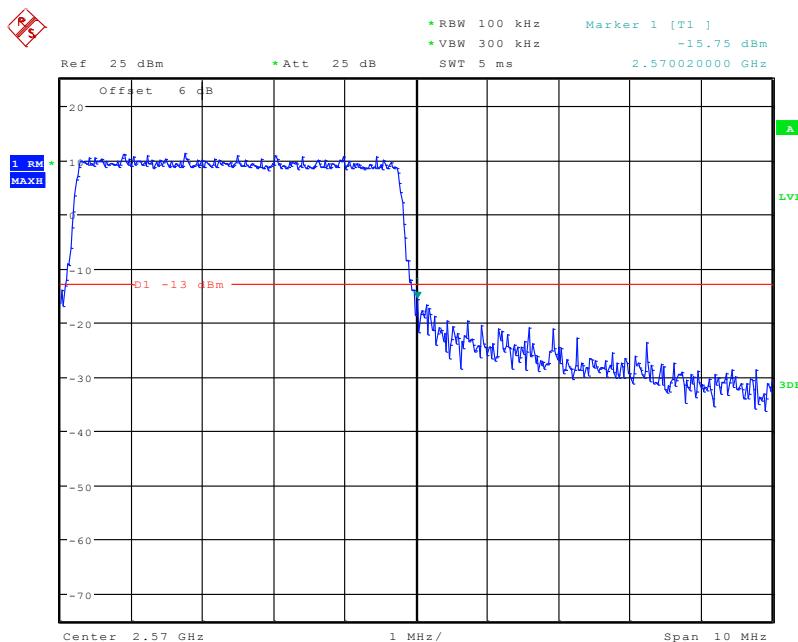
Date: 19.AUG.2019 07:33:16

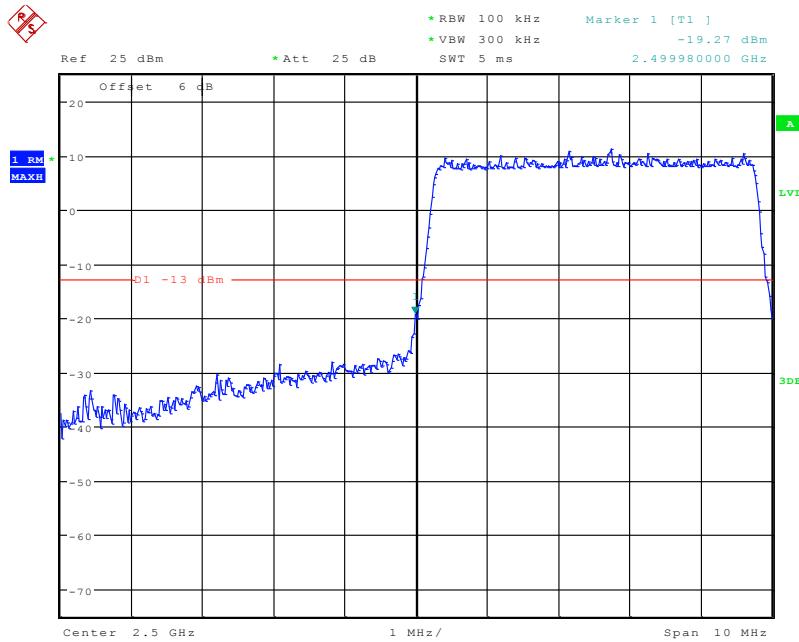
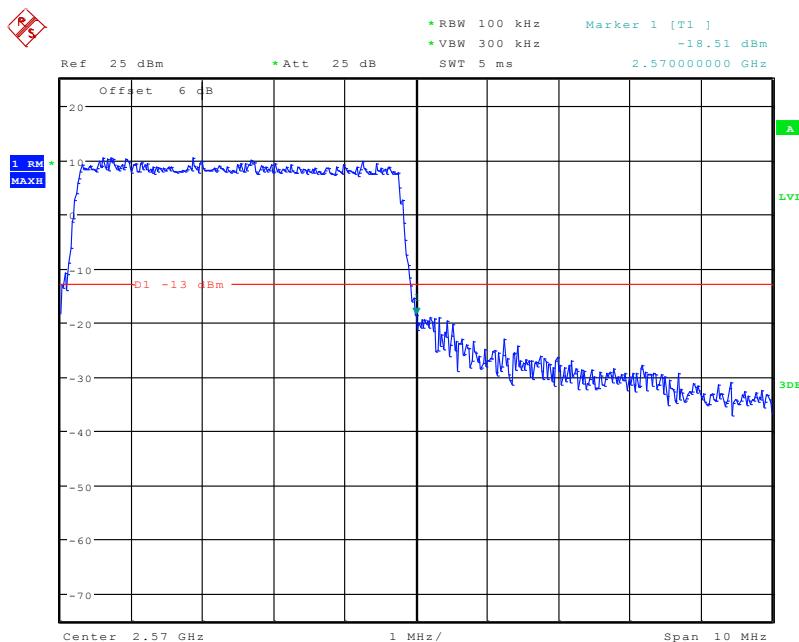
**16-QAM (10.0 MHz, FULL RB) - Left Band Edge**

