# FCC PART 27
# FCC PART 22H, PART 24E
# TEST REPORT

For

# SHENZHEN HUAPTEC CO., LTD

5th FL, E BLDG, Sogood Science Park, Sanwei Commun Hangkong Road, Xixiang, Bao'an, Shenzhen, 518102 China

**FCC ID: OWWF27-5S**

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | Wireless Cellular Repeater |

| | |
|---|---|
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| **Report Number:** | RSZ160127001-00B |
| **Report Date:** | 2016-08-12 |
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# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The *SHENZHEN HUAPTEC CO., LTD's* product, model number: *F27-5S (FCC ID: OWWF27-5S)* or the "EUT" in this report was a *Wireless Cellular Repeater,* which was measured approximately: 400 mm (L) × 280 mm (W) × 53 mm (H), rated with input voltage: rated with input voltage: DC 12V from adapter.

Manufacturer information:
Company Name: SHENZHEN HUAPTEC CO., LTD
Address: 5th FL, E BLDG, Sogood Science Park, Sanwei Community, Hangkong Road, Xixiang, Bao'an, Shenzhen, 518102 China

Adapter Information:
Model: GM85-120700-F
Input: AC 100-240V, 50/60 Hz, 2.5A
Output: DC 12V, 7.0A

Specification:(For F27-5S model)

| Support Band | UL (MHz) | DL (MHz) | UL Max. power (dBm) | DL Max. power (dBm) |
|---|---|---|---|---|
| Lower 700MHz (A+B+C Block) | 698-716 | 728-746 | 23 | 29 |
| Upper 700MHz (C Block) | 776-787 | 746-757 | 23 | 29 |
| CELLULAR | 824-849 | 869-894 | 22 | 28 |
| PCS | 1850-1915 | 1930-1995 | 22 | 28 |
| AWS-1 | 1710-1755 | 2110-2155 | 23 | 27 |

*Note: The series product, model F23-5S, F20-5S and F27-5S, they named differently just due to different output power levels and gains achieved by adjusting the software, or different shell, however they have the same designs, PCB board, electronic device. Model F27-5S was selected for fully testing, which was explained in the attached product similarity declaration letter.*

**Test data for full testing model in this report was gathered from production sample serial number: 1601302 (Assigned by Shenzhen BACL).The EUT supplied by the applicant was received on 2016-01-27.*

## Objective

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

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

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

No related submittal(s).

## Test Methodology

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

Part 20.21 – Signal Boosters
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, ANSI C63.4-2014, FCC KDB 935210 D05 v01r01.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. 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 on 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, 2013. 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

## Description of Test Configuration

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

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

## Equipment Modifications

No modification was made to the EUT.

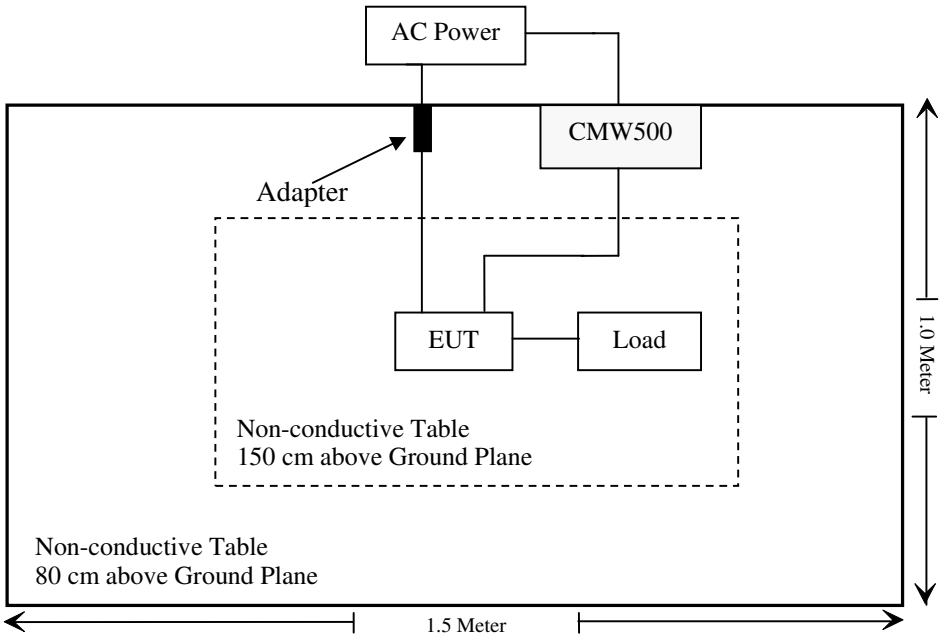
## Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| R & S | Wideband Radio Communication tester | CMW500 | 1201.002K50-146520-wh |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 |

## External I/O Cable

| Cable Description | Length (m) | From/Port | To |
|---|---|---|---|
| Un-shielding Un-detachable DC Power Cable | 1.4 | Adapter | EUT |
| Un-shielding Detachable AC Power Cable | 1.8 | AC Power | Adapter |

**Block Diagram of Test Setup**



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| § 2.1091 | Maximum Permissible exposure (MPE) | Compliance |
| § 2.1046; § 22.913; § 24.232; § 22.913; § 27.50 | RF Output Power | Compliance |
| § 2.1047 | Modulation Characteristics | Not Applicable |
| § 2.1049; § 22.917; § 24.238; §27.53 | Bandwidth | Compliance |
| § 2.1051; § 22.917; § 24.238; §27.53 | Spurious Emissions at Antenna Terminal | Compliance |
| § 2.1053; § 22.917; § 24.238; §27.53 | Field Strength of Spurious Radiation | Compliance |
| § 2.1053; § 22.917; § 24.238; §27.53 | Band Edge & Intermodulation | Compliance |
| § 2.1055; § 22.355; § 24.235; § 27.54 | Frequency stability | N/A* |
| § 20.21 | Out of Band Rejection | Compliance |

N/A*: EUT was a signal booster.

# FCC §1.1307 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## Applicable Standard

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **Averaging Time (Minutes)** |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *($180/f^2$) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | f/1500 | 30 |
| 1500-100,000 | / | / | 1.0 | 30 |

f = frequency in MHz
* = Plane-wave equivalent power density

## Result

### Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For worst case:

**Uplink**

| Test Band | Frequency (MHz) | Target power (dBm) | Target power (mW) | Antenna Gain | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|---|
| | | | | (dBi) | (numeric) | | | |
| Lower 700MHz (A+B+C Block) | 698.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.47 |
| | 707.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.47 |
| | 716.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.48 |
| Upper 700MHz (C Block) | 776.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.52 |
| | 781.5 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.52 |
| | 787.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.52 |
| CELLULAR | 824.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.55 |
| | 836.5 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.56 |
| | 849.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 0.57 |
| PCS | 1850.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |
| | 1880.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |
| | 1915.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |
| AWS-1 | 1710.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |
| | 1732.5 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |
| | 1755.0 | 23 | 199.53 | 7 | 5.01 | 30 | 0.09 | 1.00 |

**Downlink**

| Test Band | Frequency (MHz) | Target power (dBm) | Target power (mW) | Antenna Gain | | Evaluation Distance (cm) | Power Density ($mW/cm^2$) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|---|---|---|---|
| | | | | (dBi) | (numeric) | | | |
| Lower 700MHz (A+B+C Block) | 728.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.49 |
| | 737.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.49 |
| | 746.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.50 |
| Upper 700MHz (C Block) | 746.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.50 |
| | 751.5 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.50 |
| | 757.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.50 |
| CELLULAR | 869.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.58 |
| | 881.5 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.59 |
| | 894.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 0.60 |
| PCS | 1930.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |
| | 1962.5 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |
| | 1995.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |
| AWS-1 | 2110.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |
| | 2132.5 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |
| | 2155.0 | 30 | 1000 | 7 | 5.01 | 30 | 0.44 | 1.00 |

The Maximum indoor and outdoor Gain is 7.0 dBi

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 30cm from nearby persons.

**Result: Compliance**

# FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E and 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 (b) (c) (d) - RF OUTPUT POWER and AMPLIFER GAIN

## Applicable Standard

According to FCC §2.1046 and §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

According to FCC §2.1046 and §24.232 (a)(1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
(3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; *see* Tables 1 and 2 of this section.

According to §27.50(b)(9), control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.

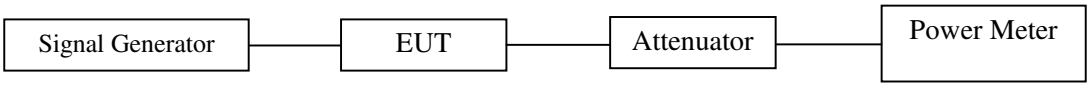
According to §27.50(c)(9), control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

According to §27.50(d)(2), the power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to an EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

## Test Procedure

*Conducted method:*

According to KDB 935210 D05 Indus Booster Basic Meas v01r01 clause 3.5



## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Agilent | P-Series Power Meter | N1912A | MY5000448 | 2015-11-03 | 2016-11-03 |
| Agilent | Wideband Power Sensor | N1921A | ESR3 | 2015-12-12 | 2016-12-11 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-06-15 | 2016-06-15 |
| WEINSCHEL | 10dB Attenuator | 5324 | AU0709 | 2015-06-18 | 2016-06-18 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

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

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 23 |

**Upper 700MHz (C Block) Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 785.4 | AWGN | Pre-AGC | -58.3 | 20.72 | 79.02 | 25.57 |
| | | | 3dB above AGC | -55.3 | 21.72 | 77.02 | 26.57 |
| | | GSM | Pre-AGC | -57.1 | 22.06 | 79.16 | 26.91 |
| | | | 3dB above AGC | -54.1 | 22.97 | 77.07 | 27.82 |
| Downlink | 749.0 | AWGN | Pre-AGC | -54.6 | 27.05 | 81.65 | 31.90 |
| | | | 3dB above AGC | -51.6 | 27.37 | 78.97 | 32.22 |
| | | GSM | Pre-AGC | -52.8 | 28.25 | 81.05 | 33.10 |
| | | | 3dB above AGC | -49.8 | 28.68 | 78.48 | 33.53 |

**CELLULAR Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 834.0 | AWGN | Pre-AGC | -60.2 | 21.15 | 81.35 | 26.00 |
| | | | 3dB above AGC | -57.2 | 21.65 | 78.85 | 26.50 |
| | | GSM | Pre-AGC | -58.4 | 21.19 | 79.59 | 26.04 |
| | | | 3dB above AGC | -55.4 | 21.77 | 77.17 | 26.62 |
| Downlink | 880.6 | AWGN | Pre-AGC | -54.5 | 27.28 | 81.78 | 32.13 |
| | | | 3dB above AGC | -51.5 | 27.72 | 79.22 | 32.57 |
| | | GSM | Pre-AGC | -53.1 | 27.26 | 80.36 | 32.11 |
| | | | 3dB above AGC | -50.1 | 27.89 | 77.99 | 32.74 |

**PCS Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1865.9 | AWGN | Pre-AGC | -60.2 | 20.88 | 81.08 | 27.88 |
| | | | 3dB above AGC | -57.2 | 21.46 | 78.66 | 28.46 |
| | | GSM | Pre-AGC | -58.8 | 20.98 | 79.78 | 27.98 |
| | | | 3dB above AGC | -55.8 | 21.96 | 77.76 | 28.96 |
| Downlink | 1951.4 | AWGN | Pre-AGC | -55.4 | 26.91 | 82.31 | 33.91 |
| | | | 3dB above AGC | -52.4 | 27.08 | 79.48 | 34.08 |
| | | GSM | Pre-AGC | -54.3 | 26.88 | 81.18 | 33.88 |
| | | | 3dB above AGC | -54.3 | 27.19 | 81.49 | 34.19 |

**AWS-1 Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1748.5 | AWGN | Pre-AGC | -58.4 | 20.96 | 79.36 | 27.96 |
| | | | 3dB above AGC | -55.4 | 21.87 | 77.27 | 28.87 |
| | | GSM | Pre-AGC | -57.2 | 20.98 | 78.18 | 27.98 |
| | | | 3dB above AGC | -54.2 | 21.95 | 76.15 | 28.95 |
| Downlink | 2150.5 | AWGN | Pre-AGC | -54.6 | 26.57 | 81.17 | 33.57 |
| | | | 3dB above AGC | -51.6 | 26.87 | 78.47 | 33.87 |
| | | GSM | Pre-AGC | -53.2 | 26.54 | 79.74 | 33.54 |
| | | | 3dB above AGC | -50.2 | 26.91 | 77.11 | 33.91 |

Note: ERP=Conducted Output Power(dBm) +Antenna Gain (dBi)-2.15 dB
EIRP=Conducted Output Power(dBm) +Antenna Gain (dBi)
The Maximum indoor and outdoor Gain for all Bands are 7.0 dBi
The frequency was selected to test, which according to the peak of the frequency point from out-of-band rejection test.

**For F23-5S model:**

**Lower 700MHz (A+B+C Block) Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 708.7 | AWGN | Pre-AGC | -55.3 | 20.34 | 75.64 | 25.19 |
| | | | 3dB above AGC | -52.3 | 21.77 | 74.07 | 26.62 |
| | | GSM | Pre-AGC | -54.1 | 20.75 | 74.85 | 25.60 |
| | | | 3dB above AGC | -51.1 | 21.74 | 72.84 | 26.59 |
| Downlink | 740.3 | AWGN | Pre-AGC | -55.1 | 23.50 | 78.60 | 28.35 |
| | | | 3dB above AGC | -52.1 | 24.99 | 77.09 | 29.84 |
| | | GSM | Pre-AGC | -53.8 | 23.19 | 76.99 | 28.04 |
| | | | 3dB above AGC | -50.8 | 24.93 | 75.73 | 29.78 |

**Upper 700MHz (C Block) Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 785.4 | AWGN | Pre-AGC | -55.4 | 20.29 | 75.69 | 25.14 |
| | | | 3dB above AGC | -52.4 | 21.71 | 74.11 | 26.56 |
| | | GSM | Pre-AGC | -54.2 | 20.31 | 74.51 | 25.16 |
| | | | 3dB above AGC | -51.2 | 21.81 | 73.01 | 26.66 |
| Downlink | 749.0 | AWGN | Pre-AGC | -56.7 | 24.01 | 80.71 | 28.86 |
| | | | 3dB above AGC | -53.7 | 24.60 | 78.30 | 29.45 |
| | | GSM | Pre-AGC | -55.5 | 24.03 | 79.53 | 28.88 |
| | | | 3dB above AGC | -52.5 | 24.79 | 77.29 | 29.64 |

**CELLULAR Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 834.0 | AWGN | Pre-AGC | -54.8 | 20.27 | 75.07 | 25.12 |
| | | | 3dB above AGC | -51.8 | 21.70 | 73.50 | 26.55 |
| | | GSM | Pre-AGC | -53.1 | 20.29 | 73.39 | 25.14 |
| | | | 3dB above AGC | -50.1 | 21.83 | 71.93 | 26.68 |
| Downlink | 880.6 | AWGN | Pre-AGC | -57.5 | 23.39 | 80.89 | 28.24 |
| | | | 3dB above AGC | -54.5 | 23.89 | 78.39 | 28.74 |
| | | GSM | Pre-AGC | -56.3 | 23.37 | 79.67 | 28.22 |
| | | | 3dB above AGC | -53.3 | 24.01 | 77.31 | 28.86 |

**PCS Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1865.9 | AWGN | Pre-AGC | -54.3 | 20.66 | 74.96 | 27.66 |
| | | | 3dB above AGC | -51.3 | 21.16 | 72.46 | 28.16 |
| | | GSM | Pre-AGC | -53.5 | 20.70 | 74.20 | 27.70 |
| | | | 3dB above AGC | -50.5 | 21.19 | 71.69 | 28.19 |
| Downlink | 1951.4 | AWGN | Pre-AGC | -56.2 | 23.55 | 79.75 | 30.55 |
| | | | 3dB above AGC | -53.2 | 24.03 | 77.23 | 31.03 |
| | | GSM | Pre-AGC | -55.0 | 23.57 | 78.57 | 30.57 |
| | | | 3dB above AGC | -52.0 | 24.09 | 76.09 | 31.09 |

**AWS-1 Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1748.5 | AWGN | Pre-AGC | -51.5 | 20.56 | 72.06 | 27.56 |
| | | | 3dB above AGC | -48.5 | 21.29 | 69.79 | 28.29 |
| | | GSM | Pre-AGC | -50.2 | 20.72 | 70.92 | 27.72 |
| | | | 3dB above AGC | -47.2 | 21.30 | 68.50 | 28.30 |
| Downlink | 2150.5 | AWGN | Pre-AGC | -57.4 | 23.66 | 81.06 | 30.66 |
| | | | 3dB above AGC | -54.4 | 24.98 | 79.38 | 31.98 |
| | | GSM | Pre-AGC | -56.1 | 23.46 | 79.56 | 30.46 |
| | | | 3dB above AGC | -53.1 | 24.86 | 77.96 | 31.86 |

Note: ERP=Conducted Output Power(dBm) +Antenna Gain (dBi)-2.15 dB
EIRP=Conducted Output Power(dBm) +Antenna Gain (dBi)
The Maximum indoor and outdoor Gain for all Bands are 7.0 dBi
The frequency was selected to test, which according to the peak of the frequency point from out-of-band rejection test.

**For F20-5S model:**

**Lower 700MHz (A+B+C Block) Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 708.7 | AWGN | Pre-AGC | -49.8 | 21.12 | 70.92 | 25.97 |
| | | | 3dB above AGC | -46.8 | 22.11 | 68.91 | 26.96 |
| | | GSM | Pre-AGC | -48.5 | 21.19 | 69.69 | 26.04 |
| | | | 3dB above AGC | -45.5 | 22.23 | 67.73 | 27.08 |
| Downlink | 740.3 | AWGN | Pre-AGC | -53.9 | 21.50 | 75.40 | 26.35 |
| | | | 3dB above AGC | -50.9 | 22.56 | 73.46 | 27.41 |
| | | GSM | Pre-AGC | -52.6 | 21.46 | 74.06 | 26.31 |
| | | | 3dB above AGC | -52.6 | 22.52 | 75.12 | 27.37 |

**Upper 700MHz (C Block) Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 785.4 | AWGN | Pre-AGC | -50.6 | 20.49 | 71.09 | 25.34 |
| | | | 3dB above AGC | -47.6 | 20.99 | 68.59 | 25.84 |
| | | GSM | Pre-AGC | -49.4 | 20.51 | 69.91 | 25.36 |
| | | | 3dB above AGC | -46.4 | 20.97 | 67.37 | 25.82 |
| Downlink | 749.0 | AWGN | Pre-AGC | -53.7 | 21.98 | 75.68 | 26.83 |
| | | | 3dB above AGC | -50.7 | 23.04 | 73.74 | 27.89 |
| | | GSM | Pre-AGC | -52.1 | 21.89 | 73.99 | 26.74 |
| | | | 3dB above AGC | -49.1 | 22.96 | 72.06 | 27.81 |

**CELLULAR Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 834.0 | AWGN | Pre-AGC | -48.6 | 21.88 | 70.48 | 26.73 |
| | | | 3dB above AGC | -45.6 | 22.25 | 67.85 | 27.10 |
| | | GSM | Pre-AGC | -47.2 | 21.79 | 68.99 | 26.64 |
| | | | 3dB above AGC | -44.2 | 22.24 | 66.44 | 27.09 |
| Downlink | 880.6 | AWGN | Pre-AGC | -55.8 | 21.62 | 77.42 | 26.47 |
| | | | 3dB above AGC | -52.8 | 22.22 | 75.02 | 27.07 |
| | | GSM | Pre-AGC | -54.2 | 21.69 | 75.89 | 26.54 |
| | | | 3dB above AGC | -51.2 | 22.36 | 73.56 | 27.21 |

**PCS Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1865.9 | AWGN | Pre-AGC | -49.8 | 21.24 | 71.04 | 28.24 |
| | | | 3dB above AGC | -46.8 | 21.82 | 68.62 | 28.82 |
| | | GSM | Pre-AGC | -48.0 | 21.31 | 69.31 | 28.31 |
| | | | 3dB above AGC | -45.0 | 21.98 | 66.98 | 28.98 |
| Downlink | 1951.4 | AWGN | Pre-AGC | -54.7 | 21.66 | 76.36 | 28.66 |
| | | | 3dB above AGC | -51.7 | 21.98 | 73.68 | 28.98 |
| | | GSM | Pre-AGC | -53.3 | 21.67 | 74.97 | 28.67 |
| | | | 3dB above AGC | -50.3 | 22.03 | 72.33 | 29.03 |

**AWS-1 Band:**

| Modes | Frequency (MHz) | Signal Type | Signal Level | Input power (dBm) | Output Power (dBm) | Gain (dB) | ERP/EIRP (dBm) |
|---|---|---|---|---|---|---|---|
| Uplink | 1748.5 | AWGN | Pre-AGC | -50.6 | 20.06 | 70.66 | 27.06 |
| | | | 3dB above AGC | -47.6 | 20.59 | 68.19 | 27.59 |
| | | GSM | Pre-AGC | -49.1 | 20.12 | 69.22 | 27.12 |
| | | | 3dB above AGC | -46.1 | 20.64 | 66.74 | 27.64 |
| Downlink | 2150.5 | AWGN | Pre-AGC | -55.9 | 20.89 | 76.79 | 27.89 |
| | | | 3dB above AGC | -52.9 | 21.17 | 74.07 | 28.17 |
| | | GSM | Pre-AGC | -54.3 | 20.71 | 75.01 | 27.71 |
| | | | 3dB above AGC | -51.3 | 21.06 | 72.36 | 28.06 |

Note: ERP=Conducted Output Power(dBm) +Antenna Gain (dBi)-2.15 dB
EIRP=Conducted Output Power(dBm) +Antenna Gain (dBi)
The Maximum indoor and outdoor Gain for all Bands are 7.0 dBi
The frequency was selected to test, which according to the peak of the frequency point from out-of-band rejection test.

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

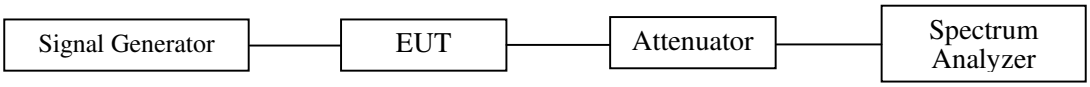
## Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 & §27.53.

## Test Procedure

According to KDB 935210 D05 Indus Booster Basic Meas v01r01 clause 3.4

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal (alternatively, the 99% OBW can be measured and used) to demonstrate compliance to the technical requirements specified in §90.219(e)(4)(i) and (ii). See KDB Publication 971168 for more information regarding measuring the OBW.




## 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 |
| WEINSCHEL | 10dB Attenuator | 5324 | AU0709 | 2015-06-18 | 2016-06-18 |
| WEINSCHEL | 10dB Attenuator | 5324 | AU0709 | 2016-06-18 | 2017-06-18 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2016-06-15 | 2017-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-07-15 | 2017-06-15 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

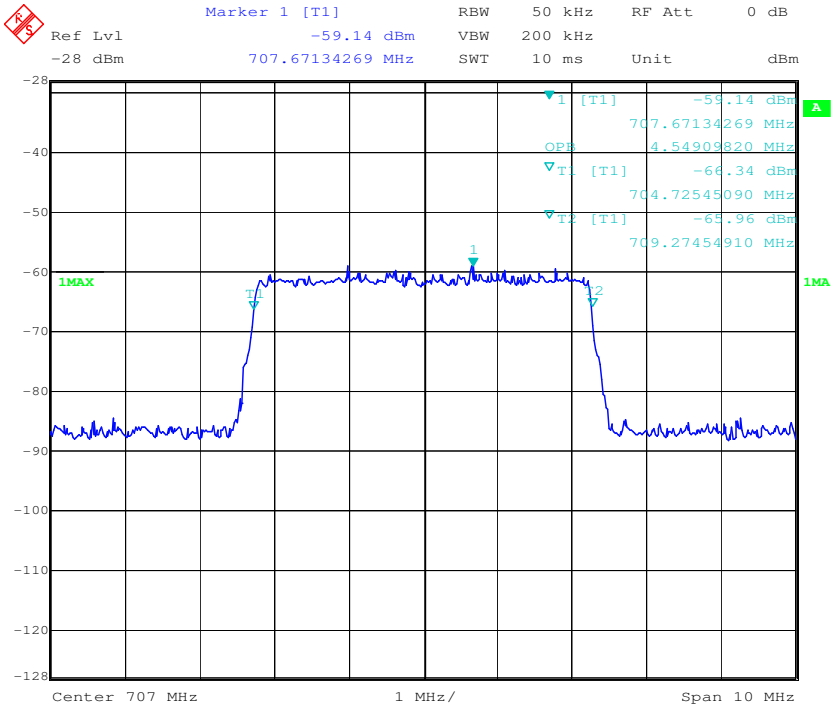
*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

# Test Data

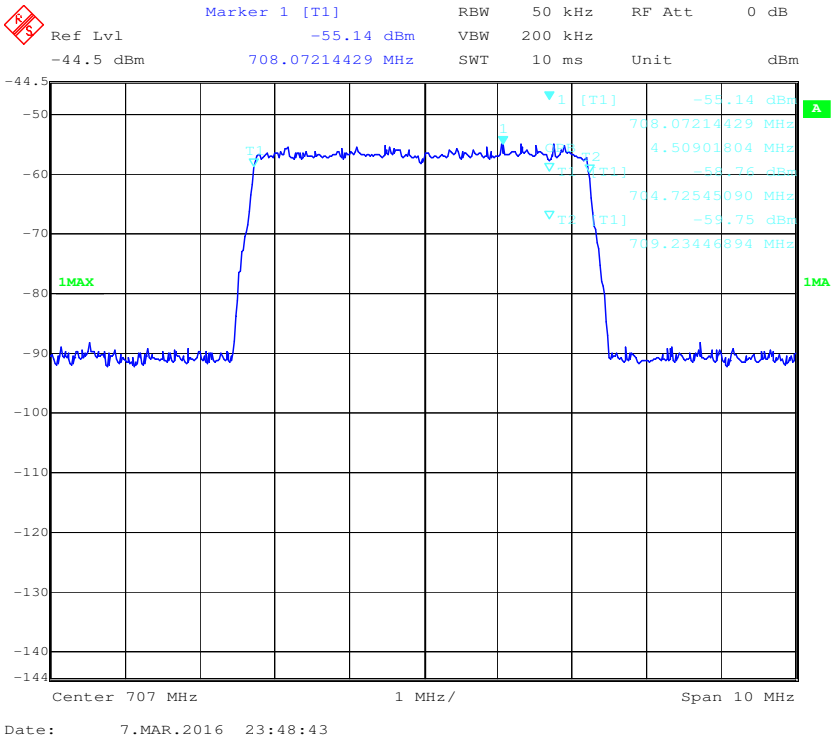
## Environmental Conditions

| | |
|---|---|
| **Temperature:** | 20~23 |

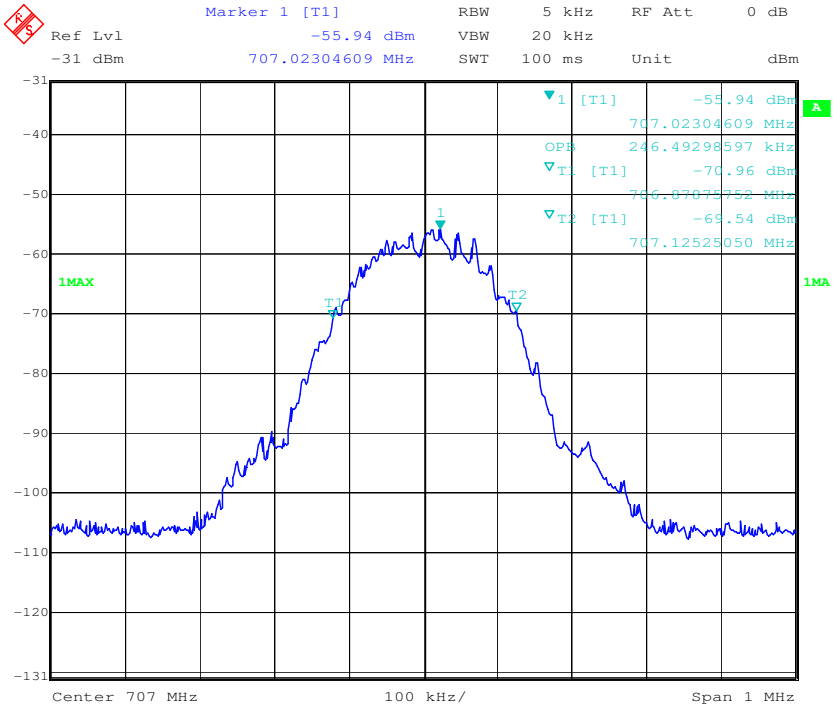
## 99% Bandwidth-UL-AWGN-Pre AGC-Input



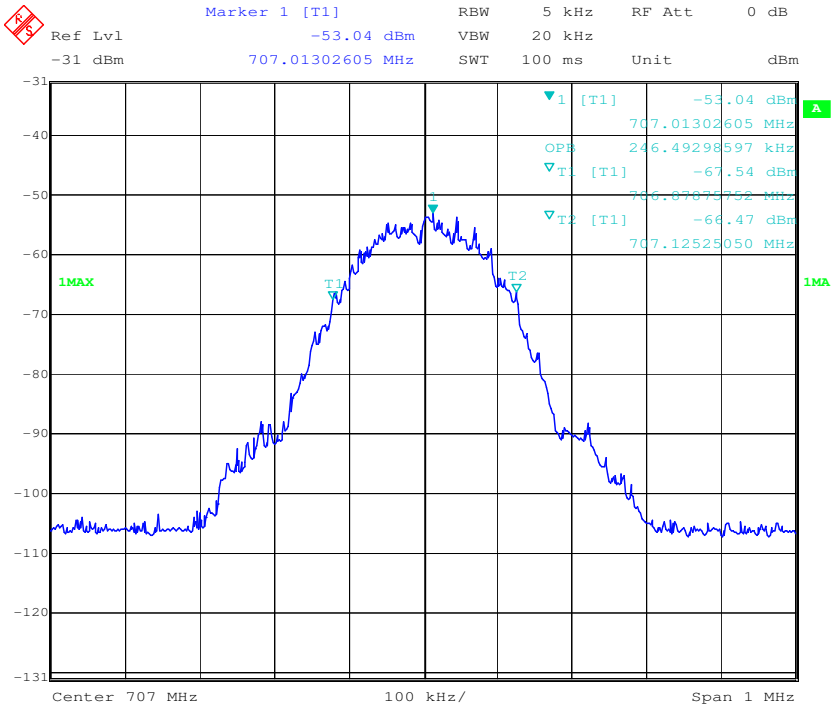

## 99% Bandwidth-UL- AWGN-3dB above AGC-Input



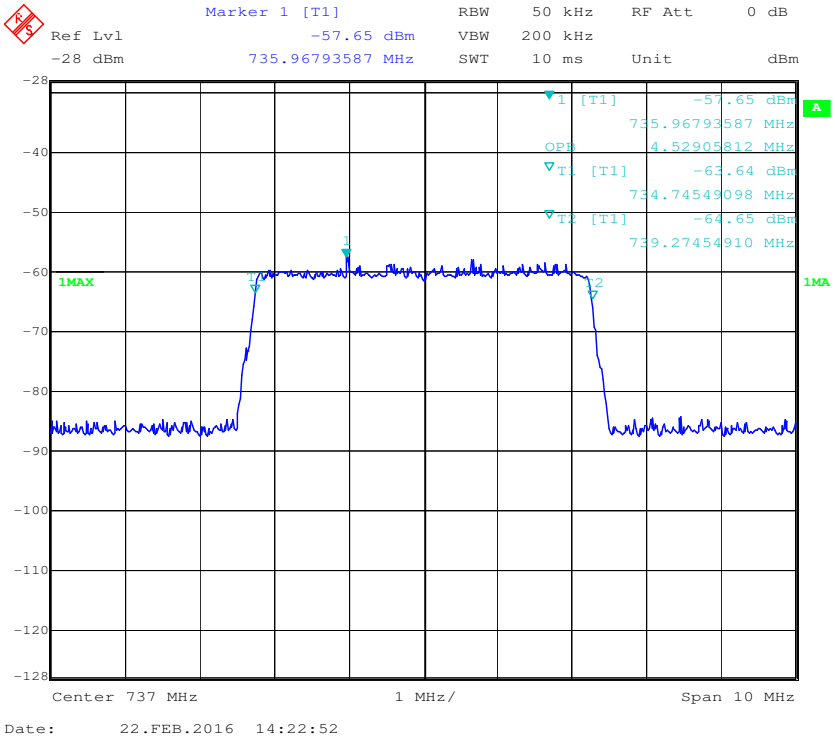
## 99% Bandwidth-UL-GSM-Pre AGC-Input



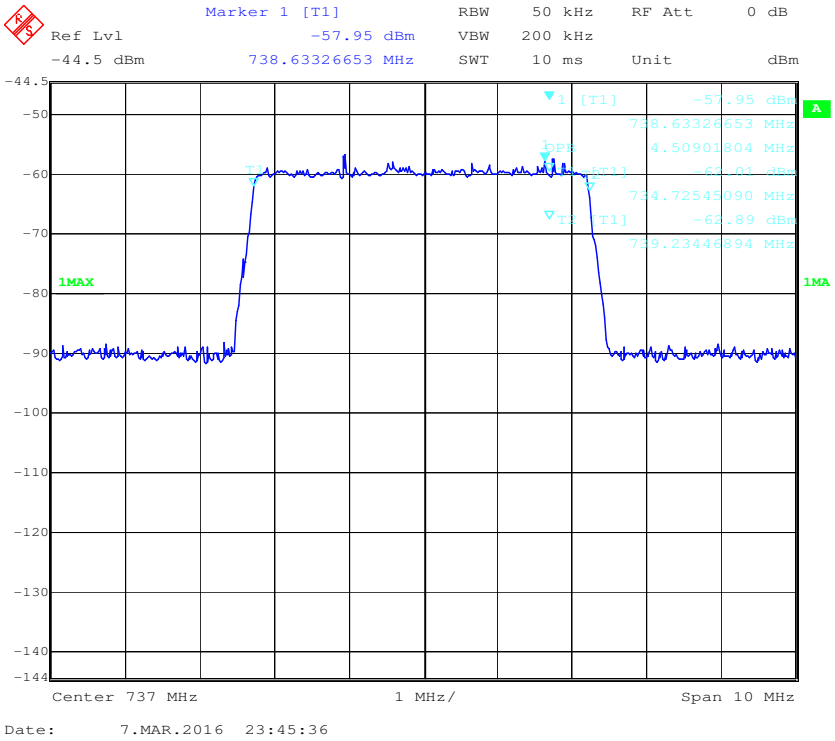

## 99% Bandwidth-UL- GSM-3dB above AGC-Input



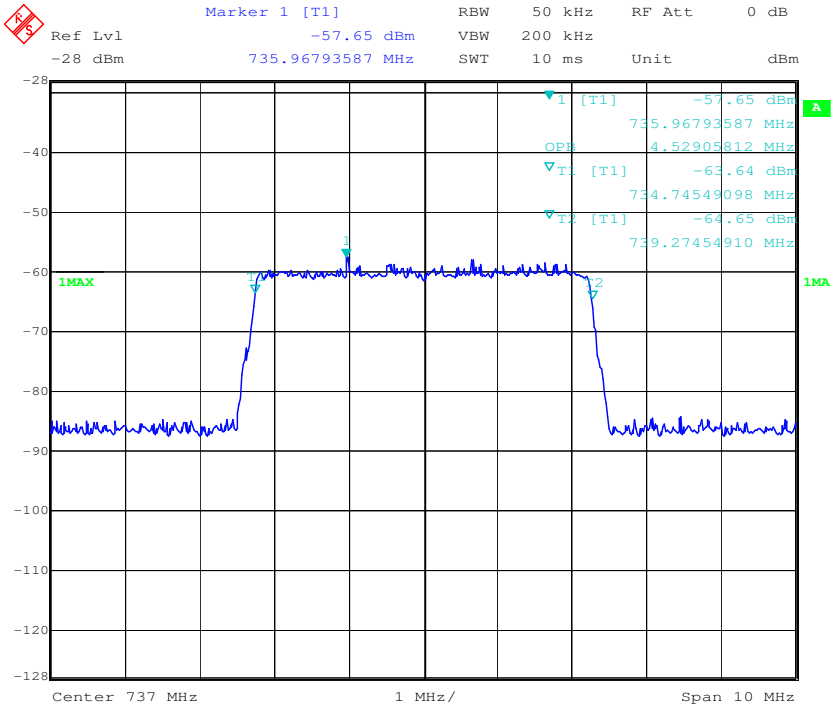
## 99% Bandwidth-DL- AWGN- Pre AGC -Input



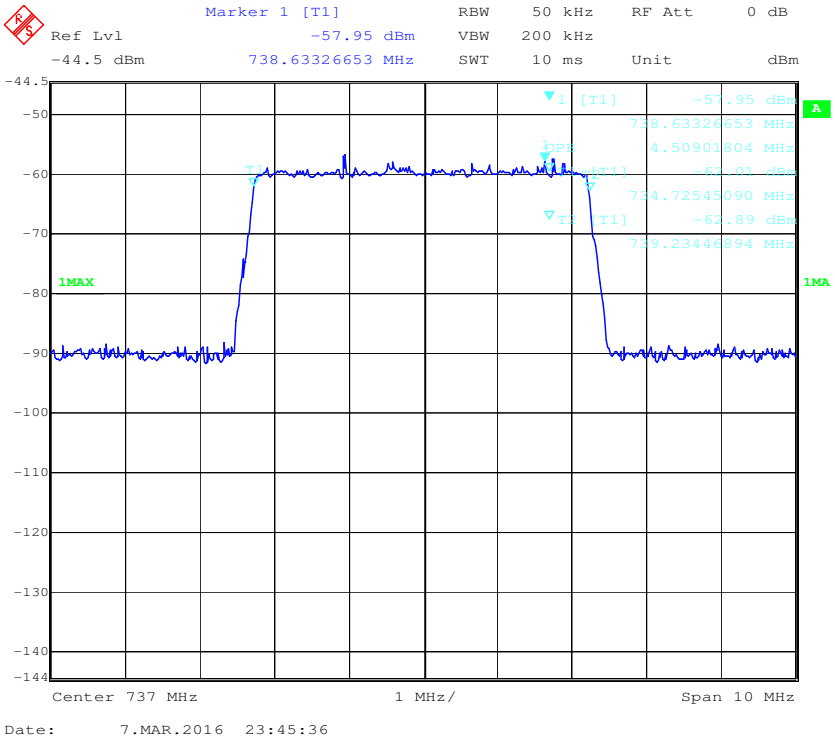

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Input



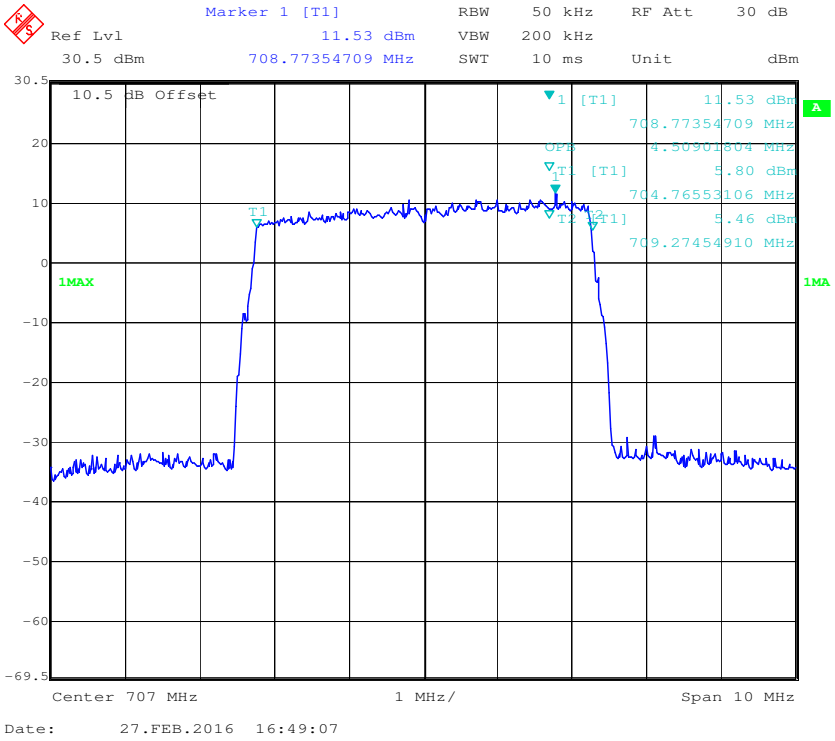
## 99% Bandwidth-DL- GSM- Pre AGC -Input



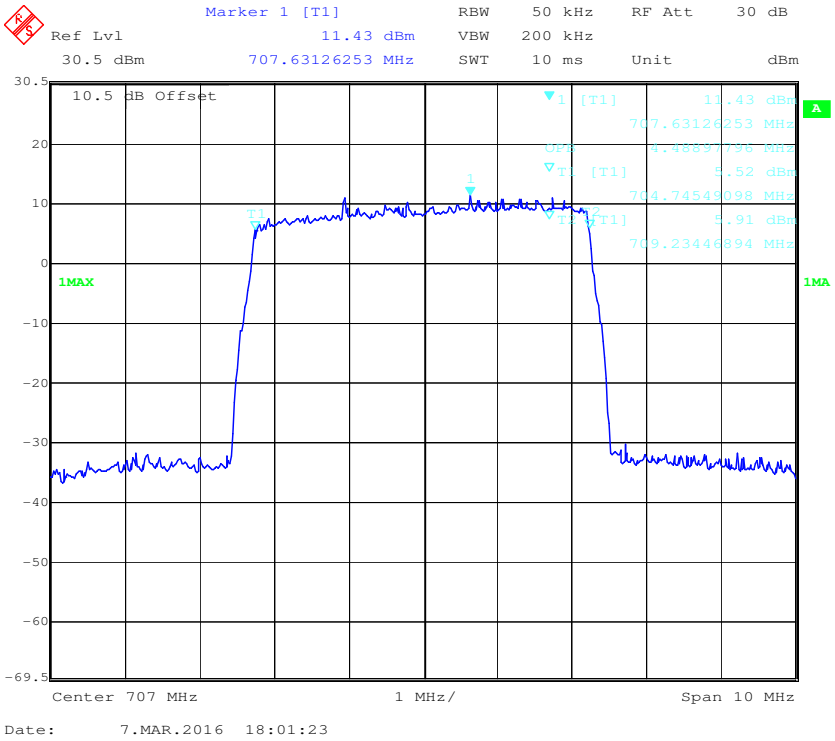

## 99% Bandwidth-DL- GSM- 3dB above AGC -Input



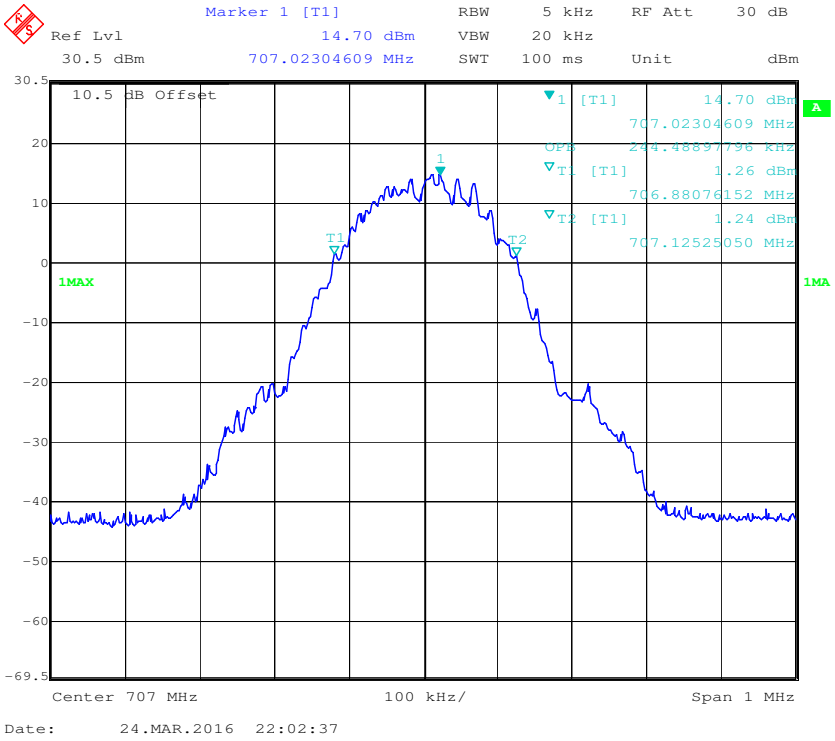
## 99% Bandwidth-UL- AWGN- Pre AGC -Output



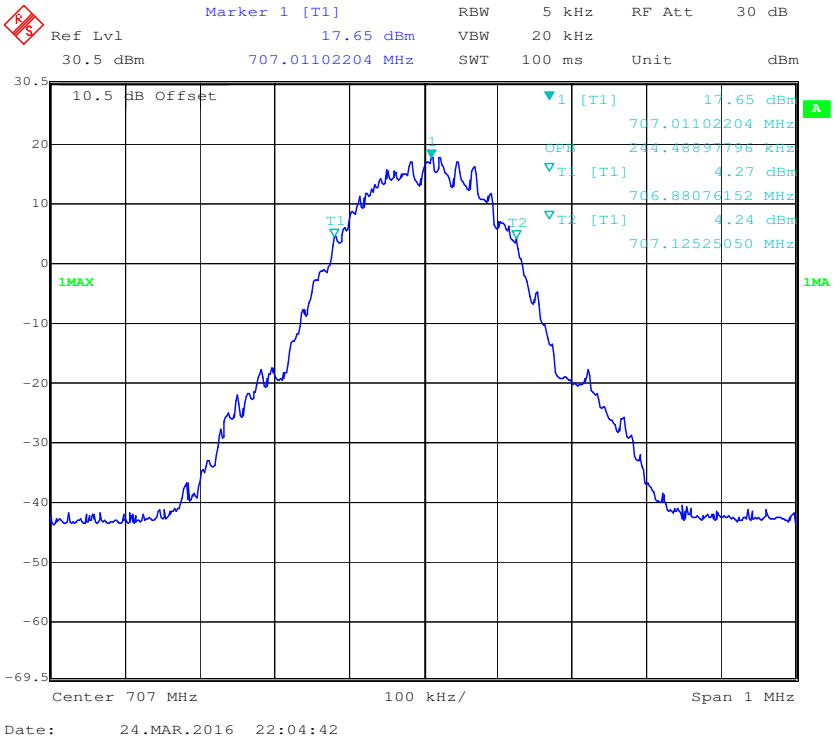

## 99% Bandwidth-UL- AWGN-3dB above AGC-Output



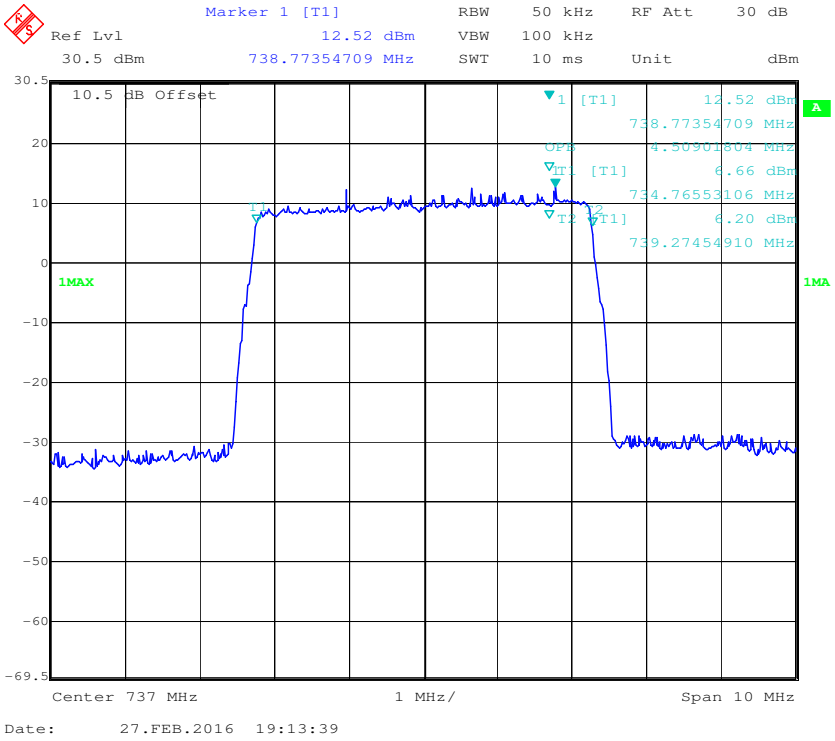
## 99% Bandwidth-UL- GSM- Pre AGC -Output



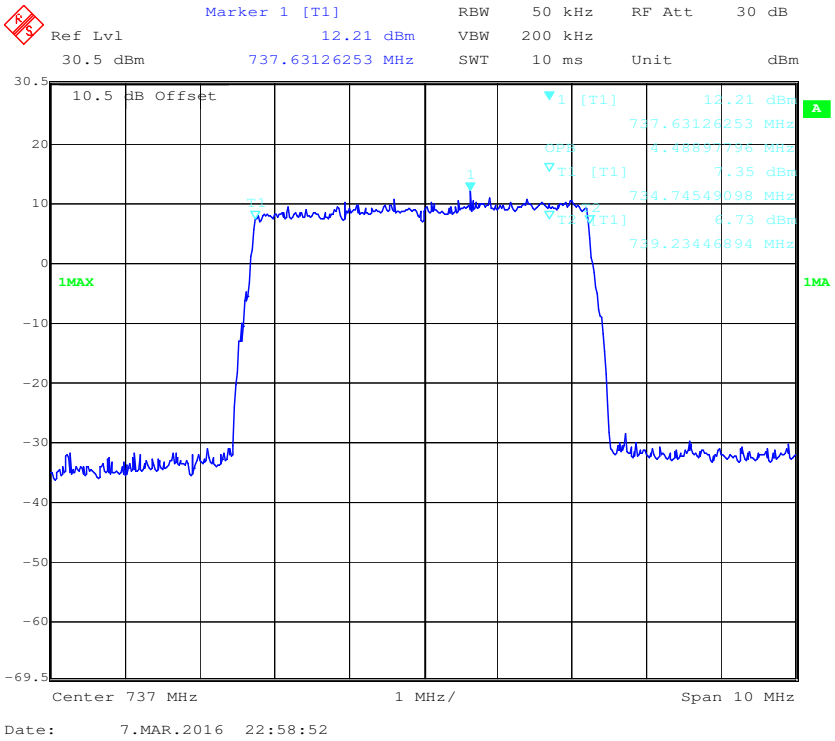

## 99% Bandwidth-UL- GSM-3dB above AGC-Output



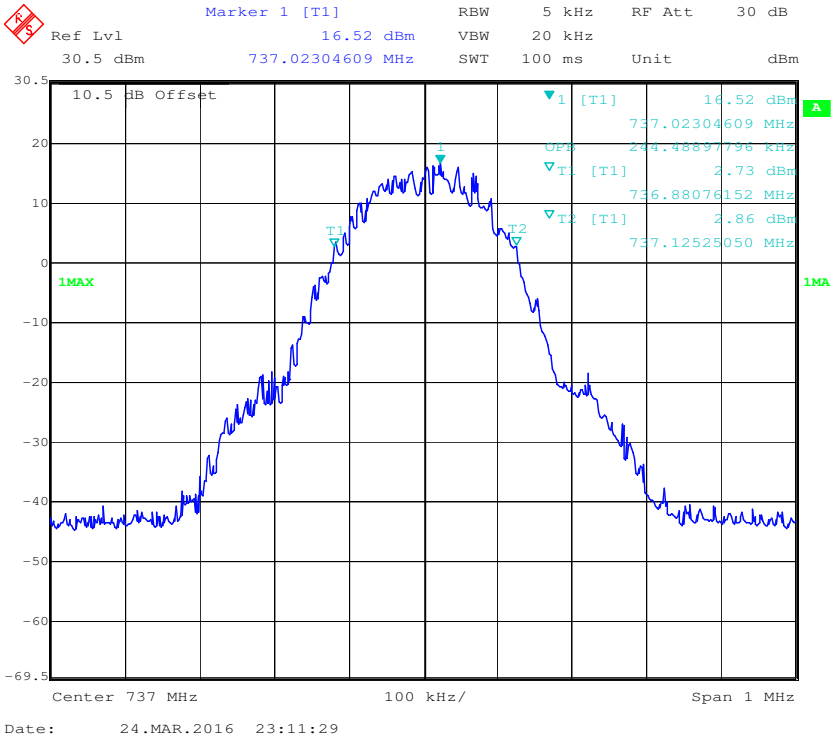
## 99% Bandwidth-DL- AWGN- Pre AGC -Output



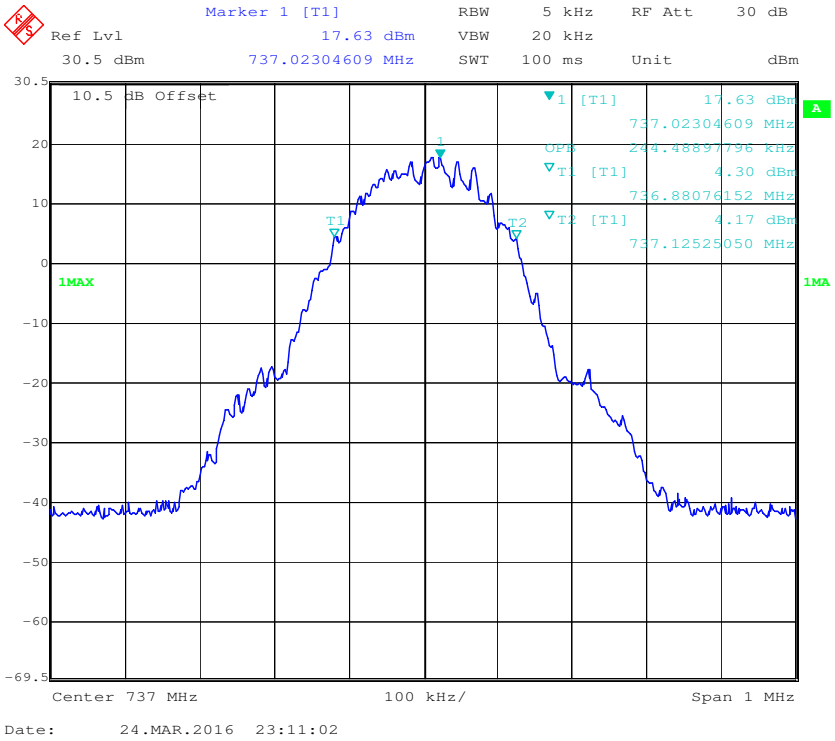

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Output



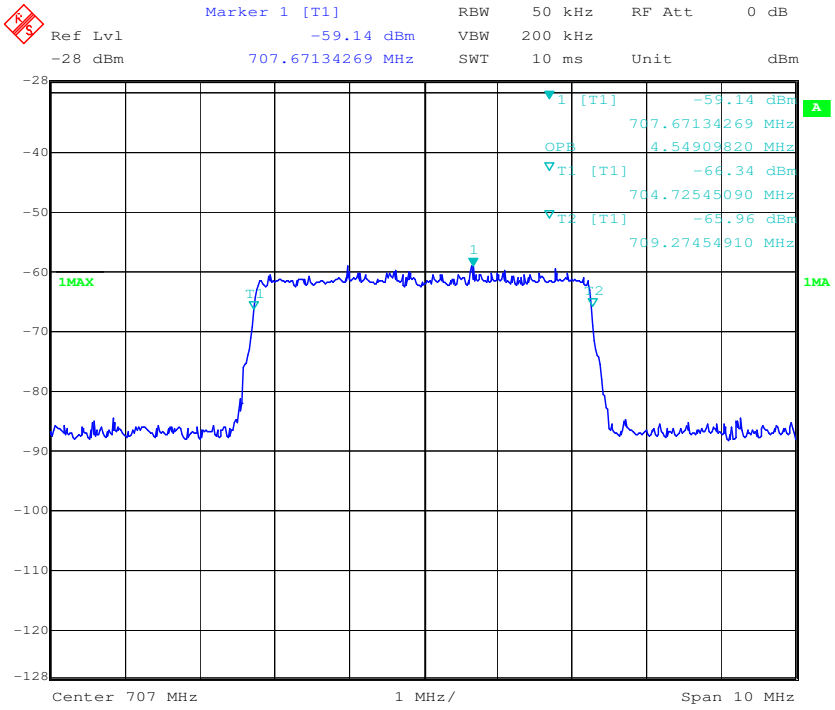
## 99% Bandwidth-DL- GSM- Pre AGC -Output



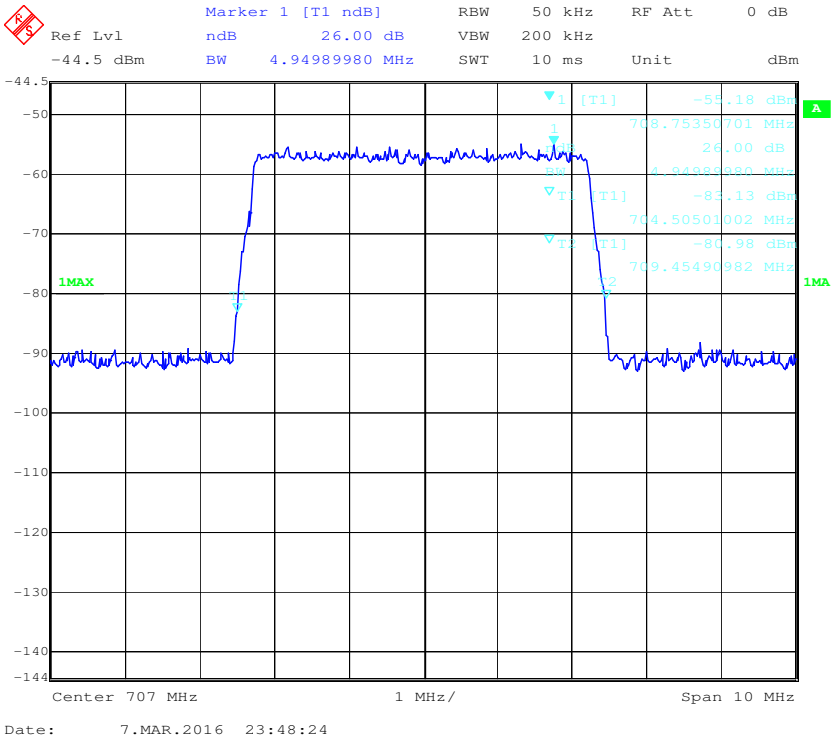

## 99% Bandwidth-DL- GSM- 3dB above AGC -Output



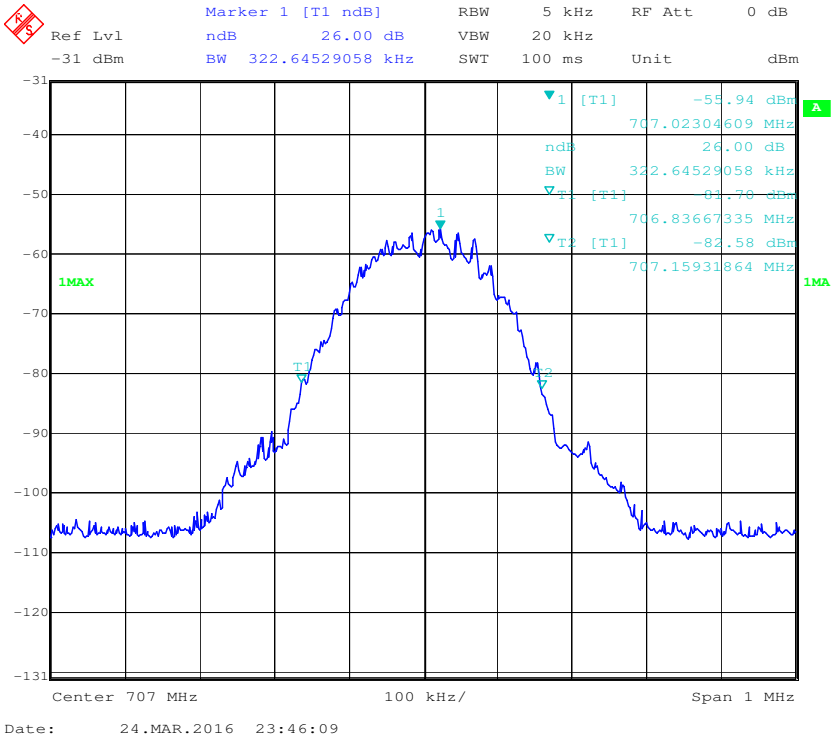
## 26 dB Bandwidth-UL-AWGN-Pre AGC-Input



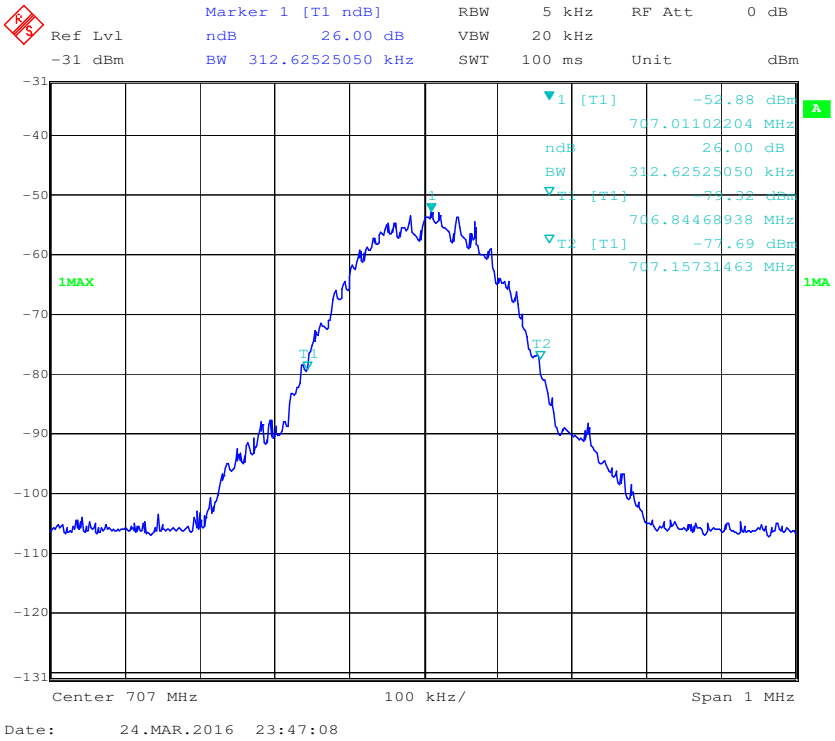

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input



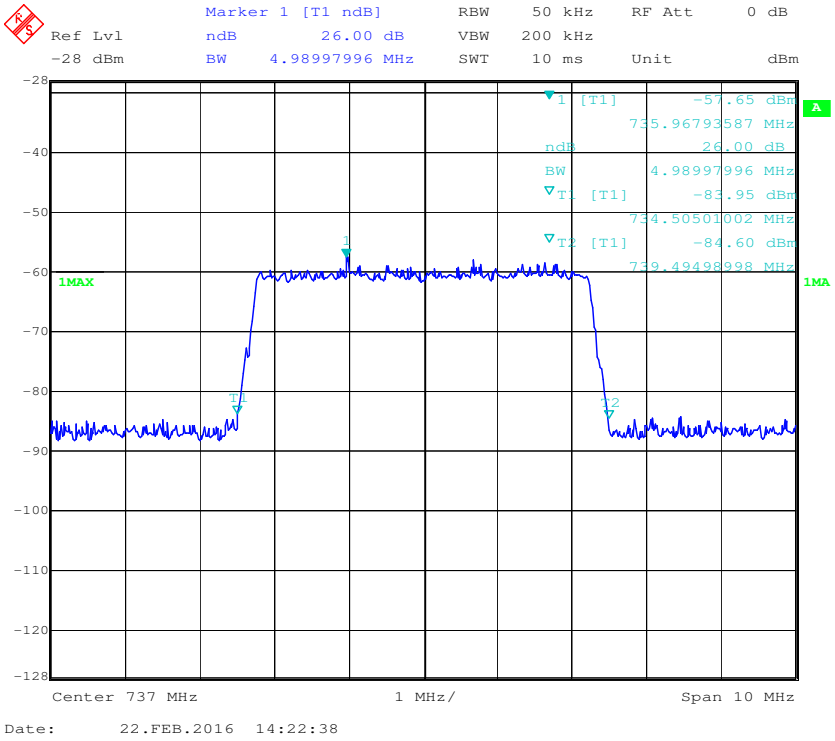
## 26 dB Bandwidth-UL-GSM-Pre AGC-Input



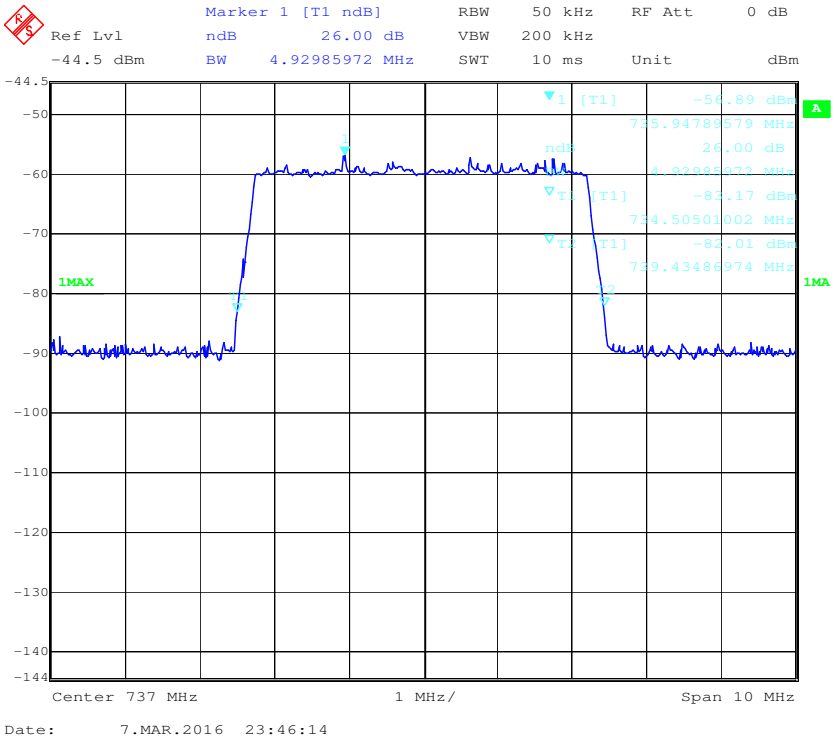

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Input



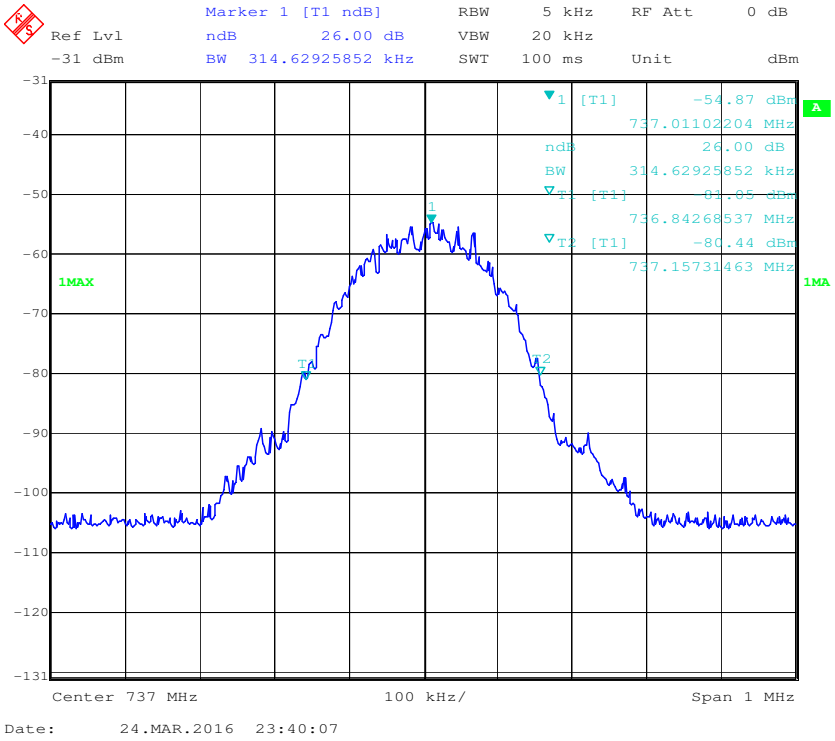
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Input



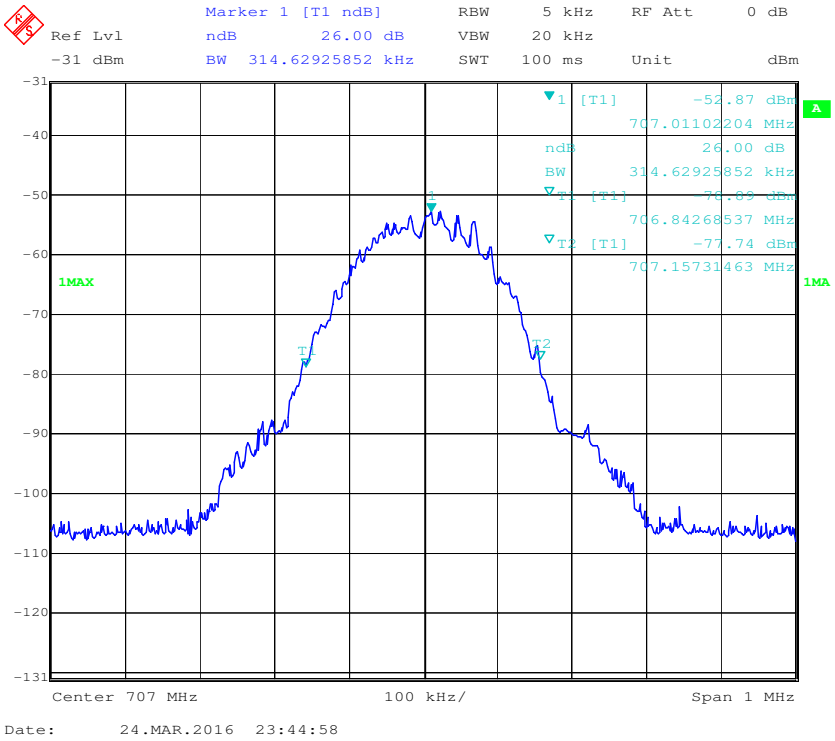

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Input



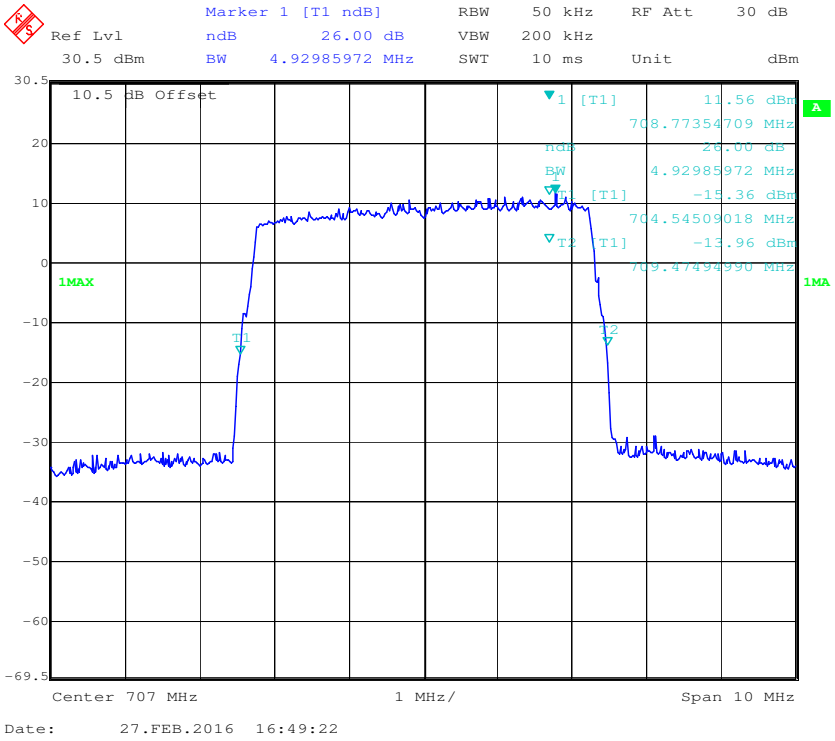
## 26 dB Bandwidth-DL- GSM- Pre AGC -Input



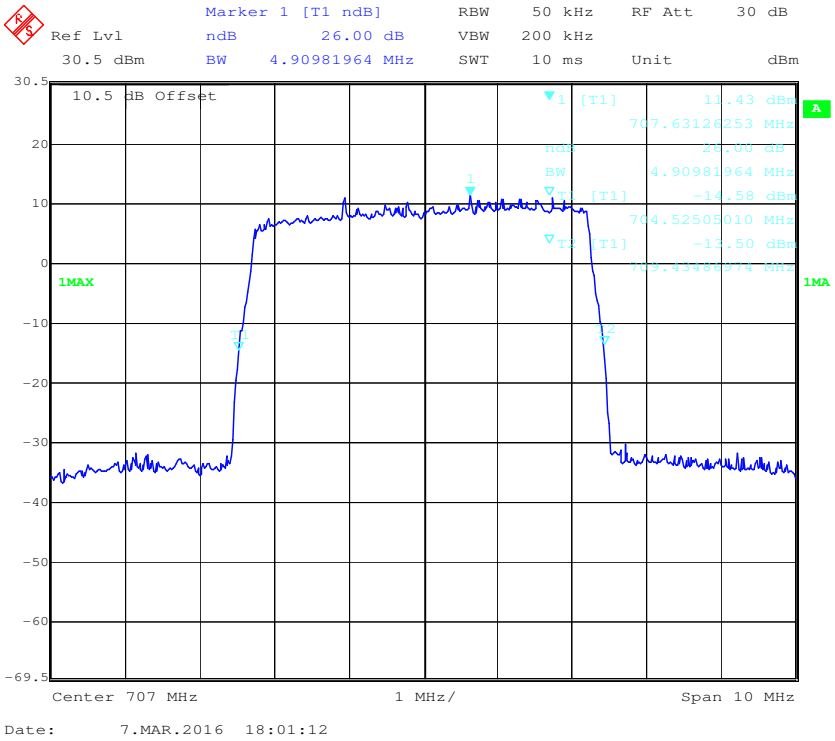

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Input



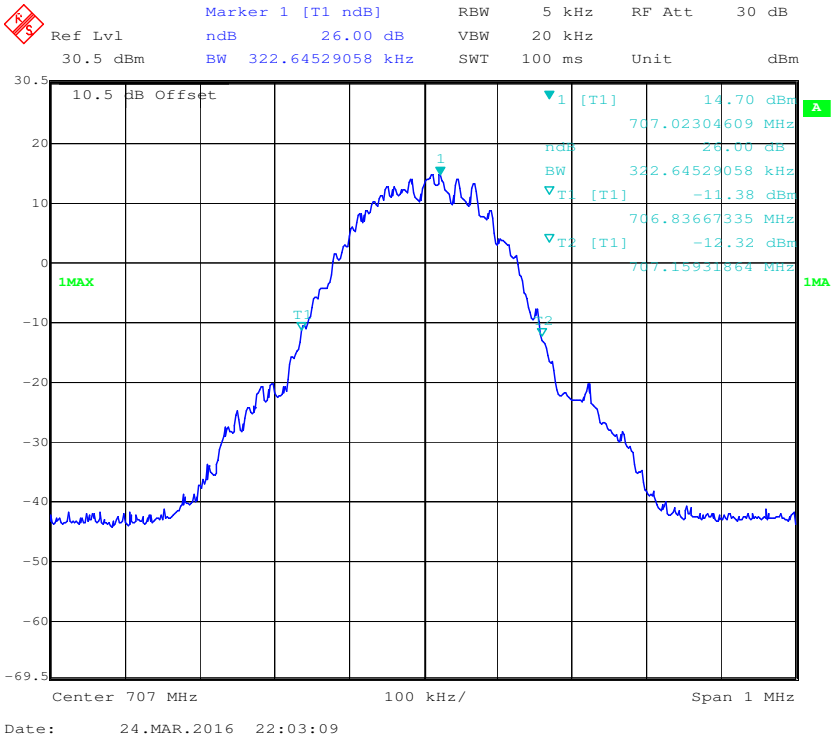
## 26 dB Bandwidth-UL- AWGN- Pre AGC -Output



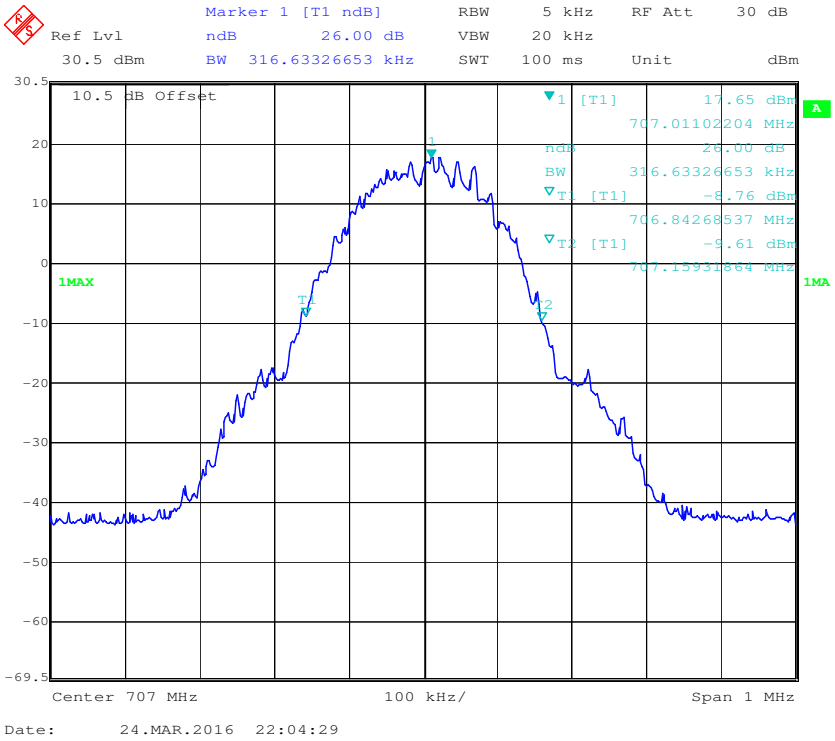

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Output



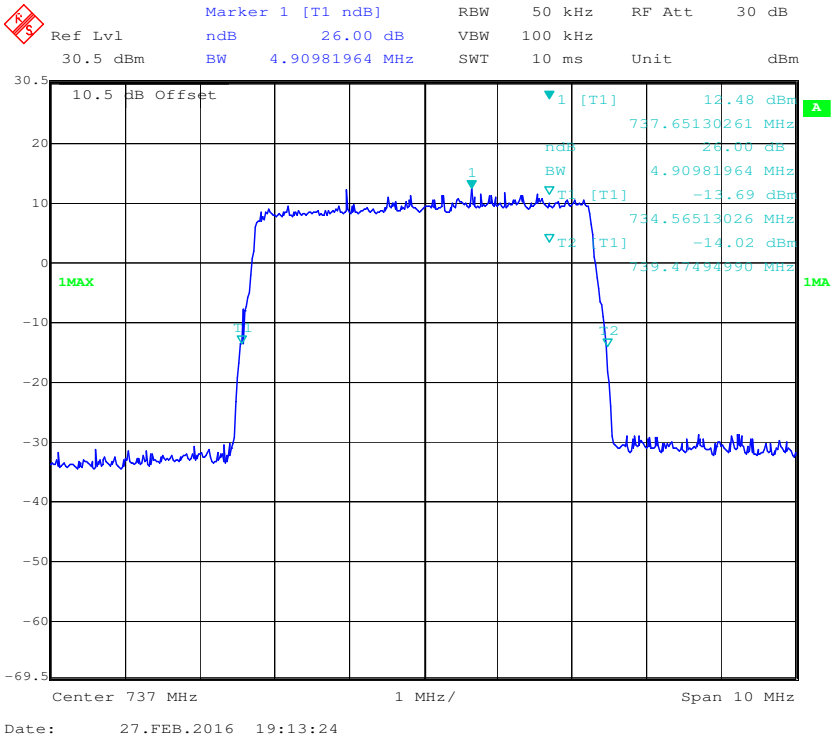
## 26 dB Bandwidth-UL- GSM- Pre AGC -Output



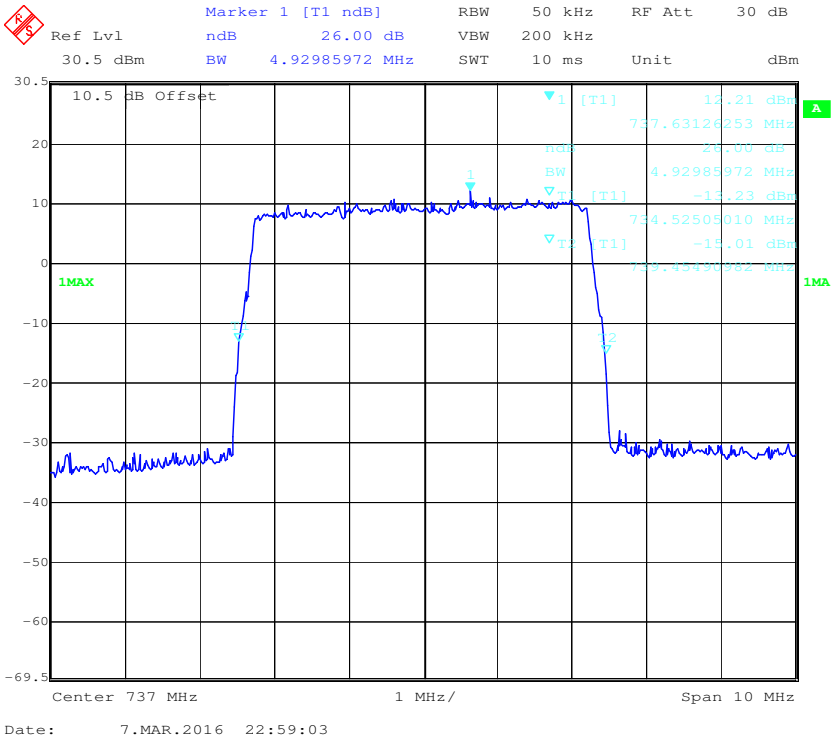

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Output



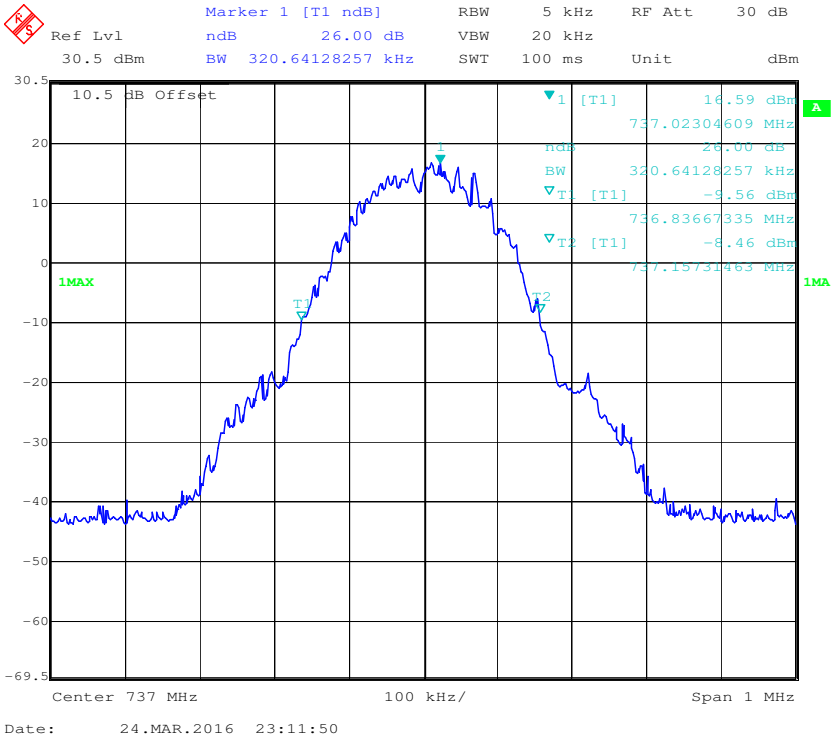
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Output



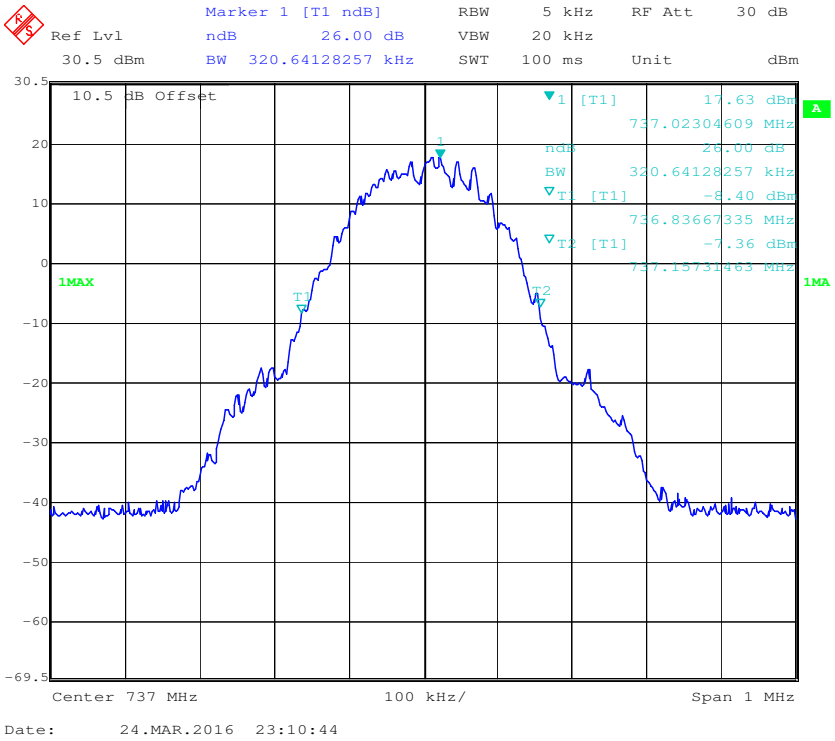

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Output



## 26 dB Bandwidth-DL- GSM- Pre AGC -Output



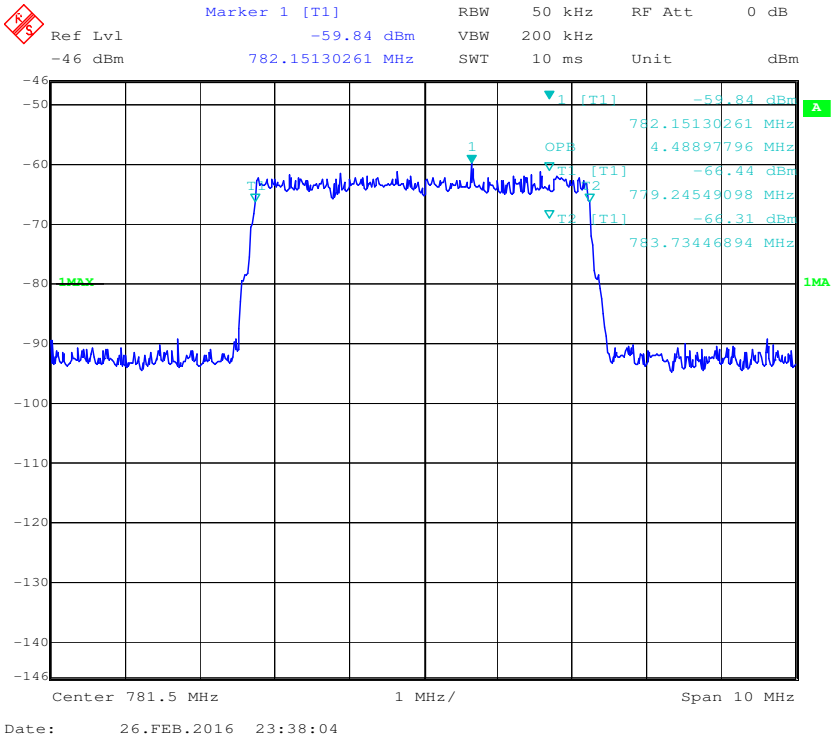

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Output



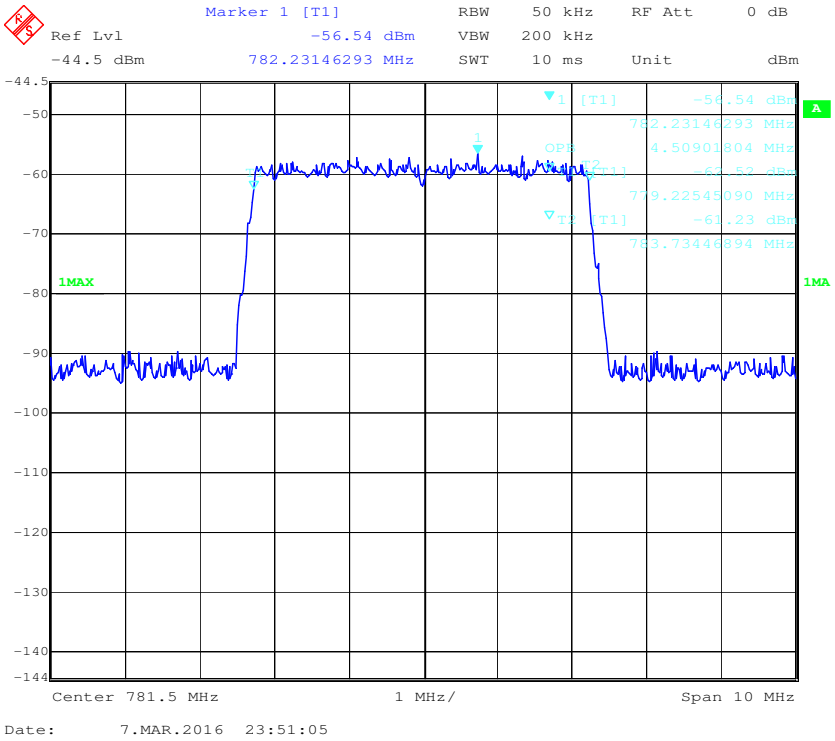
**Upper 700MHz (C Block) Band:**

| Mode | Signal Type | Signal Level | Frequency (MHz) | 99% Bandwidth (MHz) | | 26dB Bandwidth (MHz) | |
|---|---|---|---|---|---|---|---|
| | | | | Input | Output | Input | Output |
| Uplink | AWGN | Pre-AGC | 781.5 | 4.489 | 4.510 | 4.930 | 4.910 |
| | | 3dB above AGC | 781.5 | 4.510 | 4.510 | 4.910 | 4.930 |
| | GSM | Pre-AGC | 781.5 | 0.244 | 0.244 | 0.323 | 0.323 |
| | | 3dB above AGC | 781.5 | 0.246 | 0.246 | 0.323 | 0.321 |
| Downlink | AWGN | Pre-AGC | 751.5 | 4.489 | 4.489 | 4.950 | 4.910 |
| | | 3dB above AGC | 751.5 | 4.510 | 4.510 | 4.930 | 4.890 |
| | GSM | Pre-AGC | 751.5 | 0.246 | 0.246 | 0.315 | 0.315 |
| | | 3dB above AGC | 751.5 | 0.244 | 0.244 | 0.323 | 0.321 |

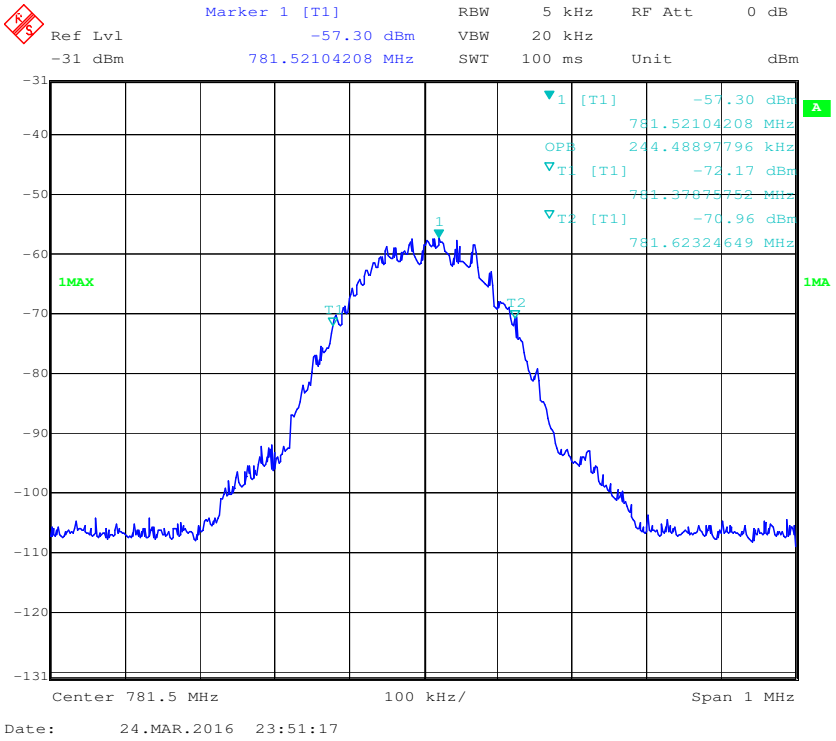
## 99% Bandwidth-UL-AWGN-Pre AGC-Input



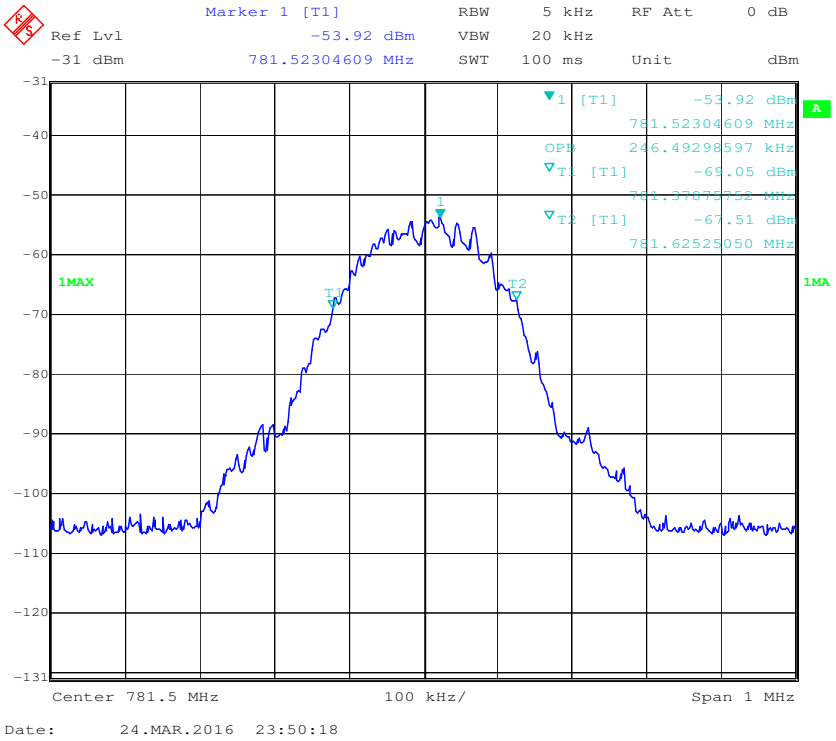

## 99% Bandwidth-UL- AWGN-3dB above AGC-Input



## 99% Bandwidth-UL-GSM-Pre AGC-Input




## 99% Bandwidth-UL- GSM-3dB above AGC-Input



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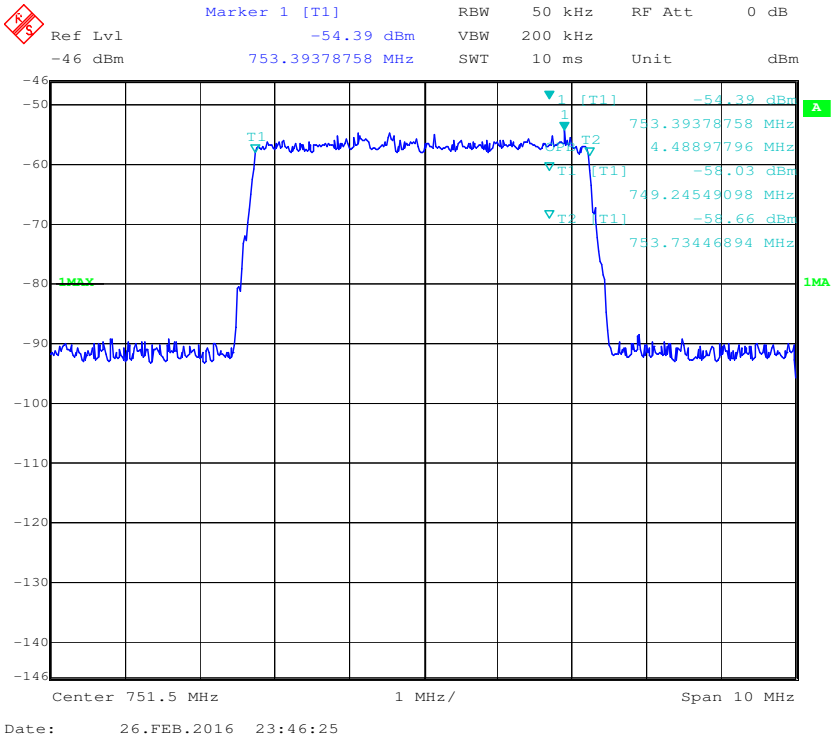
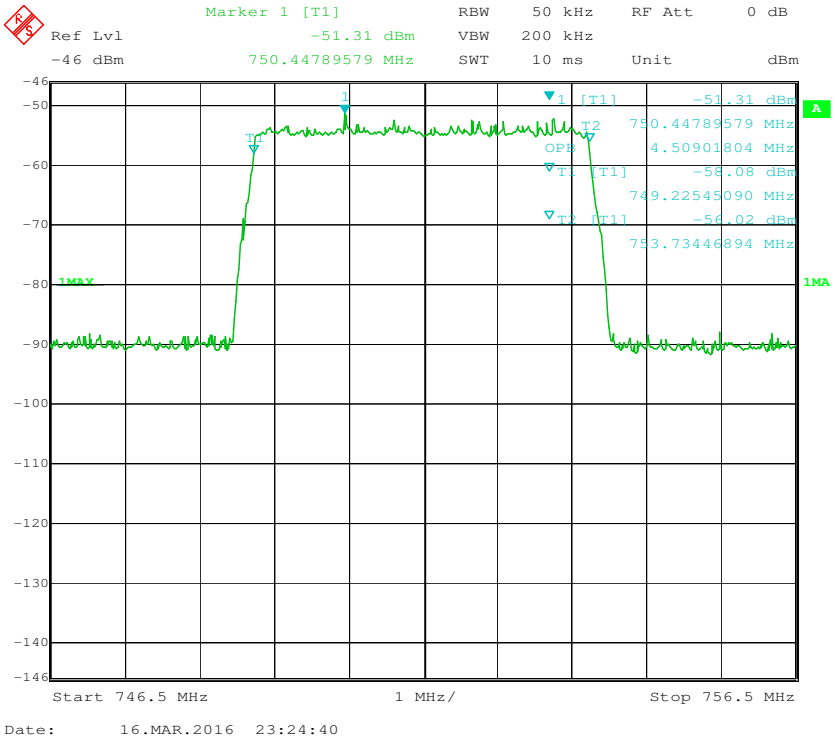
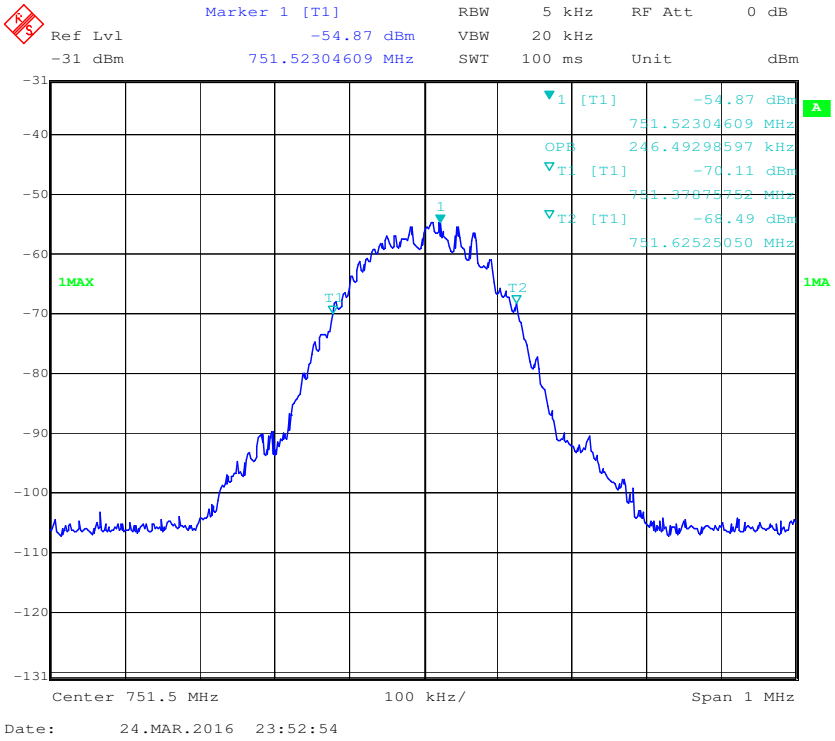


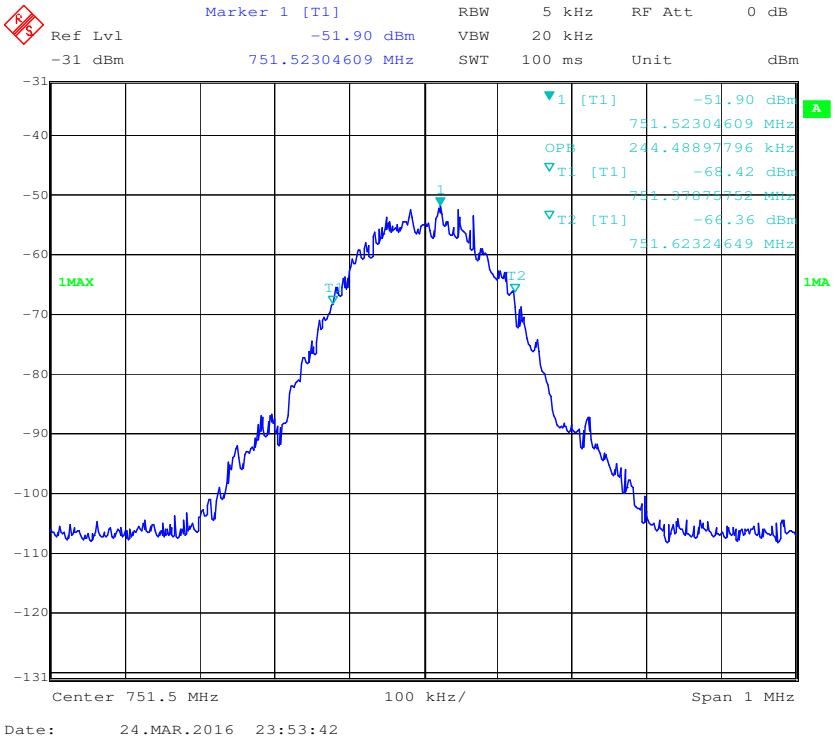

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Input



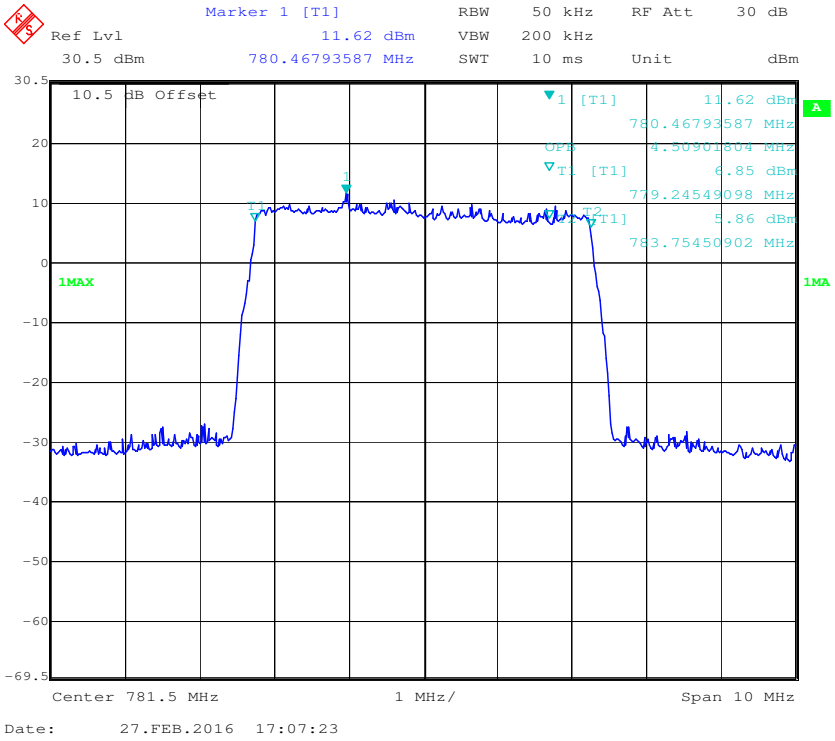
## 99% Bandwidth-DL- GSM- Pre AGC -Input



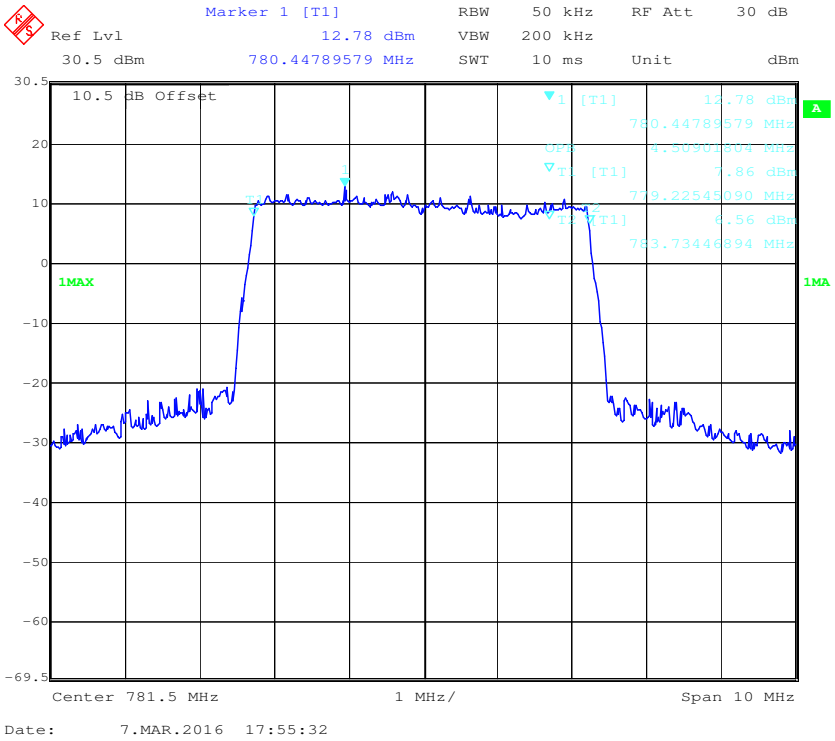

## 99% Bandwidth-DL- GSM- 3dB above AGC -Input



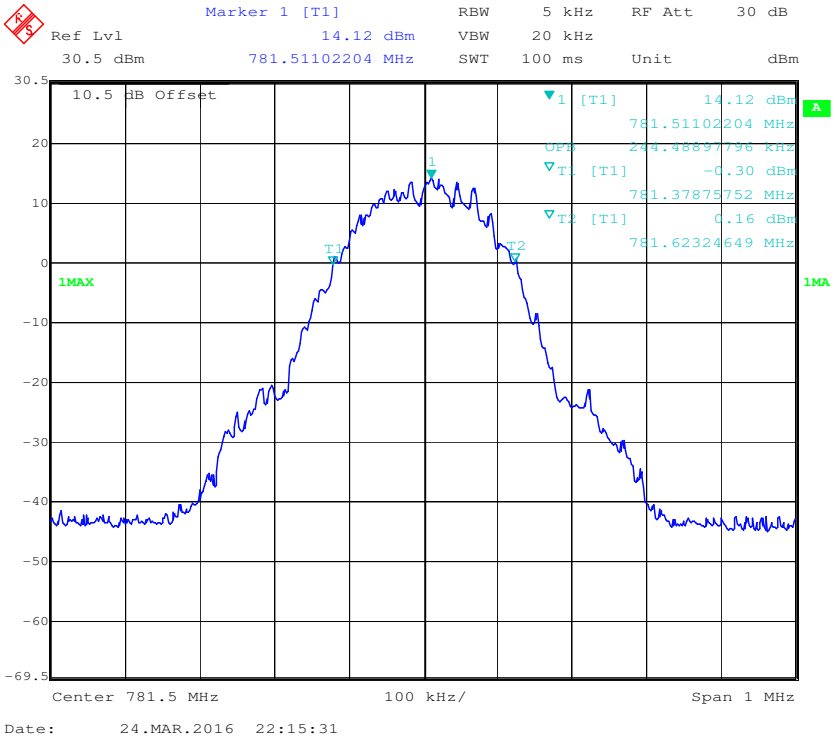
## 99% Bandwidth-UL- AWGN- Pre AGC -Output



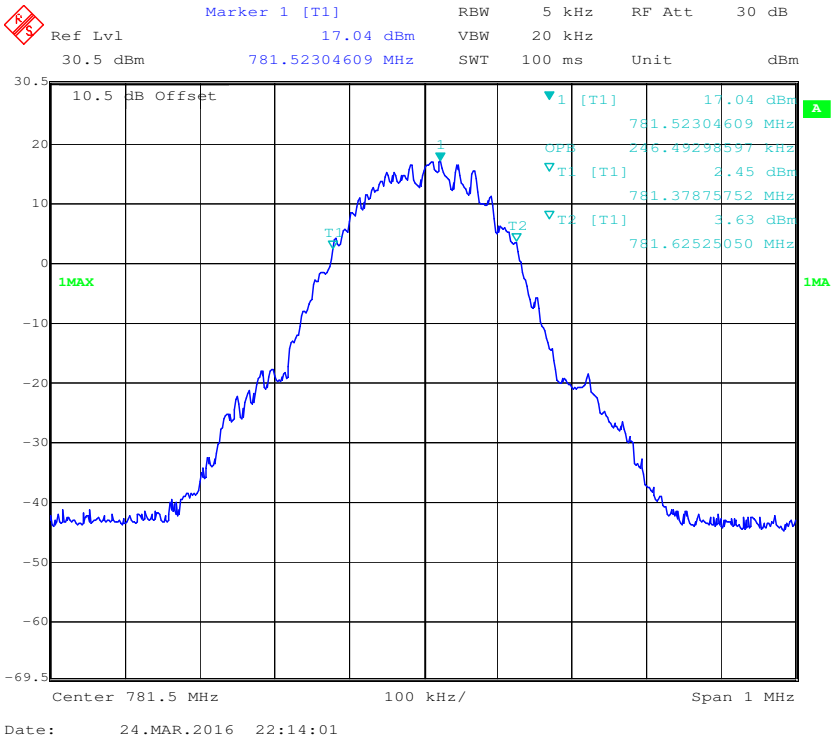

## 99% Bandwidth-UL- AWGN-3dB above AGC-Output



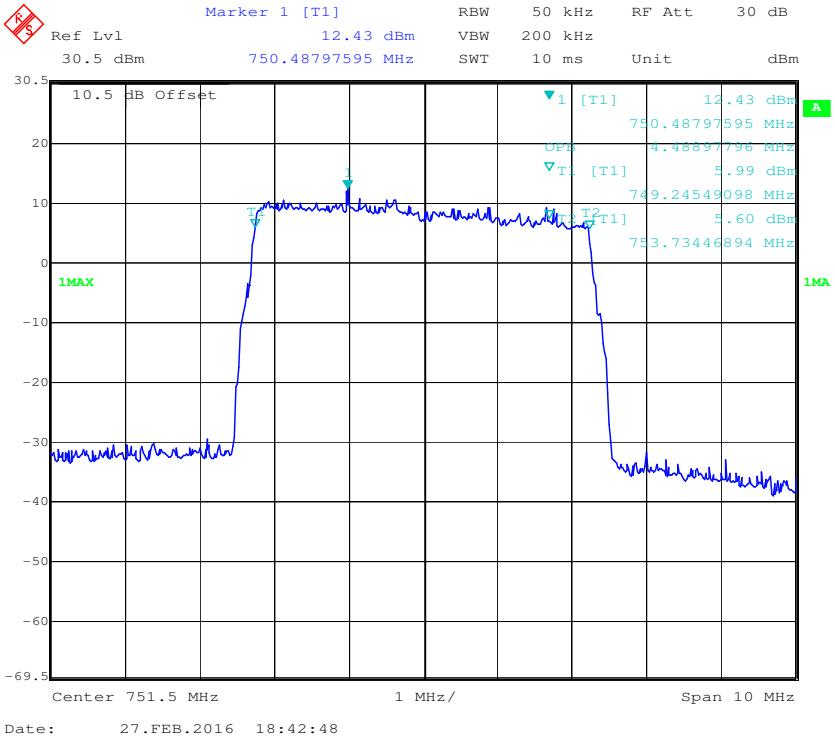
## 99% Bandwidth-UL- GSM- Pre AGC -Output



