

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com

FCC Test Report

**Product Name: CDMA1900 SN: 75984
EXTERNAL RADIO FREQUENCY POWER AMPLIFIER (ERFPA)**

FCC ID: 0W5BST1901

Applicant:

**Mobile Communications Technologies Inc.
360 Industrial Parkway South
Unit 1
Aurora Ontario L4G 3V7
Canada**

Date Receipt: MARCH 29, 2004

Date Tested: APRIL 23, 2004

**PLEASE NOTE: THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**

APPLICANT: Mobile Communications Technologies Inc.
FCC ID: 0W5BST1901
REPORT #: M\Mobile_Comm_0W5\427AUT4\427AUT4TestReport.doc
COVER SHEET

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EXHIBITS CONTAINING:

CONFIDENTIALITY LETTER
BLOCK DIAGRAM
SCHEMATIC
PARTS LIST
USERS MANUAL
LABEL SAMPLE
LABEL LOCATION
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
TUNING PROCEDURE
OPERATIONAL DESCRIPTION
TEST SET UP PHOTOGRAPH
RF EXPOSURE STATEMENT

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COMPLIANCE STATEMENT:

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards. No modifications were made to the equipment during testing in order to demonstrate compliance with these standards.

I attest that the necessary measurements were made, under my supervision, at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, Florida 32669.

Authorized Signatory Name: Bruno C. Clavier

Signature:

Date: 05/03/04

Test engineer name: Joe Scoglio

Signature:

Date: 04/27/04

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GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

2.1033(c)(1)(2) Mobile Communications Technologies Inc. will manufacture the FCCID: 0W5BST1901 EXTERNAL RF POWER AMPLIFIER in quantity, for use under FCC RULES PART 24.

Mobile Communications Technologies Inc.
360 Industrial Parkway South
Unit 1
Aurora, Ontario L4G 3V7 Canada

2.1033(c) TECHNICAL DESCRIPTION

2.1033(c)(3) Instruction book. A draft copy of the instruction manual is included in the exhibits.

2.1033(c) (4) Type of Emission: CDMA1900 was tested for two standards IS95 (2G) and CDMA2000 (3G). Reverse Link modulated signal was applied to the input "Phone" port of CDMA1900

1M25F9W (CDMA IS-95, CDMA1X, CDMA2000)

99 % Power bandwidth = 1.25 MHz
Bn = 1.25 MHz

Type of Emission: F9W (CDMA)

2.1033(c)(5) Frequency Range: 1850-1910 MHz

2.1033(c)(6) There are no user power controls.

2.1033(c)(7) Maximum input power rating +24 dBm (250 mW) RF POWER TO THE INPUT "PHONE" PORT OF DUT
Maximum rated conducted output power is 2 Watt (33dBm) at the DUT output connector(antenna side)

The device cannot operate in saturation because CDMA handsets which are attached to this device have a max output power of 24dbm. The DUT is directly connected to the handset by means of a cable which has 1.2dB loss. When CDMA handsets are at max output power of 24dBm the device remains linear within the CDMA standard for IS95, CDMA1X, CDMA2000 and WCDMA.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:
POWER INPUT:

FINAL AMPLIFIER ONLY
INPUT POWER - HIGH: (12V)(0.6A) = 7.2Watts

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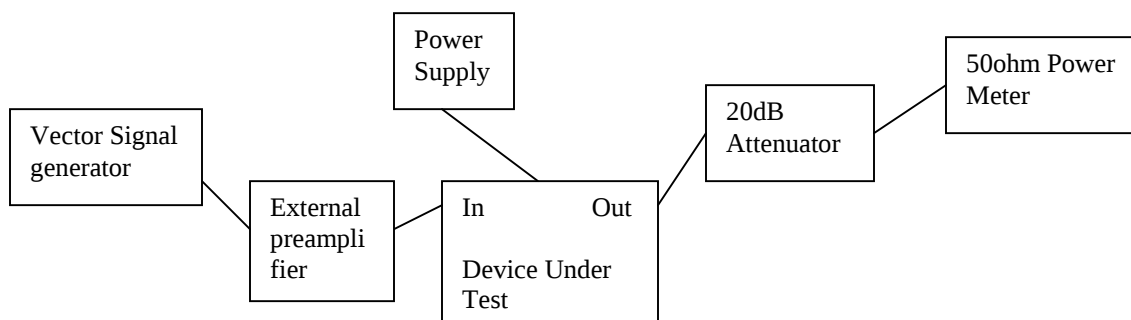
- 2.1033(c)(9) Tune-up procedure. The tune-up procedure is included in the exhibits.
- 2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram and block diagram are included in the exhibits. Description of all circuitry and devices provided for determining and stabilizing frequency is included in the exhibits.
- 2.1033(c)(11) A photograph or drawing of the equipment identification label is shown in the exhibits.
- 2.1033(c)(12) Photographs of the equipment of sufficient clarity to reveal equipment construction and layout and label location are shown in the exhibits.
- 2.1033(c)(13) For equipment employing digital modulation, a detail description of the modulation technique: N/A as this device is an amplifier
- 2.1033(c)(14) The data required for 2.1046 through 2.1057 is submitted below.

2.1046(a)

RF POWER OUTPUT

RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. External Preamplifier was used as a driver in-line between signal generator and "Phone" port of DUT. The "Antenna" port of DUT was connected to the spectrum analyzer with 20dB external attenuator. The "DC" port of DUT connected to 13.8 VDC power supply.

OUTPUT POWER: 33dBm = 2 Watts



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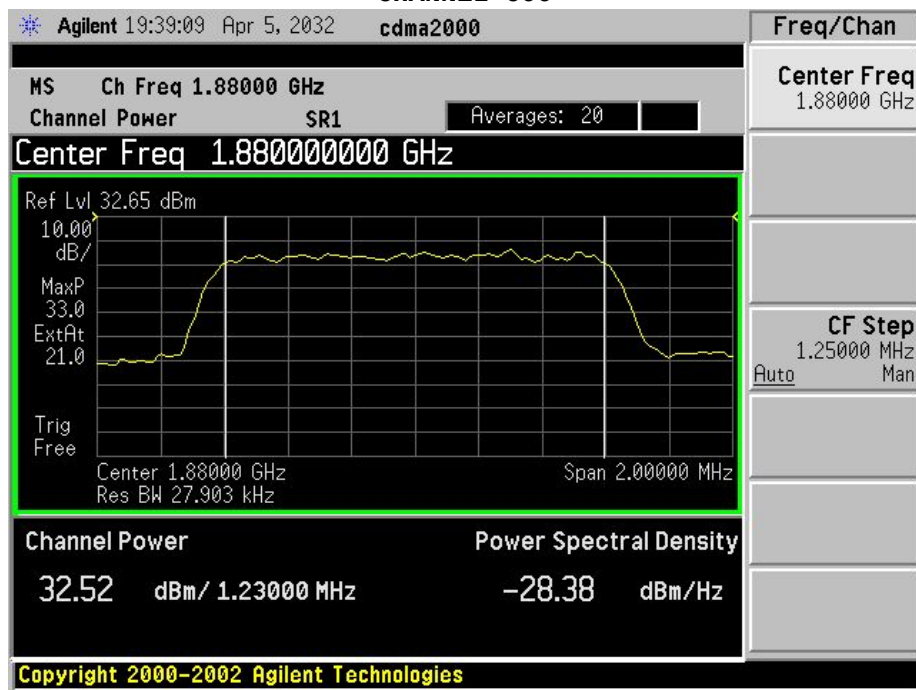
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CARRIER POWER – CDMA2000 CHANNEL 25



CHANNEL 600



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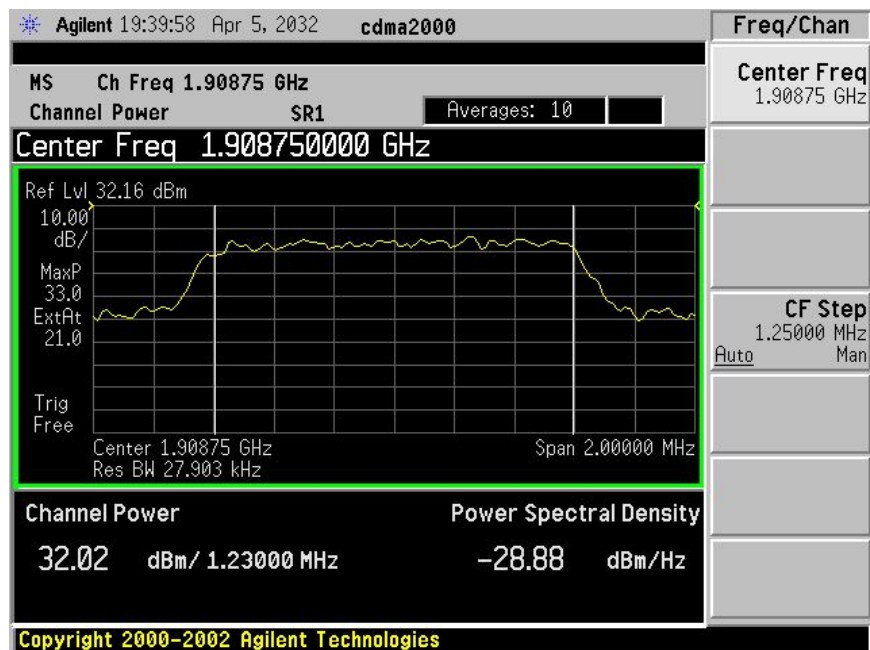
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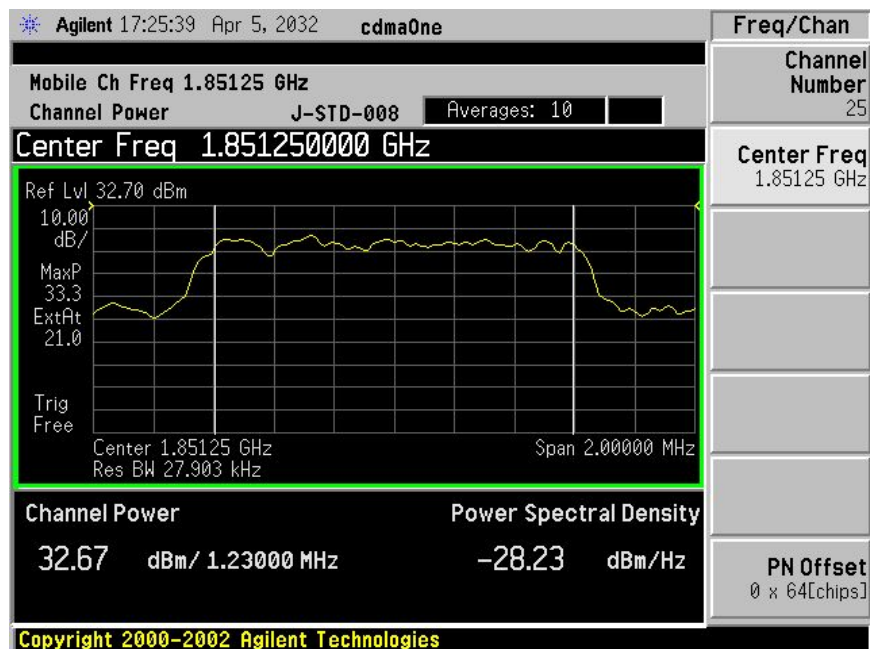
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CARRIER POWER – CDMA2000 CHANNEL 1175



CARRIER POWER – CDMA1 CHANNEL 25



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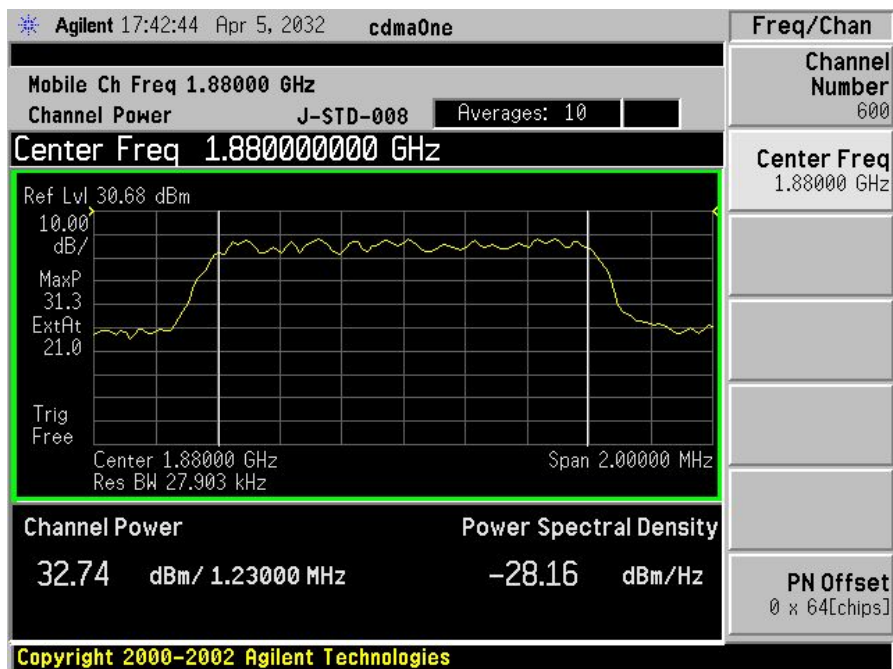
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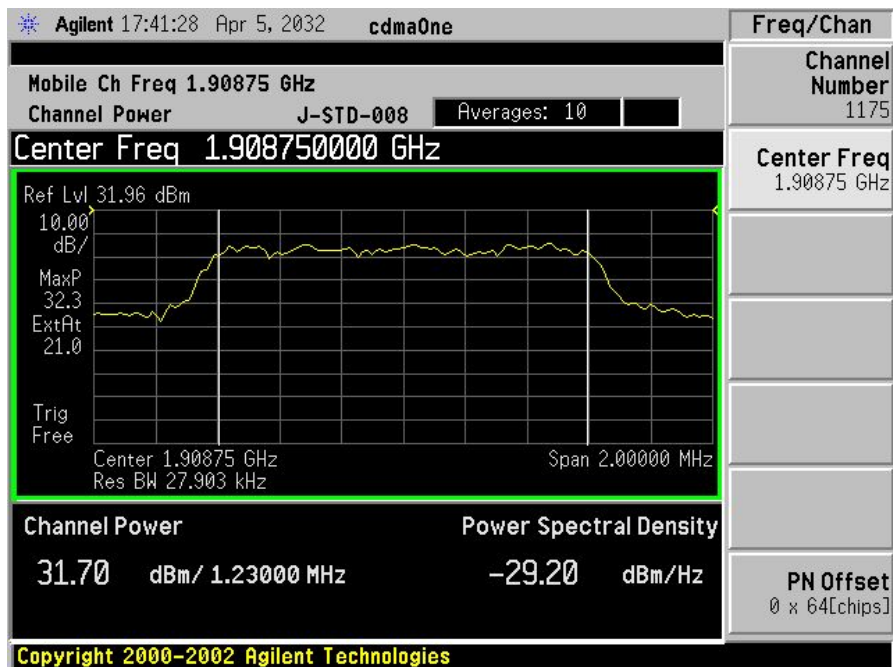
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CARRIER POWER – CDMA1 CHANNEL 600