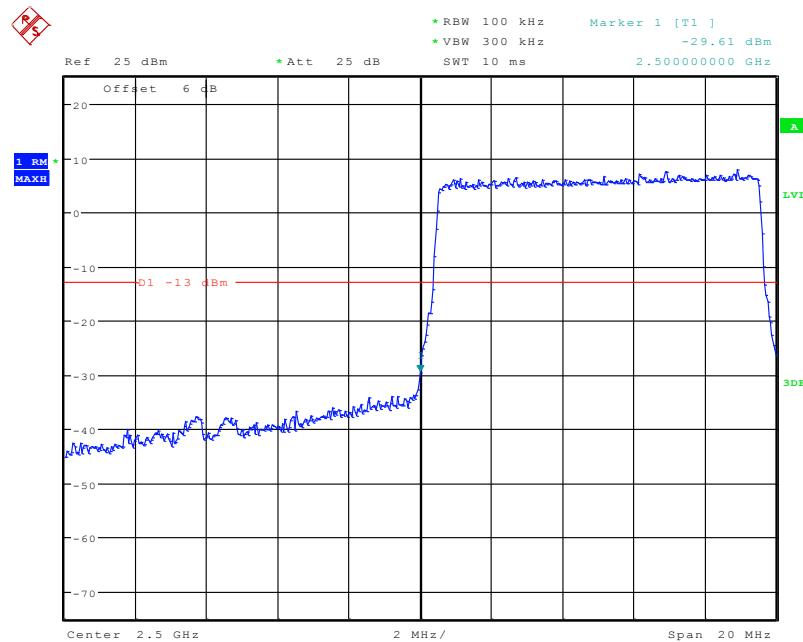
Date: 19.AUG.2019 07:32:47

**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

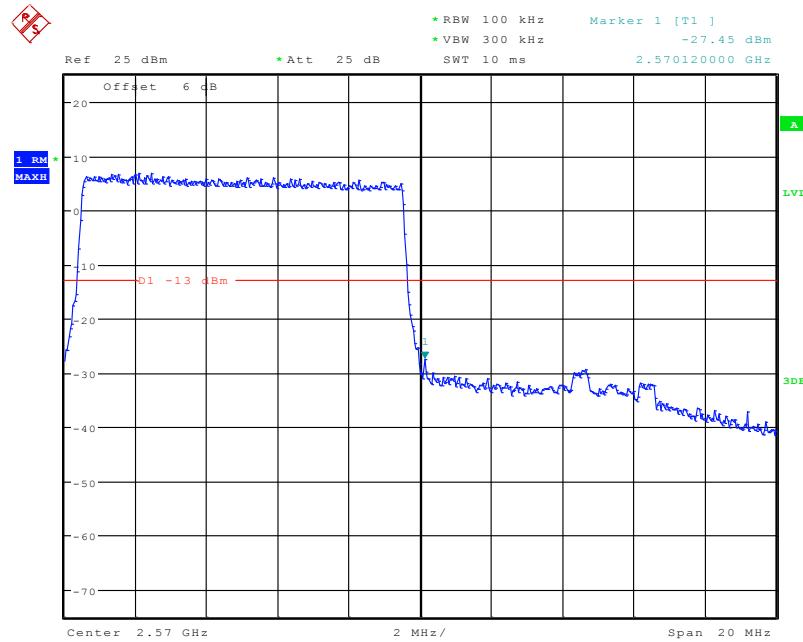
Date: 19.AUG.2019 07:33:45

**Band 7:****QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**

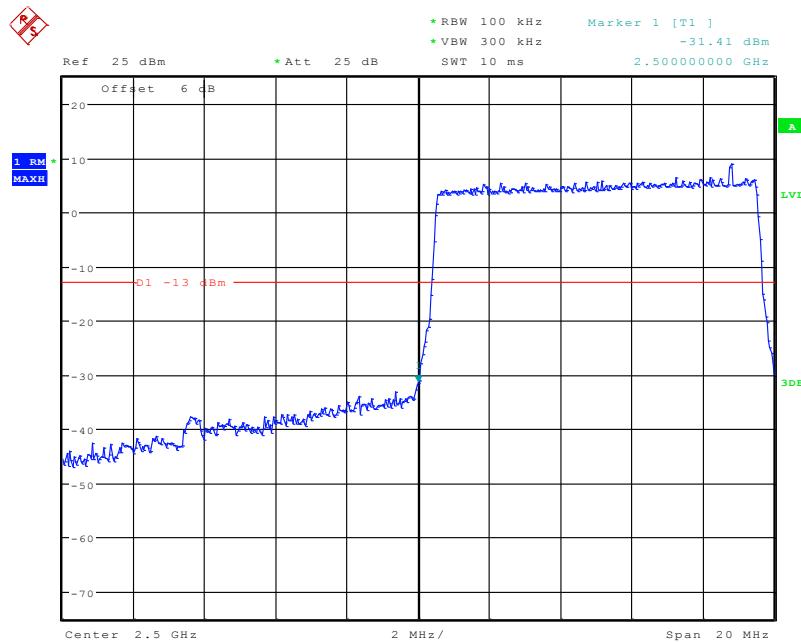
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge****16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