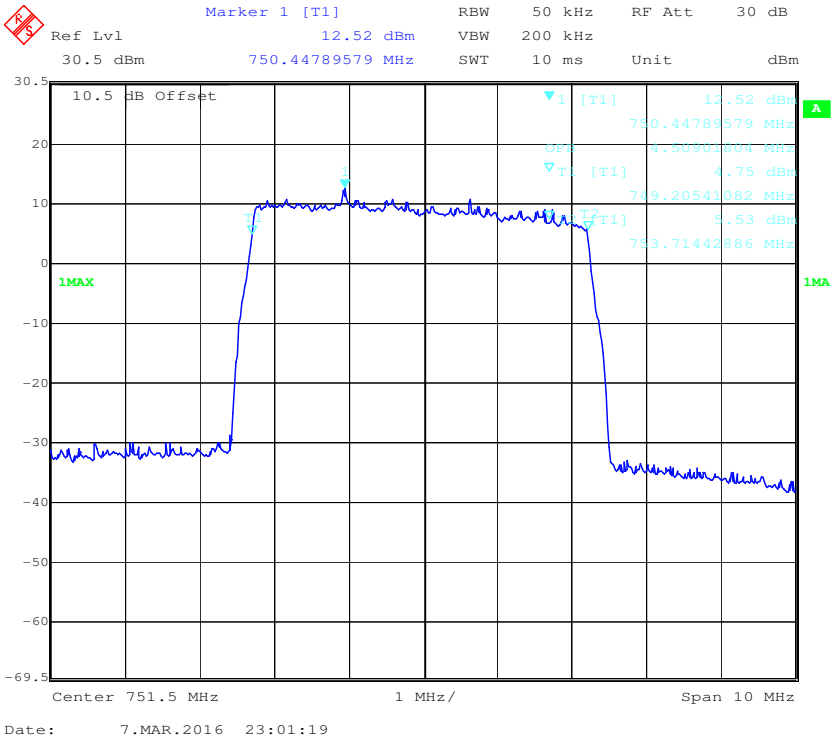

## 99% Bandwidth-UL- GSM- 3dB above AGC -Output



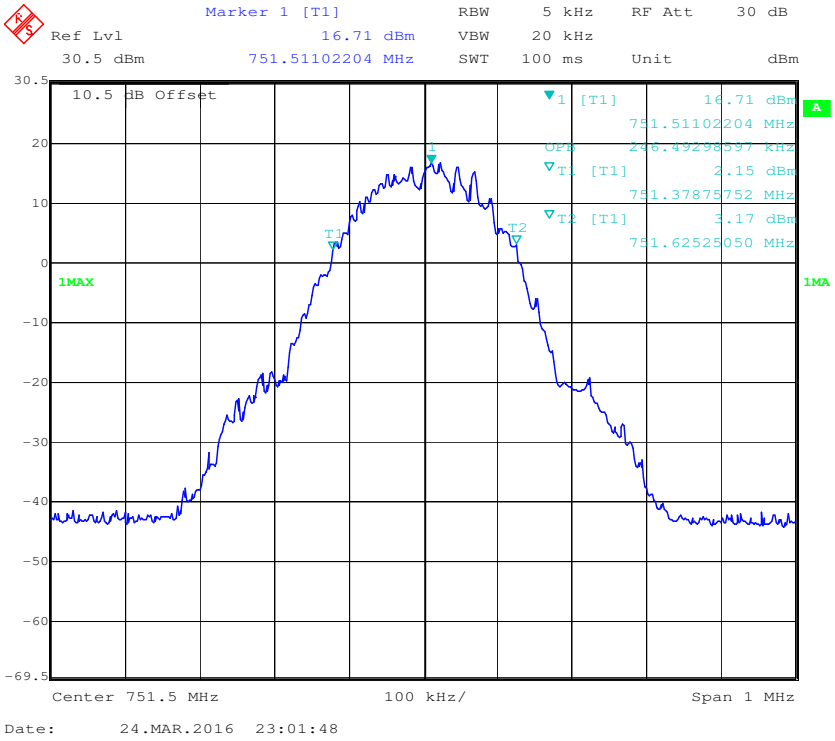
## 99% Bandwidth-DL- AWGN- Pre AGC -Output



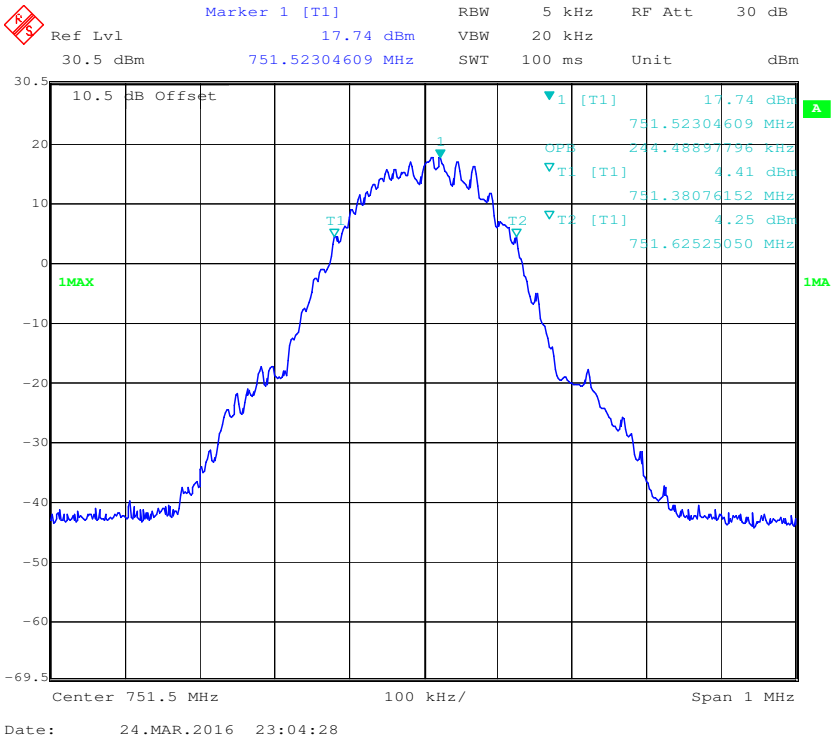

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Output



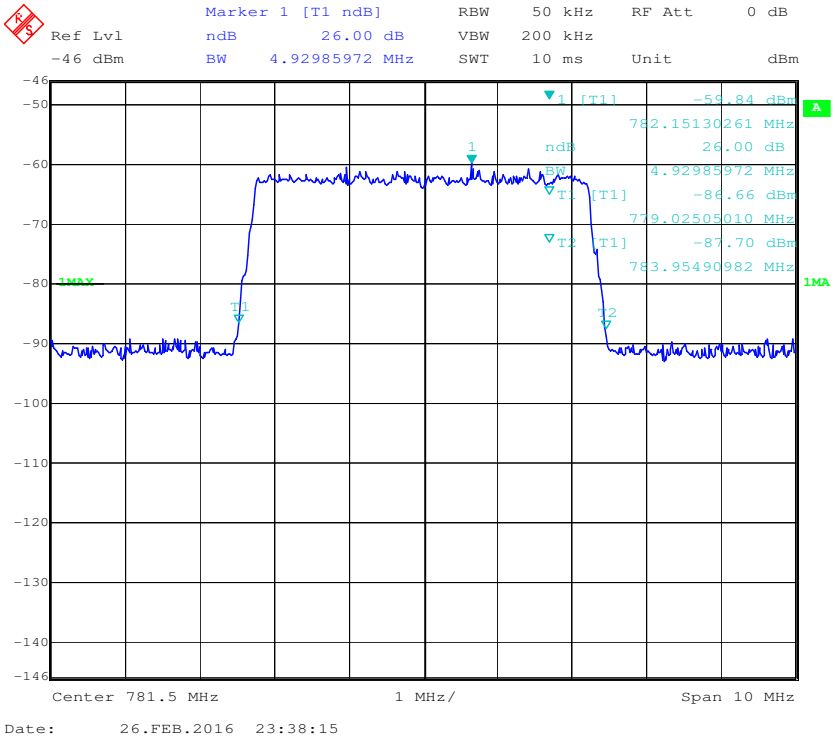
## 99% Bandwidth-DL- GSM- Pre AGC -Output



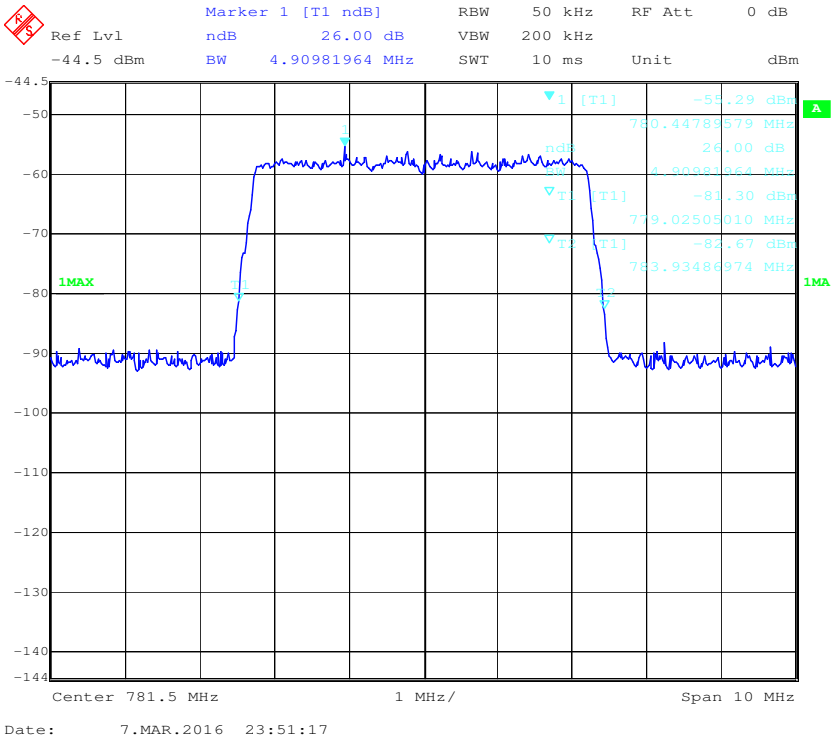

## 99% Bandwidth-DL- GSM- 3dB above AGC -Output



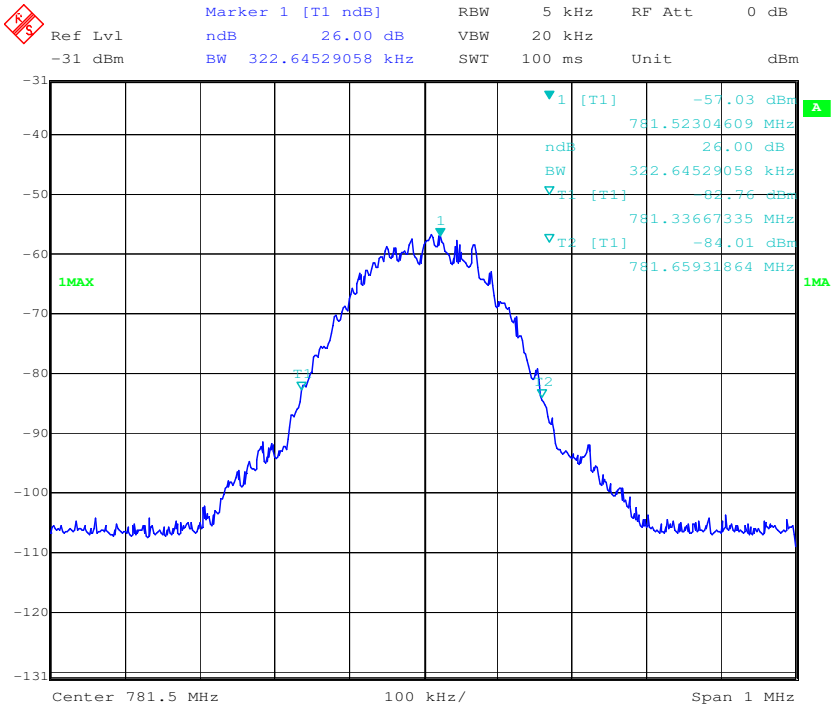
## 26 dB Bandwidth-UL-AWGN-Pre AGC-Input




## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input

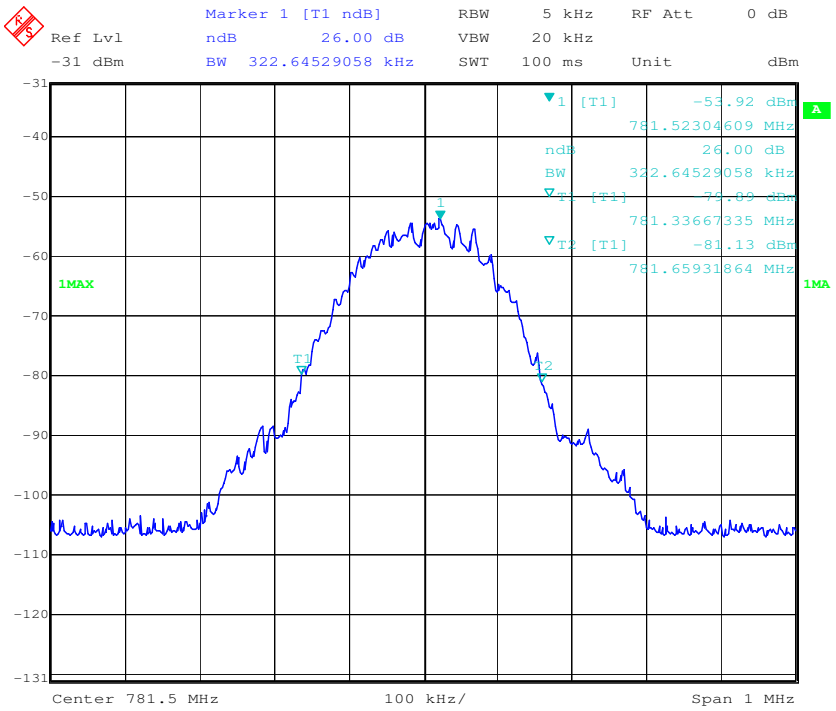


## 26 dB Bandwidth-UL-GSM-Pre AGC-Input




Date: 24.MAR.2016 23:51:45

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Input

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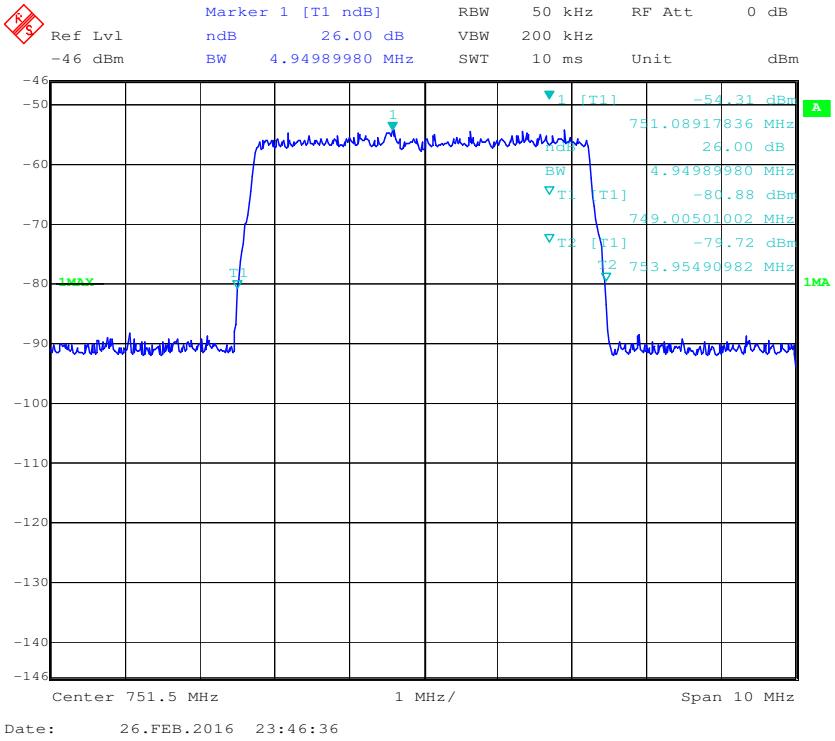
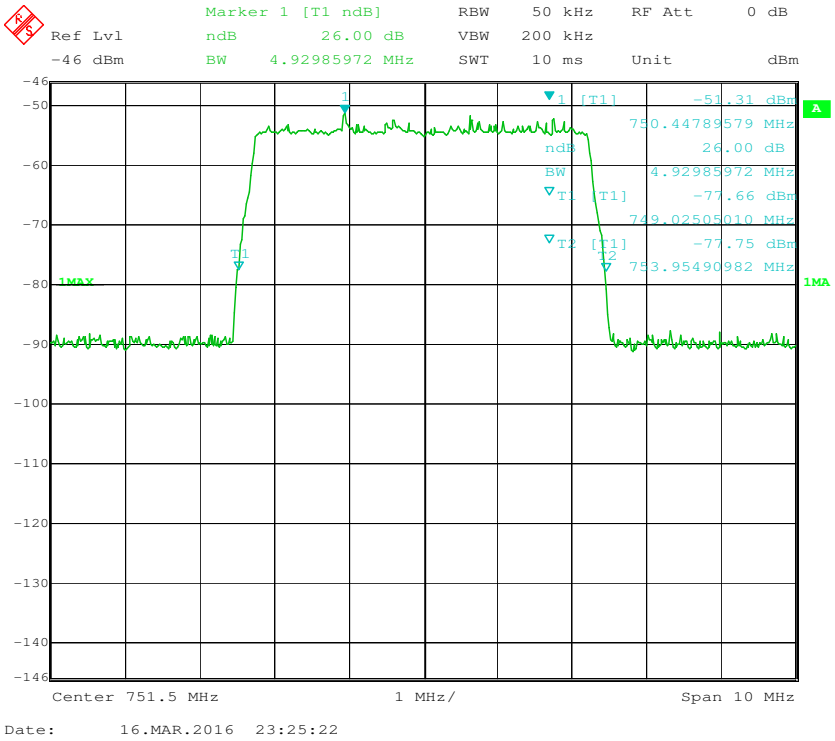
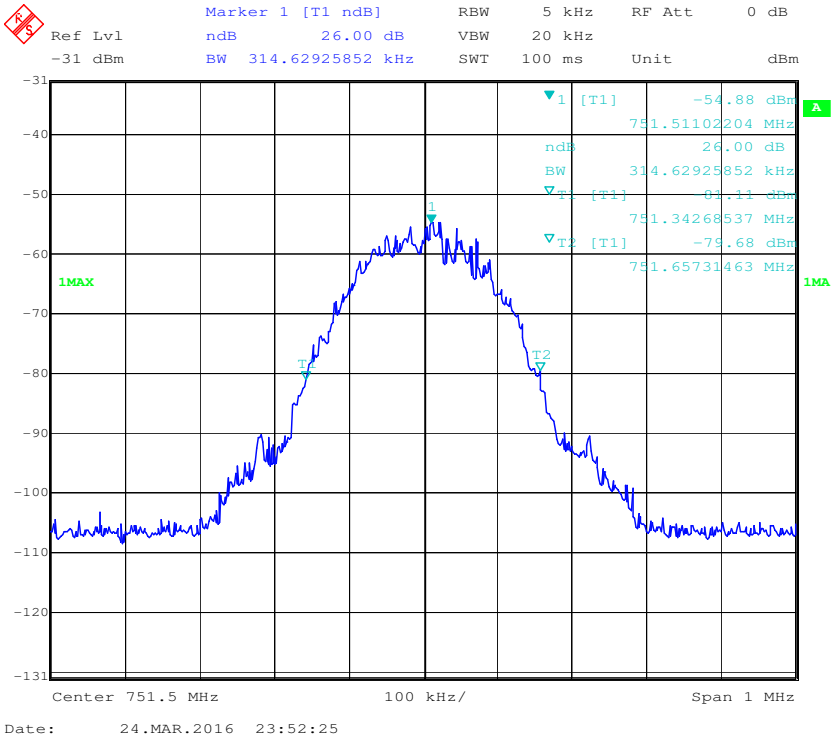
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Input



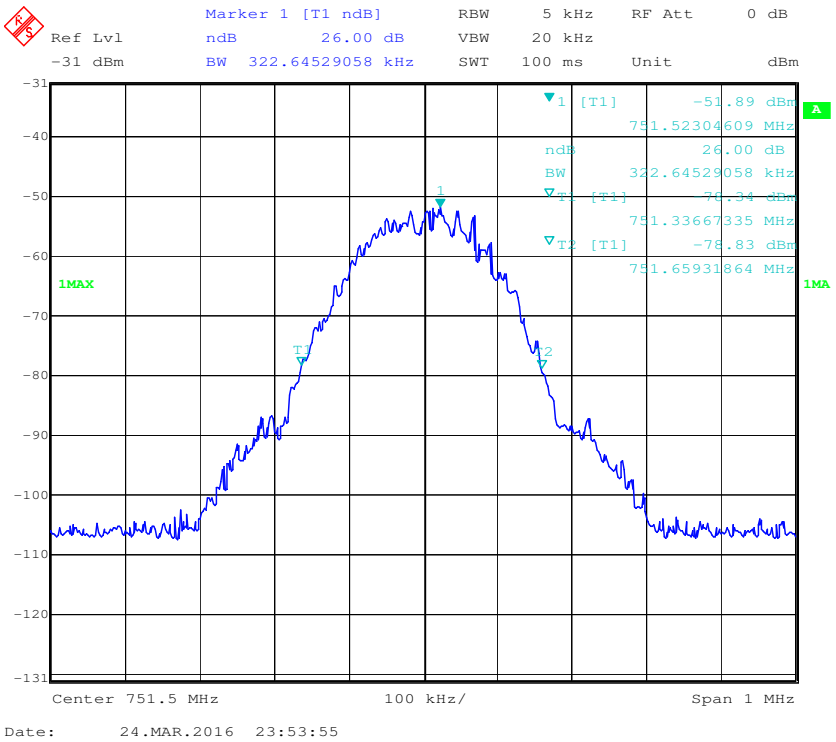

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Input



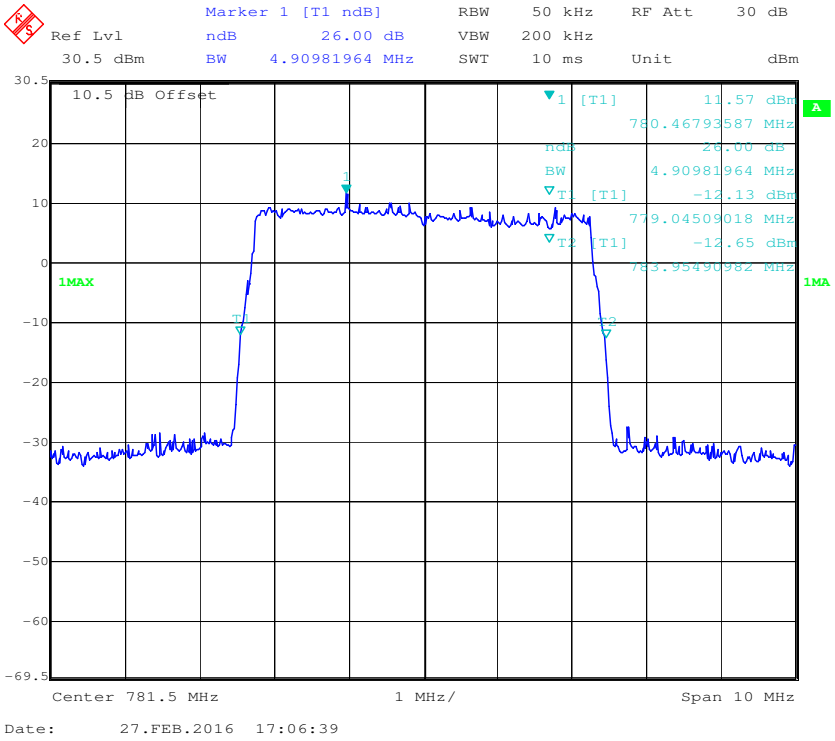
## 26 dB Bandwidth-DL- GSM- Pre AGC -Input



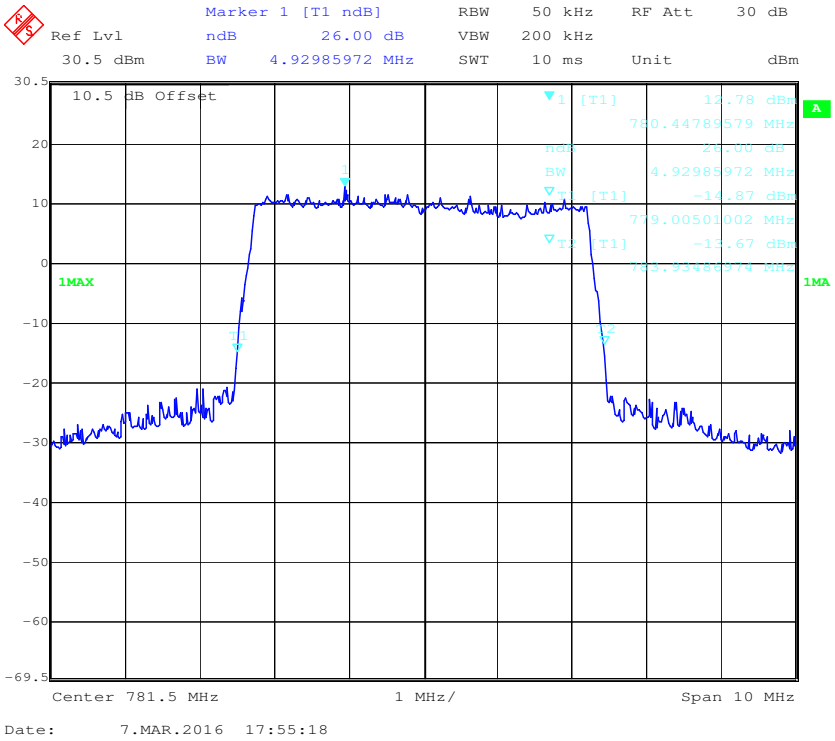

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Input



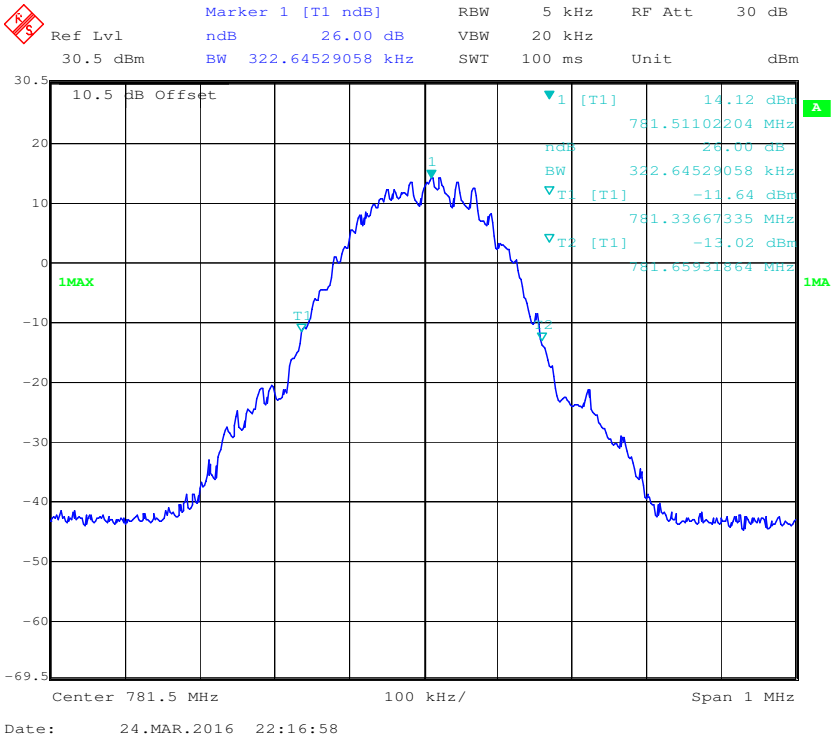
## 26 dB Bandwidth-UL- AWGN- Pre AGC -Output



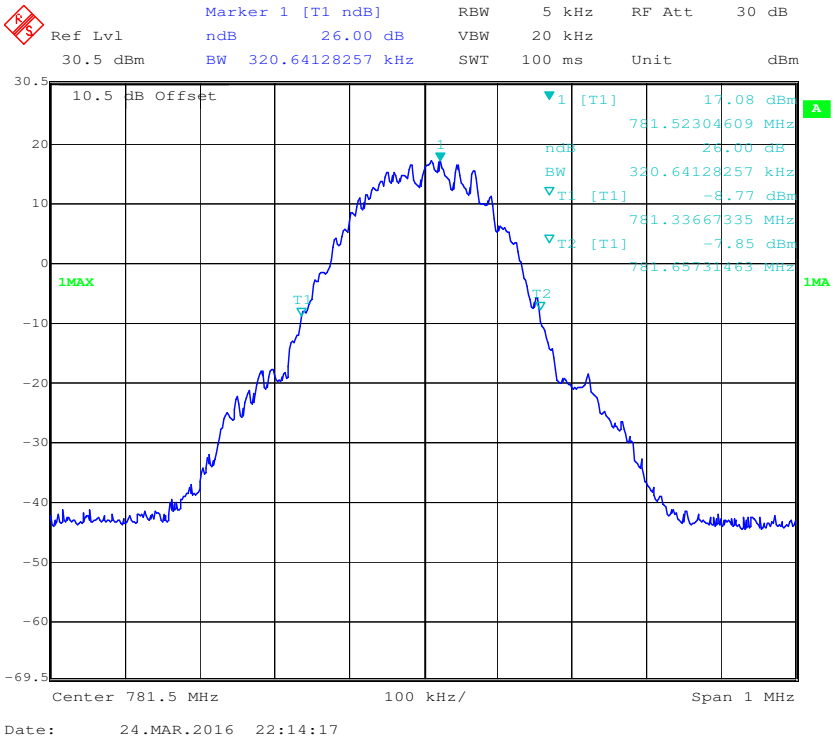

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Output



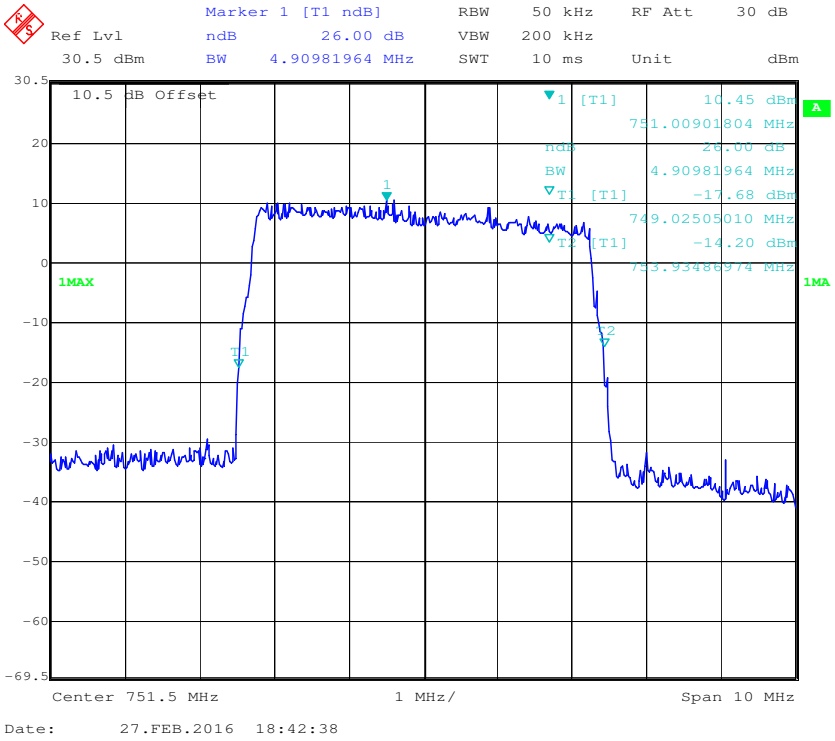
## 26 dB Bandwidth-UL- GSM- Pre AGC -Output



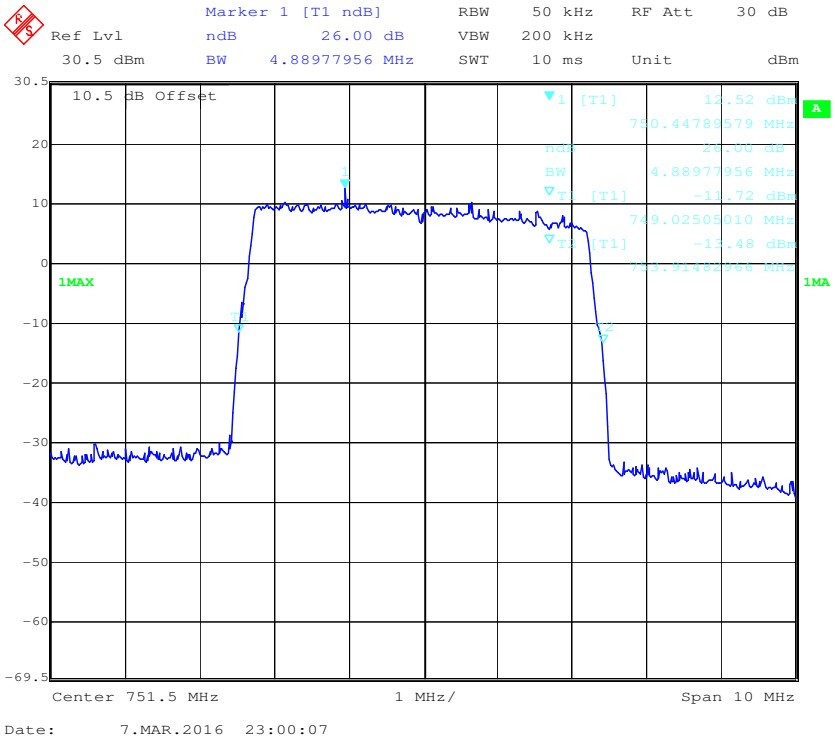

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Output



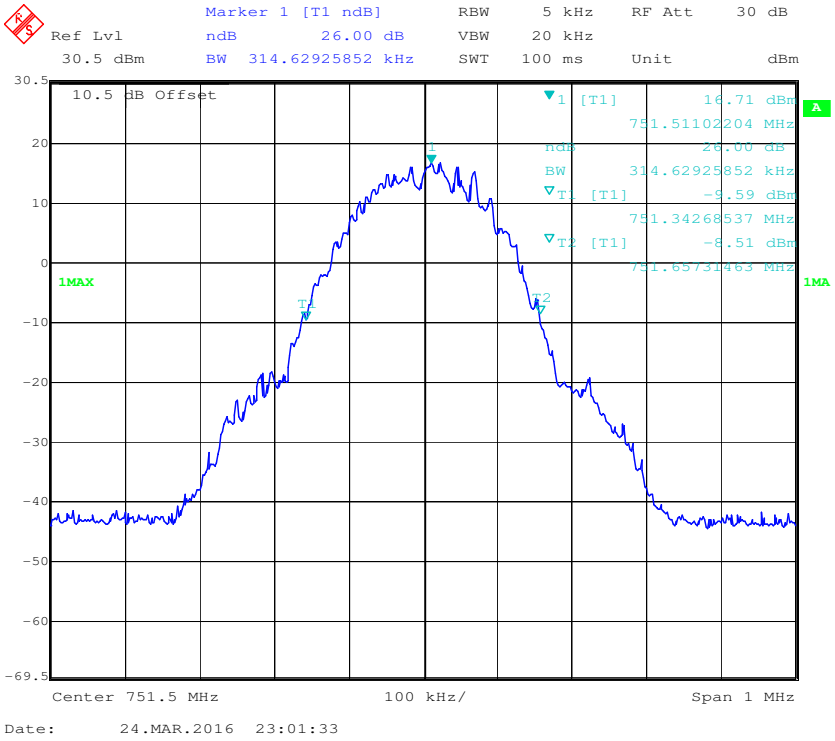
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Output



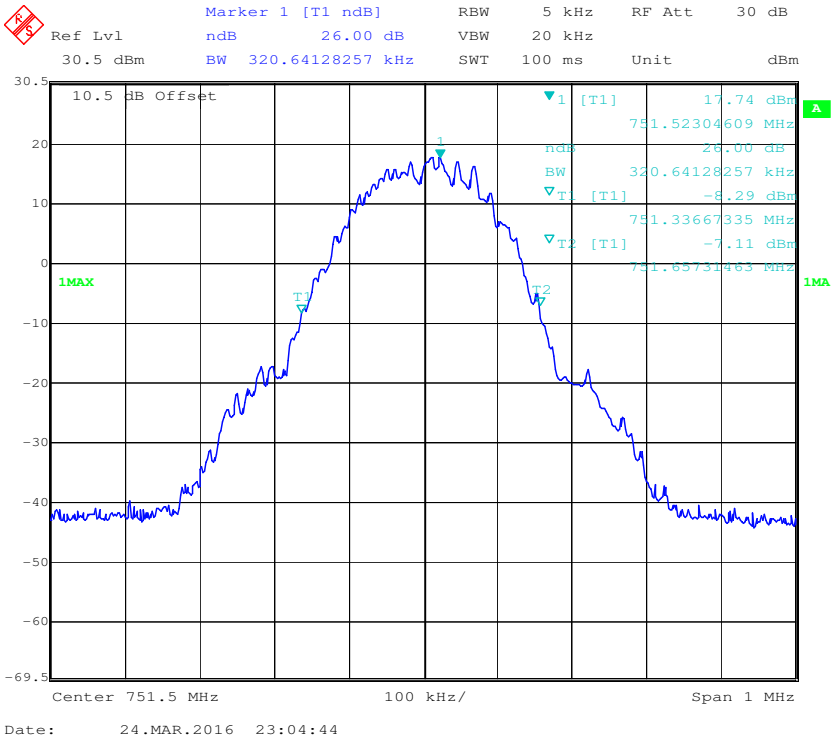

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Output



## 26 dB Bandwidth-DL- GSM- Pre AGC -Output



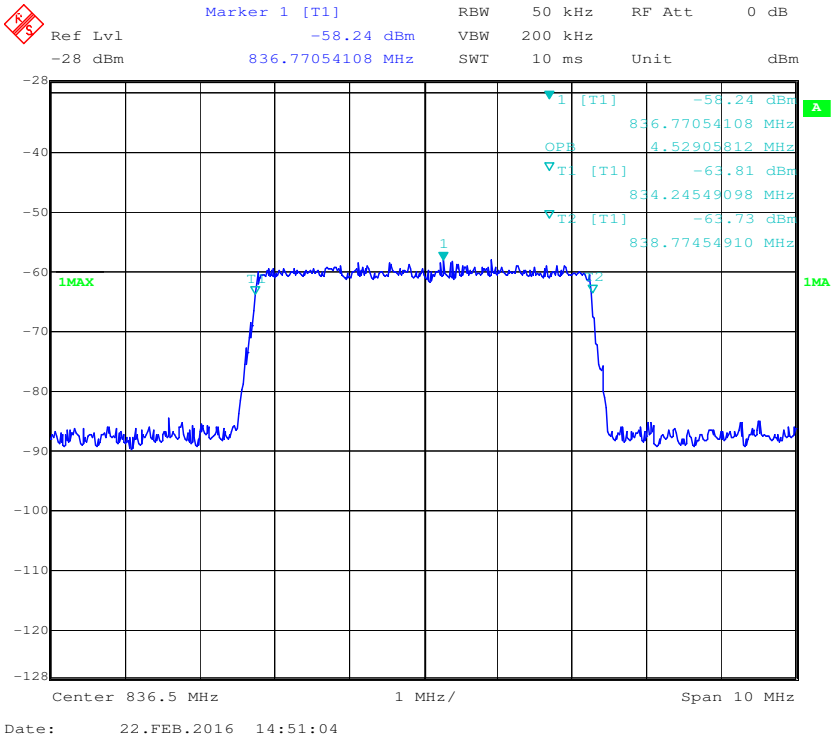

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Output



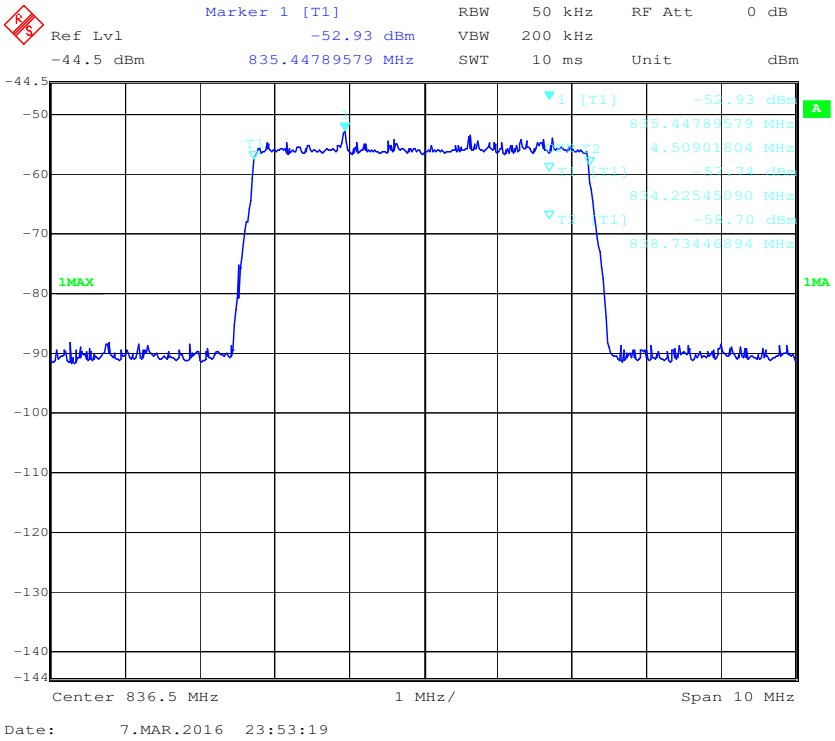
**CELLULAR Band**

| Mode | Signal Type | Signal Level | Frequency (MHz) | 99% Bandwidth (MHz) | | 26dB Bandwidth (MHz) | |
|---|---|---|---|---|---|---|---|
| | | | | Input | Output | Input | Output |
| Uplink | AWGN | Pre-AGC | 836.5 | 4.530 | 4.510 | 4.950 | 4.950 |
| | | 3dB above AGC | 836.5 | 4.510 | 4.510 | 4.930 | 4.930 |
| | GSM | Pre-AGC | 836.5 | 0.244 | 0.244 | 0.327 | 0.313 |
| | | 3dB above AGC | 836.5 | 0.244 | 0.244 | 0.319 | 0.321 |
| Downlink | AWGN | Pre-AGC | 881.5 | 4.550 | 4.510 | 4.950 | 4.950 |
| | | 3dB above AGC | 881.5 | 4.510 | 4.510 | 4.950 | 4.930 |
| | GSM | Pre-AGC | 881.5 | 0.246 | 0.246 | 0.317 | 0.319 |
| | | 3dB above AGC | 881.5 | 0.244 | 0.244 | 0.327 | 0.323 |

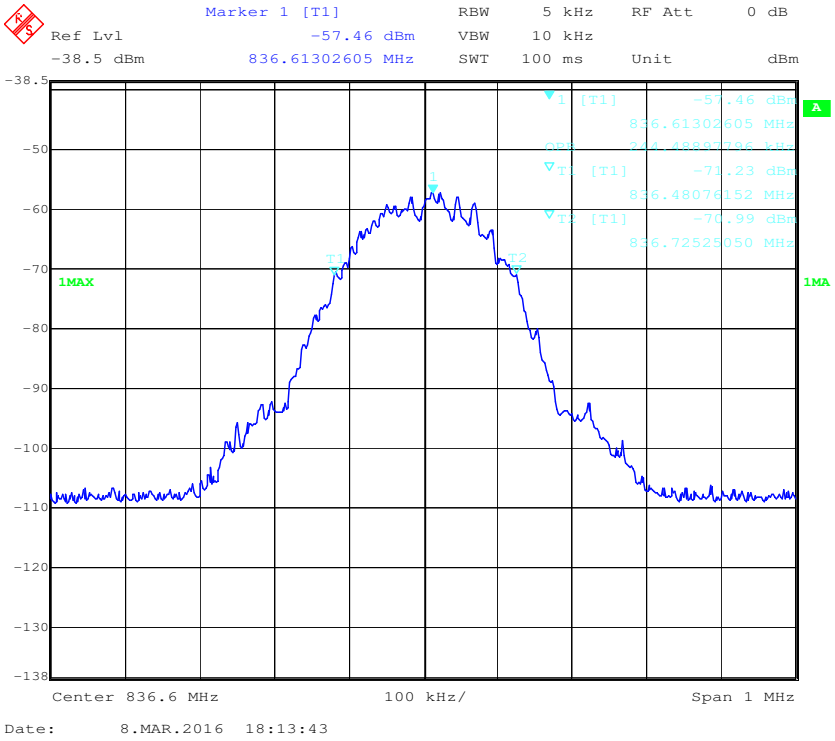
## 99% Bandwidth-UL-AWGN-Pre AGC-Input



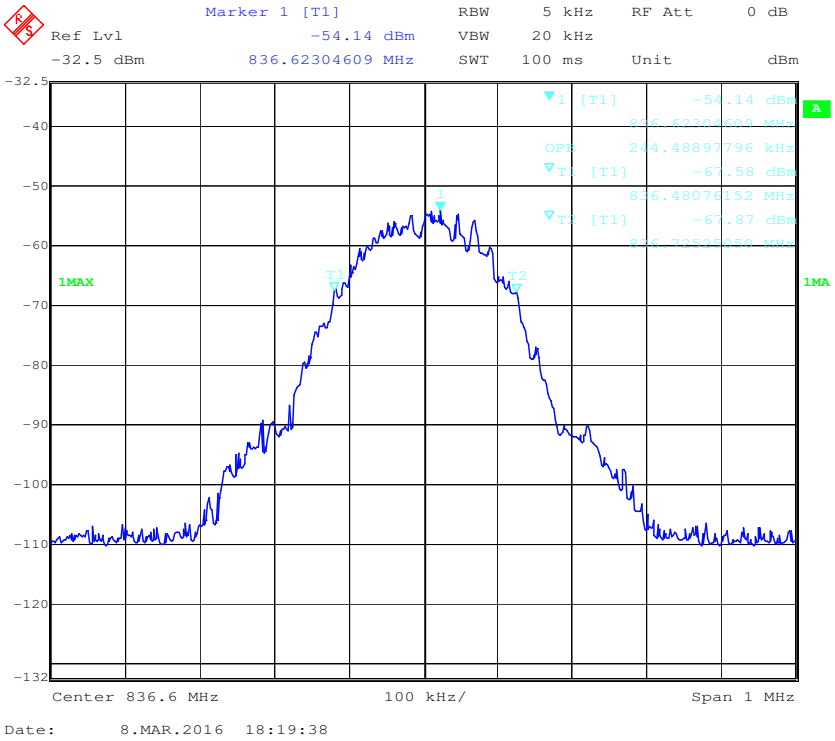

## 99% Bandwidth-UL- AWGN-3dB above AGC-Input



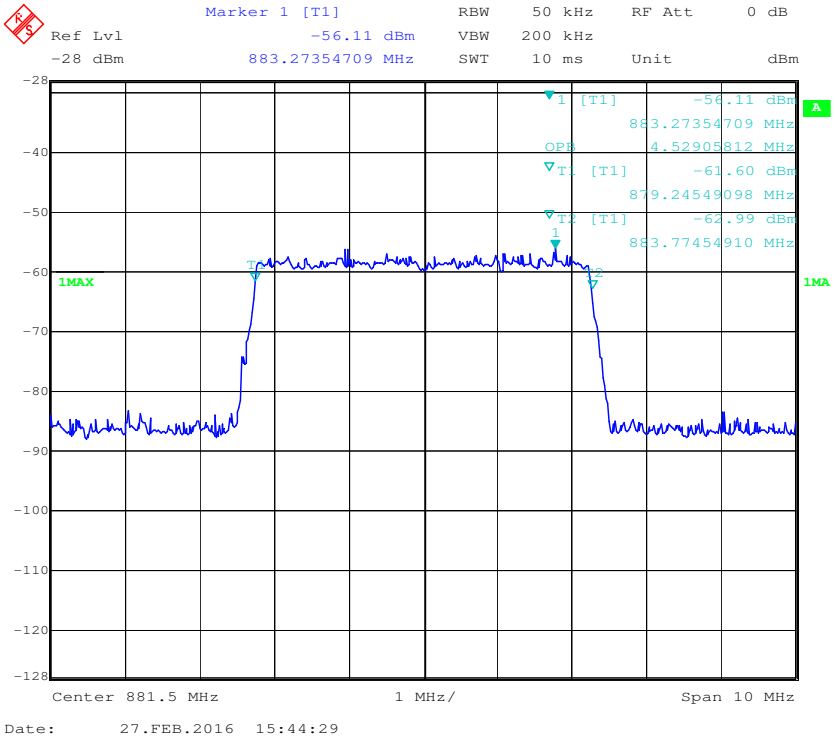
## 99% Bandwidth-UL-GSM-Pre AGC-Input



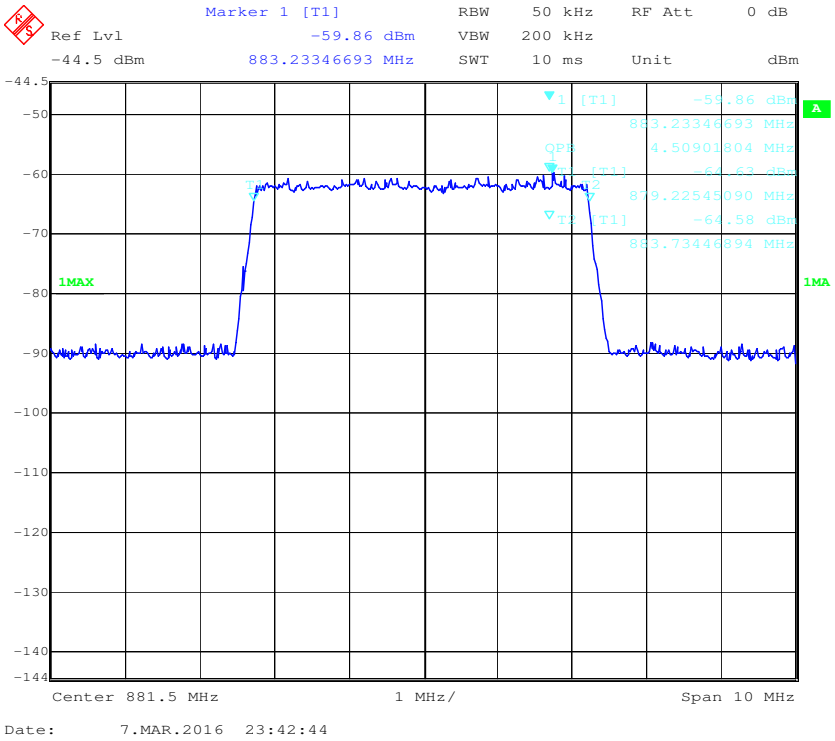

## 99% Bandwidth-UL- GSM-3dB above AGC-Input



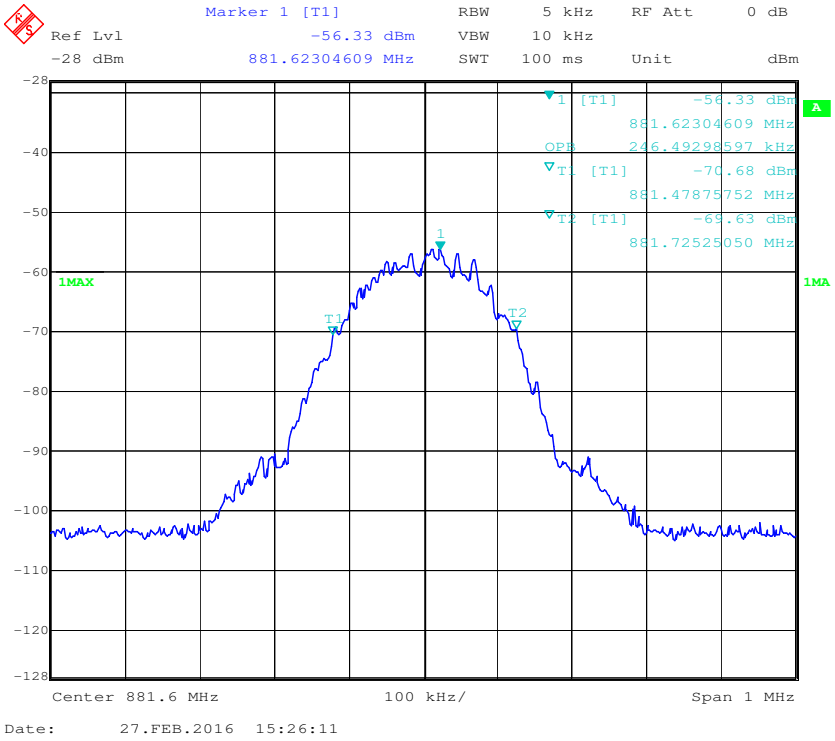
## 99% Bandwidth-DL- AWGN- Pre AGC -Input



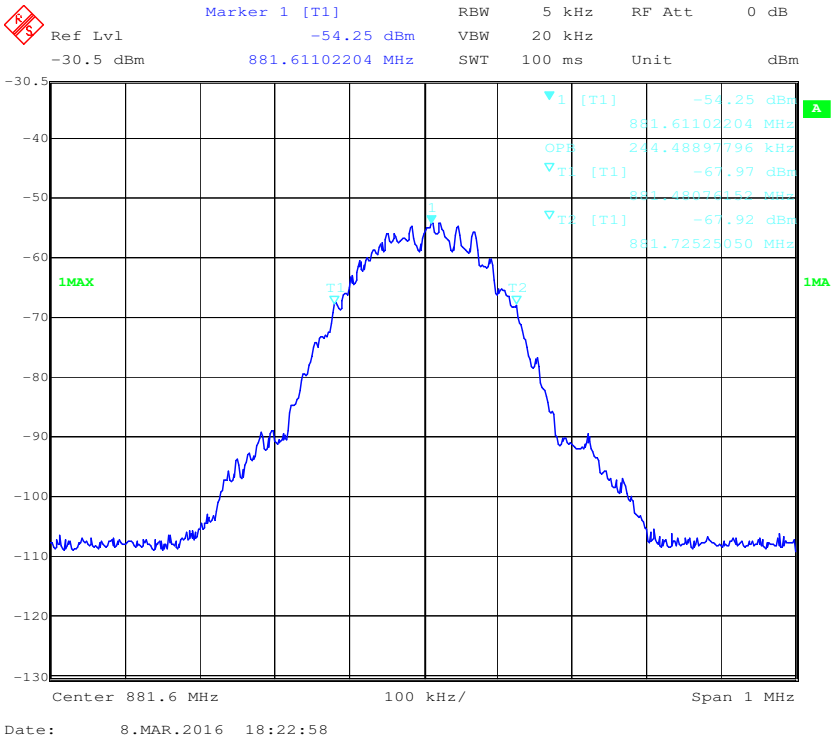

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Input



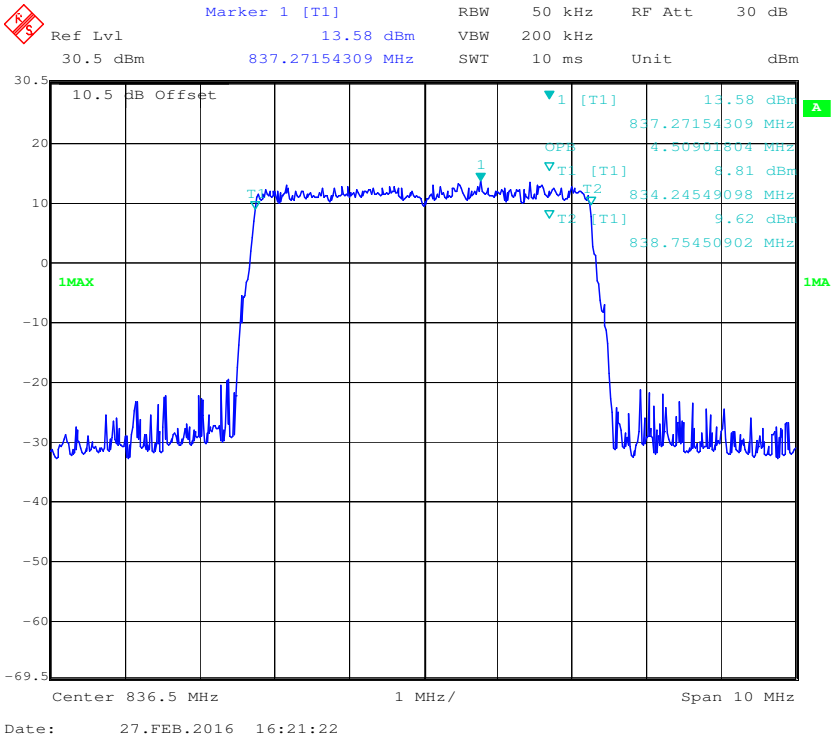
## 99% Bandwidth-DL- GSM- Pre AGC -Input



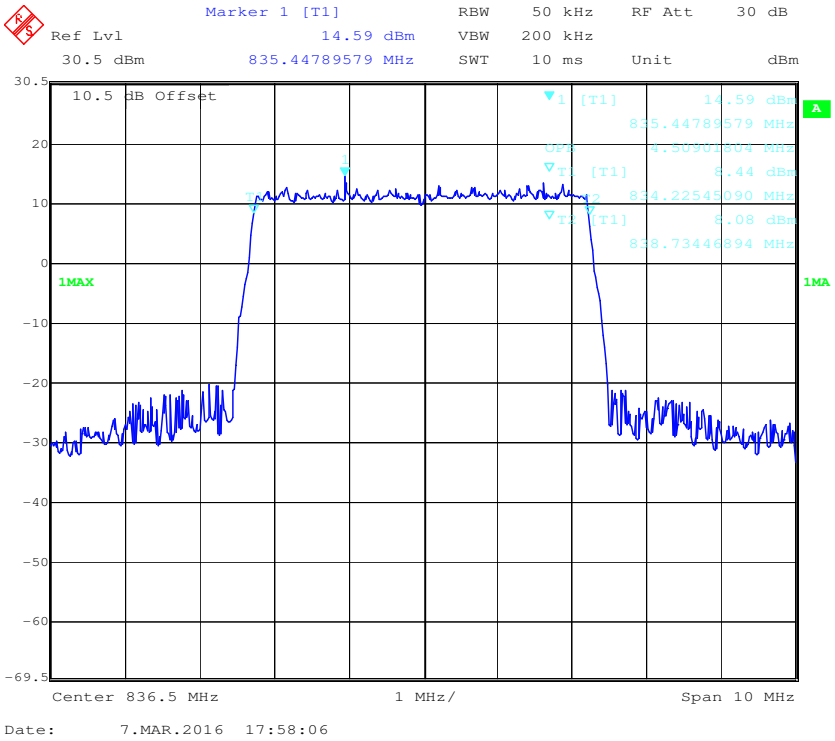

## 99% Bandwidth-DL- GSM- 3dB above AGC -Input



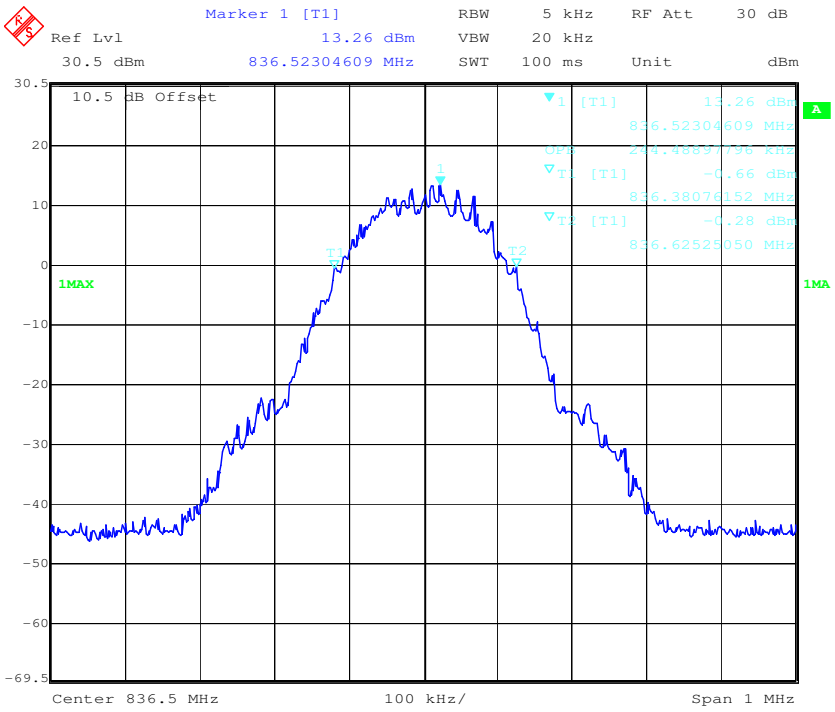
## 99% Bandwidth-UL- AWGN- Pre AGC -Output



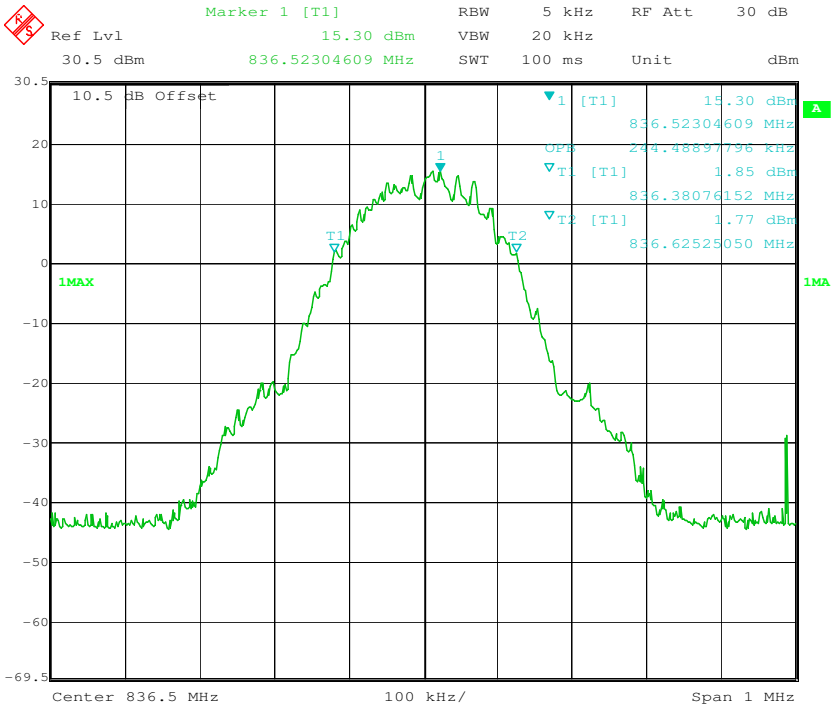

## 99% Bandwidth-UL- AWGN-3dB above AGC-Output



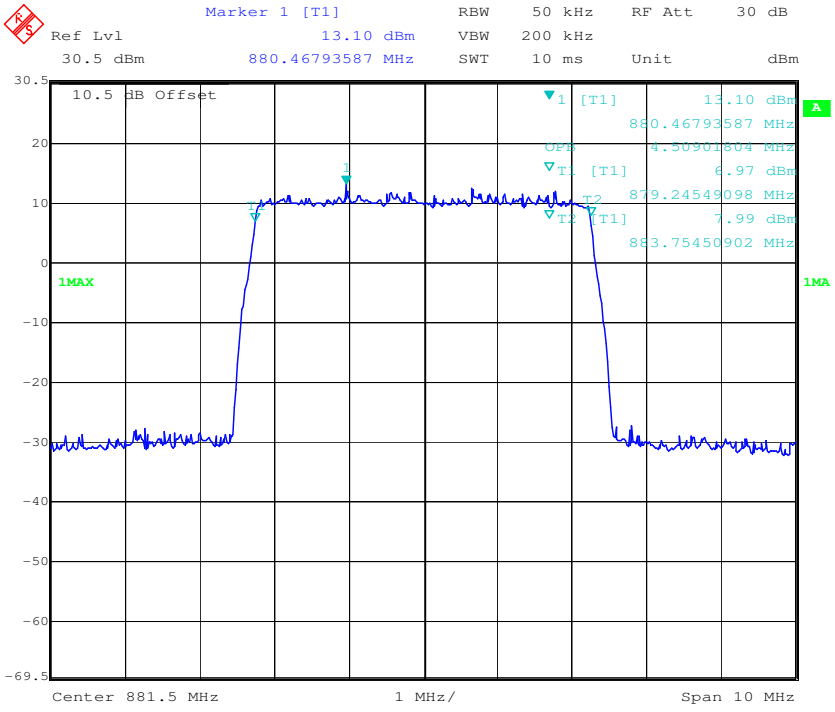
## 99% Bandwidth-UL- GSM- Pre AGC -Output



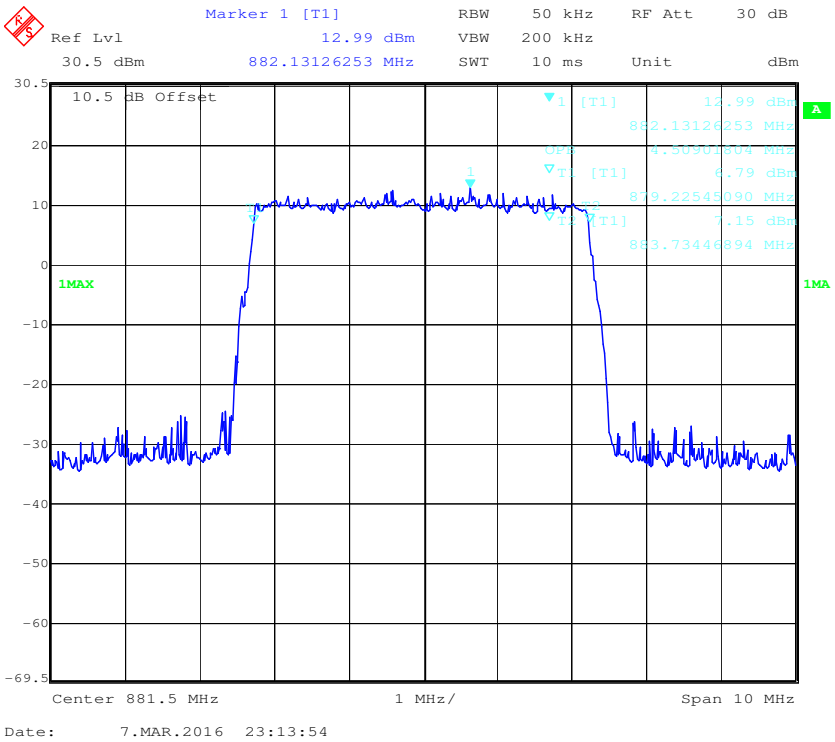

## 99% Bandwidth-UL- GSM-3dB above AGC-Output



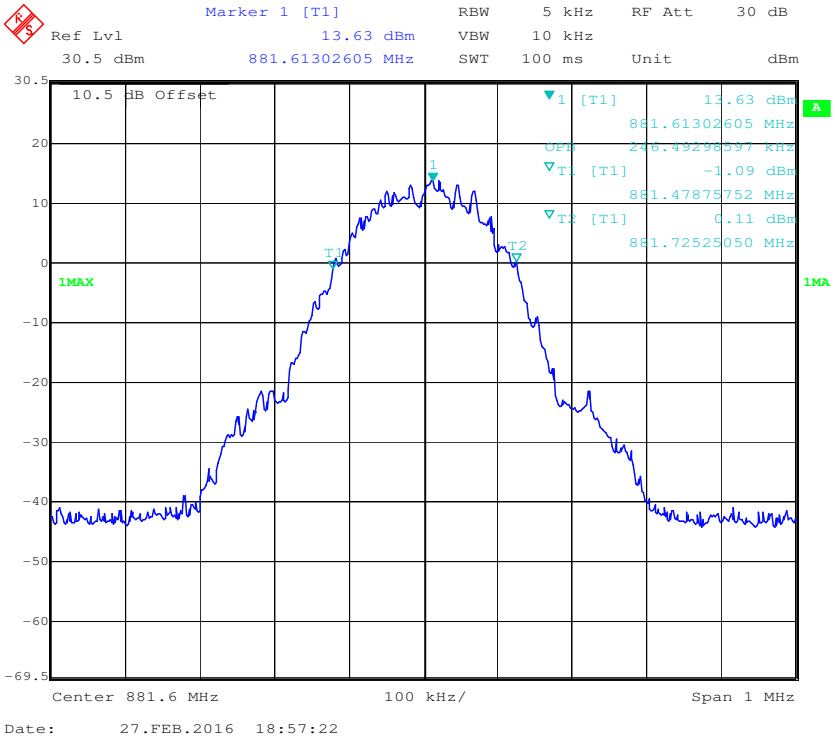
## 99% Bandwidth-DL- AWGN- Pre AGC -Output



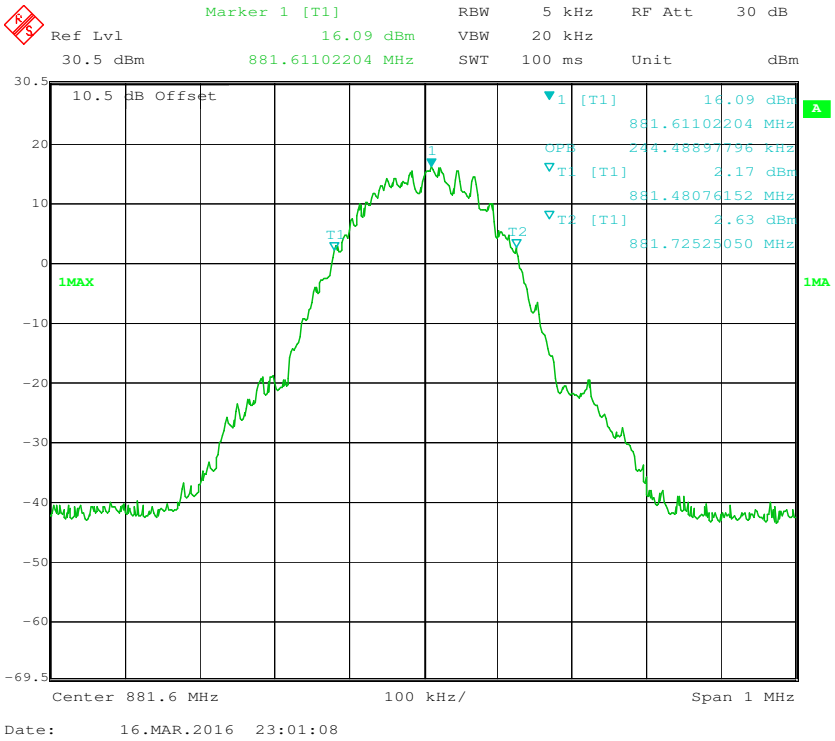

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Output



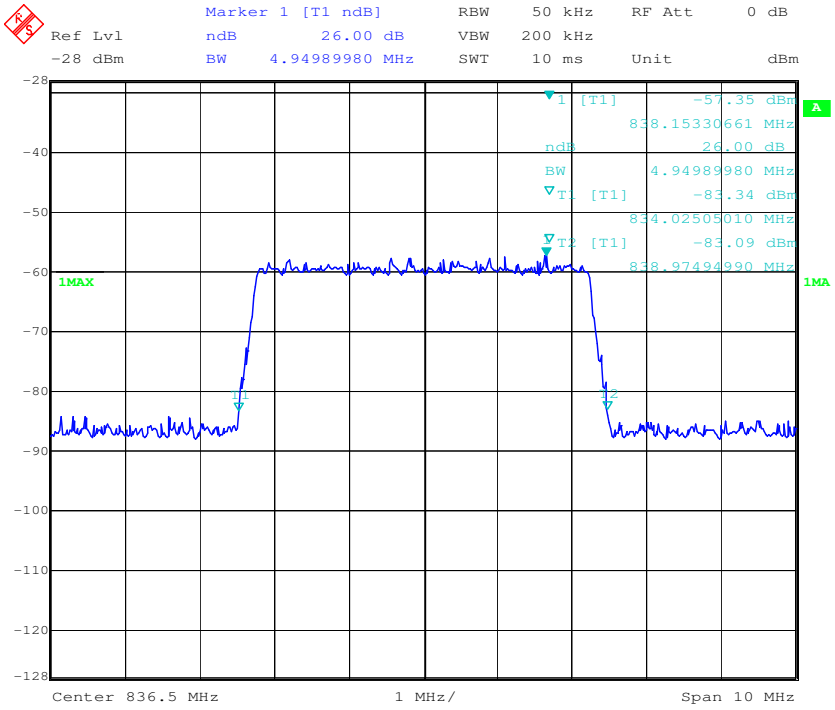
## 99% Bandwidth-DL- GSM- Pre AGC -Output



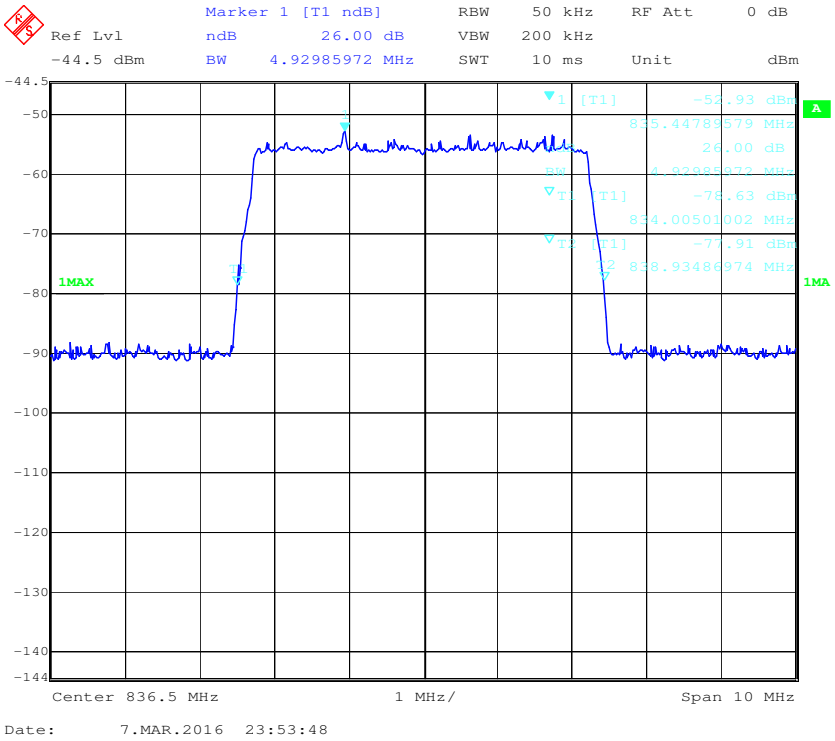

## 99% Bandwidth-DL- GSM- 3dB above AGC -Output



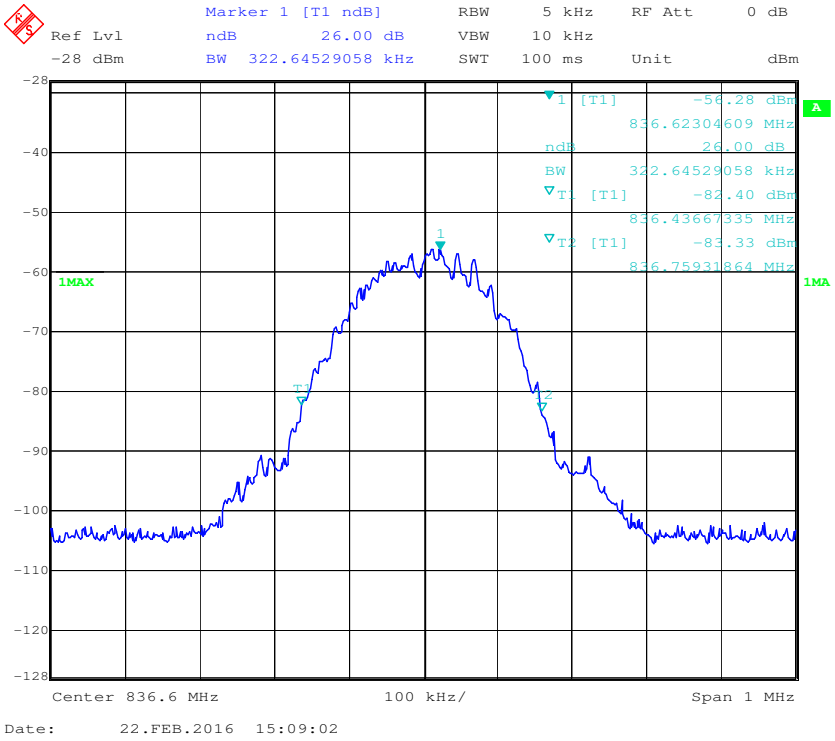
## 26 dB Bandwidth-UL-AWGN-Pre AGC-Input



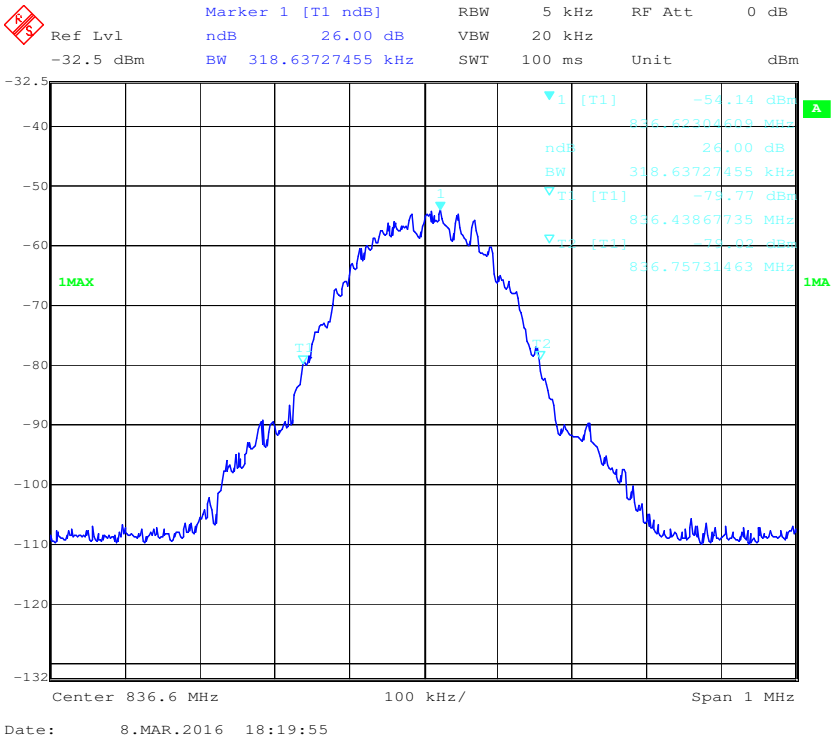

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input



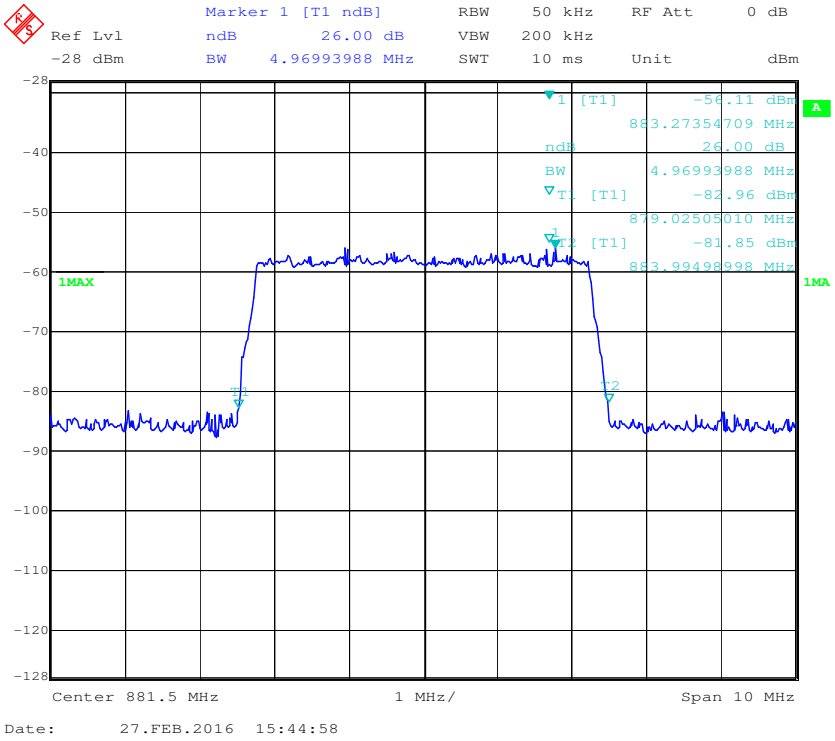
## 26 dB Bandwidth-UL-GSM-Pre AGC-Input



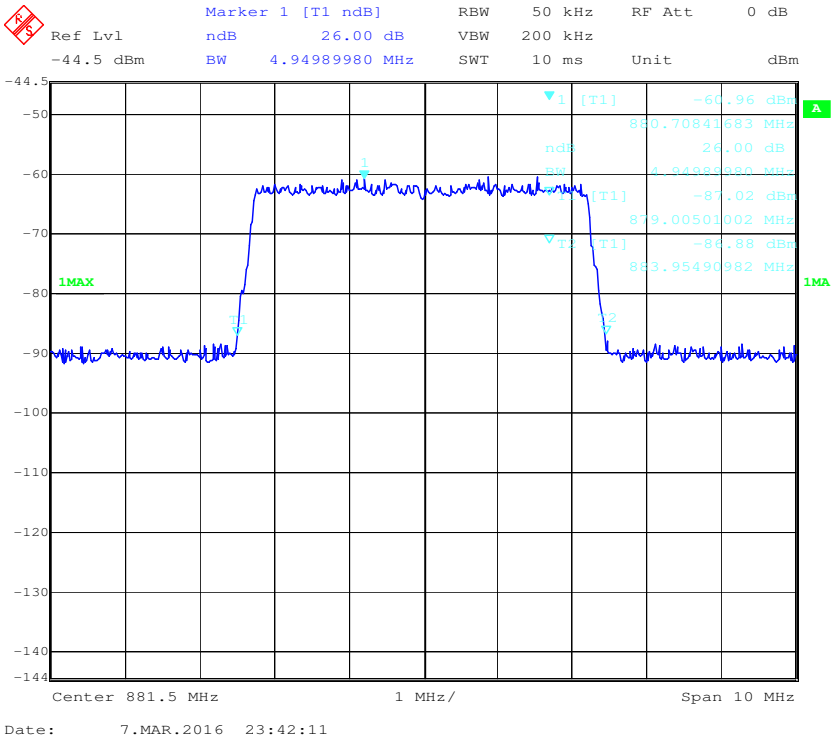

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Input



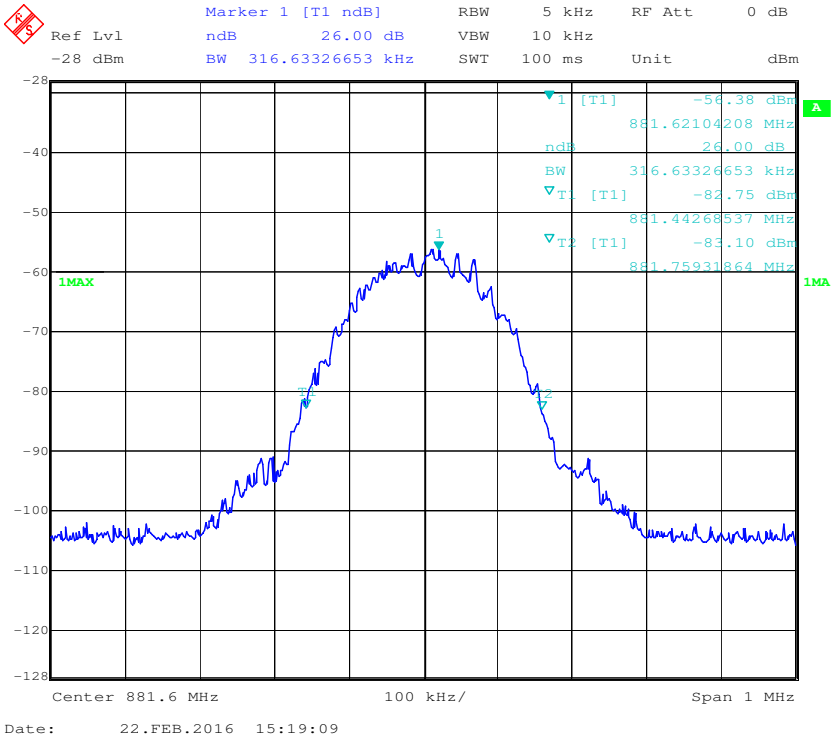
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Input



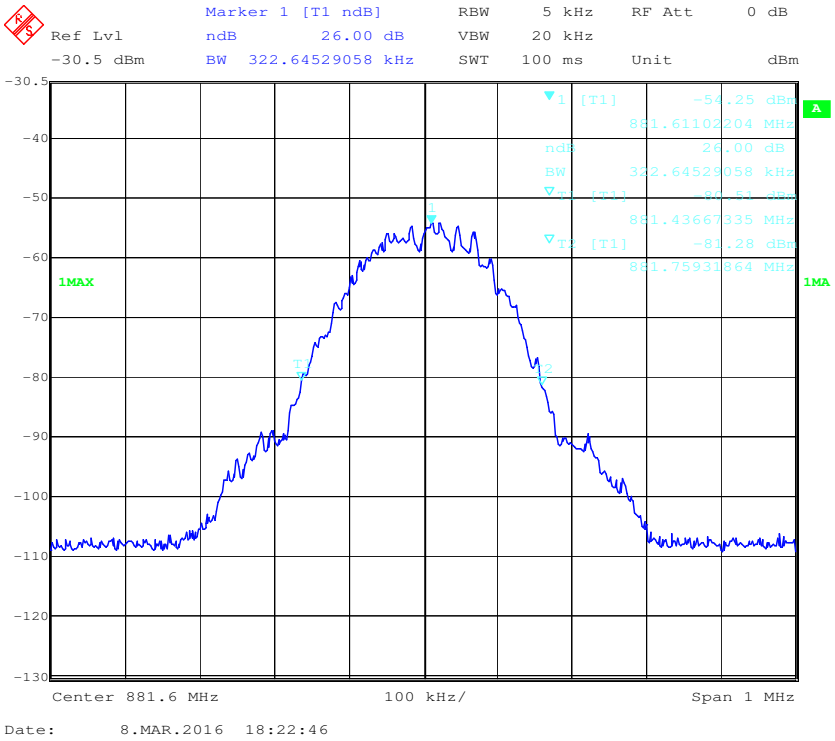

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Input



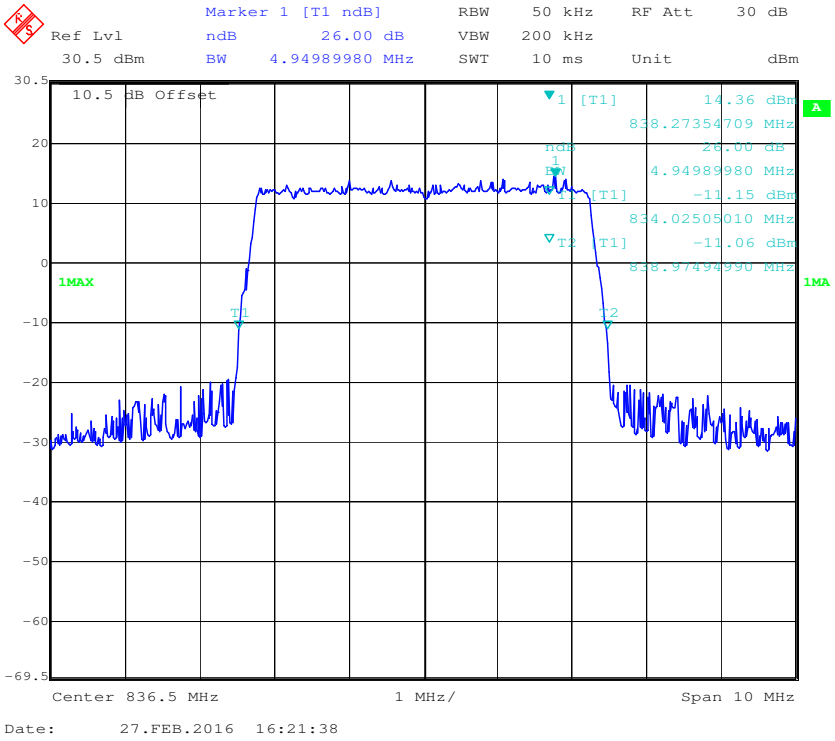
## 26 dB Bandwidth-DL- GSM- Pre AGC -Input



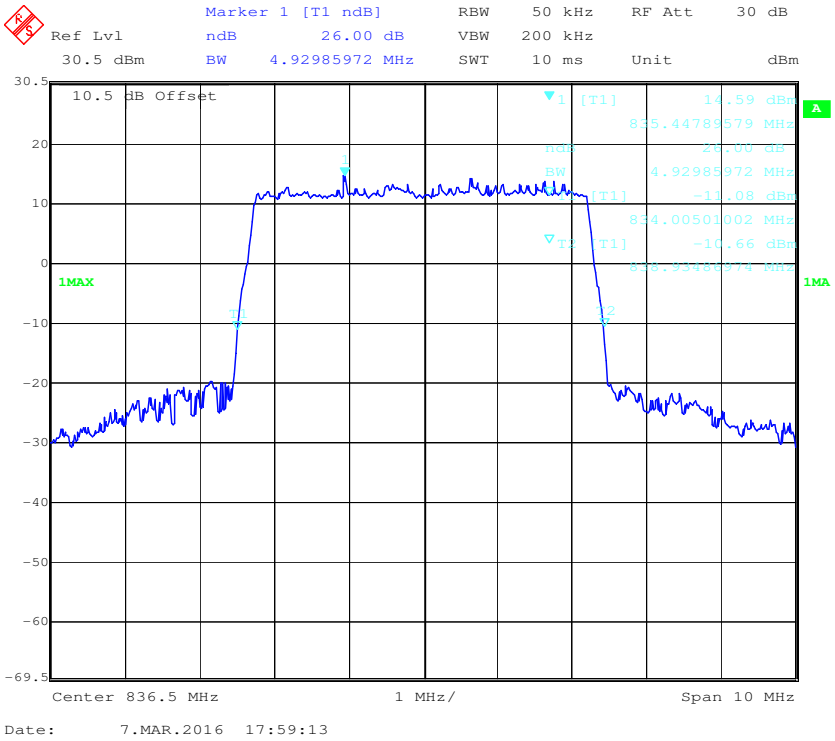

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Input



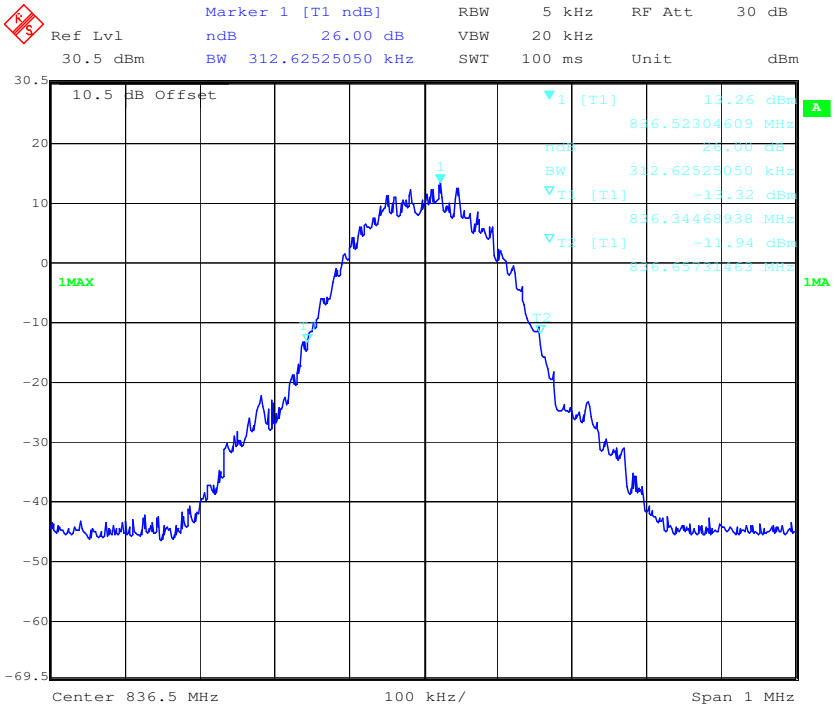
## 26 dB Bandwidth-UL- AWGN- Pre AGC -Output



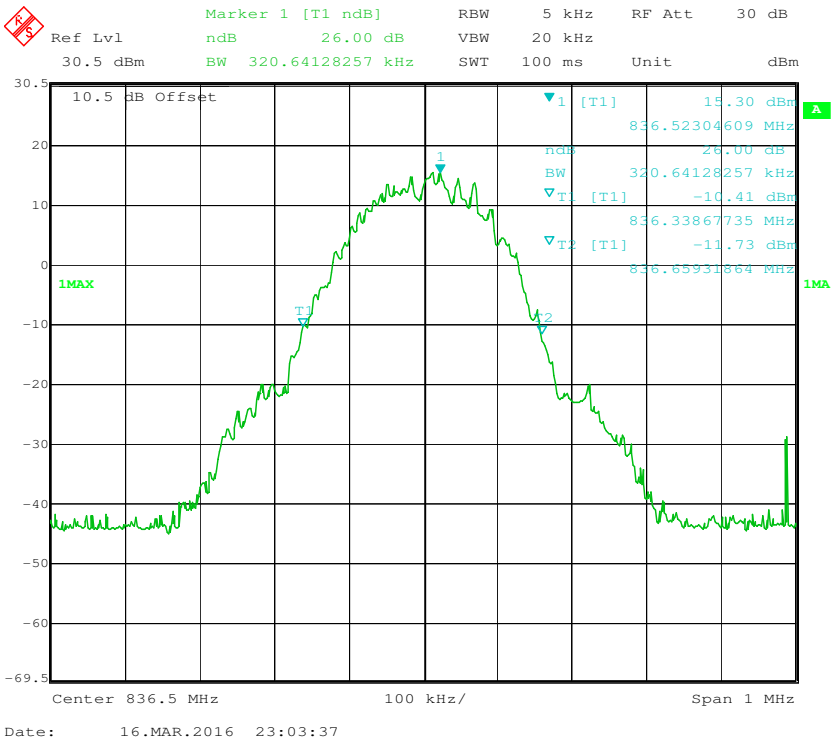

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Output



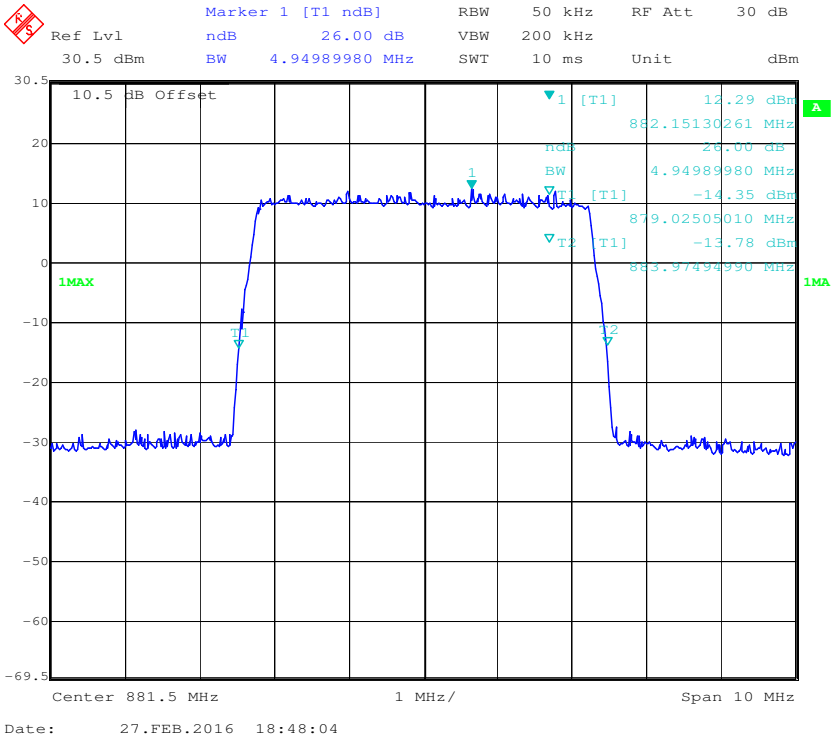
## 26 dB Bandwidth-UL- GSM- Pre AGC -Output



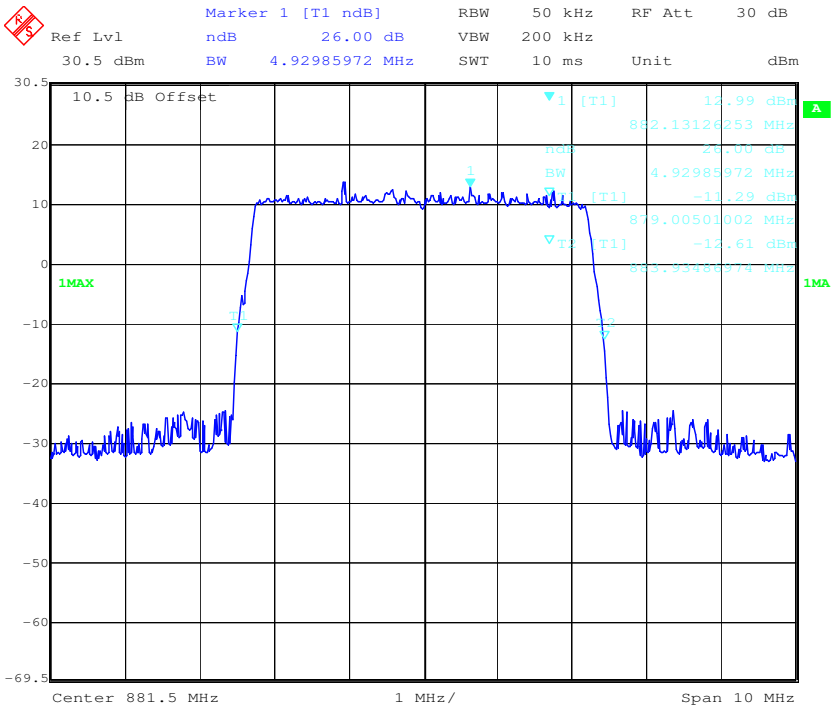

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Output



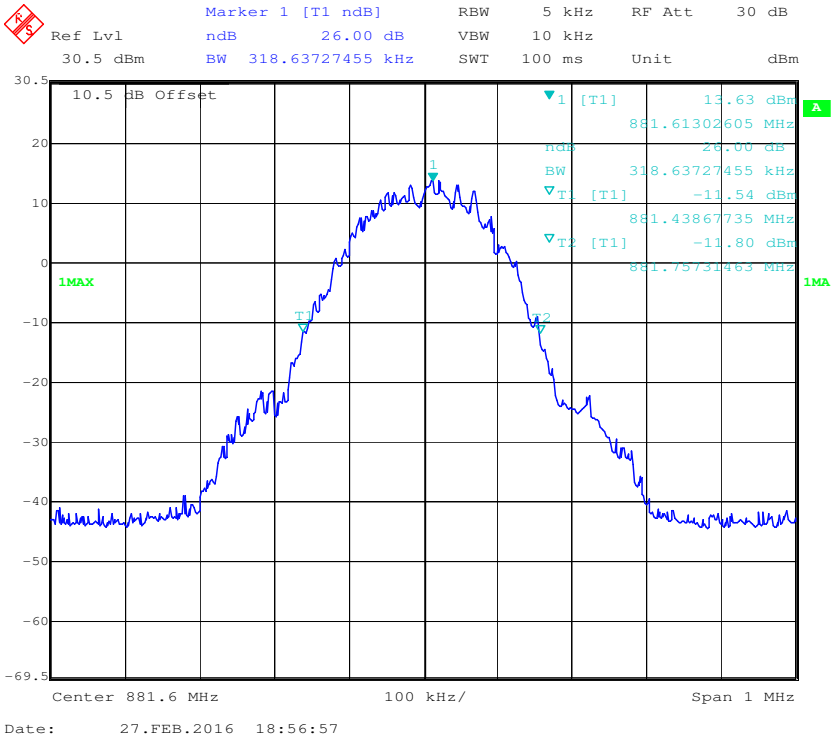
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Output



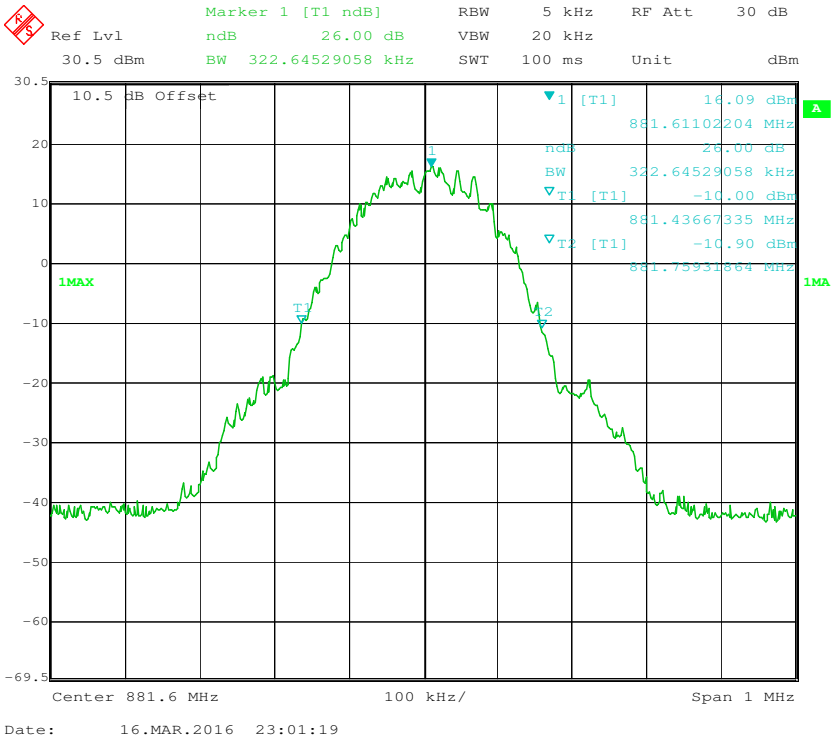

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Output



## 26 dB Bandwidth-DL- GSM- Pre AGC -Output



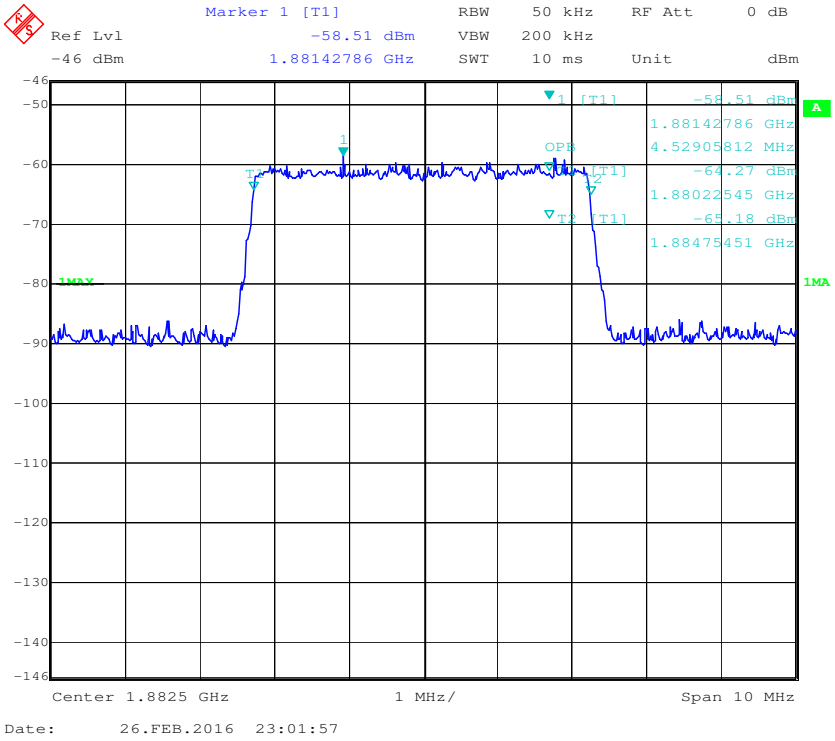

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Output



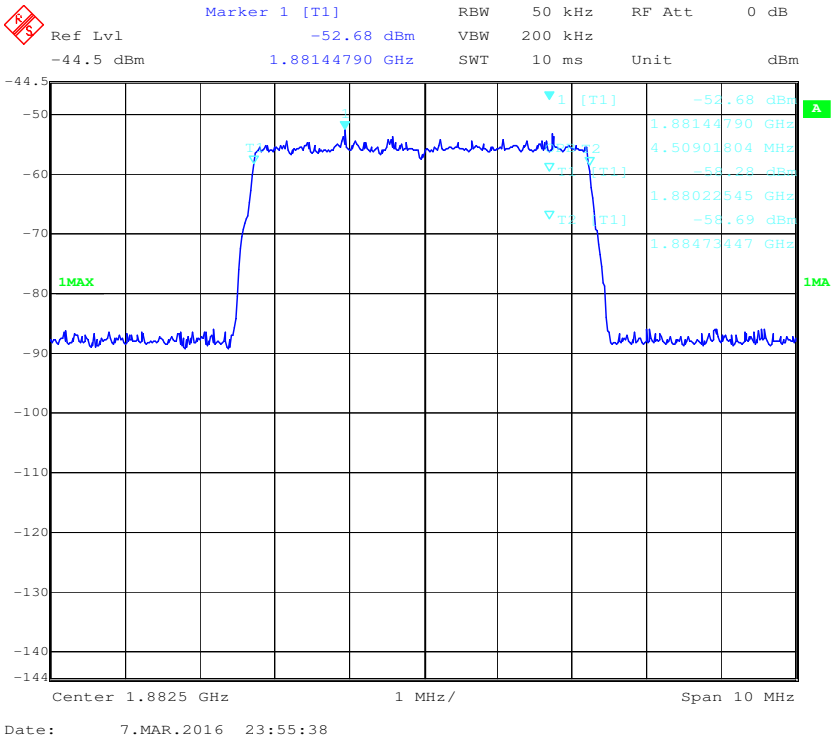
**PCS Band**

| Mode | Signal Type | Signal Level | Frequency (MHz) | 99% Bandwidth (MHz) | | 26dB Bandwidth (MHz) | |
|---|---|---|---|---|---|---|---|
| | | | | Input | Output | Input | Output |
| Uplink | AWGN | Pre-AGC | 1882.5 | 4.530 | 4.510 | 4.950 | 4.950 |
| | | 3dB above AGC | 1882.5 | 4.510 | 4.510 | 4.930 | 4.950 |
| | GSM | Pre-AGC | 1880 | 0.244 | 0.244 | 0.327 | 0.327 |
| | | 3dB above AGC | 1880 | 0.244 | 0.244 | 0.315 | 0.321 |
| Downlink | AWGN | Pre-AGC | 1962.5 | 4.530 | 4.510 | 4.990 | 4.930 |
| | | 3dB above AGC | 1962.5 | 4.530 | 4.510 | 4.970 | 4.930 |
| | GSM | Pre-AGC | 1960 | 0.244 | 0.244 | 0.315 | 0.315 |
| | | 3dB above AGC | 1960 | 0.244 | 0.244 | 0.317 | 0.315 |

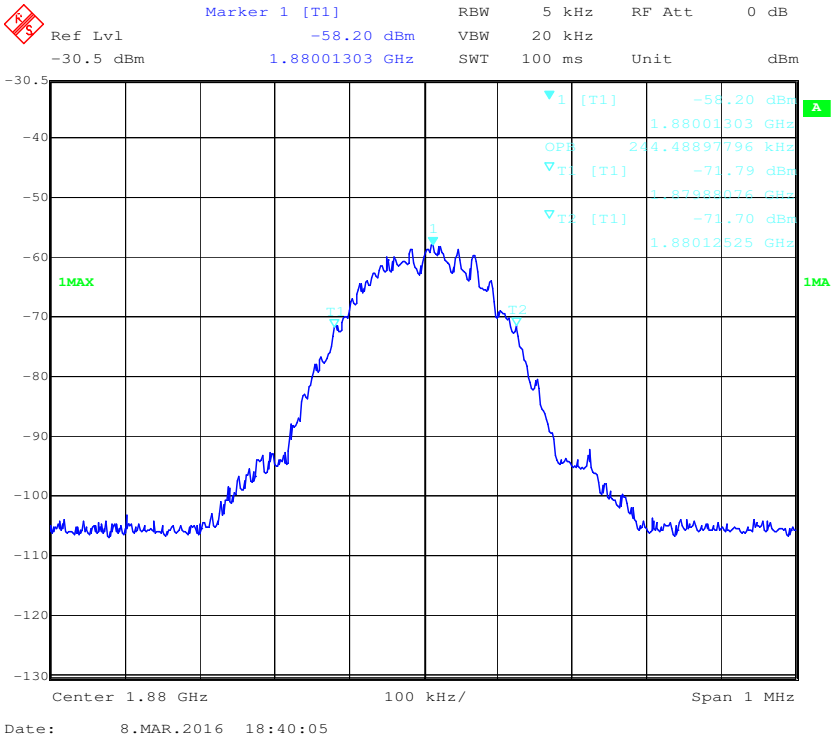
## 99% Bandwidth-UL-AWGN-Pre AGC-Input



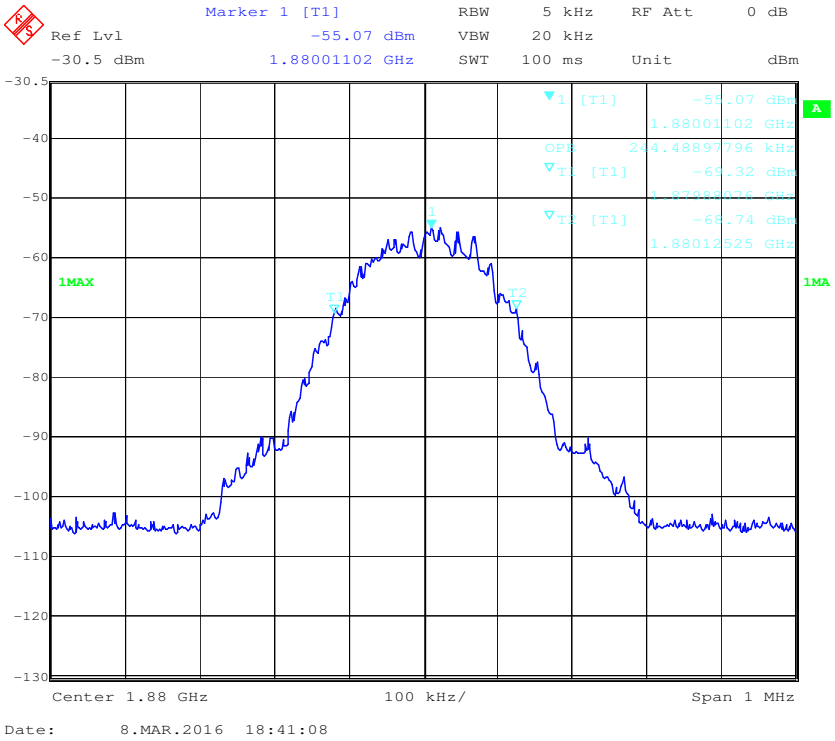

## 99% Bandwidth-UL- AWGN-3dB above AGC-Input



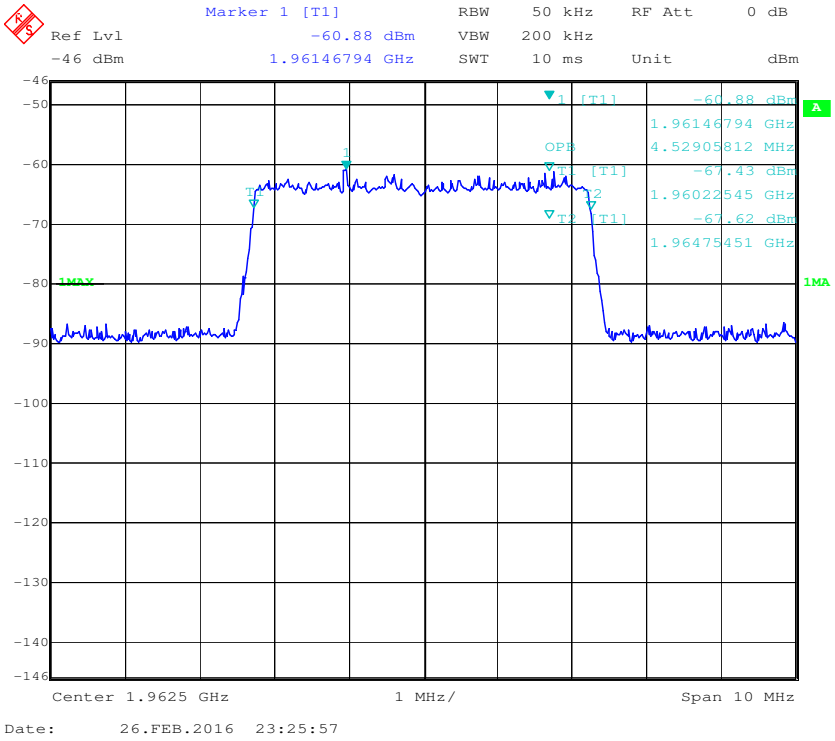
## 99% Bandwidth-UL-GSM-Pre AGC-Input



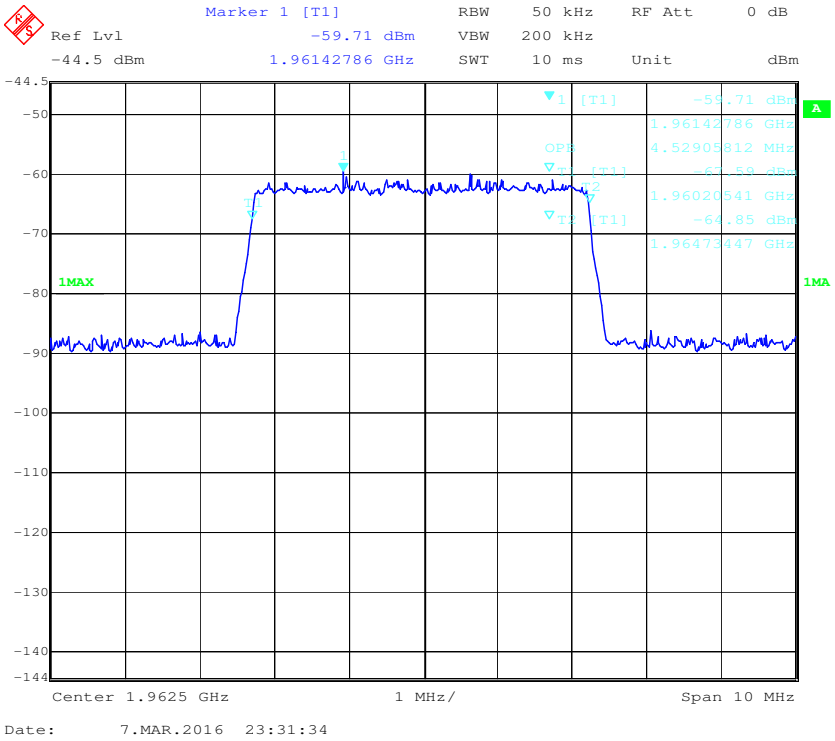

## 99% Bandwidth-UL- GSM-3dB above AGC-Input



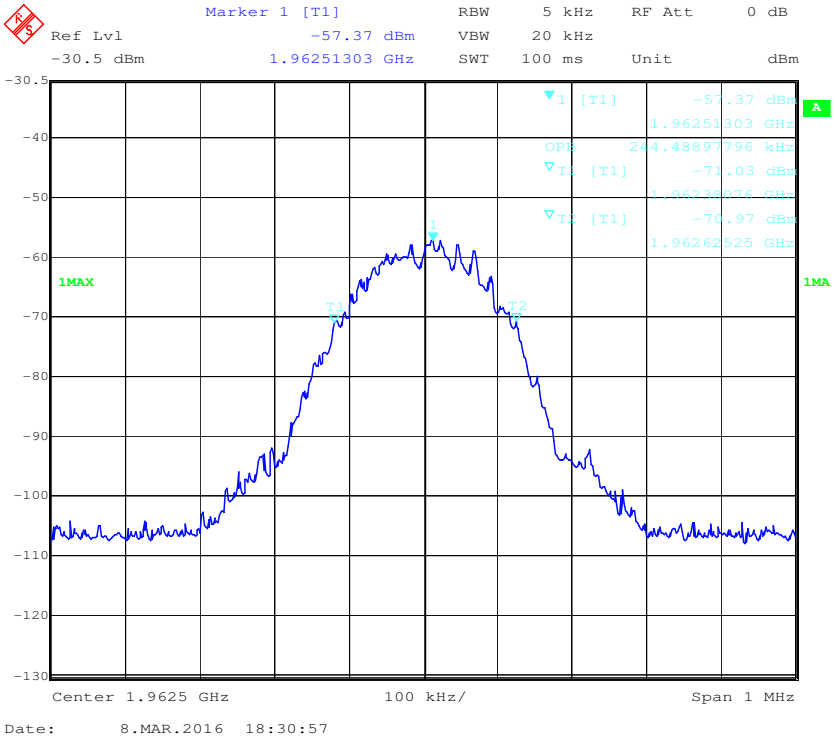
## 99% Bandwidth-DL- AWGN- Pre AGC -Input



