Lab Code: 200167-0

FCC PART 24 TYPE APPROVAL
MEASUREMENT AND TEST REPORT

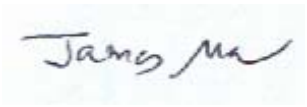
For

Telecom Technologies (USA) LLC

26112 Hitching Rail Road, Laguna Hills, CA 92653, USA

FCC ID: UM8CV1900E

Model: Clear Voice 1900

This Report Concerns: ☒ Original Report	**Product Type:** Repeater
Test Engineer:	Oscar Au 
Report No.:	R0610163
Report Date:	2006-10-23
Reviewed By:	Test Engineer: James Ma 
Prepared By: (tz)	Bay Area Compliance Laboratory Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, U.S.A. Tel: (408) 732-9162 Fax: (408) 732-9164

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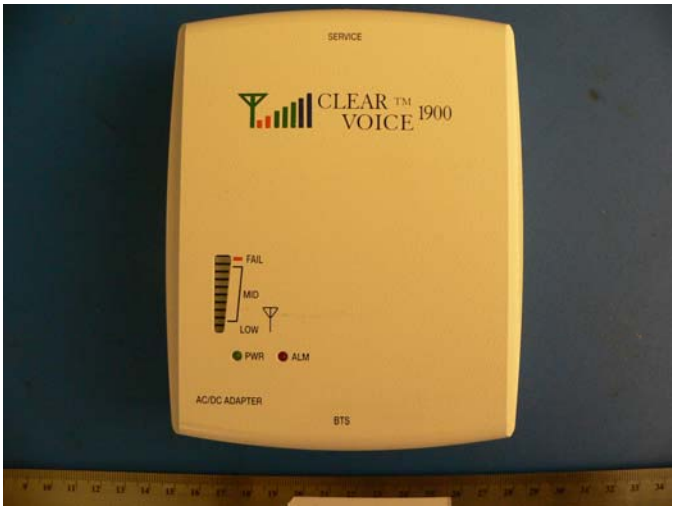
GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Telecom Technologies.*, model: Clear Voice 1900E, is a PCS cellular repeater which measures approximately 150*mmL x 120mmW x 40mmH.* It is powered by an AC-DC power adaptor with DC output of 7.5V, model P-010B, manufacture by I.T.E.

** The test data gathered are from production sample, serial number: USPCS06080367, provided by the manufacturer.*

EUT Photo



Additional photos in Exhibit C

Objective

This type approval report is prepared on behalf of *Telecom Technologies.* in accordance with Part 2, Subpart J, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 24 Subpart E - PCS

Applicable Standards: ANSI 63.4-2003, and TIA/EIA-603-C

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters, except as noted below.

Test Facility

The Test site used by BACL Corp. to collect radiated and conducted emission measurement data is located at it's facility in Sunnyvale, California, USA.

Test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003& TIA/EIA-603.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference have the reports on file and are listed under FCC file 31040/SIT 1300F2, IC registration number: 3062A, and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA 603-C.

The final qualification test was performed with the EUT operating at normal mode.

Block Diagram

Please refer to Exhibit D.

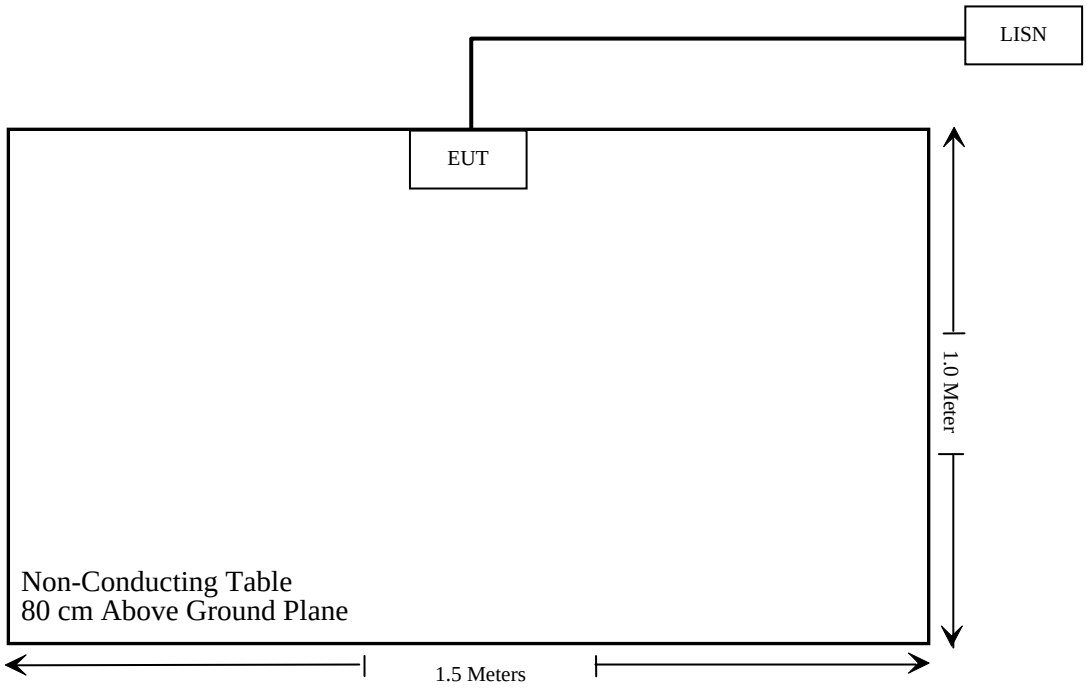
Equipment Modifications

No modifications were made to the EUT.

Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
I.T.E.	AC-DC Power Adaptor	P-010B	B01238-0625

Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: *USPCS06080367.*

FCC RULE	DESCRIPTION OF TEST	Result
§2.1046 § 24.232	RF power output	Compliant
§ 2.1049 § 24.238(b)	Emission Bandwidth	Compliant
§2.1051 § 24.238(a)	Spurious emissions at antenna terminals	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§24.238	Band Edge	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1055 § 24.235	Frequency stability	Compliant
IS-138a (3.4.4)	Two -Tone Test	Compliant
§2.1091	RF Exposure	Compliant

§2.1046 & §24.232 - RF POWER OUTPUT

Applicable Standard

According to FCC §2.1046 and §24.232 (b), mobile stations are limited to 2 watts eirp peak power.

Test Procedure

Conducted Measurement:

The antenna was removed and SMA connector was connected to the transmitter output. The transmitter output was connected to a calibrated coaxial attenuator (50 Ohm), the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter was determined by adding the value of the attenuator to the power meter reading.

The test was performed at three frequencies (low, middle, and high channels) and on all power levels which can be setup on the transmitter.

Radiated Measurement:

The transmitter was placed on a wooden turntable

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

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	22° C
Relative Humidity:	47%
ATM Pressure:	1010 mbar

** The testing was performed by Oscar Au on 2006-10-19.*

Conducted Power: CDMA

Forward (downlink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1931.25	5.93	0	33
MIDDLE	1960.00	7.85	0	33
HIGH	1988.75	7.84	0	33

Reverse (uplink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1851.25	8.31	5	33
MIDDLE	1880.00	7.70	5	33
HIGH	1908.75	5.49	5	33

Conducted Power: GSM

Forward (downlink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1931.25	6.29	0	33
MIDDLE	1960.00	6.97	0	33
HIGH	1988.75	8.00	0	33

Reverse (uplink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1851.25	6.68	5	33
MIDDLE	1880.00	7.97	5	33
HIGH	1908.75	3.75	5	33

Conducted Power: TDMA

Forward (downlink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1931.25	6.30	0	33
MIDDLE	1960.00	7.99	0	33
HIGH	1988.75	8.05	0	33

Reverse (uplink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in EIRP dBm
LOW	1851.25	7.36	5	33
MIDDLE	1880.00	7.44	5	33
HIGH	1908.75	5.82	5	33

Conducted power plots: CDMA

Forward (downlink)

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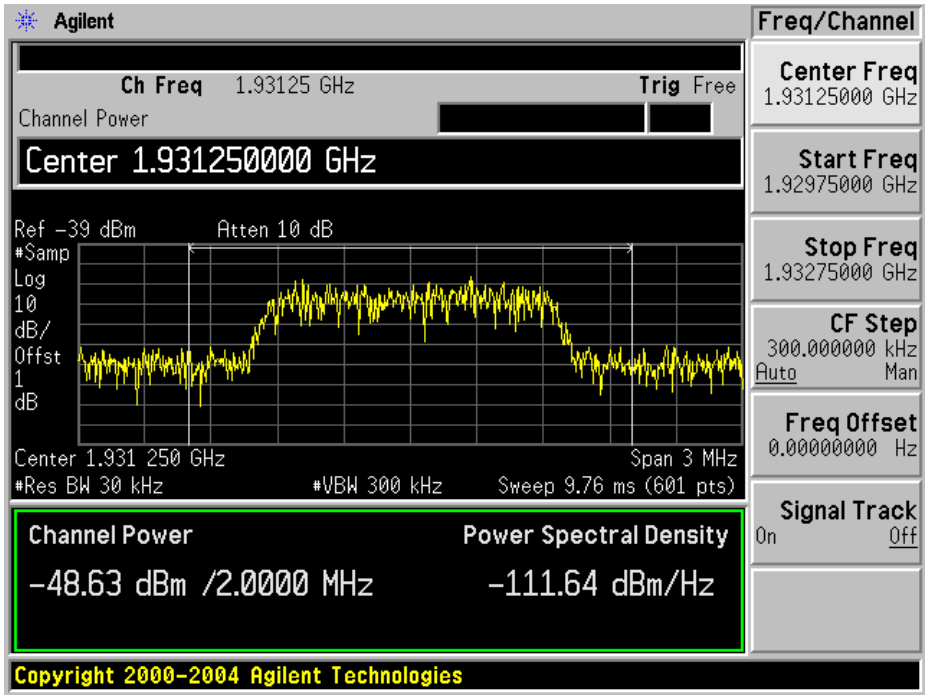
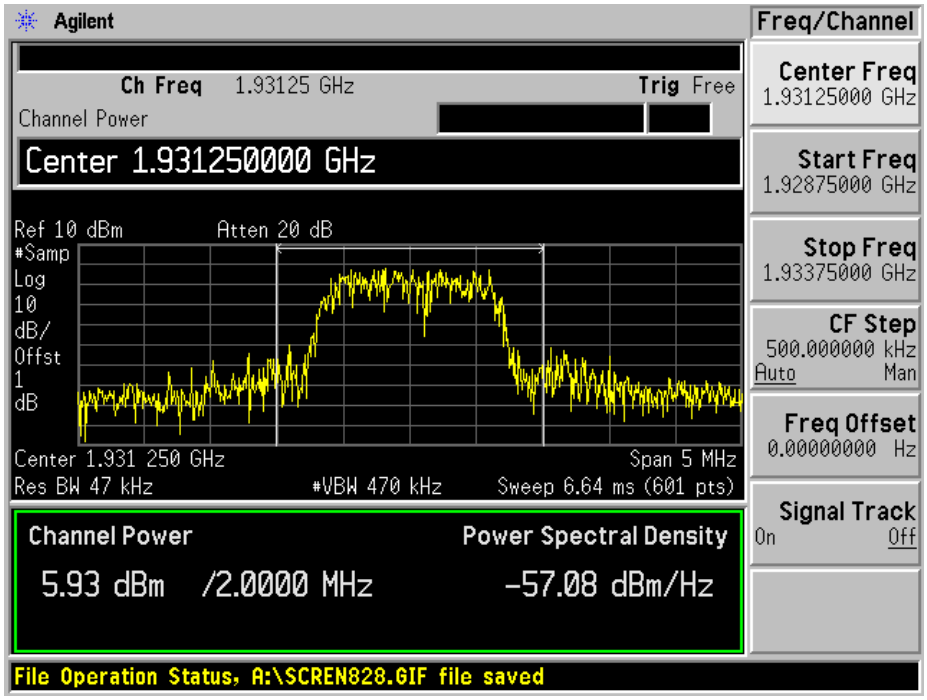


Low channel

Output



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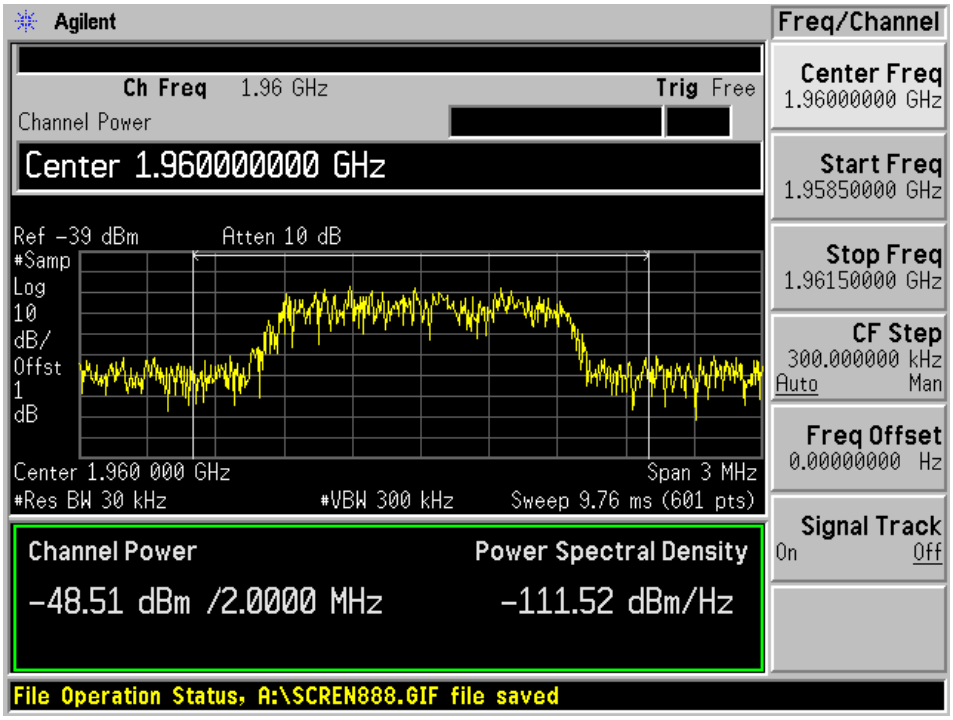
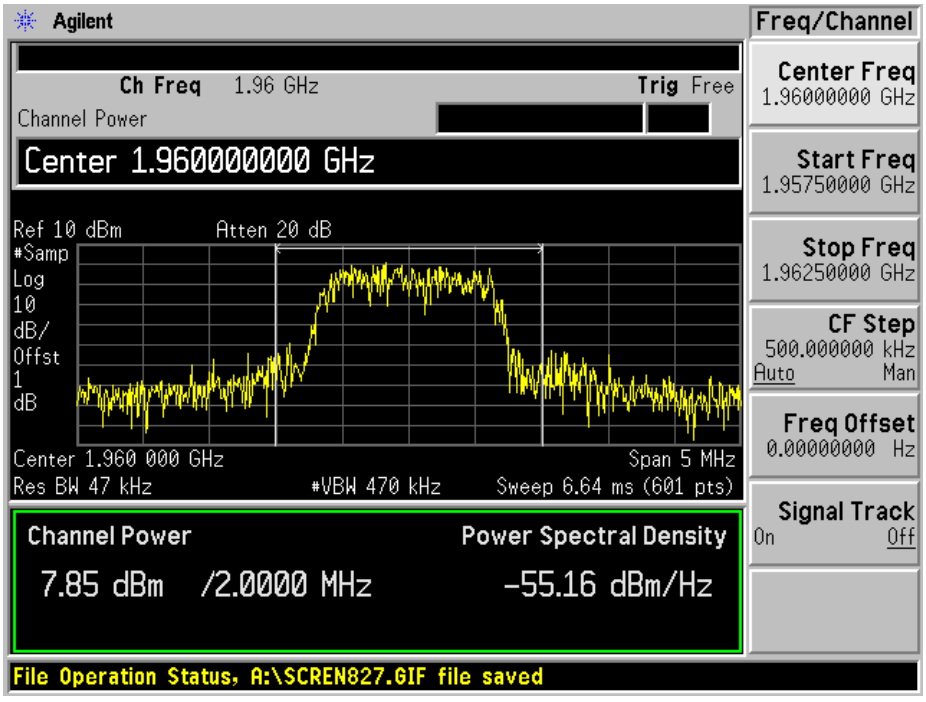


Mid channel

Output



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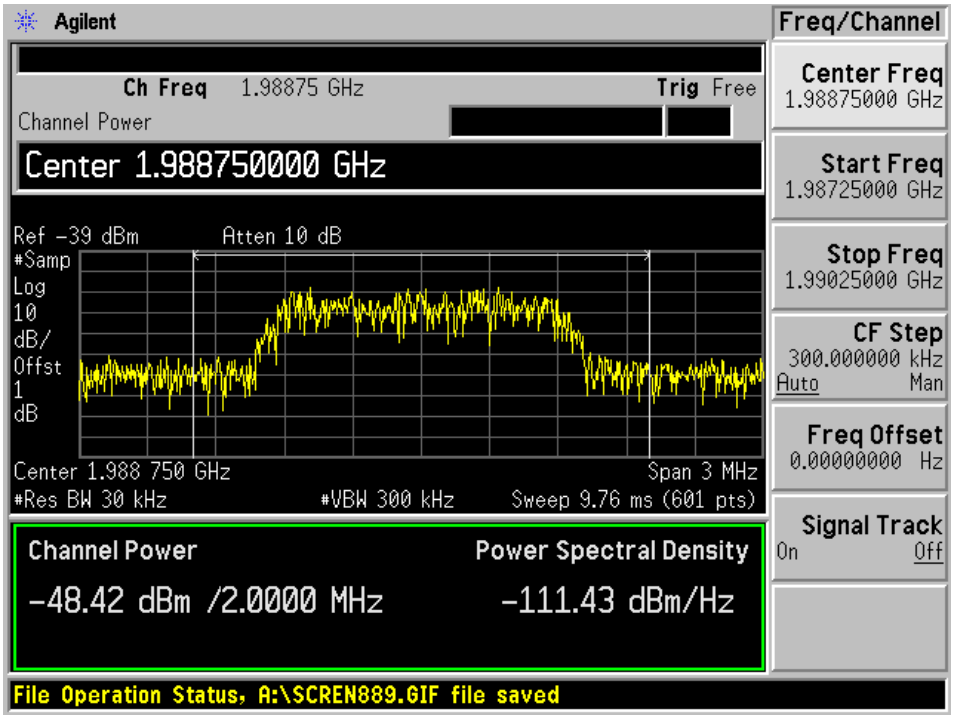

High channel

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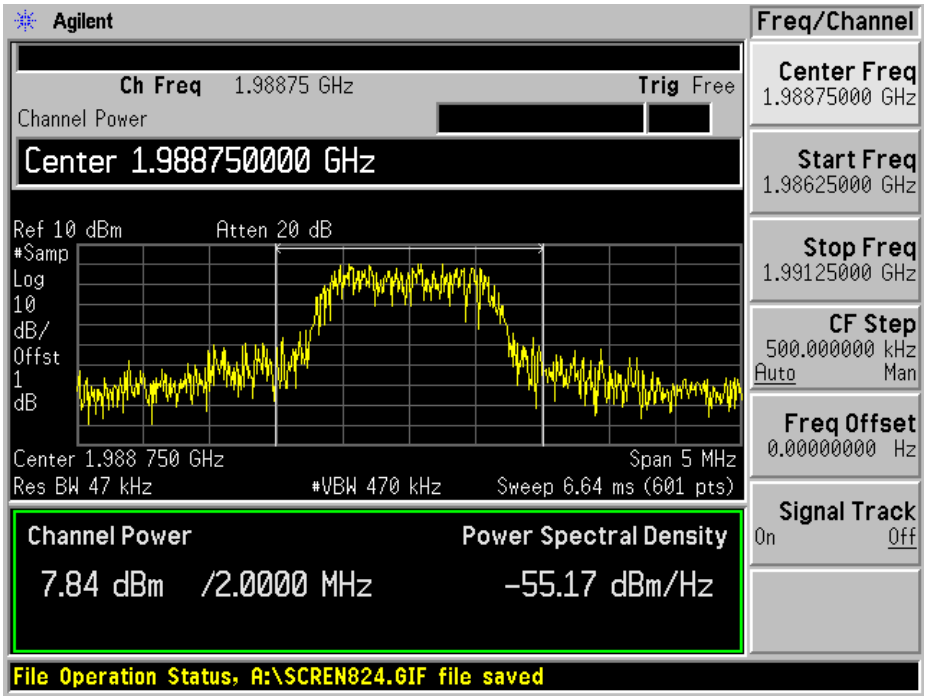
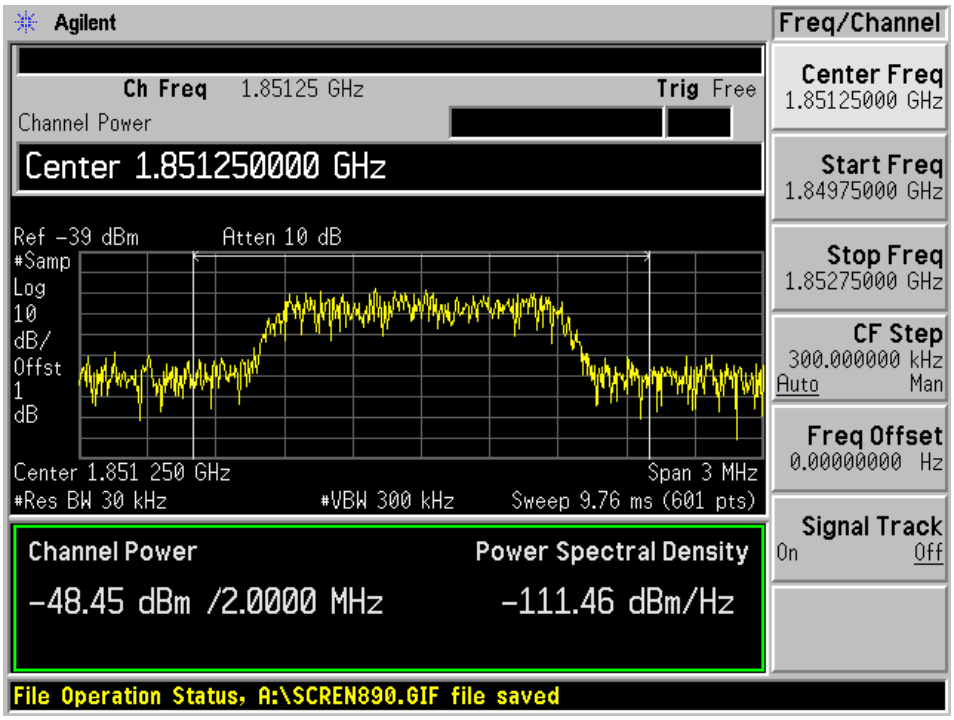


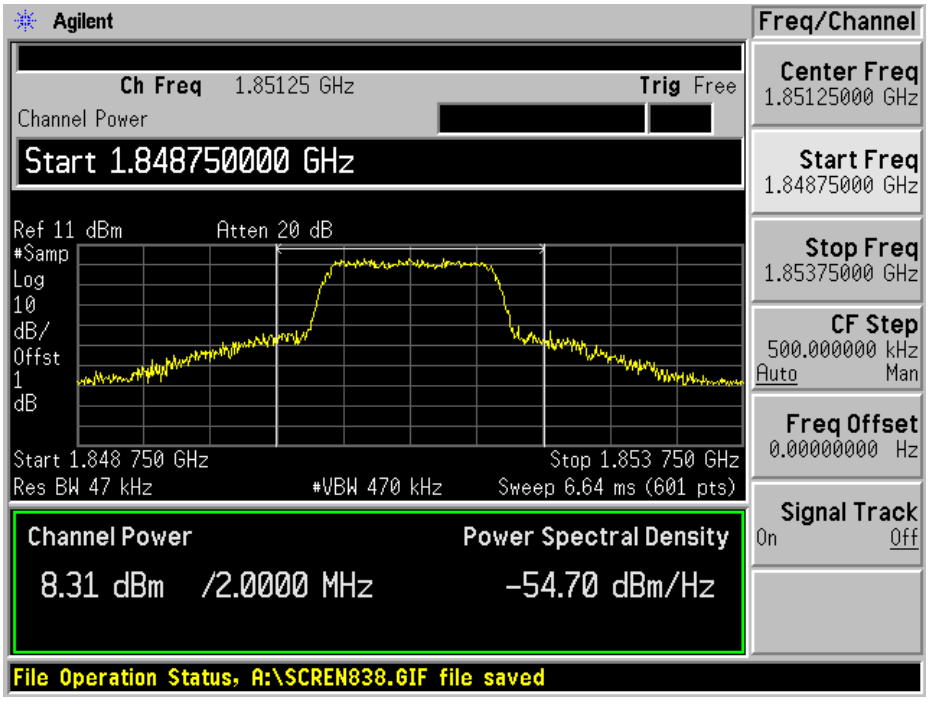
Reverse (uplink)

Input:



Low Channel

Output



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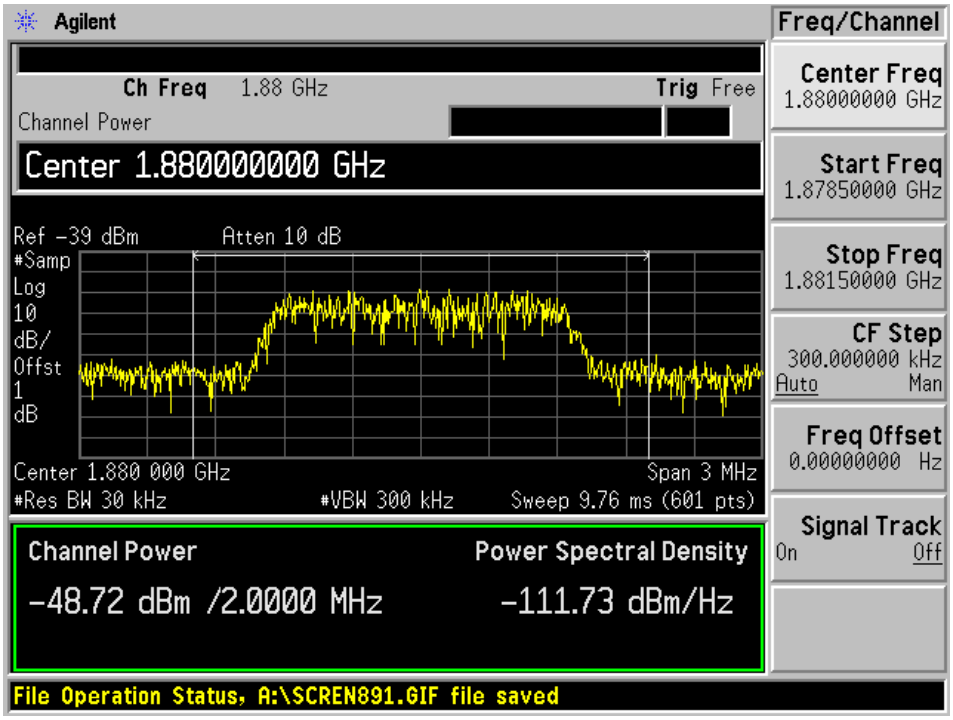

Mid Channel

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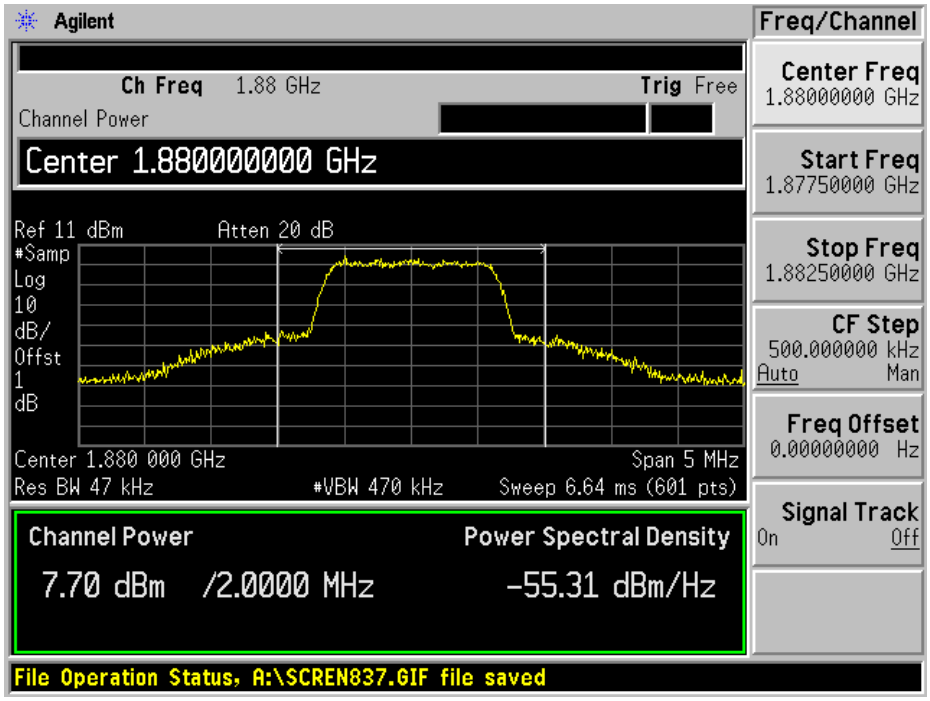