**QPSK (10.0 MHz, FULL RB) - Left Band Edge**

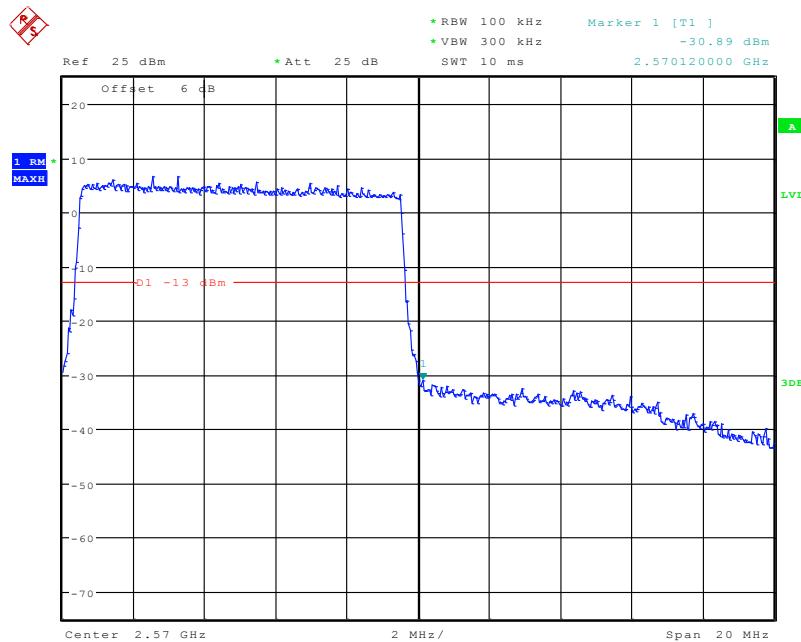
Date: 19.AUG.2019 07:36:39

**QPSK (10.0 MHz, FULL RB) - Right Band Edge**

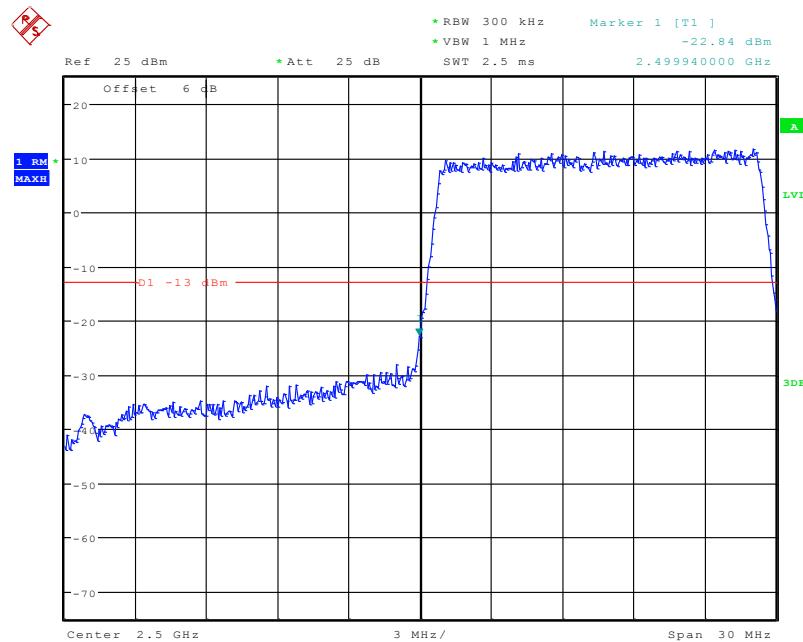
Date: 19.AUG.2019 07:37:37

**16-QAM (10.0 MHz, FULL RB) - Left Band Edge**

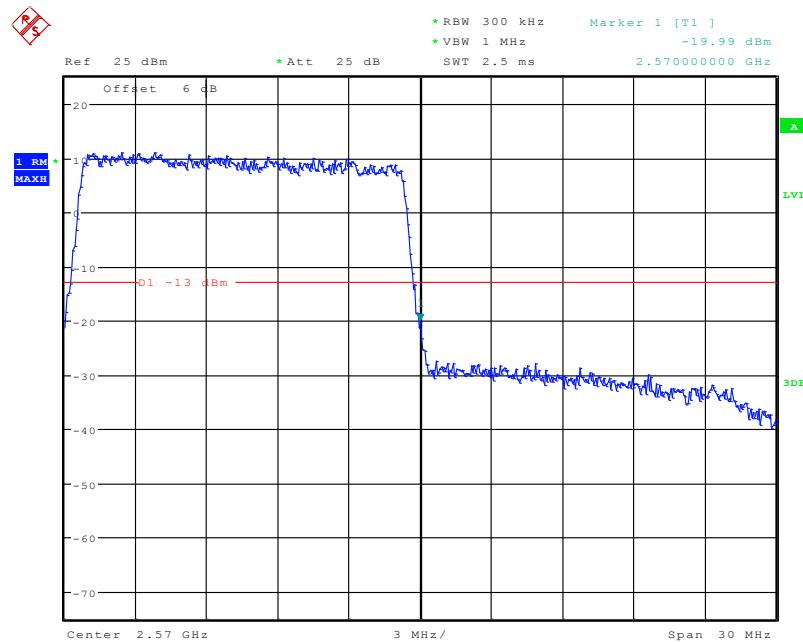
Date: 19.AUG.2019 07:37:11

**16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

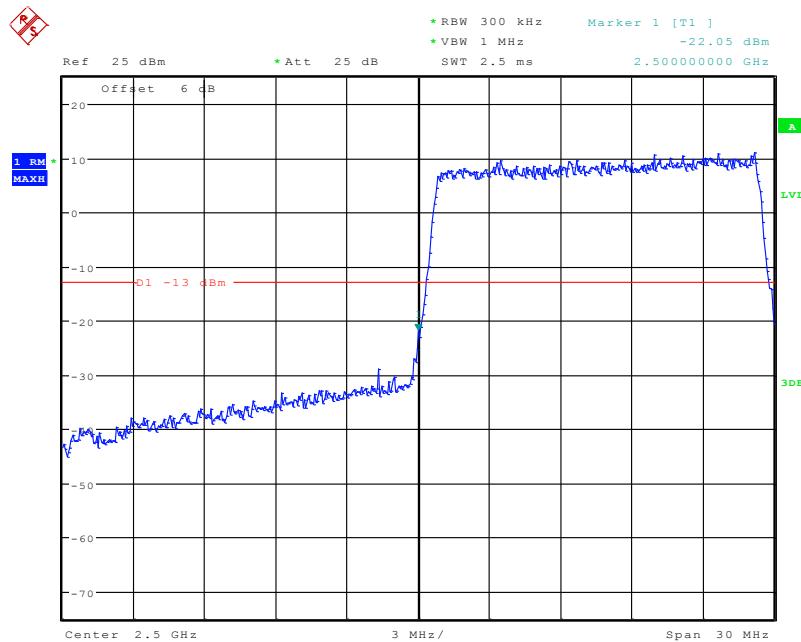
Date: 19.AUG.2019 07:38:05

**QPSK (15.0 MHz, FULL RB) - Left Band Edge**

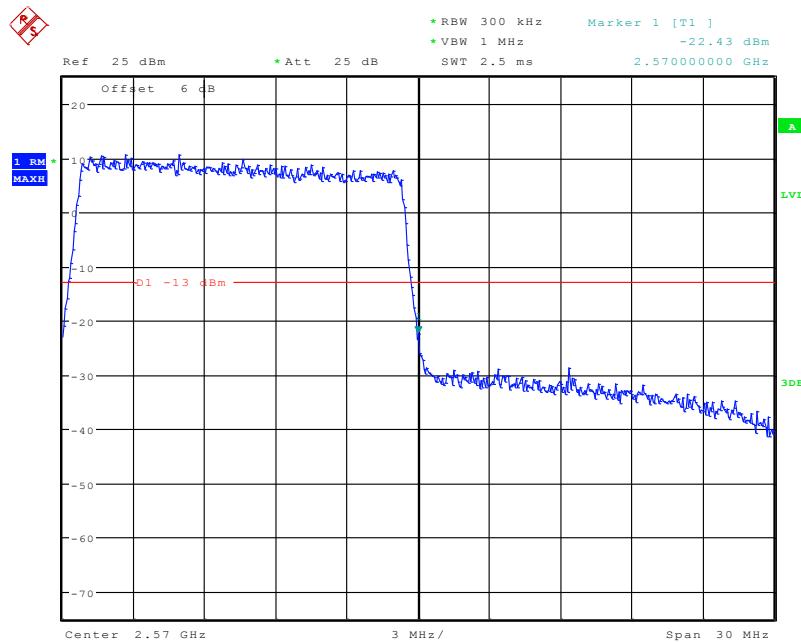
Date: 19.AUG.2019 07:38:41

**QPSK (15.0 MHz, FULL RB) - Right Band Edge**

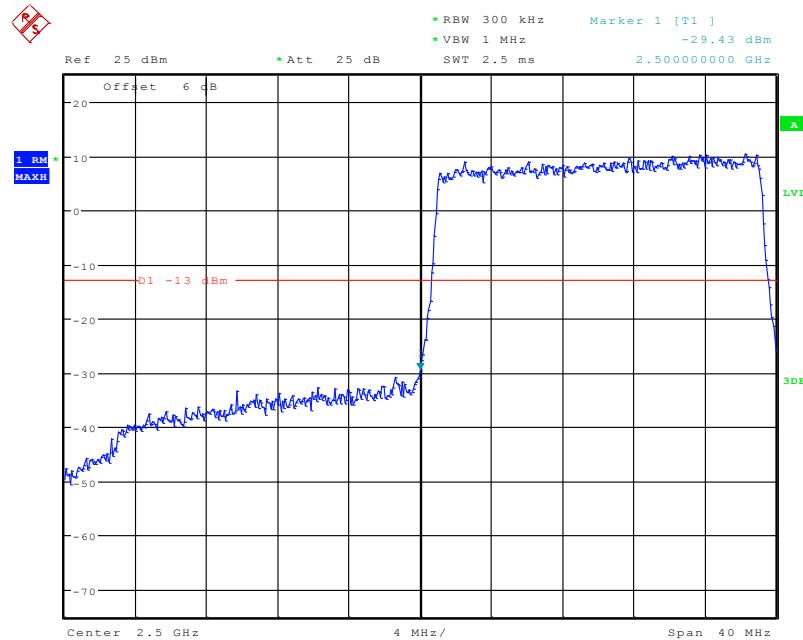
Date: 19.AUG.2019 07:39:48

**16-QAM (15.0 MHz, FULL RB) - Left Band Edge**

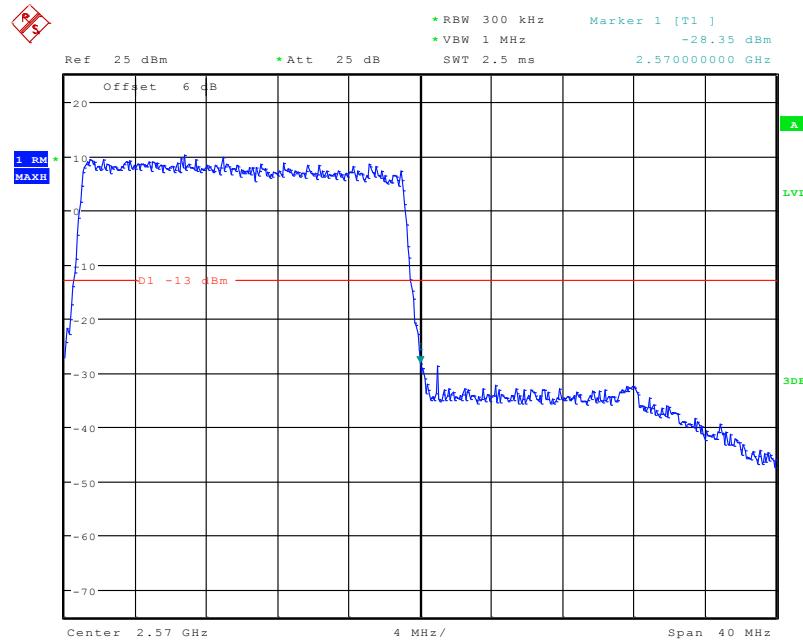
Date: 19.AUG.2019 07:39:08

**16-QAM (15.0 MHz, FULL RB) - Right Band Edge**

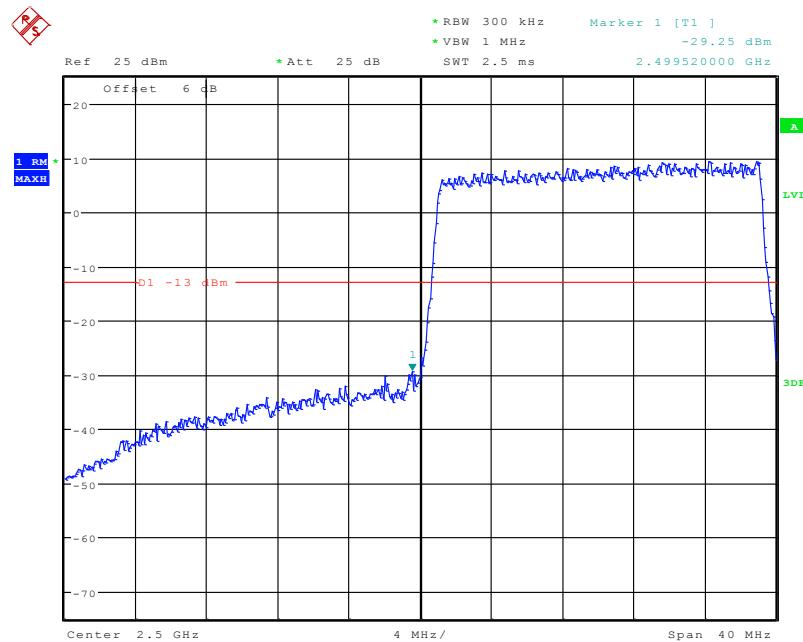
Date: 19.AUG.2019 07:40:18

**QPSK (20.0 MHz, FULL RB) - Left Band Edge**

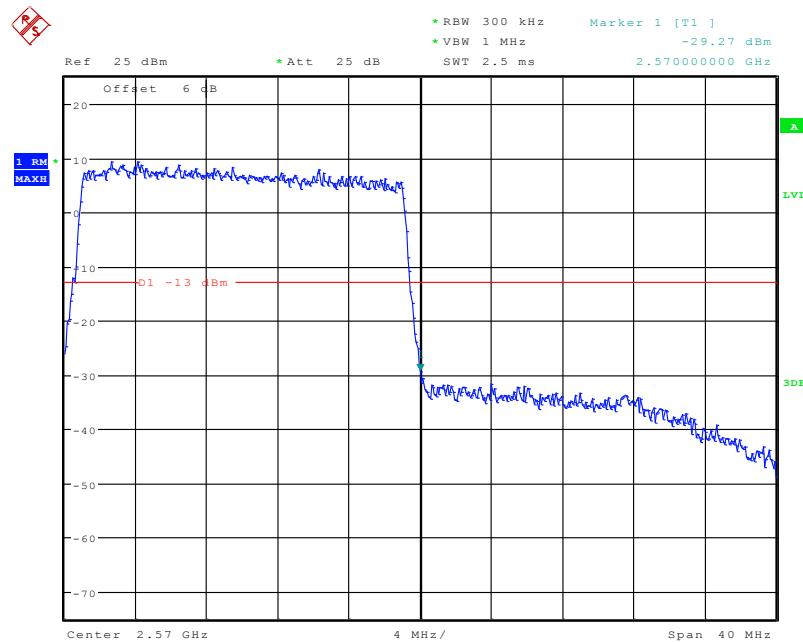
Date: 19.AUG.2019 07:40:55

**QPSK (20.0 MHz, FULL RB) - Right Band Edge**

Date: 19.AUG.2019 07:42:04

**16-QAM (20.0 MHz, FULL RB) - Left Band Edge**

Date: 19.AUG.2019 07:41:35

**16-QAM (20.0 MHz, FULL RB) - Right Band Edge**

Date: 19.AUG.2019 07:42:38

## FCC §2.1055; §22.355; §24.235; §27.54 - FREQUENCY STABILITY

### Applicable Standard

FCC §2.1055, §22.355, §24.235 and & §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