CHANNEL 1175



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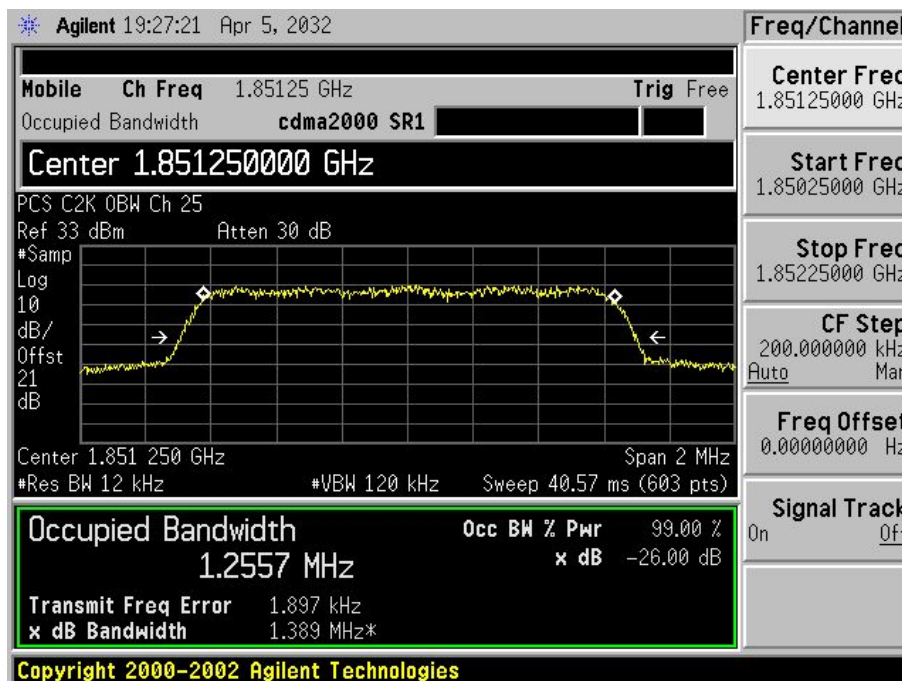
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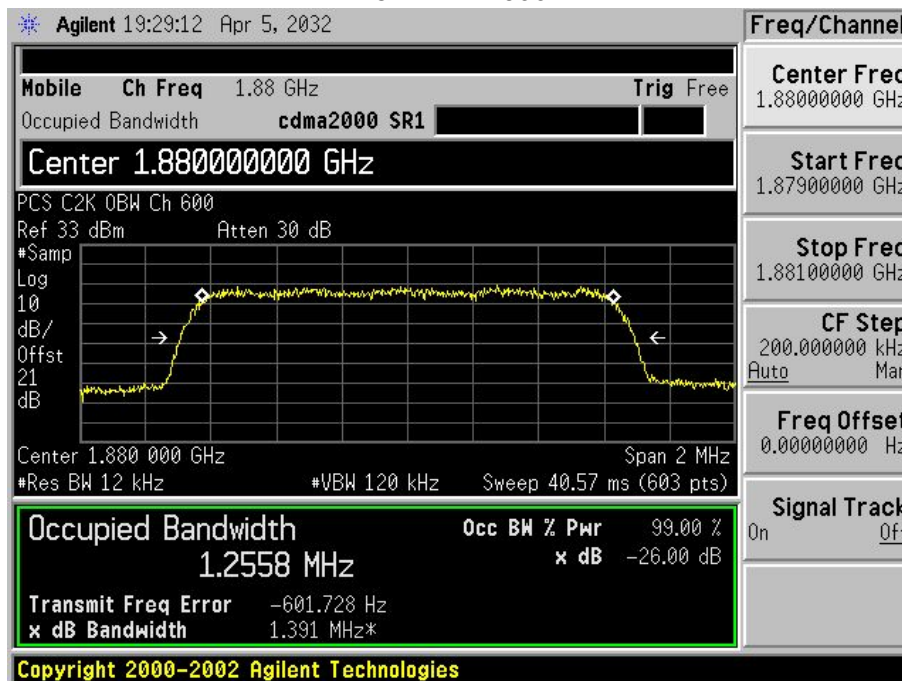
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2.1049(c) **OCCUPIED BANDWIDTH:**

OCCUPIED BANDWIDTH PLOT - CDMA2000 CHANNEL 25



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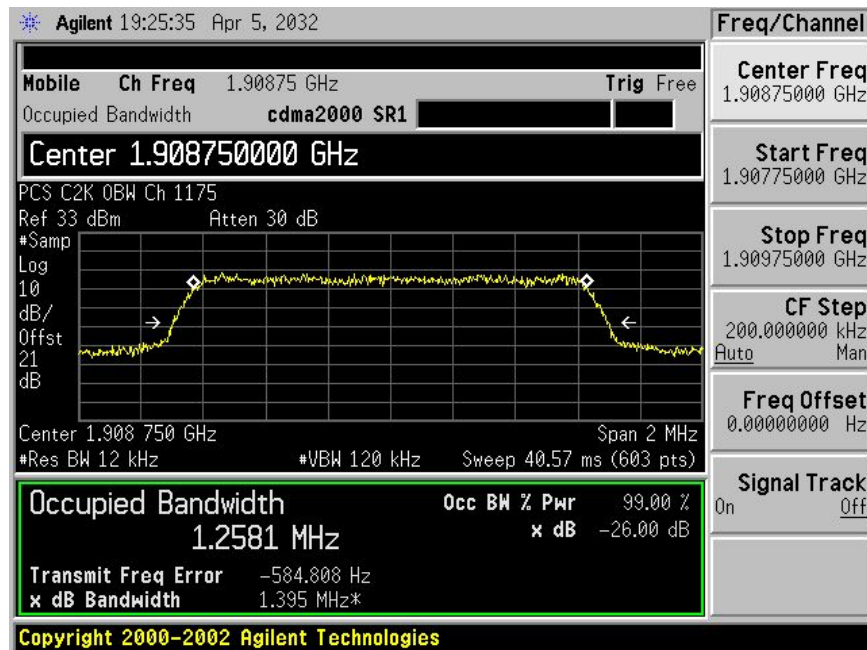
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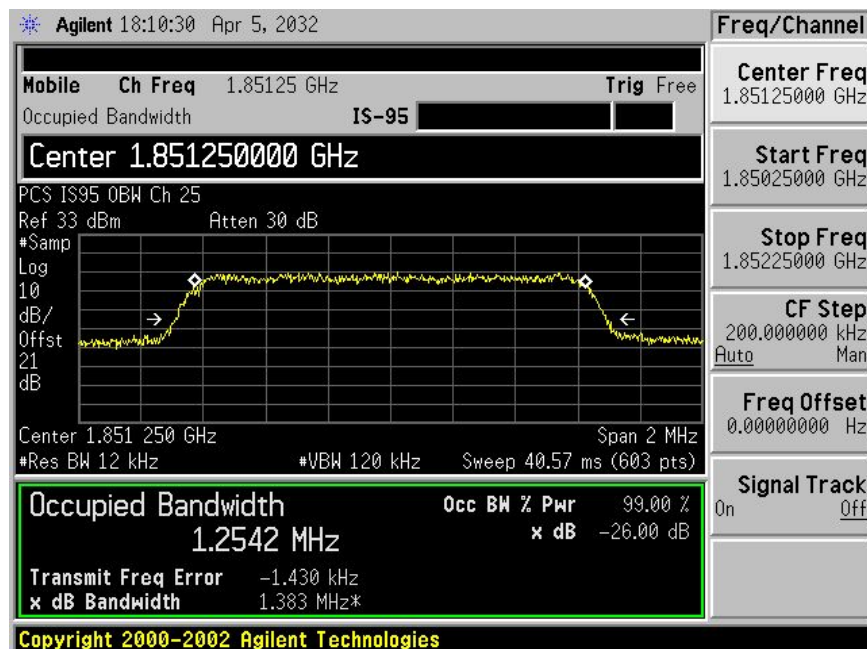
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OCCUPIED BANDWIDTH CHANNEL 600



OCCUPIED BANDWIDTH - CDMA1 CHANNEL 25



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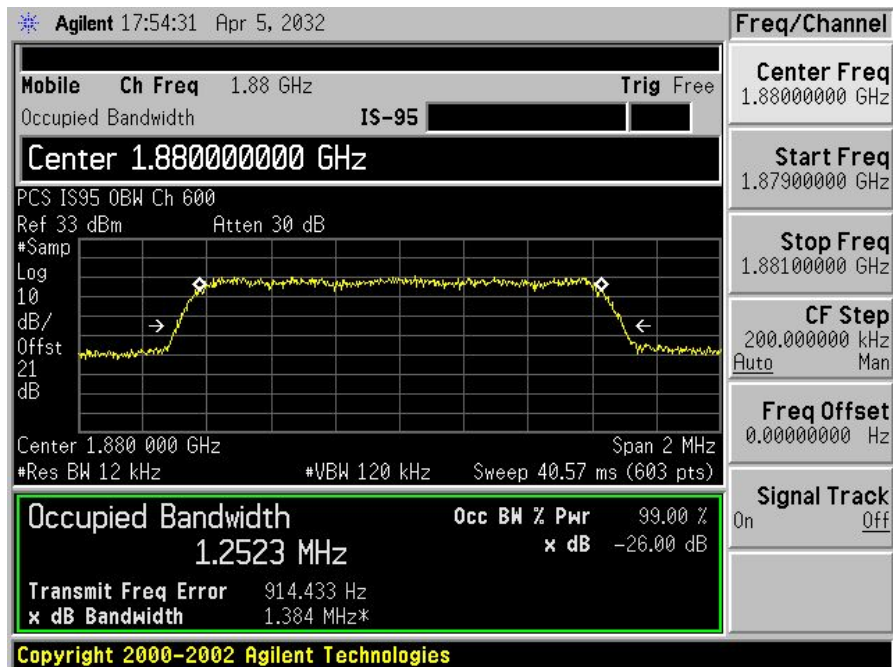
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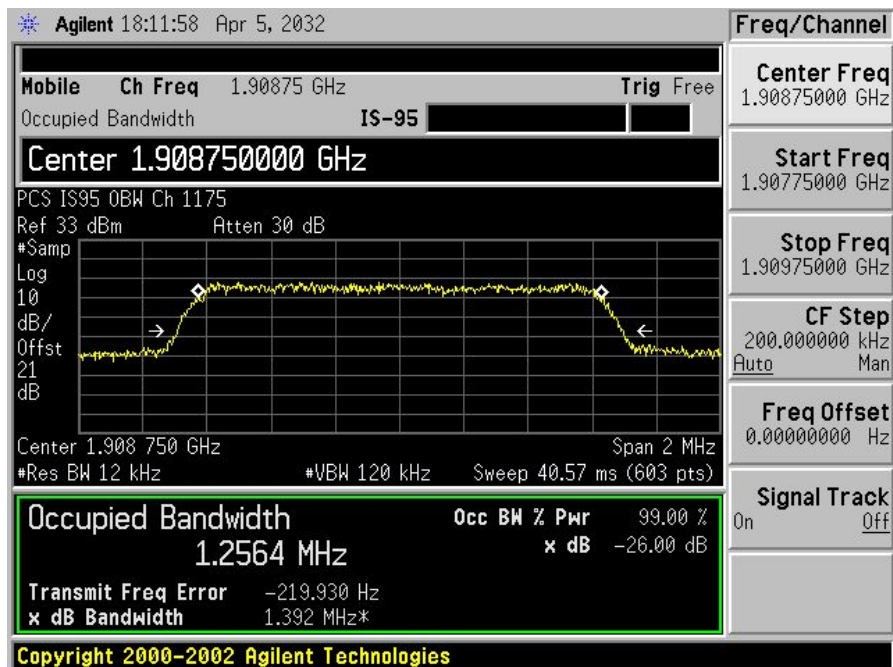
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OCCUPIED BANDWIDTH – CDMA1 CHANNEL 600