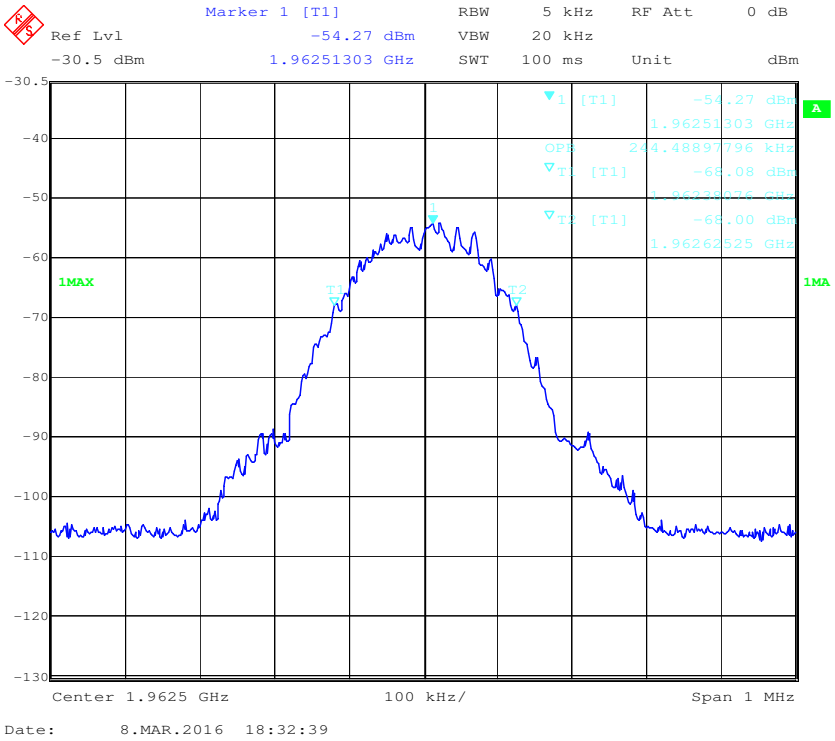

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Input



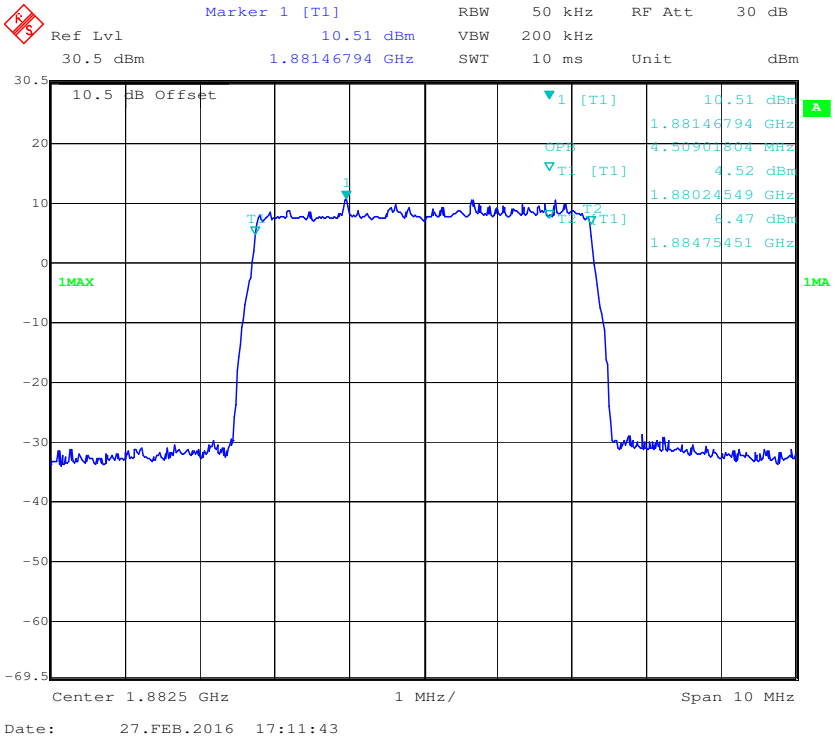
## 99% Bandwidth-DL- GSM- Pre AGC -Input



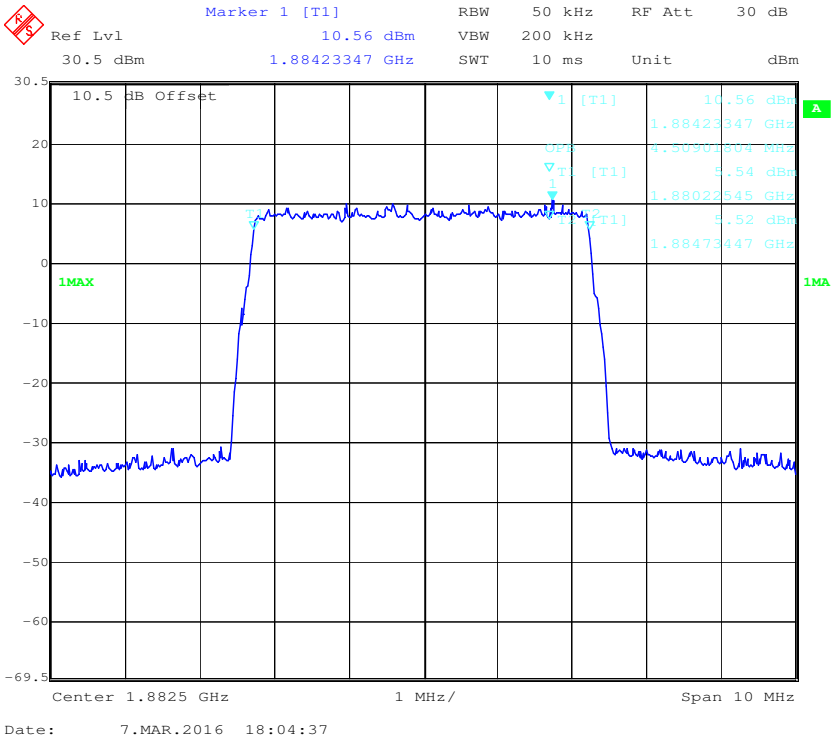

## 99% Bandwidth-DL- GSM- 3dB above AGC -Input



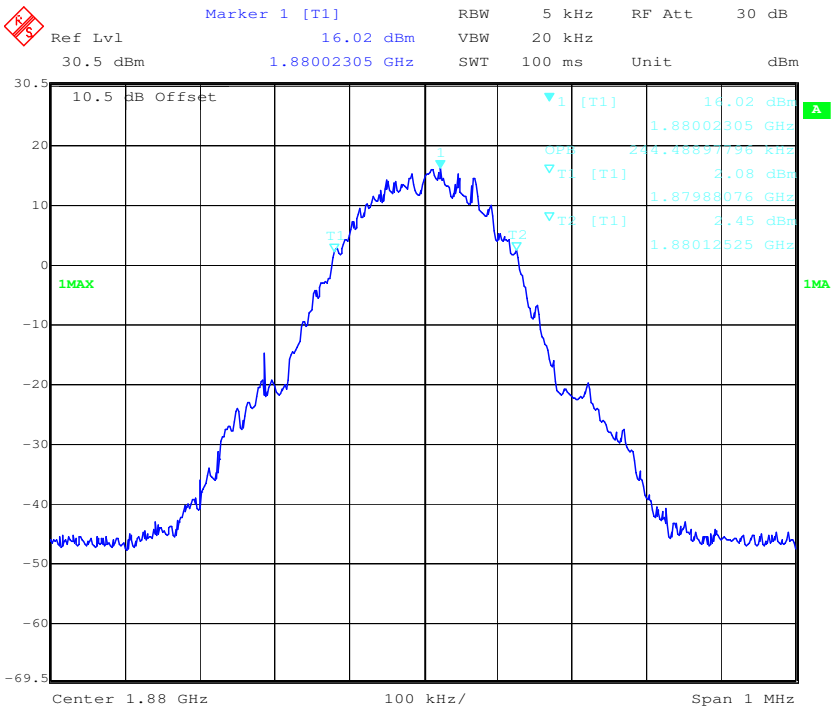
## 99% Bandwidth-UL- AWGN- Pre AGC -Output



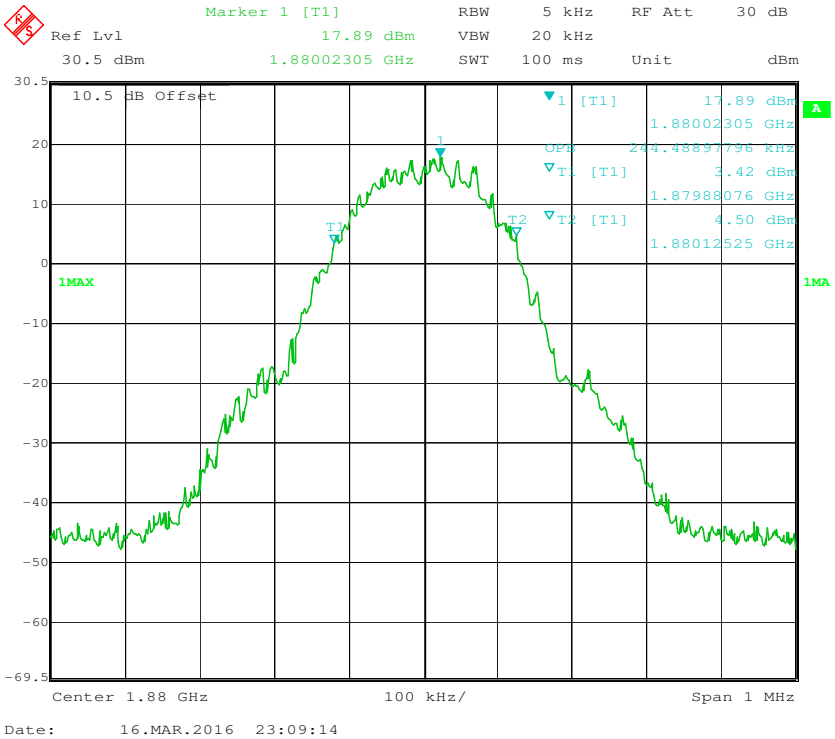

## 99% Bandwidth-UL- AWGN-3dB above AGC-Output



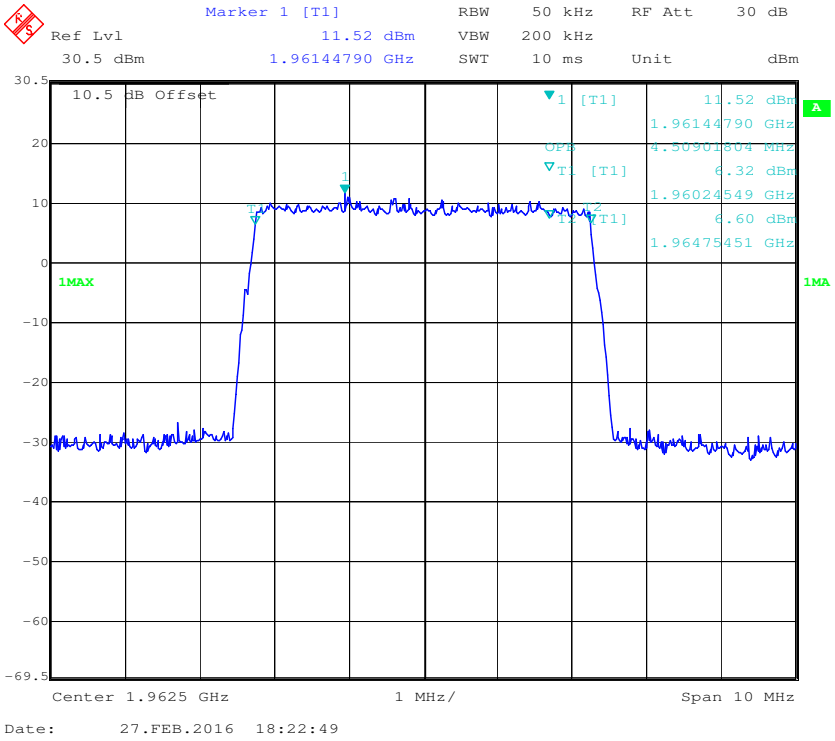
## 99% Bandwidth-UL- GSM- Pre AGC -Output



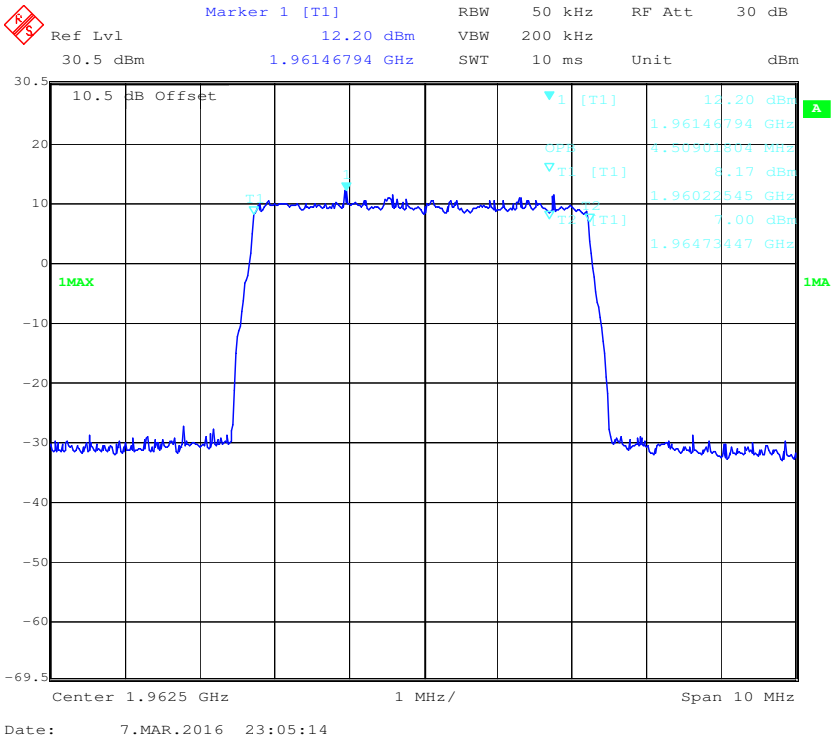

## 99% Bandwidth-UL- GSM-3dB above AGC-Output



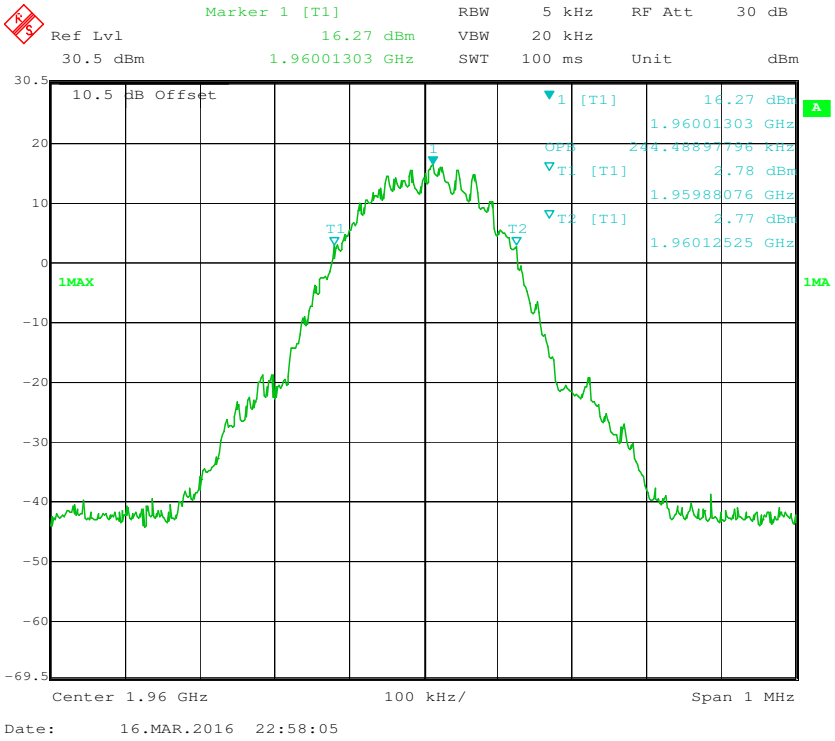
## 99% Bandwidth-DL- AWGN- Pre AGC -Output



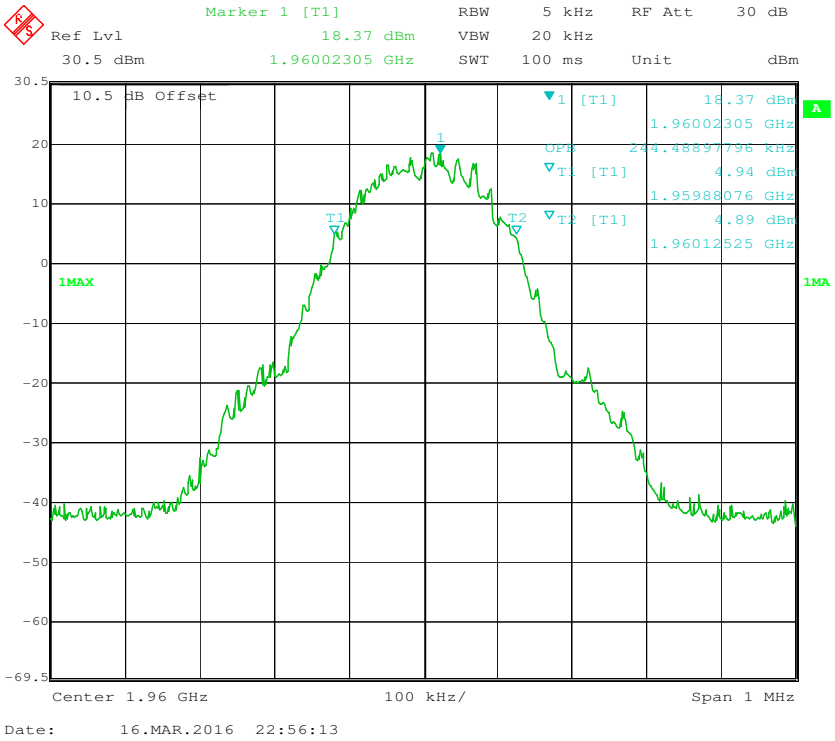

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Output



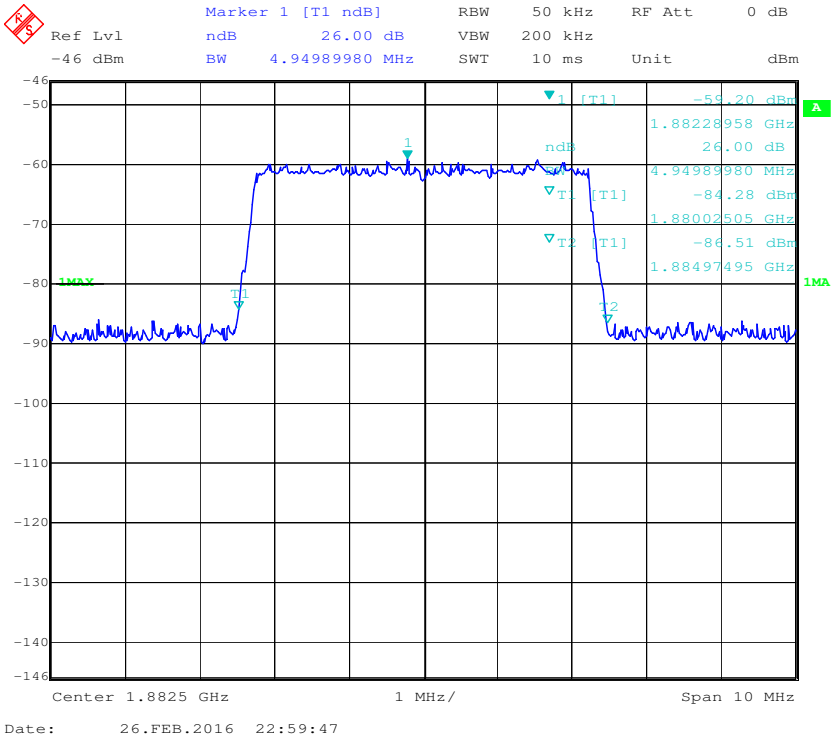
## 99% Bandwidth-DL- GSM- Pre AGC -Output



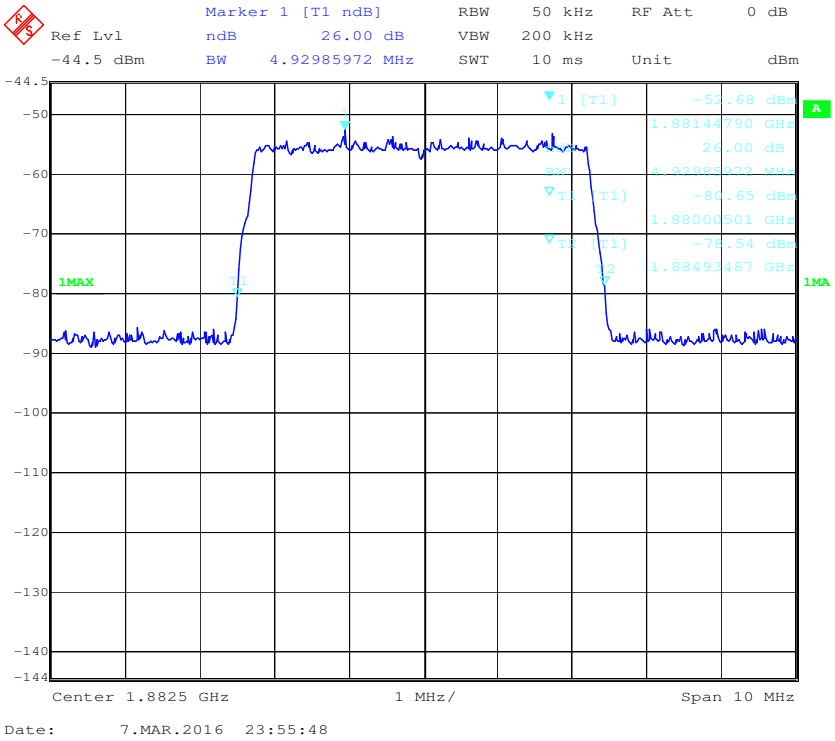

## 99% Bandwidth-DL- GSM- 3dB above AGC -Output



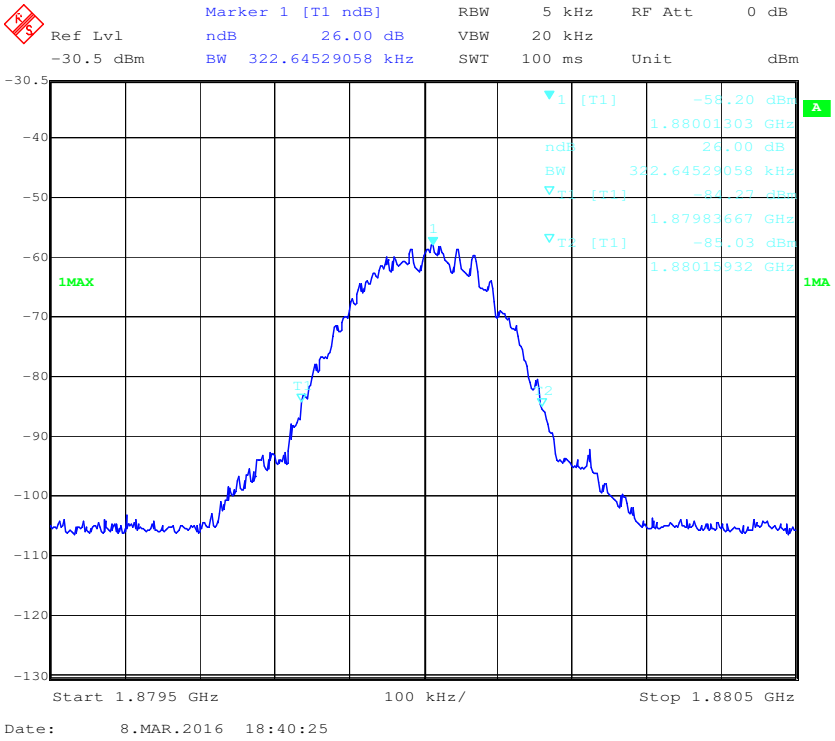
## 26 dB Bandwidth-UL-AWGN-Pre AGC-Input



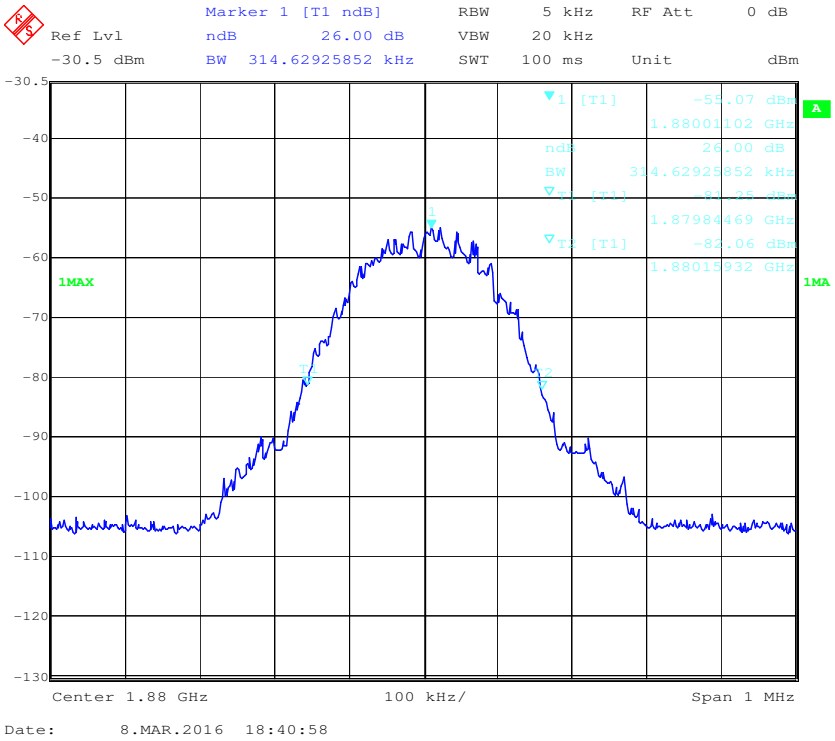

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input



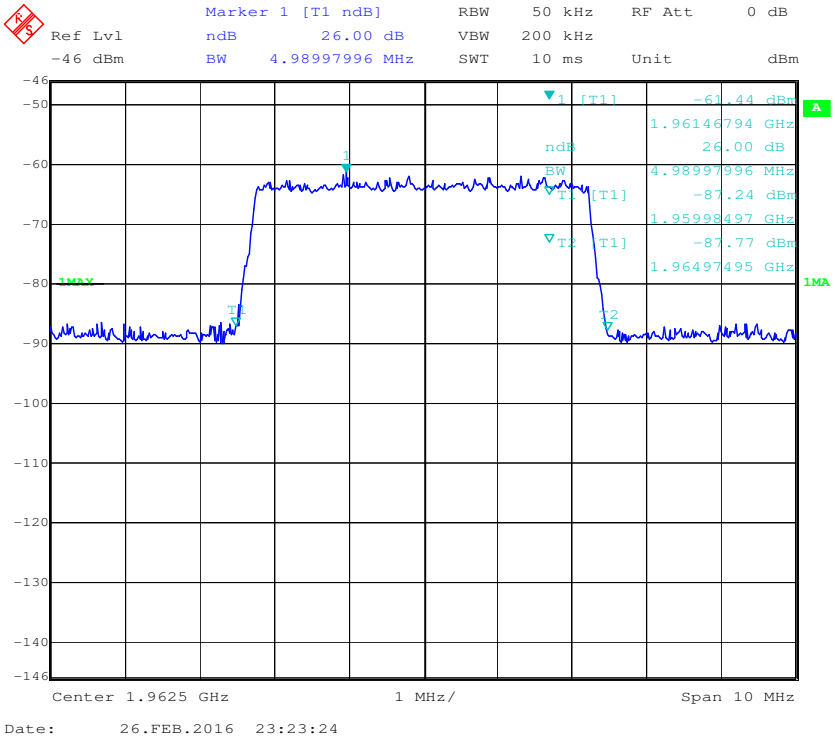
## 26 dB Bandwidth-UL-GSM-Pre AGC-Input



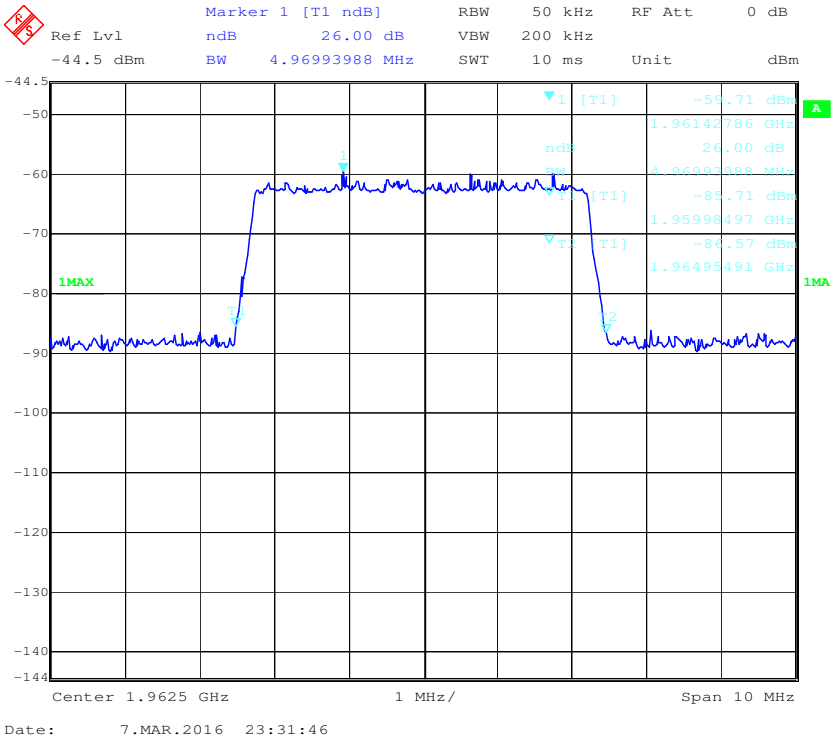

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Input



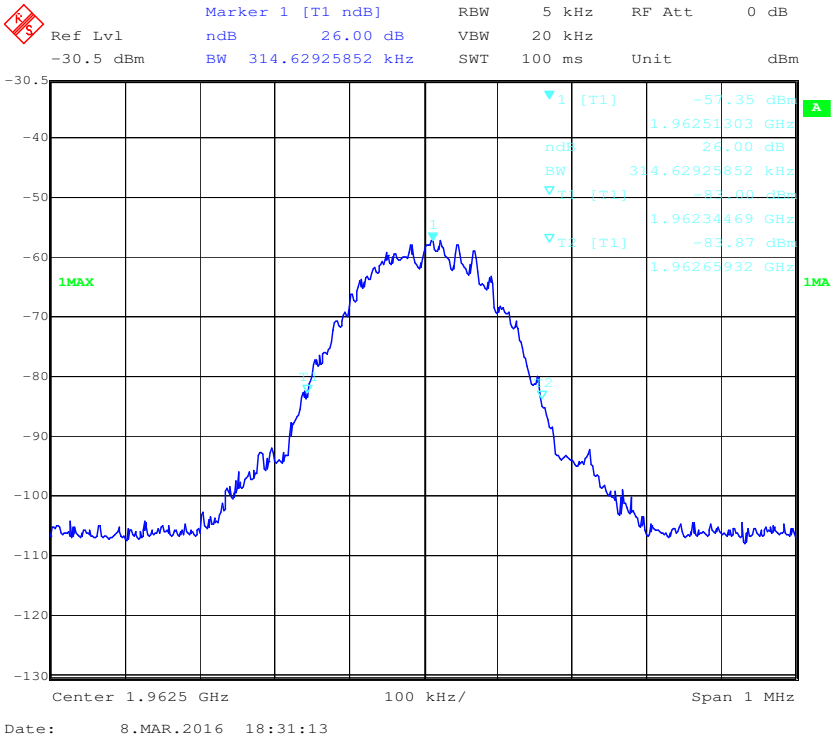
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Input



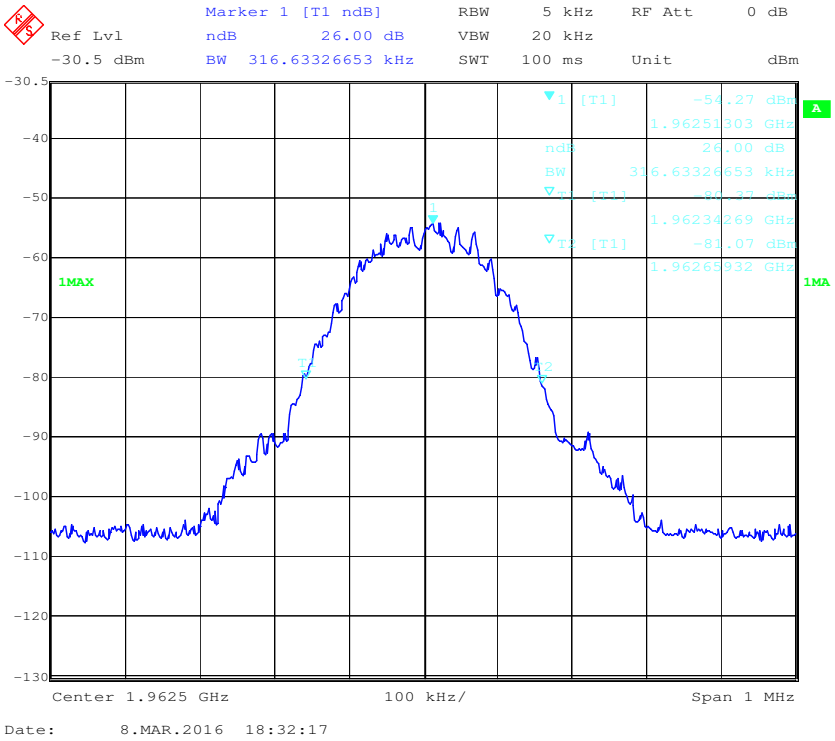

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Input



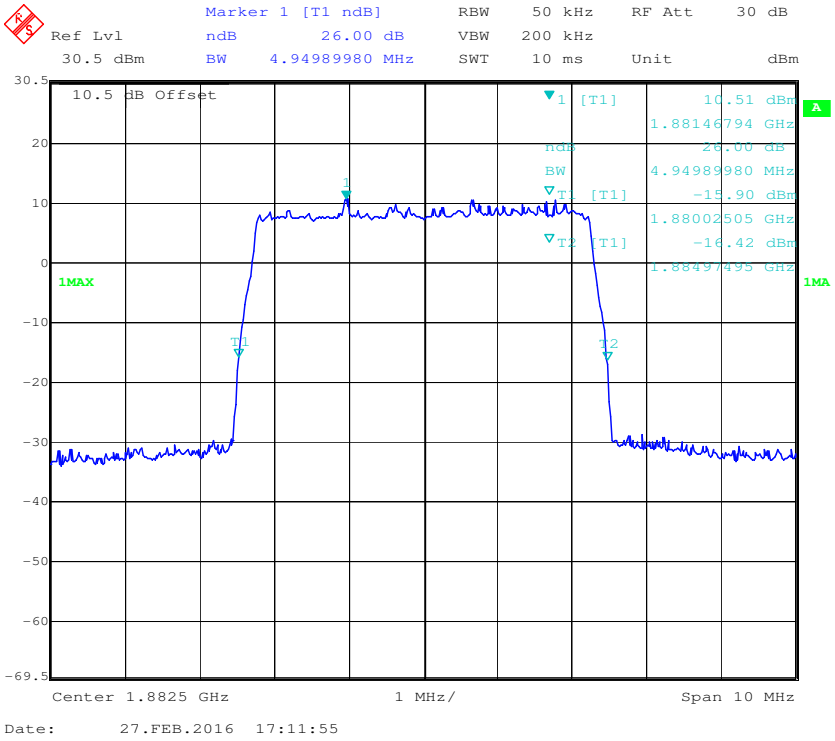
## 26 dB Bandwidth-DL- GSM- Pre AGC -Input



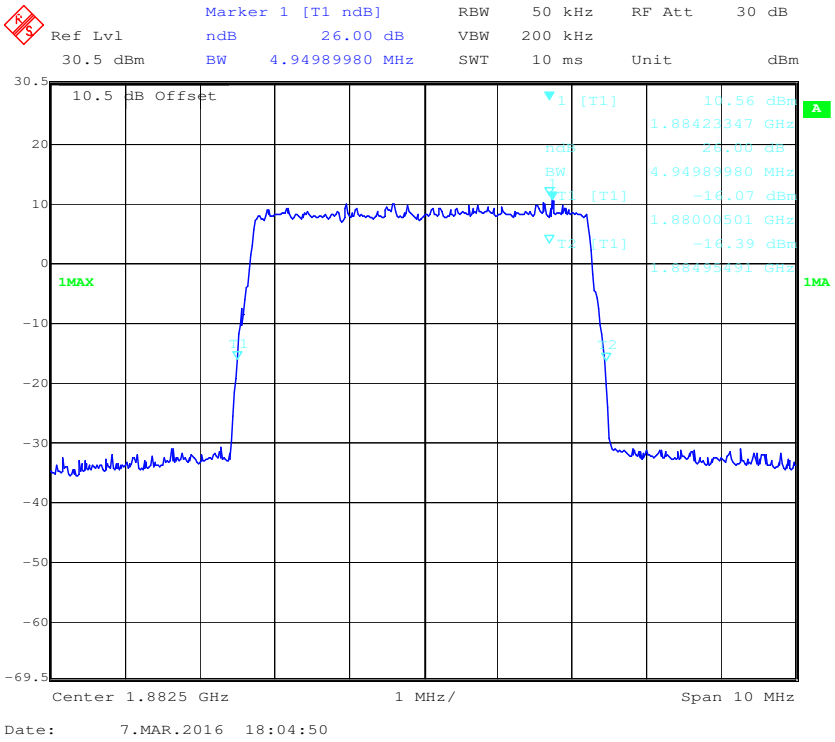

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Input



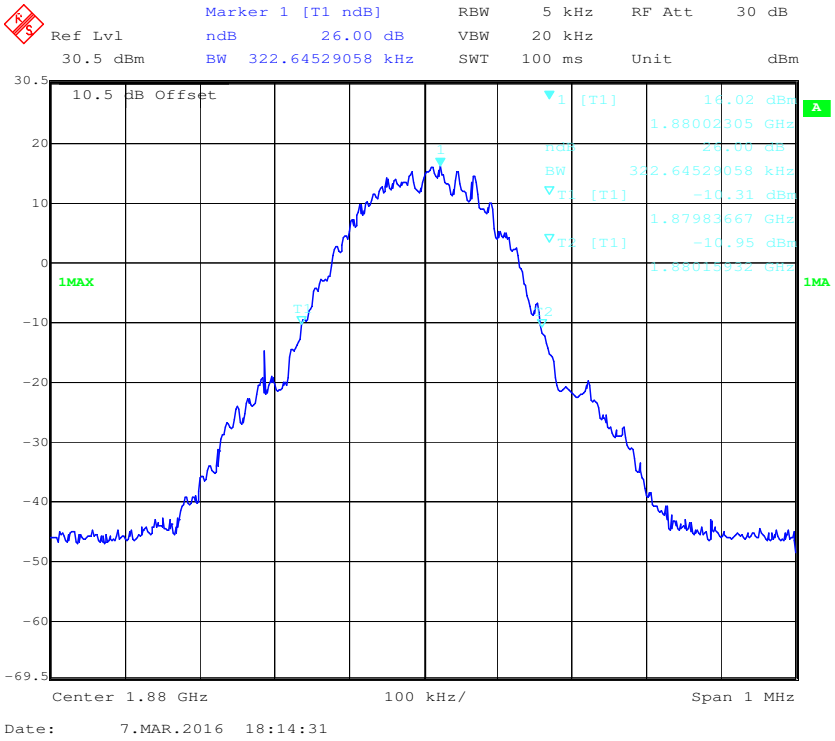
## 26 dB Bandwidth-UL- AWGN- Pre AGC -Output



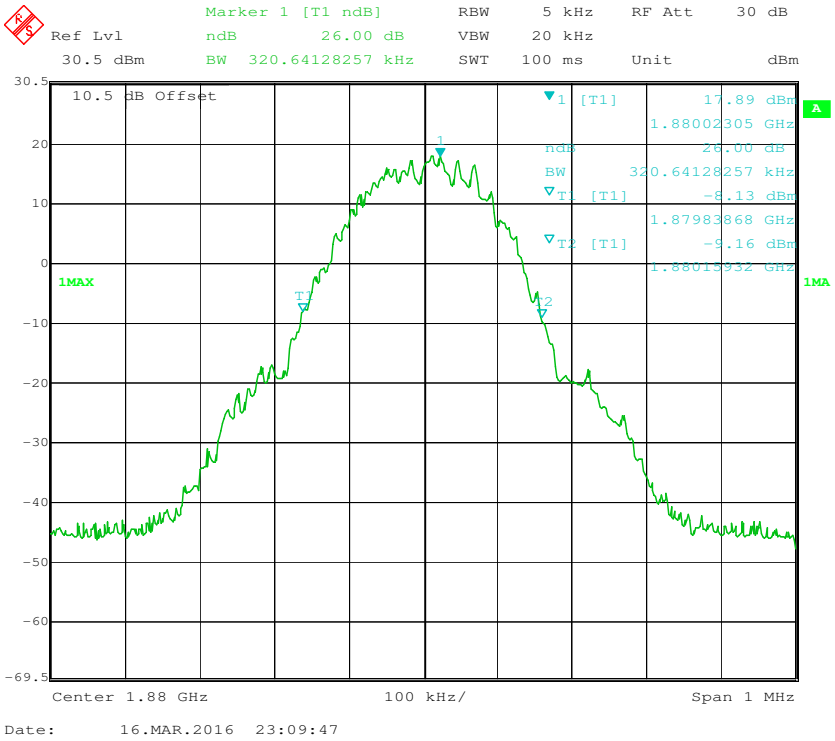

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Output



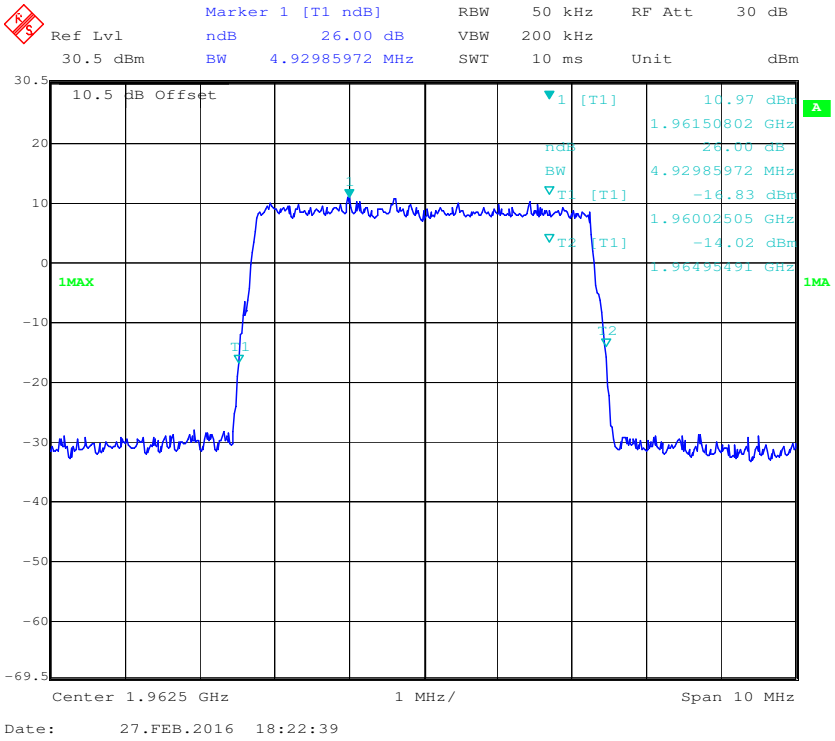
## 26 dB Bandwidth-UL- GSM- Pre AGC -Output



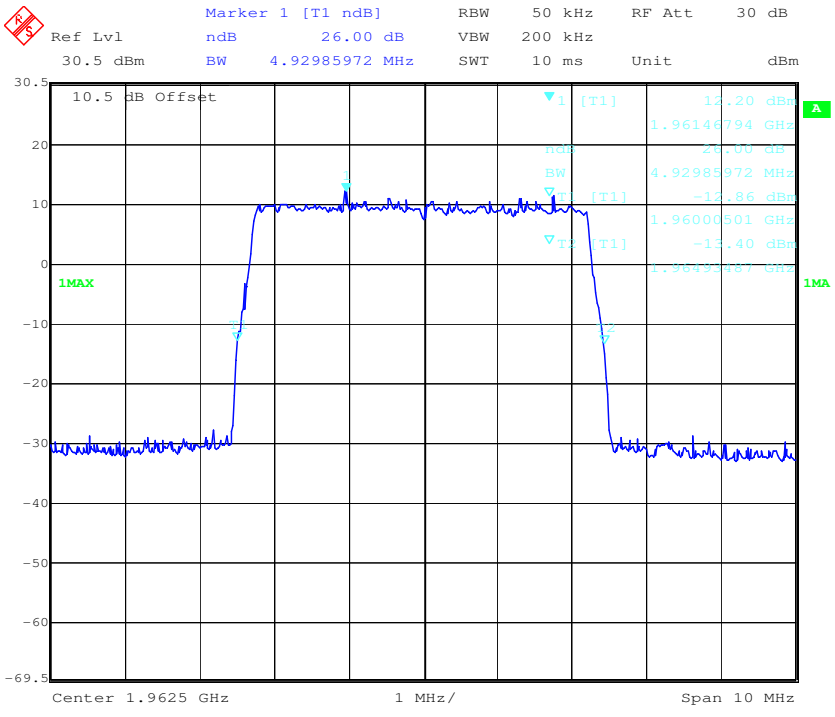

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Output



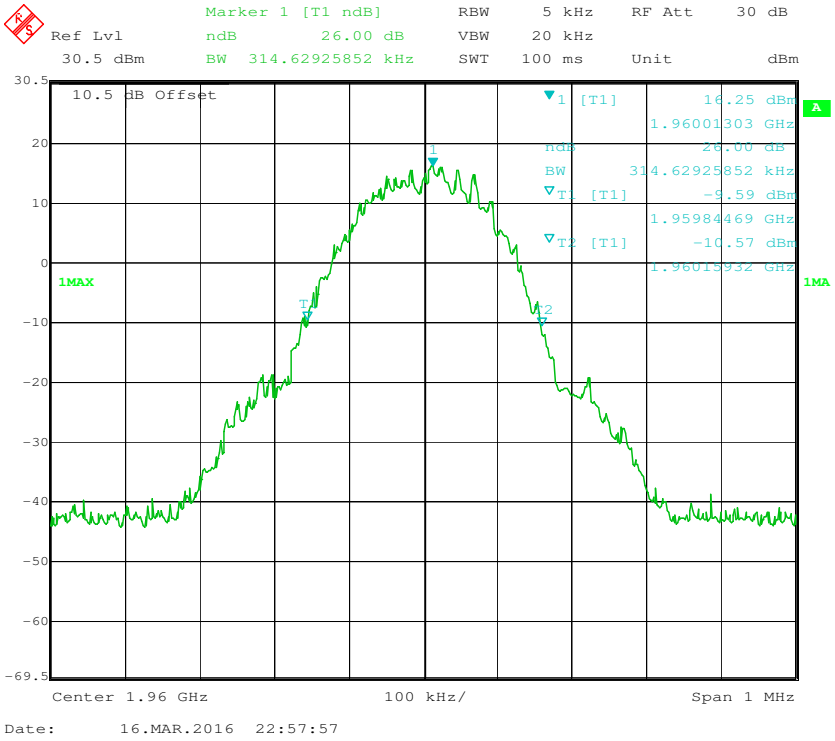
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Output



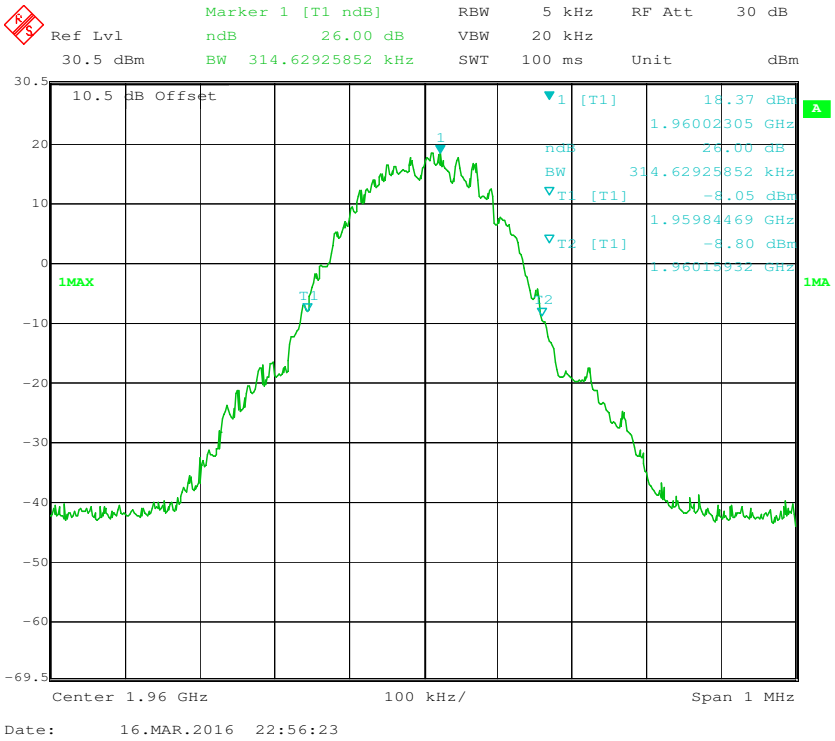

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Output



## 26 dB Bandwidth-DL- GSM- Pre AGC -Output



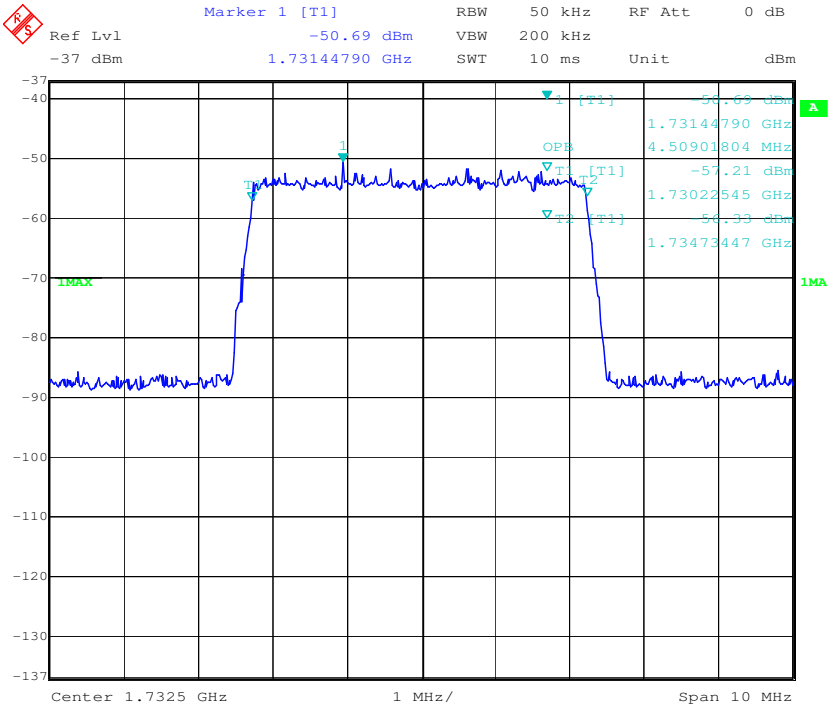

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Output



**AWS-1 Band**

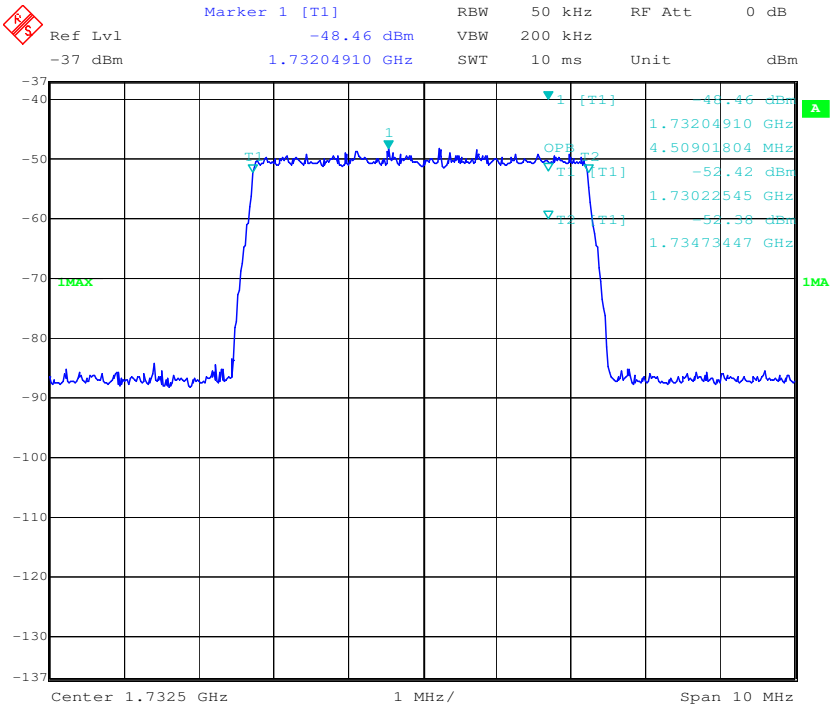
| Mode | Signal Type | Signal Level | Frequency (MHz) | 99% Bandwidth (MHz) | | 26dB Bandwidth (MHz) | |
|---|---|---|---|---|---|---|---|
| | | | | Input | Output | Input | Output |
| Uplink | AWGN | Pre-AGC | 1732.5 | 4.509 | 4.509 | 4.930 | 4.950 |
| | | 3dB above AGC | 1732.5 | 4.509 | 4.489 | 4.910 | 4.930 |
| | GSM | Pre-AGC | 1732.5 | 0.244 | 0.244 | 0.323 | 0.323 |
| | | 3dB above AGC | 1732.5 | 0.244 | 0.242 | 0.315 | 0.309 |
| Downlink | AWGN | Pre-AGC | 2132.5 | 4.529 | 4.509 | 4.950 | 4.930 |
| | | 3dB above AGC | 2132.5 | 4.529 | 4.509 | 4.950 | 4.930 |
| | GSM | Pre-AGC | 2132.5 | 0.244 | 0.244 | 0.321 | 0.317 |
| | | 3dB above AGC | 2132.5 | 0.246 | 0.246 | 0.323 | 0.321 |

## 99% Bandwidth-UL-AWGN-Pre AGC-Input



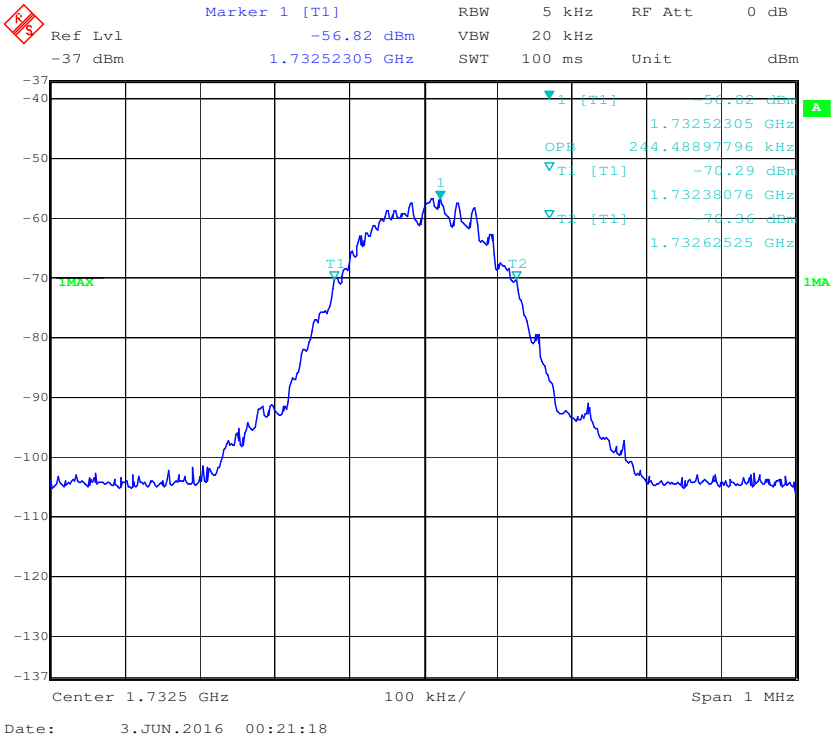

Date: 3.JUN.2016 00:08:11

## 99% Bandwidth-UL- AWGN-3dB above AGC-Input

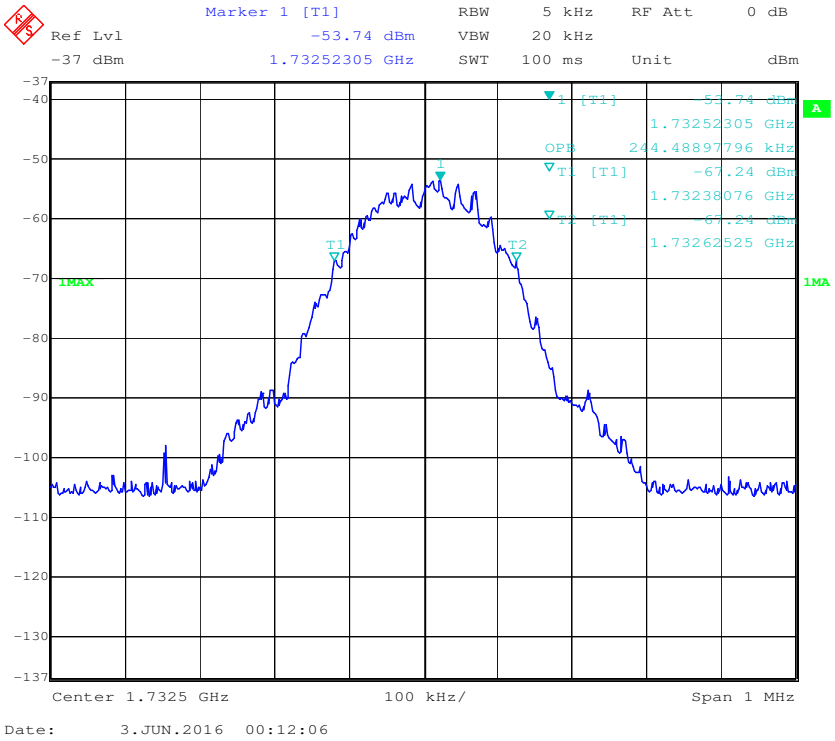



Date: 4.JUN.2016 20:34:51

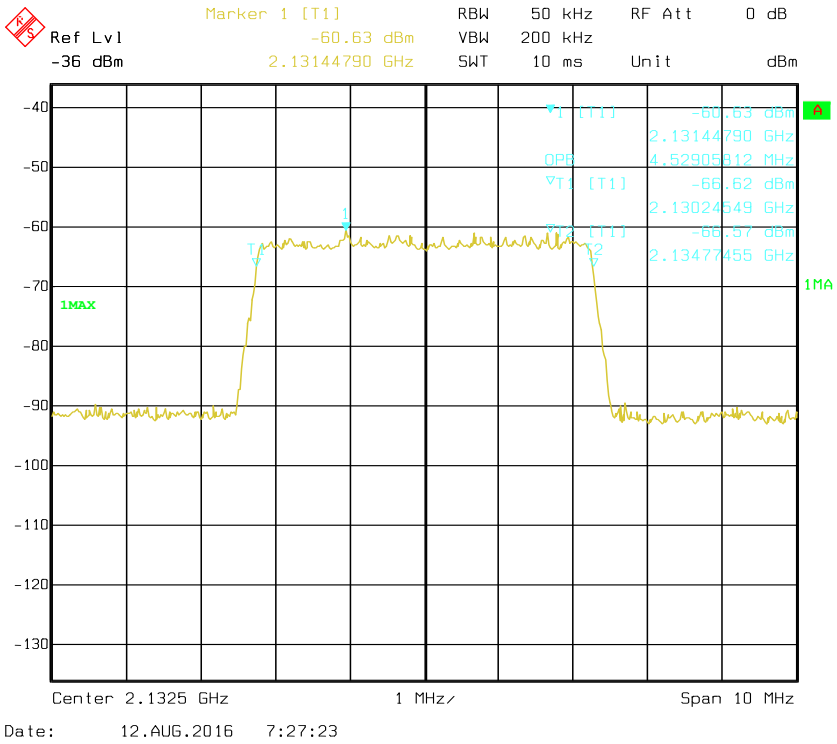
## 99% Bandwidth-UL-GSM-Pre AGC-Input



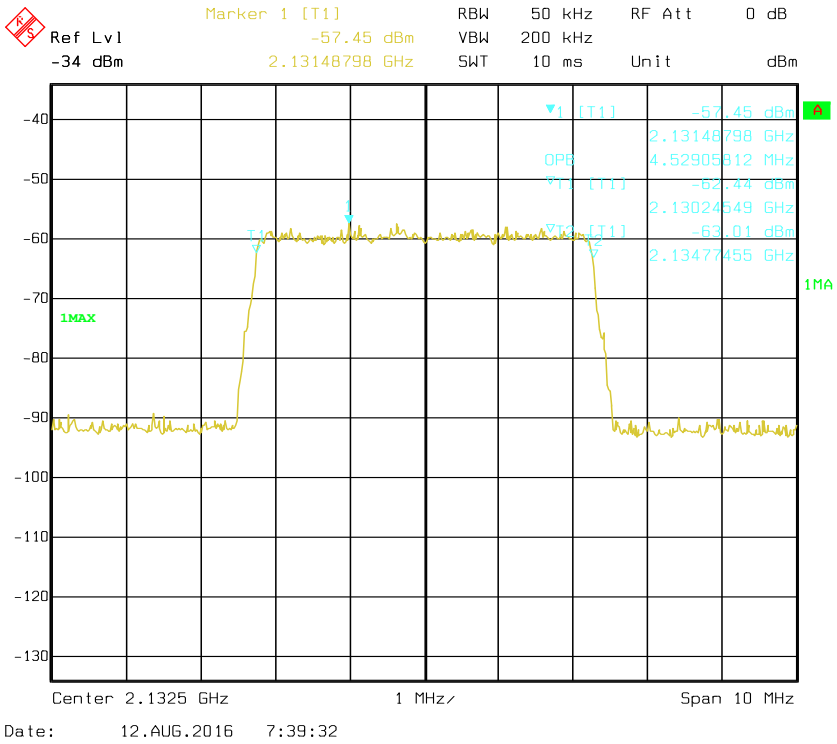

## 99% Bandwidth-UL- GSM-3dB above AGC-Input



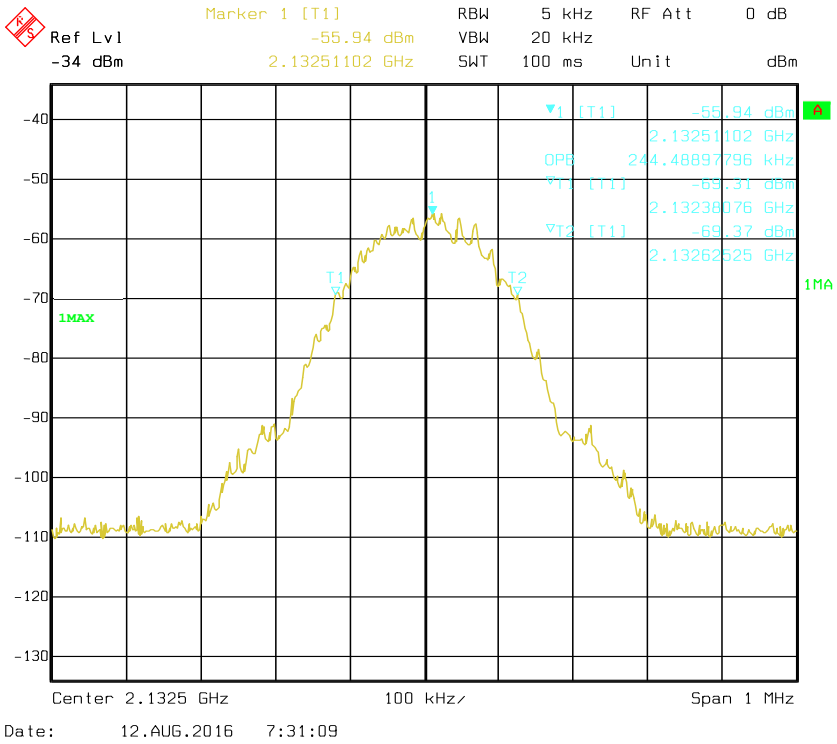
## 99% Bandwidth-DL- AWGN- Pre AGC -Input



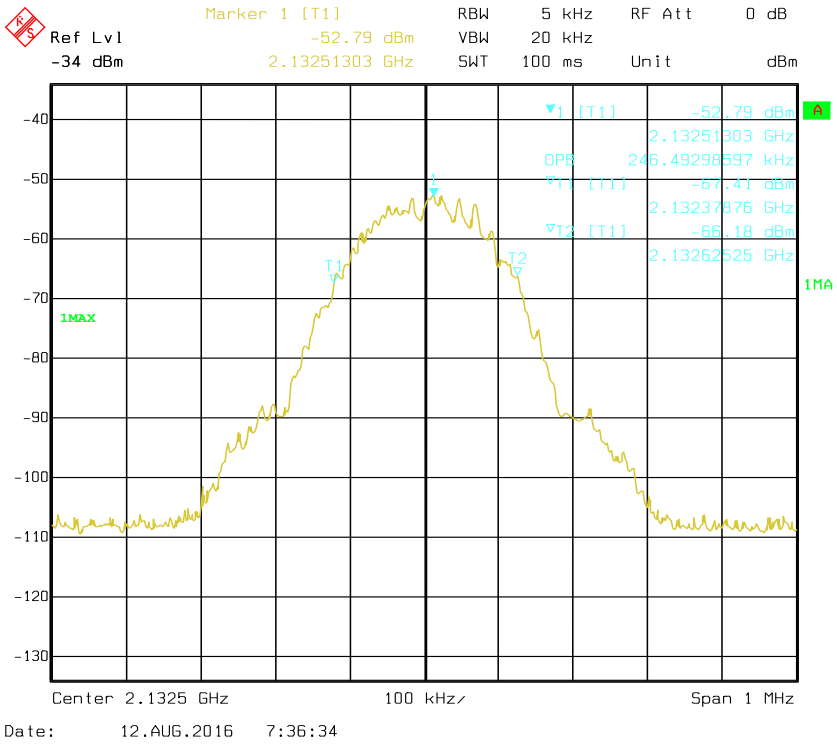

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Input



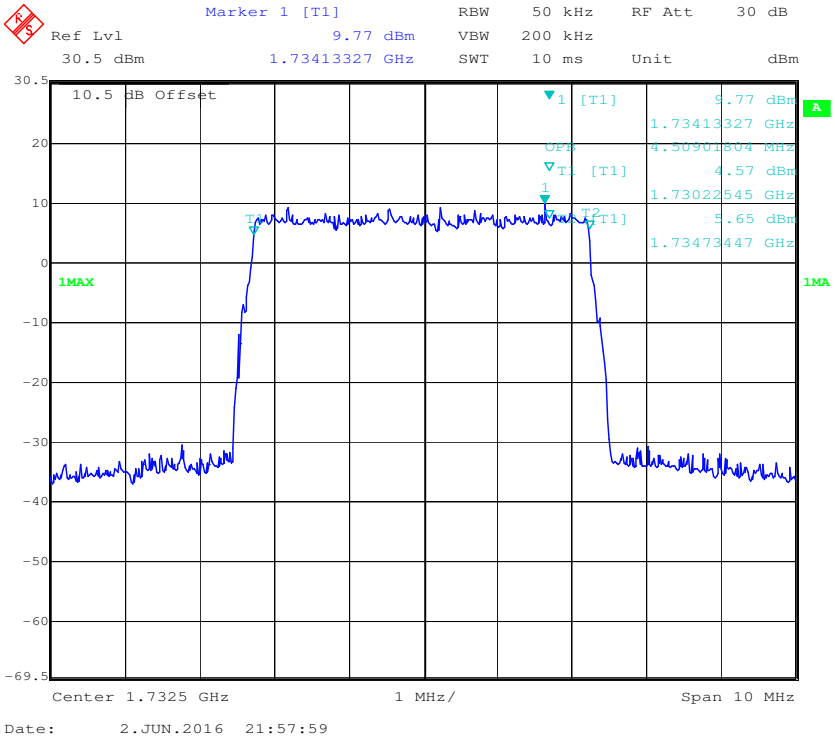
## 99% Bandwidth-DL- GSM- Pre AGC -Input



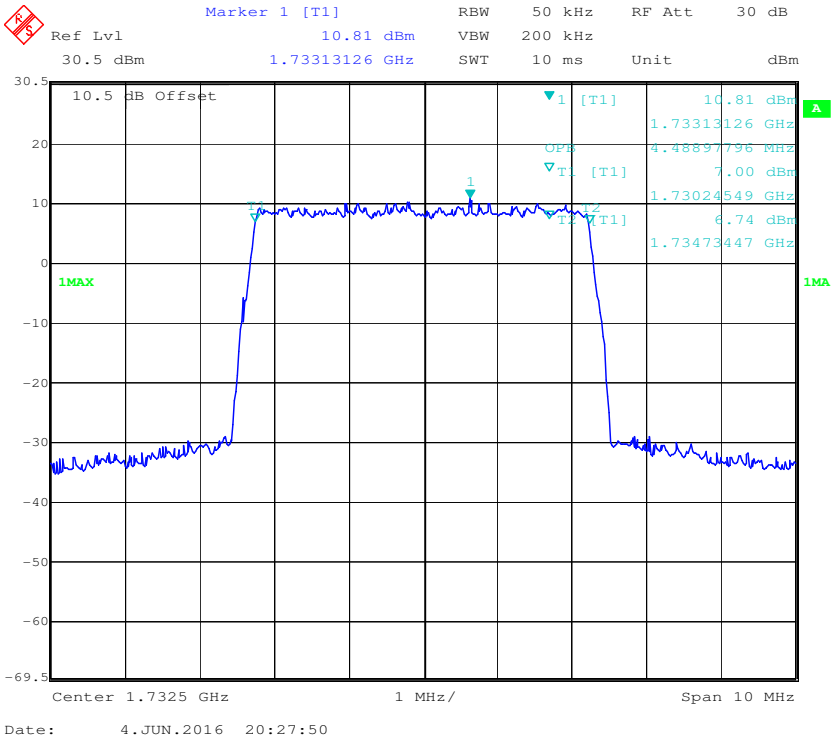

## 99% Bandwidth-DL- GSM- 3dB above AGC -Input



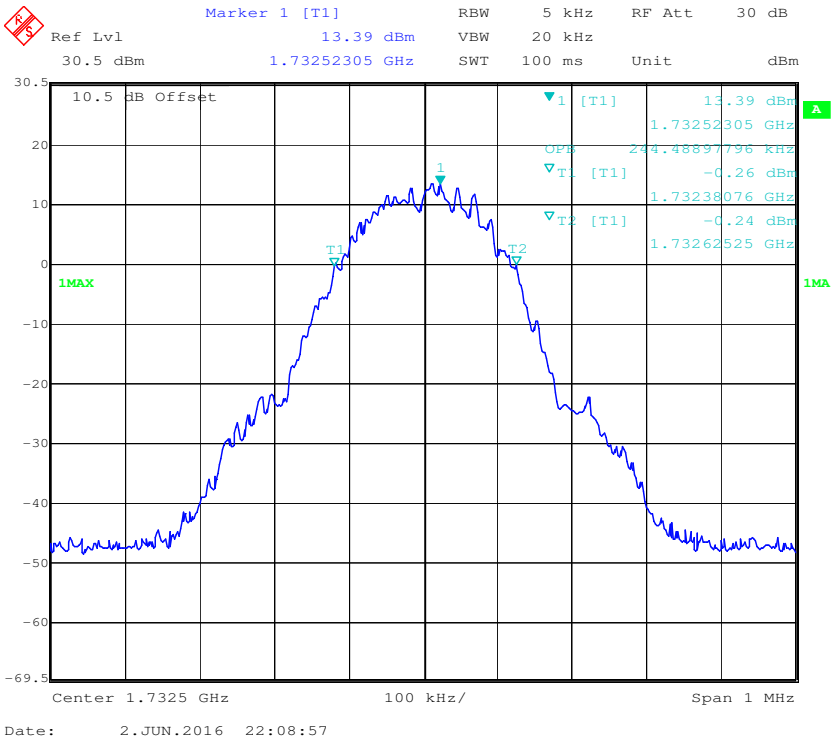
## 99% Bandwidth-UL- AWGN- Pre AGC -Output



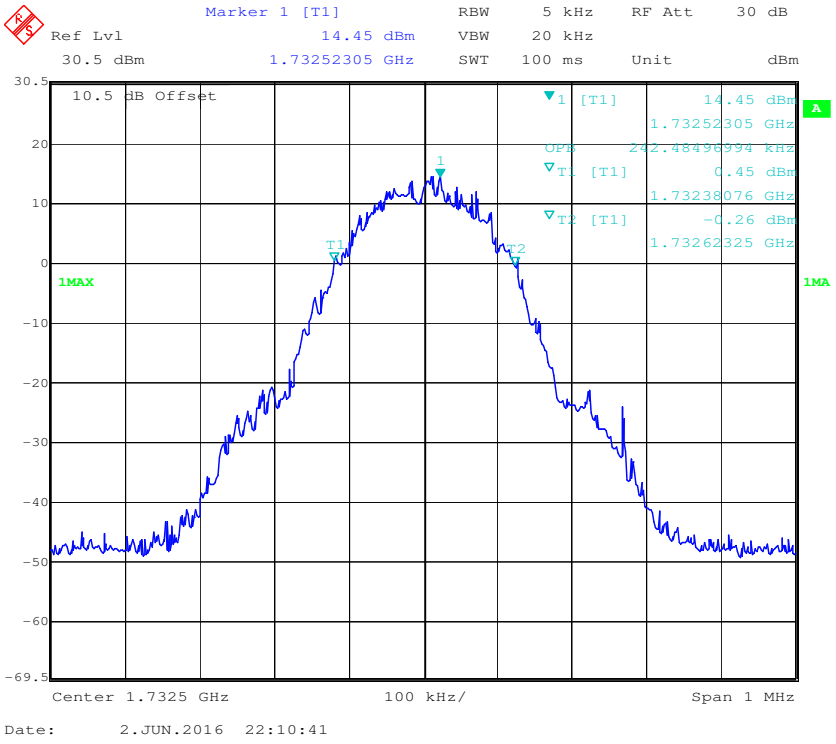

## 99% Bandwidth-UL- AWGN-3dB above AGC-Output



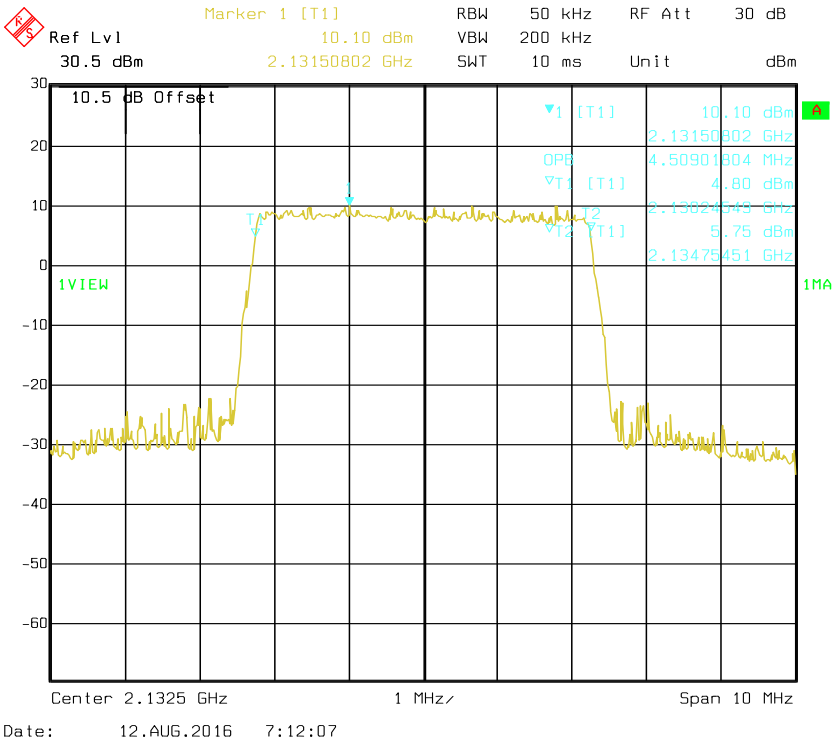
## 99% Bandwidth-UL- GSM- Pre AGC -Output



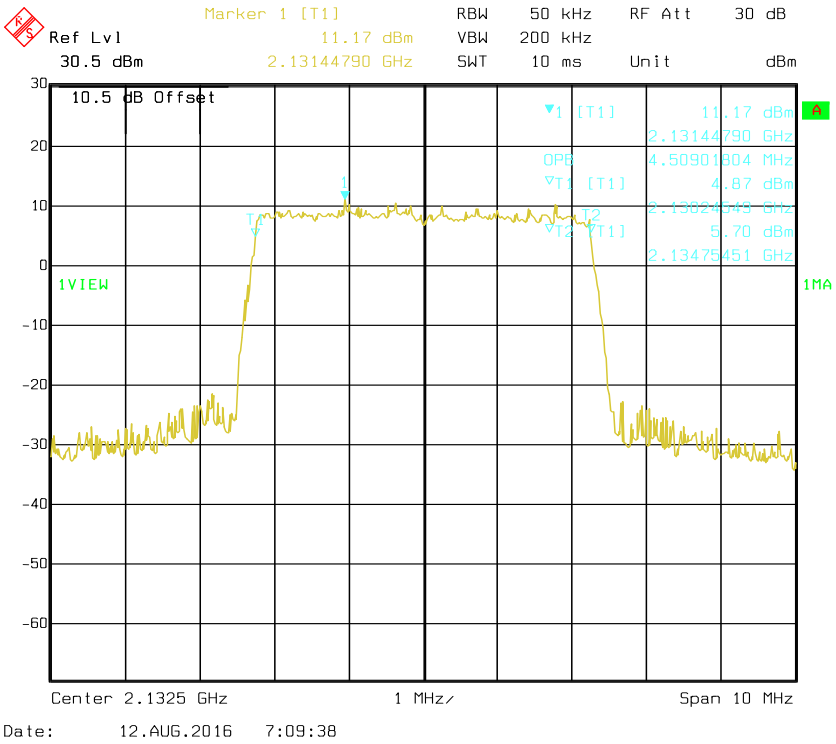

## 99% Bandwidth-UL- GSM-3dB above AGC-Output



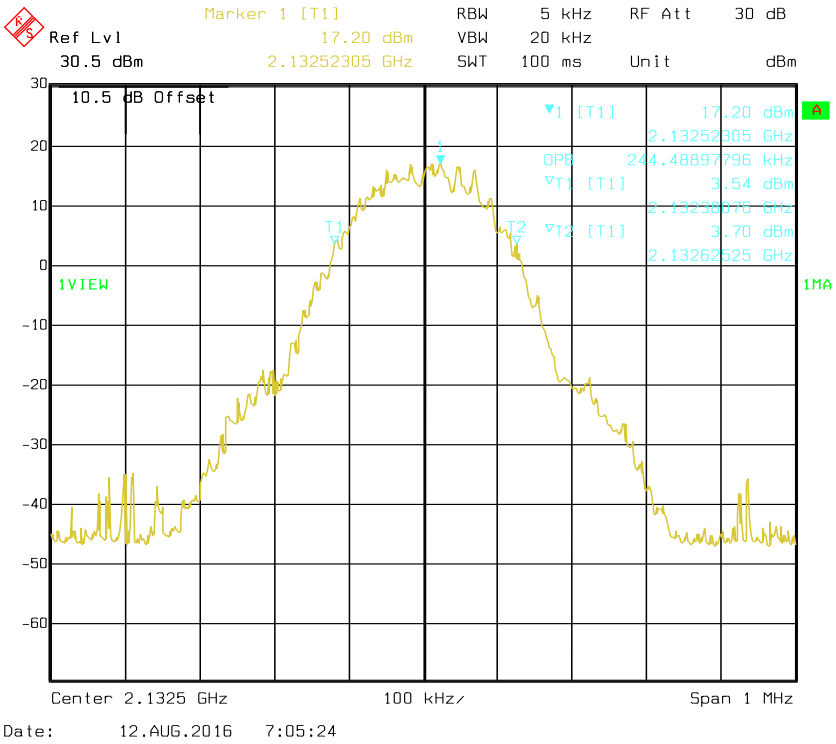
## 99% Bandwidth-DL- AWGN- Pre AGC -Output



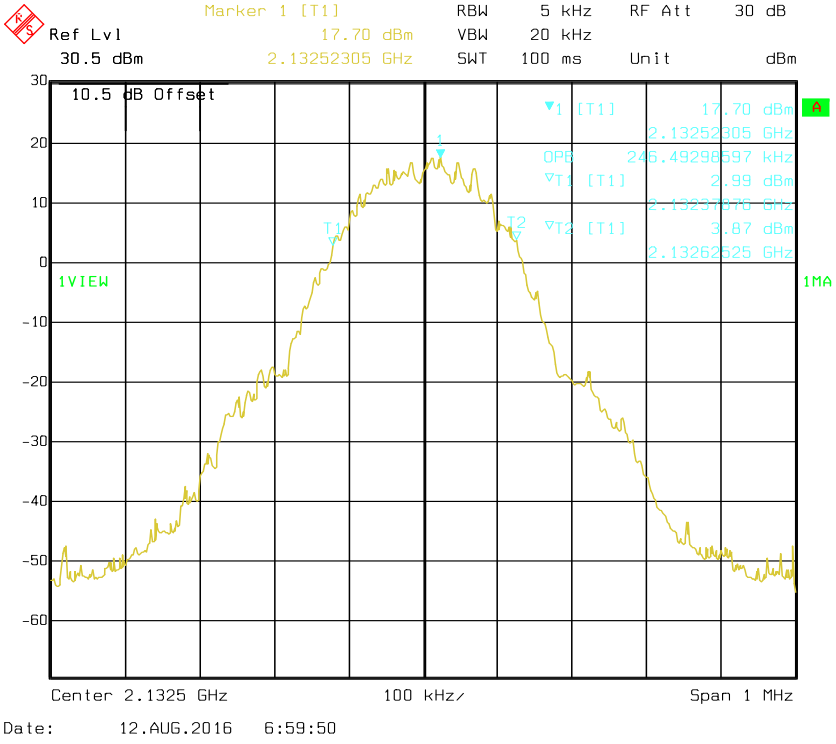

## 99% Bandwidth-DL- AWGN- 3dB above AGC -Output



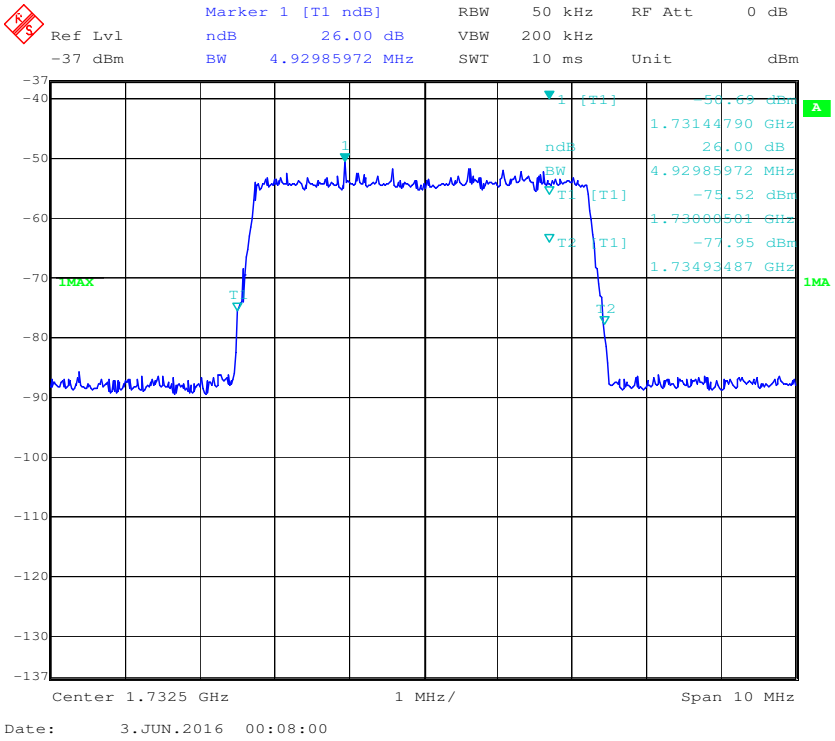
## 99% Bandwidth-DL- GSM- Pre AGC -Output



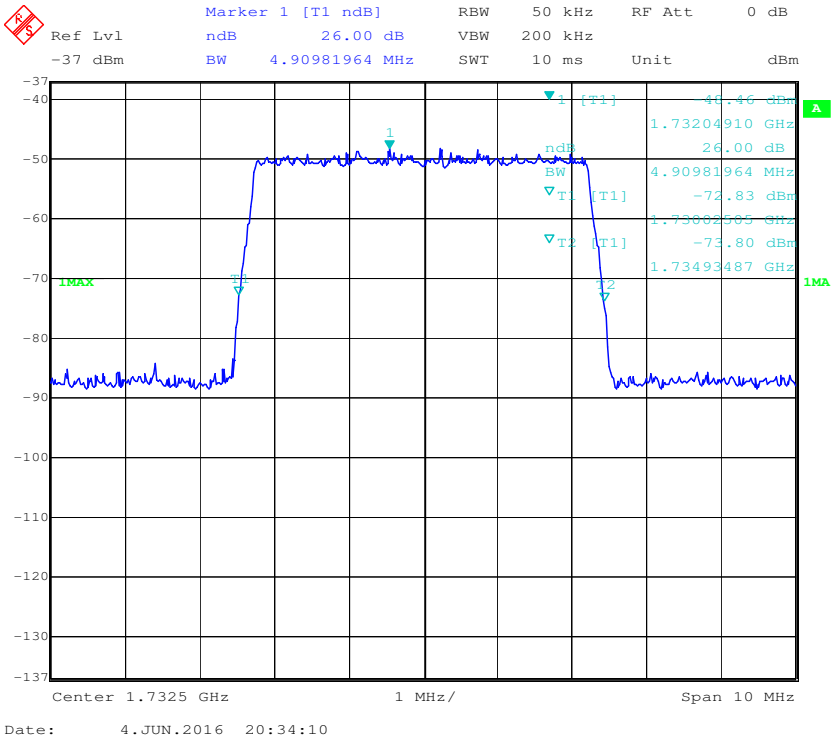

## 99% Bandwidth-DL- GSM- 3dB above AGC -Output



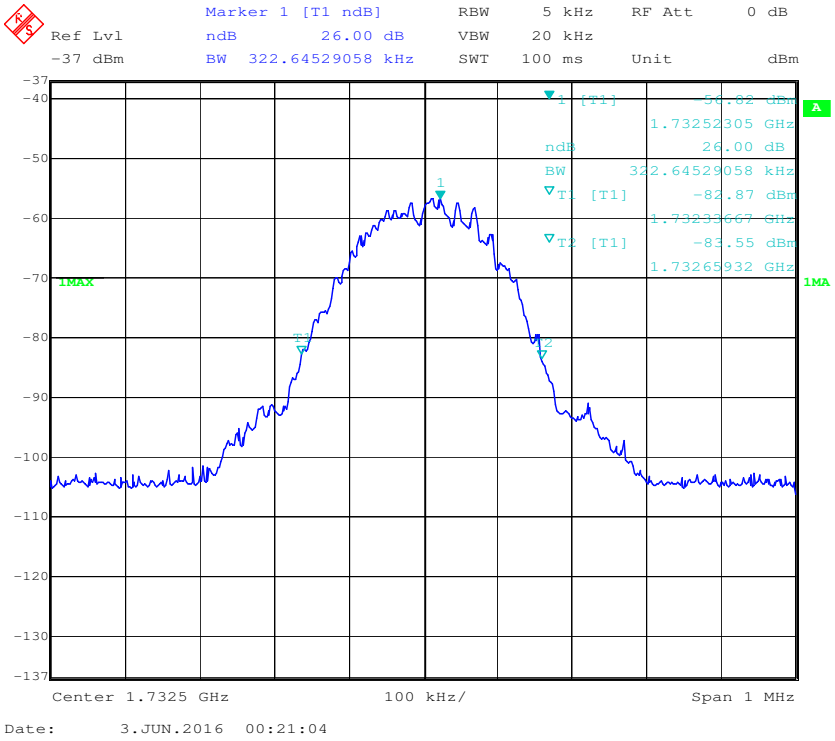
## 26 dB Bandwidth-UL-AWGN-Pre AGC-Input



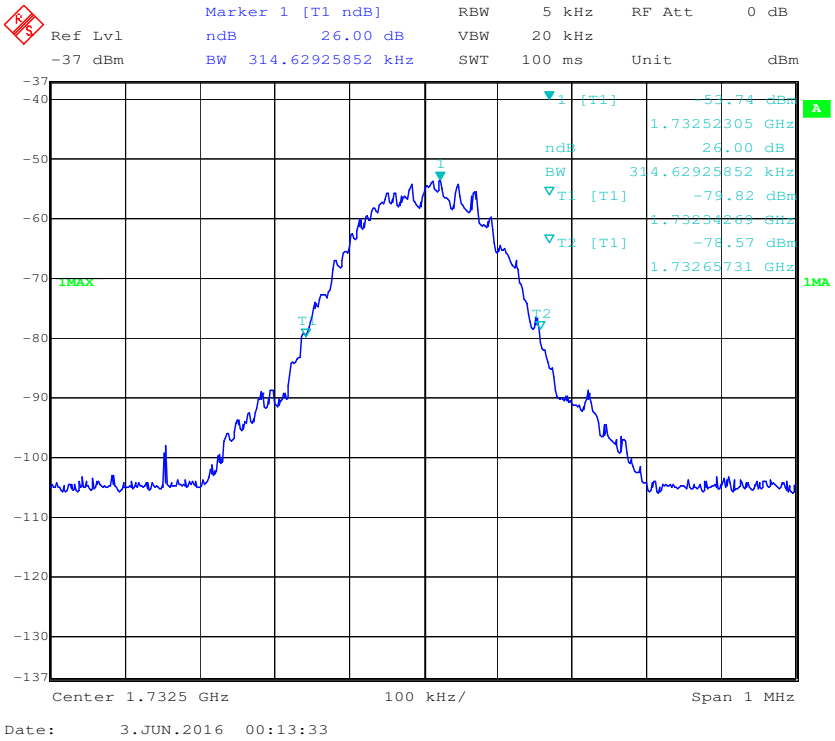

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Input



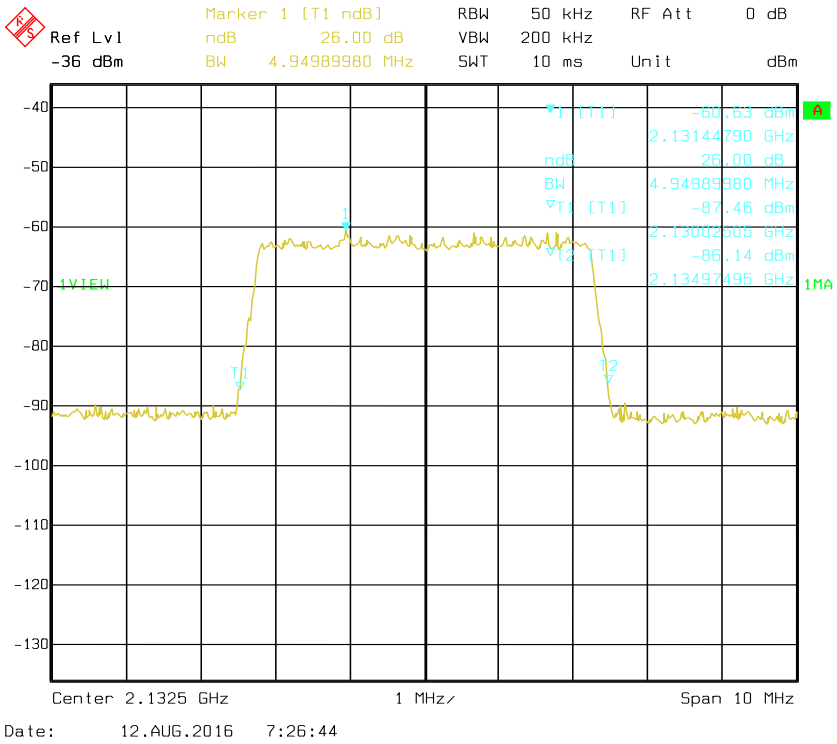
## 26 dB Bandwidth-UL-GSM-Pre AGC-Input



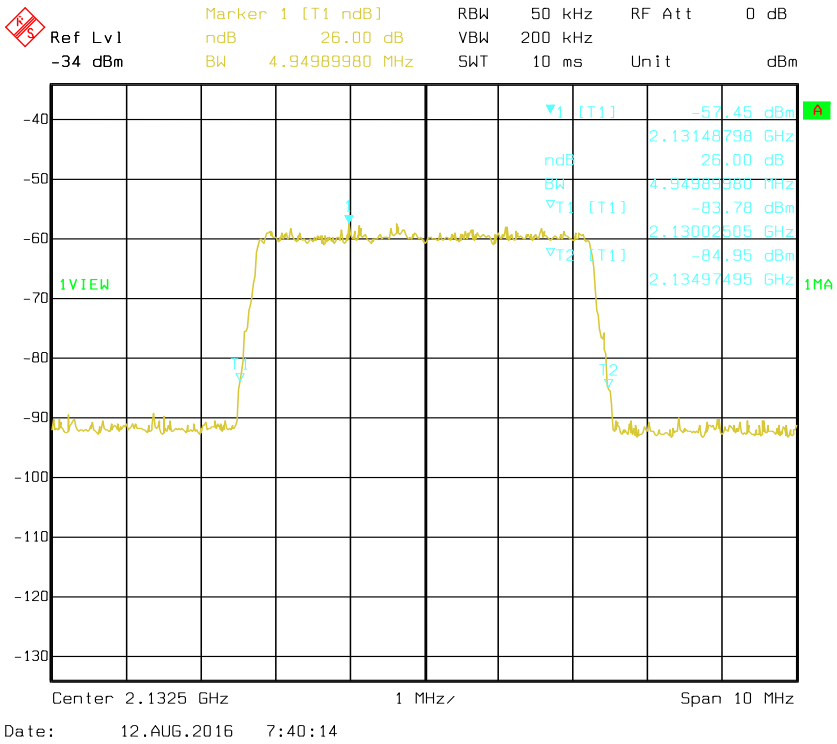

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Input



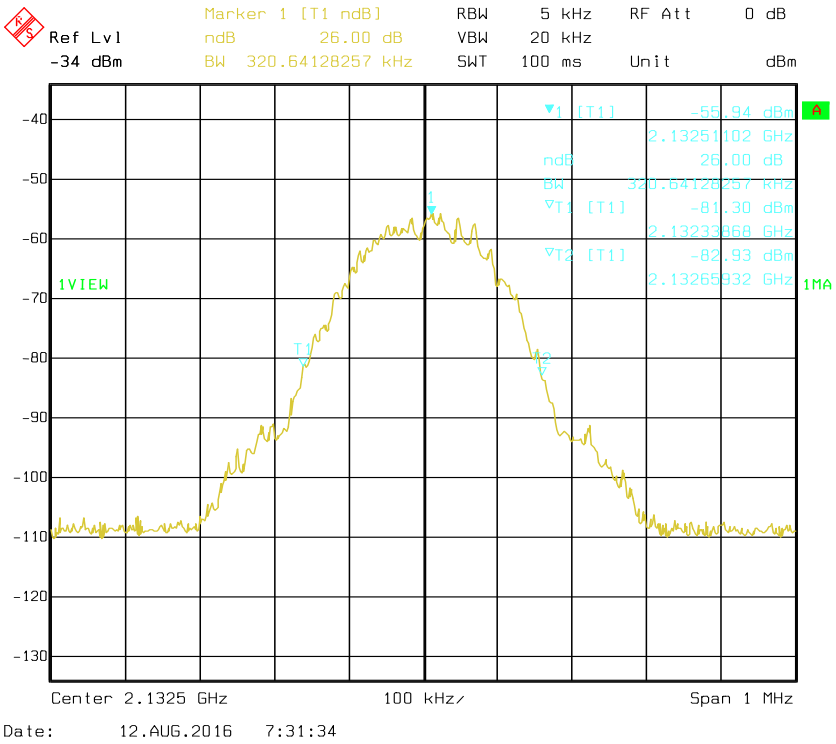
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Input



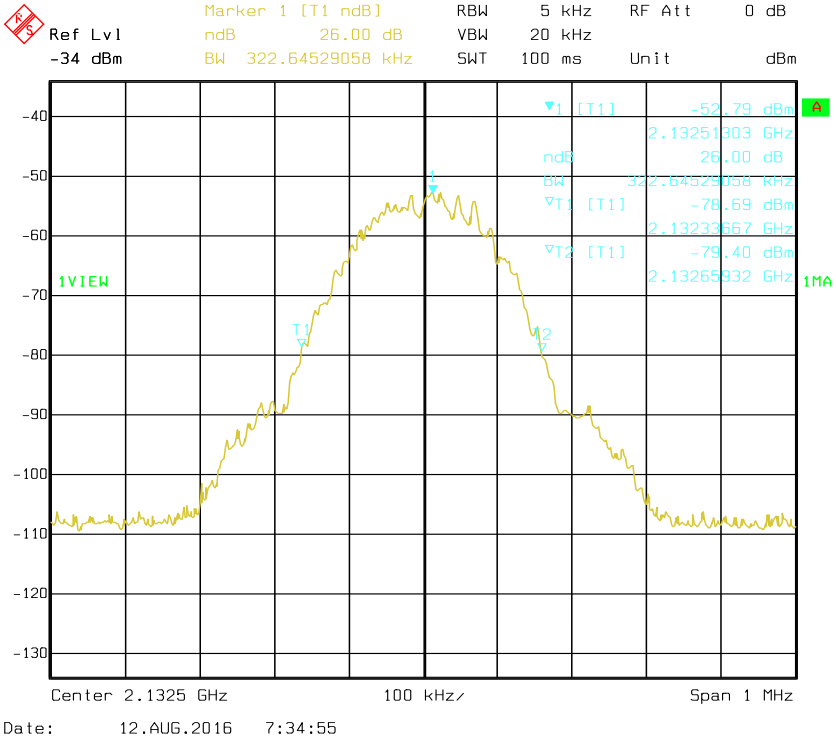

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Input



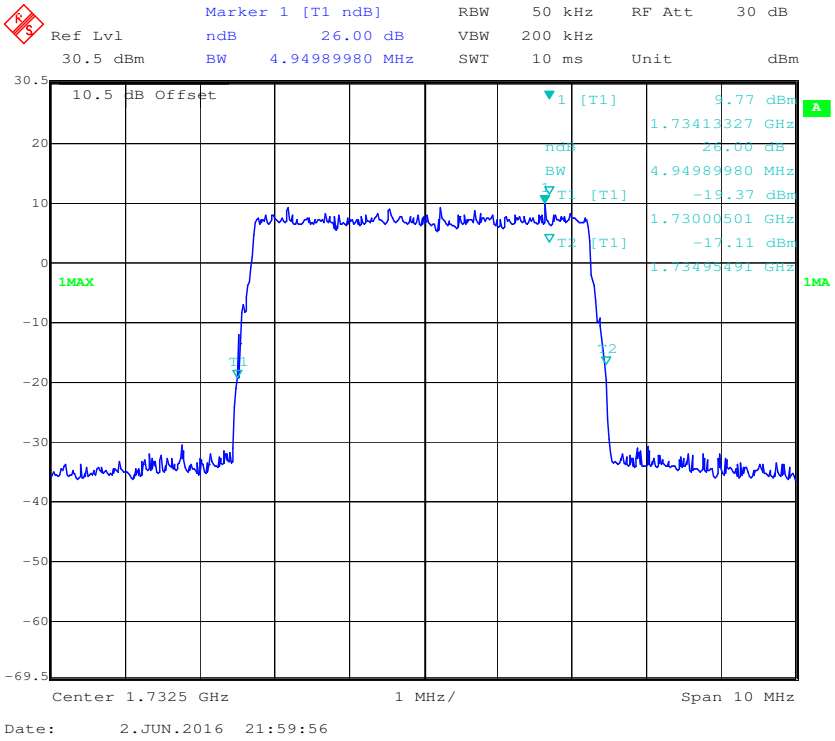
## 26 dB Bandwidth-DL- GSM- Pre AGC -Input



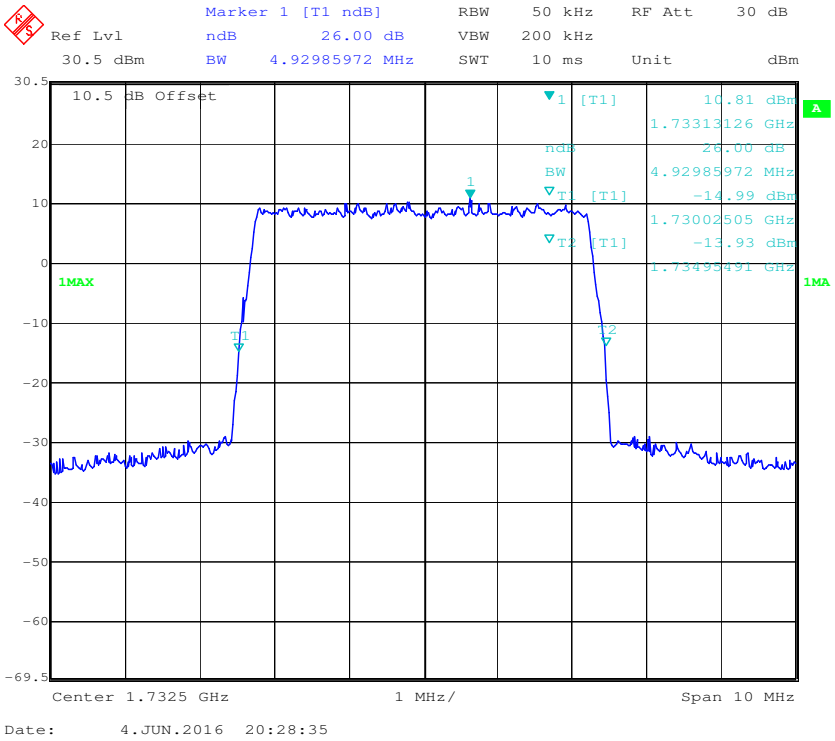

## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Input



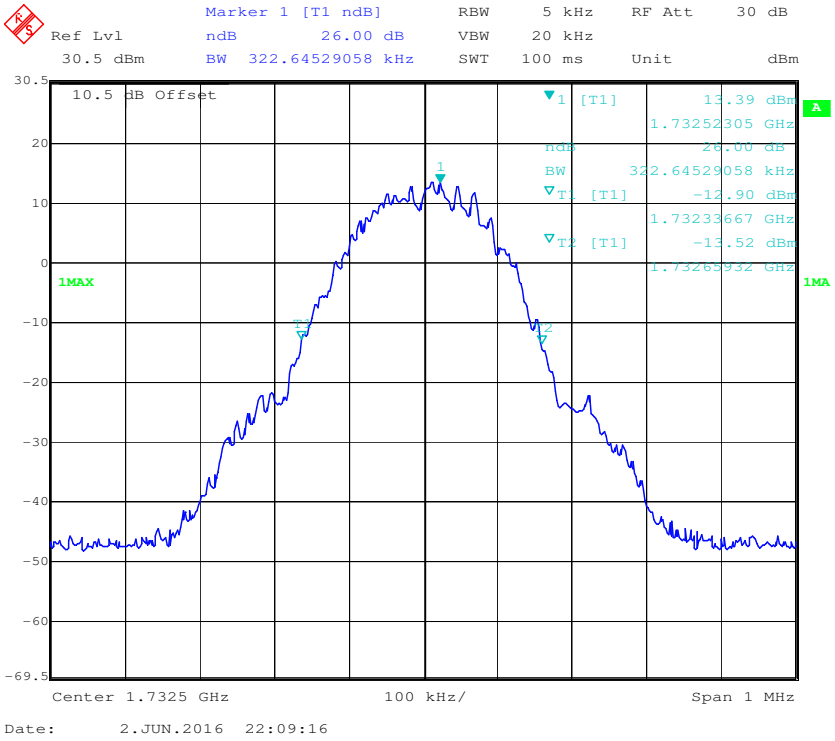
## 26 dB Bandwidth-UL- AWGN- Pre AGC -Output



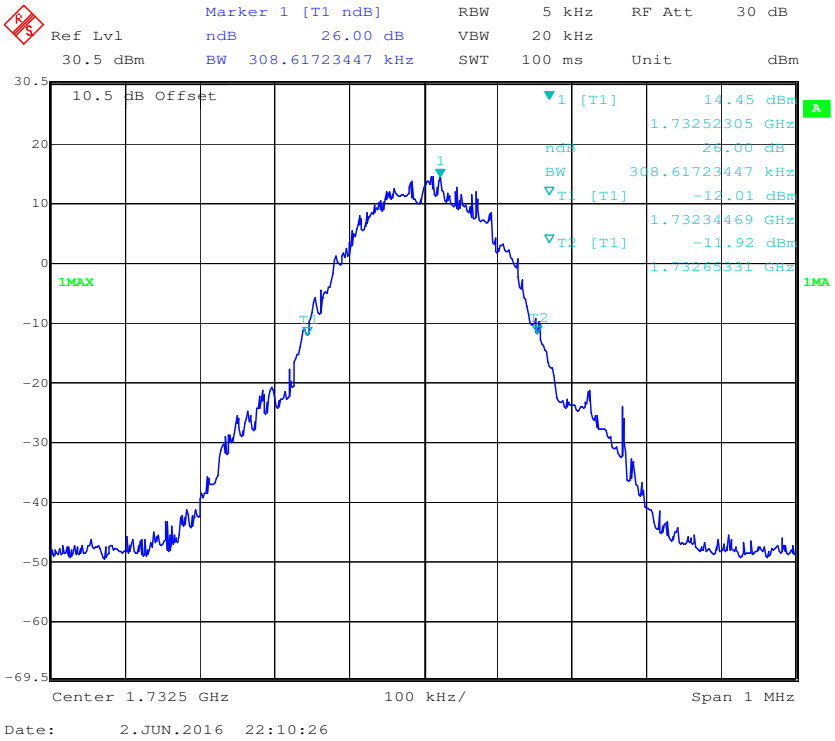

## 26 dB Bandwidth-UL- AWGN-3dB above AGC-Output



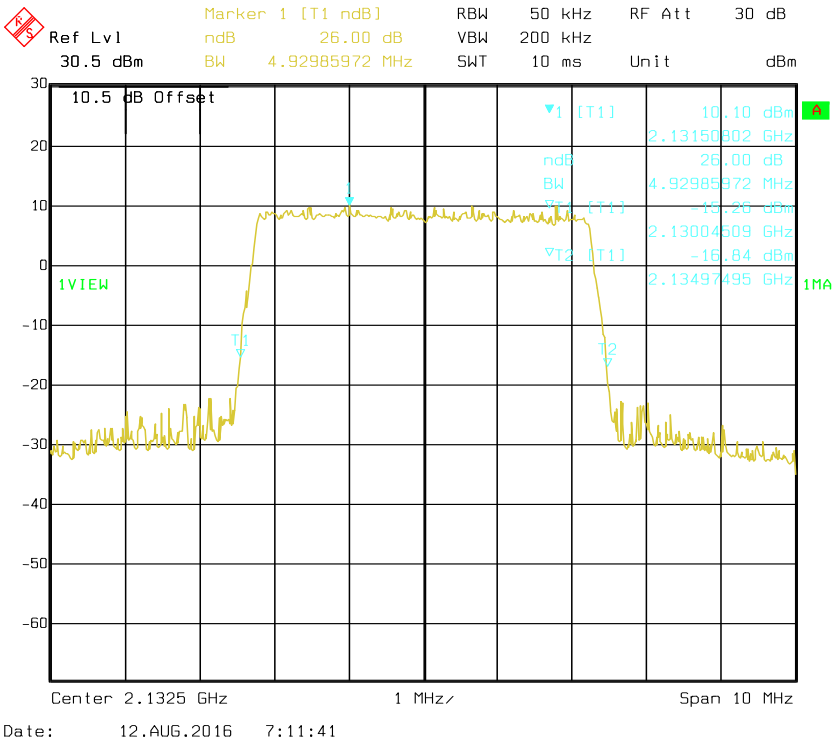
## 26 dB Bandwidth-UL- GSM- Pre AGC -Output



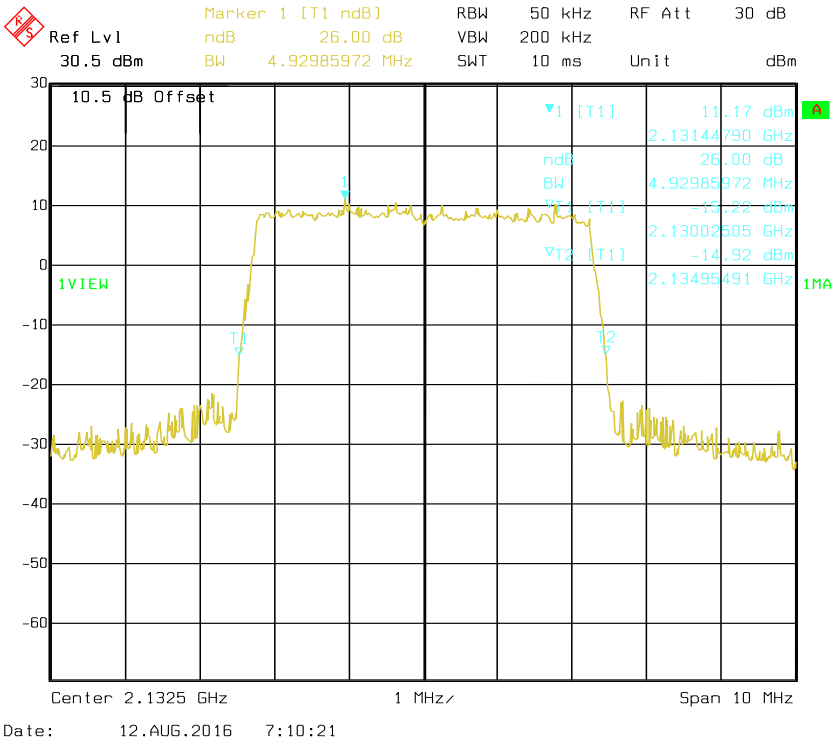

## 26 dB Bandwidth-UL- GSM-3dB above AGC-Output



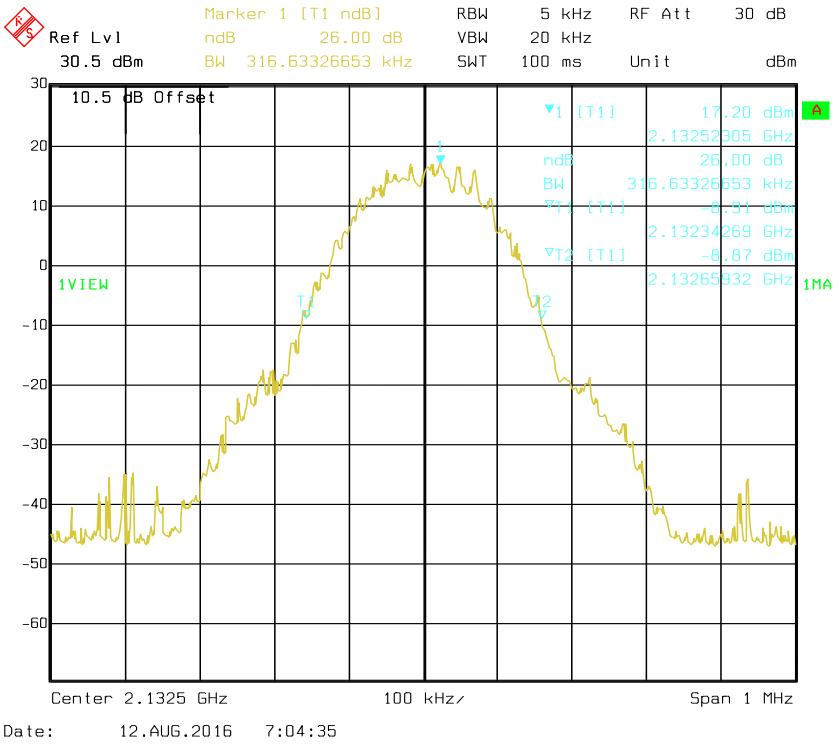
## 26 dB Bandwidth-DL- AWGN- Pre AGC -Output



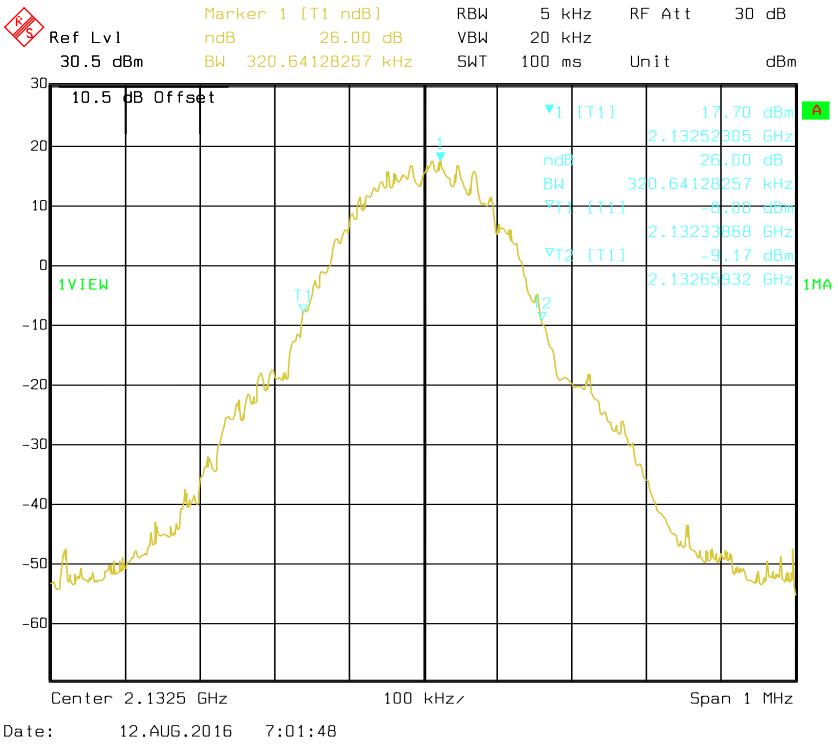

## 26 dB Bandwidth-DL- AWGN- 3dB above AGC -Output



## 26 dB Bandwidth-DL- GSM- Pre AGC -Output




## 26 dB Bandwidth-DL- GSM- 3dB above AGC -Output



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

## Applicable Standard

FCC §2.1051, §22.917, §24.238 and §27.53.