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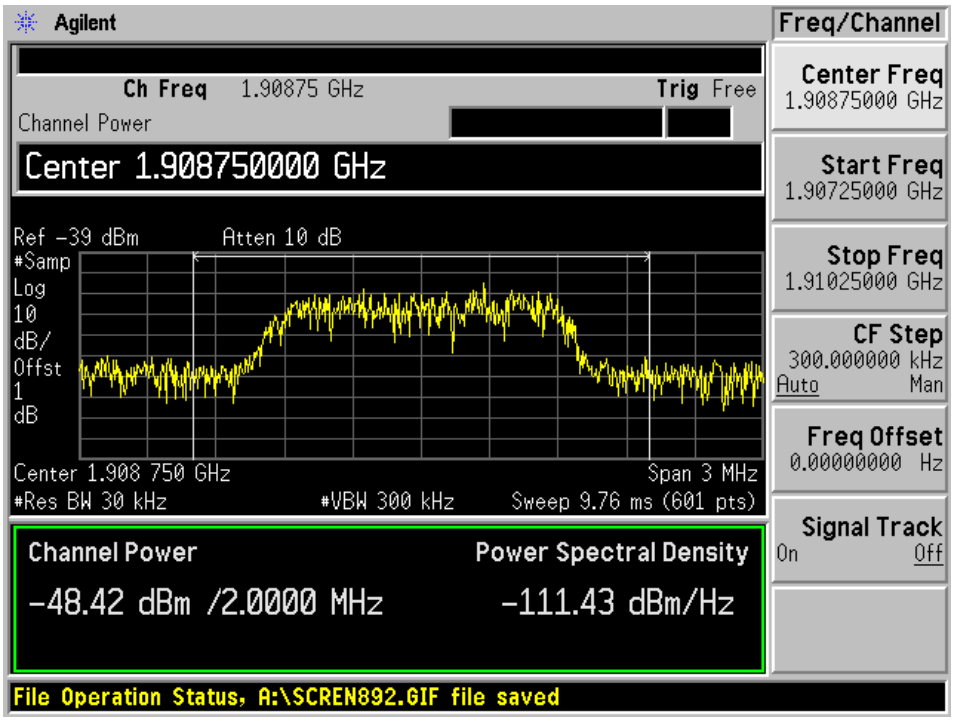

High Channel

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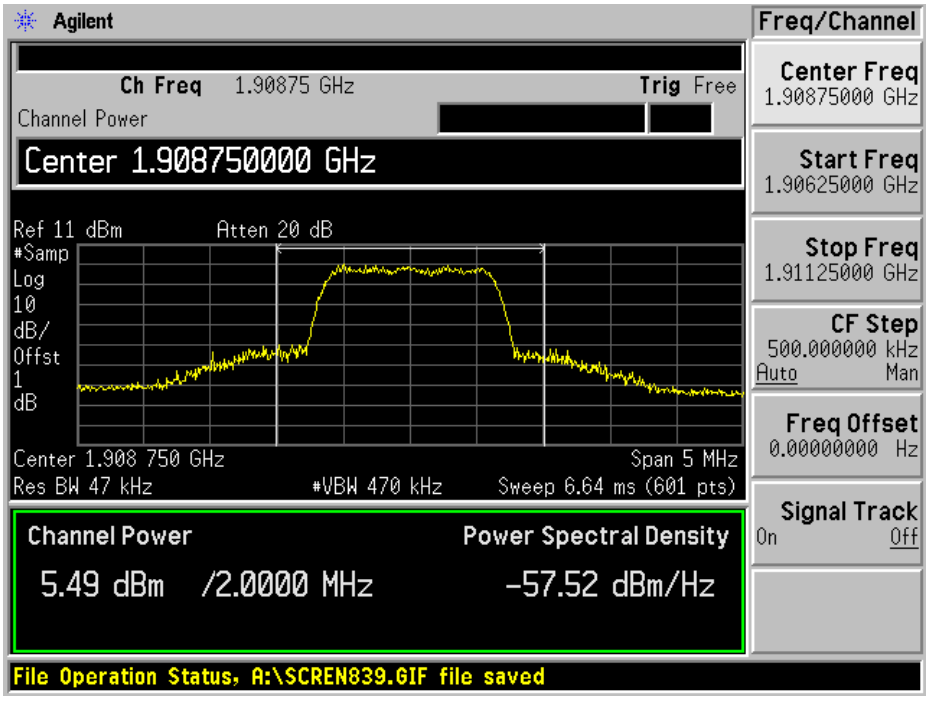
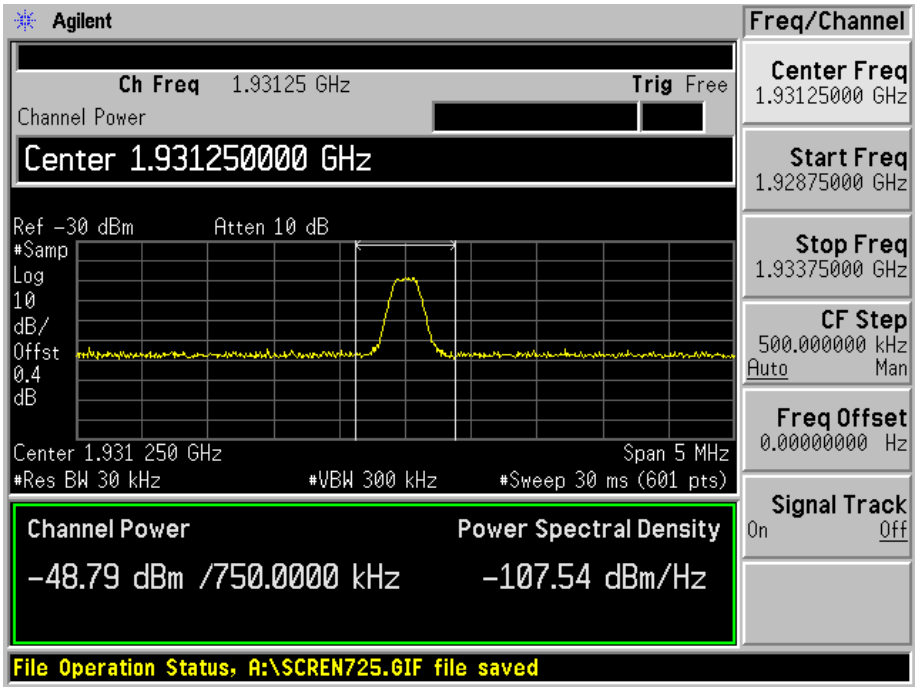


Conducted power plots: GSM

Forward (downlink)

Low Channel

Input:



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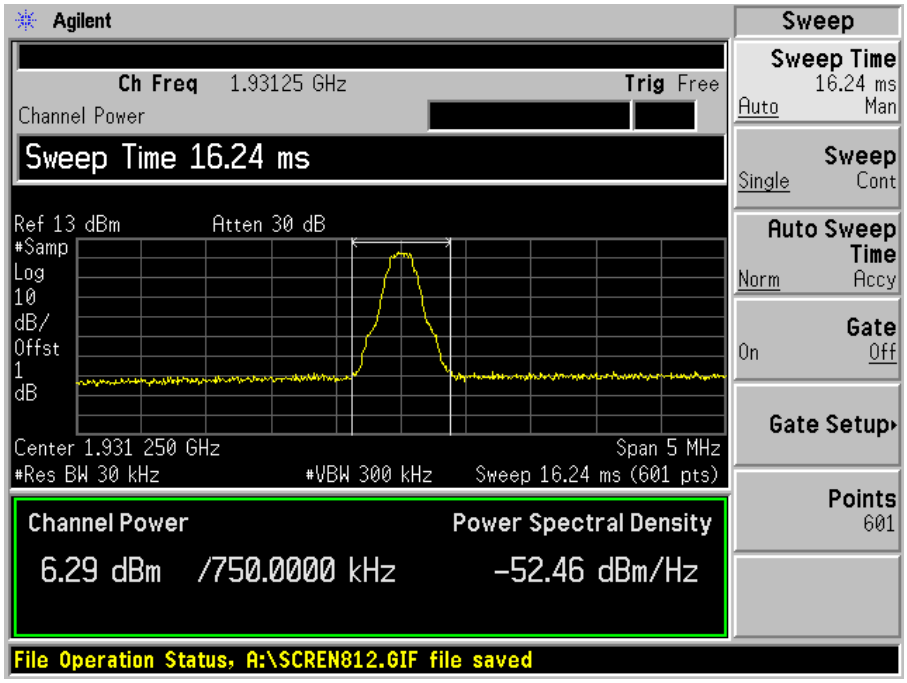

Mid Channel

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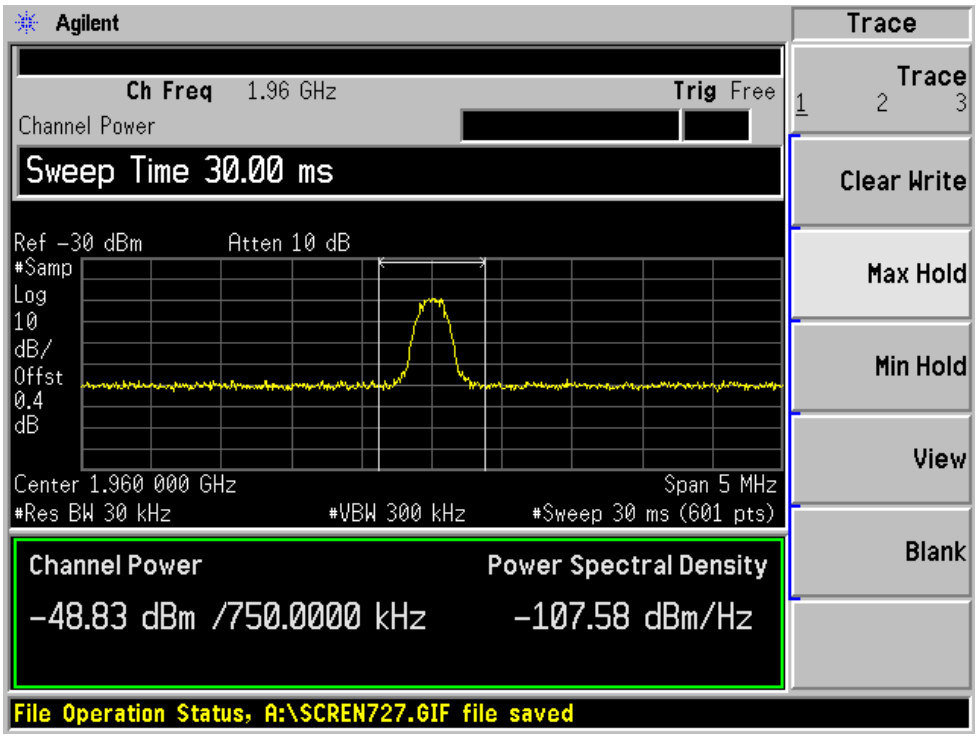

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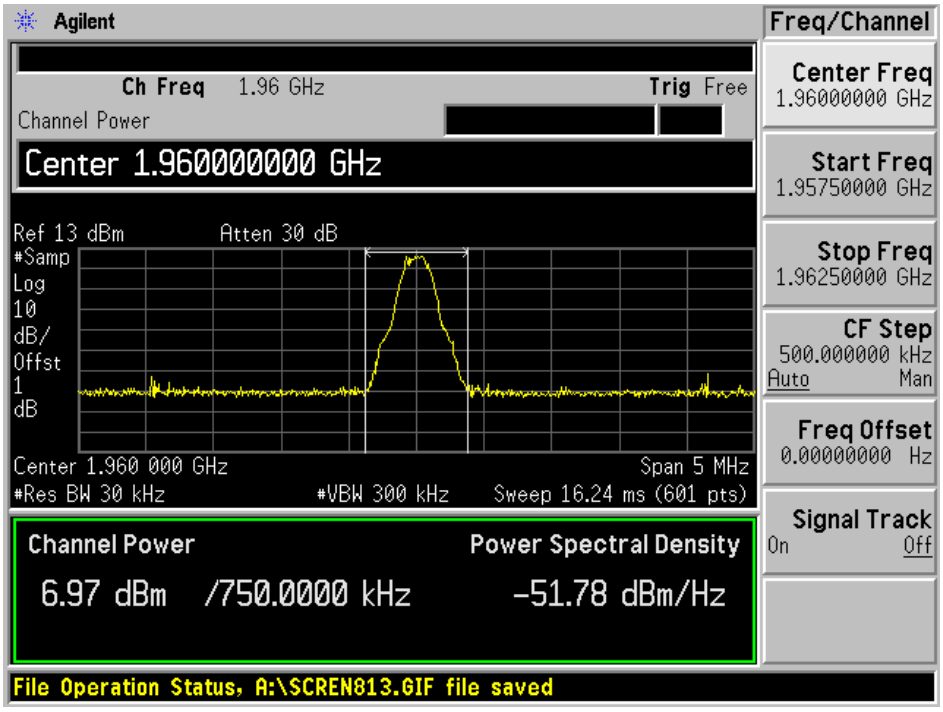

High Channel

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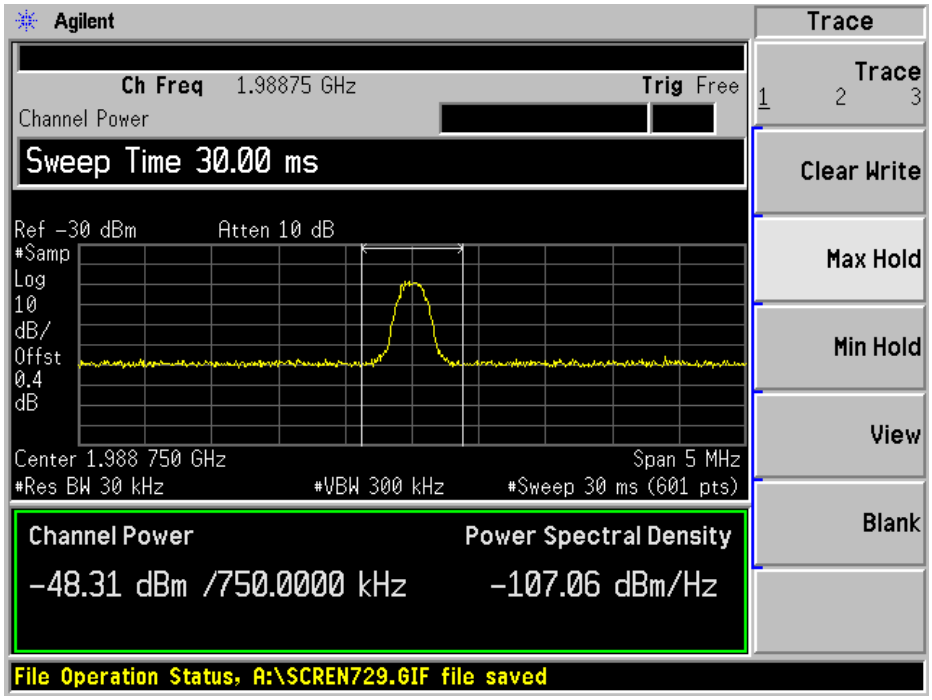

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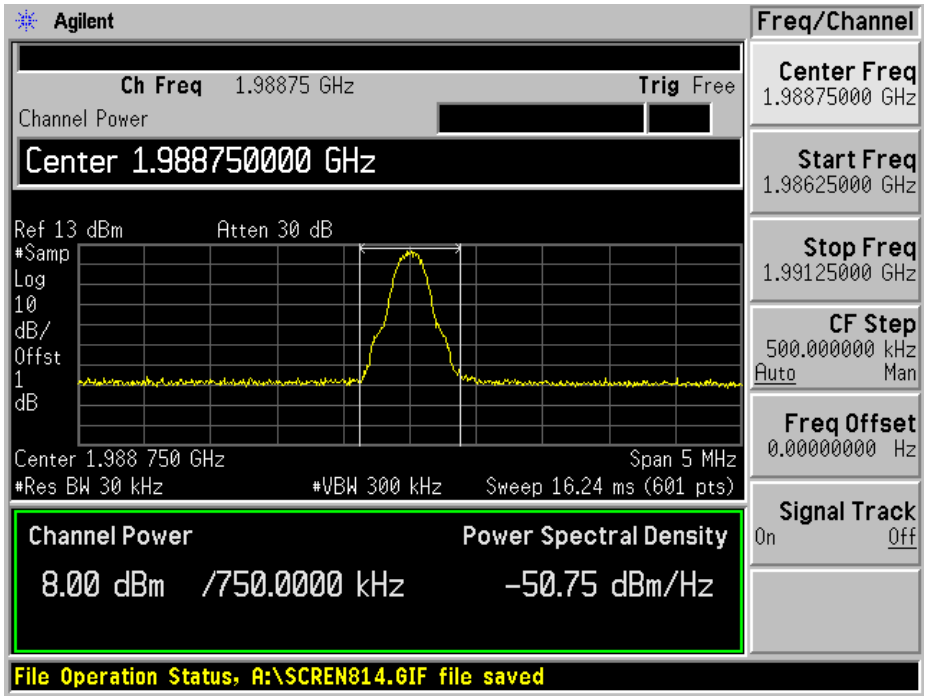

Conducted power plots: GSM

Reverse (Uplink)

Low Channel

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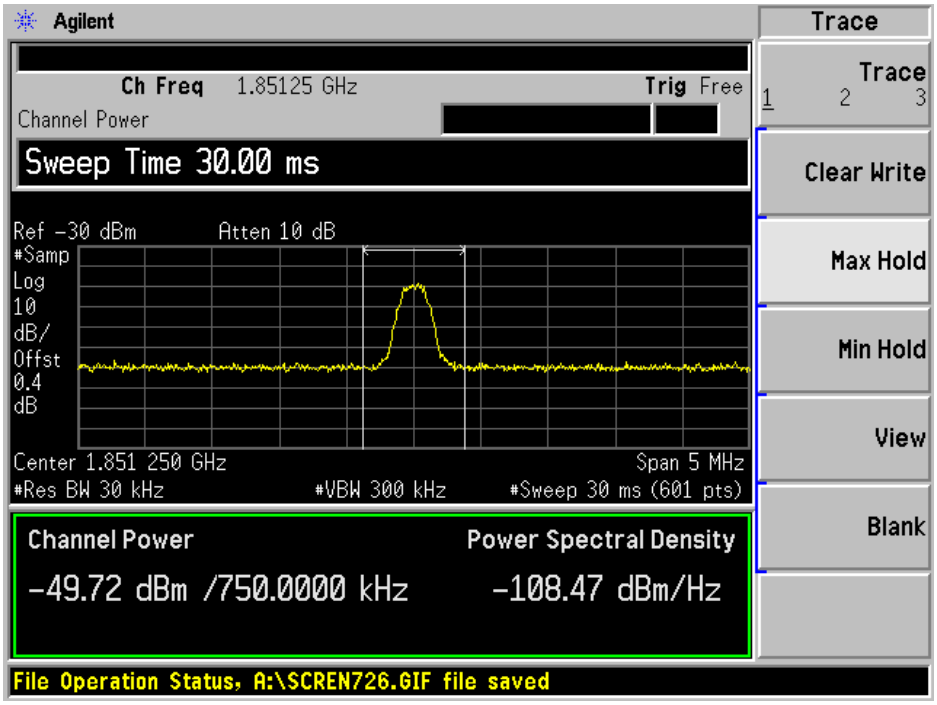

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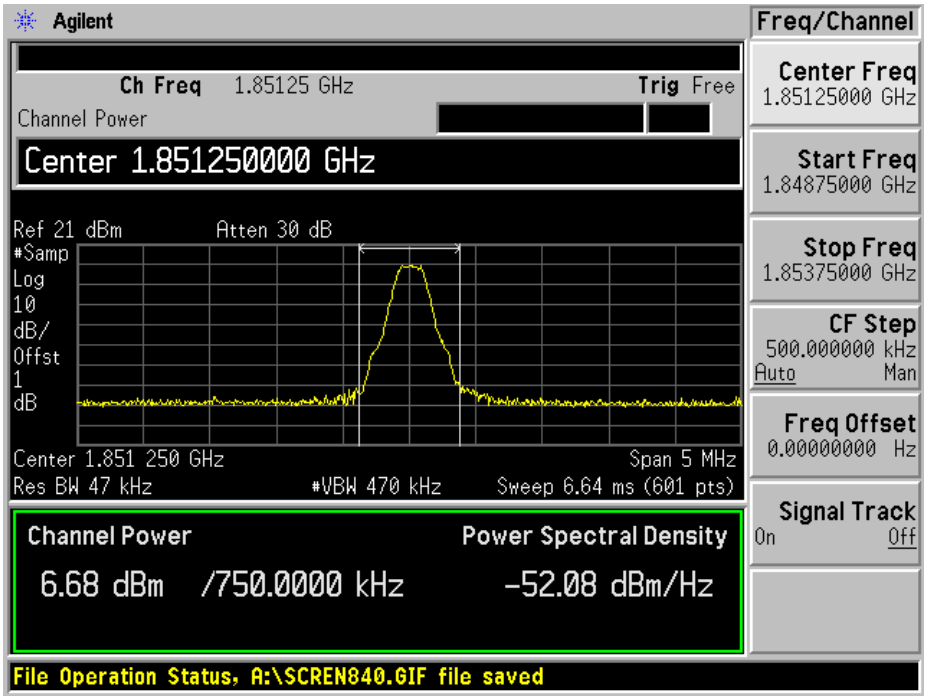

Mid Channel

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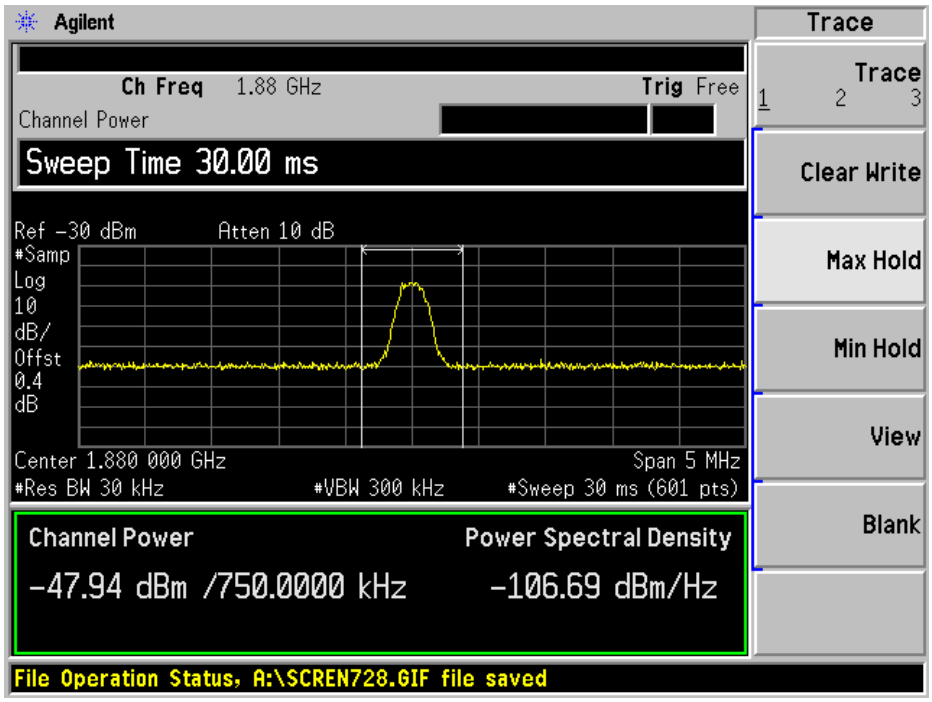

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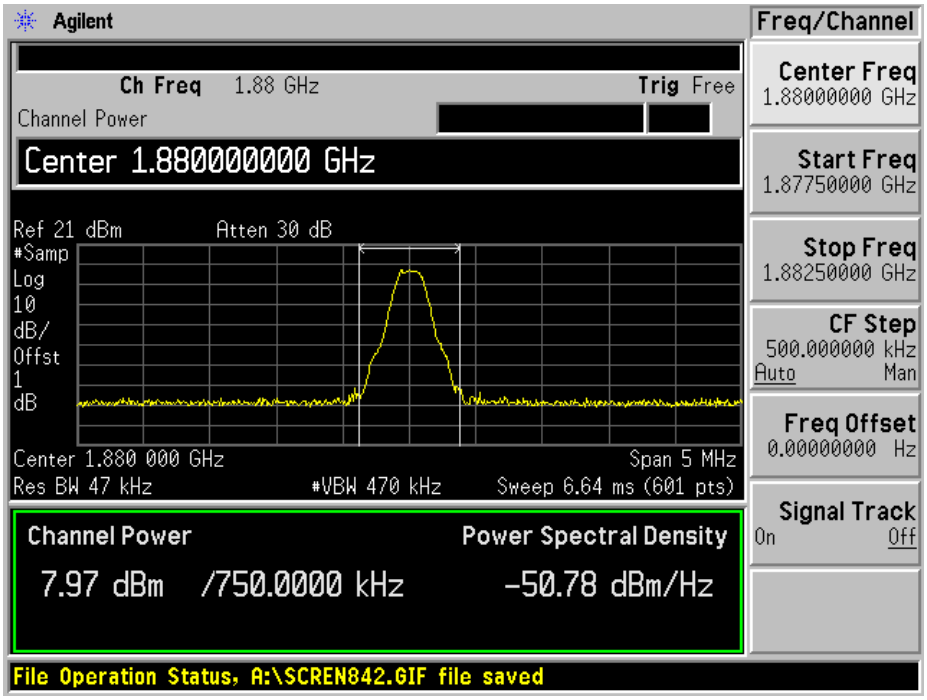

High Channel

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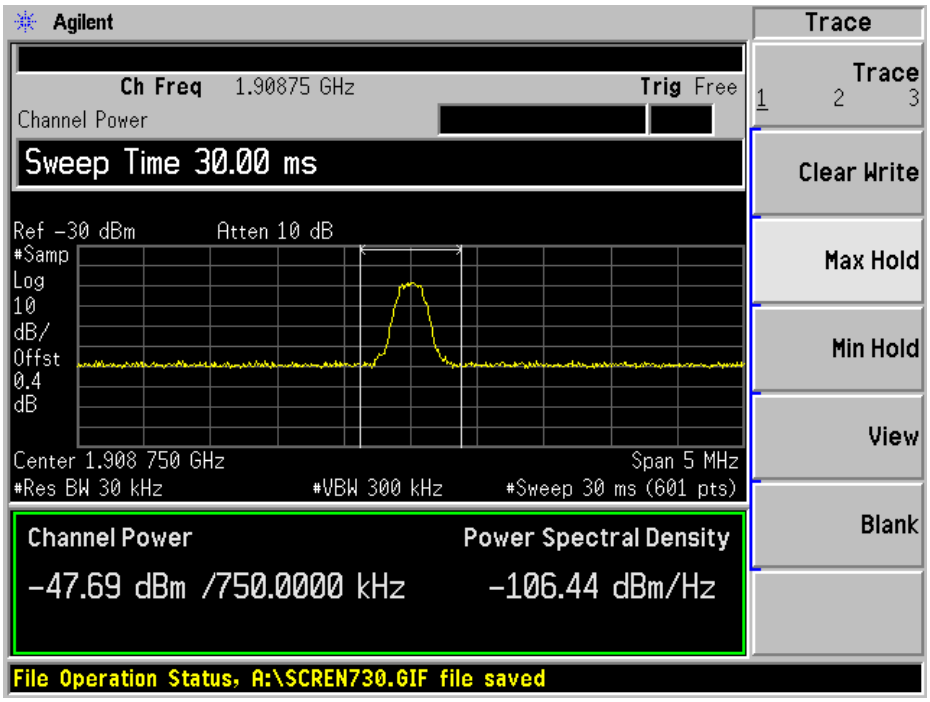

