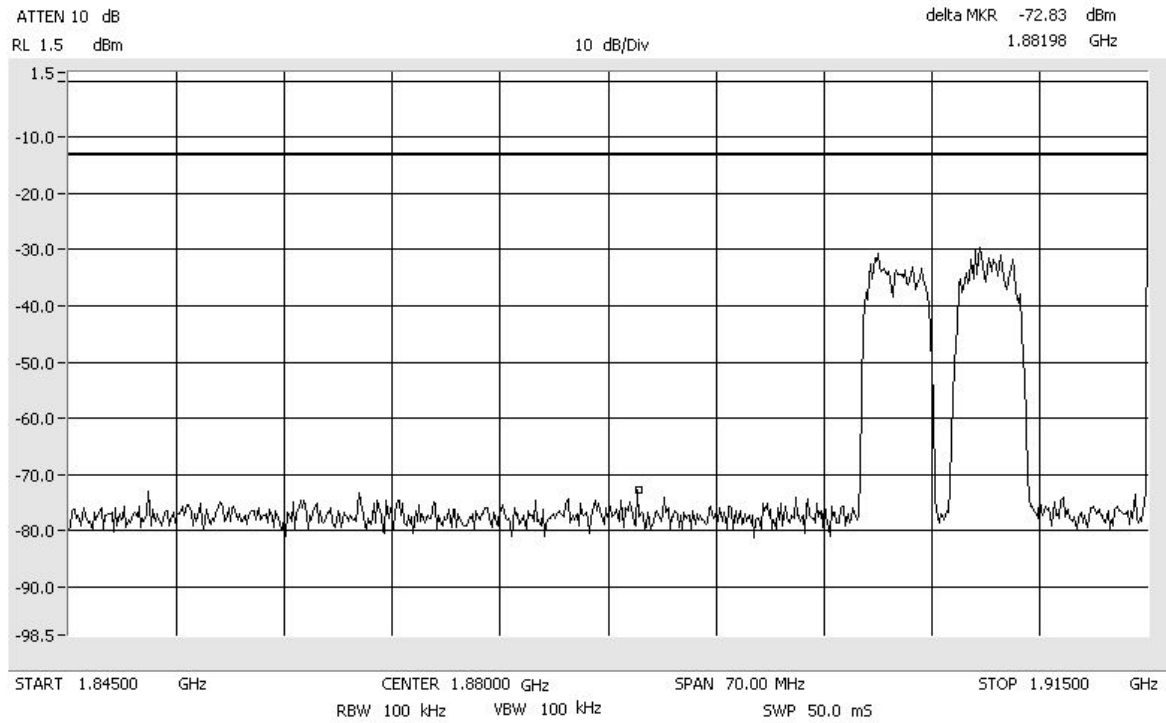
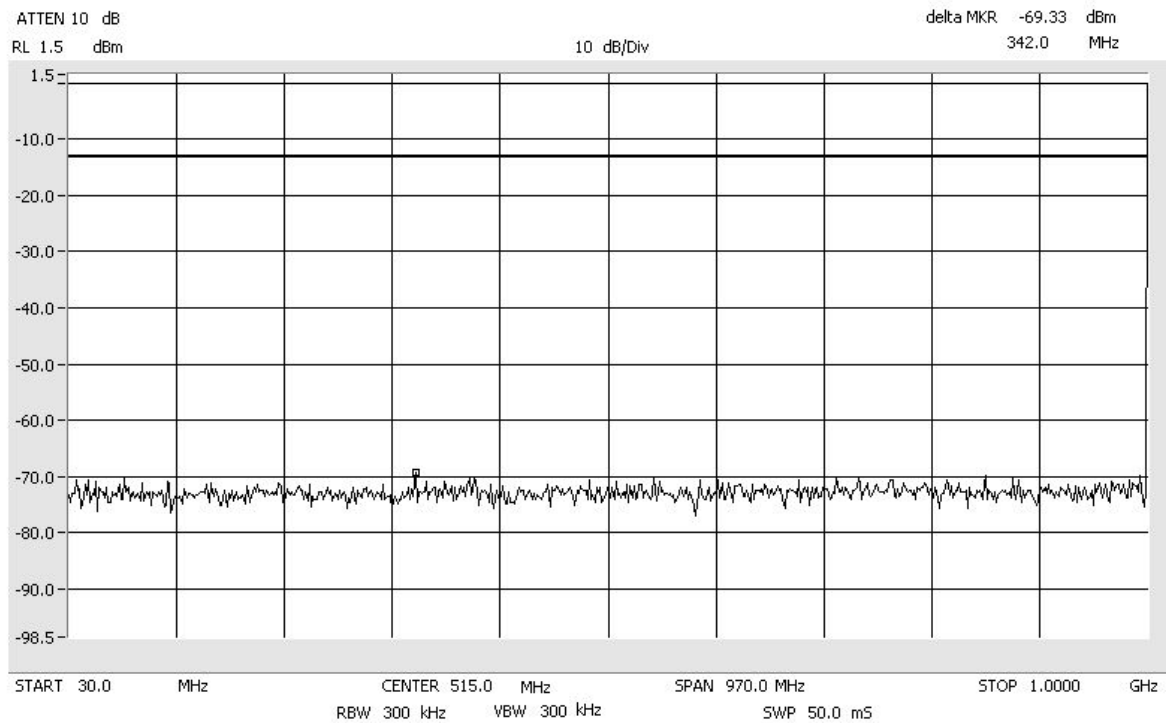


Intermodulation WCDMA\_High PCS  
Center: 1880 MHz Span: 70 MHz RBW/VBW: 100 kHz

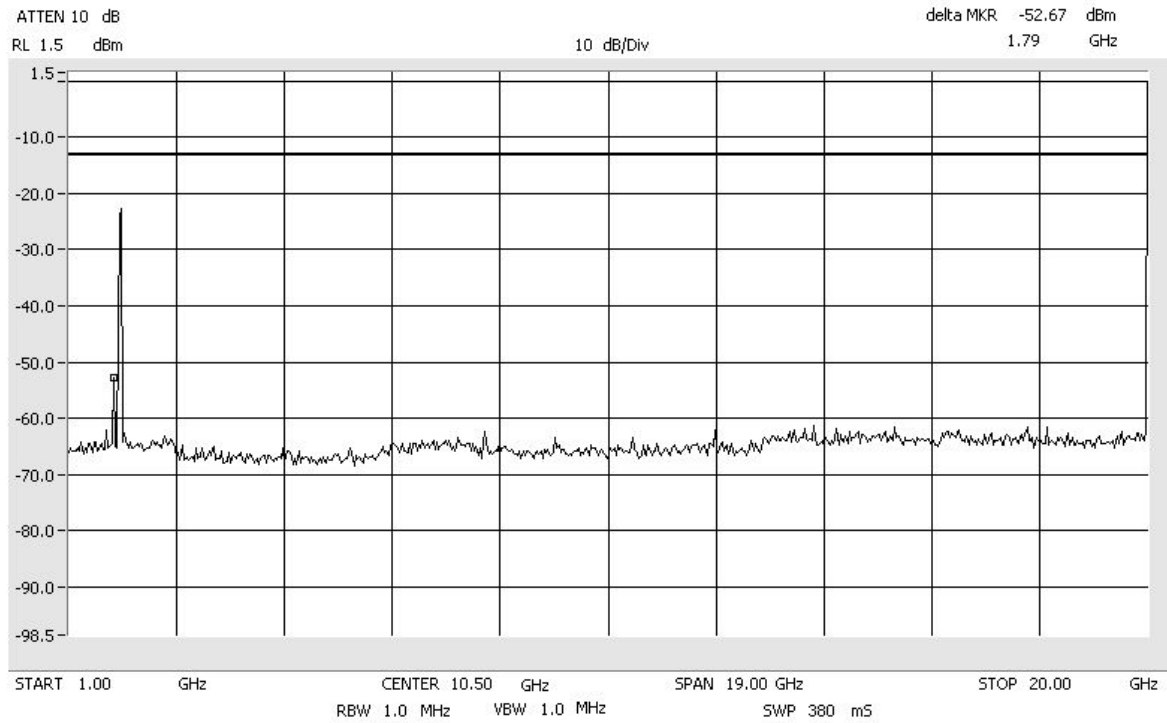


Intermodulation WCDMA\_High PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

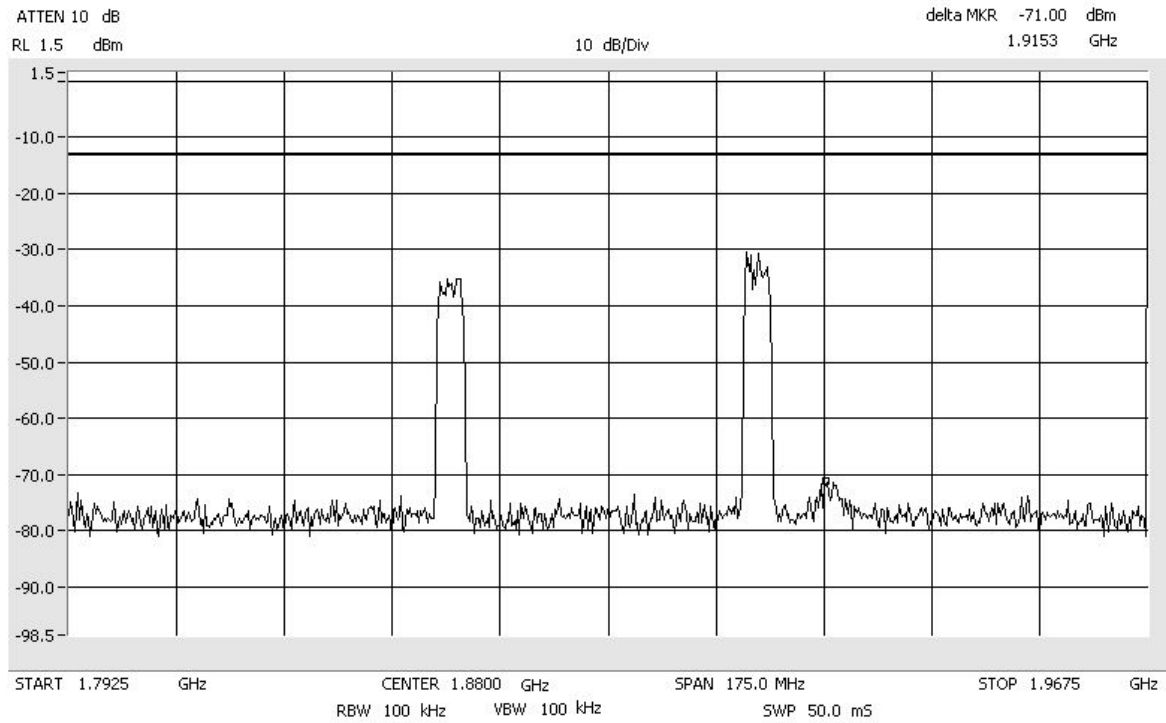


Intermodulation  
Span: 1 GHz to 20 GHz

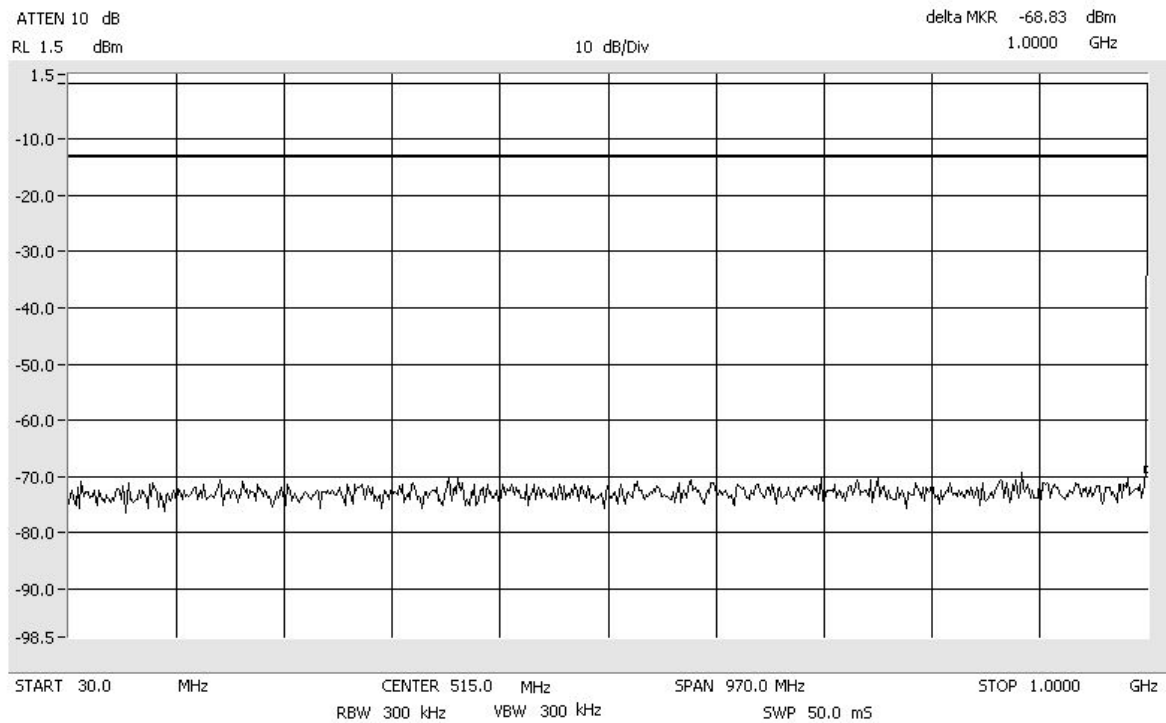
WCDMA\_High PCS  
RBW/VBW: 1 MHz



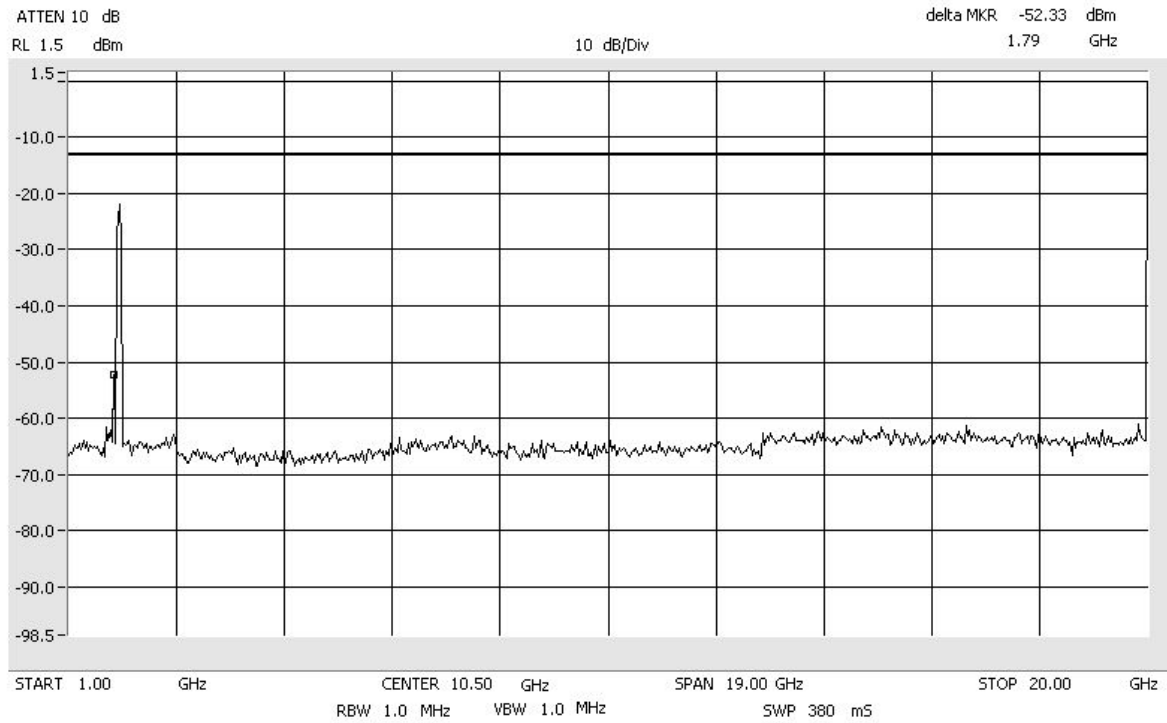
Intermodulation WCDMA\_Apart PCS  
Center: 1880 MHz Span: 175 MHz RBW/VBW: 100 kHz



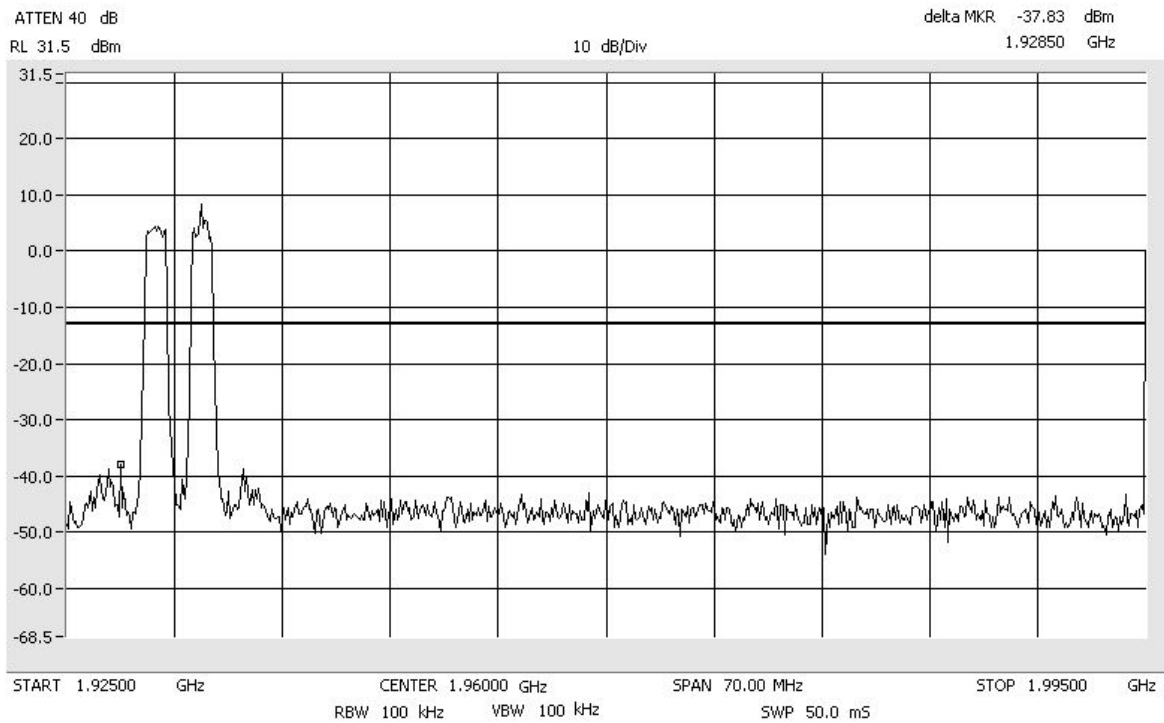
Intermodulation WCDMA\_Apart PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