CHANNEL 1175



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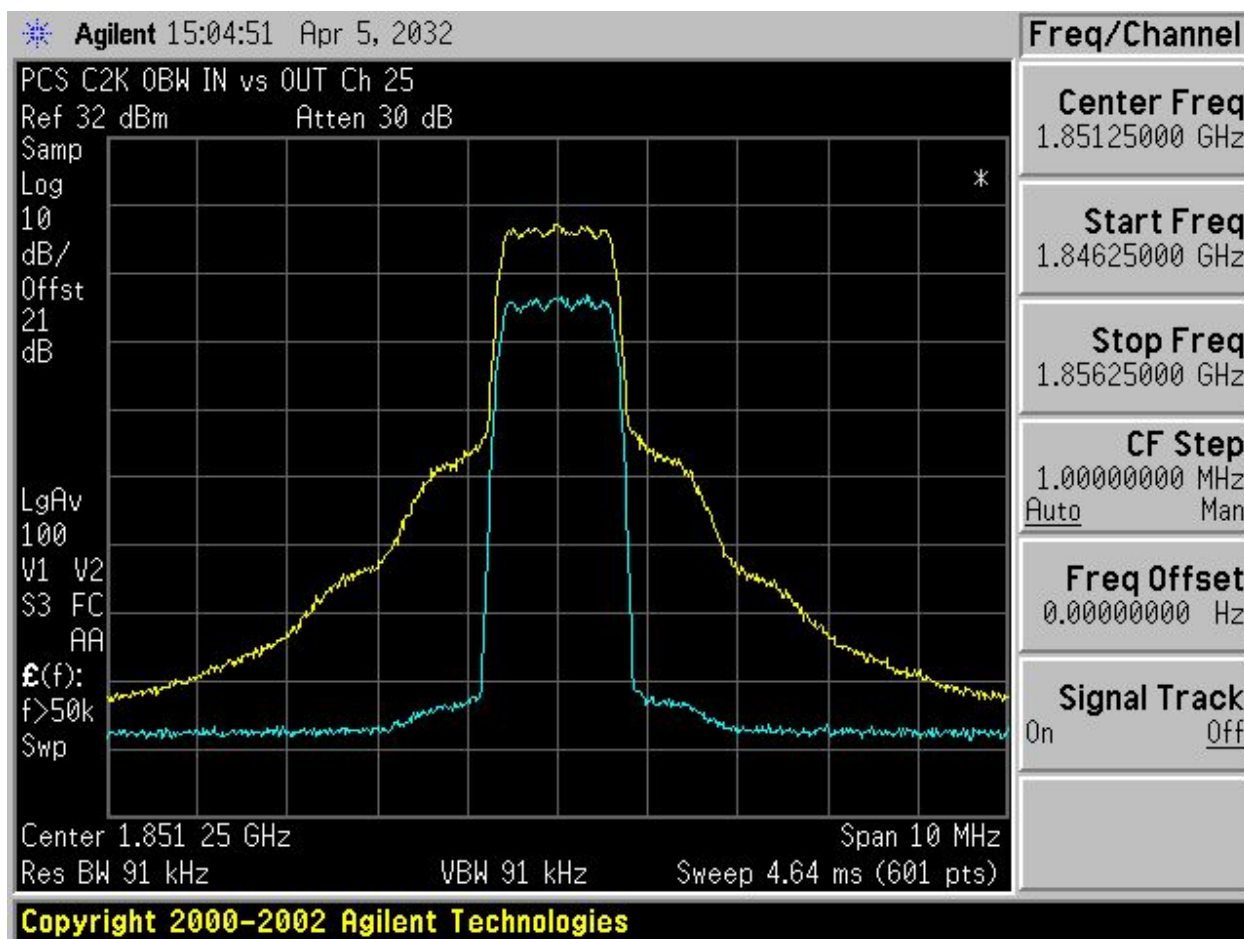
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2.1049

Input/Output Modulated Amplitude Comparison (CDMA2000)

The Reference level was calibrated using a 3/MHz/3MHz RBW/VBW. A 20 dB attenuator is accounted for on the display using a 20 dB Offset. There is an additional cable loss of 1 dB.

INPUT/OUTPUT - CHANNEL 25



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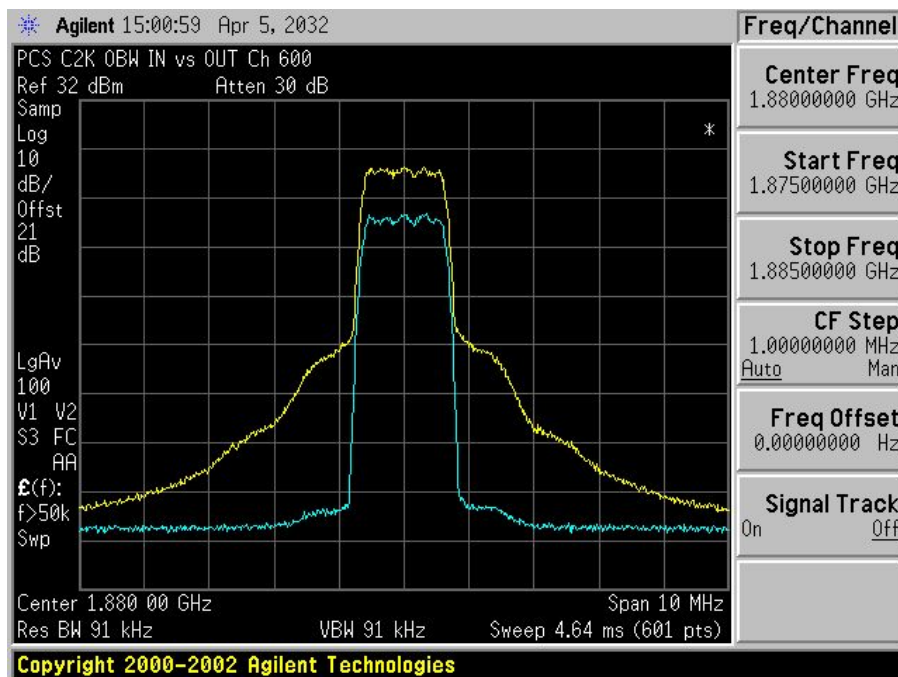
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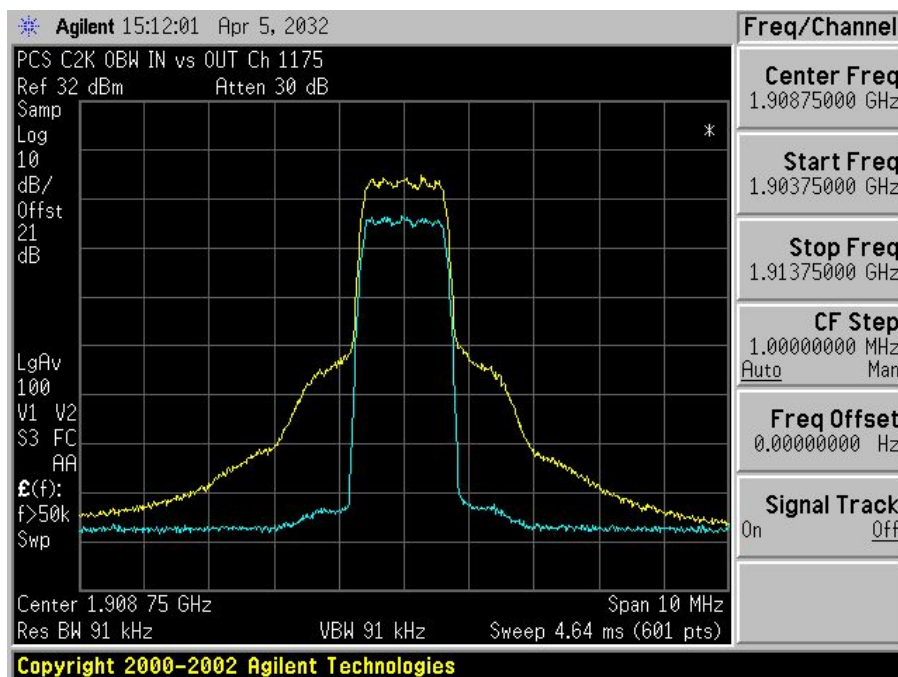
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INPUT/OUTPUT - CHANNEL 600



CHANNEL 1175



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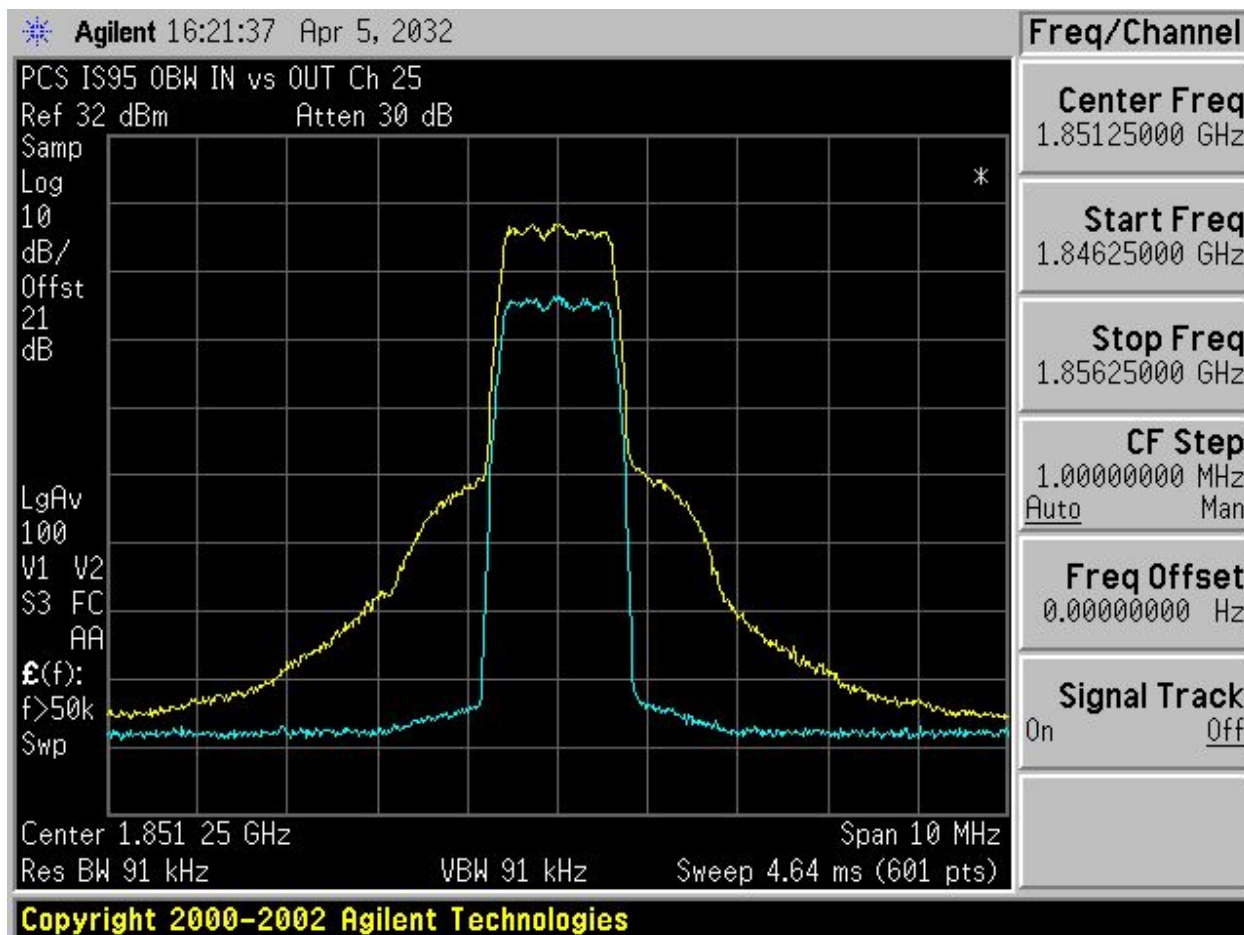
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2.1050

Input/Output Modulated Amplitude Comparison (CDMAONE)

The Reference level was calibrated using a 3/MHz/3MHz RBW/VBW. A 20 dB attenuator is accounted for on the display using a 20 dB Offset. There is an additional cable loss of 1 dB.

