Test Report Summary

FCC CFR 47, Part 24
Subpart E Broadband PCS

Manufacturer: ADC Telecommunications

Name of Equipment: FlexWave™ microBTS

Model Number(s): FWB-MBTS-D40N00

Manufacturer's Address: P.O. Box 1101
Minneapolis, MN 55440-1101

Test Report Number: MN070518

Test Date(s): 16-17 May, 2007 (ETL)
15 May, 2007 (ADC)

According to testing performed at Intertek, the above-mentioned unit is in accordance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 24.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

All testing was done in accordance with the Federal Communications Commission's CFR 47 Part 24 and the EUT fulfills the requirements of the Federal Communications Commission's CFR 47 Part 24.

Date: 18 May, 2007

Location:

Intertek Testing Services (ETL)
7250 Hudson Blvd., Suite 100
Oakdale, MN 55128
Phone: (651) 730-1188
Fax: (651) 730-1282

ADC Telecommunications
5341 12th Ave E
Shakopee, MN 55379
Phone: (952) 403-8340
Fax: (952) 403-8858

Testing Conducted by (ADC):
And Report Written by:

Mark F. Miska
Compliance Engineer

EMC Emission – T E S T R E P O R T

Test Report File Number: MN070518 **Date of Issue:** 18 May, 2007

Model Number(s): FWB-MBTS-D40N00

Product Name: FlexWave™ microBTS

Product Type: Indoor/Outdoor Base Station System

Applicant: ADC Telecommunications

Manufacturer: ADC Telecommunications

License Holder: ADC Telecommunications

Address: P.O. Box 1101
Minneapolis, MN 55440-1101

Test Result: ■ **Positive** □ Negative

Test Project Number: 3122953MIN-001
Reference(s)

Total pages including Appendices: 60

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1.0 REVISION DESCRIPTION

Rev	Total Pages	Date	Description
A	60	May 18, 2007	Original Release

2.0 DOCUMENTATION

2.1 Test Regulations

24.232 Power and antenna height limits
24.235 Frequency stability
24.238 Emission limits for Broadband PCS equipment

The emissions tests were performed according to the following regulations:

☐ FCC Part 22

■ **FCC Part 24**

☐ FCC Part 90

☐ IC RSS-131 Issue 2

Environmental Conditions in the lab:

ADC	**ETL**
Temperature: 26º C	24º C
Relative Humidity: 37%	39%
Atmospheric Pressure: 98.5 kPa	98.9 kPa

Power Supply Utilized:

Power Supply System : 1 phase, 60 Hz, 120 VAC

2.2 Test Operation Mode

☐ Standby

☐ Test Program

☐ Practice Operation

■ **Max composite out**

2.3 Configuration of the device under test:

Normal Operation – PCS - 1930 to 1990 MHz

2.4 Product Options:

None

2.5 EUT Specifications and Requirements:

Length: 36”
Width: 10”
Height: 8”
Weight: 83.0 pounds

2.6 Cables:

Cable Type	Length	From	To
CAT-V	> 3M	Ancillary Equip	EUT
RF	< 3M	EUT	50 Ohm Load
Power	< 3M	Power	Input Power

2.7 Power Requirements:

Voltage: 120 VAC
Amps: 3.9 A

2.8 Typical Installation and/or Operating Environment:

Indoor or outdoor. System is typically employed as a micro Base Station.

2.9 Other Special Requirements:

None

2.10 EUT Software:

Revision Level: Version 1.1.3.1
Description: Spirit. System Management Software

2.11 EUT System Components

Description	Model #	Serial #	FCC ID #
microBTS	FWB-MBTS-D40N00	None	

2.12 Support Equipment

Description	Manufacturer	Model #	FCC ID #
Power Meter	HP	EPM-441A	
Attenuator	Aeroflex	49-30-33	

2.13 Deviations from standard:

Modifications required to pass:

☐ As indicated on the data sheet(s)

■ **None**

Test Specification Deviations; Additions to or Exclusions from:

☐ As indicated in the Test Plan

■ **None**

2.14 General Remarks:

None.

2.15 Summary:

The requirements according to the technical regulations are

■ **met**

☐ not Met

The equipment under test does

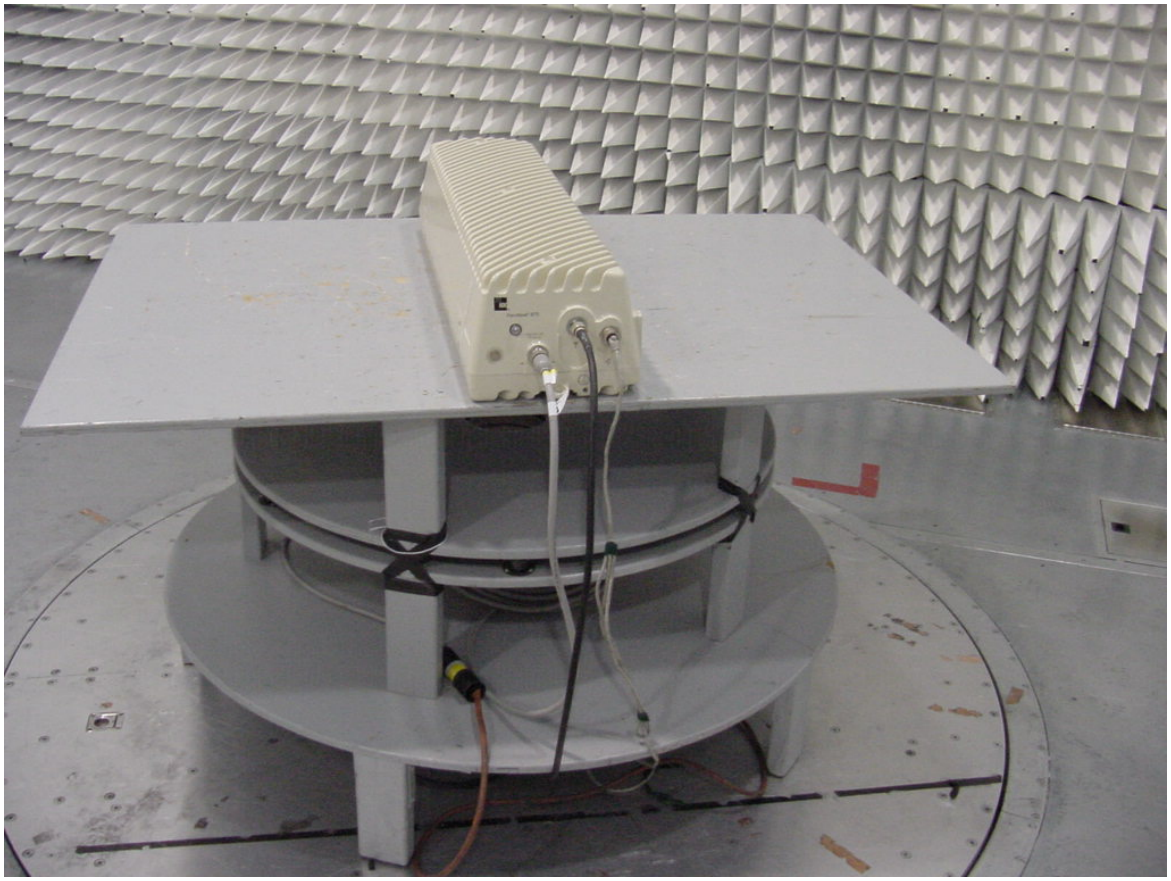
■ **fulfill the general approval requirements mentioned on page 4.**

☐ not fulfill the general approval requirements mentioned on page 4.

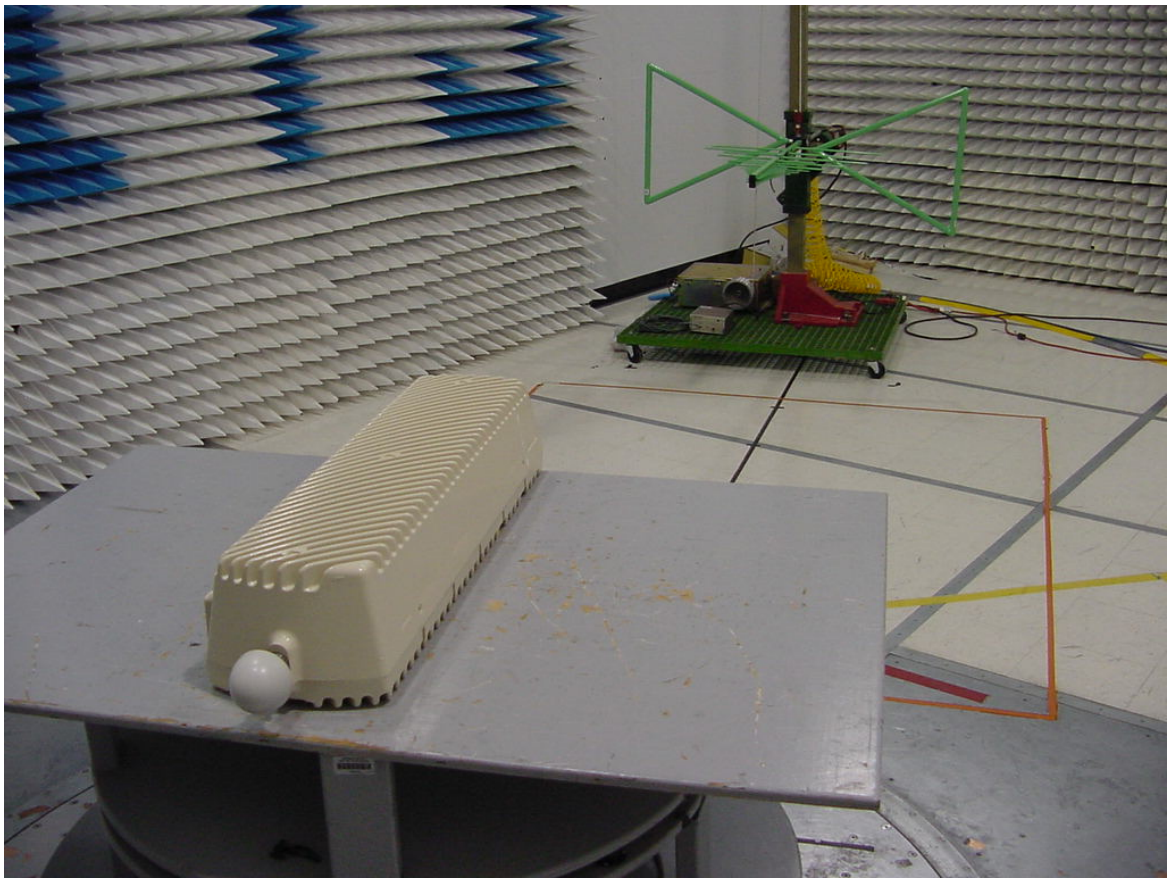
3.0 TEST SET-UP DRAWINGS AND PHOTOS

Back to Table of Contents:

3.1 Test set-up photo, radiated emissions



3.2 Test set-up photo, radiated emissions



3.3 Test Set-up Drawings

Conducted and Radiated Emission Limits Test for ADC Inc.

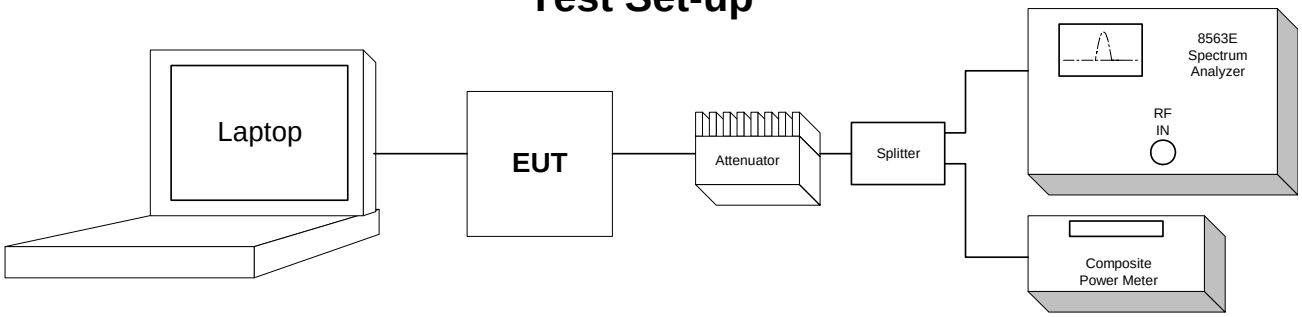
Conducted Output Power Test for ADC Inc

Inter-Modulation Test for ADC Inc.

Occupied Bandwidth Modulation Test for ADC Inc.

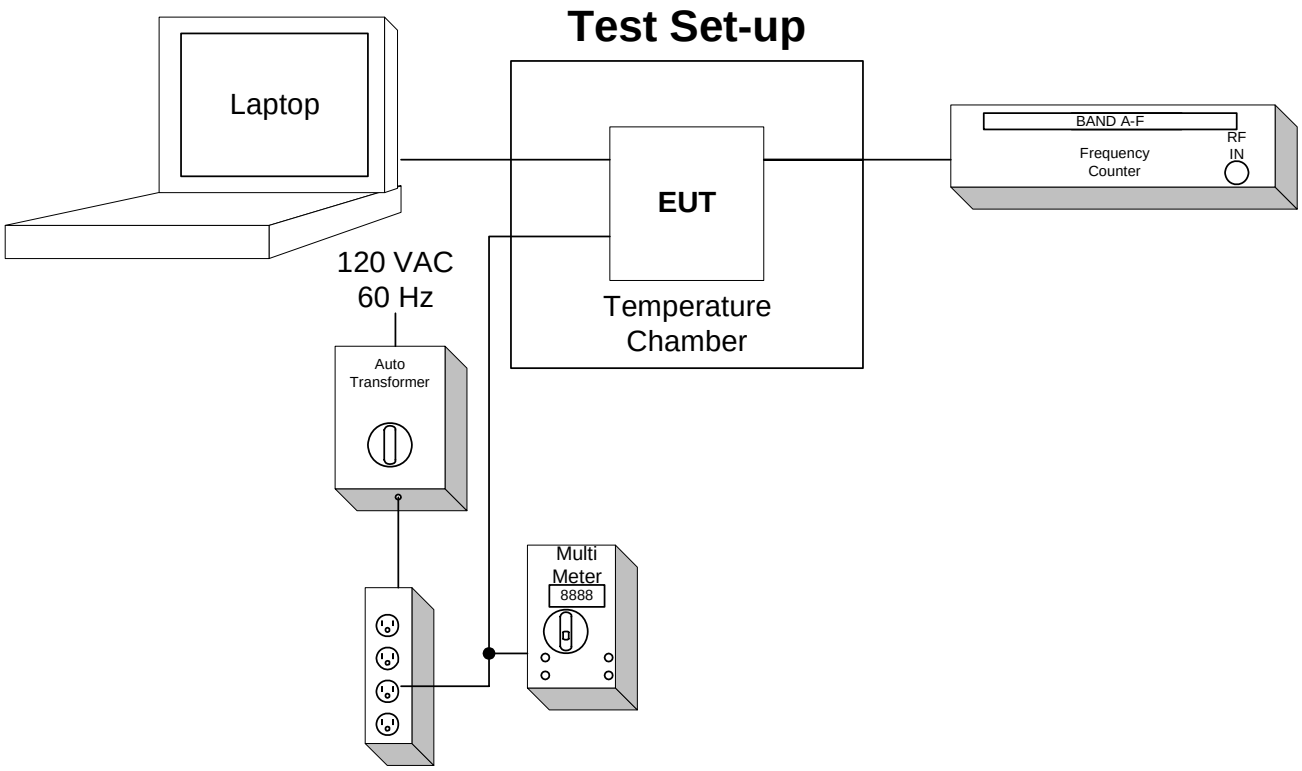
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Test Set-up



Frequency Tolerance Test for ADC Inc.
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

EUT is specified for indoor or outdoor use only with temperature range of -5° to +45° C, and was tested with its range.



4.0 TEST RESULTS

4.1.1 24.232 Power and antenna height limits

Test Summary:

- The requirements are: ■ **MET** □ NOT MET
- Minimum margin of compliance is 7.70 dB at 1930.2 MHz (EDGE)

Test Location:

□ ETL (Oakdale, MN)

■ **ADC facility (Shakopee, MN)**

Test Distance:

□ 3 Meters

□ 10 Meters

■ **Conducted measurement**

Test Equipment (ADC):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Attenuator	Aeroflex	86-30-12	N/A	CNR
Spectrum Analyzer	HP	8563E	MC27690	7-22-07
Power Meter	HP	EPM-441A	MC27670	9-20-07

Equipment with a Calibration Not Required (CNR) listing is verified and compensated for with NIST traceable calibrated equipment.

Test Limit:
100 Watts or 50 dBm Limit

Test Data:
See page 22

Test Engineer: Mark F. Miska
Date: 15 May, 2007

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4.1.2 24.235 Frequency Stability

Test Summary:

- The requirements are: ■ **MET** □ NOT MET
- The fundamental emission stays within the authorized frequency block.
- Frequency measured over a temperature range of -5 to 45º C and an input voltage range of 100 to 250 VAC.

Test Location:

□ ETL (Oakdale, MN)

■ **ADC facility (Shakopee, MN)**

Test Equipment (ADC):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Multimeter	Fluke	87	MC17932	8-1-08
Frequency Counter	HP	5347A	MC27548	8-18-07
Variable Auto Transformer	Staco	1520CT	MC44655	CNR

Equipment with a Calibration Not Required (CNR) listing is verified and compensated for with NIST traceable calibrated equipment.

Test Limit:
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Data:
See page 39

Test Engineer: Mark F. Miska
Date: 15 May, 2007

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4.1.3 24.238 Emission limitations for broadband PCS equipment

Test Summary:

- The requirements are: ■ **MET** □ NOT MET
- Out of band emissions were less than –13 dBm.
- Outside the emission bandwidth of the carrier, all emissions are attenuated at least 26 dB below the transmitter power.

Test Location:

□ ETL (Oakdale, MN)

■ **ADC facility (Shakopee, MN)**

Test Equipment (ADC):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Attenuator	Aeroflex	86-30-12	N/A	CNR
Spectrum Analyzer	HP	8563E	MC27690	7-22-07
Power Meter	HP	EPM-441A	MC27670	9-20-07
Multimeter	Fluke	87	MC17932	8-1-08
Frequency Counter	HP	5347A	MC27548	8-18-07
Temperature Chamber	Ecosphere		MC21679	1-11-08
Variable Auto Transformer	Staco	1520CT	MC44655	CNR
Digital Barometer	Fisher Scientific	02-403	MC50719	6-28-07

Equipment with a Calibration Not Required (CNR) listing is verified and compensated for with NIST traceable calibrated equipment.

Test Equipment (Intertek):

Equipment	Manufacturer	Model	Serial No.	Cal. Due.
Spectrum Analyzer	Rohde & Schwarz	FSP 40	100024	07/07
Spectrum Analyzer	Rohde & Schwarz	ESCI	100358	04/07
Instrument Control	TILE!	Ver. 3.4 K.20	N/A	N/A
Antenna	Schaffner-Chase	Bicono-Log	2630	08/07
Antenna	EMCO	Horn 3115	9507-4513	01/08
Antenna	EMCO	Horn 3115	6579	03/08
Antenna	EMCO	Horn 3116	9904-2423	07/07
Pre-Amp	MITEQ	AMF-5D	1122951	02/08
Pre-Amp	MITEQ	AMF-6F-16002600-25-10P	1222383	09/07
Generator	HP	8340B	2819A01098	09/07

Test Limit:

Out of band emissions:
Attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB, or –13 dBm.
Outside of the carrier emissions bandwidth:
26 dB below the transmitter power

Test Data:

Conducted Emissions, pages 15 – 21
Intermodulation Test, pages 23 – 35
Occupied Bandwidth, pages 36 – 38
Radiated Emissions, pages 40 – 58 (Appendix B)
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Test Engineer: Mark F. Miska
Date: 15 May, 2007
Date: 15 May, 2007
Date: 15 May, 2007

5.0 APPENDIX A

Test Data

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Test Engineer: Mark F. Miska **Date:** 15 May, 2007

Conducted Emission Limits Test for ADC Inc.
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Back

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10th harmonic of the highest carrier frequency. Test signals used are GSM and EDGE. The different signals were output one at a time from the EUT. In all cases, the out of band emissions were less than –13 dBm from the equation

$$(19\text{dBm} - [43 + 10\log(0.08\text{W})])$$

Band edge compliance is also demonstrated using a GSM and EDGE signal at the upper and lower limits of the band.

IPACCESS nanoBTS output sets the signal power level. Test signal used was ≈ +23 dBm input to LPA.
Industry practice has generally set the output signal power level.

Remote Unit (including LPA):
Range: 100 - 250 VAC
Tested @: 120 VAC
Tested @: 3.9 A
The LPA requires a constant input voltage supply of 28 VDC and was tested @ 11.6 A

Application details for 2.1033(c)(10) and 2.1033(c)(13) are covered in Theory of Operation.

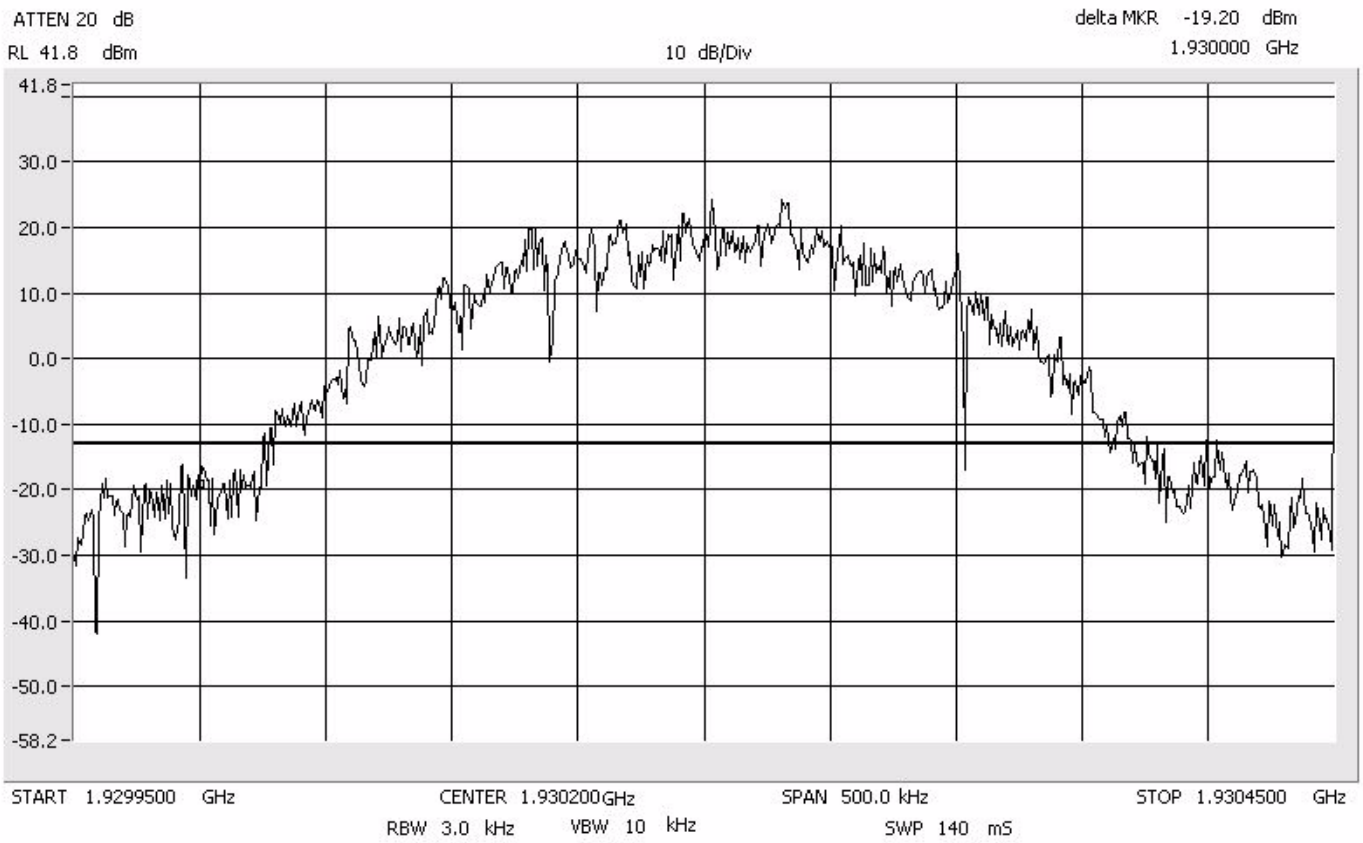
The spurious limitation is completed with the duplexer. The ALC also suppresses in-band spurious by preventing PA overdrive, while the duplexer suppresses out-of-band spurious. Internal to the electronics, the use of SAW filters provides for higher Q roll-off at band edges.

This is a constant gain device, so the setup controls the output. There is an overdrive and overpower limit control that prevents excess power.

