Lab Code: 200167-0

FCC PART 90
TEST AND MEASUREMENT REPORT

For

ADC Telecommunications Inc.

P.O. Box 1101, Minneapolis, MN 55440, USA

FCC ID: NOO-S2785-011

Report Type:	**Product Type:**
Original Report	800/900 SRAU

Test Engineer:	Dennis Huang
Report Number:	R1005032-90
Report Date:	2010-06-07
Reviewed By:	Victor Zhang Test Engineer, RF Lead
Prepared By: **(84)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1005032-90	Original Report	2010-06-07

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *ADC Telecommunications, Inc.* FCC ID: *NOO-S2785-011*, Model: *SPT-S1-8090-1* 800/900 Secondary RAU or the "EUT" as referred to in this report is a wireless network systems operate at 800 MHz and 900 MHz Band. It is a flexible multi-operator/multi-protocol single platform system supporting up to 8 Radio Frequency (RF) bands. The Master RAU communicates with a Host Unit, an Expansion Unit (comprised of a DART Remote Module (DRU), IF Expansion Module (IFEU), and Power Supply. The RAU is intended to be installed above a false ceiling in an environmentally controlled office.

1.2 Mechanical Description

(SRAU) measures approximately 211 mm **(L)** x 272 mm **(W)** x 76 mm **(H)**, and weighs approximately 3.4 kg.

**The test data gathered are from production sample, serial number: RAU2 (SRAU), provided by the manufacturer.*

1.3 Objective

This type approval report is prepared on behalf of *ADC Telecommunications, Inc.* in accordance with Part 2 Subpart J, and Part 90 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 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 90 Private Land Mobile Radio Services

Applicable Standards: TIA EIA 98-C, TIA/EIA-603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from +2.0 dB for Conducted Emissions tests and +4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have 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 radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. 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

2 SYSTEM TEST CONFIGURATION

2.1 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.

2.2 EUT Exercise Software

N/A, signal was sent through EUT using a signal generator, device was set to normal operating mode.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Support Equipment List

Manufacturer	Description	Model	Serial Number
MRAU	Master RAU	-	Unit 9
URH	Host	-	System4
DRH	Host	-	System4
Unipower Corporation	AC/DC Power Supply	RPXP48122-Z	26097N0062
IFEU	IF Expansion Module	-	S/N7

2.5 Local Support Equipment and Software List and Details

Manufacturer	Description	Model	Serial Number
Agilent	MXG Vector Signal Generator	N5182A	MY47420502
Agilent	Signal Generator	8648C	4108A05591

2.6 Internal Configurations of EUT

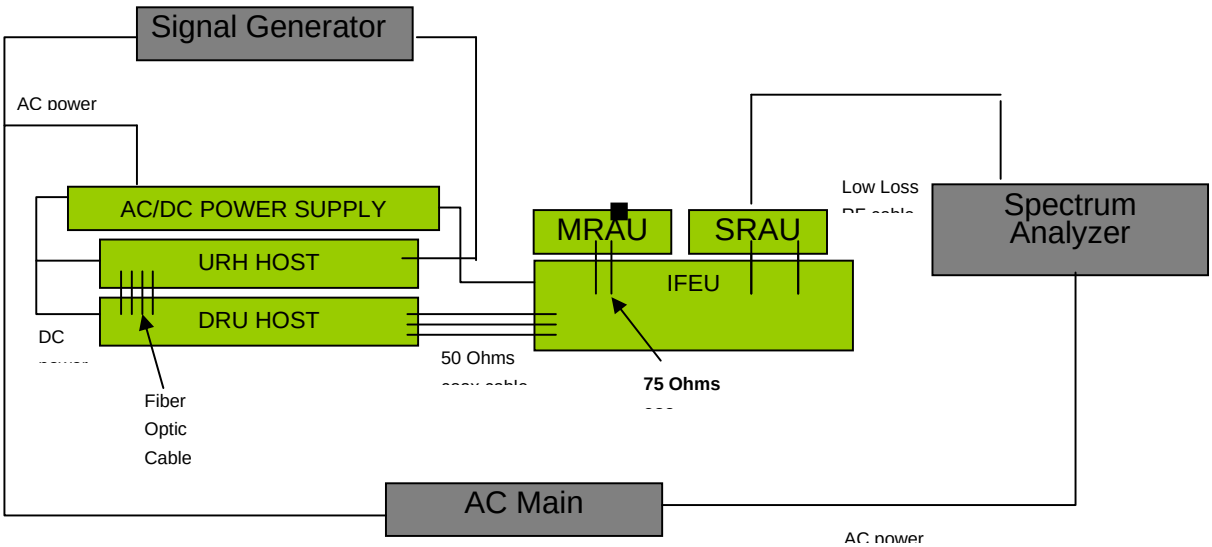
Manufacturer	Description	Model	Serial Number
ADC Telecommunication	SRAU RF 800 PCB Board	-	722768-0-A
ADC Telecommunication	SRAU RF 900 PCB Board	712767-0 REV2	722767-0-A
ADC Telecommunication	SRAU IF PCB Board	712751-0 REV2	R0939M0068NC

2.7 Interface Ports and Cables

Cable Description	Length (m)	To	From
Shielded Cable (Duplex Fiber Optic)	3	Host Unit	DRU (Dart Remote Unit)
75 Ohm Coax Cable	3	IF Expansion Unit (IFEU)	SRAU
75 Ohm Coax Cable	50 x 2	IF Expansion Unit (IFEU)	MRAU
50 ohm CATV cable	< 1	DRU	IF Expansion Unit
RF Cable	< 1	Main Hub/RAU	Spectrum Analyzer
RF Cable	< 1	Main Hub/RAU	Signal Generator

2.8 Test Setup Block Diagram

Bench Testing



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Tests	Results
§2.1046; §90.205	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	N/A[1]
§2.1049; §2.209	Occupied Bandwidth	Compliant
§2.1049; §90.210	Emission Mask	N/A[1]
§2.1051 §90.210; §90.669	Spurious Emissions at Antenna Terminals	Compliant
§2.1053; §90.210	Field Strength of Spurious Radiation	Compliant
§2.1055; §90.213	Frequency Stability	Compliant
§2.1091	RF Exposure	Compliant

Note[1]: Not Applicable

4 FCC §2.1046 & §90.205 – RF OUTPUT POWER

4.1 Applicable Standard

FCC §2.1046 and §90.205.

4.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the signal generator and the spectrum analyzer through sufficient attenuation.

4.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-06-29
Agilent	MXG Vector Signal Generator	E4438C	MY45092925	2009-08-13

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

4.4 Test Environmental Conditions

Temperature:	21-22°C
Relative Humidity:	46-50 %
ATM Pressure:	80-99kPa

The testing was performed by Dennis Huang on 2010-05-04 at RF Site.

4.5 Test Results

RF Output Power with Modulation, Single Channel Input:

Frequency Band (MHz)	Test Frequency (MHz)	Modulation Type	RF Output Power (dBm)	RF Output Power (mW)
800	851	IDEN	14.97	31.405
	860	IDEN	14.89	30.831
	869	IDEN	14.89	30.831
900	935	IDEN	14.98	31.477
	937.5	IDEN	14.90	30.902
	940	IDEN	14.93	31.117
800	851	CQPSK	15.00	31.622
	860	CQPSK	14.89	30.831
	869	CQPSK	15.00	31.622
900	935	CQPSK	14.89	30.831
	937.5	CQPSK	14.99	31.550
	940	CQPSK	14.94	31.188
800	851	C4FM (P25)	14.97	31.405
	860	C4FM (P25)	14.94	31.188
	869	C4FM (P25)	14.99	31.550
900	935	C4FM (P25)	14.95	31.260
	937.5	C4FM (P25)	15	31.622
	940	C4FM (P25)	14.92	31.045

5 FCC §2.1047 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC §2.1047(d) and Part 90, the EUT is an amplifier and there is no modulating/or limiting circuit, therefore modulation characteristic is not presented.

5.2 Test Result

N/A

6 FCC §2.1049 & §2.209 – OCCUPIED BANDWIDTH

6.1 Applicable Standard

Requirements: FCC §2.1049, §90.209, §90.210

6.2 Test Procedure

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

According to the FCC 2-11-04/EAB/RF, Input and output signals were compared to verify that there was no any degradation to the signal due to amplification and conversion from the repeater using an RBW of 300 Hz or 1% of the emission bandwidth. Then the 20 dB & 99% bandwidth was recorded.

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-06-29
Agilent	MXG Vector Signal Generator	E4438C	MY45092925	2009-08-13

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

6.4 Test Environmental Conditions

Temperature:	21-22°C
Relative Humidity:	46-50 %
ATM Pressure:	80-99kPa

The testing was performed by Dennis Huang on 2010-05-04 at RF Site.

6.5 Test Results

800 MHz Band:

Modulation Type	Channel	Frequency (MHz)	Emission Bandwidth (kHz)
iDEN	Low	851	18.051
	Middle	860	18.057
	High	869	18.093
CQPSK	Low	851	5.573
	Middle	860	5.606
	High	869	5.573
C4FM (P25)	Low	851	9.628
	Middle	860	9.680
	High	869	10.057

900 MHz Band:

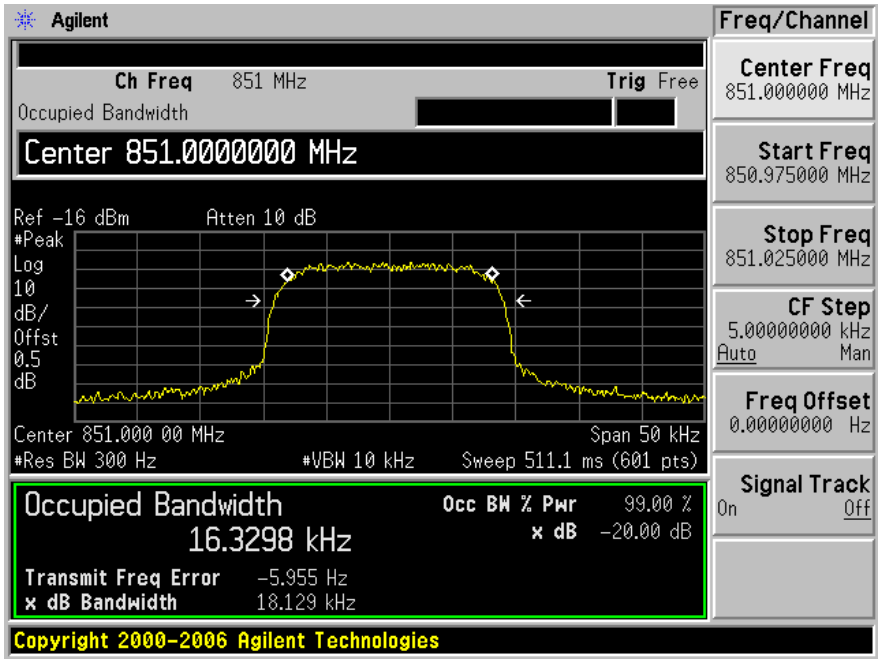
Modulation Type	Channel	Frequency (MHz)	Emission Bandwidth (kHz)
iDEN	Low	935	17.975
	Middle	937.5	18.344
	High	940	18.246
CQPSK	Low	935	5.576
	Middle	937.5	5.554
	High	940	5.587
C4FM (P25)	Low	935	9.625
	Middle	937.5	9.989
	High	940	9.668

Please refer to the following plots:

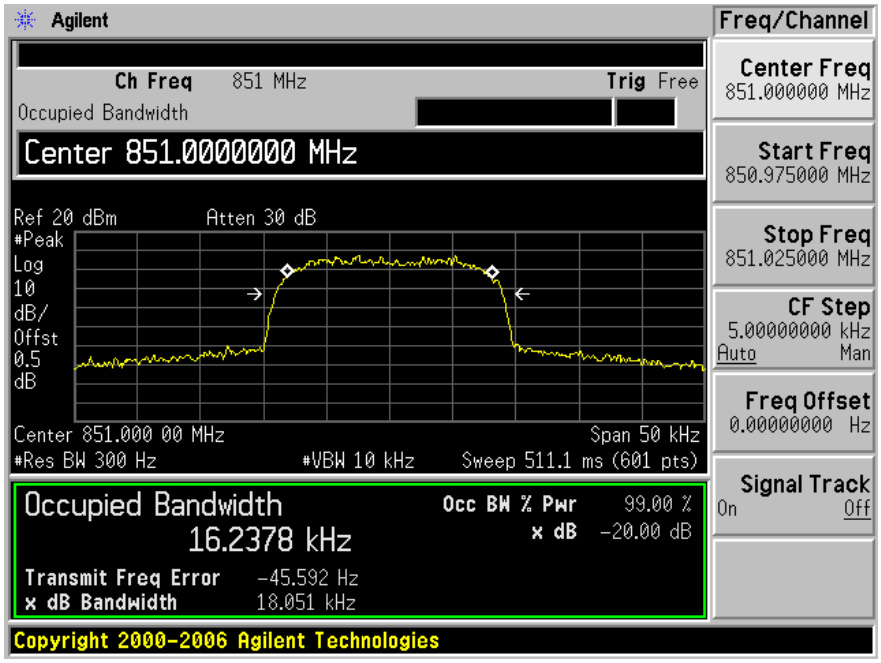
800 MHz Band

Low Channel: 851 MHz

Input (iDEN)

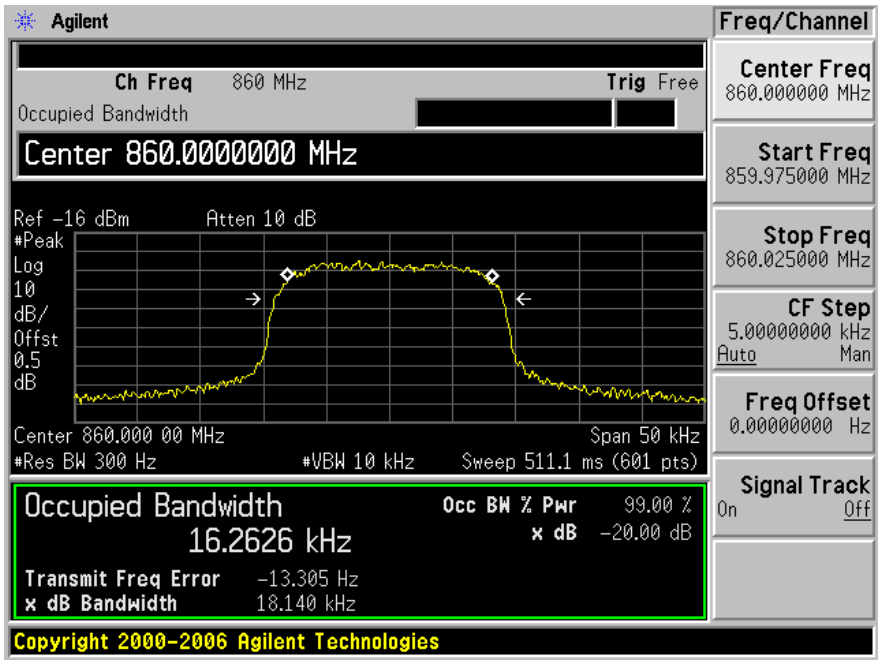


Output (iDEN)

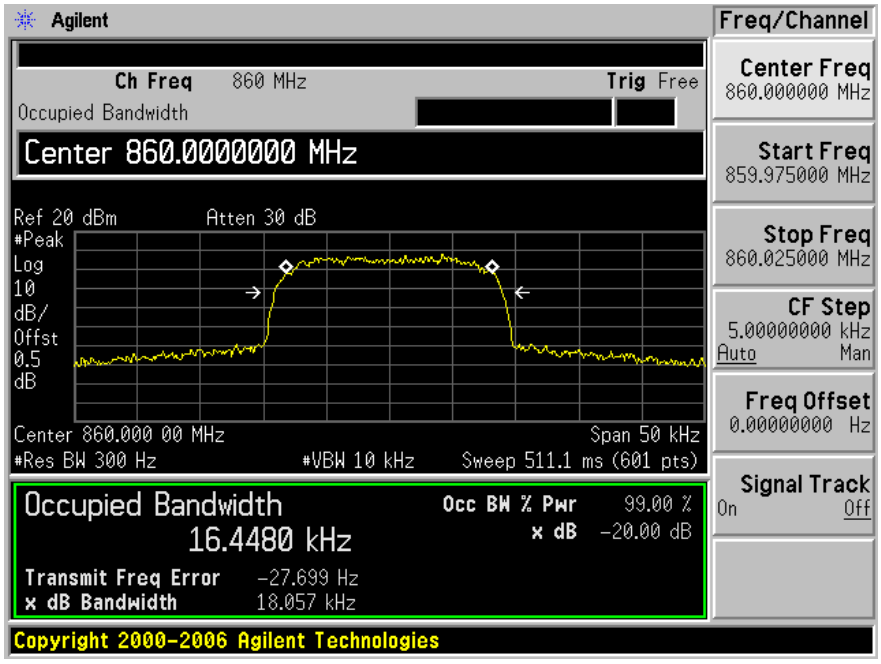


Middle Channel: 860 MHz

Input (iDEN)

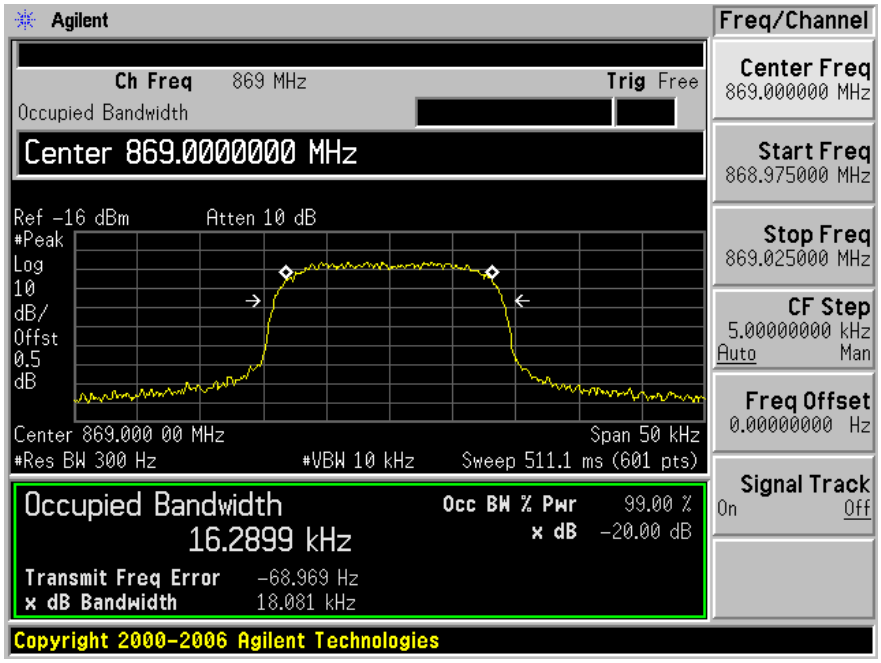


Output (iDEN)

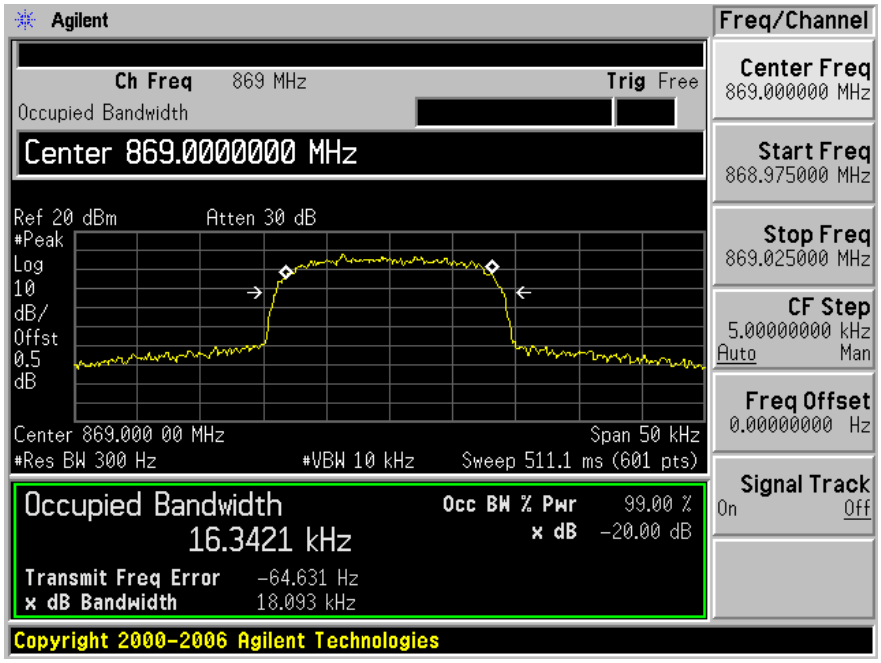


High Channel: 869 MHz

Input (iDEN)

