

Test report

1(67)

Uppgjord - Prepared	Kontr. - Checked (Sign)	Datum - Date	Rev	
Fredrik Hedlund		2003-07-07		TSR-10349-B
Godkänd - Approved	Datum/Sign - Date/Sign	Tillhör referens - File / reference		
Martin Lundhagen				

FCC Test Report
FCC CFR 47 PART 2 (24)

TMB 1900
LGP011nn

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1 Scope

This document present the test results from the FCC certification tests performed on LGP011nn. The "nn" in the type designation denotes a number between 01-99

All tests were performed according to ref. [2] & [3].

1.1 Test Object:

Unit	Frequency range	Product number	Serial number
TMB 1900	1850-1910 / 1930–1990	LGP01101	01101X1A1A03110247

FCC ID.: MKALGP011-nn

2 Summary

The unit passed all performed tests, see table below for details.

CFR 47, Part 24	Compliant	Chapter reference	Remark
RF Output Power	Yes	9.1 & 9.2	
Occupied Bandwidth	Yes	9.3 & 9.4	
Conducted Spurious Emission	Yes	9.7 & 9.8	
Radiated Spurious emission	Yes	See ref [1][1]	Test performed by SP ¹
Two Tone Intermodulation tests	N/A	7.4	

¹ SP – Swedish National Testing & Research Institute

3 Document history

Revision	Comment	author / date
PA1	First issue	FH / 20030404
B	Header updated	MHY/2003-07-07

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4 References

- [1] Application for Certification: Tower Mounted Booster Draft F24
- [2] FCC Code of Federal Regulations (CFR) 47
Telecommunications Part 2
- [3] FCC Code of Federal Regulations (CFR) 47
Telecommunications Part 24

5 Test Instruments

Type	Manufacturer	Model	LGP id	Cal due
Power meter	Agilent	E4418B	789	July 2003
Power meter sensor	HP	HP8482B	801	July 2003
30 dB Attenuator Assy	HP	HP8482B	802	July 2003
Spectrum Analyser	HP	HP8593E	038	Sept 2003
Spectrum Analyser	Agilent	E4402B	1416	July 2003
Signal generator	Agilent	E4432B	1383	May 2003
Signal generator	Agilent	E4421B	790	Oct 2003
VSA Transmitter Tester	Agilent	E4406A	1115	Oct 2003
RF Amplifier	Ophir	4003F	950	-
RF Amplifier	MA-Ltd	AM43-1.8-2-40-47	242	-
Load100W, 20 dB 50Ohm Spinner		BN-745357	-	-

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6 Description of Test Object

FCC ID.: MKALGP011-nn

The TMB is to be mounted close to the antennas, in order to increase the output power from a BS, and to reduce influence from losses in feeder cables. Alternatively the TMB can be mounted at the bottom of the tower, in order to minimize the feeder losses influence on the up-link, a TMA can be mounted at the top of the tower.

This product can be used as a booster product for all types of Base Stations, either as a "cable compensator" on a macro BS or as a "power enhancer" for a micro/pico BTS.

The TMB is suitable for a BS belonging to the ETSI class normal BS, M1, M2, M3 and P1.

The TMB is designed for the following modulation techniques: GMSK (GSM) and 8-PSK (EDGE) modulation.

The TMB are designed for co-siting and co-location with GSM (GMSK)850.

The TMB is a linear amplifier and contains no mixers or local oscillators. Hence it acts as a transparent loss inverter or loss compensator.

6.1 Downlink

Frequency	1930 -1990 MHz
Number of carriers	The TMB is designed to handle two single carriers, hence only one TX carrier in each Power Amplifier.
Input power	+28 dBm to +38 dBm
Max output power	43 dBm \pm 1 dB
Nominal Gain	The gain is defined between the BTS and ANT port. The gain is variable in 1 dB steps, from 5 to 15 dB.

6.2 Uplink

Frequency	1850-1910 MHz
Nominal Gain	The gain is defined between the ANT and BTS port. The gain is variable in 1 dB steps, from 0 to 12 dB.

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6.3 Power Supply

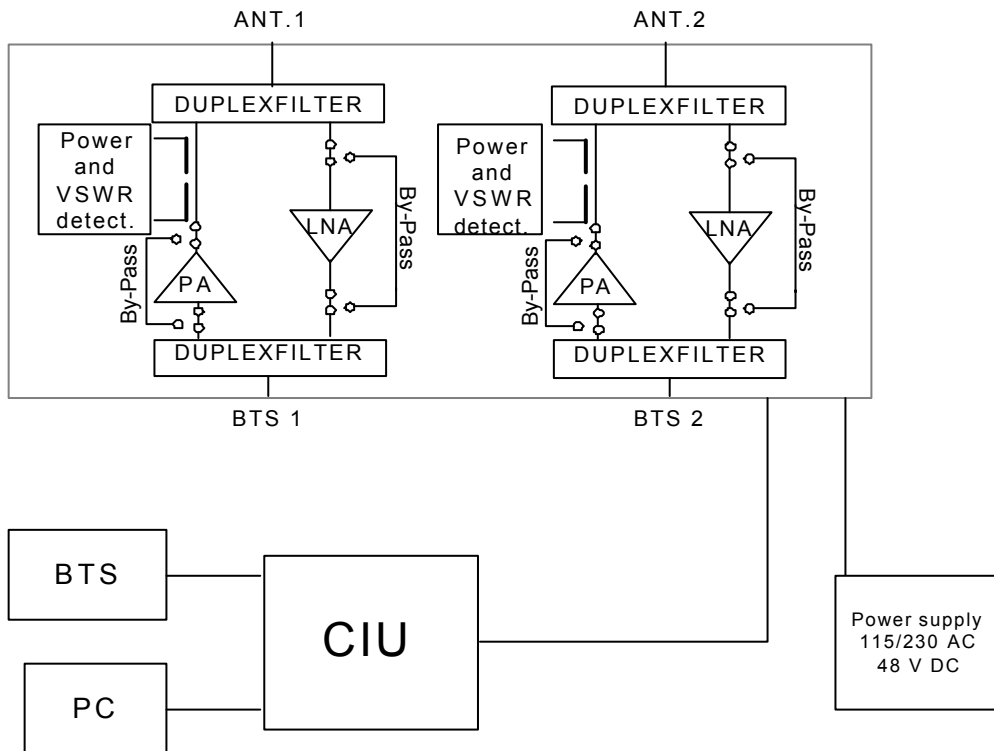
The TMB can be supplied with either 115/230VAC or 48VDC.

AC Supply voltage requirements:

- Input voltage: 85 to 265VAC or 115 VAC ± 15%
- Frequency: 47 - 63 Hz
- Power consumption: 115/230 V/AC: max 375W
(at 2 times 43 dBm)
- Power consumption max 150W
(without RF input signal)

DC Power supply 48 VDC

- Input voltage: 36-72 V DC input.
- Inputs have no potentials with respect GND.
- Power consumption: 115/230 V/AC: max 350W
(at 2 times 43 dBm)
- Power consumption: max 140W
(without RF input signal)



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7 TESTS

7.1 RF POWER OUTPUT

Test procedure

A modulated (all timeslot activated with PN23 data) signal were applied applicable BTS port.

Modulation: GSM (GMSK)

Output power were set to +43 dBm at applicable Ant port

The output power was measured with a transmitter tester.

Used test set 1

Results :

See appendix A / RF power output

7.2 Occupied bandwidth

Test procedure

A modulated (all timeslot activated with PN23 data) signal were applied applicable BTS port.

Modulation: GSM (GMSK) & EDGE

Output power were set to +43 dBm at applicable Ant port.

The occupied bandwidth was measured with a spectrum analyser.

The occupied bandwidth made from the Signal generator itself was measured to use as a comparison for possible spectral re growth.

Used test set 3

Results:

See appendix A / Occupied bandwidth

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7.3 Spurious Emission at Ant ports / Spurious at band edge

Test procedure

A CW signal (1960 MHz) were applied at applicable BTS port

Output power was set to +43 dBm at both Ant port.

The Spurious emission were measured at applicable Ant port between 10kHz to 19900MHz

Spurious at band edge was measured with a spectrum analyser at Ch 513 (B) & Ch 809 (T) at applicable ANT port.

Results :

See appendix A / Spurious Emission at ANT ports / Spurious at band edge

Used test set up 3

Note

The TMB has fixed gain between 1930 -1990 MHz (see chapter 10 for gain plot) therefore spurious at band edge measurements were only performed at Ch 513 (B+1) i.e.1930.4 MHz and Ch 809 (T-1) i.e. 1989.6 MHz. The TMB improves spurious emission performance at band edge. Therefore it is only dependent on the RF signal source if requirements are met at Ch 512 (B) i.e.1930.2 MHz and Ch 810 (T) i.e. 1989.8 MHz.

7.4 Intermodulation characteristics

This test is not applicable for the test object since it is not designed for more than one single carrier through the RF power amplifier.

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8 Test Set Ups

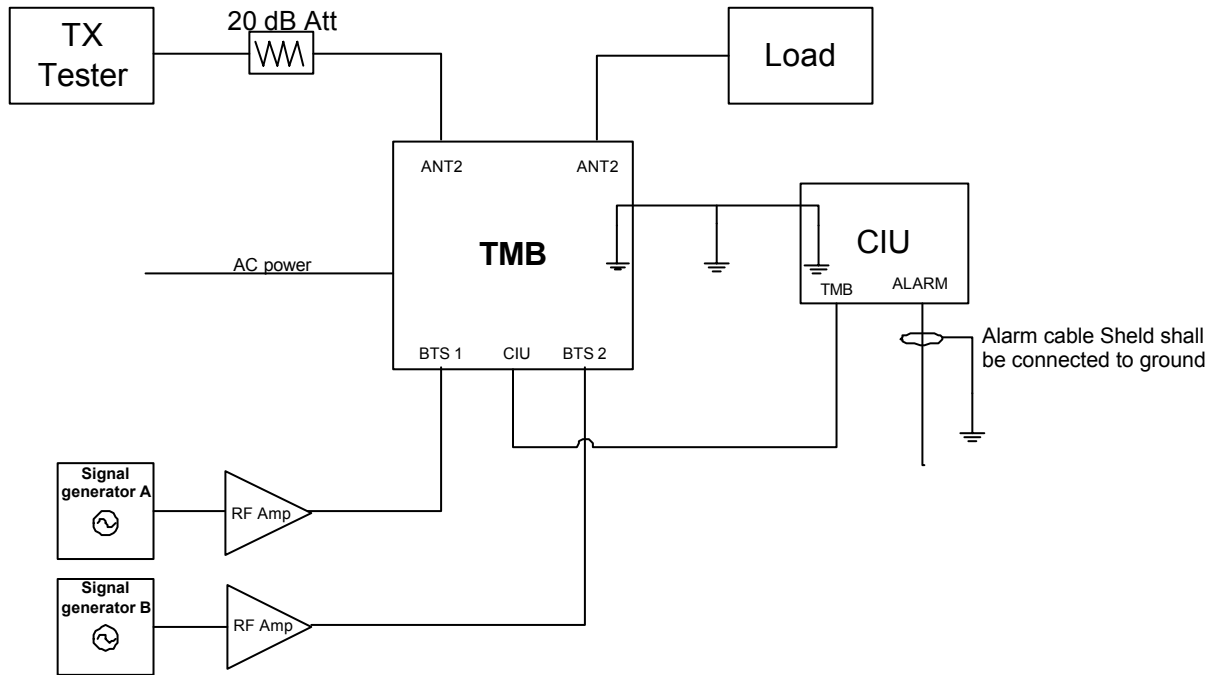


Figure 1: Test Set-up 1

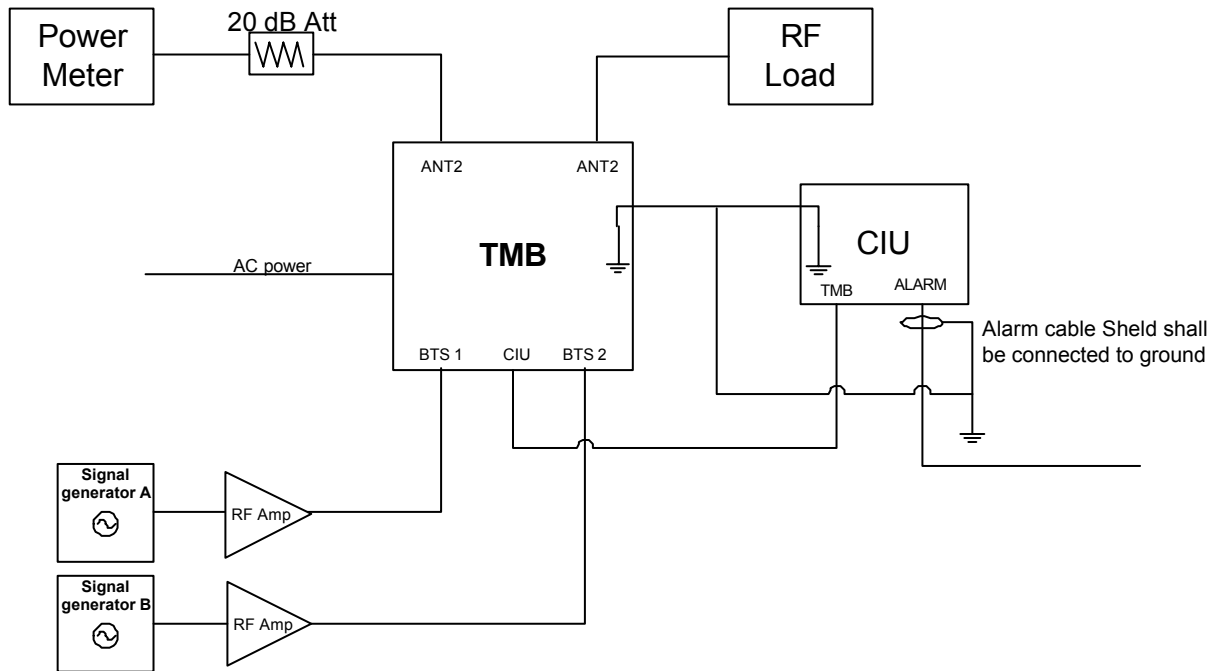


Figure 2: RF Calibration

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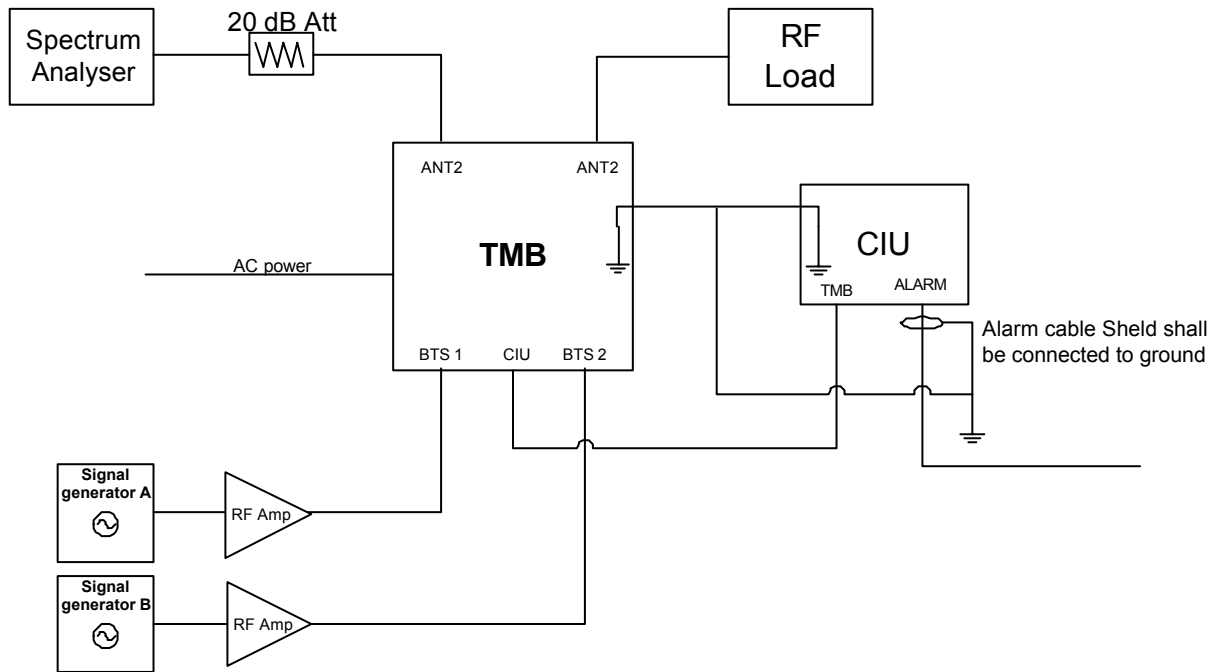