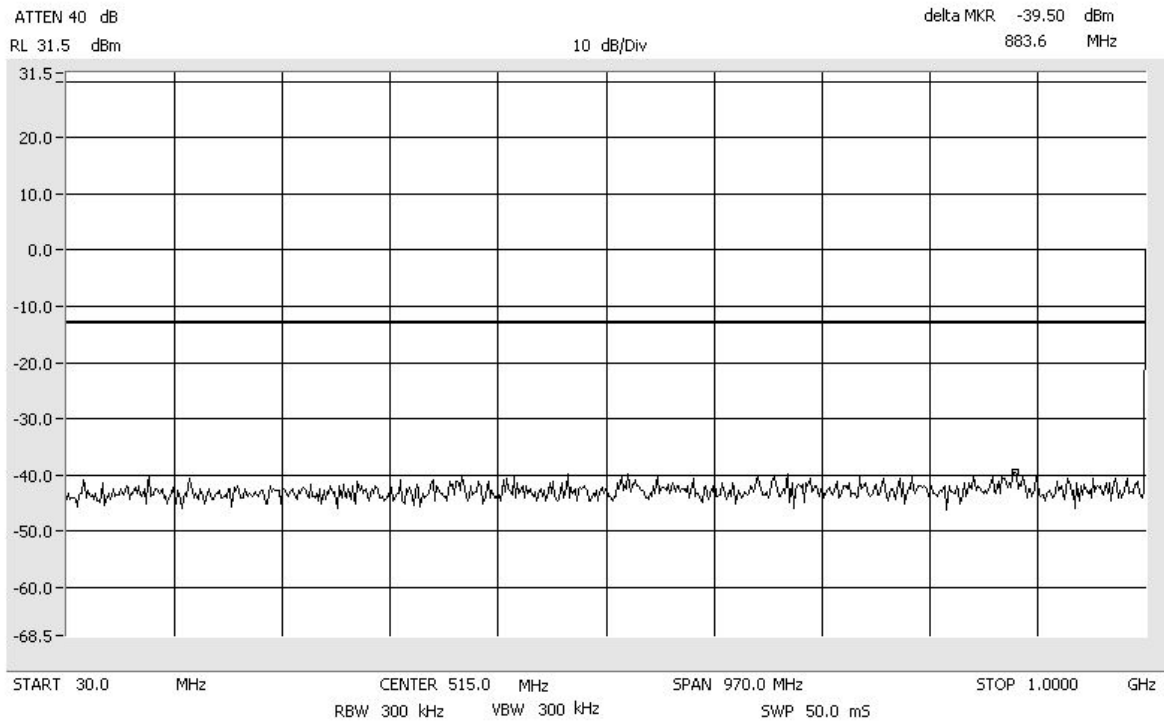
Intermodulation WCDMA\_Apart PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



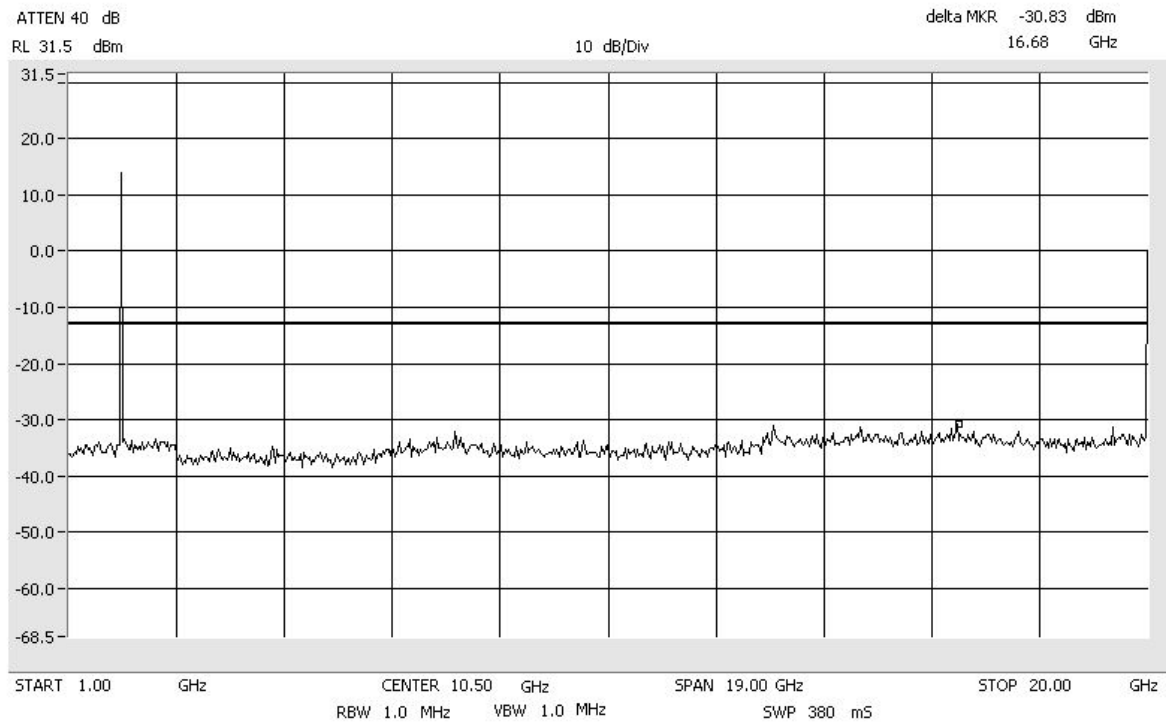
Intermodulation      CDMA2000\_Low      PCS  
Center: 1960 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



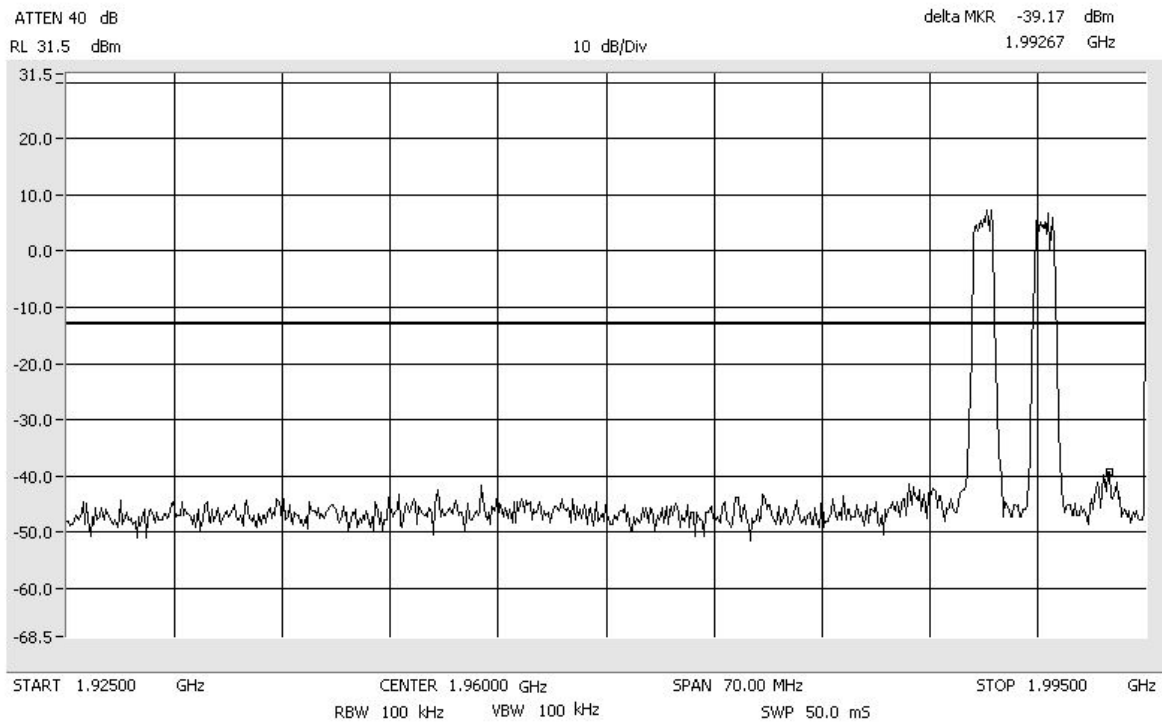
Intermodulation      CDMA2000\_Low      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



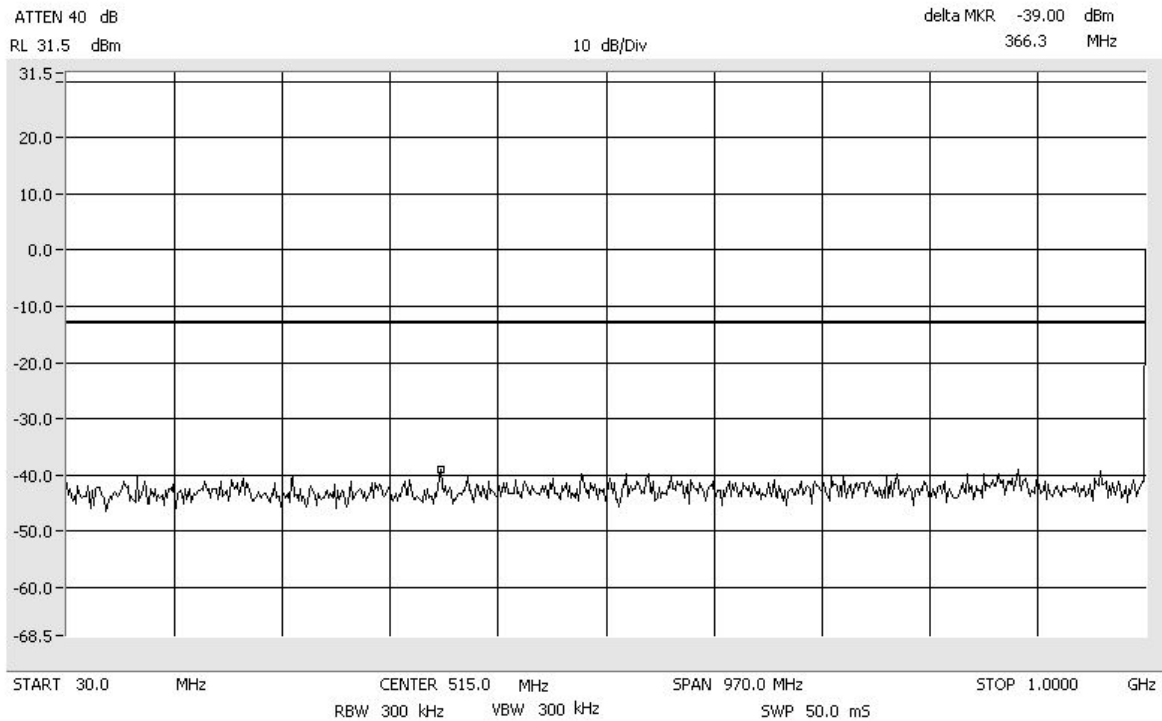
Intermodulation CDMA2000\_Low PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



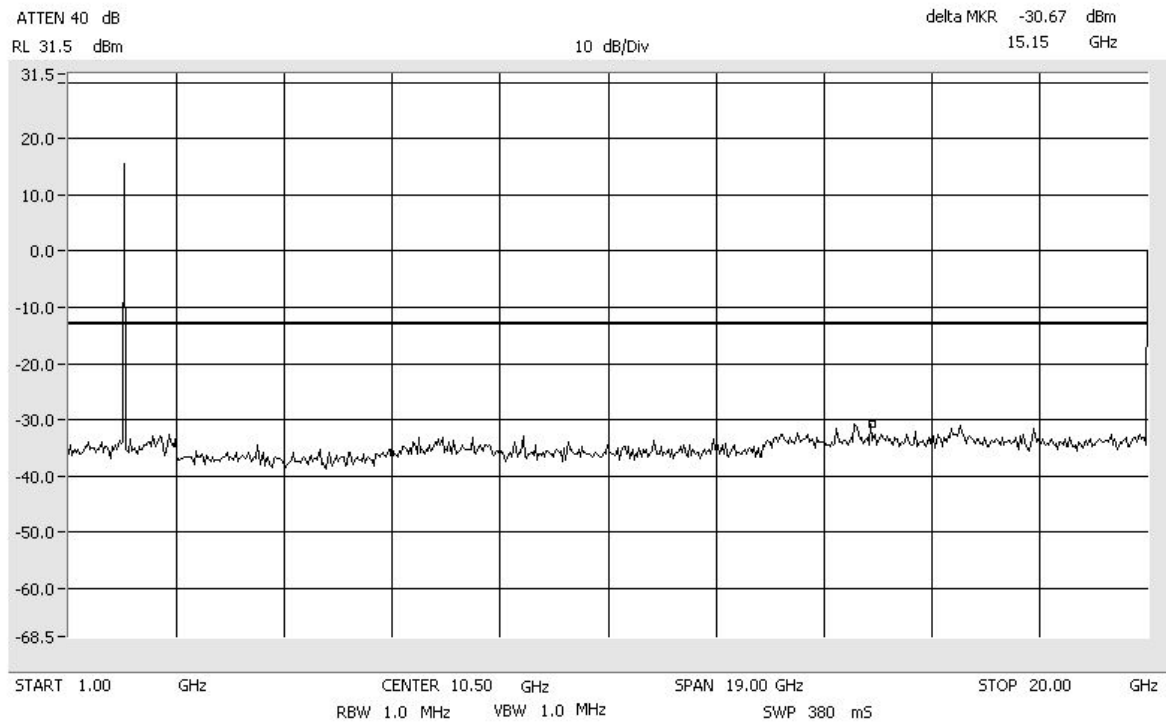
Intermodulation      CDMA2000\_High      PCS  
Center: 1960 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



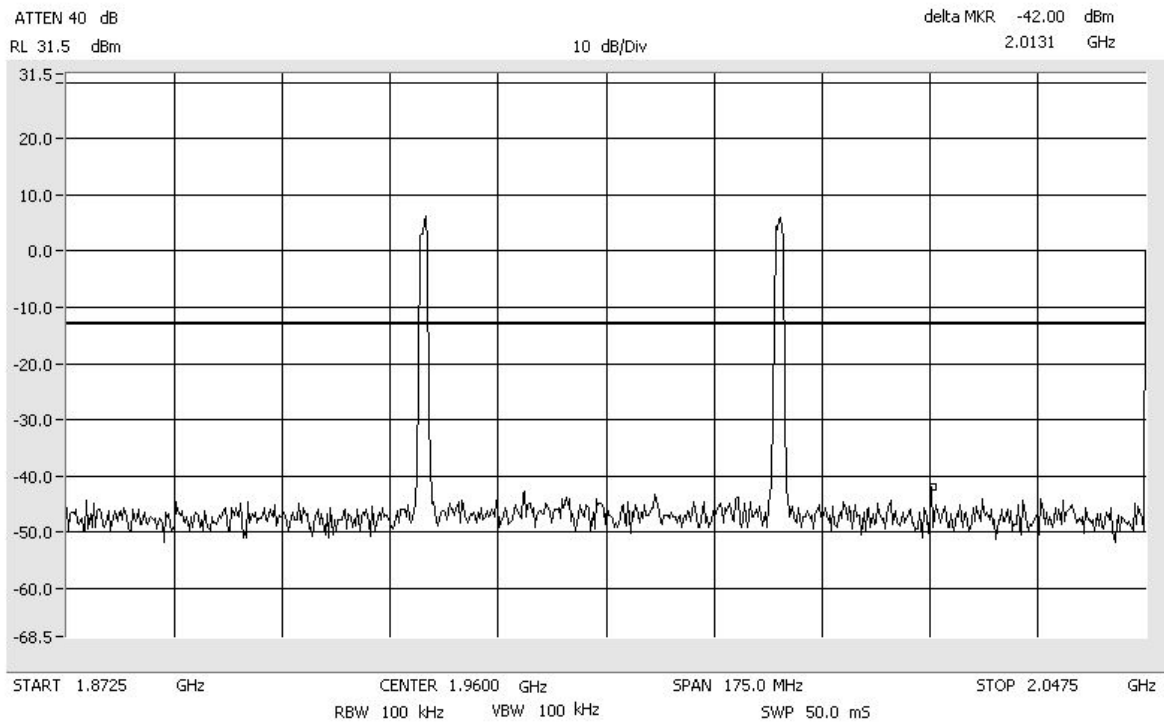
Intermodulation      CDMA2000\_High      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



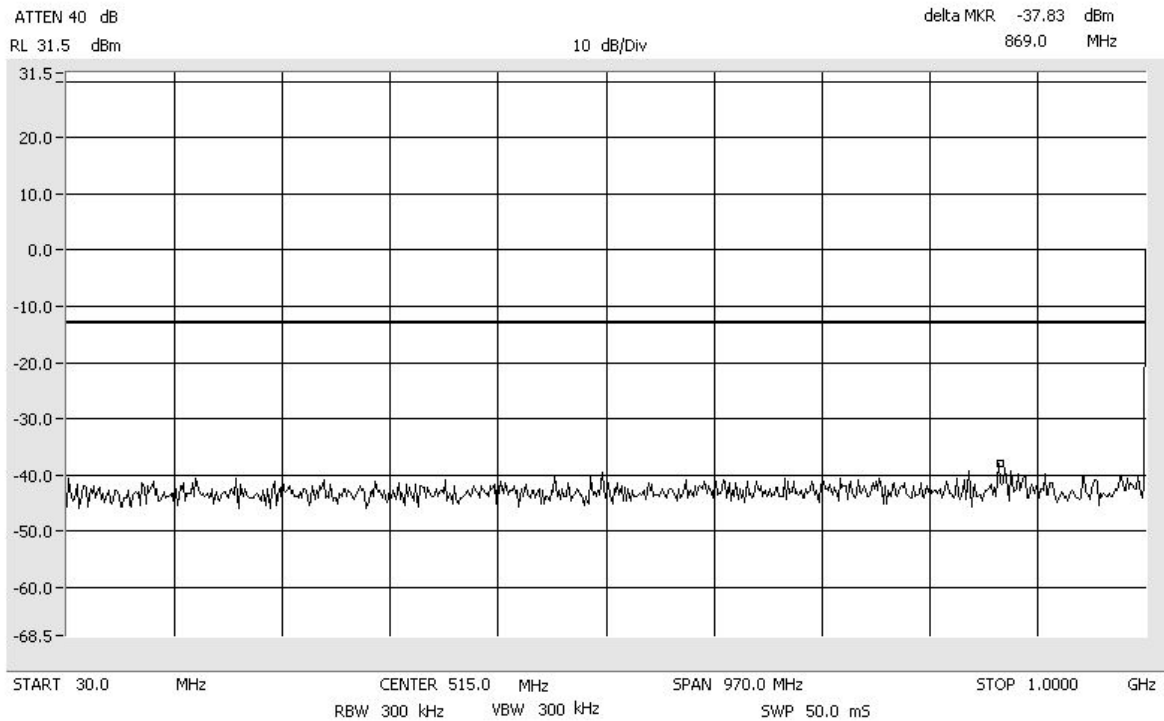
Intermodulation CDMA2000\_High PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



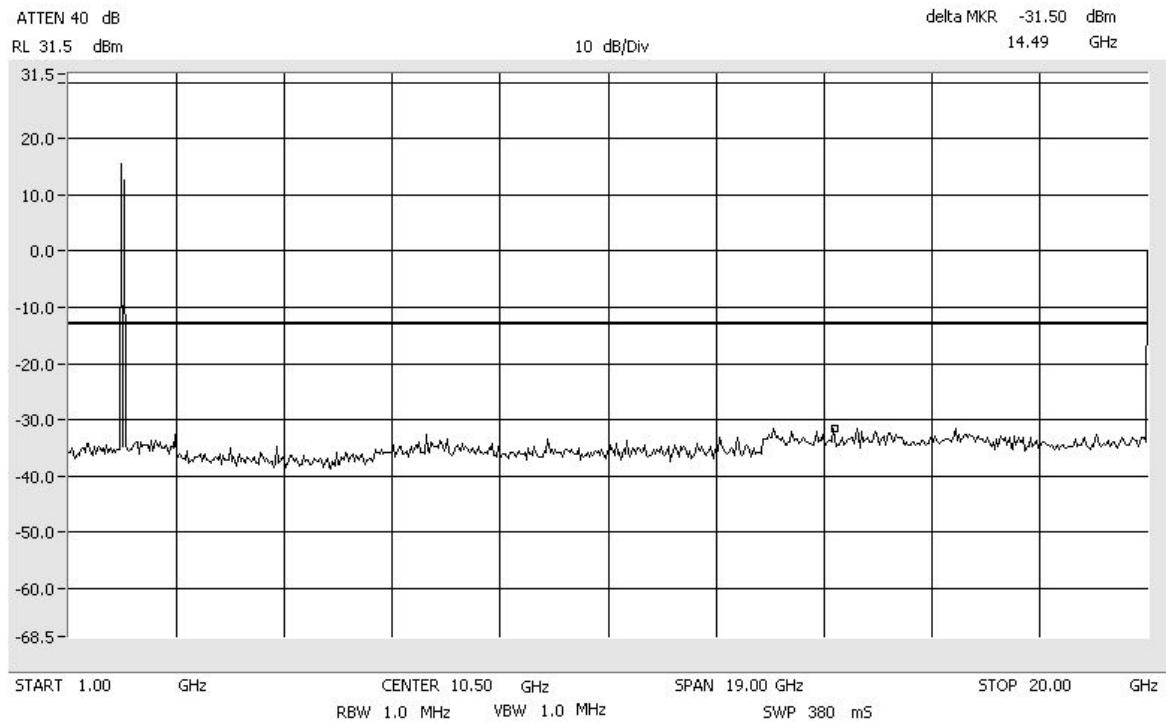
Intermodulation      CDMA2000\_Apart      PCS  
Center: 1960 MHz      Span: 175 MHz      RBW/VBW: 100 kHz