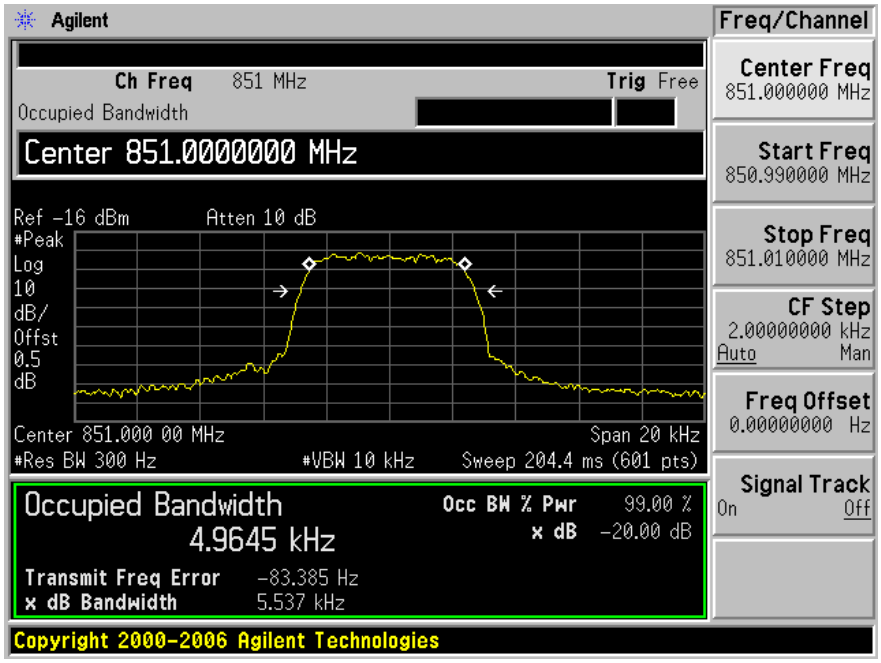


Output (iDEN)

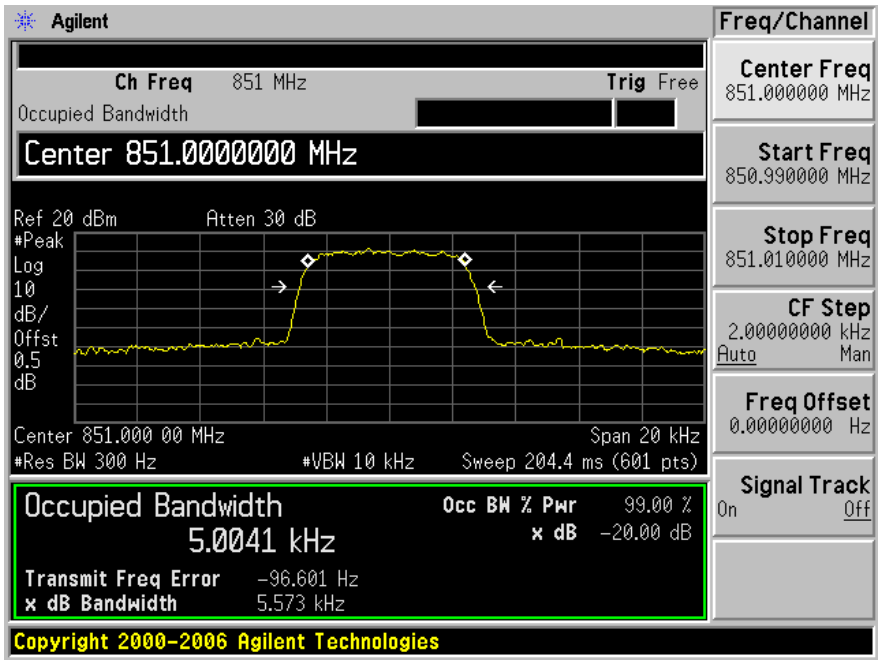


Low Channel: 851 MHz

Input (CQPSK)

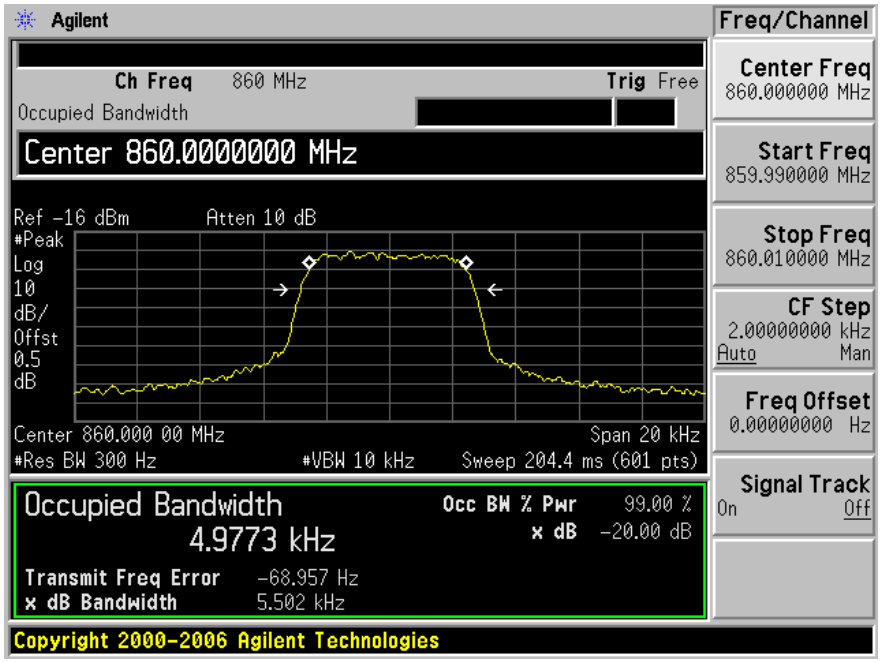


Output (CQPSK)

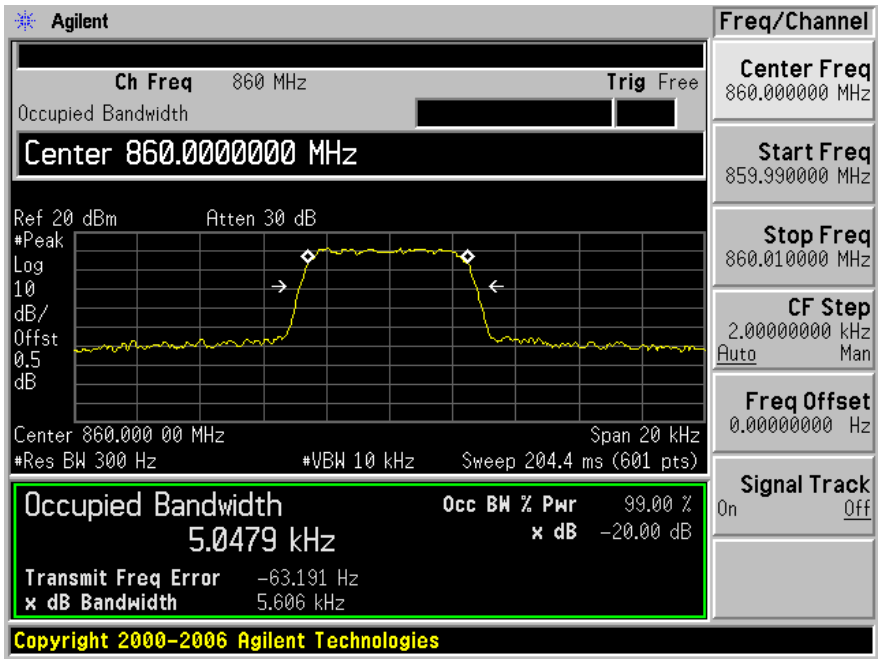


Middle Channel: 860 MHz

Input (CQPSK)

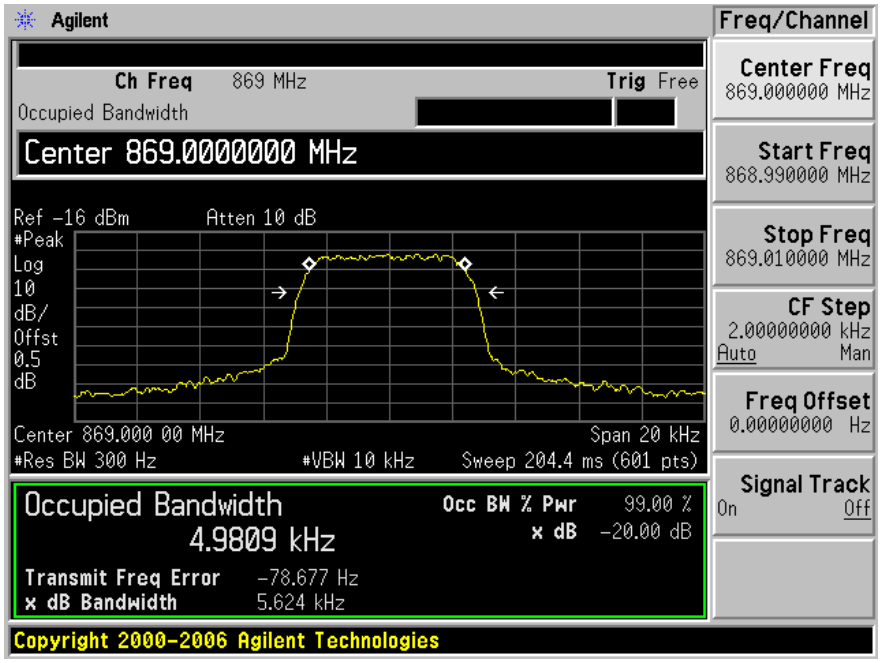


Output (CQPSK)

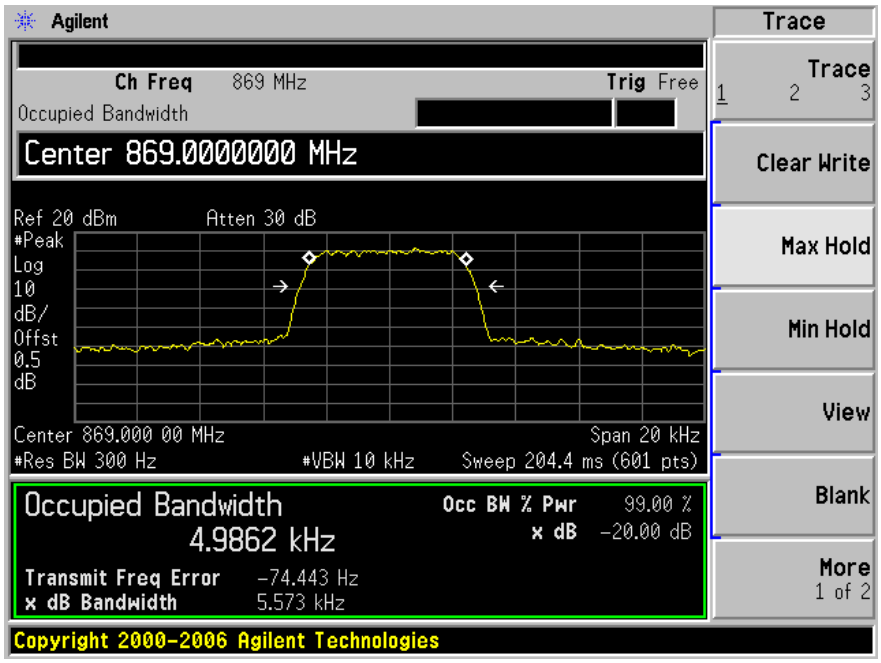


High Channel: 869 MHz

Input (CQPSK)

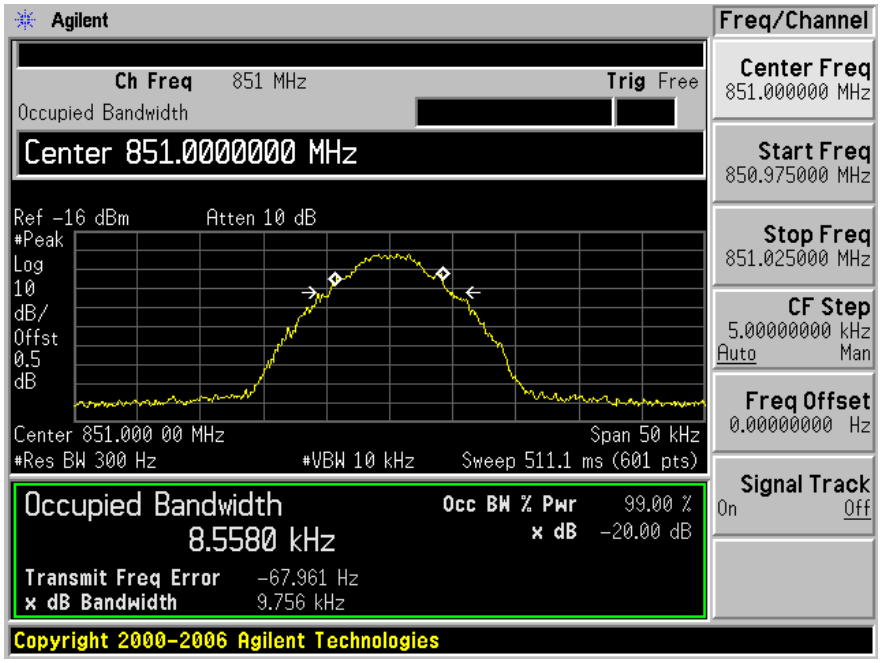


Output (CQPSK)

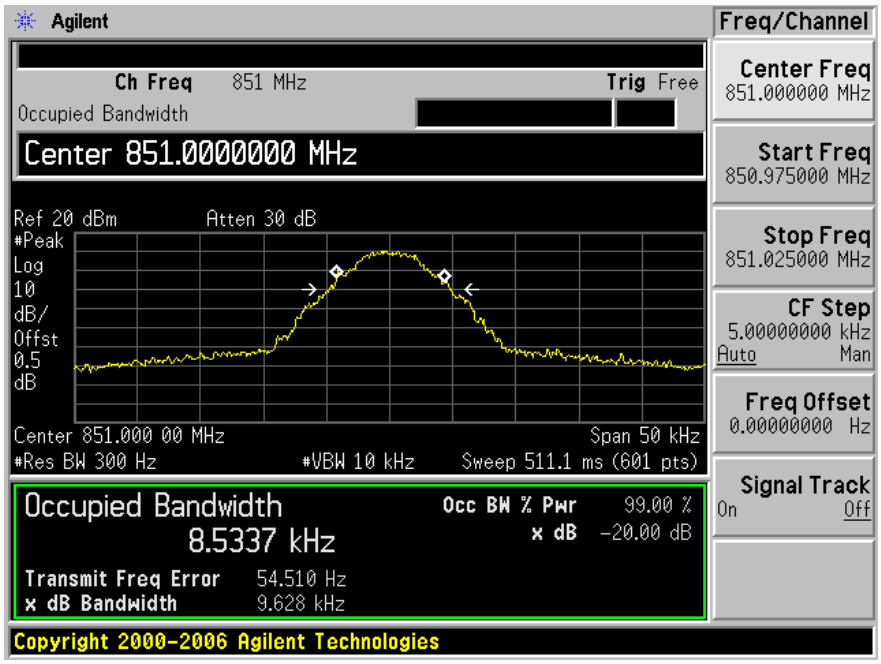


Low Channel: 851 MHz

Input (C4FM P25)

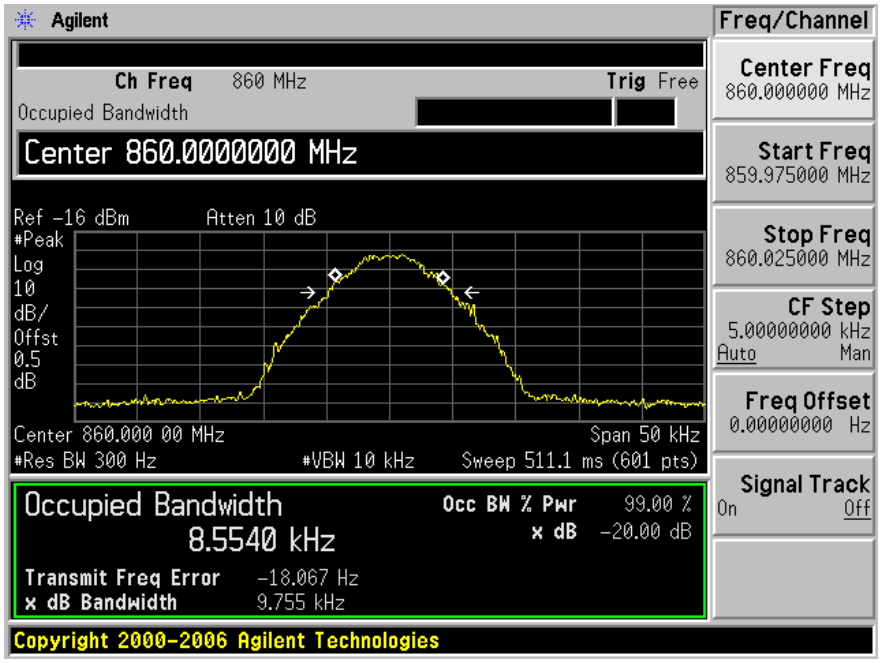


Output (C4FM P25)

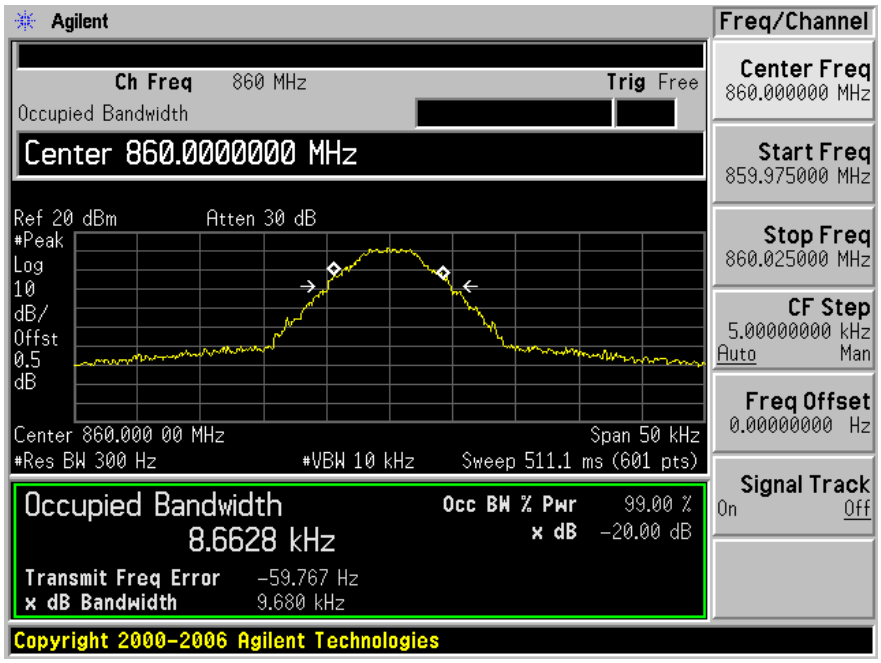


Middle Channel: 860 MHz

Input (C4FM P25)

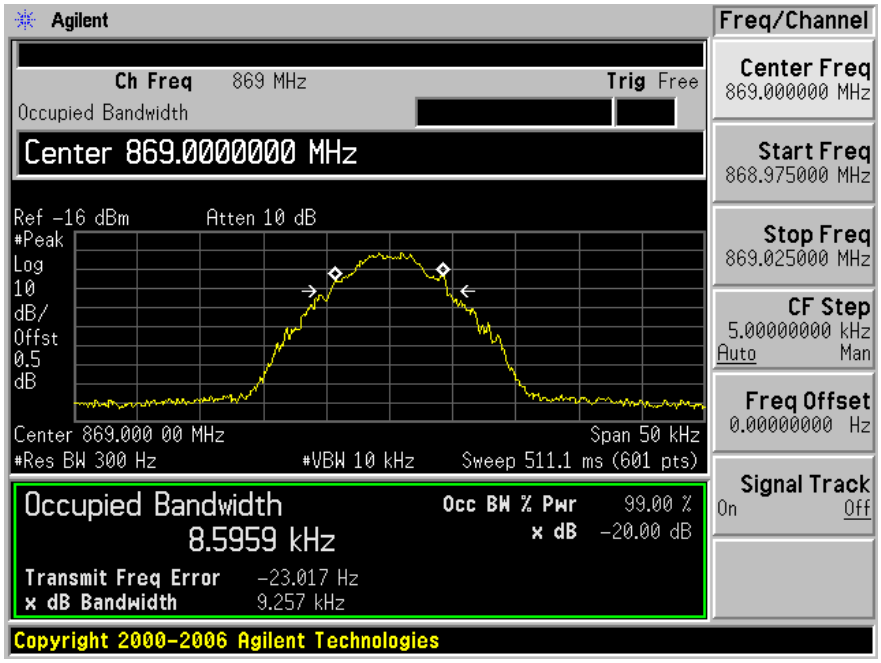


Output (C4FM P25)