| Frequency Range (MHz) | Base, fixed (ppm) | Mobile ≤ 3 watts (ppm) | Mobile > 3 watts (ppm) |
|-----------------------|-------------------|------------------------|------------------------|
| 25 to 50              | 20.0              | 20.0                   | 50.0                   |
| 50 to 450             | 5.0               | 5.0                    | 50.0                   |
| 450 to 512            | 2.5               | 5.0                    | 5.0                    |
| 821 to 896            | 1.5               | 2.5                    | 2.5                    |
| 928 to 929.           | 5.0               | N/A                    | N/A                    |
| 929 to 960.           | 1.5               | N/A                    | N/A                    |
| 2110 to 2220          | 10.0              | N/A                    | N/A                    |

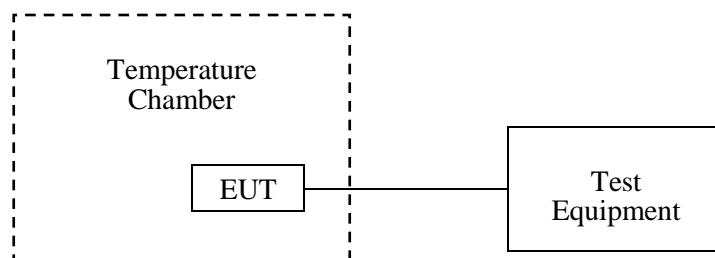
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



## Test Data

### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 51 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

The testing was performed by George Zhong on 2019-08-18 and Kieron Luo on 2019-08-19.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

### Cellular Band (Part 22H)

#### GSM Mode

| Middle Channel, $f_o = 836.6\text{MHz}$ |   |                            |                             |                |
|---|---|----------------------------|-----------------------------|----------------|
| Temperature<br>(°C)                     | Voltage<br>Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) |
| -30                                     | 3.85                                      | 3                          | 0.003586                    | 2.5            |
| -20                                     |   | 3                          | 0.003586                    | 2.5            |
| -10                                     |   | 4                          | 0.004781                    | 2.5            |
| 0                                       |   | -5                         | -0.005977                   | 2.5            |
| 10                                      |   | 8                          | 0.009563                    | 2.5            |
| 20                                      |   | -4                         | -0.004781                   | 2.5            |
| 30                                      |   | -7                         | -0.008367                   | 2.5            |
| 40                                      |   | -2                         | -0.002391                   | 2.5            |
| 50                                      |   | 4                          | 0.004781                    | 2.5            |
| 20                                      | V min.= 3.5                               | 3                          | 0.003586                    | 2.5            |
|   | V max.= 4.4                               | -4                         | -0.004781                   | 2.5            |

