PCTEST Engineering Laboratory, Inc.

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http://www.pctestlab.com

CERTIFICATE OF COMPLIANCE
FCC Part 90 Certification

MOTOROLA, INC.
8000 West Sunrise Blvd.
Ft. Lauderdale, FL 33322

Dates of Tests: March 22-24, 2004
Test Report S/N: 90.240309237-R1.AZ4
Test Site: PCTEST Lab, MD U.S.A.

FCC ID	**AZ489FT5831**
APPLICANT	**MOTOROLA, INC.**

Classification:	**Licensed Non-Broadcast Transmitter Held to Ear (TNE)**
FCC Rule Part(s):	**§ 90**
EUT Type:	**Dual-Mode PTT Phone (iDEN/ISM)**
Model(s):	***M68XAM6RR1AN***
Tx Frequency Range:	**806.013 – 824.987 MHz (iDEN/33)** **896.019 – 901.981 MHz (iDEN II/33)**
Max. RF Output Power:	**0.563 W ERP iDEN/33 (27.503 dBm)** **0.574 W ERP iDEN II/33 (27.593 dBm)**
Frequency Tolerance:	**2.5 ppm**
Emission Designator:	**18K3D7W**

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

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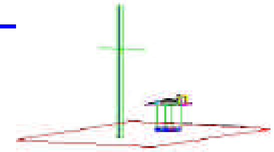
MEASUREMENT REPORT



1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

General Information

Applicant Name:	**Motorola Inc.**
Address:	**8000 West Sunrise Blvd.** **Ft. Lauderdale, FL 33322**

- FCC ID: AZ489FT5831
- Model(s): *M68XAM6RR1AN*
- Quantity: Quantity production is planned
- Emission Designator: 18K3D7W
- Tx Freq. Range: 806.013 – 824.987 MHz (iDEN/33)
  896.019 – 901.981 MHz (iDEN II/33)
- Equipment Class: Licensed Non-Broadcast Transmitter Held to Ear (TNE)
- Equipment Type: Dual-Mode PTT Phone (iDEN/ISM)
- Modulation: iDEN/ISM
- Frequency Tolerance: ± 2.5 ppm
- Max. RF Output Power: 0.940 W ERP iDEN/33 (29.733 dBm)
  0.940 W ERP iDEN II/33 (29.733 dBm)
- FCC Rule Part(s): § 90
- Dates of Tests: March 22-24, 2004
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 90.240309237-R1.AZ4

2.1 INTRODUCTION

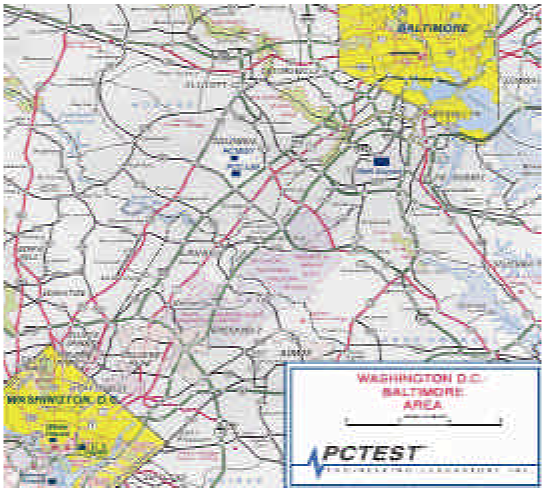


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

Measurement Procedure

The radiated and spurious measurements were made outdoors at a 3-meter test range (see Figure2). The equipment under testing was placed on a wooden turntable, 3-meters from the receive antenna. The receive antenna height and turntable rotations was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level was recorded.

For readings above 1 GHZ, the above procedure would be repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

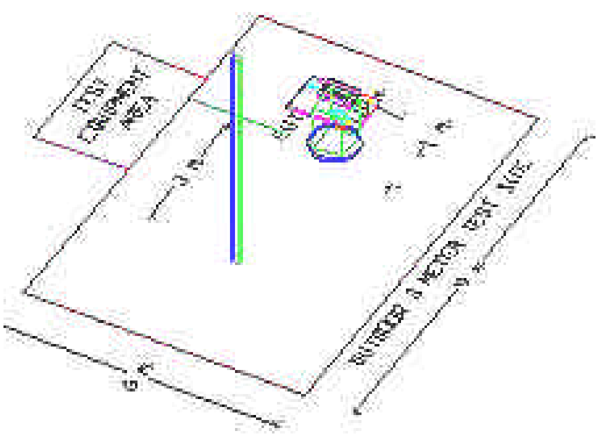


Figure 2. 3-meter outdoor test site

3.1 INSERTS

Function of Active Devices (Confidential)

The Function of active devices are shown in Exhibit H.

Block & Schematic Diagrams (Confidential)

The block diagrams are shown in Exhibit E, and the schematic diagrams are shown in Exhibit F.

Operating Instructions

The instruction manual is shown in Exhibit I.

Parts List & Tune-Up Procedure (Confidential)

The parts list & tune-up procedure is shown in Exhibit G.

Description of Freq. Stabilization Circuit (Confidential)

The description of frequency stabilization circuit is shown in Exhibit H.

Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppresion Circuits (Confidential)

The description of suppression stabilization circuits is shown in Exhibit H.

4.1 DESCRIPTION OF TESTS

4.2 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions above 1 GHz is measured at out 3-meter indoor site. The EUT is placed on the turntable connected to a dummy load in normal operation using the intended power source. A receiving antenna located 3 meters from the turntable receives any signal radiated from the transmitter and its operating accessories. The antenna is varied from 1 to 4 meters and the polarization is varied (horizontal and vertical) to determine the worst-case emission level. To obtain actual radiated signal strength, a signal generator is adjusted in output until a reading identical to that obtained with the actual transmitter is obtained at the receiver. Signal strength is read directly from the generator and recorded on the attached table.

4.3 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and an high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter (signals below 1.6 GHz) is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

4.4 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

5.0 Frequency Stability/Temperature Variation.

The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +60°C using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification **–** *The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025 (±2.5 ppm) of the center frequency.*

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (22°C to 25°C to provide a reference).
2. The equipment is subjected to an overnight "soak" at -30°C without any power applied.
3. After the overnight "soak" at -30°C (usually 14-16 hours), the equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30°C up to +50°C allowing at least two hours at
   each temperature for stabilization. In all measurements the frequency is measured within three minutes
   after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

NOTE: The EUT is tested down to the battery endpoint.

	Land Mobile				**ISM**
Characteristics	**800 MHz**		**900 MHz**		**902-928 MHz**
Power Setting	**maximum**	**minimum**	**maximum**	**minimum**	**maximum**
DC Voltage (Volts)	4	4	4	4	4
DC Current (A)	1.46	0.687	1.49	0. 687	1.4
Output Power (mW)	691	0.0775	697	0.0740	891

Table 1 Characteristics for 800 and 900 MHz bands

5.1 Test Data

5.2 Effective Radiated Power Output

A. POWER: iDEN/33 Mode

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
806.013	-13.940	V	0.536	27.293	Standard
813.513	-13.840	V	0.563	27.503	Standard
824.987	-14.140	V	0.541	27.333	Standard
813.513	-14.940	V	0.437	26.403	Extended

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

5.1 Test Data (Continued)

5.3 Effective Radiated Power Output

A. POWER: iDEN II/33 Mode

Freq. Tuned (MHz)	REF. LEVEL (dBm)	AFCL (dB)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
869.019	-13.940	31.65	V	0.541	27.333	Standard
898.494	-13.840	31.81	V	0.574	27.593	Standard
901.981	-14.140	31.96	V	0.555	27.443	Standard
898.494	-14.940	31.81	V	0.446	26.493	Extended

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

6.1 Test Data (Continued)

6.2 iDEN/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 806.013 MHz
CHANNEL: Low
MEASURED OUTPUT POWER: 27.503 dBm = 0.563 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10} (W) =$ 40.50 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1612.03	-41.88	6.10	-35.78	V	63.3
2418.04	-31.28	6.70	-24.58	V	52.1
3224.05	-47.08	6.80	-40.28	V	67.8
4030.06	-56.08	6.50	-49.58	V	77.1
4836.08	-61.28	7.00	-54.28	V	81.8

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

6.1 Test Data (Continued)

6.3 iDEN/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 813.513 MHz
CHANNEL: Mid
MEASURED OUTPUT POWER: 27.503 dBm = 0.563 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 40.50 dBc

FREQ. (MHz)	**LEVEL @ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1627.03	-40.98	6.10	-34.88	V	62.4
2440.54	-30.58	6.70	-23.88	V	51.4
3254.05	-47.58	6.80	-40.78	V	68.3
4067.56	-55.48	6.50	-48.98	V	76.5
4881.08	-58.78	7.00	-51.78	V	79.3

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:
The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

6.1 Test Data (Continued)

6.4 iDEN/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.987 MHz
CHANNEL: High
MEASURED OUTPUT POWER: 27.503 dBm = 0.563 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: $43 + 10\log_{10}$ (W) = 40.50 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.97	-41.68	6.10	-35.58	V	63.1
2474.96	-30.18	6.70	-23.48	V	51.0
3299.95	-47.08	6.80	-40.28	V	67.8
4124.94	-55.78	6.50	-49.28	V	76.8
4949.92	-60.18	7.00	-53.18	V	80.7

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:
The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