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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

## Test Procedure

Please refer to KDB 935210 D05 Indus Booster Basic Meas v01r01 clause 3.6.3

## 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 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-06-15 | 2016-06-15 |
| WEINSCHEL | 3dB Attenuator | 5321 | AU0709 | 2015-06-18 | 2016-06-18 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

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

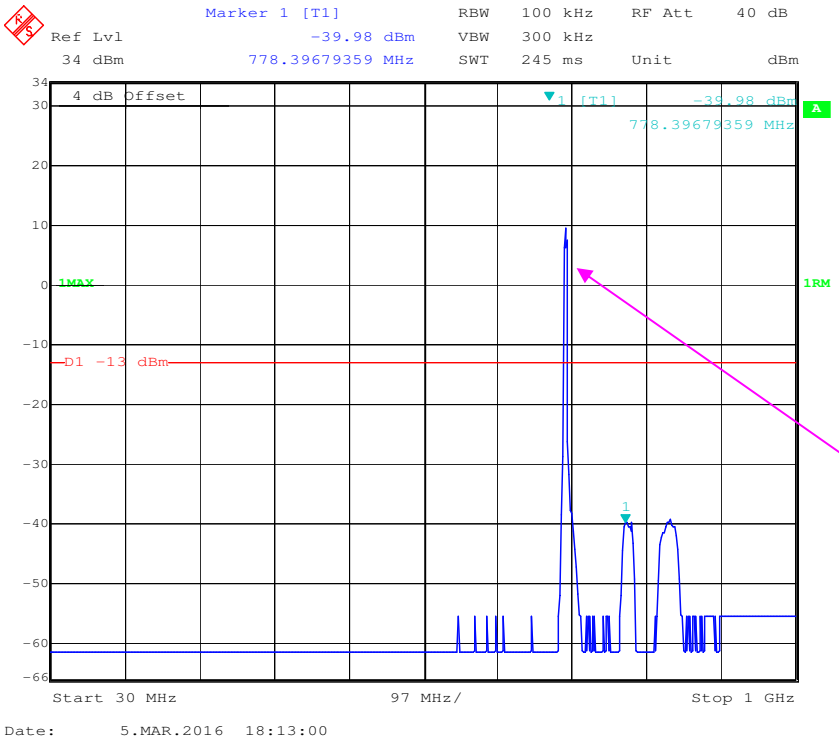
## Test Data

### Environmental Conditions

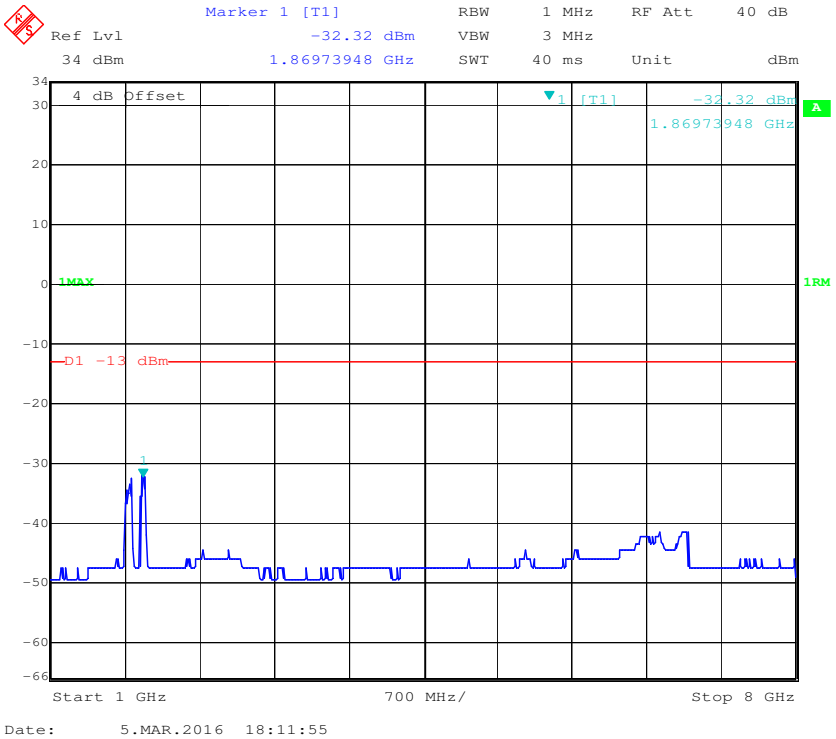
| | |
|---|---|
| **Temperature:** | 22~24 |

**Uplink:**

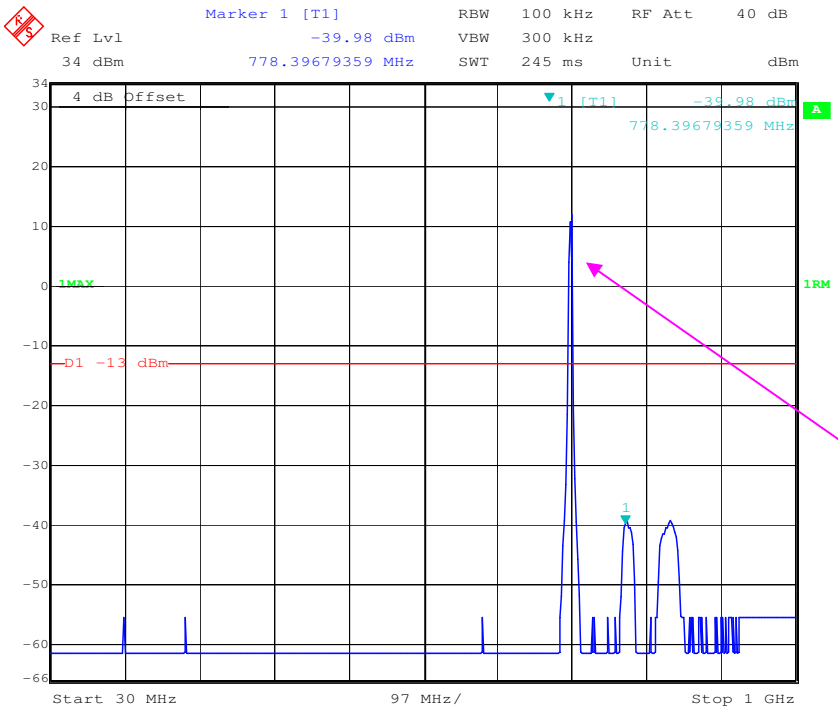
**Lower 700MHz (A+B+C Block)-AWGN-Pre AGC-Low Channel**




Fundamental test

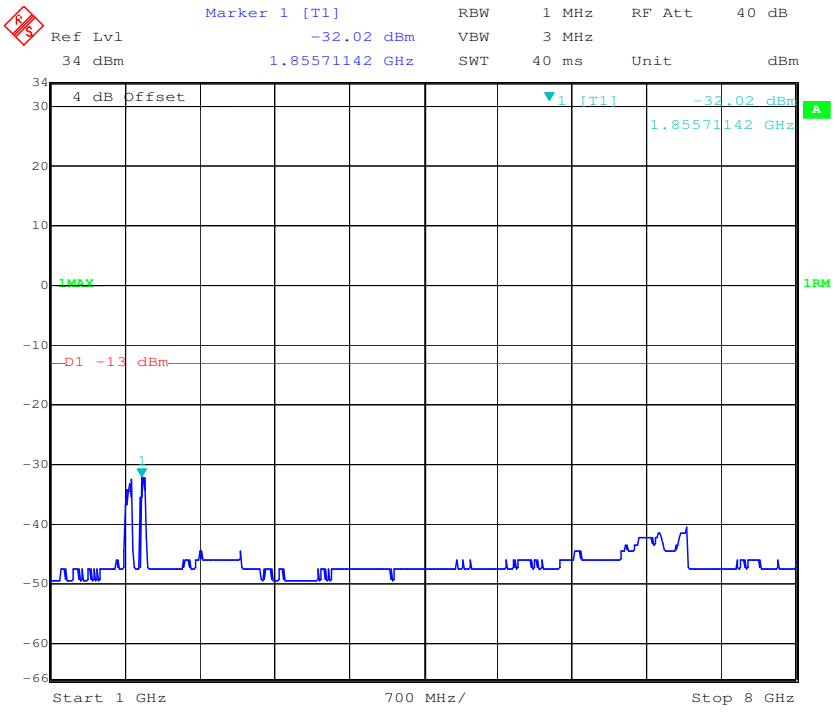


**Lower 700MHz (A+B+C Block) - AWGN-Pre AGC-Middle Channel**



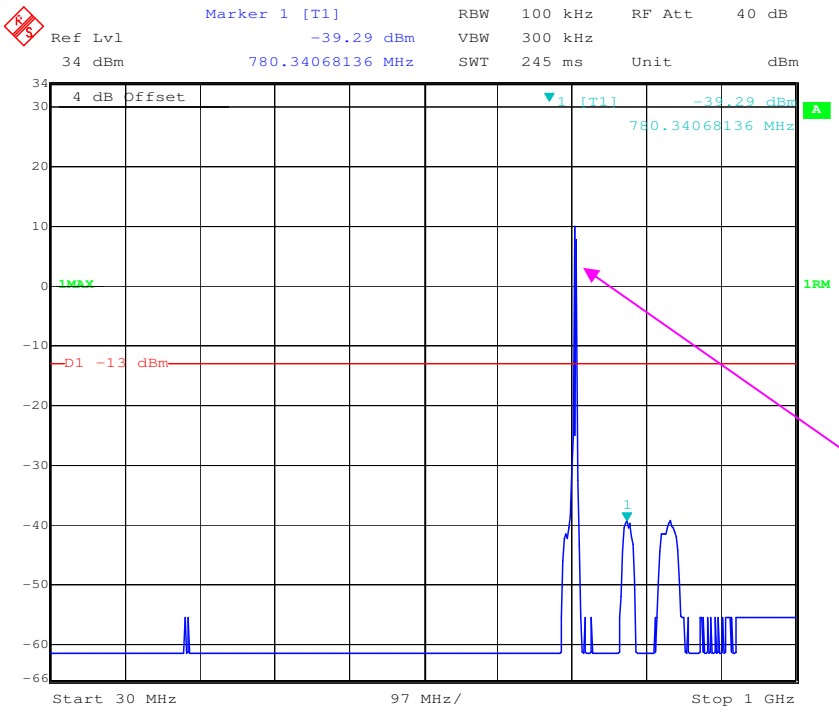

Fundamental test

Date: 5.MAR.2016 18:13:51



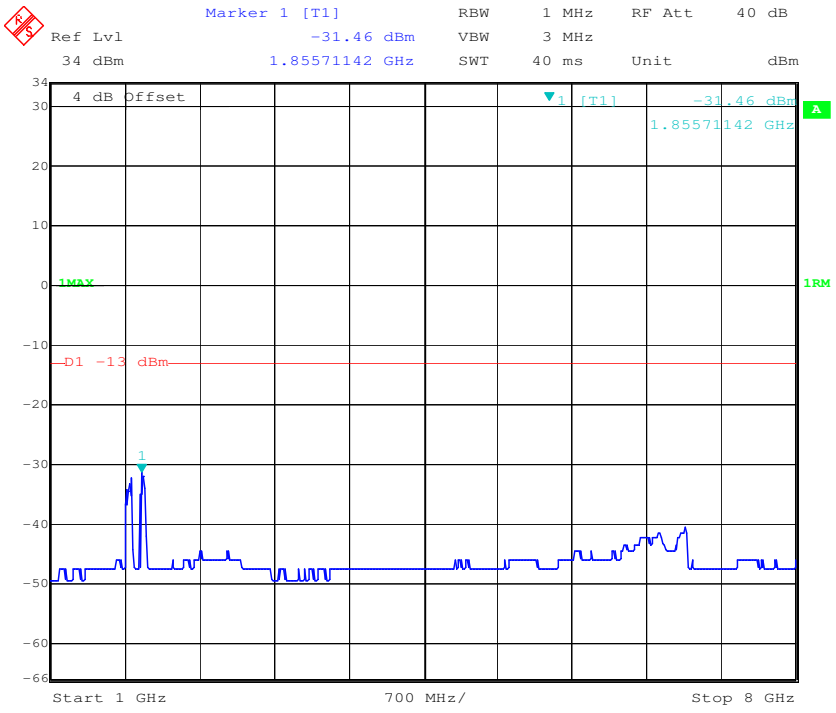

Date: 5.MAR.2016 18:14:18

**Lower 700MHz (A+B+C Block) - AWGN-Pre AGC-High Channel**




Fundamental test

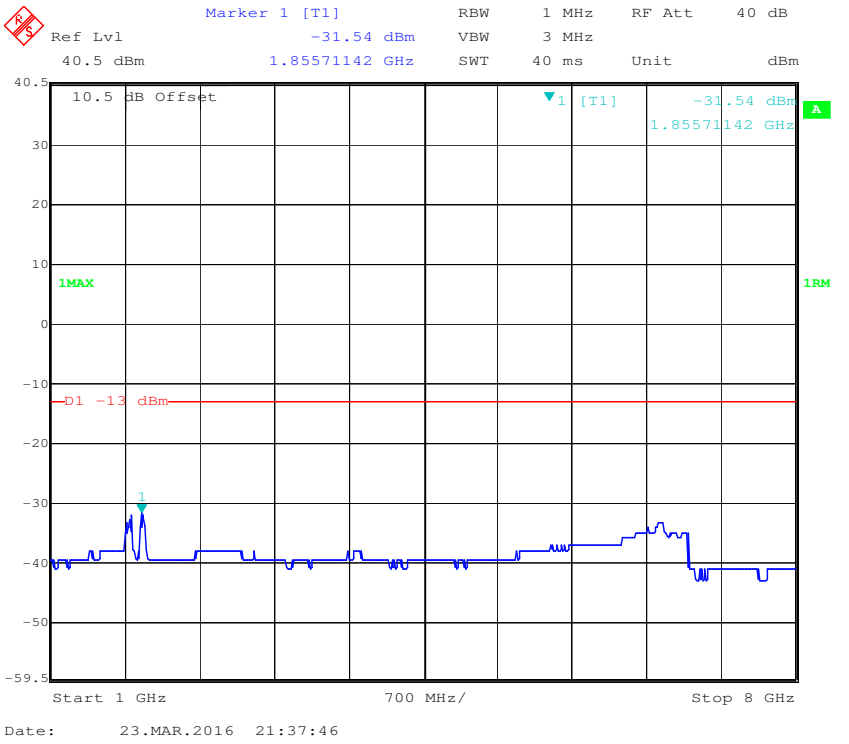
Date: 5.MAR.2016 18:17:39




Date: 5.MAR.2016 18:16:44

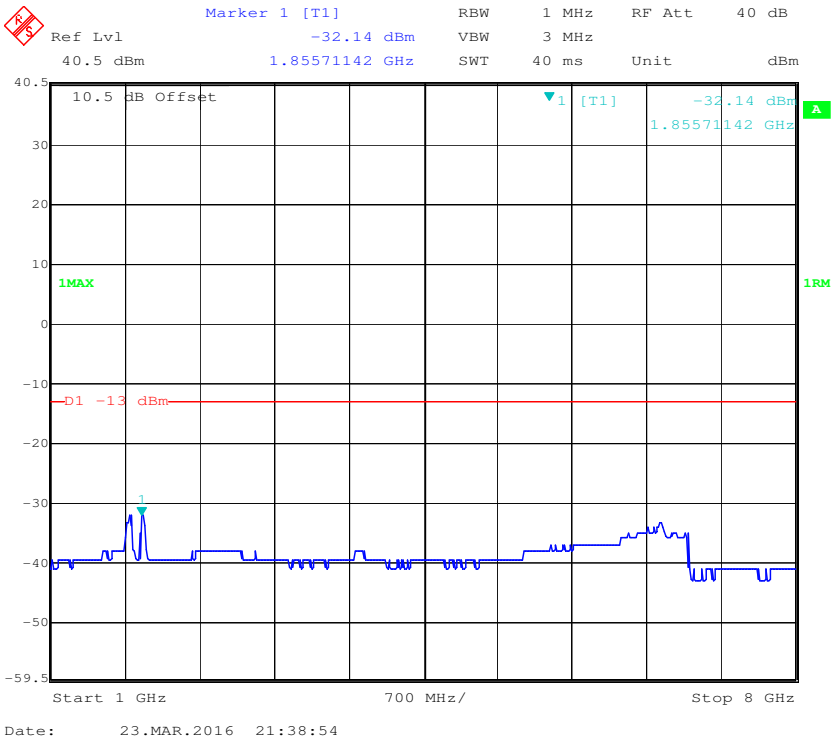
## Lower 700MHz (A+B+C Block) - GSM-Pre AGC-Low Channel


Fundamental test

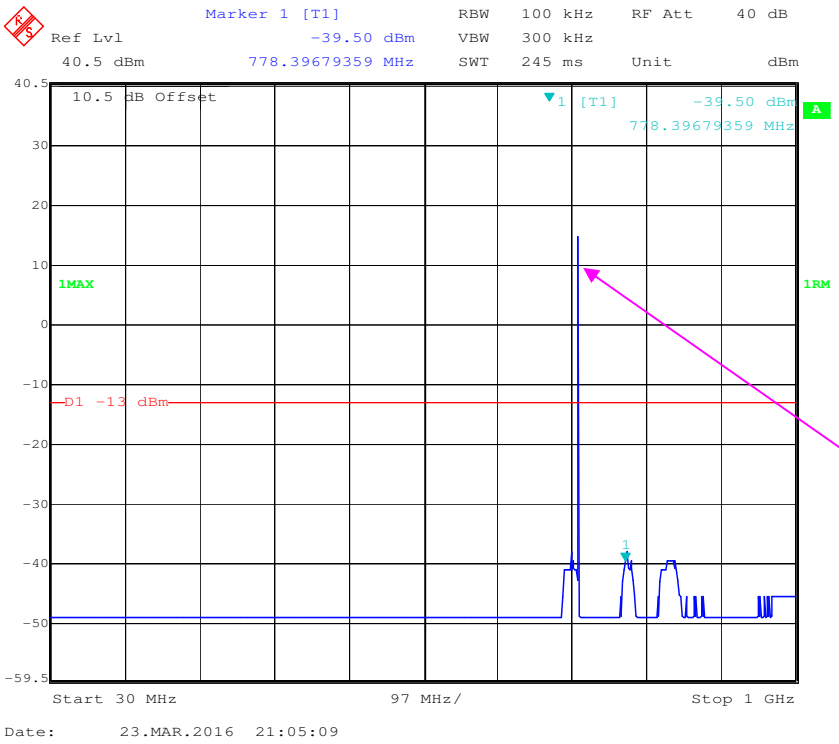


**Lower 700MHz (A+B+C Block) - GSM-Pre AGC-Middle Channel**

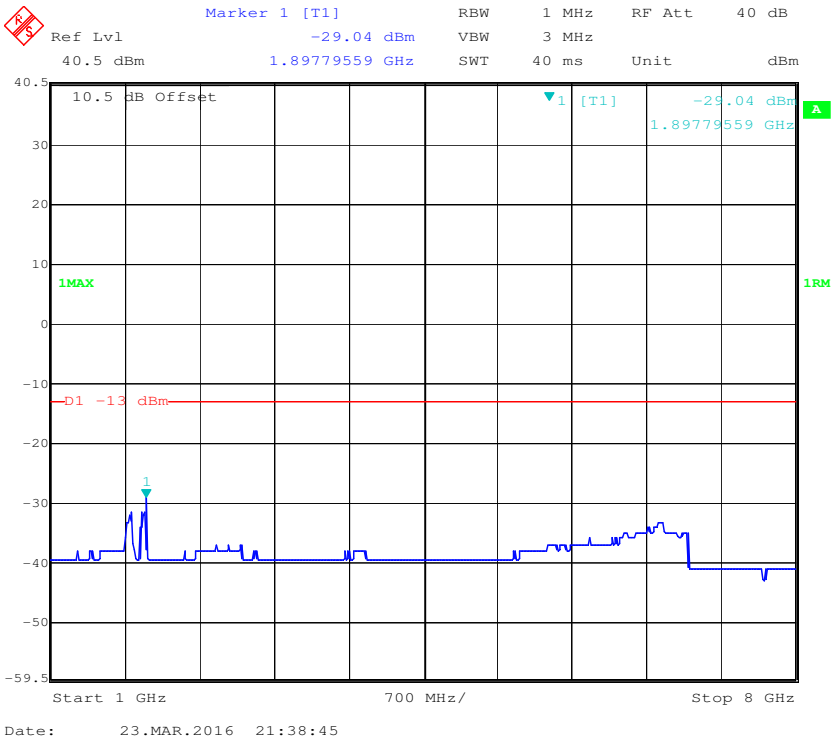

Fundamental test



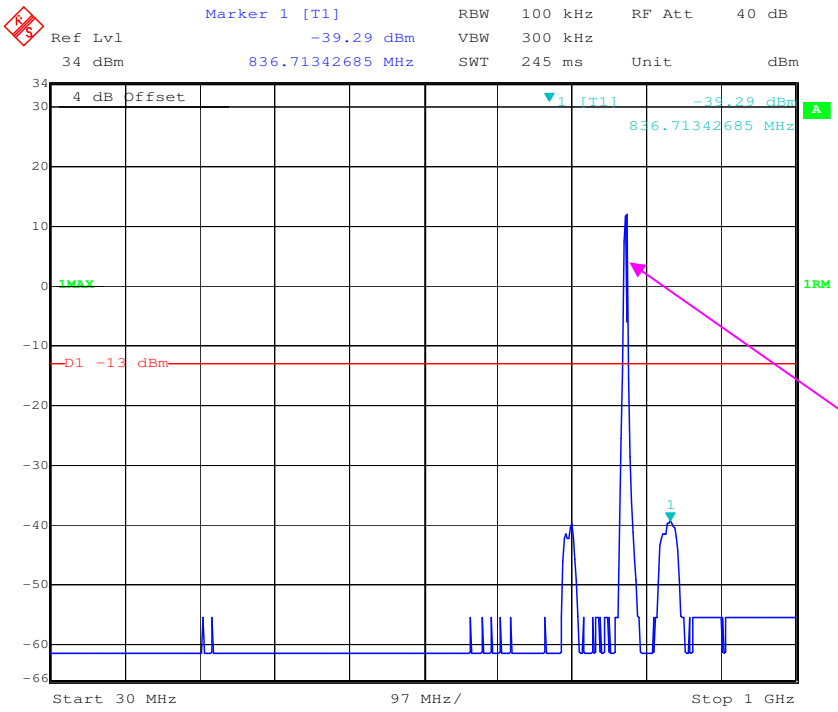
## Lower 700MHz (A+B+C Block) - GSM-Pre AGC-High Channel



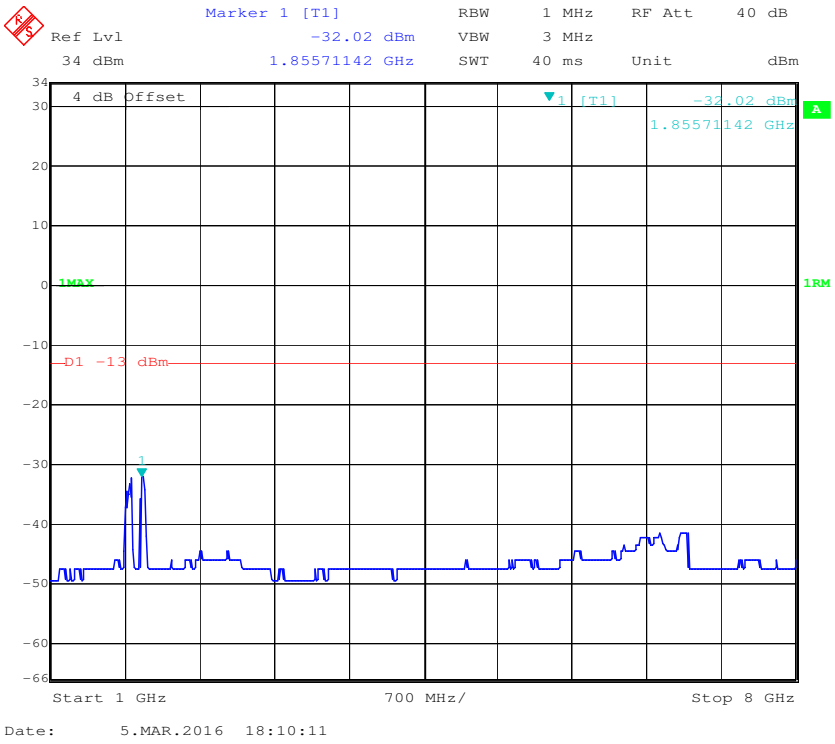

Fundamental test



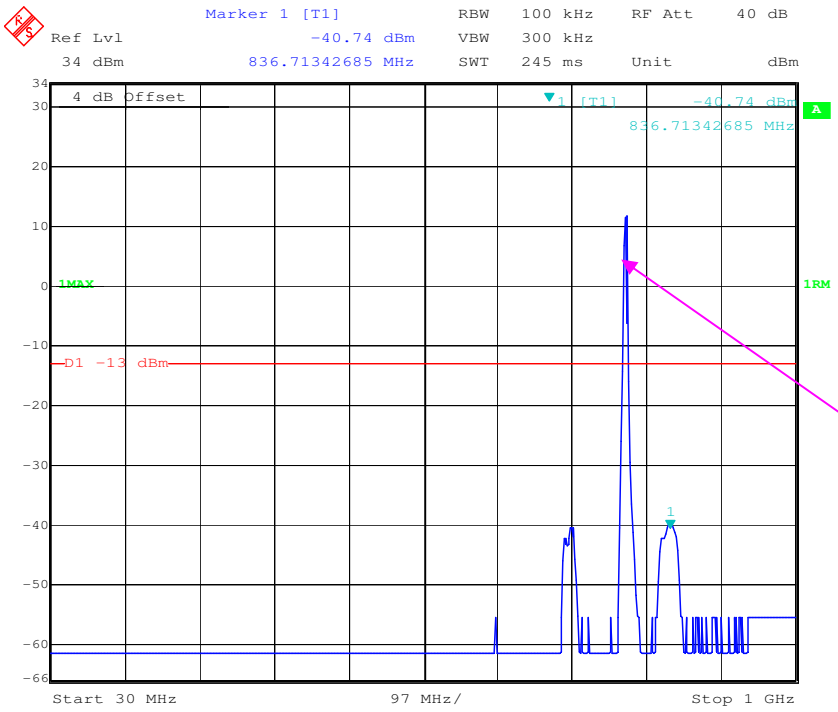
## Upper 700MHz (C Block) - AWGN-Pre AGC-Low Channel



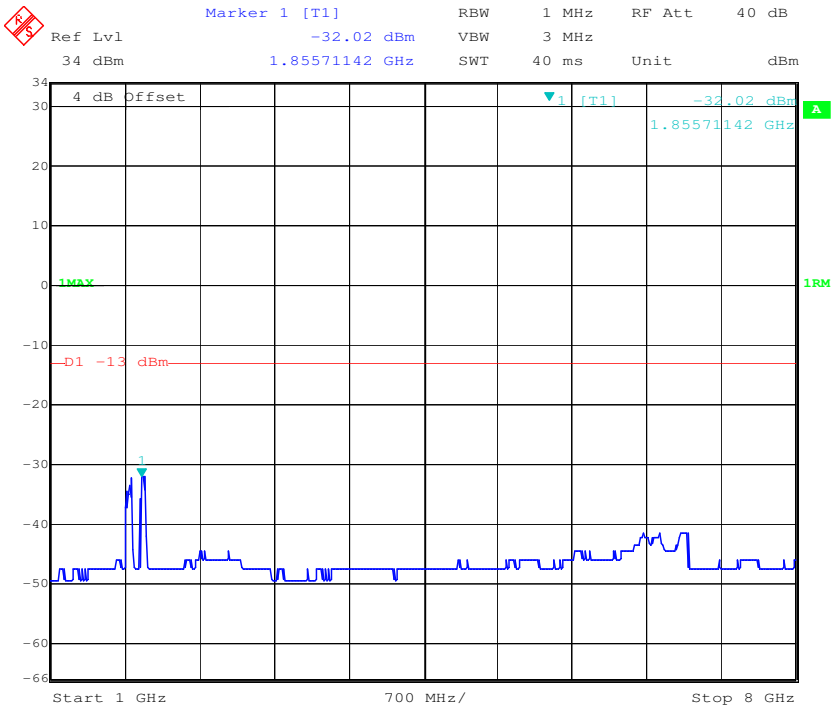

Fundamental test



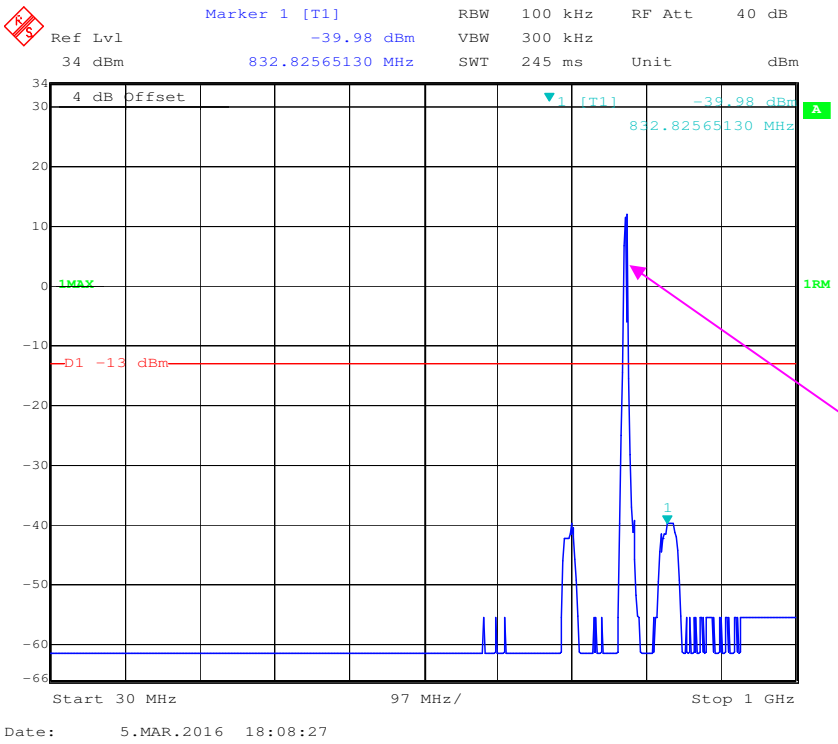
## Upper 700MHz (C Block) - AWGN-Pre AGC-Middle Channel



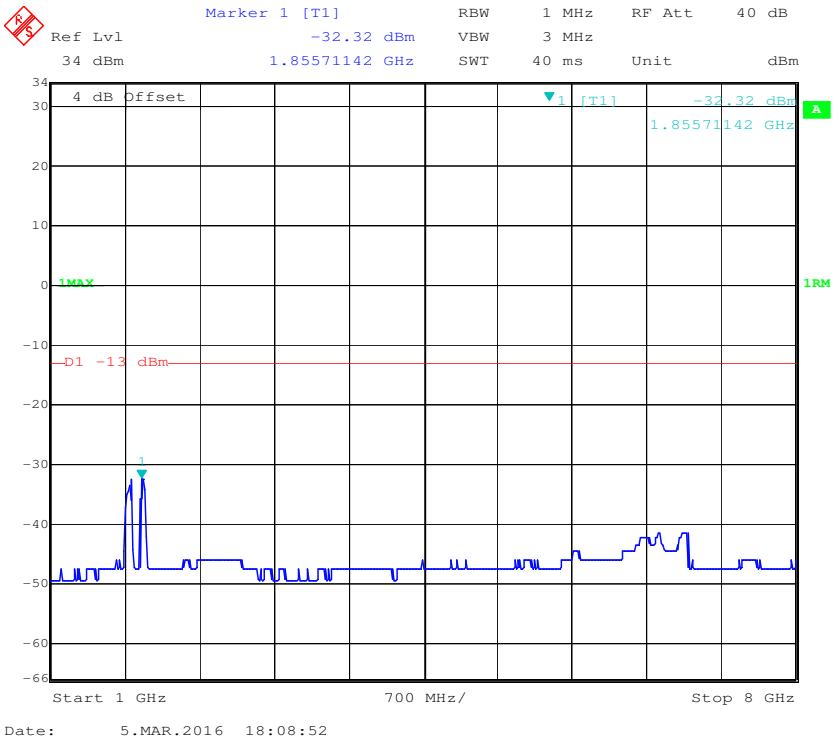

Fundamental test



## Upper 700MHz (C Block) - AWGN-Pre AGC-High Channel

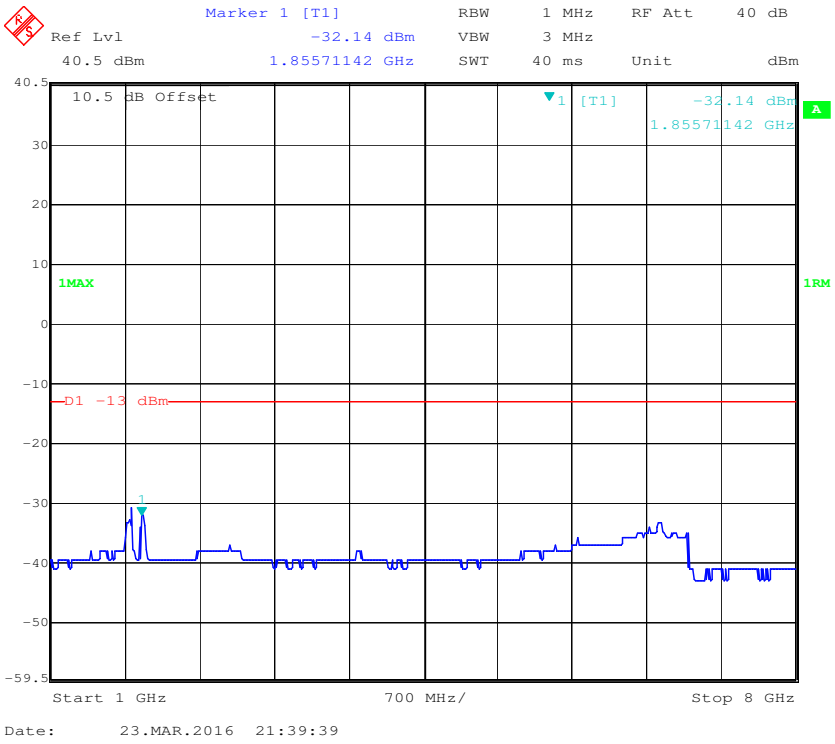



Fundamental test

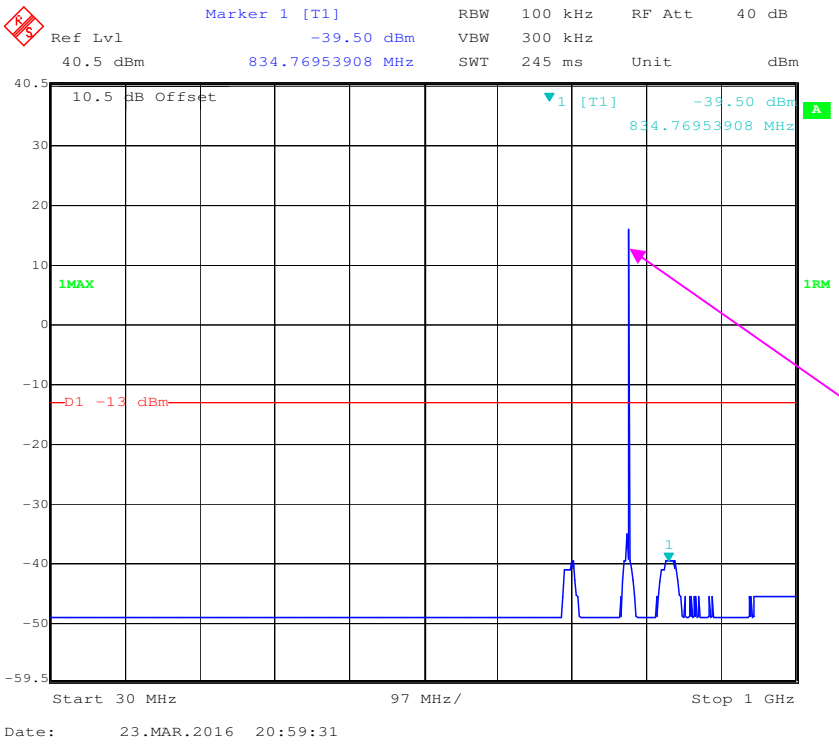


## Upper 700MHz (C Block) - GSM-Pre AGC-Low Channel

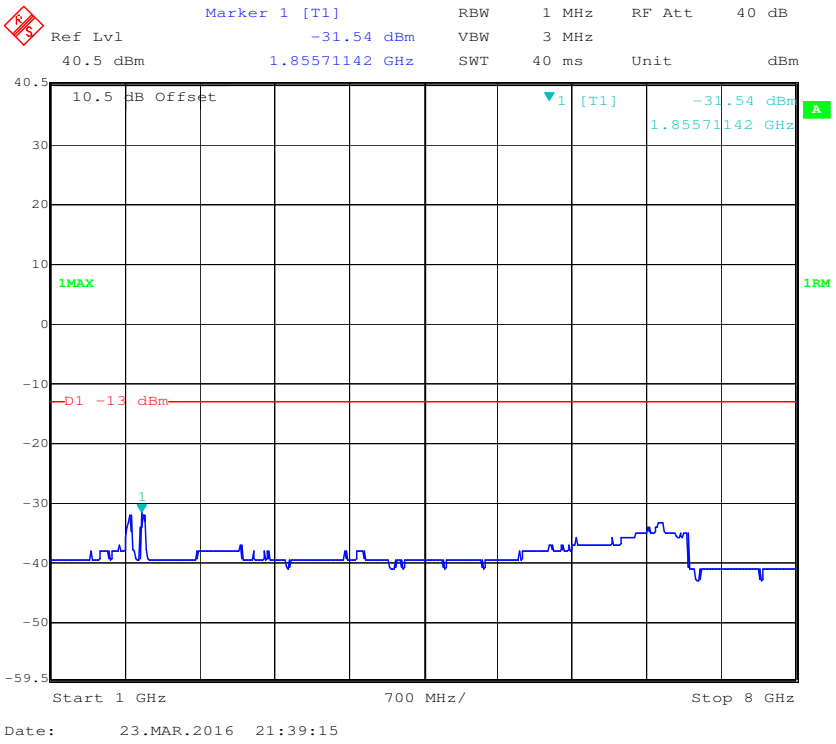

Fundamental test



## Upper 700MHz (C Block) - GSM-Pre AGC-Middle Channel

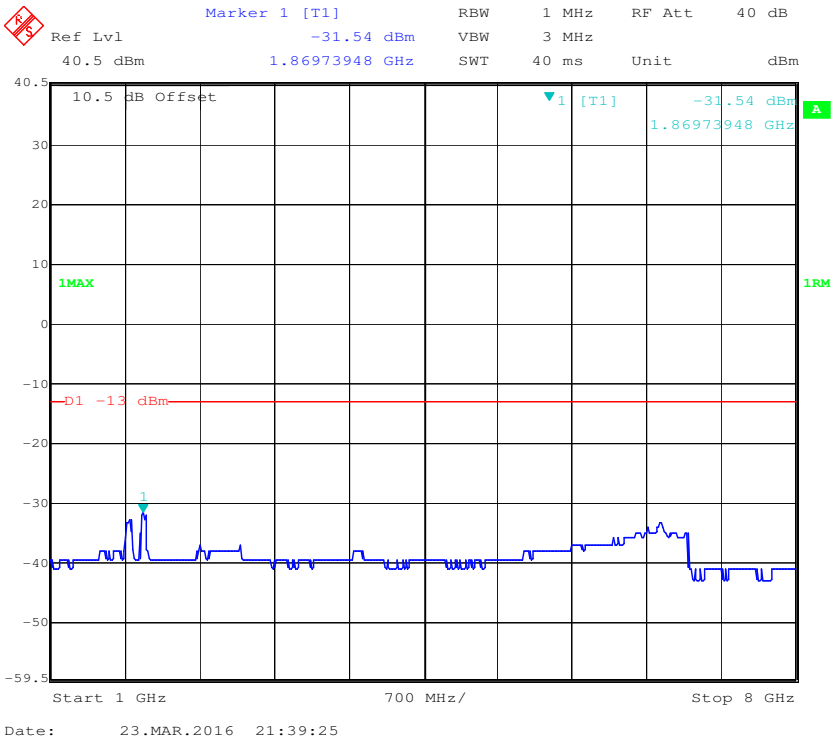



Fundamental test

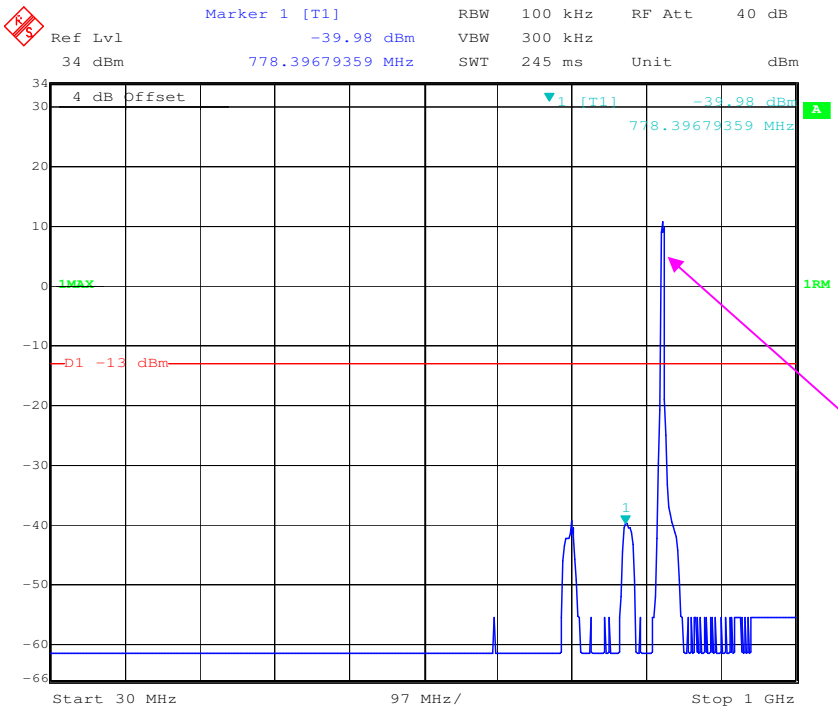


## Upper 700MHz (C Block) - GSM-Pre AGC-High Channel

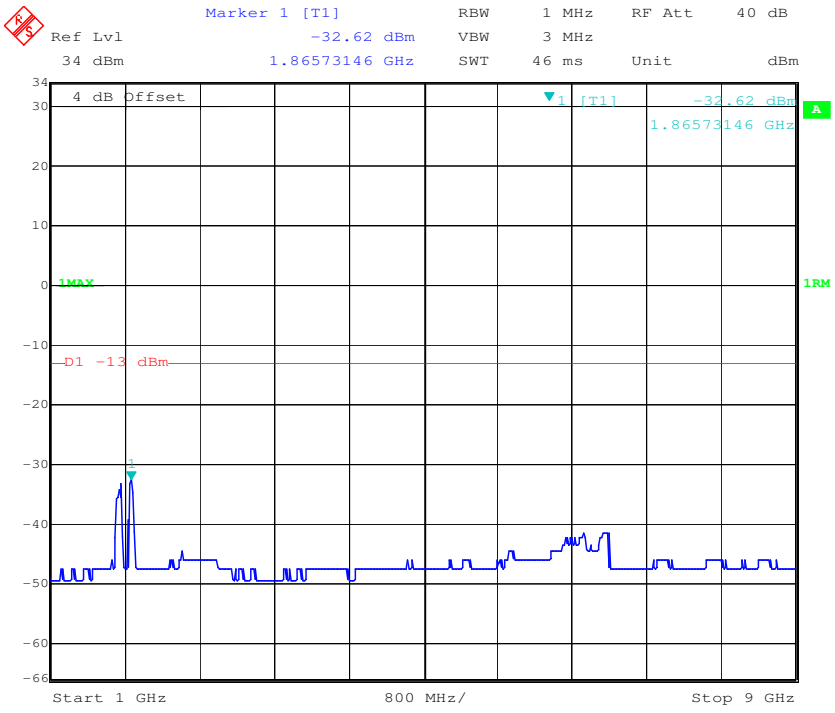

Fundamental test



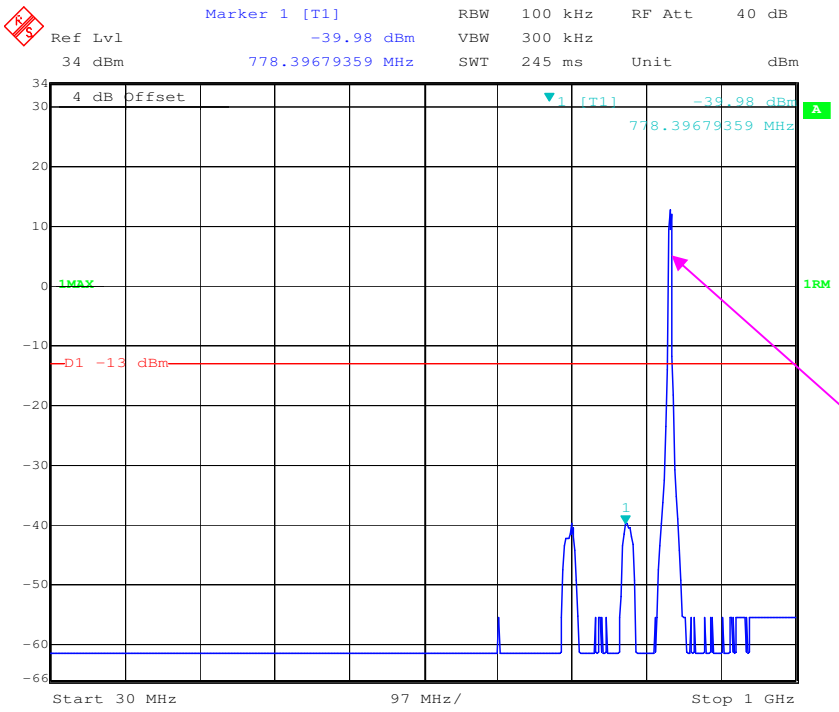
## CELLULAR - AWGN-Pre AGC-Low Channel



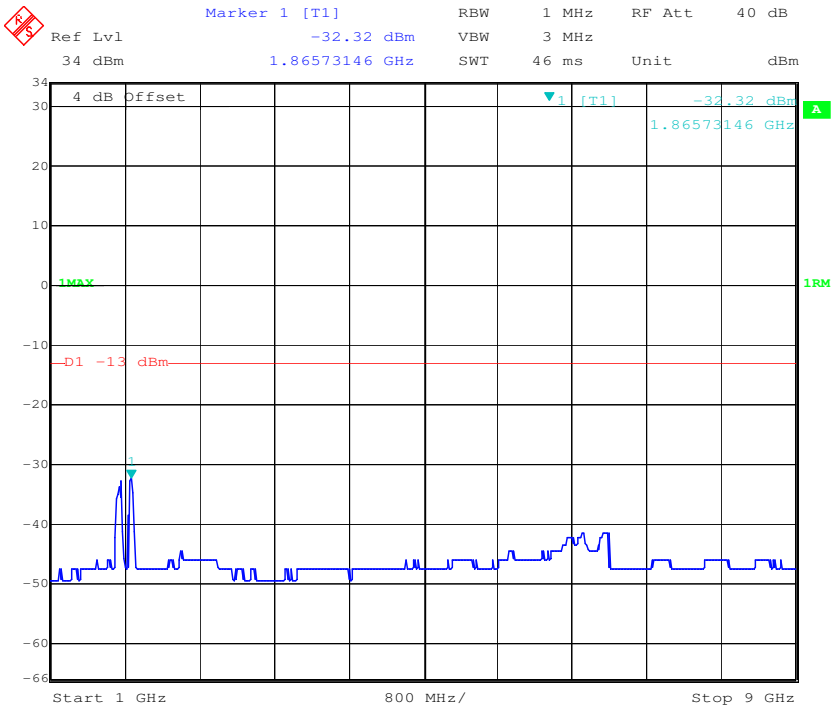

Fundamental test



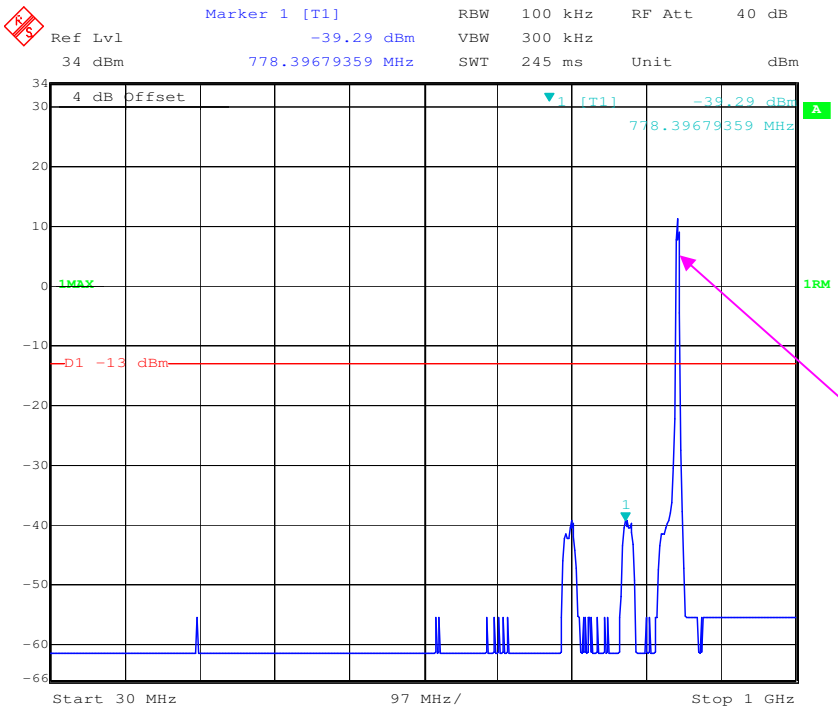
## CELLULAR - AWGN-Pre AGC-Middle Channel



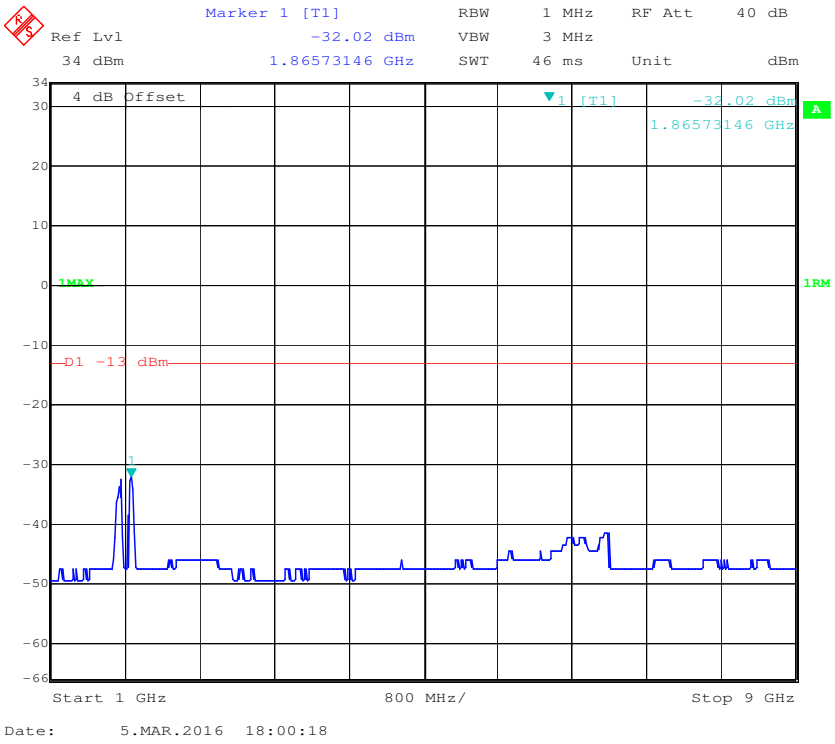

Fundamental test



## CELLULAR - AWGN-Pre AGC-High Channel

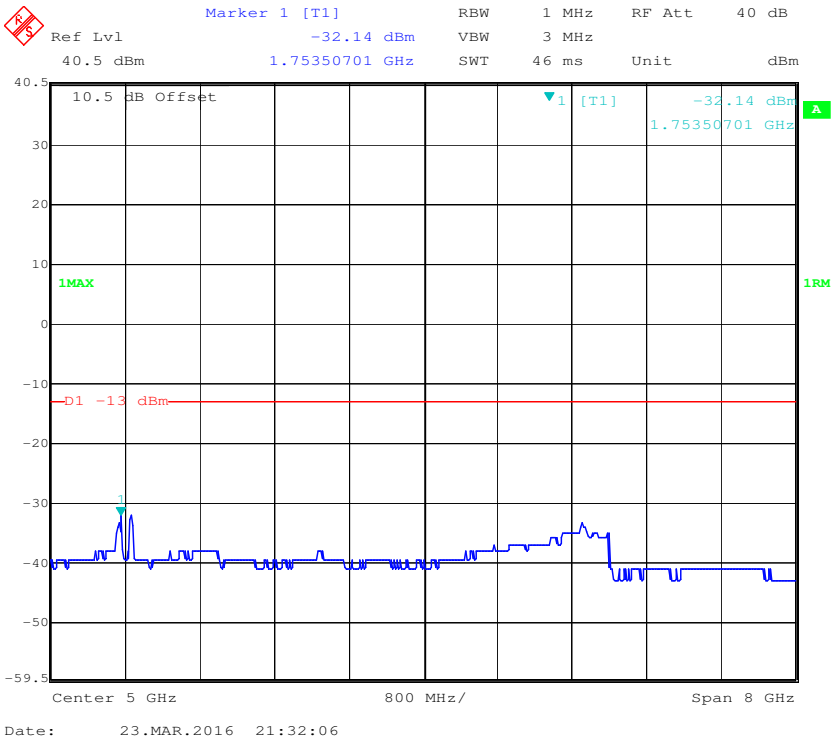



Fundamental test



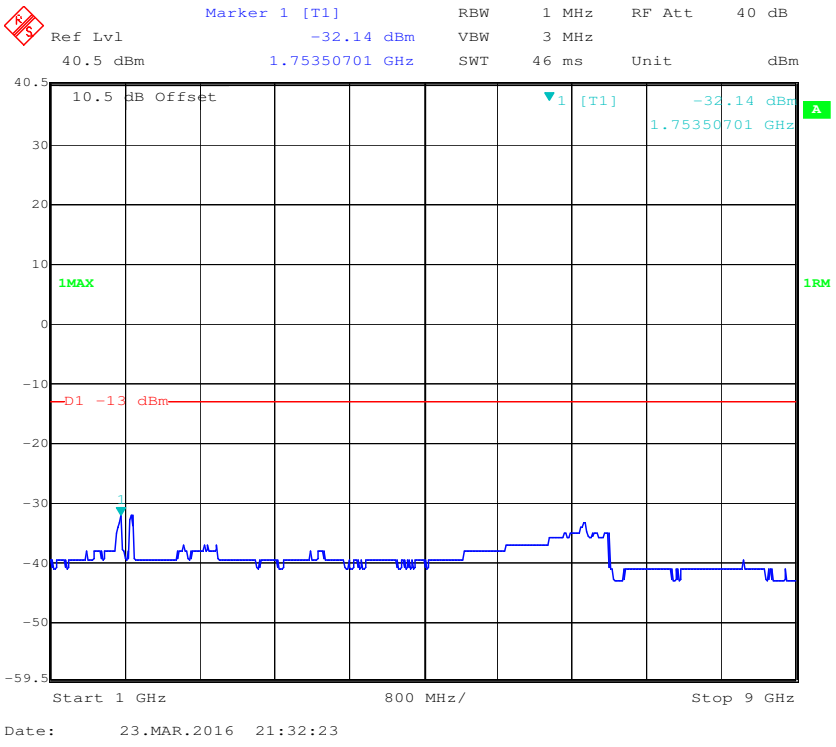
## CELLULAR - GSM-Pre AGC-Low Channel


Fundamental test

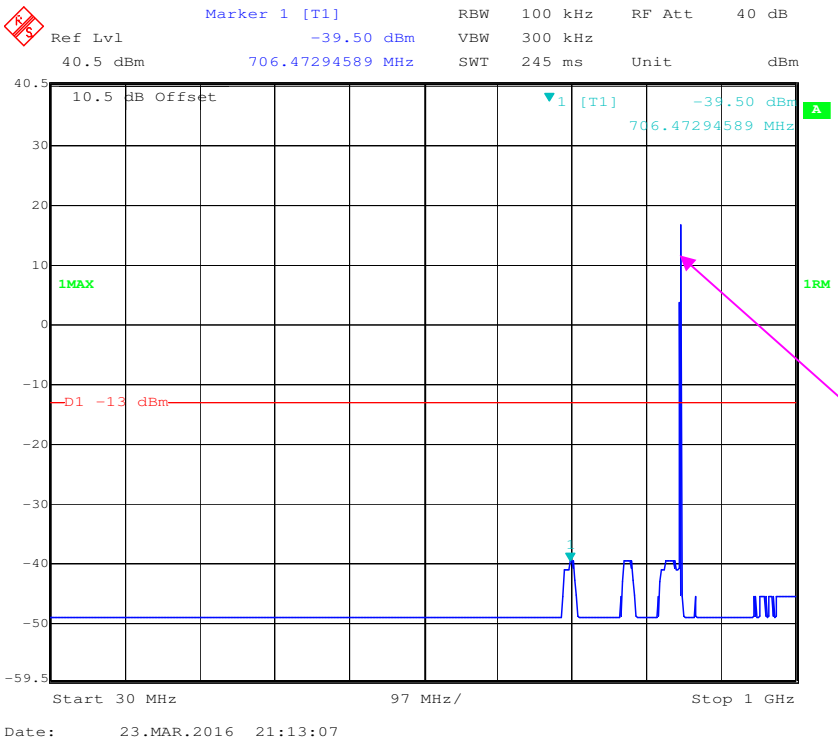


## CELLULAR - GSM-Pre AGC-Middle Channel

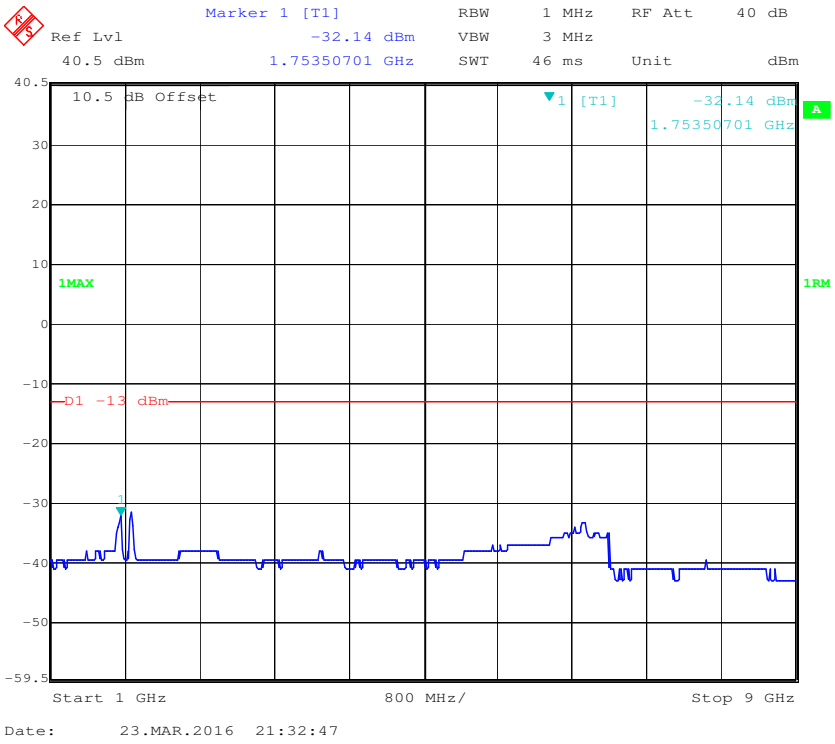

Fundamental test



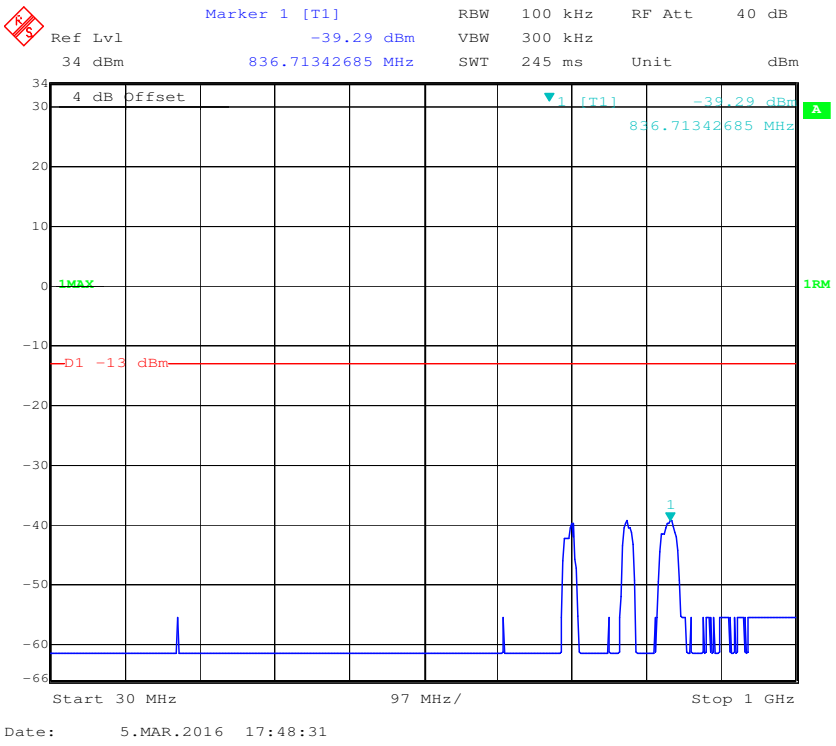
## CELLULAR - GSM-Pre AGC-High Channel

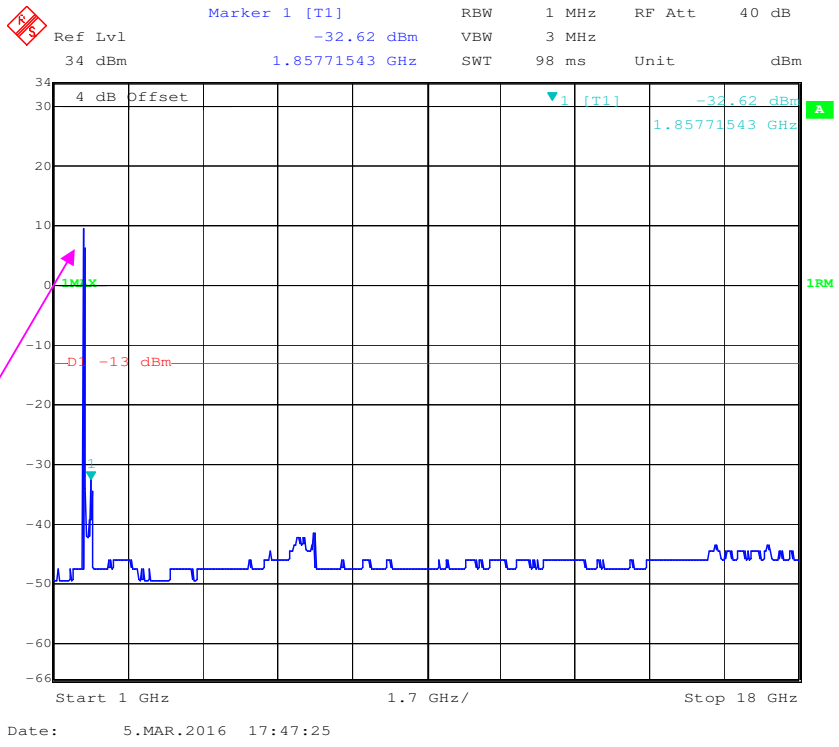



Fundamental test



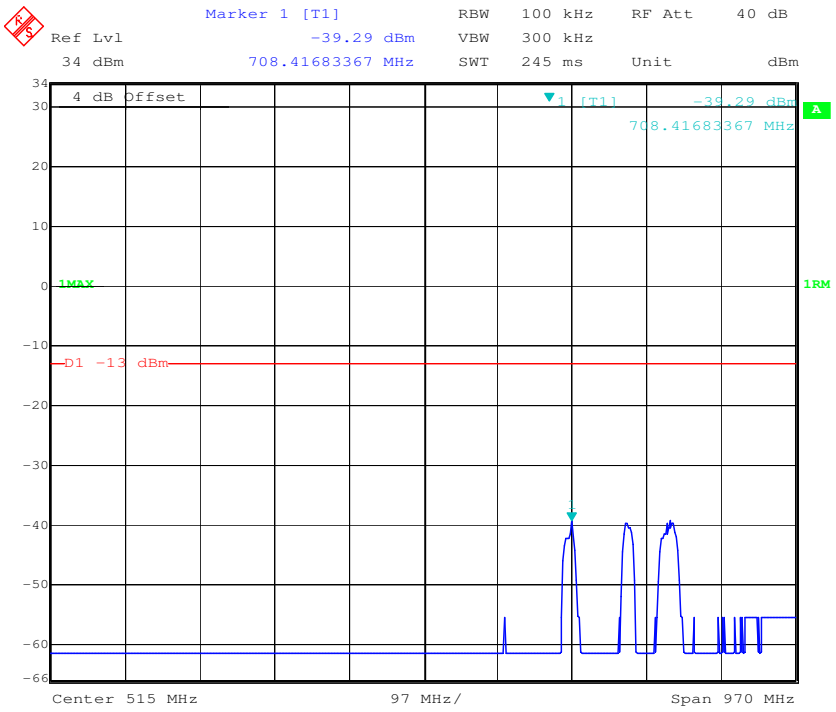
## PCS- AWGN-Pre AGC-Low Channel

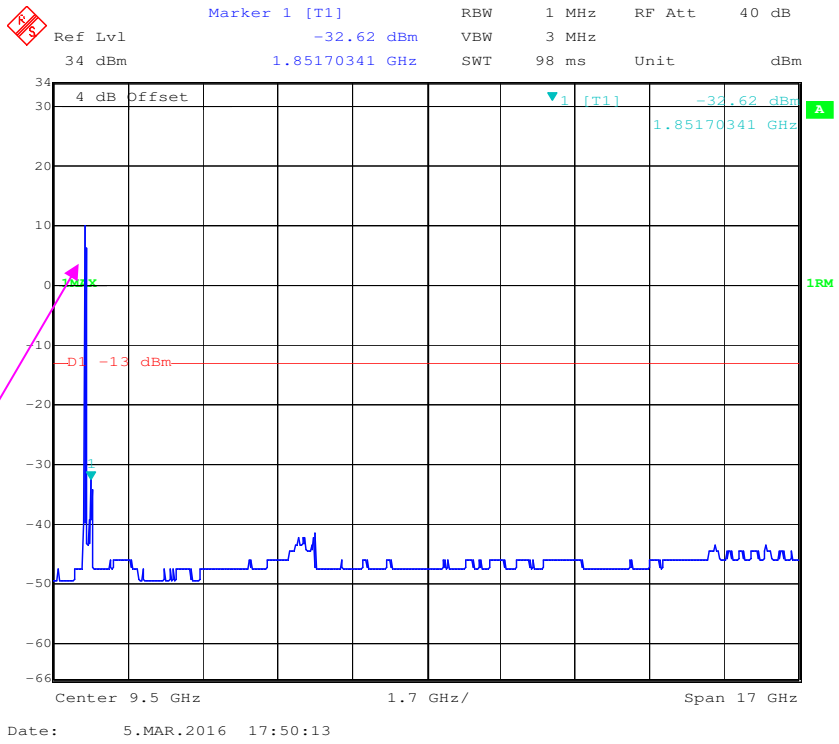



Fundamental test

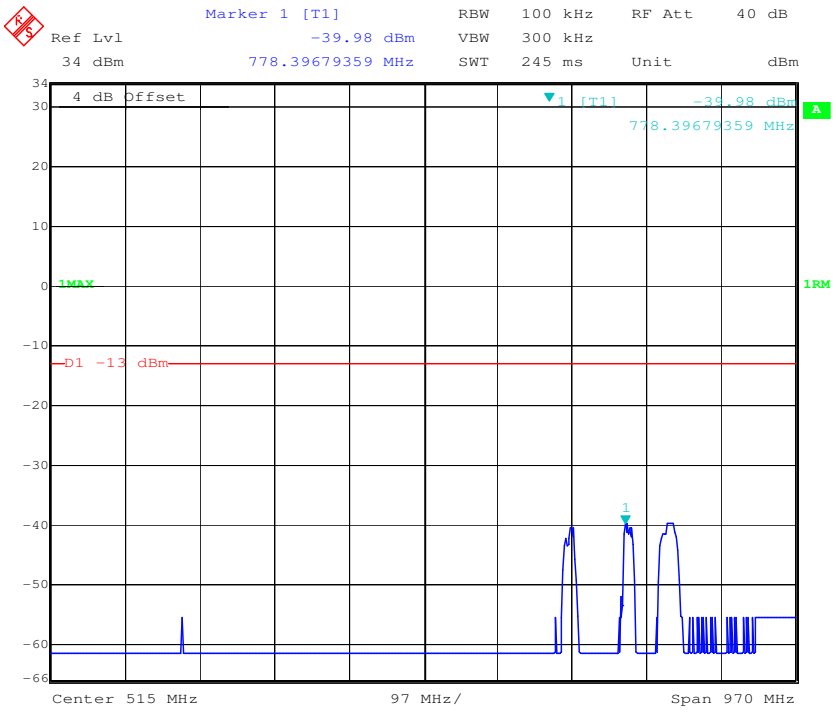
## PCS- AWGN-Pre AGC-Middle Channel

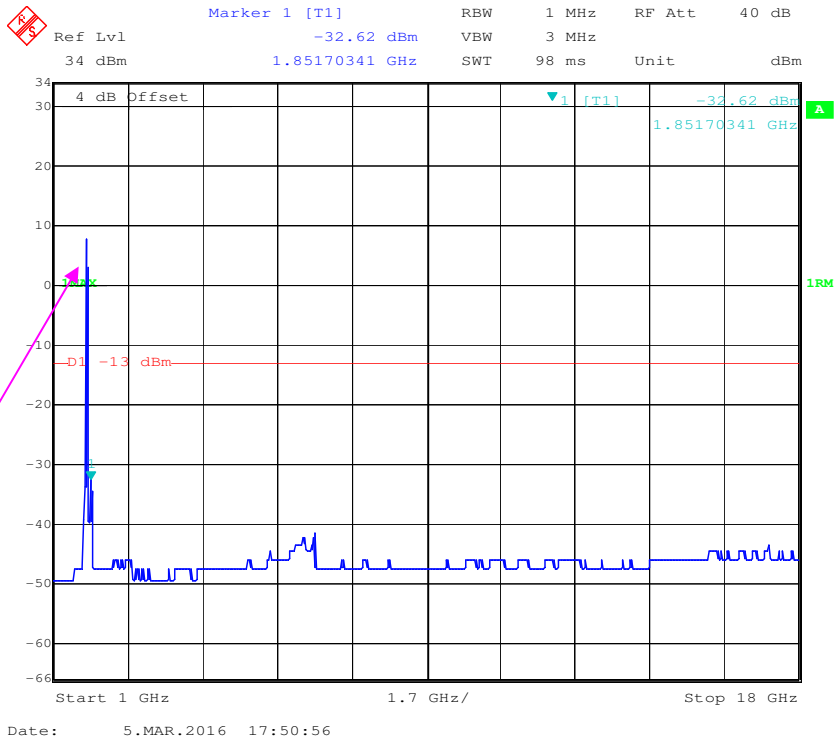



Fundamental test

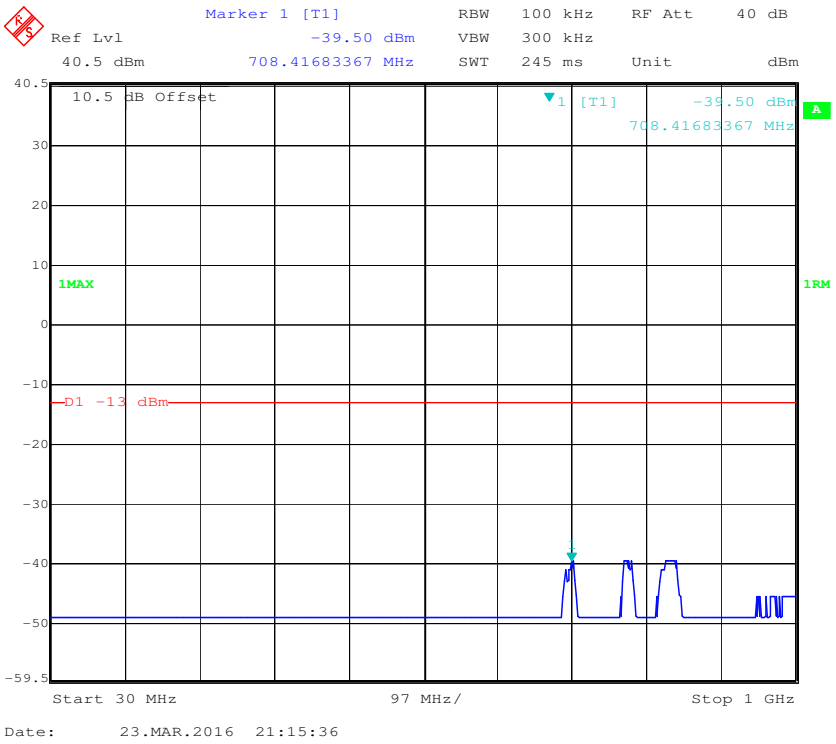
## PCS- AWGN-Pre AGC-High Channel

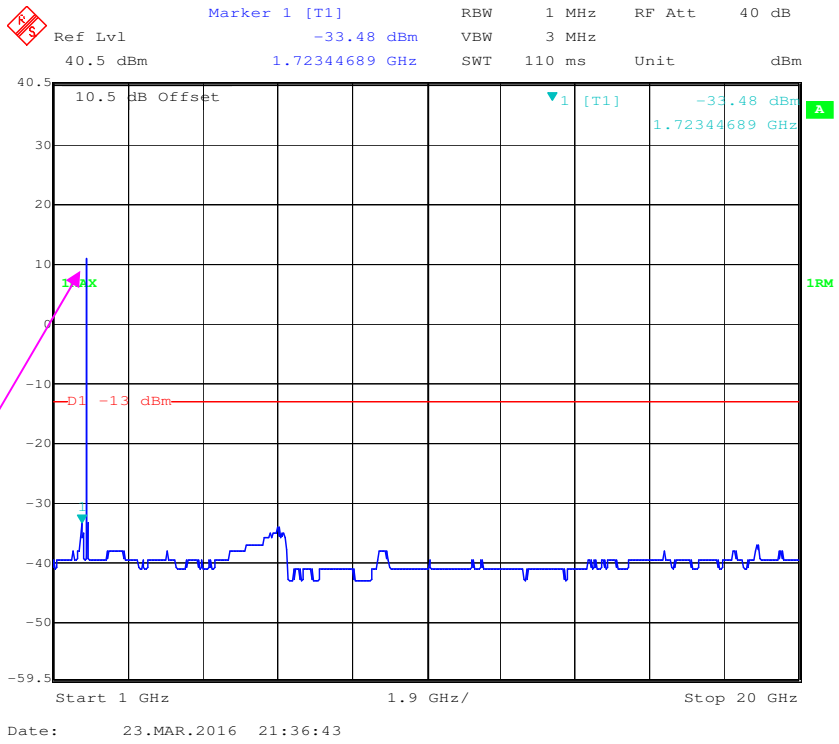



Fundamental test

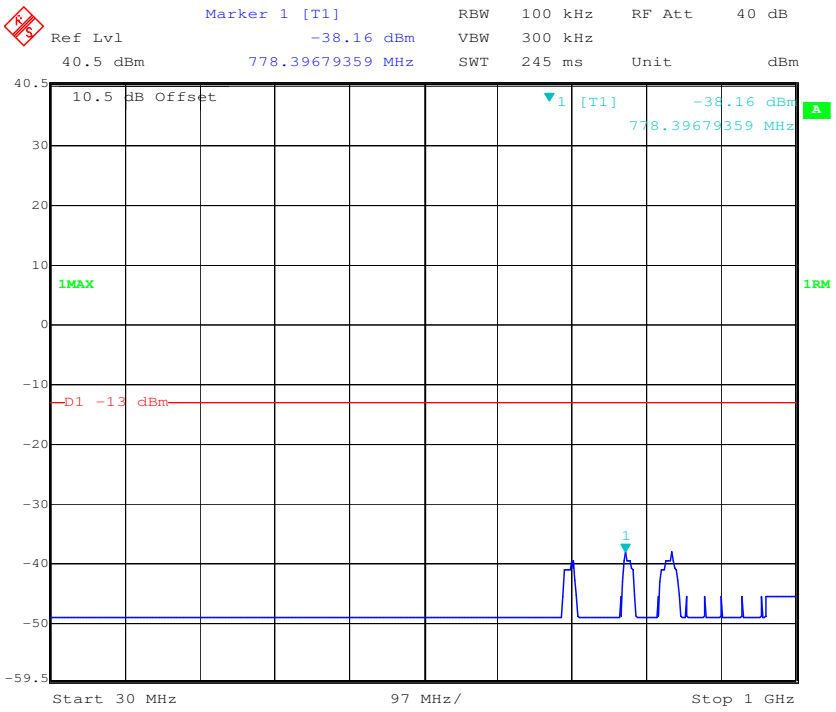
## PCS- GSM-Pre AGC-Low Channel

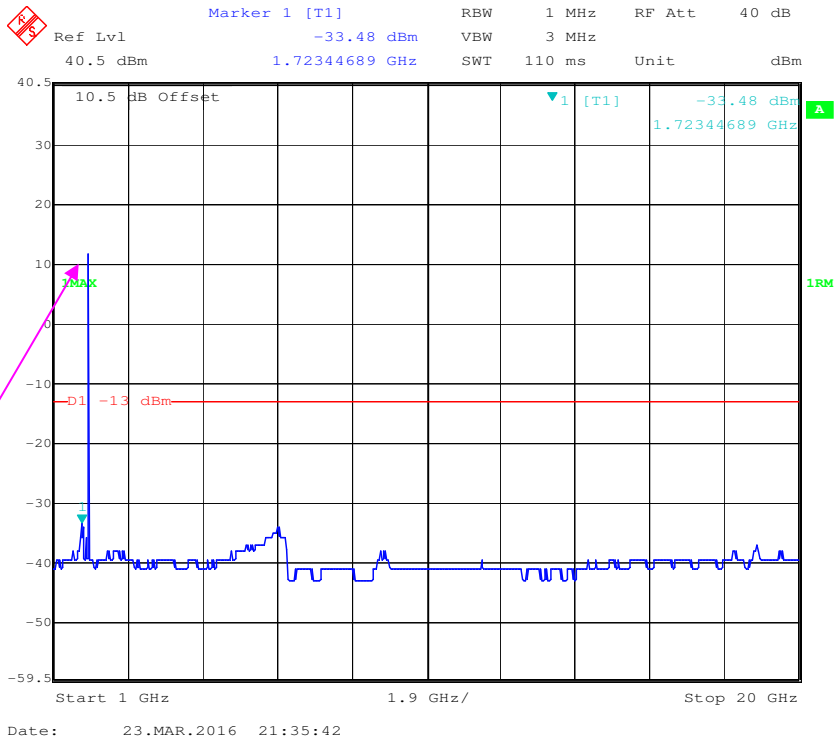



Fundamental test

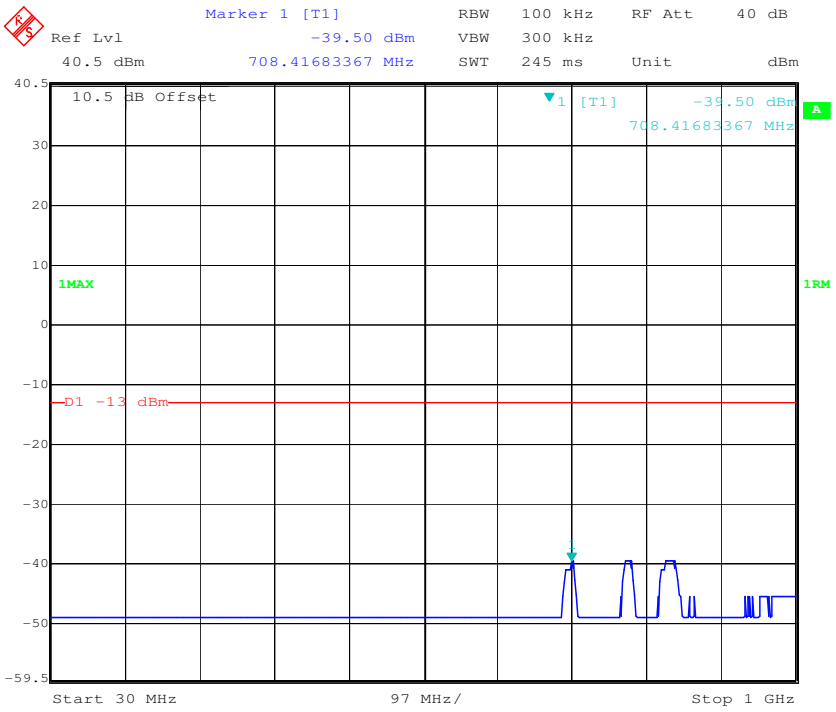
## PCS- GSM-Pre AGC-Middle Channel

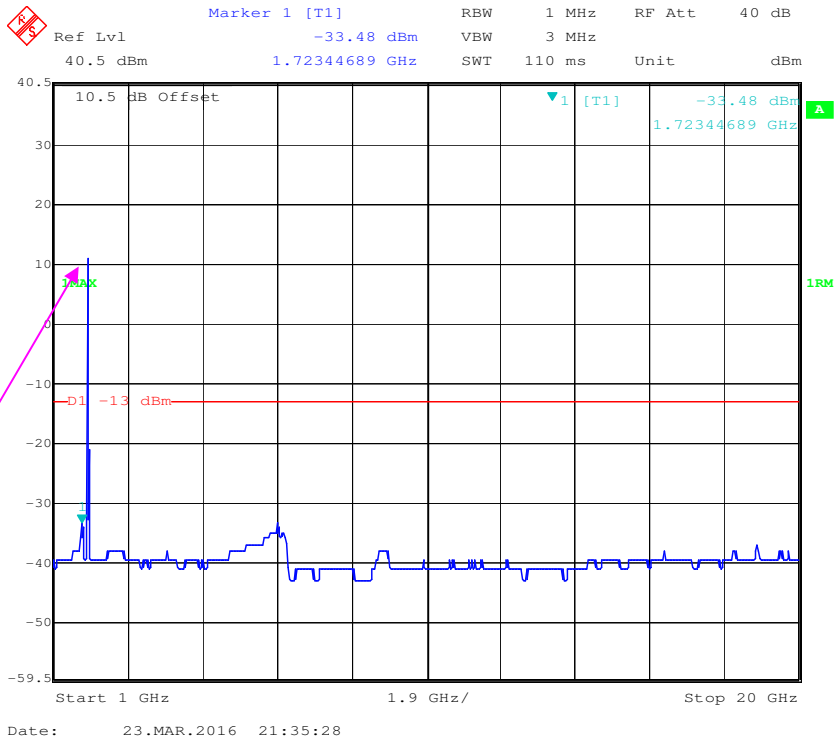



Fundamental test

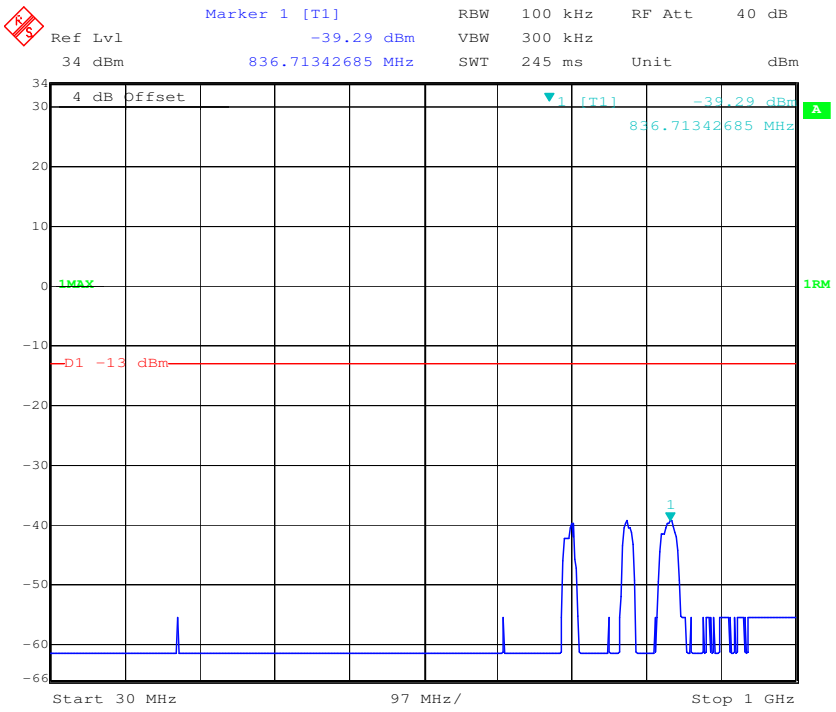
## PCS- GSM-Pre AGC-High Channel



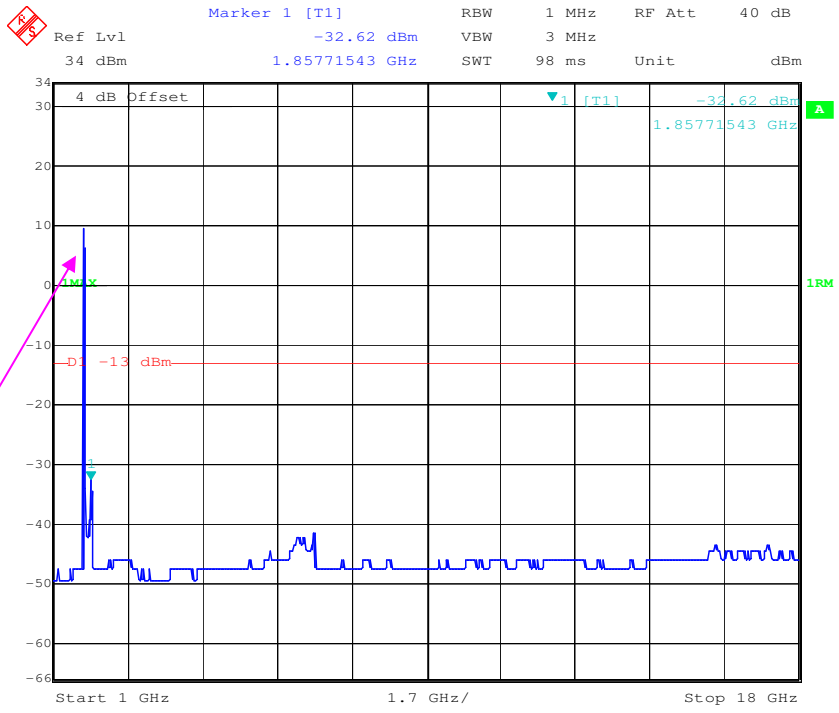




Fundamental test

## AWS - AWGN-Pre AGC-Low Channel



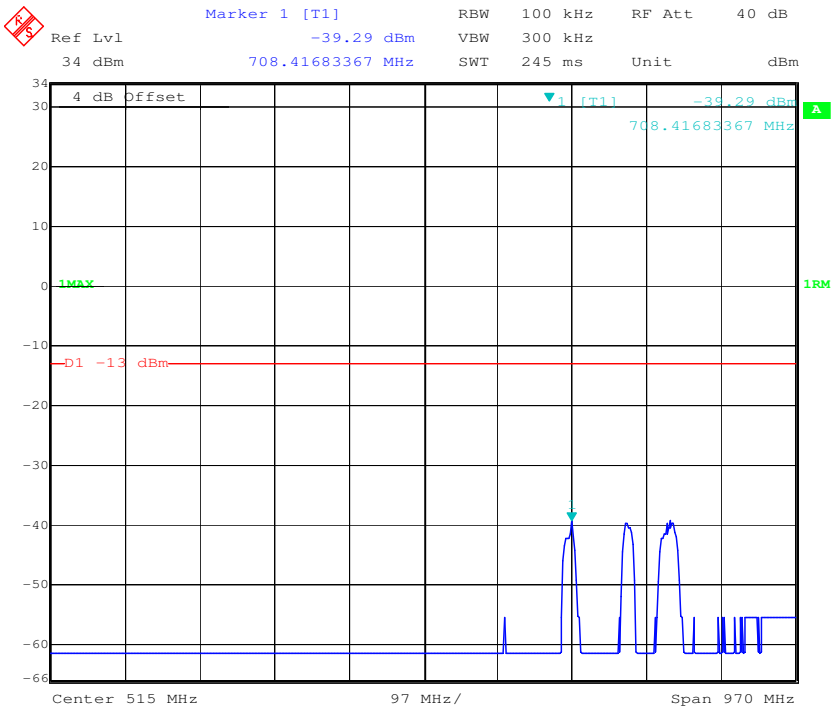

Date: 5.MAR.2016 17:48:31

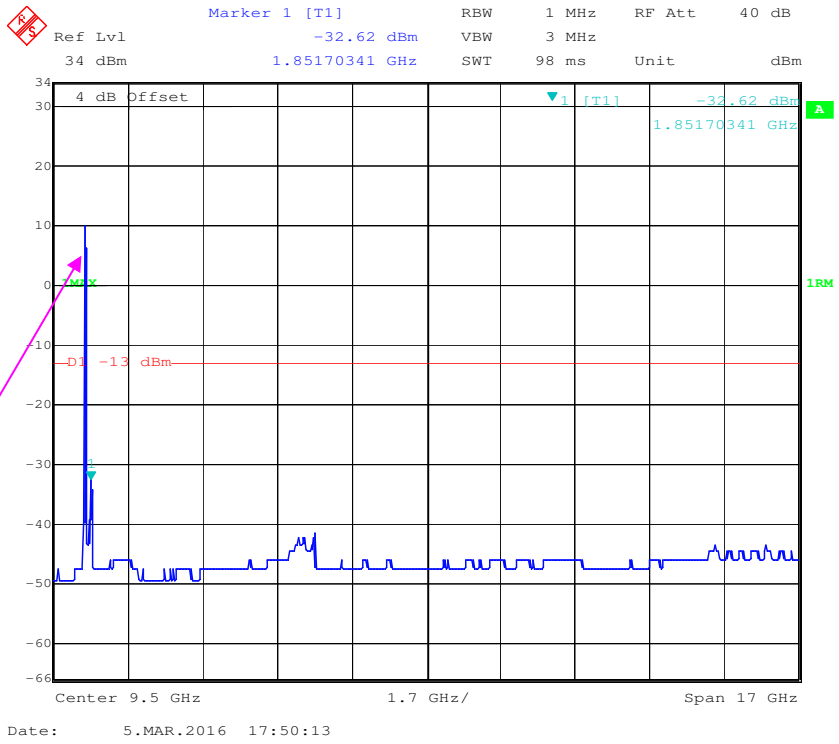



Fundamental test

Date: 5.MAR.2016 17:47:25

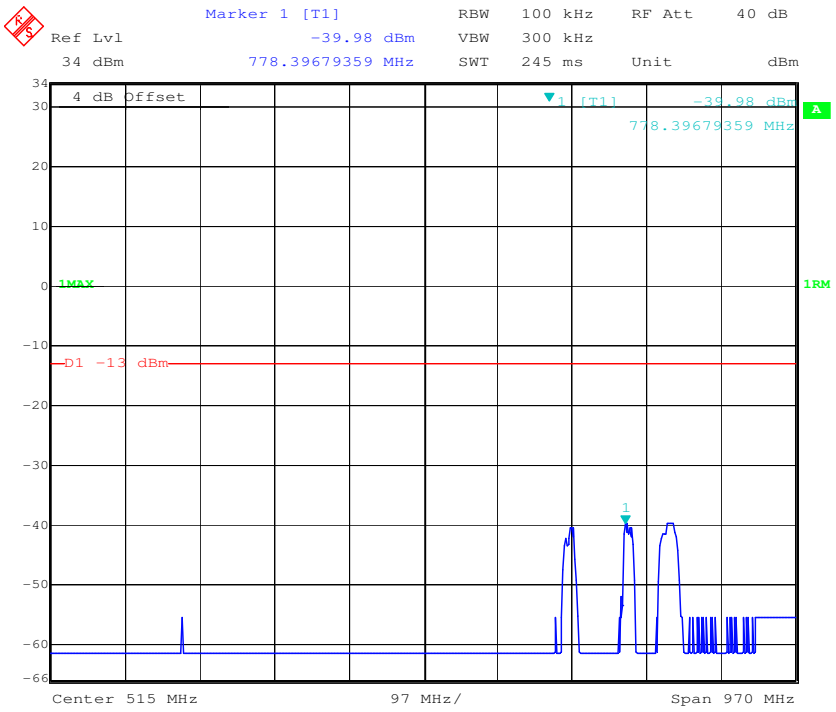
**AWS- AWGN-Pre AGC-Middle Channel**

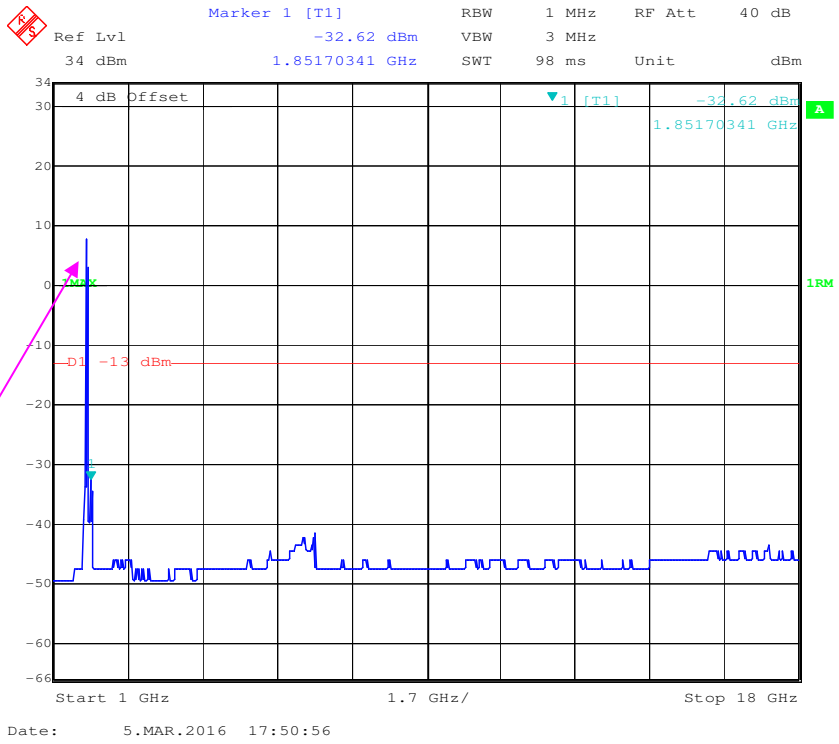



Fundamental test

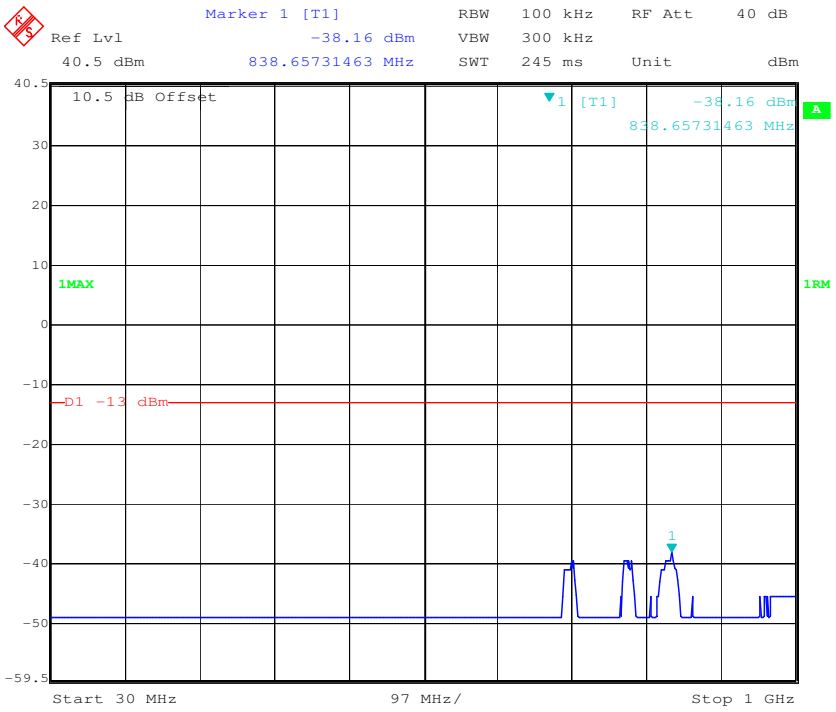
## AWS- AWGN-Pre AGC-High Channel

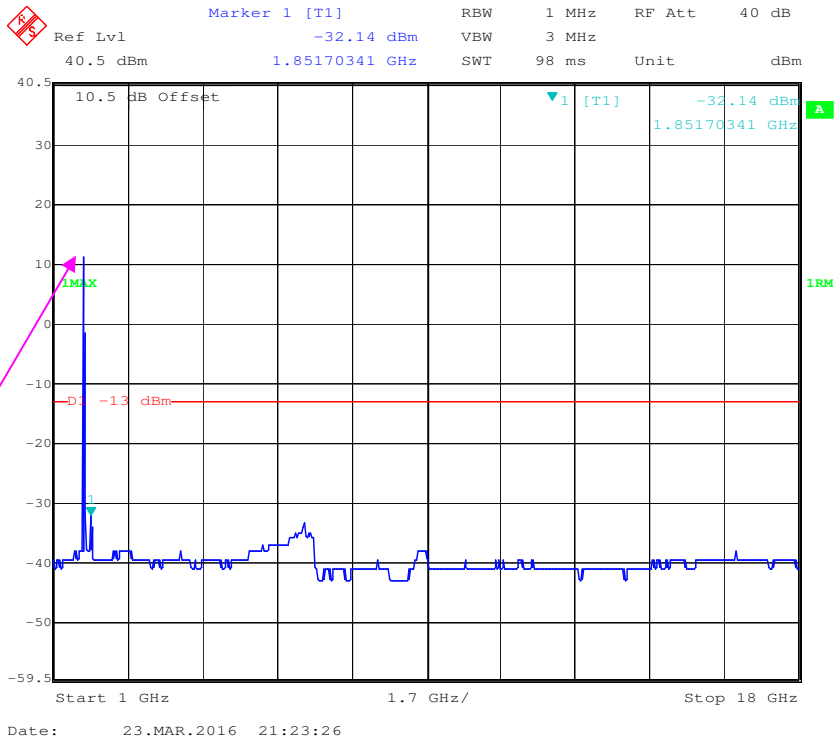



Fundamental test

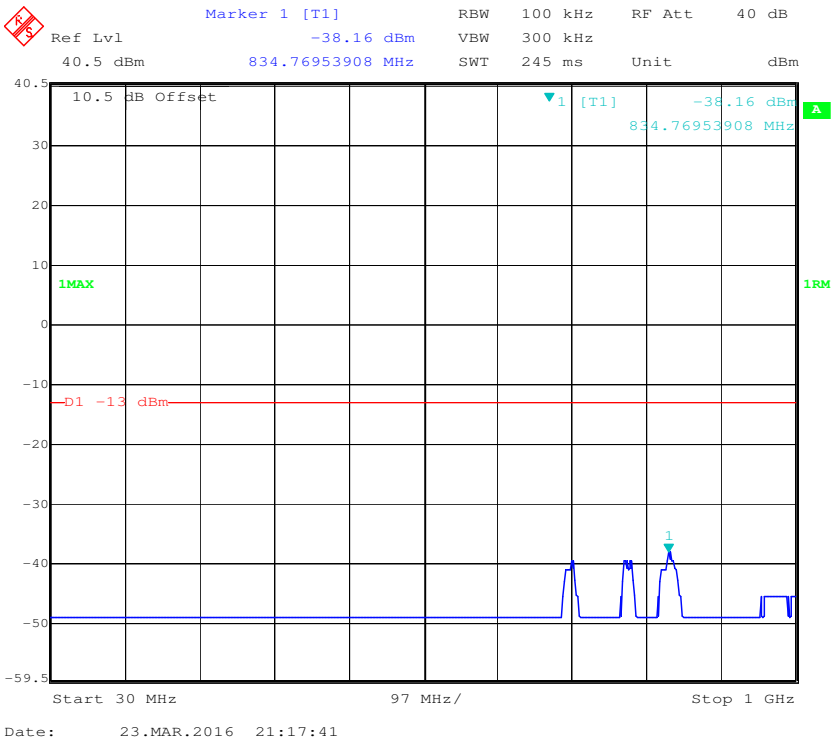
## AWS- GSM-Pre AGC-Low Channel

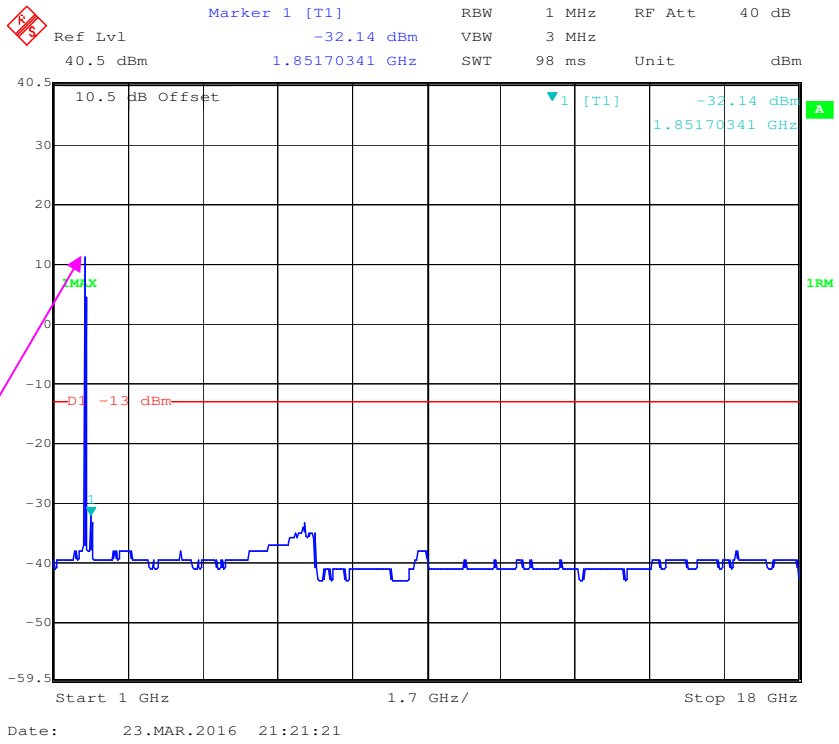



Fundamental test

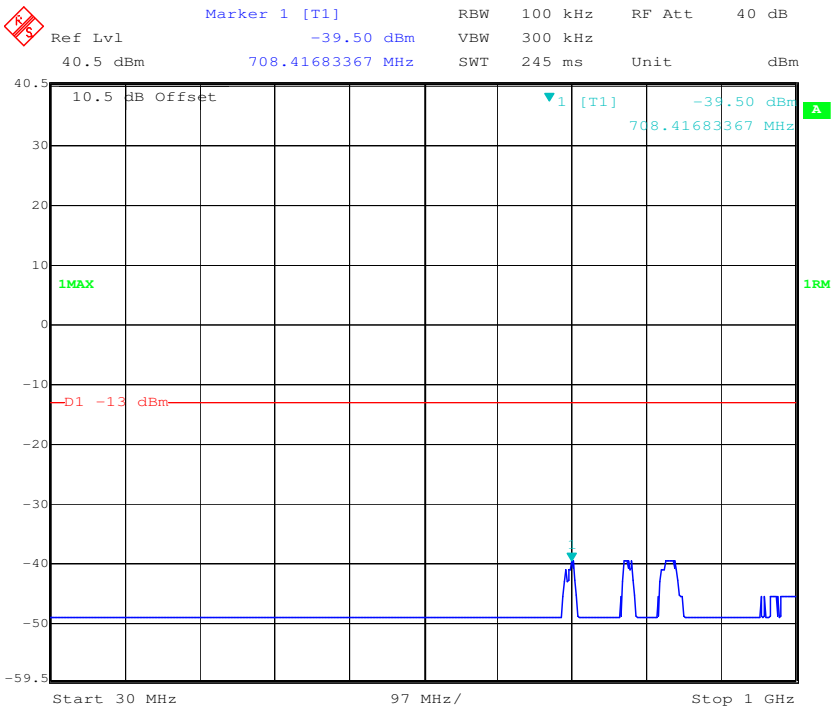
## AWS- GSM-Pre AGC-Middle Channel

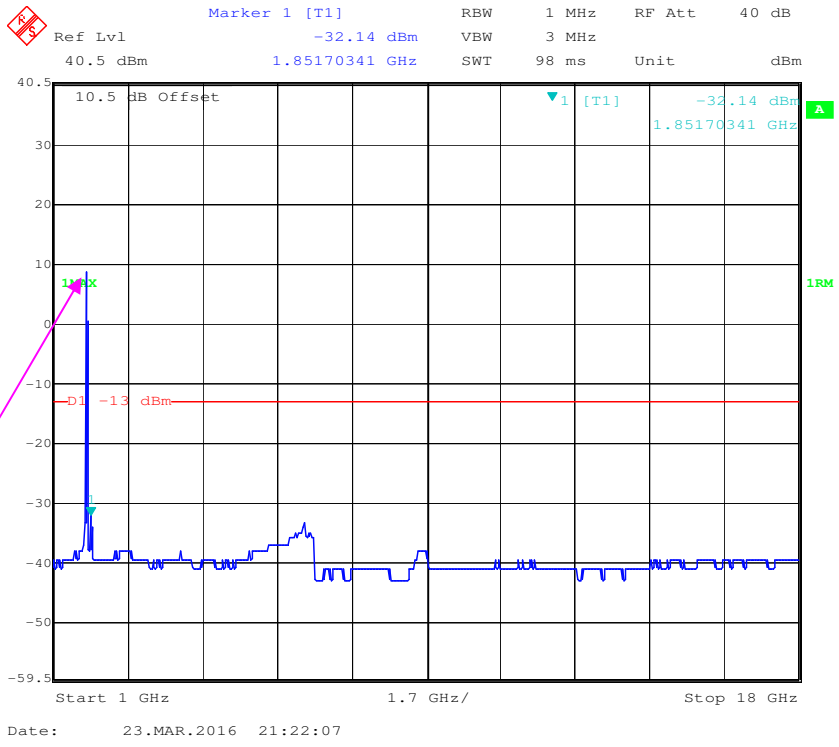



Fundamental test

## AWS- GSM-Pre AGC-High Channel

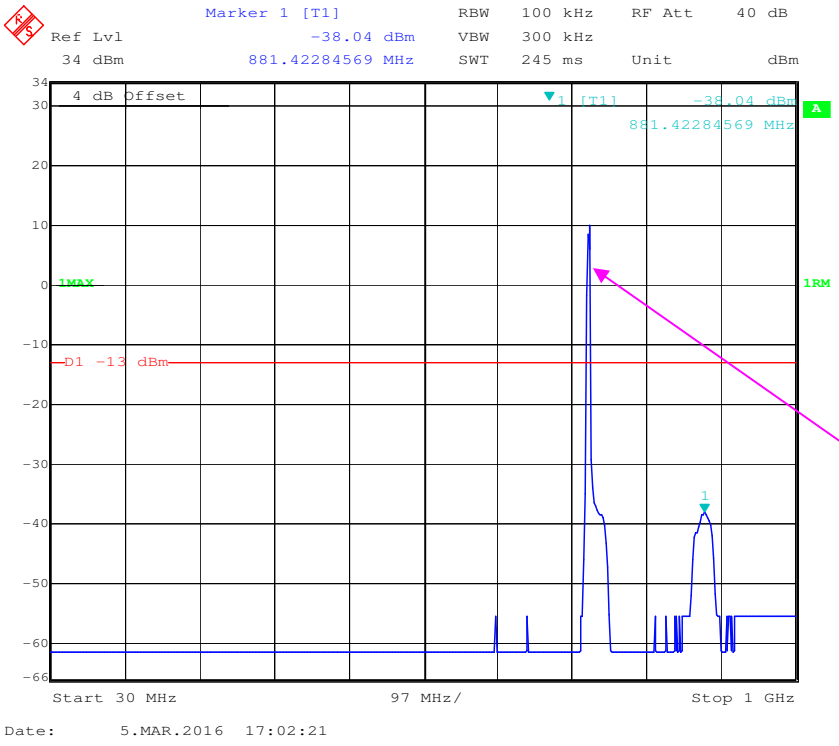


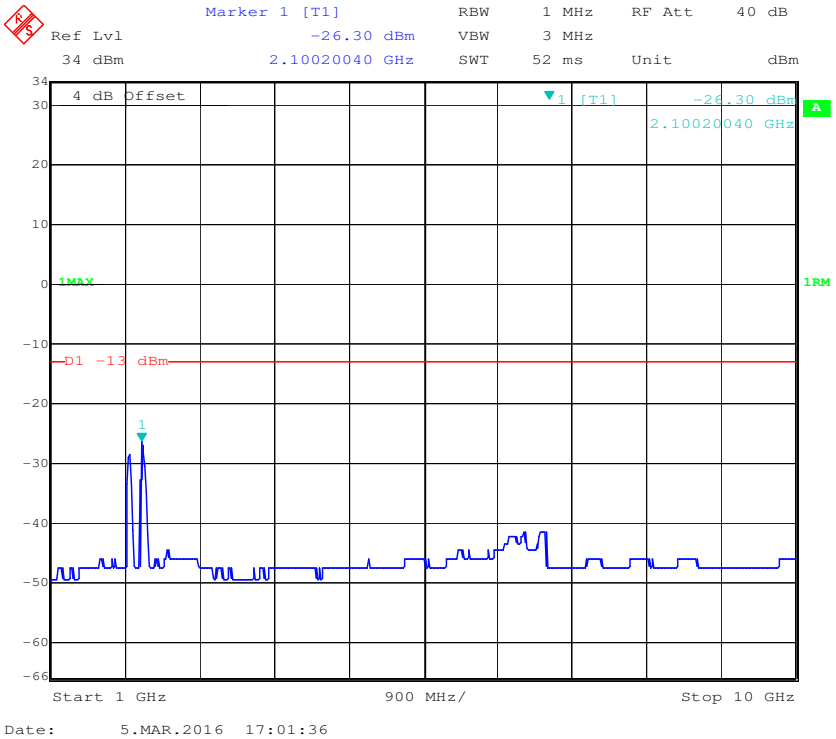

Fundamental test

**Downlink:**

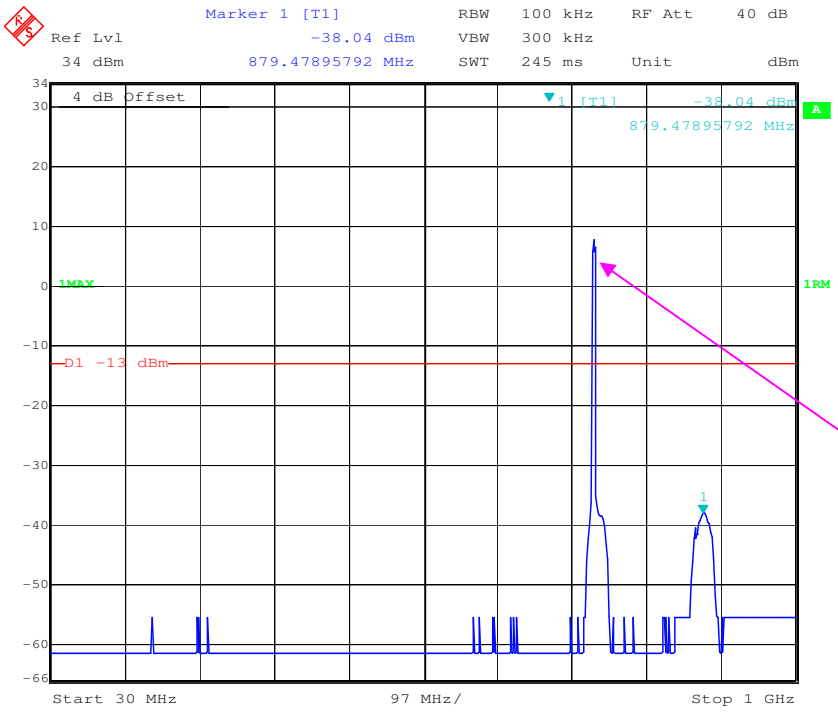
**Lower 700MHz (A+B+C Block) - AWGN-Pre AGC-Low Channel**




