

FCC PART 24 TYPE APPROVAL EMI MEASUREMENT AND TEST REPORT

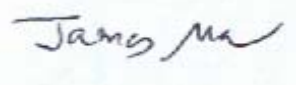
For

Telecom Technologies (USA) LLC

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

FCC ID: UM8CV1900

Model: Clear Voice 1900

This Report Concerns: ☒ Original Report		Product Type: Cellular Repeater
Test Engineer:	Oscar Au 	
Report No.:	R0609202	
Report Date:	2006-09-30	
Reviewed By:	Test Engineer: James Ma 	
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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratories Corp. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP or any agency of the U.S. Government

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Telecom Technologies.*, model: Clear Voice 1900, is a PCS cellular repeater which measures approximately 170mmL x 125mmW x 27mmH. It is powered by a AC-DC power adaptor with DC output of 7.5V, model PW118, manufacture by AULT Korea Corp.

* The test data gathered are from production sample, serial number: HG0001, 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

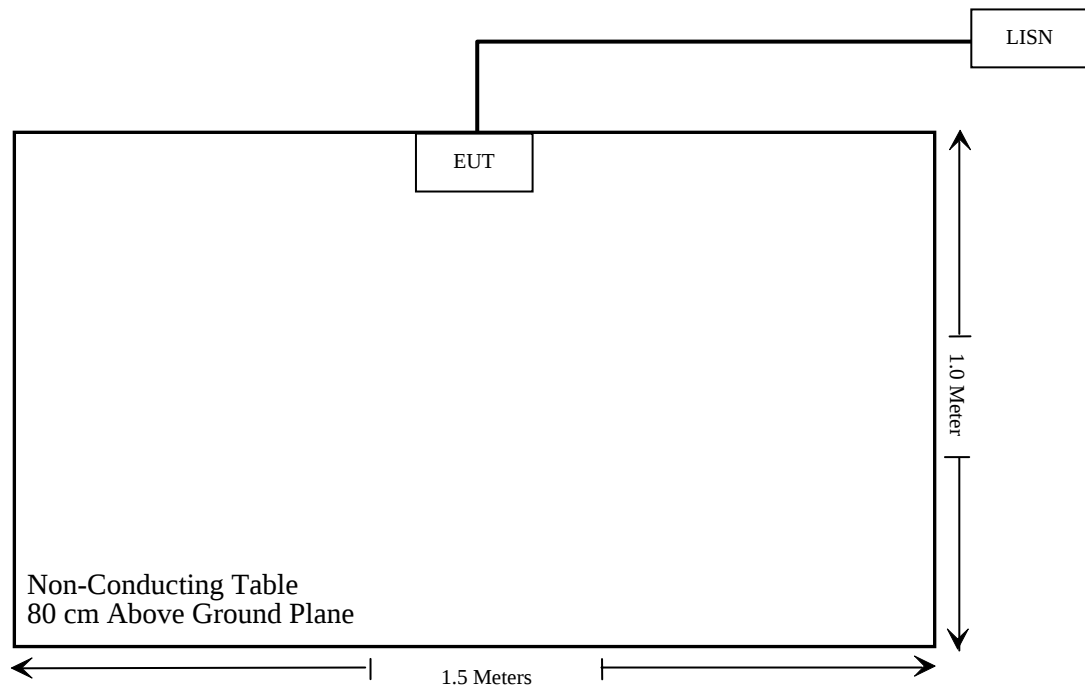
Please refer to Exhibit D.

Equipment Modifications

No modifications were made to the EUT.

Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Ault Korea Corp.	AC-DC Power Adaptor	PW118	05501A REV A

Test Setup Block Diagram

SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: *HG0001*.

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:	23° C
Relative Humidity:	37%
ATM Pressure:	1020 mbar

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

Conducted Power: CDMA

Forward (downlink)

Channel	Frequency (MHz)	Output Power in dBm	Output Power in W	Antenna in dBi	Limit in W
LOW	1931.25	7.2	0.00524	0	2
MIDDLE	1960.00	8.0	0.00631	0	2
HIGH	1988.75	7.8	0.00603	0	2

Reverse (uplink)

Channel	Frequency (MHz)	Output Power in dBm	Output Power in W	Antenna in dBi	Limit in W
LOW	1851.25	6.7	0.00467	5	2
MIDDLE	1880.00	8.1	0.00645	5	2
HIGH	1908.75	9.1	0.00812	5	2

Conducted Power: GSM

Forward (downlink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in W
LOW	1931.25	7.82	0	2
MIDDLE	1960.00	6.83	0	2
HIGH	1988.75	7.86	0	2

Reverse (uplink)

Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in W
LOW	1851.25	7.34	5	2
MIDDLE	1880.00	8.80	5	2
HIGH	1908.75	5.12	5	2

Conducted Power: **TDMA**

Forward (downlink)

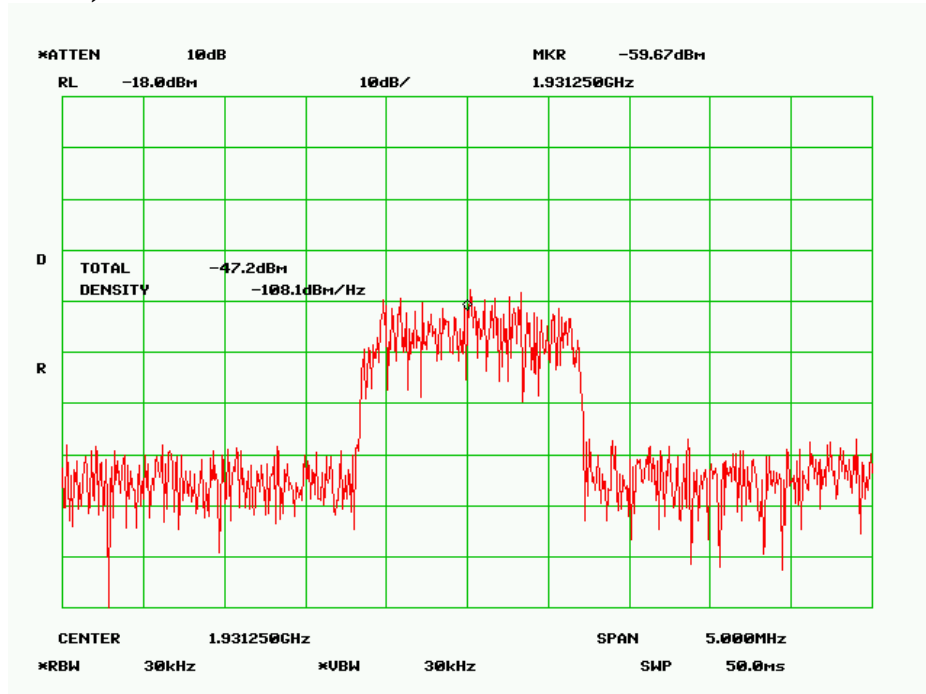
Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in W
LOW	1931.25	6.61	0	2
MIDDLE	1960.00	7.51	0	2
HIGH	1988.75	7.80	0	2

Reverse (uplink)

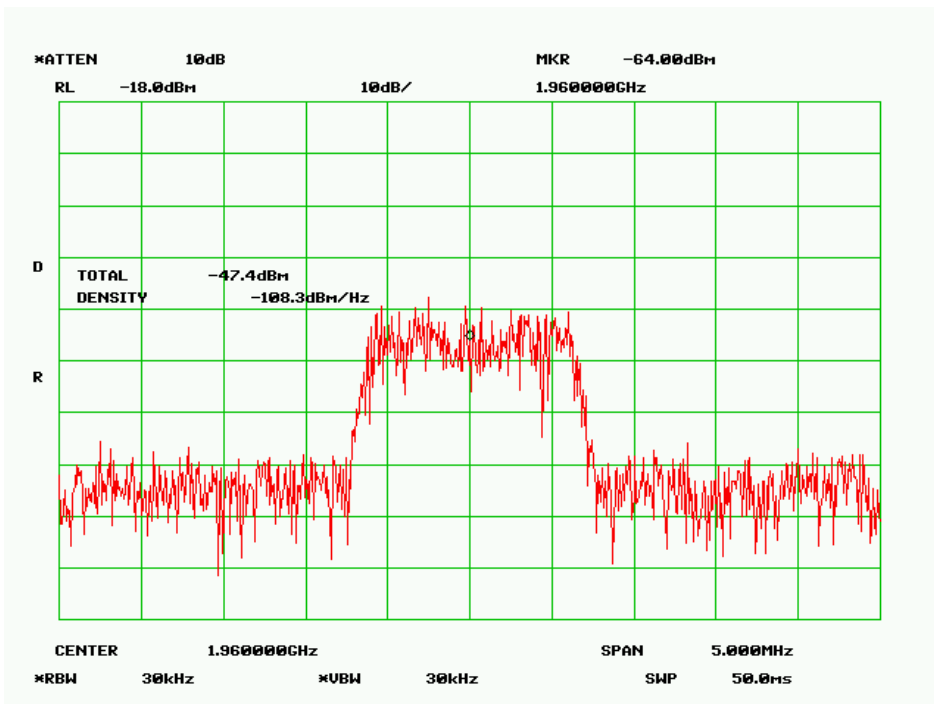
Channel	Frequency (MHz)	Output Power in dBm	Antenna in dBi	Limit in W
LOW	1851.25	8.33	5	2
MIDDLE	1880.00	7.57	5	2
HIGH	1908.75	5.99	5	2

Conducted power plots: **CDMA****Forward (downlink):**

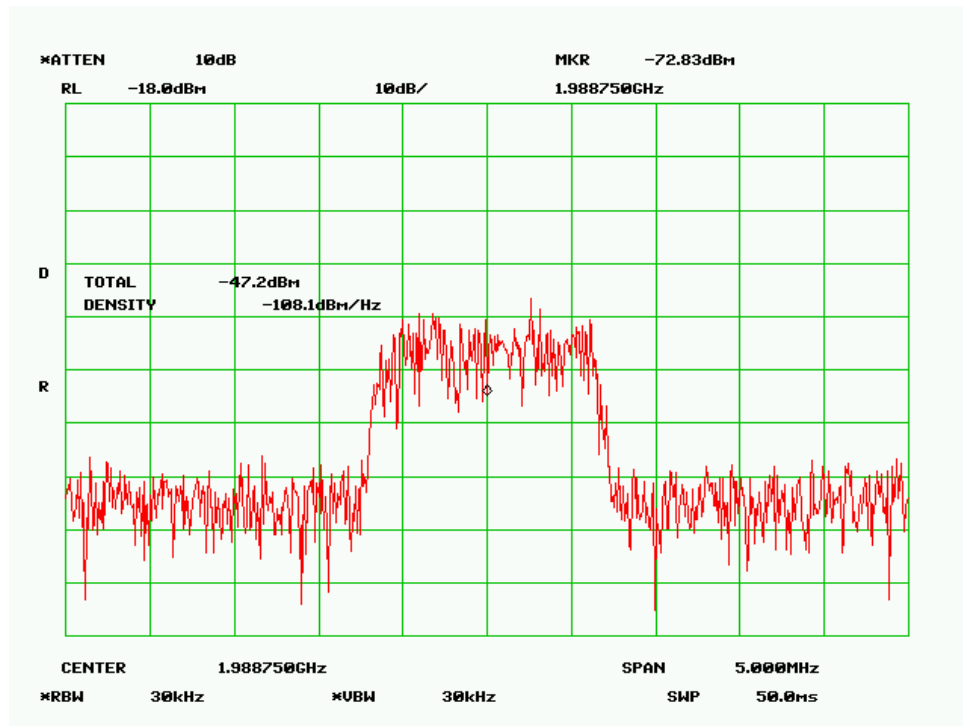
Input:



Low channel

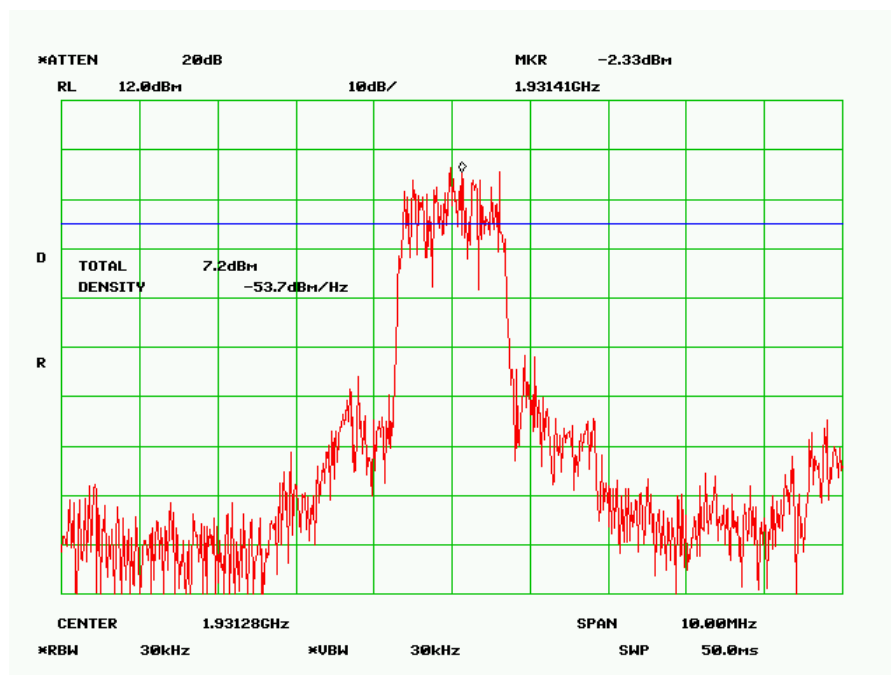


Mid channel

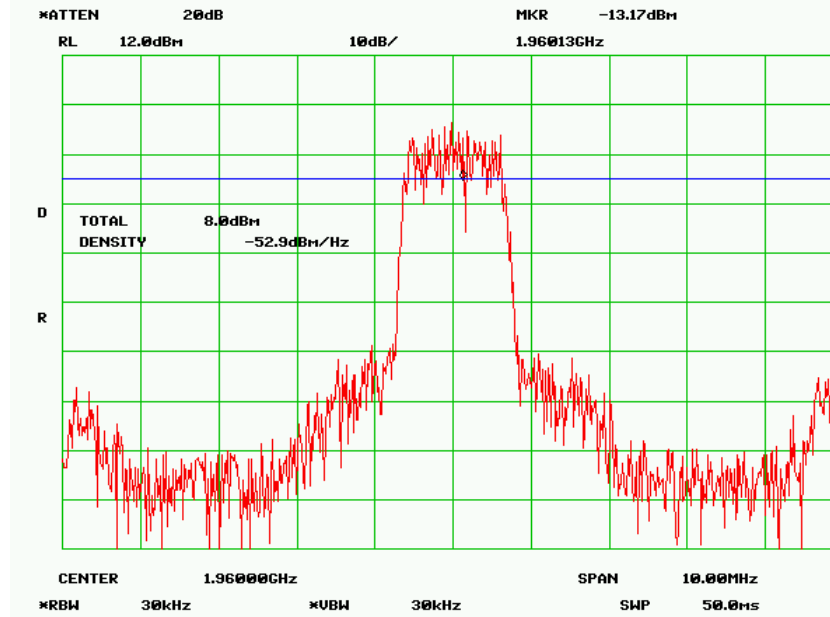


High channel

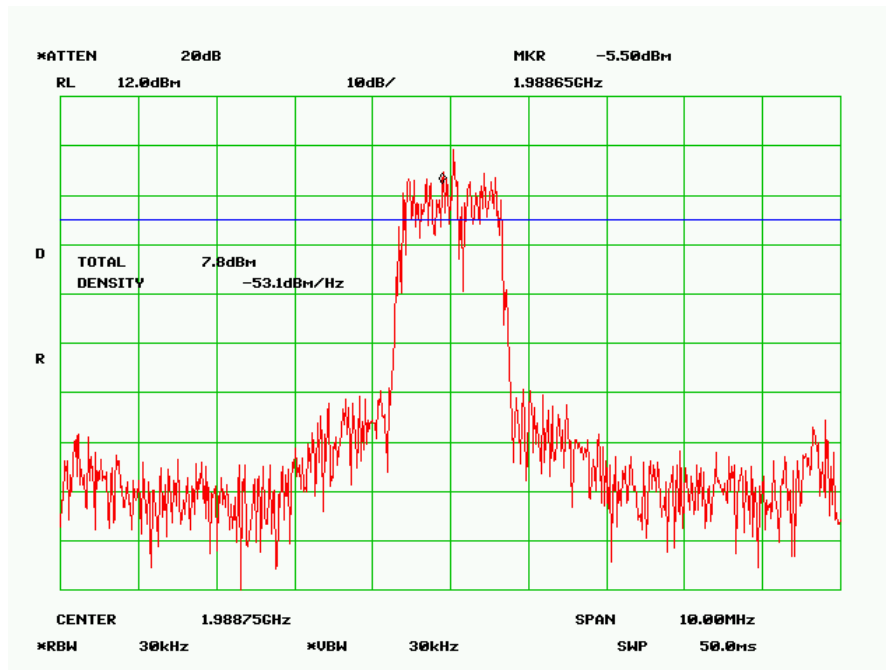
Output:



Low channel



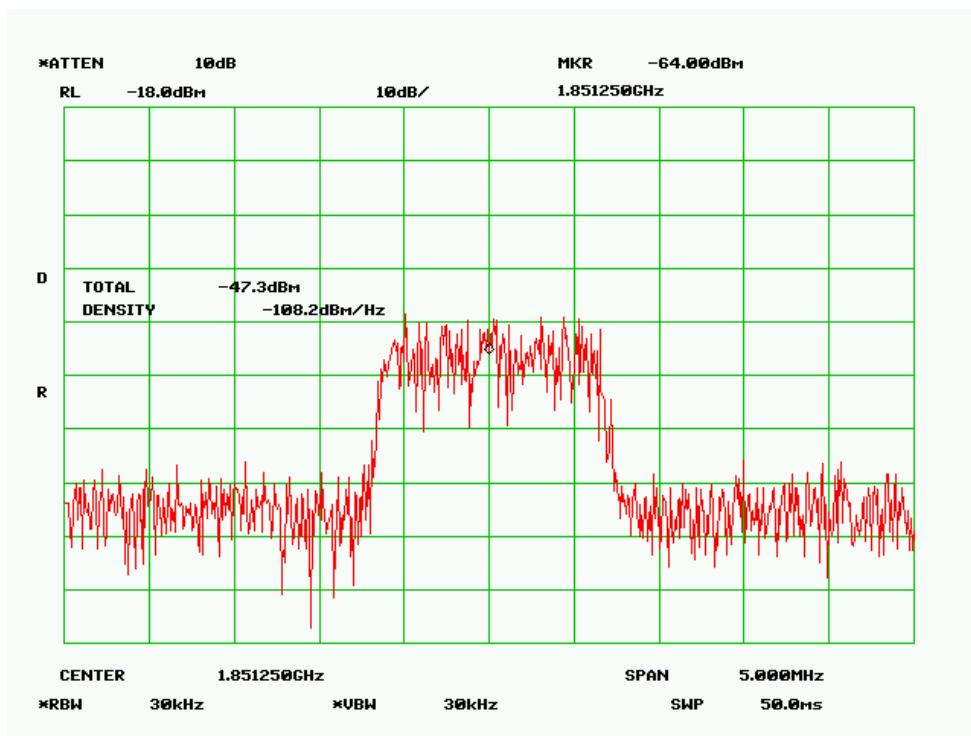
Mid channel



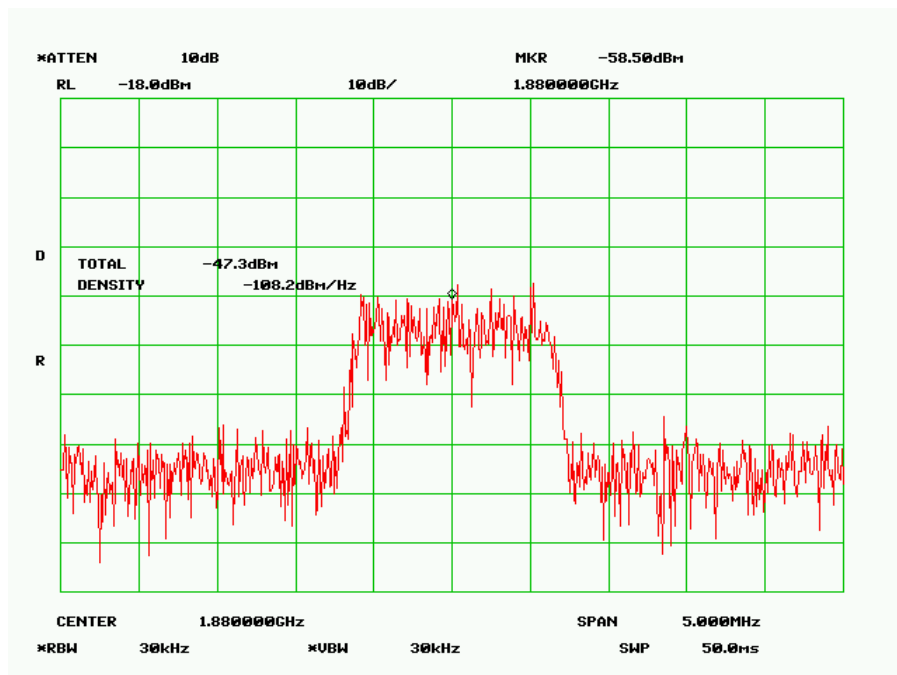
High channel

Reverse (uplink):

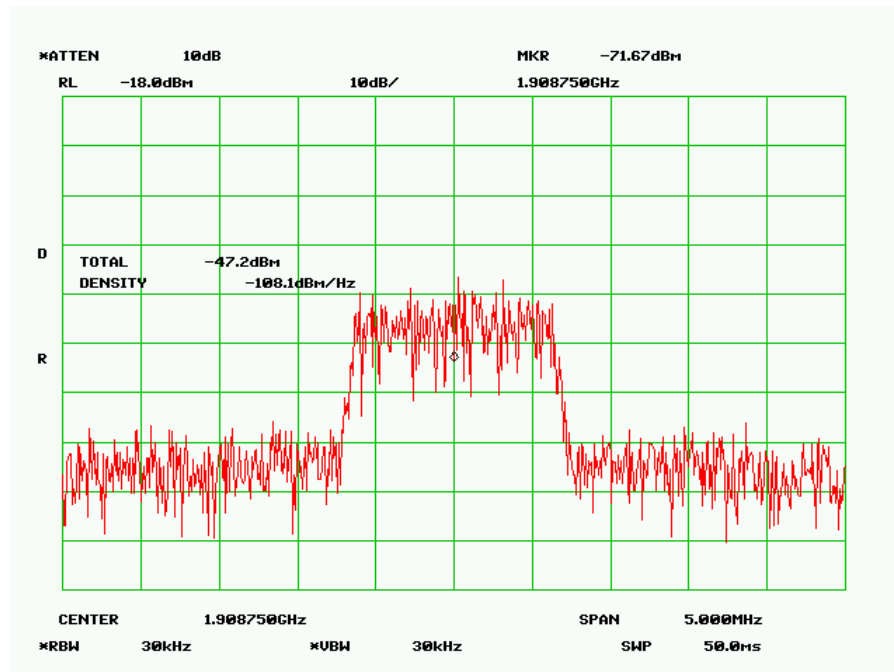
Input:



Low Channel

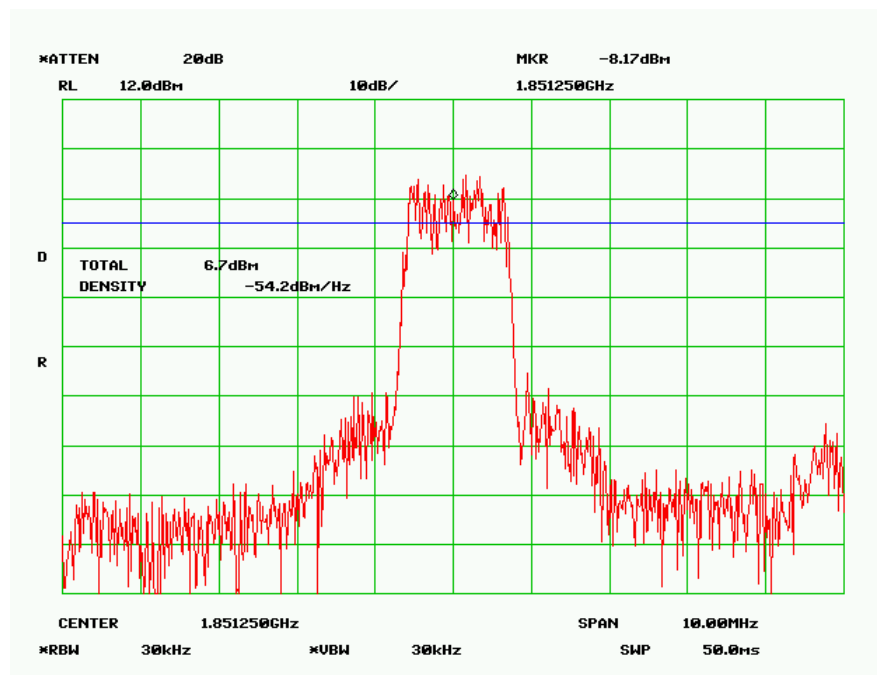


Mid Channel

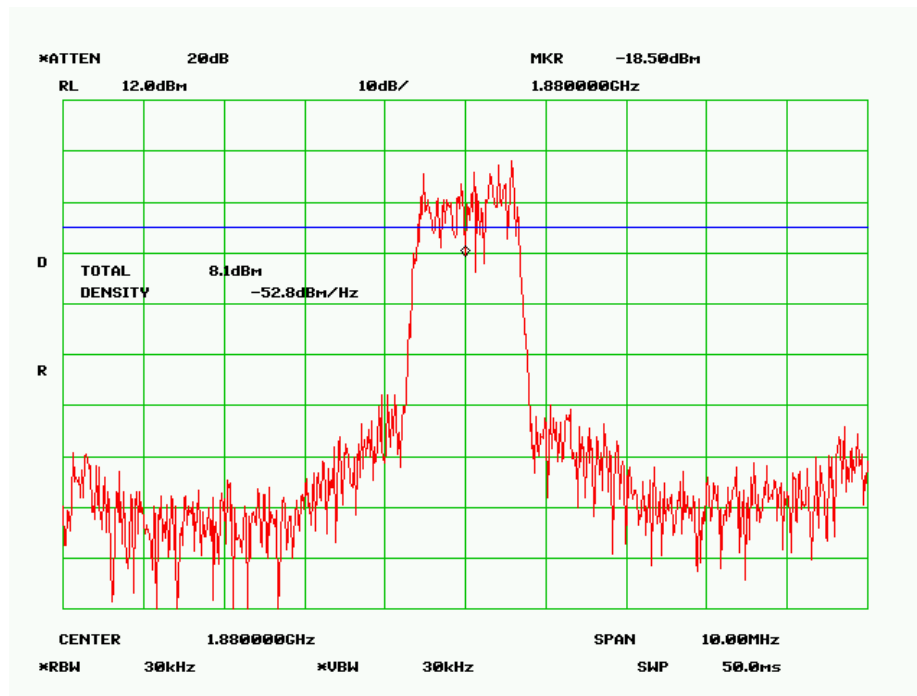


High Channel

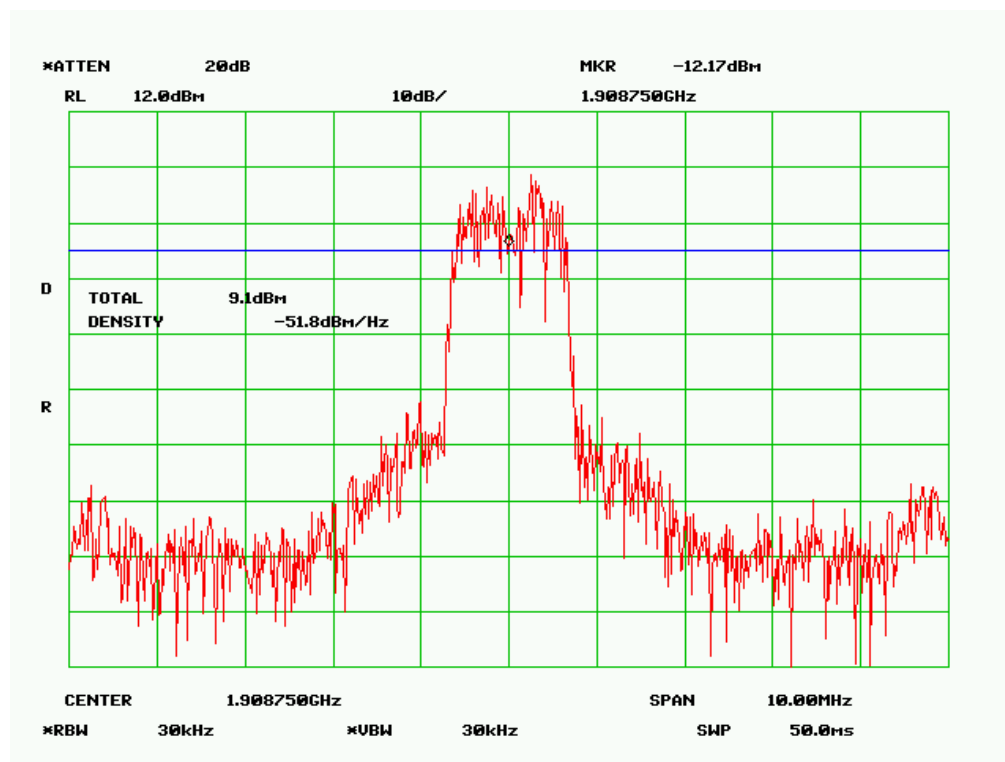
Output:



Low Channel



Mid Channel

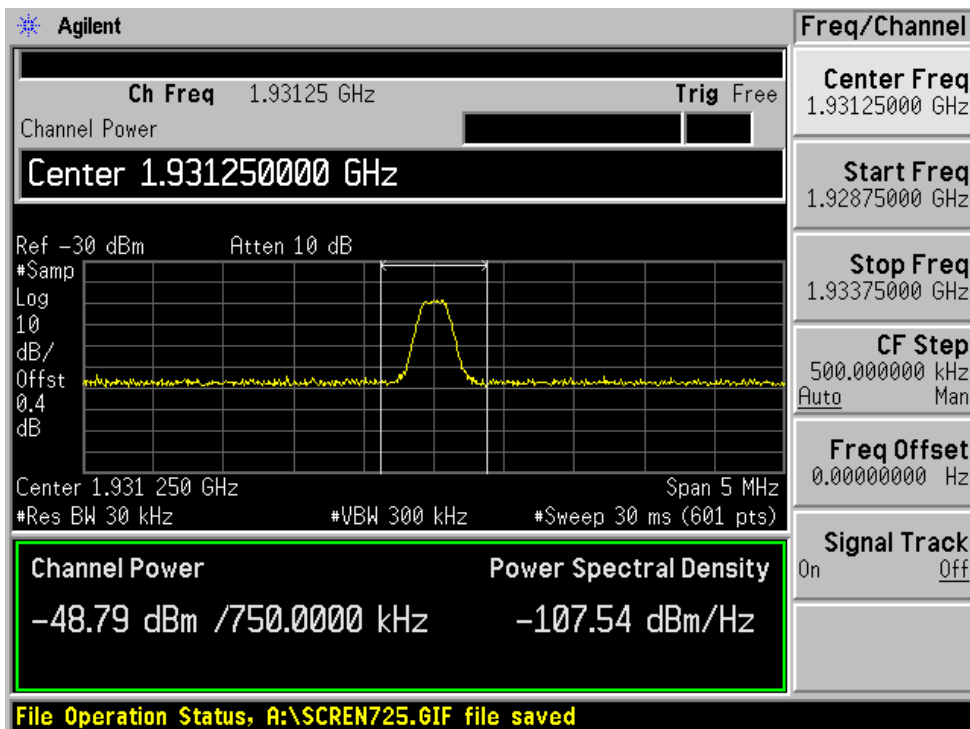


High Channel

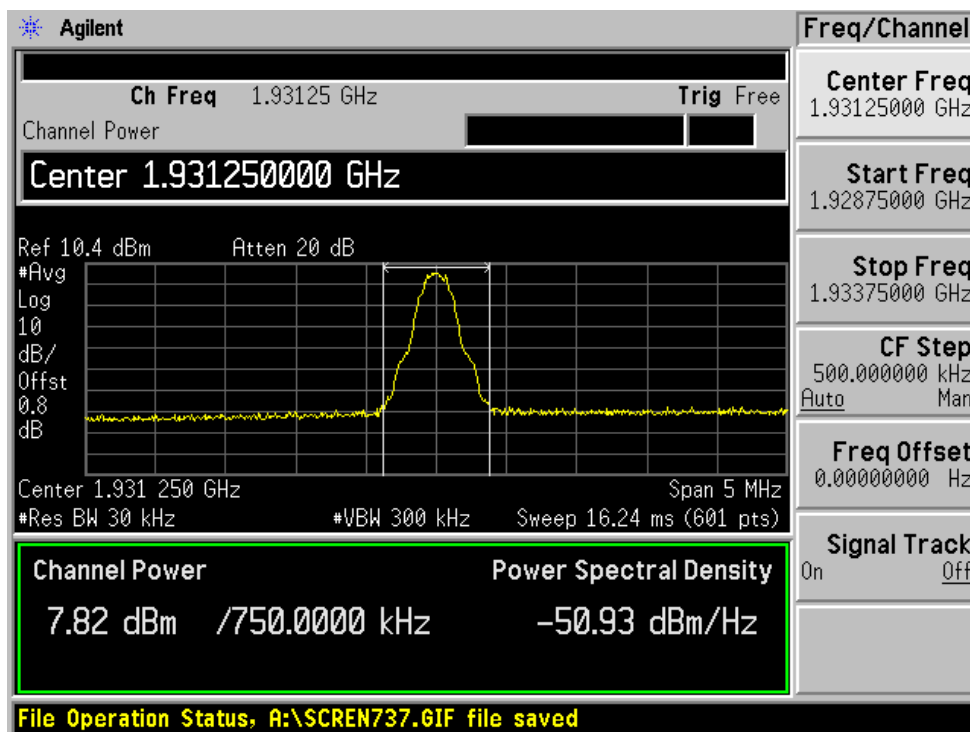
Conducted power plots: **GSM****Forward (downlink):**

Low Channel:

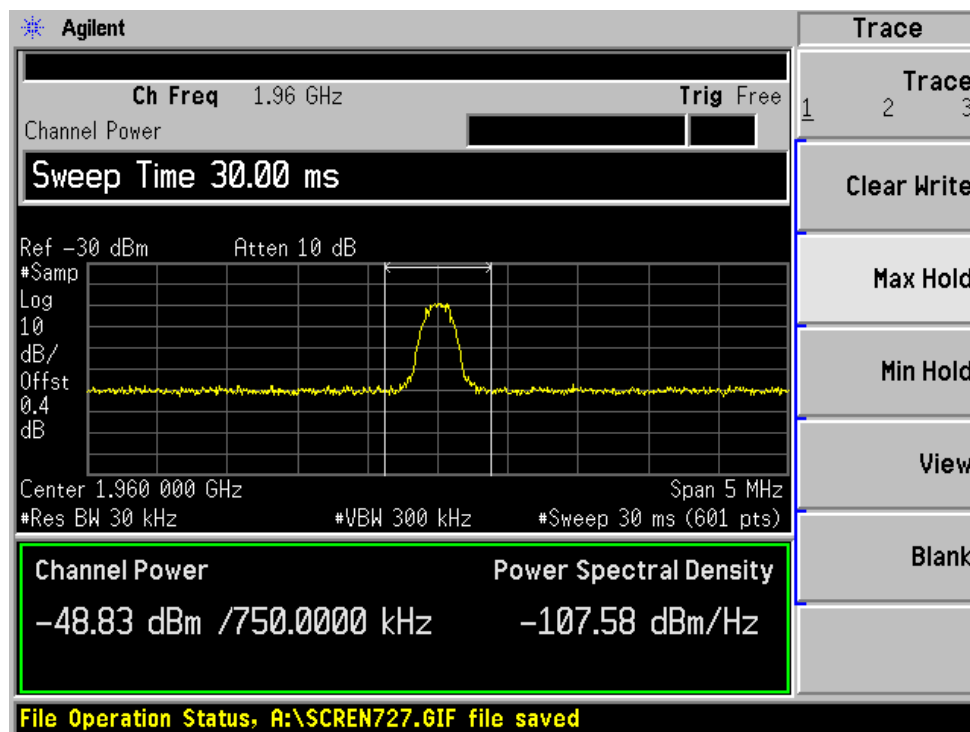
Input:



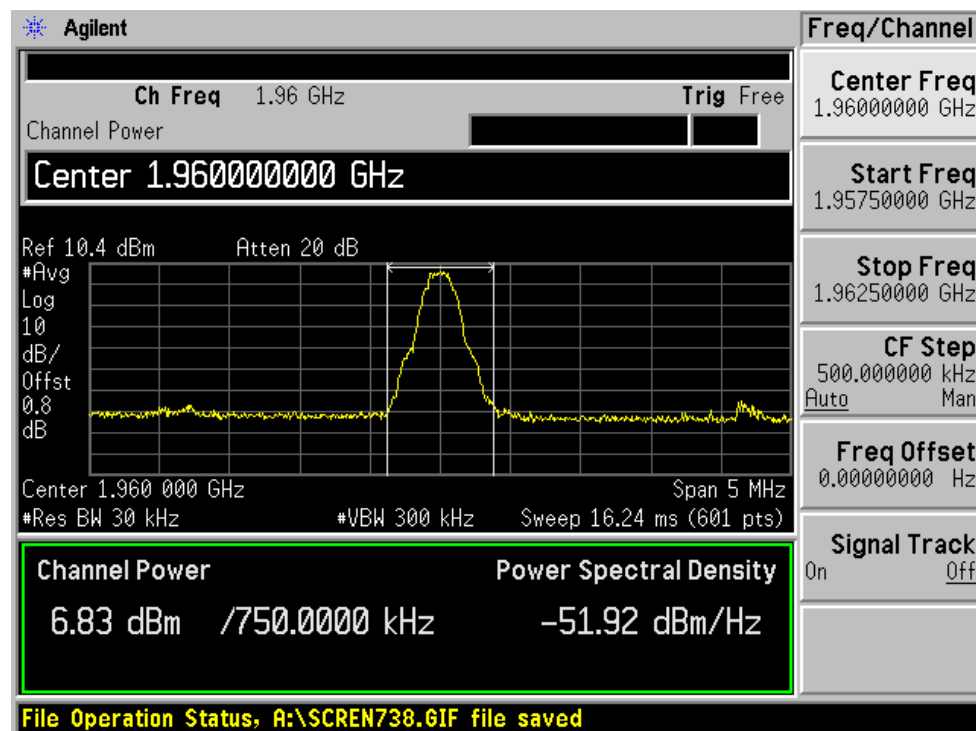
Output



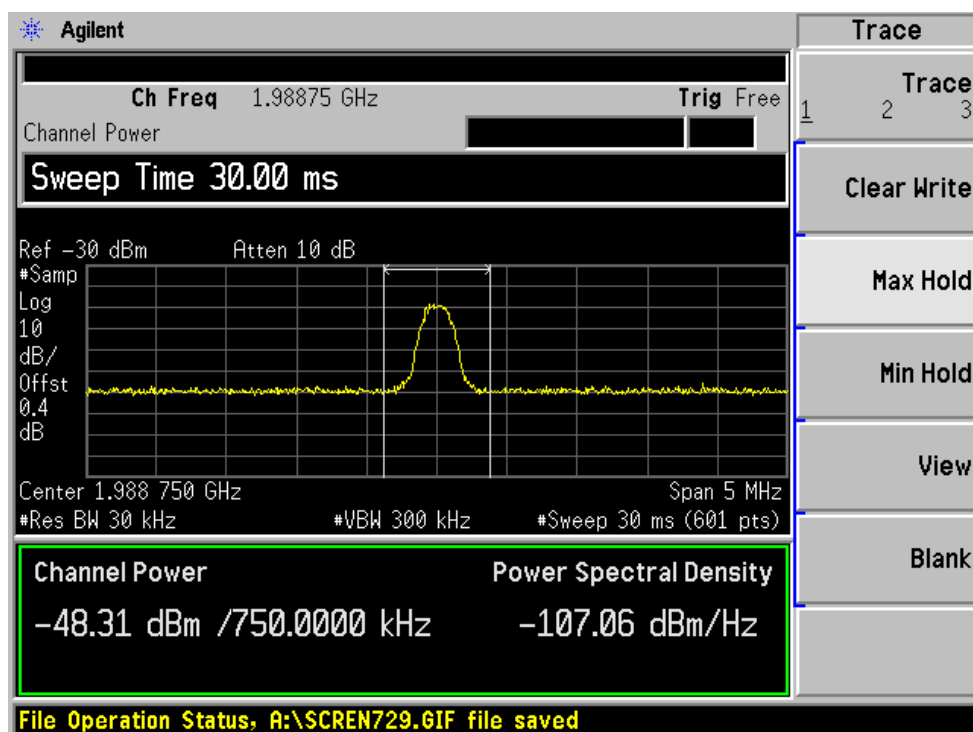
Input: Mid Channel



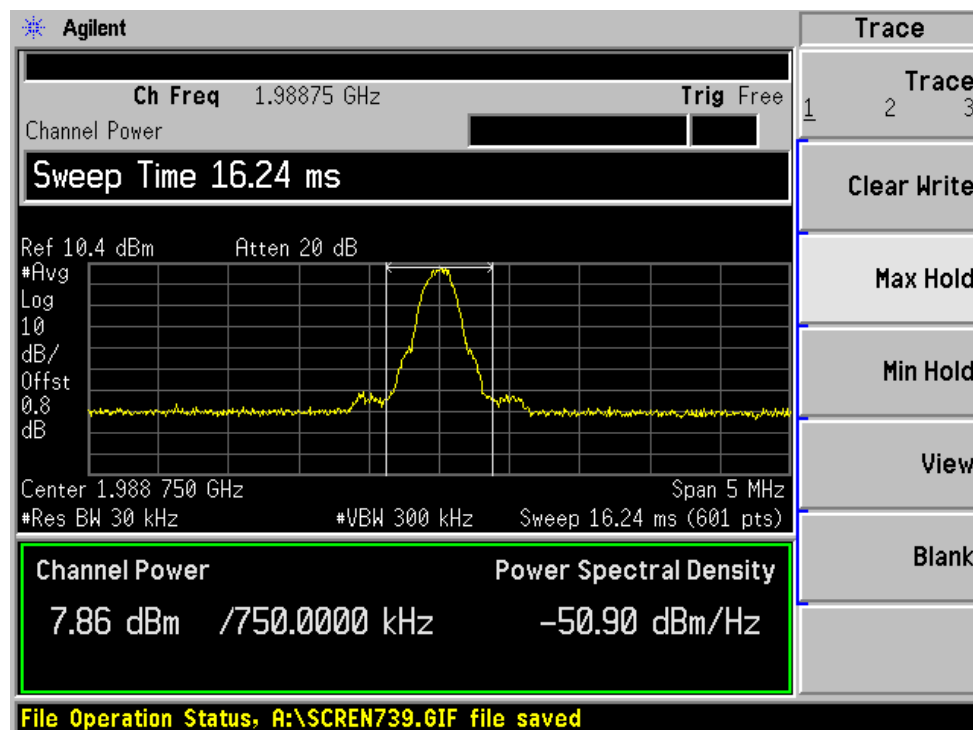
Output



Input: High Channel

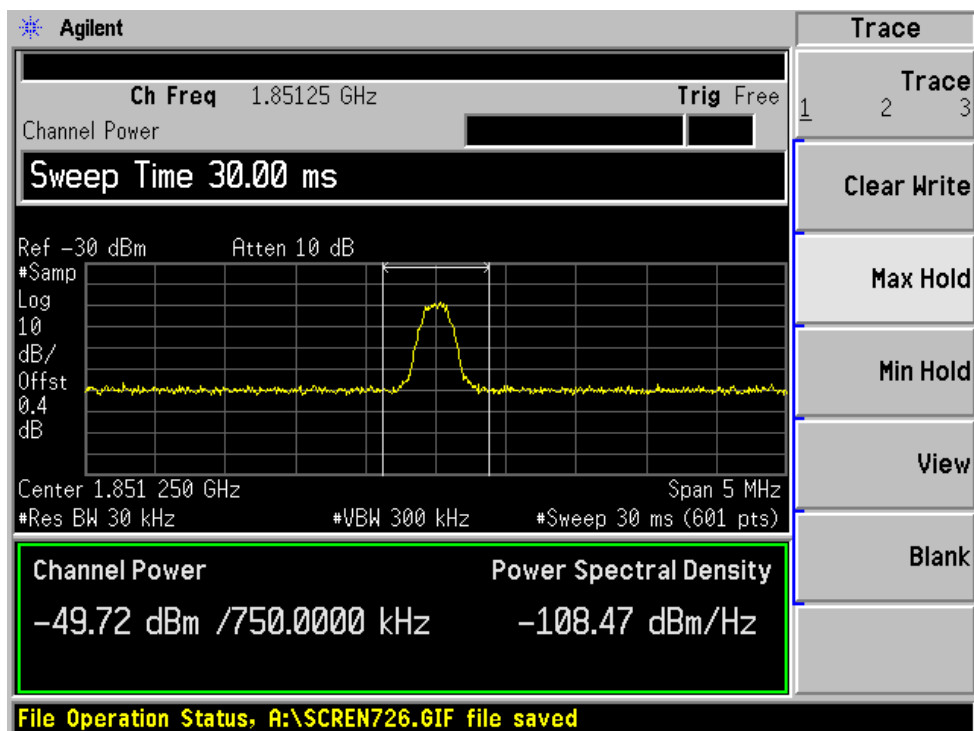


Output

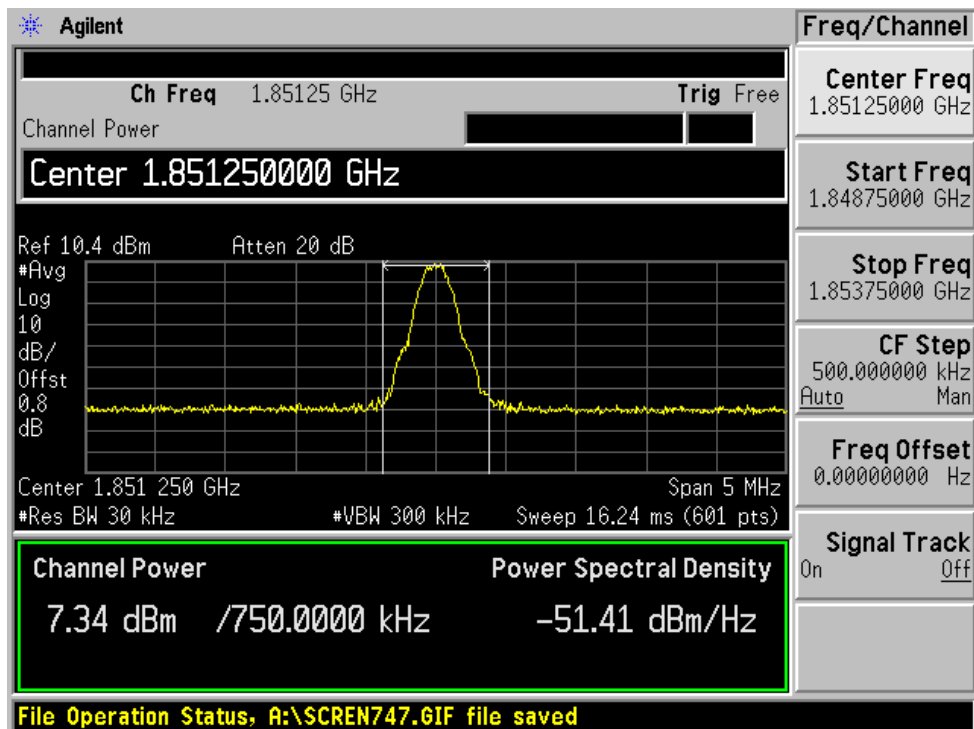


Conducted power plots: **GSM****Forward (Uplink):**

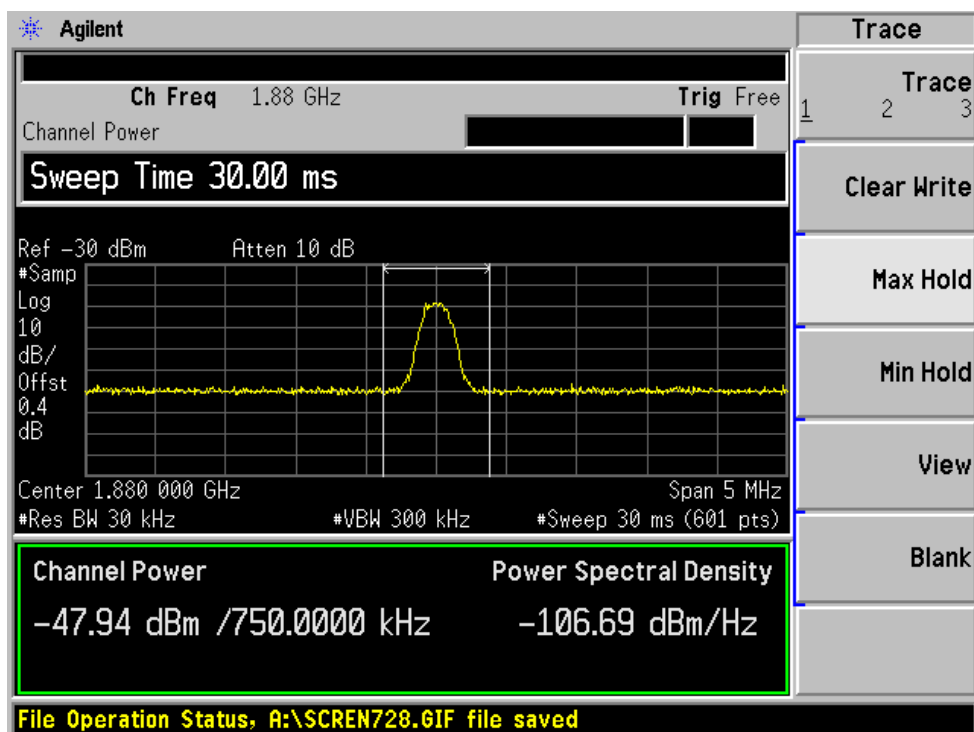
Input: Low Channel



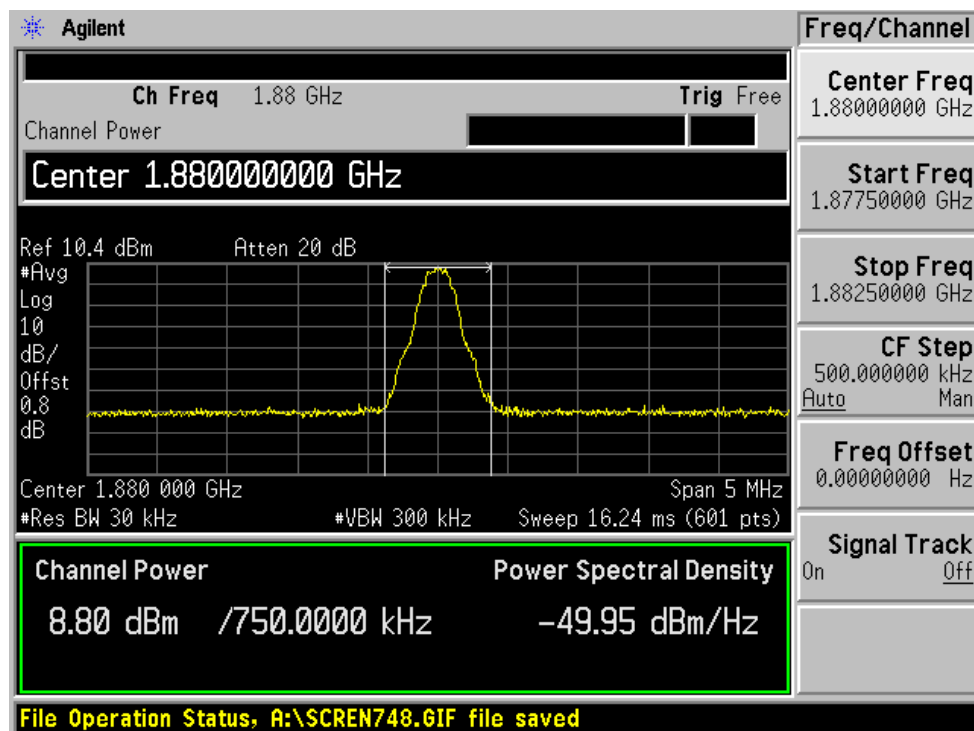
Output



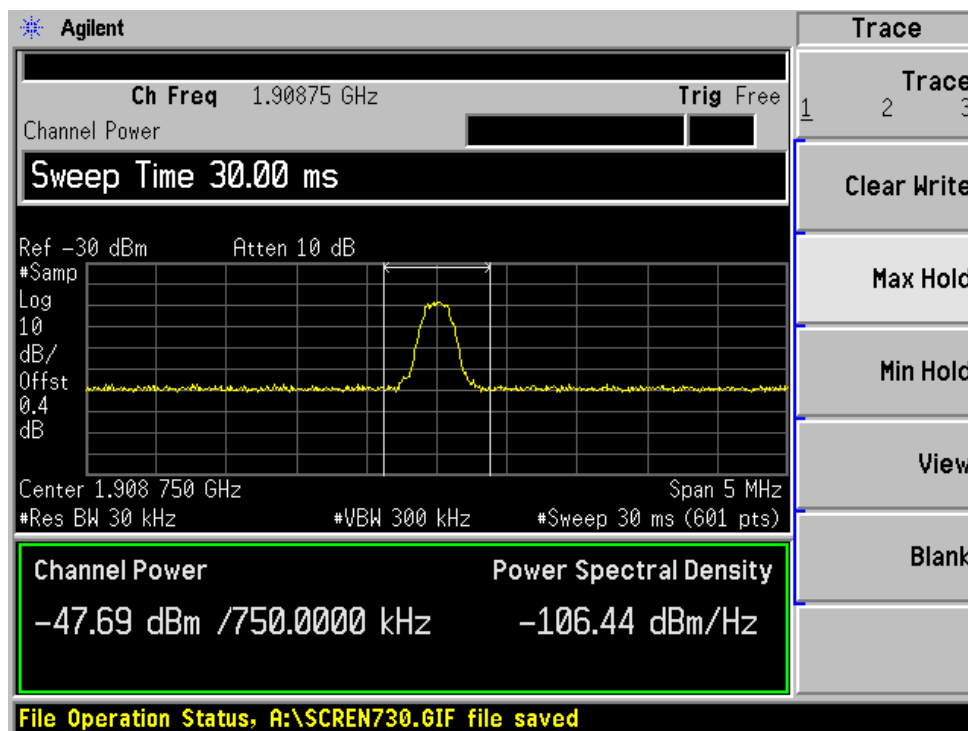
Input: Mid Channel



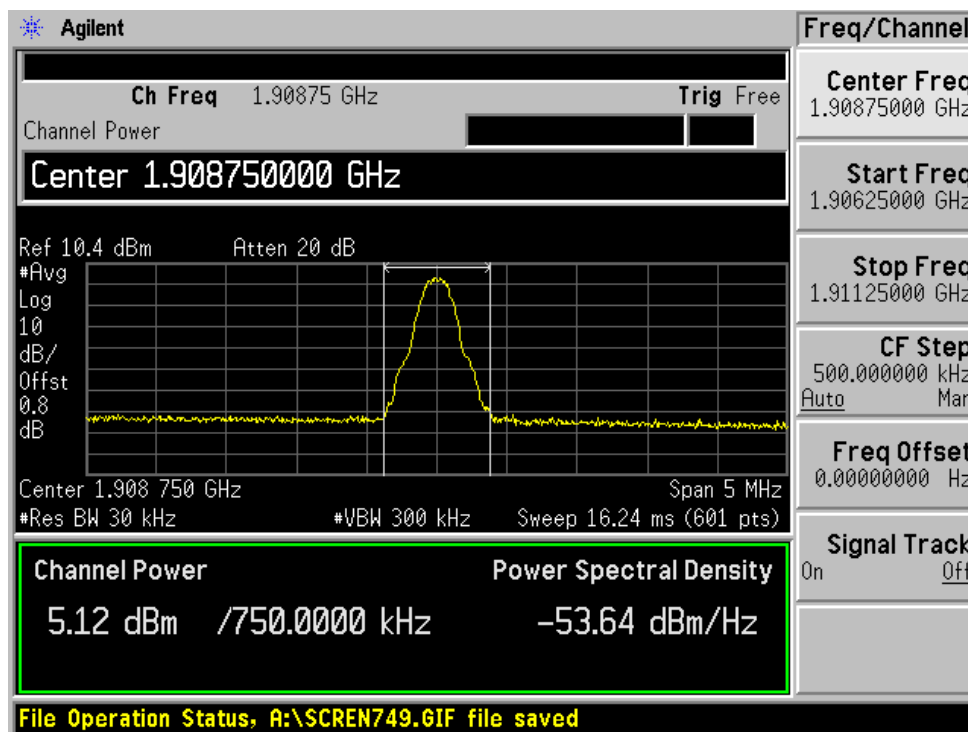
Output



Input: High Channel



Output

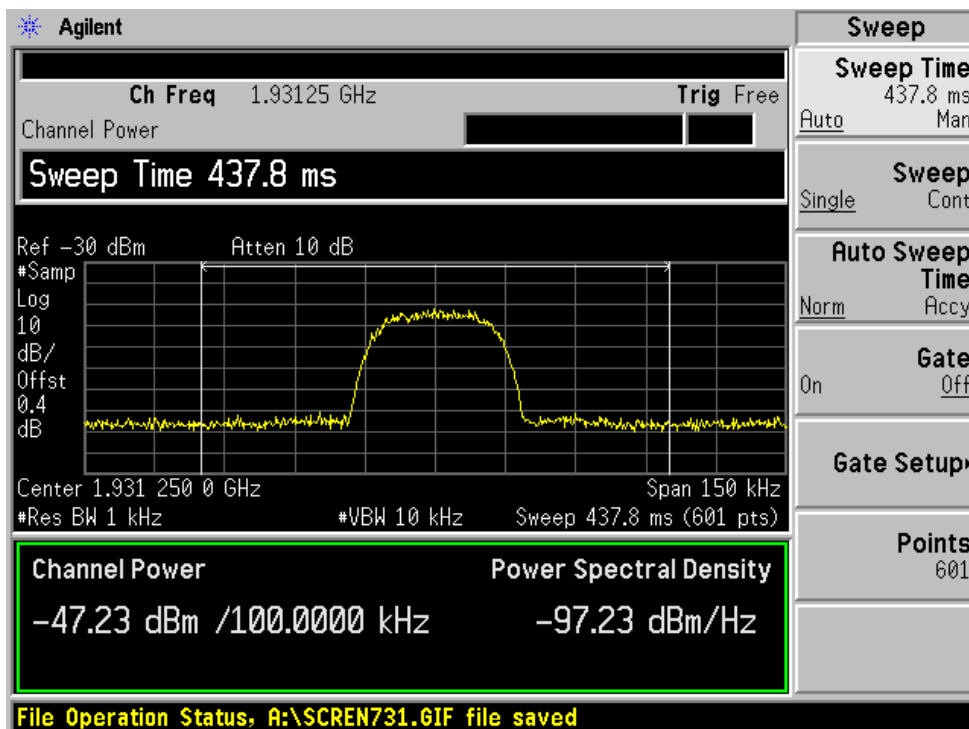


Conducted power plots: TDMA

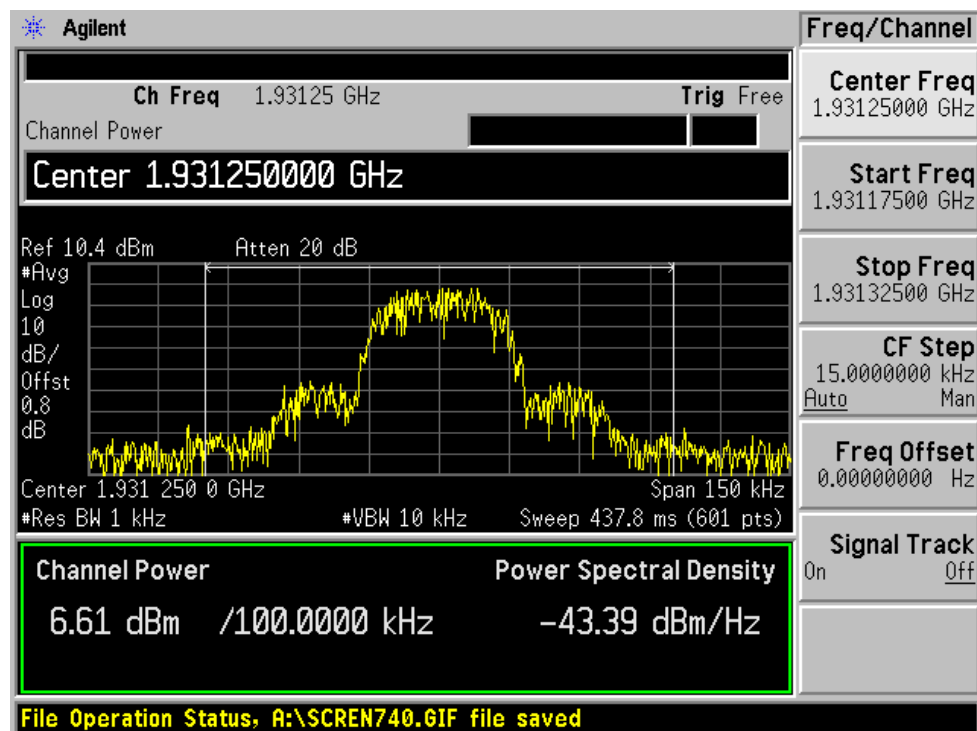
Forward (downlink):

