

FCC PART 27  
FCC PART 22H, PART 24E  
MEASUREMENT AND TEST REPORT

For

**MFOURTEL MEXICO S.A. DE C.V.**

Av. Ejército Nacional 436 Piso 3 Polanco V sección Miguel Hidalgo Mexico DF 11560

**FCC ID: CLNHS1**

|                                                                                                                                                                                                                                                                                                                 |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                                                          | <b>Product Type:</b><br>4G Mobile Wifi |
| <b>Test Engineer:</b> Simon Wang <i>Simon wang</i>                                                                                                                                                                                                                                                              |                                        |
| <b>Report Number:</b> RSZ160307004-00C                                                                                                                                                                                                                                                                          |                                        |
| <b>Report Date:</b> 2016-04-01                                                                                                                                                                                                                                                                                  |                                        |
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**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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

The *MFOURTEL MEXICO S.A. DE C.V.*'s product, model number: *HS1 (FCC ID: CLNHS1)* or the "EUT" in this report was a *4G Mobile Wifi*, which was measured approximately: 93 mm (L) × 60 mm (W) × 14 mm (H), rated with input voltage: DC 3.8V rechargeable Li-ion battery or DC 5V from adapter.

Adapter Information:

Model: M4

Input AC: 100-240V, 50/60Hz, 150mA

Output DC: 5V, 1000mA

*\*All measurement and test data in this report was gathered from production sample serial number: 1601533 (Assigned by Shenzhen BACL). The EUT supplied by the applicant was received on 2016-03-07.*

### Objective

This type approval report is prepared on behalf of *MFOURTEL MEXICO S.A. DE C.V.* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of 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)

Part 15.247 DTS submissions with FCC ID: CLNHS1.

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-Part 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 radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.81 dB for 30MHz-1GHz and 4.88 dB for above 1GHz, 1.95dB for conducted measurement.

## **Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2103. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

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.

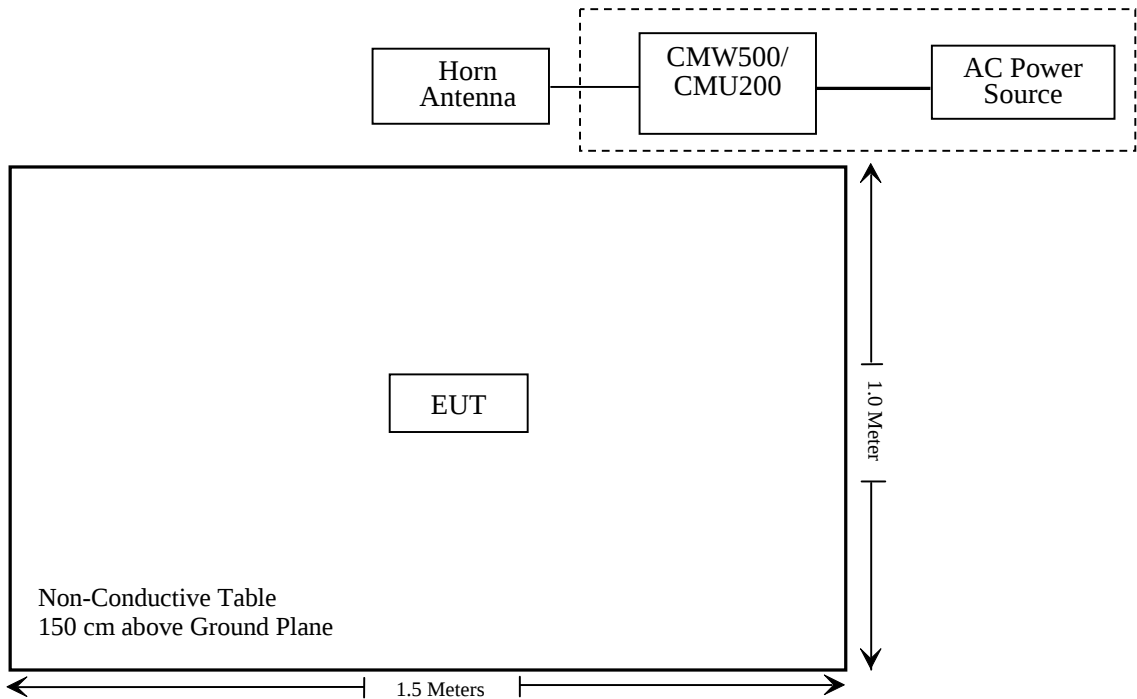
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

| Manufacturer    | Description                          | Model  | Serial Number |
|-----------------|--------------------------------------|--------|---------------|
| Rohde & Schwarz | Wideband Radio Communication Tester  | CMW500 | 1201.002K50   |
| Rohde & Schwarz | Universal Radio Communication Tester | CMU200 | 106891        |

Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC Rules                                               | Description of Test                    | Result         |
|---------------------------------------------------------|----------------------------------------|----------------|
| §1.1307 (b)(1), §2.1093                                 | RF Exposure Information                | Compliance*    |
| §2.1046; § 22.913 (a);<br>§ 24.232 (c); §27.50 (d) (i)  | RF Output Power                        | Compliance     |
| § 2.1047                                                | Modulation Characteristics             | Not Applicable |
| § 2.1049; § 22.905;<br>§ 22.917; § 24.238; §27.53 (c)   | Occupied Bandwidth                     | Compliance     |
| § 2.1051; § 22.917 (a);<br>§ 24.238 (a); §27.53(c) (g)  | Spurious Emissions at Antenna Terminal | Compliance     |
| § 2.1053; § 22.917 (a);<br>§ 24.238 (a); §27.53 (c) (g) | Spurious Radiated Emissions            | Compliance     |
| § 22.917 (a);<br>§ 24.238 (a); §27.53 (c) (g);          | 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: RSZ160307004-20.

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

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### **Applicable Standard**

FCC§1.1307, §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: RSZ160307004-20.

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## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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According to FCC § 2.1047(d) , Part 22H & 24E, Part 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 - RF OUTPUT POWER****Applicable Standards**

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..

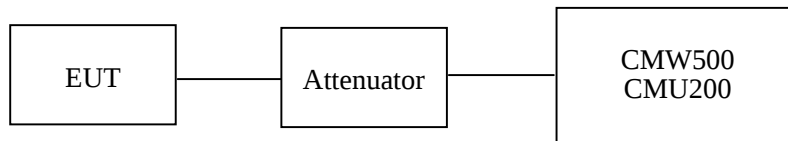
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz. The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(c), Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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

**Test Procedure***Conducted method:*

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

*Radiated method:*

TIA603-D section 2.2.17

**Test Equipment List and Details**

| Manufacturer          | Description                          | Model                 | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|-----------------------|-----------------------|------------------|----------------------|
| Rohde & Schwarz       | EMI Test Receiver                    | ESCI                  | 101120                | 2015-11-03       | 2016-11-03           |
| Sunol Sciences        | Bi-log Antenna                       | JB1                   | A040904-2             | 2014-12-07       | 2017-12-06           |
| HP                    | Synthesized Sweeper                  | HP 8341B              | 2624A00116            | 2015-07-02       | 2016-07-01           |
| COM POWER             | Dipole Antenna                       | AD-100                | 041000                | 2015-08-18       | 2016-08-18           |
| A.H. System           | Horn Antenna                         | SAS-200/571           | 135                   | 2015-08-18       | 2018-08-17           |
| Rohde & Schwarz       | Signal Analyzer                      | FSIQ26                | 8386001028            | 2015-12-11       | 2016-12-11           |
| Sunol Sciences        | Horn Antenna                         | DRH-118               | A052604               | 2014-12-29       | 2017-12-28           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200                | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500                | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | UFA210A-1-4724-30050U | MFR64369 223410-001   | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | 104PEA                | 218124002             | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | RG-214                | 1                     | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | RG-214                | 2                     | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | RG-214                | 3                     | 2015-06-15       | 2016-06-15           |
| WEINSCHL              | 10dB Attenuator                      | 5324                  | AU0709                | 2015-06-18       | 2016-06-18           |

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

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

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 23 °C    |
| <b>Relative Humidity:</b> | 50 %     |
| <b>ATM Pressure:</b>      | 101.0kPa |

*The testing was performed by Simon Wang on 2016-03-26.*

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

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|      |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| GPRS | 128     | 824.2           | 32.29                      | 29.32   | 28.43   | 27.20   | 38.45       |
|      | 190     | 836.6           | 32.23                      | 29.13   | 28.17   | 27.05   | 38.45       |
|      | 251     | 848.8           | 32.53                      | 28.96   | 27.91   | 26.67   | 38.45       |

| Mode  | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|-------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|       |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| EGPRS | 128     | 824.2           | 26.08                      | 24.84   | 22.90   | 21.79   | 38.45       |
|       | 190     | 836.6           | 26.22                      | 25.01   | 23.01   | 21.96   | 38.45       |
|       | 251     | 848.8           | 26.17                      | 24.98   | 22.92   | 21.44   | 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  |               | 21.85                      | 21.89            | 21.89          |
|                |                | HSDPA     | 1             | 20.86                      | 20.90            | 20.92          |
|                |                |           | 2             | 20.87                      | 20.87            | 20.90          |
|                |                |           | 3             | 20.88                      | 20.89            | 20.89          |
|                |                |           | 4             | 20.89                      | 20.91            | 20.93          |
|                |                | HSUPA     | 1             | 20.68                      | 20.70            | 20.80          |
|                |                |           | 2             | 20.70                      | 20.73            | 20.82          |
|                |                |           | 3             | 20.72                      | 20.74            | 20.81          |
|                |                |           | 4             | 20.69                      | 20.76            | 20.83          |
|                |                |           | 5             | 20.71                      | 20.76            | 20.84          |
|                |                | HSPA+     | 1             | 21.34                      | 21.29            | 21.30          |

**PCS Band (Part 24E)**

| Mode | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|      |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| GPRS | 512     | 1850.2          | 32.51                      | 29.66   | 27.46   | 26.28   | 33          |
|      | 661     | 1880.0          | 32.07                      | 29.72   | 27.08   | 25.66   | 33          |
|      | 810     | 1909.8          | 31.46                      | 29.72   | 26.86   | 25.43   | 33          |

| Mode  | Channel | Frequency (MHz) | Average Output Power (dBm) |         |         |         | Limit (dBm) |
|-------|---------|-----------------|----------------------------|---------|---------|---------|-------------|
|       |         |                 | 1 slot                     | 2 slots | 3 slots | 4 slots |             |
| EGPRS | 512     | 1850.2          | 25.88                      | 24.65   | 22.74   | 21.23   | 33          |
|       | 661     | 1880.0          | 25.89                      | 24.52   | 22.59   | 21.45   | 33          |
|       | 810     | 1909.8          | 25.86                      | 24.60   | 22.56   | 21.37   | 33          |

| Mode            | Test Condition | Test Mode | 3GPP Sub Test | Average Output Power (dBm) |                  |                |
|-----------------|----------------|-----------|---------------|----------------------------|------------------|----------------|
|                 |                |           |               | Low Frequency              | Middle Frequency | High Frequency |
| WCDMA (Band II) | Normal         | RMC12.2k  |               | 22.69                      | 22.65            | 22.51          |
|                 |                | HSDPA     | 1             | 21.70                      | 21.63            | 21.53          |
|                 |                |           | 2             | 21.69                      | 21.65            | 21.51          |
|                 |                |           | 3             | 21.69                      | 21.66            | 21.53          |
|                 |                |           | 4             | 21.68                      | 21.64            | 21.52          |
|                 |                | HSUPA     | 1             | 20.79                      | 20.75            | 20.64          |
|                 |                |           | 2             | 20.76                      | 20.76            | 20.67          |
|                 |                |           | 3             | 20.76                      | 20.76            | 20.65          |
|                 |                |           | 4             | 20.78                      | 20.77            | 20.66          |
|                 |                |           | 5             | 20.74                      | 20.79            | 21.69          |
|                 |                | HSPA+     | 1             | 21.80                      | 21.78            | 21.68          |

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

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GPRS | Low     | 0.29     | 13         |
|      | Middle  | 0.26     | 13         |
|      | High    | 0.34     | 13         |

| Mode  | Channel | PAR (dB) | Limit (dB) |
|-------|---------|----------|------------|
| EGPRS | Low     | 2.37     | 13         |
|       | Middle  | 2.49     | 13         |
|       | High    | 2.63     | 13         |

| Mode          | Channel | PAR (dB) | Limit (dB) |
|---------------|---------|----------|------------|
| RMC (BPSK)    | Low     | 3.35     | 13         |
|               | Middle  | 3.39     | 13         |
|               | High    | 3.42     | 13         |
| HSDPA (16QAM) | Low     | 3.36     | 13         |
|               | Middle  | 3.42     | 13         |
|               | High    | 3.48     | 13         |
| HSUPA (BPSK)  | Low     | 3.56     | 13         |
|               | Middle  | 3.61     | 13         |
|               | High    | 3.72     | 13         |
| HSPA+ (16QAM) | Low     | 3.56     | 13         |
|               | Middle  | 3.85     | 13         |
|               | High    | 3.49     | 13         |

**PCS Band**

| Mode | Channel | PAR (dB) | Limit (dB) |
|------|---------|----------|------------|
| GPRS | Low     | 0.29     | 13         |
|      | Middle  | 0.26     | 13         |
|      | High    | 0.21     | 13         |

| Mode  | Channel | PAR (dB) | Limit (dB) |
|-------|---------|----------|------------|
| EGPRS | Low     | 2.27     | 13         |
|       | Middle  | 2.39     | 13         |
|       | High    | 2.27     | 13         |

| Mode          | Channel | PAR (dB) | Limit (dB) |
|---------------|---------|----------|------------|
| WCDMA (BPSK)  | Low     | 2.63     | 13         |
|               | Middle  | 3.25     | 13         |
|               | High    | 2.76     | 13         |
| HSDPA (16QAM) | Low     | 3.32     | 13         |
|               | Middle  | 2.99     | 13         |
|               | High    | 3.45     | 13         |
| HSUPA (BPSK)  | Low     | 2.96     | 13         |
|               | Middle  | 2.79     | 13         |
|               | High    | 2.91     | 13         |
| HSPA+ (16QAM) | Low     | 2.88     | 13         |
|               | Middle  | 2.86     | 13         |
|               | High    | 2.79     | 13         |

**Radiated Power****ERP & EIRP****GSM Mode:**

| Frequency<br>(MHz)                               | Receiver<br>Reading<br>(dBμV) | 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) | S.G.<br>Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| ERP for Cellular Band (Part 22H), Middle Channel |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 848.8                                            | 96.29                         | 282                          | 1             | H              | 29.9                   | 0.67                  | 0                       | 29.23                      | 38.45          | 9.22           |
| 848.8                                            | 95.87                         | 128                          | 2.4           | V              | 29.5                   | 0.67                  | 0                       | 28.83                      | 38.45          | 9.62           |
| EIRP for PCS Band (Part 24E), Midddle Channel    |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 1880.00                                          | 89.72                         | 331                          | 1.5           | H              | 21.0                   | 1.40                  | 7.30                    | 26.90                      | 33             | 6.1            |
| 1880.00                                          | 86.53                         | 218                          | 1.6           | V              | 17.3                   | 1.40                  | 7.30                    | 23.20                      | 33             | 9.8            |

**EDGE Mode:**

| Frequency<br>(MHz)                               | Receiver<br>Reading<br>(dBμV) | 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) | S.G.<br>Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| ERP for Cellular Band (Part 22H), Middle Channel |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 836.6                                            | 92.67                         | 27                           | 1.5           | H              | 24.7                   | 0.67                  | 0                       | 24.03                      | 38.45          | 14.42          |
| 836.6                                            | 89.27                         | 258                          | 1.8           | V              | 22.3                   | 0.67                  | 0                       | 21.63                      | 38.45          | 16.82          |
| EIRP for PCS Band (Part 24E), Middle Channel     |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 1880.0                                           | 85.35                         | 139                          | 1.4           | H              | 16.7                   | 1.40                  | 7.30                    | 22.60                      | 33             | 10.40          |
| 1880.0                                           | 84.75                         | 265                          | 1.3           | V              | 15.5                   | 1.40                  | 7.30                    | 21.40                      | 33             | 11.60          |

**WCDMA Mode:**

| Frequency<br>(MHz)                                | Receiver<br>Reading<br>(dBμV) | 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) | S.G.<br>Level<br>(dBm) | Cable<br>loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| ERP for WCDMA Band V (Part 22H), Middle Channel   |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 836.6                                             | 88.21                         | 83                           | 1             | H              | 21.8                   | 0.67                  | 0                       | 21.13                      | 38.45          | 17.32          |
| 836.6                                             | 87.79                         | 79                           | 2.4           | V              | 21.4                   | 0.67                  | 0                       | 20.73                      | 38.45          | 17.72          |
| EIRP for WCDMA Band II (Part 24E), Middle Channel |                               |                              |               |                |                        |                       |                         |                            |                |                |
| 1880.00                                           | 82.32                         | 88                           | 1.3           | H              | 13.6                   | 1.40                  | 7.30                    | 19.50                      | 33             | 13.5           |
| 1880.00                                           | 83.71                         | 269                          | 2.4           | V              | 14.5                   | 1.40                  | 7.30                    | 20.40                      | 33             | 12.6           |

**Note:**

All above data were tested with no amplifier.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

**LTE Band 2:****Maximum Output Power**

| <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> |
|----------------------------|-------------------|--------------------------|----------------------------------|-------------------------------------|-----------------------------------|
| 1.4                        | QPSK              | RB Size=1, RB Offset=0   | 22.16                            | 22.19                               | 22.58                             |
|                            |                   | RB Size=1, RB Offset=2   | 22.14                            | 22.26                               | 22.53                             |
|                            |                   | RB Size=1, RB Offset=5   | 22.11                            | 22.13                               | 22.05                             |
|                            |                   | RB Size=3, RB Offset=0   | 22.23                            | 22.29                               | 22.51                             |
|                            |                   | RB Size=3, RB Offset=1   | 22.26                            | 22.05                               | 22.54                             |
|                            |                   | RB Size=3, RB Offset=2   | 22.24                            | 22.24                               | 22.57                             |
|                            |                   | RB Size=6, RB Offset=0   | 21.29                            | 21.28                               | 21.43                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.43                            | 21.39                               | 21.67                             |
|                            |                   | RB Size=1, RB Offset=2   | 21.26                            | 20.97                               | 22.62                             |
|                            |                   | RB Size=1, RB Offset=5   | 21.30                            | 21.28                               | 21.29                             |
|                            |                   | RB Size=3, RB Offset=0   | 21.41                            | 21.44                               | 21.28                             |
|                            |                   | RB Size=3, RB Offset=1   | 21.47                            | 21.53                               | 21.2                              |
|                            |                   | RB Size=3, RB Offset=2   | 21.35                            | 21.42                               | 21.32                             |
|                            |                   | RB Size=6, RB Offset=0   | 21.08                            | 21.29                               | 21.14                             |
| 3.0                        | QPSK              | RB Size=1, RB Offset=0   | 22.39                            | 22.22                               | 22.75                             |
|                            |                   | RB Size=1, RB Offset=7   | 22.27                            | 22.25                               | 22.69                             |
|                            |                   | RB Size=1, RB Offset=14  | 22.29                            | 22.09                               | 21.97                             |
|                            |                   | RB Size=8, RB Offset=0   | 22.33                            | 22.36                               | 22.31                             |
|                            |                   | RB Size=8, RB Offset=4   | 22.41                            | 22.3                                | 22.25                             |
|                            |                   | RB Size=8, RB Offset=7   | 22.26                            | 22.4                                | 22.52                             |
|                            |                   | RB Size=15, RB Offset=0  | 21.16                            | 21.24                               | 21.73                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.51                            | 21.63                               | 22.15                             |
|                            |                   | RB Size=1, RB Offset=7   | 21.52                            | 21.54                               | 22.14                             |
|                            |                   | RB Size=1, RB Offset=14  | 21.31                            | 21.28                               | 21.92                             |
|                            |                   | RB Size=8, RB Offset=0   | 21.48                            | 21.58                               | 21.81                             |
|                            |                   | RB Size=8, RB Offset=4   | 21.47                            | 21.58                               | 21.75                             |
|                            |                   | RB Size=8, RB Offset=7   | 21.36                            | 21.28                               | 21.79                             |
|                            |                   | RB Size=15, RB Offset=0  | 21.24                            | 21.07                               | 21.24                             |

| Bandwidth (MHz) | Modulation | RB size/RB Offset        | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|-----------------|------------|--------------------------|-------------------|----------------------|--------------------|
| 5.0             | QPSK       | RB Size=1, RB Offset=0   | 22.44             | 22.37                | 22.95              |
|                 |            | RB Size=1, RB Offset=12  | 22.29             | 22.36                | 22.88              |
|                 |            | RB Size=1, RB Offset=24  | 22.21             | 22.06                | 22.21              |
|                 |            | RB Size=12, RB Offset=0  | 22.34             | 22.22                | 22.42              |
|                 |            | RB Size=12, RB Offset=6  | 22.23             | 22.21                | 22.12              |
|                 |            | RB Size=12, RB Offset=11 | 22.22             | 22.27                | 22.81              |
|                 |            | RB Size=25, RB Offset=0  | 21.19             | 21.90                | 21.71              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.64             | 21.88                | 22.02              |
|                 |            | RB Size=1, RB Offset=12  | 21.37             | 21.49                | 22.28              |
|                 |            | RB Size=1, RB Offset=24  | 21.86             | 21.67                | 21.63              |
|                 |            | RB Size=12, RB Offset=0  | 21.58             | 21.76                | 21.56              |
|                 |            | RB Size=12, RB Offset=6  | 21.85             | 21.67                | 21.58              |
|                 |            | RB Size=12, RB Offset=11 | 21.52             | 21.51                | 21.45              |
|                 |            | RB Size=25, RB Offset=0  | 21.28             | 21.27                | 21.29              |
| 10.0            | QPSK       | RB Size=1, RB Offset=0   | 21.67             | 21.72                | 22.44              |
|                 |            | RB Size=1, RB Offset=24  | 21.75             | 21.91                | 22.47              |
|                 |            | RB Size=1, RB Offset=49  | 21.78             | 21.75                | 22.33              |
|                 |            | RB Size=25, RB Offset=0  | 21.86             | 21.78                | 22.39              |
|                 |            | RB Size=25, RB Offset=12 | 21.63             | 21.67                | 22.52              |
|                 |            | RB Size=25, RB Offset=24 | 21.71             | 21.69                | 22.51              |
|                 |            | RB Size=50, RB Offset=0  | 21.81             | 21.64                | 22.44              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.71             | 21.84                | 22.68              |
|                 |            | RB Size=1, RB Offset=24  | 21.64             | 21.83                | 22.65              |
|                 |            | RB Size=1, RB Offset=49  | 21.65             | 21.63                | 22.55              |
|                 |            | RB Size=25, RB Offset=0  | 21.69             | 21.75                | 22.45              |
|                 |            | RB Size=25, RB Offset=12 | 21.82             | 21.77                | 22.43              |
|                 |            | RB Size=25, RB Offset=24 | 21.64             | 21.56                | 22.39              |
|                 |            | RB Size=50, RB Offset=0  | 21.68             | 21.65                | 22.75              |

| 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   | 22.42             | 22.38                | 22.16              |
|                 |            | RB Size=1, RB Offset=37  | 22.18             | 22.19                | 22.59              |
|                 |            | RB Size=1, RB Offset=74  | 22.51             | 22.5                 | 21.93              |
|                 |            | RB Size=36, RB Offset=0  | 22.54             | 22.63                | 22.02              |
|                 |            | RB Size=36, RB Offset=18 | 22.22             | 22.32                | 21.98              |
|                 |            | RB Size=36, RB Offset=37 | 22.32             | 22.32                | 22.79              |
|                 |            | RB Size=75, RB Offset=0  | 22.18             | 22.19                | 22.6               |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 22.23             | 22.34                | 21.82              |
|                 |            | RB Size=1, RB Offset=37  | 22.1              | 22.23                | 22.01              |
|                 |            | RB Size=1, RB Offset=74  | 22.31             | 22.22                | 22.57              |
|                 |            | RB Size=36, RB Offset=0  | 22.05             | 22.05                | 22.55              |
|                 |            | RB Size=36, RB Offset=18 | 21.93             | 22.06                | 22.11              |
|                 |            | RB Size=36, RB Offset=37 | 21.94             | 21.97                | 21.81              |
|                 |            | RB Size=75, RB Offset=0  | 21.87             | 21.94                | 21.86              |
| 20.0            | QPSK       | RB Size=1, RB Offset=0   | 22.71             | 22.69                | 22.63              |
|                 |            | RB Size=1, RB Offset=49  | 22.32             | 22.38                | 22.39              |
|                 |            | RB Size=1, RB Offset=99  | 22.31             | 22.38                | 22.41              |
|                 |            | RB Size=50, RB Offset=0  | 22.27             | 22.27                | 22.21              |
|                 |            | RB Size=50, RB Offset=24 | 22.27             | 22.35                | 22.19              |
|                 |            | RB Size=50, RB Offset=49 | 22.24             | 22.14                | 22.33              |
|                 |            | RB Size=100, RB Offset=0 | 22.30             | 22.33                | 22.14              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 22.40             | 22.48                | 22.50              |
|                 |            | RB Size=1, RB Offset=49  | 22.35             | 22.45                | 22.13              |
|                 |            | RB Size=1, RB Offset=99  | 22.37             | 22.4                 | 23.22              |
|                 |            | RB Size=50, RB Offset=0  | 22.38             | 22.34                | 22.21              |
|                 |            | RB Size=50, RB Offset=24 | 22.32             | 22.34                | 23.03              |
|                 |            | RB Size=50, RB Offset=49 | 22.15             | 22.31                | 23.01              |
|                 |            | RB Size=100, RB Offset=0 | 22.41             | 22.33                | 22.79              |

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

| Modulation          | Middle Channel (dB) | PAR Limit (dB) | Result |
|---------------------|---------------------|----------------|--------|
| QPSK(1RB Size)      | 4.36                | 13             | Pass   |
| QPSK (100%RB Size)  | 4.62                | 13             | Pass   |
| 16QAM (1RB Size)    | 4.45                | 13             | Pass   |
| 16QAM (100%RB Size) | 4.50                | 13             | Pass   |

**EIRP:****QPSK:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1.4 MHz Bandwidth  |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 84.34                         | 124                              | 2.1           | H              | 15.7                 | 1.40                  | 7.30                    | 21.60                      | 33             |
| 1880.00            | 81.19                         | 70                               | 2.3           | V              | 12.0                 | 1.40                  | 7.30                    | 17.90                      | 33             |
| 3 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 84.45                         | 146                              | 2.0           | H              | 15.8                 | 1.40                  | 7.30                    | 21.70                      | 33             |
| 1880.00            | 81.66                         | 158                              | 1.2           | V              | 12.4                 | 1.40                  | 7.30                    | 18.30                      | 33             |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 84.63                         | 111                              | 2.4           | H              | 16.0                 | 1.40                  | 7.30                    | 21.90                      | 33             |
| 1880.00            | 81.94                         | 265                              | 2.0           | V              | 12.7                 | 1.40                  | 7.30                    | 18.60                      | 33             |
| 10MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 86.71                         | 322                              | 2.4           | H              | 18.0                 | 1.40                  | 7.30                    | 23.90                      | 33             |
| 1880.00            | 83.39                         | 73                               | 2.5           | V              | 14.2                 | 1.40                  | 7.30                    | 20.10                      | 33             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 86.41                         | 132                              | 1.0           | H              | 17.7                 | 1.40                  | 7.30                    | 23.60                      | 33             |
| 1880.00            | 82.45                         | 78                               | 1.3           | V              | 13.2                 | 1.40                  | 7.30                    | 19.10                      | 33             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 82.39                         | 223                              | 1.2           | H              | 13.7                 | 1.40                  | 7.30                    | 19.60                      | 33             |
| 1880.00            | 81.07                         | 348                              | 1.9           | V              | 11.8                 | 1.40                  | 7.30                    | 17.70                      | 33             |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1.4 MHz Bandwidth  |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 81.27                         | 260                              | 2.1           | V              | 12.6                 | 1.40                  | 7.30                    | 18.50                      | 33             |
| 1880.00            | 86.09                         | 125                              | 2.4           | H              | 16.9                 | 1.40                  | 7.30                    | 22.80                      | 33             |
| 3 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880               | 81.36                         | 260                              | 2.1           | V              | 12.7                 | 1.4                   | 7.3                     | 18.6                       | 33             |
| 1880               | 86.18                         | 125                              | 2.4           | H              | 17.0                 | 1.4                   | 7.3                     | 22.9                       | 33             |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880.00            | 82.89                         | 129                              | 1.7           | V              | 14.2                 | 1.40                  | 7.30                    | 20.10                      | 33             |
| 1880.00            | 86.02                         | 307                              | 1.6           | H              | 16.8                 | 1.40                  | 7.30                    | 22.70                      | 33             |
| 10 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880               | 81.29                         | 260                              | 2.1           | V              | 12.6                 | 1.4                   | 7.3                     | 18.5                       | 33             |
| 1880               | 86.50                         | 125                              | 2.4           | H              | 17.3                 | 1.4                   | 7.3                     | 23.2                       | 33             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880               | 82.12                         | 260                              | 2.1           | V              | 13.5                 | 1.4                   | 7.3                     | 19.4                       | 33             |
| 1880               | 86.07                         | 125                              | 2.4           | H              | 16.9                 | 1.4                   | 7.3                     | 22.8                       | 33             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1880               | 82.06                         | 260                              | 2.1           | V              | 13.4                 | 1.4                   | 7.3                     | 19.3                       | 33             |
| 1880               | 86.2                          | 125                              | 2.4           | H              | 17.0                 | 1.4                   | 7.3                     | 22.9                       | 33             |

**LTE Band 4:****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  | 21.12             | 21.07                | 21.23              |
|                 |            | RB Size=1, RB Offset=2  | 21.72             | 21.89                | 21.27              |
|                 |            | RB Size=1, RB Offset=5  | 21.93             | 21.98                | 21.33              |
|                 |            | RB Size=3, RB Offset=0  | 21.99             | 21.04                | 21.22              |
|                 |            | RB Size=3, RB Offset=1  | 21.87             | 21.81                | 21.10              |
|                 |            | RB Size=3, RB Offset=2  | 21.58             | 21.82                | 21.16              |
|                 |            | RB Size=6, RB Offset=0  | 21.75             | 21.86                | 21.23              |
|                 | 16QAM      | RB Size=1, RB Offset=0  | 21.05             | 21.99                | 21.14              |
|                 |            | RB Size=1, RB Offset=2  | 21.17             | 21.83                | 21.05              |
|                 |            | RB Size=1, RB Offset=5  | 21.25             | 21.76                | 21.21              |
|                 |            | RB Size=3, RB Offset=0  | 21.34             | 21.72                | 21.27              |
|                 |            | RB Size=3, RB Offset=1  | 21.68             | 21.64                | 21.46              |
|                 |            | RB Size=3, RB Offset=2  | 21.66             | 21.73                | 21.41              |
|                 |            | RB Size=6, RB Offset=0  | 21.75             | 21.63                | 21.34              |
| 3.0             | QPSK       | RB Size=1, RB Offset=0  | 20.95             | 20.61                | 21.57              |
|                 |            | RB Size=1, RB Offset=7  | 20.82             | 20.77                | 21.32              |
|                 |            | RB Size=1, RB Offset=14 | 21.04             | 20.89                | 21.41              |
|                 |            | RB Size=8, RB Offset=0  | 20.91             | 20.65                | 21.68              |
|                 |            | RB Size=8, RB Offset=4  | 20.97             | 20.85                | 21.31              |
|                 |            | RB Size=8, RB Offset=7  | 21.14             | 20.81                | 21.64              |
|                 |            | RB Size=15, RB Offset=0 | 20.67             | 20.52                | 21.53              |
|                 | 16QAM      | RB Size=1, RB Offset=0  | 21.36             | 21.08                | 21.52              |
|                 |            | RB Size=1, RB Offset=7  | 21.29             | 21.07                | 21.34              |
|                 |            | RB Size=1, RB Offset=14 | 21.16             | 20.77                | 21.53              |
|                 |            | RB Size=8, RB Offset=0  | 20.91             | 20.88                | 21.15              |
|                 |            | RB Size=8, RB Offset=4  | 20.77             | 20.77                | 21.59              |
|                 |            | RB Size=8, RB Offset=7  | 21.20             | 20.91                | 21.28              |
|                 |            | RB Size=15, RB Offset=0 | 20.86             | 21.04                | 21.51              |

| Bandwidth (MHz) | Modulation | RB size/RB Offset        | Low Channel (dBm) | Middle Channel (dBm) | High Channel (dBm) |
|-----------------|------------|--------------------------|-------------------|----------------------|--------------------|
| 5.0             | QPSK       | RB Size=1, RB Offset=0   | 20.75             | 21.78                | 21.21              |
|                 |            | RB Size=1, RB Offset=12  | 21.06             | 21.79                | 21.02              |
|                 |            | RB Size=1, RB Offset=24  | 21.03             | 21.98                | 21.23              |
|                 |            | RB Size=12, RB Offset=0  | 21.01             | 22.04                | 21.02              |
|                 |            | RB Size=12, RB Offset=6  | 21.01             | 21.86                | 21.12              |
|                 |            | RB Size=12, RB Offset=11 | 20.88             | 21.88                | 20.97              |
|                 |            | RB Size=25, RB Offset=0  | 20.84             | 21.96                | 20.91              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.02             | 21.93                | 21.18              |
|                 |            | RB Size=1, RB Offset=12  | 21.10             | 21.92                | 21.22              |
|                 |            | RB Size=1, RB Offset=24  | 20.76             | 22.15                | 21.19              |
|                 |            | RB Size=12, RB Offset=0  | 20.81             | 21.9                 | 21.16              |
|                 |            | RB Size=12, RB Offset=6  | 21.21             | 22.21                | 21.13              |
|                 |            | RB Size=12, RB Offset=11 | 20.95             | 22.52                | 21.37              |
|                 |            | RB Size=25, RB Offset=0  | 21.04             | 22.26                | 20.89              |
| 10.0            | QPSK       | RB Size=1, RB Offset=0   | 22.41             | 22.15                | 20.89              |
|                 |            | RB Size=1, RB Offset=24  | 21.8              | 21.7                 | 20.83              |
|                 |            | RB Size=1, RB Offset=49  | 21.86             | 21.65                | 21.13              |
|                 |            | RB Size=25, RB Offset=0  | 21.45             | 21.43                | 20.78              |
|                 |            | RB Size=25, RB Offset=12 | 21.75             | 21.98                | 21.06              |
|                 |            | RB Size=25, RB Offset=24 | 21.91             | 21.92                | 20.9               |
|                 |            | RB Size=50, RB Offset=0  | 21.25             | 21.38                | 20.97              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.24             | 21.54                | 20.85              |
|                 |            | RB Size=1, RB Offset=24  | 21.63             | 21.48                | 20.76              |
|                 |            | RB Size=1, RB Offset=49  | 21.77             | 21.36                | 20.74              |
|                 |            | RB Size=25, RB Offset=0  | 22.03             | 21.91                | 20.61              |
|                 |            | RB Size=25, RB Offset=12 | 21.88             | 21.76                | 20.78              |
|                 |            | RB Size=25, RB Offset=24 | 21.59             | 21.59                | 20.75              |
|                 |            | RB Size=50, RB Offset=0  | 21.81             | 21.86                | 20.93              |

| 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   | 22.02             | 22.21                | 21.78              |
|                 |            | RB Size=1, RB Offset=37  | 21.76             | 22.15                | 22.78              |
|                 |            | RB Size=1, RB Offset=74  | 21.84             | 21.61                | 21.42              |
|                 |            | RB Size=36, RB Offset=0  | 21.59             | 22.14                | 22.36              |
|                 |            | RB Size=36, RB Offset=18 | 21.59             | 21.76                | 22.17              |
|                 |            | RB Size=36, RB Offset=37 | 21.84             | 21.65                | 22.15              |
|                 |            | RB Size=75, RB Offset=0  | 21.98             | 22.17                | 21.64              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.81             | 21.91                | 22.16              |
|                 |            | RB Size=1, RB Offset=37  | 21.58             | 21.84                | 22.2               |
|                 |            | RB Size=1, RB Offset=74  | 22.14             | 22.5                 | 21.34              |
|                 |            | RB Size=36, RB Offset=0  | 22.35             | 22.11                | 22.26              |
|                 |            | RB Size=36, RB Offset=18 | 22.91             | 22.77                | 22.2               |
|                 |            | RB Size=36, RB Offset=37 | 21.75             | 21.88                | 22.12              |
|                 |            | RB Size=75, RB Offset=0  | 21.53             | 21.83                | 21.11              |
| 20.0            | QPSK       | RB Size=1, RB Offset=0   | 22.36             | 22.35                | 22.44              |
|                 |            | RB Size=1, RB Offset=49  | 21.88             | 21.66                | 21.84              |
|                 |            | RB Size=1, RB Offset=99  | 21.82             | 22.75                | 21.57              |
|                 |            | RB Size=50, RB Offset=0  | 21.64             | 21.95                | 21.28              |
|                 |            | RB Size=50, RB Offset=24 | 22.03             | 22.15                | 21.63              |
|                 |            | RB Size=50, RB Offset=49 | 21.69             | 21.99                | 21.59              |
|                 |            | RB Size=100, RB Offset=0 | 21.89             | 21.97                | 21.42              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 21.91             | 21.98                | 21.45              |
|                 |            | RB Size=1, RB Offset=49  | 21.51             | 21.59                | 21.66              |
|                 |            | RB Size=1, RB Offset=99  | 21.26             | 21.99                | 21.34              |
|                 |            | RB Size=50, RB Offset=0  | 21.41             | 21.56                | 22.60              |
|                 |            | RB Size=50, RB Offset=24 | 21.12             | 21.85                | 22.45              |
|                 |            | RB Size=50, RB Offset=49 | 21.45             | 21.96                | 21.60              |
|                 |            | RB Size=100, RB Offset=0 | 21.24             | 21.12                | 21.62              |

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

| Modulation          | Middle Channel (dB) | PAR Limit (dB) | Result |
|---------------------|---------------------|----------------|--------|
| QPSK(1RB Size)      | 5.22                | 13             | Pass   |
| QPSK (100%RB Size)  | 5.64                | 13             | Pass   |
| 16QAM (1RB Size)    | 5.31                | 13             | Pass   |
| 16QAM (100%RB Size) | 5.47                | 13             | Pass   |

**EIRP:****QPSK:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1.4 MHz Bandwidth  |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.50            | 83.42                         | 181                              | 1.3           | H              | 14.6                 | 1.60                  | 6.90                    | 19.9                       | 30             |
| 1732.50            | 80.65                         | 151                              | 2.4           | V              | 11.4                 | 1.60                  | 6.90                    | 16.7                       | 30             |
| 3 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.50            | 83.88                         | 320                              | 1.9           | H              | 15.1                 | 1.60                  | 6.90                    | 20.4                       | 30             |
| 1732.50            | 80.74                         | 63                               | 2.4           | V              | 11.5                 | 1.60                  | 6.90                    | 16.8                       | 30             |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.50            | 85.37                         | 131                              | 1.5           | H              | 16.6                 | 1.60                  | 6.90                    | 21.9                       | 30             |
| 1732.50            | 82.27                         | 87                               | 2.5           | V              | 13.1                 | 1.60                  | 6.90                    | 18.4                       | 30             |
| 10MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.50            | 85.03                         | 174                              | 1.4           | H              | 16.2                 | 1.60                  | 6.90                    | 21.5                       | 30             |
| 1732.50            | 83.22                         | 283                              | 1.3           | V              | 14.0                 | 1.60                  | 6.90                    | 19.3                       | 30             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 85.24                         | 174                              | 1.4           | H              | 16.1                 | 1.6                   | 6.9                     | 21.4                       | 30             |
| 1732.5             | 83.31                         | 283                              | 1.3           | V              | 14.1                 | 1.6                   | 6.9                     | 19.4                       | 30             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 85.31                         | 174                              | 1.4           | H              | 16.7                 | 1.6                   | 6.9                     | 22.0                       | 30             |
| 1732.5             | 83.43                         | 283                              | 1.3           | V              | 14.2                 | 1.6                   | 6.9                     | 19.5                       | 30             |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1.4 MHz Bandwidth  |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 80.78                         | 174                              | 1.4           | V              | 12.2                 | 1.6                   | 6.9                     | 17.5                       | 30             |
| 1732.5             | 84.91                         | 283                              | 1.3           | H              | 15.7                 | 1.6                   | 6.9                     | 21.0                       | 30             |
| 3 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 80.91                         | 174                              | 1.4           | V              | 12.3                 | 1.6                   | 6.9                     | 17.6                       | 30             |
| 1732.5             | 84.75                         | 283                              | 1.3           | H              | 15.5                 | 1.6                   | 6.9                     | 20.8                       | 30             |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.50            | 80.68                         | 24                               | 1.5           | V              | 11.9                 | 1.60                  | 6.90                    | 17.20                      | 30             |
| 1732.50            | 87.89                         | 201                              | 2.0           | H              | 16.7                 | 1.60                  | 6.90                    | 22.00                      | 30             |
| 10 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 81.28                         | 174                              | 1.4           | V              | 12.7                 | 1.6                   | 6.9                     | 18.0                       | 30             |
| 1732.5             | 85.79                         | 283                              | 1.3           | H              | 16.6                 | 1.6                   | 6.9                     | 21.9                       | 30             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 81.11                         | 174                              | 1.4           | V              | 12.5                 | 1.6                   | 6.9                     | 17.8                       | 30             |
| 1732.5             | 86.2                          | 283                              | 1.3           | H              | 17                   | 1.6                   | 6.9                     | 22.3                       | 30             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 1732.5             | 81.24                         | 174                              | 1.4           | V              | 12.6                 | 1.6                   | 6.9                     | 17.9                       | 30             |
| 1732.5             | 86.53                         | 283                              | 1.3           | H              | 17.3                 | 1.6                   | 6.9                     | 22.6                       | 30             |

**LTE Band 7:****Maximum Output Power**

| <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> |
|----------------------------|-------------------|--------------------------|----------------------------------|-------------------------------------|-----------------------------------|
| 5.0                        | QPSK              | RB Size=1, RB Offset=0   | 22.42                            | 21.69                               | 22.85                             |
|                            |                   | RB Size=1, RB Offset=12  | 22.12                            | 21.96                               | 22.79                             |
|                            |                   | RB Size=1, RB Offset=24  | 22.77                            | 22.7                                | 22.38                             |
|                            |                   | RB Size=12, RB Offset=0  | 22.59                            | 22.8                                | 22.27                             |
|                            |                   | RB Size=12, RB Offset=6  | 22.26                            | 22.99                               | 22.21                             |
|                            |                   | RB Size=12, RB Offset=11 | 22.48                            | 22.75                               | 22.78                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.15                            | 21.07                               | 22.04                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 21.91                            | 21.87                               | 22.11                             |
|                            |                   | RB Size=1, RB Offset=12  | 21.83                            | 21.92                               | 22.46                             |
|                            |                   | RB Size=1, RB Offset=24  | 21.99                            | 21.91                               | 21.64                             |
|                            |                   | RB Size=12, RB Offset=0  | 21.69                            | 21.7                                | 21.82                             |
|                            |                   | RB Size=12, RB Offset=6  | 22.14                            | 21.78                               | 21.58                             |
|                            |                   | RB Size=12, RB Offset=11 | 21.73                            | 21.75                               | 21.42                             |
|                            |                   | RB Size=25, RB Offset=0  | 20.84                            | 20.98                               | 20.83                             |
| 10.0                       | QPSK              | RB Size=1, RB Offset=0   | 23.19                            | 22.54                               | 23.06                             |
|                            |                   | RB Size=1, RB Offset=24  | 22.75                            | 22.4                                | 22.28                             |
|                            |                   | RB Size=1, RB Offset=49  | 22.56                            | 22.9                                | 22.97                             |
|                            |                   | RB Size=25, RB Offset=0  | 22.29                            | 22.27                               | 22.31                             |
|                            |                   | RB Size=25, RB Offset=12 | 22.61                            | 22.44                               | 22.35                             |
|                            |                   | RB Size=25, RB Offset=24 | 22.59                            | 21.38                               | 22.41                             |
|                            |                   | RB Size=50, RB Offset=0  | 21.92                            | 21.51                               | 22.31                             |
|                            | 16QAM             | RB Size=1, RB Offset=0   | 22.6                             | 21.87                               | 21.71                             |
|                            |                   | RB Size=1, RB Offset=24  | 22.48                            | 21.84                               | 21.35                             |
|                            |                   | RB Size=1, RB Offset=49  | 21.48                            | 21.97                               | 21.39                             |
|                            |                   | RB Size=25, RB Offset=0  | 21.62                            | 21.48                               | 21.52                             |
|                            |                   | RB Size=25, RB Offset=12 | 21.62                            | 21.72                               | 21.65                             |
|                            |                   | RB Size=25, RB Offset=24 | 22.21                            | 21.51                               | 21.63                             |
|                            |                   | RB Size=50, RB Offset=0  | 20.93                            | 20.81                               | 20.66                             |

| 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   | 22.57             | 22.08                | 22.59              |
|                 |            | RB Size=1, RB Offset=37  | 22.72             | 22.24                | 22.79              |
|                 |            | RB Size=1, RB Offset=74  | 22.66             | 21.99                | 22.23              |
|                 |            | RB Size=36, RB Offset=0  | 22.71             | 22.46                | 22.22              |
|                 |            | RB Size=36, RB Offset=18 | 22.44             | 22.2                 | 22.09              |
|                 |            | RB Size=36, RB Offset=37 | 22.54             | 22.26                | 22.79              |
|                 |            | RB Size=75, RB Offset=0  | 22.56             | 22.10                | 22.65              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 22.27             | 22.12                | 22.28              |
|                 |            | RB Size=1, RB Offset=37  | 22.38             | 22.2                 | 22.33              |
|                 |            | RB Size=1, RB Offset=74  | 22.75             | 22.07                | 22.63              |
|                 |            | RB Size=36, RB Offset=0  | 22.33             | 22.22                | 22.73              |
|                 |            | RB Size=36, RB Offset=18 | 22.2              | 22.24                | 22.45              |
|                 |            | RB Size=36, RB Offset=37 | 22.22             | 22.23                | 22.26              |
|                 |            | RB Size=75, RB Offset=0  | 22.13             | 22.2                 | 22.73              |
| 20.0            | QPSK       | RB Size=1, RB Offset=0   | 22.84             | 22.81                | 22.75              |
|                 |            | RB Size=1, RB Offset=49  | 22.64             | 22.35                | 22.58              |
|                 |            | RB Size=1, RB Offset=99  | 22.31             | 22.12                | 22.14              |
|                 |            | RB Size=50, RB Offset=0  | 22.48             | 22.16                | 22.14              |
|                 |            | RB Size=50, RB Offset=24 | 22.50             | 22.29                | 22.01              |
|                 |            | RB Size=50, RB Offset=49 | 22.52             | 22.41                | 22.53              |
|                 |            | RB Size=100, RB Offset=0 | 22.41             | 22.55                | 22.94              |
|                 | 16QAM      | RB Size=1, RB Offset=0   | 22.77             | 22.37                | 22.78              |
|                 |            | RB Size=1, RB Offset=49  | 22.48             | 22.22                | 22.21              |
|                 |            | RB Size=1, RB Offset=99  | 22.46             | 22.92                | 23.35              |
|                 |            | RB Size=50, RB Offset=0  | 22.52             | 22.42                | 22.56              |
|                 |            | RB Size=50, RB Offset=24 | 22.64             | 22.47                | 22.49              |
|                 |            | RB Size=50, RB Offset=49 | 22.41             | 22.65                | 22.41              |
|                 |            | RB Size=100, RB Offset=0 | 22.53             | 22.66                | 22.38              |

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

| Modulation          | Middle Channel (dB) | PAR Limit (dB) | Result |
|---------------------|---------------------|----------------|--------|
| QPSK(1RB Size)      | 3.75                | 13             | Pass   |
| QPSK (100%RB Size)  | 6.02                | 13             | Pass   |
| 16QAM (1RB Size)    | 3.32                | 13             | Pass   |
| 16QAM (100%RB Size) | 5.58                | 13             | Pass   |

**EIRP:****QPSK:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.24                         | 337                              | 1.1           | H              | 15.9                 | 1.70                  | 8.60                    | 22.80                      | 33             |
| 2535               | 83.52                         | 58                               | 2.0           | V              | 16.8                 | 1.70                  | 8.60                    | 23.70                      | 33             |
| 10MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.26                         | 337                              | 1.1           | H              | 15.9                 | 1.7                   | 8.6                     | 22.8                       | 33             |
| 2535               | 83.67                         | 58                               | 2.0           | V              | 17                   | 1.7                   | 8.6                     | 23.9                       | 33             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.37                         | 337                              | 1.1           | H              | 16                   | 1.7                   | 8.6                     | 22.9                       | 33             |
| 2535               | 83.61                         | 58                               | 2.0           | V              | 16.9                 | 1.7                   | 8.6                     | 23.8                       | 33             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.18                         | 337                              | 1.1           | H              | 15.8                 | 1.7                   | 8.6                     | 22.7                       | 33             |
| 2535               | 83.49                         | 58                               | 2.0           | V              | 16.8                 | 1.7                   | 8.6                     | 23.7                       | 33             |

**16QAM:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |
| Middle Channel     |                               |                                  |               |                |                      |                       |                         |                            |                |
| 5 MHz Bandwidth    |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 84.06                         | 6                                | 1.2           | H              | 17.7                 | 1.70                  | 8.60                    | 24.60                      | 33             |
| 2535               | 84.44                         | 195                              | 1.6           | V              | 17.7                 | 1.70                  | 8.60                    | 24.60                      | 33             |
| 10 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.81                         | 337                              | 1.1           | H              | 16.5                 | 1.7                   | 8.6                     | 23.4                       | 33             |
| 2535               | 83.99                         | 58                               | 2.0           | V              | 17.3                 | 1.7                   | 8.6                     | 24.2                       | 33             |
| 15 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.54                         | 337                              | 1.1           | H              | 16.2                 | 1.7                   | 8.6                     | 23.1                       | 33             |
| 2535               | 83.2                          | 58                               | 2.0           | V              | 16.5                 | 1.7                   | 8.6                     | 23.4                       | 33             |
| 20 MHz Bandwidth   |                               |                                  |               |                |                      |                       |                         |                            |                |
| 2535               | 82.72                         | 337                              | 1.1           | H              | 16.4                 | 1.7                   | 8.6                     | 23.3                       | 33             |
| 2535               | 83.89                         | 58                               | 2.0           | V              | 17.2                 | 1.7                   | 8.6                     | 24.1                       | 33             |

**Note:**

All above data were tested with no amplifier

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

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

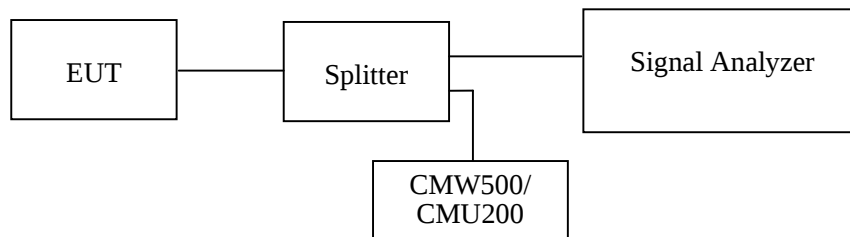
### Applicable Standards

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 5 kHz (Cellular /PCS) & 100 kHz (WCDMA) and the 26 dB & 99% bandwidth was recorded.



### Test Equipment List and Details

| Manufacturer          | Description                          | Model  | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|--------|-----------------------|------------------|----------------------|
| Rohde & Schwarz       | Signal Analyzer                      | FSIQ26 | 8386001028            | 2015-12-11       | 2016-12-11           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200 | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500 | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | RG-214 | 4                     | 2015-06-15       | 2016-06-15           |
| WEINSCHTEL            | 6dB Attenuator                       | 1012   | 30187                 | 2015-06-18       | 2016-06-18           |
| WEINSCHTEL            | 3dB Attenuator                       | 5321   | AU0709                | 2015-06-18       | 2016-06-18           |

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

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

|                           |                |
|---------------------------|----------------|
| <b>Temperature:</b>       | 23~24 °C       |
| <b>Relative Humidity:</b> | 51~54 %        |
| <b>ATM Pressure:</b>      | 100.5~101.0kPa |

The testing was performed by Simon Wang from 2016-03-18 to 2016-03-29.