Fundamental test

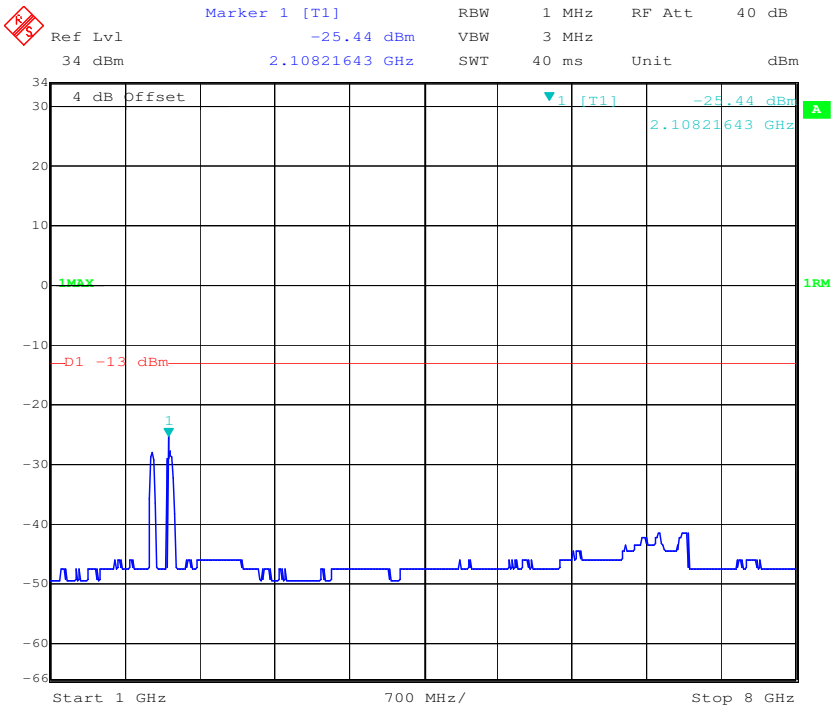


**Lower 700MHz (A+B+C Block) - AWGN-Pre AGC-Middle Channel**



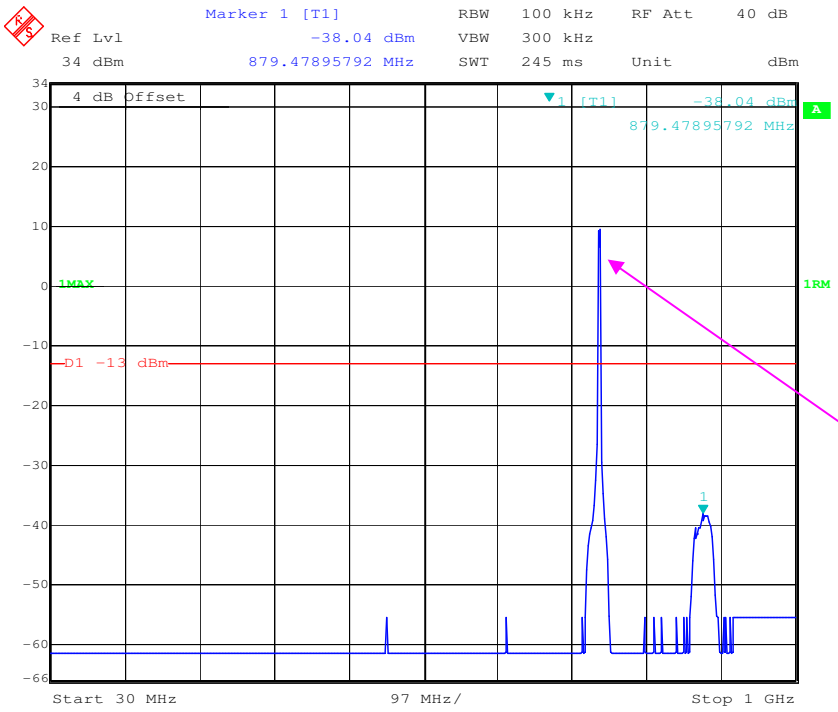

Fundamental test

Date: 5.MAR.2016 17:05:03

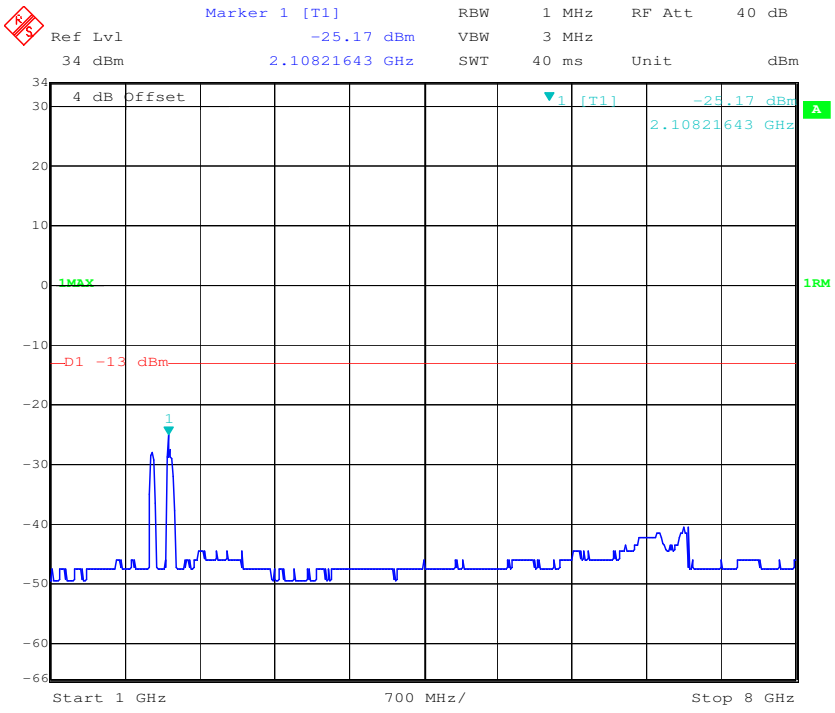



Date: 5.MAR.2016 17:05:42

## Lower 700MHz (A+B+C Block) - AWGN-Pre AGC-High Channel

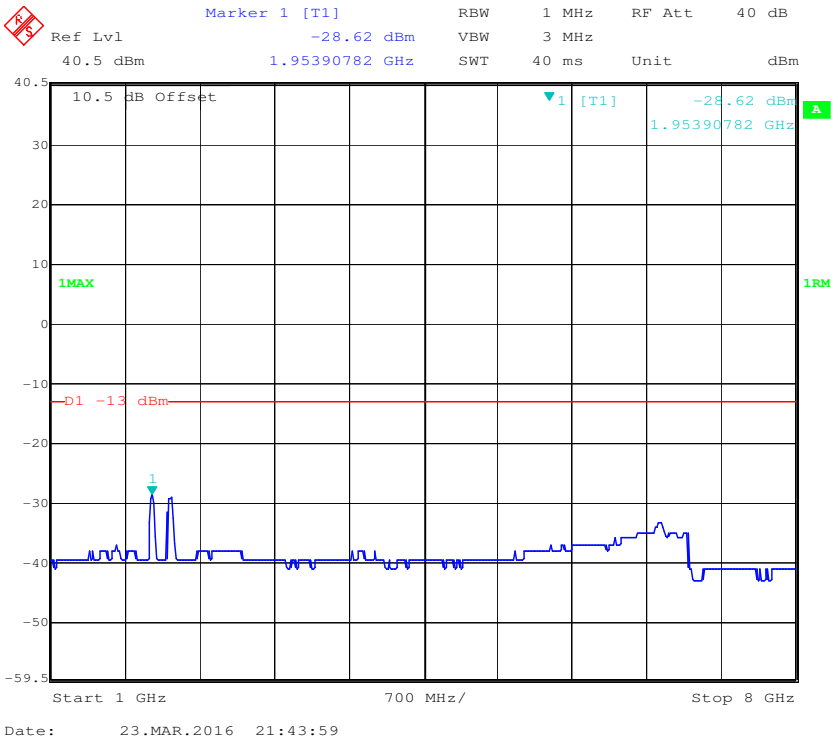



Fundamental test

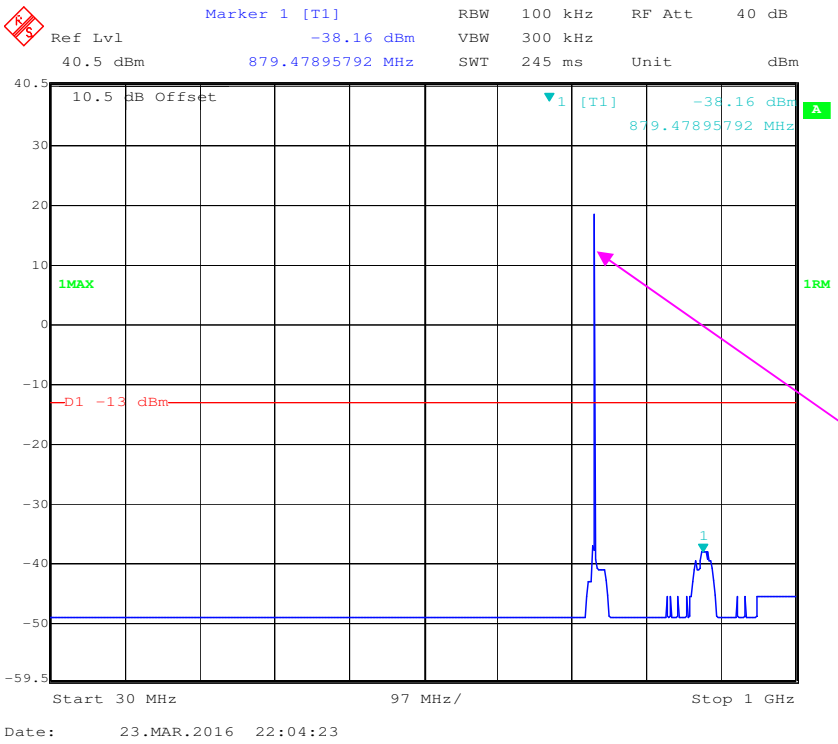


## Lower 700MHz (A+B+C Block) - GSM-Pre AGC-Low Channel

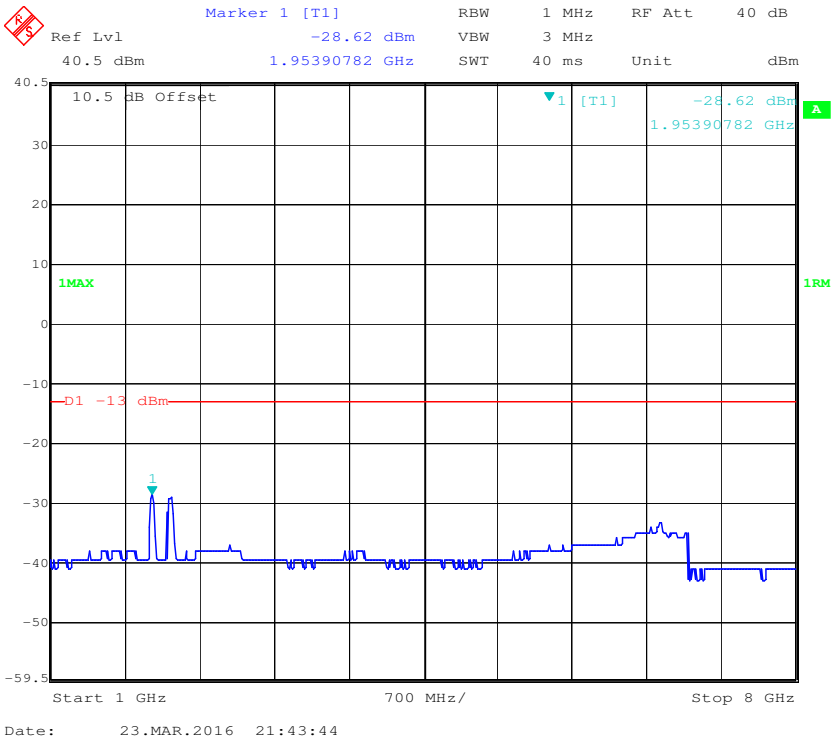

Fundamental test



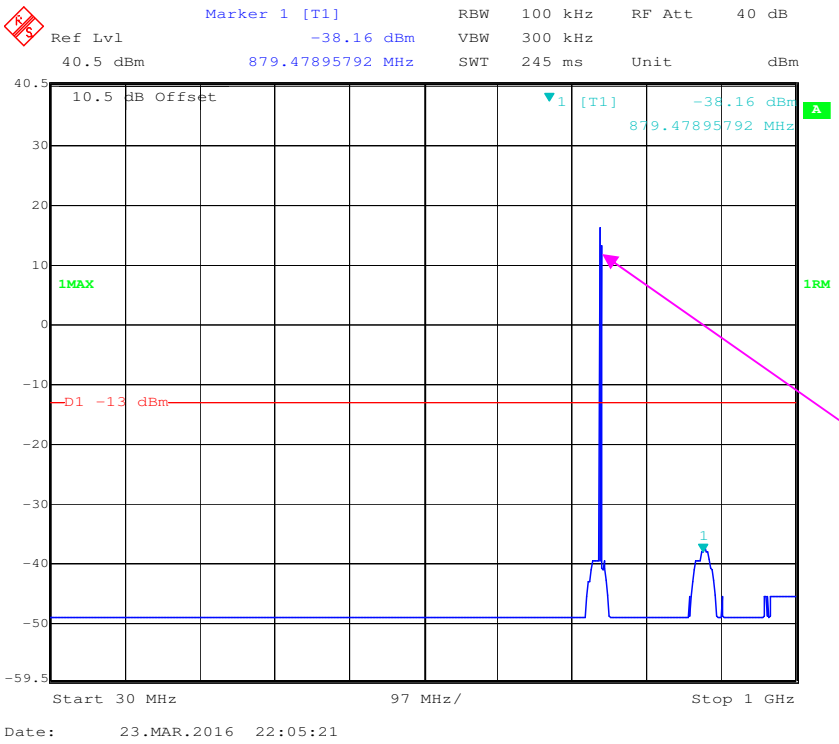
**Lower 700MHz (A+B+C Block) - GSM-Pre AGC-Middle Channel**



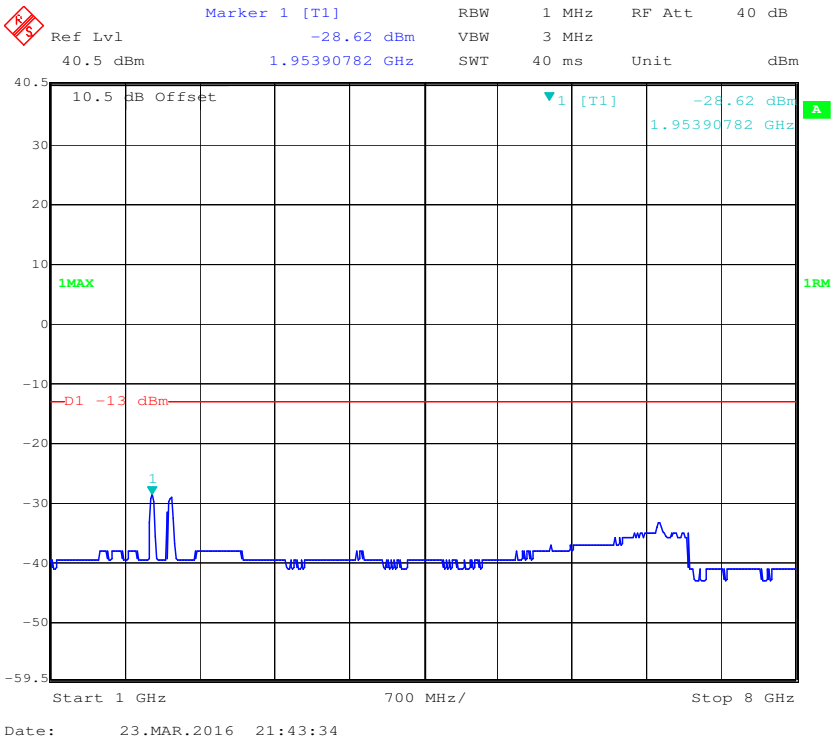

Fundamental test



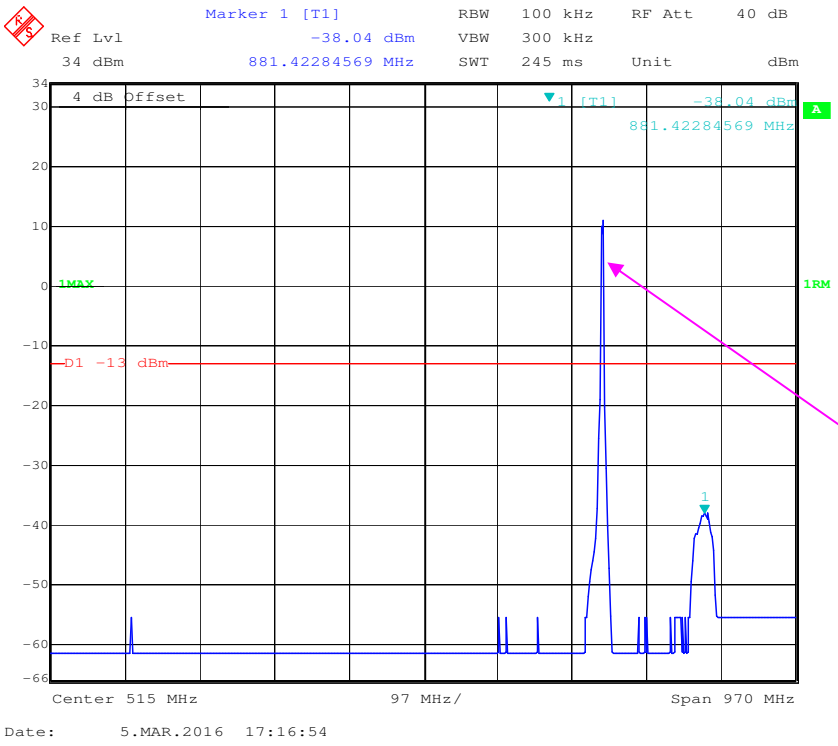
## Lower 700MHz (A+B+C Block) - GSM-Pre AGC-High Channel




Fundamental test

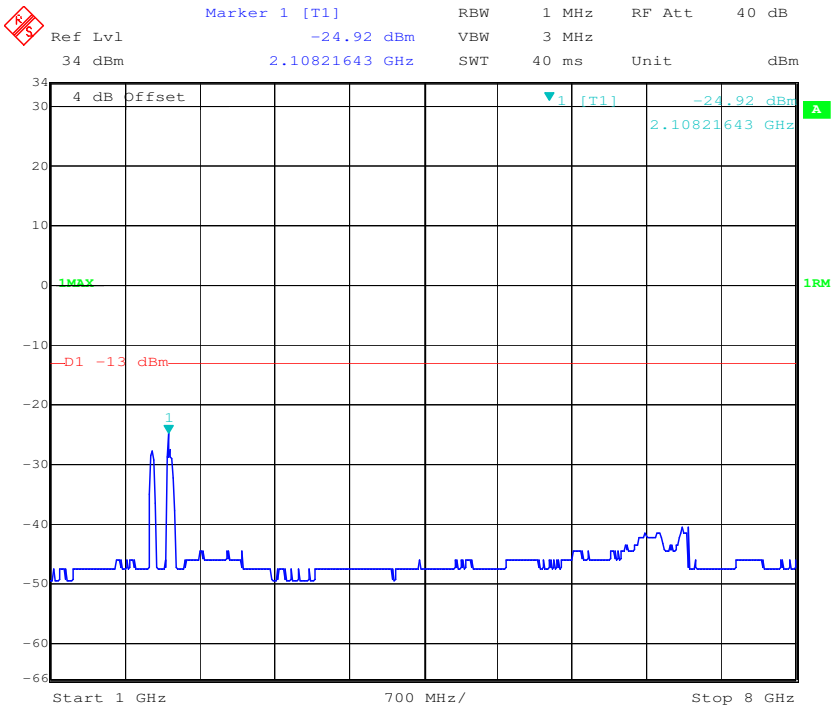


## Upper 700MHz (C Block) - AWGN-Pre AGC-Low Channel



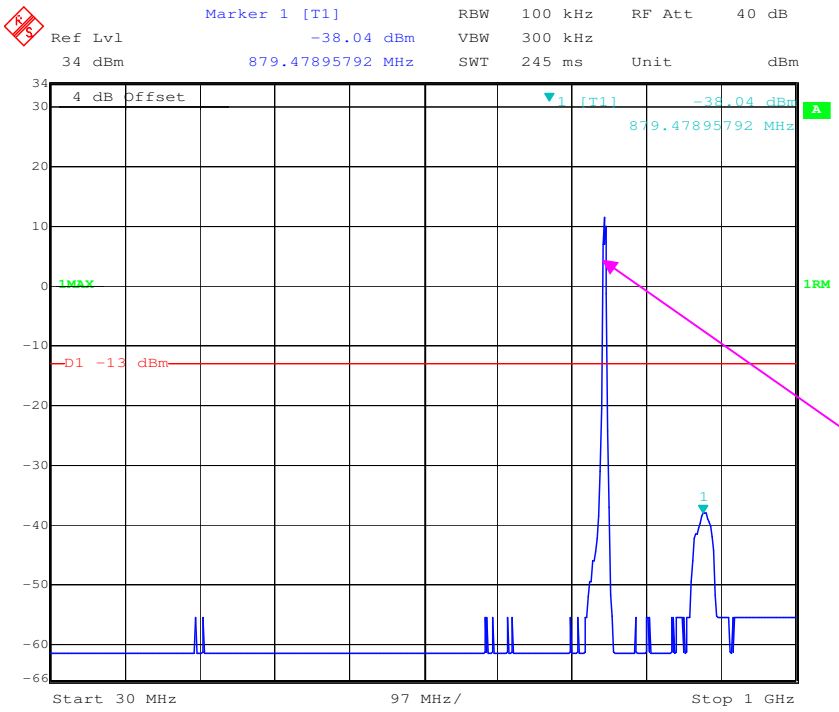

Fundamental test

Date: 5.MAR.2016 17:16:54




Date: 5.MAR.2016 17:18:17

**Upper 700MHz (C Block) - AWGN-Pre AGC-Middle Channel**

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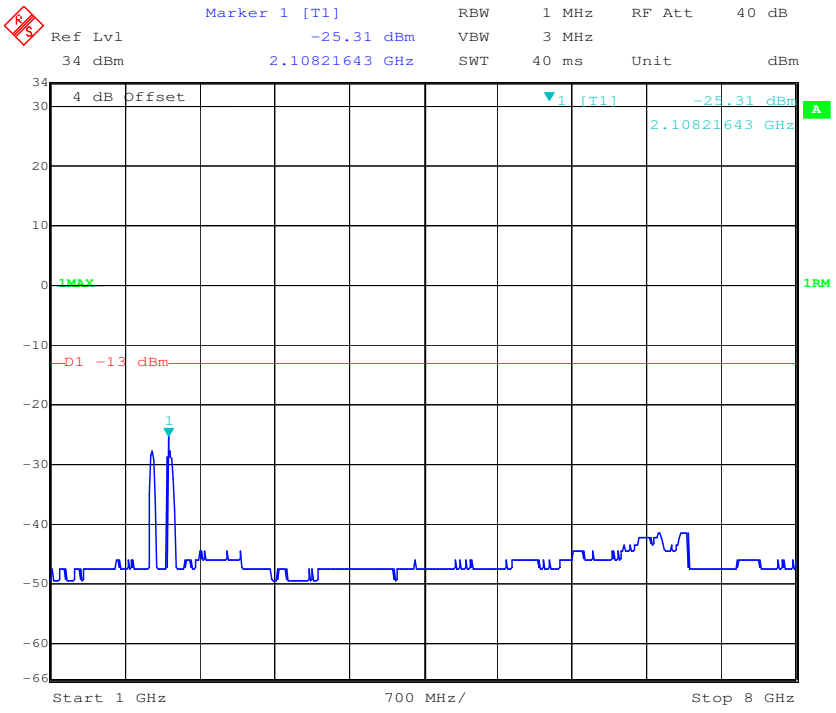
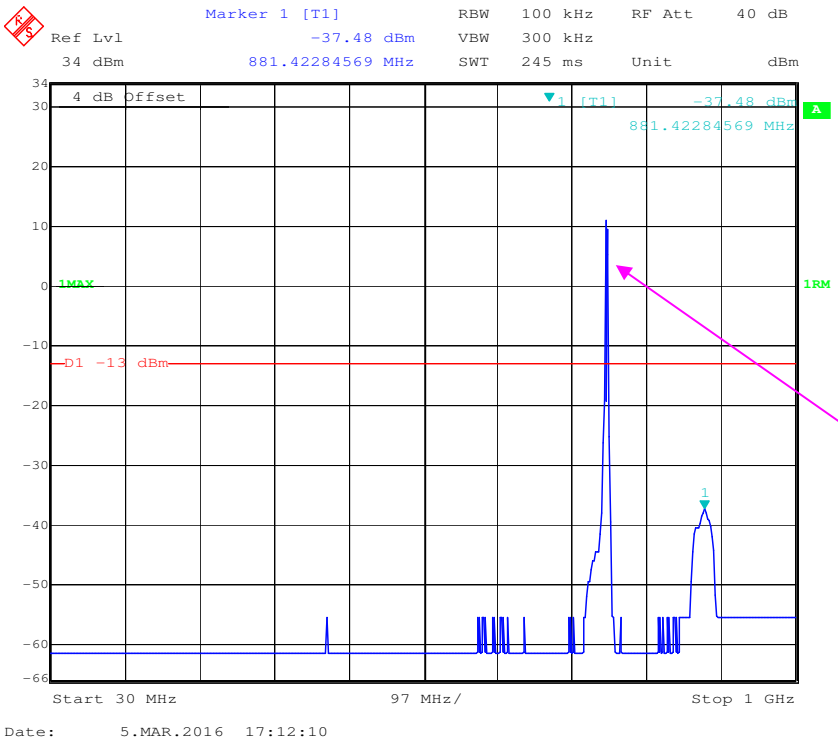
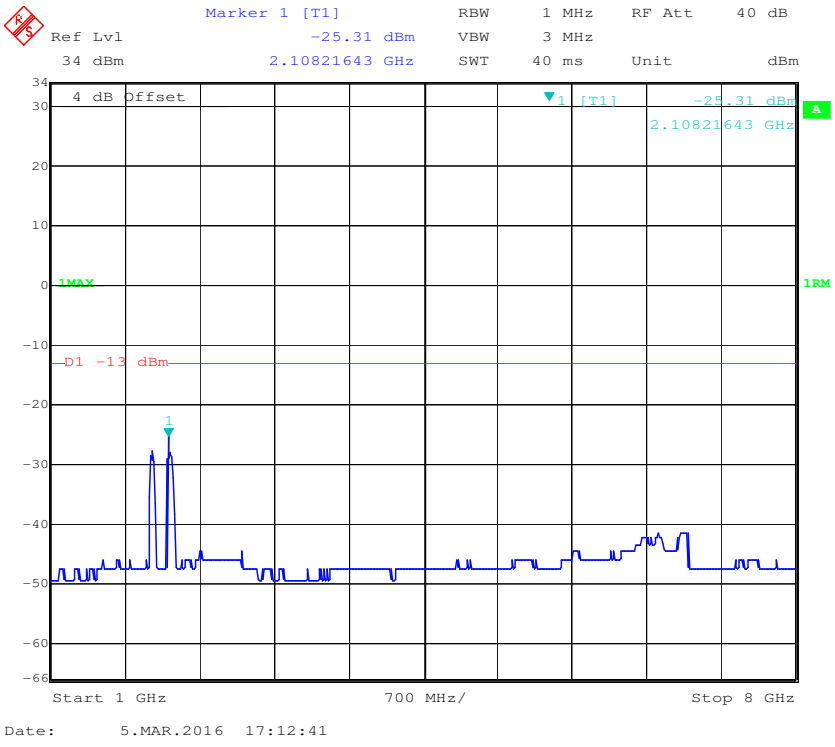



Date: 5.MAR.2016 17:14:21

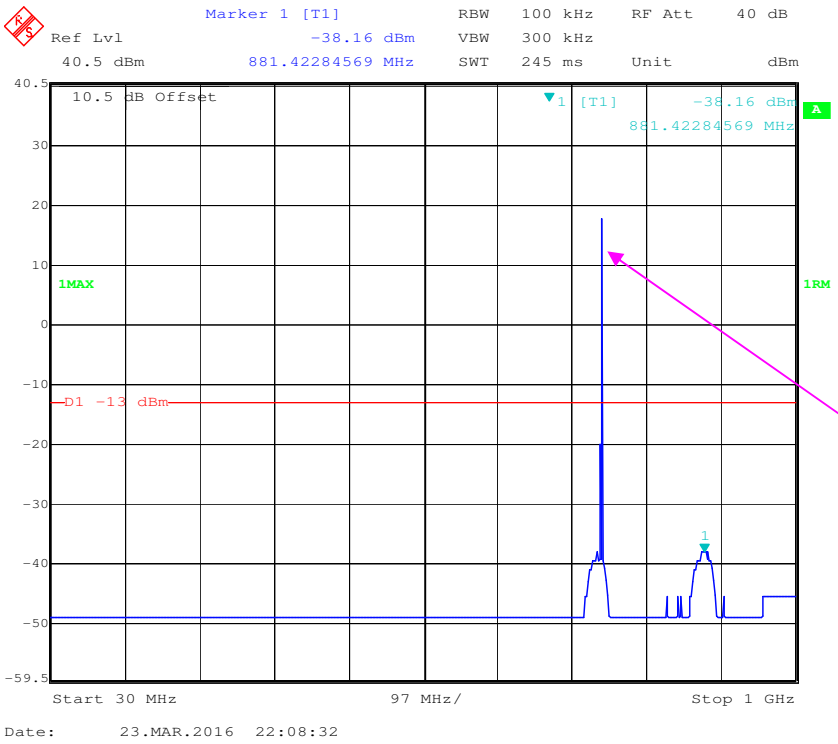
## Upper 700MHz (C Block) - AWGN-Pre AGC-High Channel



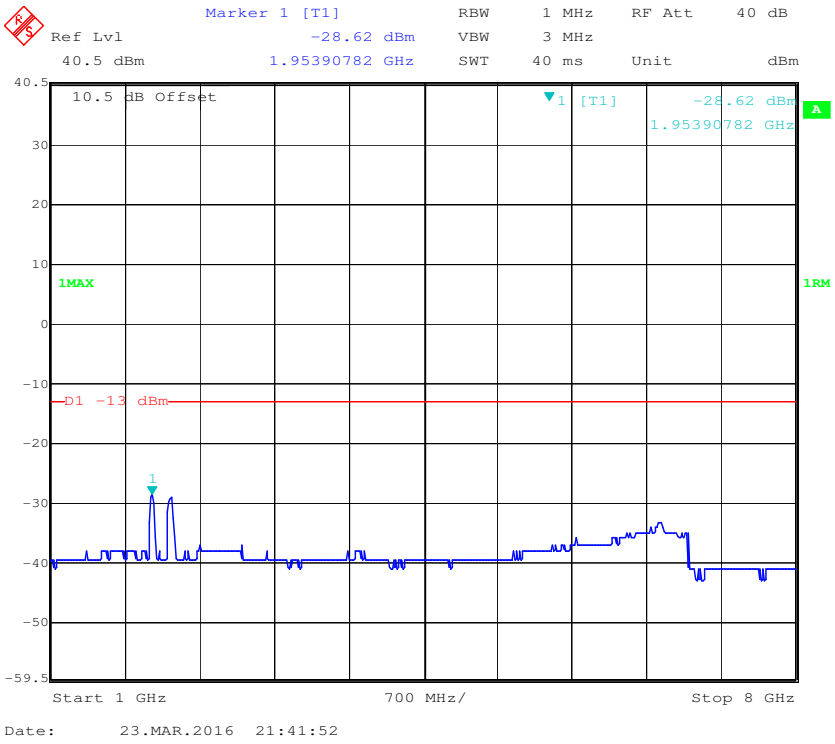

Fundamental test



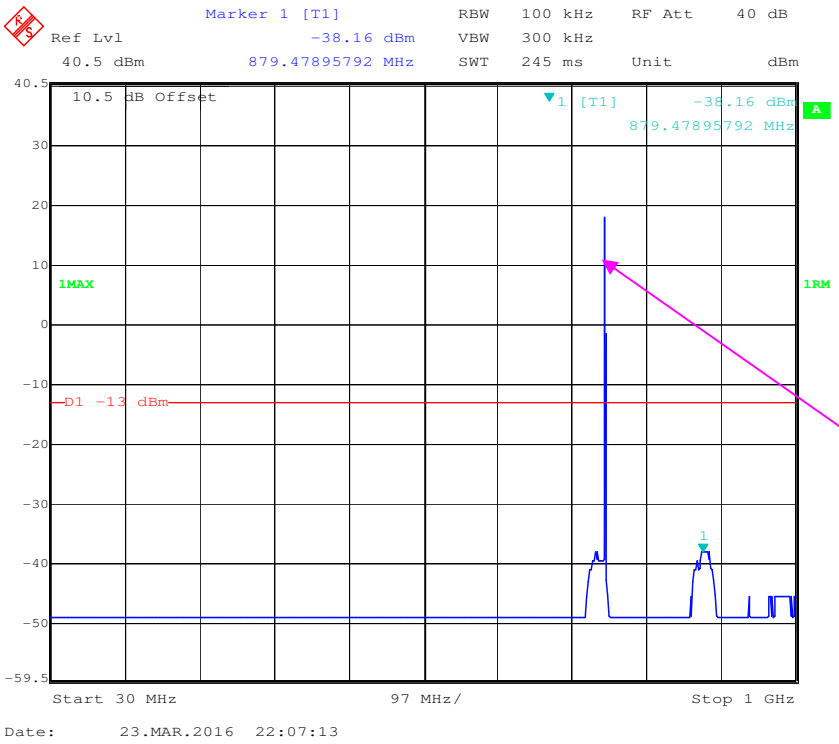
## Upper 700MHz (C Block) - GSM-Pre AGC-Low Channel



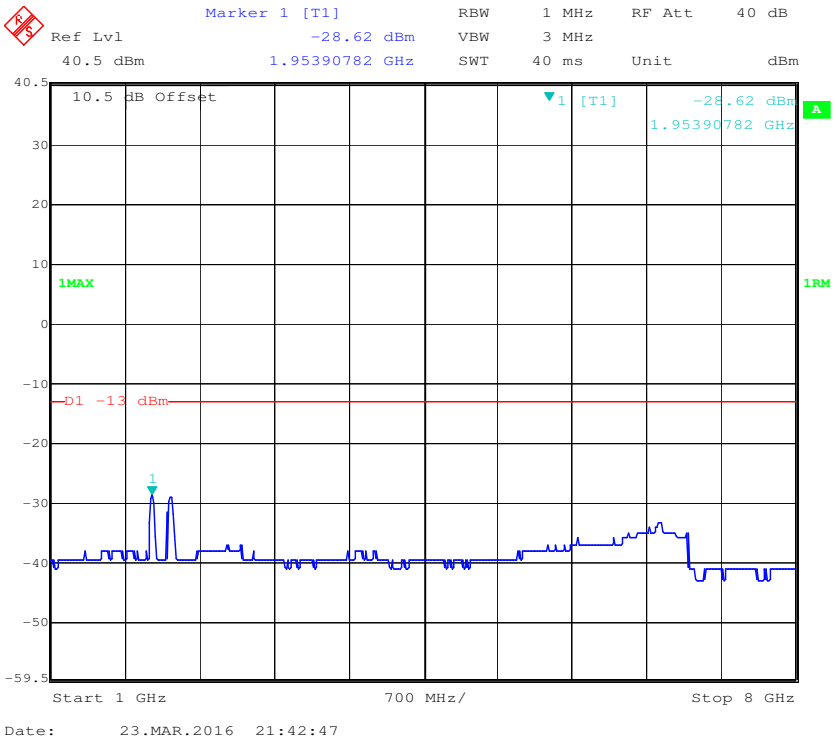

Fundamental test



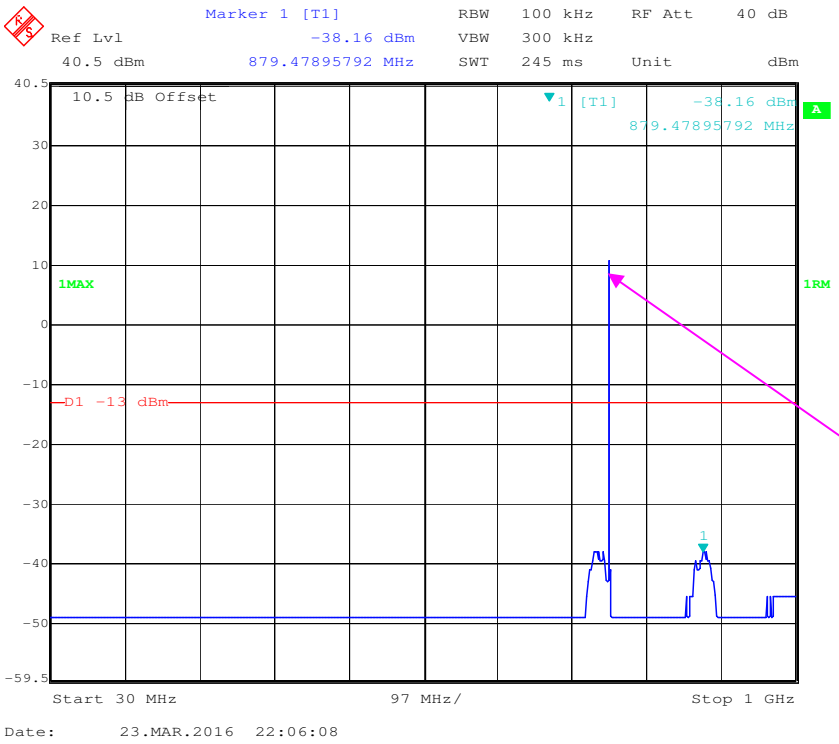
## Upper 700MHz (C Block) - GSM-Pre AGC-Middle Channel



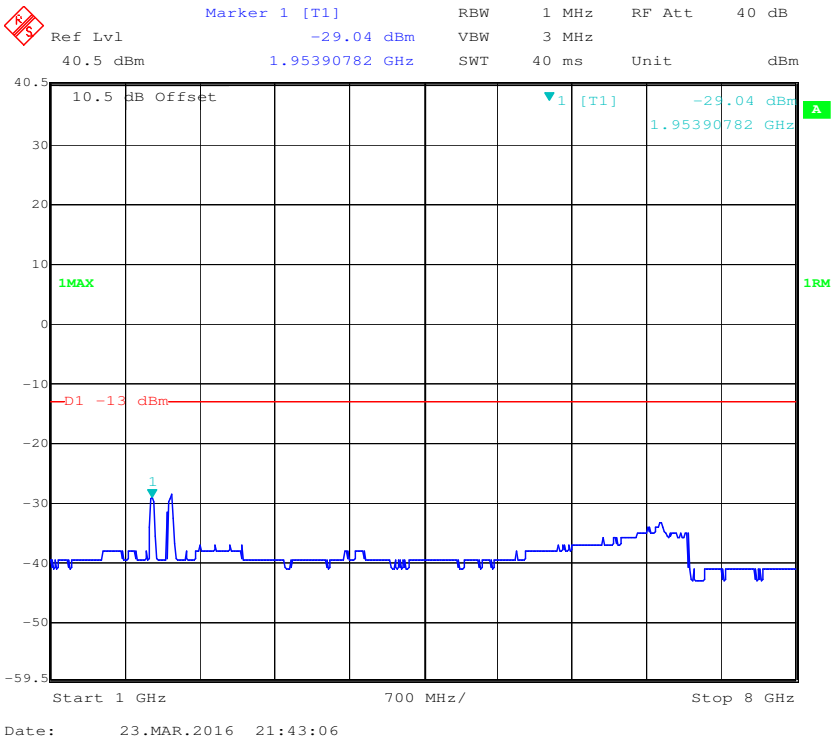

Fundamental test



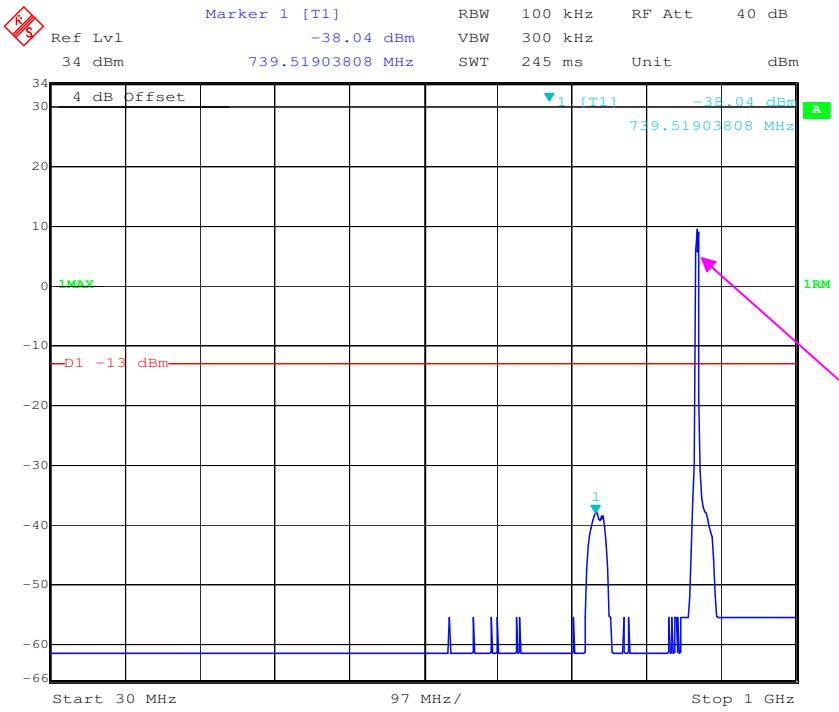
## Upper 700MHz (C Block) - GSM-Pre AGC-High Channel



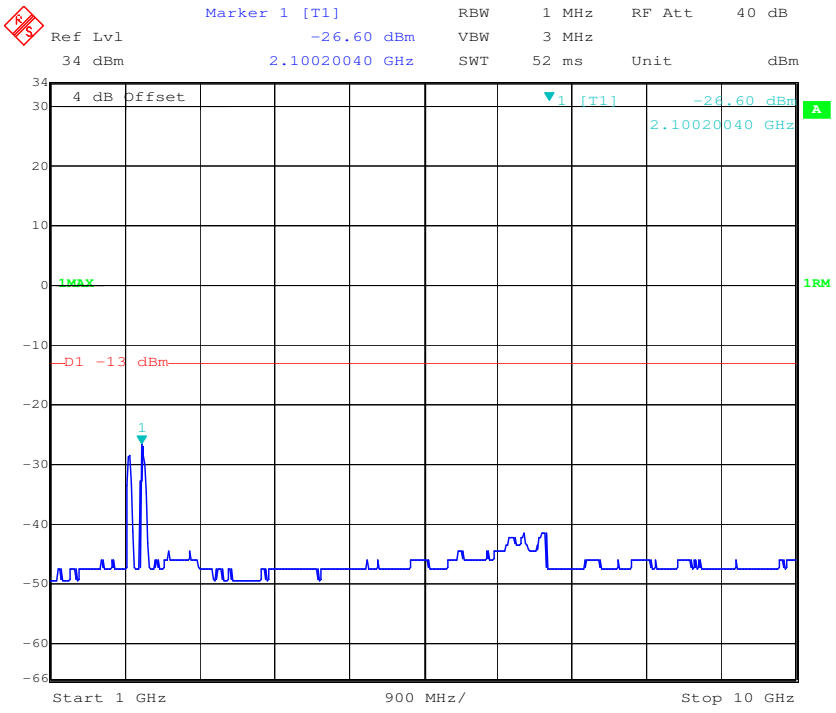

Fundamental test



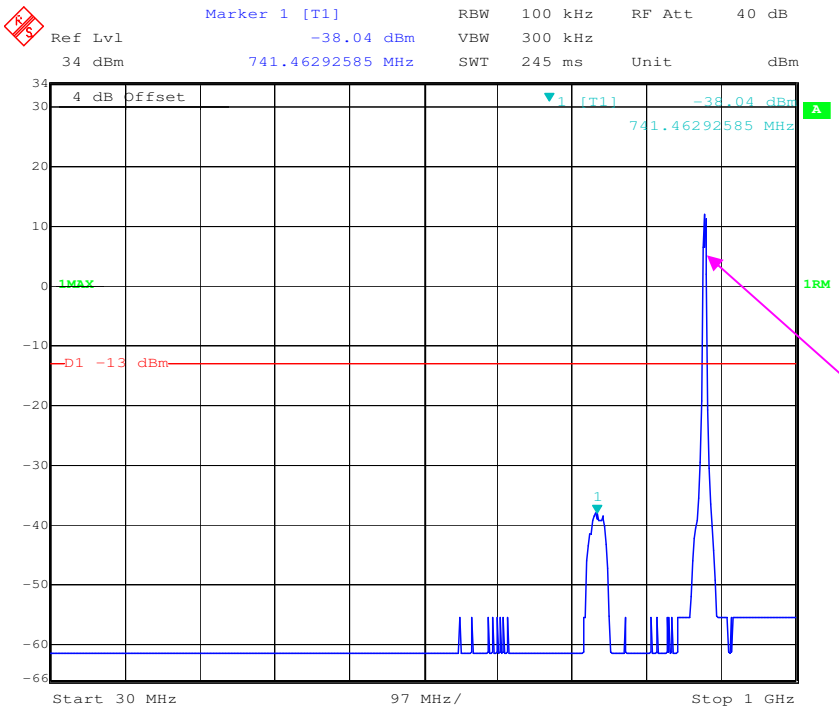
## CELLULAR - AWGN-Pre AGC-Low Channel



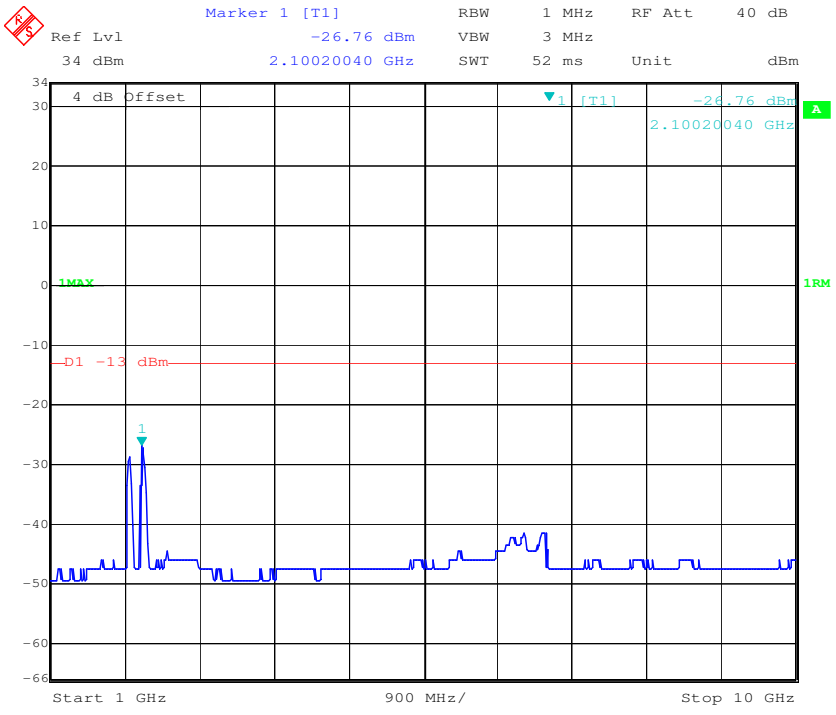

Fundamental test



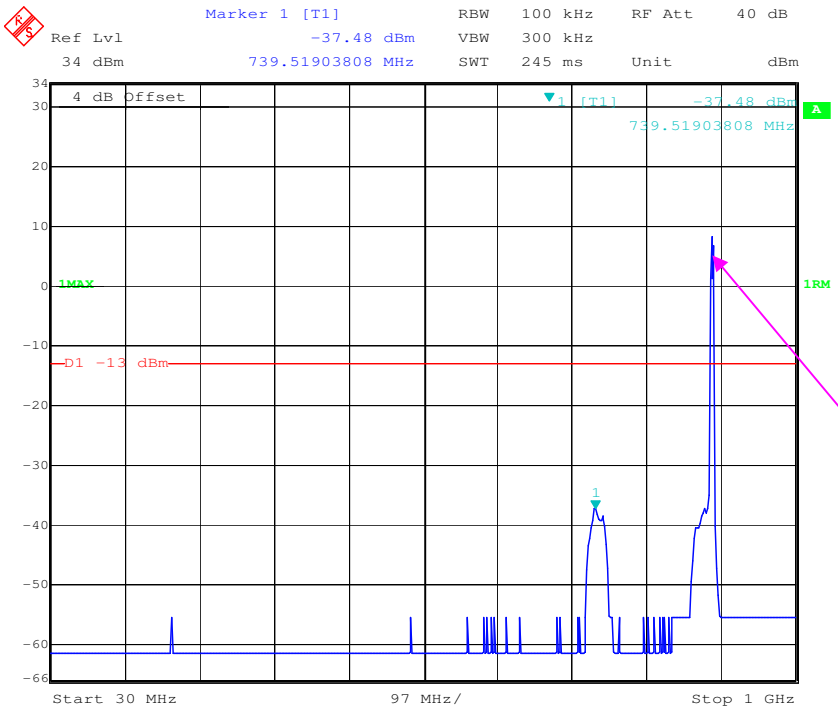
## CELLULAR - AWGN-Pre AGC-Middle Channel




Fundamental test

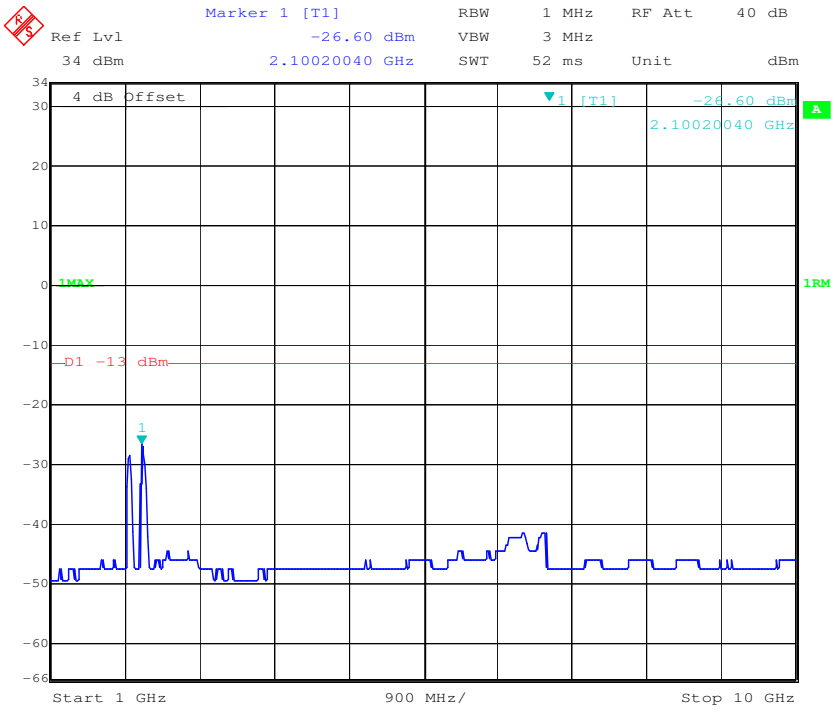


## CELLULAR - AWGN-Pre AGC-High Channel



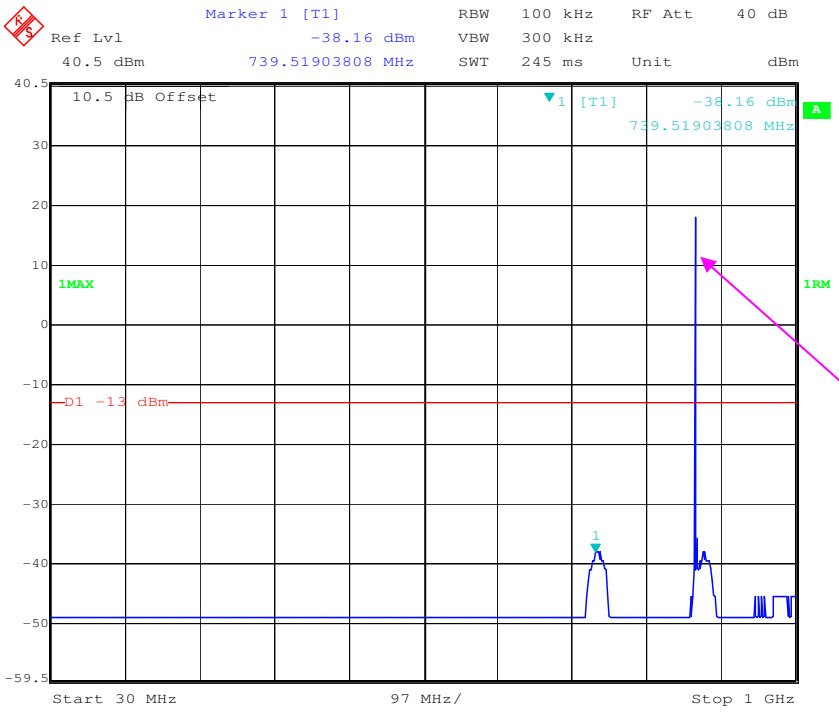

Date: 5.MAR.2016 17:27:14

Fundamental test

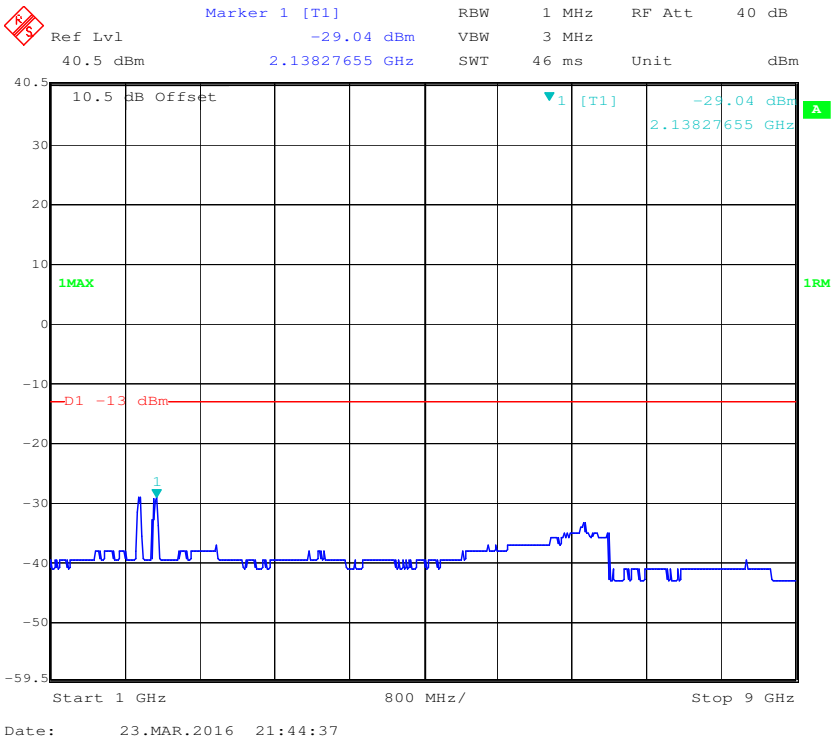



Date: 5.MAR.2016 17:25:36

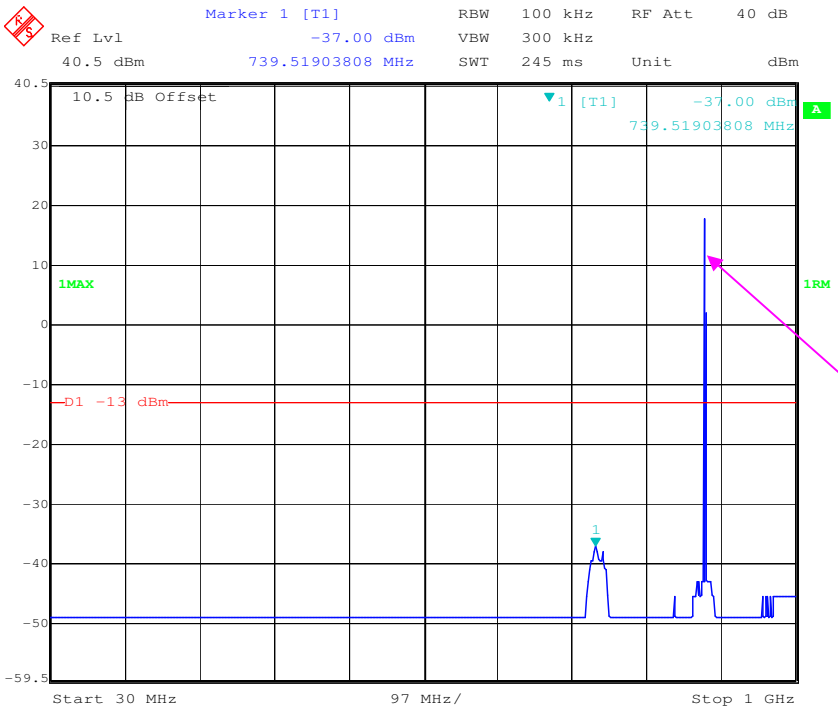
## CELLULAR -GSM-Pre AGC-Low Channel



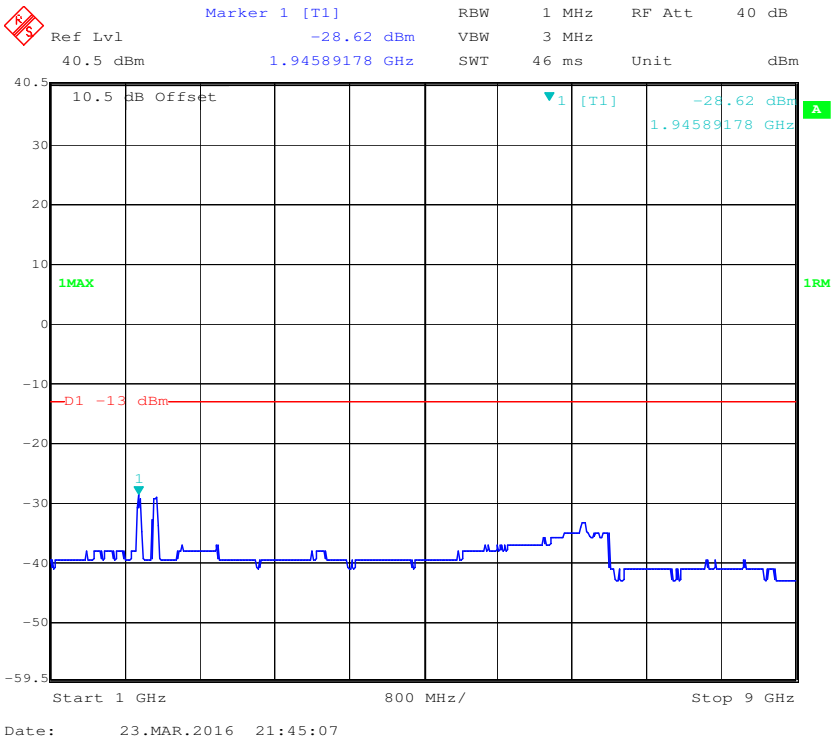

Fundamental test



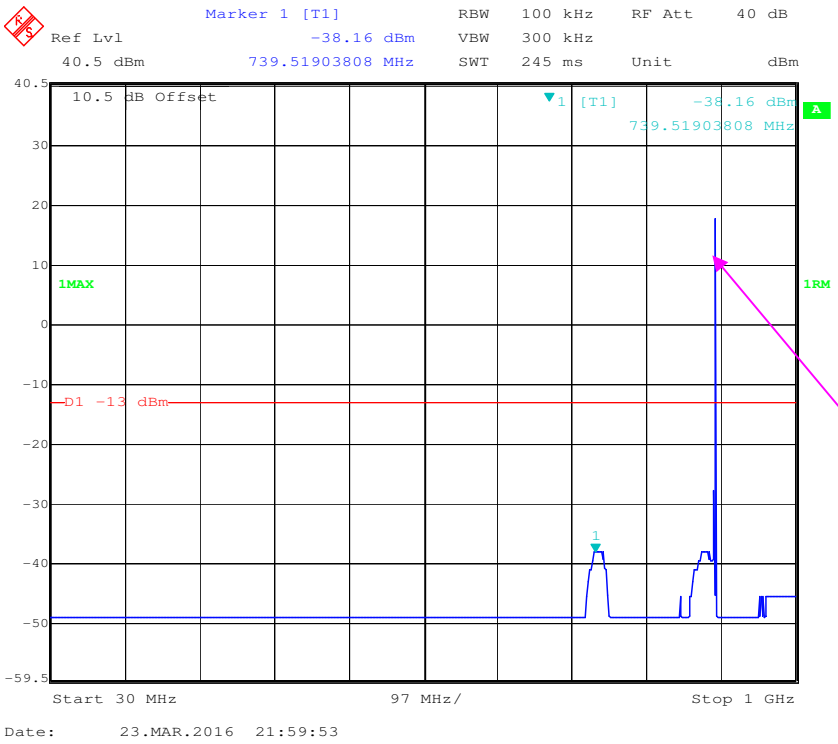
## CELLULAR - GSM-Pre AGC-Middle Channel



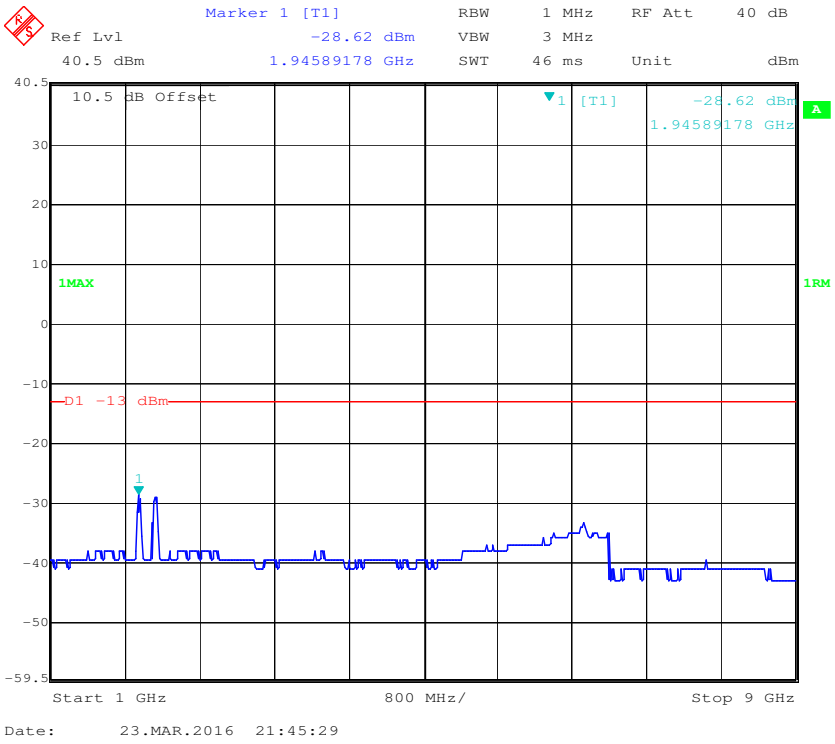

Fundamental test



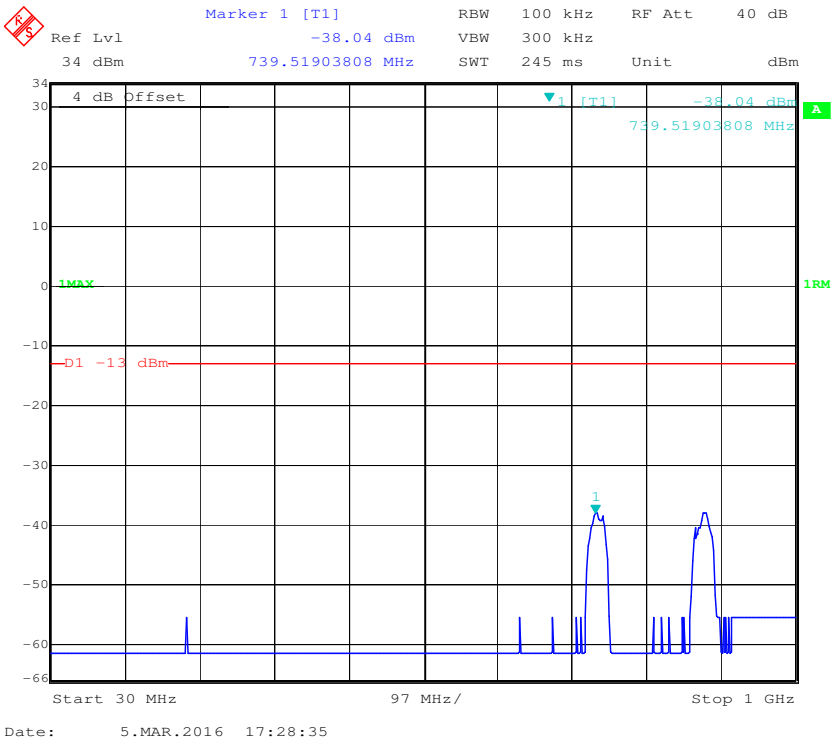
## CELLULAR - GSM-Pre AGC-High Channel

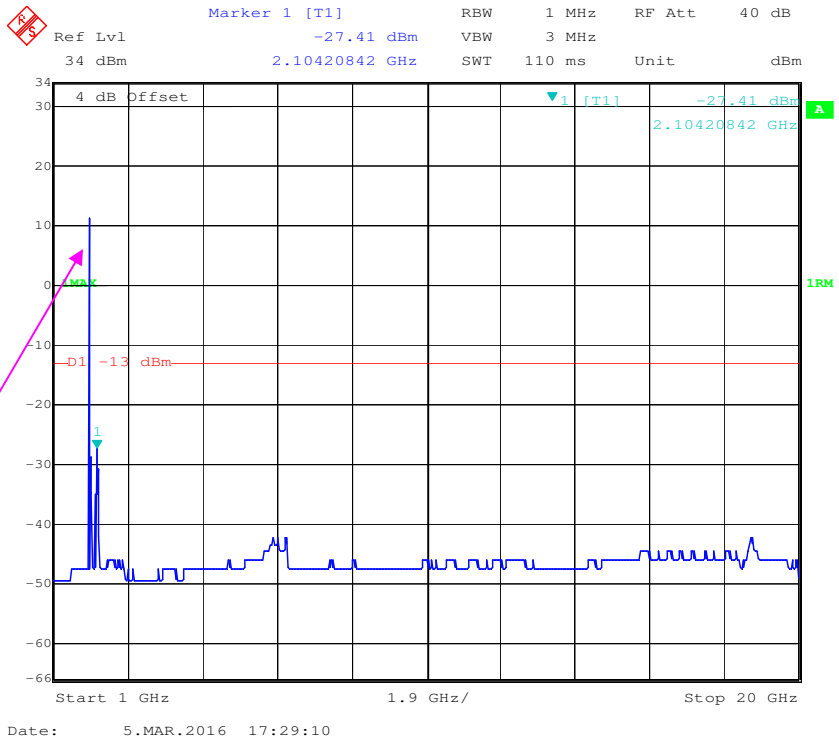



Fundamental test



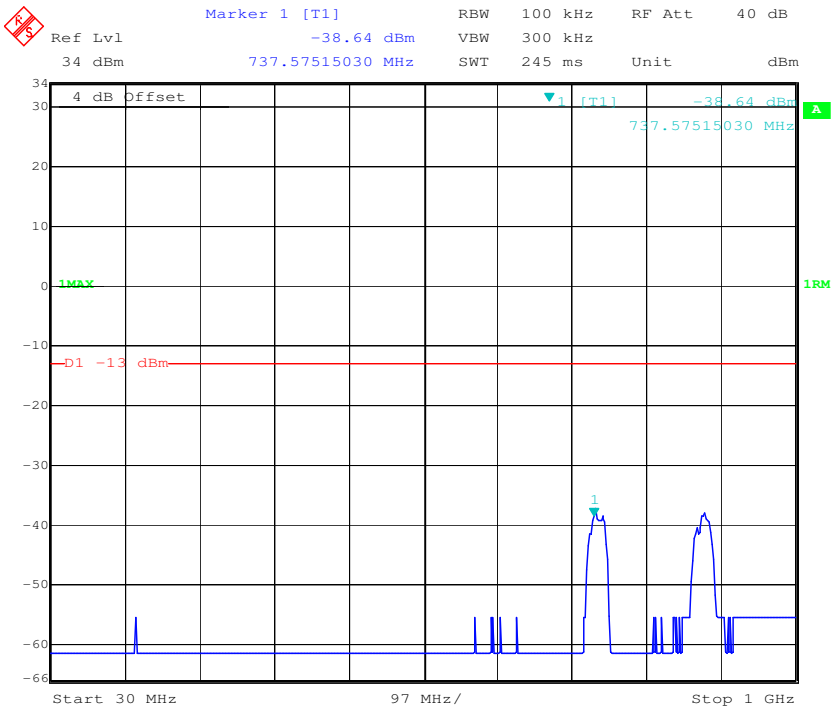
## PCS- AWGN-Pre AGC-Low Channel

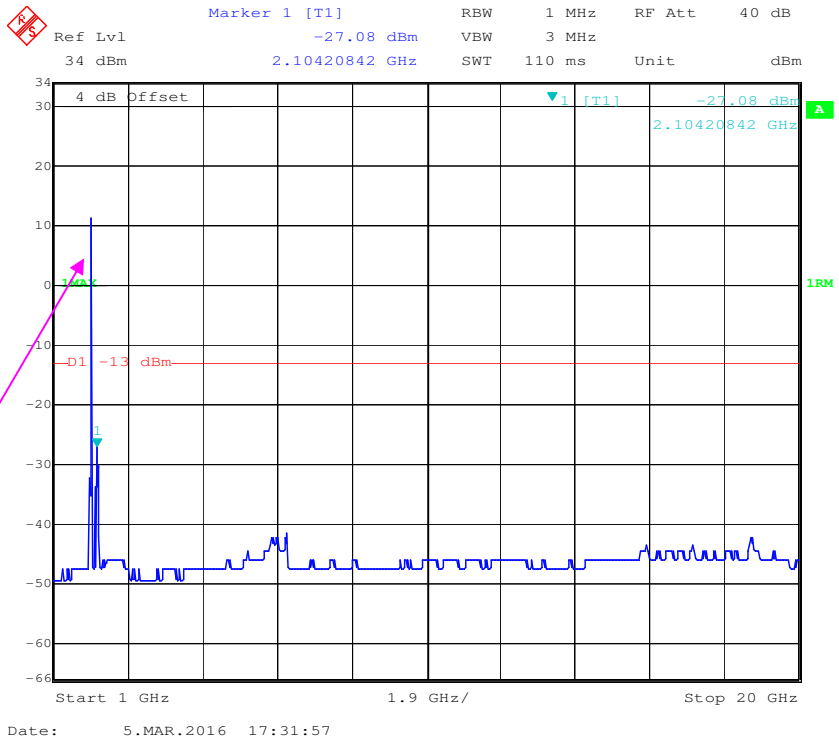



Fundamental test

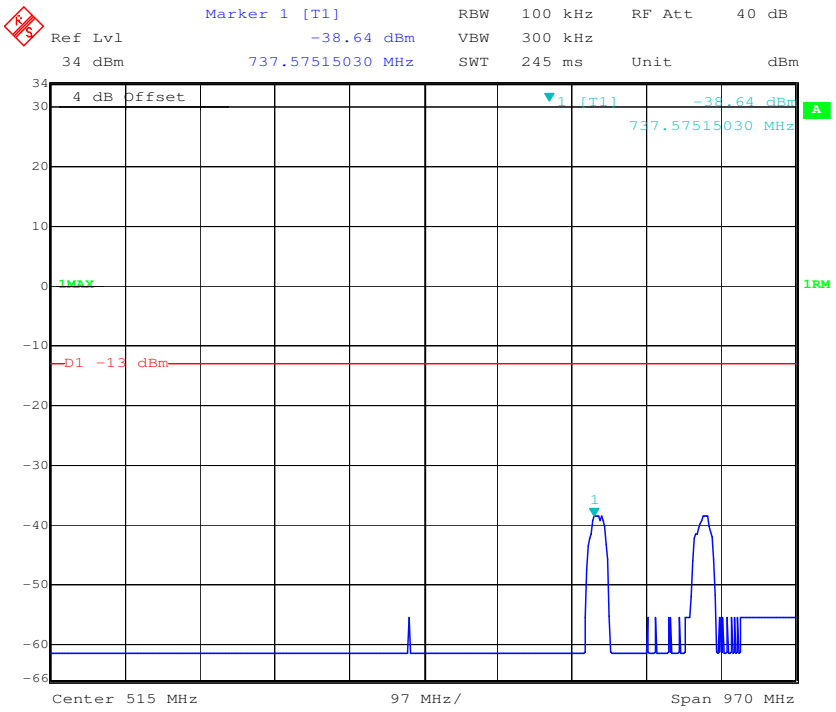
## PCS- AWGN-Pre AGC-Middle Channel

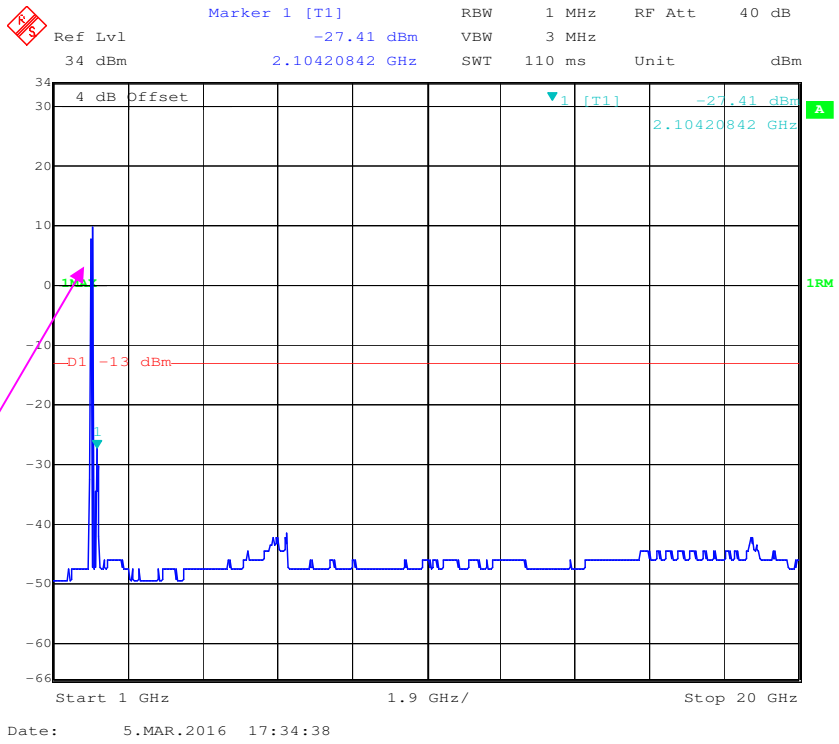



Fundamental test

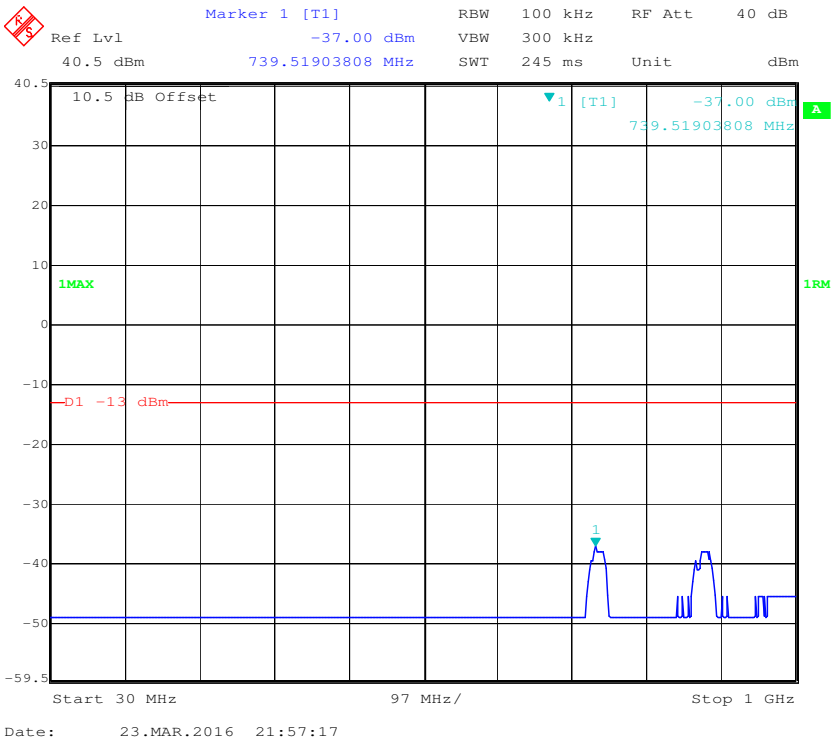
## PCS- AWGN-Pre AGC-High Channel

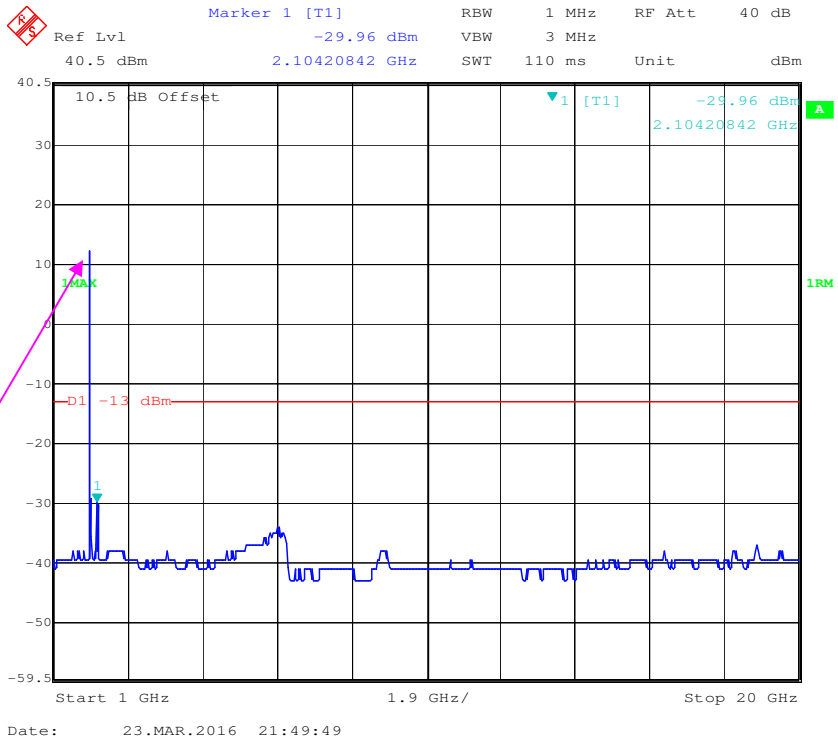



Fundamental test

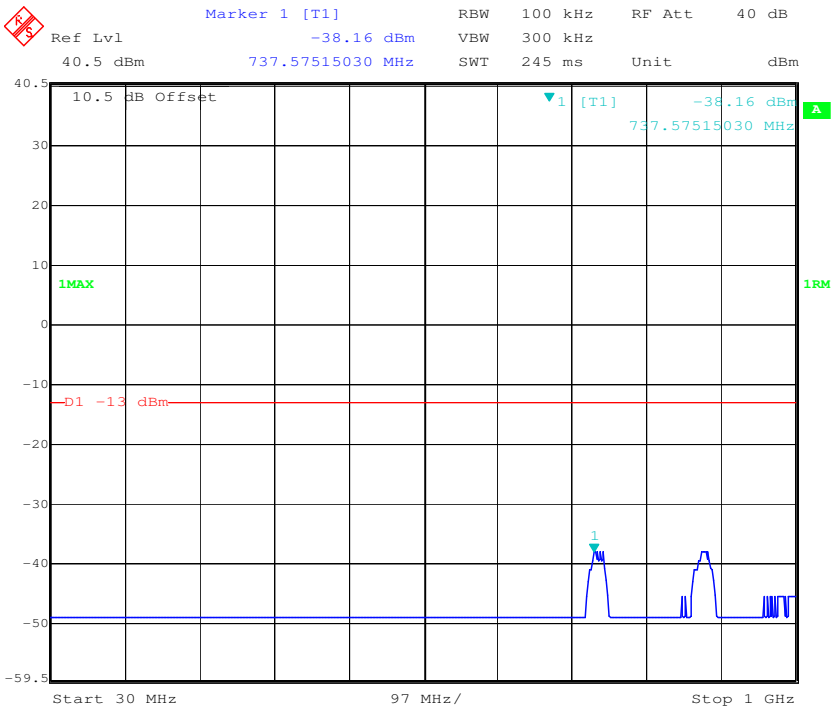
## PCS- GSM-Pre AGC-Low Channel

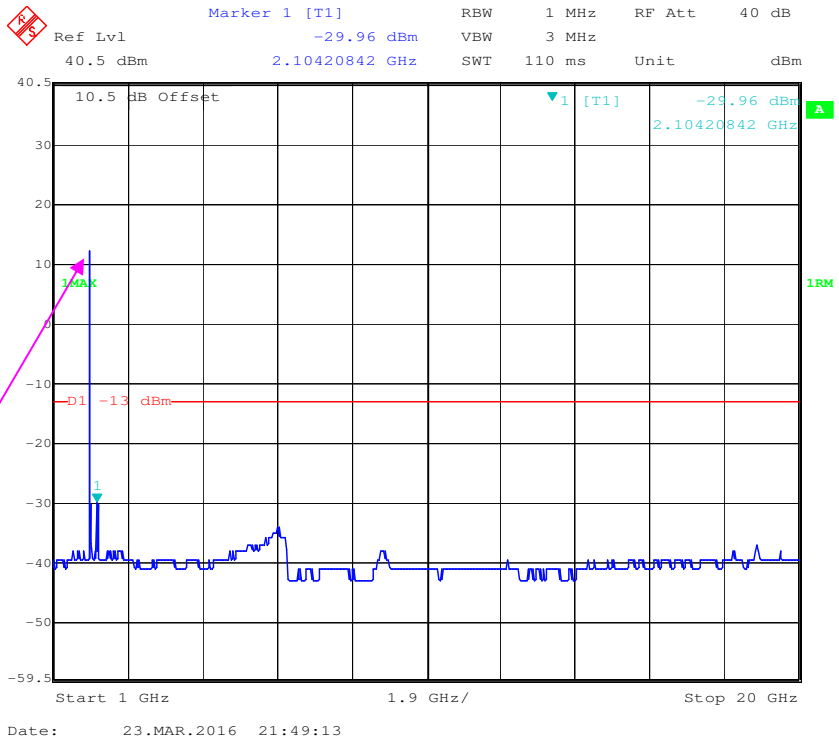



Fundamental test

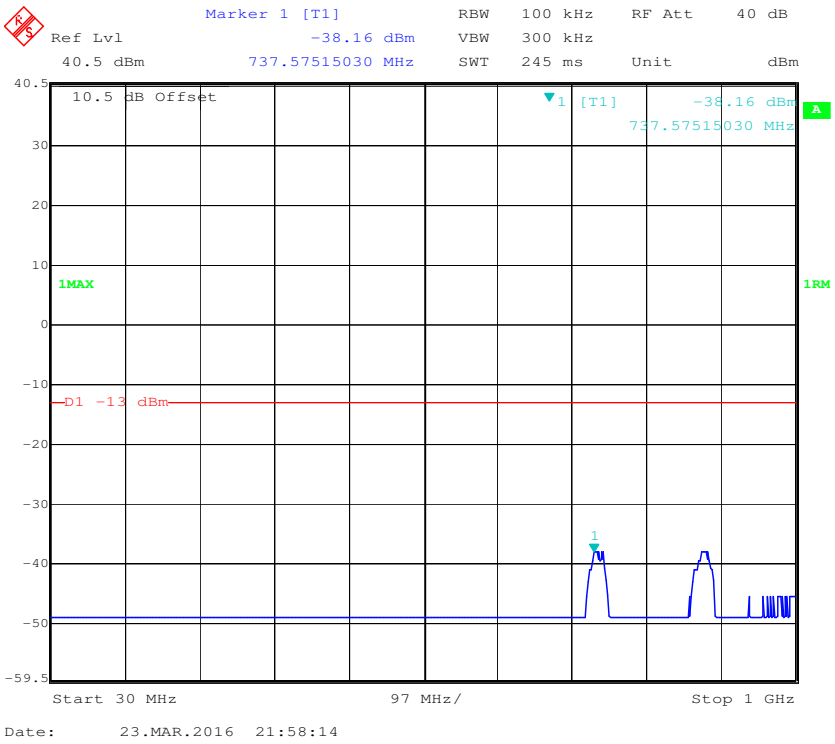
## PCS- GSM-Pre AGC-Middle Channel

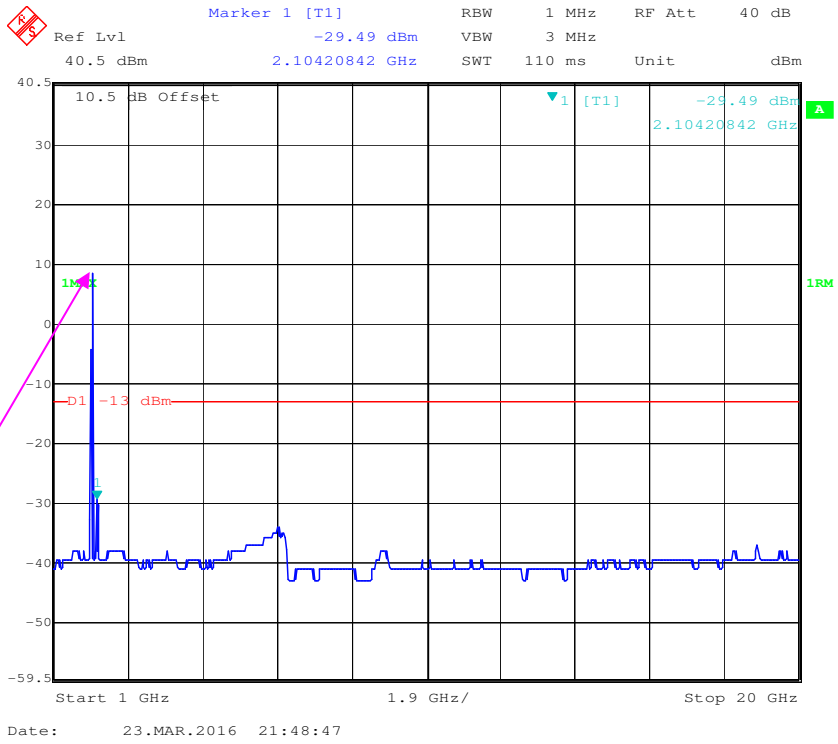



Fundamental test

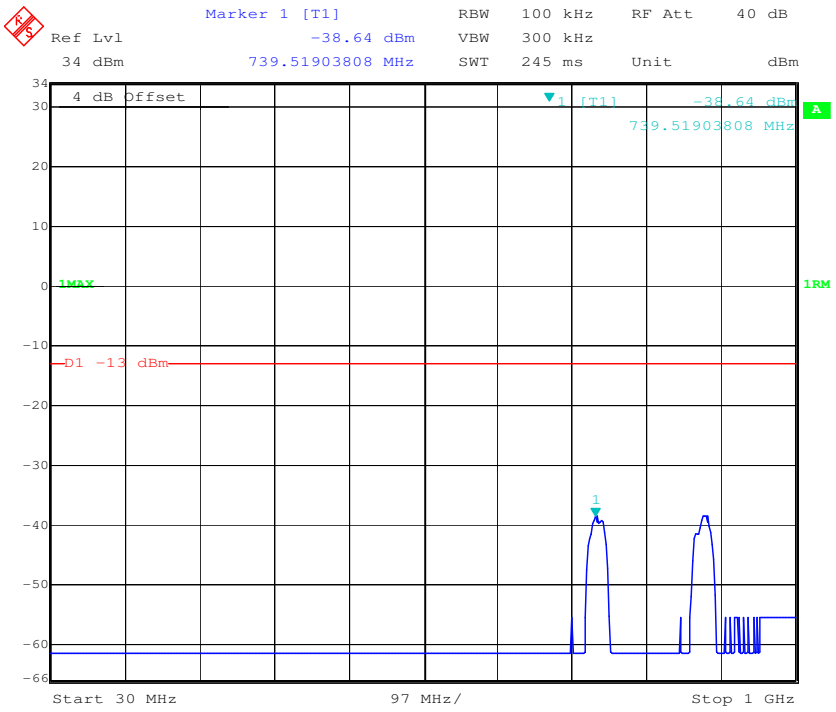
## PCS- GSM-Pre AGC-High Channel

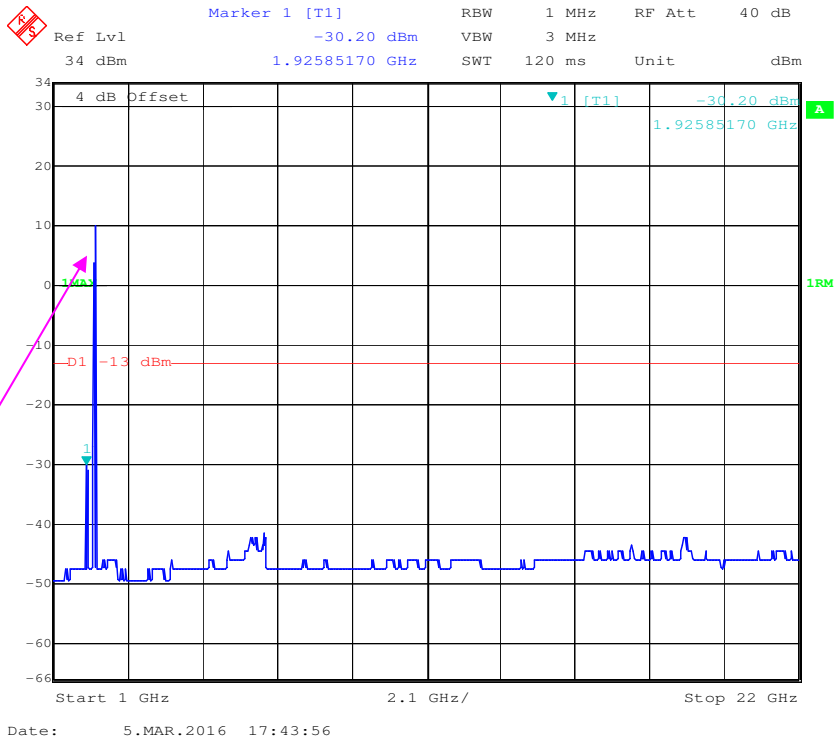



Fundamental test

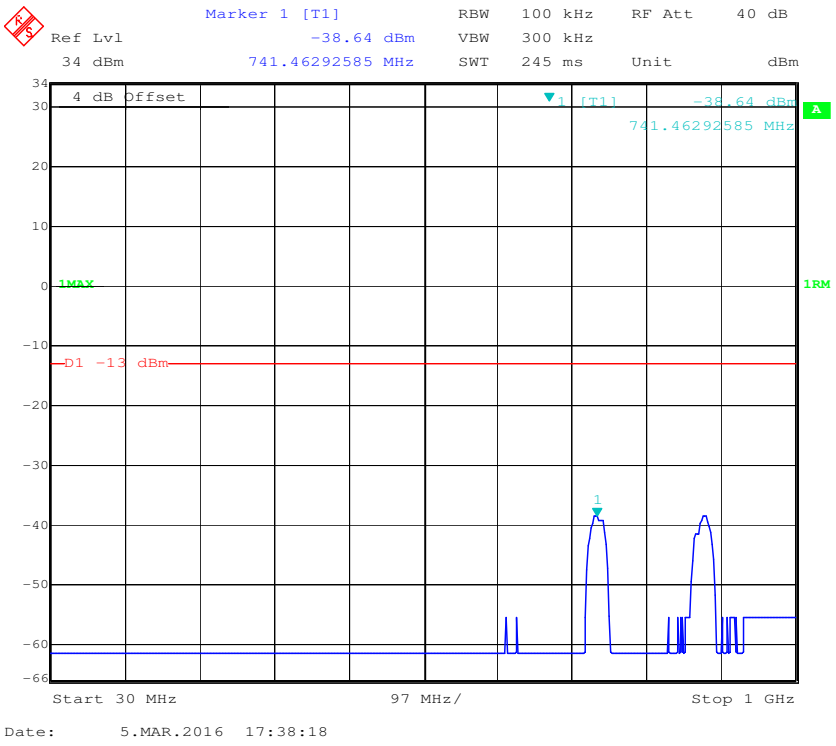
## AWS- AWGN-Pre AGC-Low Channel

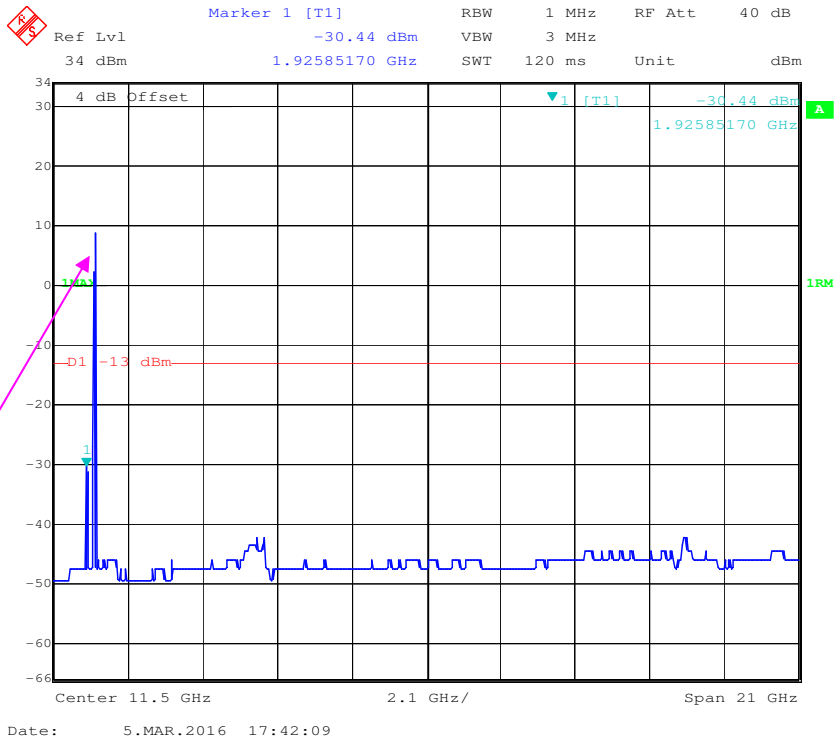



Fundamental test

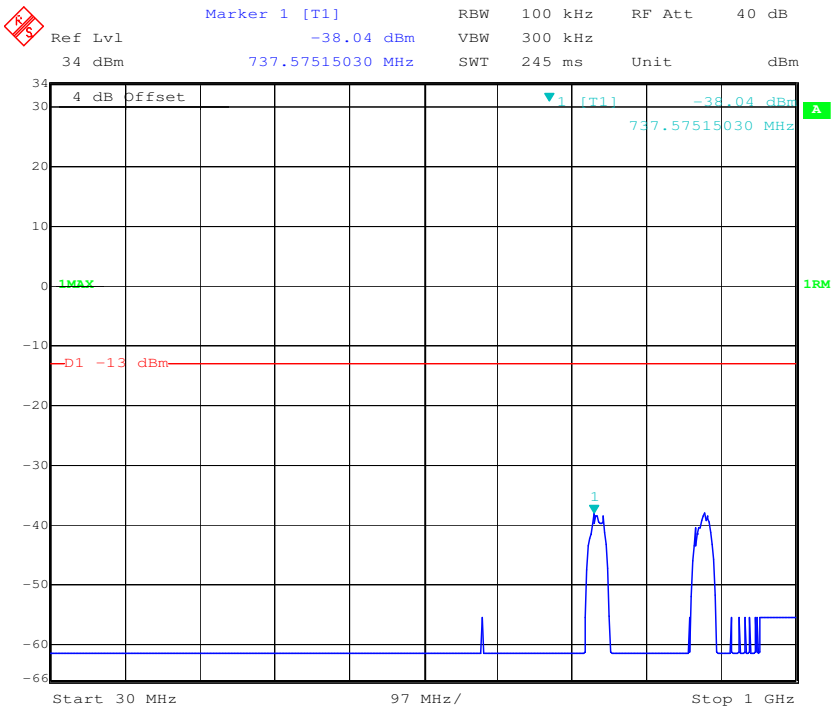
## AWS- AWGN-Pre AGC-Middle Channel

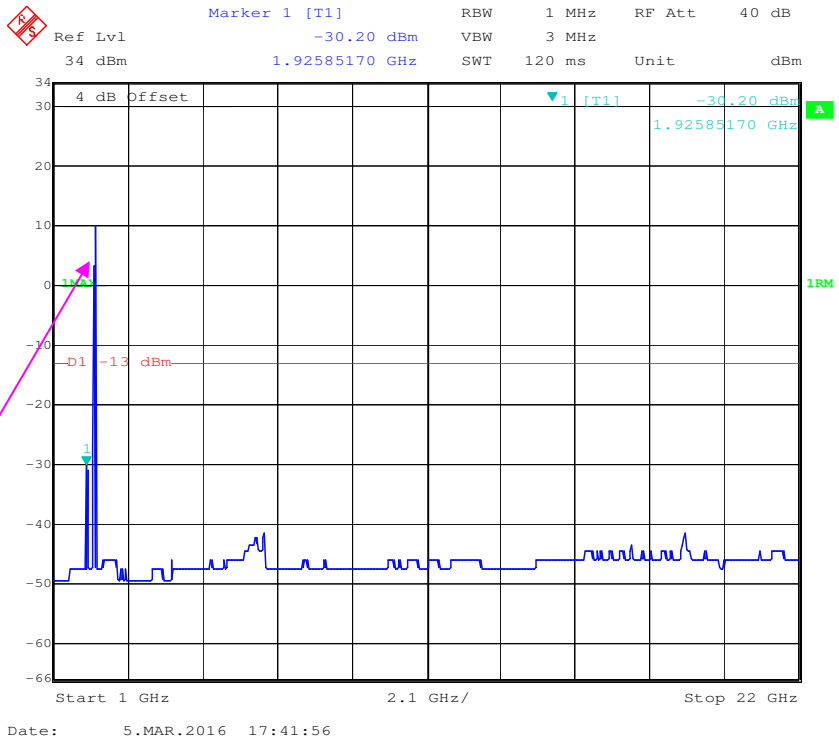



Fundamental test

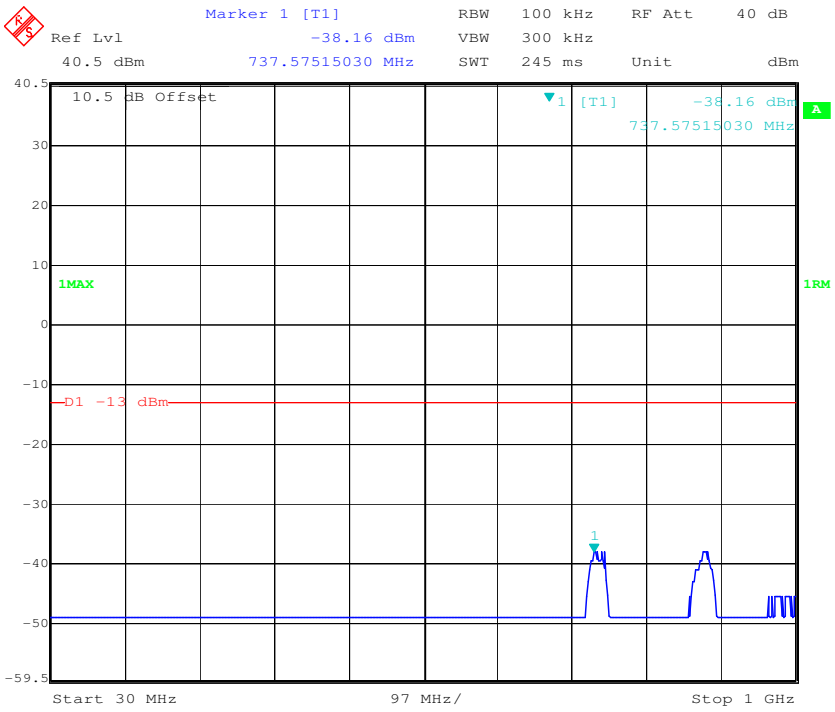
## AWS- AWGN-Pre AGC-High Channel

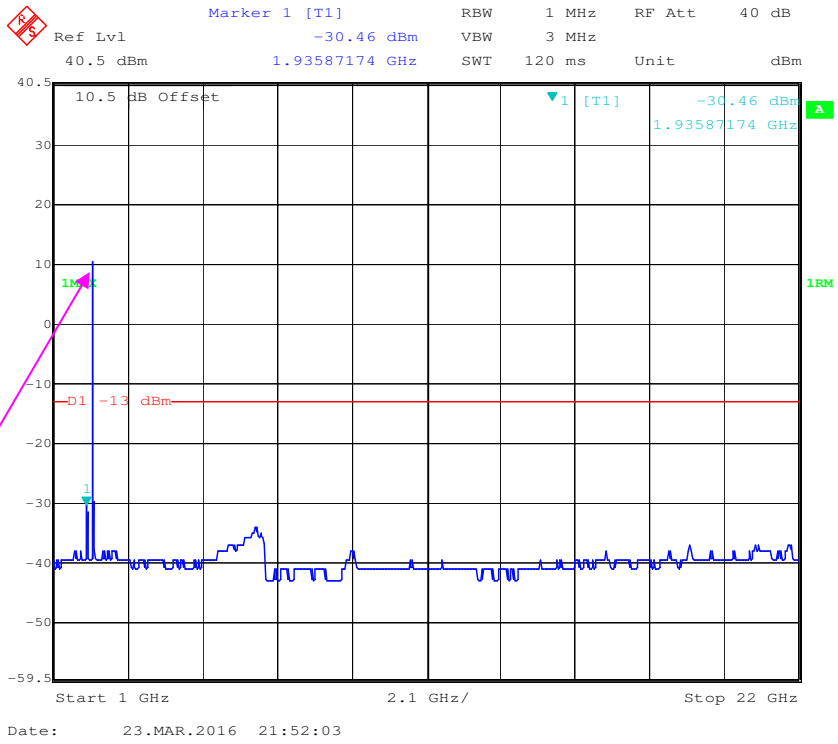



Fundamental test

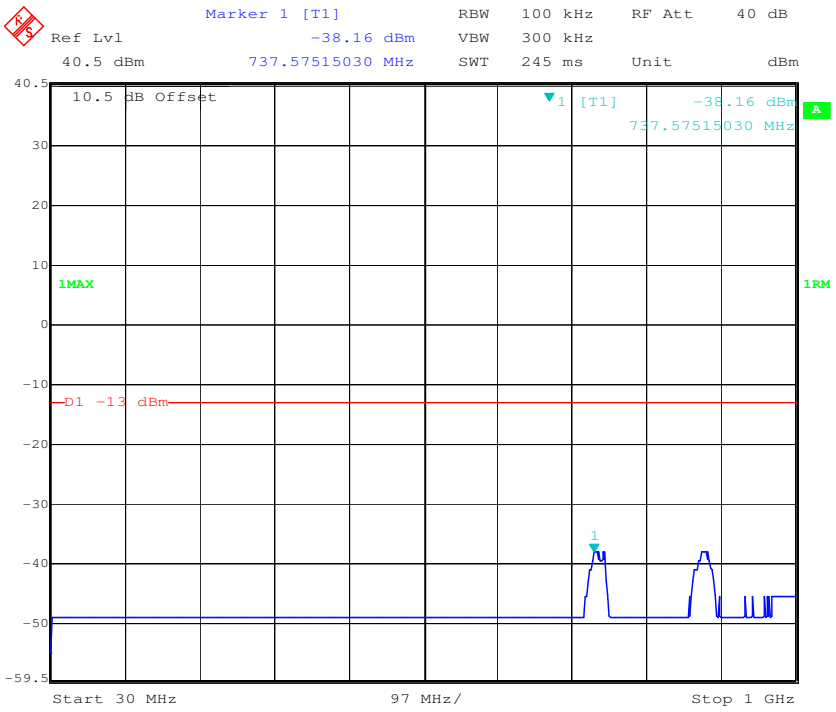
## AWS- GSM-Pre AGC-Low Channel

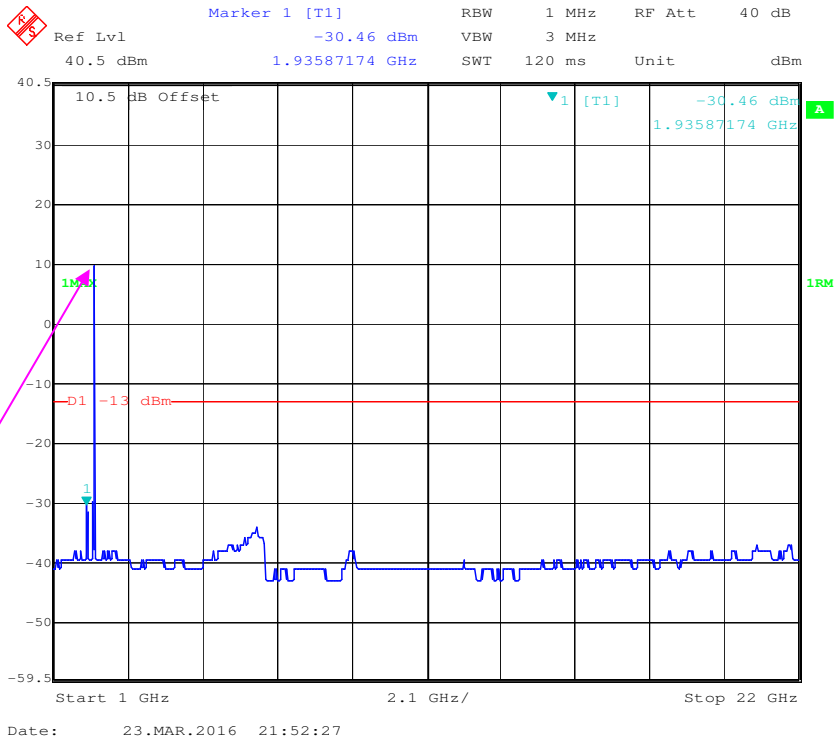



Fundamental test

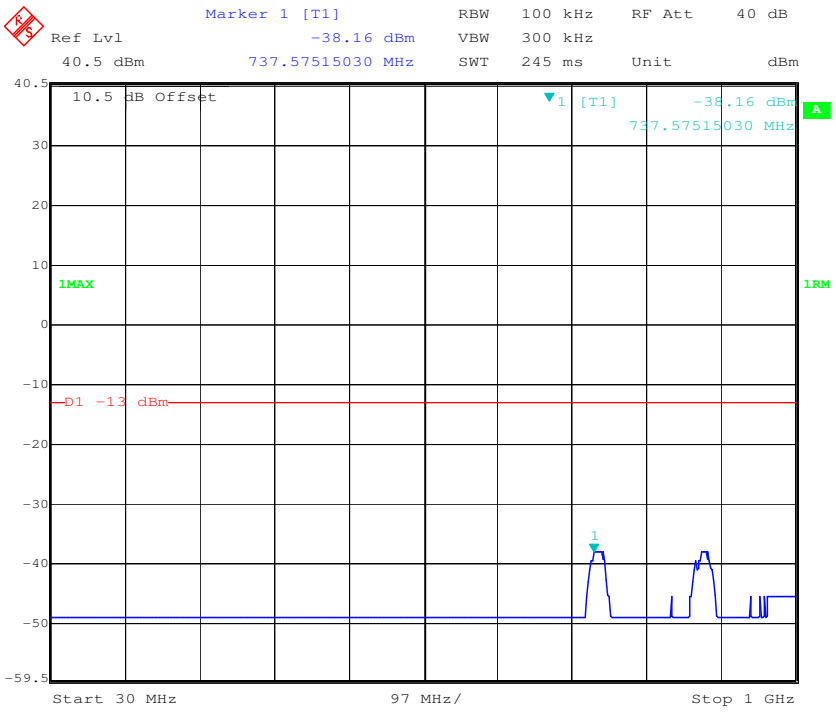
## AWS- GSM-Pre AGC-Middle Channel

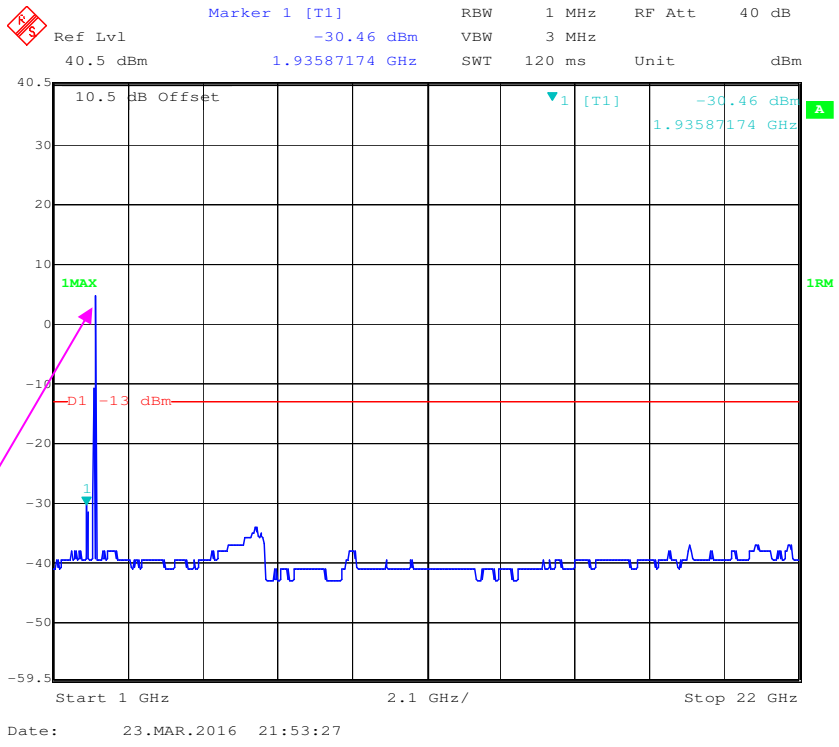



Fundamental test

## AWS- GSM-Pre AGC-High Channel




Fundamental test

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

## Applicable Standard

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

## Test Procedure

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

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

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

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 (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 $\text{Log}_{10}$ (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 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 101120 | 2015-11-03 | 2016-11-03 |
| 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 | 721027 | 2015-08-18 | 2016-08-18 |
| A.H. System | Horn Antenna | SAS-200/571 | 135 | 2015-08-18 | 2018-08-17 |
| Electro-Mechanics | Horn Antenna | 3116 | 9510-2270 | 2013-10-14 | 2016-10-13 |
| R & S | Wideband Radio Communication tester | CMW500 | 1201.002K50 -146520-wh | 2015-06-03 | 2016-06-03 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

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

# Test Data

## Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 |

| Frequency (MHz) | Receiver Reading (dBμV) | Turntable Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 22H/24E/27 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | Limit (dBm) | Margin (dB) |
| **Uplink** | | | | | | | | | | |
| **Lower 700MHz (A+B+C Block) Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 8 GHz** | | | | | | | | | | |
| 208.91 | 35.09 | 221 | 2.5 | H | -61.9 | 0.30 | 0 | -62.20 | -13 | 49.20 |
| 208.91 | 36.91 | 164 | 1.3 | V | -60.1 | 0.30 | 0 | -60.40 | -13 | 47.40 |
| 1414.00 | 47.35 | 90 | 2.2 | H | -61.1 | 1.20 | 6.40 | -55.90 | -13 | 42.90 |
| 1414.00 | 47.51 | 359 | 1.5 | V | -60.9 | 1.20 | 6.40 | -55.70 | -13 | 42.70 |
| **Upper 700MHz (C Block) Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 8 GHz** | | | | | | | | | | |
| 208.91 | 36.49 | 316 | 1.2 | H | -60.5 | 0.30 | 0 | -60.80 | -13 | 47.80 |
| 208.91 | 35.36 | 356 | 1.9 | V | -61.6 | 0.30 | 0 | -61.90 | -13 | 48.90 |
| 1563.00 | 46.48 | 129 | 2.2 | H | -62.3 | 1.30 | 6.70 | -56.90 | -13 | 43.90 |
| 1563.00 | 47.65 | 41 | 2.2 | V | -60.6 | 1.30 | 6.70 | -55.20 | -13 | 42.20 |
| **CELLULAR Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 10 GHz** | | | | | | | | | | |
| 208.91 | 36.80 | 342 | 1.9 | H | -60.2 | 0.30 | 0 | -60.50 | -13 | 47.50 |
| 208.91 | 35.36 | 76 | 2.4 | V | -61.6 | 0.30 | 0 | -61.90 | -13 | 48.90 |
| 1673.00 | 49.96 | 137 | 2.2 | H | -57.4 | 1.60 | 6.90 | -52.10 | -13 | 39.10 |
| 1673.00 | 46.51 | 116 | 2.4 | V | -61.3 | 1.60 | 6.90 | -56.00 | -13 | 43.00 |
| **PCS Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 20 GHz** | | | | | | | | | | |
| 208.91 | 36.21 | 273 | 1.2 | H | -60.8 | 0.30 | 0 | -61.10 | -13 | 48.10 |
| 208.91 | 36.05 | 191 | 2.5 | V | -60.9 | 0.30 | 0 | -61.20 | -13 | 48.20 |
| 3765.00 | 47.77 | 293 | 1.7 | H | -51.7 | 1.90 | 9.90 | -43.70 | -13 | 30.70 |
| 3765.00 | 46.42 | 257 | 1.3 | V | -52.7 | 1.90 | 9.90 | -44.70 | -13 | 31.70 |
| **AWS-1 Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 18 GHz** | | | | | | | | | | |
| 208.91 | 36.91 | 131 | 1.8 | H | -60.1 | 0.30 | 0 | -60.40 | -13 | 47.40 |
| 208.91 | 35.20 | 327 | 2.0 | V | -61.8 | 0.30 | 0 | -62.10 | -13 | 49.10 |
| 3465.00 | 47.60 | 153 | 1.8 | H | -47.9 | 1.90 | 10.00 | -39.80 | -13 | 26.80 |
| 3465.00 | 46.79 | 234 | 1.5 | V | -48.9 | 1.90 | 10.00 | -40.80 | -13 | 27.80 |

| Frequency (MHz) | Receiver Reading (dBμV) | Turntable Angle Degree | Rx Antenna | | Substituted | | | Absolute Level (dBm) | FCC Part 22H/24E/27 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (m) | Polar (H/V) | SG Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | | Limit (dBm) | Margin (dB) |
| **Downlink** | | | | | | | | | | |
| **Lower 700MHz (A+B+C Block) Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 8 GHz** | | | | | | | | | | |
| 208.91 | 35.77 | 280 | 1.5 | H | -61.2 | 0.30 | 0 | -61.50 | -13 | 48.50 |
| 208.91 | 35.52 | 235 | 1.5 | V | -61.5 | 0.30 | 0 | -61.80 | -13 | 48.80 |
| 1474.00 | 46.22 | 12 | 2.1 | H | -62.5 | 1.20 | 6.50 | -57.20 | -13 | 44.20 |
| 1474.00 | 46.53 | 28 | 2.2 | V | -61.2 | 1.20 | 6.50 | -55.90 | -13 | 42.90 |
| **Upper 700MHz (C Block) Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 8 GHz** | | | | | | | | | | |
| 208.91 | 36.95 | 10 | 1.6 | H | -60.0 | 0.30 | 0 | -60.30 | -13 | 47.30 |
| 208.91 | 36.21 | 137 | 1.8 | V | -60.8 | 0.30 | 0 | -61.10 | -13 | 48.10 |
| 1503.00 | 47.70 | 337 | 1.4 | H | -61.1 | 1.20 | 6.50 | -55.80 | -13 | 42.80 |
| 1503.00 | 46.73 | 239 | 1.5 | V | -61.0 | 1.20 | 6.50 | -55.70 | -13 | 42.70 |
| **CELLULAR Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 10 GHz** | | | | | | | | | | |
| 208.91 | 36.54 | 255 | 1.7 | H | -60.5 | 0.30 | 0 | -60.80 | -13 | 47.80 |
| 208.91 | 36.17 | 144 | 1.3 | V | -60.8 | 0.30 | 0 | -61.10 | -13 | 48.10 |
| 1763.00 | 46.77 | 154 | 1.5 | H | -61.1 | 1.40 | 7.10 | -55.40 | -13 | 42.40 |
| 1763.00 | 47.49 | 200 | 2.3 | V | -60.3 | 1.40 | 7.10 | -54.60 | -13 | 41.60 |
| **PCS Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 20 GHz** | | | | | | | | | | |
| 208.91 | 35.49 | 327 | 2.0 | H | -61.5 | 0.30 | 0 | -61.80 | -13 | 48.80 |
| 208.91 | 35.95 | 61 | 1.2 | V | -61.0 | 0.30 | 0 | -61.30 | -13 | 48.30 |
| 3925.00 | 47.60 | 158 | 2.0 | H | -51.3 | 2.20 | 9.90 | -43.60 | -13 | 30.60 |
| 3925.00 | 46.72 | 13 | 1.6 | V | -51.8 | 2.20 | 9.90 | -44.10 | -13 | 31.10 |
| **AWS-1 Band** | | | | | | | | | | |
| **Test frequency range: 30MHz - 22 GHz** | | | | | | | | | | |
| 208.91 | 35.34 | 91 | 1.4 | H | -61.7 | 0.30 | 0 | -62.00 | -13 | 49.00 |
| 208.91 | 35.82 | 354 | 2.0 | V | -61.2 | 0.30 | 0 | -61.50 | -13 | 48.50 |
| 4290.00 | 47.00 | 86 | 2.2 | H | -48.1 | 2.60 | 9.80 | -40.90 | -13 | 27.90 |
| 4290.00 | 47.80 | 268 | 1.2 | V | -47.6 | 2.60 | 9.80 | -40.40 | -13 | 27.40 |

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

# FCC §2.1053, §22.917 & §24.238 & §27.53 - BAND EDGES & INTERMODULATION

## Applicable Standard

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

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.