INPUT/OUTPUT - CHANNEL 25



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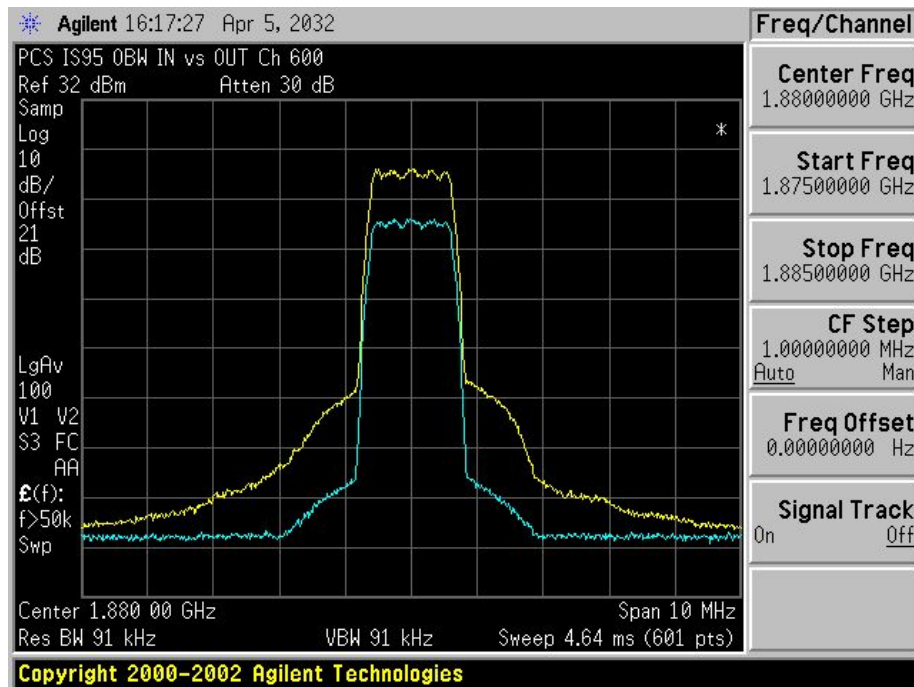
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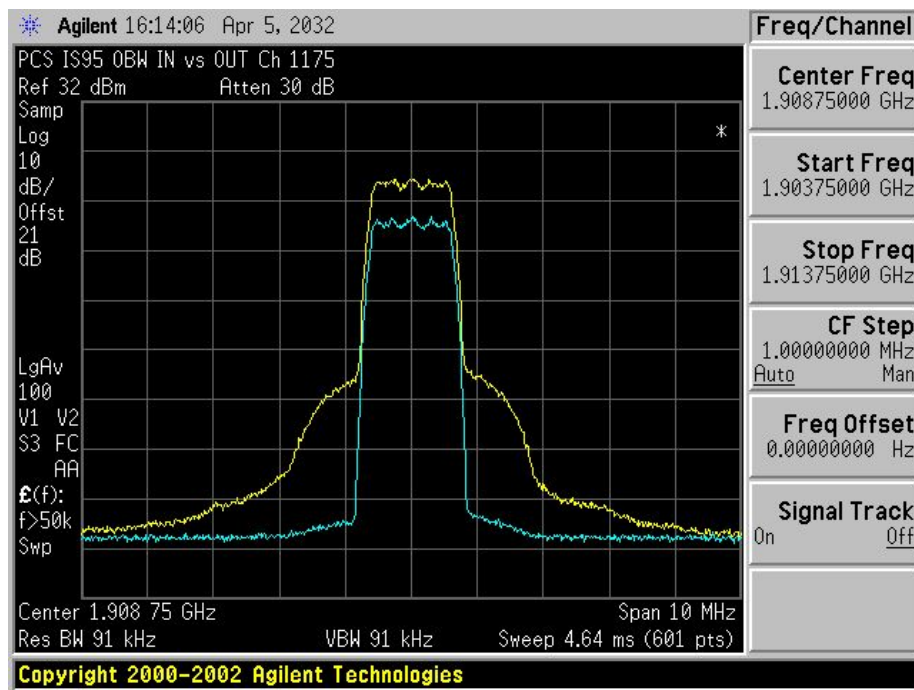
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INPUT/OUTPUT - CHANNEL 600



CHANNEL 1175



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22.917 (e)

Out of band emissions (CDMA2000):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least:

$$\text{At least } 43 + 10\log(P_o) = \text{dB.}$$

Band-edges compliance (CDMA2000):

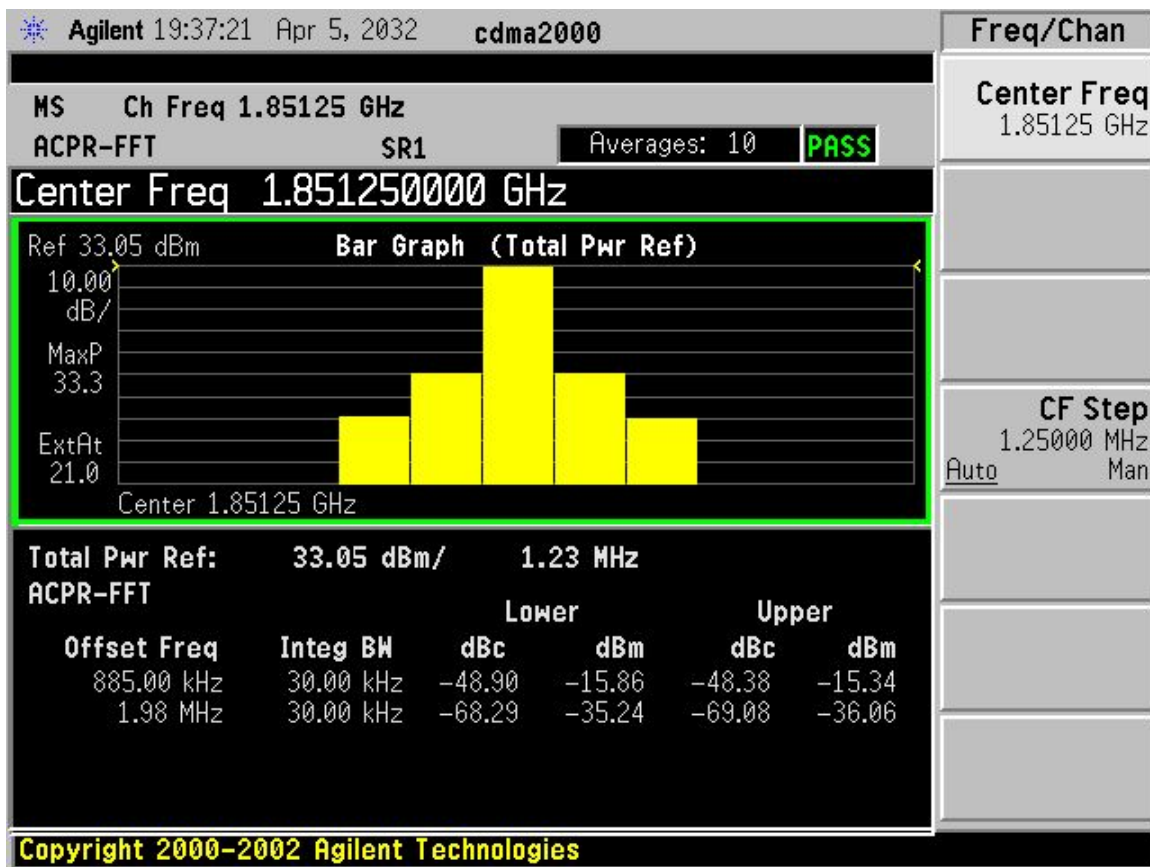
Measurement were performed in accordance with Part 24.238(E)

Conducted output power: 33 dBm

Channel (MHz)	Band-edge Frequency (MHz)	Amplitude level at the band-edge(dBm)	Limit (dBm)	Margin (dB)
1851.25	1850	-18.3	-13.0	-5.3
1848.75	1910	-17.6	-13.0	-4.6

The Reference level on the following plots was calibrated using a 3MHz RBW=VBW.

OUT OF BAND GAIN - CHANNEL 25



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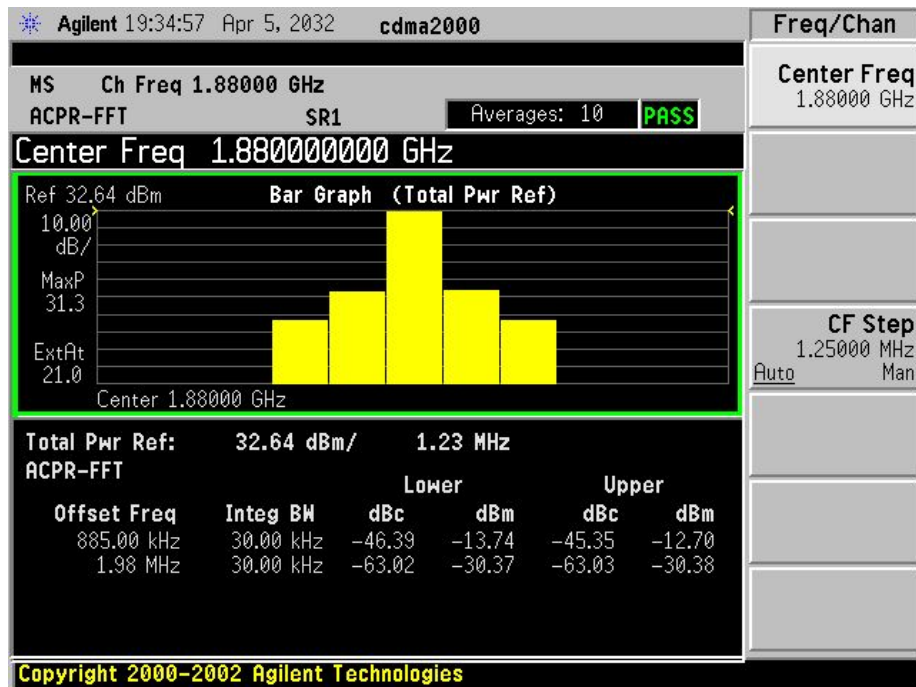
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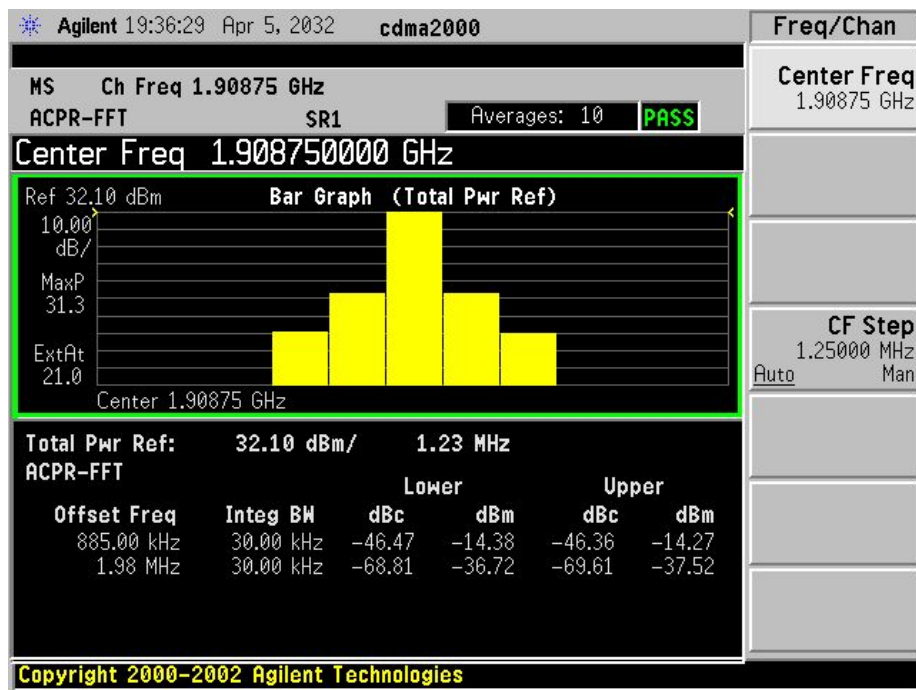
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OUT OF BAND GAIN - CHANNEL 600



CHANNEL 1175



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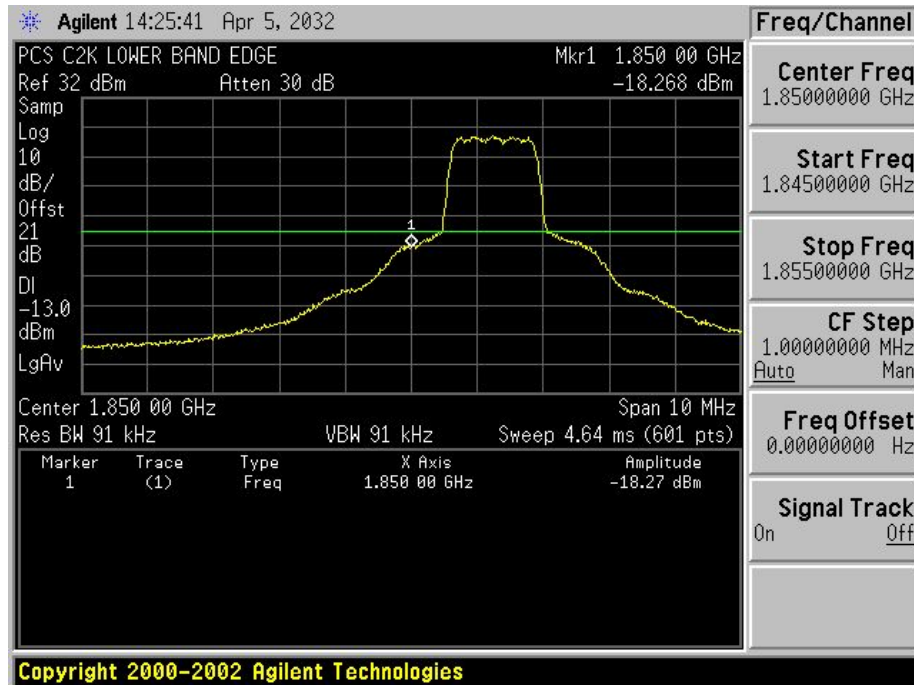
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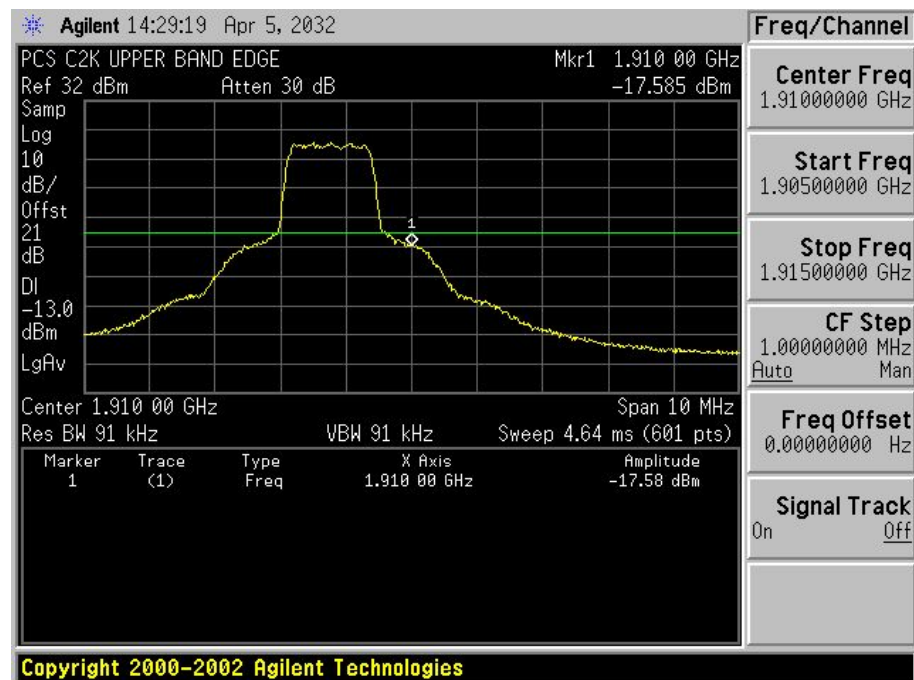
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BANDEDGE - LOWER