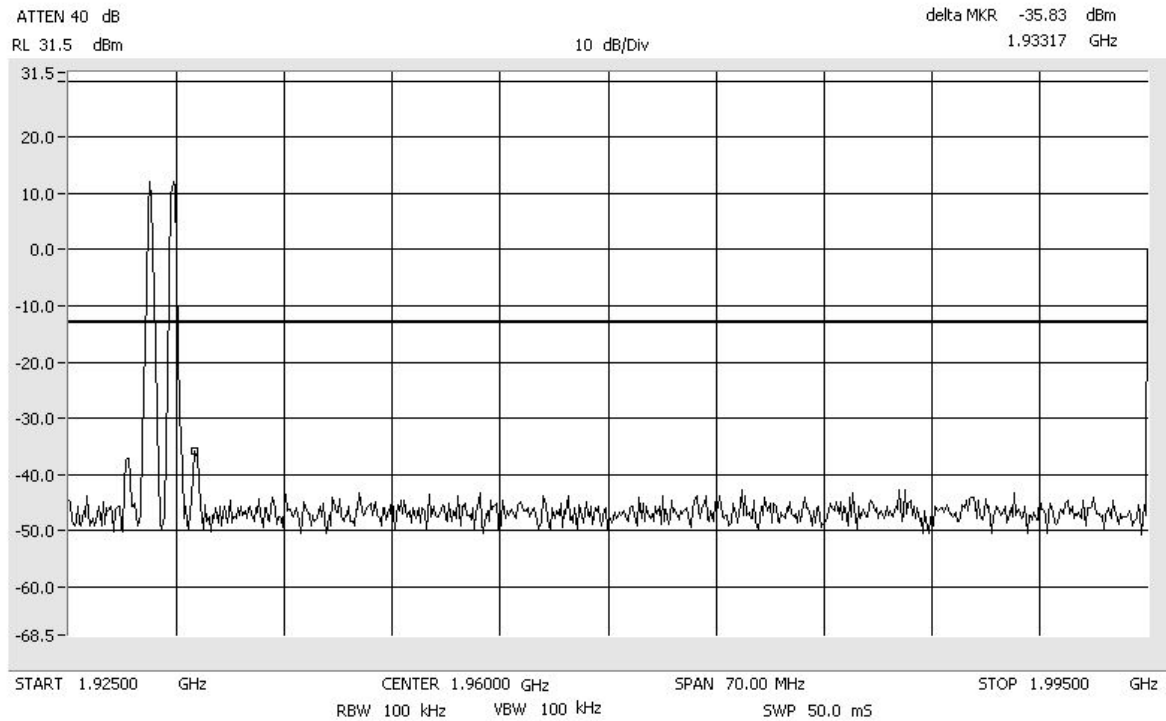
Intermodulation      CDMA2000\_Apart      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



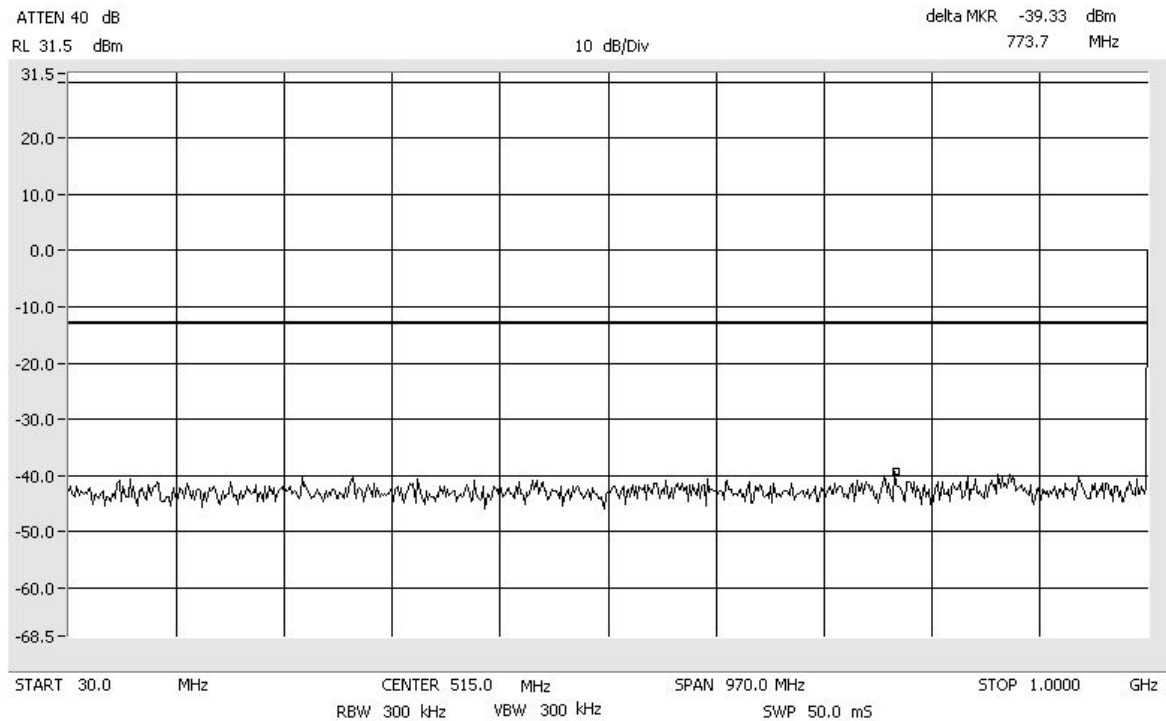
Intermodulation CDMA2000\_Apart PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



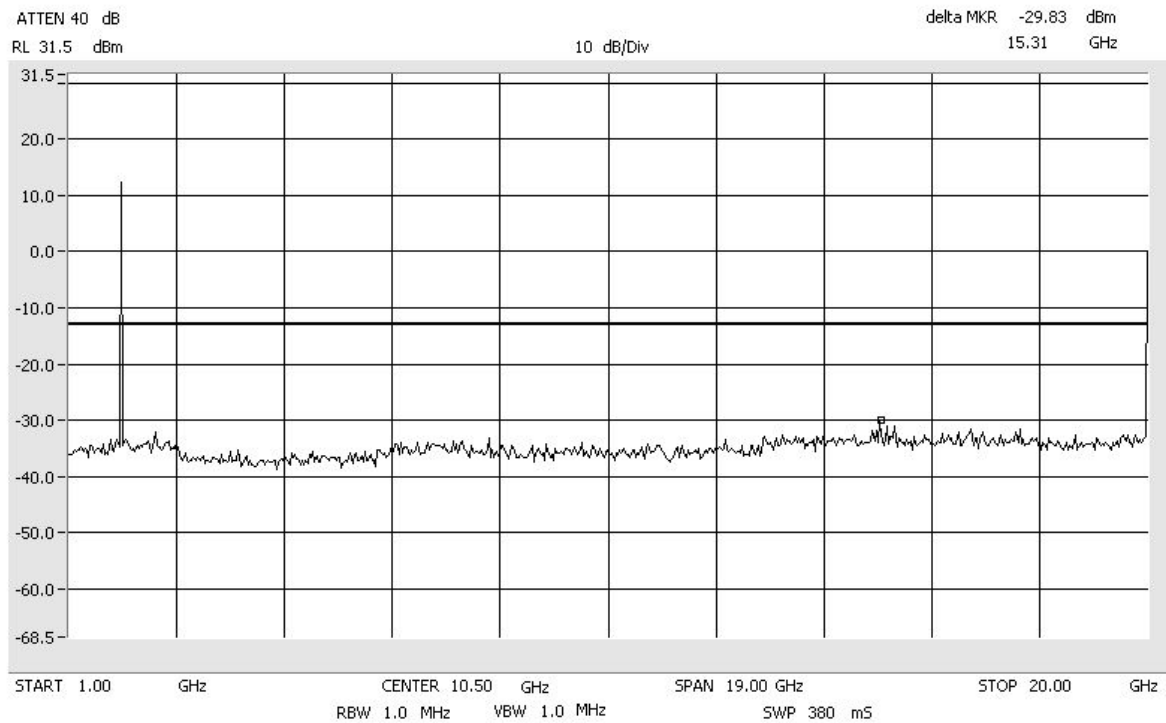
Intermodulation      EDGE\_Low      PCS  
Center: 1960 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



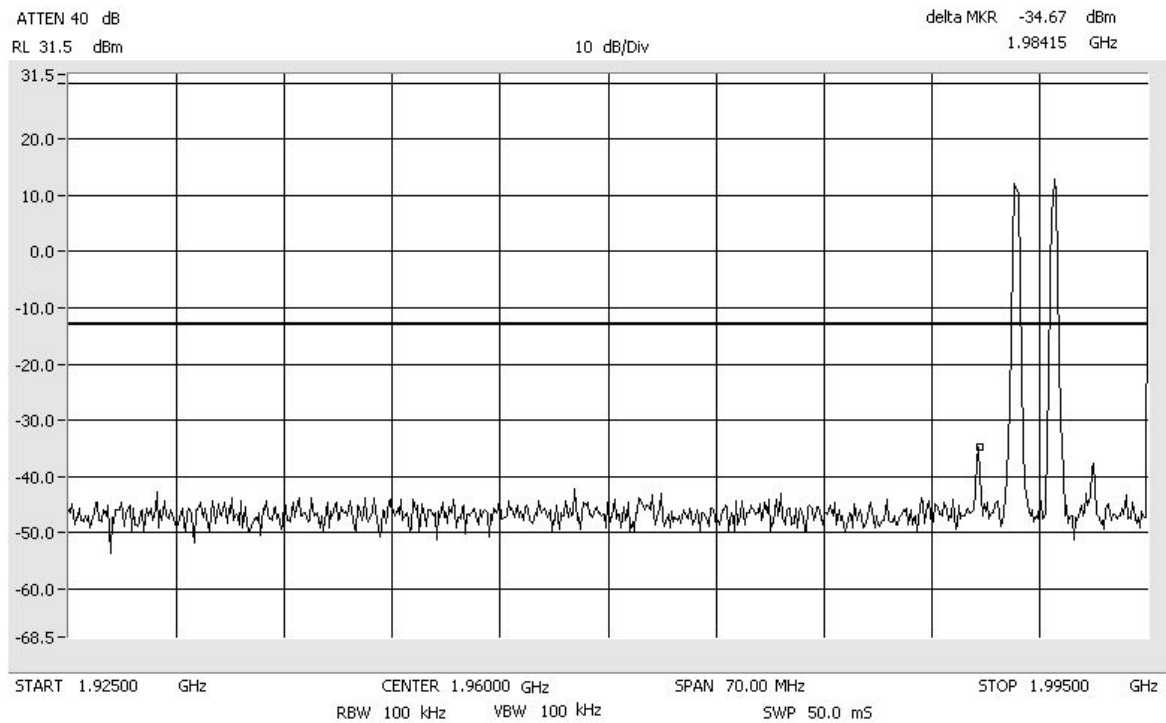
Intermodulation      EDGE\_Low      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



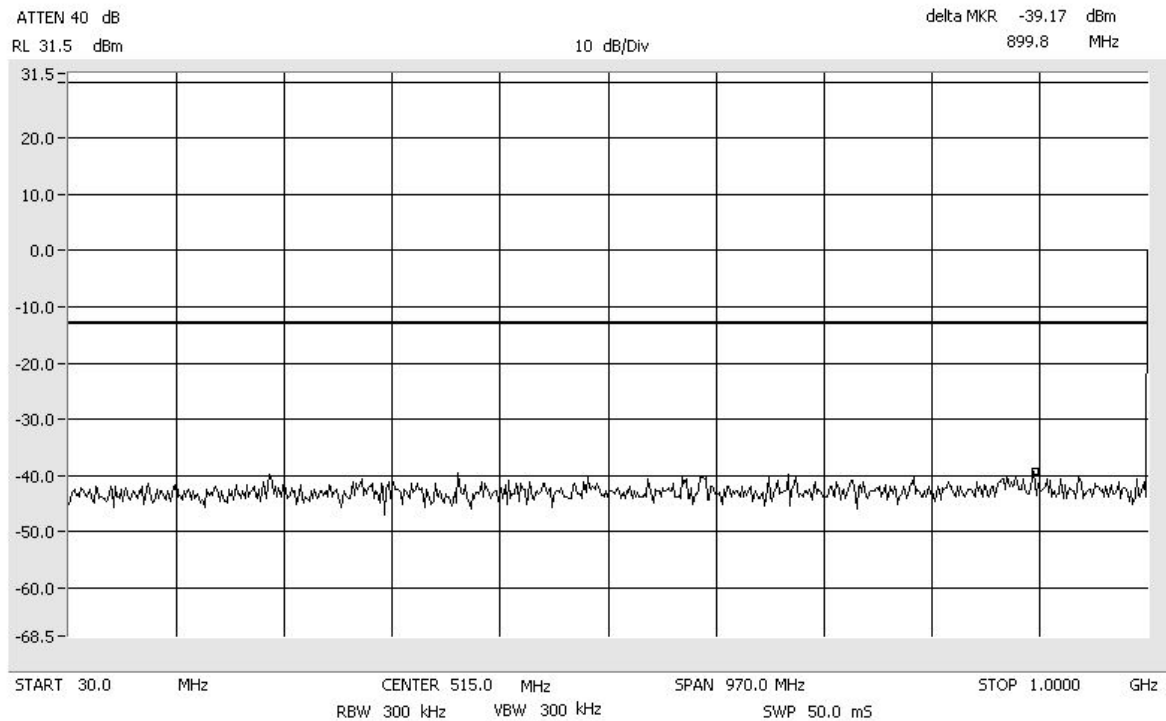
Intermodulation      EDGE\_Low    PCS  
Span: 1 GHz to 20 GHz      RBW/VBW: 1 MHz



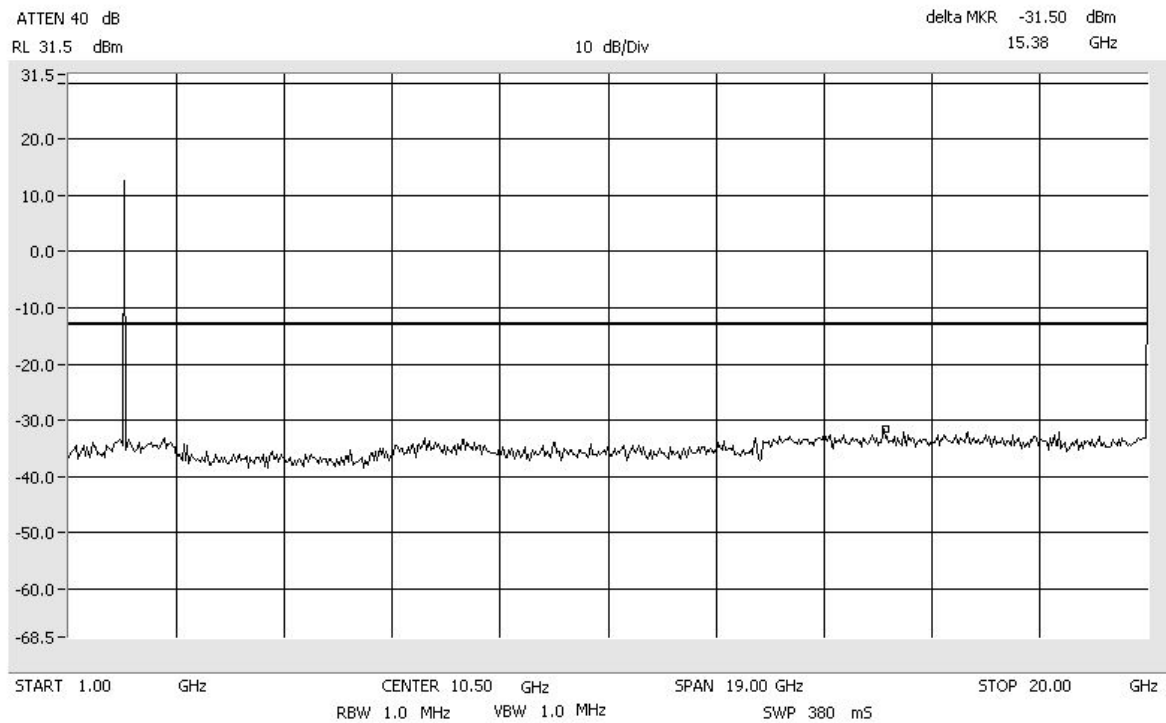
Intermodulation      EDGE\_High      PCS  
Center: 1960 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



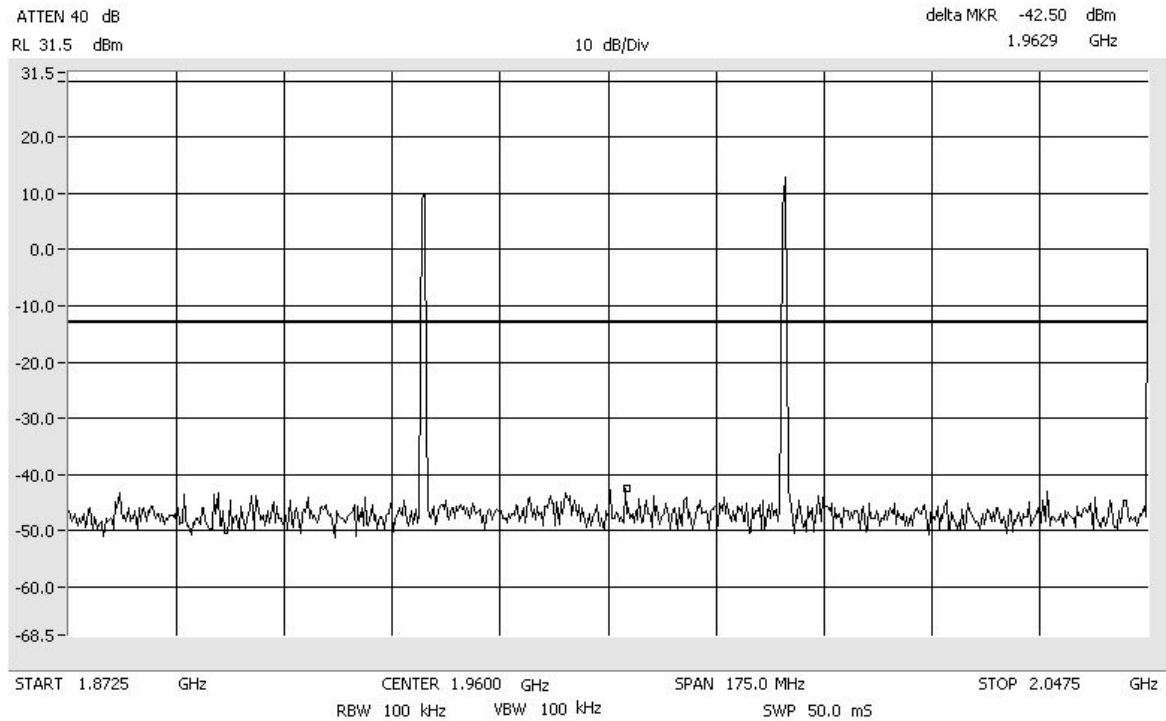
Intermodulation      EDGE\_High      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