Low Channel:

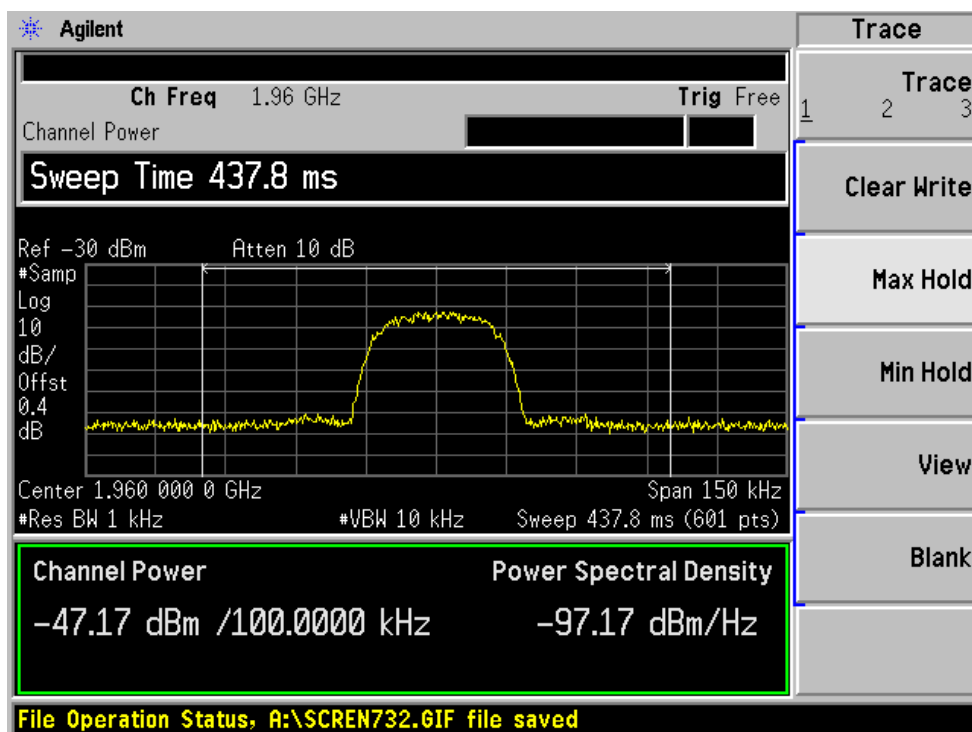
Input:



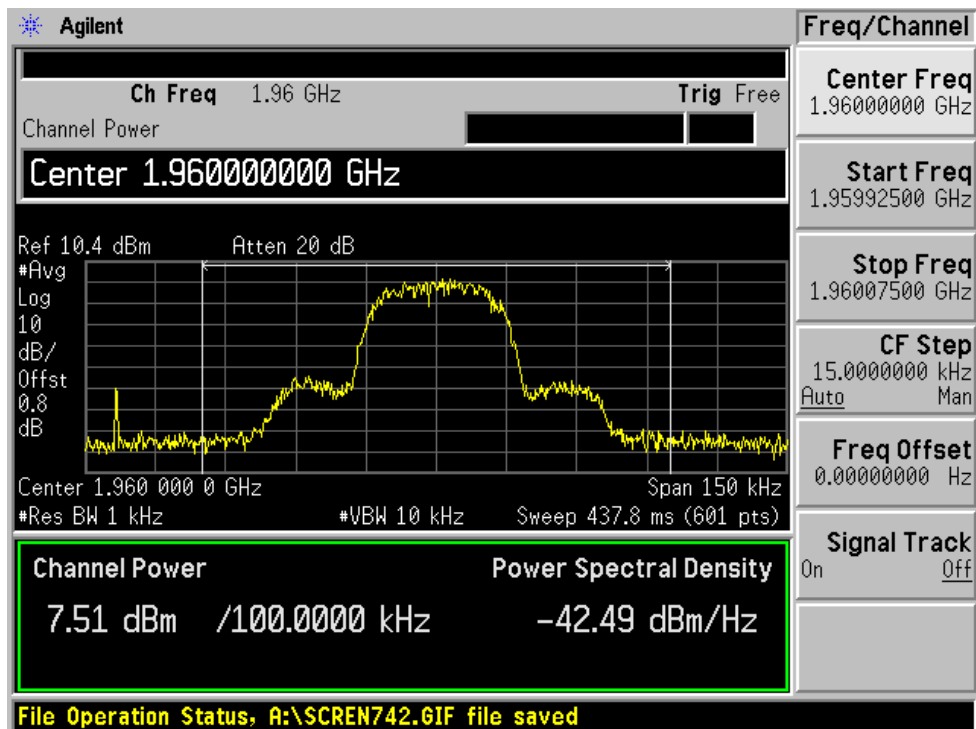
Output



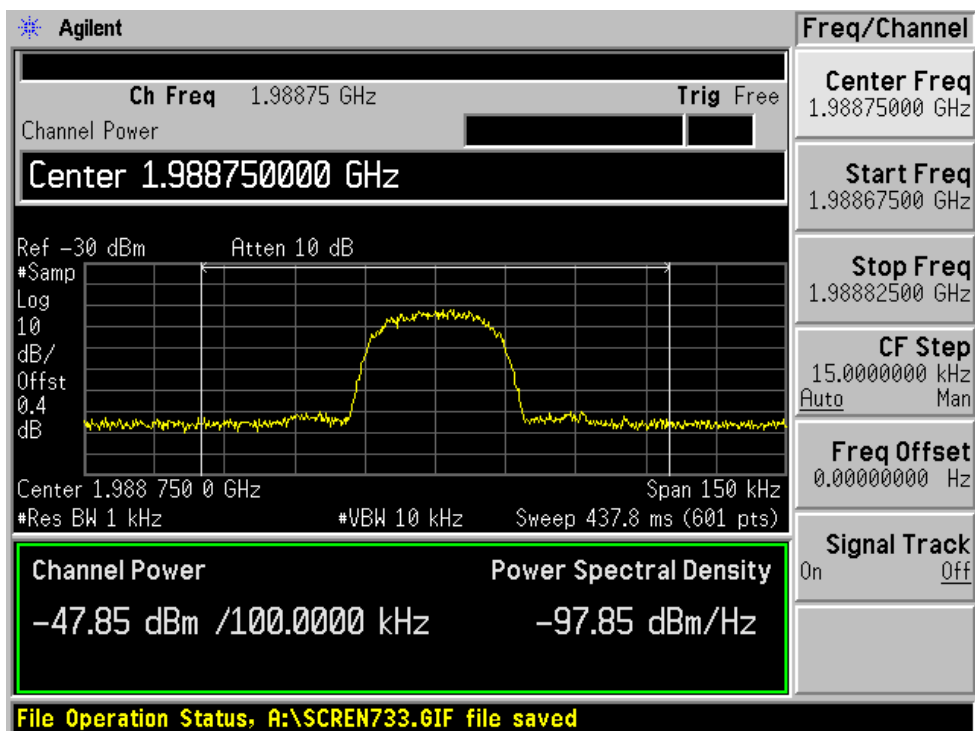
Input: Mid Channel



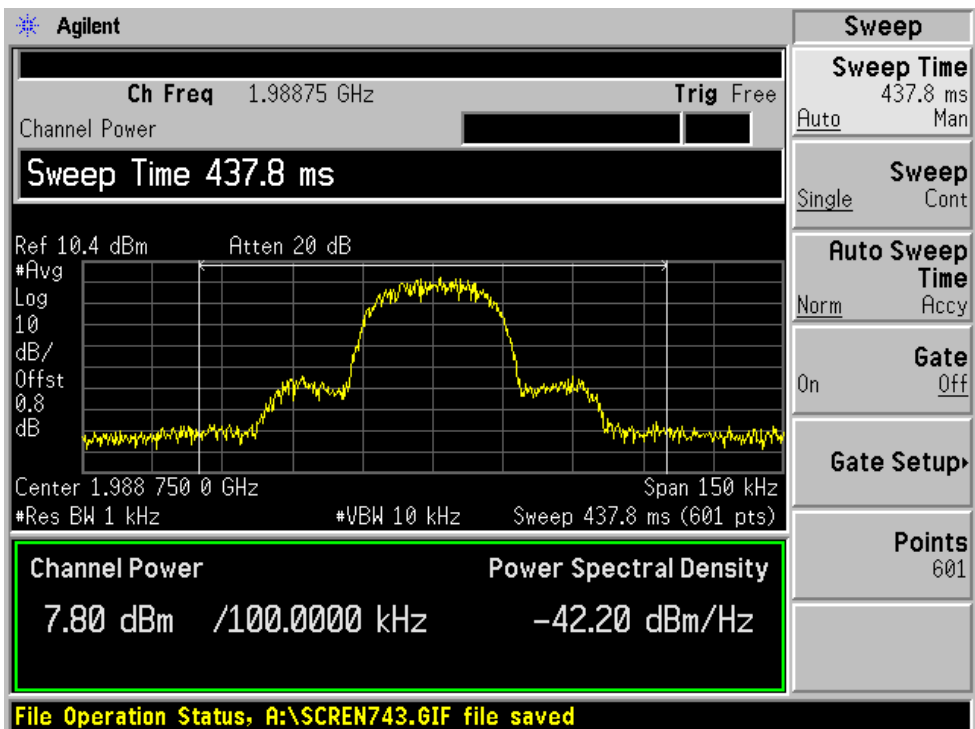
Output



Input: High Channel



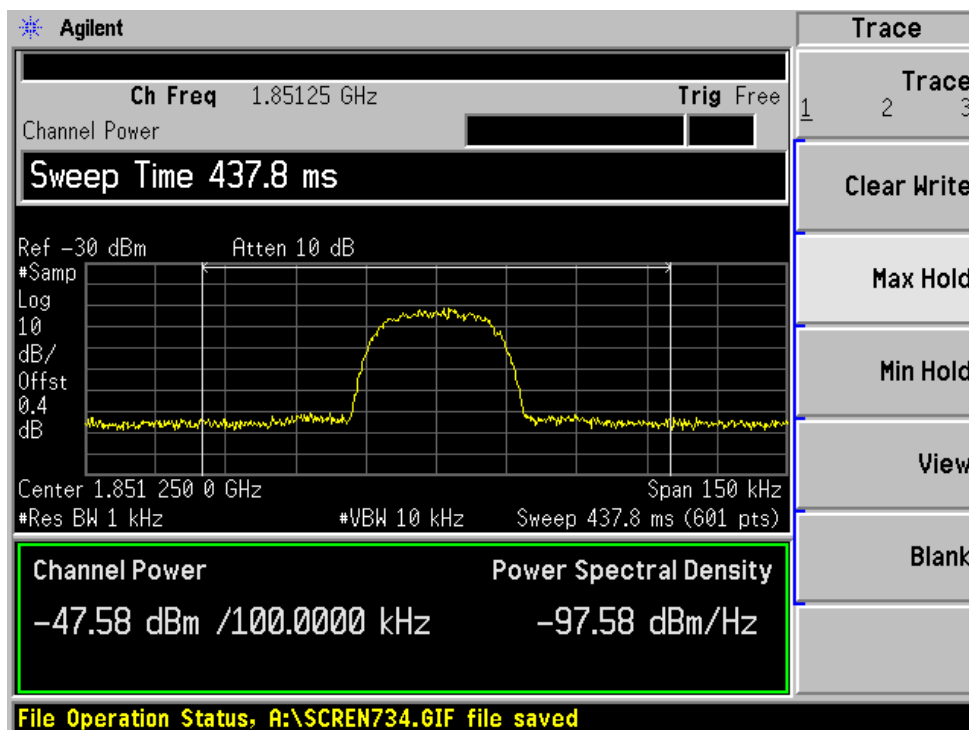
Output



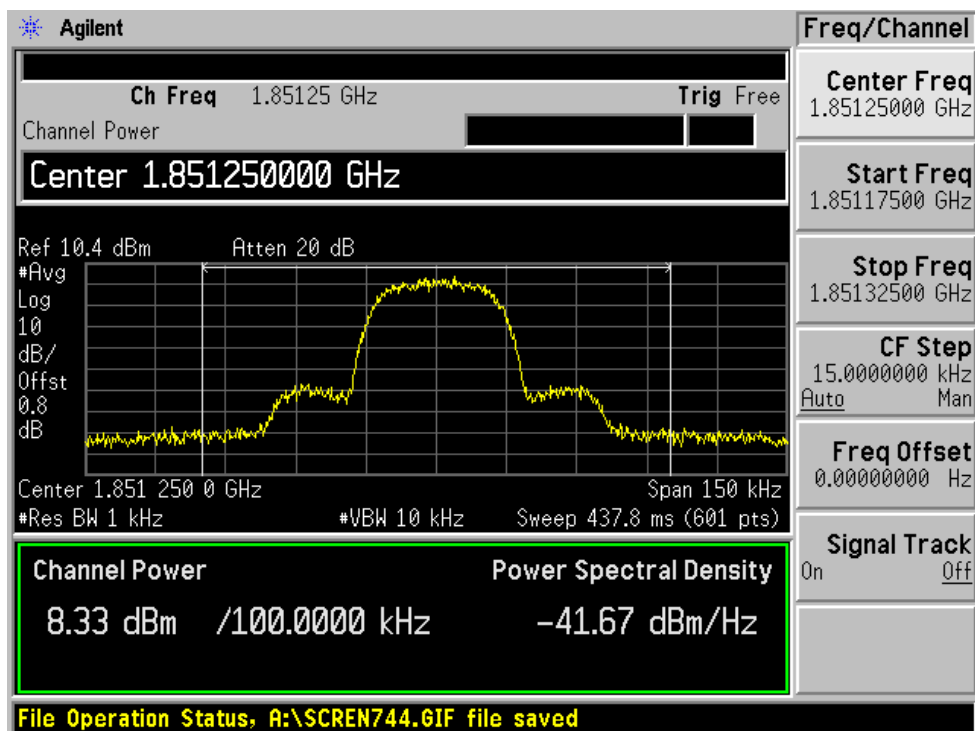
Conducted power plots: TDMA

Forward (Uplink):

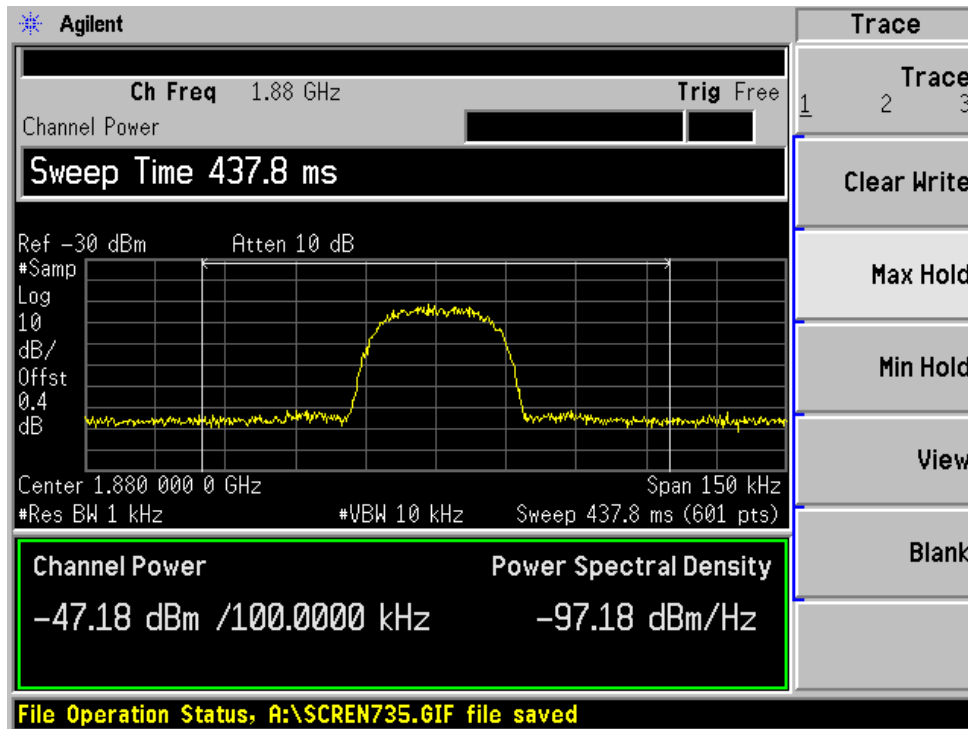
Input: Low Channel



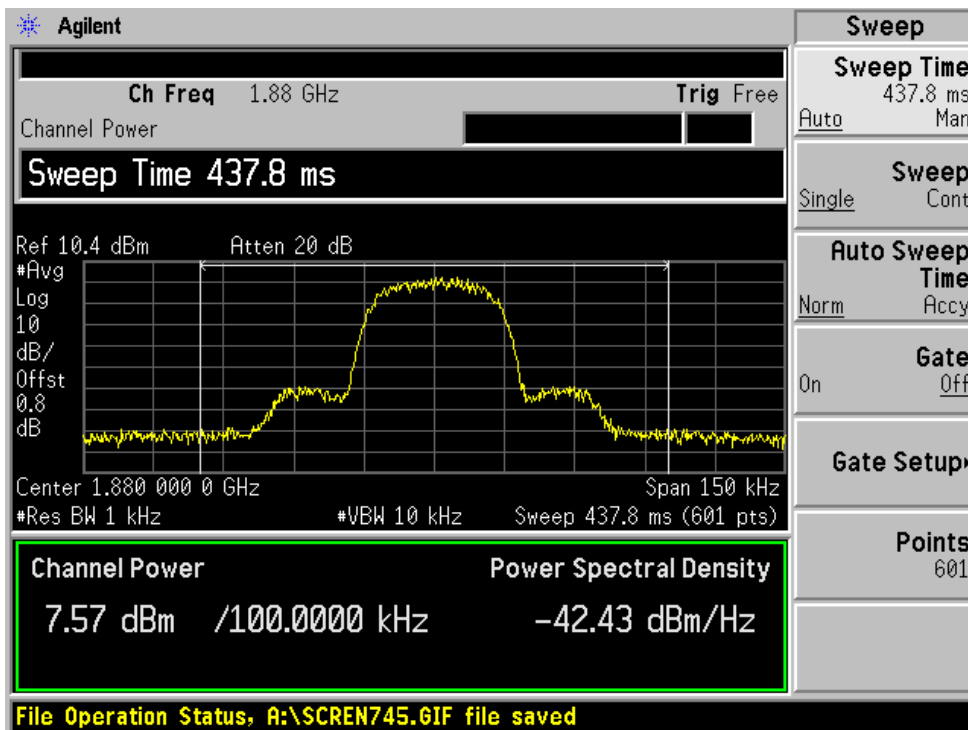
Output



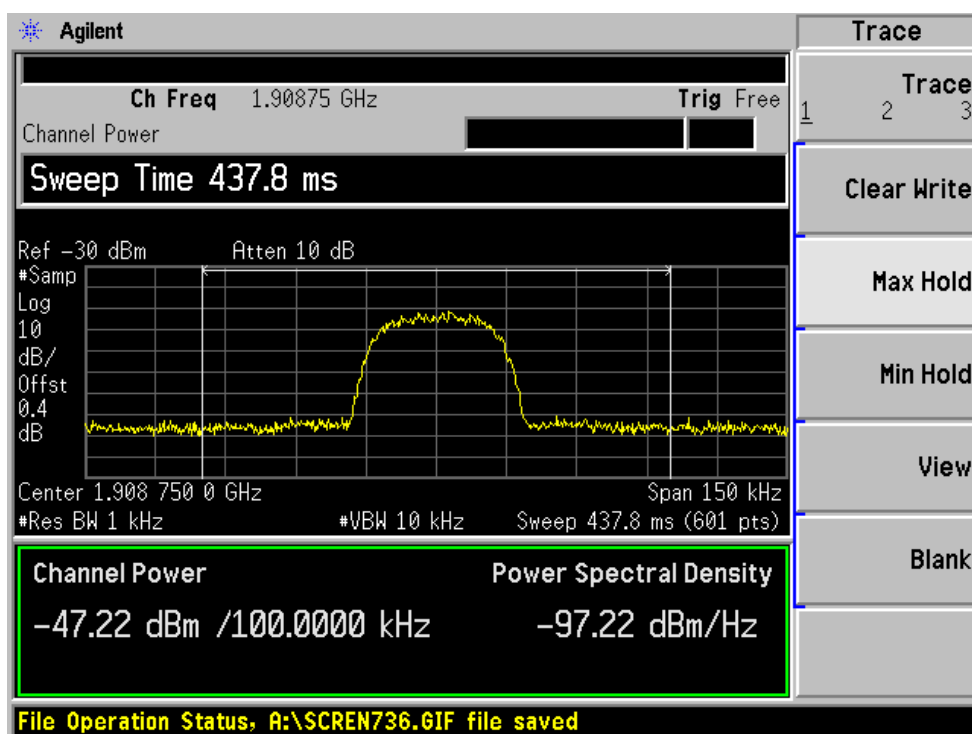
Input: Mid Channel



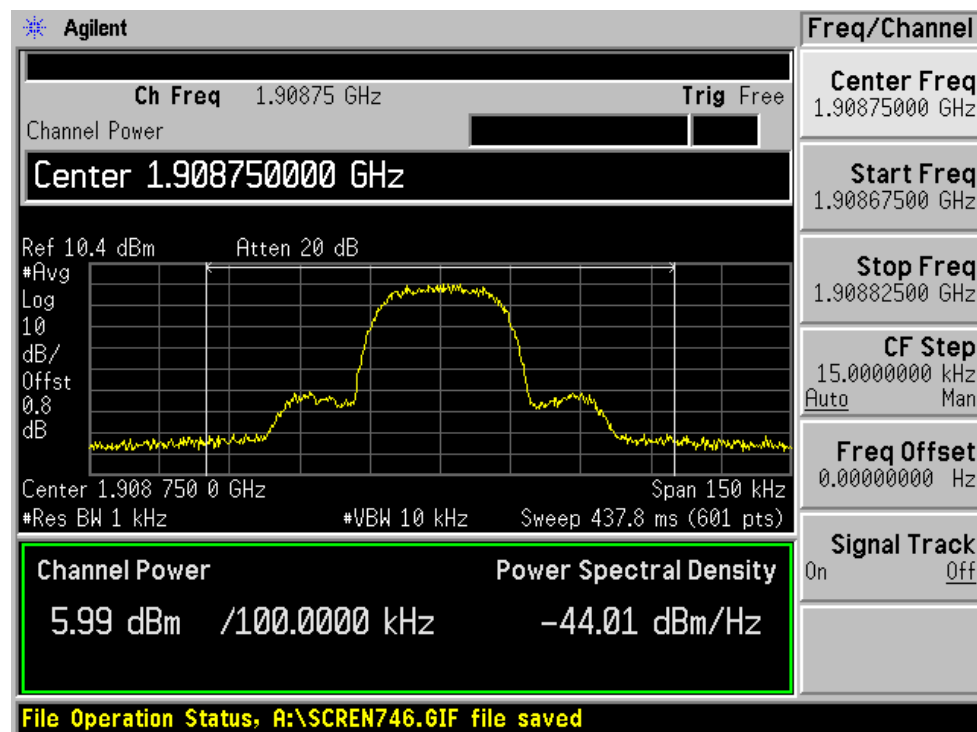
Output



Input: High Channel



Output



§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:	37%
ATM Pressure:	1020 mbar