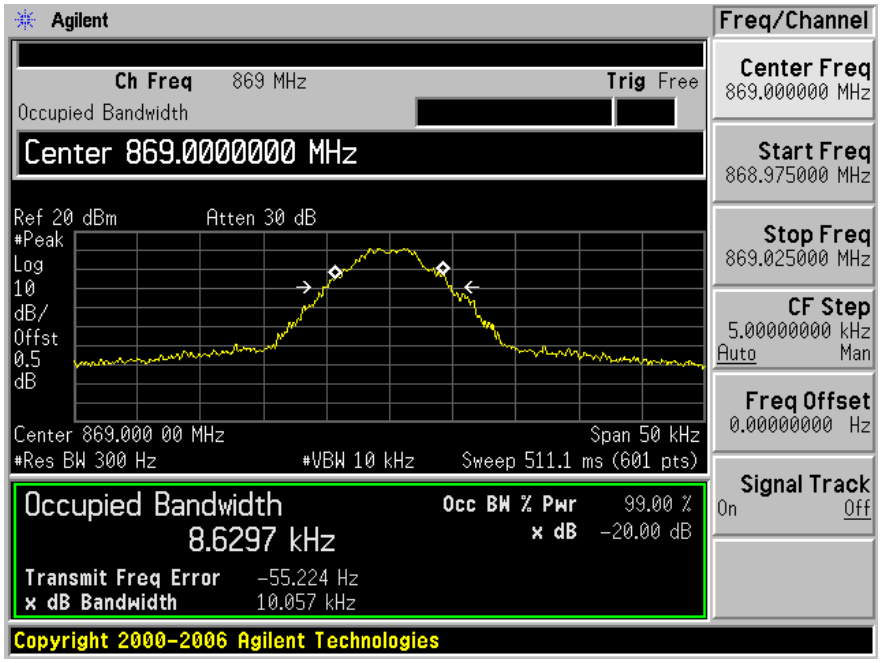


High Channel: 869 MHz

Input (C4FM P25)



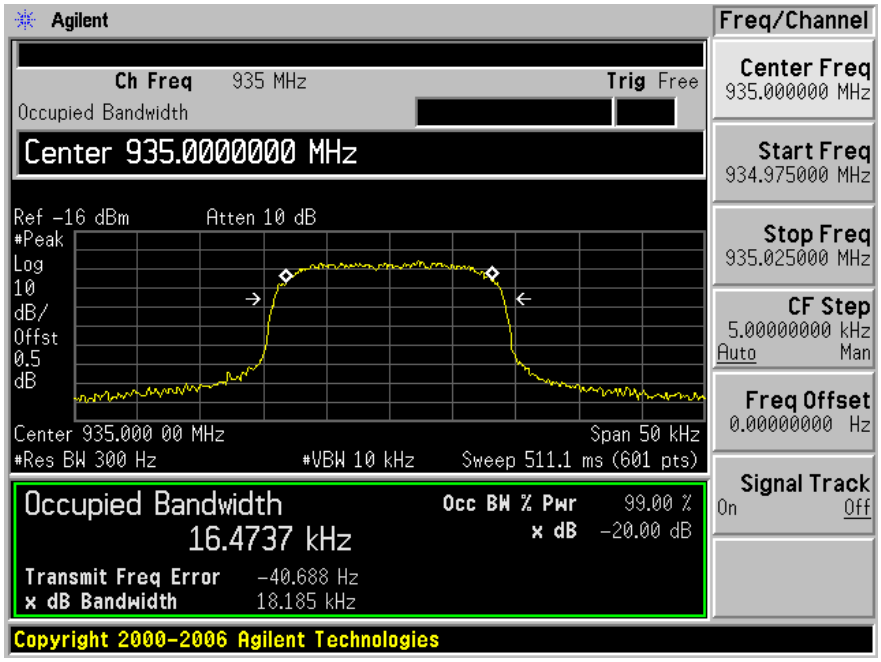
Output (C4FM P25)



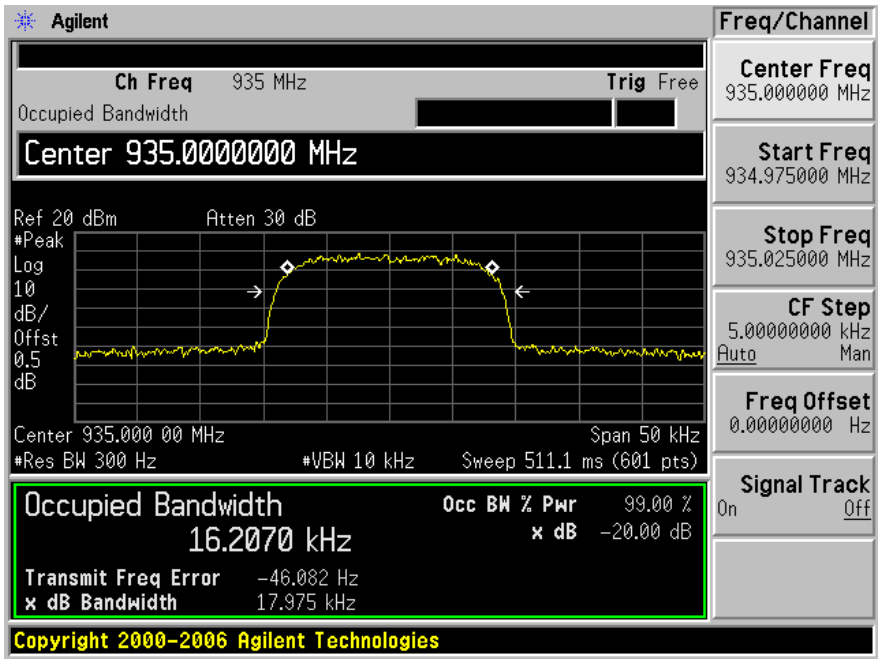
900 MHz Band

Low Channel: 935 MHz

Input (iDEN)

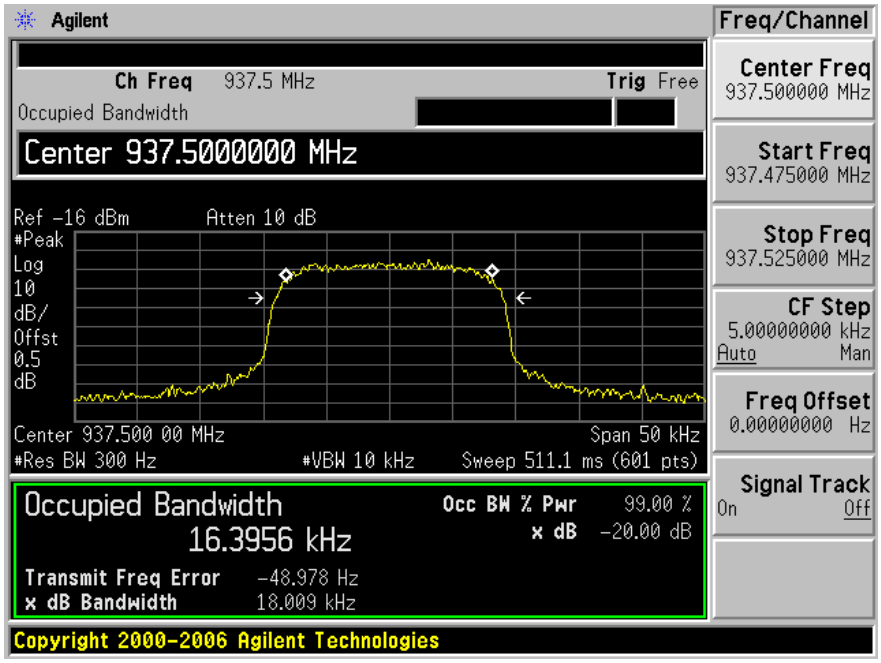


Output (iDEN)

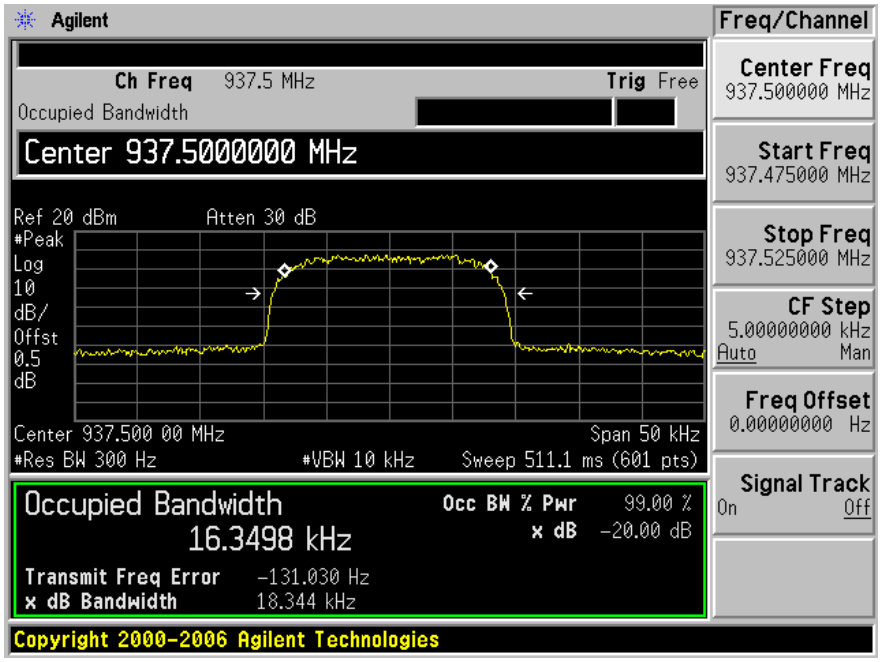


Middle Channel: 937.5 MHz

Input (iDEN)

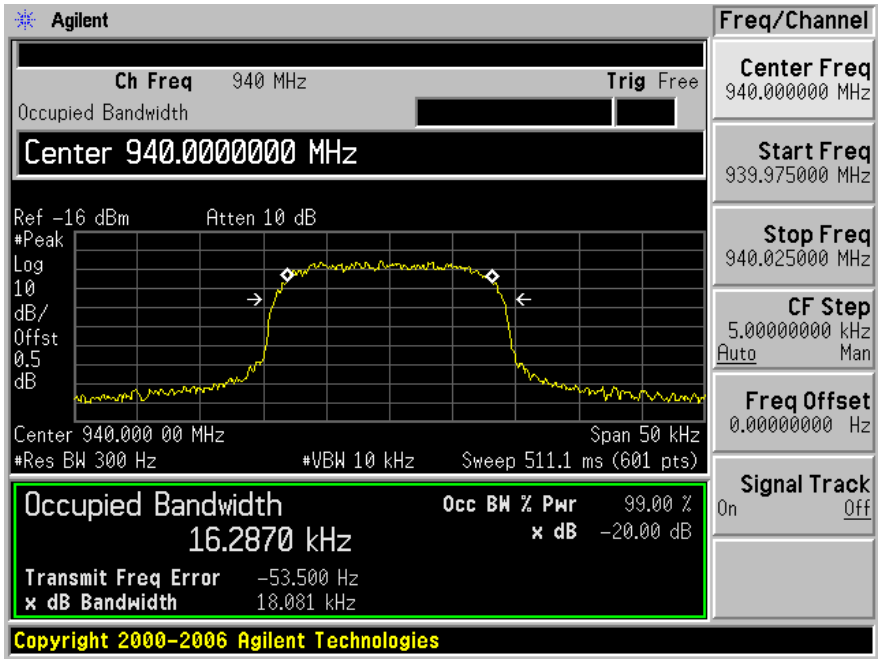


Output (iDEN)

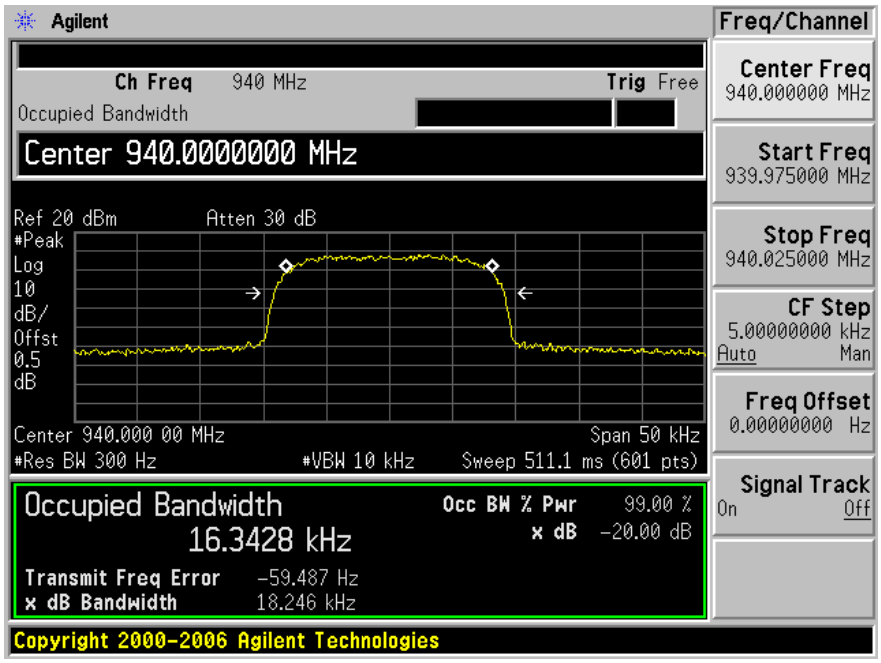


High Channel: 940MHz

Input (iDEN)

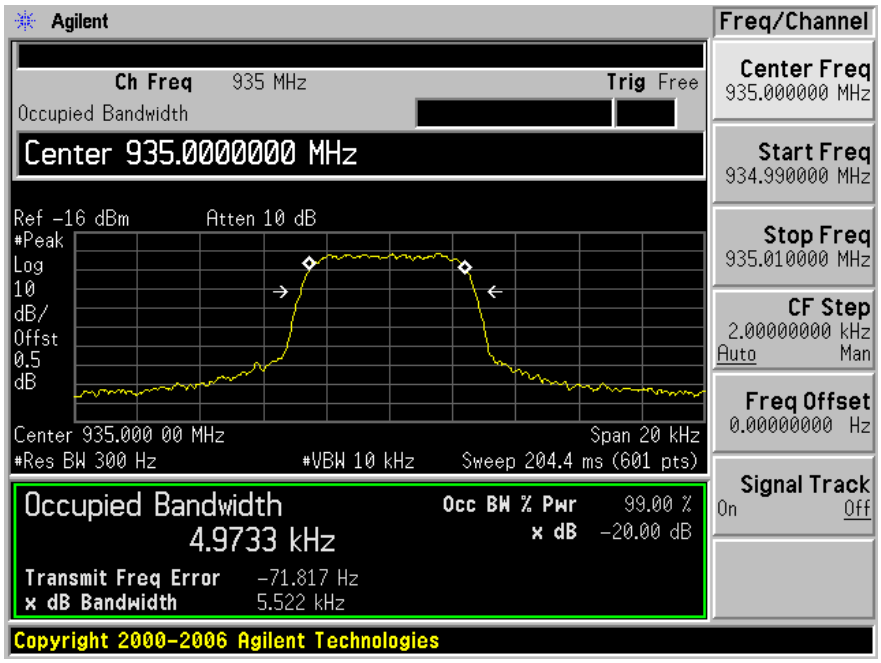


Output (iDEN)

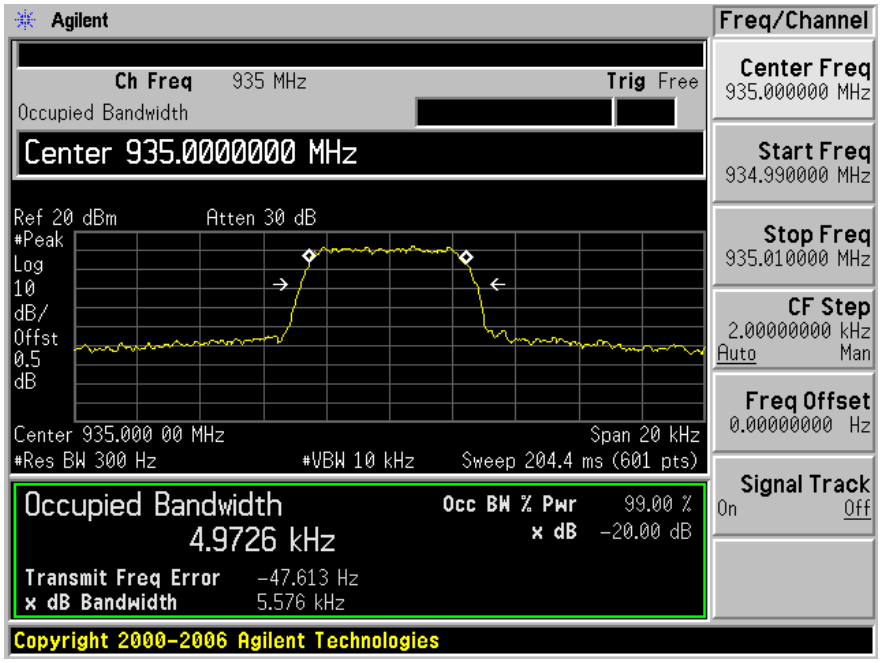


Low Channel: 935 MHz

Input (CQPSK)

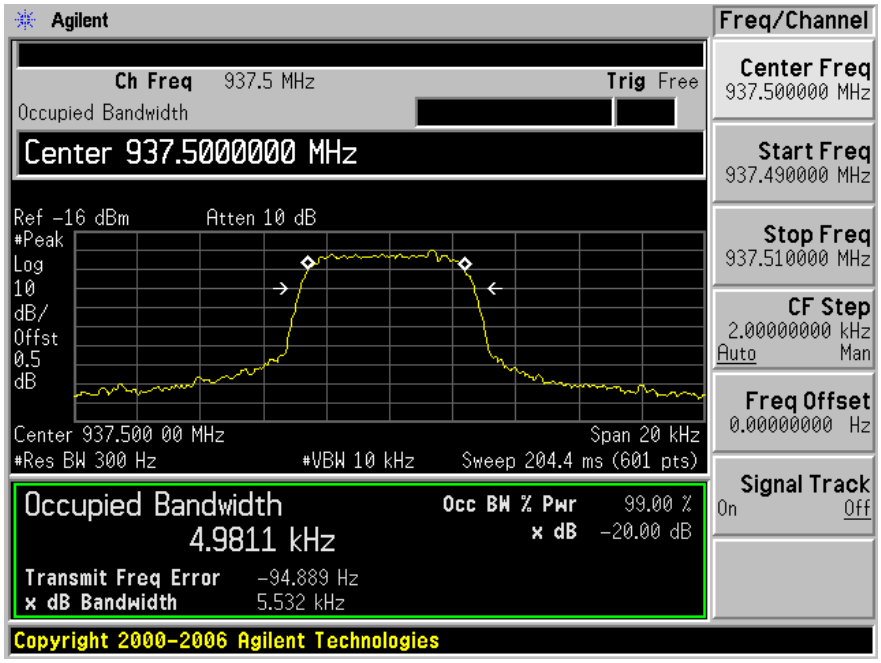


Output (CQPSK)

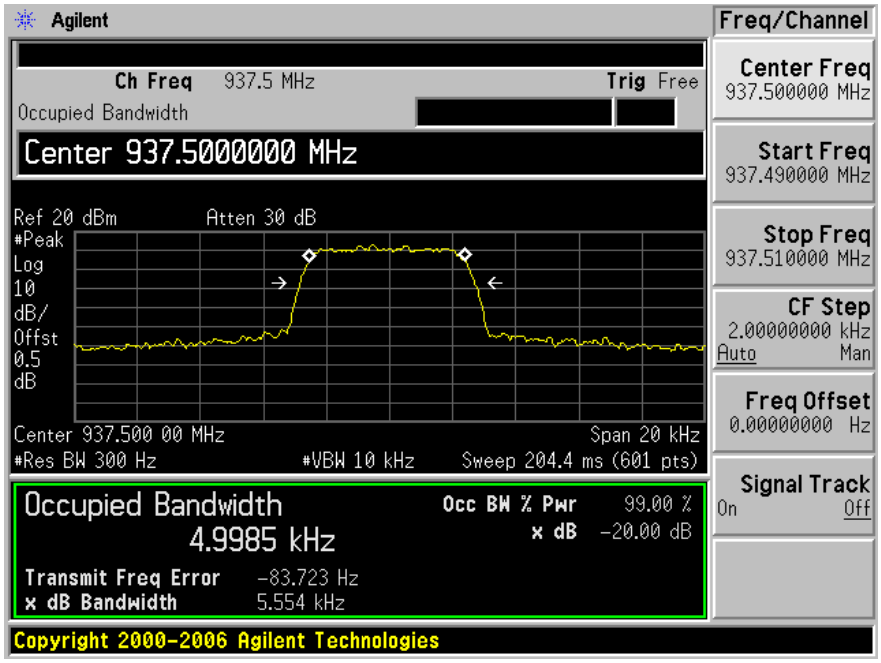


Middle Channel: 937.5 MHz

Input (CQPSK)