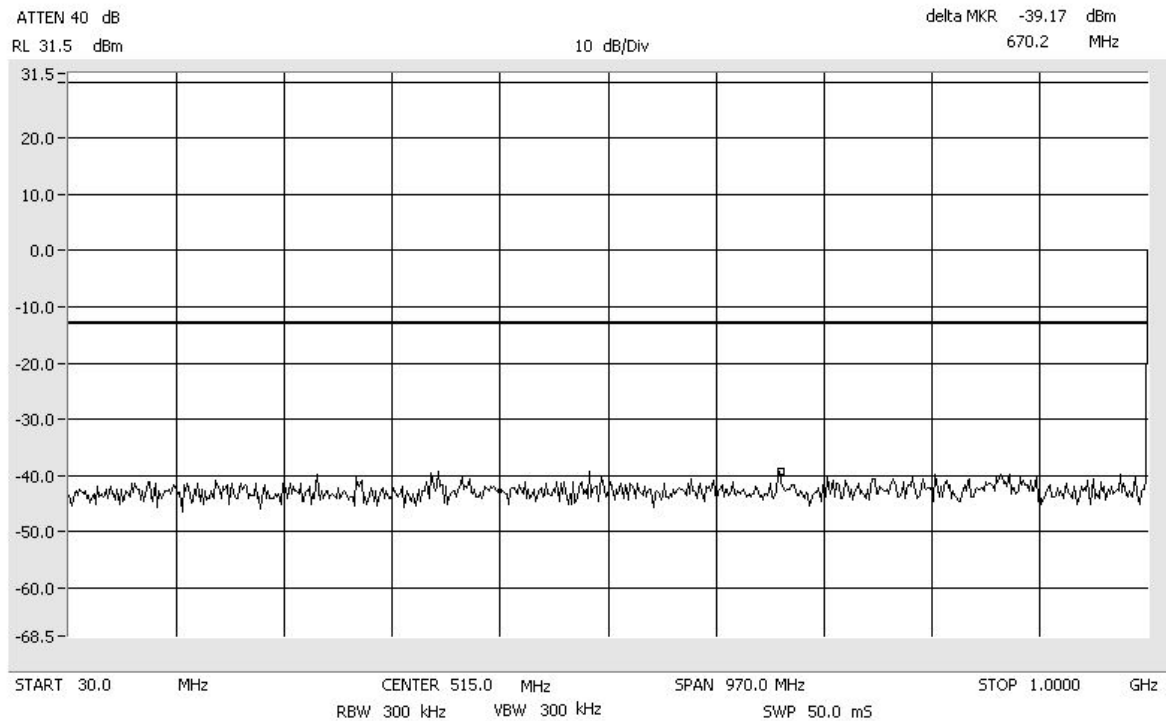
Intermodulation      EDGE\_High    PCS  
Span: 1 GHz to 20 GHz      RBW/VBW: 1 MHz



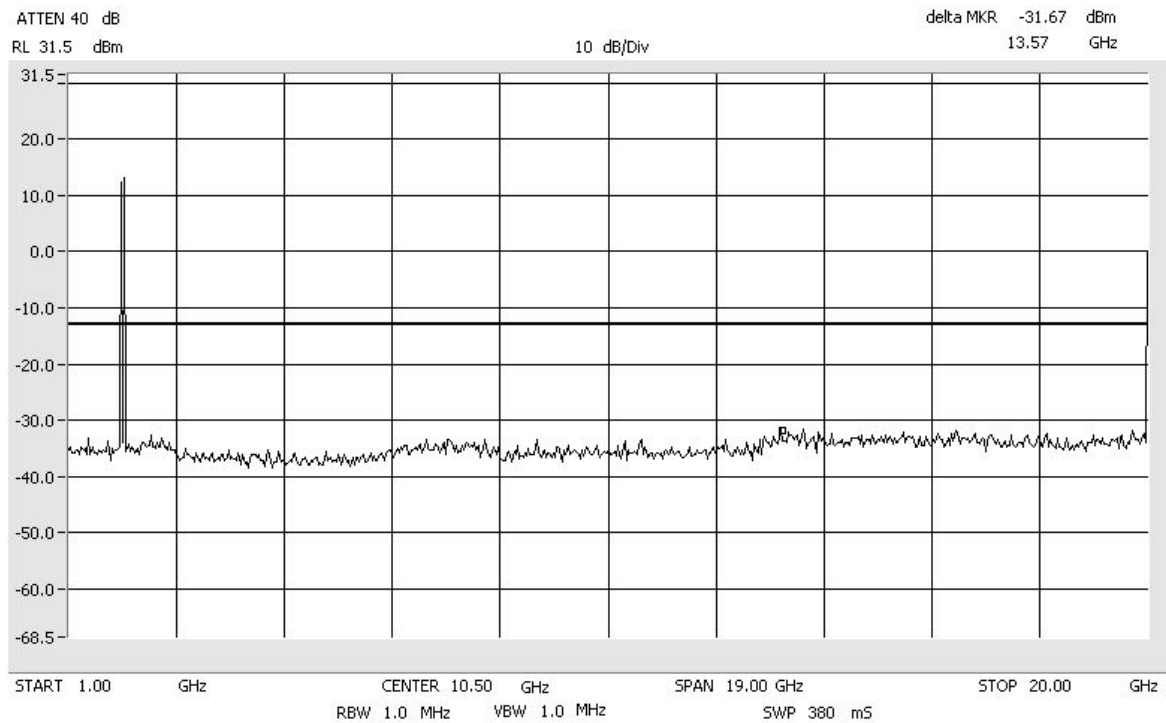
Intermodulation      EDGE\_Apart   PCS  
Center: 1960 MHz      Span: 175 MHz      RBW/VBW: 100 kHz



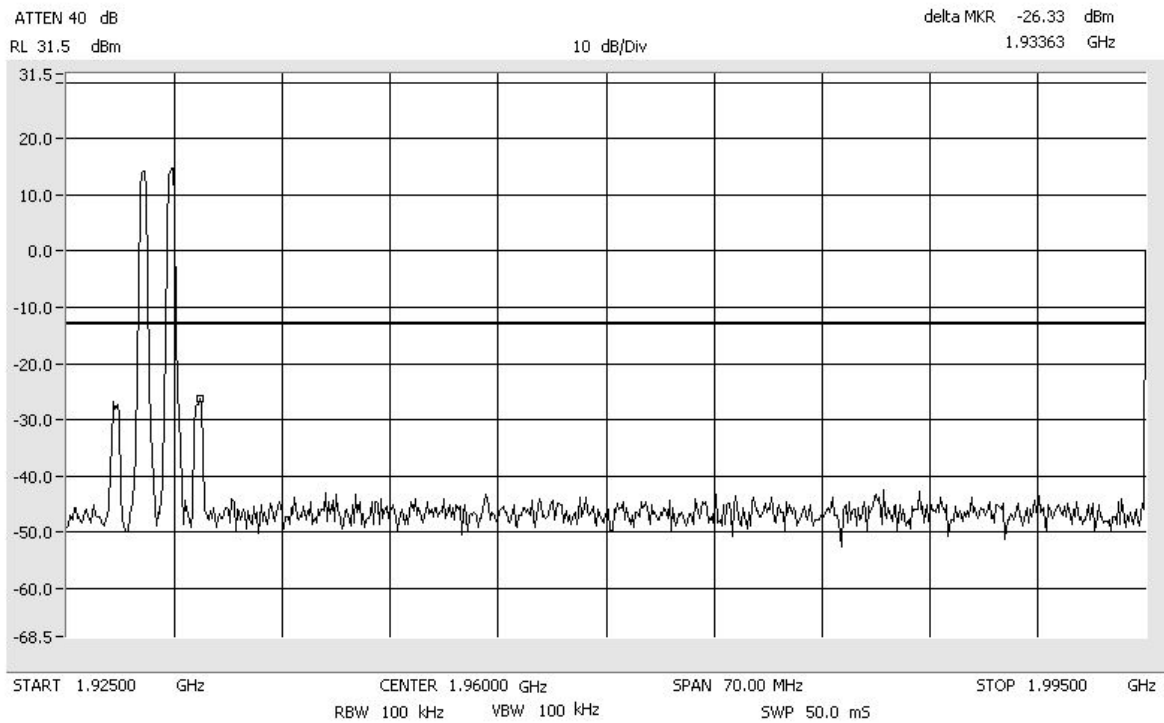
Intermodulation      EDGE\_Apart   PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



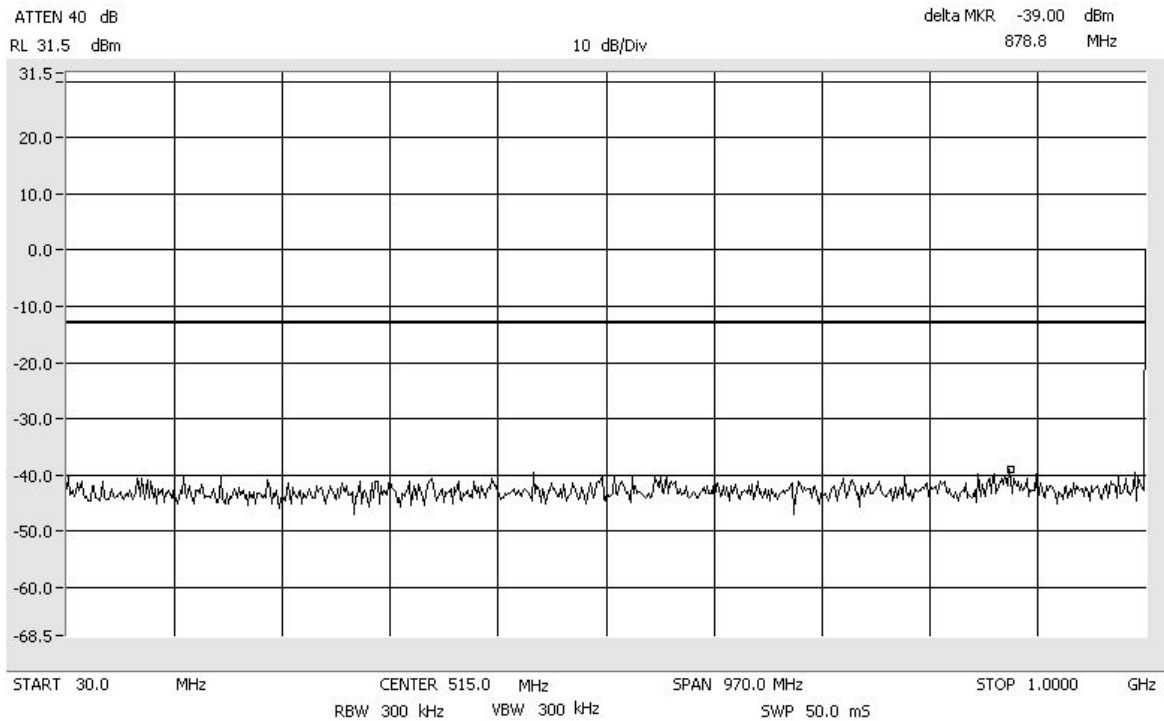
Intermodulation      EDGE\_Apart PCS  
Span: 1 GHz to 20 GHz      RBW/VBW: 1 MHz



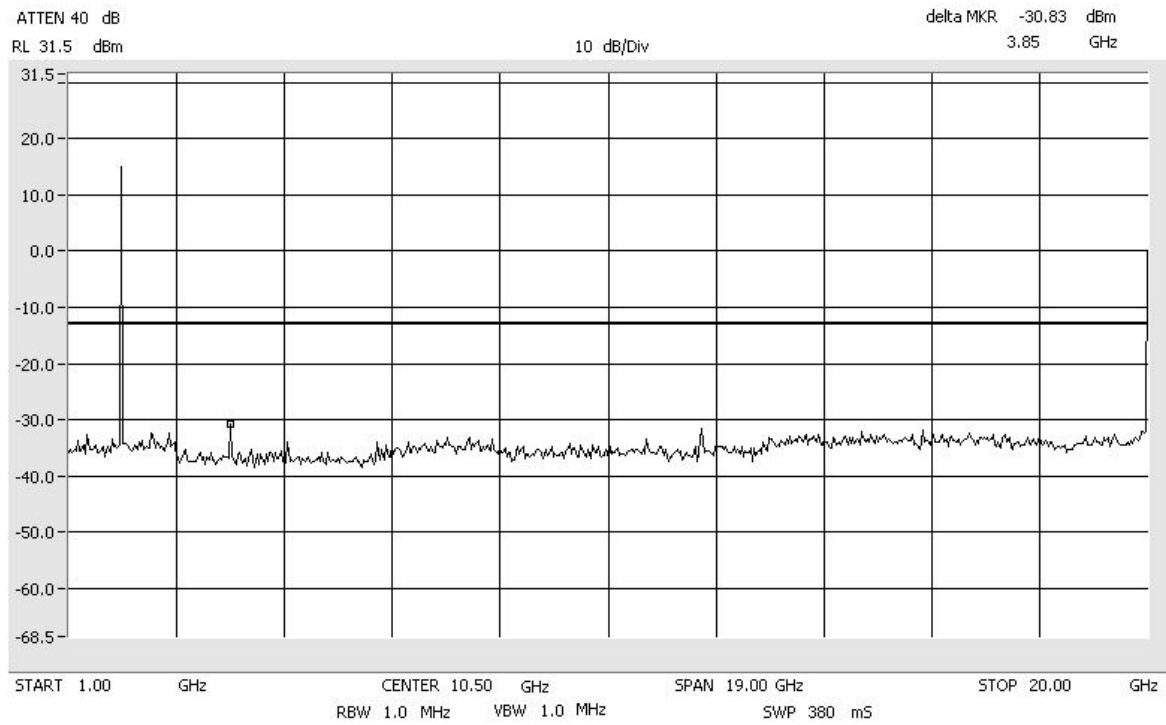
Intermodulation GSM\_Low PCS  
Center: 1960 MHz Span: 70 MHz RBW/VBW: 100 kHz



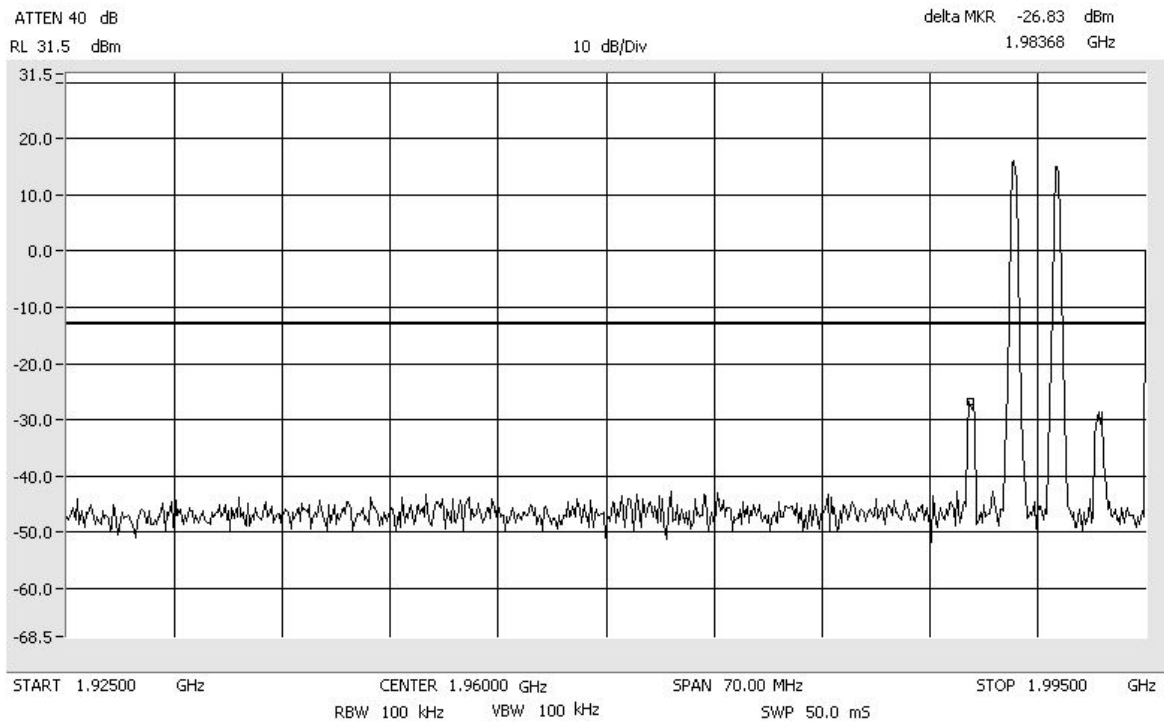
Intermodulation GSM\_Low PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



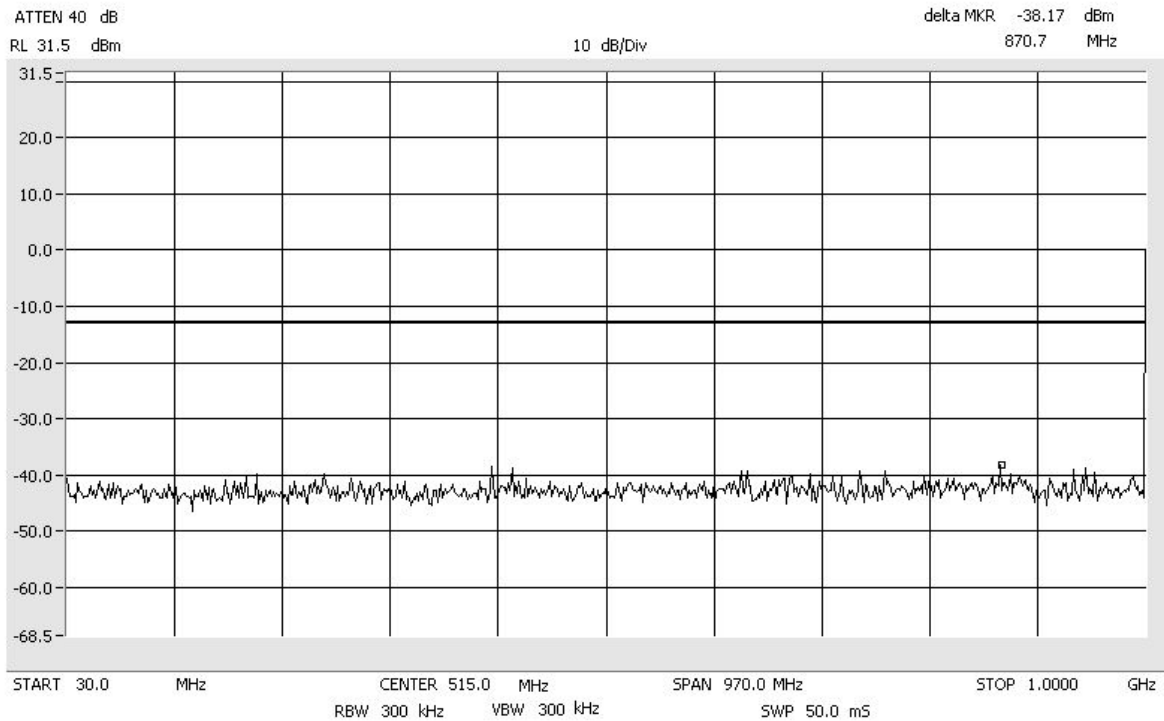
Intermodulation      GSM\_Low      PCS  
Span: 1 GHz to 20 GHz      RBW/VBW: 1 MHz



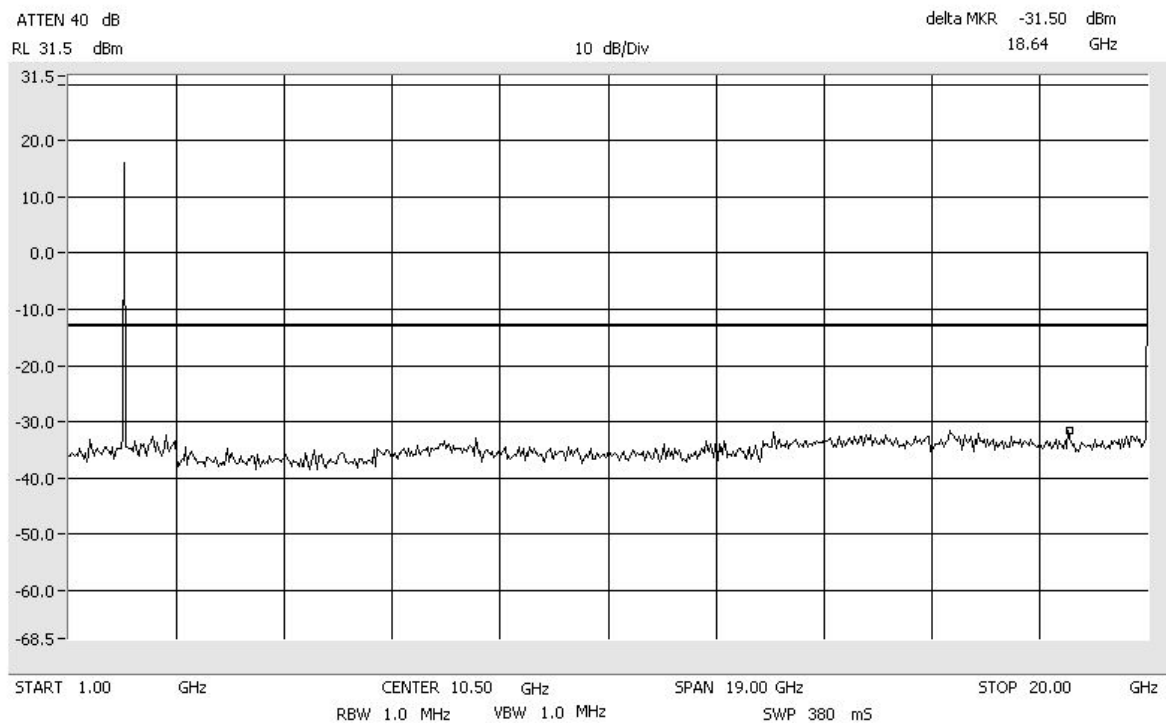
Intermodulation GSM\_High PCS  
Center: 1960 MHz Span: 70 MHz RBW/VBW: 100 kHz



