



# **FCC RF Test Report**

**Product Name: HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone  
with Bluetooth**

**Model Number: HUAWEI U8651S, U8651S, Summit**

**Report No: SYBH(Z-RF)002022012-2008  
FCC ID: QISU8651S**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

Tel: +86 755 28780808 Fax: +86 755 89652518

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## Contents

|          |                                                              |           |
|----------|--------------------------------------------------------------|-----------|
| <b>1</b> | <b><u>General Information</u></b>                            | <b>5</b>  |
| 1.1      | APPLIED STANDARD.....                                        | 5         |
| 1.2      | TEST LOCATION.....                                           | 5         |
| 1.3      | TEST ENVIRONMENT CONDITION .....                             | 5         |
| <b>2</b> | <b><u>Test Summary</u></b> .....                             | <b>6</b>  |
| <b>3</b> | <b><u>Product Description</u></b> .....                      | <b>7</b>  |
| 3.1      | PRODUCTION INFORMATION .....                                 | 7         |
| 3.2      | TEST DESCRIPTION.....                                        | 9         |
| <b>4</b> | <b><u>General Test Conditions / Configurations</u></b> ..... | <b>10</b> |
| 4.1      | RF CHANNELS UNDER TEST.....                                  | 10        |
| 4.2      | TEST MODES.....                                              | 10        |
| 4.3      | TEST ENVIRONMENTS .....                                      | 10        |
| 4.4      | TEST SETUPS.....                                             | 11        |
| 4.5      | TEST CONDITIONS .....                                        | 13        |
| <b>5</b> | <b><u>Main Test Instruments</u></b> .....                    | <b>15</b> |
| <b>6</b> | <b><u>Test Results</u></b> .....                             | <b>16</b> |
| <b>7</b> | <b><u>Measurement Uncertainty</u></b> .....                  | <b>17</b> |



## 1 General Information

### 1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2:2011, Subpart J  
47 CFR FCC Part 24:2011, Subpart E

### 1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.  
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R.  
China

### 1.3 Test Environment Condition

Ambient Temperature: 20 – 25 °C  
Ambient Relative Humidity: 45 – 55 %  
Atmospheric Pressure: 101 kPa



## 2 Test Summary

Table 1 Summary of results

| PCS Band                               |                 |                                                                                                                                               |        |
|----------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Test Case                              | FCC Part No.    | Requirements                                                                                                                                  | Result |
| Transmitter Output Power               | 2.1046 & 24.232 | Peak EIRP not exceed 2 W                                                                                                                      | Pass   |
| Modulation Characteristics             | 2.1047          | Digital modulation                                                                                                                            | Pass   |
| Occupied Bandwidth                     | 2.1049          | (Not specified)                                                                                                                               | Pass   |
| Band Edges Compliance                  | 2.1051 & 24.238 | Below -13 dBm/1%*EBW, in 1 MHz range                                                                                                          | Pass   |
| Spurious Emission at Antenna Terminals | 2.1051 & 24.238 | Below -13 dBm/1 kHz, 9 kHz to 150 kHz<br>Below -13 dBm/10 kHz, 150 kHz to 30 MHz<br>Below -13 dBm/1 MHz, 30 MHz to 10 <sup>th</sup> harmonics | Pass   |
| Field Strength of Spurious Radiation   | 2.1053 & 24.238 | Below -13 dBm/1 MHz                                                                                                                           | Pass   |
| Frequency Stability                    | 2.1055 & 24.235 | Stay within the authorized frequency block                                                                                                    | Pass   |

## 3 Product Description

### 3.1 Production Information

#### 3.1.1 General Description

HUAWEI U8651S, U8651S, U8651, Astro subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band IV and Band II and Band V. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only GSM1900 and WCDMA BAND II test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

The difference between U8651S and U8651T is showed in the following table.

|                    | U8651S                                 | U8651T                                 |
|--------------------|----------------------------------------|----------------------------------------|
| GSM four bands     | the same                               | the same                               |
| WCDMA bands        | WCDMA1900/AWS/850                      | WCDMA1900/AWS/850                      |
| FLASH              | the same                               | the same                               |
| PCB                | the same                               | the same                               |
| Appearance         | the difference                         | the difference                         |
| Bluetooth mode     | the same                               | the same                               |
| WLAN mode          | the same                               | the same                               |
| BT/ WLAN antenna   | the same                               | the same                               |
| GSM/ WCDMA antenna | the same                               | the same                               |
| External camera    | the same                               | the same                               |
| internal camera    | the same                               | the same                               |
| Adapter            | the same                               | the same                               |
| Battery            | the same                               | the same                               |
| Chipset            | the same                               | the same                               |
| Memory             | the same                               | the same                               |
| Form factor        | Bar type, Internal antenna             | Bar type, Internal antenna             |
| RF Parameter       | The same RF Parameter in the same band | The same RF Parameter in the same band |
| BT RF Parameter    | the same                               | the same                               |
| Dimension          | the same                               | the same                               |
| Weight             | the same                               | the same                               |
| Bluetooth          | the same                               | the same                               |
| External camera    | the same                               | the same                               |



|                      |                              |                              |
|----------------------|------------------------------|------------------------------|
| Main Frequency NV    | The same NV in the same band | The same NV in the same band |
| BT conducted power   | the same                     | the same                     |
| WIFI conducted power | the same                     | the same                     |

So U8651S RF test data refer to U8651T RF report .

### 3.1.2 Board

|                                                      |                            |                  |
|------------------------------------------------------|----------------------------|------------------|
| HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth |                            |                  |
| HUAWEI U8651S, U8651S, Summit                        |                            |                  |
| Board and Module                                     |                            |                  |
| Hardware Version                                     | Software Version           | Serial Number    |
| HD4U865M                                             | U8651S100R001USAC85B2<br>9 | L7M7ND1270400132 |

### 3.1.3 Adapter

|                     |                                                                                           |
|---------------------|-------------------------------------------------------------------------------------------|
| AC/DC Adapter Model | HW-050100U1W                                                                              |
| Manufacturer        | Huawei Technologies Co., Ltd.                                                             |
| Input Voltage       | ~100-240V 50/60Hz 0.2A                                                                    |
| Output Voltage      | 5V  1A |
| Rated Power         | 5W                                                                                        |

### 3.1.4 Battery

|                     |                               |                                                                                                                                                                                                                                                                                   |
|---------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                | Manufacture                   | Description                                                                                                                                                                                                                                                                       |
| Rechargeable Li-ion | Huawei Technologies Co., Ltd. | Battery Model: HB5K1H<br>Rated capacity: 1400mAh<br>Nominal Voltage:  +3.7V<br>Charging Voltage:  +4.2V |

## 3.2 Test Description

### 3.2.1 Supported Frequency Range

| Characteristics | Description      |
|-----------------|------------------|
| Downlink        | 1930 to 1990 MHz |
| Uplink          | 1850 to 1910MHz  |

### 3.2.2 Transmitter / Receiver Characteristics

| Characteristics                    | Description                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------|
| System Type                        | GSM<br>UMTS                                                                                  |
| TX Output Power (per Antenna Port) | GSM system: 30dBm<br>UMTS system: 24dBm                                                      |
| Channel Spacing(s) / Bandwidth(s)  | GSM system: 200 kHz<br>UMTS system: 5 MHz                                                    |
| Designation of Emissions           | GSM system: 245KGXW (GMSK modulation),<br>247KG7W (8PSK modulation))<br>UMTS system: 4M19F9W |

### 3.2.3 Antenna Gain

|                    |       |
|--------------------|-------|
| Antenna Gain(dBi): | 0     |
| Antenna Gain(dBd): | -2.15 |

### 3.2.4 Power Supply

|                             | Description                                                                        |
|-----------------------------|------------------------------------------------------------------------------------|
| Power Supply Type           | Directly Connected to DC /AC Power Supply                                          |
| Input to Adapter (DC power) | DC Voltage Nominal: $\approx$ +3.7V<br>DC Voltage Range: $\approx$ +3.6 V to +4.2V |

## 4 General Test Conditions / Configurations

### 4.1 RF Channels under Test

| Test Mode | TX / RX | RF Channel   |              |              |
|-----------|---------|--------------|--------------|--------------|
|           |         | Bottom (B)   | Middle (M)   | Top (T)      |
| TM1/TM2   | TX      | Channel 512  | Channel 661  | Channel 810  |
|           |         | 1850.2MHz    | 1880.0MHz    | 1909.8MHz    |
|           | RX      | Channel 512  | Channel 661  | Channel 810  |
|           |         | 1930.2 MHz   | 1960.0 MHz   | 1989.8 MHz   |
| TM3/TM4   | TX      | Channel 9262 | Channel9400  | Channel9538  |
|           |         | 1852.4MHz    | 1880.0MHz    | 1907.6MHz    |
|           | RX      | Channel 9662 | Channel 9800 | Channel 9938 |
|           |         | 1932.4 MHz   | 1960.0 MHz   | 1987.6 MHz   |

### 4.2 Test Modes

| Test Mode | Test Modes Description    |
|-----------|---------------------------|
| TM1       | GSM/GPRS, GMSK modulation |
| TM2       | EDGE, 8PSK modulation     |
| TM3       | WCDMA QPSK modulation     |
| TM4       | HSDPA 16QAM modulation    |

### 4.3 Test Environments

| Environment Parameter | Selected Values During Tests |         |
|-----------------------|------------------------------|---------|
| Relative Humidity     | Ambient                      |         |
| Temperature           | TN                           | Ambient |
| Voltage               | VL                           | 3.6V    |
|                       | VN                           | 3.7V    |
|                       | VH                           | 4.2V    |

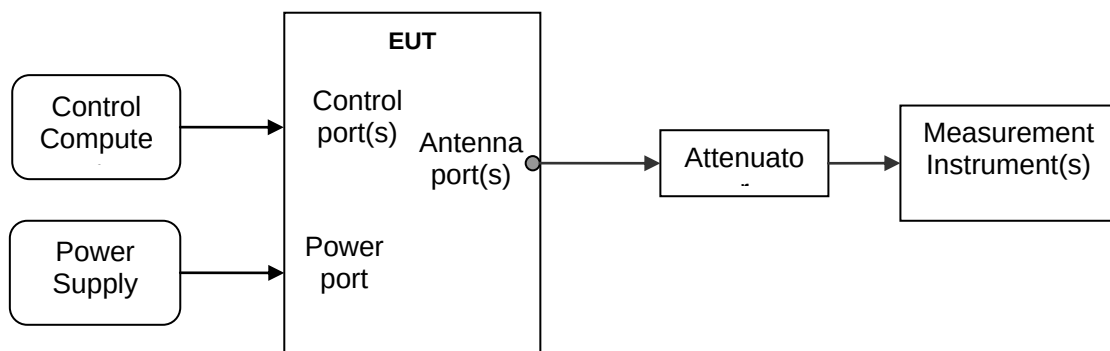
NOTE: VL= lower extreme test voltages  
VN= nominal voltage  
VH= upper extreme test voltage  
TN= nominal temperature

## 4.4 Test Setups

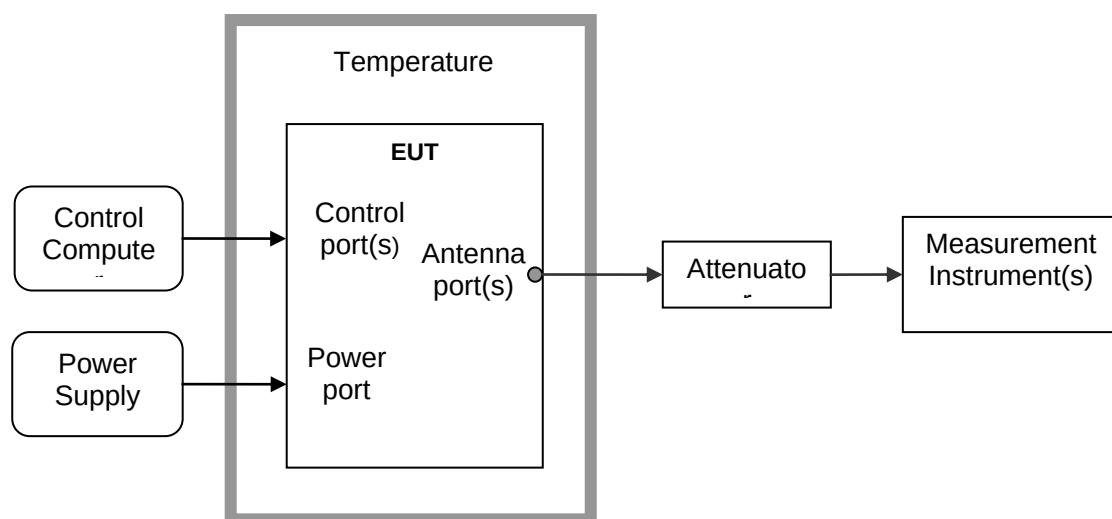
### 4.4.1 General Test Setup Configurations

| Configuration       | Description                                                                                                                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Antenna Ports  | Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT. |
| Multiple RF Sources | Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.                                                                                                                                       |

### 4.4.2 Test Setup 1



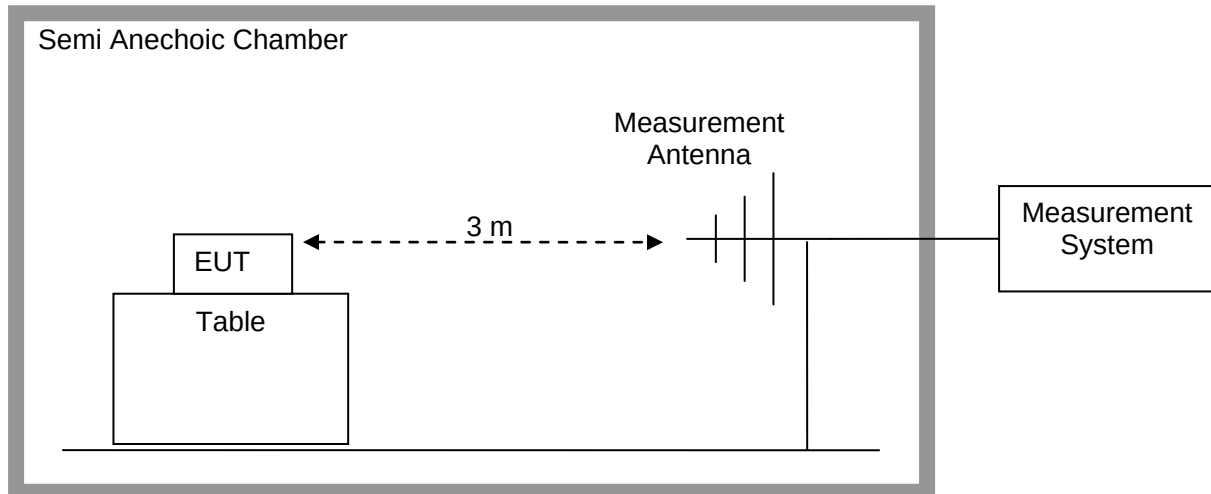
### 4.4.3 Test Setup 2



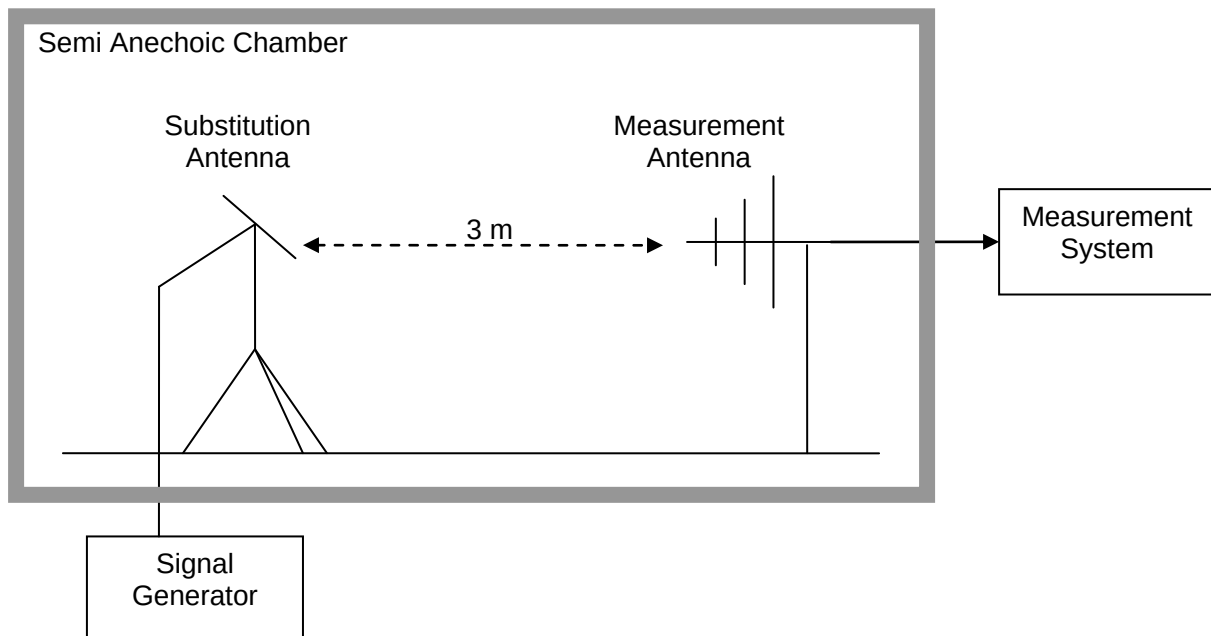
#### 4.4.4 Test Setup 3

NOTE: Effective Isotropic radiated power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

##### Step 1: Pre-test



##### Step 2: Substitution method to verify the maximum EIRP



## 4.5 Test Conditions

| Test Case                              | Test Conditions    |                                                                                                                           |
|----------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| Transmitter Output Power               | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1& Setup 3                                                                                                     |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | B, M, T                                                                                                                   |
|                                        | Test Mode          | TM1/TM2/TM3/TM4/TM5                                                                                                       |
| Modulation Characteristics             | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM2/TM3                                                                                                               |
| Occupied Bandwidth                     | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | B, M, T                                                                                                                   |
|                                        | Test Mode          | TM1/TM2/TM3                                                                                                               |
| Band Edges Compliance                  | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | B, T                                                                                                                      |
|                                        | Test Mode          | TM1/TM2/TM3                                                                                                               |
| Spurious Emission at Antenna Terminals | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 1                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | B, M, T                                                                                                                   |
|                                        | Test Mode          | TM1/TM2/TM3                                                                                                               |
| Field Strength of Spurious Radiation   | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Setup 3                                                                                                              |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM2/TM3/TM4                                                                                                           |
| Frequency Stability                    | Test Configuration | (1) -30 °C to +50 °C with step 10 °C at Rated Voltage;<br>(2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature. |
|                                        | Test Setup         | Test Setup 2                                                                                                              |
|                                        | RF Channels (TX)   | M                                                                                                                         |



|           |                 |             |
|-----------|-----------------|-------------|
| Test Case | Test Conditions |             |
|           | Test Mode       | TM1/TM2/TM3 |

## 5 Main Test Instruments

| Equipment Description                | Manufacturer | Model                   | Serial Number | Calibrated until |
|--------------------------------------|--------------|-------------------------|---------------|------------------|
| Power supply                         | KEITHLEY     | 2303                    | 1288003       | Sep.27,2012      |
| Universal Radio Communication Tester | R&S          | CMU200                  | 117341        | Jan.12.2013      |
| Universal Radio Communication Tester | Agilent      | E5515C                  | MY50260239    | Aug.31,2012      |
| Spectrum Analyzer                    | Agilent      | E4440A                  | MY49420179    | Apr.20,2012      |
| Signal Analyzer                      | R&S          | FSQ31                   | 200021        | Sep.27,2012      |
| Temperature Chamber                  | WEISS        | WKL64                   | 24600294      | Jan.03,2013      |
| Signal generator                     | Agilent      | E8257D                  | MY49281095    | Jul.9.2012       |
| Test receiver                        | R&S          | ESU26                   | 100150        | May.29.2012      |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 919/1009      | Jan.29.2012      |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 979/917       | Jan.29.2012      |
| Horn Antenna                         | R & S        | HF906                   | 100683        | May.15, 2012     |
| Horn Antenna                         | R & S        | HF906                   | 100684        | Jul.01, 2012     |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-357      | May.15, 2012     |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-356      | May.15, 2012     |



## 6 Test Results

| No. | Test Item                              | Test Result |
|-----|----------------------------------------|-------------|
| 1   | Transmitter Output Power               | Appendix A  |
| 2   | Modulation Characteristics             | Appendix B  |
| 3   | Occupied Bandwidth                     | Appendix C  |
| 4   | Band Edges Compliance                  | Appendix D  |
| 5   | Spurious Emission at Antenna Terminals | Appendix E  |
| 6   | Field Strength of Spurious Radiation   | Appendix F  |
| 7   | Frequency Stability                    | Appendix G  |
| 8   | Photos of Test setup                   | Appendix H  |

NOTE: The Appendix H only photos of Test setup,no test data.

## 7 Measurement Uncertainty

For a 95% confidence level ( $k=2$ ), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

| Test Item                            |                          | Extended Uncertainty                               |
|--------------------------------------|--------------------------|----------------------------------------------------|
| Transmitter Output Power             | Power (dBm)              | U =0.39 dB                                         |
| Occupied Bandwidth                   | Magnitude (%)            | U=0.2%                                             |
| Band Edge Compliance                 | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Conducted Spurious Emissions         | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Field Strength of Spurious Radiation | ERP (dBm)                | U=4.6 dB (30 MHz – 1GHz)<br>U=3.0 dB (above 1 GHz) |
| Frequency Stability                  | Frequency Accuracy (ppm) | U=0.21 ppm                                         |

The END



## Appendix A

### Transmitter Output Power

According to FCC Part 2.1046 & Part 24 Subpart E

## Conducted Power of Transmitter

Table 1 Measurement Results

| TEST CONDITIONS     |       | RF Output Power (Conducted) |       |                |       |                |       |
|---------------------|-------|-----------------------------|-------|----------------|-------|----------------|-------|
|                     |       | Channel512(B)               |       | Channel661(M)  |       | Channel810(T)  |       |
|                     |       | 1850.2MHz                   |       | 1880.0MHz      |       | 1909.8MHz      |       |
|                     |       | dBm                         |       | dBm            |       | dBm            |       |
| $T_{nom} / V_{nom}$ |       | Measured                    | Limit | Measured       | Limit | Measured       | Limit |
| TM1                 |       | 30.02                       | 33    | 29.79          | 33    | 29.69          | 33    |
| TM2                 |       | 26.53                       | 33    | 26.30          | 33    | 26.19          | 33    |
|                     |       |                             |       |                |       |                |       |
| TEST CONDITIONS     |       | Channel9262(B)              |       | Channel9400(M) |       | Channel9538(T) |       |
|                     |       | 1852.4MHz                   |       | 1880.0MHz      |       | 1907.6MHz      |       |
|                     |       | dBm                         |       | dBm            |       | dBm            |       |
| $T_{nom} / V_{nom}$ |       | Measured                    | Limit | Measured       | Limit | Measured       | Limit |
| TM3                 |       | 22.46                       | 33    | 22.98          | 33    | 22.57          | 33    |
| TM4                 | Case1 | 22.34                       | 33    | 22.91          | 33    | 22.48          | 33    |
|                     | Case2 | 22.06                       | 33    | 22.65          | 33    | 22.24          | 33    |
|                     | Case3 | 21.85                       | 33    | 22.44          | 33    | 22.08          | 33    |
|                     | Case4 | 21.49                       | 33    | 21.98          | 33    | 22.11          | 33    |

## Peak-to-Average Ratio

Table 1 Measurement Results

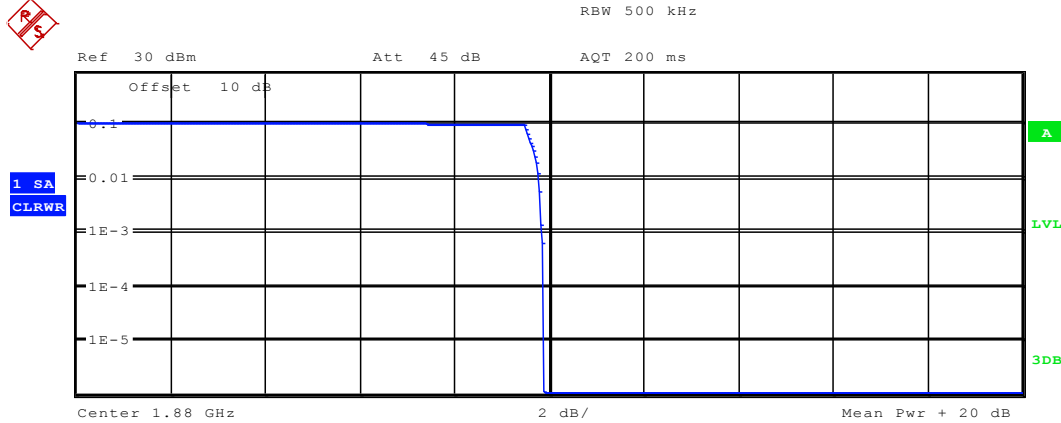
| TEST CONDITIONS     |       | Channel512(B)<br>1850.2MHz  |       | Channel661(M)<br>1880.0MHz  |       | Channel810(T)<br>1909.8MHz  |       |
|---------------------|-------|-----------------------------|-------|-----------------------------|-------|-----------------------------|-------|
|                     |       | dBm                         |       | dBm                         |       | dBm                         |       |
| $T_{nom} / V_{nom}$ |       | Measured                    | Limit | Measured                    | Limit | Measured                    | Limit |
| TM1                 |       | 9.56                        | 13.0  | 9.87                        | 13.0  | 9.59                        | 13.0  |
| TM2                 |       | 9.72                        | 13.0  | 9.94                        | 13.0  | 9.55                        | 13.0  |
|                     |       |                             |       |                             |       |                             |       |
| TEST CONDITIONS     |       | Channel9262(B)<br>1852.4MHz |       | Channel9400(M)<br>1880.0MHz |       | Channel9538(T)<br>1907.6MHz |       |
|                     |       | dBm                         |       | dBm                         |       | dBm                         |       |
| $T_{nom} / V_{nom}$ |       | Measured                    | Limit | Measured                    | Limit | Measured                    | Limit |
| TM3                 |       | 3.01                        | 13.0  | 3.14                        | 13.0  | 2.91                        | 13.0  |
| TM4                 | Case1 | 2.78                        | 13.0  | 2.87                        | 13.0  | 2.94                        | 13.0  |
|                     | Case2 | 2.89                        | 13.0  | 2.68                        | 13.0  | 2.96                        | 13.0  |
|                     | Case3 | 2.94                        | 13.0  | 2.68                        | 13.0  | 2.91                        | 13.0  |
|                     | Case4 | 2.88                        | 13.0  | 2.64                        | 13.0  | 2.93                        | 13.0  |



## Test Plot of Peak-to-Average Ratio

Note: All relevant operation modes have been tested, and the worst case Plot is included in this report.