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           | 244.49                       | 320.64                         |
| EGPRS(8PSK) | 836.6           | 246.49                       | 312.63                         |

| Mode          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---------------|-----------------|------------------------------|--------------------------------|
| RMC (BPSK)    | 836.6           | 4.19                         | 4.71                           |
| HSUPA (BPSK)  | 836.6           | 4.17                         | 4.71                           |
| HSDPA (16QAM) | 836.6           | 4.19                         | 4.69                           |

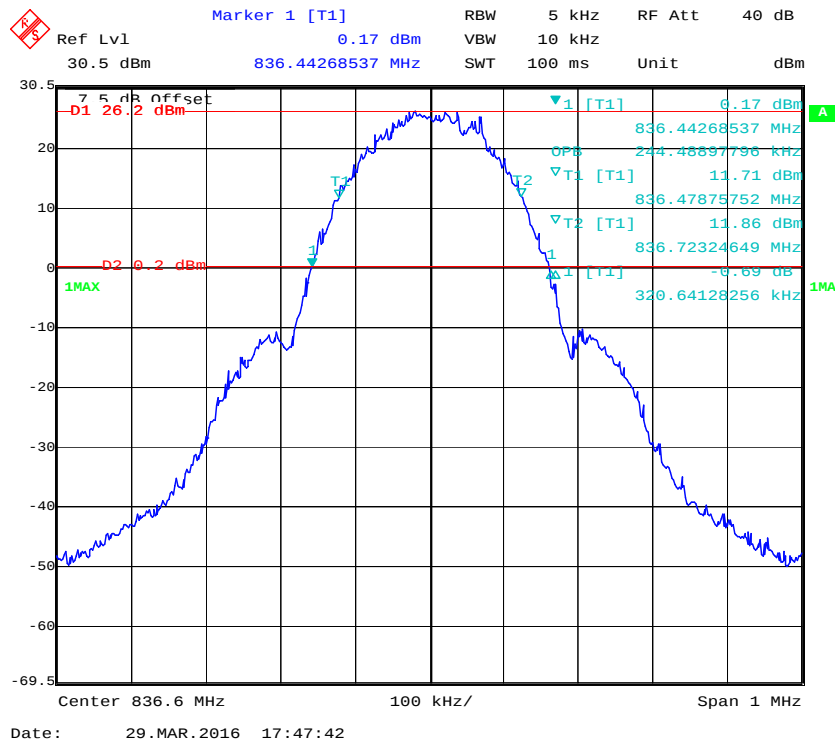
**PCS Band (Part 24E)**

| Mode        | Frequency (MHz) | 99% Occupied Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|-------------|-----------------|------------------------------|--------------------------------|
| GSM(GMSK)   | 1880.0          | 244.49                       | 314.63                         |
| EGPRS(8PSK) | 1880.0          | 244.49                       | 316.61                         |

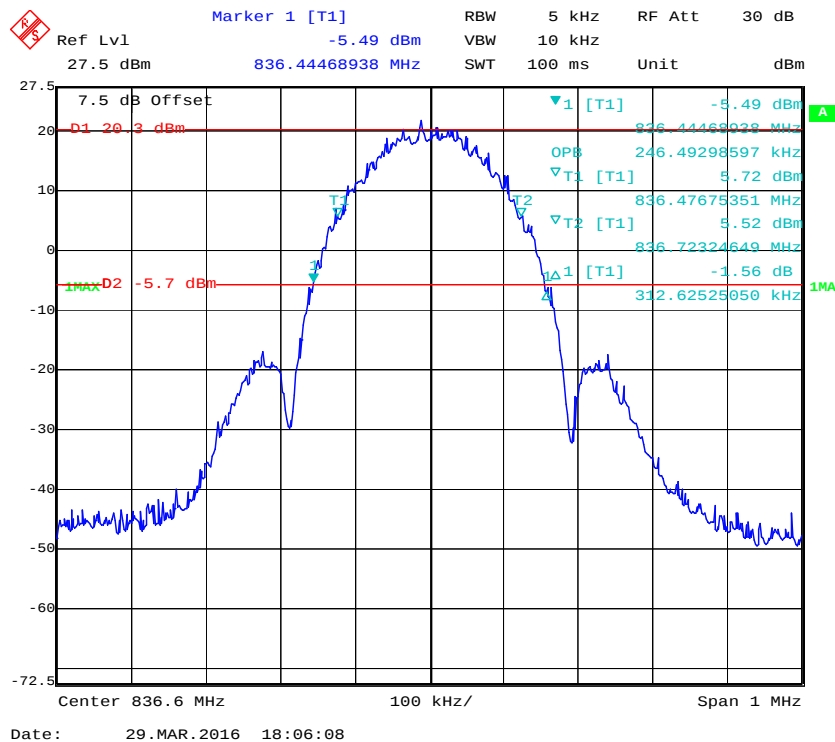
| Mode          | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---------------|-----------------|------------------------------|--------------------------------|
| RMC (BPSK)    | 1880.0          | 4.17                         | 4.69                           |
| HSUPA (BPSK)  | 1880.0          | 4.19                         | 4.71                           |
| HSDPA (16QAM) | 1880.0          | 4.19                         | 4.71                           |

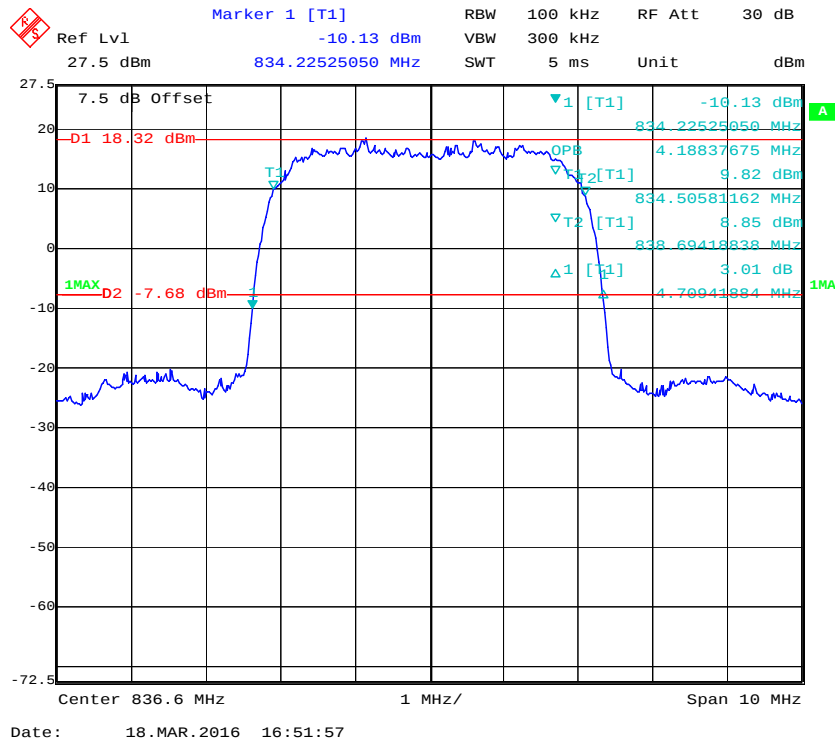
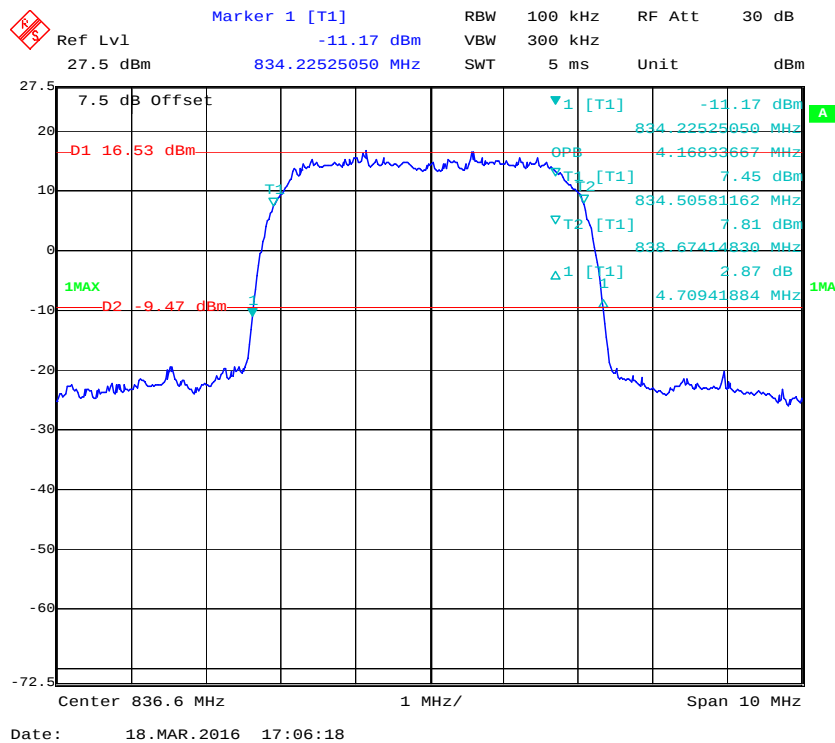
## Cellular Band (Part 22H)

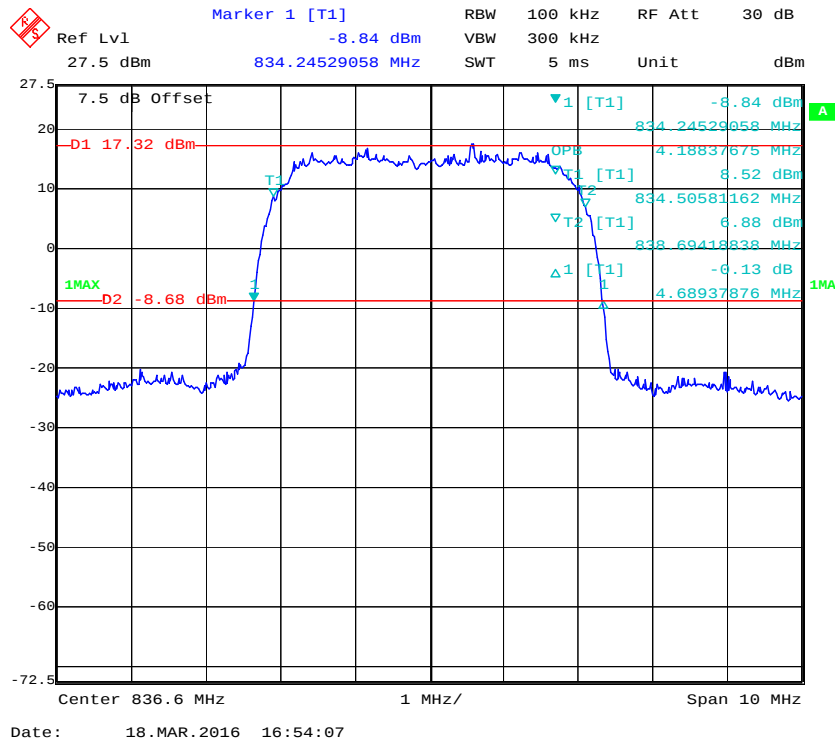
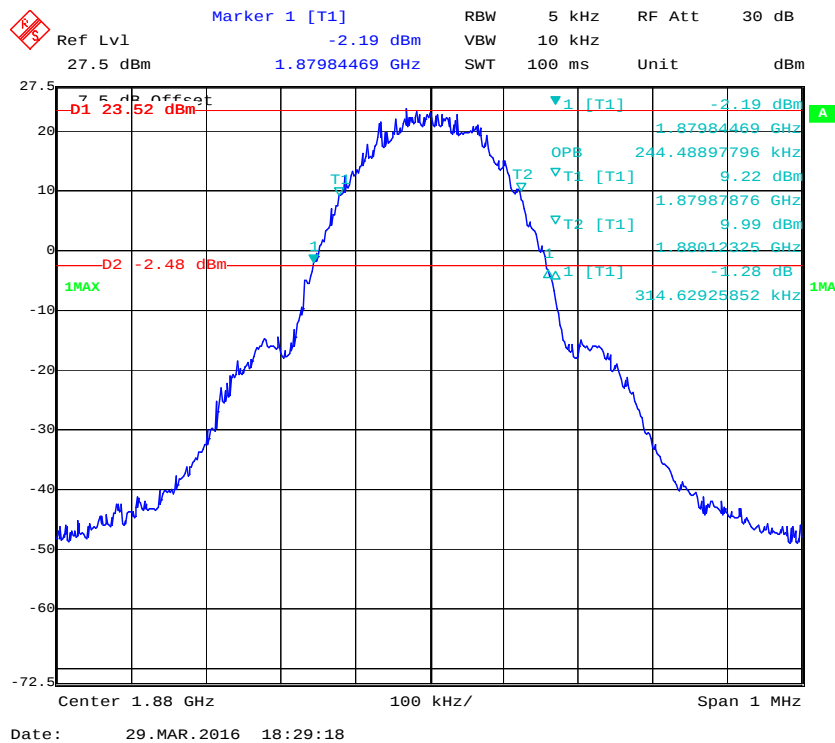
## 99% Occupied &amp; 26 dB Emissions Bandwidth for GSM (GMSK) Mode

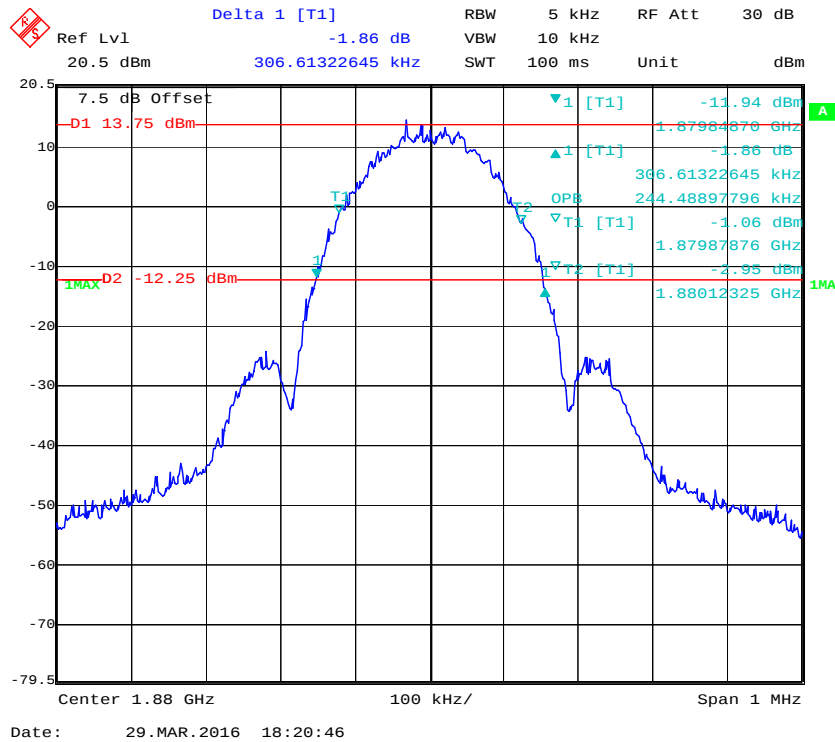
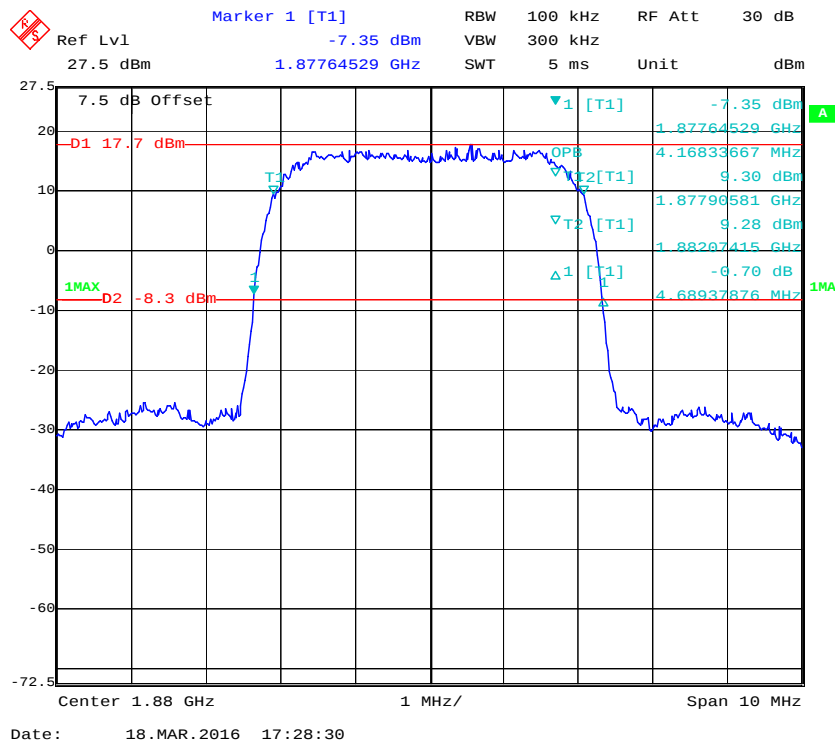


## 99% Occupied &amp; 26 dB Emissions Bandwidth for EDGE Mode

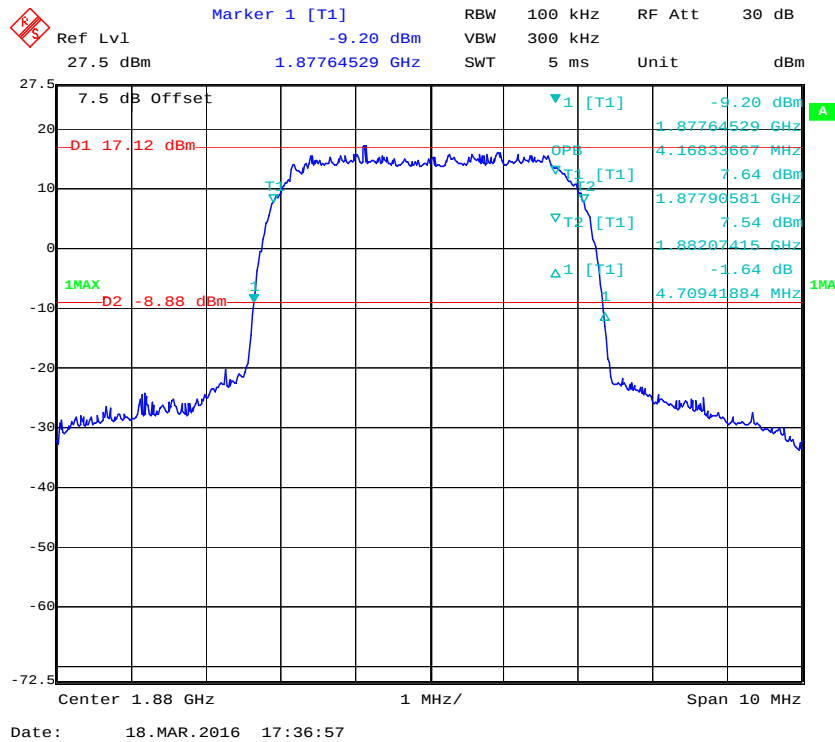


**99% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode****99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode**

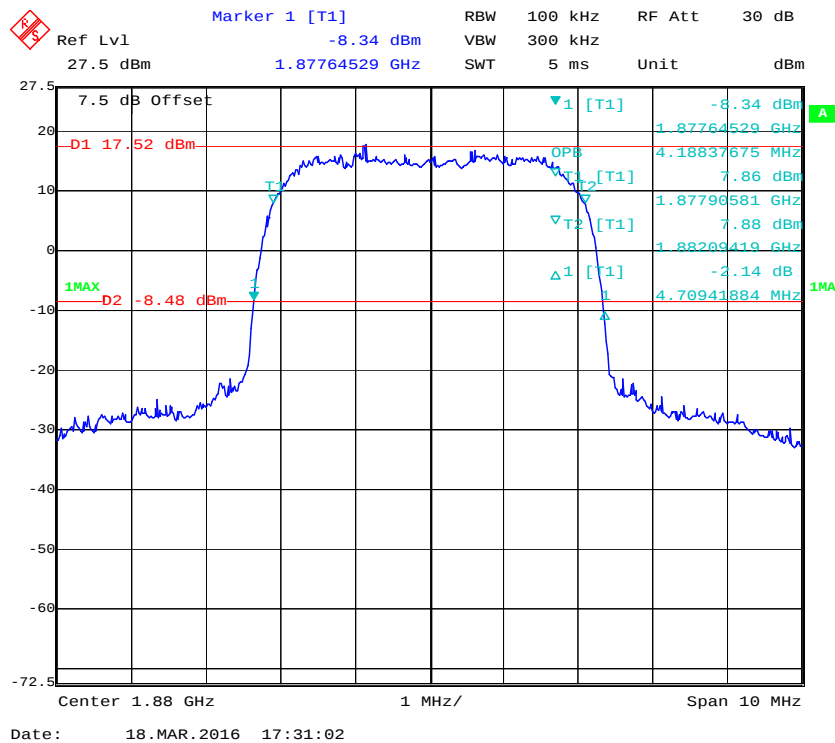
**99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode****PCS Band (Part 24E)****99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode**

**99% Occupied & 26 dB Emissions Bandwidth for EGPRS Mode****999% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode**

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



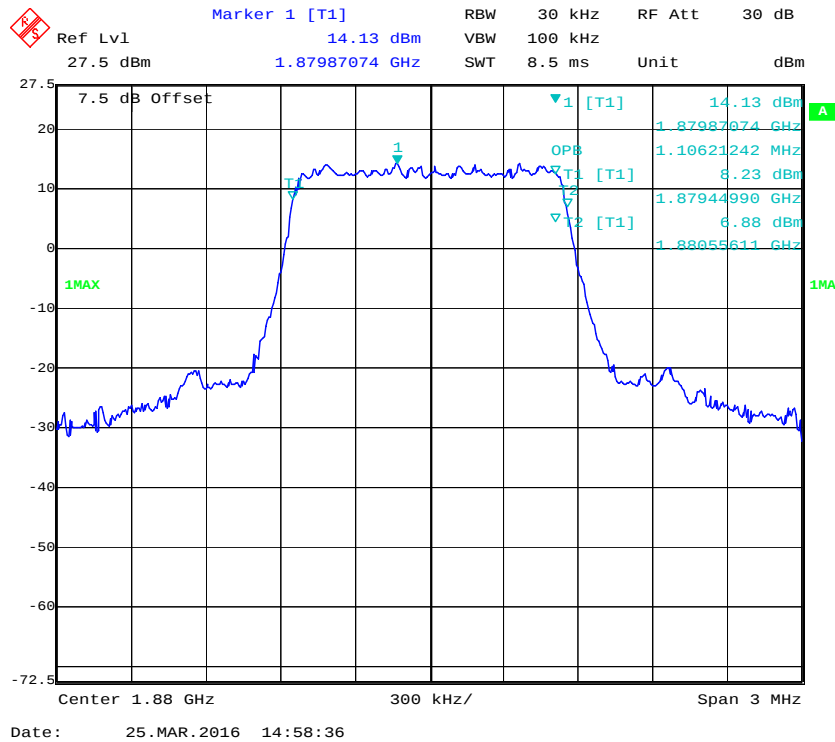
### 99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode



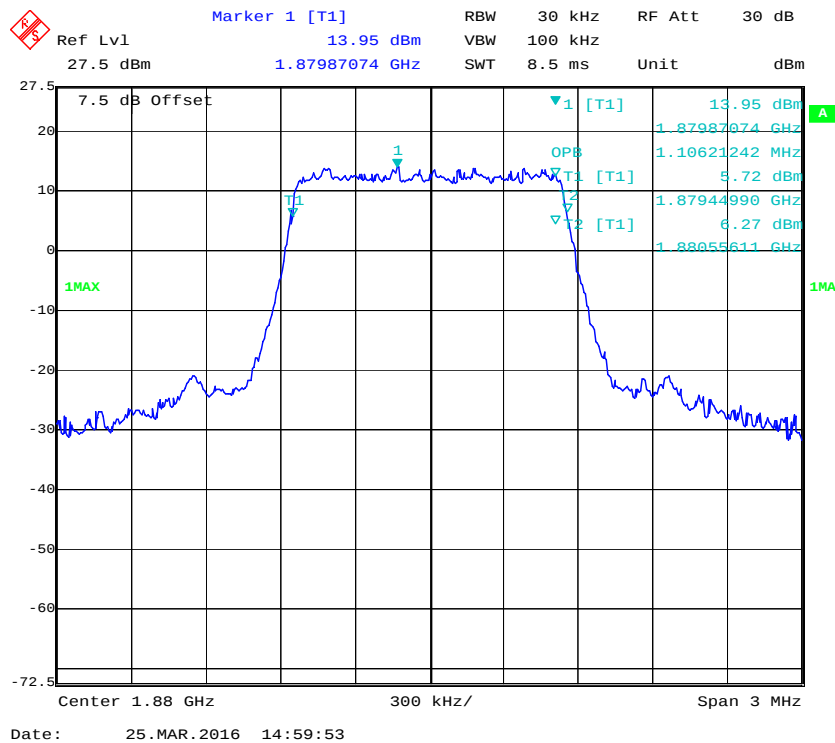
**LTE Band 2: (Middle Channel)**

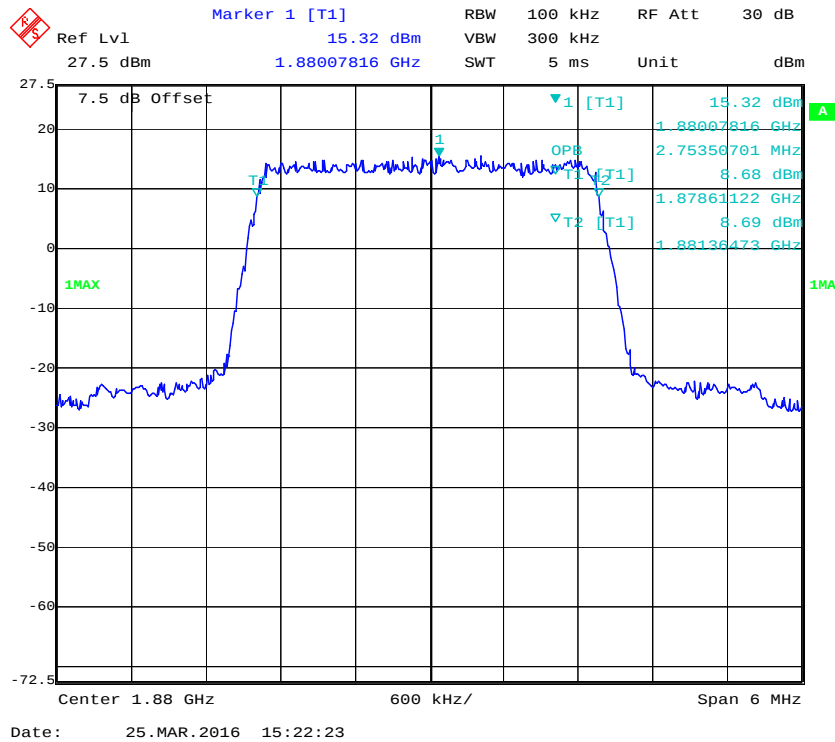
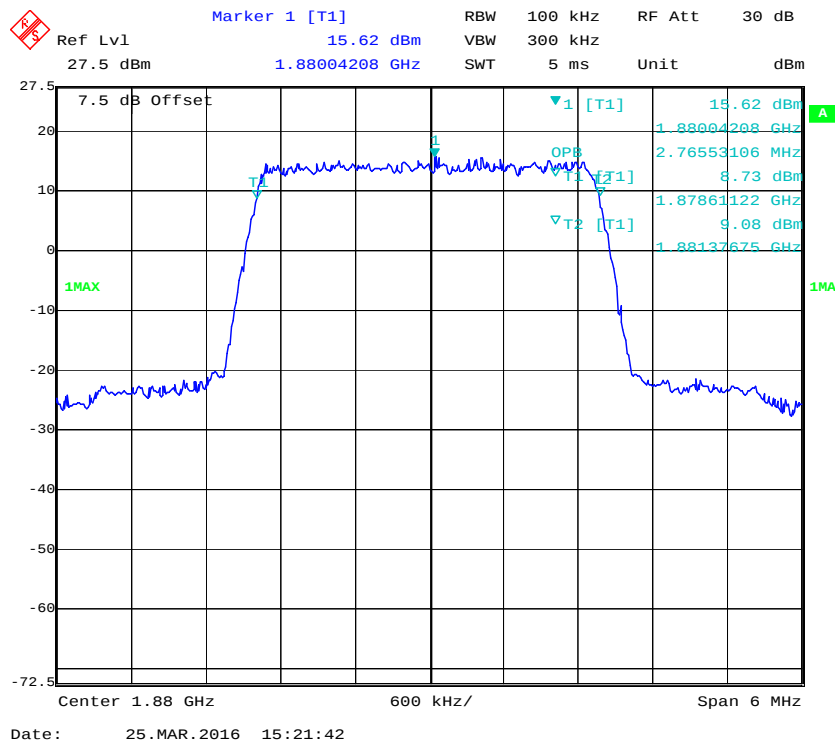
| <b>Bandwidth<br/>(MHz)</b> | <b>Modulation</b> | <b>99% Occupied<br/>Bandwidth<br/>(MHz)</b> | <b>26 dB Emission<br/>Bandwidth<br/>(MHz)</b> |
|----------------------------|-------------------|---------------------------------------------|-----------------------------------------------|
| 1.4                        | QPSK              | 1.11                                        | 1.31                                          |
|                            | 16QAM             | 1.11                                        | 1.30                                          |
| 3.0                        | QPSK              | 2.75                                        | 3.13                                          |
|                            | 16QAM             | 2.77                                        | 3.13                                          |
| 5.0                        | QPSK              | 4.53                                        | 5.07                                          |
|                            | 16QAM             | 4.53                                        | 5.03                                          |
| 10.0                       | QPSK              | 9.10                                        | 10.26                                         |
|                            | 16QAM             | 9.10                                        | 10.22                                         |
| 15.0                       | QPSK              | 13.47                                       | 14.91                                         |
|                            | 16QAM             | 13.53                                       | 15.09                                         |
| 20.0                       | QPSK              | 18.44                                       | 20.92                                         |
|                            | 16QAM             | 18.44                                       | 20.92                                         |

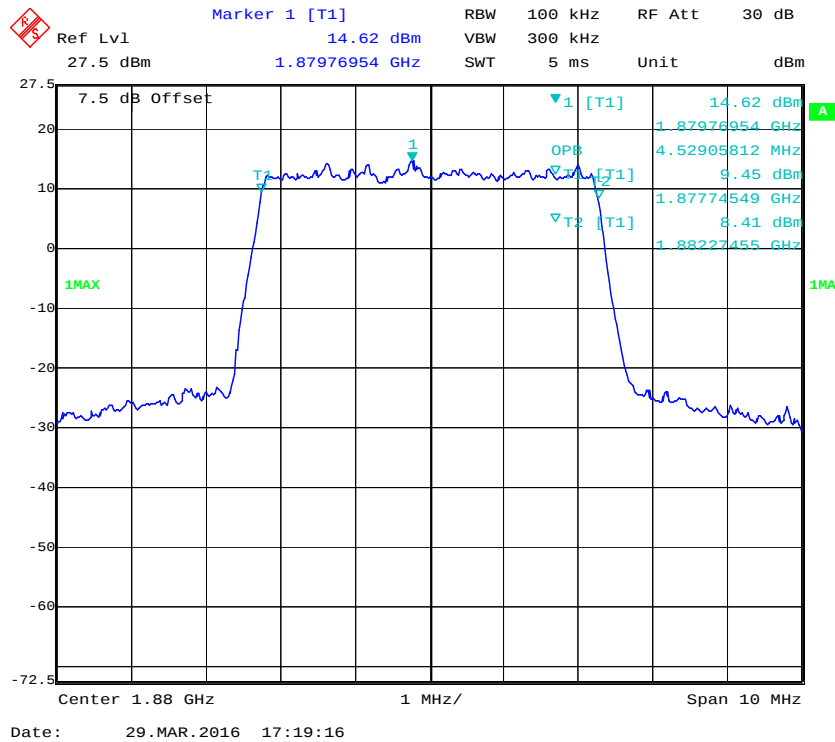
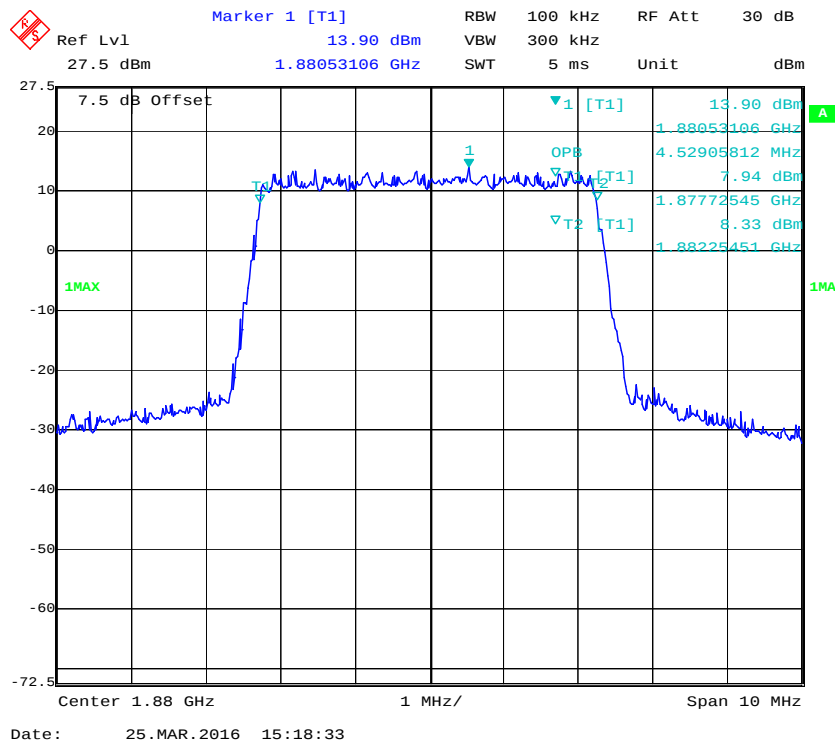
### QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel

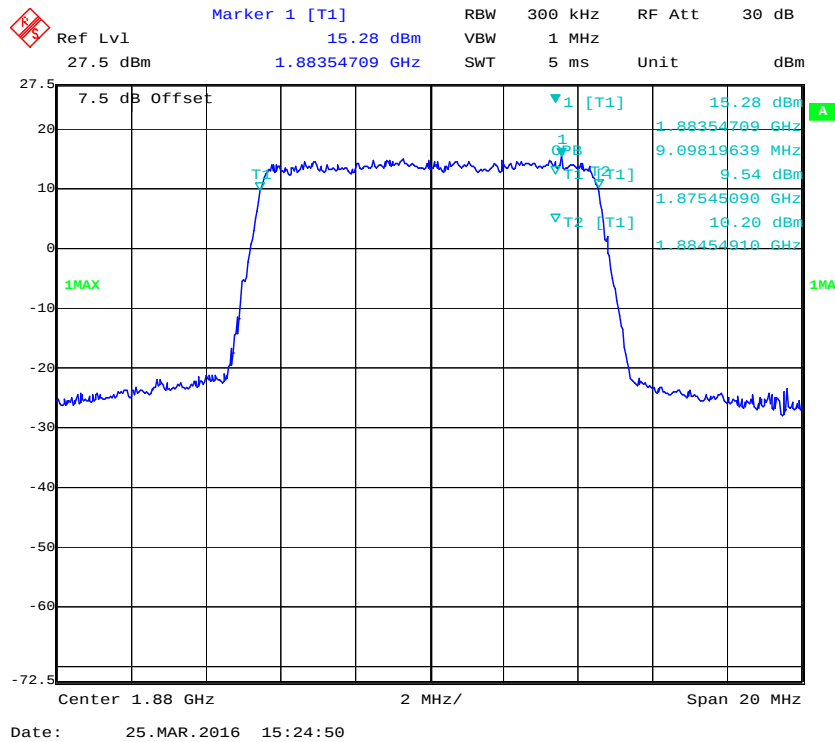
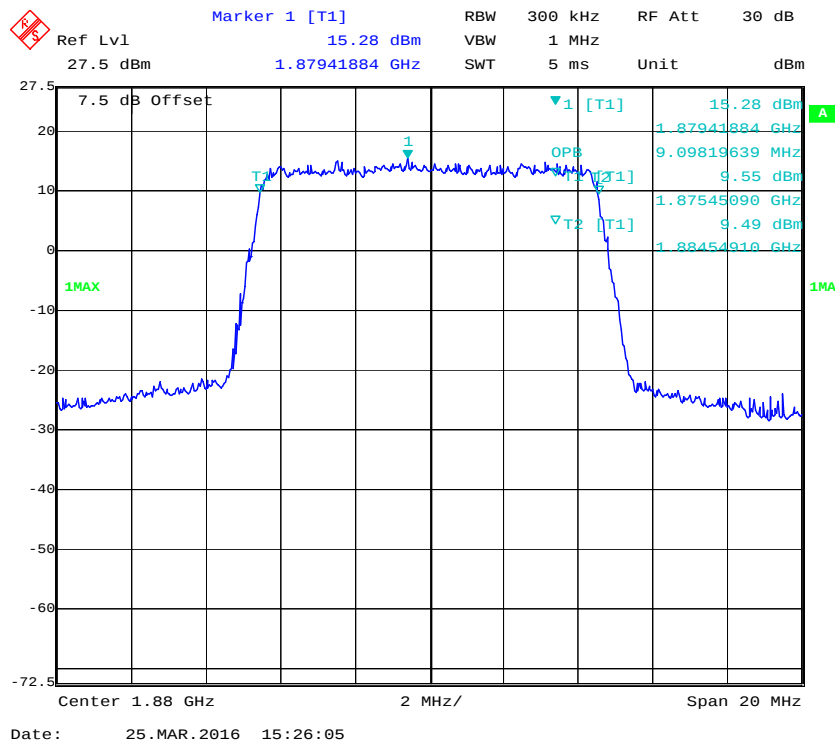


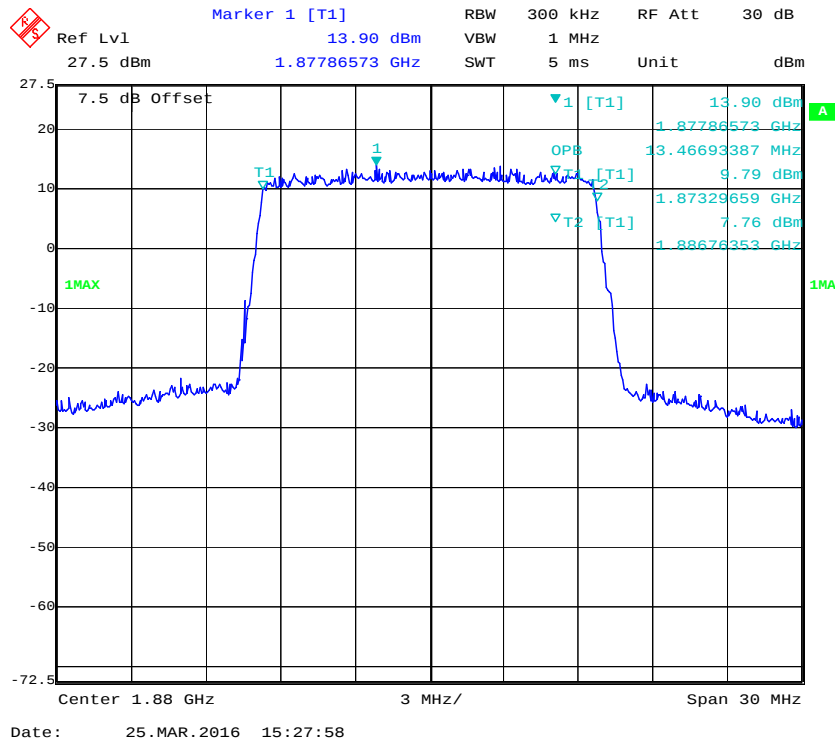
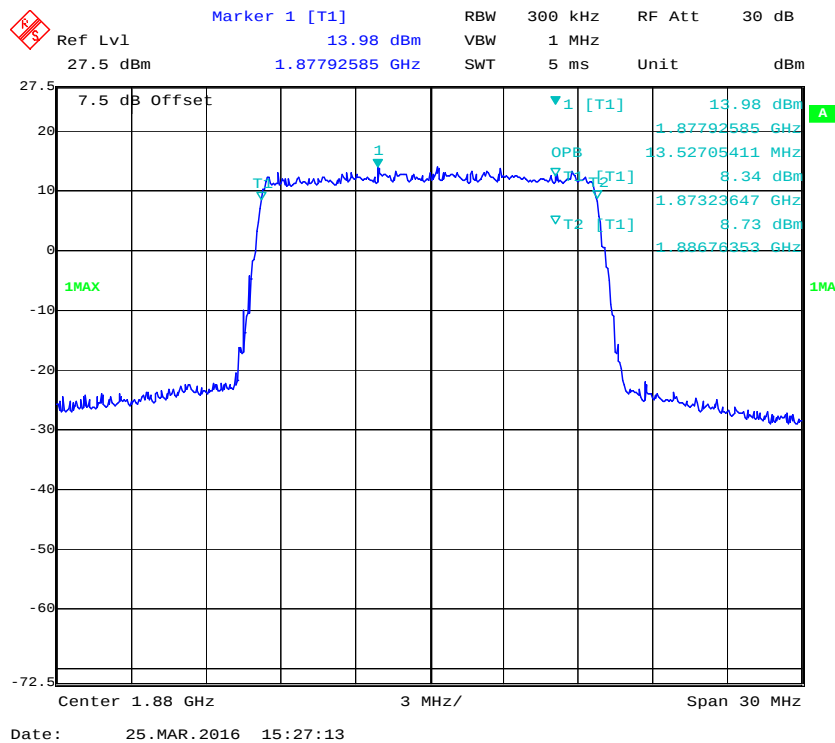
### 16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel

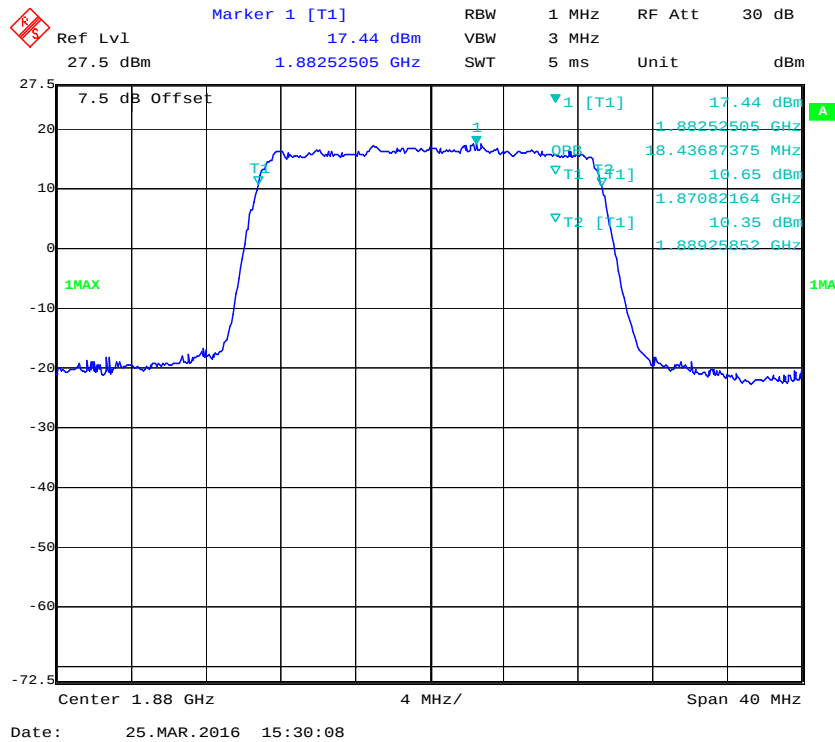
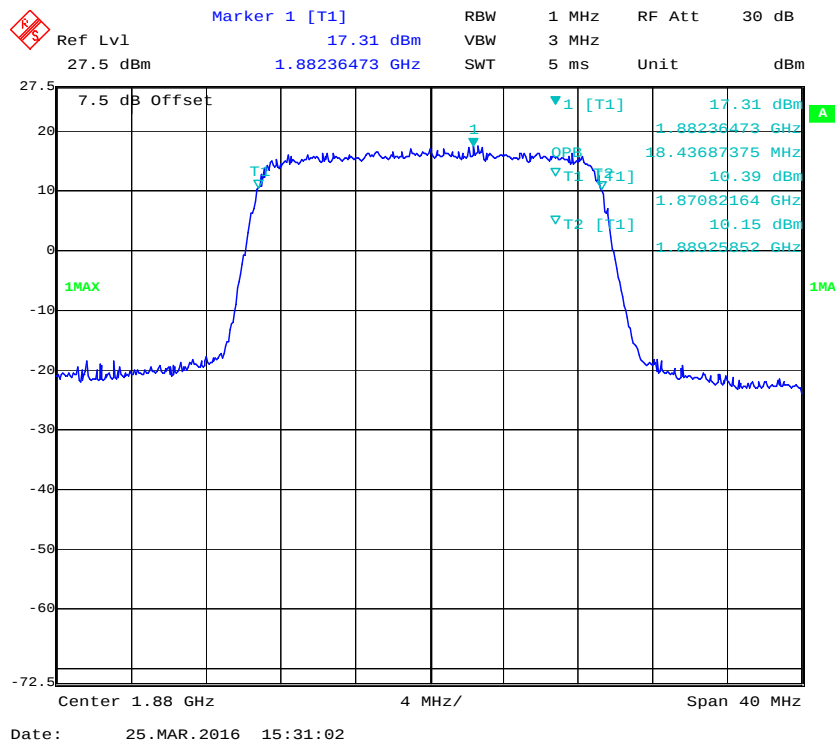


**QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**

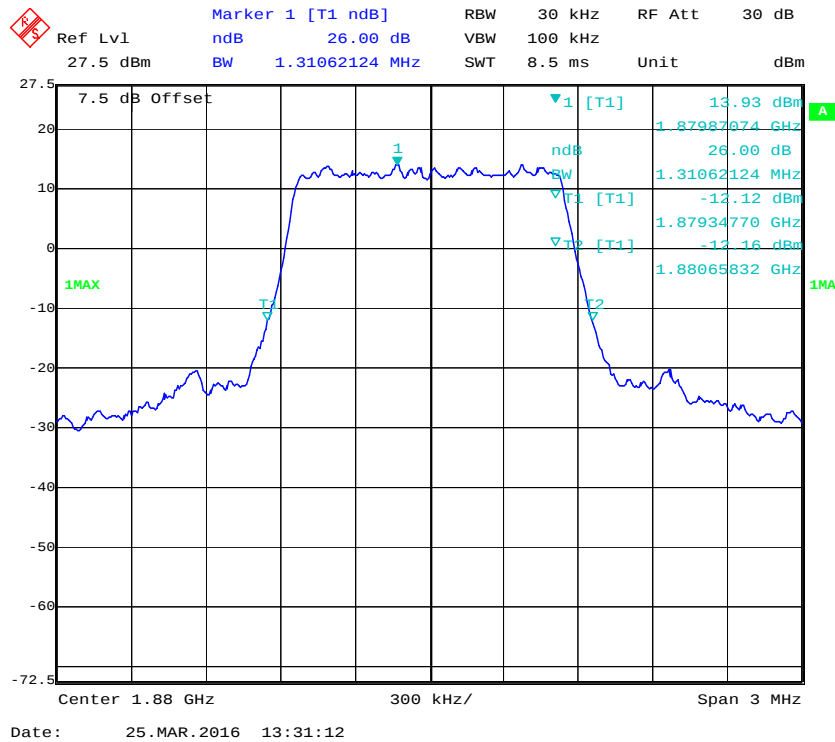
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**

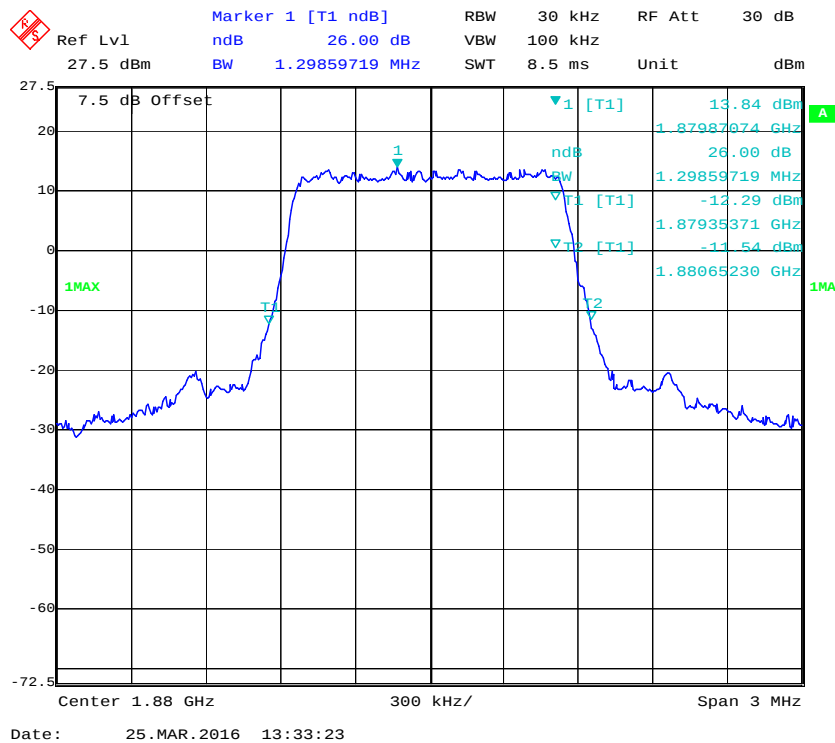
**QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

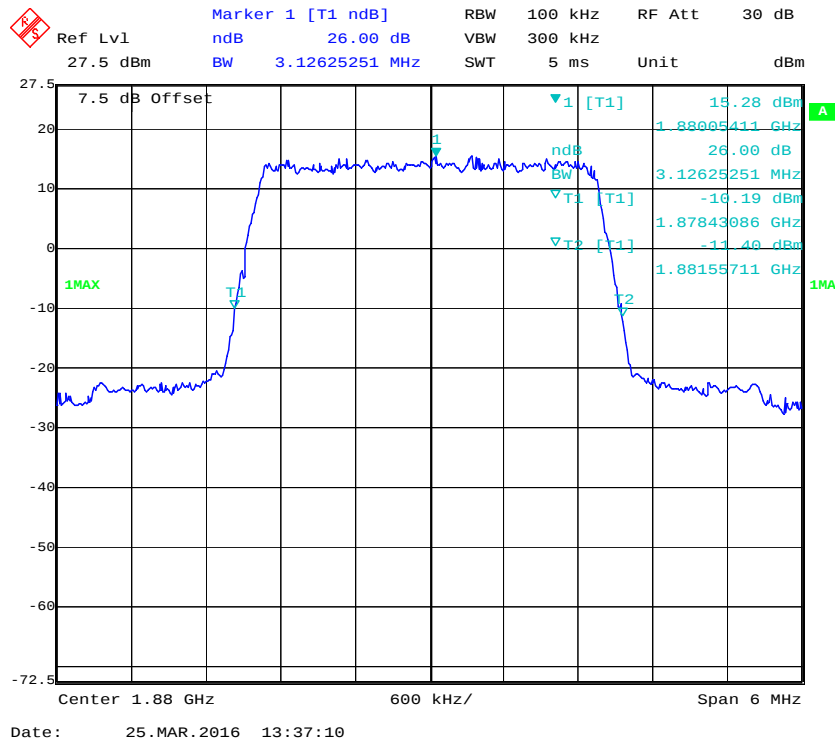
## QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



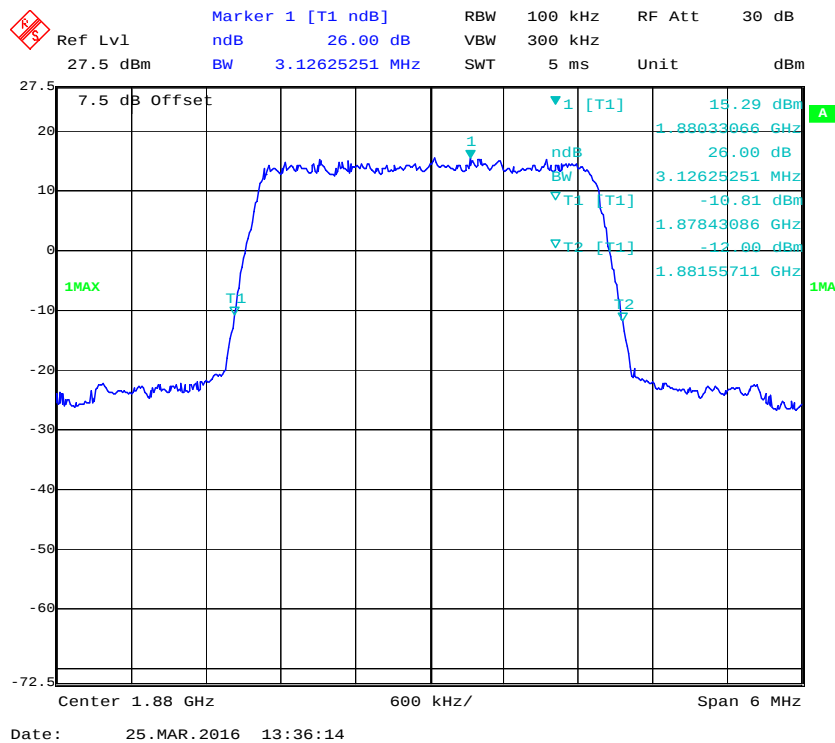
## 16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



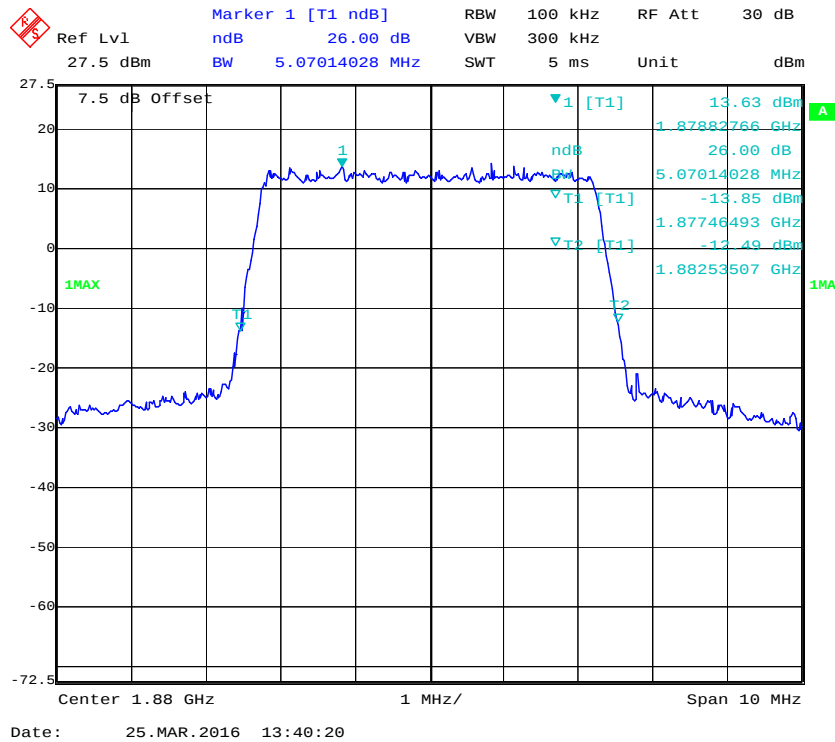
## QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



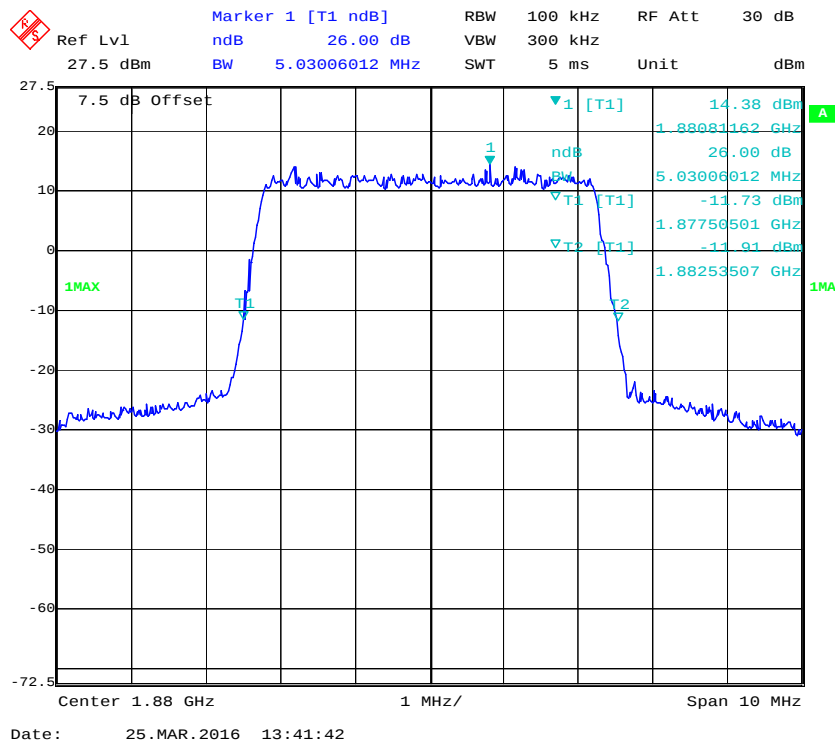
## 16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



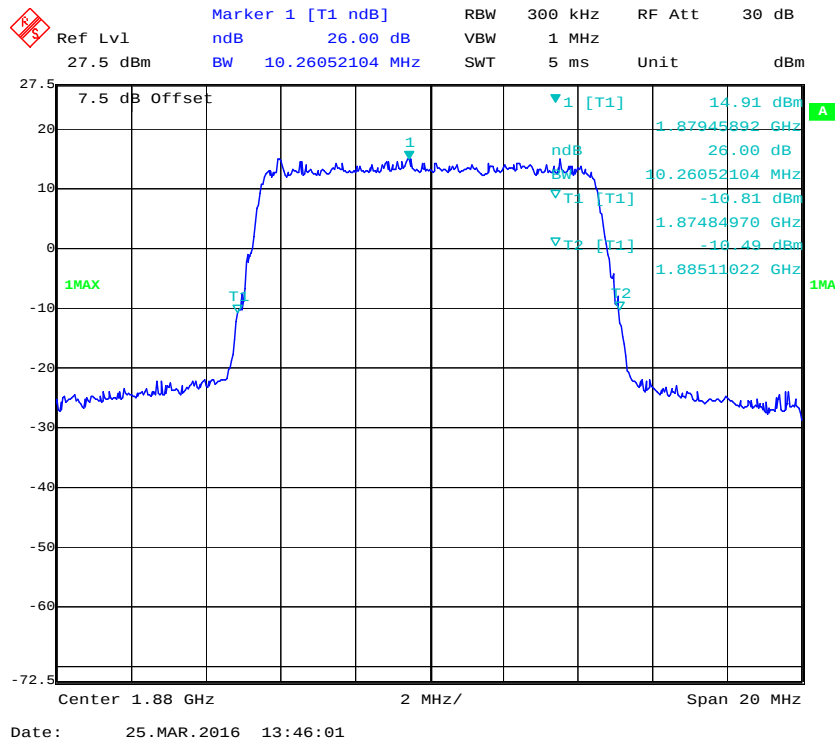
## QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



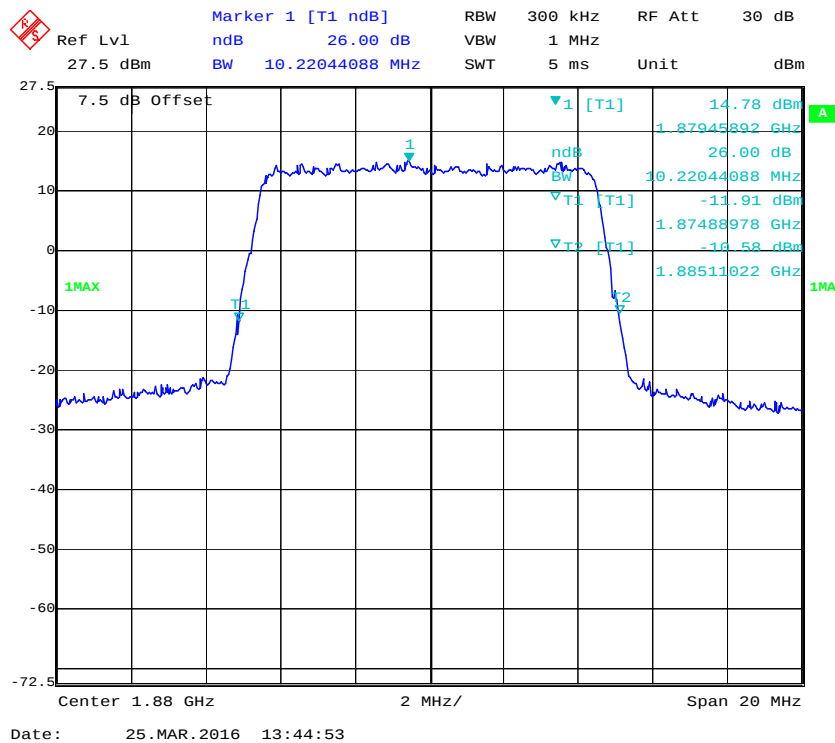
## 16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



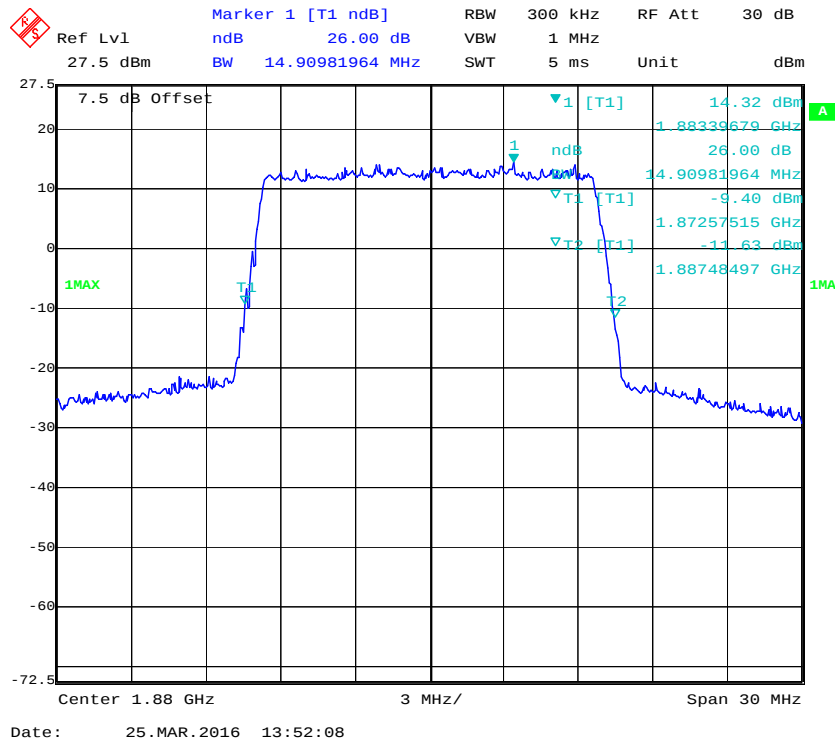
## QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



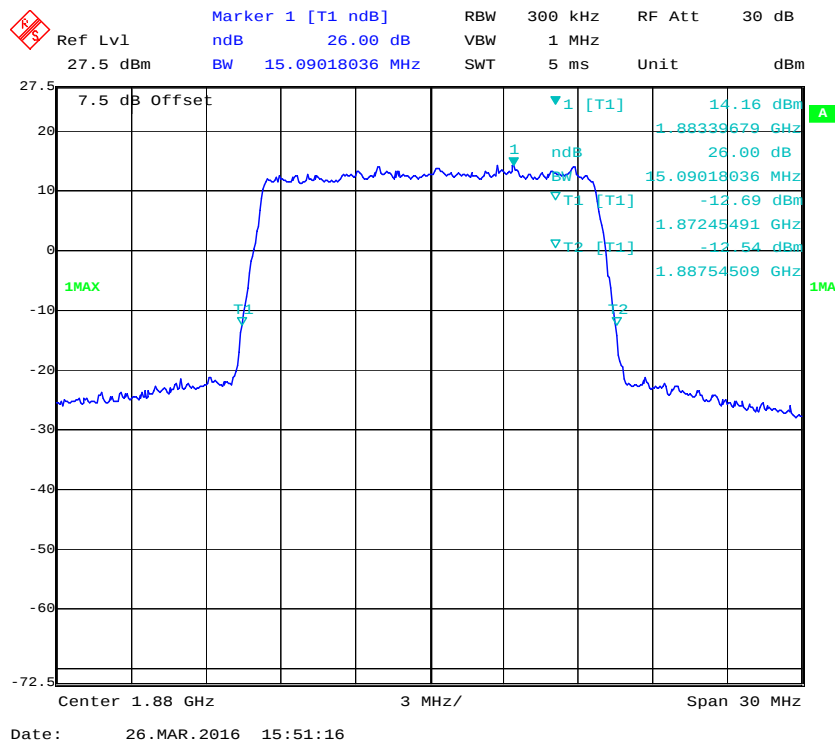
## 16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



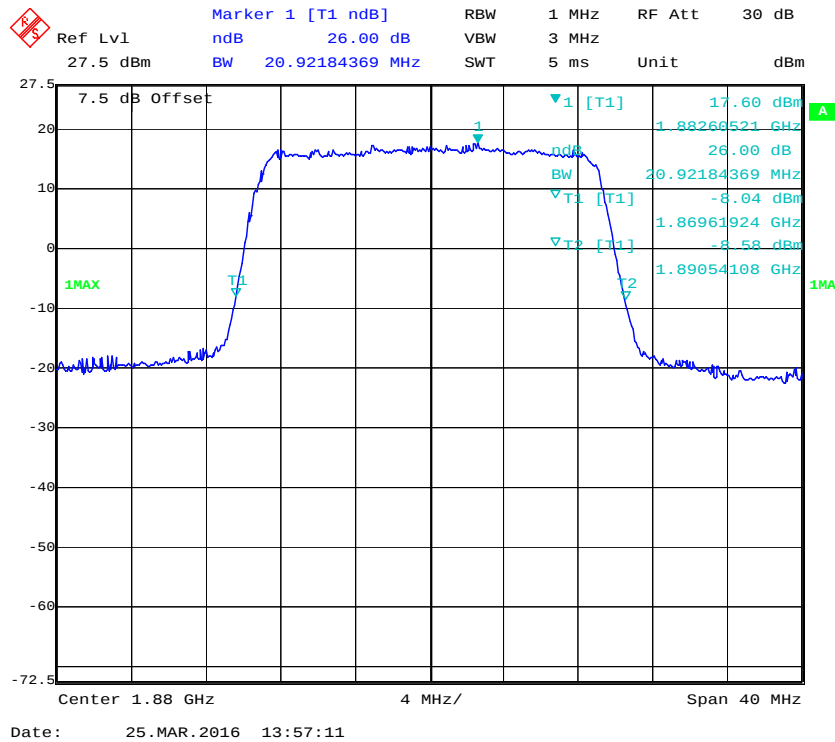
## QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