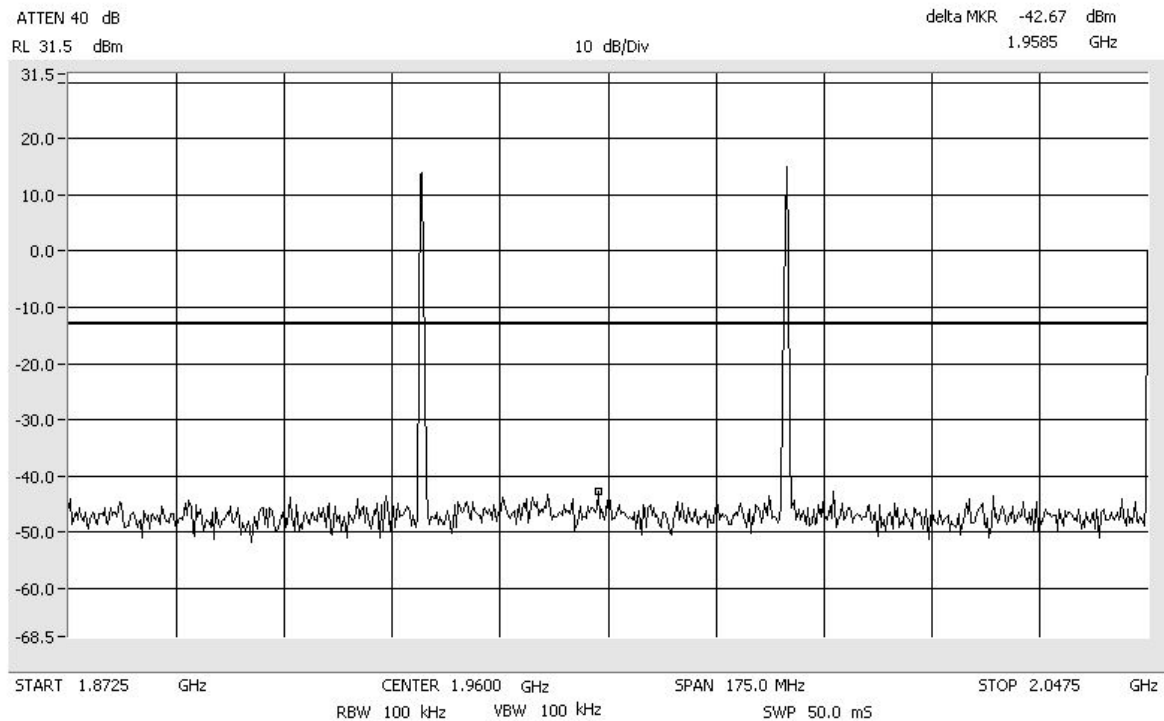
Intermodulation GSM\_High PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



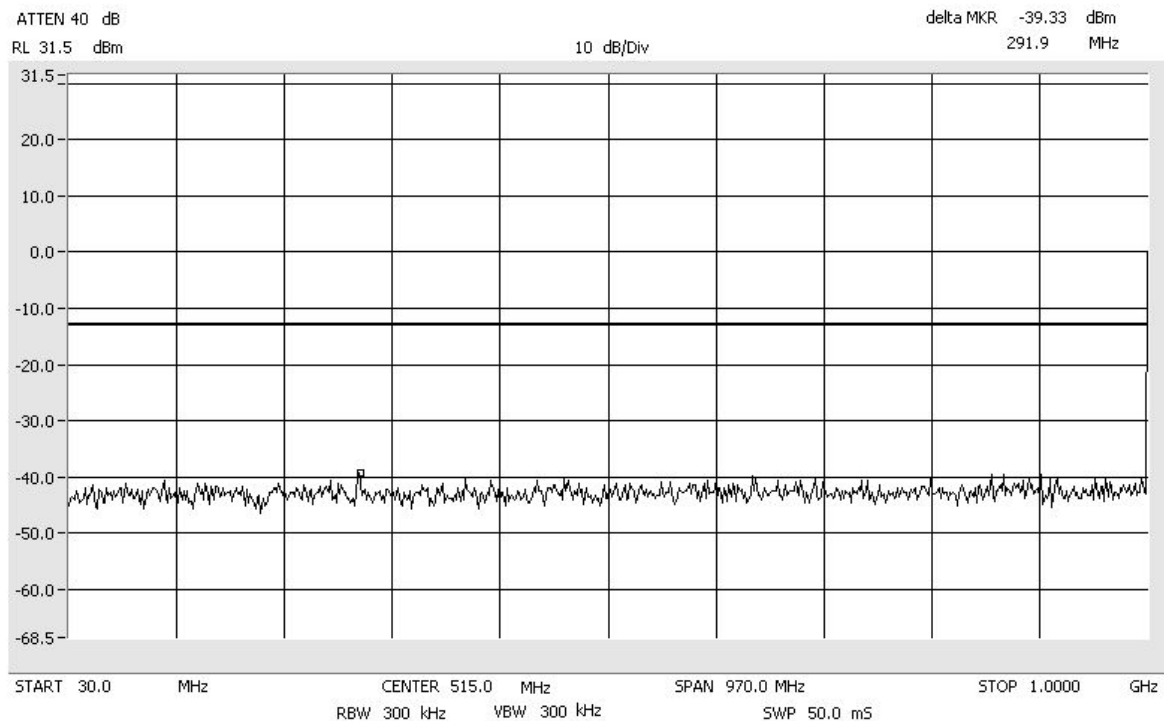
Intermodulation GSM\_High PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



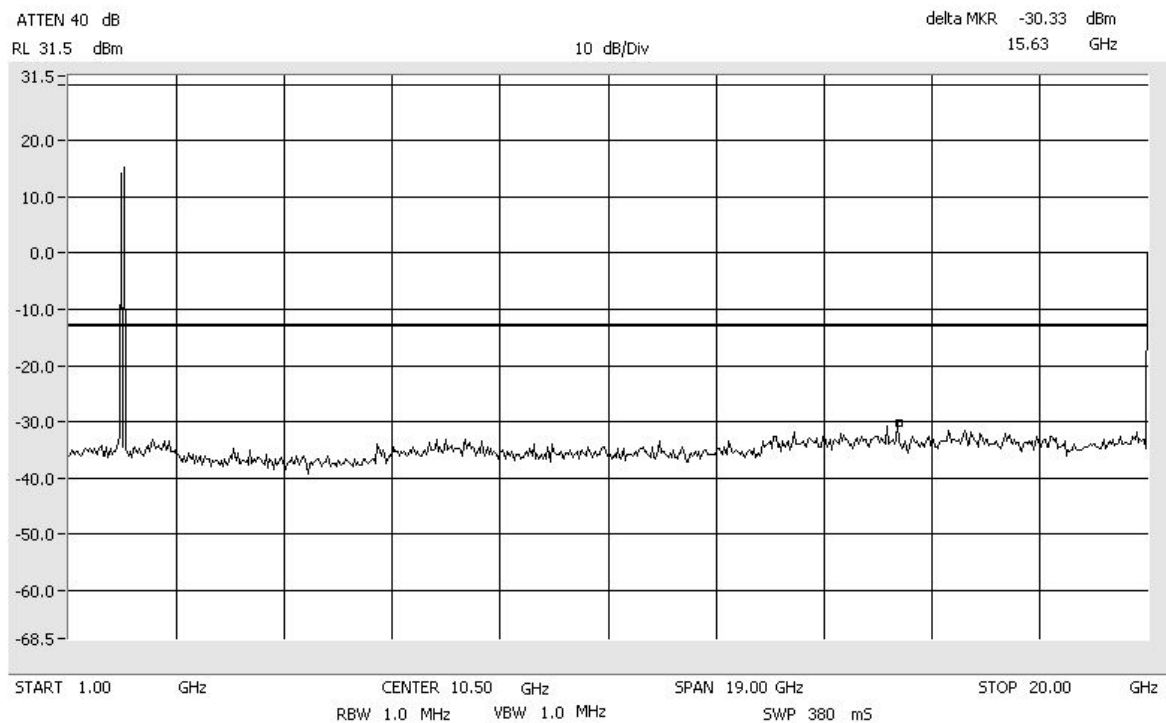
Intermodulation      GSM\_Apart      PCS  
Center: 1960 MHz      Span: 175 MHz      RBW/VBW: 100 kHz



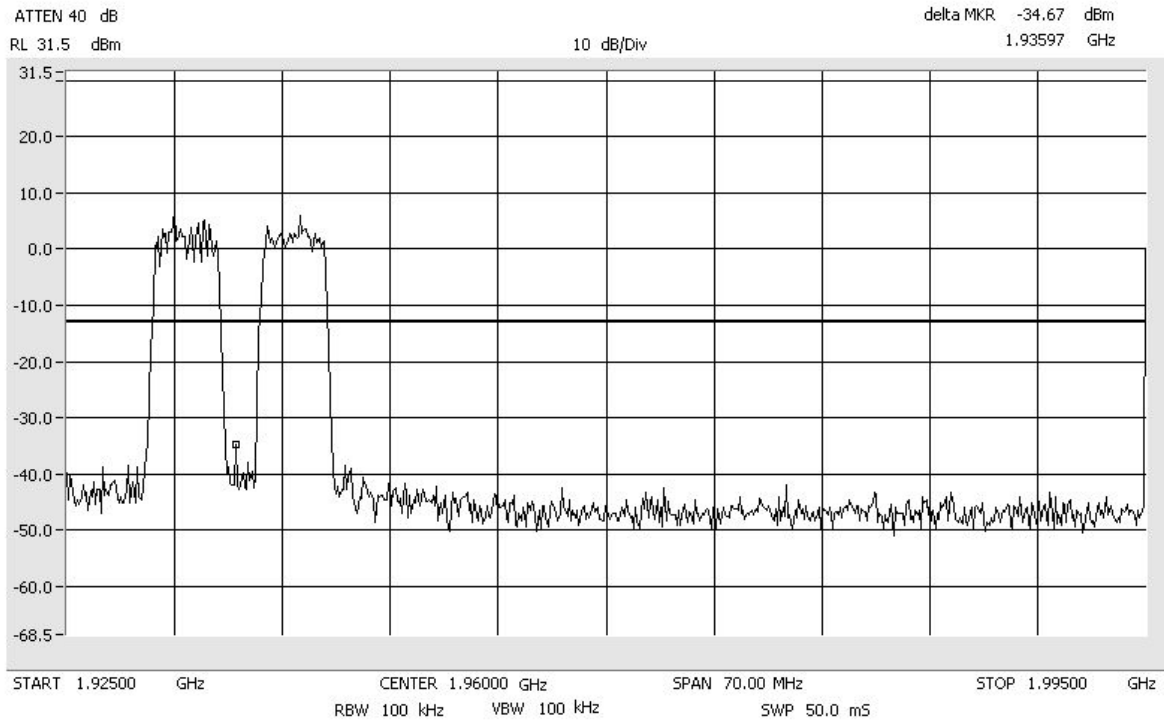
Intermodulation      GSM\_Apart      PCS  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



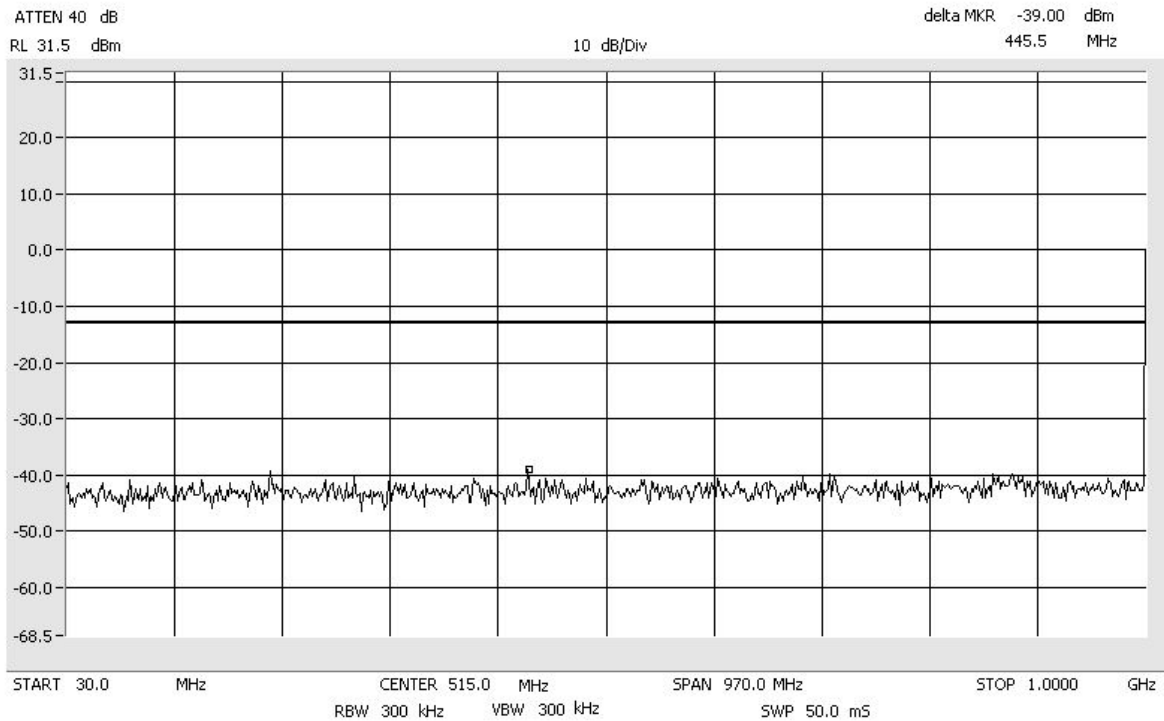
Intermodulation      GSM\_Apart    PCS  
Span: 1 GHz to 20 GHz      RBW/VBW: 1 MHz



Intermodulation WCDMA\_Low PCS  
Center: 1960 MHz Span: 70 MHz RBW/VBW: 100 kHz

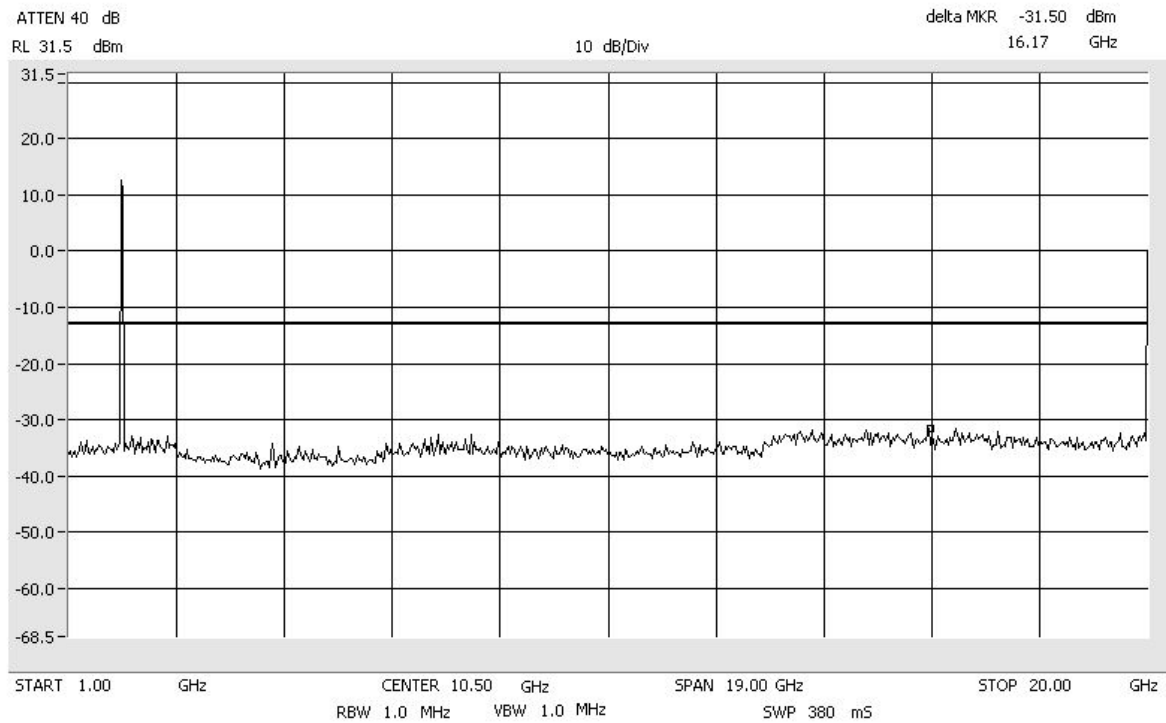


Intermodulation WCDMA\_Low PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