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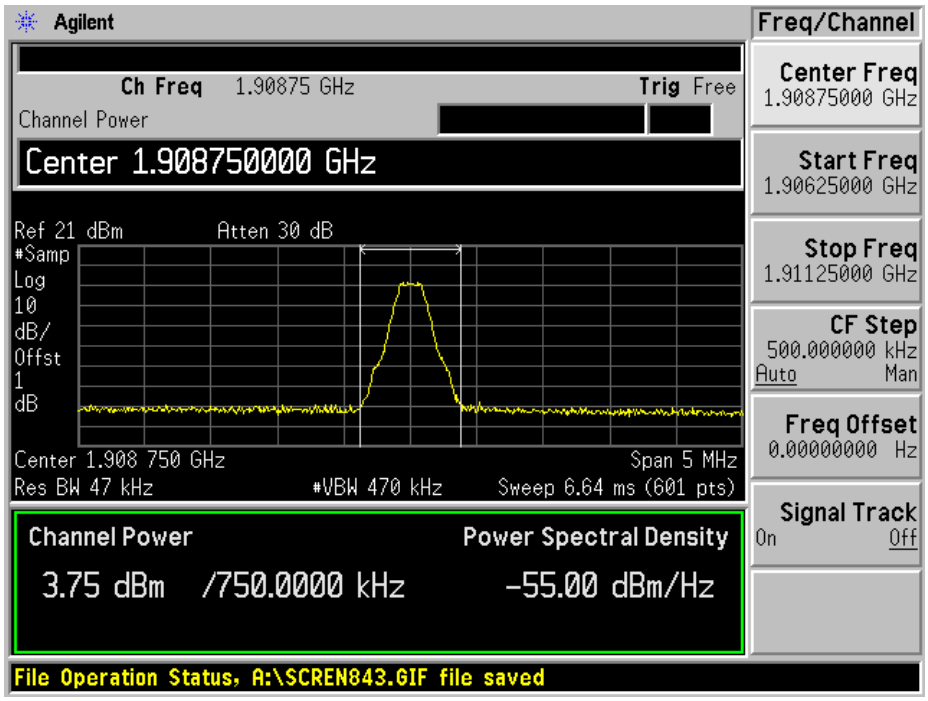
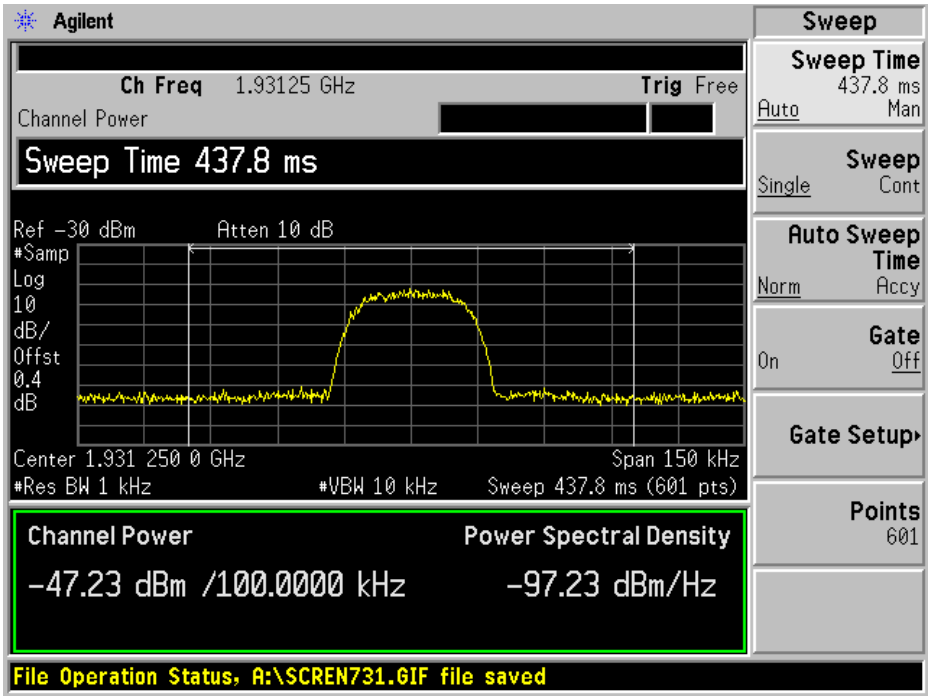


Conducted power plots: TDMA

Forward (downlink)

Low Channel

Input:



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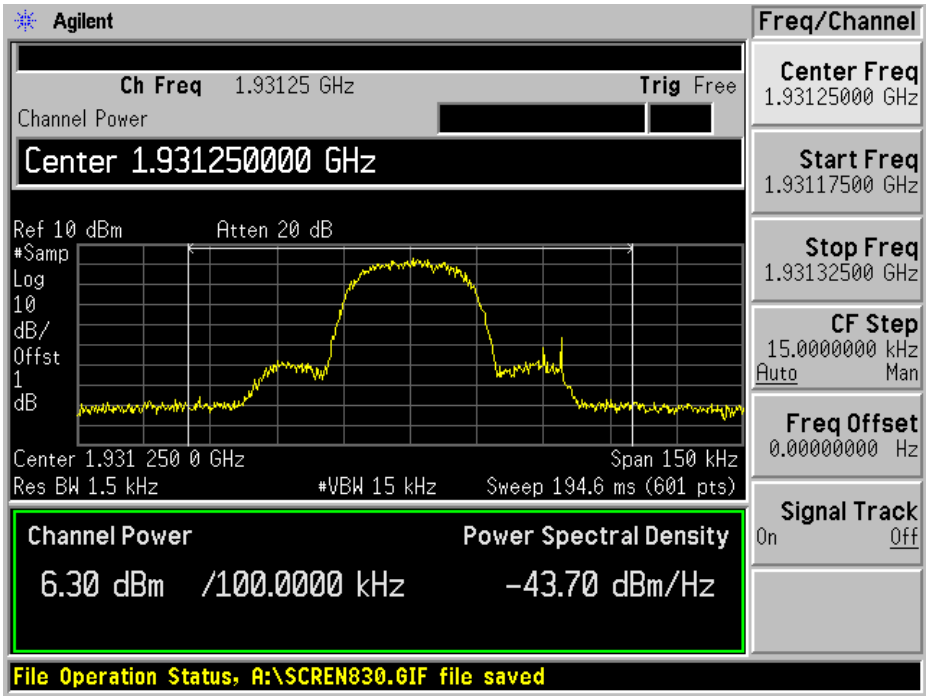

Mid Channel

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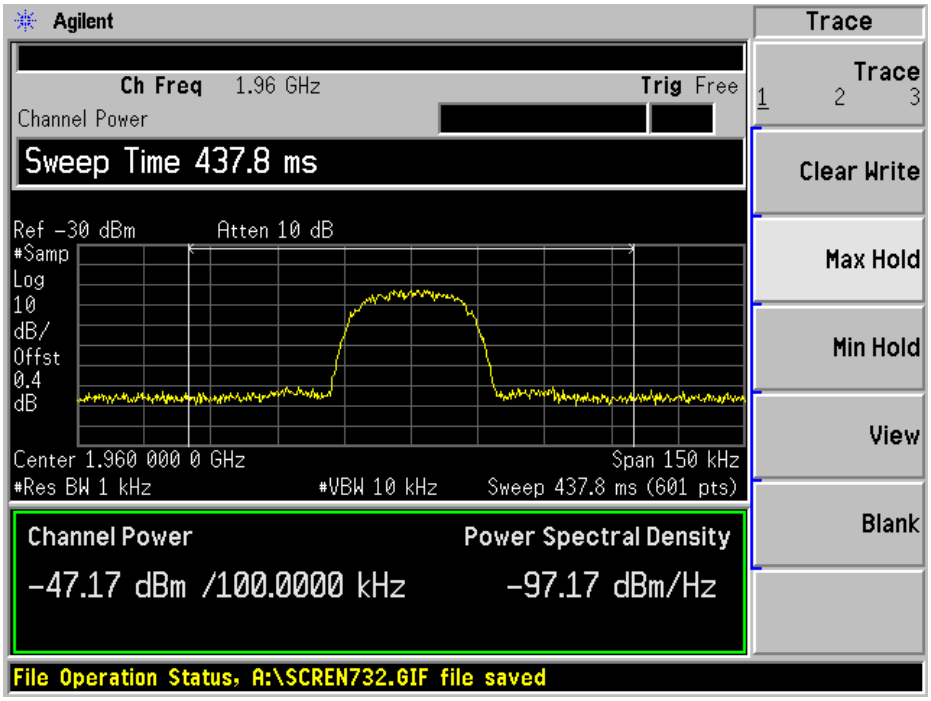

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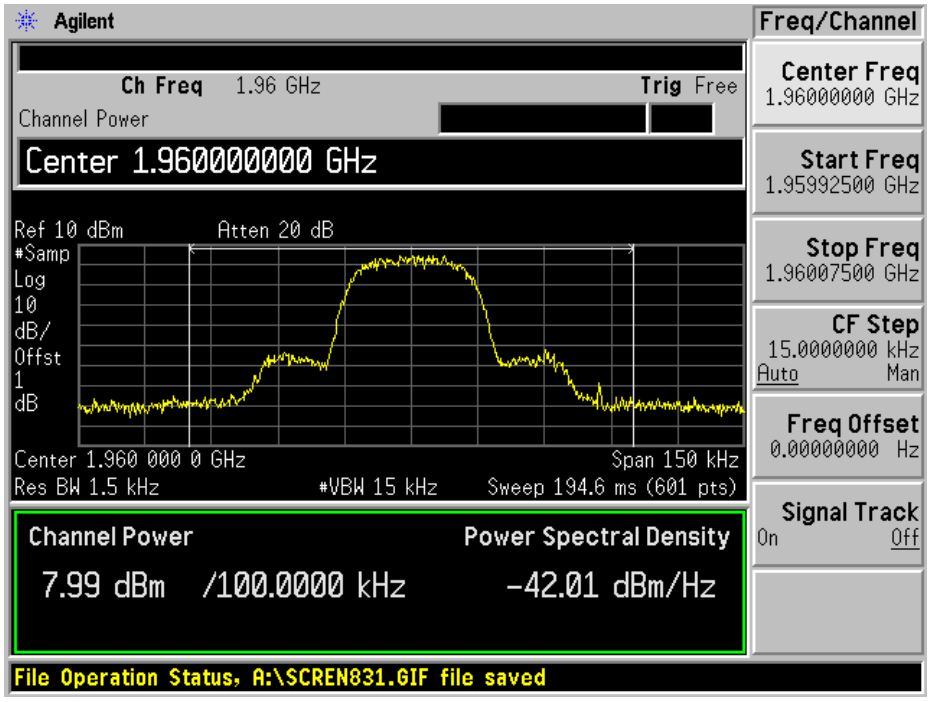

High Channel

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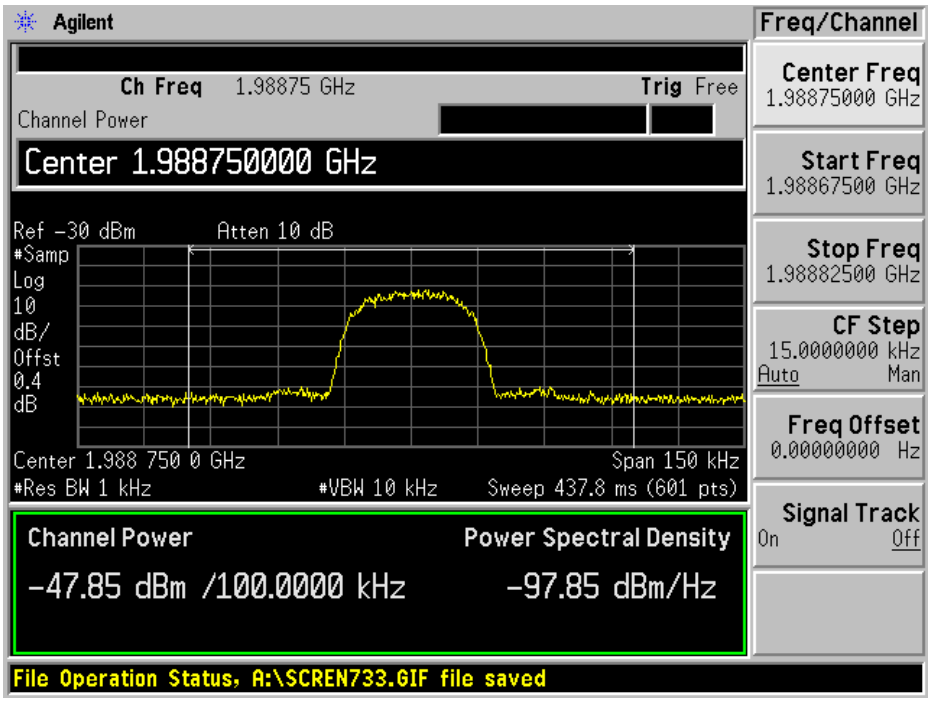

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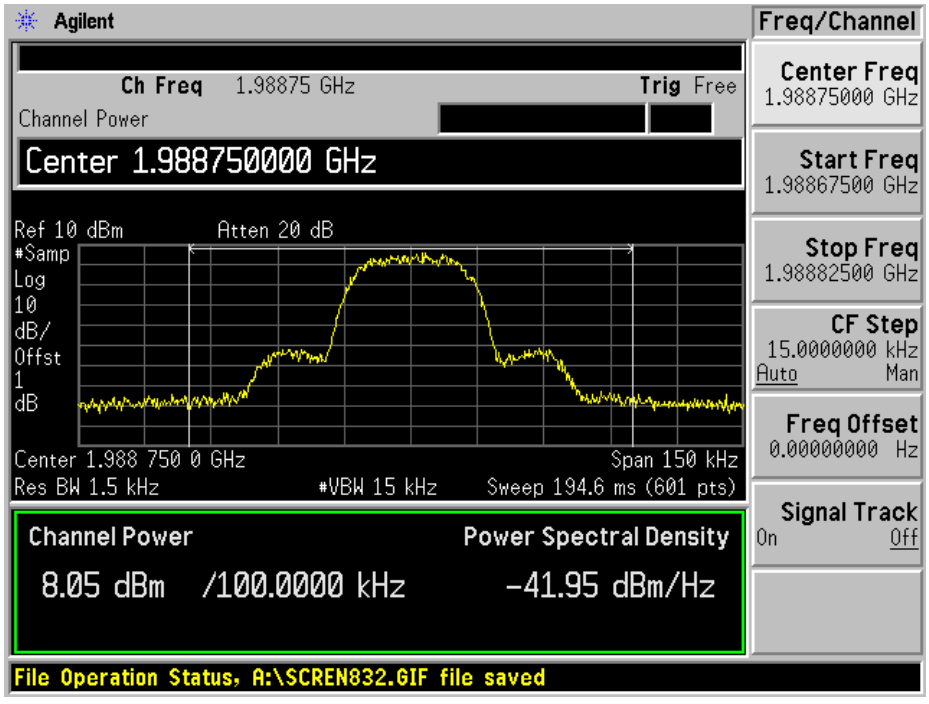
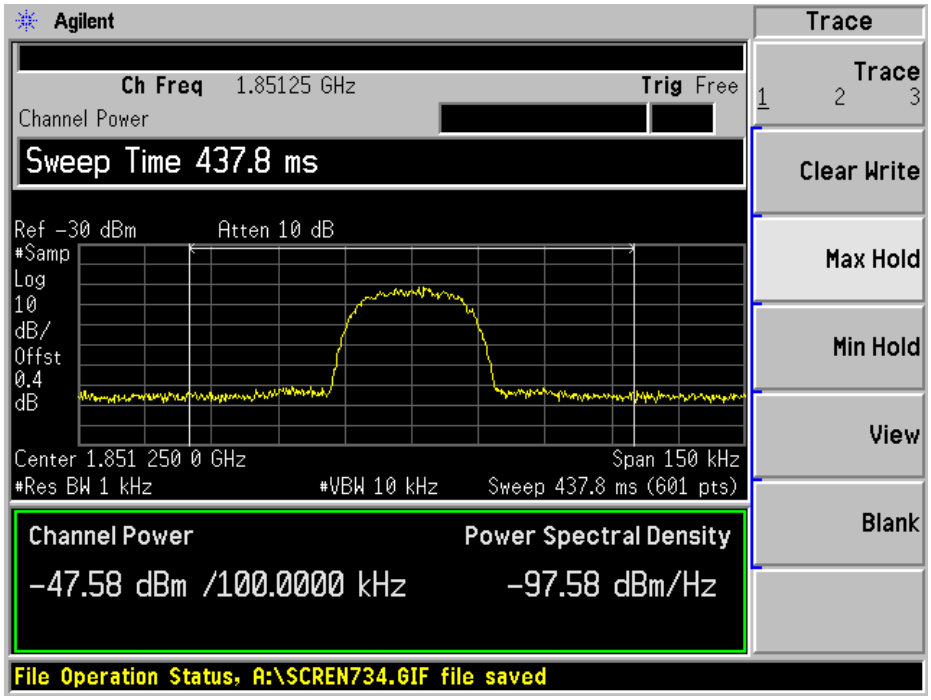


Conducted power plots: TDMA

Reverse (Downlink)

Low Channel

Input:



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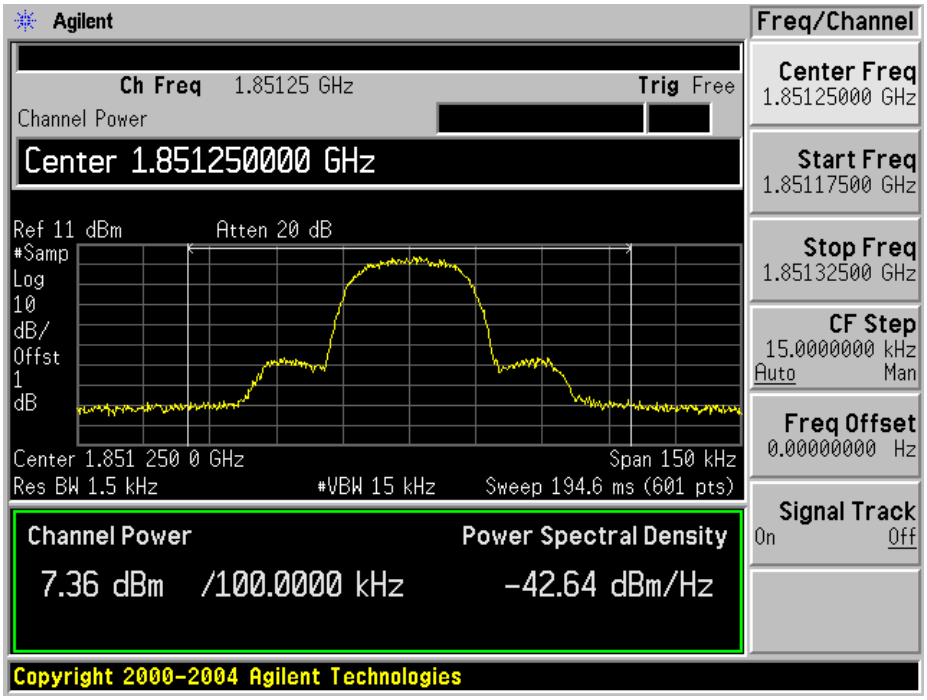

Mid Channel

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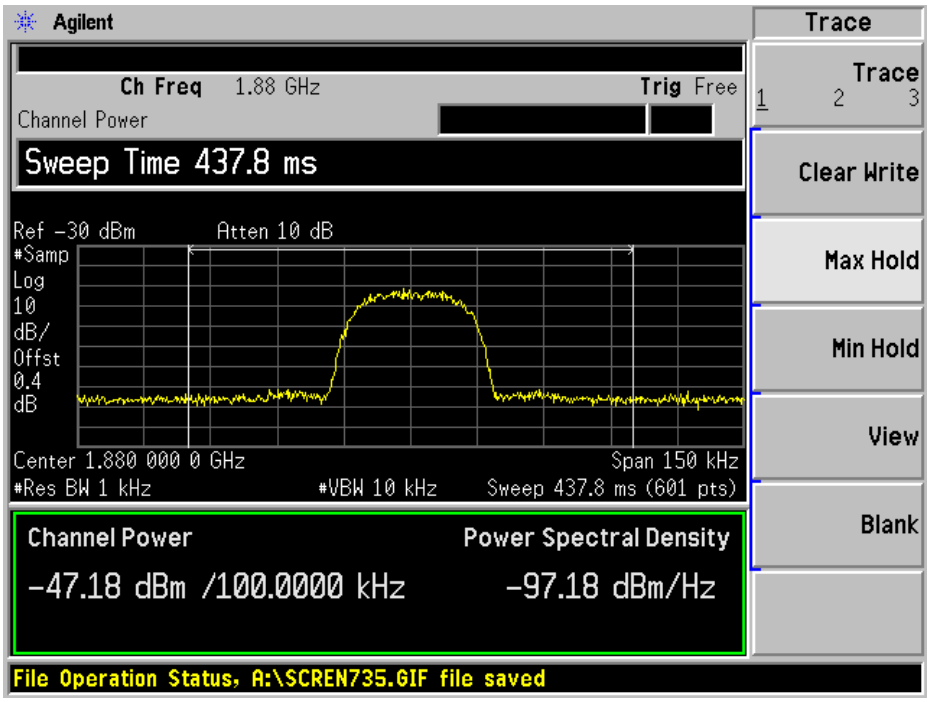

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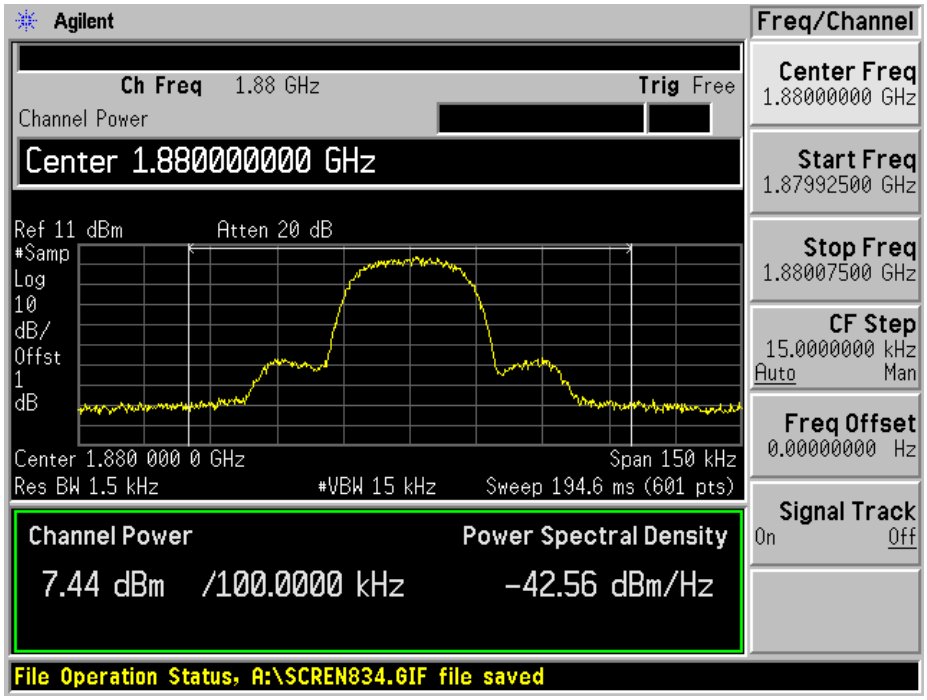

High Channel

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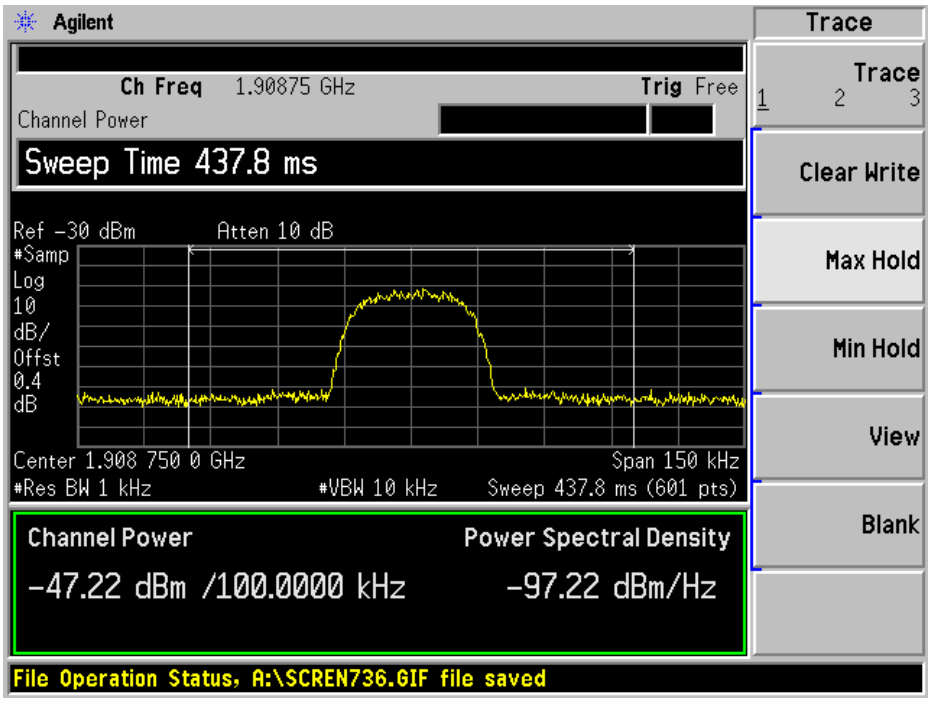

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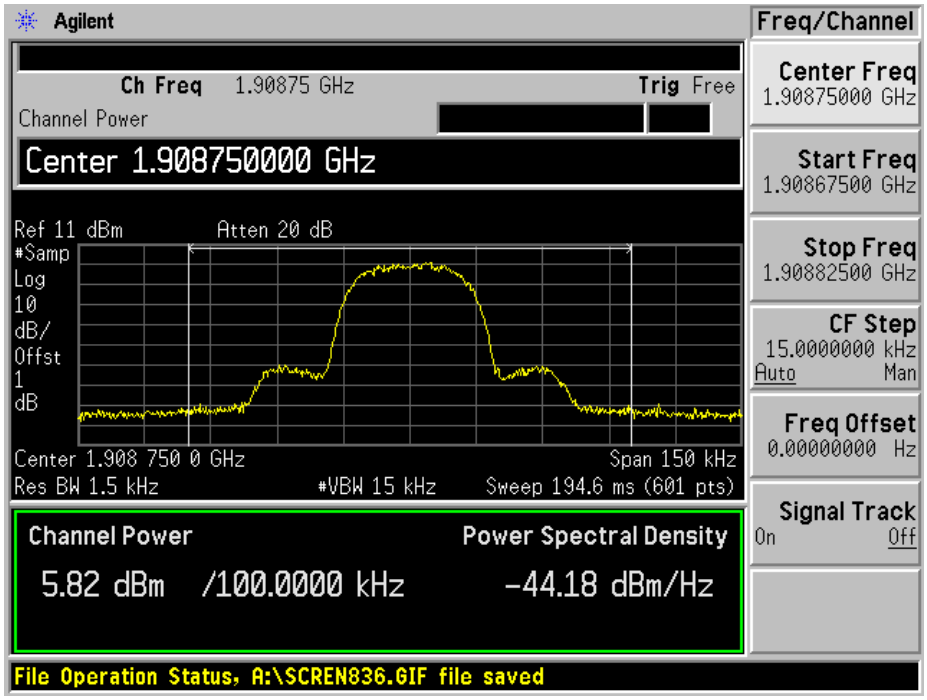


§2.1049 & §24.238 - EMISSION BANDWIDTH

Applicable Standards

According to FCC §2.1049 and §24.238 (b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 KHz and the spectrum was recorded.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	23° C
Relative Humidity:	39%
ATM Pressure:	1012 mbar