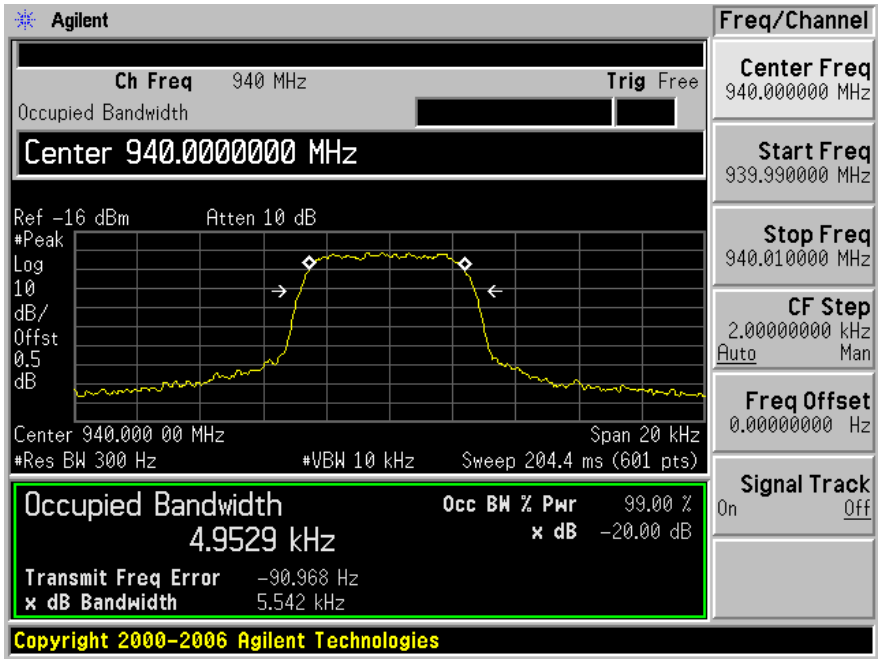


Output (CQPSK)

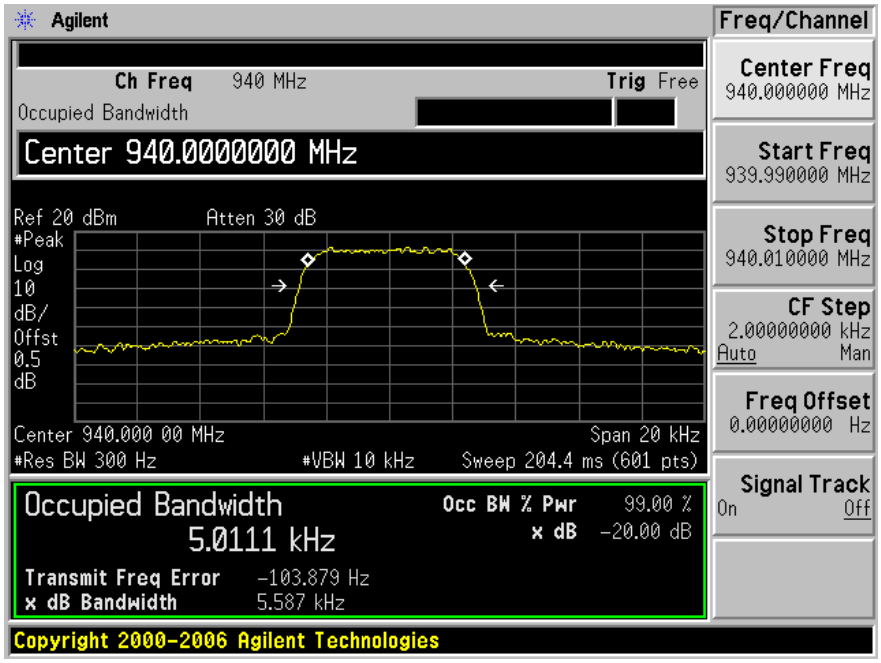


High Channel: 940 MHz

Input (CQPSK)

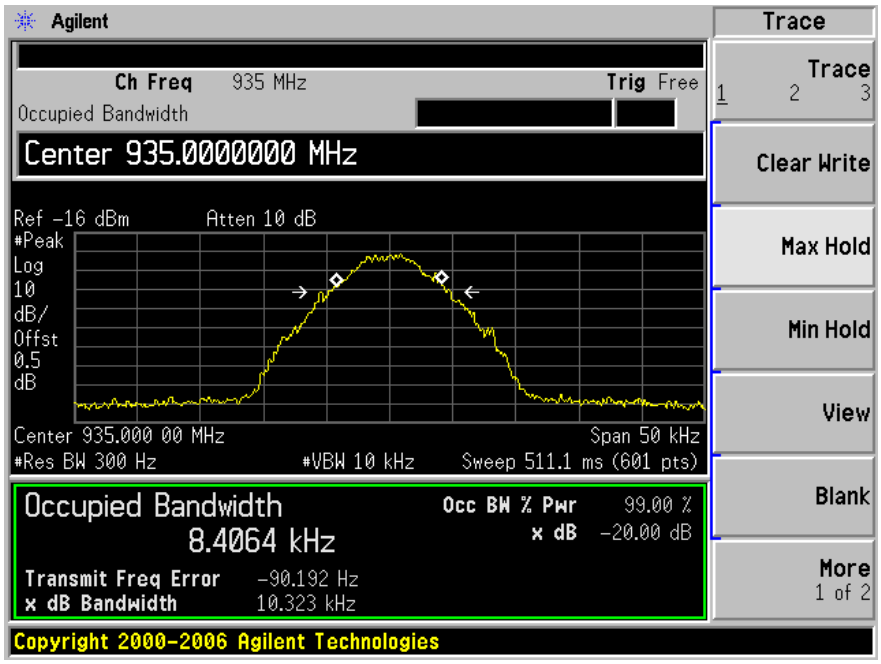


Output (CQPSK)

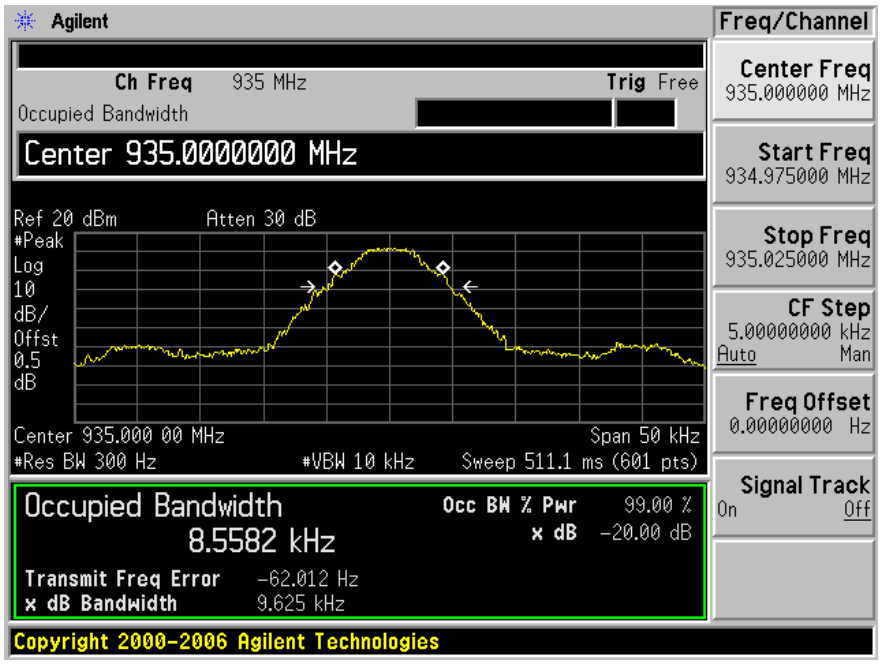


Low Channel: 935 MHz

Input (C4FM P25)

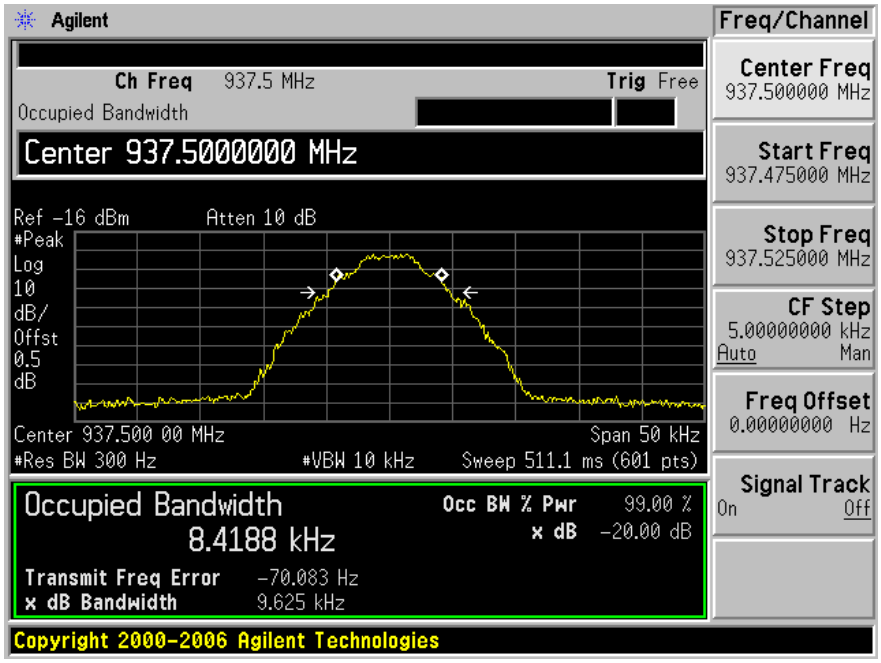


Output (C4FM P25)

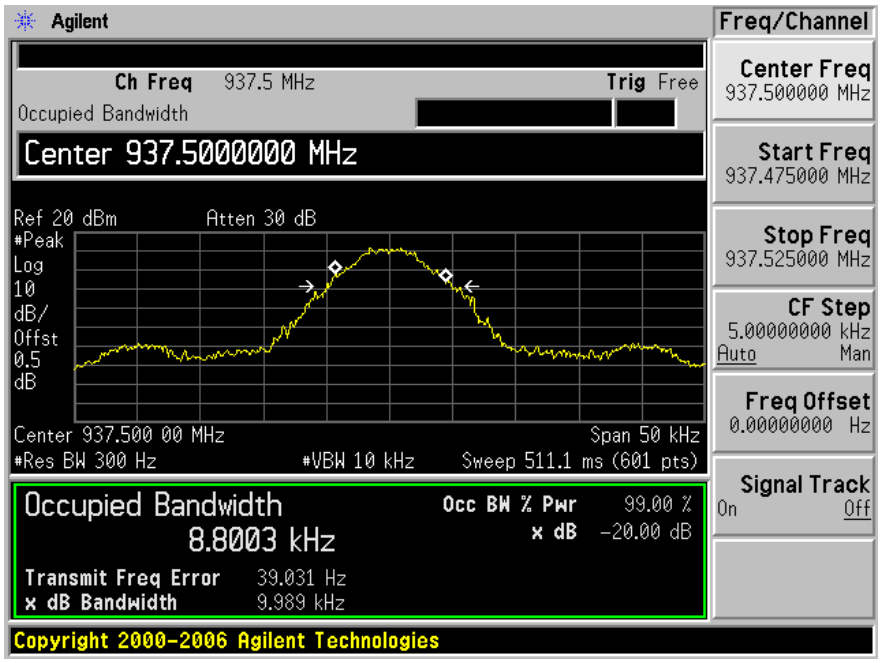


Middle Channel: 937.5 MHz

Input (C4FM P25)

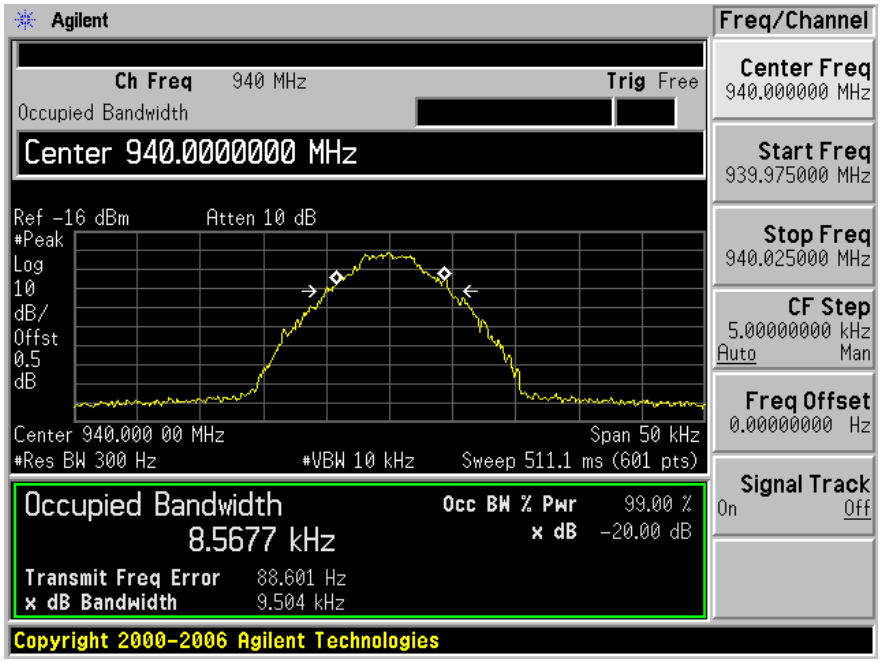


Output (C4FM P25)

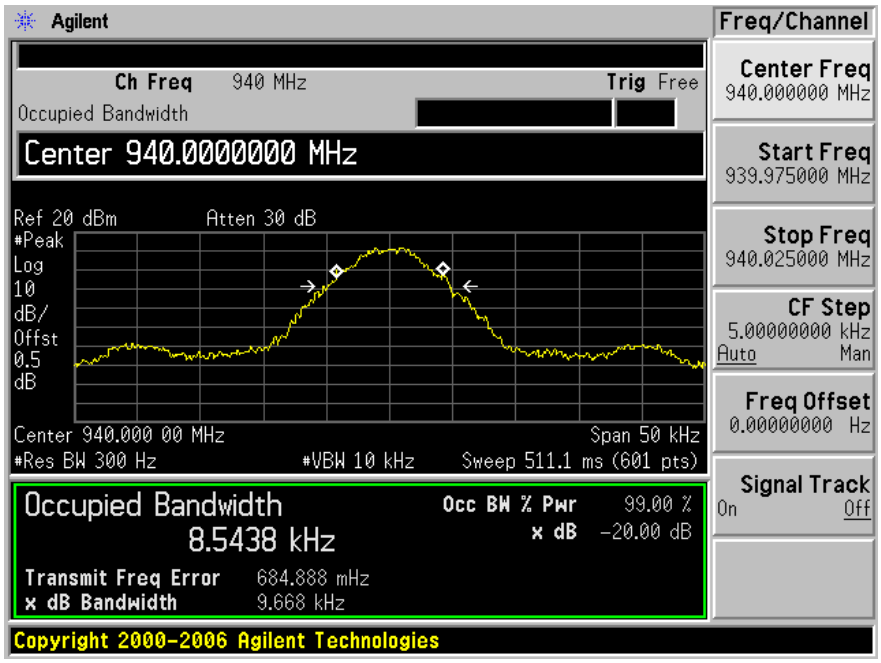


High Channel: 940 MHz

Input (C4FM P25)



Output (C4FM P25)



7 FCC §2.1049 & §90.210 – EMISSION MASK

7.1 Applicable Standard

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (m) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating in the frequency bands governed under this part.

Applicable Emission Masks

Frequency band (MHz)	Mask for equipment with audio low pass Filter	Mask for equipment without audio low pass filter
Below 25 \1\	A or B	A or C
25-50	B	C
72-76	B	C
150-174 \2\	B, D, or E	C, D, or E
150 Paging-only	B	C
220-222	F	F
421-512 \2\	B, D, or E	C, D, or E
450 Paging-only	B	G
806-821/851-866 \3\	B	G
821-824/866-869	B	H
896-901/935-940	I	J
902-928	K	K
929-930	B	G
Above 940	B	C
All other bands	B	C

Note:

1. Equipment using single sideband J3E emission must meet the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.
2. Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed ton operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.
3. Equipment used in this band licensed to EA or non-EA systems shall comply with the emission mask provisions of Sec. 90.691.

7.2 Test Results

N/A

8 FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

8.1 Applicable Standard

Requirements: FCC §2.1051 and §90.210.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1057.

8.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator 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 10^{th} harmonic.

8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-06-29
Rohde & Schwarz	Signal Generator	SMIQ03	3273071015	2010-03-31
Agilent	MXG Vector Signal Generator	E4438C	MY45092925	2009-08-13

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

8.4 Test Environmental Conditions

Temperature:	21-22°C
Relative Humidity:	46-50 %
ATM Pressure:	80-99kPa

** The testing was performed by Dennis Huang on 2010-04-05 at RF Site.*

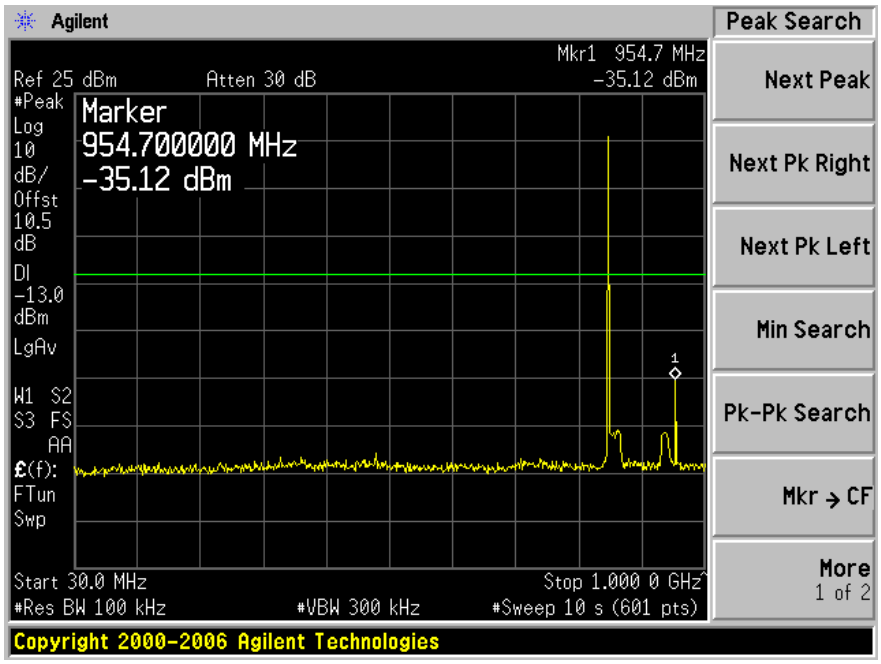
8.5 Test Results

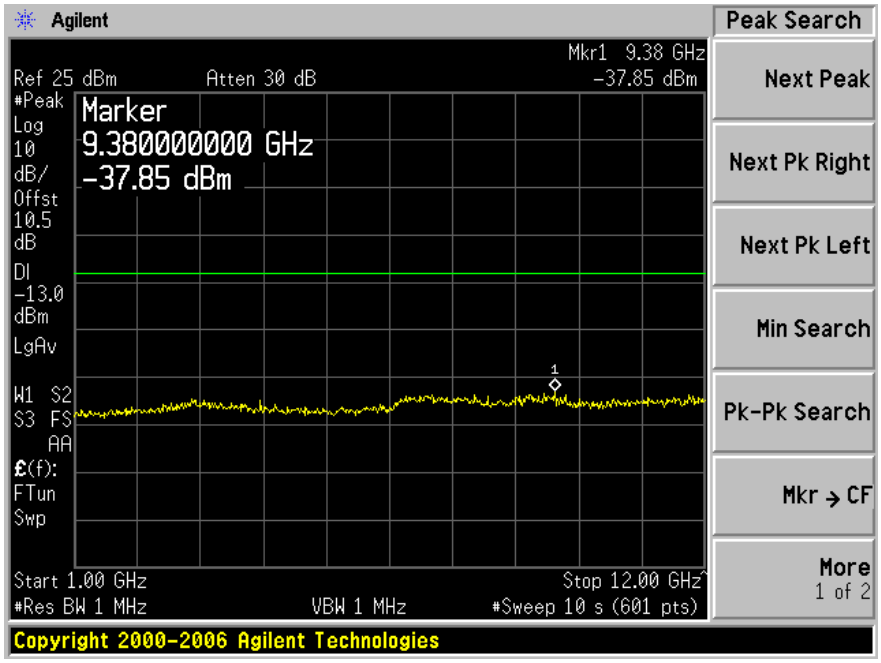
Please refer to the hereinafter plots.

