FCC CFR47 CERTIFICATION

PART 22H and 24E

TEST REPORT

FOR

DUAL-BAND TRI-MODE PCS/AMPS/CDMA
CELLULAR CAMERA PHONE

MODEL NUMBER: VT-5D

FCC ID: GKRVT-5D

REPORT NUMBER: 04I2820-1

ISSUE DATE: July 19, 2004

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1. TEST RESULT CERTIFICATION

COMPANY NAME: COMPAL ELECTRONICS, INC.

EUT DESCRIPTION: DUAL-BAND TRI-MODE PCS/AMPS/CDMA CELLULAR CAMERA PHONE

MODEL NUMBER: VT-5D

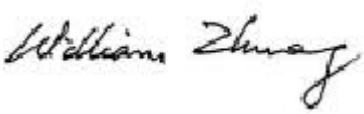
DATE TESTED: 7/8/2004 –7/14/2004

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	LICENSED TX MODULE IN MOBILE APPLICATION
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 22 Subpart H and 24 Subpart E

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 22 Subpart H-Cellular Radiotelephone Service and 24 Subpart E-Broadband PCS. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Tested By:



WILLIAM ZHUANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

This equipment is a Dual-band and tri-mode (PCS-CDMA/Cellular-CDMA/AMPS) portable mobile station of which frequency range are 1850 ~1990MHz and 824～894MHz. It has an antenna gain of 1.8dBi in Cell band and 0.4dBi in PCS band, which has an output power of 25.3dBm (AMPS, ERP), 27.5dBm (CDMA, ERP), and 29.4dBm (PCS, EIRP).

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

4. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

6. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

7. TEST SETUP, PROCEDURE AND RESULT

7.1. SECTION 2.1046: RF POWER OUTPUT

INSTRUMENTS LIST

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Peak Power Meter	**Agilent**	**E4416A**	**GB41291160**	**11/7/2004**
EMI Receiver, 9 kHz ~ 2.9 GHz	**HP**	**8542E**	**3942A00286**	**11/21/2004**
RF Filter Section	**HP**	**85420E**	**3705A00256**	**11/21/2004**
Antenna, Tuned Dipole	**CDI**	**Roberts**	**117**	**5/15/2005**
Spectrum Analyzer	**Agilent**	**E4446A**	**MY43360112**	**1/13/2005**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3117**	**29310**	**12/26/2004**

MEASUREMENT PROCEDURE

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.

3). The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4). The transmitter shall be placed 0.80 meter above the ground plane, the X, Y, and Z positions shall be tested and the worst case reported. The transmitter shall be switched on with typical modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8). The maximum signal level detected by the measuring receiver shall be noted.

9). The transmitter shall be replaced by a tuned dipole (substitution antenna).

10). The substitution antenna shall be oriented for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11). The substitution antenna shall be connected to a calibrated signal generator.

12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

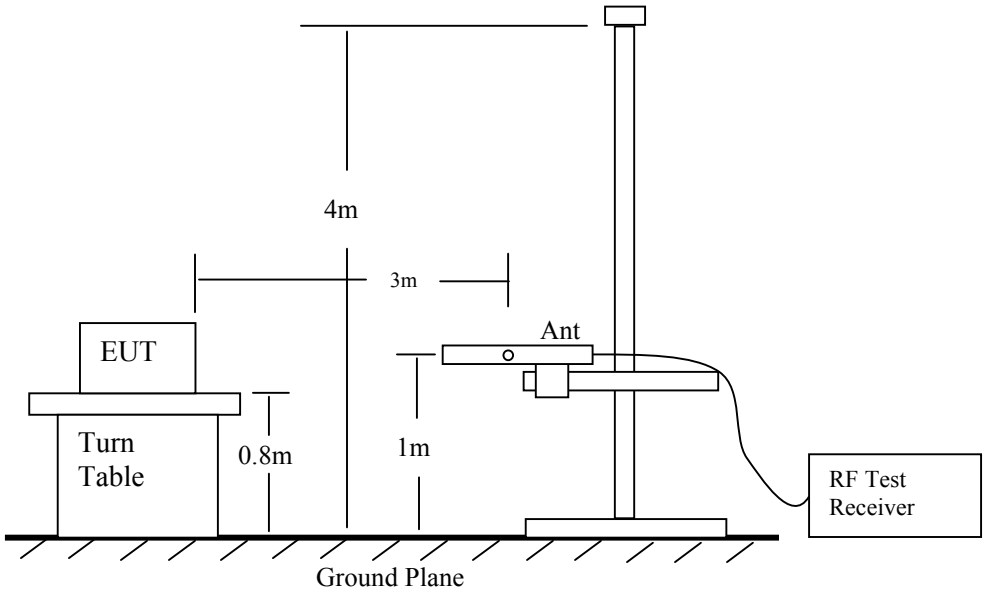
13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