## Test Procedure

Please refer to KDB 935210 D05 Indus Booster Basic Meas v01 clause 3.6.2

## 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 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2016-06-15 | 2017-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2016-06-15 | 2017-06-15 |
| WEINSCHEL | 10dB Attenuator | 5324 | AU0709 | 2015-06-18 | 2016-06-18 |
| WEINSCHEL | 10dB Attenuator | 5324 | AU0709 | 2016-06-18 | 2017-06-18 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

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

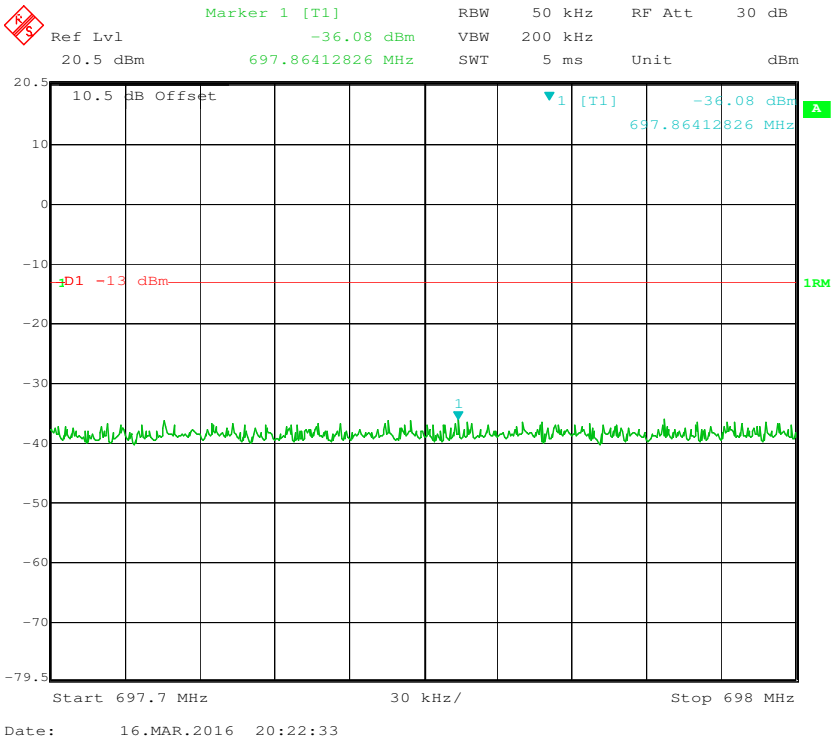
## Test Data

### Environmental Conditions

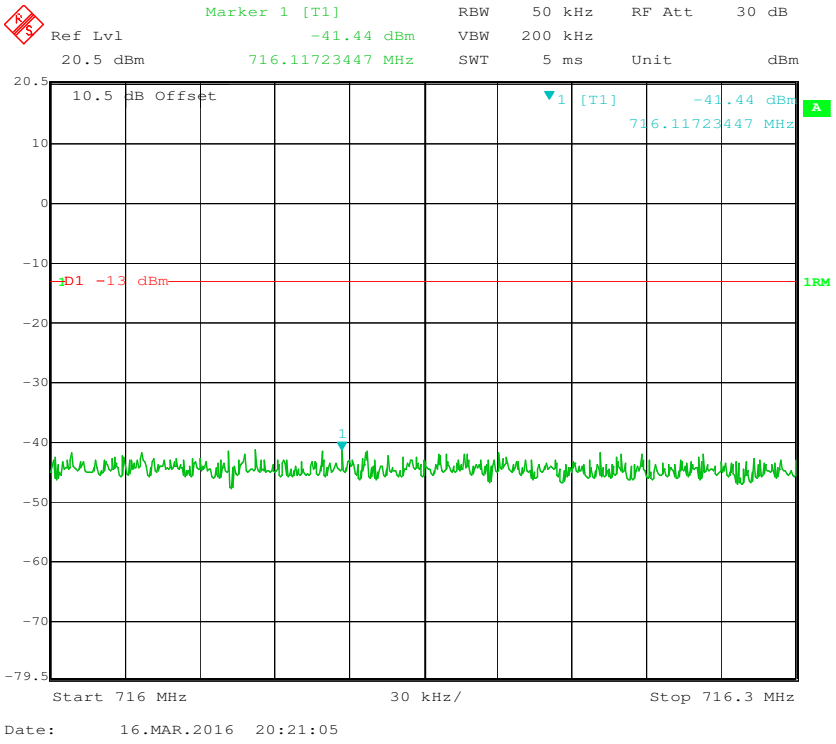
| | |
|---|---|
| **Temperature:** | 22~24 |

**For Band Edge:**
**Uplink:**

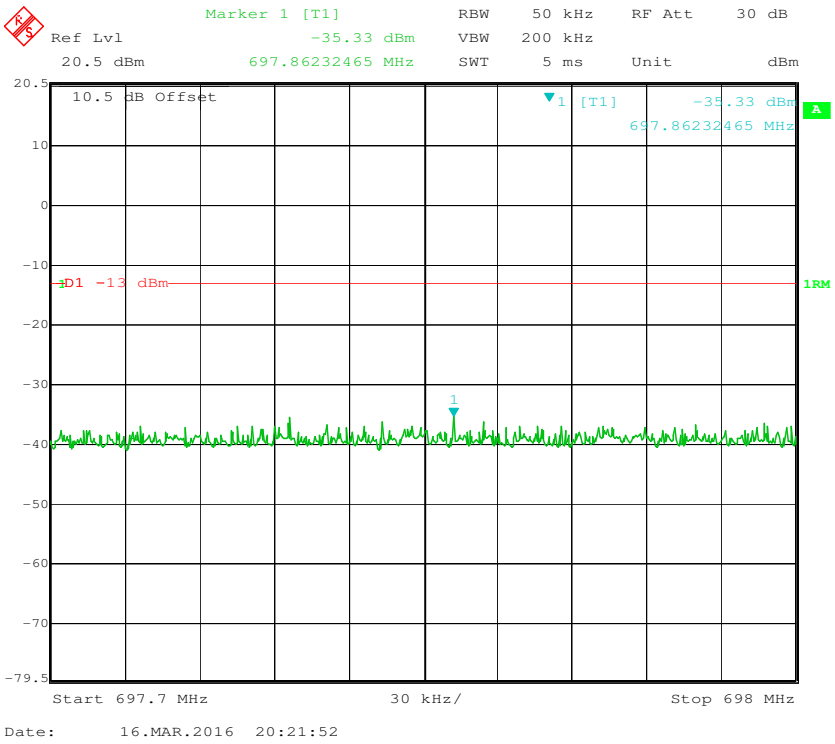
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-Pre AGC**



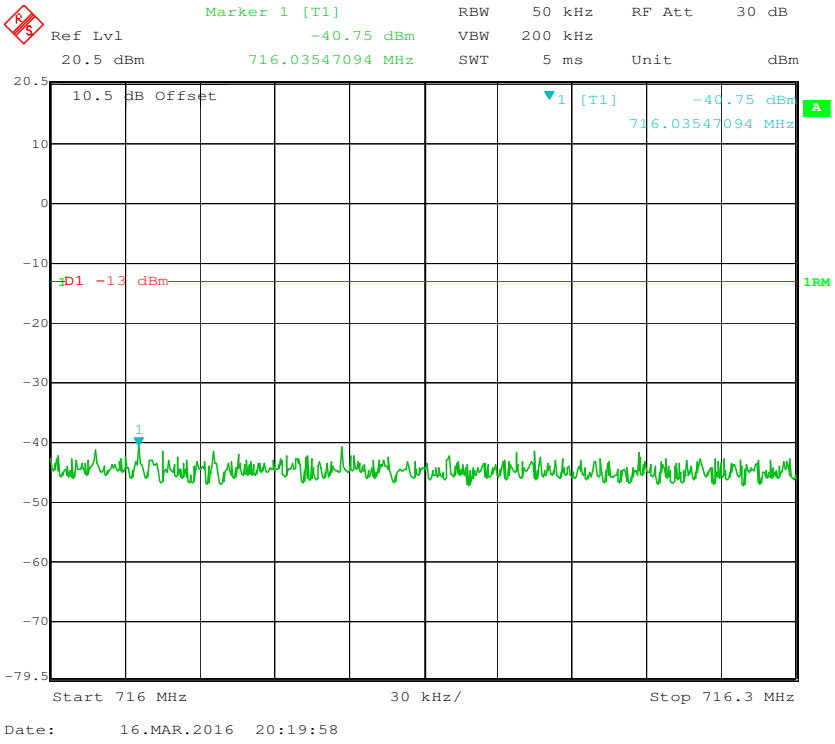

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-Pre AGC**



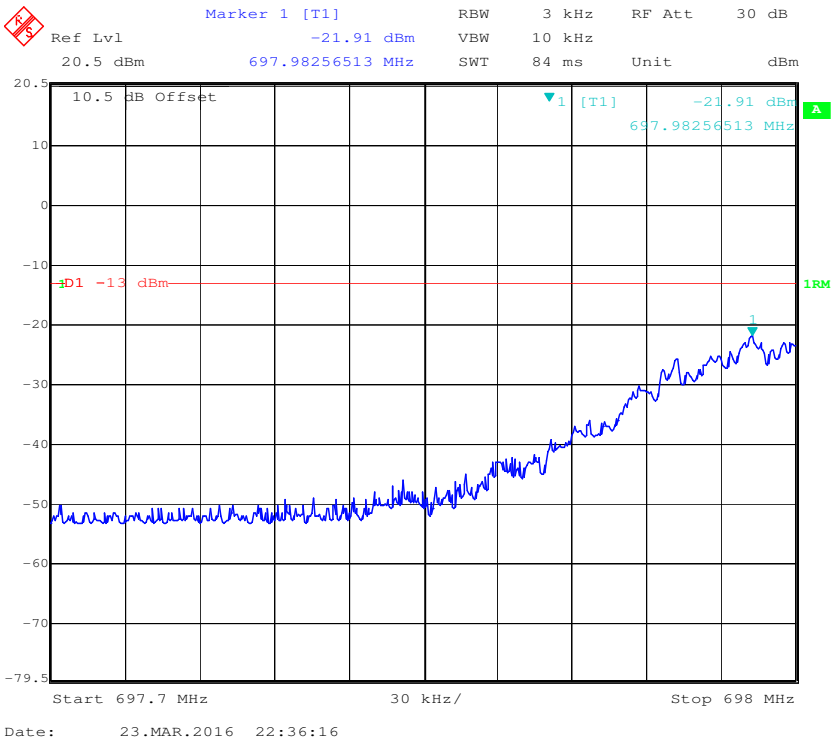
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-3dB above AGC**



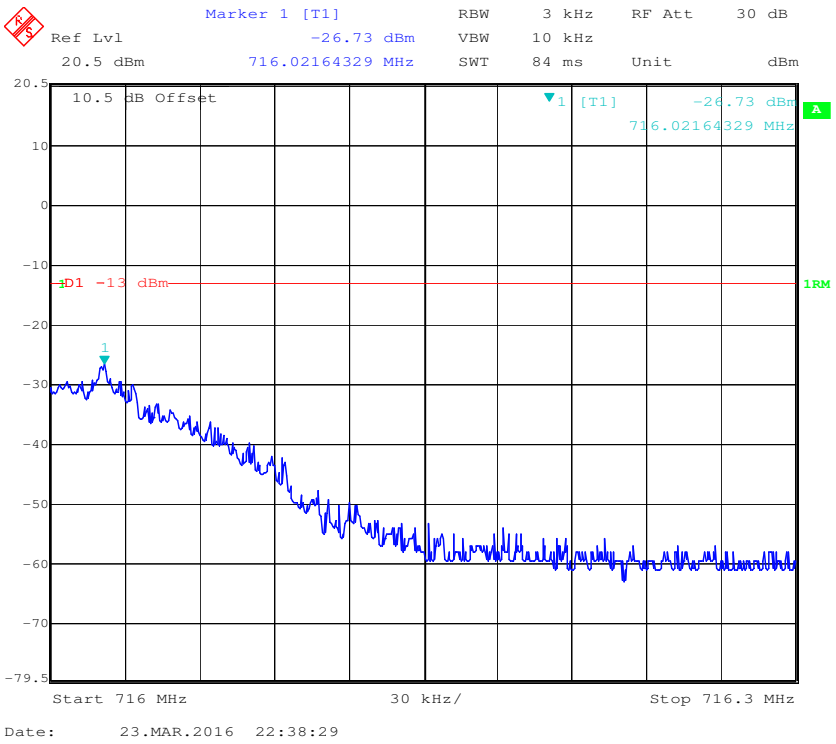

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-3dB above AGC**



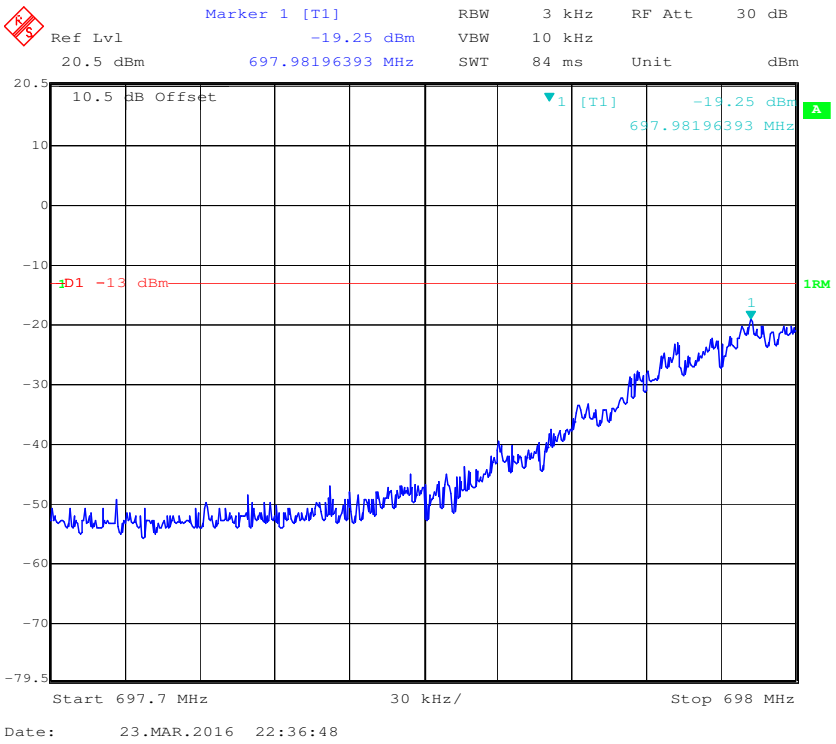
## Upper 700MHz (C Block) Band, Left Band Edge for GSM-Pre AGC



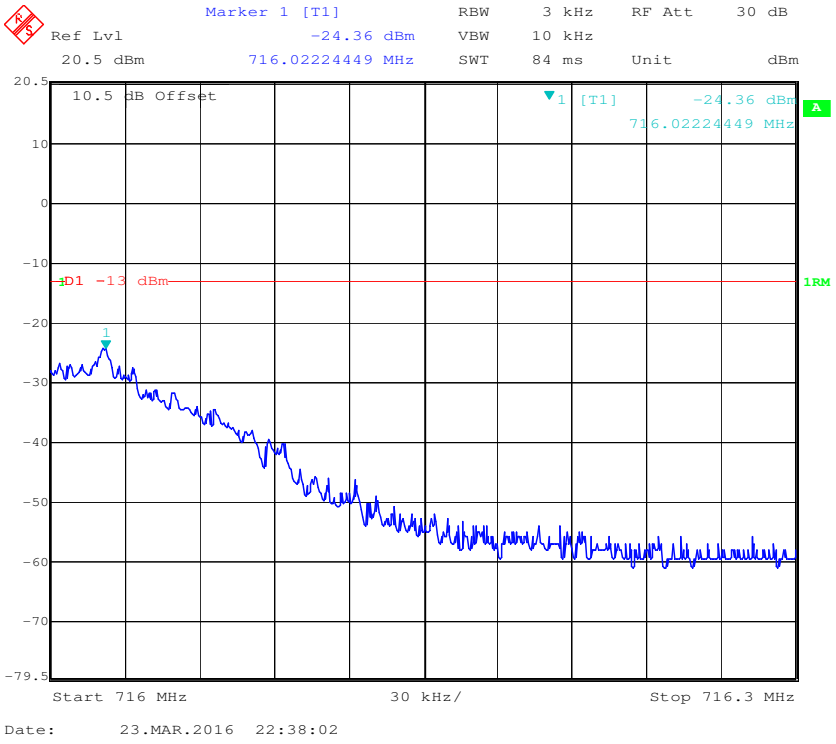

## Upper 700MHz (C Block) Band, Right Band Edge for GSM-Pre AGC



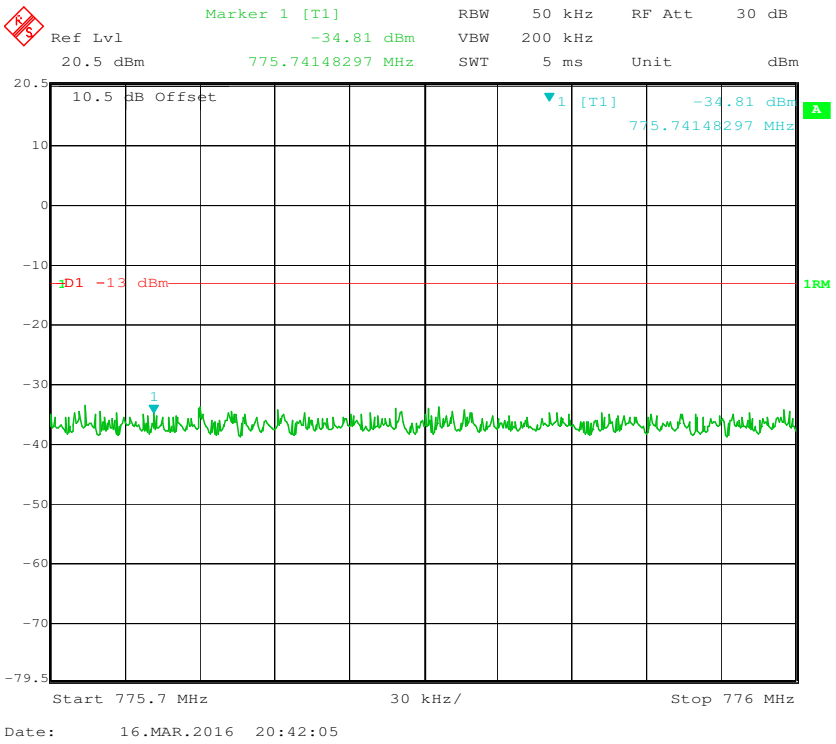
**Upper 700MHz (C Block) Band, Left Band Edge for GSM-3dB above AGC**



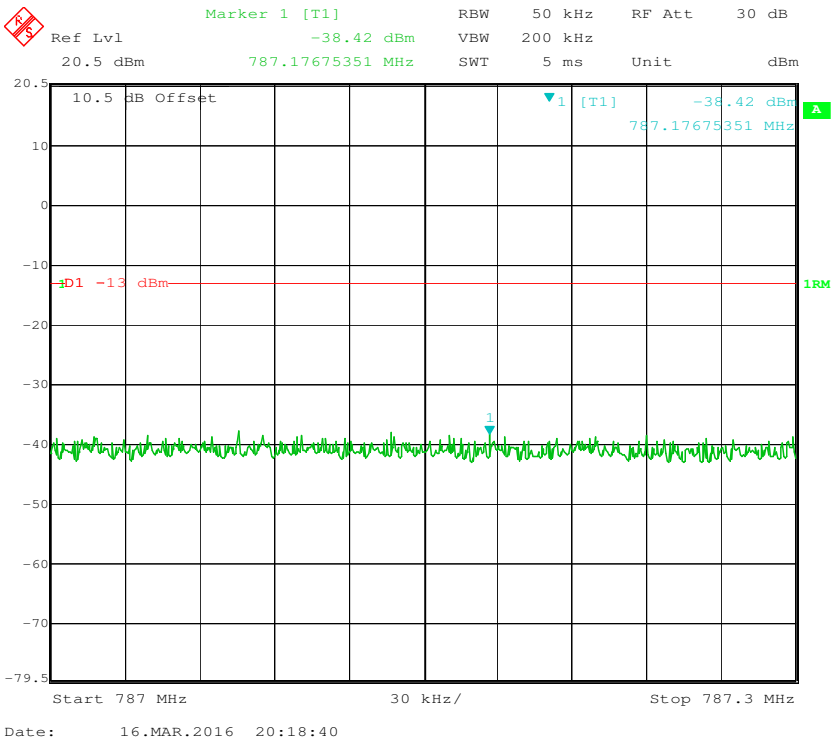

**Upper 700MHz (C Block) Band, Right Band Edge for GSM-3dB above AGC**



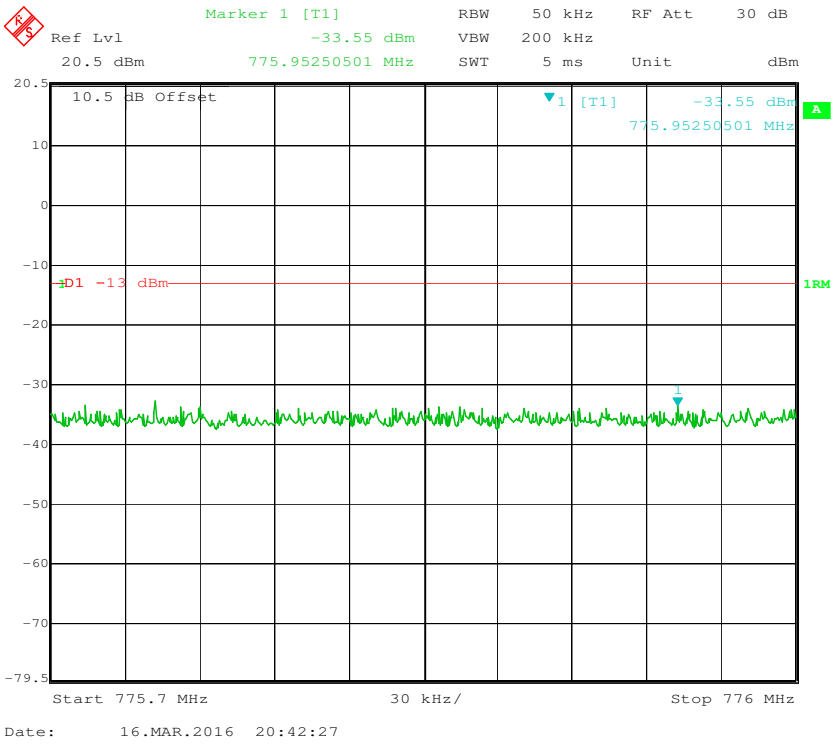
## Upper 700MHz (C Block) Band, Left Band Edge for AWGN-Pre AGC



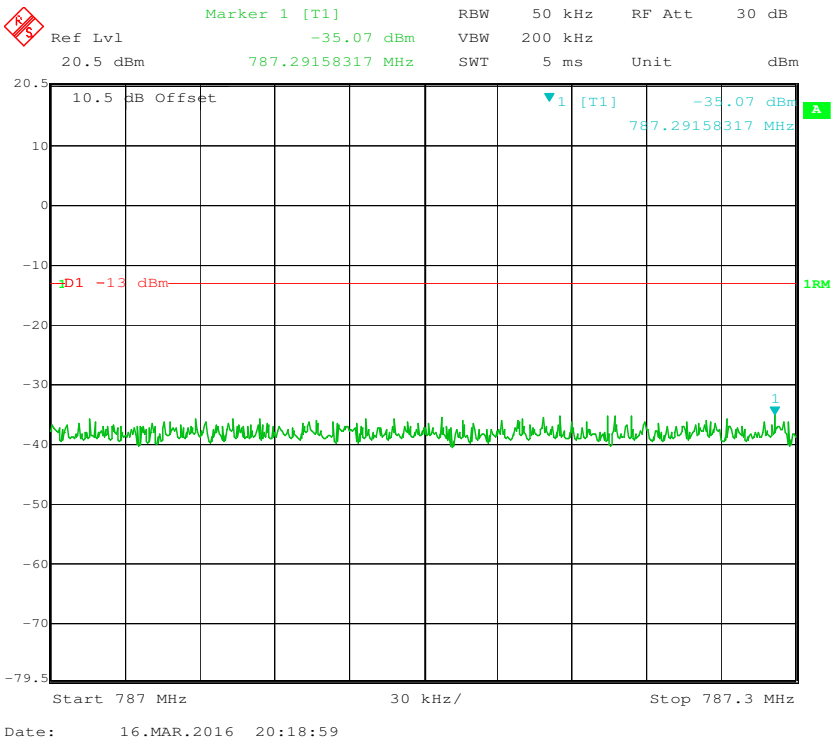

## Upper 700MHz (C Block) Band, Right Band Edge for AWGN-Pre AGC



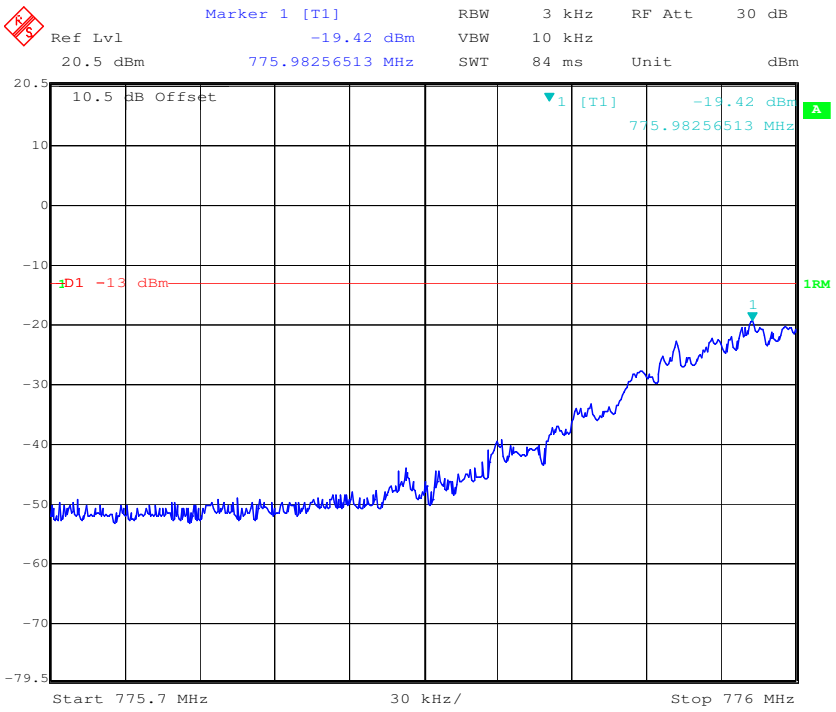
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-3dB above AGC**



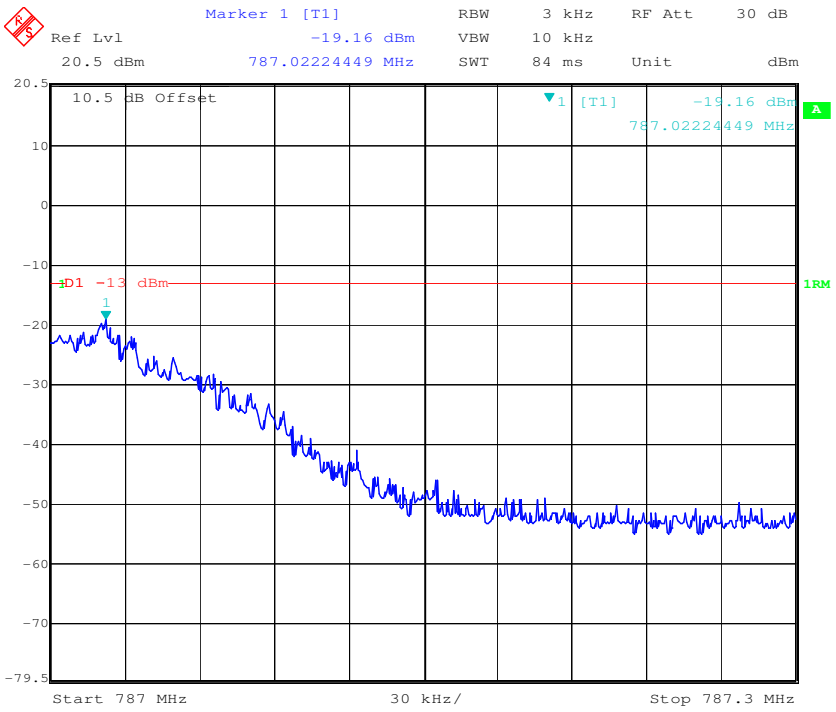

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-3dB above AGC**



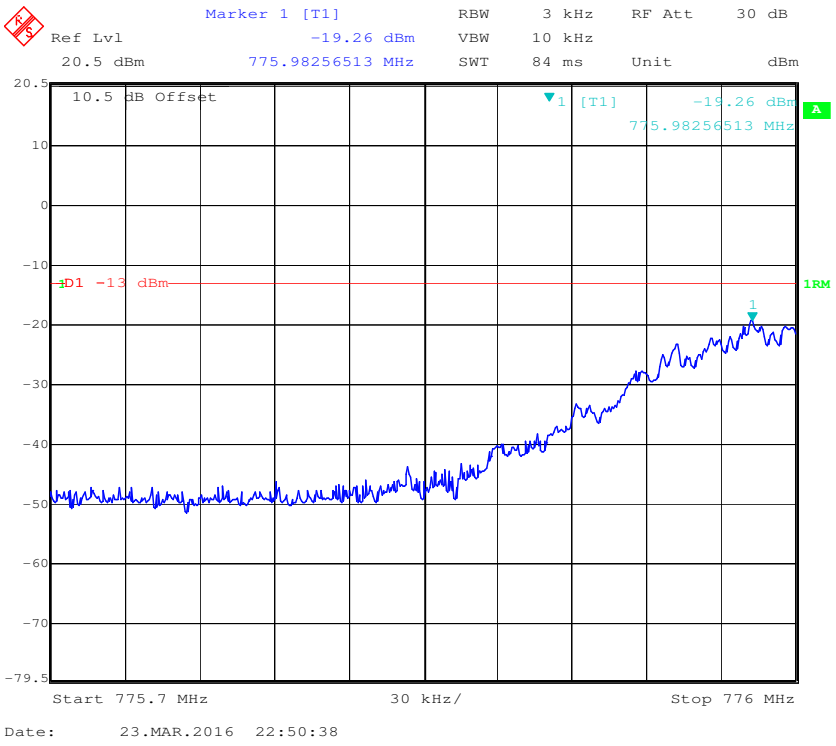
## Upper 700MHz (C Block) Band, Left Band Edge for GSM-Pre AGC



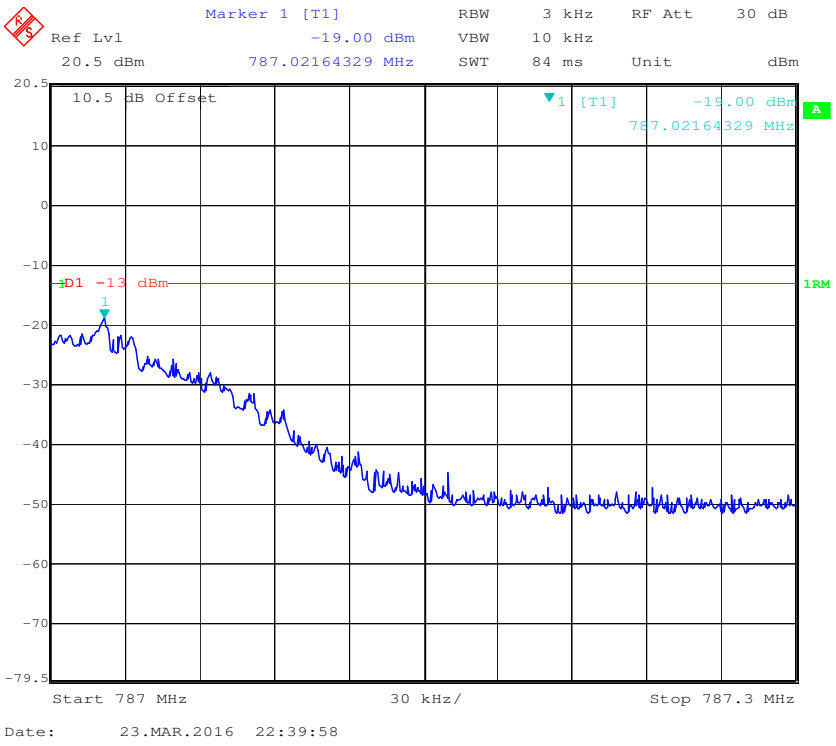

## Upper 700MHz (C Block) Band, Right Band Edge for GSM-Pre AGC



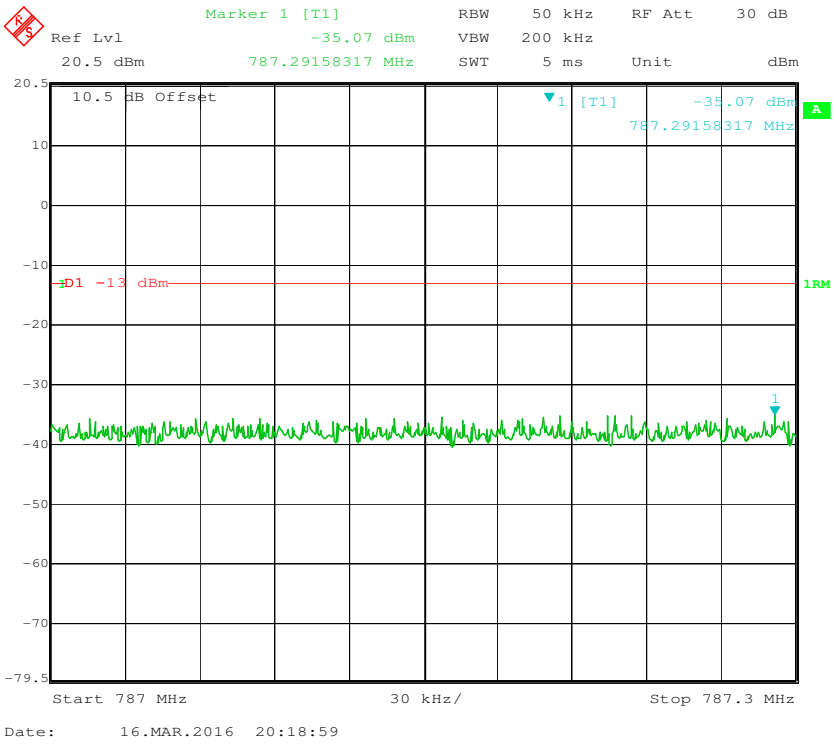
**Upper 700MHz (C Block) Band, Left Band Edge for GSM-3dB above AGC**



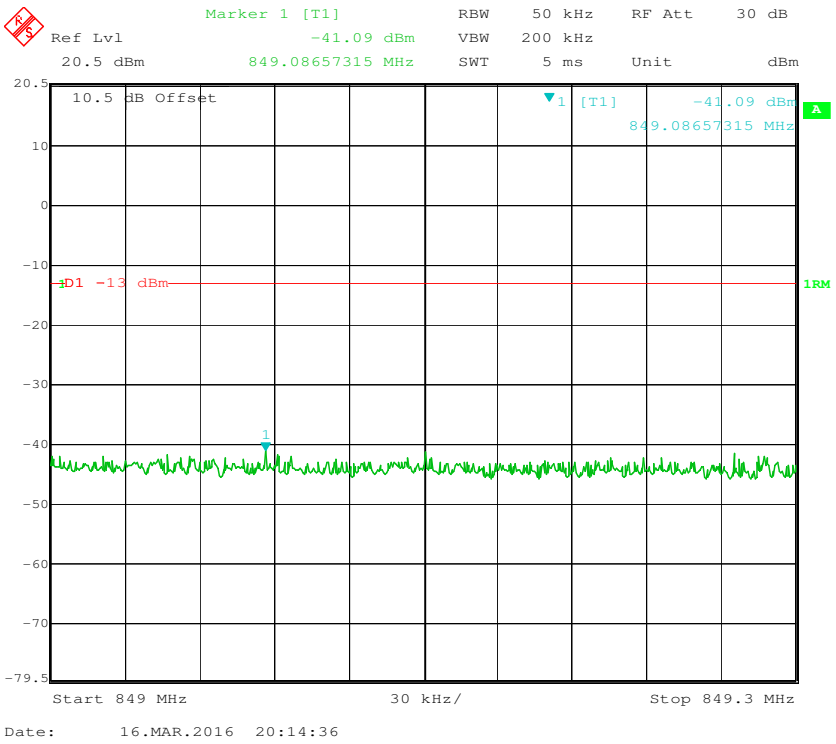

**Upper 700MHz (C Block) Band, Right Band Edge for GSM-3dB above AGC**



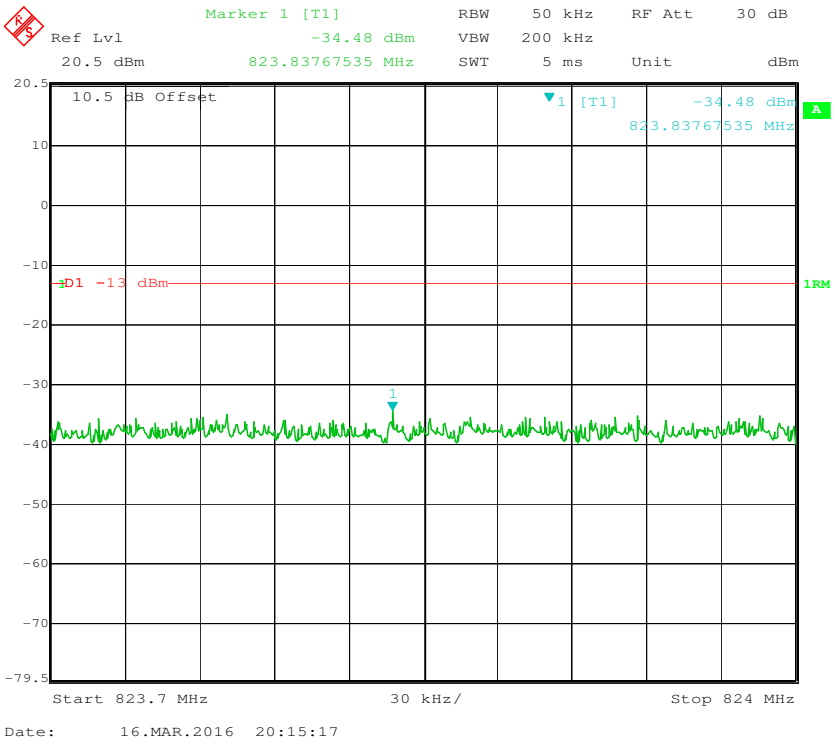
## CELLULAR Band, Left Band Edge for AWGN-Pre AGC



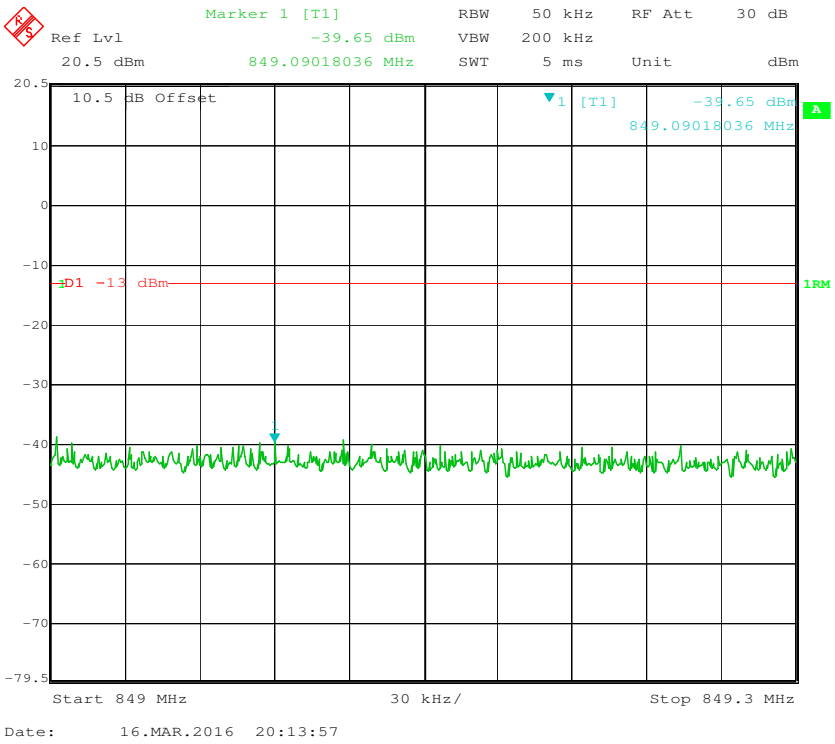

## CELLULAR Band, Right Band Edge for AWGN-Pre AGC



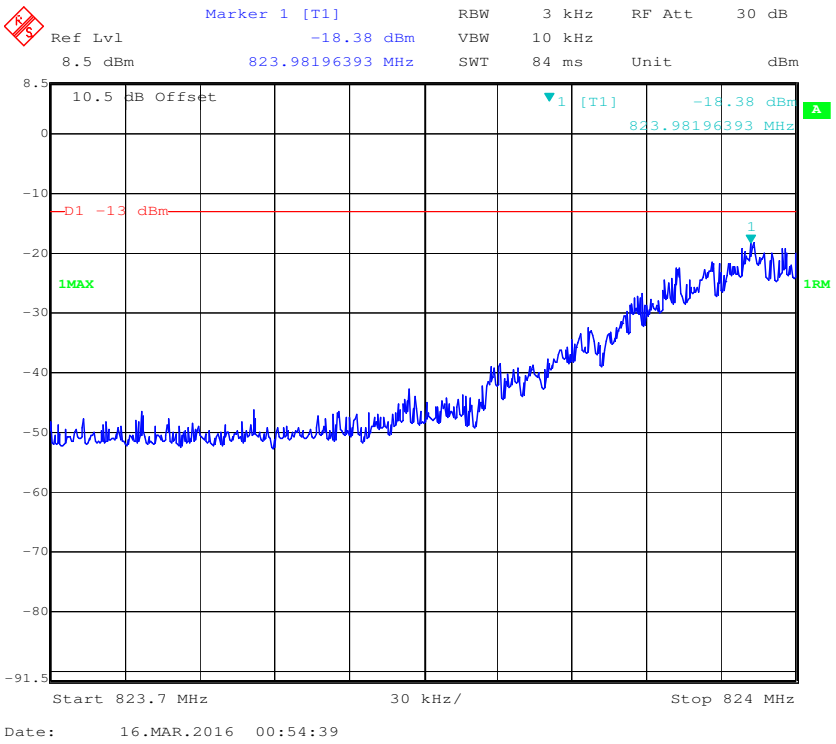
## CELLULAR Band, Left Band Edge for AWGN-3dB above AGC



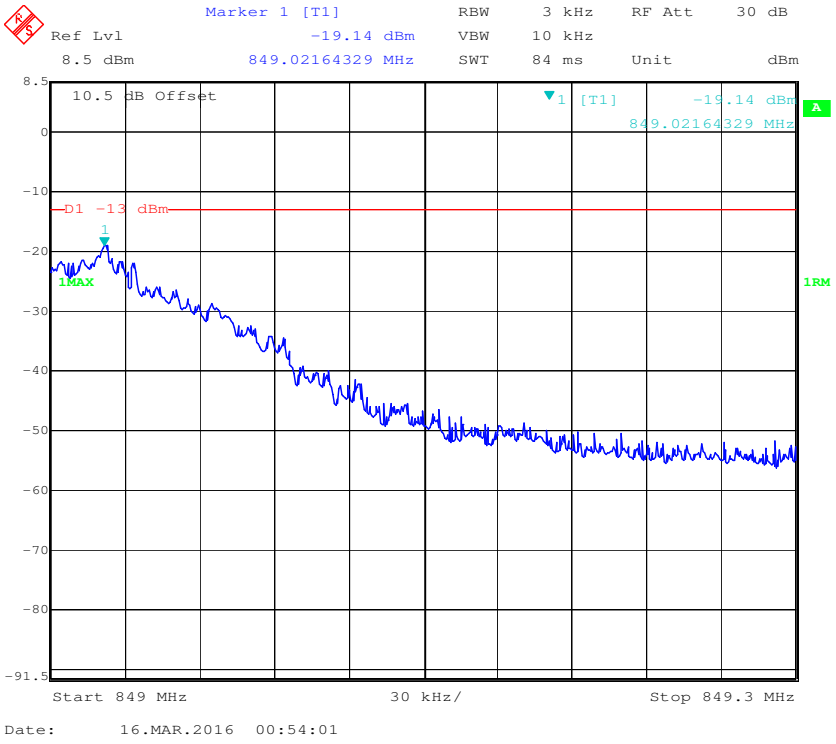

## CELLULAR Band, Right Band Edge for AWGN-3dB above AGC



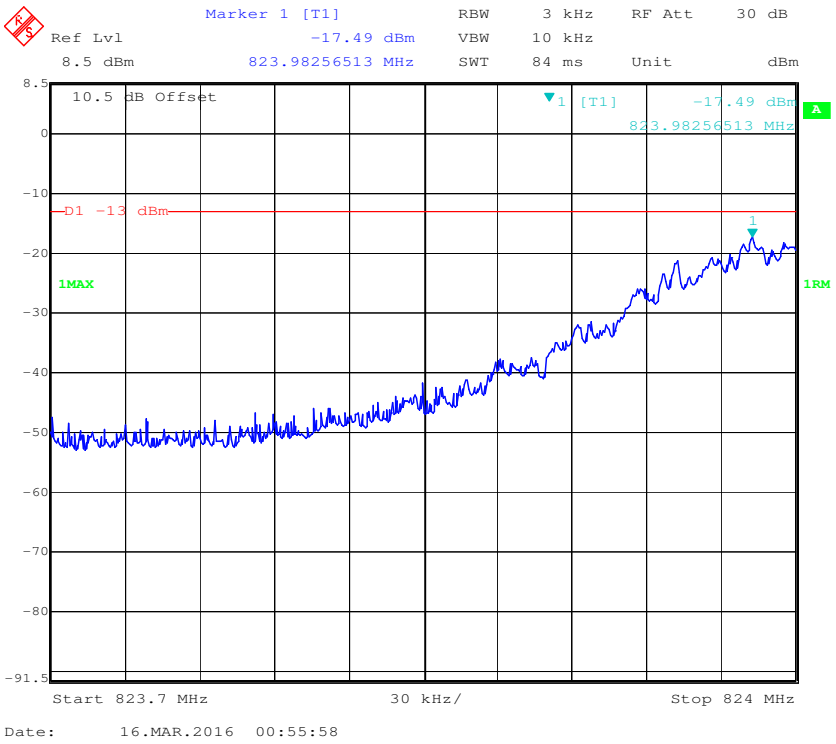
## CELLULAR Band, Left Band Edge for GSM-Pre AGC



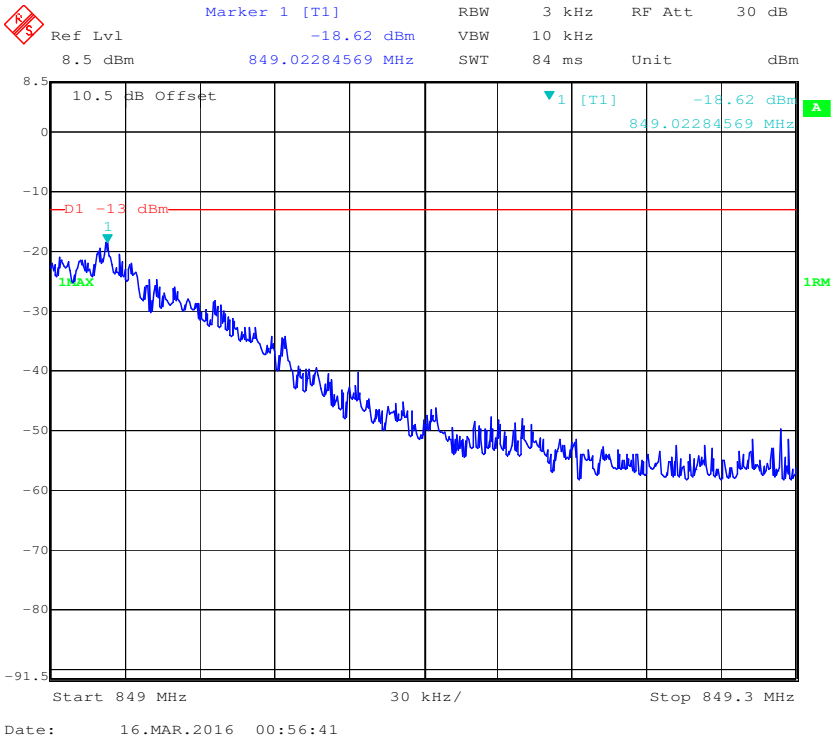

## CELLULAR Band, Right Band Edge for GSM-Pre AGC



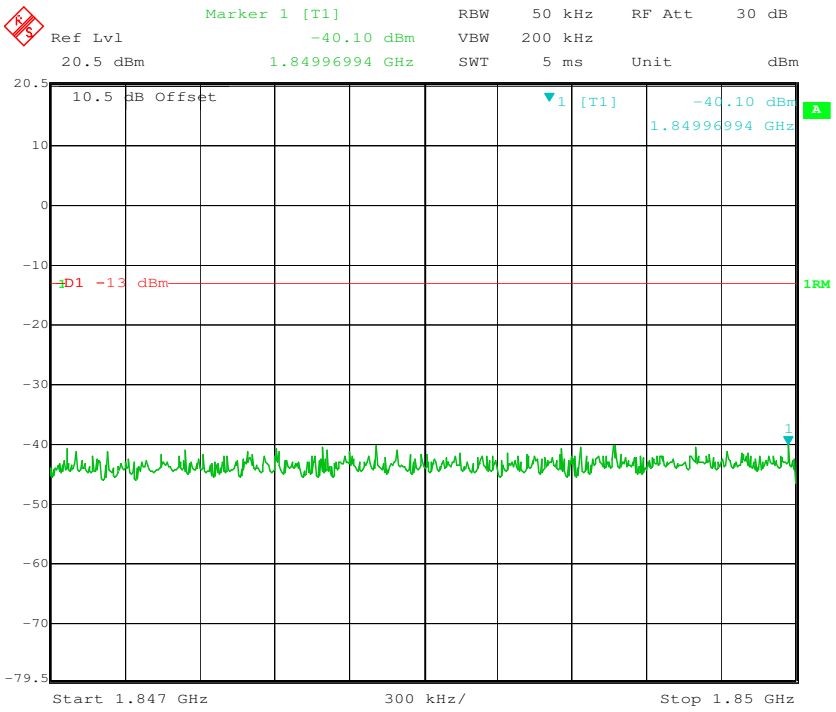
## CELLULAR Band, Left Band Edge for GSM-3dB above AGC



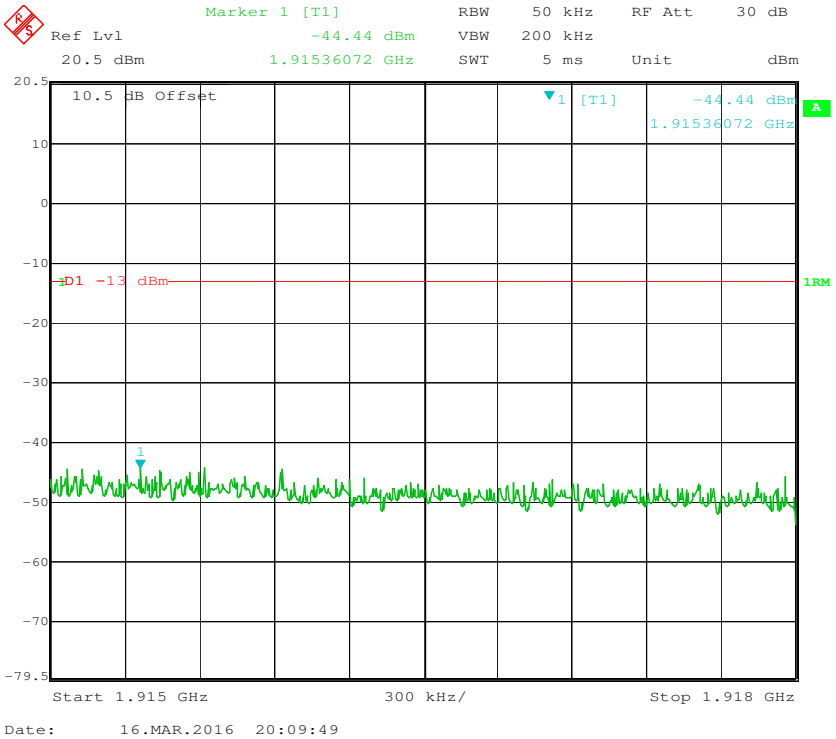

## CELLULAR Band, Right Band Edge for GSM-3dB above AGC



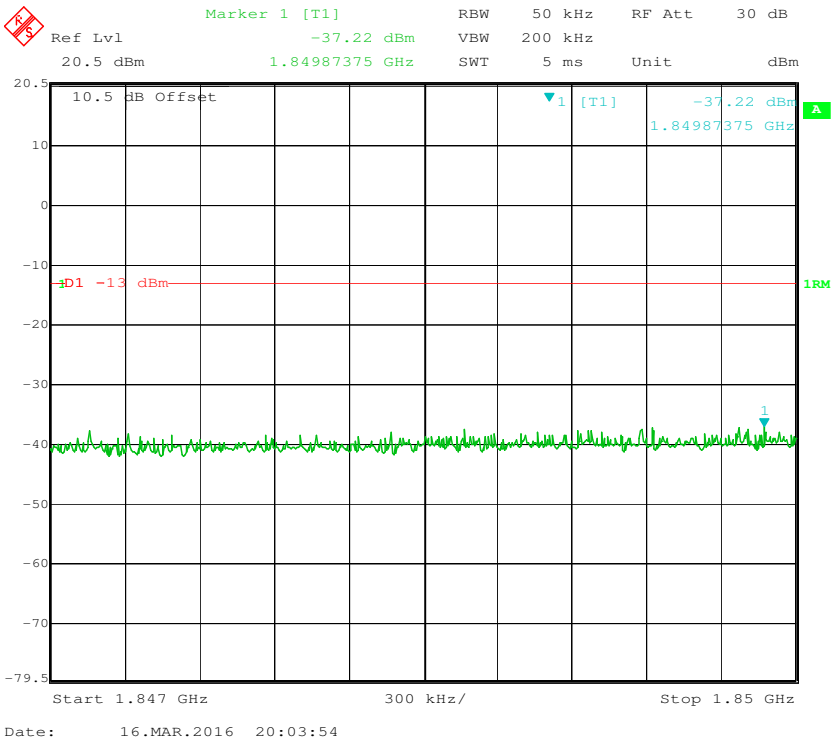
## PCS Band, Left Band Edge for AWGN-Pre AGC



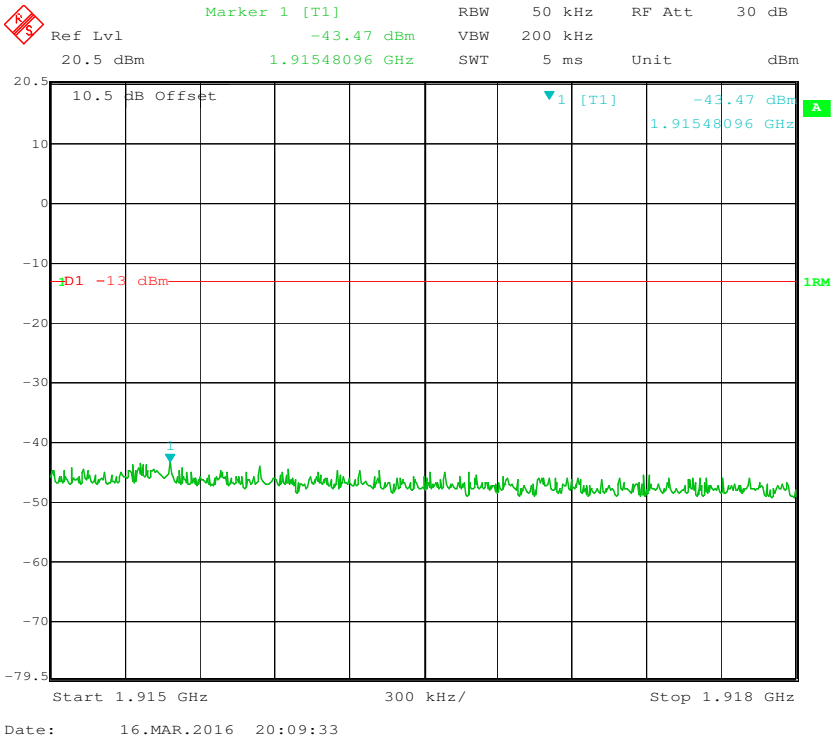

## PCS Band, Right Band Edge for AWGN-Pre AGC



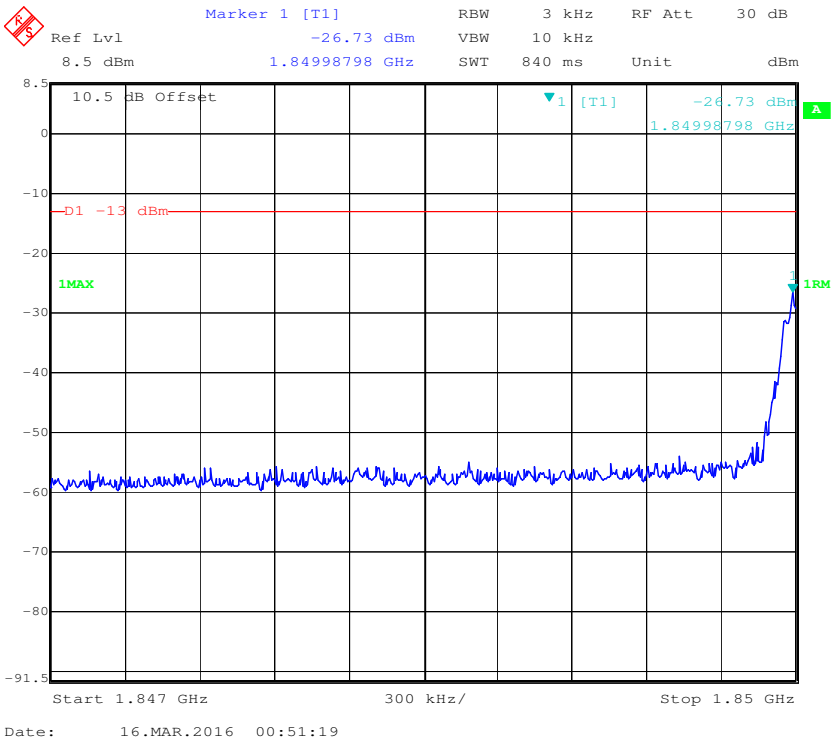
## PCS Band, Left Band Edge for AWGN-3dB above AGC



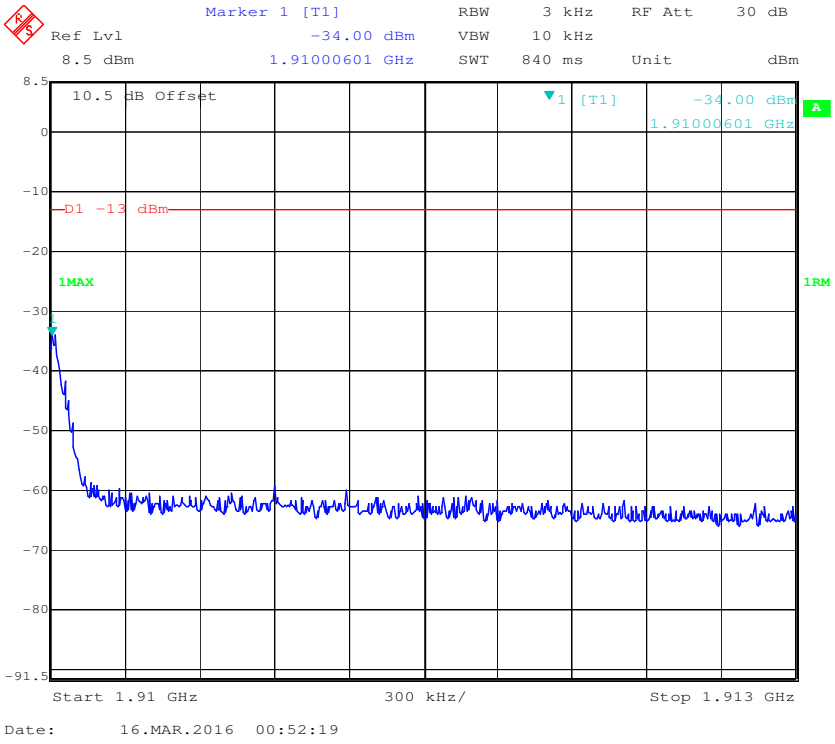

## PCS Band, Right Band Edge for AWGN-3dB above AGC



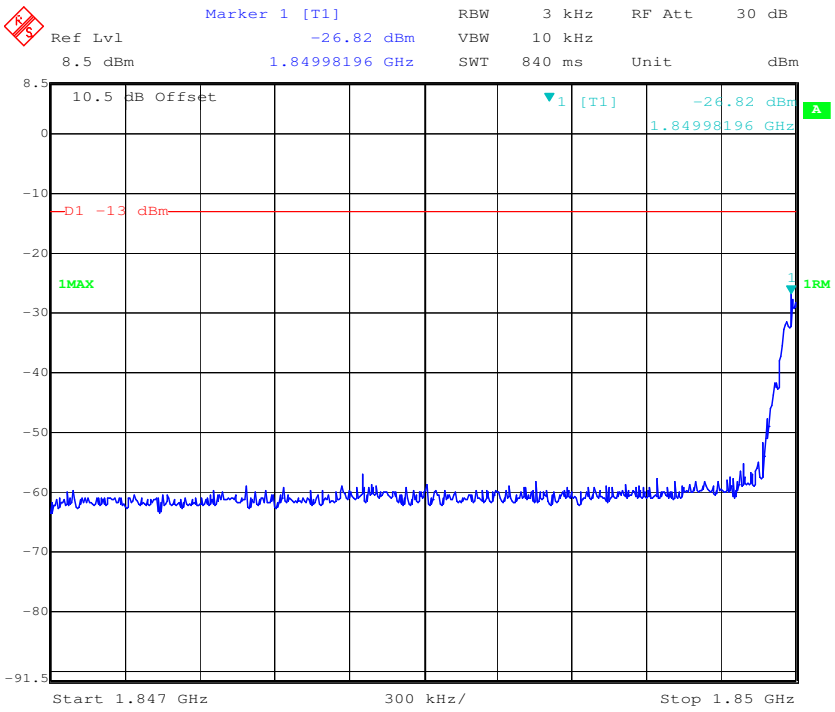
## PCS Band, Left Band Edge for GSM-Pre AGC



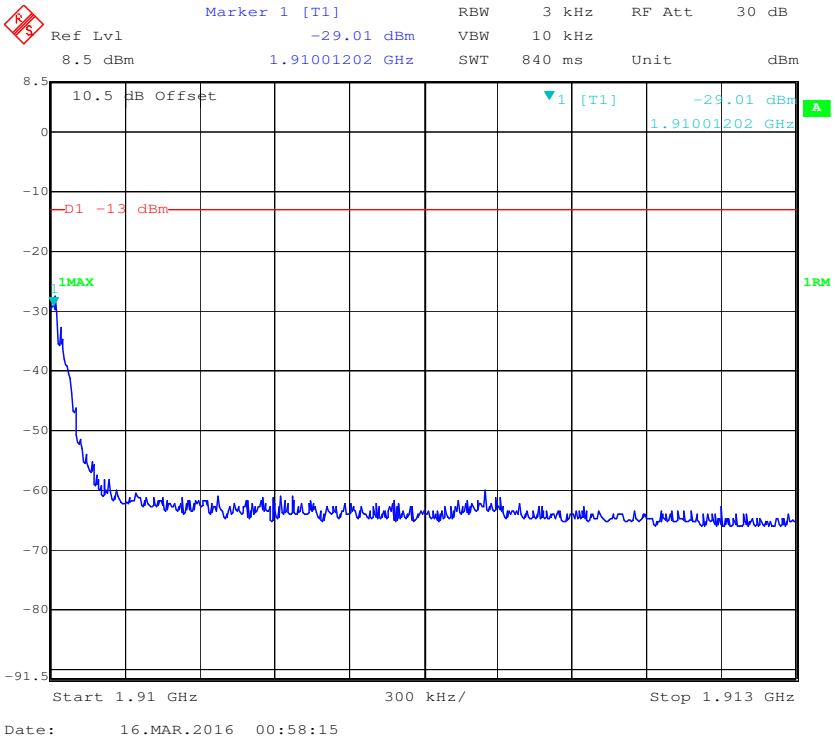

## PCS Band, Right Band Edge for GSM-Pre AGC



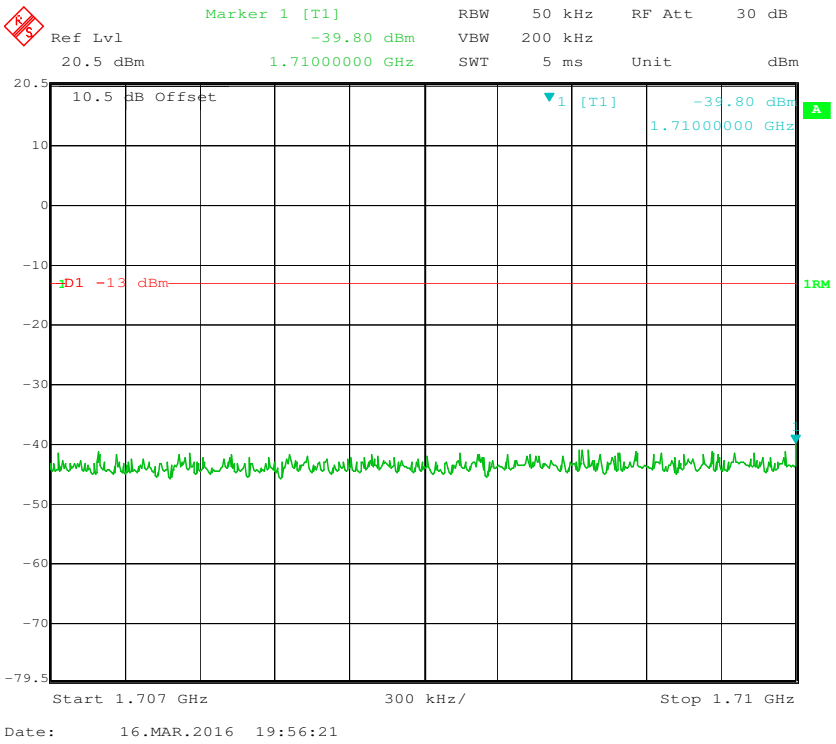
## PCS Band, Left Band Edge for GSM-3dB above AGC



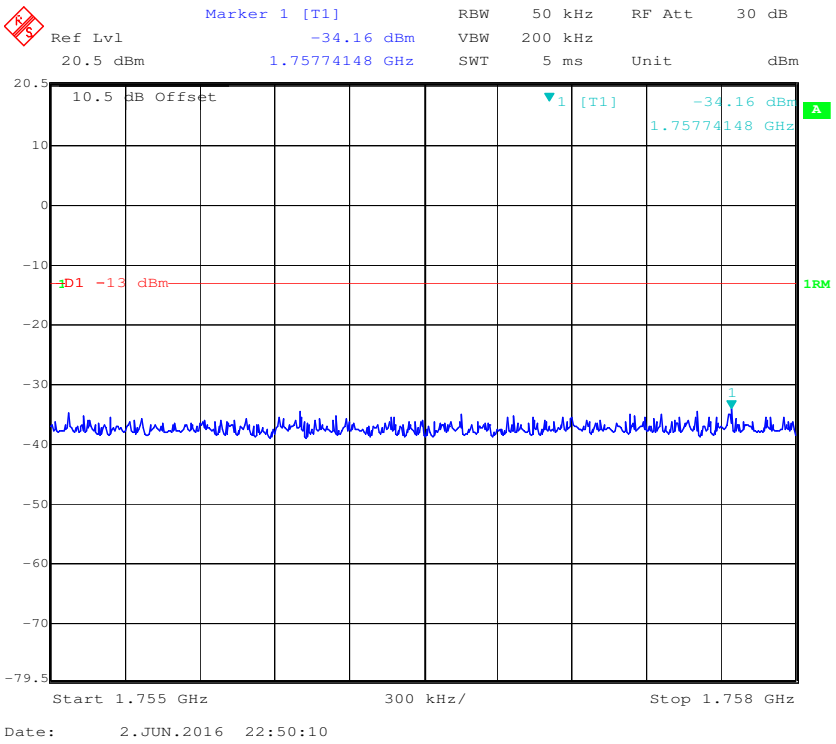

## PCS Band, Right Band Edge for GSM-3dB above AGC



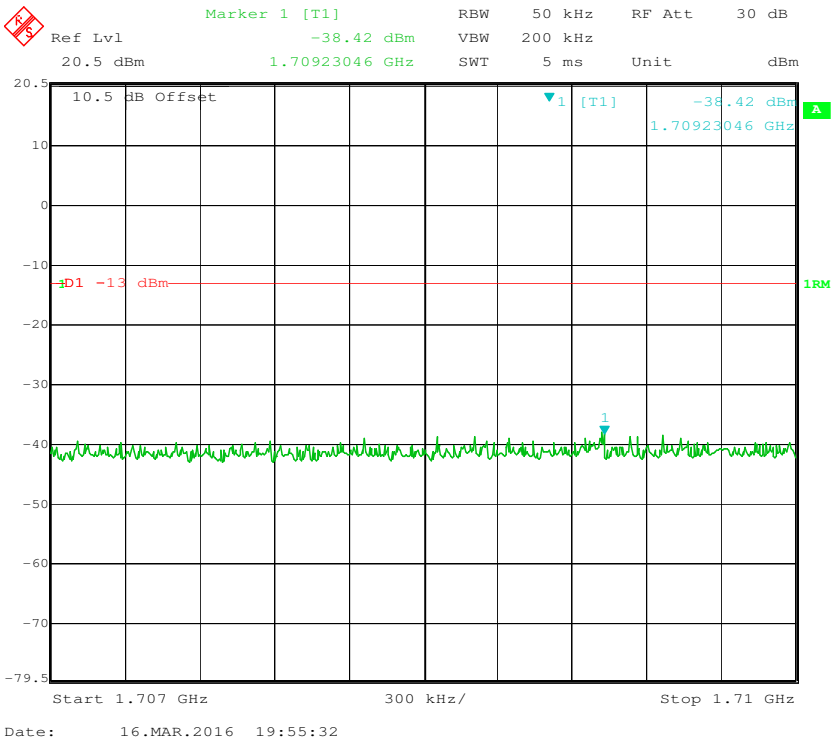
## AWS-1 Band, Left Band Edge for AWGN-Pre AGC



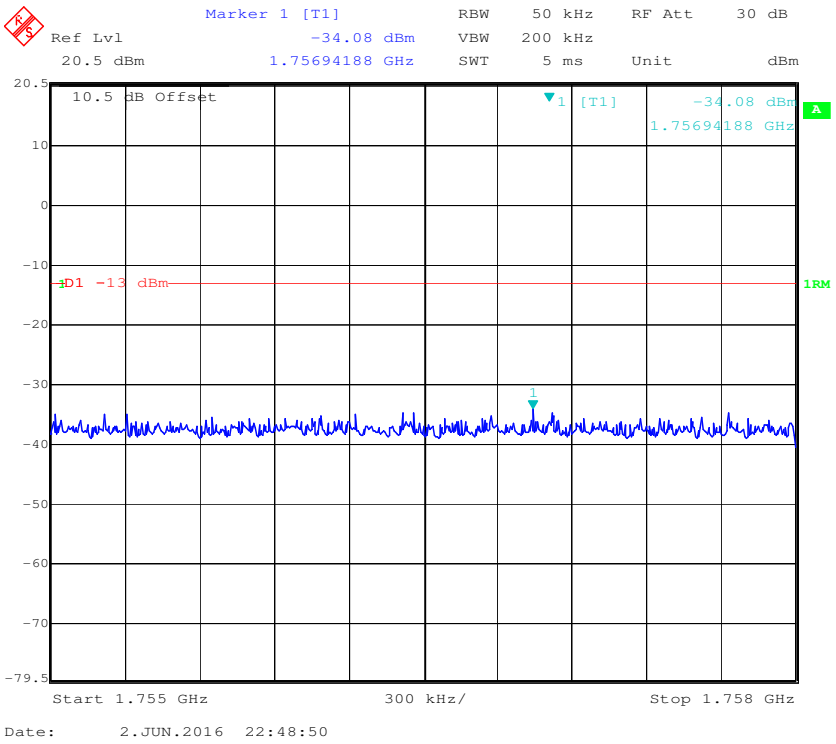

## AWS-1 Band, Right Band Edge for AWGN-Pre AGC



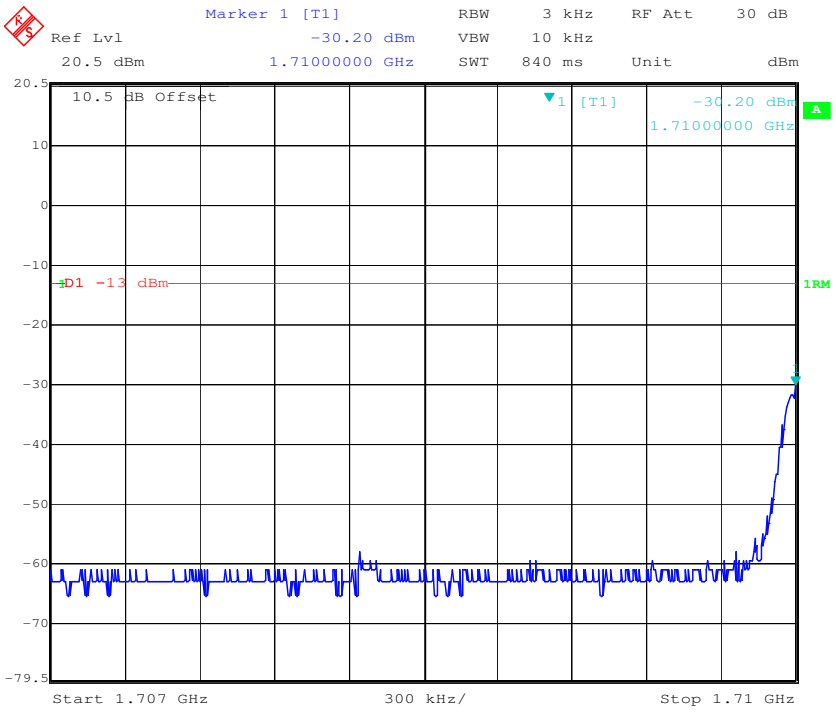
## AWS-1 Band, Left Band Edge for AWGN-3dB above AGC



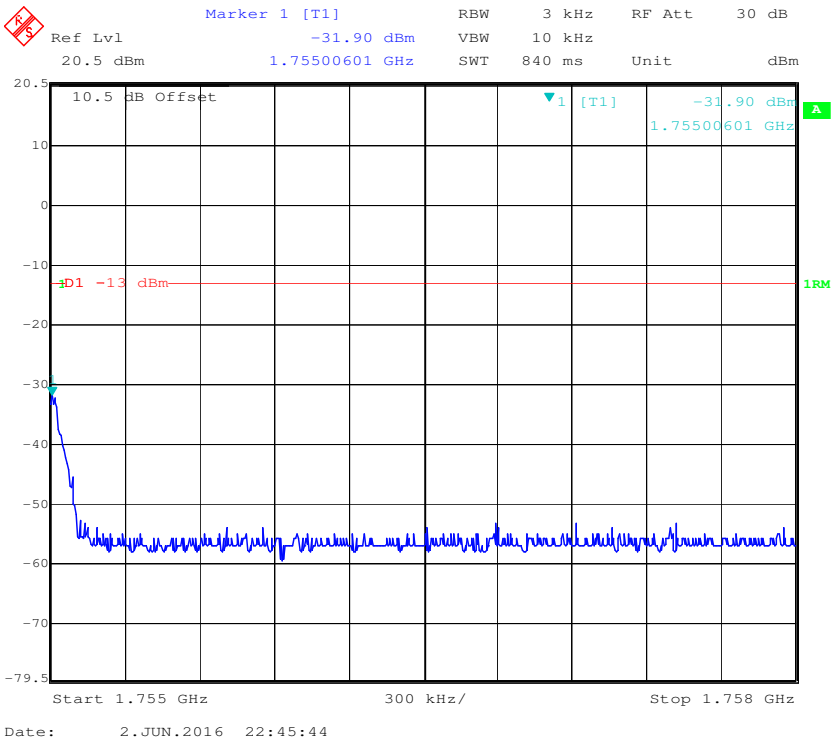

## AWS-1 Band, Right Band Edge for AWGN-3dB above AGC



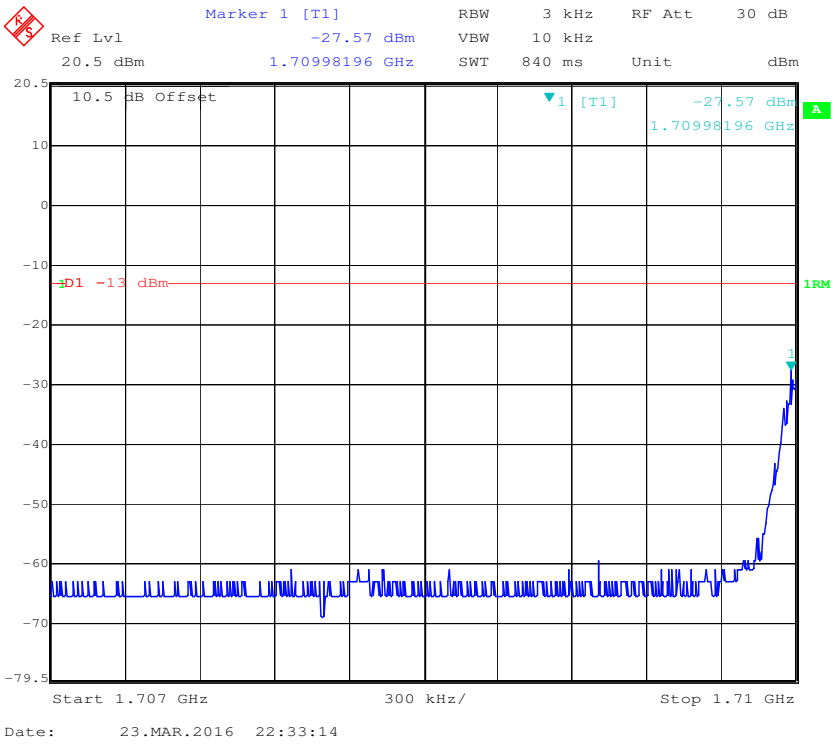
## AWS-1 Band, Left Band Edge for GSM-Pre AGC



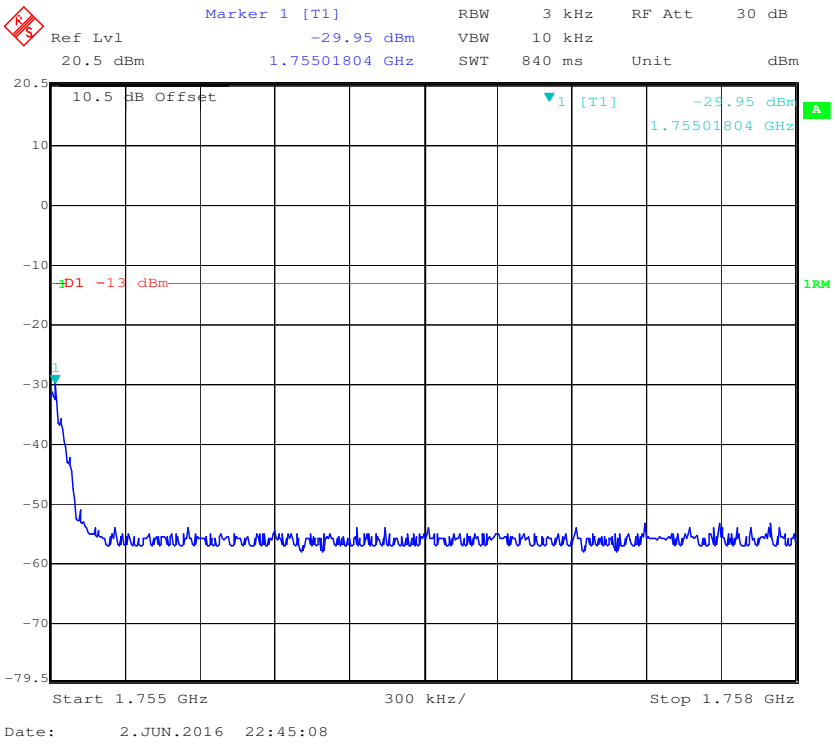

## AWS-1 Band, Right Band Edge for GSM-Pre AGC



## AWS-1 Band, Left Band Edge for GSM-3dB above AGC

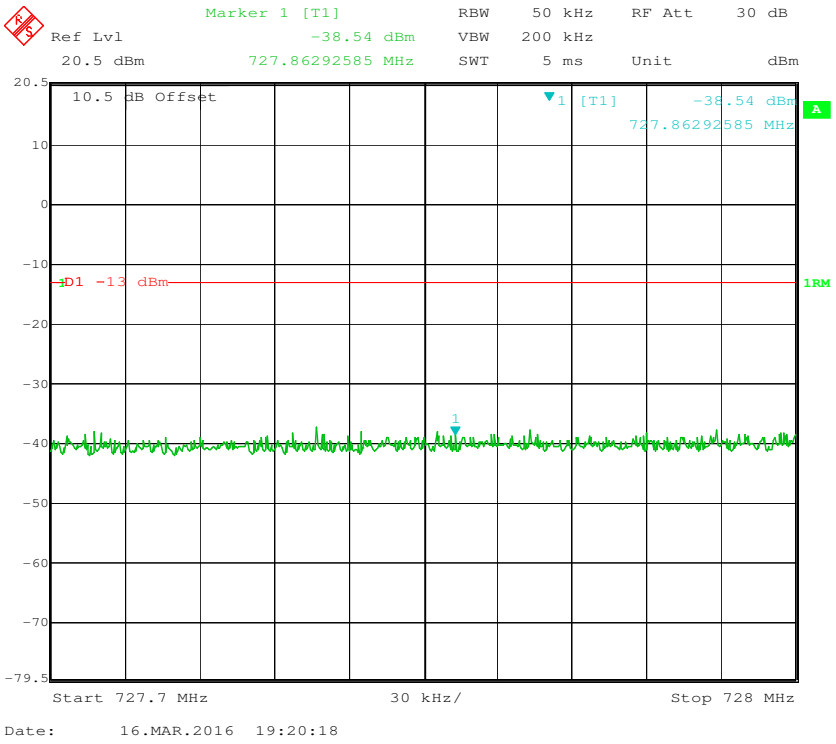



## AWS-1 Band, Right Band Edge for GSM-3dB above AGC

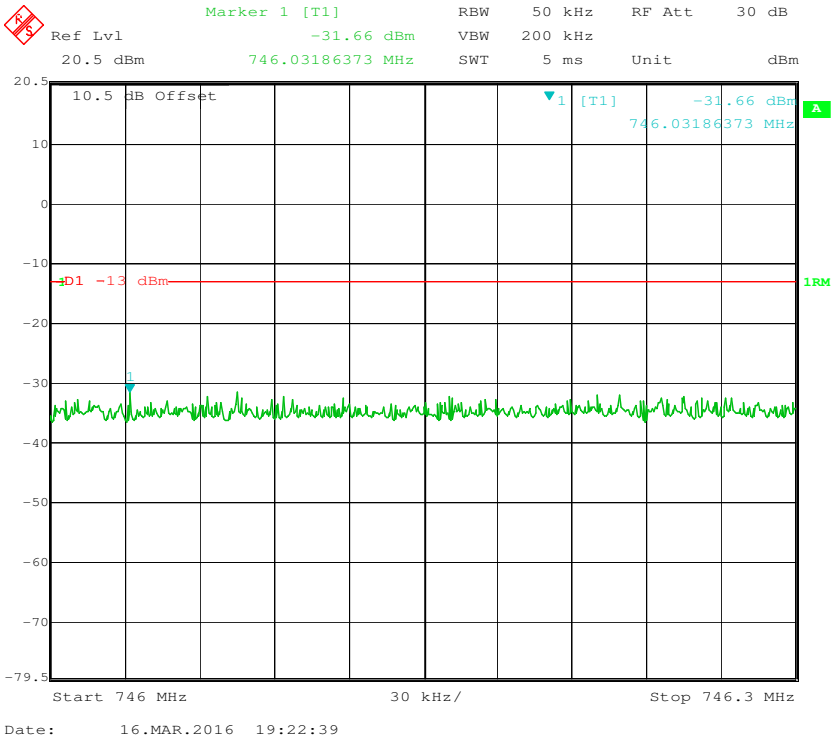


**Downlink:**

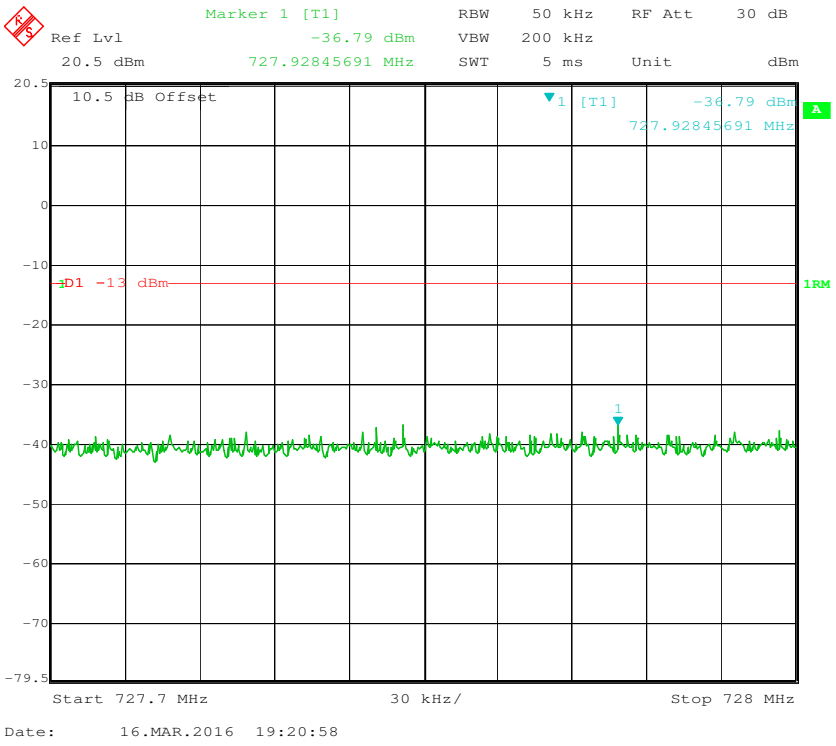
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-Pre AGC**



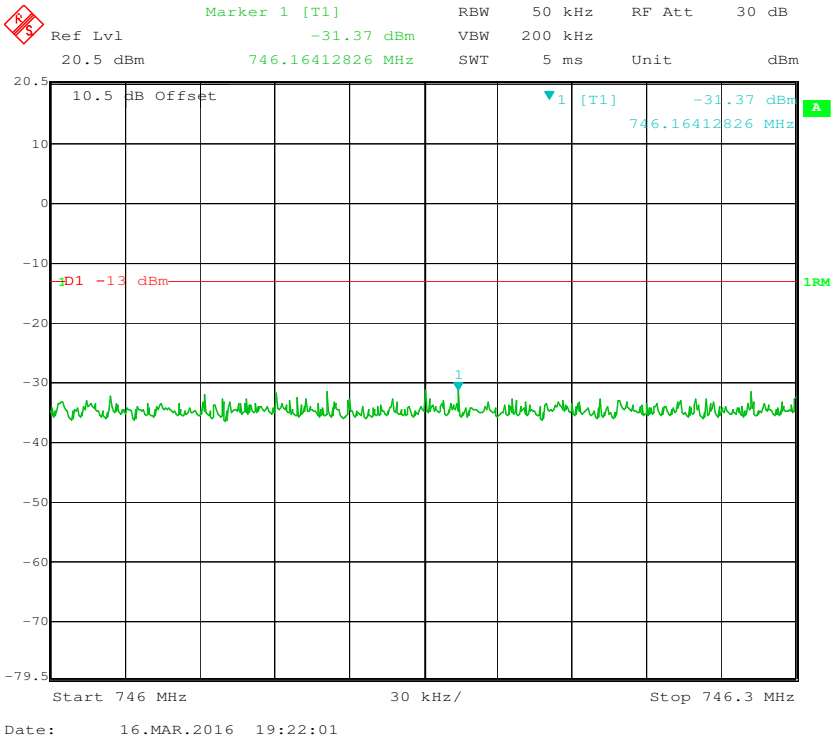

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-Pre AGC**



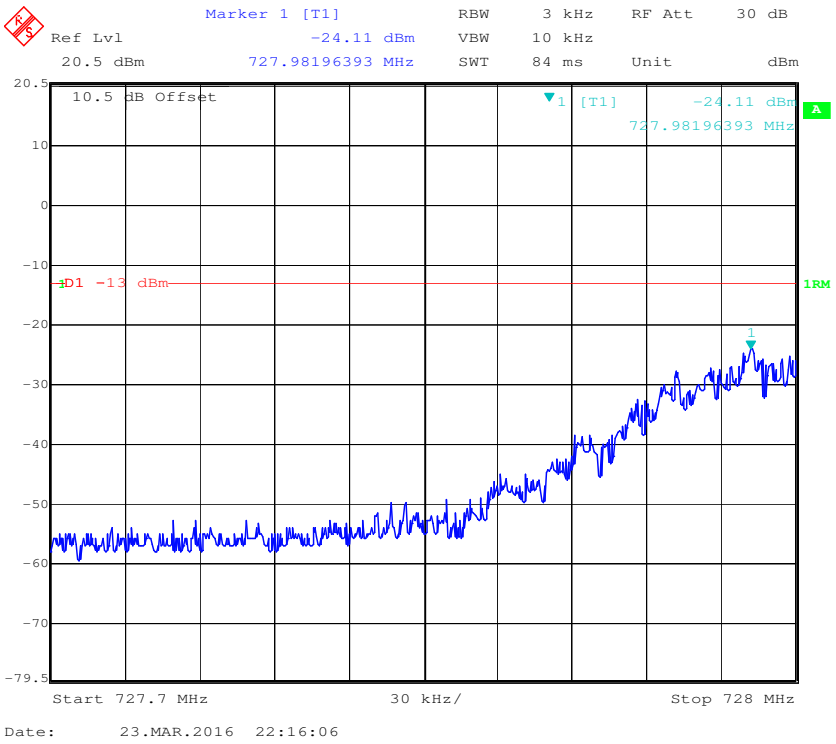
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-3dB above AGC**



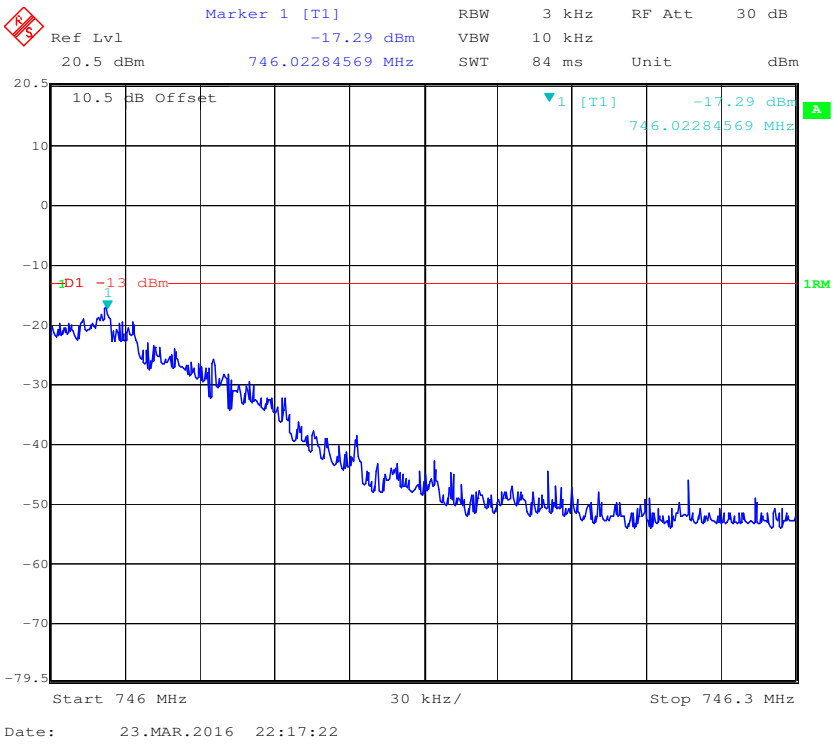

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-3dB above AGC**



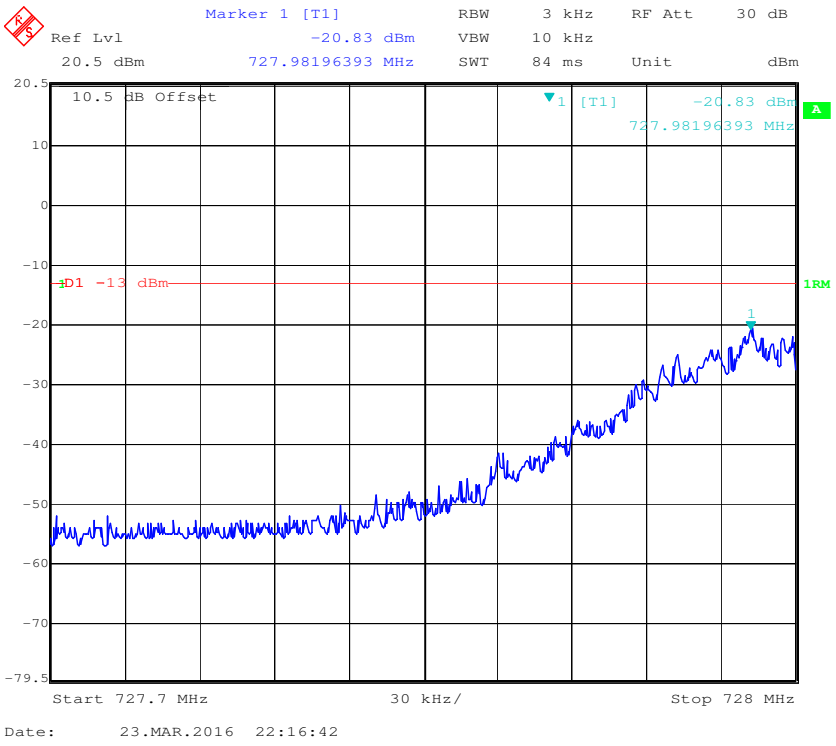
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-Pre AGC**



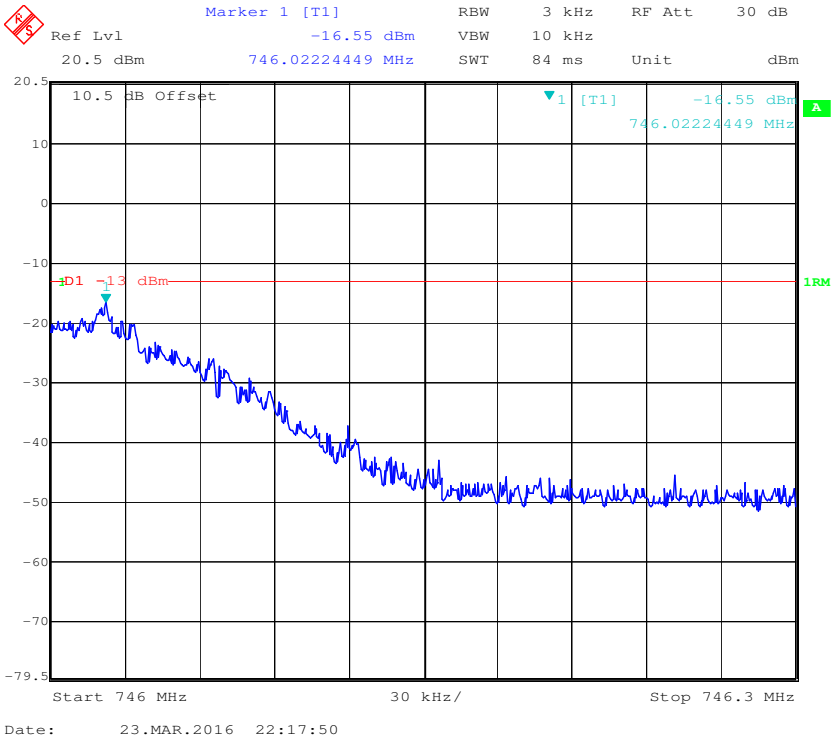

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-Pre AGC**



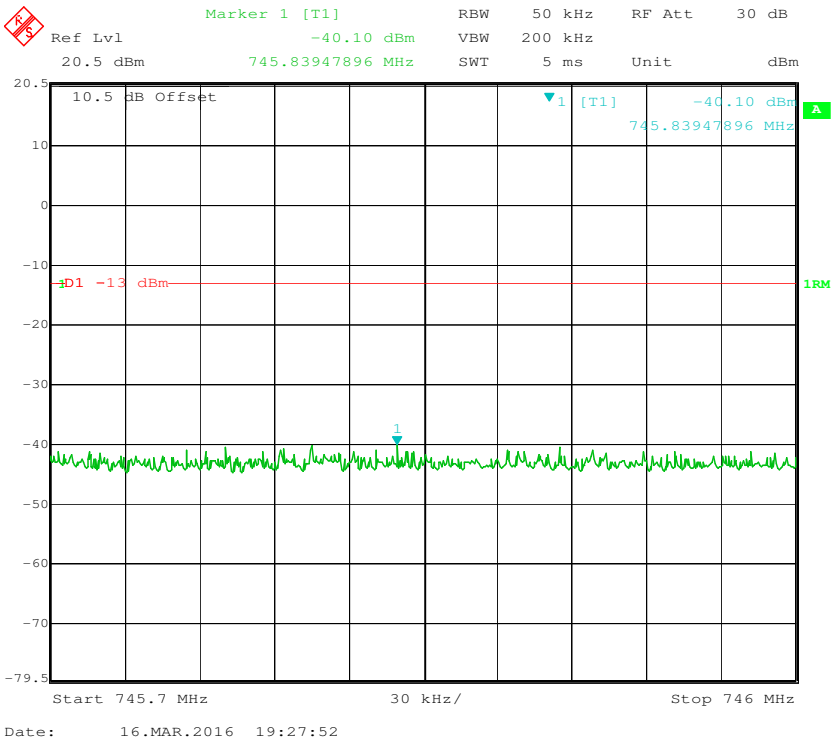
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-3dB above AGC**



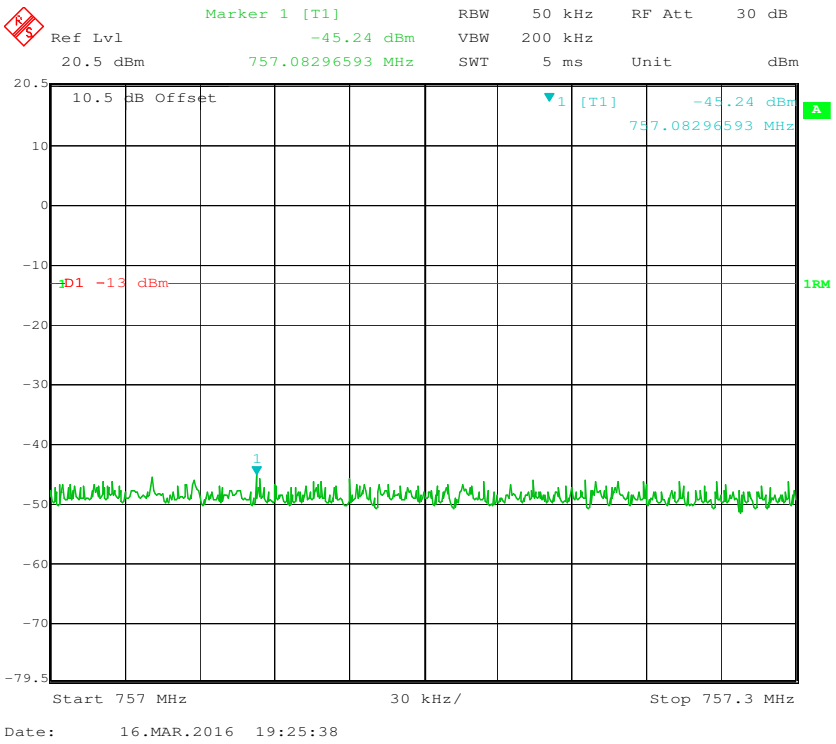

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-3dB above AGC**



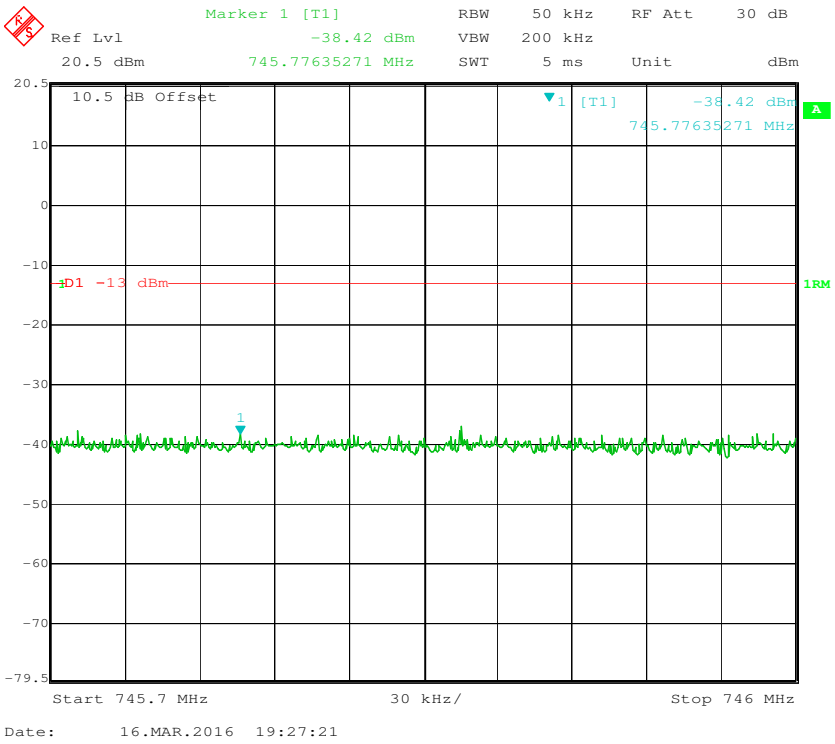
## Upper 700MHz (C Block) Band, Left Band Edge for AWGN-Pre AGC



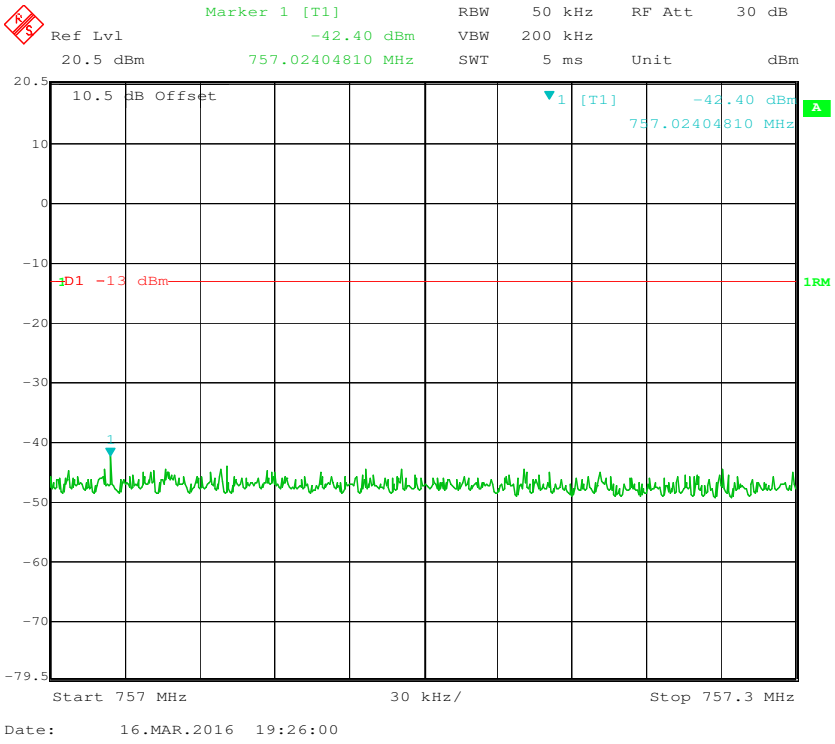

## Upper 700MHz (C Block) Band, Right Band Edge for AWGN-Pre AGC



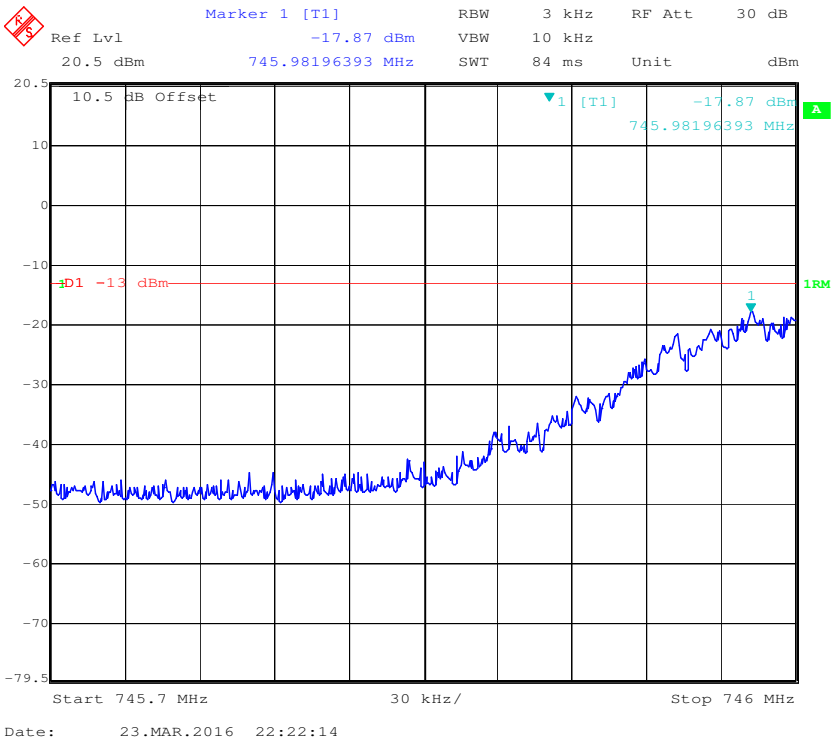
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-3dB above AGC**



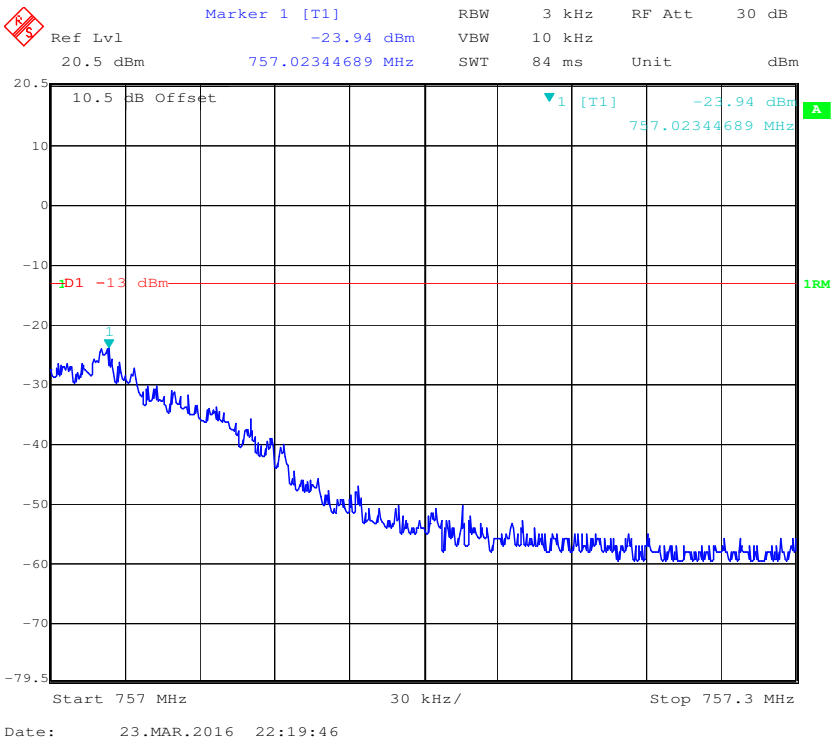

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-3dB above AGC**



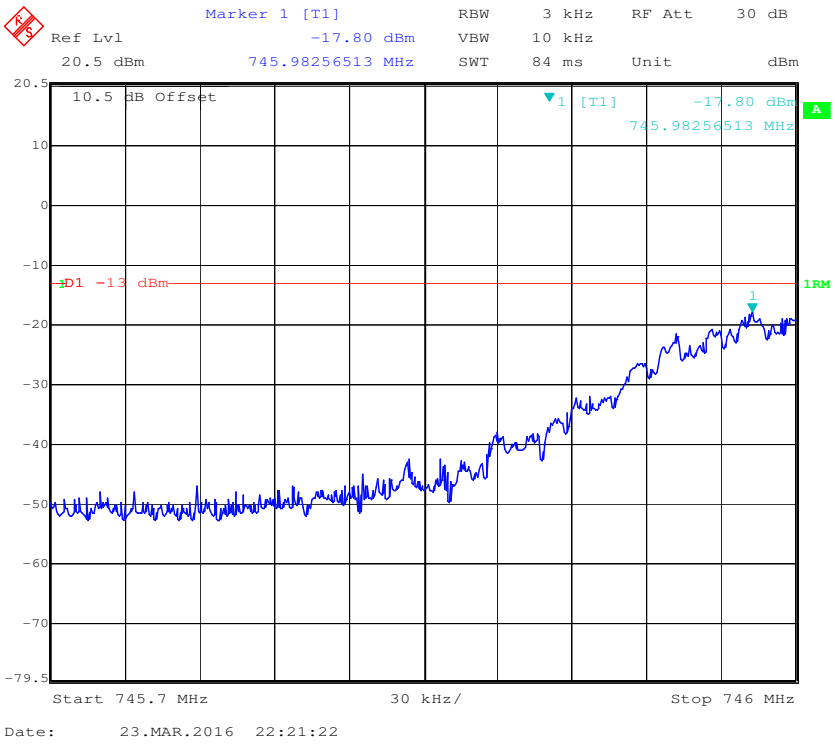
## Upper 700MHz (C Block) Band, Left Band Edge for GSM-Pre AGC