UPPER



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22.917 (e)

Out of band emissions (CDMAOne):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least:

$$\text{At least } 43 + 10\log(P_o) = \text{dB.}$$

Conducted output power: 33 dBm

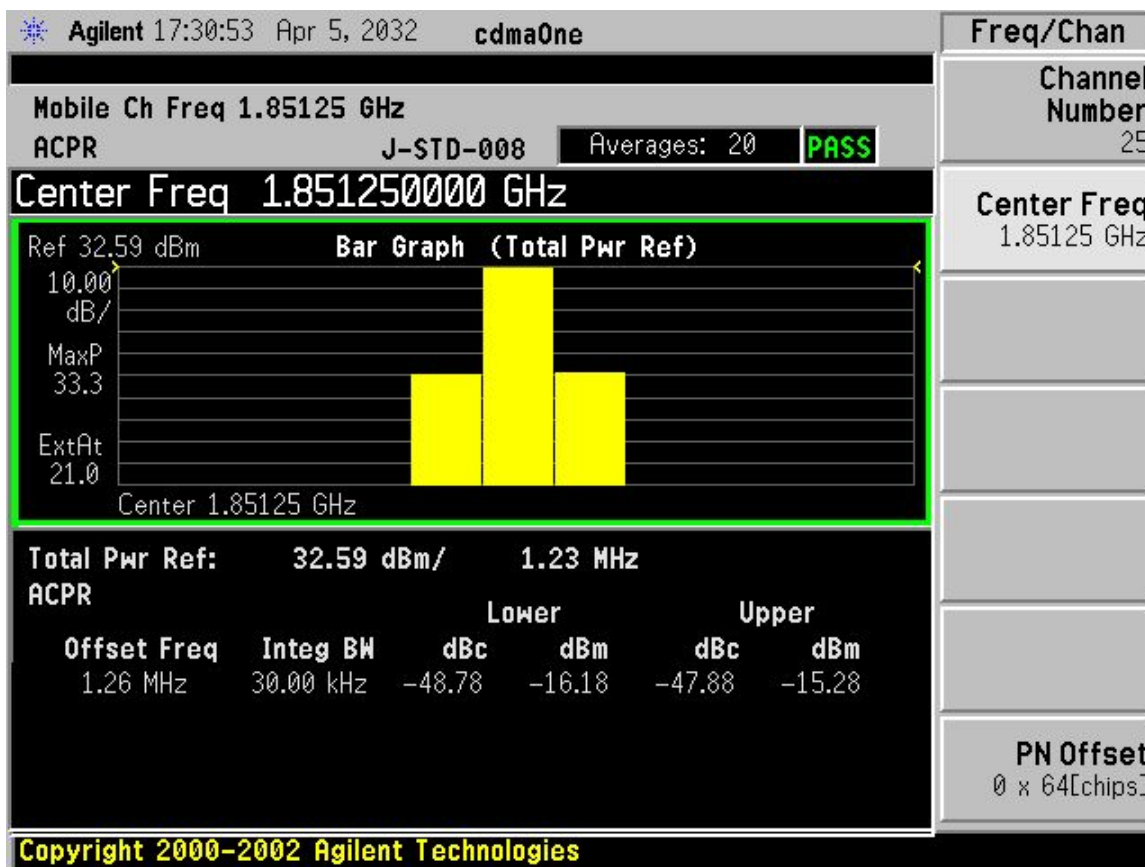
Band-edges compliance (CDMAOne):

Measurement were performed in accordance with Part 24.238(E)

Channel (MHz)	Band-edge Frequency (MHz)	Amplitude level at the band-edge(dBm)	Limit (dBm)	Margin (dB)
1851.25	1850	-15.5	-13.0	-2.5
1848.75	1910	-15.9	-13.0	-2.9

The Reference level on the following plots was calibrated using a 3MHz RBW=VBW.

OUT OF BAND GAIN - CHANNEL 25



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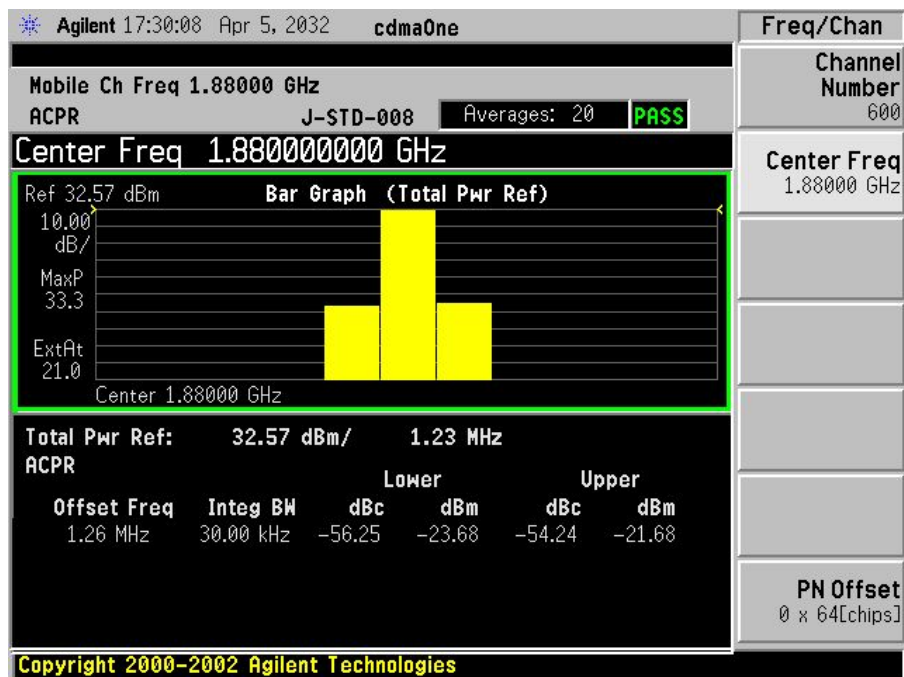
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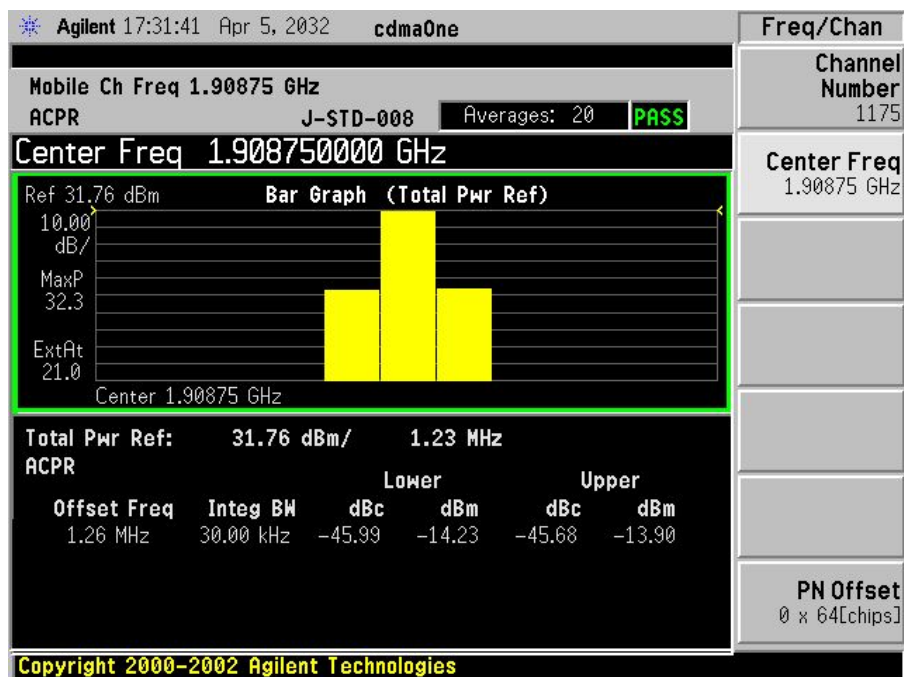
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OUT OF BAND GAIN - CHANNEL 600



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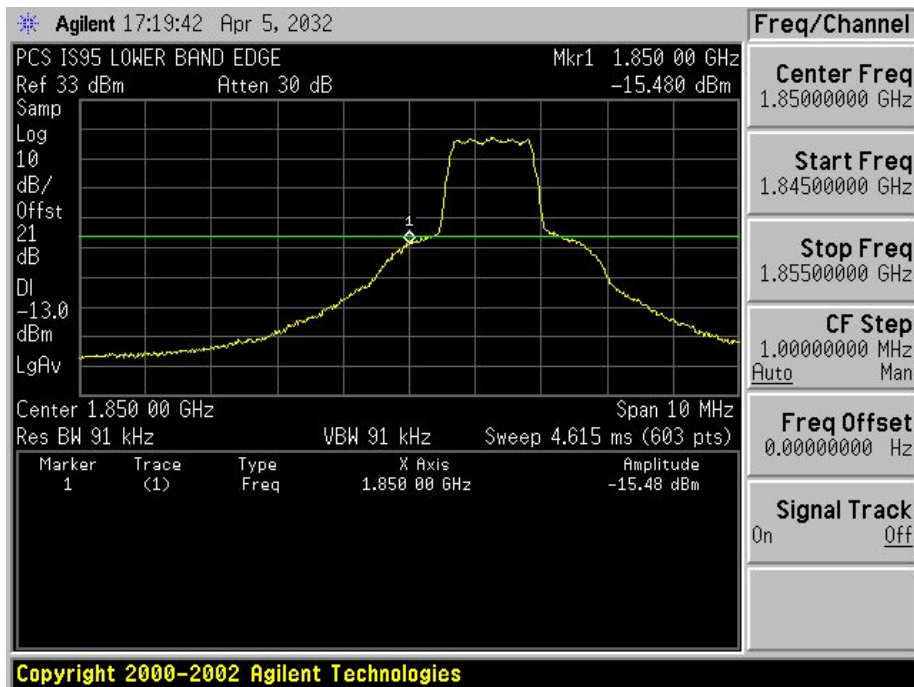
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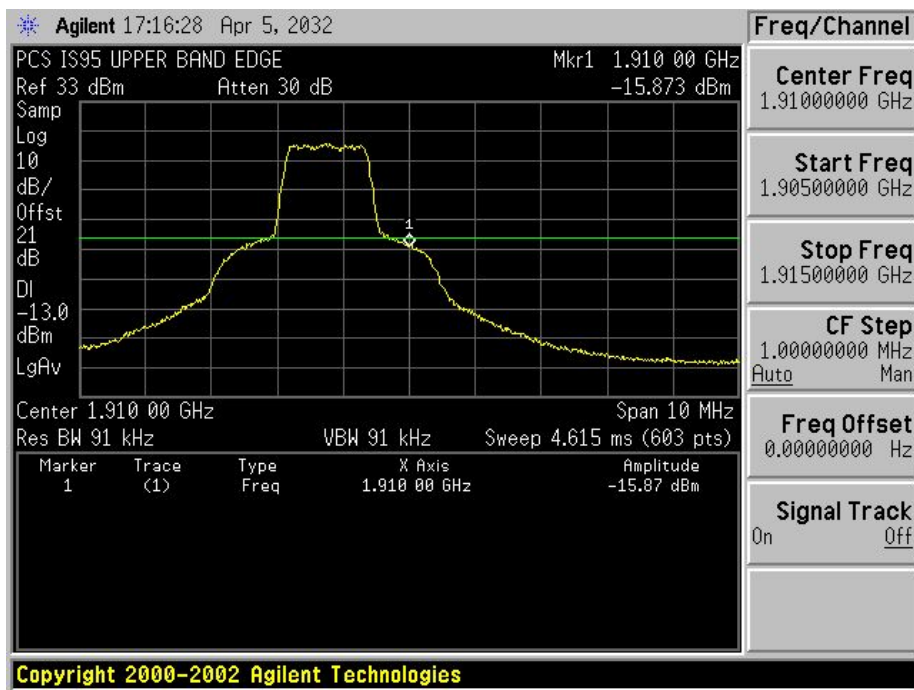
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BANDEDGE - LOWER