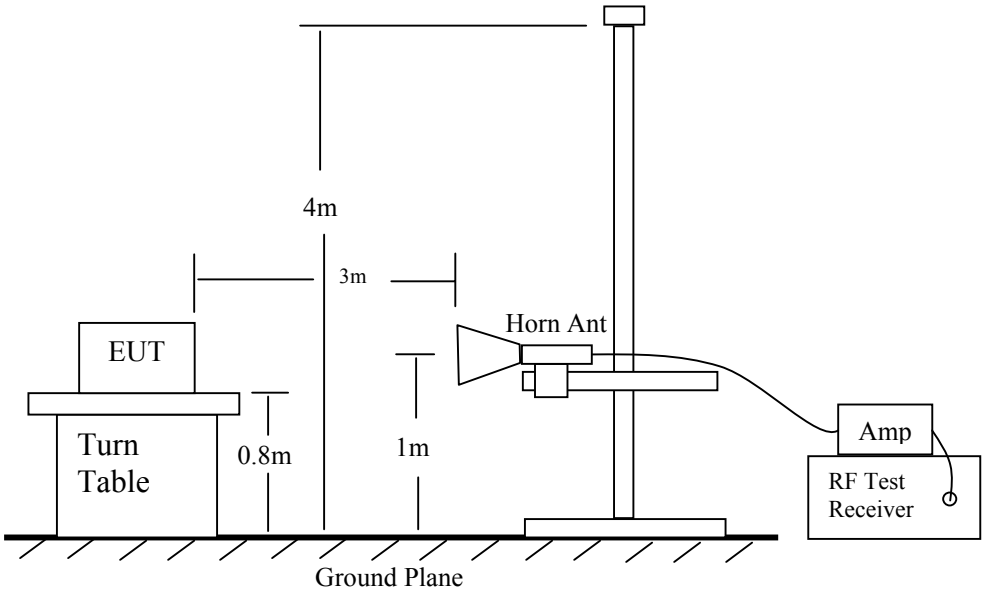
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

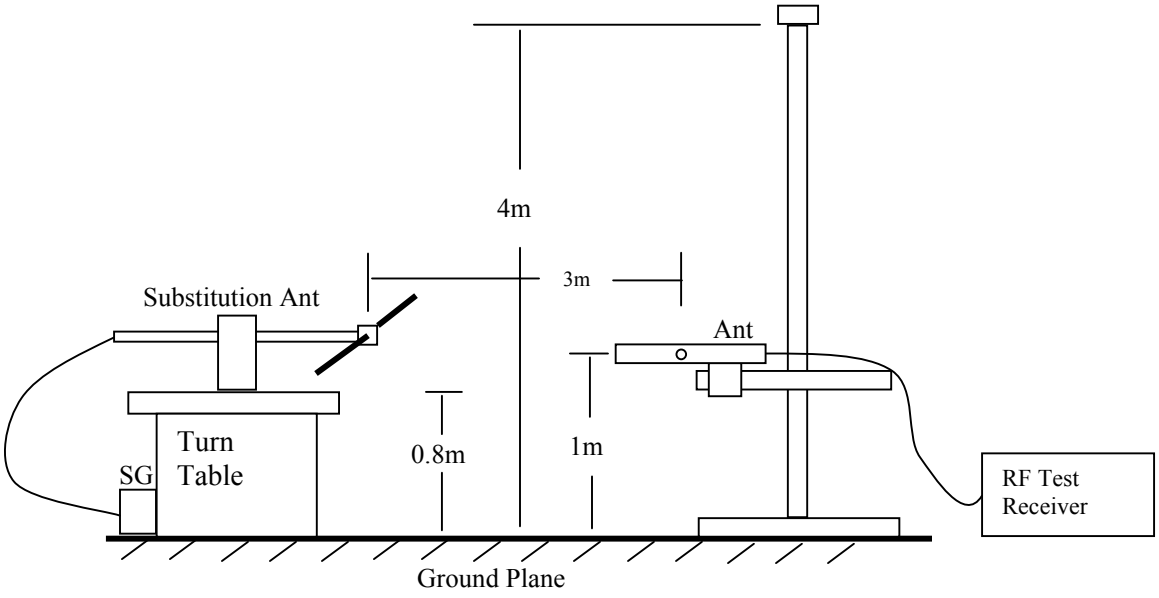
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.