800 MHz Band

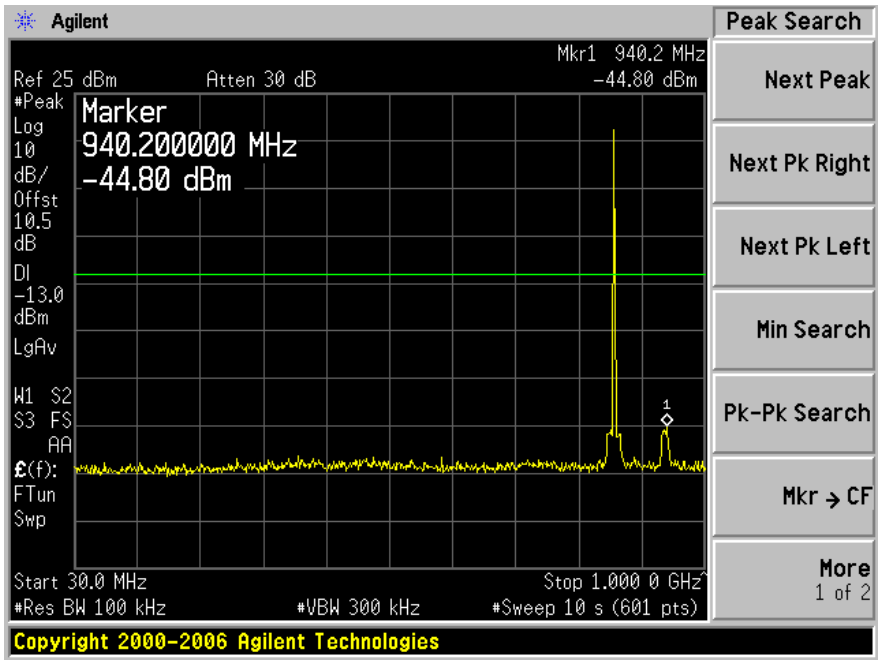
Modulation: iDEN

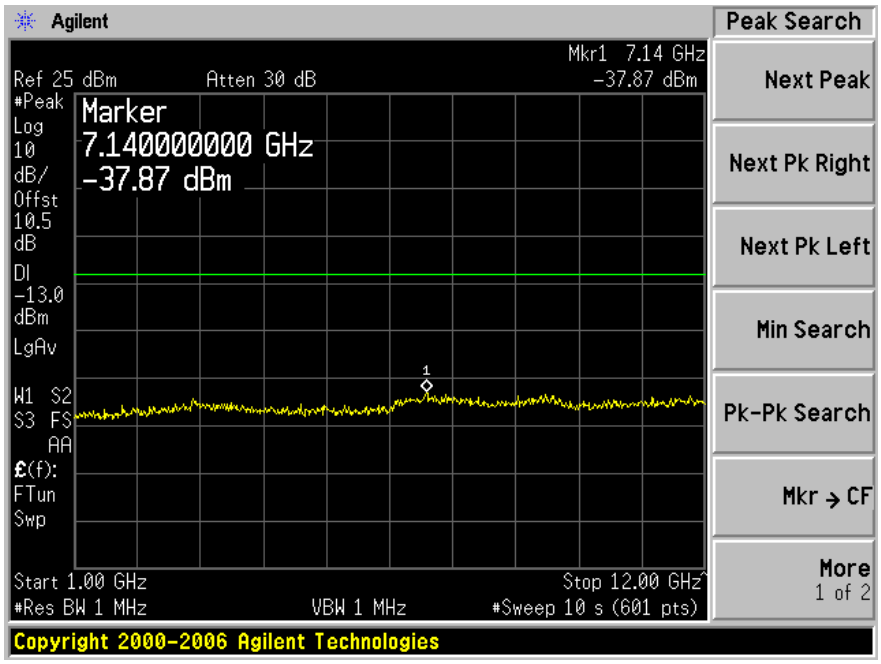
Low Channel (851 MHz)



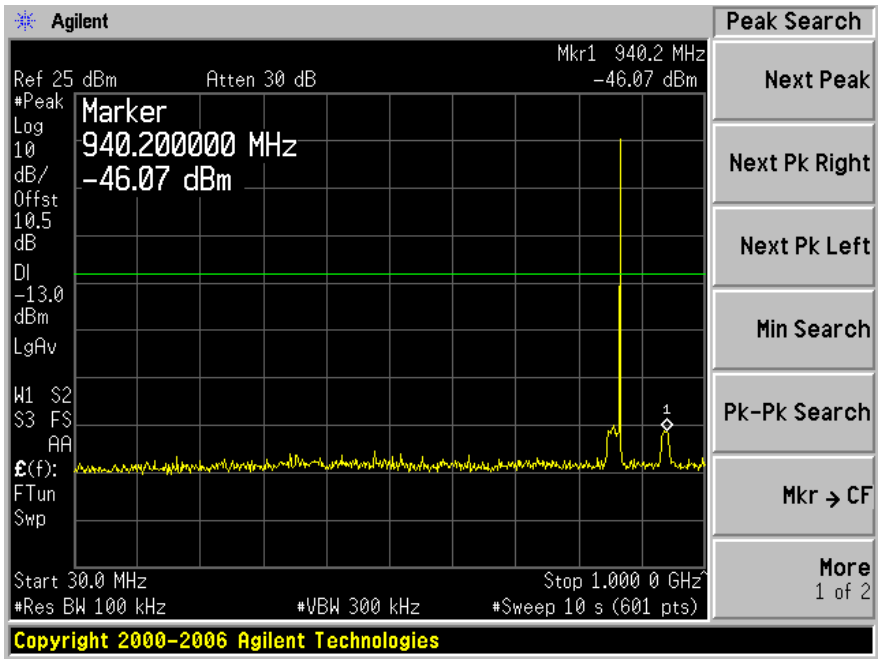


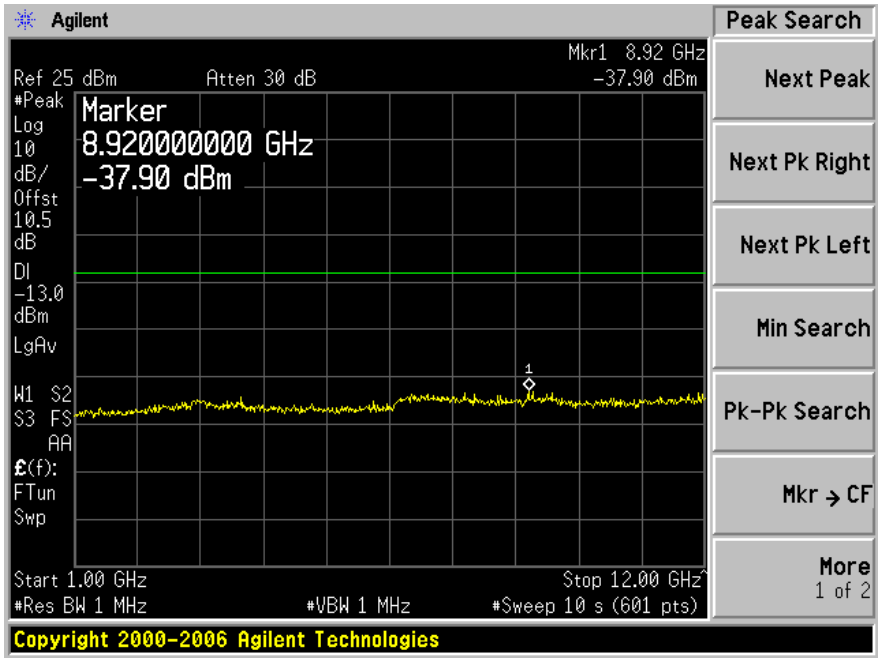
Middle Channel (860 MHz)





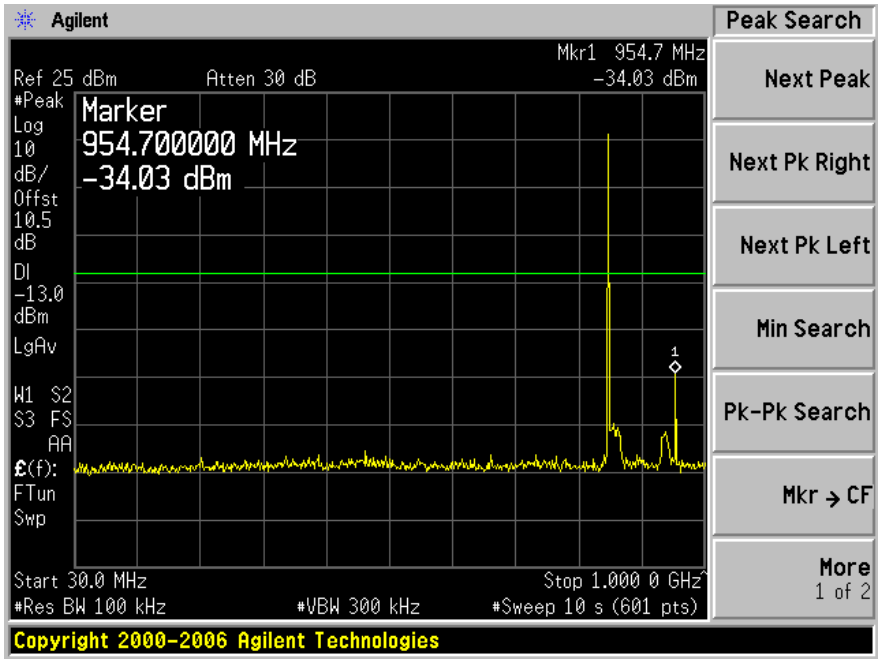
High Channel (869 MHz)

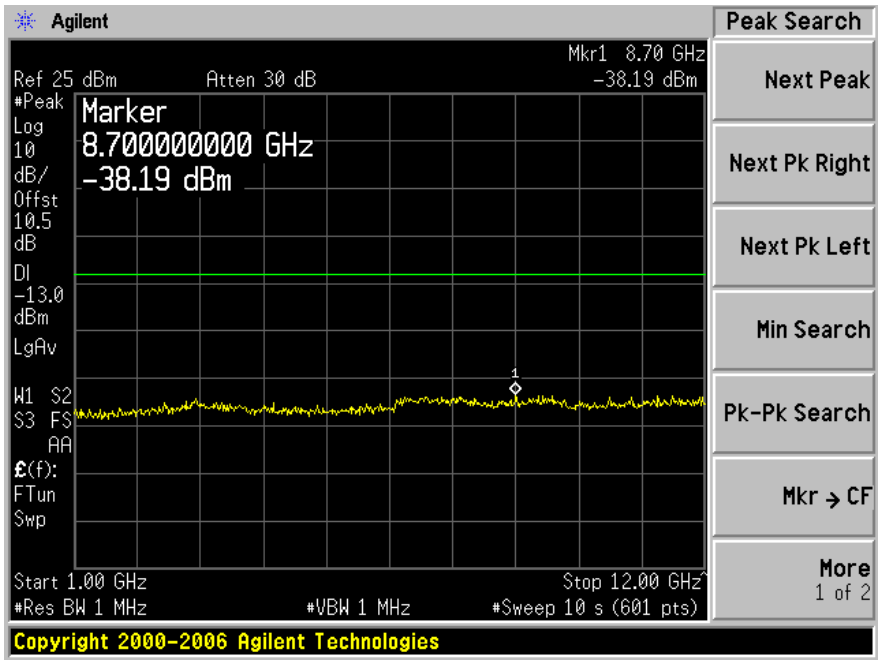




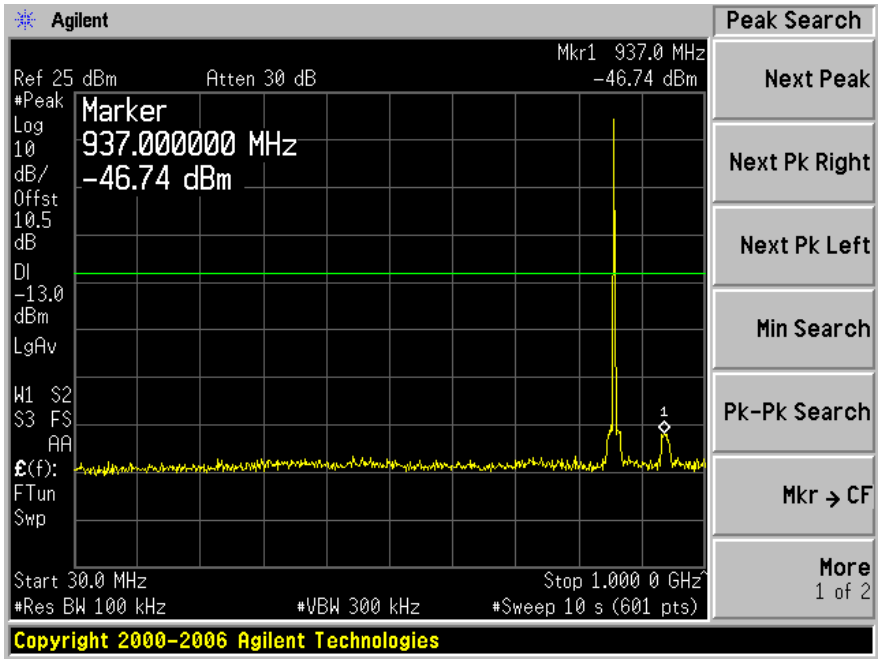
Modulation: CQPSK

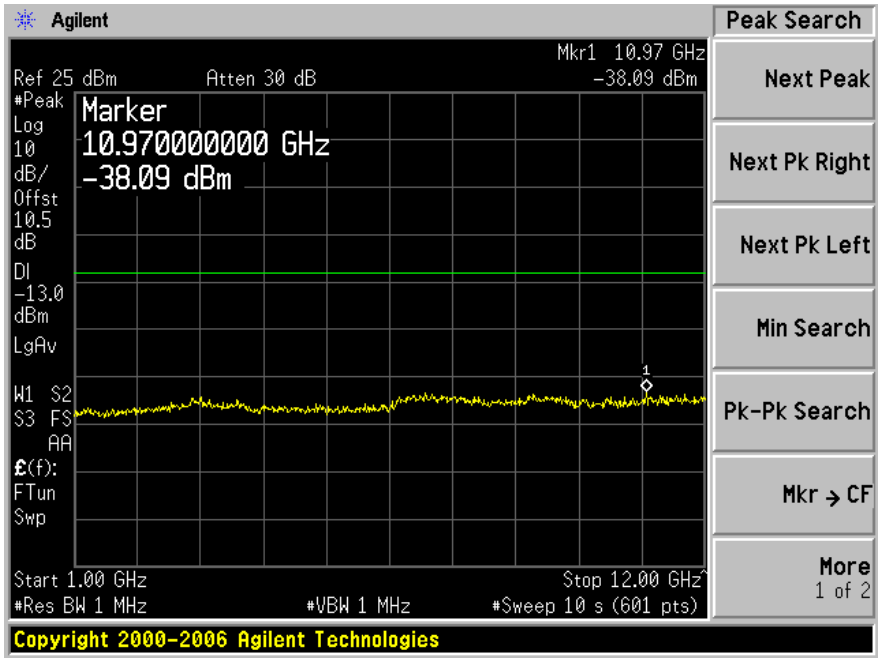
Low Channel (851MHz)



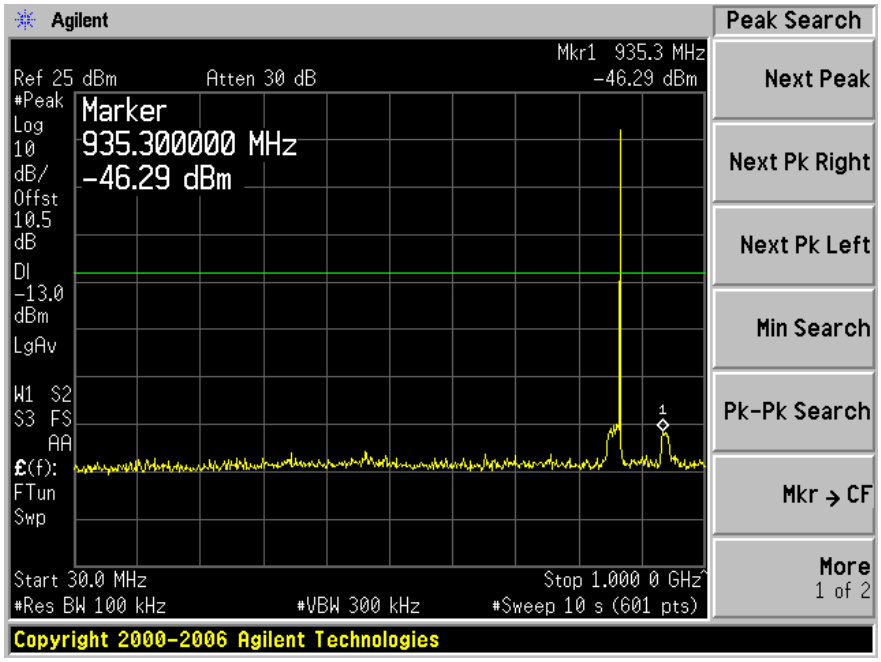


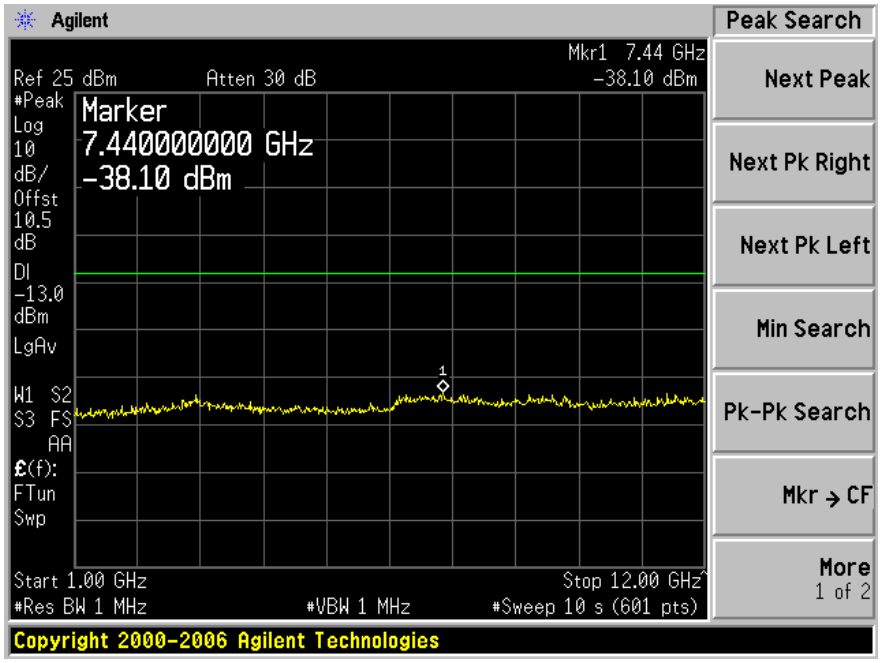
Middle Channel (860MHz)





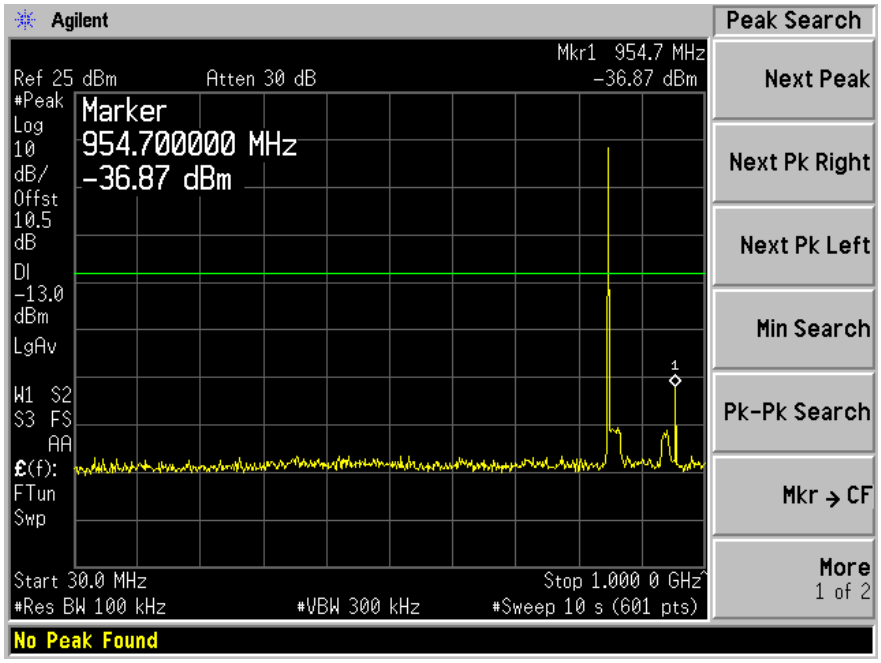
High Channel (869 MHz)

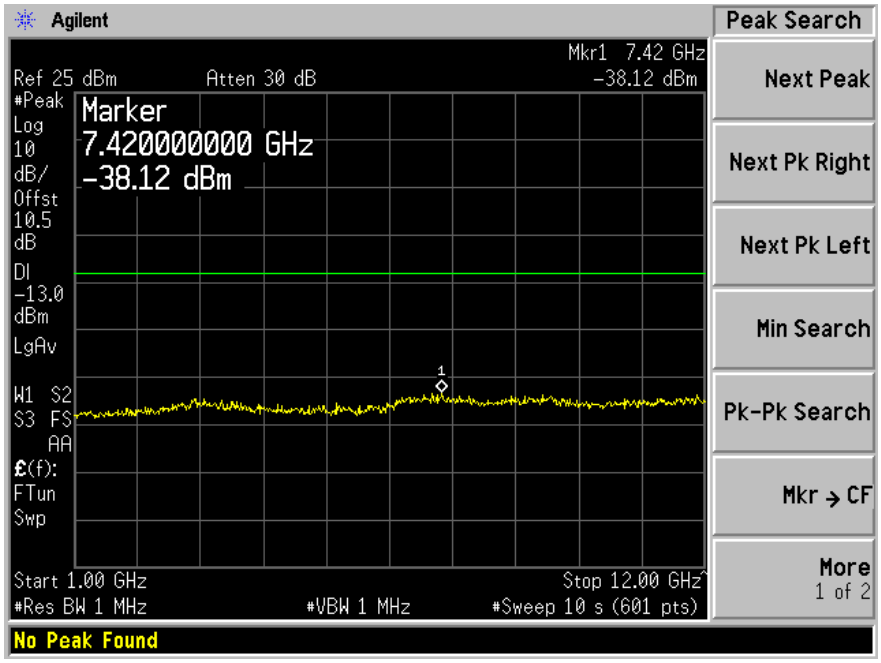




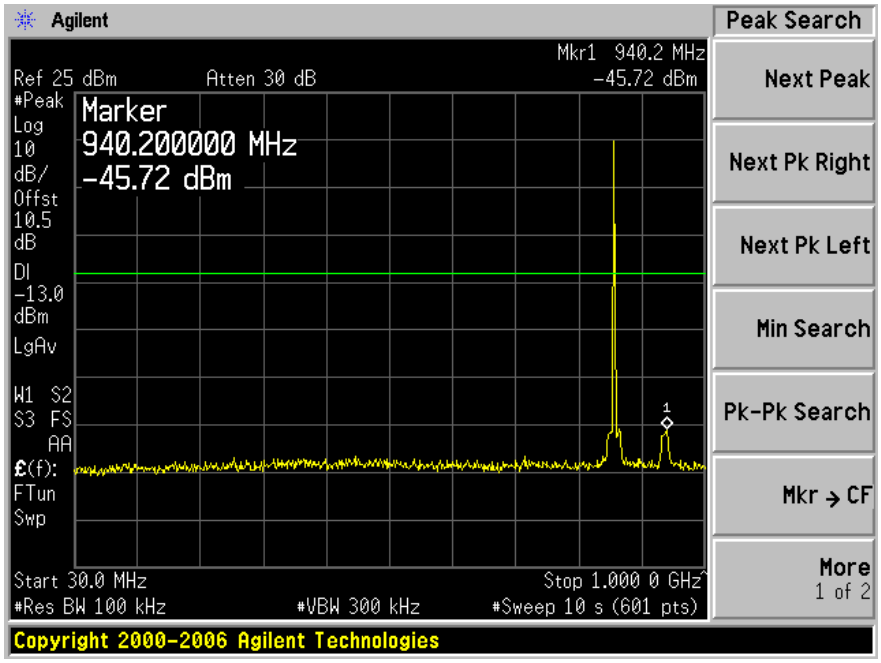
Modulation: C4FM (P25)