UPPER



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2.1051

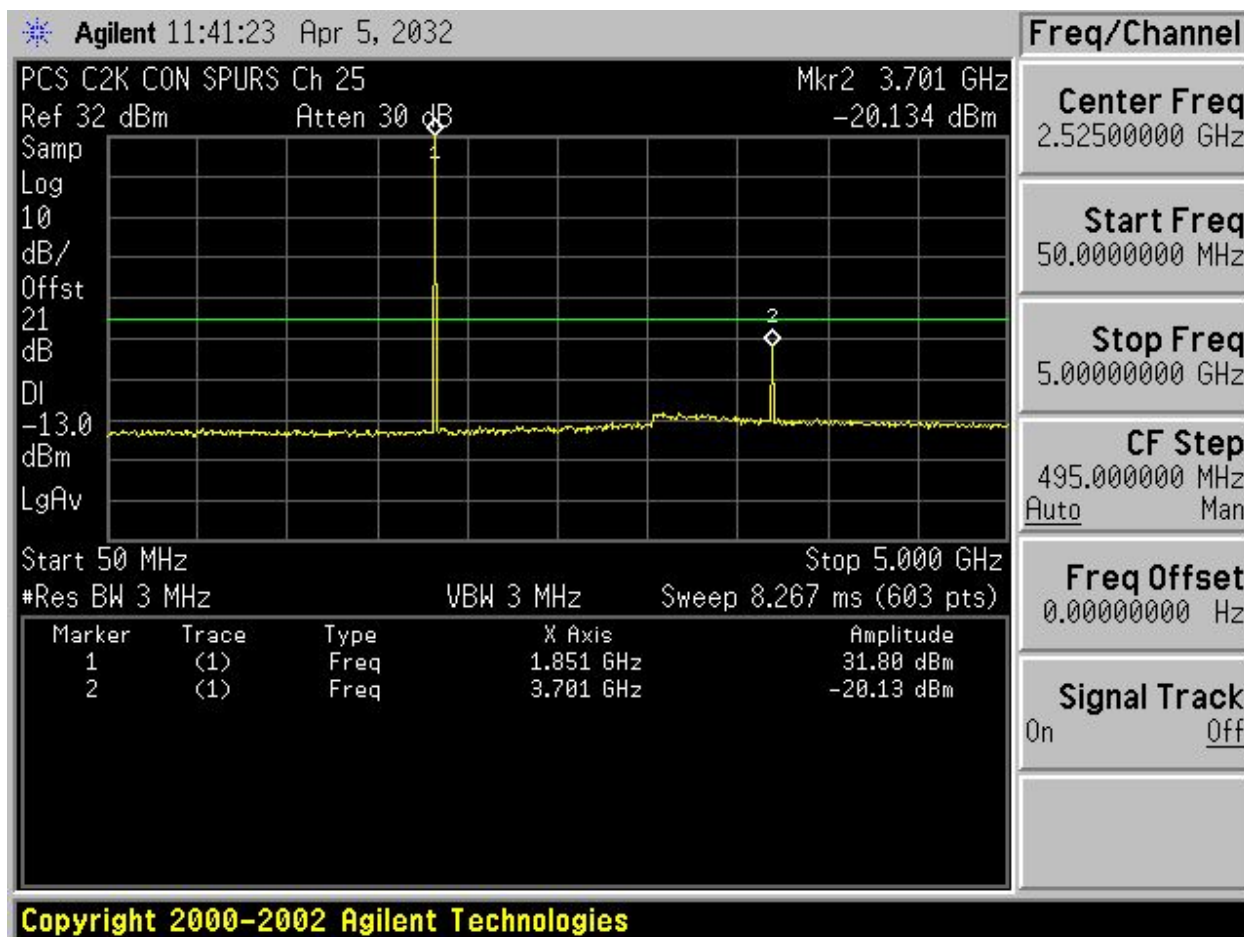
Spurious emissions at antenna terminals (conducted) (CDMA2000):

Data on the following page shows the level of conducted spurious responses. For analog modulation, the carrier was modulated 100% using a 2500 Hz tone. For digital modulation, the carrier is modulated to its maximum extent. The spectrum was scanned from 9kHz to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

The following test equipment was used:

- (1) PSA E4440 (Spectrum Analyzer) SN: MY410003101.
- (2) ESG E4438C (Signal Generator) SN: MY42080661

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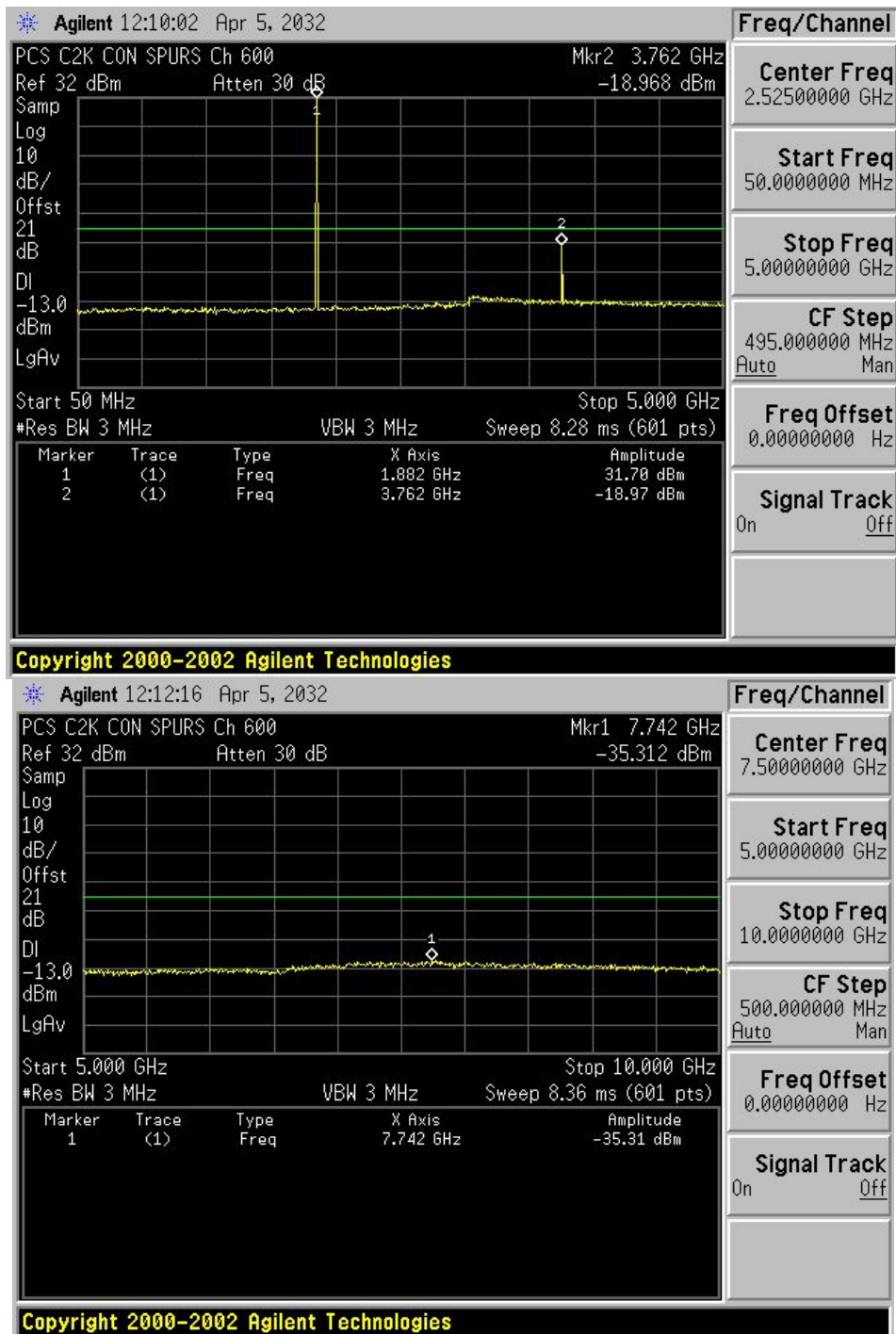
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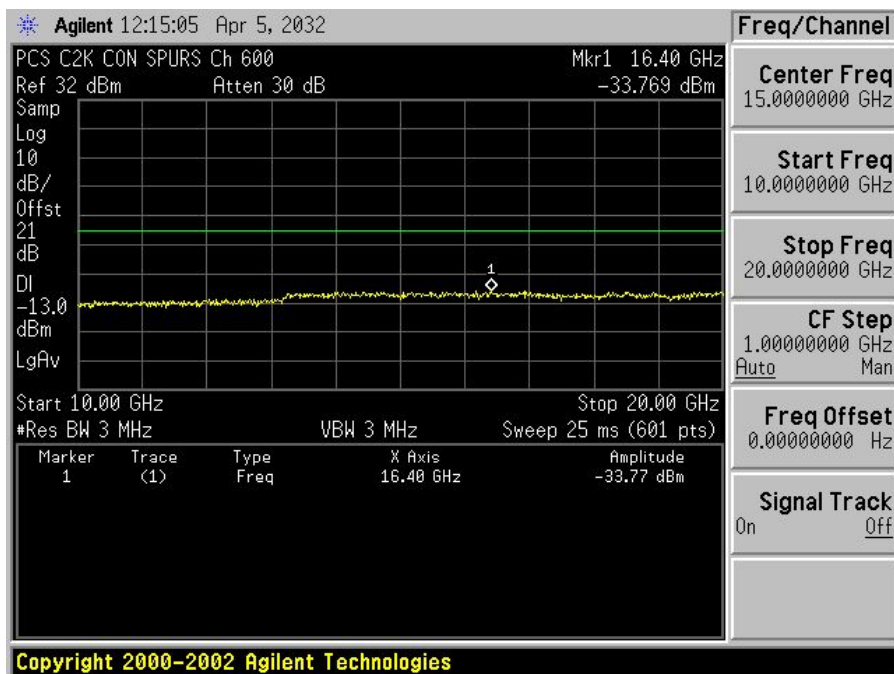
849 NW State Road 45