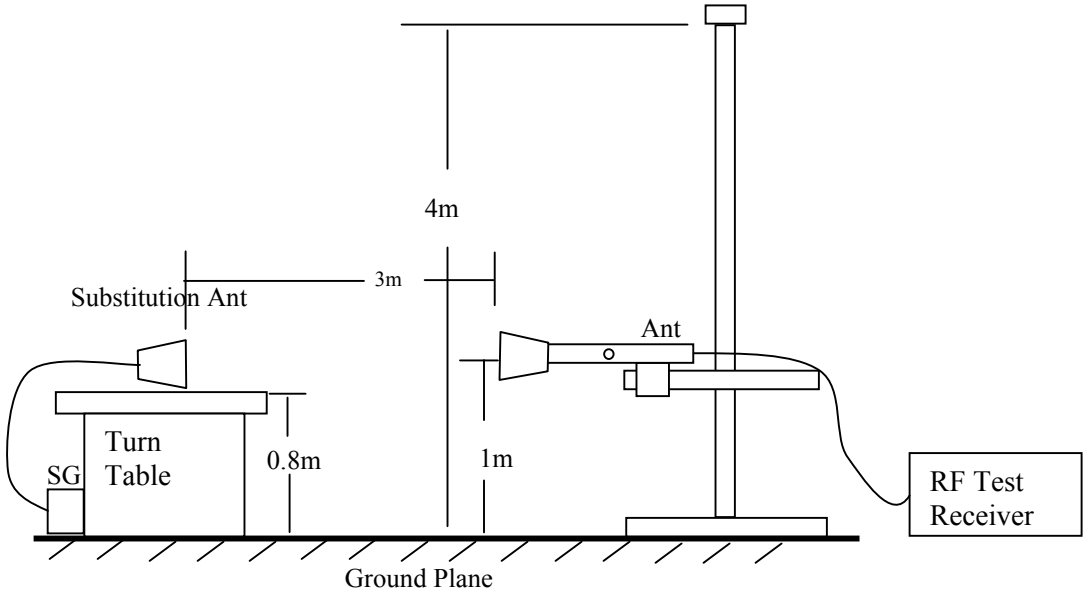
Radiated Emission Measurement 30 to 1000 MHz



Radiated Emission Above 1000 MHz



Radiated Emission – Substitution Method Set-up



Radiated Emission – Substitution Method Set-up

X position:

Y position:

Z position:

Test result:

AMPS Output Power (ERP):

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Worst case at Y position										
0.824	93.8	V	21.0	0.6	0.6	-1.6	18.8	38.5	-19.6	Low Ch
0.824	97.0	H	23.4	0.6	0.6	-1.6	21.2	38.5	-17.2	Low Ch
0.836	90.8	V	18.0	0.6	0.6	-1.6	15.8	38.5	-22.6	Mid Ch
0.836	101.1	H	27.5	0.6	0.6	-1.6	25.3	38.5	-13.1	Mid Ch
0.849	92.4	V	19.6	0.6	0.6	-1.6	17.4	38.5	-21.0	High Ch
0.849	96.5	H	22.9	0.6	0.6	-1.6	20.8	38.5	-17.7	High Ch

RBW = VBW = 1MHz

CDMA Output Power (ERP):

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Worst case at Y position										
0.825	97.6	V	24.8	0.6	0.6	-1.6	22.7	38.5	-15.8	Low Ch
0.825	101.6	H	28.0	0.6	0.6	-1.6	25.9	38.5	-12.6	Low Ch
0.836	97.8	V	25.0	0.6	0.6	-1.6	22.8	38.5	-15.6	Mid Ch
0.836	101.4	H	28.0	0.6	0.6	-1.6	25.9	38.5	-12.6	Mid Ch
0.848	94.4	V	21.6	0.6	0.6	-1.6	19.5	38.5	-19.0	High Ch
0.848	103.3	H	29.7	0.6	0.6	-1.6	27.5	38.5	-10.9	High Ch