TM1



Complementary Cumulative Distribution Function

NOF samples: 100000, Usable BW: 424kHz

Trace 1  
Mean 12.59 dBm  
Peak 22.47 dBm  
Crest 9.88 dB

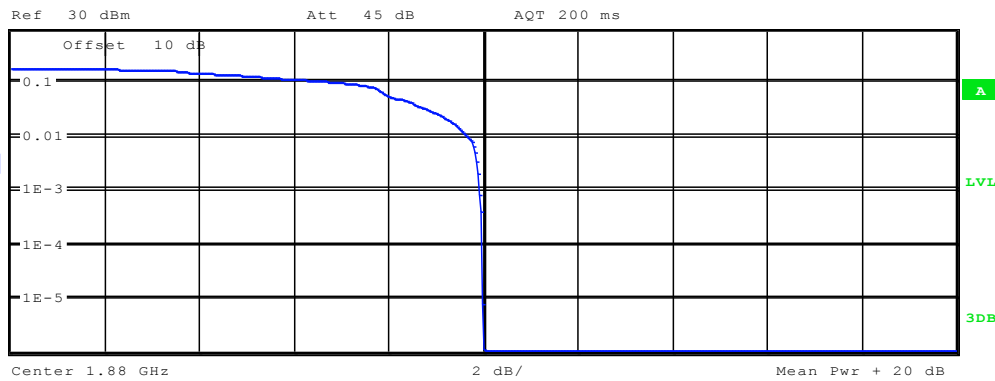
|       |         |
|-------|---------|
| 10 %  | 9.49 dB |
| 1 %   | 9.78 dB |
| .1 %  | 9.87 dB |
| .01 % | 9.90 dB |



## TM2



RBW 500 kHz



Complementary Cumulative Distribution Function  
NOF samples: 100000, Usable BW: 424kHz

Trace 1  
Mean 11.85 dBm  
Peak 21.83 dBm  
Crest 9.98 dB

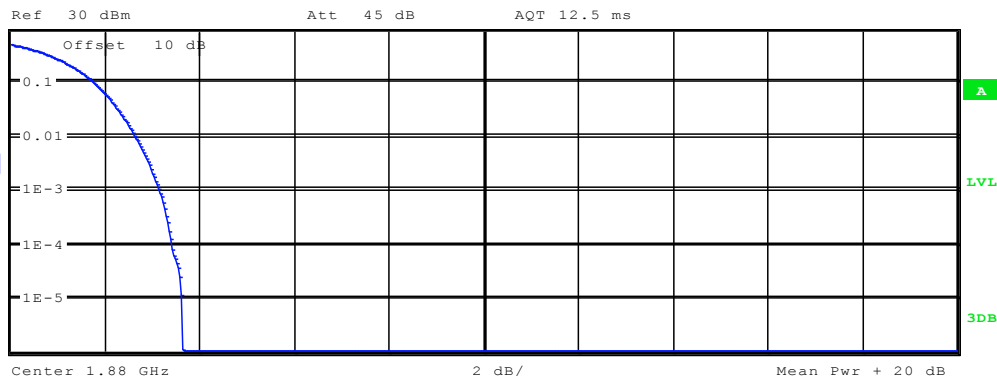
|       |          |
|-------|----------|
| 10 %  | 7.18 dB  |
| 1 %   | 9.68 dB  |
| .1 %  | 9.94 dB  |
| .01 % | 10.00 dB |



## TM3/TM4



RBW 5 MHz



Complementary Cumulative Distribution Function  
NOF samples: 100000, Usable BW: 7.1MHz

Trace 1  
Mean 15.15 dBm  
Peak 18.80 dBm  
Crest 3.64 dB

|       |         |
|-------|---------|
| 10 %  | 1.76 dB |
| 1 %   | 2.63 dB |
| .1 %  | 3.14 dB |
| .01 % | 3.43 dB |



## Efficient Isotropic Radiated Power(EIRP)

Table 2 Substitution Results

| Test Mode | Freq. [MHz] | Meas. Level [dBm] | Substitution Antenna Type | SGP   | Substitution Gain [dBi] | Cable Loss [dB] | Substitution Level (EIRP) | FCC limit [dBm] | Result |
|-----------|-------------|-------------------|---------------------------|-------|-------------------------|-----------------|---------------------------|-----------------|--------|
|           |             |                   |                           | [dBm] |                         |                 | [dBm]                     |                 |        |
| TM1       | 1850.2      | 30.02             | Horn Ant.                 | 26.55 | 4.5                     | 1               | 30.05                     | 33              | Pass   |
| TM1       | 1880.0      | 29.79             | Horn Ant.                 | 26.25 | 4.5                     | 1               | 29.75                     | 33              | Pass   |
| TM1       | 1909.8      | 29.69             | Horn Ant.                 | 25.88 | 4.8                     | 1               | 29.68                     | 33              | Pass   |
| TM2       | 1850.2      | 26.53             | Horn Ant.                 | 23.05 | 4.5                     | 1               | 26.55                     | 33              | Pass   |
| TM2       | 1880.0      | 26.30             | Horn Ant.                 | 22.85 | 4.5                     | 1               | 26.35                     | 33              | Pass   |
| TM2       | 1909.8      | 26.19             | Horn Ant.                 | 22.38 | 4.8                     | 1               | 26.18                     | 33              | Pass   |
| TM3       | 1852.4      | 22.46             | Horn Ant.                 | 18.91 | 4.5                     | 1               | 22.41                     | 33              | Pass   |
| TM3       | 1880.0      | 22.98             | Horn Ant.                 | 19.45 | 4.5                     | 1               | 22.95                     | 33              | Pass   |
| TM3       | 1907.6      | 22.57             | Horn Ant.                 | 18.76 | 4.8                     | 1               | 22.56                     | 33              | Pass   |

Note: a, For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP=Signal Generator Level

The END



## **Appendix B**

### **Modulation Characteristics**

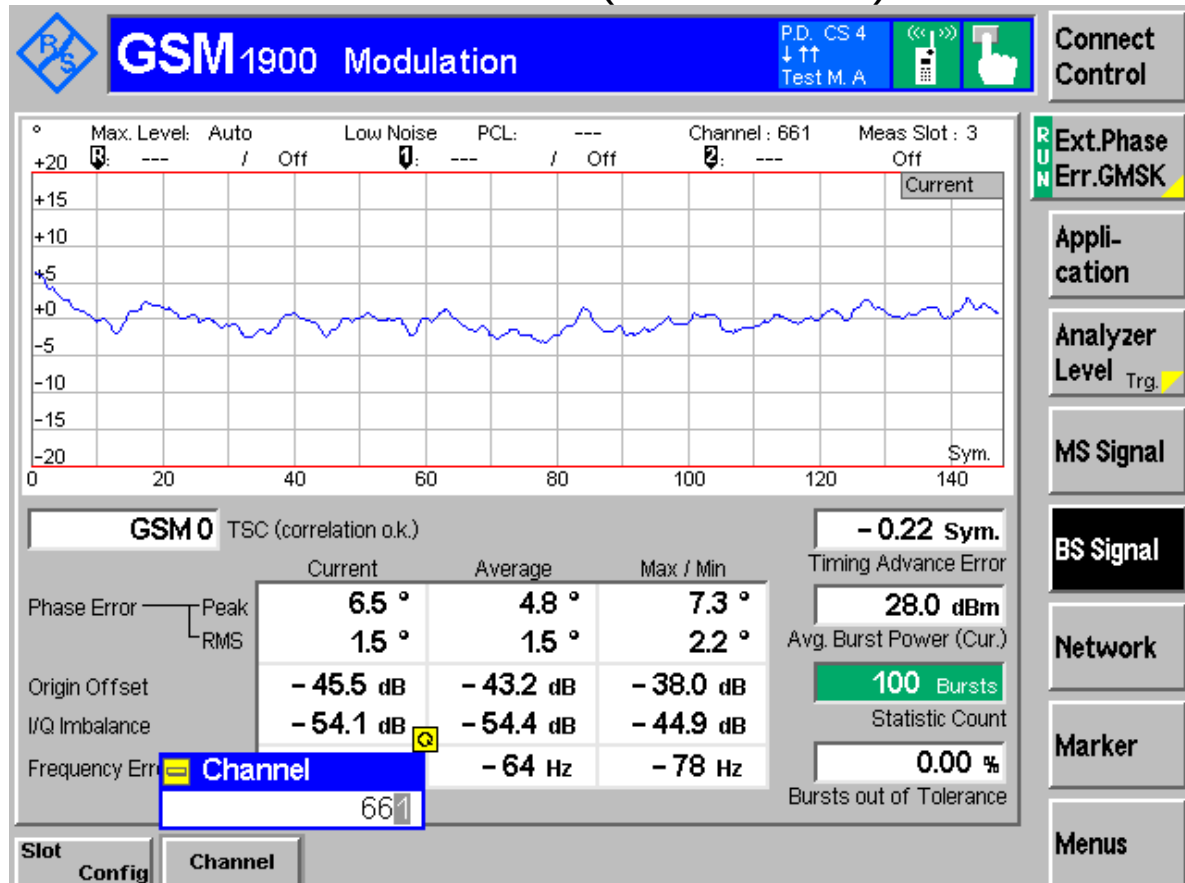
According to FCC Part 2.1047 & Part24 Subpart E



## 1 Test Plot

### 1.1 Test Mode = TM 1

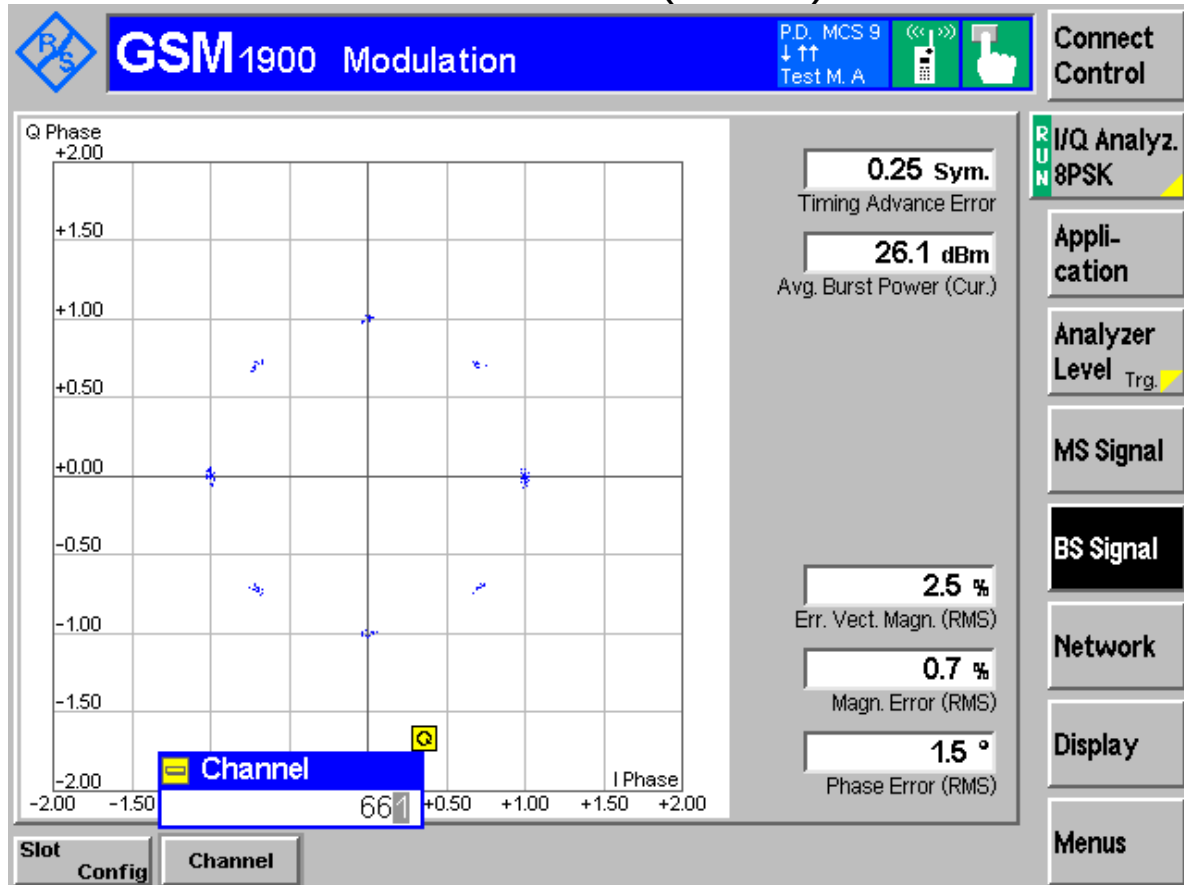
#### Channel 661 (GPRS/GSM)





## 1.2 Test Mode = TM 2

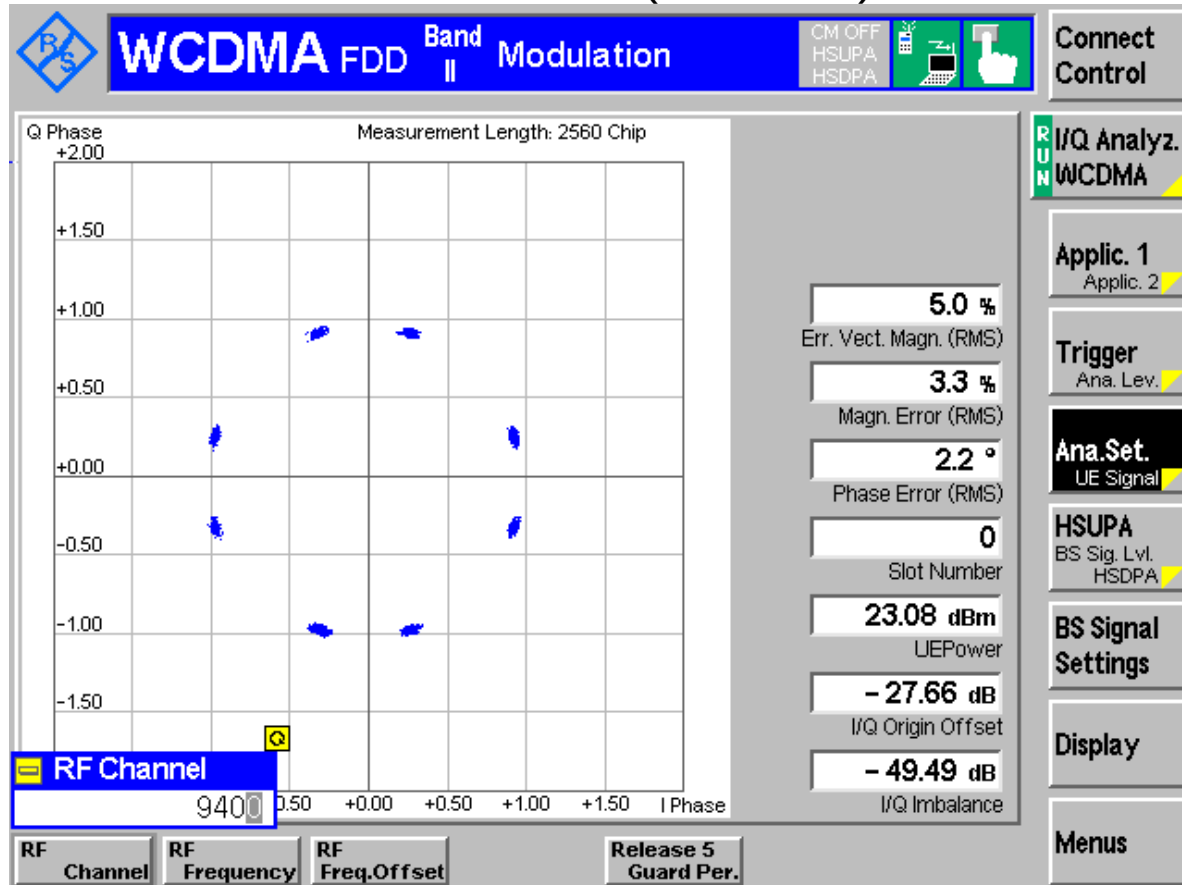
### Channel 661 (EDGE)





### 1.3 Test Mode = TM 3

## Channel 9400 ( WCDMA)



The END



## Appendix C

### Occupied Bandwidth According to FCC Part 2.1049 & Part 24 Subpart E



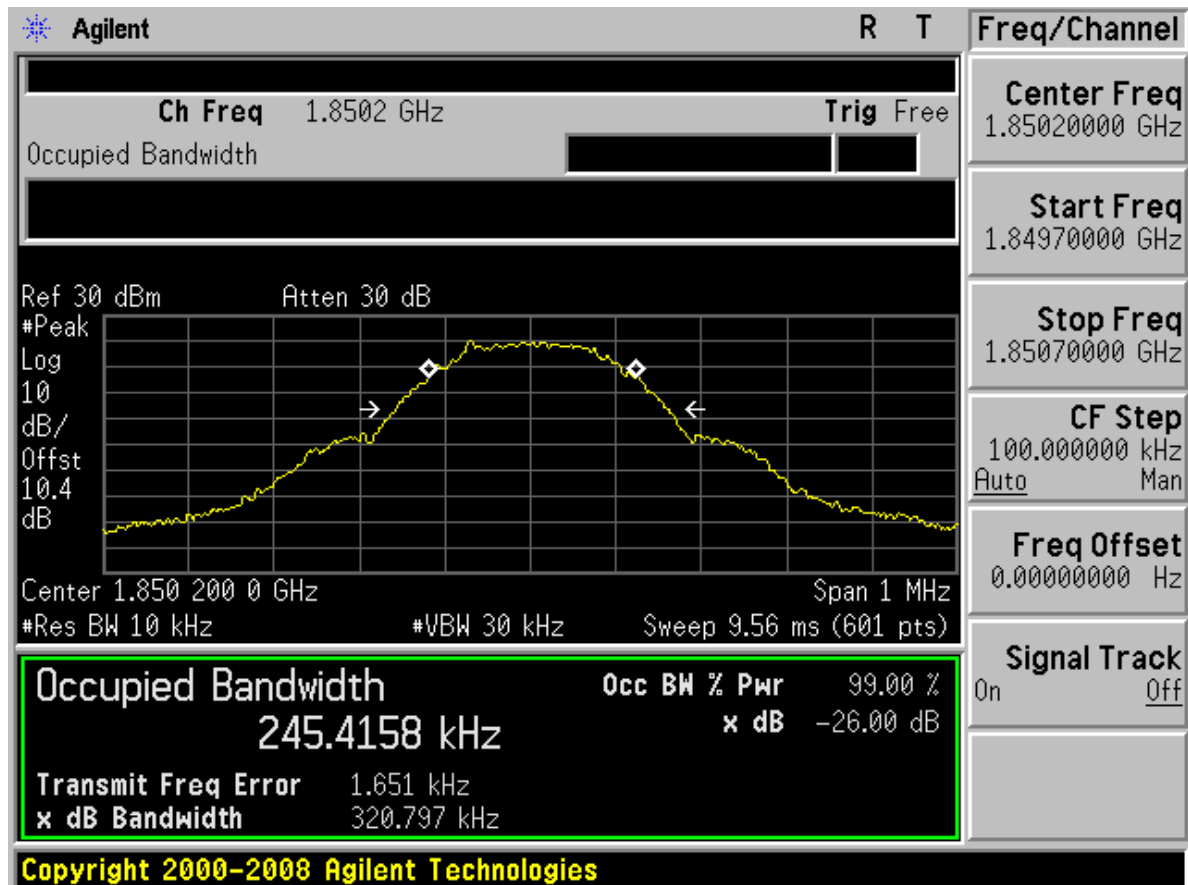
## Result Table

Table 1 Measurement Results

| Test Mode | RF Channel | Occupied Bandwidth [MHz] | -26dB BW [MHz] | Verdict |
|-----------|------------|--------------------------|----------------|---------|
| TM1       | 512        | 0.245                    | 0.321          | Pass    |
|           | 661        | 0.241                    | 0.315          | Pass    |
|           | 810        | 0.241                    | 0.311          | Pass    |
| TM2       | 512        | 0.245                    | 0.311          | Pass    |
|           | 661        | 0.247                    | 0.306          | Pass    |
|           | 810        | 0.241                    | 0.311          | Pass    |
| TM3       | 9262       | 4.176                    | 4.654          | Pass    |
|           | 9400       | 4.163                    | 4.652          | Pass    |
|           | 9538       | 4.187                    | 4.664          | Pass    |

