# FCC Part 22H & 24E & 27
# Measurement and Test Report

**For**

**Cyrus Technology GmbH**

**Hergelsbendenstrasse 49, 52080 Aachen, Germany**

**FCC ID: 2AI3KCS24NA**

| | |
|---|---|
| **FCC Rules:** | FCC Part 22H, FCC Part 24E, FCC Part 27 |
| **Product Description:** | Rugged Phone |
| **Tested Model:** | CS24NA |
| **Report No.:** | STR18088156I-1 |
| **Sample Receipt Date:** | 2018-07-31 |
| **Tested Date:** | 2018-08-01 to 2018-09-05 |
| **Issued Date:** | 2018-09-05 |
| **Tested By:** | Jason Su / Engineer |
| **Reviewed By:** | Silin Chen / EMC Manager |
| **Approved & Authorized By:** | Jandy So / PSQ Manager |

**Prepared By:**

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# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

**Client Information**

Applicant: Cyrus Technology GmbH
Address of applicant: Hergelsbendenstrasse 49, 52080 Aachen, Germany

Manufacturer: Cyrus Technology GmbH
Address of manufacturer: Hergelsbendenstrasse 49, 52080 Aachen, Germany

| **General Description of EUT:** | |
|---|---|
| Product Name: | Rugged Phone |
| Brand Name: | Cyrus |
| Model No.: | CS24NA |
| Adding Model(s): | / |
| Rated Voltage: | DC 3.85V by Battery |
| Battery: | 4500mAh |
| Adapter Model: | Model: Y733-20<br>Input:AC100-240V 50/60Hz 0.35A Output: DC5V 2000mA |
| Software Version: | CS24_V2.12_2018_01_17 |
| Hardware Version: | L808F-MB |
| Device Category: | Portable Device |
| | |
| *The EUT Main board support GSM850 /PCS1900, WCDMA Band 2/4/5, LTE Band 2/4/5/7/12 function. It is intended for speech, Multimedia Message Service (MMS) transmission. It is equipped with GPRS/EDGE class 12 for GSM850/PCS1900, GPS, FM, Bluetooth and Wi-Fi functions. For more information see the following datasheet* | |
| *Note: The test data is gathered from a production sample provided by the manufacturer.* | |

| Technical Characteristics of EUT: | |
|---|---|
| **2G** | |
| Support Networks: | GSM, GPRS, EDGE |
| Support Band: | GSM850/PCS1900 |
| Uplink Frequency: | GSM/GPRS/EDGE 850: 824~849MHz<br>GSM/GPRS/EDGE 1900: 1850~1910MHz |
| Downlink Frequency: | GSM/GPRS/EDGE 850: 869~894MHz<br>GSM/GPRS/EDGE 1900: 1930~1990MHz |
| Max RF Output Power: | GSM850: 32.40dBm, GSM1900: 29.89dBm<br>EDGE850: 27.94dBm, EDGE1900: 22.98dBm |
| Type of Emission: | GSM850: 247KGXW, GSM1900: 250KGXW<br>EDGE850: 249KG7W, EDGE1900: 248KG7W |
| Type of Modulation: | GMSK, 8PSK |
| Type of Antenna: | Integral Antenna |
| Antenna Gain: | GSM850: -1.30dBi; GSM1900: 1.30dBi |
| GPRS/EDGE Class: | Class 12 |
| **3G** | |
| Support Networks: | WCDMA, HSDPA, HSUPA |
| Support Band: | WCDMA Band 2, WCDMA Band 4, WCDMA Band 5 |
| Uplink Frequency: | WCDMA Band 2: 1850~1910MHz<br>WCDMA Band 4: 1710-1755 MHz<br>WCDMA Band 5: 824~849MHz |
| Downlink Frequency: | WCDMA Band 2: 1930~1990MHz<br>WCDMA Band 4: 2110-2155 MHz<br>WCDMA Band 5: 869~894MHz |
| RF Output Power: | WCDMA Band 2: 22.80dBm,<br>WCDMA Band 4: 22.81dBm,<br>WCDMA Band 5: 22.43dBm |
| Type of Emission: | WCDMA Band 2: 4M24F9W<br>WCDMA Band 4: 4M23F9W<br>WCDMA Band 5: 4M23F9W |
| Type of Modulation: | BPSK |
| Antenna Type: | Integral Antenna |
| Antenna Gain: | WCDMA Band 2: 1.30dBi, WCDMA Band 4: -0.60dBi,<br>WCDMA Band 5: -1.30dBi |

## 1.2 Test Standards

The following report is prepared on behalf of the Cyrus Technology GmbH in accordance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 22 subpart H and FCC Part 24 subpart E of the Federal Communication Commissions rules.

***Maintenance of compliance*** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI/TIA-603-D: 2010 and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 971168 D01 Power Meas License Digital Systems v03 shall be performed also.

## 1.4 Test Facility

**FCC – Registration No.: 125990**

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

**Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

| **Test Mode List** | | |
|---|---|---|
| Test Mode | Description | Remark |
| TM1 | GSM 850 | Low, Middle, High Channels |
| TM2 | GPRS 850 | Low, Middle, High Channels |
| TM3 | EDGE 850 | Low, Middle, High Channels |
| TM4 | GSM 1900 | Low, Middle, High Channels |
| TM5 | GPRS 1900 | Low, Middle, High Channels |
| TM6 | EDGE 1900 | Low, Middle, High Channels |
| TM7 | WCDMA Band 5 | Low, Middle, High Channels |
| TM8 | HSDPA Band 5 | Low, Middle, High Channels |
| TM9 | HSUPA Band 5 | Low, Middle, High Channels |
| TM10 | WCDMA Band 4 | Low, Middle, High Channels |
| TM11 | HSDPA Band 4 | Low, Middle, High Channels |
| TM12 | HSUPA Band 4 | Low, Middle, High Channels |
| TM13 | WCDMA Band 2 | Low, Middle, High Channels |
| TM14 | HSDPA Band 2 | Low, Middle, High Channels |
| TM15 | HSUPA Band 2 | Low, Middle, High Channels |

| Testing Configure | | | |
|---|---|---|---|
| Support Band | Support Standard | Channel Frequency | Channel Number |
| GSM 850 | GSM/GPRS/EDGE | 824.2 MHz | 128 |
| | | 836.6 MHz | 190 |
| | | 848.8 MHz | 251 |
| PCS 1900 | GSM/GPRS/EDGE | 1850.2 MHz | 512 |
| | | 1880.0 MHz | 661 |
| | | 1909.8 MHz | 810 |
| WCDMA Band 5 | WCDMA/HSDPA/HSUPA | 826.4 MHz | 4132 |
| | | 836.6 MHz | 4183 |
| | | 846.6 MHz | 4233 |
| WCDMA Band 4 | WCDMA/HSDPA/HSUPA | 1712.4 MHz | 4132 |
| | | 1732.4 MHz | 4183 |
| | | 1752.6 MHz | 4233 |
| WCDMA Band 2 | WCDMA/HSDPA/HSUPA | 1852.4 MHz | 9262 |
| | | 1880.0 MHz | 9400 |
| | | 1907.6 MHz | 9538 |
| Note: the transmitter has been tested on the communications mode of GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA compliance test and record the worst case. | | | |

EUT Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|---|---|---|---|
| USB-C Cable | 1.0 | Unshielded | Without Core |
| Earphone | 1.2 | Unshielded | Without Core |

Auxiliary Equipment List and Details

| Description | Manufacturer | Model | Serial Number |
|---|---|---|---|
| / | / | / | / |

Special Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|---|---|---|---|
| / | / | / | / |

## 1.6 Measurement Uncertainty

| Measurement uncertainty | | |
|---|---|---|
| Parameter | Conditions | Uncertainty |
| RF Output Power | Conducted | ±0.42dB |
| Occupied Bandwidth | Conducted | ±1.5% |
| Frequency Stability | Conducted | 2.3% |
| Transmitter Spurious Emissions | Conducted | ±0.42dB |
| Transmitter Spurious Emissions | Radiated | 30-200MHz ±4.52dB |
| | | 0.2-1GHz ±5.56dB |
| | | 1-6GHz ±3.84dB |
| | | 6-18GHz ±3.92dB |

## 1.7 Test Equipment List and Details

| No. | Description | Manufacturer | Model | Serial No. | Cal Date | Due. Date |
|---|---|---|---|---|---|---|
| SEMT-1075 | Communication Tester | Rohde & Schwarz | CMW500 | 148650 | 2018-05-22 | 2019-05-21 |
| SEMT-1063 | GSM Tester | Rohde & Schwarz | CMU200 | 114403 | 2018-05-22 | 2019-05-21 |
| SEMT-1072 | Spectrum Analyzer | Agilent | E4407B | MY41440400 | 2018-05-22 | 2019-05-21 |
| SEMT-1079 | Spectrum Analyzer | Agilent | N9020A | US47140102 | 2018-05-22 | 2019-05-21 |
| SEMT-1080 | Signal Generator | Agilent | 83752A | 3610A01453 | 2018-05-22 | 2019-05-21 |
| SEMT-1081 | Vector Signal Generator | Agilent | N5182A | MY47070202 | 2018-05-22 | 2019-05-21 |
| SEMT-1028 | Power Divider | Weinschel | 1506A | PM204 | 2018-05-22 | 2019-05-21 |
| SEMT-1082 | Power Divider | RF-Lambda | RFLT4W5M18G | 14110400027 | 2018-05-22 | 2019-05-21 |
| SEMT-1031 | Spectrum Analyzer | Rohde & Schwarz | FSP30 | 836079/035 | 2018-05-22 | 2019-05-21 |
| SEMT-1007 | EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2018-05-22 | 2019-05-21 |
| SEMT-1008 | Amplifier | Agilent | 8447F | 3113A06717 | 2018-05-22 | 2019-05-21 |
| SEMT-1043 | Amplifier | C&D | PAP-1G18 | 2002 | 2018-05-22 | 2019-05-21 |
| SEMT-1069 | Loop Antenna | Schwarz beck | FMZB 1516 | 9773 | 2017-06-08 | 2020-06-07 |
| SEMT-1068 | Broadband Antenna | Schwarz beck | VULB9163 | 9163-333 | 2017-06-08 | 2020-06-07 |
| SEMT-1042 | Horn Antenna | ETS | 3117 | 00086197 | 2017-06-08 | 2020-06-07 |
| SEMT-1121 | Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170582 | 2017-06-08 | 2020-06-07 |
| SEMT-1168 | Pre-amplifier | Direction Systems Inc. | PAP-0126 | 14141-12838 | 2018-05-22 | 2019-05-21 |
| SEMT-1169 | Pre-amplifier | Direction | PAP-2640 | 14145-14153 | 2018-05-22 | 2019-05-21 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Systems Inc. | | | | |
| SEMT-1163 | Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100612 | 2018-05-22 | 2019-05-21 |
| SEMT-1170 | DRG Horn Antenna | A.H. SYSTEMS | SAS-574 | 571 | 2018-03-19 | 2021-03-18 |
| SEMT-1166 | Power Limiter | Agilent | N9356B | MY45450376 | 2018-05-22 | 2019-05-21 |
| SEMT-1048 | RF Limiter | ATTEN | AT-BSF-2400~2500 | / | 2018-05-22 | 2019-05-21 |
| SEMT-1076 | RF Switcher | Top Precision | RCS03-A2 | / | 2018-05-22 | 2019-05-21 |
| SEMT-C001 | Cable | Zheng DI | LL142-07-07-10M(A) | / | 2018-03-19 | 2019-03-18 |
| SEMT-C002 | Cable | Zheng DI | ZT40-2.92J-2.92J-6M | / | 2018-03-19 | 2019-03-18 |
| SEMT-C003 | Cable | Zheng DI | ZT40-2.92J-2.92J-2.5M | / | 2018-03-19 | 2019-03-18 |
| SEMT-C004 | Cable | Zheng DI | 2M0RFC | / | 2018-03-19 | 2019-03-18 |
| SEMT-C005 | Cable | Zheng DI | 1M0RFC | / | 2018-03-19 | 2019-03-18 |
| SEMT-C006 | Cable | Zheng DI | 1M0RFC | / | 2018-03-19 | 2019-03-18 |

# 2. SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test Item | Result |
|---|---|---|
| § 1.1307, § 2.1093 | RF Exposure | Compliant |
| § 22.913 (a), § 24.232 (c), §27.50(d) | RF Output Power | Compliant |
| § 24.51, § 27.50 | Peak-to-average Ratio (PAR) of Transmitter | Compliant |
| § 22.917 (b), § 24.238 (b), § 27.53 | Emission Bandwidth | Compliant |
| § 22.917 (a), § 24.238 (a), § 27.53(h) | Spurious Emissions at Antenna Terminal | Compliant |
| § 22.917 (a), § 24.238 (a), § 27.53(h) | Spurious Radiation Emissions | Compliant |
| § 22.917 (a), § 24.238 (a), § 27.53(h) | Out of Band Emissions | Compliant |
| § 22.355, § 24.235, § 27.54 | Frequency Stability | Compliant |

# 3. RF Exposure

## 3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

## 3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR report.

# 4. RF Output Power

## 4.1 Standard Applicable

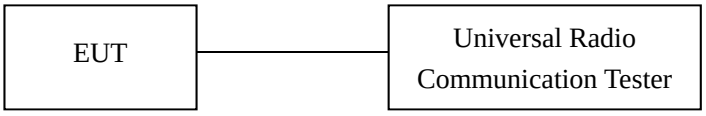
According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

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

According to §27.50(d)(4), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

## 4.2 Test Procedure

Conducted output power test method:




Radiated power test method:

1.The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.

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

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

4. 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.

## 4.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23 °C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

## 4.4 Summary of Test Results/Plots

**Max. Radiated Power**

ERP For GSM Mode GSM850

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 824.2 | 29.56 | 1.5 | 0 | H | 1.5 | 0 | 28.06 | 38.45 |
| 824.2 | 31.08 | 1.5 | 0 | V | 1.5 | 0 | 29.58 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.4 | 31.91 | 1.5 | 0 | H | 1.5 | 0 | 30.41 | 38.45 |
| 836.4 | 31.12 | 1.5 | 0 | V | 1.5 | 0 | 29.62 | 38.45 |
| High Channel | | | | | | | | |
| 848.8 | 30.54 | 1.5 | 0 | H | 1.5 | 0 | 29.04 | 38.45 |
| 848.8 | 30.77 | 1.5 | 0 | V | 1.5 | 0 | 29.27 | 38.45 |

EIRP For GSM Mode PCS1900

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1850.2 | 20.63 | 1.5 | 0 | H | 1.9 | 7.7 | 26.43 | 33.00 |
| 1850.2 | 21.28 | 1.5 | 0 | V | 1.9 | 7.7 | 27.08 | 33.00 |
| Middle Channel | | | | | | | | |
| 1880.0 | 22.52 | 1.5 | 0 | H | 1.9 | 7.7 | 28.32 | 33.00 |
| 1880.0 | 21.84 | 1.5 | 0 | V | 1.9 | 7.7 | 27.64 | 33.00 |
| High Channel | | | | | | | | |
| 1909.8 | 22.44 | 1.5 | 0 | H | 1.9 | 7.7 | 28.24 | 33.00 |
| 1909.8 | 22.66 | 1.5 | 0 | V | 1.9 | 7.7 | 28.46 | 33.00 |

ERP For GPRS Mode GSM850

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 824.2 | 30.09 | 1.5 | 0 | H | 1.5 | 0 | 28.59 | 38.45 |
| 824.2 | 31.31 | 1.5 | 0 | V | 1.5 | 0 | 29.81 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.6 | 29.42 | 1.5 | 0 | H | 1.5 | 0 | 27.92 | 38.45 |
| 836.6 | 31.94 | 1.5 | 0 | V | 1.5 | 0 | 30.44 | 38.45 |
| High Channel | | | | | | | | |
| 848.8 | 29.66 | 1.5 | 0 | H | 1.5 | 0 | 28.16 | 38.45 |
| 848.8 | 31.11 | 1.5 | 0 | V | 1.5 | 0 | 29.61 | 38.45 |

EIRP For GPRS Mode PCS1900

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1850.2 | 21.55 | 1.5 | 0 | H | 1.9 | 7.7 | 27.35 | 33.00 |
| 1850.2 | 22 | 1.5 | 0 | V | 1.9 | 7.7 | 27.8 | 33.00 |
| Middle Channel | | | | | | | | |
| 1880.0 | 22.15 | 1.5 | 0 | H | 1.9 | 7.7 | 27.95 | 33.00 |
| 1880.0 | 22.41 | 1.5 | 0 | V | 1.9 | 7.7 | 28.21 | 33.00 |
| High Channel | | | | | | | | |
| 1909.8 | 23.46 | 1.5 | 0 | H | 1.9 | 7.7 | 29.26 | 33.00 |
| 1909.8 | 21.82 | 1.5 | 0 | V | 1.9 | 7.7 | 27.62 | 33.00 |

ERP For EDGE Mode GSM850

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 824.2 | 27.08 | 1.5 | 0 | H | 1.5 | 0 | 25.58 | 38.45 |
| 824.2 | 25.75 | 1.5 | 0 | V | 1.5 | 0 | 24.25 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.6 | 26.55 | 1.5 | 0 | H | 1.5 | 0 | 25.05 | 38.45 |
| 836.6 | 27.09 | 1.5 | 0 | V | 1.5 | 0 | 25.59 | 38.45 |
| High Channel | | | | | | | | |
| 848.8 | 25.8 | 1.5 | 0 | H | 1.5 | 0 | 24.3 | 38.45 |
| 848.8 | 27.47 | 1.5 | 0 | V | 1.5 | 0 | 25.97 | 38.45 |

EIRP For EDGE Mode PCS1900

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1850.2 | 16.43 | 1.5 | 0 | H | 1.9 | 7.7 | 22.23 | 33.00 |
| 1850.2 | 18 | 1.5 | 0 | V | 1.9 | 7.7 | 23.8 | 33.00 |
| Middle Channel | | | | | | | | |
| 1880.0 | 16.24 | 1.5 | 0 | H | 1.9 | 7.7 | 22.04 | 33.00 |
| 1880.0 | 16.56 | 1.5 | 0 | V | 1.9 | 7.7 | 22.36 | 33.00 |
| High Channel | | | | | | | | |
| 1909.8 | 17.49 | 1.5 | 0 | H | 1.9 | 7.7 | 22.75 | 33.00 |
| 1909.8 | 16.8 | 1.5 | 0 | V | 1.9 | 7.7 | 21.95 | 33.00 |

ERP For WCDMA Mode Band 5

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dBd | dBm | dBm |
| Low Channel | | | | | | | | |
| 826.4 | 23.78 | 1.5 | 0 | H | 1.5 | 0 | 22.28 | 38.45 |
| 826.4 | 22.67 | 1.5 | 0 | V | 1.5 | 0 | 21.17 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.6 | 23.15 | 1.5 | 0 | H | 1.5 | 0 | 21.65 | 38.45 |
| 836.6 | 22.69 | 1.5 | 0 | V | 1.5 | 0 | 21.19 | 38.45 |
| High Channel | | | | | | | | |
| 846.6 | 23.78 | 1.5 | 0 | H | 1.5 | 0 | 22.28 | 38.45 |
| 846.6 | 23.32 | 1.5 | 0 | V | 1.5 | 0 | 21.82 | 38.45 |

ERP For HSDPA Mode Band 5

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dBd | dBm | dBm |
| Low Channel | | | | | | | | |
| 826.4 | 21.56 | 1.5 | 0 | H | 1.5 | 0 | 20.06 | 38.45 |
| 826.4 | 21.24 | 1.5 | 0 | V | 1.5 | 0 | 19.74 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.6 | 21.77 | 1.5 | 0 | H | 1.5 | 0 | 20.27 | 38.45 |
| 836.6 | 20.57 | 1.5 | 0 | V | 1.5 | 0 | 19.07 | 38.45 |
| High Channel | | | | | | | | |
| 846.6 | 21.32 | 1.5 | 0 | H | 1.5 | 0 | 19.82 | 38.45 |
| 846.6 | 21.94 | 1.5 | 0 | V | 1.5 | 0 | 20.44 | 38.45 |

ERP For HSUPA Mode Band 5

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 22H Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dBd | dBm | dBm |
| Low Channel | | | | | | | | |
| 826.4 | 22.1 | 1.5 | 0 | H | 1.5 | 0 | 20.6 | 38.45 |
| 826.4 | 20.33 | 1.5 | 0 | V | 1.5 | 0 | 18.83 | 38.45 |
| Middle Channel | | | | | | | | |
| 836.6 | 21.48 | 1.5 | 0 | H | 1.5 | 0 | 19.98 | 38.45 |
| 836.6 | 21.39 | 1.5 | 0 | V | 1.5 | 0 | 19.89 | 38.45 |
| High Channel | | | | | | | | |
| 846.6 | 22.04 | 1.5 | 0 | H | 1.5 | 0 | 20.54 | 38.45 |
| 846.6 | 21.98 | 1.5 | 0 | V | 1.5 | 0 | 20.48 | 38.45 |

EIRP For WCDMA Mode Band 4

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1712.4 | 15.58 | 1.5 | 0 | H | 1.8 | 7.7 | 21.48 | 30.00 |
| 1712.4 | 16.93 | 1.5 | 0 | V | 1.8 | 7.7 | 22.83 | 30.00 |
| Middle Channel | | | | | | | | |
| 1732.4 | 16.39 | 1.5 | 0 | H | 1.8 | 7.7 | 22.29 | 30.00 |
| 1732.4 | 16.69 | 1.5 | 0 | V | 1.8 | 7.7 | 22.59 | 30.00 |
| High Channel | | | | | | | | |
| 1752.6 | 16.97 | 1.5 | 0 | H | 1.8 | 7.7 | 22.87 | 30.00 |
| 1752.6 | 17.06 | 1.5 | 0 | V | 1.8 | 7.7 | 22.96 | 30.00 |

EIRP For HSDPA Mode Band 4

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1712.4 | 13.25 | 1.5 | 0 | H | 1.8 | 7.7 | 19.15 | 30.00 |
| 1712.4 | 14.41 | 1.5 | 0 | V | 1.8 | 7.7 | 20.31 | 30.00 |
| Middle Channel | | | | | | | | |
| 1732.4 | 14.58 | 1.5 | 0 | H | 1.8 | 7.7 | 20.48 | 30.00 |
| 1732.4 | 13.05 | 1.5 | 0 | V | 1.8 | 7.7 | 18.95 | 30.00 |
| High Channel | | | | | | | | |
| 1752.6 | 14.05 | 1.5 | 0 | H | 1.8 | 7.7 | 19.95 | 30.00 |
| 1752.6 | 13.85 | 1.5 | 0 | V | 1.8 | 7.7 | 19.75 | 30.00 |

EIRP For HSUPA Mode Band 4

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1712.4 | 14.06 | 1.5 | 0 | H | 1.8 | 7.7 | 19.96 | 30.00 |
| 1712.4 | 13.3 | 1.5 | 0 | V | 1.8 | 7.7 | 19.2 | 30.00 |
| Middle Channel | | | | | | | | |
| 1732.4 | 13.35 | 1.5 | 0 | H | 1.8 | 7.7 | 19.25 | 30.00 |
| 1732.4 | 14 | 1.5 | 0 | V | 1.8 | 7.7 | 19.9 | 30.00 |
| High Channel | | | | | | | | |
| 1752.6 | 14.07 | 1.5 | 0 | H | 1.8 | 7.7 | 19.97 | 30.00 |
| 1752.6 | 14.47 | 1.5 | 0 | V | 1.8 | 7.7 | 20.37 | 30.00 |

EIRP For WCDMA Mode Band 2

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1852.4 | 15.41 | 1.5 | 0 | H | 1.9 | 7.7 | 21.21 | 33 |
| 1852.4 | 16.25 | 1.5 | 0 | V | 1.9 | 7.7 | 22.05 | 33 |
| Middle Channel | | | | | | | | |
| 1880.0 | 15.4 | 1.5 | 0 | H | 1.9 | 7.7 | 21.2 | 33 |
| 1880.0 | 15.66 | 1.5 | 0 | V | 1.9 | 7.7 | 21.46 | 33 |
| High Channel | | | | | | | | |
| 1907.6 | 16.86 | 1.5 | 0 | H | 1.9 | 7.7 | 22.66 | 33 |
| 1907.6 | 16.97 | 1.5 | 0 | V | 1.9 | 7.7 | 22.77 | 33 |

EIRP For HSDPA Mode Band 2

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1852.4 | 13.17 | 1.5 | 0 | H | 1.9 | 7.7 | 18.97 | 33 |
| 1852.4 | 14.55 | 1.5 | 0 | V | 1.9 | 7.7 | 20.35 | 33 |
| Middle Channel | | | | | | | | |
| 1880.0 | 13.74 | 1.5 | 0 | H | 1.9 | 7.7 | 19.54 | 33 |
| 1880.0 | 13.96 | 1.5 | 0 | V | 1.9 | 7.7 | 19.76 | 33 |
| High Channel | | | | | | | | |
| 1907.6 | 14.28 | 1.5 | 0 | H | 1.9 | 7.7 | 20.08 | 33 |
| 1907.6 | 14.22 | 1.5 | 0 | V | 1.9 | 7.7 | 20.02 | 33 |

EIRP For HSUPA Mode Band 2

| Frequency | Substitude SG | Height | Table | Polar | Cable loss | Antenna Gain | Result | FCC Part 24E Limit |
|---|---|---|---|---|---|---|---|---|
| MHz | dBm | Meter | Degree | H / V | dB | dB | dBm | dBm |
| Low Channel | | | | | | | | |
| 1852.4 | 14.87 | 1.5 | 0 | H | 1.9 | 7.7 | 20.67 | 33 |
| 1852.4 | 14.38 | 1.5 | 0 | V | 1.9 | 7.7 | 20.18 | 33 |
| Middle Channel | | | | | | | | |
| 1880.0 | 14.33 | 1.5 | 0 | H | 1.9 | 7.7 | 20.13 | 33 |
| 1880.0 | 13.9 | 1.5 | 0 | V | 1.9 | 7.7 | 19.7 | 33 |
| High Channel | | | | | | | | |
| 1907.6 | 14.72 | 1.5 | 0 | H | 1.9 | 7.7 | 20.52 | 33 |
| 1907.6 | 14.78 | 1.5 | 0 | V | 1.9 | 7.7 | 20.58 | 33 |

Note: Result = Substitude - Cable loss + Antenna Gain

**Max. Conducted Output Power**

For Cellular Band (GSM850)

| Test Mode | Channel | Frequency (MHz) | Average Power (dBm) | FCC Part 22.913 Limit (dBm) |
|---|---|---|---|---|
| GSM | Low Channel | 824.2 | 32.35 | 38.45 |
| | Middle Channel | 836.6 | 32.21 | 38.45 |
| | High Channel | 848.8 | 32.08 | 38.45 |
| GPRS(1 Slot) | Low Channel | 824.2 | 32.40 | 38.45 |
| | Middle Channel | 836.6 | 32.29 | 38.45 |
| | High Channel | 848.8 | 32.16 | 38.45 |
| EDGE(1 Slot) | Low Channel | 824.2 | 27.94 | 38.45 |
| | Middle Channel | 836.6 | 27.88 | 38.45 |
| | High Channel | 848.8 | 27.74 | 38.45 |

For PCS Band (GSM1900)

| Test Mode | Channel | Frequency (MHz) | Average Power (dBm) | FCC Part 24.232 Limit (dBm) |
|---|---|---|---|---|
| GSM | Low Channel | 1850.2 | 29.55 | 33.0 |
| | Middle Channel | 1880.0 | 29.66 | 33.0 |
| | High Channel | 1909.8 | 29.63 | 33.0 |
| GPRS(1 Slot) | Low Channel | 1850.2 | 29.86 | 33.0 |
| | Middle Channel | 1880.0 | 29.89 | 33.0 |
| | High Channel | 1909.8 | 29.89 | 33.0 |
| EDGE(1 Slot) | Low Channel | 1850.2 | 22.98 | 33.0 |
| | Middle Channel | 1880.0 | 22.81 | 33.0 |
| | High Channel | 1909.8 | 22.69 | 33.0 |

For WCDMA Band 5

| Test Mode | Channel | Frequency (MHz) | Average Power (dBm) | FCC Part 22.913 Limit (dBm) |
|---|---|---|---|---|
| WCDMA | Low Channel | 826.4 | 22.32 | 38.45 |
| | Middle Channel | 836.6 | 22.43 | 38.45 |
| | High Channel | 846.6 | 22.29 | 38.45 |
| HSDPA | Low Channel | 826.4 | 21.54 | 38.45 |
| | Middle Channel | 836.6 | 21.59 | 38.45 |
| | High Channel | 846.6 | 21.42 | 38.45 |
| HSUPA | Low Channel | 826.4 | 21.49 | 38.45 |
| | Middle Channel | 836.6 | 21.55 | 38.45 |
| | High Channel | 846.6 | 21.40 | 38.45 |

For WCDMA Band 4

| Test Mode | Channel | Frequency (MHz) | Average Power (dBm) | FCC Part 22.913 Limit (dBm) |
|---|---|---|---|---|
| WCDMA | Low Channel | 1712.4 | 22.81 | 30.0 |
| | Middle Channel | 1733.4 | 22.68 | 30.0 |
| | High Channel | 1752.6 | 22.73 | 30.0 |
| HSDPA | Low Channel | 1712.4 | 21.82 | 30.0 |
| | Middle Channel | 1733.4 | 21.86 | 30.0 |
| | High Channel | 1752.6 | 21.89 | 30.0 |
| HSUPA | Low Channel | 1712.4 | 21.85 | 30.0 |
| | Middle Channel | 1733.4 | 21.87 | 30.0 |
| | High Channel | 1752.6 | 21.90 | 30.0 |

For WCDMA Band 2

| Test Mode | Channel | Frequency (MHz) | Average Power (dBm) | FCC Part 24.232 Limit (dBm) |
|---|---|---|---|---|
| WCDMA | Low Channel | 1852.4 | 22.56 | 33.00 |
| | Middle Channel | 1880.0 | 22.64 | 33.00 |
| | High Channel | 1907.6 | 22.80 | 33.00 |
| HSDPA | Low Channel | 1852.4 | 21.73 | 33.00 |
| | Middle Channel | 1880.0 | 21.79 | 33.00 |
| | High Channel | 1907.6 | 21.92 | 33.00 |
| HSUPA | Low Channel | 1852.4 | 21.75 | 33.00 |
| | Middle Channel | 1880.0 | 21.77 | 33.00 |
| | High Channel | 1907.6 | 22.03 | 33.00 |

# 5. Peak-to-average Ratio (PAR) of Transmitter

## 5.1 Standard Applicable

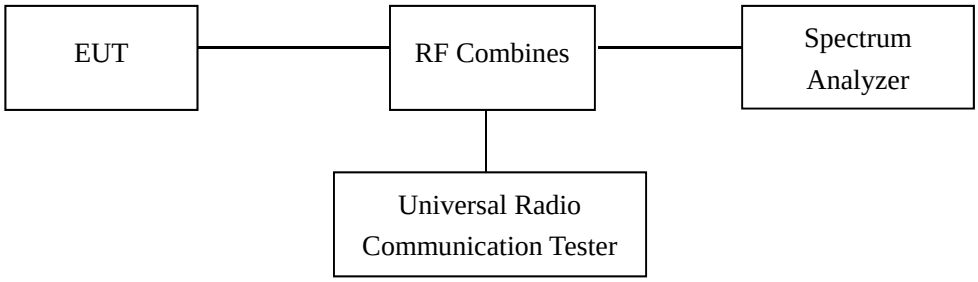
According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

## 5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:




## 5.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

## 5.4 Summary of Test Results

Only the worst case was selected to record

For PCS Band

| Test Mode | Channel | Frequency (MHz) | PAR (dB) | Limit (dB) |
|---|---|---|---|---|
| GSM | 512 | 1850.2 | 3.47 | 13 |
| GPRS(1 Slot) | 512 | 1850.2 | 4.58 | 13 |
| EDGE(1 Slot) | 512 | 1850.2 | 4.68 | 13 |

For WCDMA Band 2

| Test Mode | Channel | Frequency (MHz) | PAR (dB) | Limit (dB) |
|---|---|---|---|---|
| WCDMA | 9262 | 1880 | 4.32 | 13 |
| HSDPA | 9400 | 1880 | 5.02 | 13 |
| HSUPA | 9400 | 1880 | 4.65 | 13 |

# 6. Emission Bandwidth

## 6.1 Standard Applicable

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

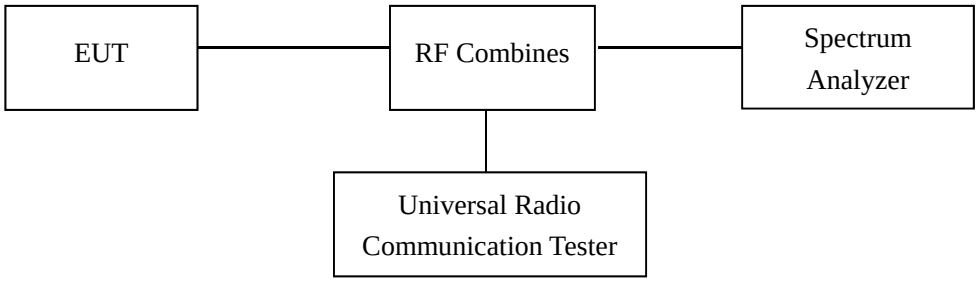
According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

## 6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:




## 6.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23 °C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

## 6.4 Summary of Test Results/Plots

For Cellular Band

| Test Mode | Channel | Frequency (MHz) | 99% Emission Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|---|---|---|---|---|
| GSM | 128 | 824.2 | 239.9147 | 306.033 |
| | 190 | 836.6 | 246.7675 | 329.600 |
| | 251 | 848.8 | 245.1137 | 308.995 |
| GPRS | 128 | 824.2 | 242.1124 | 321.023 |
| | 190 | 836.6 | 237.0717 | 321.842 |
| | 251 | 848.8 | 244.5735 | 309.506 |
| EDGE | 128 | 824.2 | 248.6910 | 326.454 |
| | 190 | 836.6 | 244.0931 | 320.192 |
| | 251 | 848.8 | 247.5310 | 321.313 |

For PCS Band

| Test Mode | Channel | Frequency (MHz) | 99% Emission Bandwidth (kHz) | 26 dB Emission Bandwidth (kHz) |
|---|---|---|---|---|
| GSM | 512 | 1850.2 | 246.6859 | 309.718 |
| | 661 | 1880.0 | 242.7402 | 313.565 |
| | 810 | 1909.8 | 250.1525 | 320.295 |
| GPRS | 512 | 1850.2 | 245.0195 | 305.734 |
| | 661 | 1880.0 | 241.0385 | 312.980 |
| | 810 | 1909.8 | 245.2551 | 308.182 |
| EDGE | 512 | 1850.2 | 244.6786 | 324.972 |
| | 661 | 1880.0 | 247.9252 | 318.175 |
| | 810 | 1909.8 | 244.9845 | 319.968 |

For Band 5

| Test Mode | Channel | Frequency (MHz) | 99% Emission Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---|---|---|---|---|
| WCDMA | 4132 | 826.4 | 4.2061 | 4.893 |
| | 4183 | 836.6 | 4.2177 | 4.870 |
| | 4233 | 846.6 | 4.1864 | 4.899 |
| HSDPA | 4132 | 826.4 | 4.1930 | 4.874 |
| | 4183 | 836.6 | 4.2183 | 4.900 |
| | 4233 | 846.6 | 4.2206 | 4.890 |
| HSUPA | 4132 | 826.4 | 4.2194 | 4.922 |
| | 4183 | 836.6 | 4.2326 | 4.819 |
| | 4233 | 846.6 | 4.2014 | 4.858 |

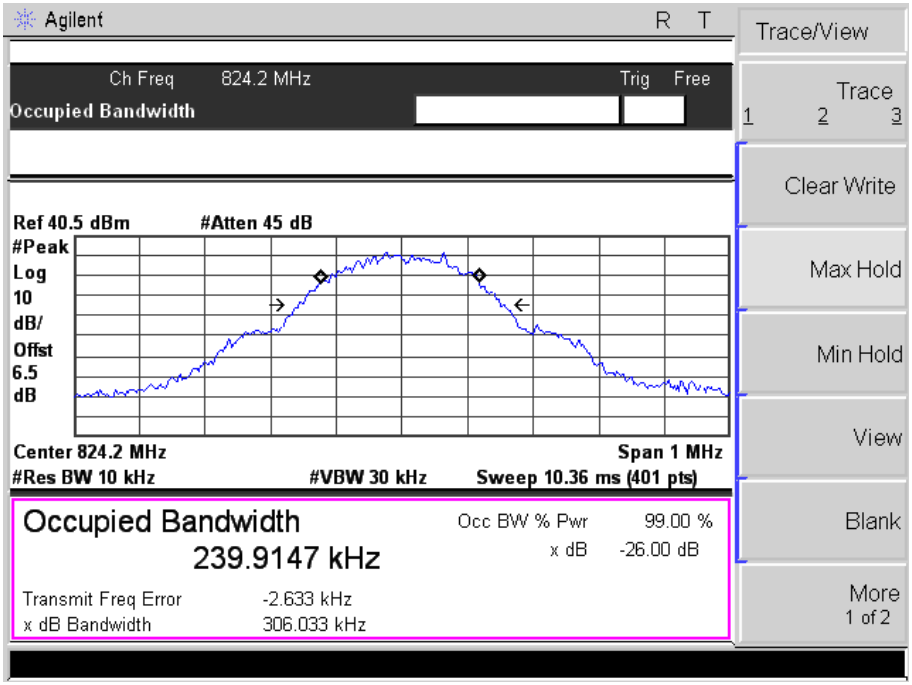
For Band 4

| Test Mode | Channel | Frequency (MHz) | 99% Emission Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---|---|---|---|---|
| WCDMA | 1312 | 1712.4 | 4.2220 | 4.876 |
| | 1412 | 1732.4 | 4.2209 | 4.887 |
| | 1513 | 1752.6 | 4.1935 | 4.900 |
| HSDPA | 1312 | 1712.4 | 4.215+ | 4.912 |
| | 1412 | 1732.4 | 4.1973 | 4.866 |
| | 1513 | 1752.6 | 4.2155 | 4.869 |
| HSUPA | 1312 | 1712.4 | 4.2199 | 4.865 |
| | 1412 | 1732.4 | 4.2053 | 4.897 |
| | 1513 | 1752.6 | 4.2275 | 4.898 |

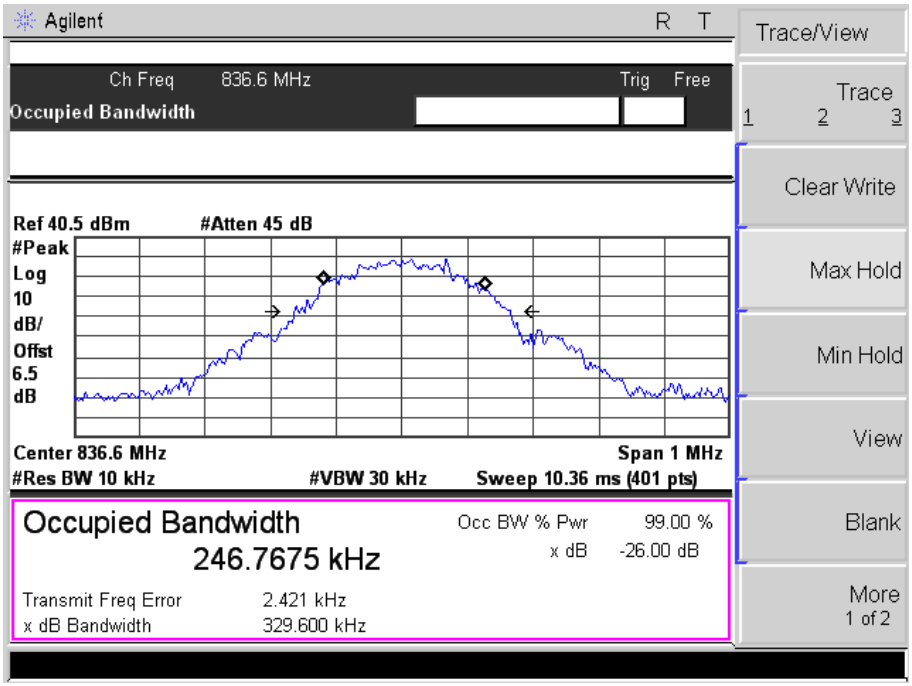
For Band 2

| Test Mode | Channel | Frequency (MHz) | 99% Emission Bandwidth (MHz) | 26 dB Emission Bandwidth (MHz) |
|---|---|---|---|---|
| WCDMA | 9262 | 1852.4 | 4.2221 | 4.863 |
| | 9400 | 1880.0 | 4.2163 | 4.842 |
| | 9538 | 1907.6 | 4.2223 | 4.880 |
| HSDPA | 9262 | 1852.4 | 4.2111 | 4.900 |
| | 9400 | 1880.0 | 4.2143 | 4.867 |
| | 9538 | 1907.6 | 4.2359 | 4.918 |
| HSUPA | 9262 | 1852.4 | 4.2329 | 4.869 |
| | 9400 | 1880.0 | 4.2236 | 4.905 |
| | 9538 | 1907.6 | 4.2106 | 4.898 |