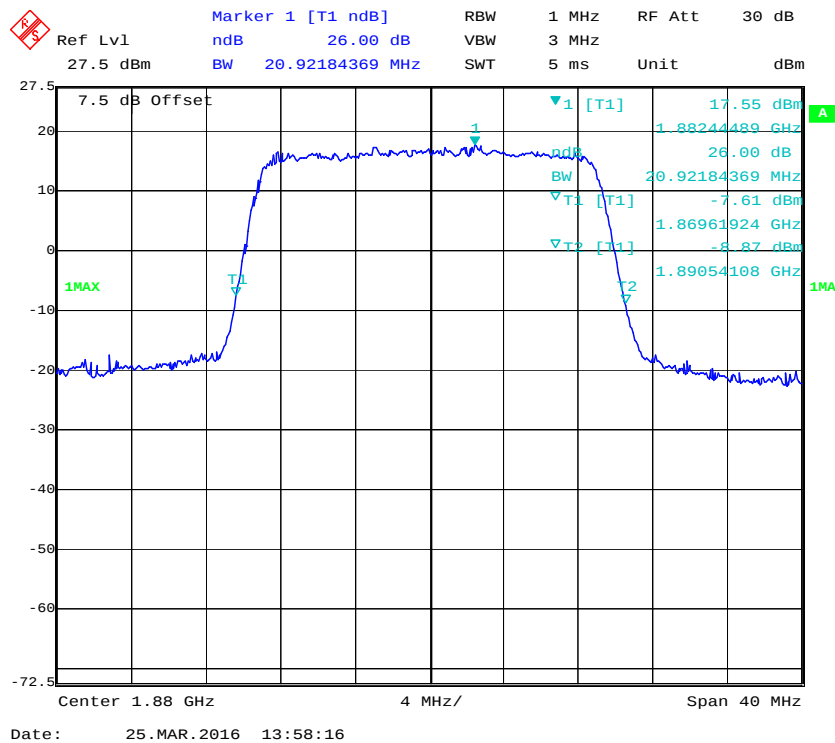
## 16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



## QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel

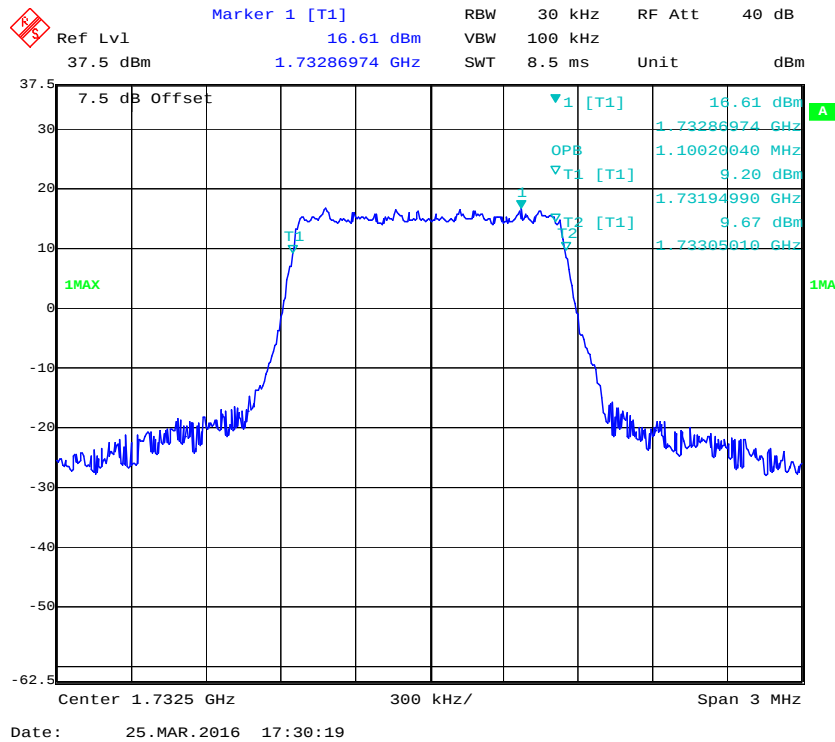
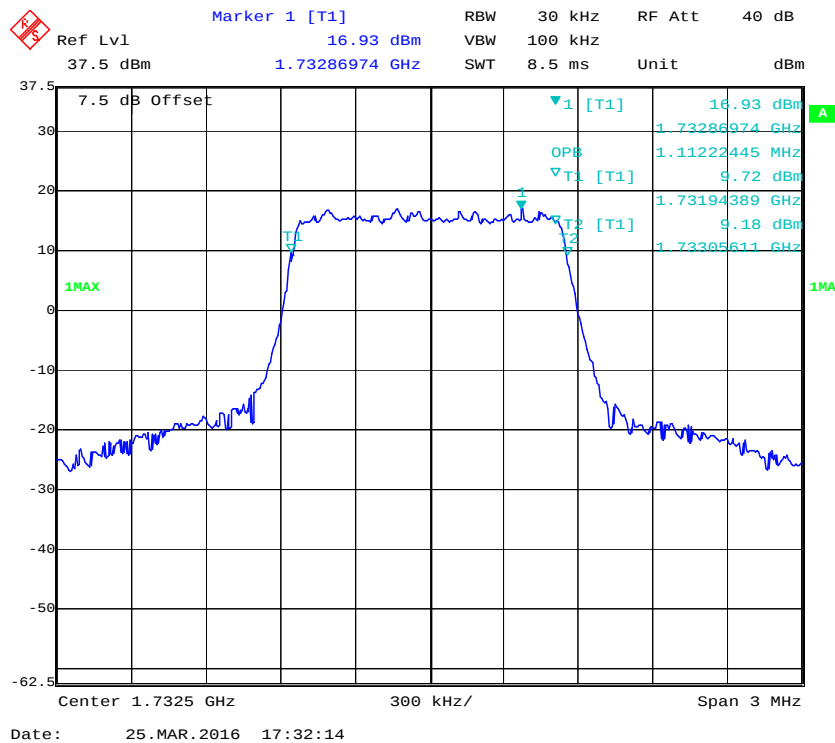


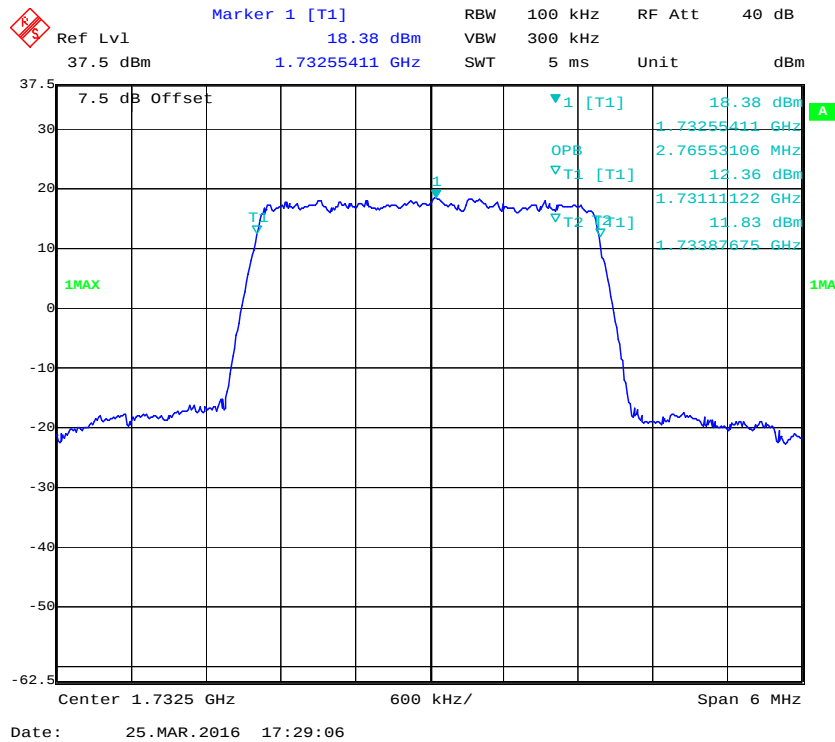
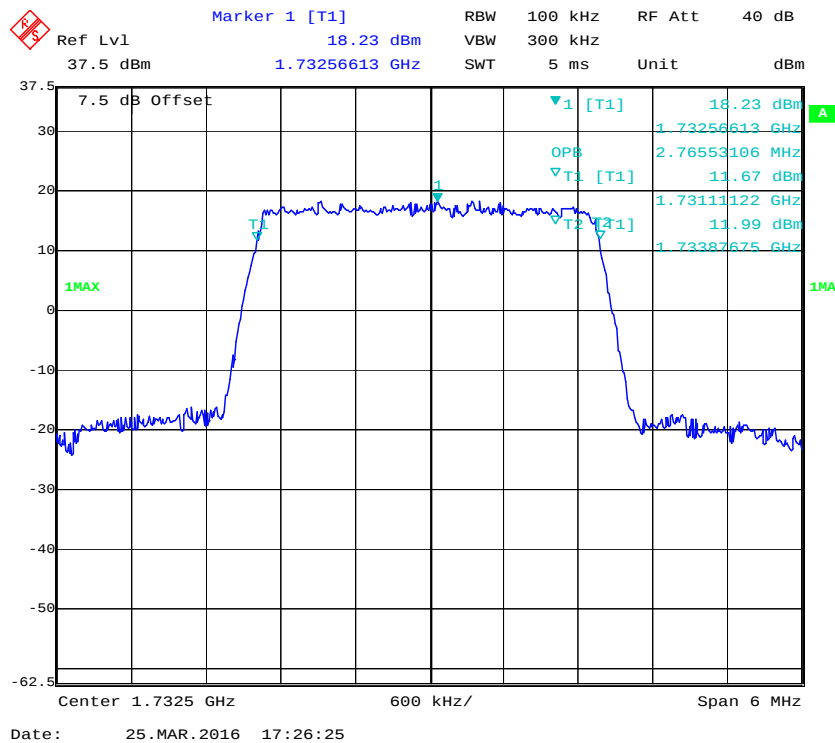
## 16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel

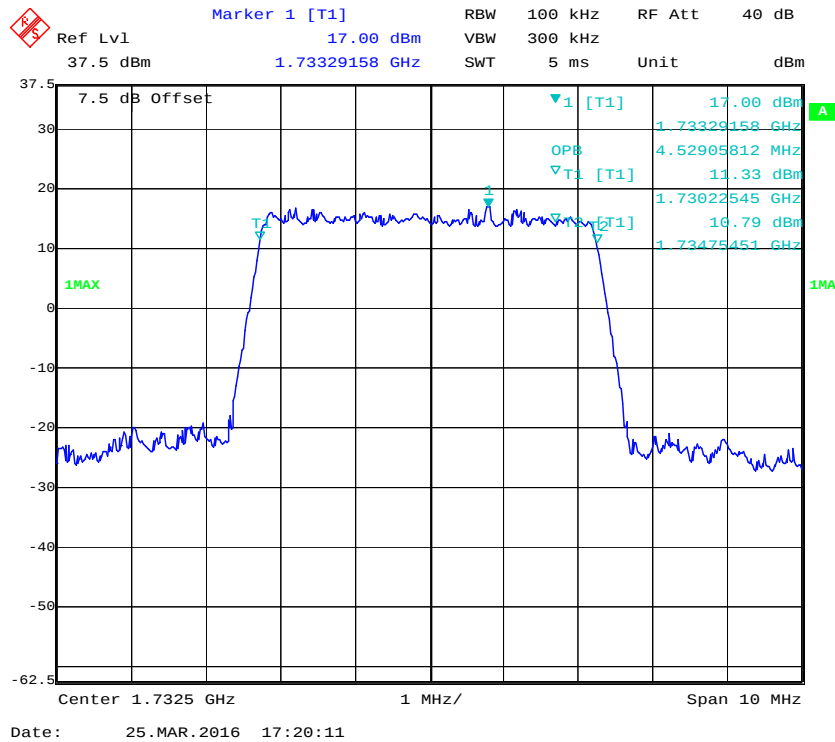
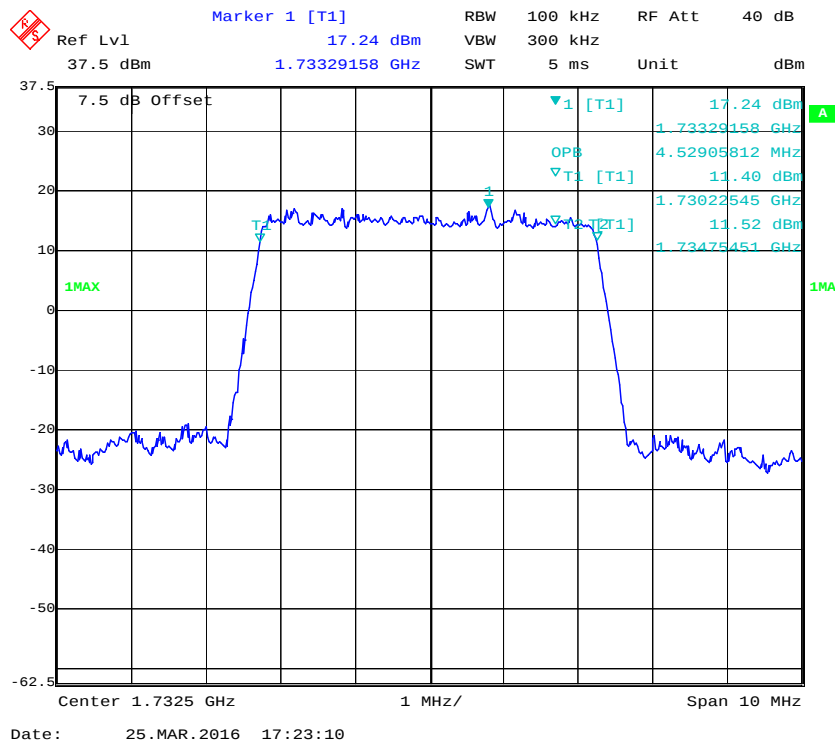


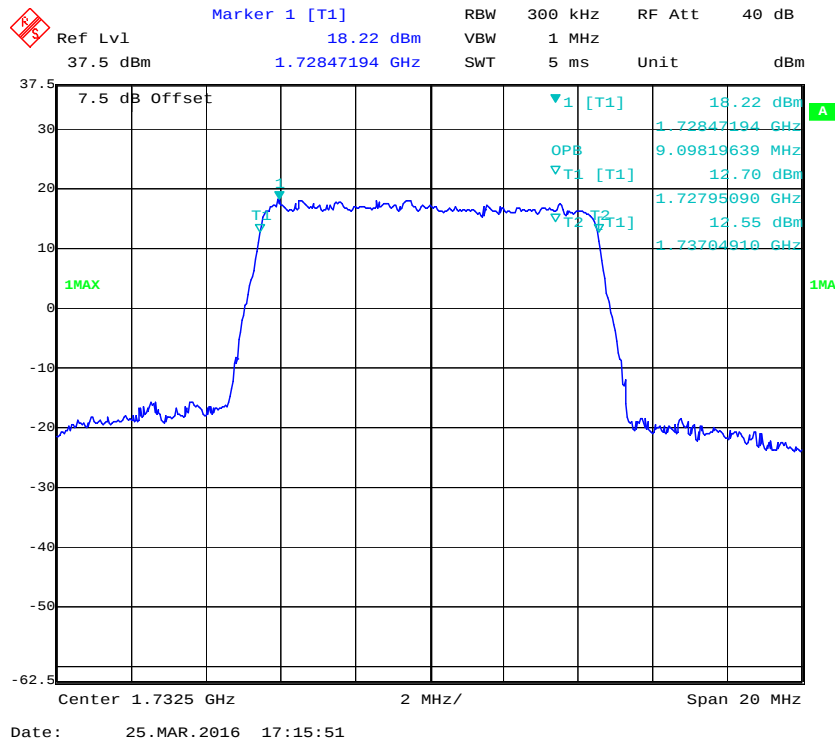
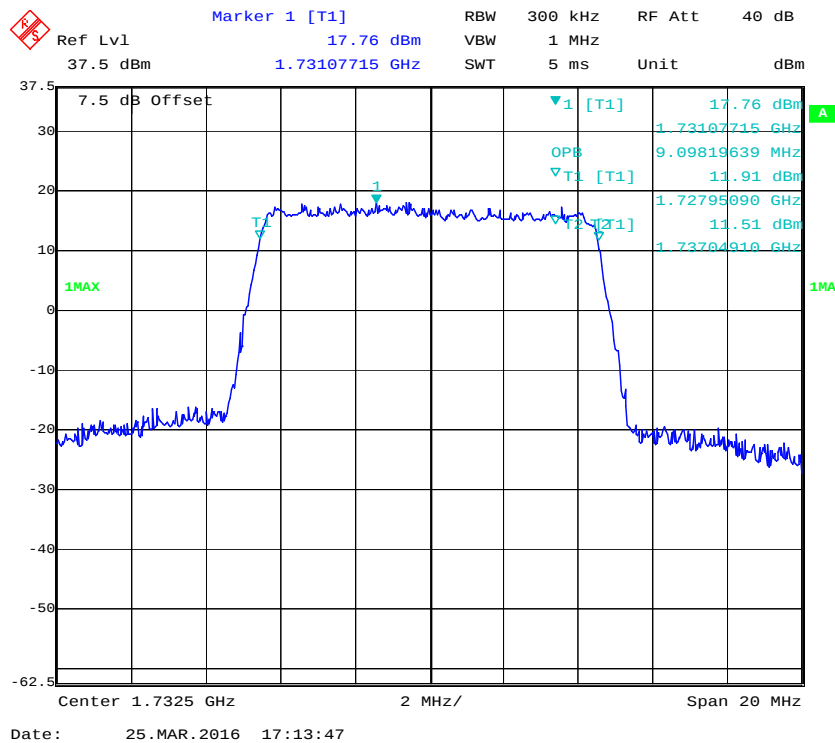
**LTE Band 4: (Middle Channel)**

| <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              | 1.10                                        | 1.31                                          |
|                            | 16QAM             | 1.11                                        | 1.30                                          |
| 3.0                        | QPSK              | 2.77                                        | 3.13                                          |
|                            | 16QAM             | 2.77                                        | 3.14                                          |
| 5.0                        | QPSK              | 4.53                                        | 5.05                                          |
|                            | 16QAM             | 4.53                                        | 5.05                                          |
| 10.0                       | QPSK              | 9.10                                        | 10.30                                         |
|                            | 16QAM             | 9.10                                        | 10.26                                         |
| 15.0                       | QPSK              | 13.53                                       | 14.97                                         |
|                            | 16QAM             | 13.53                                       | 14.97                                         |
| 20.0                       | QPSK              | 18.52                                       | 21.08                                         |
|                            | 16QAM             | 18.60                                       | 21.16                                         |

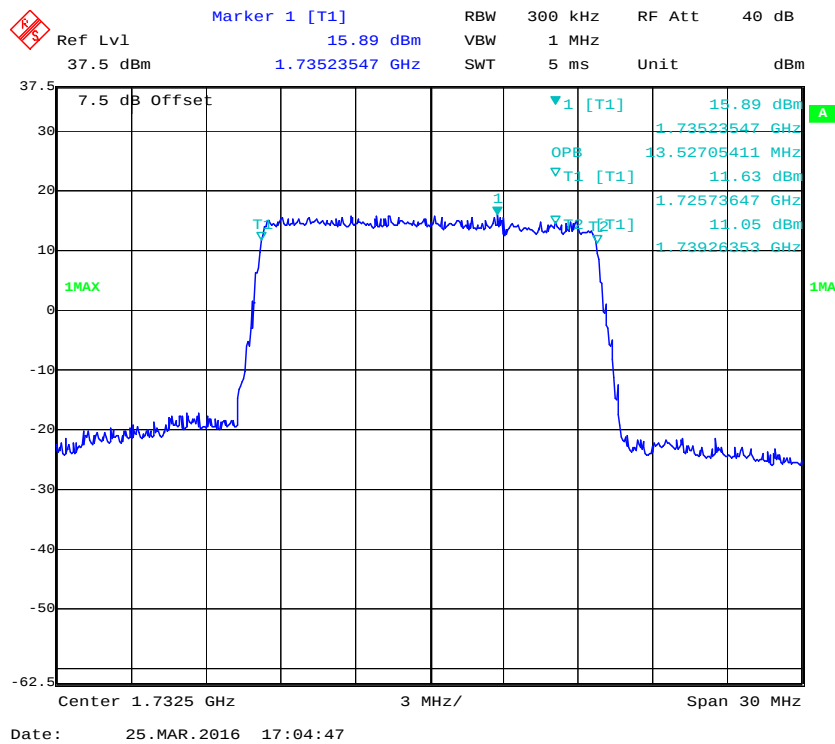
**QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**

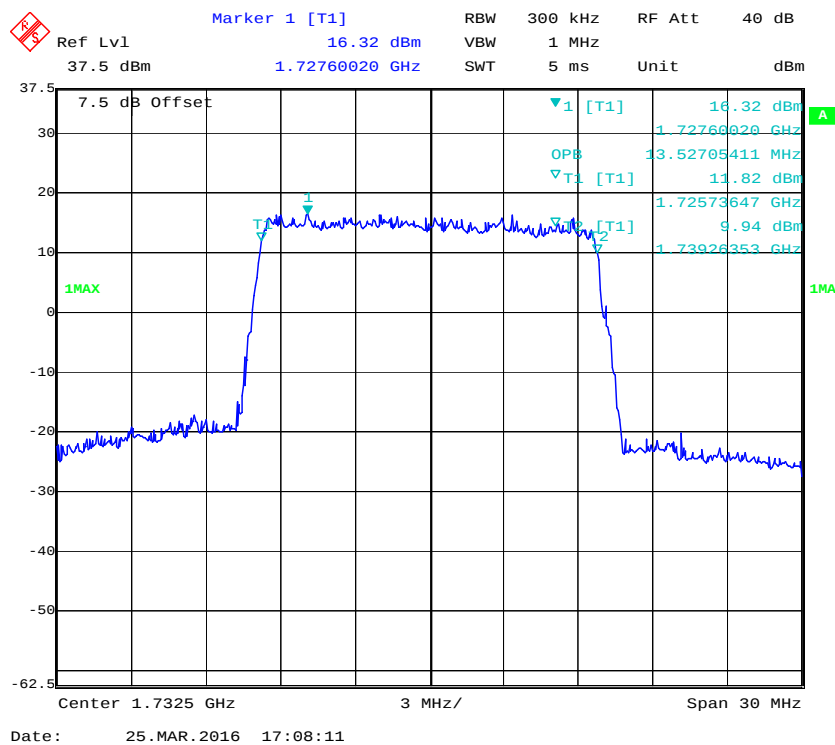
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel**

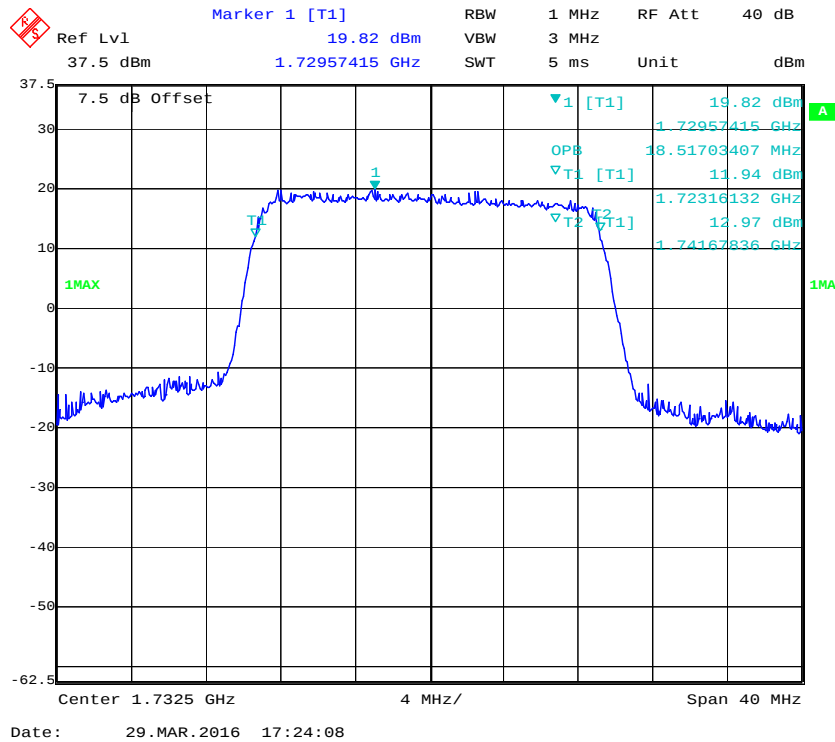
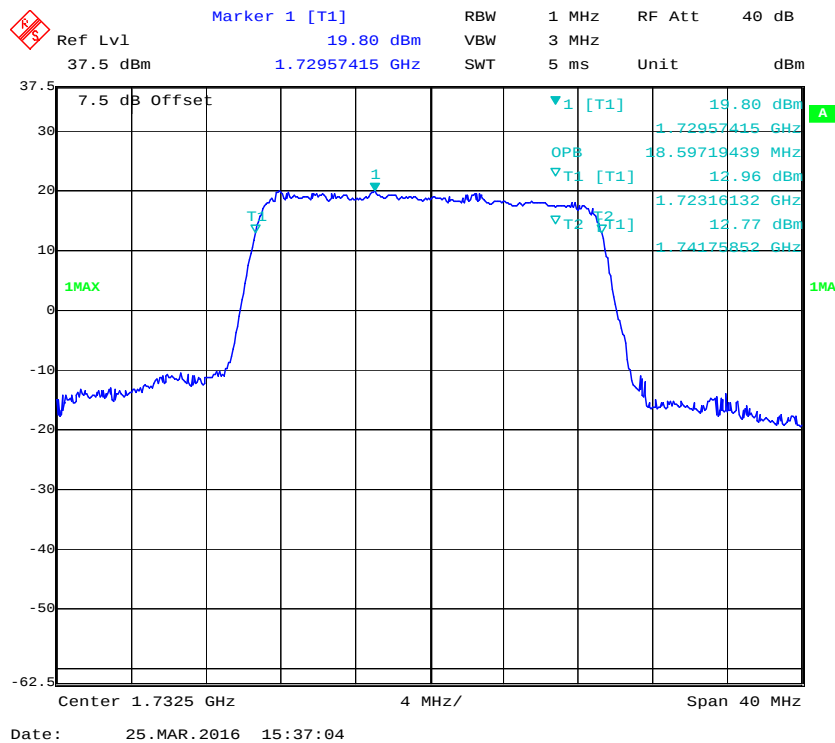
**QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**

### QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel

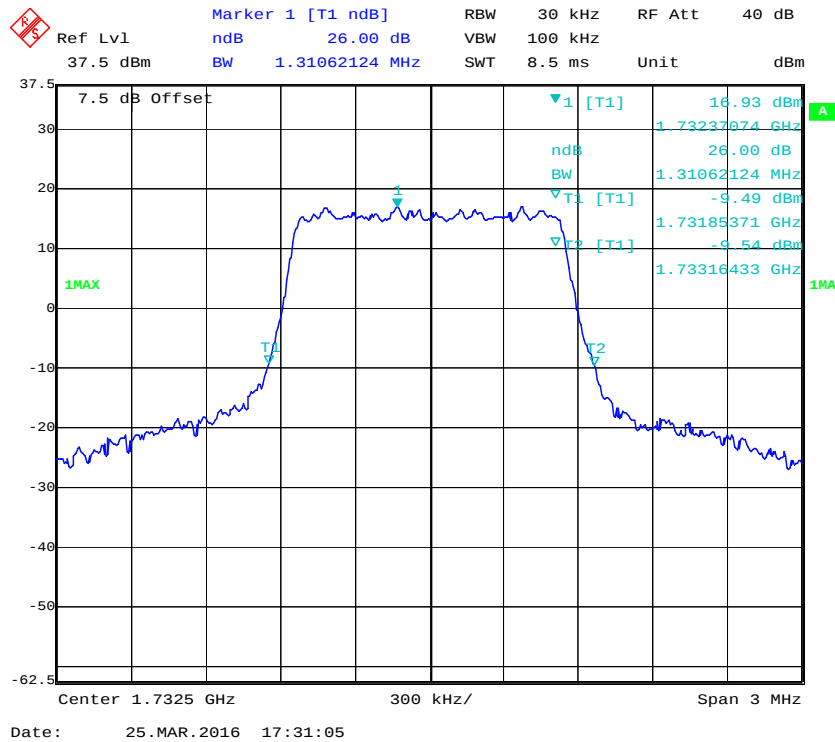


### 16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel

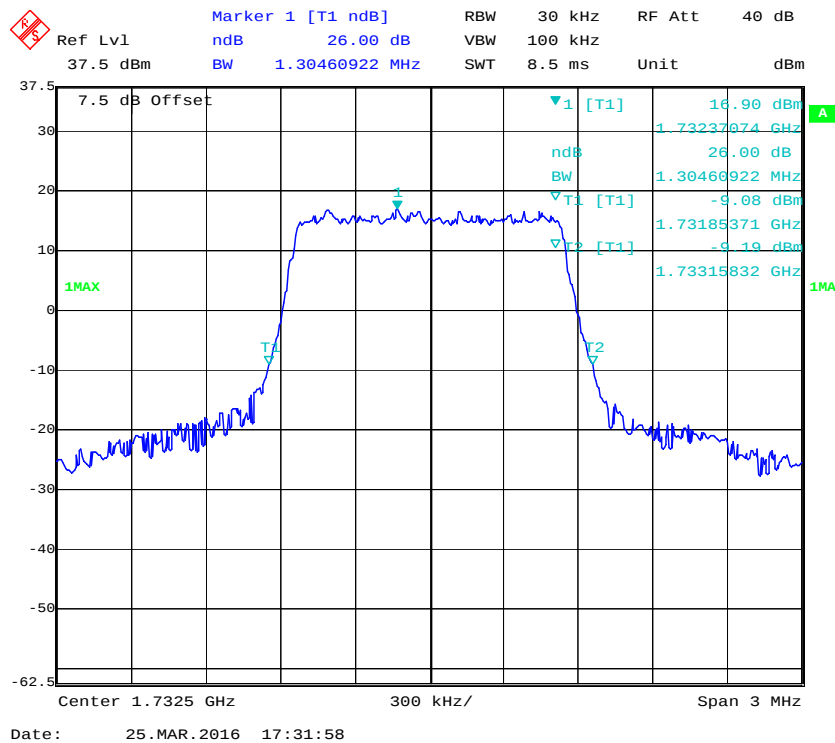


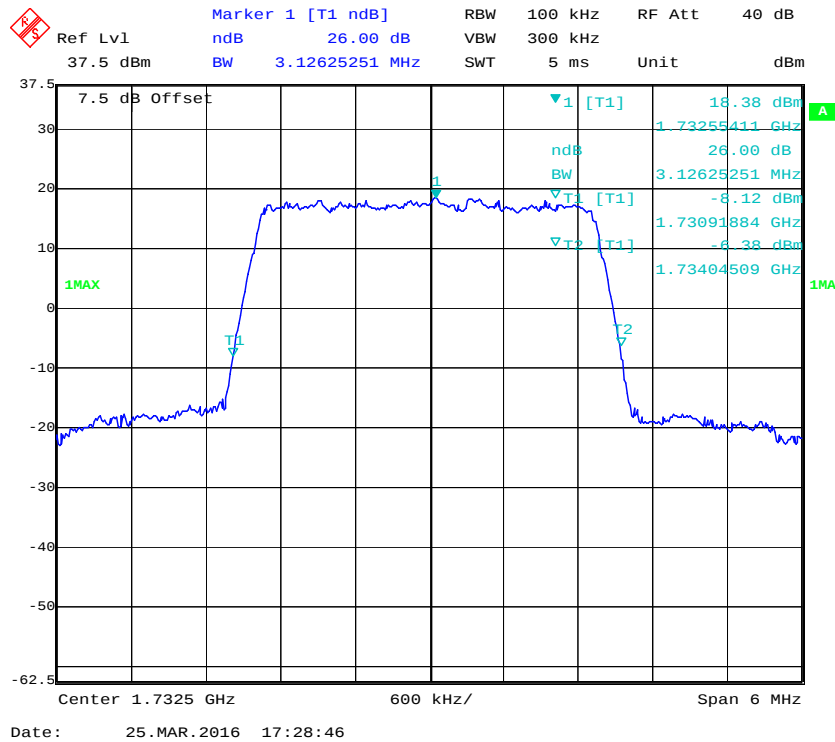
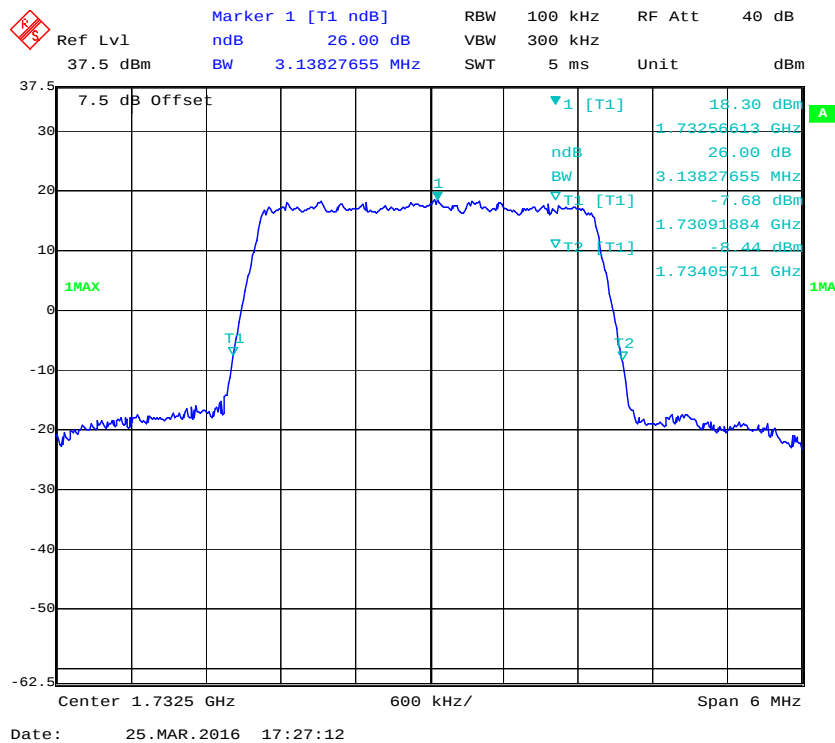
**QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

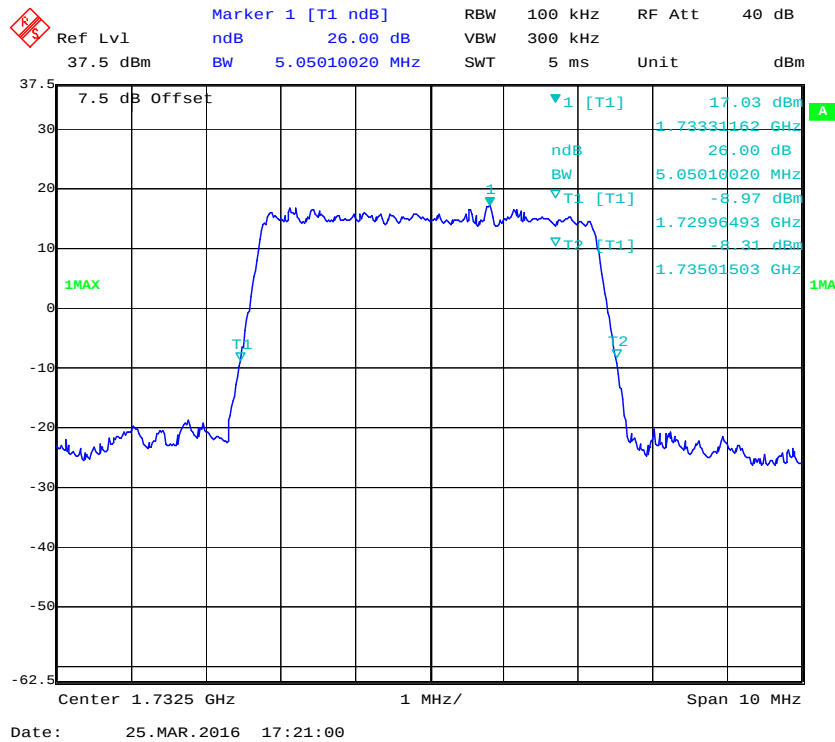
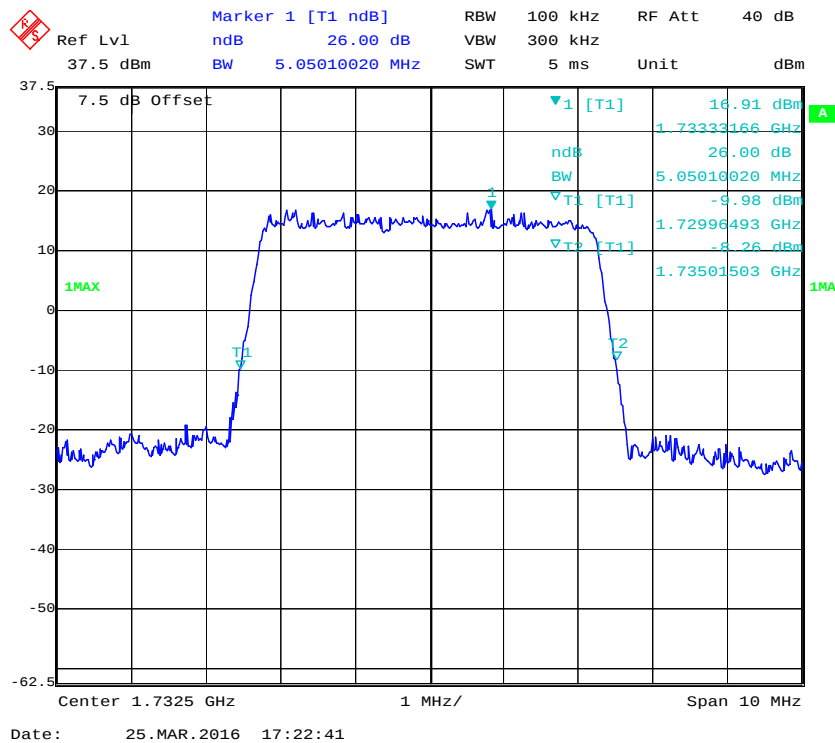
## QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



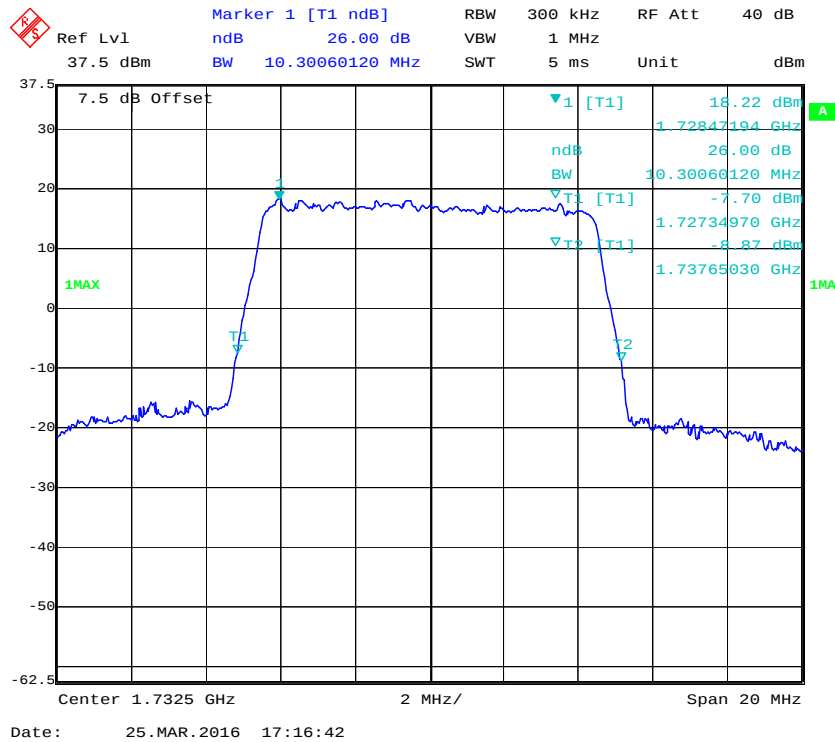
## 16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



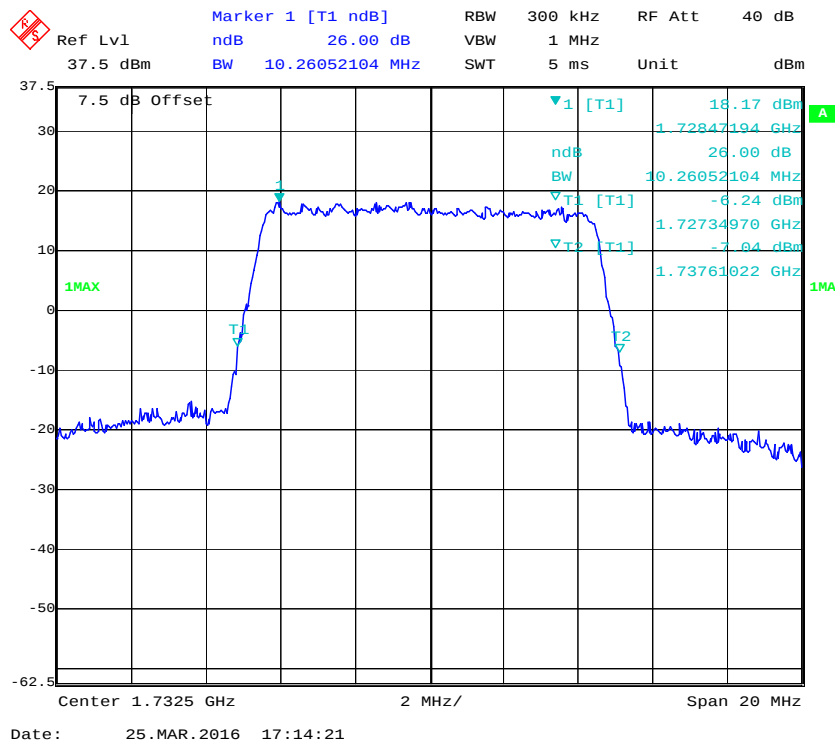
**QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel**

**QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel**

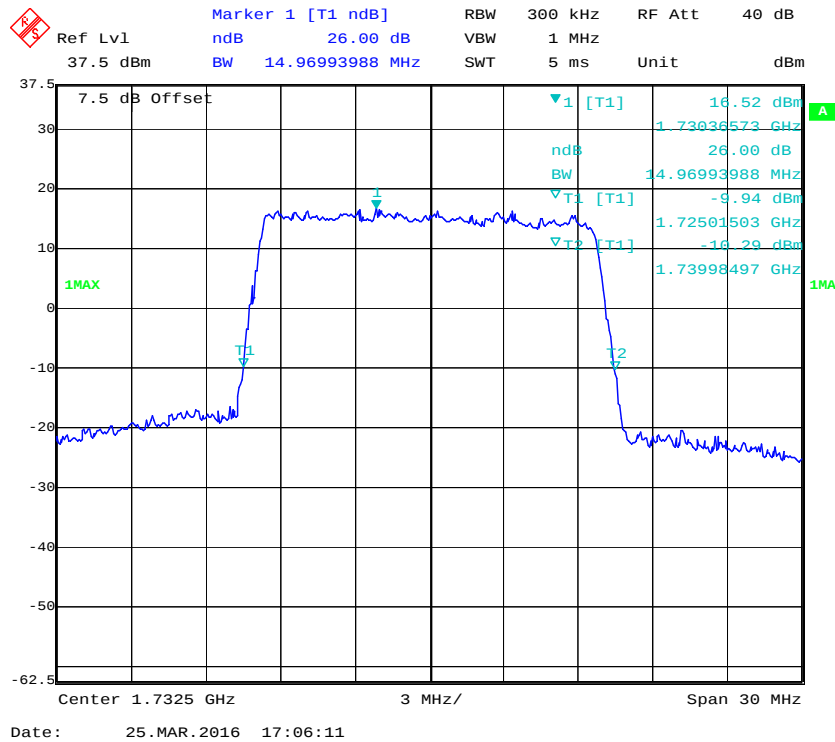
## QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



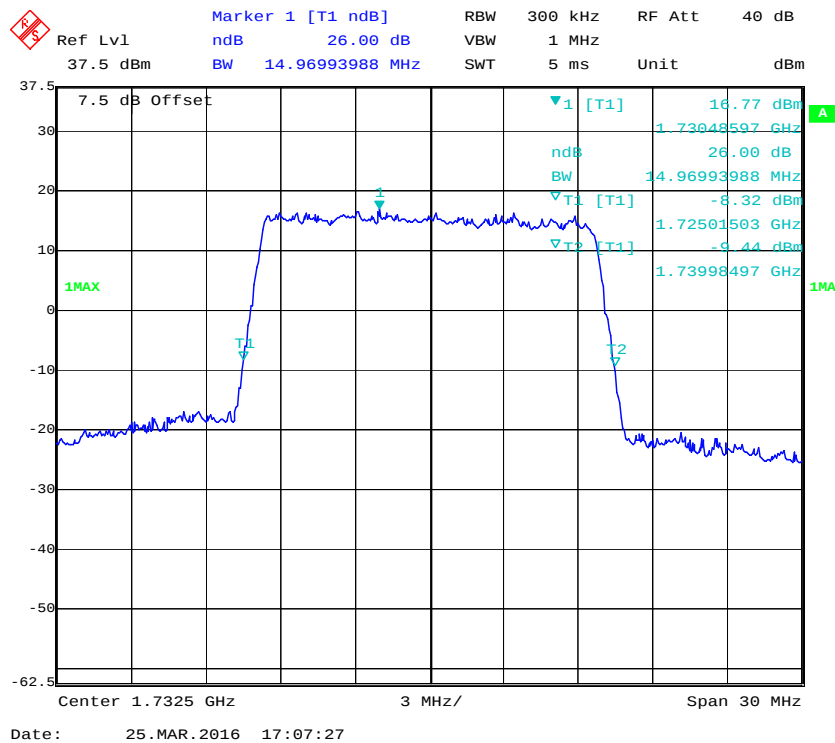
## 16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



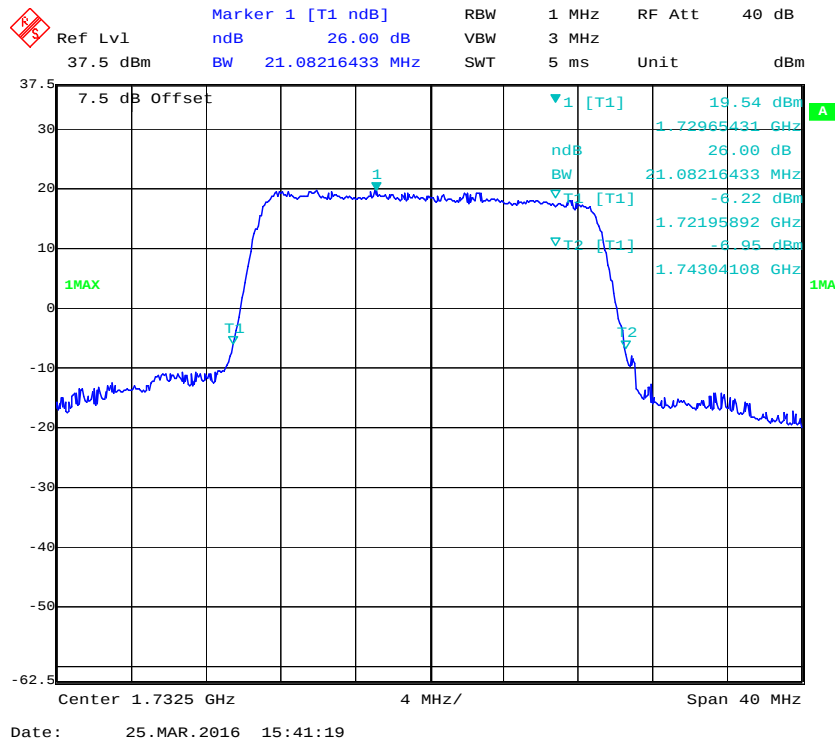
## QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



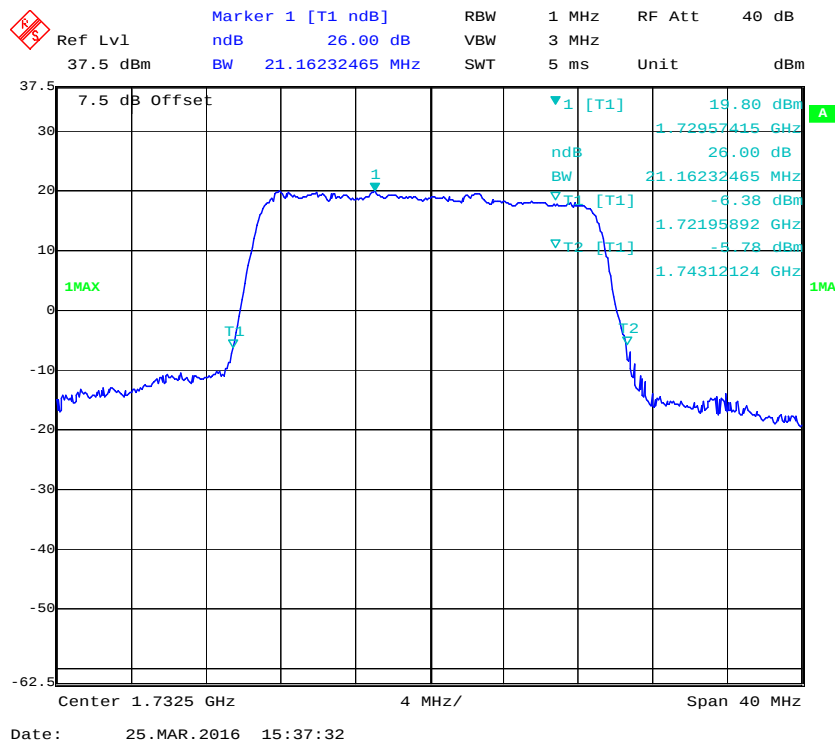
## 16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



### QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel

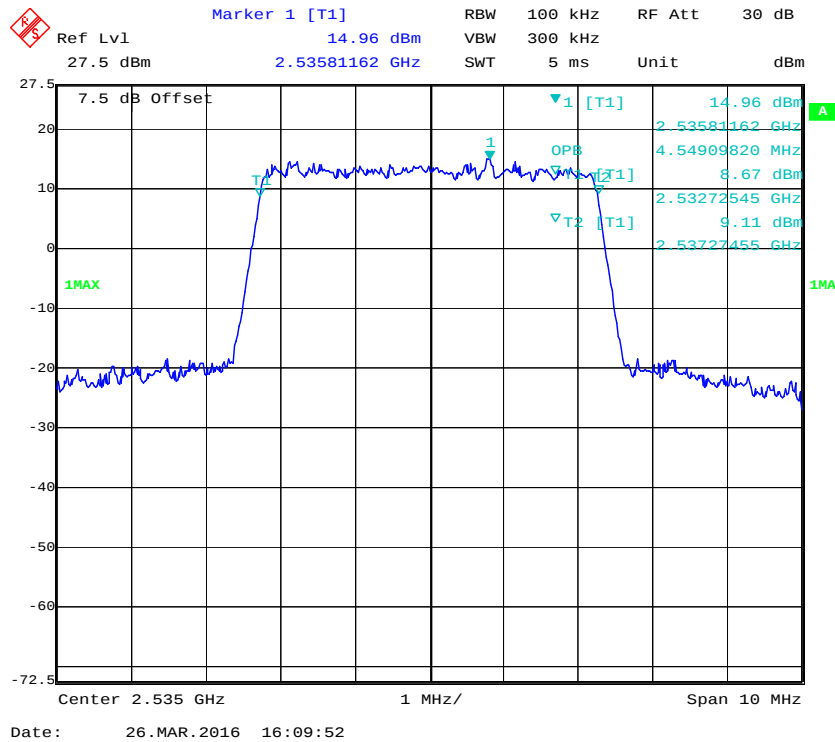
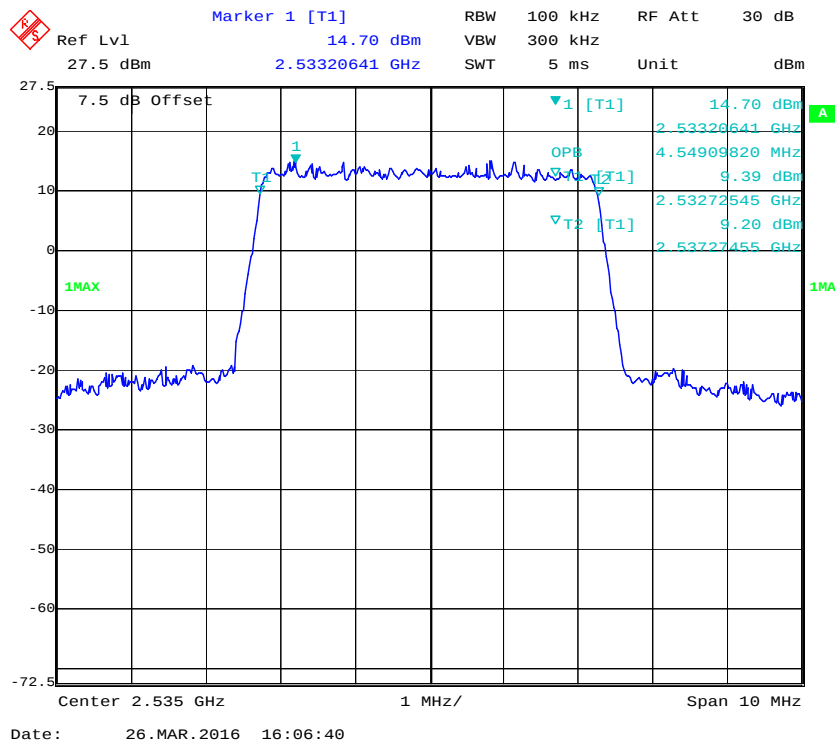


### 16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel

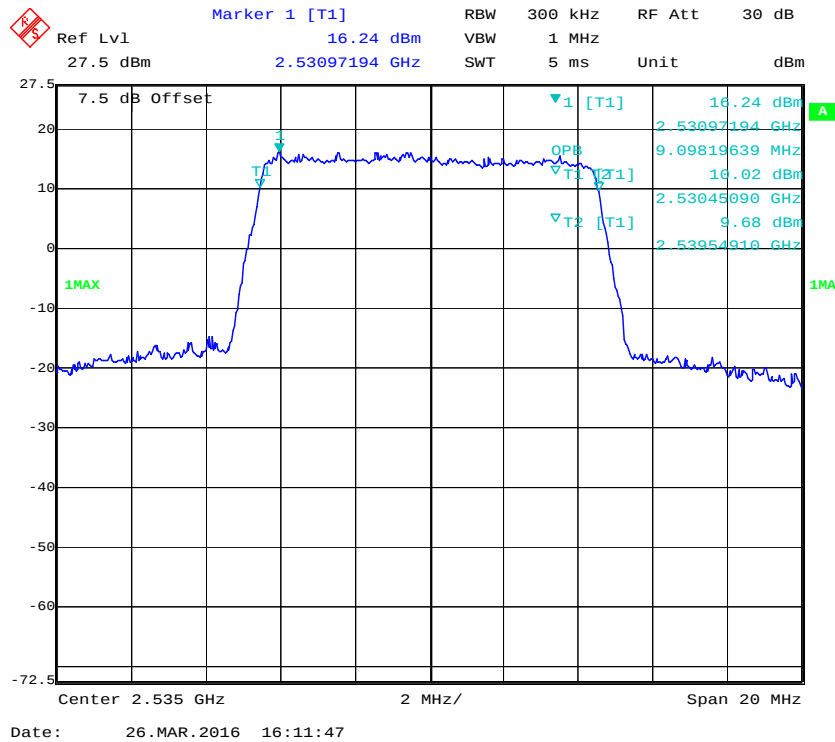


**LTE Band 7: (Middle Channel)**

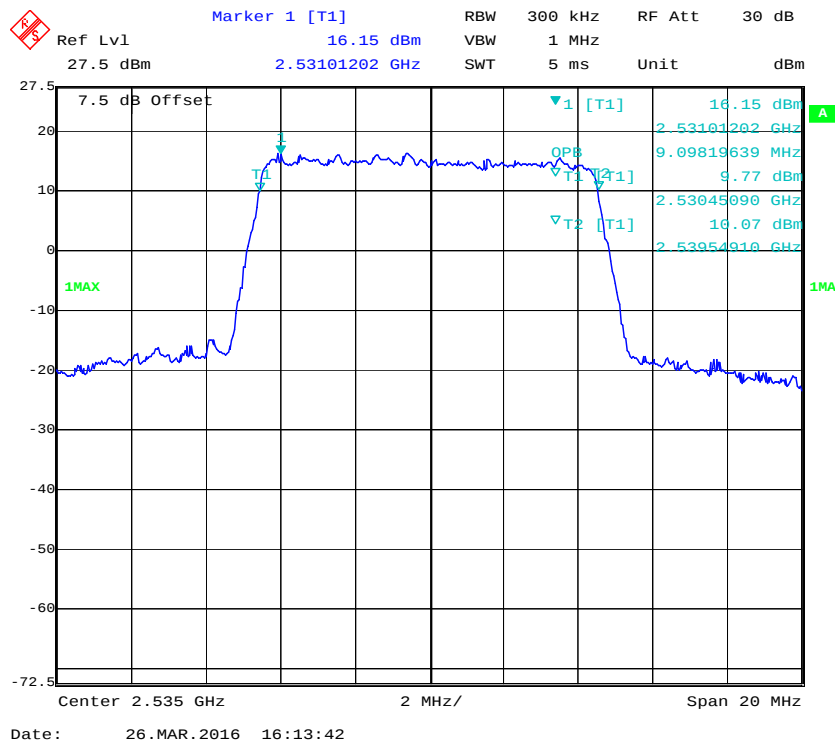
| Bandwidth<br>(MHz) | Modulation | 99% Occupied<br>Bandwidth<br>(MHz) | 26 dB Emission<br>Bandwidth<br>(MHz) |
|--------------------|------------|------------------------------------|--------------------------------------|
| 5.0                | QPSK       | 4.55                               | 5.03                                 |
|                    | 16QAM      | 4.55                               | 5.03                                 |
| 10.0               | QPSK       | 9.10                               | 10.34                                |
|                    | 16QAM      | 9.10                               | 10.34                                |
| 15.0               | QPSK       | 13.53                              | 14.91                                |
|                    | 16QAM      | 13.53                              | 14.97                                |
| 20.0               | QPSK       | 18.52                              | 21.08                                |
|                    | 16QAM      | 18.52                              | 21.00                                |