Figure 3: Test Set up 3

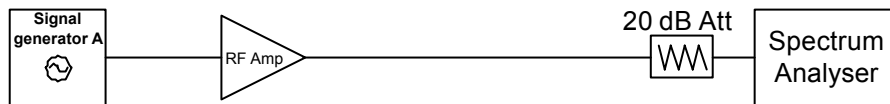


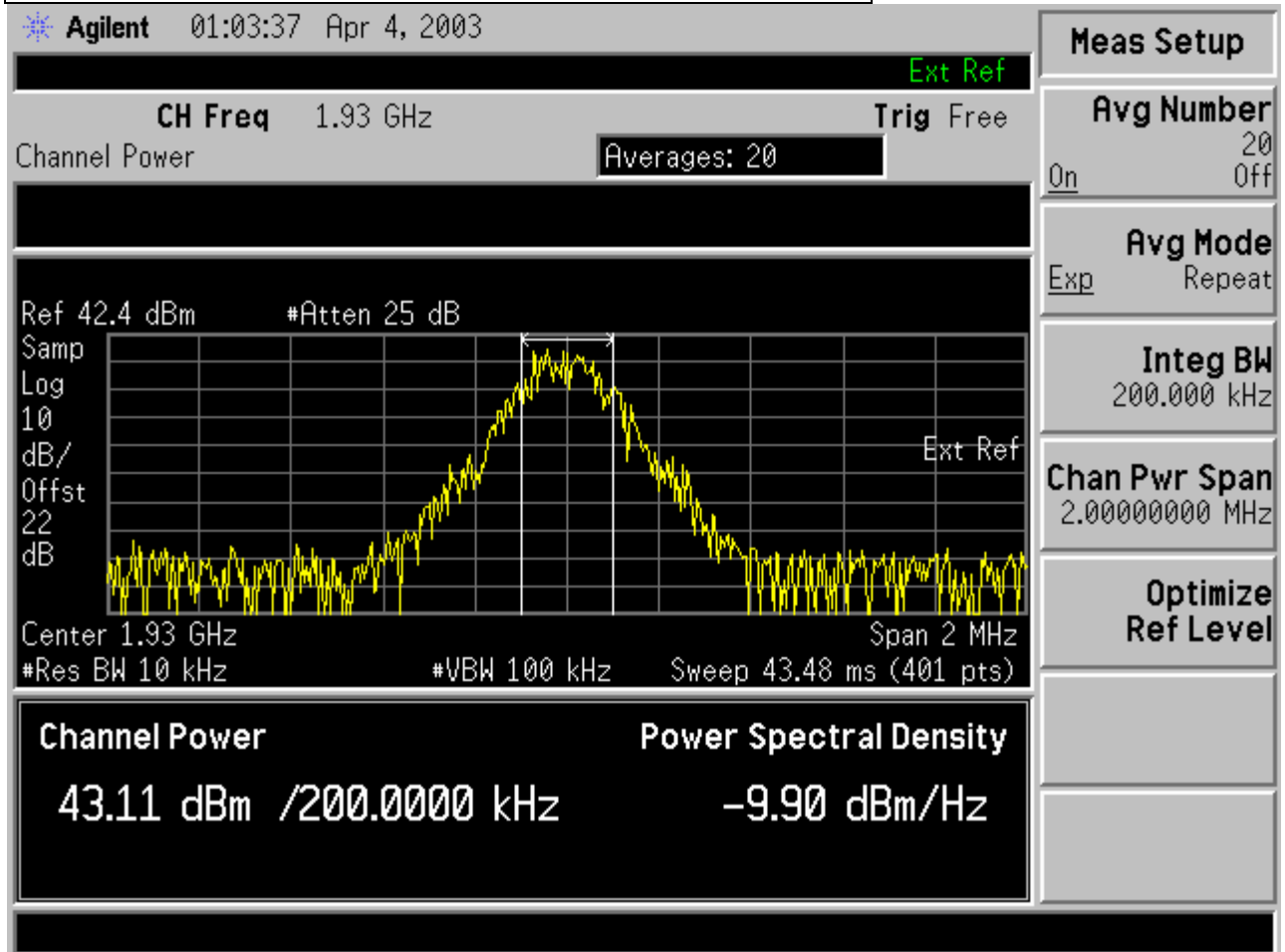
Figure 4: Reference test set-up

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9 Appendix A

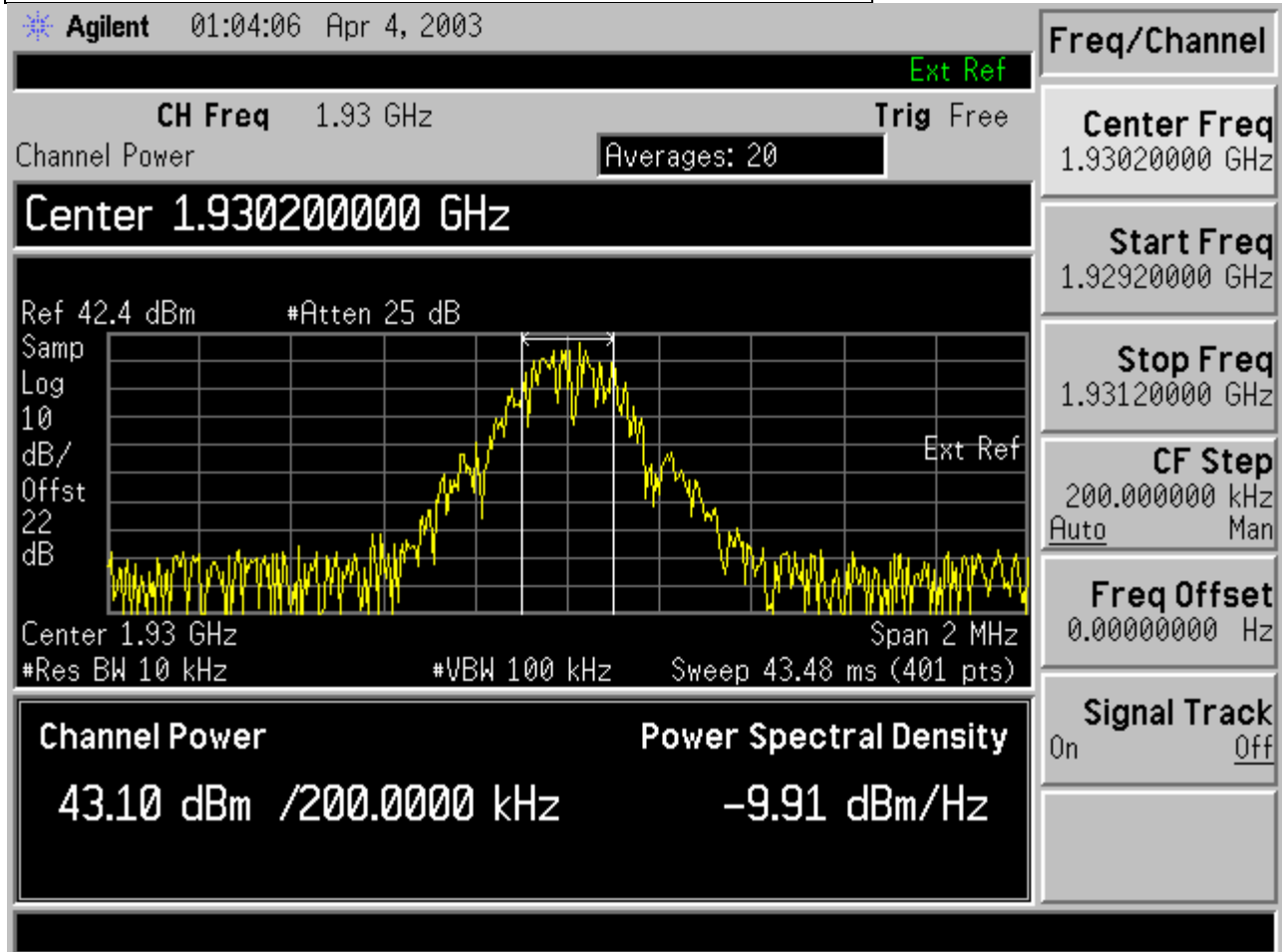
9.1 RF POWER OUTPUT ANT 1

Mean power ANT 1
 Channel B 1930.2 MHz
 Gain 15 dB
 Input voltage 115VAC
 Modulation: GSM (GMSK)



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Mean power ANT 1
 Channel B 1930.2 MHz
 Gain 15 dB
 Input voltage 265VAC
 Modulation: GSM (GMSK)



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Mean power ANT 1
 Channel B 1930.2 MHz
 Gain 15 dB
 Input voltage 85VAC
 Modulation: GSM (GMSK)

Agilent 01:02:56 Apr 4, 2003

CH Freq 1.93 GHz Trig Free Ext Ref

Channel Power Averages: 20

Number of Averages 20

Ref 42.4 dBm #Atten 25 dB

Samp 10
 Log dB/Offst 22 dB

Center 1.93 GHz Span 2 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 43.48 ms (401 pts)

Channel Power	Power Spectral Density
43.19 dBm /200.0000 kHz	-9.82 dBm/Hz

Meas Setup

Avg Number 20 On Off

Avg Mode Exp Repeat

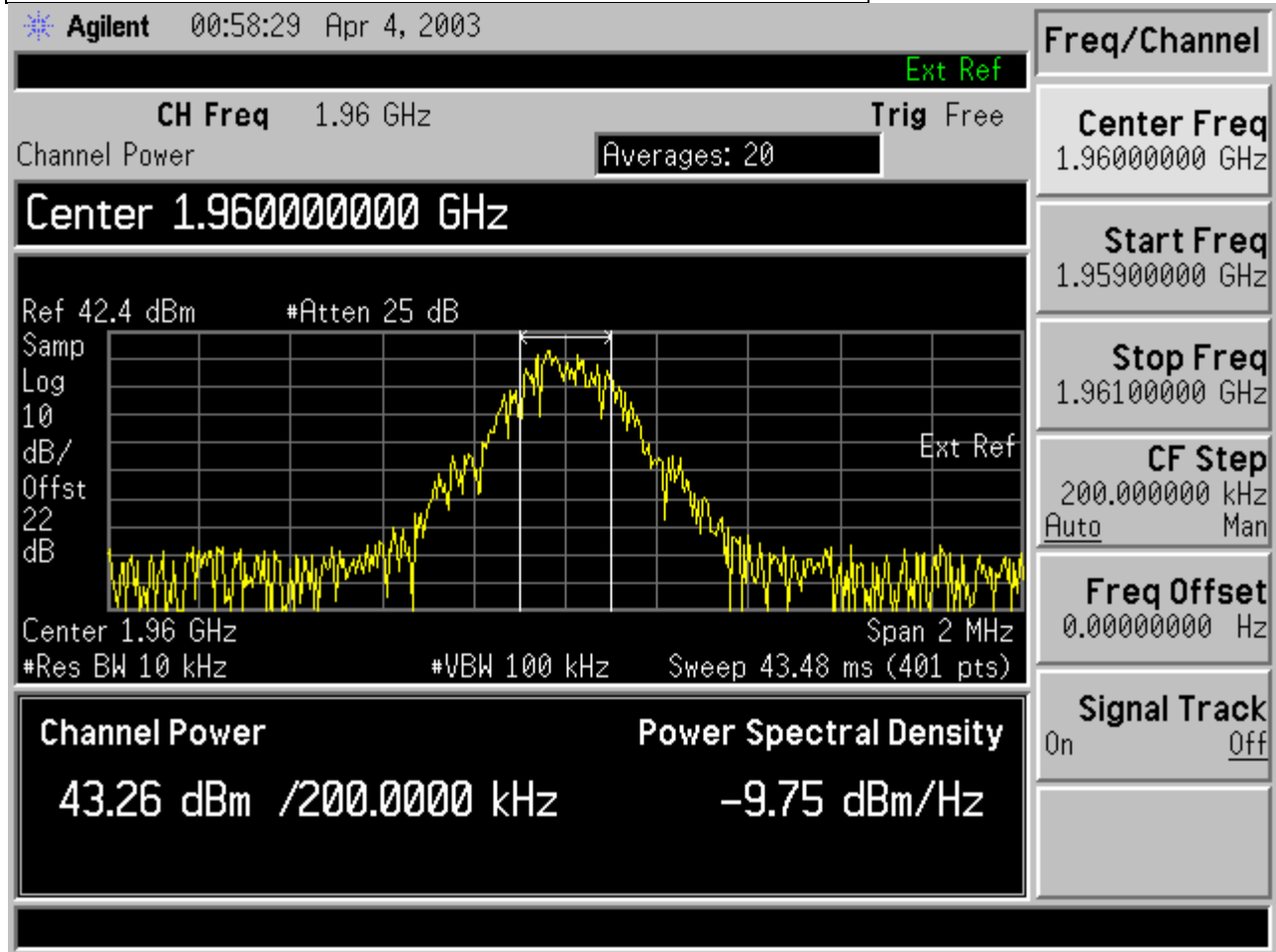
Integ BW 200.000 kHz

Chan Pwr Span 2.00000000 MHz

Optimize Ref Level

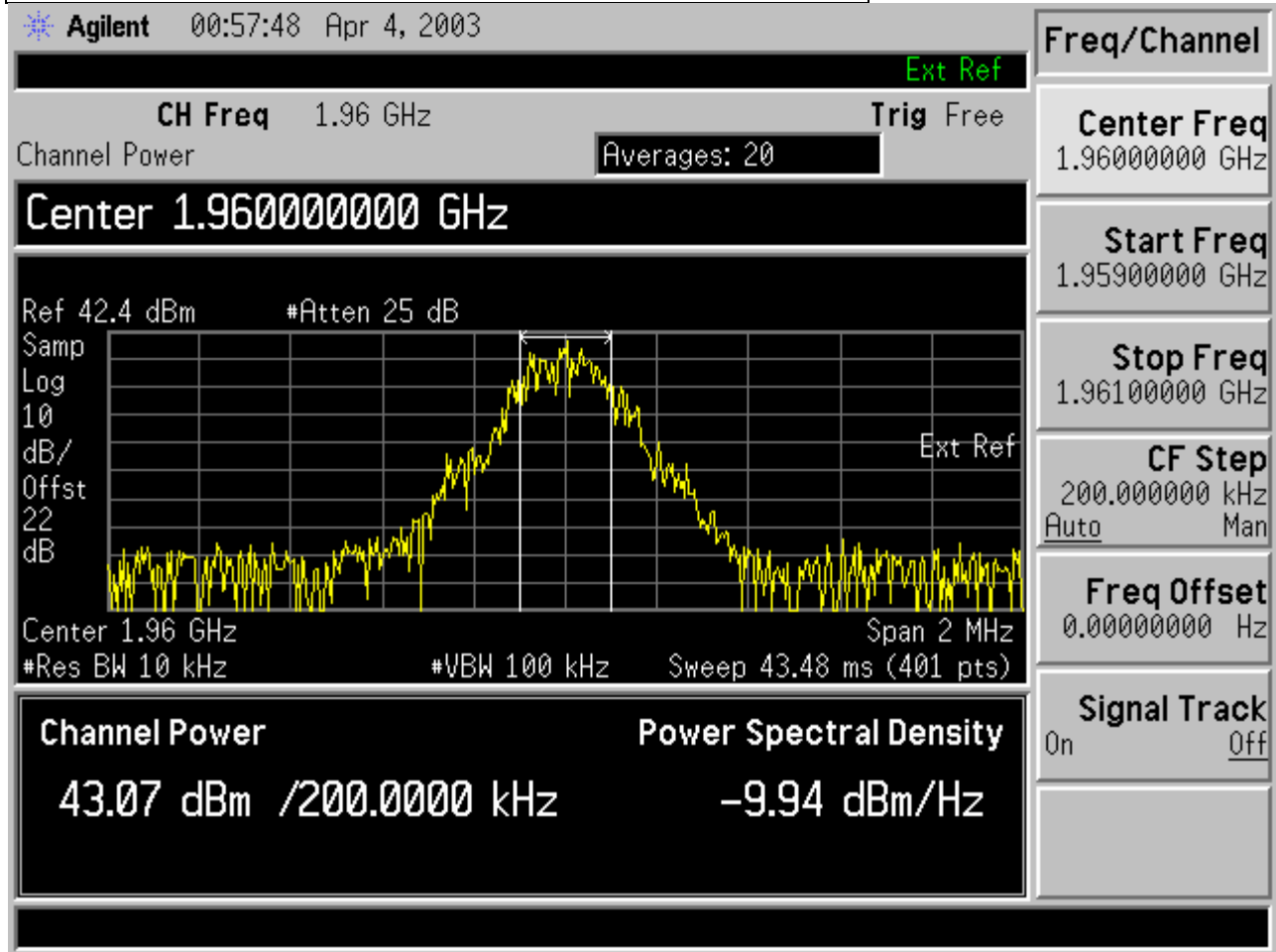
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Mean power ANT 1
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 115VAC
 Modulation: GSM (GMSK)



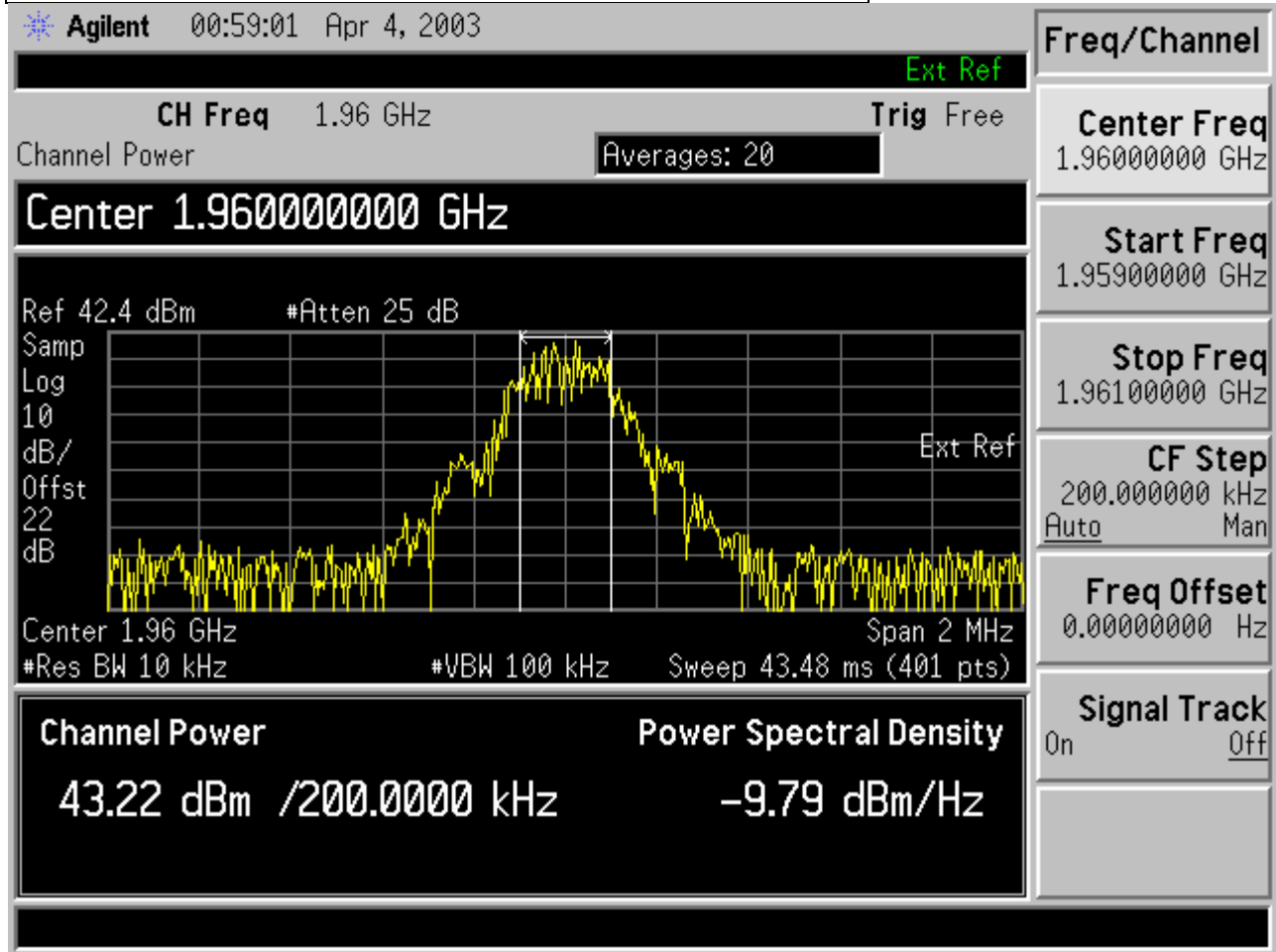
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Mean power ANT 1
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 265 VAC
 Modulation: GSM (GMSK)