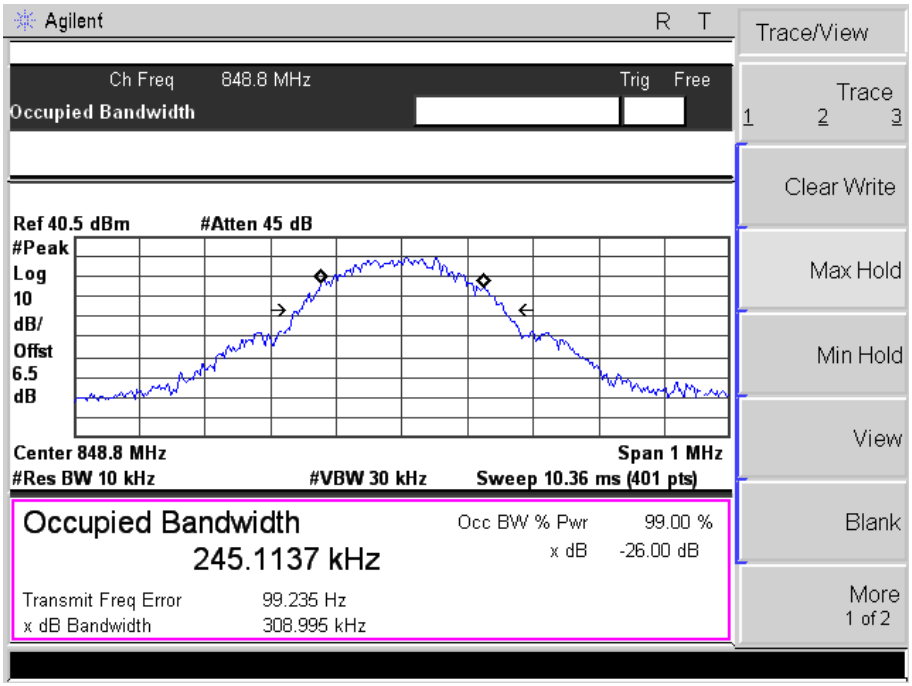
For Cellular Band
GSM Low Channel



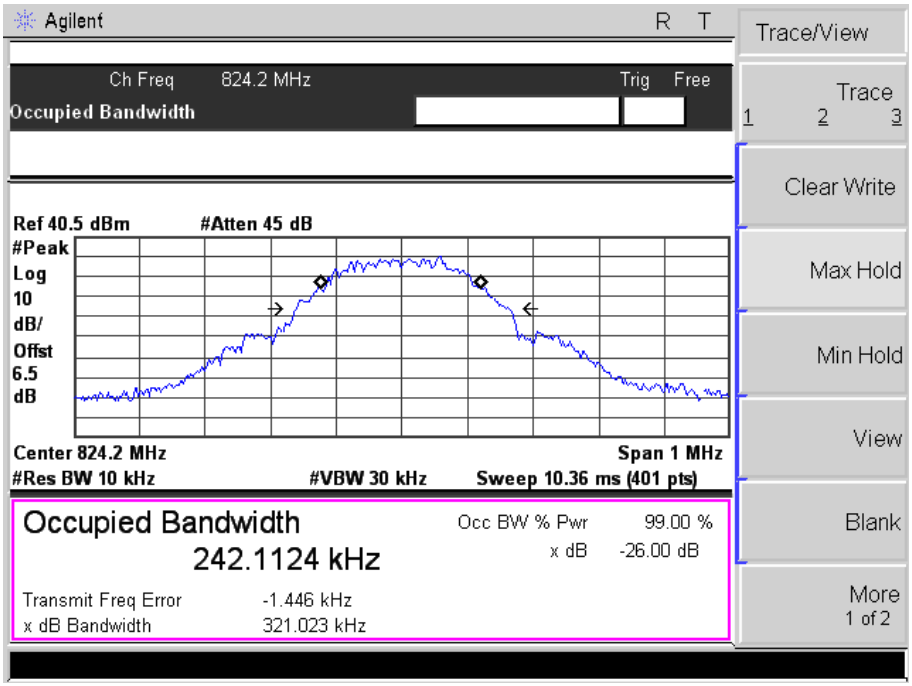

GSM Middle Channel



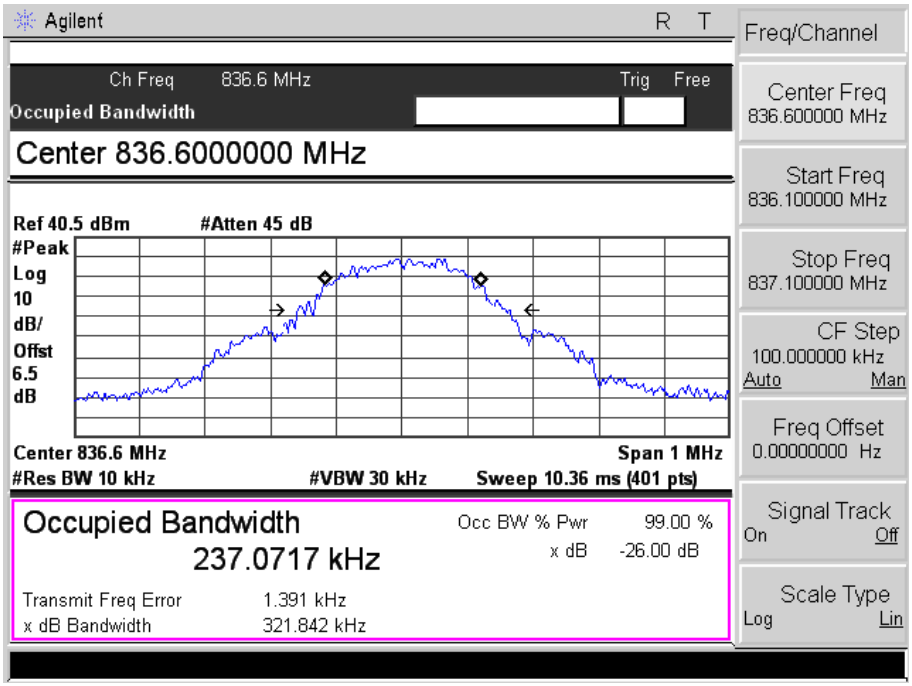
GSM High channel



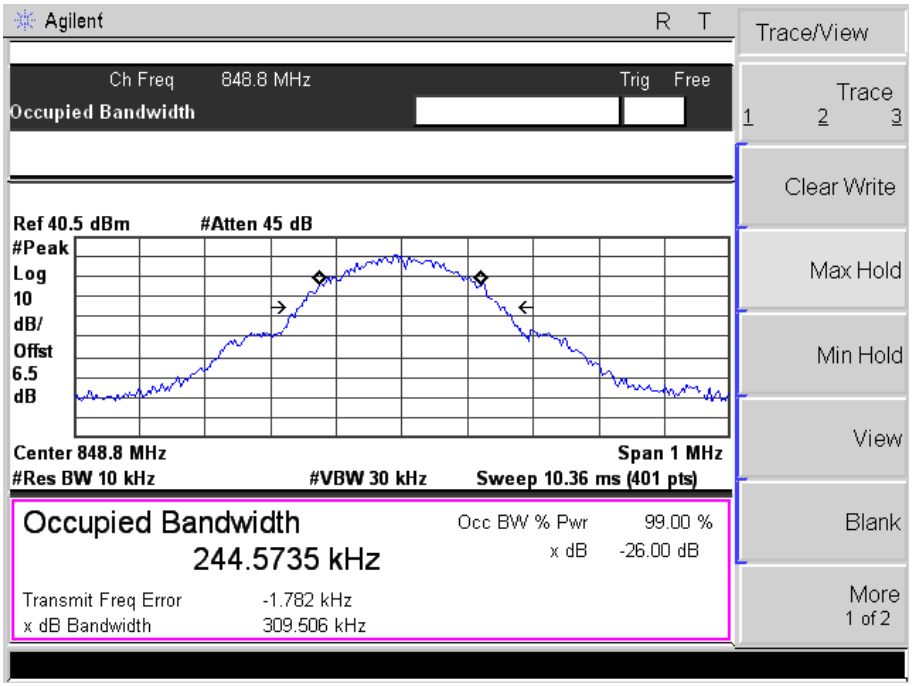

GPRS Low Channel



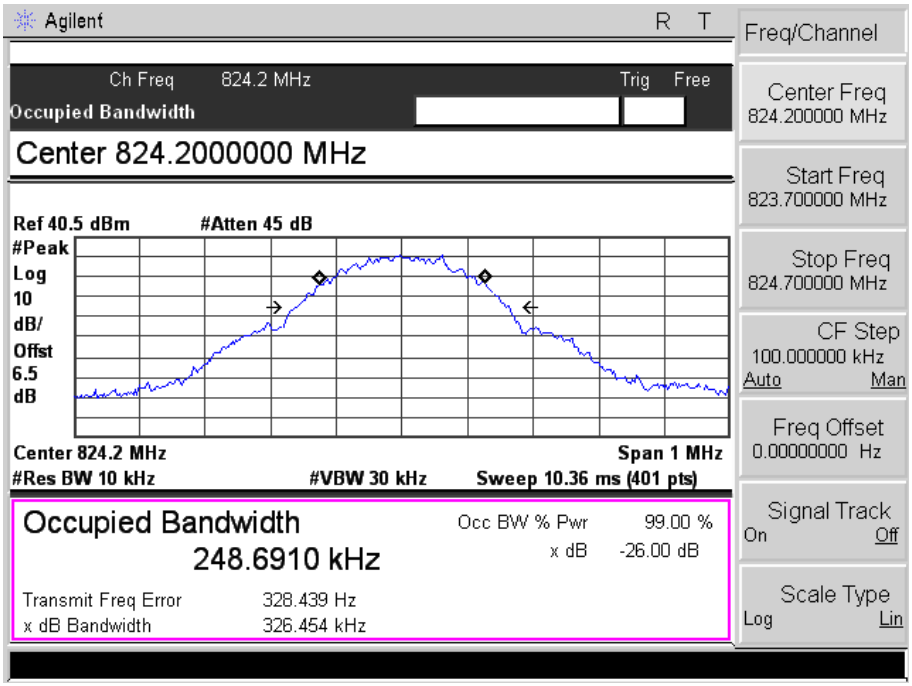
GPRS Middle Channel



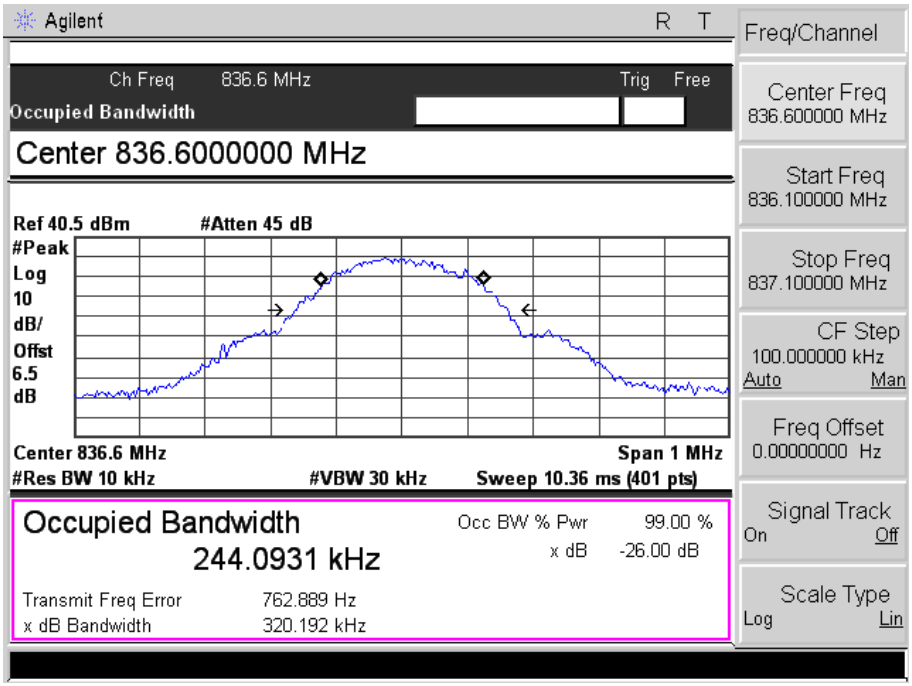

GPRS High Channel



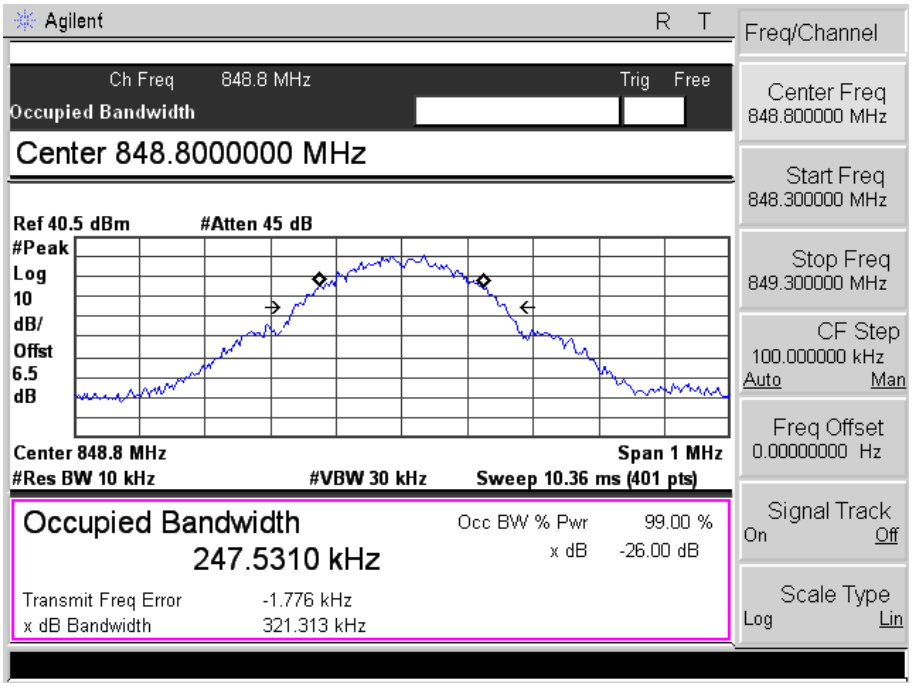
EDGE Low Channel




EDGE Middle Channel

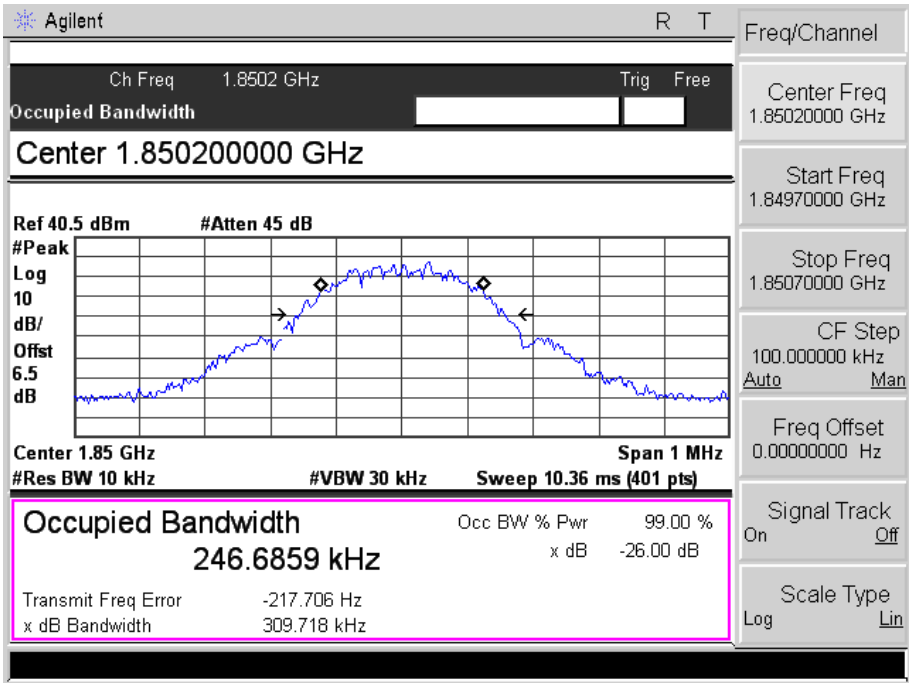


EDGE High Channel

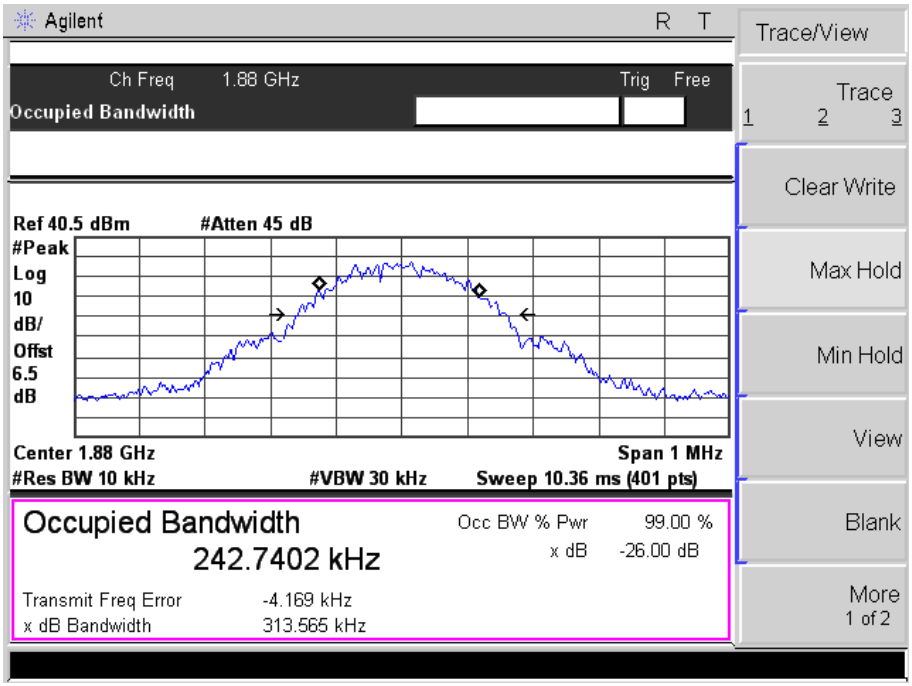



For PCS Band

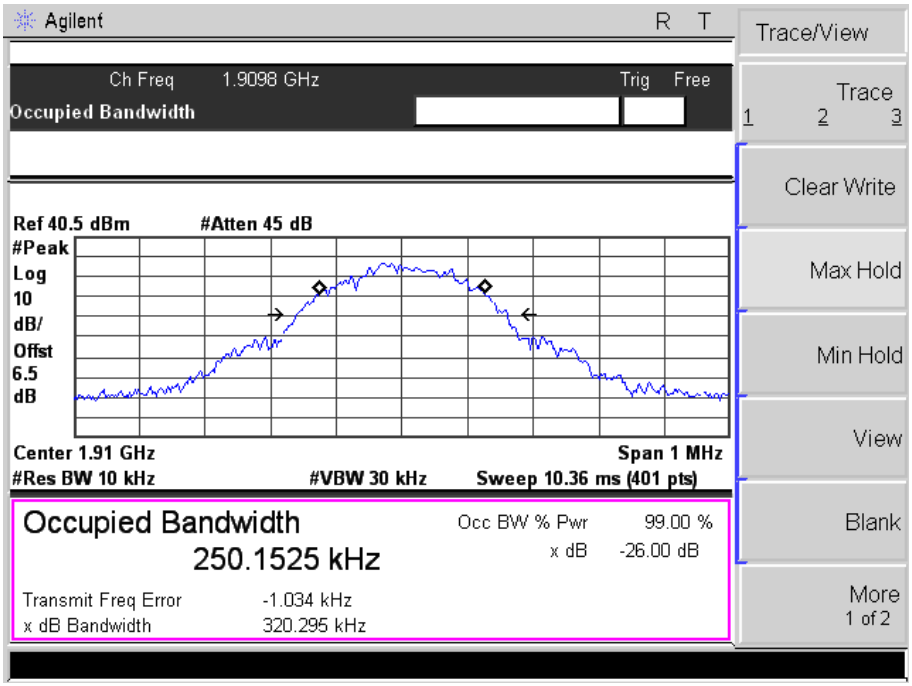
GSM Low Channel



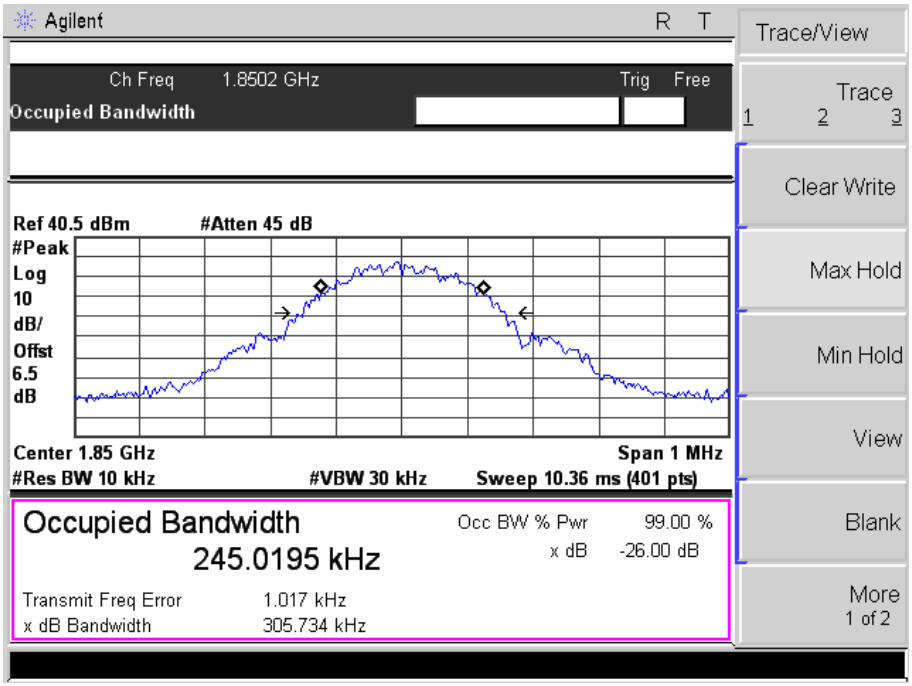
GSM Middle Channel



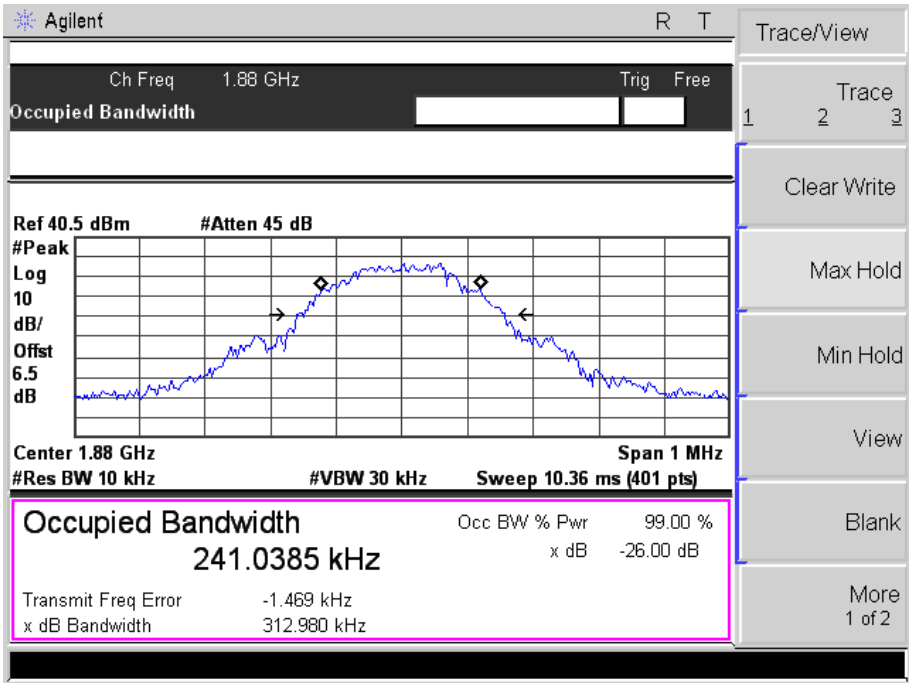

GSM High channel



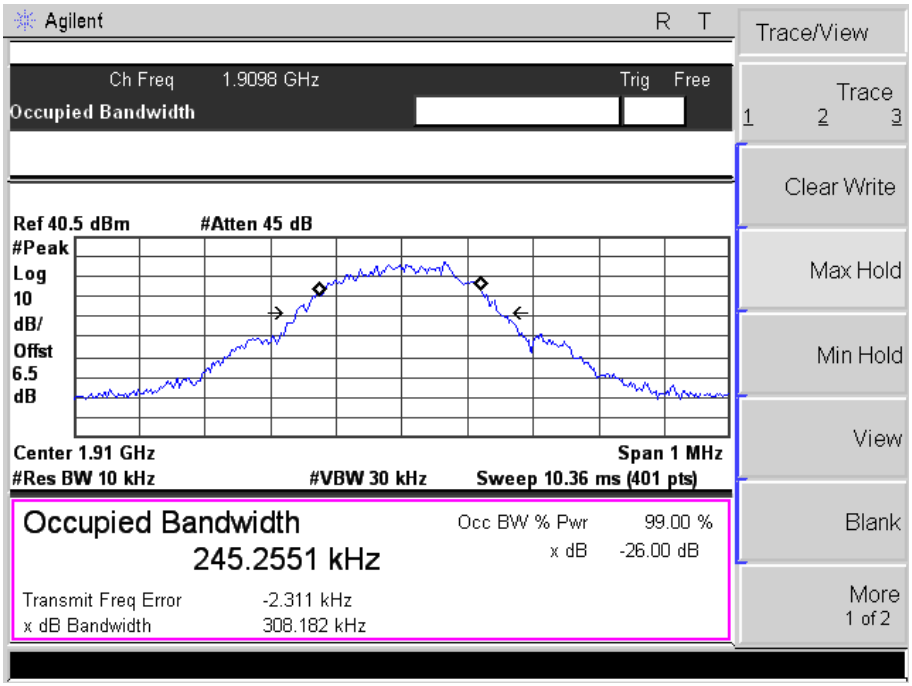
GPRS Low Channel



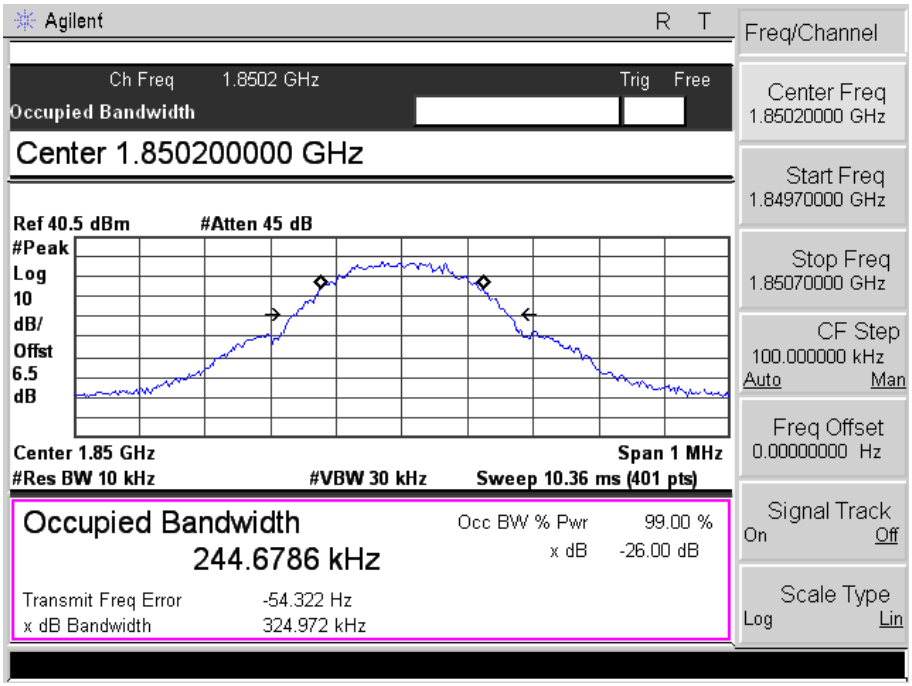

GPRS Middle Channel



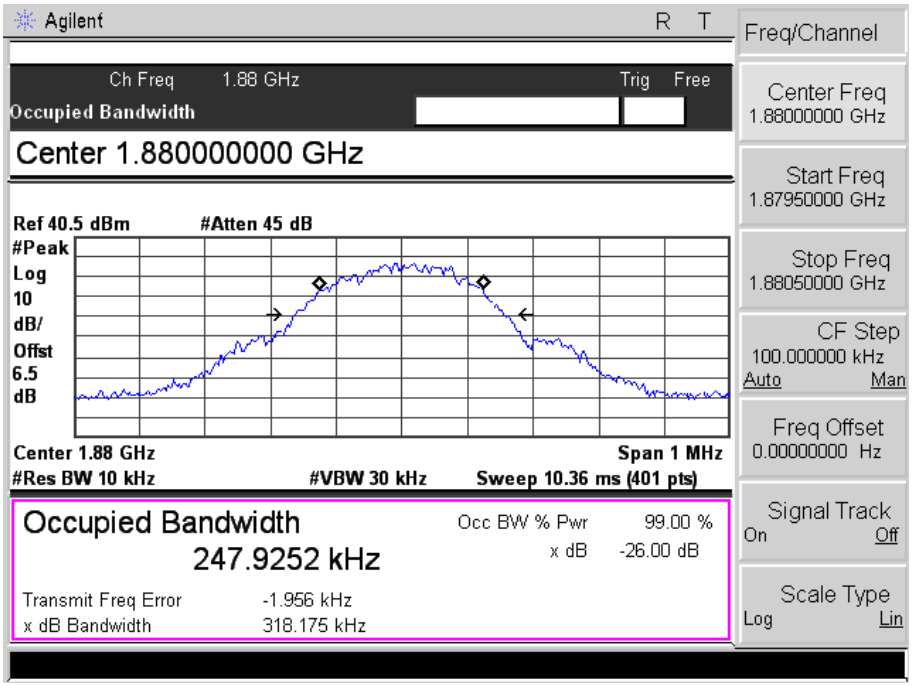
GPRS High Channel



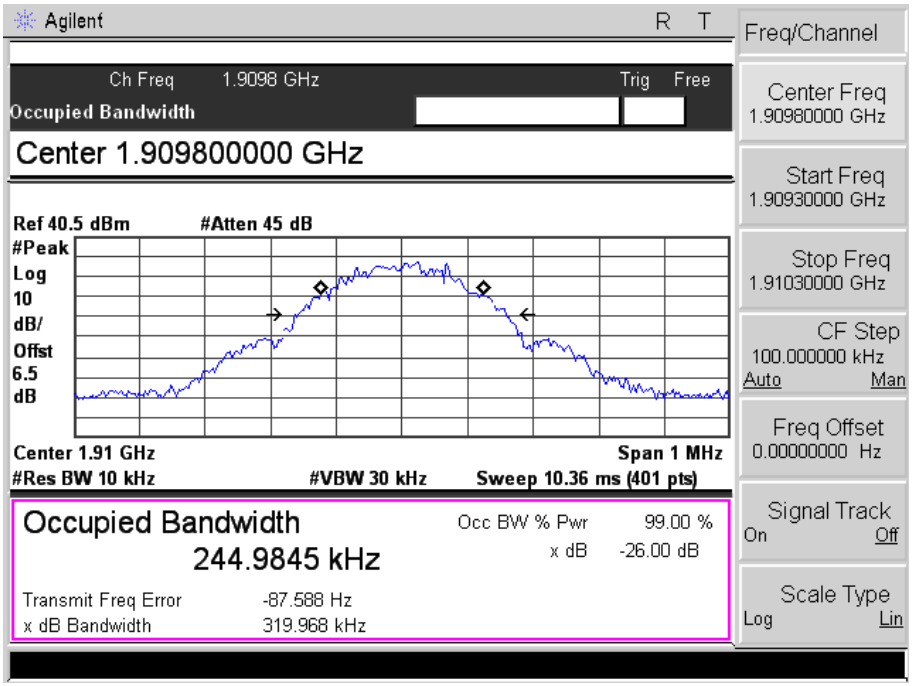

EDGE Low Channel



EDGE Middle Channel

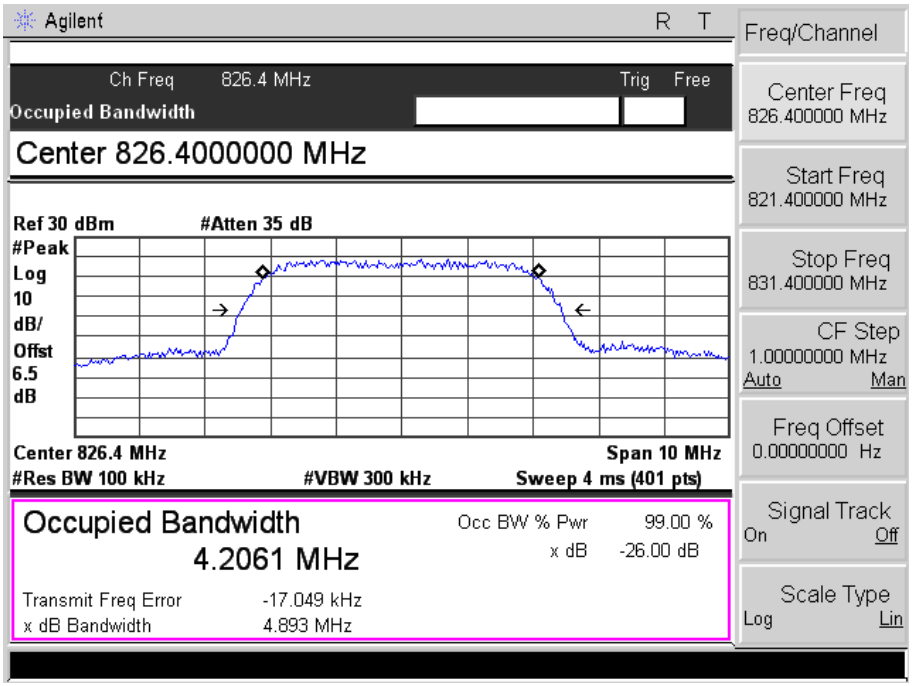



EDGE High Channel

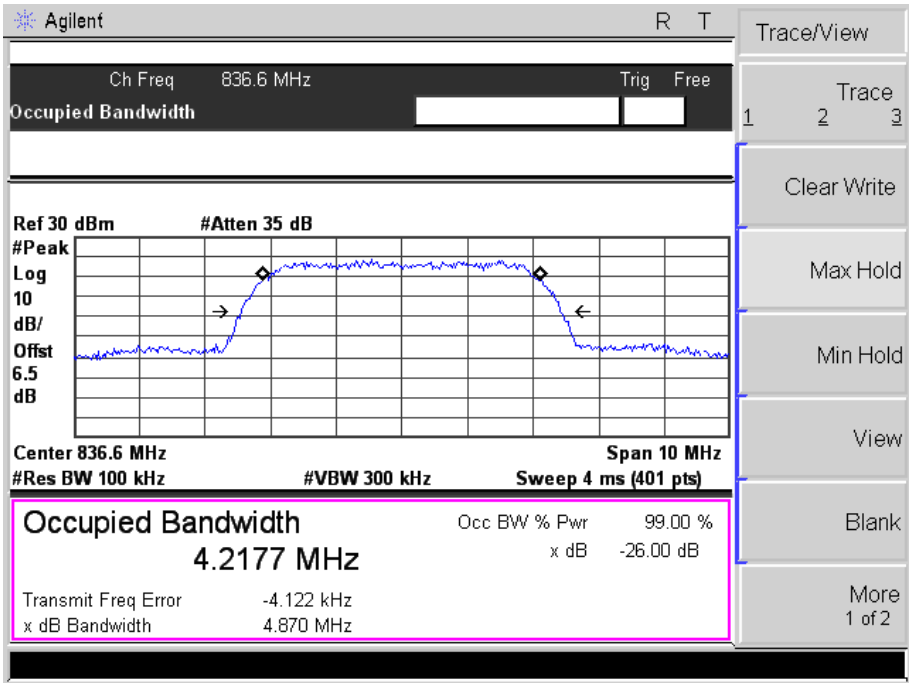


For Band V

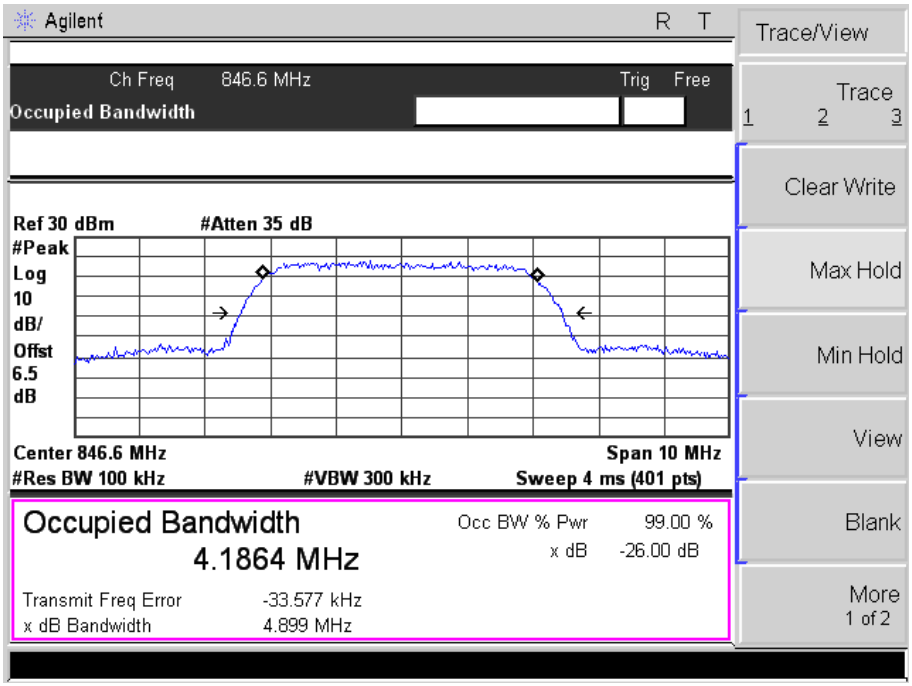
WCDMA Low Channel



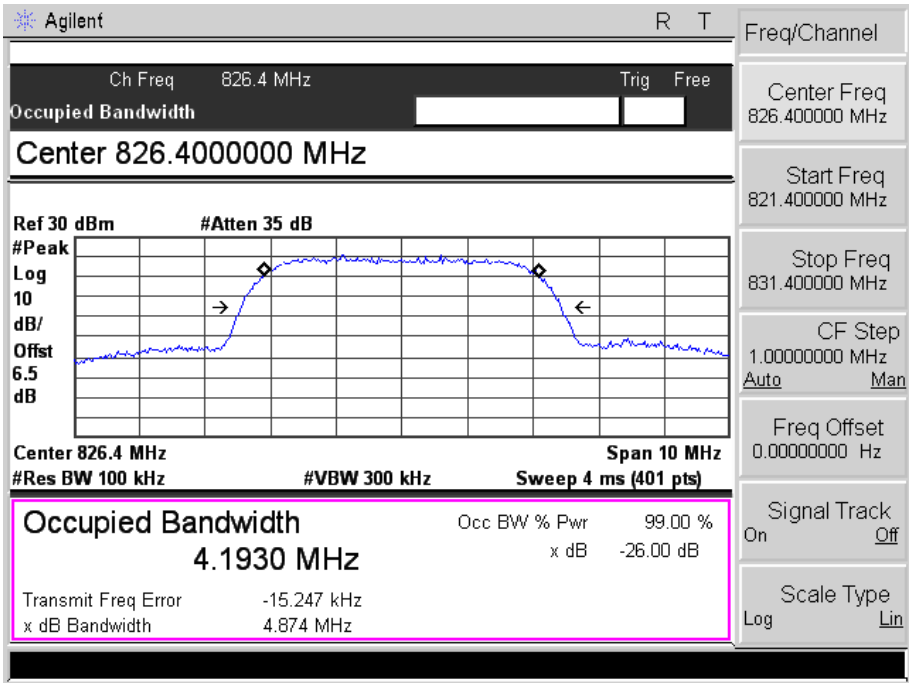

WCDMA Middle Channel



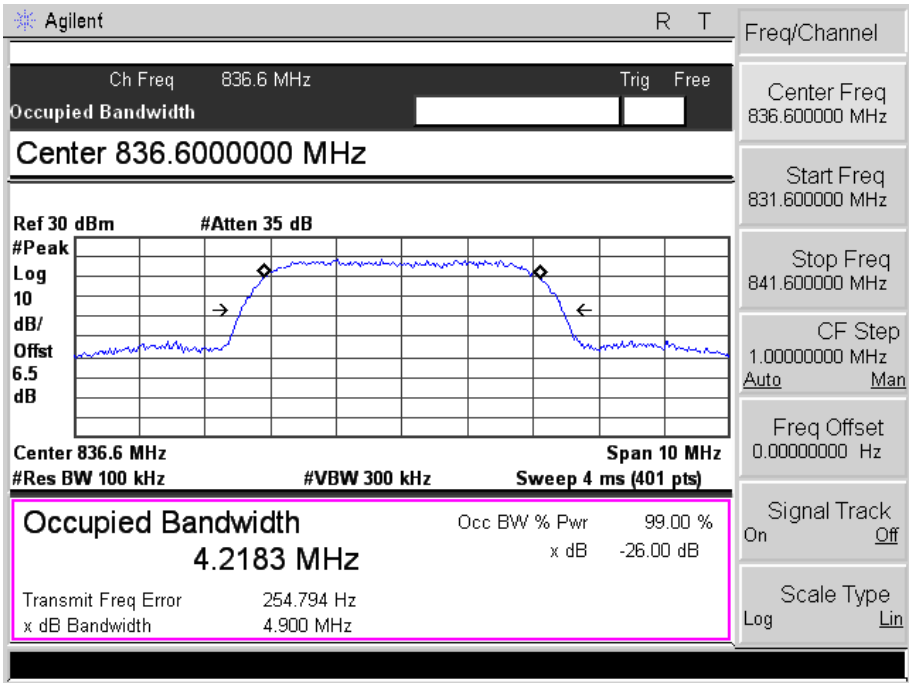
WCDMA High Channel



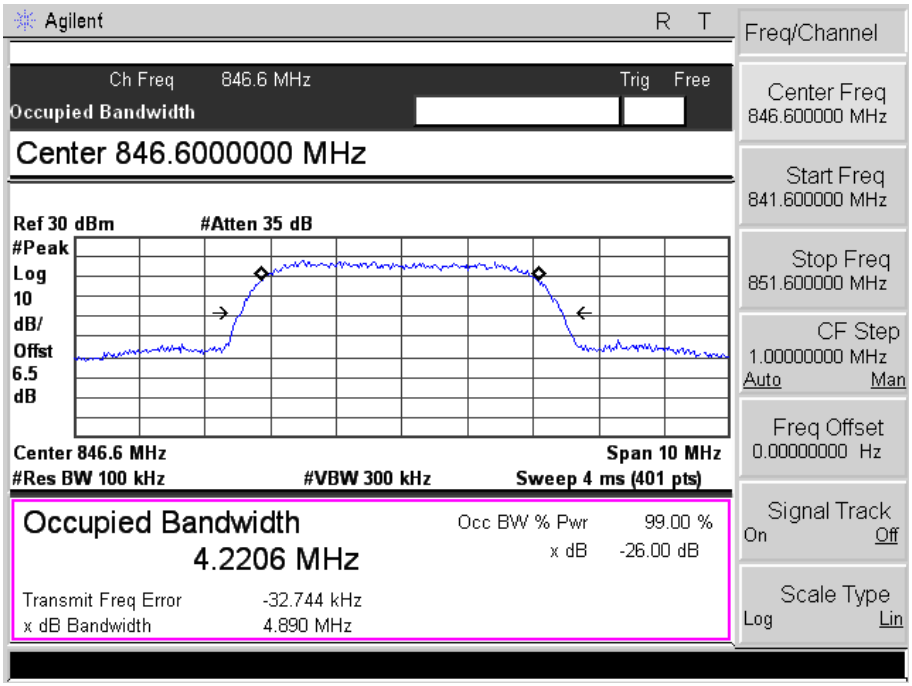

HSDPA Low Channel



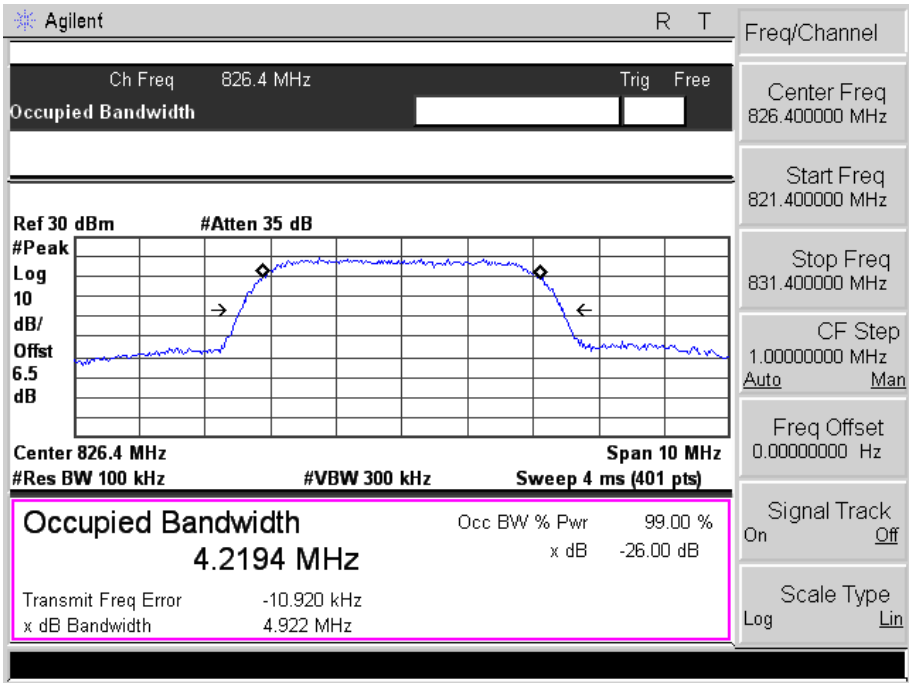
HSDPA Middle Channel



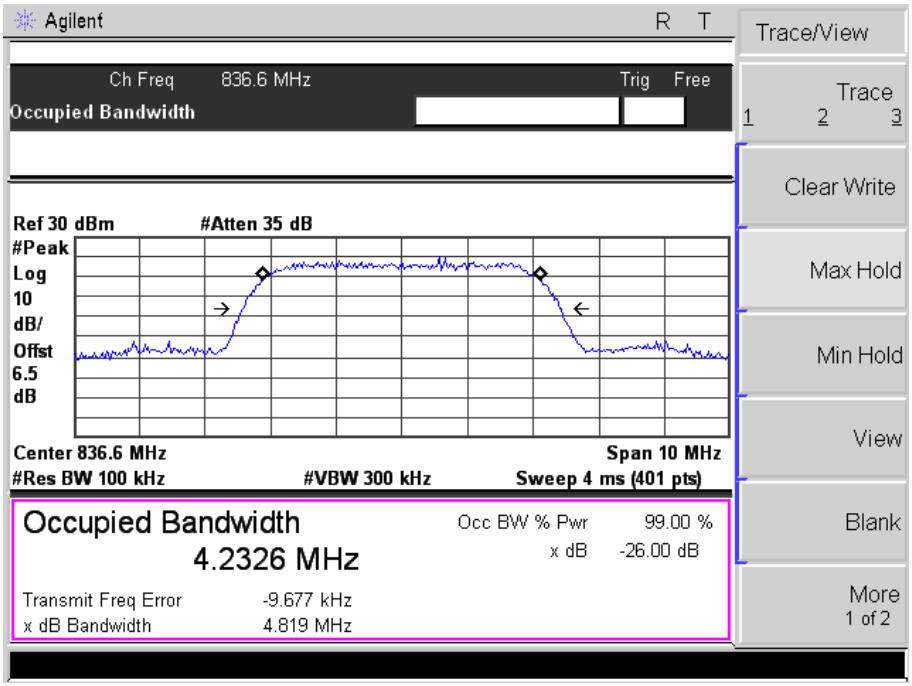

HSDPA High Channel



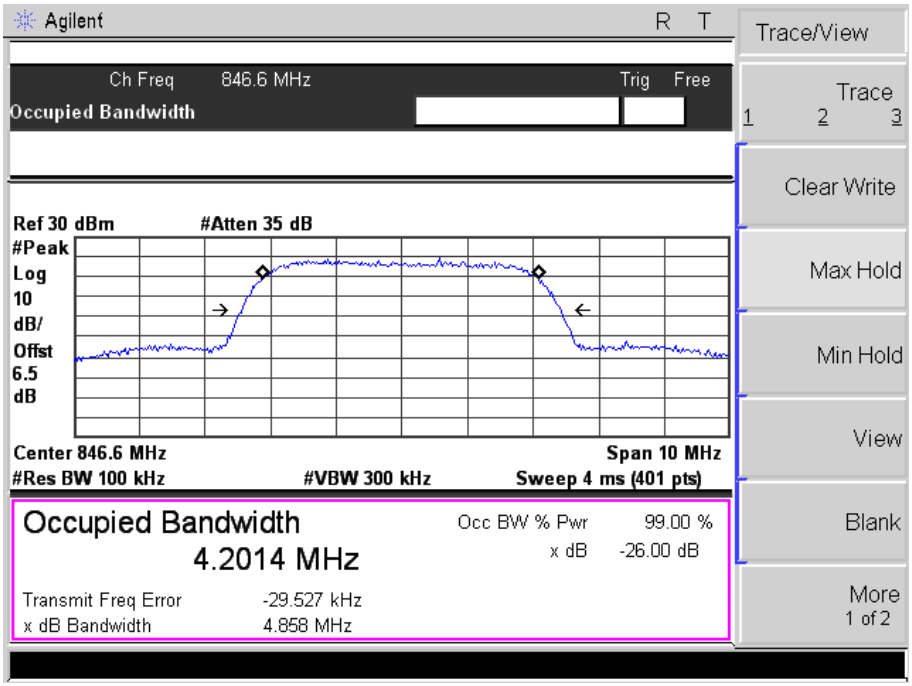
HSUPA Low Channel




HSUPA Middle Channel

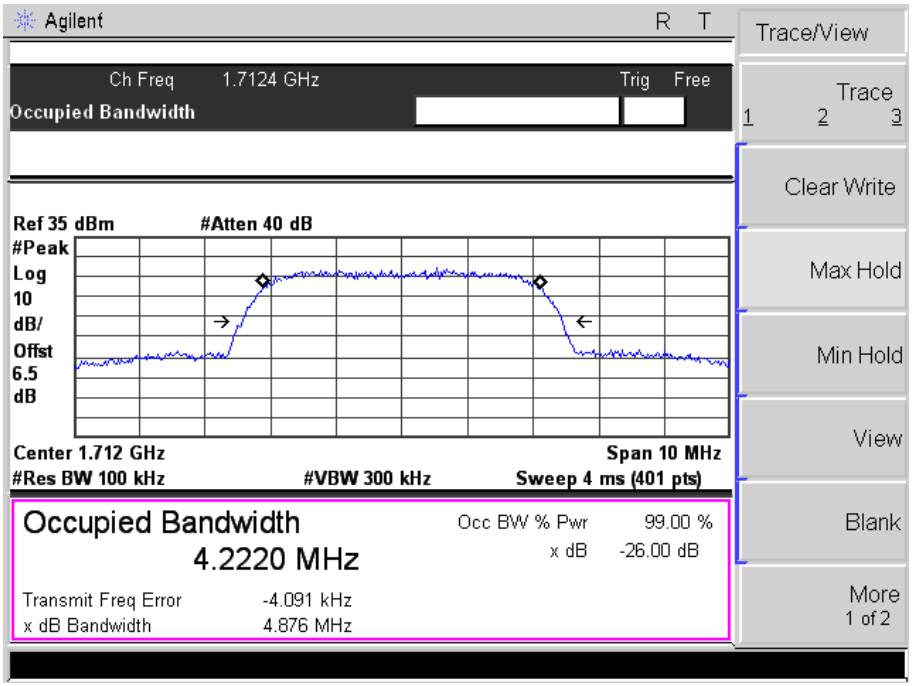


HSUPA High Channel

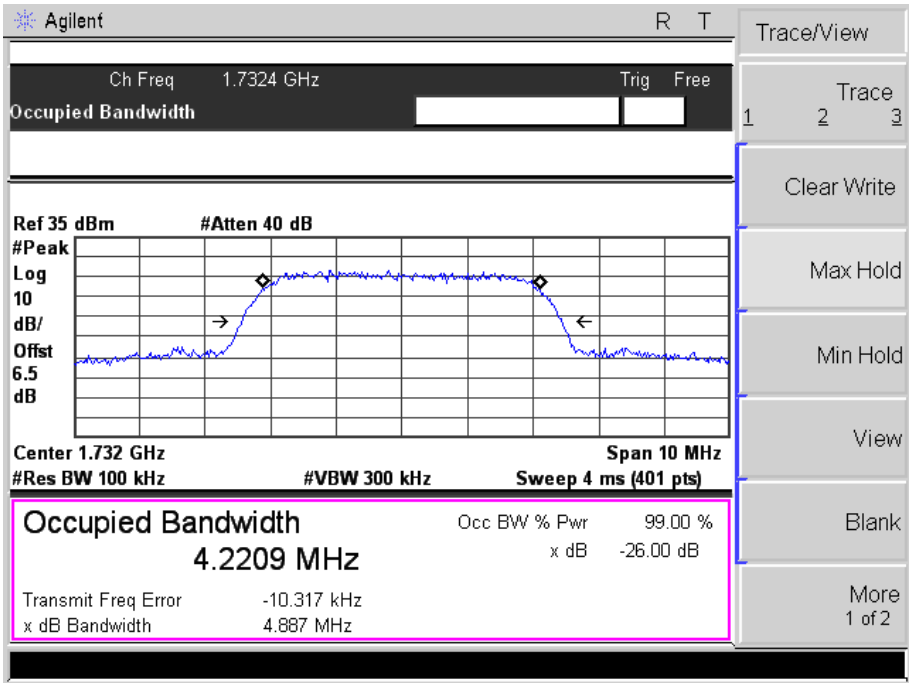



For Band IV

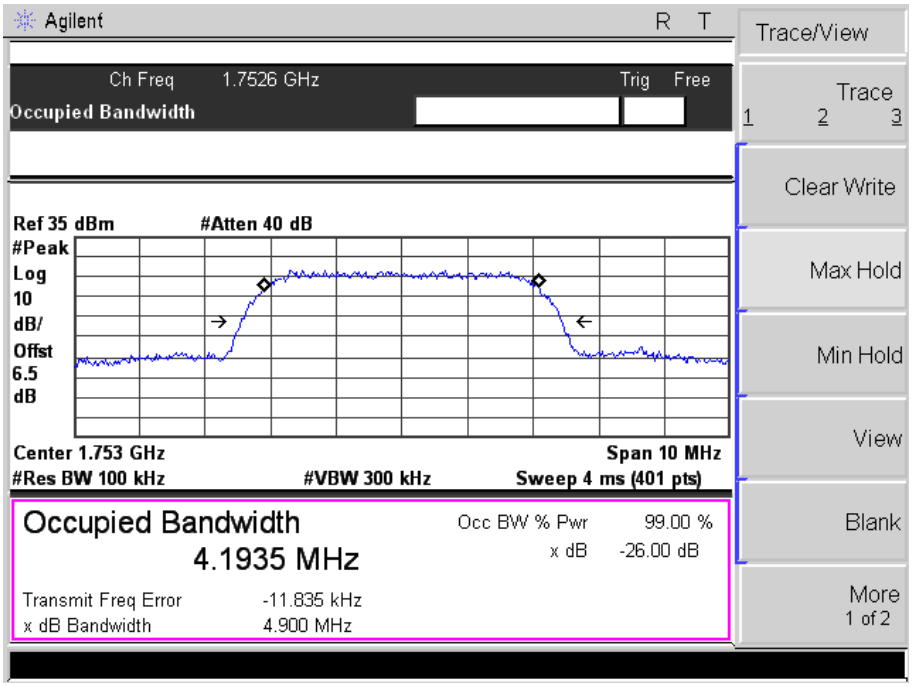
WCDMA Low Channel



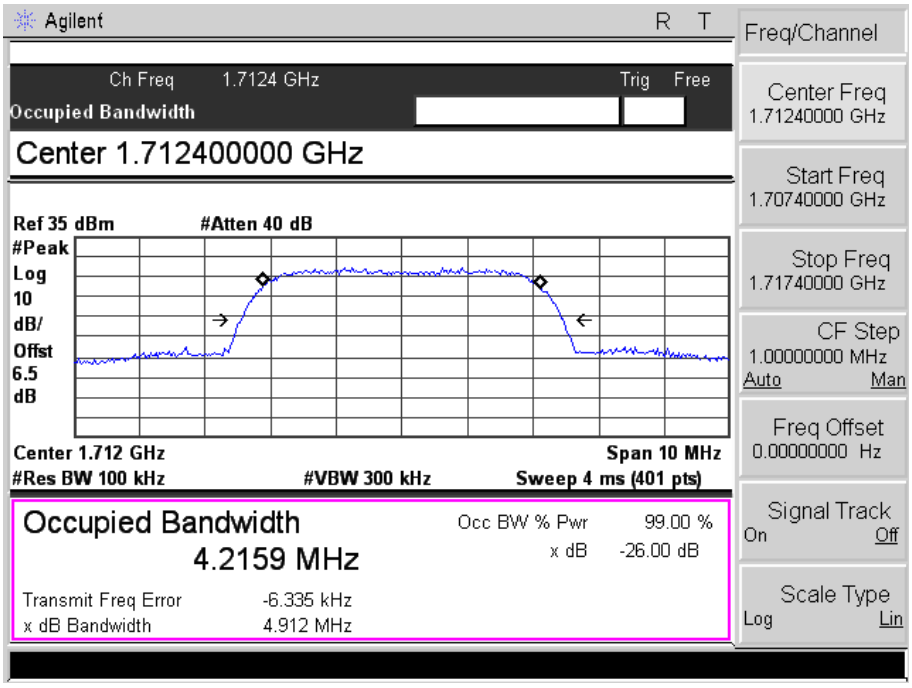
WCDMA Middle Channel



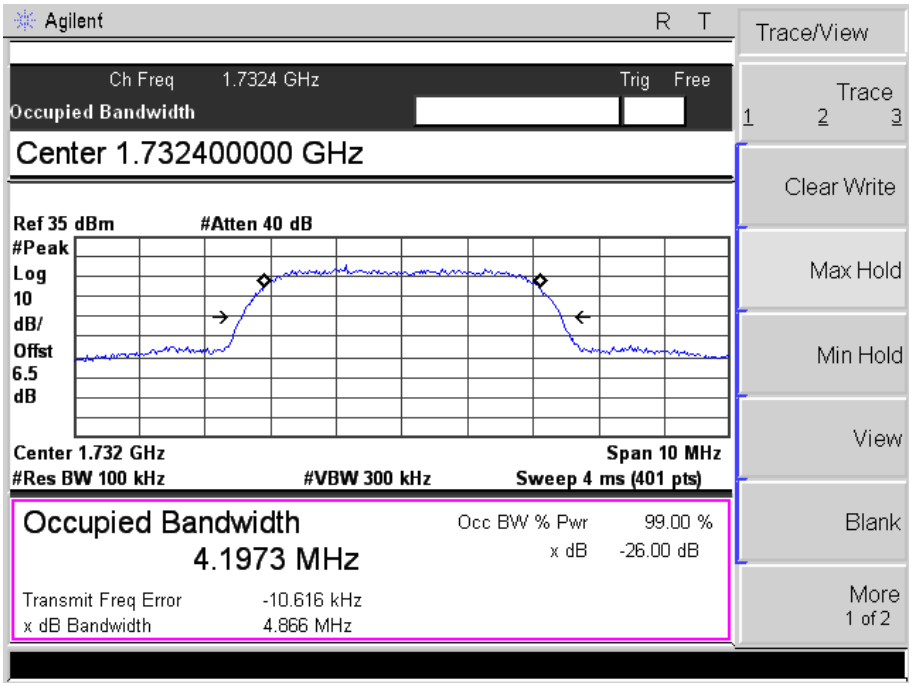

WCDMA High Channel



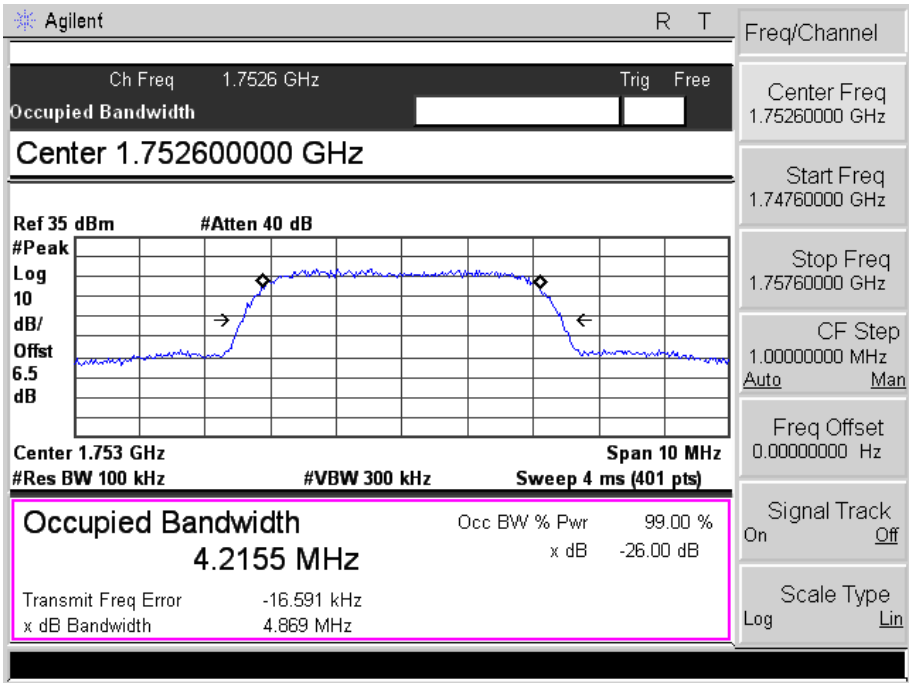
HSDPA Low Channel



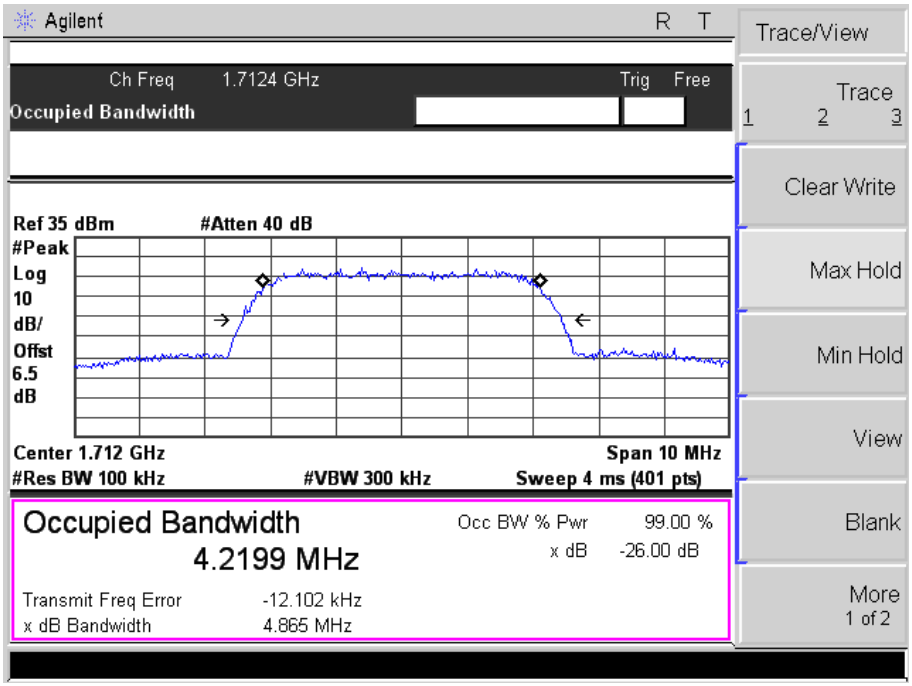

HSDPA Middle Channel



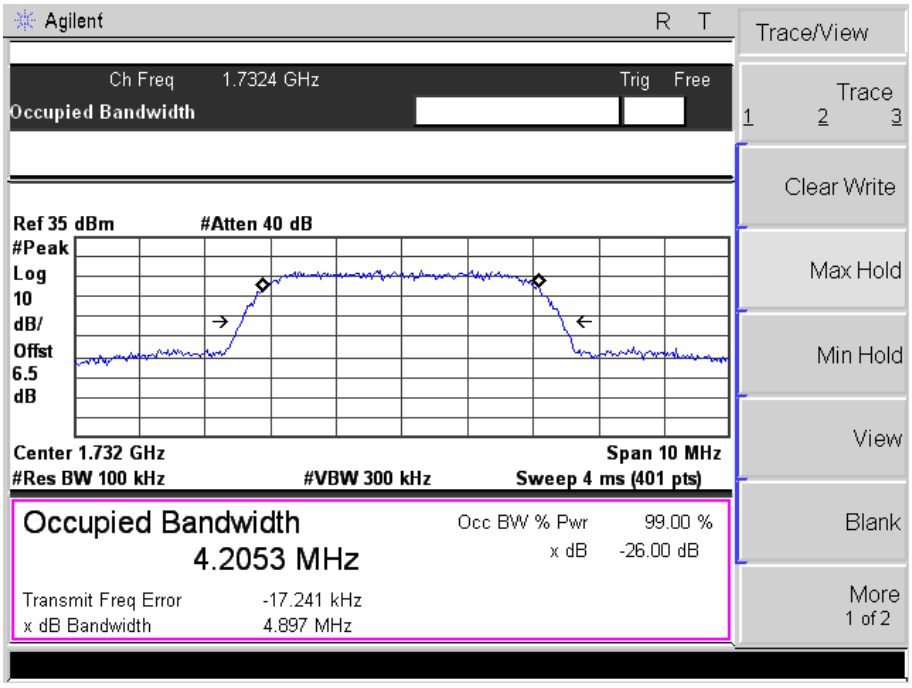
HSDPA High Channel



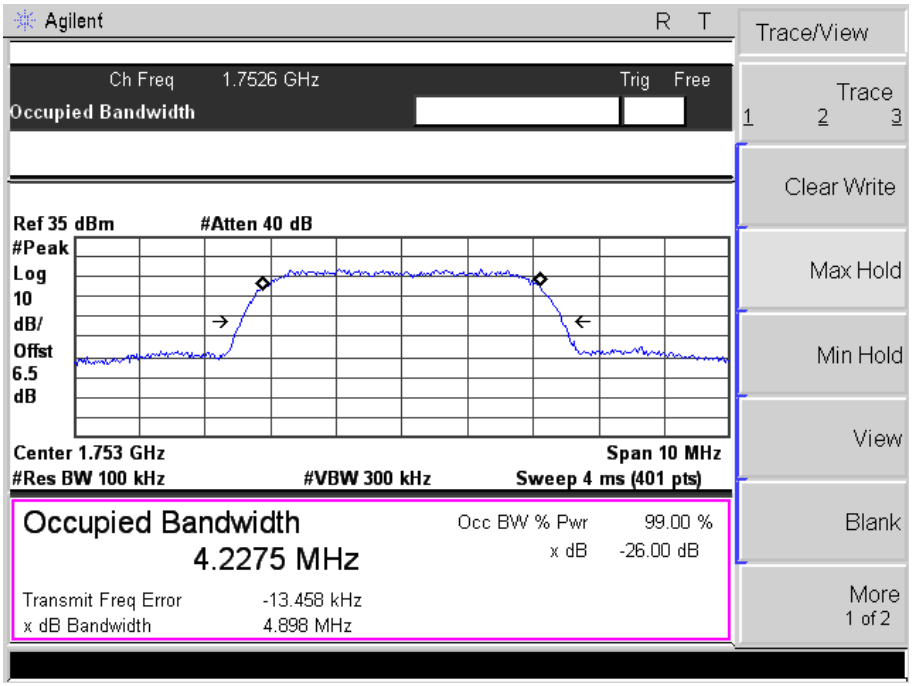

HSUPA Low Channel



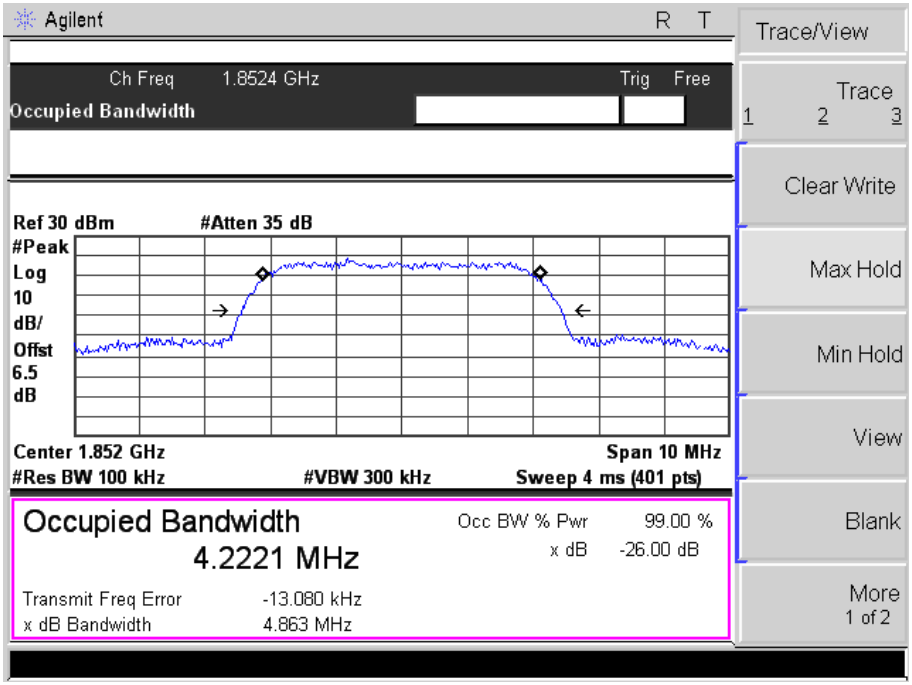
HSUPA Middle Channel



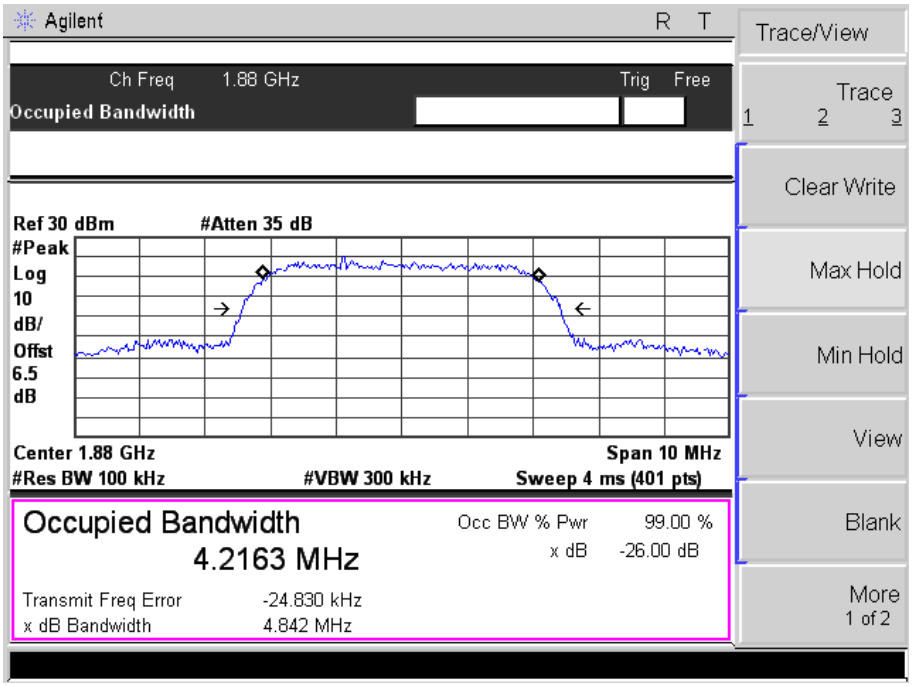

HSUPA High Channel



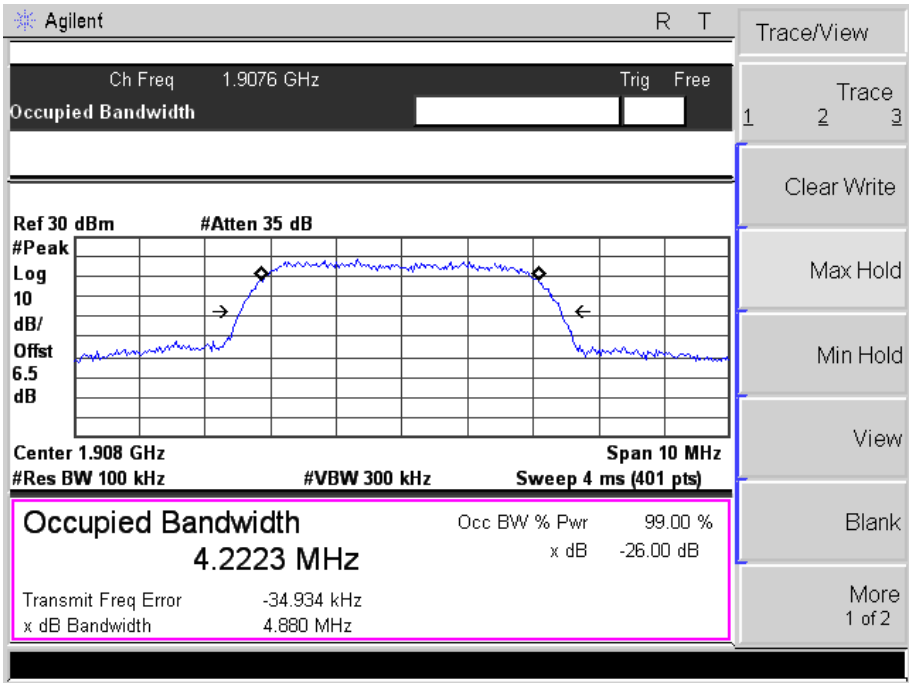
For Band II
WCDMA Low Channel



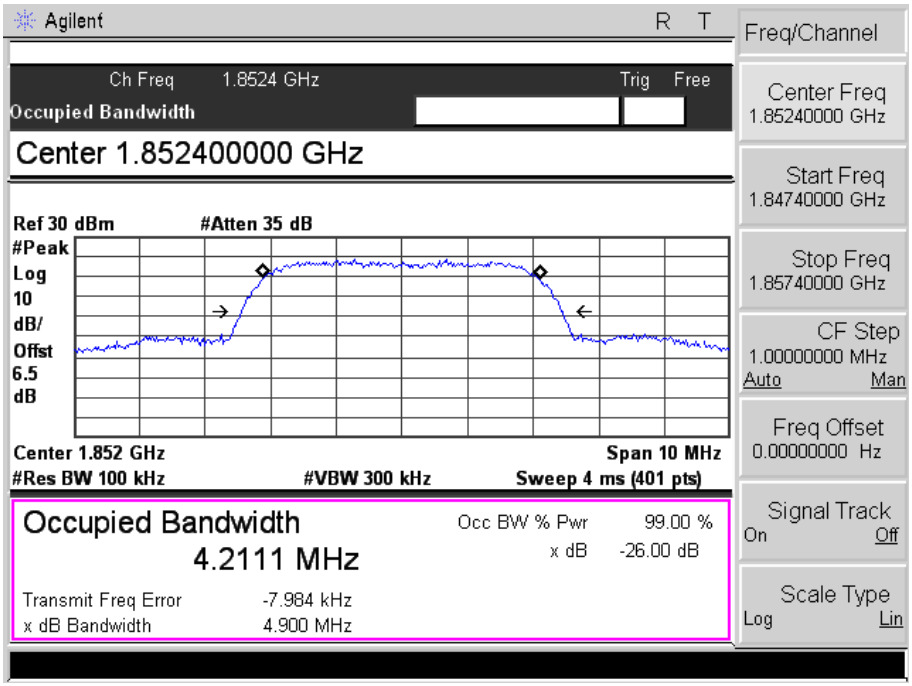

WCDMA Middle Channel



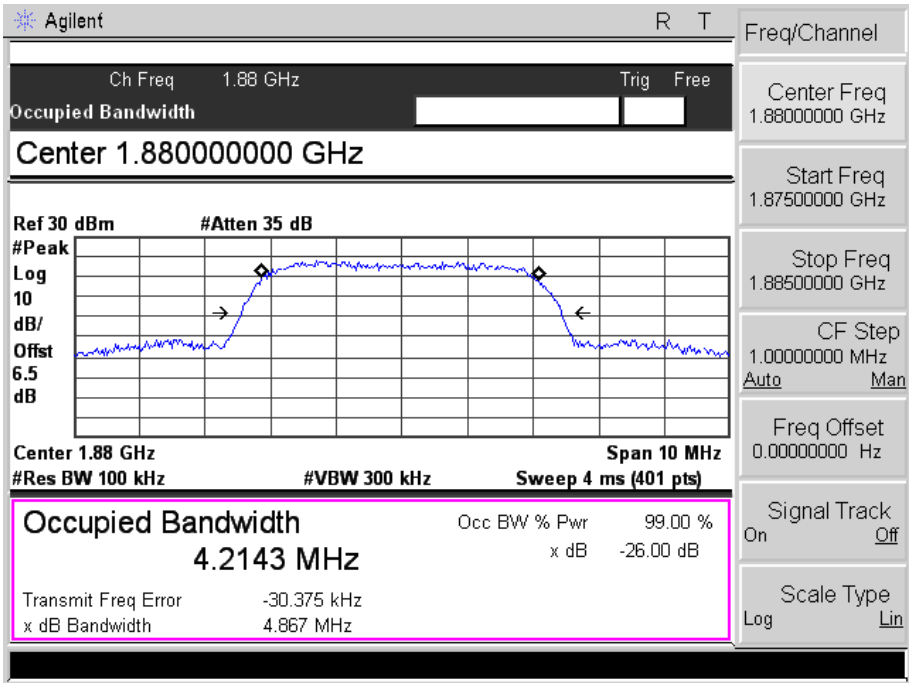
WCDMA High Channel



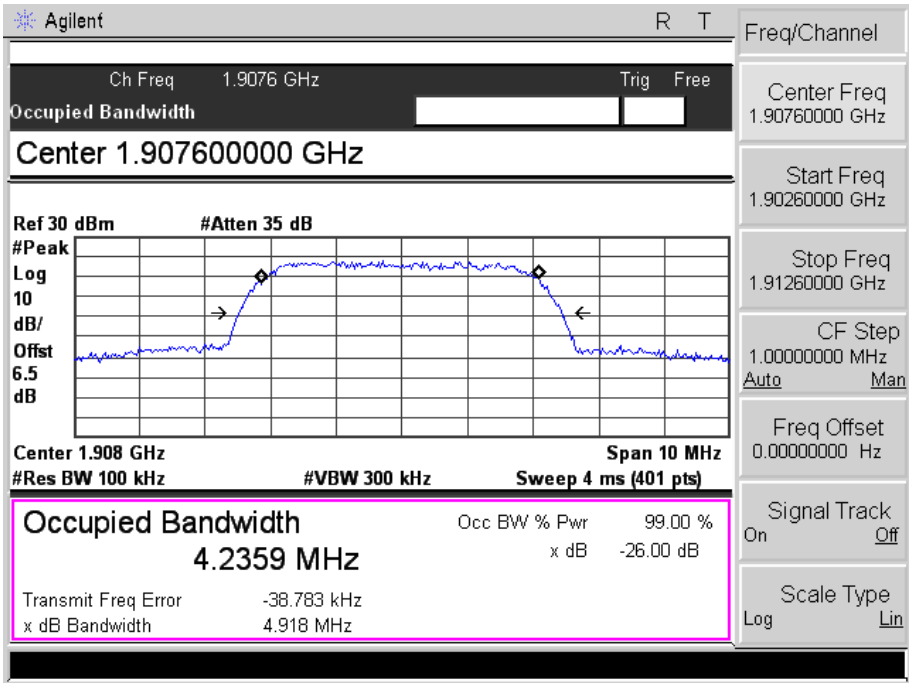

HSDPA Low Channel



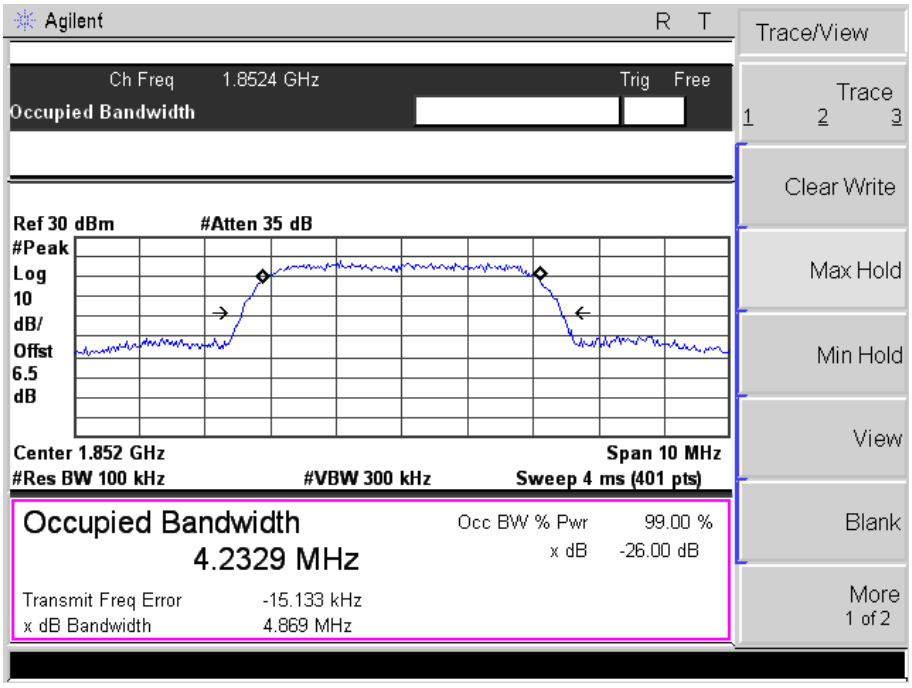
HSDPA Middle Channel



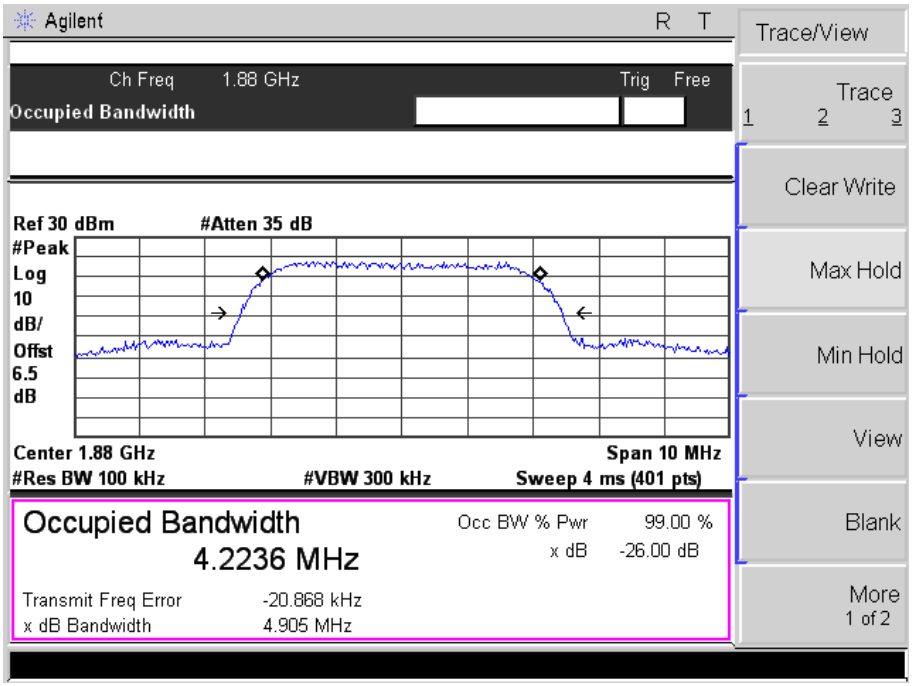

HSDPA High Channel



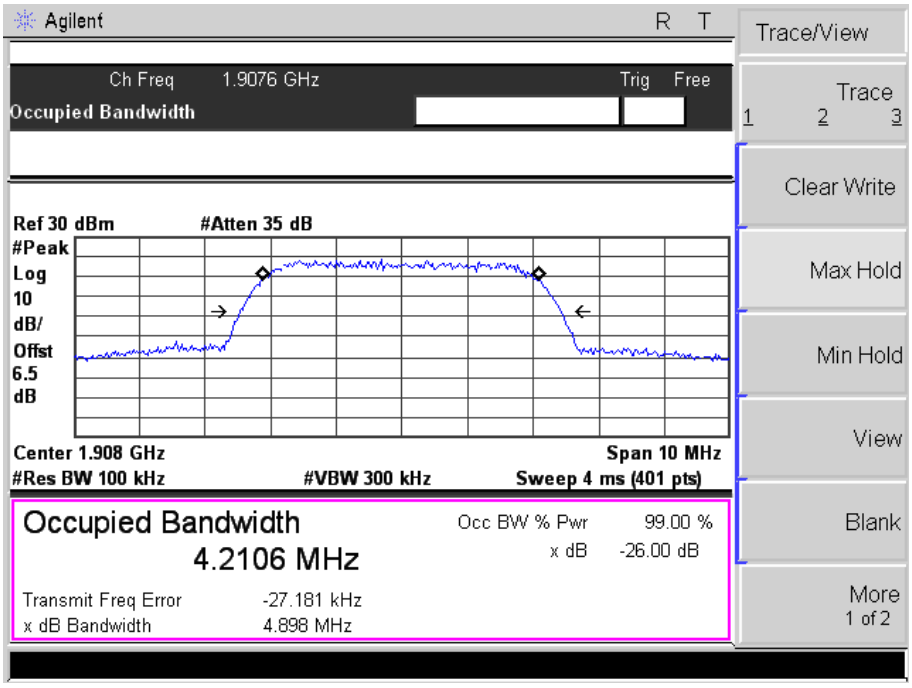
HSUPA Low Channel




HSUPA Middle Channel



HSUPA High Channel



# 7. Out of Band Emissions at Antenna Terminal

## 7.1 Standard Applicable

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

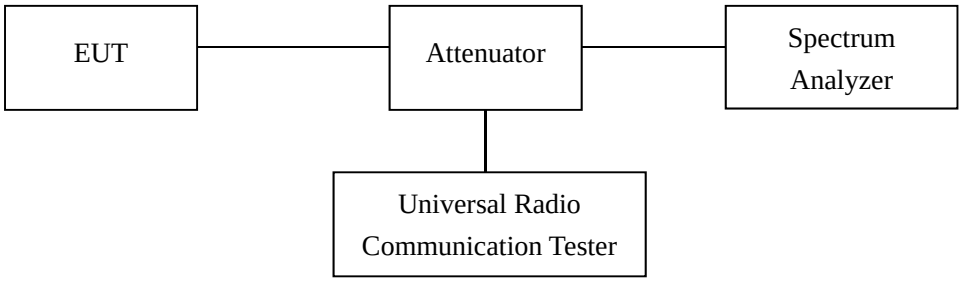
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