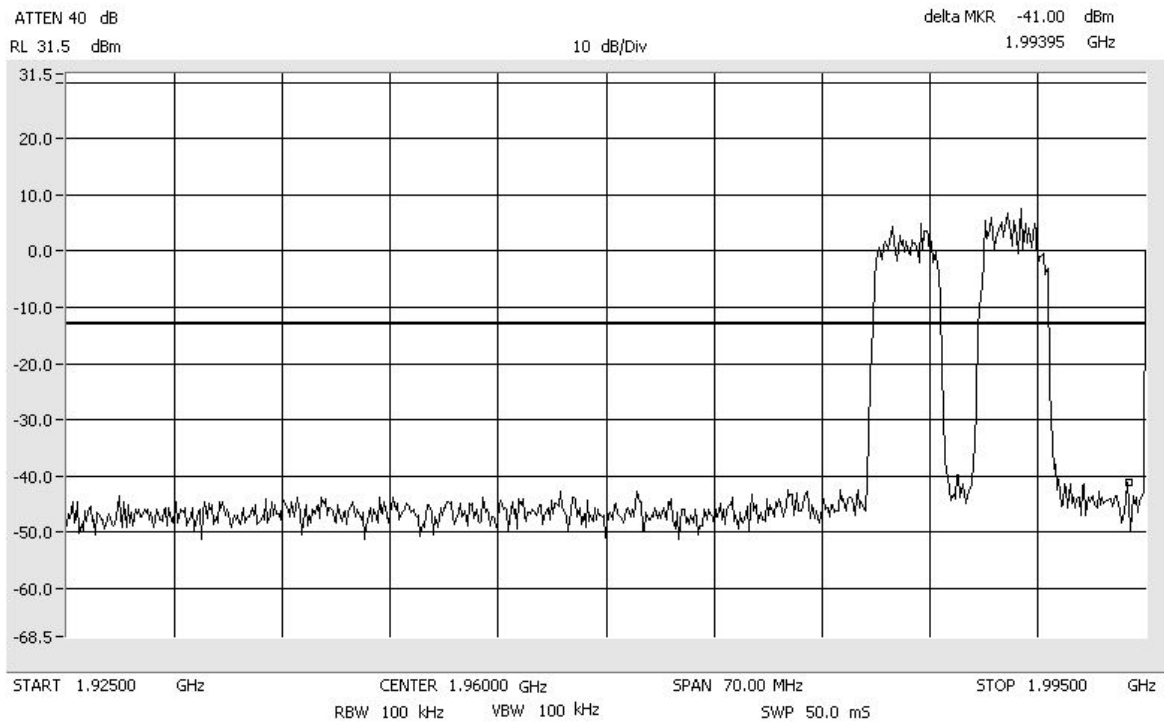


Intermodulation  
Span: 1 GHz to 20 GHz

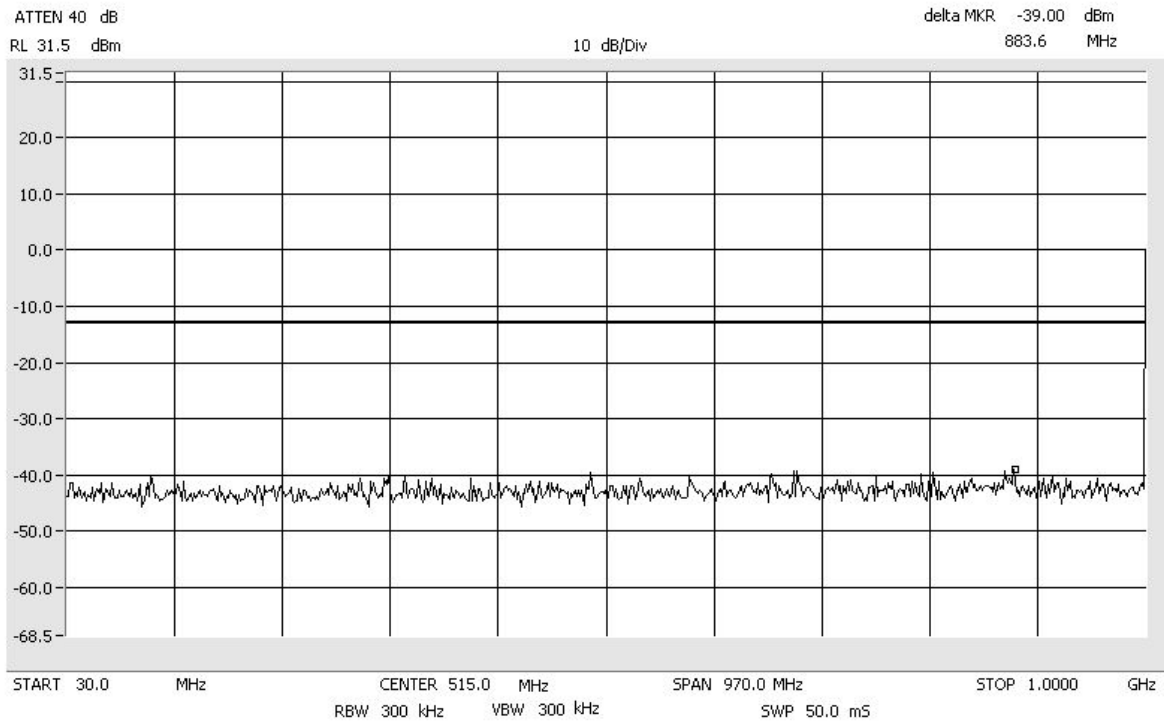
WCDMA\_Low PCS  
RBW/VBW: 1 MHz



Intermodulation WCDMA\_High PCS  
Center: 1960 MHz Span: 70 MHz RBW/VBW: 100 kHz

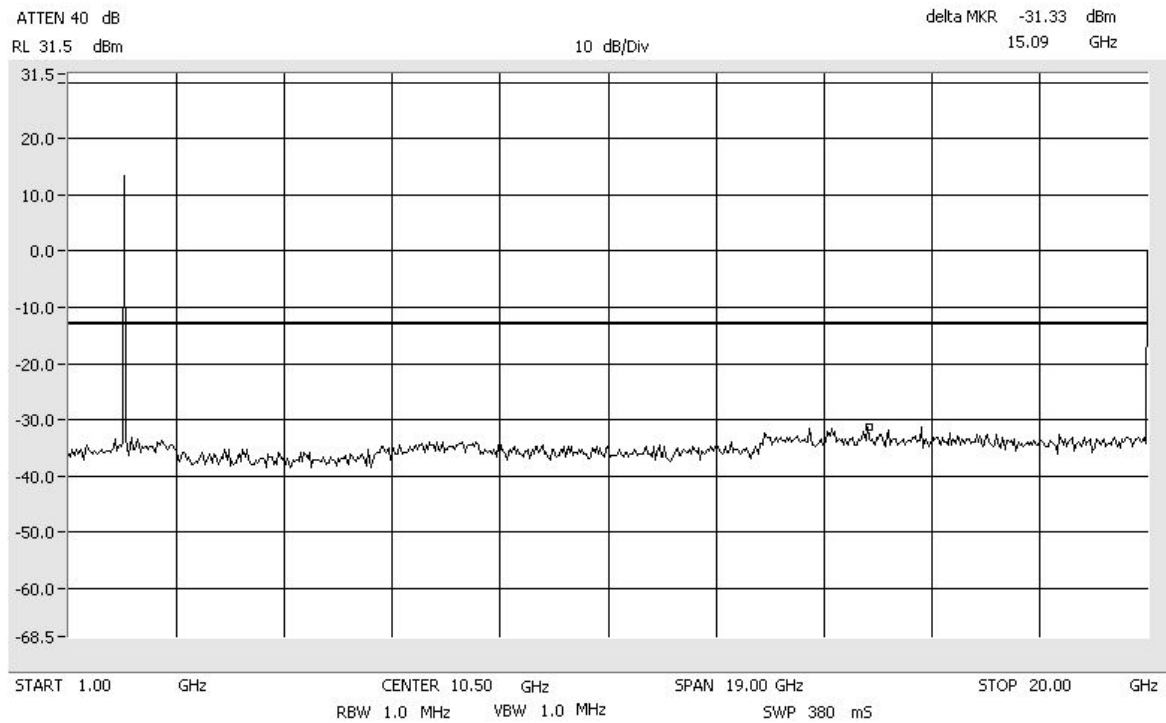


Intermodulation WCDMA\_High PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

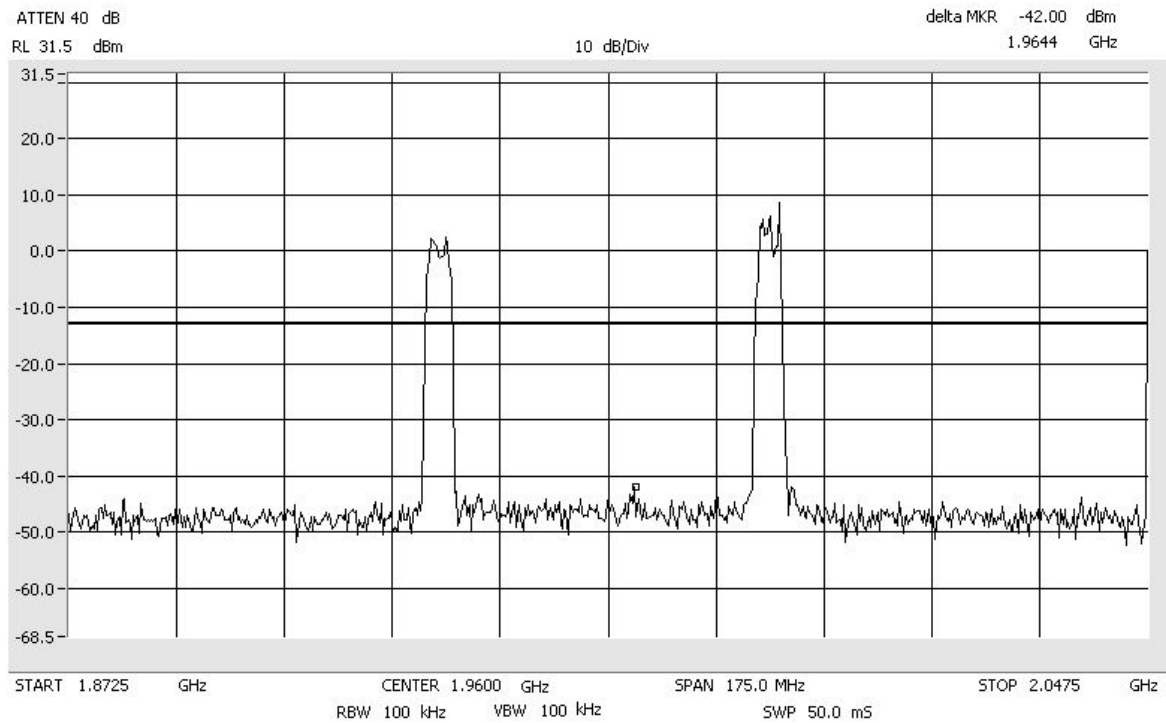


Intermodulation  
Span: 1 GHz to 20 GHz

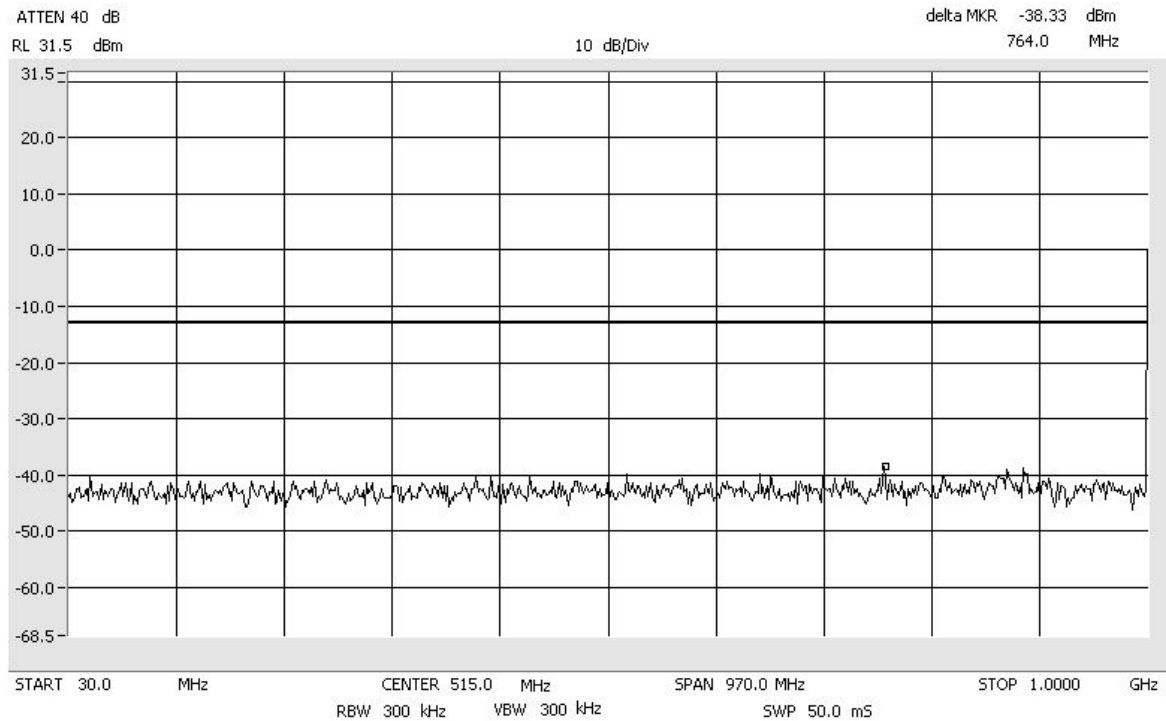
WCDMA\_High PCS  
RBW/VBW: 1 MHz



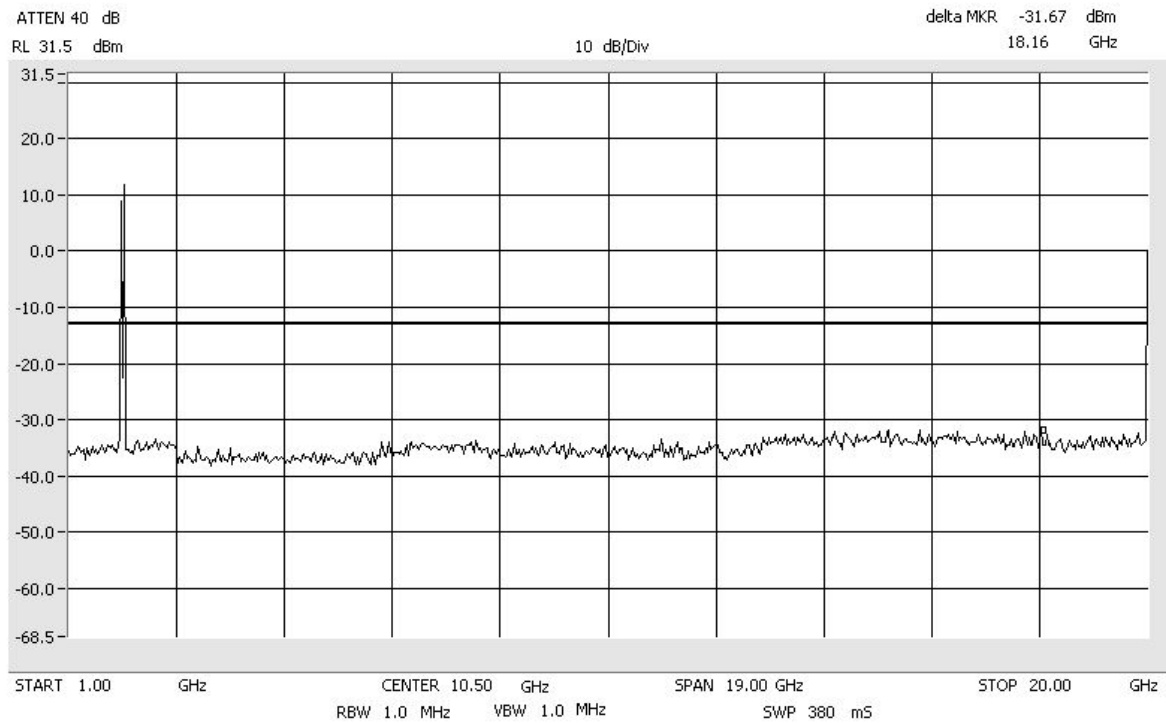
Intermodulation WCDMA\_Apart PCS  
Center: 1960 MHz Span: 175 MHz RBW/VBW: 100 kHz



Intermodulation WCDMA\_Apart PCS  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation WCDMA\_Apart PCS  
Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



## 7.5 Occupied Bandwidth Modulation Test

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An input/output Occupied Bandwidth test was done with modulation types: CDMA2000, EDGE, GSM and WCDMA. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT. The following plots show input signals vs. output signals.

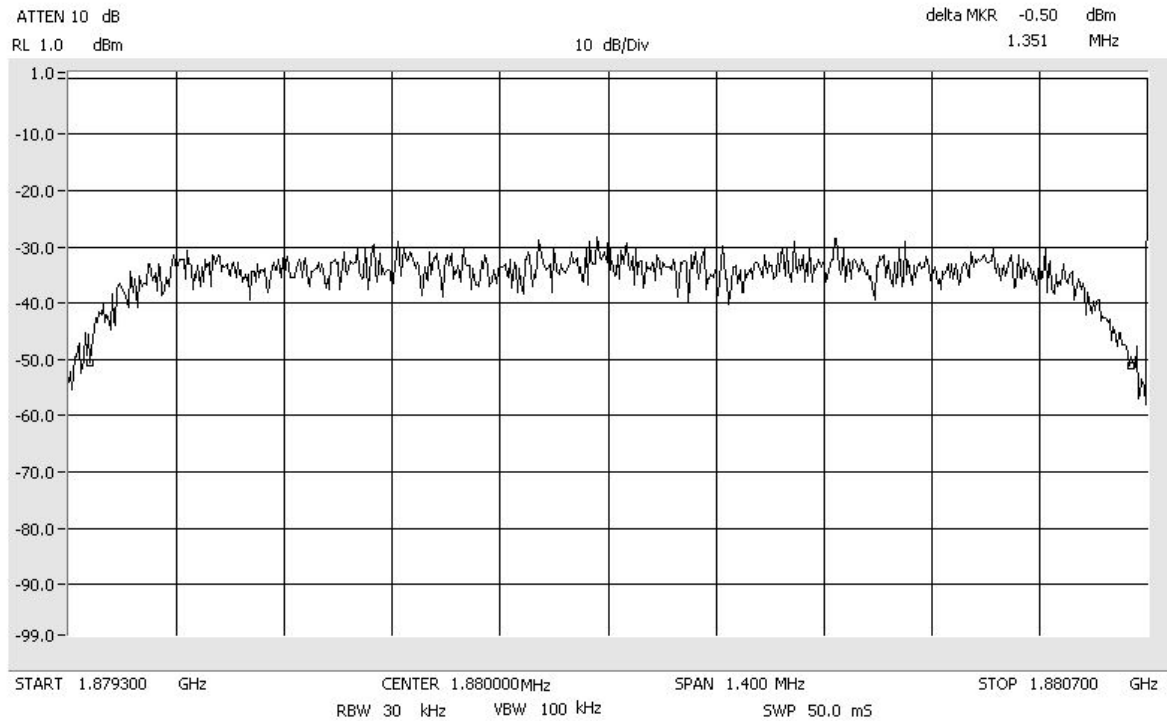
The resolution bandwidth is reduced to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are moved to the -20 dB points (from the previously established center frequency level) on either side of center frequency.

### Results:

Pass (see plots)