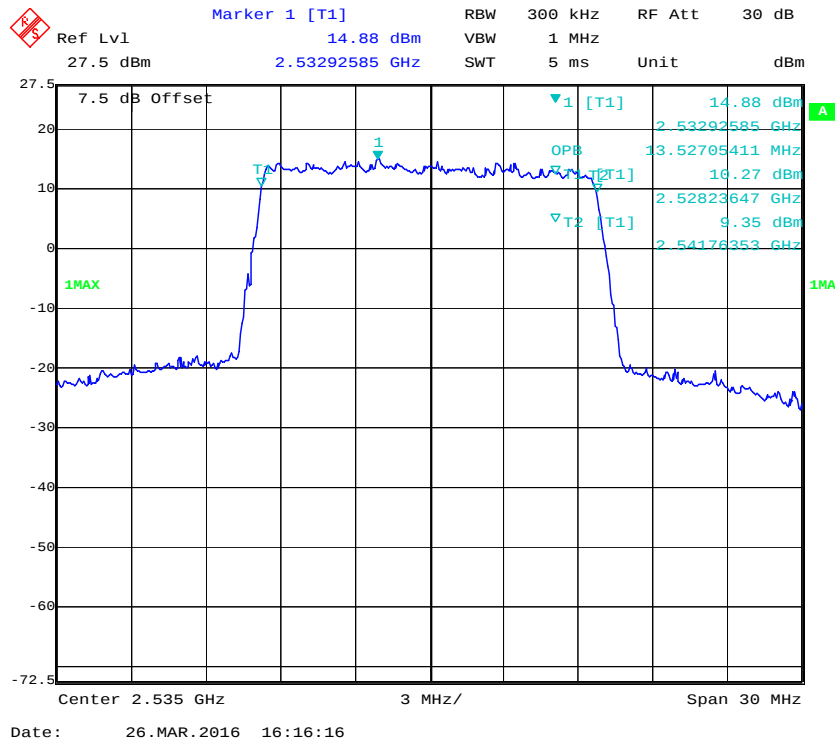
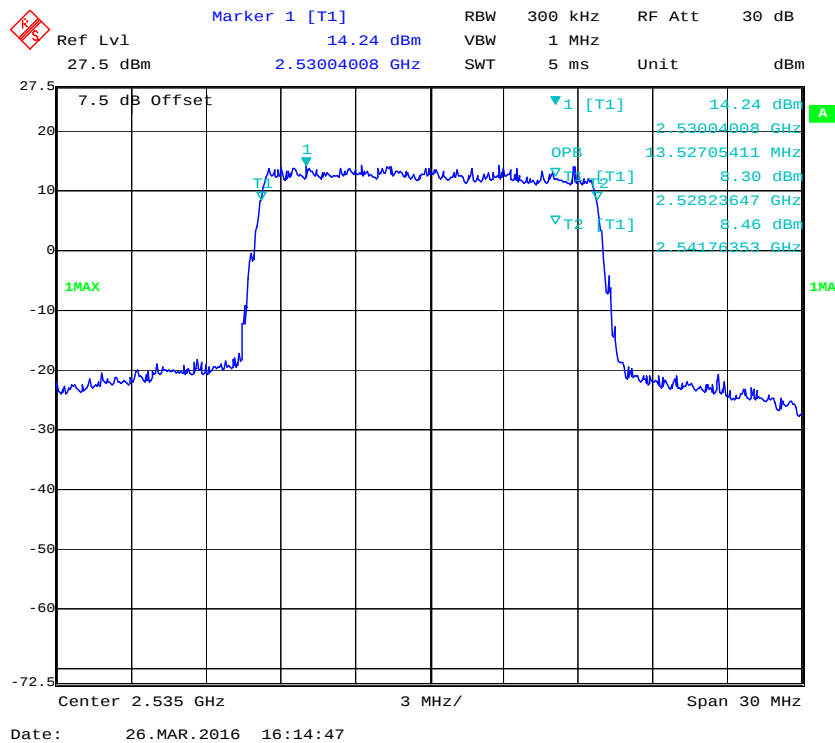
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel**

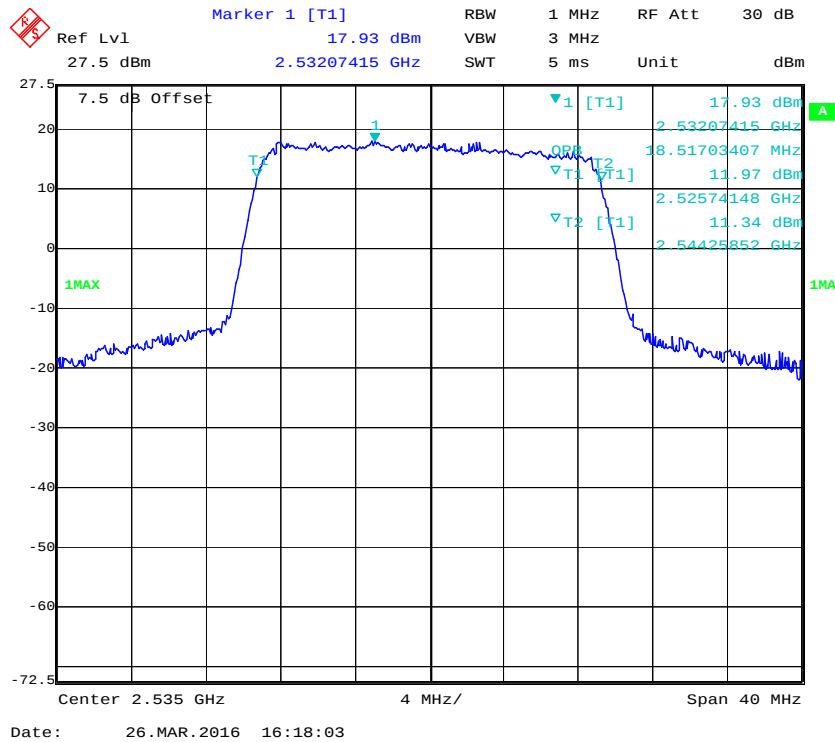
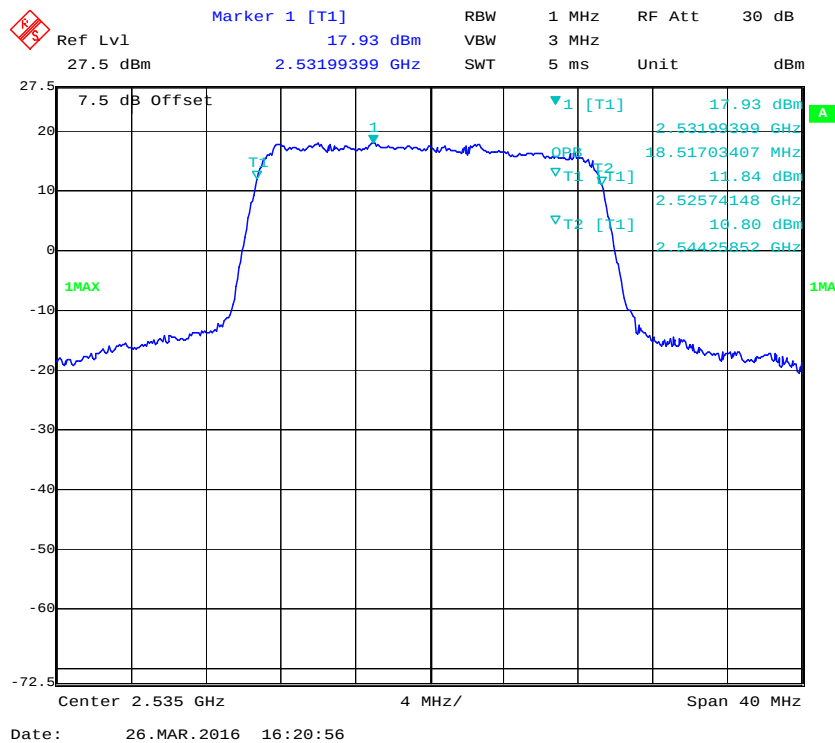
### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



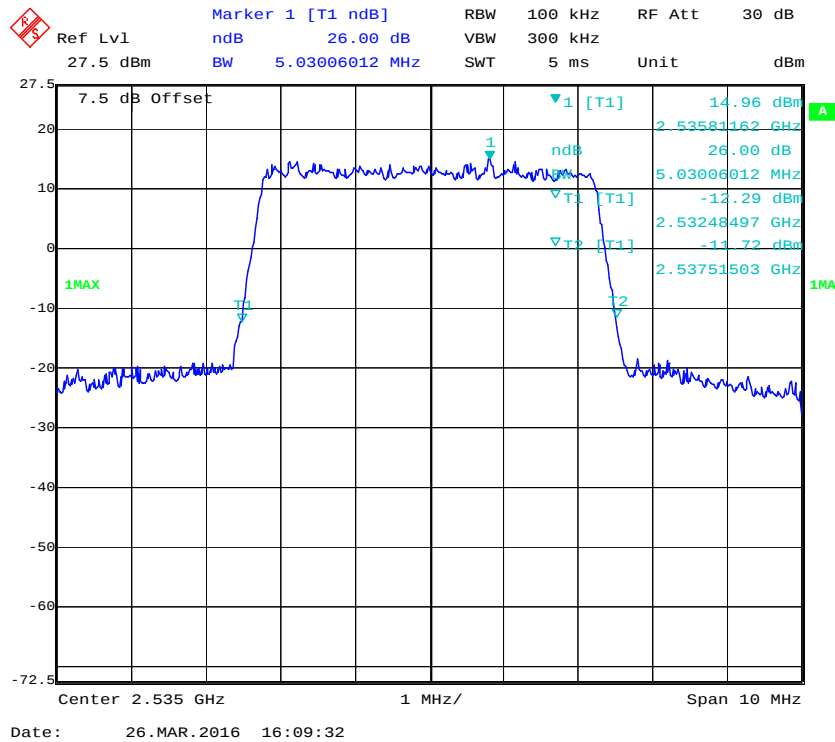
### 16-QAM (10.0MHz) - 99% Occupied Bandwidth, Middle channel



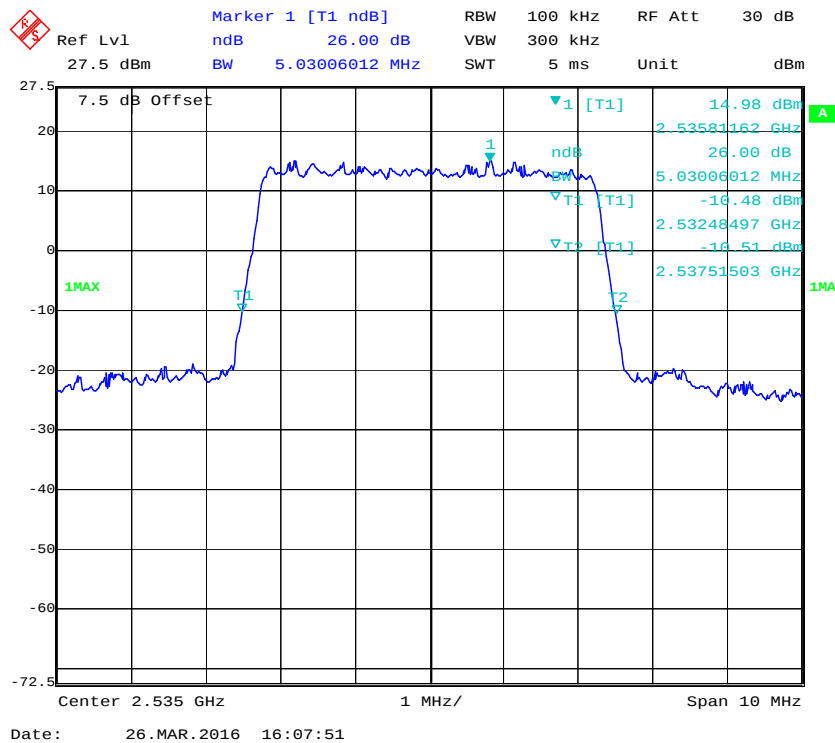
**QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**

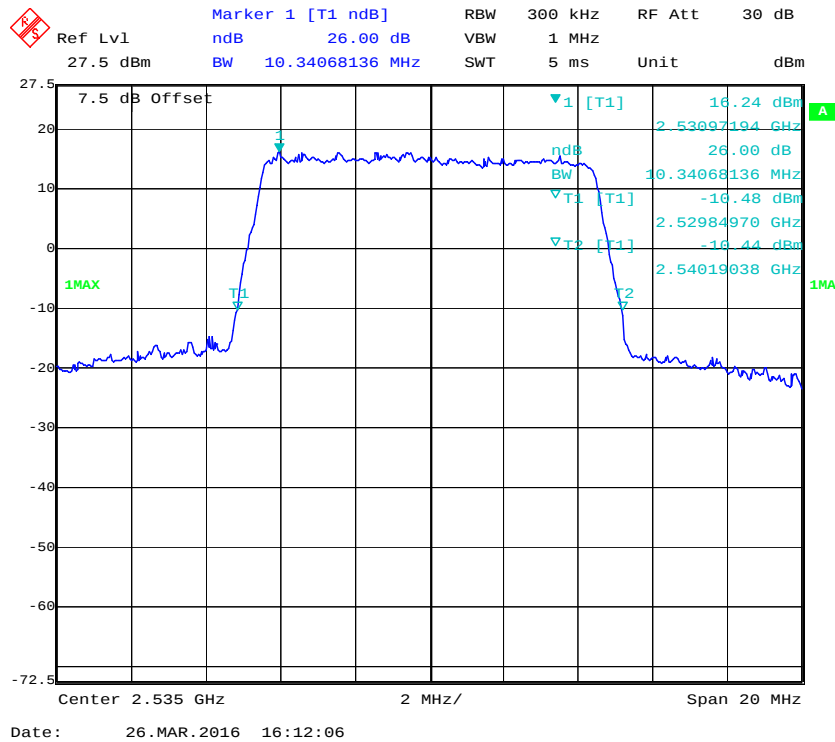
## QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



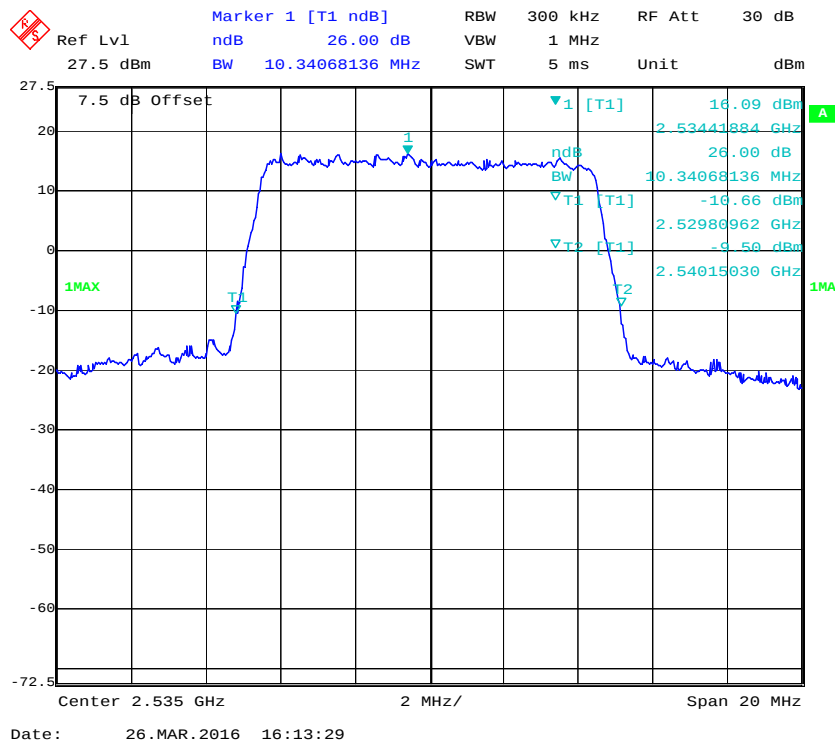
## 16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



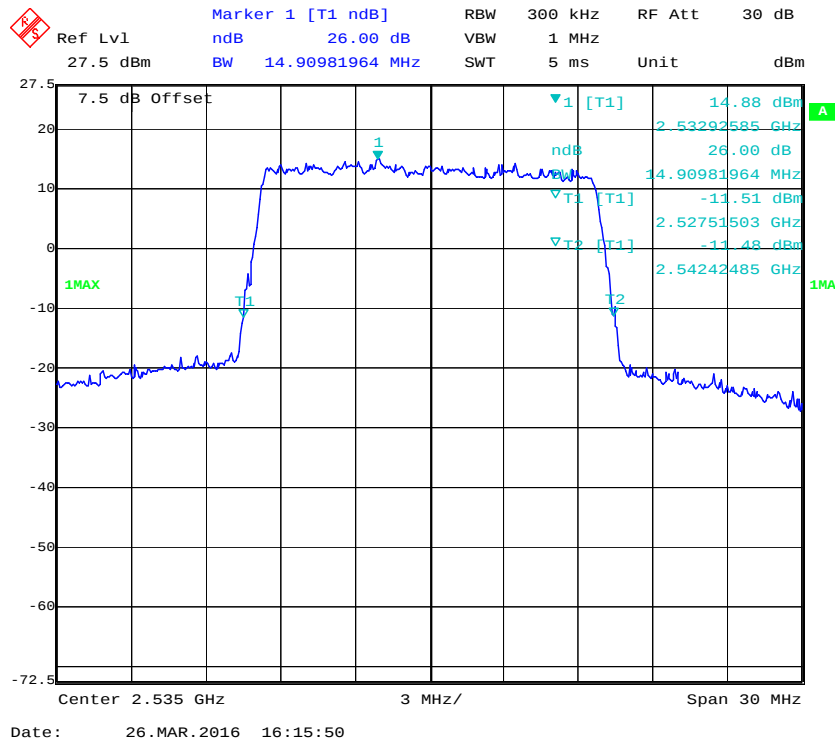
## QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



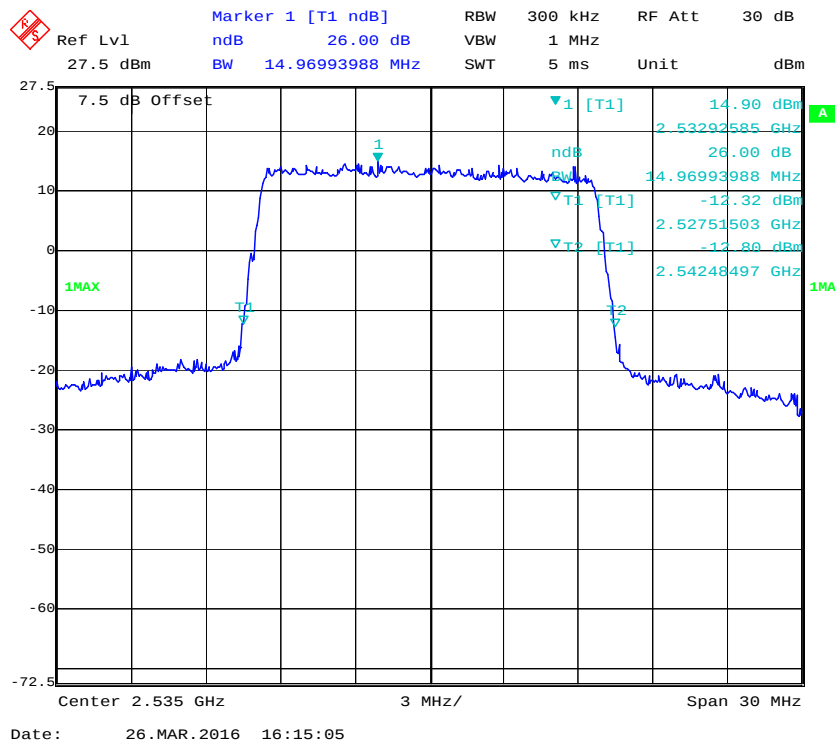
## 16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



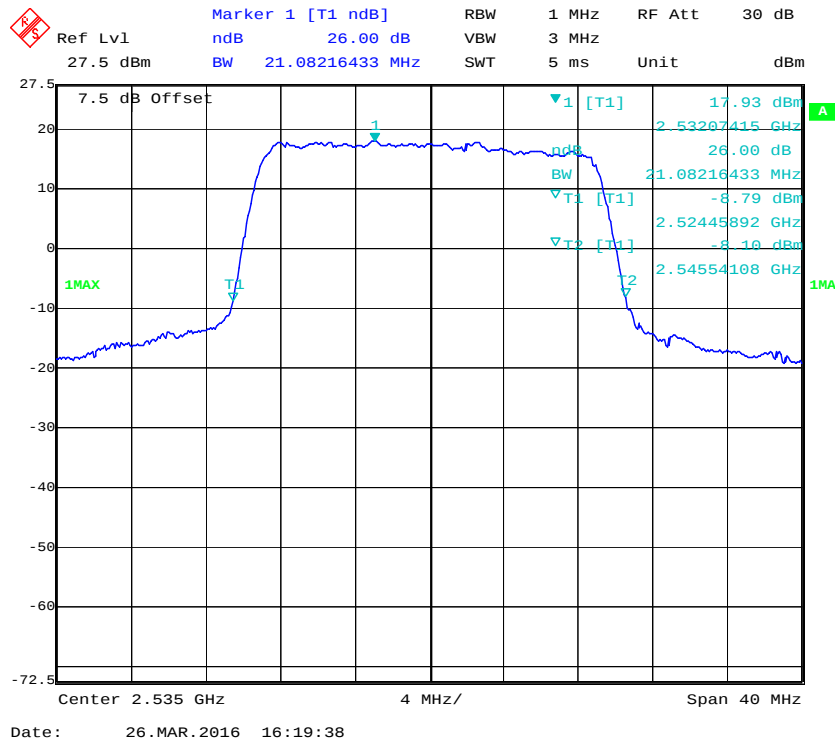
### QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



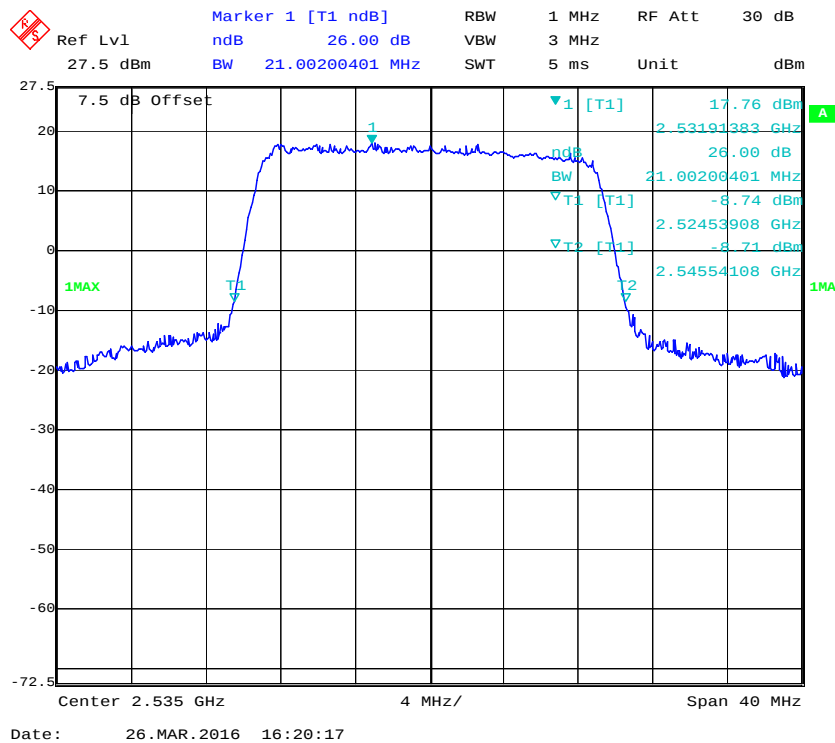
### 16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



## QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



## 16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



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

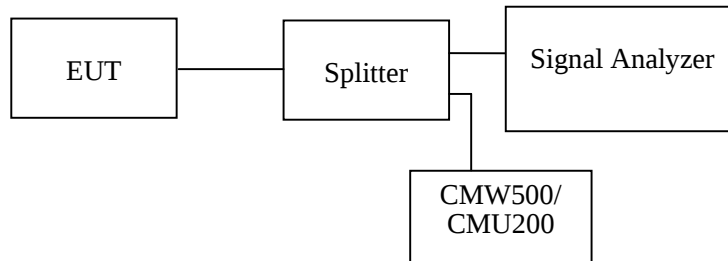
### Applicable Standards

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 Equipment List and Details

| Manufacturer          | Description                          | Model  | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|--------|-----------------------|------------------|----------------------|
| Rohde & Schwarz       | Signal Analyzer                      | FSIQ26 | 8386001028            | 2015-12-11       | 2016-12-11           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200 | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500 | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | RG-214 | 4                     | 2015-06-15       | 2016-06-15           |
| WEINSCHL              | 6dB Attenuator                       | 1012   | 30187                 | 2015-06-18       | 2016-06-18           |
| WEINSCHL              | 3dB Attenuator                       | 5321   | AU0709                | 2015-06-18       | 2016-06-18           |

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

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

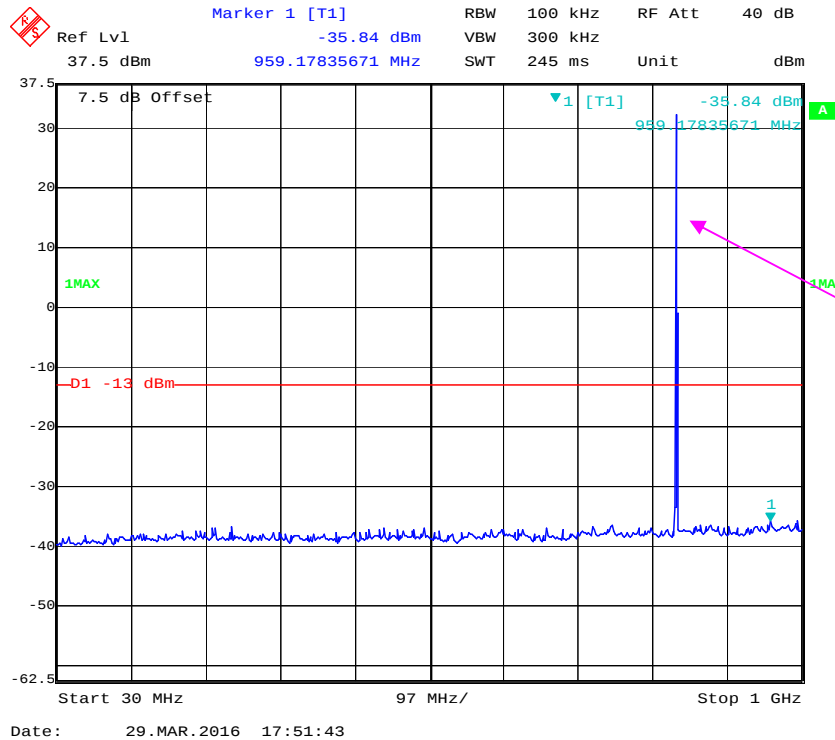
|                           |                |
|---------------------------|----------------|
| <b>Temperature:</b>       | 20~23 °C       |
| <b>Relative Humidity:</b> | 50~55 %        |
| <b>ATM Pressure:</b>      | 100.0~101.0kPa |

*The testing was performed by Simon Wang from 2016-03-18 to 2016-03-29.*

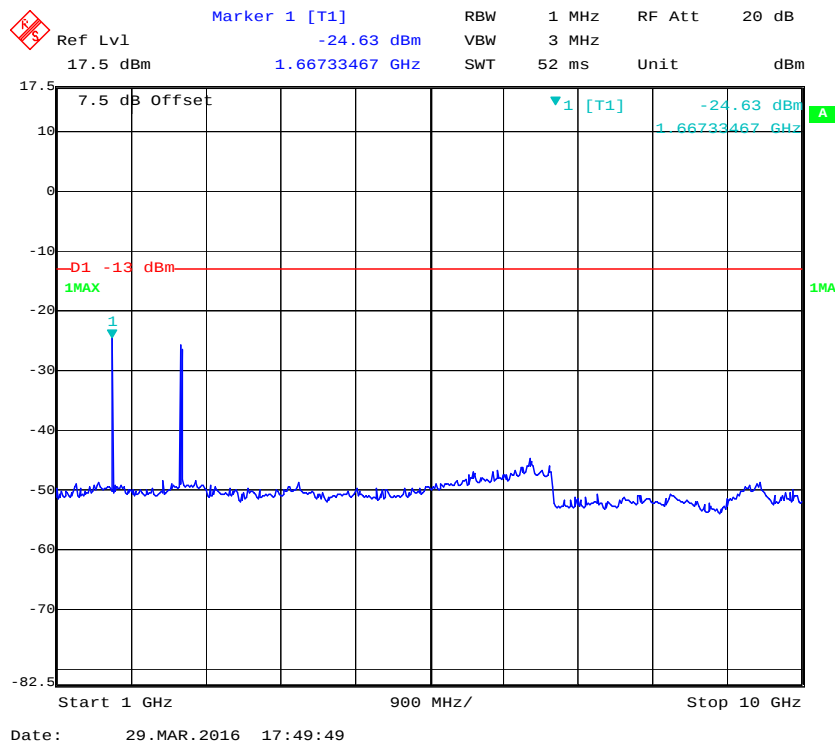
*Please refer to the following plots.*

## Cellular Band (Part 22H)

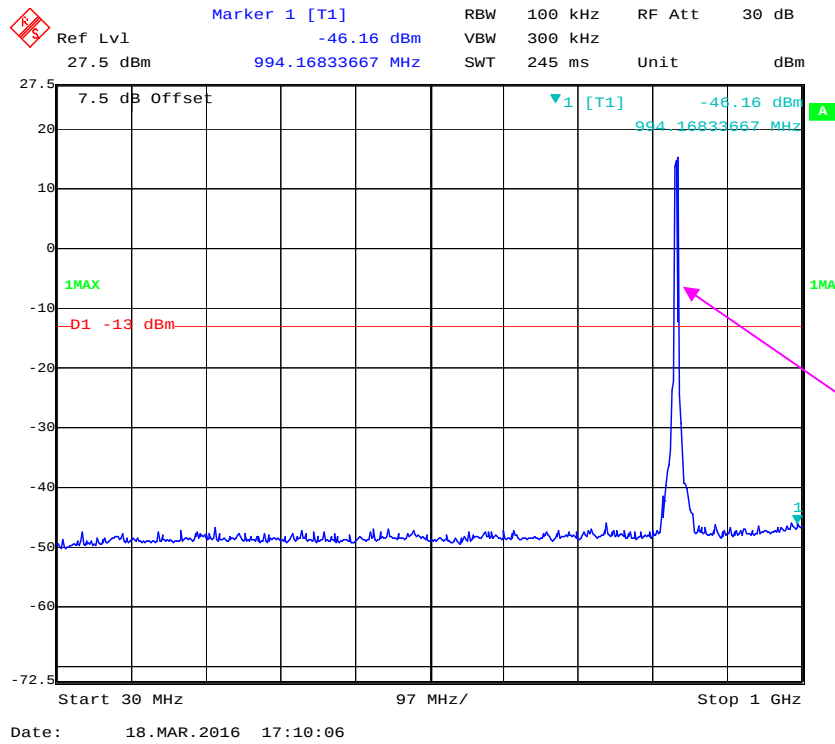
## 30 MHz – 1 GHz (GSM Mode)



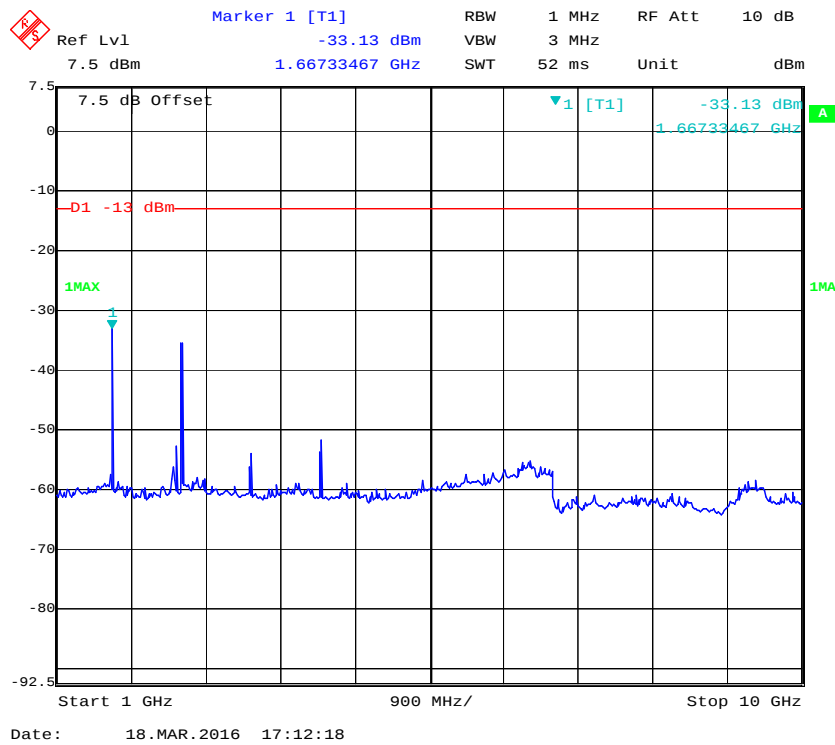
## 1 GHz – 10 GHz (GSM Mode)



### 30 MHz – 1 GHz (WCDMA Mode)

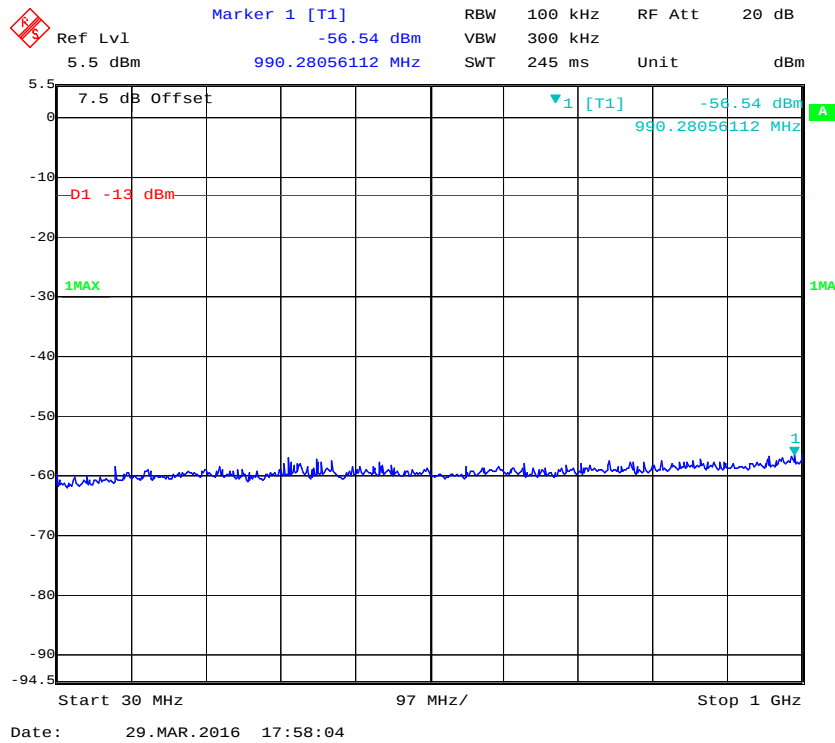


### 1 GHz – 10 GHz (WCDMA Mode)

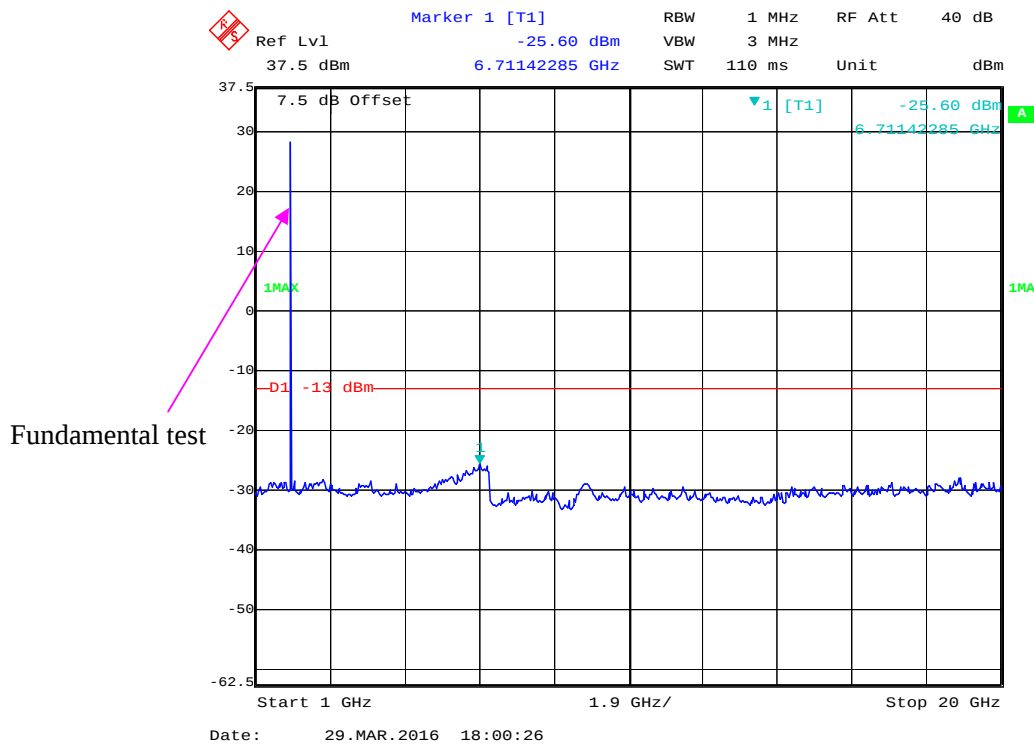


PCS Band (Part 24E)

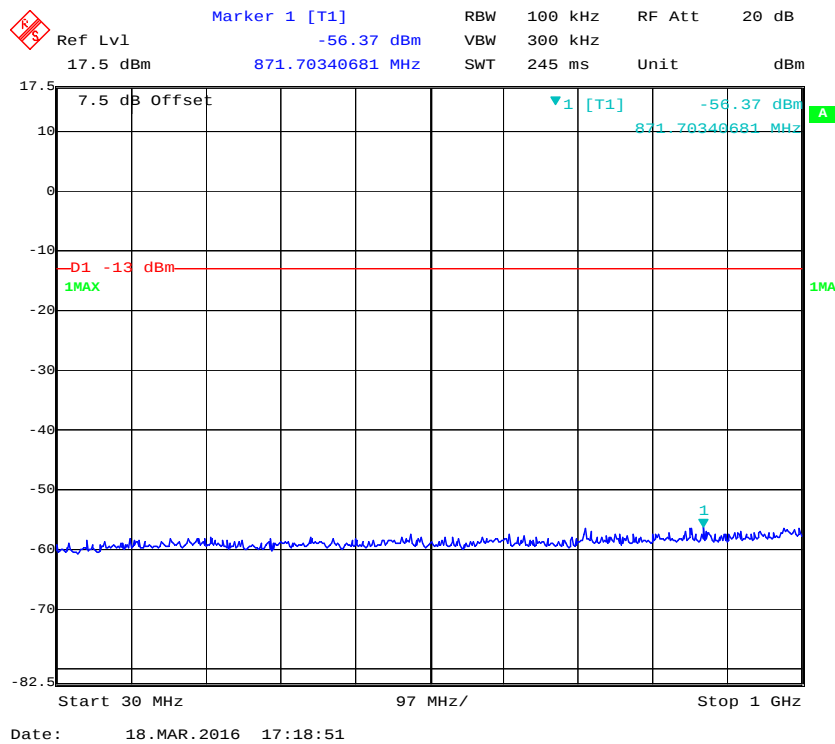
30 MHz – 1 GHz (GSM Mode)



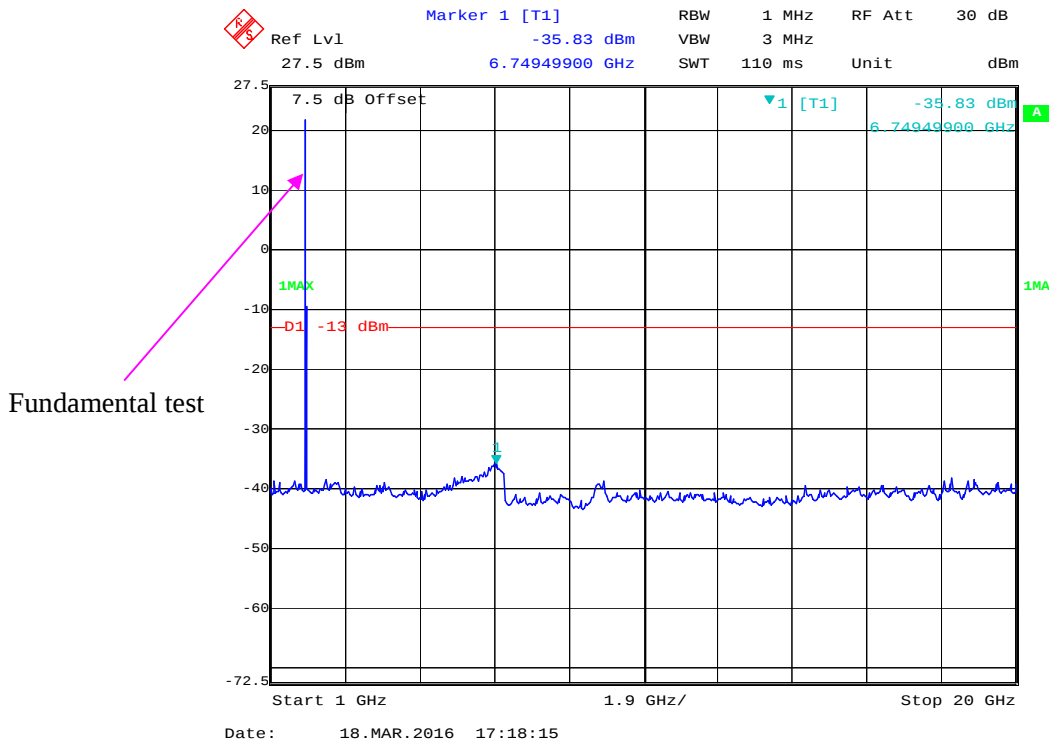
1 GHz – 20 GHz (GSM Mode)



## 30 MHz – 1 GHz (WCDMA Mode)

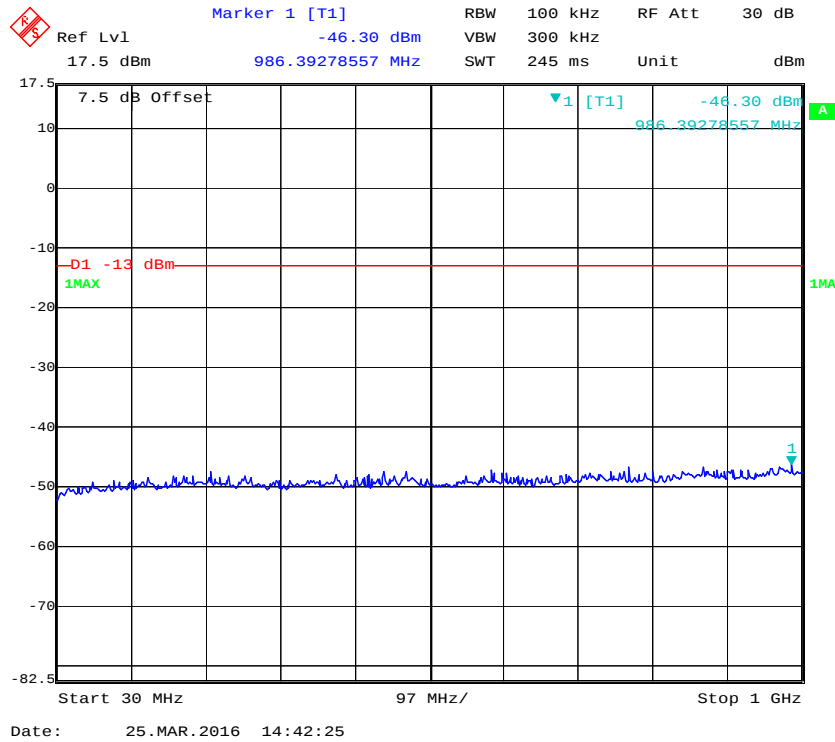


## 1 GHz – 20 GHz (WCDMA Mode)

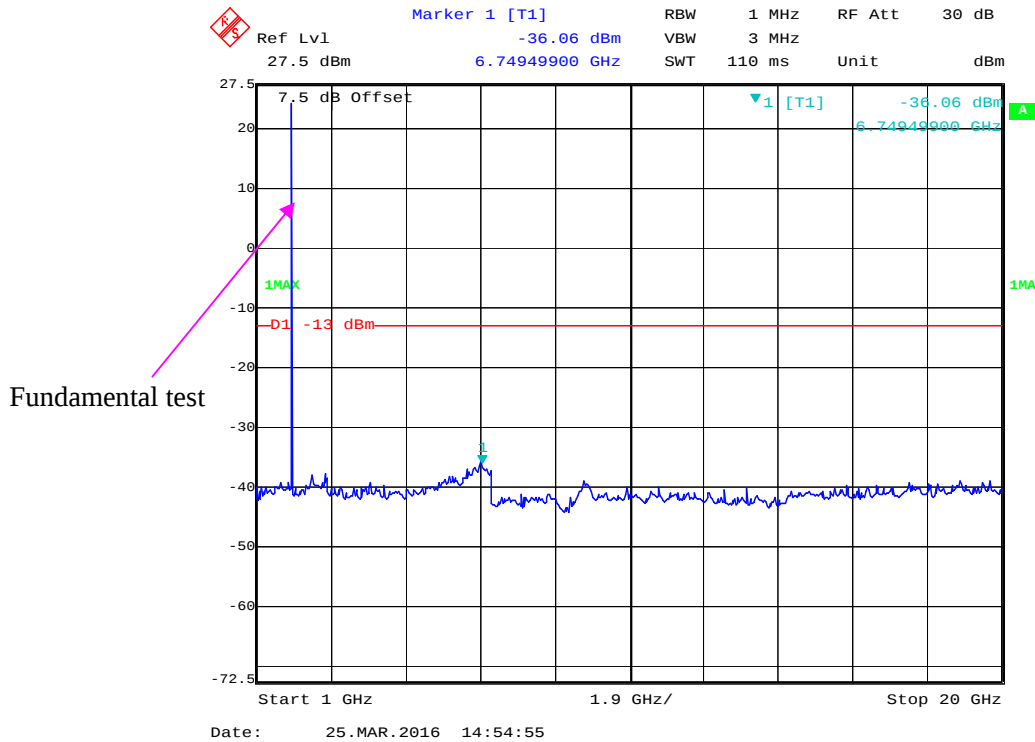


**LTE Band 2:**

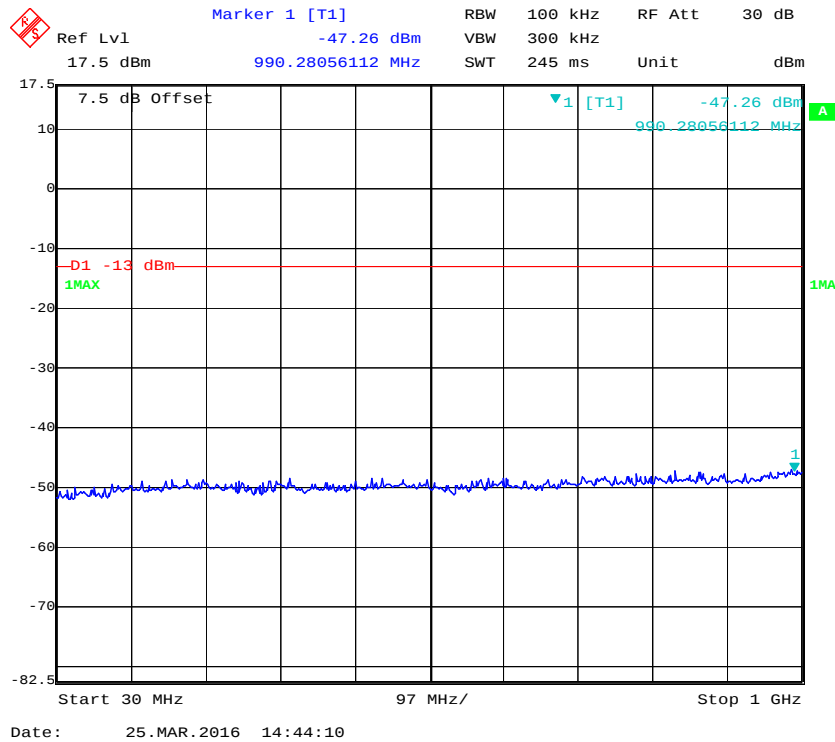
**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**



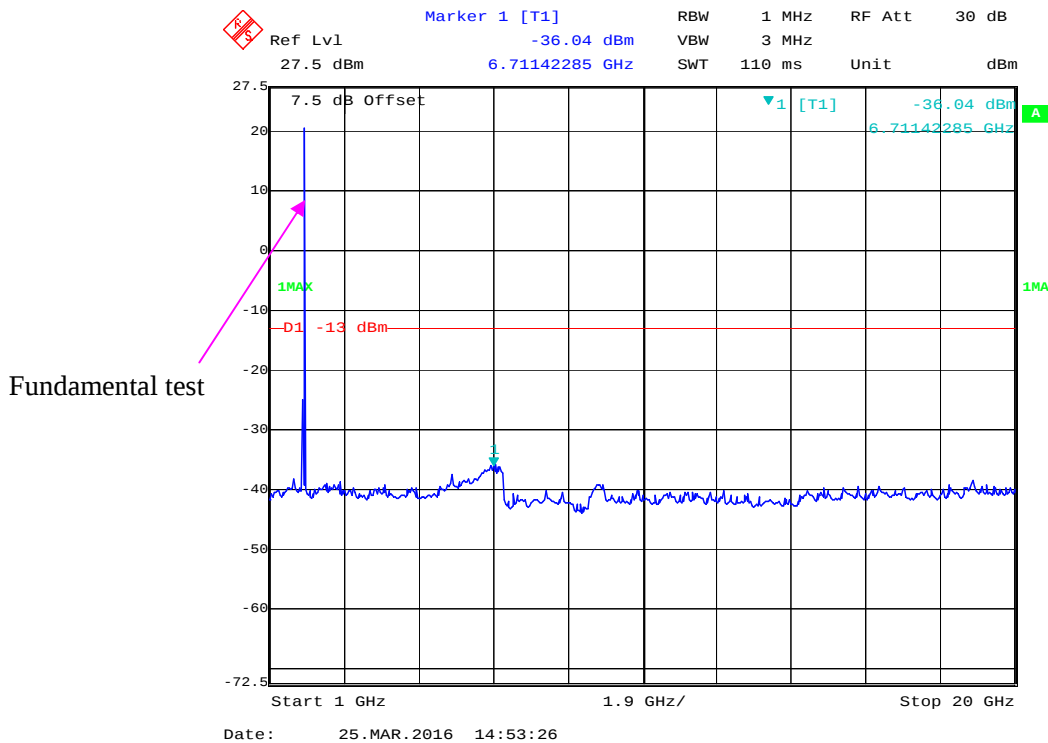
**1 GHz – 20 GHz (1.4 MHz, Middle Channel)**

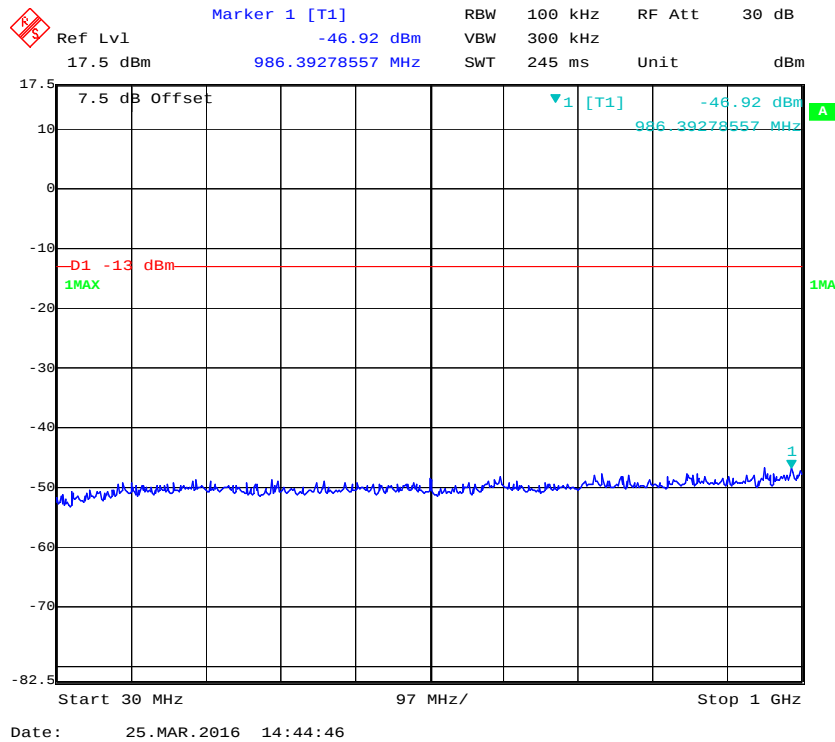
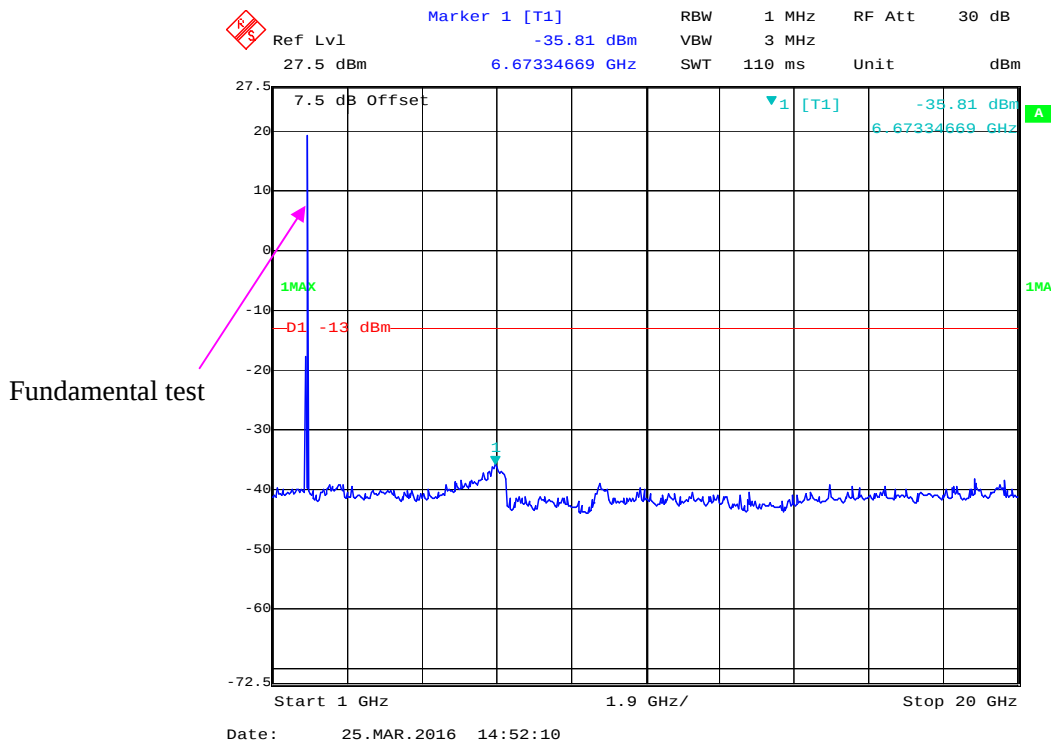


### 30 MHz - 1 GHz (3.0 MHz, Middle Channel)

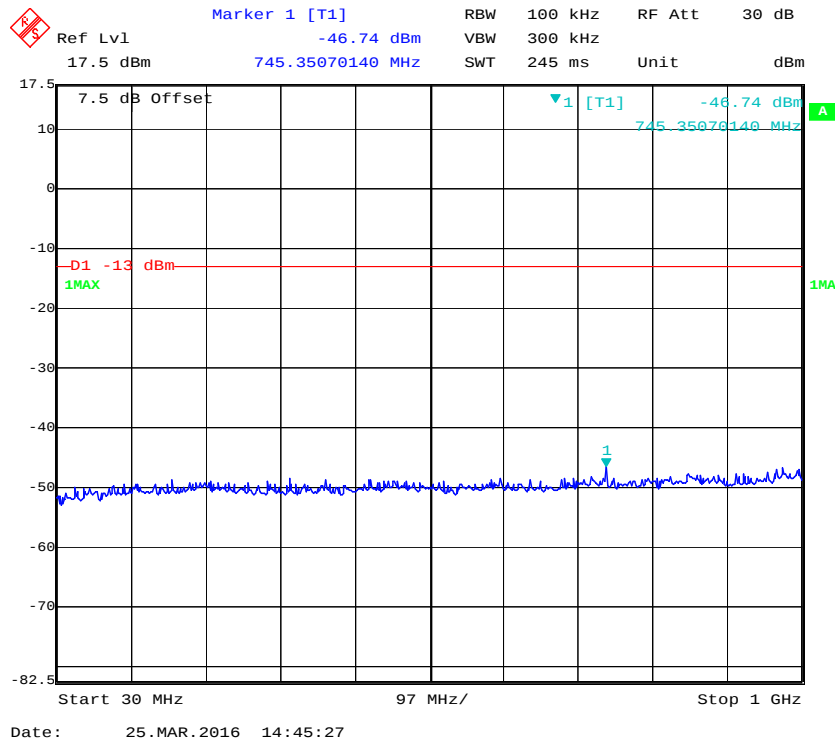


### 1 GHz – 20 GHz (3.0 MHz, Middle Channel)

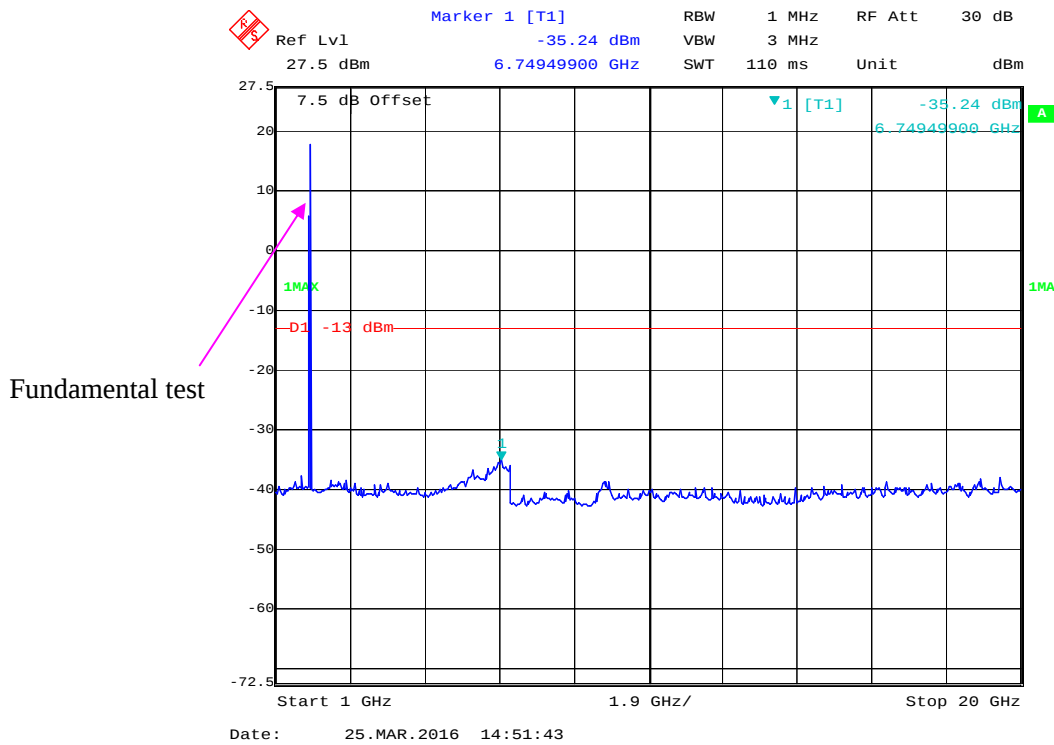


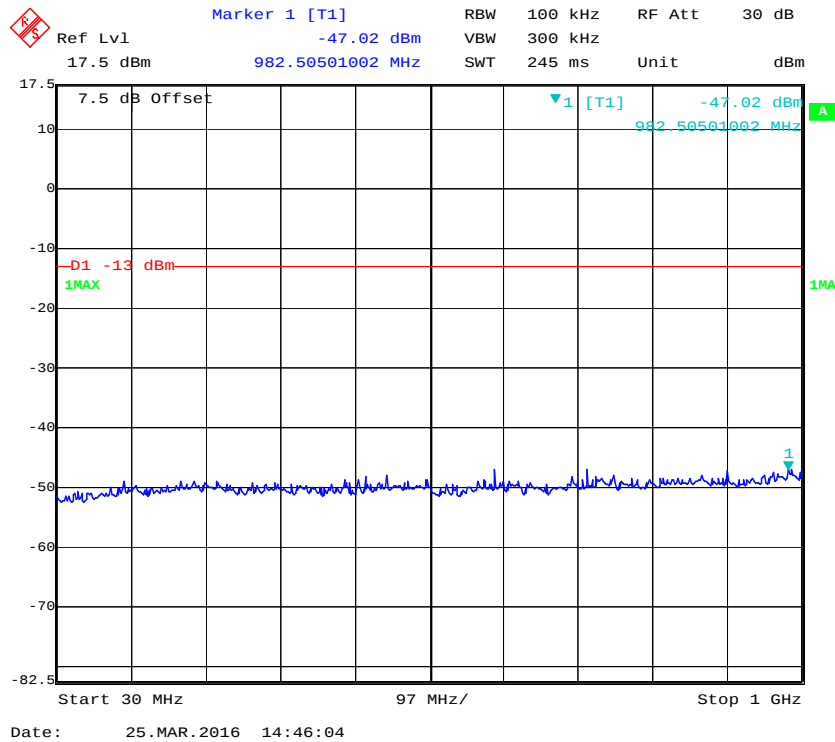
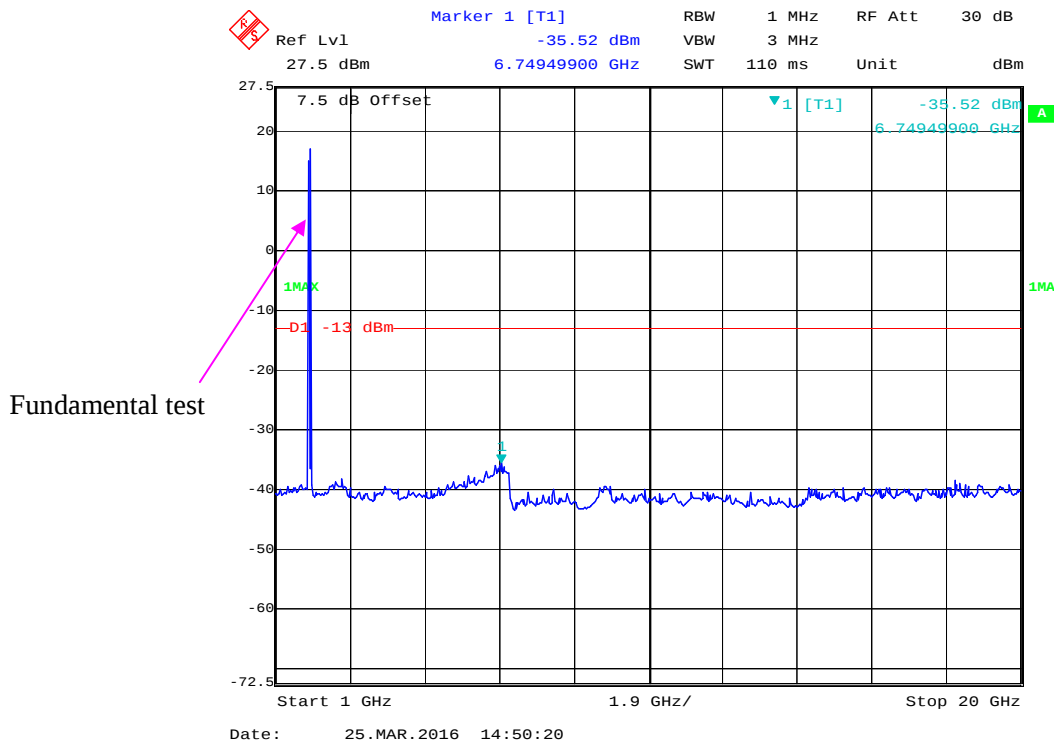
**30 MHz - 1 GHz (5.0 MHz, Middle Channel)****1 GHz – 20 GHz (5.0 MHz, Middle Channel)**