**EDGE Mode**

| Middle Channel, $f_o=836.6\text{MHz}$ |   |                            |                             |                |
|---------------------------------------|---|----------------------------|-----------------------------|----------------|
| Temperature<br>(°C)                   | Voltage<br>Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) |
| -30                                   | 3.85                                      | 2                          | 0.002391                    | 2.5            |
| -20                                   |   | -4                         | -0.004781                   | 2.5            |
| -10                                   |   | -3                         | -0.003586                   | 2.5            |
| 0                                     |   | 5                          | 0.005977                    | 2.5            |
| 10                                    |   | -1                         | -0.001195                   | 2.5            |
| 20                                    |   | -4                         | -0.004781                   | 2.5            |
| 30                                    |   | 5                          | 0.005977                    | 2.5            |
| 40                                    |   | -7                         | -0.008367                   | 2.5            |
| 50                                    |   | 4                          | 0.004781                    | 2.5            |
| 20                                    | V min.= 3.5                               | -1                         | -0.001195                   | 2.5            |
|                                       | V max.= 4.4                               | 4                          | 0.004781                    | 2.5            |

**WCDMA Mode**

| Middle Channel, $f_o=836.6\text{MHz}$ |   |                            |                             |                |
|---------------------------------------|---|----------------------------|-----------------------------|----------------|
| Temperature<br>(°C)                   | Voltage<br>Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) |
| -30                                   | 3.85                                      | 2                          | 0.002391                    | 2.5            |
| -20                                   |   | -4                         | -0.004781                   | 2.5            |
| -10                                   |   | -72                        | -0.086063                   | 2.5            |
| 0                                     |   | 4                          | 0.004781                    | 2.5            |
| 10                                    |   | 1                          | 0.001195                    | 2.5            |
| 20                                    |   | -7                         | -0.008367                   | 2.5            |
| 30                                    |   | -3                         | -0.003586                   | 2.5            |
| 40                                    |   | 5                          | 0.005977                    | 2.5            |
| 50                                    |   | 4                          | 0.004781                    | 2.5            |
| 20                                    | V min.= 3.5                               | -1                         | -0.001195                   | 2.5            |
|                                       | V max.= 4.4                               | 4                          | 0.004781                    | 2.5            |

**PCS Band (Part 24E)****GSM Mode**

| Middle Channel, $f_0=1880.0$ MHz |   |                            |                             |        |
|----------------------------------|---|----------------------------|-----------------------------|--------|
| Temperature<br>(°C)              | Voltage<br>Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Result |
| -30                              | 3.85                                      | 4                          | 0.002128                    | pass   |
| -20                              |   | -2                         | -0.001064                   | pass   |
| -10                              |   | -1                         | -0.000532                   | pass   |
| 0                                |   | -5                         | -0.002660                   | pass   |
| 10                               |   | 6                          | 0.003191                    | pass   |
| 20                               |   | 7                          | 0.003723                    | pass   |
| 30                               |   | 2                          | 0.001064                    | pass   |
| 40                               |   | 4                          | 0.002128                    | pass   |
| 50                               |   | 2                          | 0.001064                    | pass   |
| 20                               | V min.= 3.5                               | 5                          | 0.002660                    | pass   |
|                                  | V max.= 4.4                               | 3                          | 0.001596                    | pass   |

**EDGE Mode**

| Middle Channel, $f_0=1880.0$ MHz |   |                            |                             |        |
|----------------------------------|---|----------------------------|-----------------------------|--------|
| Temperature<br>(°C)              | Voltage<br>Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Result |
| -30                              | 3.85                                      | 7                          | 0.003723                    | pass   |
| -20                              |   | -5                         | -0.002660                   | pass   |
| -10                              |   | -6                         | -0.003191                   | pass   |
| 0                                |   | 4                          | 0.002128                    | pass   |
| 10                               |   | 2                          | 0.001064                    | pass   |
| 20                               |   | -7                         | -0.003723                   | pass   |
| 30                               |   | 6                          | 0.003191                    | pass   |
| 40                               |   | -8                         | -0.004255                   | pass   |
| 50                               |   | 4                          | 0.002128                    | pass   |
| 20                               | V min.= 3.5                               | 4                          | 0.002128                    | pass   |
|                                  | V max.= 4.4                               | 9                          | 0.004787                    | pass   |

**WCDMA Mode**

| <b>Middle Channel, <math>f_0=1880.0</math> MHz</b> |  |                             |                              |               |
|--|--|-----------------------------|------------------------------|---------------|
| <b>Temperature (°C)</b>                            | <b>Voltage Supplied (V<sub>DC</sub>)</b> | <b>Frequency Error (Hz)</b> | <b>Frequency Error (ppm)</b> | <b>Result</b> |
| -30  | 3.85                                     | 5                           | 0.002660                     | pass          |
| -20  |  | -2                          | -0.001064                    | pass          |
| -10  |  | 4                           | 0.002128                     | pass          |
| 0  |  | 1                           | 0.000532                     | pass          |
| 10   |  | 3                           | 0.001596                     | pass          |
| 20   |  | -1                          | -0.000532                    | pass          |
| 30   |  | -2                          | -0.001064                    | pass          |
| 40   |  | -7                          | -0.003723                    | pass          |
| 50   |  | 6                           | 0.003191                     | pass          |
| 20   | V min.= 3.5                              | 2                           | 0.001064                     | pass          |
|  | V max.= 4.4                              | 9                           | 0.004787                     | pass          |