## 7.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10$^{th}$ harmonic.

Test Configuration for the out of band emissions testing:




## 7.3 Environmental Conditions

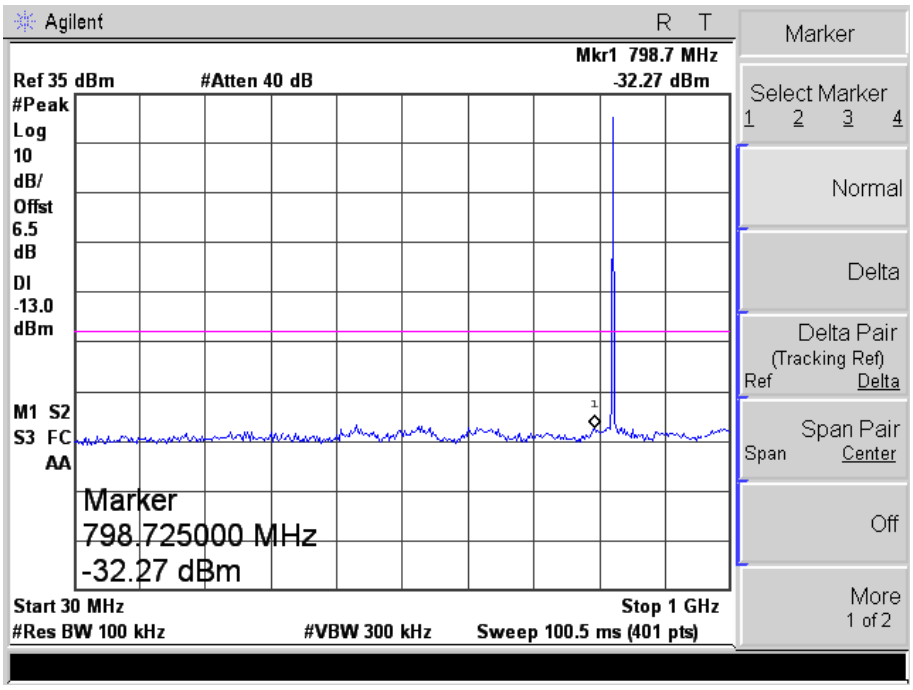
| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1018 mbar |

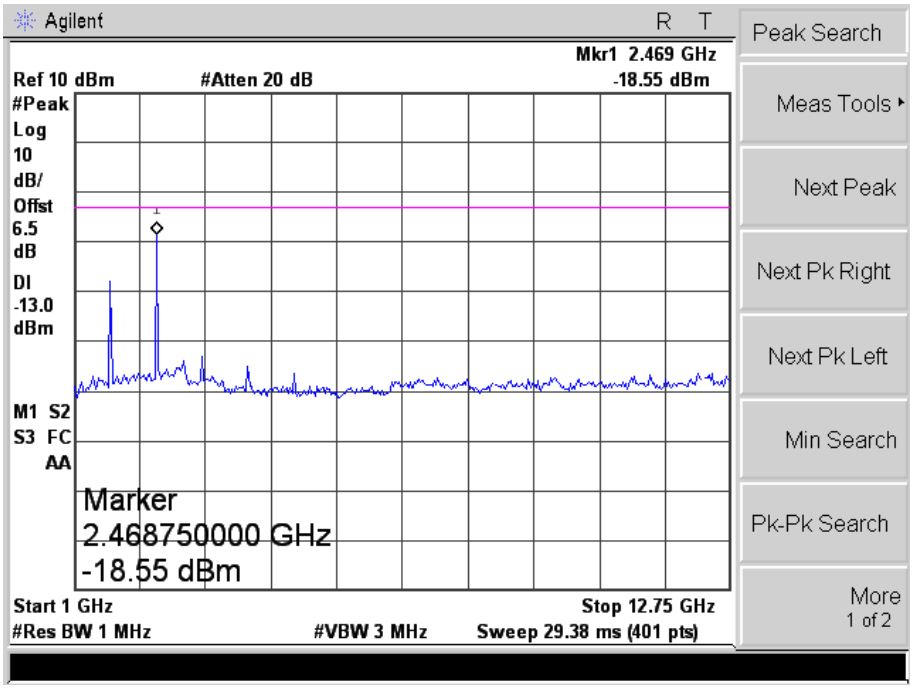
## 7.4 Summary of Test Results/Plots

*Please refer to the following test plots* For Cellular Band

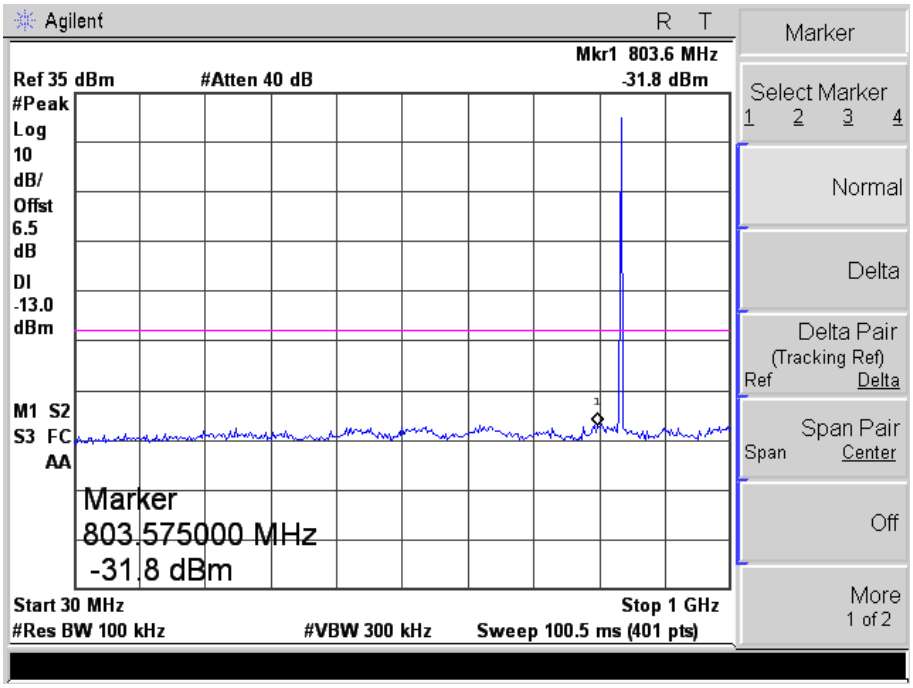
*Please refer to the following test plots* For Cellular Band