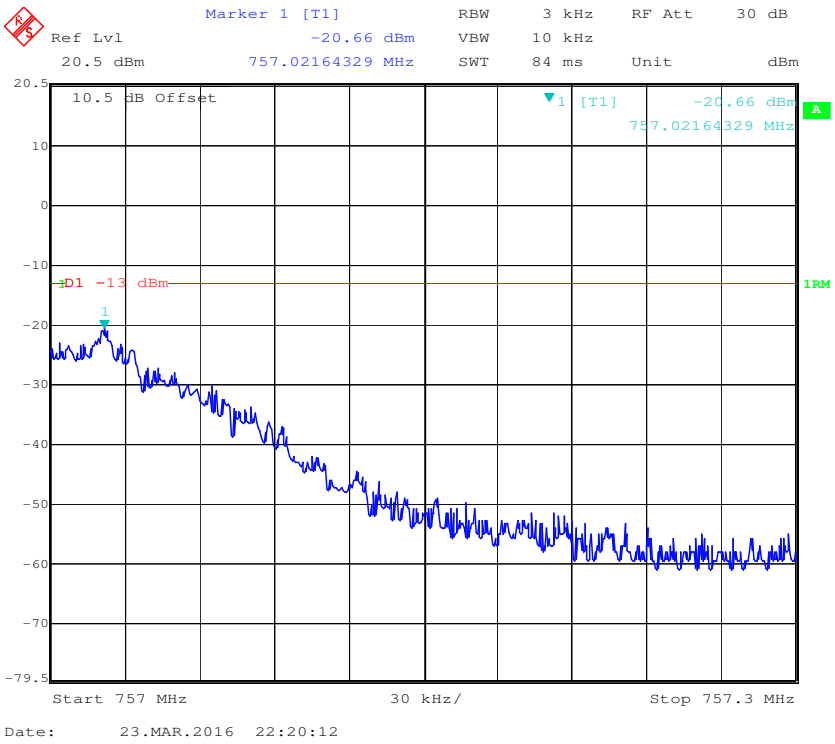

## Upper 700MHz (C Block) Band, Right Band Edge for GSM-Pre AGC



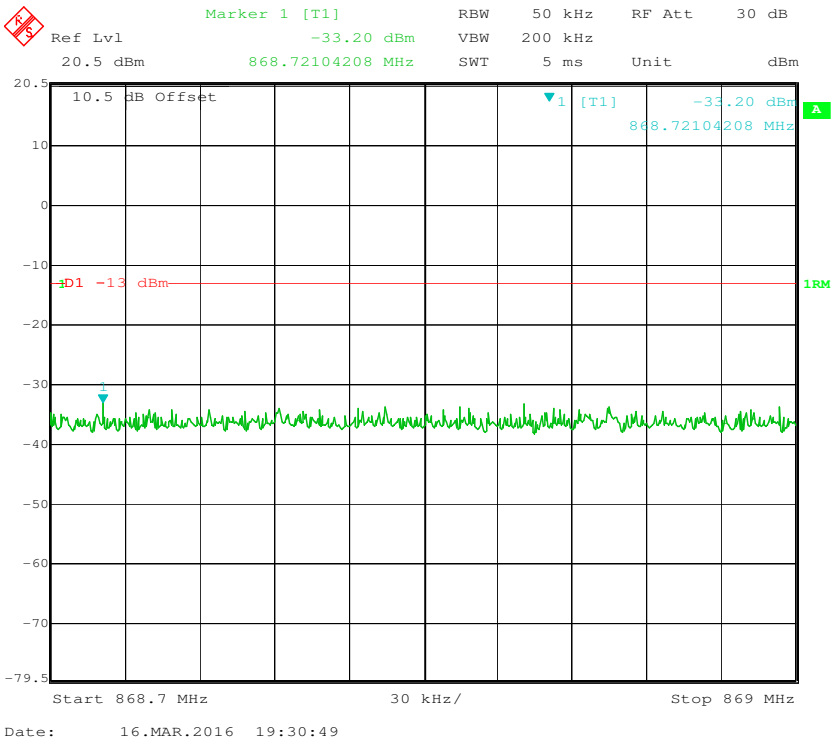
**Upper 700MHz (C Block) Band, Left Band Edge for GSM-3dB above AGC**



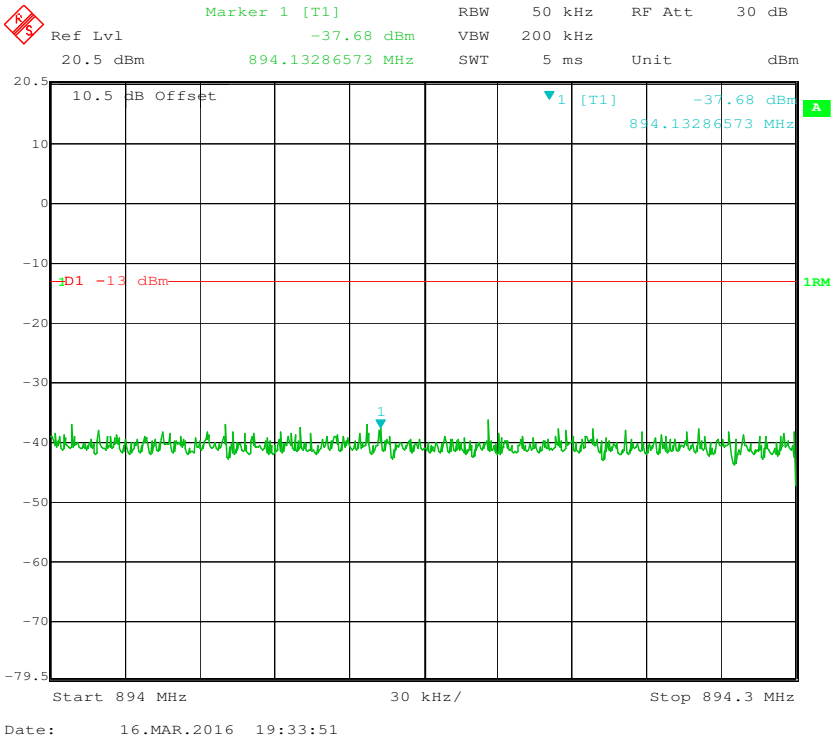

**Upper 700MHz (C Block) Band, Right Band Edge for GSM-3dB above AGC**



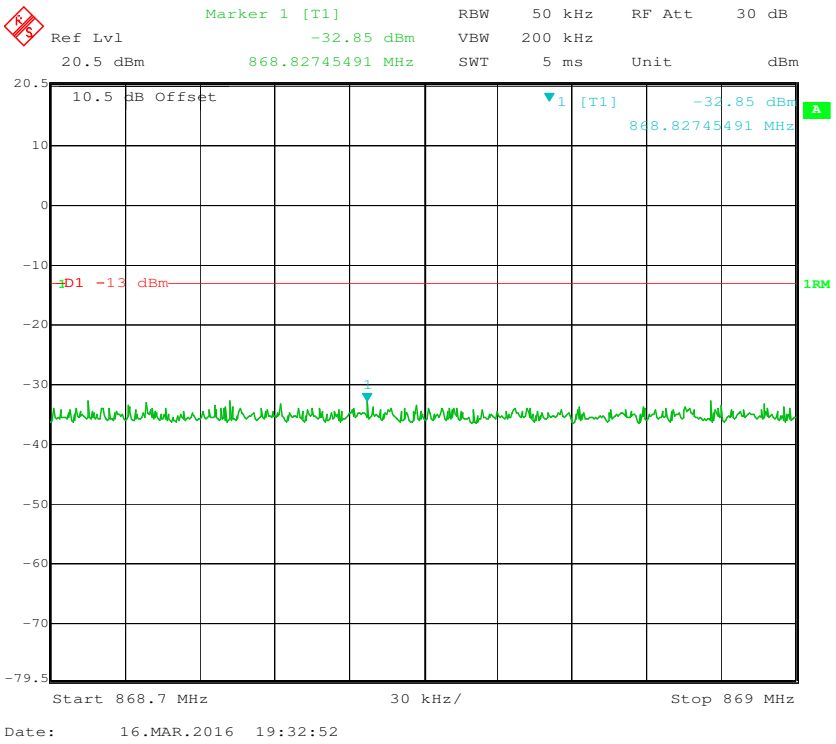
## CELLULAR Band, Left Band Edge for AWGN-Pre AGC



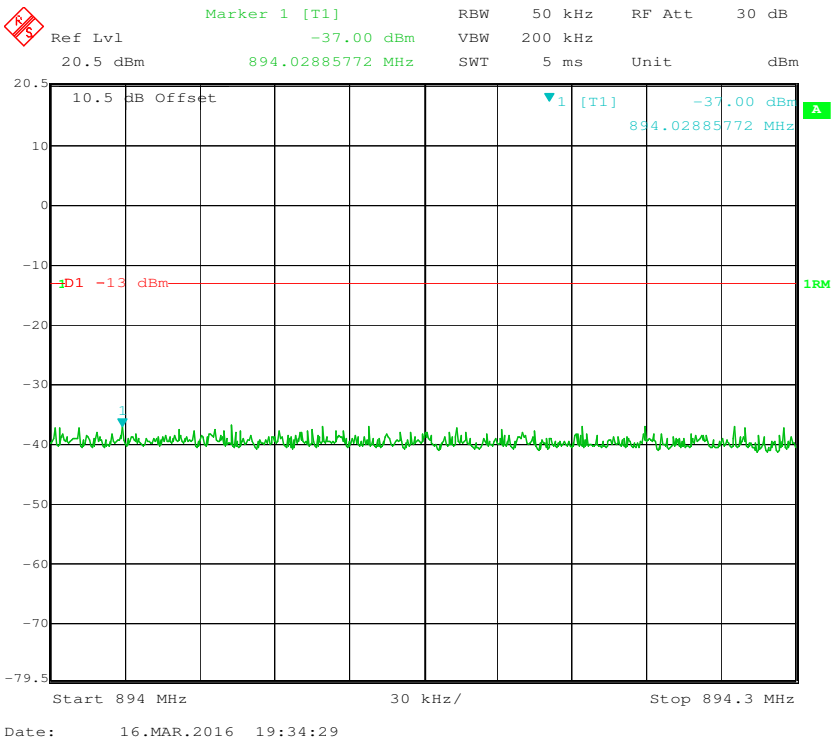

## CELLULAR Band, Right Band Edge for AWGN-Pre AGC



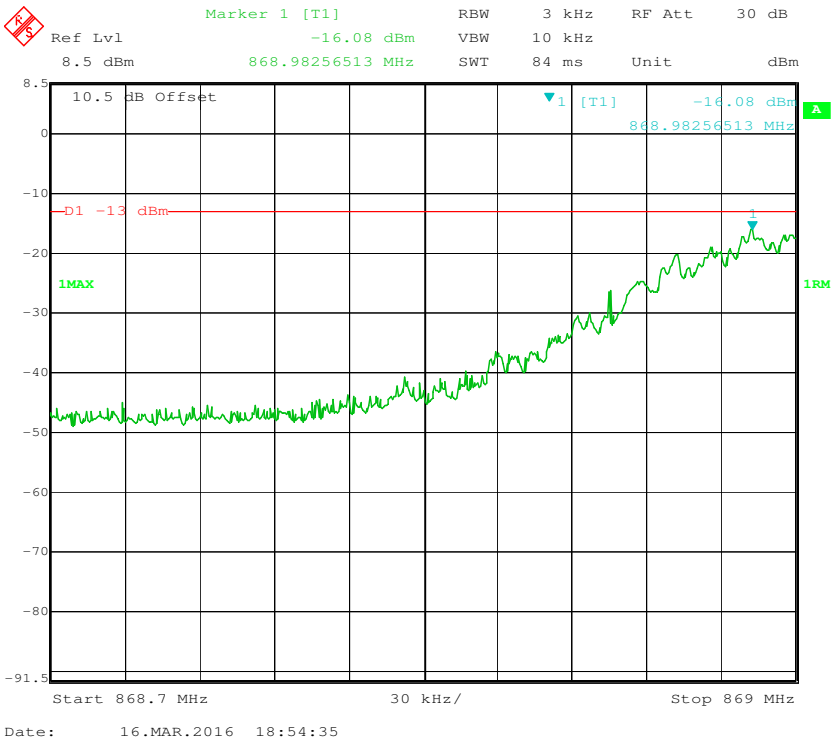
## CELLULAR Band, Left Band Edge for AWGN-3dB above AGC



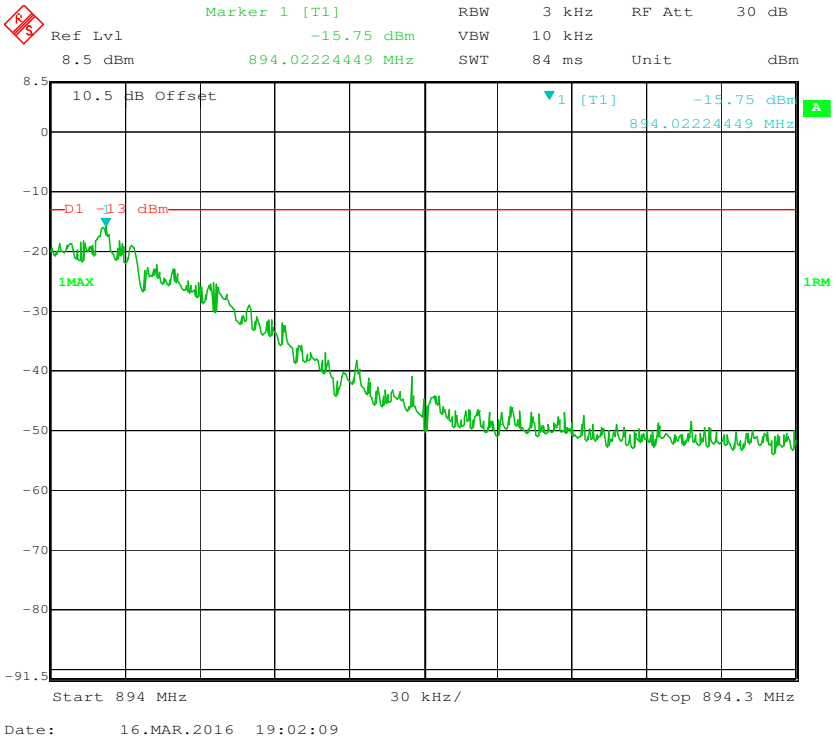

## CELLULAR Band, Right Band Edge for AWGN-3dB above AGC



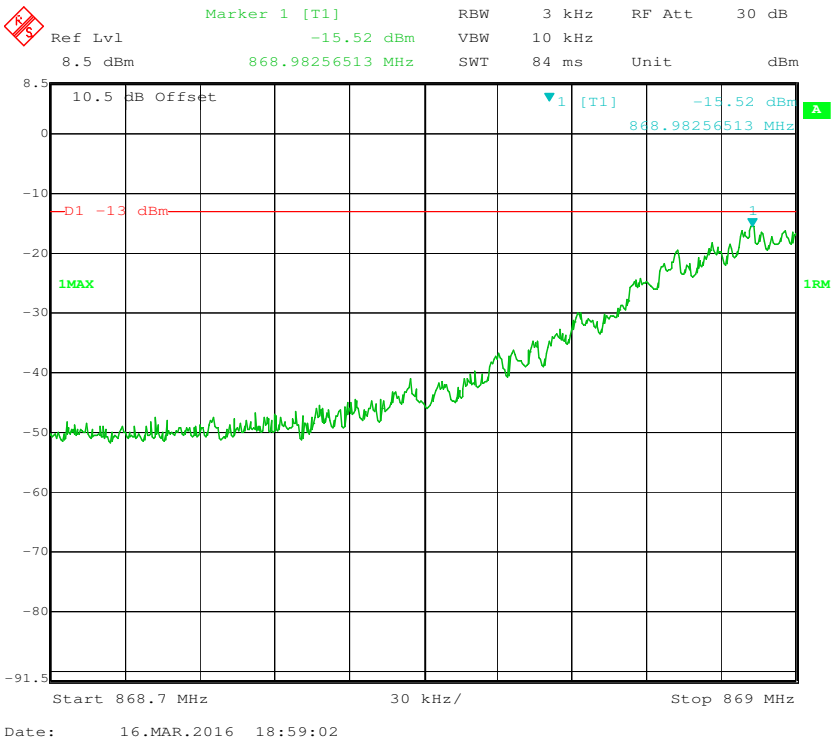
## CELLULAR Band, Left Band Edge for GSM-Pre AGC



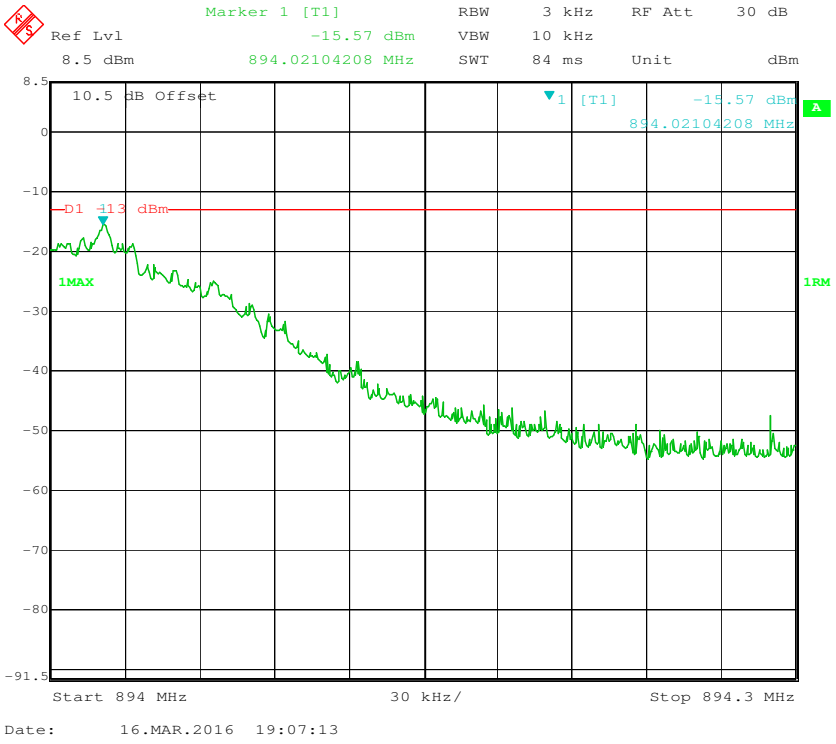

## CELLULAR Band, Right Band Edge for GSM-Pre AGC



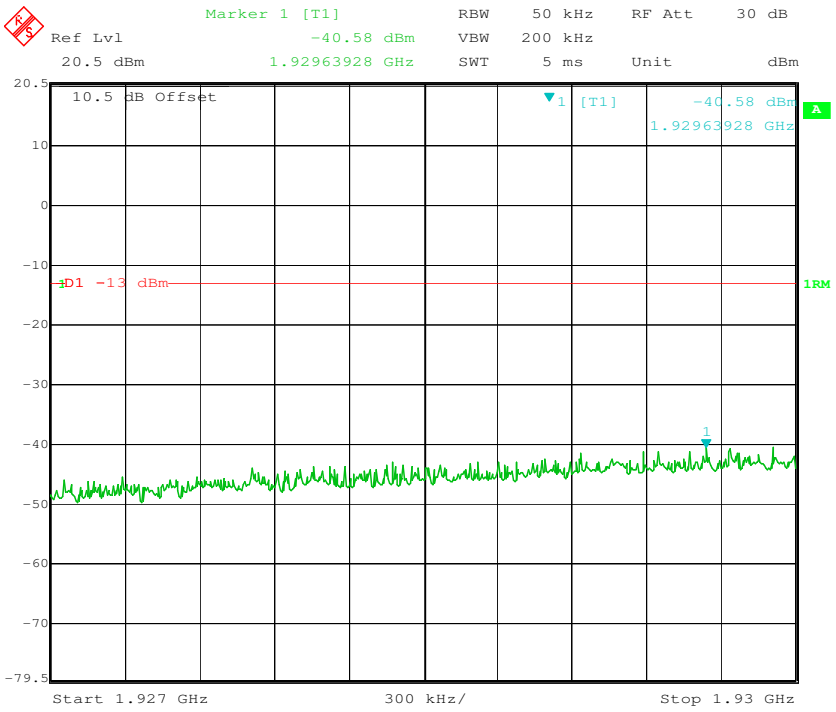
## CELLULAR Band, Left Band Edge for GSM-3dB above AGC



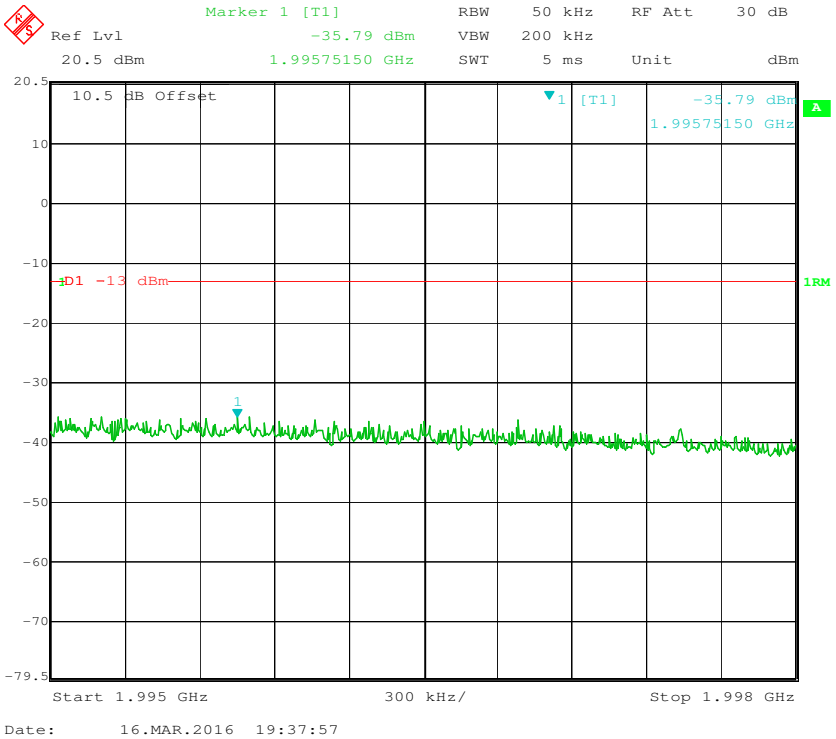

## CELLULAR Band, Right Band Edge for GSM-3dB above AGC



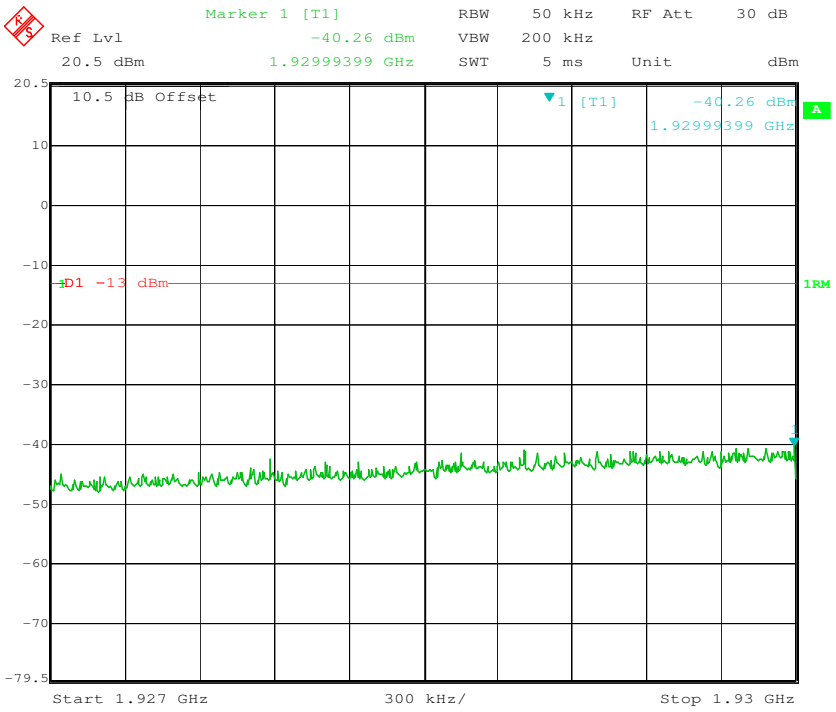
## PCS Band, Left Band Edge for AWGN-Pre AGC



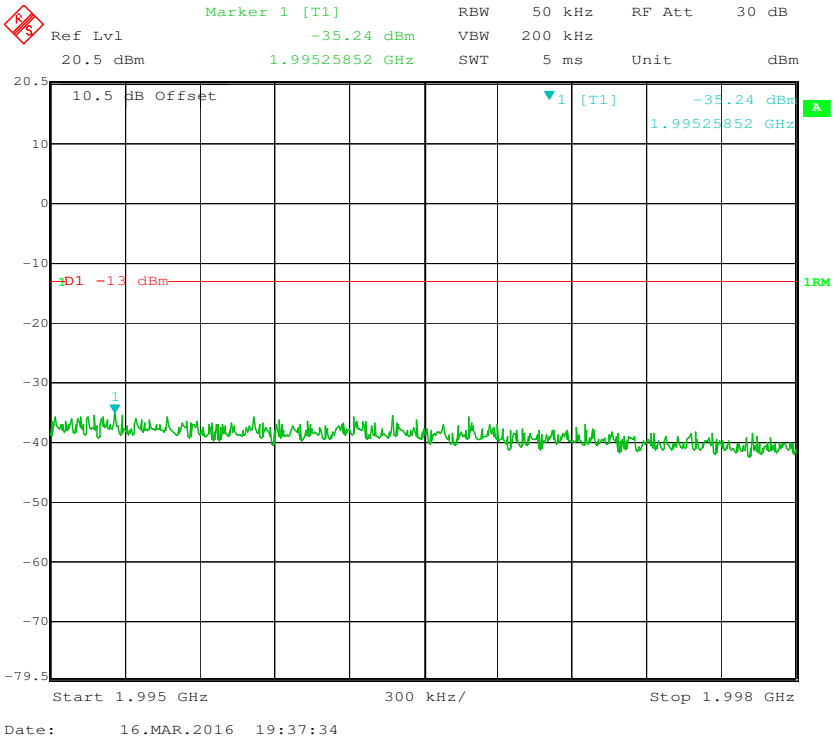

## PCS Band, Right Band Edge for AWGN-Pre AGC



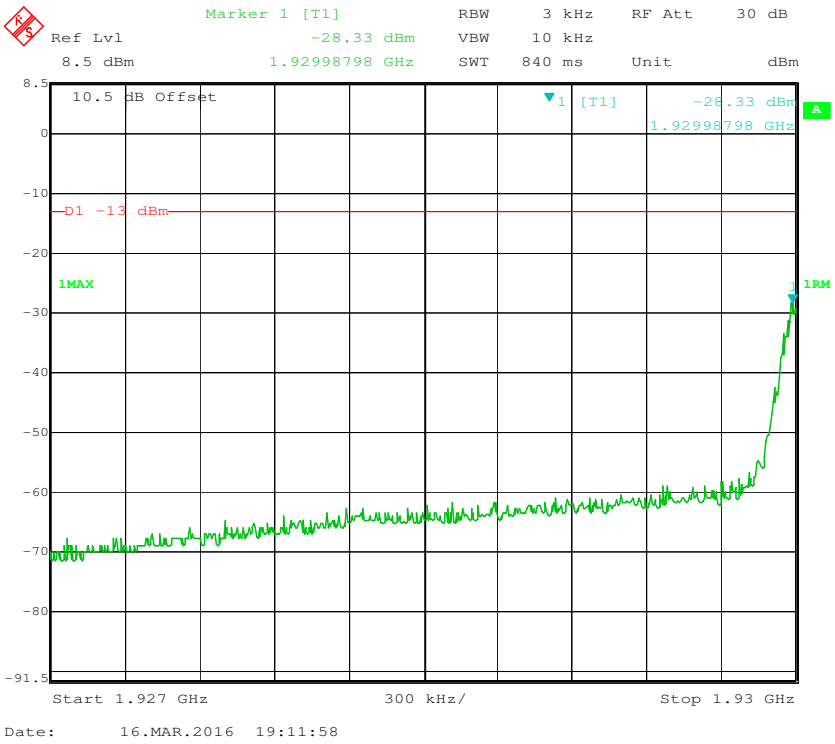
## PCS Band, Left Band Edge for AWGN-3dB above AGC



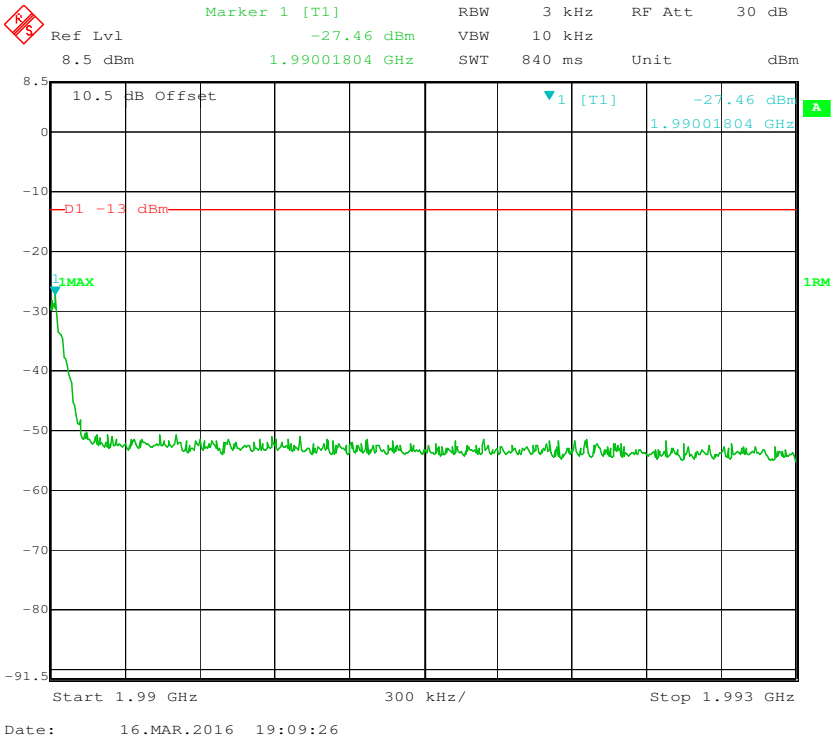

## PCS Band, Right Band Edge for AWGN-3dB above AGC



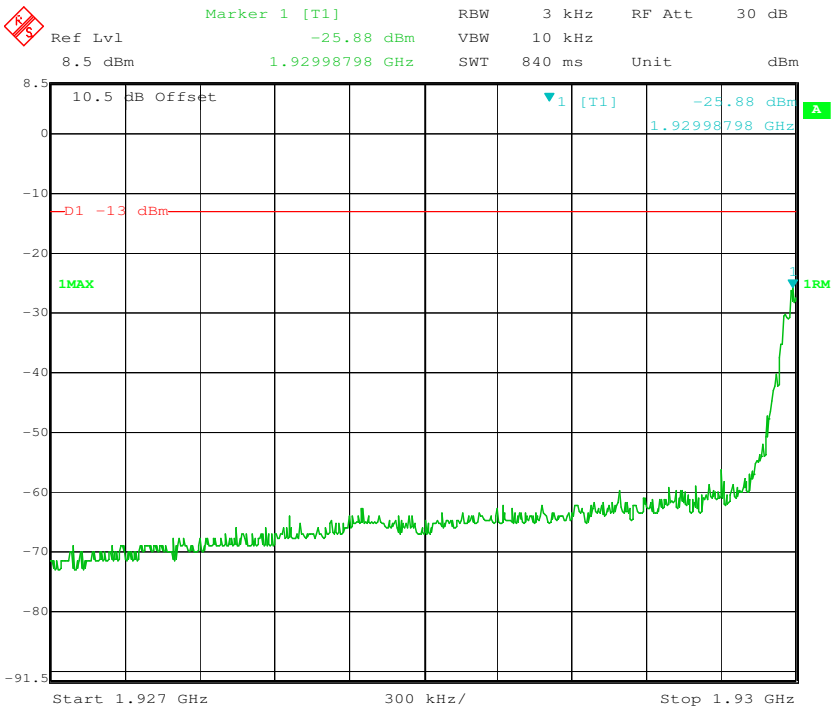
## PCS Band, Left Band Edge for GSM-Pre AGC



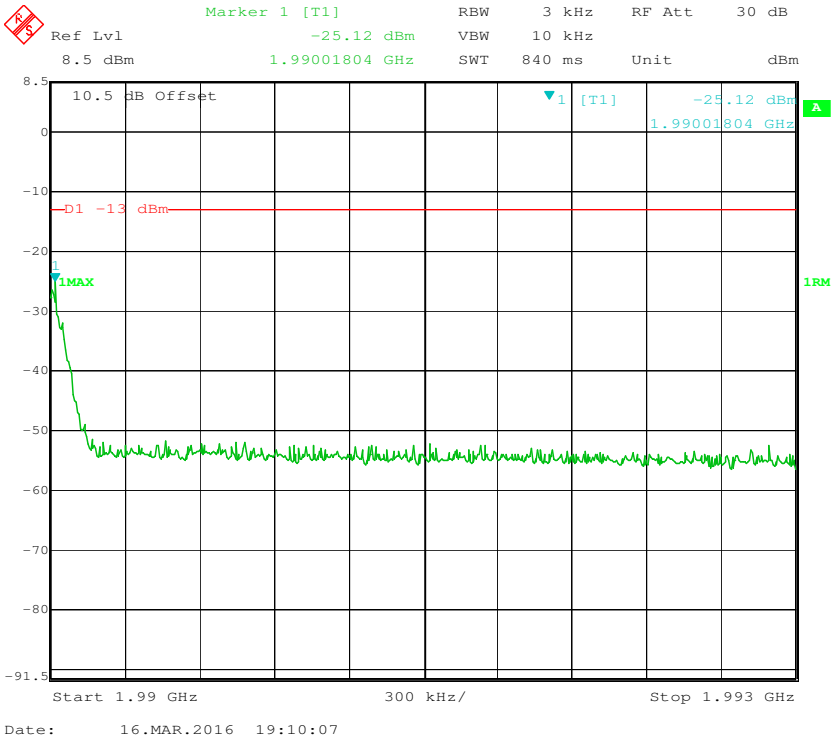

## PCS Band, Right Band Edge for GSM-Pre AGC



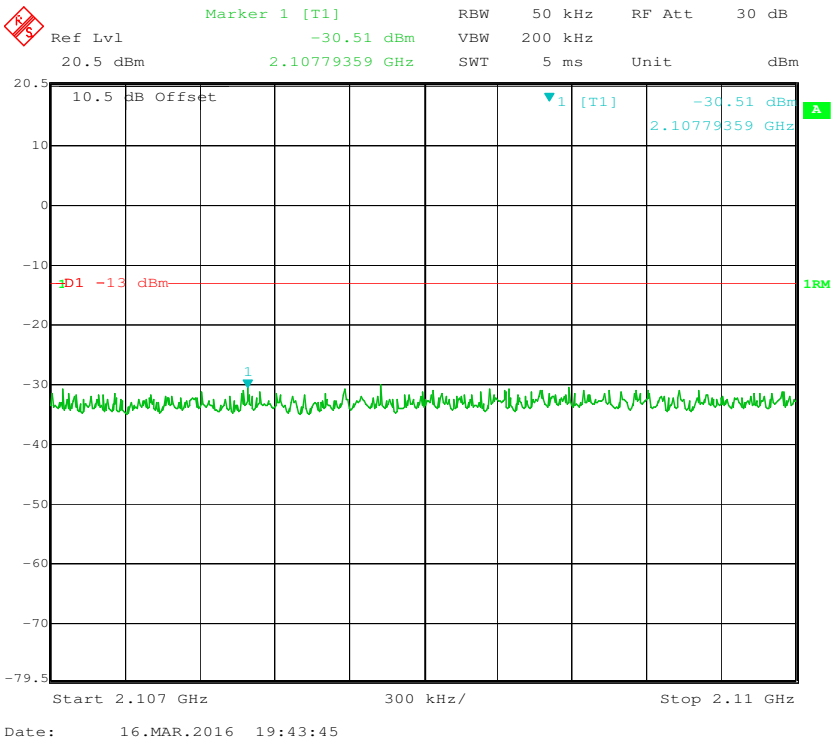
## PCS Band, Left Band Edge for GSM-3dB above AGC



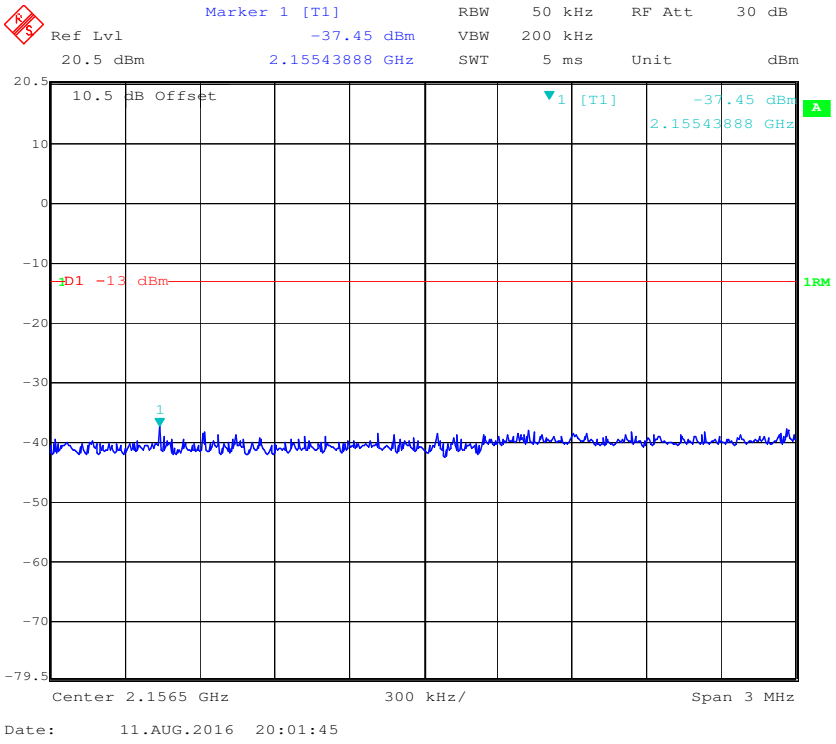

## PCS Band, Right Band Edge for GSM-3dB above AGC



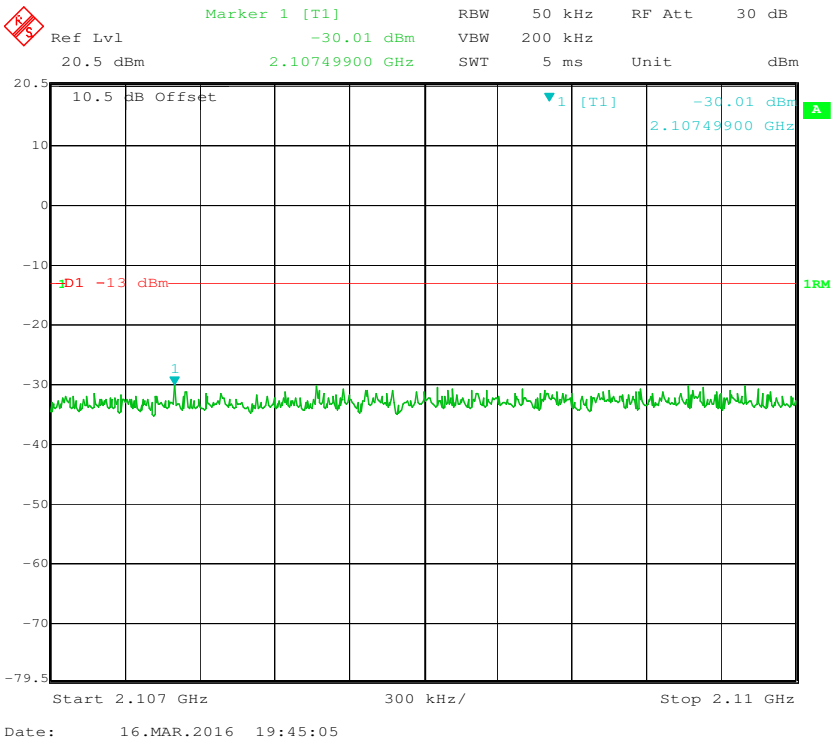
## AWS-1 Band, Left Band Edge for AWGN-Pre AGC



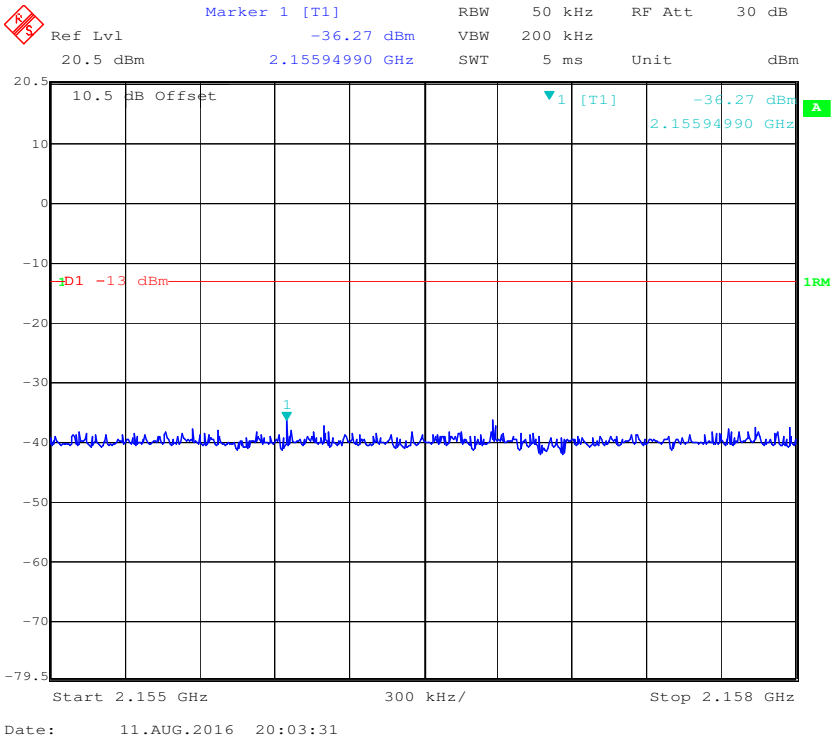

## AWS-1 Band, Right Band Edge for AWGN-Pre AGC



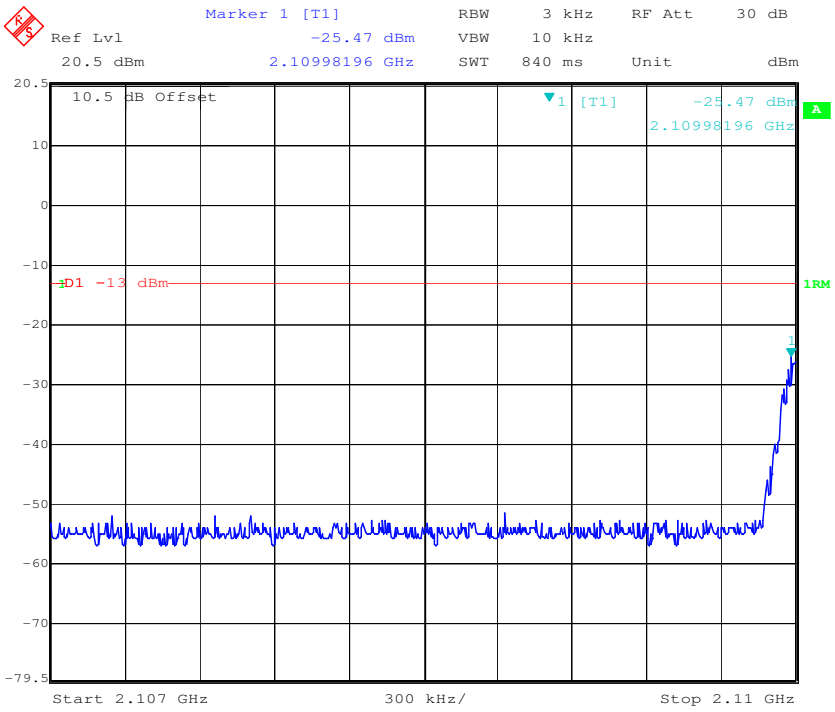
## AWS-1 Band, Left Band Edge for AWGN-3dB above AGC



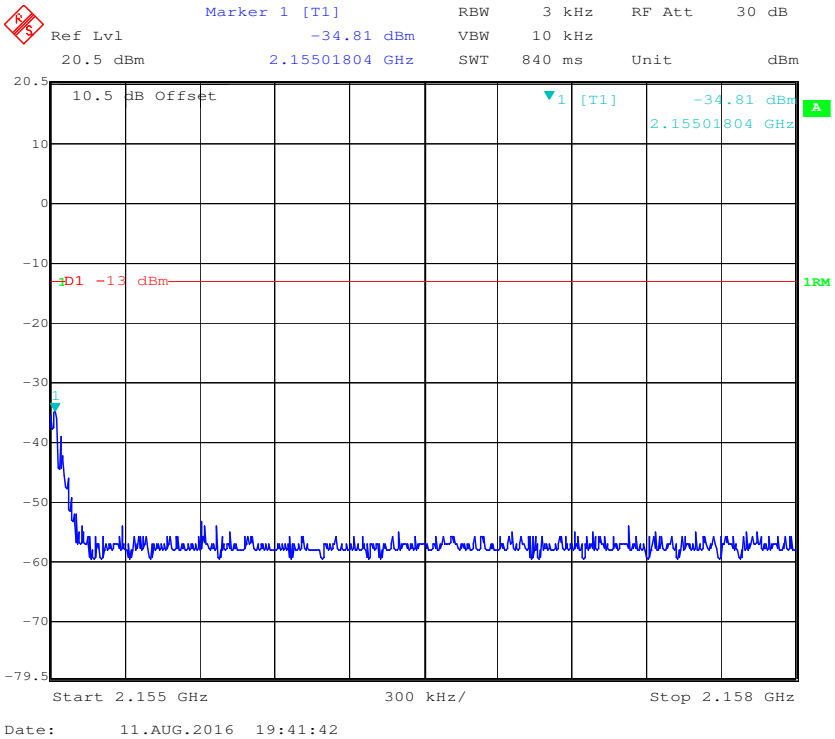

## AWS-1 Band, Right Band Edge for AWGN-3dB above AGC



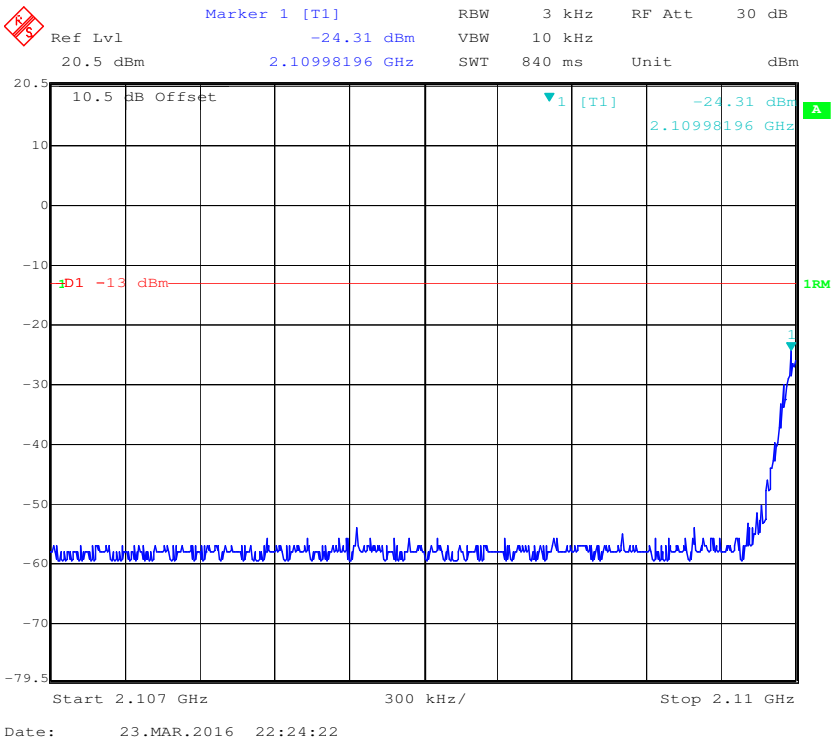
## AWS-1 Band, Left Band Edge for GSM-Pre AGC



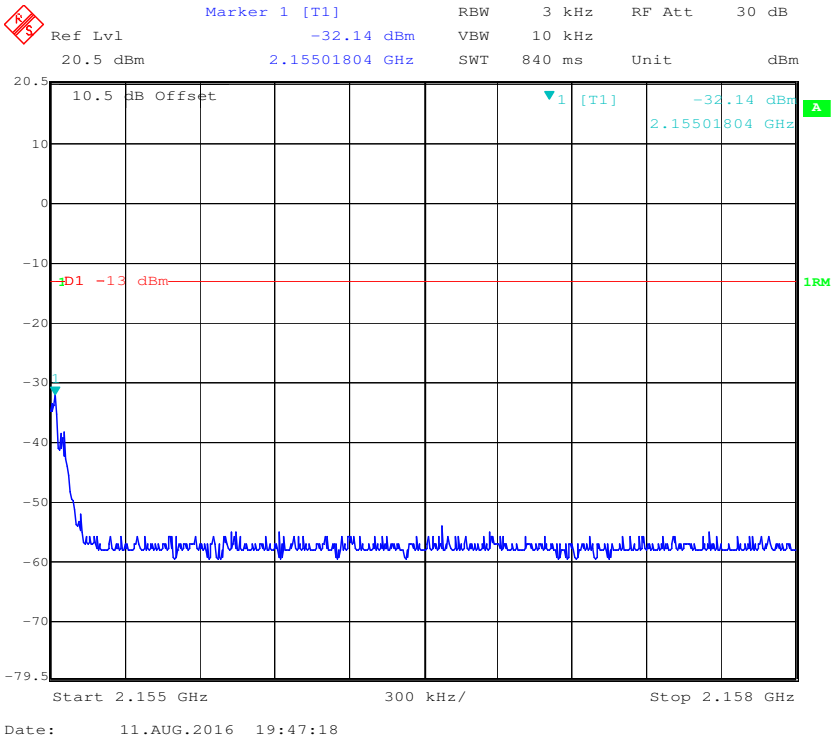

## AWS-1 Band, Right Band Edge for GSM-Pre AGC



## AWS-1 Band, Left Band Edge for GSM-3dB above AGC

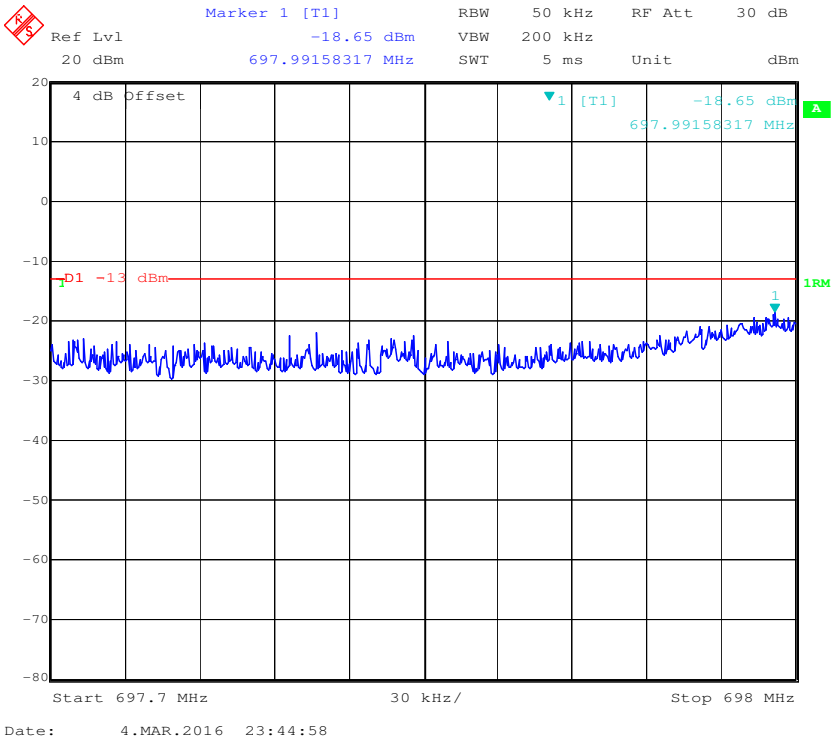



## AWS-1 Band, Right Band Edge for GSM-3dB above AGC

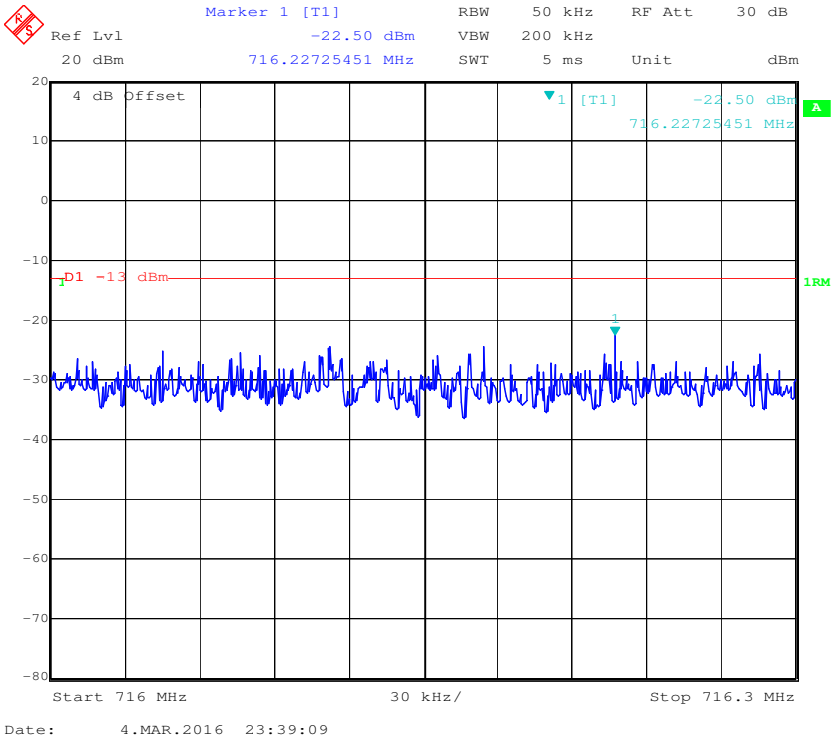


**Inter-Modulation**
**Uplink:**

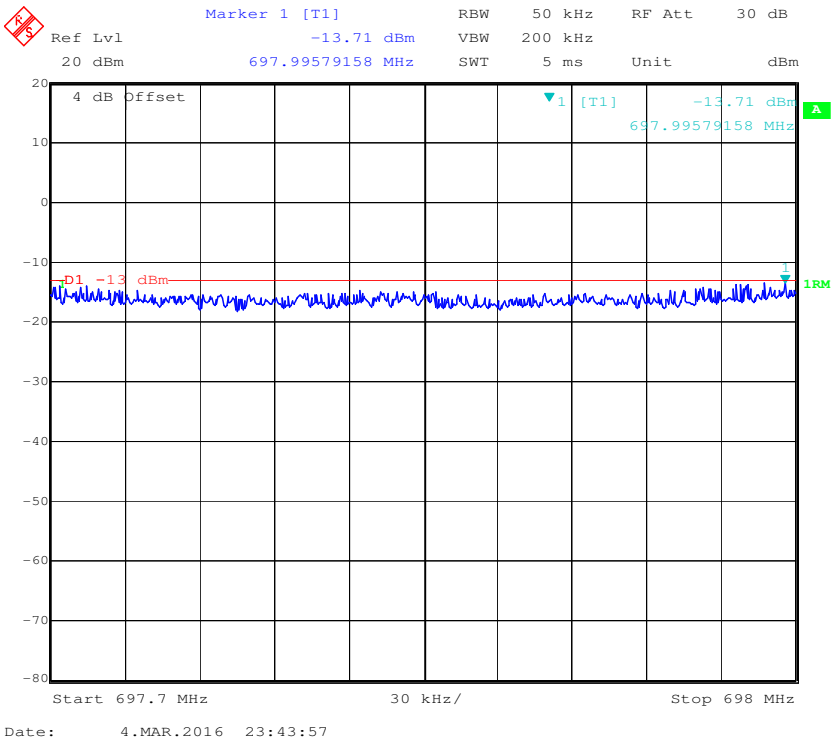
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-Pre AGC**



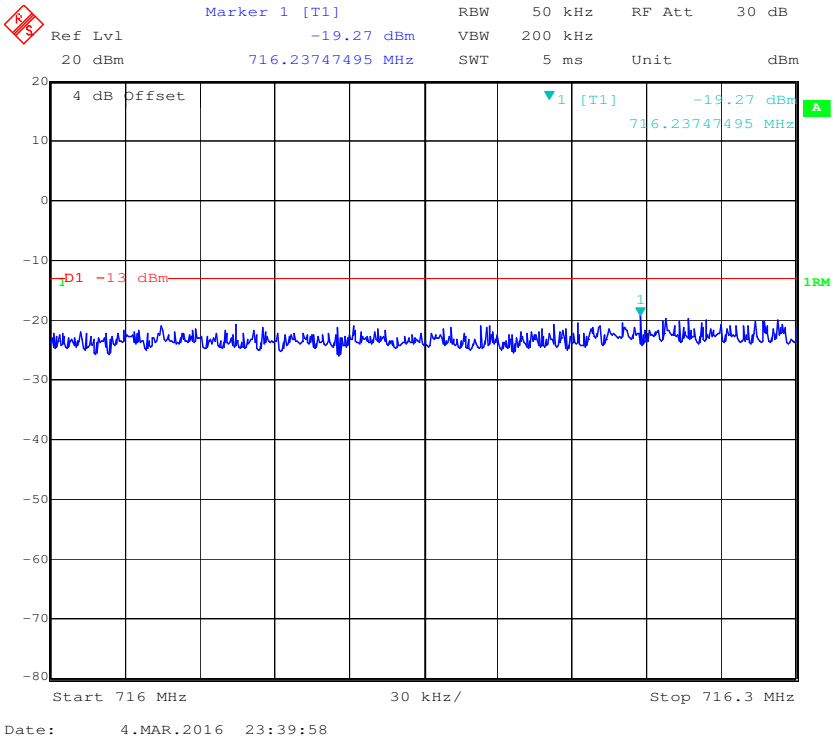

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-Pre AGC**



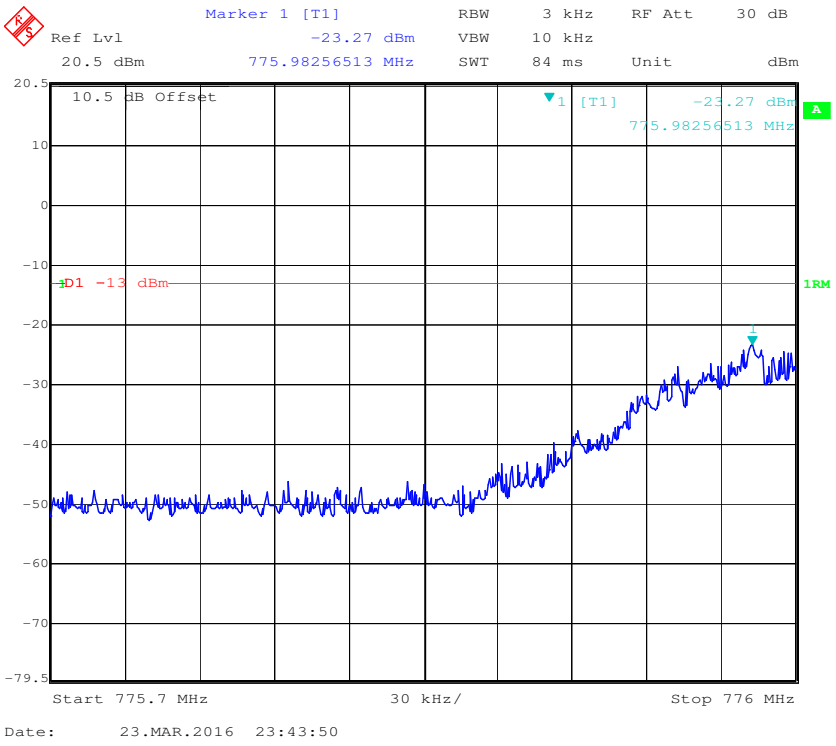
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-3dB above AGC**



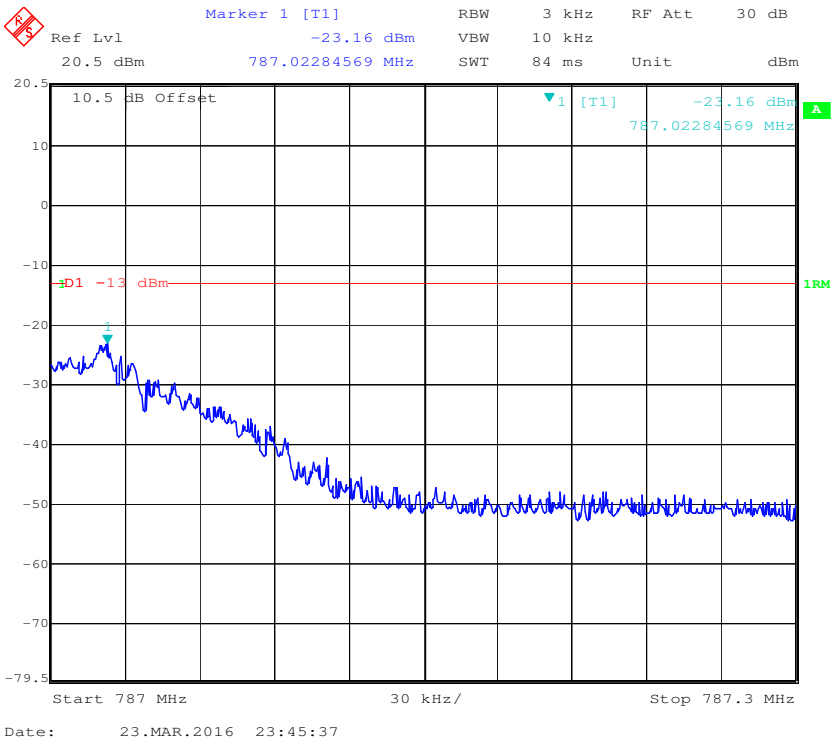

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-3dB above AGC**



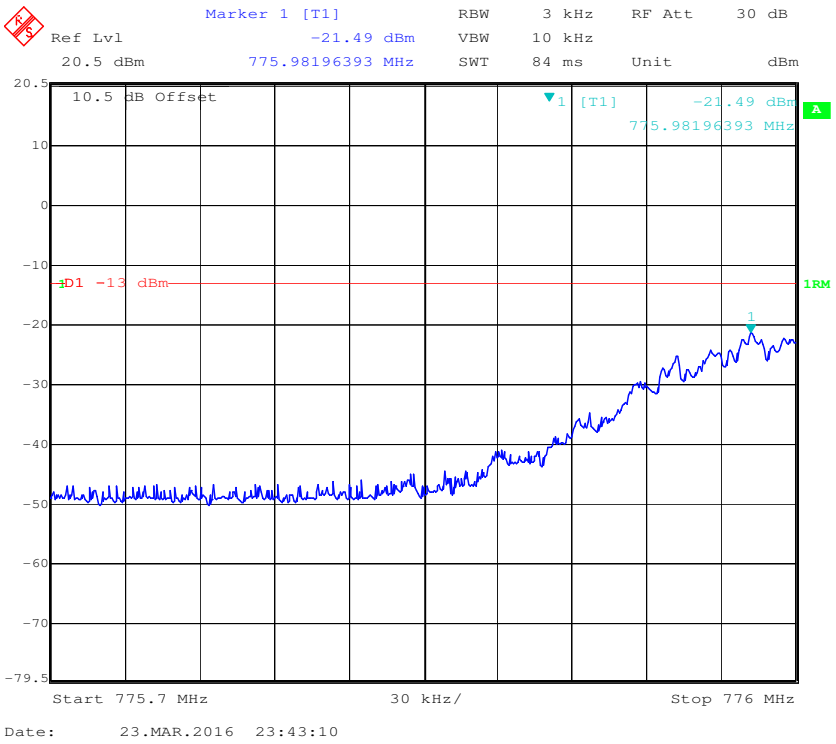
## Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-Pre AGC



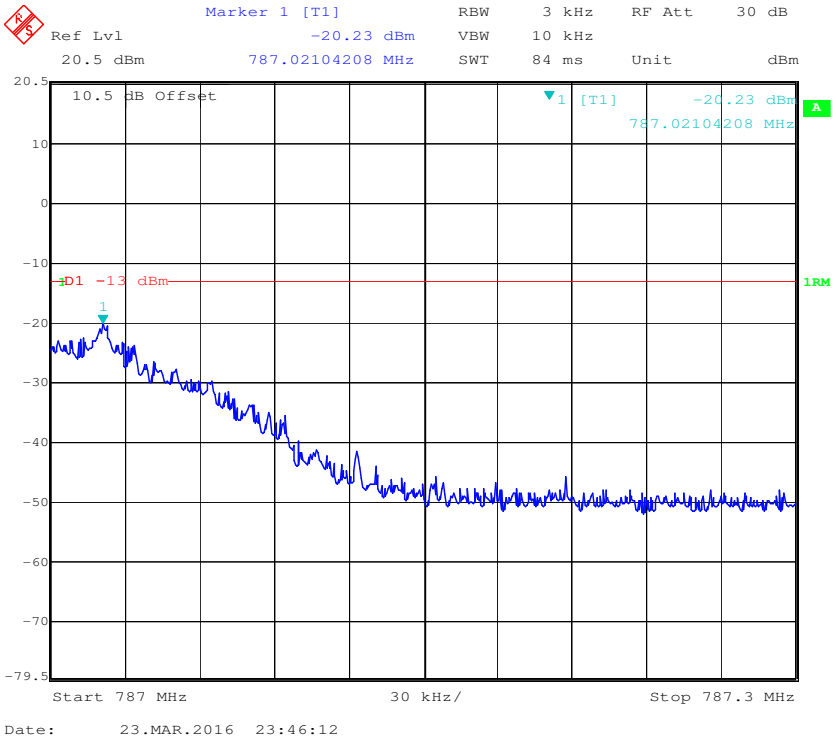

## Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-Pre AGC



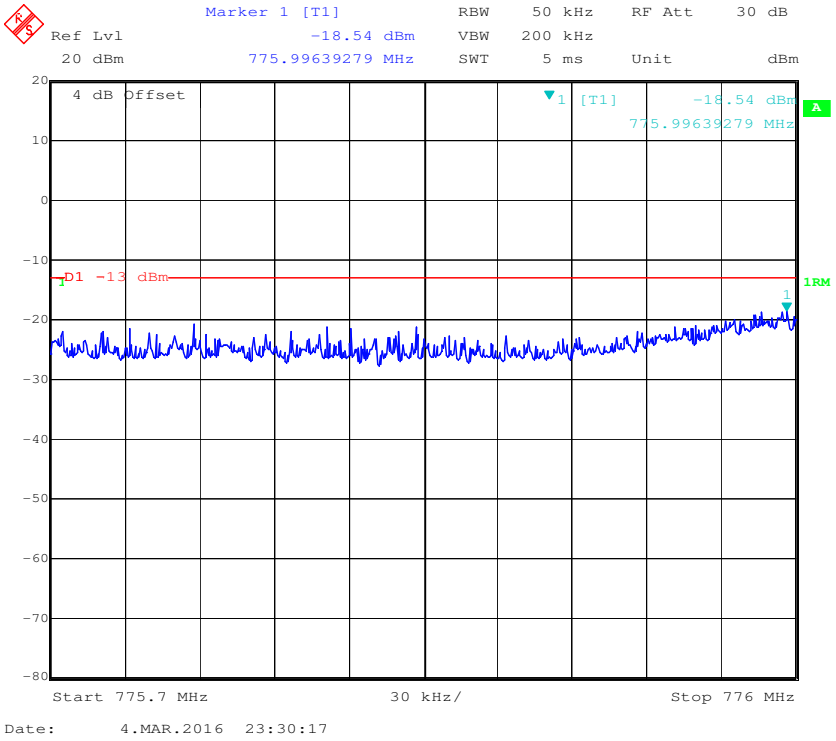
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-3dB above AGC**



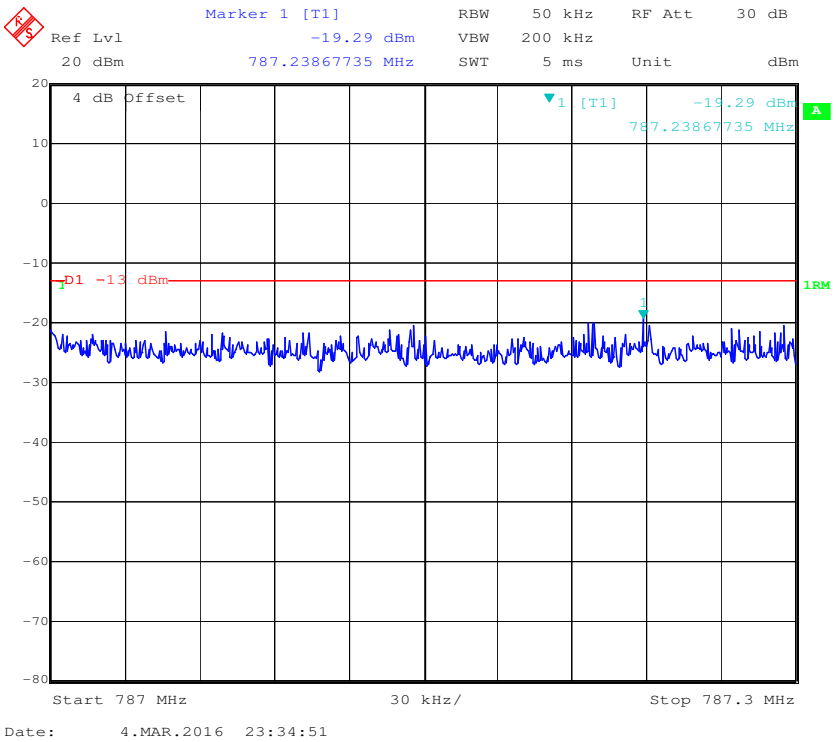

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-3dB above AGC**



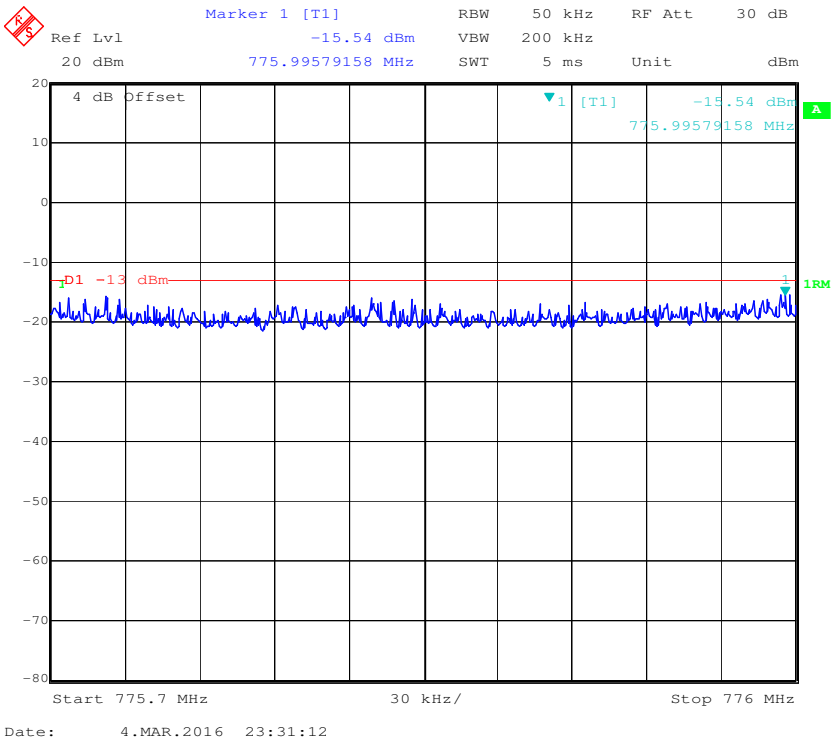
## Upper 700MHz (C Block) Band, Left Band Edge for AWGN-Pre AGC



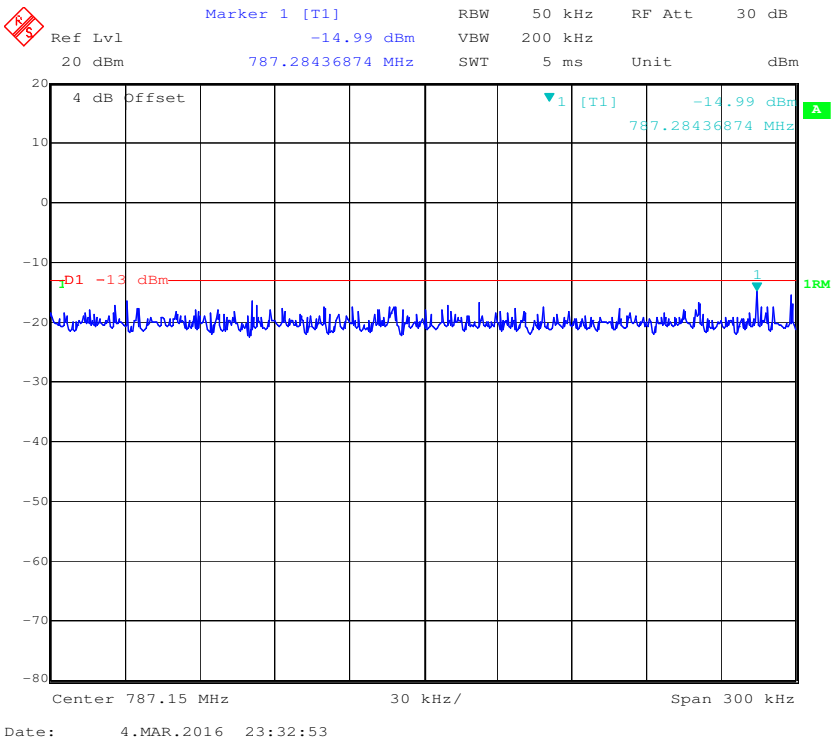

## Upper 700MHz (C Block) Band, Right Band Edge for AWGN-Pre AGC



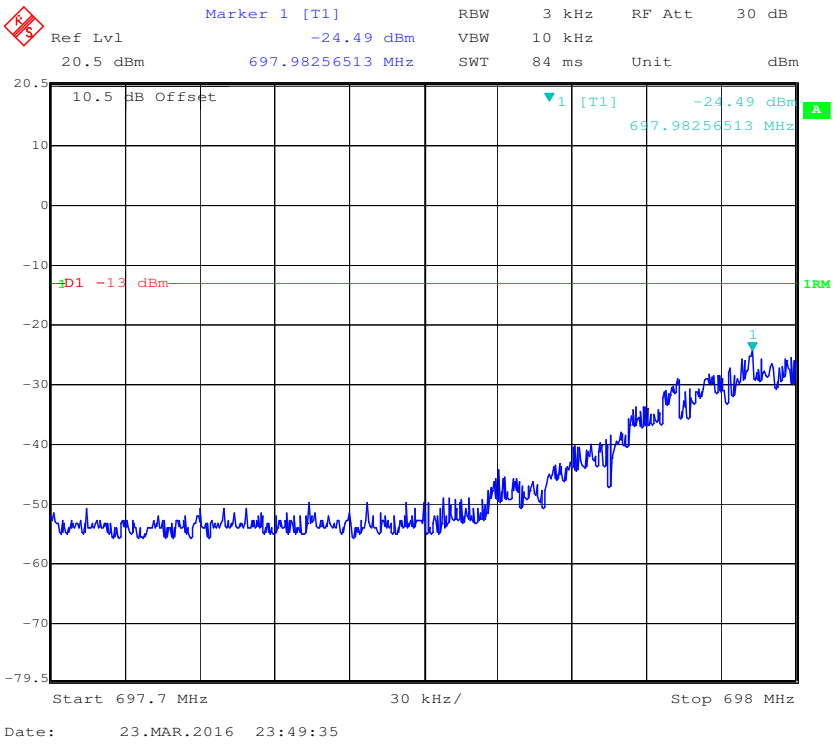
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-3dB above AGC**



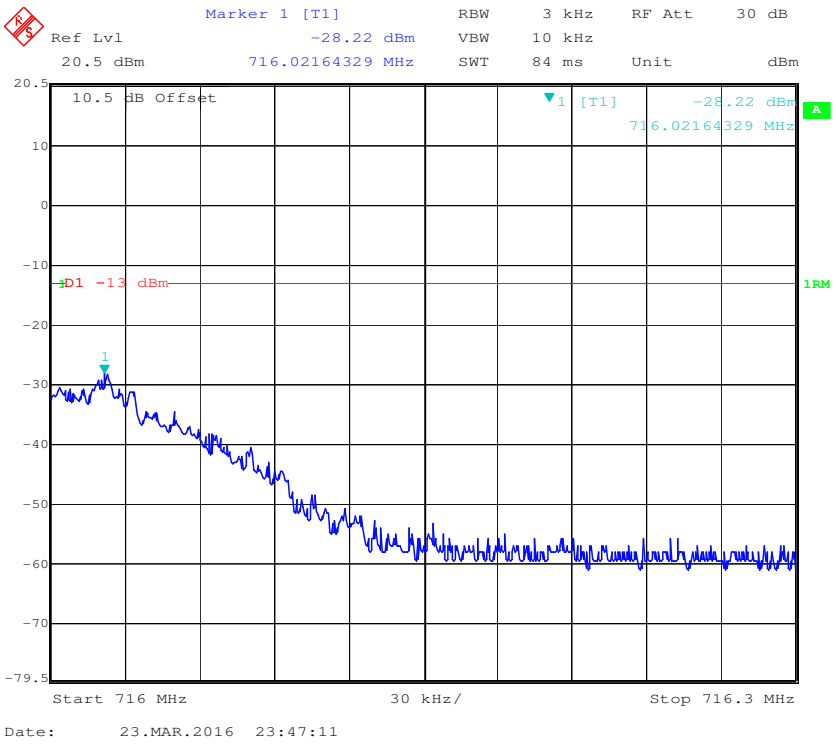

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-3dB above AGC**



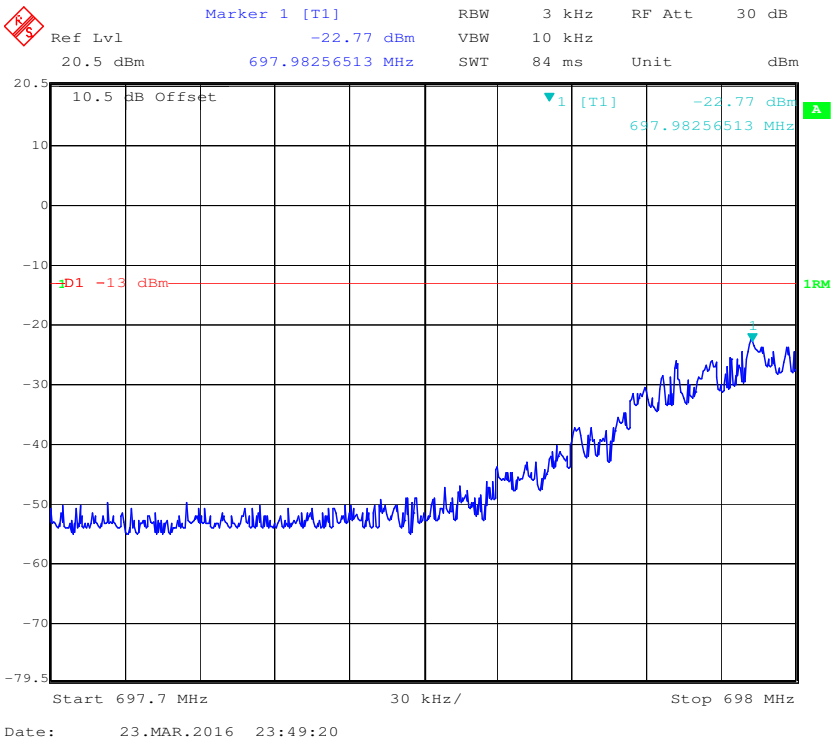
## Upper 700MHz (C Block) Band, Left Band Edge for GSM-Pre AGC



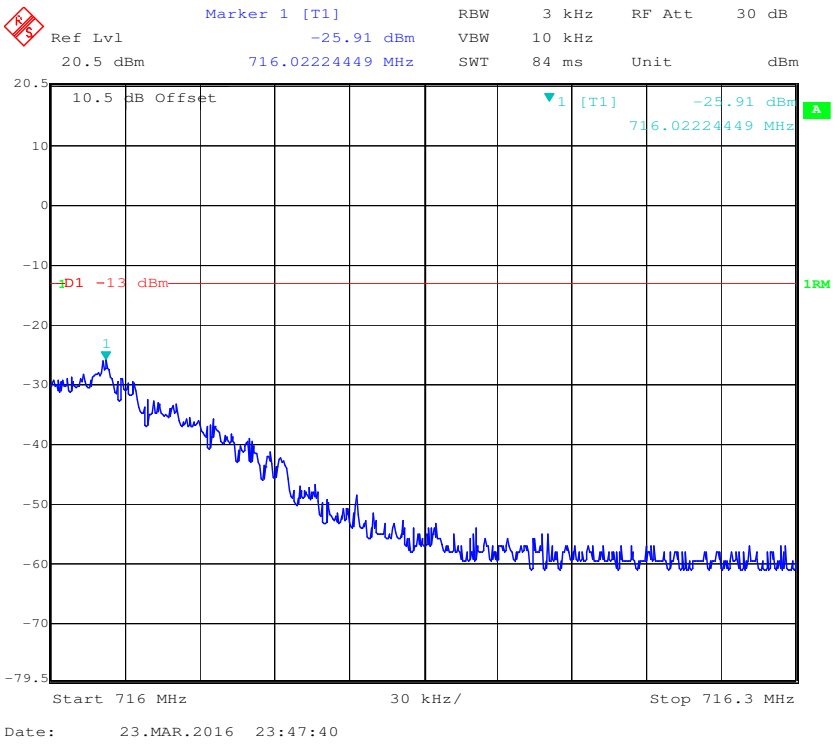

## Upper 700MHz (C Block) Band, Right Band Edge for GSM-Pre AGC



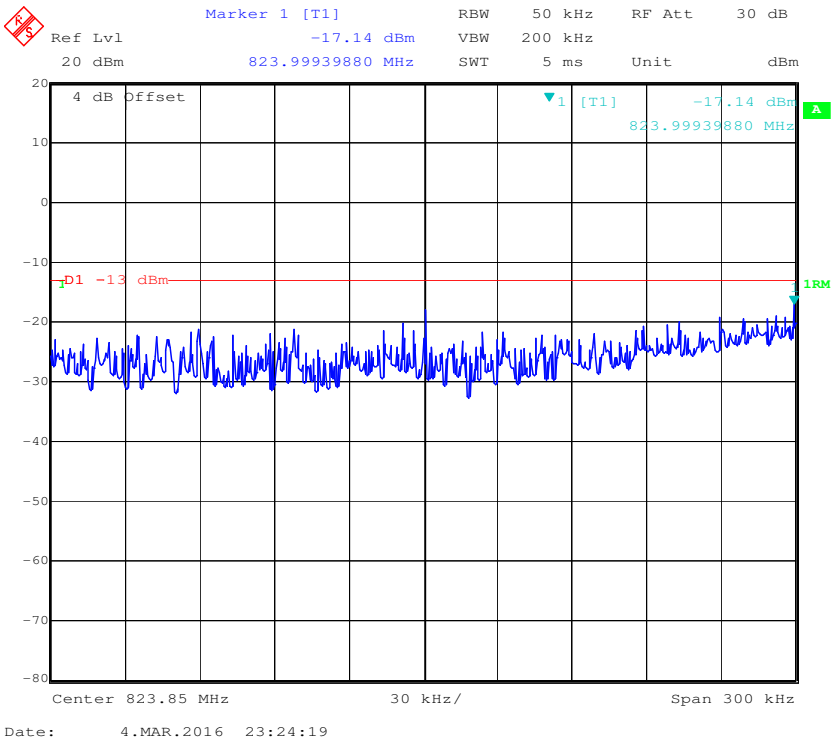
**Upper 700MHz (C Block) Band, Left Band Edge for GSM-3dB above AGC**



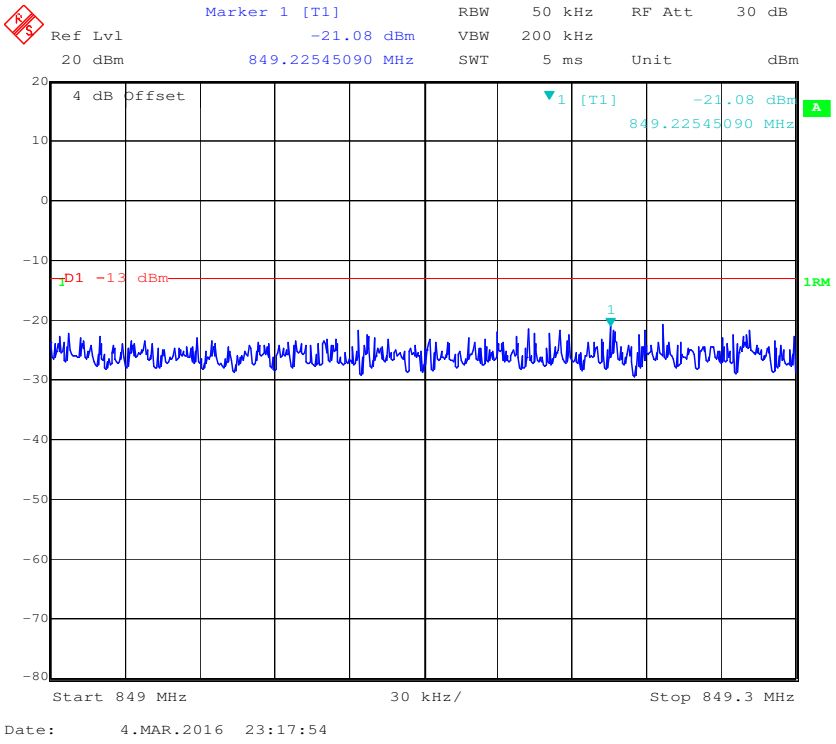

**Upper 700MHz (C Block) Band, Right Band Edge for GSM-3dB above AGC**



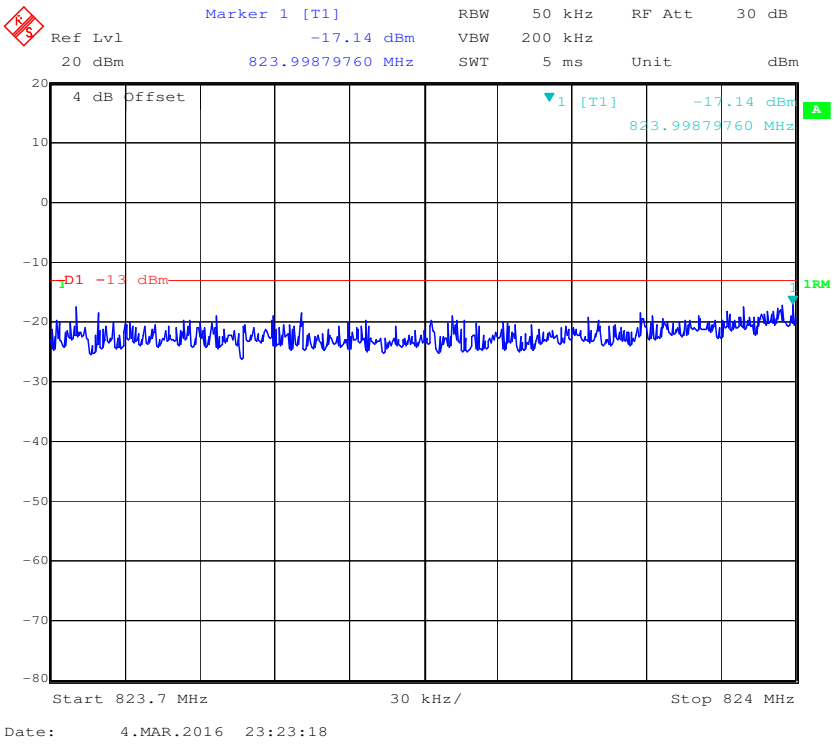
## CELLULAR Band, Left Band Edge for AWGN-Pre AGC



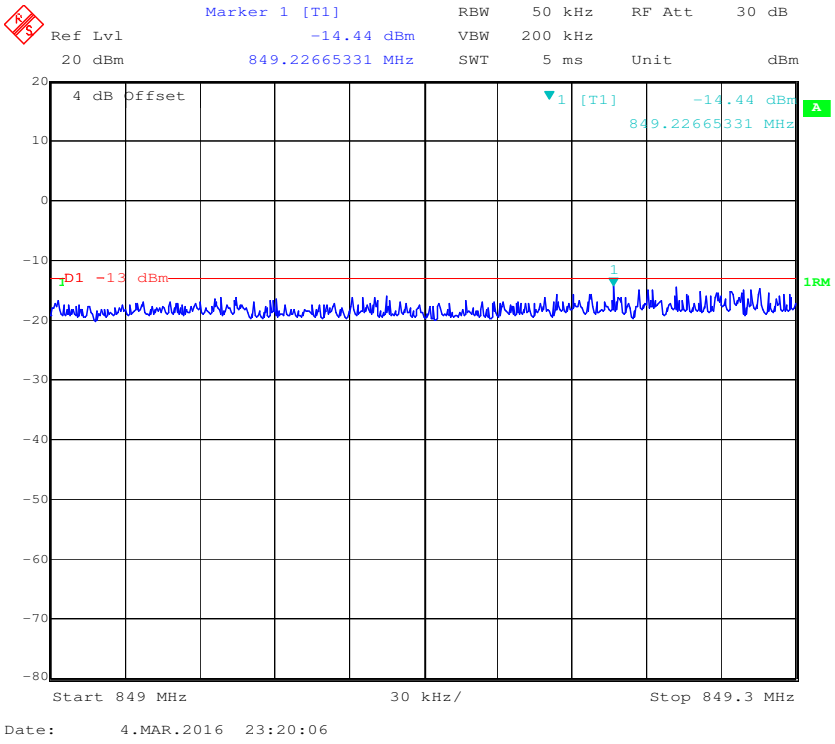

## CELLULAR Band, Right Band Edge for AWGN-Pre AGC



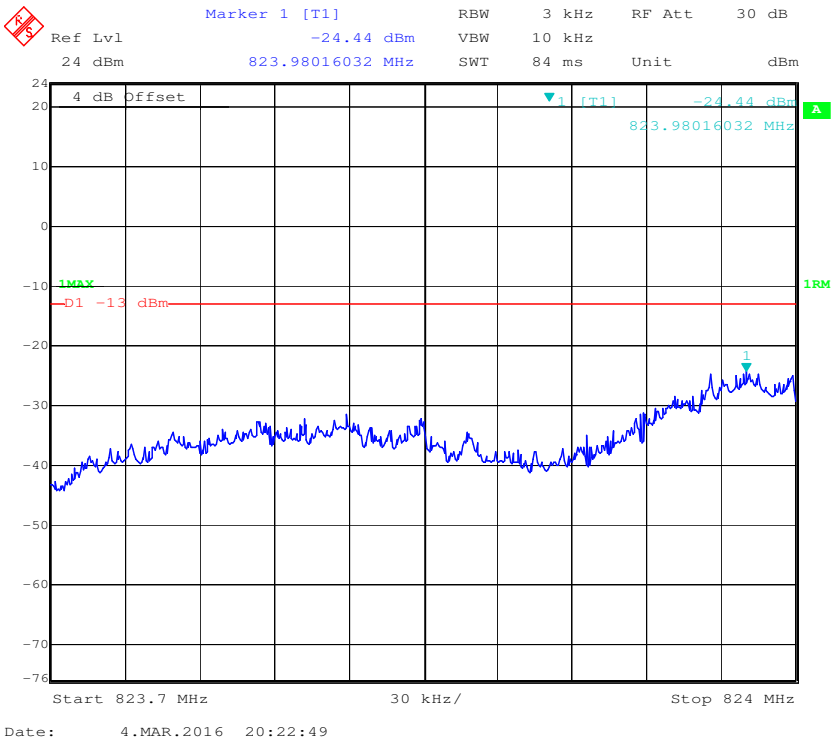
## CELLULAR Band, Left Band Edge for AWGN-3dB above AGC



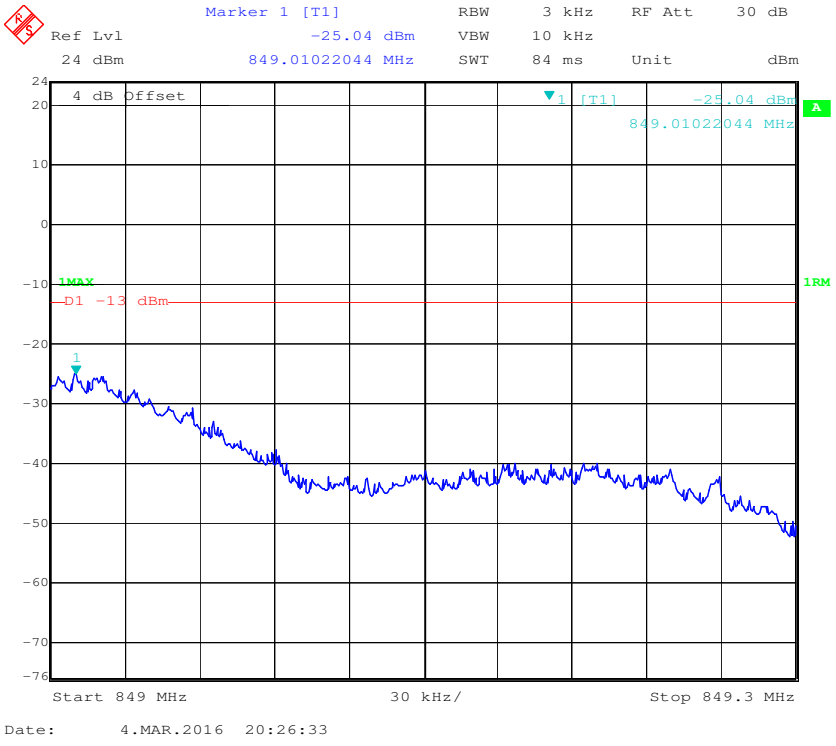

## CELLULAR Band, Right Band Edge for AWGN-3dB above AGC



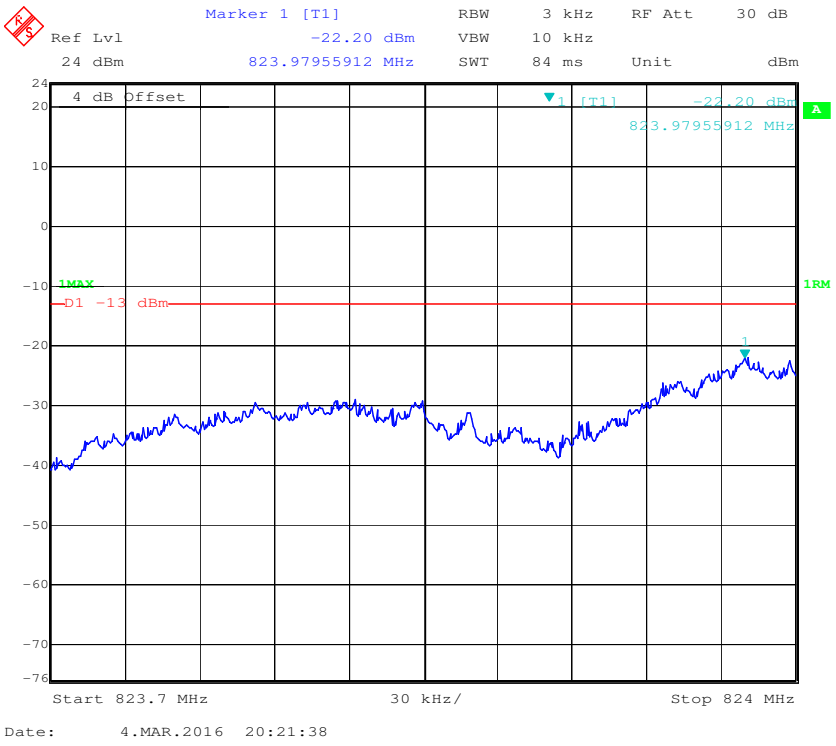
## CELLULAR Band, Left Band Edge for GSM-Pre AGC



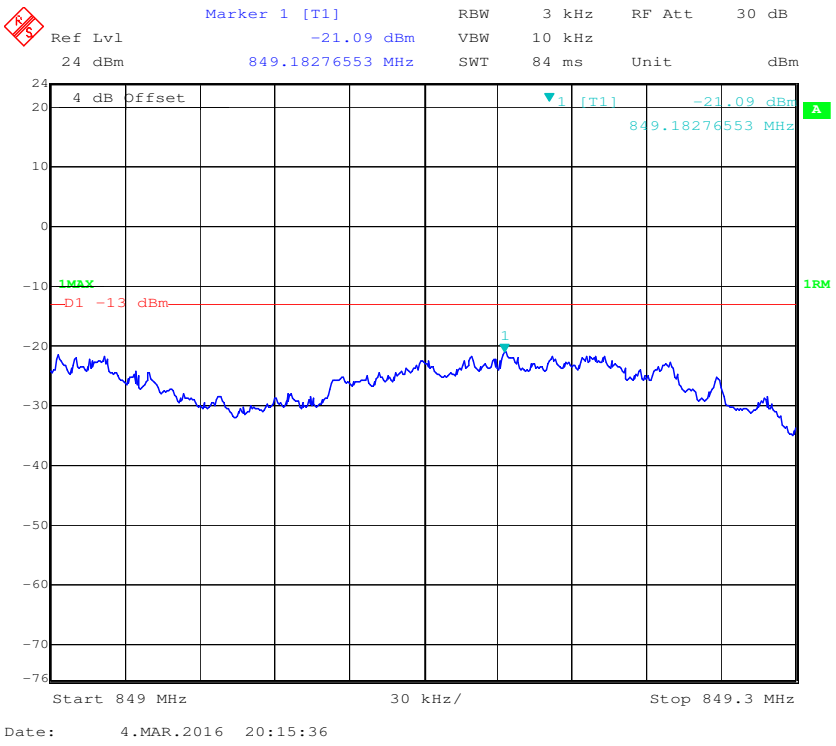

## CELLULAR Band, Right Band Edge for GSM-Pre AGC



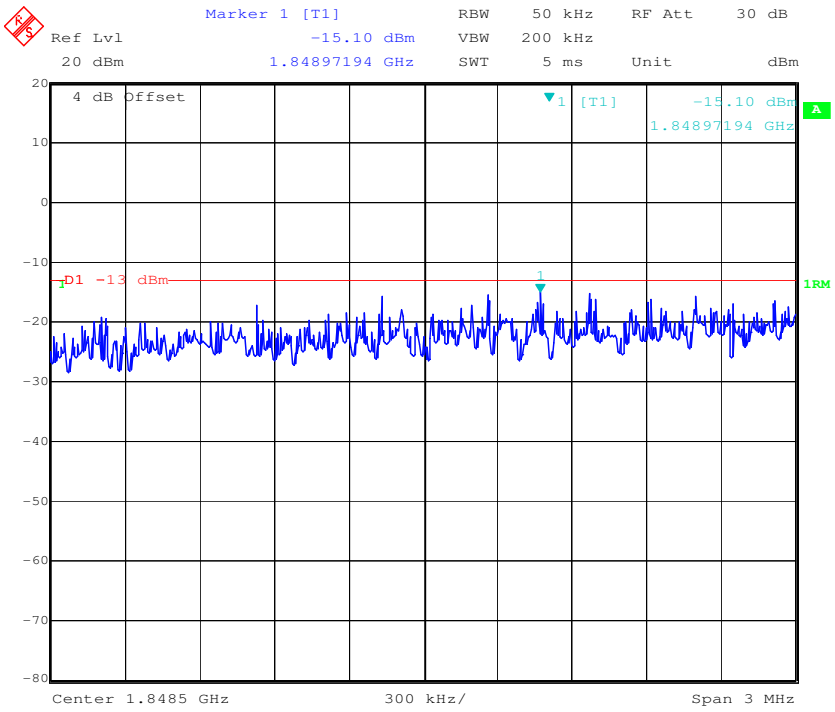
## CELLULAR Band, Left Band Edge for GSM-3dB above AGC



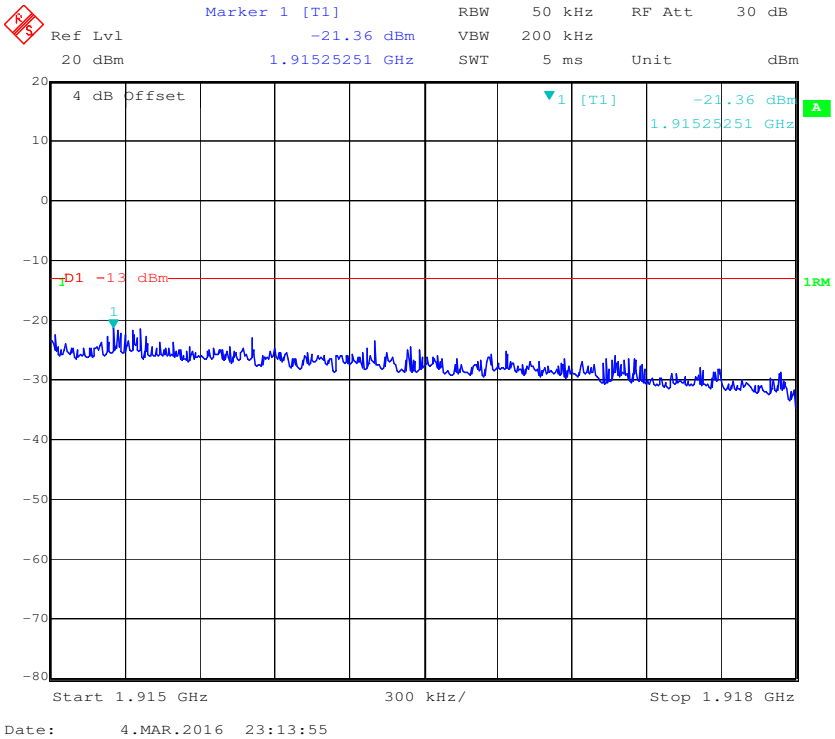

## CELLULAR Band, Right Band Edge for GSM-3dB above AGC



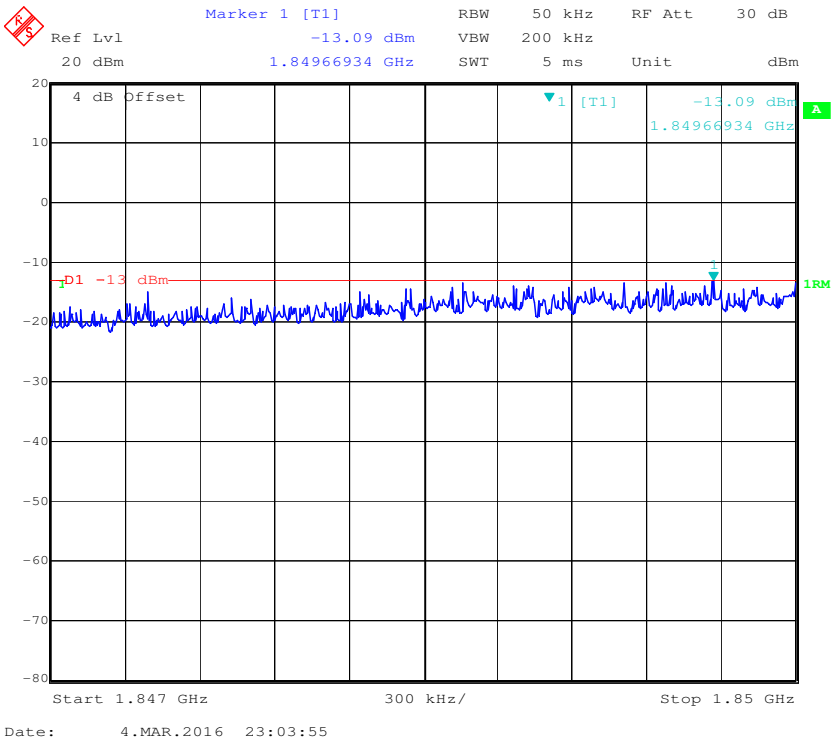
## PCS Band, Left Band Edge for AWGN-Pre AGC



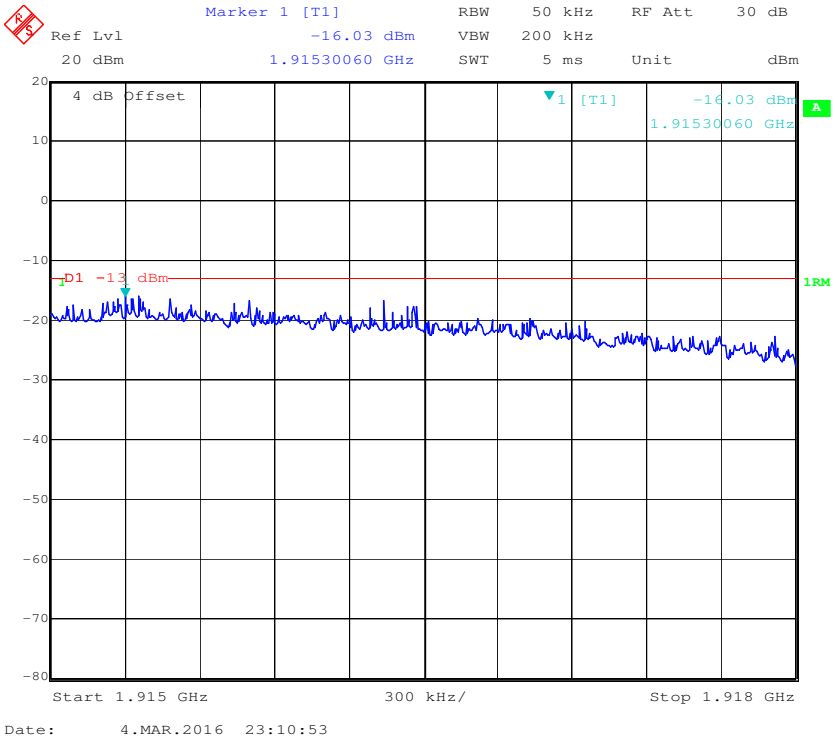

## PCS Band, Right Band Edge for AWGN-Pre AGC



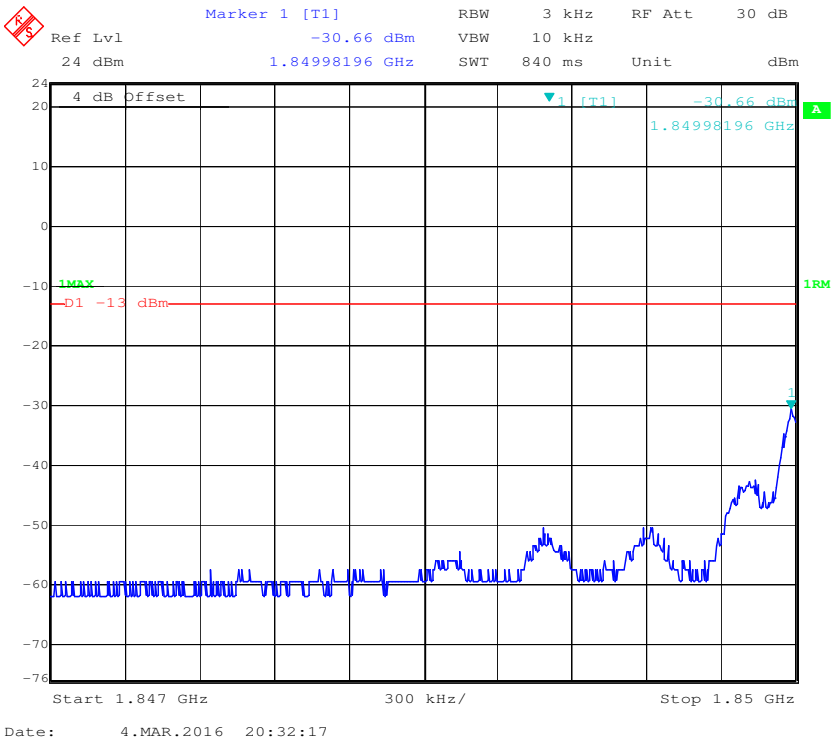
## PCS Band, Left Band Edge for AWGN-3dB above AGC



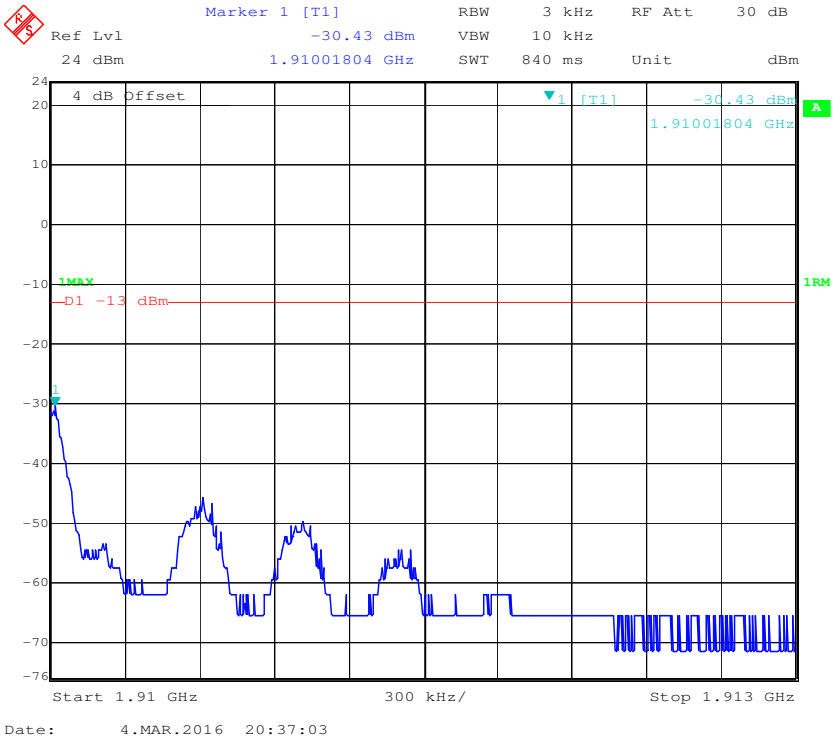

## PCS Band, Right Band Edge for AWGN-3dB above AGC



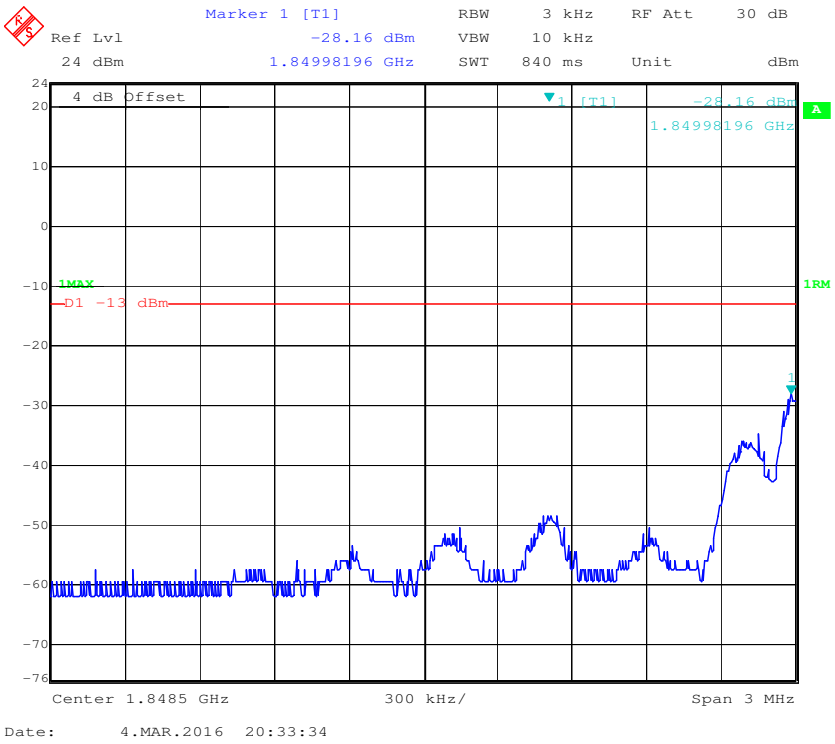
## PCS Band, Left Band Edge for GSM-Pre AGC



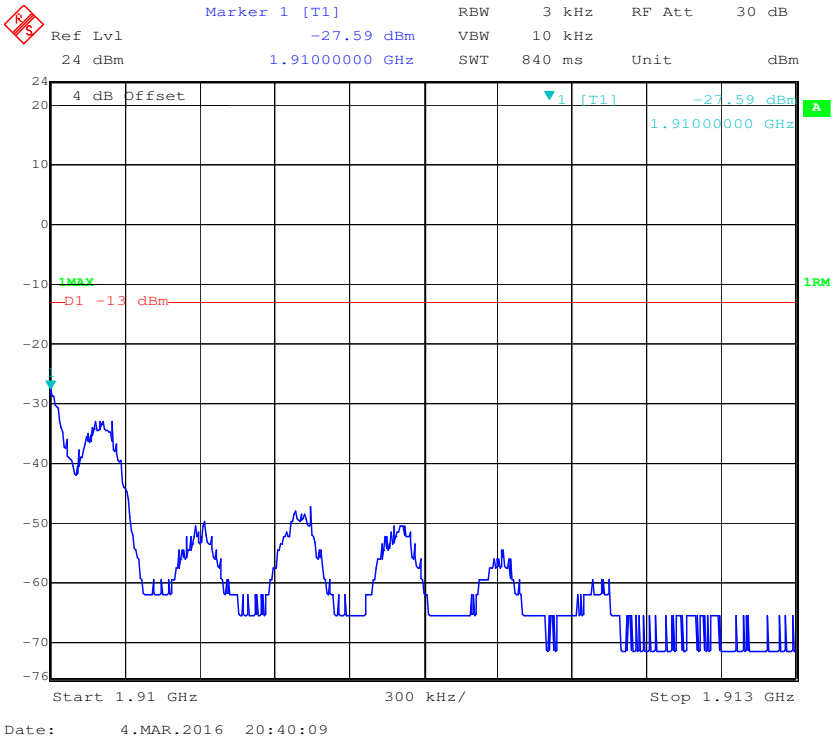

## PCS Band, Right Band Edge for GSM-Pre AGC



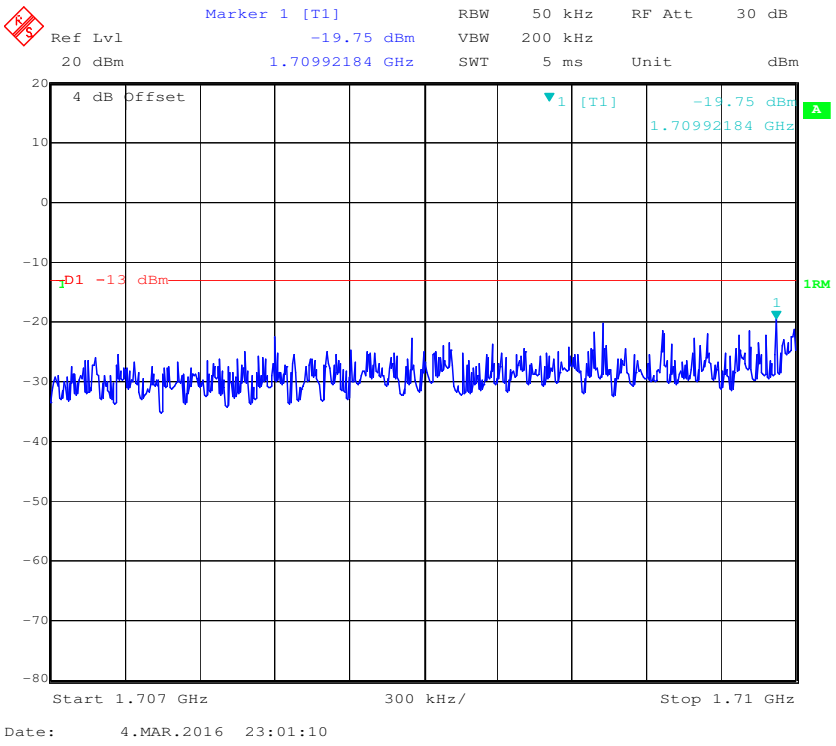
## PCS Band, Left Band Edge for GSM-3dB above AGC