** The testing was performed by Oscar Au on 2006-10-19.*

Test Results

CDMA
Forward (downlink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (MHz)	26 dB Bandwidth (MHz)
Low	1931.25	1.30	1.40
Middle	1960.00	1.28	1.46
High	1988.75	1.28	1.45

Reverse (uplink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (MHz)	26 dB Bandwidth (MHz)
Low	1851.25	1.27	1.44
Middle	1880.00	1.27	1.44
High	1908.75	1.28	1.44

GSM
Forward (downlink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1931.25	257.74	342.08
Middle	1960.00	252.06	334.18
High	1988.75	252.18	337.39

Reverse (uplink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1851.25	252.17	340.28
Middle	1880.00	254.42	338.82
High	1908.75	252.26	337.45

TDMA
Forward (downlink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1931.25	27.52	33.21
Middle	1960.00	27.96	33.82
High	1988.75	27.10	33.34

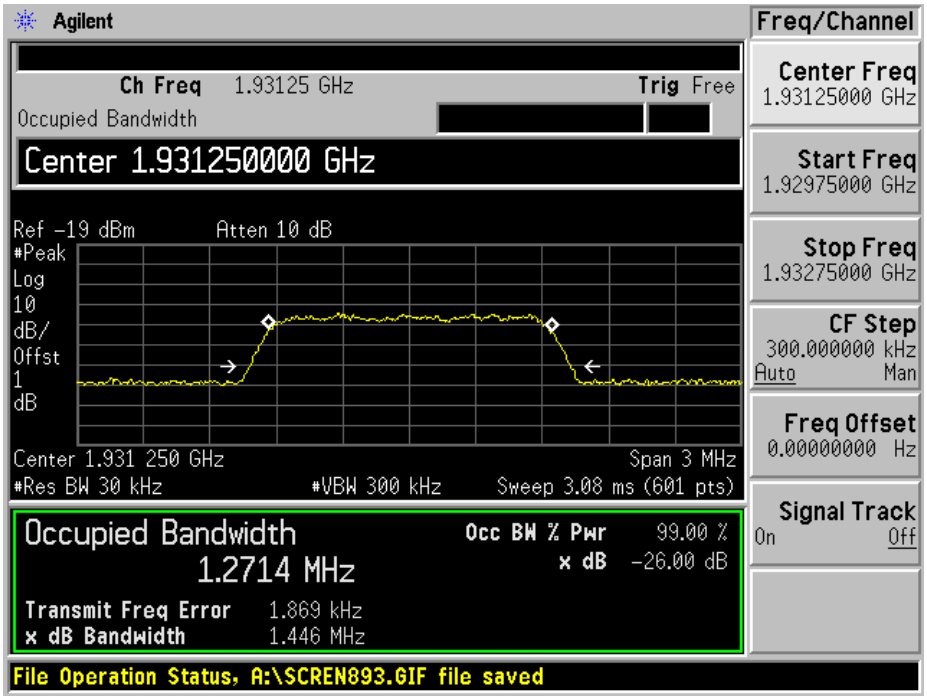
Reverse (uplink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1851.25	27.04	33.29
Middle	1880.00	27.45	33.07
High	1908.75	27.43	32.93

CDMA

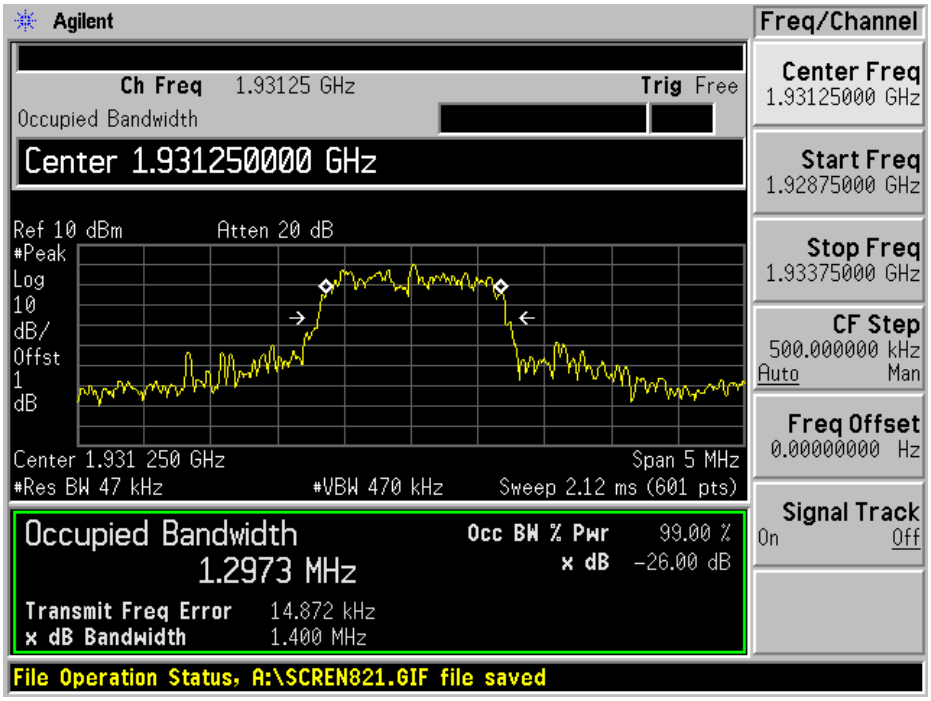
Forward (Downlink)

Input

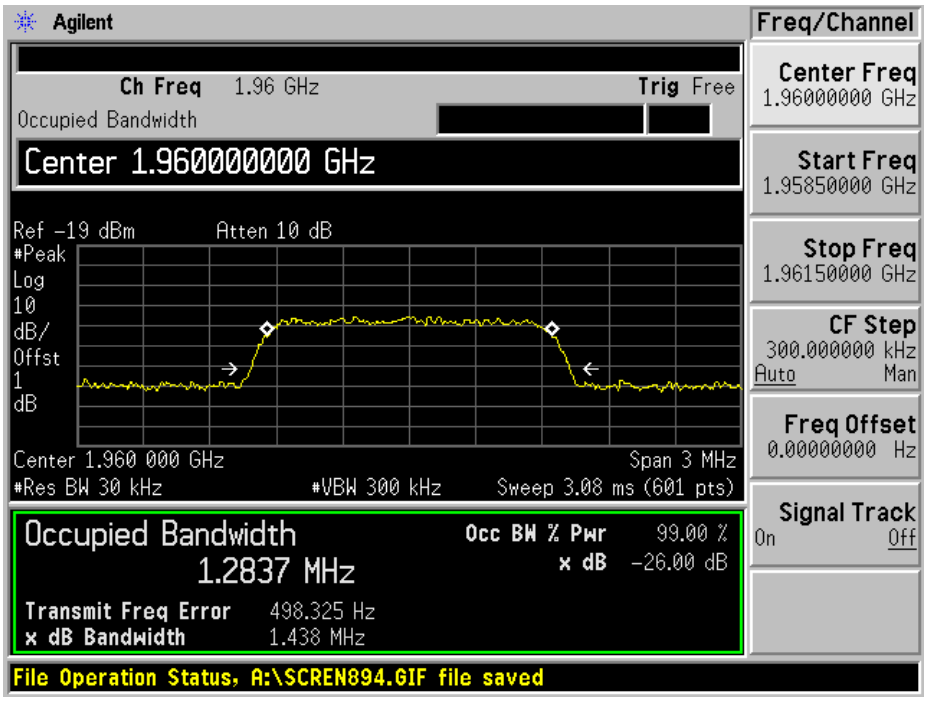


Low channel

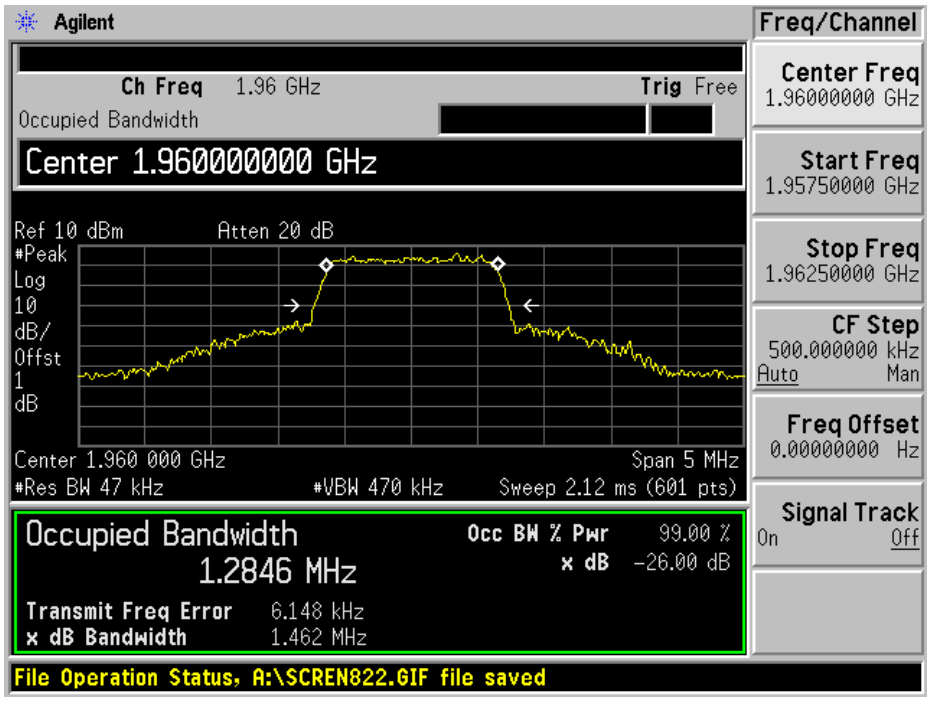
Output



Input

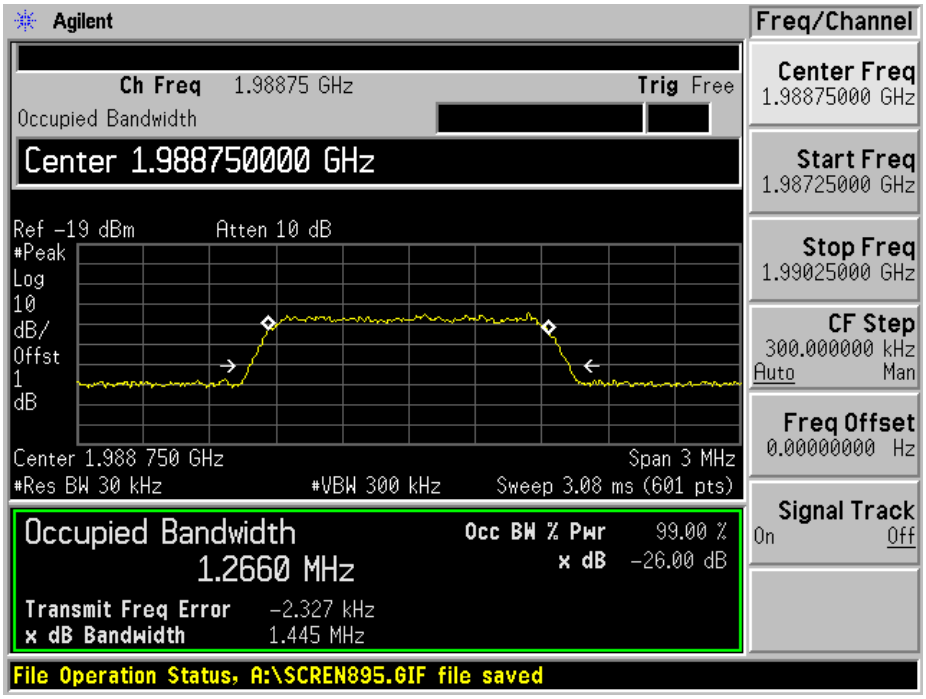


Output



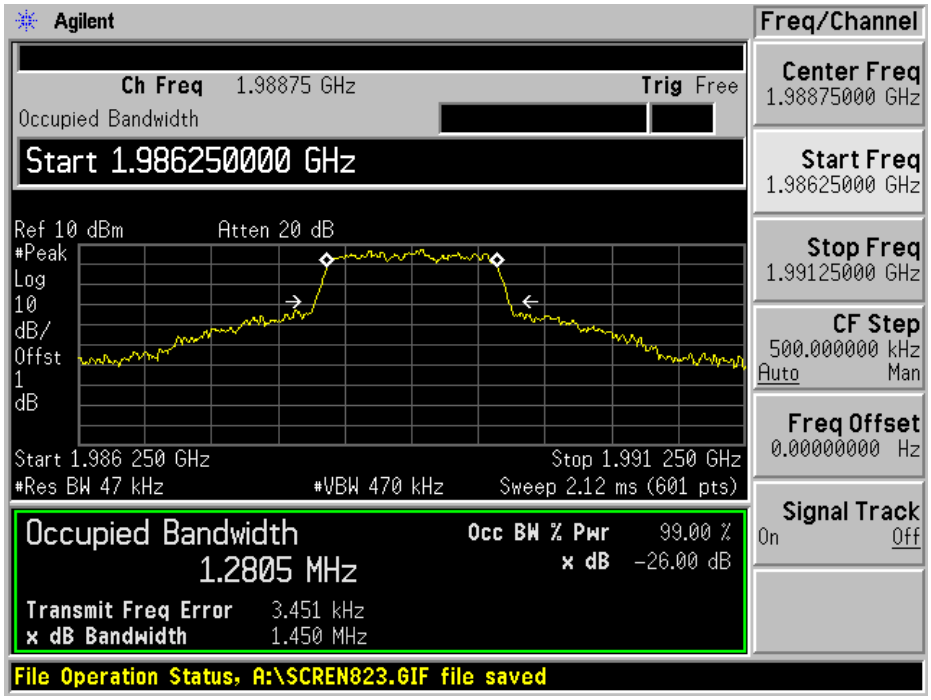
Mid channel

Input



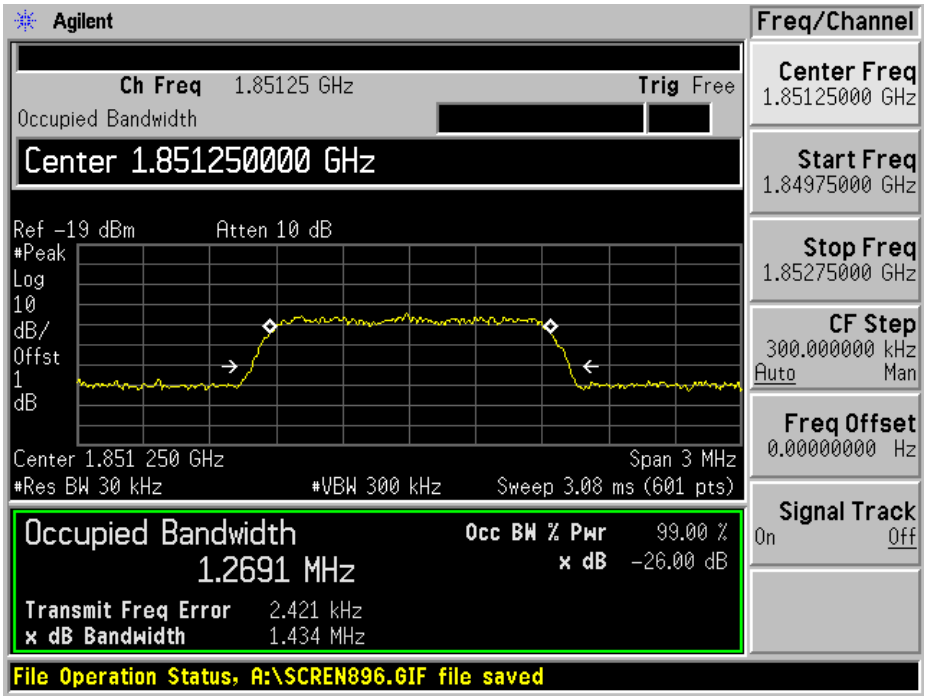
High channel

Output

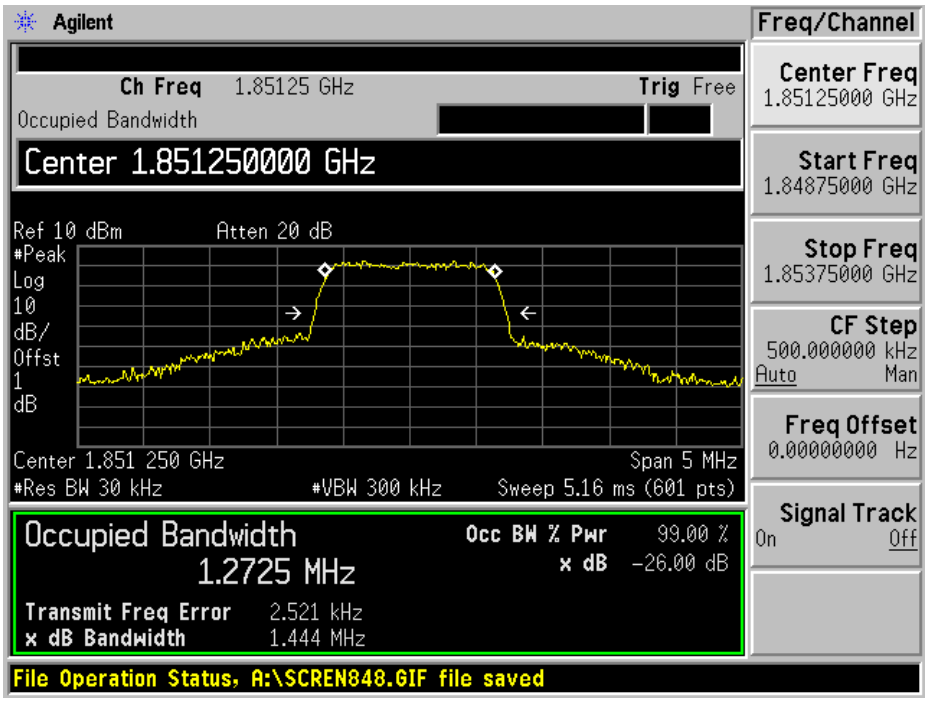


CDMA
Reverse (Uplink)

Input

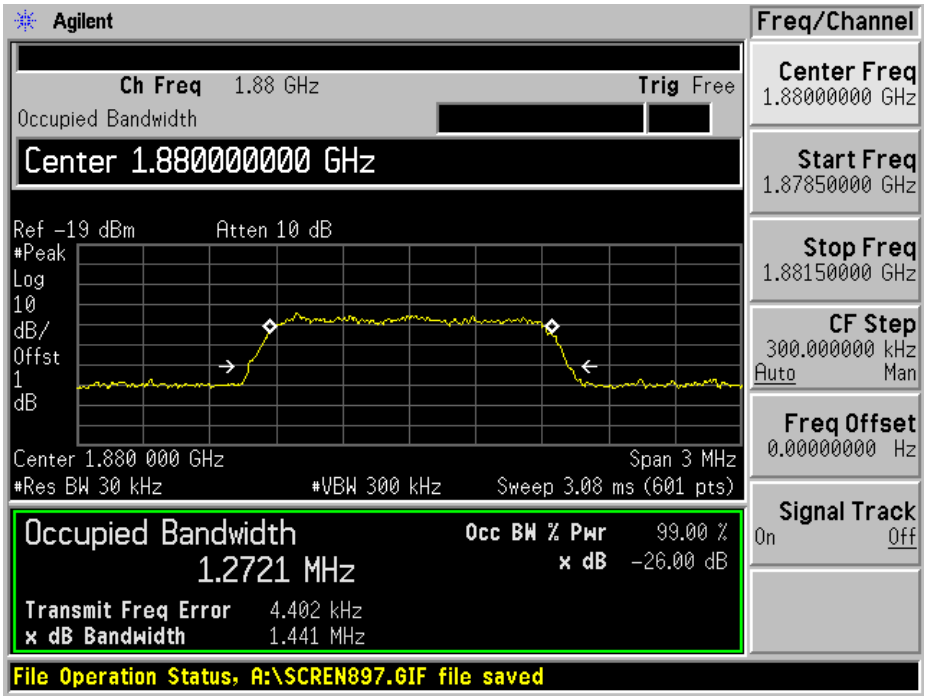


Output



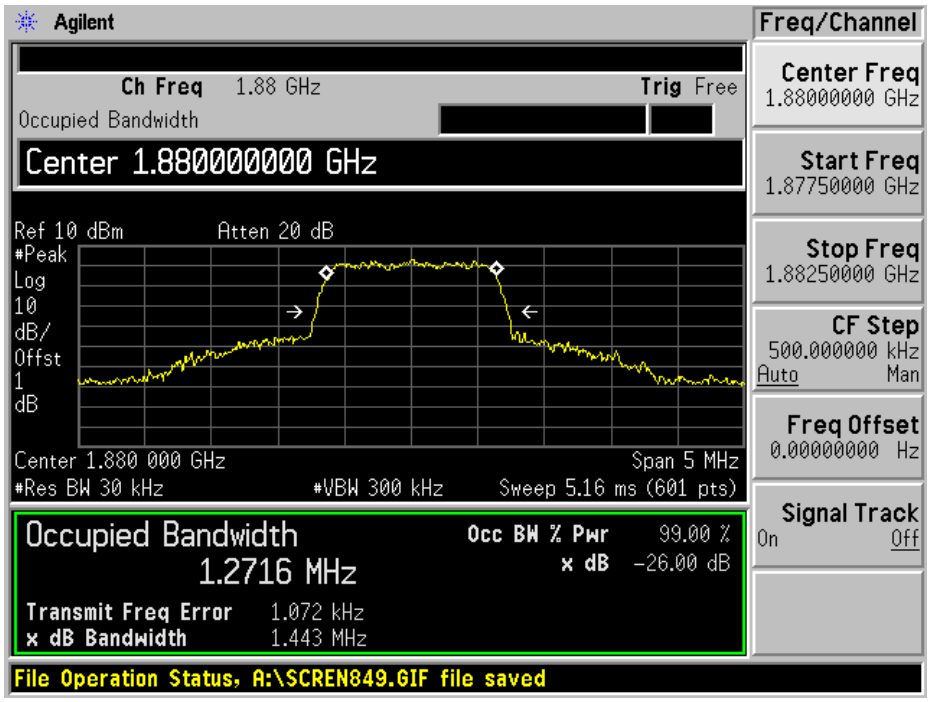
Low channel

Input

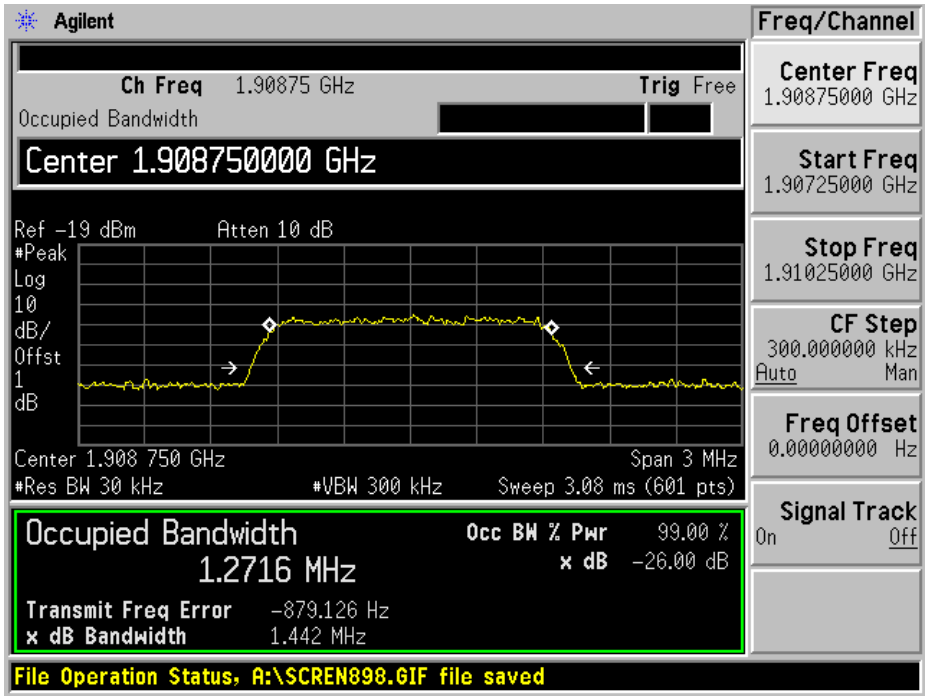


Mid channel

Output

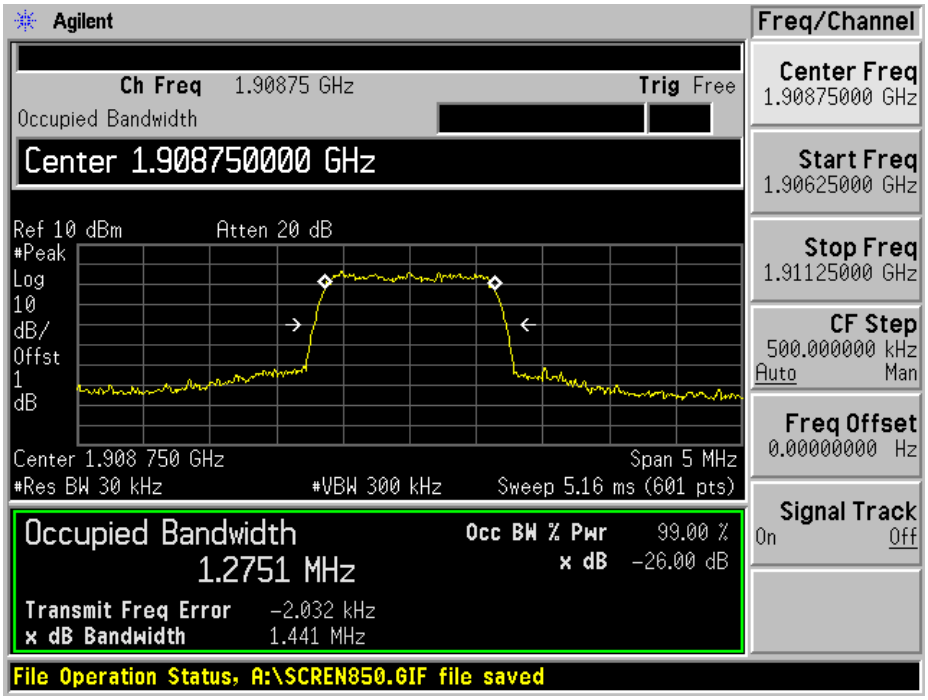


Input



High channel

Output

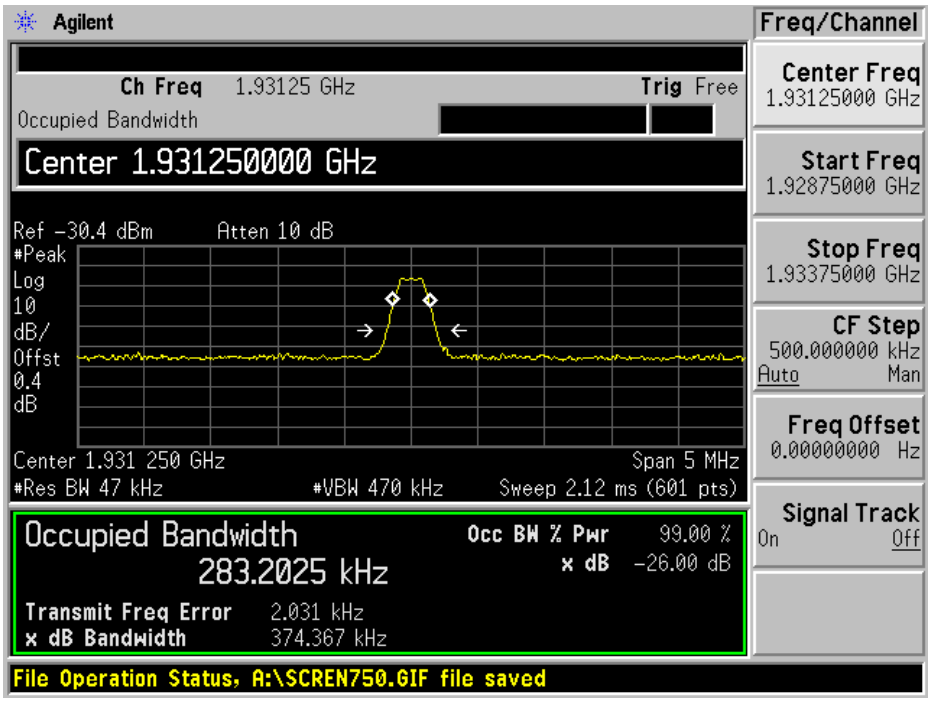


GSM

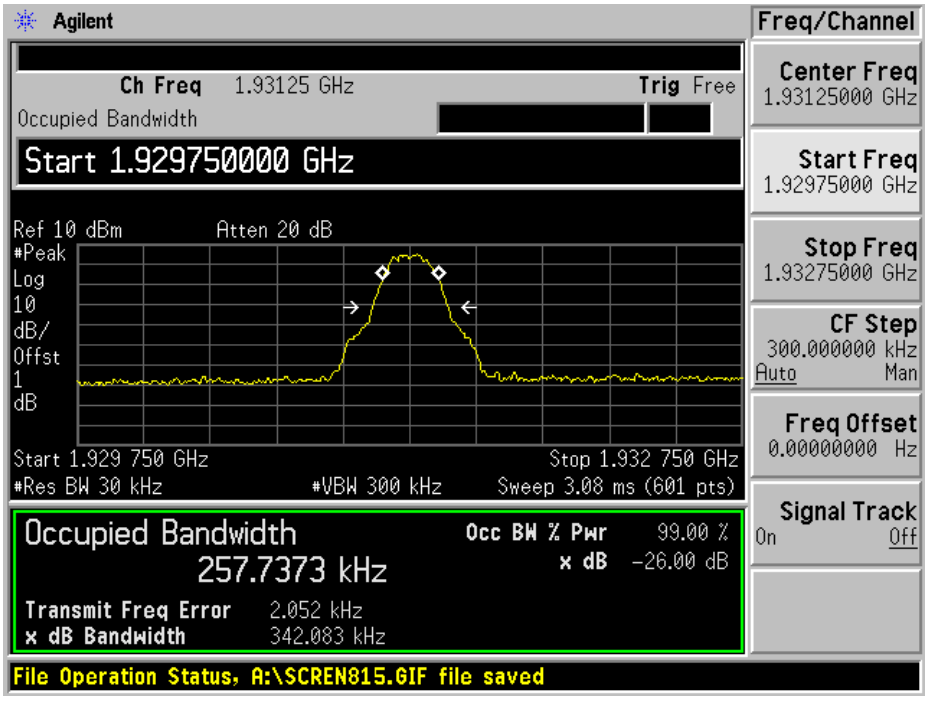
Forward (Downlink)