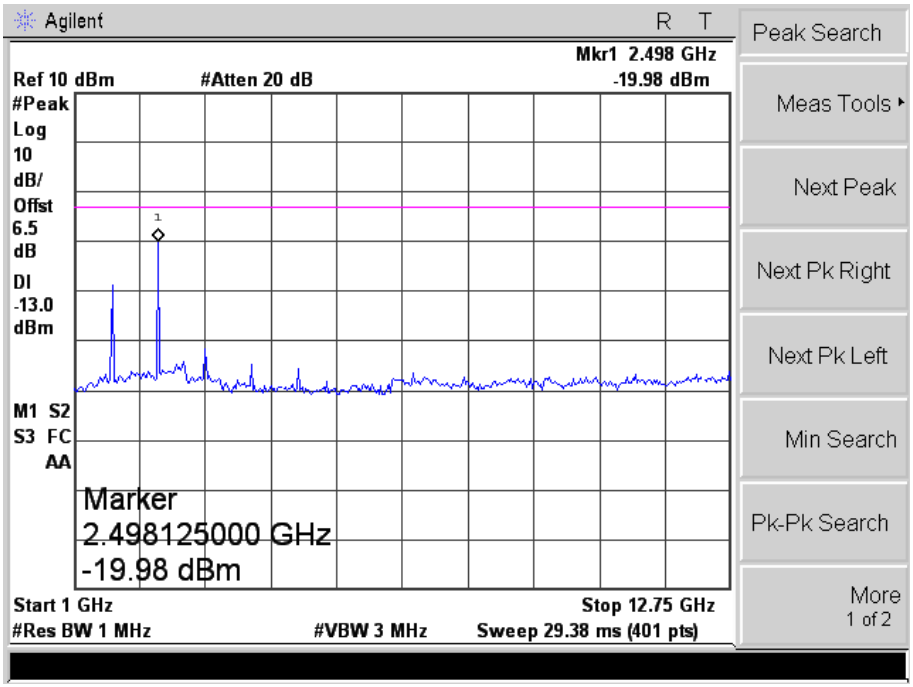
GSM Low Channel



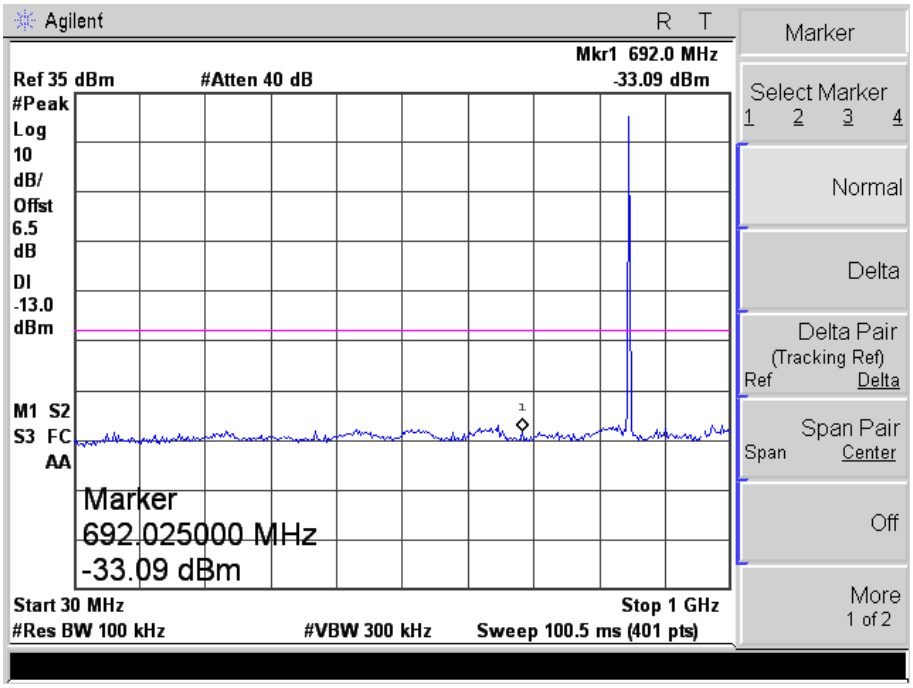



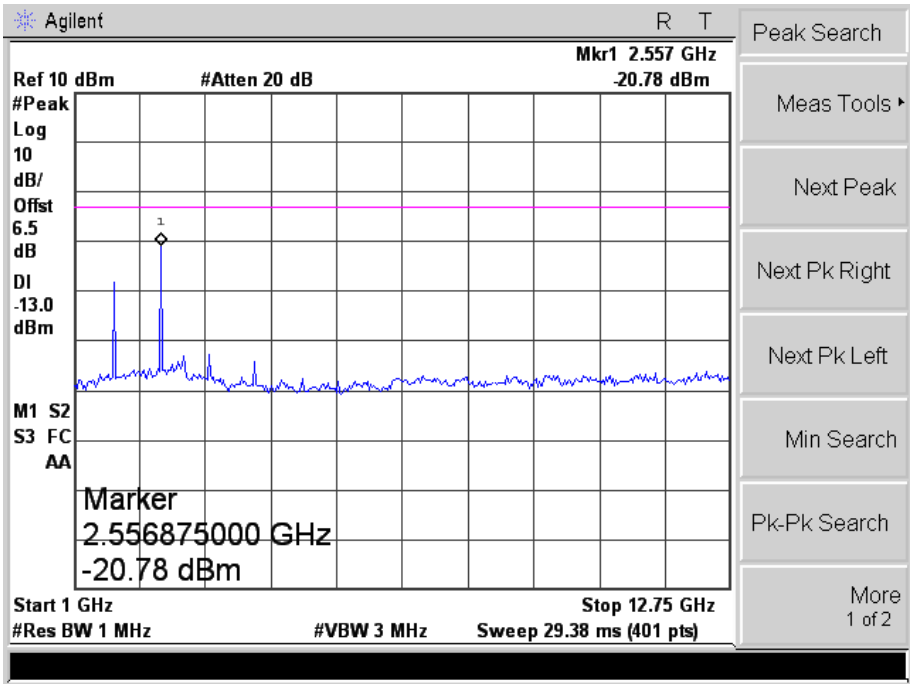
GSM Middle Channel



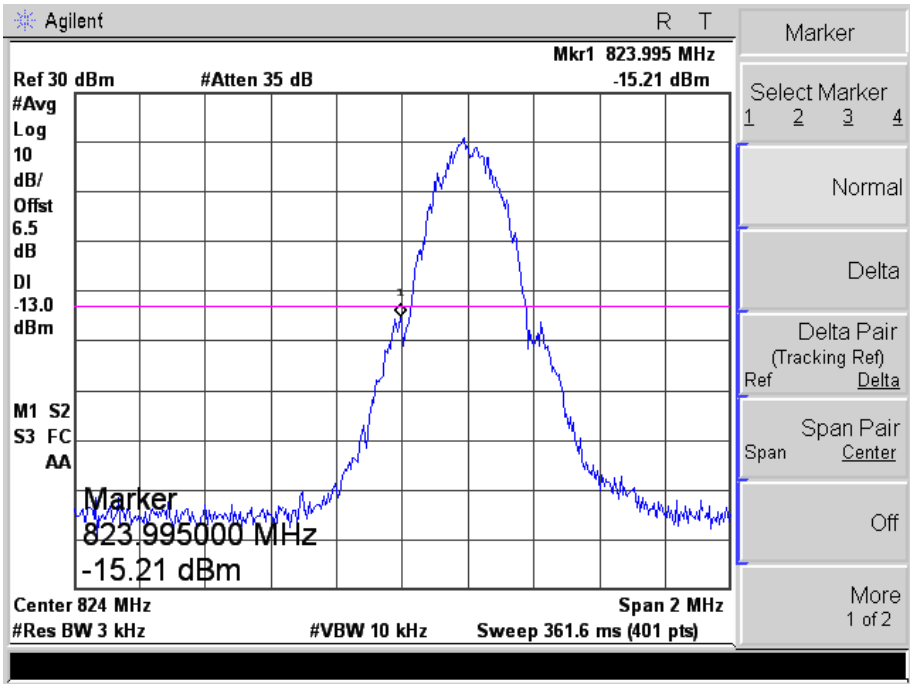



GSM High Channel

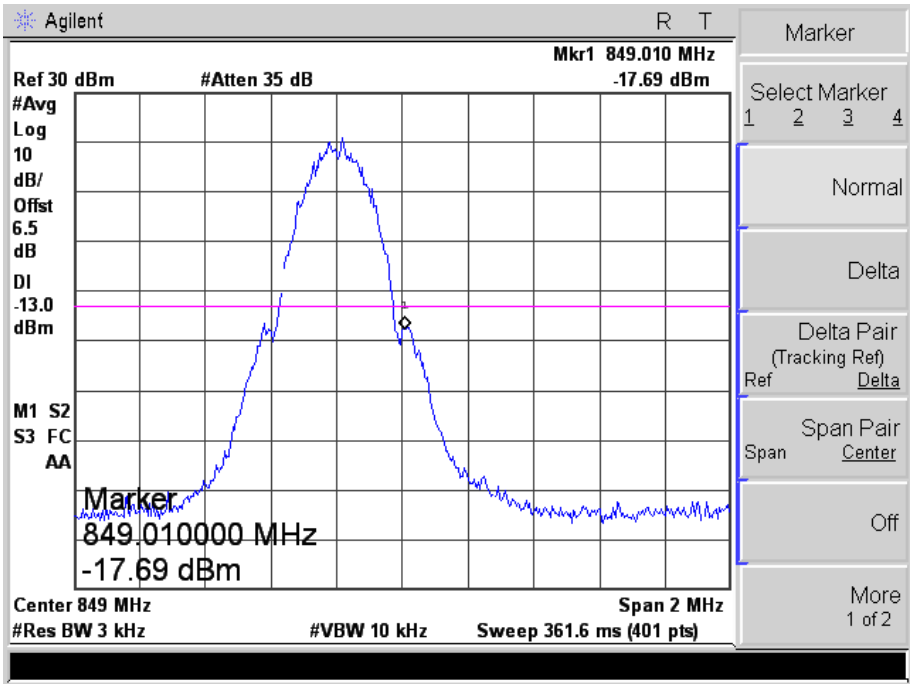


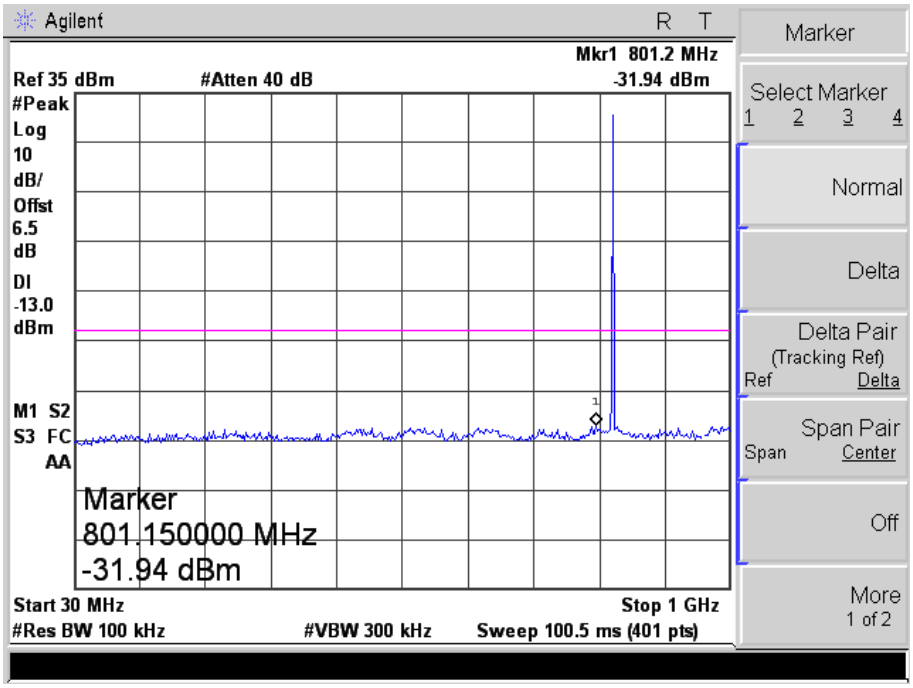
GSM Low Band Emission

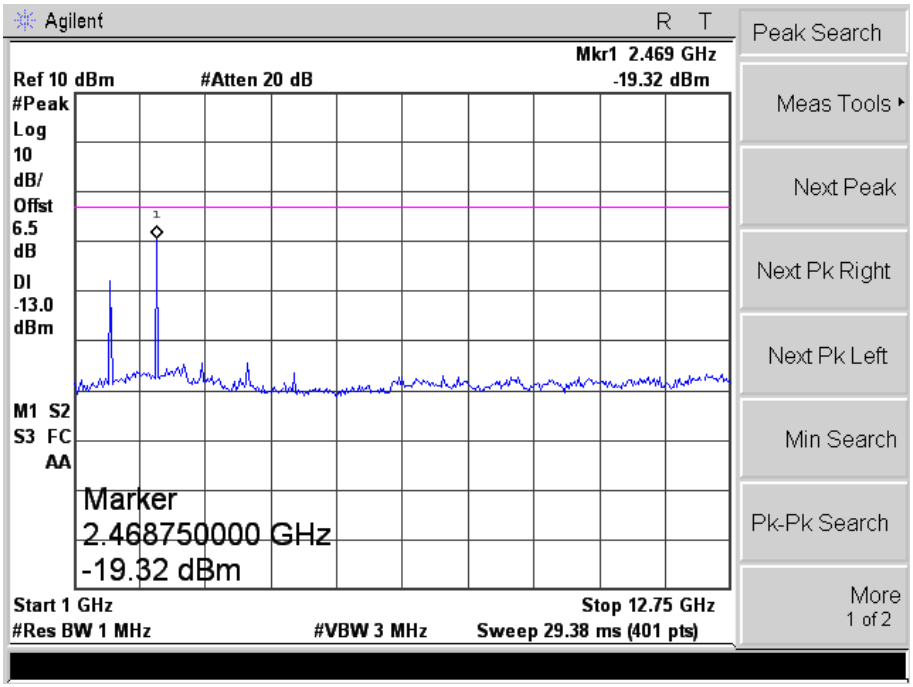



GSM High Band Emission

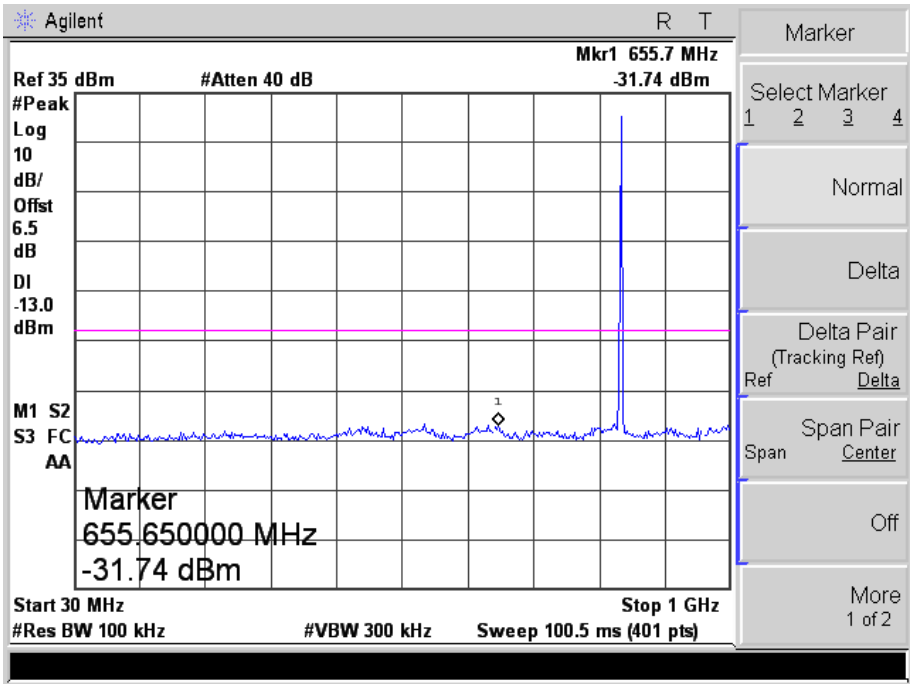


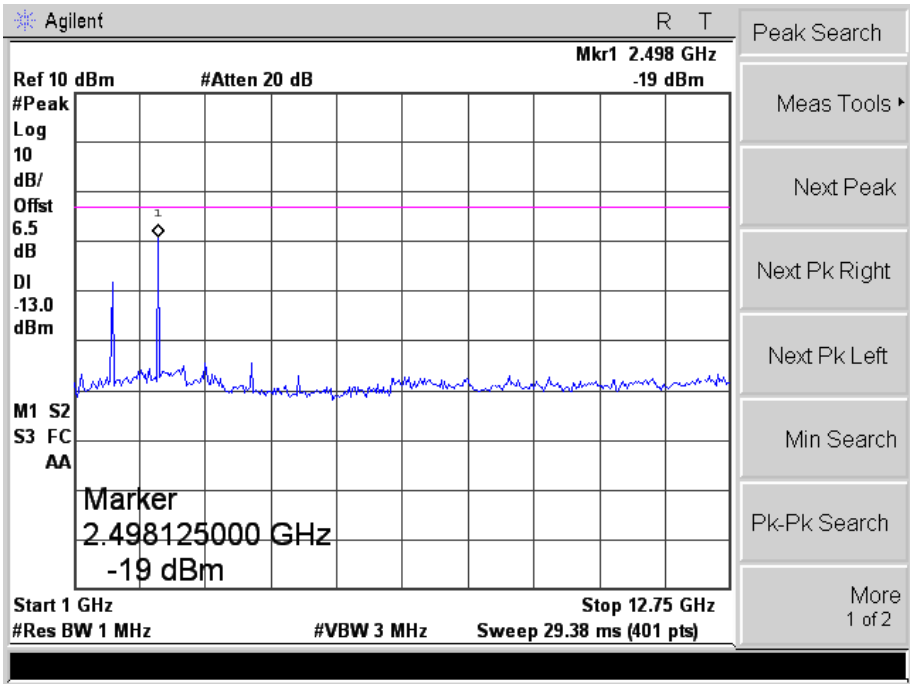
GPRS Low Channel



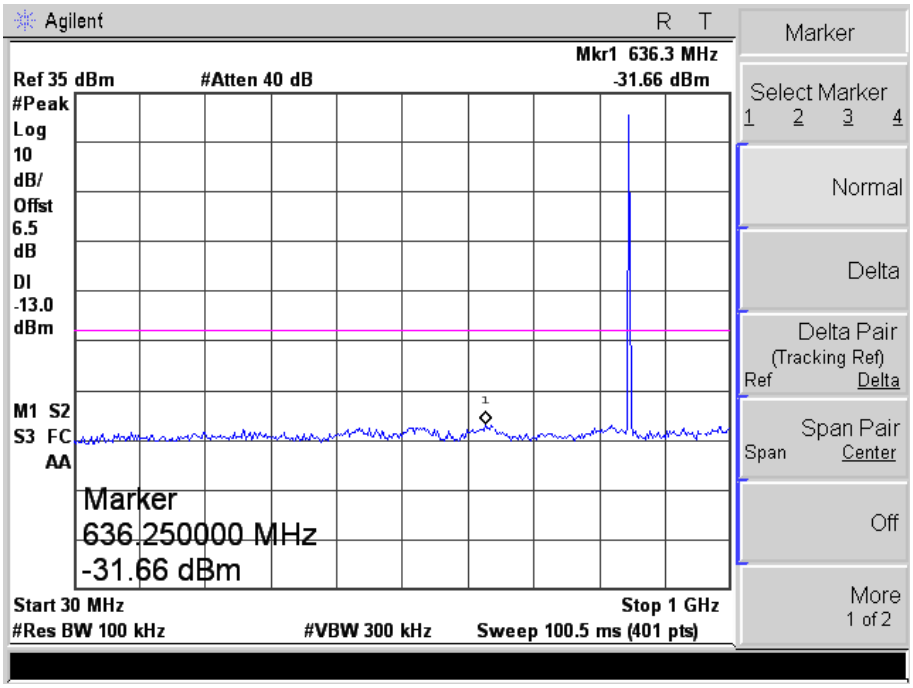



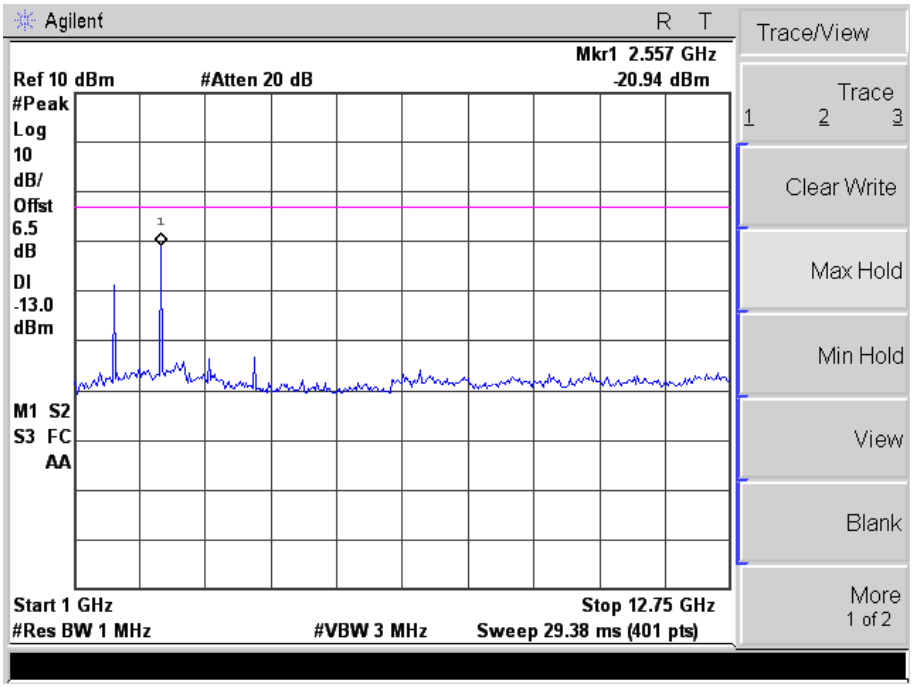
GPRS Middle Channel



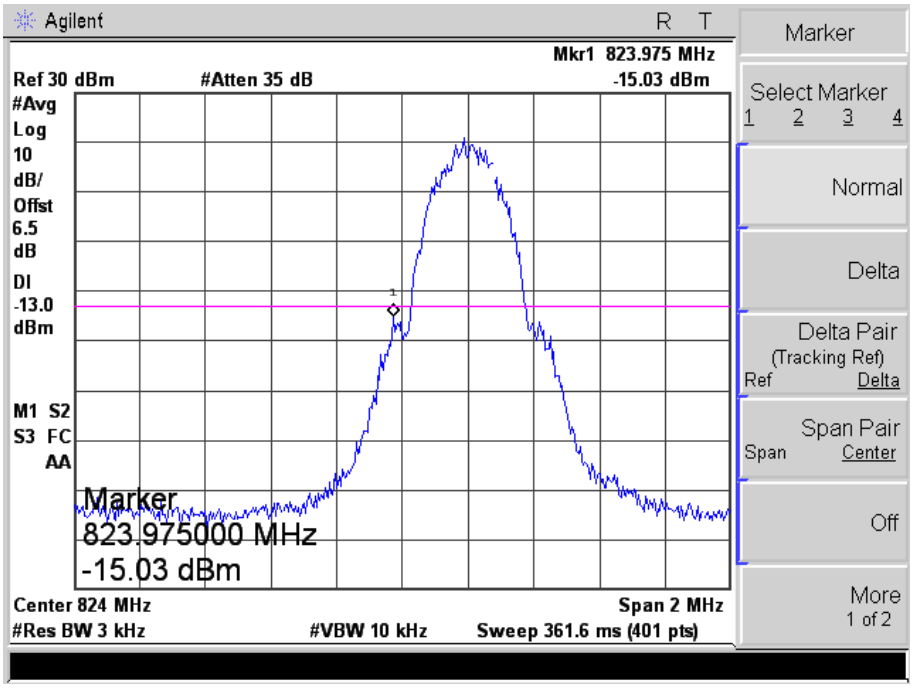



GPRS High Channel

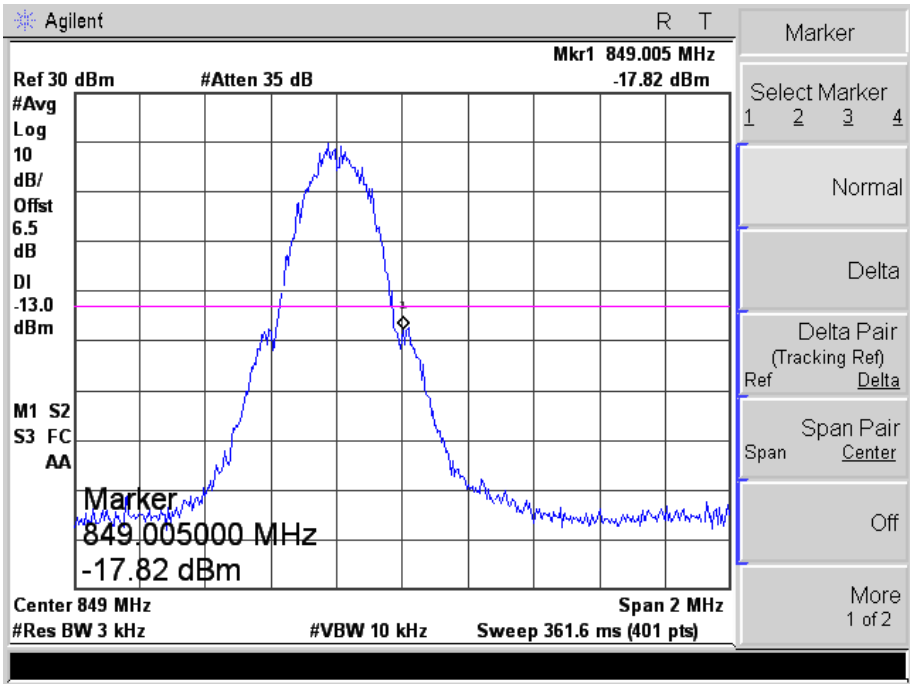


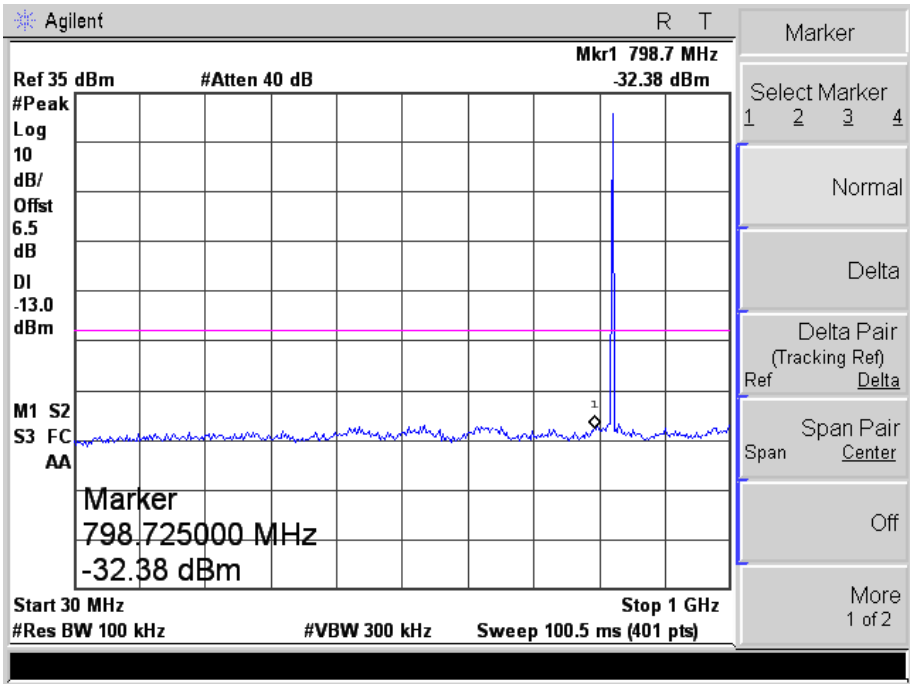
GPRS Low Band Emission

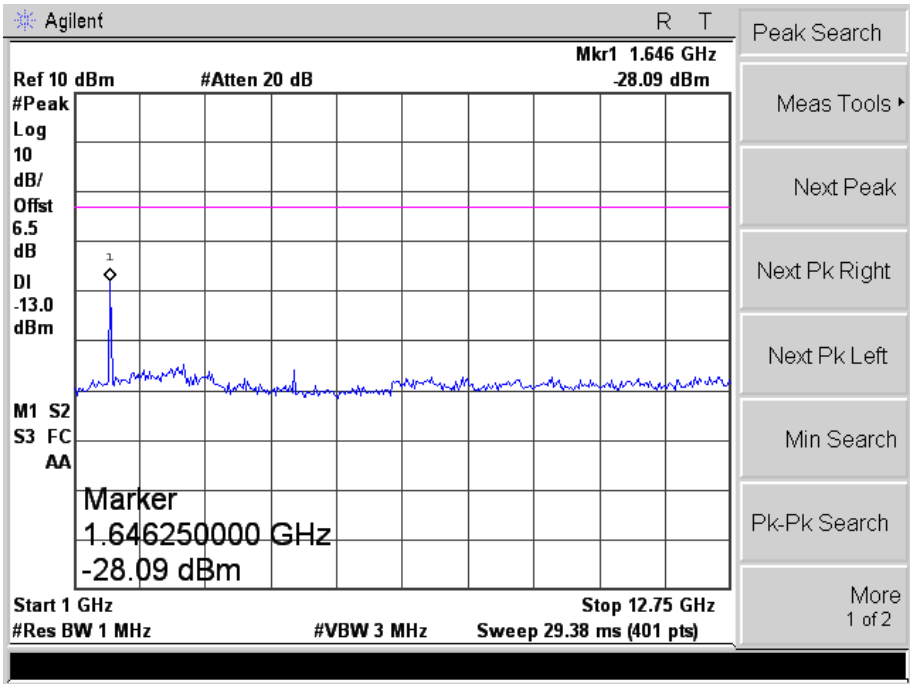



GPRS High Band Emission

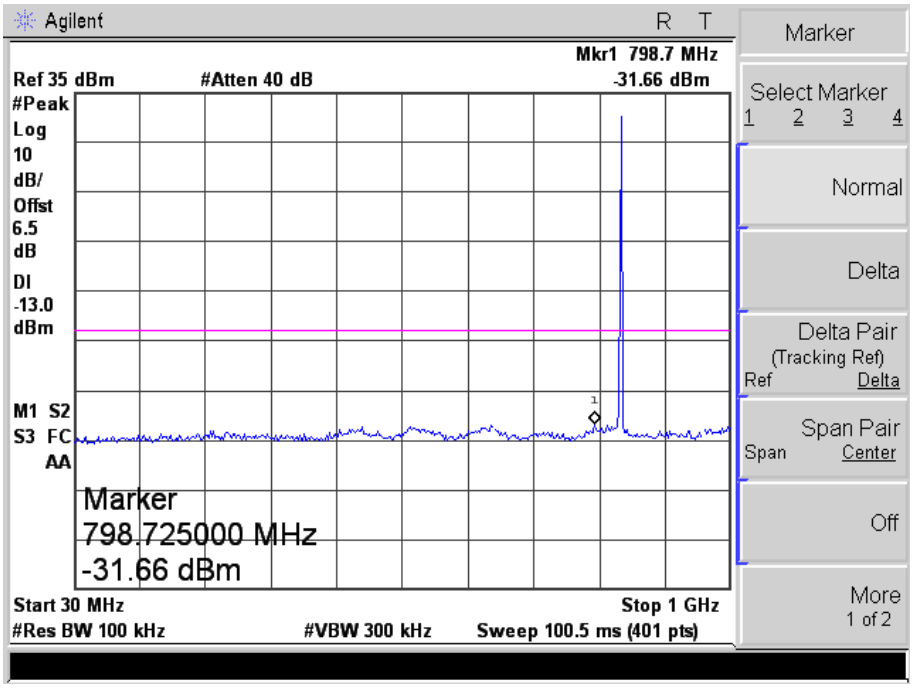


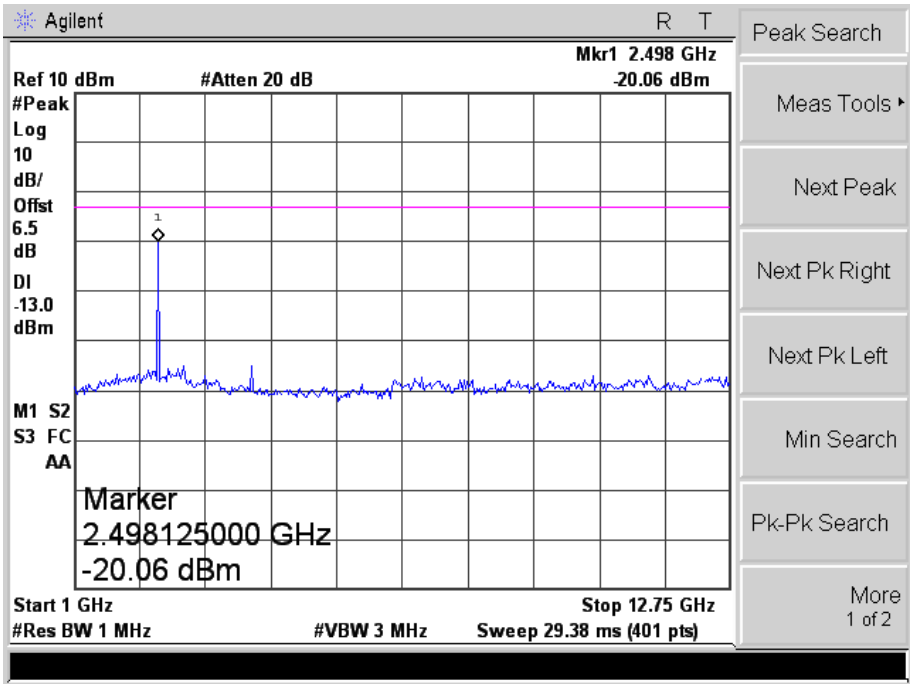
EDGE Low Channel



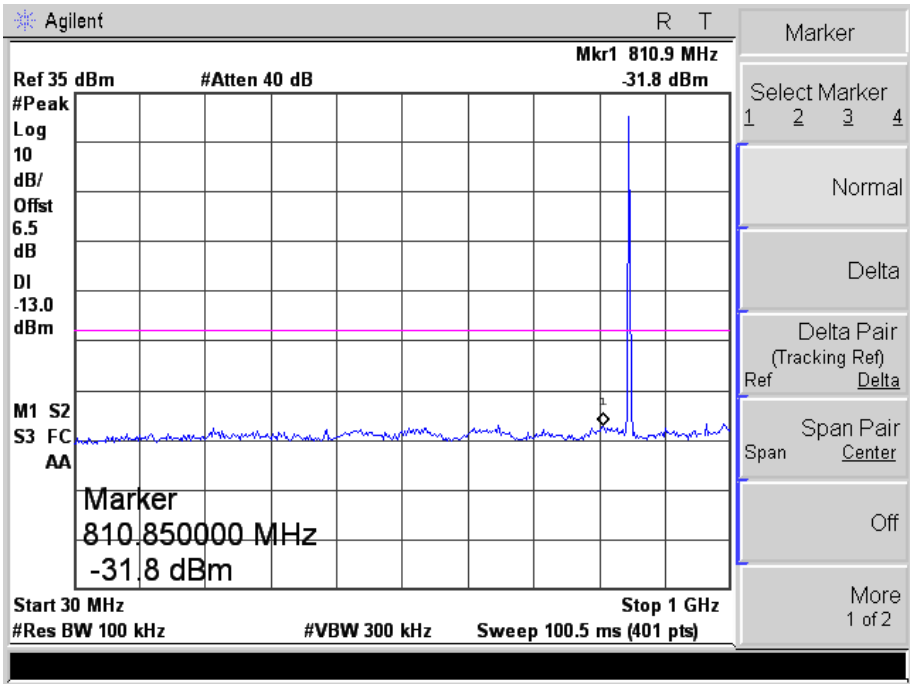



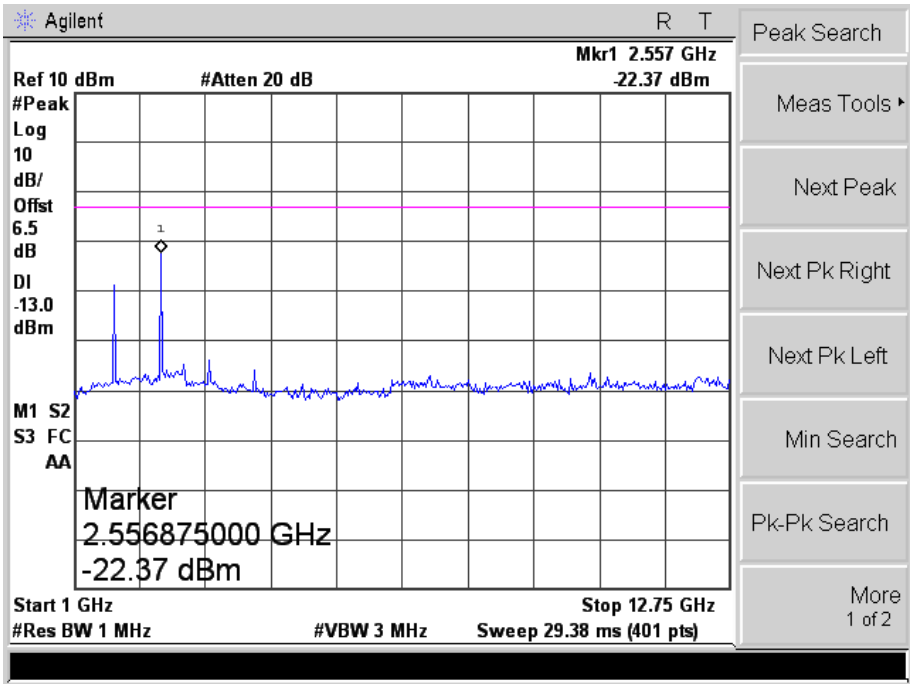
EDGE Middle Channel



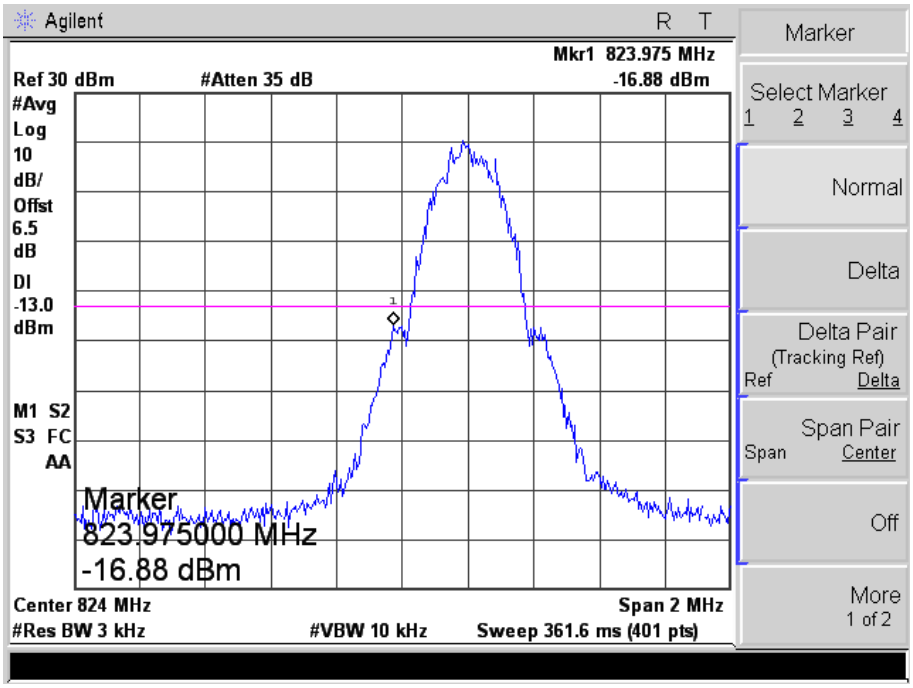



EDGE High Channel

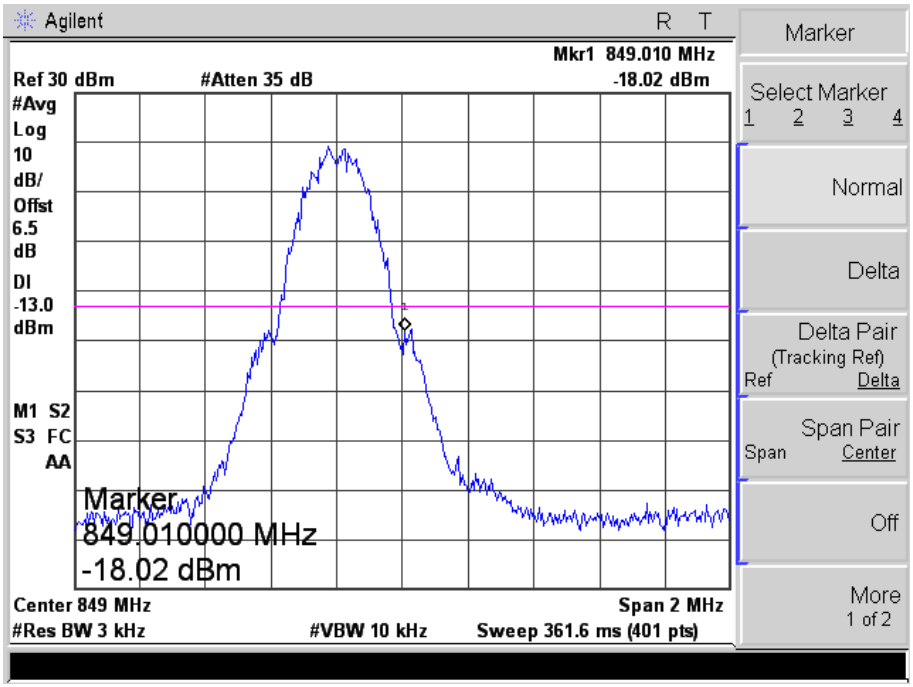


EDGE Low Band Emission

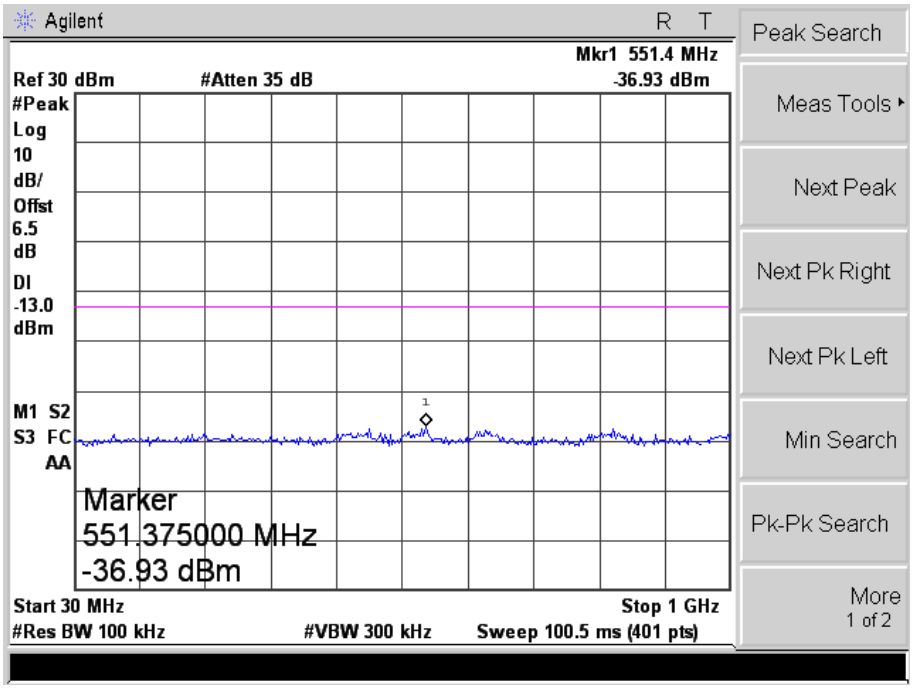


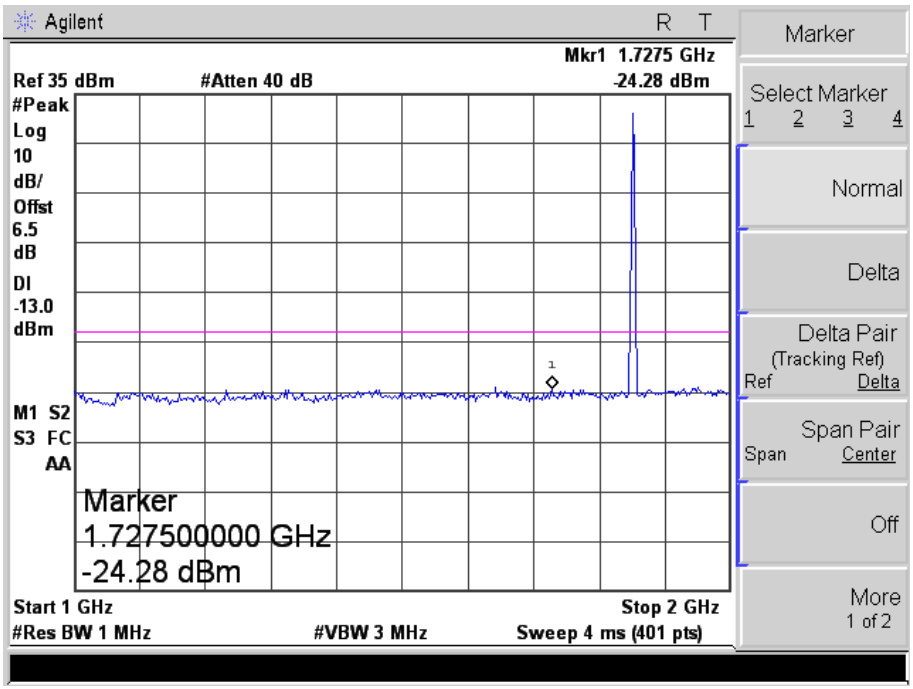

EDGE High Band Emission

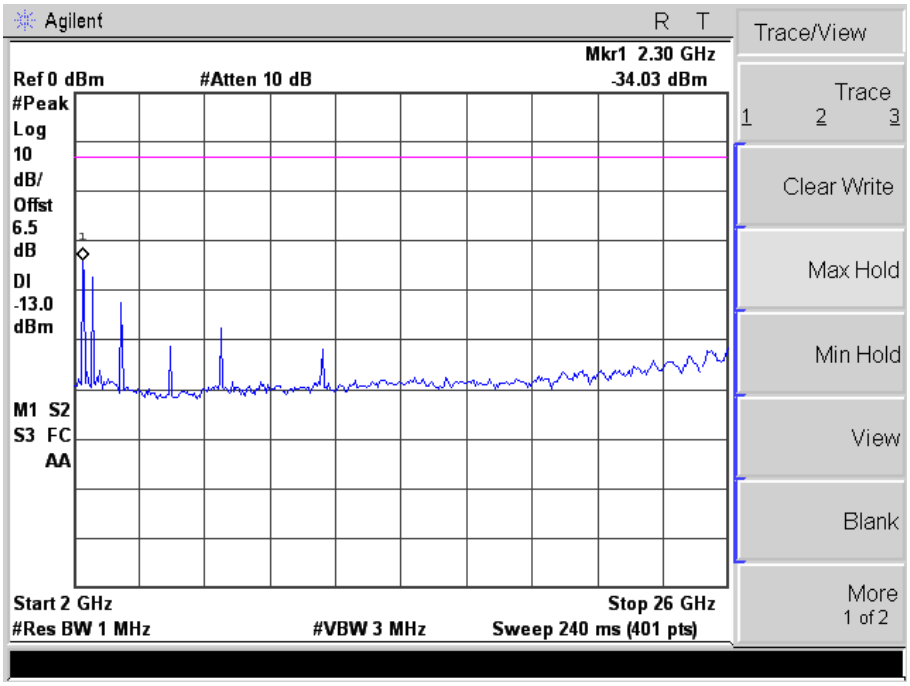


For PCS Band

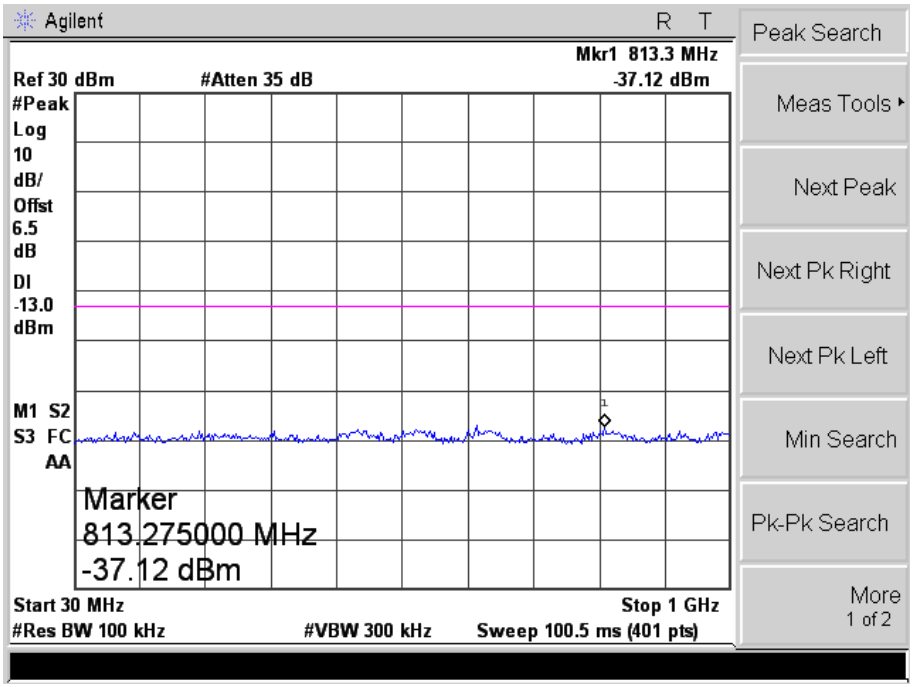
GSM Low Channel

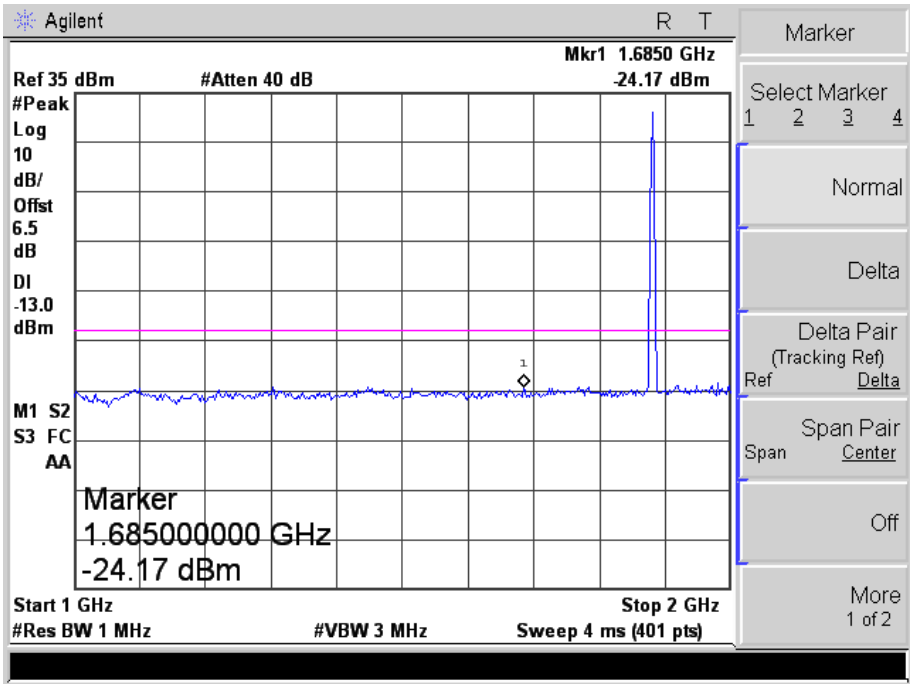


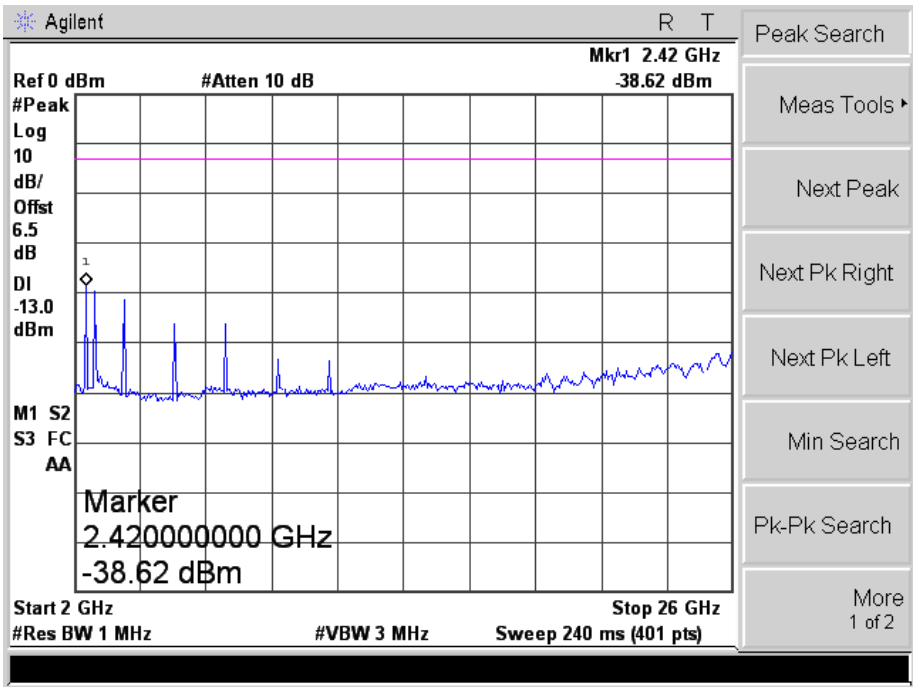





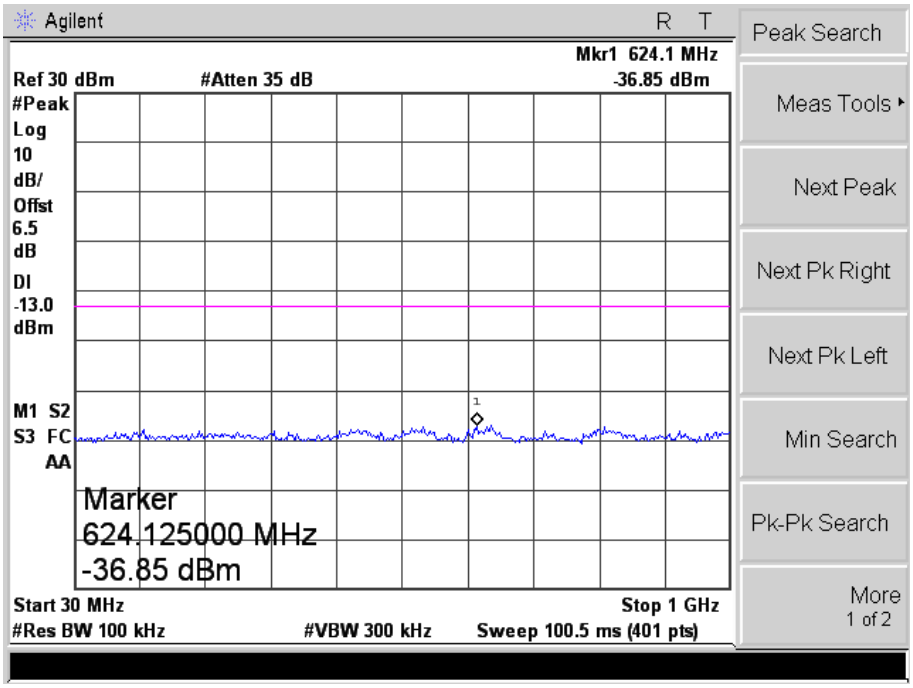

GSM Middle Channel

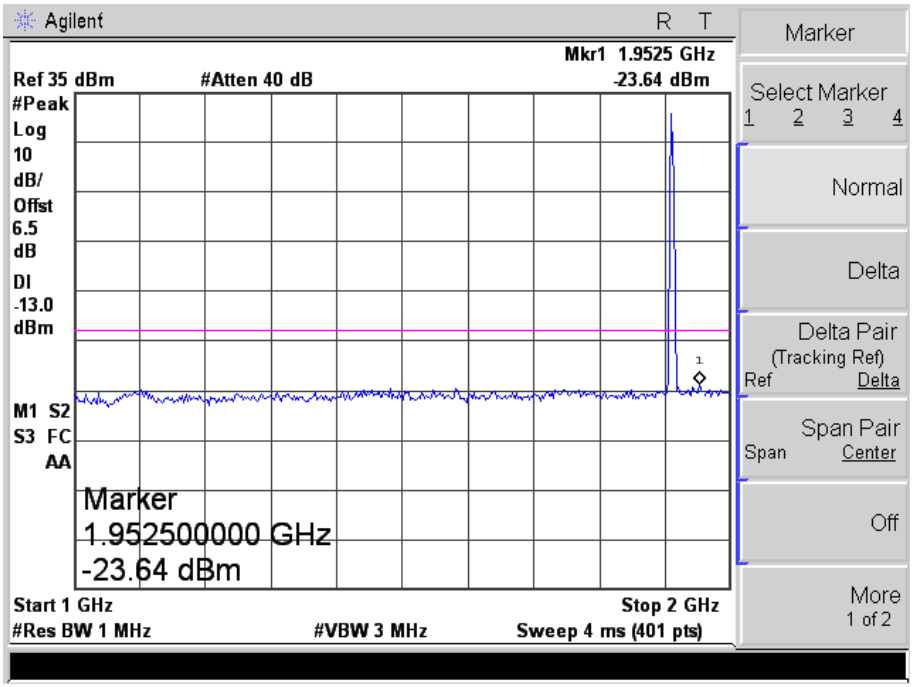


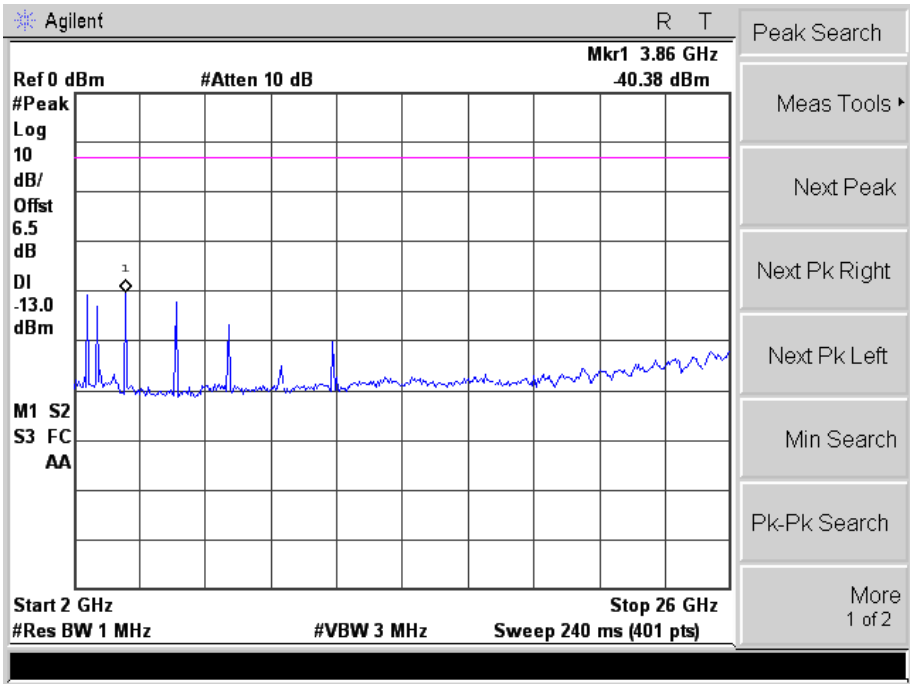

Agilent
R T
Mkr1 1.6850 GHz
Ref 35 dBm
#Atten 40 dB
-24.17 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.685000000 GHz
-24.17 dBm
Start 1 GHz
Stop 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 2.42 GHz
Ref 0 dBm
#Atten 10 dB
-38.62 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
2.420000000 GHz
-38.62 dBm
Start 2 GHz
Stop 26 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

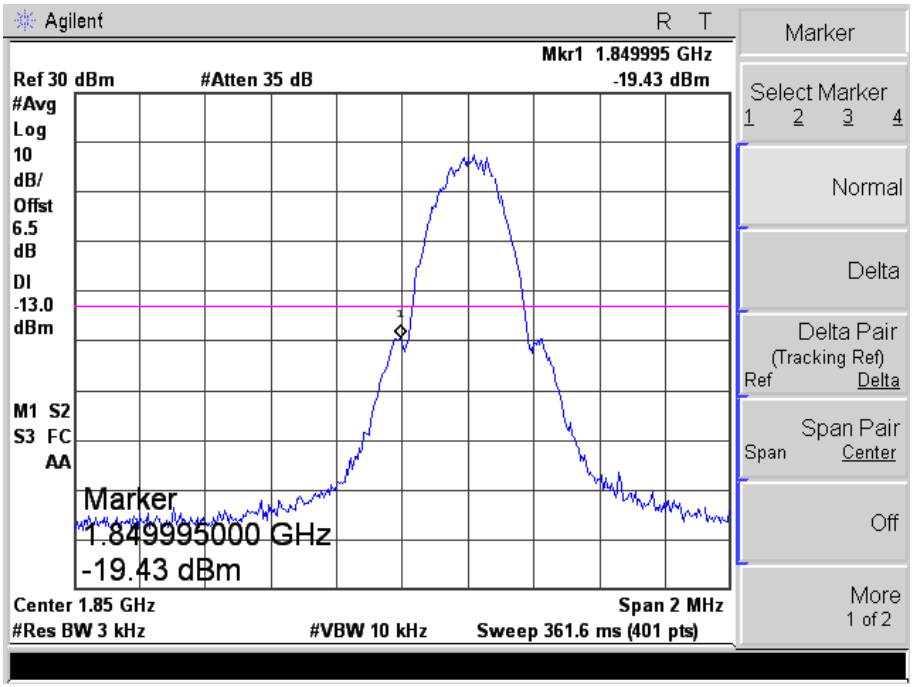
GSM High Channel



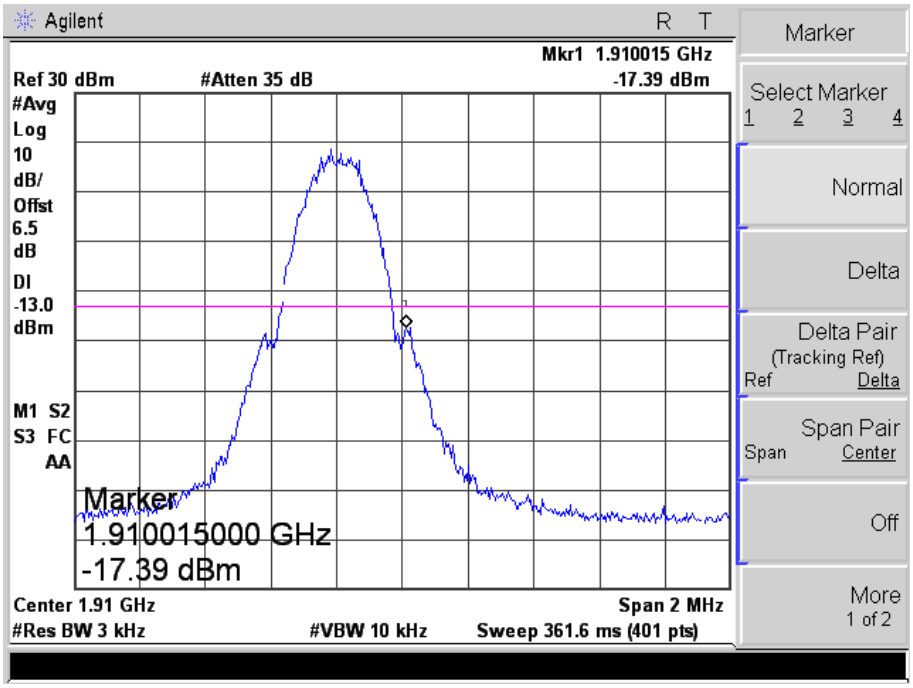





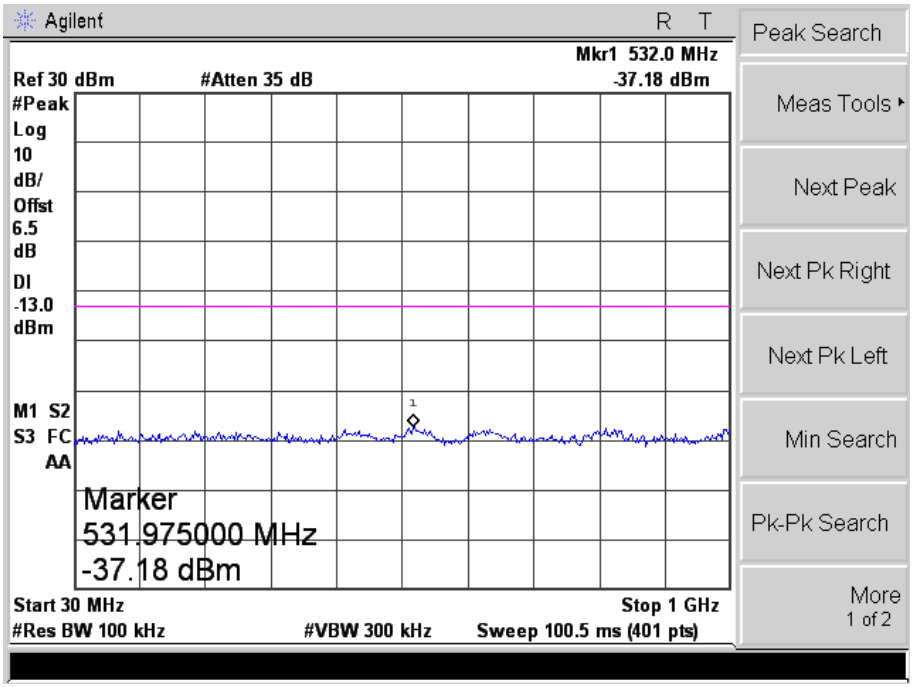

GSM Low Band Emission

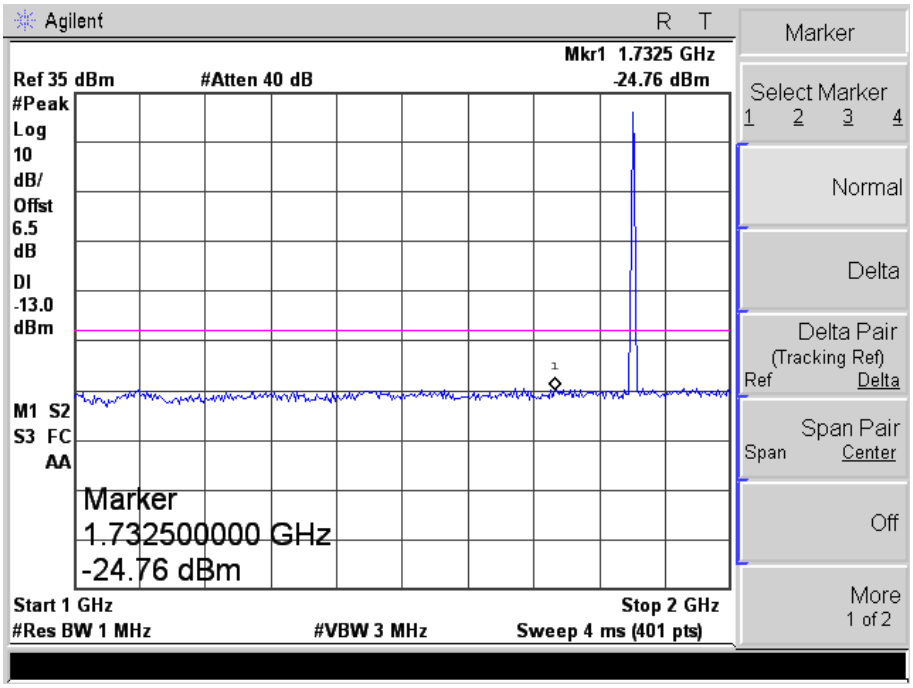


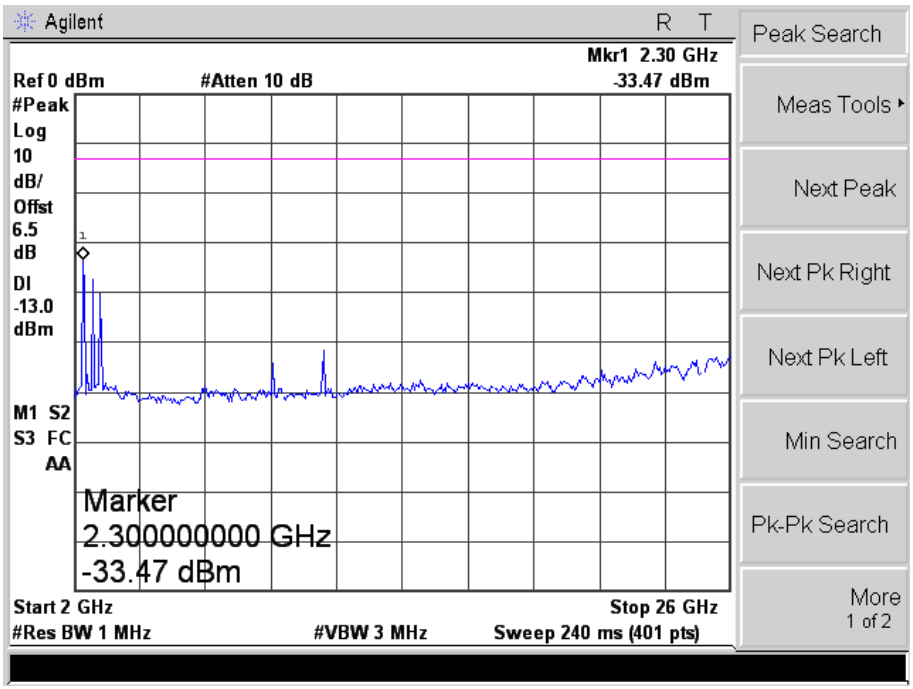
GSM High Band Emission



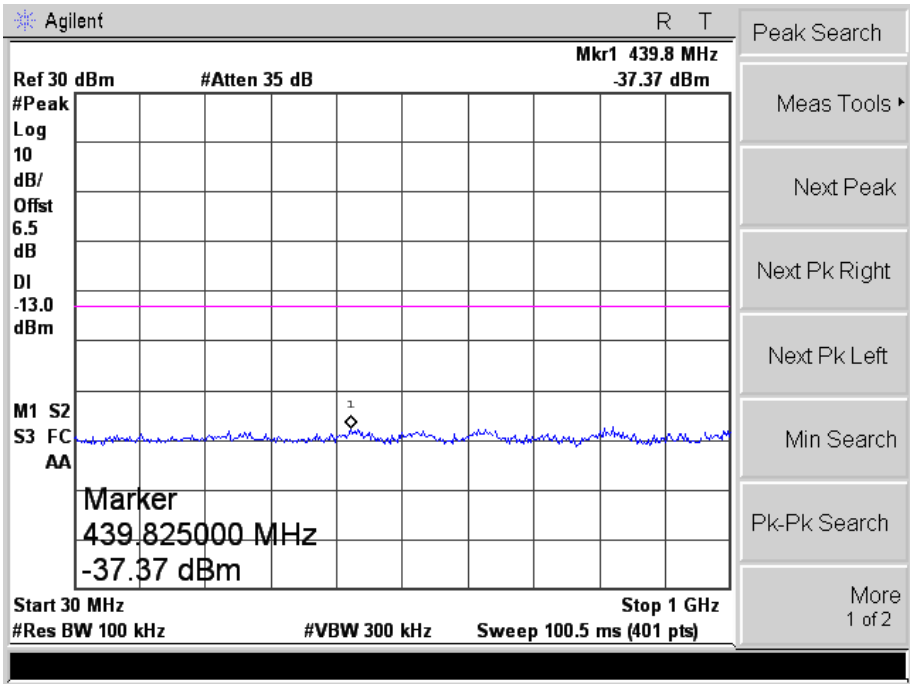

GPRS Low Channel

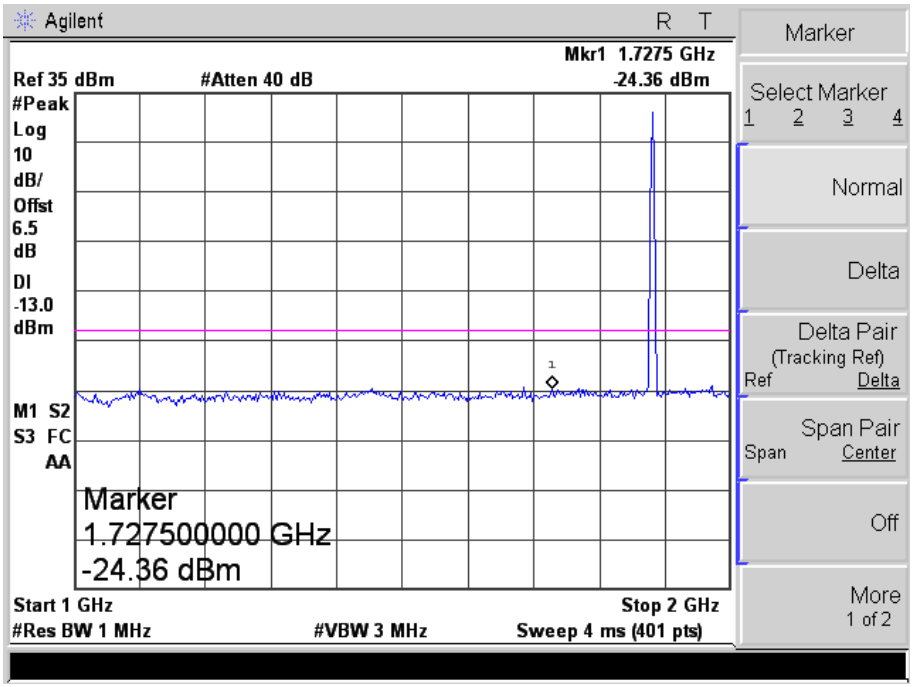


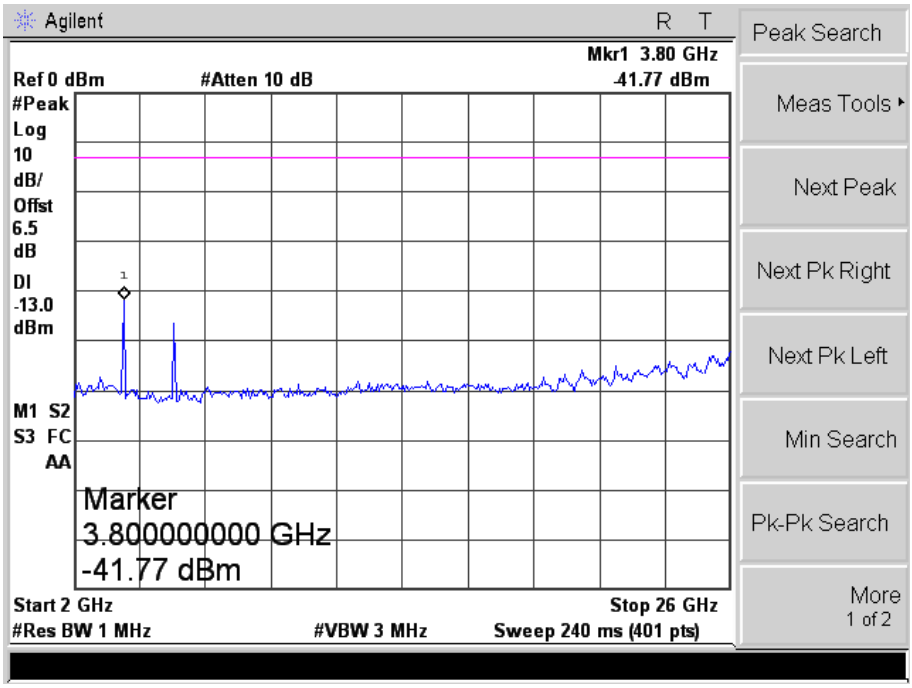

Agilent
R T
Mkr1 1.7325 GHz
-24.76 dBm
Ref 35 dBm
#Atten 40 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.732500000 GHz
-24.76 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 2.30 GHz
-33.47 dBm
Ref 0 dBm
#Atten 10 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
2.300000000 GHz
-33.47 dBm
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

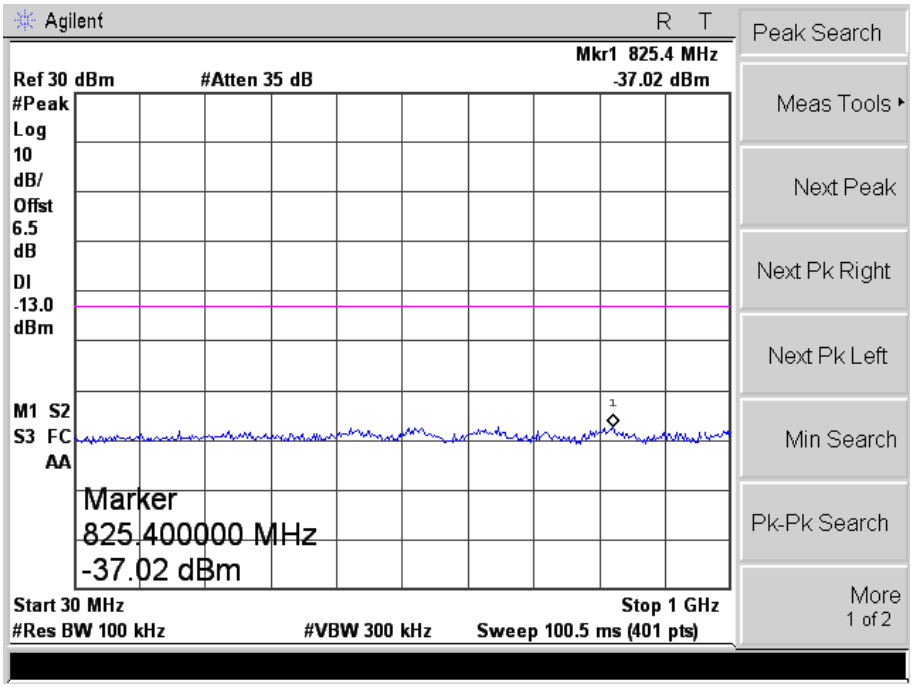
GPRS Middle Channel

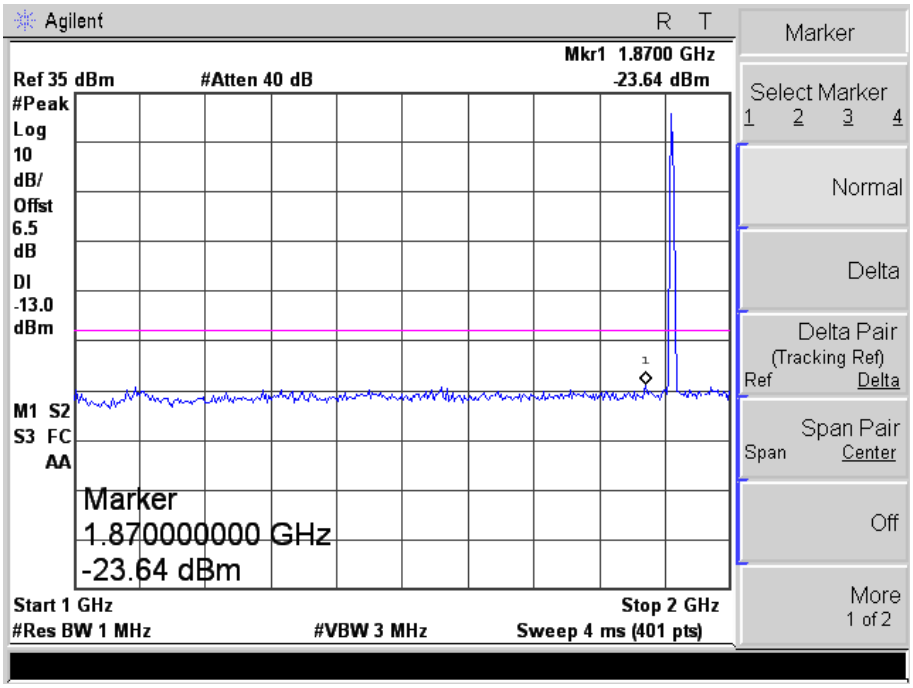


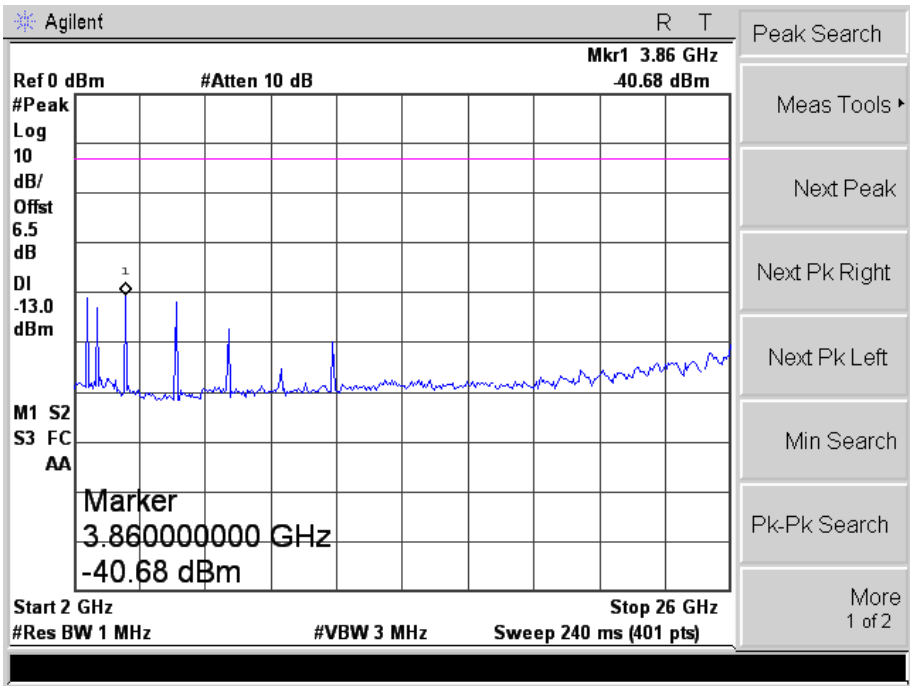





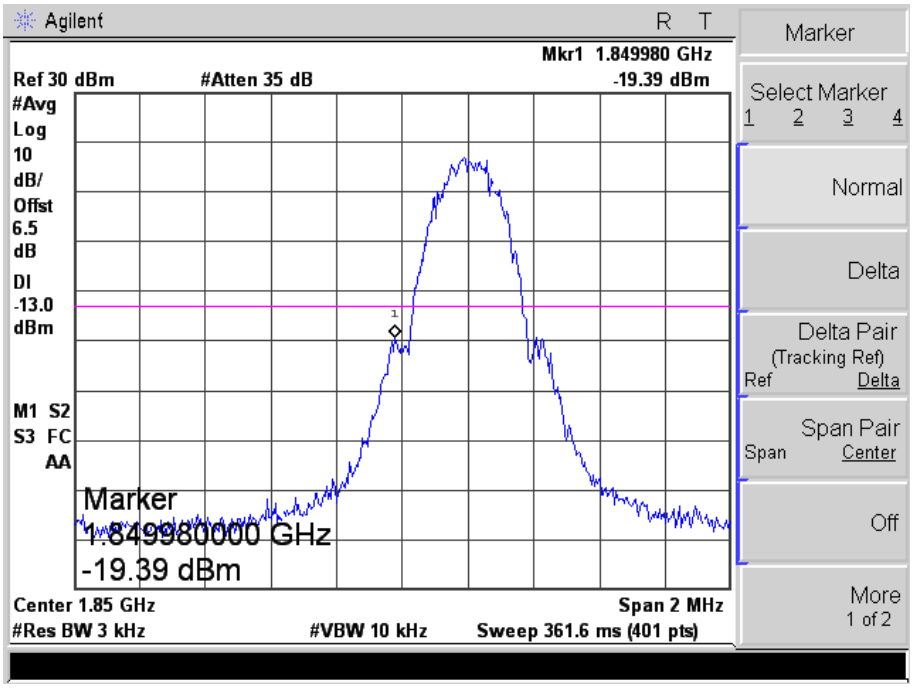

GPRS High Channel



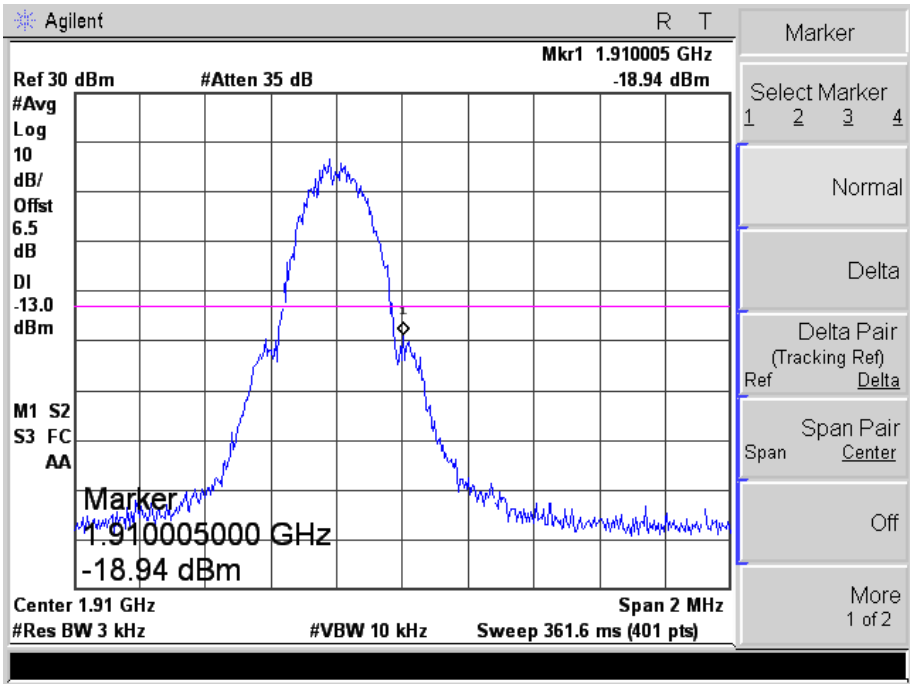

Agilent
R T
Mkr1 1.8700 GHz
-23.64 dBm
Ref 35 dBm
#Atten 40 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.870000000 GHz
-23.64 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 3.86 GHz
-40.68 dBm
Ref 0 dBm
#Atten 10 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
3.860000000 GHz
-40.68 dBm
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

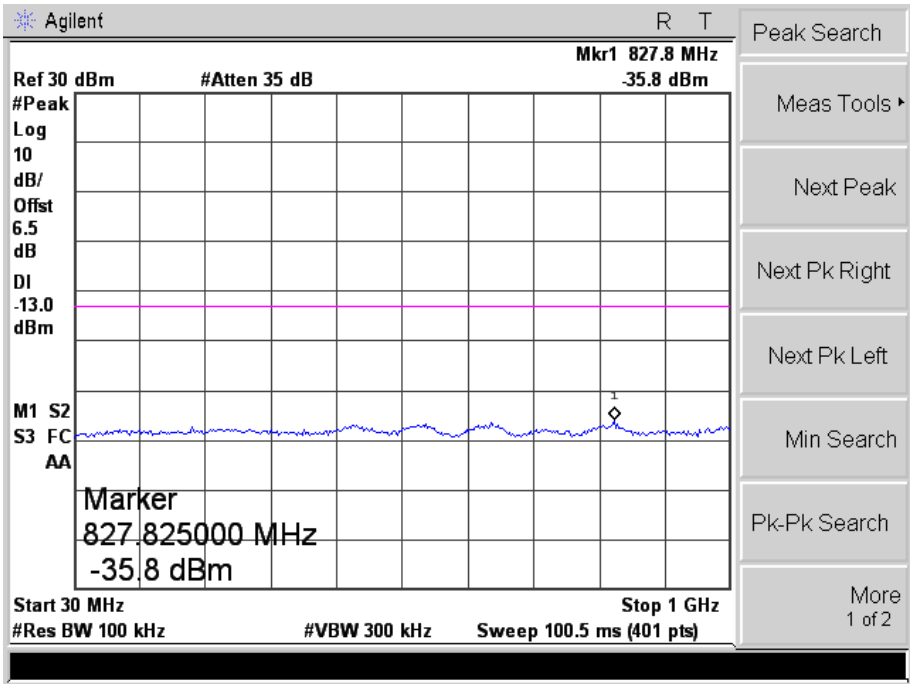
GPRS Low Band Emission

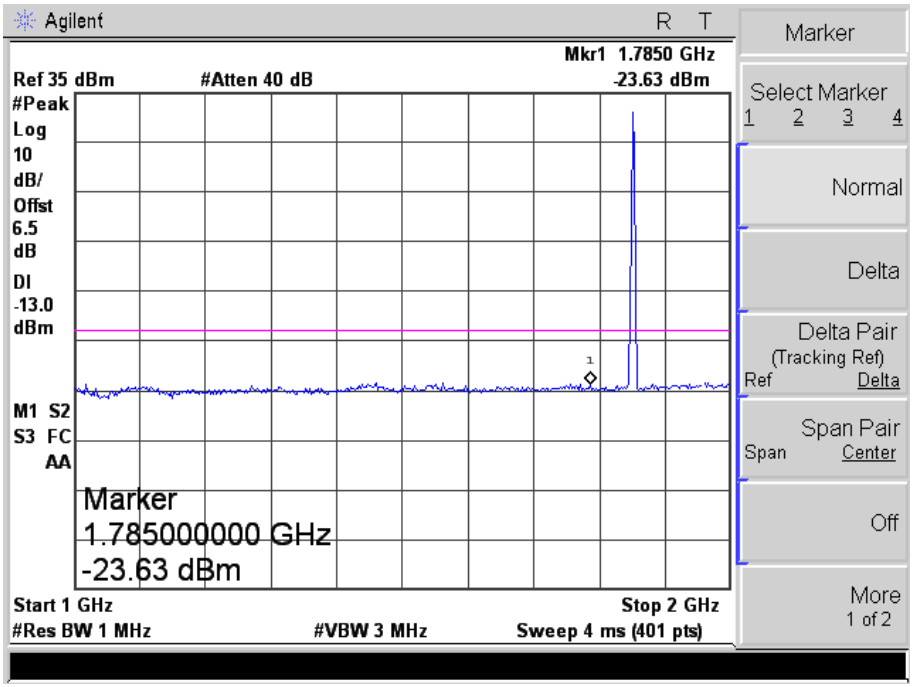


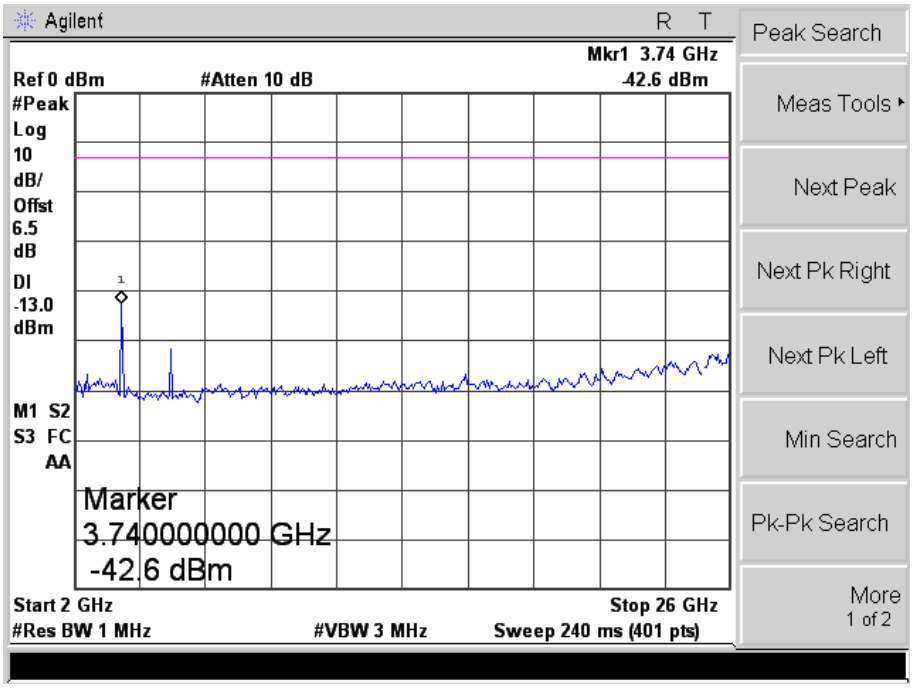

GPRS High Band Emission



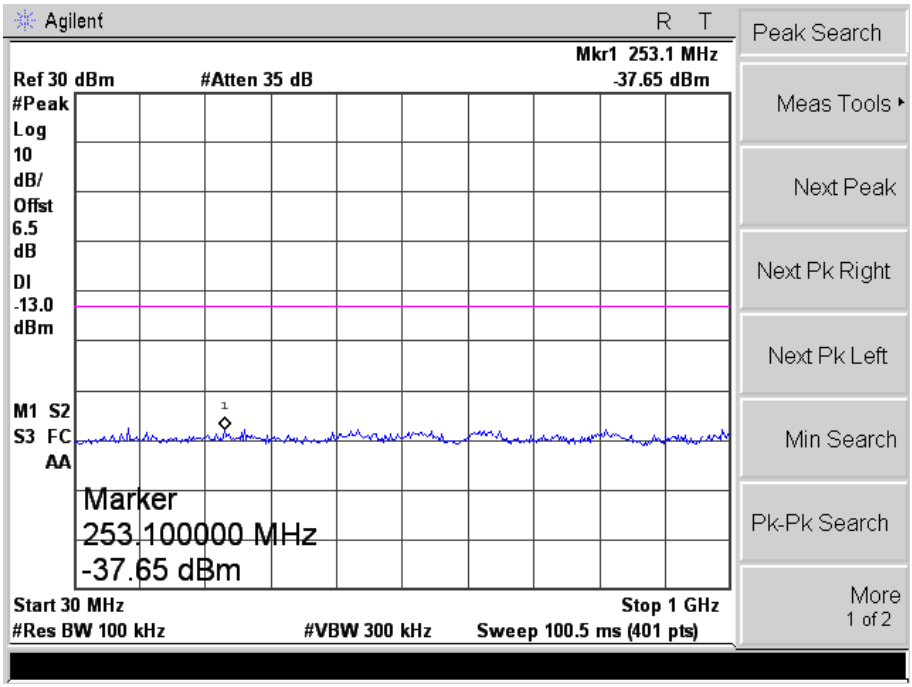
EDGE Low Channel

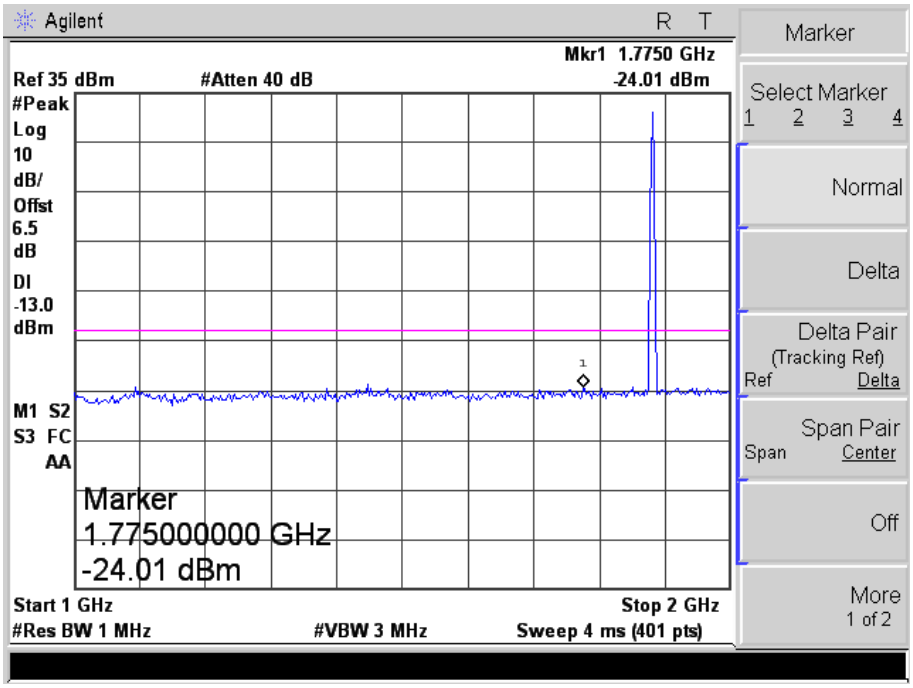


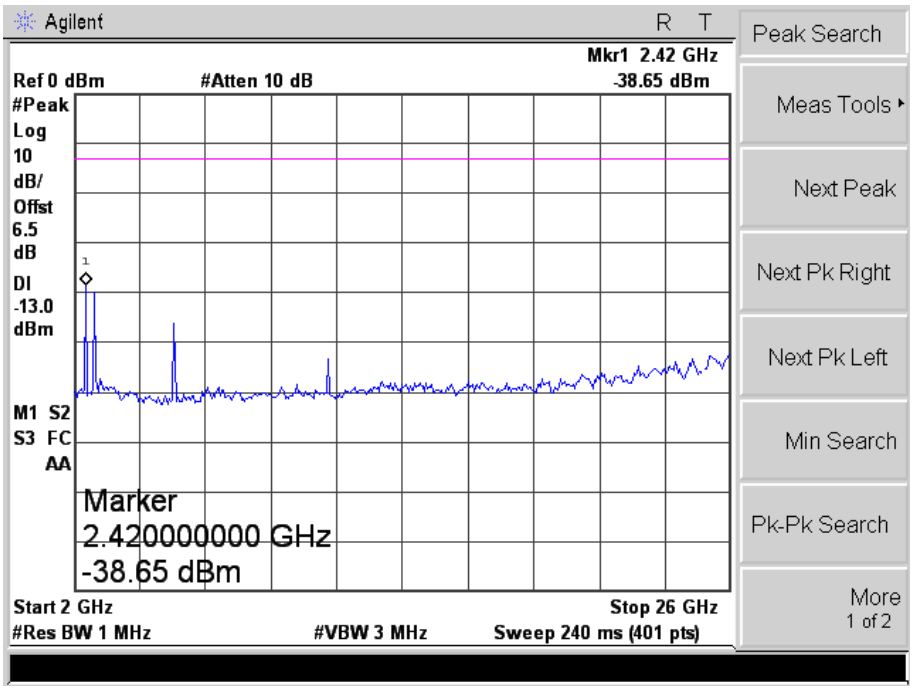





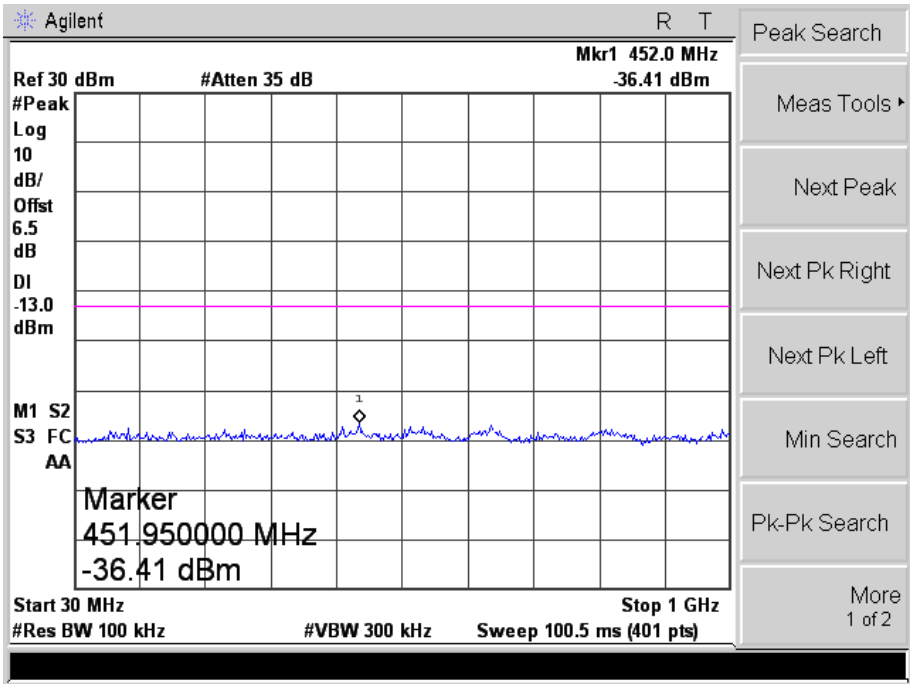

EDGE Middle Channel

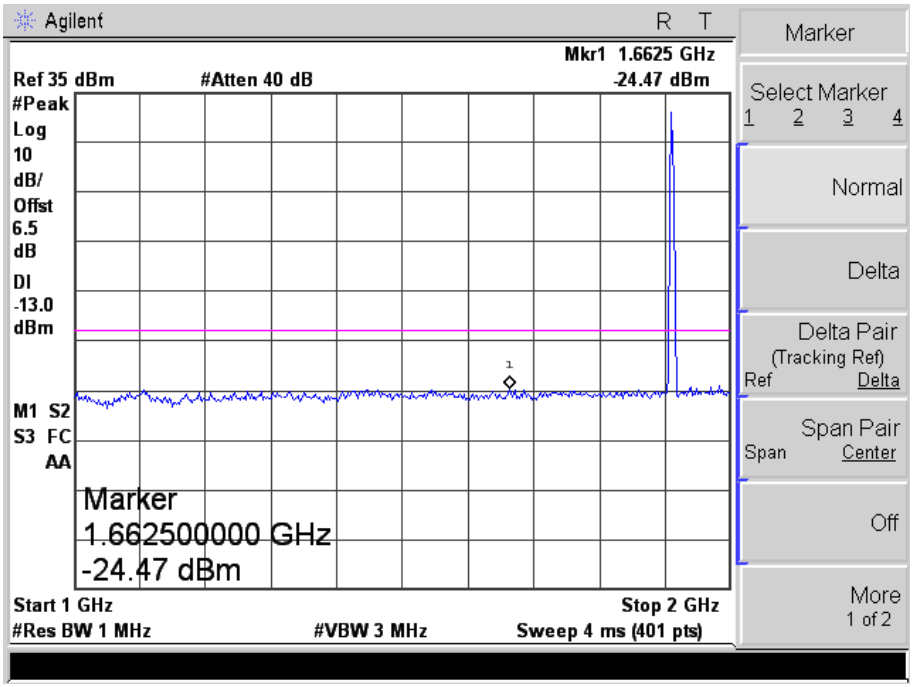


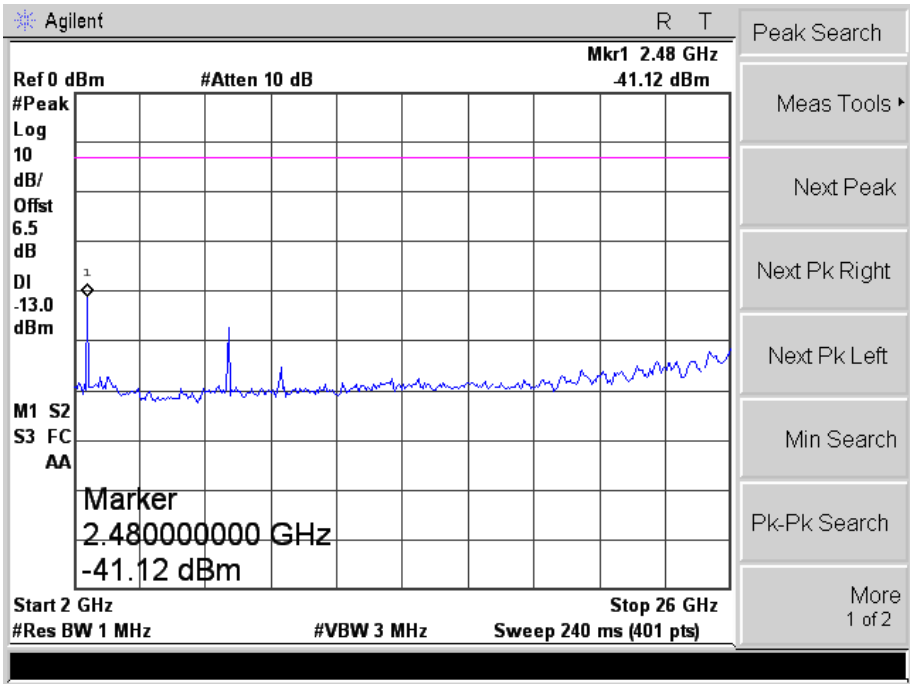

Agilent
R T
Mkr1 1.7750 GHz
Ref 35 dBm
#Atten 40 dB
-24.01 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.775000000 GHz
-24.01 dBm
Start 1 GHz
Stop 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 2.42 GHz
Ref 0 dBm
#Atten 10 dB
-38.65 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
2.420000000 GHz
-38.65 dBm
Start 2 GHz
Stop 26 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