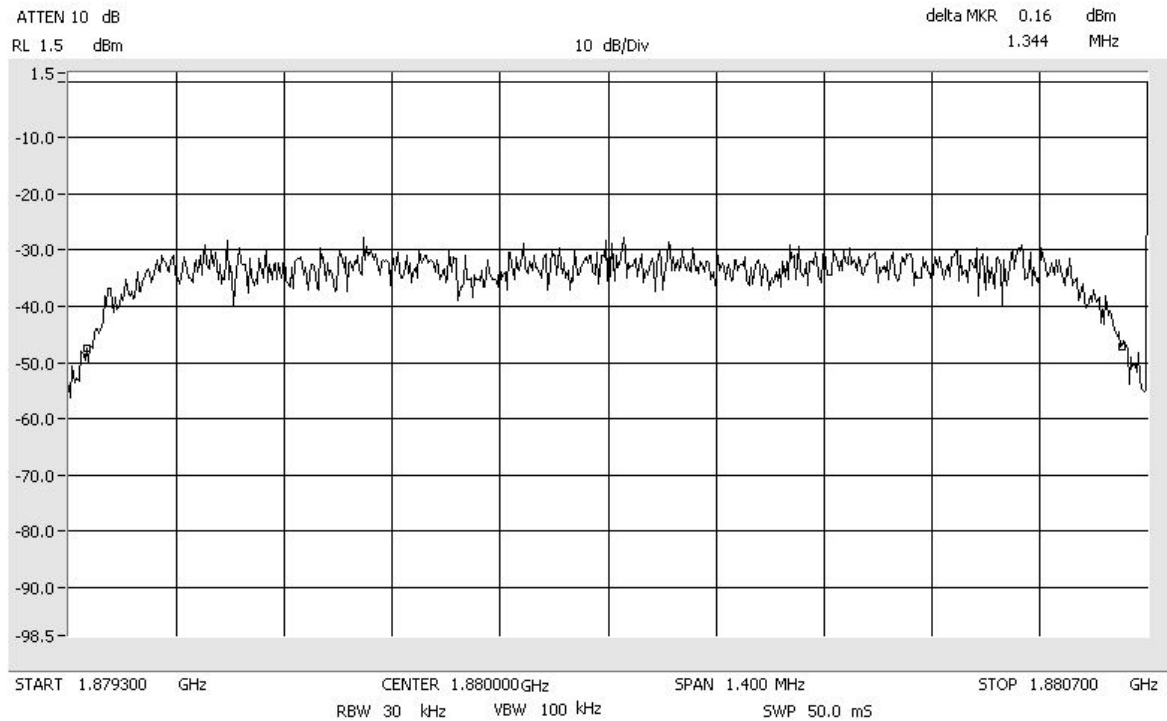
Occupied Bandwidth  
Span: 1.4 MHz

CDMA2000\_Signal\_In  
RBW: 30 kHz VBW: 100 kHz

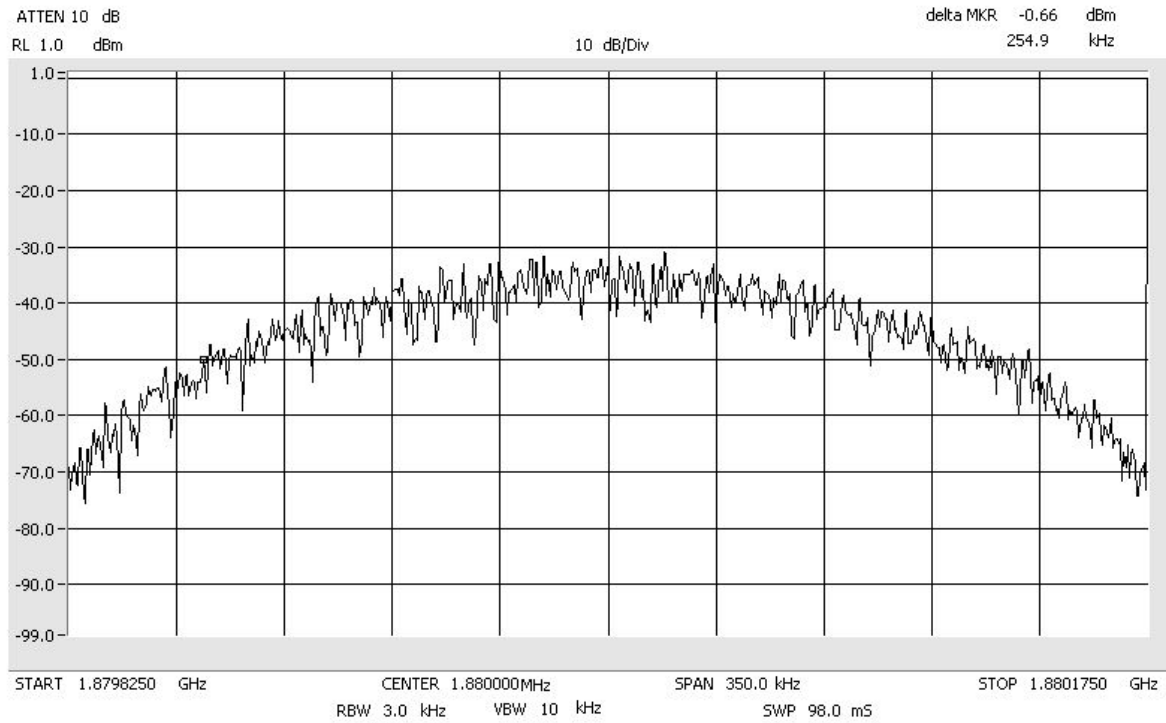


Occupied Bandwidth  
Span: 1.4 MHz

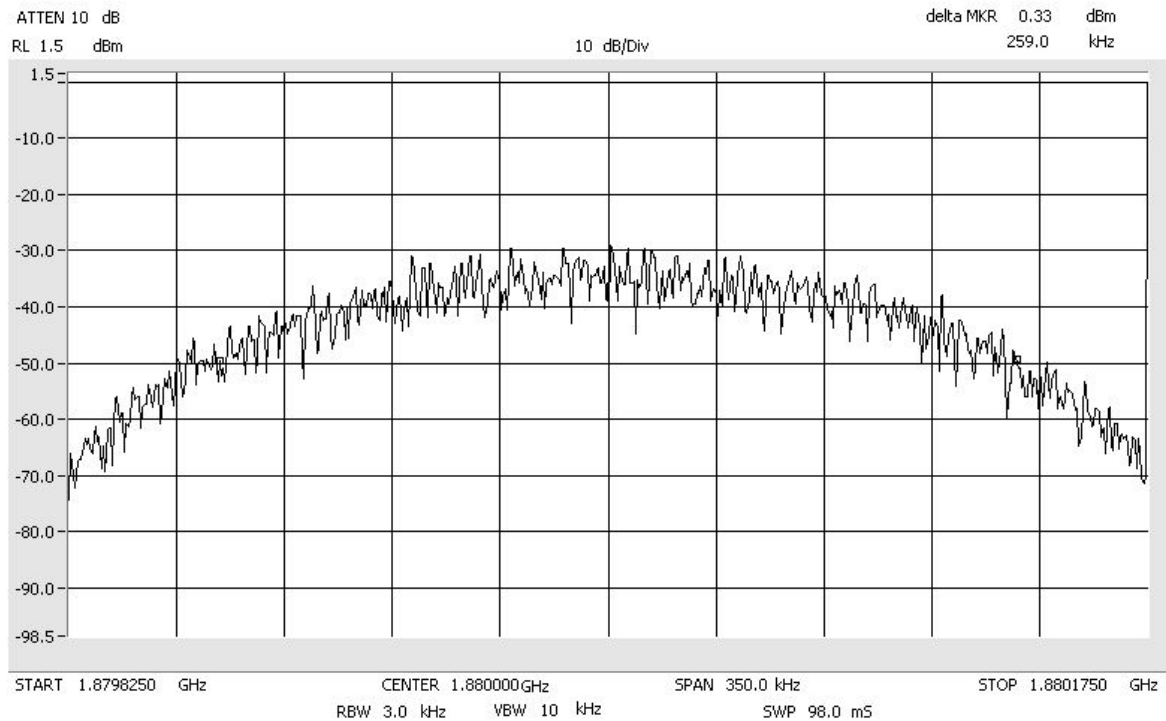
CDMA2000\_Signal\_Out  
RBW: 30 kHz VBW: 100 kHz



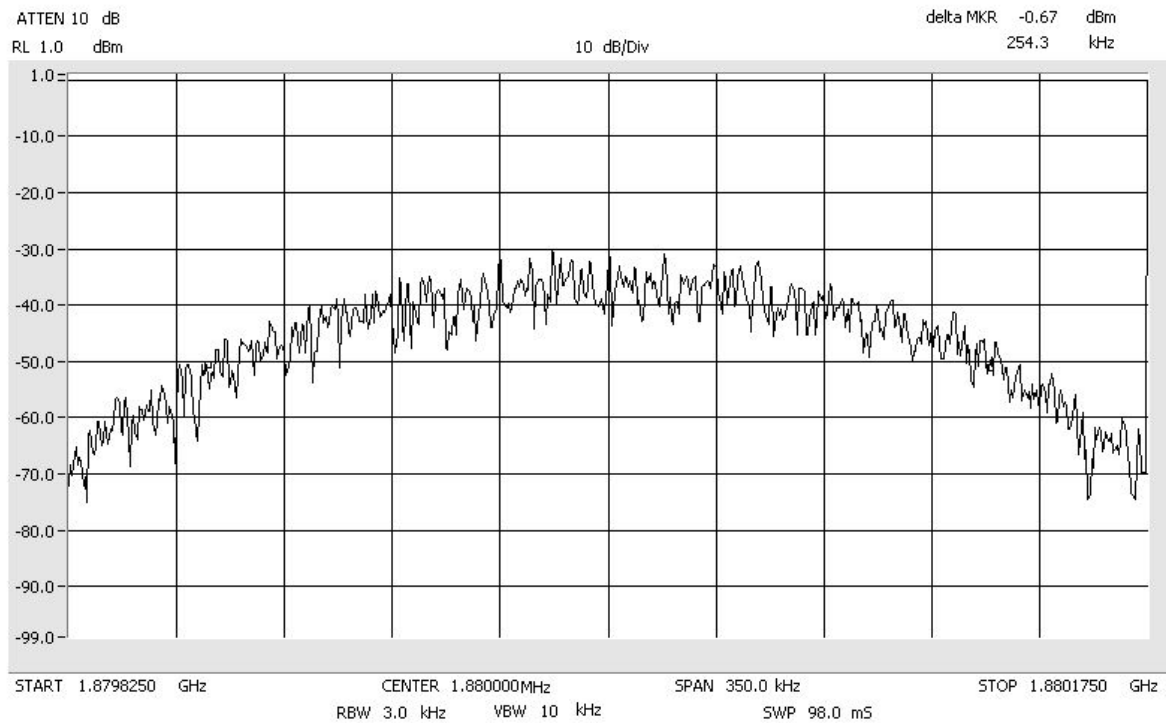
Occupied Bandwidth      EDGE\_Signal\_In  
Span: 350 kHz      RBW: 3 kHz    VBW: 10 kHz



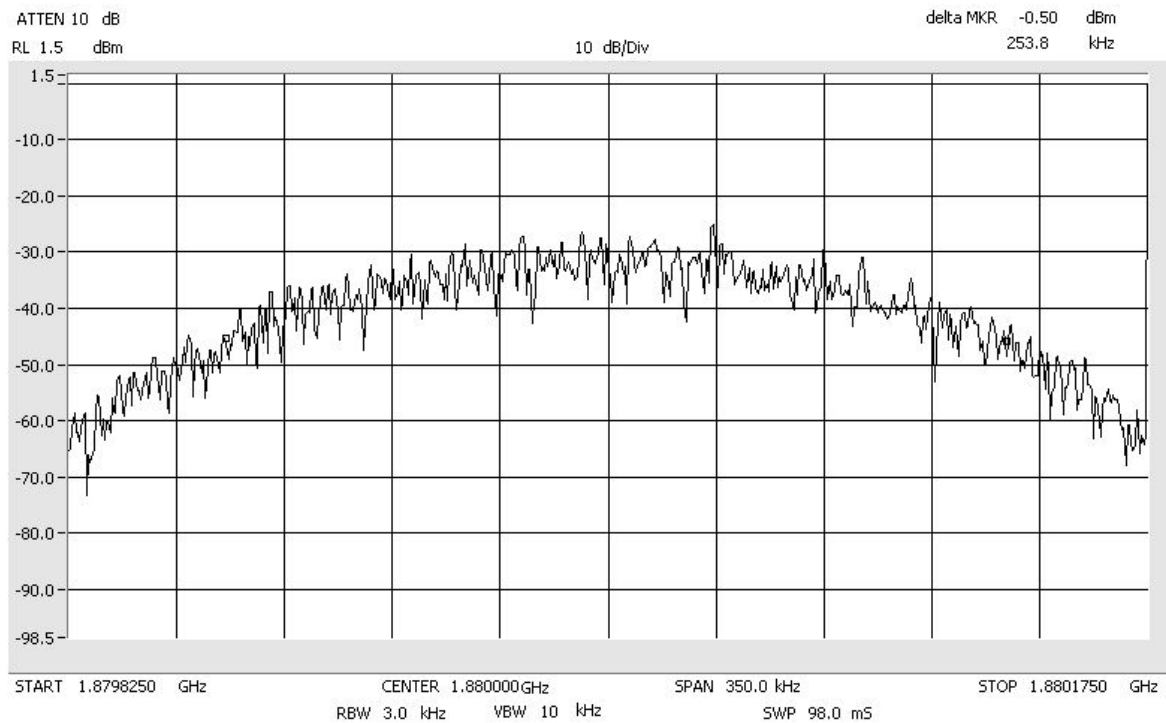
Occupied Bandwidth      EDGE\_Signal\_Out  
Span: 350 kHz      RBW: 3 kHz    VBW: 10 kHz