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

Test Results

CDMA

Forward (downlink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (MHz)	26 dB Bandwidth (MHz)
Low	1931.25	1.283	1.450
Middle	1960.00	1.297	1.450
High	1988.75	1.283	1.442

Reverse (uplink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (MHz)	26 dB Bandwidth (MHz)
Low	1851.25	1.267	1.446
Middle	1880.00	1.300	1.446
High	1908.75	1.267	1.433

GSM**Forward (downlink)**

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1931.25	270.00	371.00
Middle	1960.00	276.15	370.68
High	1988.75	270.77	369.40

Reverse (uplink)

Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1851.25	272.29	366.64
Middle	1880.00	270.49	367.40
High	1908.75	270.91	371.61

TDMA**Forward (downlink)**

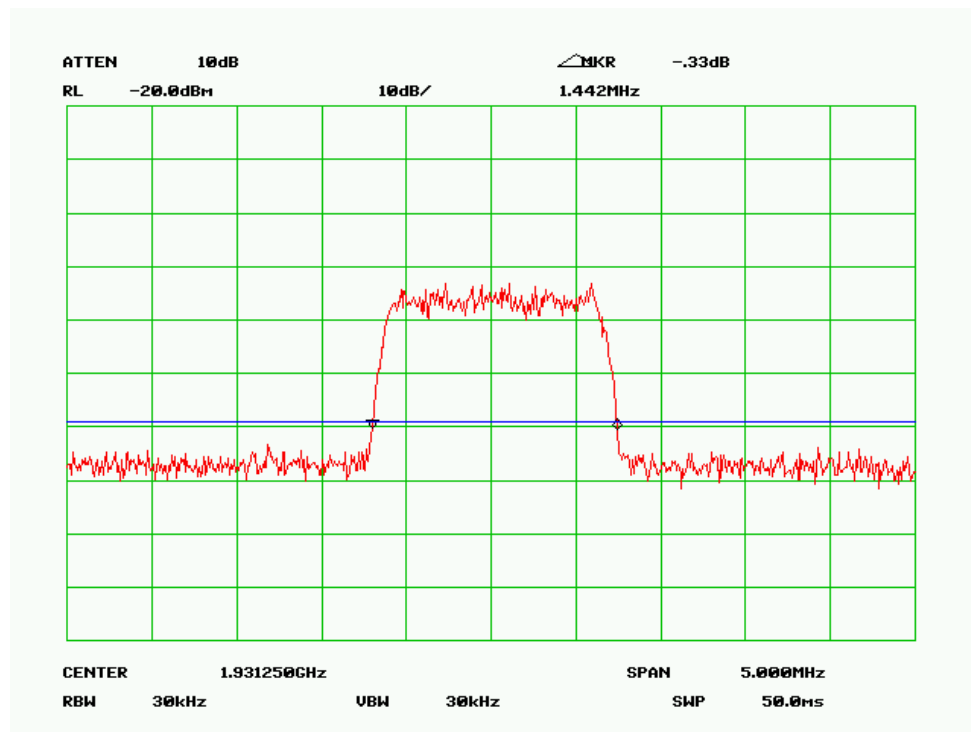
Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1931.25	27.19	33.54
Middle	1960.00	27.25	33.37
High	1988.75	26.72	33.01

Reverse (uplink)

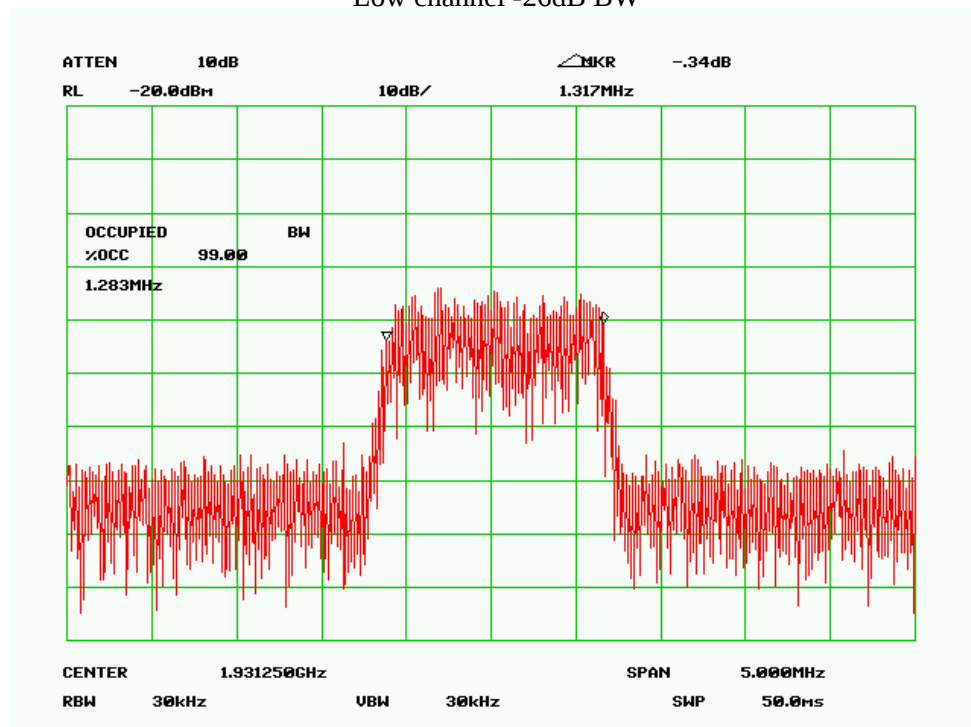
Channel	Channel frequency (MHz)	99% Power Bandwidth (KHz)	26 dB Bandwidth (KHz)
Low	1851.25	27.44	33.38
Middle	1880.00	27.44	33.34
High	1908.75	27.61	33.26

**CDMA
Forward (Downlink)**

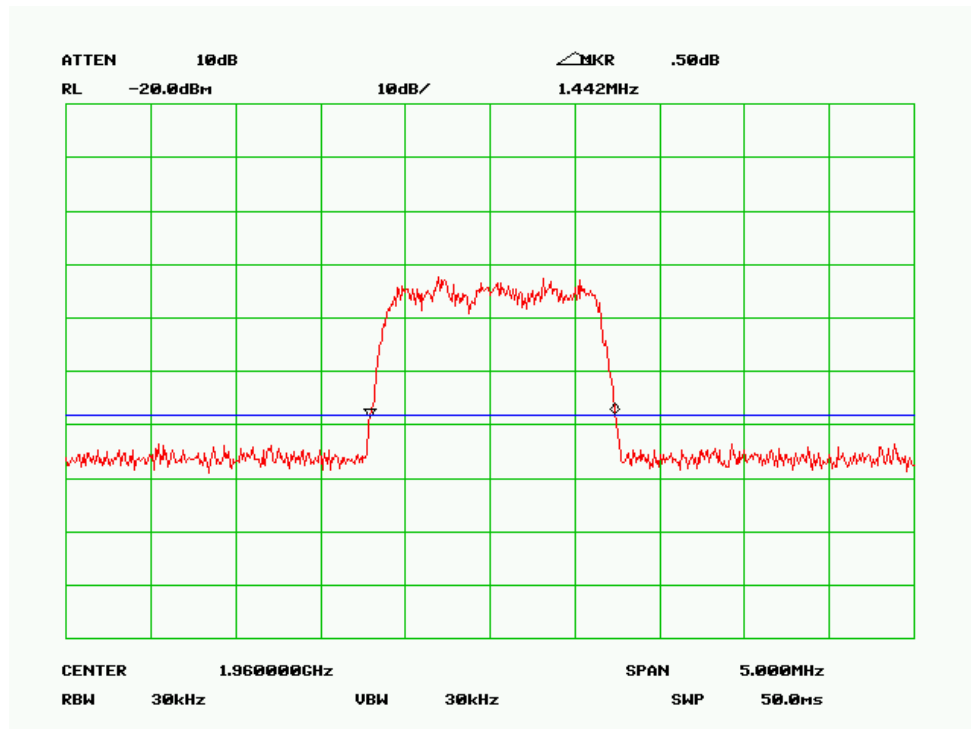
Input



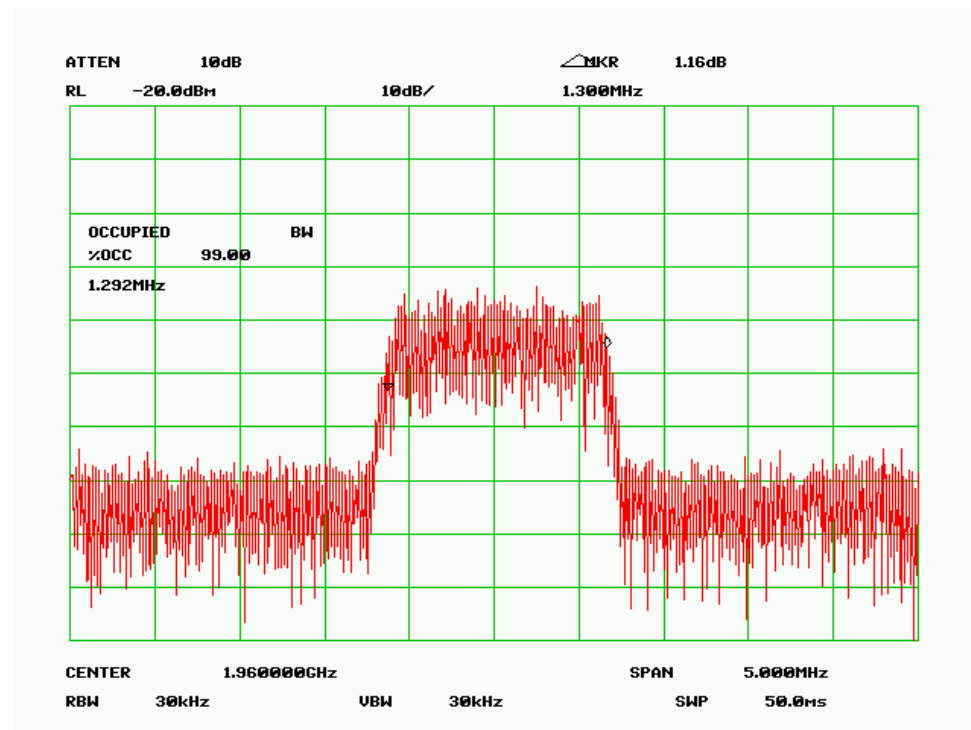
Low channel -26dB BW



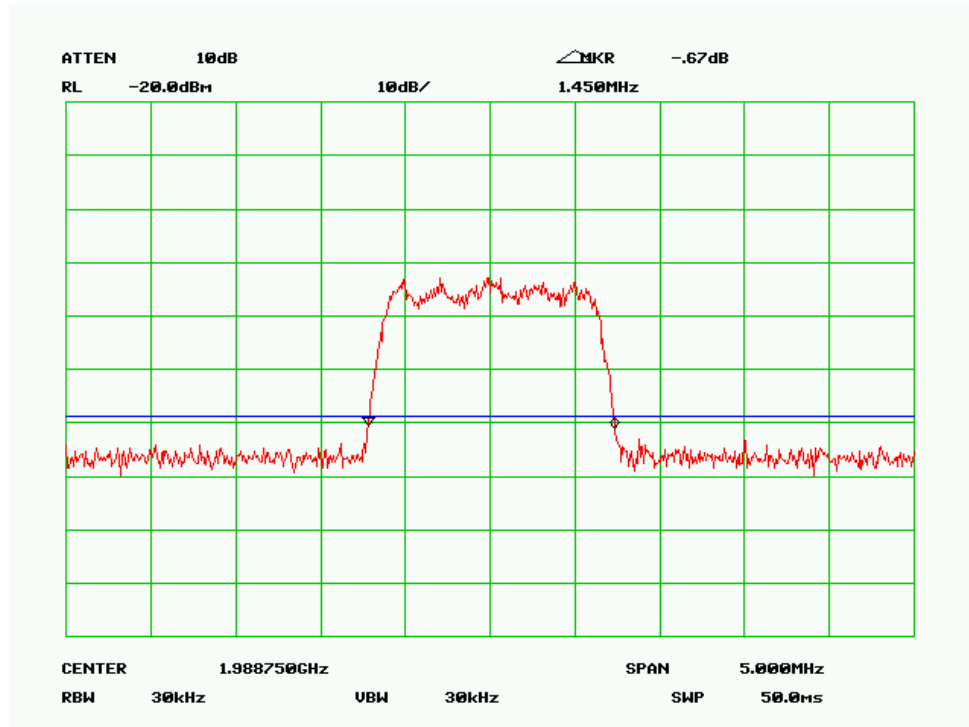
Low Channel -99% BW



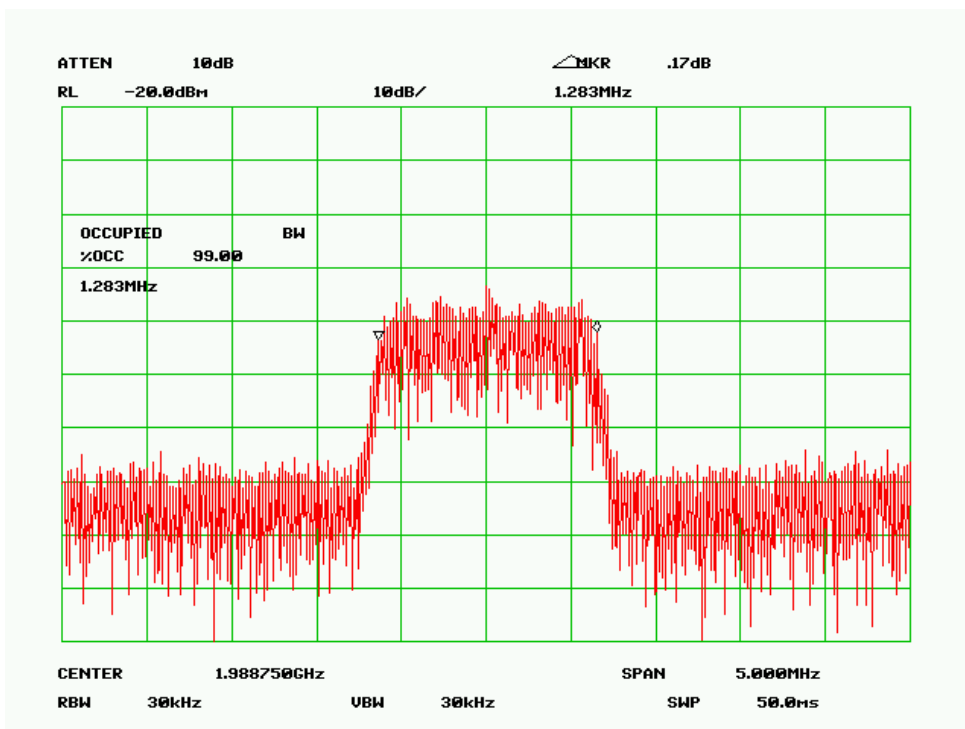
Mid channel -26dB BW



Mid channel -99% BW

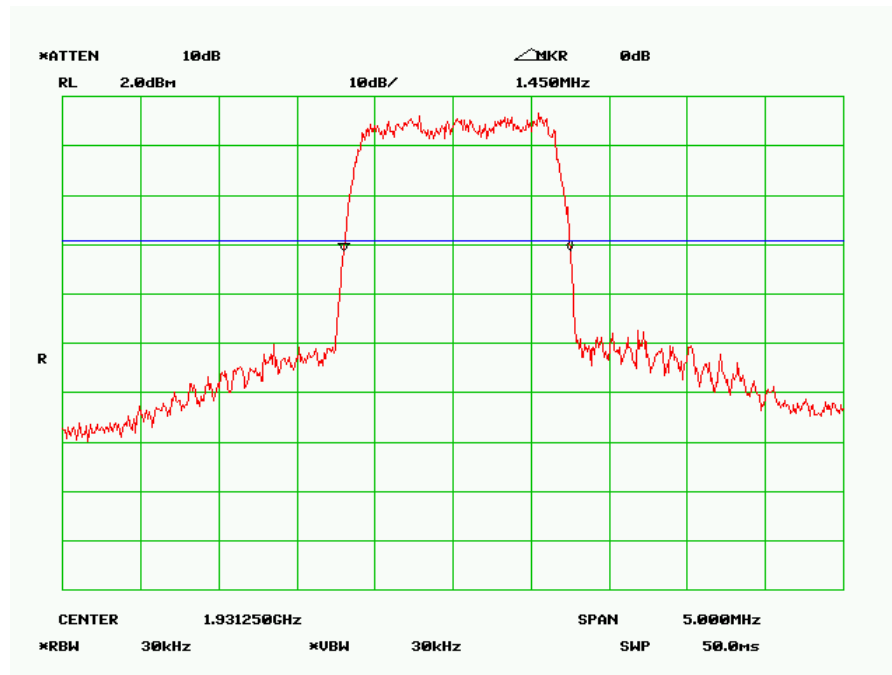


High Channel -26dB BW

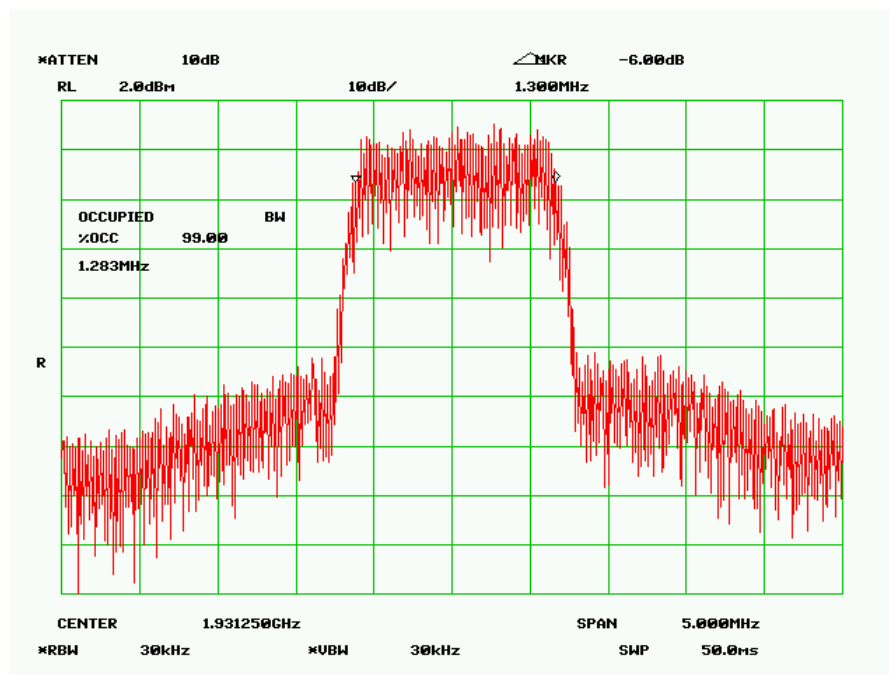


High channel -99% BW

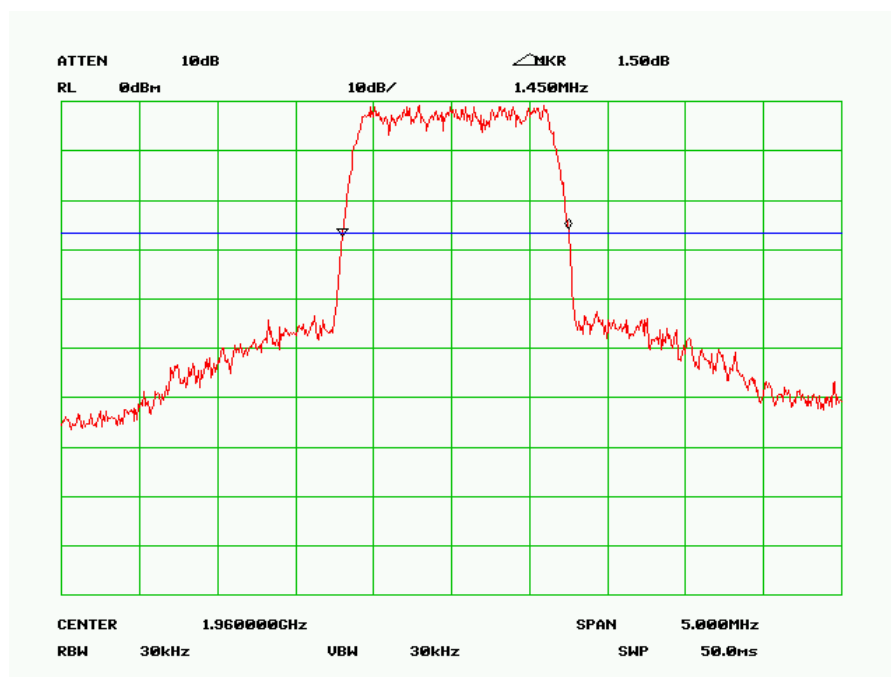
Output



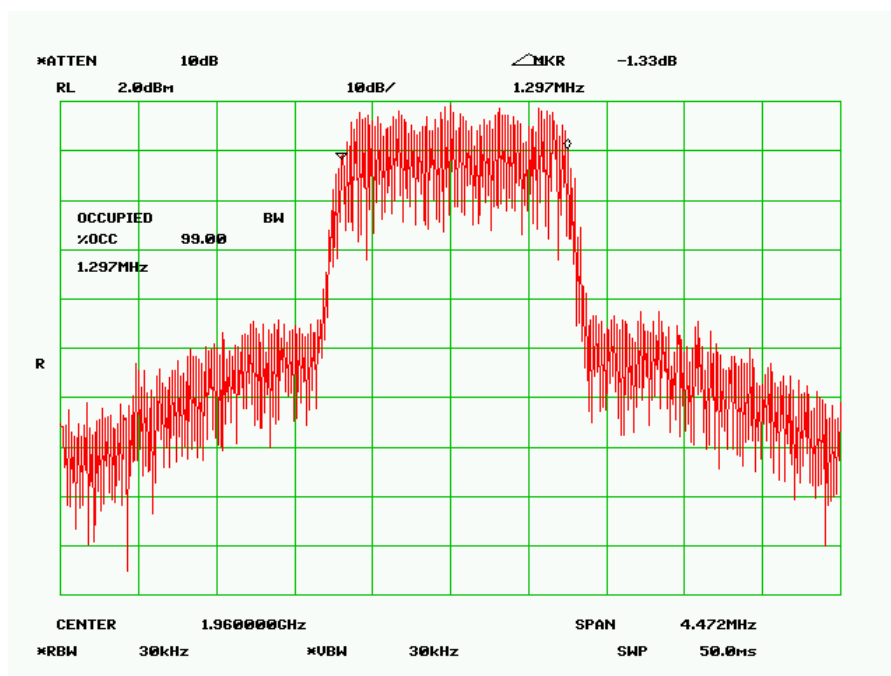
Low channel -26dB BW



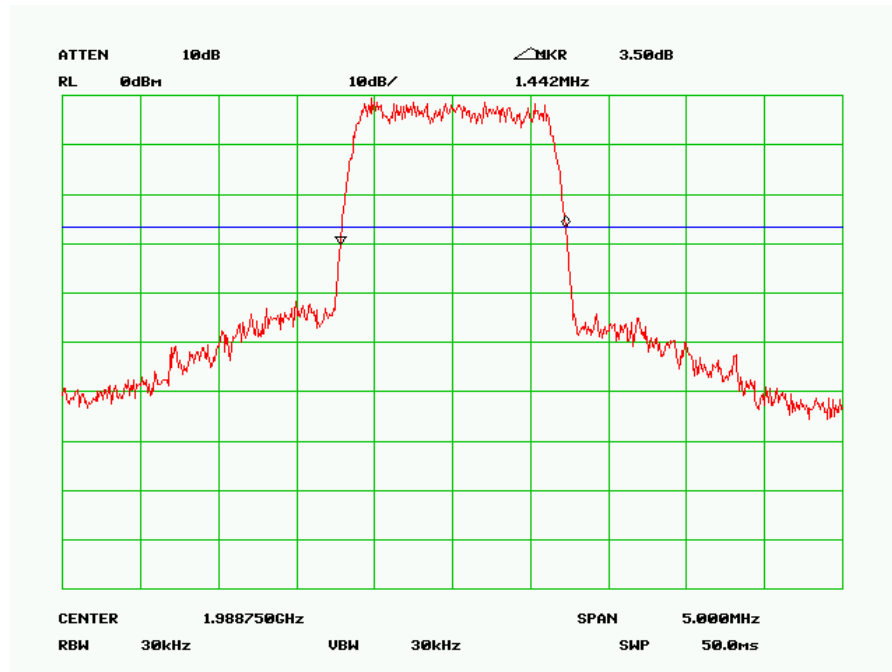
Low Channel -99% BW



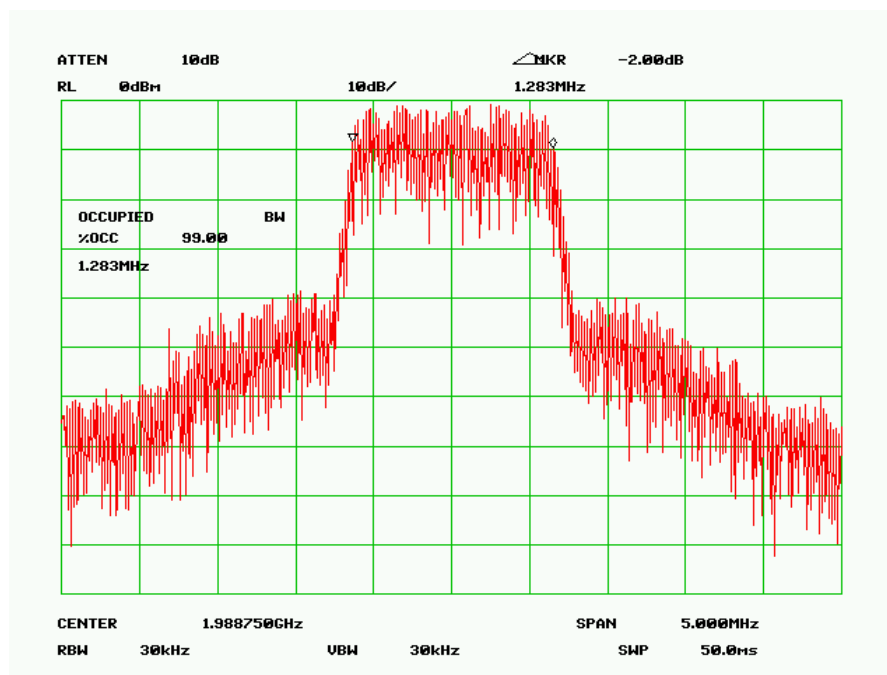
Mid channel -26dB BW



Mid channel -99% BW



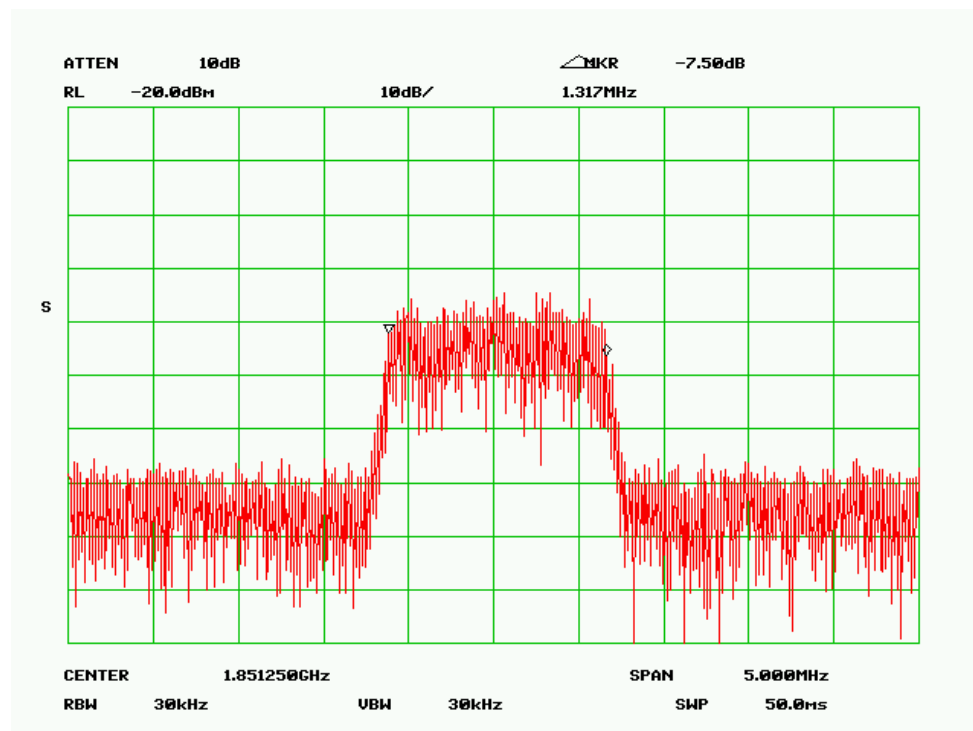
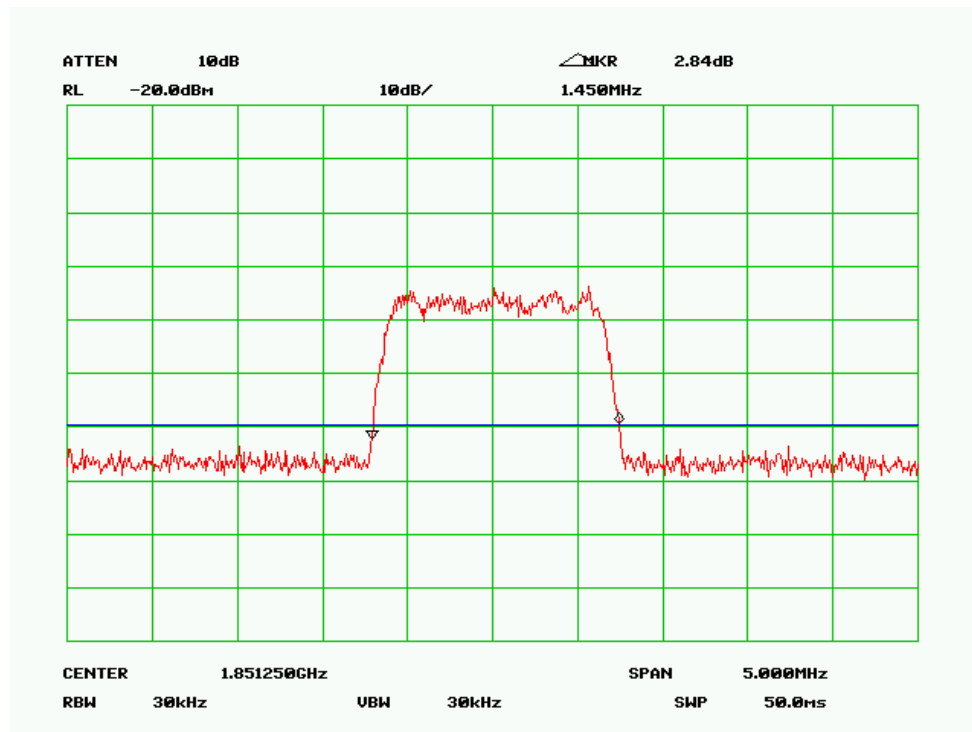
High Channel -26dB BW