Results:
Pass (See plots)

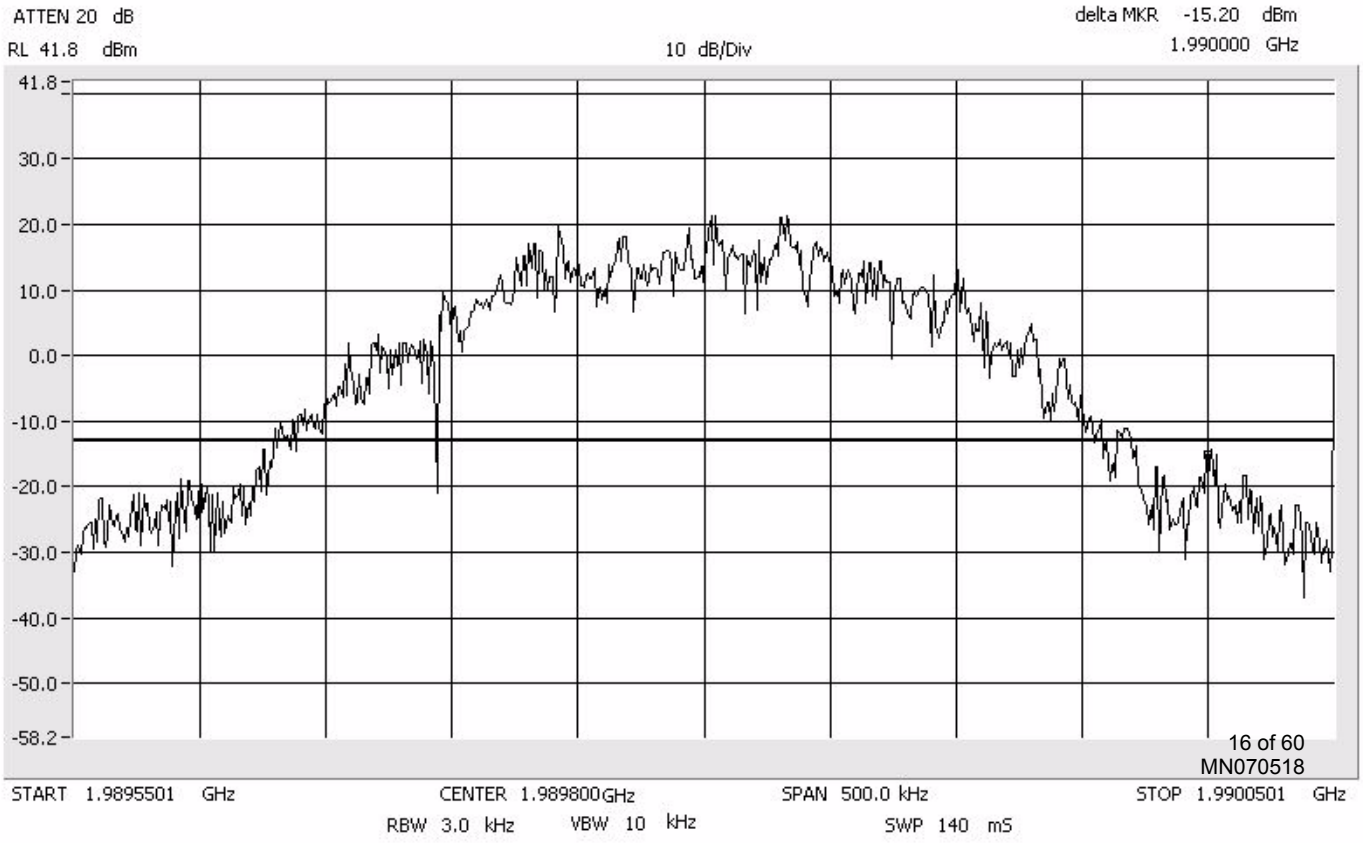
Band Edge
GSM

Center: 1930.20
Span: 500 kHz
RBW: 3 kHz
VBW: 10 kHz



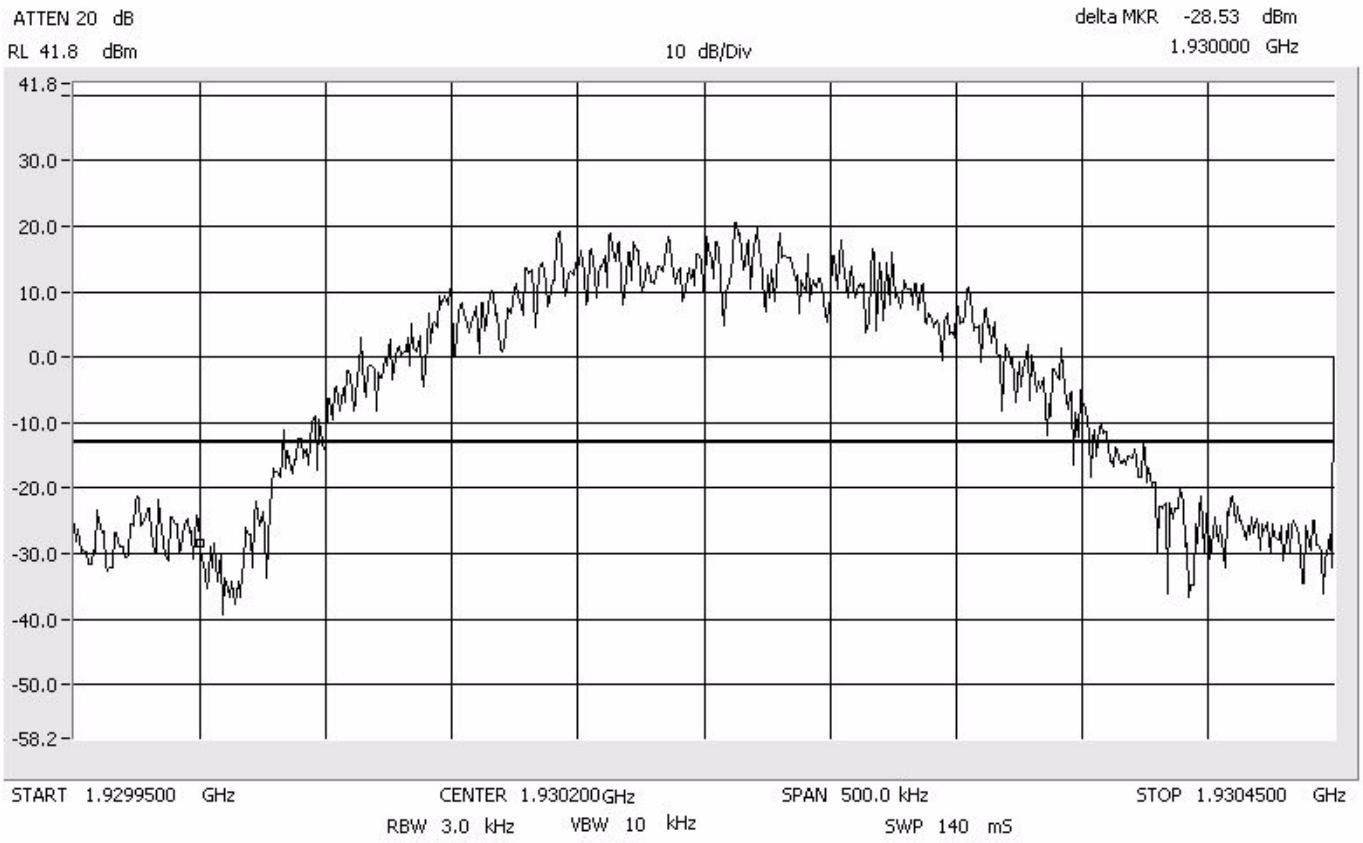
Band Edge
GSM

Center: 1989.80 MHz
Span: 500 kHz
RBW: 3 kHz
VBW: 10 kHz



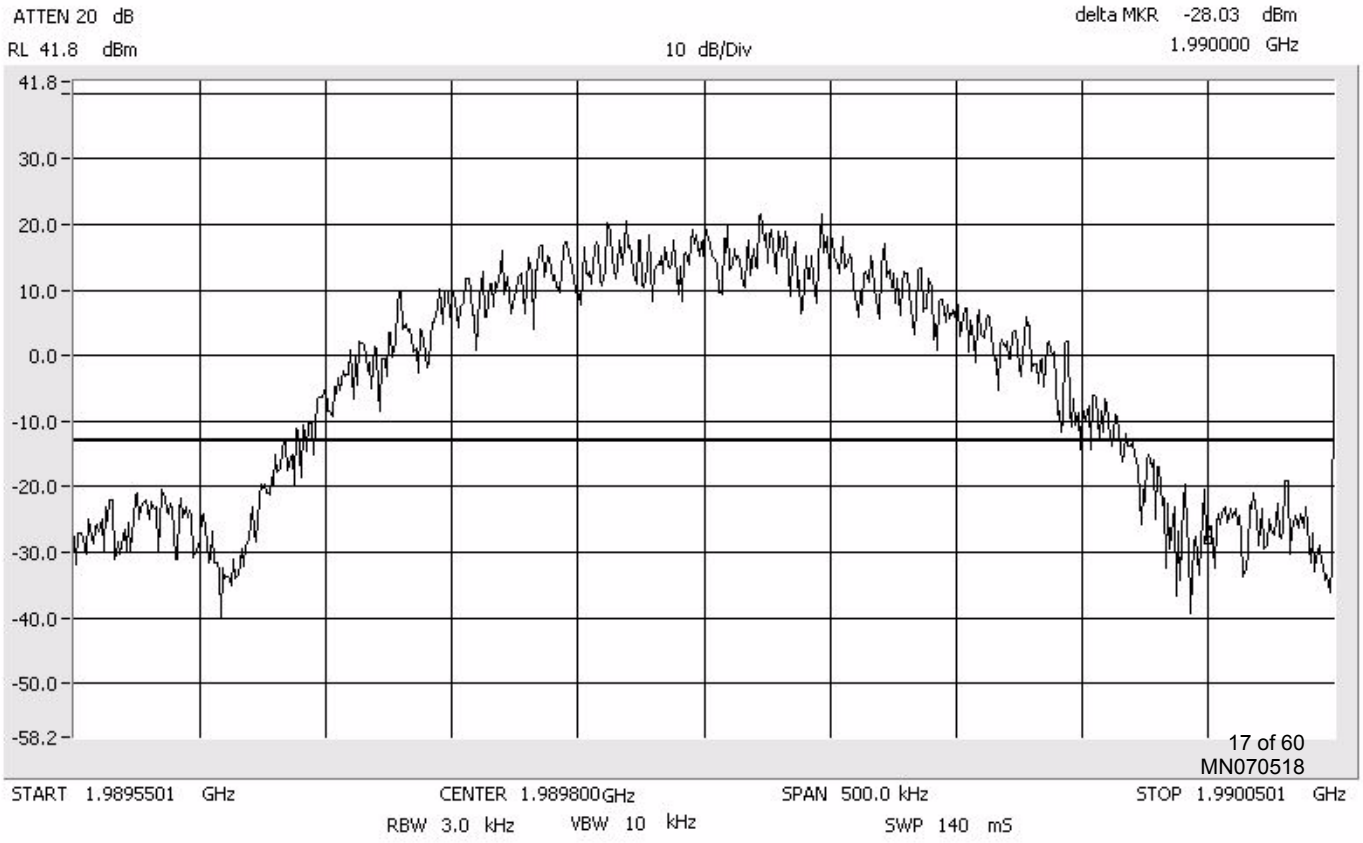
Band Edge
EDGE

Center: 1930.20
Span: 500 kHz
RBW: 3 kHz
VBW: 10 kHz



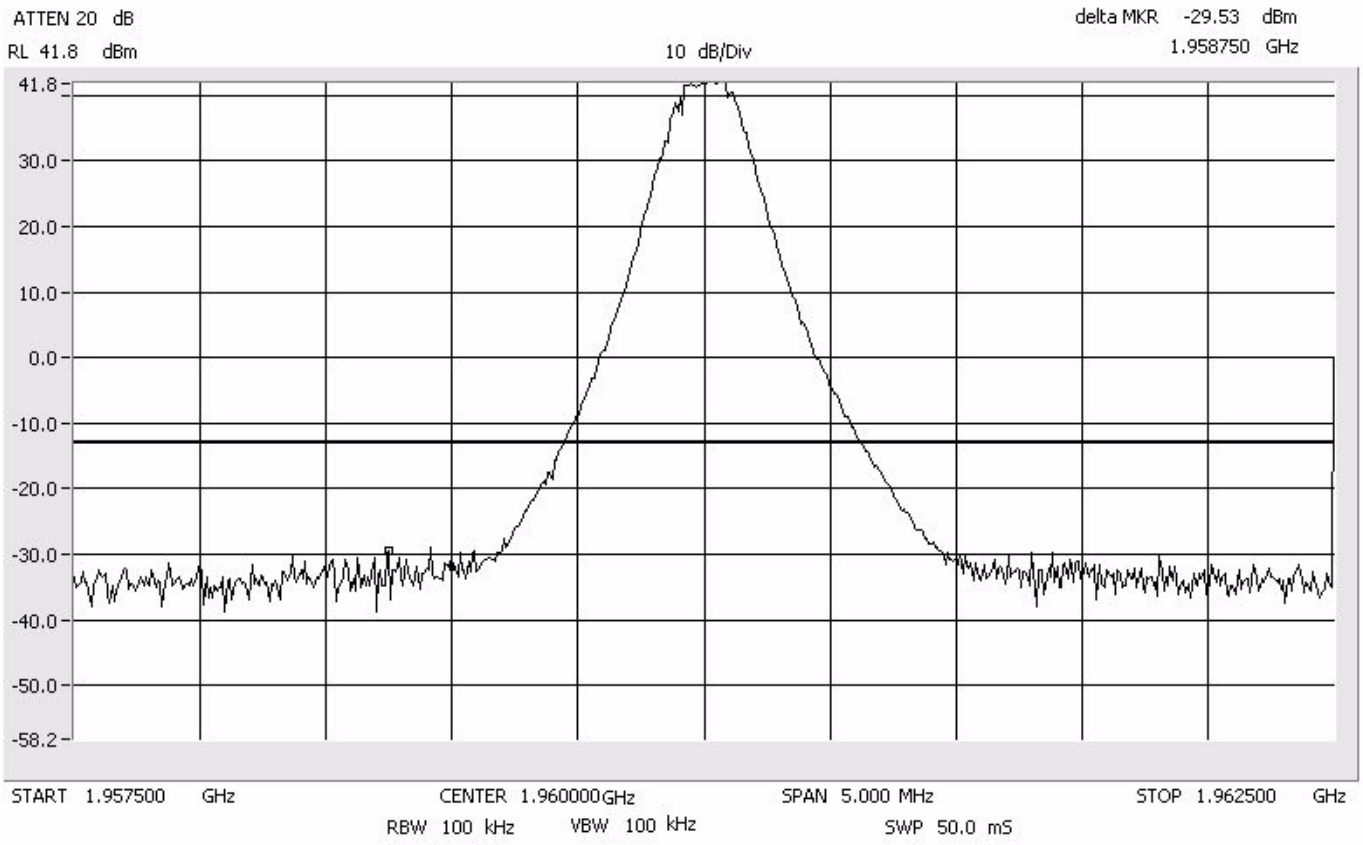
Band Edge
EDGE

Center: 1989.80 MHz
Span: 500 kHz
RBW: 3 kHz
VBW: 10 kHz



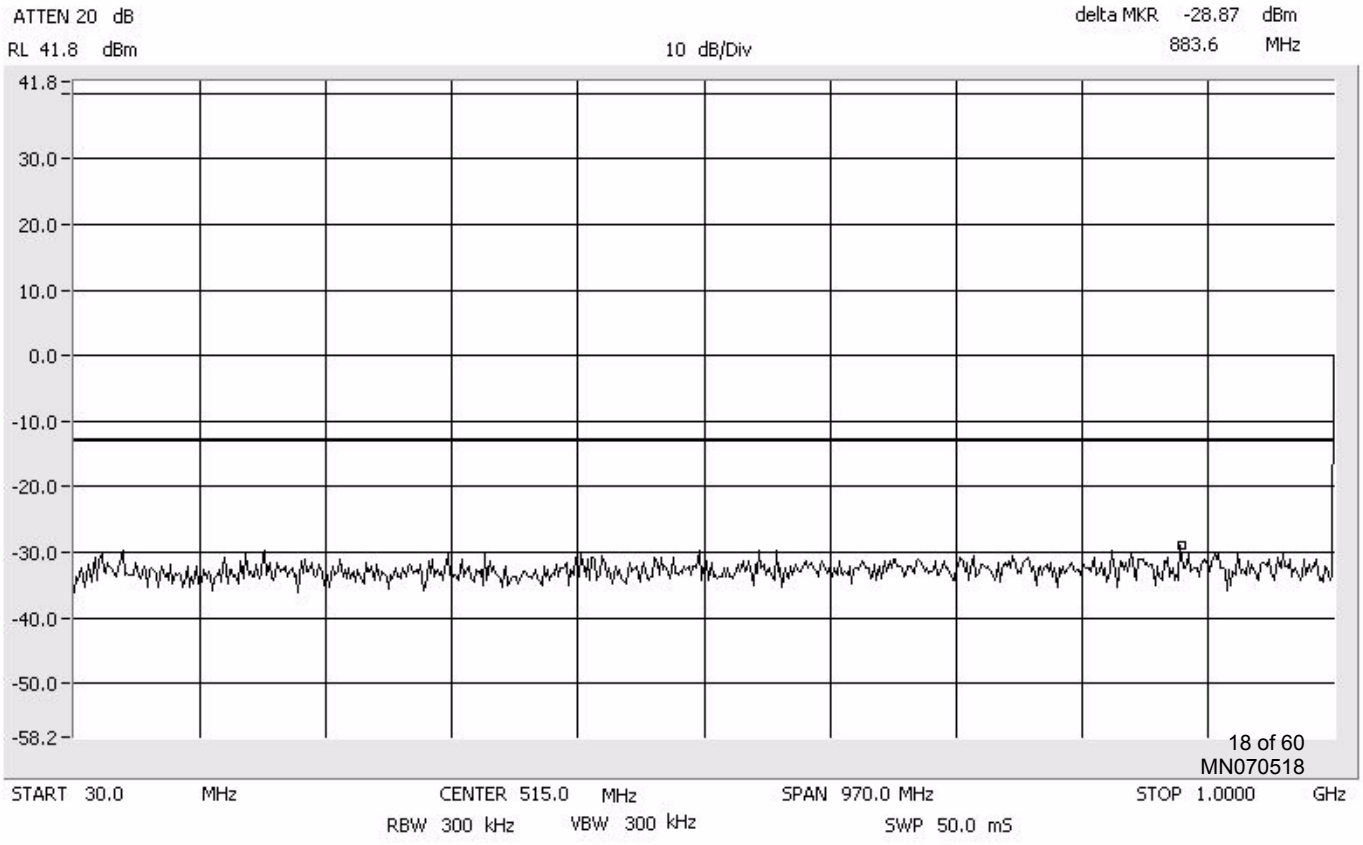
Conducted Emissions
GSM
1900 MHz

Mid Band
Span: 5 MHz
RBW/VBW: 100 kHz



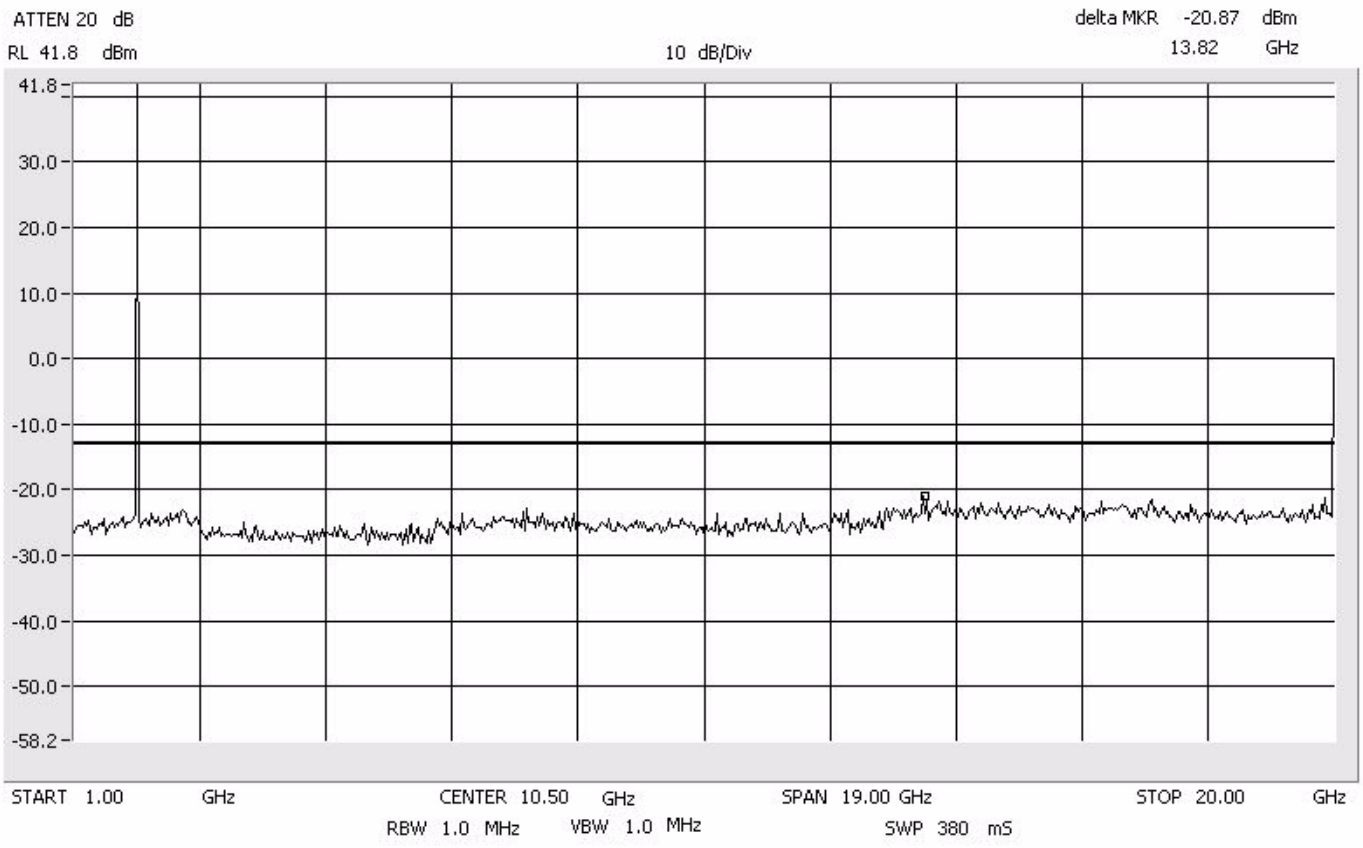
Conducted Emissions
GSM
1900 MHz

Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



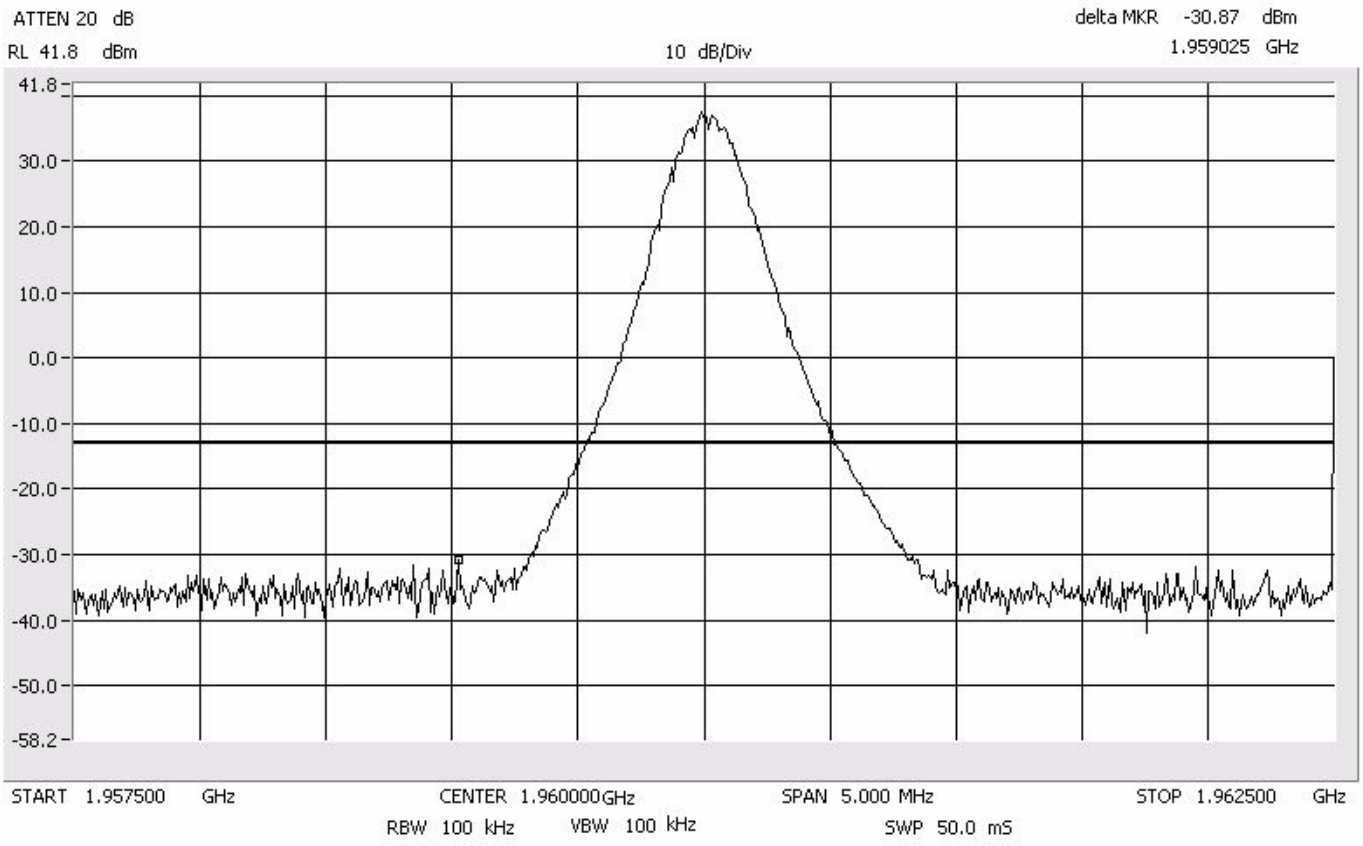
Conducted Emissions
GSM
1900 MHz

1 GHz to 20 GHz
RBW/VBW: 1 MHz



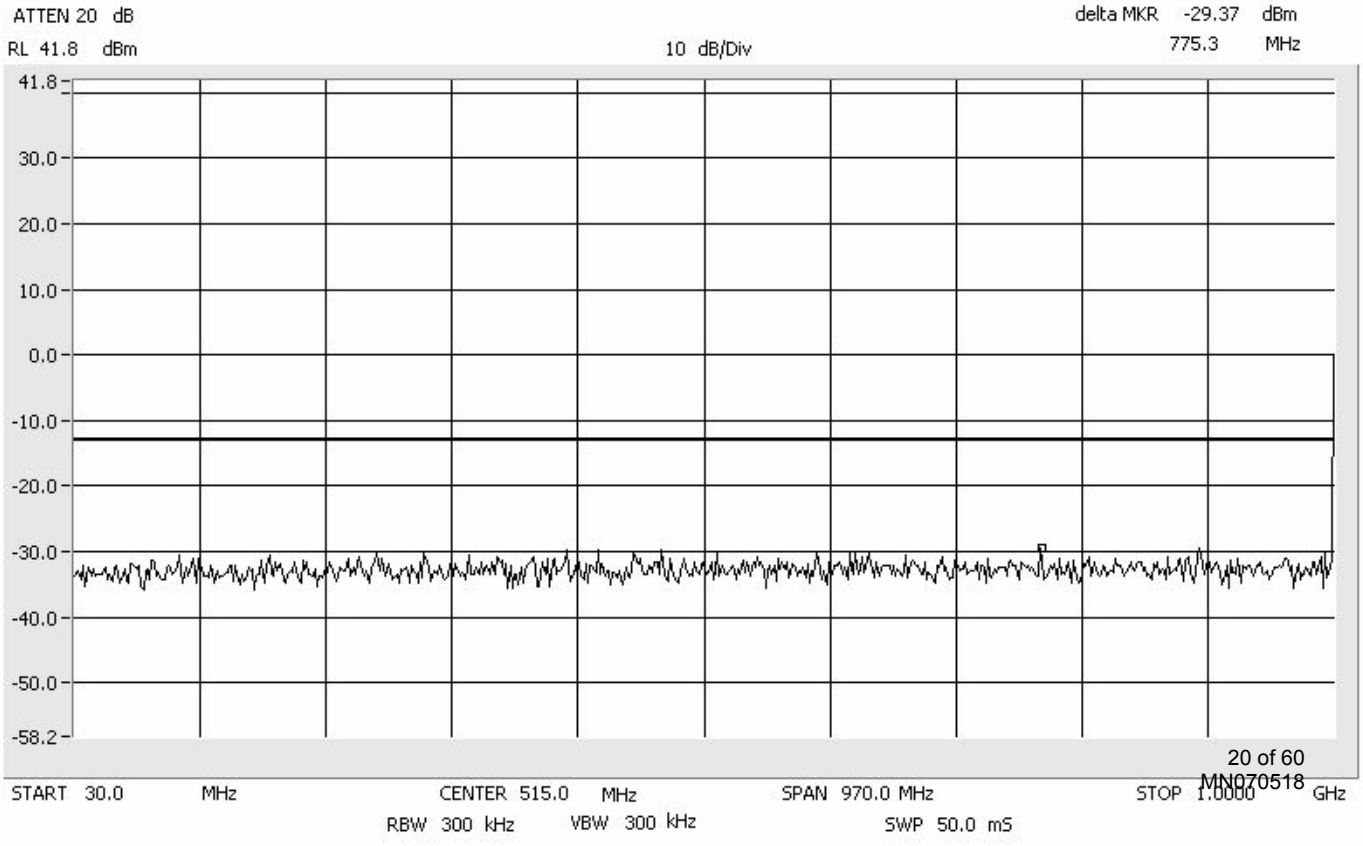
Conducted Emissions
EDGE
1900 MHz

Mid Band
Span: 5 MHz
RBW/VBW: 100 kHz



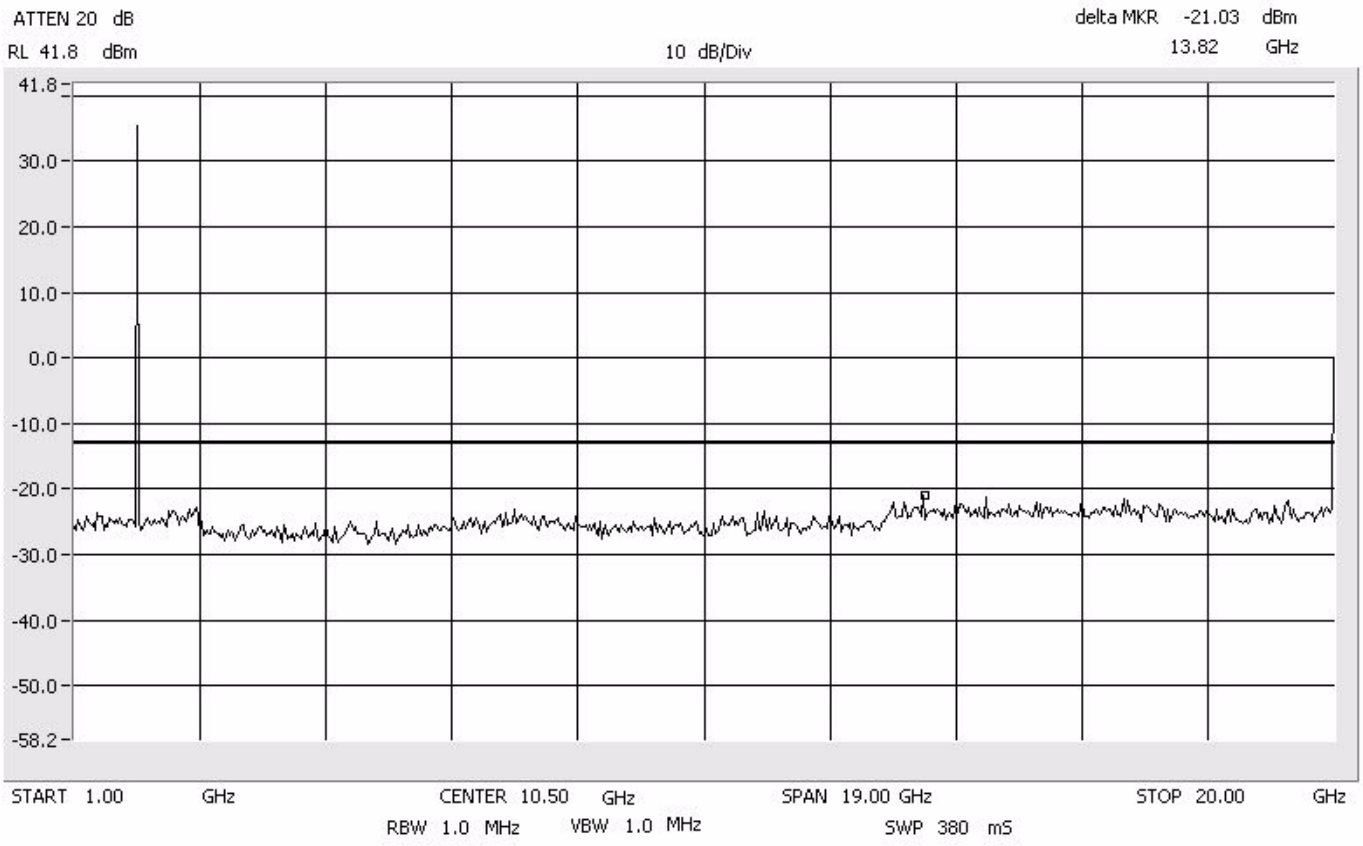
Conducted Emissions
EDGE
1900 MHz

Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



Conducted Emissions
EDGE
1900 MHz

1 GHz to 20 GHz
RBW/VBW: 1 MHz



Conducted Output Power Test for ADC Inc.
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Back

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected to the power meter. The carrier output, below, was conducted using a single GSM and EDGE signal. The power meter level was offset to compensate for attenuators and cable loss between the EUT and the power meter.