RBW=VBW=3MHz

PCS Output Power (ERP):

f GHz	SA reading (dBuV/m)	Ant. Pol. (H/V)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Worst case at X position										
1.851	88.0	V	23.3	1.5	4.4	2.3	24.1	38.5	-14.3	Low Ch
1.851	90.6	H	26.6	1.5	4.4	2.3	27.4	38.5	-11.0	Low Ch
1.880	88.4	V	23.8	1.5	4.4	2.2	24.6	38.5	-13.9	Mid Ch
1.880	92.4	H	28.6	1.5	4.4	2.2	29.4	38.5	-9.1	Mid Ch
1.909	87.2	V	22.9	1.5	4.3	2.2	23.6	38.5	-14.9	High Ch
1.909	90.2	H	26.6	1.5	4.3	2.2	27.3	38.5	-11.2	High Ch

RBW = VBW = 3MHz

Conducted Output Power:

AMPS

	Ch.#	Freq. (MHz)	Peak Power Meter (dBm)	Avg. Power Meter (dBm)
Low Ch.	991	824.04	26.3	26.10
Mid Ch.	383	836.49	26.23	26.05
High Ch.	799	848.97	26.15	26.06

RF Cable Loss 0.5 dB

CDMA

	Ch.#	Freq. (MHz)	Peak Power Meter (dBm)	Avg. Power Meter (dBm)
Low Ch.	1015	824.70	28.22	23.5
Mid Ch.	363	835.89	28.38	23.7
High Ch.	777	848.31	28.28	23.5

RF Cable Loss 0.5 dB

PCS

	Ch.#	Freq. (MHz)	Peak Power Meter (dBm)	Avg. Power Meter (dBm)
Low Ch.	25	1851.25	28.10	23.5
Mid Ch.	600	1880.00	28.73	23.6
High Ch.	1175	1908.75	28.32	23.7

RF Cable Loss: 0.9 dB

Note: Antenna Gain is dBi

7.1. SECTION 2.1047: MODULATION CHARACTERISTICS

PROVISIONS APPLICABLE

According to CFR 47 section 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000 Hz shall be measured.

According to CFR 47 section 22.915 (d) _ Audio Filter Characteristics

(1) For mobile stations, these signals must be attenuated, relative to the level at 1KHz, as follows:
   - (i) In the frequency ranges of 3.0 to 5.9Khz and 6.1 to 15.0KHz, signals must be attenuated by at least 40 log (f / 3) dB, where f is the frequency of the signal in KHz.
   - (ii) In the frequency ranges of 5.9 to 6.1KHz, signals must be attenuated at least 35dB.
   - (iii) In the frequency ranges above 15KHz, signals must be attenuated at least 28dB.

MEASUREMENT METHOD

Modulation Limit

1). Configure the EUT as shown below, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0 dB) and vary the input level from -20 to +20 dB. Record the frequency deviation obtained as a function of the input level.

2). Repeat step 1 with input frequency changing to 300, 1004, 1500Hz, and 2500 Hz in sequence.

Audio Frequency Response

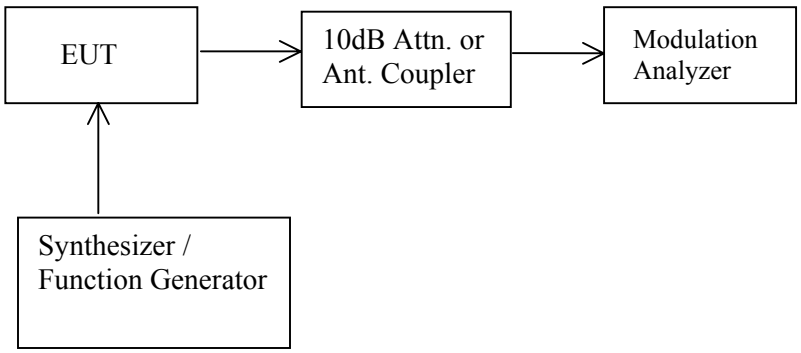
1). Configure the EUT as shown below.

2). Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).

3). Vary the Audio frequency from 100 Hz to 10 KHz and record the frequency deviation.

4). Audio Frequency Response = 20 $\log_{10}$ (Deviation of test frequency / Deviation of 1KHz reference).

TETS SETUP



Modulation characteristic measurement configuration

Audio Low Pass Filter Response

1). Configure the EUT as shown below.

2). Connect the audio frequency generator as close as possible the input of the post limiter low pass filter within the transmitter under test.

3). Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.

4). Apply 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.

5). Record the dB level of the 1000 Hz spectral line on the audio spectrum analyzer as LEV_{REF}.

6). Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.

7). Record audio spectrum analyzer levels, at the frequency in step 6).