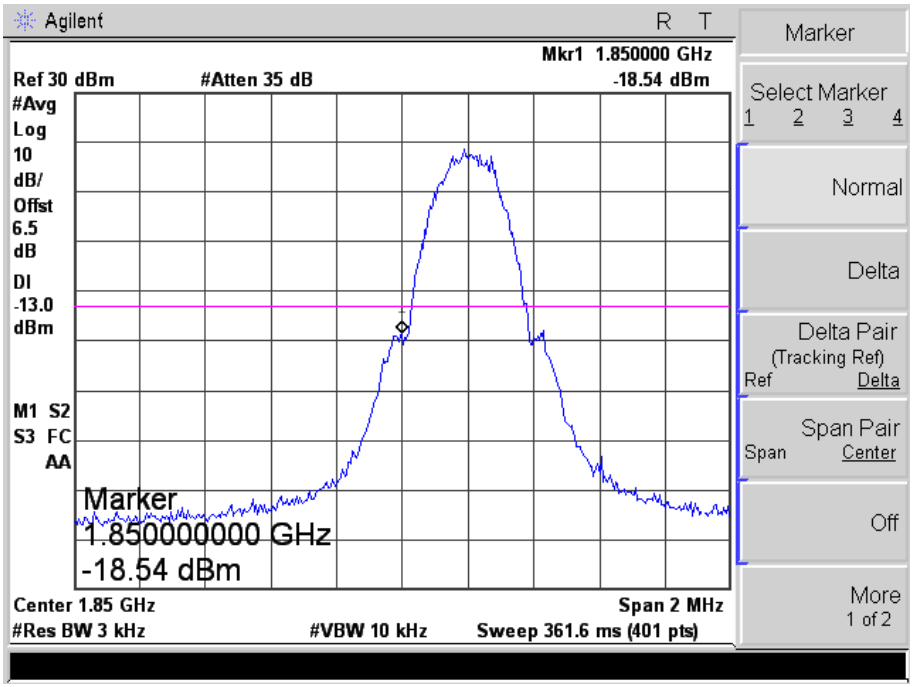
EDGE High Channel



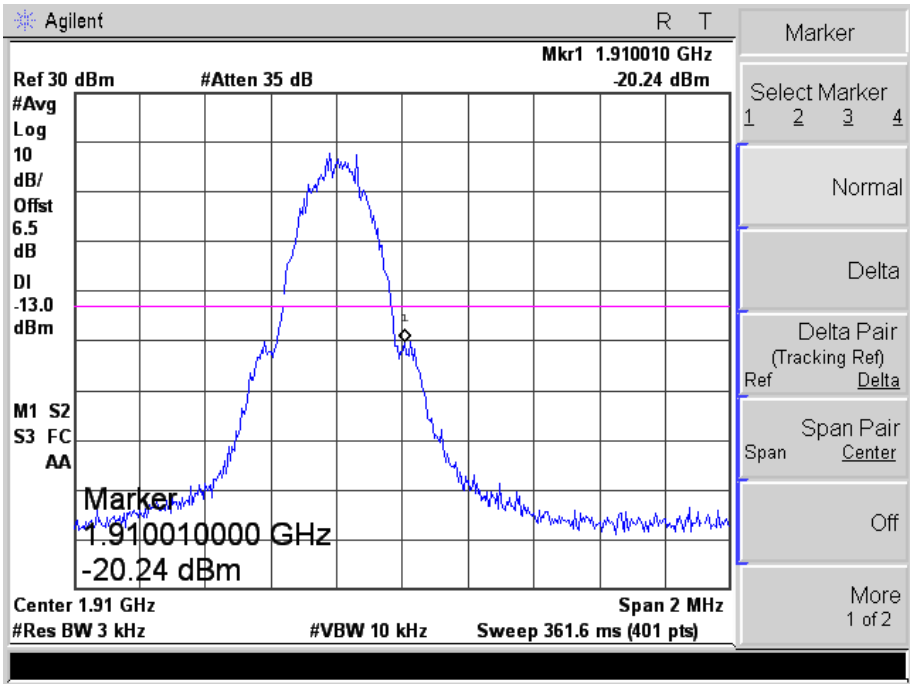






EDGE Low Band Emission

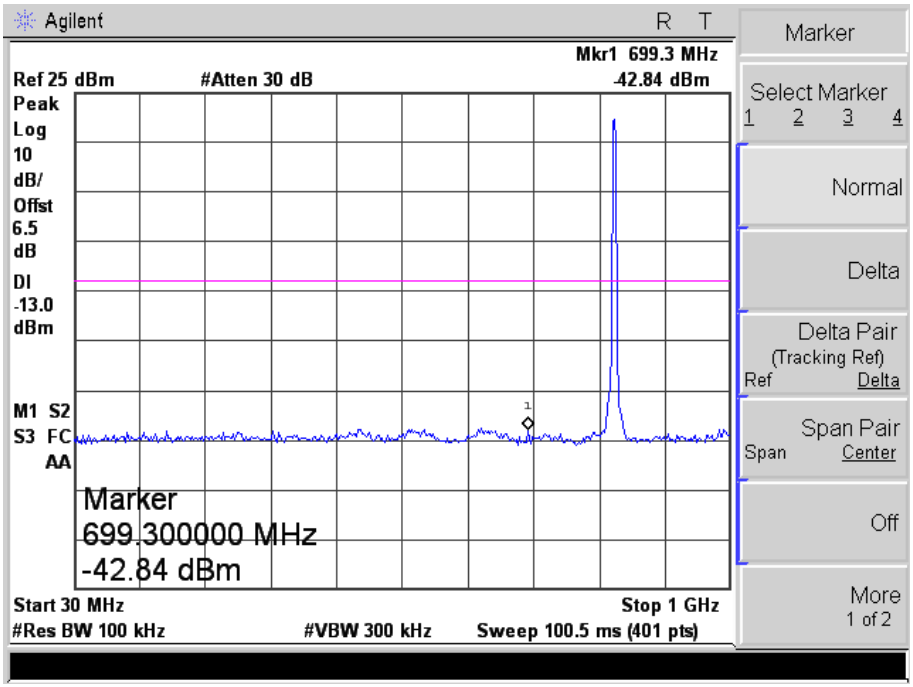


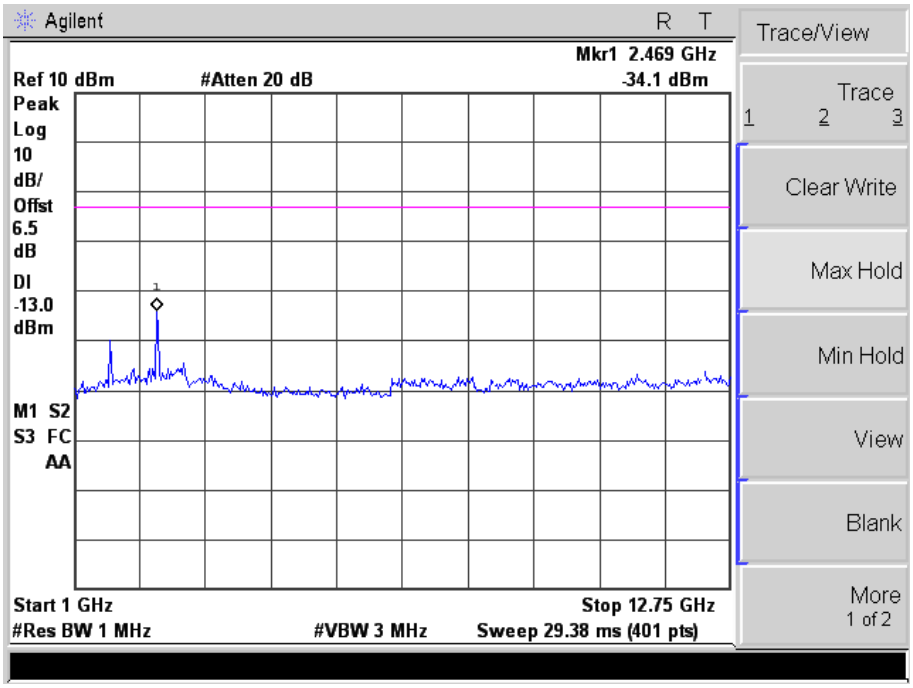
EDGE High Band Emission



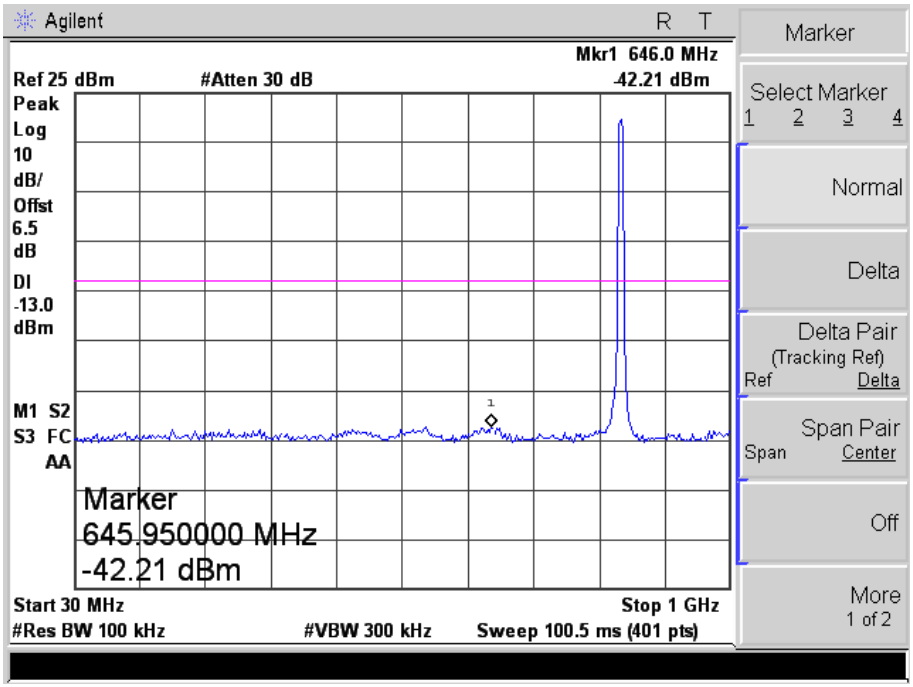

**For Band V**

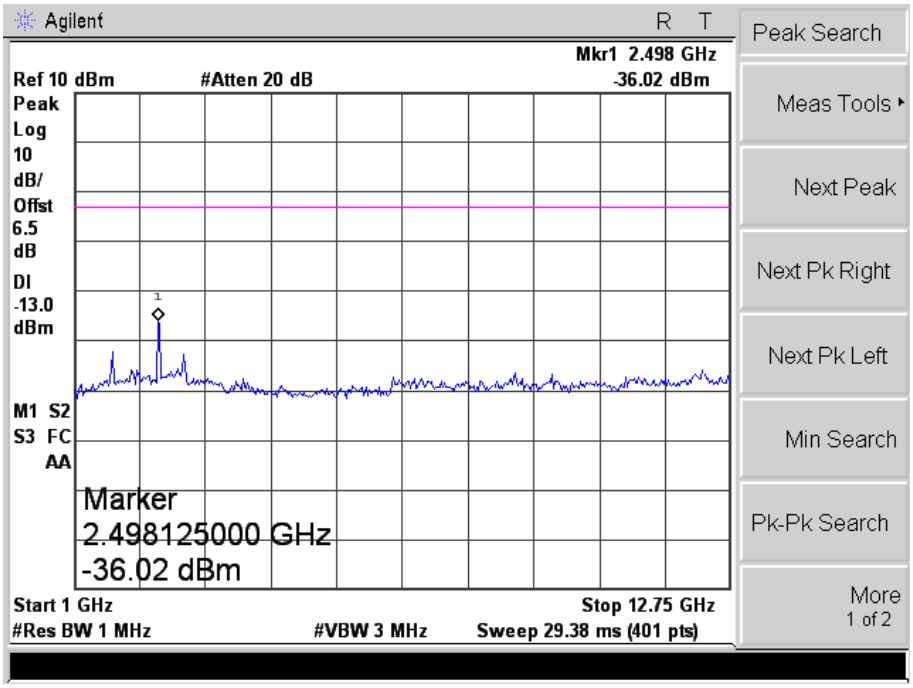
WCDMA Low Channel



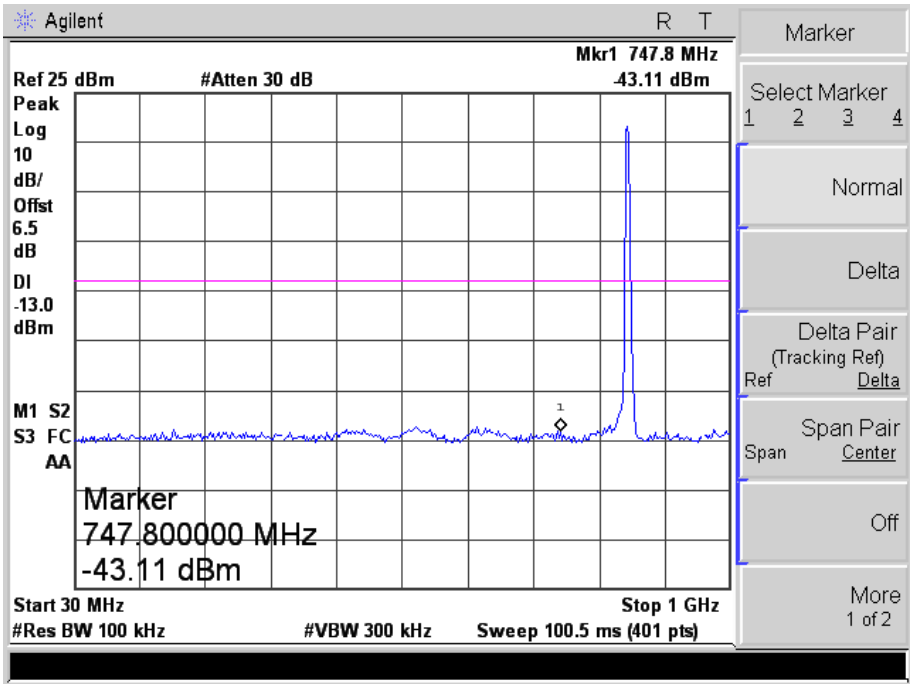


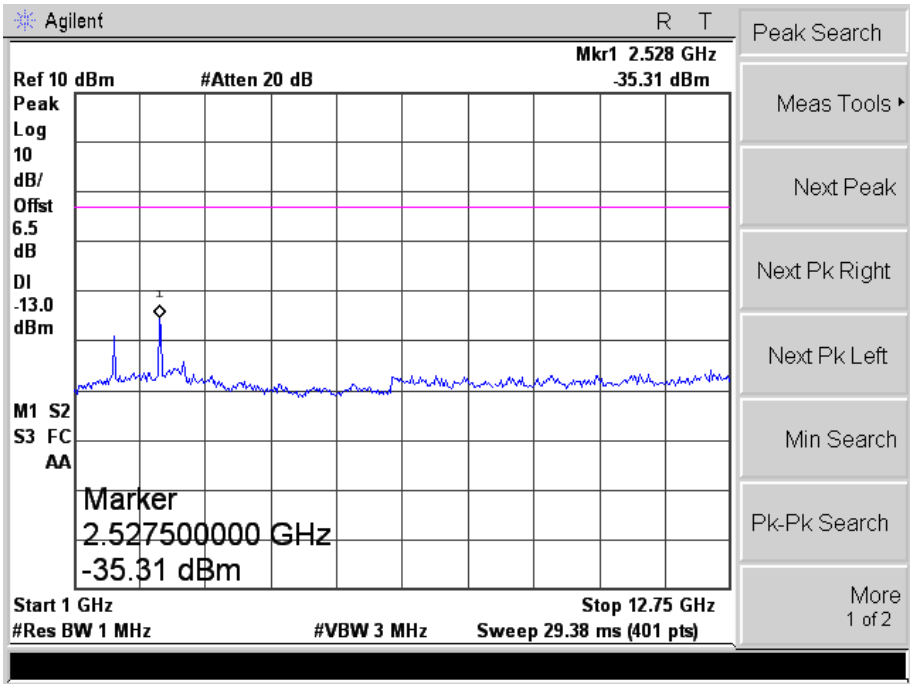

WCDMA Middle Channel



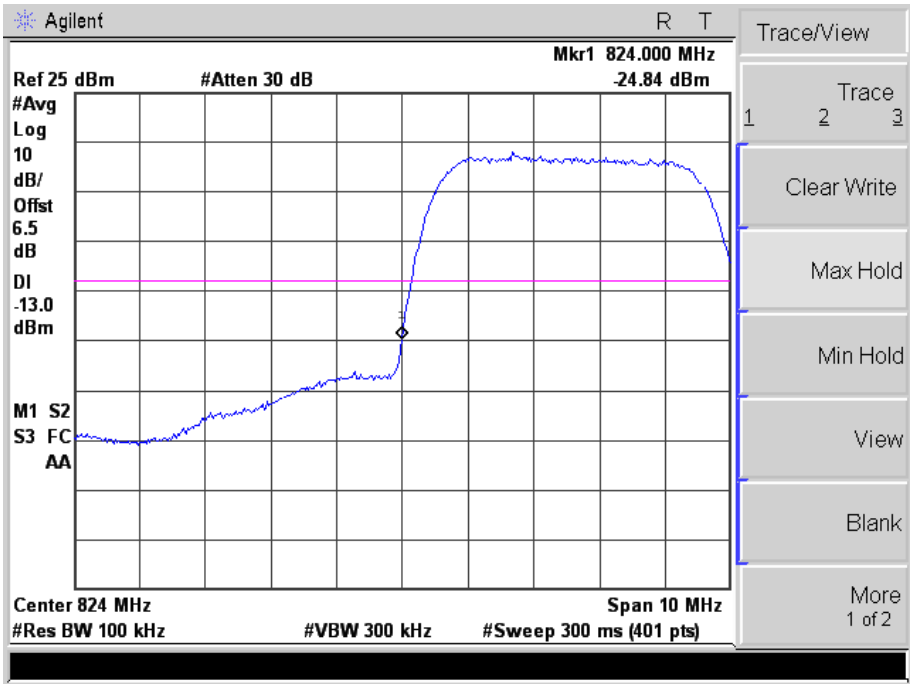



WCDMA High Channel

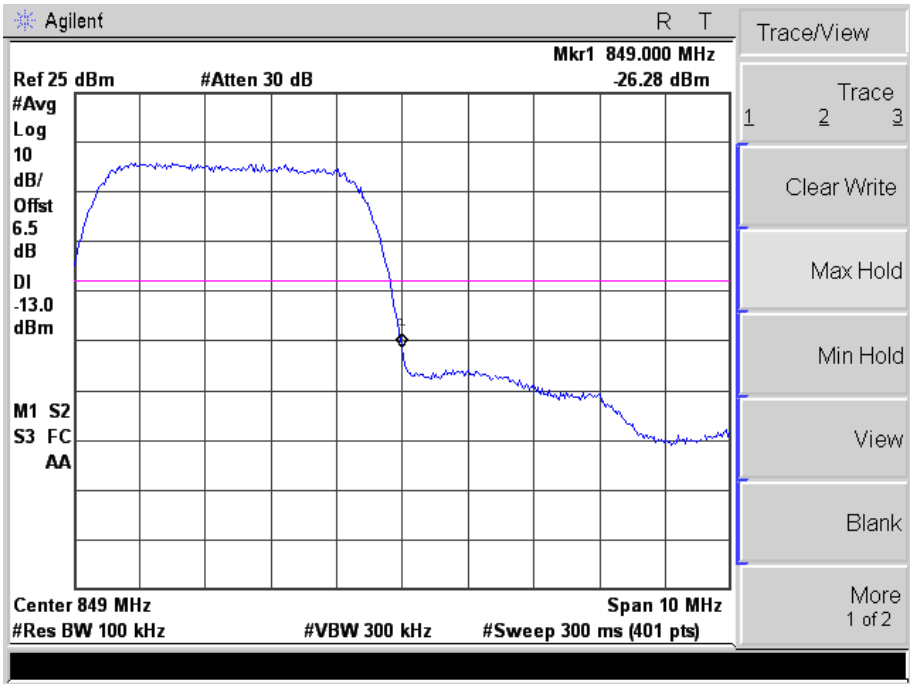




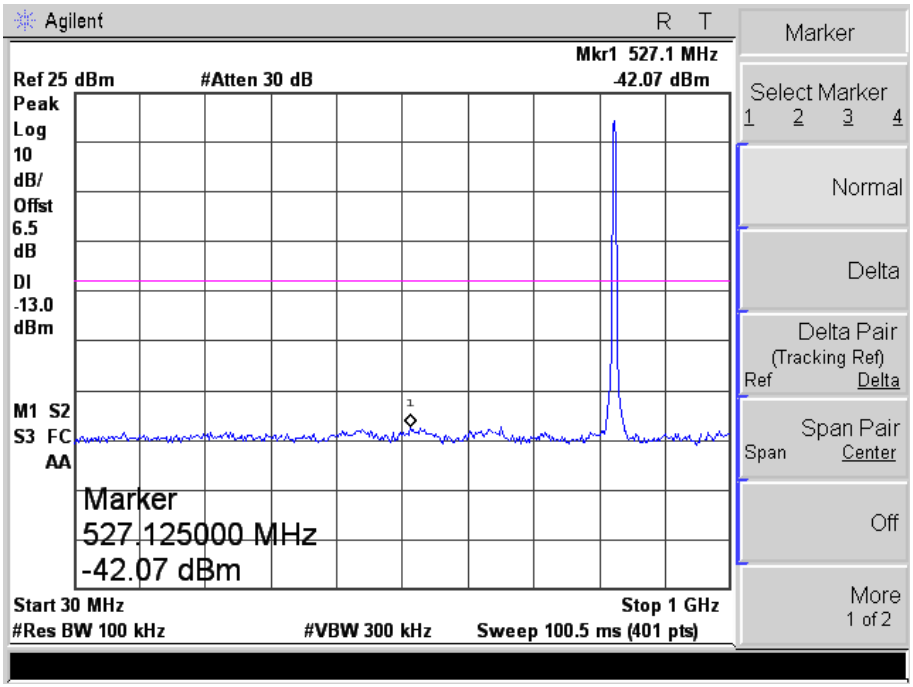

WCDMA Low Band Spurious Emission

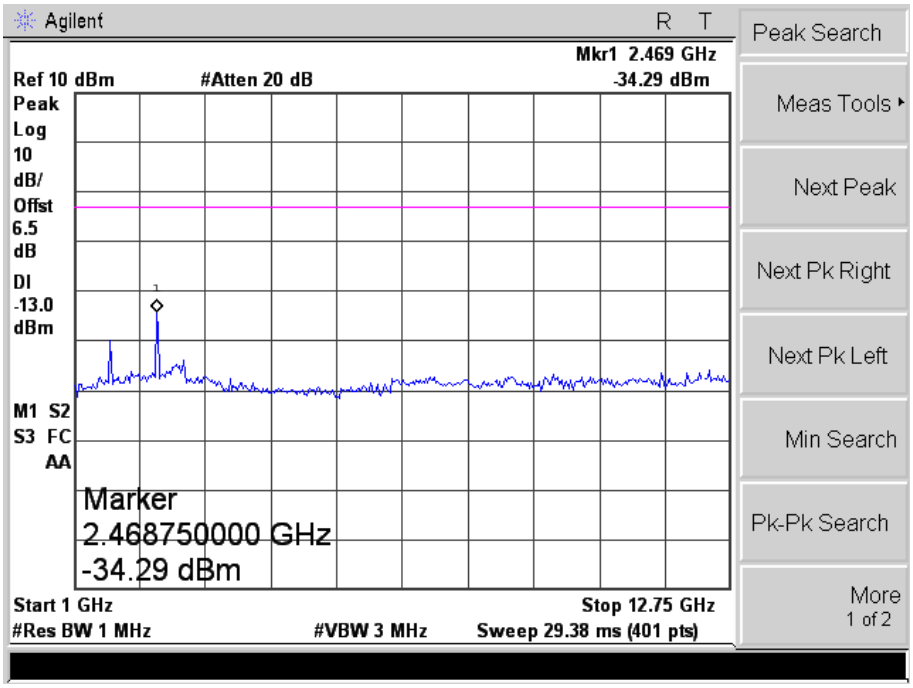


WCDMA High Band Spurious Emission

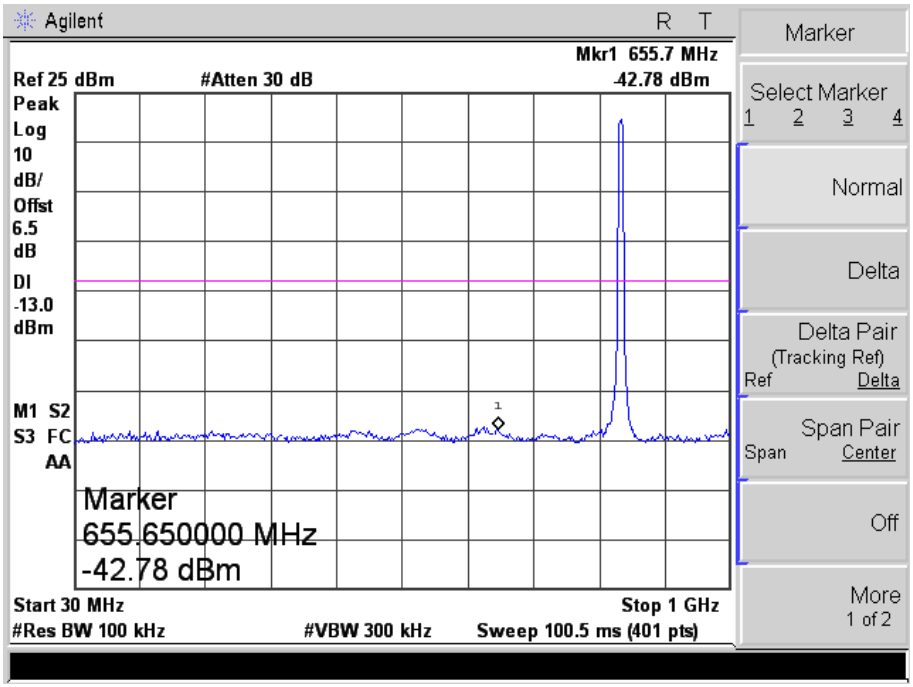


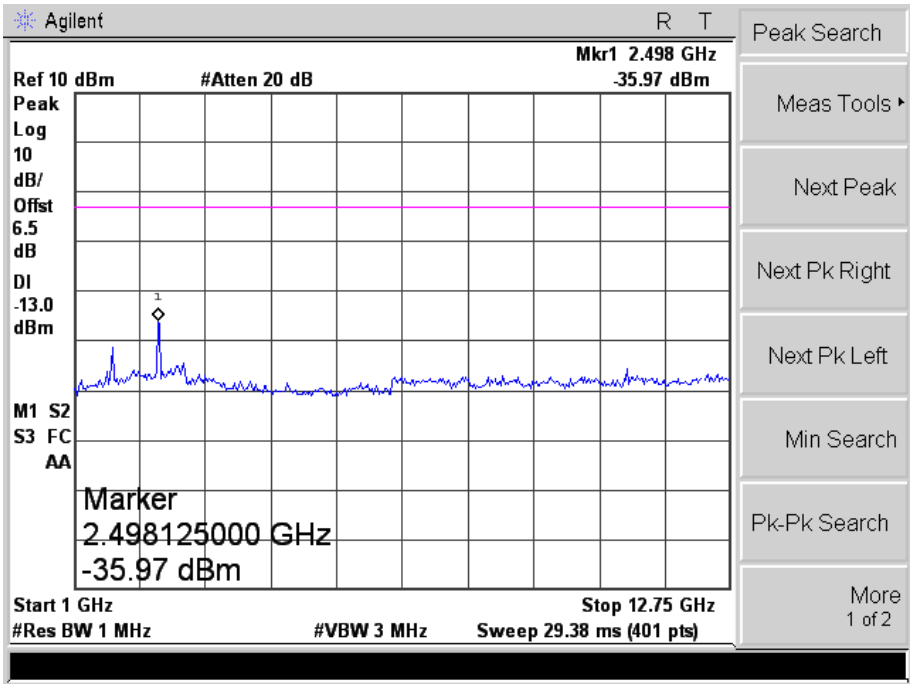

HSDPA Low Channel



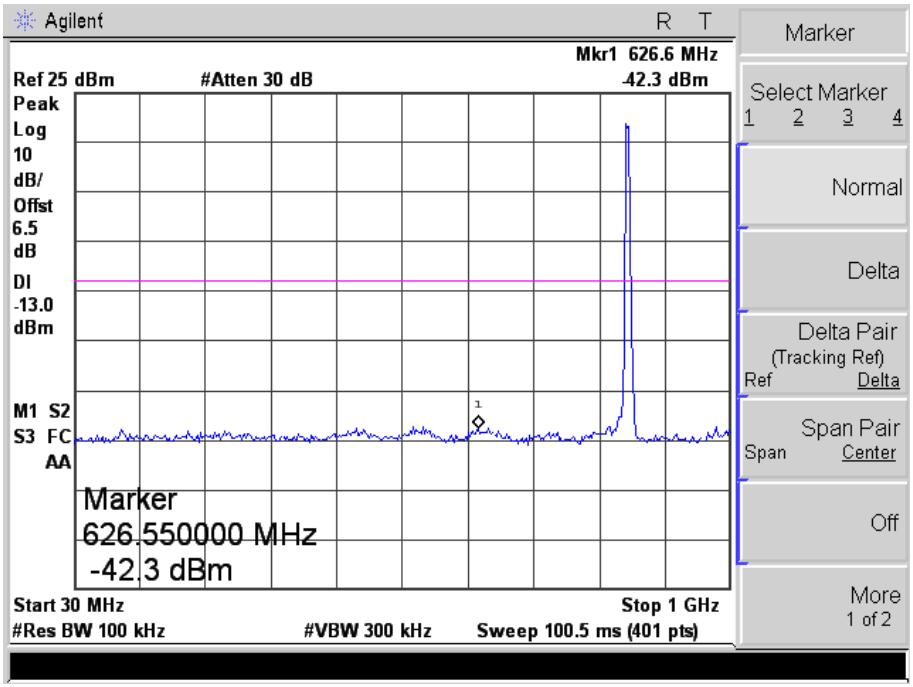


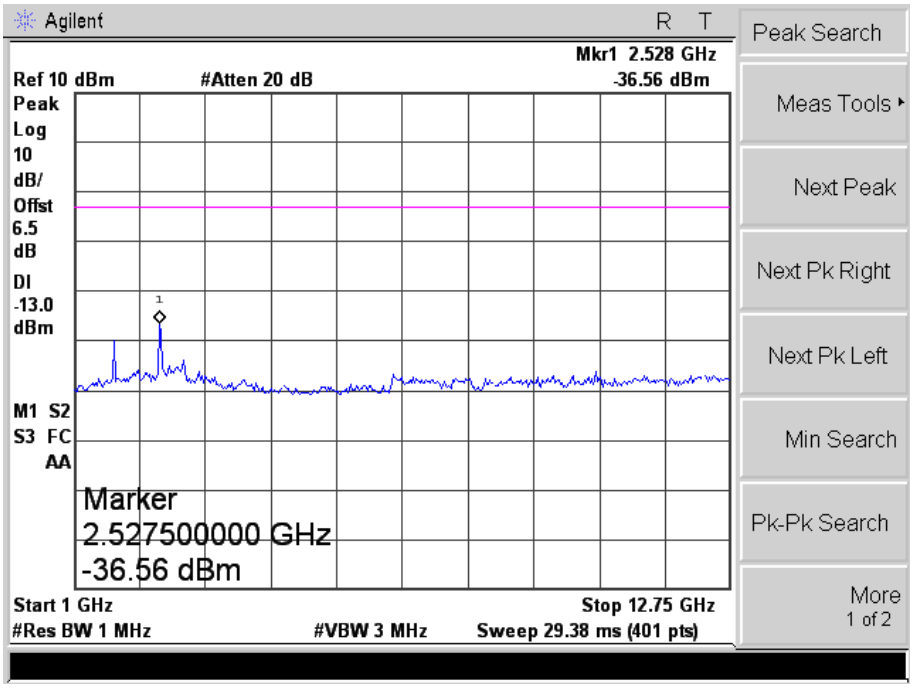

HSDPA Middle Channel



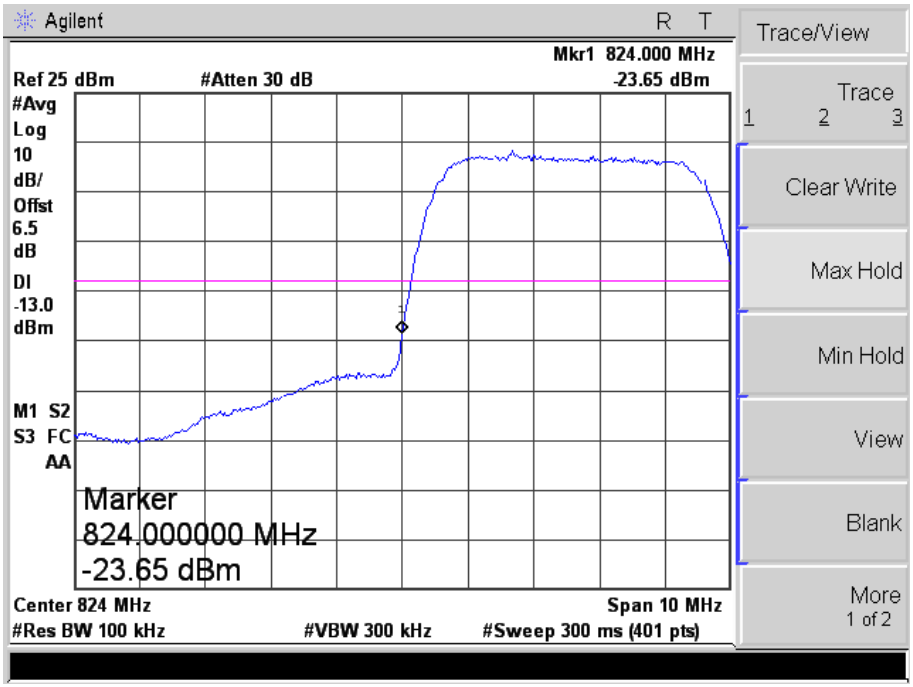



HSDPA High Channel

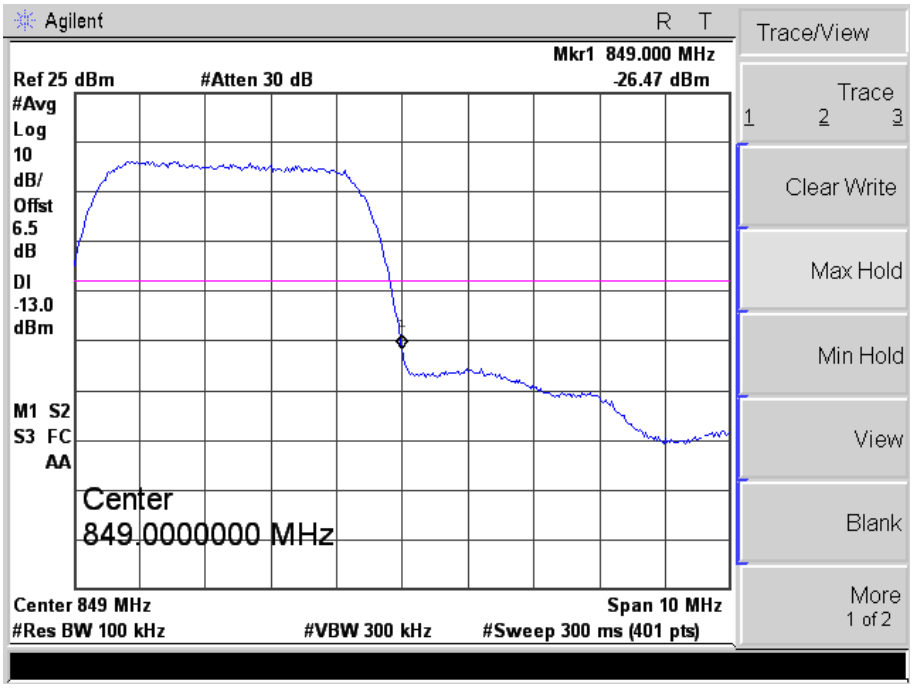




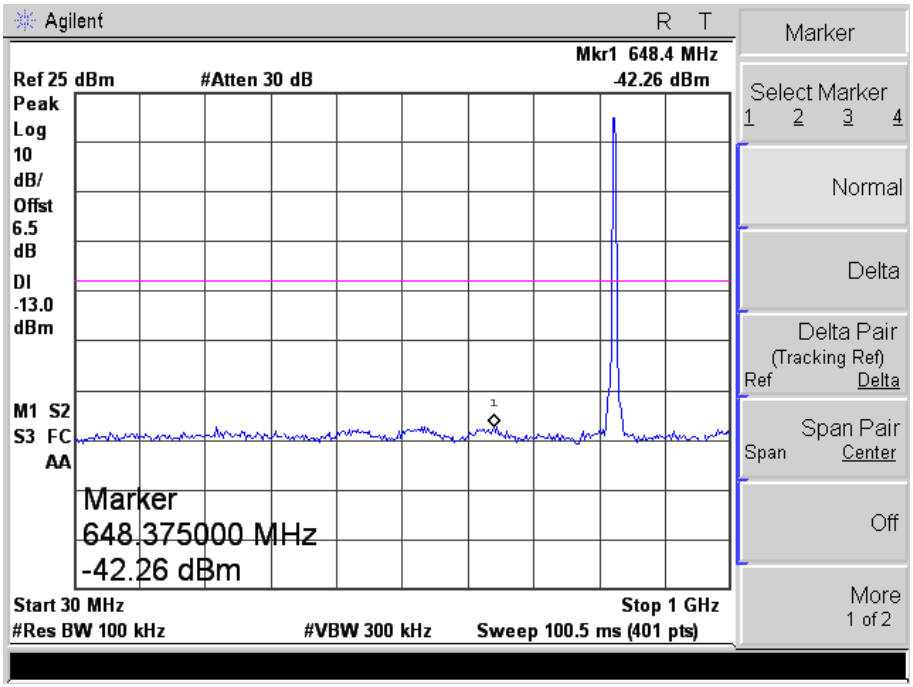

HSDPA Low Band Spurious Emission

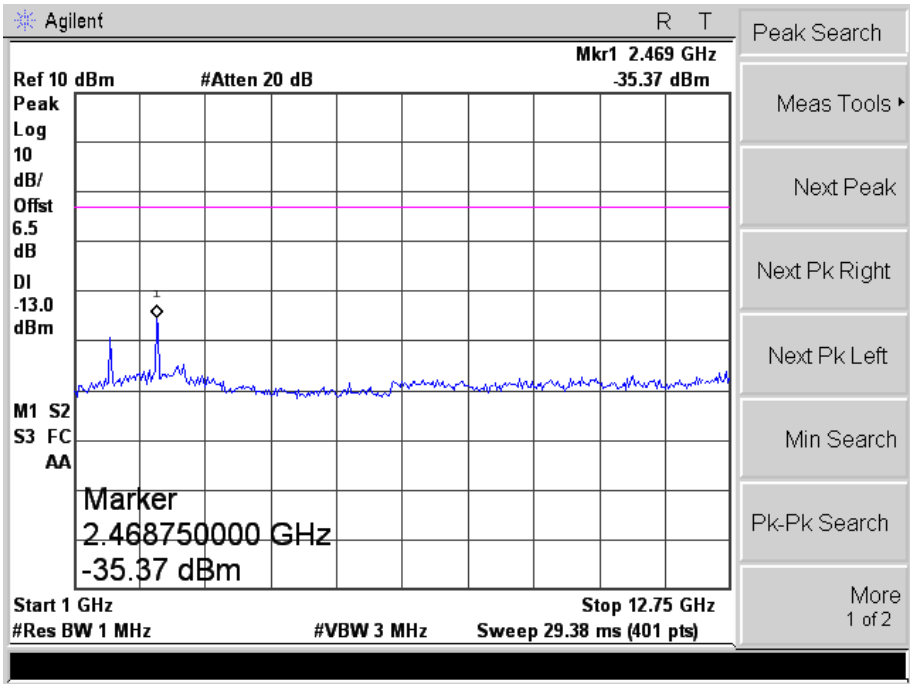


HSDPA High Band Spurious Emission

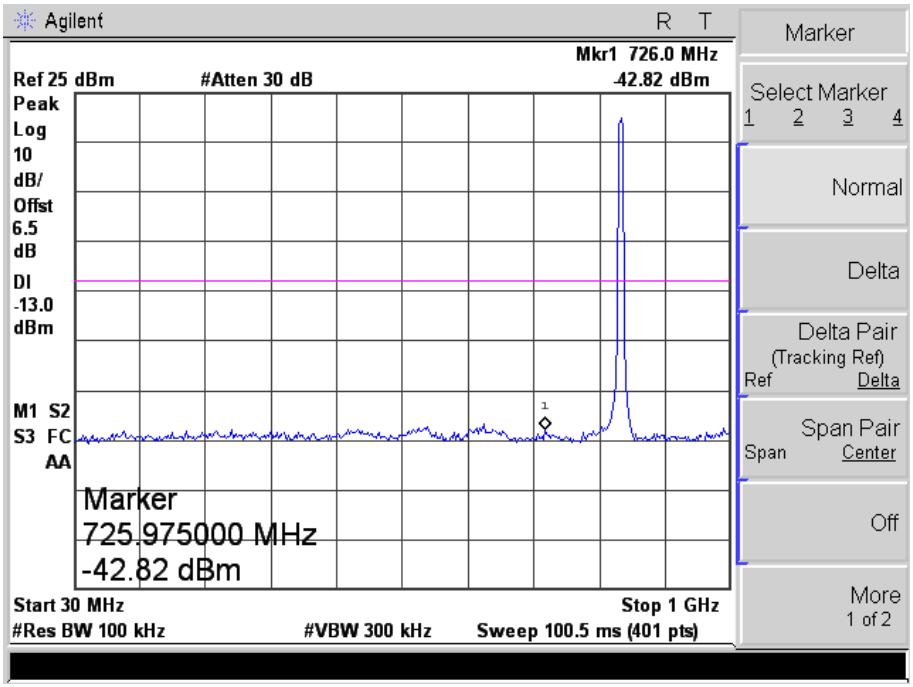


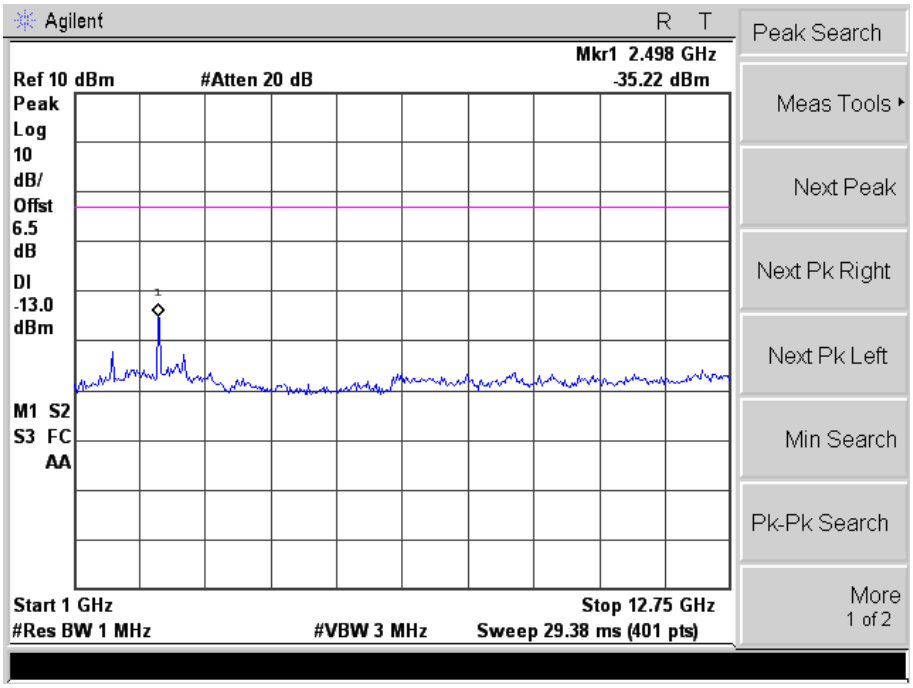

HSUPA Low Channel



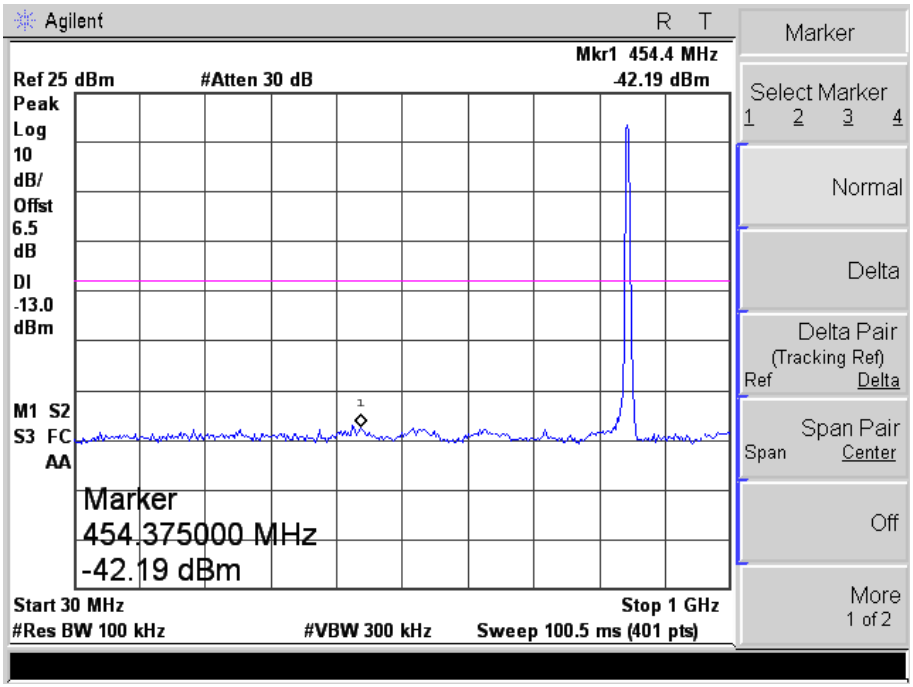


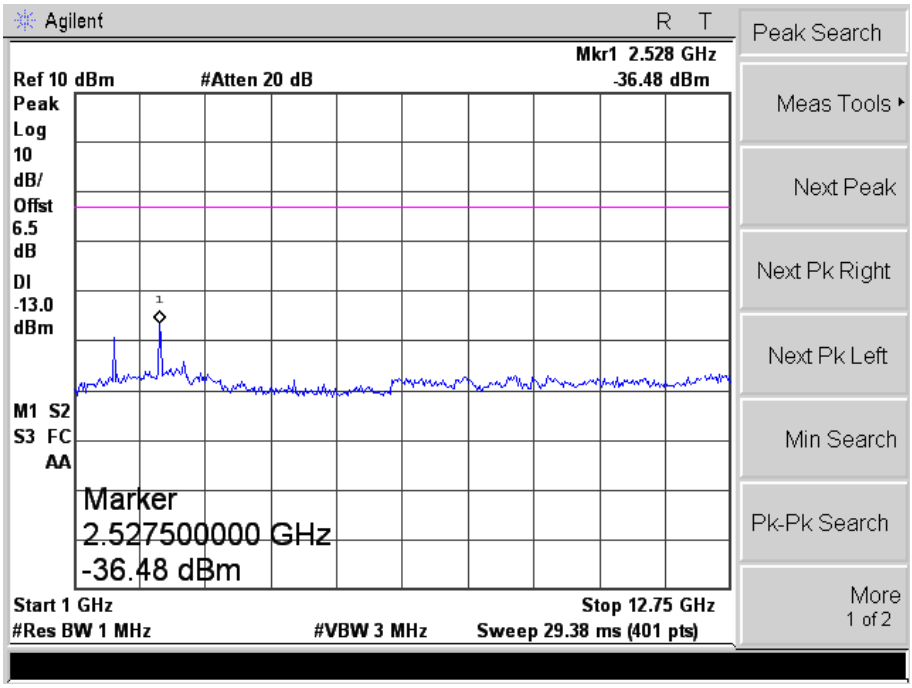

HSUPA Middle Channel



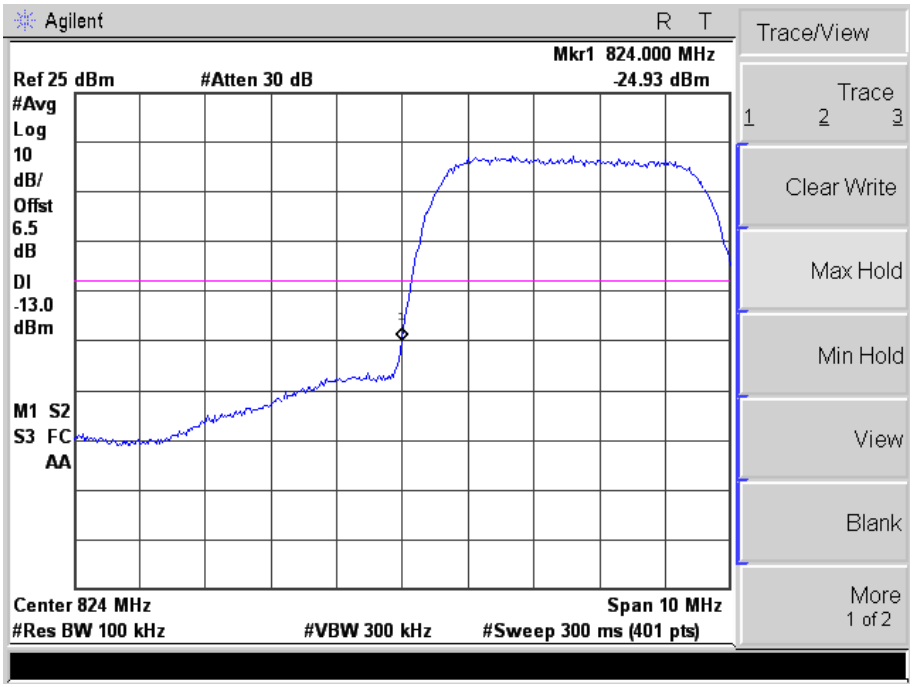



HSUPA High Channel

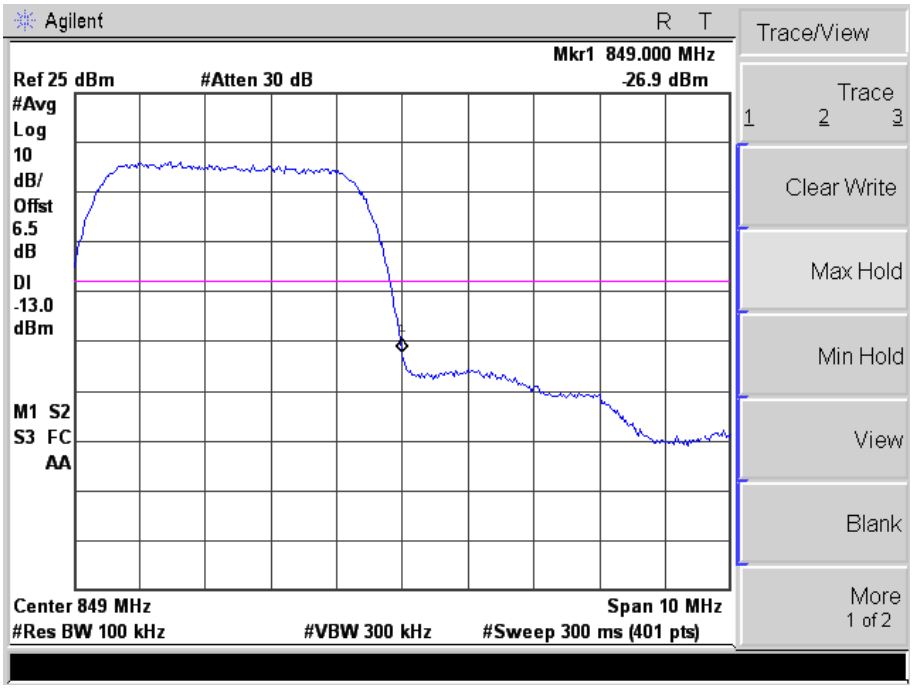





HSUPA Low Band Spurious Emission

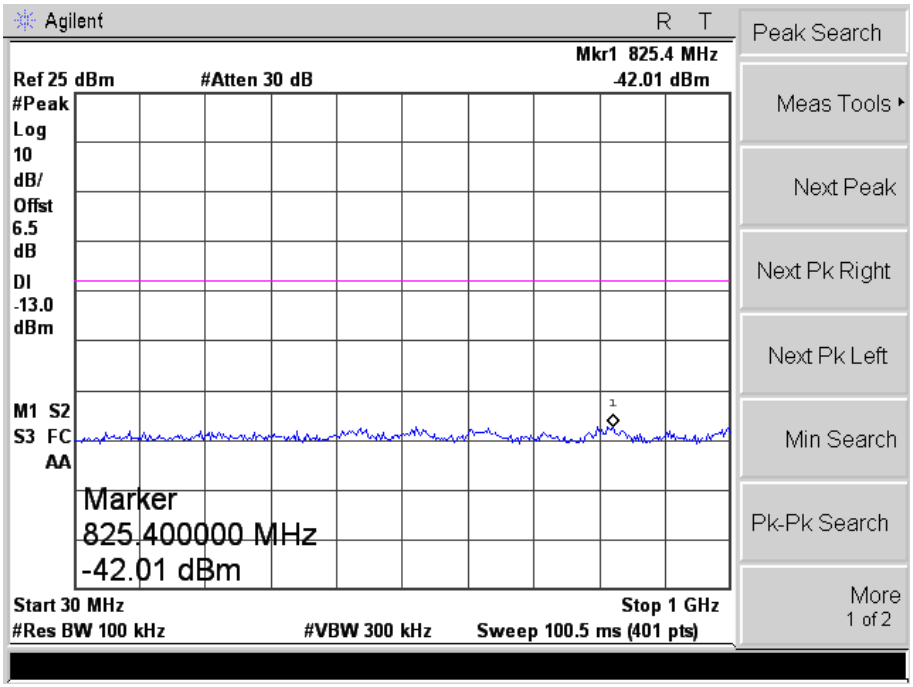


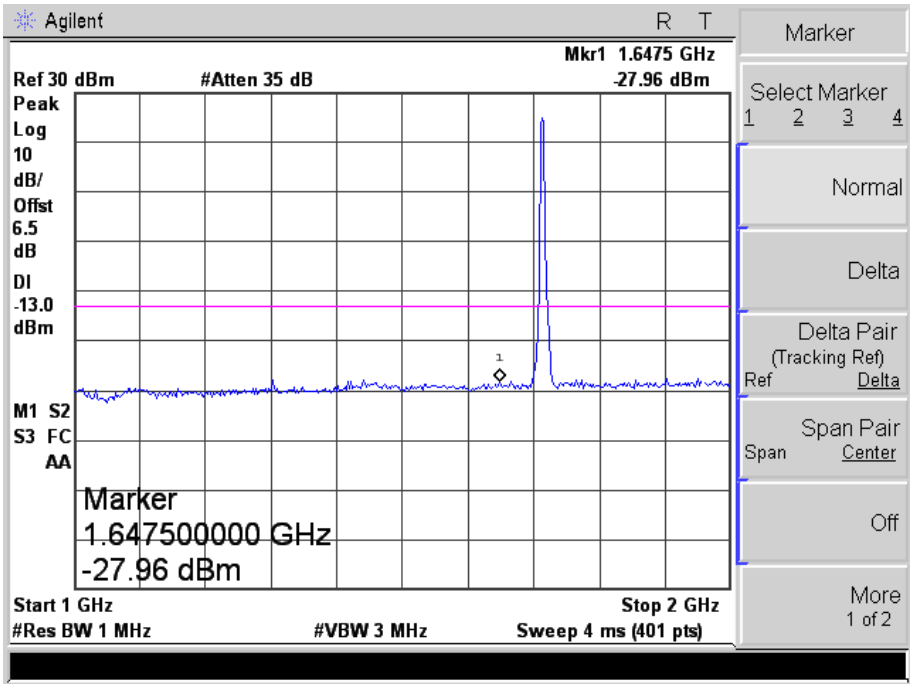
HSUPA High Band Spurious Emission

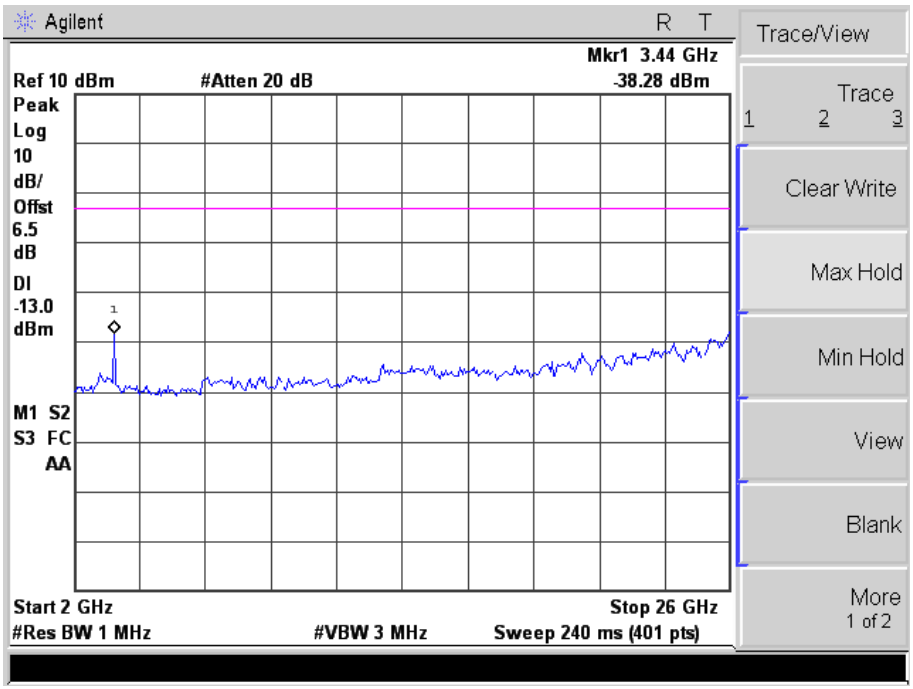



**For Band IV**

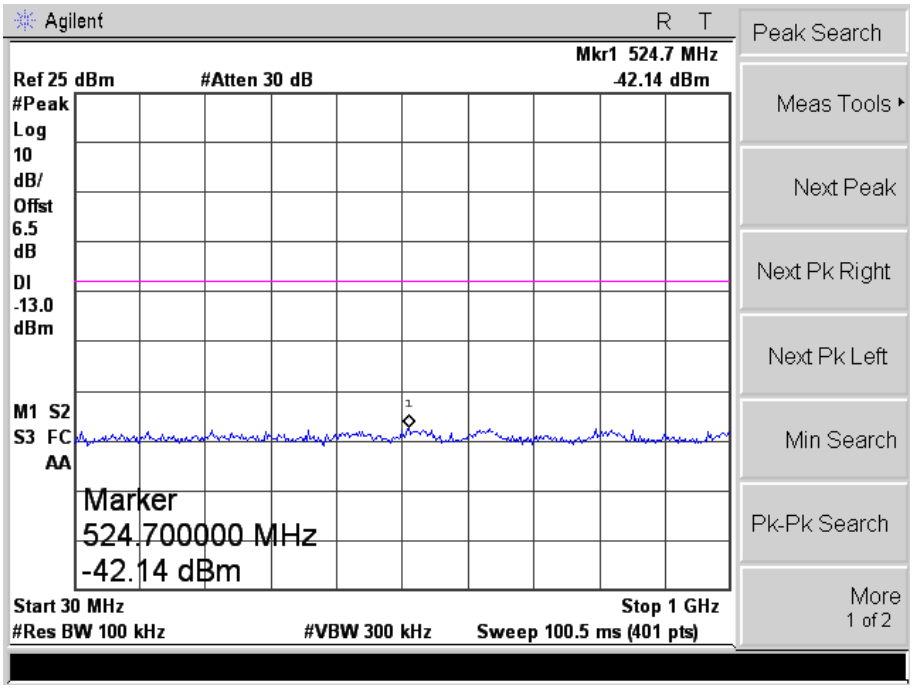
WCDMA Low Channel

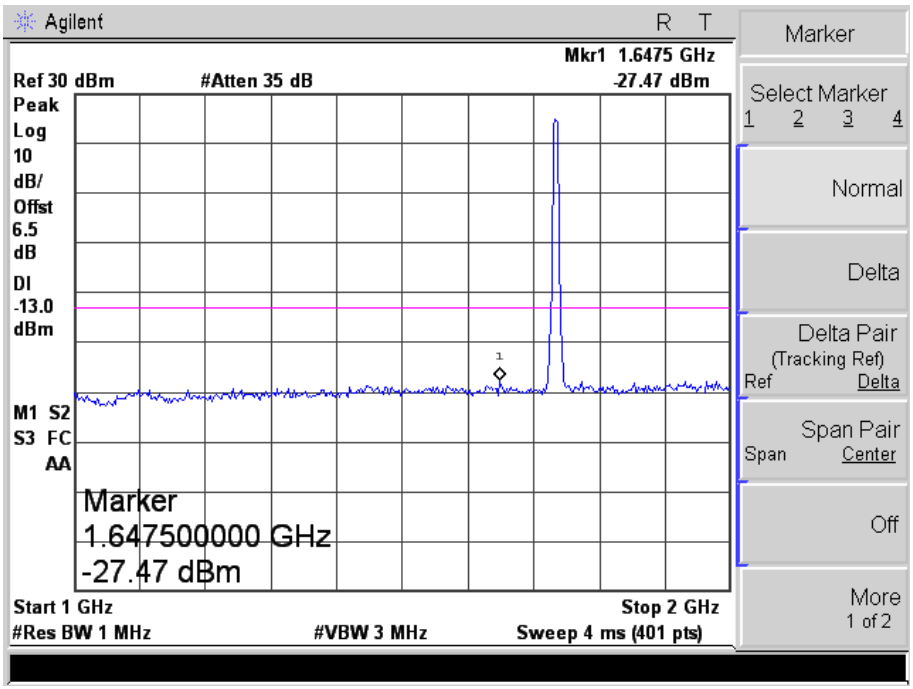


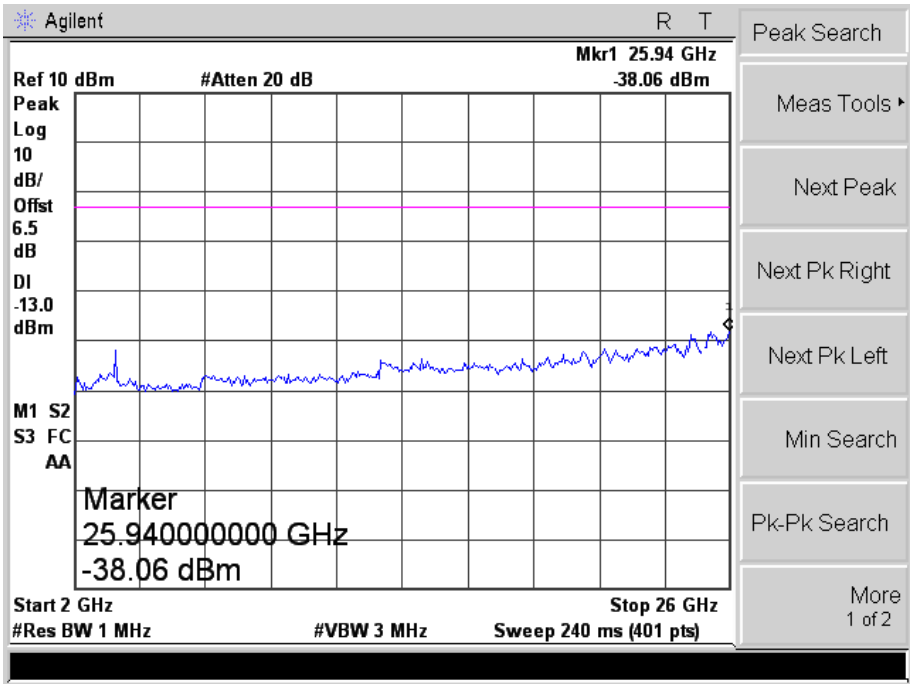

Agilent
R T
Mkr1 1.6475 GHz
-27.96 dBm
Ref 30 dBm
#Atten 35 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.647500000 GHz
-27.96 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 3.44 GHz
-38.28 dBm
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