6.1 Test Data (Continued)

6.5 iDEN II/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 896.019 MHz
CHANNEL: Low
MEASURED OUTPUT POWER: 27.593 dBm = 0.574 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: 43 + 10 $\log_{10}$ (W) = 40.59 dBc

FREQ. (MHz)	**LEVEL @ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1792.04	-41.38	6.10	-35.28	V	62.9
2688.06	-31.88	6.70	-25.18	V	52.8
3584.08	-45.98	6.80	-39.18	V	66.8
4480.09	-54.98	6.50	-48.48	V	76.1
5376.11	-59.78	7.00	-52.78	V	80.4

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

6.1 Test Data (Continued)

6.6 iDEN II/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 898.494 MHz
CHANNEL: Mid
MEASURED OUTPUT POWER: 27.593 dBm = 0.574 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10}$ (W) = 40.59 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1796.99	-41.98	6.10	-35.88	V	63.5
2695.48	-32.08	6.70	-25.38	V	53.0
3593.98	-46.58	6.80	-39.78	V	67.4
4492.47	-54.18	6.50	-47.68	V	75.3
5390.96	-58.58	7.00	-51.58	V	79.2

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:
The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

6.1 Test Data (Continued)

6.7 iDEN II/33 Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 901.981 MHz
CHANNEL: High
MEASURED OUTPUT POWER: 27.593 dBm = 0.574 W
MODULATION SIGNAL: iDEN (Internal)
DISTANCE: 3 meters
LIMIT: $43 + 10 \log_{10}$ (W) = 40.59 dBc

FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1803.96	-41.88	6.10	-35.78	V	63.4
2705.94	-31.98	6.70	-25.28	V	52.9
3607.92	-47.08	6.80	-40.28	V	67.9
4509.91	-53.58	6.50	-47.08	V	74.7
5411.89	-58.98	7.00	-51.98	V	79.6

NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:
The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.1 TEST DATA

Radiated Spurious Measurements

Freq. (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	Height (m)	Azimuth (°angle)	F/S (uV/m)	Margin (dB)
147.3	- 85.13	13.44	V	2.3	10	58.26	- 8.2
151.5	- 87.1	13.71	V	2.2	80	47.91	- 9.9
187.64	- 88.78	15.88	H	1.9	210	50.75	- 9.4
263.8	- 88.29	19.30	H	1.6	140	79.48	- 8.0
270.5	- 177.38	107.18	V	1.3	180	69.23	- 9.2
545.0	- 90.52	27.02	H	1.1	210	149.67	- 2.5

Table A-1. Radiated Measurements at 3-meters

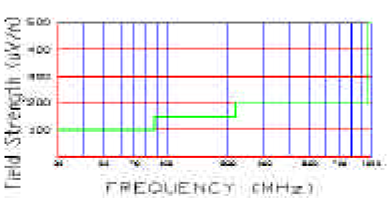


Figure A-1. Limits at 3 meters

NOTES:

1. All modes of operation were investigated and the worst-case emissions are reported.

2. The radiated limits are shown on Figure A-1. Above 1 GHz the limit is 500µV/m.

[1] All readings are calibrated by HP8640B signal generator with accuracy traceable to the National Institute of Standards and Technology (NIST).

[2] AFCL = Antenna Factor (Roberts dipole) and Cable Loss (30 ft. RG58C/U).

[3] Measurements using CISPR quasi-peak mode. Above 1GHz, peak detector function mode is used with a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

8.1 Test Data

8.2 FREQUENCY STABILITY (iDEN/33)

OPERATING FREQUENCY: 813,512,503 Hz

CHANNEL: Mid

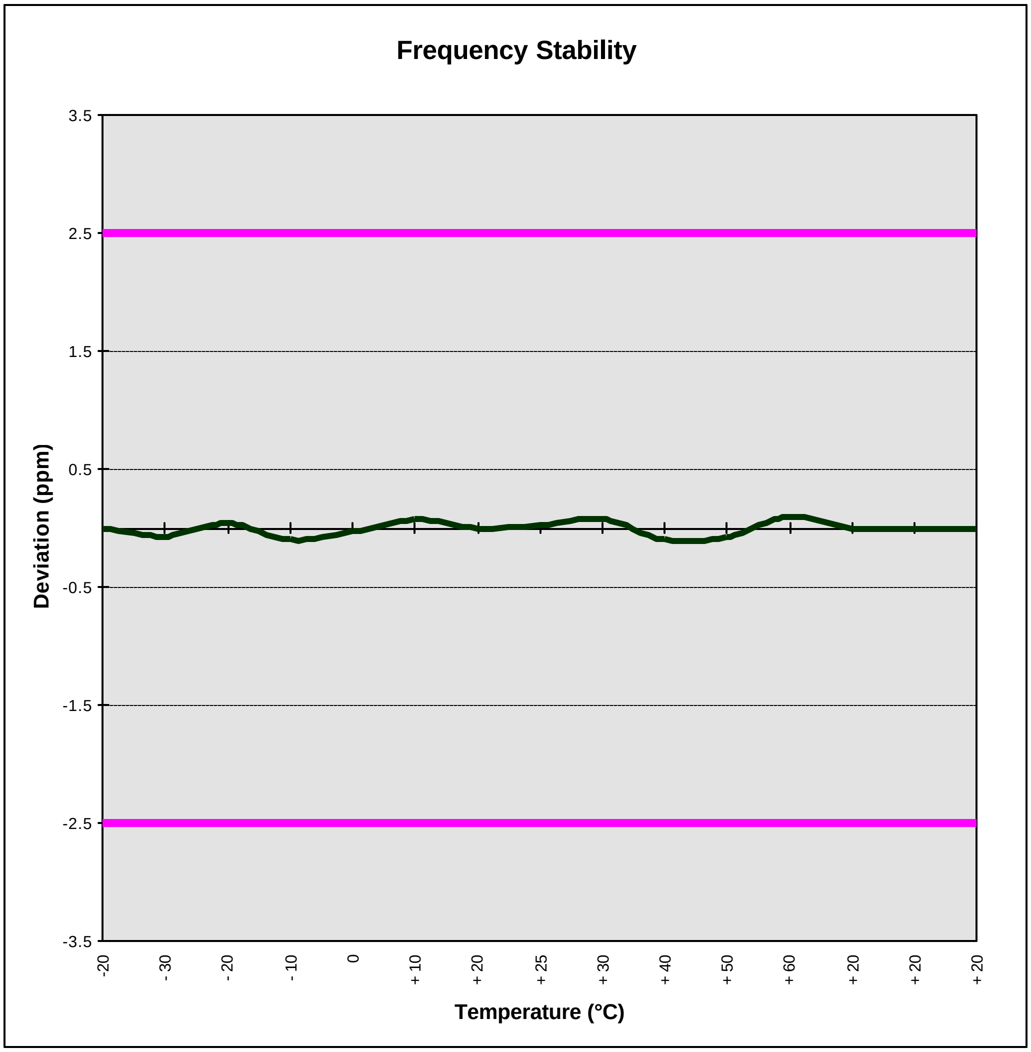
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	813,512,503	0.000000
100 %		- 30	813,512,560	-0.000007
100 %		- 20	813,512,470	0.000004
100 %		- 10	813,512,584	-0.000010
100 %		0	813,512,527	-0.000003
100 %		+ 10	813,512,446	0.000007
100 %		+ 20	813,512,503	0.000000
100 %		+ 25	813,512,487	0.000002
100 %		+ 30	813,512,438	0.000008
100 %		+ 40	813,512,584	-0.000010
100 %		+ 50	813,512,568	-0.000008
100 %		+ 60	813,512,422	0.000010
85 %	3.17	+ 20	813,512,503	0.000000
115 %	4.26	+ 20	813,512,503	0.000000
BATT. ENDPOINT	2.86	+ 20	813,512,503	0.000000