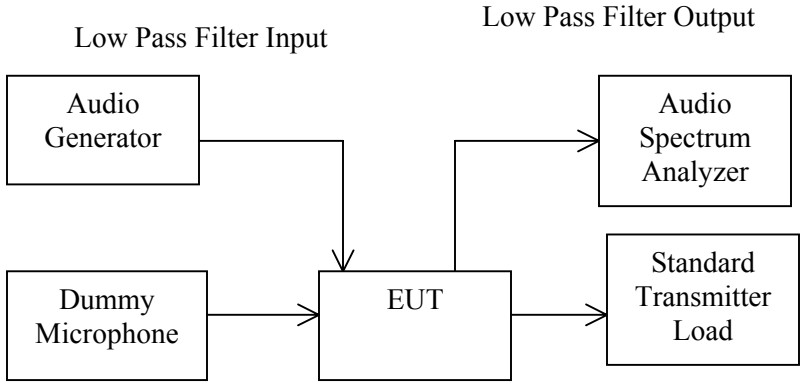
8). Record the dB level on the audio spectrum analyzer as LEV_{FREQ}.

9). Calculate the audio frequency response at the test frequency as:

low pass filter response = LEV_{FREQ} - LEV_{REF}

10). Repeat the 6) through 9) for all the desired test frequencies.

TEST SETUP



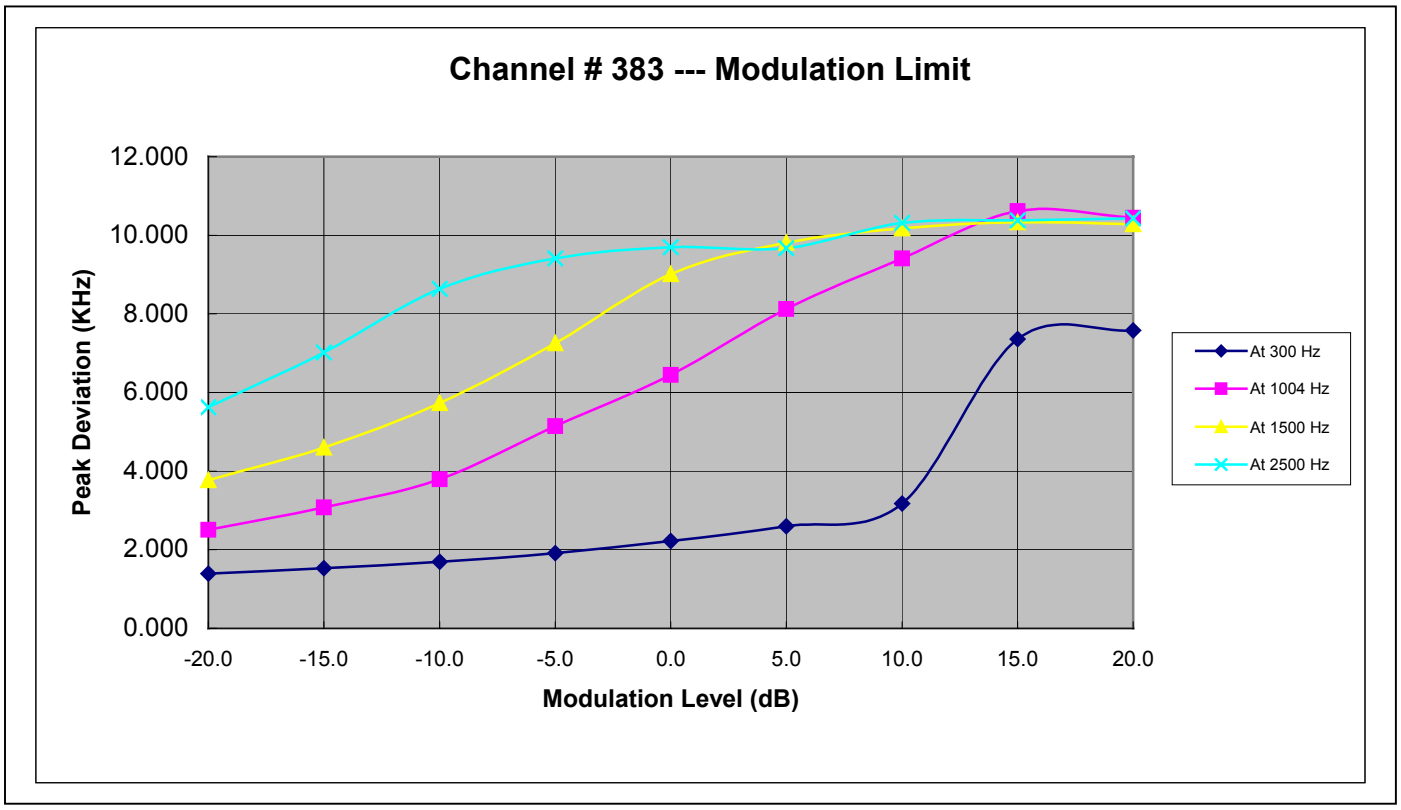
Audio low pass filter response measurement configuration