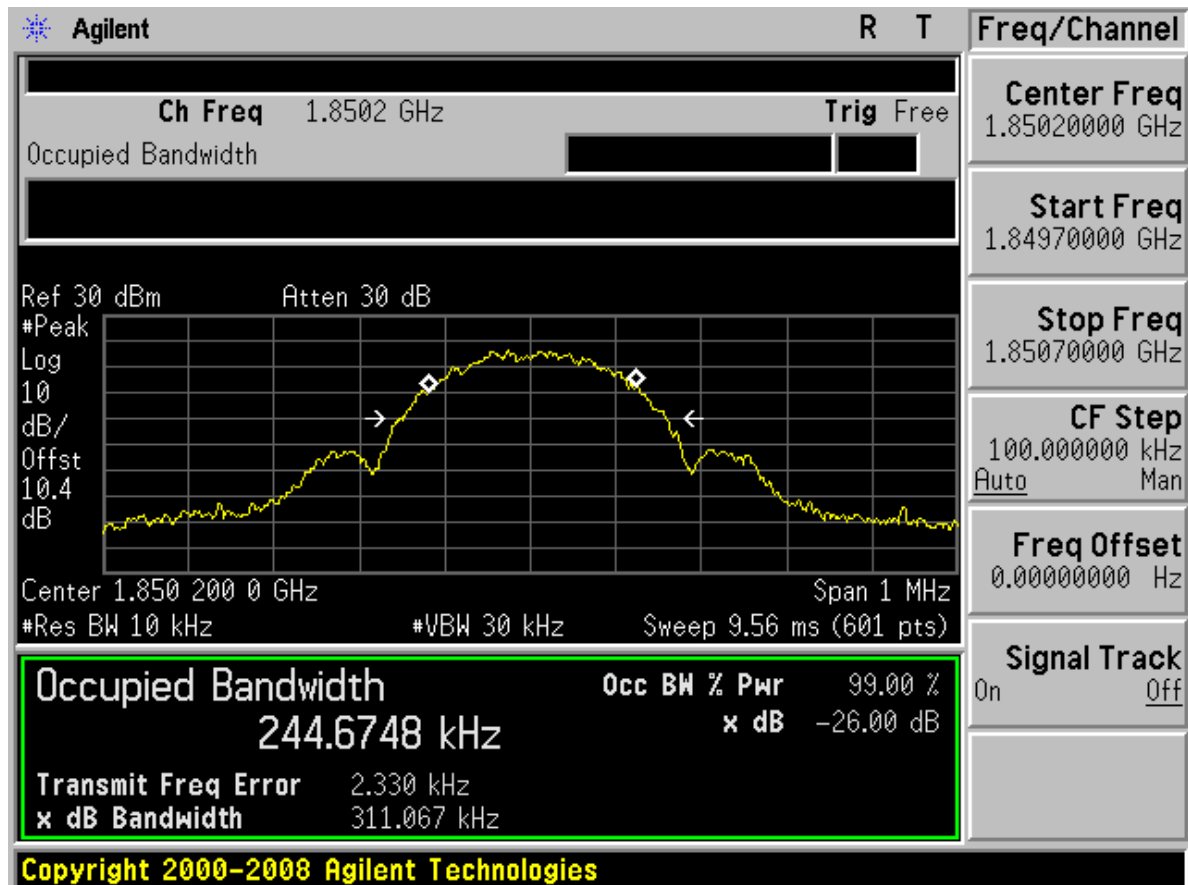


## TM1:GPRS/GSM Channel 512



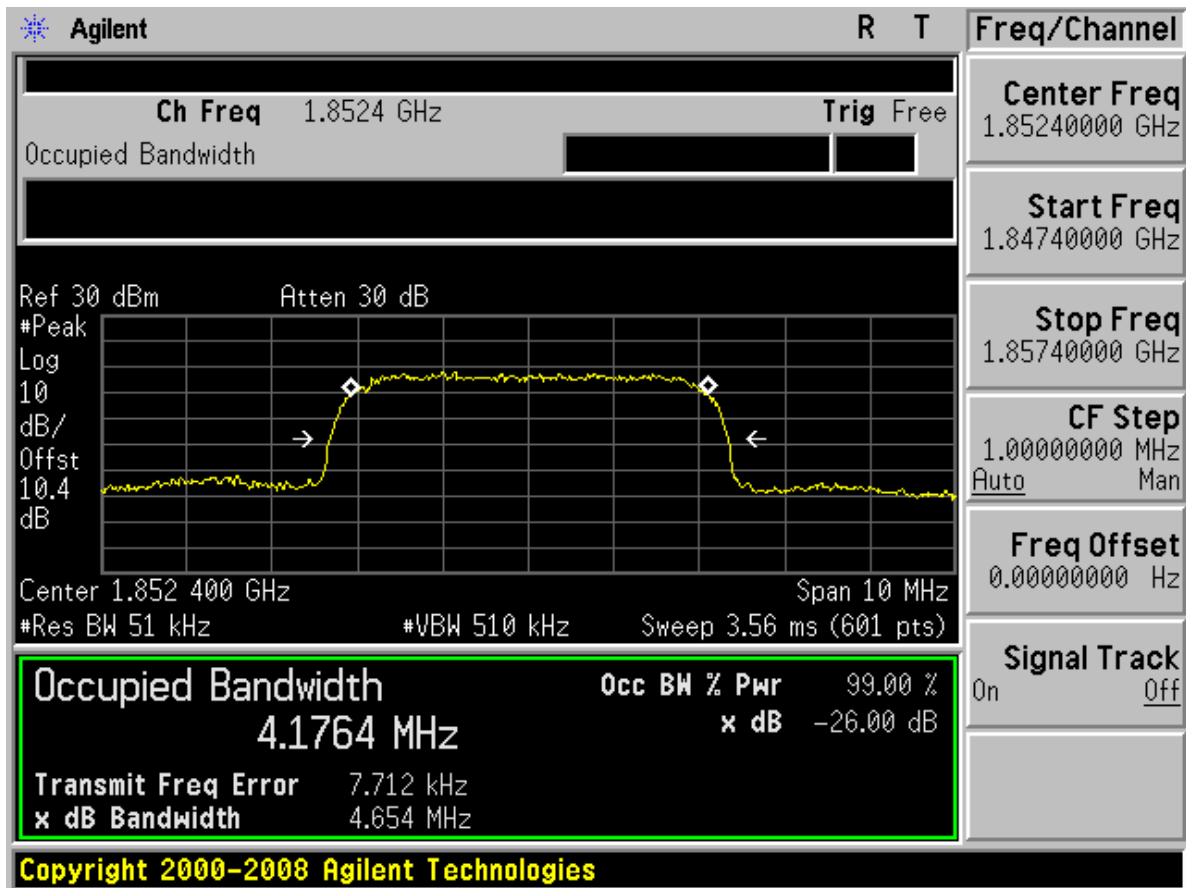


## TM2:EDGE Channel 512



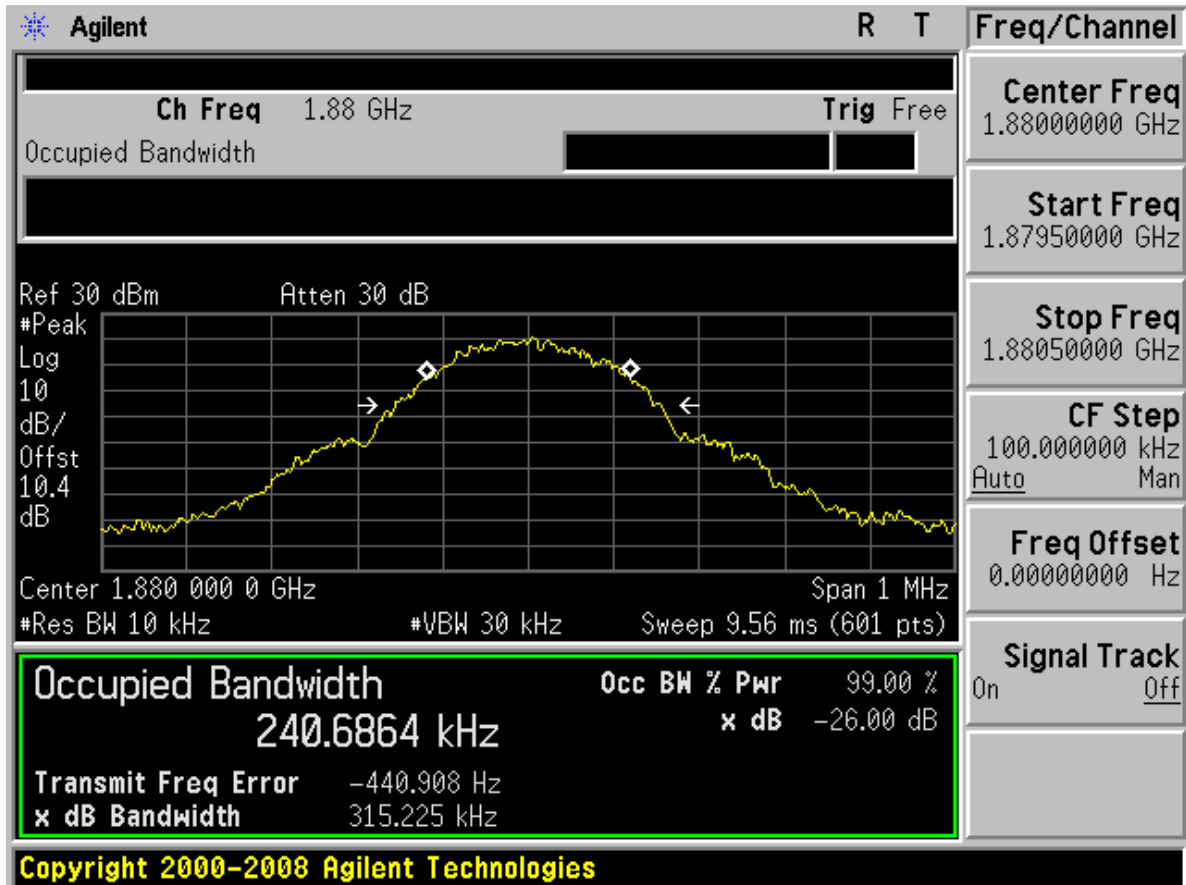


## TM3: WCDMA Channel 9262



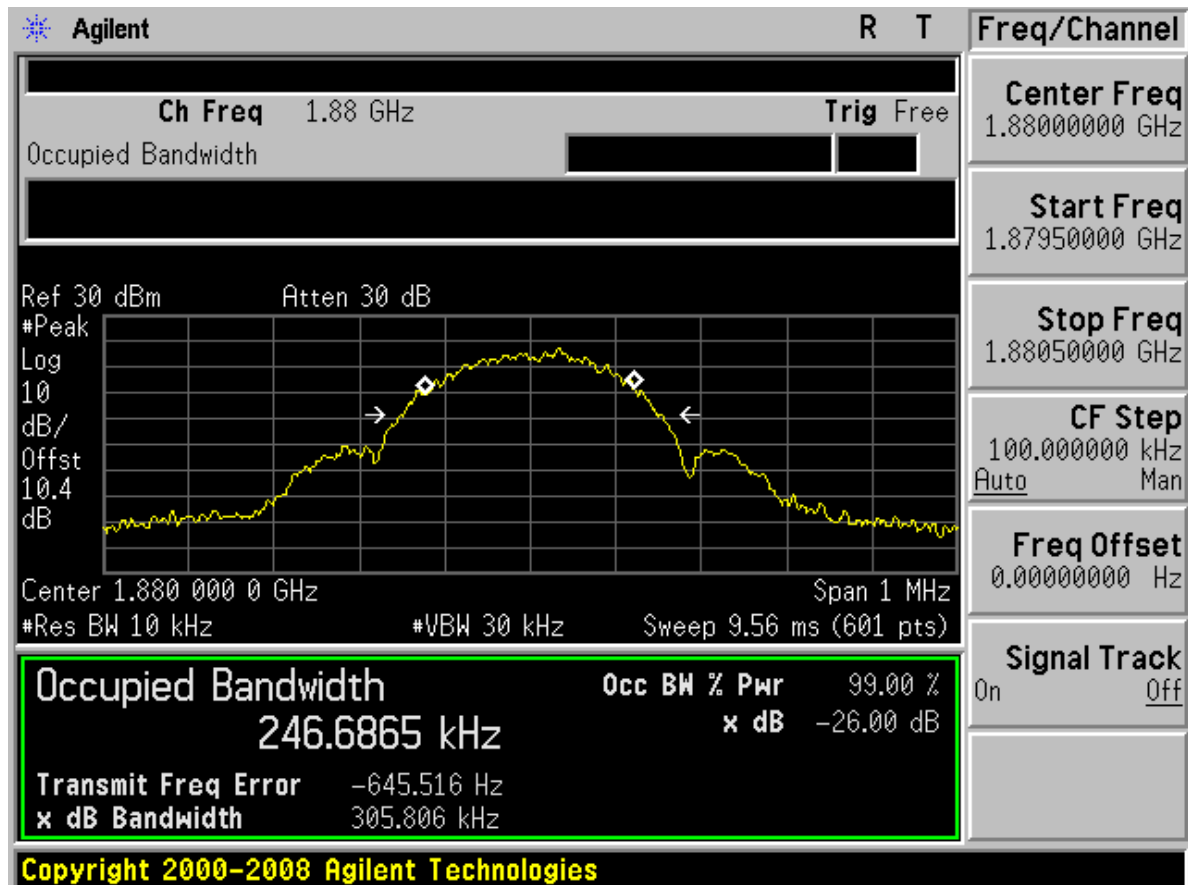


## TM1:GPRS/GSM Channel 661



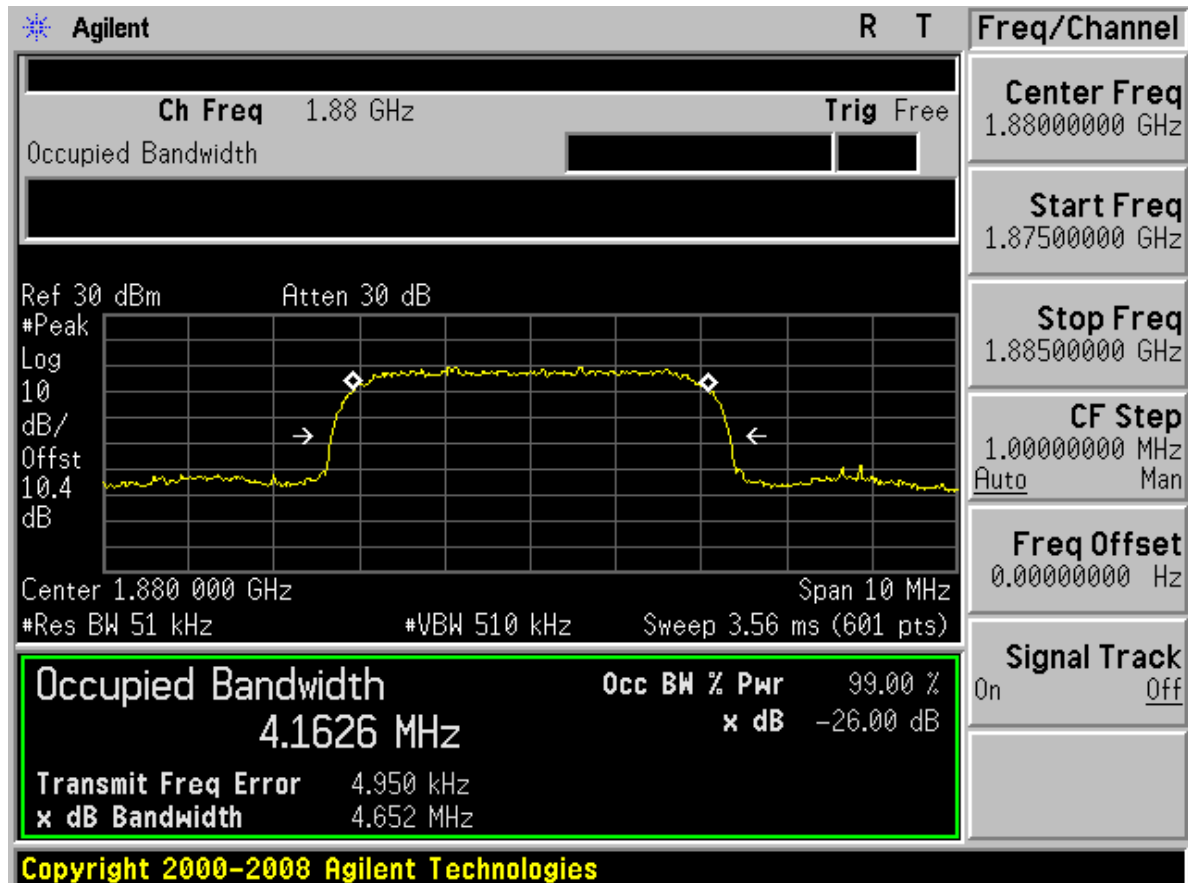


## TM2:EDGE Channel 661



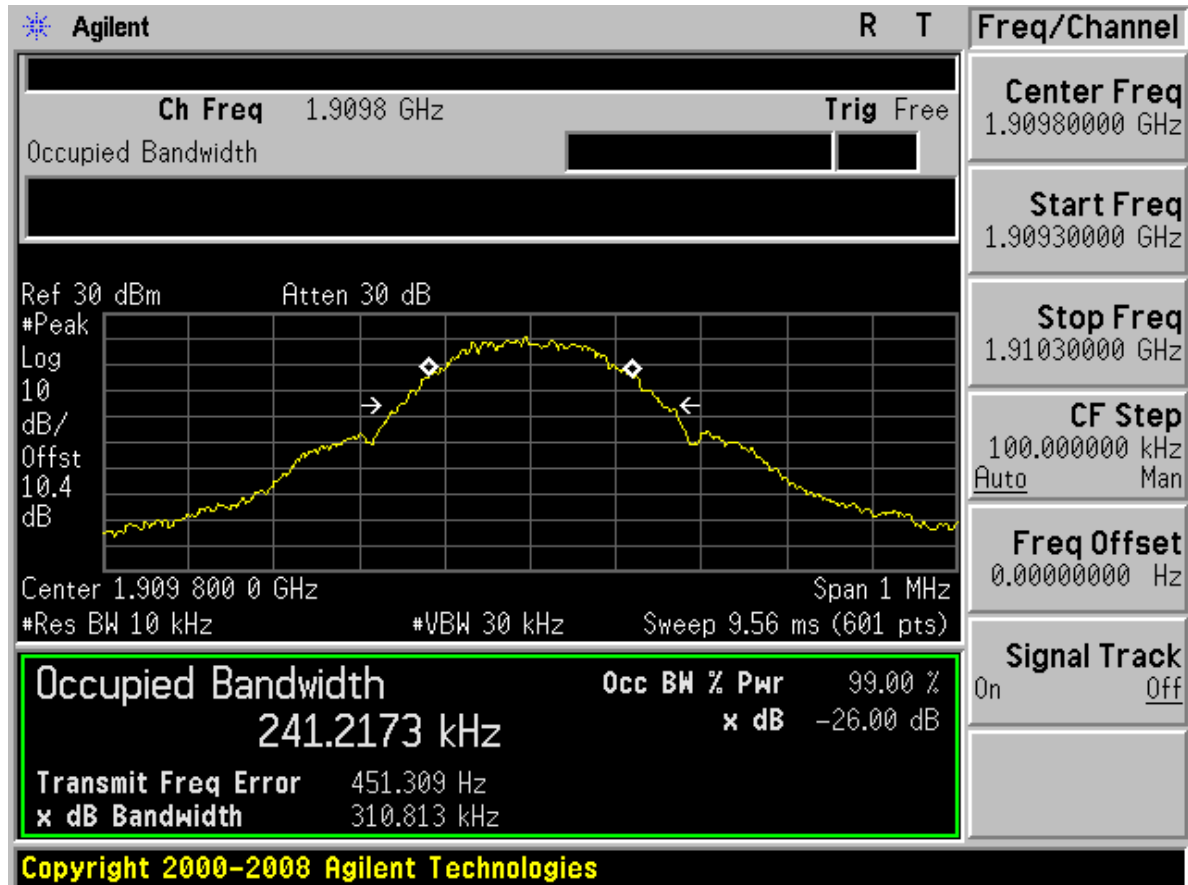


## TM3: WCDMA Channel 9400



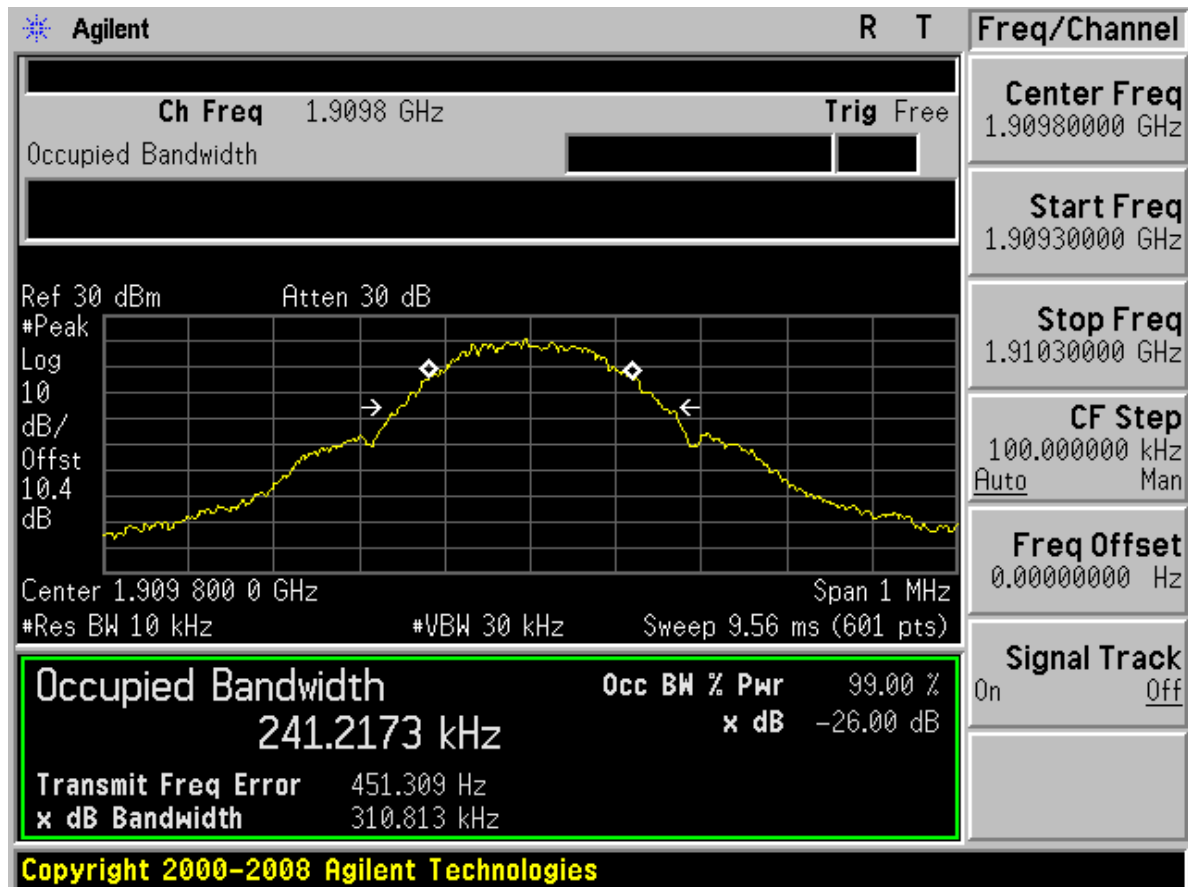


## TM1:GPRS/GSM Channel 810



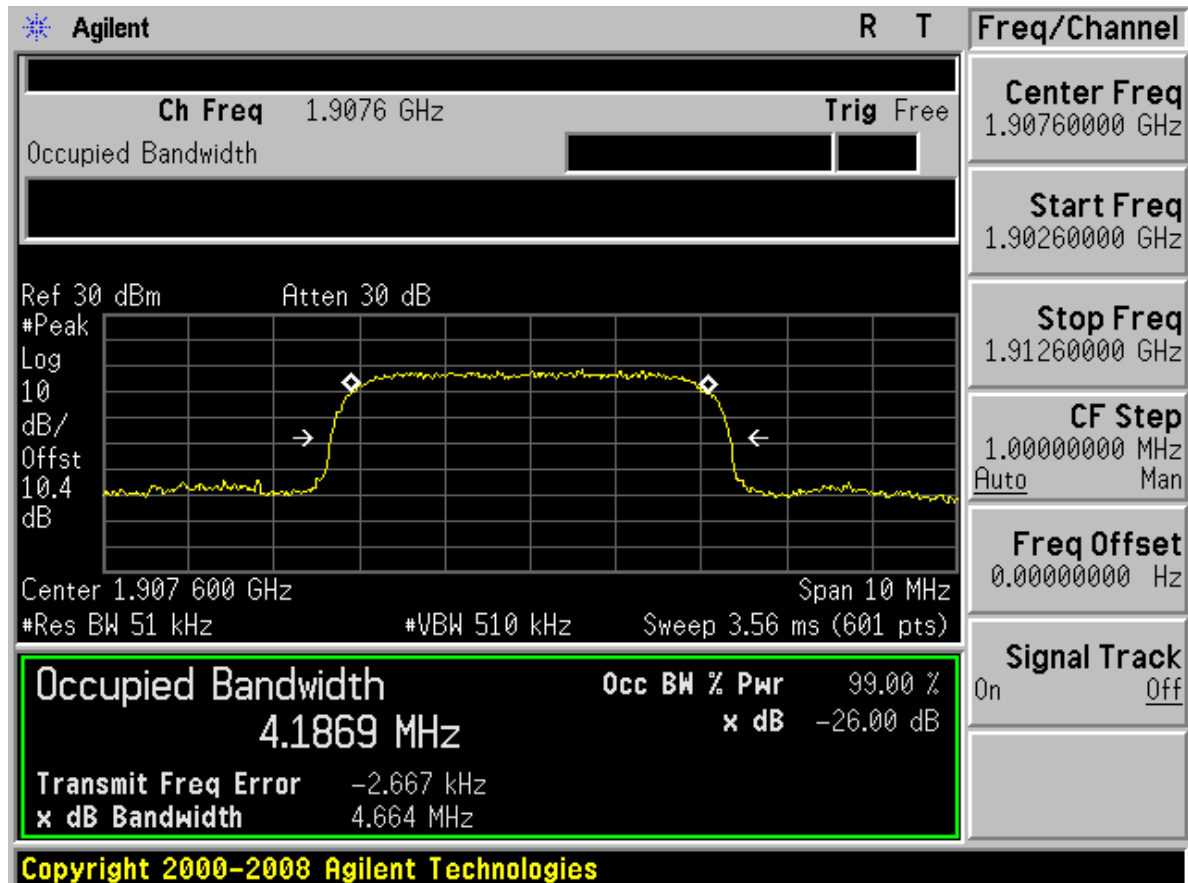


## TM2:EDGE Channel 810





## TM3: WCDMA Channel 9538



The END



## Appendix D

### Band Edges Compliance According to FCC Part 2.1051 & 24.238



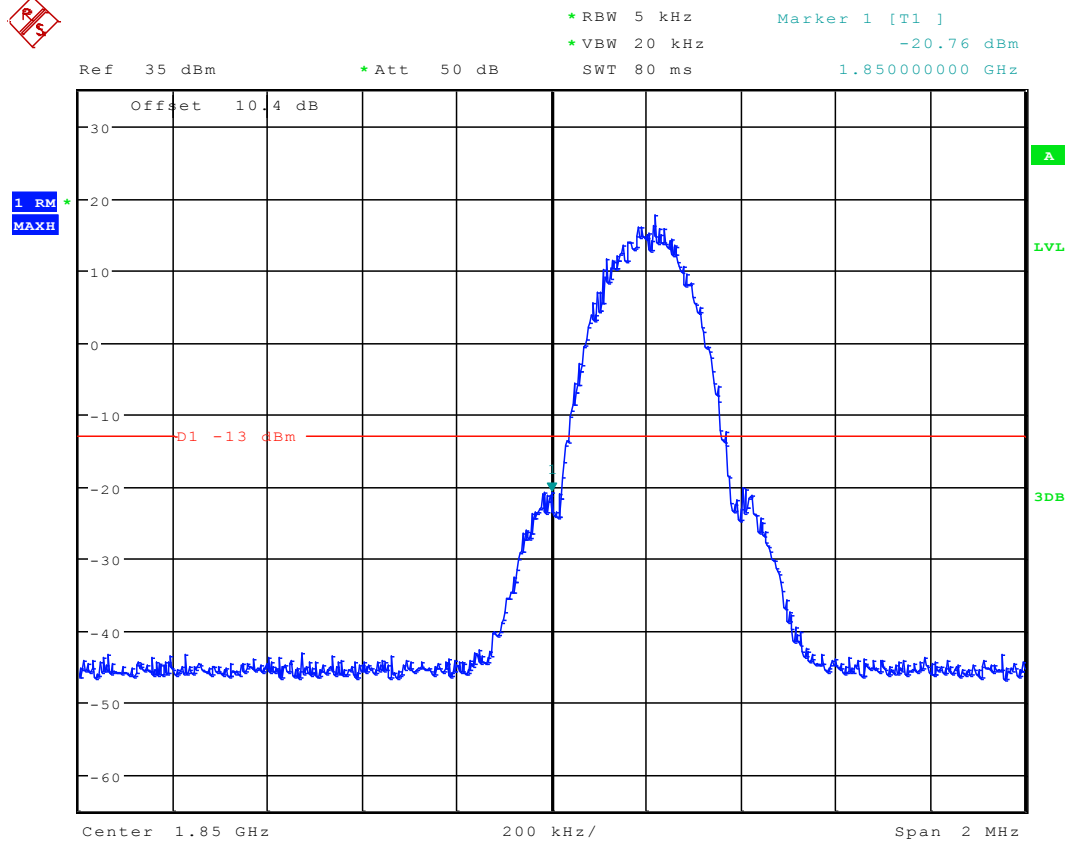
## 26dB Occupied Bandwidth

Note: All relevant operation modes have been tested, and the widest case data is included in this table.

| Mode    | -26dB BW<br>[MHz] | RBW to Measure Band Edge<br>[kHz] |
|---------|-------------------|-----------------------------------|
| TM1/TM2 | 0.321             | $\geq 3.21$ ,<br>used 5           |
| TM3     | 4.664             | $\geq 46.64$<br>used 50           |



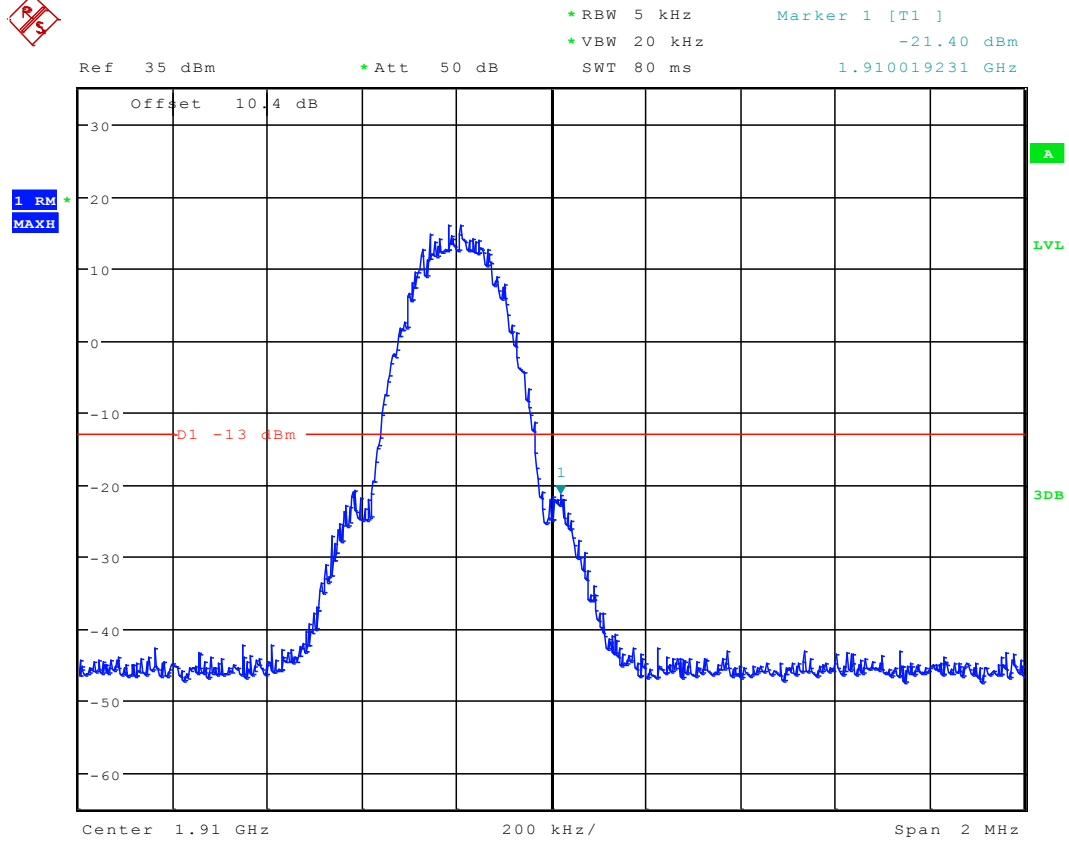
## TM1:GPRS/GSM Left Edge Channel 512

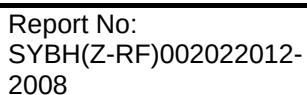
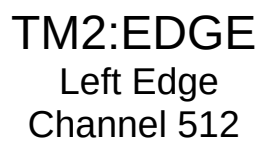
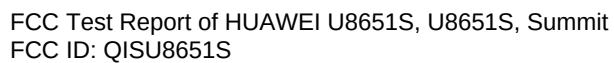