8.1 Test Data (Continued)

8.3 FREQUENCY STABILITY (iDEN/33)



8.1 Test Data (Continued)

8.4 FREQUENCY STABILITY (iDEN II/33)

OPERATING FREQUENCY: 898,493,753 Hz

CHANNEL: Mid

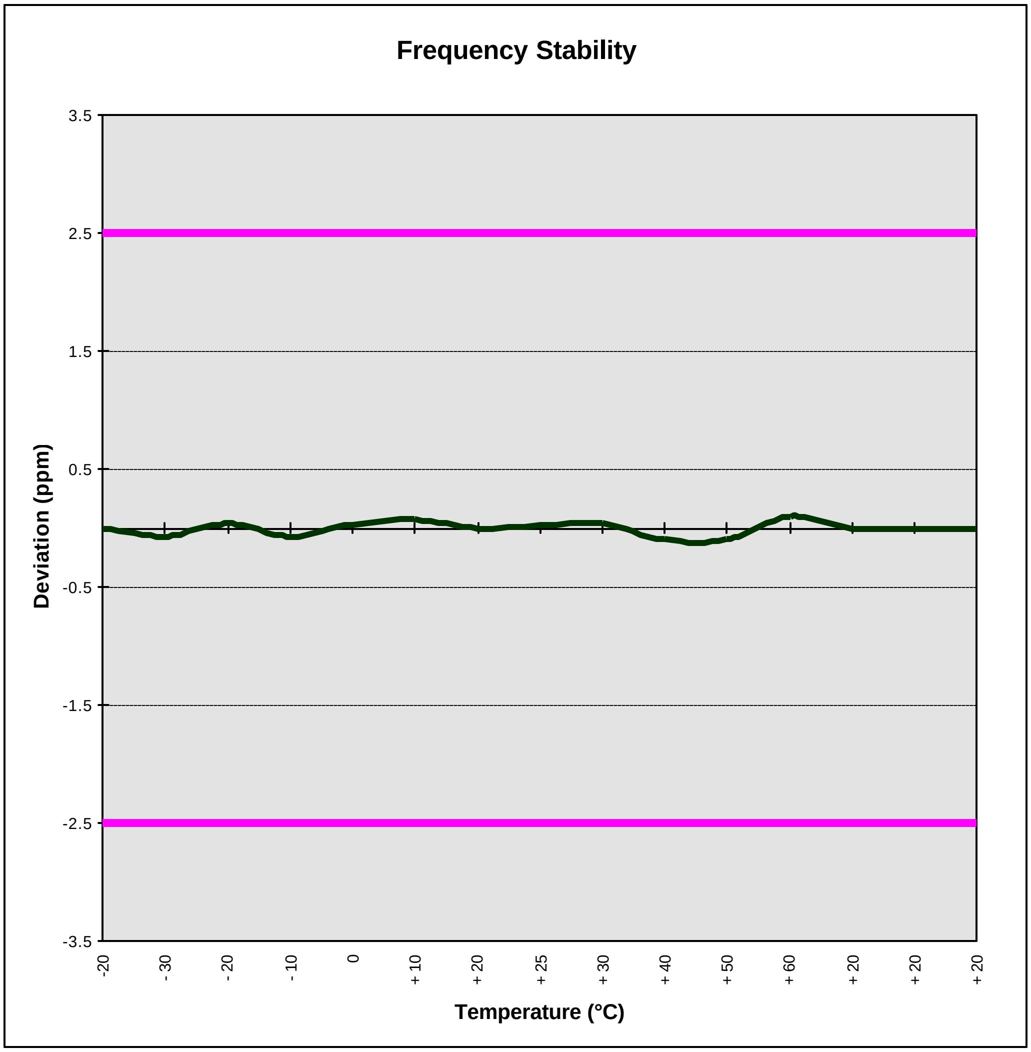
REFERENCE VOLTAGE: 3.7 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (ºC)	FREQ. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	898,493,753	0.000000
100 %		- 30	898,493,816	-0.000007
100 %		- 20	898,493,717	0.000004
100 %		- 10	898,493,816	-0.000007
100 %		0	898,493,726	0.000003
100 %		+ 10	898,493,690	0.000007
100 %		+ 20	898,493,753	0.000000
100 %		+ 25	898,493,735	0.000002
100 %		+ 30	898,493,717	0.000004
100 %		+ 40	898,493,843	-0.000010
100 %		+ 50	898,493,843	-0.000010
100 %		+ 60	898,493,663	0.000010
85 %	3.17	+ 20	898,493,753	0.000000
115 %	4.26	+ 20	898,493,753	0.000000
BATT. ENDPOINT	2.87	+ 20	898,493,753	0.000000

8.1 Test Data (Continued)

8.5 FREQUENCY STABILITY (iDEN II/33)



9.1 PLOT(S) OF EMISSIONS

(SEE APPENDIX D)

10.1 TEST EQUIPMENT

10.2 Type	Model	Cal. Due Date	S/N
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	08/15/04	3638A08713
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/04	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (100Hz-1.8GHz)	08/10/04	3144A02458
Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/04	2232A19558
Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/04	1851A09816
Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/04	94215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/04	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/05	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	09/17/04	0608-03241
Quasi-Peak Adapter	HP 85650A	08/15/04	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	3/11/05	0194-04082
RG58 Coax Test Cable	No. 167		n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)		3531A00115
Broadband Amplifier (2)	HP 8447D		1145A00470, 1937A03348
Broadband Amplifier	HP 8447F		2443A03784
Transient Limiter	HP 11947A (9kHz-200MHz)		2820A00300
Horn Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design		1295, 1332, 0355
Log-Spiral Antenna (3)	Ailtech/Eaton 93490-1		0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set)		
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCO LISN	3816/2		1079
EMCO LISN	3816/2		1077
EMCO LISN	3725/2		2009
Microwave Preamplifier 40dB Gain	HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Ailtech/Eaton Receiver	NM37/57A-SL		0792-03271
Spectrum Analyzer	HP 8594A		3051A00187
Spectrum Analyzer (2)	HP 8591A		3034A01395, 3108A02053
Modulation Analyzer	HP 8901A		2432A03467
NTSC Pattern Generator	Leader 408		0377433
Noise Figure Meter	HP 8970B		3106A02189
Noise Figure Meter	Ailtech 7510		TE31700
Noise Generator	Ailtech 7010		1473
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Shielded Screen Room	RF Lindgren Model 26-2/2-0		6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81		R2437 (PCT278)
Enviromental Chamber	Associated Systems Model 1025 (Temperature/Humidity)		PCT285

* Calibration traceable to the National Institute of Standards and Technology (NIST).

11.1 SAMPLE CALCULATIONS

Modulation Characteristics and Necessary Bandwidth -- Pursuant 47 CFR 2.1033(c)13, 2.1047(d) & 2.202

Digitally encoded speech or digital data is transmitted in four sub-channels at a 4 kHz rate using M-ary symbols mapped to predetermined fixed magnitude and phase components within 1 of 3 constellations associated with a particular modulation scheme. Figure 6-2 illustrates symbol mapping to one of the four QPSK sub-channels constellations. Figure 6-3 illustrates symbol mapping to one of the four 16QAM sub-channels constellation. Figure 6-4 illustrates symbol mapping to one of the four 64QAM sub-channels constellation. For Quad-QPSK modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 4 points on the constellation. For Quad-16QAM modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 16 points on the constellation. For Quad-64 modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 64 points on the constellation. The bandwidth of the modulating signals is limited by the pair of modulation limiting low pass filters within the modem block function of U801 (see Figure 4-2 in Exhibit 4.3). These filters serve to limit out-of-band and spurious emissions due to modulation. The necessary bandwidth of the sub-channels is limited to 4.8 kHz by the pair of modulation limiting low pass filters. The transfer response of these filters is depicted in Figure 6-1 where the filter excess bandwidth coefficient of 0.2 is shown. This excess bandwidth leads to the necessary bandwidth calculation of (1 + 0.2) x (4 kHz) = 4.8 kHz. Since the sub-channels are spaced 4.5 kHz apart, the necessary bandwidth of the composite 4 sub-channel symbol streams is 4.8 + (3 x 4.5) = 18.3 kHz.