Low Channel

Input:

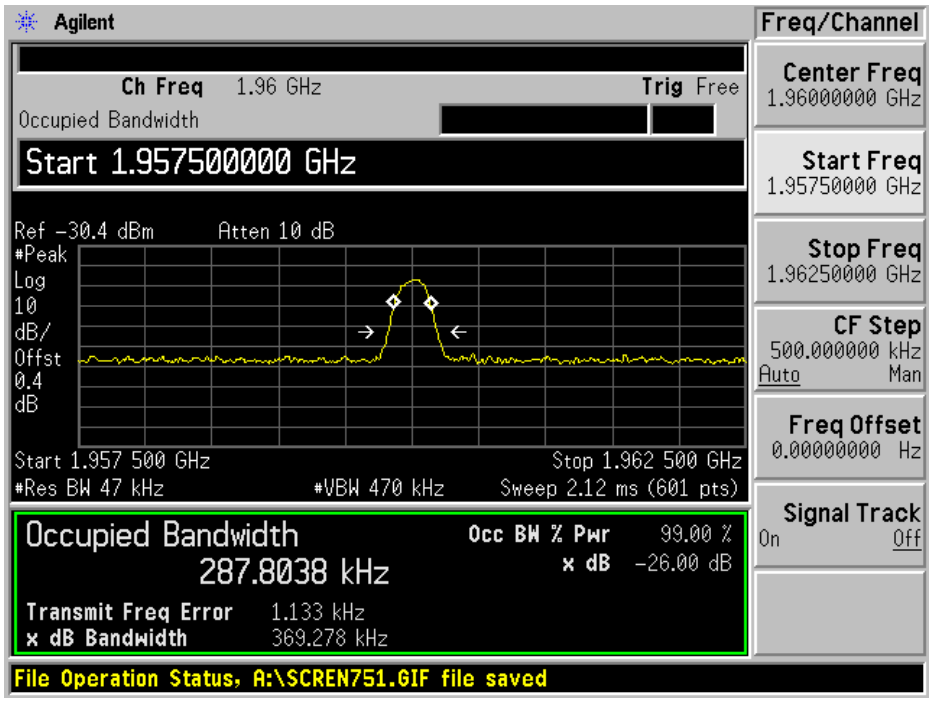


Output

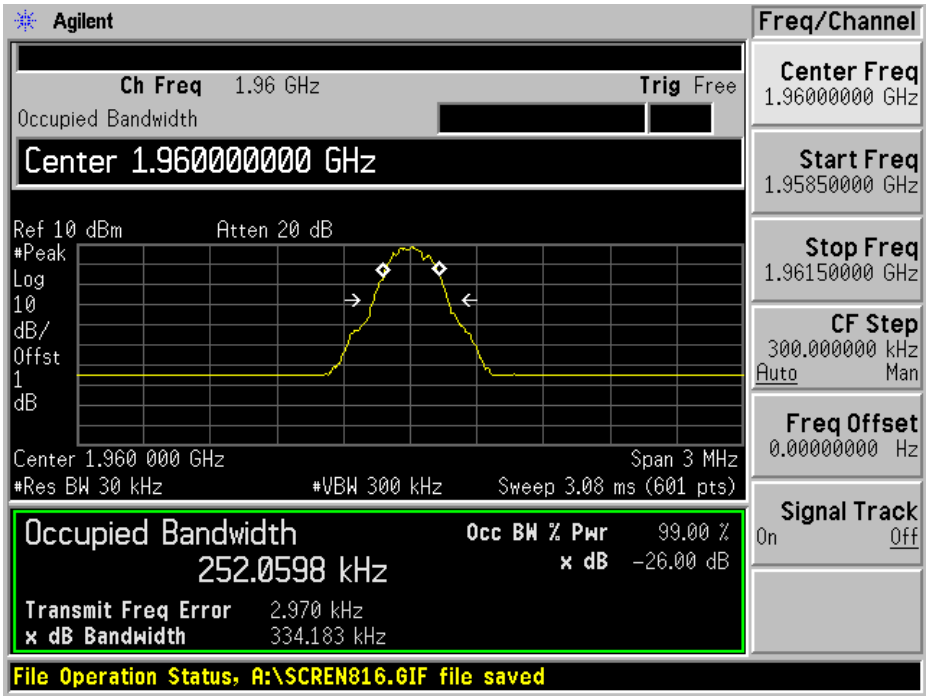


Mid Channel

Input

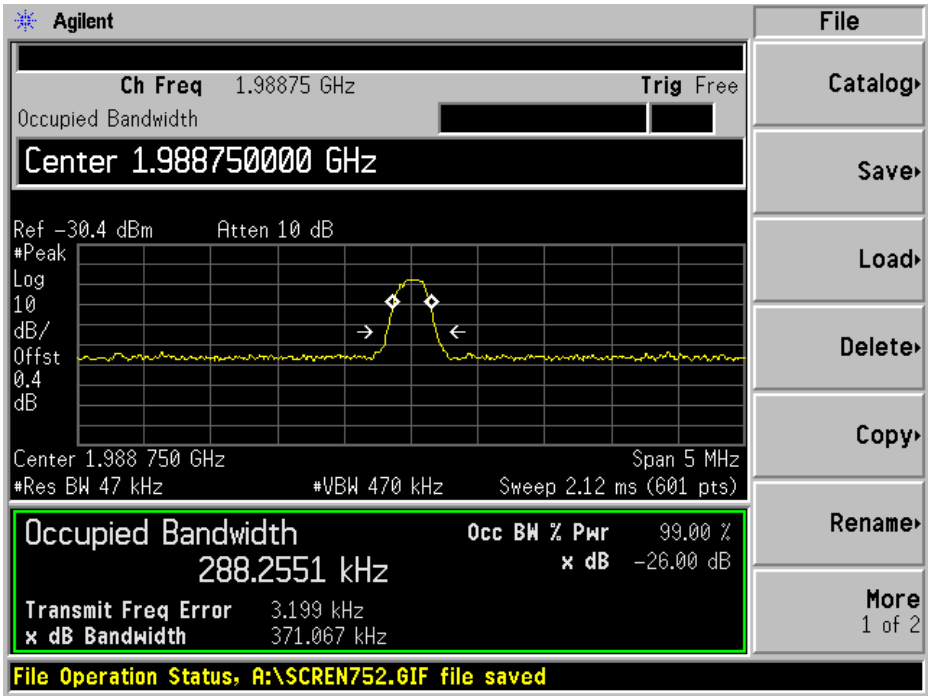


Output

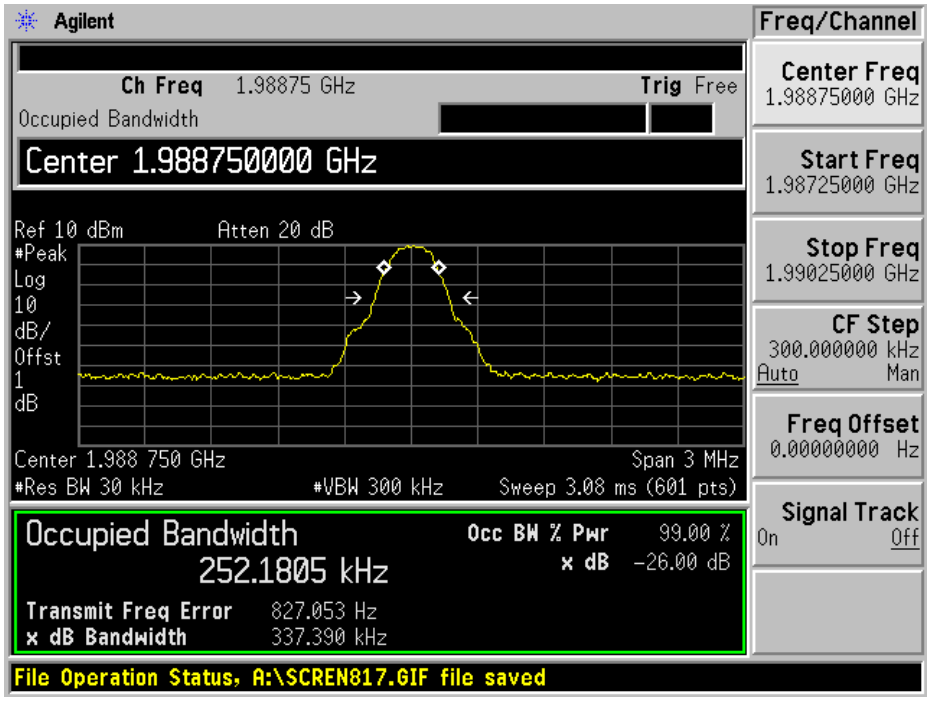


High Channel

Input



Output

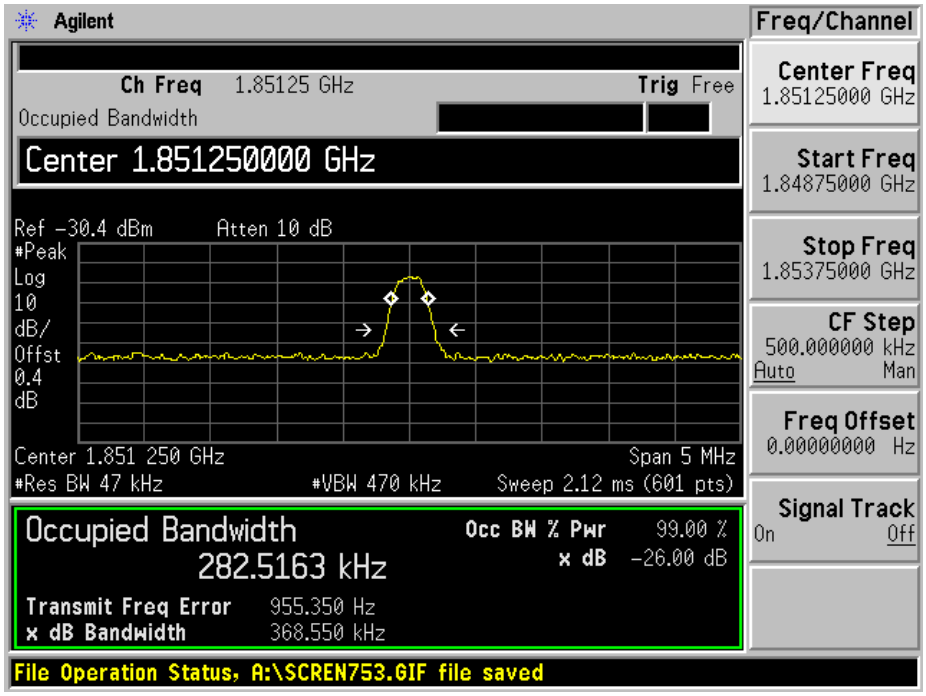


GSM

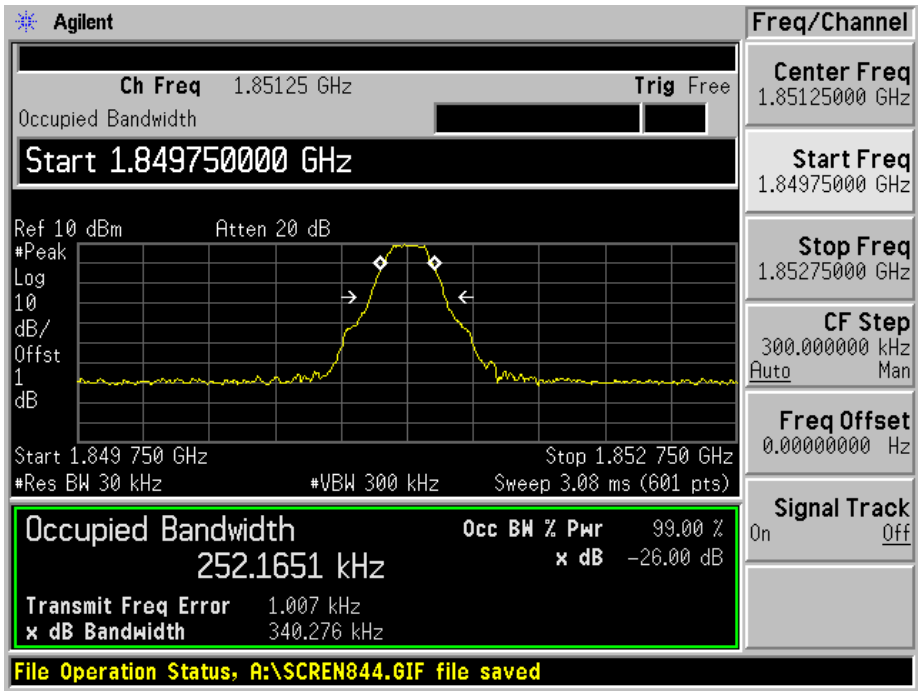
Reverse (Uplink)

Low Channel

Input

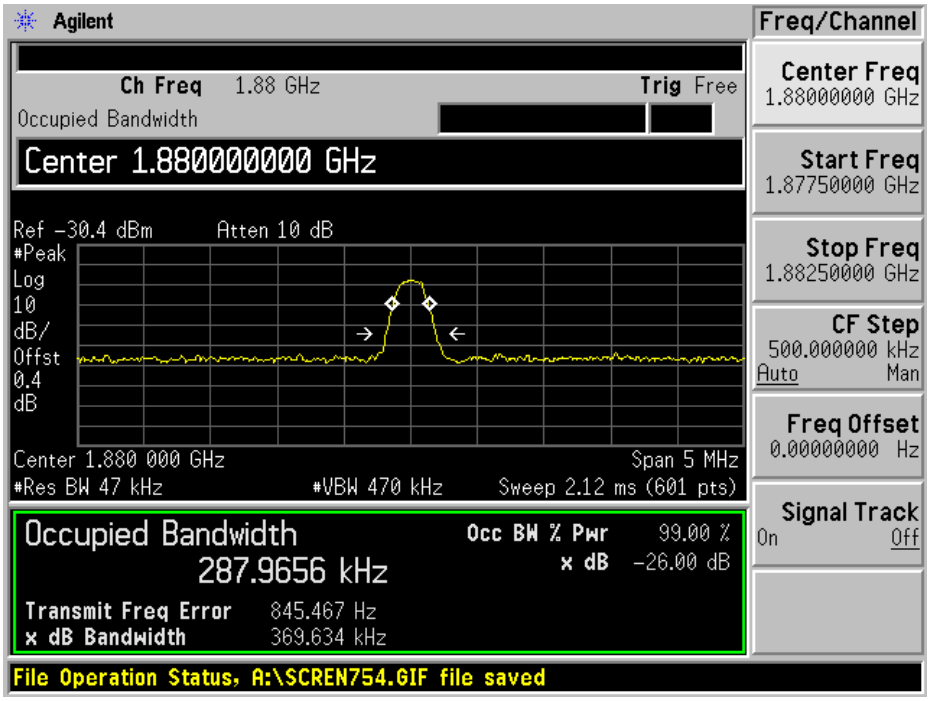


Output

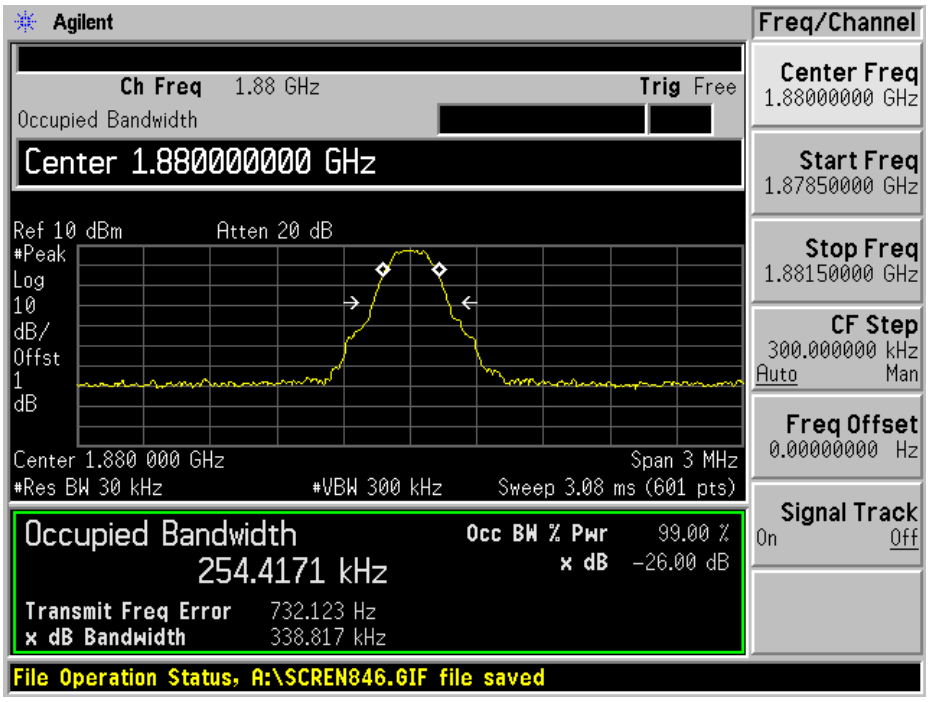


Mid Channel

Input

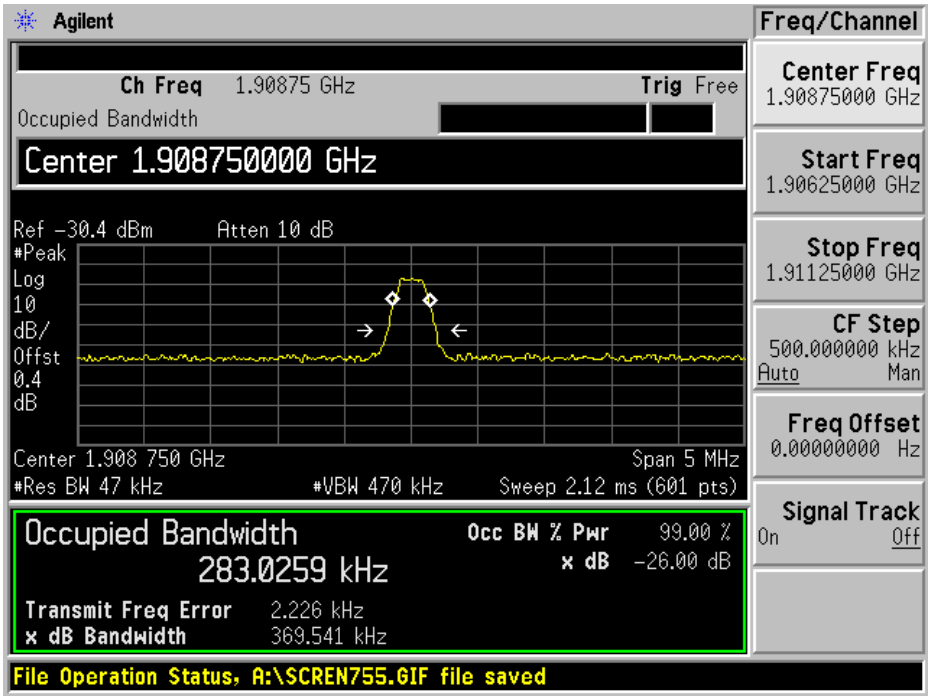


Output

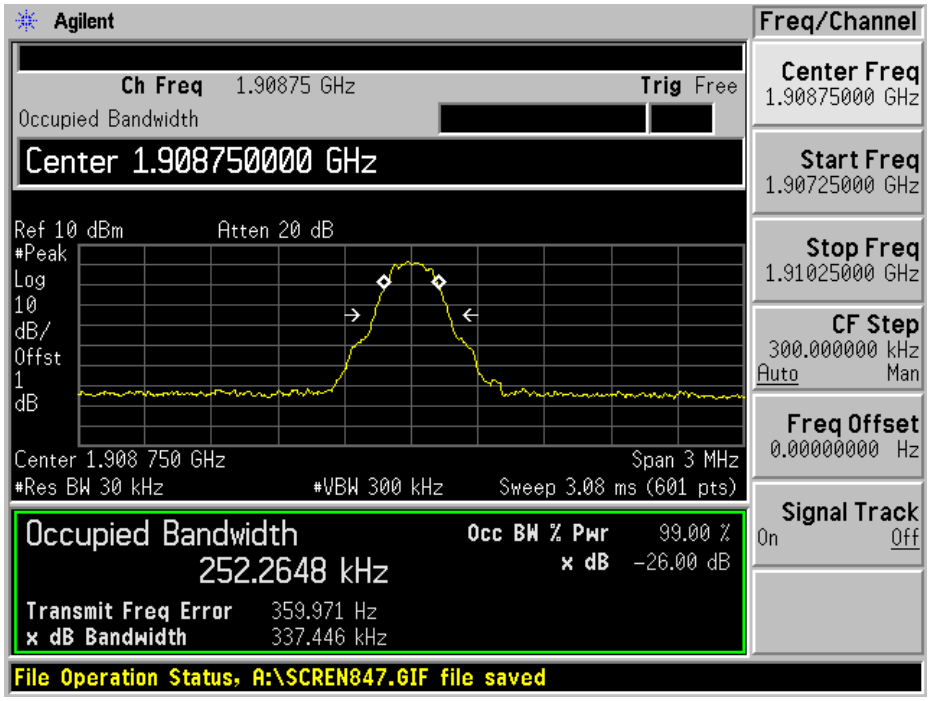


High Channel

Input:



Output

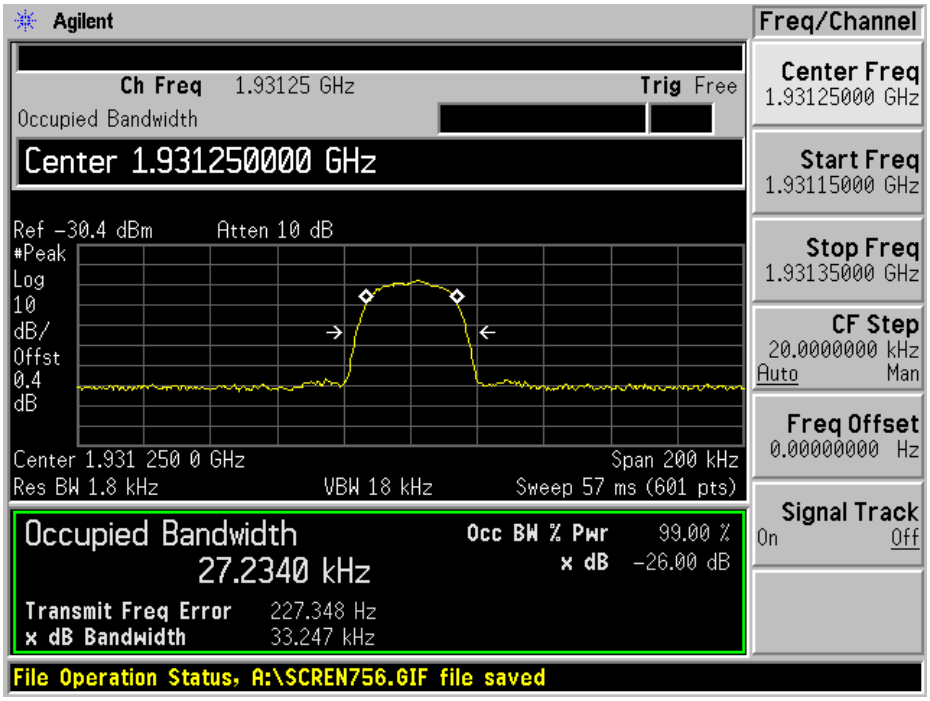


TDMA

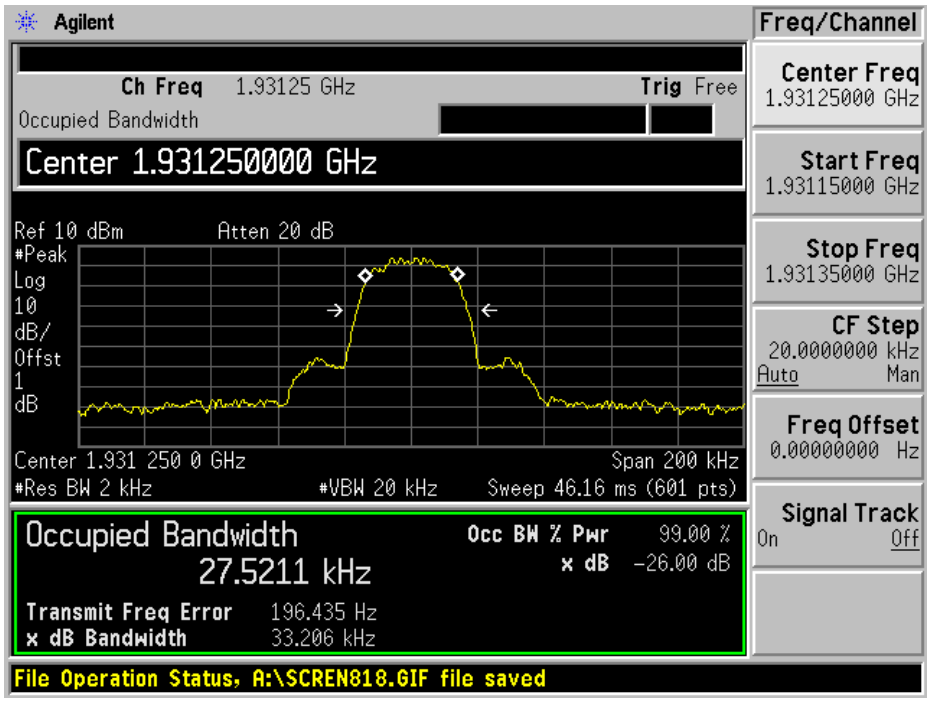
Forward (Downlink)