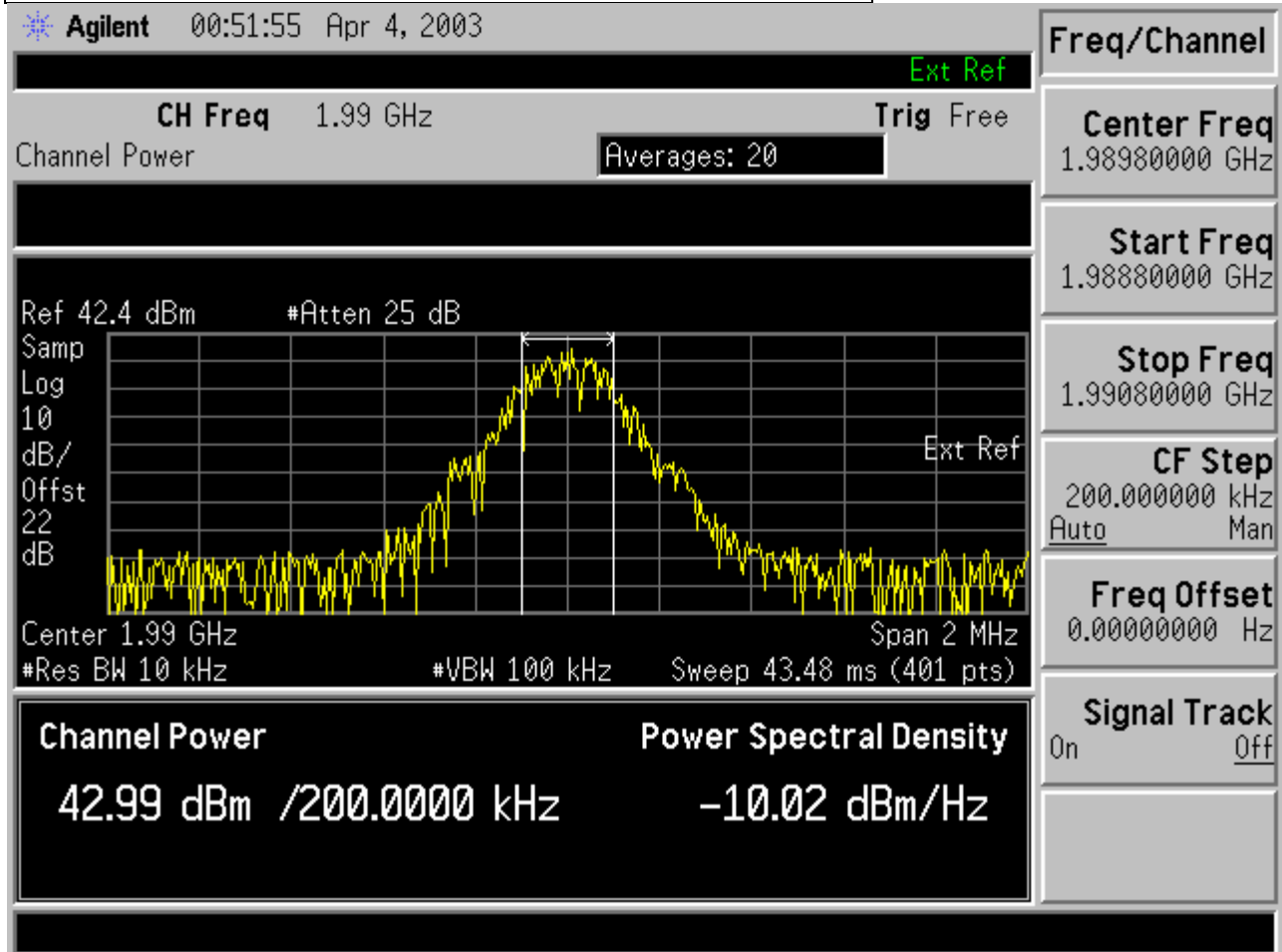
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Mean power ANT 1
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 85 VAC
 Modulation: GSM (GMSK)



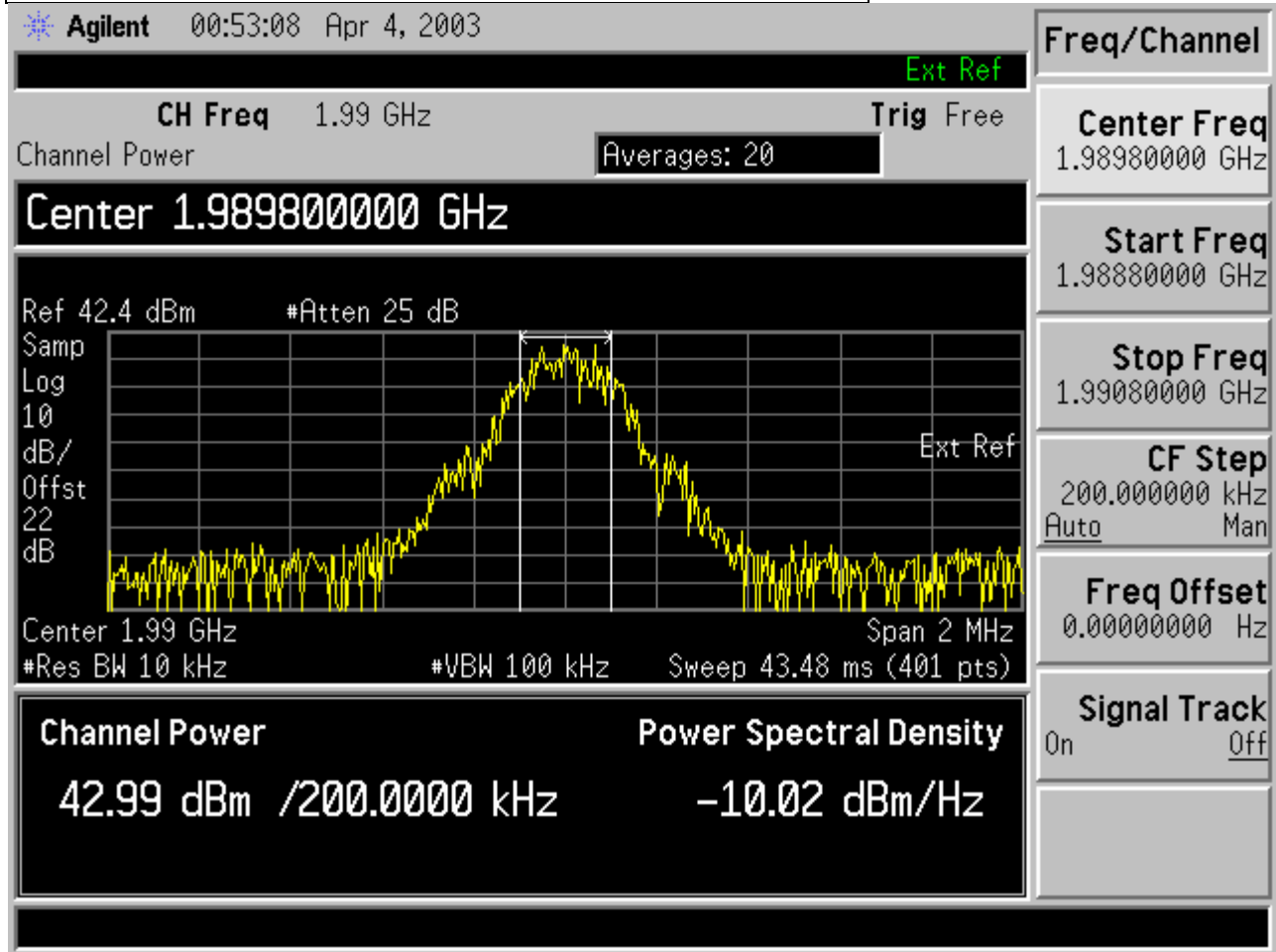
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Mean power ANT 1
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 115VAC
 Modulation: GSM (GMSK)



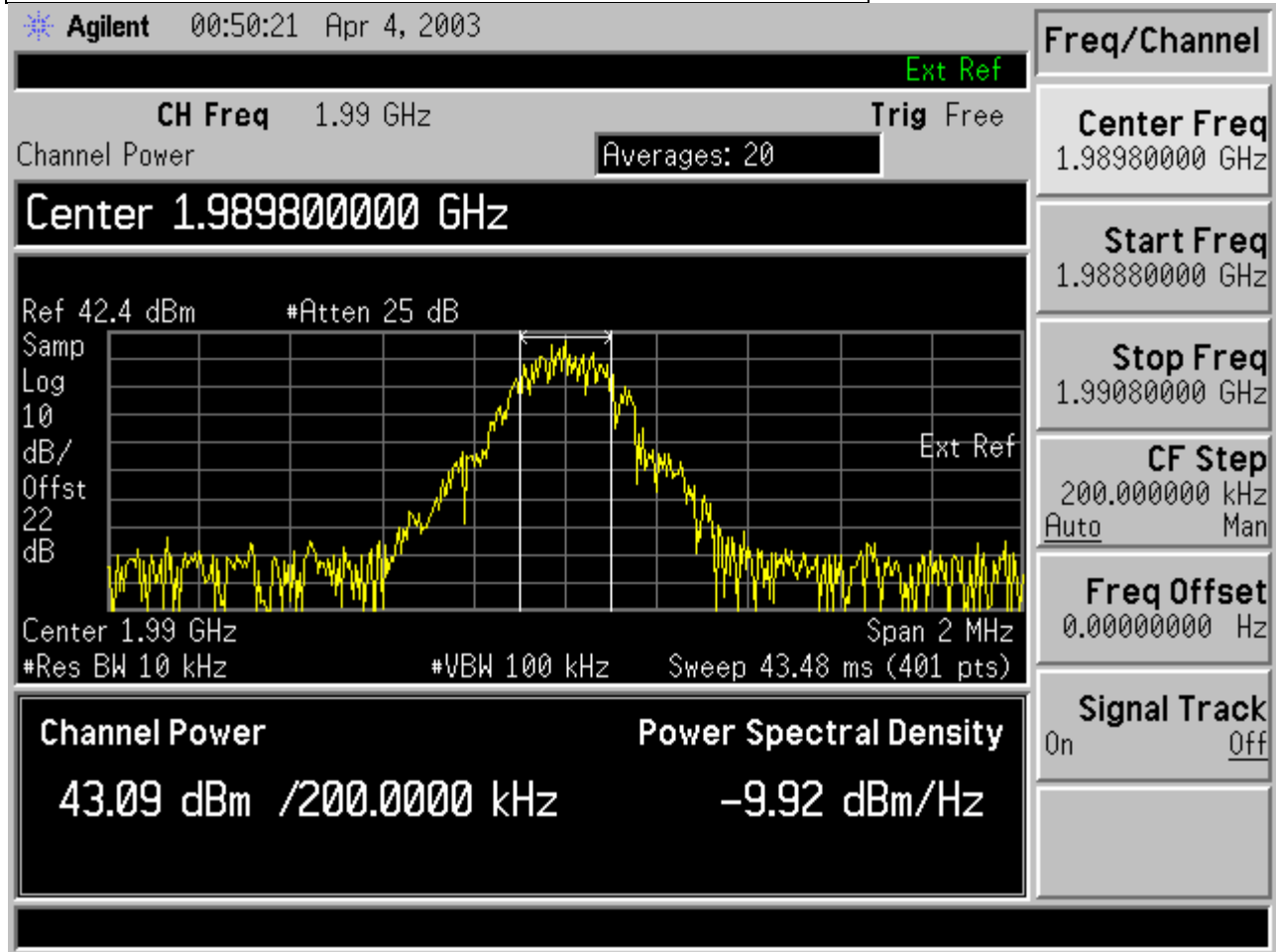
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Mean power ANT 1
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 265 VAC
 Modulation: GSM (GMSK)



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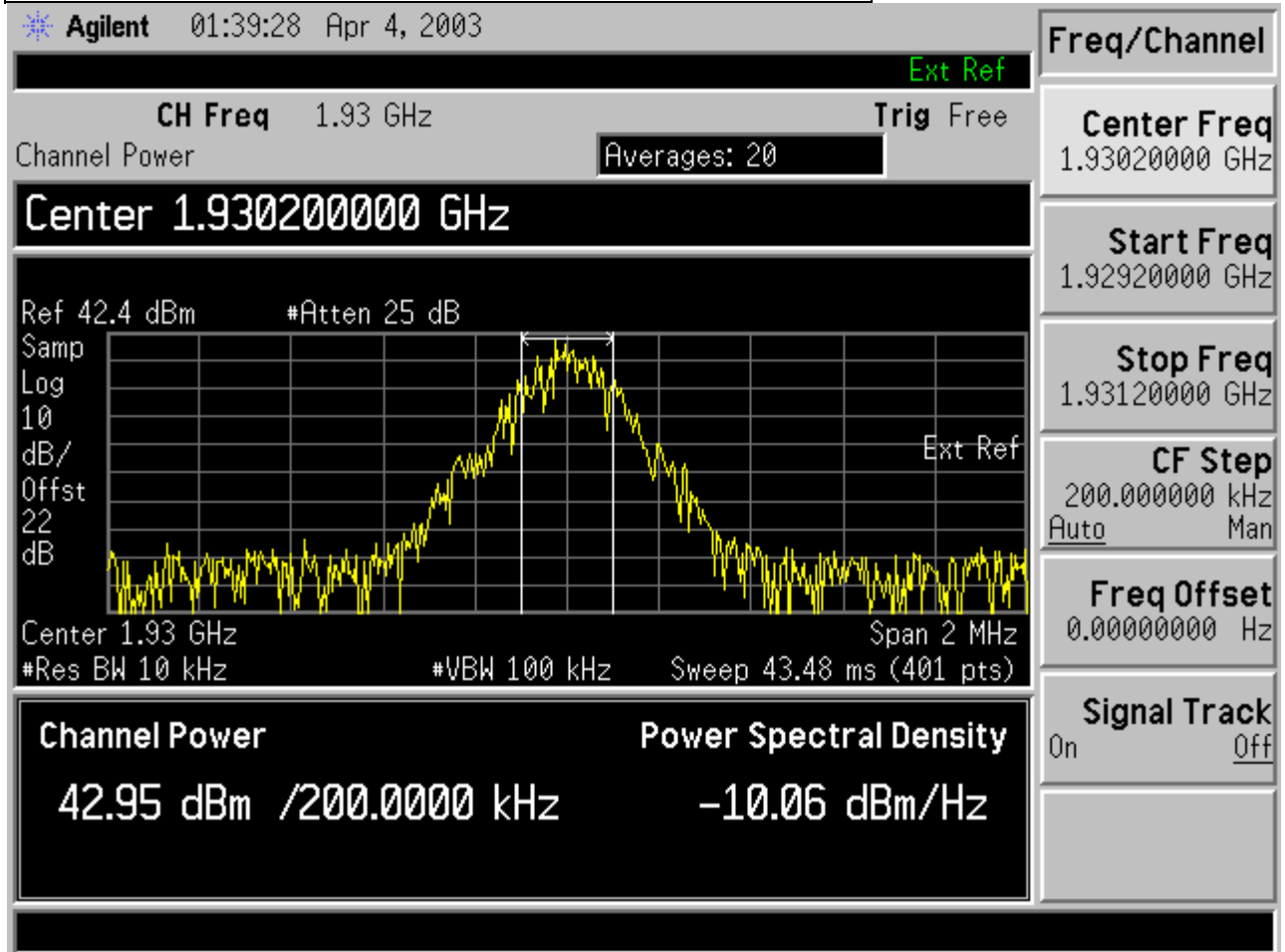
Mean power ANT 1
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 85 VAC
 Modulation: GSM (GMSK)



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9.2 RF POWER OUTPUT ANT 2

Mean power ANT 2 CH B
 Channel B 1930.2 MHz
 Gain 15 dB
 Input voltage 115VAC
 Modulation: GSM (GMSK)



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Mean power ANT 2
Channel B 1930.2 MHz
Gain 15 dB
Input voltage 265 VAC
Modulation: GSM (GMSK)

Agilent 01:38:42 Apr 4, 2003

Ext Ref

CH Freq 1.93 GHz **Trig** Free

Channel Power **Averages: 20**

Center 1.930200000 GHz

Ref 42.4 dBm #Atten 25 dB

Samp 10
Log
dB/Offst 22 dB

Center 1.93 GHz Span 2 MHz
#Res BW 10 kHz #VBW 100 kHz Sweep 43.48 ms (401 pts)