A signal was used at the low, mid and high parts of the selected band. The power meter level was offset by 41.8 dB to compensate for attenuators and cable loss between the EUT and the power meter.

GSM	**16.48 Watts**
Carrier Frequency	Carrier Output
1930.2 MHz	41.83 dBm
1960.0 MHz	42.17 dBm
1989.8 MHz	41.37 dBm

EDGE	**16.98 Watts**
Carrier Frequency	Carrier Output
1930.2 MHz	42.30 dBm
1960.0 MHz	41.63 dBm
1989.8 MHz	41.47 dBm

Intermodulation Test for ADC Inc
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Back

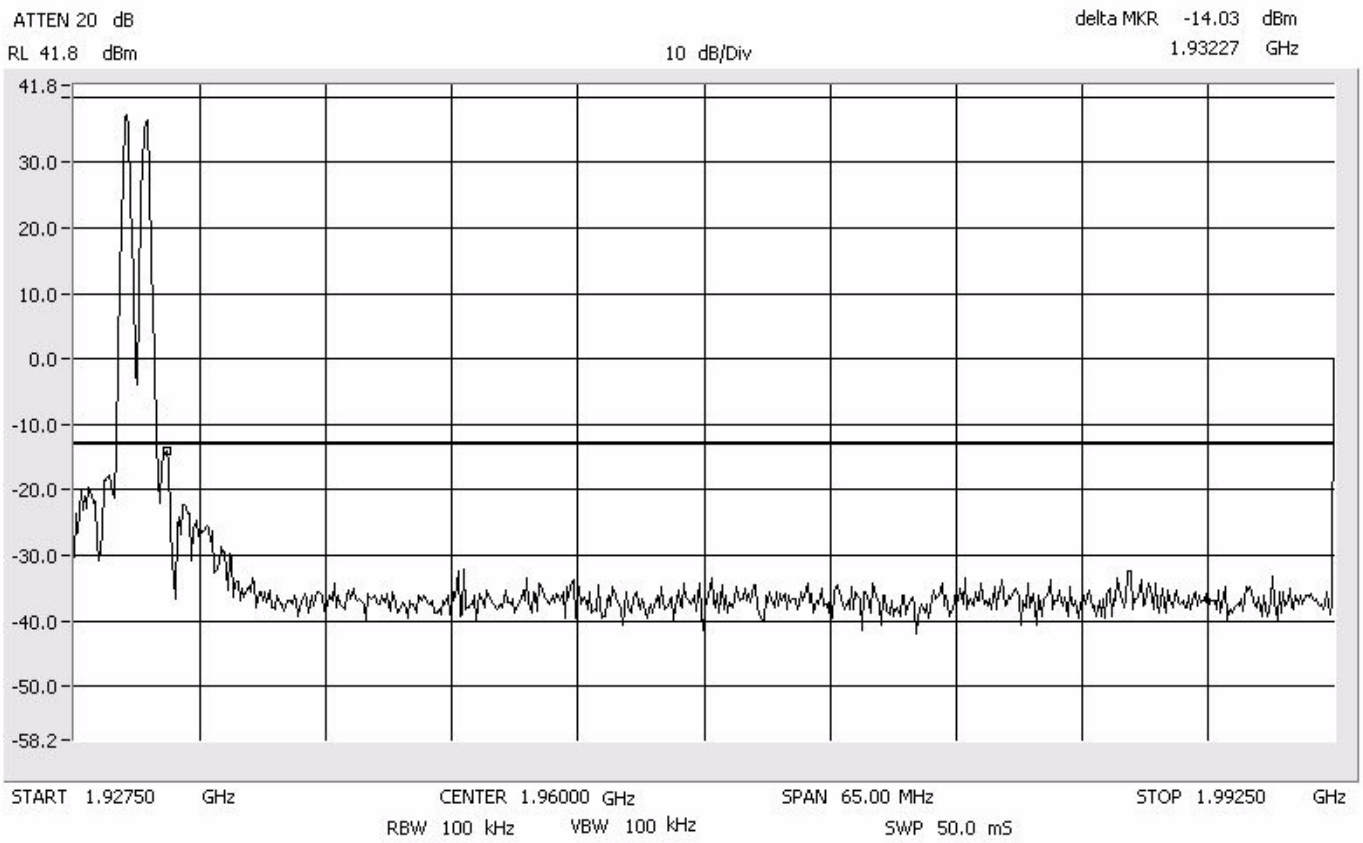
The inter-modulation products test was performed for the EUT. Three tests were preformed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were GSM and EDGE. An investigation was made from 30 MHz to the 10^{th} Harmonic of the highest fundamental frequency (~20 GHz). The following plots show the results.

Results:
(See Plots)

GSM

Intermodulation
Close - Lower
PCS 1900 MHz

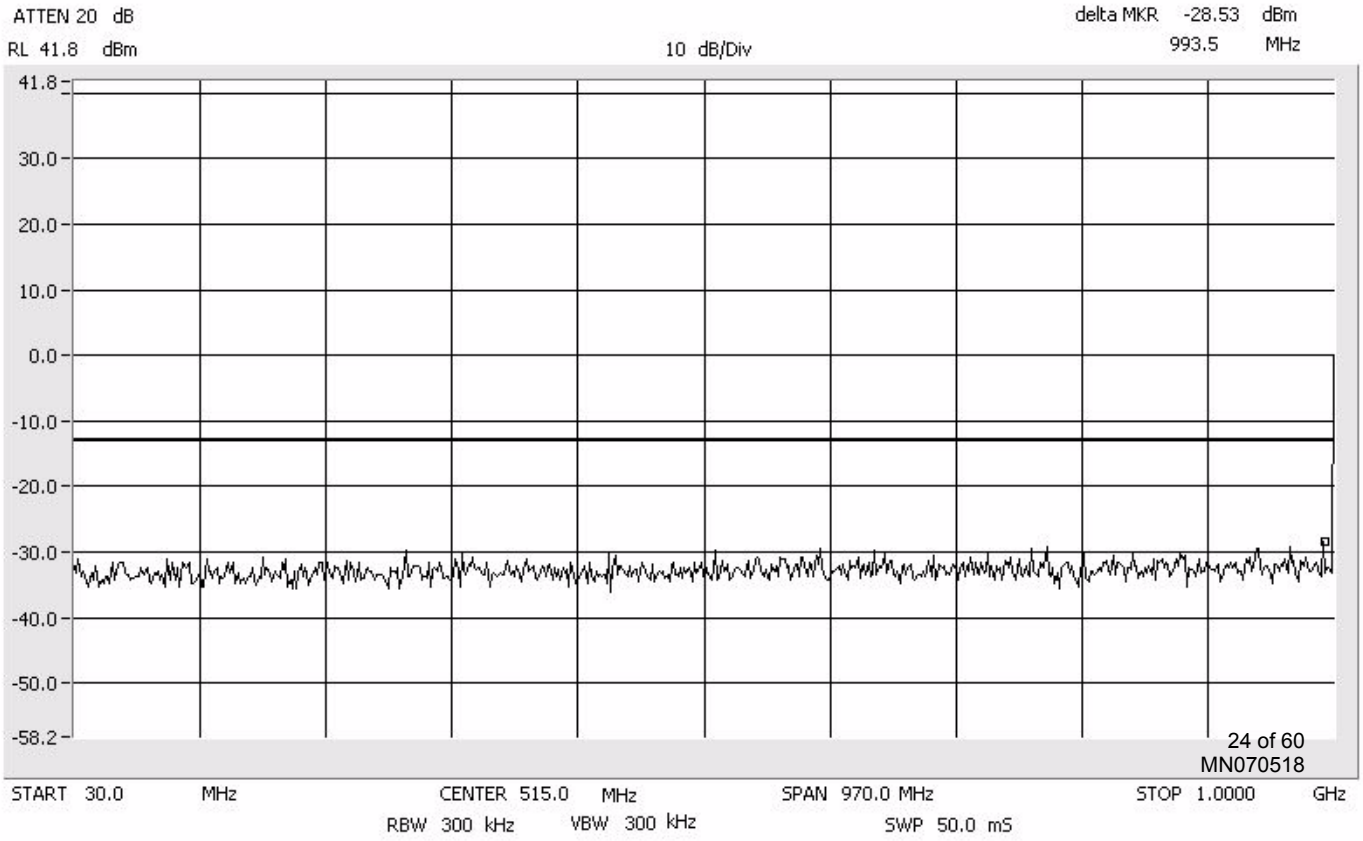
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



GSM

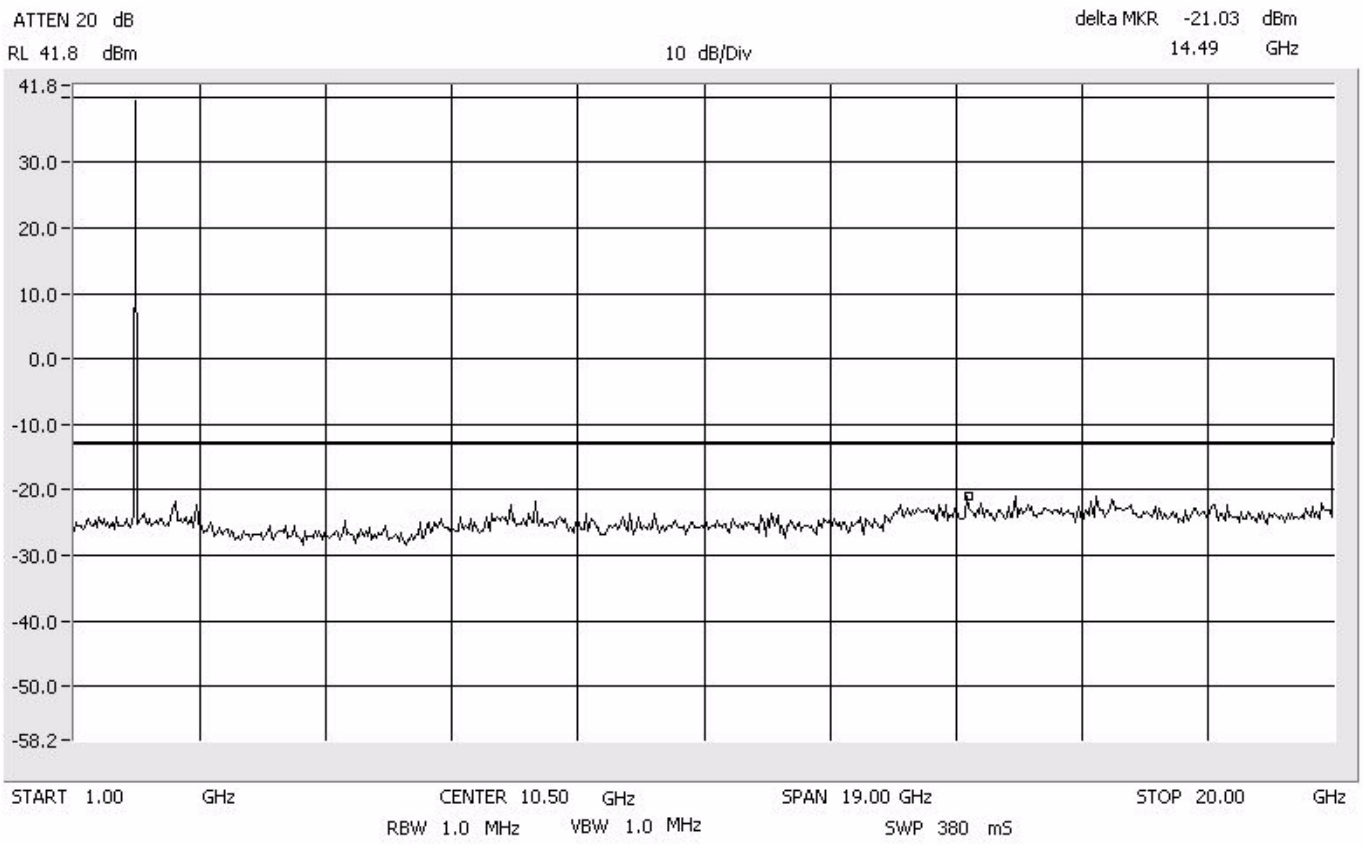
Intermodulation
Close - Lower
PCS 1900 MHz

Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



Intermodulation
Close - Lower
PCS 1900 MHz

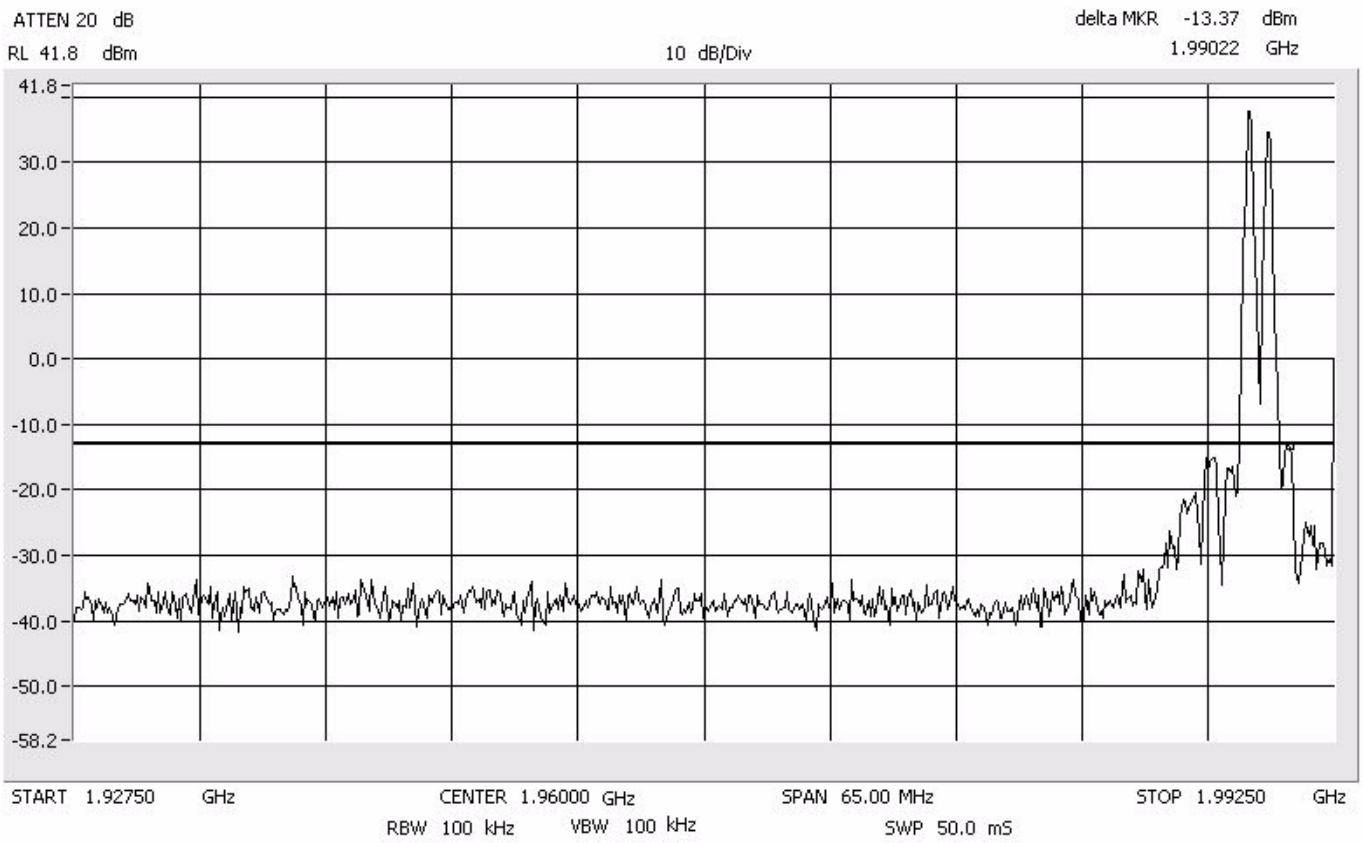
Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