Low Channel

Input

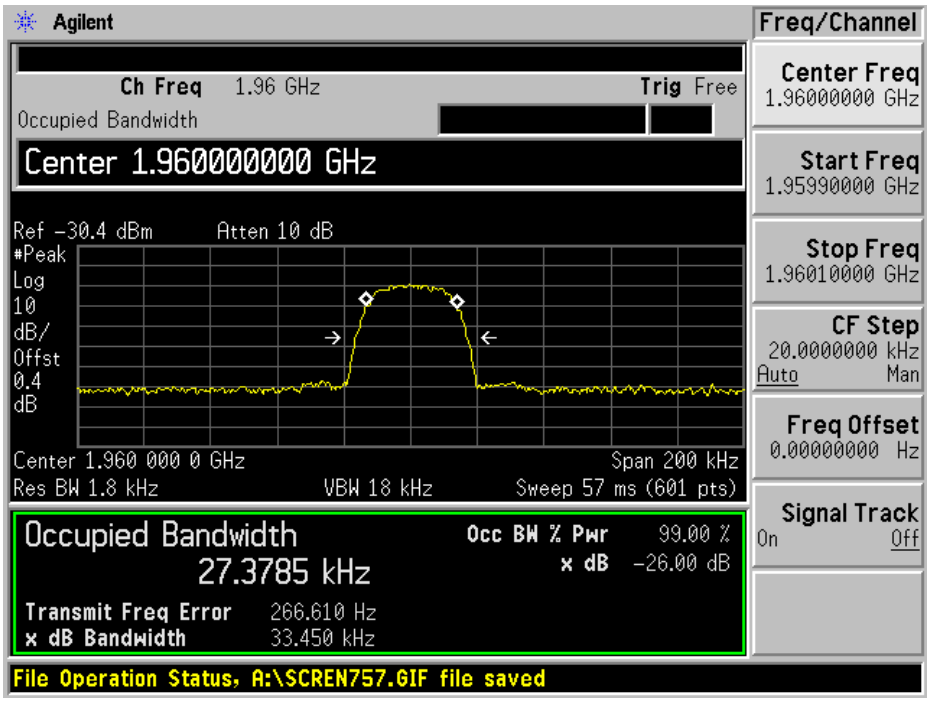


Output

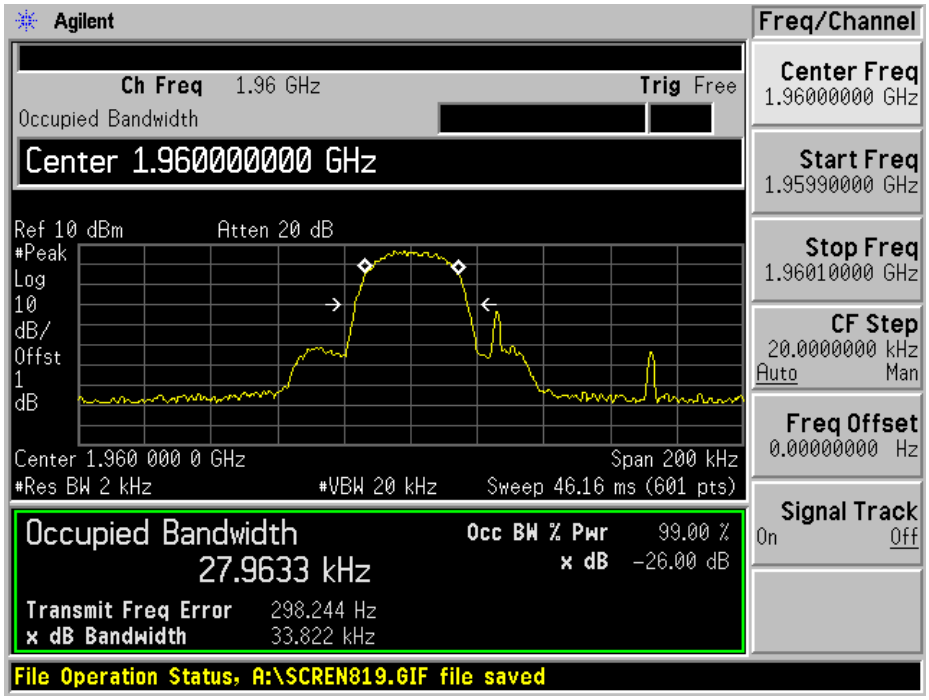


Mid Channel

Input

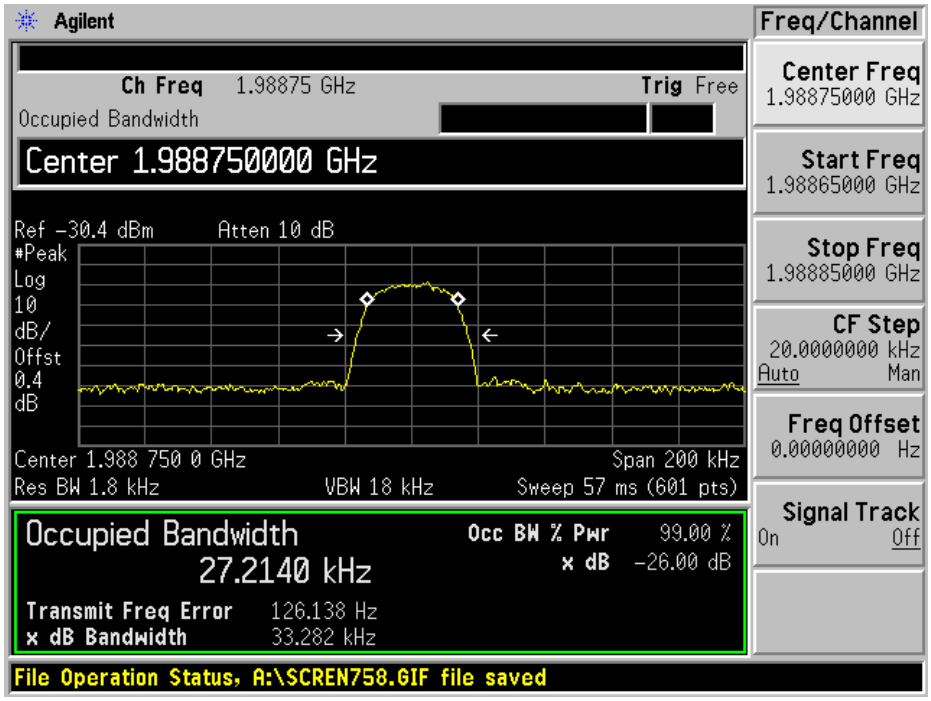


Output

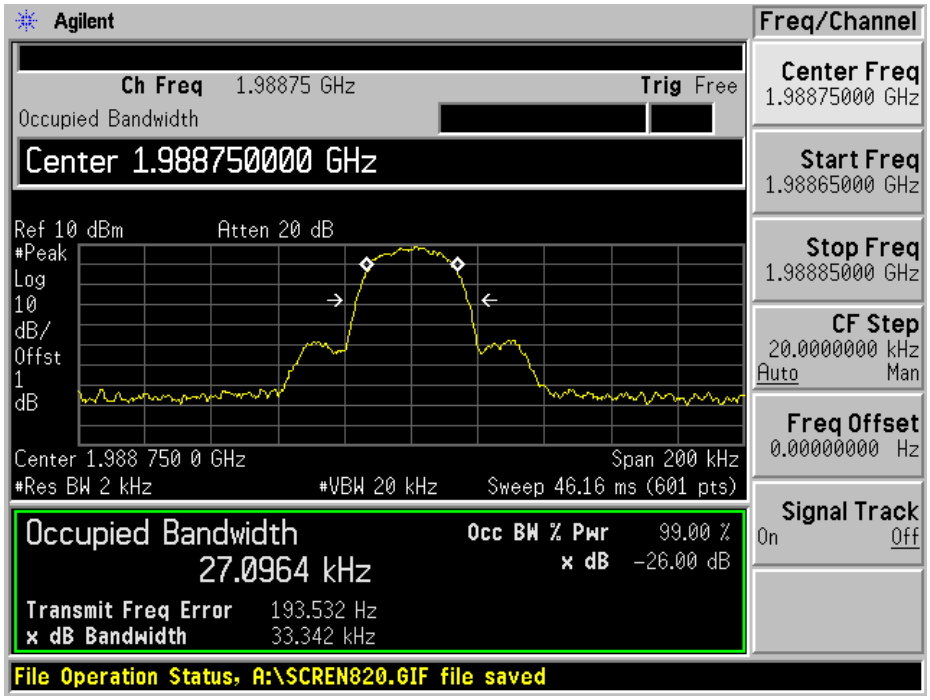


High Channel

Input



Output

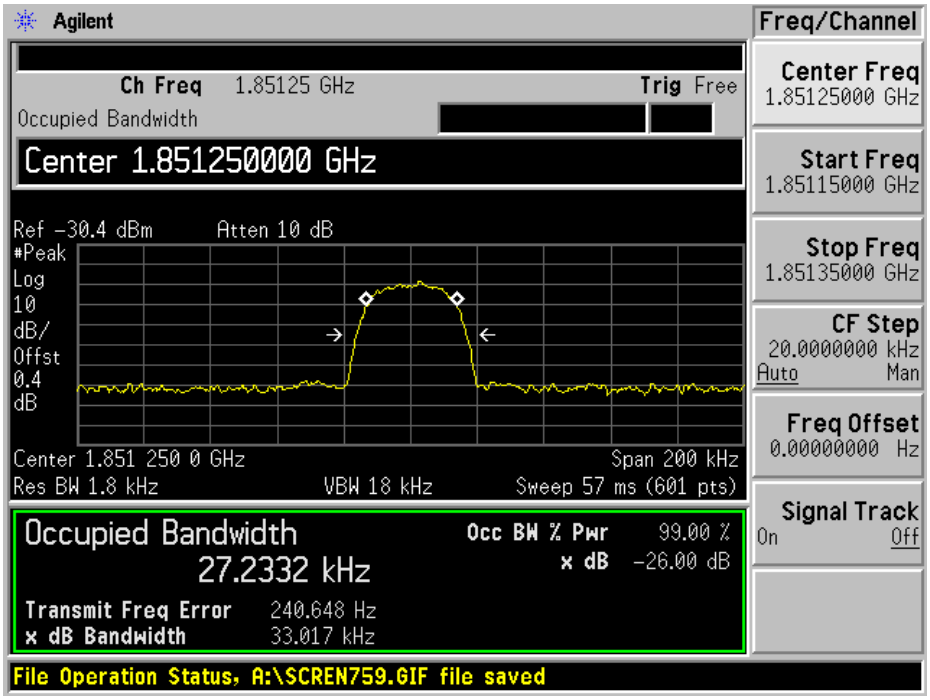


TDMA

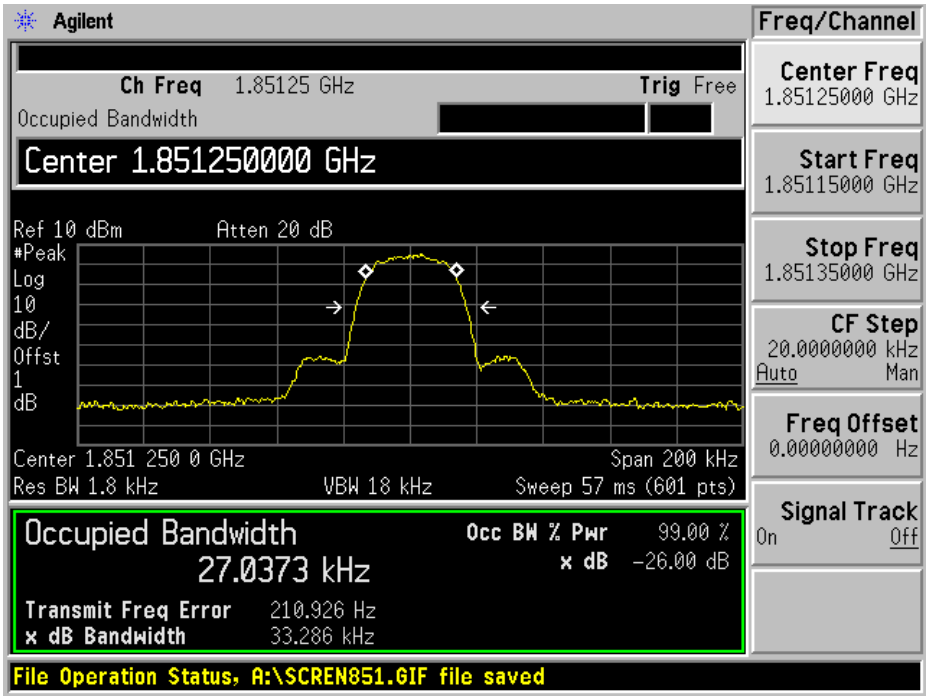
Reverse (Uplink)

Low Channel

Input

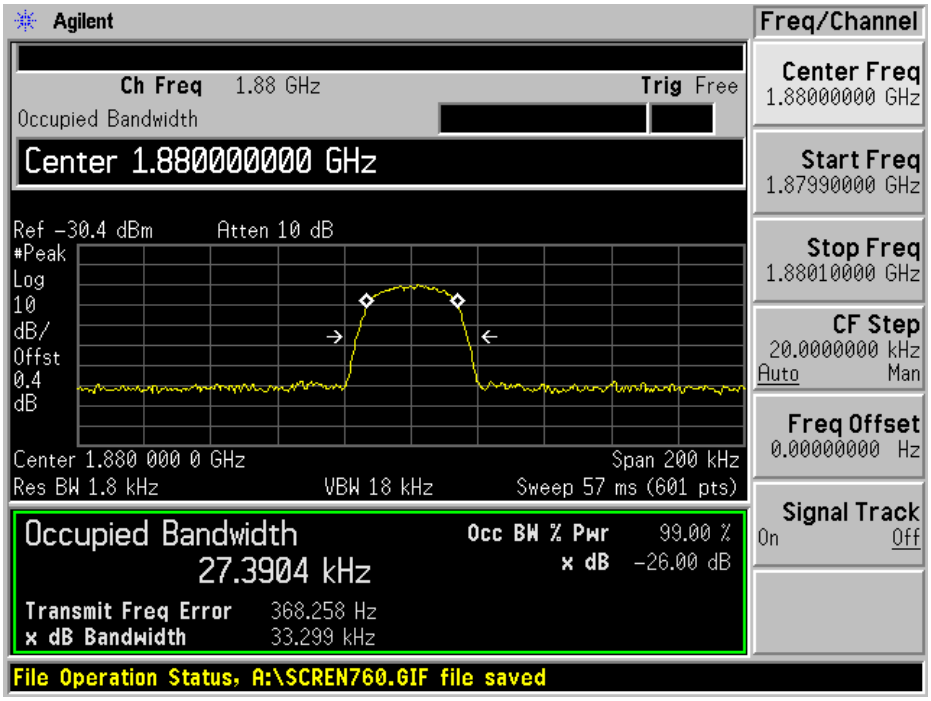


Output

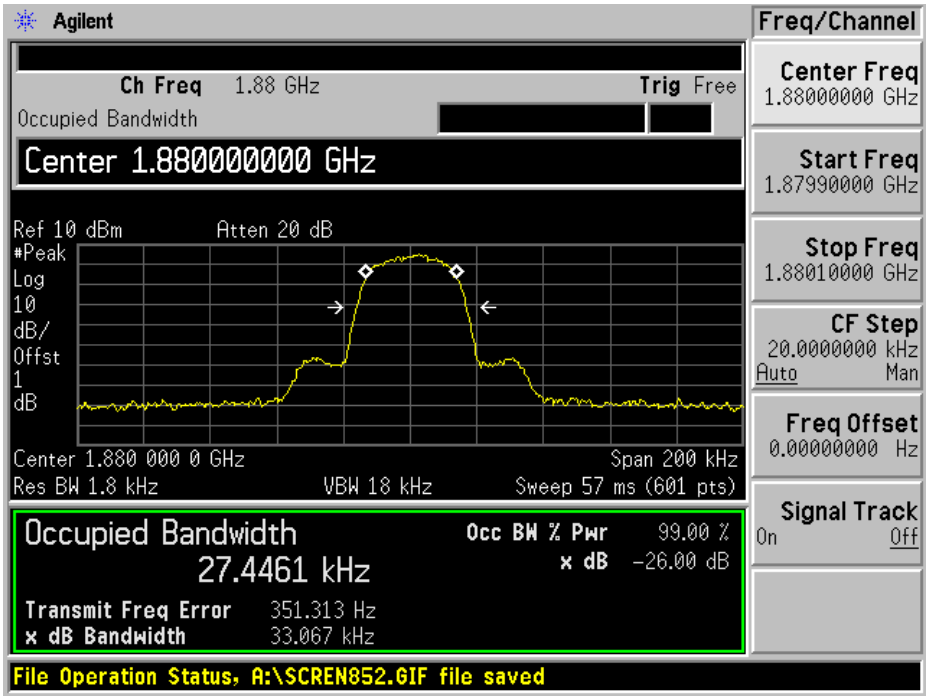


Mid Channel

Input

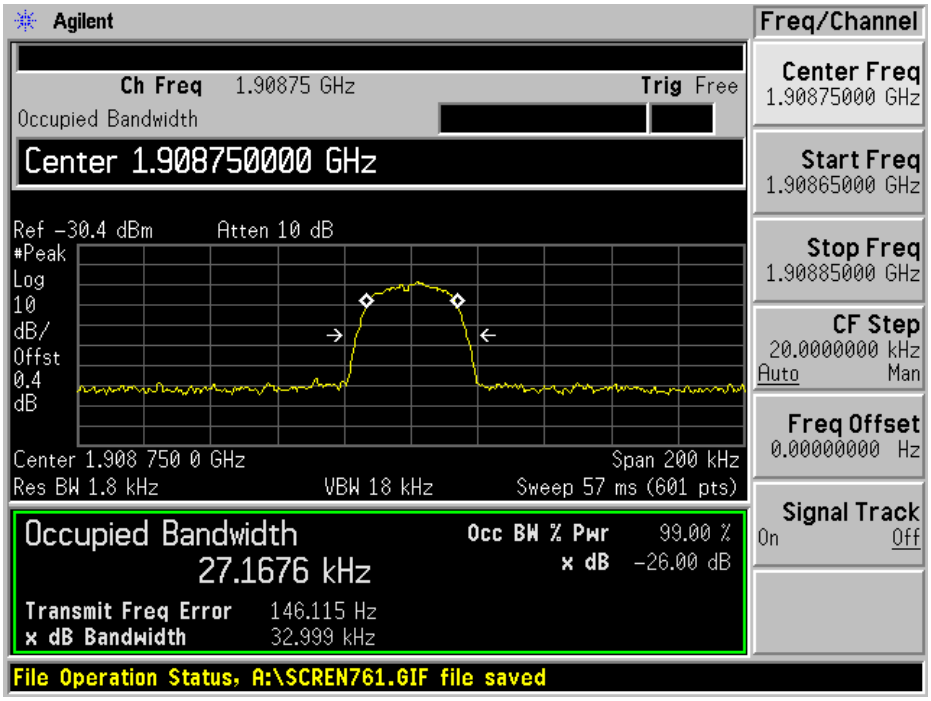


Output

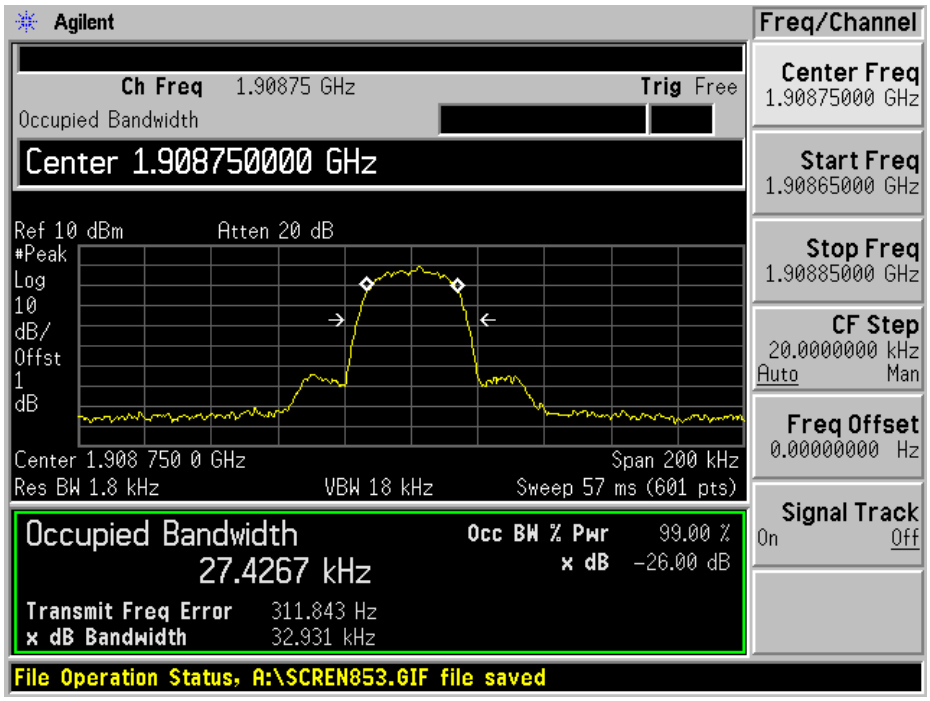


High Channel

Input



Output



§2.1051 & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standards

According to FCC §2.1049 and §24.238, on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 KHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	23° C
Relative Humidity:	42%
ATM Pressure:	1013 mbar

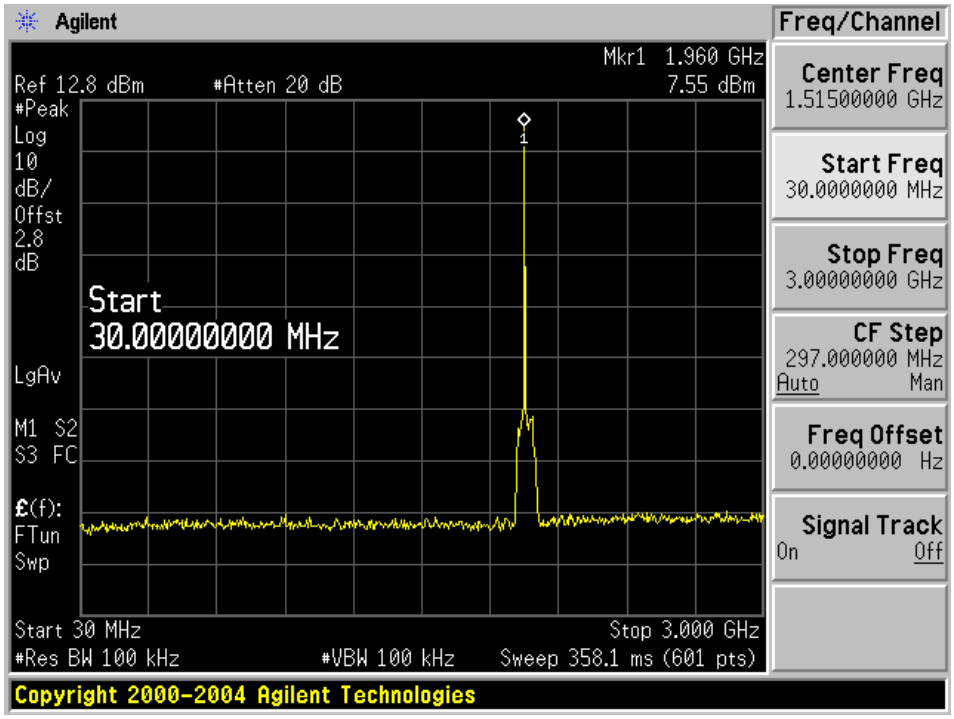
** The testing was performed by Oscar Au on 2006-10-20.*

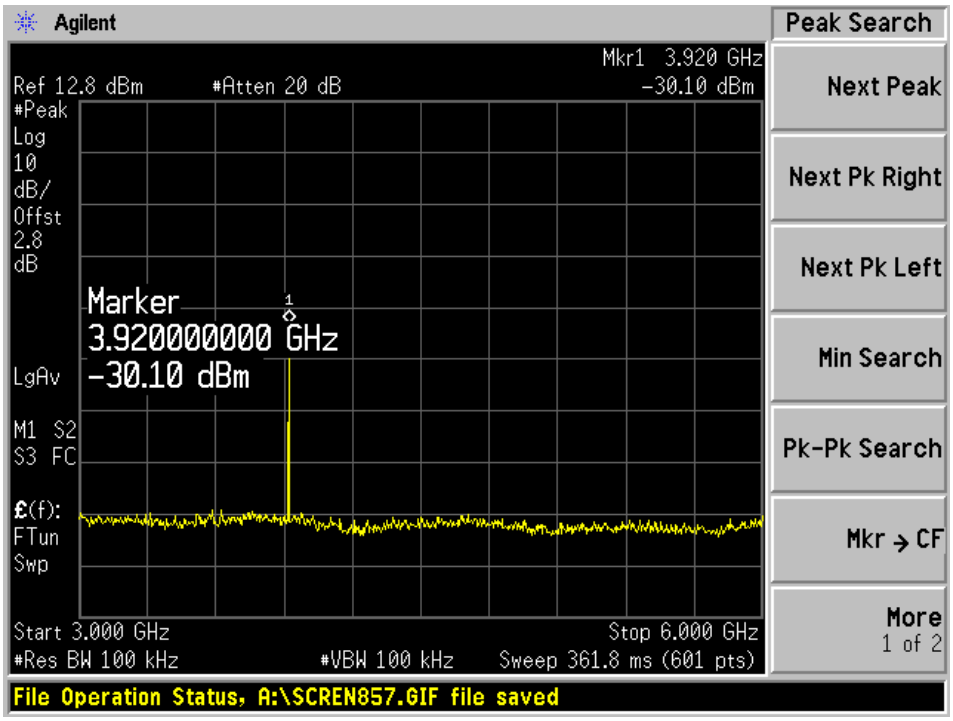
Test Results:

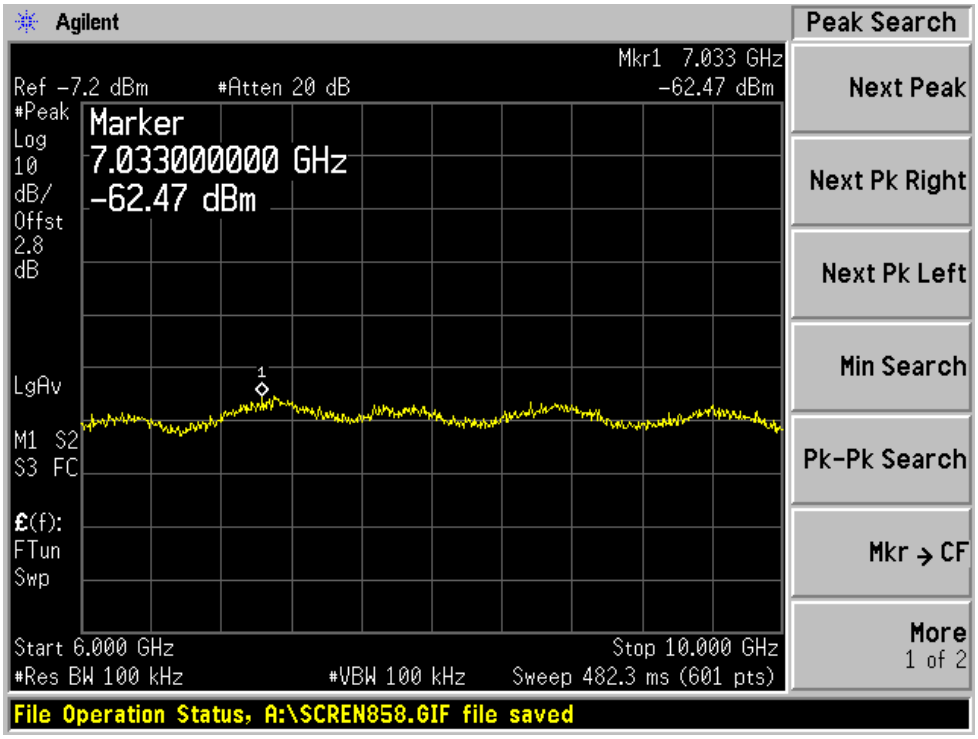
Pass, Please refer to the hereinafter plots.