## Right Edge



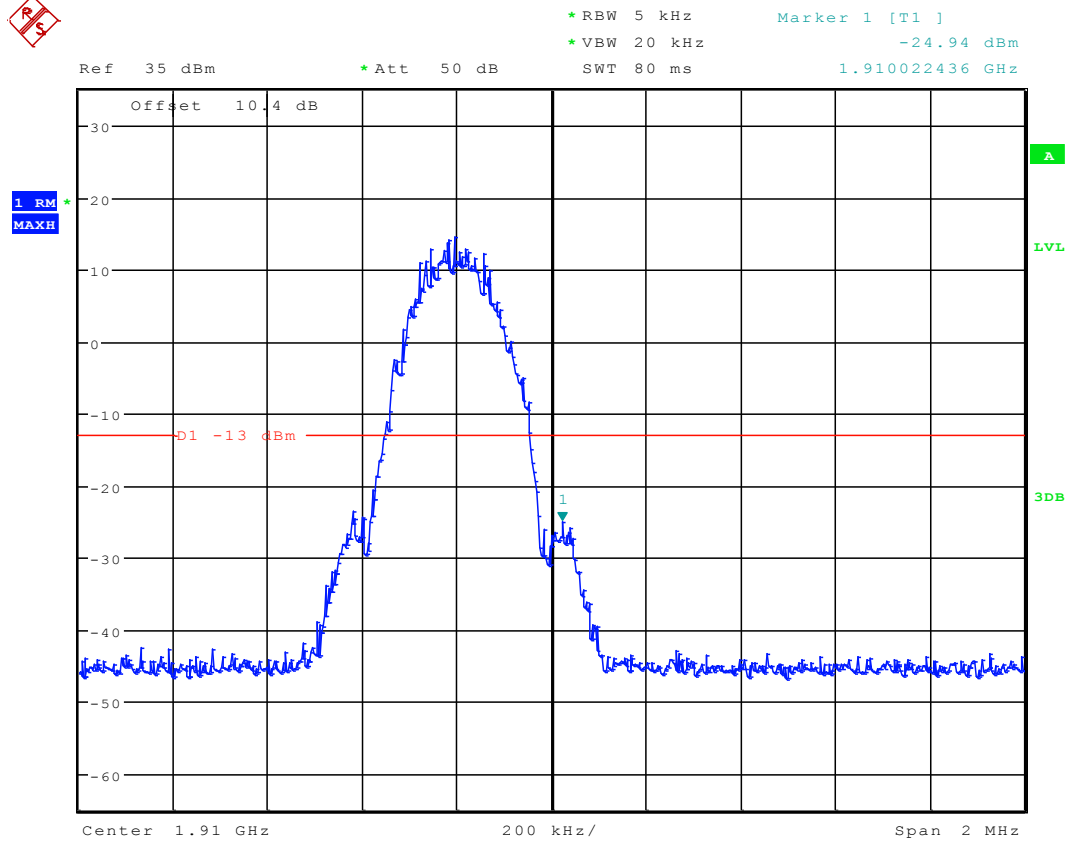
## Channel 810





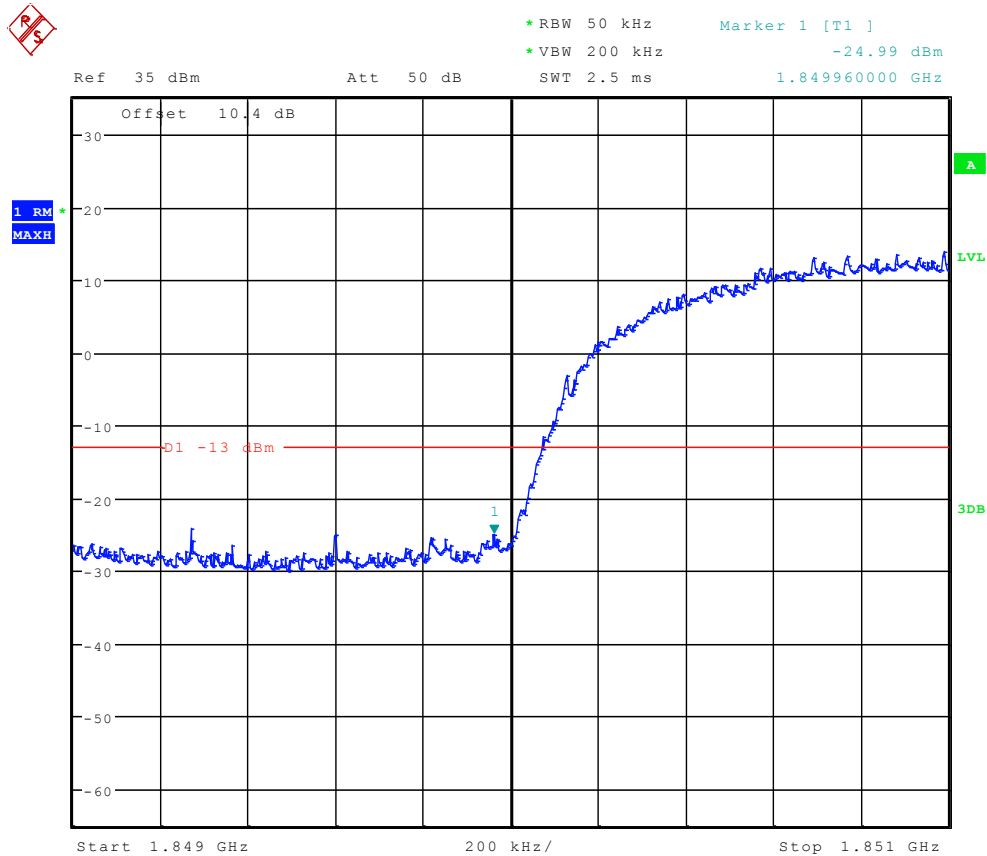


## Right Edge Channel 810



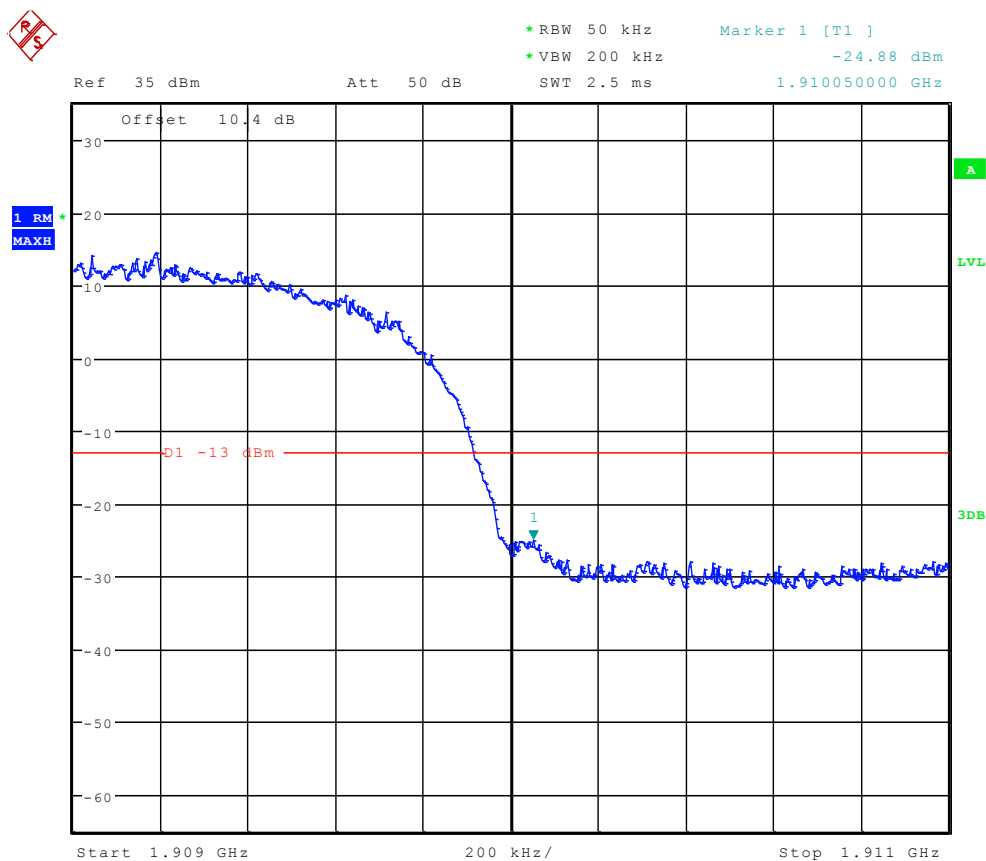


## TM3: WCDMA Left Edge Channel 9262





## Right Edge Channel 9538



The END



## **Appendix E**

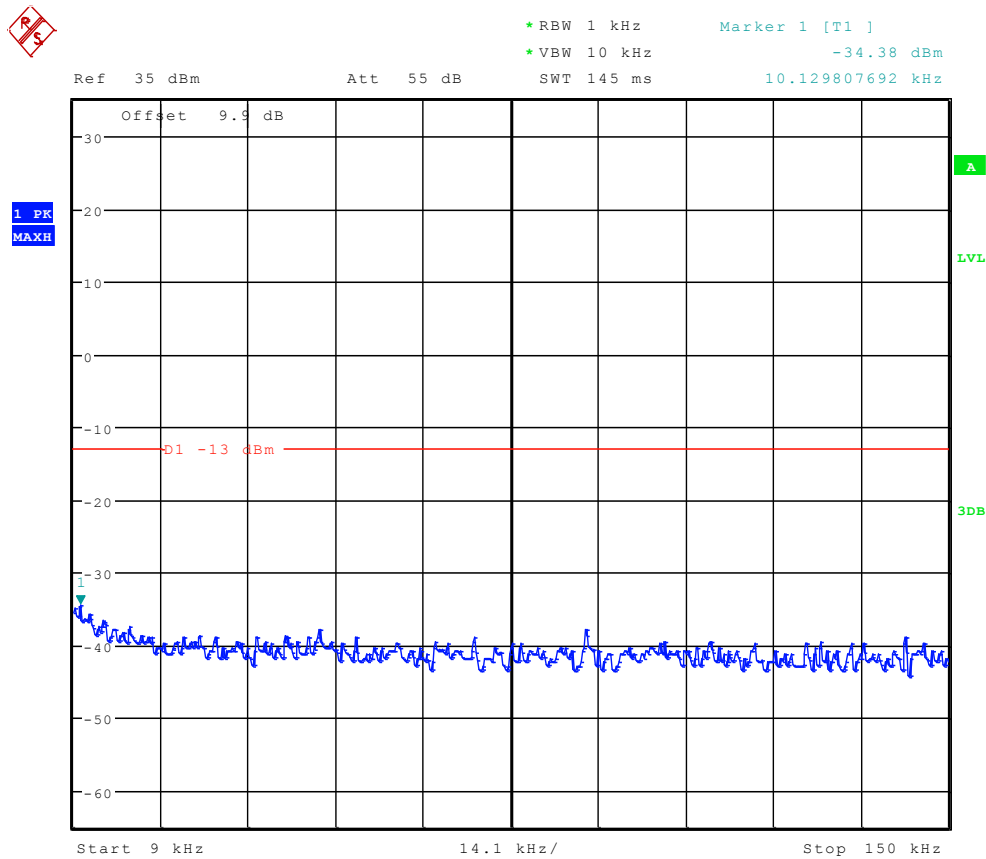
# Spurious Emission at Antenna Terminal

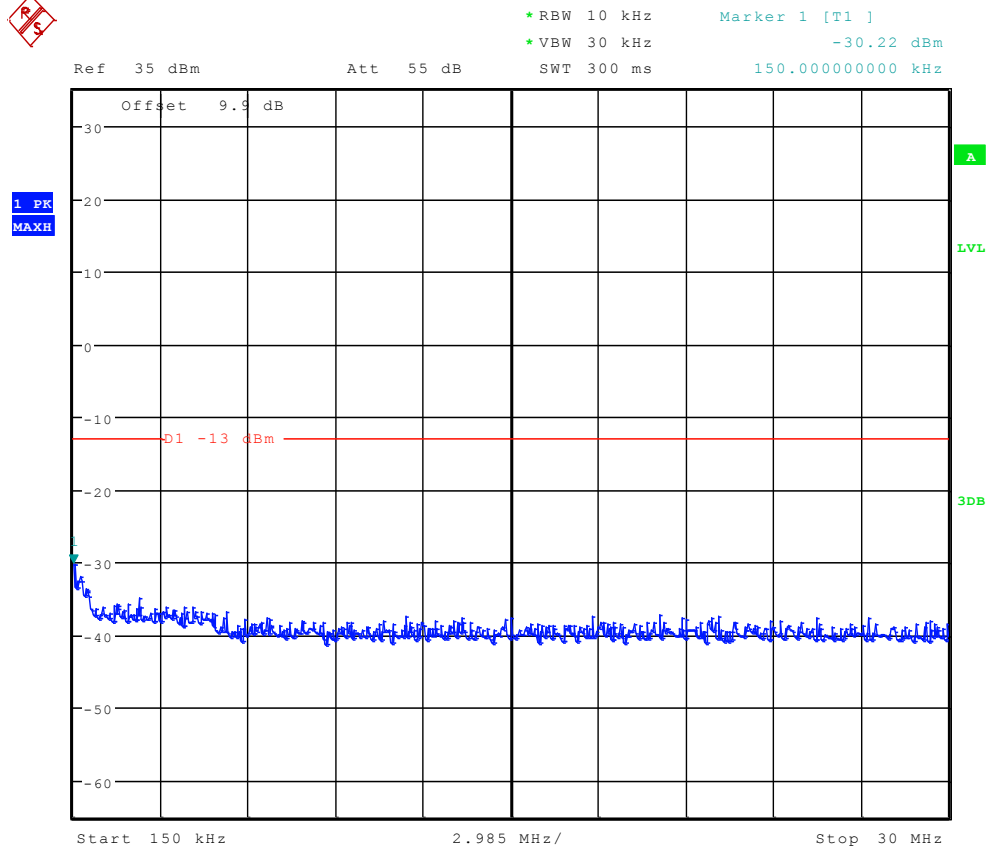
According to FCC Part 2.1051 & 24.238

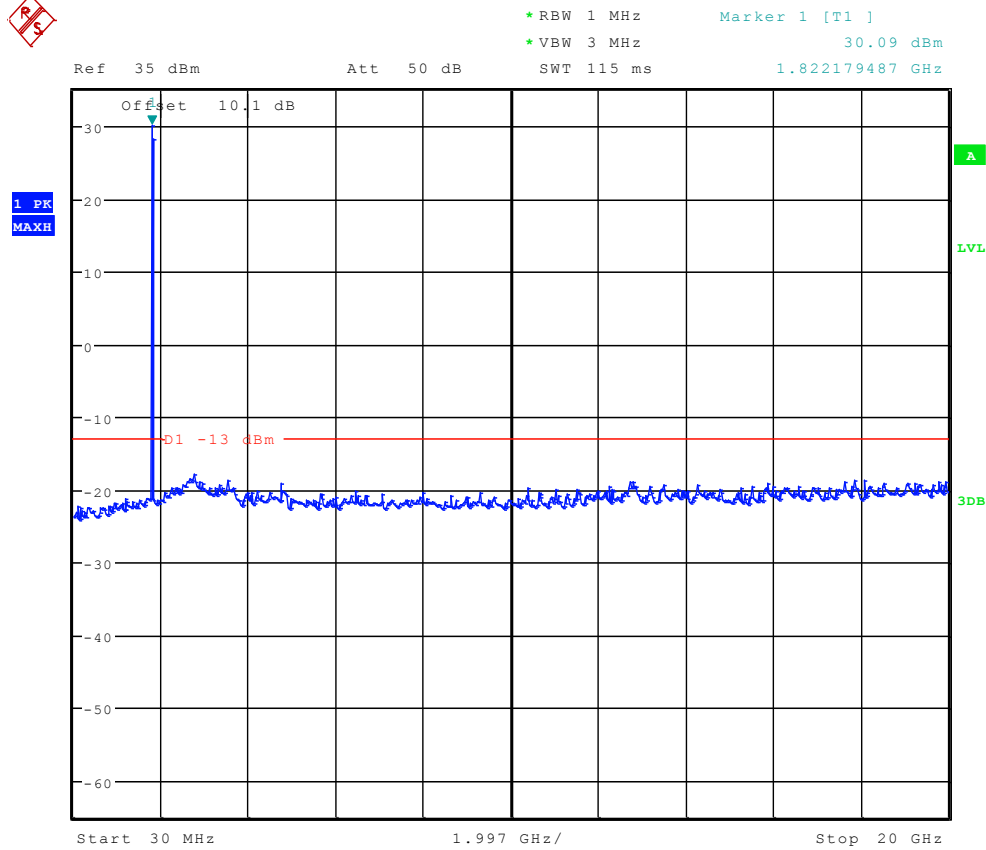


## TM1:GPRS/GSM

### Channel 512

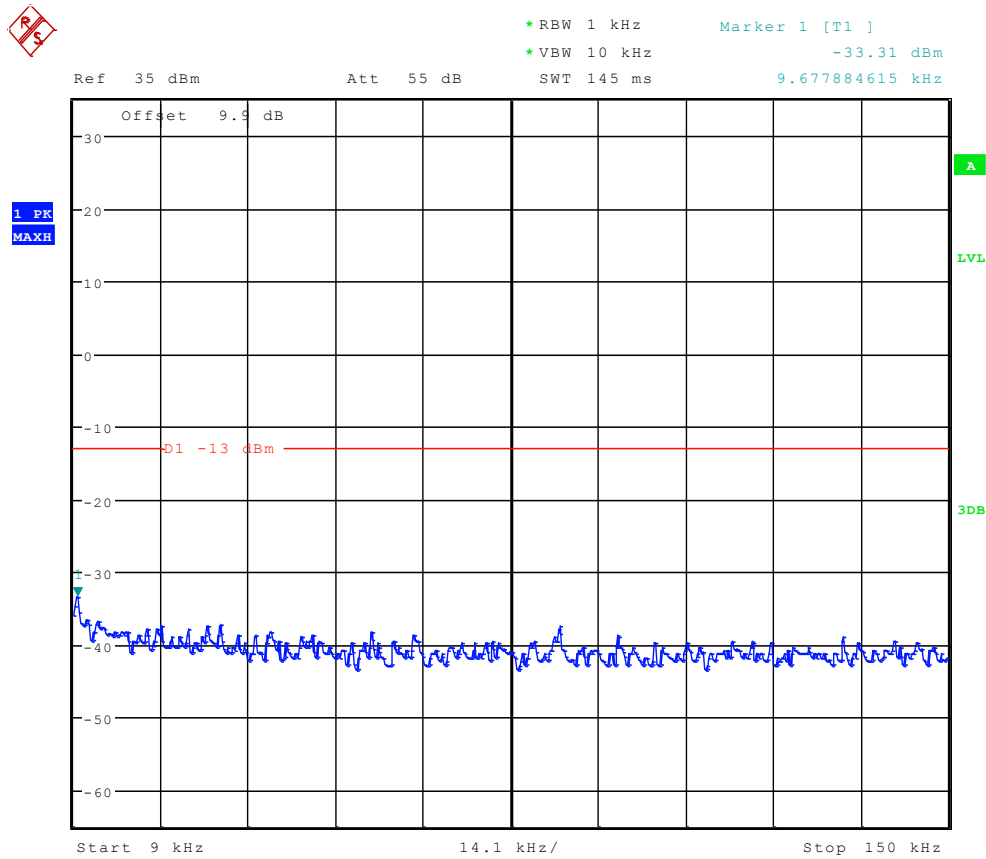






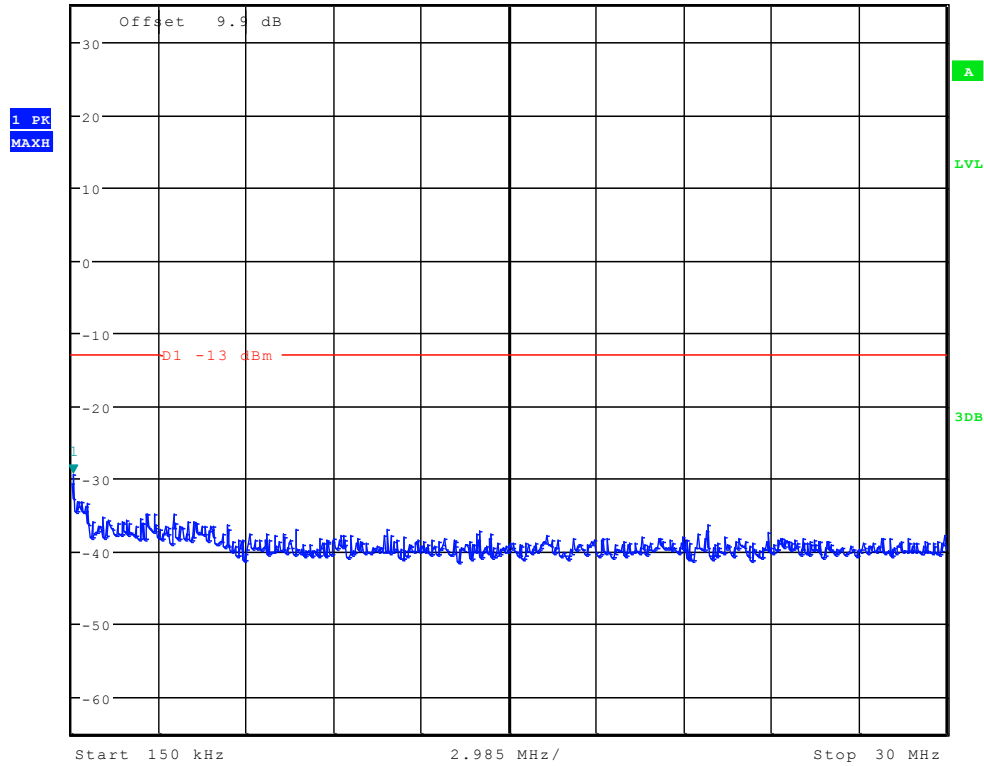


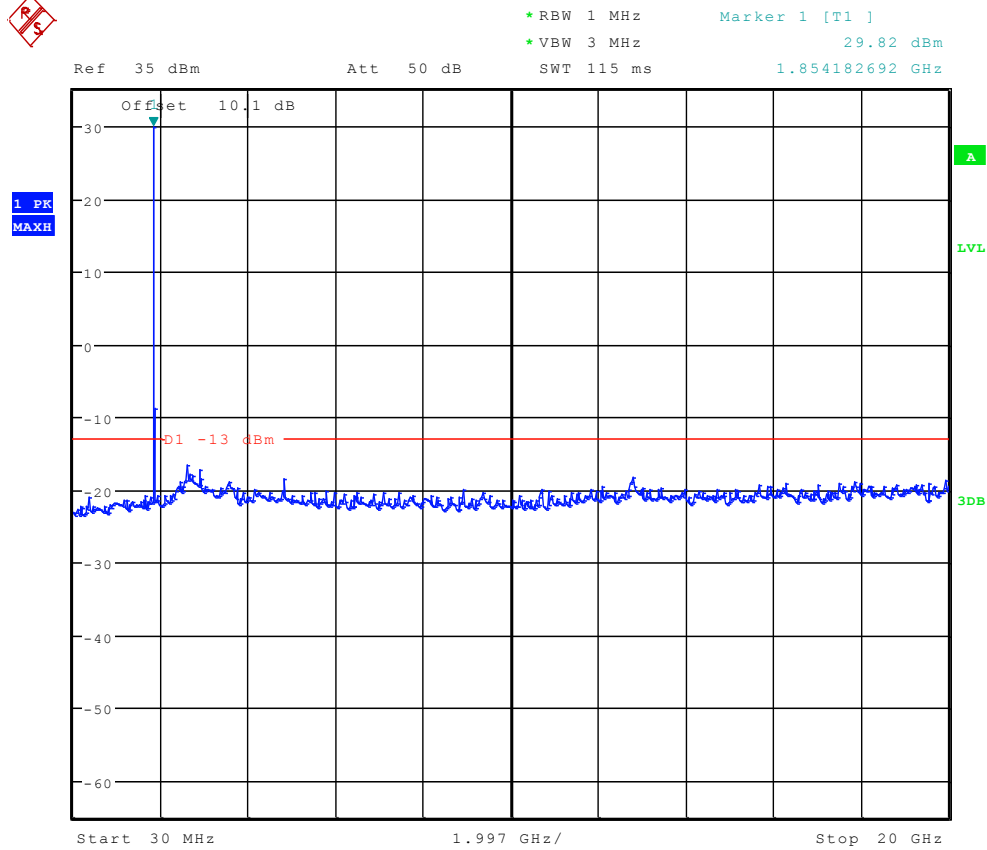
## Channel 661





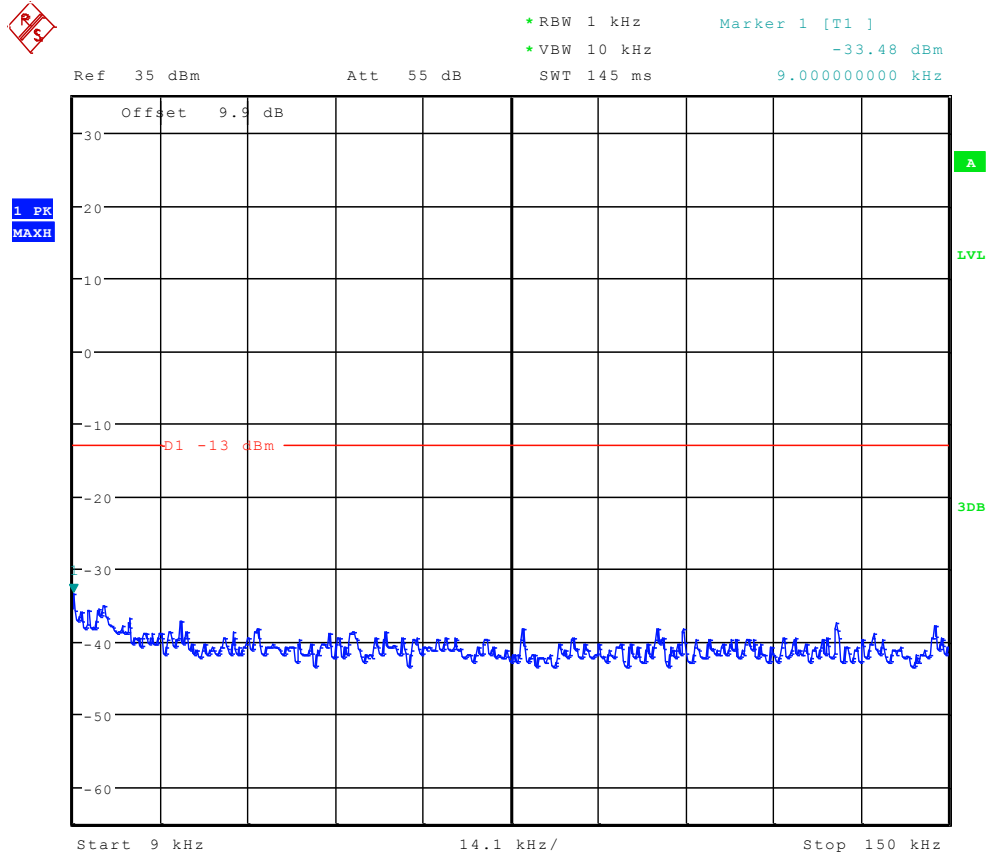
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -29.37 dBm  
Ref 35 dBm      Att 55 dB      SWT 300 ms      197.836538462 kHz