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

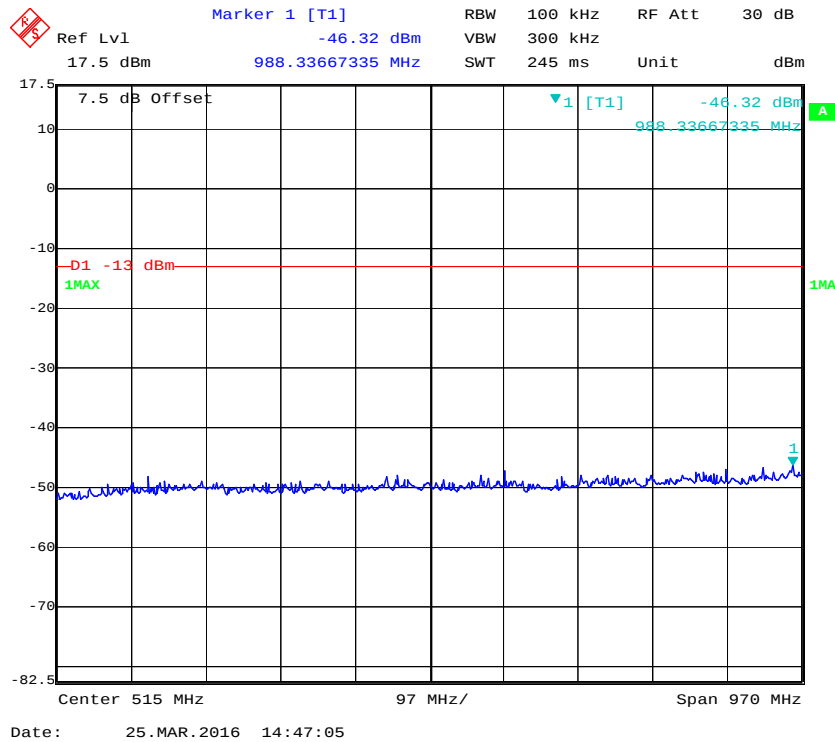


### 1 GHz – 20 GHz (10.0 MHz, Middle Channel)

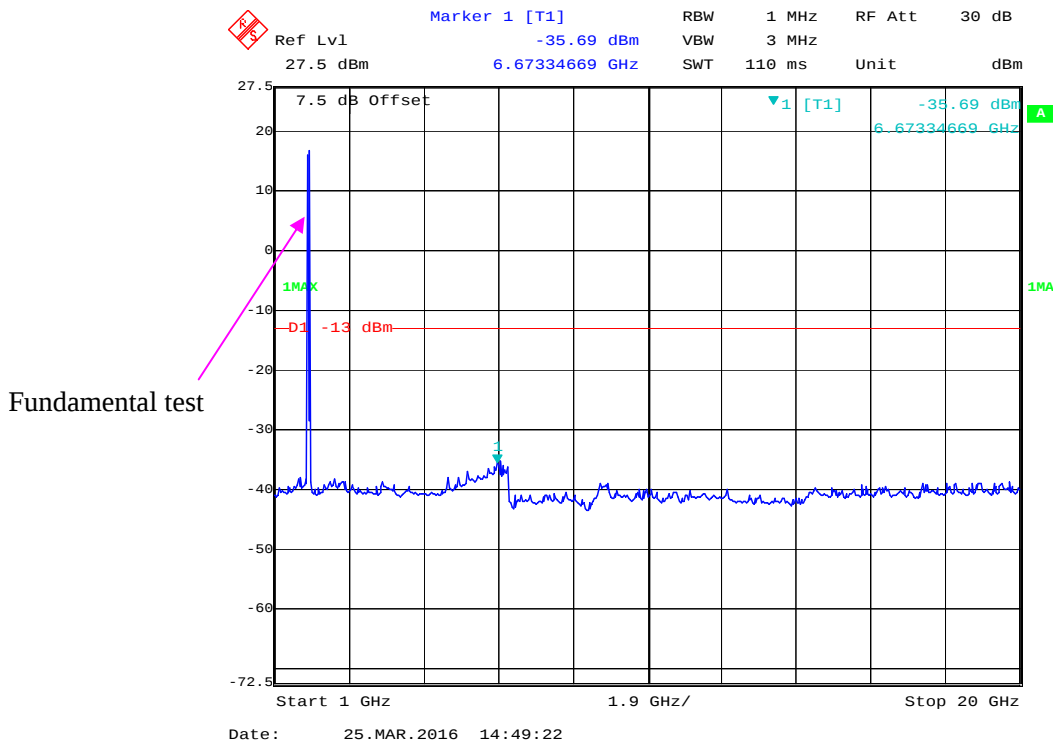


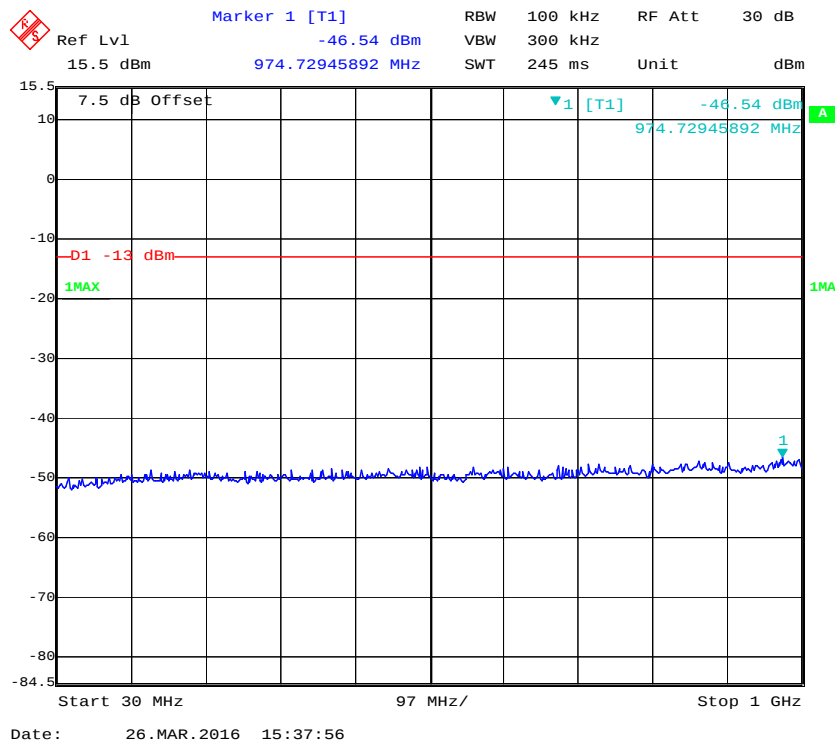
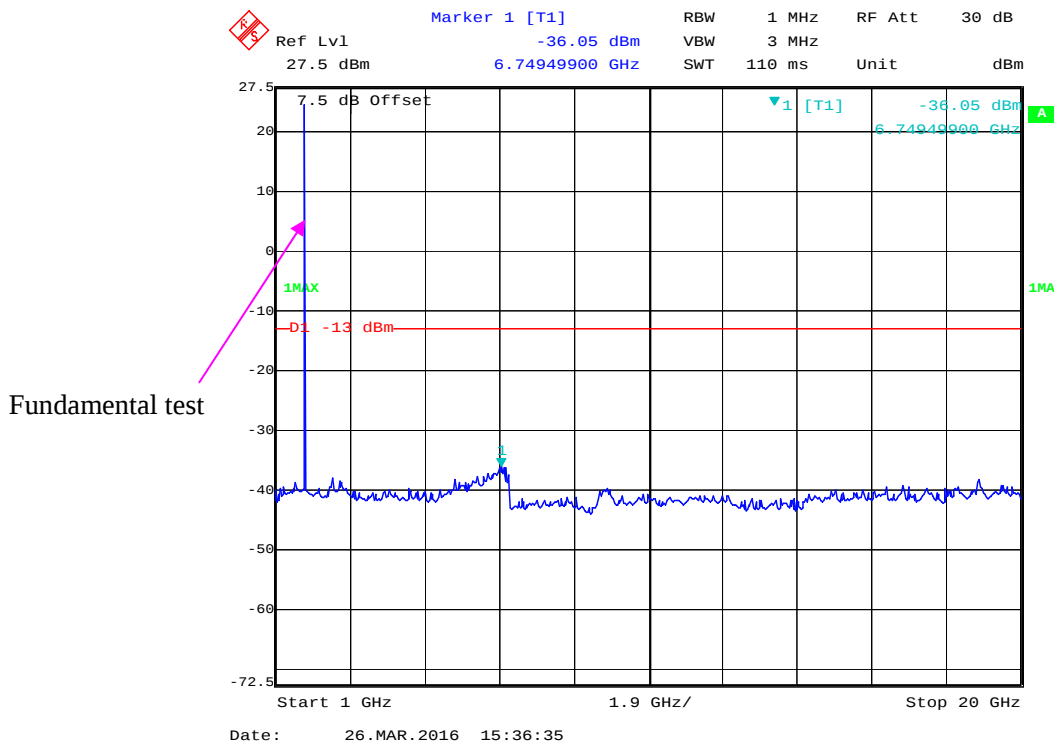
**30 MHz - 1 GHz (15.0 MHz, Middle Channel)****1 GHz - 20 GHz (15.0 MHz, Middle Channel)**

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



### 1 GHz - 20 GHz (20.0 MHz, Middle Channel)



**LTE Band 4:****30 MHz - 1 GHz (1.4 MHz, Middle Channel)****1 GHz – 20 GHz (1.4 MHz, Middle Channel)**

Marker 1 [T1]

RBW 100 kHz RF Att 30 dB

VBW 300 kHz

SWT 245 ms Unit dBm

Ref Lvl -47.37 dBm

15.5 dBm 984.44889780 MHz

7.5 dB Offset

1 [T1] -47.37 dBm

984.44889780 MHz

D1 -13 dBm

1MAX

1

Start 30 MHz 97 MHz/ Stop 1 GHz

Date: 26.MAR.2016 15:38:57

Ref Lvl 27.5 dBm  
 Marker 1 [T1] 6.71142285 GHz -35.27 dBm  
 RBW 1 MHz RF Att 30 dB  
 VBW 3 MHz  
 SWT 110 ms Unit dBm

7.5 dB Offset  
 1MAX  
 -13 dBm  
 1 [T1]  
 -35.27 dBm  
 6.71142285 GHz

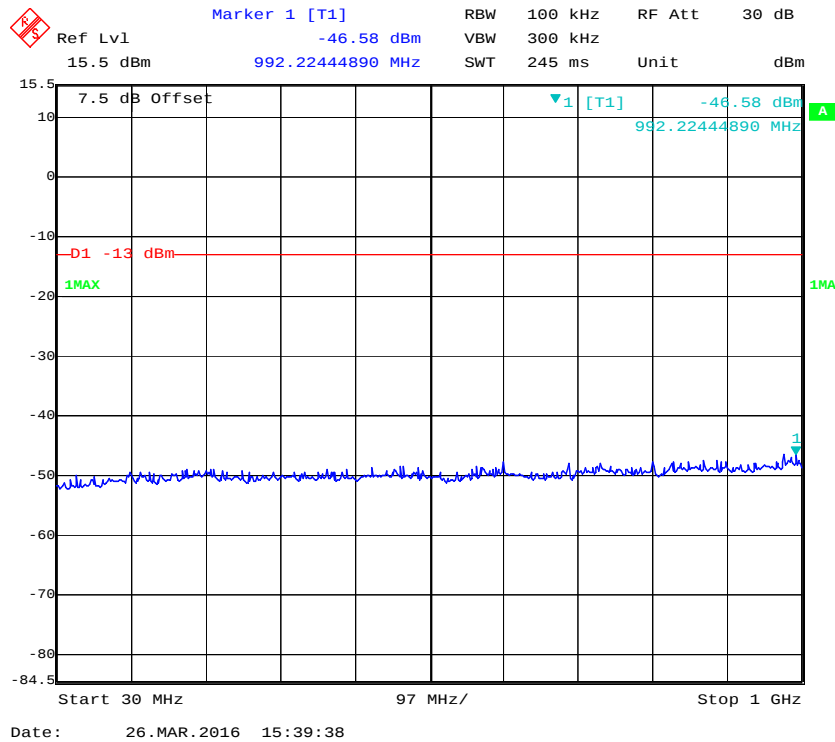
t

Start 1 GHz 1.9 GHz/ Stop 20 GHz

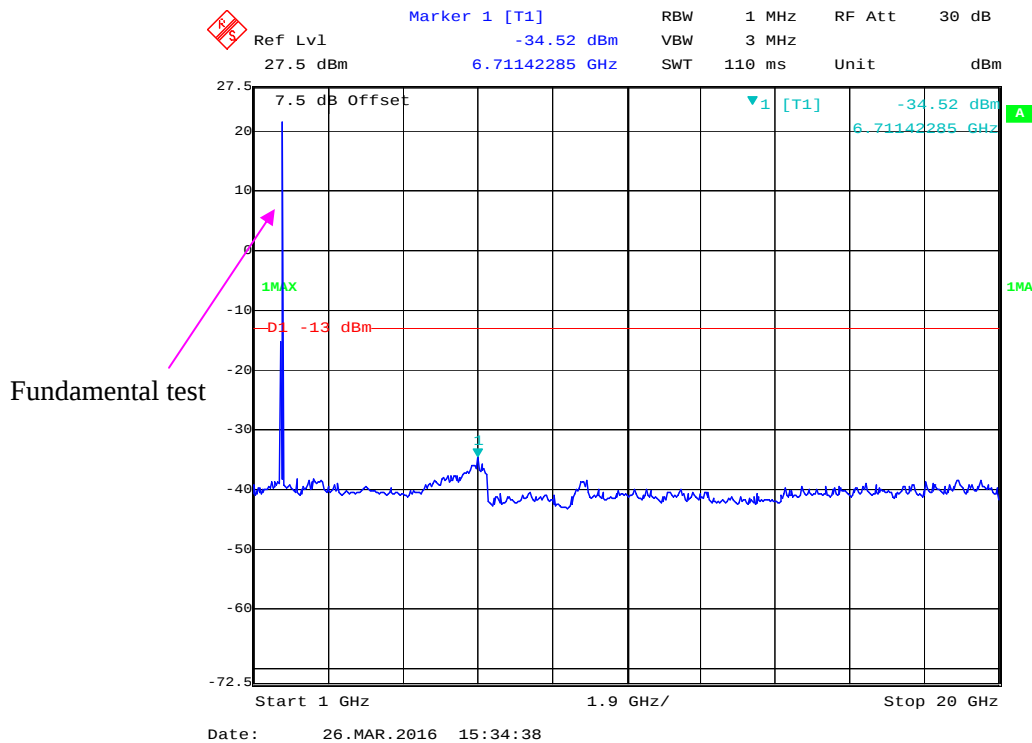
Date: 26.MAR.2016 15:35:21

## Fundamental test

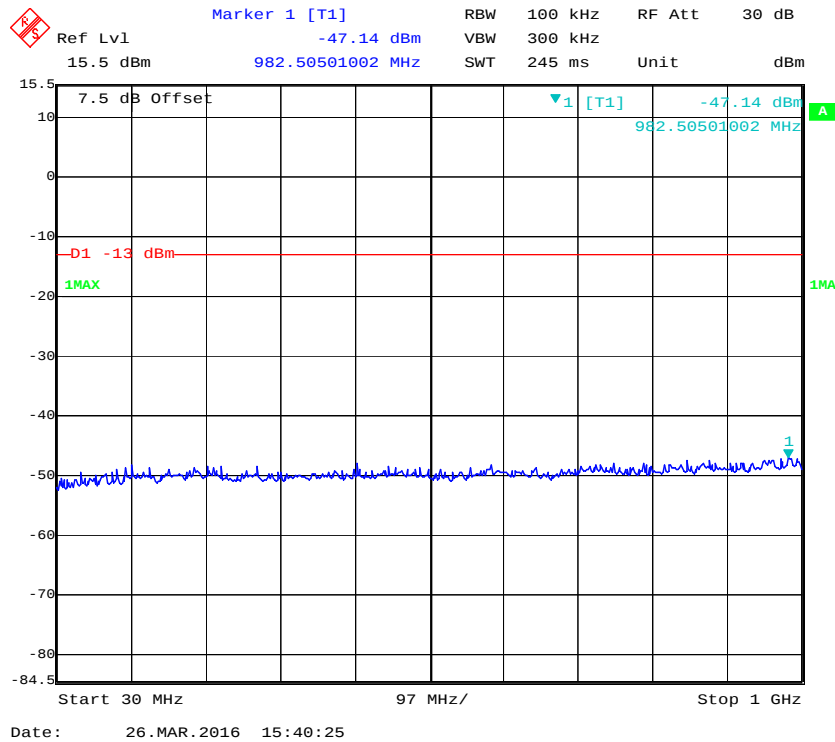
### 30 MHz - 1 GHz (5.0 MHz, Middle Channel)



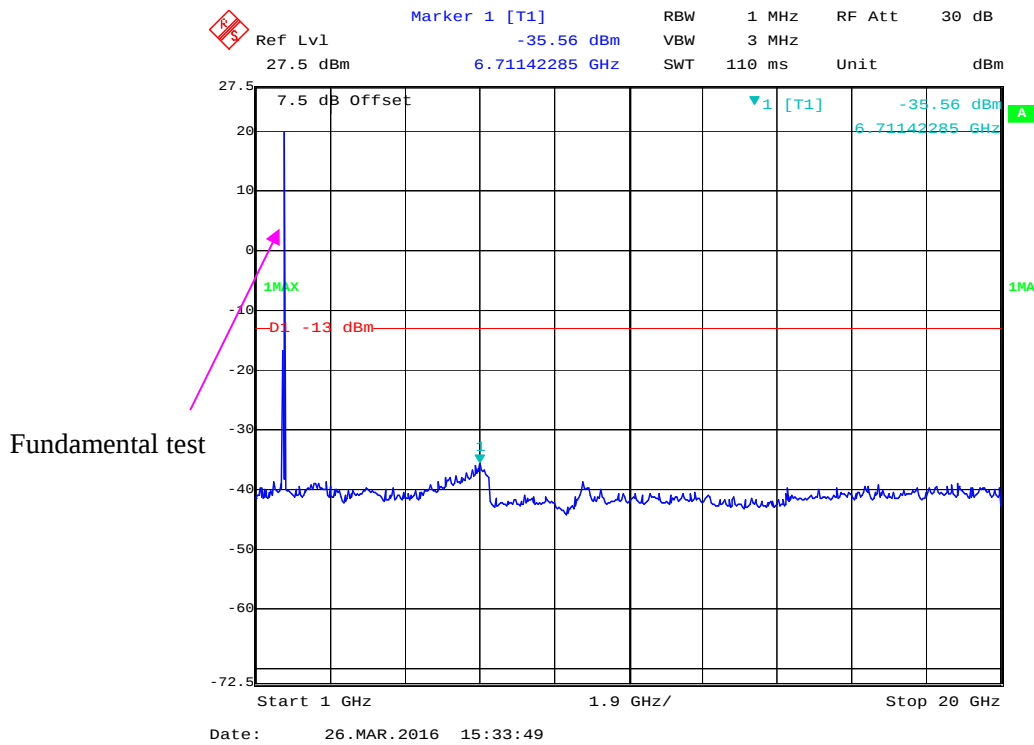
### 1 GHz – 20 GHz (5.0 MHz, Middle Channel)

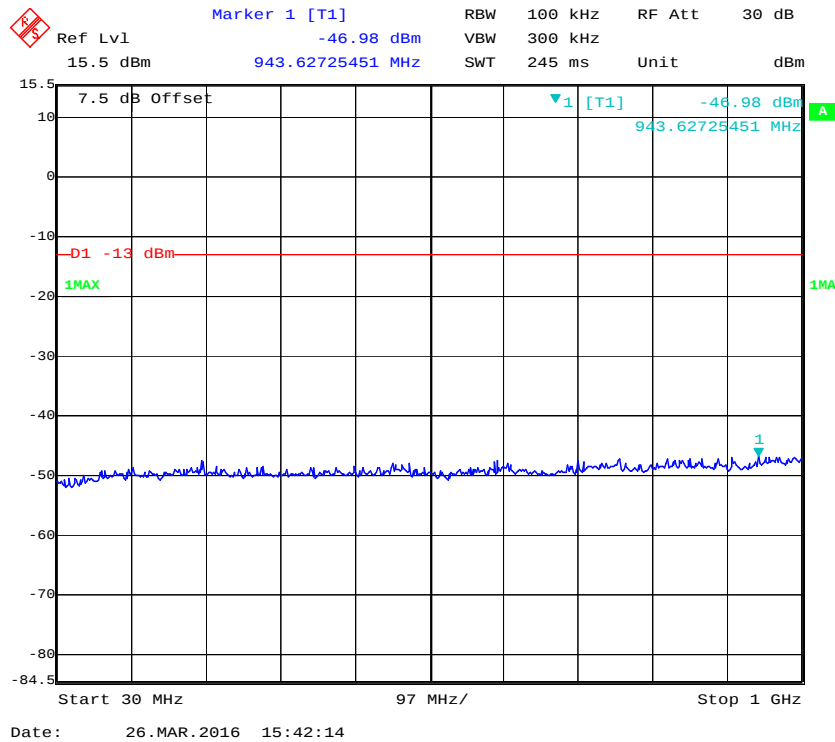
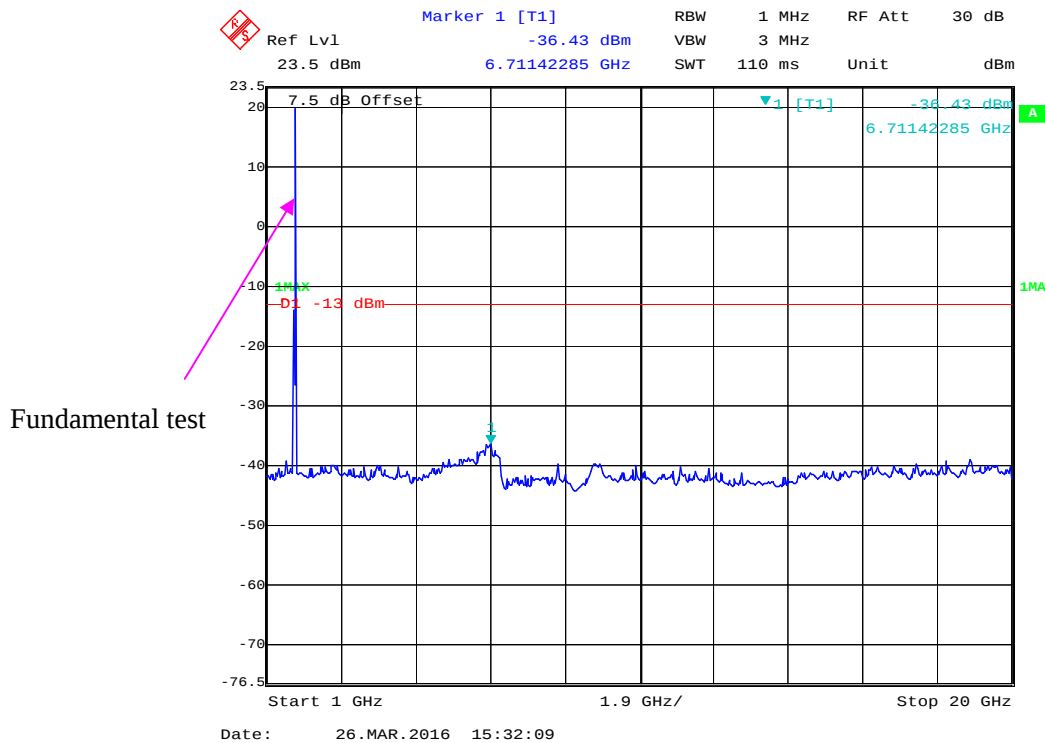


### 30 MHz - 1 GHz (10.0 MHz, Middle Channel)

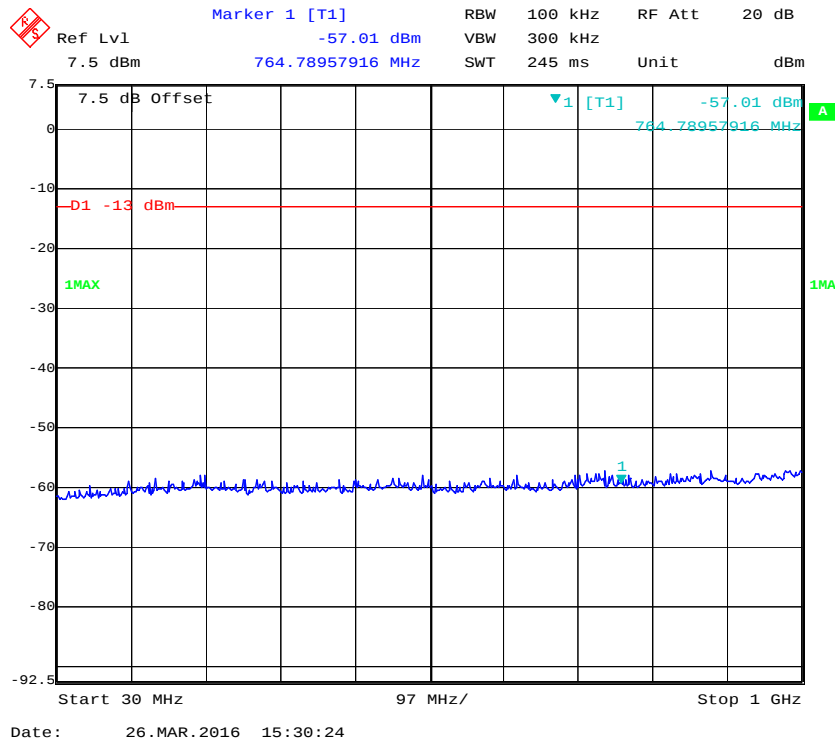


### 1 GHz – 20 GHz (10.0 MHz, Middle Channel)

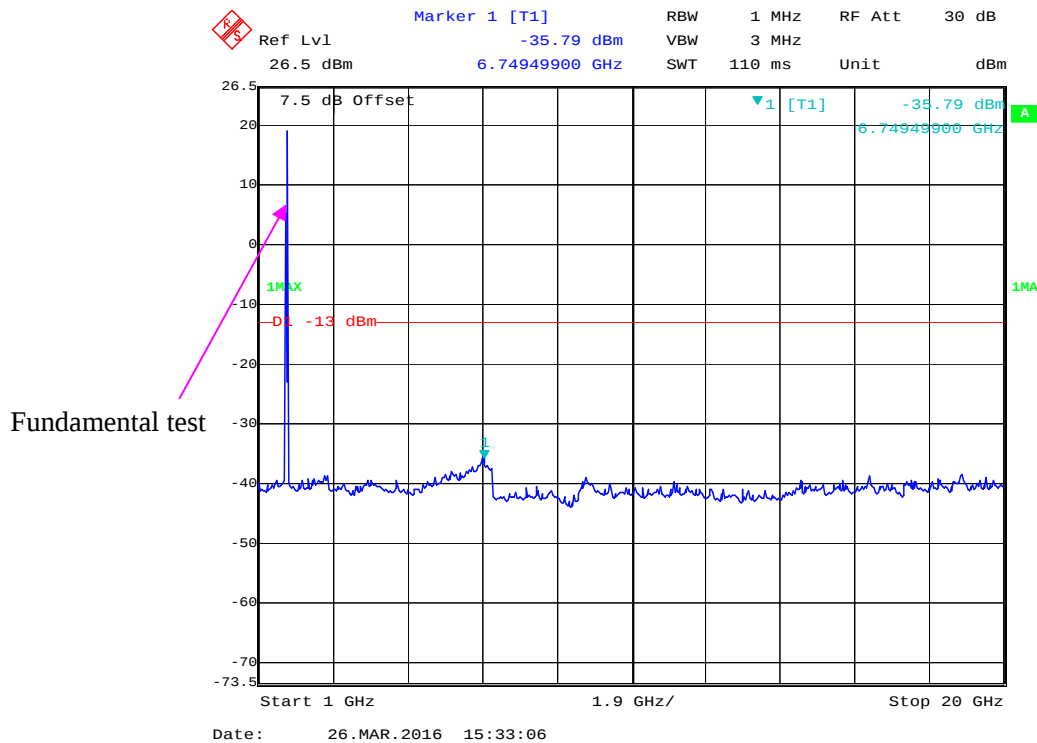


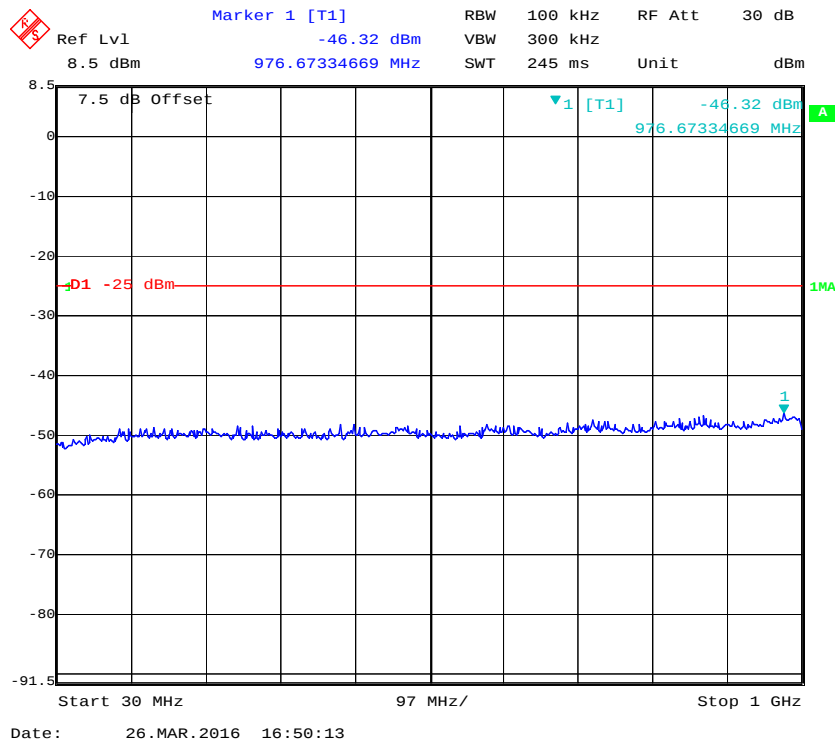
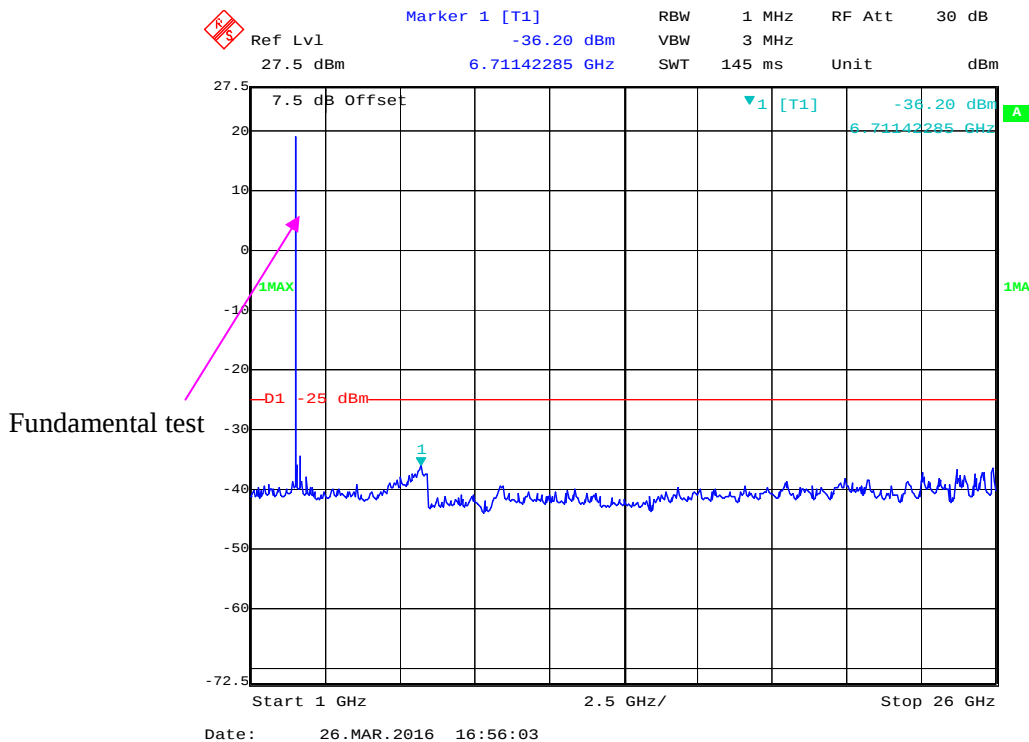
**30 MHz - 1 GHz (15.0 MHz, Middle Channel)****1 GHz - 20 GHz (15.0 MHz, Middle Channel)**

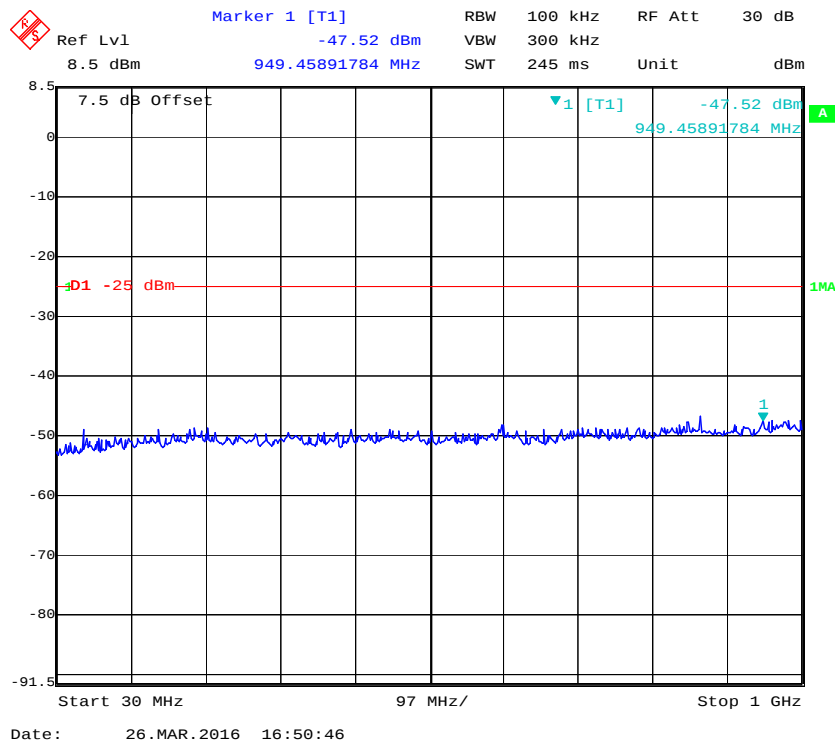
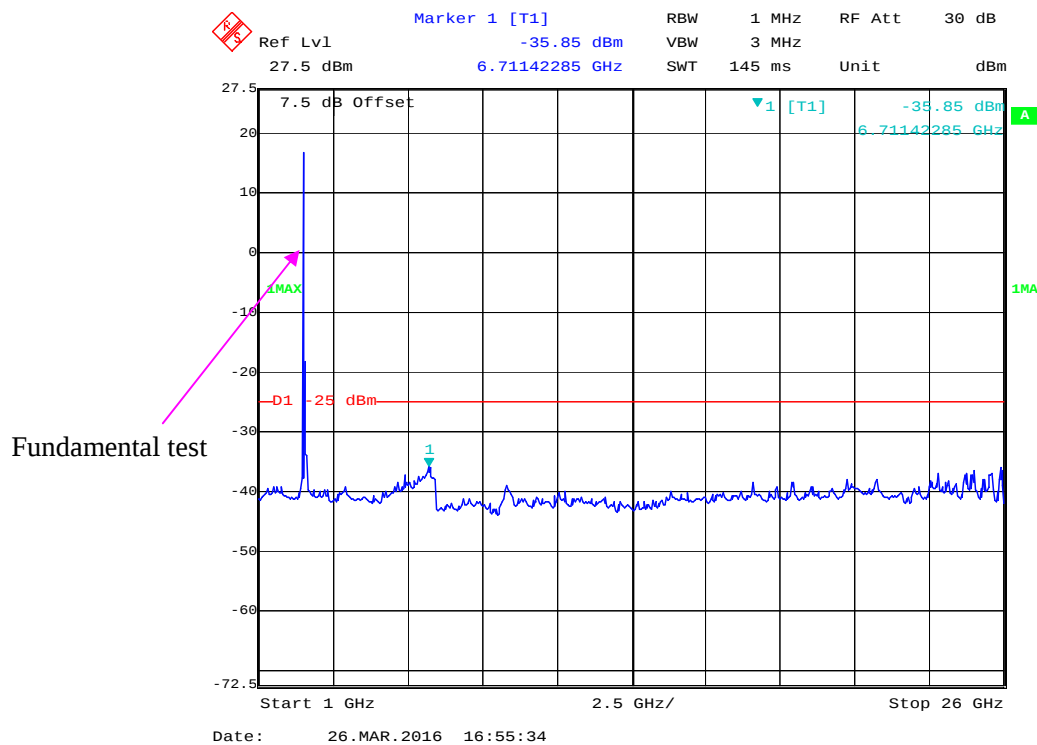
### 30 MHz - 1 GHz (20.0 MHz, Middle Channel)

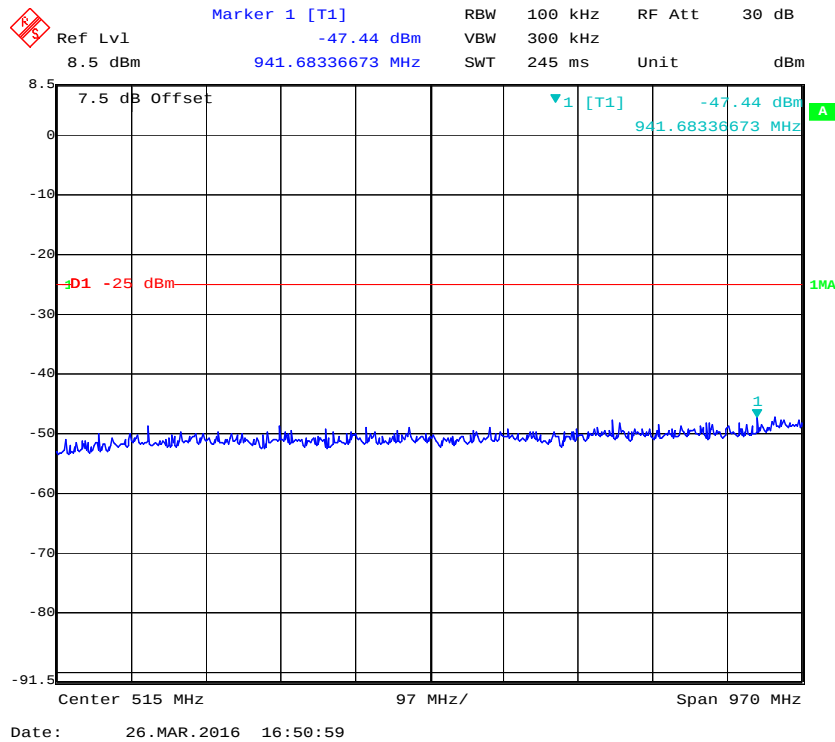
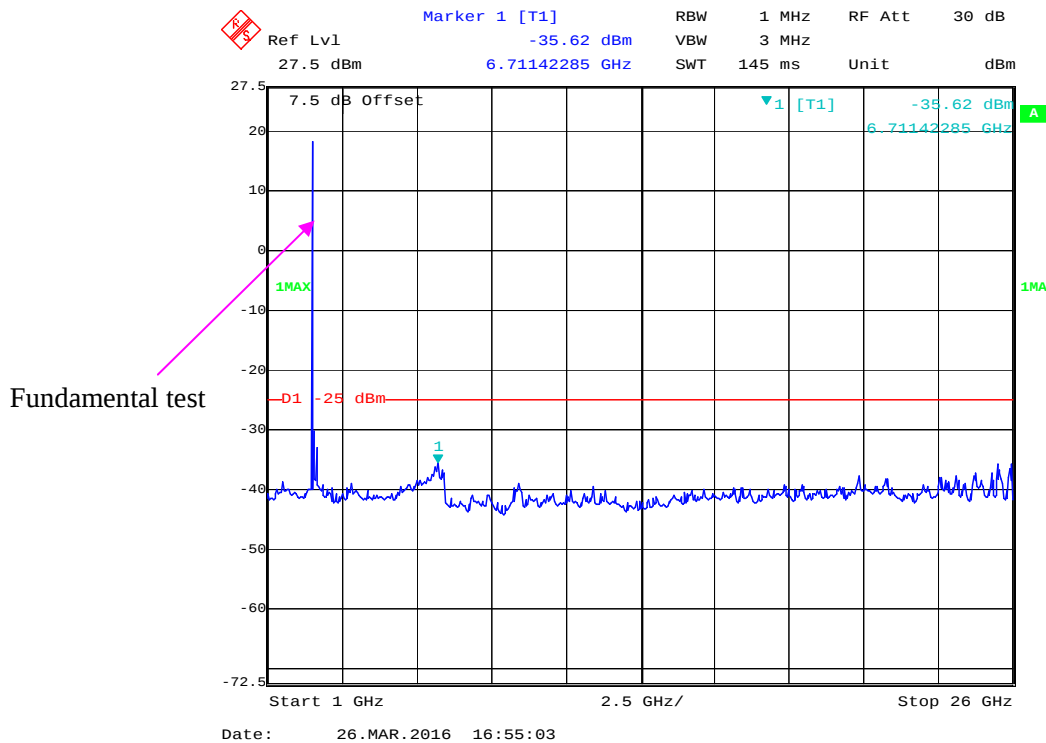


### 1 GHz - 20 GHz (20.0 MHz, Middle Channel)

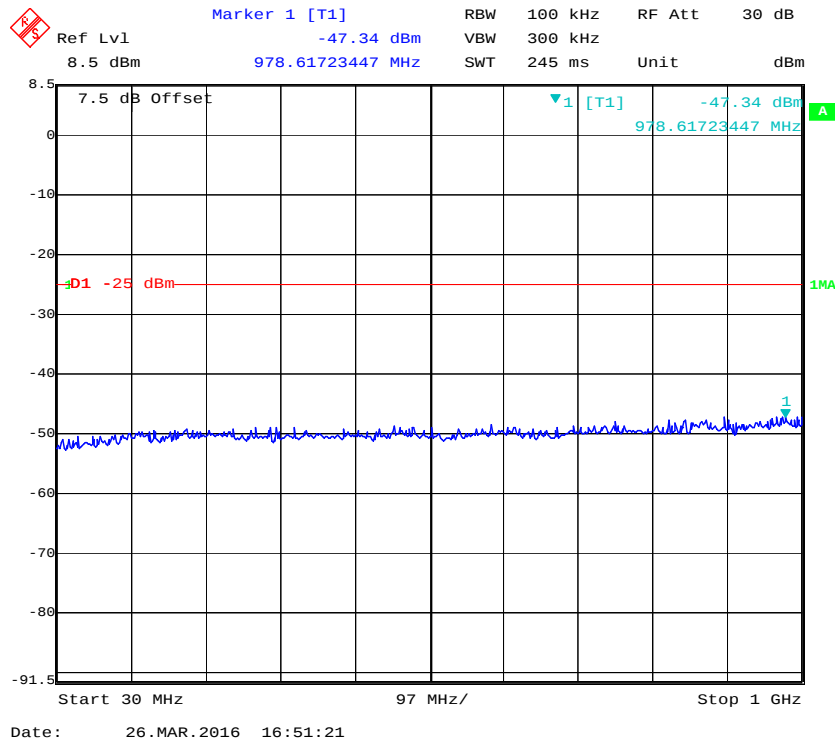


**LTE Band 7:****30 MHz - 1 GHz (5.0 MHz, Middle Channel)****1 GHz - 26 GHz (5.0 MHz, Middle Channel)**

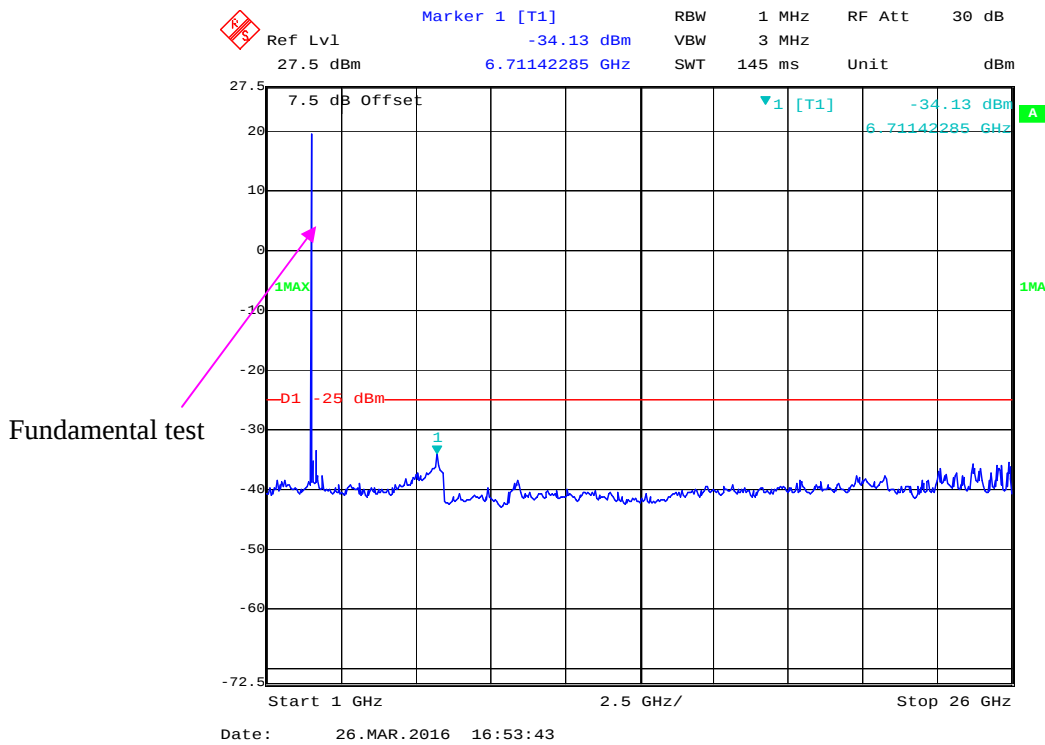
**30 MHz - 1 GHz (10.0 MHz, Middle Channel)****1 GHz – 26 GHz (10.0 MHz, Middle Channel)**

**30 MHz - 1 GHz (15.0 MHz, Middle Channel)****1 GHz - 26 GHz (15.0 MHz, Middle Channel)**

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



### 1 GHz - 26 GHz (20.0 MHz, Middle Channel)



## **FCC §2.1053, §22.917 & §24.238 & §27.53 - SPURIOUS RADIATED EMISSIONS**

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### **Applicable Standards**

FCC § 2.1053, §22.917 and § 24.238 and § 27.53.

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

### **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 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.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg (\text{TX pwr in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \text{Log}_{10} (\text{power out in Watts})$

**Test Equipment List and Details**

| Manufacturer          | Description                          | Model                 | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|-----------------------|-----------------------|------------------|----------------------|
| Sunol Sciences        | Horn Antenna                         | DRH-118               | A052604               | 2014-12-29       | 2017-12-28           |
| Sunol Sciences        | Bi-log Antenna                       | JB1                   | A040904-2             | 2014-12-07       | 2017-12-06           |
| Rohde & Schwarz       | Signal Analyzer                      | FSIQ26                | 8386001028            | 2015-12-11       | 2016-12-11           |
| Mini                  | Pre-amplifier                        | ZVA-183-S+            | 5969001149            | 2015-04-23       | 2016-04-23           |
| HP                    | Amplifier                            | HP8447E               | 1937A01046            | 2015-05-06       | 2016-05-06           |
| HP                    | Signal Generator                     | HP 8341B              | 2624A00116            | 2015-07-02       | 2016-07-01           |
| COM POWER             | Dipole Antenna                       | AD-100                | 041000                | 2015-08-18       | 2016-08-18           |
| A.H. System           | Horn Antenna                         | SAS-200/571           | 135                   | 2015-08-18       | 2018-08-17           |
| Rohde & Schwarz       | EMI Test Receiver                    | ESCI                  | 101120                | 2015-11-03       | 2016-11-03           |
| Electro-Mechanics     | Horn Antenna                         | 3116                  | 9510-2270             | 2013-10-14       | 2016-10-13           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200                | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500                | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | UFA210A-1-4724-30050U | MFR64369 223410-001   | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | 104PEA                | 218124002             | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | RG-214                | 1                     | 2015-06-15       | 2016-06-15           |
| Ducommun technologies | RF Cable                             | RG-214                | 2                     | 2015-06-15       | 2016-06-15           |

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

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

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 23 °C    |
| <b>Relative Humidity:</b> | 50 %     |
| <b>ATM Pressure:</b>      | 101.0kPa |

*The testing was performed by Simon Wang on 2016-03-26.*

*Test mode: Transmitting*

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case as below)

30 MHz ~ 10 GHz:

**Cellular Band (Part 22H)**

| Frequency<br>(MHz)         | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| GSM Mode, Middle channel   |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 302.57                     | 31.85                         | 116                          | 1.8           | H              | -65.1                | 0.36                  | 0                       | -65.46                     | -13            | 52.46          |
| 302.57                     | 31.18                         | 248                          | 1.5           | V              | -65.8                | 0.36                  | 0                       | -66.16                     | -13            | 53.16          |
| 1673.20                    | 61.13                         | 167                          | 2.1           | H              | -46.3                | 1.60                  | 6.90                    | -41.00                     | -13            | 28.00          |
| 1673.20                    | 68.35                         | 309                          | 1.9           | V              | -39.5                | 1.60                  | 6.90                    | -34.20                     | -13            | 21.20          |
| 2509.80                    | 65.17                         | 139                          | 2.3           | H              | -39.4                | 1.70                  | 8.60                    | -32.50                     | -13            | 19.50          |
| 2509.80                    | 68.23                         | 354                          | 1.7           | V              | -36.7                | 1.70                  | 8.60                    | -29.80                     | -13            | 16.80          |
| 3346.40                    | 49.16                         | 106                          | 1.3           | H              | -52.3                | 1.90                  | 9.80                    | -44.40                     | -13            | 31.40          |
| 3346.40                    | 45.21                         | 294                          | 1.7           | V              | -56.8                | 1.90                  | 9.80                    | -48.90                     | -13            | 35.90          |
| 4183.00                    | 42.84                         | 63                           | 1.5           | H              | -58.5                | 2.00                  | 9.80                    | -50.70                     | -13            | 37.70          |
| 4183.00                    | 42.51                         | 244                          | 2.5           | V              | -59.3                | 2.00                  | 9.80                    | -51.50                     | -13            | 38.50          |
| WCDMA Mode, Middle channel |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 352.90                     | 31.56                         | 272                          | 1.6           | H              | -65.4                | 0.40                  | 0                       | -65.80                     | -13            | 52.80          |
| 352.90                     | 31.66                         | 155                          | 1.8           | V              | -65.3                | 0.40                  | 0                       | -65.70                     | -13            | 52.70          |
| 1673.20                    | 47.82                         | 133                          | 1.0           | H              | -59.6                | 1.60                  | 6.90                    | -54.30                     | -13            | 41.30          |
| 1673.20                    | 48.81                         | 242                          | 1.6           | V              | -59.0                | 1.60                  | 6.90                    | -53.70                     | -13            | 40.70          |
| 2509.80                    | 46.75                         | 311                          | 1.7           | H              | -57.8                | 1.70                  | 8.60                    | -50.90                     | -13            | 37.90          |
| 2509.80                    | 50.24                         | 11                           | 1.0           | V              | -54.7                | 1.70                  | 8.60                    | -47.80                     | -13            | 34.80          |
| 3346.40                    | 44.52                         | 99                           | 2.1           | H              | -56.9                | 1.90                  | 9.80                    | -49.00                     | -13            | 36.00          |
| 3346.40                    | 43.47                         | 26                           | 2.0           | V              | -58.6                | 1.90                  | 9.80                    | -50.70                     | -13            | 37.70          |
| 4183.00                    | 44.64                         | 319                          | 1.6           | H              | -56.7                | 2.00                  | 9.80                    | -48.90                     | -13            | 35.90          |
| 4183.00                    | 43.06                         | 300                          | 1.4           | V              | -58.7                | 2.00                  | 9.80                    | -50.90                     | -13            | 37.90          |

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

| Frequency<br>(MHz)      | Receiver<br>Reading<br>(dBμV) | 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) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| GSM Mode, Low channel   |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 302.57                  | 31.61                         | 223                          | 1.1           | H              | -65.4                | 0.36                  | 0                       | -65.76                     | -13            | 52.76          |
| 302.57                  | 31.29                         | 21                           | 1.1           | V              | -65.7                | 0.36                  | 0                       | -66.06                     | -13            | 53.06          |
| 3700.4                  | 45.13                         | 6                            | 1.3           | H              | -54.3                | 1.90                  | 9.90                    | -46.30                     | -13            | 33.30          |
| 3700.4                  | 44.33                         | 273                          | 1.6           | V              | -54.7                | 1.90                  | 9.90                    | -46.70                     | -13            | 33.70          |
| WCDMA Mode, Low channel |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 436.90                  | 30.42                         | 56                           | 2.4           | H              | -66.6                | 0.44                  | 0                       | -67.04                     | -13            | 54.04          |
| 436.90                  | 31.87                         | 241                          | 1.1           | V              | -65.1                | 0.44                  | 0                       | -65.54                     | -13            | 52.54          |
| 3704.80                 | 43.16                         | 197                          | 2.4           | H              | -56.3                | 1.90                  | 9.90                    | -48.30                     | -13            | 35.30          |
| 3704.80                 | 42.76                         | 54                           | 1.6           | V              | -56.3                | 1.90                  | 9.90                    | -48.30                     | -13            | 35.30          |

Test mode: Transmitting (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 (dBμV) | Angle Degree | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) |                      |             |             |
| <b>Band 2</b> |                |              |            |             |                |                 |                   |                      |             |             |
| 389.20        | 31.06          | 111          | 1.0        | H           | -65.9          | 0.42            | 0                 | -66.32               | -13         | 53.32       |
| 389.20        | 31.19          | 275          | 1.7        | V           | -65.8          | 0.42            | 0                 | -66.22               | -13         | 53.22       |
| 351.60        | 31.24          | 229          | 1.8        | H           | -65.8          | 0.40            | 0                 | -66.20               | -13         | 53.20       |
| 351.60        | 31.12          | 55           | 2.4        | V           | -65.9          | 0.40            | 0                 | -66.30               | -13         | 53.30       |
| 3760.00       | 43.61          | 12           | 1.3        | H           | -55.9          | 1.90            | 9.90              | -47.90               | -13         | 34.90       |
| 3760.00       | 41.51          | 280          | 2.1        | V           | -57.6          | 1.90            | 9.90              | -49.60               | -13         | 36.60       |
| <b>Band 4</b> |                |              |            |             |                |                 |                   |                      |             |             |
| 389.20        | 31.57          | 156          | 1.6        | H           | -65.4          | 0.42            | 0                 | -65.82               | -13         | 52.82       |
| 389.20        | 31.39          | 314          | 2.4        | V           | -65.6          | 0.42            | 0                 | -66.02               | -13         | 53.02       |
| 462.30        | 31.62          | 174          | 2.3        | H           | -65.4          | 0.47            | 0                 | -65.87               | -13         | 52.87       |
| 462.30        | 31.87          | 104          | 1.9        | V           | -65.1          | 0.47            | 0                 | -65.57               | -13         | 52.57       |
| 3465.00       | 42.13          | 212          | 1.9        | H           | -53.4          | 1.90            | 10.00             | -45.30               | -13         | 32.30       |
| 3465.00       | 41.78          | 243          | 1.2        | V           | -53.9          | 1.90            | 10.00             | -45.80               | -13         | 32.80       |
| <b>Band 7</b> |                |              |            |             |                |                 |                   |                      |             |             |
| 389.20        | 31.45          | 152          | 1.0        | H           | -65.5          | 0.42            | 0                 | -65.92               | -25         | 40.92       |
| 389.20        | 31.19          | 315          | 2.4        | V           | -65.8          | 0.42            | 0                 | -66.22               | -25         | 41.22       |
| 358.90        | 31.06          | 202          | 1.0        | H           | -65.9          | 0.40            | 0                 | -66.30               | -25         | 41.30       |
| 358.90        | 31.29          | 225          | 2.4        | V           | -65.7          | 0.40            | 0                 | -66.10               | -25         | 41.10       |
| 3465.00       | 40.45          | 338          | 1.2        | H           | -55.1          | 1.90            | 10.00             | -47.0                | -25         | 22.00       |
| 3465.00       | 41.67          | 9            | 1.2        | V           | -54.0          | 1.90            | 10.00             | -45.9                | -25         | 20.90       |

**Note:**

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

## **FCC §22.917(a) & §24.238(a) & §27.53 - BAND EDGES**

### **Applicable Standards**

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.