Channel Power **Power Spectral Density**

43.07 dBm /200.0000 kHz -9.94 dBm/Hz

Freq/Channel

Center Freq 1.93020000 GHz

Start Freq 1.92920000 GHz

Stop Freq 1.93120000 GHz

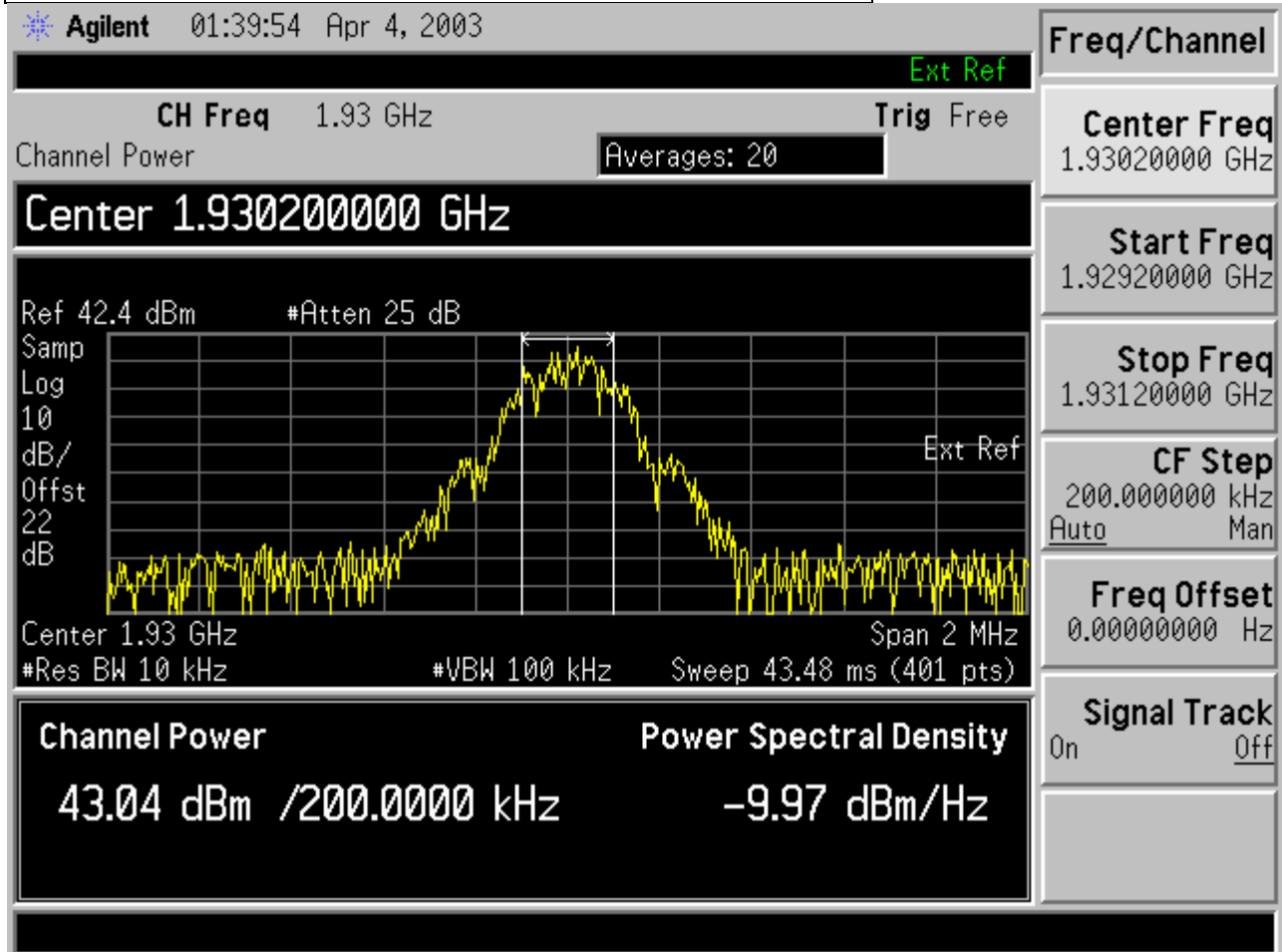
CF Step 200.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

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Mean power ANT 2
Channel B 1930.2 MHz
Gain 15 dB
Input voltage 85 VAC
Modulation: GSM (GMSK)



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Mean power ANT 2
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 115 VAC
 Modulation: GSM (GMSK)

Agilent 01:34:25 Apr 4, 2003

CH Freq 1.96 GHz Trig Free Ext Ref

Channel Power Averages: 19

Number of Averages 20

Ref 42.4 dBm #Atten 25 dB

Samp 10
 Log
 dB/Offst 22
 dB

Start 1.959 GHz Stop 1.961 GHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 43.48 ms (401 pts)

Channel Power Power Spectral Density
 42.95 dBm /200.0000 kHz -10.06 dBm/Hz

Meas Setup

Avg Number 20 On Off

Avg Mode Exp Repeat

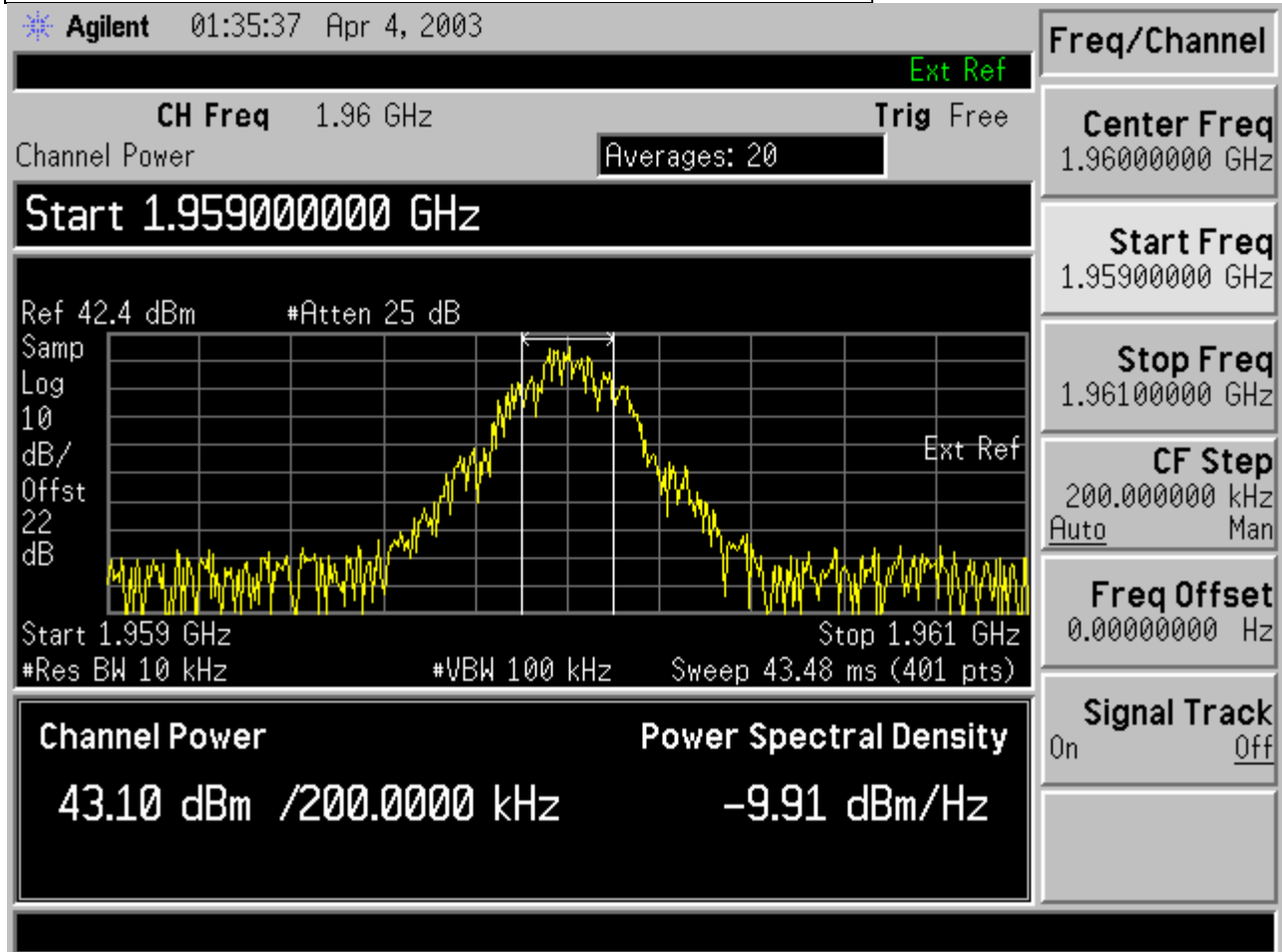
Integ BW 200.000 kHz

Chan Pwr Span 2.00000000 MHz

Optimize Ref Level

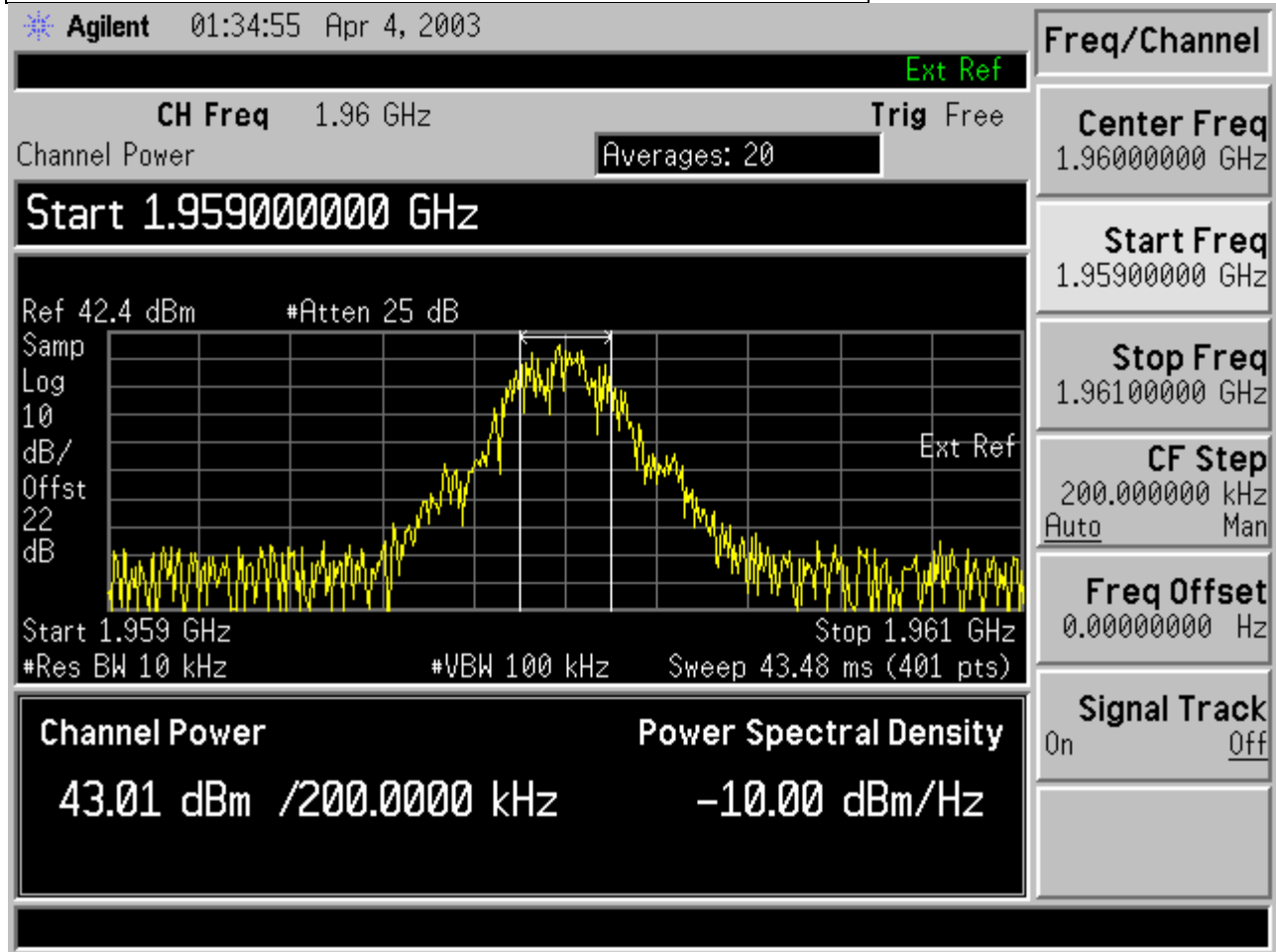
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Mean power ANT 2
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 265 VAC
 Modulation: GSM (GMSK)



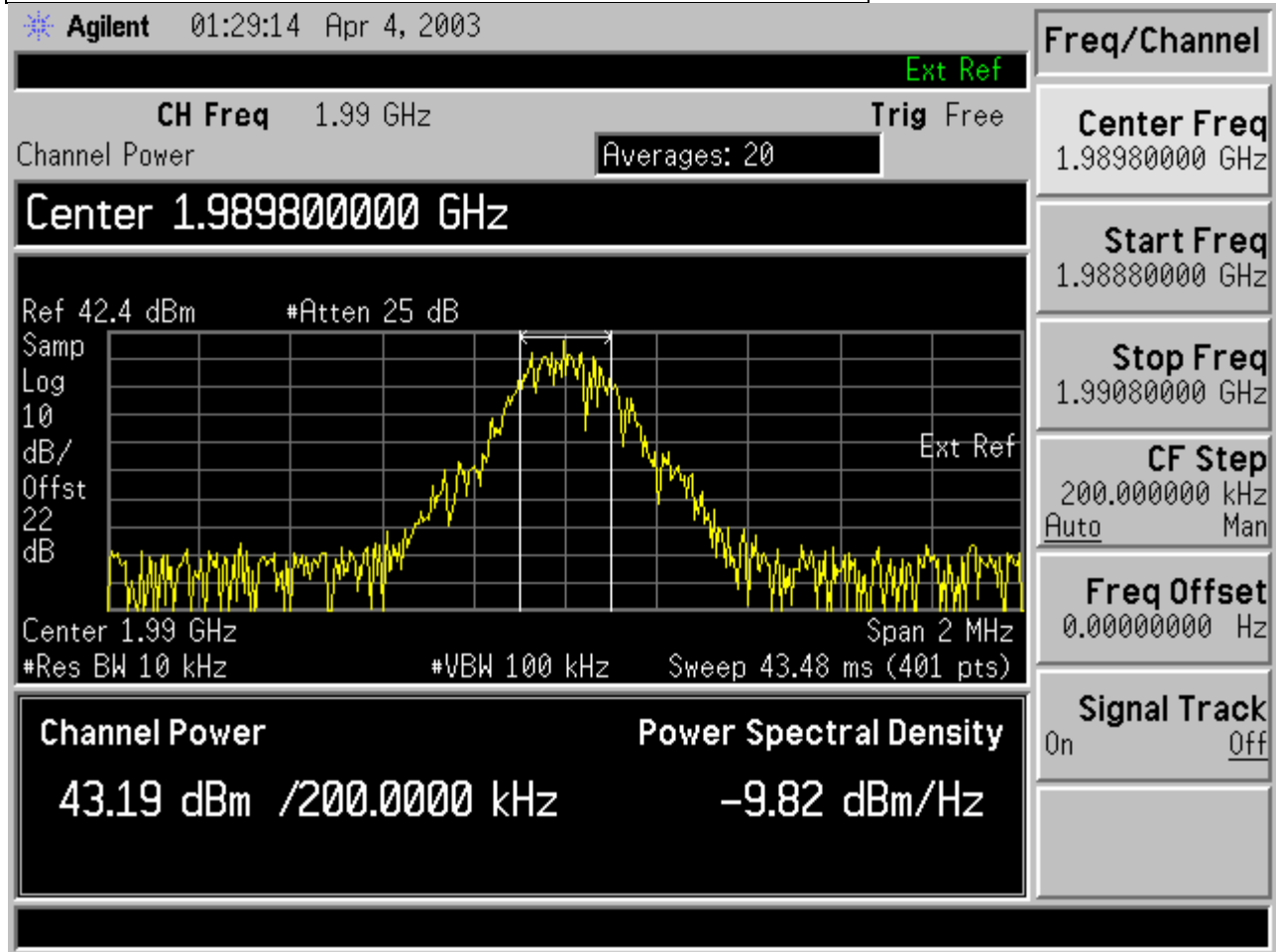
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Mean power ANT 2
 Channel M 1960 MHz
 Gain 15 dB
 Input voltage 85 VAC
 Modulation: GSM (GMSK)



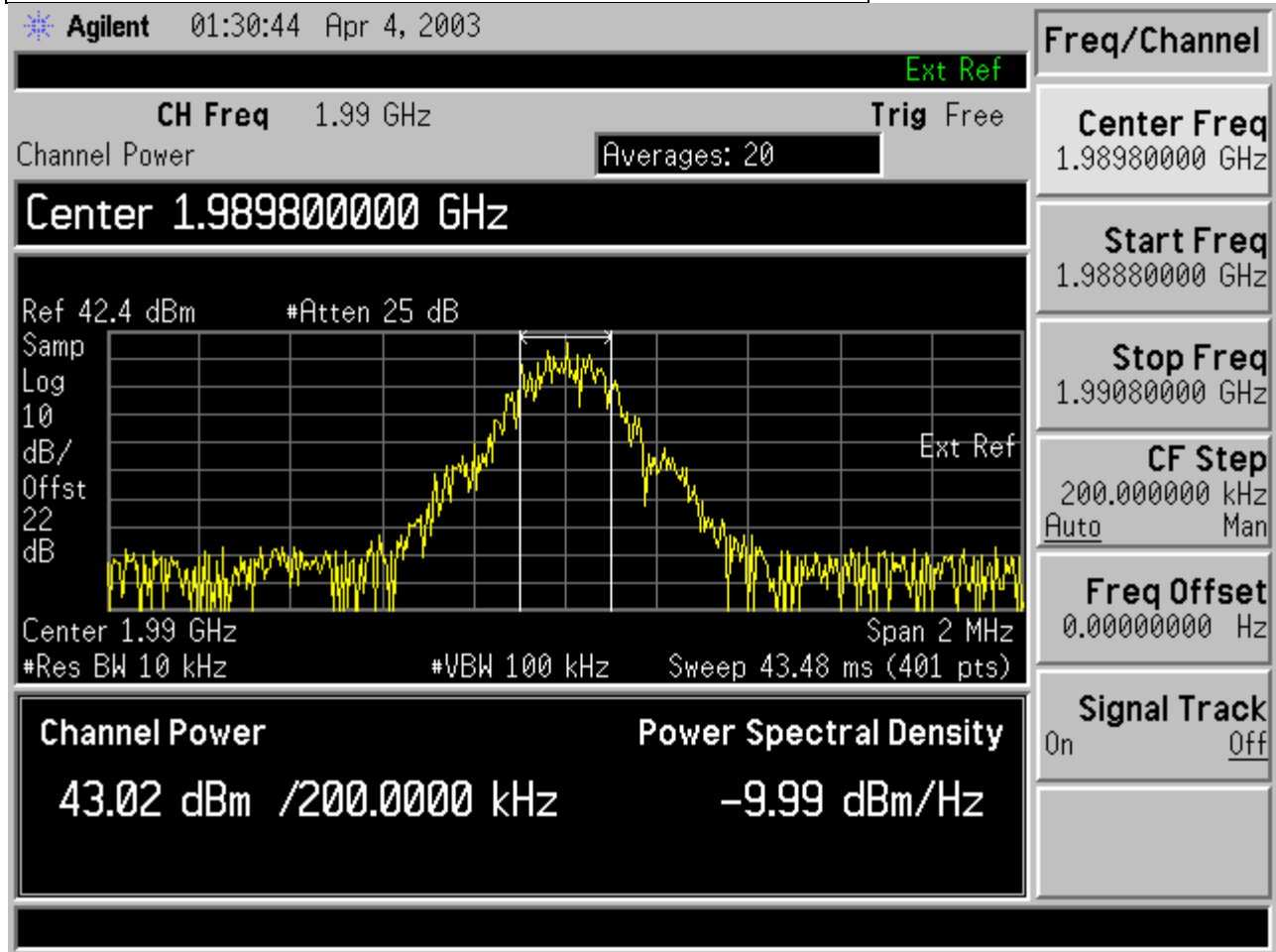
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Mean power ANT 2
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 115 VAC
 Modulation: GSM (GMSK)