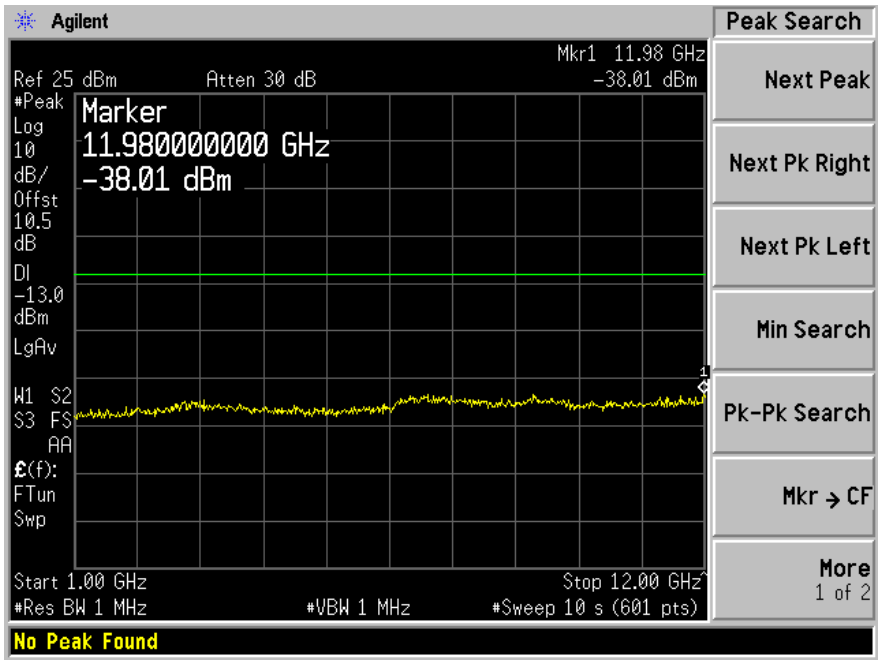
Low Channel (851 MHz)



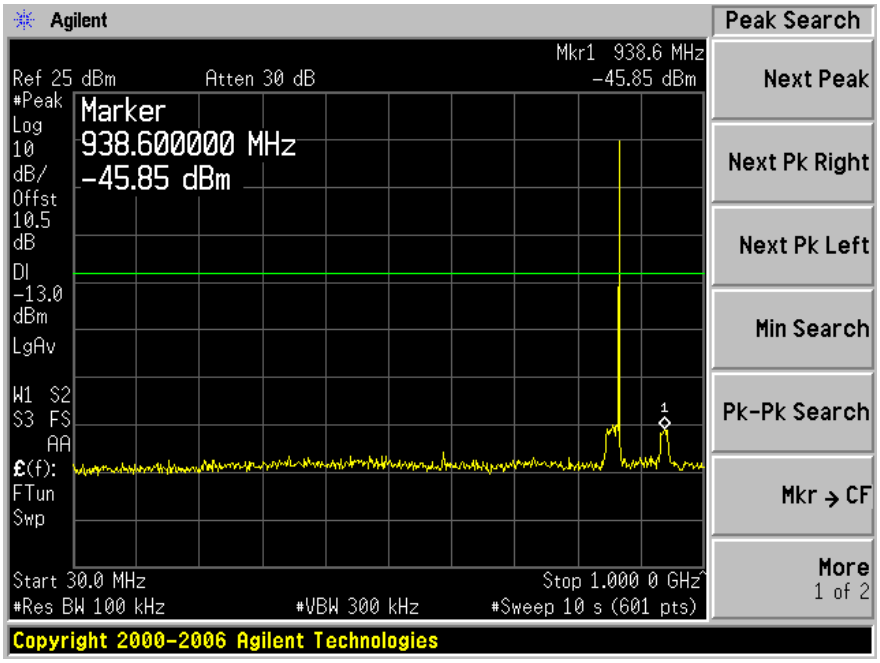


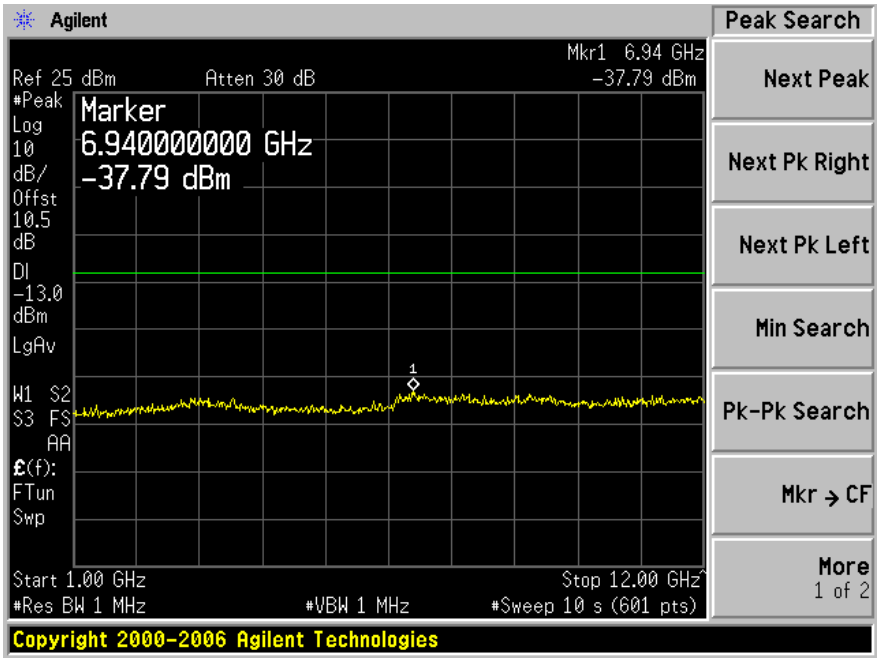
Middle Channel (860 MHz)





High Channel (869 MHz)

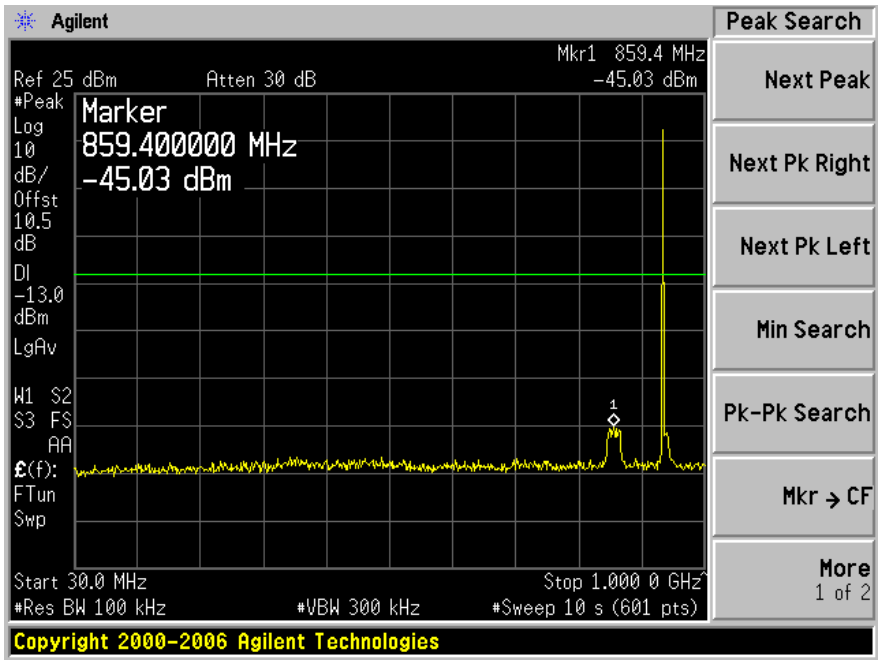


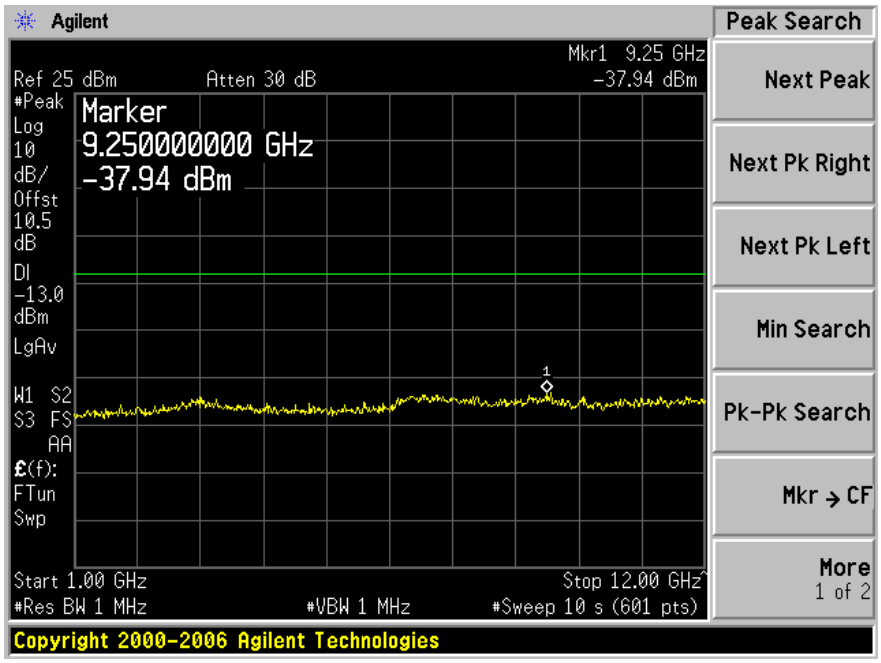


900 MHz Band

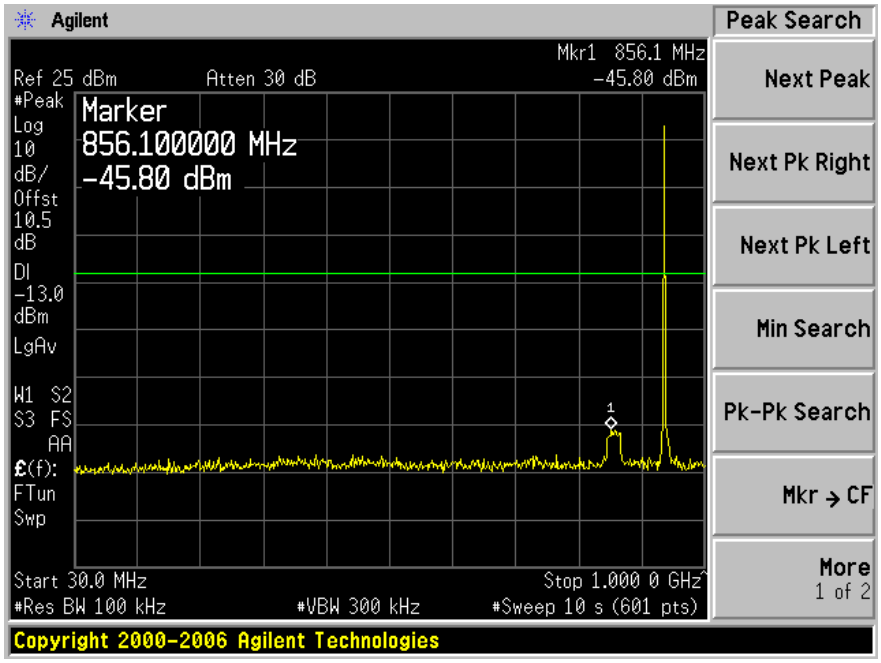
Modulation: iDEN

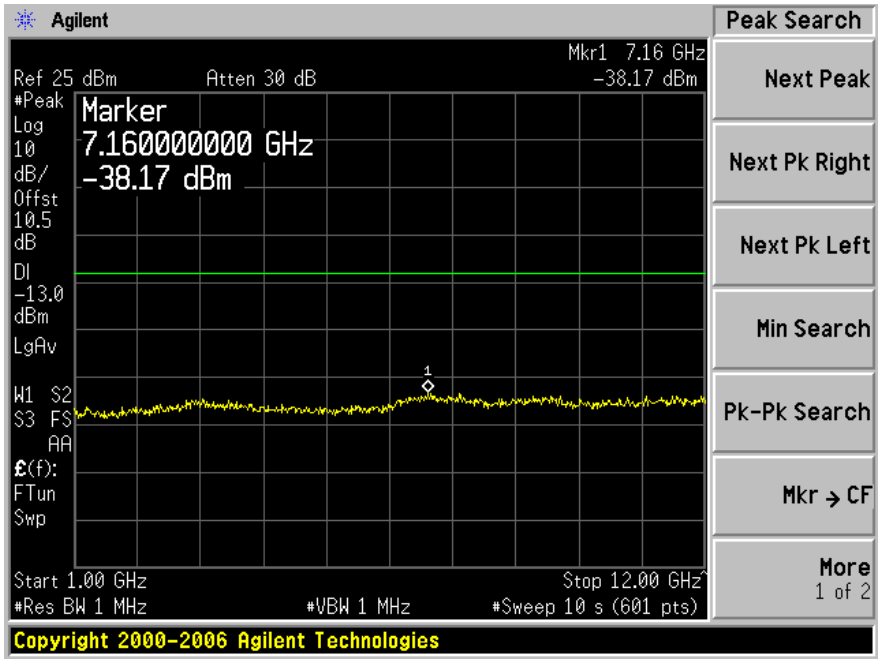
Low Channel (935 MHz)



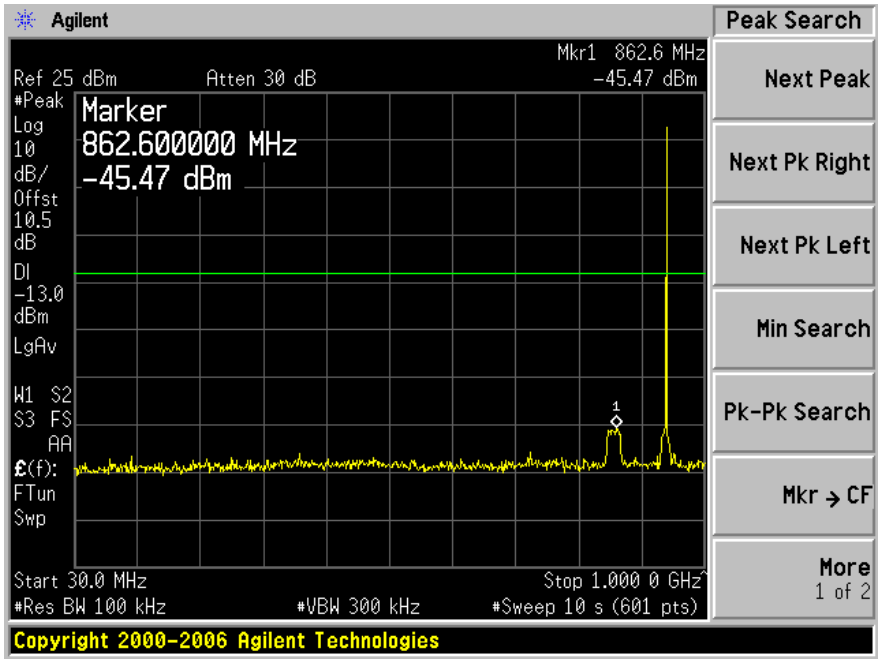


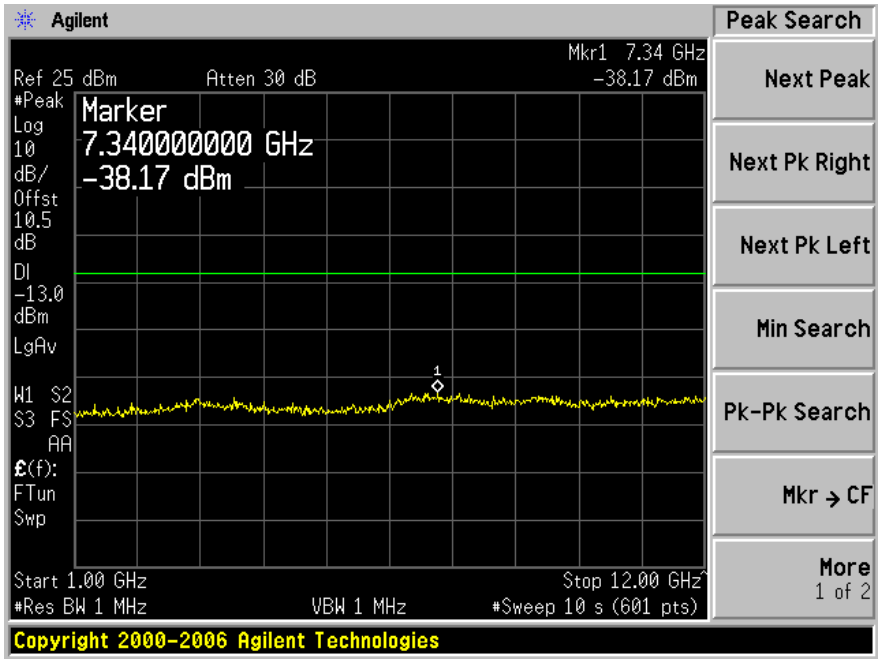
Middle Channel (937.5 MHz)





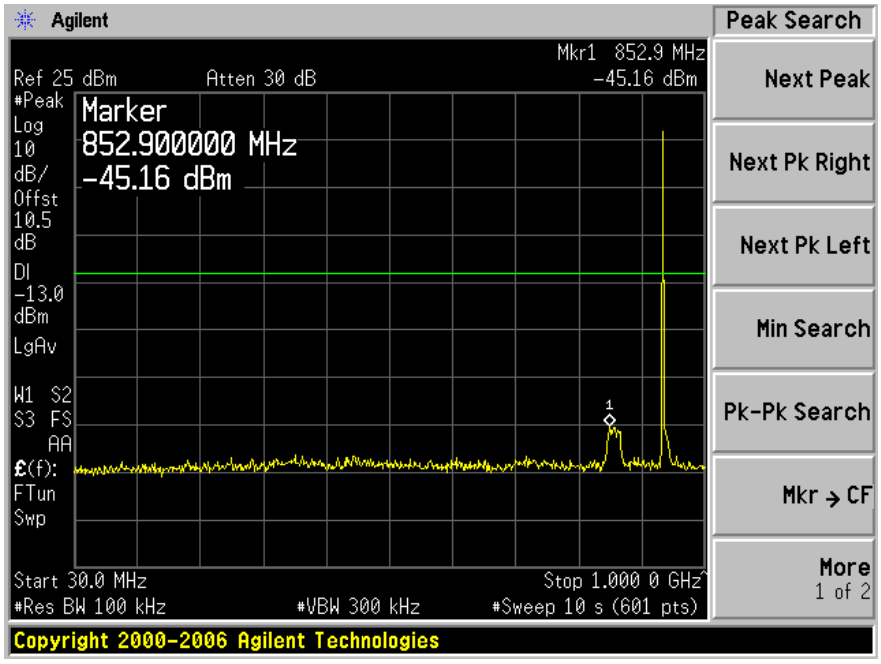
High Channel (940 MHz)