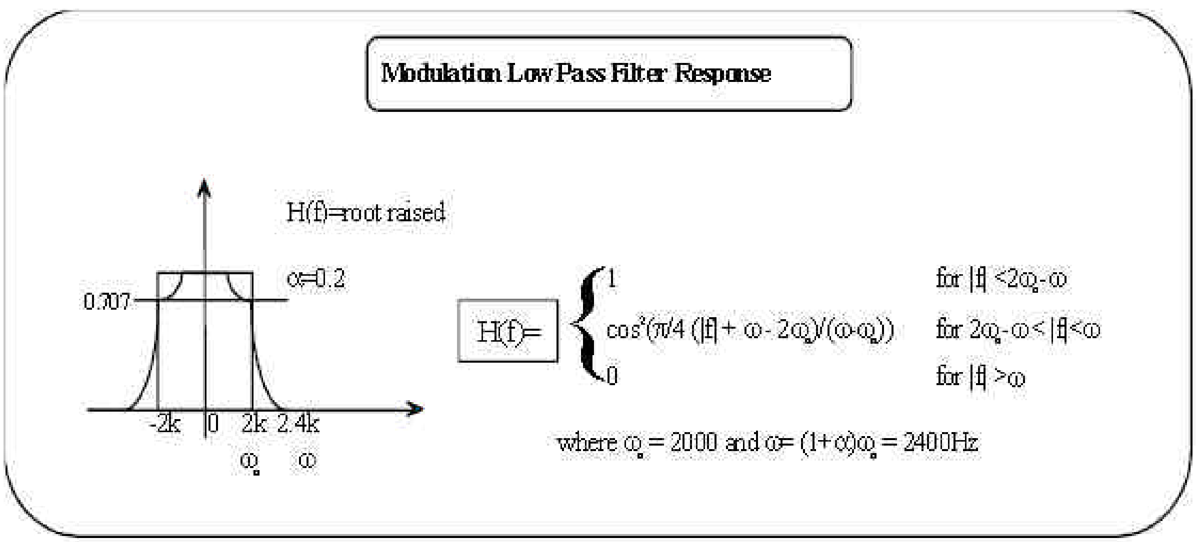


Figure 6-1: Modulation Low Pass Filter Response

11.1 SAMPLE CALCULATIONS (Continued)

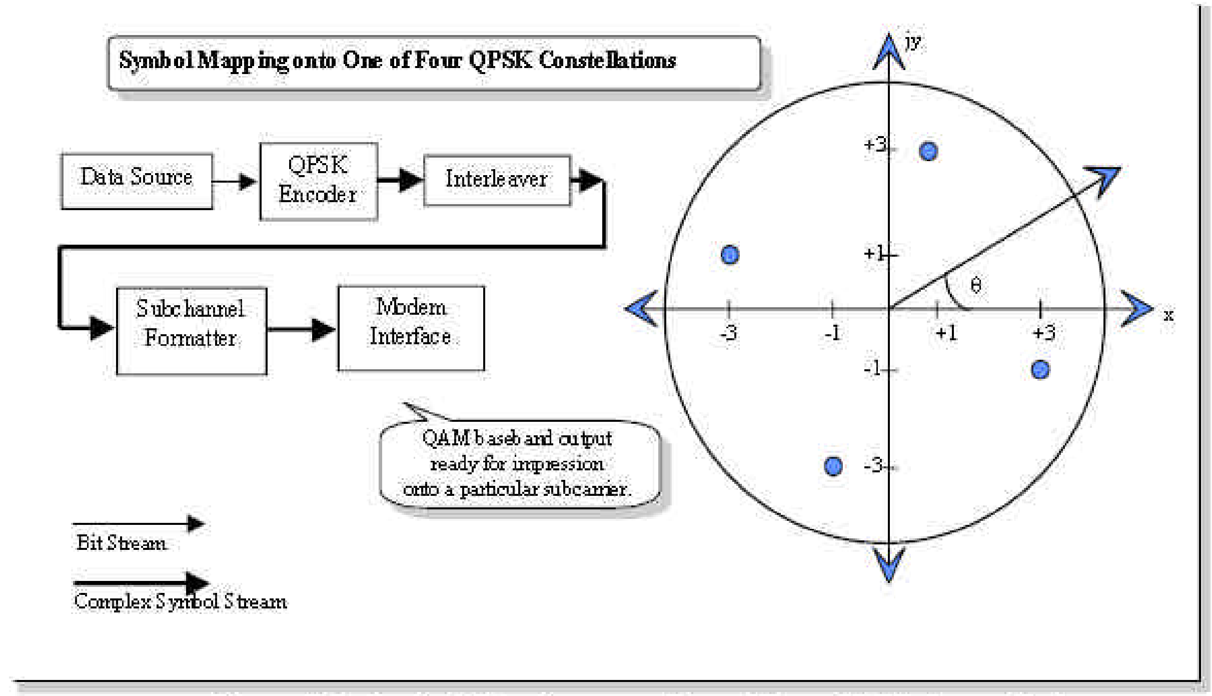


Figure 6-2: Symbol Mapping onto One of Four QPSK Constellations

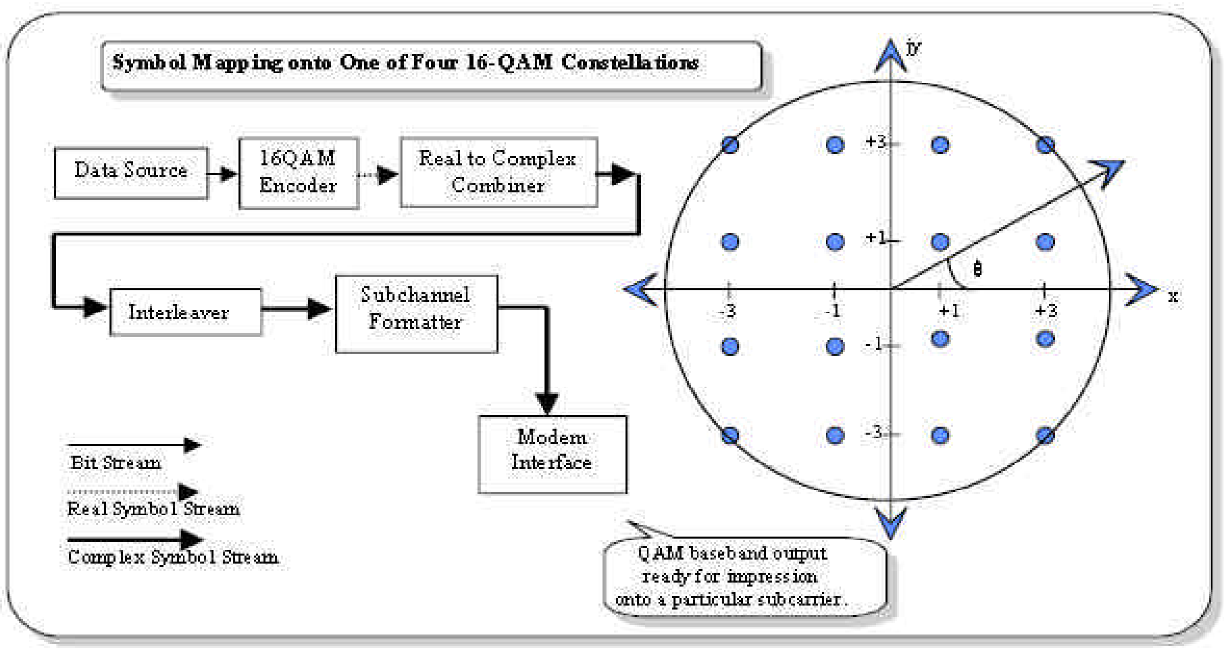


Figure 6-3: Symbol Mapping onto One of Four 16-QAM Constellations

11.1 SAMPLE CALCULATIONS (Continued)

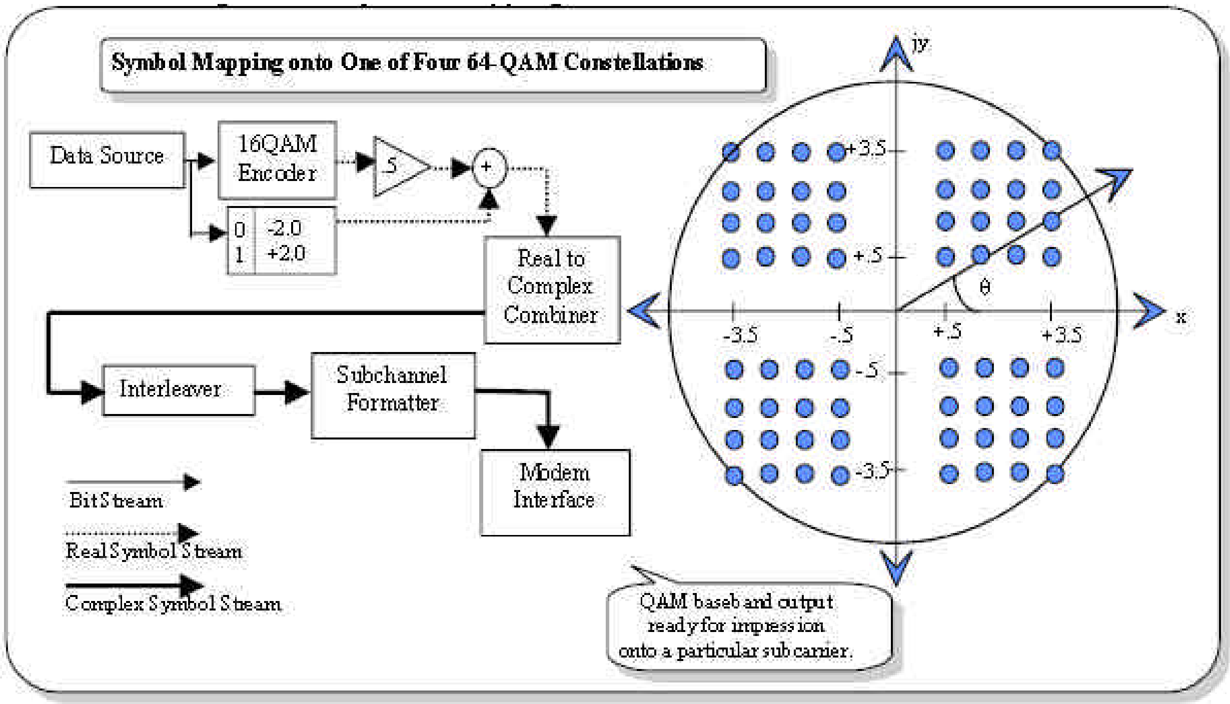
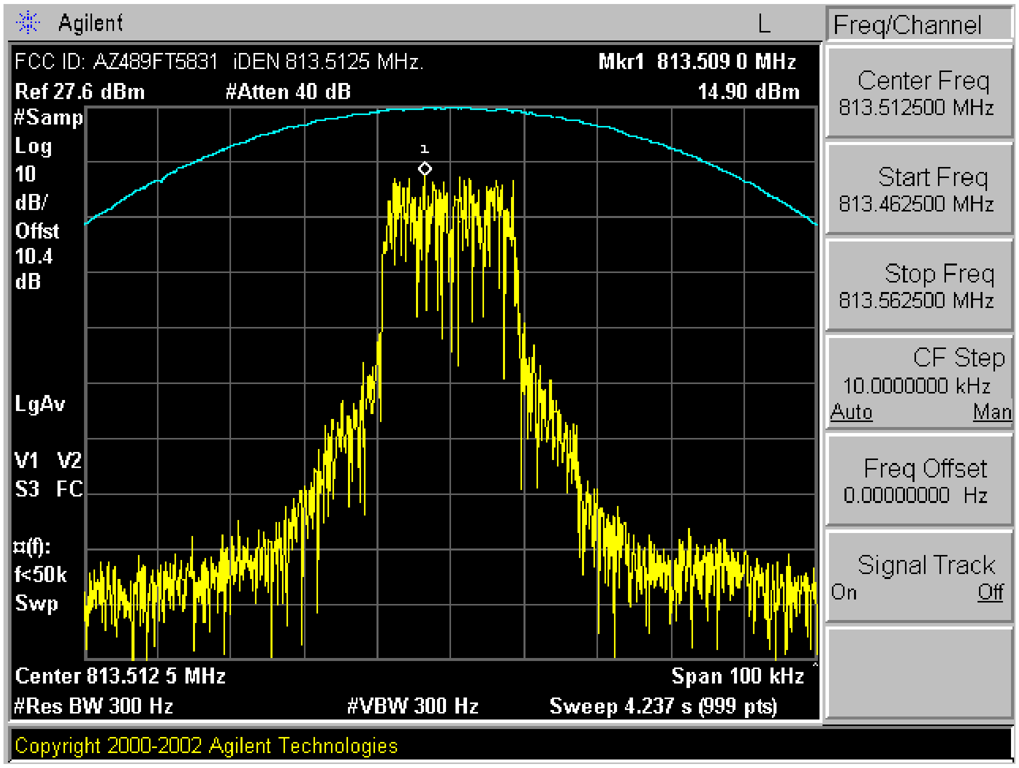