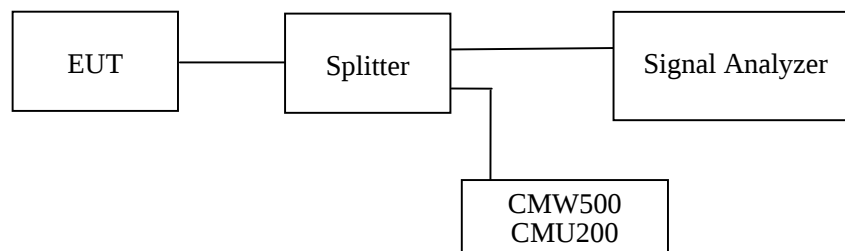
According to FCC §27.53, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

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

### **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 Equipment List and Details**

| Manufacturer          | Description                          | Model  | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|--------|-----------------------|------------------|----------------------|
| Rohde & Schwarz       | Signal Analyzer                      | FSIQ26 | 8386001028            | 2015-12-11       | 2016-12-11           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200 | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500 | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | RG-214 | 4                     | 2015-06-15       | 2016-06-15           |
| WEINSCHTEL            | 6dB Attenuator                       | 1012   | 30187                 | 2015-06-18       | 2016-06-18           |

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

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

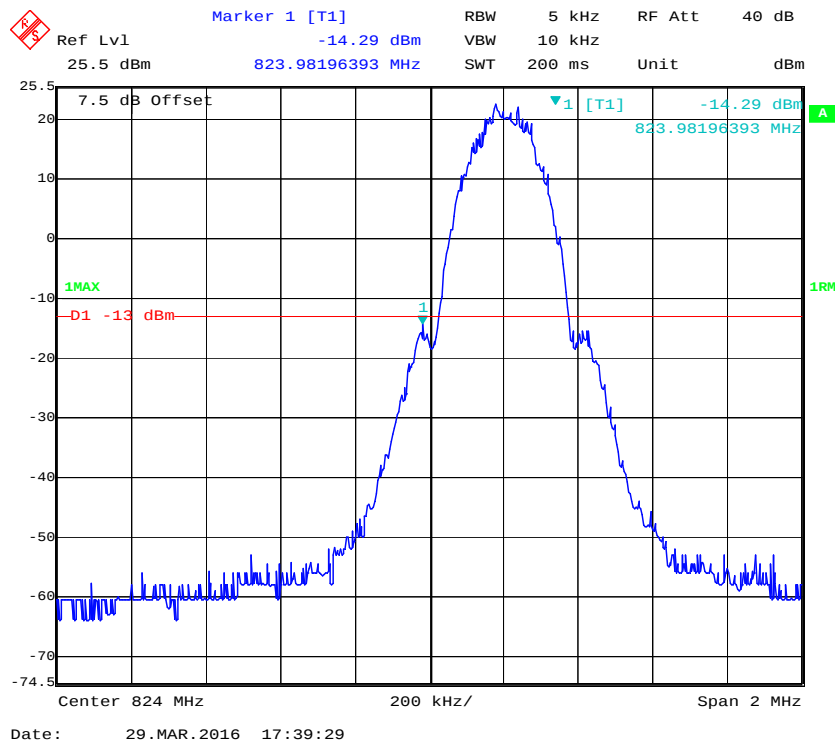
|                           |                |
|---------------------------|----------------|
| <b>Temperature:</b>       | 21~25 °C       |
| <b>Relative Humidity:</b> | 51~55 %        |
| <b>ATM Pressure:</b>      | 100.5~101.0kPa |

*The testing was performed by Simon Wang from 2016-03-18 to 2016-03-30.*

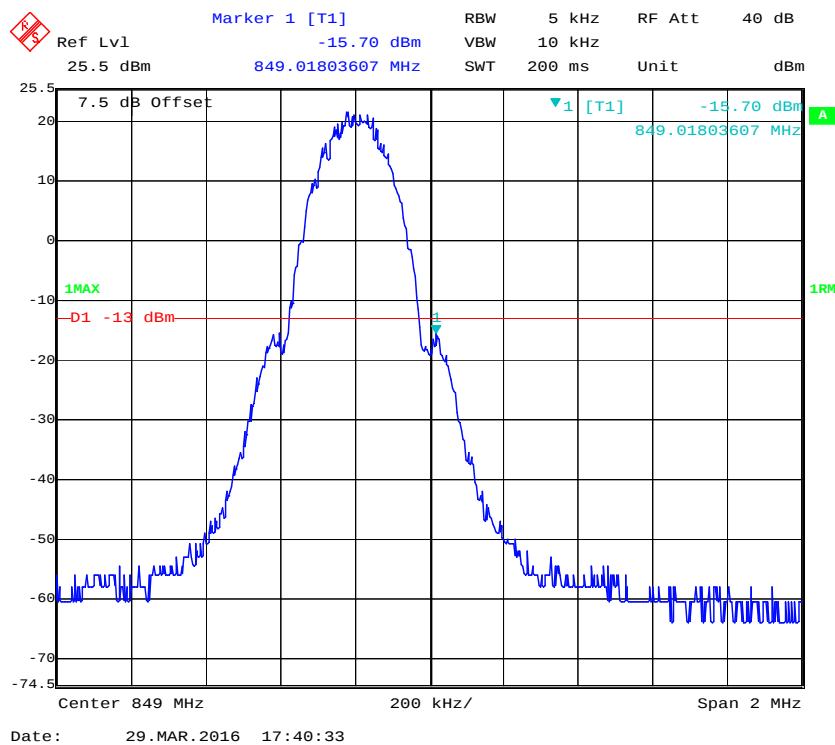
*EUT operation mode: Transmitting*

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

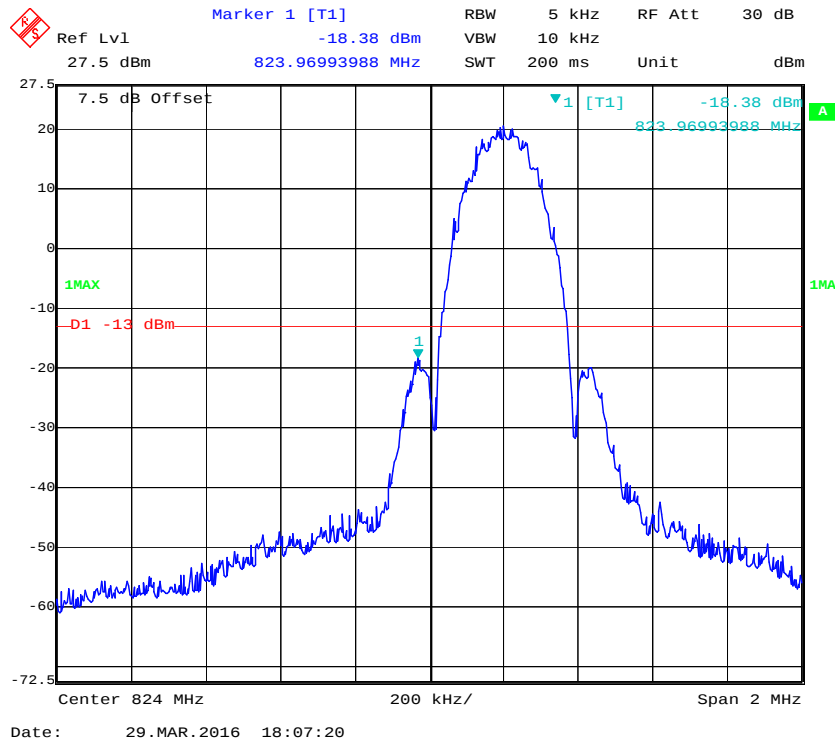
## Cellular Band, Left Band Edge for GSM (GMSK) Mode



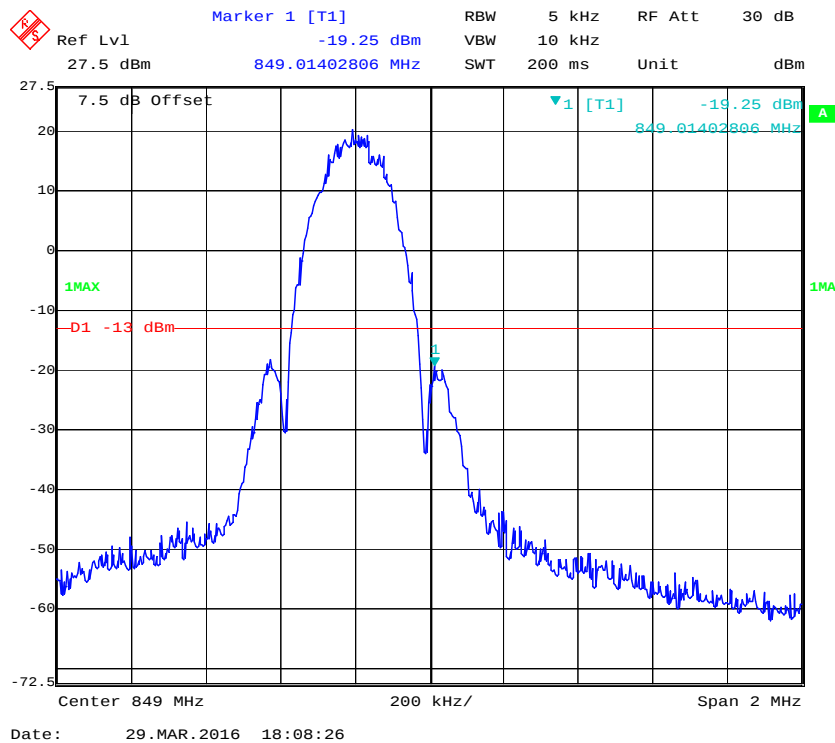
## Cellular Band, Right Band Edge for GSM (GMSK) Mode



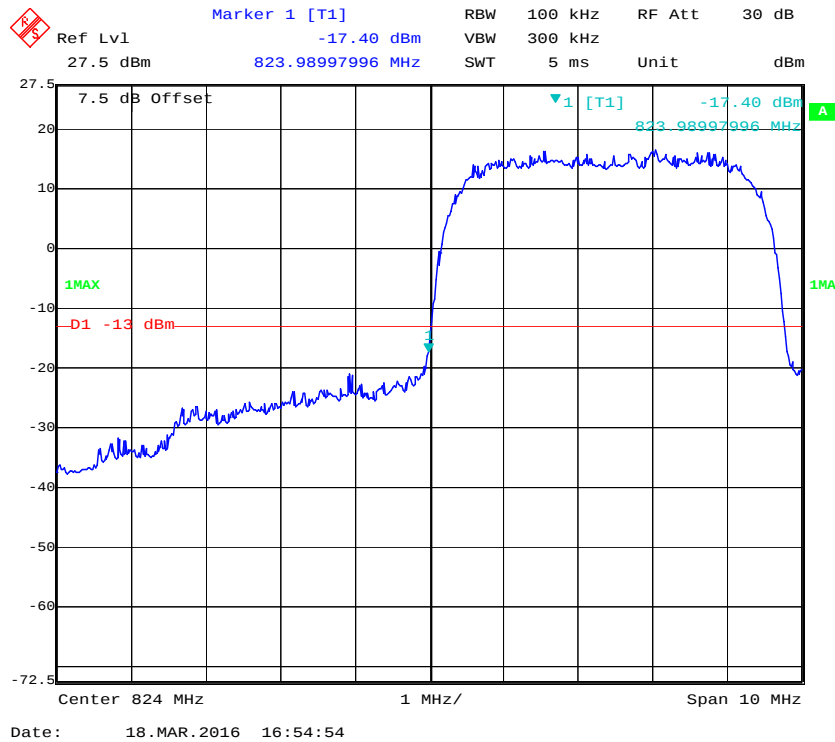
## Cellular Band, Left Band Edge for EGPRS Mode



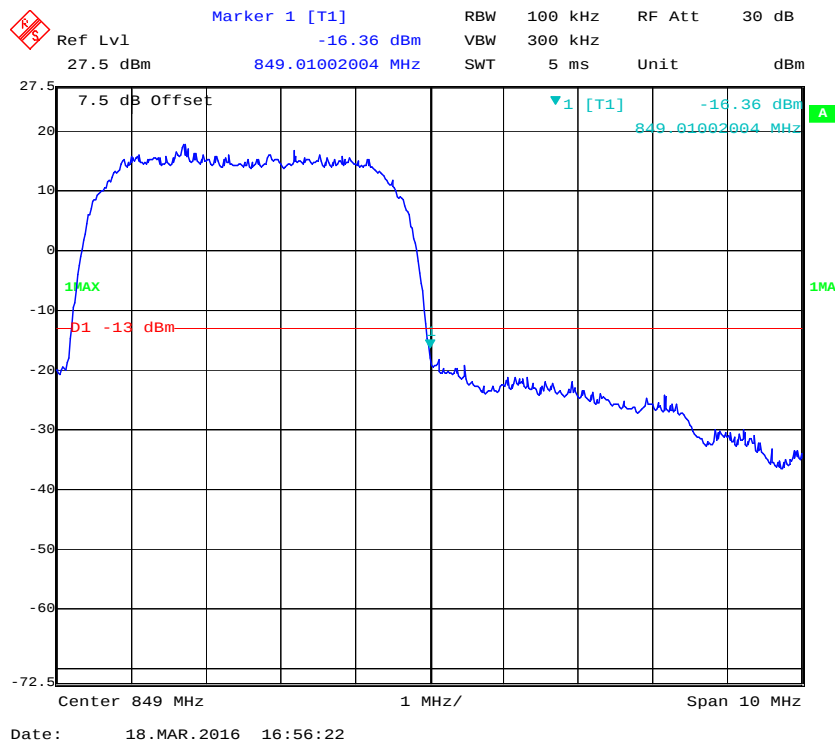
## Cellular Band, Right Band Edge for EGPRS Mode

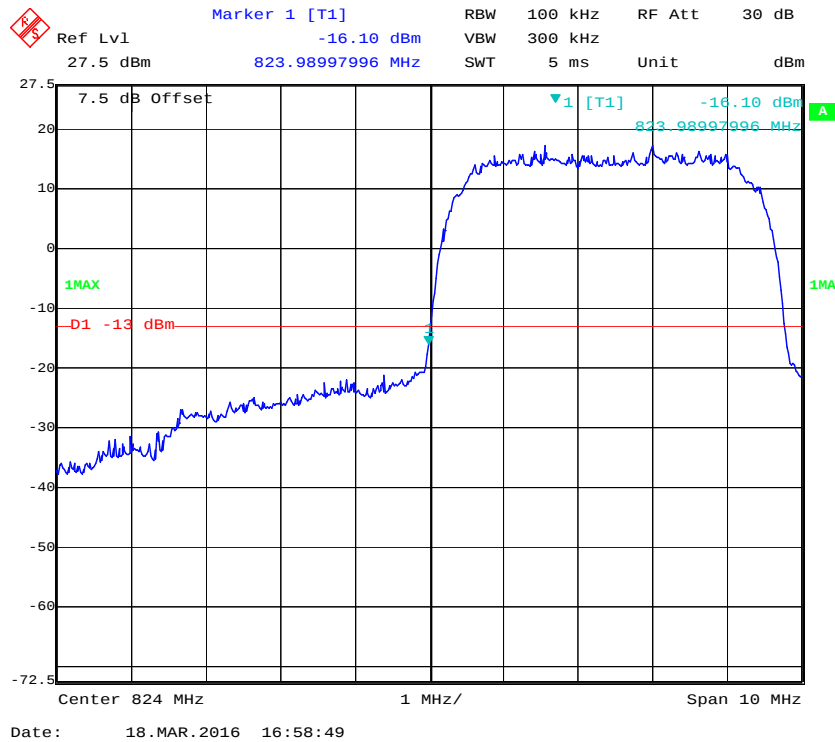
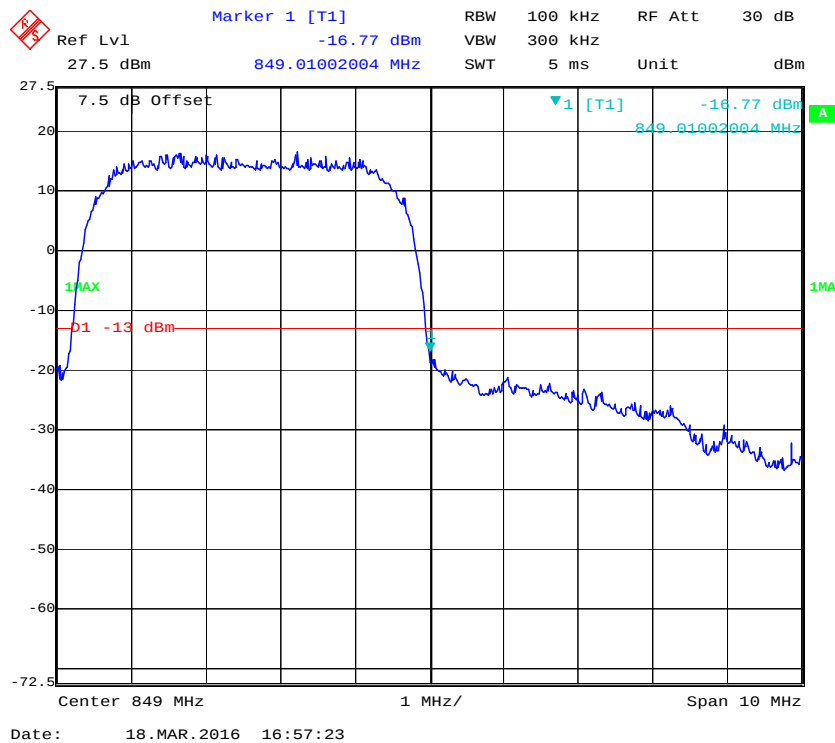


## Cellular Band, Left Band Edge for RMC (BPSK) Mode

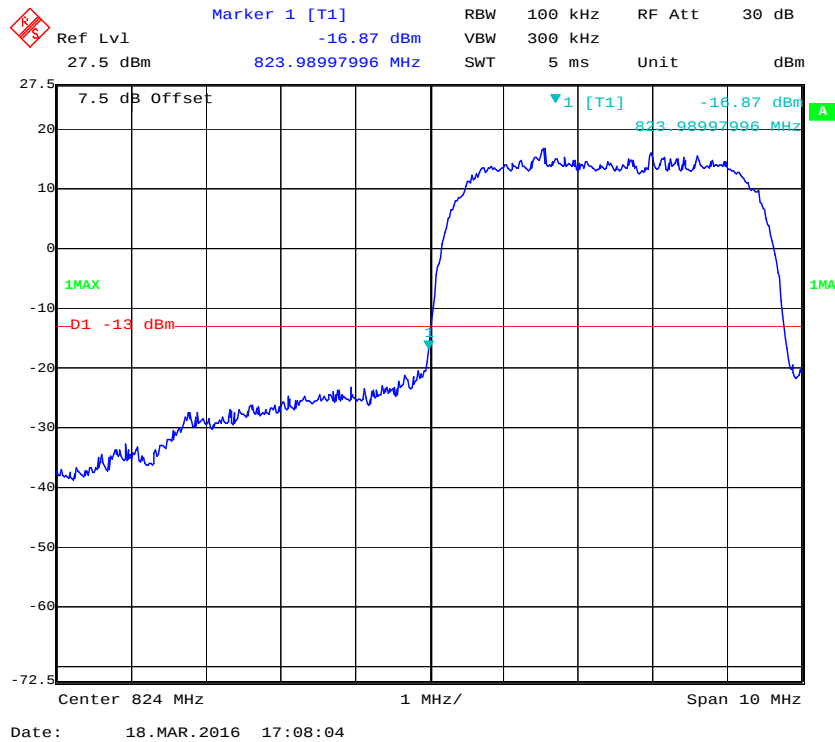


## Cellular Band, Right Band Edge for RMC (BPSK) Mode

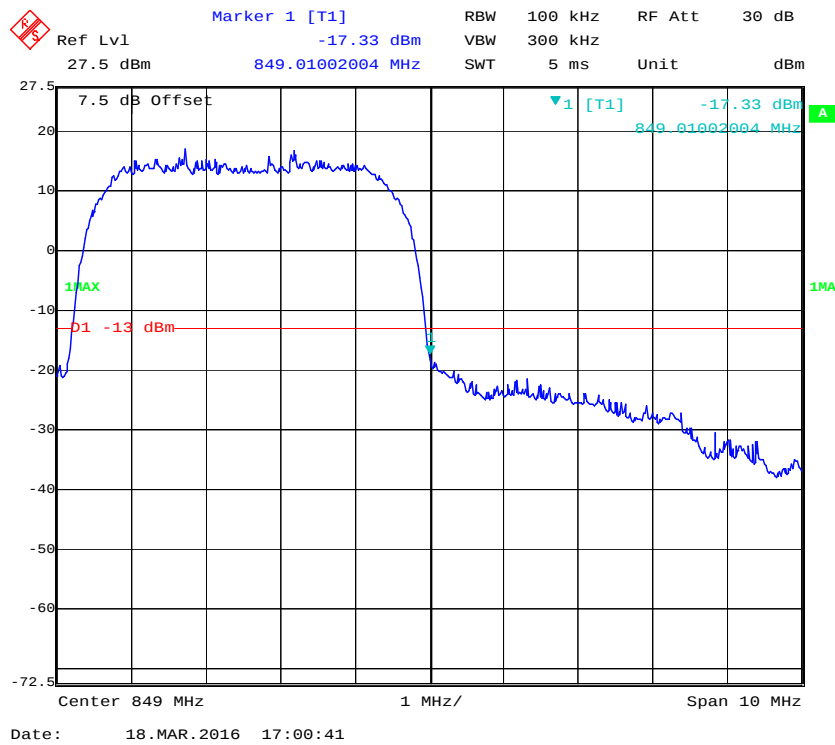


**Cellular Band, Left Band Edge for HSDPA (16QAM) Mode****Cellular Band, Right Band Edge for HSDPA (16QAM) Mode**

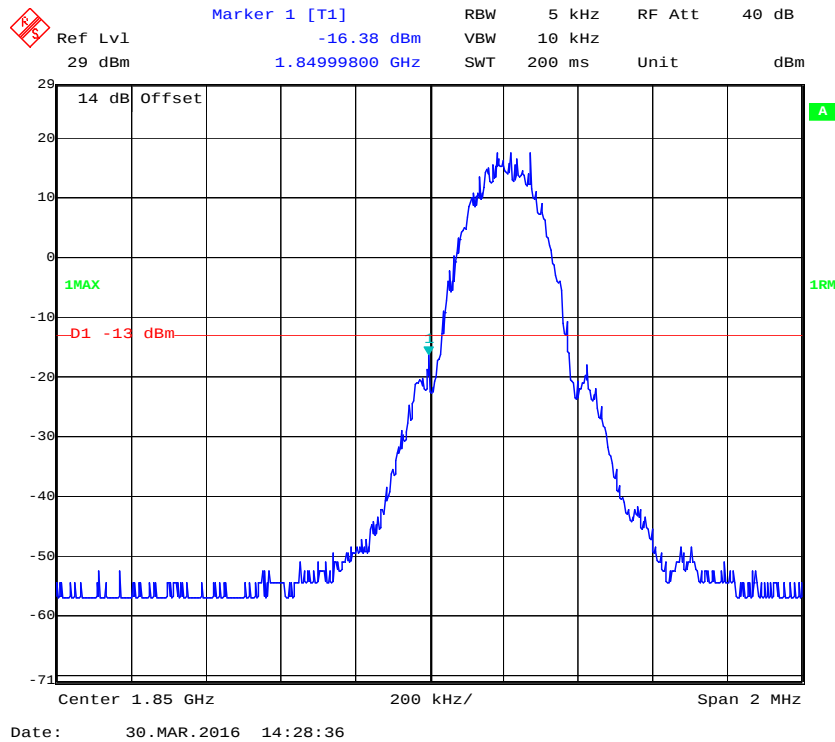
### Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



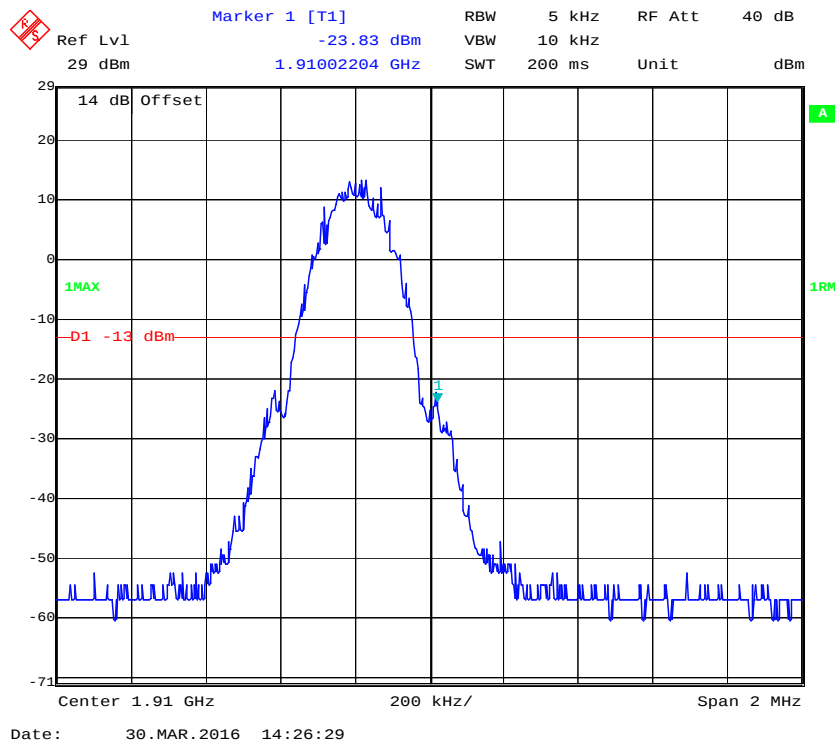
### Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



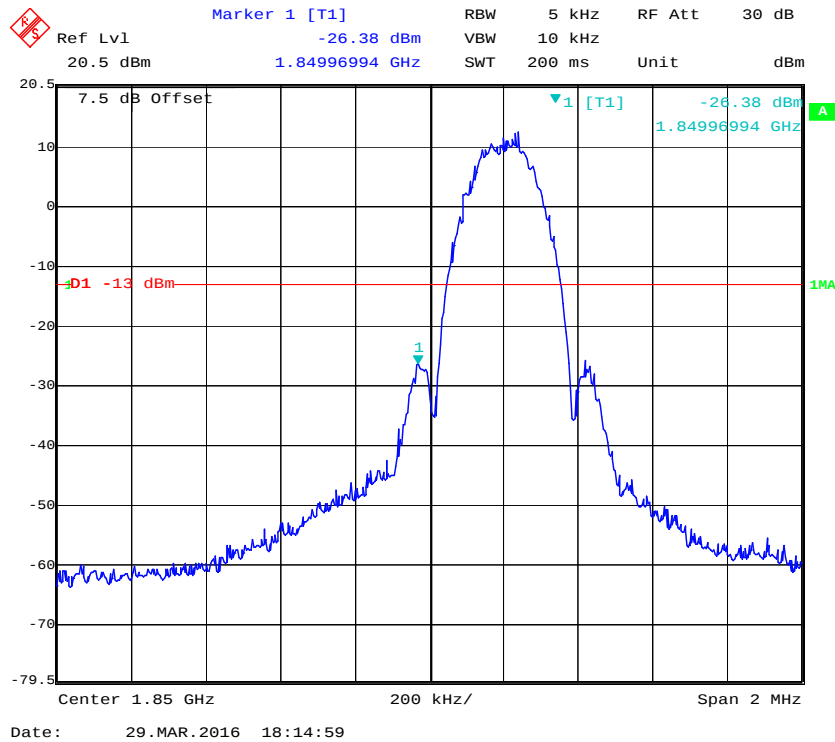
### PCS Band, Left Band Edge for GSM (GMSK) Mode



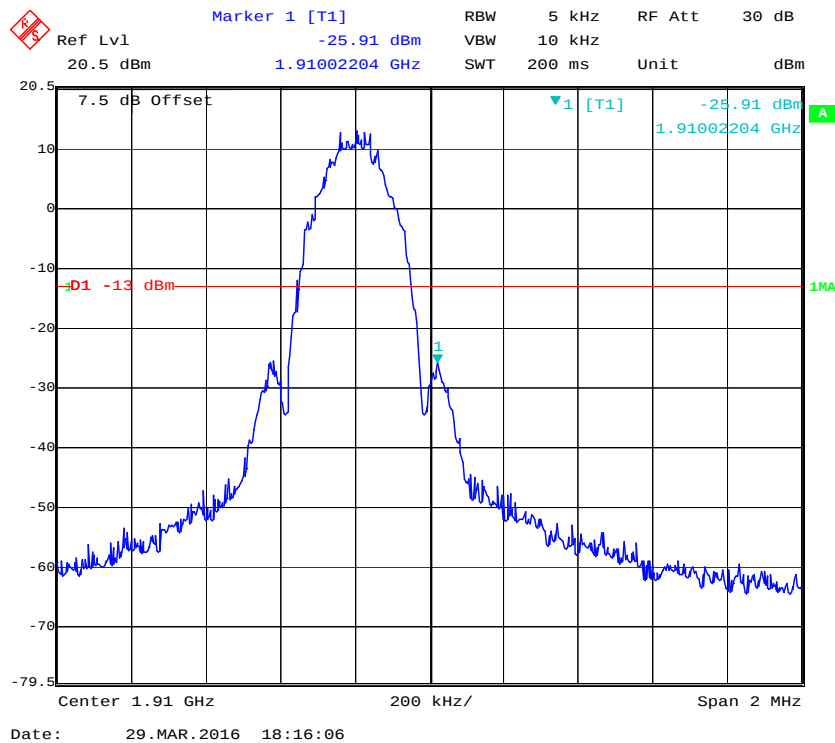
### PCS Band, Right Band Edge for GSM (GMSK) Mode



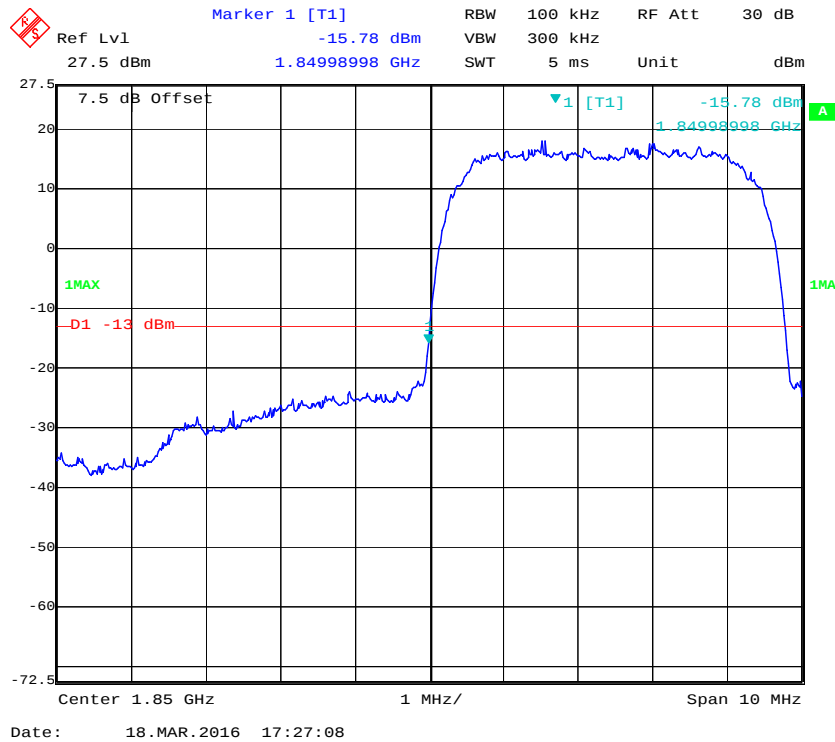
### PCS Band, Left Band Edge for EGPRS Mode



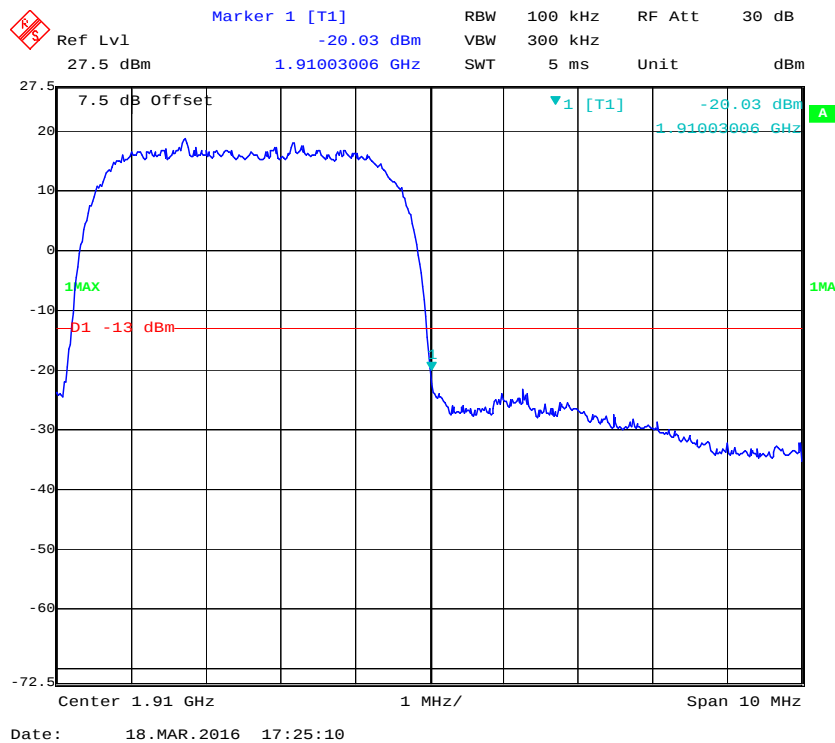
### PCS Band, Right Band Edge for EGPRS Mode



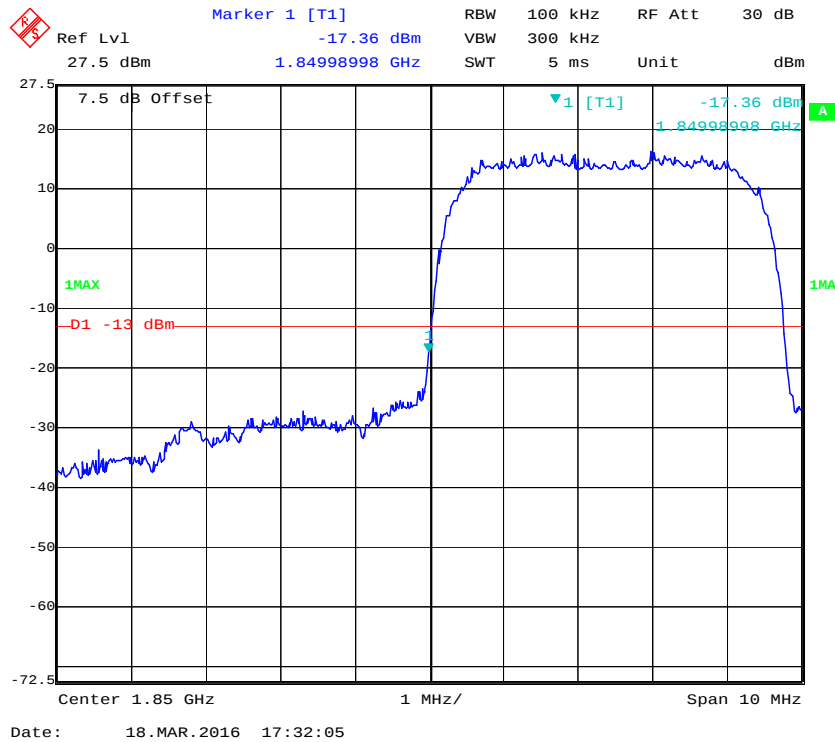
## PCS Band, Left Band Edge for RMC (BPSK) Mode



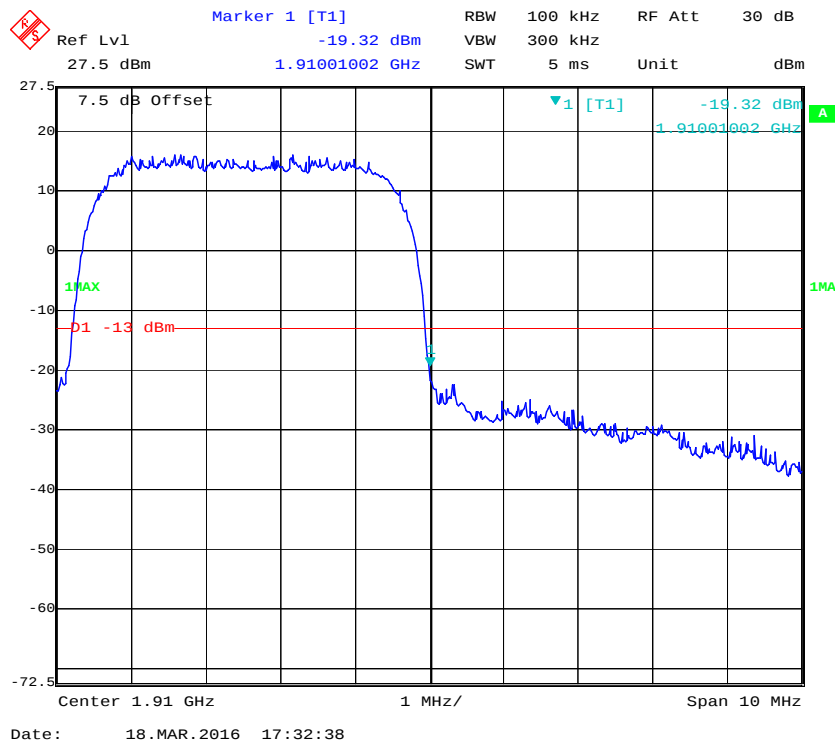
## PCS Band, Right Band Edge for RMC (BPSK) Mode



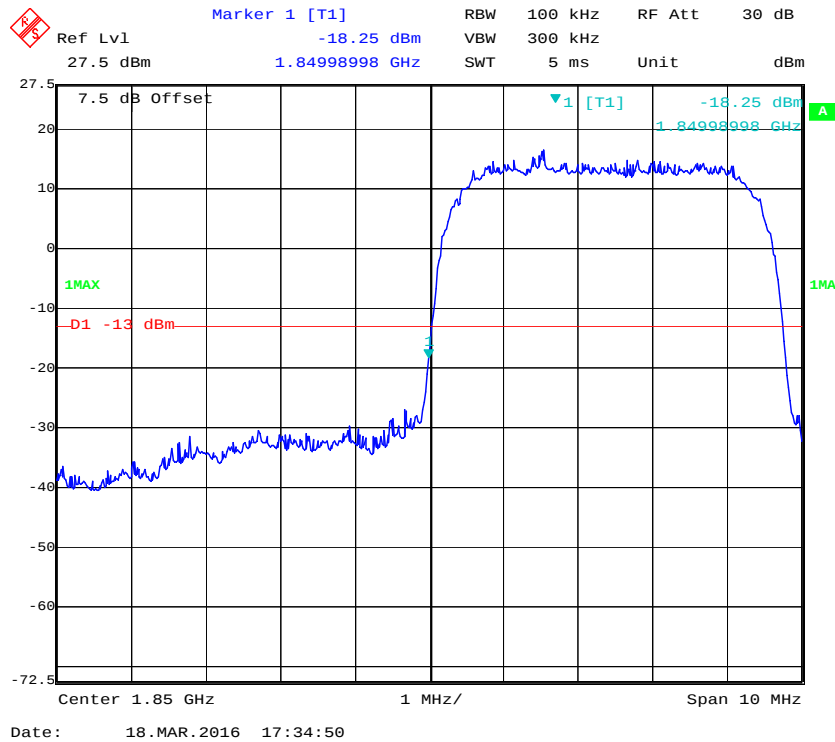
## PCS Band, Left Band Edge for HSDPA (16QAM) Mode



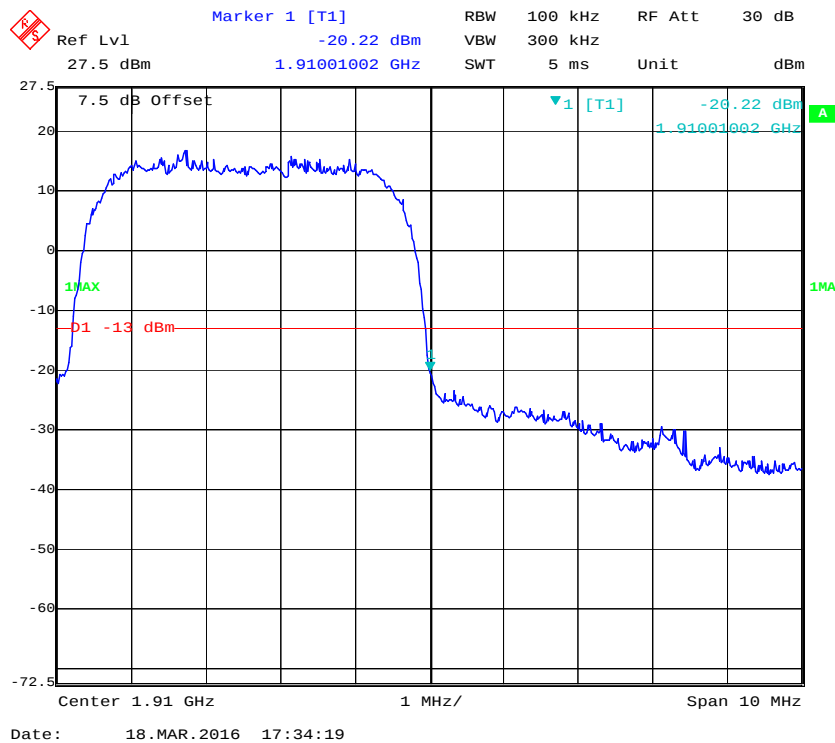
## PCS Band, Right Band Edge for HSDPA (16QAM) Mode

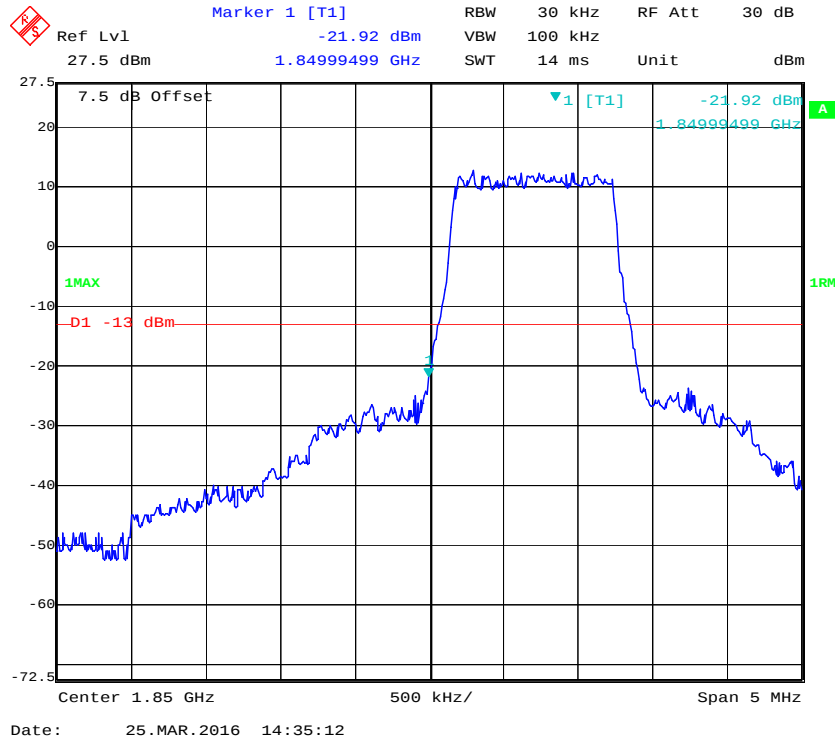
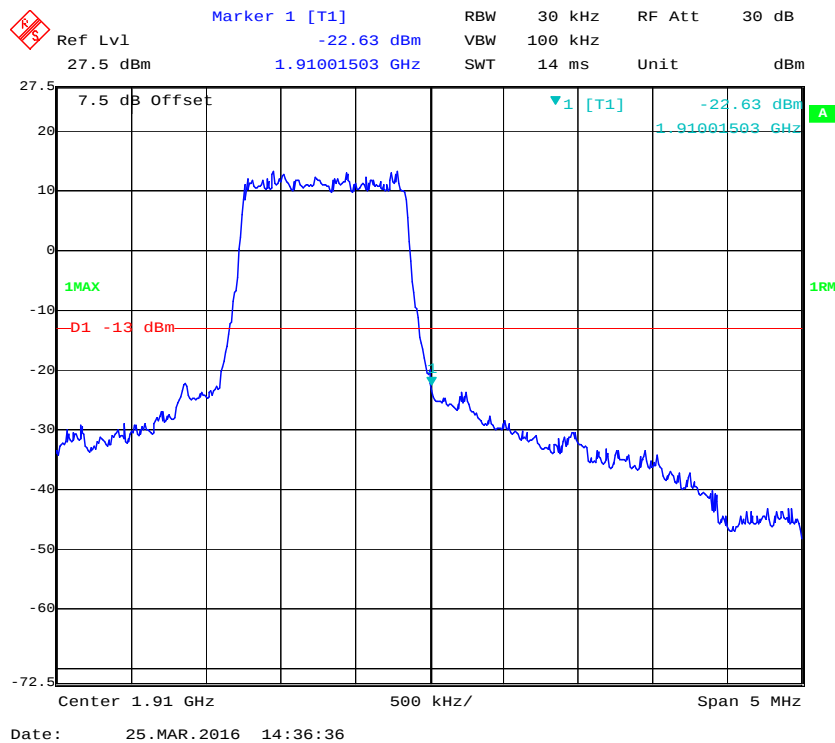


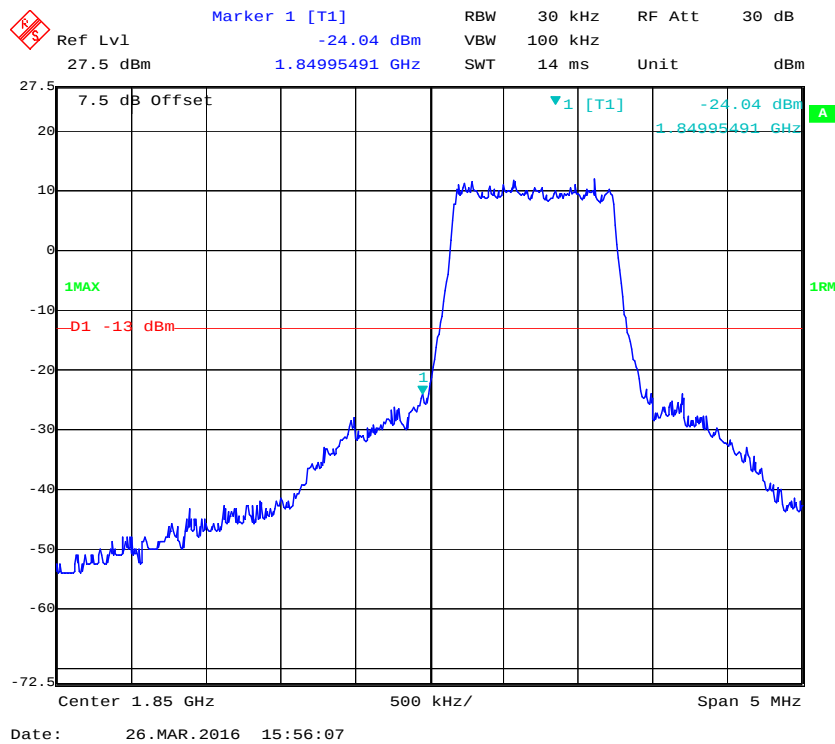
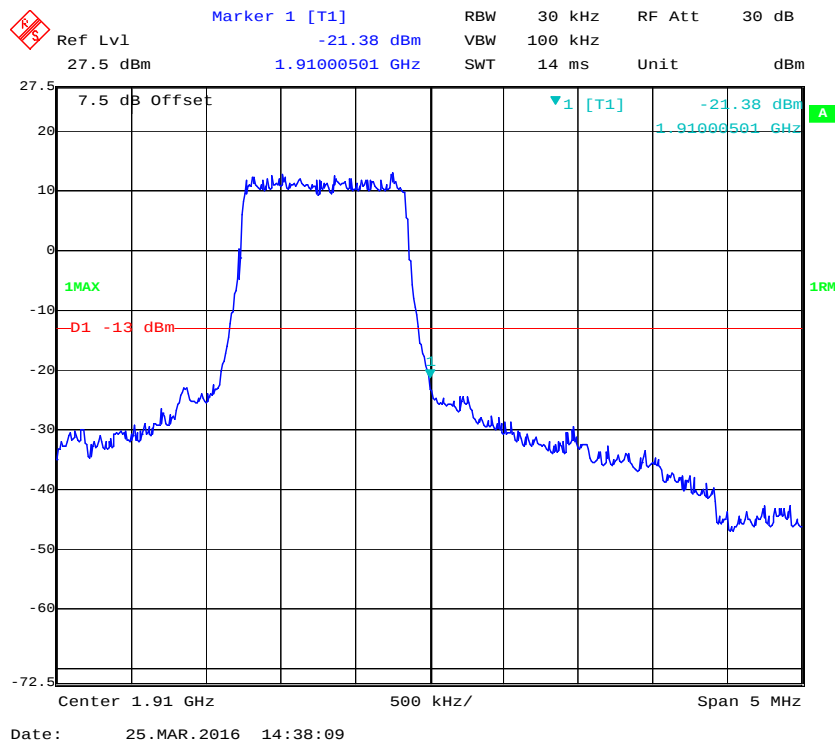
## PCS Band, Left Band Edge for HSUPA (BPSK) Mode



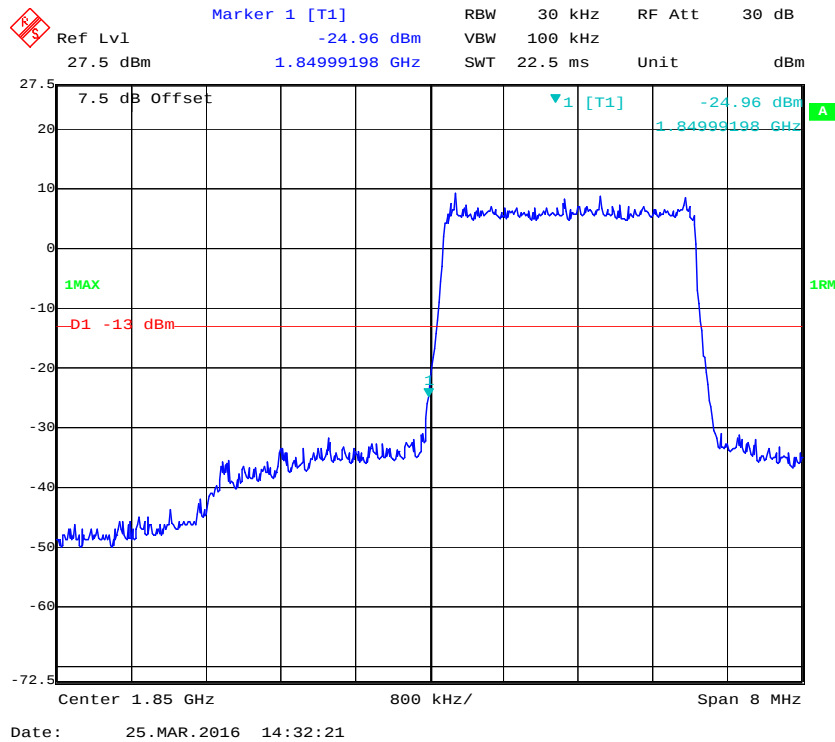
## PCS Band, Right Band Edge for HSUPA (BPSK) Mode



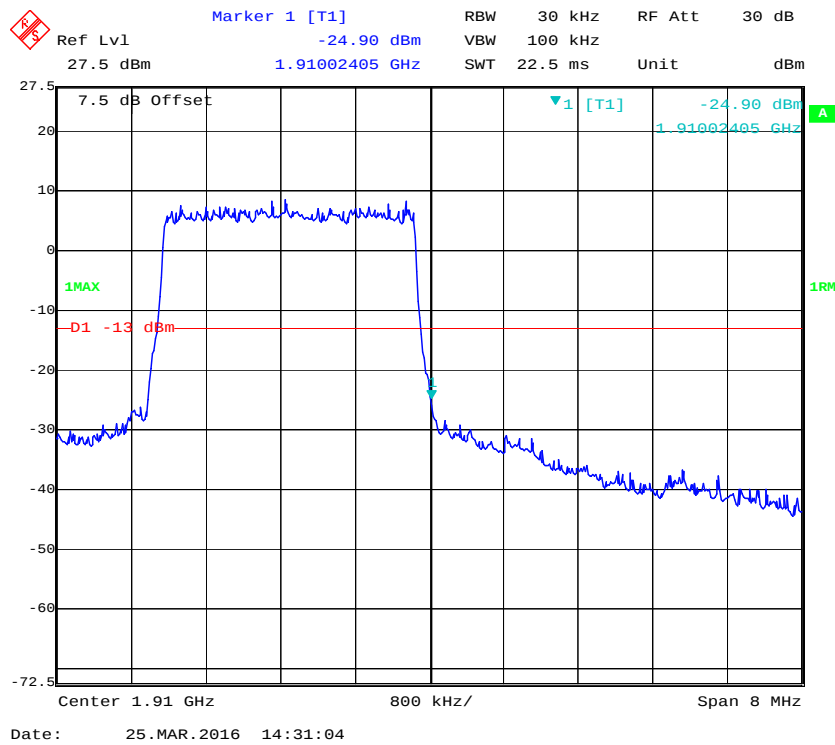
**Band 2:****QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

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

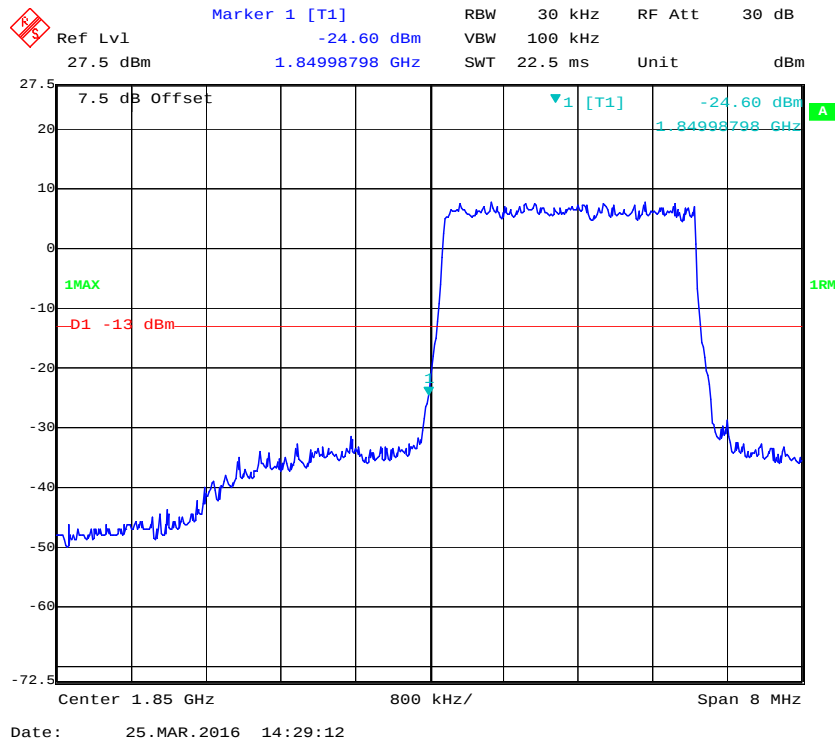
### QPSK (3.0 MHz, FULL RB) - Left Band Edge



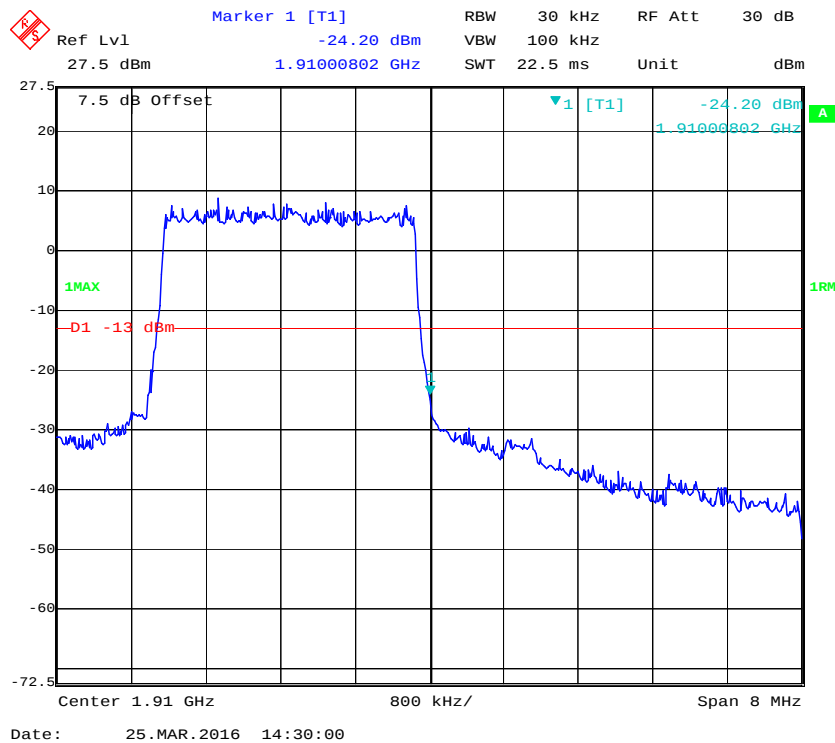
### QPSK (3.0 MHz, FULL RB) - Right Band Edge