Occupied Bandwidth GSM\_Signal\_In  
Span: 350 kHz RBW: 3 kHz VBW: 10 kHz

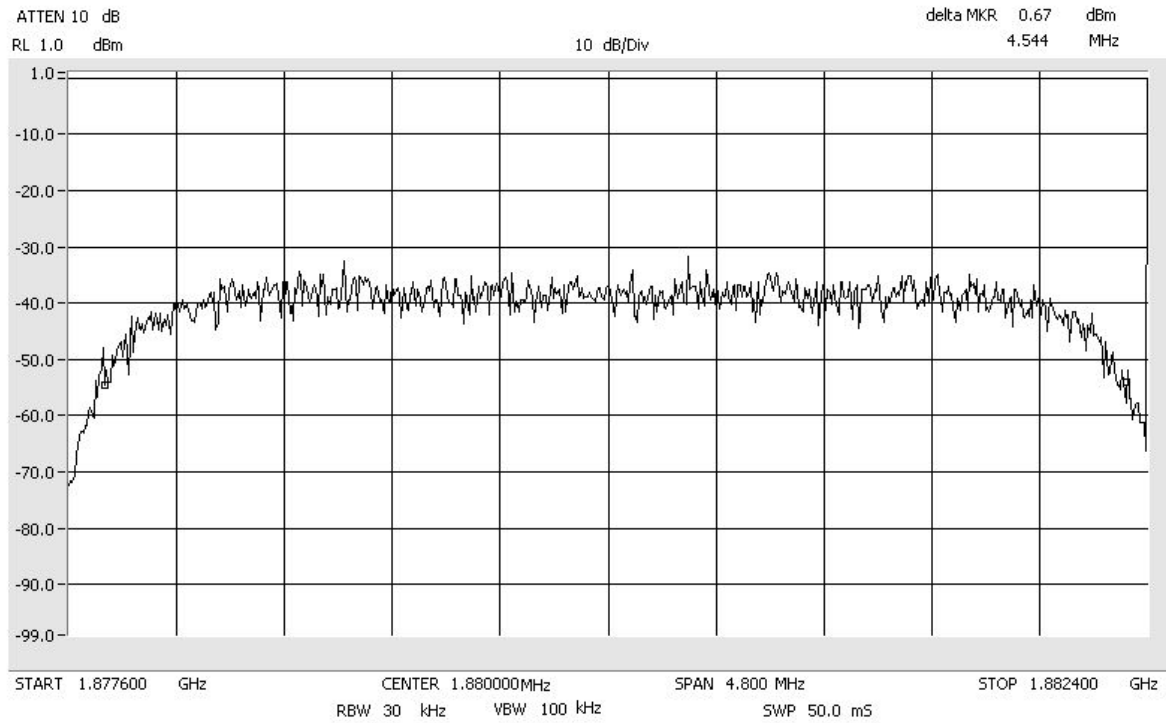


Occupied Bandwidth GSM\_Signal\_Out  
Span: 350 kHz RBW: 3 kHz VBW: 10 kHz



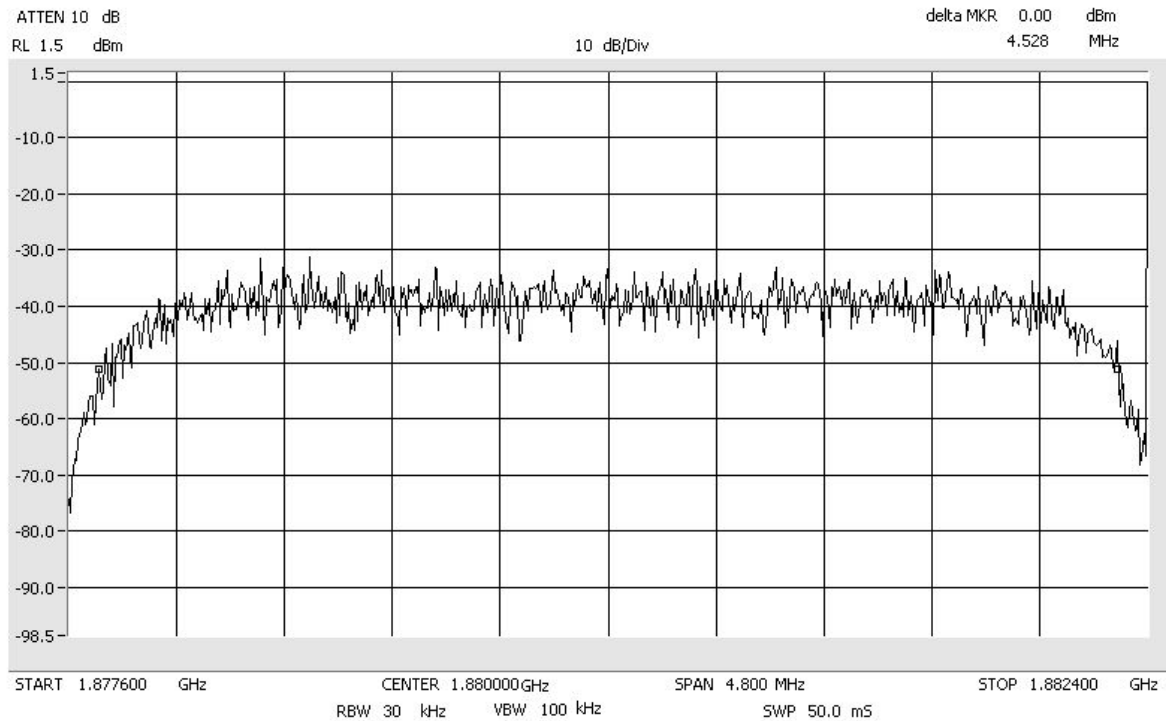
Occupied Bandwidth  
Span: 4.8 MHz

WCDMA\_Signal\_In  
RBW: 30 kHz VBW: 100 kHz



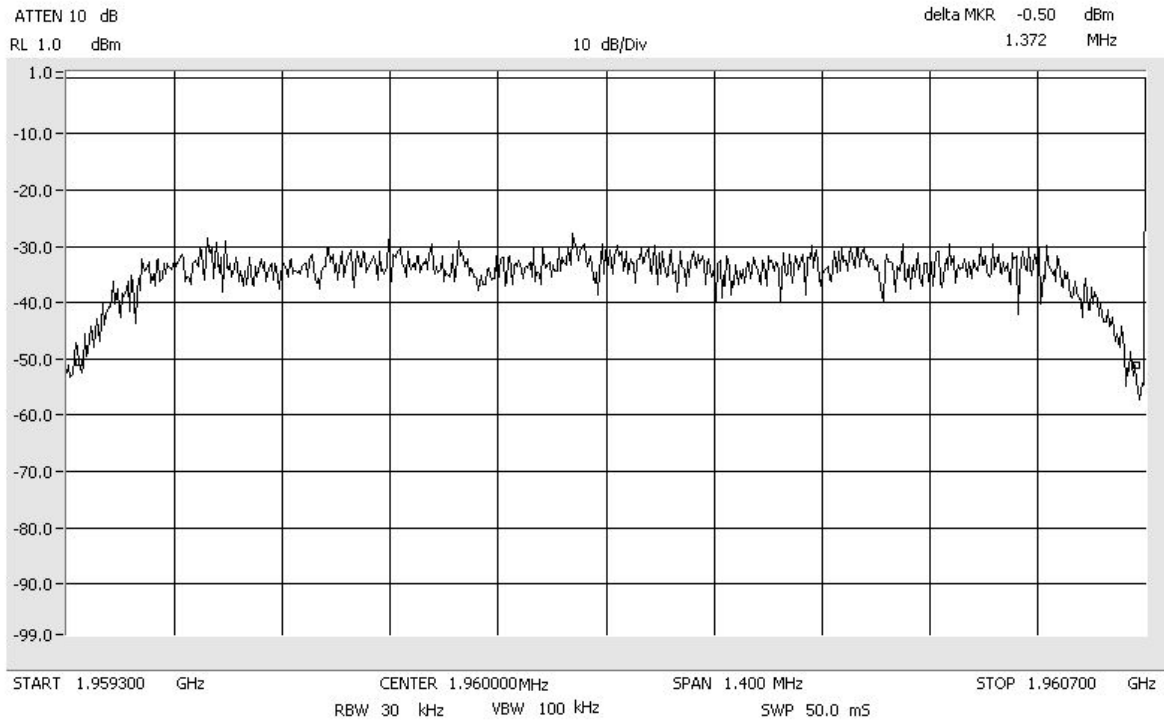
Occupied Bandwidth  
Span: 4.8 MHz

WCDMA\_Signal\_Out  
RBW: 30 kHz VBW: 100 kHz



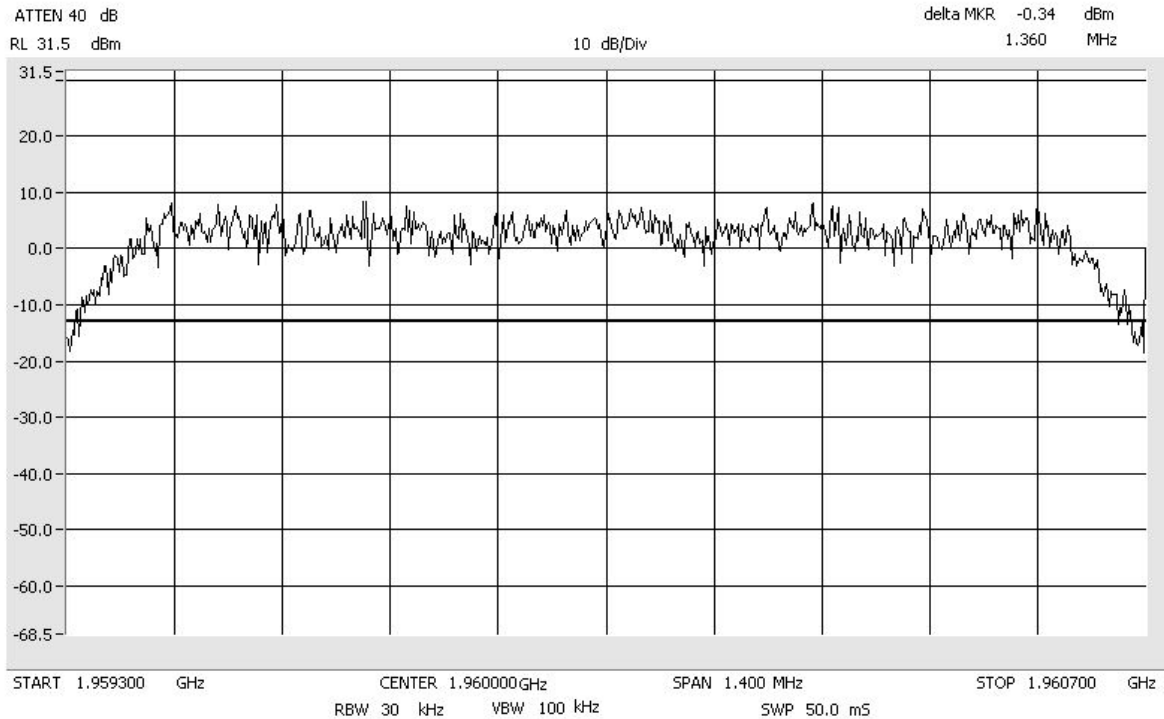
Occupied Bandwidth  
Span: 1.4 MHz

CDMA2000\_Signal\_In  
RBW: 30 kHz VBW: 100 kHz



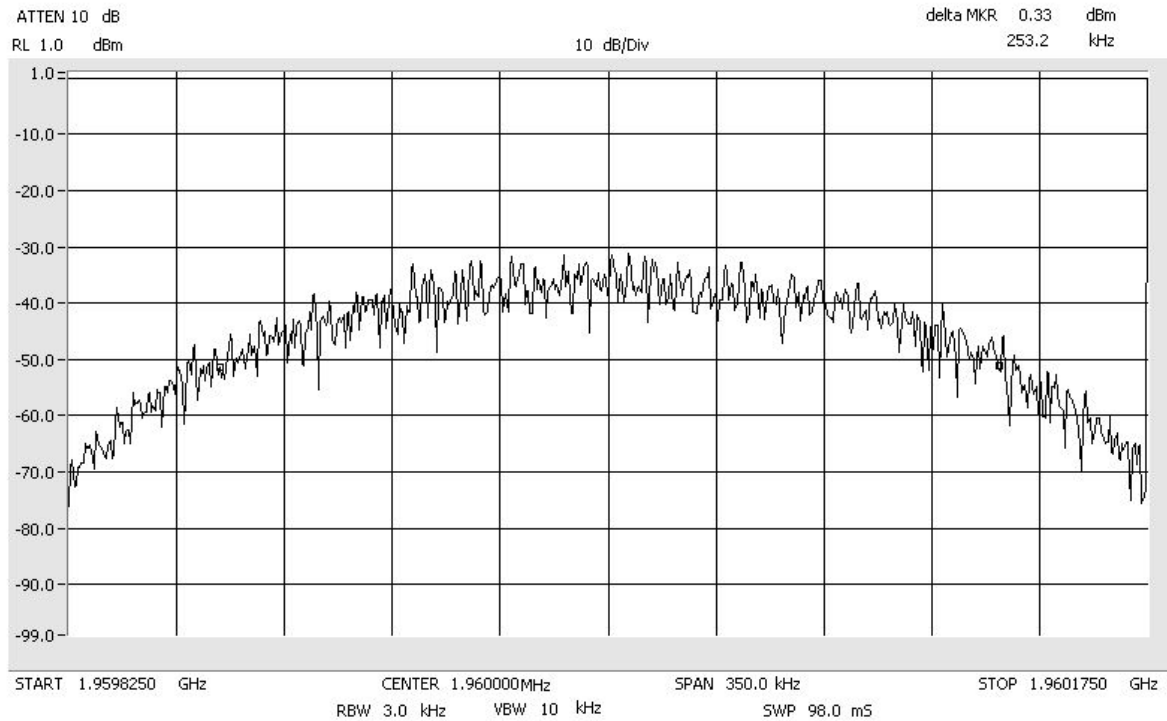
Occupied Bandwidth  
Span: 1.4 MHz

CDMA2000\_Signal\_Out  
RBW: 30 kHz VBW: 100 kHz



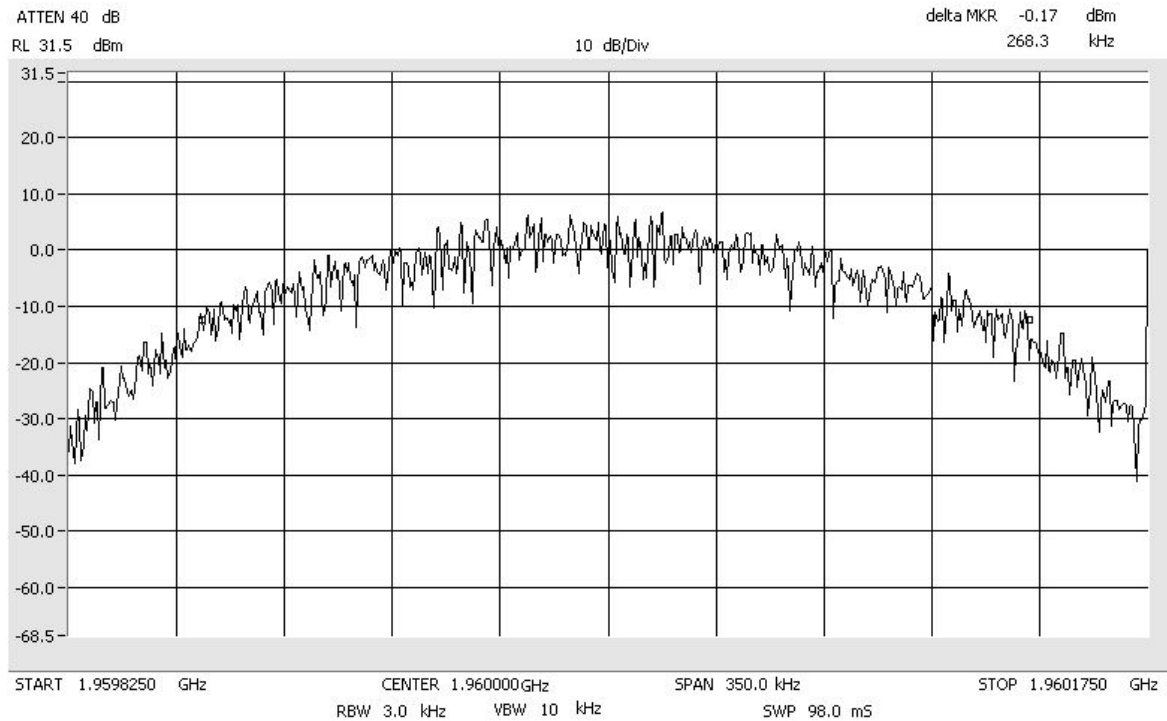
Occupied Bandwidth  
Span: 350 kHz

EDGE\_Signal\_In  
RBW: 3 kHz VBW: 10 kHz

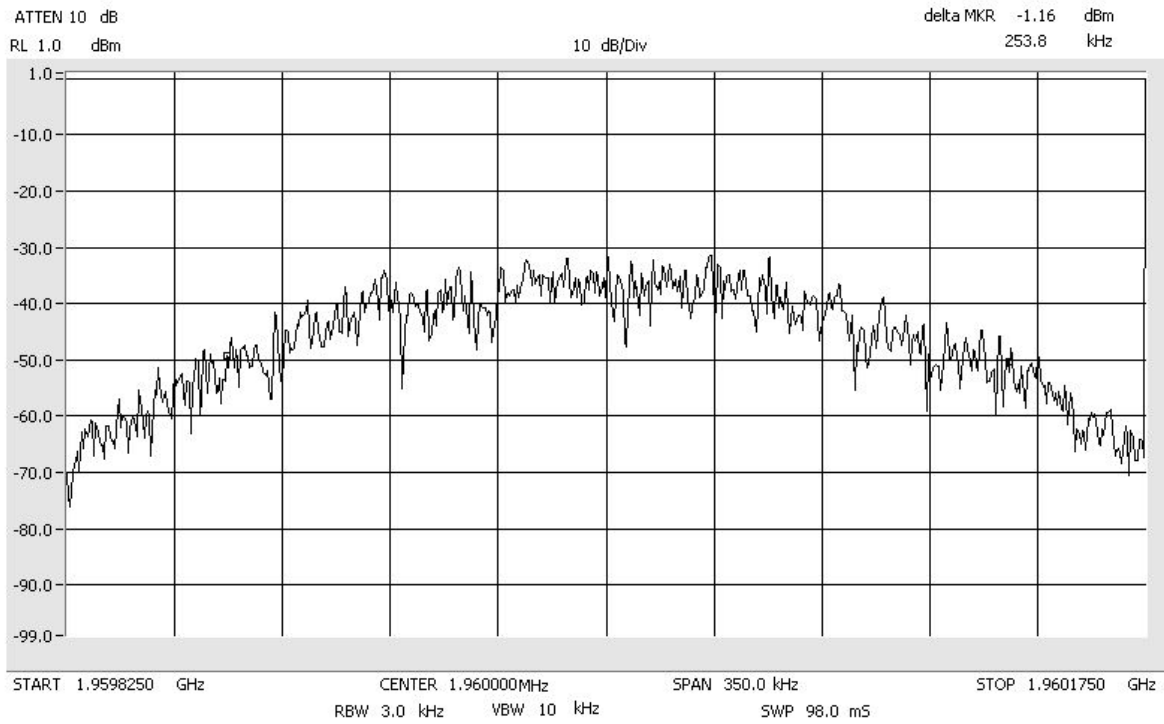


Occupied Bandwidth  
Span: 350 kHz

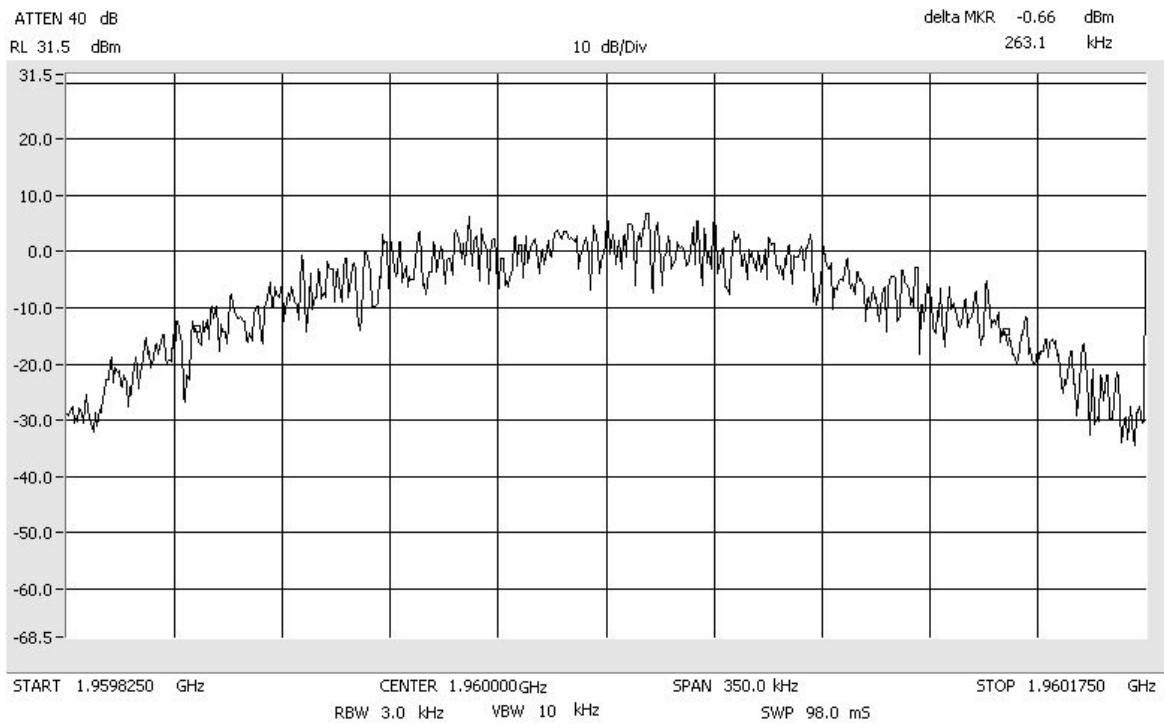
EDGE\_Signal\_Out  
RBW: 3 kHz VBW: 10 kHz



Occupied Bandwidth GSM\_Signal\_In  
Span: 350 kHz RBW: 3 kHz VBW: 10 kHz

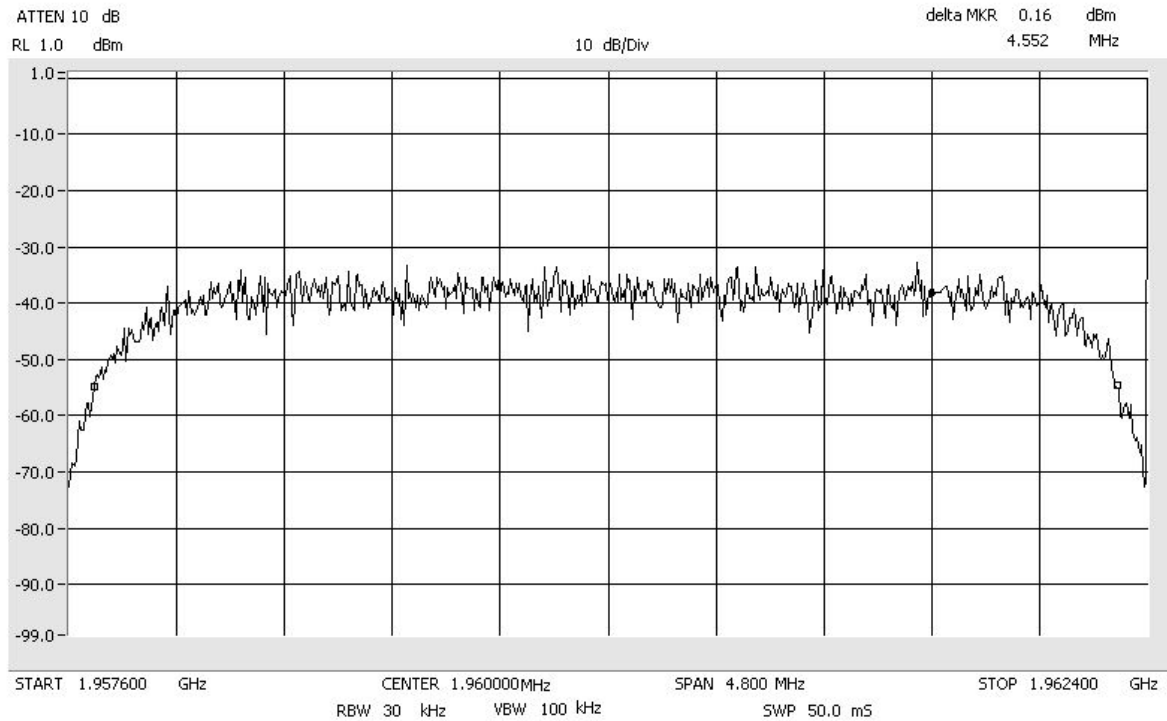


Occupied Bandwidth GSM\_Signal\_Out  
Span: 350 kHz RBW: 3 kHz VBW: 10 kHz



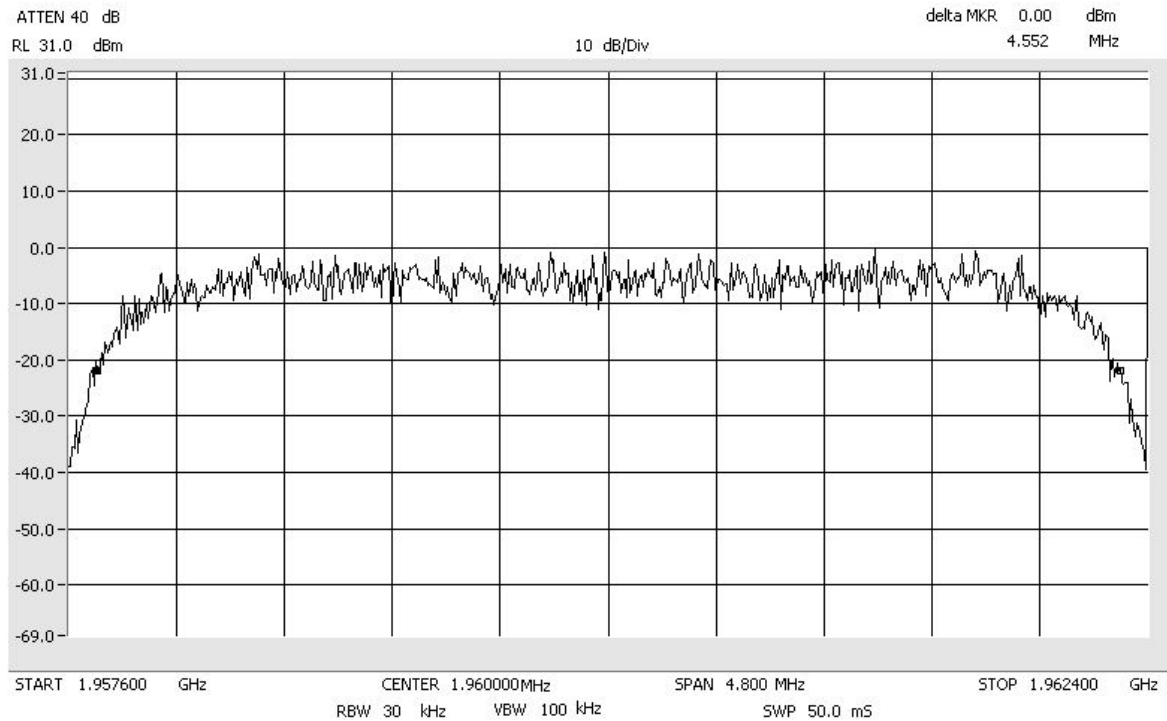
Occupied Bandwidth  
Span: 4.8 MHz

WCDMA\_Signal\_In  
RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth  
Span: 4.8 MHz

WCDMA\_Signal\_Out  
RBW: 30 kHz VBW: 100 kHz



Measurement Protocol

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# Measurement Protocol

## Environmental conditions of the lab, (ADC)

Temperature: 21 - 26° C

Relative Humidity: 21 - 24 %

Atmospheric Pressure: 97.8 - 100.0 kPa

## **Test Methodology:**

Emission testing is performed according to the procedures in ANSI C63.4-2003.

## **Measurement Uncertainty**

The test system for conducted emissions is defined as the signal generator(s), the power meter, the spectrum analyzer and the coaxial cable. The equipment comprising the test systems is calibrated prior to testing the EUT.

## **Justification**

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left un-terminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

## **Radiated Emissions**

The final level, in dBuV/m, equals the reading from the spectrum analyzer (Level dBuV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Appendix B.

Example:

FREQ (MHz)	LEVEL (dBuV)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

## **Substitution Method**

A cabinet (or enclosure) radiated emission scan was also made, at Intertek, with the EUT's antenna replaced with a termination to demonstrate case radiation compliance to the -13 dBm requirement. Radiated emissions from the EUT are measured in the frequency range of 30 to 20,000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT is rotated 360 degrees. The field strength levels were measured per ANSI C63.4. The EUT is then replaced with a tuned dipole antenna (below 1GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the highest level measured from the EUT. The signal generator level minus the cable loss from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level.

## **Test Equipment**

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

## Radiated Emissions Test Data

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Document Name: 3150809MIN-002\_Radiated\_Emissions\_Test\_Report\_Part\_24

**Test Engineer:** Norman Shpilsher**Date:** 7 May, 2008**Test Procedure:**

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

**Test Site Location:**

The test site is a 3 meter Semi-Anechoic Chamber, constructed by Panashield™ Inc. and located inside the building at 7250 Hudson Blvd. Suite 100, Oakdale, MN 55128.

**Test Site Description:**

The 3 meter Semi-Anechoic Chamber is constructed of Panabolt™ modular RF shielding and self-supported with structural steel designed for the local seismic zone rating. The chamber has the nominal size of 20' wide x 29' long x 18' high. All walls and ceiling of the chamber are treated with FFG-1000 Ferrite Grid absorber which was developed specifically to meet international requirements for EMC anechoic chambers for emissions and immunity measurements. To meet high frequency testing white HY-35 hybrid absorber is mounted on the ferrites in specular regions of the chamber.

The chamber has a 2 meter diameter ANSI test volume area and meets the requirements of ANSI C63.4 (1992), EN55022, and FCC Part 15 standards for testing at a 3 meter path length.

FCC Registration Number: 90706

IC Registration Number: 4359