Figure 6-4: Symbol Mapping onto One of Four 64-QAM Constellations

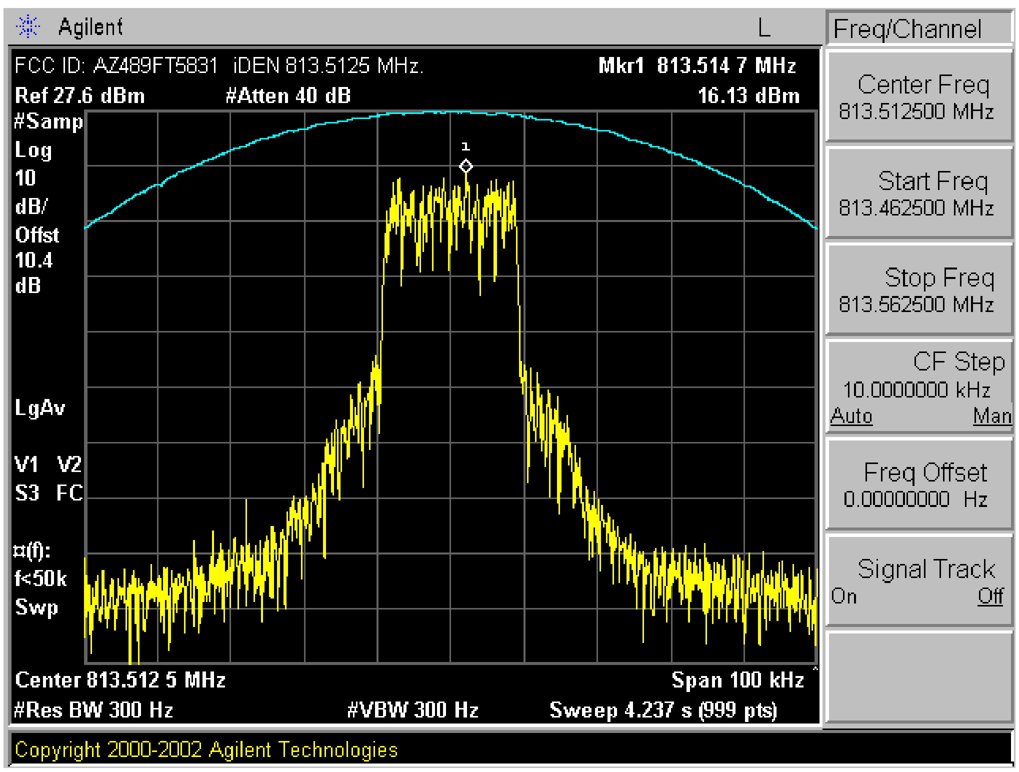
12.1 CONCLUSION

The data collected shows that the **MOTOROLA Dual-Mode PTT Phone (iDEN/ISM) FCC ID: AZ489FT5831** complies with all the requirements of Part 90 of the FCC rules.

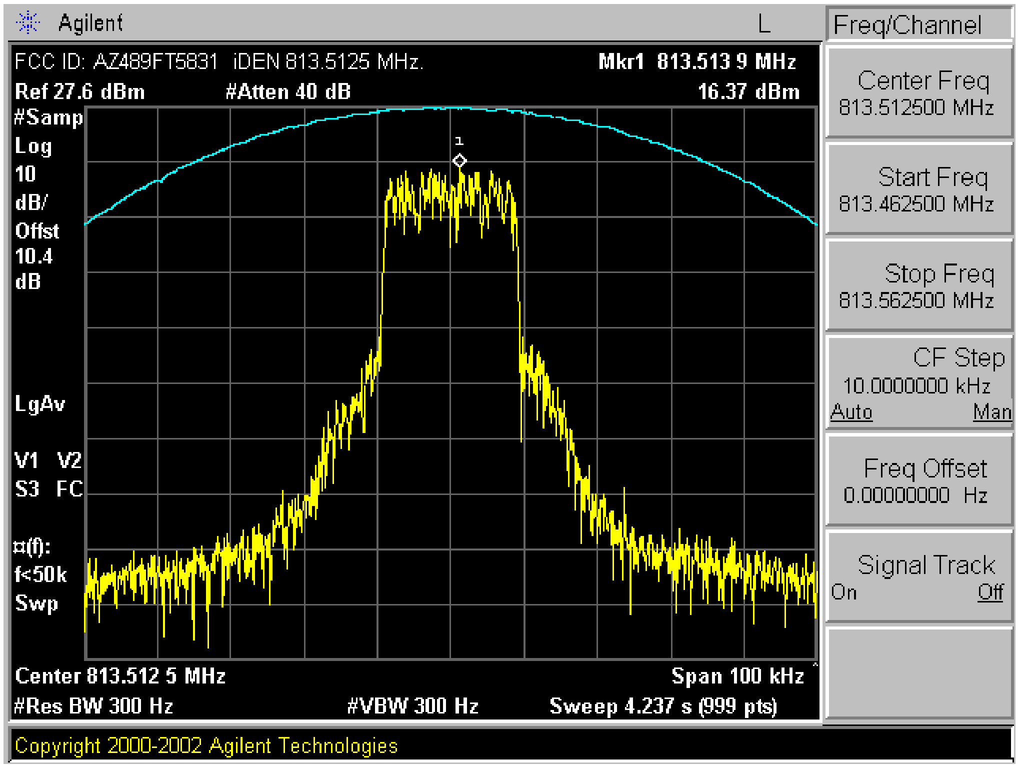
APPENDIX A: TEST PLOTS

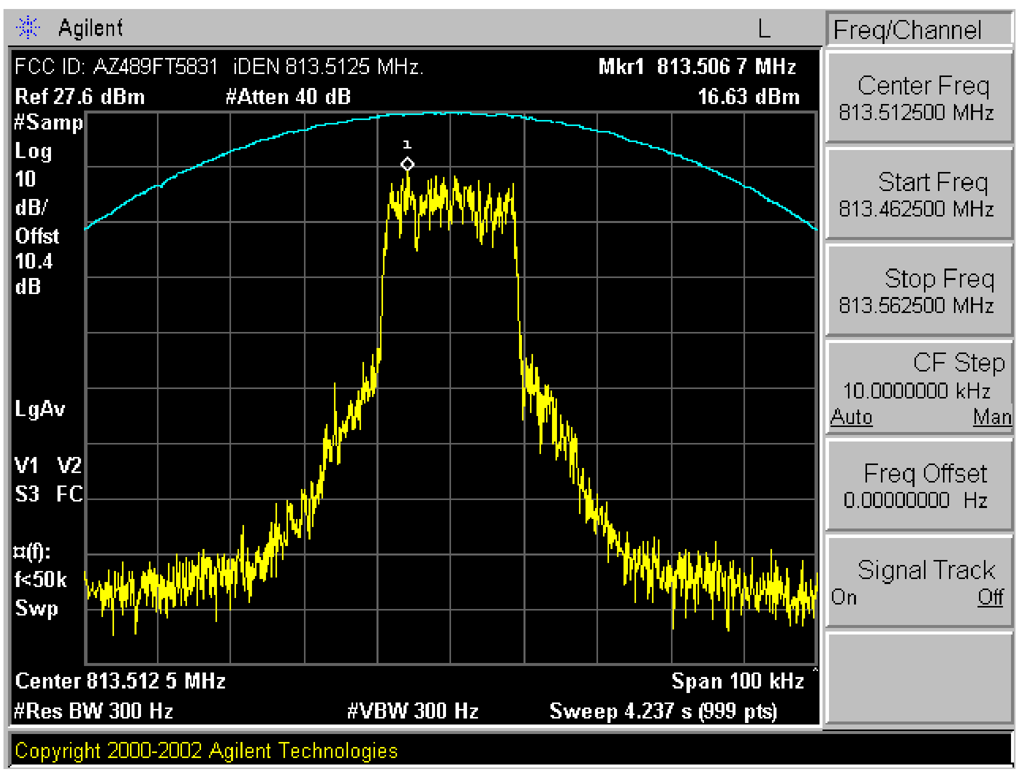


Agilent
Freq/Channel
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.509 0 MHz
Ref 27.6 dBm
#Atten 40 dB
14.90 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies