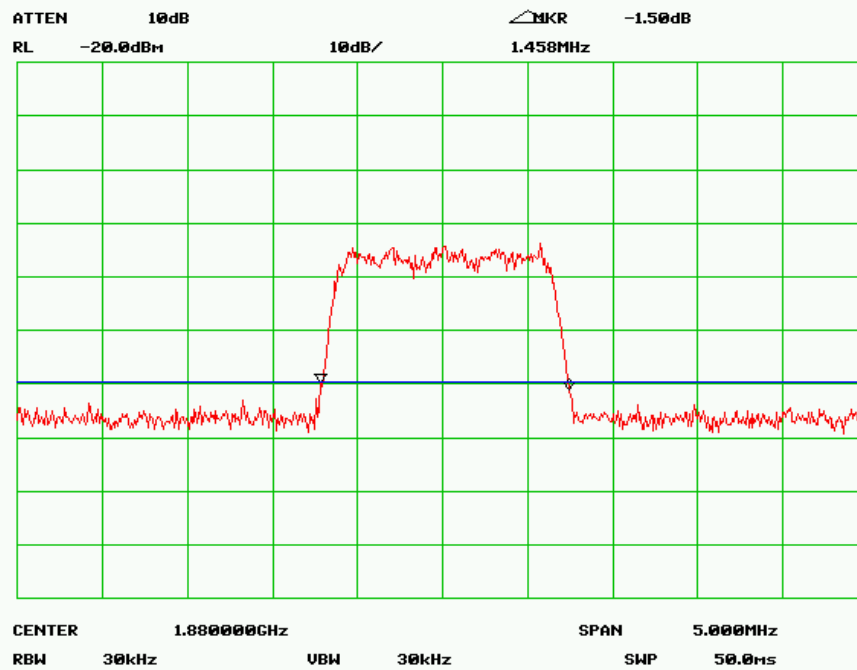


High channel -99% BW

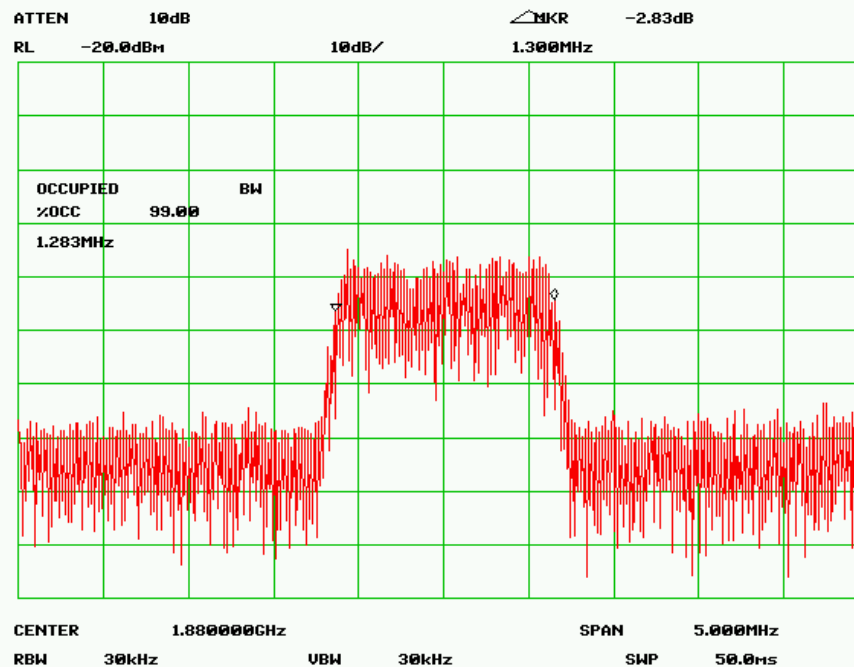
**CDMA
Reverse (Uplink)**

Input

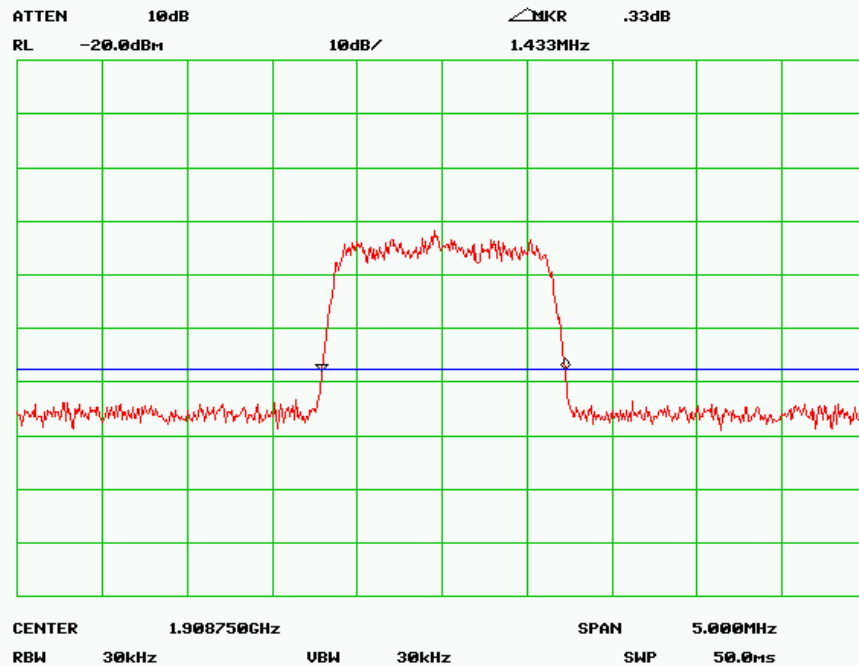




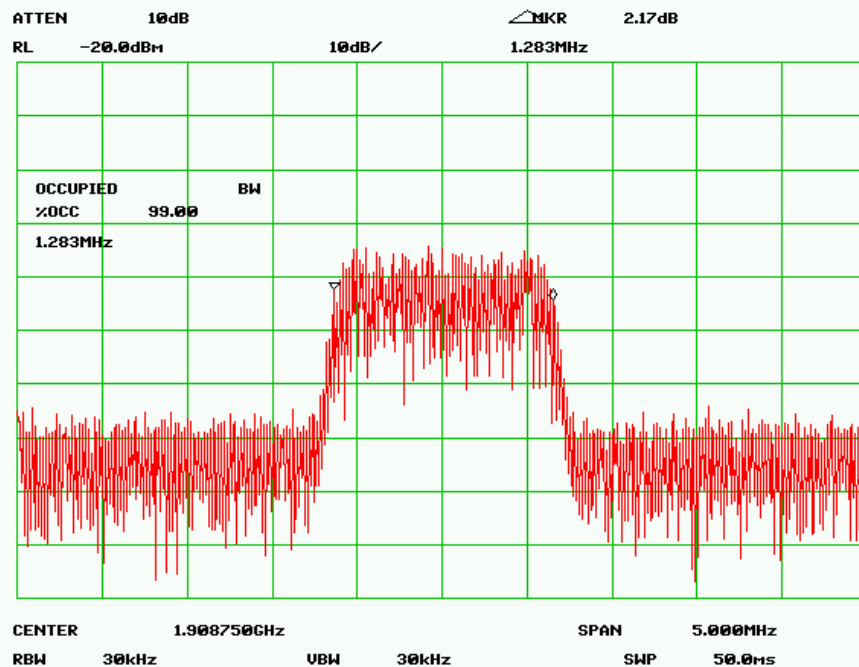
Mid channel -26dB BW



Mid channel -99% BW

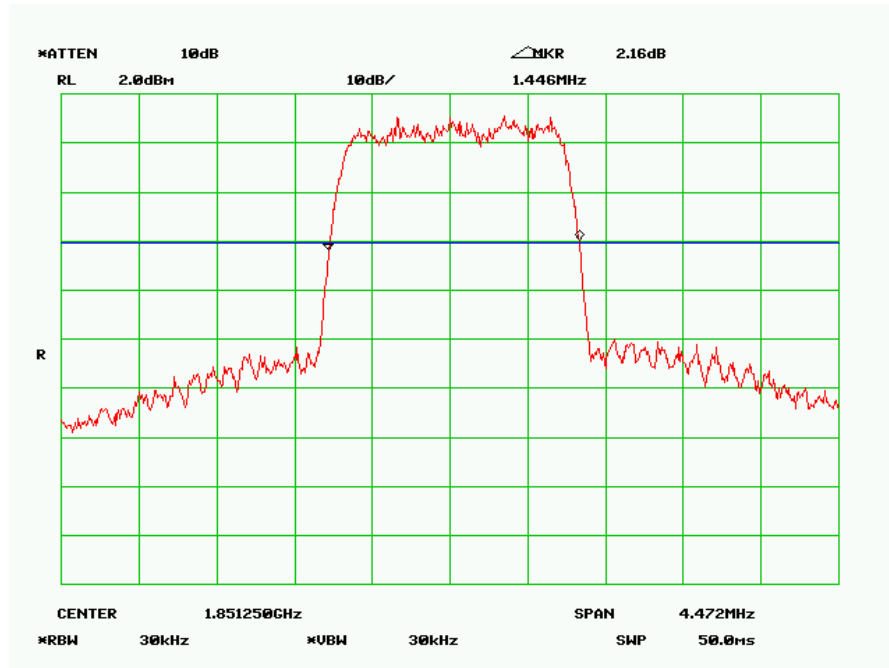


High channel -26dB BW

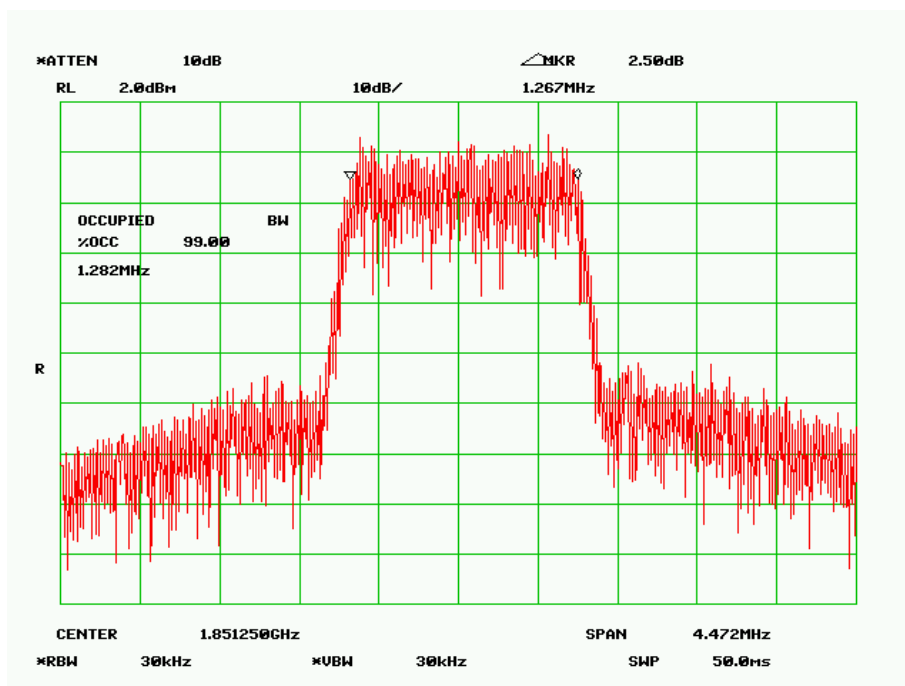


High channel -99% BW

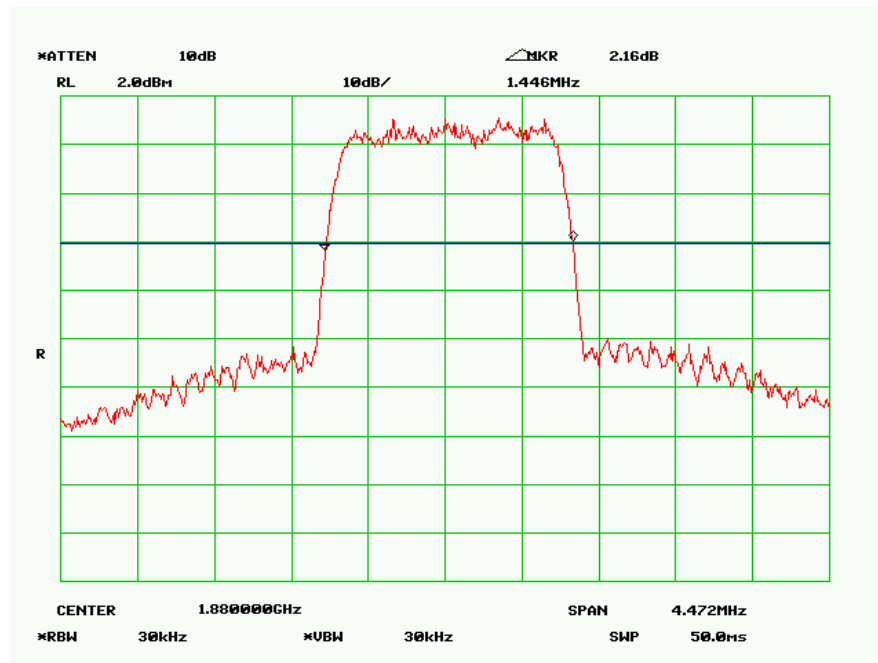
Output



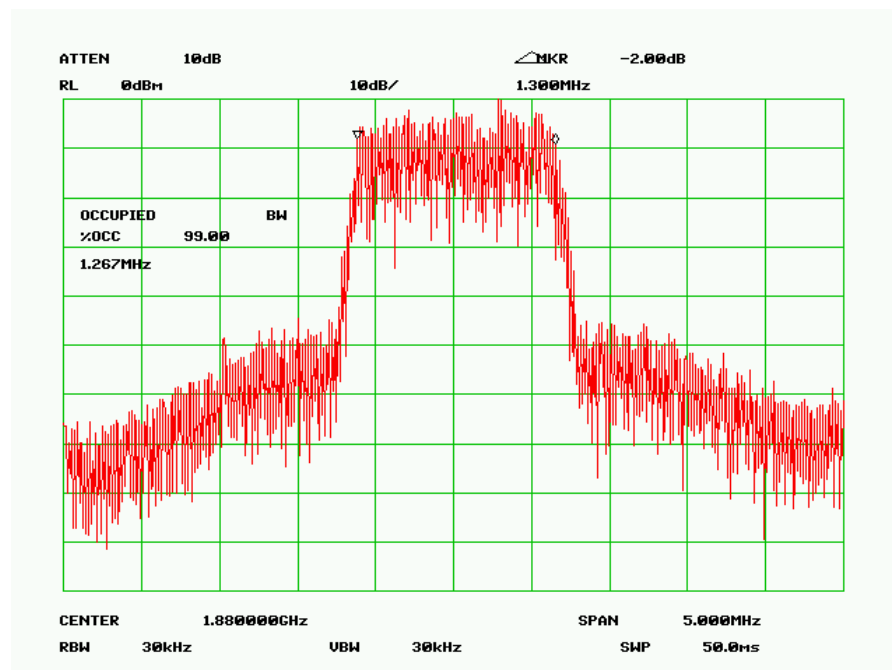
Low Channel -26dB BW



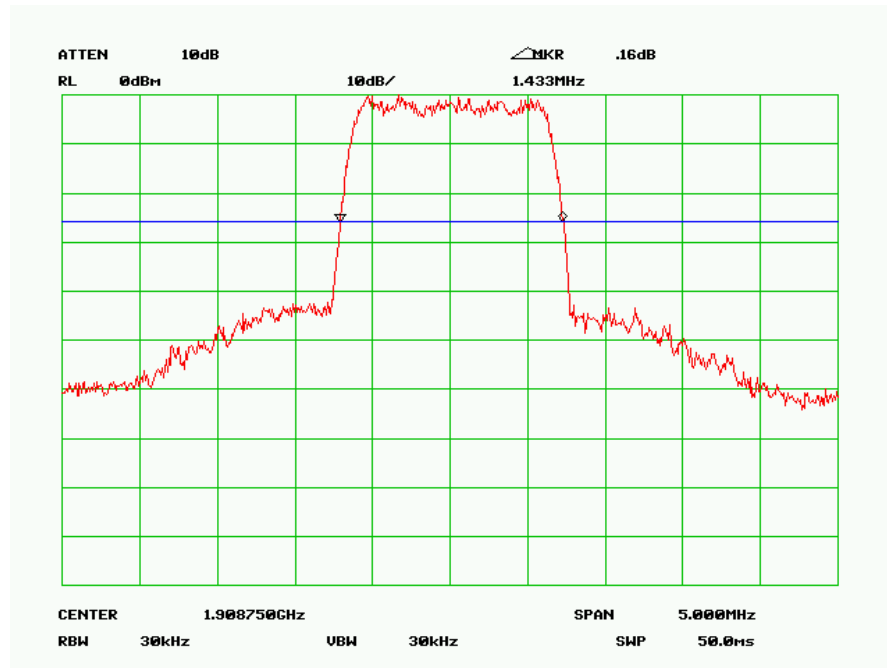
Low channel -99% BW



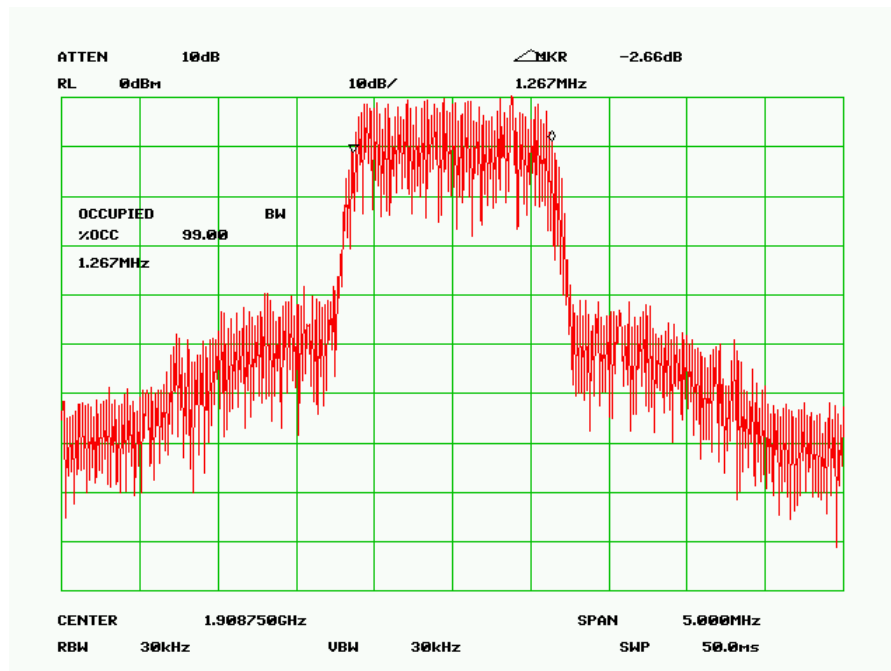
Mid channel -26dB BW



Mid channel -99% BW



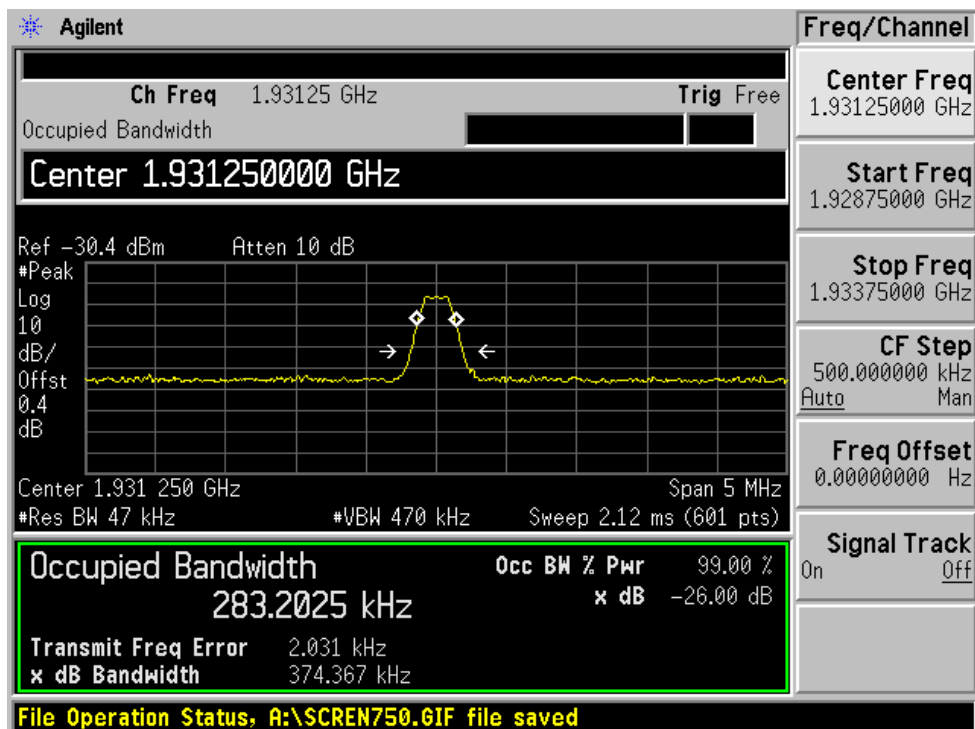
High channel -26dB BW



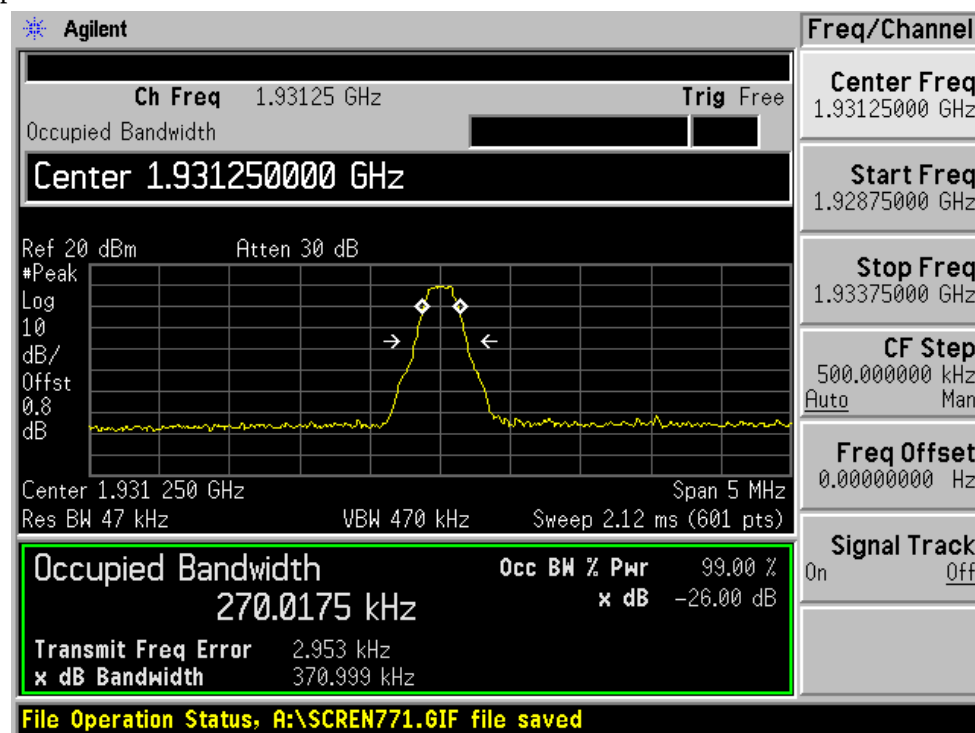
High channel -99% BW

**GSM
Forward (Downlink)**

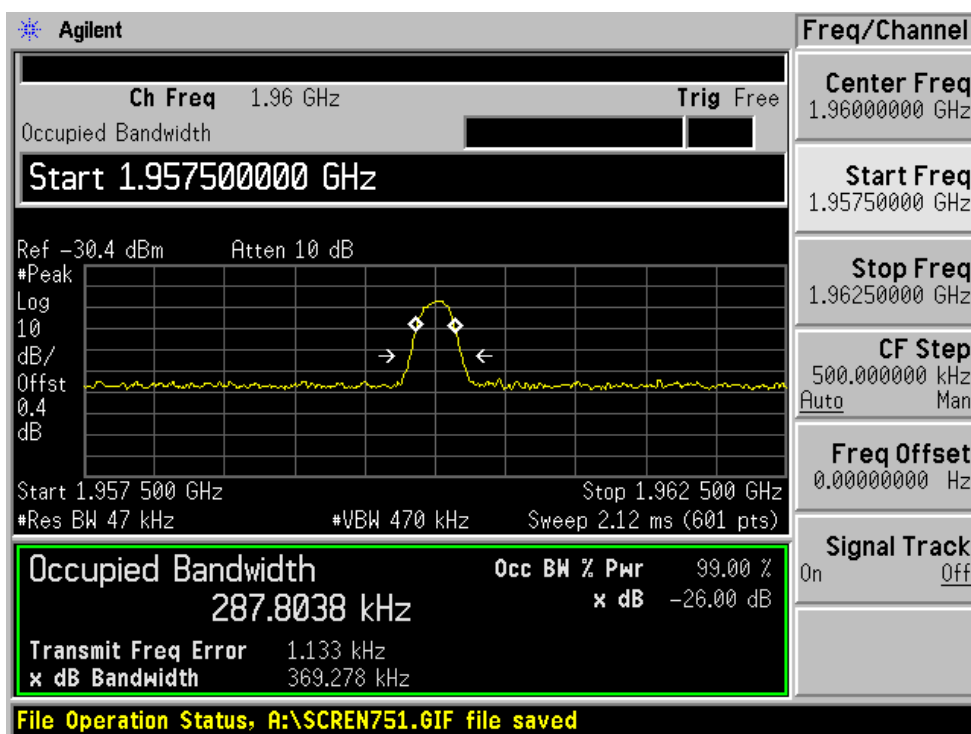
Input: Low Channel



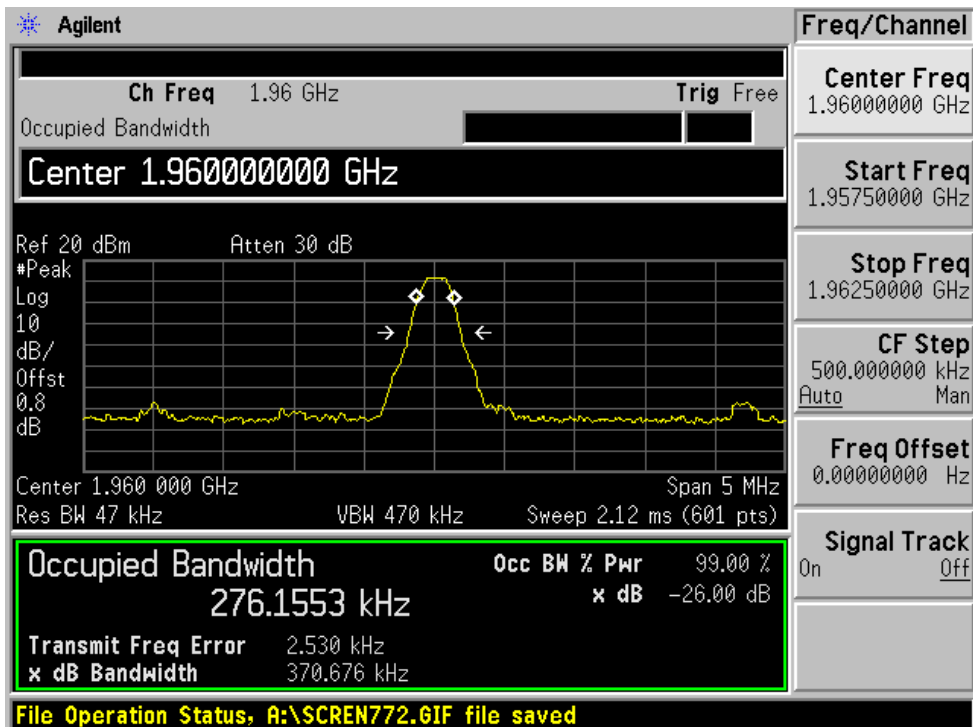
Output



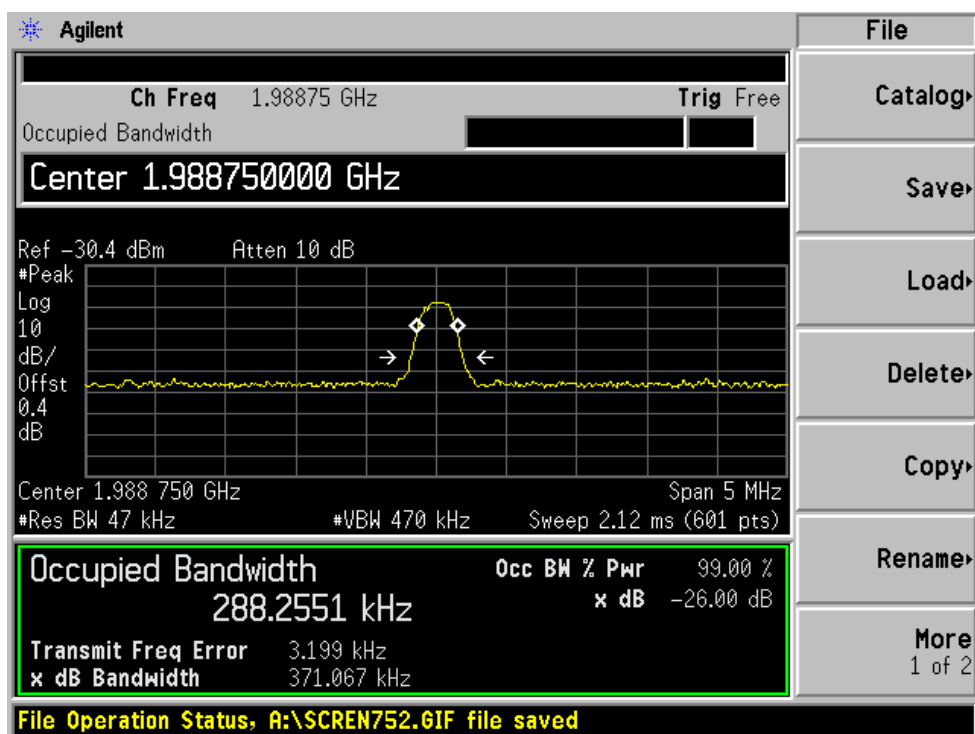
Input : Mid Channel



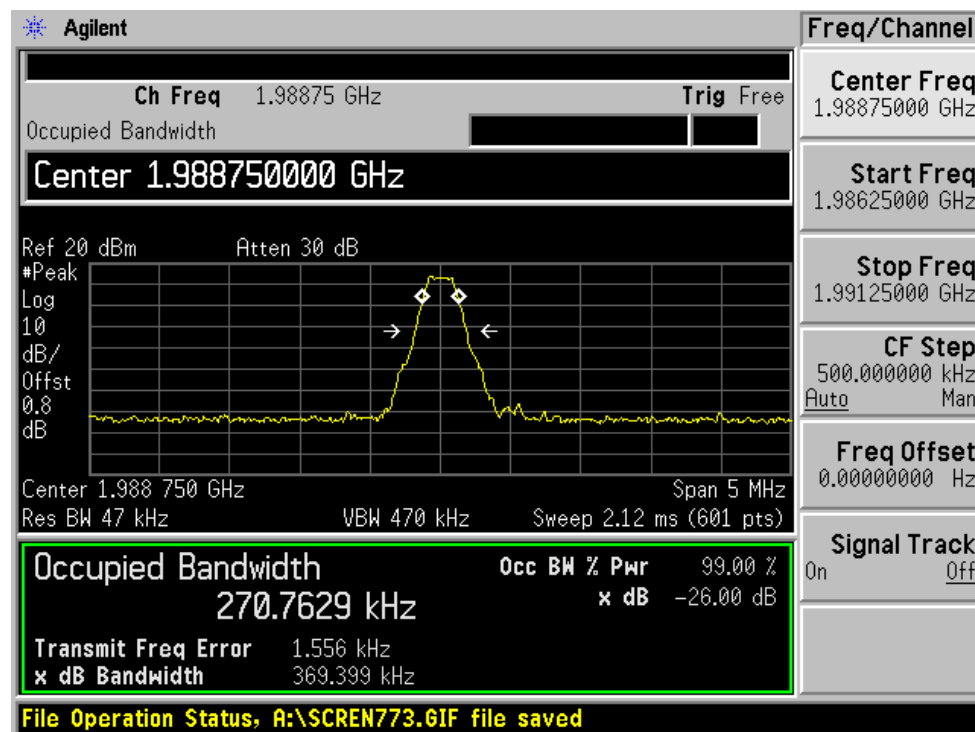
Output



Input: High Channel

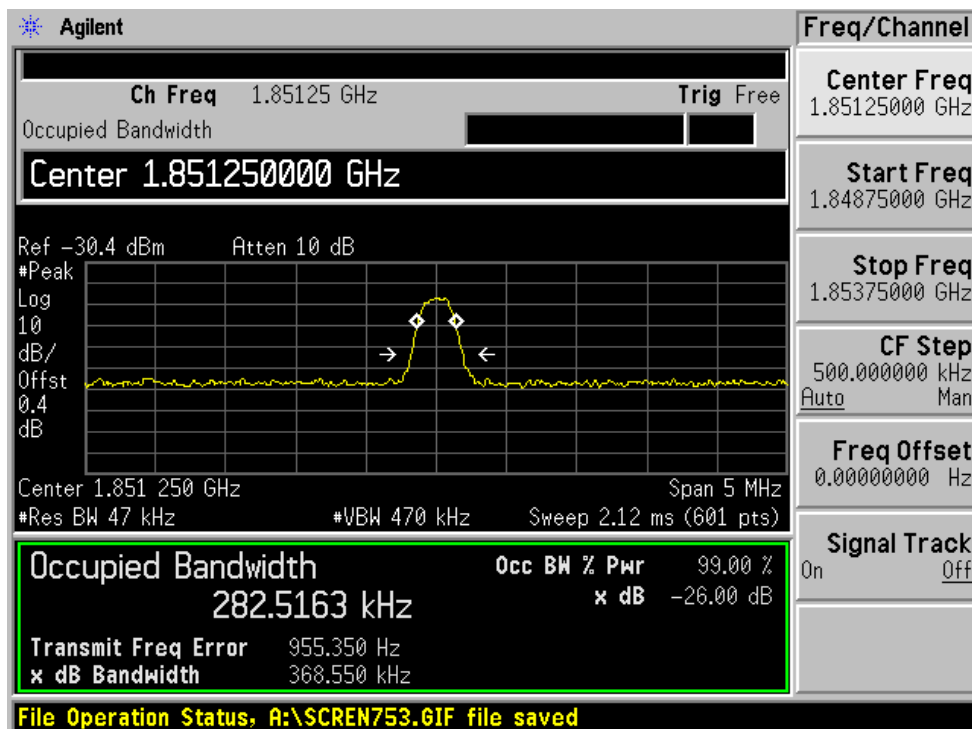


Output

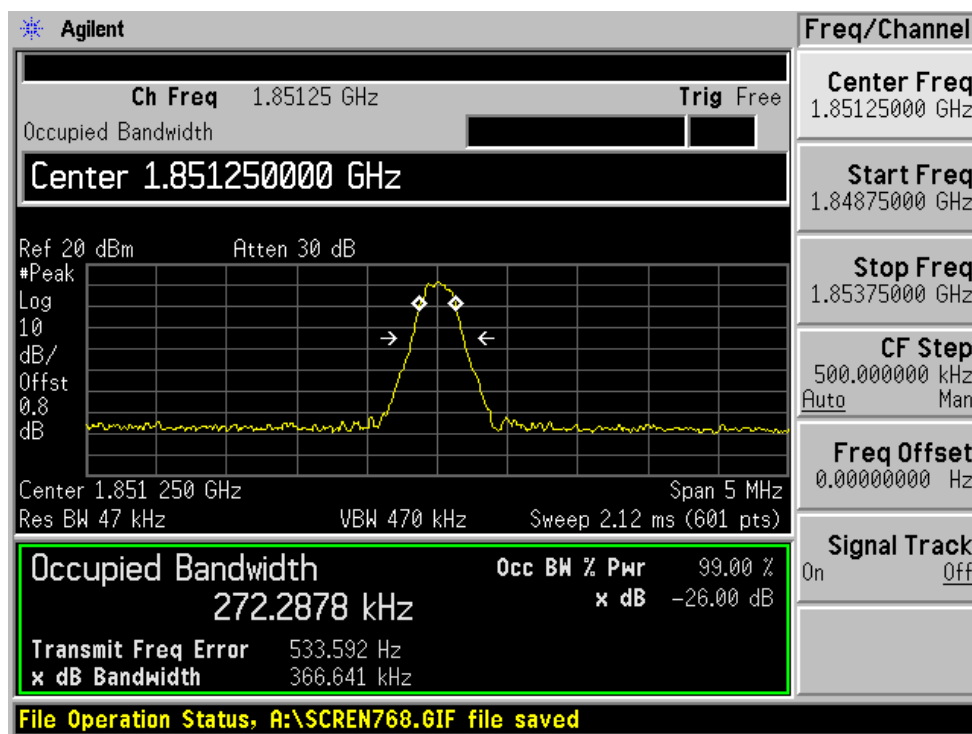


**GSM
Reverse (Uplink)**

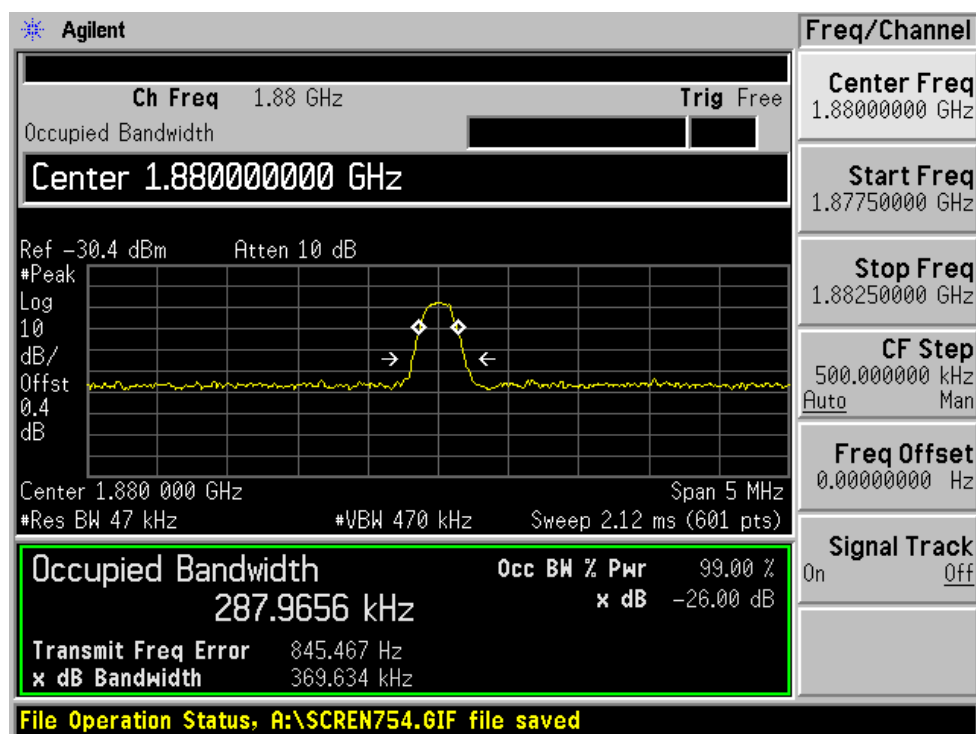
Input : Low Channel



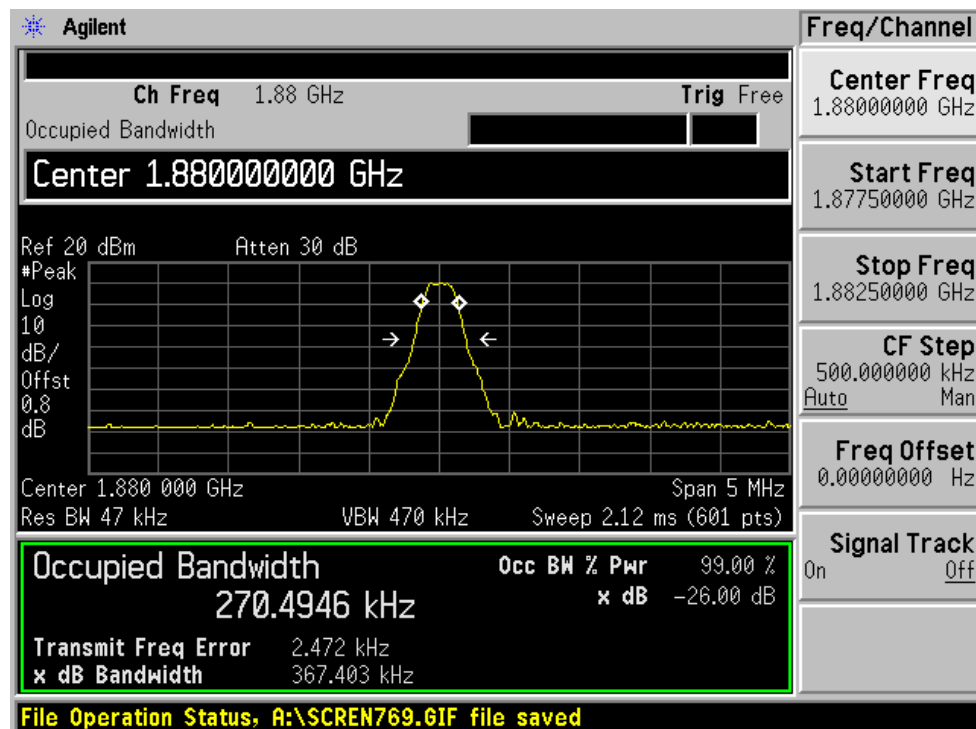
Output



Input: Mid Channel



Output



Agilent

Ch Freq 1.90875 GHz Trig Free

Occupied Bandwidth

Center 1.908750000 GHz

Ref -30.4 dBm Atten 10 dB

#Peak Log 10 dB/ Offst 0.4 dB

Center 1.908750 GHz Span 5 MHz

#Res BW 47 kHz #VBW 470 kHz Sweep 2.12 ms (601 pts)

Occupied Bandwidth 283.0259 kHz Occ BW % Pwr 99.00 % x dB -26.00 dB

Transmit Freq Error 2.226 kHz x dB Bandwidth 369.541 kHz

File Operation Status, A:\SCREEN755.GIF file saved

Freq/Channel

Center Freq 1.90875000 GHz

Start Freq 1.90625000 GHz

Stop Freq 1.91125000 GHz

CF Step 500.000000 kHz Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

Agilent

Ch Freq 1.90875 GHz Trig Free

Occupied Bandwidth

Center 1.908750000 GHz

Ref 20 dBm Atten 30 dB

#Peak Log 10 dB/Offst 0.8 dB

Center 1.908 750 GHz Span 5 MHz

Res BW 47 kHz VBW 470 kHz Sweep 2.12 ms (601 pts)