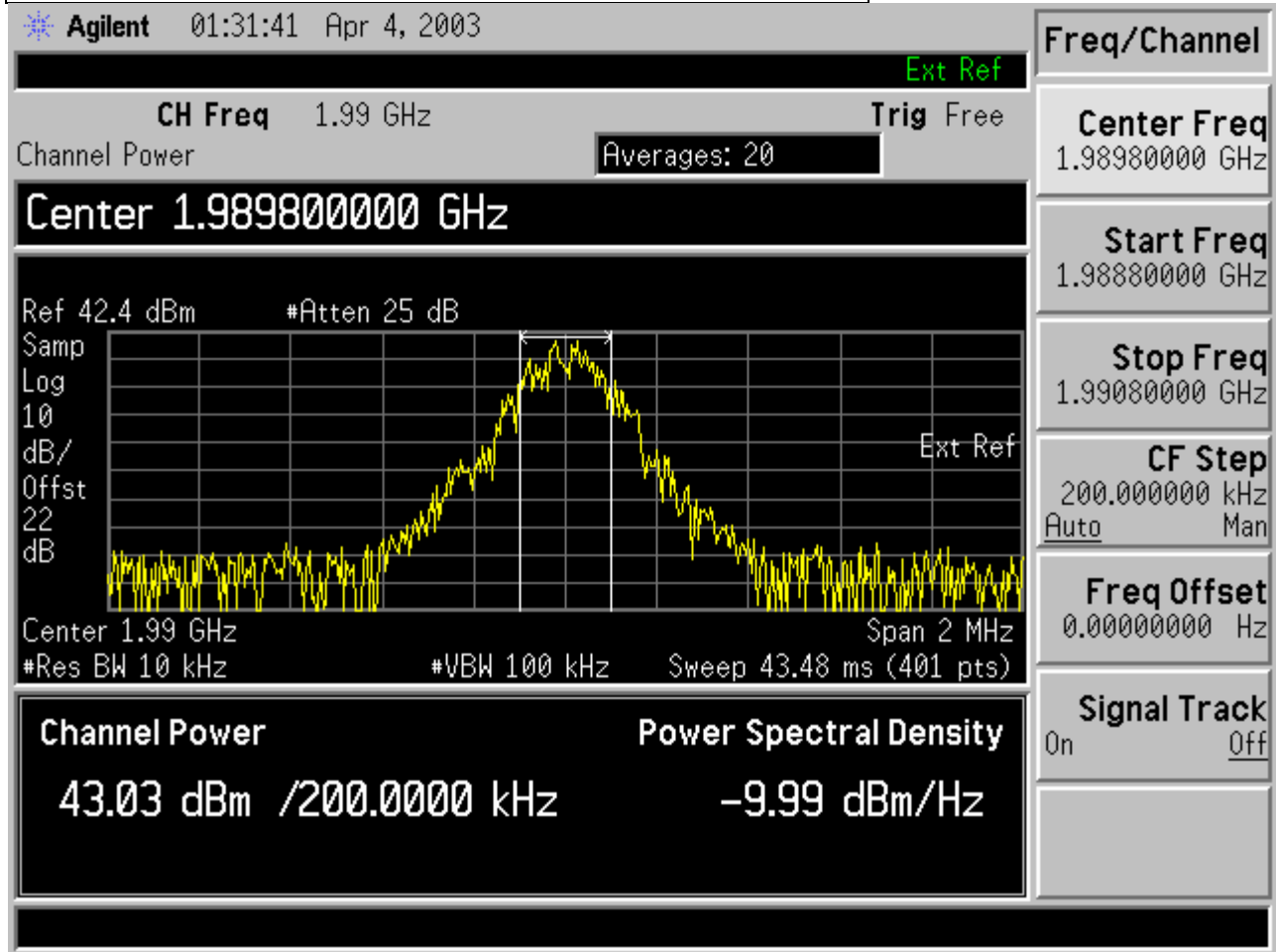
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Mean power ANT 2
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 265 VAC*
 Modulation: GSM (GMSK)



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Mean power ANT 2
 Channel T 1989.8 MHz
 Gain 15 dB
 Input voltage 85 VAC
 Modulation: GSM (GMSK)



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9.3 Occupied band width ANT 1

Occupied bandwidth
Channel B 1930.2 MHz
Modulation: GSM (GMSK)

Agilent 00:36:59 Apr 3, 2003

CH Freq 1.93 GHz Trig Free

Occupied Bandwidth Averages: 20

Number of Averages 20

Ref 41.44 dBm #Atten 25 dB

Peak Log 10 dB/Offst 21 dB

Center 1.93 GHz Span 1 MHz

#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth 247.4041 kHz Occ BW % Pwr 99.00 %

Transmit Freq Error 2.380 kHz

x dB Bandwidth 584.061 kHz

Meas Setup

Avg Number 20 On Off

Avg Mode Exp Repeat

Max Hold On Off

Occ BW % Pwr 99.00 %

OBW Span 1.00000000 MHz

x dB -51.00 dB

Optimize Ref Level

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Occupied bandwidth
Channel B 1930.2 MHz
Modulation: EDGE

Agilent 03:59:58 Apr 24, 2003

Freq/Channel

CH Freq 1.93 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.93020000 GHz

Ref 41 dBm #Atten 30 dB

Center Freq 1.93020000 GHz

Start Freq 1.92970000 GHz

Stop Freq 1.93070000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
244.0220 kHz

Transmit Freq Error 584.991 Hz
x dB Bandwidth 313.052 kHz

Center 1.93 GHz Span 1 MHz
#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

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Occupied bandwidth
Channel M 1960 MHz
Modulation: GSM (GMSK)

Agilent 00:39:41 Apr 3, 2003 Ext Ref

CH Freq 1.96 GHz **Trig** Free

Occupied Bandwidth Averages: 20

Ref 41.44 dBm #Atten 25 dB

Peak
Log
10
dB/
Offst
21
dB

Center 1.96 GHz Span 1 MHz

#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Freq/Channel	
Center Freq	1.96000000 GHz
Start Freq	1.95950000 GHz
Stop Freq	1.96050000 GHz
CF Step	100.000000 kHz Auto Man
Freq Offset	0.00000000 Hz
Signal Track	On <u>Off</u>

Occupied Bandwidth **Occ BW % Pwr** 99.00 %

247.1794 kHz

Transmit Freq Error 2.300 kHz

x dB Bandwidth 583.821 kHz

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Occupied bandwidth
Channel M 1960 MHz
Modulation: EDGE

Agilent 03:58:12 Apr 24, 2003

CH Freq 1.96 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.960000000 GHz

Ref 41 dBm #Atten 30 dB

Center 1.96 GHz **Span** 1 MHz
#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
245.3827 kHz

Transmit Freq Error 1.064 kHz
x dB Bandwidth 314.470 kHz

Freq/Channel

Center Freq 1.96000000 GHz

Start Freq 1.95950000 GHz

Stop Freq 1.96050000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

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Occupied bandwidth
Channel T 1989.8 MHz
Modulation: GSM (GMSK)

Agilent 00:44:35 Apr 3, 2003 Ext Ref

CH Freq 1.99 GHz **Trig** Free

Occupied Bandwidth Averages: 20

Center 1.989800000 GHz

Ref 41.44 dBm #Atten 25 dB

Peak
Log
10
dB/
Offst
21
dB

Center 1.99 GHz Span 1 MHz
#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
246.9252 kHz

Transmit Freq Error 2.326 kHz
x dB Bandwidth 584.156 kHz

Freq/Channel

Center Freq 1.98980000 GHz

Start Freq 1.98930000 GHz

Stop Freq 1.99030000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track
On Off

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Occupied bandwidth
Channel T 1989.8 MHz
Modulation: EDGE

Agilent 03:56:30 Apr 24, 2003

CH Freq 1.99 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.989800000 GHz

Ref 41 dBm #Atten 30 dB

Center 1.99 GHz **Span** 1 MHz
#Res BW 10 kHz #VBW 100 kHz **Sweep** 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
244.1961 kHz

Transmit Freq Error 1.241 kHz
x dB Bandwidth 314.833 kHz

Freq/Channel

Center Freq 1.98980000 GHz

Start Freq 1.98930000 GHz

Stop Freq 1.99030000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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9.4 Occupied band width ANT 2

Occupied bandwidth
Channel B 1930.2MH
Modulation: GSM (GMSK)

Agilent 01:48:27 Apr 4, 2003

Ext Ref

CH Freq 1.93 GHz Trig Free

Occupied Bandwidth Averages: 20

Center 1.930200000 GHz

Ref 46.4 dBm #Atten 30 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.93 GHz Span 1 MHz

#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth 246.2579 kHz Occ BW % Pwr 99.00 %

Transmit Freq Error 1.966 kHz

x dB Bandwidth 323.904 kHz*

Freq/Channel

Center Freq 1.93020000 GHz

Start Freq 1.92970000 GHz

Stop Freq 1.93070000 GHz

CF Step 100.000000 kHz Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
Channel B 1930.2MH
Modulation: EDGE

Agilent 02:10:15 Apr 24, 2003

Freq/Channel

CH Freq 1.96 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.960000000 GHz

Center Freq 1.960000000 GHz

Start Freq 1.959500000 GHz

Stop Freq 1.960500000 GHz

CF Step 100.0000000 kHz
Auto Man

Freq Offset 0.000000000 Hz

Signal Track On Off

Ref 41 dBm #Atten 30 dB

Center 1.96 GHz Span 1 MHz
#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
244.7940 kHz

Transmit Freq Error 1.109 kHz
x dB Bandwidth 317.765 kHz

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
Channel M 1960MHz
Modulation: GSM (GMSK)

Agilent 01:49:26 Apr 4, 2003 Ext Ref

CH Freq 1.96 GHz **Trig** Free

Occupied Bandwidth Averages: 20

Center 1.960000000 GHz

Ref 46.4 dBm #Atten 30 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.96 GHz Span 1 MHz

#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %

246.1728 kHz

Transmit Freq Error 1.125 kHz

x dB Bandwidth 317.811 kHz*

Freq/Channel

Center Freq
1.96000000 GHz

Start Freq
1.95950000 GHz

Stop Freq
1.96050000 GHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
Channel M 1960MHz
Modulation: EDGE

Agilent 02:24:27 Apr 24, 2003

CH Freq 1.99 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.989800000 GHz

Ref 41 dBm #Atten 30 dB

Center 1.99 GHz **Span** 1 MHz
#Res BW 10 kHz #VBW 100 kHz **Sweep** 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
245.7947 kHz

Transmit Freq Error 949.180 Hz
x dB Bandwidth 314.127 kHz

Freq/Channel

Center Freq 1.98980000 GHz

Start Freq 1.98930000 GHz

Stop Freq 1.99030000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
Channel T 1989.8 MHz
Modulation: GSM (GMSK)

Agilent 01:50:12 Apr 4, 2003 Ext Ref

CH Freq 1.99 GHz **Trig** Free

Occupied Bandwidth Averages: 20

Center 1.989800000 GHz

Ref 46.4 dBm #Atten 30 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.99 GHz Span 1 MHz

#Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %

247.4246 kHz

Transmit Freq Error 1.396 kHz

x dB Bandwidth 319.839 kHz*

Freq/Channel

Center Freq
1.98980000 GHz

Start Freq
1.98930000 GHz

Stop Freq
1.99030000 GHz

CF Step
100.000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
Channel T 1989.8 MHz
Modulation: EDGE

Agilent 02:08:28 Apr 24, 2003

Freq/Channel

CH Freq 1.93 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Center 1.93020000 GHz

Ref 41 dBm #Atten 30 dB

Center Freq 1.93020000 GHz

Start Freq 1.92970000 GHz

Stop Freq 1.93070000 GHz

CF Step 100.000000 kHz
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
245.8293 kHz

Transmit Freq Error 1.267 kHz
x dB Bandwidth 315.852 kHz

Center 1.93 GHz **Span** 1 MHz
#Res BW 10 kHz #VBW 100 kHz **Sweep** 27.5 ms (401 pts)

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel B 1930.2 MHz
 Modulation: GSM (GMSK)
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 00:30:08 Apr 3, 2003

CH Freq 1.93 GHz Trig Free
 Occupied Bandwidth Averages: 20

Center 1.93020000 GHz

Ref 40.46 dBm #Atten 25 dB
 Peak Log 10 dB/Offst 20 dB

Center 1.93 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth 247.4812 kHz Occ BW % Pwr 99.00 %

Transmit Freq Error 2.519 kHz
 x dB Bandwidth 585.787 kHz

Ext Ref

Freq/Channel

Center Freq 1.93020000 GHz

Start Freq 1.92970000 GHz

Stop Freq 1.93070000 GHz

CF Step 100.000000 kHz Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel B 1930.2 MHz
 Modulation: EDGE
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 04:05:10 Apr 24, 2003

CH Freq 1.93 GHz **Trig** Free
 Occupied Bandwidth **Averages: 20**

Center 1.93020000 GHz

Ref 41 dBm #Atten 30 dB

Center 1.93 GHz **Span** 1 MHz
 #Res BW 10 kHz #VBW 100 kHz **Sweep** 27.5 ms (401 pts)

Occupied Bandwidth **Occ BW % Pwr** 99.00 %
247.3294 kHz

Transmit Freq Error 2.314 kHz
x dB Bandwidth 323.525 kHz

Freq/Channel
Center Freq 1.93020000 GHz
Start Freq 1.92970000 GHz
Stop Freq 1.93070000 GHz
CF Step 100.000000 kHz
 Auto Man
Freq Offset 0.00000000 Hz
Signal Track
 On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel M 1960 MHz
 Modulation: GSM (GMSK)
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 00:26:33 Apr 3, 2003

CH Freq 1.96 GHz Trig Free
 Occupied Bandwidth Averages: 20

Center 1.96000000 GHz

Ref 40.46 dBm #Atten 25 dB
 Peak
 Log
 10
 dB/
 Offst
 20
 dB

Center 1.96 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth Occ BW % Pwr 99.00 %
 247.1906 kHz

Transmit Freq Error 2.151 kHz
 x dB Bandwidth 583.981 kHz

Freq/Channel
 Center Freq 1.96000000 GHz
 Start Freq 1.95950000 GHz
 Stop Freq 1.96050000 GHz
 CF Step 100.000000 kHz
 Auto Man
 Freq Offset 0.00000000 Hz
 Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel M 1960 MHz
 Modulation: EDGE
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 04:07:27 Apr 24, 2003

CH Freq 1.96 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Number of Averages 20

Ref 41 dBm #Atten 30 dB

Peak Log 10 dB/Offst 21 dB

Center 1.96 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth	Occ BW % Pwr	99.00 %
246.6412 kHz		
Transmit Freq Error	1.931 kHz	
x dB Bandwidth	321.026 kHz	

Meas Setup

Avg Number
 20
 On Off

Avg Mode
 Exp Repeat

Max Hold
 On Off

Occ BW % Pwr
 99.00 %

OBW Span
 1.00000000 MHz

x dB
 -26.00 dB

Optimize Ref Level

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel T 1989.8 MHz
 Modulation: GSM (GMSK)
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 00:21:49 Apr 3, 2003

CH Freq 1.99 GHz Trig Free
 Occupied Bandwidth Averages: 20

Center 1.989800000 GHz

Ref 40.46 dBm #Atten 25 dB
 Samp Log
 10 dB/Offst
 20 dB

Center 1.99 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth 246.4881 kHz Occ BW % Pwr 99.00 %

Transmit Freq Error 1.110 kHz
 x dB Bandwidth 582.639 kHz*

C:\SCREN104.GIF file saved

Freq/Channel	Center Freq 1.98980000 GHz
Start Freq	1.98930000 GHz
Stop Freq	1.99030000 GHz
CF Step	100.000000 kHz Auto Man
Freq Offset	0.00000000 Hz
Signal Track	On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Occupied bandwidth
 Channel T 1989.8 MHz
 Modulation: EDGE
 TEST SETUP WITHOUT D.U.T CONNECTED

Agilent 04:09:26 Apr 24, 2003

CH Freq 1.99 GHz **Trig** Free

Occupied Bandwidth **Averages: 20**

Number of Averages 20

Ref 41 dBm #Atten 30 dB

Peak Log 10 dB/Offst 21 dB

Center 1.99 GHz Span 1 MHz
 #Res BW 10 kHz #VBW 100 kHz Sweep 27.5 ms (401 pts)

Occupied Bandwidth	Occ BW % Pwr	99.00 %
246.4730 kHz		
Transmit Freq Error	2.753 kHz	
x dB Bandwidth	317.658 kHz	