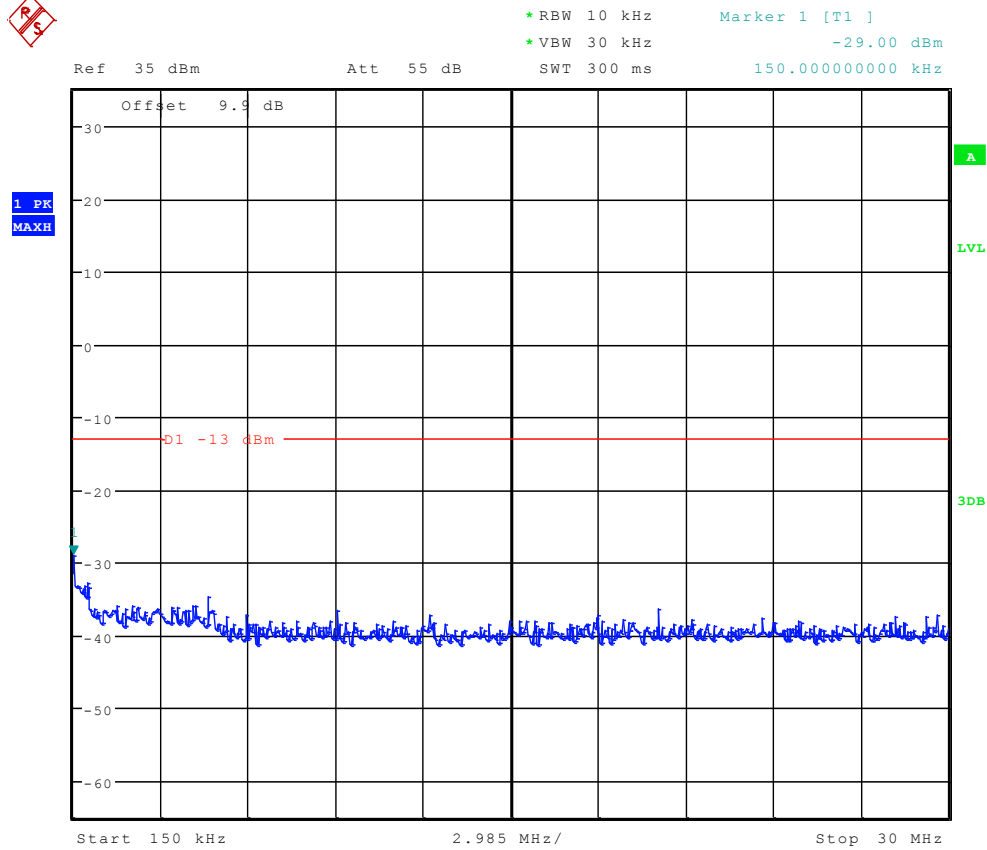


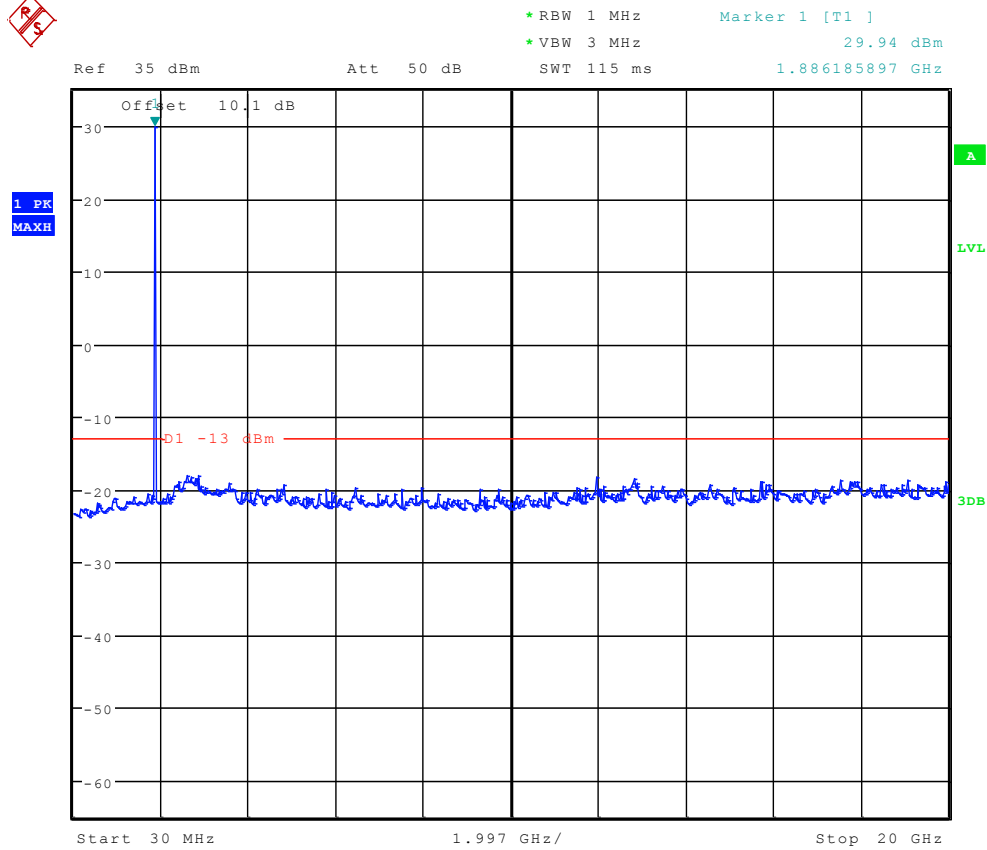




## Channel 810

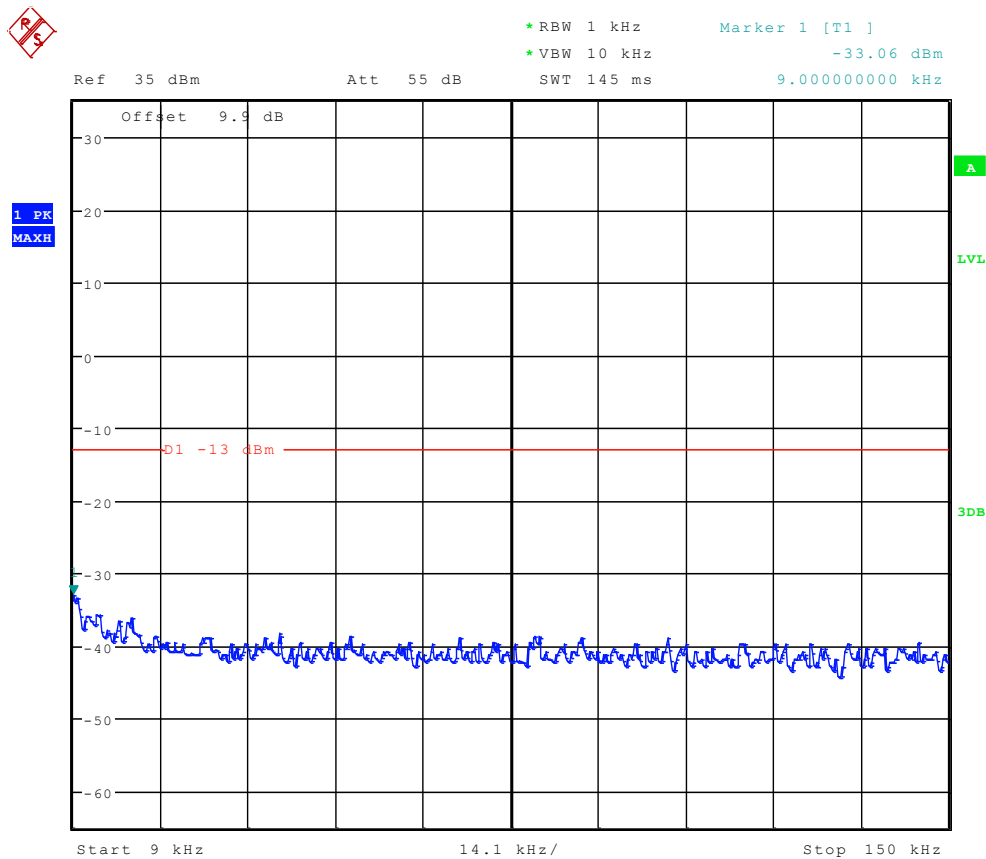


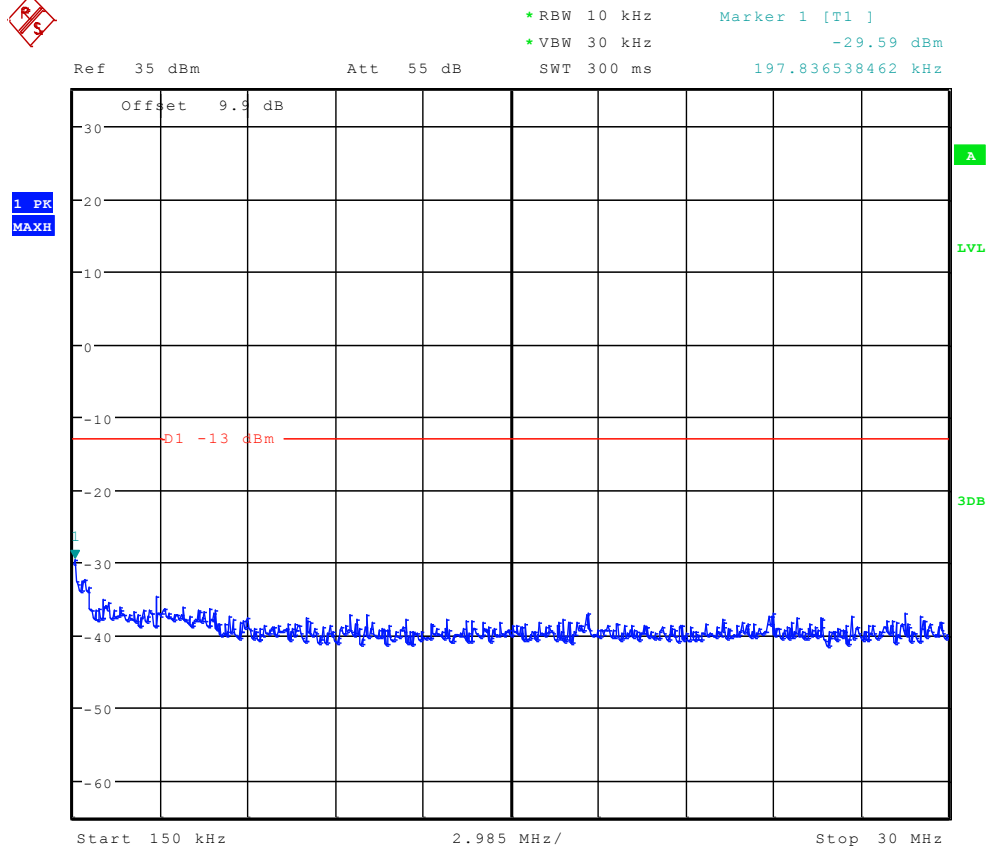


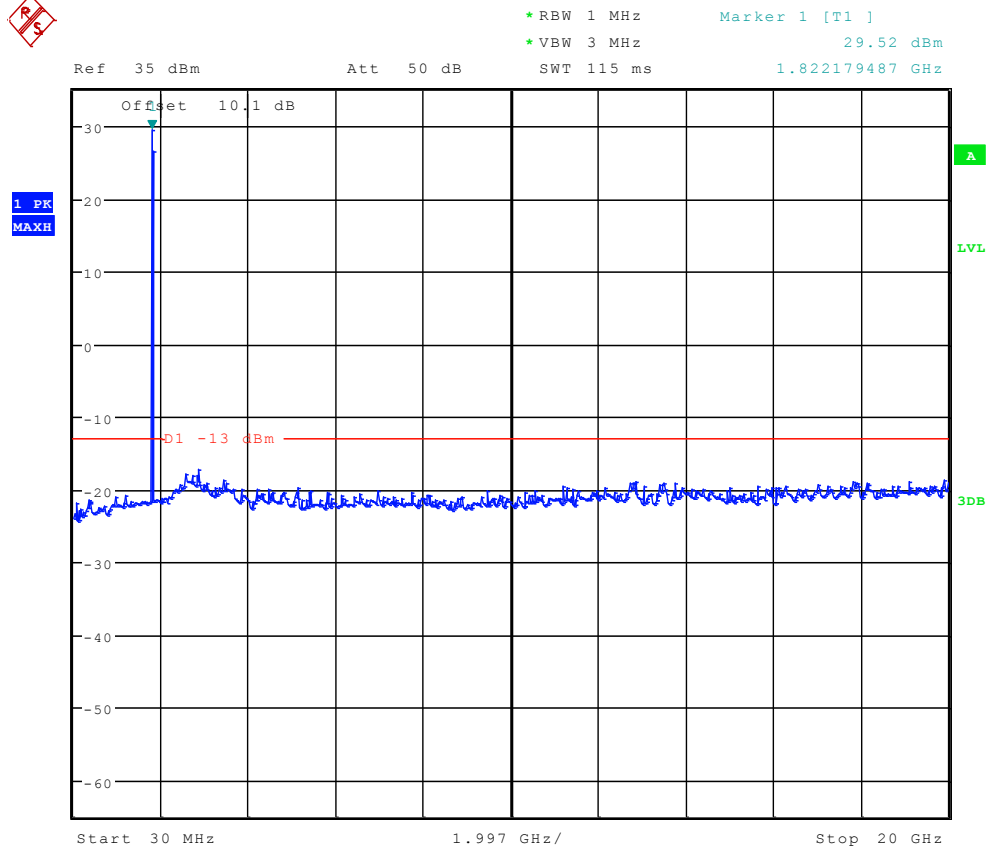




## TM2:EDGE Channel 512

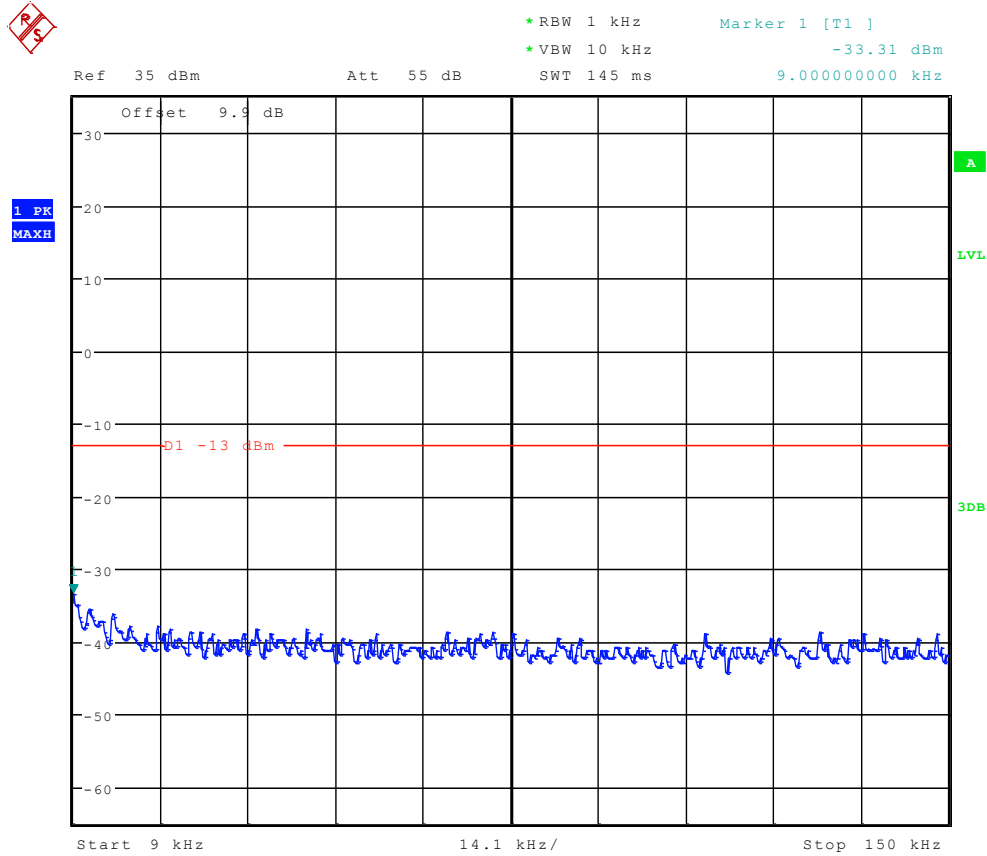


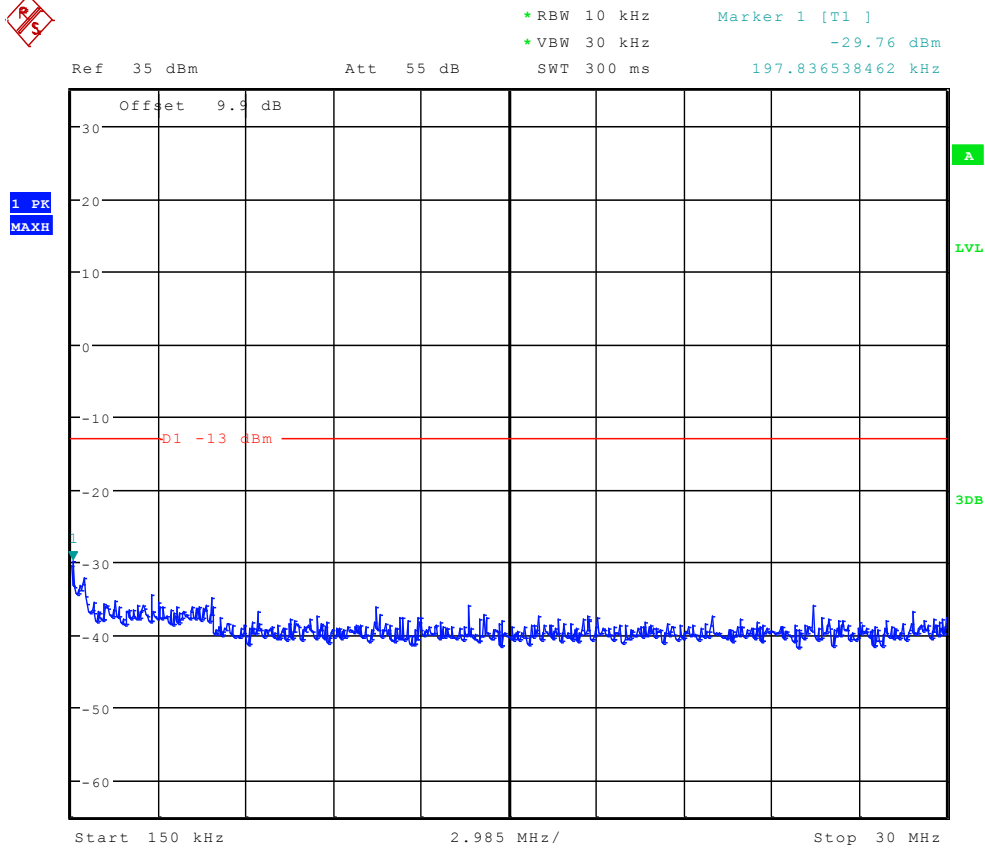


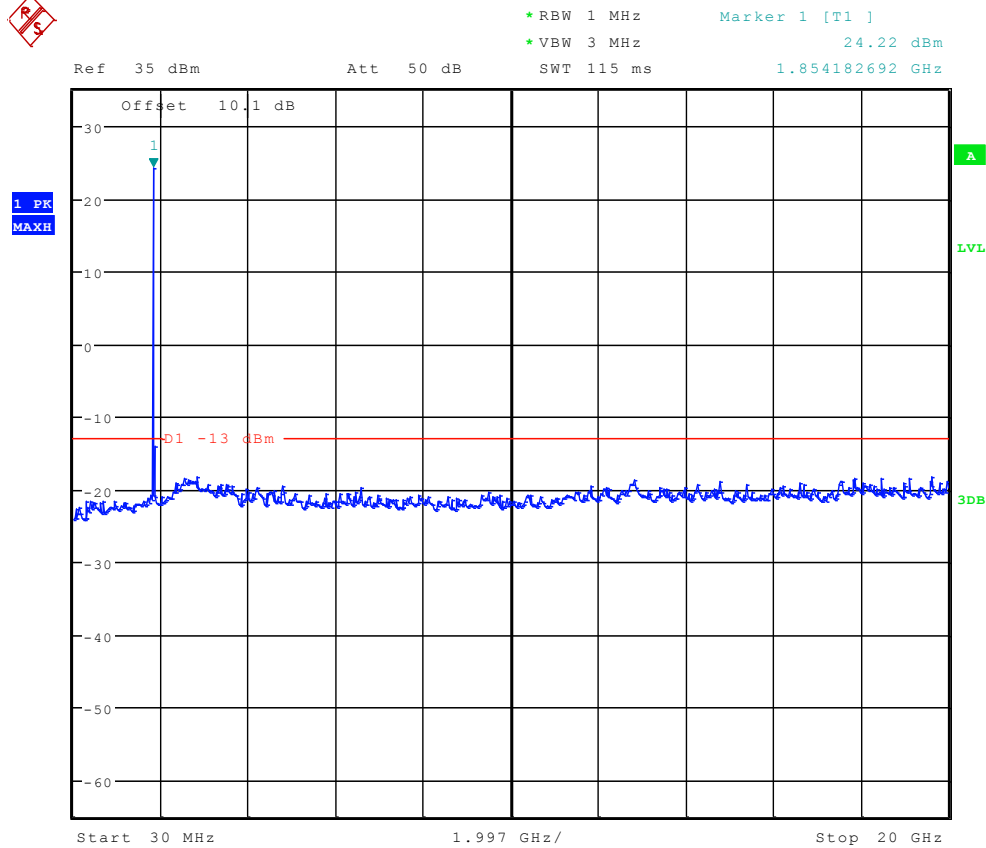




## Channel 661

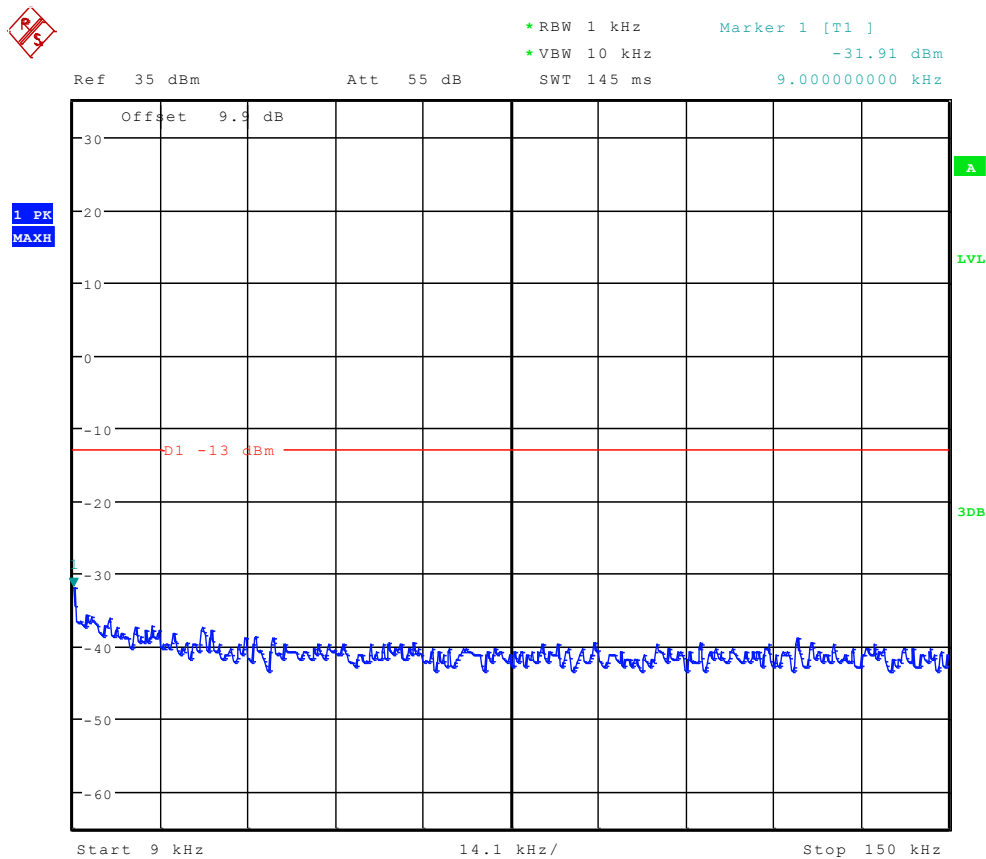


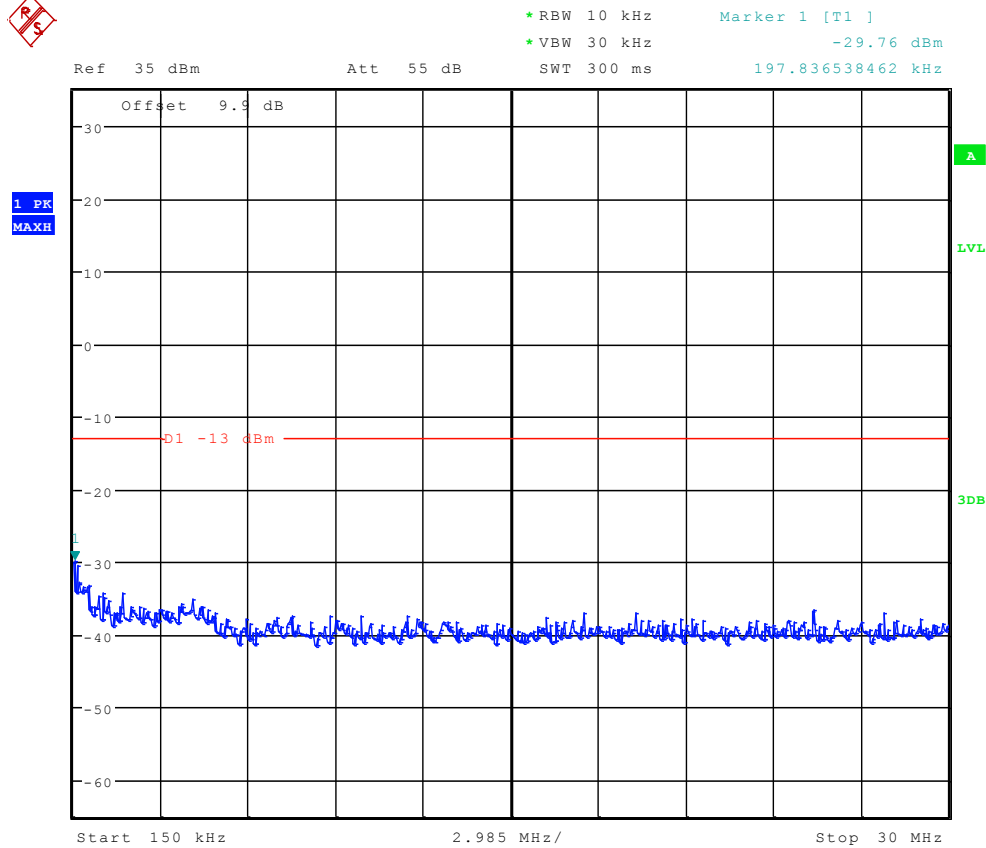


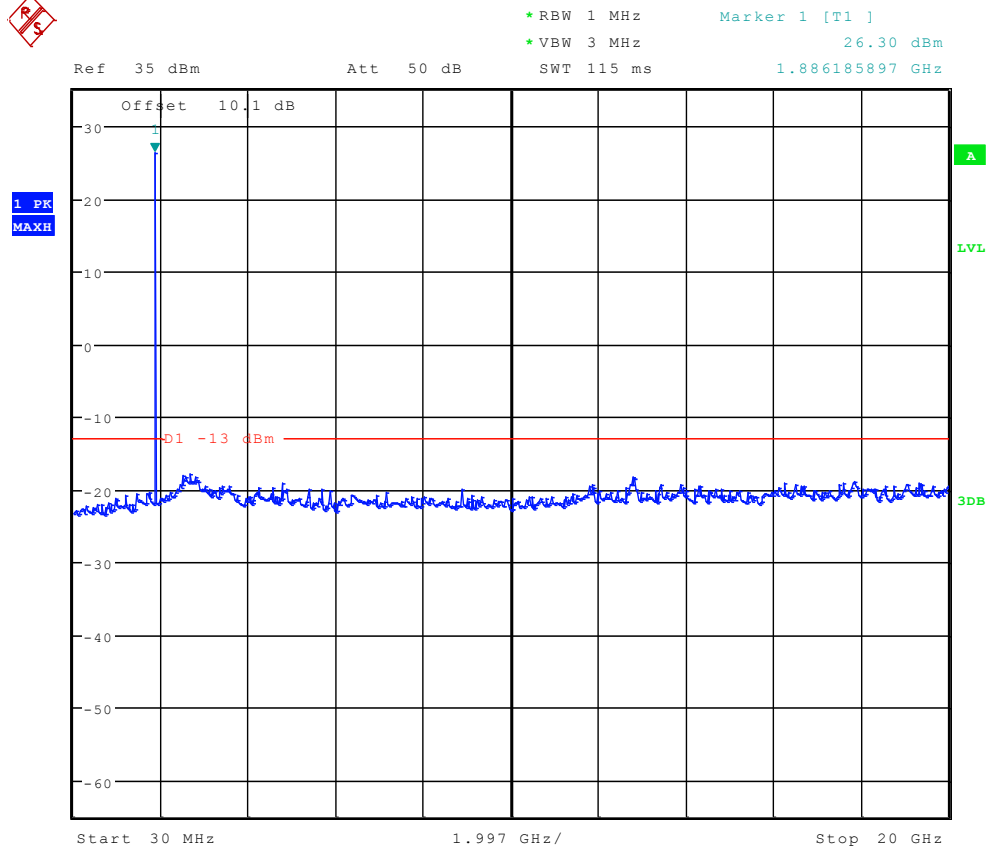




## Channel 810



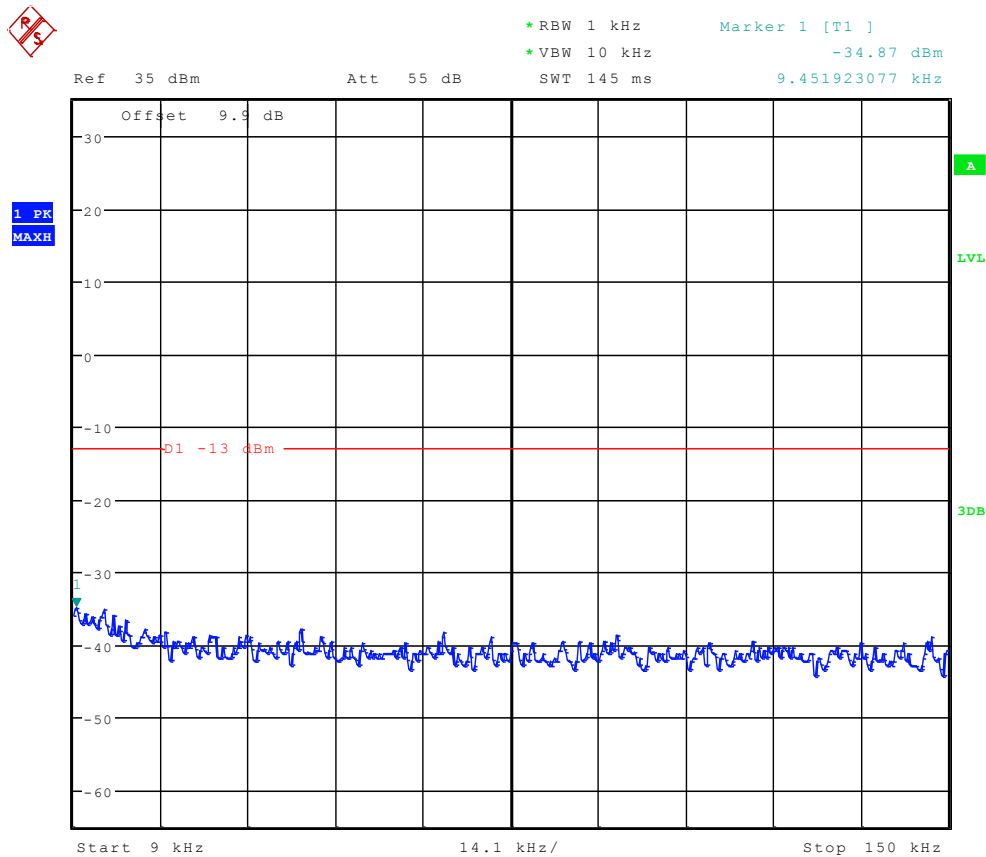


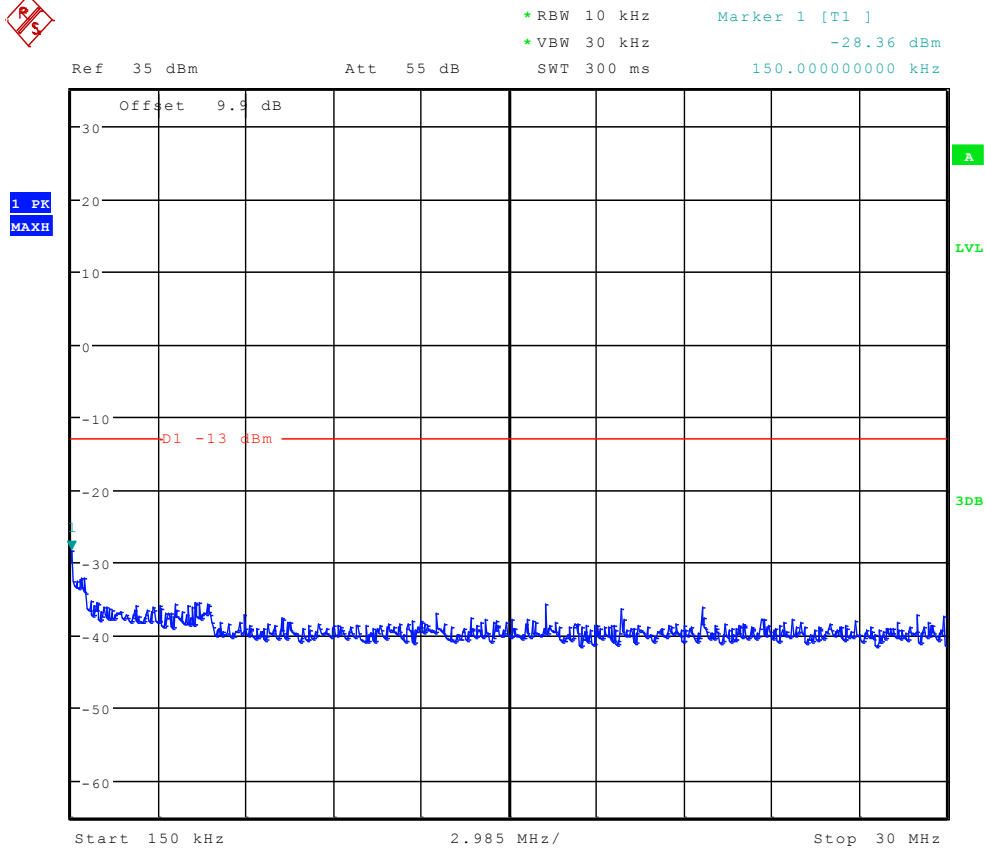