GSM

Intermodulation
Close - Upper
PCS 1900 MHz

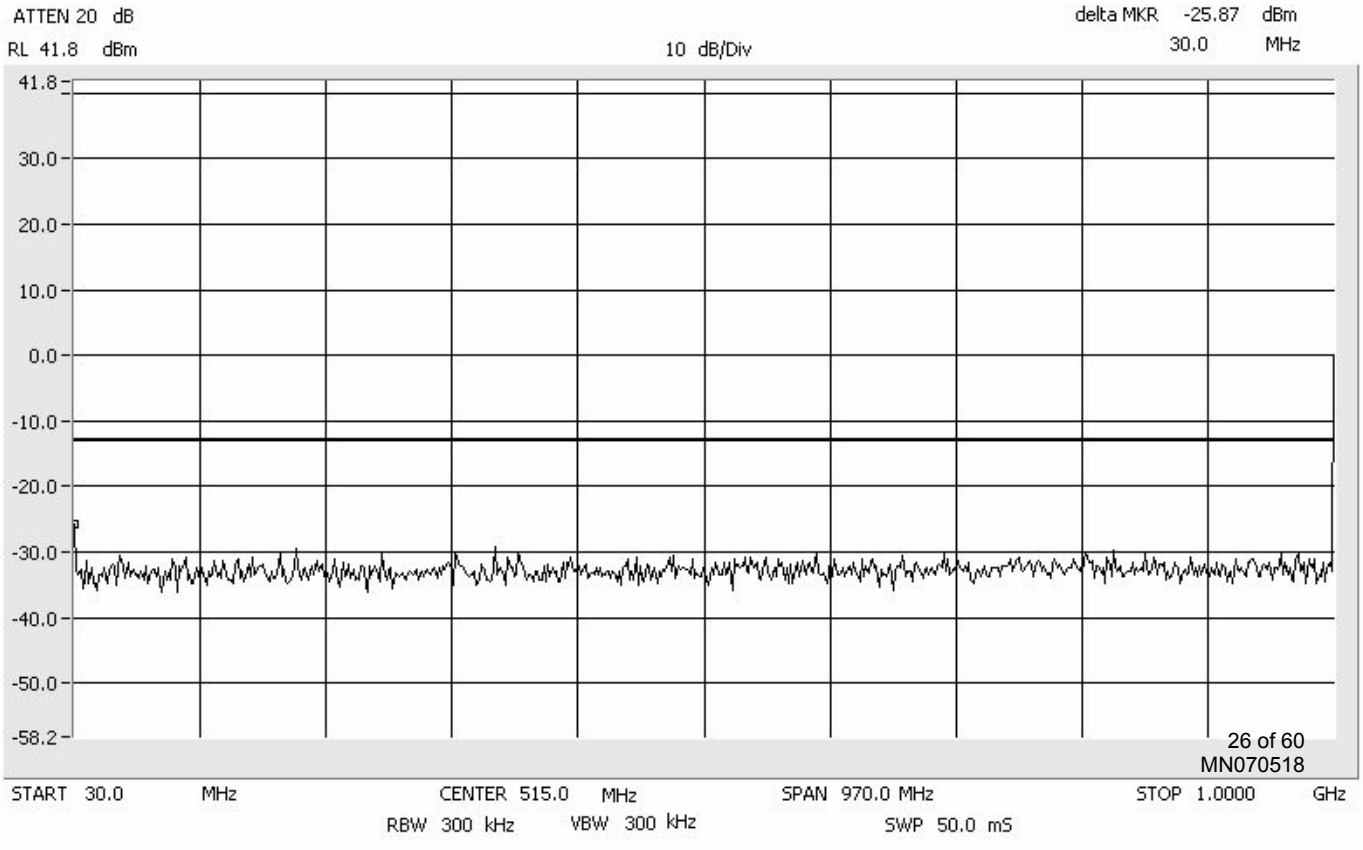
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



GSM

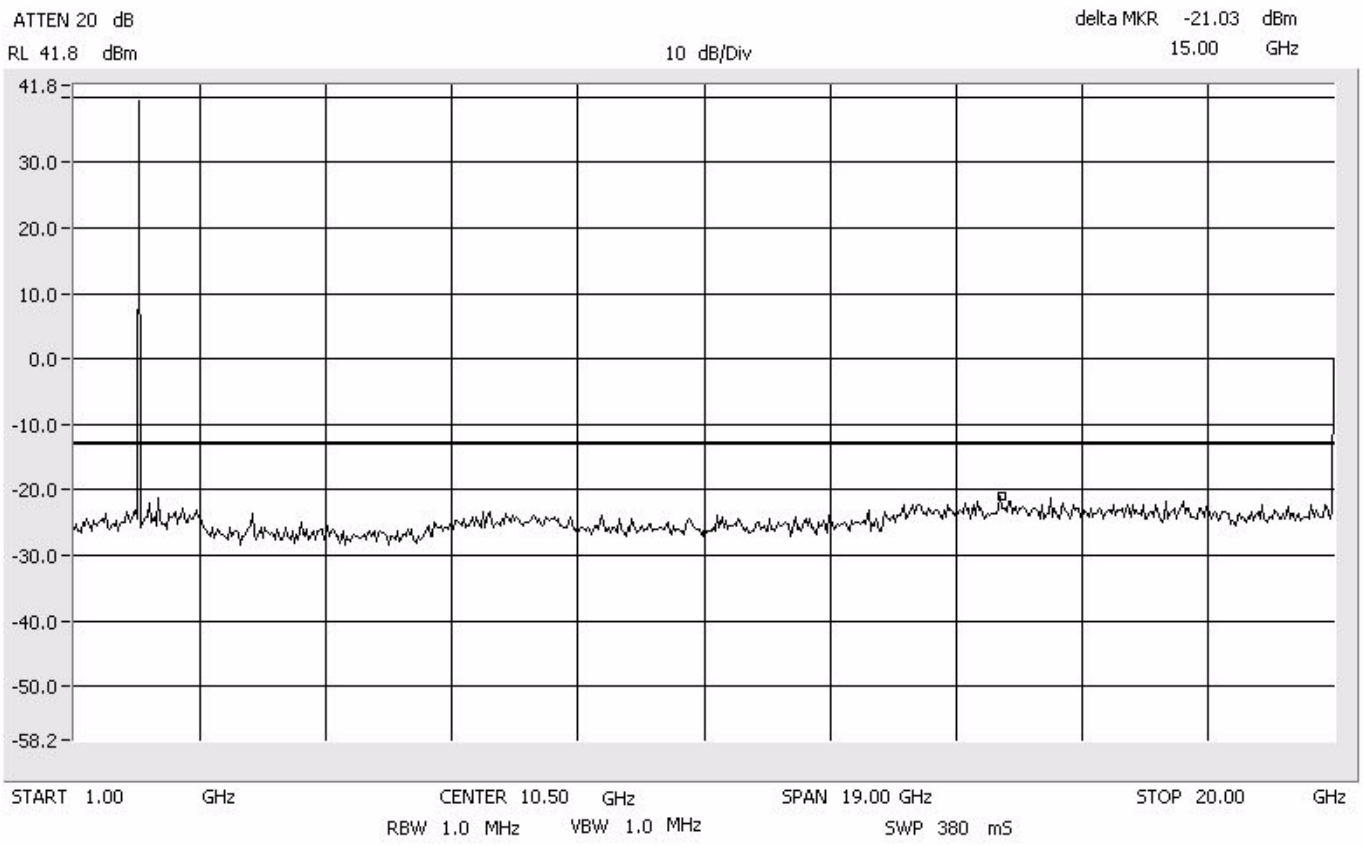
Intermodulation
Close - Upper
PCS 1900 MHz

Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



Intermodulation
Close - Upper
PCS 1900 MHz

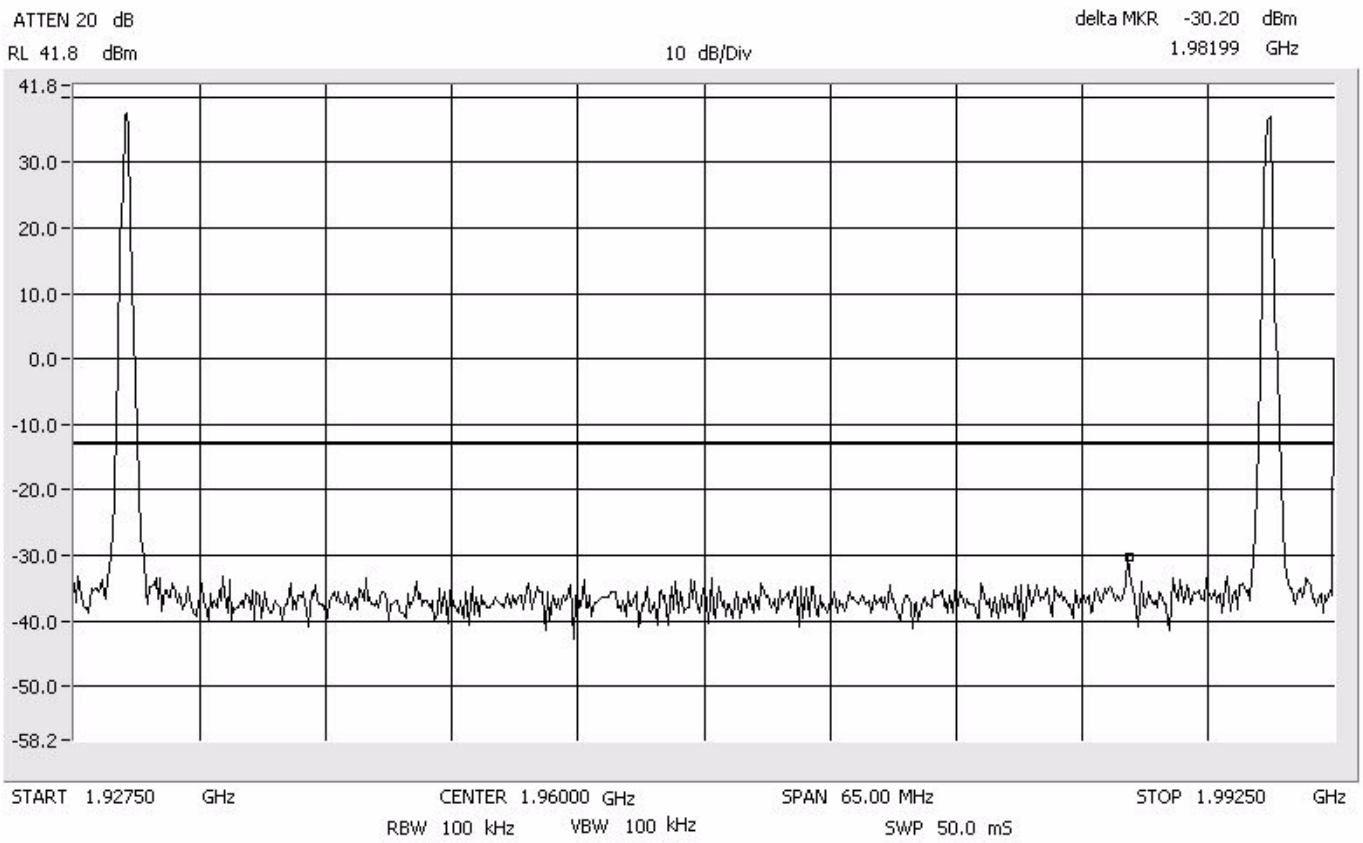
Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



GSM

Intermodulation
Apart
PCS 1900 MHz

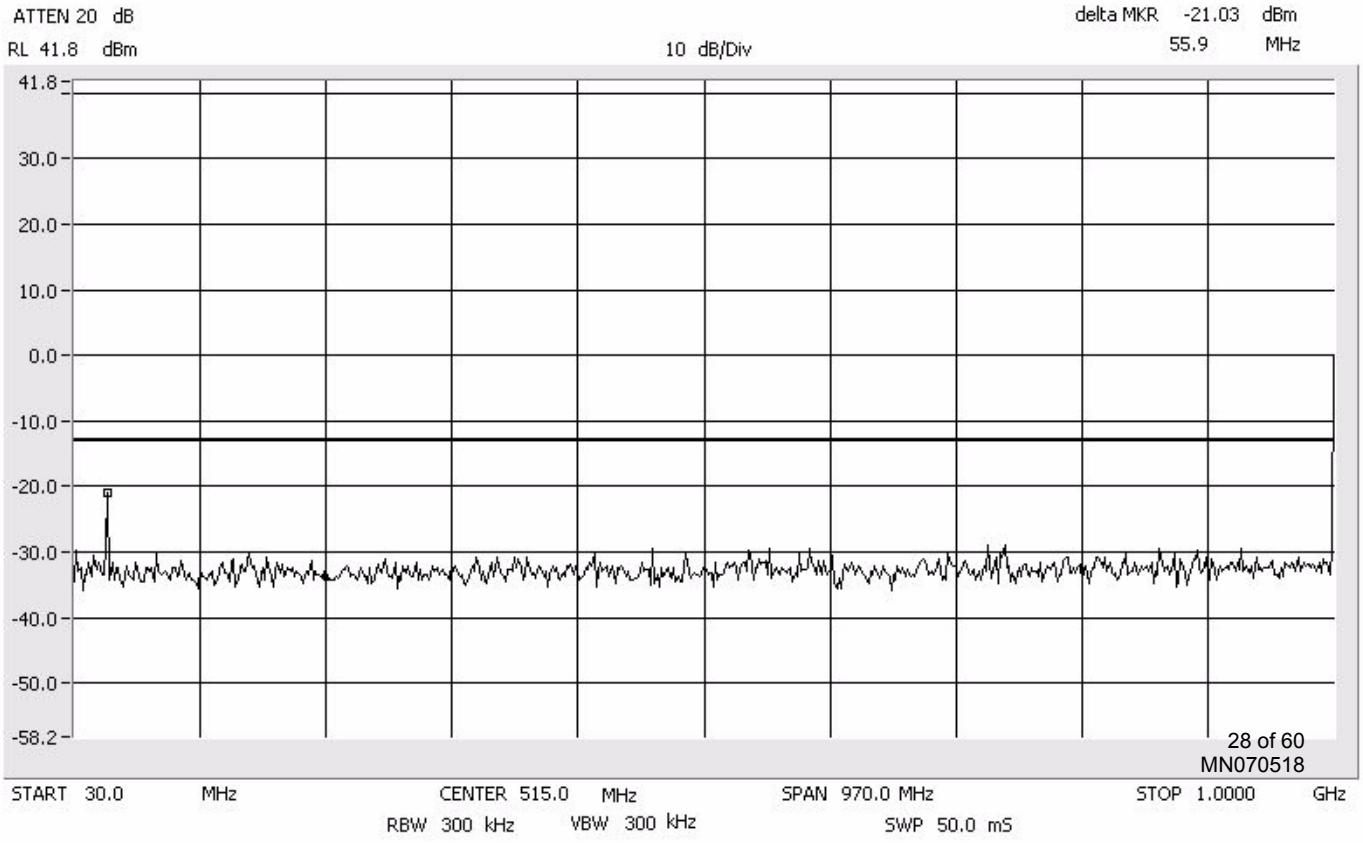
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



GSM

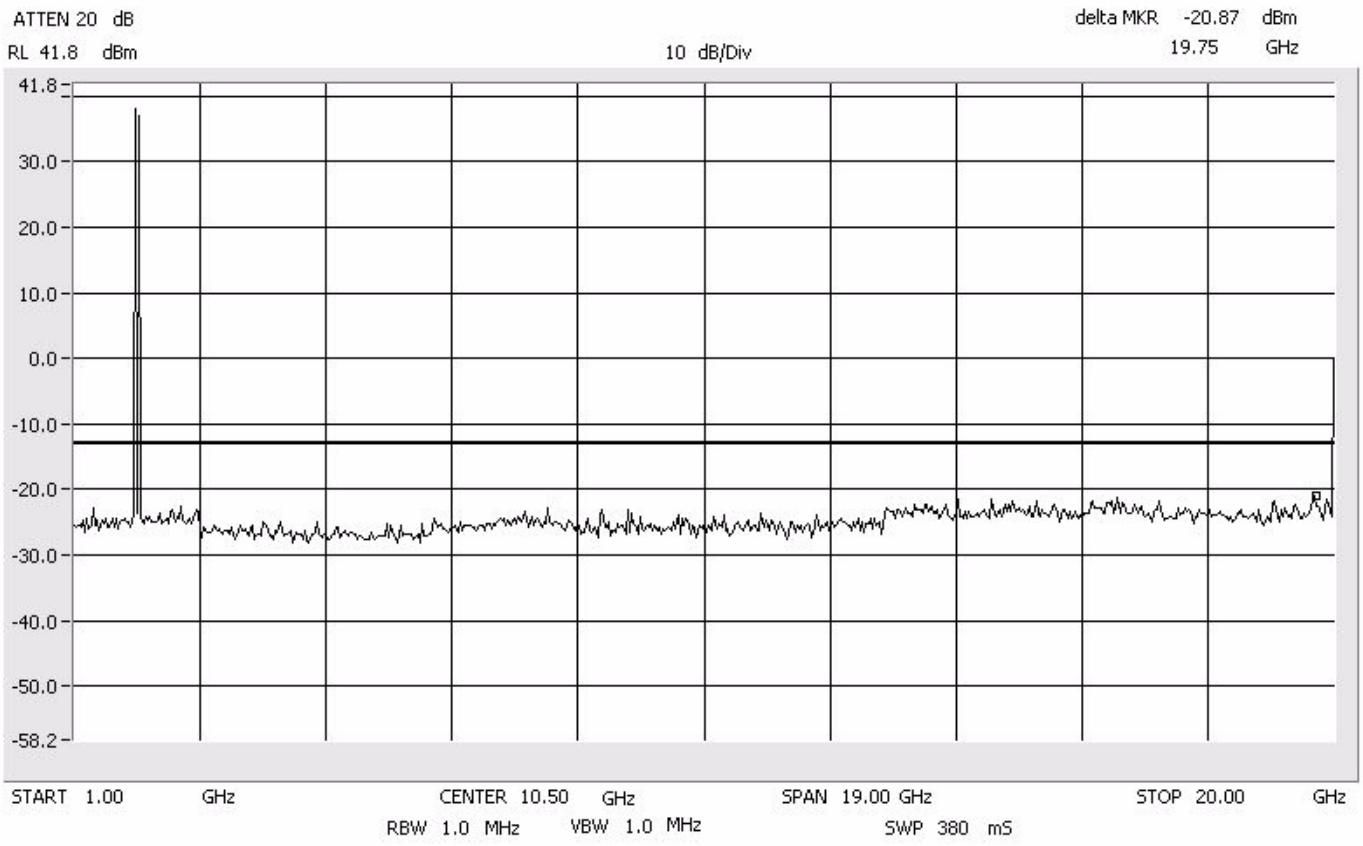
Intermodulation
Apart
PCS 1900 MHz

Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



Intermodulation
Apart
PCS 1900 MHz

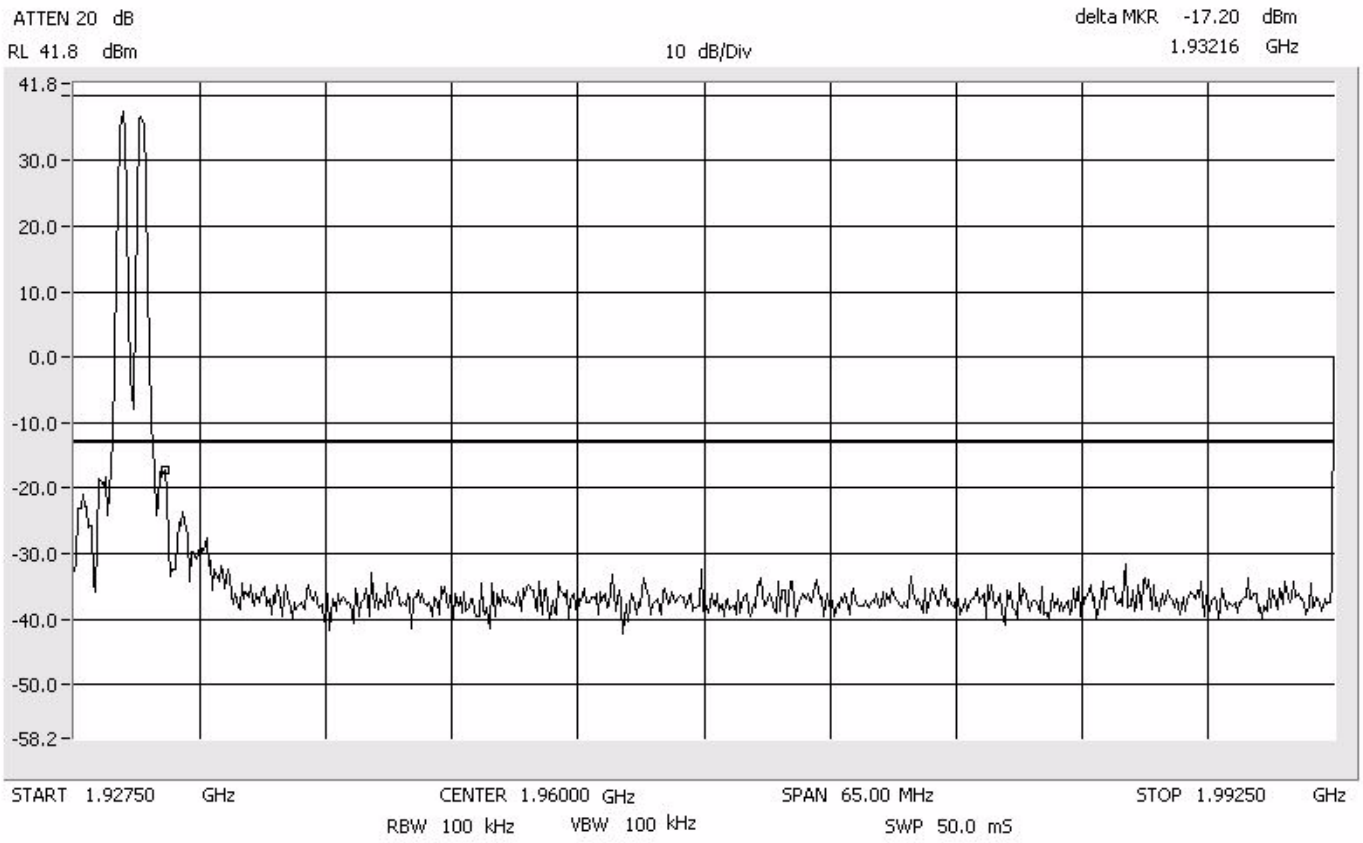
Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Close - Lower
PCS 1900 MHz

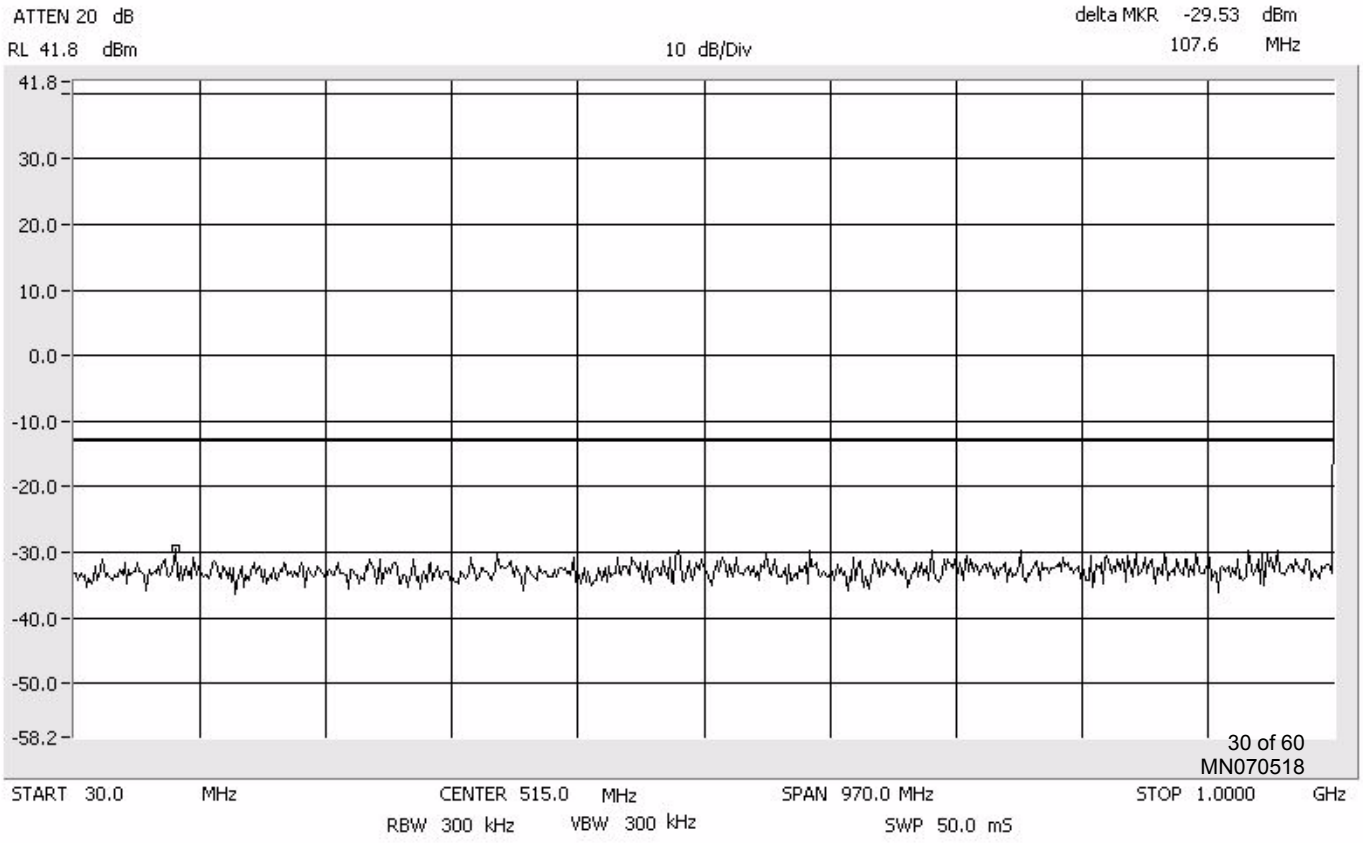
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