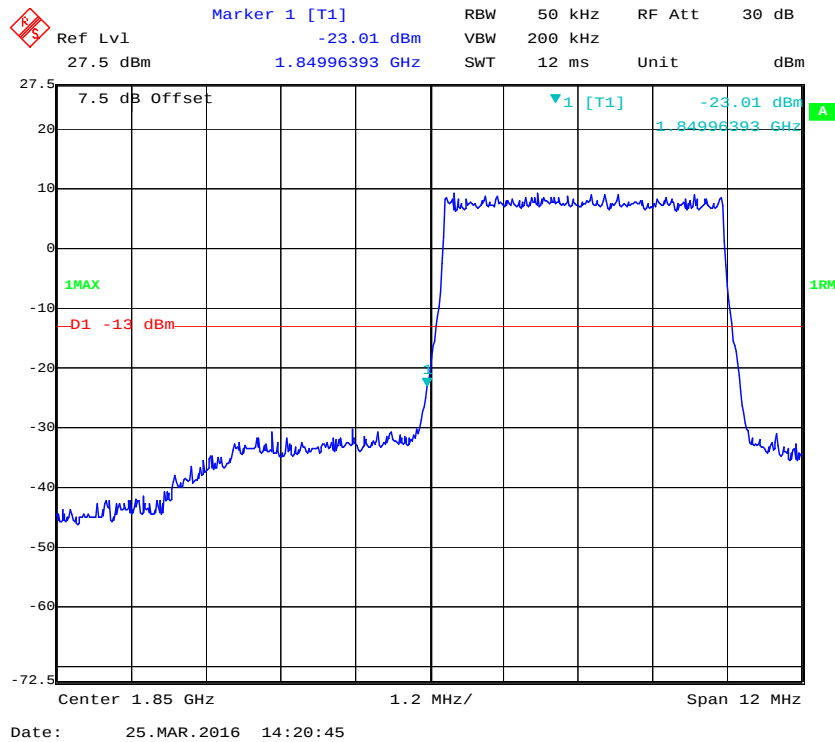
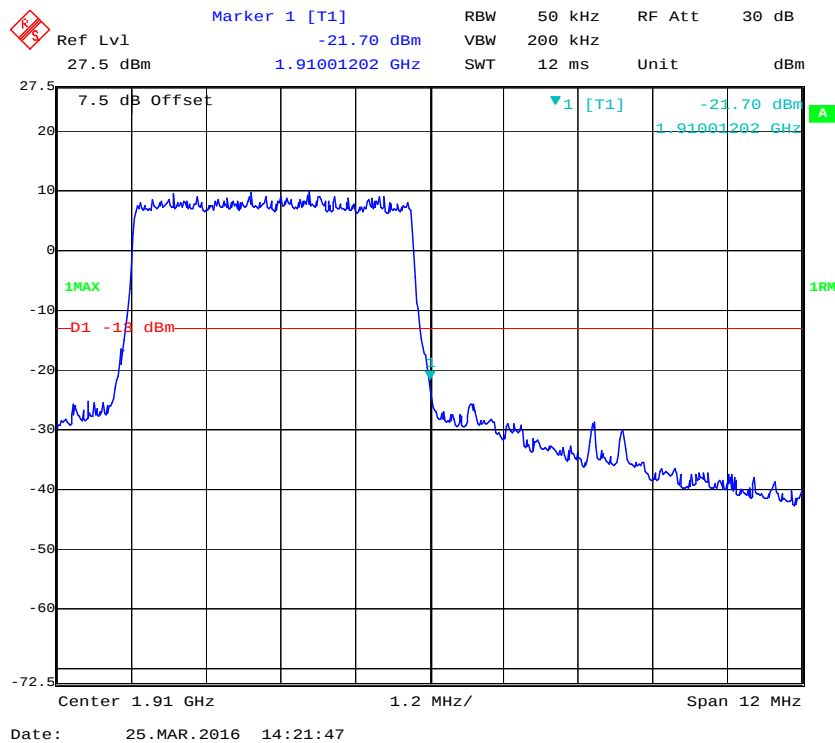


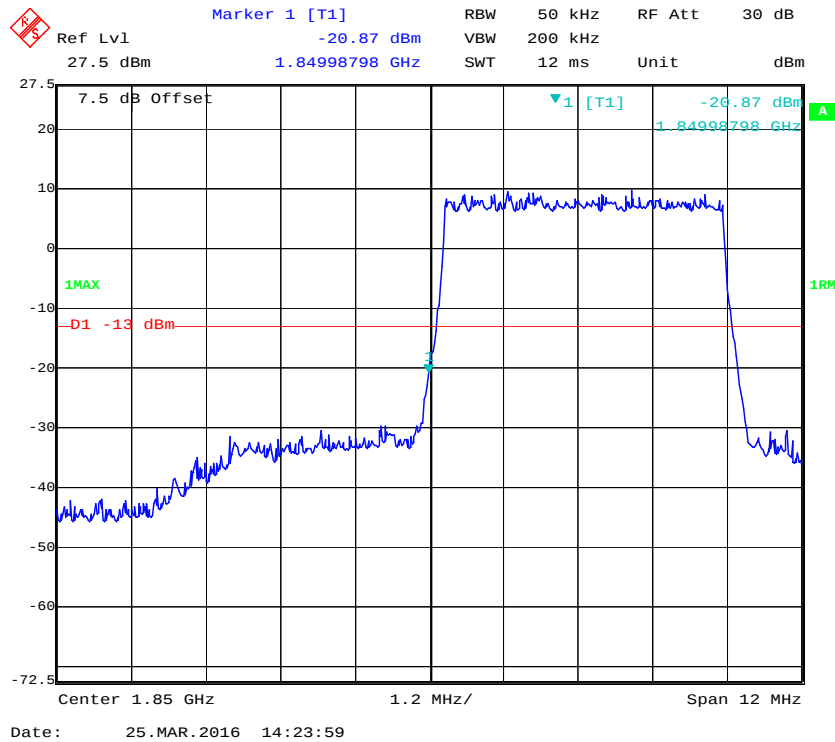
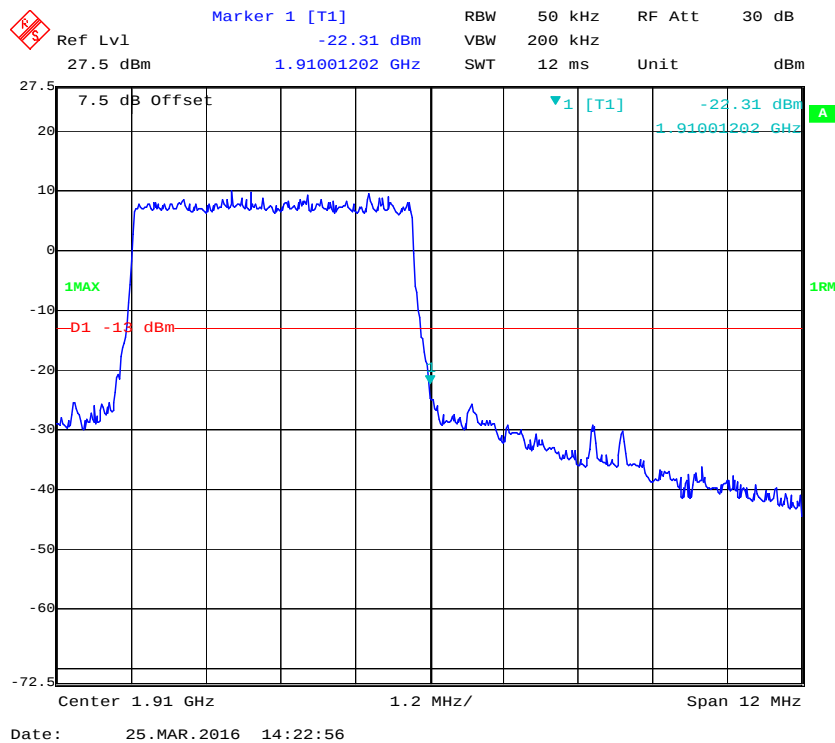
### 16-QAM (3.0 MHz, FULL RB) - Left Band Edge

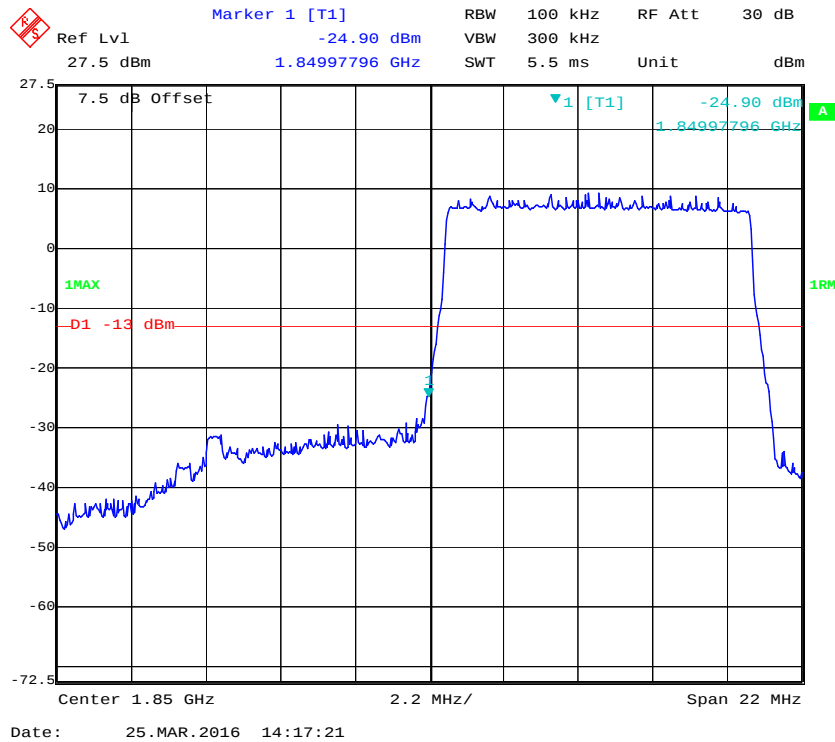
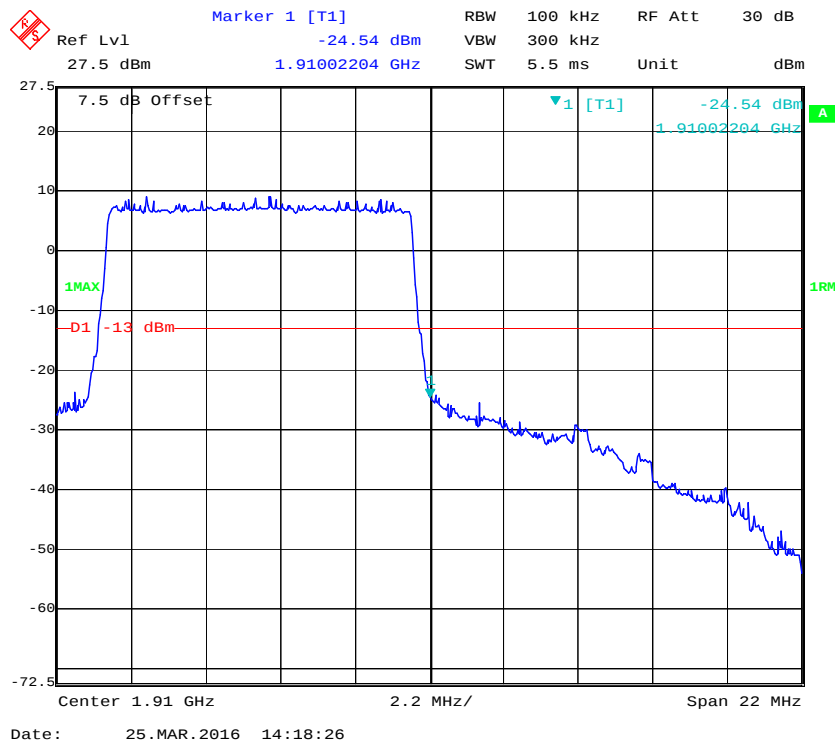


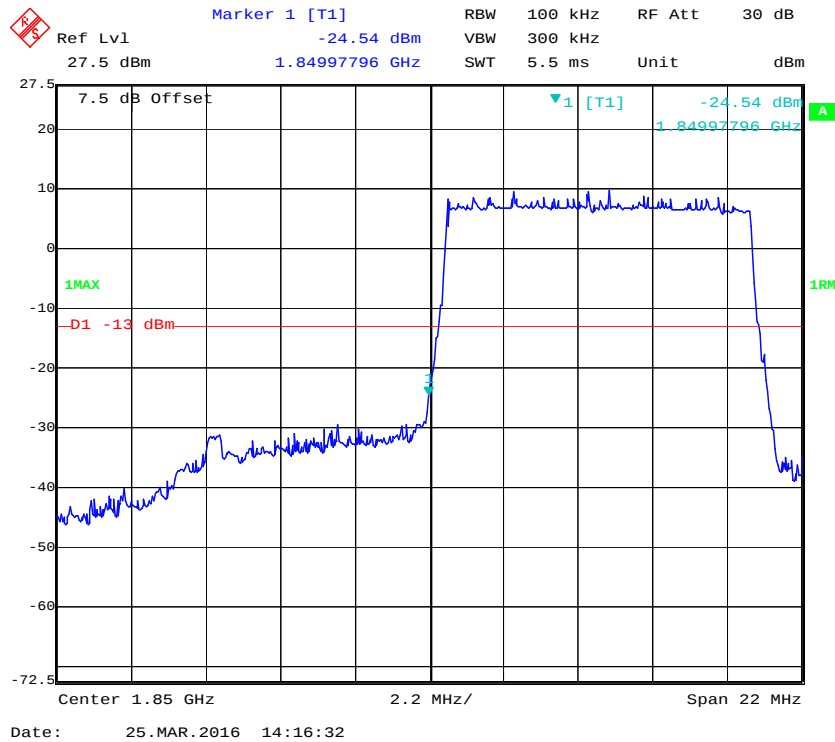
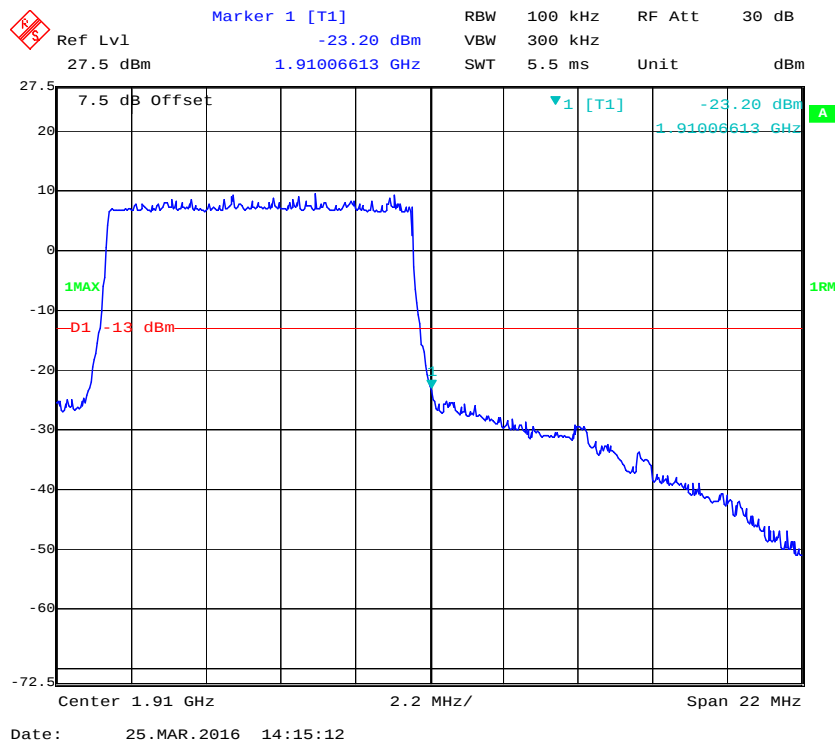
### 16-QAM (3.0 MHz, FULL RB) - Right Band Edge

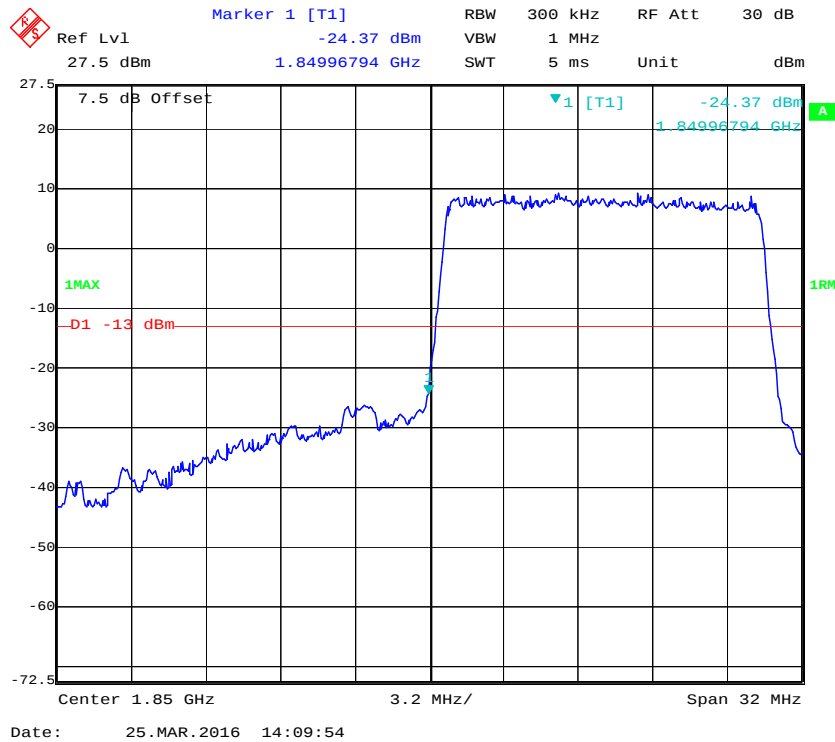
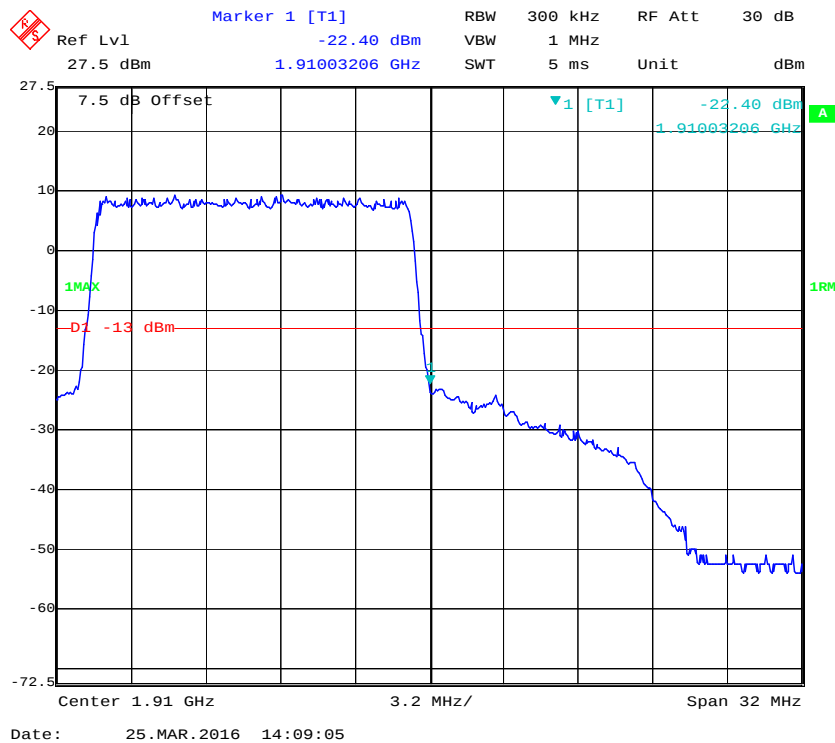


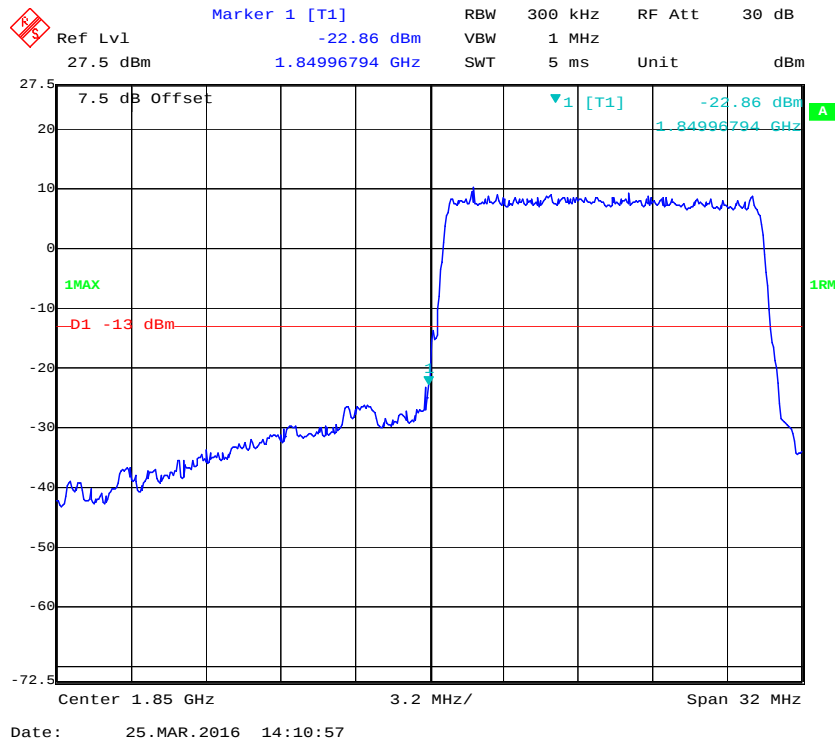
**QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**

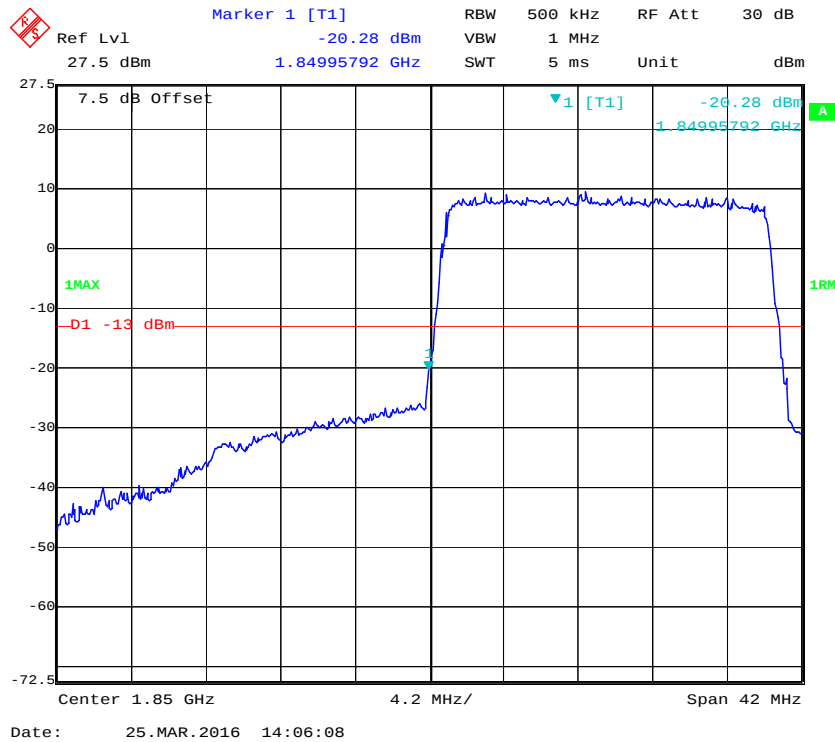
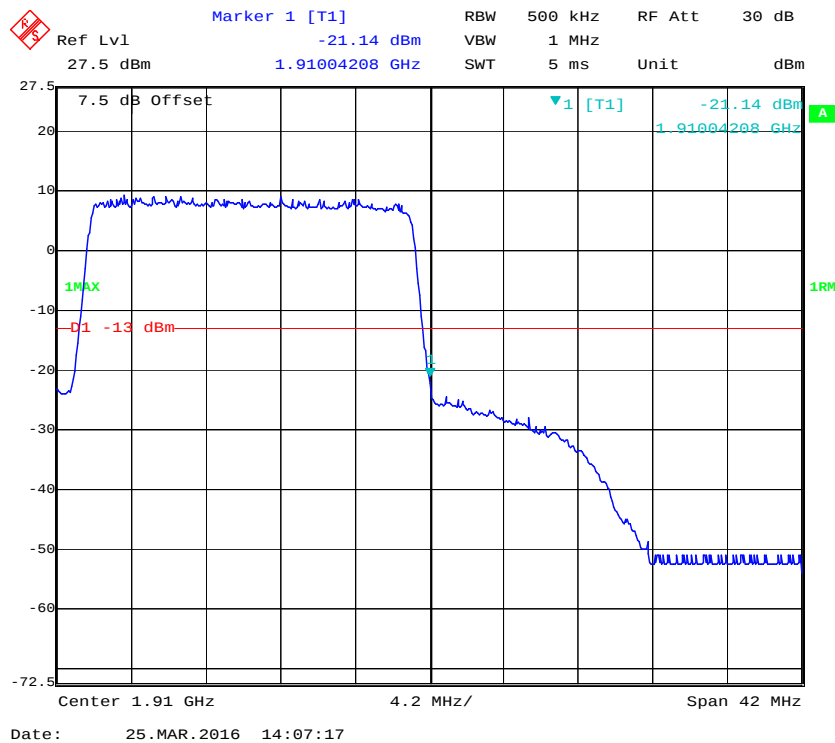
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge****16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

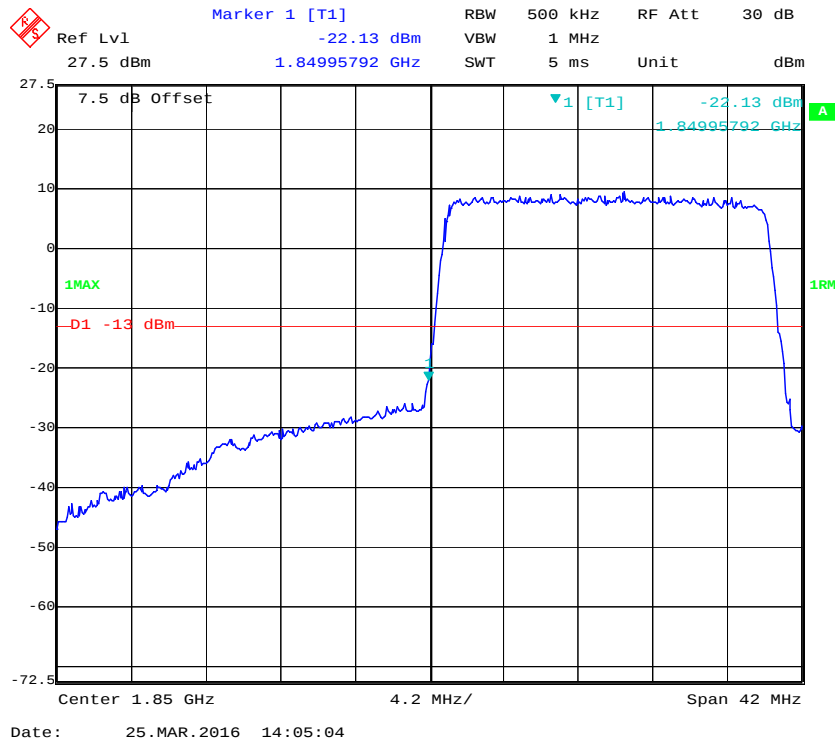
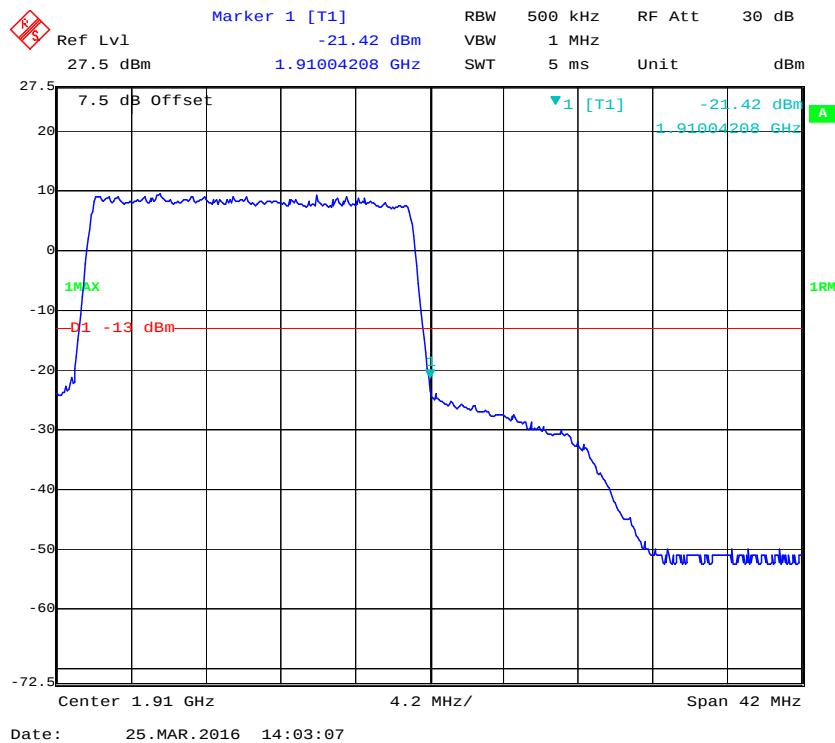
**QPSK (10.0 MHz, FULL RB) - Left Band Edge****QPSK (10.0 MHz, FULL RB) - Right Band Edge**

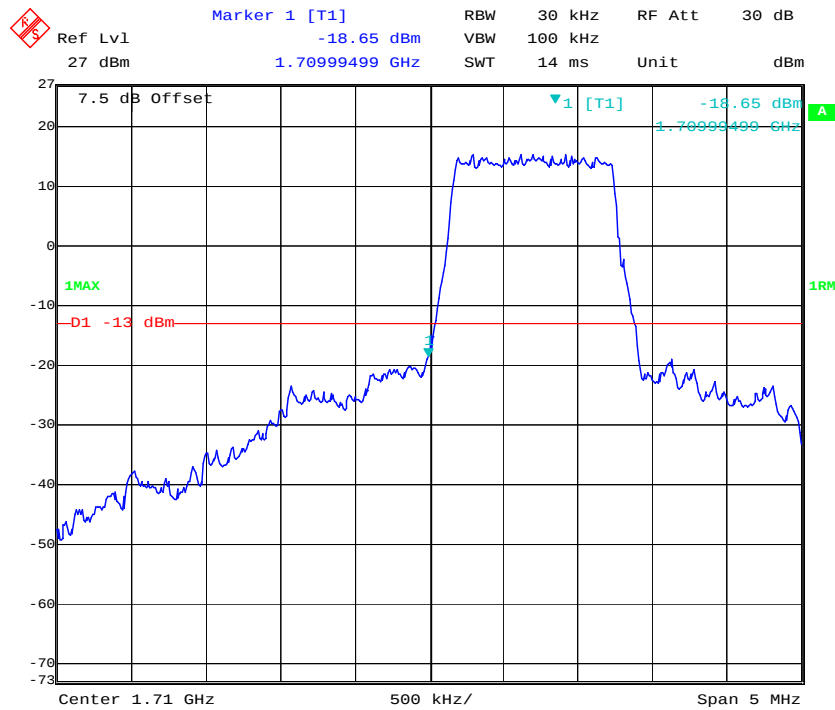
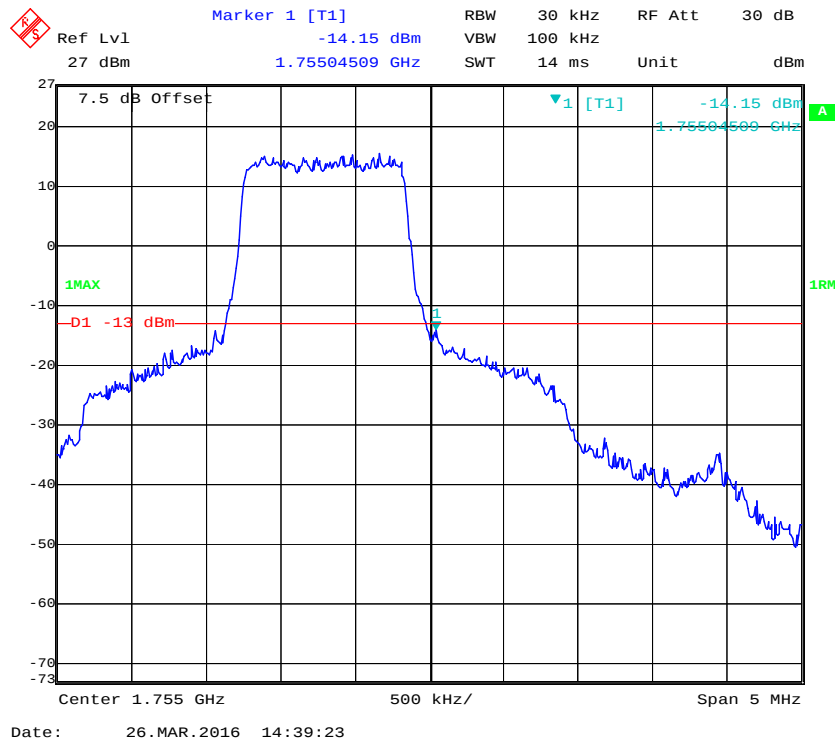
**16-QAM (10.0 MHz, FULL RB) - Left Band Edge****16-QAM (10.0 MHz, FULL RB) - Right Band Edge**

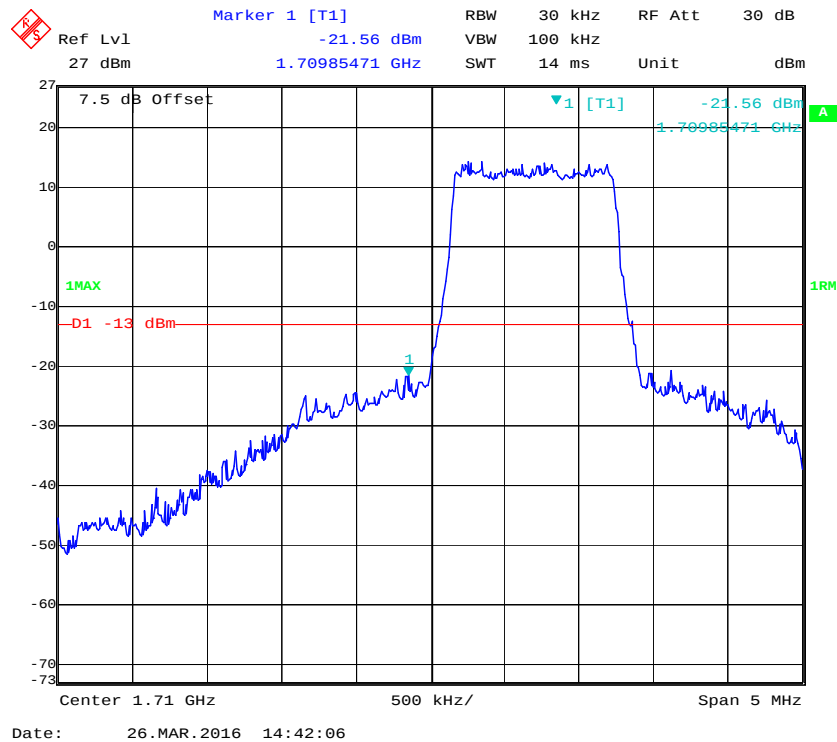
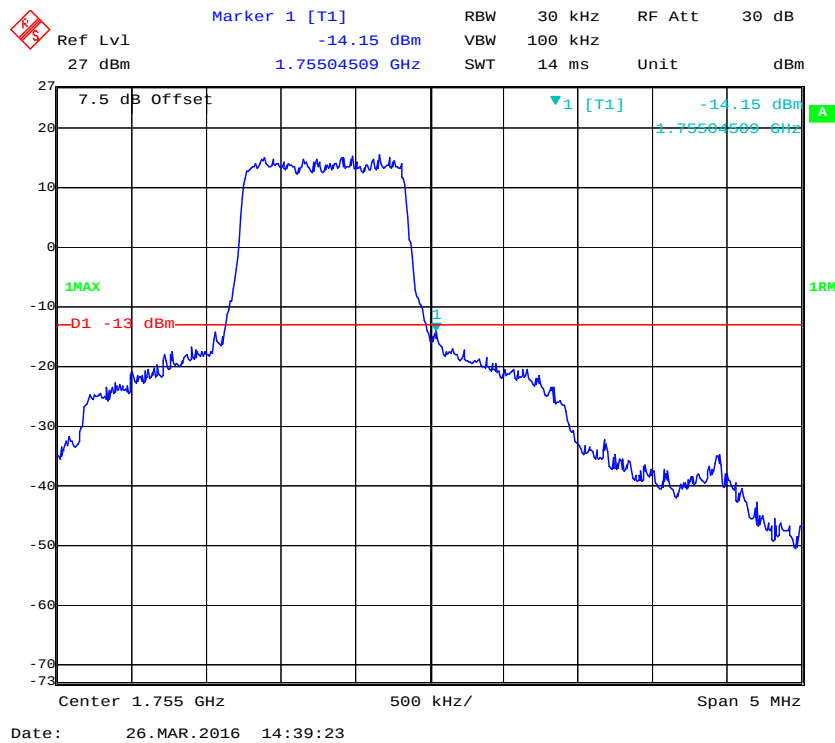
**QPSK (15.0 MHz, FULL RB) - Left Band Edge****QPSK (15.0 MHz, FULL RB) - Right Band Edge**

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

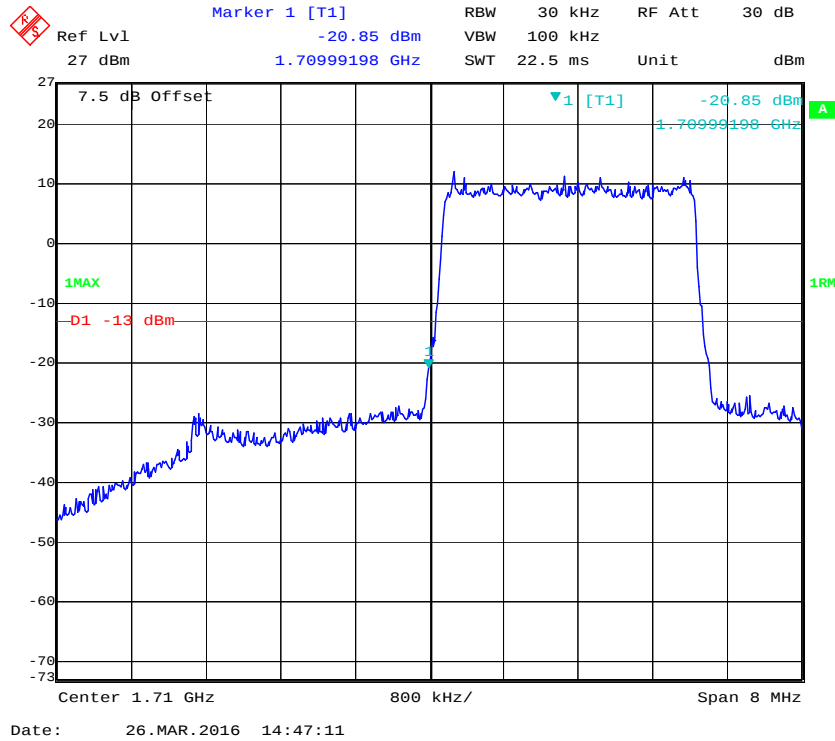
**QPSK (20.0 MHz, FULL RB) - Left Band Edge****QPSK (20.0 MHz, FULL RB) - Right Band Edge**

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

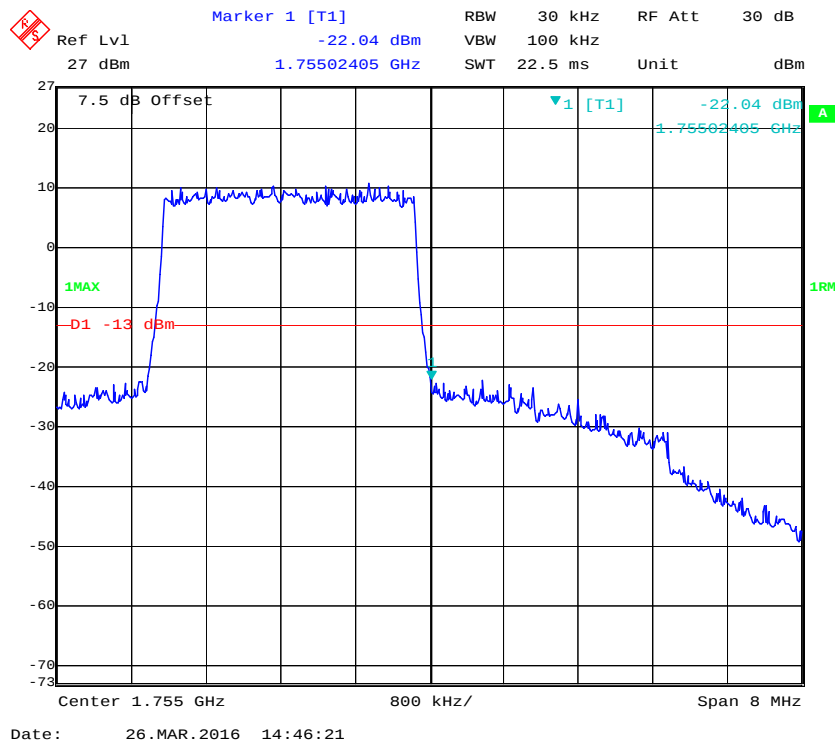
**Band 4:****QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

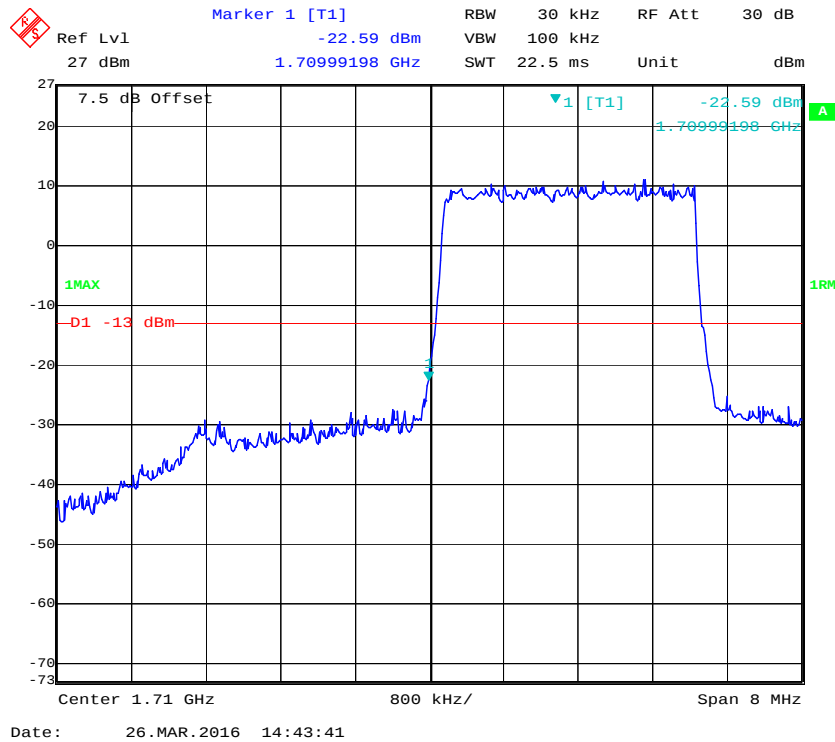
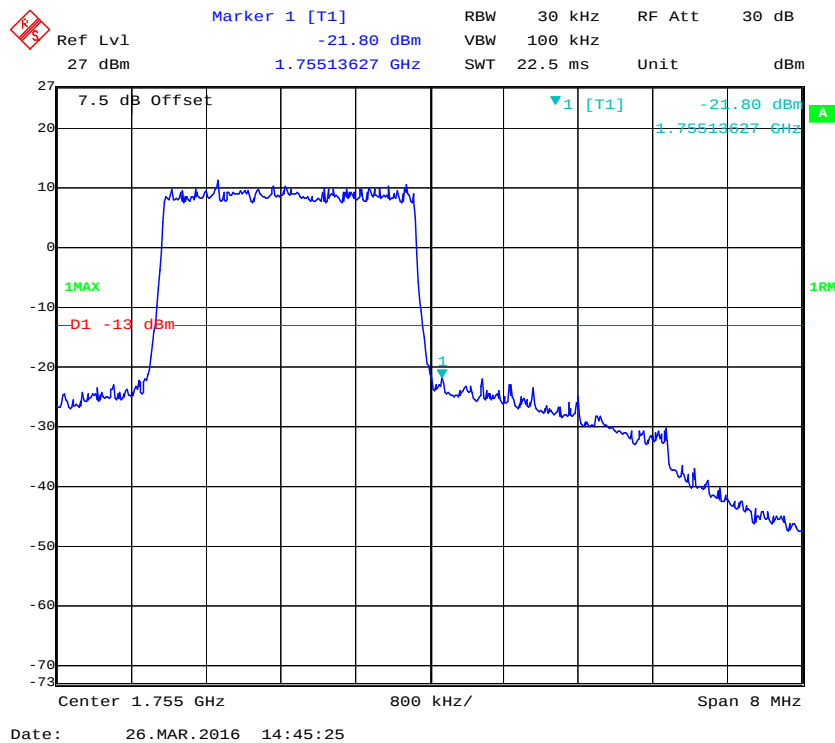
**16-QAM (1.4 MHz, FULL RB) - Left Band Edge****16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

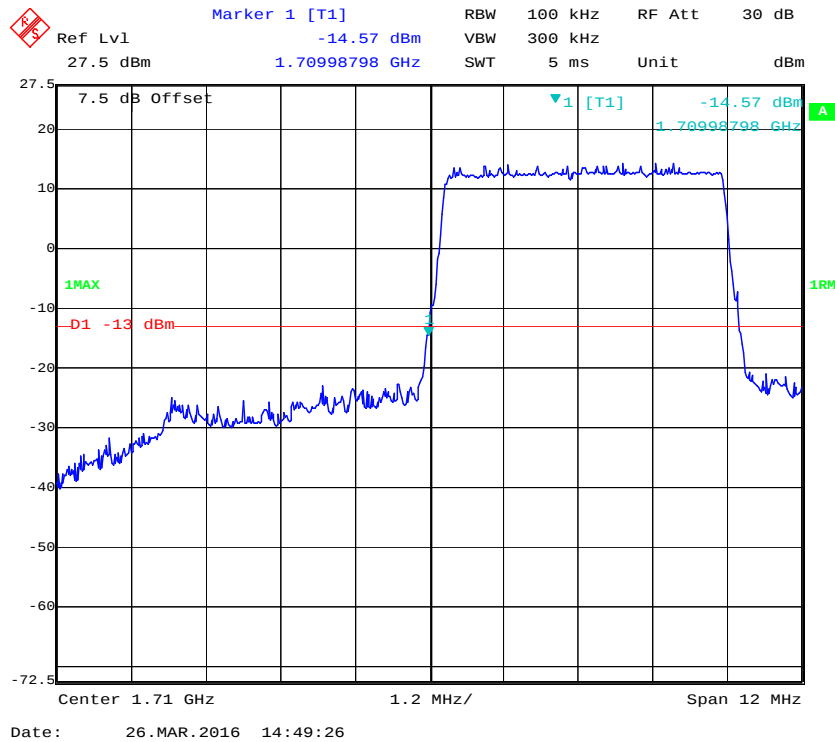
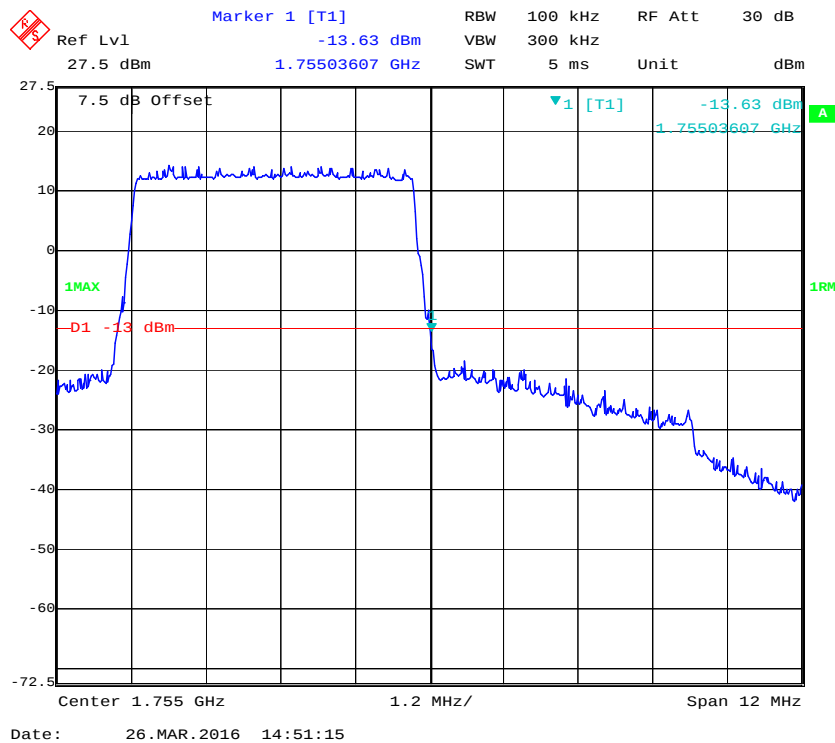
### QPSK (3.0 MHz, FULL RB) - Left Band Edge



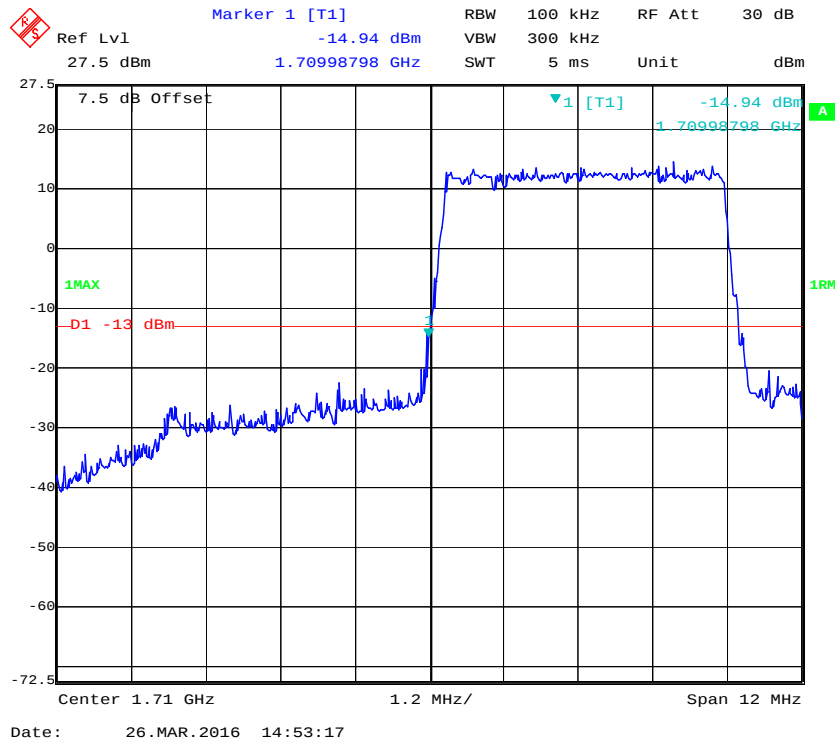
### QPSK (3.0 MHz, FULL RB) - Right Band Edge



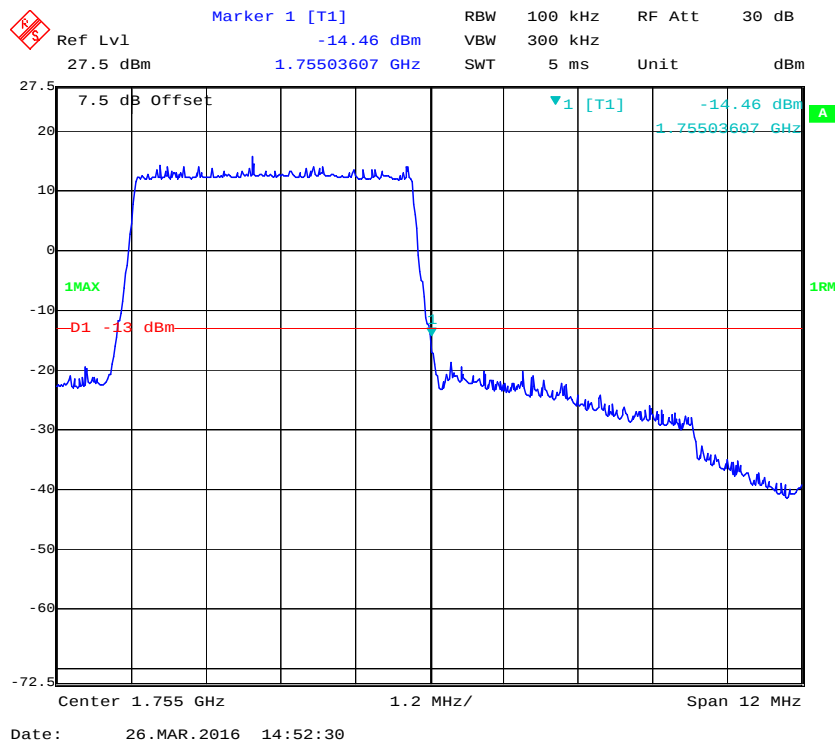
**16-QAM (3.0 MHz, FULL RB) - Left Band Edge****16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

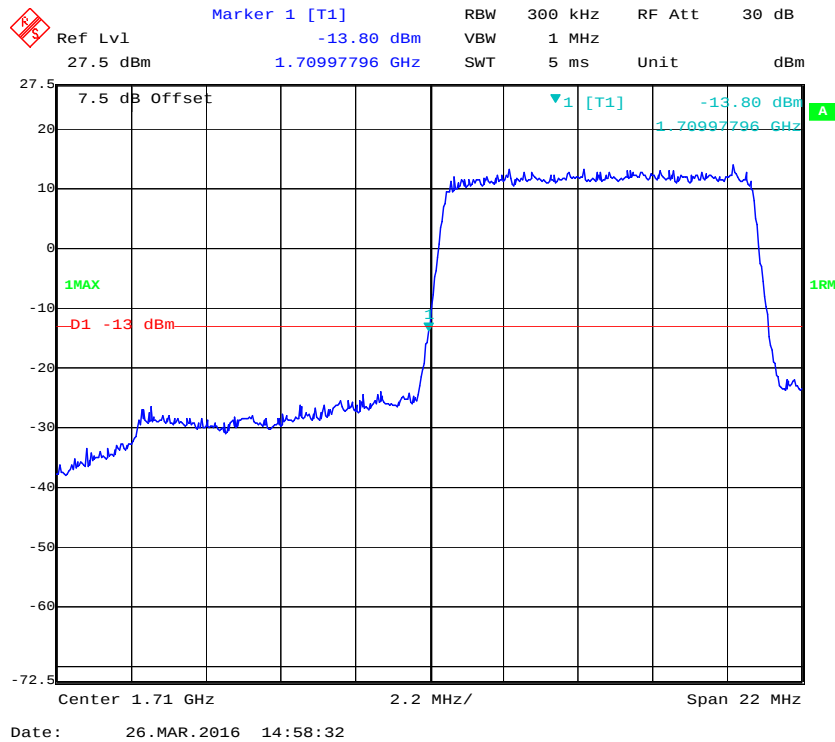
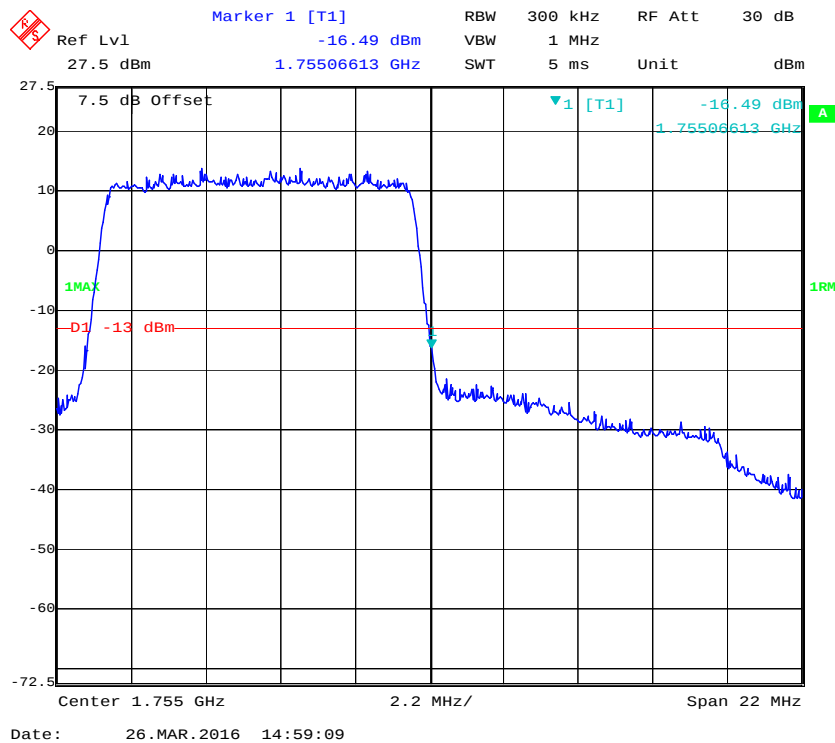
**QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**

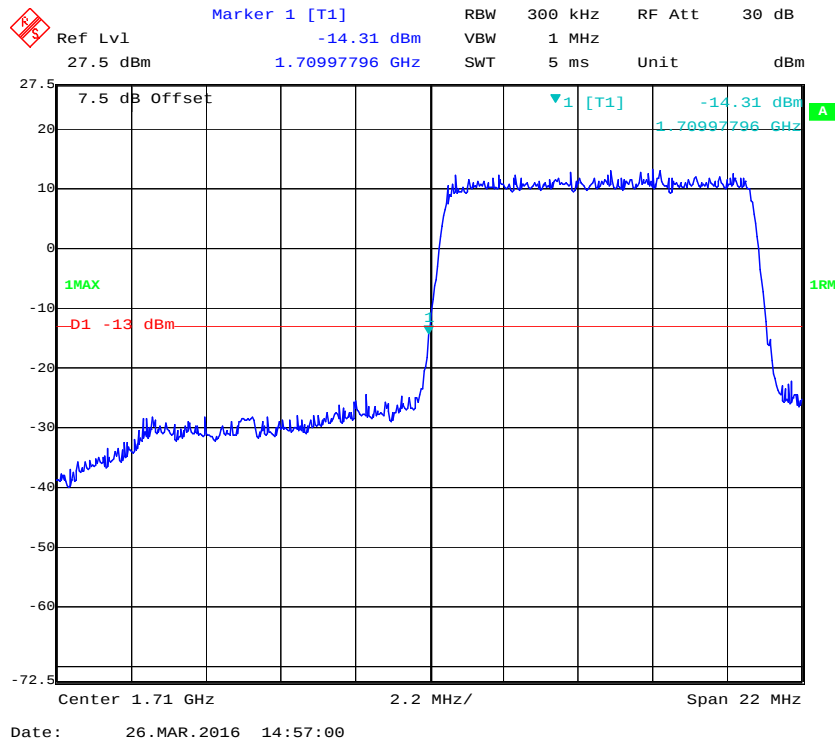
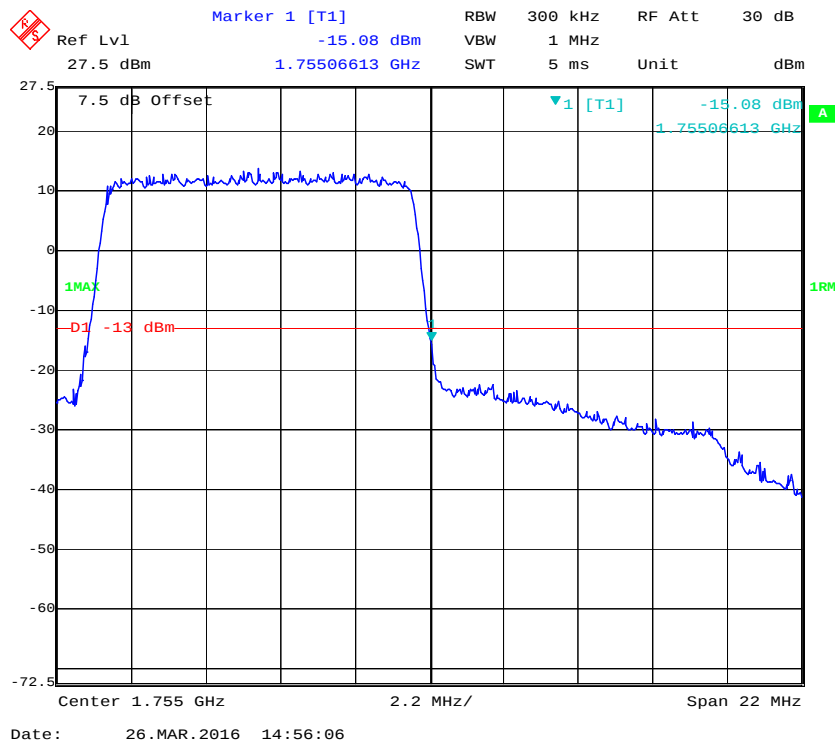
### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge