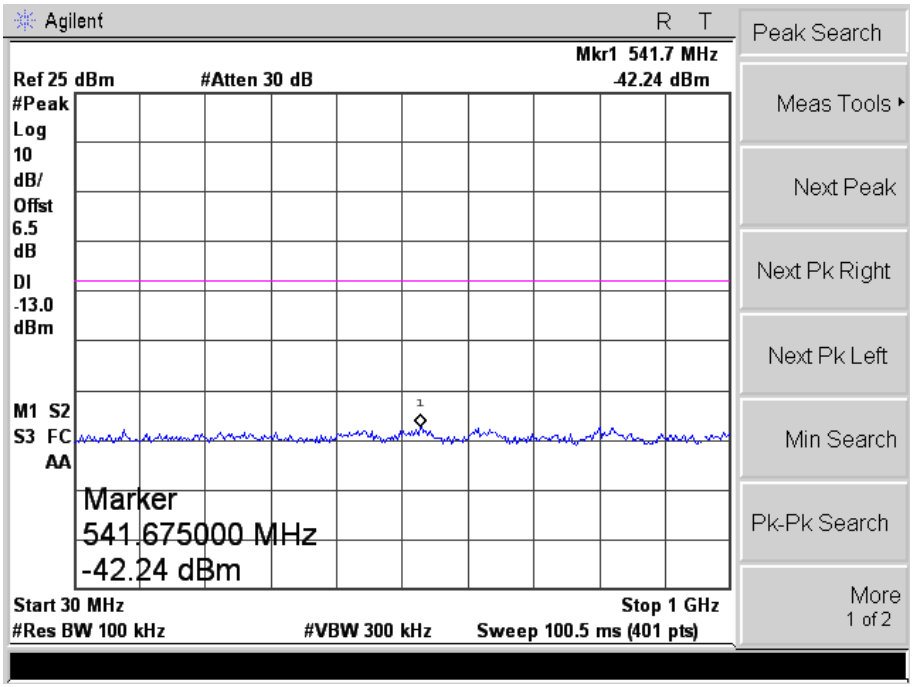
WCDMA Middle Channel

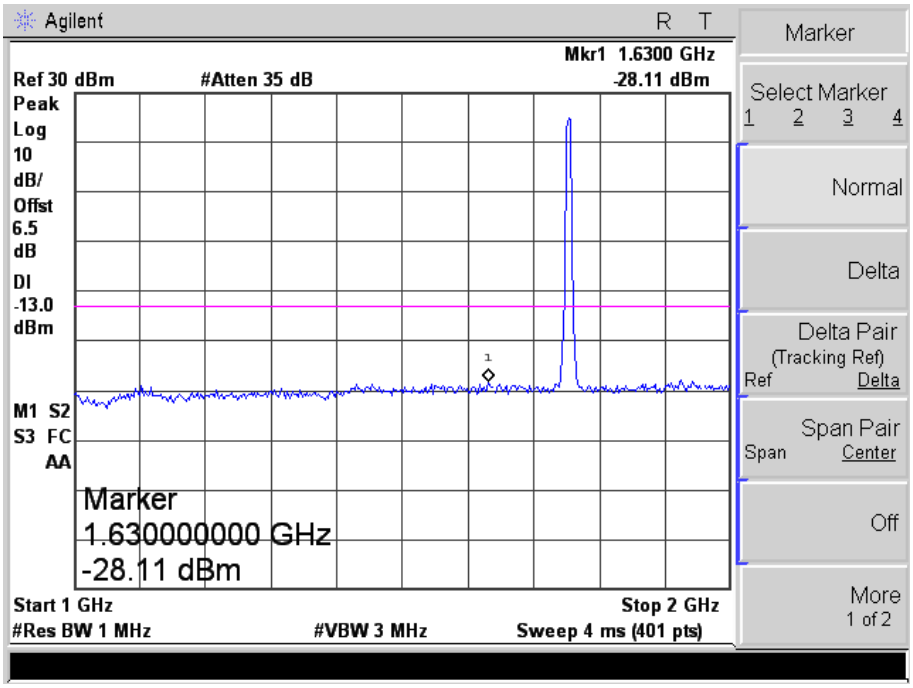


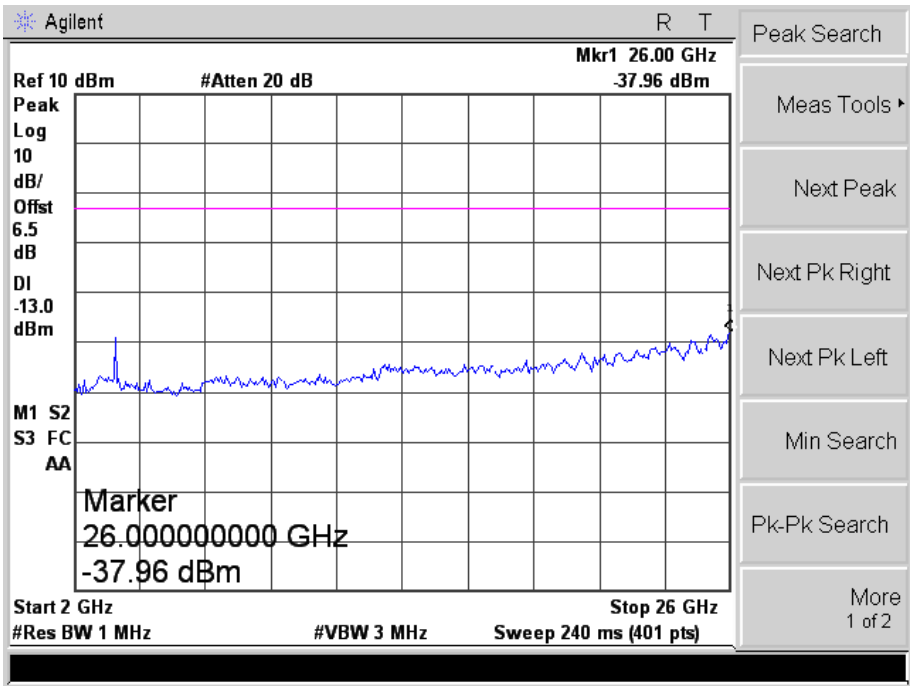





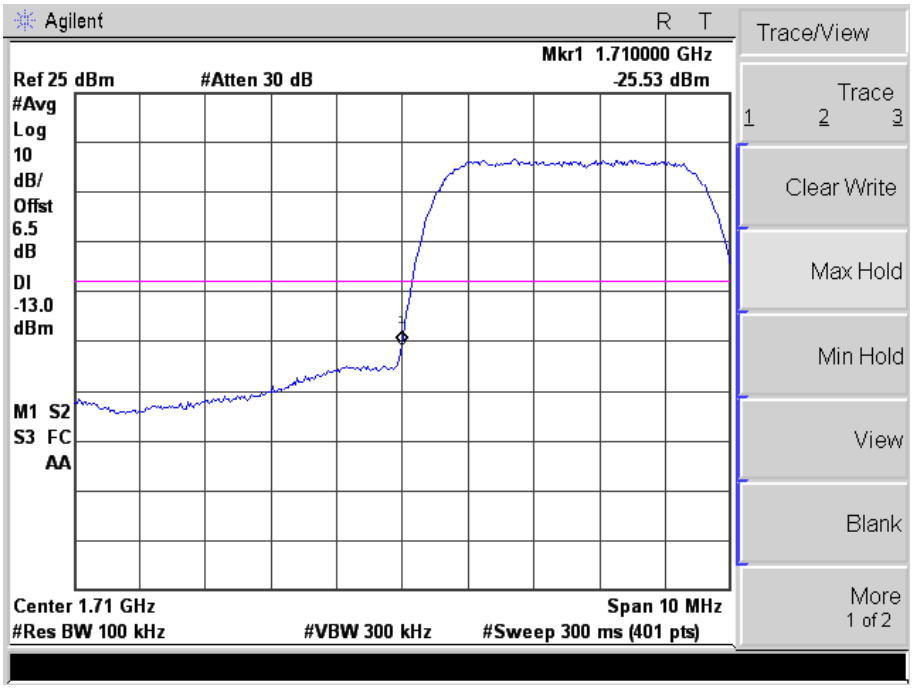

WCDMA High Channel



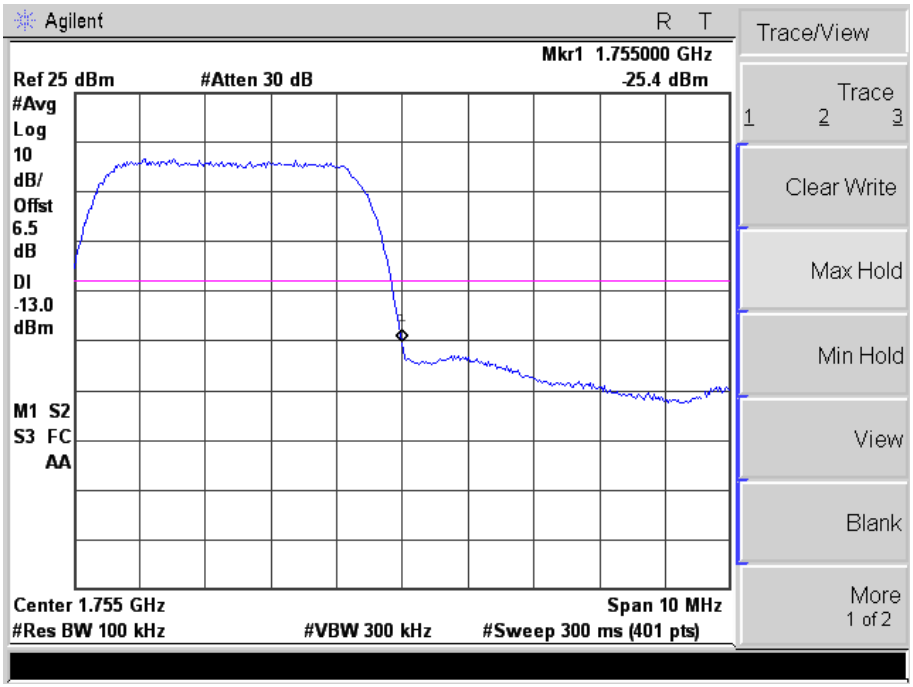

Agilent
R T
Mkr1 1.6300 GHz
-28.11 dBm
Ref 30 dBm
#Atten 35 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.630000000 GHz
-28.11 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 26.00 GHz
-37.96 dBm
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
26.000000000 GHz
-37.96 dBm
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

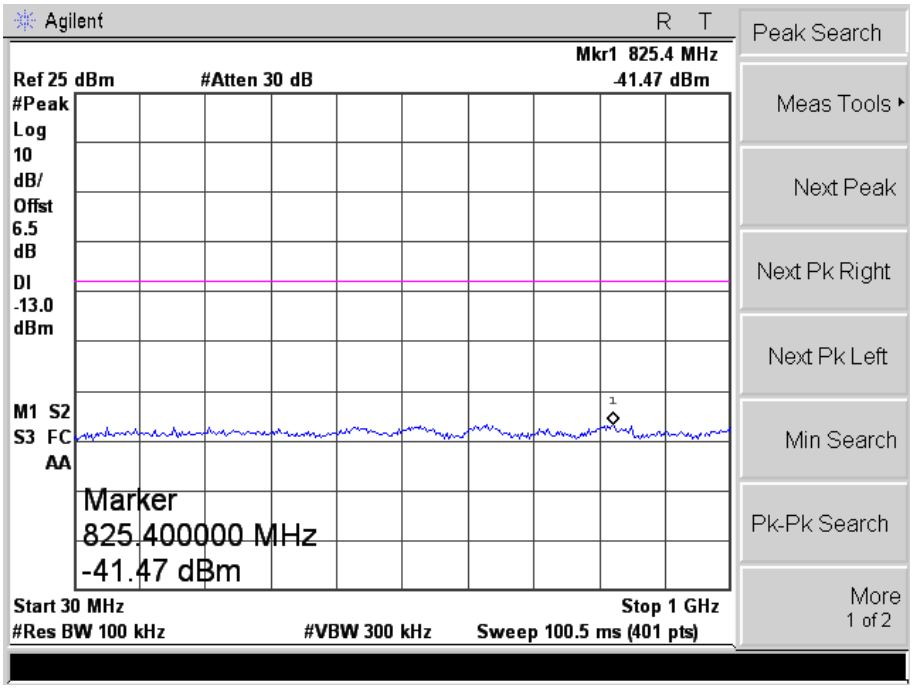
WCDMA Low Band Spurious Emission

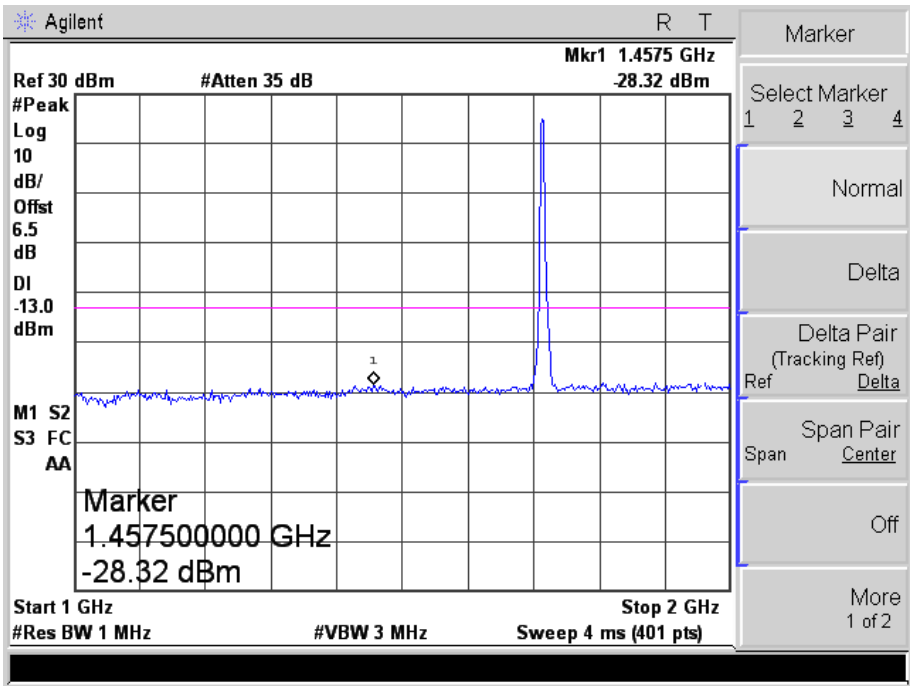


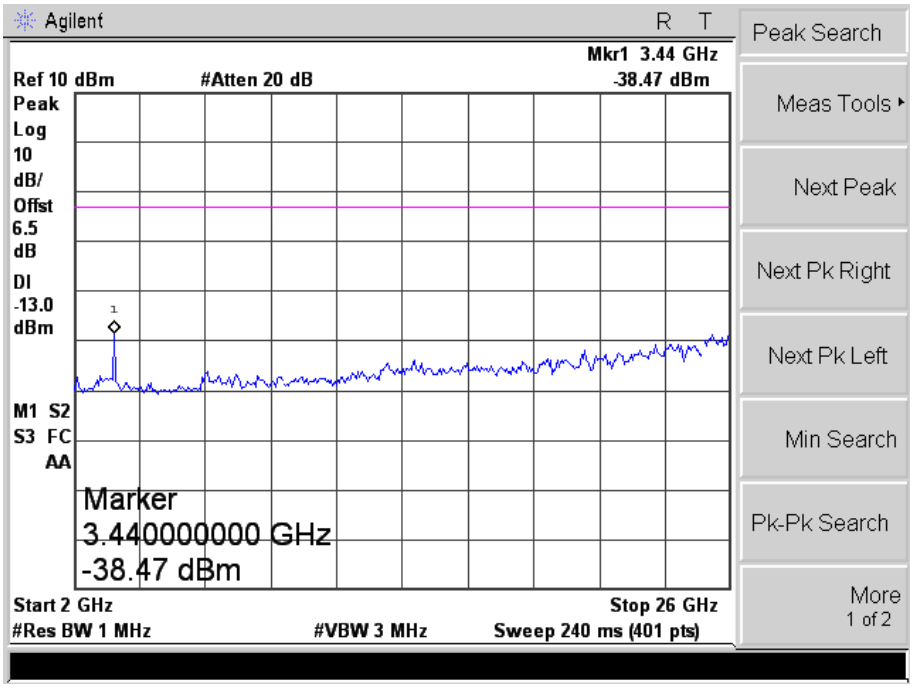

WCDMA High Band Spurious Emission



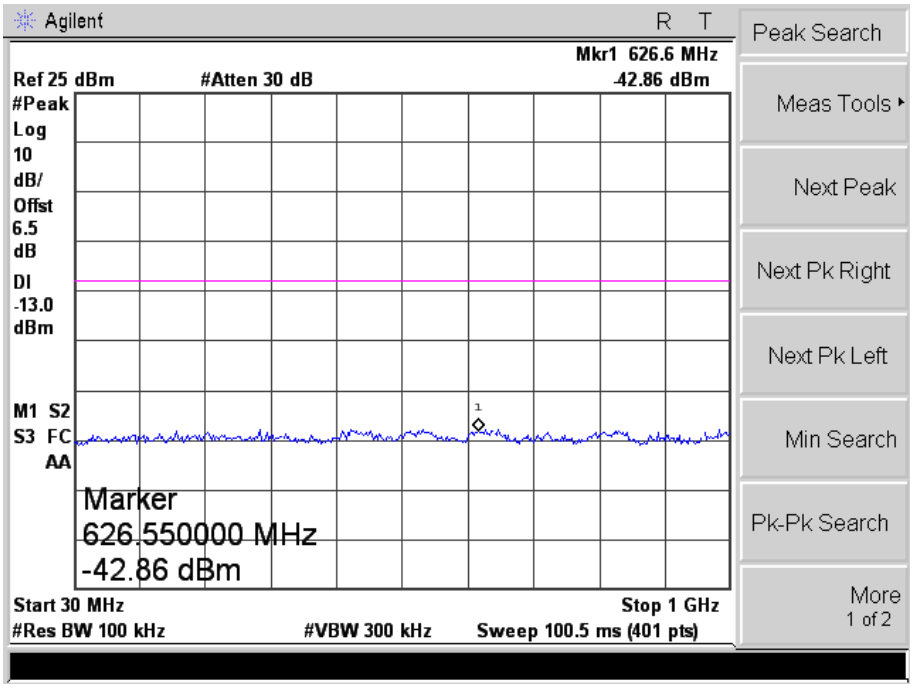
HSDPA Low Channel

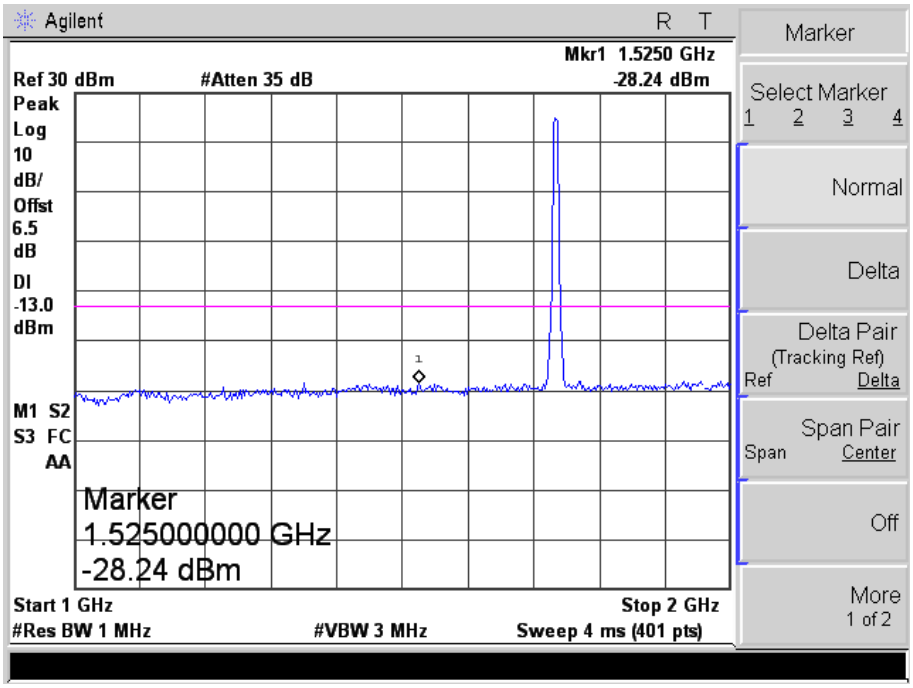


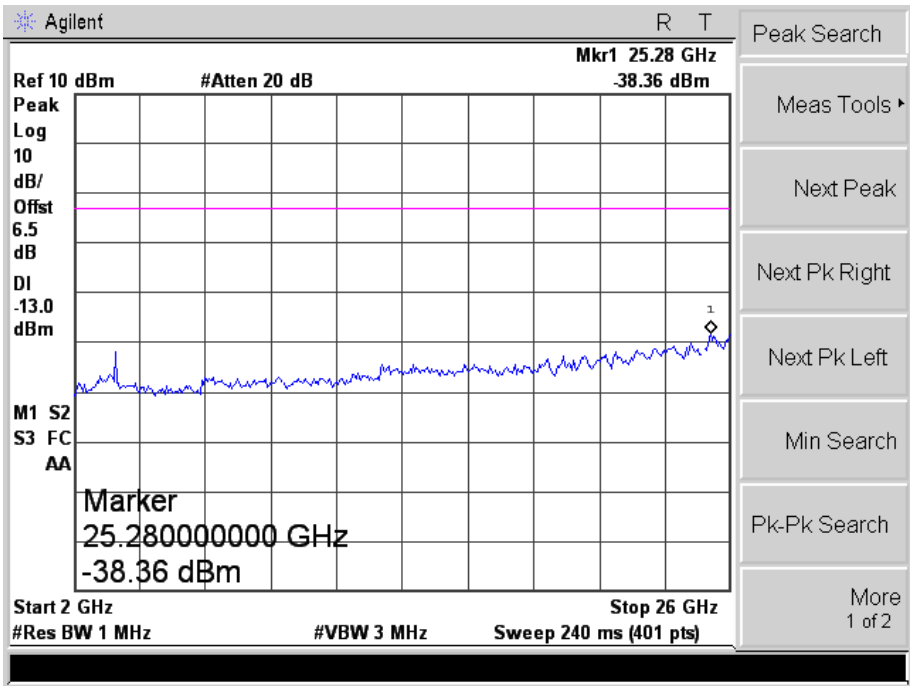





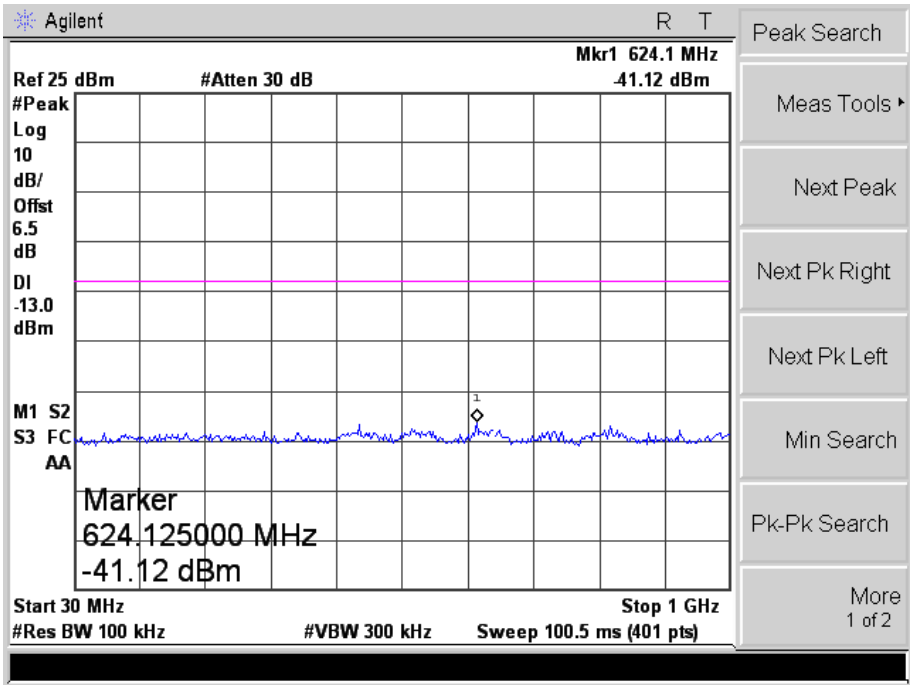

HSDPA Middle Channel

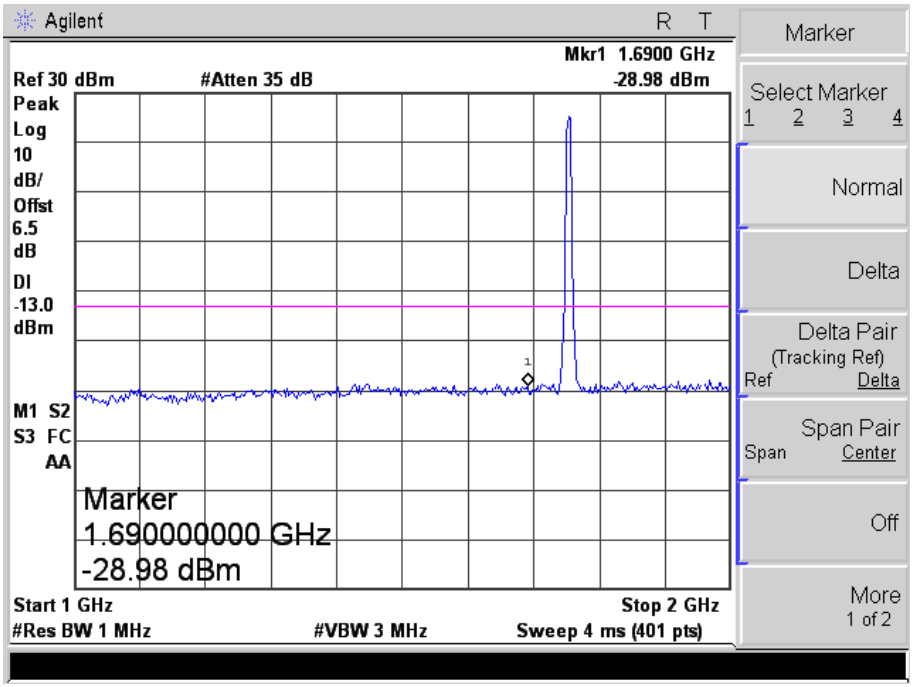


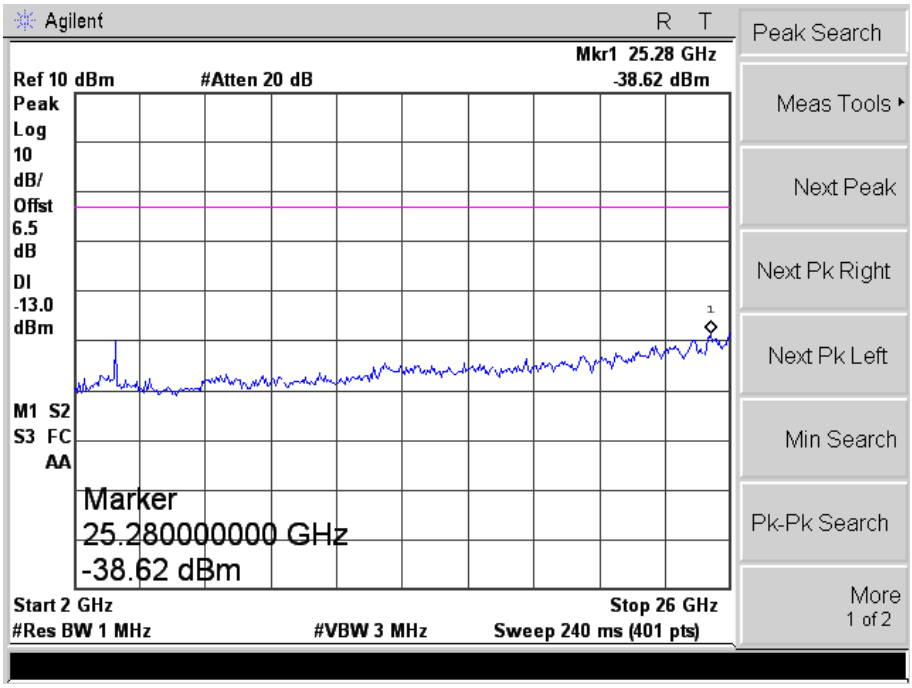

Agilent
R T
Mkr1 1.5250 GHz
-28.24 dBm
Ref 30 dBm
#Atten 35 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.525000000 GHz
-28.24 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 25.28 GHz
-38.36 dBm
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
25.280000000 GHz
-38.36 dBm
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

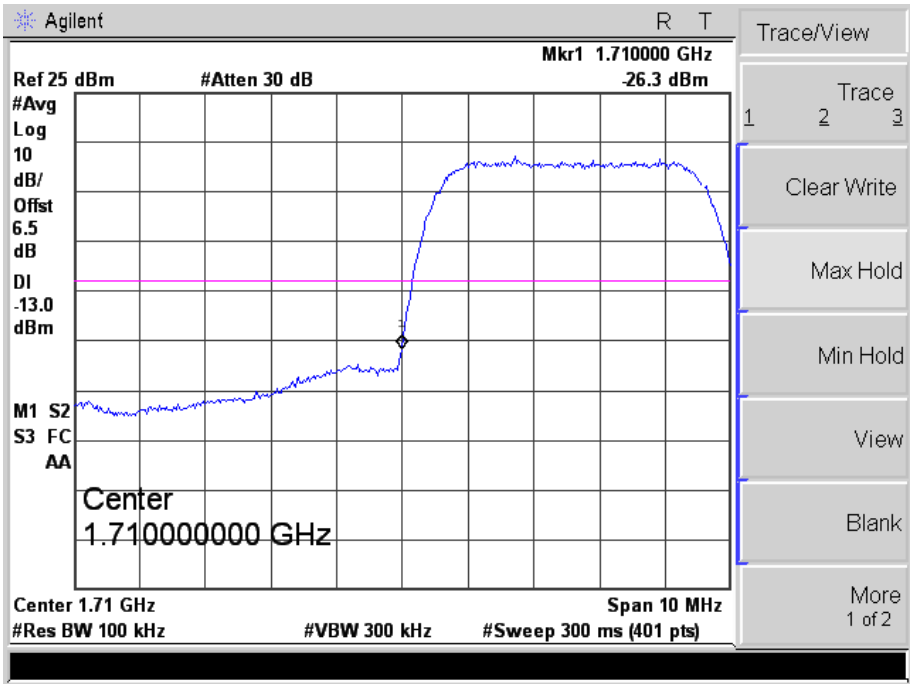
HSDPA High Channel



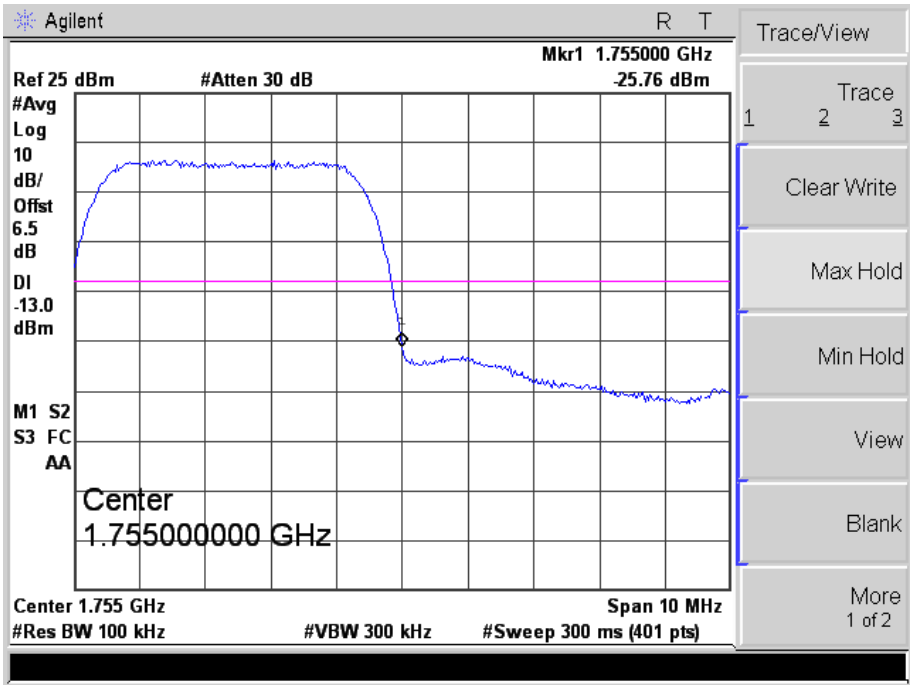





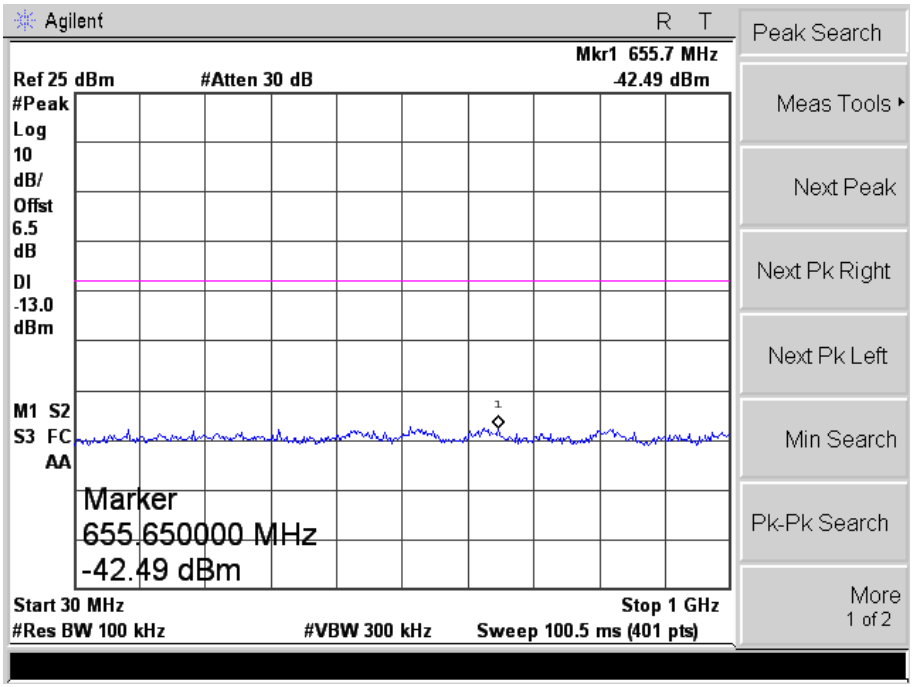

HSDPA Low Band Spurious Emission

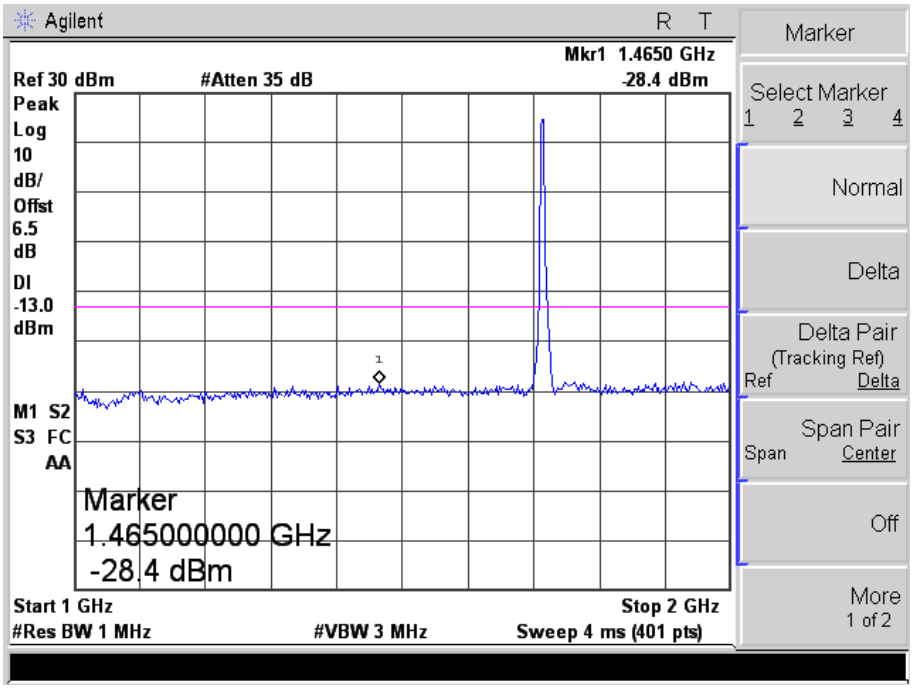


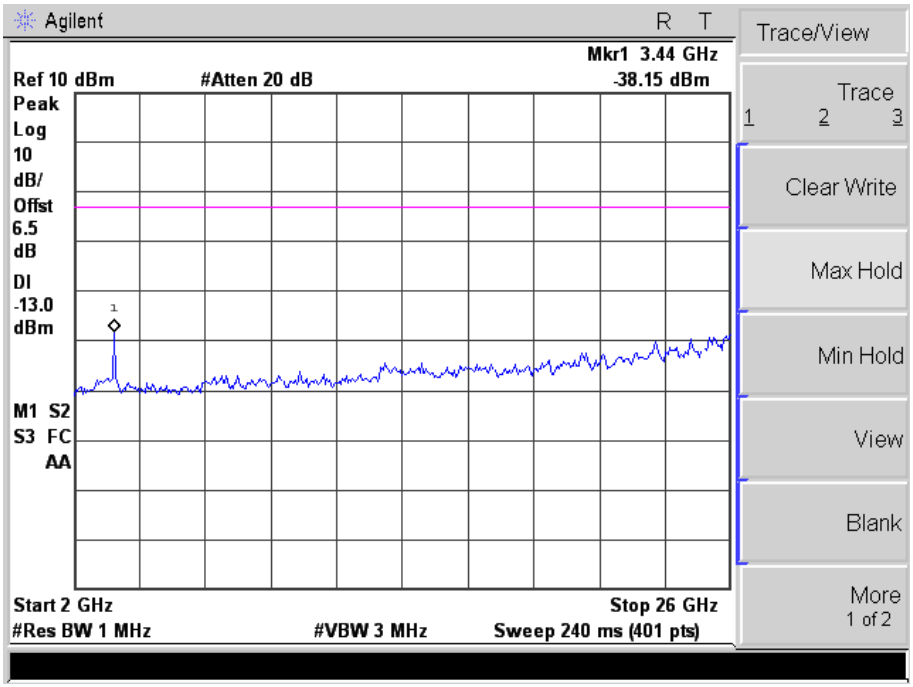
HSDPA High Band Spurious Emission



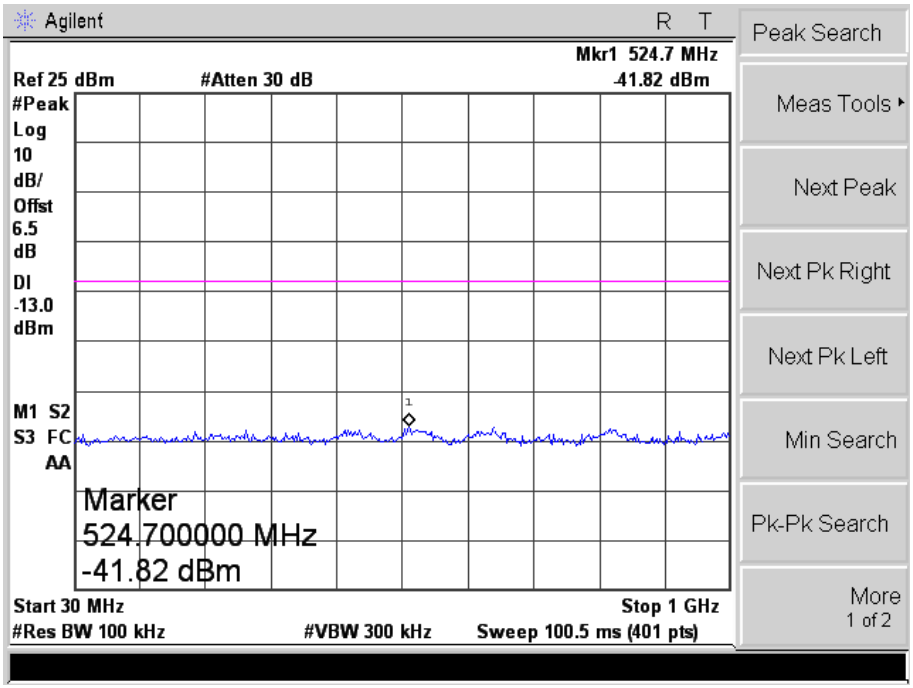

HSUPA Low Channel

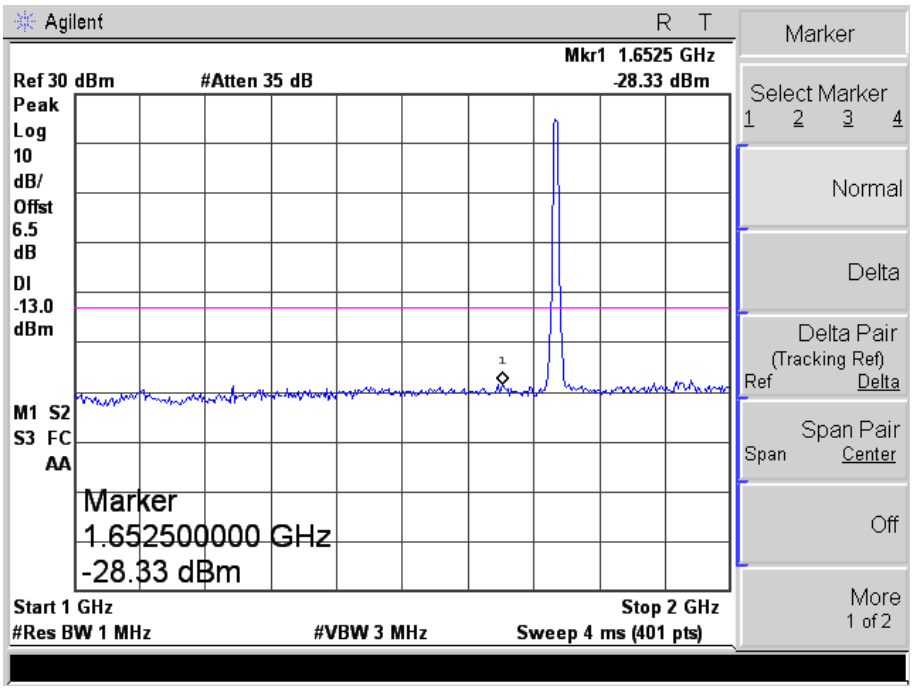


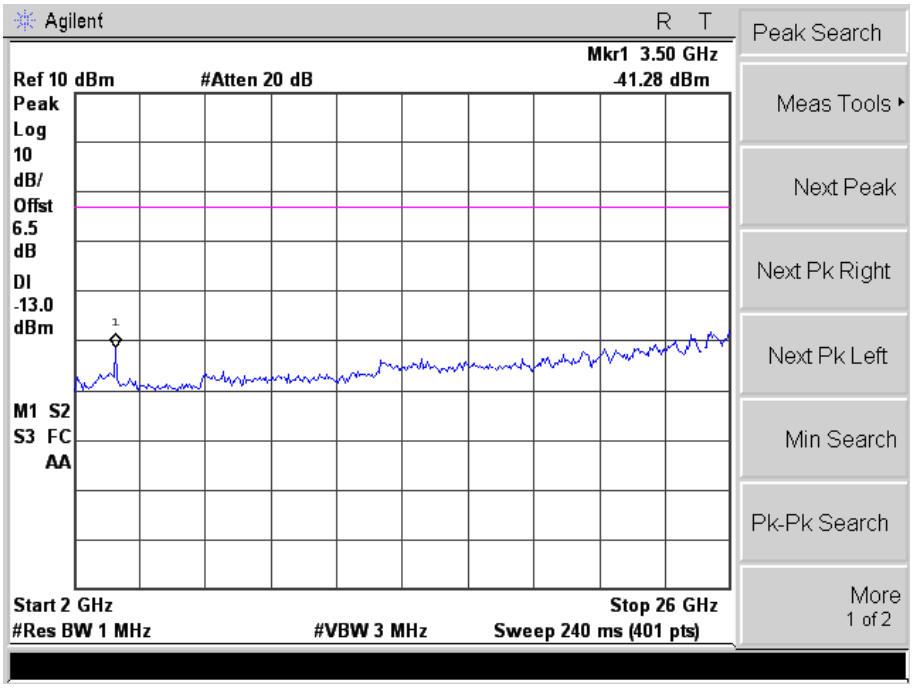

Agilent
R T
Mkr1 1.4650 GHz
Ref 30 dBm
#Atten 35 dB
-28.4 dBm
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.465000000 GHz
-28.4 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 3.44 GHz
Ref 10 dBm
#Atten 20 dB
-38.15 dBm
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

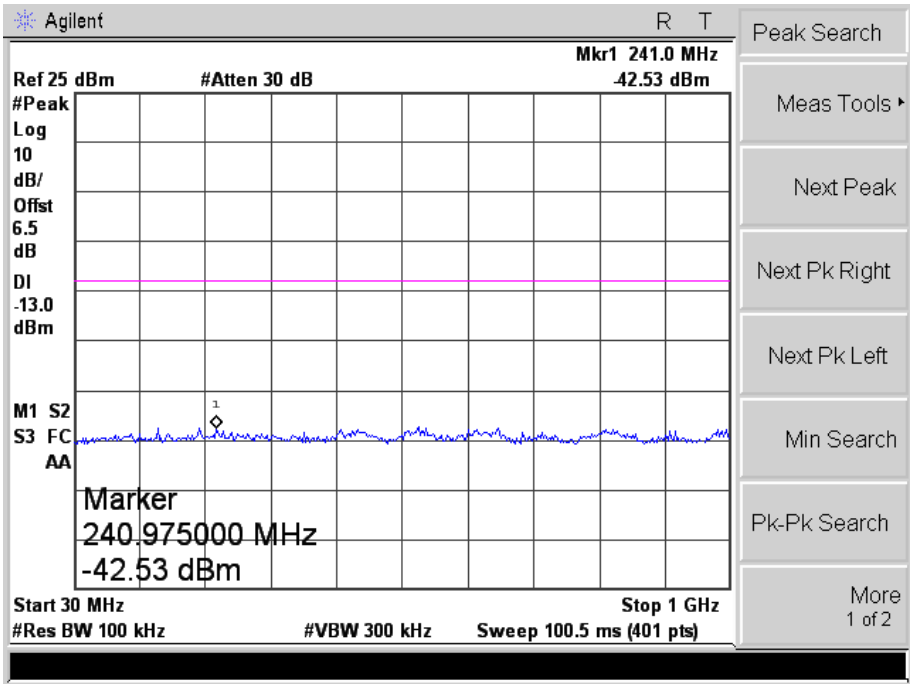
HSUPA Middle Channel

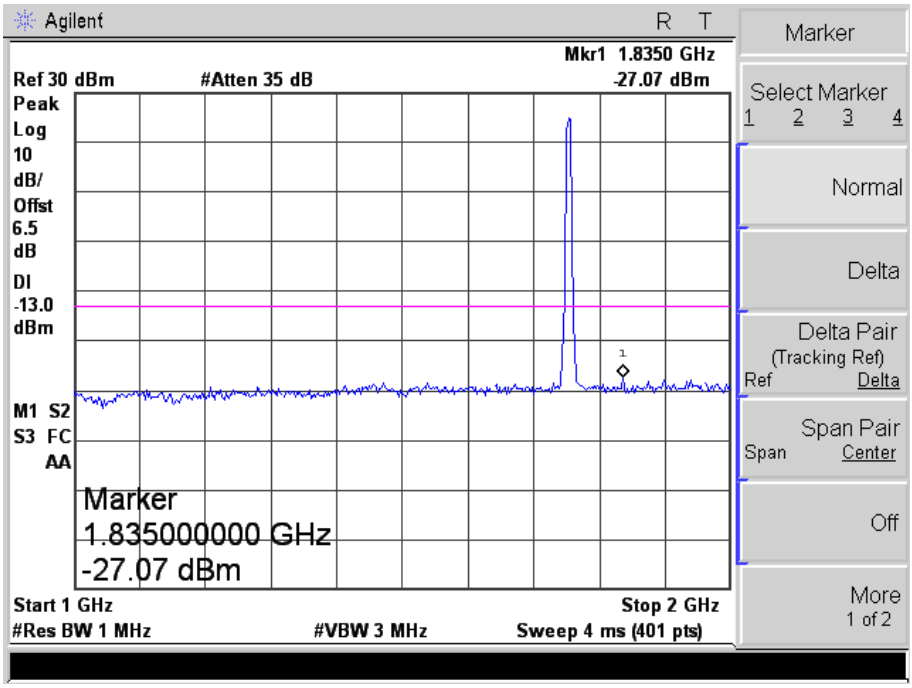


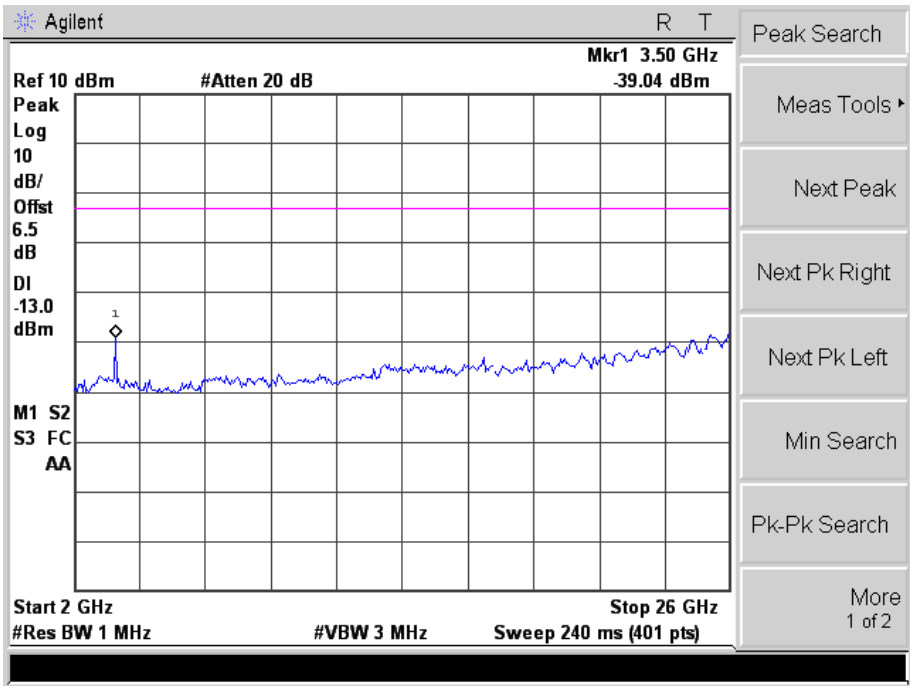





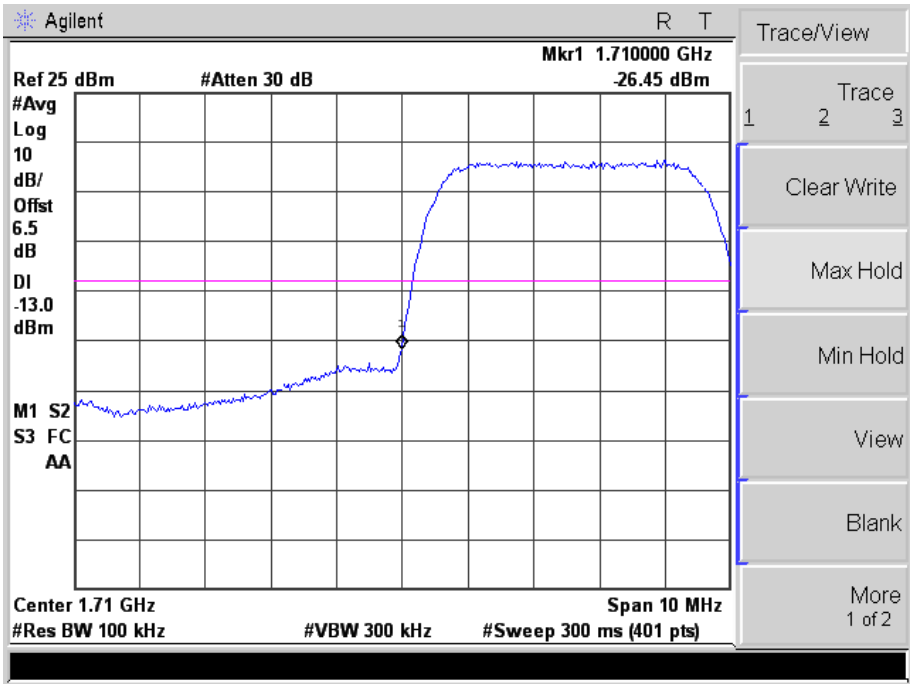

HSUPA High Channel



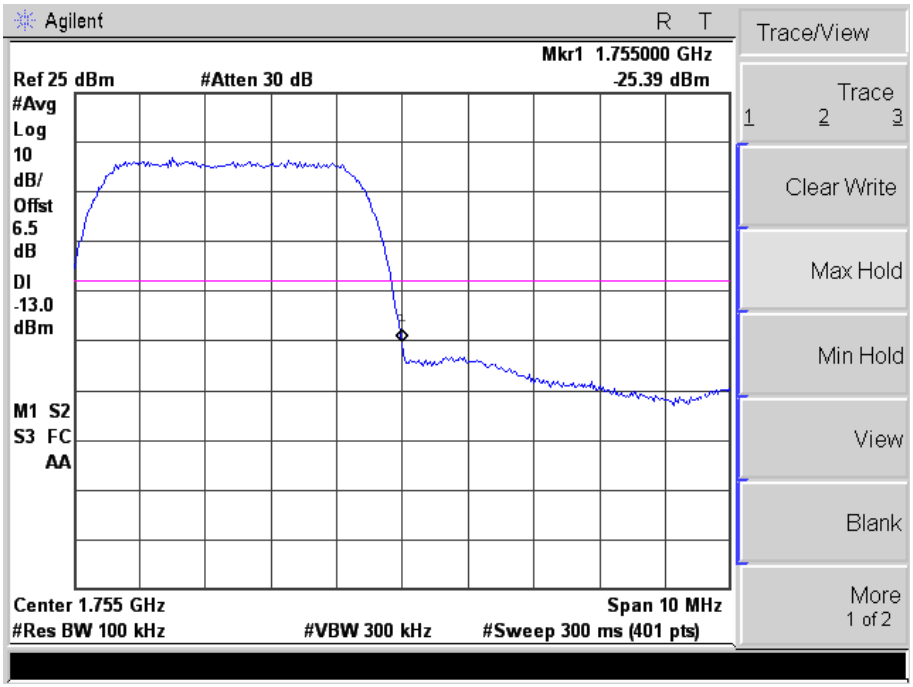

Agilent
R T
Mkr1 1.8350 GHz
-27.07 dBm
Ref 30 dBm
#Atten 35 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.835000000 GHz
-27.07 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 3.50 GHz
-39.04 dBm
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