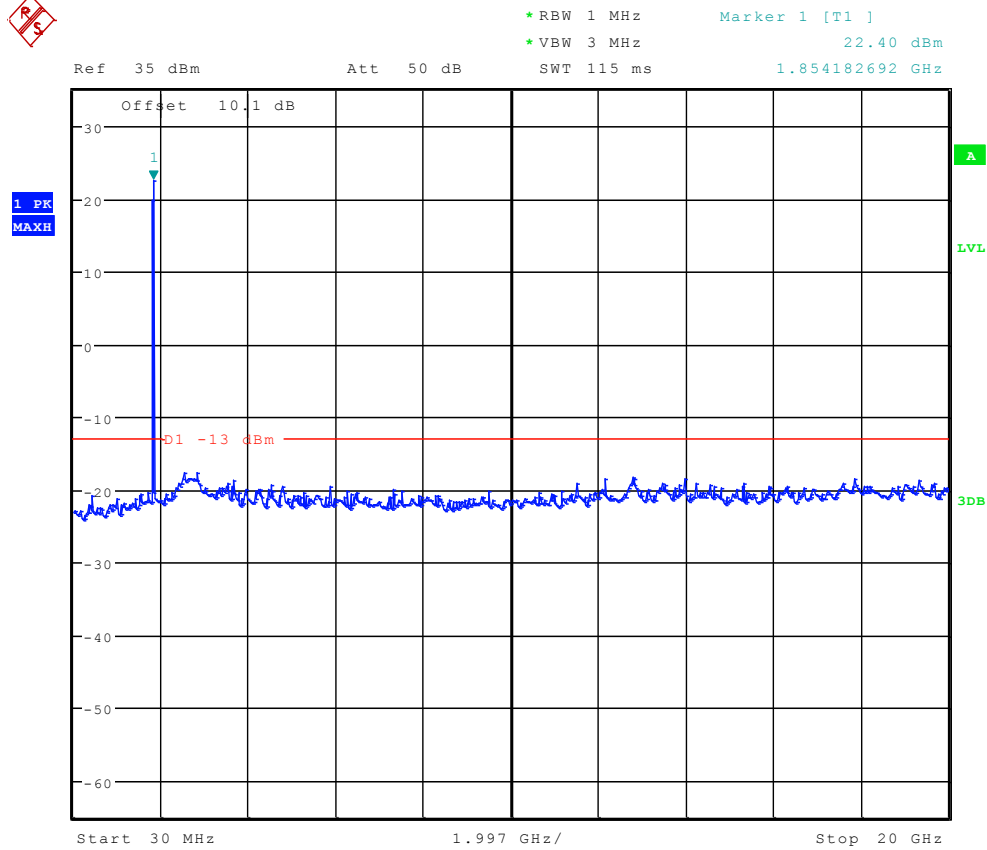


## TM3: WCDMA

### Channel 9262

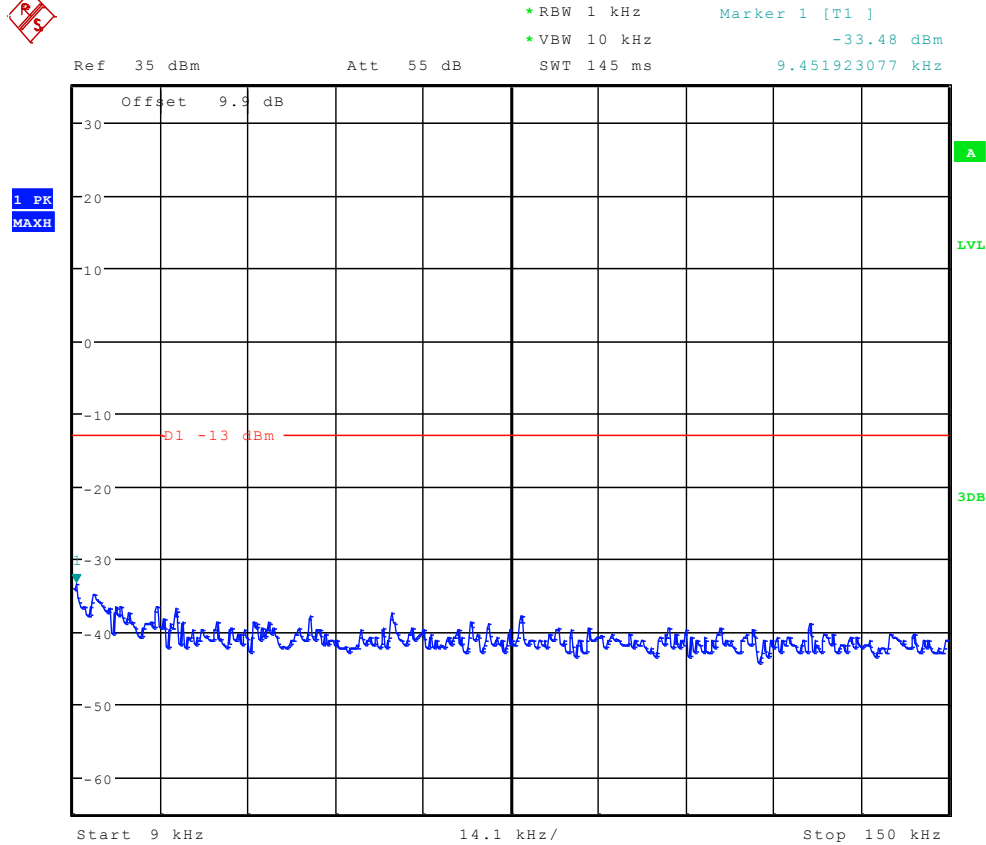


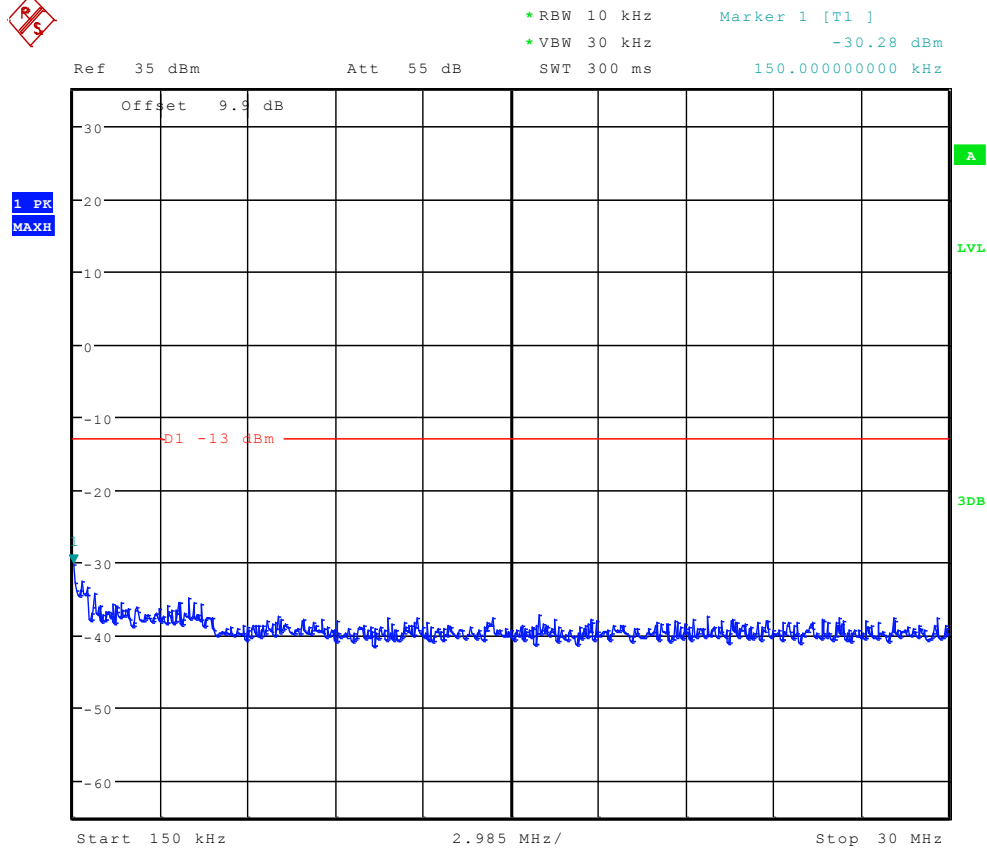


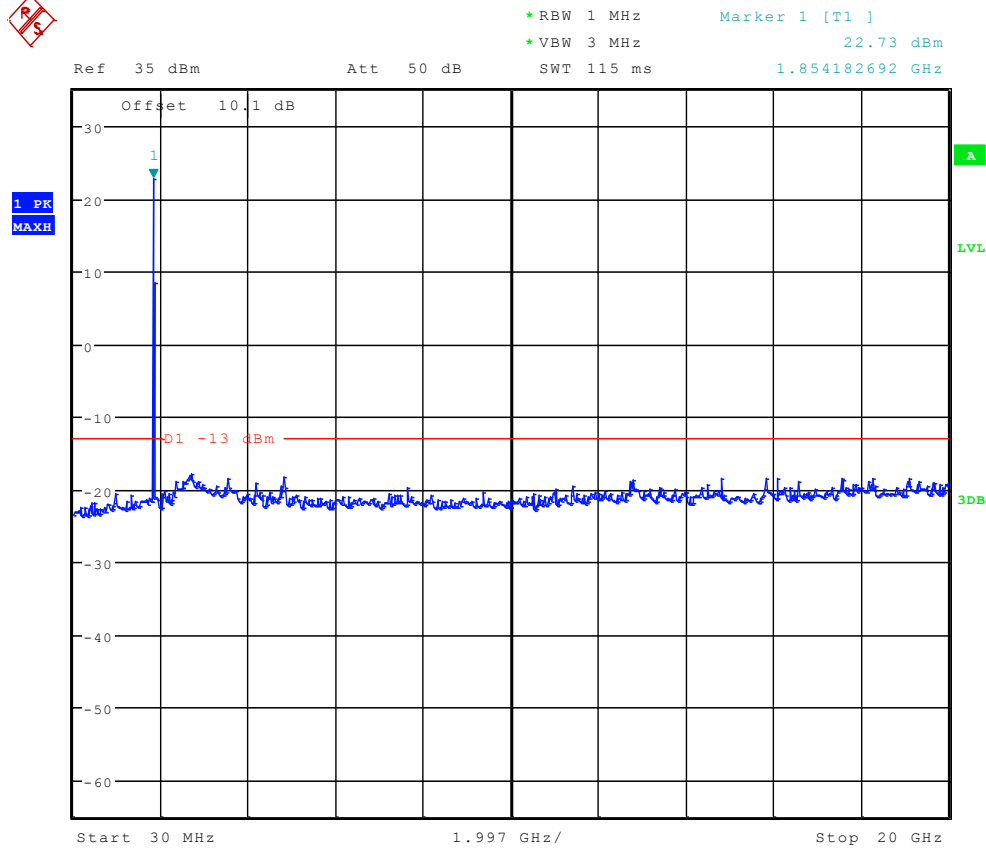




## Channel 9400

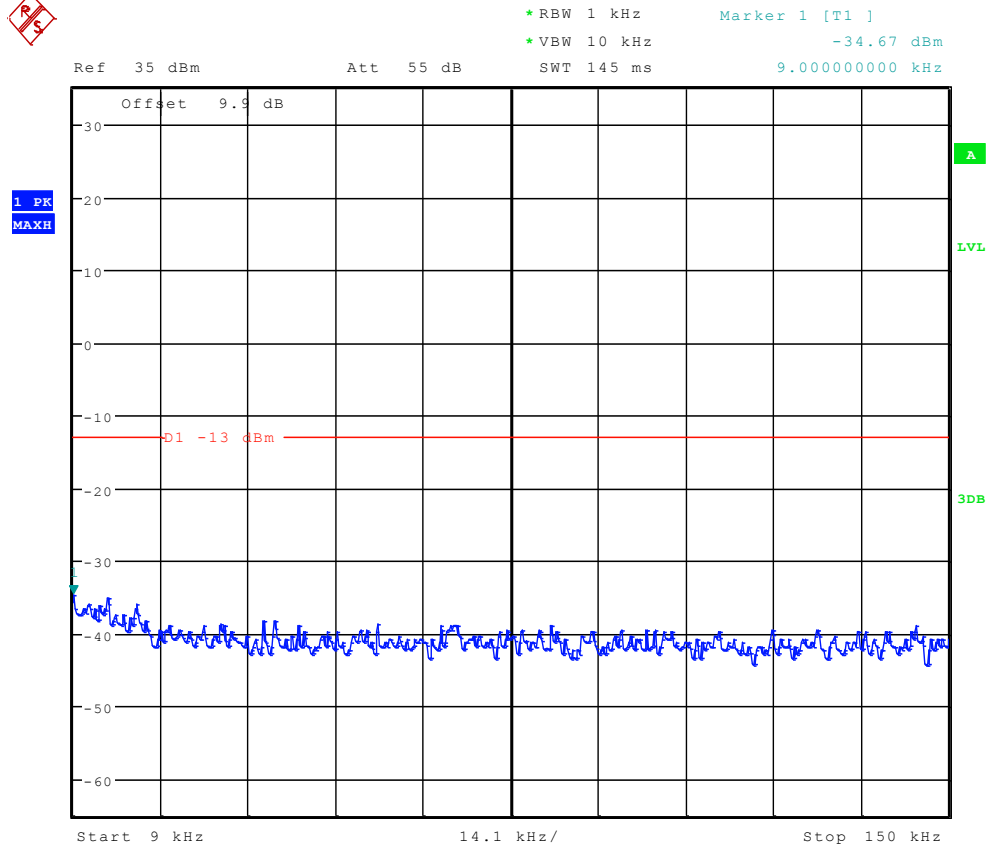


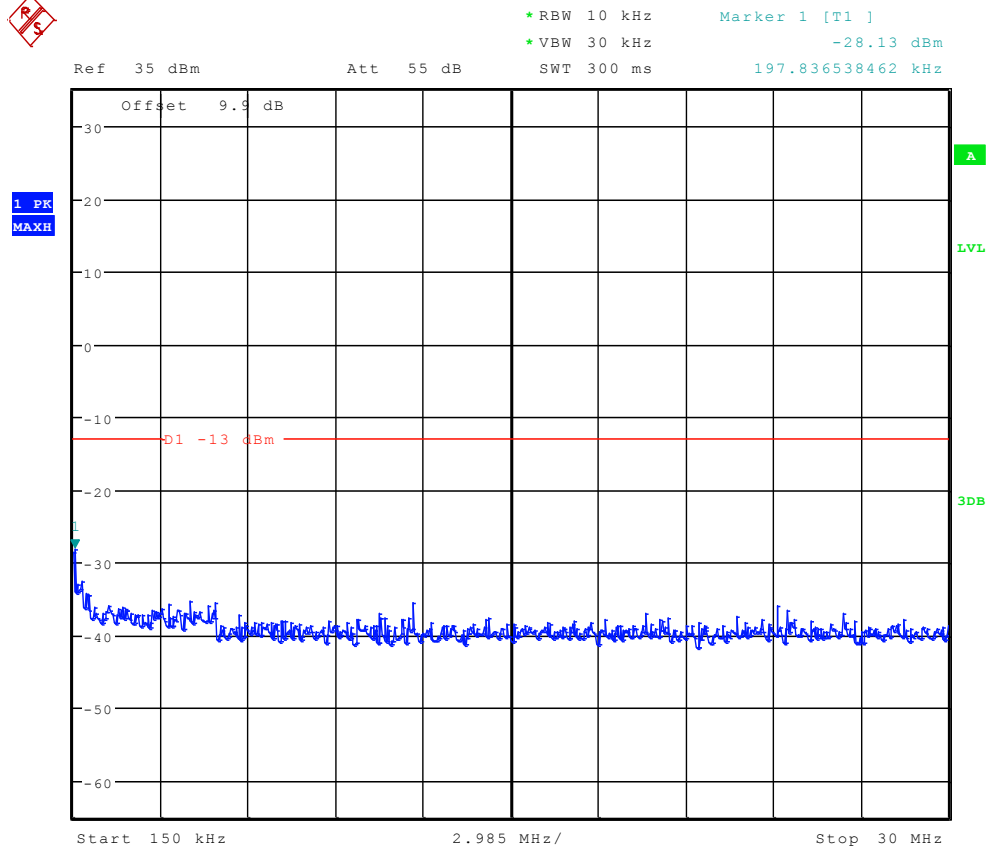


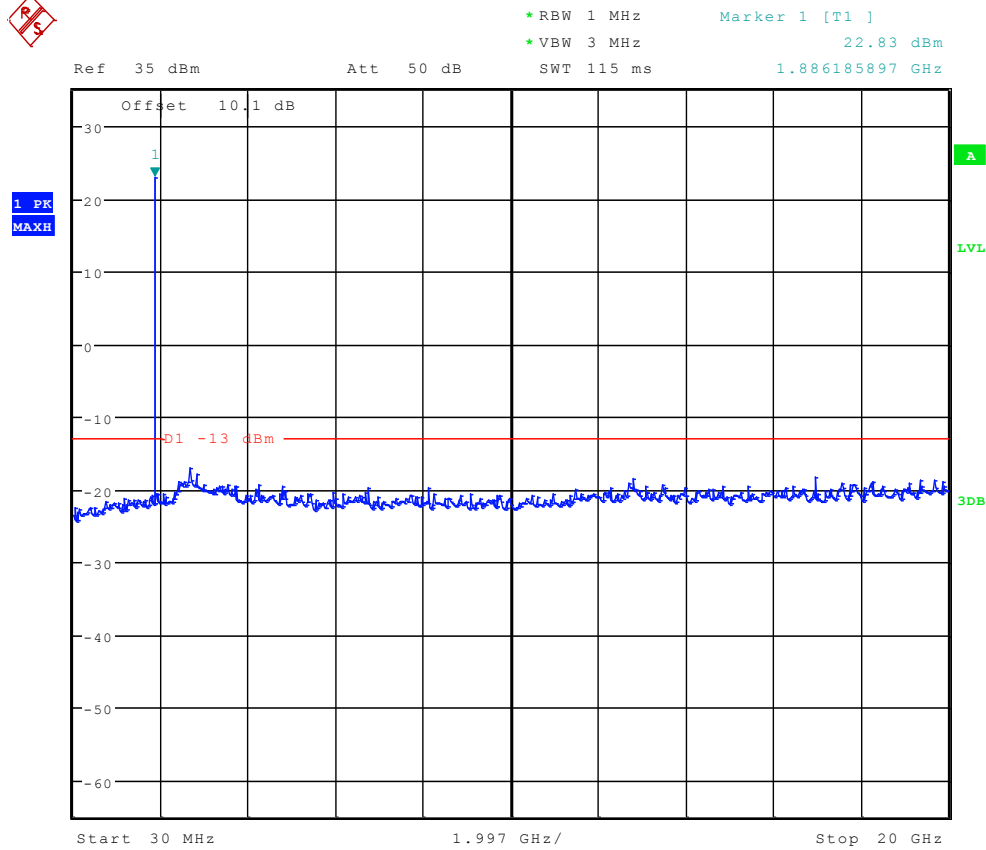




## Channel 9538







The END



## **AppendixF**

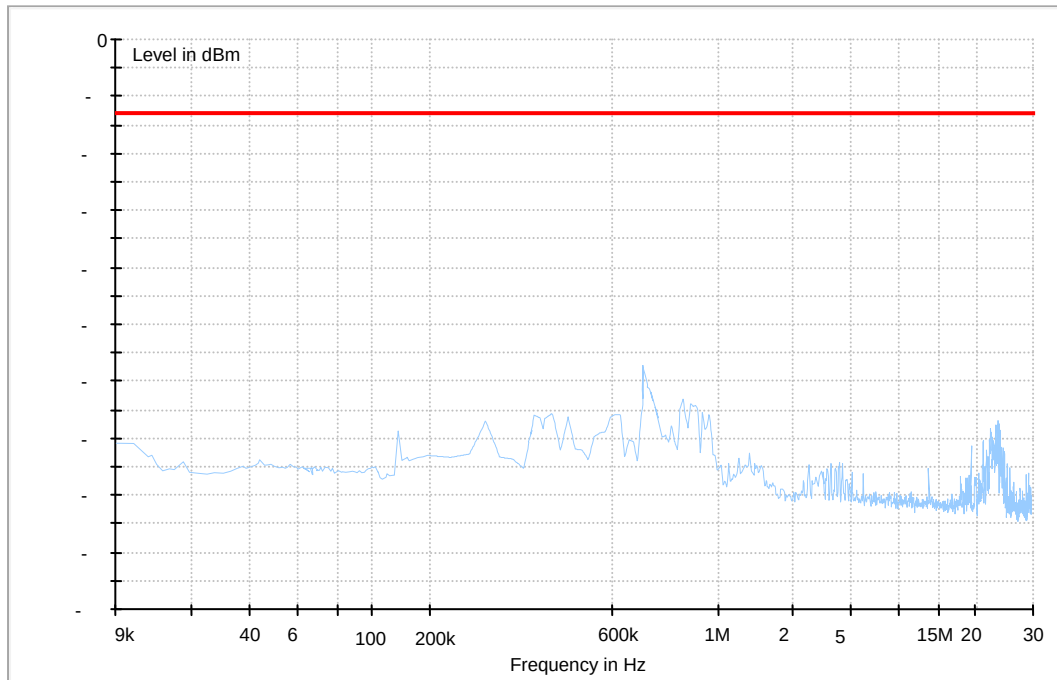
# **Field Strength of Spurious Emissions**

According to FCC Part 2.1053 & Part24.238



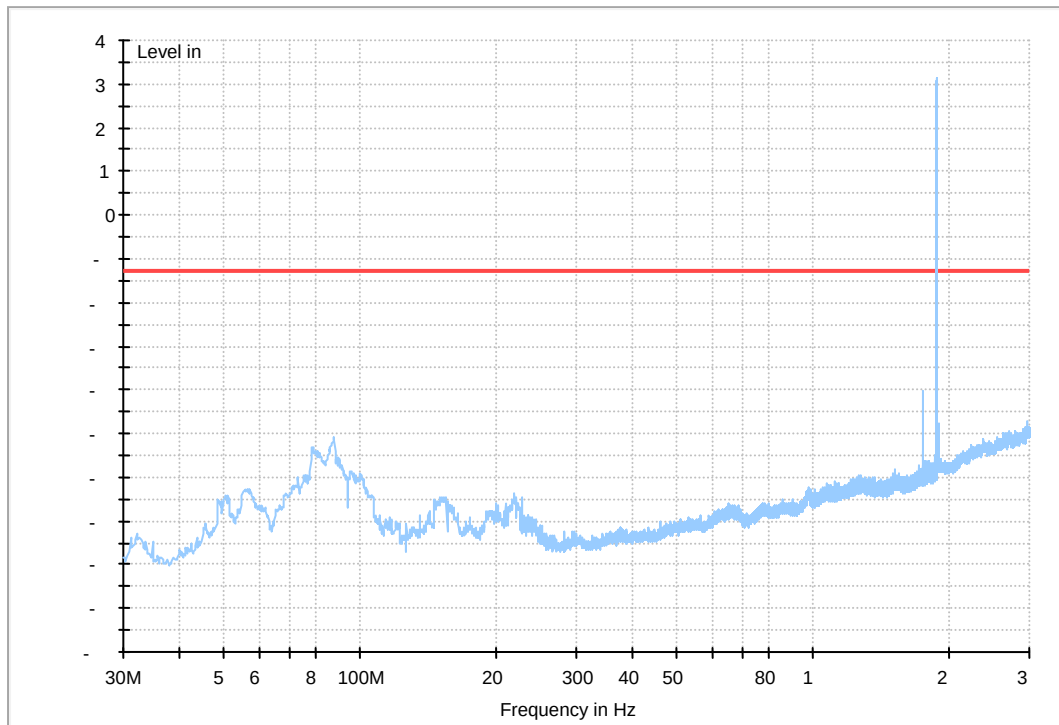
## GSM 1900

Traffic Mode (9kHz-30MHz)