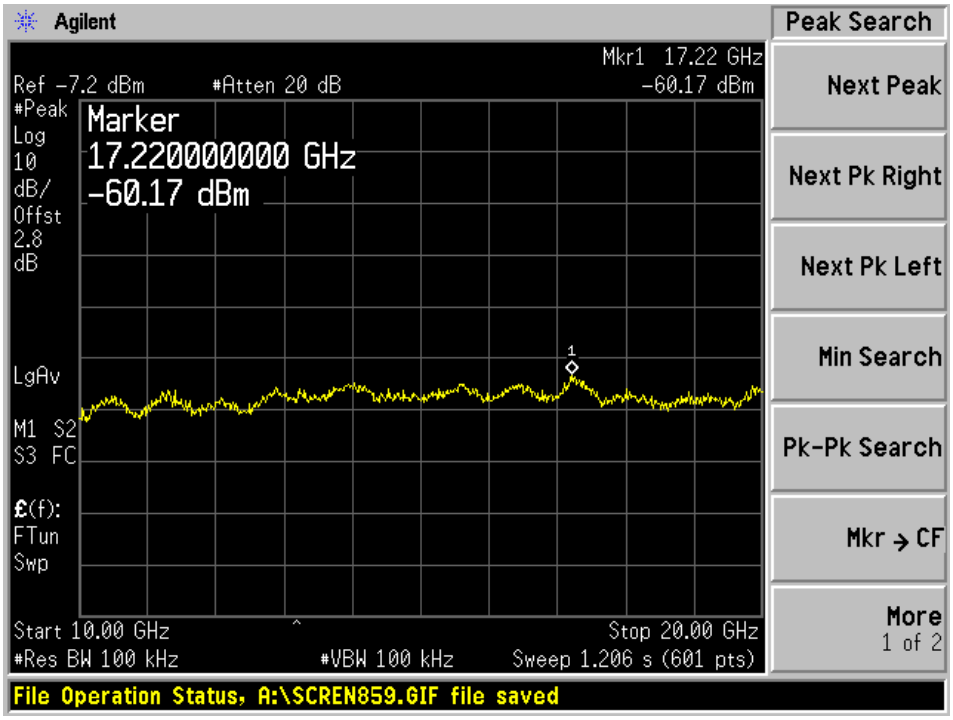
Forward (Downlink)

Mid Channel



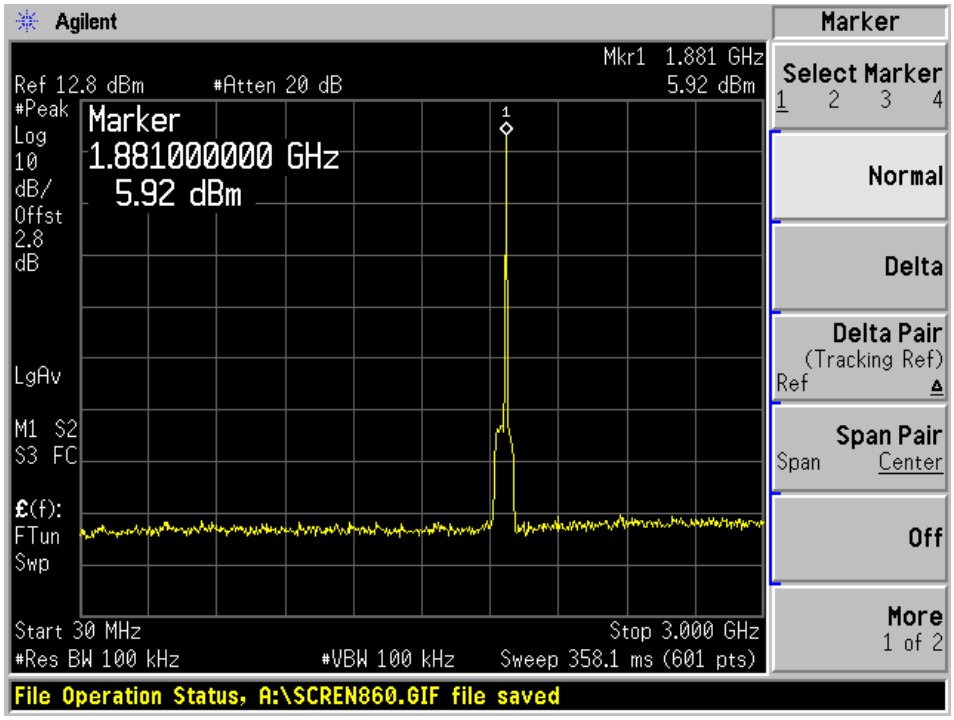


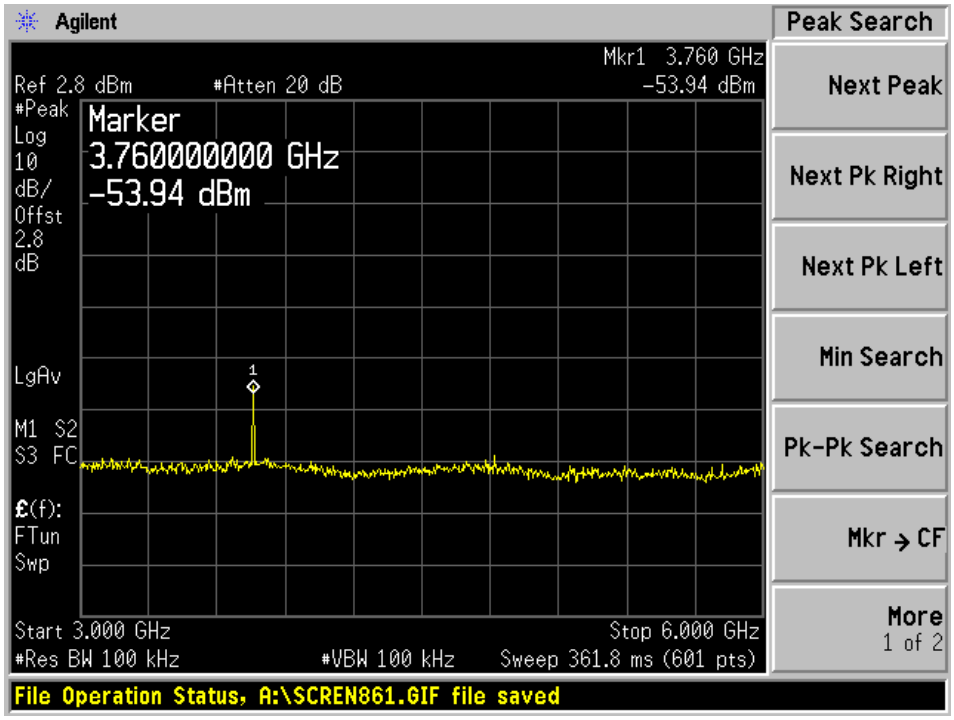

Agilent
Peak Search
Mkr1 7.033 GHz
Ref -7.2 dBm
#Atten 20 dB
-62.47 dBm
#Peak
Log
10
dB/
Offst
2.8
dB
Marker
7.033000000 GHz
-62.47 dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 6.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 482.3 ms (601 pts)
File Operation Status, A:\SCREN858.GIF file saved

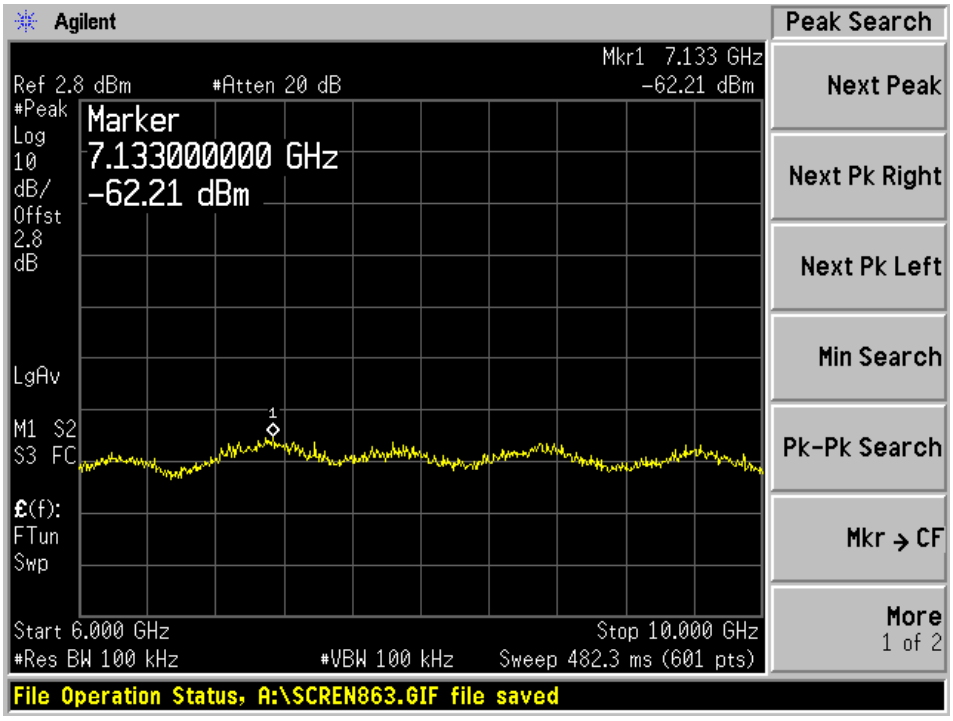

Agilent
Peak Search
Mkr1 17.22 GHz
Ref -7.2 dBm
#Atten 20 dB
-60.17 dBm
#Peak
Log
10
dB/
Offst
2.8
dB
Marker
17.220000000 GHz
-60.17 dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 10.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 1.206 s (601 pts)
File Operation Status, A:\SCREN859.GIF file saved

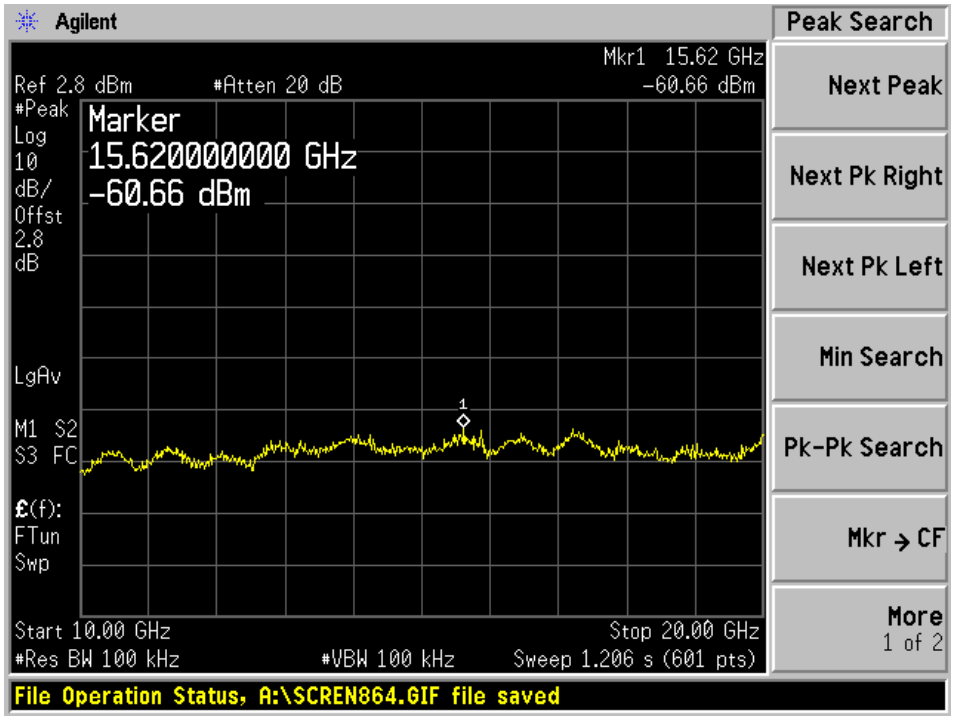
Reverse (Uplink)

Mid Channel






Agilent
Peak Search
Mkr1 7.133 GHz
Ref 2.8 dBm
#Atten 20 dB
-62.21 dBm
#Peak
Log
10
dB/
Offst
2.8
dB
Marker
7.133000000 GHz
-62.21 dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 6.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 482.3 ms (601 pts)
File Operation Status, A:\SCREN863.GIF file saved


Agilent
Peak Search
Mkr1 15.62 GHz
Ref 2.8 dBm
#Atten 20 dB
-60.66 dBm
#Peak
Log
10
dB/
Offst
2.8
dB
Marker
15.620000000 GHz
-60.66 dBm
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 10.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 1.206 s (601 pts)
File Operation Status, A:\SCREN864.GIF file saved

§2.1053 - SPURIOUS RADIATED EMISSION

Applicable Standards

Requirements: CFR 47, § 2.1053, and § 24.238 (a).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

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

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

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06
Sunol Science	30MHz ~ 3 GHz Antenna	JB3	A020106-3/S006628	2006-02-14
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	2006-08-21
HP	Generator, Signal	83650B	3614A00276	2006-05-10
Sunol Sciences	Antenna, Horn, Std	DRH-118	A052704	2005-10-02
A.R.A	Antenna, Horn, DRG	DRG-118/A	1132	2005-10-17

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	27° C
Relative Humidity:	37%
ATM Pressure:	1020 mbar

** The testing was performed by Oscar Au on 2006-09-30.*

Summary of Test Results

According to the data hereinafter, the EUT

Test Result

Forward (Down Link) – Omni Antenna
Gain = 0 dBi
Carrier frequency= 1960.00 MHz

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Amp. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Level dBm	dBm	dB
3920	42.3	290	2.0	v	3920	-63.0	11.5	1.9	-53.4	-13	-40.4
3920	39.6	200	1.6	h	3920	-62.5	11.5	1.9	-52.9	-13	-39.9

Reverse (Up Link) - Patch Antenna
Gain = 5 dBi
Carrier frequency 1880.00 MHz

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Level dBm	dBm	dB
3760	51.3	210	1.5	v	3760	-54.6	11.5	1.9	-45.0	-13	-32.0
3760	47.2	80	1.3	h	3760	-58.3	11.5	1.9	-48.7	-13	-35.7

§24.238 – BAND EDGE

Applicable Standards

According to FCC §2.1049 and §24.238, when measuring the emission limits, carrier frequency shall be adjusted as close to the frequency block edges, both upper and lower.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. Adjust the carrier frequency as close to the frequency block edges both upper and lower. Sufficient scans were taken to show any out of band-edge emission.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	22° C
Relative Humidity:	34%
ATM Pressure:	1014 mbar

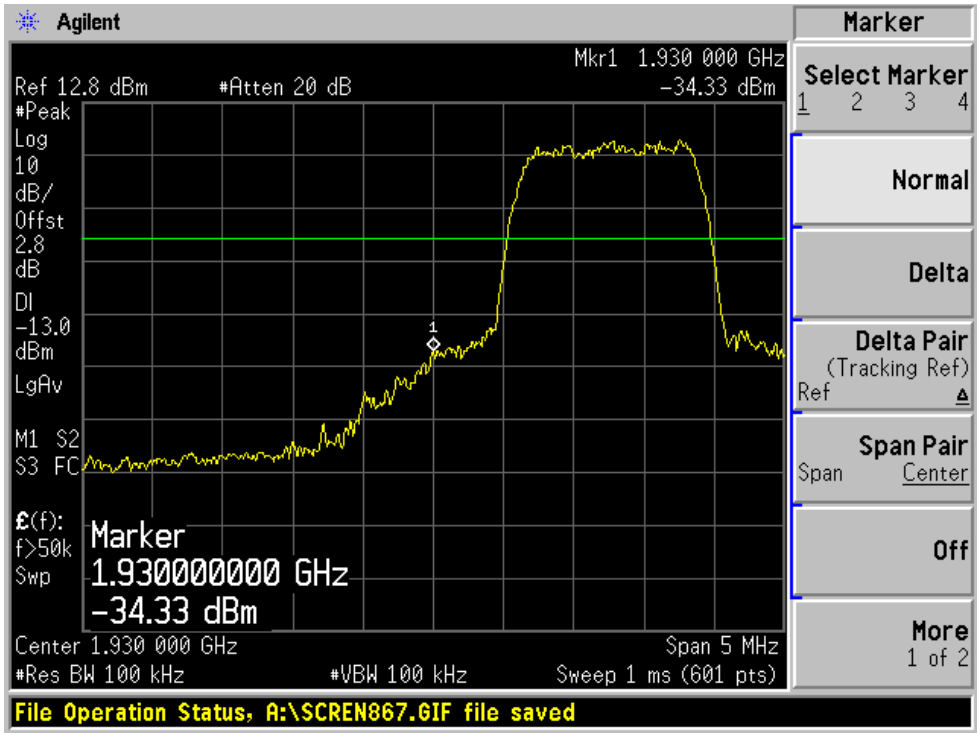
** The testing was performed by Oscar Au on 2006-10-20.*

Test Results

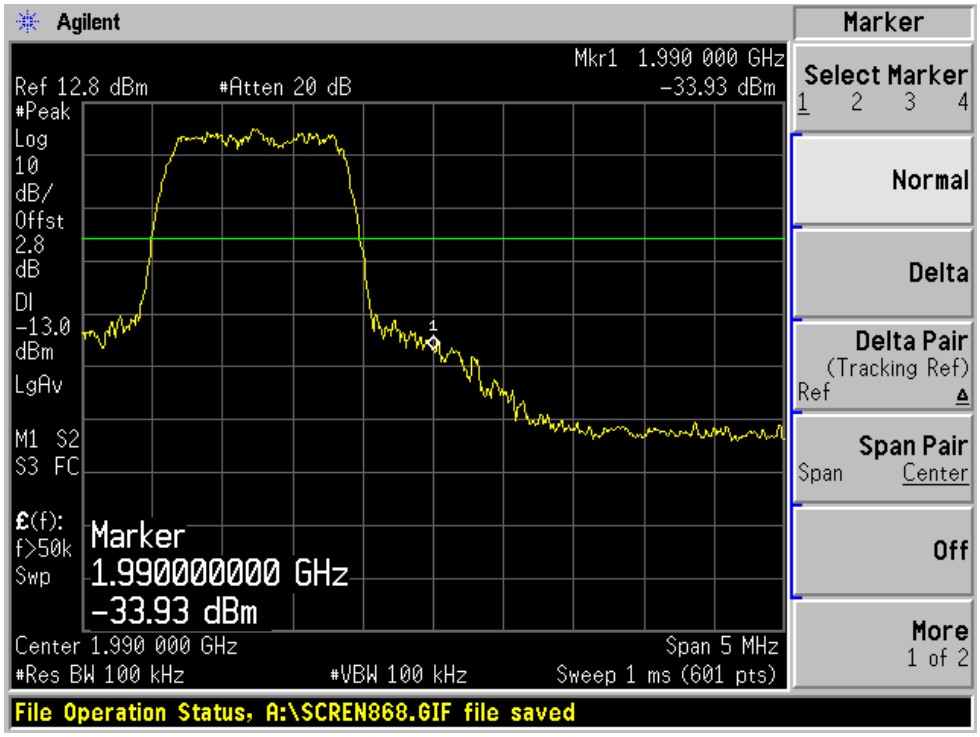
Please refer to plots hereinafter.

Forward (Downlink)

Lowest Channel:

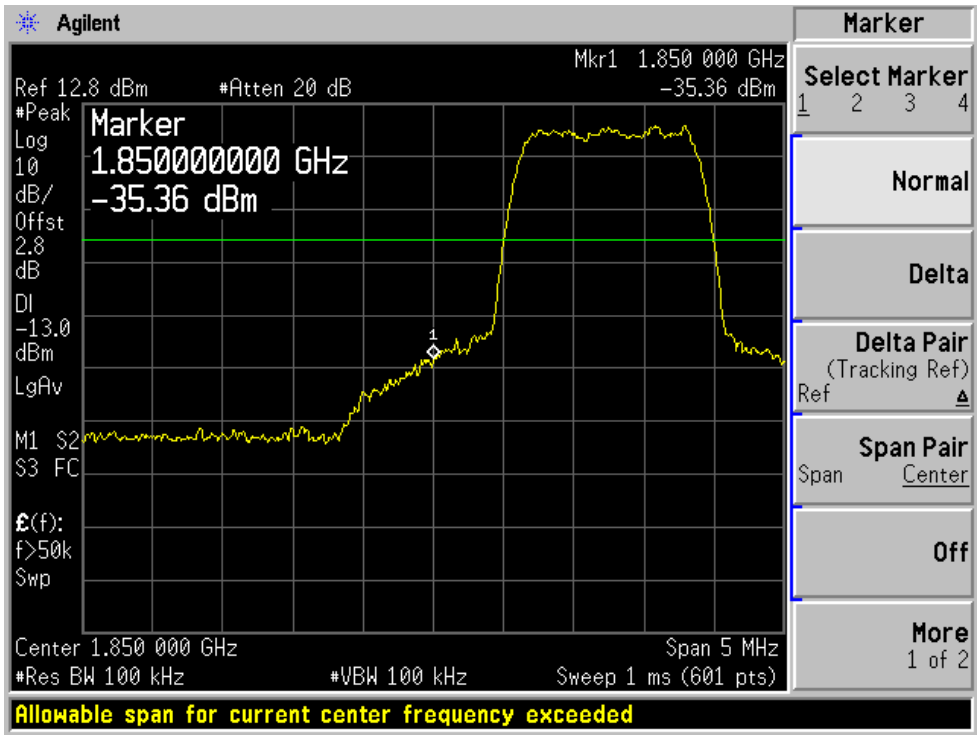


Highest Channel:

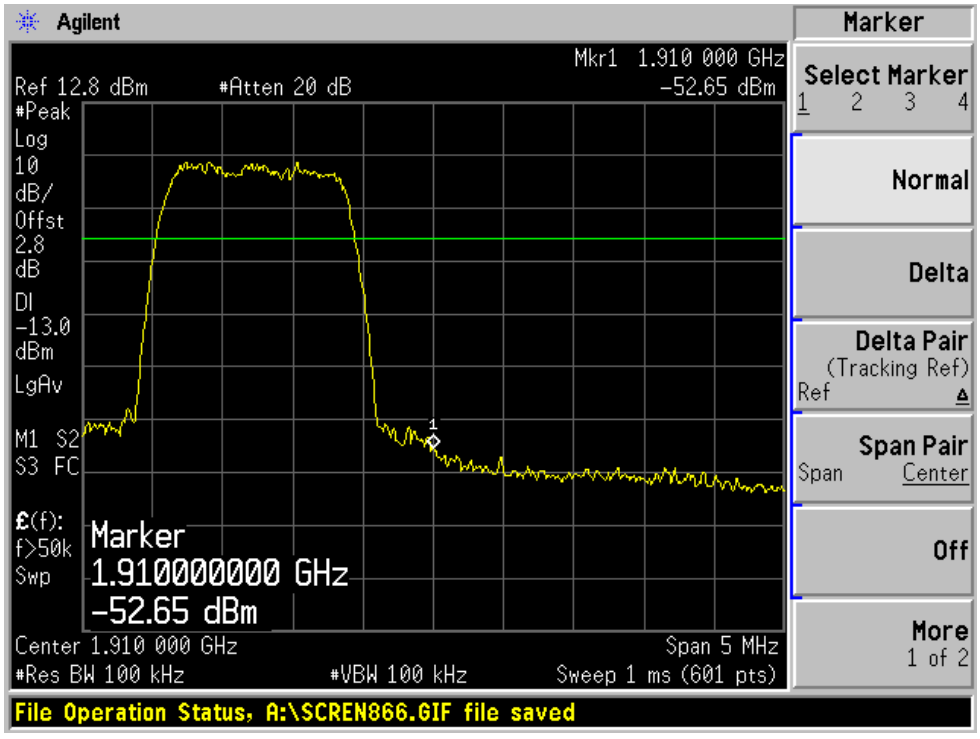


Reverse (Uplink)

Lowest Channel:



Highest Channel:



§2.1055(a), §2.1055(d) & §24.235 - FREQUENCY STABILITY

Applicable Standard

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

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

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03
Tenney	Temperature Oven	Versa Tenn	12.222-193	2006-06-21

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Environmental Conditions

Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1015 mbar

** The testing was performed by Oscar Au on 2006-10-20.*

Forward (Downlink) Mid Channel = 1960 MHz

Condition		Ref Freq	Measured Freq	Freq Error	Freq Error	Limit
Voltage (V dc)	Temperature (C)	MHz	MHz	Hz	PPM	PPM
7.5	50	1960	1959.99767	1078	0.55	2.5
7.5	40	1960	1959.99739	1274	0.65	2.5
7.5	30	1960	1960.00021	843	0.43	2.5
7.5	20	1960	1960.00003	431	0.22	2.5
7.5	10	1960	1959.99911	235	0.12	2.5
7.5	0	1960	1959.99885	490	0.25	2.5
7.5	-10	1960	1960.00012	686	0.35	2.5
7.5	-20	1960	1959.99827	843	0.43	2.5
7.5	-30	1960	1959.99986	1254	0.64	2.5

Reverse (Uplink) Mid Channel = 1880 MHz

Condition		Ref Freq	Measured Freq	Freq Error	Freq Error	Limit
Voltage (V dc)	Temperature (C)	MHz	MHz	Hz	PPM	PPM
7.5	50	1880	1879.99776	1090	0.58	2.5
7.5	40	1880	1879.99994	1260	0.67	2.5
7.5	30	1880	1879.99814	1015	0.54	2.5
7.5	20	1880	1879.99905	602	0.32	2.5
7.5	10	1880	1879.99981	451	0.24	2.5
7.5	0	1880	1880.00011	301	0.16	2.5
7.5	-10	1880	1879.99862	620	0.33	2.5
7.5	-20	1880	1879.99796	1034	0.55	2.5
7.5	-30	1880	1880.00012	1090	0.58	2.5

Reference Frequency:1960 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	**Environment Temperature (°C)**	**Measured Frequency (MHz)**	**PPM Error**
6	22	1959.99784	1.1

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	**Environment Temperature (°C)**	**Measured Frequency (MHz)**	**PPM Error**
6	22	1880.00248	-1.14

IS-138a (3.4.4) TWO-TONE TEST

Applicable Standards

According to IS-138A (3.4.4), Intermediation products must be attenuated below the rated power of the EUT by at least 43 +10log (P), equivalent to –13 dBm.