Agilent
Freq/Channel
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.514 7 MHz
Ref 27.6 dBm
#Atten 40 dB
16.13 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.513 9 MHz
Ref 27.6 dBm
#Atten 40 dB
16.37 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Copyright 2000-2002 Agilent Technologies
Freq/Channel
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent
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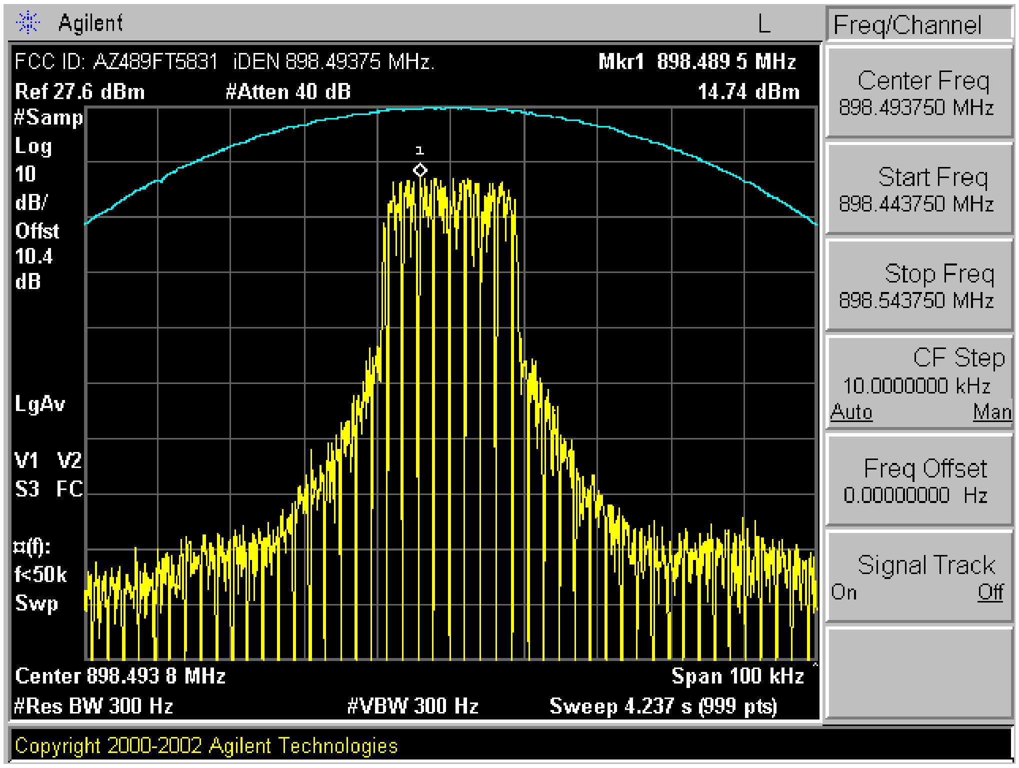
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.506 7 MHz
Ref 27.6 dBm
#Atten 40 dB
16.63 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Copyright 2000-2002 Agilent Technologies
Freq/Channel
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off