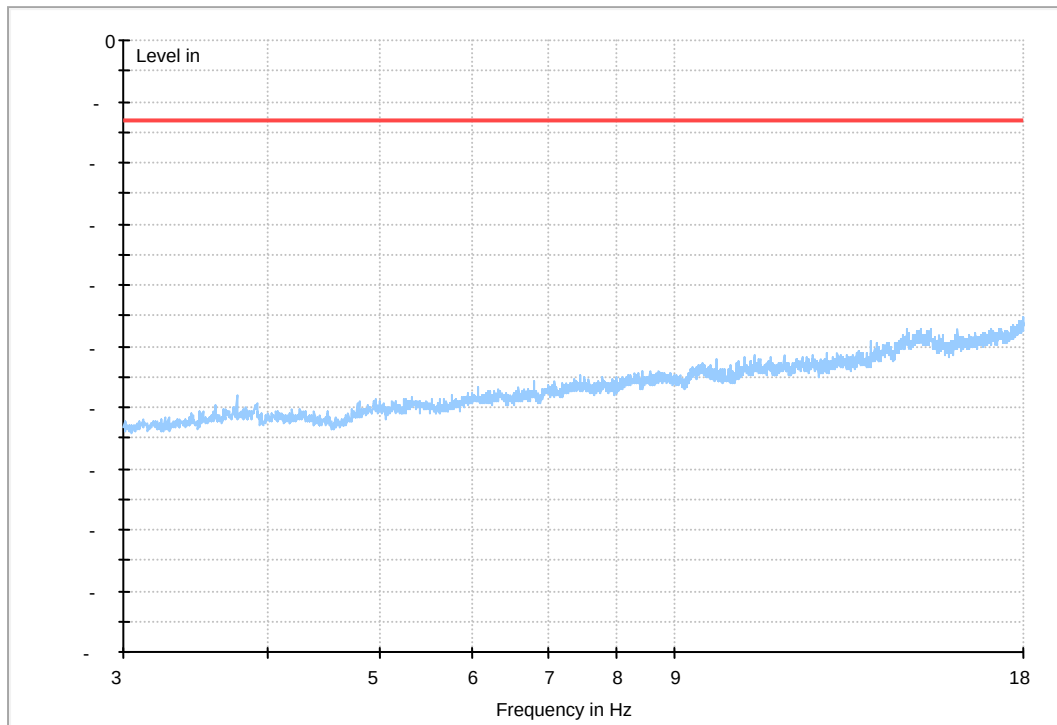


## Traffic Mode (30MHz-3GHz)



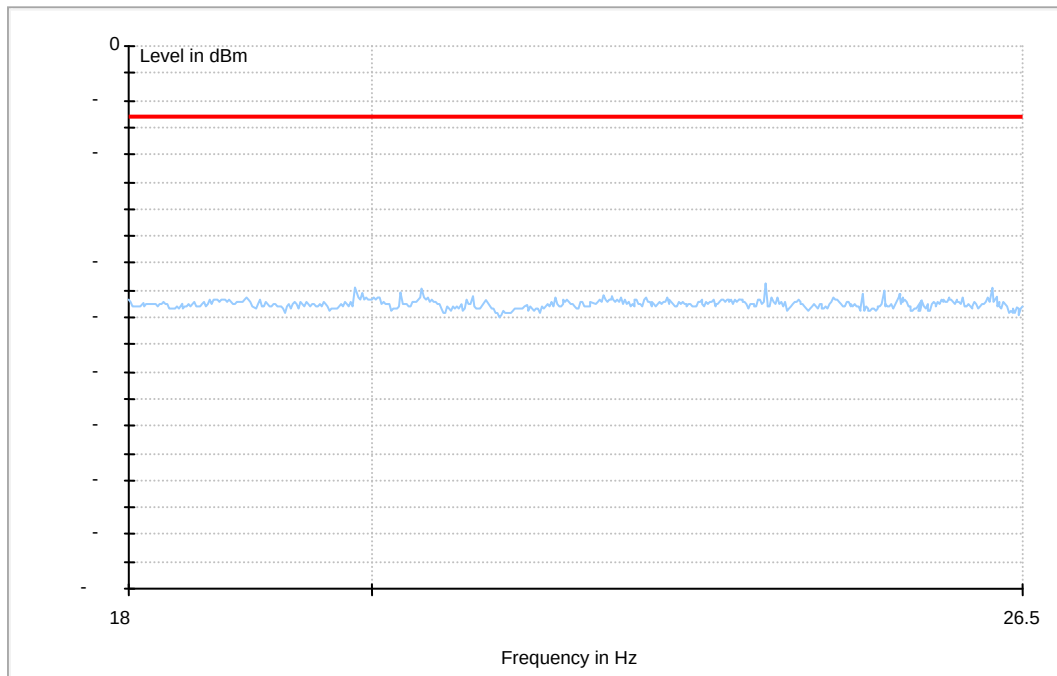


## Traffic Mode (3GHz-18GHz)





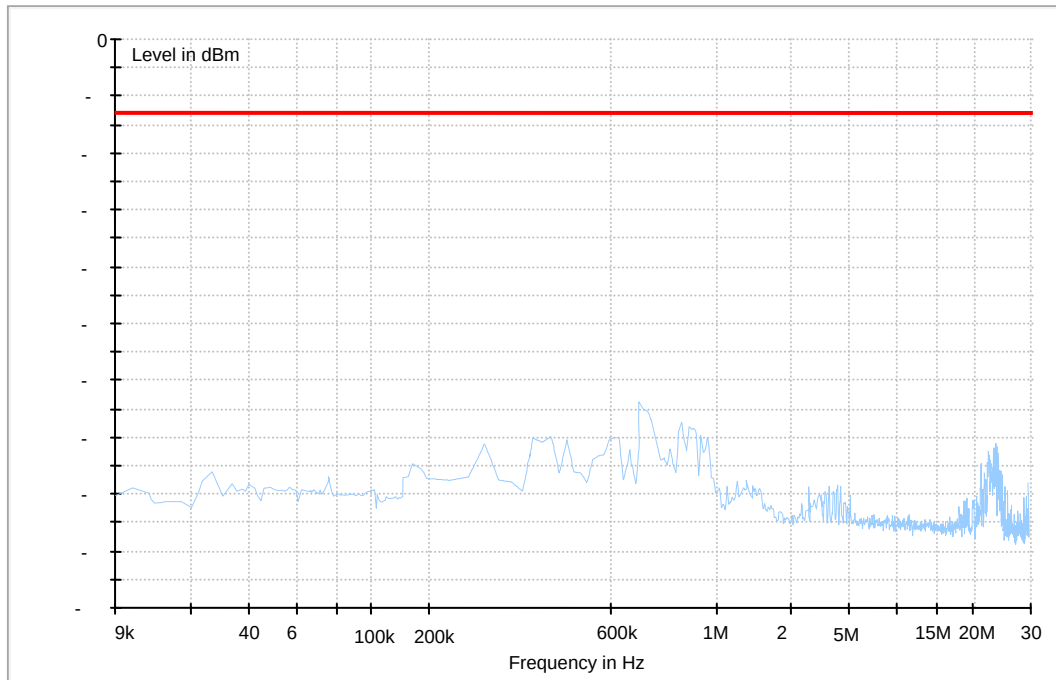
## Traffic Mode (18GHz-26.5GHz)





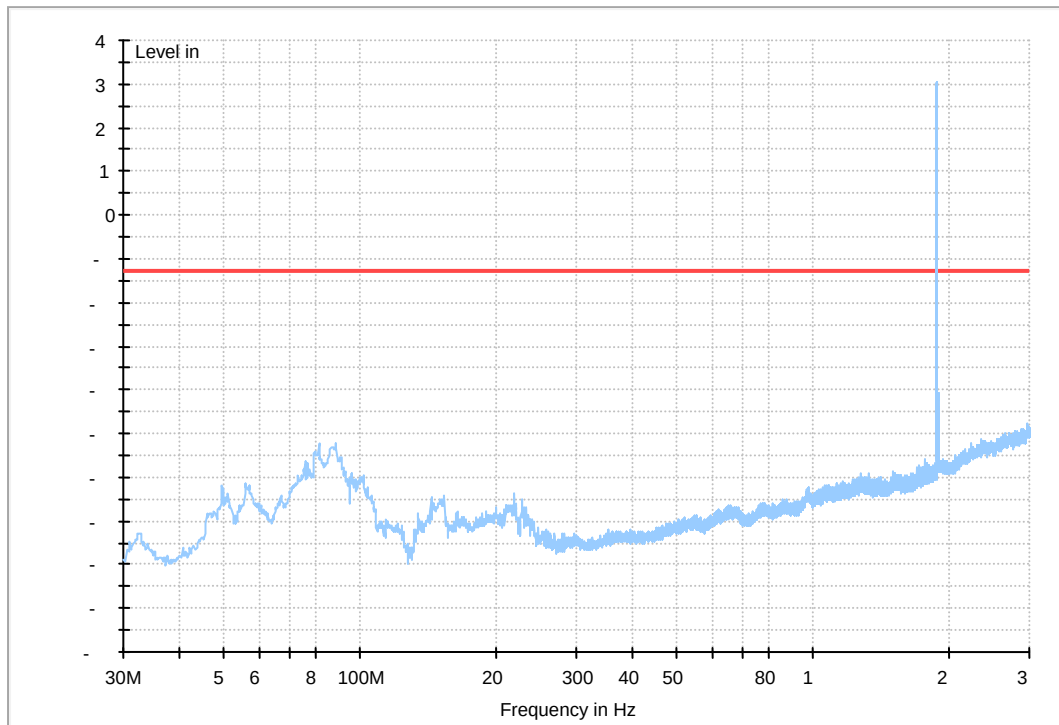
## GPRS1900

Traffic Mode (9kHz-30MHz)



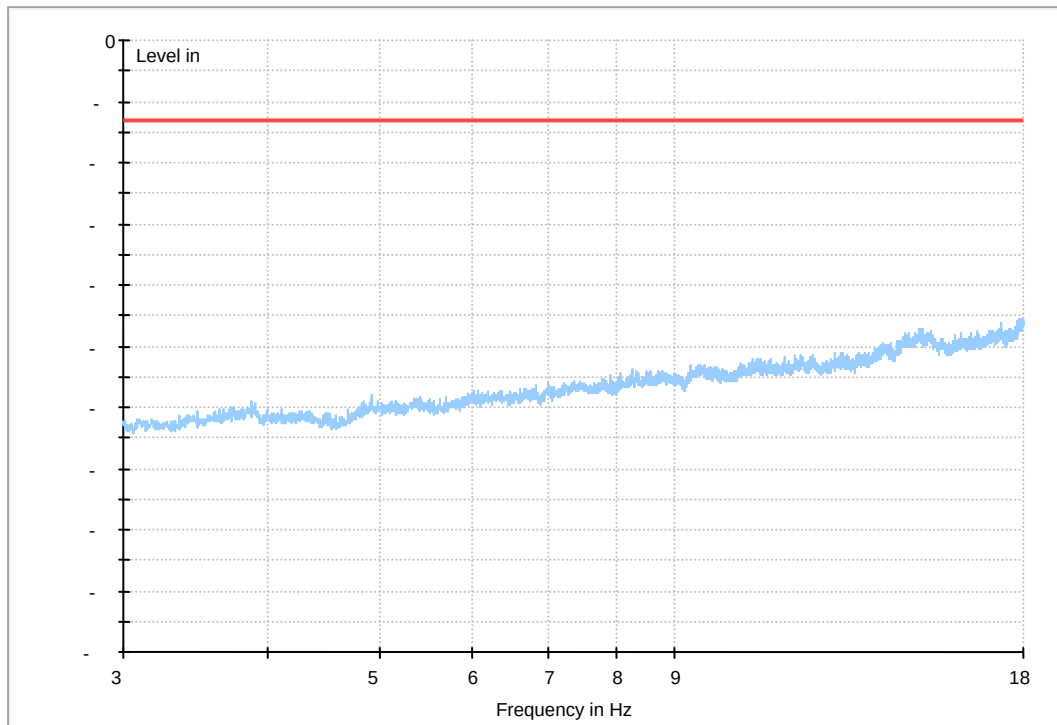


## Traffic Mode (30MHz-3GHz)



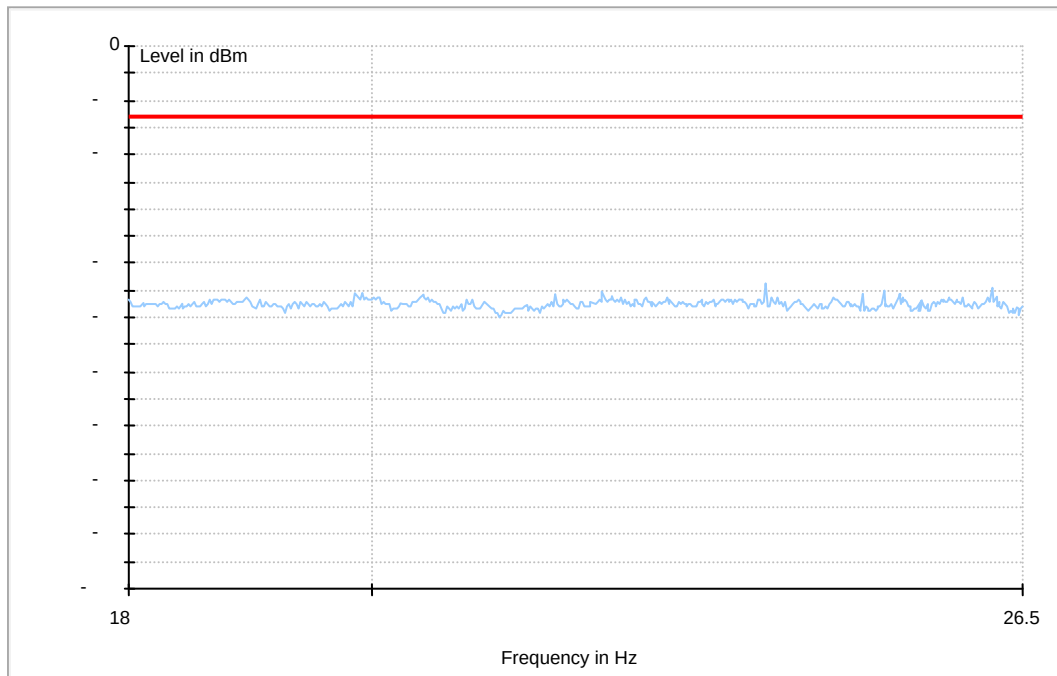


## Traffic Mode (3GHz-18GHz)





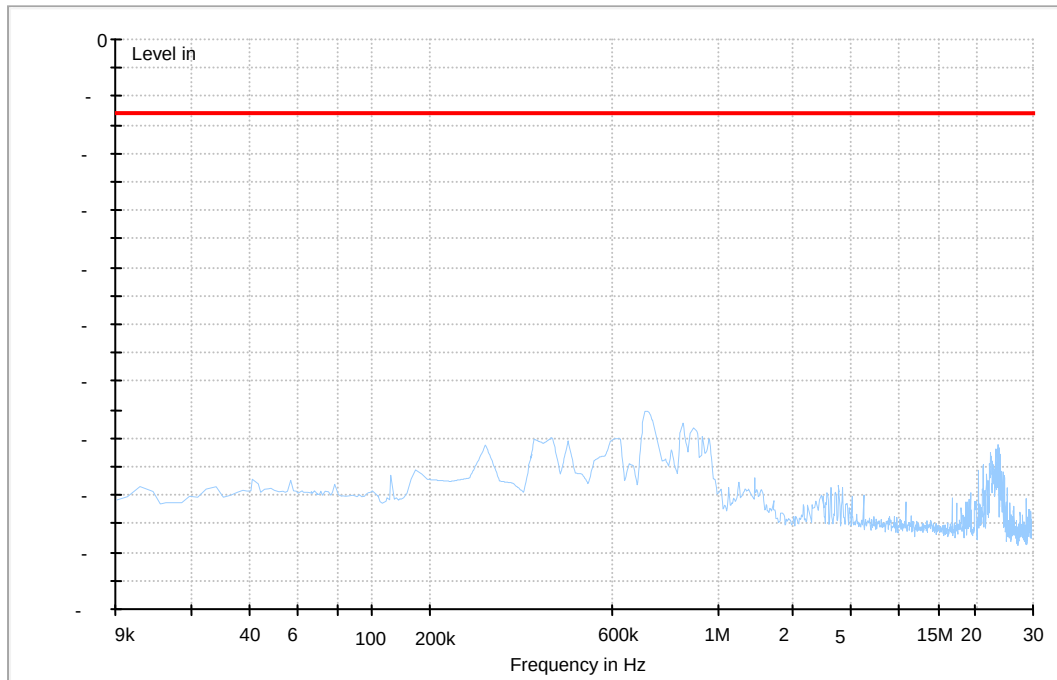
## Traffic Mode (18GHz-26.5GHz)





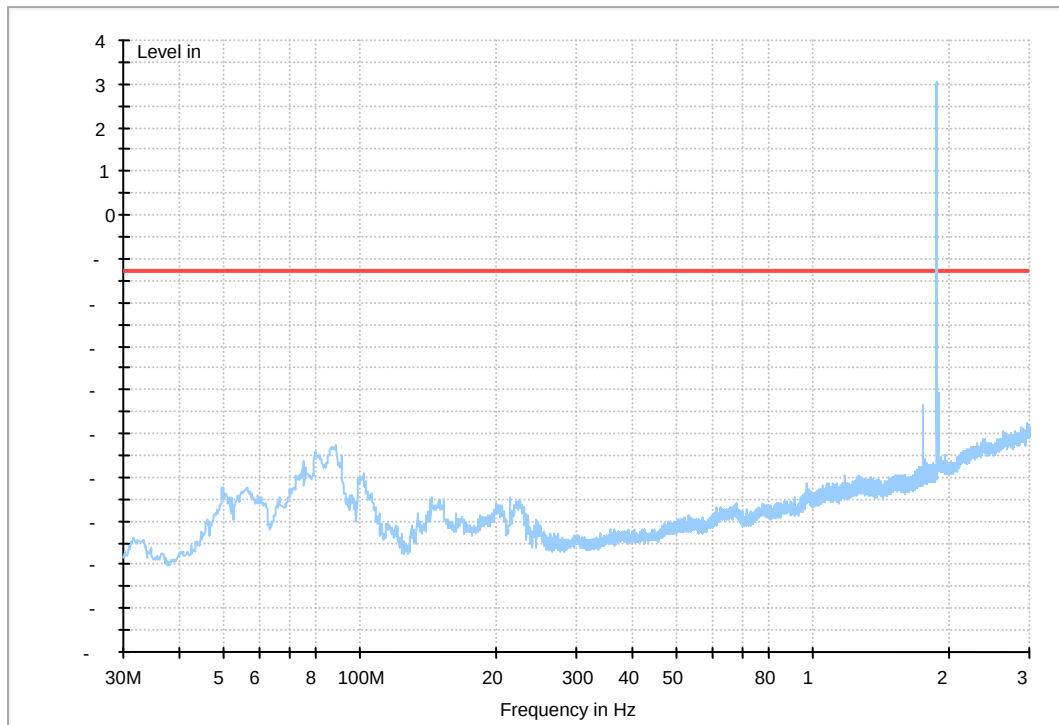
## EDGE 1900

Traffic Mode (9kHz-30MHz)



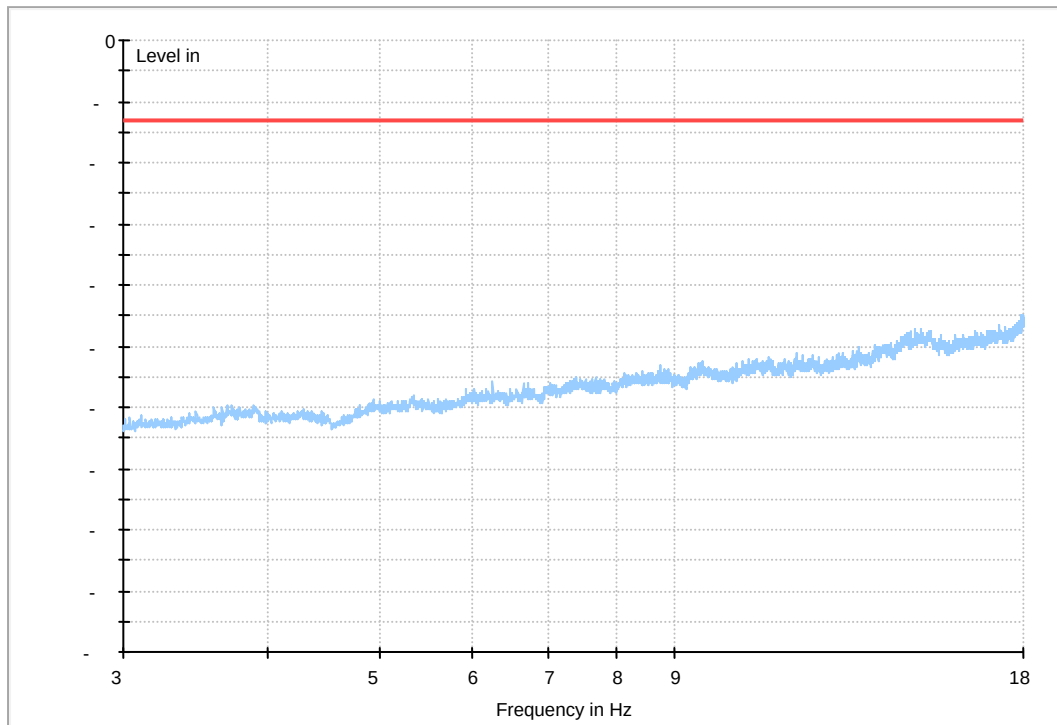


## Traffic Mode (30MHz-3GHz)



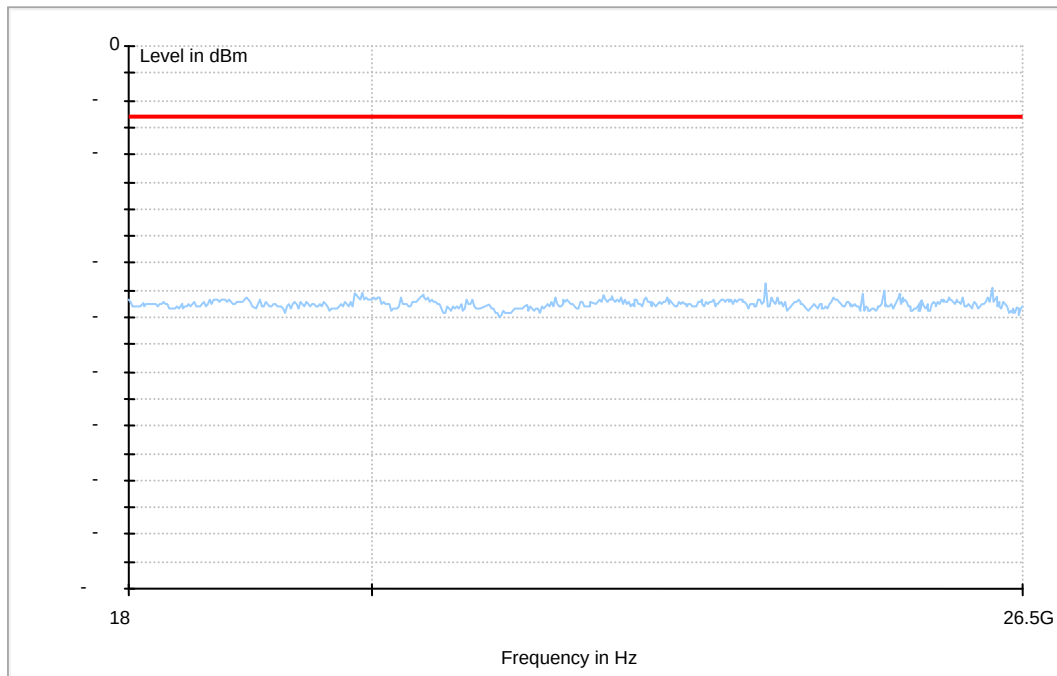


## Traffic Mode (3GHz-18GHz)





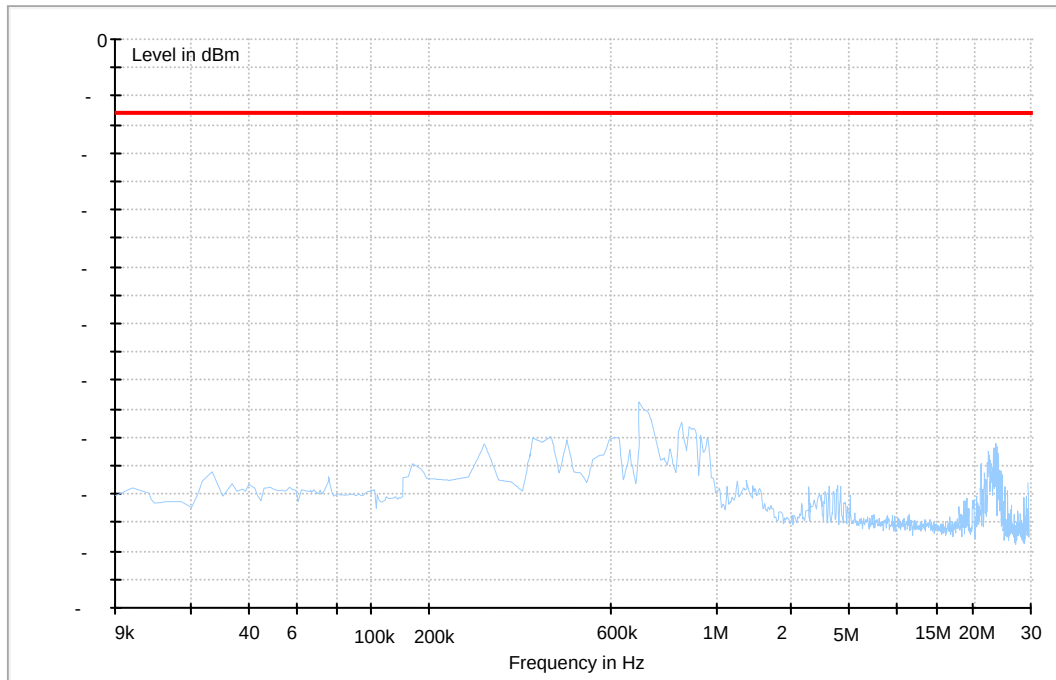
## Traffic Mode (18GHz-26.5GHz)





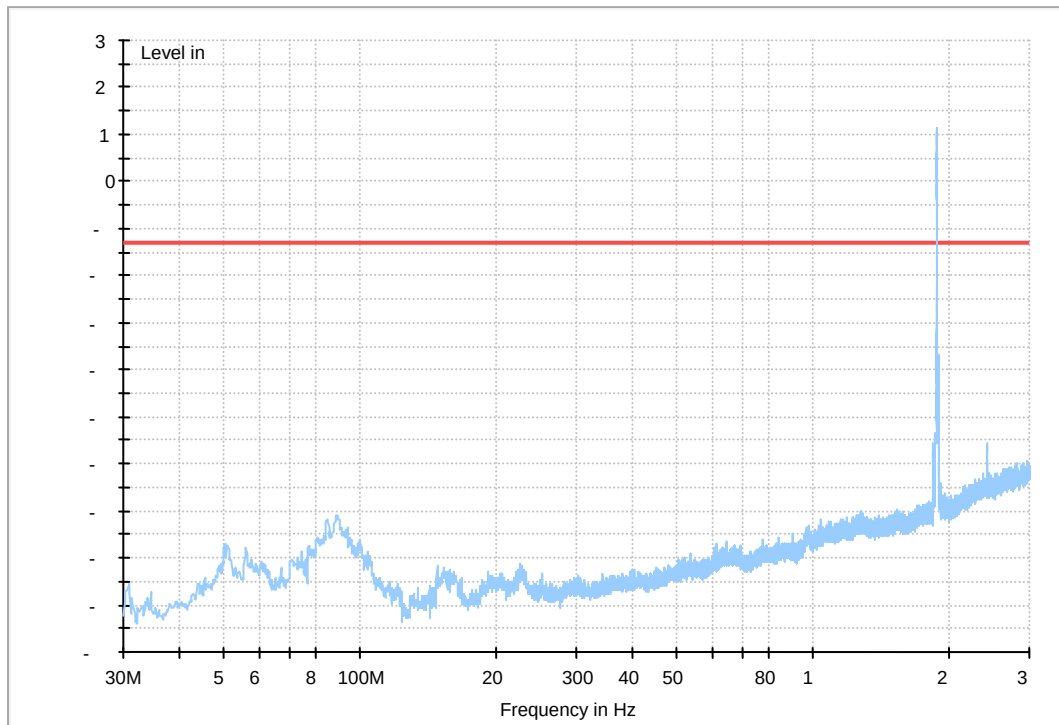
## WCDMA1900

Traffic Mode (9kHz-30MHz)