Meas Setup

Avg Number 20
On Off

Avg Mode Repeat
Exp

Max Hold Off
On

Occ BW % Pwr 99.00 %

OBW Span 1.00000000 MHz

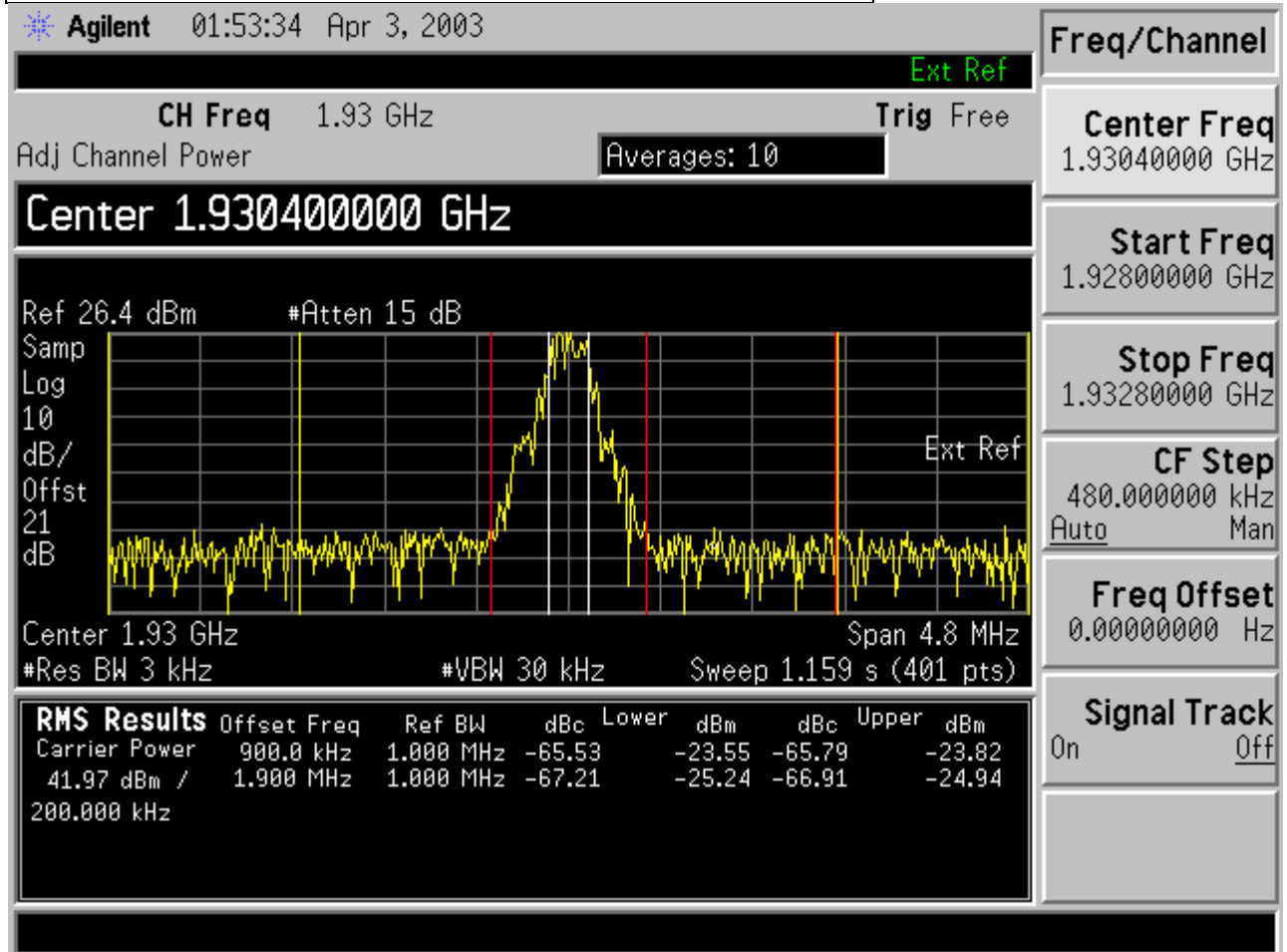
x dB -26.00 dB

Optimize Ref Level

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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9.5 Spurious at Band edged ANT 1

Spurious at Band edge
Channel 513 1930.4 MHz
Modulation: GSM (GMSK)



Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 513 1930.4 MHz
Modulation: EDGE

Agilent 06:25:35 Apr 24, 2003

Ext Ref

CH Freq 1.93 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.930400000 GHz

Ref 40 dBm Atten 30 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.93 GHz Span 4.8 MHz

#Res BW 3 kHz VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results		Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-60.10	-17.40	-60.62	-17.92			
42.70 dBm /	1.900 MHz	1.000 MHz	-64.84	-22.14	-64.83	-22.13			
	200.000 kHz								

Ext Ref

Freq/Channel

Center Freq 1.93040000 GHz

Start Freq 1.92800000 GHz

Stop Freq 1.93280000 GHz

CF Step 480.000000 kHz Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 809 1989.6 MHz
Modulation: GSM (GMSK)

Agilent 01:58:33 Apr 3, 2003

Ext Ref

CH Freq 1.99 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.989600000 GHz

Ref 26.4 dBm #Atten 15 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.99 GHz Span 4.8 MHz

#Res BW 3 kHz #VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results		Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-65.81	-24.36	-65.98	-24.53			
41.45 dBm /	1.900 MHz	1.000 MHz	-67.18	-25.73	-67.19	-25.74			
	200.000 kHz								

Ext Ref

Freq/Channel

Center Freq 1.989600000 GHz

Start Freq 1.987200000 GHz

Stop Freq 1.992000000 GHz

CF Step 480.0000000 kHz Auto Man

Freq Offset 0.000000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 809 1989.6 MHz
Modulation: EDGE

Agilent 06:27:40 Apr 24, 2003

Ext Ref

CH Freq 1.99 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.989600000 GHz

Ref 40 dBm Atten 30 dB

Samp 10 Log dB/Offst 21 dB

Center 1.99 GHz Span 4.8 MHz

#Res BW 3 kHz VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results		Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-60.19	-17.14	-61.03	-17.98			
43.04 dBm /	1.900 MHz	1.000 MHz	-64.64	-21.59	-64.78	-21.74			
	200.000 kHz								

Ext Ref

Freq/Channel

Center Freq 1.989600000 GHz

Start Freq 1.987200000 GHz

Stop Freq 1.992000000 GHz

CF Step 480.0000000 kHz Auto Man

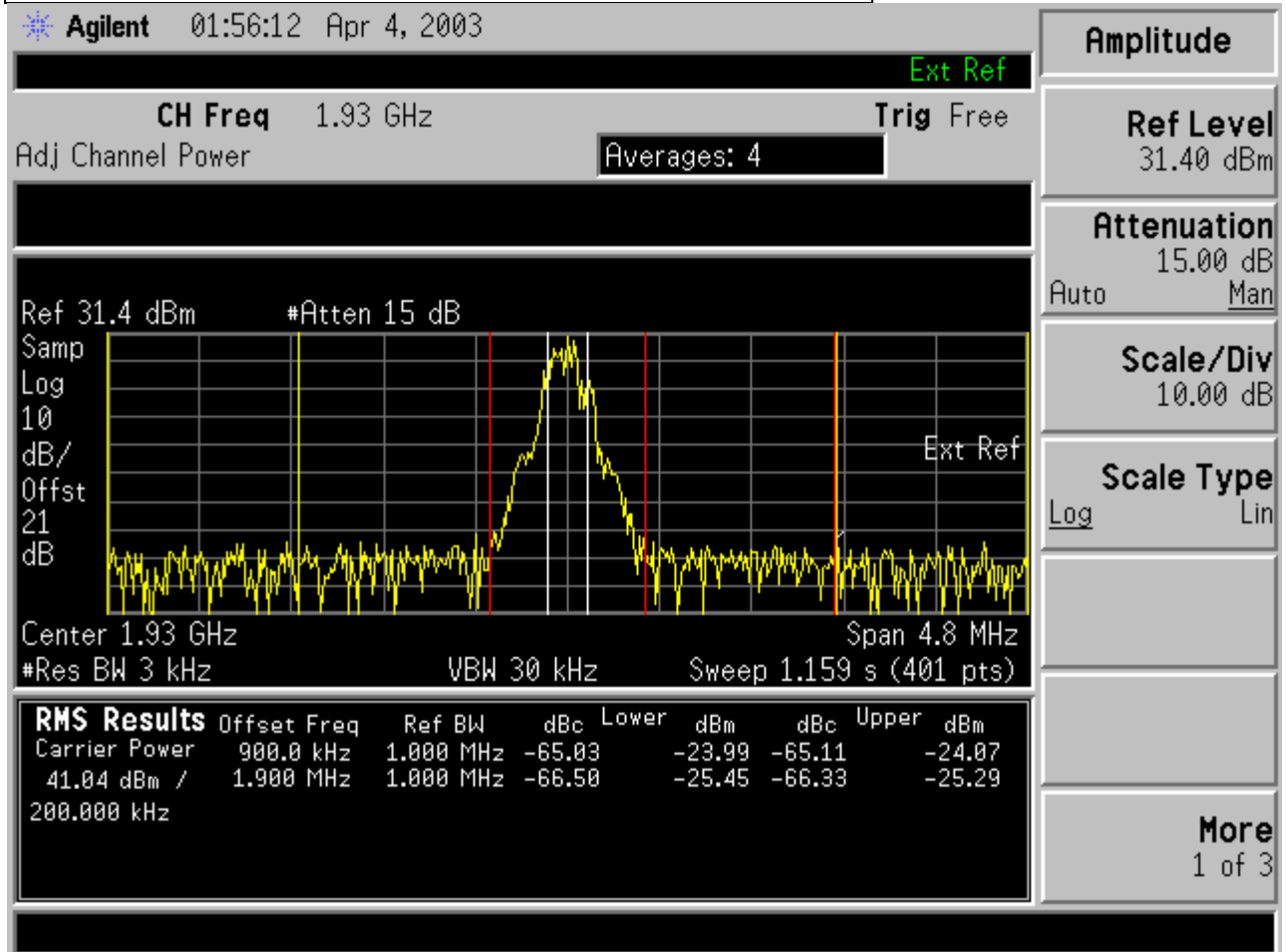
Freq Offset 0.000000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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9.6 Spurious at Band edged ANT 2

Spurious at Band edge
Channel 513 1930.4 MHz
Modulation: GSM (GMSK)



Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 513 1930.4 MHz
Modulation: EDGE

Agilent 06:30:36 Apr 24, 2003

Ext Ref

CH Freq 1.93 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.930400000 GHz

Ref 40 dBm Atten 30 dB

Center 1.93 GHz Span 4.8 MHz

#Res BW 3 kHz VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results	Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-59.80	-17.04	-60.19	-17.43		
42.76 dBm /	1.900 MHz	1.000 MHz	-64.81	-22.06	-64.76	-22.00		
	200.000 kHz							

Ext Ref

Freq/Channel

Center Freq 1.93040000 GHz

Start Freq 1.92800000 GHz

Stop Freq 1.93280000 GHz

CF Step 480.000000 kHz Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 809 1989.6 MHz
Modulation: GSM (GMSK)

Agilent 02:00:01 Apr 4, 2003

Ext Ref

CH Freq 1.99 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.989600000 GHz

Ref 31.4 dBm #Atten 15 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.99 GHz Span 4.8 MHz

#Res BW 3 kHz VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results	Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-64.74	-25.80	-64.66	-25.73		
38.93 dBm /	1.900 MHz	1.000 MHz	-65.97	-27.03	-65.96	-27.03		
	200.000 kHz							

Ext Ref

Freq/Channel

Center Freq 1.989600000 GHz

Start Freq 1.987200000 GHz

Stop Freq 1.992000000 GHz

CF Step 480.0000000 kHz Auto Man

Freq Offset 0.000000000 Hz

Signal Track On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious at Band edge
Channel 809 1989.6 MHz
Modulation: EDGE

Agilent 06:32:50 Apr 24, 2003 Ext Ref

CH Freq 1.99 GHz Trig Free

Adj Channel Power Averages: 10

Center 1.989600000 GHz

Ref 40 dBm Atten 30 dB

Samp Log 10 dB/ Offst 21 dB

Center 1.99 GHz Span 4.8 MHz

#Res BW 3 kHz VBW 30 kHz Sweep 1.159 s (401 pts)

RMS Results		Offset Freq	Ref BW	dBc	Lower	dBm	dBc	Upper	dBm
Carrier Power	900.0 kHz	1.000 MHz	-58.83	-16.32	-59.62	-17.11			
42.51 dBm /	1.900 MHz	1.000 MHz	-63.93	-21.42	-64.52	-22.01			
	200.000 kHz								

Freq/Channel

Center Freq
1.989600000 GHz

Start Freq
1.987200000 GHz

Stop Freq
1.992000000 GHz

CF Step
480.0000000 kHz
Auto Man

Freq Offset
0.000000000 Hz

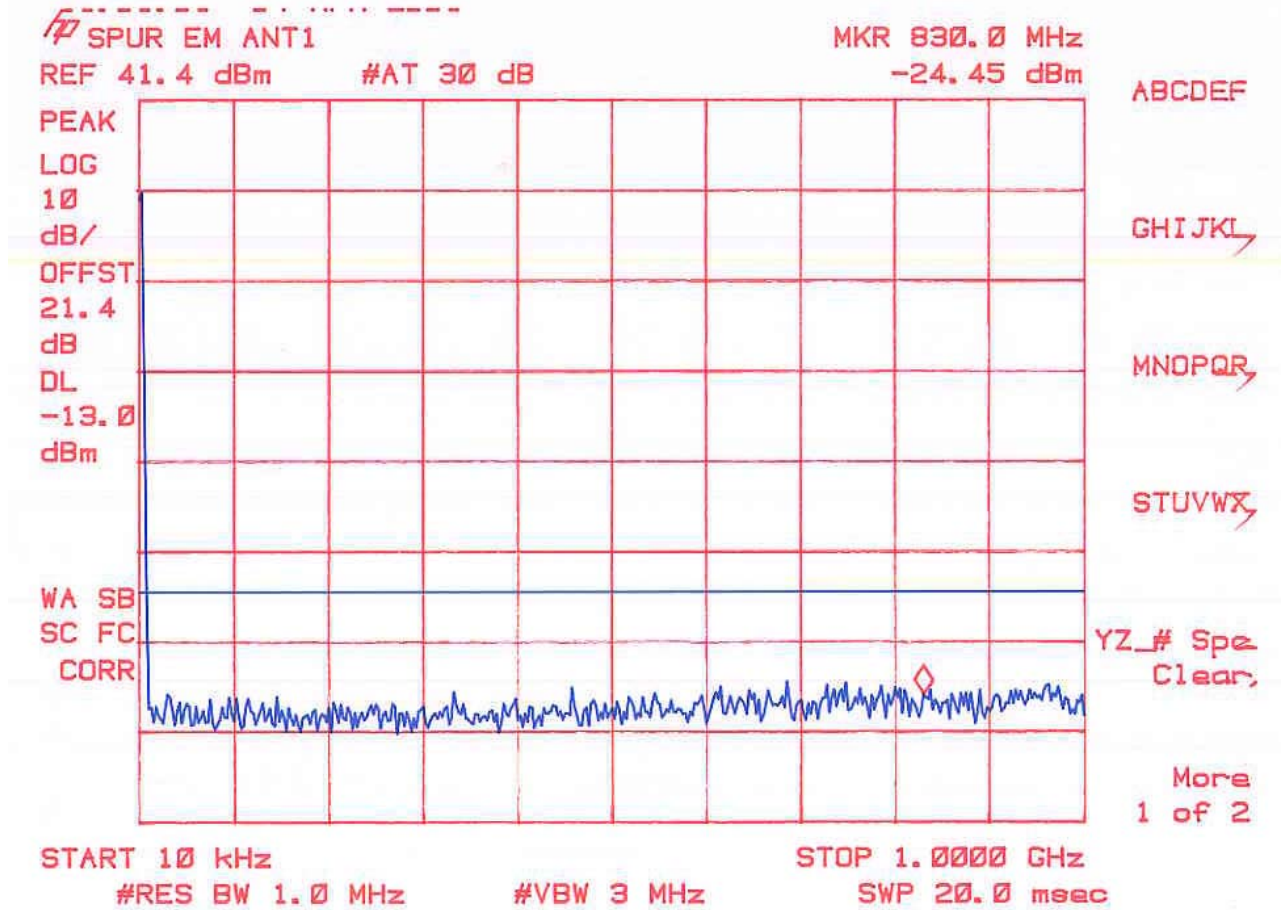
Signal Track
On Off

Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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9.7 Spurious emission Ant port 1

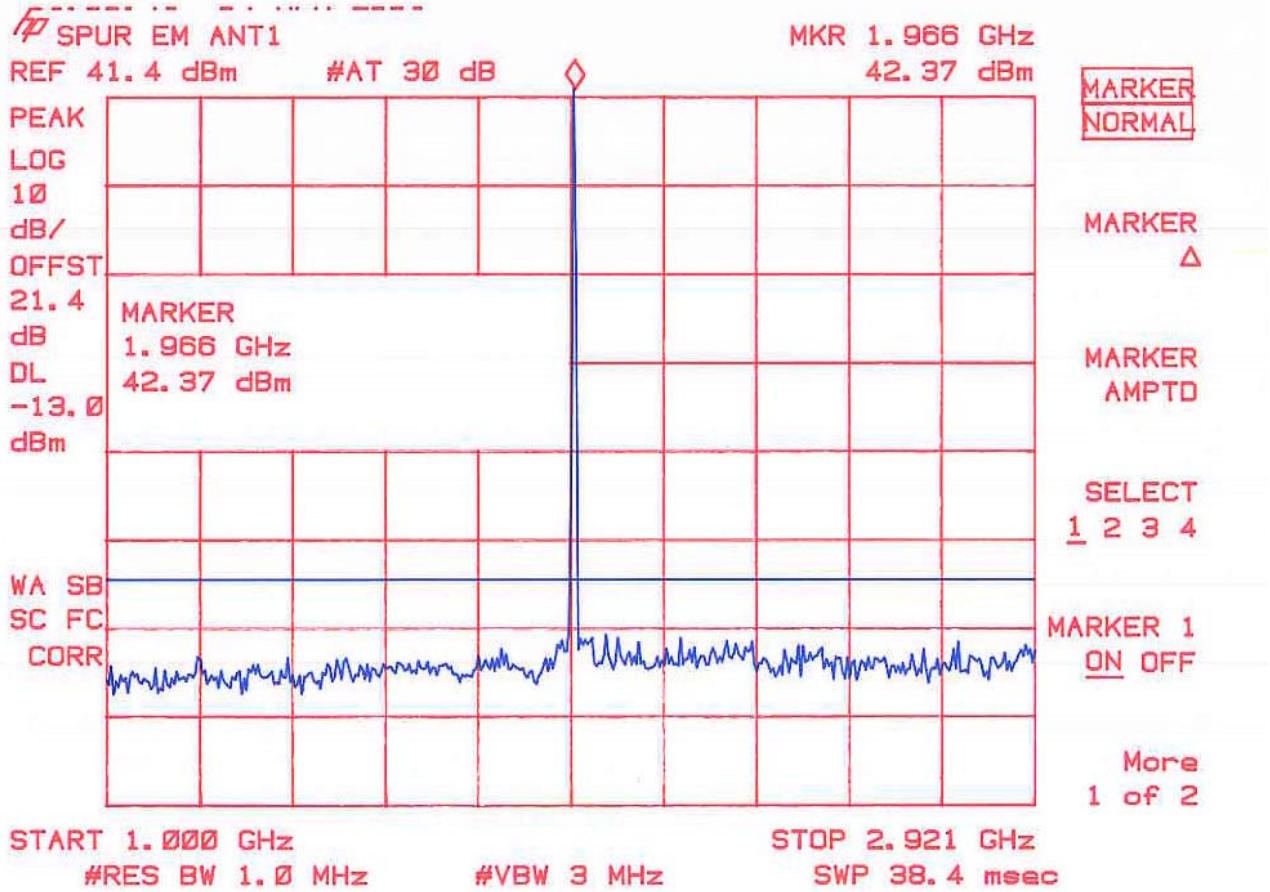
Applied CW signal at BTS 1 port: 1960MHz