Newberry, Florida 32669

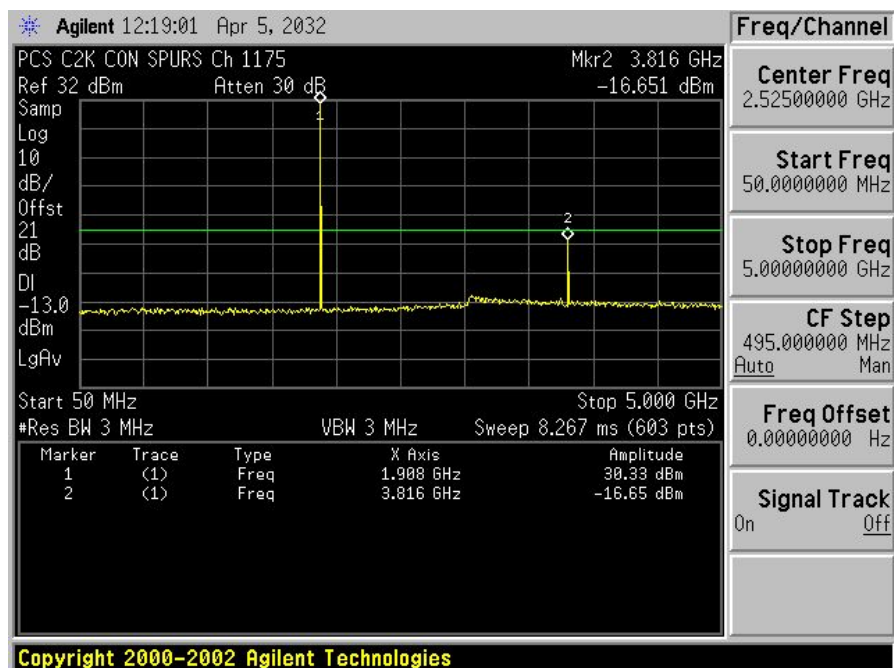
<http://www.timcoengr.com>

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CONDUCTED - CHANNEL 600



CHANNEL 1175



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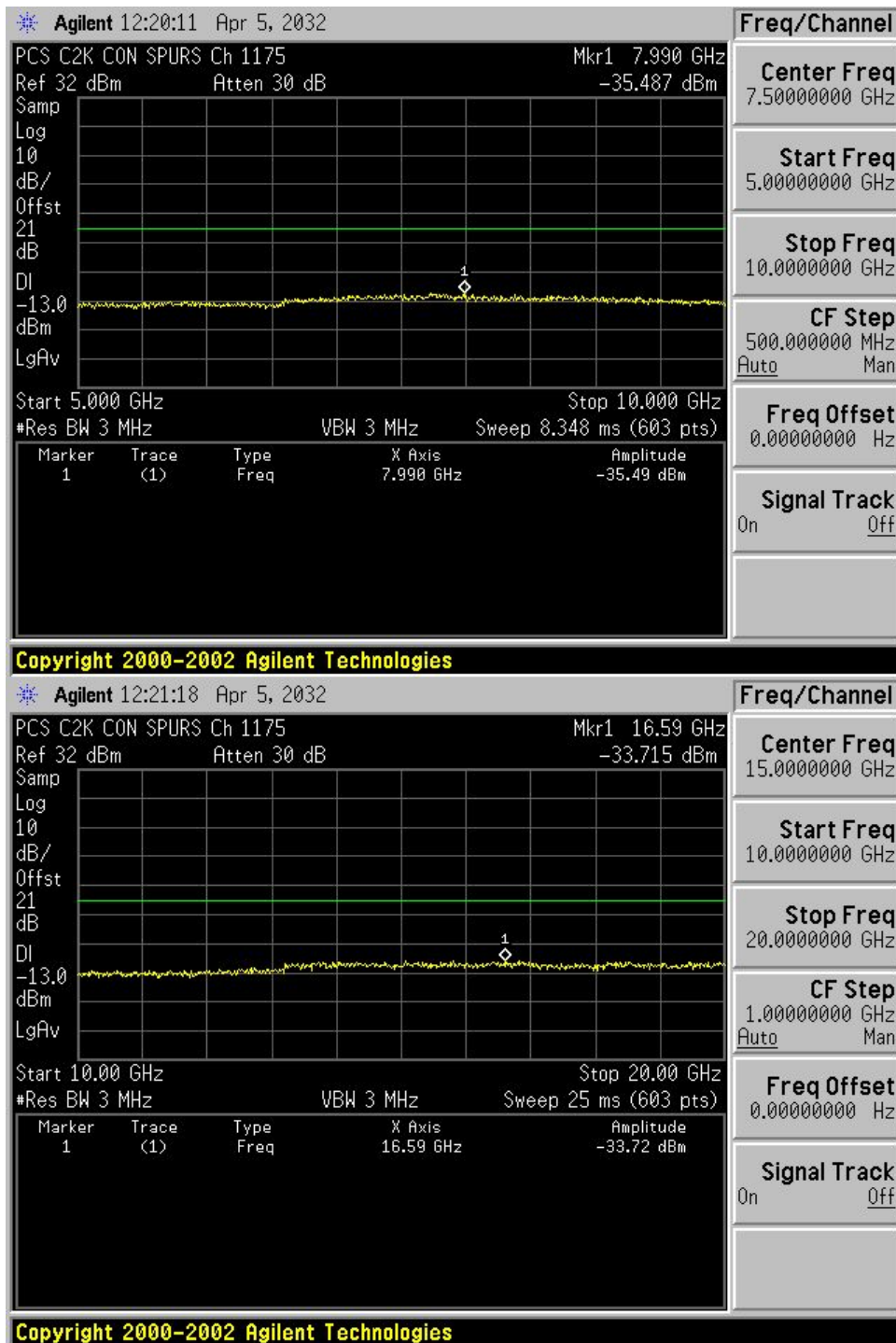
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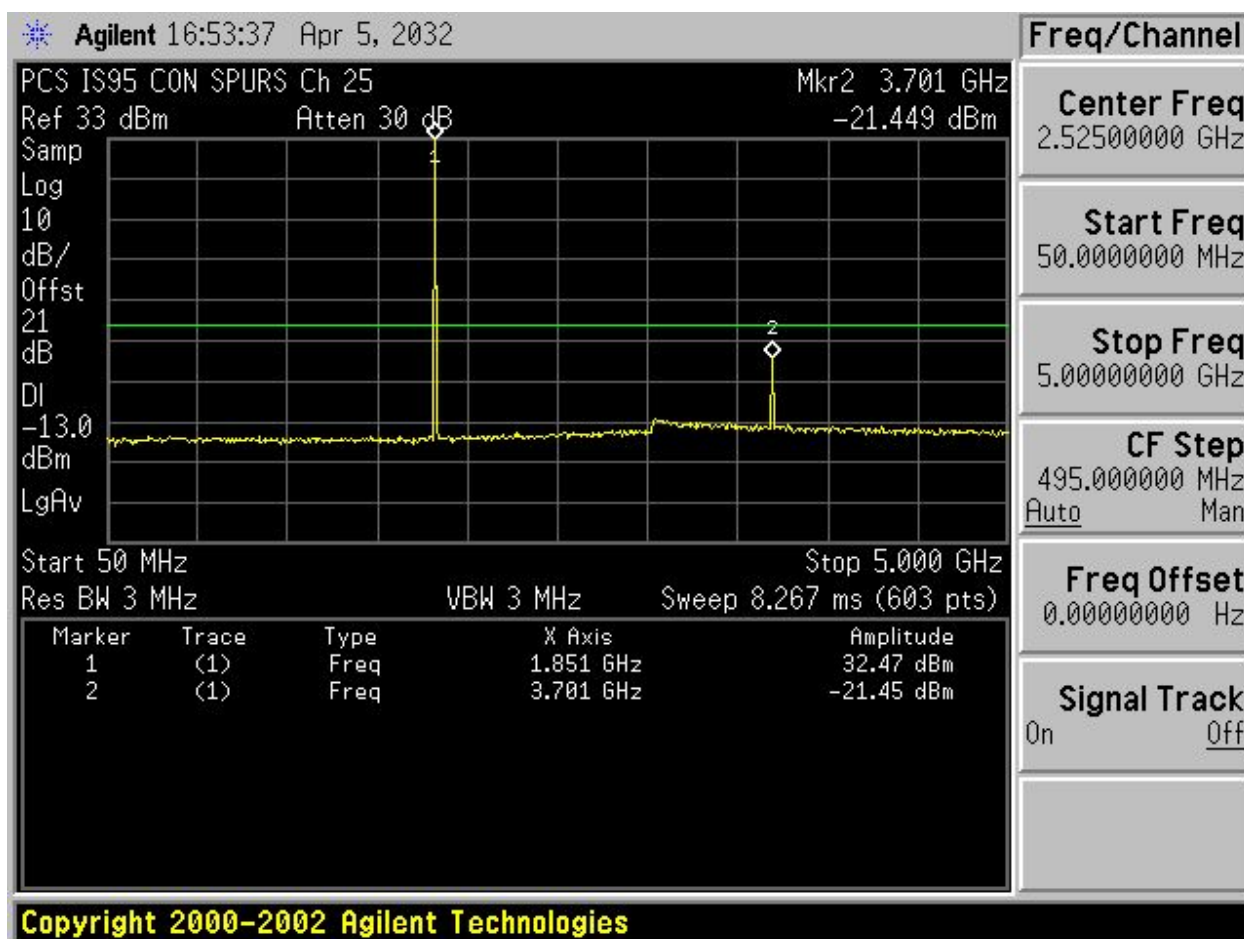
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2.1051

Spurious emissions at antenna terminals (conducted) (CDMAOne):

Data on the following page shows the level of conducted spurious responses. For analog modulation, the carrier was modulated 100% using a 2500 Hz tone. For digital modulation, the carrier is modulated to its maximum extent. The spectrum was scanned from 9kHz to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

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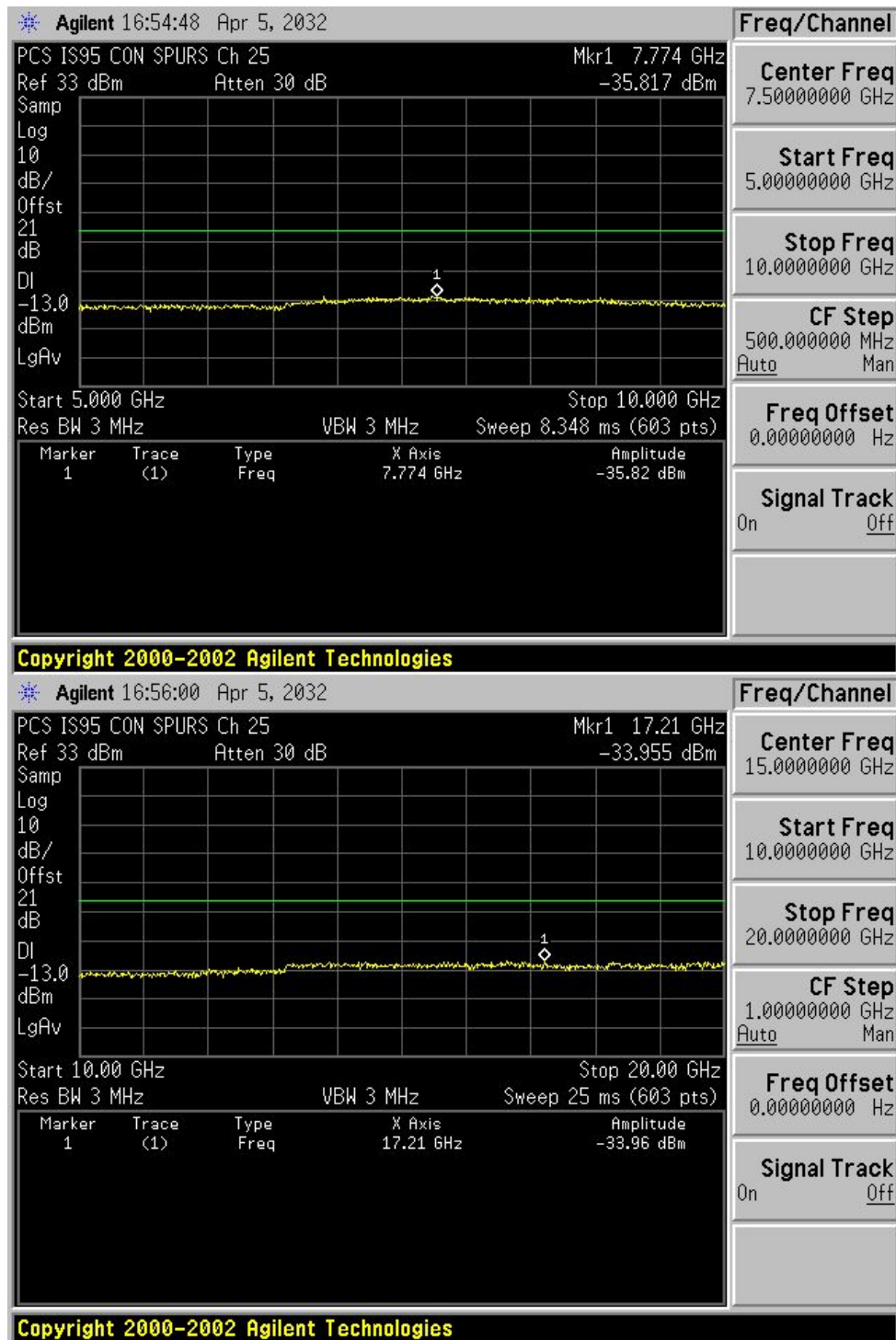
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CHANNEL 25



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CHANNEL 600



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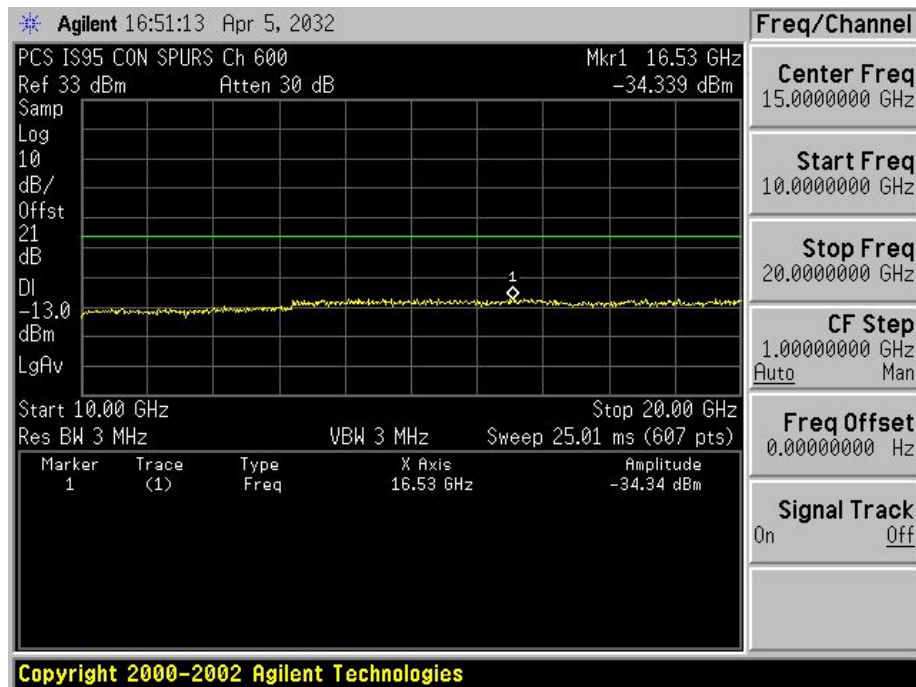
849 NW State Road 45

Newberry, Florida 32669

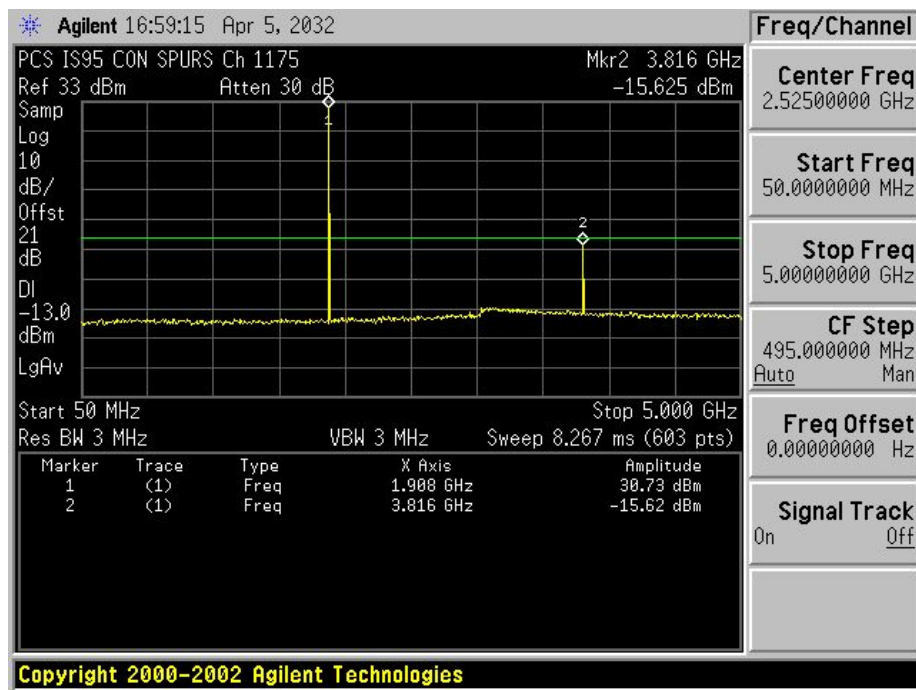
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CHANNEL 600