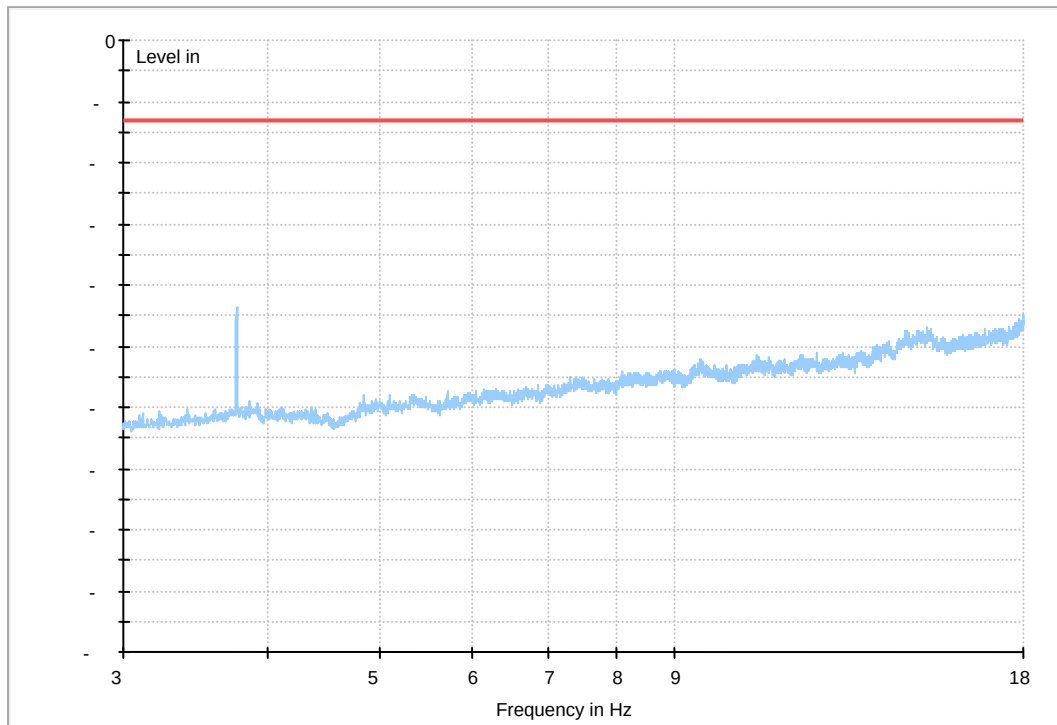


## Traffic Mode (30MHz-3GHz)



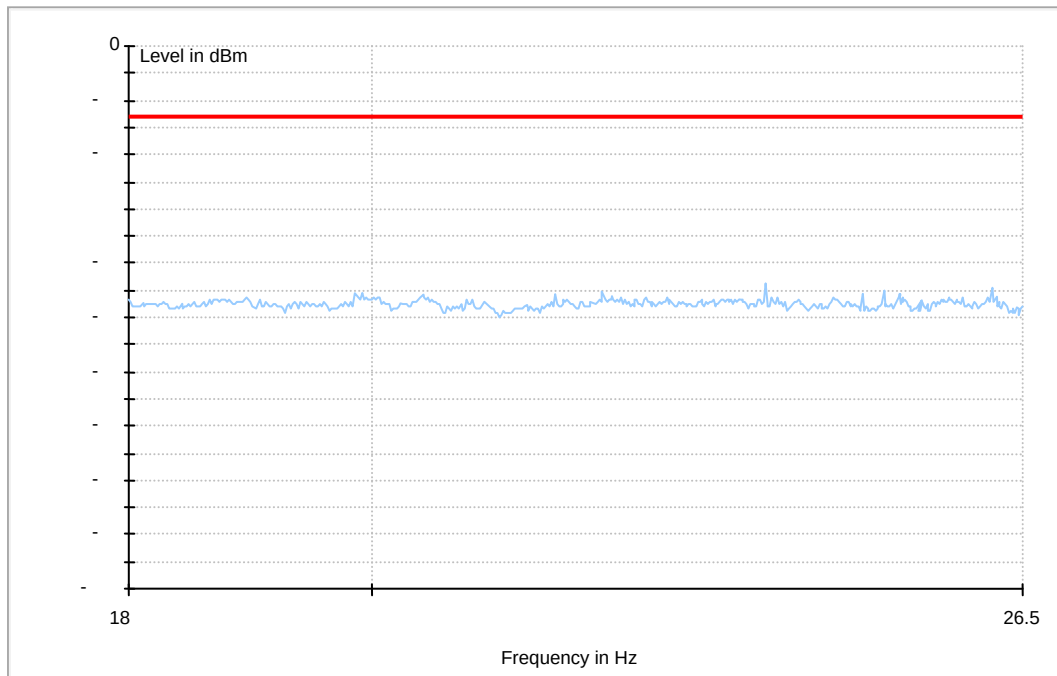


## Traffic Mode (3GHz-18GHz)





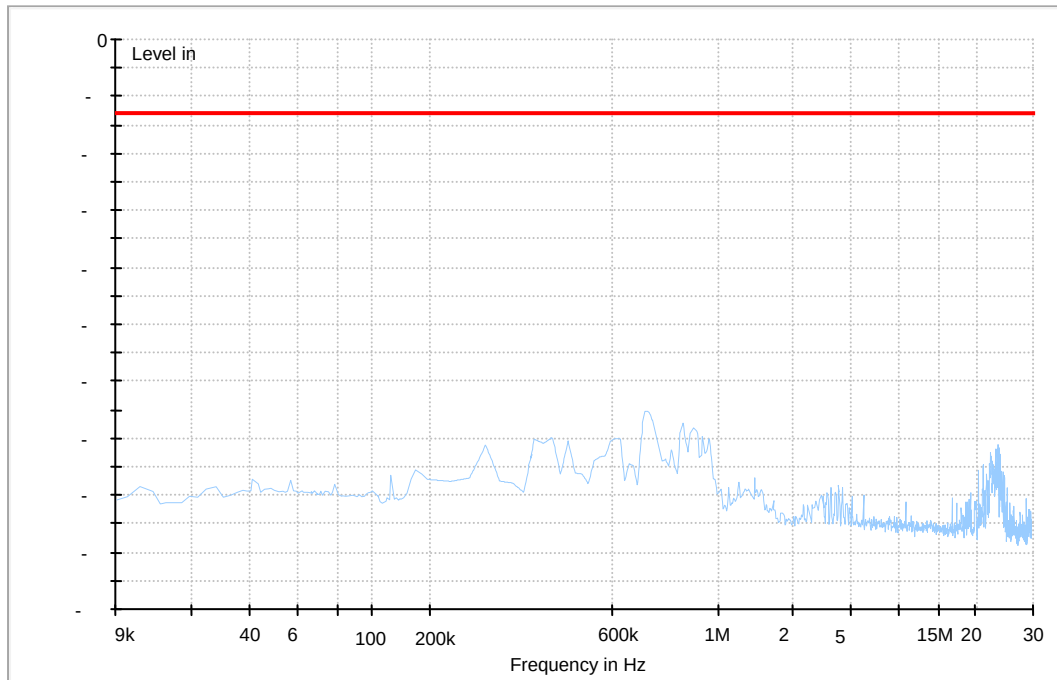
## Traffic Mode (18GHz-26.5GHz)





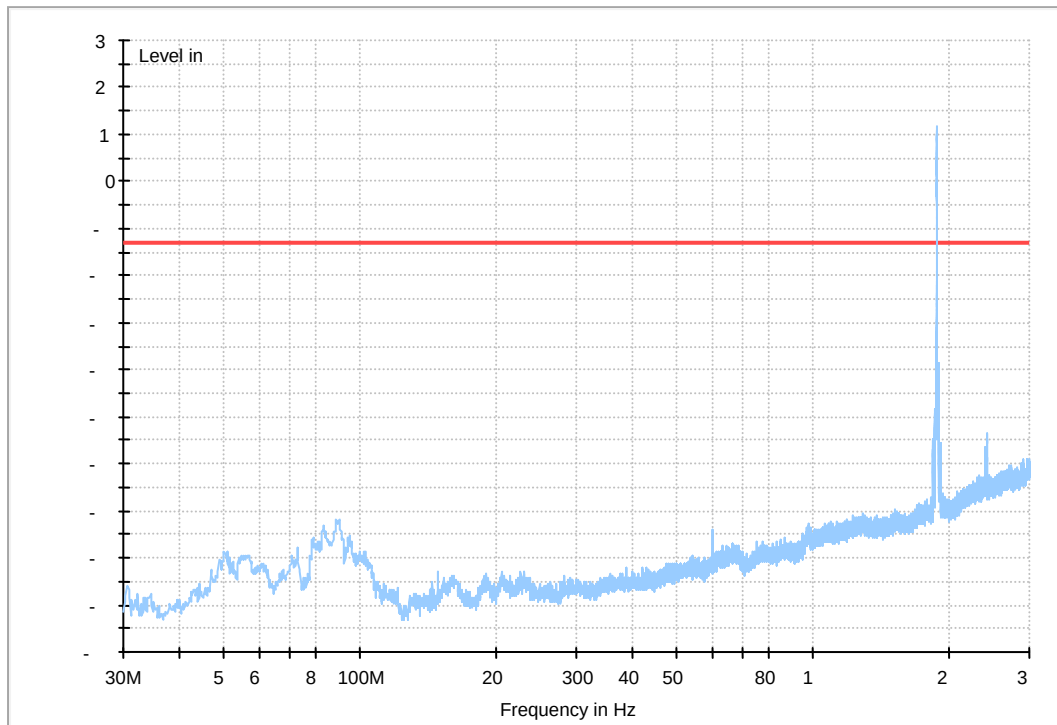
## HSDPA 1900

Traffic Mode (9kHz-30MHz)



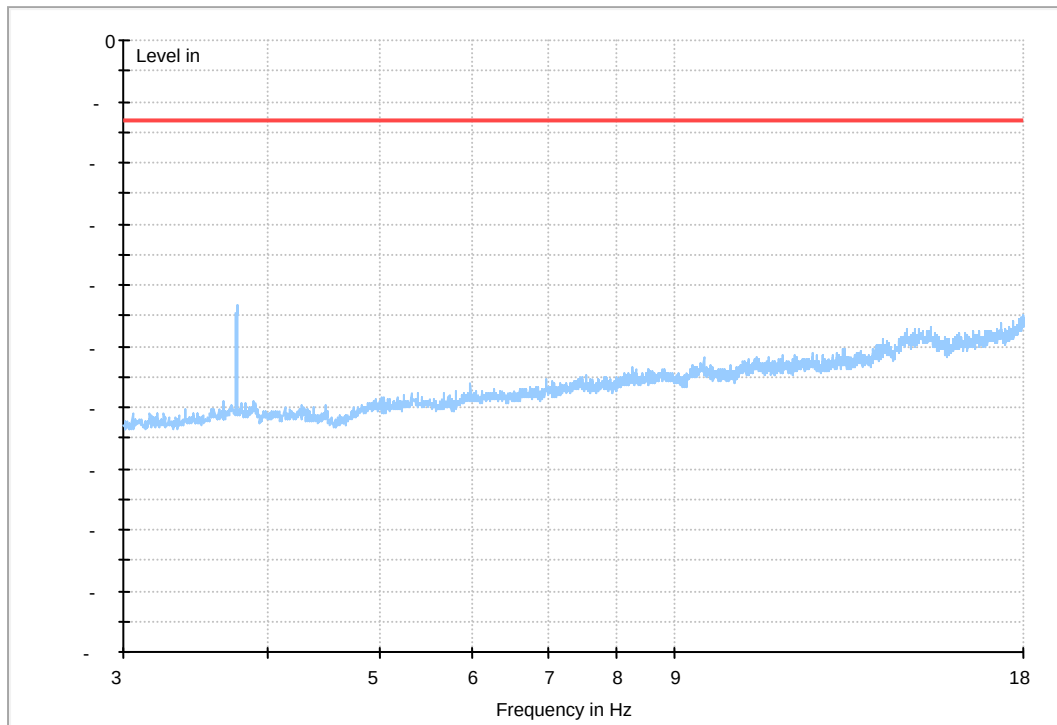


## Traffic Mode (30MHz-3GHz)



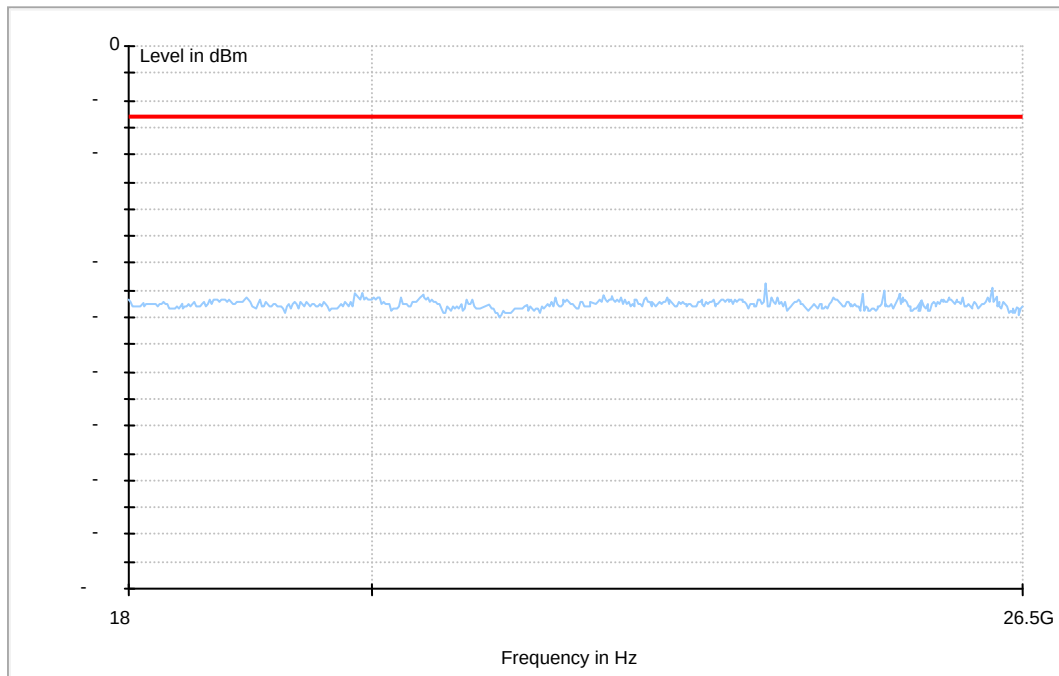


## Traffic Mode (3GHz-18GHz)





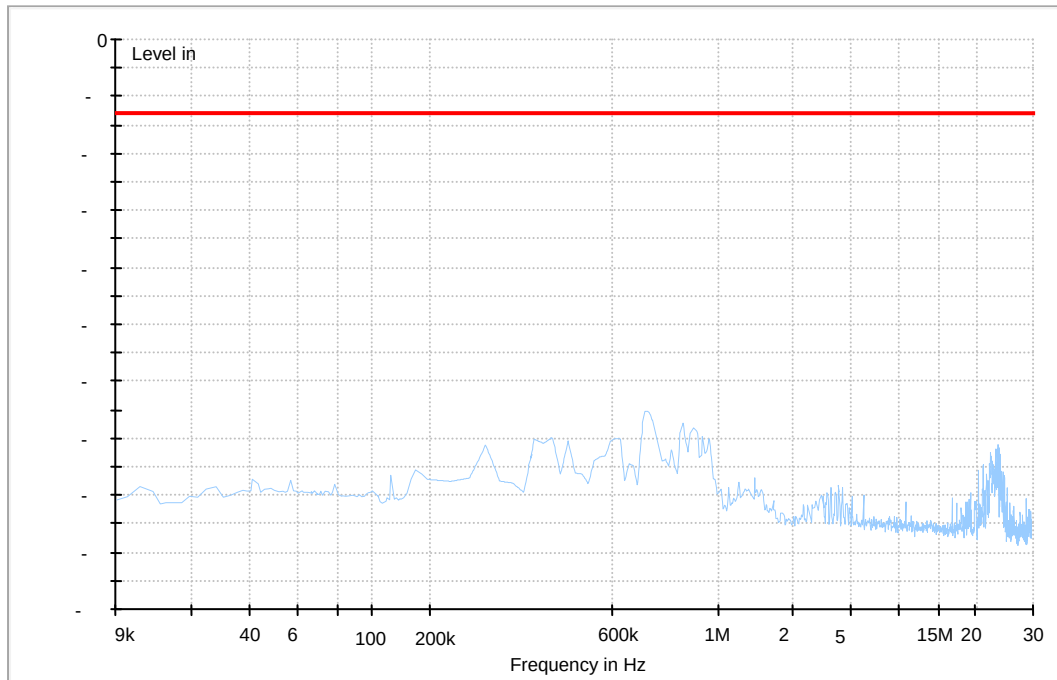
## Traffic Mode (18GHz-26.5GHz)





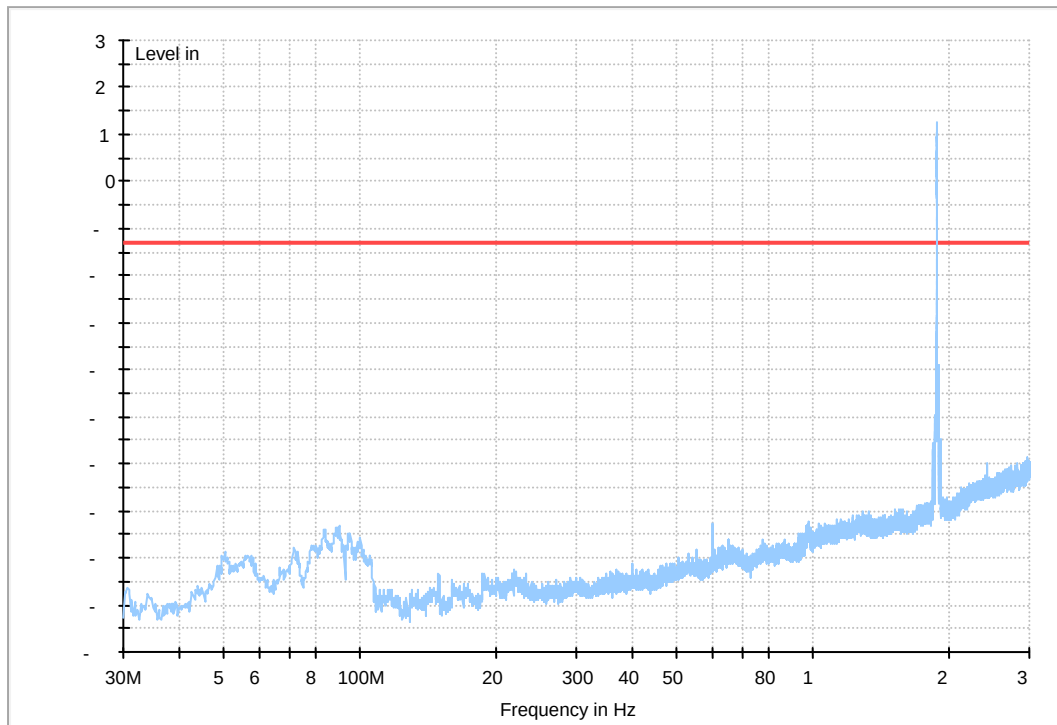
## HSUPA 1900

Traffic Mode (9kHz-30MHz)



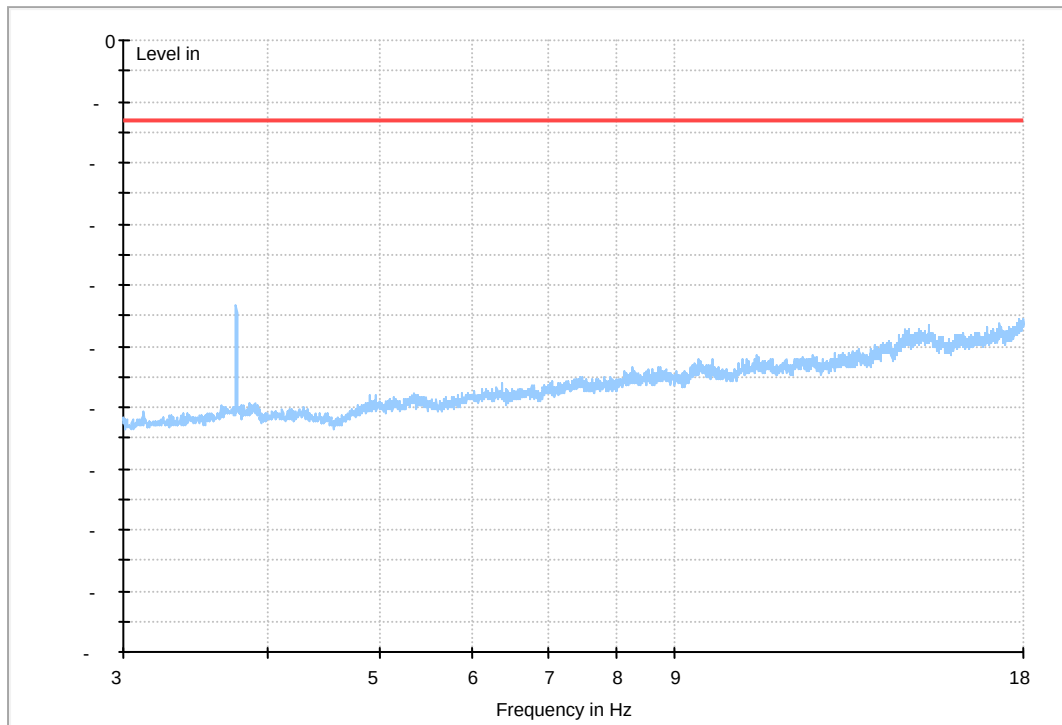


## Traffic Mode (30MHz-3GHz)



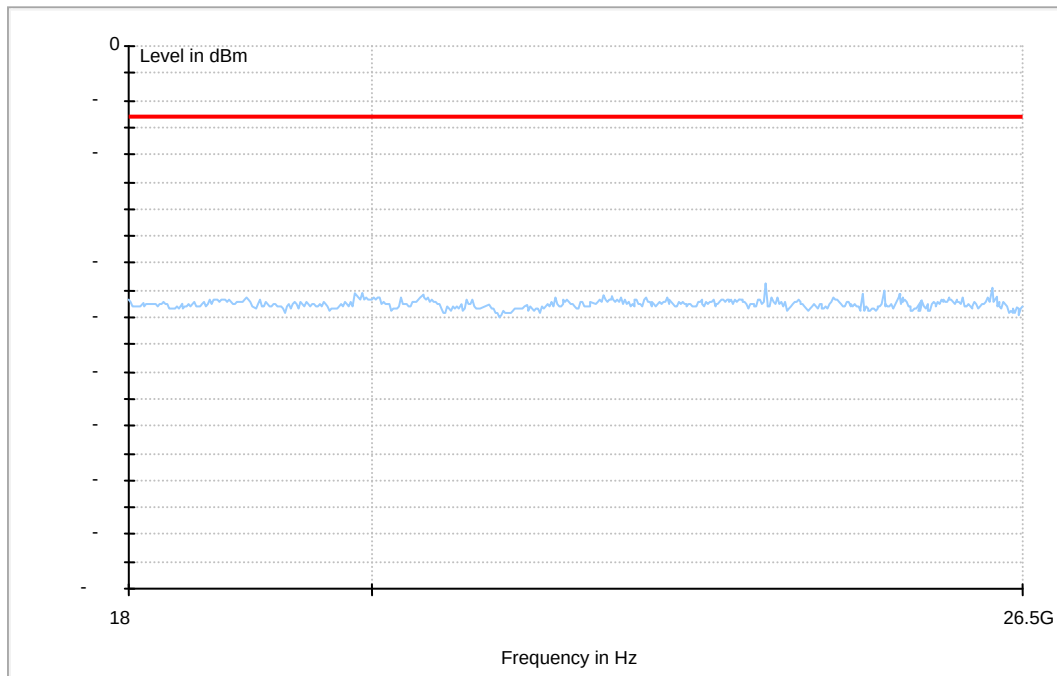


## Traffic Mode (3GHz-18GHz)





## Traffic Mode (18GHz-26.5GHz)



The END



## Appendix G

### Frequency Stability

According to FCC Part 2.1055& Part 24.235



## **Frequency Error vs. Temperature:**

| Test Mode | RF Ch. | Volt. | Temp.  | Freq. Error [Hz] | Freq. vs. rated [ppm] | Freq. vs. 20 °C [ppm] | Limit [ppm] | Verdict |
|-----------|--------|-------|--------|------------------|-----------------------|-----------------------|-------------|---------|
| TM 1      | M      | 100%  | -30 °C | 12               | 0.006383              | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | 17               | 0.009043              | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | -14              | -0.00745              | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | 10               | 0.005319              | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | 16               | 0.008511              | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | -13              | -0.00691              | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | -15              | -0.00798              | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | 13               | 0.006915              | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | -15              | -0.00798              | ---                   | ±2.5        | Pass    |
| TM 2      | M      | 100%  | -30 °C | 13               | 0.006915              | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | -14              | -0.00745              | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | 13               | 0.006915              | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | -15              | -0.00798              | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | 13               | 0.006915              | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | 14               | 0.007447              | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | -9               | -0.00479              | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | 12               | 0.006383              | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | 12               | 0.006383              | ---                   | ±2.5        | Pass    |
| TM 3      | M      | 100%  | -30 °C | 8                | 0.004255              | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | 12               | 0.006383              | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | -12              | -0.00638              | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | 11               | 0.005851              | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | -19              | -0.01011              | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | -18              | -0.00957              | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | -11              | -0.00585              | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | 12               | 0.006383              | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | -15              | -0.00798              | ---                   | ±2.5        | Pass    |



## Frequency Error vs. Voltage:

| Test Mode | RF Ch. | Temp. | Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Freq. vs. 20 °C [ppm] | Limit [ppm] | Verdict |
|-----------|--------|-------|-------|------------------|-----------------------|-----------------------|-------------|---------|
| TM 1      | M      | 20 °C | 85 %  | 16               | 0.008511              | ---                   | ±2.5        | Pass    |
|           |        |       | 100 % | 15               | 0.007979              | ---                   | ±2.5        | Pass    |
|           |        |       | 115 % | 10               | 0.005319              | ---                   | ±2.5        | Pass    |
| TM 2      | M      | 20 °C | 85 %  | -12              | -0.00638              | ---                   | ±2.5        | Pass    |
|           |        |       | 100 % | -16              | -0.00851              | ---                   | ±2.5        | Pass    |
|           |        |       | 115 % | 13               | 0.006915              | ---                   | ±2.5        | Pass    |
| TM 3      | M      | 20 °C | 85 %  | -18              | -0.00957              | ---                   | ±2.5        | Pass    |
|           |        |       | 100 % | 15               | 0.007979              | ---                   | ±2.5        | Pass    |
|           |        |       | 115 % | -15              | -0.00798              | ---                   | ±2.5        | Pass    |

The END