HSUPA Low Band Spurious Emission

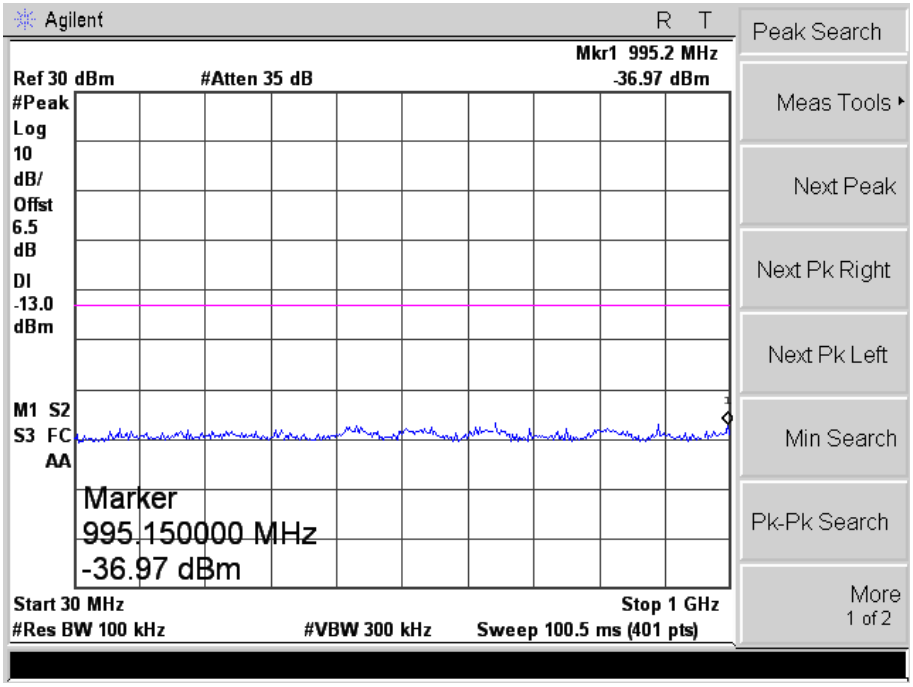


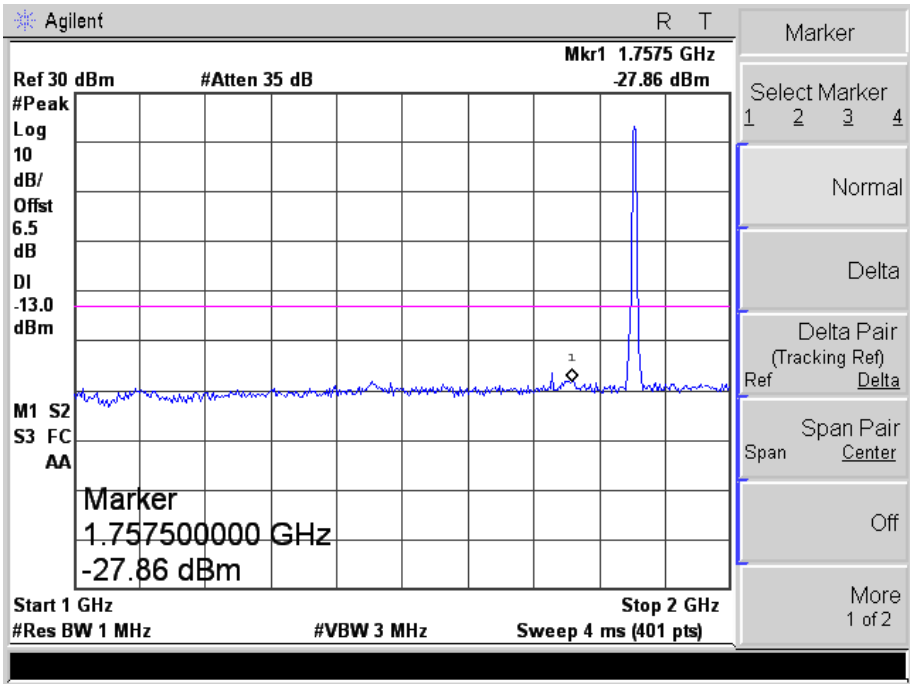

HSUPA High Band Spurious Emission

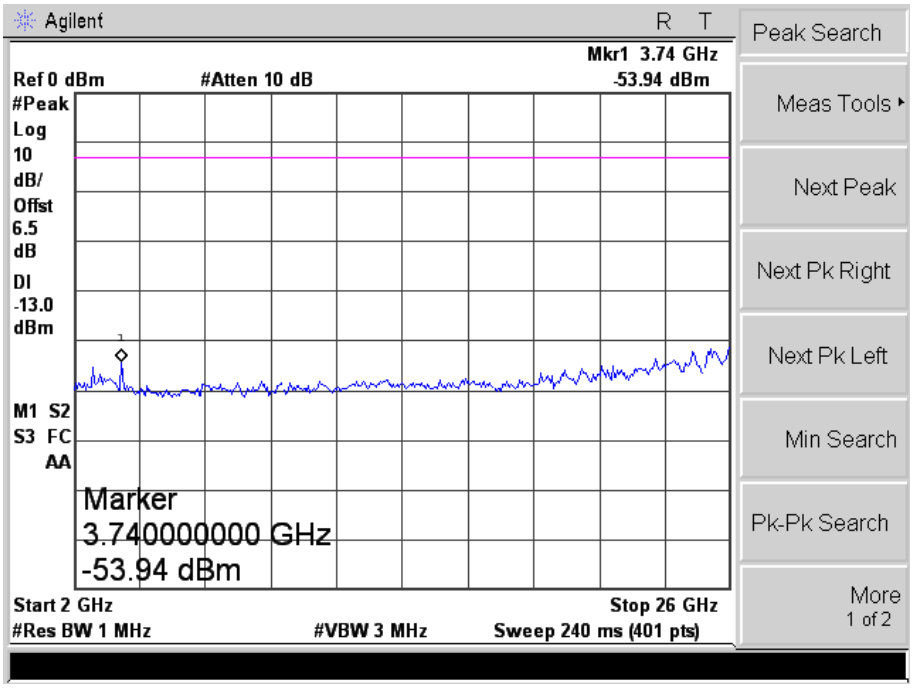


**For Band II**

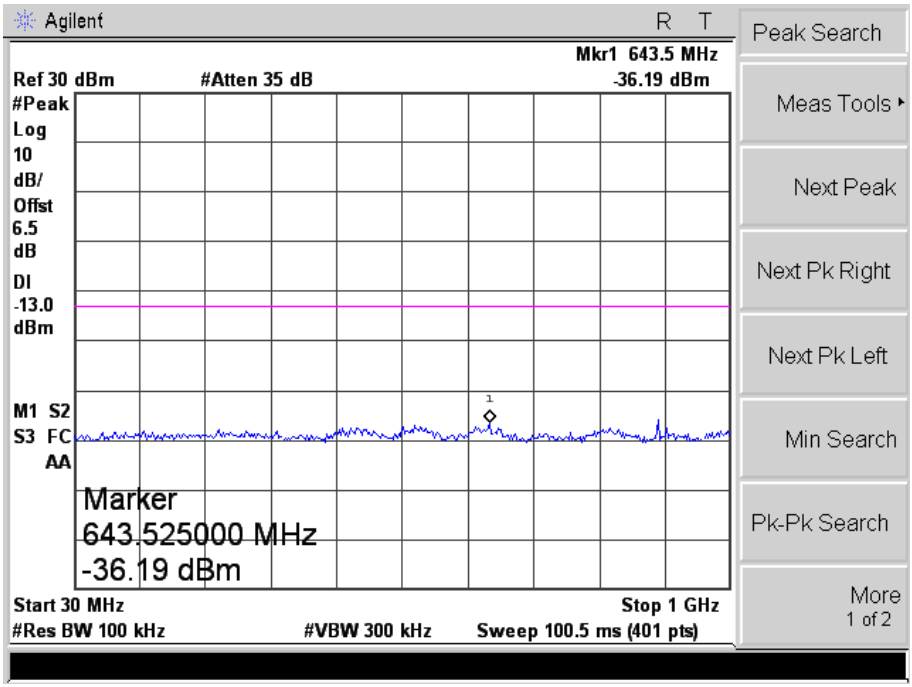
WCDMA Low Channel

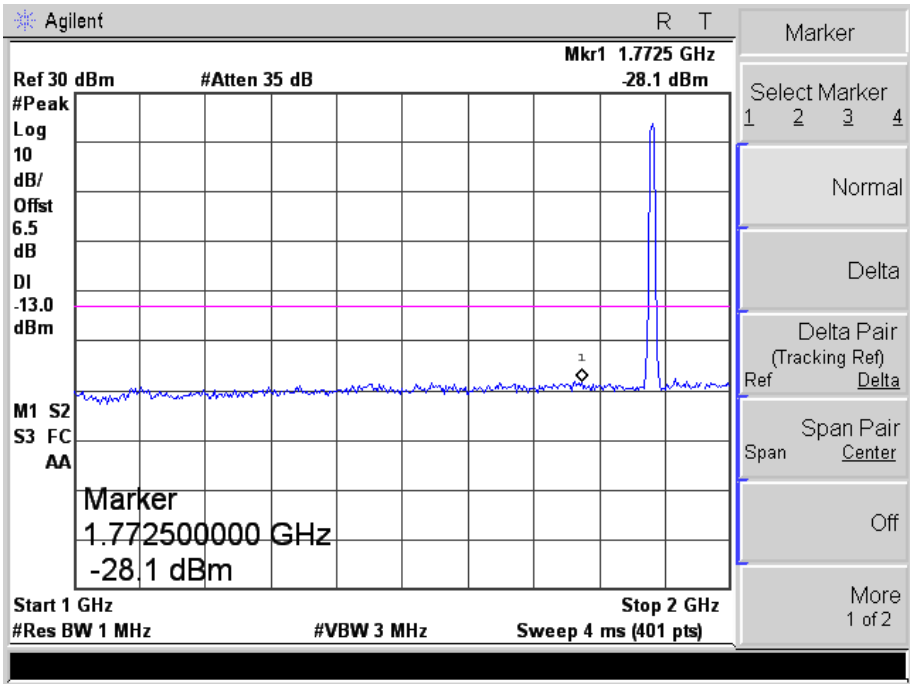


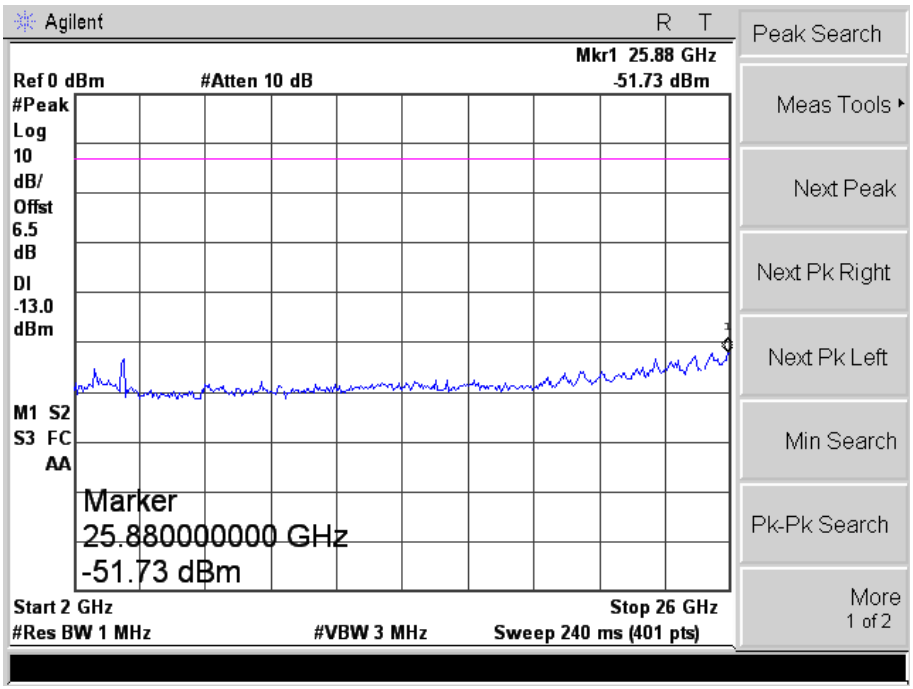





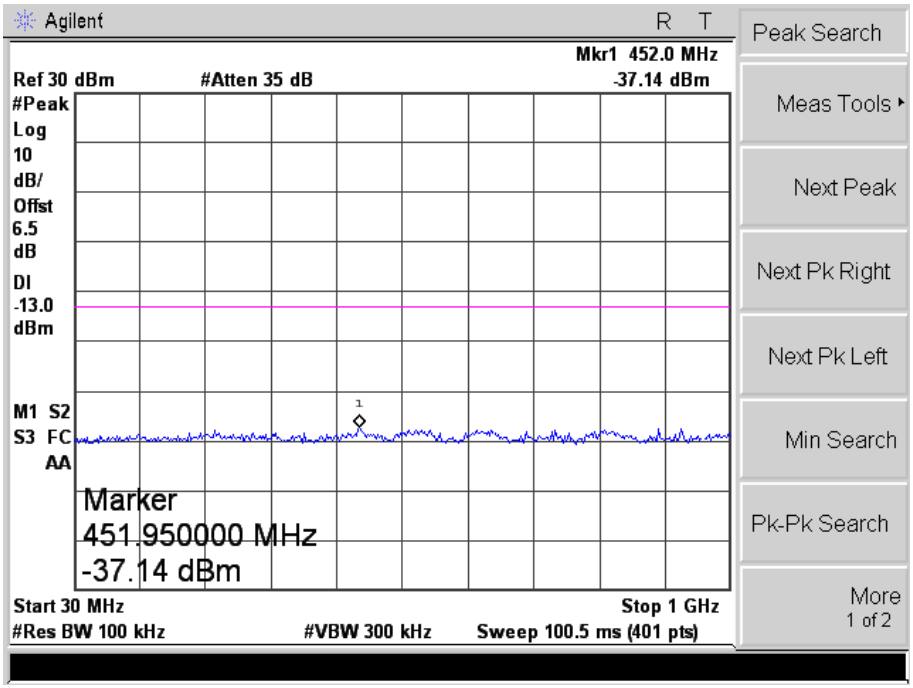

WCDMA Middle Channel

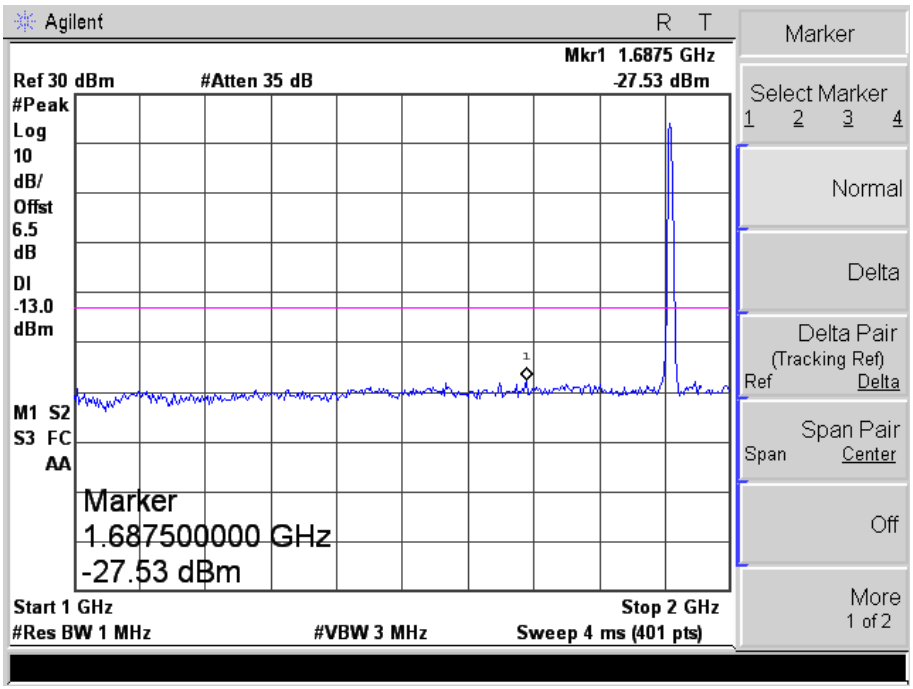


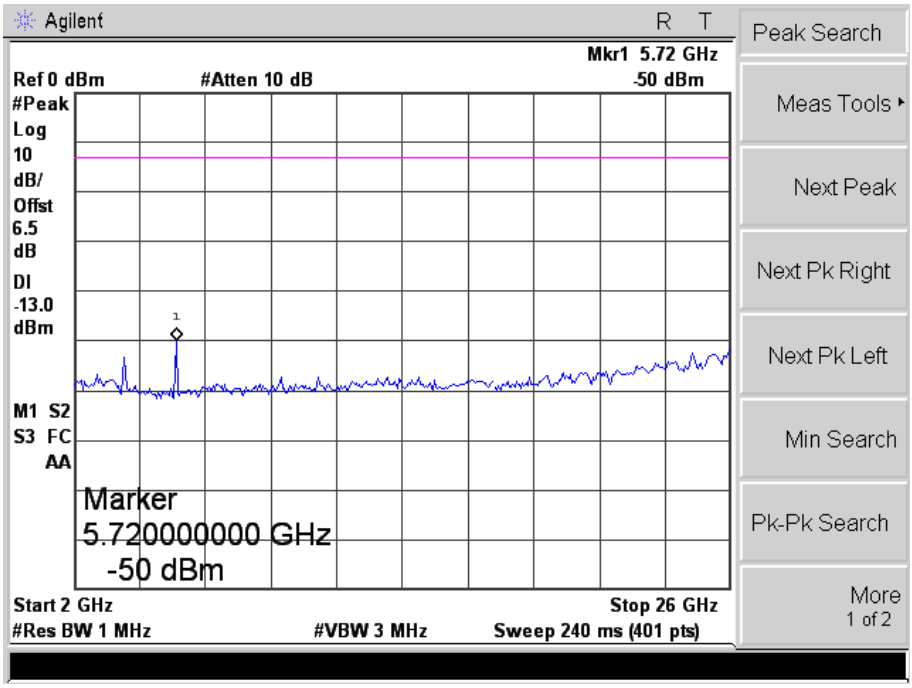

Agilent
R T
Mkr1 1.7725 GHz
Ref 30 dBm
#Atten 35 dB
-28.1 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.772500000 GHz
-28.1 dBm
Start 1 GHz
Stop 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 25.88 GHz
Ref 0 dBm
#Atten 10 dB
-51.73 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
25.880000000 GHz
-51.73 dBm
Start 2 GHz
Stop 26 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

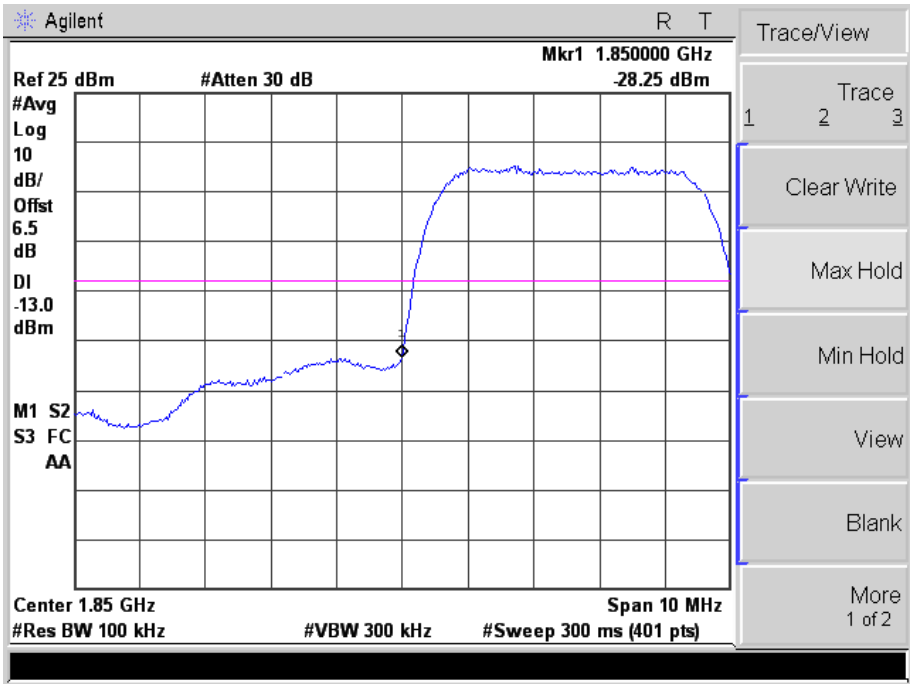
WCDMA High Channel



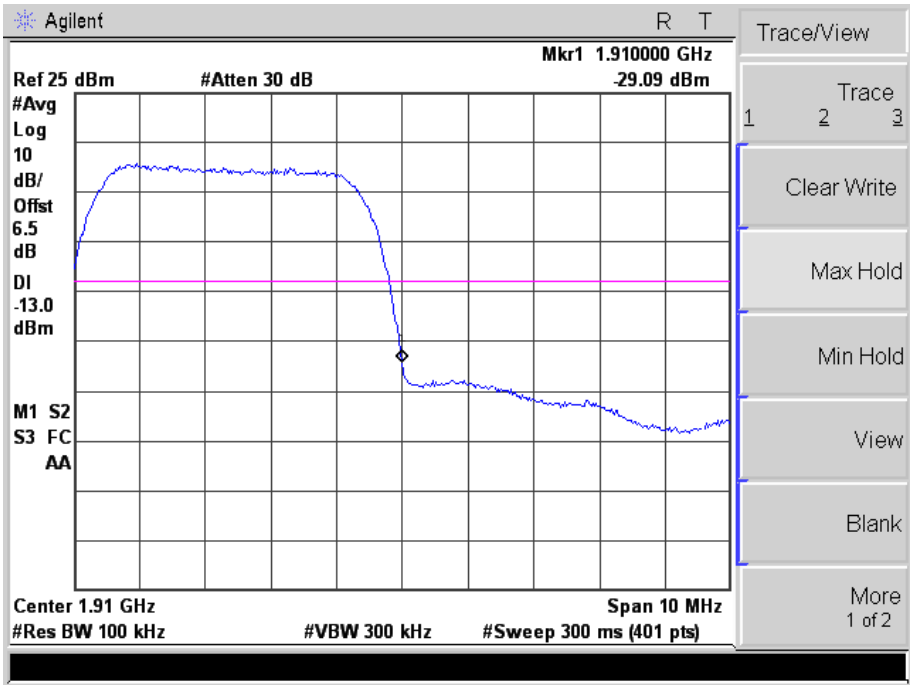





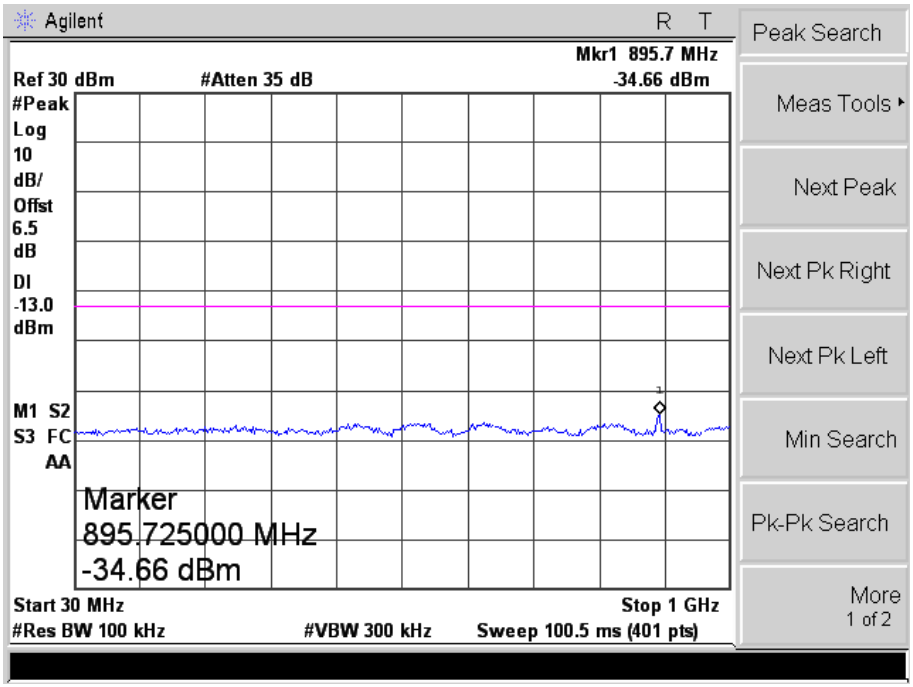

WCDMA Low Band Spurious Emission

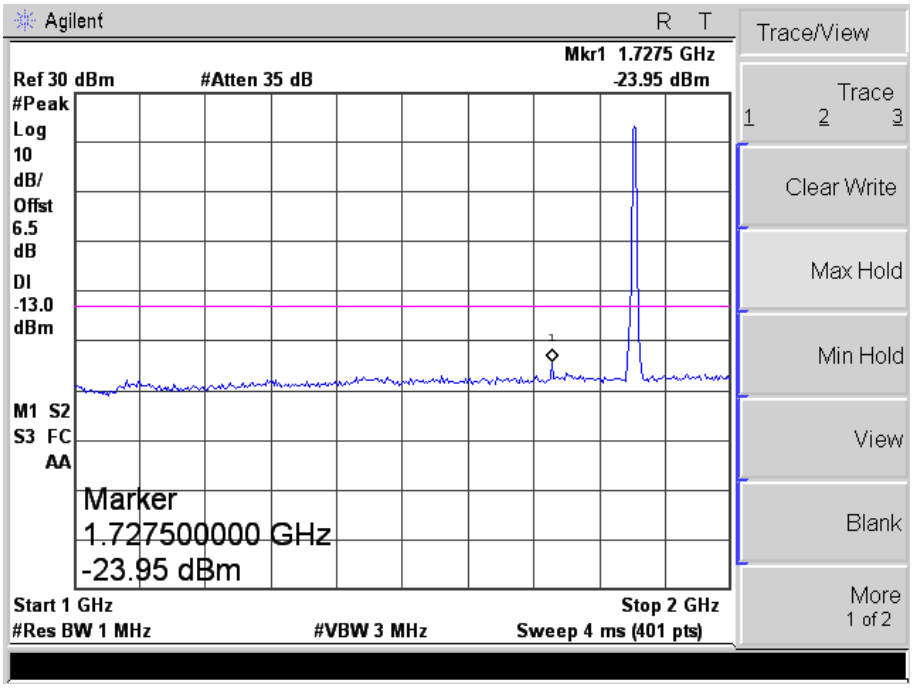


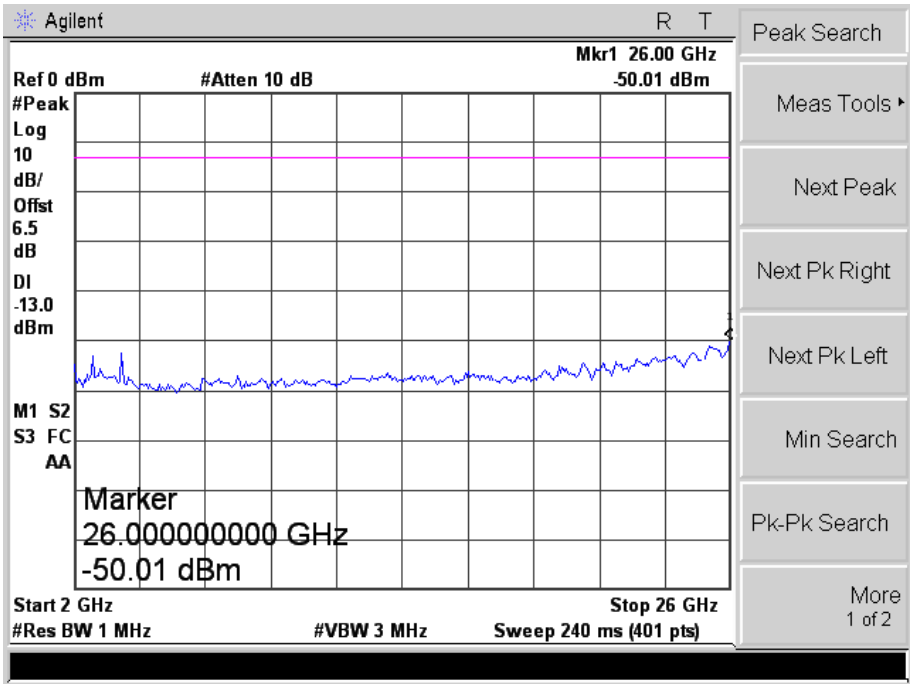
WCDMA High Band Spurious Emission



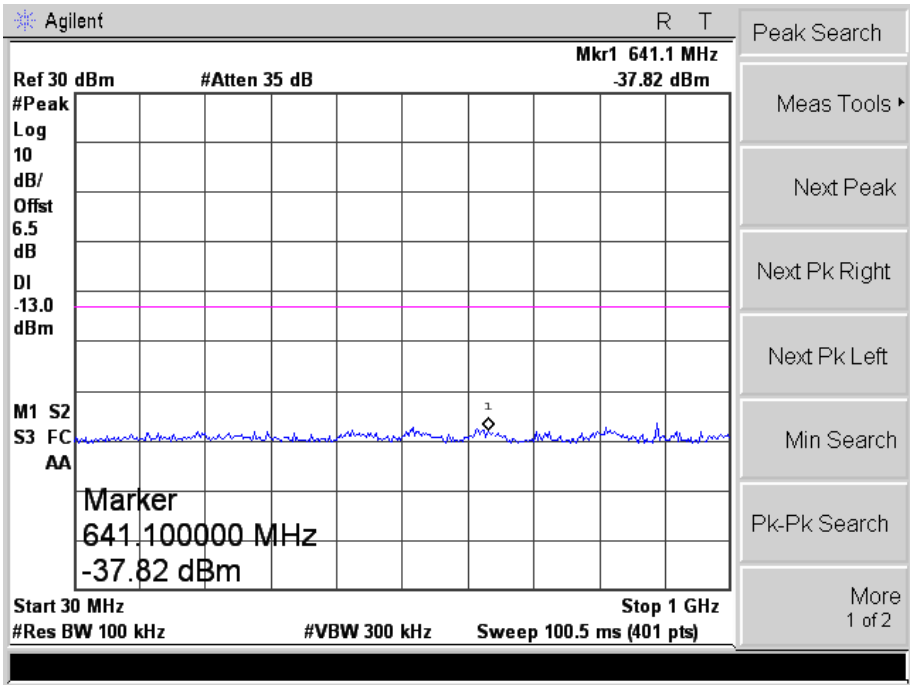

HSDPA Low Channel

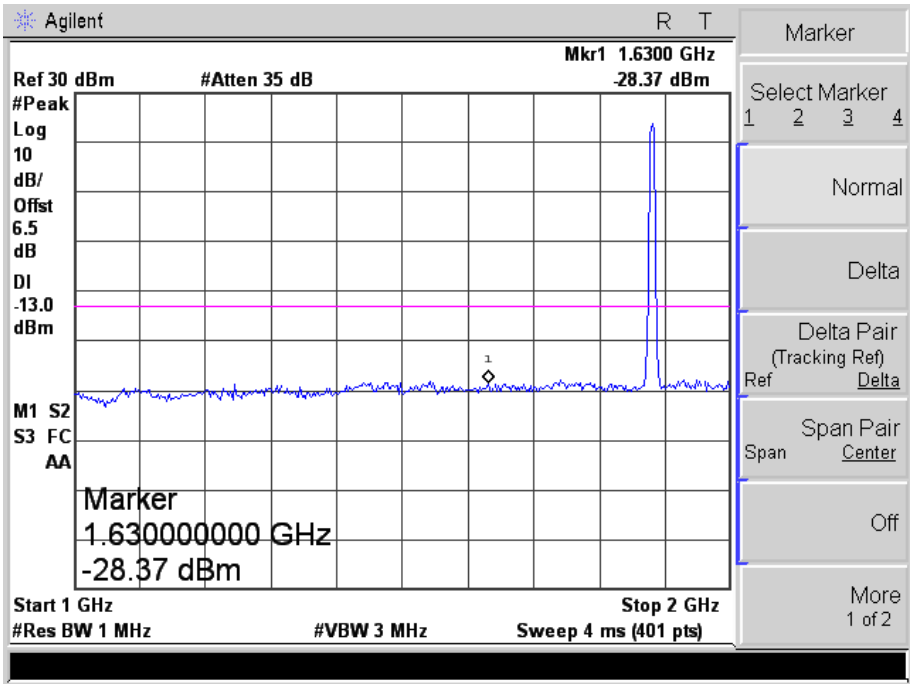


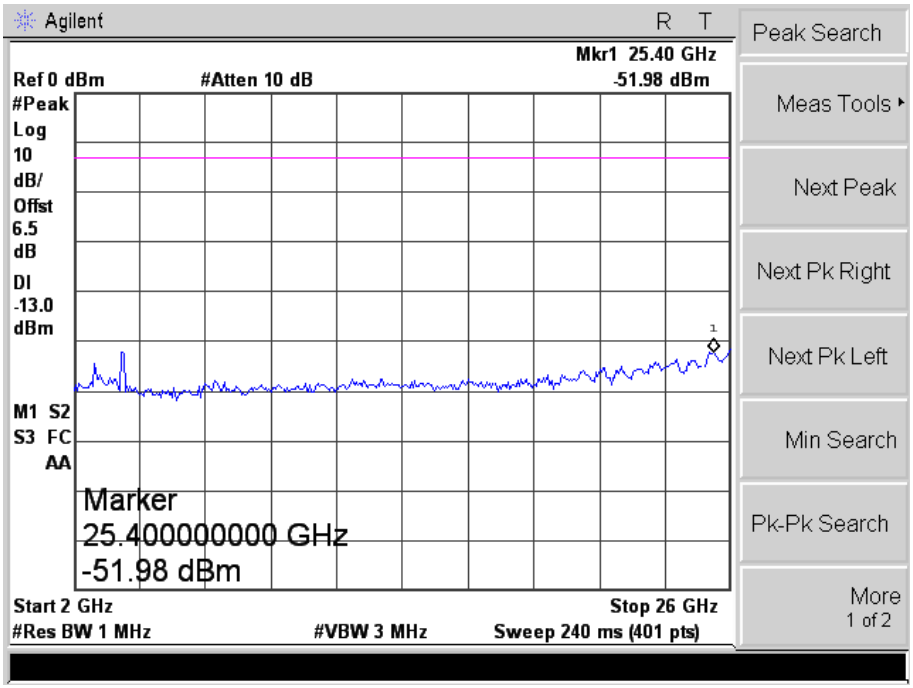

Agilent
R T
Mkr1 1.7275 GHz
Ref 30 dBm
#Atten 35 dB
-23.95 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.727500000 GHz
-23.95 dBm
Start 1 GHz
Stop 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2


Agilent
R T
Mkr1 26.00 GHz
Ref 0 dBm
#Atten 10 dB
-50.01 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
26.000000000 GHz
-50.01 dBm
Start 2 GHz
Stop 26 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

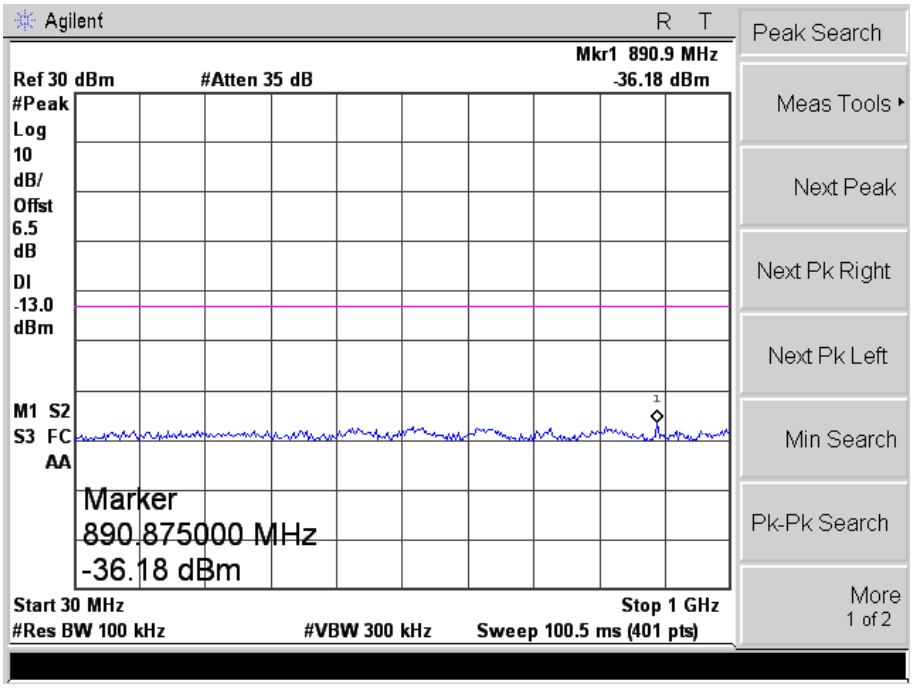
HSDPA Middle Channel

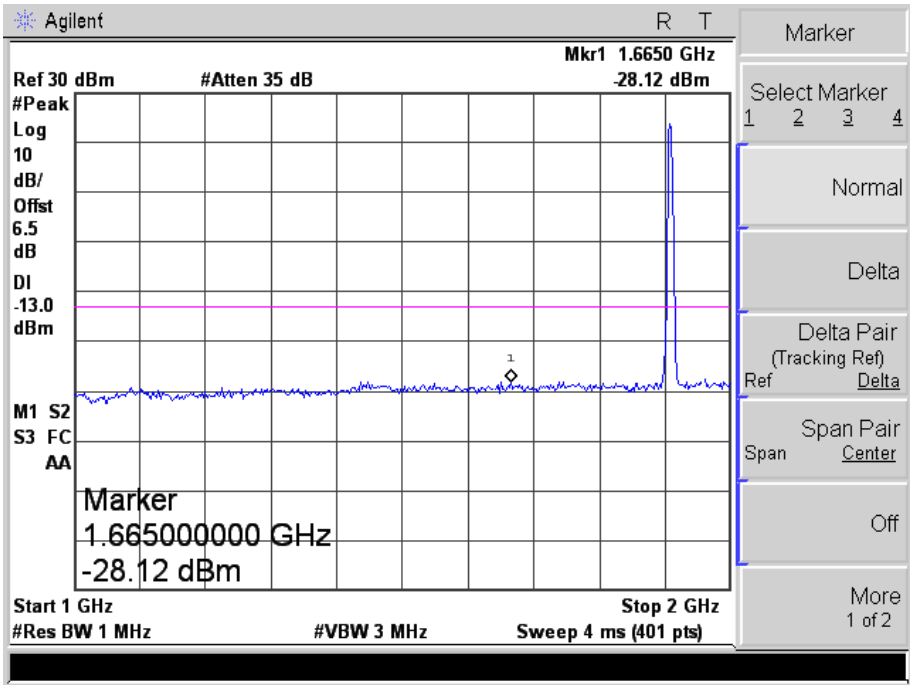


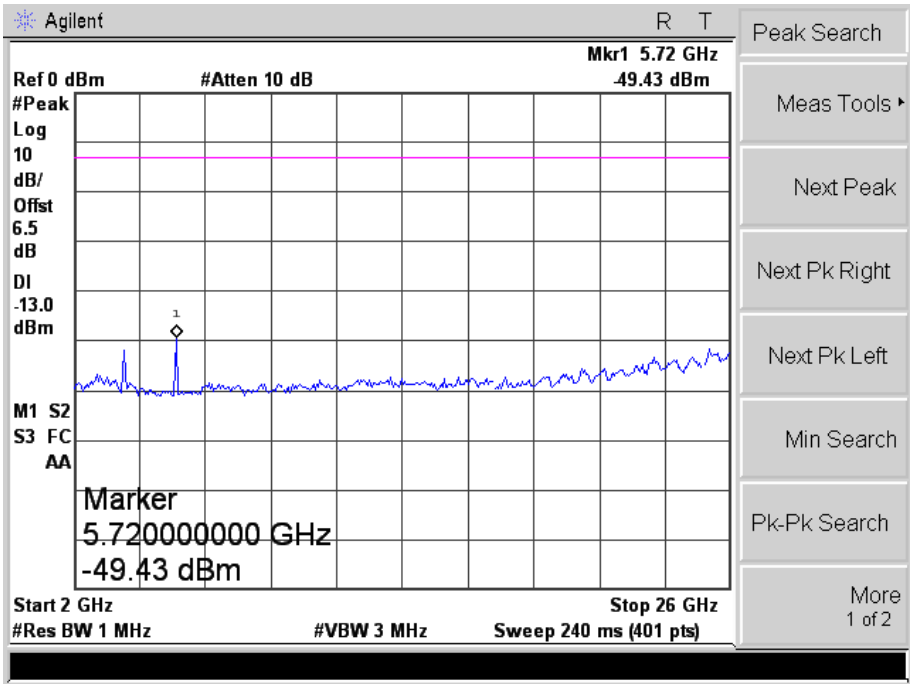





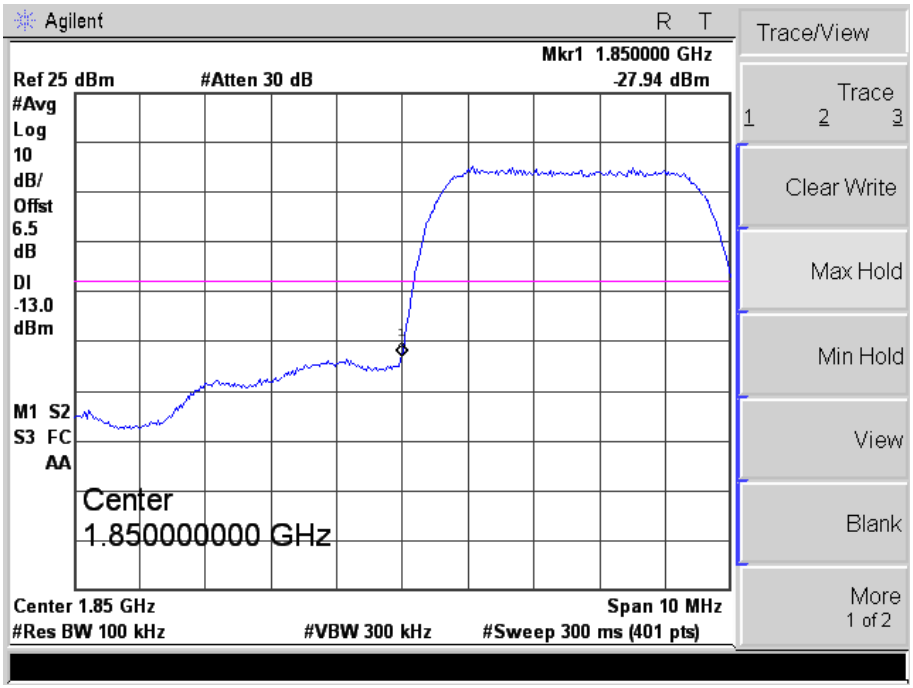

HSDPA High Channel



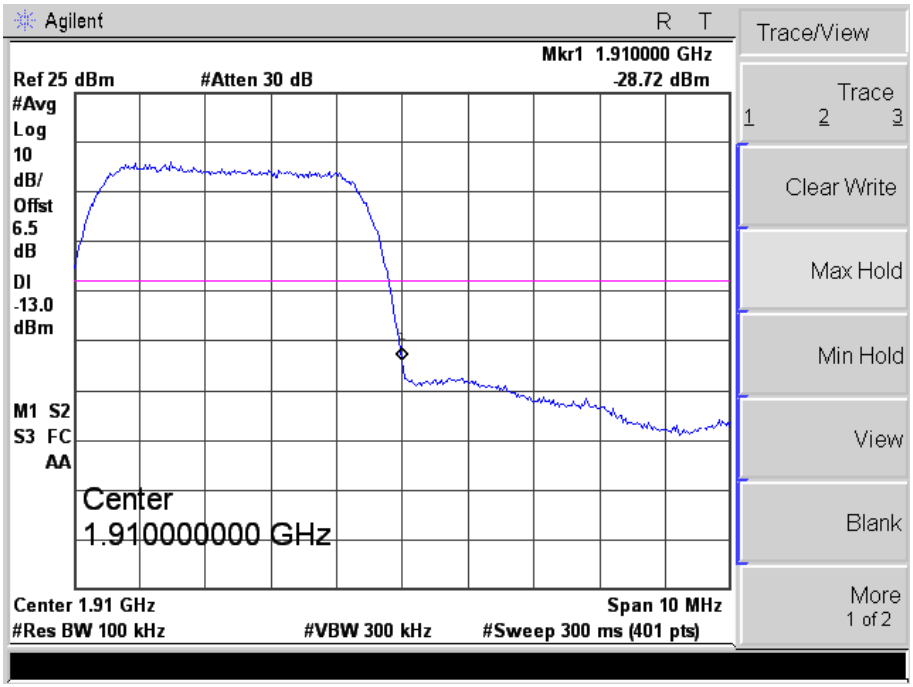

Agilent
R T
Mkr1 1.6650 GHz
Ref 30 dBm
#Atten 35 dB
-28.12 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.665000000 GHz
-28.12 dBm
Start 1 GHz
Stop 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 5.72 GHz
Ref 0 dBm
#Atten 10 dB
-49.43 dBm
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
5.720000000 GHz
-49.43 dBm
Start 2 GHz
Stop 26 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

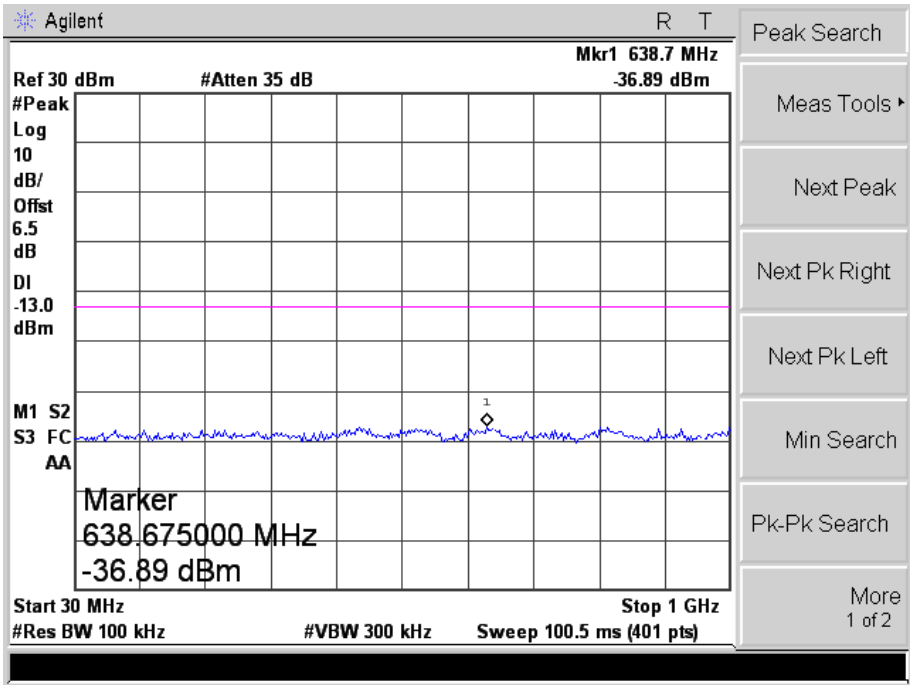
HSDPA Low Band Spurious Emission

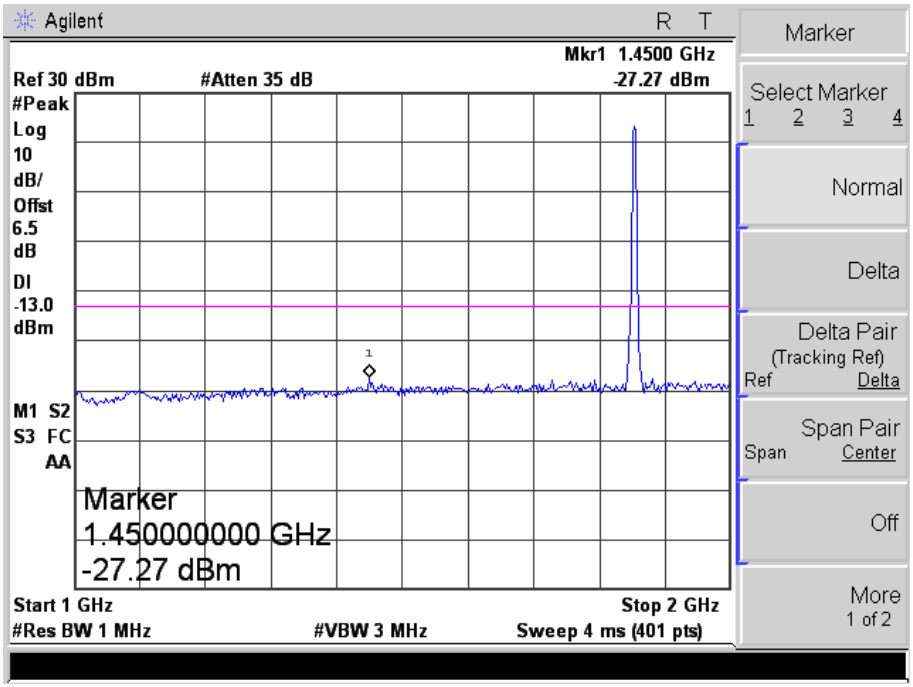


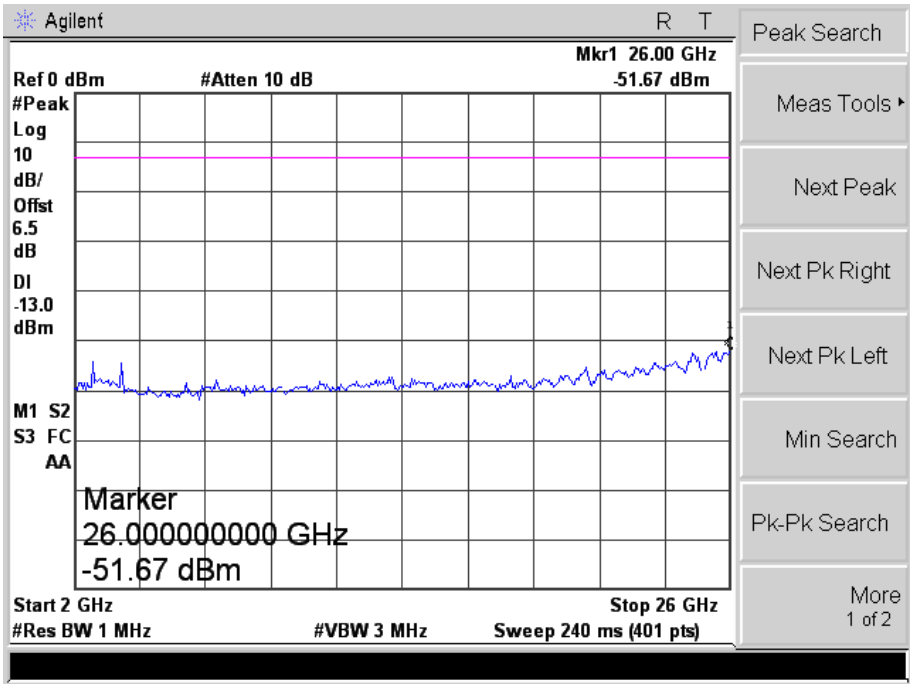

HSDPA High Band Spurious Emission



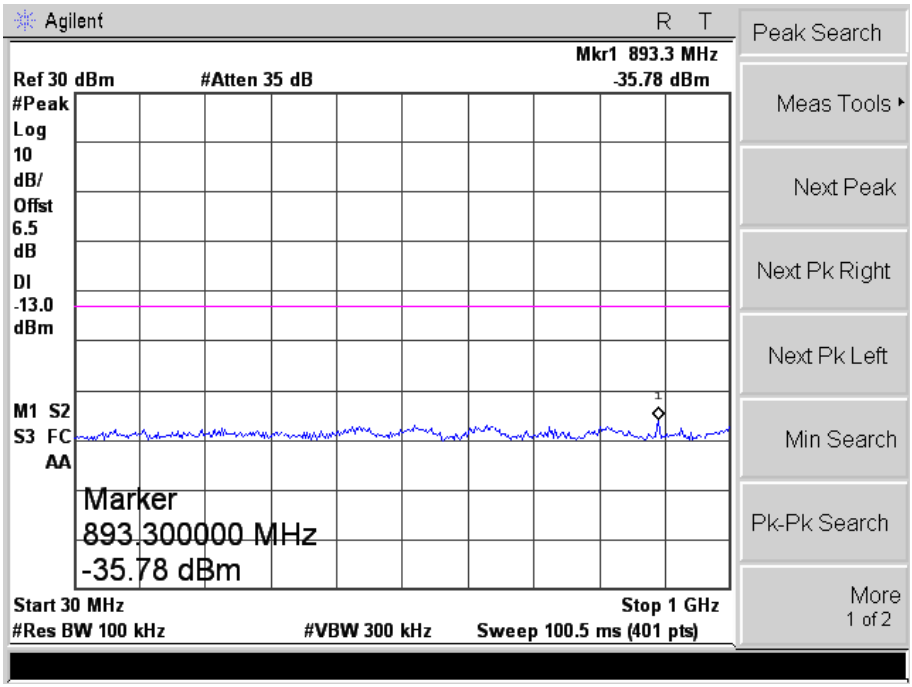
HSUPA Low Channel

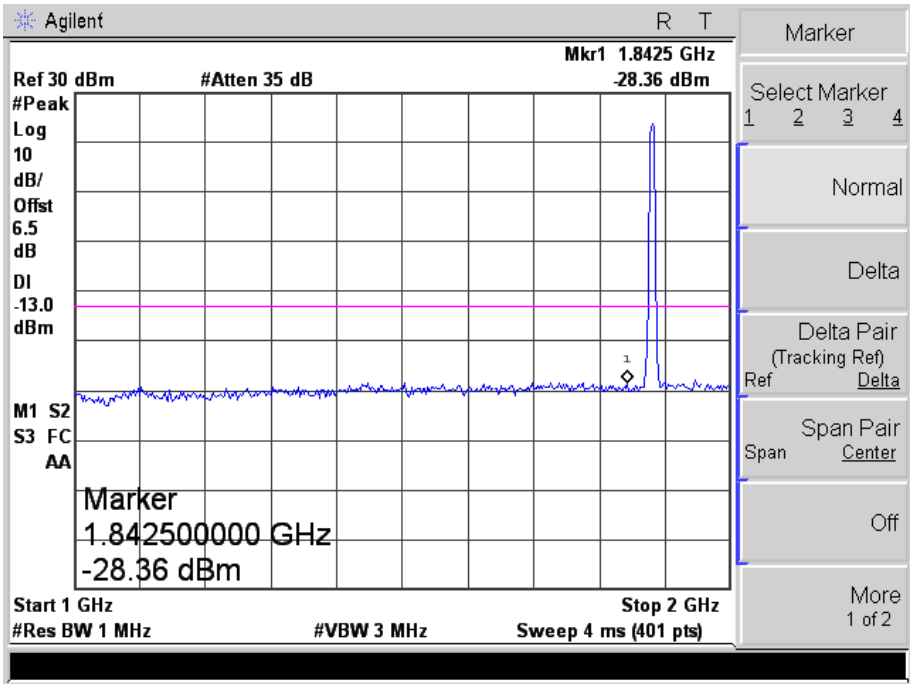


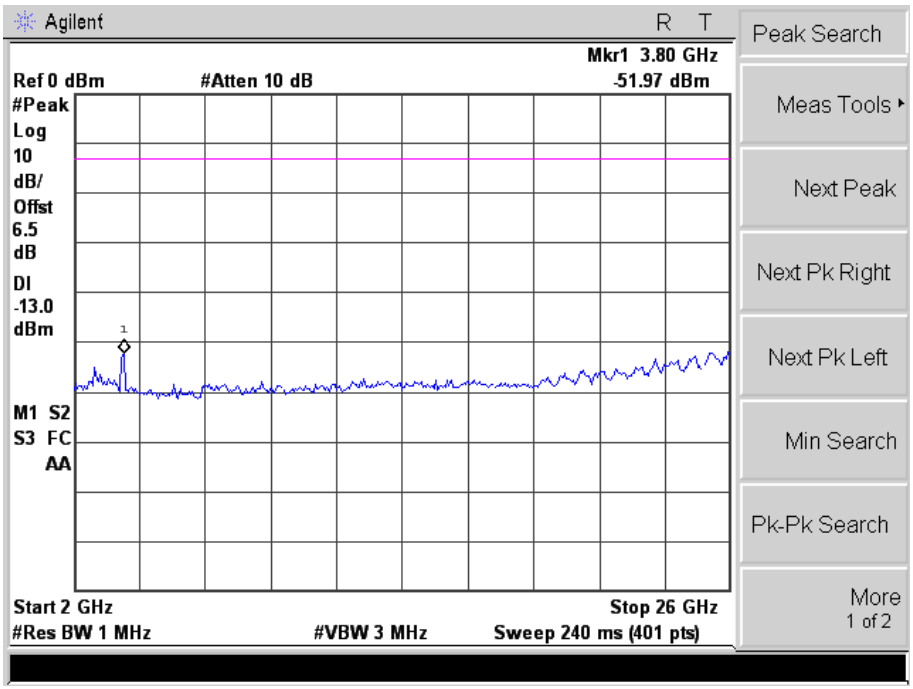





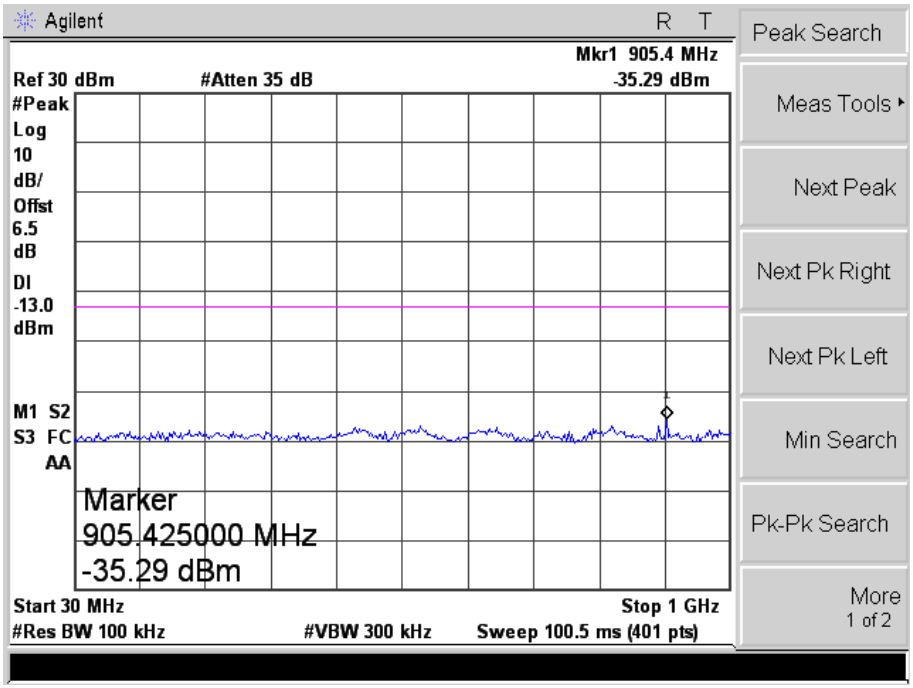

HSUPA Middle Channel

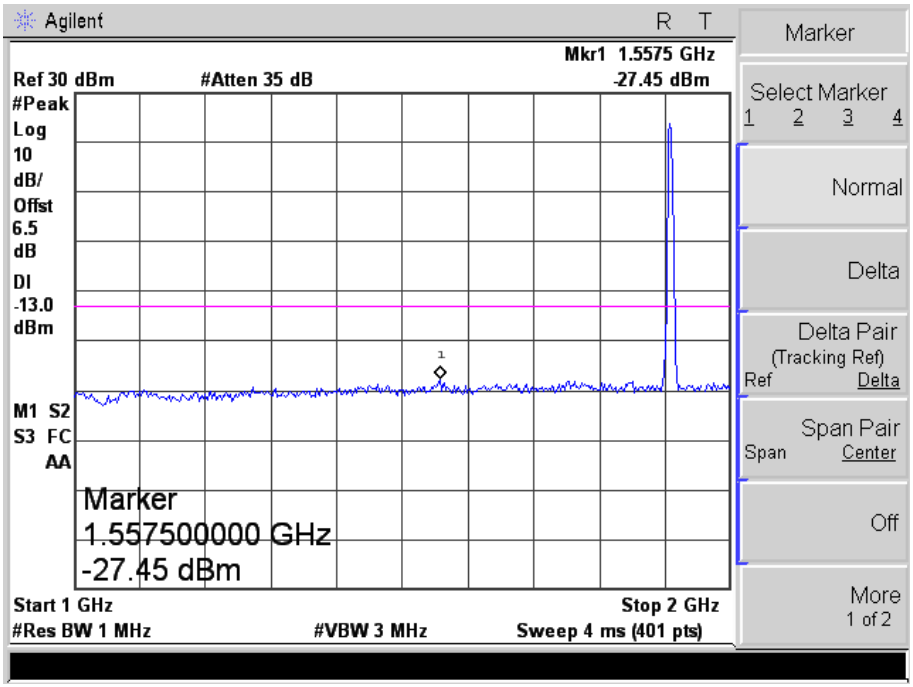


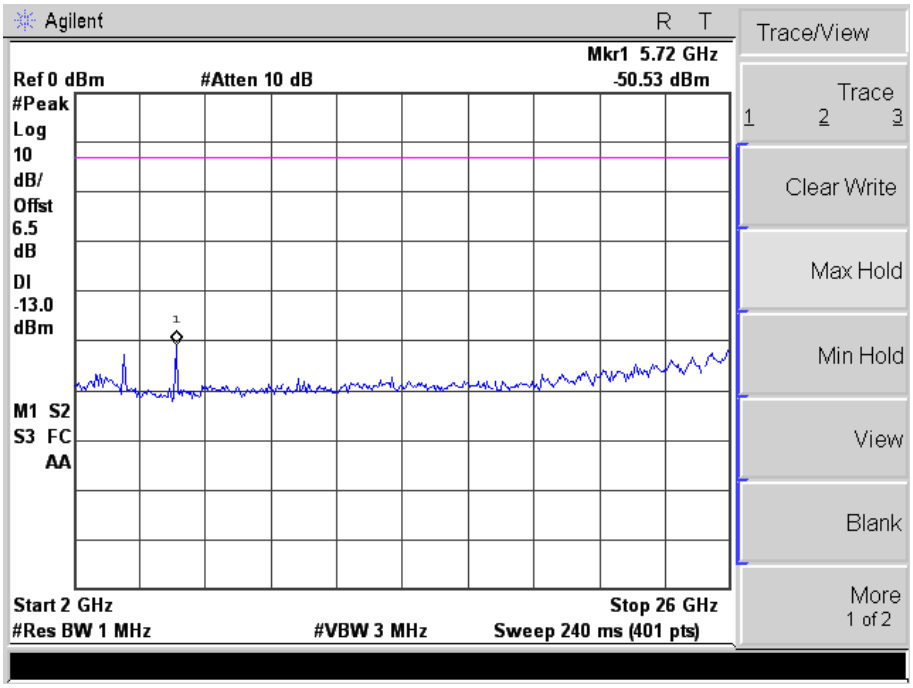

Agilent
R T
Mkr1 1.8425 GHz
-28.36 dBm
Ref 30 dBm
#Atten 35 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Marker
1.842500000 GHz
-28.36 dBm
Start 1 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 3.80 GHz
-51.97 dBm
Ref 0 dBm
#Atten 10 dB
#Peak
Log
10
dB/
Offst
6.5
dB
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Start 2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Stop 26 GHz
Sweep 240 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