Spurious emission 10kHz-1G



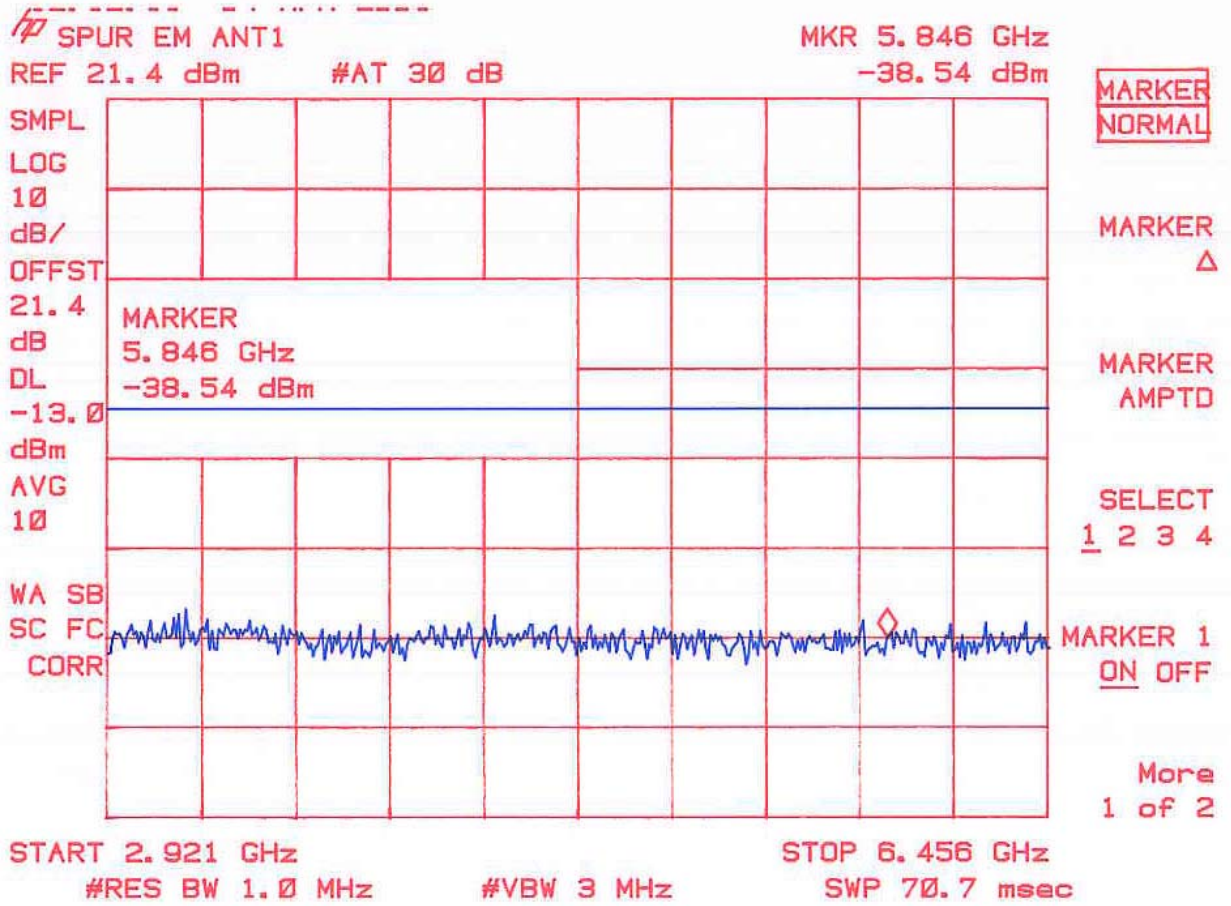
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 1G - 2.921G



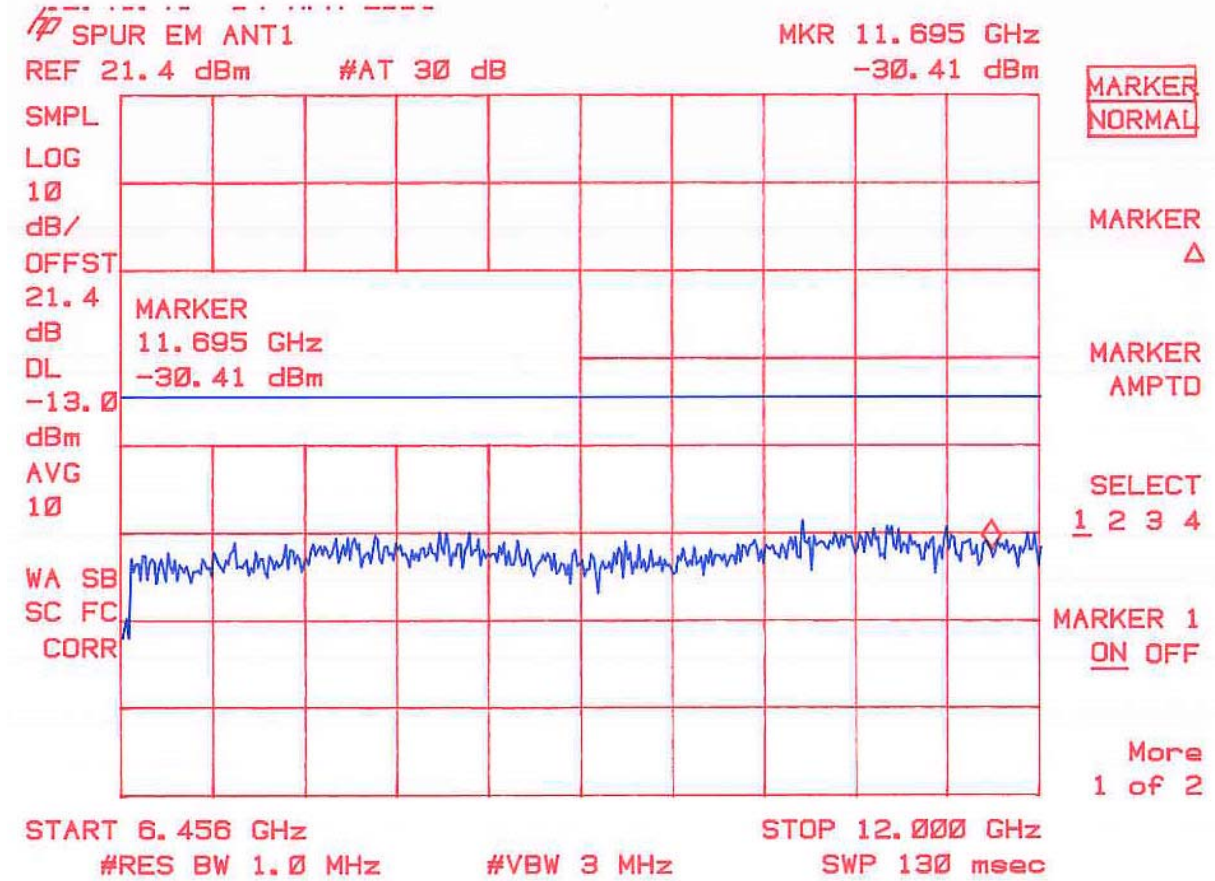
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 2.921G – 6.456 G



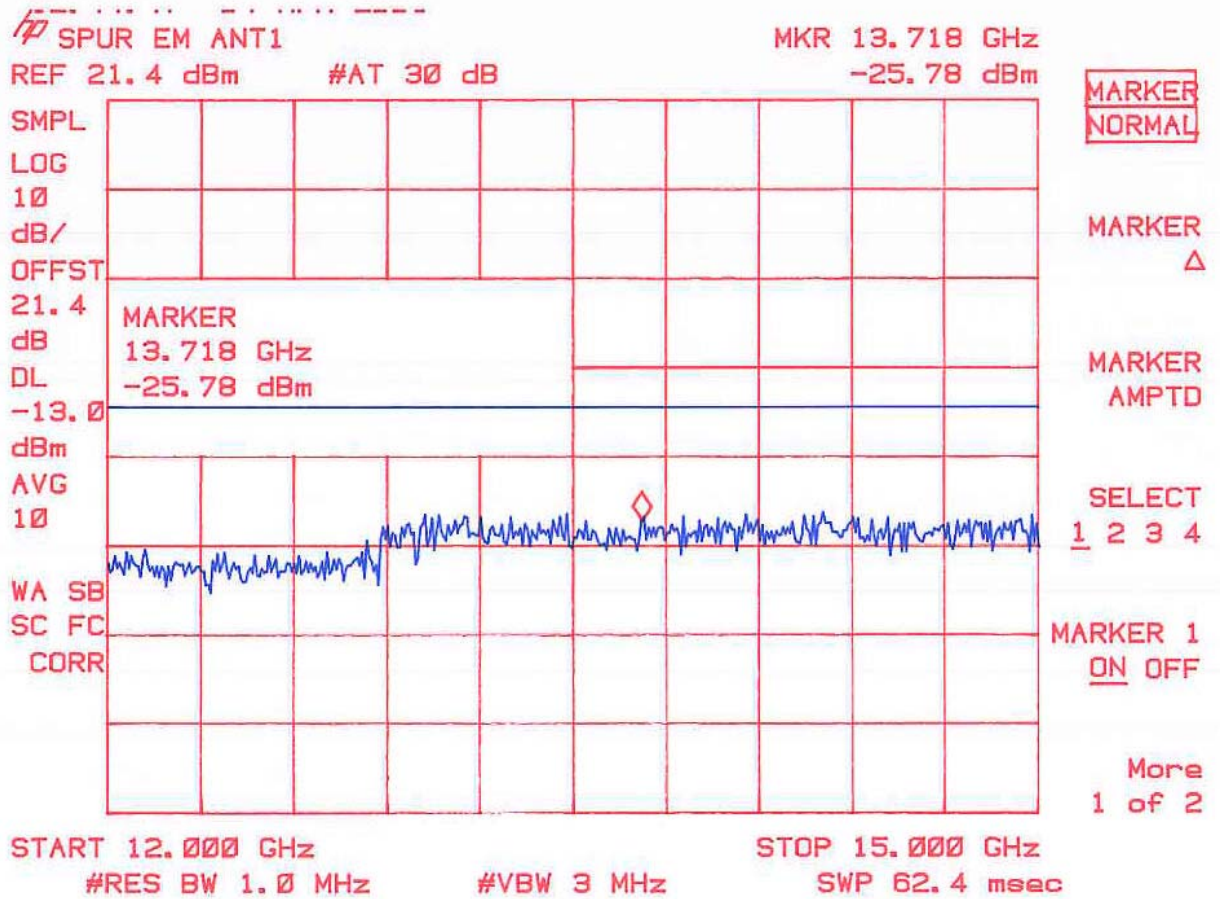
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 6.456 G – 12.0 G



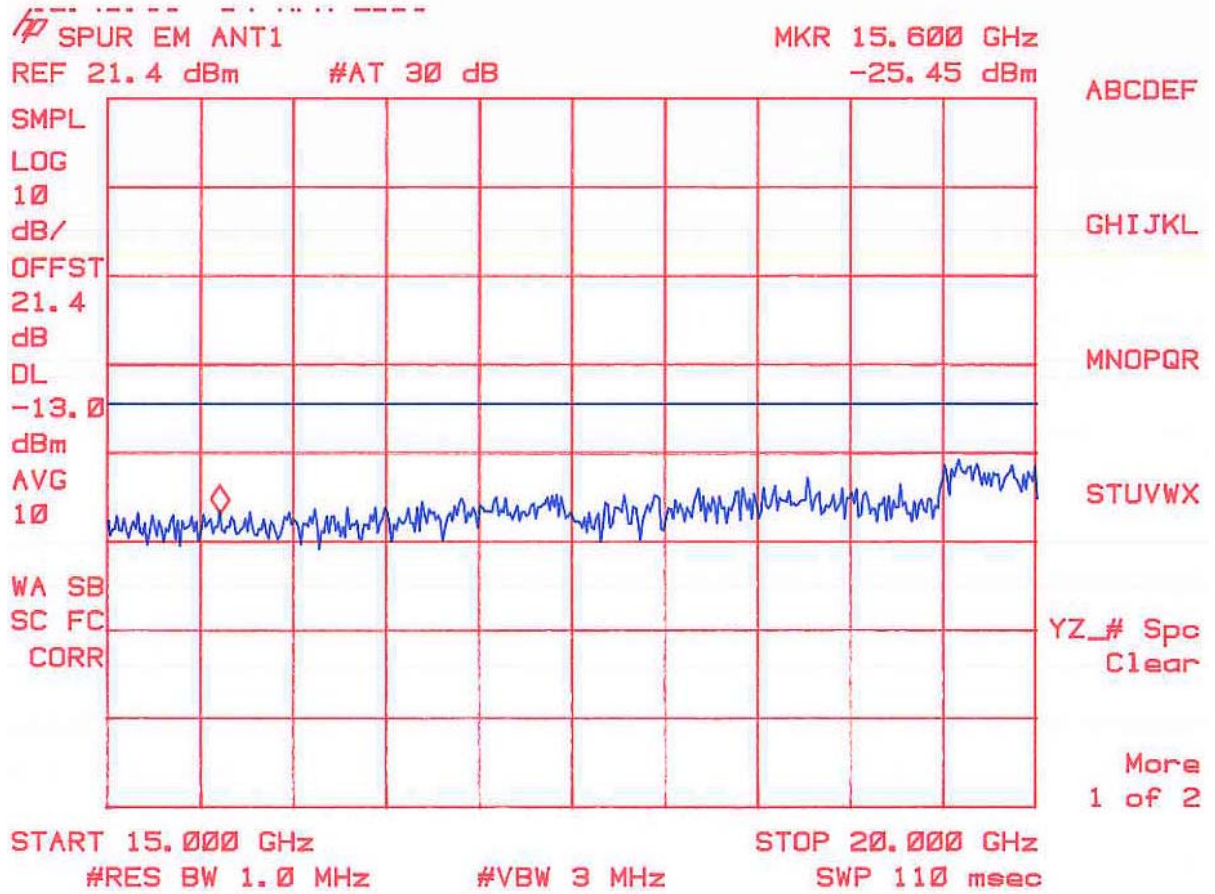
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 12.0 G – 15.0 G



Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 15.0 G – 20. G

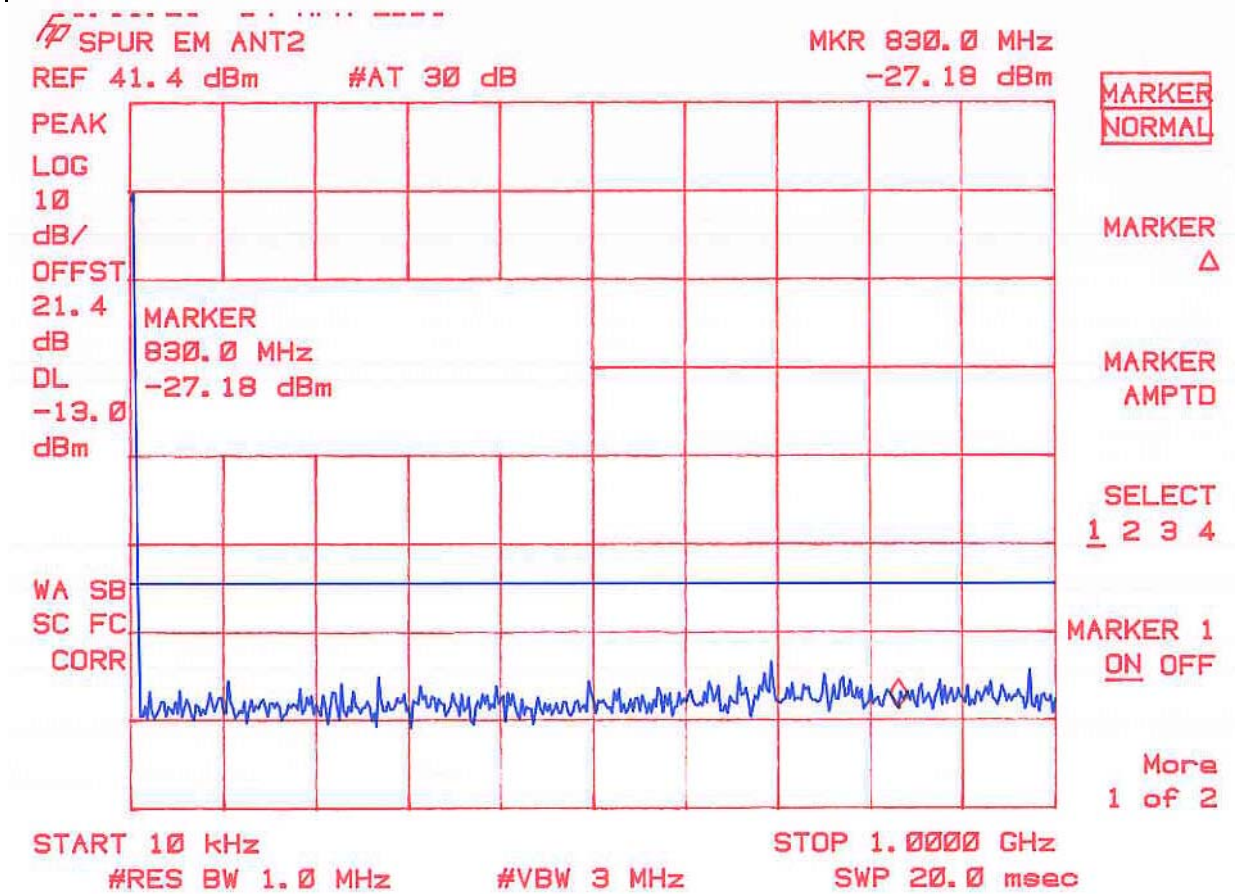


Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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9.8 Spurious emission Ant port 2