Agilent
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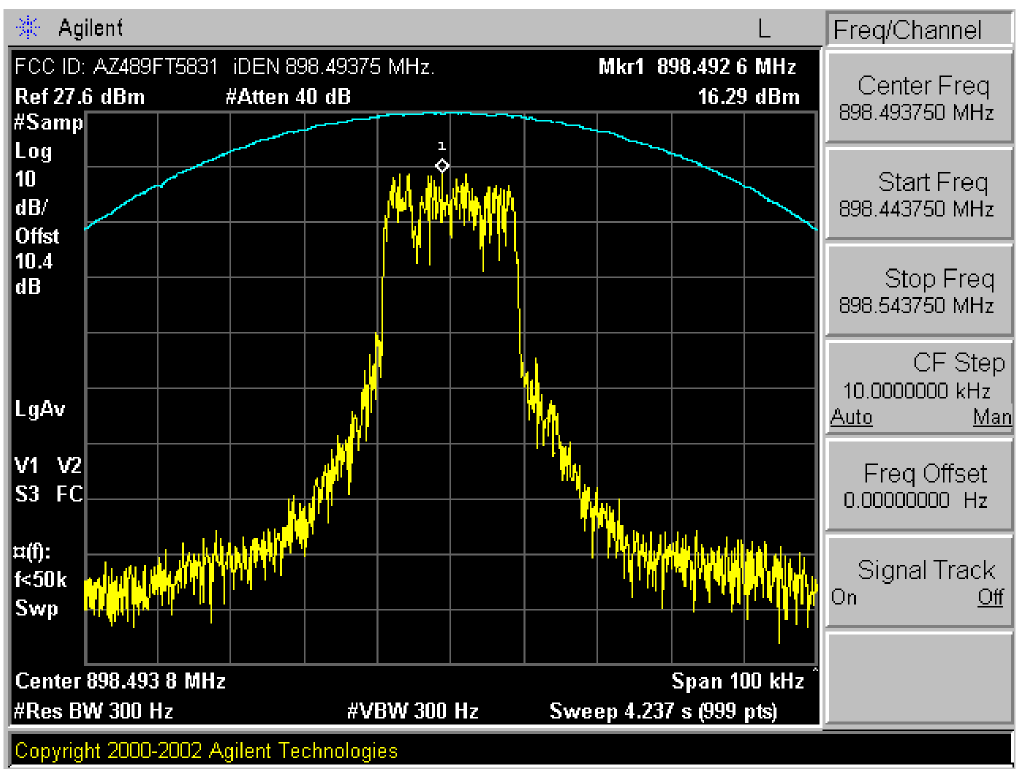
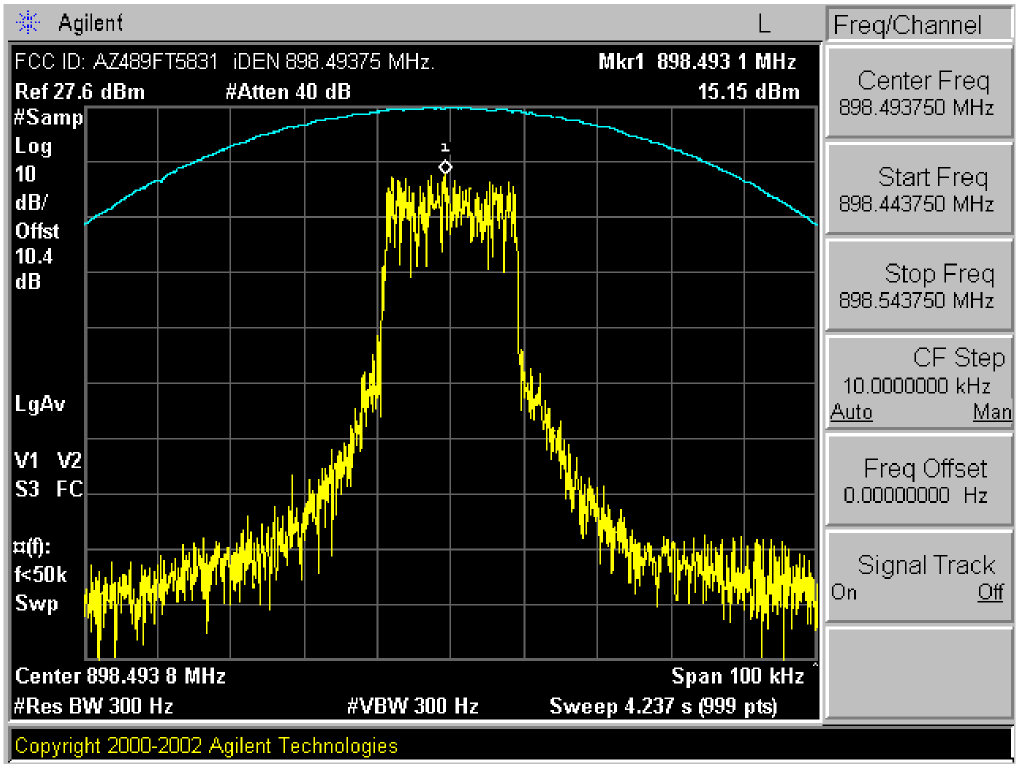
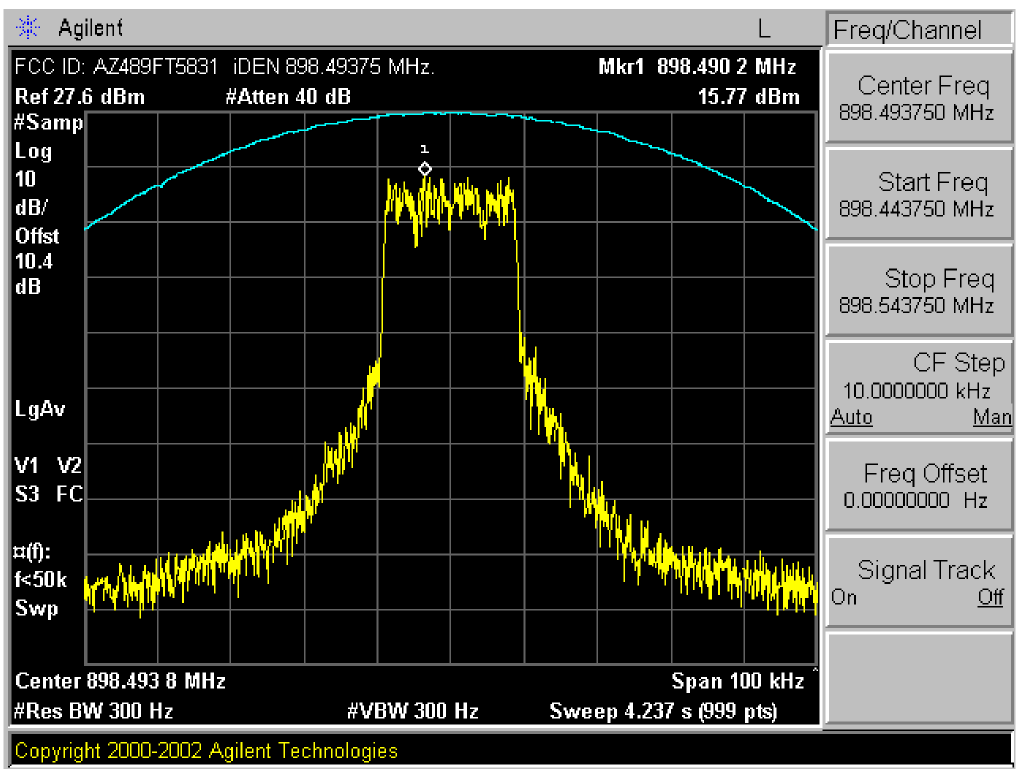
Freq/Channel
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.489 5 MHz
Ref 27.6 dBm
#Atten 40 dB
14.74 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.492 6 MHz
Ref 27.6 dBm
#Atten 40 dB
16.29 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.493 1 MHz
Ref 27.6 dBm
#Atten 40 dB
15.15 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies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Freq/Channel
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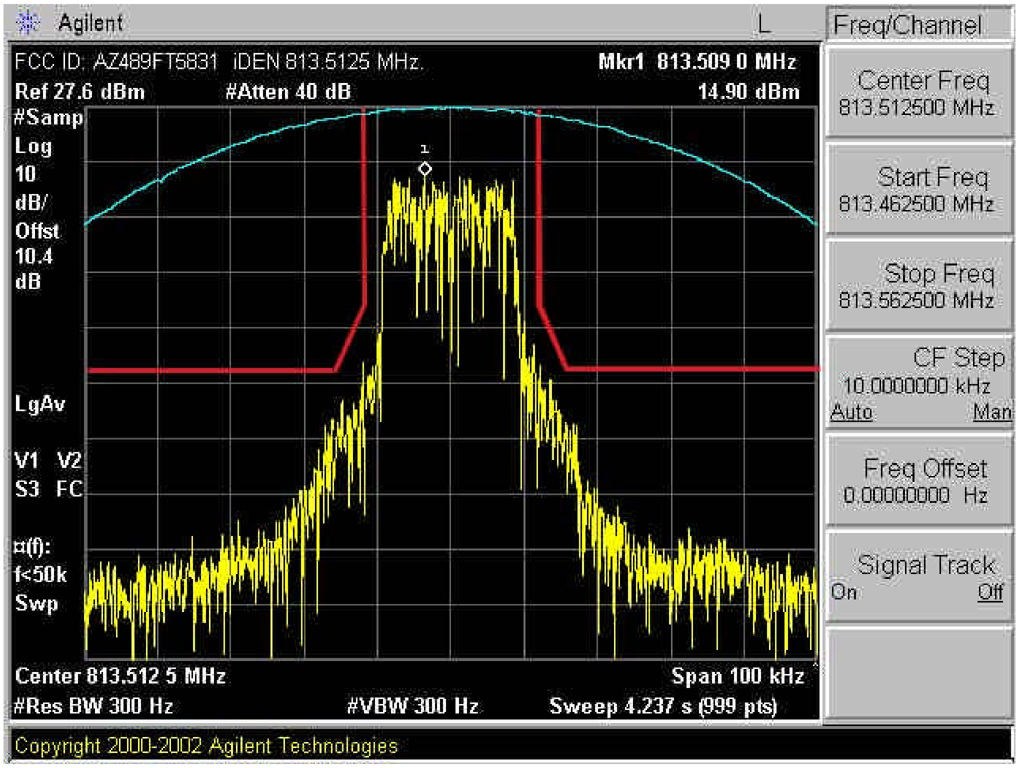
Mkr1 898.490 2 MHz
Ref 27.6 dBm
#Atten 40 dB
15.77 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies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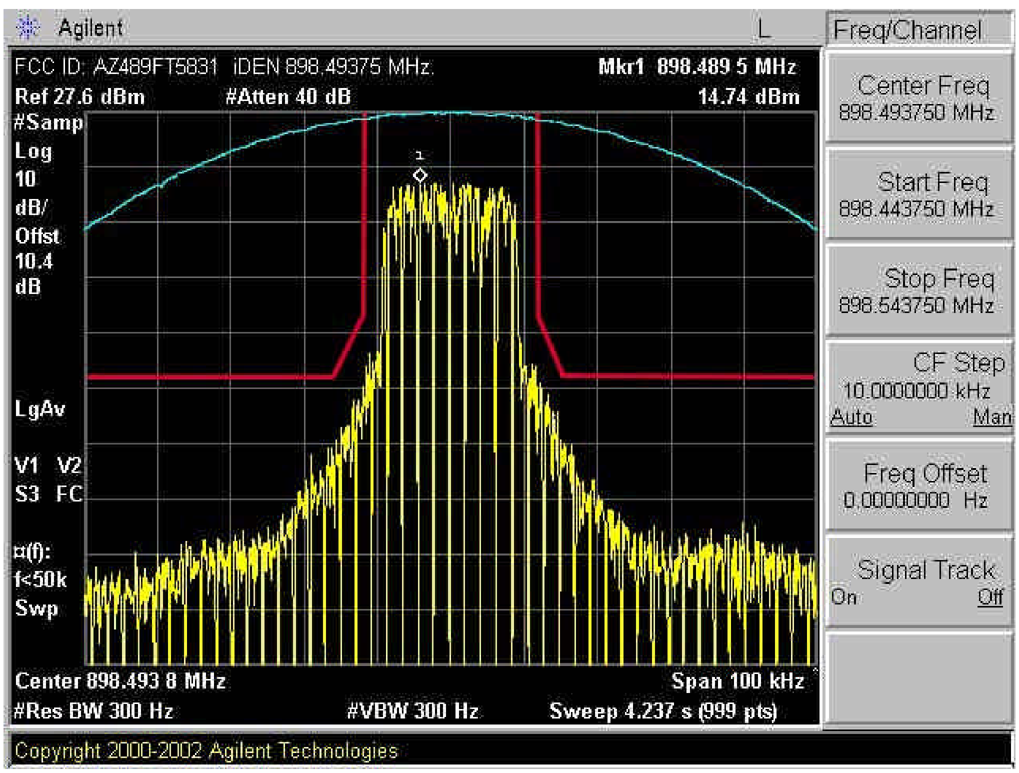
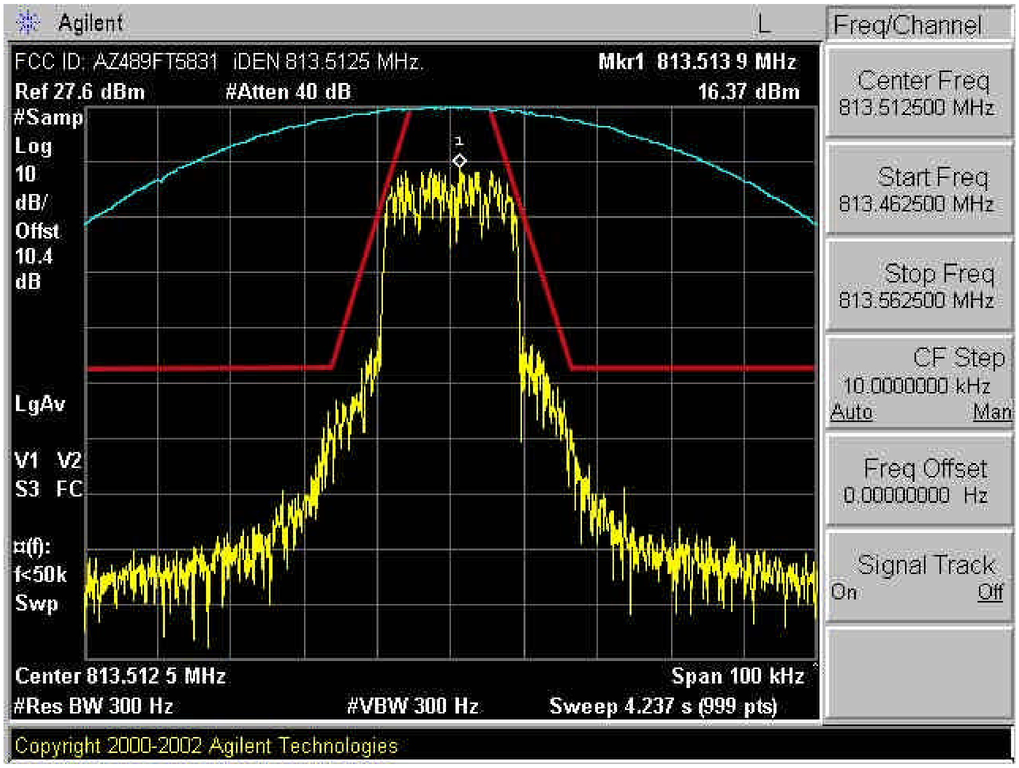
Freq/Channel
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.509 0 MHz
Ref 27.6 dBm
#Atten 40 dB
14.90 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
Freq/Channel
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.489 5 MHz
Ref 27.6 dBm
#Atten 40 dB
14.74 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies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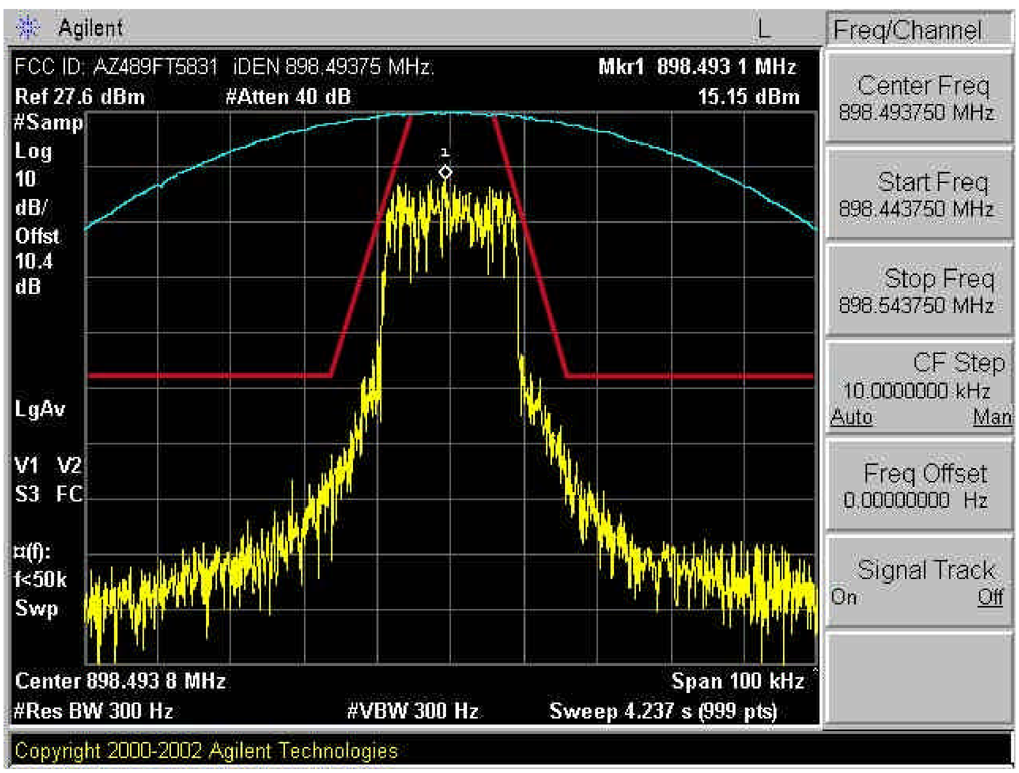