Occupied Bandwidth 270.9131 kHz

Occ BW % Pwr 99.00 %

x dB -26.00 dB

Transmit Freq Error 1.167 kHz

x dB Bandwidth 371.606 kHz

File Operation Status, A:\SCREEN770.GIF file saved

Freq/Channel

Center Freq 1.90875000 GHz

Start Freq 1.90625000 GHz

Stop Freq 1.91125000 GHz

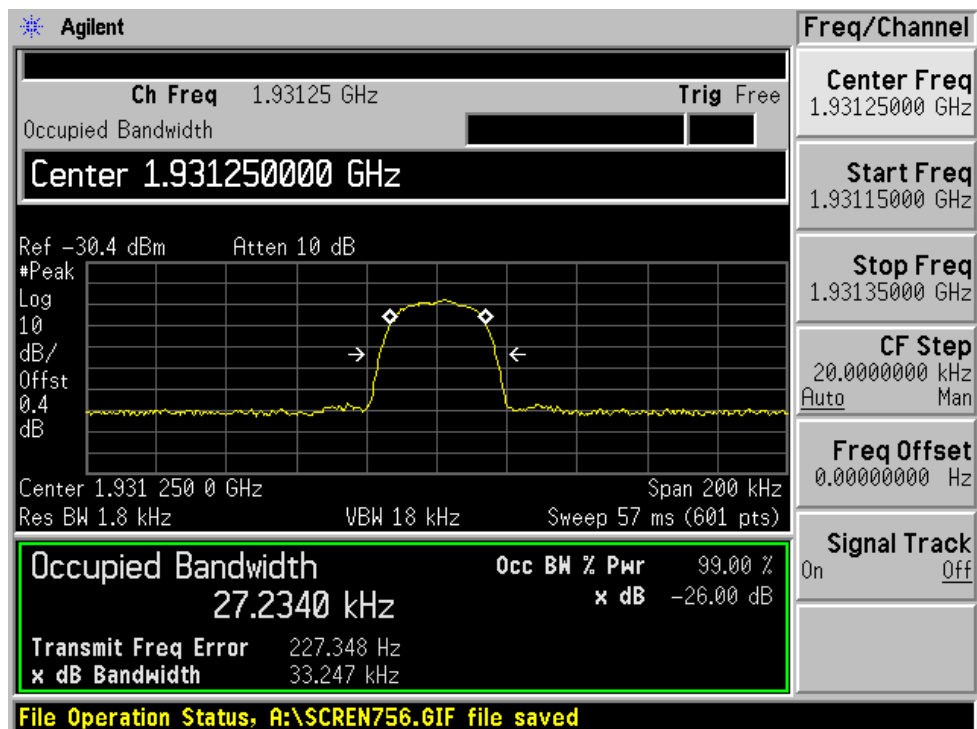
CF Step 500.000000 kHz

Freq Offset 0.00000000 Hz

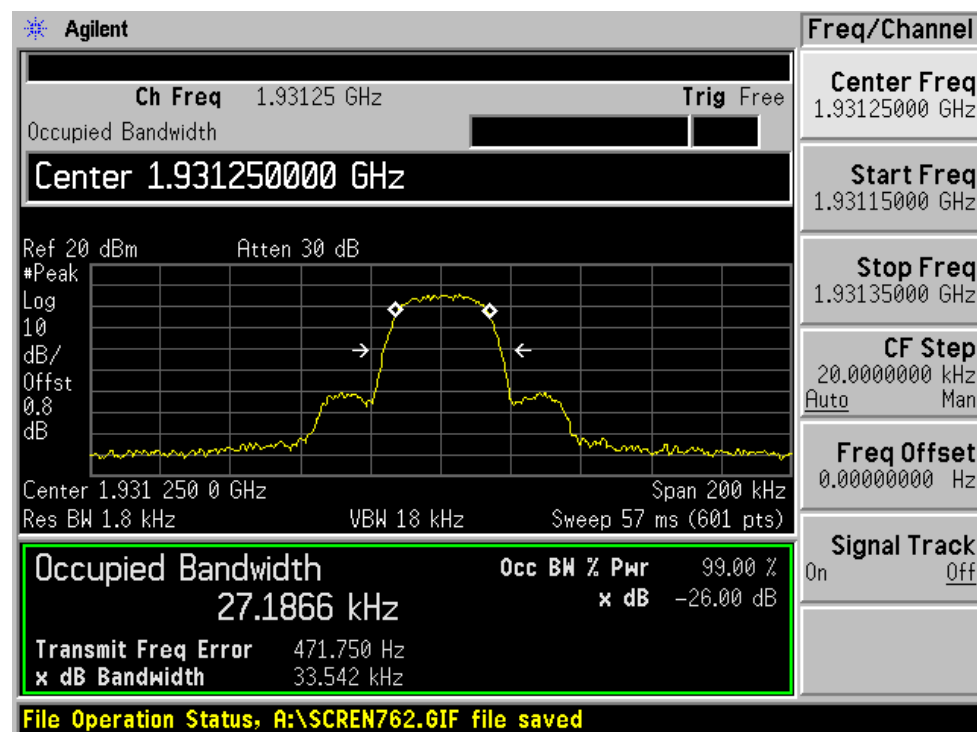
Signal Track On Off

**TDMA
Forward (Downlink)**

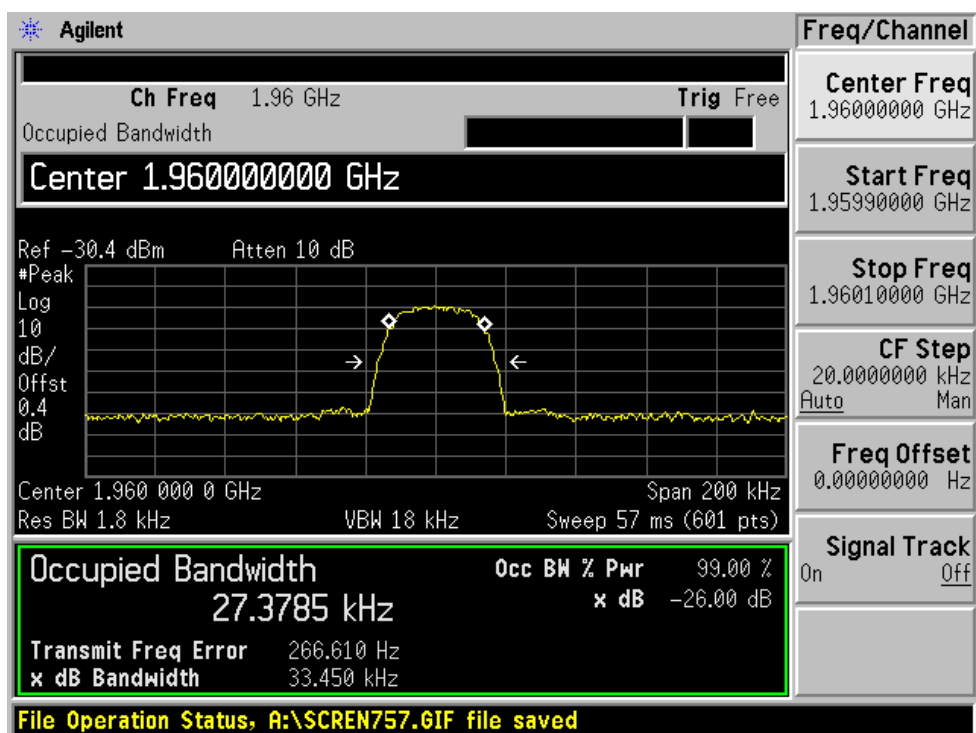
Input: Low Channel



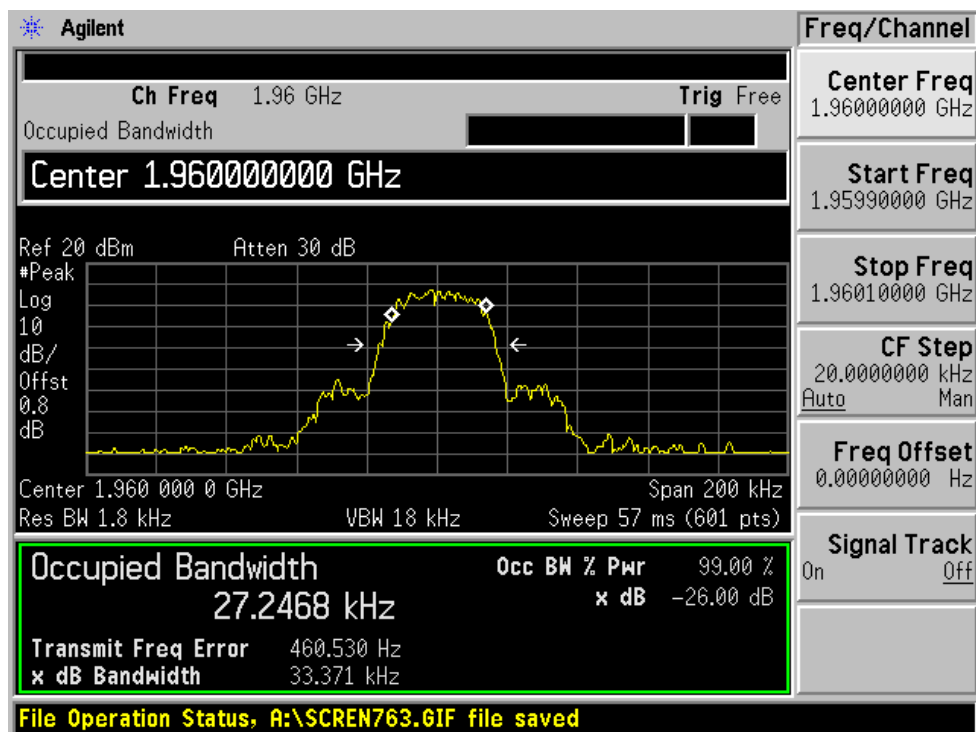
Output



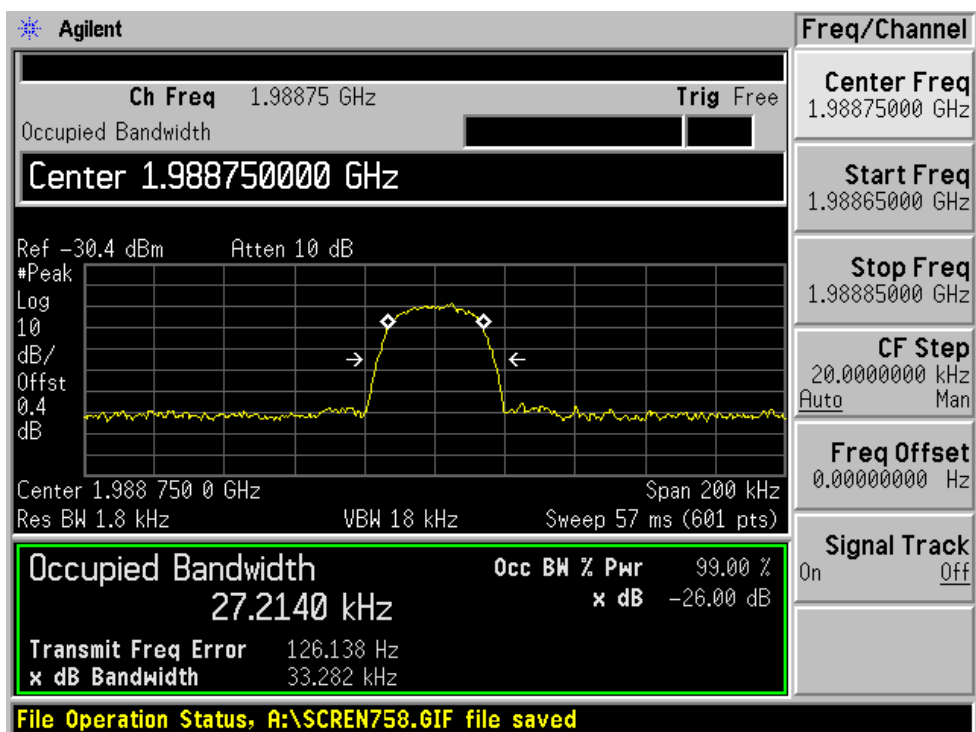
Input : Mid Channel



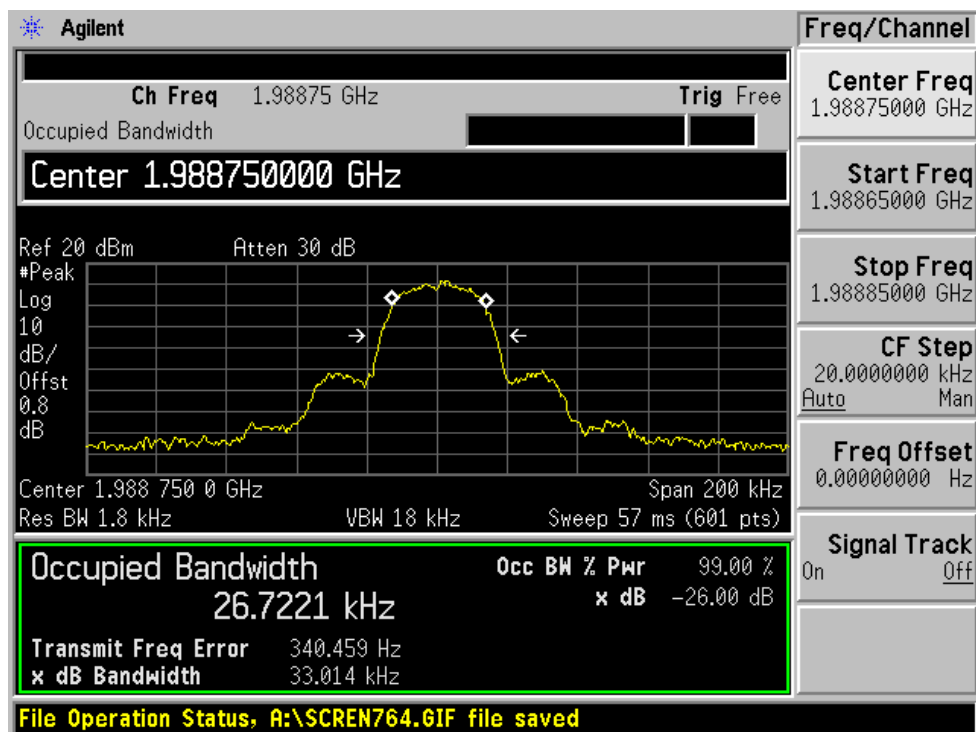
Output



Input: High Channel

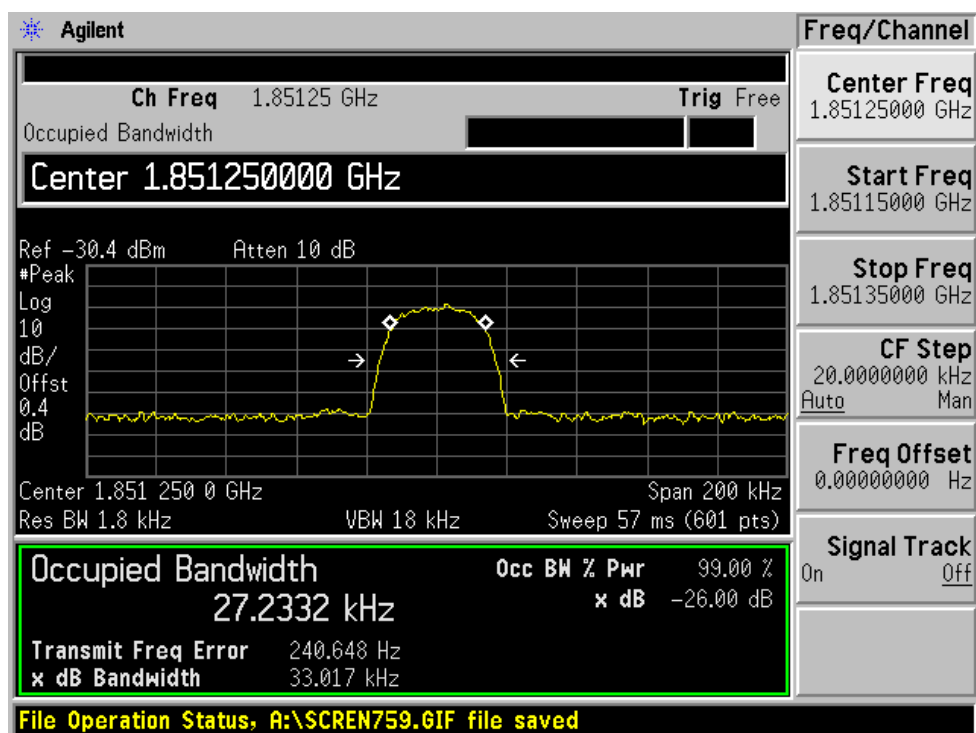


Output

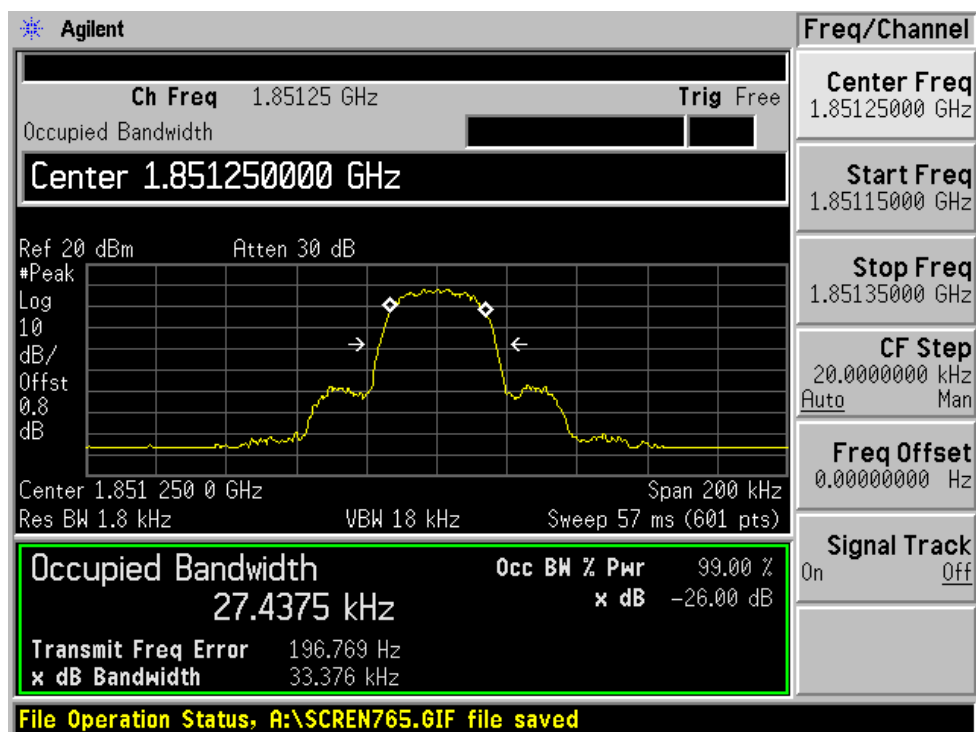


**TDMA
Reverse (Uplink)**

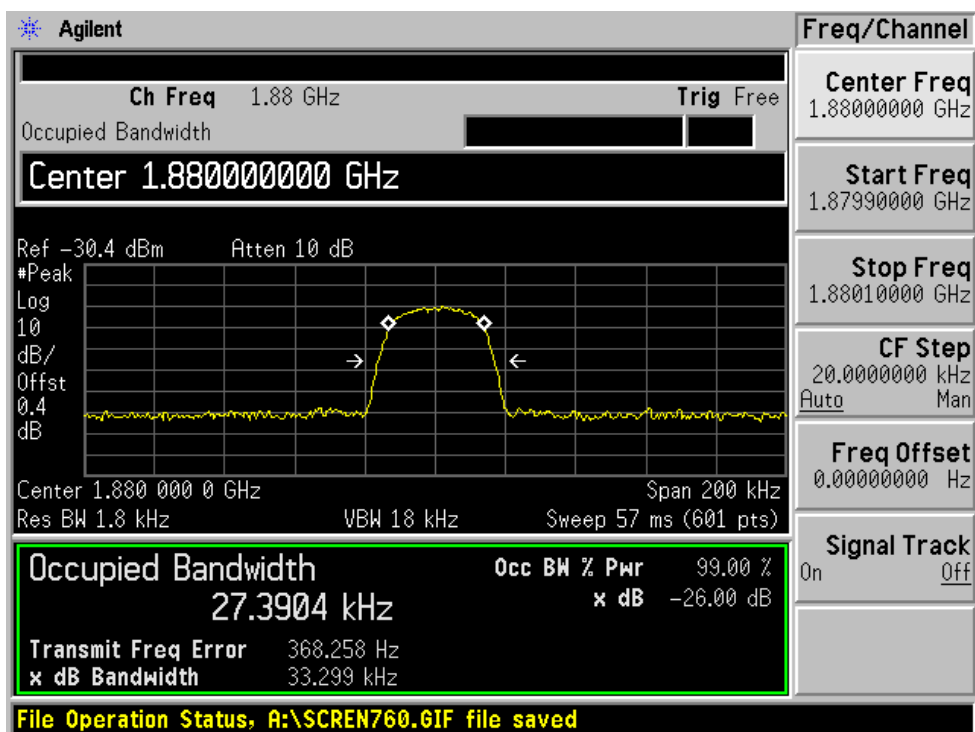
Input : Low Channel



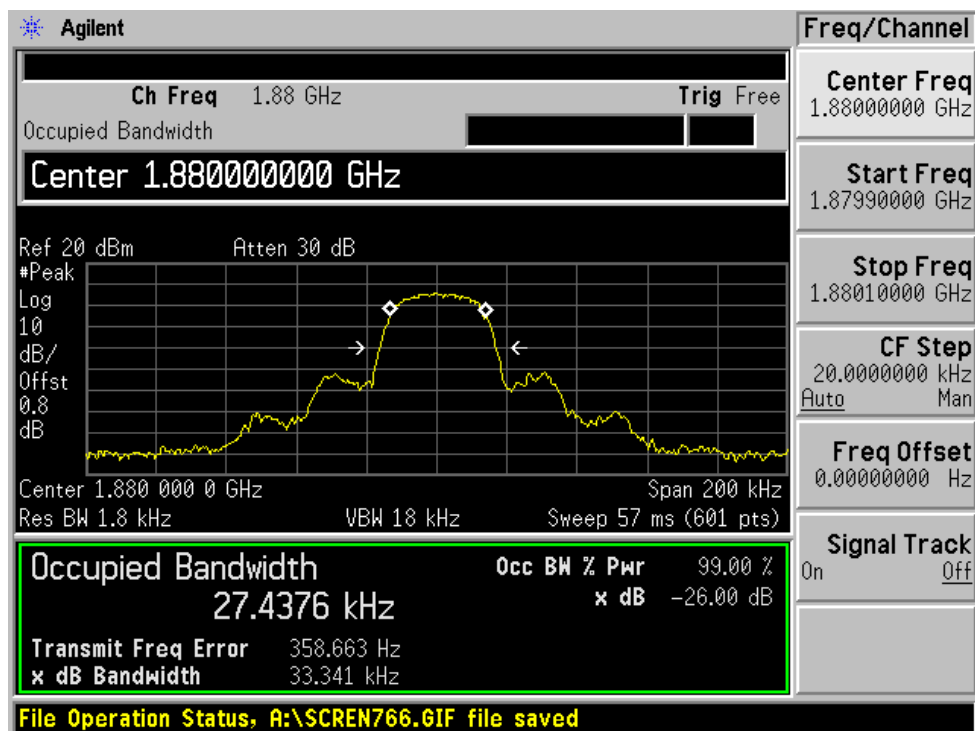
Output



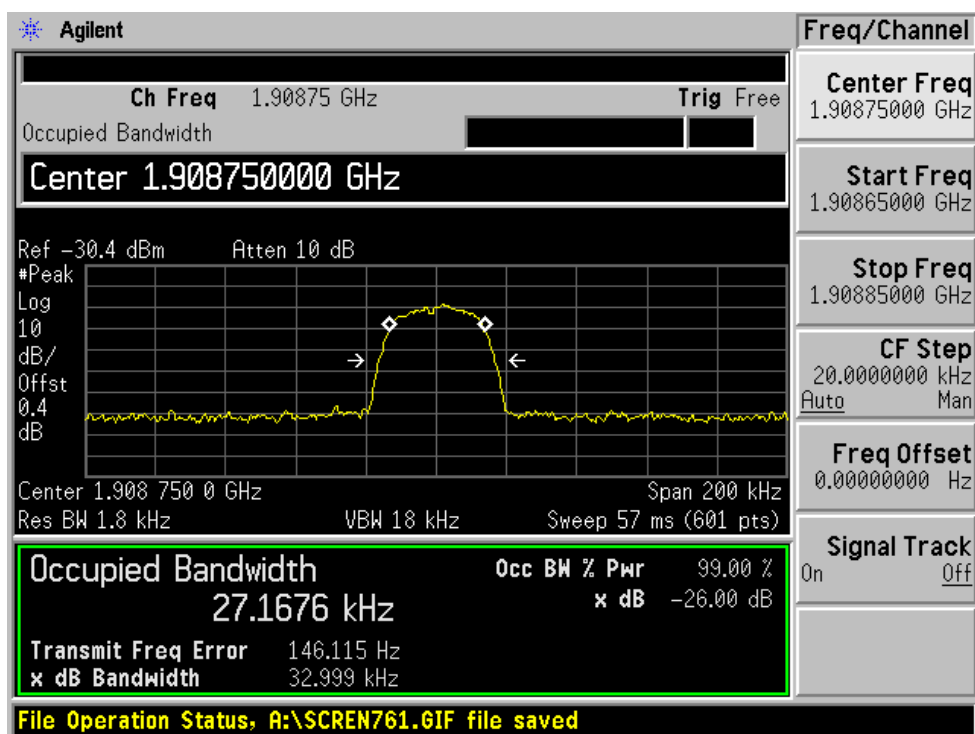
Input: Mid Channel



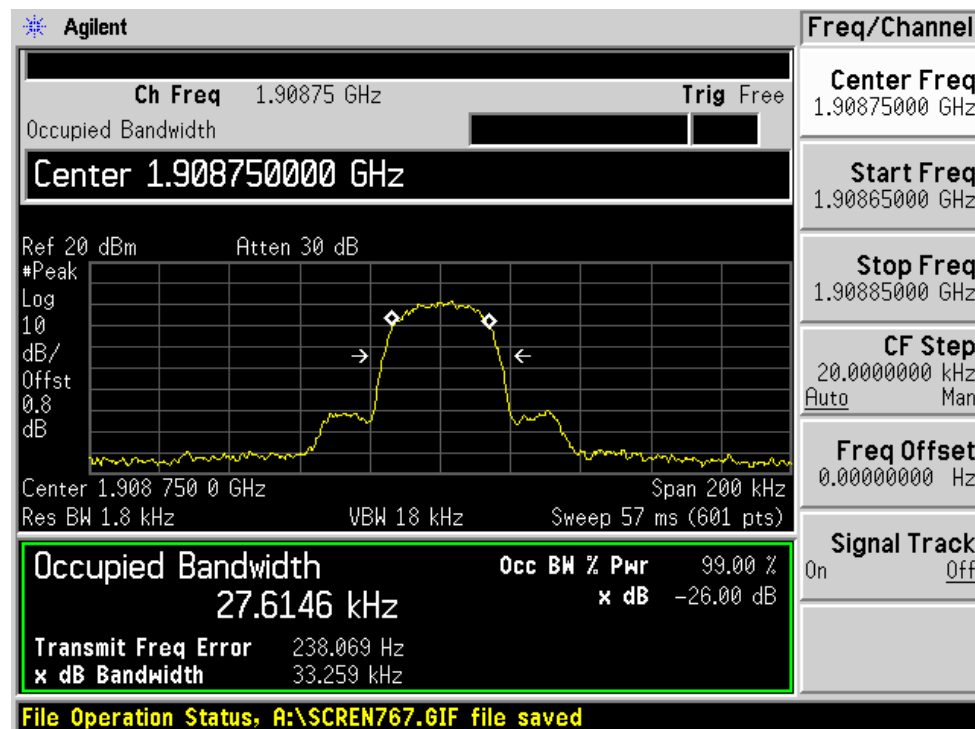
Output



Input: High Channel



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:	37%
ATM Pressure:	1020 mbar

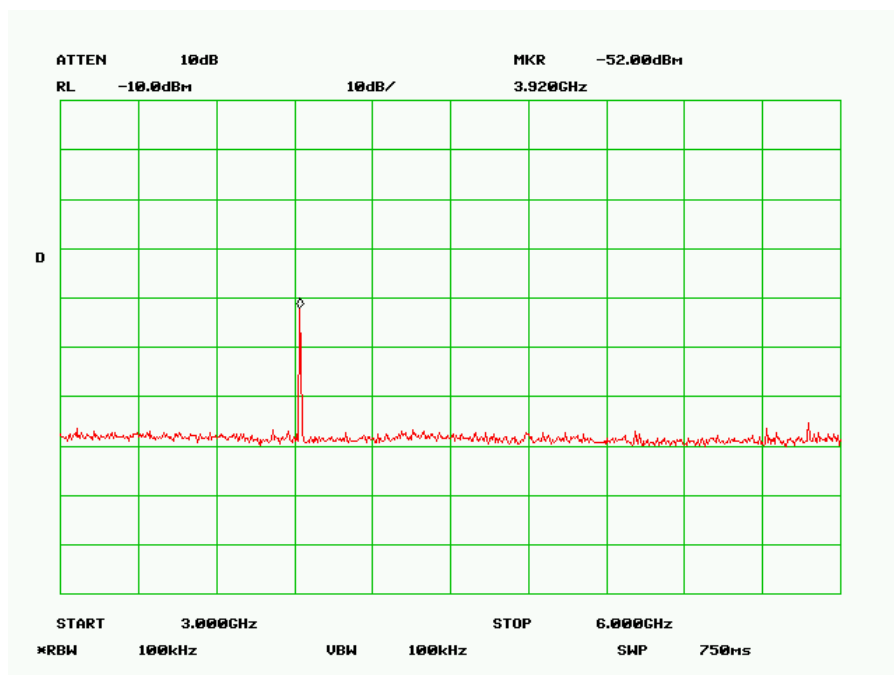
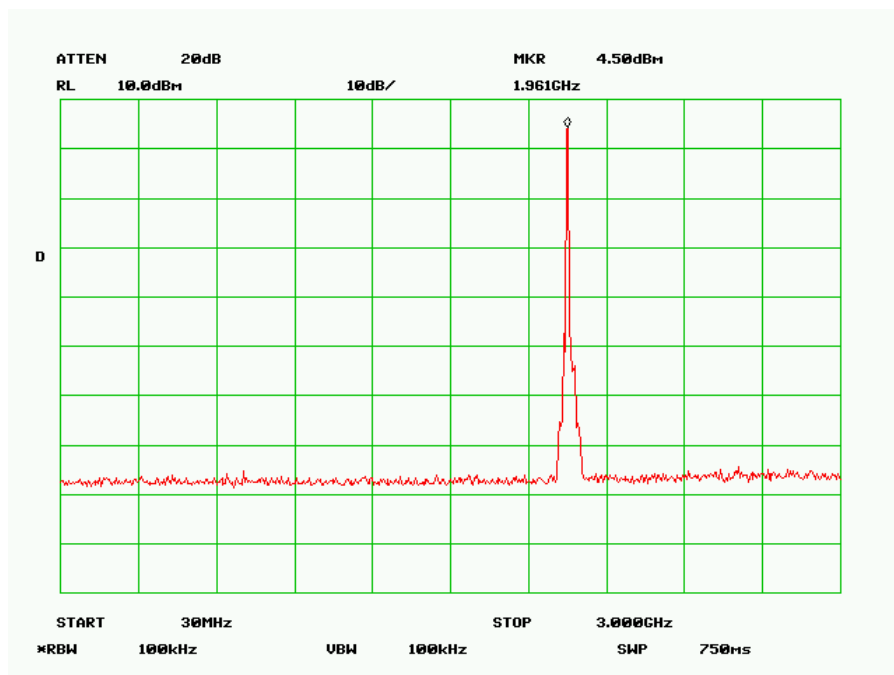
** The testing was performed by Oscar Au on 2006-09-30.*

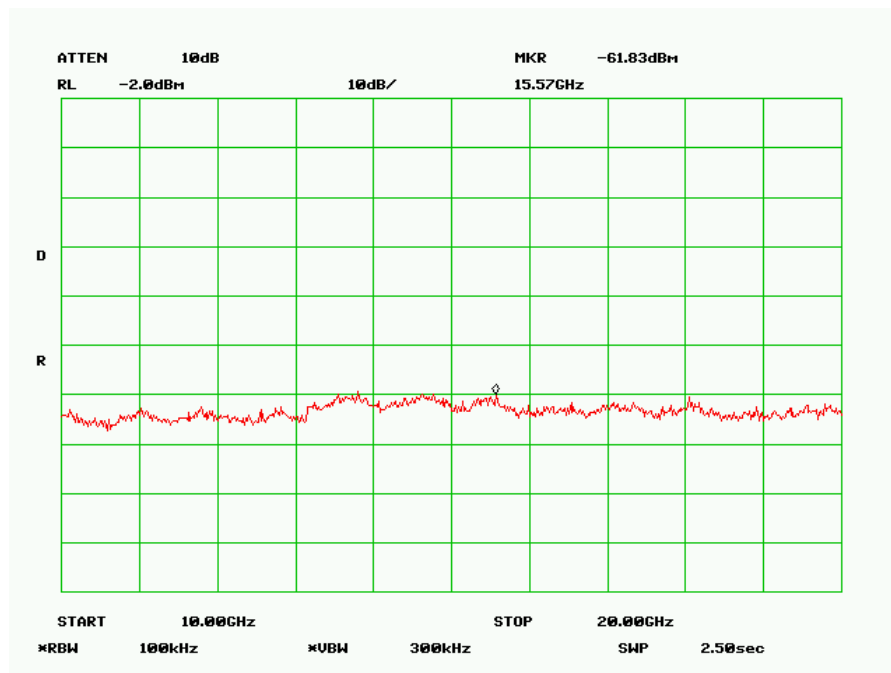
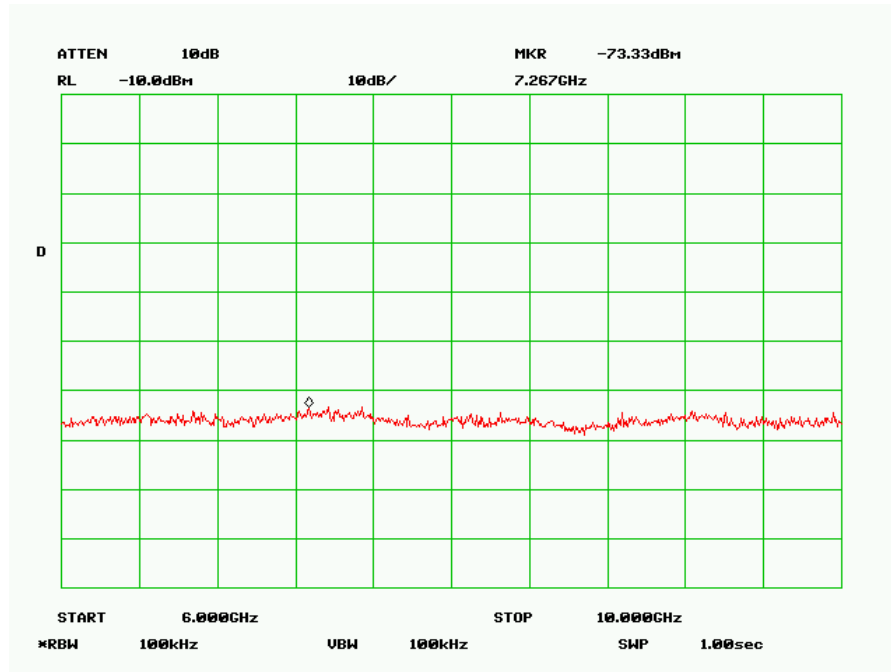
Test Results:

Pass, Please refer to the hereinafter plots.