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 KHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic. Two input signals are equal in level (and can be raised equally), were send to the EUT.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Signal Generator	SMIQ03	DE23746	2006-08-03

** The testing was performed by Oscar Au on 2006-10-21.*

Test Results

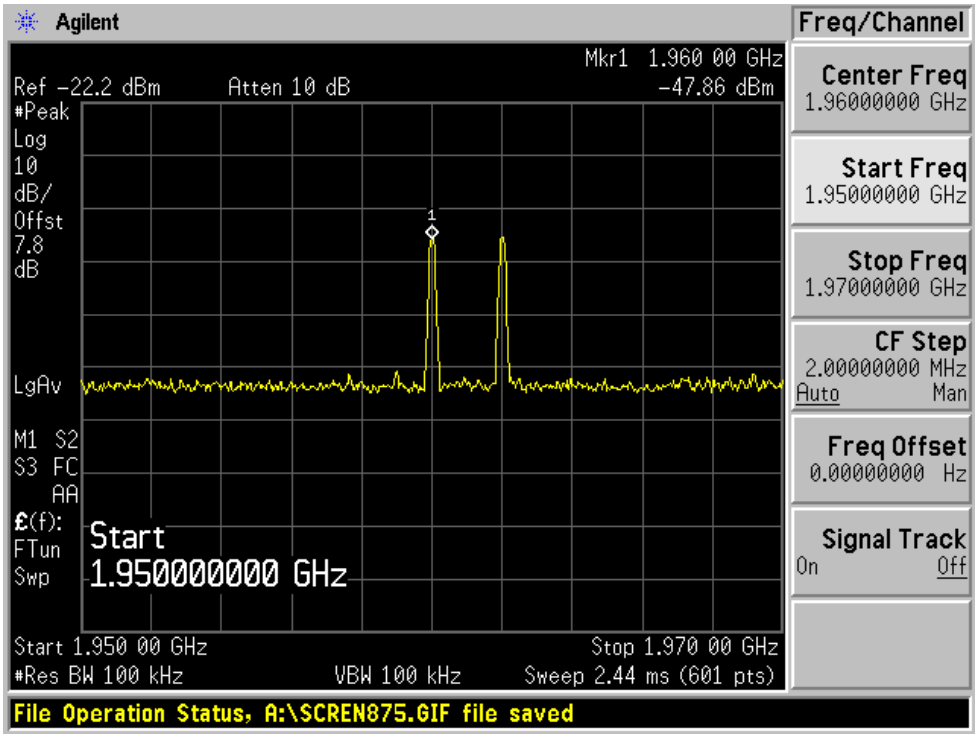
Mode	Channel	Measured
Uplink	Mid	< -13dBm
Downlink	Mid	< -13dBm

Plots of Two-Tone Test Result

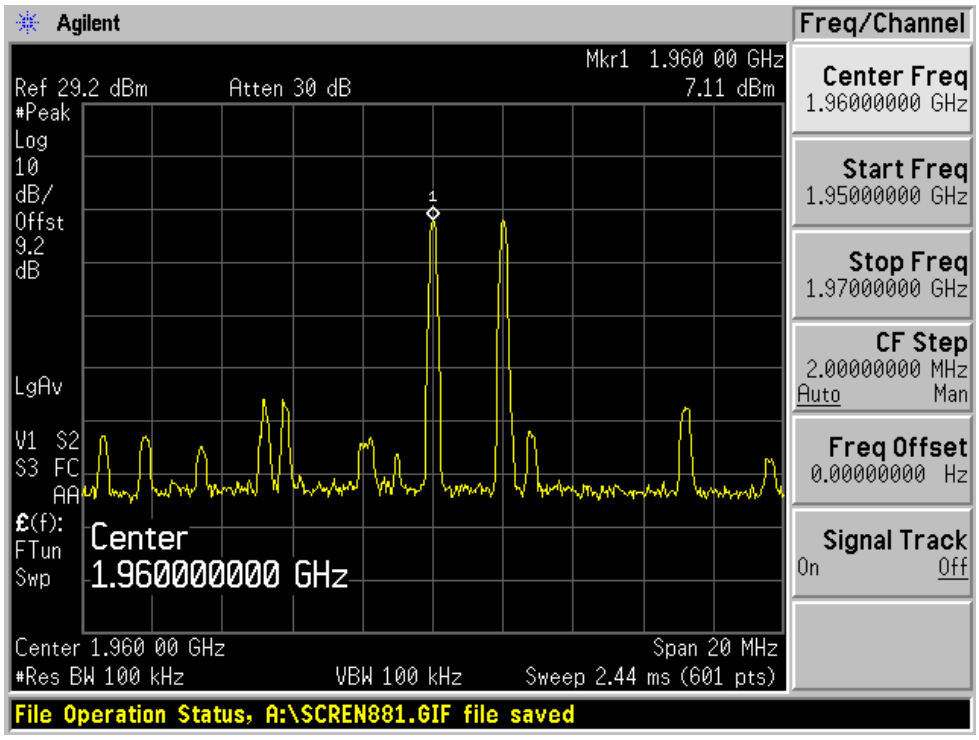
Please refer to plots hereinafter.

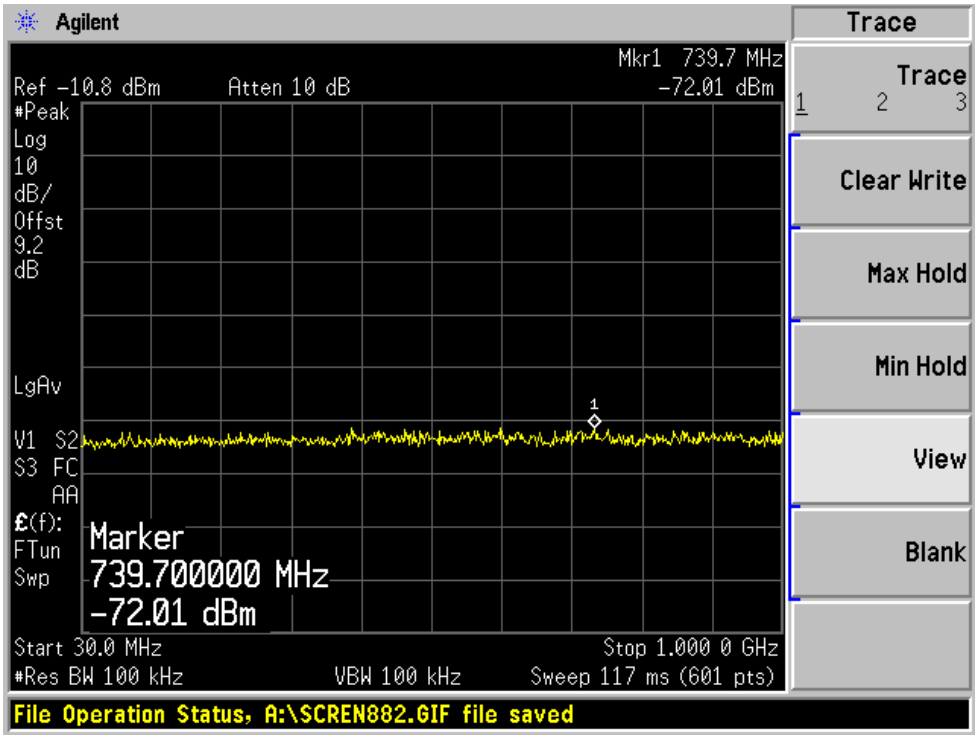
Forward (Uplink)

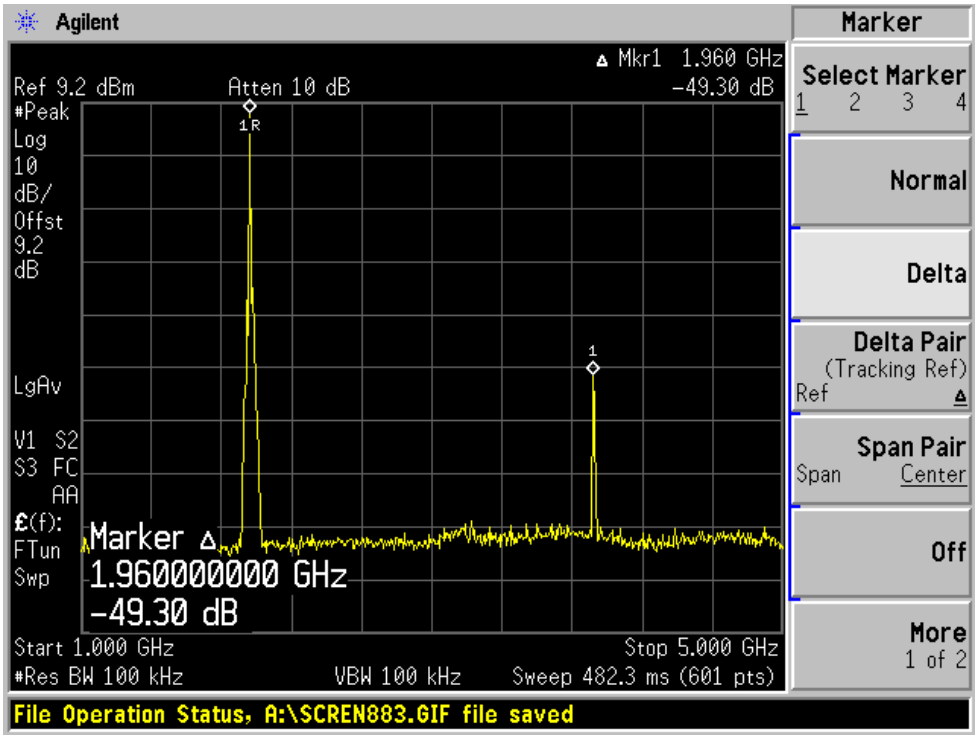
Input

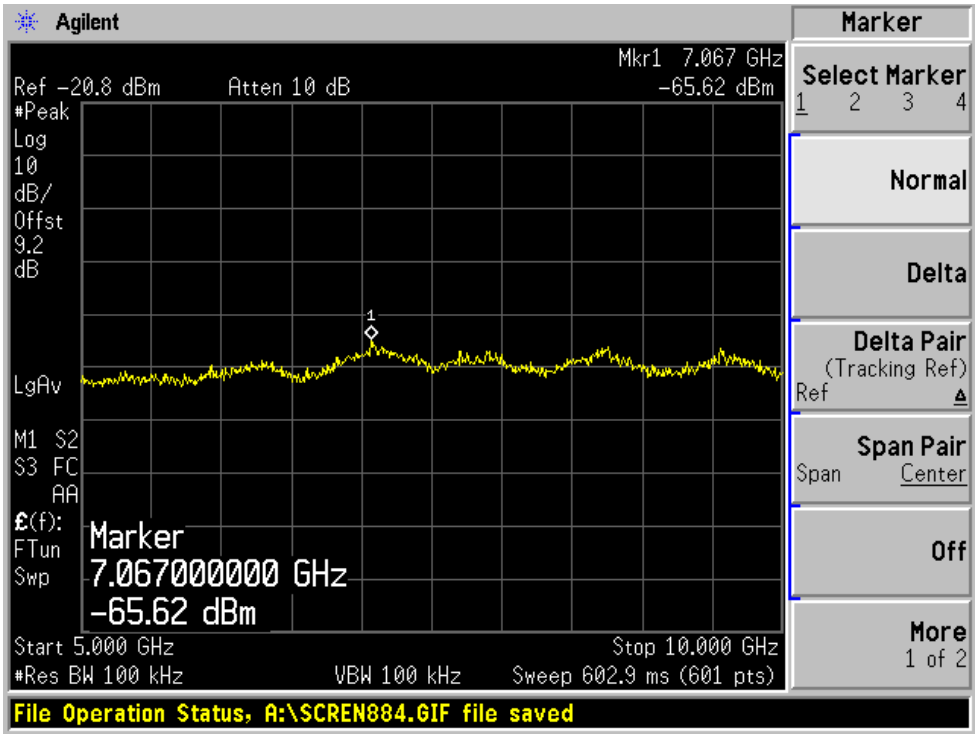


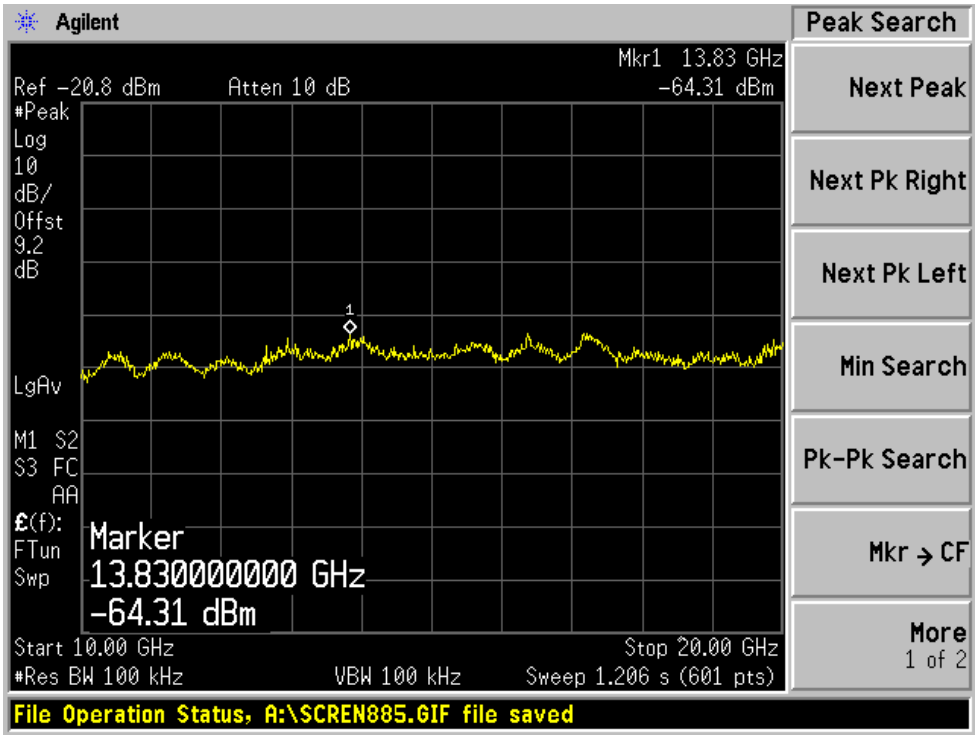
Output




Agilent
Trace
Mkr1 739.7 MHz
Ref -10.8 dBm
Atten 10 dB
-72.01 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
739.700000 MHz
-72.01 dBm
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 117 ms (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
File Operation Status, A:\SCREN882.GIF file saved

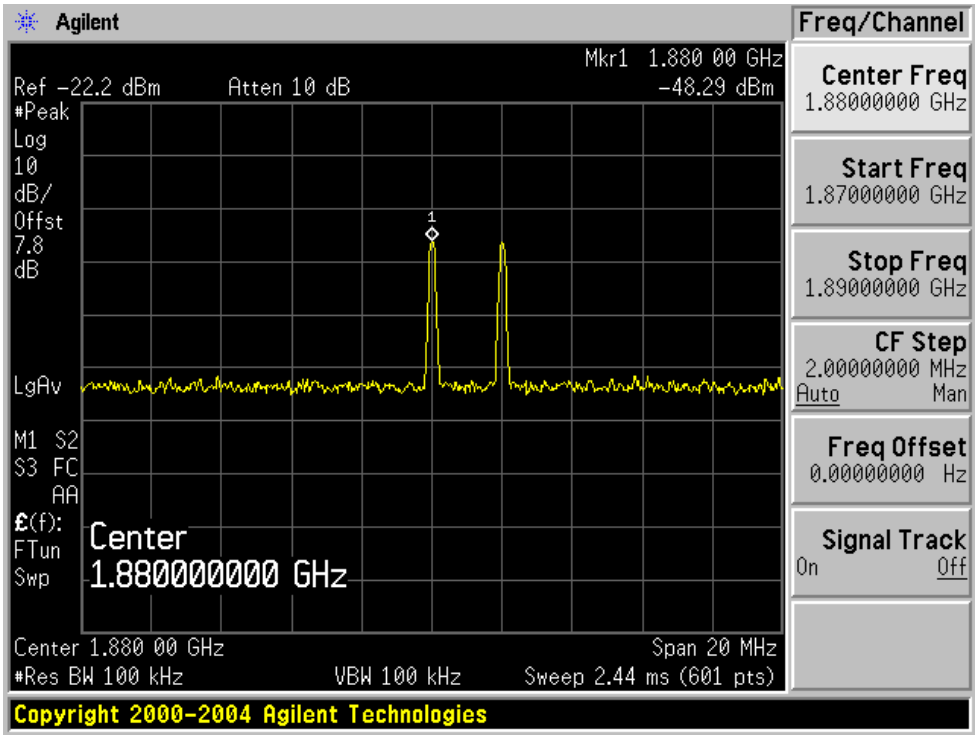

Agilent
Marker
Δ Mkr1 1.960 GHz
Ref 9.2 dBm
Atten 10 dB
-49.30 dB
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker Δ
1.960000000 GHz
-49.30 dB
Start 1.000 GHz
Stop 5.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 482.3 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\SCREN883.GIF file saved


Agilent
Marker
Mkr1 7.067 GHz
Ref -20.8 dBm
Atten 10 dB
-65.62 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
7.067000000 GHz
-65.62 dBm
Start 5.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 602.9 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\SCREN884.GIF file saved

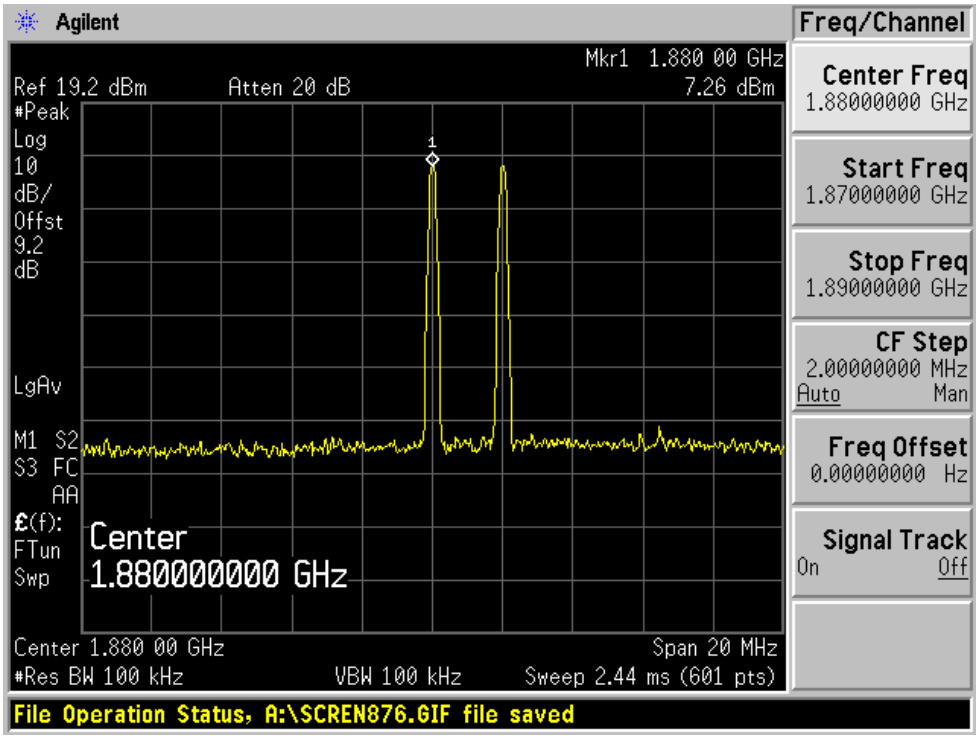

Agilent
Peak Search
Mkr1 13.83 GHz
Ref -20.8 dBm
Atten 10 dB
-64.31 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
13.830000000 GHz
-64.31 dBm
Start 10.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 1.206 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN885.GIF file saved

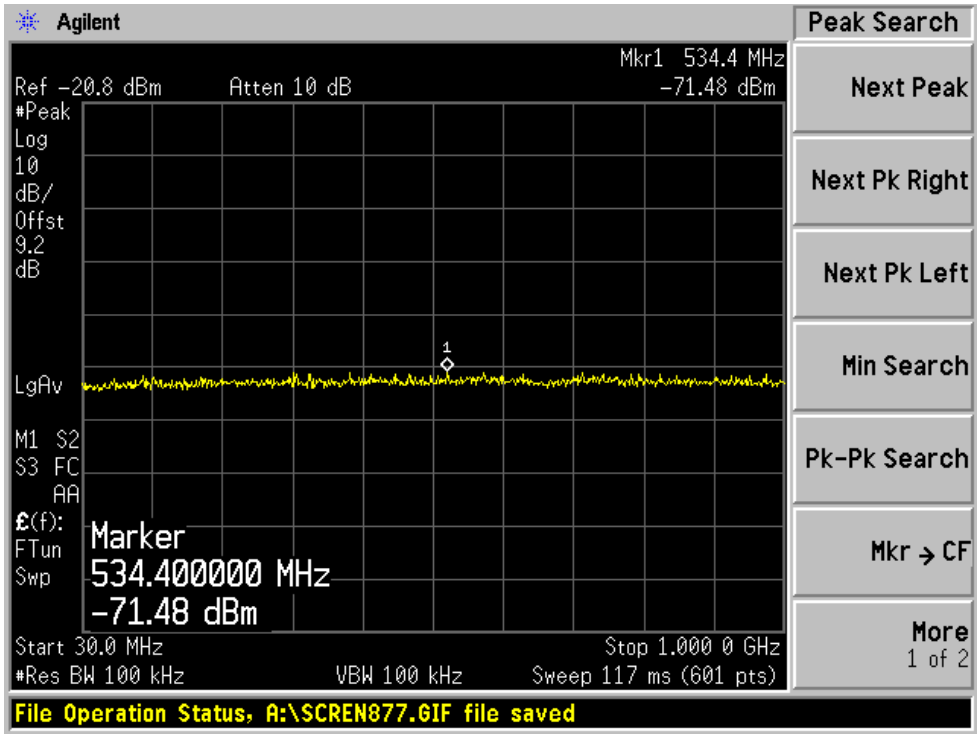
Reverse (Uplink)

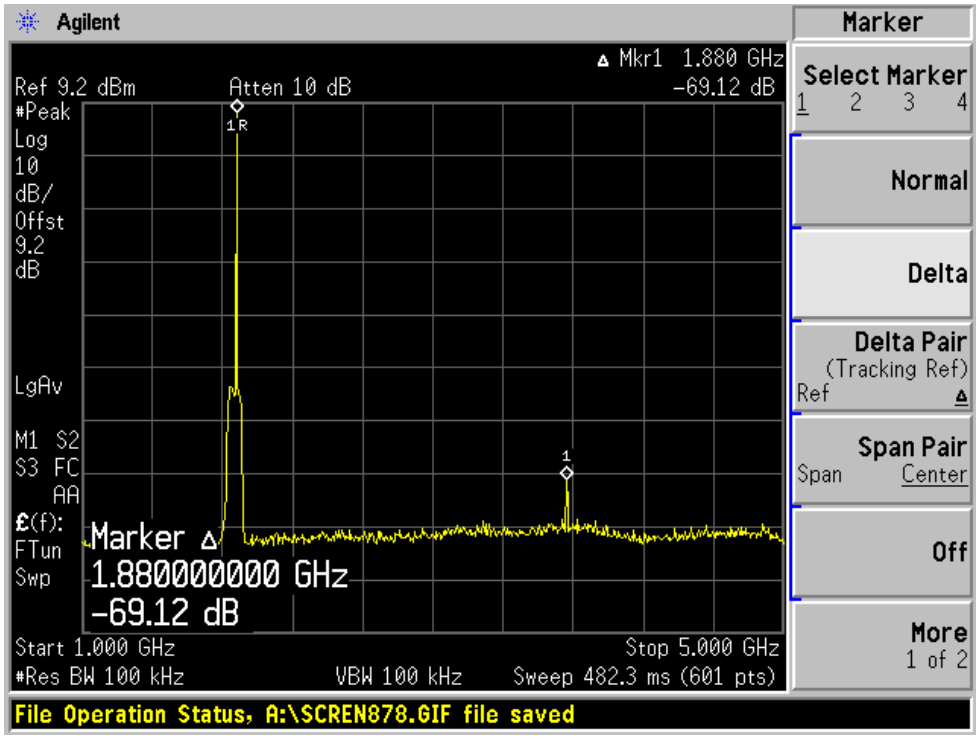
Input

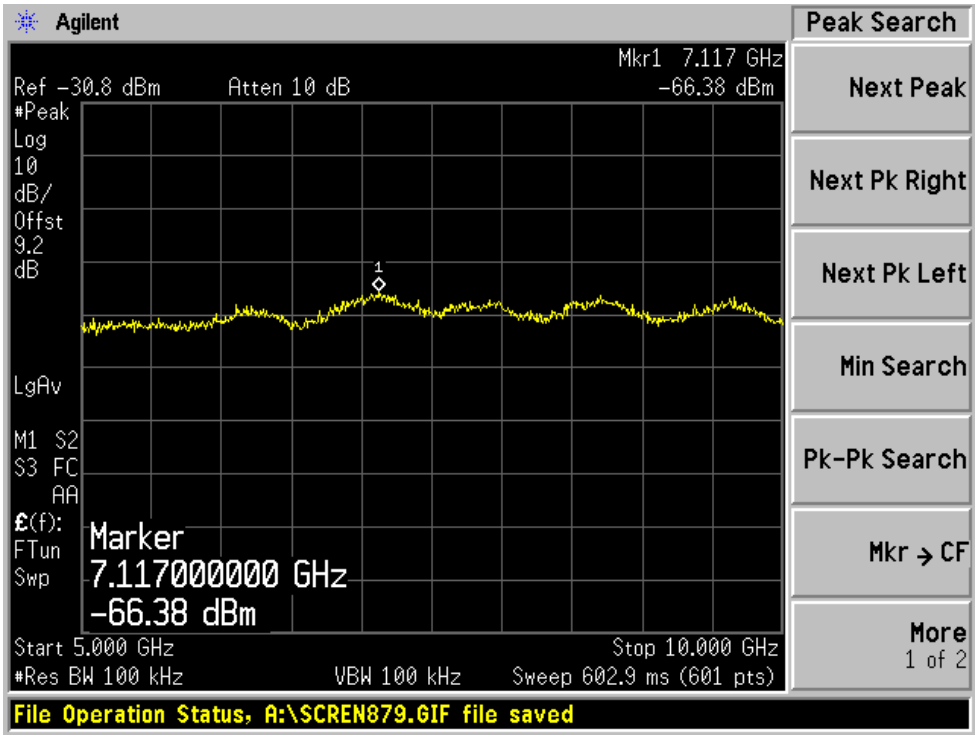


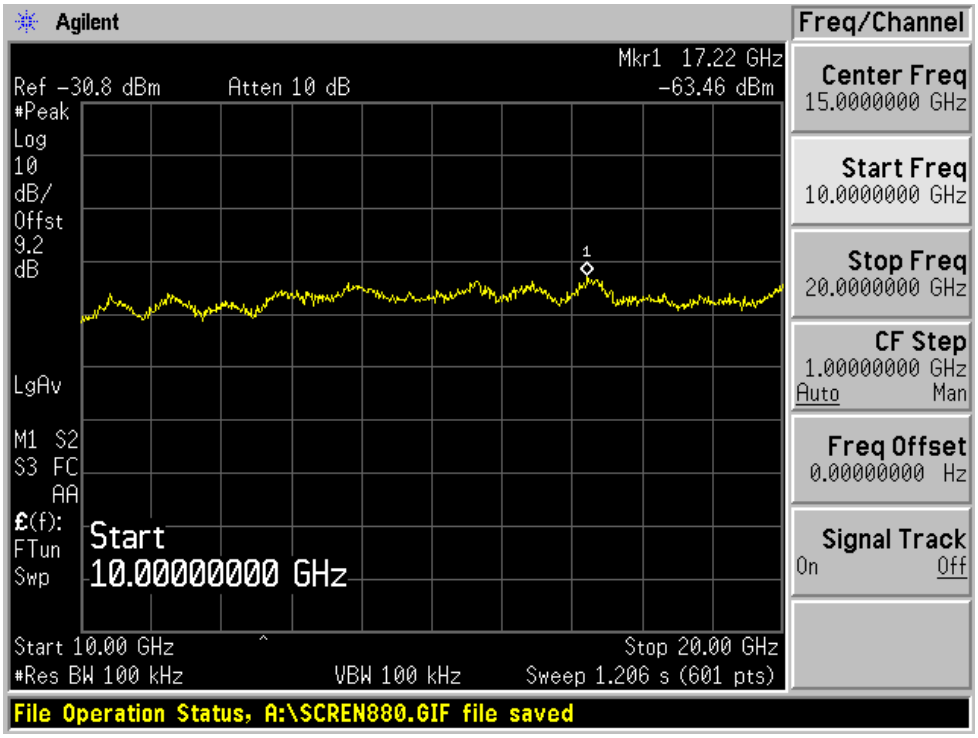
Output




Agilent
Peak Search
Mkr1 534.4 MHz
Ref -20.8 dBm
Atten 10 dB
-71.48 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
534.400000 MHz
-71.48 dBm
Start 30.0 MHz
#Res BW 100 kHz
VBW 100 kHz
Stop 1.000 0 GHz
Sweep 117 ms (601 pts)
File Operation Status, A:\SCREN877.GIF file saved


Agilent
Marker
Δ Mkr1 1.880 GHz
Ref 9.2 dBm
Atten 10 dB
-69.12 dB
#Peak
Log
10
dB/
Offst
9.2
dB
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span
Center
Off
More
1 of 2
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker Δ
1.880000000 GHz
-69.12 dB
Start 1.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Stop 5.000 GHz
Sweep 482.3 ms (601 pts)
File Operation Status, A:\SCREN878.GIF file saved


Agilent
Peak Search
Mkr1 7.117 GHz
Ref -30.8 dBm
Atten 10 dB
-66.38 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
7.117000000 GHz
-66.38 dBm
Start 5.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 602.9 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN879.GIF file saved


Agilent
Freq/Channel
Mkr1 17.22 GHz
Ref -30.8 dBm
Atten 10 dB
-63.46 dBm
#Peak
Log
10
dB/
Offst
9.2
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start
10.00000000 GHz
Start 10.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 1.206 s (601 pts)
Center Freq
15.0000000 GHz
Start Freq
10.0000000 GHz
Stop Freq
20.0000000 GHz
CF Step
1.00000000 GHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
File Operation Status, A:\SCREN880.GIF file saved