CHANNEL 1175



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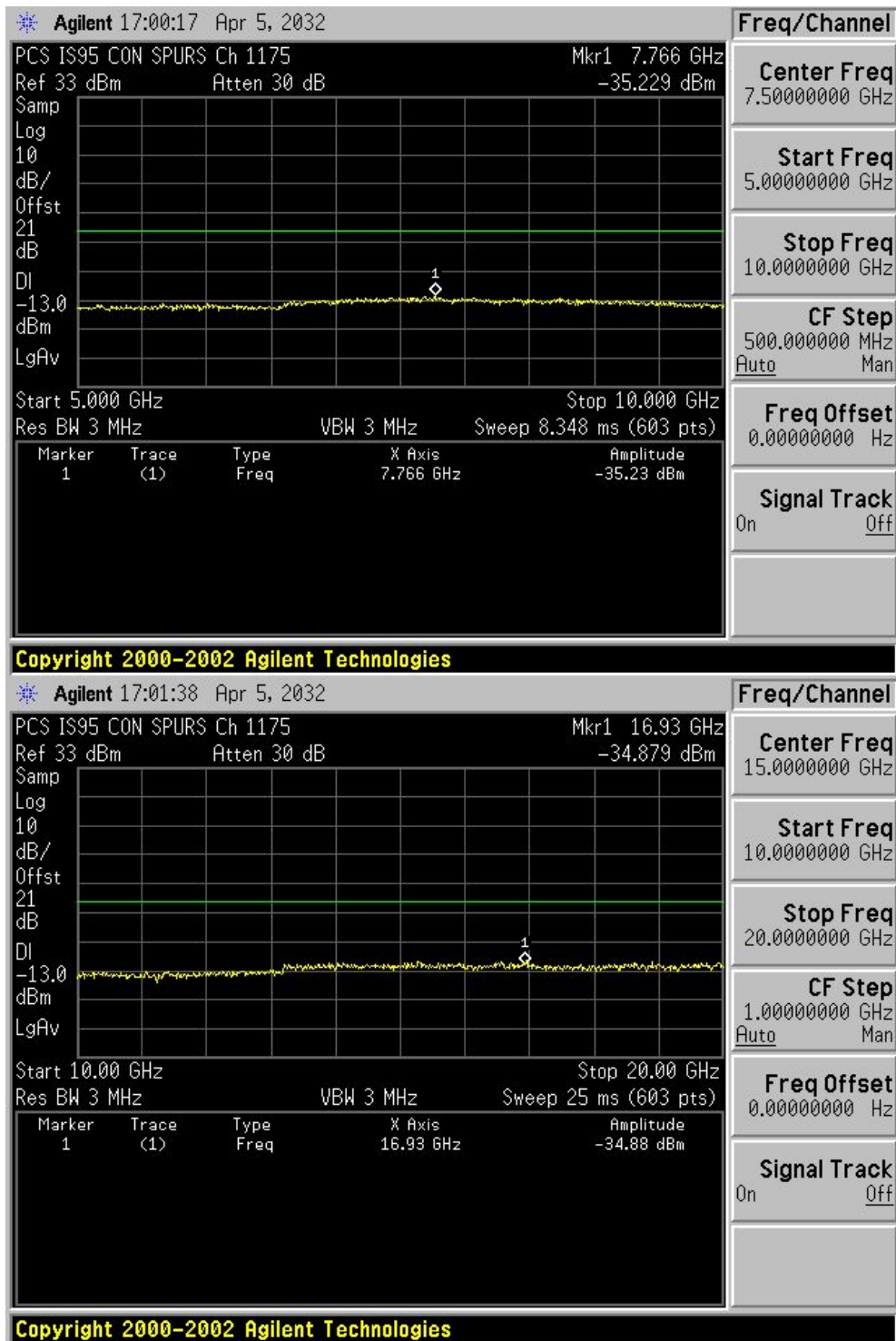
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CHANNEL 1175



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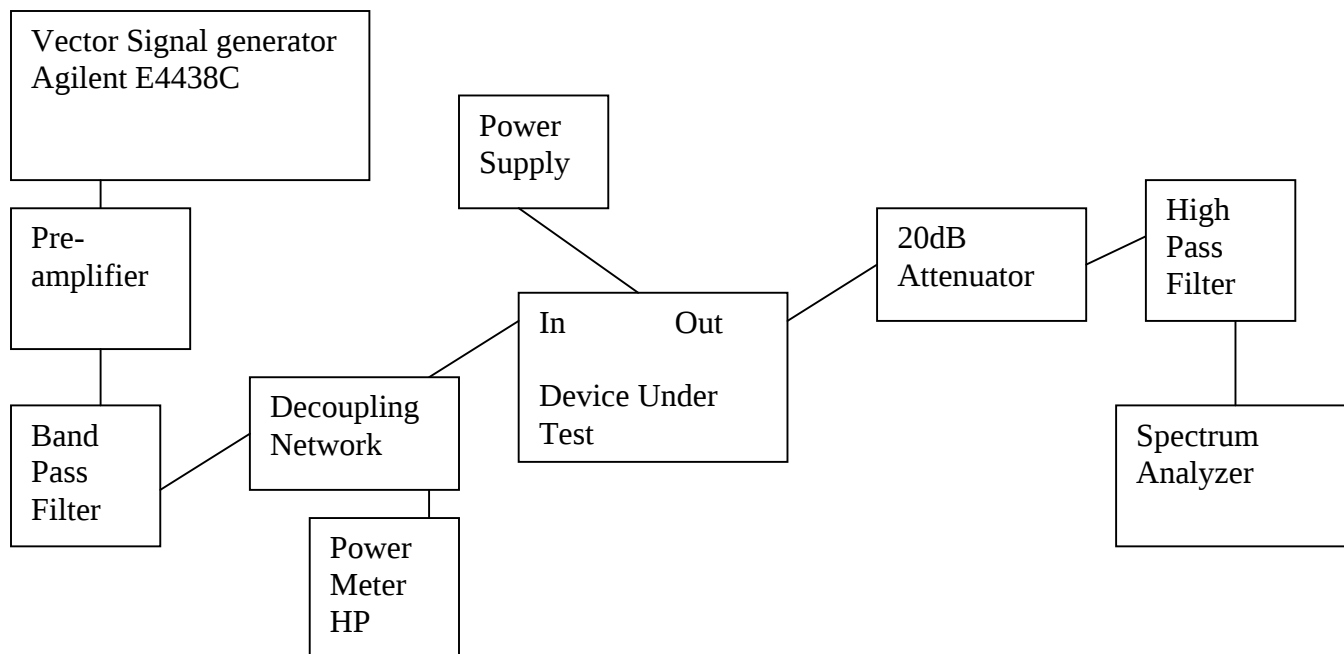
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Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD. The spectrum was scanned from 9kHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 N.W. State Road 45, Newberry, Florida 32669.

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2.1053 Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be $43 + 10\log(P_o)$ dB below the mean power output of the transmitter.

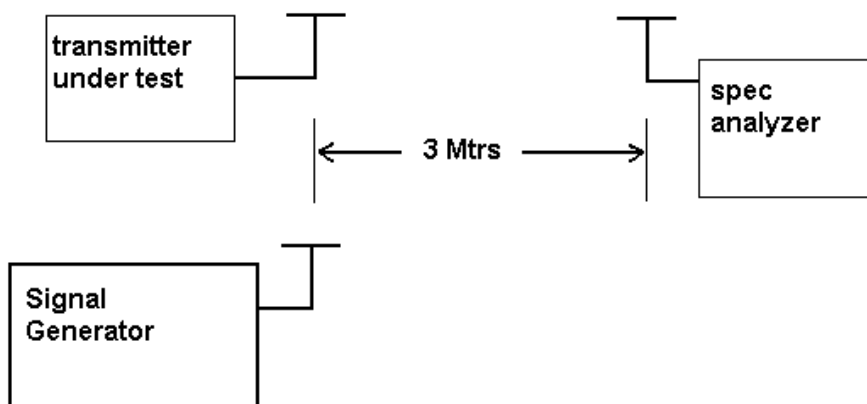
$$43 + 10\log(2) = 46.0 \text{ dBc}$$

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading (dBm)	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
1850.00	H	33.0	0	0	0
3700.00	V	-20.1	1.42	7.55	53.1
5550.00	V	-56.7	1.72	8.42	89.7

All other harmonics were at least 66dB below the limit.

Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENTS: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

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EMC Equipment List

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
X	3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
	3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
	Receiver, Beige Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 8/31/01	8/31/03
	RF Preselector	HP	85685A	3221A01400	CAL 8/31/01	8/31/03
	Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 8/31/01	8/31/03
X	Receiver, Blue Tower Spectrum Analyzer	HP	8568B	2928A04729	CAL	4/15/05
X				2848A18049	4/15/03	
X	RF Preselector	HP	85685A	2926A00983	CAL	4/15/05
X	Quasi-Peak Adapter	HP	85650A	2811A01279	CAL	4/15/05
	Receiver, Silver/Grey Tower Spectrum Analyzer	HP	8566B Opt 462	3552A22064 3638A08608	CAL 10/14/02	10/14/04
	RF Preselector	HP	85685A	2620A00294	CAL 10/14/02	10/14/04
	Quasi-Peak Adapter	HP	85650A	3303A01844	CAL 10/14/02	10/14/04
	Preamplifier	HP	8449B	3008A01075	CHAR 1/28/02	1/28/04
X	Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
	Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
	Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
	BiconiLog Antenna	EMCO	3143	9409-1043		
X	Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
	Log-Periodic Antenna	Electro-Metrics	EM-6950	632	CHAR 10/15/01	10/15/03
	Log-Periodic Antenna	Electro-Metrics	LPA-30	409	CAL 3/4/03	3/4/05

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	153	CAL 9/26/02	9/26/05
	Double-Ridged Horn Antenna	Electro-Metrics	RGA-180	2319	CAL 2/17/03	2/17/05
	Horn Antenna	Electro-Metrics	EM-6961	6246	CAL 3/31/03	3/31/05
	Horn Antenna	ATM	19-443-6R	None	No Cal Required	
	Passive Loop Antenna	EMC Test Systems	EMCO 6512	9706-1211	CHAR 7/10/01	7/10/03
	Line Impedance Stabilization . . .	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03
	Line Impedance Stabilization . . .	Electro-Metrics	EM-7820	2682	CAL 3/12/03	3/12/05
	Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 5/25/99	5/25/01
	Termaline Wattmeter	Bird Electronic Corporation	6104	1926	CHAR 12/12/01	12/12/03
	Oscilloscope	Tektronix	2230	300572	CHAR 2/1/01	2/1/03
	System One	Audio Precision	System One	SYS1-45868	CHAR 4/25/02	4/25/04
	Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04
	AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/03
	AC Voltmeter	HP	400FL	2213A14261	CHAR 10/15/01	10/15/03
	AC Voltmeter	HP	400FL	2213A14728	CHAR 10/15/01	10/15/03
X	Digital Multimeter	Fluke	77	35053830	CHAR 1/8/02	1/8/04
	Digital Multimeter	Fluke	77	43850817	CHAR 1/8/02	1/8/04
	Digital Multimeter	HP	E2377A	2927J05849	CHAR 1/8/02	1/8/04
	Multimeter	Fluke	FLUKE-77-3	79510405	CHAR 9/26/01	9/26/03
	Peak Power Meter	HP	8900C	2131A00545	CHAR 1/26/01	1/26/03
	Power Meter	HP	432A	1141A07655	CAL 4/15/03	4/15/05

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Power Meter And Sensor	Bird	4421-107 4022	0166 0218	CAL 4/16/03	4/16/05
	Power Sensor	HP	478A	72129	CAL 4/15/03	4/15/05
	Digital Thermometer	Fluke	2166A	42032	CAL 1/16/02	1/16/04
	Thermometer	Traulsen	SK-128		CHAR 1/22/02	1/22/04
	Thermometer	Extech	4028	14871-2	CAL 3/7/03	3/7/05
X	Hygro-Thermometer	Extech	445703	0602	CAL 10/4/02	10/4/04
	Frequency Counter	HP	5352B	2632A00165	CAL 11/28/01	11/28/03
	Frequency Counter	HP	5385A	2730A03025	CAL 3/7/03	3/7/05
	Power Sensor	Agilent Technologies	84811A	2551A02705	CHAR 1/26/01	1/26/03
	Service Monitor	IFR	FM/AM 500A	5182	CAL 11/22/00	11/22/02
	Comm. Serv. Monitor	IFR	FM/AM 1200S	6593	CAL 5/12/02	5/12/04
	Signal Generator	HP	8640B	2308A21464	CAL 2/15/02	2/15/04
	Sweep Generator	Wiltron	6648	101009	CAL 4/15/03	4/15/05
	Sweep Generator	Wiltron	6669M	007005	CAL 3/3/03	3/3/05
	Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
	Modulation Meter	Boonton	8220	10901AB	CAL 4/15/03	4/15/05
	Near Field Probe	HP	HP11940A	2650A02748	CHAR 2/1/01	2/1/03
	BandReject Filter	Lorch Microwave	5BR4-2400/ 60-N	Z1	CHAR 3/2/01	3/2/03
	BandReject Filter	Lorch Microwave	6BR6-2442/ 300-N	Z1	CHAR 3/2/01	3/2/03
	BandReject Filter	Lorch Microwave	5BR4-10525/ 900-S	Z1	CHAR 3/2/01	3/2/03
	High Pass Filter	Microlab	HA-10N		CHAR 10/4/01	10/4/03
	High Pass Filter	Microlab	HA-20N		CHAR 2/7/03	2/7/05

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DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
Audio Oscillator	HP	653A	832-00260	CHAR 3/1/01	3/1/03
Frequency Counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/03
Frequency Counter	HP	5385A	3242A07460	CAL 3/7/03	3/7/05
Preamplifier	HP	8449B-H02	3008A00372	CHAR 3/4/01	3/4/03
Amplifier	HP	11975A	2738A01969	CHAR 3/1/01	3/1/03
Egg Timer	Unk			CHAR 8/31/01	8/31/03
Measuring Tape, 20M	Kraftixx	0631-20		CHAR 2/1/02	2/1/04
Measuring Tape, 7.5M	Kraftixx	7.5M PROFI		2/1/02	2/1/04
Coaxial Cable #51	Insulated Wire Inc.	NPS 2251-2880	Timco #51	CHAR 1/23/02	1/23/04
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/04
Coaxial Cable #65	General Cable Co.	E9917 RG233/U	Timco #65	CHAR 1/23/02	1/23/04
Coaxial Cable #106	Unknown	Unknown	Timco #106	CHAR 1/23/02	1/23/04

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