EDGE

Intermodulation
Close - Lower
PCS 1900 MHz

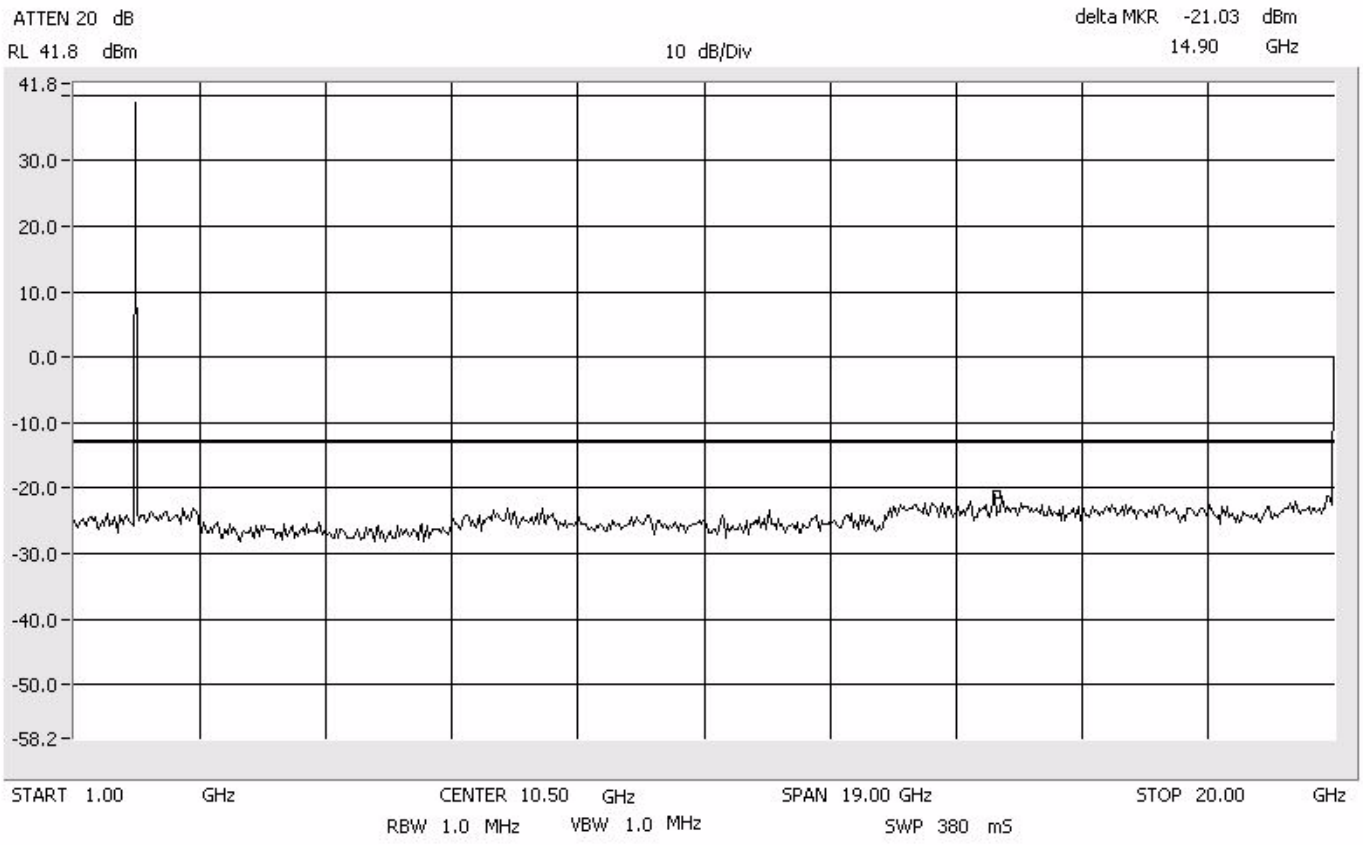
Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



EDGE

Intermodulation
Close - Lower
PCS 1900 MHz

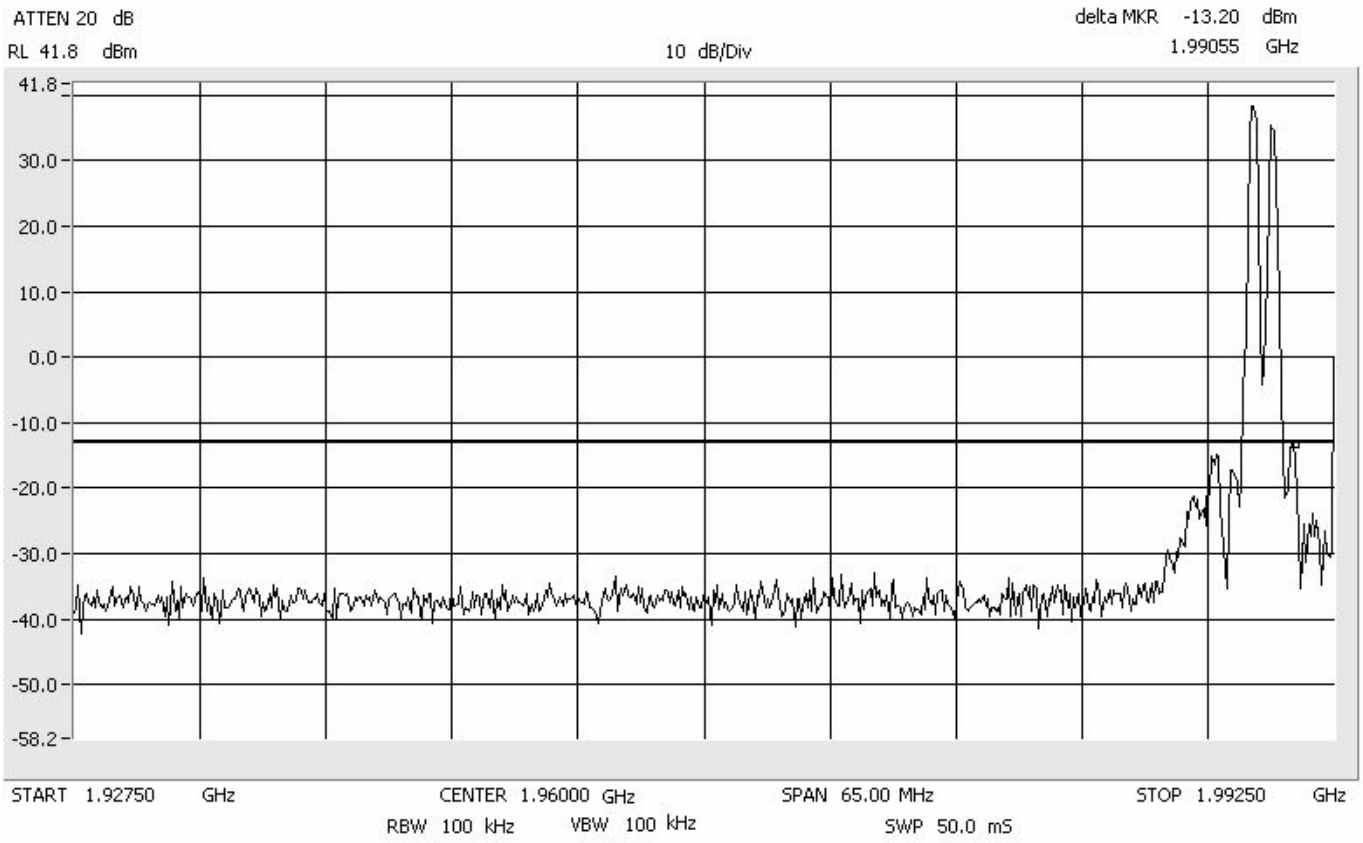
Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Close - Upper
PCS 1900 MHz

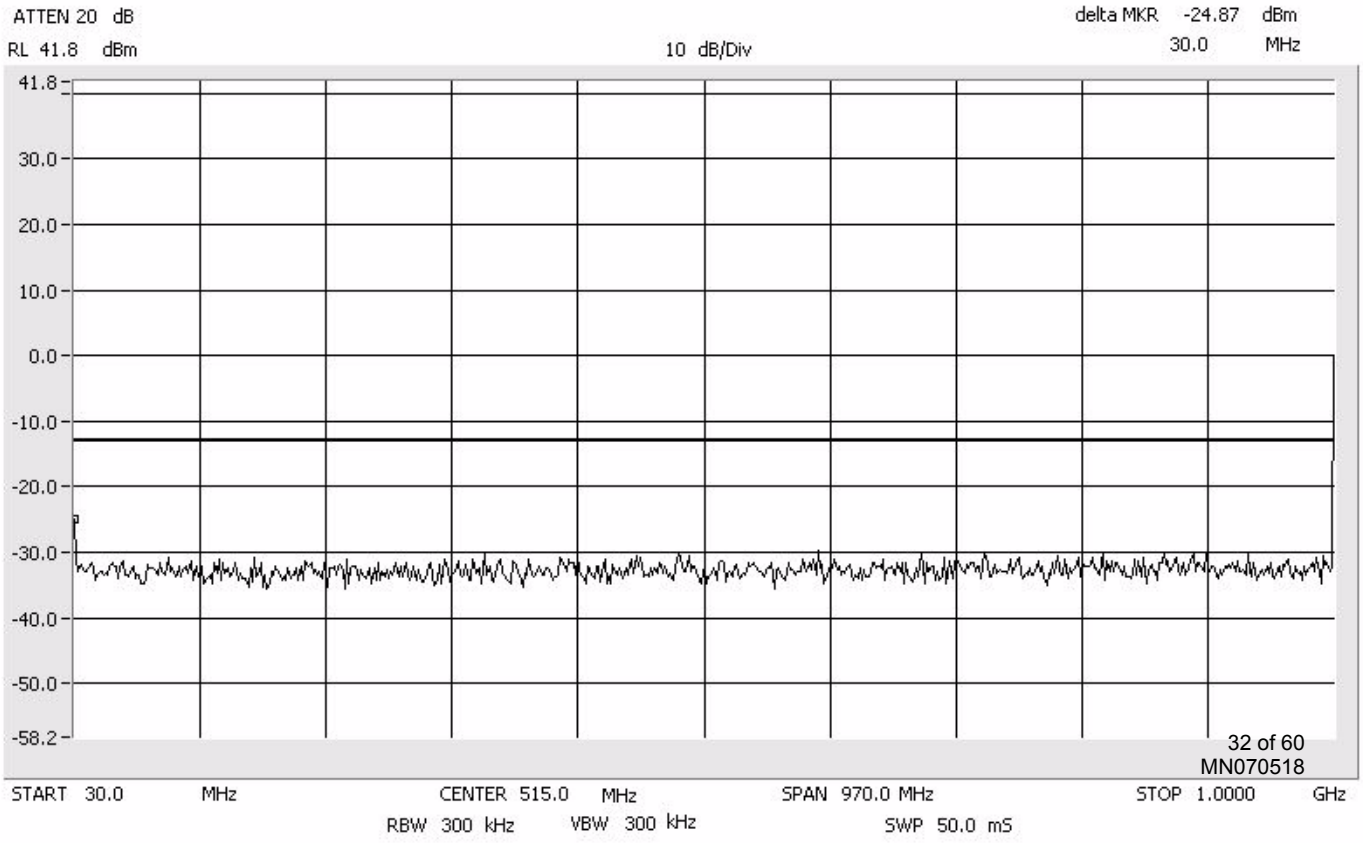
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



EDGE

Intermodulation
Close - Upper
PCS 1900 MHz

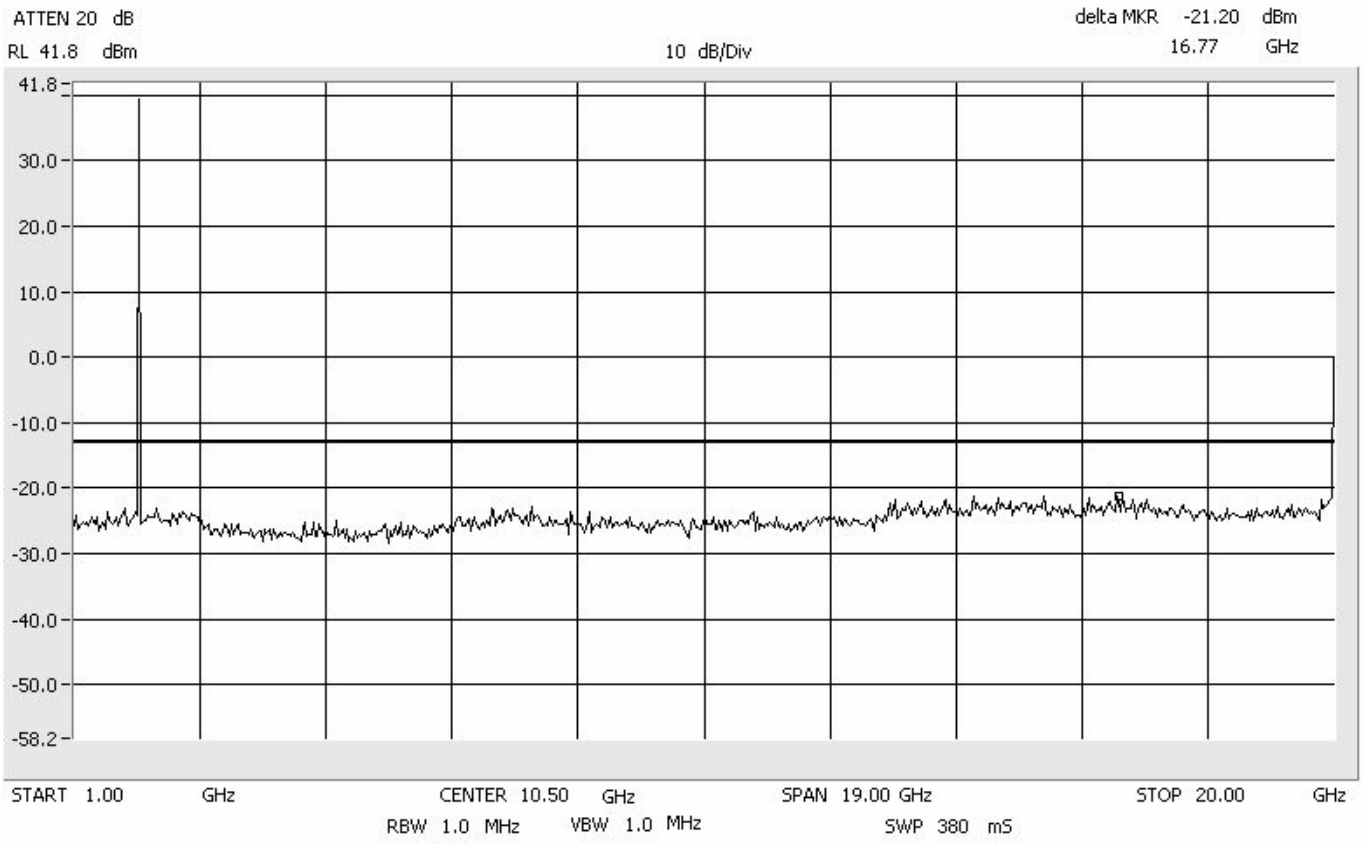
Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



EDGE

Intermodulation
Close - Upper
PCS 1900 MHz

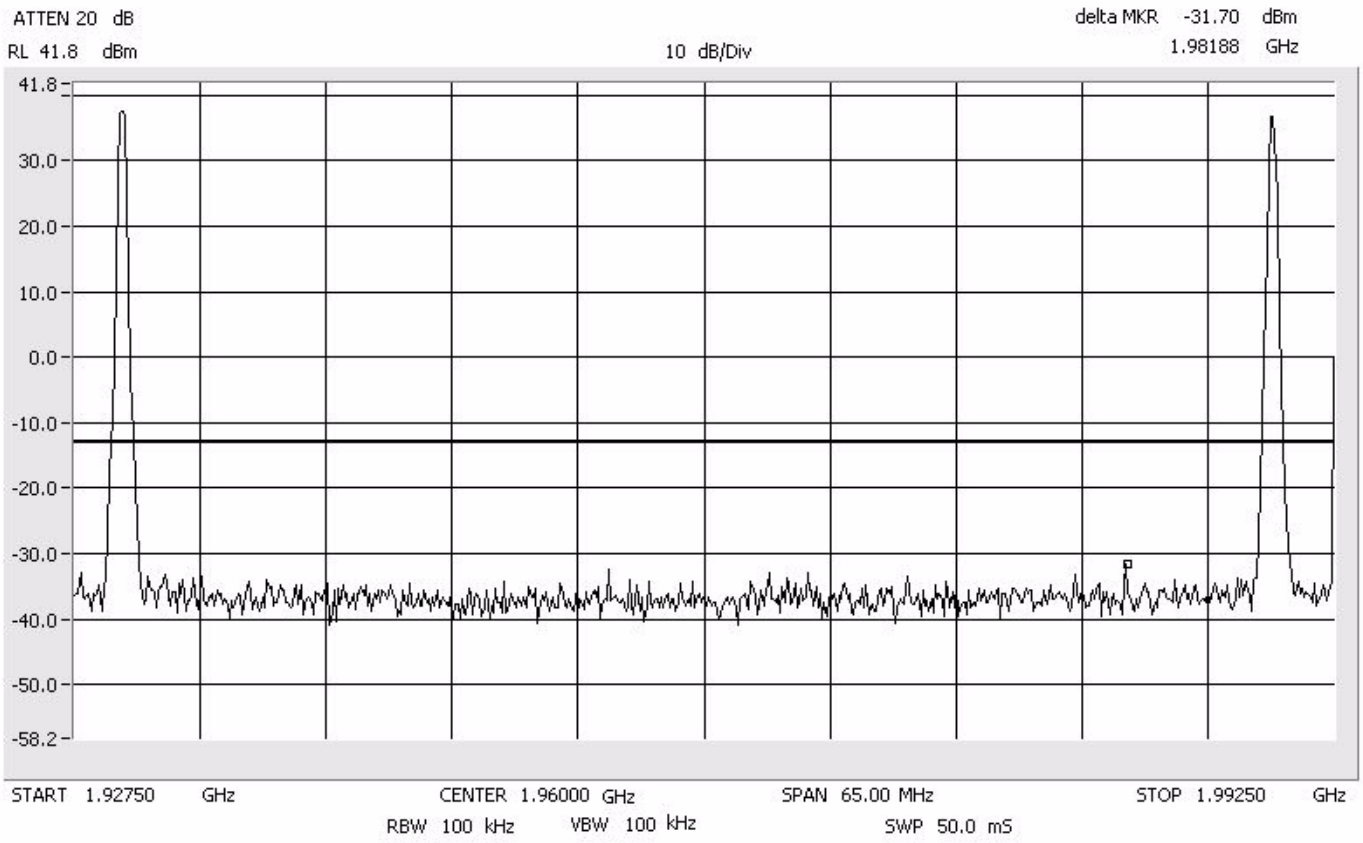
Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Apart
PCS 1900 MHz

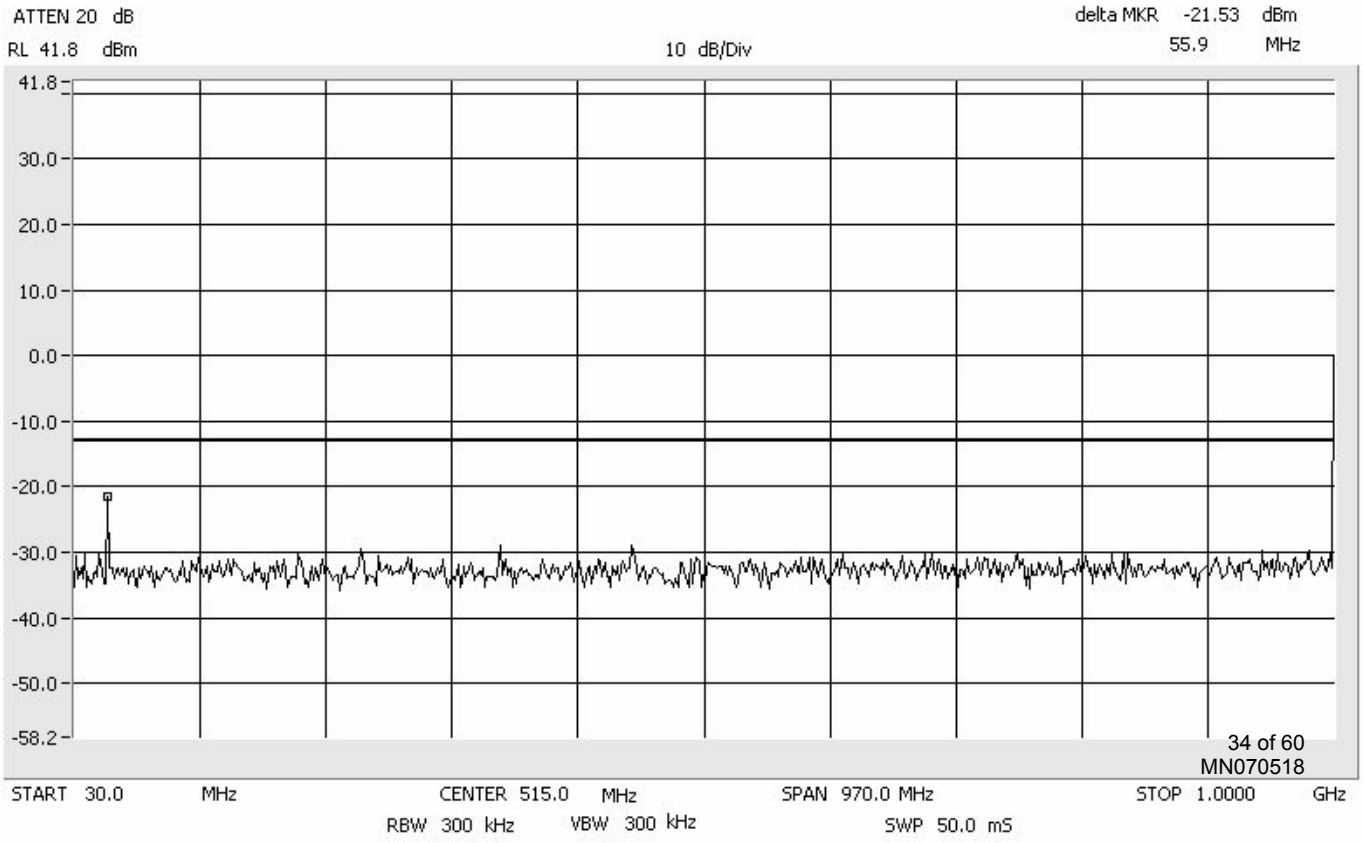
Center: 1960.0 MHz
Span: 65 MHz
RBW/VBW: 100 kHz



EDGE

Intermodulation
Apart
PCS 1900 MHz

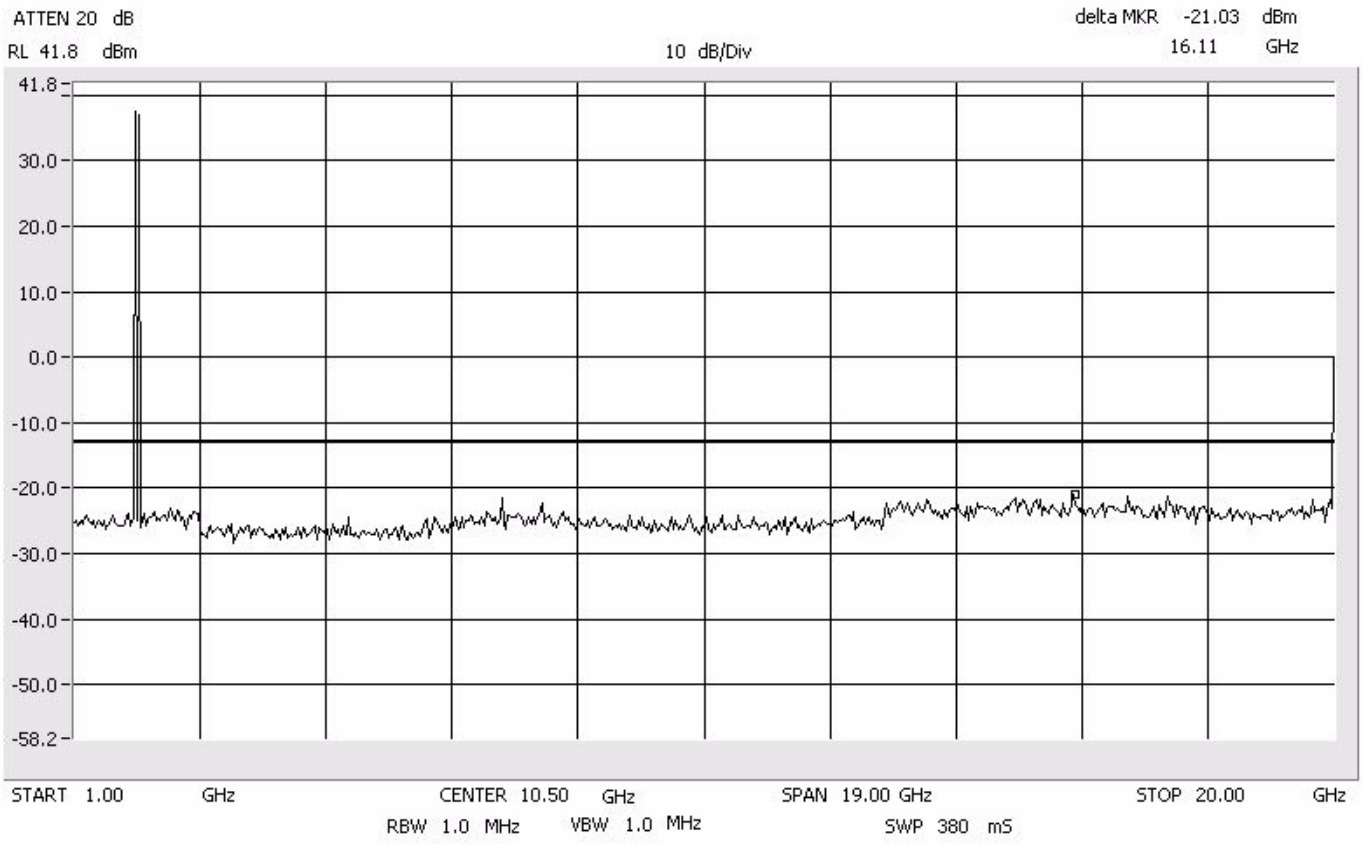
Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



EDGE

Intermodulation
Apart
PCS 1900 MHz

Span: 1 GHz to 20 GHz
RBW/VBW: 1 MHz



Occupied Bandwidth Modulation Test for ADC Inc.
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Back

An output Occupied Bandwidth test was done with modulation types: GSM and EDGE. The purpose was to determine the amount of occupied bandwidth for the different types of modulation schemes produced by the EUT. The following plots show output signals.