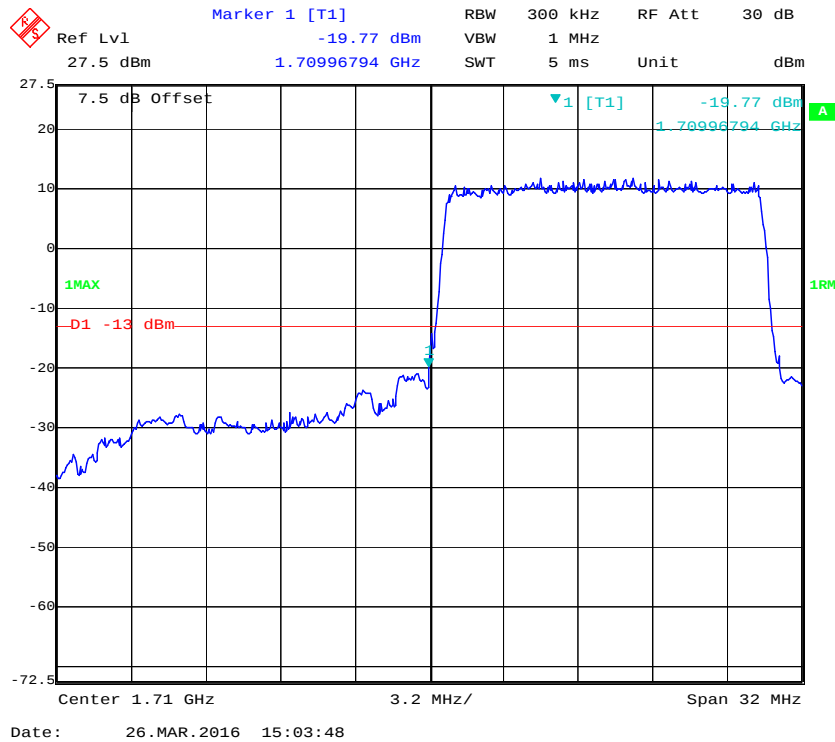
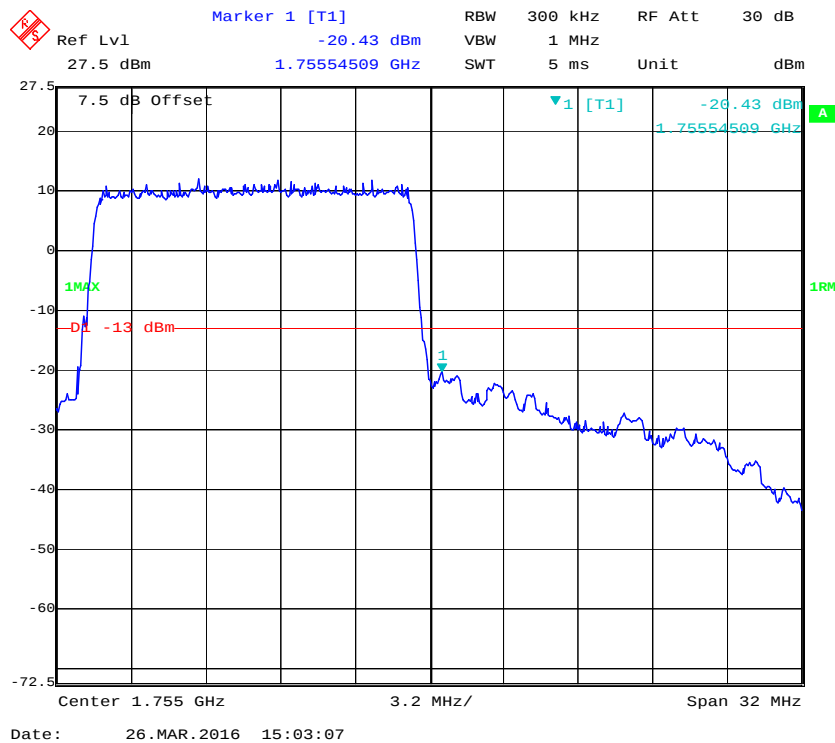


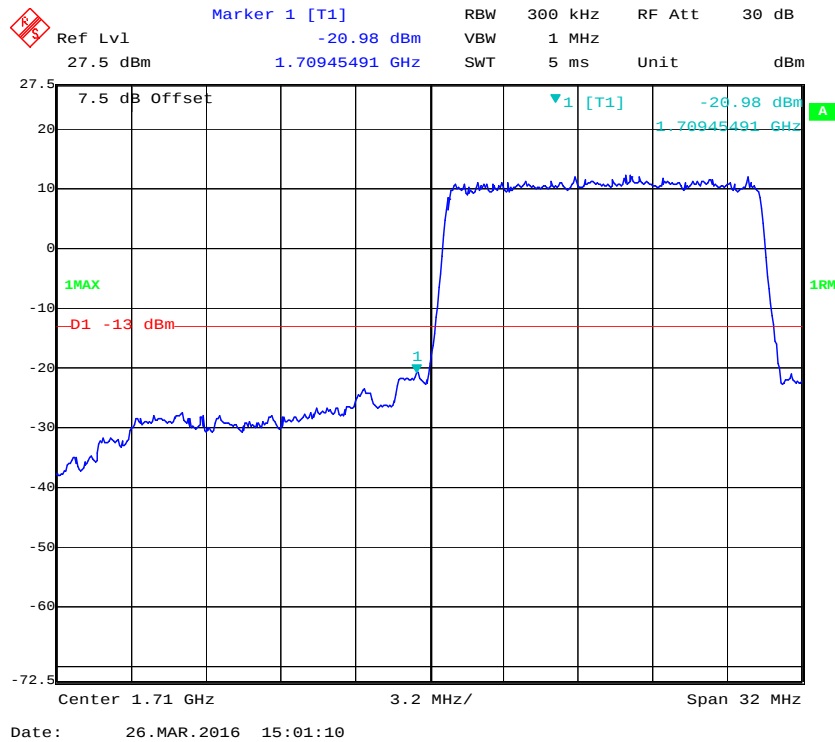
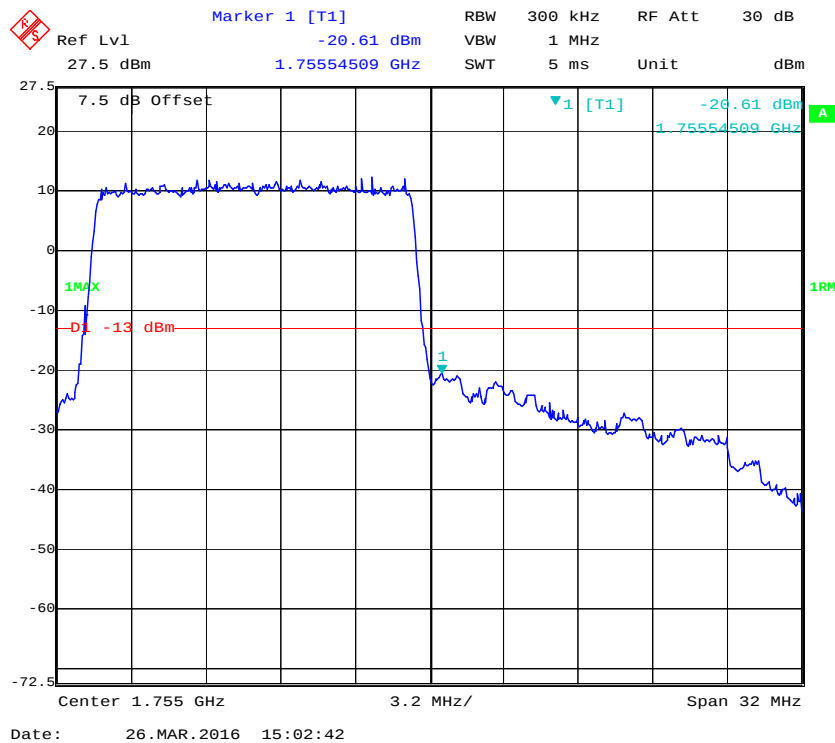
### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge



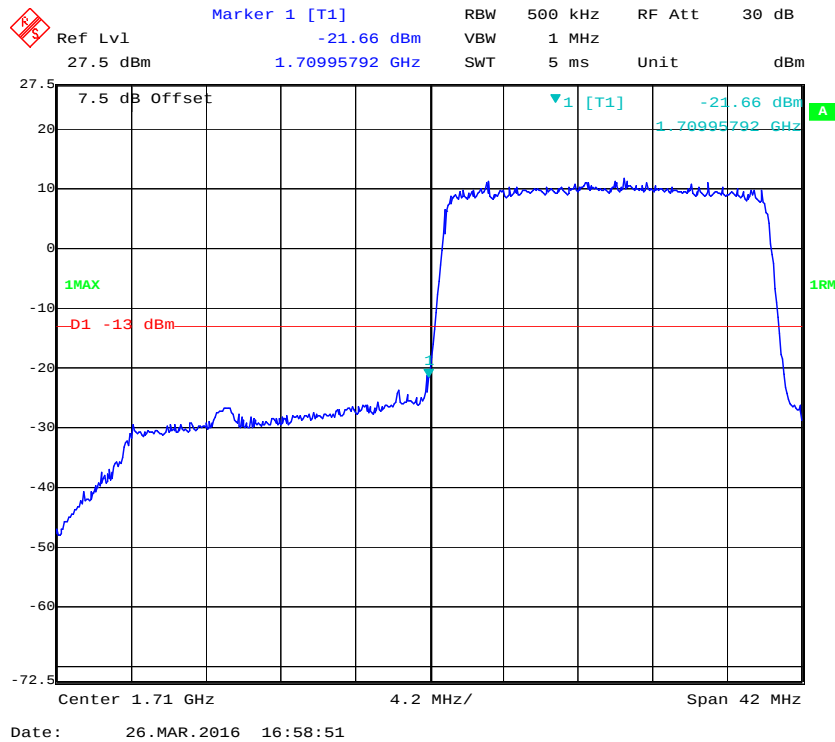
**QPSK (10.0 MHz, FULL RB) - Left Band Edge****QPSK (10.0 MHz, FULL RB) - Right Band Edge**

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

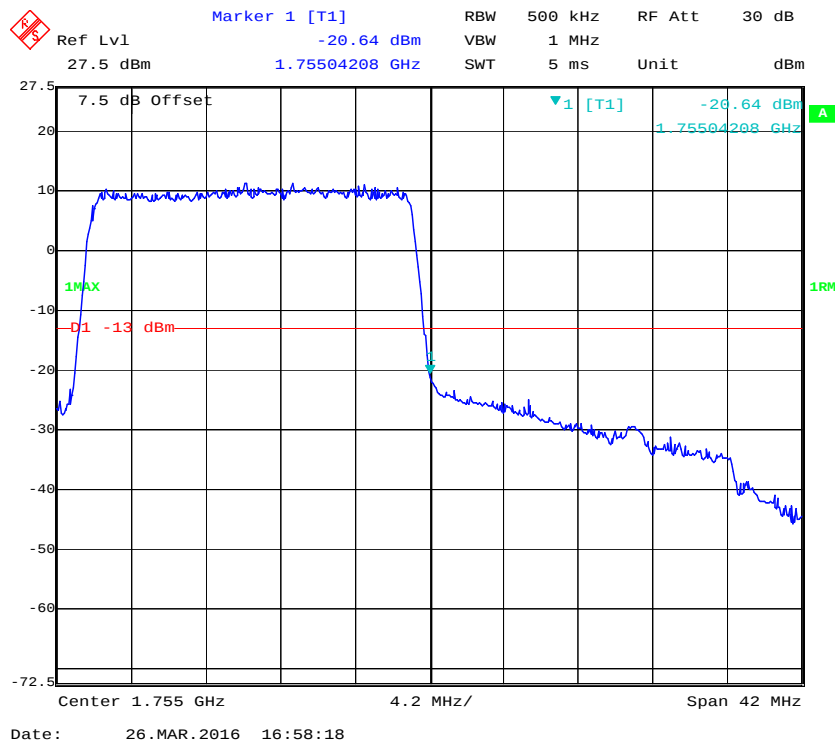
**QPSK (15.0 MHz, FULL RB) - Left Band Edge****QPSK (15.0 MHz, FULL RB) - Right Band Edge**

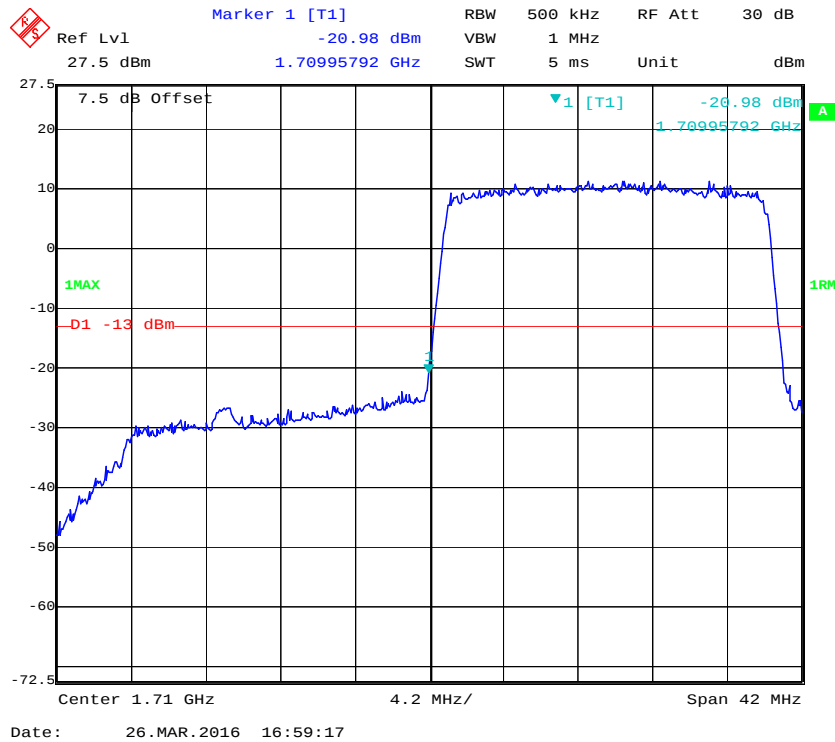
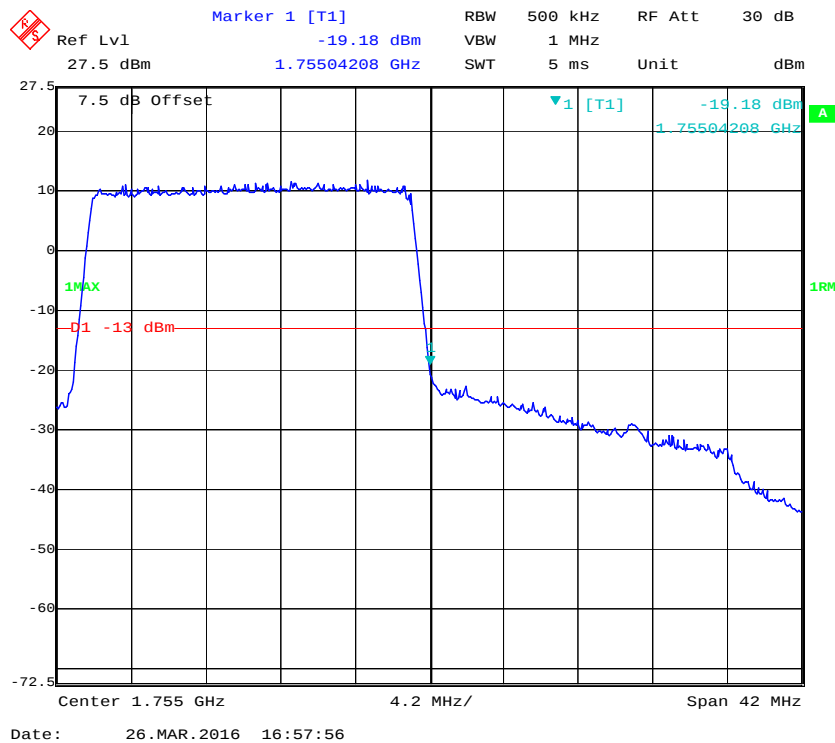
**16-QAM (15.0 MHz, FULL RB) - Left Band Edge****16-QAM (15.0 MHz, FULL RB) - Right Band Edge**

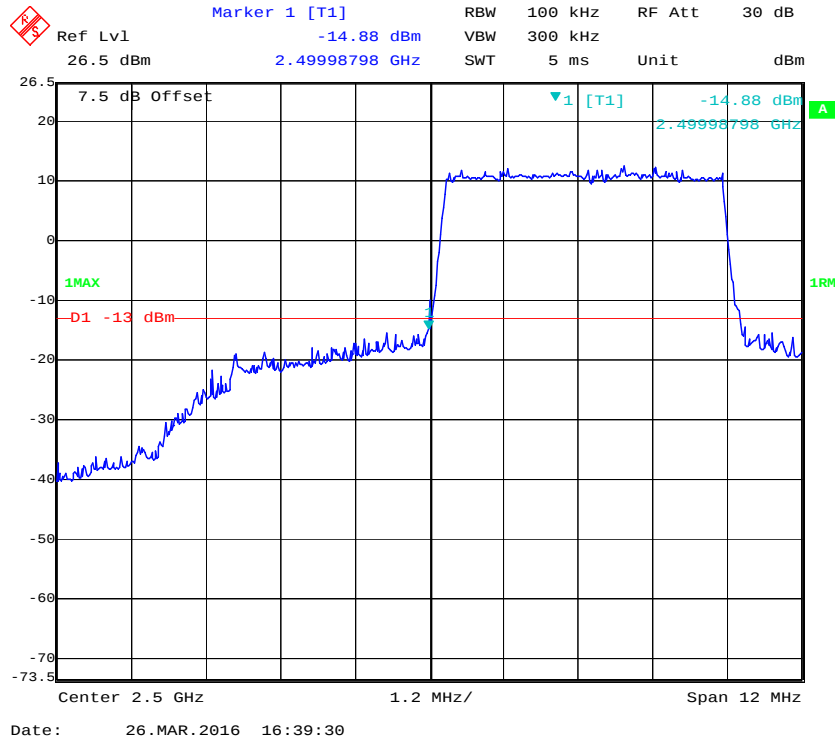
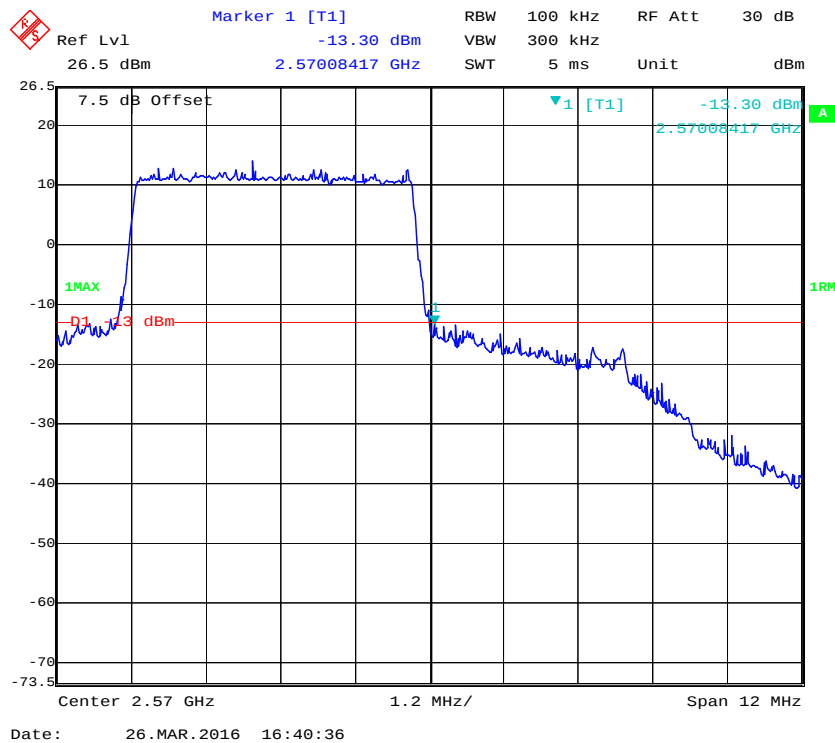
### QPSK (20.0 MHz, FULL RB) - Left Band Edge

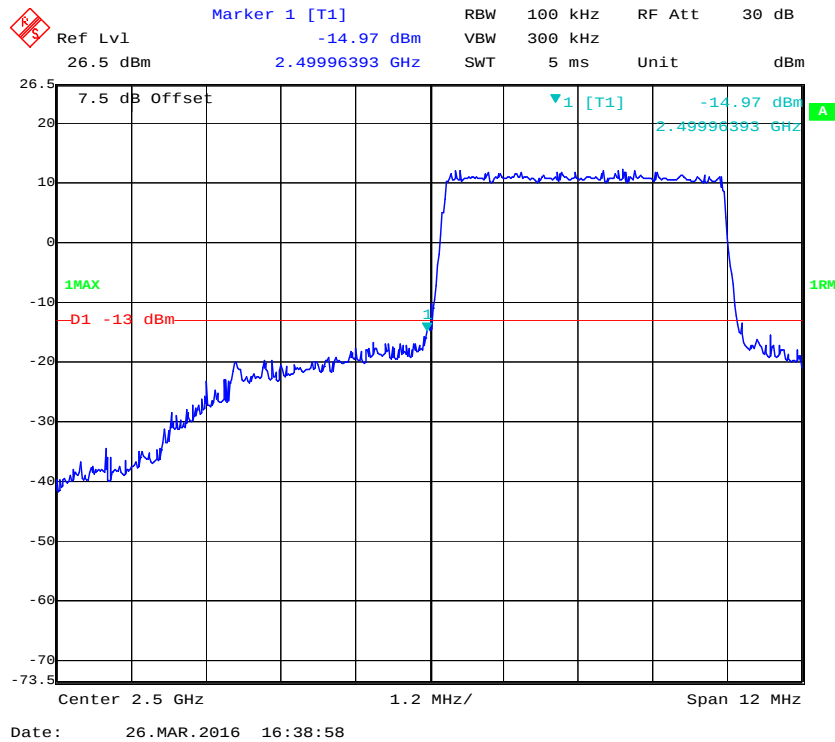
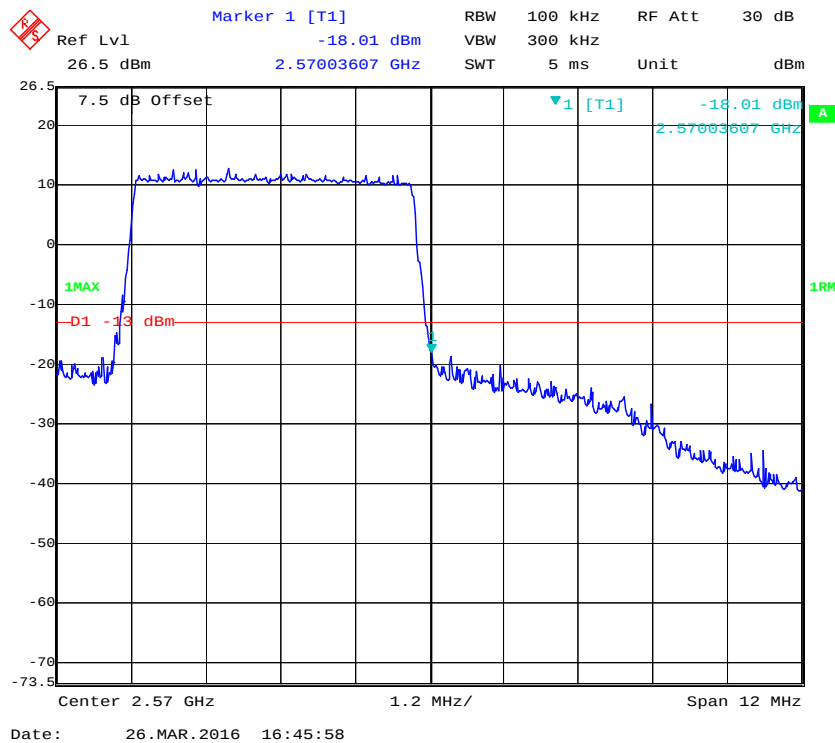


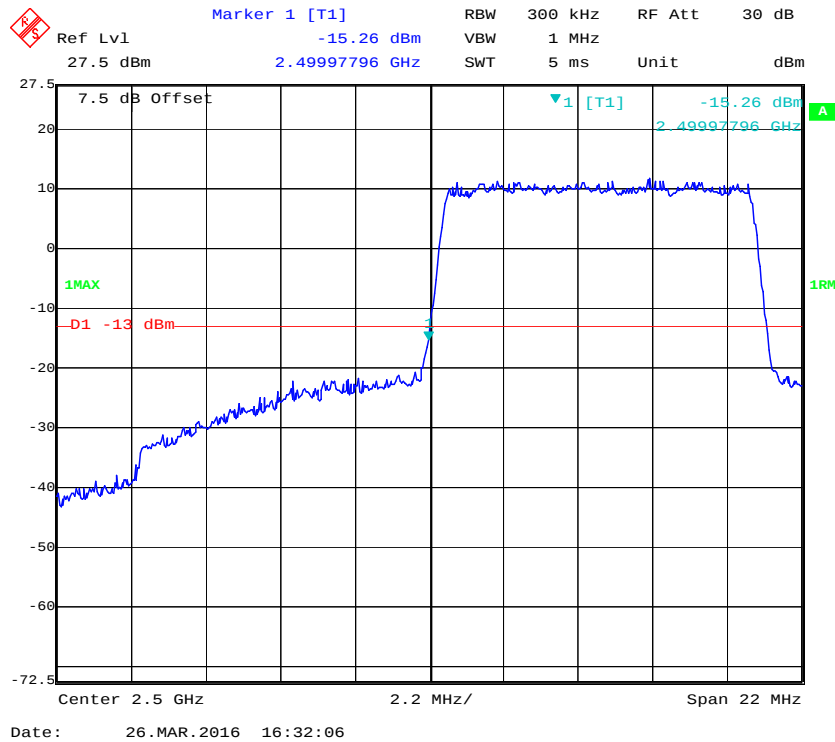
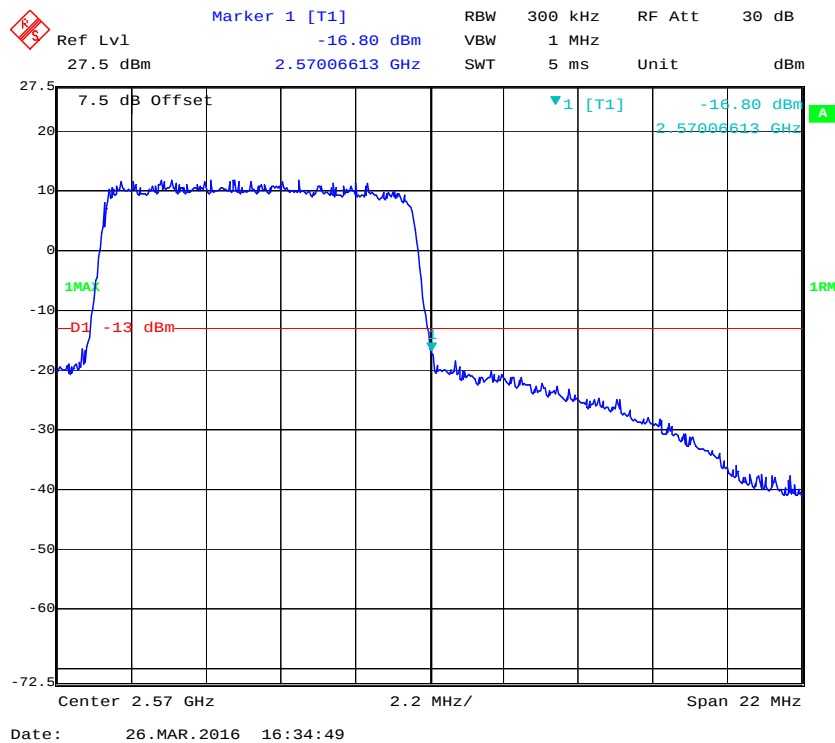
### QPSK (20.0 MHz, FULL RB) - Right Band Edge



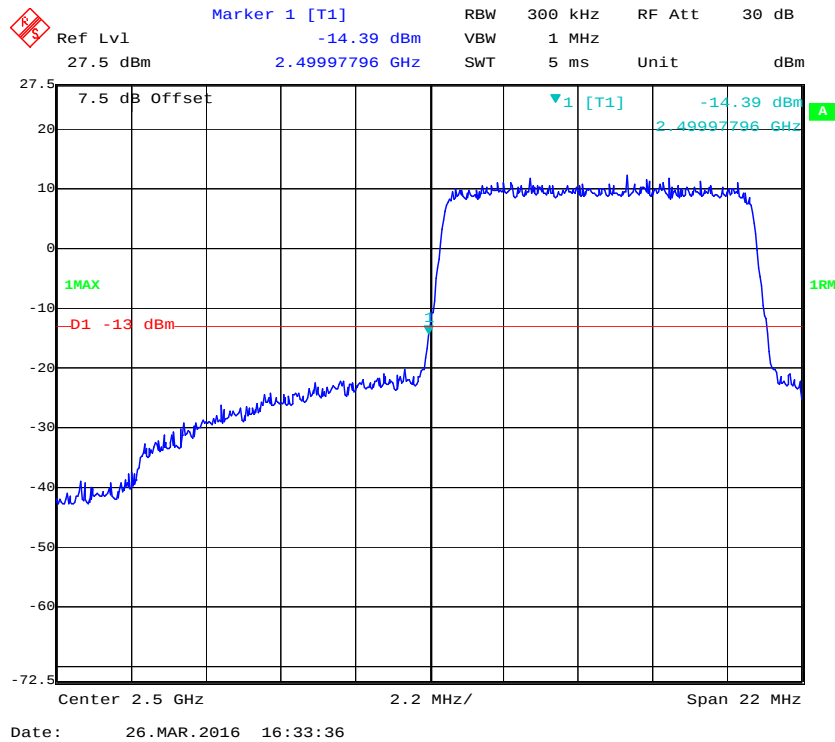
**16-QAM (20.0 MHz, FULL RB) - Left Band Edge****16-QAM (20.0 MHz, FULL RB) - Right Band Edge**

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

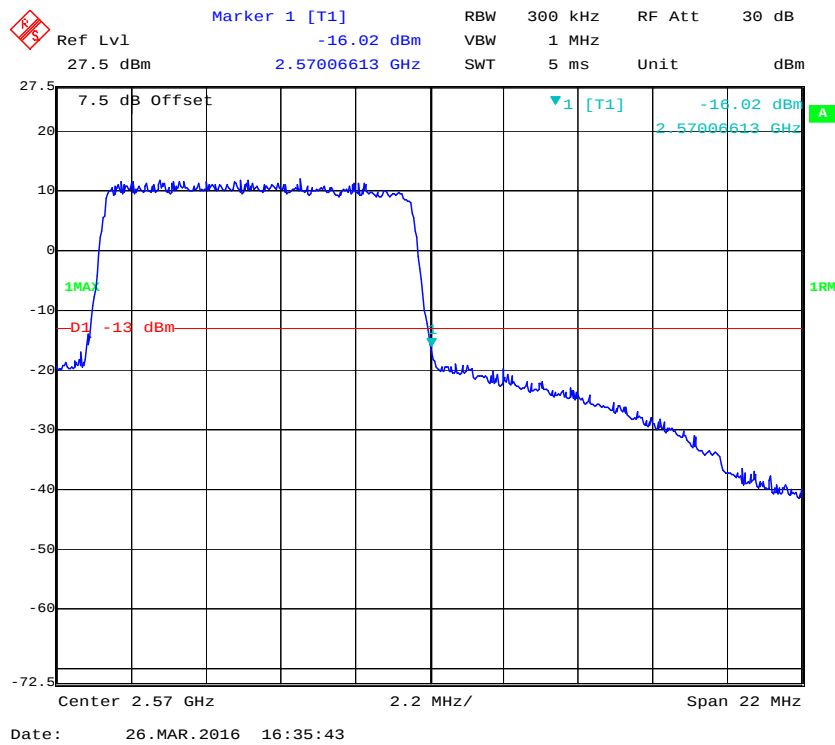
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge****16-QAM (5.0 MHz, FULL RB) - Right Band Edge**

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

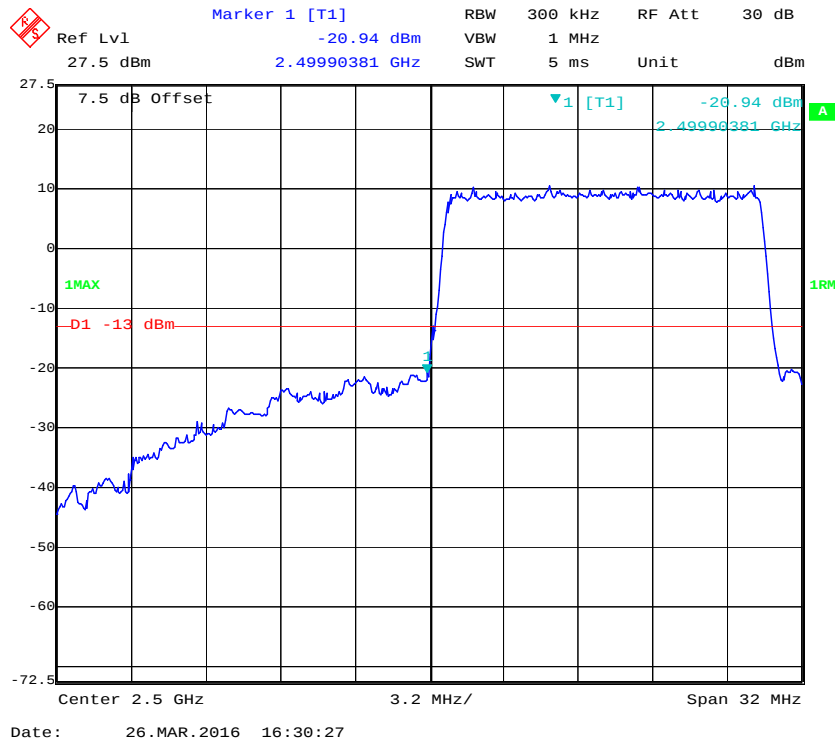
### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



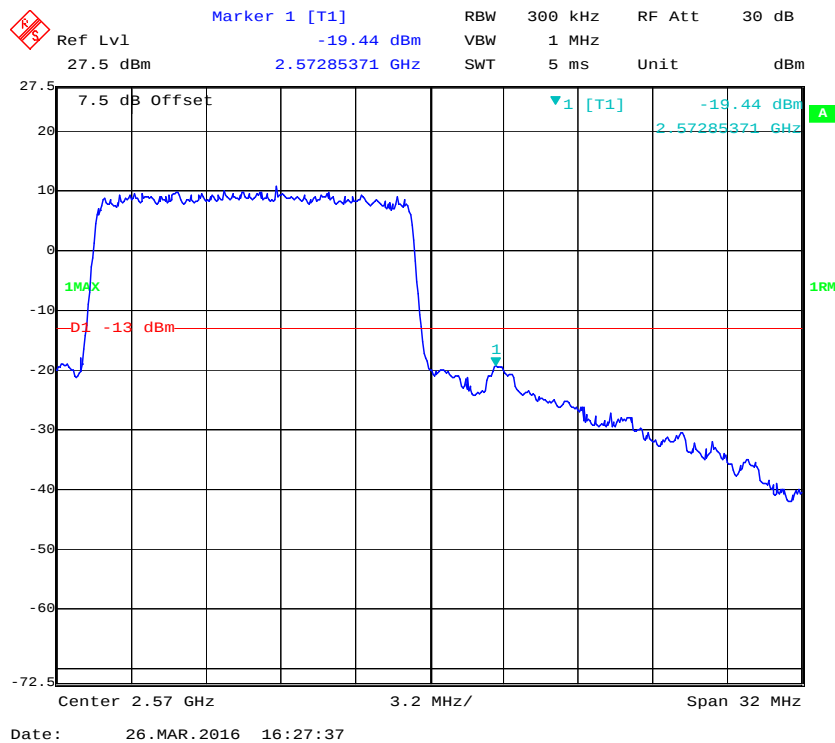
### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge

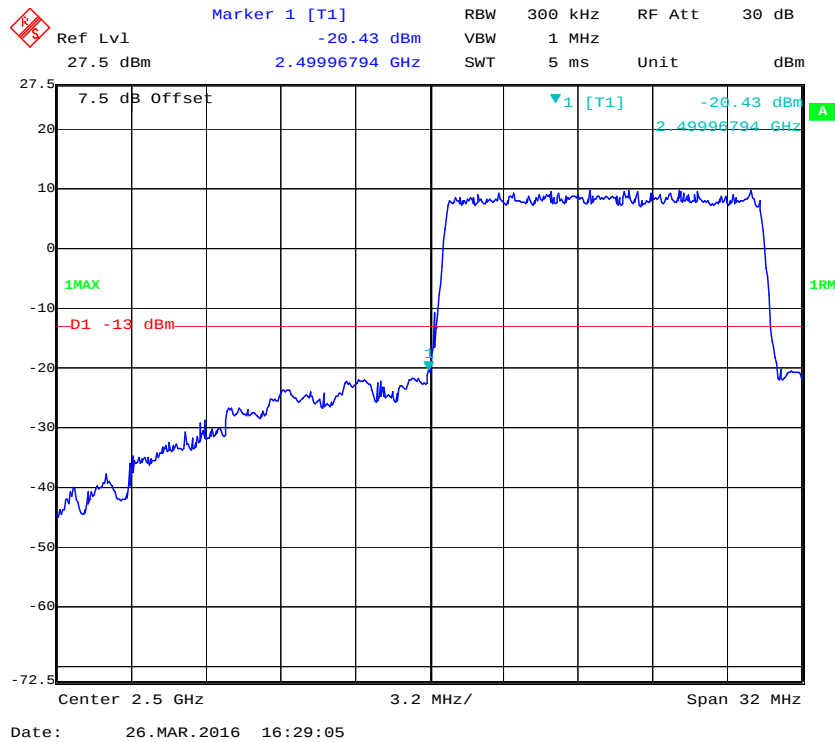
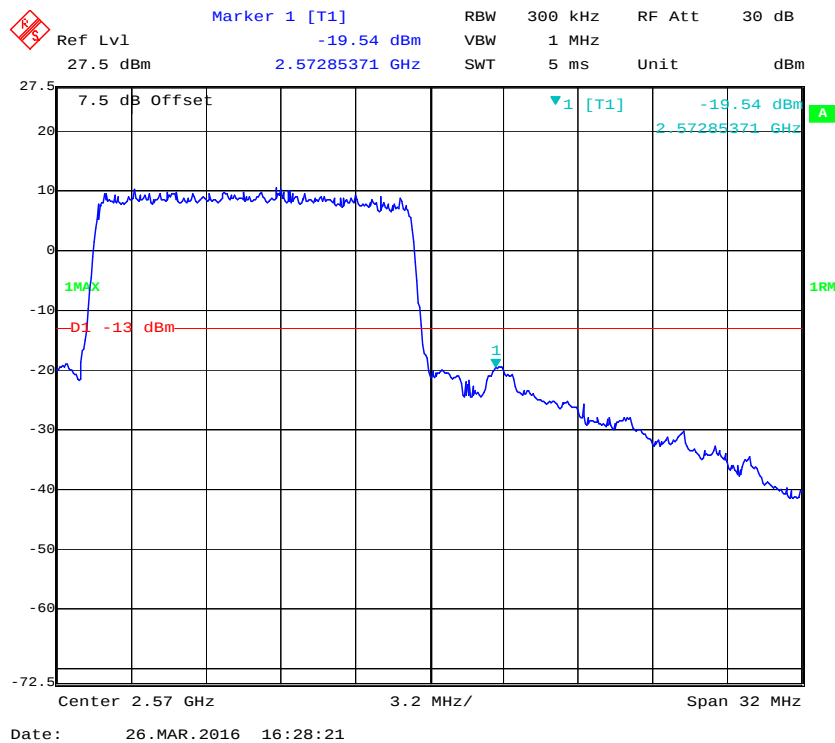


## QPSK (15 MHz, FULL RB) - Left Band Edge

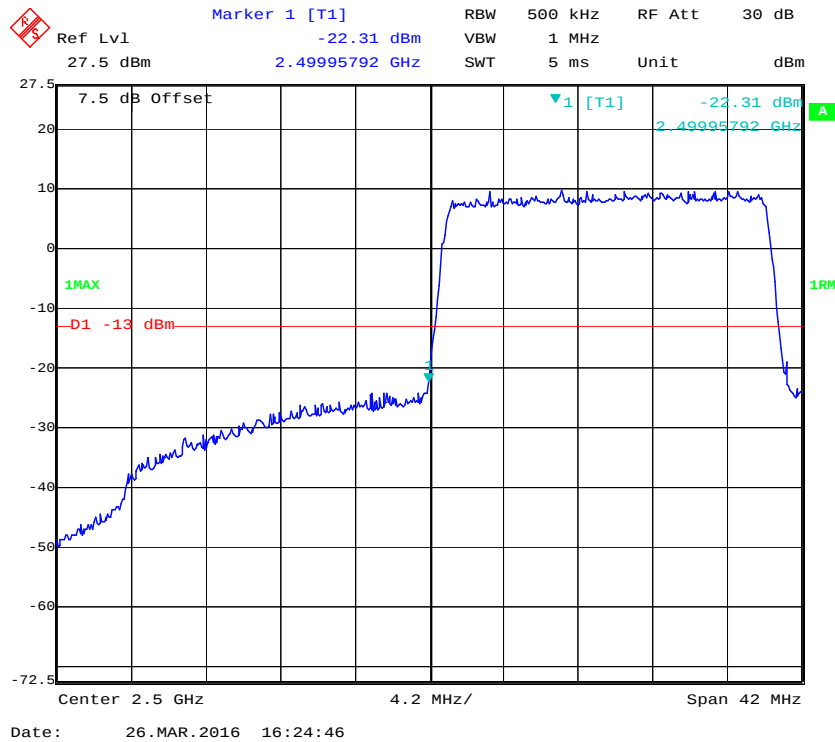


## QPSK (15 MHz, FULL RB) - Right Band Edge

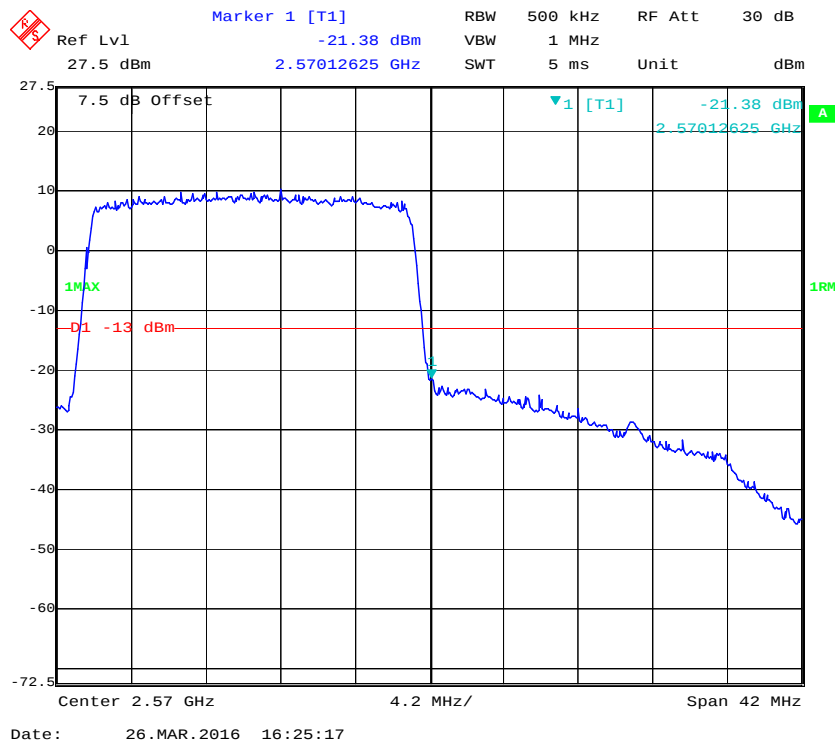


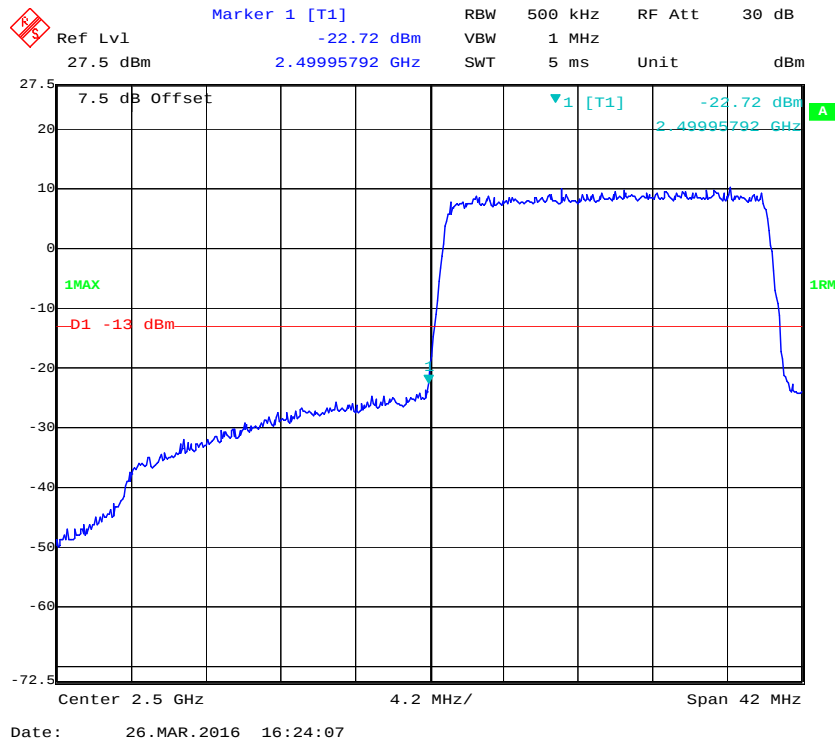
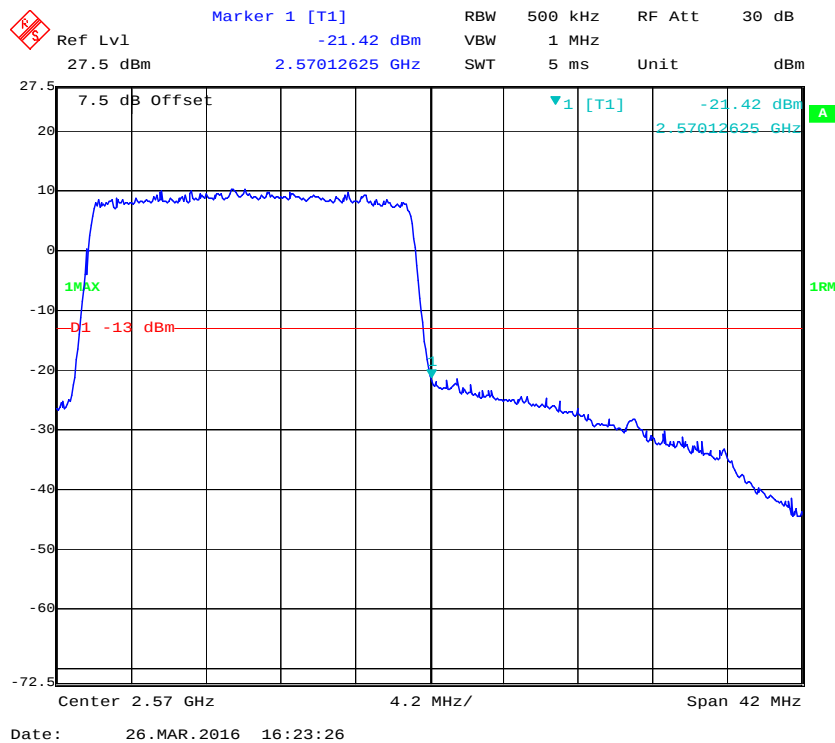
**16-QAM (15 MHz, FULL RB) - Left Band Edge****16-QAM (15 MHz, FULL RB) - Right Band Edge**

### QPSK (20 MHz, FULL RB) - Left Band Edge



### QPSK (20 MHz, FULL RB) - Right Band Edge



**16-QAM (20 MHz, FULL RB) - Left Band Edge****16-QAM (20 MHz, FULL RB) - Right Band Edge**

**FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY****Applicable Standards**

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                    |

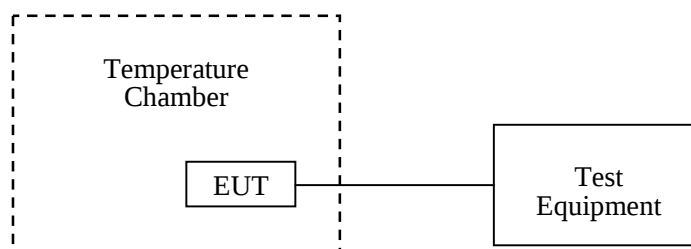
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

**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 Equipment List and Details**

| Manufacturer          | Description                          | Model   | Serial Number         | Calibration Date | Calibration Due Date |
|-----------------------|--------------------------------------|---------|-----------------------|------------------|----------------------|
| ESPEC                 | Temperature & Humidity Chamber       | EL-10KA | 09107726              | 2015-11-01       | 2016-11-01           |
| Rohde & Schwarz       | Universal Radio Communication Tester | CMU200  | 106891                | 2015-11-23       | 2016-11-23           |
| R&S                   | Wideband Radio Communication tester  | CMW500  | 1201.002K50-146520-wh | 2015-11-23       | 2016-11-23           |
| Ducommun technologies | RF Cable                             | RG-214  | 4                     | 2015-06-15       | 2016-06-15           |
| WEINSCHTEL            | 6dB Attenuator                       | 1012    | 30187                 | 2015-06-18       | 2016-06-18           |

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

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

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 22 °C    |
| <b>Relative Humidity:</b> | 50 %     |
| <b>ATM Pressure:</b>      | 101.0kPa |

*The testing was performed by Simon Wang on 2016-03-30.*

*EUT operation mode: Transmitting*

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

**Cellular Band (Part 22H)****GSM Mode**

| Middle Channel, $f_0=836.6$ MHz |                                   |                      |                       |             |
|---------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -20                             | 3.8                               | 27                   | 0.032                 | 2.5         |
| -10                             |                                   | 22                   | 0.026                 | 2.5         |
| 0                               |                                   | 20                   | 0.024                 | 2.5         |
| 10                              |                                   | 23                   | 0.027                 | 2.5         |
| 20                              |                                   | 21                   | 0.025                 | 2.5         |
| 30                              |                                   | 28                   | 0.033                 | 2.5         |
| 40                              |                                   | 27                   | 0.032                 | 2.5         |
| 50                              |                                   | 25                   | 0.030                 | 2.5         |
| 25                              | V min.= 3.5                       | 24                   | 0.029                 | 2.5         |
| 25                              | V max.= 4.35                      | 26                   | 0.031                 | 2.5         |

**EDGE Mode**

| Middle Channel, $f_0=836.6$ MHz |                                   |                      |                       |             |
|---------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -20                             | 3.8                               | 26                   | 0.0311                | 2.5         |
| -10                             |                                   | 27                   | 0.0323                | 2.5         |
| 0                               |                                   | 23                   | 0.0275                | 2.5         |
| 10                              |                                   | 24                   | 0.0287                | 2.5         |
| 20                              |                                   | 28                   | 0.0335                | 2.5         |
| 30                              |                                   | 29                   | 0.0347                | 2.5         |
| 40                              |                                   | 28                   | 0.0335                | 2.5         |
| 50                              |                                   | 21                   | 0.0251                | 2.5         |
| 25                              | V min.= 3.5                       | 22                   | 0.0263                | 2.5         |
| 25                              | V max.= 4.35                      | 29                   | 0.0347                | 2.5         |

**WCDMA Mode**

| Middle Channel, $f_0 = 836.6$ MHz |                                   |                      |                       |             |
|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------|
| Temperature (°C)                  | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) |
| -20                               | 3.8                               | -4                   | -0.0048               | 2.5         |
| -10                               |                                   | -3                   | -0.0036               | 2.5         |
| 0                                 |                                   | -2                   | -0.0024               | 2.5         |
| 10                                |                                   | -1                   | -0.0012               | 2.5         |
| 20                                |                                   | 3                    | 0.0036                | 2.5         |
| 30                                |                                   | -2                   | -0.0024               | 2.5         |
| 40                                |                                   | 2                    | 0.0024                | 2.5         |
| 50                                |                                   | 1                    | 0.0012                | 2.5         |
| 25                                | V min.= 3.5                       | 3                    | 0.0036                | 2.5         |
| 25                                | V max.= 4.35                      | 2                    | 0.0024                | 2.5         |

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

| Middle Channel, $f_0 = 1880.0$ MHz |                                   |                      |                       |        |
|------------------------------------|-----------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                   | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -20                                | 3.8                               | 18                   | 0.0096                | pass   |
| -10                                |                                   | 23                   | 0.0122                | pass   |
| 0                                  |                                   | 20                   | 0.0106                | pass   |
| 10                                 |                                   | 19                   | 0.0101                | pass   |
| 20                                 |                                   | 21                   | 0.0112                | pass   |
| 30                                 |                                   | 16                   | 0.0085                | pass   |
| 40                                 |                                   | 27                   | 0.0144                | pass   |
| 50                                 |                                   | 19                   | 0.0101                | pass   |
| 25                                 | V min.= 3.5                       | 20                   | 0.0106                | pass   |
| 25                                 | V max.= 4.35                      | 22                   | 0.0117                | pass   |

**EDGE Mode**

| Middle Channel, $f_0 = 1880.0$ MHz |                                   |                      |                       |        |
|------------------------------------|-----------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                   | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -20                                | 3.8                               | 14                   | 0.0074                | pass   |
| -10                                |                                   | 13                   | 0.0069                | pass   |
| 0                                  |                                   | 17                   | 0.0090                | pass   |
| 10                                 |                                   | 15                   | 0.0080                | pass   |
| 20                                 |                                   | 19                   | 0.0101                | pass   |
| 30                                 |                                   | 15                   | 0.0080                | pass   |
| 40                                 |                                   | 14                   | 0.0074                | pass   |
| 50                                 |                                   | 20                   | 0.0106                | pass   |
| 25                                 | V min.= 3.5                       | 22                   | 0.0117                | pass   |
| 25                                 | V max.= 4.35                      | 18                   | 0.0096                | pass   |

**WCDMA Mode**

| Middle Channel, $f_0 = 1880.0$ MHz |                                   |                      |                       |        |
|------------------------------------|-----------------------------------|----------------------|-----------------------|--------|
| Temperature (°C)                   | Power Supplied (V <sub>DC</sub> ) | Frequency Error (Hz) | Frequency Error (ppm) | Result |
| -20                                | 3.8                               | 0                    | 0                     | pass   |
| -10                                |                                   | 2                    | 0.0011                | pass   |
| 0                                  |                                   | 3                    | 0.0016                | pass   |
| 10                                 |                                   | 1                    | 0.0005                | pass   |
| 20                                 |                                   | 2                    | 0.0011                | pass   |
| 30                                 |                                   | -3                   | -0.0016               | pass   |
| 40                                 |                                   | -4                   | -0.0021               | pass   |
| 50                                 |                                   | -2                   | -0.0011               | pass   |
| 25                                 | V min.= 3.5                       | 5                    | 0.0027                | pass   |
| 25                                 | V max.= 4.35                      | 2                    | 0.0011                | pass   |

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

| Bandwidth                   | Voltage (V <sub>DC</sub> ) | Temperature (°C) | QPSK (Hz) | QPSK (ppm) | Result |
|-----------------------------|----------------------------|------------------|-----------|------------|--------|
| 10.0 MHz,<br>Middle Channel | 3.7                        | -30              | -15       | -0.0080    | Pass   |
|                             |                            | -20              | -17       | -0.0090    | Pass   |
|                             |                            | -10              | -19       | -0.0101    | Pass   |
|                             |                            | 0                | -14       | -0.0074    | Pass   |
|                             |                            | 10               | -16       | -0.0085    | Pass   |
|                             |                            | 20               | -12       | -0.0064    | Pass   |
|                             |                            | 30               | -17       | -0.0090    | Pass   |
|                             |                            | 40               | -18       | -0.0096    | Pass   |
|                             |                            | 50               | -20       | -0.0106    | Pass   |
|                             | 3.8                        | 25               | -17       | -0.0090    | Pass   |
|                             | 3.5                        | 25               | -24       | -0.0128    | Pass   |
|                             | 4.35                       | 25               | -19       | -0.0101    | Pass   |

**Band 4:**

| Bandwidth                   | Voltage (V <sub>DC</sub> ) | Temperature (°C) | QPSK (Hz) | QPSK (ppm) | Result |
|-----------------------------|----------------------------|------------------|-----------|------------|--------|
| 10.0 MHz,<br>Middle Channel | 3.7                        | -30              | -20       | -0.0115    | Pass   |
|                             |                            | -20              | -19       | -0.0110    | Pass   |
|                             |                            | -10              | -17       | -0.0098    | Pass   |
|                             |                            | 0                | -23       | -0.0133    | Pass   |
|                             |                            | 10               | -19       | -0.0110    | Pass   |
|                             |                            | 20               | -15       | -0.0087    | Pass   |
|                             |                            | 30               | -14       | -0.0081    | Pass   |
|                             |                            | 40               | -16       | -0.0092    | Pass   |
|                             |                            | 50               | -18       | -0.0104    | Pass   |
|                             | 3.8                        | 25               | -21       | -0.0121    | Pass   |
|                             | 3.5                        | 25               | -19       | -0.0110    | Pass   |
|                             | 4.35                       | 25               | -23       | -0.0133    | Pass   |

**Band 7:**

| Bandwidth                           | Voltage<br>(V <sub>DC</sub> ) | Temperature<br>(°C) | QPSK<br>(Hz) | QPSK<br>(ppm) | Result |
|-------------------------------------|-------------------------------|---------------------|--------------|---------------|--------|
| <b>10.0 MHz,<br/>Middle Channel</b> | 3.7                           | -30                 | -18          | -0.00710      | Pass   |
|                                     |                               | -20                 | -19          | -0.00750      | Pass   |
|                                     |                               | -10                 | -20          | -0.00789      | Pass   |
|                                     |                               | 0                   | -24          | -0.00947      | Pass   |
|                                     |                               | 10                  | -21          | -0.00828      | Pass   |
|                                     |                               | 20                  | -19          | -0.00750      | Pass   |
|                                     |                               | 30                  | -18          | -0.00710      | Pass   |
|                                     |                               | 40                  | -17          | -0.00671      | Pass   |
|                                     |                               | 50                  | -18          | -0.00710      | Pass   |
|                                     | 3.8                           | 25                  | -17          | -0.00671      | Pass   |
|                                     | 3.5                           | 25                  | -20          | -0.00789      | Pass   |
|                                     | 4.35                          | 25                  | -19          | -0.00750      | Pass   |

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