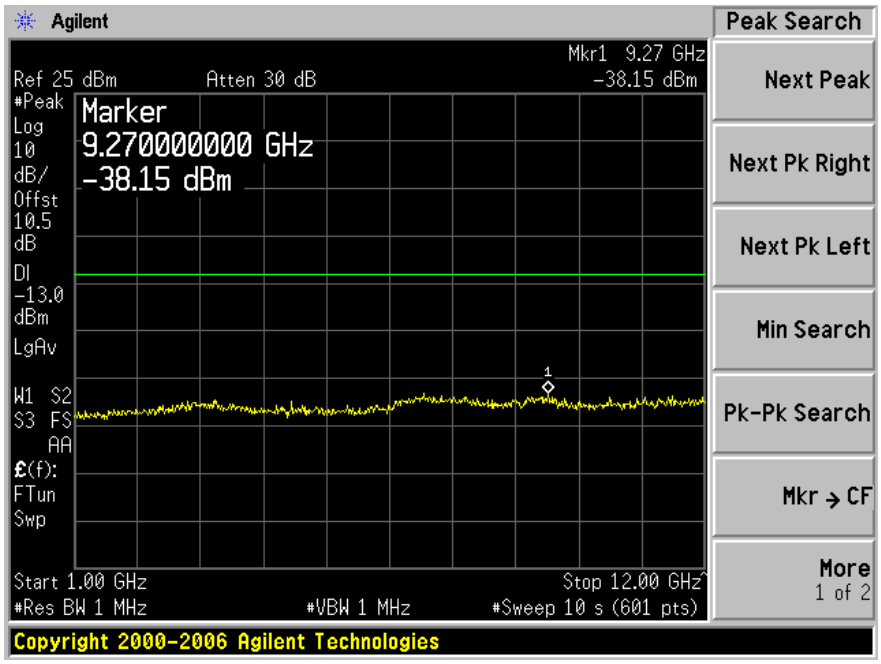




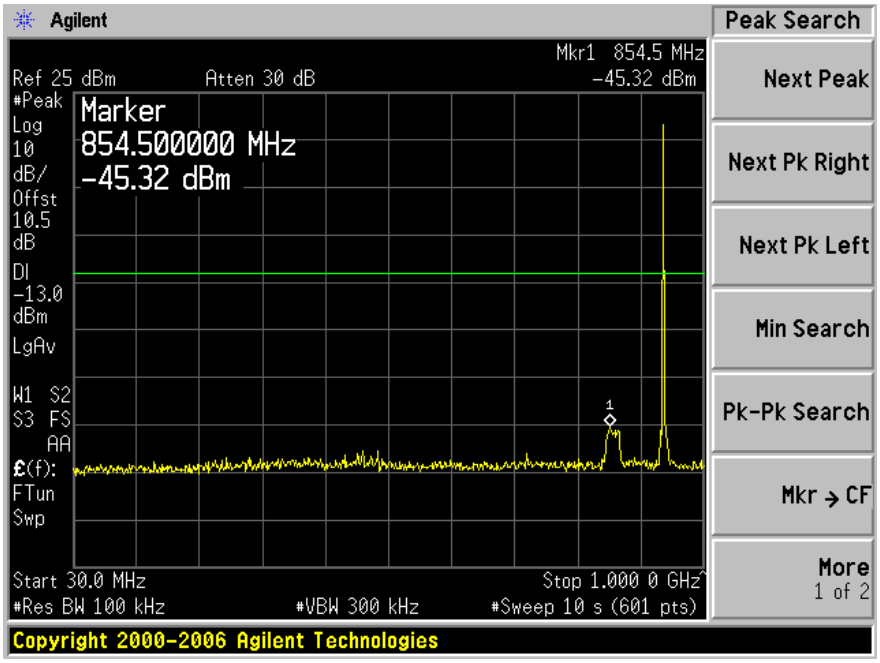
Modulation: CQPSK

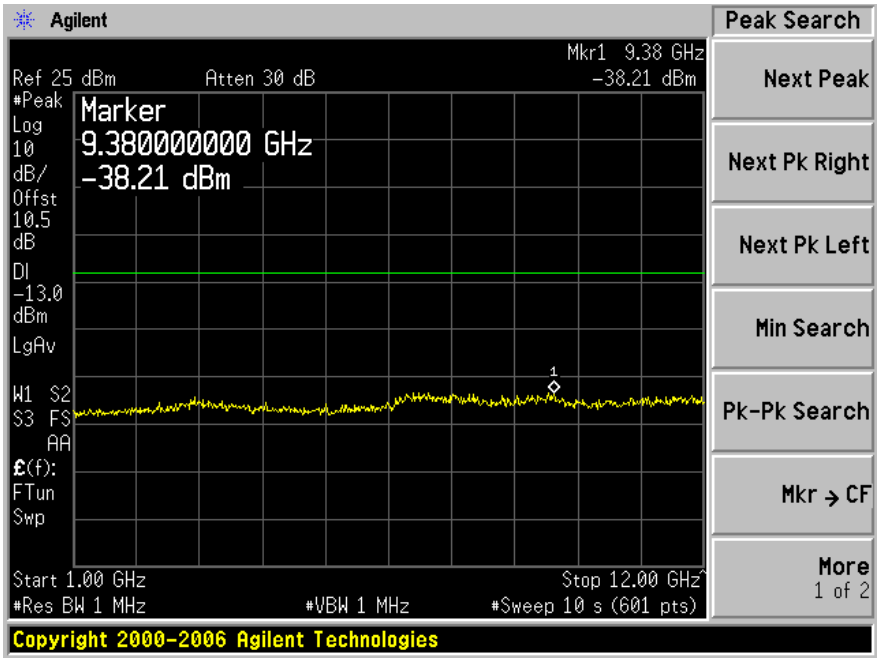
Low Channel (935 MHz)



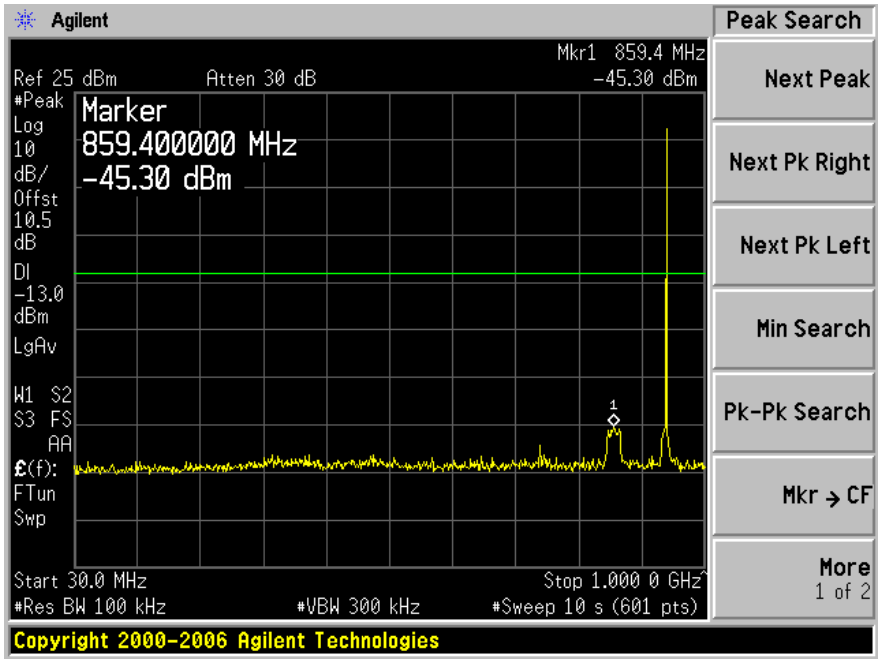


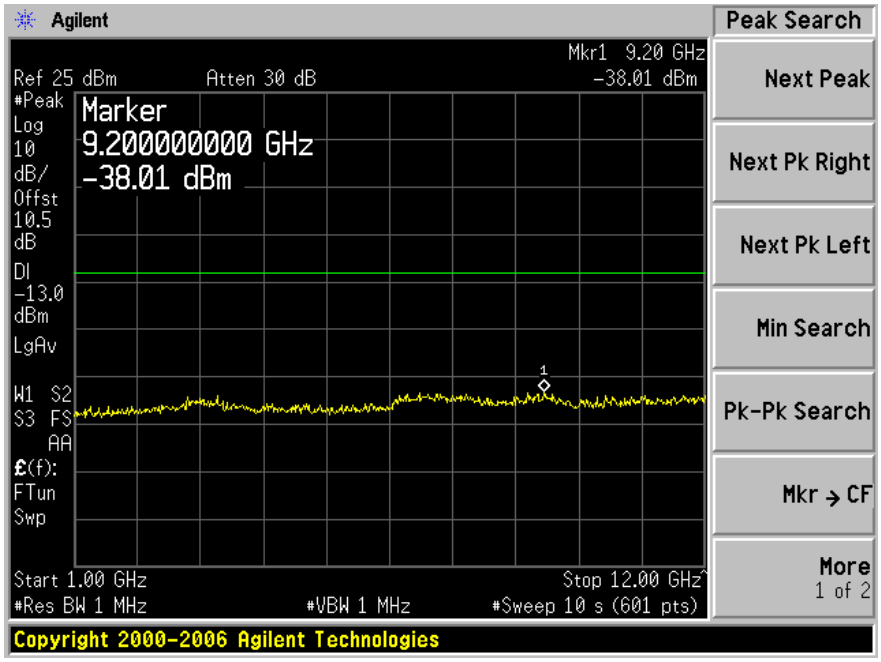
Middle Channel (937.5 MHz)





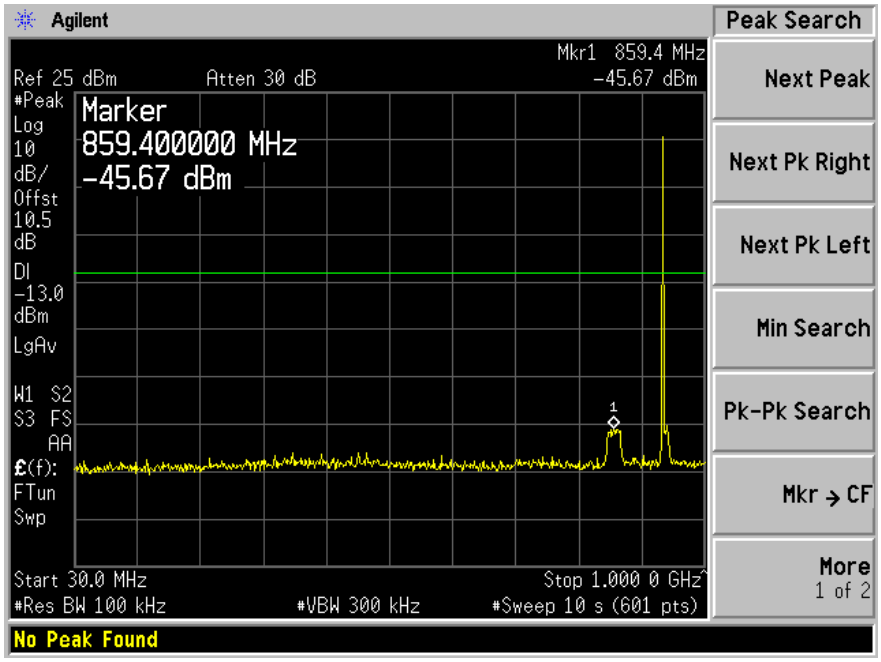
High Channel (940 MHz)

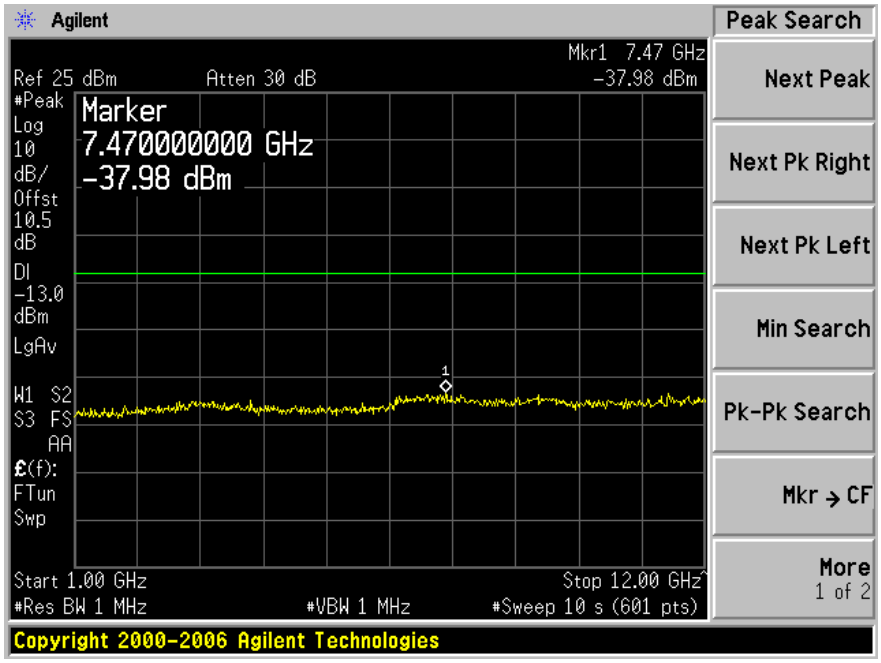




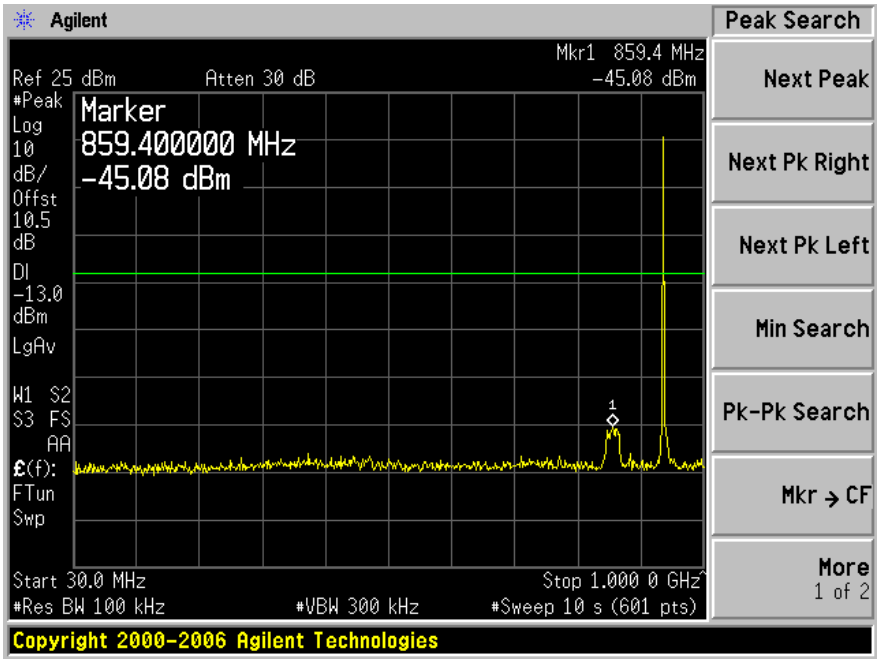
Modulation: C4FM (P25)

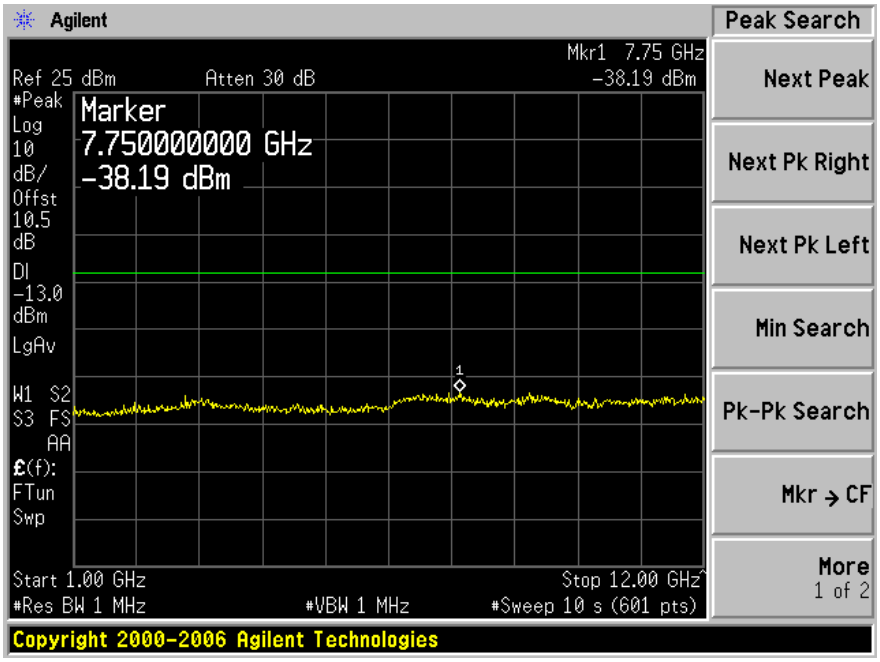
Low Channel (935 MHz)



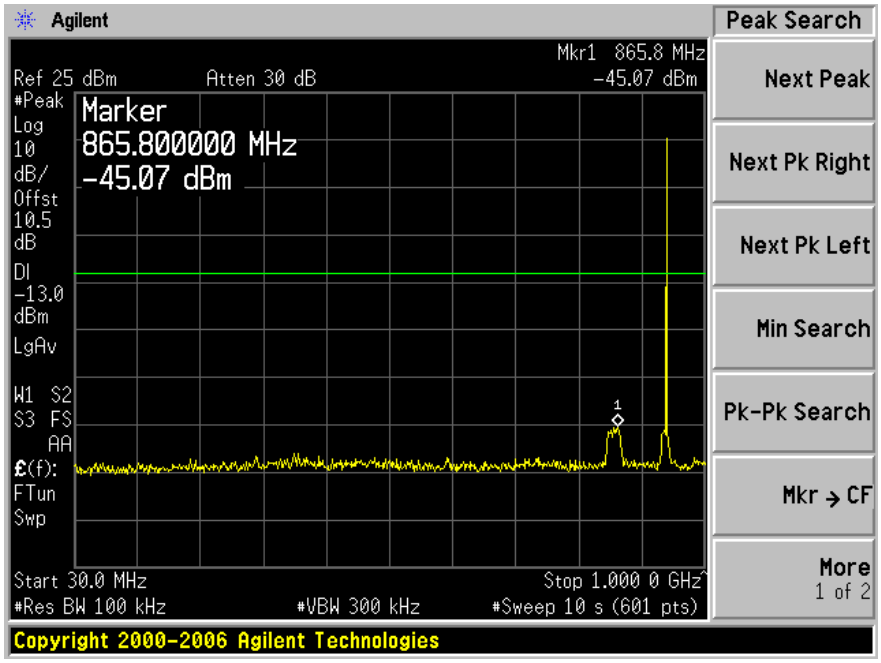


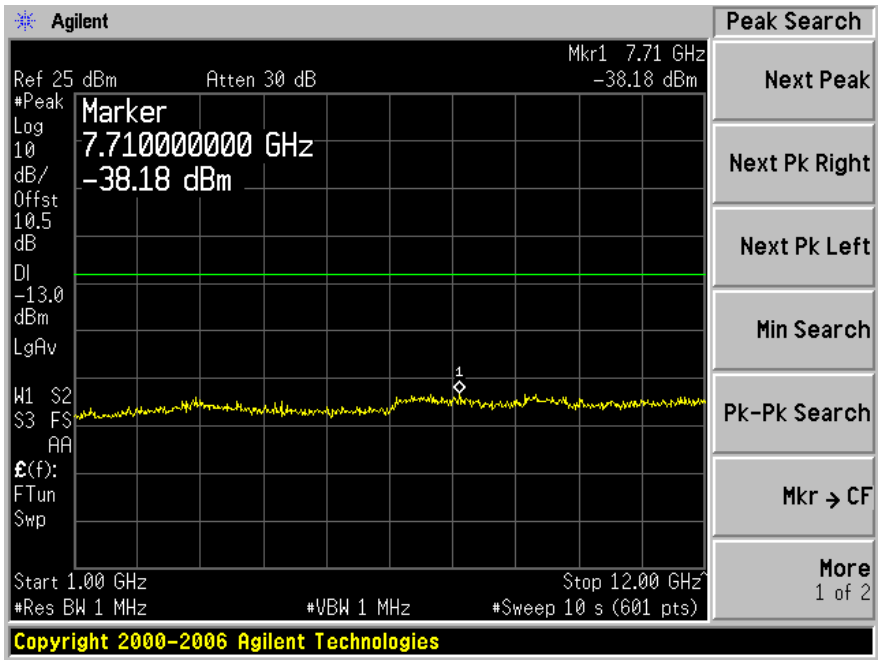
Middle Channel (937.5 MHz)





High Channel (940 MHz)