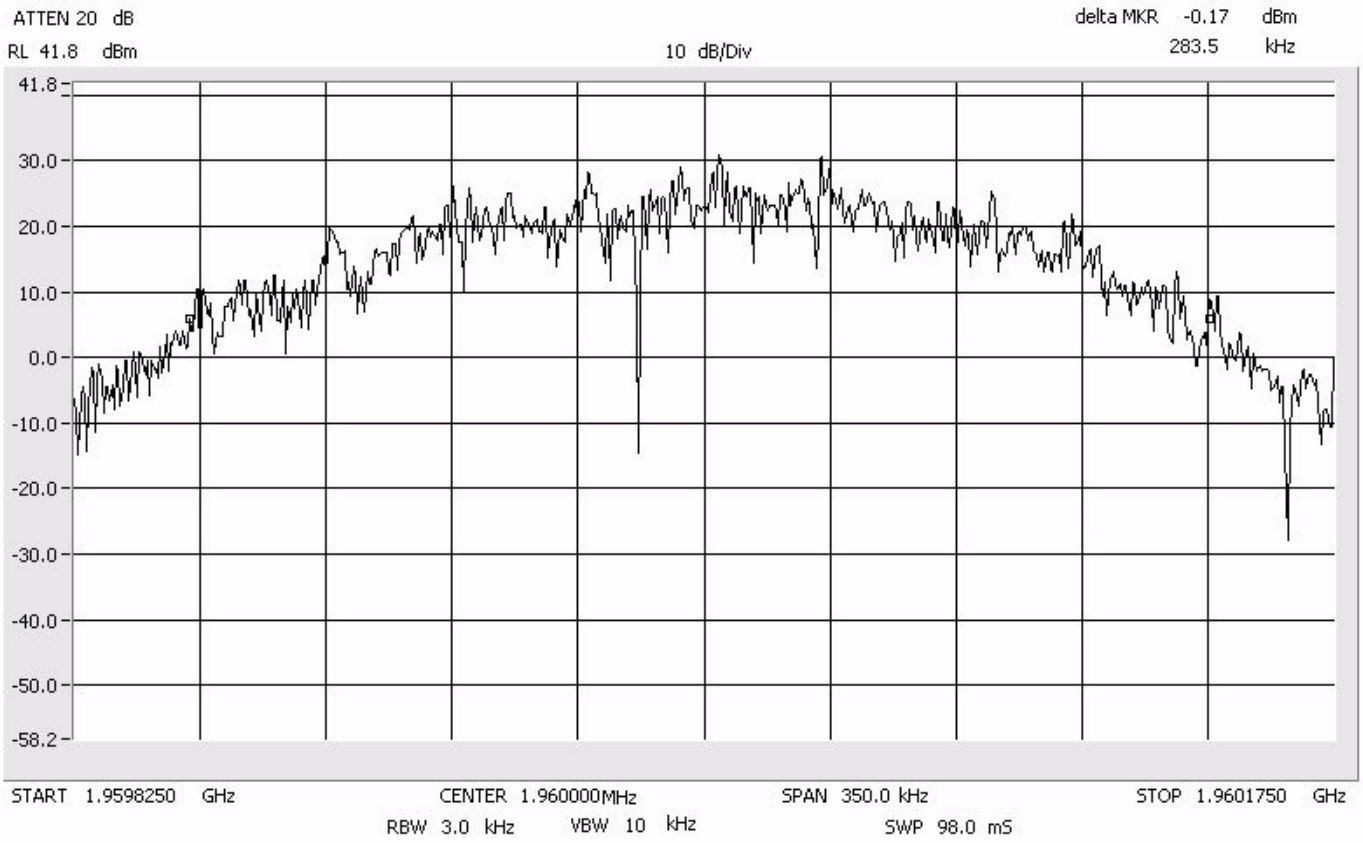
The resolution bandwidth is reduced to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are moved to the -20 dB points (from the previously established center frequency level) on either side of center frequency.

Results:

Pass (see plots)

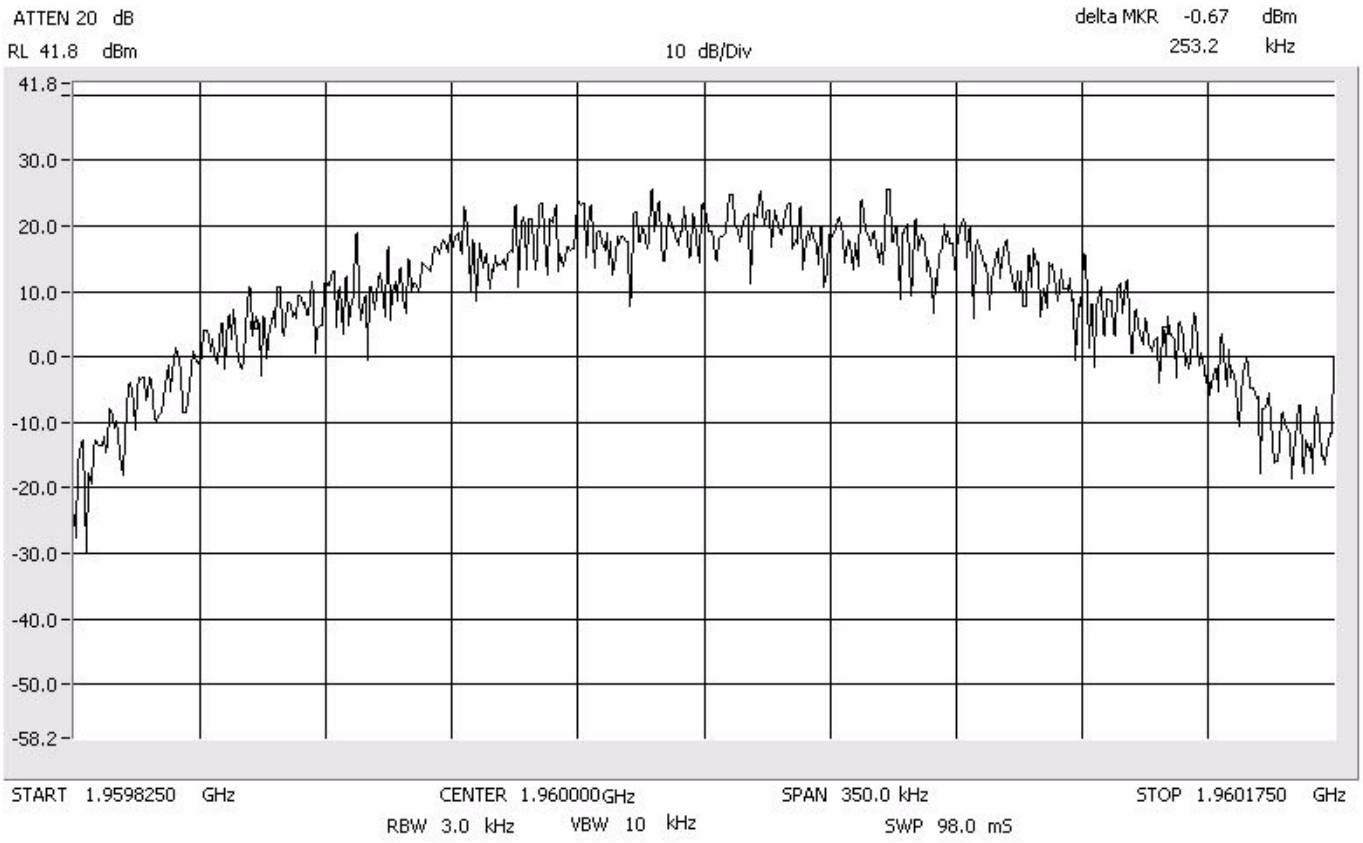
Occupied Bandwidth
GSM
Signal Out

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



Occupied Bandwidth
EDGE
Signal Out

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



Frequency Tolerance Test for ADC Inc.
FlexWave™ microBTS
Model Number FWB-MBTS-D40N00

Back

EUT PCS (1900 MHz)

Input Voltage	Carrier Frequency	Measured Frequency	Meets Requirements?
100 VAC	1930.200 MHz	1930.200 MHz	Yes
175 VAC	1930.200 MHz	1930.200 MHz	Yes
250 VAC	1930.200 MHz	1930.200 MHz	Yes
100 VAC	1960.000 MHz	1960.000 MHz	Yes
175 VAC	1960.000 MHz	1960.000 MHz	Yes
250 VAC	1960.000 MHz	1960.000 MHz	Yes
100 VAC	1989.800 MHz	1989.800 MHz	Yes
175 VAC	1989.800 MHz	1989.800 MHz	Yes
250 VAC	1989.800 MHz	1989.800 MHz	Yes
Temperature	**Carrier Frequency**	**Measured Frequency**	**Meets Requirements?**
-5 Deg. C	1930.200 MHz	1930.200 MHz	Yes
0 Deg. C	1930.200 MHz	1930.200 MHz	Yes
10 Deg. C	1930.200 MHz	1930.200 MHz	Yes
20 Deg. C	1930.200 MHz	1930.200 MHz	Yes
30 Deg. C	1930.200 MHz	1930.200 MHz	Yes
40 Deg. C	1930.200 MHz	1930.200 MHz	Yes
45 Deg. C	1930.200 MHz	1930.200 MHz	Yes
-5 Deg. C	1960.000 MHz	1960.000 MHz	Yes
0 Deg. C	1960.000 MHz	1960.000 MHz	Yes
10 Deg. C	1960.000 MHz	1960.000 MHz	Yes
20 Deg. C	1960.000 MHz	1960.000 MHz	Yes
30 Deg. C	1960.000 MHz	1960.000 MHz	Yes
40 Deg. C	1960.000 MHz	1960.000 MHz	Yes
45 Deg. C	1960.000 MHz	1960.000 MHz	Yes
-5 Deg. C	1989.800 MHz	1989.800 MHz	Yes
0 Deg. C	1989.800 MHz	1989.800 MHz	Yes
10 Deg. C	1989.800 MHz	1989.800 MHz	Yes
20 Deg. C	1989.800 MHz	1989.800 MHz	Yes
30 Deg. C	1989.800 MHz	1989.800 MHz	Yes
40 Deg. C	1989.800 MHz	1989.800 MHz	Yes
45 Deg. C	1989.800 MHz	1989.800 MHz	Yes

6.0 APPENDIX B

Intertek Test Data

Back to Test Data:

Substitution Results:
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Test Engineer: Norman Shpilsher **Date:** 16 and 17 May, 2007

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

TEST DATA

Test Data Number: 3122953MIN-001
Project Number: 3122953

Testing performed on the
FlexWave microBTS

to
47 CFR, Part 24:2006

For
ADC Telecommunications Inc.

Test Performed by:	Test Authorized by:
Intertek	ADC Telecommunications Inc.
7250 Hudson Blvd. Suite 100	5341 12th Avenue East
Oakdale, MN 55128	Shakopee, MN 55379

Prepared by: _____ Date: May 17, 2007
Norman Shpilsher

Reviewed by: _____ Date: May 17, 2007
Simon Khazon

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1.0 JOB DESCRIPTION

Equipment:	FlexWave microBTS
Description:	PCS Base Station Transceiver
Transmitter Operating Range:	1930 to 1990MHz
Customer:	Mr. Mark Miska ADC Telecommunications Inc. 5341 12th Avenue East Shakopee, MN 55379 Phone: 952-403-8340
Test Standards:	**47 CFR, Part 24:2006**
Date Sample Submitted:	May 16, 2007
Test Work Started:	May 16, 2007
Test Work Completed:	May 17, 2007
Test Sample Conditions:	Good

2.0 TEST RESULTS

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST STANDARD	TEST	COMMENTS
Part 24	Spurious Enclosure Radiated Emissions	Pass

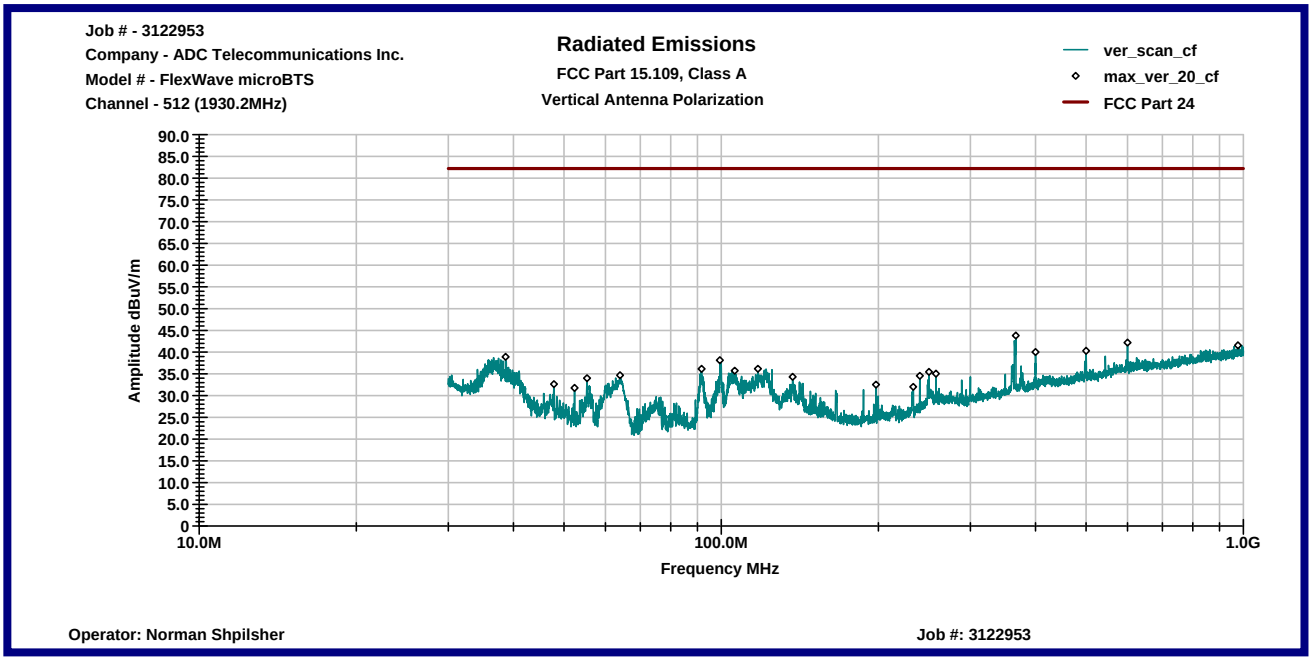
The EUT enclosure Radiated Emissions were tested with the transmitter tuned to low channel 512 (1930.2MHz), middle channel 661 (1960.0MHz), and upper channel 810 (1989.8MHz) operating frequency.
The transmitter RF output was connected to the HP Analyzer located outside of the test site via RF Cable.
The remote laptop computer located outside of the test site was connected to the Ethernet Port of the transmitter via CAT5 cable.
Testing was performed in frequency range from 30MHz to 20GHz.

Radiated Emissions in frequency range from 30MHz to 1GHz are shown in Graphs 1 to 3.
Radiated Emissions in frequency range from 1 to 10GHz are shown in Graphs 4 to 6.
Spurious Radiated Emissions in frequency range from 18 to 20GHz are shown in Graphs 7 to 9.

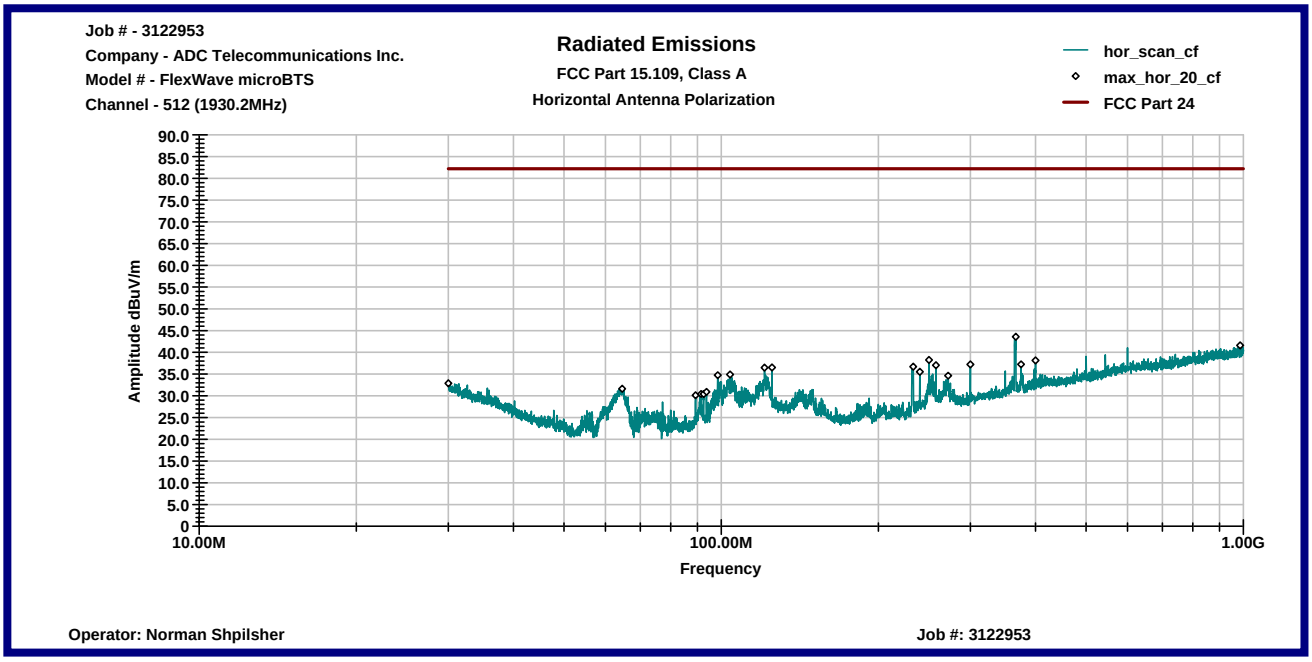
The second harmonic emissions were measured for Spurious Radiated Emissions Power (substitution measurements) as the maximum transmitter emissions and with the level above 20dB below the field strength limits of 82.2dBμV/m correlated with -13dBm of Radiated Power.
The Spurious Radiated Emissions Power is shown in the Table 1.
Emissions at transmitters operating frequencies were removed from the Table.