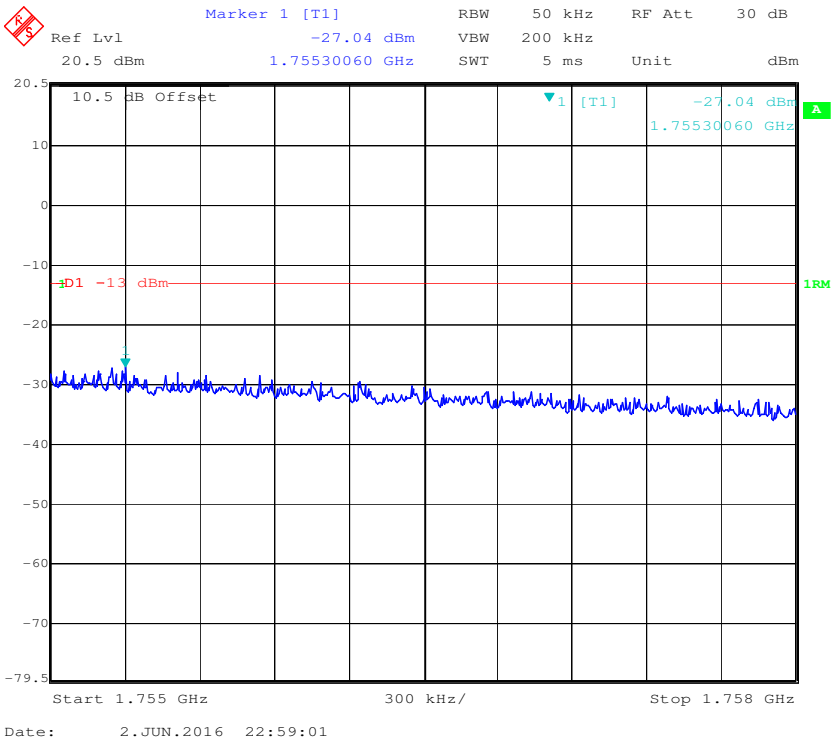

## PCS Band, Right Band Edge for GSM-3dB above AGC



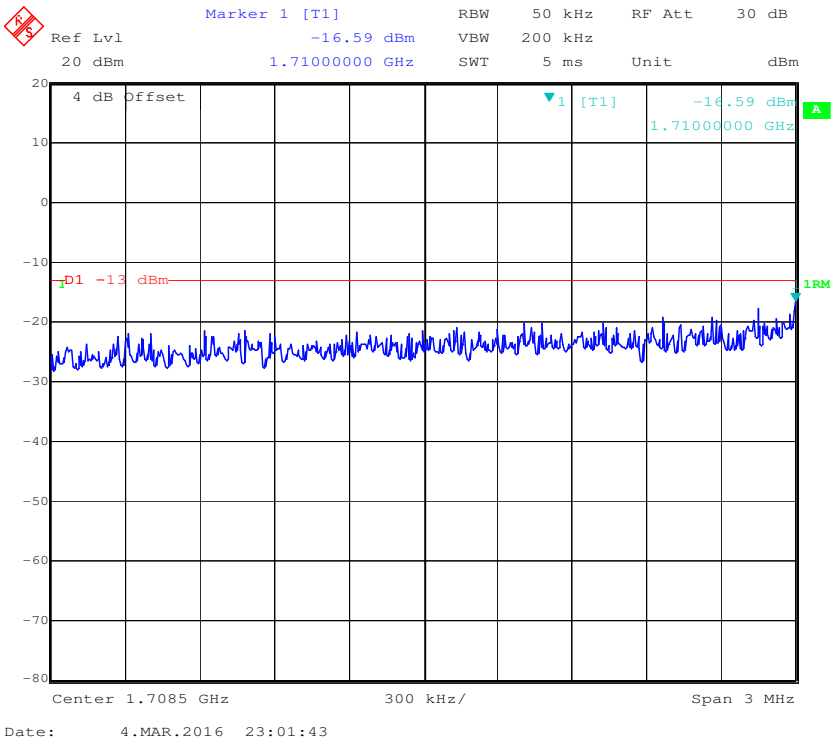
## AWS-1 Band, Left Band Edge for AWGN-Pre AGC



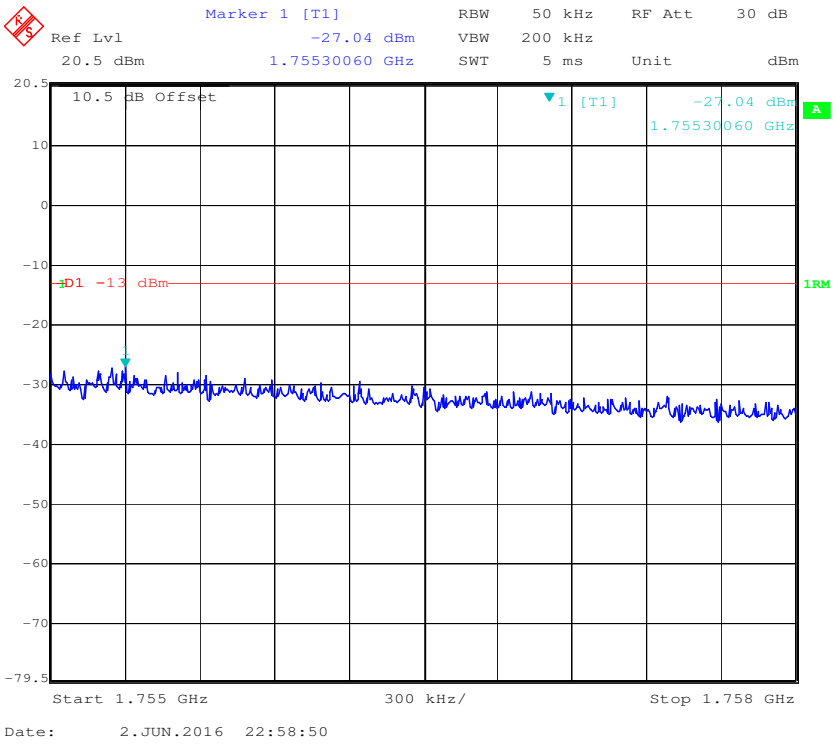

## AWS-1 Band, Right Band Edge for AWGN-Pre AGC



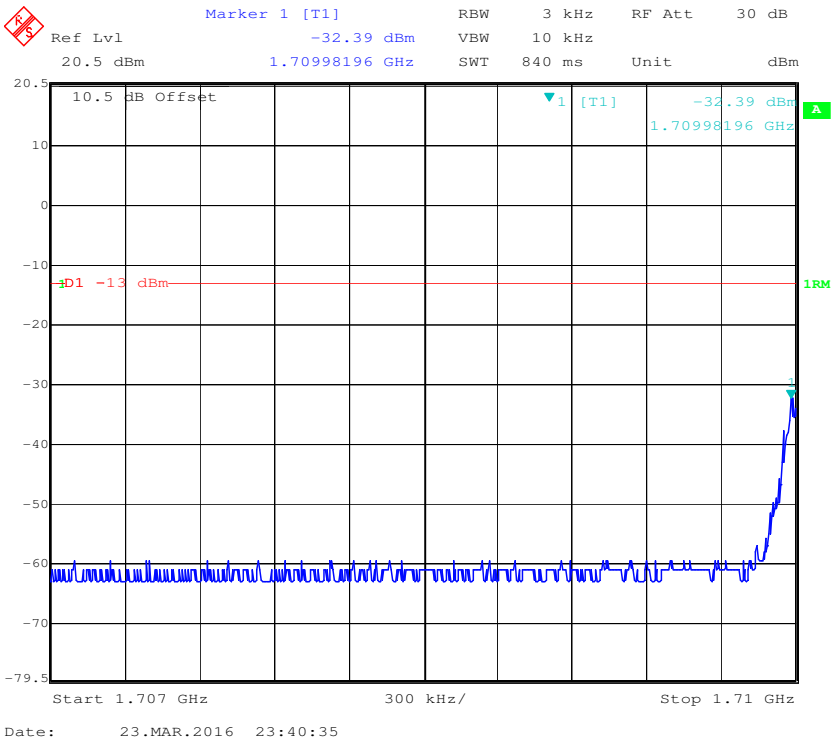
## AWS-1 Band, Left Band Edge for AWGN-3dB above AGC



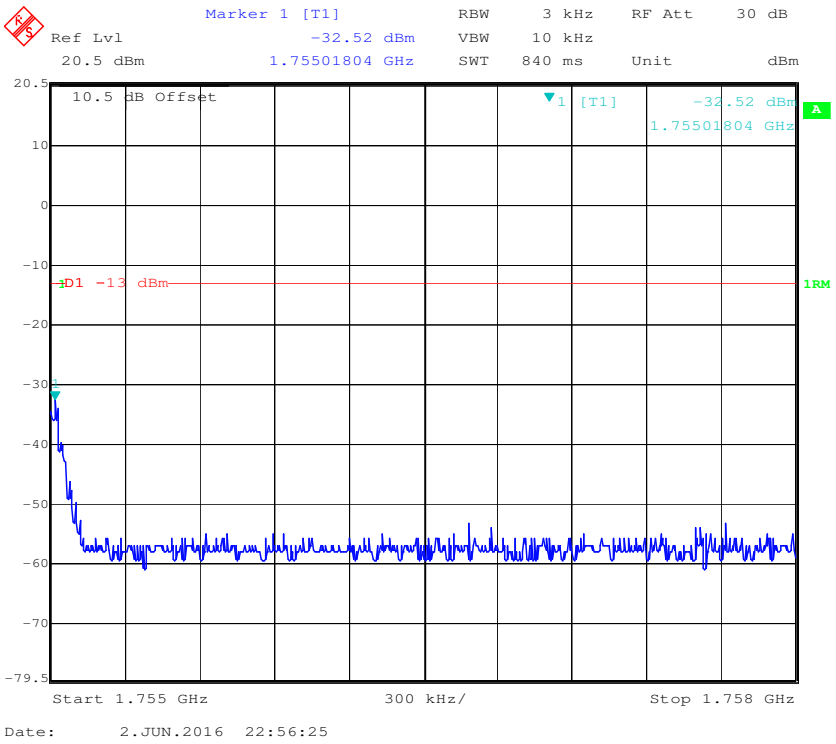

## AWS-1 Band, Right Band Edge for AWGN-3dB above AGC



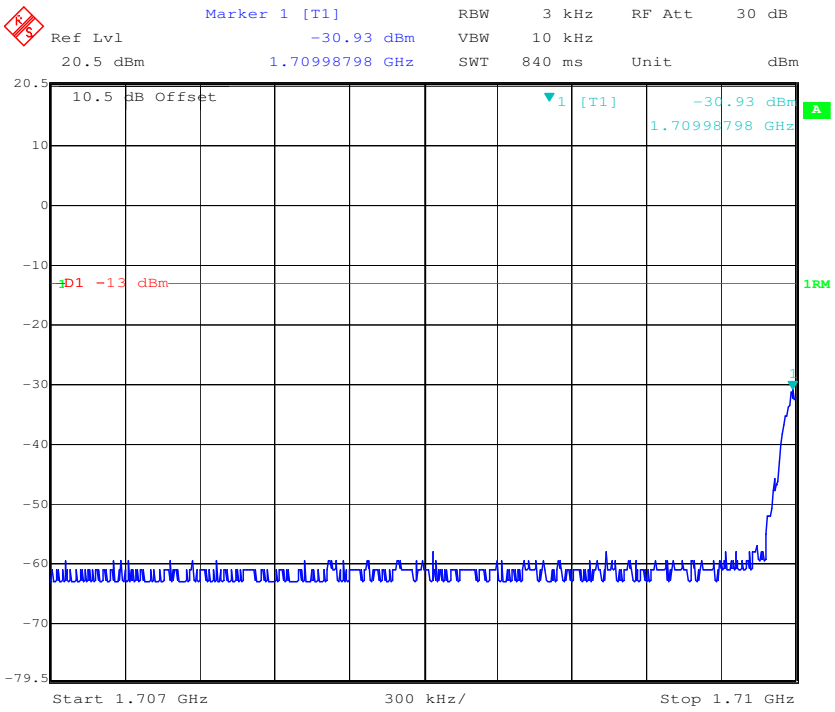
## AWS-1 Band, Left Band Edge for GSM-Pre AGC



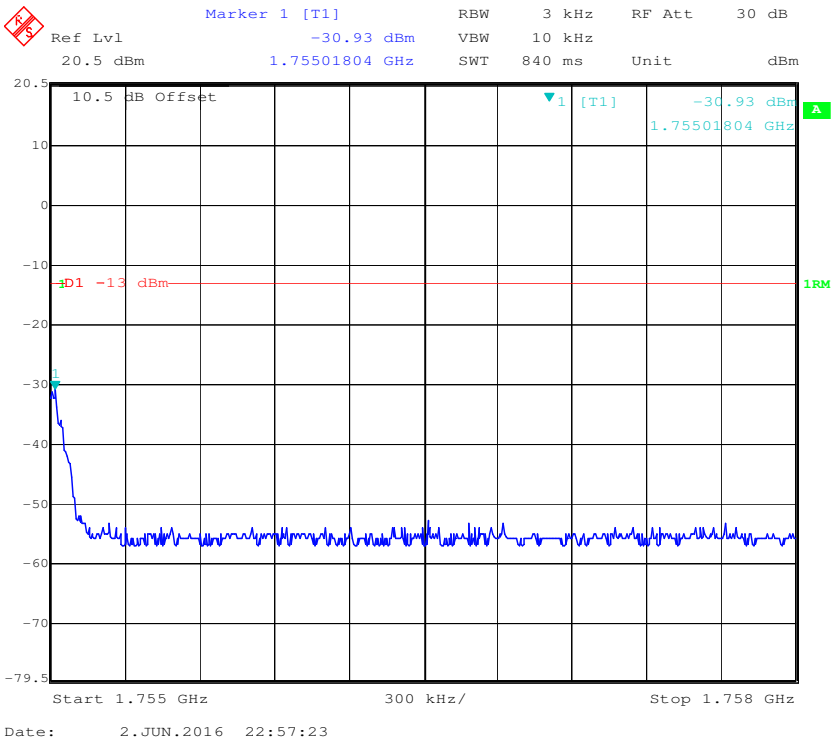

## AWS-1 Band, Right Band Edge for GSM-Pre AGC



## AWS-1 Band, Left Band Edge for GSM-3dB above AGC

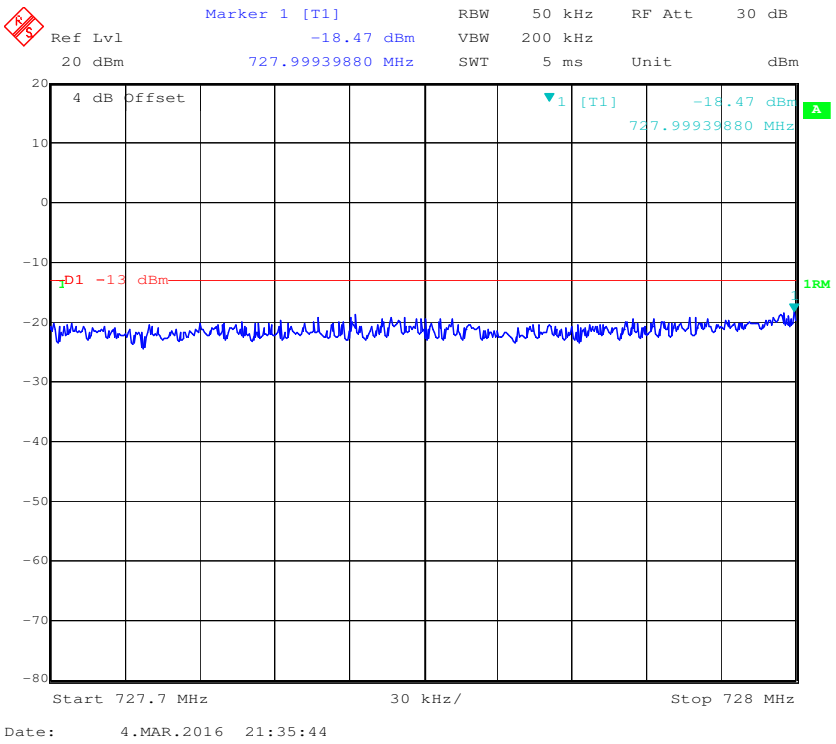



## AWS-1 Band, Right Band Edge for GSM-3dB above AGC

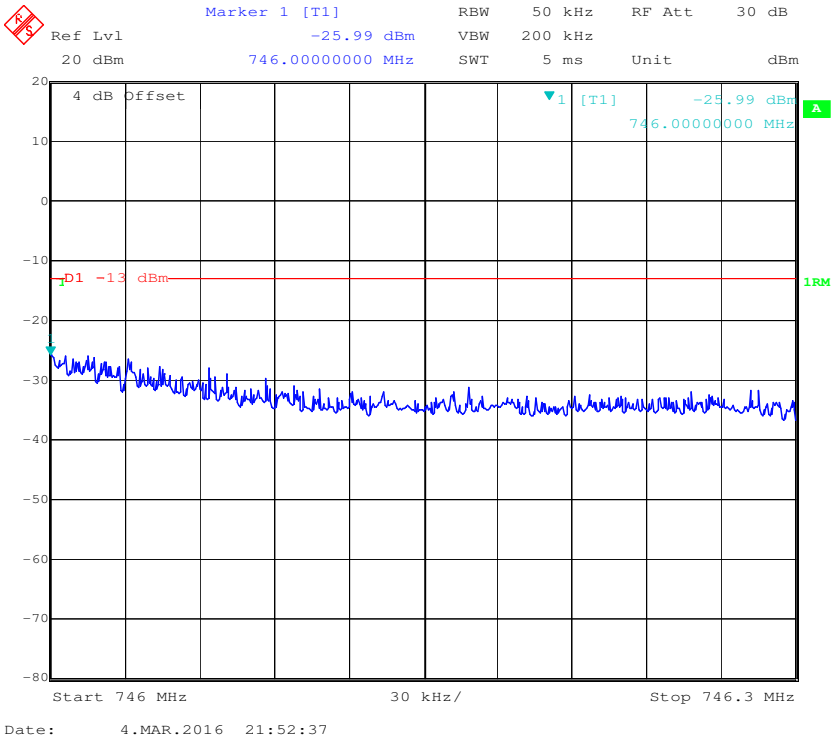


**Downlink:**

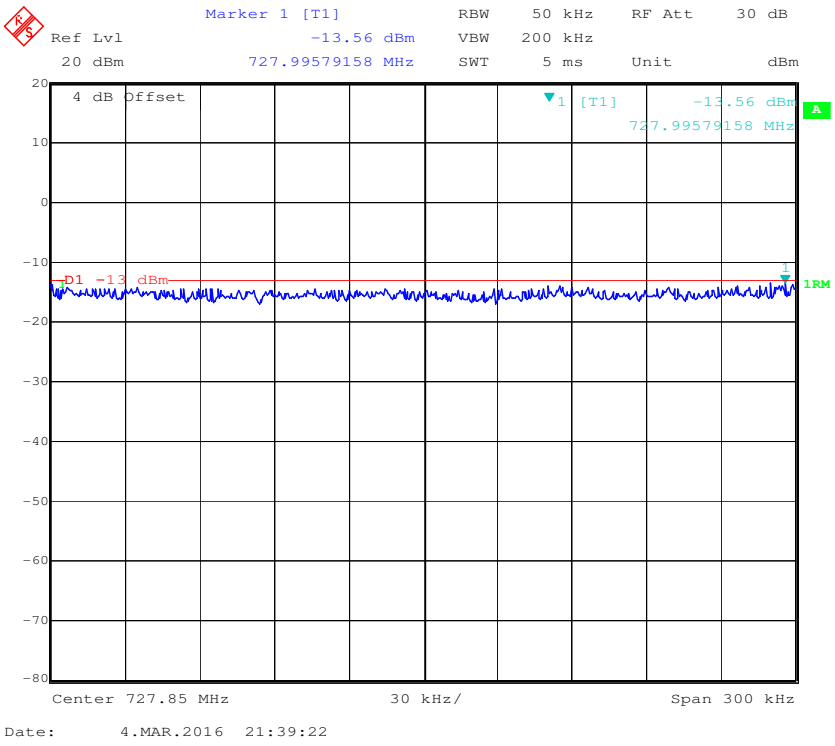
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-Pre AGC**



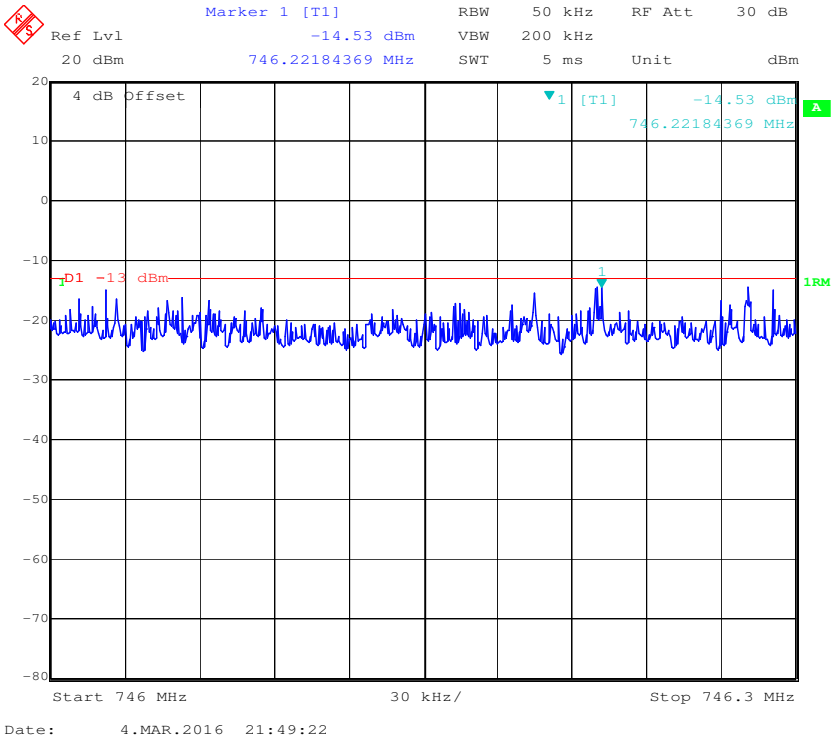

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-Pre AGC**



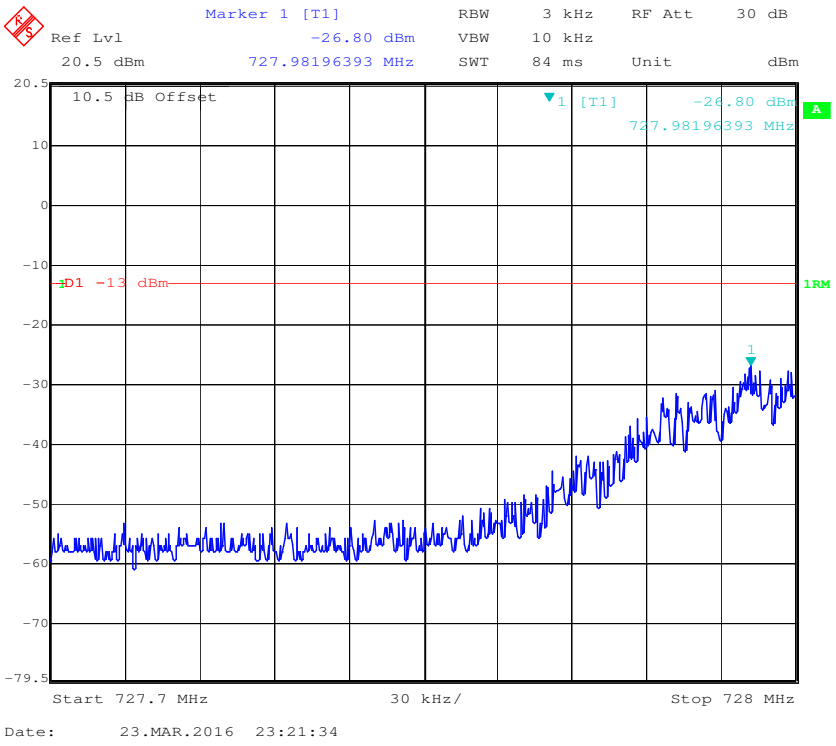
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for AWGN-3dB above AGC**



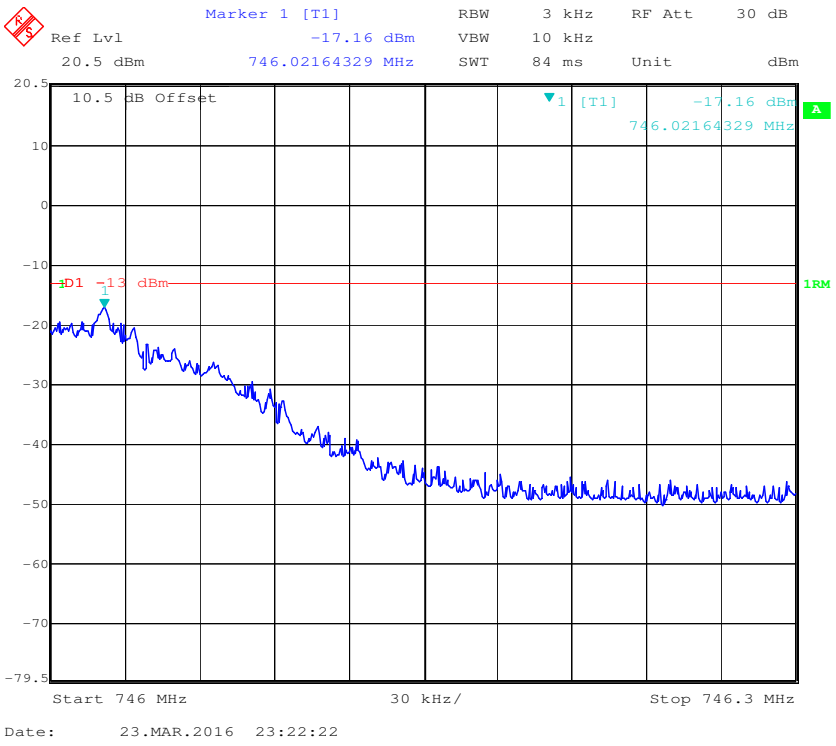

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for AWGN-3dB above AGC**



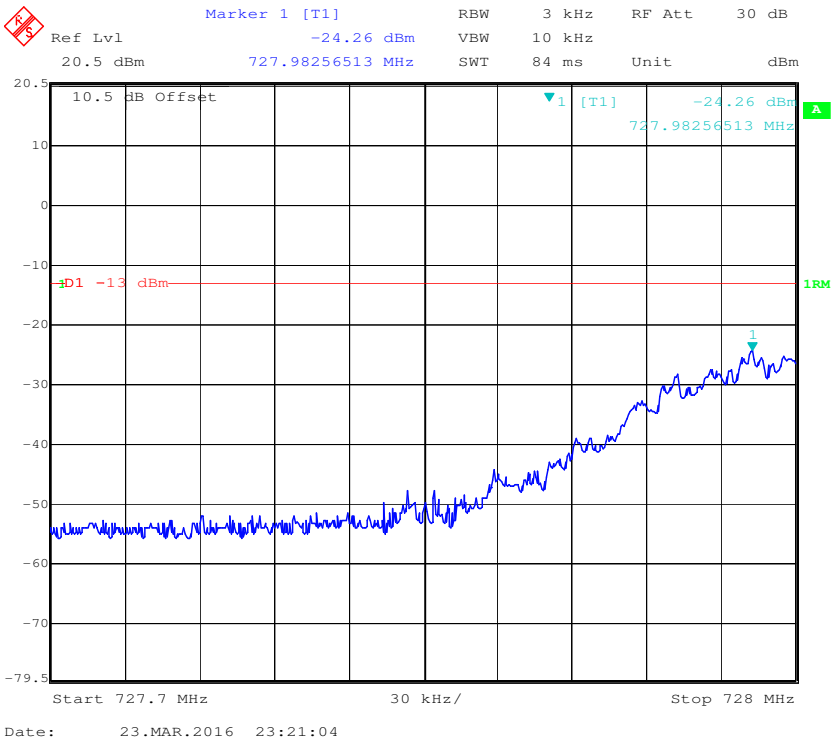
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-Pre AGC**



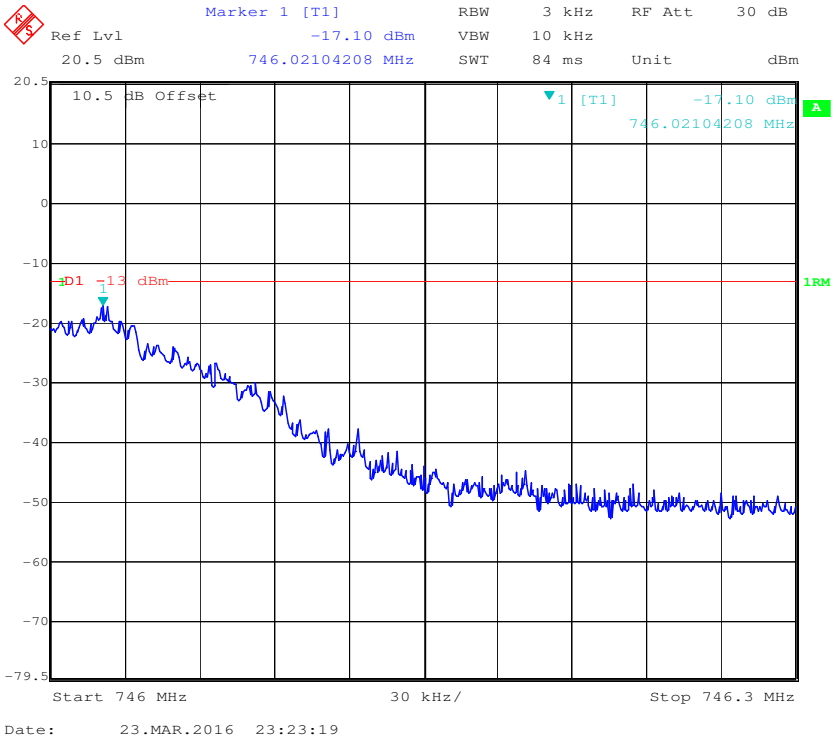

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-Pre AGC**



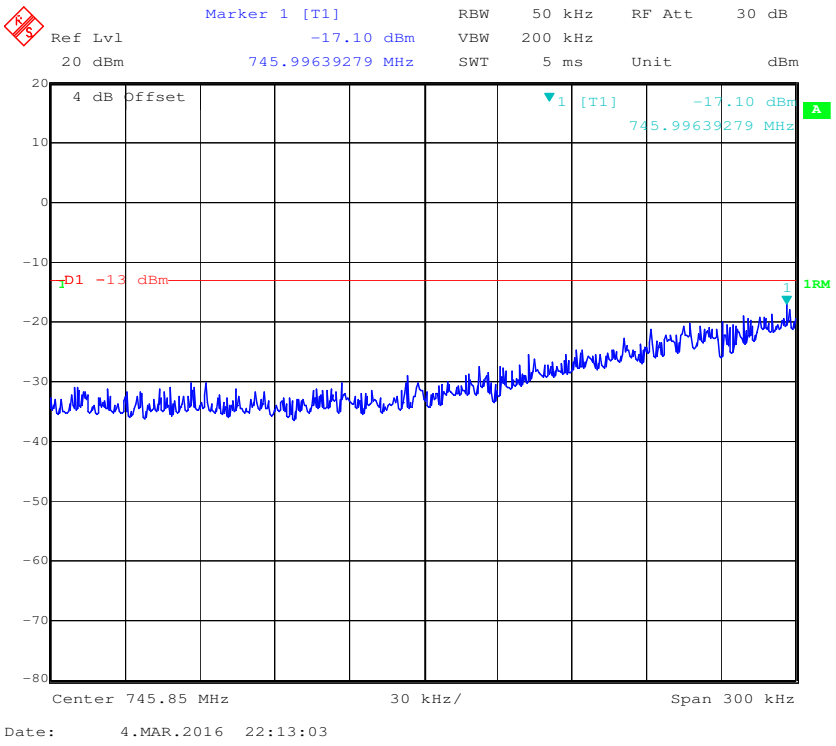
**Lower 700MHz (A+B+C Block) Band, Left Band Edge for GSM-3dB above AGC**



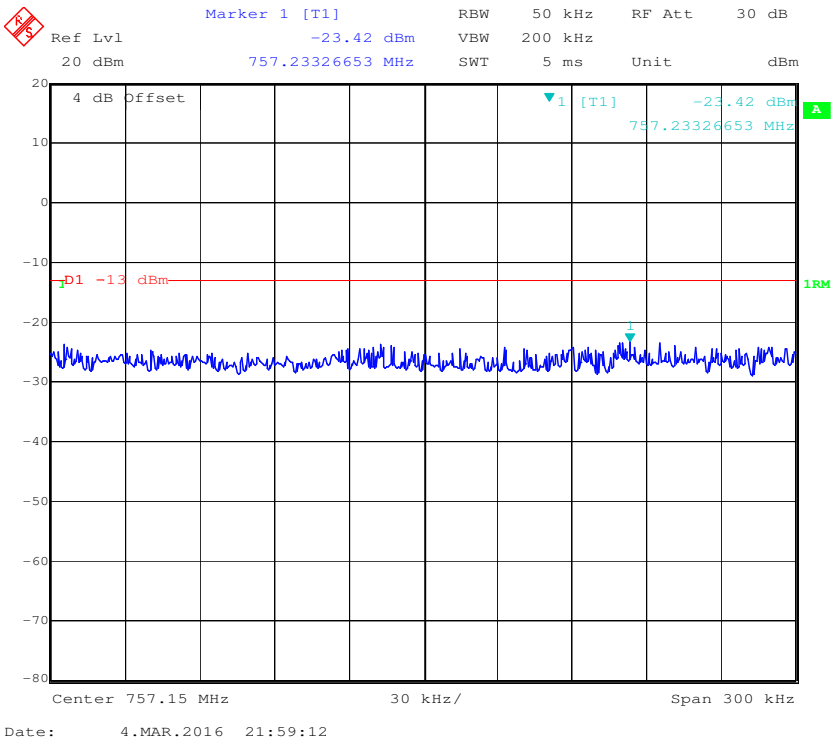

**Lower 700MHz (A+B+C Block) Band, Right Band Edge for GSM-3dB above AGC**



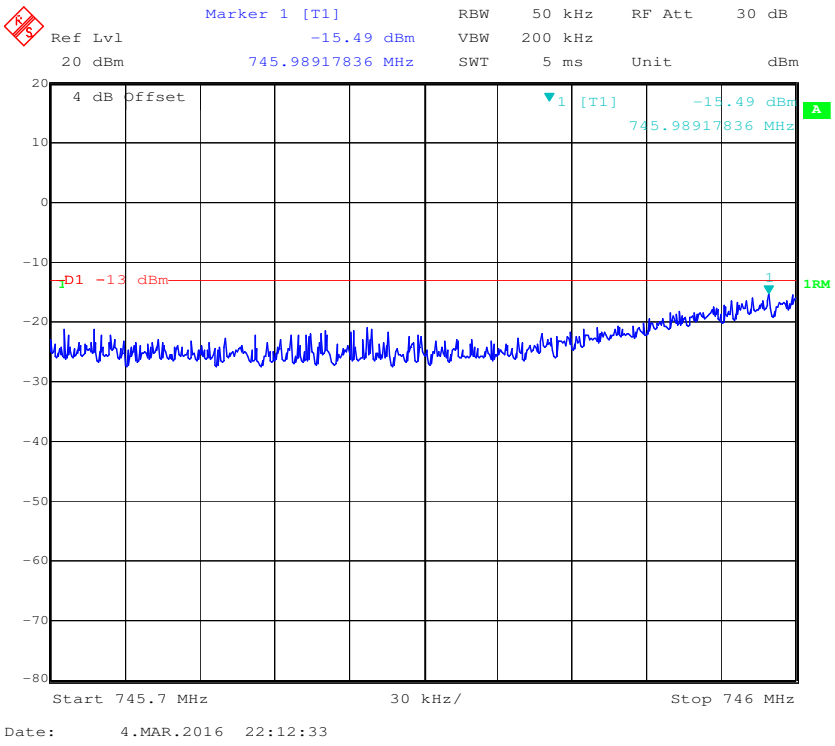
## Upper 700MHz (C Block) Band, Left Band Edge for AWGN-Pre AGC



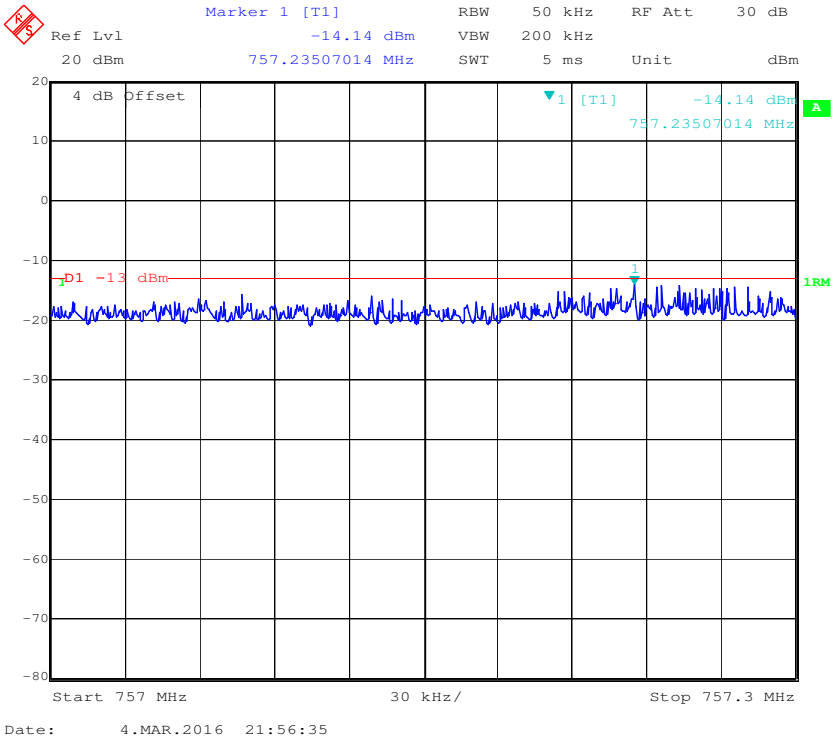

## Upper 700MHz (C Block) Band, Right Band Edge for AWGN-Pre AGC



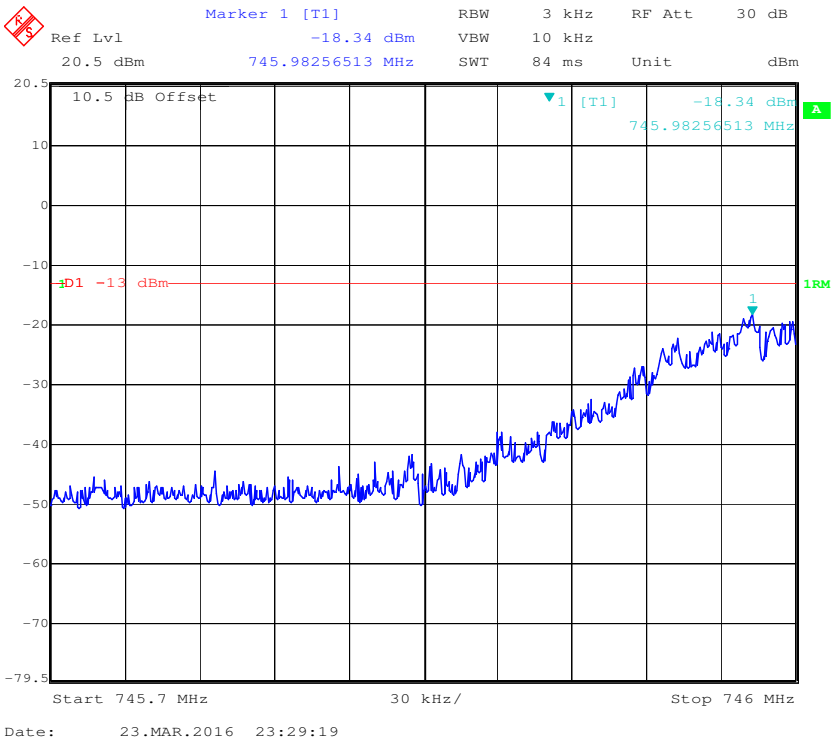
**Upper 700MHz (C Block) Band, Left Band Edge for AWGN-3dB above AGC**



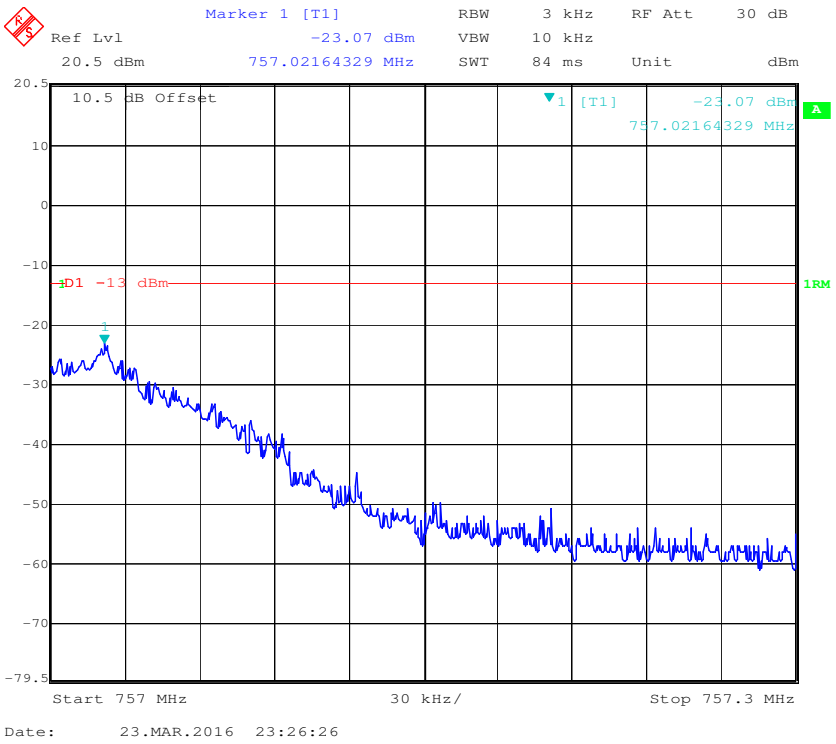

**Upper 700MHz (C Block) Band, Right Band Edge for AWGN-3dB above AGC**



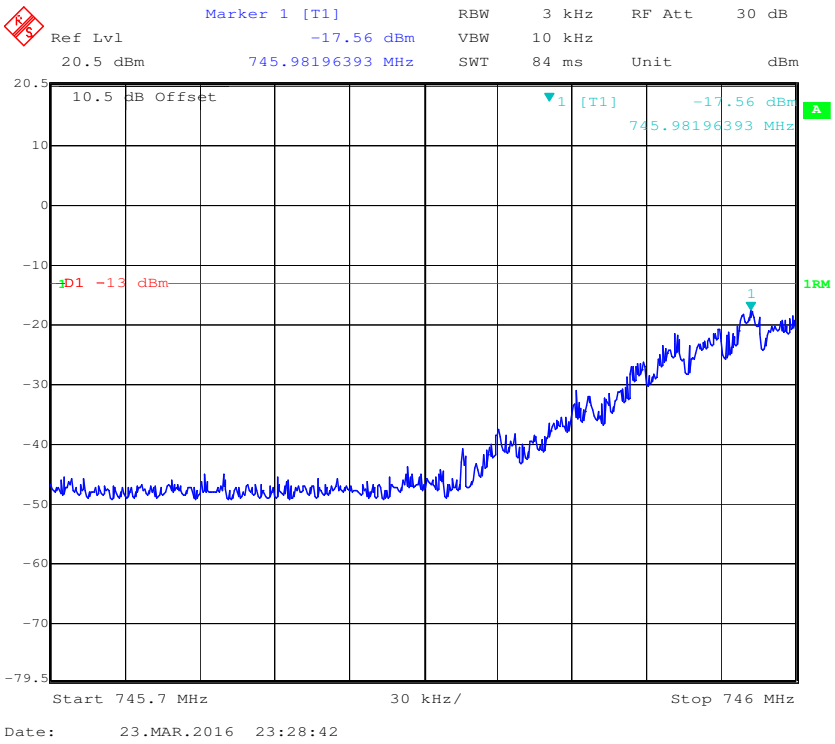
## Upper 700MHz (C Block) Band, Left Band Edge for GSM-Pre AGC



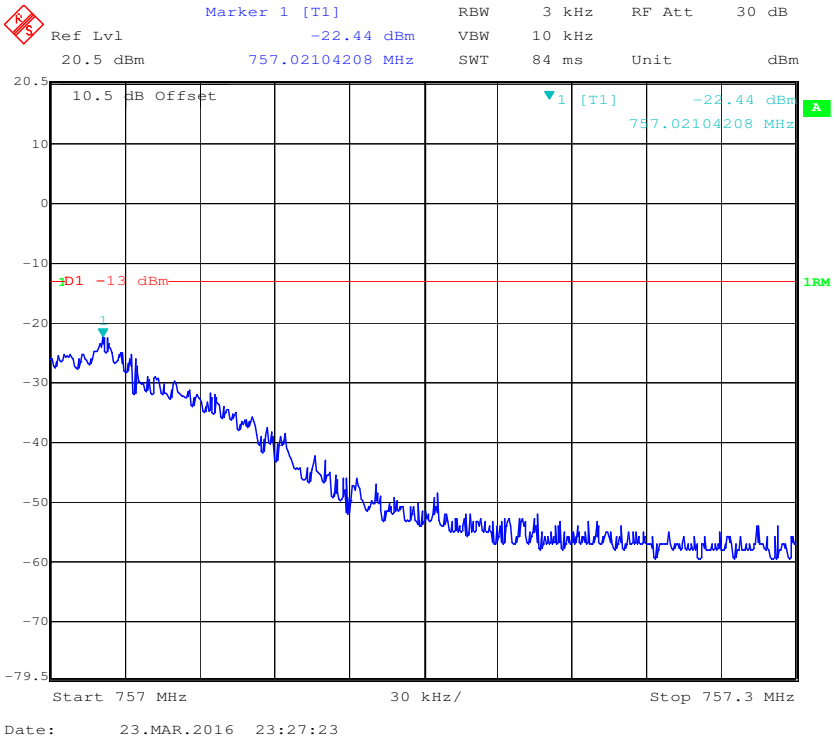

## Upper 700MHz (C Block) Band, Right Band Edge for GSM-Pre AGC



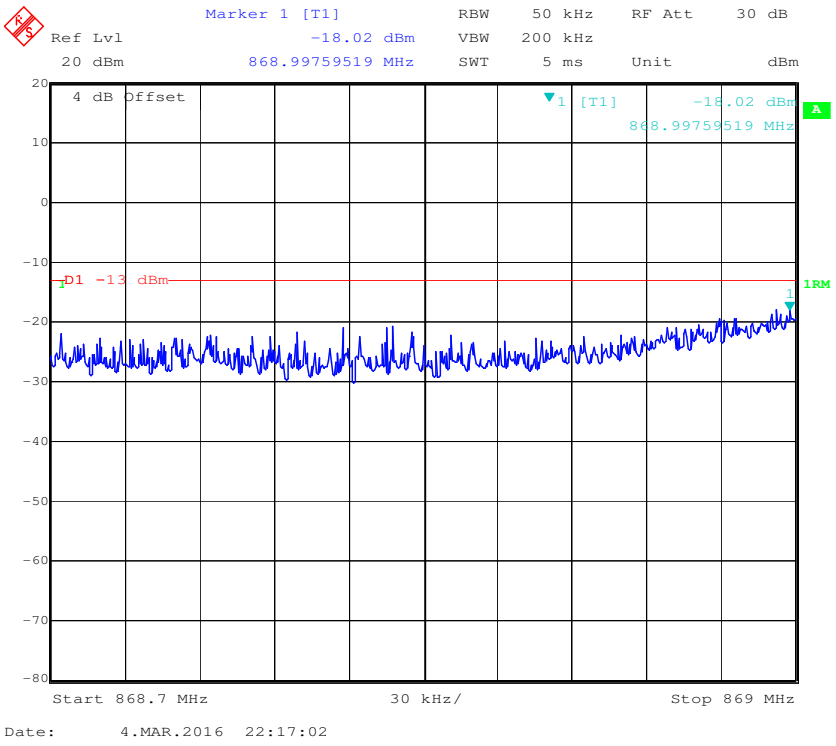
**Upper 700MHz (C Block) Band, Left Band Edge for GSM-3dB above AGC**



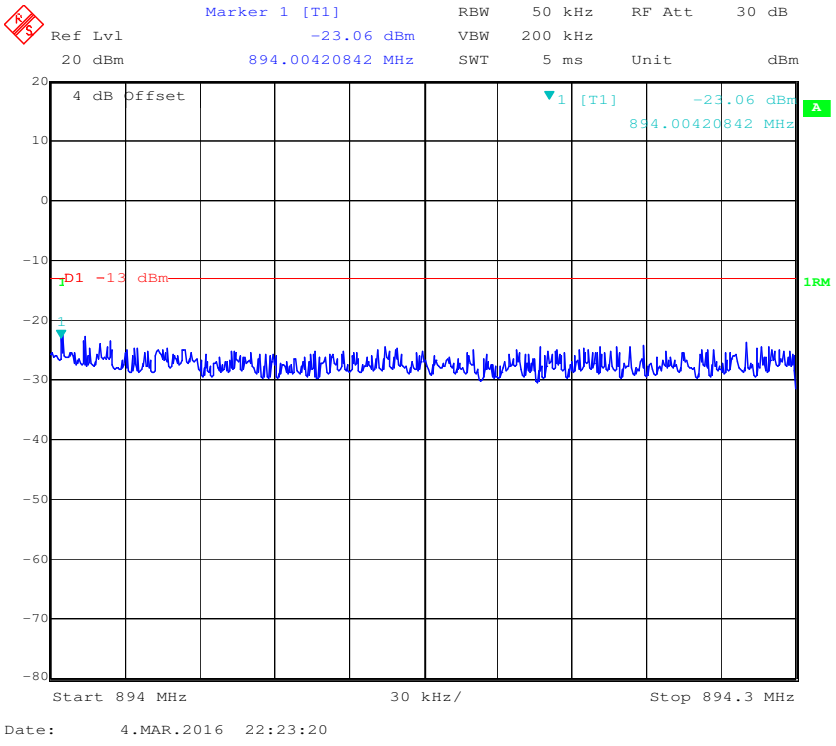

**Upper 700MHz (C Block) Band, Right Band Edge for GSM-3dB above AGC**



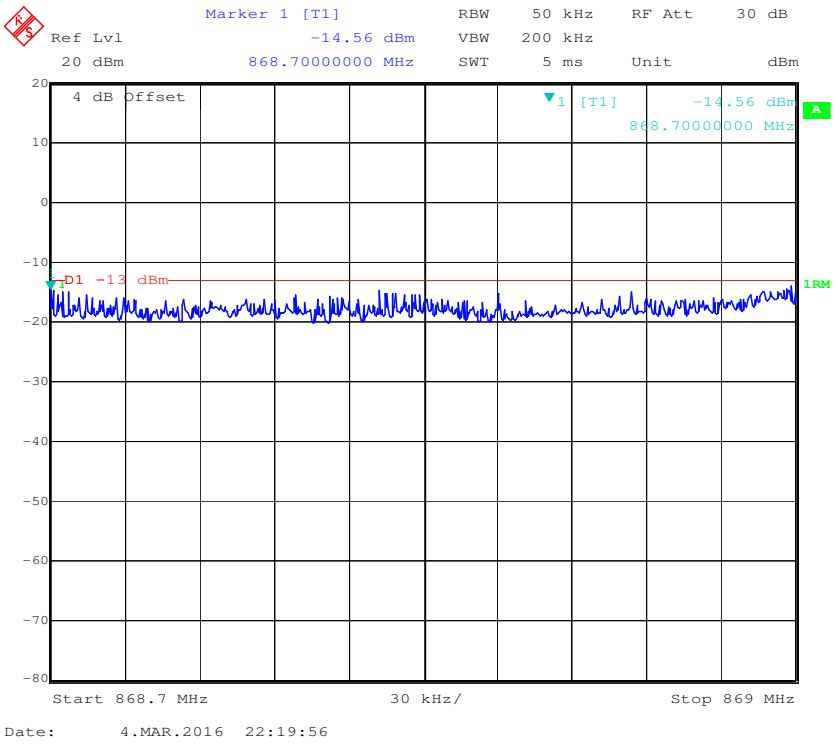
## CELLULAR Band, Left Band Edge for AWGN-Pre AGC



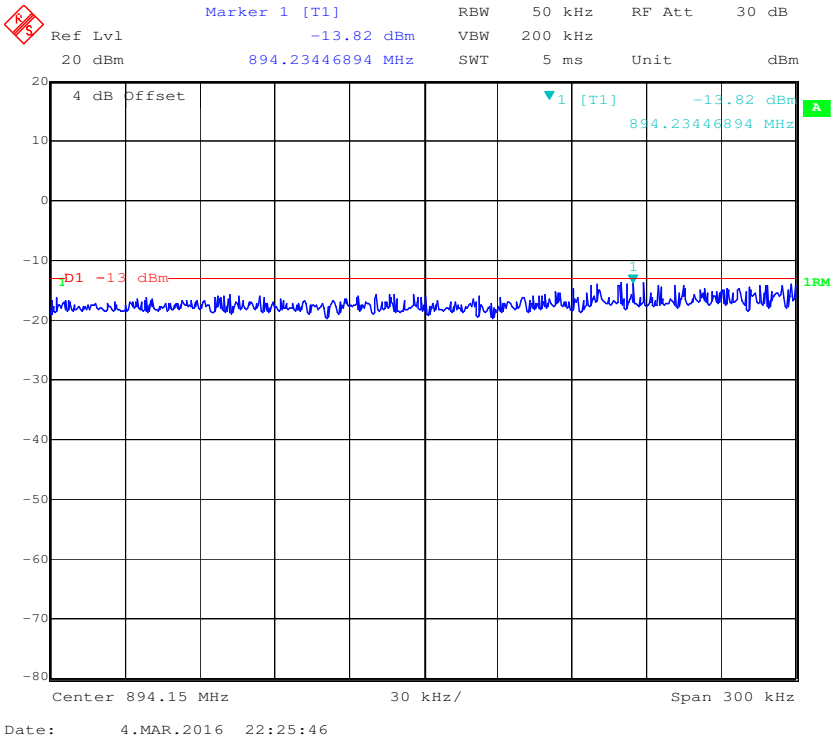

## CELLULAR Band, Right Band Edge for AWGN-Pre AGC



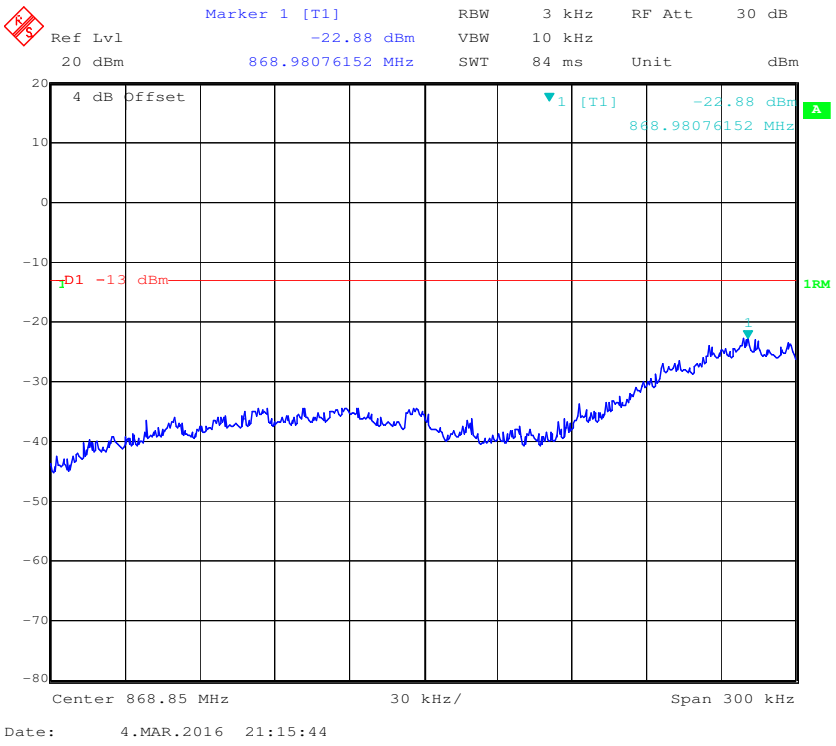
## CELLULAR Band, Left Band Edge for AWGN-3dB above AGC



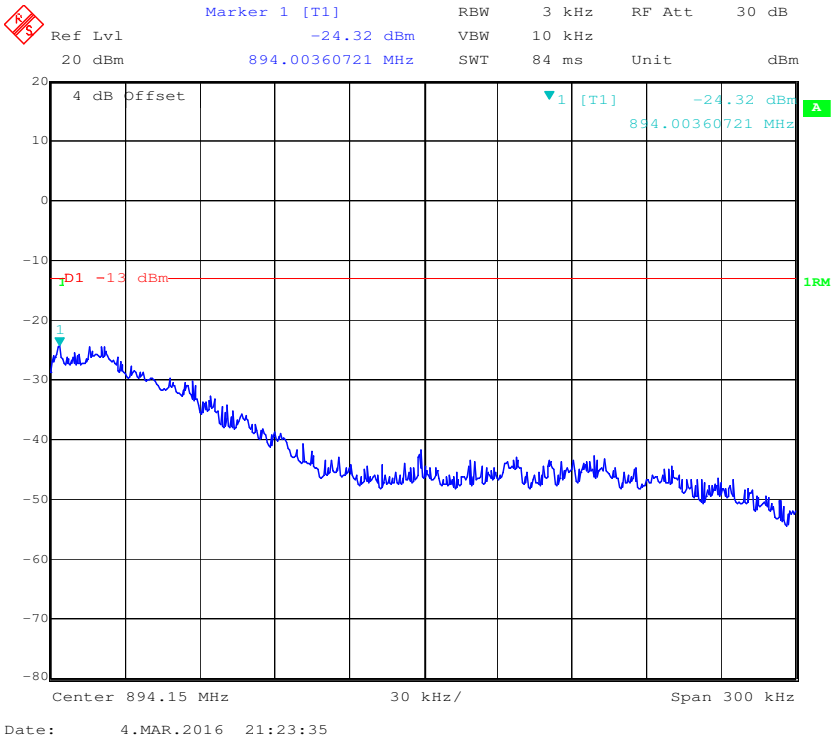

## CELLULAR Band, Right Band Edge for AWGN-3dB above AGC



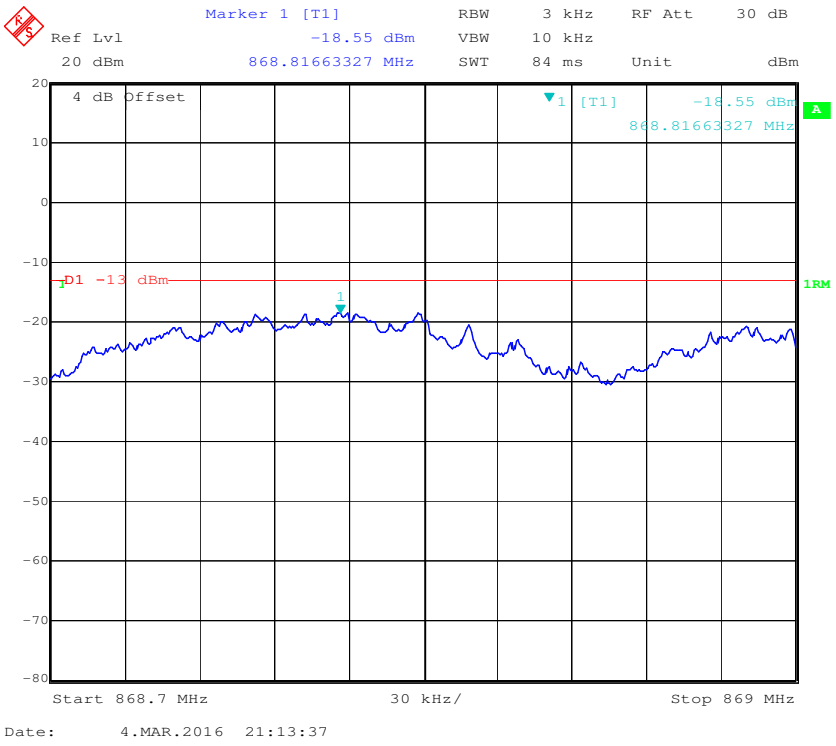
## CELLULAR Band, Left Band Edge for GSM-Pre AGC



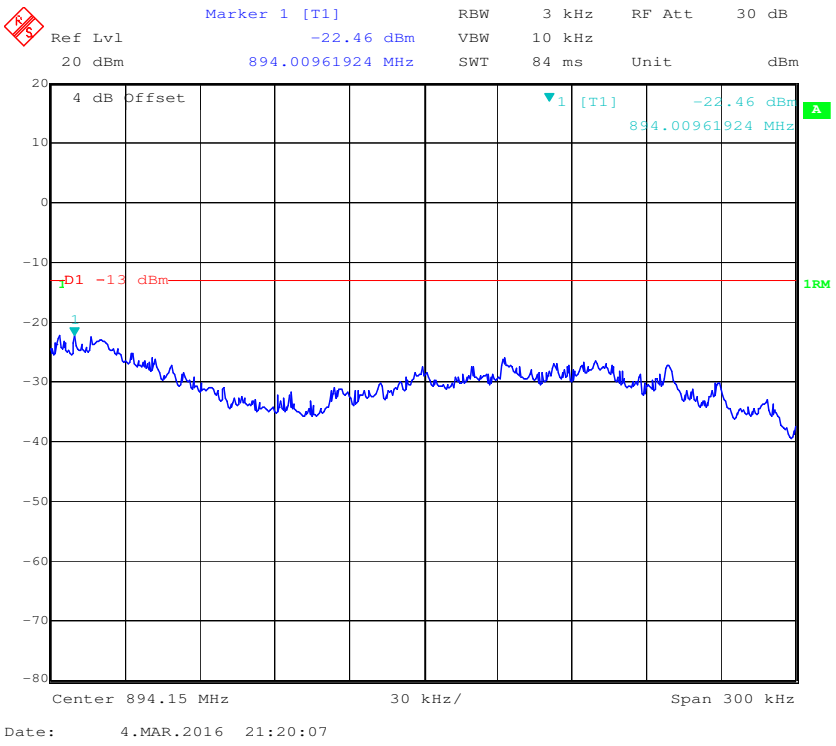

## CELLULAR Band, Right Band Edge for GSM-Pre AGC



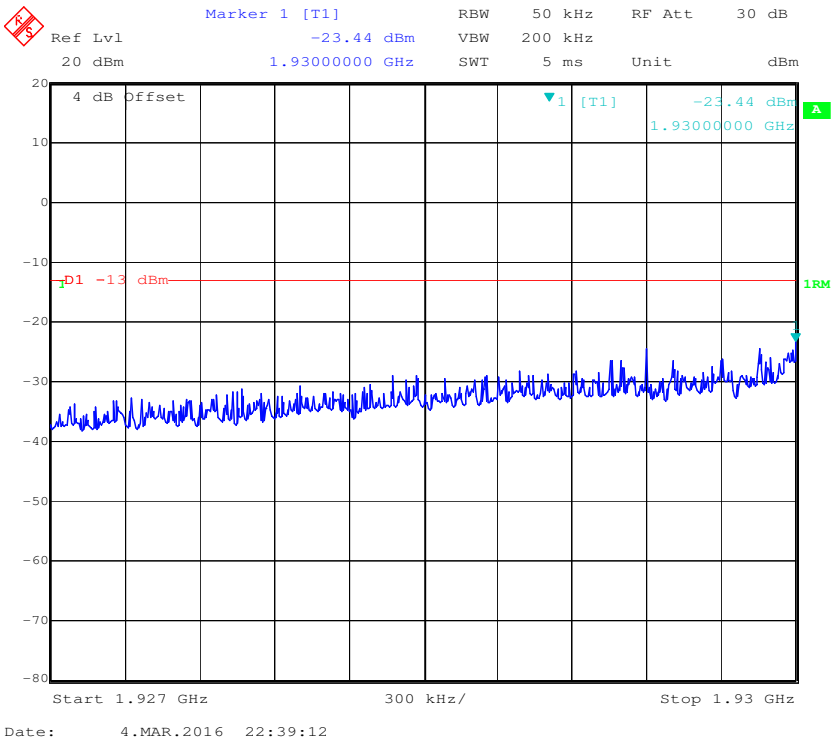
## CELLULAR Band, Left Band Edge for GSM-3dB above AGC



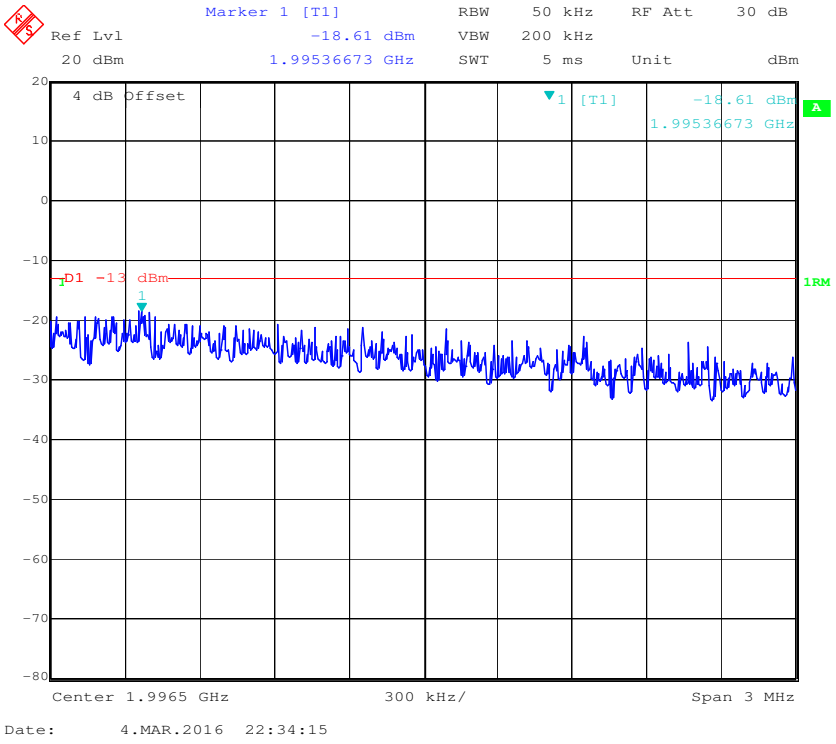

## CELLULAR Band, Right Band Edge for GSM-3dB above AGC



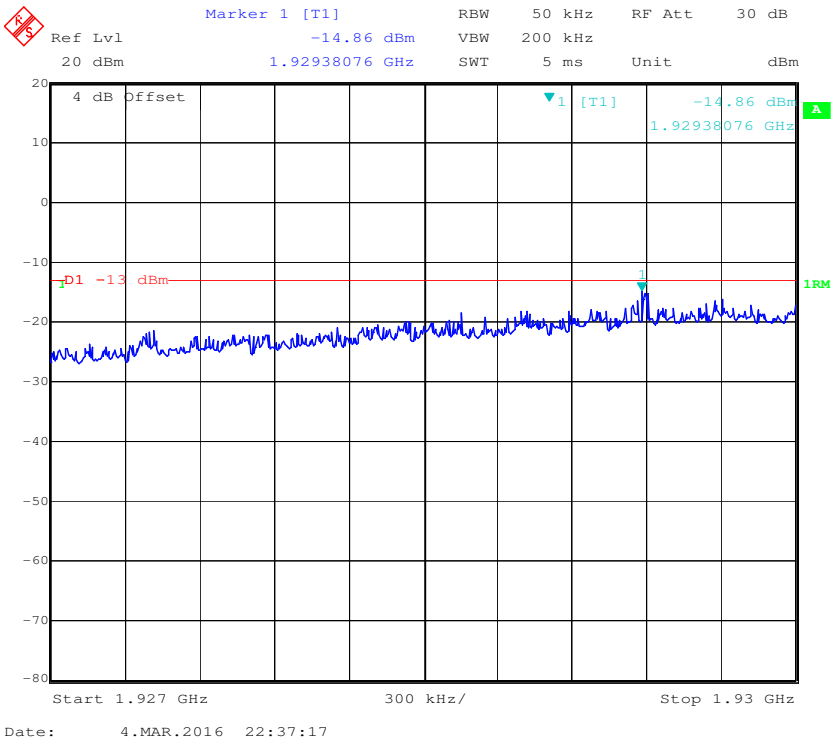
## PCS Band, Left Band Edge for AWGN-Pre AGC



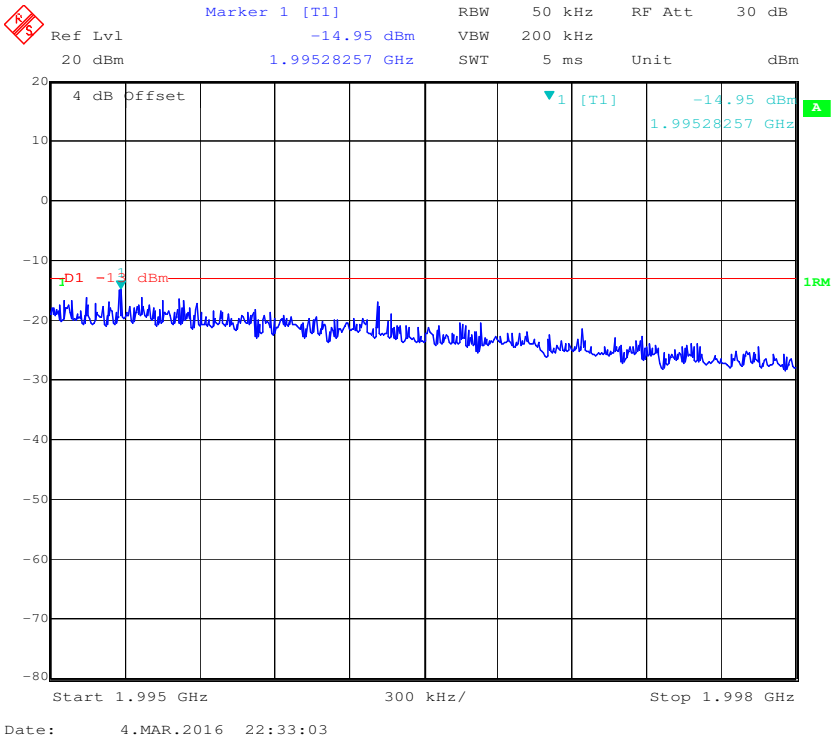

## PCS Band, Right Band Edge for AWGN-Pre AGC



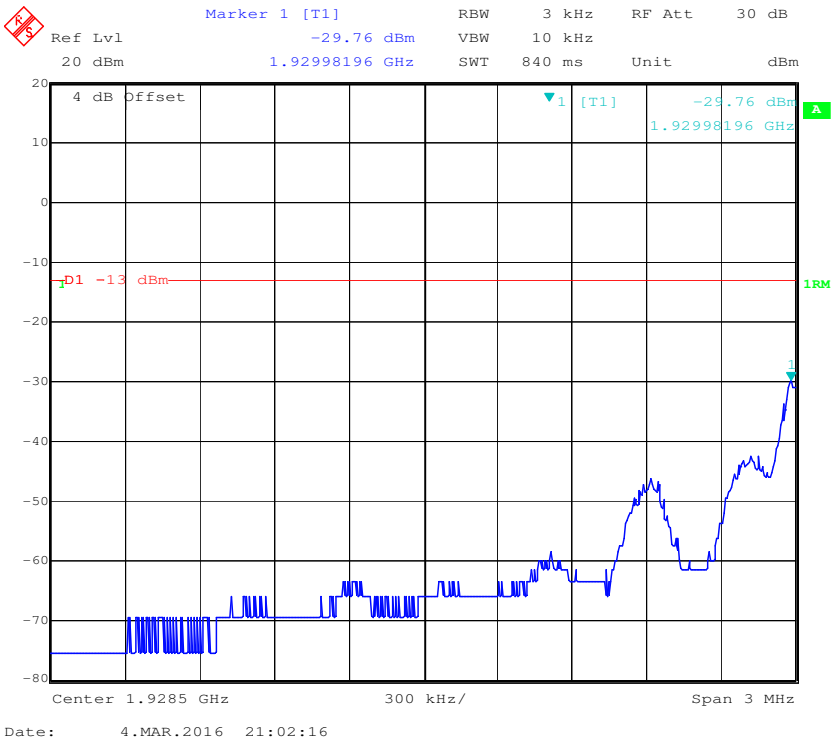
## PCS Band, Left Band Edge for AWGN-3dB above AGC



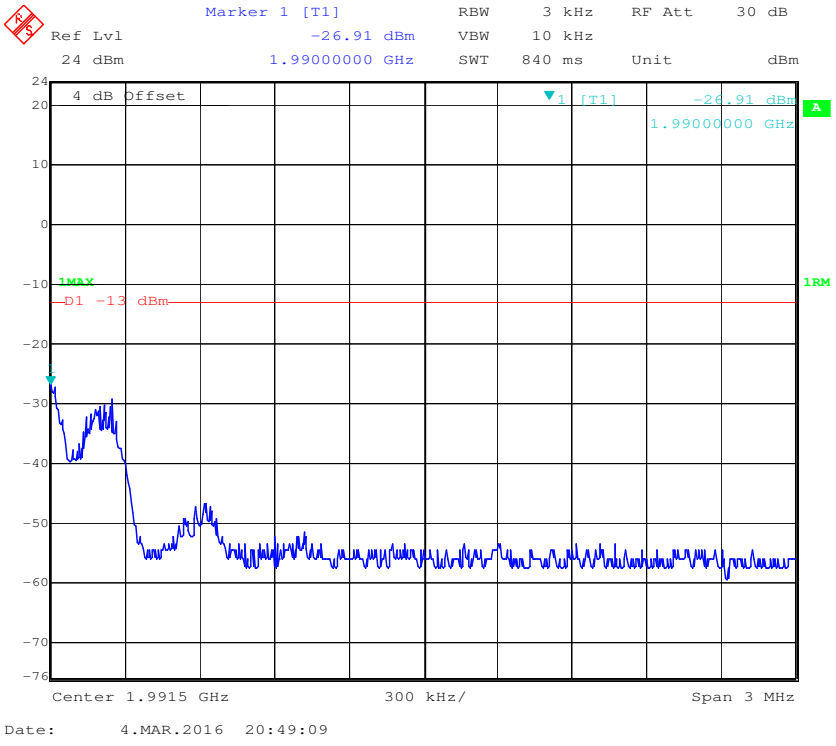

## PCS Band, Right Band Edge for AWGN-3dB above AGC



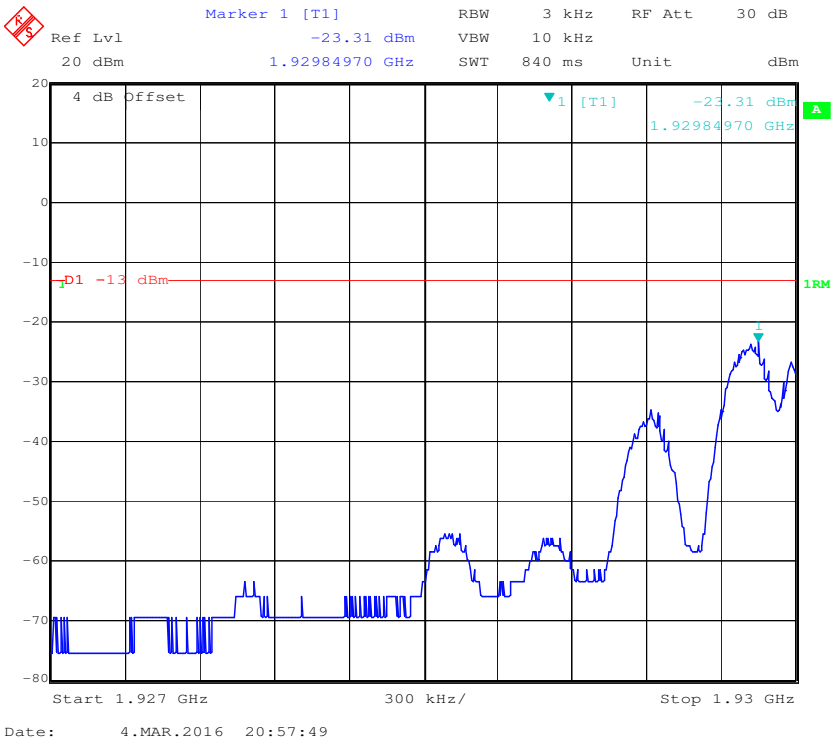
## PCS Band, Left Band Edge for GSM-Pre AGC



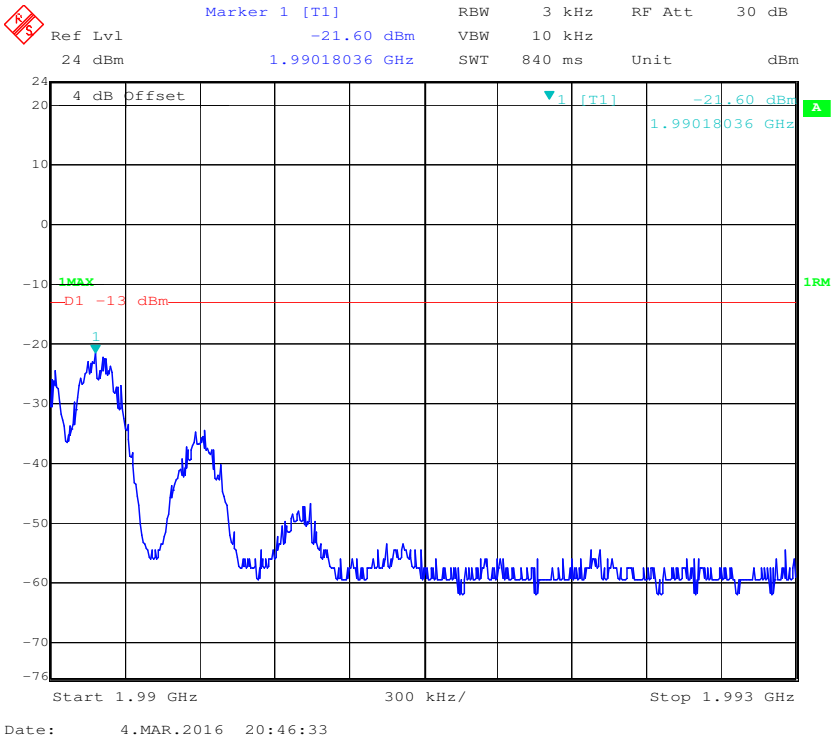

## PCS Band, Right Band Edge for GSM-Pre AGC



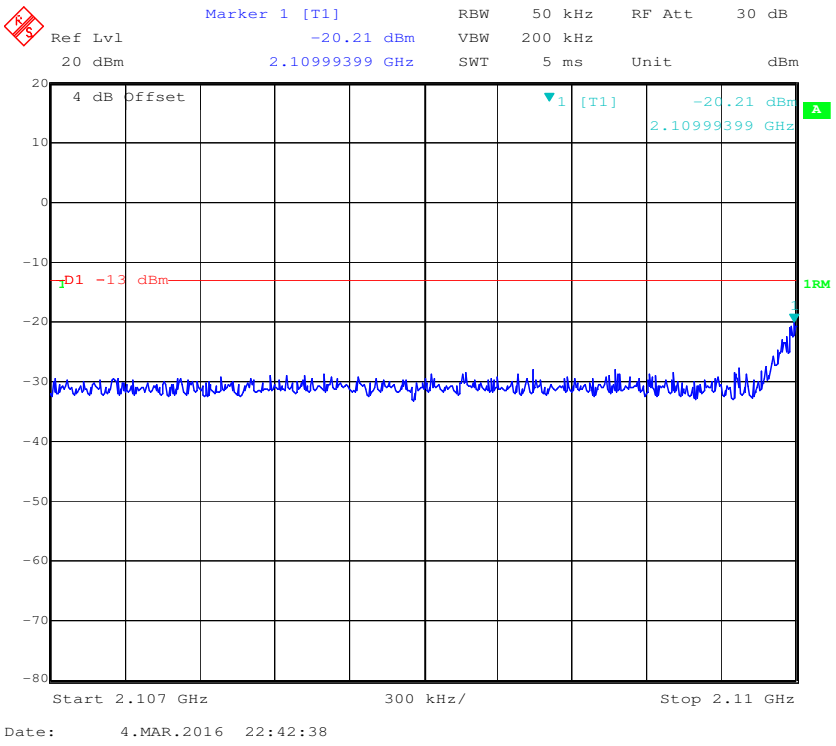
## PCS Band, Left Band Edge for GSM-3dB above AGC



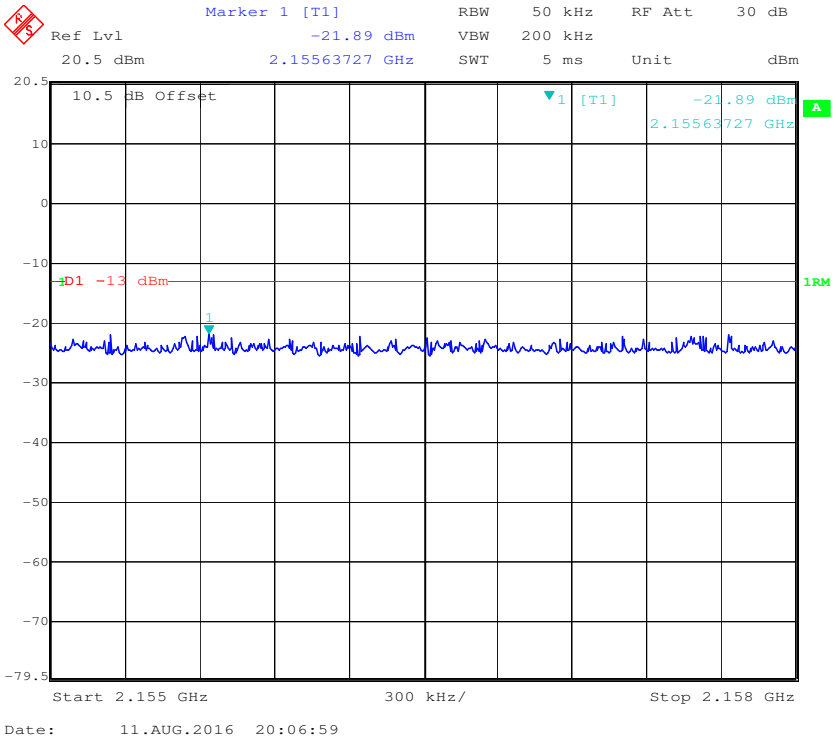

## PCS Band, Right Band Edge for GSM-3dB above AGC



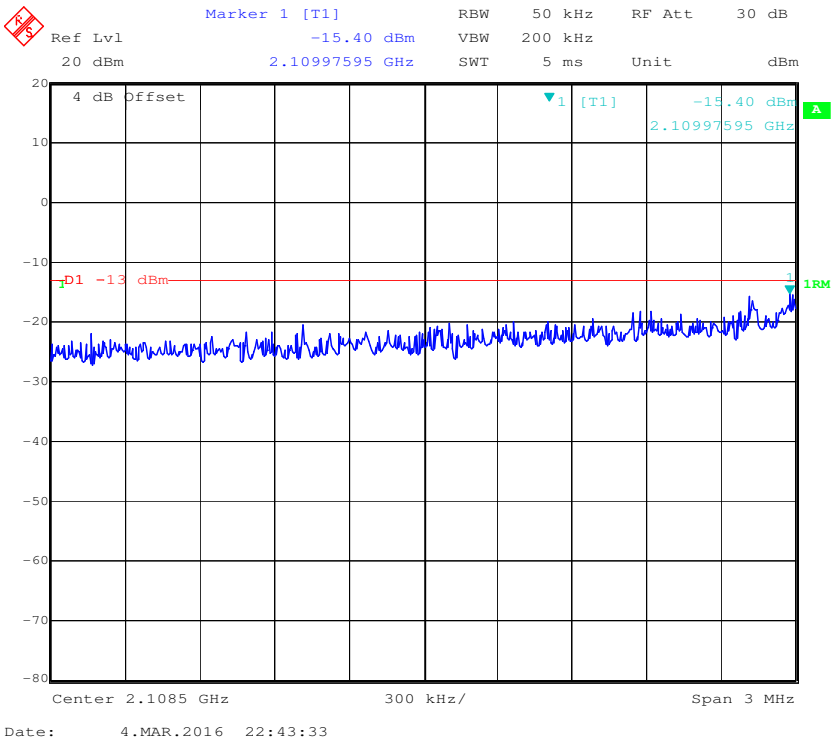
## AWS-1 Band, Left Band Edge for AWGN-Pre AGC



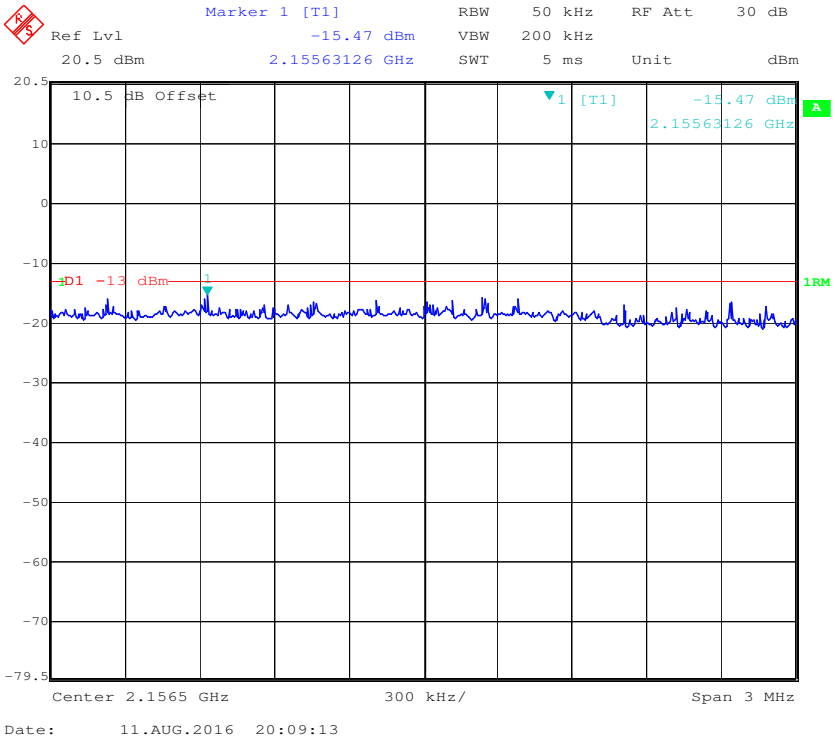

## AWS-1 Band, Right Band Edge for AWGN-Pre AGC



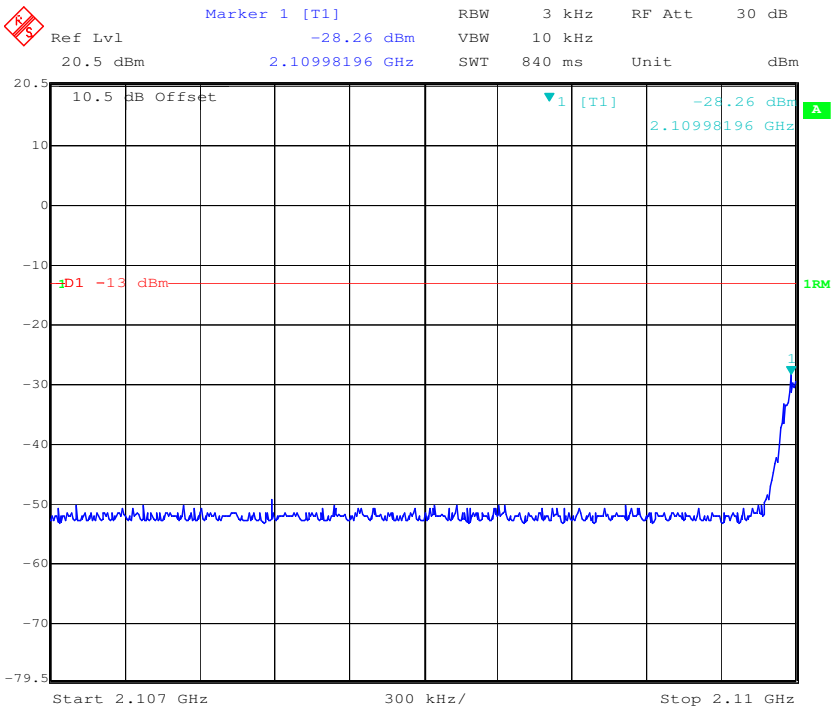
## AWS-1 Band, Left Band Edge for AWGN-3dB above AGC



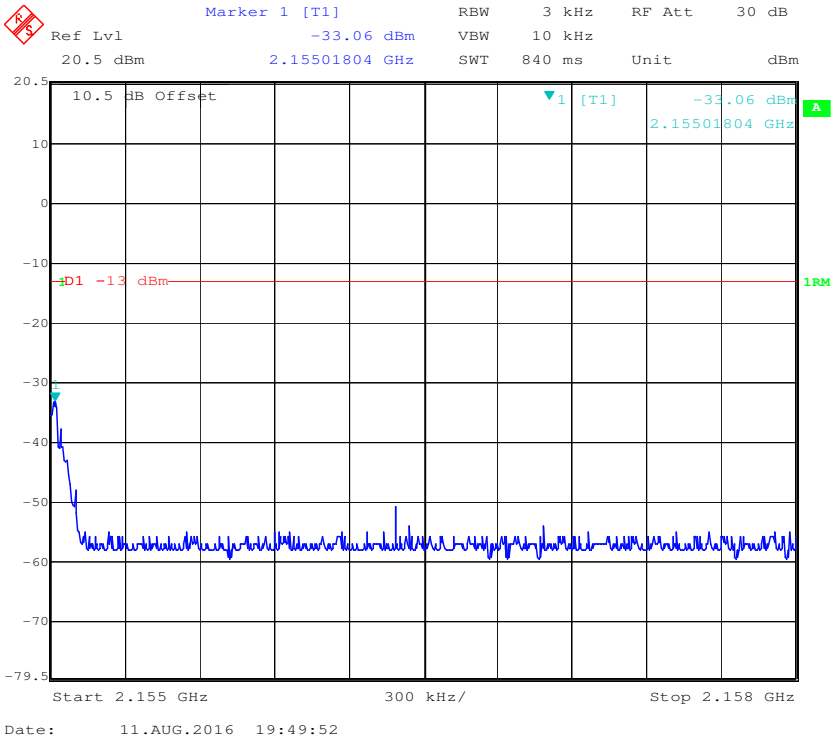

## AWS-1 Band, Right Band Edge for AWGN-3dB above AGC



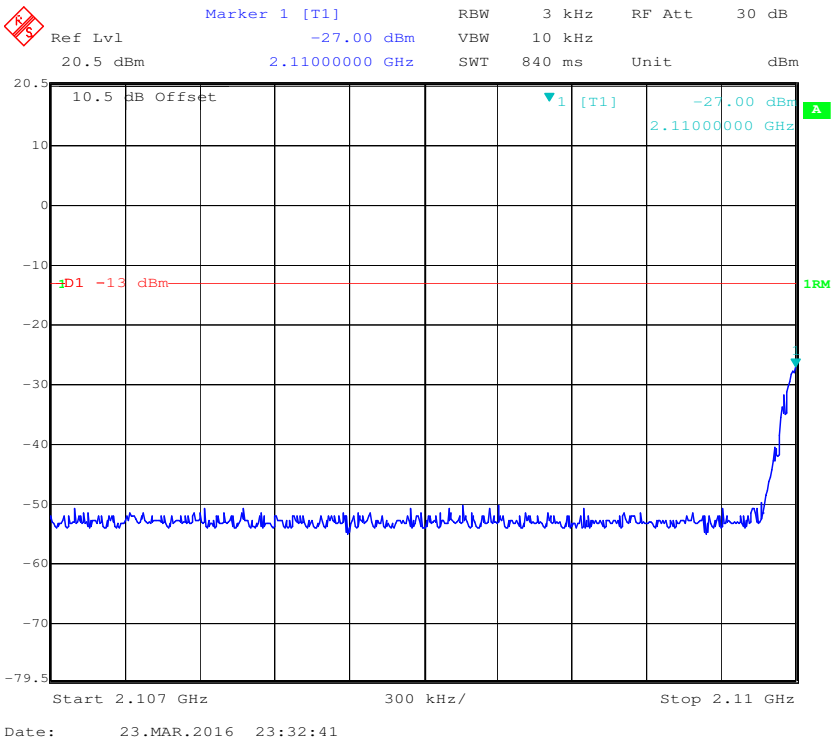
## AWS-1 Band, Left Band Edge for GSM-Pre AGC



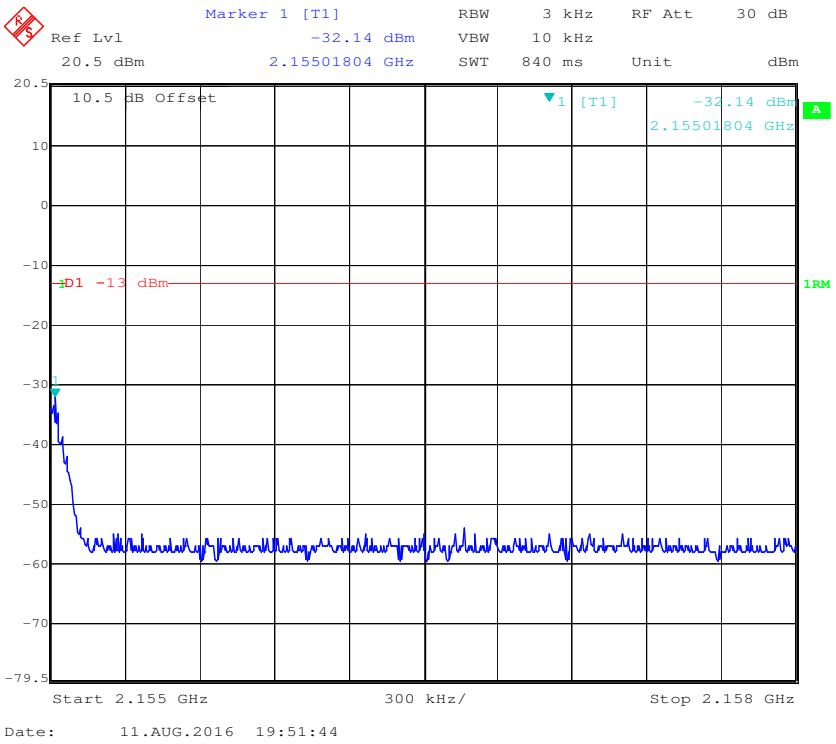

## AWS-1 Band, Right Band Edge for GSM-Pre AGC



## AWS-1 Band, Left Band Edge for GSM-3dB above AGC




## AWS-1 Band, Right Band Edge for GSM-3dB above AGC



# FCC §20.21 - OUT OF BAND REJECTION

## Applicable Standard

According to FCC Part § 20.21, a frequency selective booster shall have -20dB at the band edge referenced to the gain in the center of the pass band of the booster, where band edge is the end of the licensee's allocated spectrum.

## Test Procedure

KDB 935210 D05 Indus Booster Basic Meas v01r01, Section 3.3.

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.The span of the spectrum analyzer was set to be wide enough in order to capture the spectrum of entire operating band.

## 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 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 3 | 2016-06-15 | 2017-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2015-06-15 | 2016-06-15 |
| Ducommun technologies | RF Cable | RG-214 | 2 | 2016-06-15 | 2017-06-15 |
| WEINSCHEL | 3dB Attenuator | 5321 | AU0709 | 2015-06-18 | 2016-06-18 |
| WEINSCHEL | 3dB Attenuator | 5321 | AU0709 | 2016-06-18 | 2017-06-18 |
| Agilent | ESG Vector Signal Generator | E4438C | US41461205 | 2015-11-12 | 2016-11-12 |

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

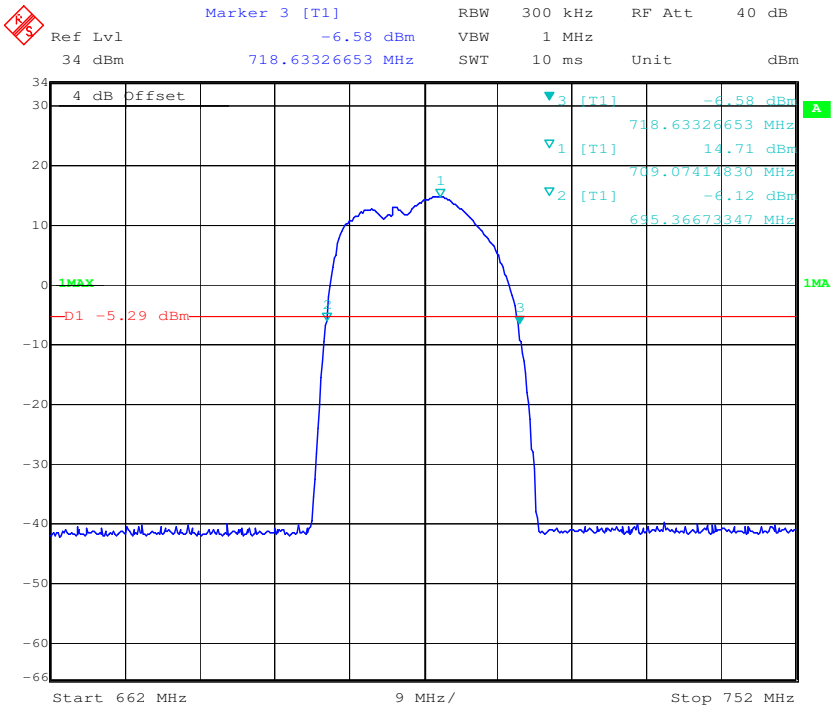
## Test Data

### Environmental Conditions

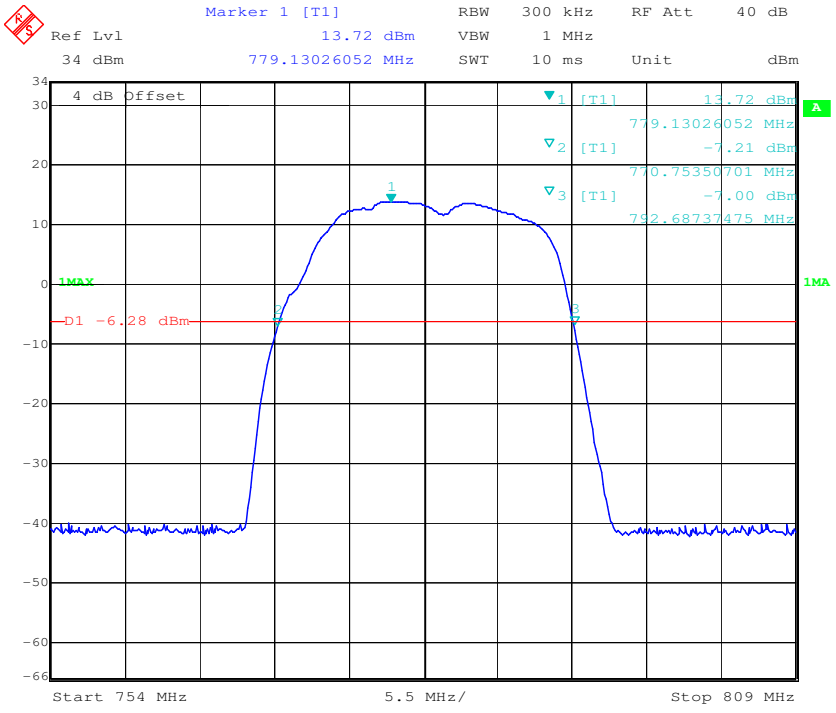
| | |
|---|---|
| **Temperature:** | 22 |

**Uplink:**

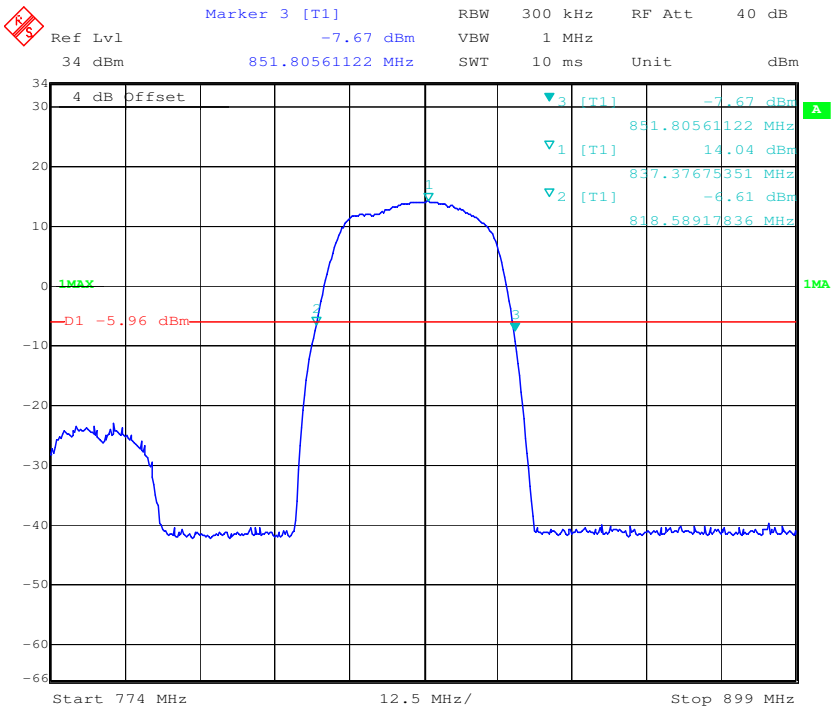
**Lower 700MHz (A+B+C Block) Band**



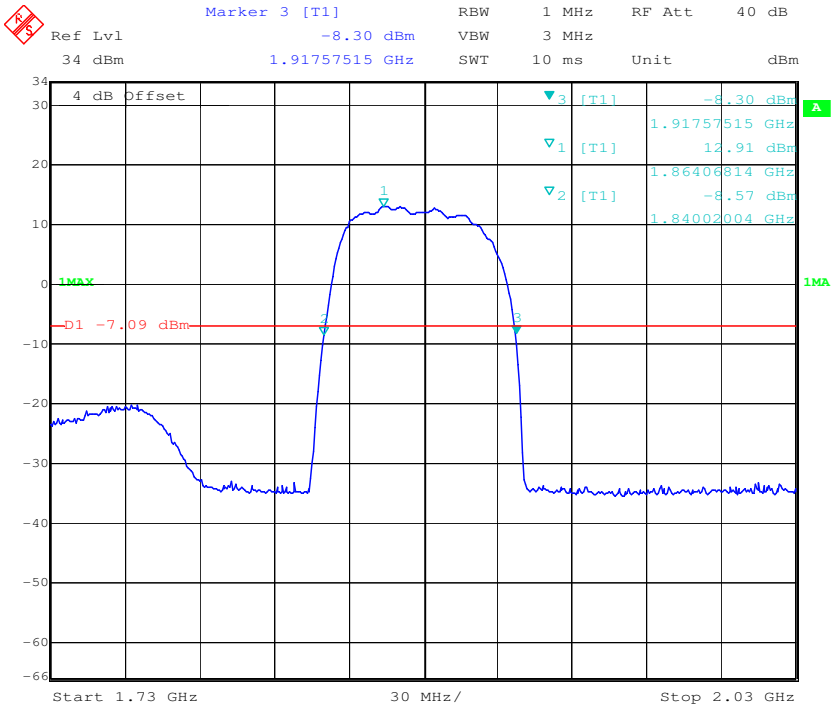

**Upper 700MHz (C Block) Band**



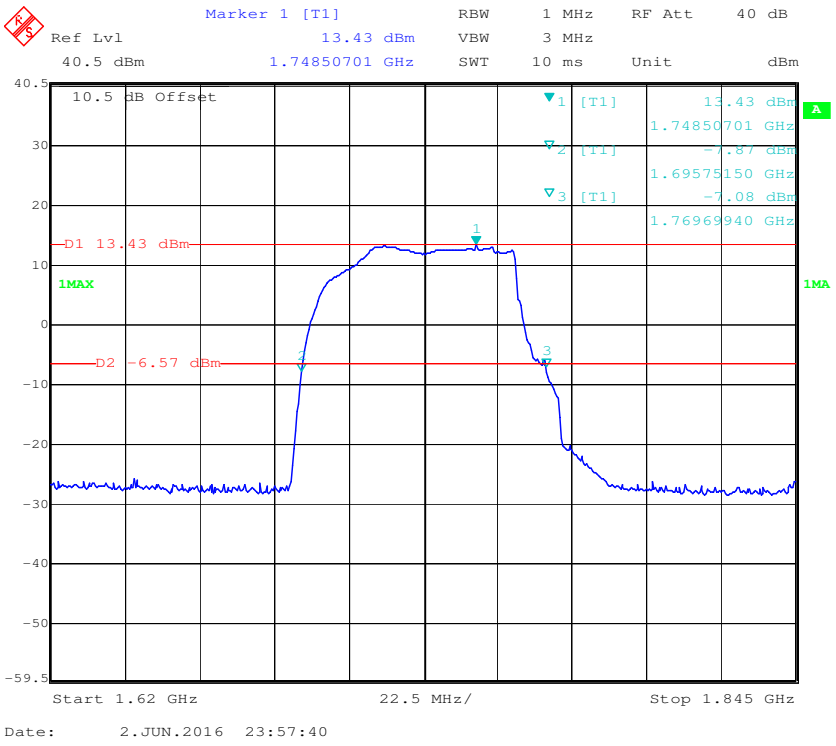
## CELLULAR Band




## PCS Band

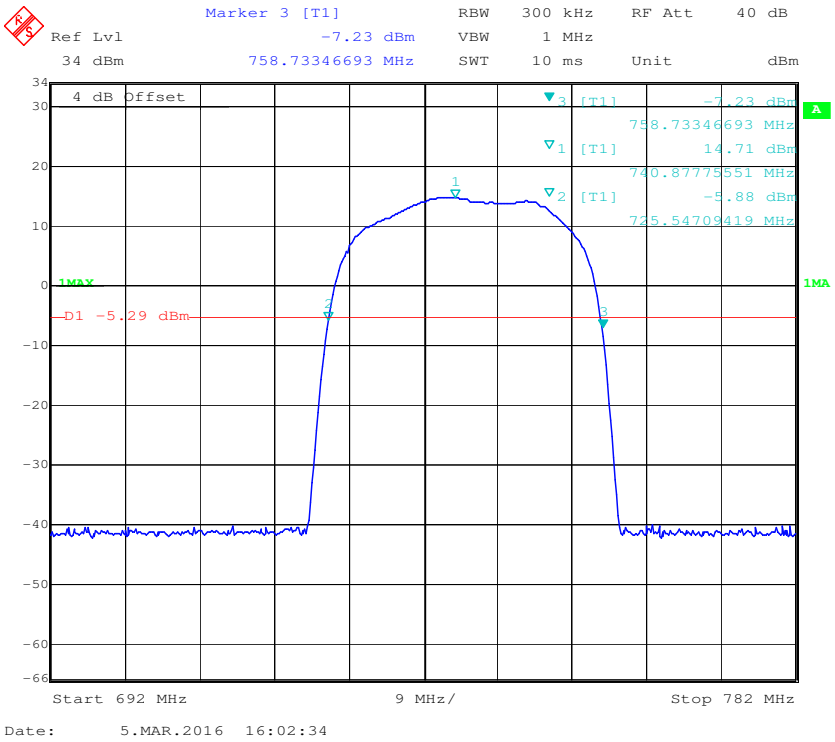


## AWS-1 Band

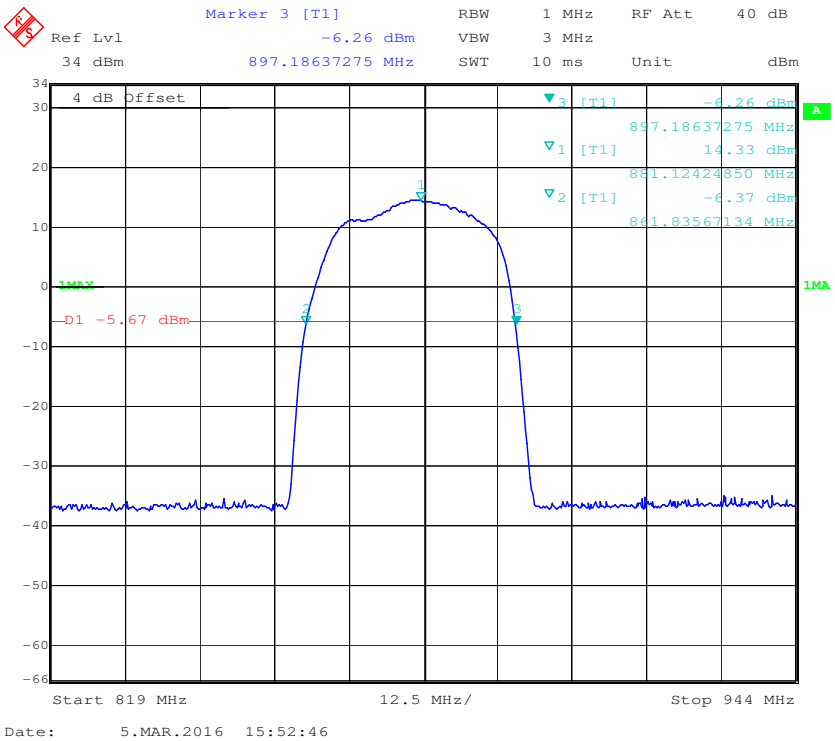

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl 13.43 dBm
VBW 3 MHz
40.5 dBm 1.74850701 GHz
SWT 10 ms
Unit dBm
10.5 dB Offset
1 [T1] 13.43 dBm
1.74850701 GHz
2 [T1] -7.87 dBm
1.69575150 GHz
3 [T1] -7.08 dBm
1.76969940 GHz
D1 13.43 dBm
D2 -6.57 dBm
1MAX
A
1MA
40.5
30
20
10
0
-10
-20
-30
-40
-50
-59.5
Start 1.62 GHz
22.5 MHz/
Stop 1.845 GHz
Date: 2.JUN.2016 23:57:40

**Downlink:**

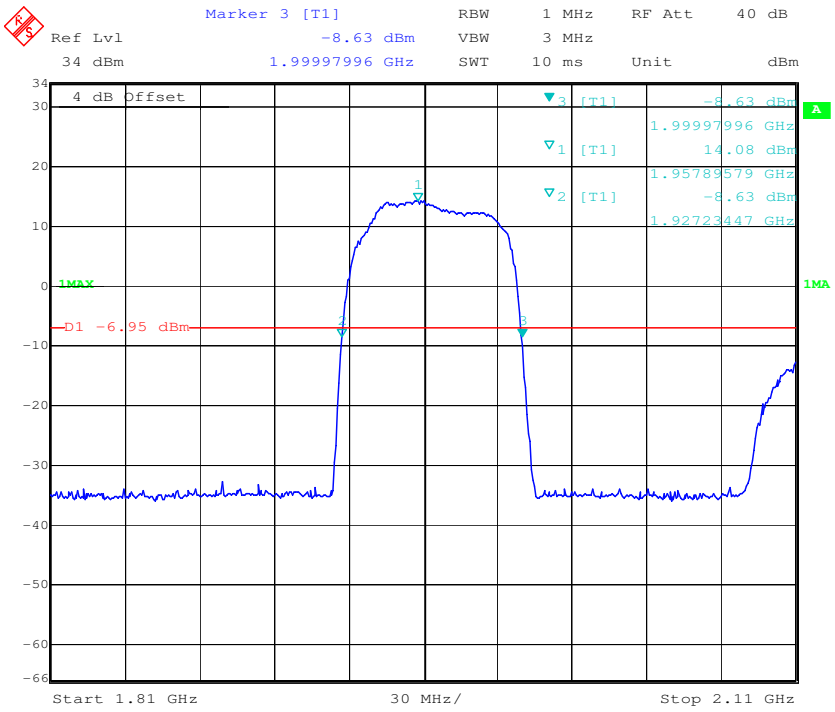
**Lower 700MHz (A+B+C Block) & Upper 700MHz (C Block) Band**



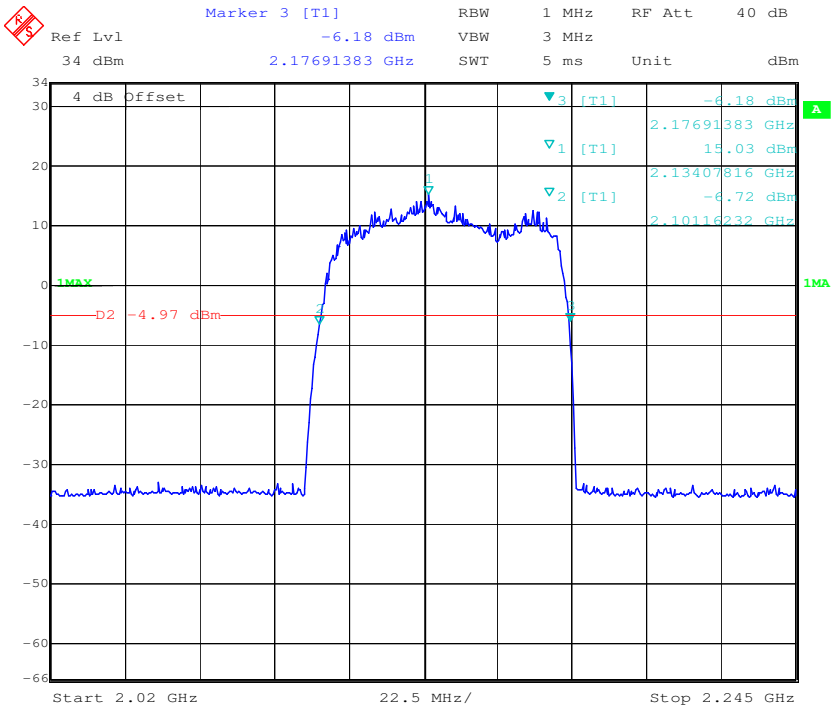

**CELLULAR Band**



## PCS Band




## AWS-1 Band




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