**AWS Band (Part 27)**

| <b>Temperature (°C)</b> | <b>Power Supplied (V<sub>DC</sub>)</b> | <b>F<sub>L</sub> (MHz)</b> | <b>F<sub>H</sub> (MHz)</b> | <b>F<sub>L</sub> Limit (MHz)</b> | <b>F<sub>H</sub> Limit (MHz)</b> |
|-------------------------|--|----------------------------|----------------------------|----------------------------------|----------------------------------|
| -30                     | 3.85                                   | 1710.0047                  | 1754.9967                  | 1710                             | 1755                             |
| -20                     |  | 1710.0034                  | 1754.9947                  | 1710                             | 1755                             |
| -10                     |  | 1710.0052                  | 1754.9934                  | 1710                             | 1755                             |
| 0                       |  | 1710.0064                  | 1754.9968                  | 1710                             | 1755                             |
| 10                      |  | 1710.0047                  | 1754.9937                  | 1710                             | 1755                             |
| 20                      |  | 1710.0047                  | 1754.9946                  | 1710                             | 1755                             |
| 30                      |  | 1710.0054                  | 1754.9985                  | 1710                             | 1755                             |
| 40                      |  | 1710.0031                  | 1754.9924                  | 1710                             | 1755                             |
| 50                      |  | 1710.0070                  | 1754.9985                  | 1710                             | 1755                             |
| 20                      | V min.= 3.5                            | 1710.0045                  | 1754.9960                  | 1710                             | 1755                             |
|                         | V max.= 4.4                            | 1710.0015                  | 1754.9981                  | 1710                             | 1755                             |

**LTE:**  
**QPSK:**  
**Band 2:**

| <b>10.0 MHz Middle Channel, <math>f_o=1880\text{MHz}</math></b> |  |                                     |                                      |               |
|---|--|-------------------------------------|--------------------------------------|---------------|
| <b>Temperature<br/>(°C)</b>                                     | <b>Voltage Supplied<br/>(V<sub>DC</sub>)</b> | <b>Frequency<br/>Error<br/>(Hz)</b> | <b>Frequency<br/>Error<br/>(ppm)</b> | <b>Result</b> |
| -30   | 3.85   | -7                                  | -0.0037                              | pass          |
| -20   |  | -5                                  | -0.0027                              | pass          |
| -10   |  | -5                                  | -0.0027                              | pass          |
| 0   |  | -6                                  | -0.0032                              | pass          |
| 10  |  | -4                                  | -0.0021                              | pass          |
| 20  |  | -4                                  | -0.0021                              | pass          |
| 30  |  | -6                                  | -0.0032                              | pass          |
| 40  |  | -1                                  | -0.0005                              | pass          |
| 50  |  | -3                                  | -0.0016                              | pass          |
| 20  | V min.= 3.5                                  | -4                                  | -0.0021                              | pass          |
|   | V max.= 4.4                                  | -4                                  | -0.0021                              | pass          |

**Band 4:**

| <b>10 MHz Bandwidth</b>     |  |                                |                                |                                      |                                      |
|-----------------------------|--|--------------------------------|--------------------------------|--------------------------------------|--------------------------------------|
| <b>Temperature<br/>(°C)</b> | <b>Power<br/>Supplied<br/>(V<sub>DC</sub>)</b> | <b>F<sub>L</sub><br/>(MHz)</b> | <b>F<sub>H</sub><br/>(MHz)</b> | <b>F<sub>L</sub> Limit<br/>(MHz)</b> | <b>F<sub>H</sub> Limit<br/>(MHz)</b> |
| -30                         | 3.85   | 1710.5229                      | 1754.7558                      | 1710                                 | 1755                                 |
| -20                         |  | 1710.5245                      | 1754.7558                      | 1710                                 | 1755                                 |
| -10                         |  | 1710.5252                      | 1754.7571                      | 1710                                 | 1755                                 |
| 0                           |  | 1710.5248                      | 1754.7573                      | 1710                                 | 1755                                 |
| 10                          |  | 1710.5246                      | 1754.7581                      | 1710                                 | 1755                                 |
| 20                          |  | 1710.5236                      | 1754.7576                      | 1710                                 | 1755                                 |
| 30                          |  | 1710.5248                      | 1754.7572                      | 1710                                 | 1755                                 |
| 40                          |  | 1710.5238                      | 1754.7566                      | 1710                                 | 1755                                 |
| 50                          |  | 1710.5240                      | 1754.7557                      | 1710                                 | 1755                                 |
| 20                          | V min.= 3.5                                    | 1710.5232                      | 1754.7568                      | 1710                                 | 1755                                 |
|                             | V max.= 4.4                                    | 1710.5228                      | 1754.7558                      | 1710                                 | 1755                                 |

**Band 5:**

| 10.0 MHz Middle Channel, $f_o = 836.5\text{MHz}$ |  |                            |                             |                |
|--|--|----------------------------|-----------------------------|----------------|
| Temperature<br>(°C)                              | Voltage Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) |
| -30  | 3.85                                   | -7                         | -0.0084                     | 2.5            |
| -20  |  | -3                         | -0.0036                     | 2.5            |
| -10  |  | -2                         | -0.0024                     | 2.5            |
| 0  |  | -6                         | -0.0072                     | 2.5            |
| 10   |  | -4                         | -0.0048                     | 2.5            |
| 20   |  | -3                         | -0.0036                     | 2.5            |
| 30   |  | -2                         | -0.0024                     | 2.5            |
| 40   |  | -3                         | -0.0036                     | 2.5            |
| 50   |  | -4                         | -0.0048                     | 2.5            |
| 20   | V min.= 3.5                            | -3                         | -0.0036                     | 2.5            |
|  | V max.= 4.4                            | -7                         | -0.0084                     | 2.5            |

**Band 7:**

| 10 MHz Bandwidth    |   |                         |                         |                               |                               |
|---------------------|---|-------------------------|-------------------------|-------------------------------|-------------------------------|
| Temperature<br>(°C) | Power<br>Supplied<br>(V <sub>DC</sub> ) | F <sub>L</sub><br>(MHz) | F <sub>H</sub><br>(MHz) | F <sub>L</sub> Limit<br>(MHz) | F <sub>H</sub> Limit<br>(MHz) |
| -30                 | 3.85                                    | 2500.4515               | 2569.7009               | 2500                          | 2570                          |
| -20                 |   | 2500.4531               | 2569.7028               | 2500                          | 2570                          |
| -10                 |   | 2500.4532               | 2569.7010               | 2500                          | 2570                          |
| 0                   |   | 2500.4534               | 2569.7029               | 2500                          | 2570                          |
| 10                  |   | 2500.4520               | 2569.7022               | 2500                          | 2570                          |
| 20                  |   | 2500.4530               | 2569.7018               | 2500                          | 2570                          |
| 30                  |   | 2500.4513               | 2569.7015               | 2500                          | 2570                          |
| 40                  |   | 2500.4519               | 2569.7032               | 2500                          | 2570                          |
| 50                  |   | 2500.4518               | 2569.7011               | 2500                          | 2570                          |
| 20                  | V min.= 3.5                             | 2500.4525               | 2569.7016               | 2500                          | 2570                          |
|                     | V max.= 4.4                             | 2500.4516               | 2569.7013               | 2500                          | 2570                          |