Graph # 1
Radiated Emissions from 30MHz to 1GHz, Channel 512

Vertical Antenna Polarization

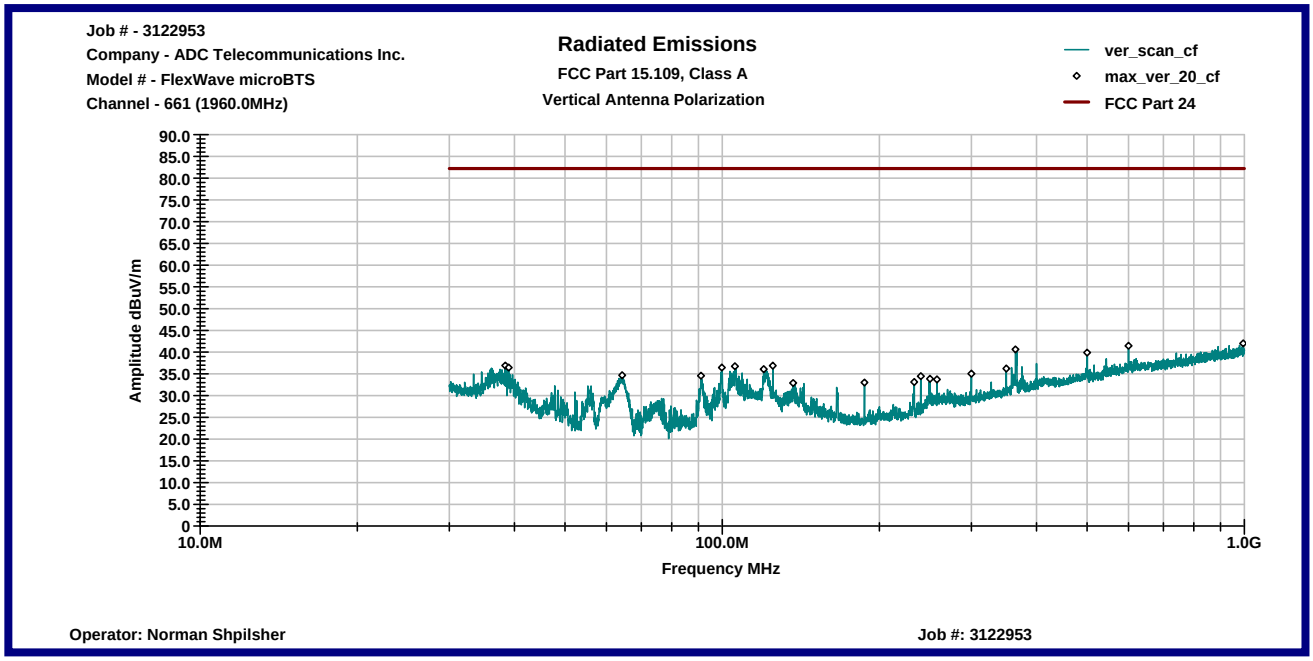


Horizontal Antenna Polarization

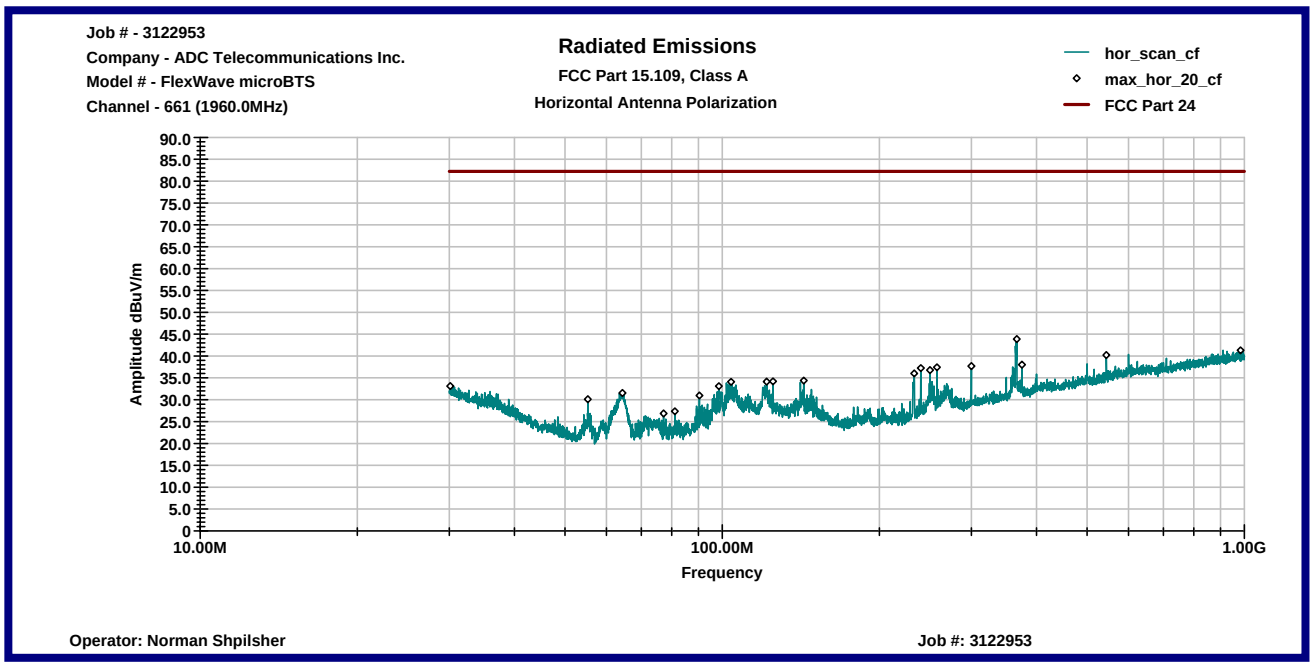


Graph # 2
Radiated Emissions from 30MHz to 1GHz, Channel 661

Vertical Antenna Polarization

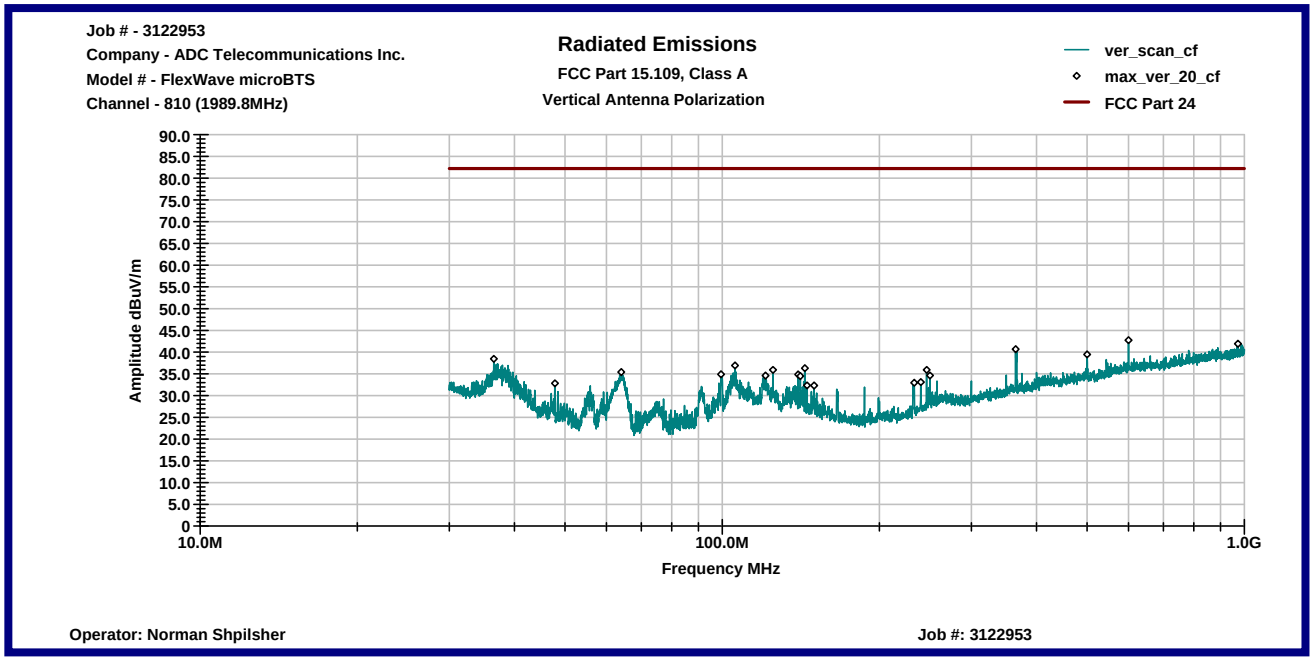


Horizontal Antenna Polarization

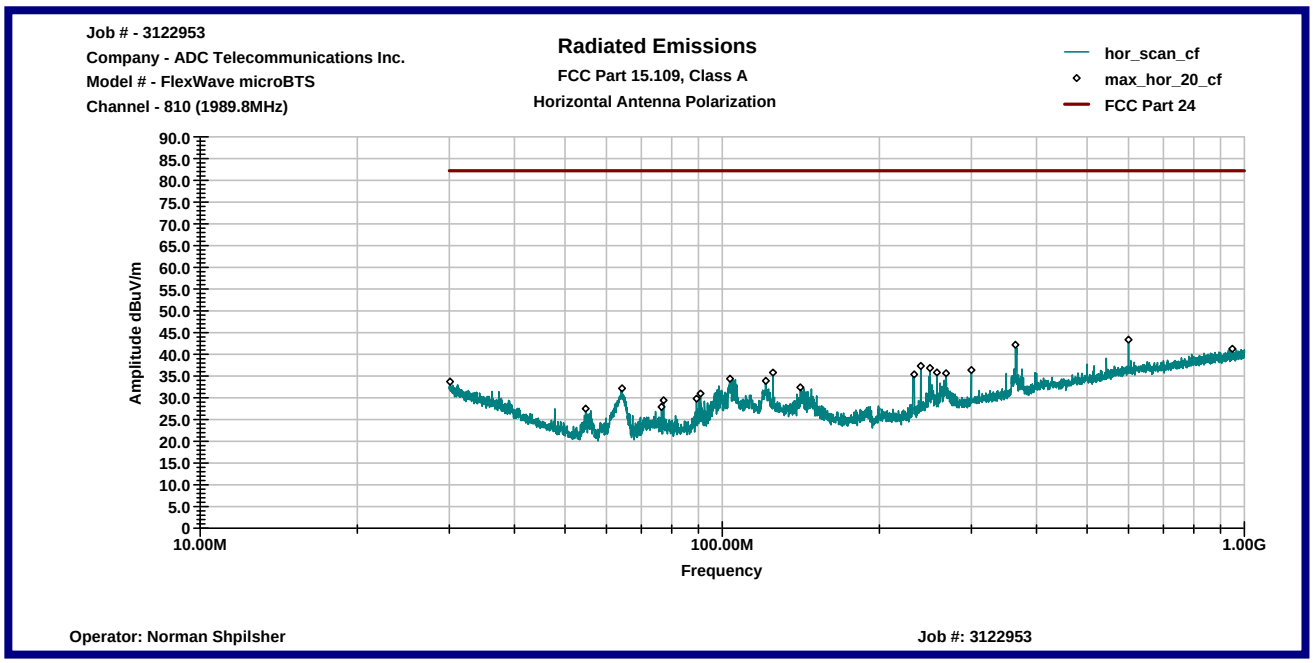


Graph # 3
Radiated Emissions from 30MHz to 1GHz, Channel 810

Vertical Antenna Polarization

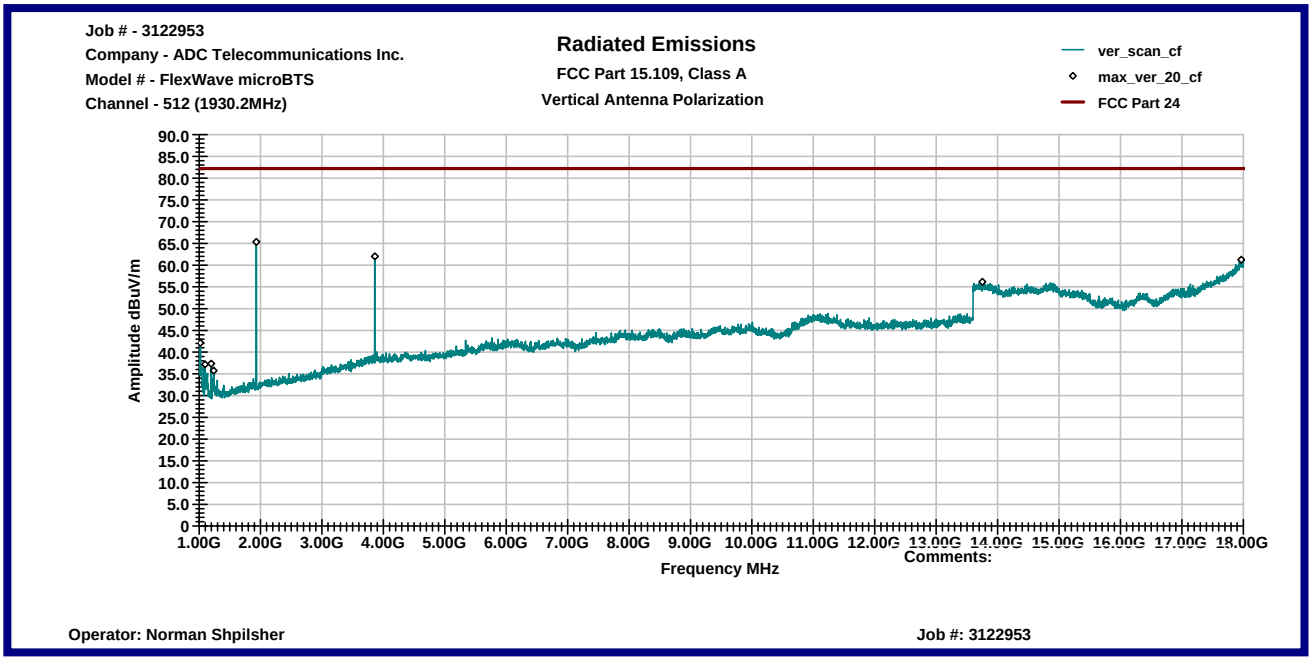


Horizontal Antenna Polarization

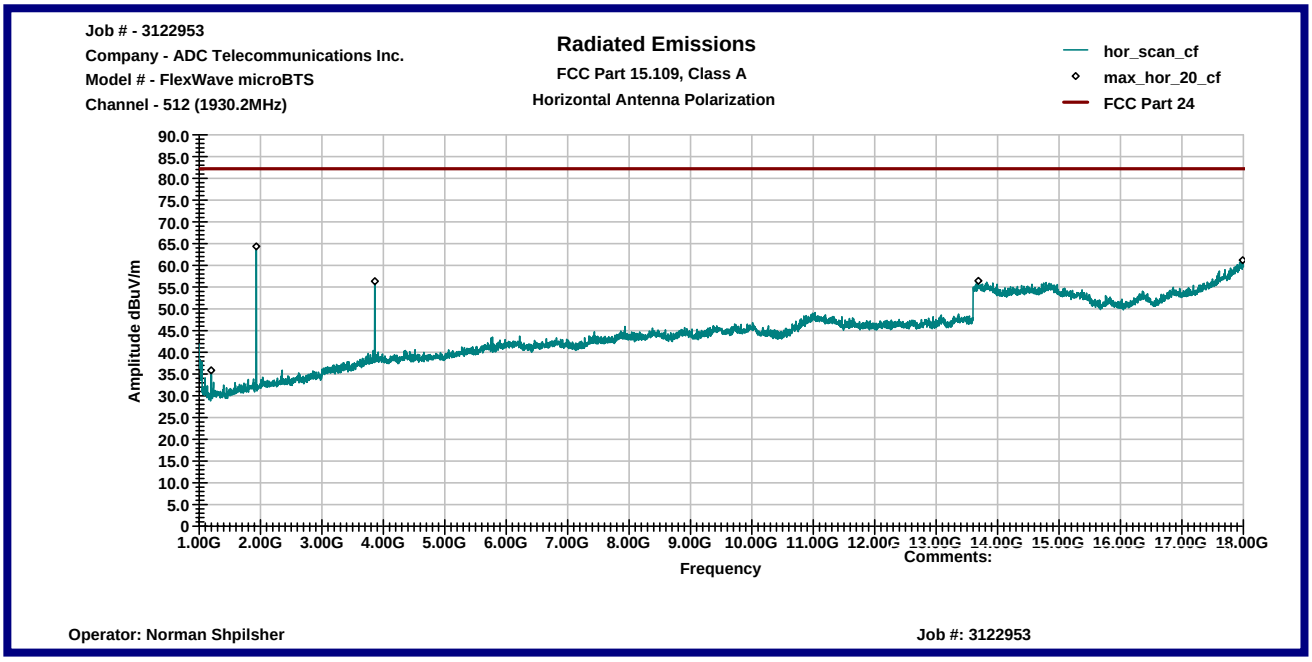


Graph # 4
Radiated Emissions from 1 to 18GHz, Channel 512

Vertical Antenna Polarization

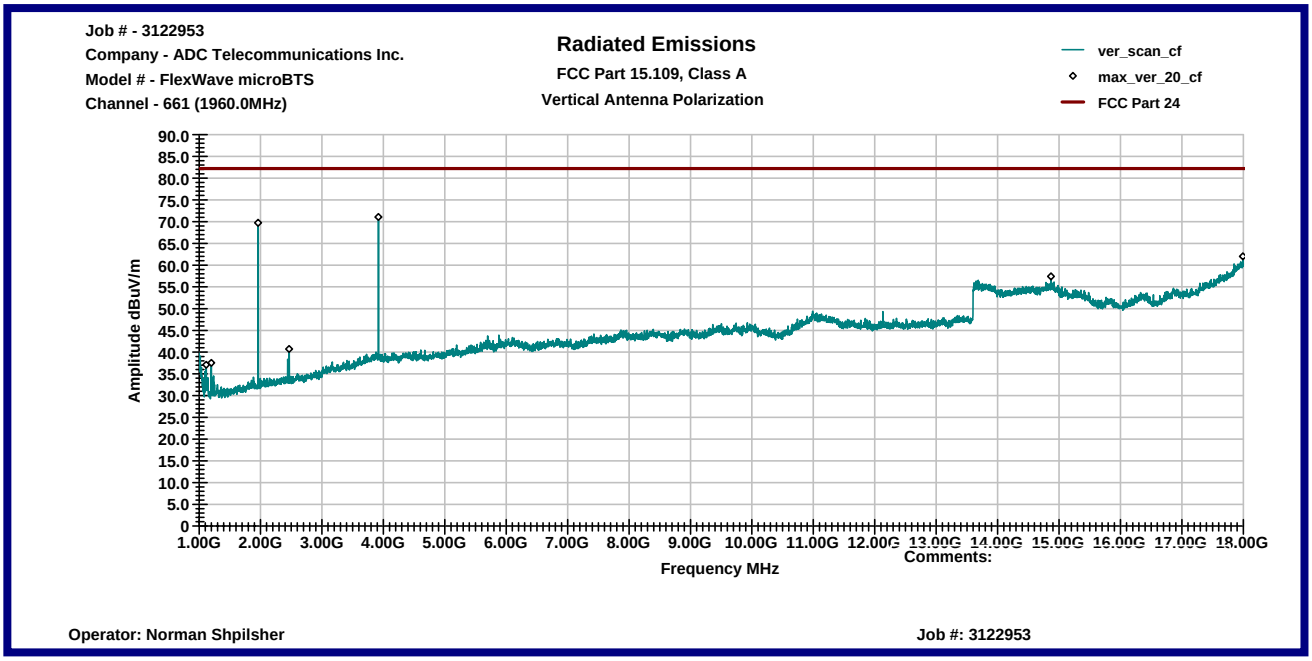


Horizontal Antenna Polarization

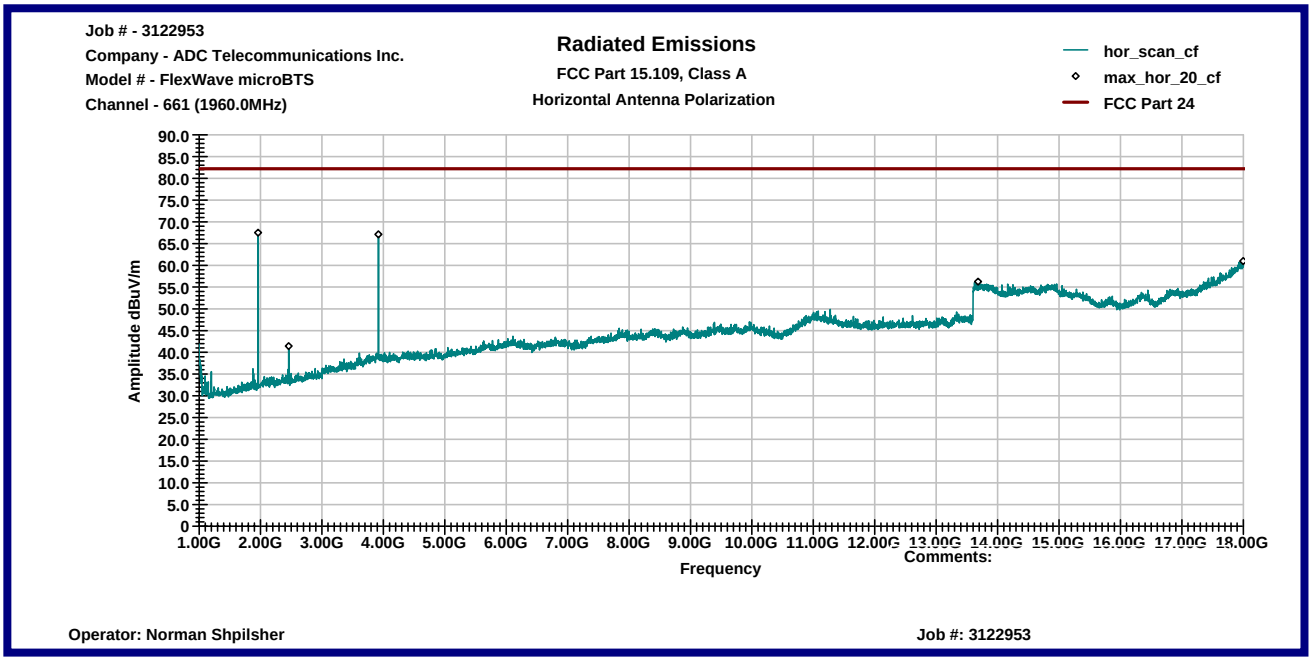


Graph # 5
Radiated Emissions from 1 to 18GHz, Channel 662

Vertical Antenna Polarization

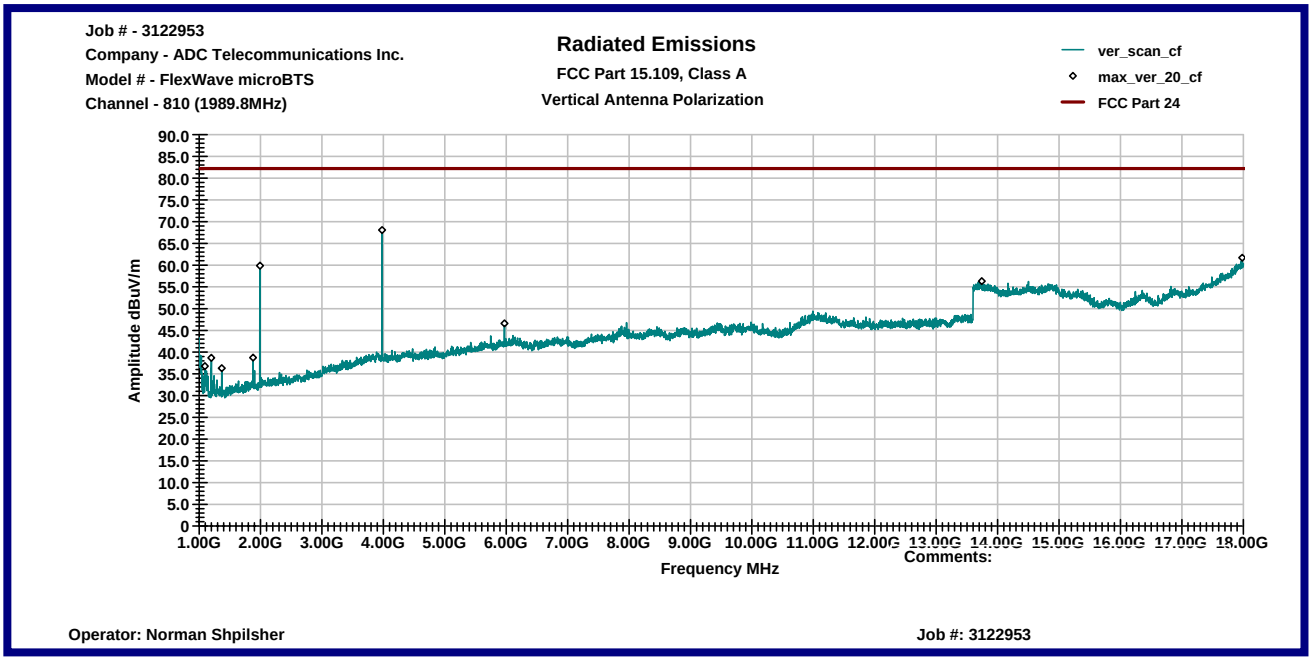


Horizontal Antenna Polarization

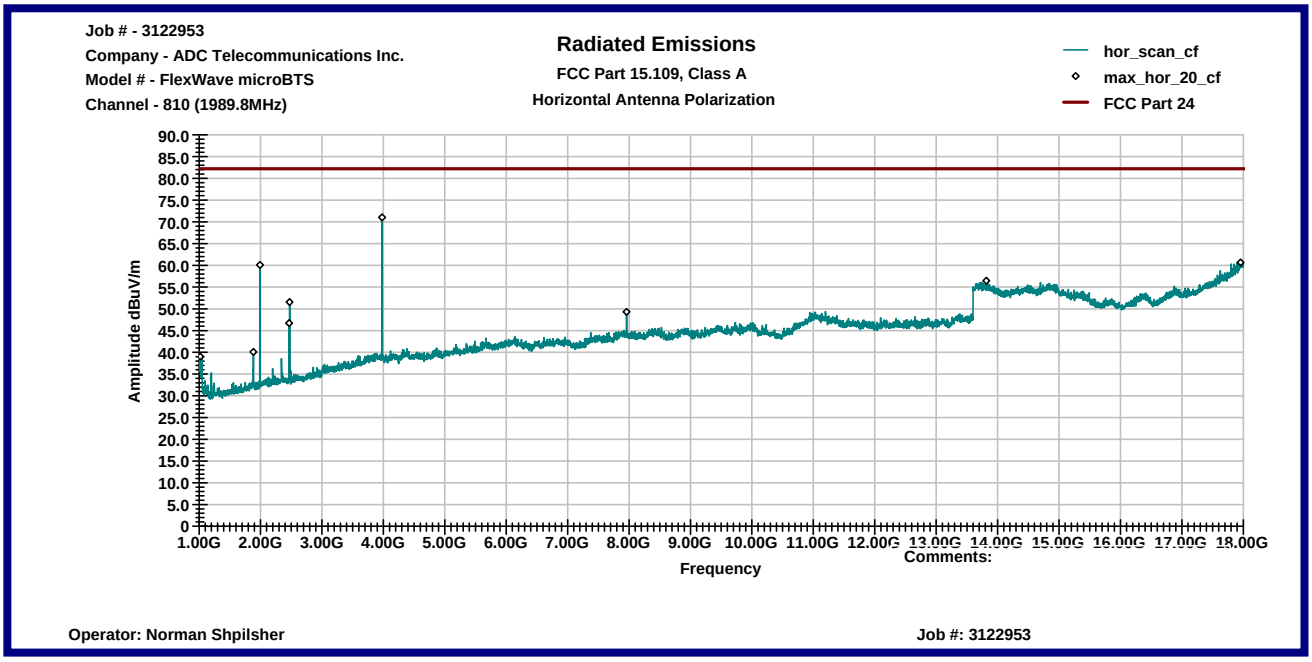


Graph # 6
Radiated Emissions from 1 to 18GHz, Channel 810

Vertical Antenna Polarization

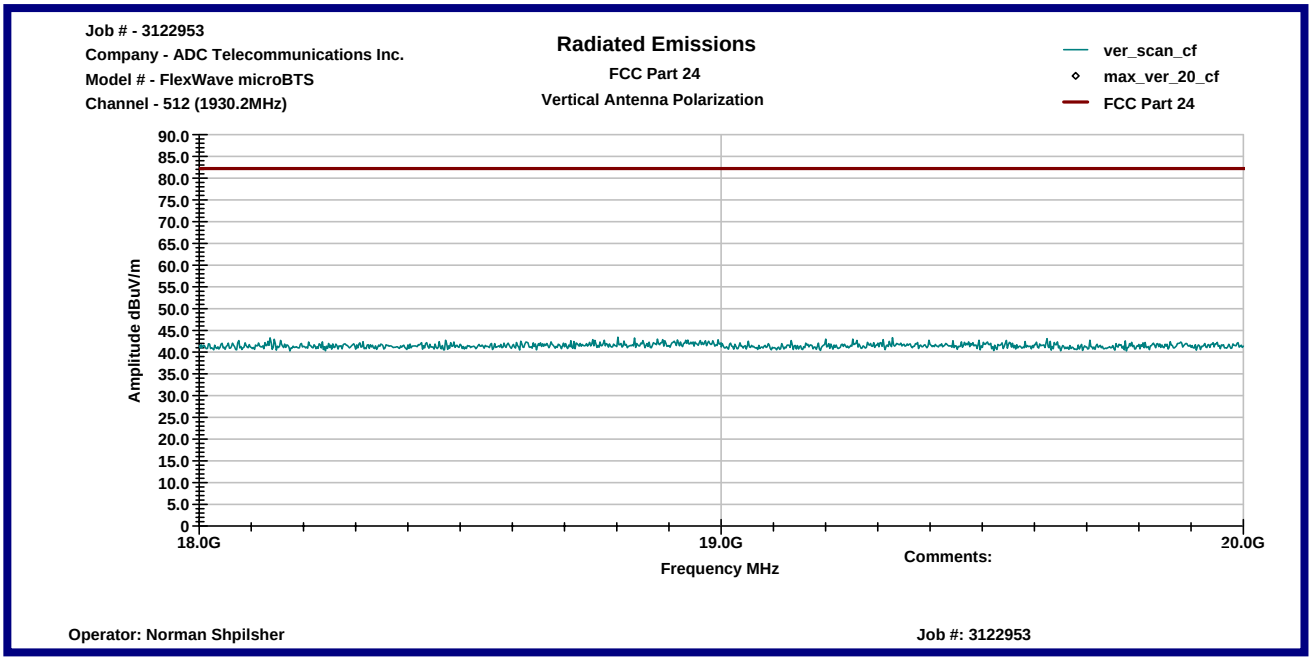


Horizontal Antenna Polarization

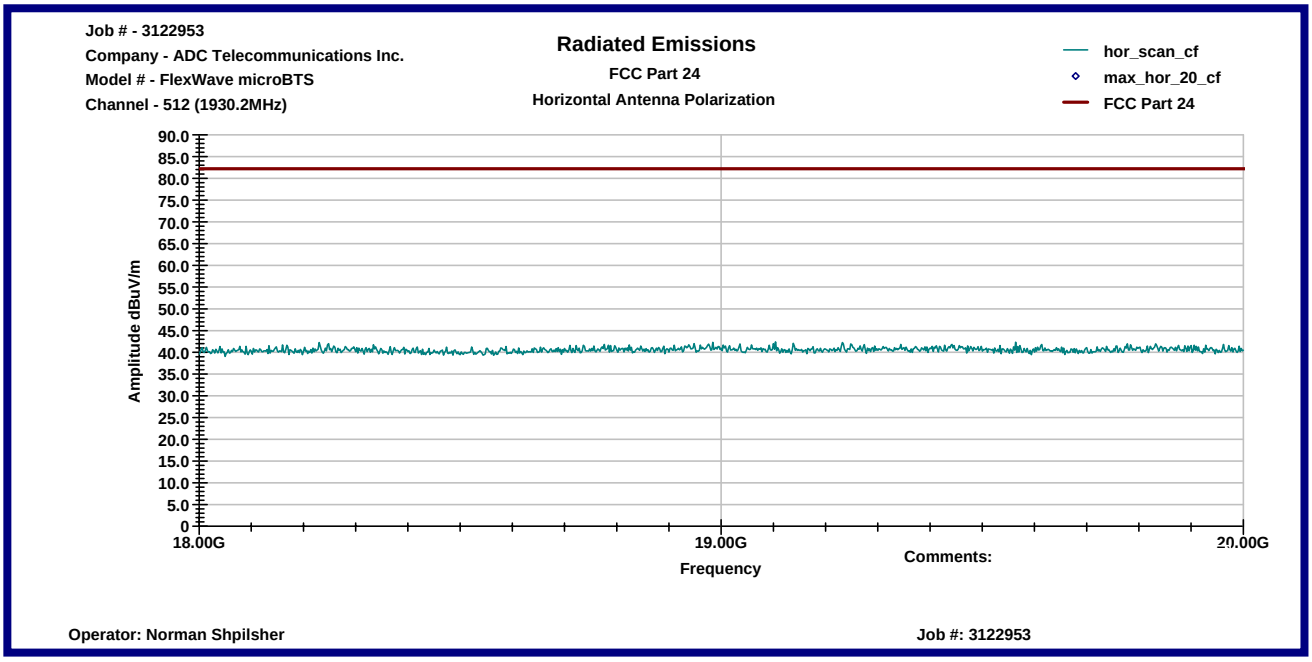


Graph # 7
Radiated Emissions from 18 to 20GHz, Channel 512

Vertical Antenna Polarization

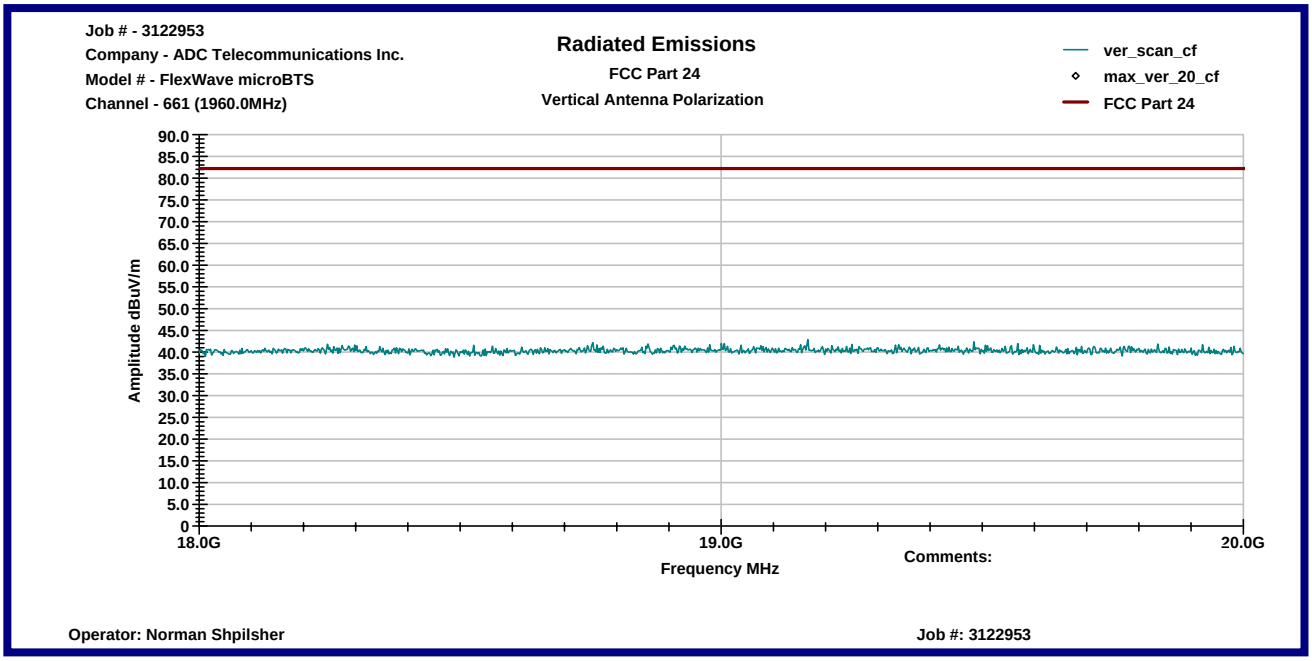


Horizontal Antenna Polarization

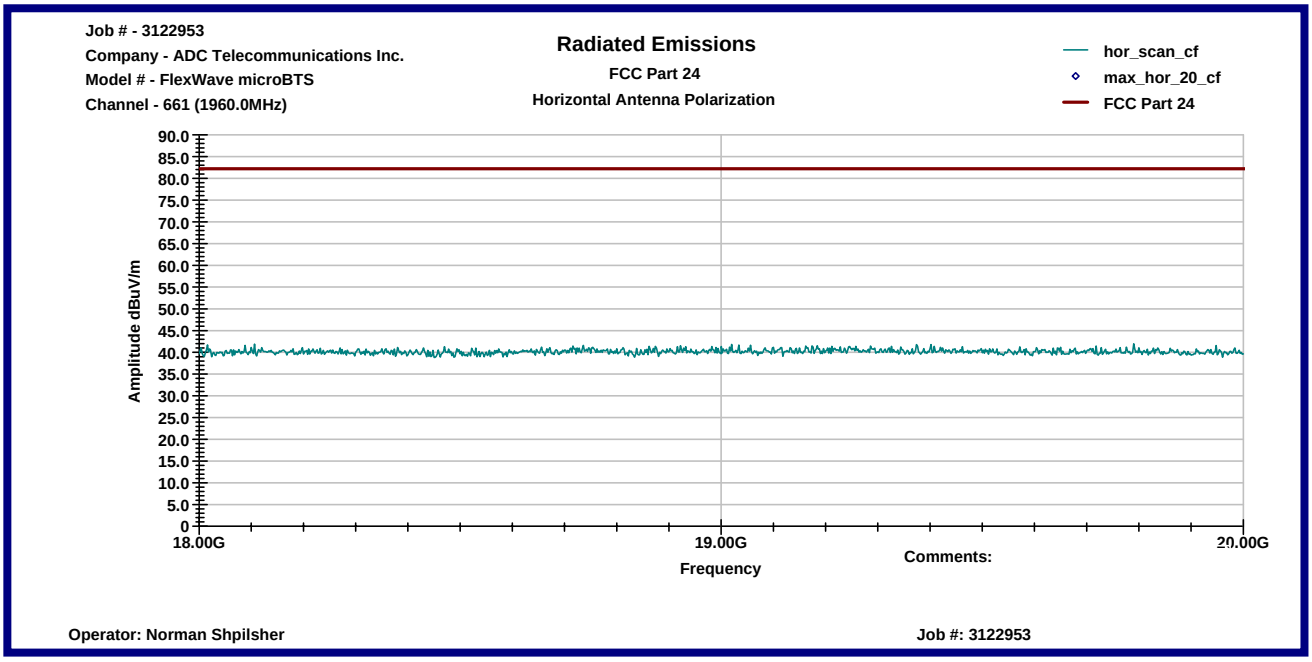


Graph # 8
Radiated Emissions from 18 to 20GHz, Channel 661

Vertical Antenna Polarization

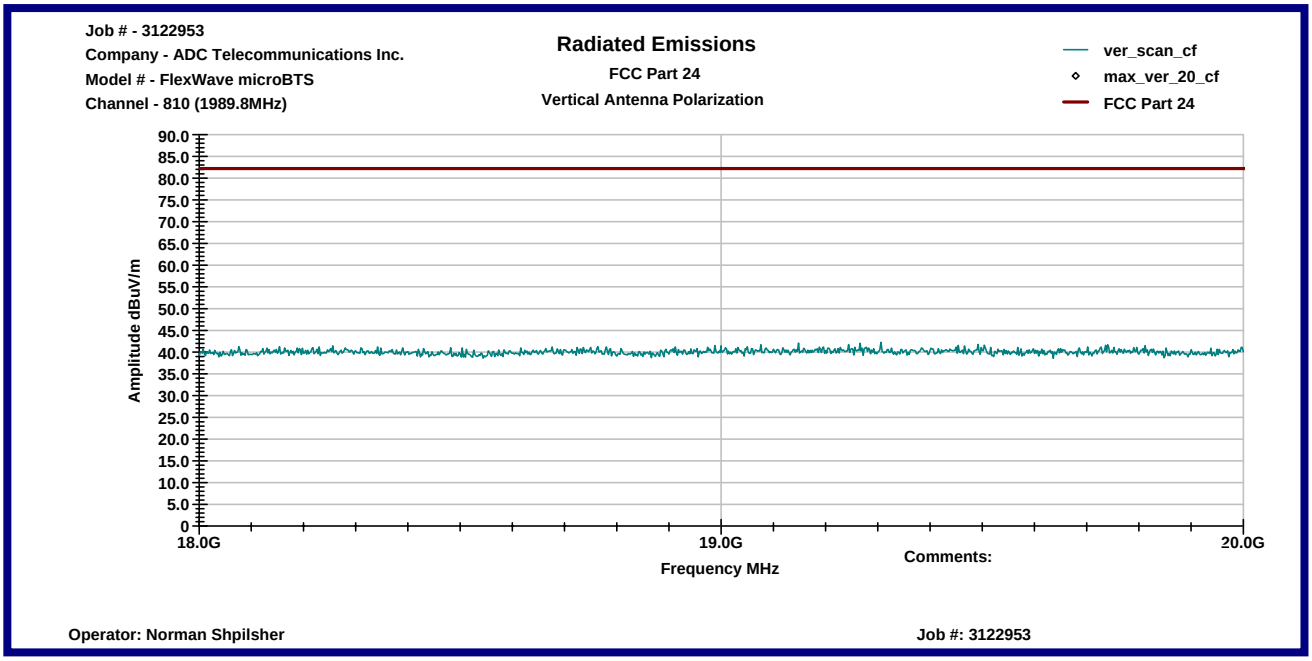


Horizontal Antenna Polarization

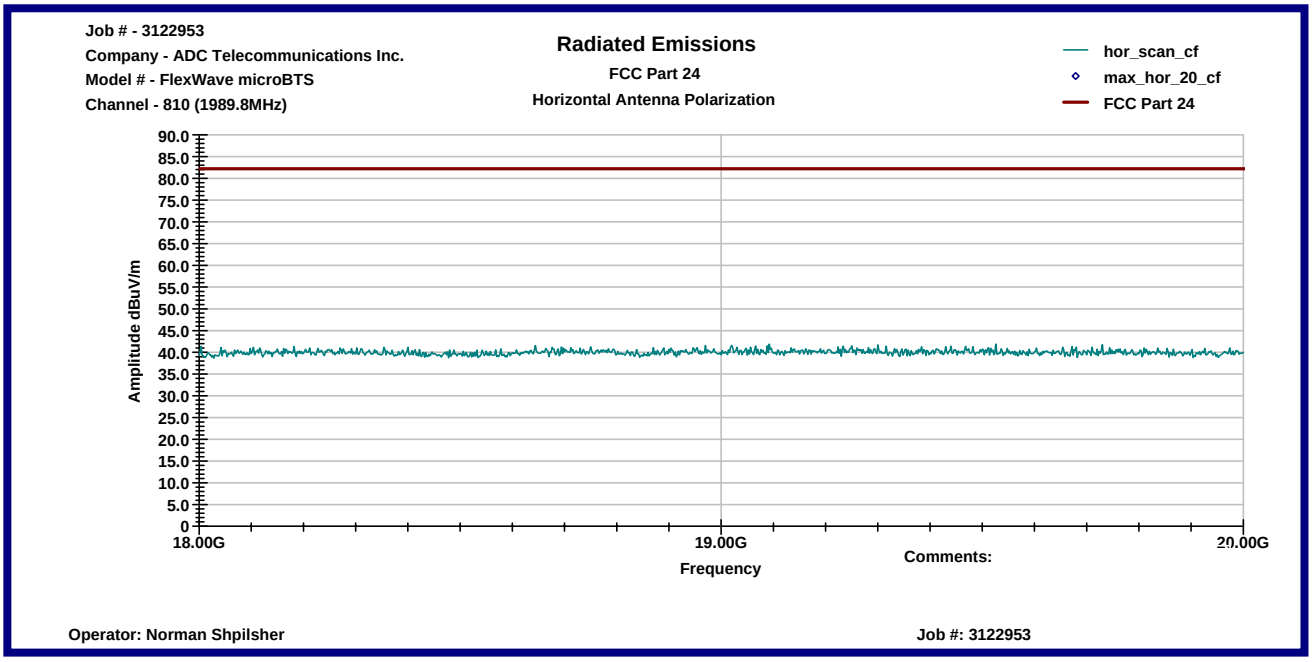


Graph # 9
Radiated Emissions from 18 to 20GHz, Channel 810

Vertical Antenna Polarization



Horizontal Antenna Polarization



Spurious Radiated Emissions Power **Date:** 05-17-2007

Company: ADC Telecommunications Inc.
Model: FlexWave microBTS
Test Engineer: Norman Shpilsher
Special Config. Info: Sabstitution Method
Standard: FCC Part 24
Frequency Range: 30MHz to 20GHz
Test Site: 3m Anechoic Chamber
Note: The table shows the worst case radiated emissions
Emissions at fundamental frequency removed from the Table

Table # 1