Forward (Downlink)

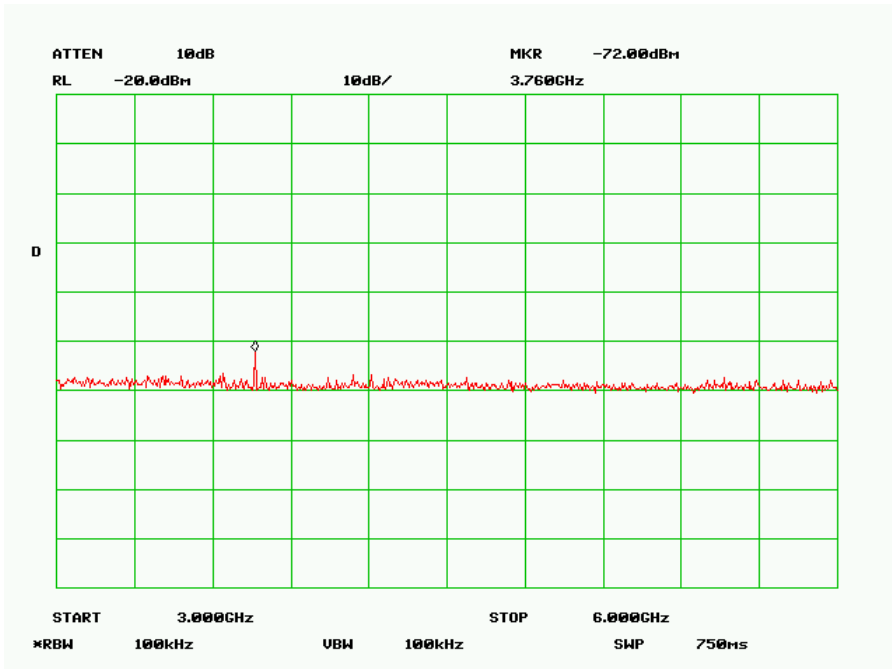
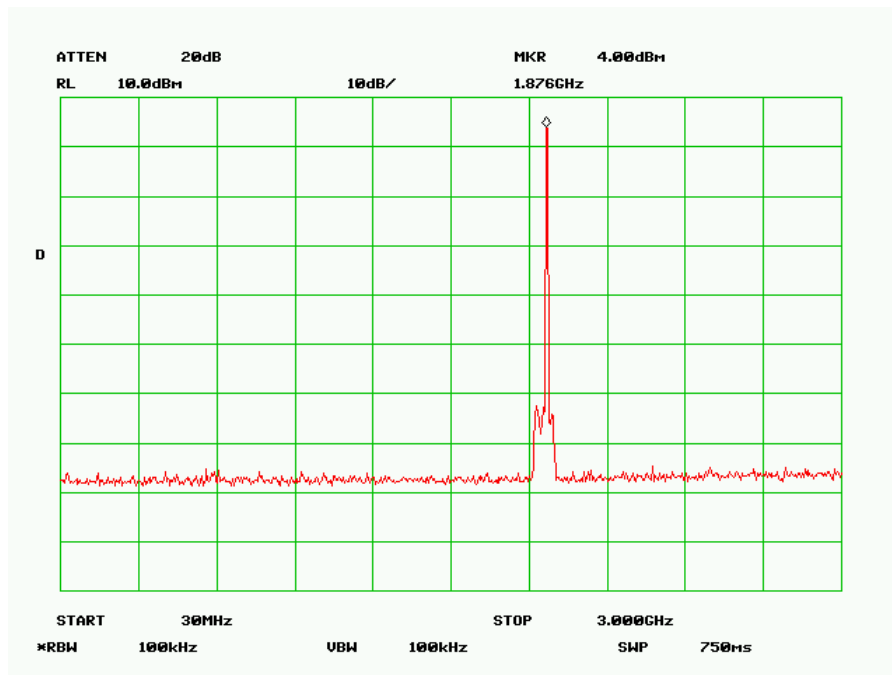
Mid Channel

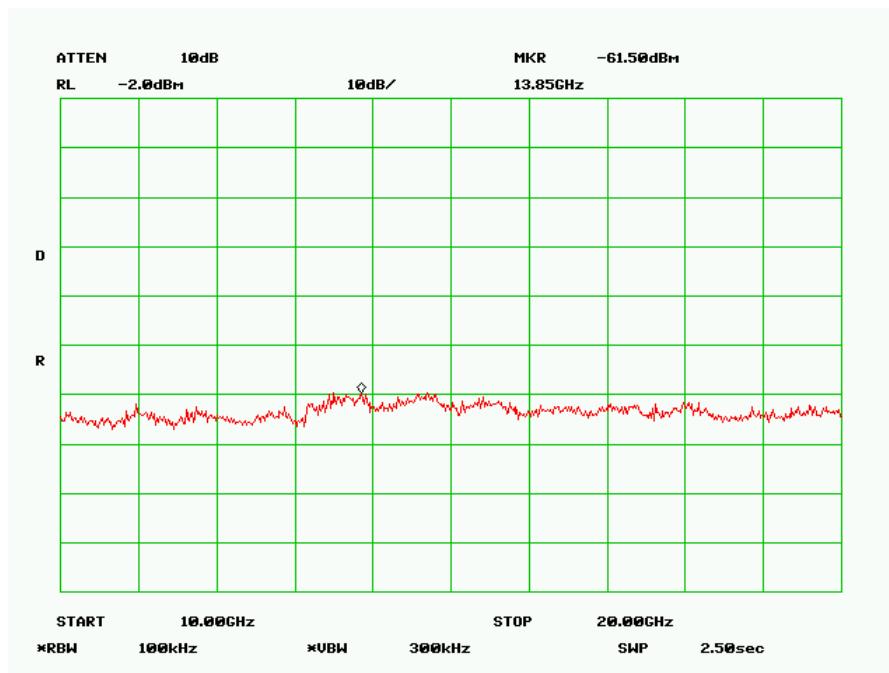
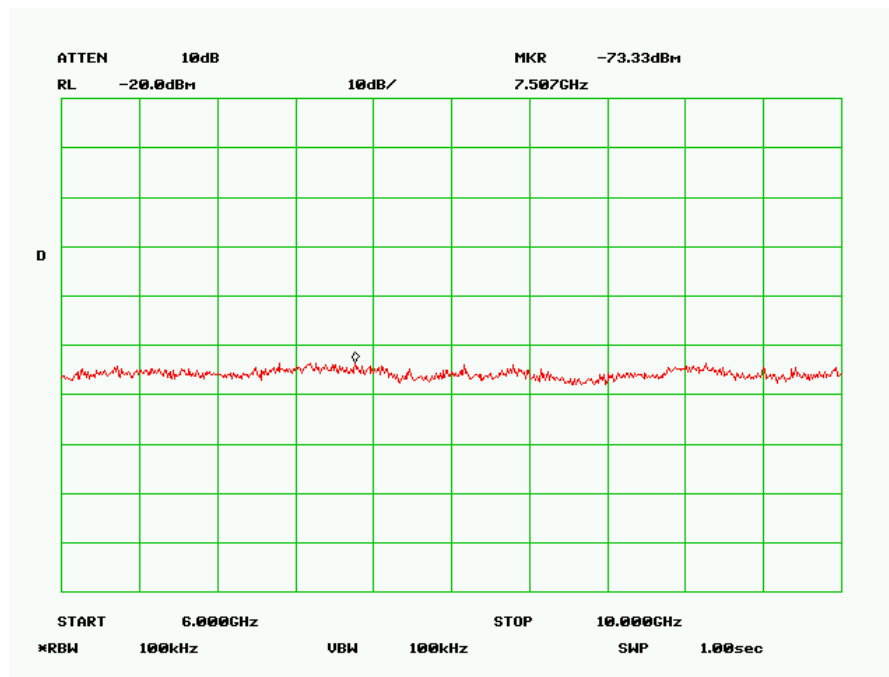




Reverse (Uplink)

Mid Channel





§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 = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{ Log}_{10} (\text{power out in Watts})$

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	2005-08-15
HP	Amplifier, Pre	8447D	2944A10187	2005-08-25
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 Gain Correction	Cable Loss dB	Absolute Level dBm	Limit dBm	Margin dB
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm					
3920	40.1	270	2.1	v	3920	-65.2	11.5	1.9	-55.6	-13	-42.6
3920	38.7	60	1.8	h	3920	-63.4	11.5	1.9	-53.8	-13	-40.8

Reverse (Up Link) - Patch Antenna

Gain = 5 dBi

Carrier frequency 1880.00 MHz

Indicated		Table	Test Antenna		Substituted		Antenna Gain Correction	Cable Loss dB	Absolute Level dBm	Limit dBm	Margin dB
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm					
3760	50.5	150	1.4	v	3760	-55.4	11.5	1.9	-45.8	-13	-32.8
3760	45.2	40	1.3	h	3760	-60.3	11.5	1.9	-50.7	-13	-37.7

§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:	23° C
Relative Humidity:	37%
ATM Pressure:	1020 mbar

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

Test Results

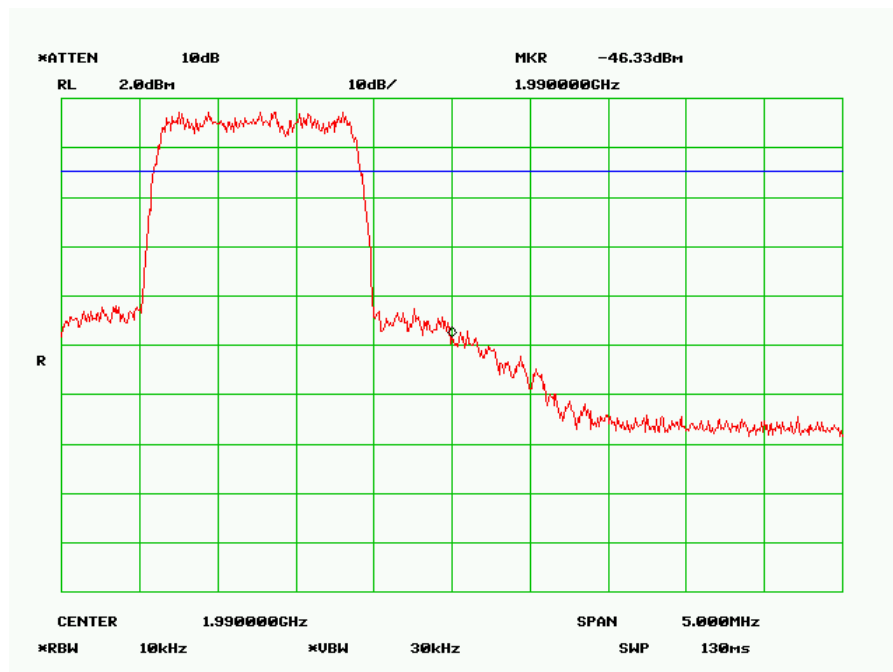
Please refer to plots hereinafter.

Forward (Downlink)

Lowest Channel:

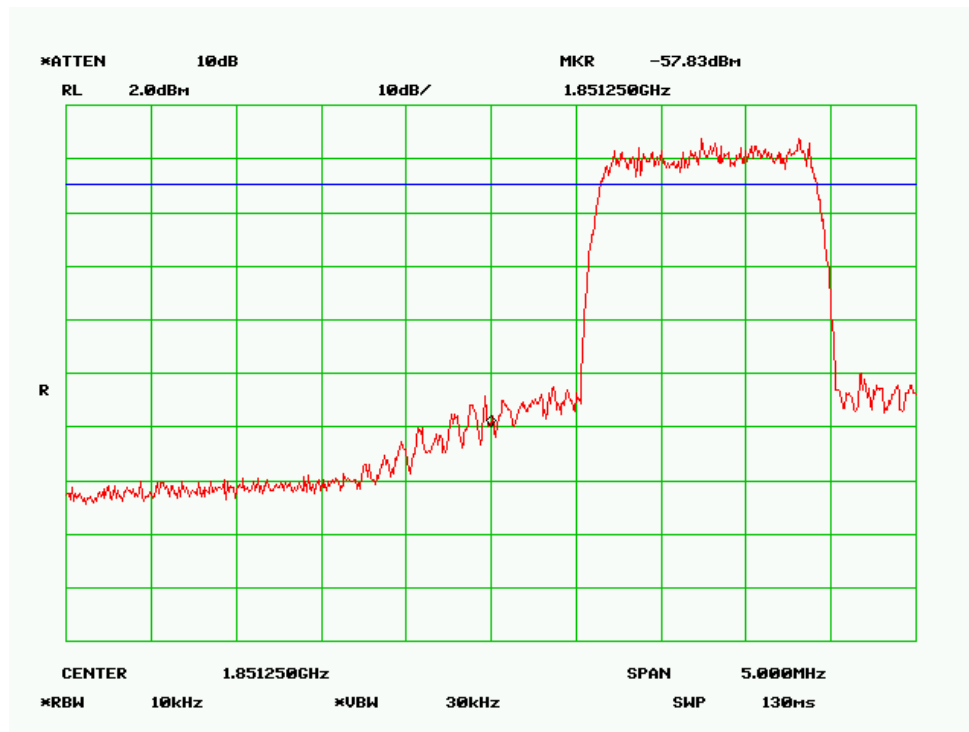


Highest Channel:

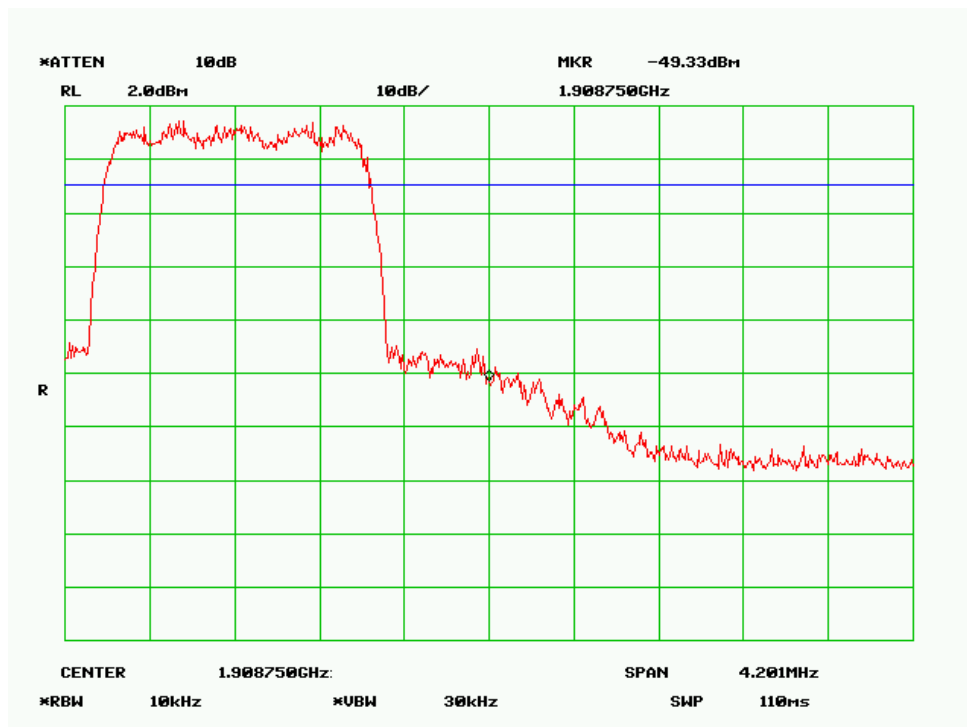


Reverse (Uplink)

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

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

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	1959.99875	1251	0.64	2.5
7.5	40	1960	1959.99866	1340	0.68	2.5
7.5	30	1960	1960.00105	1050	0.54	2.5
7.5	20	1960	1960.00046	458	0.23	2.5
7.5	10	1960	1959.99935	651	0.33	2.5
7.5	0	1960	1959.99934	660	0.34	2.5
7.5	-10	1960	1960.00081	809	0.41	2.5
7.5	-20	1960	1959.99911	890	0.45	2.5
7.5	-30	1960	1960.00111	1105	0.56	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	1879.99885	1153	0.61	2.5
7.5	40	1880	1880.0012	1202	0.64	2.5
7.5	30	1880	1879.99916	845	0.45	2.5
7.5	20	1880	1879.99965	350	0.19	2.5
7.5	10	1880	1880.00026	256	0.14	2.5
7.5	0	1880	1880.00041	405	0.22	2.5
7.5	-10	1880	1879.99924	756	0.40	2.5
7.5	-20	1880	1879.99899	1011	0.54	2.5
7.5	-30	1880	1880.00121	1210	0.64	2.5

Reference Frequency:1960 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	Environment Temperature (°C)	Measured Frequency (MHz)	PPM Error
6.0	20	1960.00207	1.05

Reference Frequency: 1880 MHz, Limit: 2.5ppm			
Power Supplied (VDC)	Environment Temperature (°C)	Measured Frequency (MHz)	PPM Error
6.0	20	1879.99785	-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 $43 + 10\log(P)$, 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 sent 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 2006-09-30.

Test Results

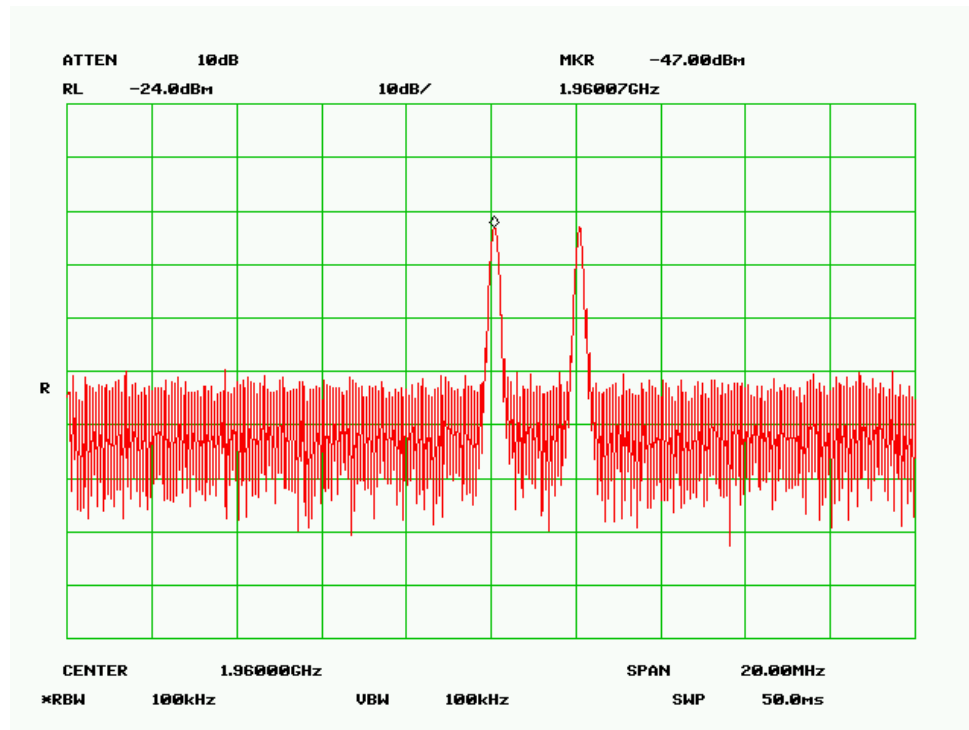
Mode	Channel	Measured
Uplink	Mid	< -13dBm
Downlink	Mid	< -13dBm

Plots of Two-Tone Test Result

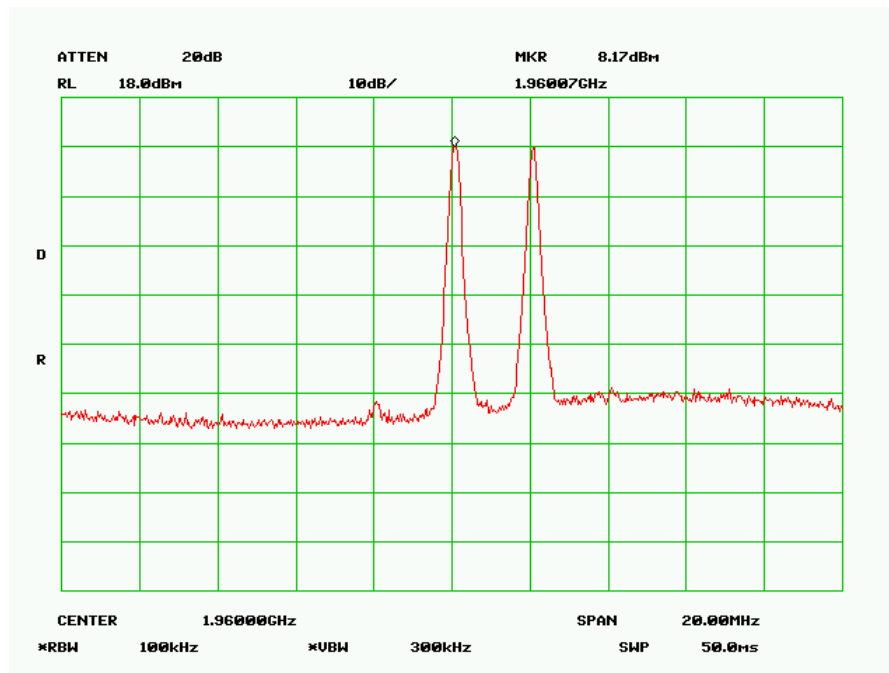
Please refer to plots hereinafter.

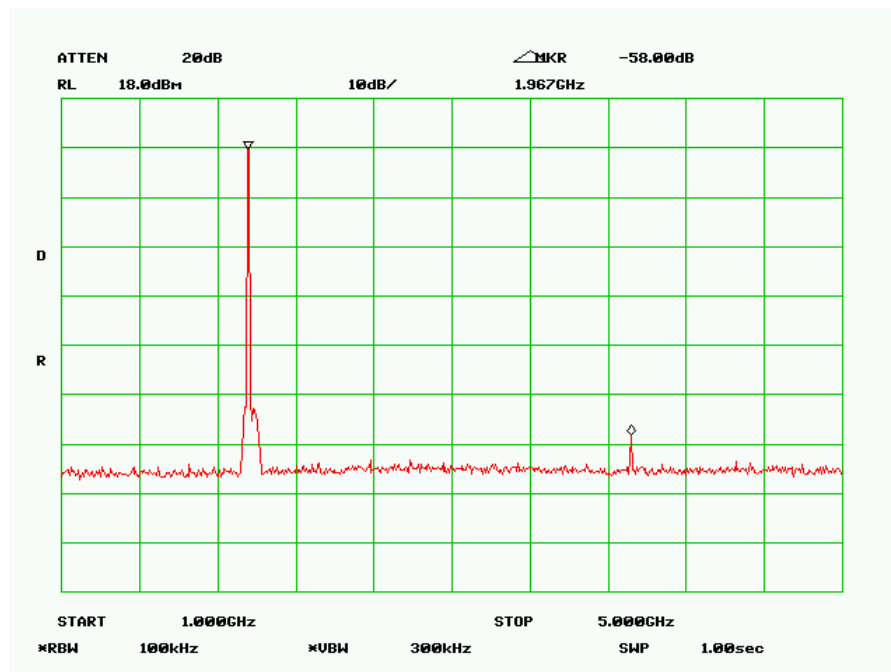
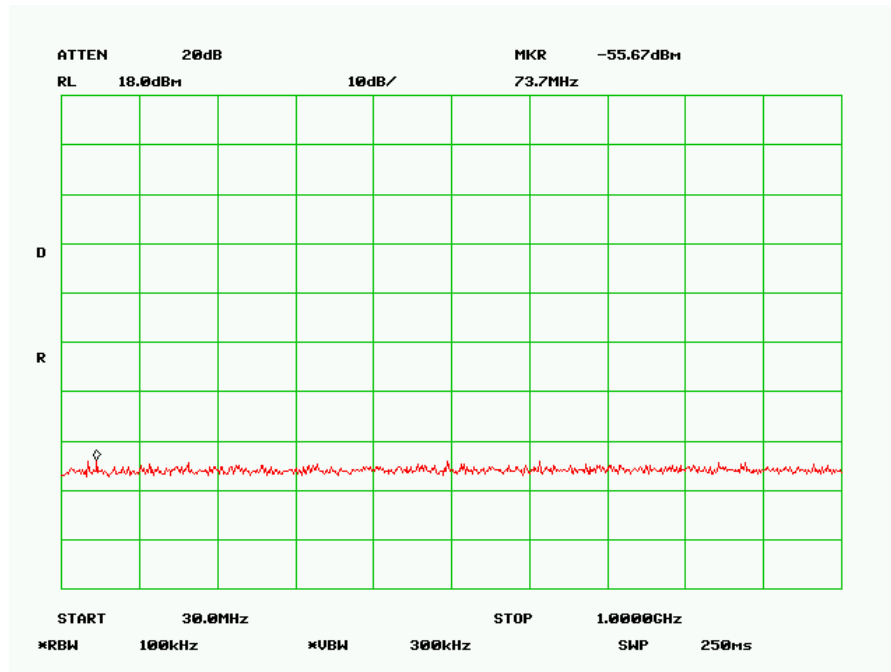
Forward (Uplink)

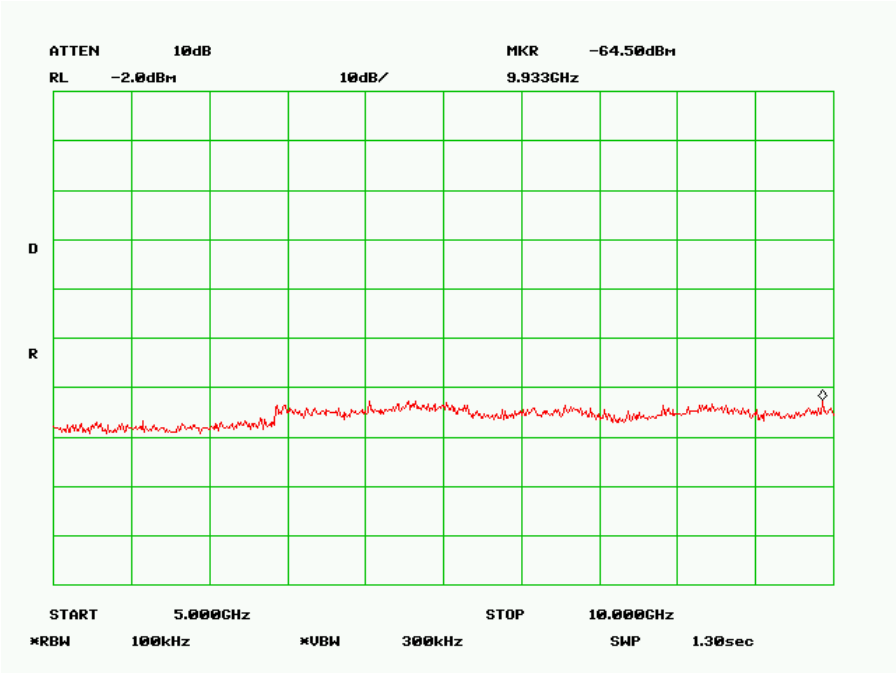
Input

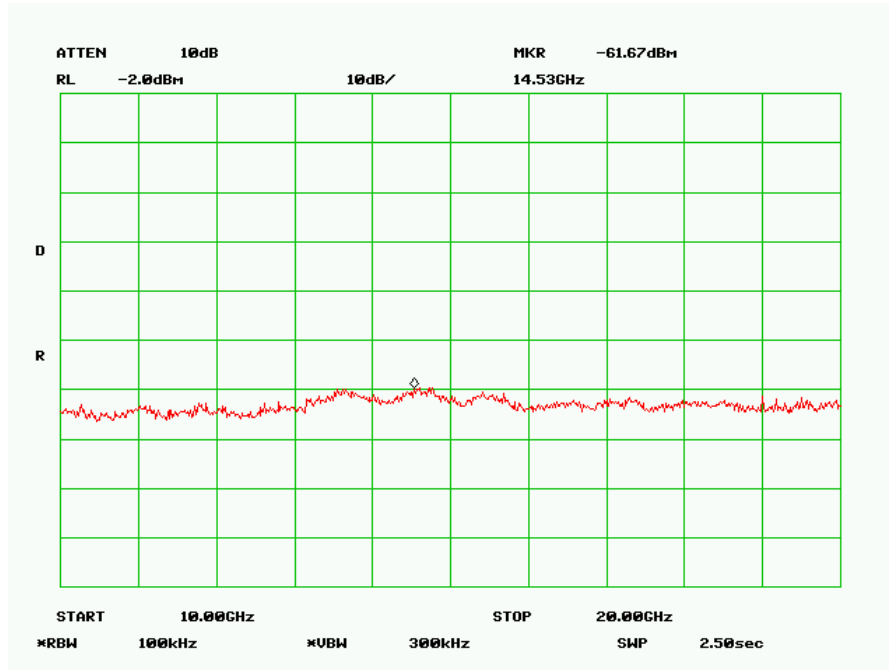


Output



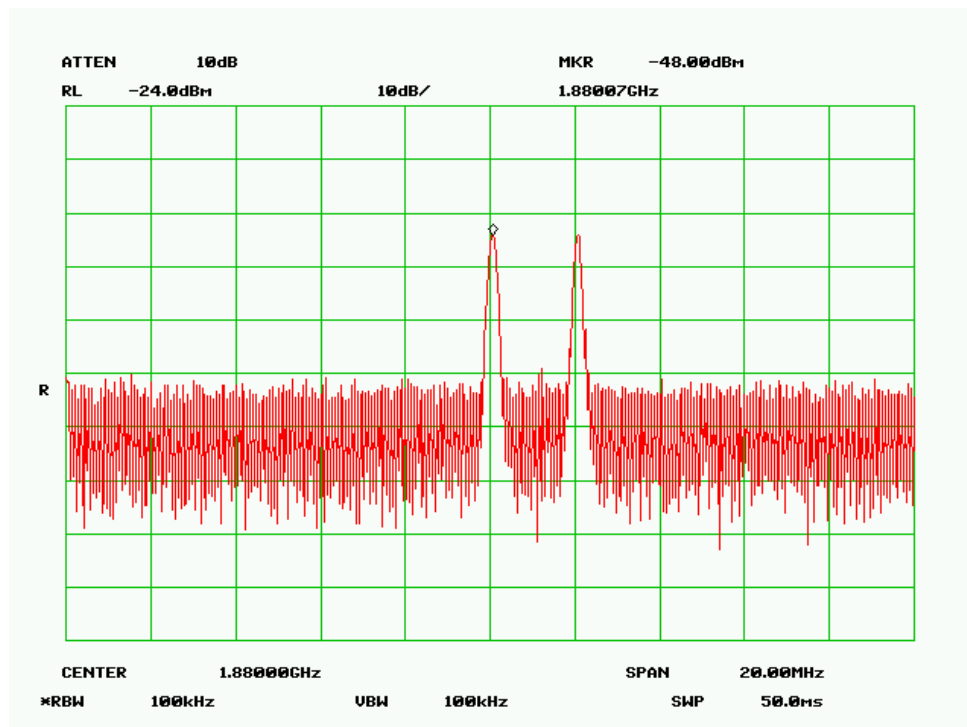






Reverse (Downlink)

Input



Output