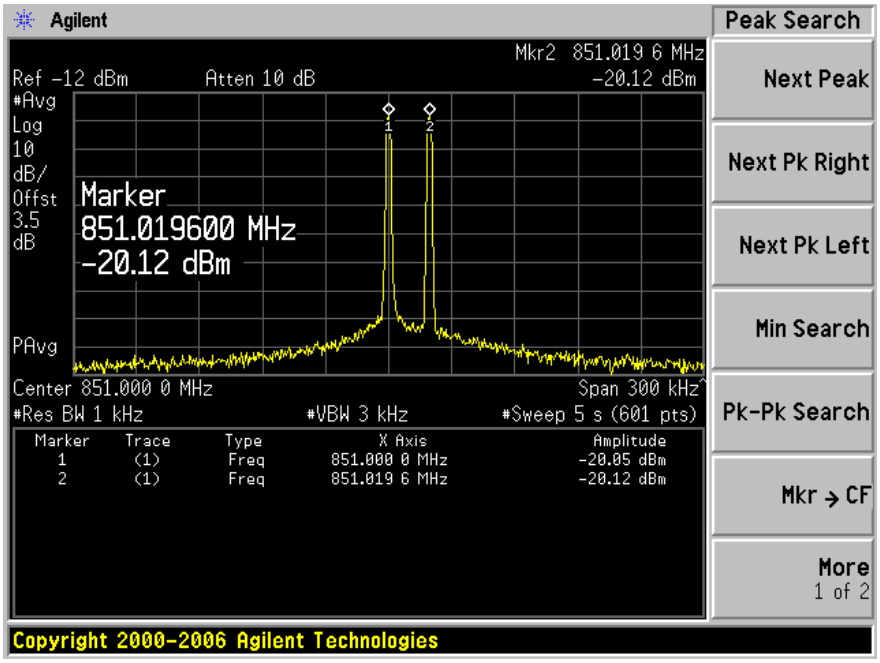


Inter-modulation

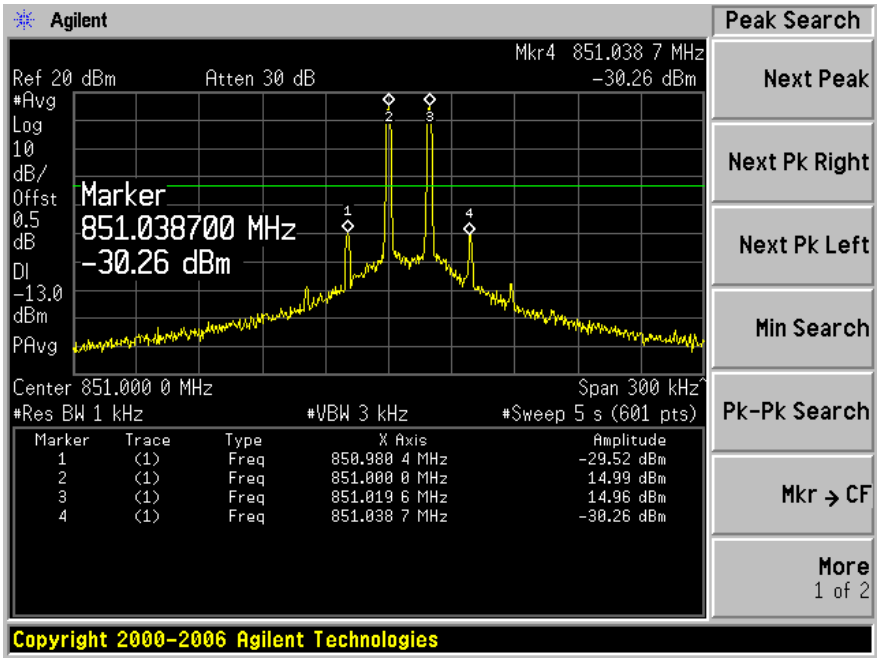
800 MHz Band

Low Channel: 851MHz

Input

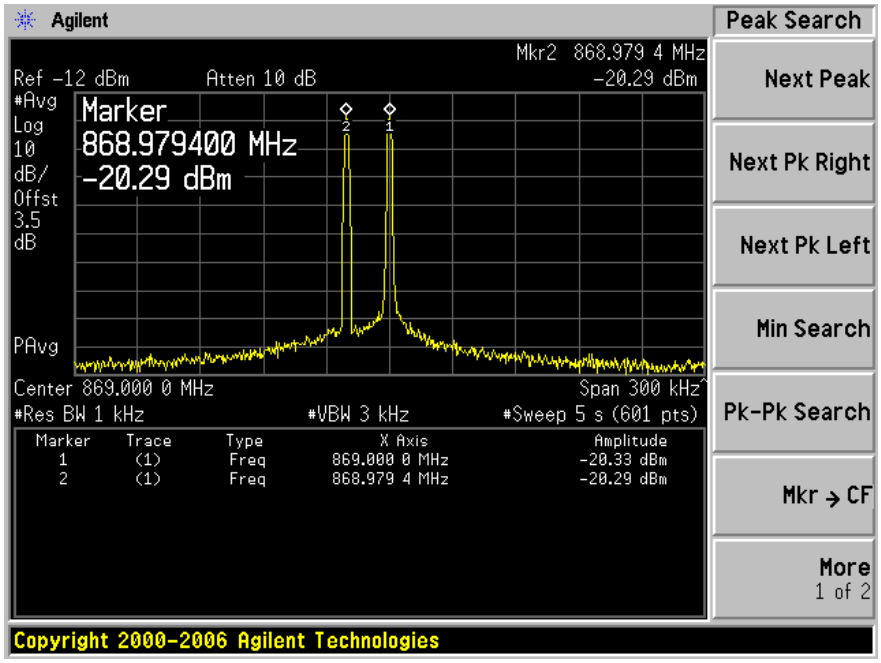


Output

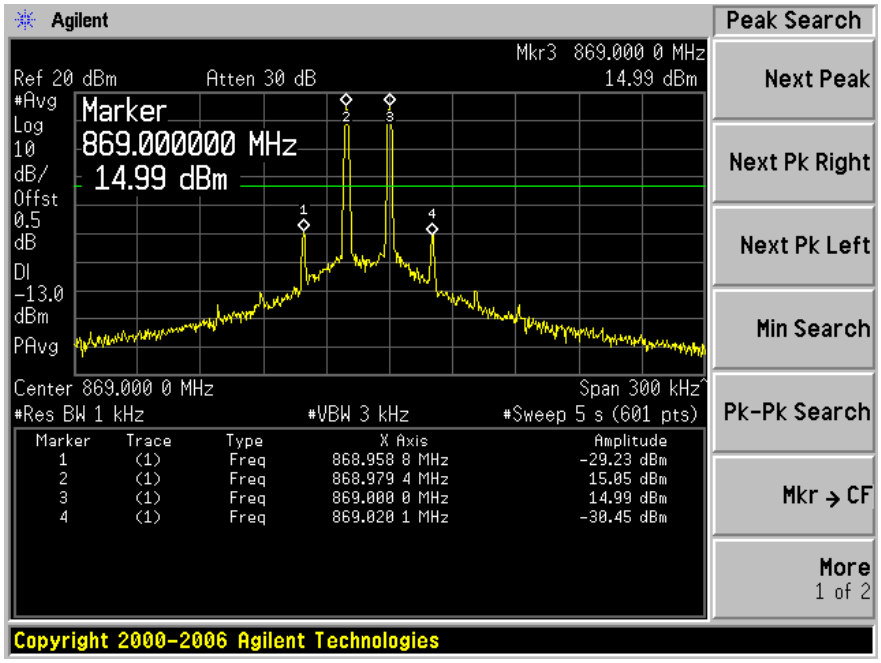


High Channel: 869 MHz

Input



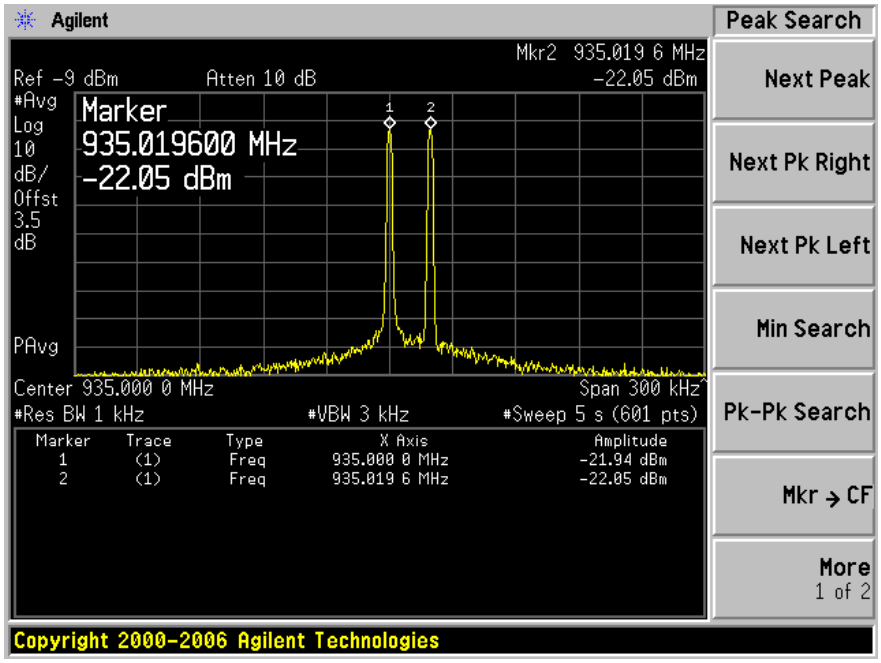
Output



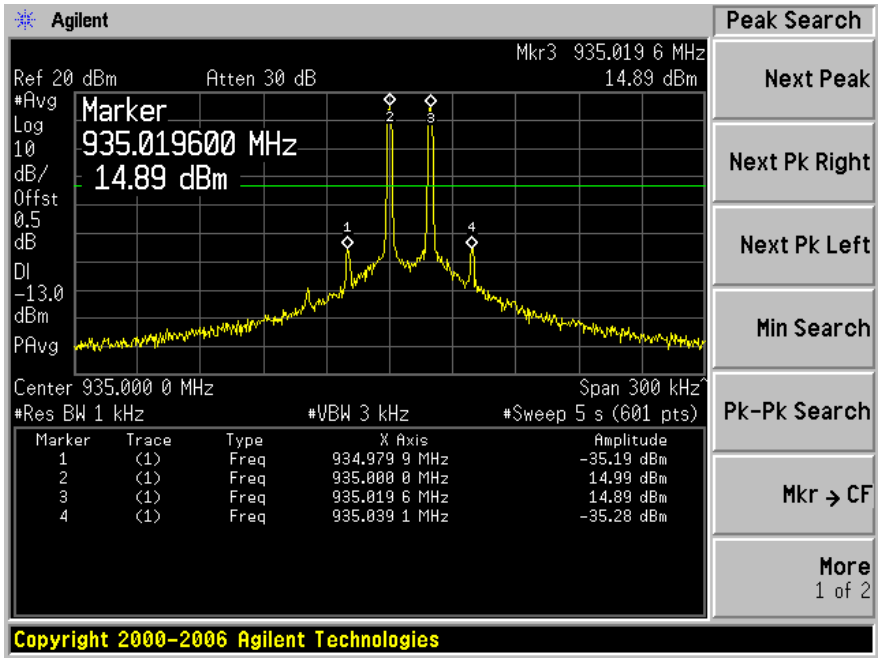
900 MHz Band

Low Channel: 935 MHz

Input

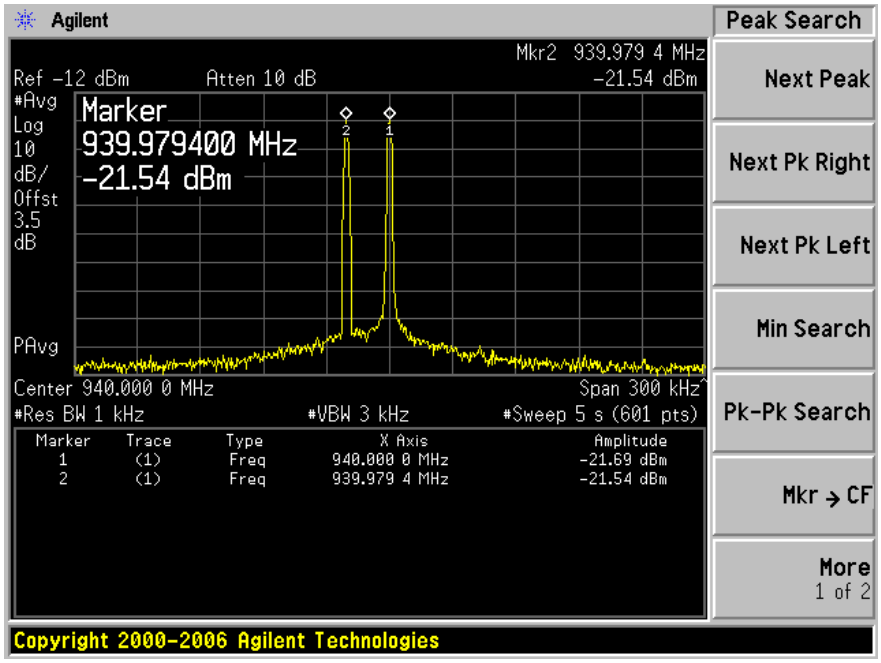


Output

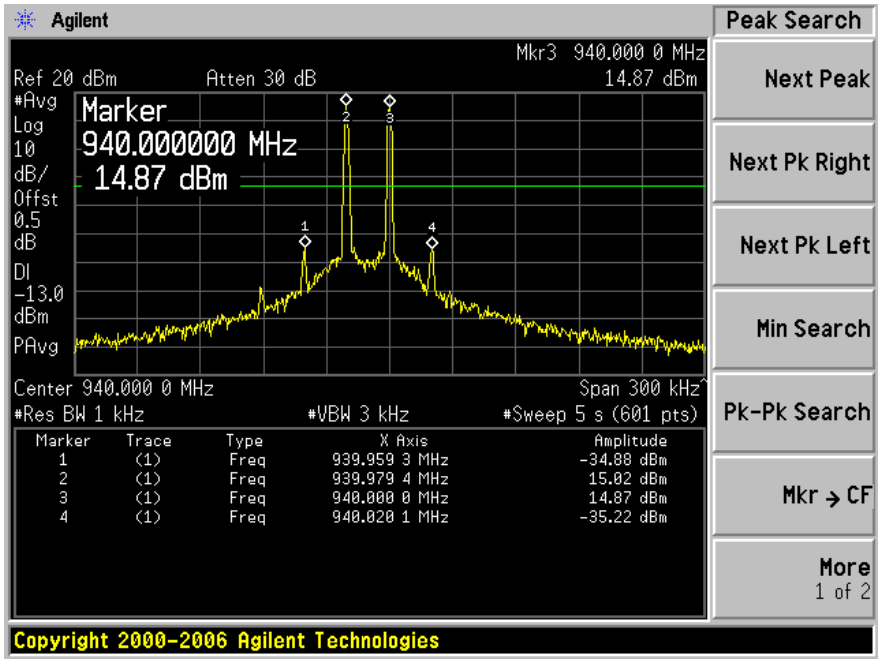


High Channel: 940 MHz

Input



Output



9 FCC §2.1053- SPURIOUS RADIATED EMISSIONS

9.1 Applicable Standard

Requirements: FCC §2.1053.

9.2 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 log (TX Power in Watts/0.001) – the absolute level
Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-06-29
Agilent	MXG Vector Signal Generator	E4438C	MY45092925	2009-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2009-04-29
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
HP	Pre Amplifier	8449B	3147A00400	2010-02-01
A.H Systems	Antenna, Horn	SAS-200/571	261	2009-09-23
A.R.A Inc	Horn antenna	DRG-1181A	1132	2009-10-27
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2009-08-20

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

9.4 Test Environmental Conditions

Temperature:	21-22°C
Relative Humidity:	46-50 %
ATM Pressure:	80-99kPa

** The testing was performed by Dennis Huang on 2010-05-06 in 5 meter chamber #3.*

9.5 Summary of Test Results

The worst case reading as follows:

Operating Frequency Band: 800 MHz			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency**
-23.2	6144	Horizontal	860 MHz

Operating Frequency Band: 900 MHz			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Input Frequency**
-22.59	6144	Horizontal	937.5 MHz

9.6 Test Results

800 MHz Band: CW Signal - Middle Channel 860 MHz

Indicated		**Turntable Azimuth (degree)**	**Test Antenna**		**Substituted**					**Limit (dBm)**	**Margin (dB)**
Frequency (MHz)	**S.A. Amp. (dBuV)**		**Height (m)**	**Polarity (H/V)**	**Frequency (MHz)**	**Level (dBm)**	**Antenna Cord. (dB)**	**Cable Loss (dB)**	**Absolute Level (dBm)**		
6144	55.55	11	1.43	H	6144	-45.1	10.9	2	-36.2	-13	-23.2
1474.5	59.51	39	1.0	H	1474.5	-45.79	8.8	1.34	-38.33	-13	-25.33
1474.5	59.27	136	1	V	1474.5	-46.03	8.8	1.34	-38.57	-13	-25.57
1250	64.85	31	1.75	V	1250	-45.25	7.1	1.34	-39.49	-13	-26.49
6144	52.25	347	1.0	V	6144	-48.4	10.9	2	-39.5	-13	-26.5
3072	56.28	26	1.0	H	3072	-47.77	9.5	1.68	-39.95	-13	-26.95
1250	63.9	288	1.0	H	1250	-46.2	7.1	1.34	-40.44	-13	-27.44
3072	52.44	316	1.0	V	3072	-51.61	9.5	1.68	-43.79	-13	-30.79
2047	55.27	27	1.0	H	2047	-53.01	8.6	1.32	-45.73	-13	-32.73
2047	55.1	38	1.27	V	2047	-53.18	8.6	1.32	-45.9	-13	-32.9

900 MHz Band – CW Signal Middle Channel 937.5 MHz

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Antenna Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
6144	56.16	8	1.49	H	6144	-44.49	10.9	2	-35.59	-13	-22.59
1474.5	60.37	322	1.36	V	1474.5	-44.93	8.8	1.34	-37.47	-13	-24.47
6144	53.7	346	1.59	V	6144	-46.95	10.9	2	-38.05	-13	-25.05
1474.5	58.42	55	1.0	H	1474.5	-46.88	8.8	1.34	-39.42	-13	-26.42
1250	64.65	9	1.17	V	1250	-45.45	7.1	1.34	-39.69	-13	-26.69
1250	63.69	289	1.0	H	1250	-46.41	7.1	1.34	-40.65	-13	-27.65
1875	51.99	306	1.63	H	1875	-52.06	9.6	1.34	-43.8	-13	-30.8
1875	51.52	30	1.32	V	1875	-52.53	9.6	1.34	-44.27	-13	-31.27
2047	55.65	27	1.7	H	2047	-52.63	8.6	1.32	-45.35	-13	-32.35
2047	54.93	38	1.27	V	2047	-53.35	8.6	1.32	-46.07	-13	-33.07

10 FCC §90.213 – FREQUENCY STABILITY

10.1 Applicable Standard

FCC §90.213, ±1 ppm of the Operating Frequency Tuned

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to the Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC 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 AC power supply Source. The voltage was set to 110% 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.

10.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4446A	US44300386	2009-06-29
Agilent	MXG Vector Signal Generator	E4438C	MY45092925	2009-08-13

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

10.4 Test Environmental Conditions

Temperature:	21-22°C
Relative Humidity:	46-50 %
ATM Pressure:	80-99kPa

** The testing was performed by Dennis Huang on 2010-05-04 at RF Site.*

10.5 Test Results

800 MHz Band:

The EUT is tested at 860 MHz with CW

Test Environments		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)
Voltage (ac)	Temperature (^{O}C)				
120	-30	860	860.00005	50	0.05813953
120	-20	860	860.00003	30	0.03488372
120	-10	860	860.00007	70	0.08139535
120	0	860	860.00007	70	0.08139535
120	10	860	860.00007	70	0.08139535
120	20	860	860.00006	60	0.06976744
120	30	860	860.00005	50	0.05813953
120	40	860	860.00007	70	0.08139535
120	50	860	860.00007	70	0.08139535
102	20	860	860.00003	30	0.03488372
138	20	860	860.00005	50	0.05813953

900 MHz Band

The EUT is tested at 937.5 MHz with CW

Test Environments		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)
Voltage (ac)	Temperature (^{O}C)				
120	-30	937.5	937.50007	70	0.07466667
120	-20	937.5	937.50005	50	0.05333333
120	-10	937.5	937.50005	50	0.05333333
120	0	937.5	937.50005	50	0.05333333
120	10	937.5	937.50007	70	0.07466667
120	20	937.5	937.50007	70	0.07466667
120	30	937.5	937.50005	50	0.05333333
120	40	937.5	937.50007	70	0.07466667
120	50	937.5	937.50007	70	0.07466667
102	20	937.5	937.50008	80	0.08533333
138	20	937.5	937.50005	50	0.05333333

11 FCC §1.1307(b)(1) & §2.1091 - RF EXPOSURE

11.1 Applicable Standard

According to §1.1310 and §2.1091 (Mobile Devices) RF exposure is calculated.

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

11.2 MPE Prediction

Predication of MPE limit at a given distance, equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

800 MHz Band:

Maximum peak output power at antenna input terminal (dBm):	15.00
Maximum peak output power at antenna input terminal (mW):	31.622
Prediction distance (cm):	20
Prediction frequency (MHz):	851
Antenna Gain, typical (dBi):	8.0
Maximum Antenna Gain (numeric):	6.31
Power density at predication frequency and distance (mW/cm^2):	0.0397
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.56

900 MHz Band:

Maximum peak output power at antenna input terminal (dBm):	15.00
Maximum peak output power at antenna input terminal (mW):	31.622
Prediction distance (cm):	20
Prediction frequency (MHz):	937.5
Antenna Gain, typical (dBi):	8.0
Maximum Antenna Gain (numeric):	6.31
Power density at predication frequency and distance (mW/cm^2):	0.0397
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	0.625

11.3 Test Results

The device is compliant with the requirement MPE limit for uncontrolled exposure.