Frequency of Emissions MHz	Operating Frequency MHz	Antenna Polarity	Measured Emissions dBμV	Substitution Generator Power dBm	Substitution Antenna Gain dBi	Cable Loss dB	ERP Spur. Emissions dBm	Limit dBm	Margin dB
3860.40	1930.20	V	63.9	-42.8	9.6	0.4	-33.6	-13.0	-20.6
3920.00	1960.00	V	72.8	-33.8	9.6	0.4	-24.6	-13.0	-11.6
3979.60	1989.80	V	69.6	-37.0	9.5	0.4	-27.9	-13.0	-14.9
3860.40	1930.20	H	58.3	-49.3	9.6	0.4	-40.1	-13.0	-27.1
3920.00	1960.00	H	68.8	-38.4	9.6	0.4	-29.2	-13.0	-16.2
3979.60	1989.80	H	72.6	-34.5	9.6	0.4	-25.3	-13.0	-12.3

3.0 TEST EQUIPMENT / ENVIRONMENTAL CONDITIONS

Receivers/Spectrum Analyzers and Test Software

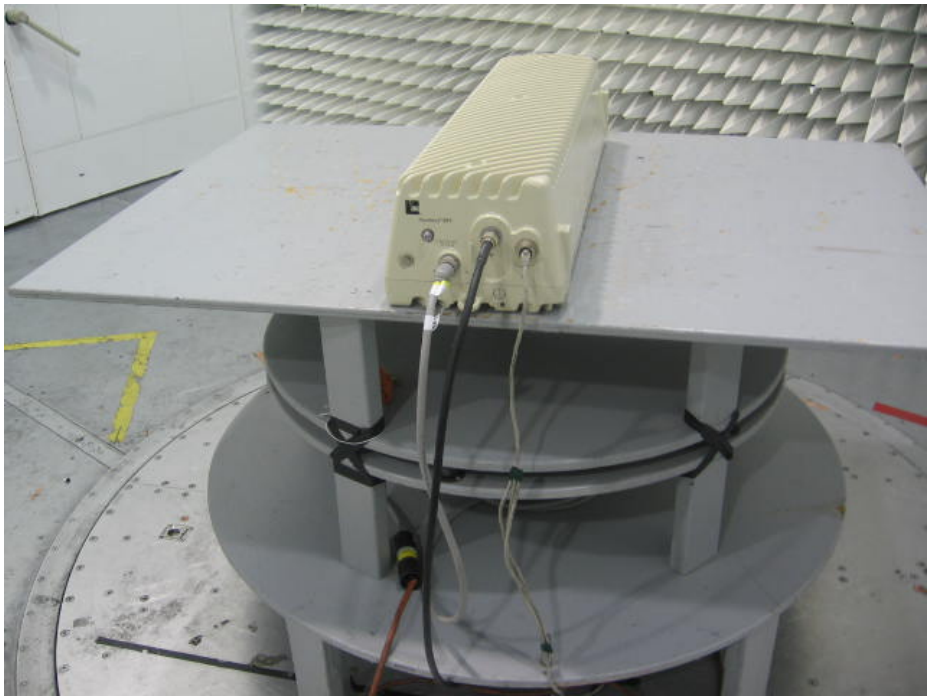
DESCRIPTION	SERIAL NO.	LAST CAL	CAL DUE	USED
Rohde & Schwarz FSP 40 Spectrum Analyzer	100024	07/06	07/07	X
Rohde & Schwarz ESCI Spectrum Analyzer	100358	04/06	04/18/07	X
TILE! Instrument Control System	Ver. 3.4 K.24	N/A	N/A	X

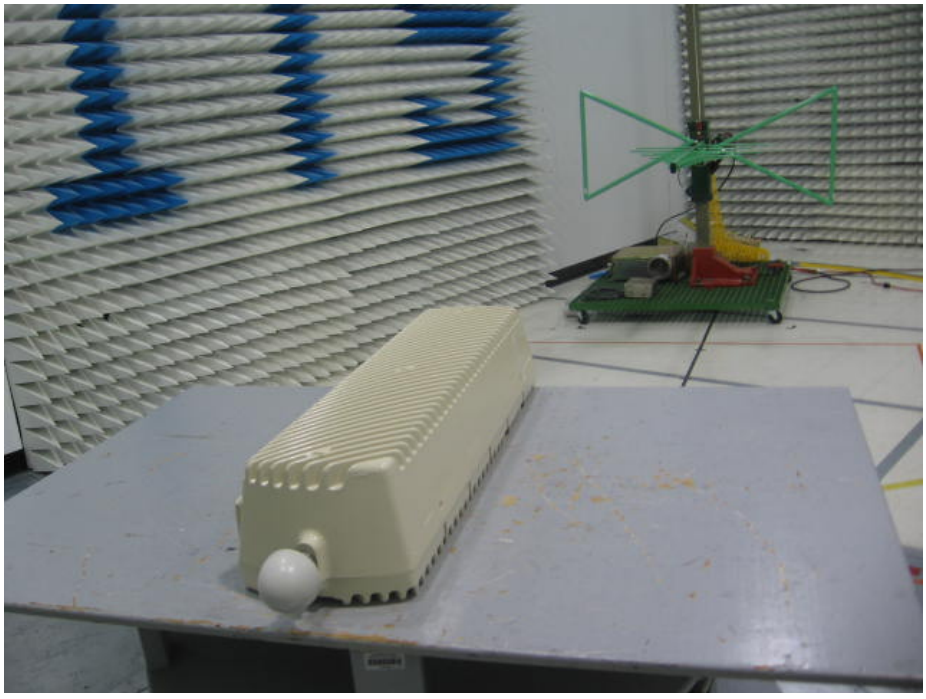
Antennas/Generators/Pre-Amps

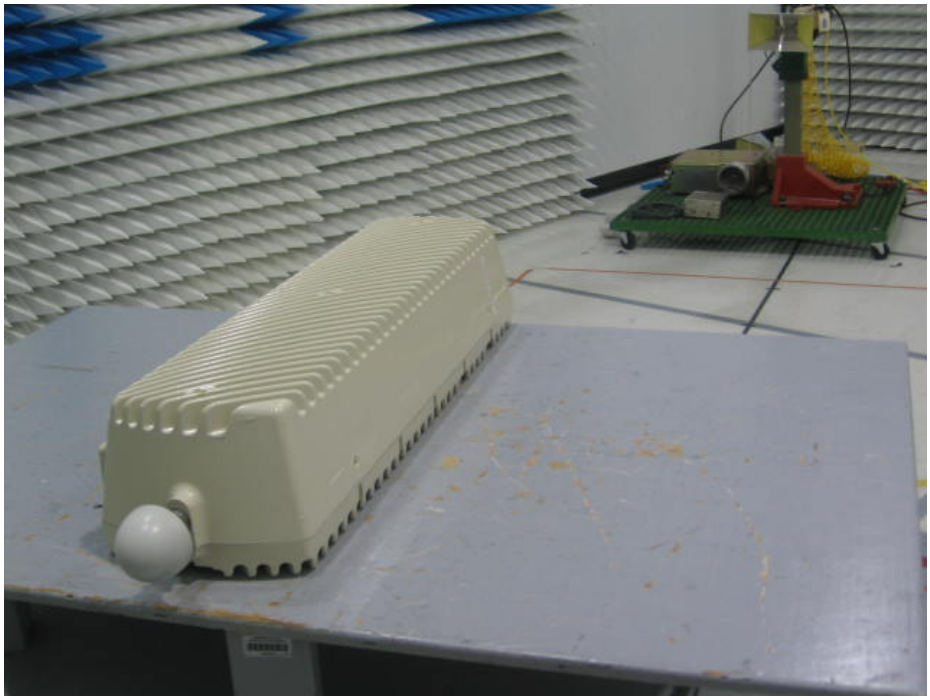
DESCRIPTION	SERIAL NO.	LAST CAL	CAL DUE	USED
Schaffner-Chase Bicono-Log Antenna	2630	08/06	08/07	X
EMCO Horn Antenna 3115	9507-4513	01/07	01/08	X
EMCO Horn Antenna 3115	6579	03/07	03/08	X
EMCO Waveguide Horn Antenna 3116	9904-2423	07/06	07/07	X
CDI Roberts Antenna 3 140-400MHz	00598	N/A	N/A	
CDI Roberts Antenna 4 400-1000MHz	00599	N/A	N/A	
MITEQ AMF-5D Pre-Amplifier	1122951	04/07	04/08	X
MITEQ AMF-6F-16002600-25-10P Pre-Amplifier	1222383	09/06	09/07	X
HP 8340B Synthesized Sweeper	2819A01098	09/06	09/07	X
Rohde & Schwarz SMY 02, Signal Generator	DE23691	10/06	10/07	

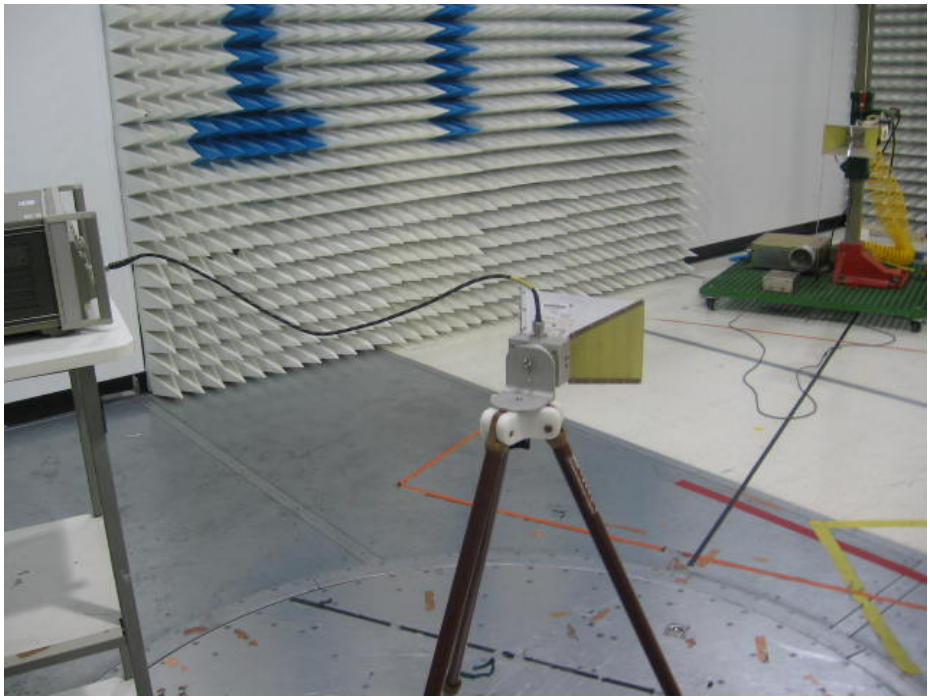
Temperature: 24° C
Relative Humidity: 39%
Atmospheric pressure: 98.9 kPa

4.0 CONFIGURATION PHOTOGRAPHS









7.0 APPENDIX C

Measurement Protocol

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Measurement Protocol

Environmental conditions of the lab, (ADC)
Temperature: 21 - 26º 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 FINAL (dB) (dB/m) (dB) (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 place directly on the turntable/ground plane. Interface cable 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 are 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.