**16QAM:**  
**Band 2:**

| 10.0 MHz Middle Channel, $f_o=1880\text{MHz}$ |  |                            |                             |        |
|---|--|----------------------------|-----------------------------|--------|
| Temperature<br>(°C)                           | Voltage Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Result |
| -30   | 3.85                                   | -4                         | -0.0021                     | pass   |
| -20   |  | -4                         | -0.0021                     | pass   |
| -10   |  | -2                         | -0.0011                     | pass   |
| 0   |  | -6                         | -0.0032                     | pass   |
| 10  |  | -4                         | -0.0021                     | pass   |
| 20  |  | -3                         | -0.0016                     | pass   |
| 30  |  | -3                         | -0.0016                     | pass   |
| 40  |  | -1                         | -0.0005                     | pass   |
| 50  |  | -2                         | -0.0011                     | pass   |
| 20  | V min.= 3.5                            | -3                         | -0.0016                     | pass   |
|   | V max.= 4.4                            | -4                         | -0.0021                     | pass   |

**Band 4:**

| 10 MHz Bandwidth    |   |                         |                         |                               |                               |
|---------------------|---|-------------------------|-------------------------|-------------------------------|-------------------------------|
| Temperature<br>(°C) | Power<br>Supplied<br>(V <sub>DC</sub> ) | F <sub>L</sub><br>(MHz) | F <sub>H</sub><br>(MHz) | F <sub>L</sub> Limit<br>(MHz) | F <sub>H</sub> Limit<br>(MHz) |
| -30                 | 3.85                                    | 1710.4369               | 1754.7815               | 1710                          | 1755                          |
| -20                 |   | 1710.4388               | 1754.7818               | 1710                          | 1755                          |
| -10                 |   | 1710.4381               | 1754.7812               | 1710                          | 1755                          |
| 0                   |   | 1710.4366               | 1754.7835               | 1710                          | 1755                          |
| 10                  |   | 1710.4370               | 1754.7825               | 1710                          | 1755                          |
| 20                  |   | 1710.4386               | 1754.7823               | 1710                          | 1755                          |
| 30                  |   | 1710.4392               | 1754.7824               | 1710                          | 1755                          |
| 40                  |   | 1710.4392               | 1754.7825               | 1710                          | 1755                          |
| 50                  |   | 1710.4368               | 1754.7824               | 1710                          | 1755                          |
| 20                  | V min.= 3.5                             | 1710.4368               | 1754.7815               | 1710                          | 1755                          |
|                     | V max.= 4.4                             | 1710.4379               | 1754.7836               | 1710                          | 1755                          |

**Band 5:**

| 10.0 MHz Middle Channel, $f_o = 836.5\text{MHz}$ |  |                            |                             |                |
|--|--|----------------------------|-----------------------------|----------------|
| Temperature<br>(°C)                              | Voltage Supplied<br>(V <sub>DC</sub> ) | Frequency<br>Error<br>(Hz) | Frequency<br>Error<br>(ppm) | Limit<br>(ppm) |
| -30  | 3.85                                   | -3                         | -0.0036                     | 2.5            |
| -20  |  | -3                         | -0.0036                     | 2.5            |
| -10  |  | -1                         | -0.0012                     | 2.5            |
| 0  |  | -5                         | -0.0060                     | 2.5            |
| 10   |  | -3                         | -0.0036                     | 2.5            |
| 20   |  | -2                         | -0.0024                     | 2.5            |
| 30   |  | 0                          | 0.0000                      | 2.5            |
| 40   |  | -3                         | -0.0036                     | 2.5            |
| 50   |  | -3                         | -0.0036                     | 2.5            |
| 20   | V min.= 3.5                            | -2                         | -0.0024                     | 2.5            |
|  | V max.= 4.4                            | -3                         | -0.0036                     | 2.5            |

**Band 7:**

| 10 MHz Bandwidth    |   |                         |                         |                               |                               |
|---------------------|---|-------------------------|-------------------------|-------------------------------|-------------------------------|
| Temperature<br>(°C) | Power<br>Supplied<br>(V <sub>DC</sub> ) | F <sub>L</sub><br>(MHz) | F <sub>H</sub><br>(MHz) | F <sub>L</sub> Limit<br>(MHz) | F <sub>H</sub> Limit<br>(MHz) |
| -30                 | 3.85                                    | 2500.4515               | 2569.7009               | 2500                          | 2570                          |
| -20                 |   | 2500.4524               | 2569.7013               | 2500                          | 2570                          |
| -10                 |   | 2500.4538               | 2569.7012               | 2500                          | 2570                          |
| 0                   |   | 2500.4539               | 2569.7009               | 2500                          | 2570                          |
| 10                  |   | 2500.4513               | 2569.7025               | 2500                          | 2570                          |
| 20                  |   | 2500.4520               | 2569.7014               | 2500                          | 2570                          |
| 30                  |   | 2500.4537               | 2569.7007               | 2500                          | 2570                          |
| 40                  |   | 2500.4532               | 2569.7026               | 2500                          | 2570                          |
| 50                  |   | 2500.4525               | 2569.7008               | 2500                          | 2570                          |
| 20                  | V min.= 3.5                             | 2500.4515               | 2569.7026               | 2500                          | 2570                          |
|                     | V max.= 4.4                             | 2500.4525               | 2569.7006               | 2500                          | 2570                          |

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