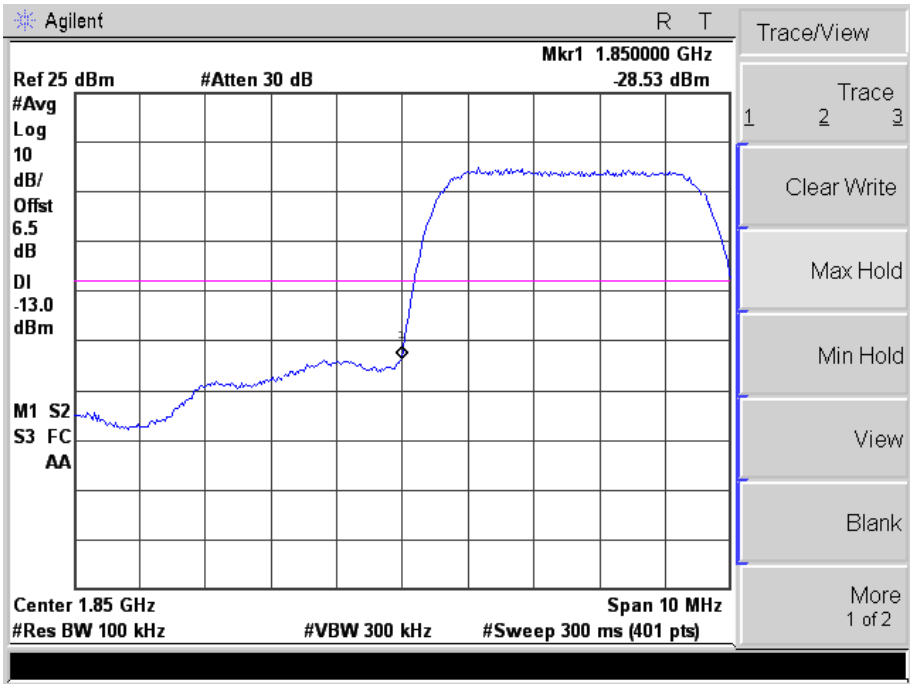
HSUPA High Channel



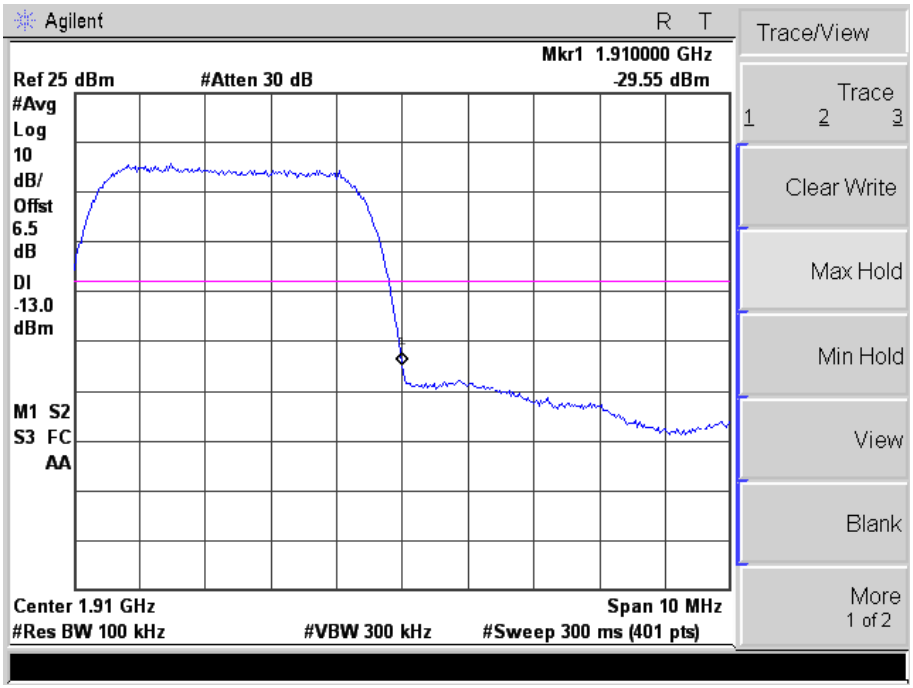






HSUPA Low Band Spurious Emission



HSUPA High Band Spurious Emission



# 8. Spurious Radiated Emissions

## 8.1 Standard Applicable

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

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

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

## 8.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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 attenuation limit in dB =43+10 $Log_{10}$ (power out in Watts)

## 8.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1012 mbar |

## 8.4 Summary of Test Results/Plots

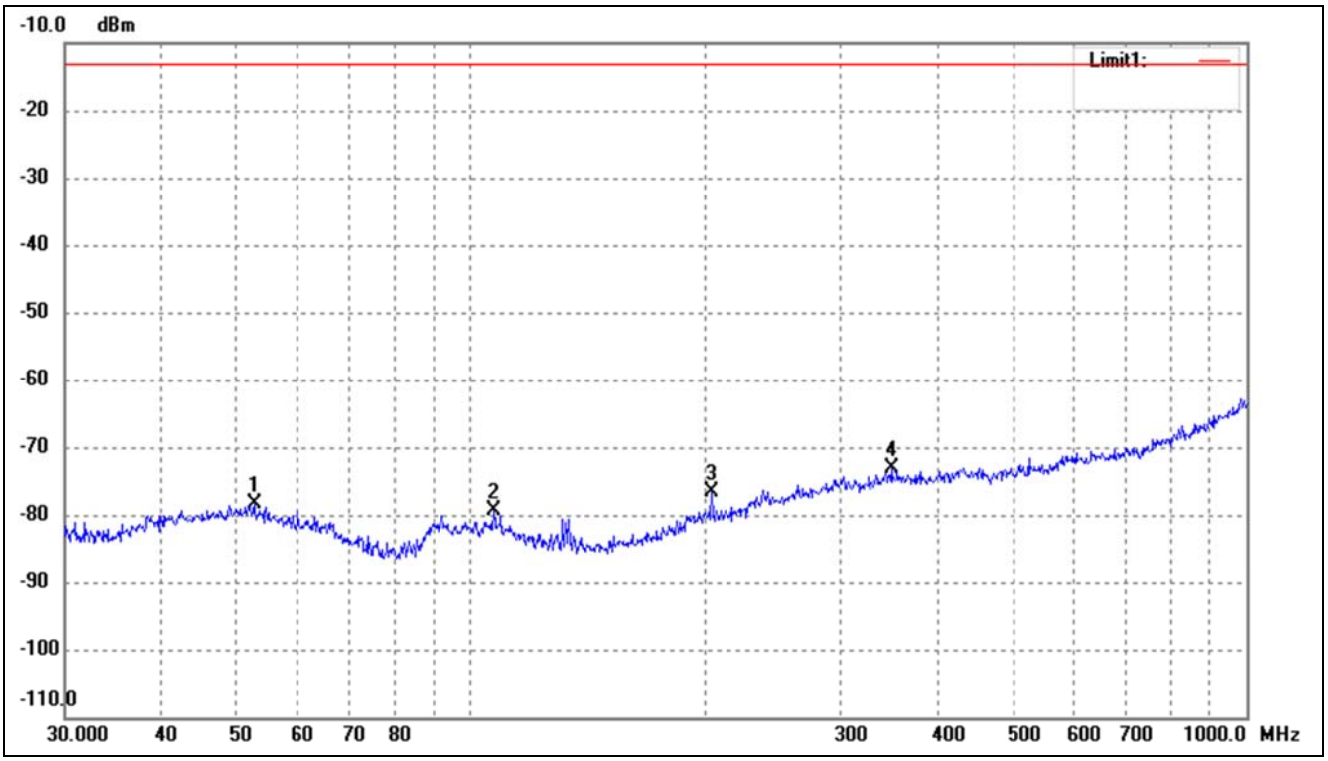
According to the data below, the FCC Part 22.917 and 24.238 standards, and had the worst margin of:

*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

*Spurious Emission From 30MHz to 1GHz*

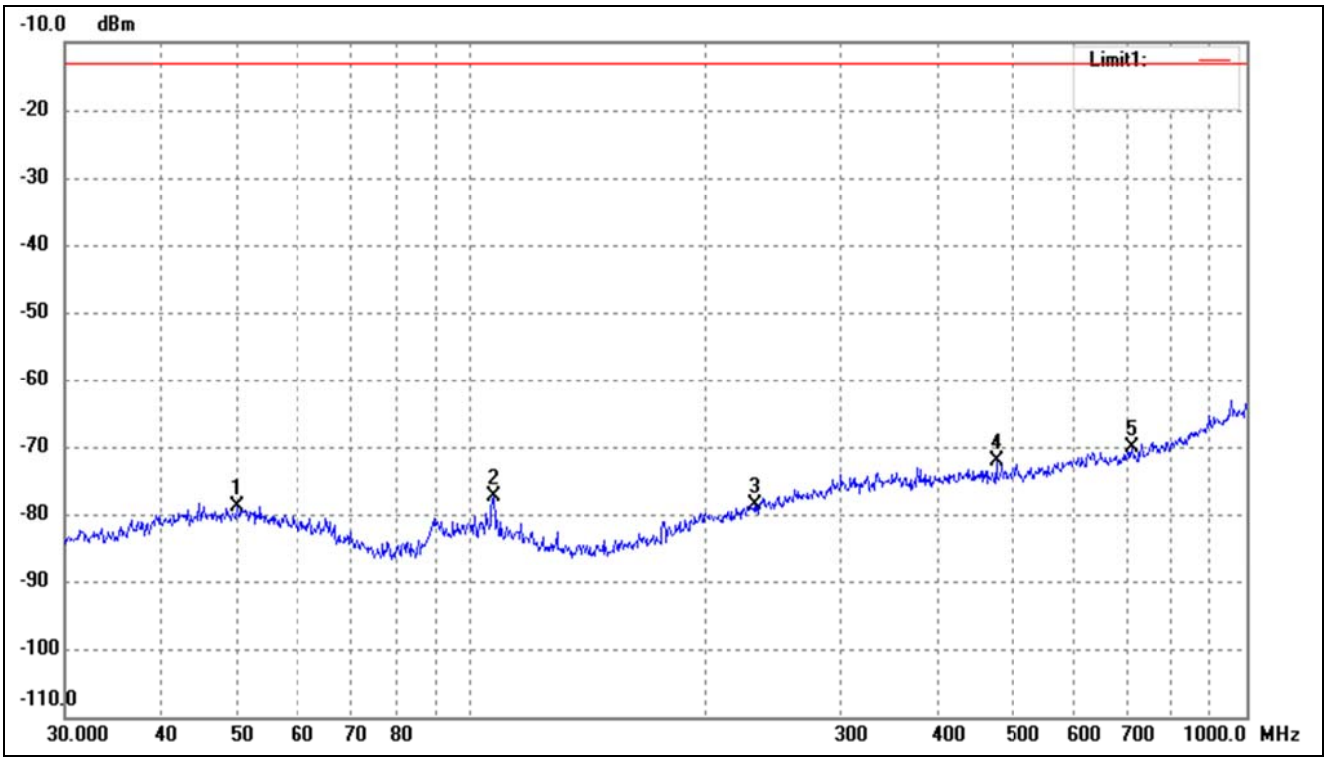
*For Cellular Band_ GSM850 Mode*

*Horizontal:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 52.5753 | -76.61 | -1.88 | -78.49 | -13.00 | -65.49 | ERP |
| 2 | 107.1337 | -75.65 | -3.67 | -79.32 | -13.00 | -66.32 | ERP |
| 3 | 204.2377 | -74.79 | -1.88 | -76.67 | -13.00 | -63.67 | ERP |
| 4 | 349.2500 | -76.61 | 3.42 | -73.19 | -13.00 | -60.19 | ERP |

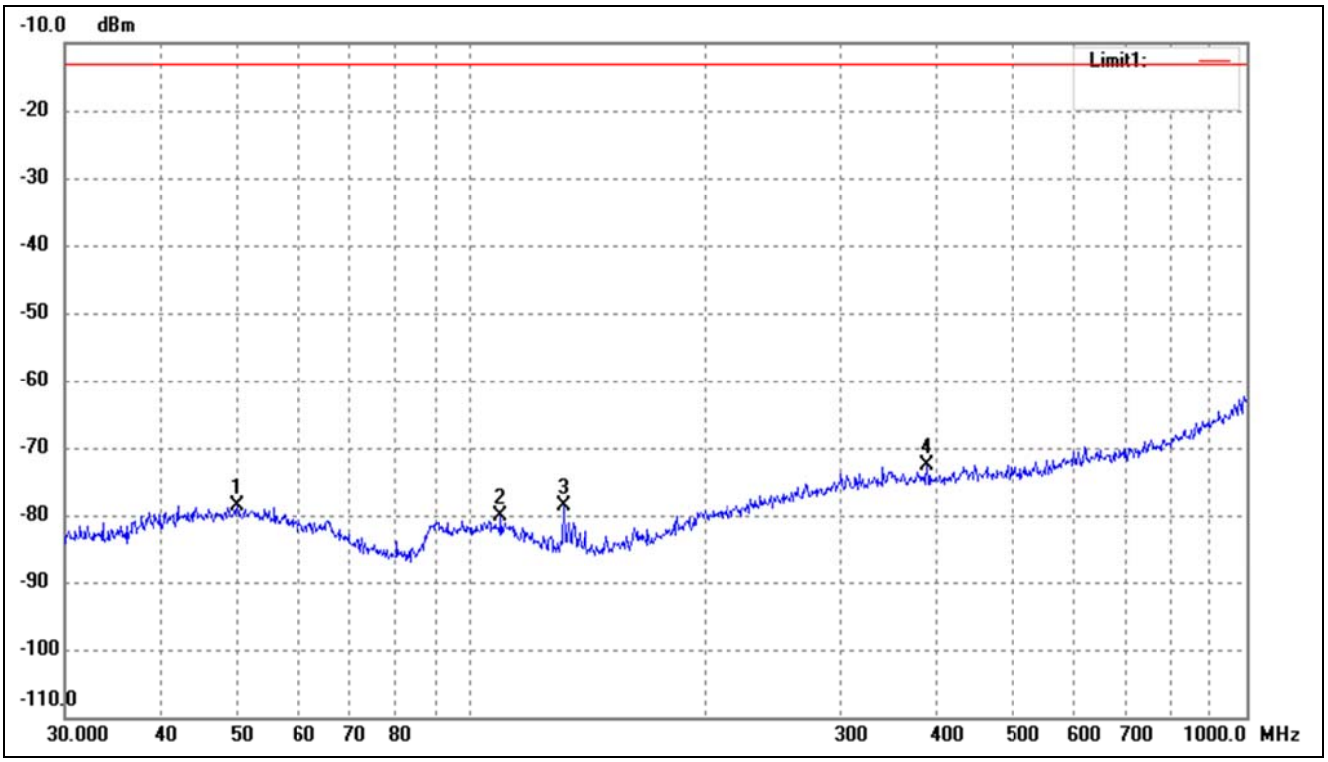
*Vertical:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 50.0566 | -77.05 | -1.80 | -78.85 | -13.00 | -65.85 | ERP |
| 2 | 107.1337 | -73.69 | -3.67 | -77.36 | -13.00 | -64.36 | ERP |
| 3 | 232.5318 | -78.31 | -0.40 | -78.71 | -13.00 | -65.71 | ERP |
| 4 | 475.4991 | -75.39 | 3.19 | -72.20 | -13.00 | -59.20 | ERP |
| 5 | 711.6734 | -76.54 | 6.43 | -70.11 | -13.00 | -57.11 | ERP |

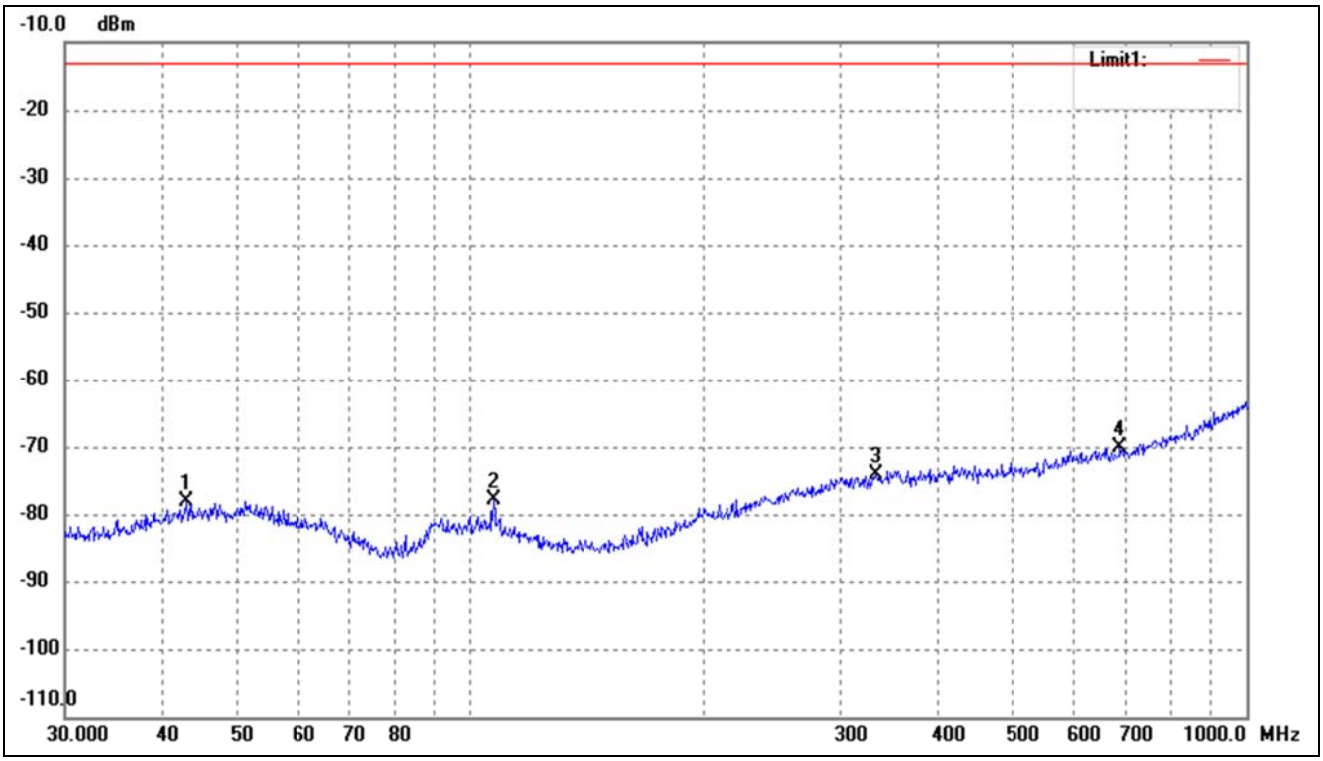
*For Cellular Band_ GSM1900 Mode*

*Horizontal:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 50.0566 | -76.92 | -1.80 | -78.72 | -13.00 | -65.72 | ERP |
| 2 | 109.4116 | -76.38 | -3.86 | -80.24 | -13.00 | -67.24 | ERP |
| 3 | 131.7577 | -72.00 | -6.74 | -78.74 | -13.00 | -65.74 | ERP |
| 4 | 387.9920 | -75.53 | 2.84 | -72.69 | -13.00 | -59.69 | ERP |

*Vertical:*

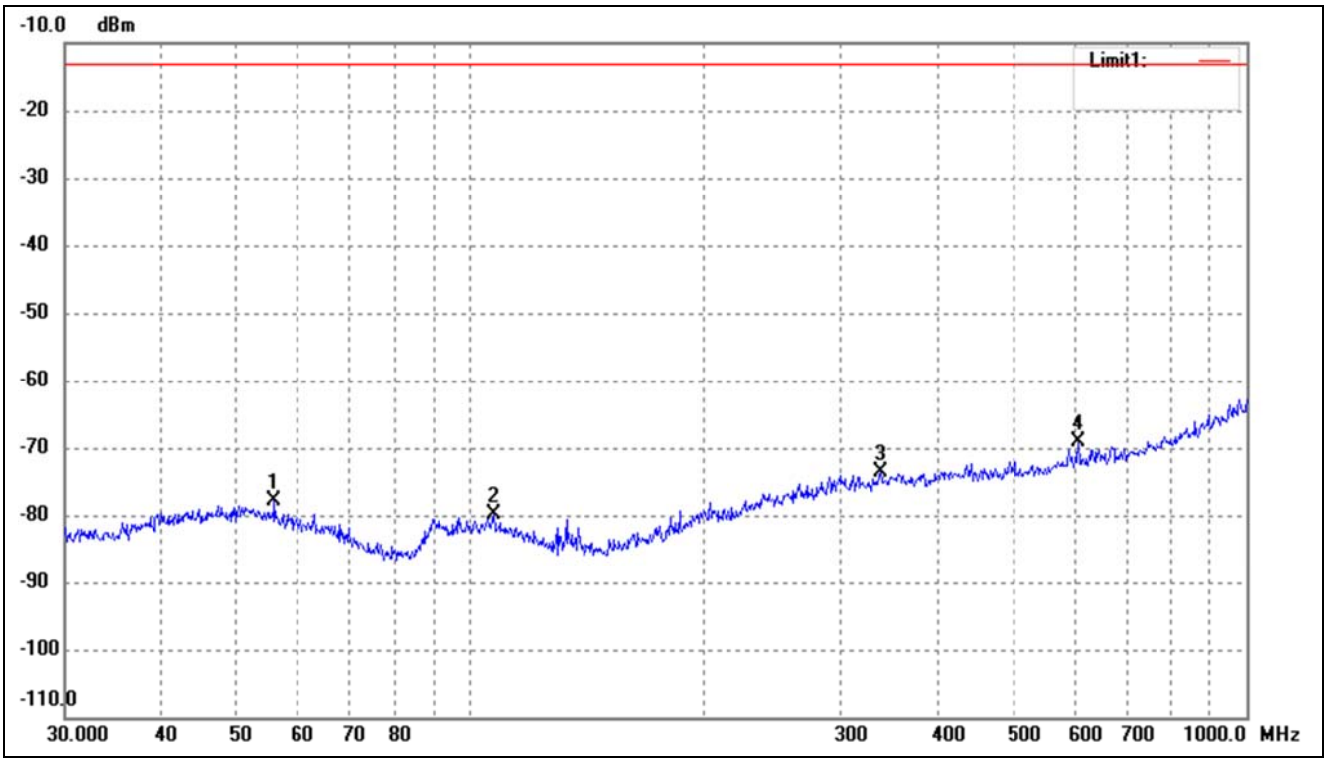



| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 43.0505 | -75.72 | -2.31 | -78.03 | -13.00 | -65.03 | ERP |
| 2 | 107.1337 | -74.22 | -3.67 | -77.89 | -13.00 | -64.89 | ERP |
| 3 | 333.6867 | -77.08 | 2.96 | -74.12 | -13.00 | -61.12 | ERP |
| 4 | 687.1507 | -76.08 | 6.07 | -70.01 | -13.00 | -57.01 | ERP |

*Note: Margin= (Reading+ Correct)- Limit*

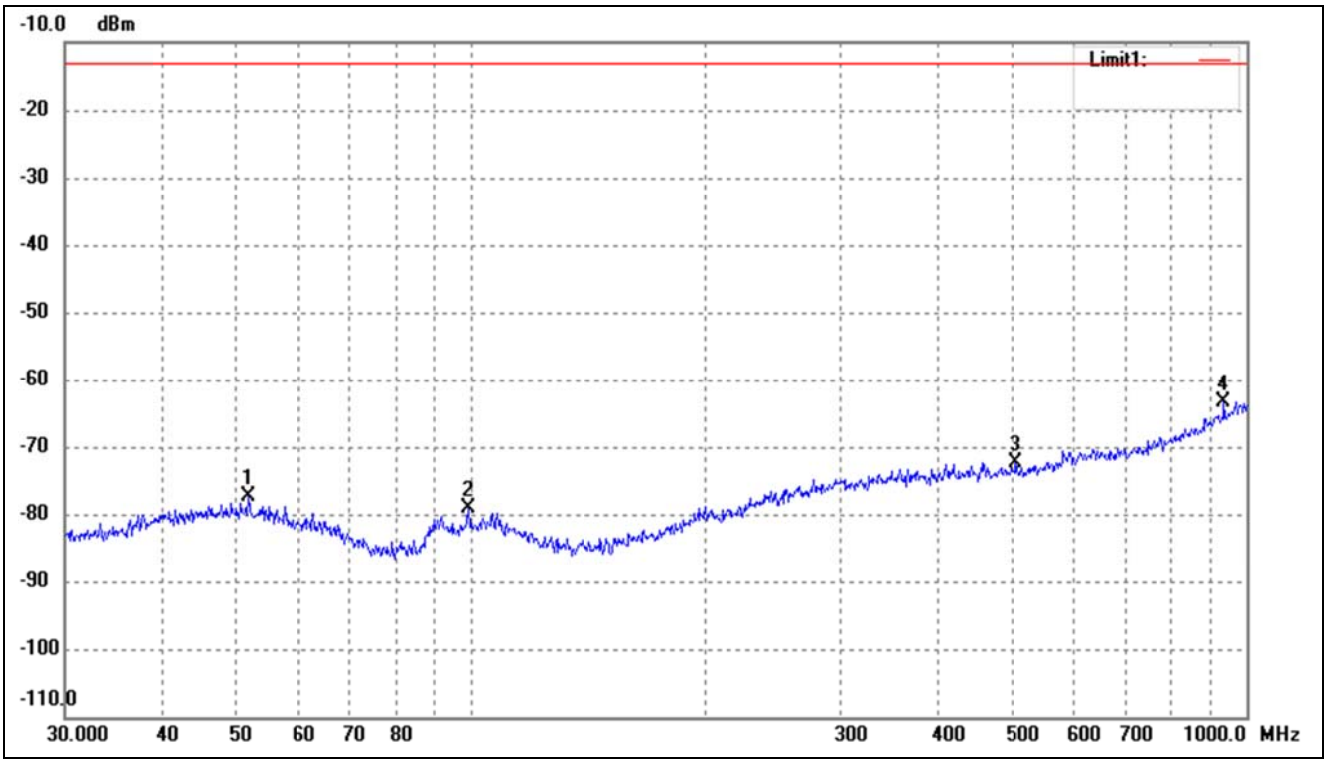
*For band 5 Mode*

*Horizontal:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 55.8047 | -75.30 | -2.53 | -77.83 | -13.00 | -64.83 | ERP |
| 2 | 107.1337 | -76.27 | -3.67 | -79.94 | -13.00 | -66.94 | ERP |
| 3 | 338.4001 | -76.82 | 3.08 | -73.74 | -13.00 | -60.74 | ERP |
| 4 | 607.7867 | -74.47 | 5.25 | -69.22 | -13.00 | -56.22 | ERP |

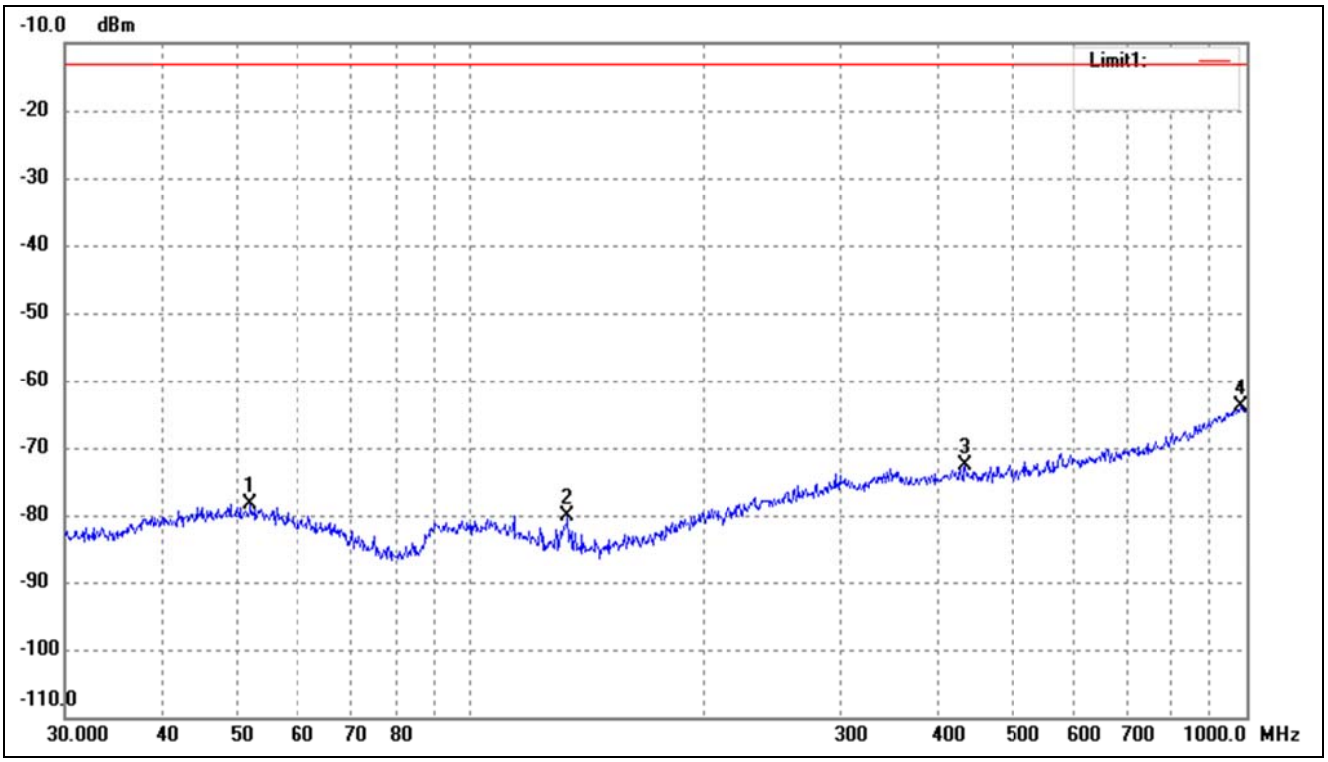
*Vertical:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | |
| 1 | 51.6616 | -75.67 | -1.79 | -77.46 | -13.00 | -64.46 | ERP |
| 2 | 99.5281 | -75.16 | -4.06 | -79.22 | -13.00 | -66.22 | ERP |
| 3 | 504.7062 | -75.69 | 3.41 | -72.28 | -13.00 | -59.28 | ERP |
| 4 | 935.5463 | -75.03 | 11.75 | -63.28 | -13.00 | -50.28 | ERP |

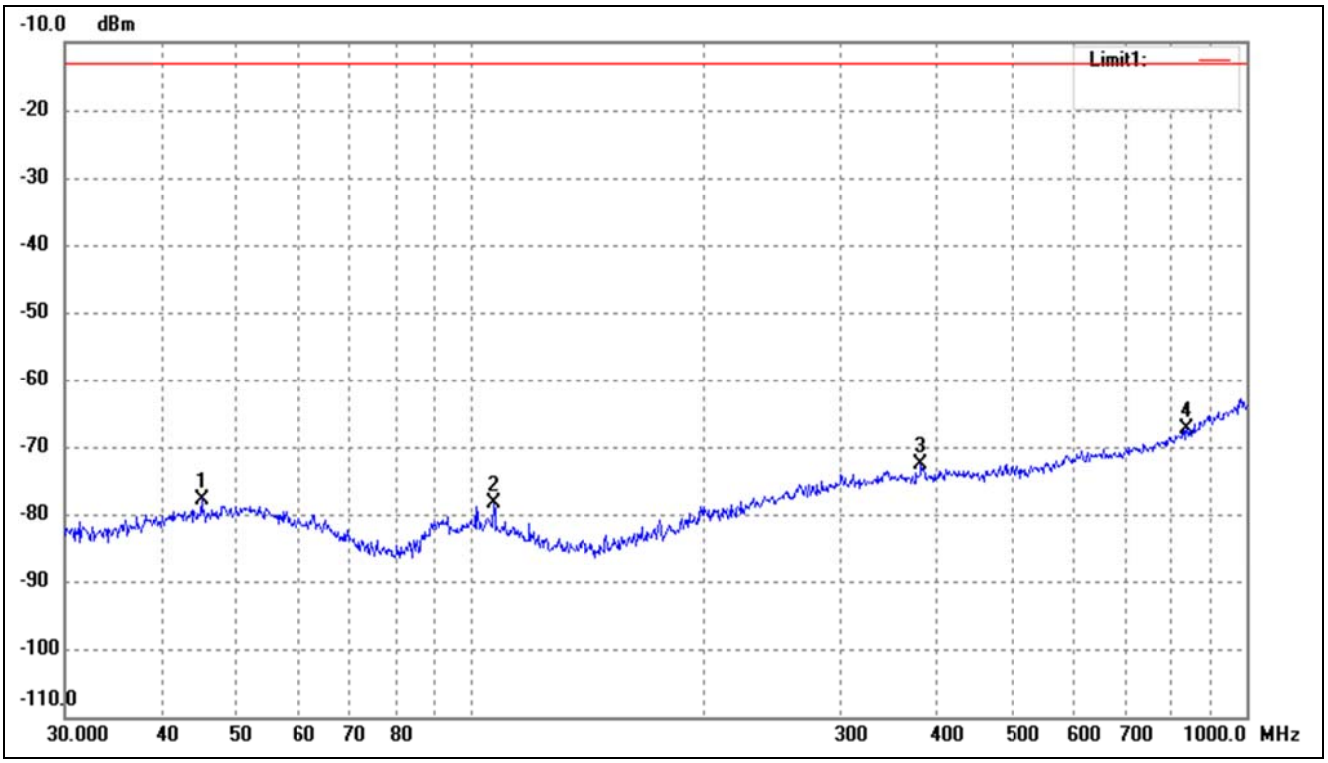
*For band 4 Mode*

*Horizontal:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 52.0251 | -76.60 | -1.79 | -78.39 | -13.00 | -65.39 | ERP |
| 2 | 133.1511 | -73.30 | -6.82 | -80.12 | -13.00 | -67.12 | ERP |
| 3 | 434.0651 | -76.08 | 3.46 | -72.62 | -13.00 | -59.62 | ERP |
| 4 | 982.6200 | -77.08 | 13.14 | -63.94 | -13.00 | -50.94 | ERP |

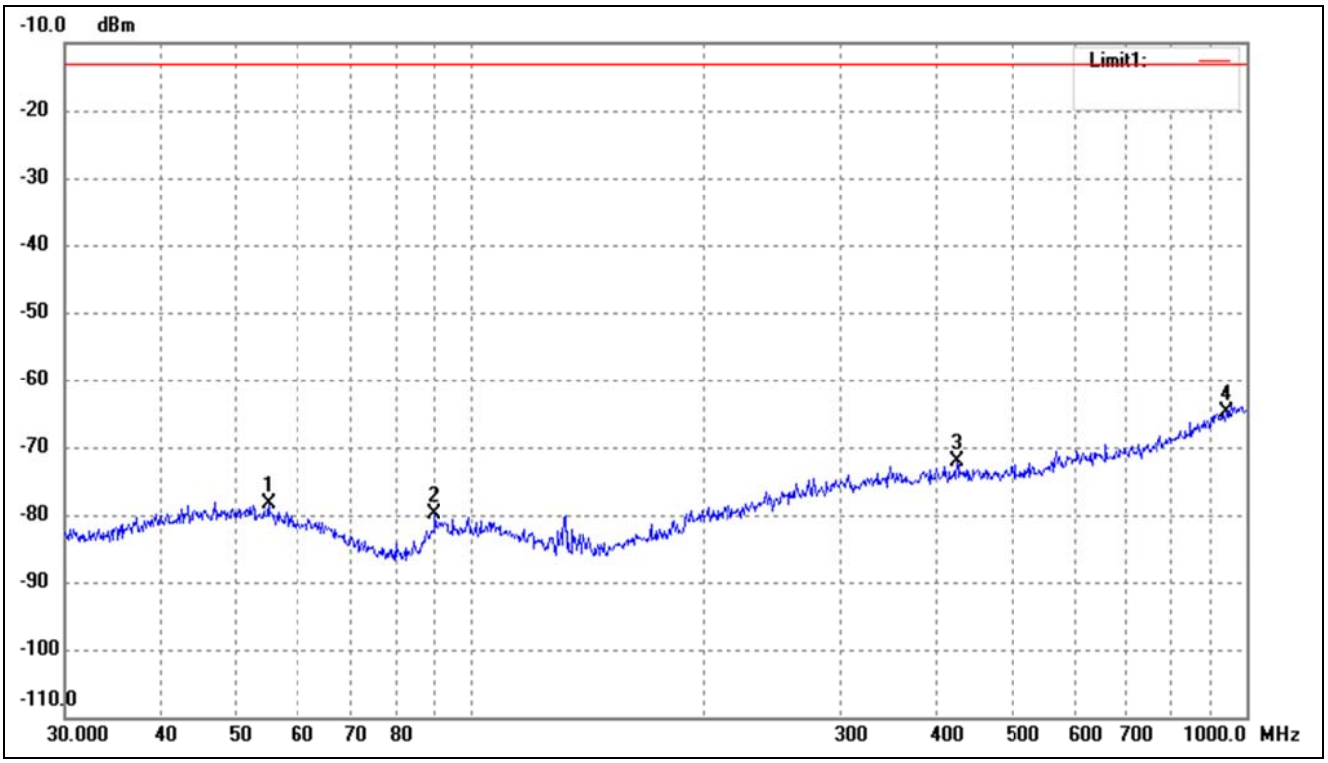
*Vertical:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | |
| 1 | 45.0583 | -75.65 | -2.10 | -77.75 | -13.00 | -64.75 | ERP |
| 2 | 107.1337 | -74.73 | -3.67 | -78.40 | -13.00 | -65.40 | ERP |
| 3 | 381.2487 | -75.79 | 3.10 | -72.69 | -13.00 | -59.69 | ERP |
| 4 | 839.1818 | -76.32 | 9.00 | -67.32 | -13.00 | -54.32 | ERP |

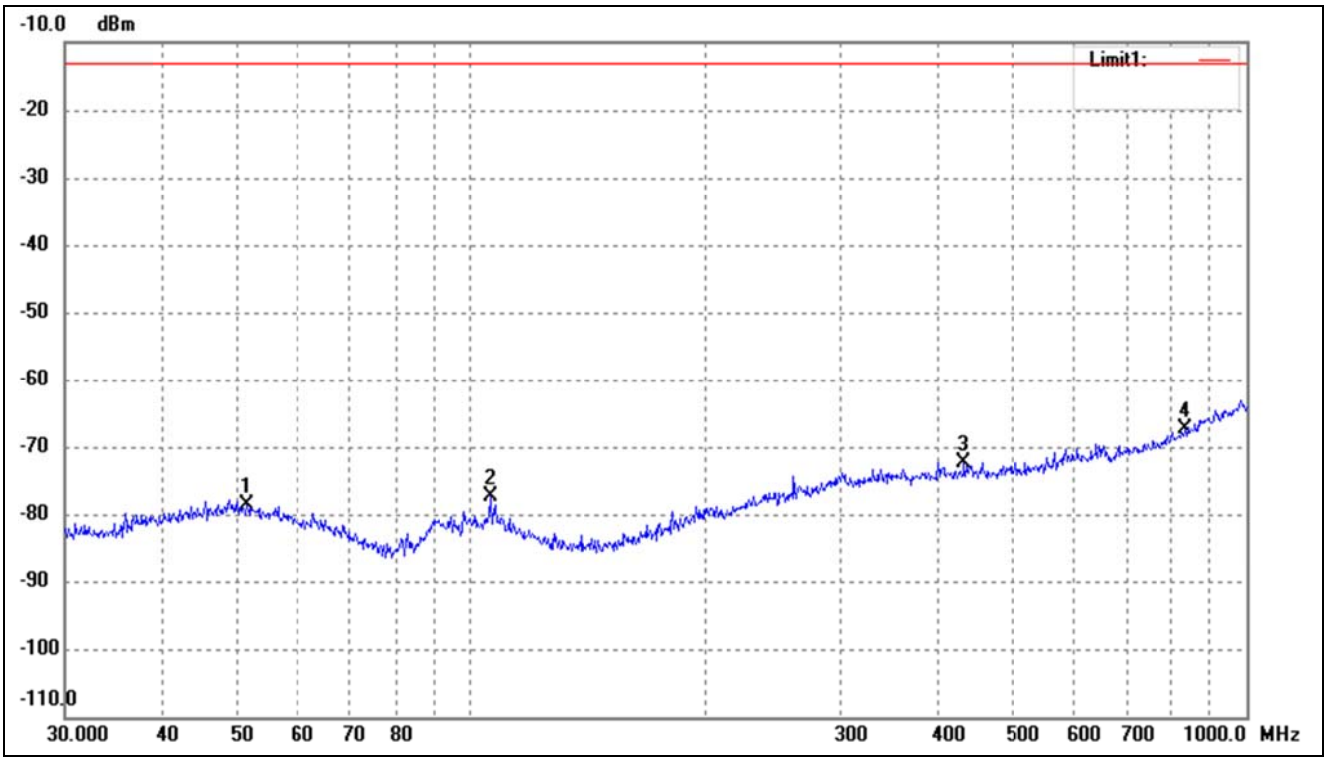
*For band 2 Mode*

*Horizontal:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | |
| 1 | 54.8348 | -76.02 | -2.29 | -78.31 | -13.00 | -65.31 | ERP |
| 2 | 89.9047 | -76.17 | -3.72 | -79.89 | -13.00 | -66.89 | ERP |
| 3 | 423.5403 | -75.57 | 3.40 | -72.17 | -13.00 | -59.17 | ERP |
| 4 | 942.1305 | -76.88 | 11.89 | -64.99 | -13.00 | -51.99 | ERP |

*Vertical:*




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | Factor(dB) | (dBm) | (dBm) | (dB) | |
| 1 | 51.4807 | -76.77 | -1.80 | -78.57 | -13.00 | -65.57 | ERP |
| 2 | 106.0126 | -73.67 | -3.59 | -77.26 | -13.00 | -64.26 | ERP |
| 3 | 432.5457 | -75.82 | 3.48 | -72.34 | -13.00 | -59.34 | ERP |
| 4 | 836.2443 | -76.41 | 8.99 | -67.42 | -13.00 | -54.42 | ERP |

*Note: Margin= (Reading+ Correct)- Limit*

*Spurious Emissions Above 1GHz*

*For Cellular Band_GSM850 Mode*

| Frequency | Reading | Correct | Result | Limit | Margin | Polar |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | H/V |
| Low Channel (824.2MHz) | | | | | | |
| 1648.4 | -35.94 | 4.94 | -31 | -13 | -18 | H |
| 2472.6 | -43.87 | 8.46 | -35.41 | -13 | -22.41 | H |
| 1648.4 | -35.86 | 4.94 | -30.92 | -13 | -17.92 | V |
| 2472.6 | -42.1 | 8.46 | -33.64 | -13 | -20.64 | V |
| Middle Channel (836.6MHz) | | | | | | |
| 1673.2 | -36 | 5.11 | -30.89 | -13 | -17.89 | H |
| 2509.8 | -44.11 | 8.54 | -35.57 | -13 | -22.57 | H |
| 1673.2 | -34.49 | 5.11 | -29.38 | -13 | -16.38 | V |
| 2509.8 | -43.1 | 8.54 | -34.56 | -13 | -21.56 | V |
| High Channel (848.8MHz) | | | | | | |
| 1697.6 | -34.55 | 5.25 | -29.3 | -13 | -16.3 | H |
| 2546.4 | -42.23 | 8.57 | -33.66 | -13 | -20.66 | H |
| 1697.6 | -34.05 | 5.25 | -28.8 | -13 | -15.8 | V |
| 2546.4 | -44.29 | 8.57 | -35.72 | -13 | -22.72 | V |

*For PCS Band_GSM1900 Mode*

| Frequency | Reading | Correct | Result | Limit | Margin | Polar |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | H/V |
| Low Channel (1850.2MHz) | | | | | | |
| 3700.4 | -39.67 | 10.54 | -29.13 | -13 | -16.13 | H |
| 5550.6 | -46.21 | 13.37 | -32.84 | -13 | -19.84 | H |
| 3700.4 | -42.06 | 10.54 | -31.52 | -13 | -18.52 | V |
| 5550.6 | -48.21 | 13.37 | -34.84 | -13 | -21.84 | V |
| Middle Channel (1880MHz) | | | | | | |
| 3760.0 | -41.7 | 10.64 | -31.06 | -13 | -18.06 | H |
| 5640.0 | -47.88 | 13.54 | -34.34 | -13 | -21.34 | H |
| 3760.0 | -41.93 | 10.64 | -31.29 | -13 | -18.29 | V |
| 5640.0 | -47 | 13.54 | -33.46 | -13 | -20.46 | V |
| High Channel (1909.8MHz) | | | | | | |
| 3819.6 | -41.38 | 10.74 | -30.64 | -13 | -17.64 | H |
| 5729.4 | -48.53 | 13.71 | -34.82 | -13 | -21.82 | H |
| 3819.6 | -40.74 | 10.74 | -30 | -13 | -17 | V |
| 5729.4 | -48.03 | 13.71 | -34.32 | -13 | -21.32 | V |

*For Band 5 Mode*

| Frequency | Reading | Correct | Result | Limit | Margin | Polar |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | H/V |
| Low Channel (826.4MHz) | | | | | | |
| 1652.8 | -35.22 | 4.94 | -30.28 | -13 | -17.28 | H |
| 2479.2 | -42.23 | 8.46 | -33.77 | -13 | -20.77 | H |
| 1652.8 | -34.84 | 4.94 | -29.9 | -13 | -16.9 | V |
| 2479.2 | -43.01 | 8.46 | -34.55 | -13 | -21.55 | V |
| Middle Channel (836.6MHz) | | | | | | |
| 1672.8 | -34.97 | 5.11 | -29.86 | -13 | -16.86 | H |
| 2509.2 | -43.83 | 8.54 | -35.29 | -13 | -22.29 | H |
| 1672.8 | -34.36 | 5.11 | -29.25 | -13 | -16.25 | V |
| 2509.2 | -43.04 | 8.54 | -34.5 | -13 | -21.5 | V |
| High Channel (846.6MHz) | | | | | | |
| 1693.2 | -35.59 | 5.25 | -30.34 | -13 | -17.34 | H |
| 2539.8 | -41.55 | 8.57 | -32.98 | -13 | -19.98 | H |
| 1693.2 | -34.56 | 5.25 | -29.31 | -13 | -16.31 | V |
| 2539.8 | -41.43 | 8.57 | -32.86 | -13 | -19.86 | V |

*For Band 4 Mode*

| Frequency | Reading | Correct | Result | Limit | Margin | Polar |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | H/V |
| Low Channel (1712.4MHz) | | | | | | |
| 3424.8 | -32.71 | 9.87 | -22.84 | -13 | -9.84 | H |
| 5137.2 | -39.72 | 13.02 | -26.7 | -13 | -13.7 | H |
| 3424.8 | -35.18 | 9.87 | -25.31 | -13 | -12.31 | V |
| 5137.2 | -42.17 | 13.02 | -29.15 | -13 | -16.15 | V |
| Middle Channel (1732.4MHz) | | | | | | |
| 3464.8 | -33.63 | 9.97 | -23.66 | -13 | -10.66 | H |
| 5197.2 | -41.18 | 12.54 | -28.64 | -13 | -15.64 | H |
| 3464.8 | -34.73 | 9.97 | -24.76 | -13 | -11.76 | V |
| 5197.2 | -40.76 | 12.54 | -28.22 | -13 | -15.22 | V |
| High Channel (1752.6MHz) | | | | | | |
| 3505.2 | -32.51 | 10.03 | -22.48 | -13 | -9.48 | H |
| 5257.8 | -42.17 | 14.03 | -28.14 | -13 | -15.14 | H |
| 3505.2 | -35.86 | 10.03 | -25.83 | -13 | -12.83 | V |
| 5257.8 | -40.78 | 14.03 | -26.75 | -13 | -13.75 | V |

*For Band 2 Mode*

| Frequency | Reading | Correct | Result | Limit | Margin | Polar |
|---|---|---|---|---|---|---|
| (MHz) | (dBm) | dB | (dBm) | (dBm) | (dB) | H/V |
| Low Channel (1852.4MHz) | | | | | | |
| 3704.8 | -34.14 | 10.17 | -23.97 | -13 | -10.97 | H |
| 5557.2 | -41.3 | 14.69 | -26.61 | -13 | -13.61 | H |
| 3704.8 | -36.03 | 10.17 | -25.86 | -13 | -12.86 | V |
| 5557.2 | -41.34 | 14.69 | -26.65 | -13 | -13.65 | V |
| Middle Channel (1880MHz) | | | | | | |
| 3760.8 | -36.81 | 10.26 | -26.55 | -13 | -13.55 | H |
| 5640.0 | -41.83 | 14.78 | -27.05 | -13 | -14.05 | H |
| 3760.8 | -36.83 | 10.26 | -26.57 | -13 | -13.57 | V |
| 5640.0 | -43.61 | 14.78 | -28.83 | -13 | -15.83 | V |
| High Channel (1907.6MHz) | | | | | | |
| 3815.2 | -36.89 | 10.59 | -26.3 | -13 | -13.3 | H |
| 5722.8 | -44.45 | 15.03 | -29.42 | -13 | -16.42 | H |
| 3815.2 | -36.05 | 10.59 | -25.46 | -13 | -12.46 | V |
| 5722.8 | -41.93 | 15.03 | -26.9 | -13 | -13.9 | H |

*Note: Result=Reading+ Correct, Margin= Result- Limit*

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*

# 9. Frequency Stability

## 9.1 Standard Applicable

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

Frequency Tolerance for Cellular Band

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

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

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

## 9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

| Temperature: | Supply Voltage |
|---|---|
| 20°C | DC 3.3-4.2V declared by manufacturer |
| -30°C to +50°C | Normal |

## 9.3 Environmental Conditions

| | |
|---|---|
| Temperature: | 23°C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

## 9.4 Summary of Test Results/Plots

For Cellular Band GSM Mode

| Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 69 | 0.0828 |
| 40 | 3.85 | 54 | 0.0644 |
| 30 | 3.85 | 44 | 0.0524 |
| 20 | 3.85 | 37 | 0.0441 |
| 10 | 3.85 | 32 | 0.0386 |
| 0 | 3.85 | 25 | 0.0294 |
| -10 | 3.85 | 28 | 0.0340 |
| -20 | 3.85 | 35 | 0.0414 |
| -30 | 3.85 | 42 | 0.0506 |

For PCS Band GSM Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 65 | 0.0348 |
| 40 | 3.85 | 53 | 0.0282 |
| 30 | 3.85 | 49 | 0.0262 |
| 20 | 3.85 | 43 | 0.0229 |
| 10 | 3.85 | 39 | 0.0209 |
| 0 | 3.85 | 32 | 0.0168 |
| -10 | 3.85 | 35 | 0.0188 |
| -20 | 3.85 | 41 | 0.0217 |
| -30 | 3.85 | 47 | 0.0250 |

For Cellular Band GPRS Mode

| Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 59 | 0.0708 |
| 40 | 3.85 | 48 | 0.0570 |
| 30 | 3.85 | 42 | 0.0497 |
| 20 | 3.85 | 38 | 0.0451 |
| 10 | 3.85 | 31 | 0.0368 |
| 0 | 3.85 | 26 | 0.0313 |
| -10 | 3.85 | 34 | 0.0405 |
| -20 | 3.85 | 40 | 0.0478 |
| -30 | 3.85 | 47 | 0.0561 |

For PCS Band GPRS Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 48 | 0.0258 |
| 40 | 3.85 | 39 | 0.0209 |
| 30 | 3.85 | 35 | 0.0184 |
| 20 | 3.85 | 27 | 0.0143 |
| 10 | 3.85 | 22 | 0.0119 |
| 0 | 3.85 | 15 | 0.0082 |
| -10 | 3.85 | 21 | 0.0110 |
| -20 | 3.85 | 28 | 0.0151 |
| -30 | 3.85 | 35 | 0.0184 |

For Cellular Band EDGE Mode

| Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 80 | 0.0956 |
| 40 | 3.85 | 65 | 0.0782 |
| 30 | 3.85 | 55 | 0.0653 |
| 20 | 3.85 | 48 | 0.0570 |
| 10 | 3.85 | 42 | 0.0506 |
| 0 | 3.85 | 38 | 0.0460 |
| -10 | 3.85 | 46 | 0.0552 |
| -20 | 3.85 | 54 | 0.0644 |
| -30 | 3.85 | 62 | 0.0736 |

For PCS Band EDGE Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 65 | 0.0344 |
| 40 | 3.85 | 50 | 0.0266 |
| 30 | 3.85 | 40 | 0.0213 |
| 20 | 3.85 | 34 | 0.0180 |
| 10 | 3.85 | 29 | 0.0155 |
| 0 | 3.85 | 24 | 0.0127 |
| -10 | 3.85 | 28 | 0.0151 |
| -20 | 3.85 | 35 | 0.0184 |
| -30 | 3.85 | 42 | 0.0221 |

For WCDMA Band 5 Mode

| Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 57 | 0.0680 |
| 40 | 3.85 | 53 | 0.0634 |
| 30 | 3.85 | 45 | 0.0533 |
| 20 | 3.85 | 38 | 0.0460 |
| 10 | 3.85 | 31 | 0.0368 |
| 0 | 3.85 | 23 | 0.0276 |
| -10 | 3.85 | 28 | 0.0340 |
| -20 | 3.85 | 32 | 0.0386 |
| -30 | 3.85 | 40 | 0.0478 |

For WCDMA Band 4 Mode

| Reference Frequency(Middle Channel): 1733.4 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 66 | 0.0352 |
| 40 | 3.85 | 52 | 0.0274 |
| 30 | 3.85 | 46 | 0.0245 |
| 20 | 3.85 | 41 | 0.0217 |
| 10 | 3.85 | 35 | 0.0184 |
| 0 | 3.85 | 30 | 0.0160 |
| -10 | 3.85 | 34 | 0.0180 |
| -20 | 3.85 | 42 | 0.0221 |
| -30 | 3.85 | 45 | 0.0241 |

For WCDMA Band 2 Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 56 | 0.0671 |
| 40 | 3.85 | 42 | 0.0506 |
| 30 | 3.85 | 38 | 0.0451 |
| 20 | 3.85 | 33 | 0.0395 |
| 10 | 3.85 | 29 | 0.0349 |
| 0 | 3.85 | 24 | 0.0285 |
| -10 | 3.85 | 28 | 0.0340 |
| -20 | 3.85 | 35 | 0.0423 |
| -30 | 3.85 | 41 | 0.0487 |

For HSDPA Band 5 Mode

| Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 54 | 0.0286 |
| 40 | 3.85 | 43 | 0.0229 |
| 30 | 3.85 | 34 | 0.0180 |
| 20 | 3.85 | 28 | 0.0151 |
| 10 | 3.85 | 22 | 0.0119 |
| 0 | 3.85 | 18 | 0.0098 |
| -10 | 3.85 | 23 | 0.0123 |
| -20 | 3.85 | 29 | 0.0155 |
| -30 | 3.85 | 36 | 0.0192 |

For HSDPA Band 4 Mode

| Reference Frequency(Middle Channel): 1733.4 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 57 | 0.0680 |
| 40 | 3.85 | 49 | 0.0588 |
| 30 | 3.85 | 42 | 0.0497 |
| 20 | 3.85 | 35 | 0.0423 |
| 10 | 3.85 | 31 | 0.0368 |
| 0 | 3.85 | 24 | 0.0285 |
| -10 | 3.85 | 31 | 0.0368 |
| -20 | 3.85 | 35 | 0.0423 |
| -30 | 3.85 | 39 | 0.0469 |

For HSDPA Band 2 Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 54 | 0.0286 |
| 40 | 3.85 | 42 | 0.0221 |
| 30 | 3.85 | 33 | 0.0176 |
| 20 | 3.85 | 27 | 0.0143 |
| 10 | 3.85 | 22 | 0.0119 |
| 0 | 3.85 | 15 | 0.0082 |
| -10 | 3.85 | 22 | 0.0119 |
| -20 | 3.85 | 27 | 0.0143 |
| -30 | 3.85 | 31 | 0.0164 |

For HSUPA Band 5 Mode

| Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 62 | 0.0736 |
| 40 | 3.85 | 49 | 0.0588 |
| 30 | 3.85 | 40 | 0.0478 |
| 20 | 3.85 | 35 | 0.0414 |
| 10 | 3.85 | 30 | 0.0359 |
| 0 | 3.85 | 23 | 0.0276 |
| -10 | 3.85 | 28 | 0.0331 |
| -20 | 3.85 | 33 | 0.0395 |
| -30 | 3.85 | 38 | 0.0451 |

For HSUPA Band 4 Mode

| Reference Frequency(Middle Channel): 1733.4 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 68 | 0.0364 |
| 40 | 3.85 | 55 | 0.0291 |
| 30 | 3.85 | 43 | 0.0229 |
| 20 | 3.85 | 38 | 0.0205 |
| 10 | 3.85 | 35 | 0.0184 |
| 0 | 3.85 | 28 | 0.0151 |
| -10 | 3.85 | 35 | 0.0184 |
| -20 | 3.85 | 41 | 0.0217 |
| -30 | 3.85 | 45 | 0.0241 |

For HSUPA Band 2 Mode

| Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | MCF (Hz) | Error (ppm) |
| 50 | 3.85 | 60 | 0.0717 |
| 40 | 3.85 | 51 | 0.0607 |
| 30 | 3.85 | 42 | 0.0506 |
| 20 | 3.85 | 35 | 0.0414 |
| 10 | 3.85 | 28 | 0.0331 |
| 0 | 3.85 | 21 | 0.0248 |
| -10 | 3.85 | 25 | 0.0294 |
| -20 | 3.85 | 31 | 0.0368 |
| -30 | 3.85 | 36 | 0.0432 |

So, Frequency Stability Versus Input Voltage is:

| Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 38 | 0.0451 |
| | 3.85 | 32 | 0.0377 |
| | 4.35 | 46 | 0.0552 |
| Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 26 | 0.0139 |
| | 3.85 | 22 | 0.0115 |
| | 4.35 | 37 | 0.0196 |
| Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 42 | 0.0506 |
| | 3.85 | 27 | 0.0322 |
| | 4.35 | 35 | 0.0414 |
| Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 34 | 0.0180 |
| | 3.85 | 18 | 0.0098 |
| | 4.35 | 24 | 0.0127 |

| Reference Frequency(Middle Channel): EDGE 836.6MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 26 | 0.0313 |
| | 3.85 | 22 | 0.0267 |
| | 4.35 | 35 | 0.0423 |
| Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 32 | 0.0168 |
| | 3.85 | 20 | 0.0106 |
| | 4.35 | 30 | 0.0160 |
| Reference Frequency(Middle Channel): WCDMA 836.6MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 43 | 0.0515 |
| | 3.85 | 30 | 0.0359 |
| | 4.35 | 45 | 0.0533 |
| Reference Frequency(Middle Channel): WCDMA 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 27 | 0.0143 |
| | 3.85 | 21 | 0.0110 |
| | 4.35 | 31 | 0.0164 |
| Reference Frequency(Middle Channel): WCDMA 1733.4MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.3 | 28 | 0.0330 |
| | 3.7 | 18 | 0.0204 |
| | 4.3 | 31 | 0.0184 |

| Reference Frequency(Middle Channel): HSDPA 836.6MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 25 | 0.0294 |
| | 3.85 | 18 | 0.0211 |
| | 4.35 | 30 | 0.0359 |
| Reference Frequency(Middle Channel): HSDPA 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 32 | 0.0168 |
| | 3.85 | 18 | 0.0094 |
| | 4.35 | 26 | 0.0139 |
| Reference Frequency(Middle Channel): HSDPA 1733.4MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.3 | 28 | 0.0384 |
| | 3.7 | 18 | 0.0313 |
| | 4.3 | 31 | 0.0283 |
| Reference Frequency(Middle Channel): HSUPA 836.6MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 32 | 0.0377 |
| | 3.85 | 21 | 0.0248 |
| | 4.35 | 25 | 0.0294 |
| Reference Frequency(Middle Channel): HSUPA 1880 MHz, Limit: 2.5ppm | | | |
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.5 | 35 | 0.0188 |
| | 3.85 | 23 | 0.0123 |
| | 4.35 | 28 | 0.0151 |

| Reference Frequency(Middle Channel): HSUPA 1733.4MHz, Limit: 2.5ppm | | | |
|---|---|---|---|
| Environment Temperature (°C) | Power Supplied (VDC) | Frequency Measure with Time Elapsed | |
| | | Frequency (Hz) | Error (ppm) |
| 20 | 3.3 | 28 | 0.0442 |
| | 3.7 | 18 | 0.0402 |
| | 4.3 | 31 | 0.0324 |

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