L
Freq/Channel
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.513 9 MHz
Ref 27.6 dBm
#Atten 40 dB
16.37 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies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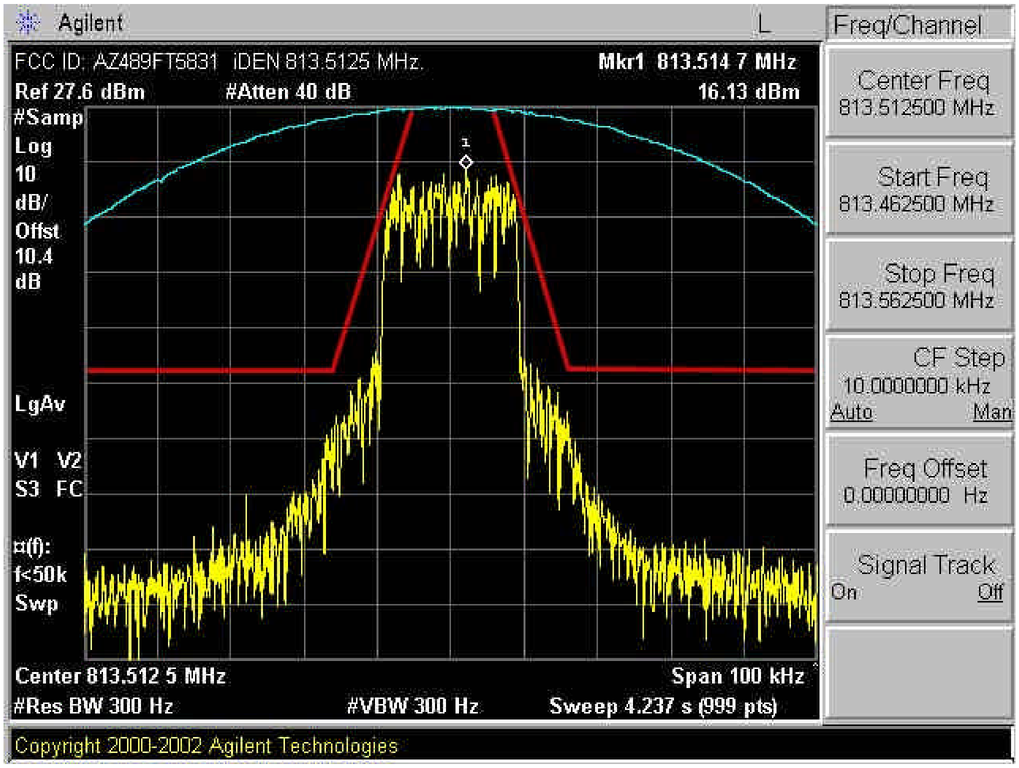
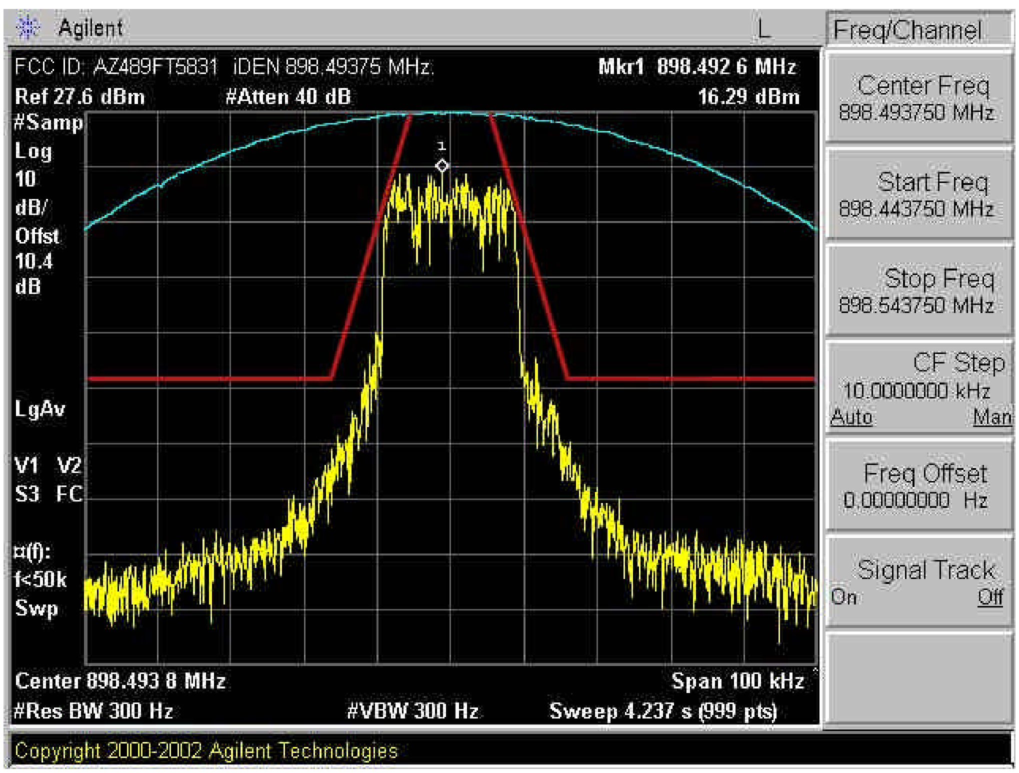
L
Freq/Channel
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.493 1 MHz
Ref 27.6 dBm
#Atten 40 dB
15.15 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
FCC ID: AZ489FT5831 iDEN 813.5125 MHz.
Mkr1 813.514 7 MHz
Ref 27.6 dBm
#Atten 40 dB
16.13 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 813.512 5 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Freq/Channel
Center Freq
813.512500 MHz
Start Freq
813.462500 MHz
Stop Freq
813.562500 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies


Agilent
L
FCC ID: AZ489FT5831 iDEN 898.49375 MHz.
Mkr1 898.492 6 MHz
Ref 27.6 dBm
#Atten 40 dB
16.29 dBm
#Samp
Log
10
dB/
Offst
10.4
dB
LgAv
V1 V2
S3 FC
¤(f):
f<50k
Swp
Center 898.493 8 MHz
Span 100 kHz
#Res BW 300 Hz
#VBW 300 Hz
Sweep 4.237 s (999 pts)
Freq/Channel
Center Freq
898.493750 MHz
Start Freq
898.443750 MHz
Stop Freq
898.543750 MHz
CF Step
10.0000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2002 Agilent Technologies