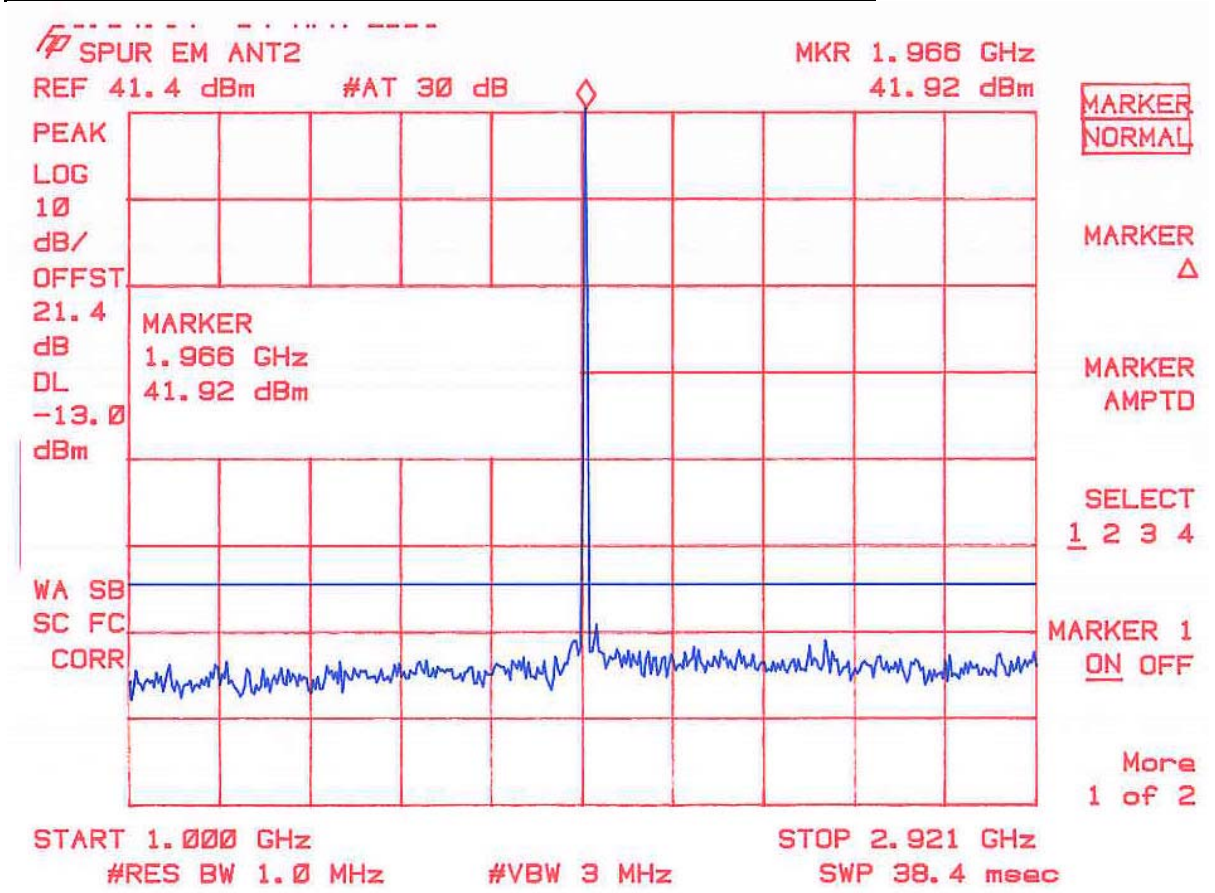
Applied CW signal at BTS 2 port: 1960MHz

Spurious emission 10KHz – 1.0 G



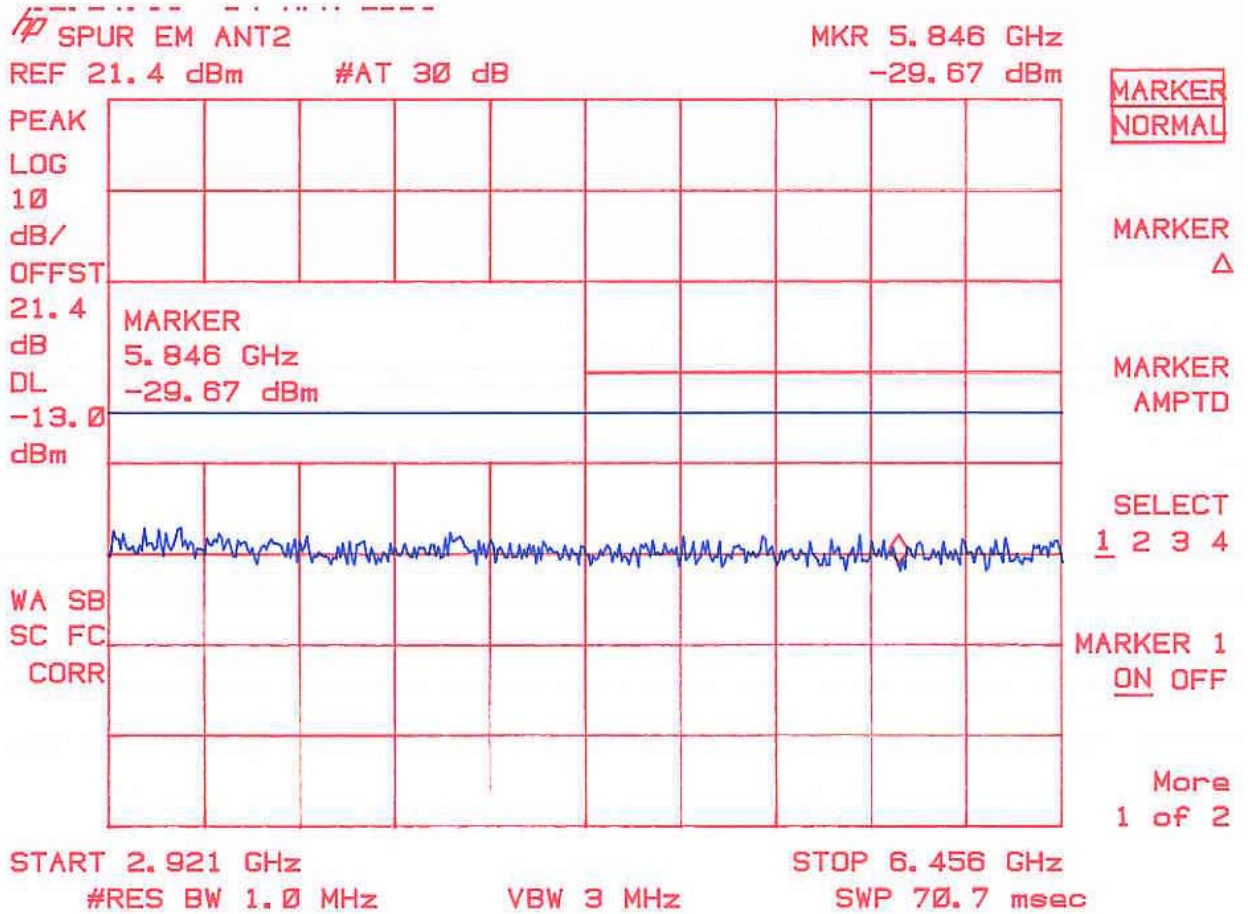
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 1.0 G – 2.921 G



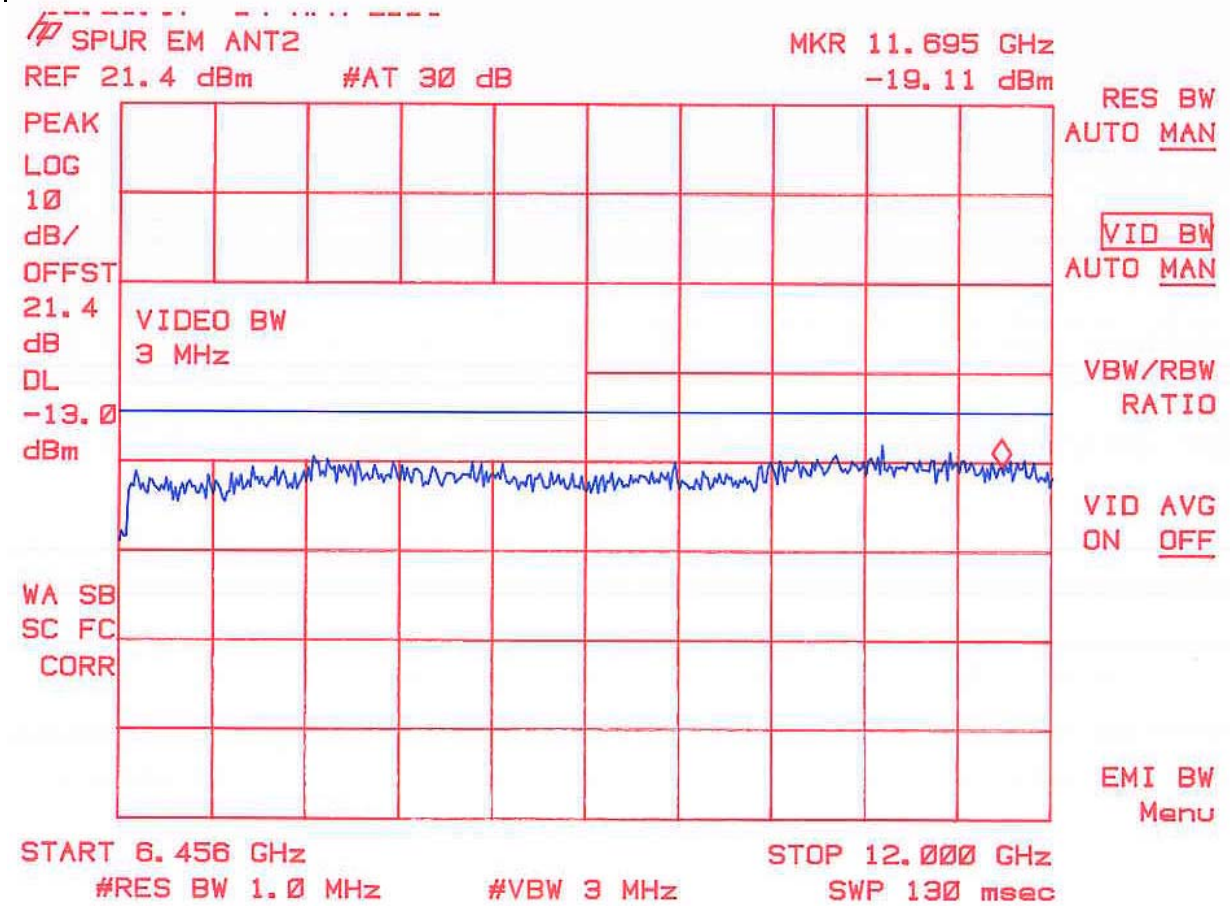
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 2.921 G – 6.456 G



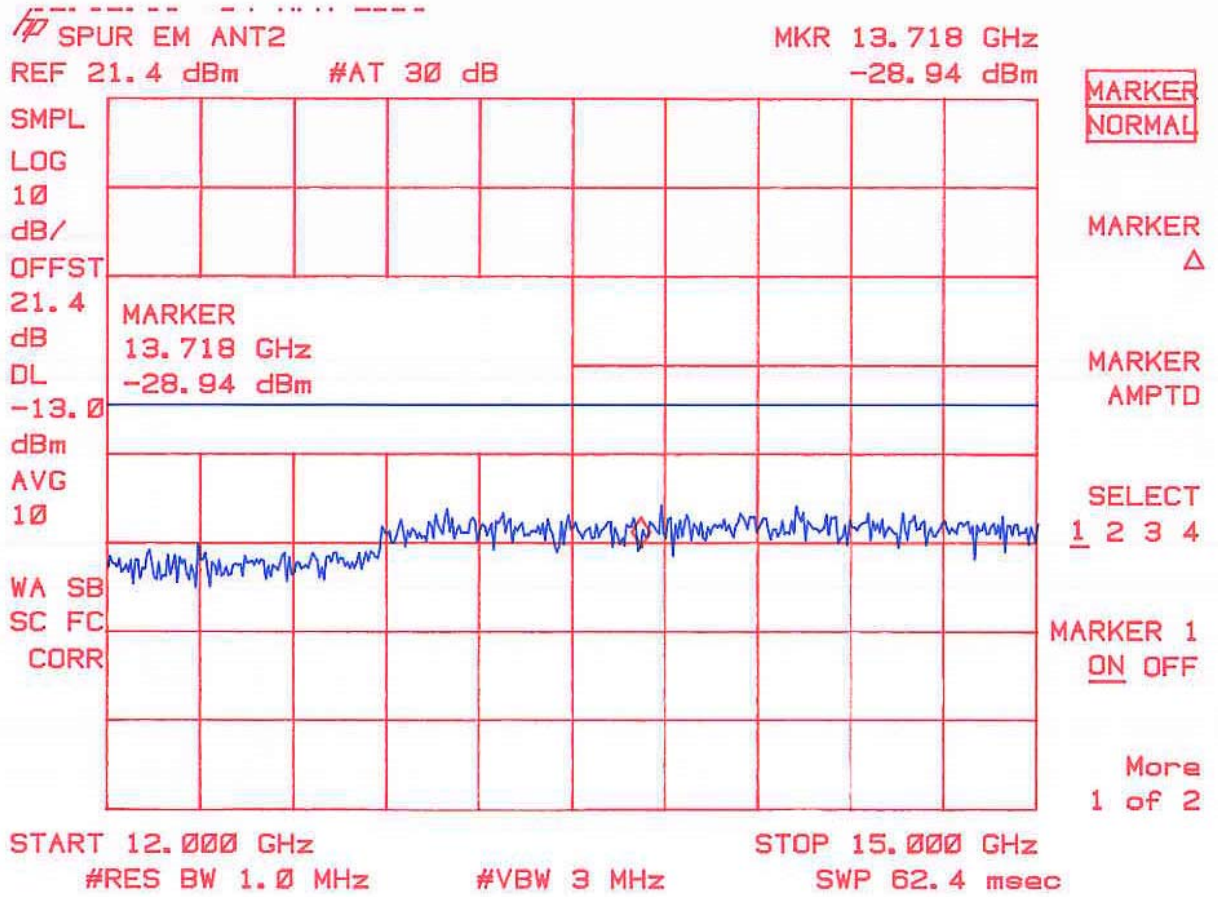
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 6.456 G – 12.0 G



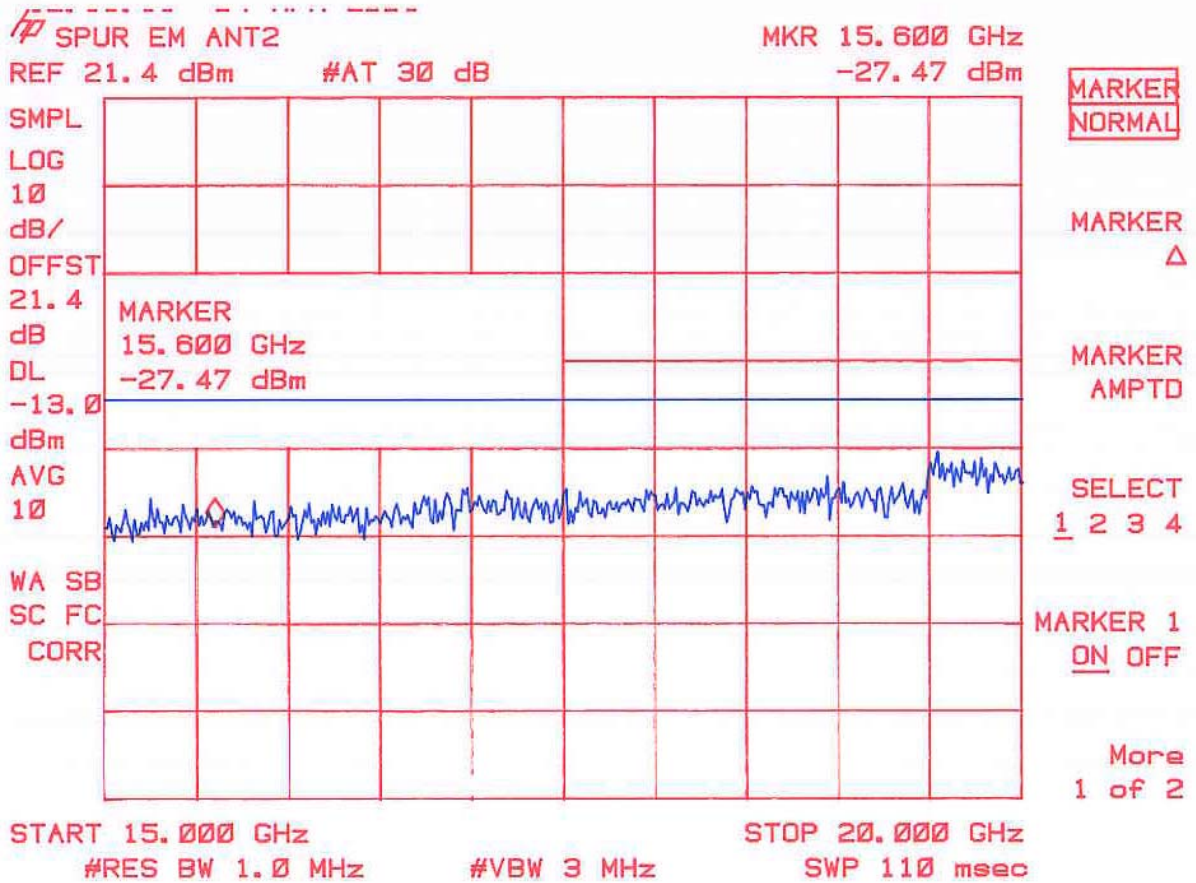
Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 12.0 G.– 15.0 G



Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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Spurious emission 15.0 G – 20.0 G



Uppgjord - Prepared Fredrik Hedlund	Datum - Date 2003-07-07	Rev B	Dokumentnr - Document no TSR-10349-B
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10 Gain Plot 1930-1990 MHz