MEASUREMENT INSTRUMENT

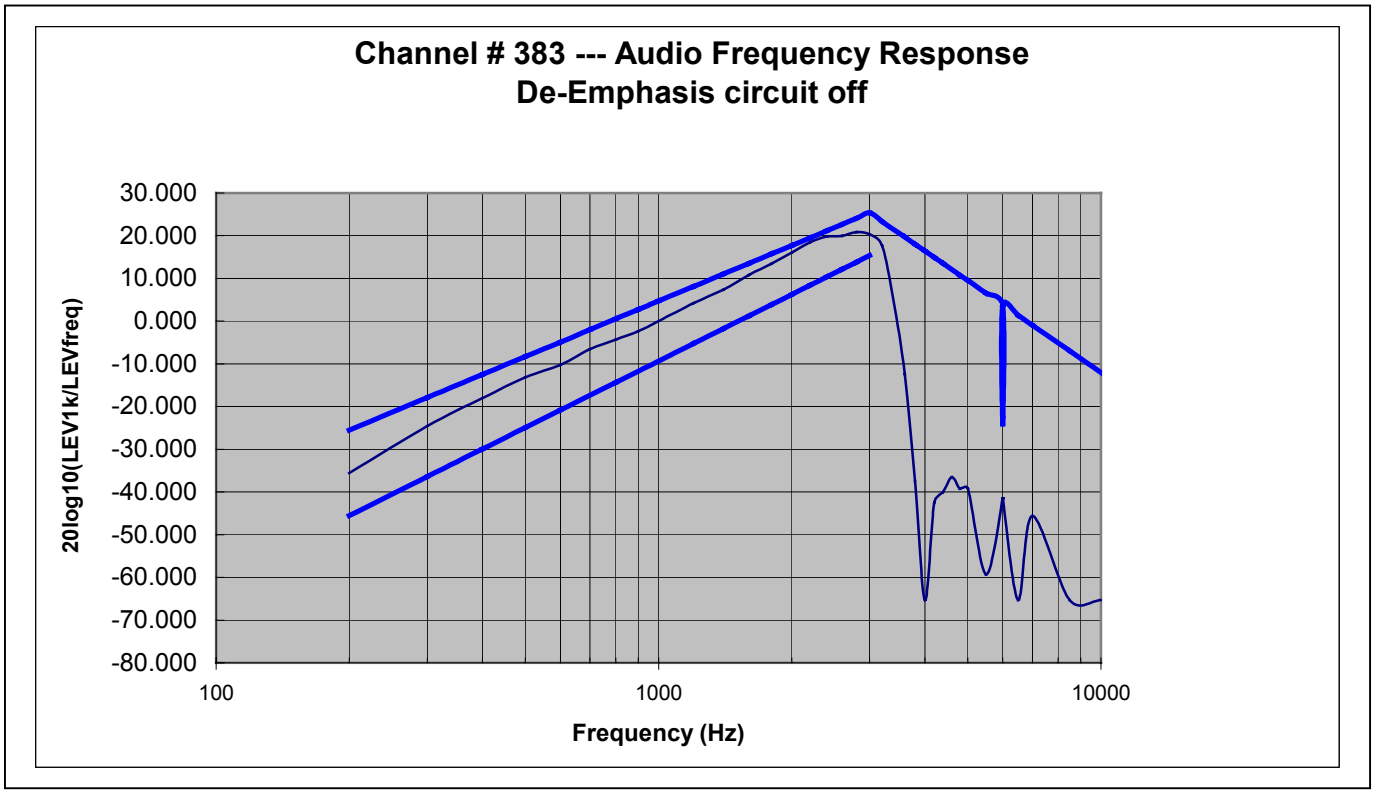
TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Spectrum Analyzer	**HP**	**E4446A**	**US42510266**	**7/23/2004**
Function Generator	**HP**	**3325A**	**2652A24749**	**5/8/2005**
Modulation Analyzer	**HP**	**8901B**	**3438A05272**	**6/23/2005**

MEASUREMENT RESULT:

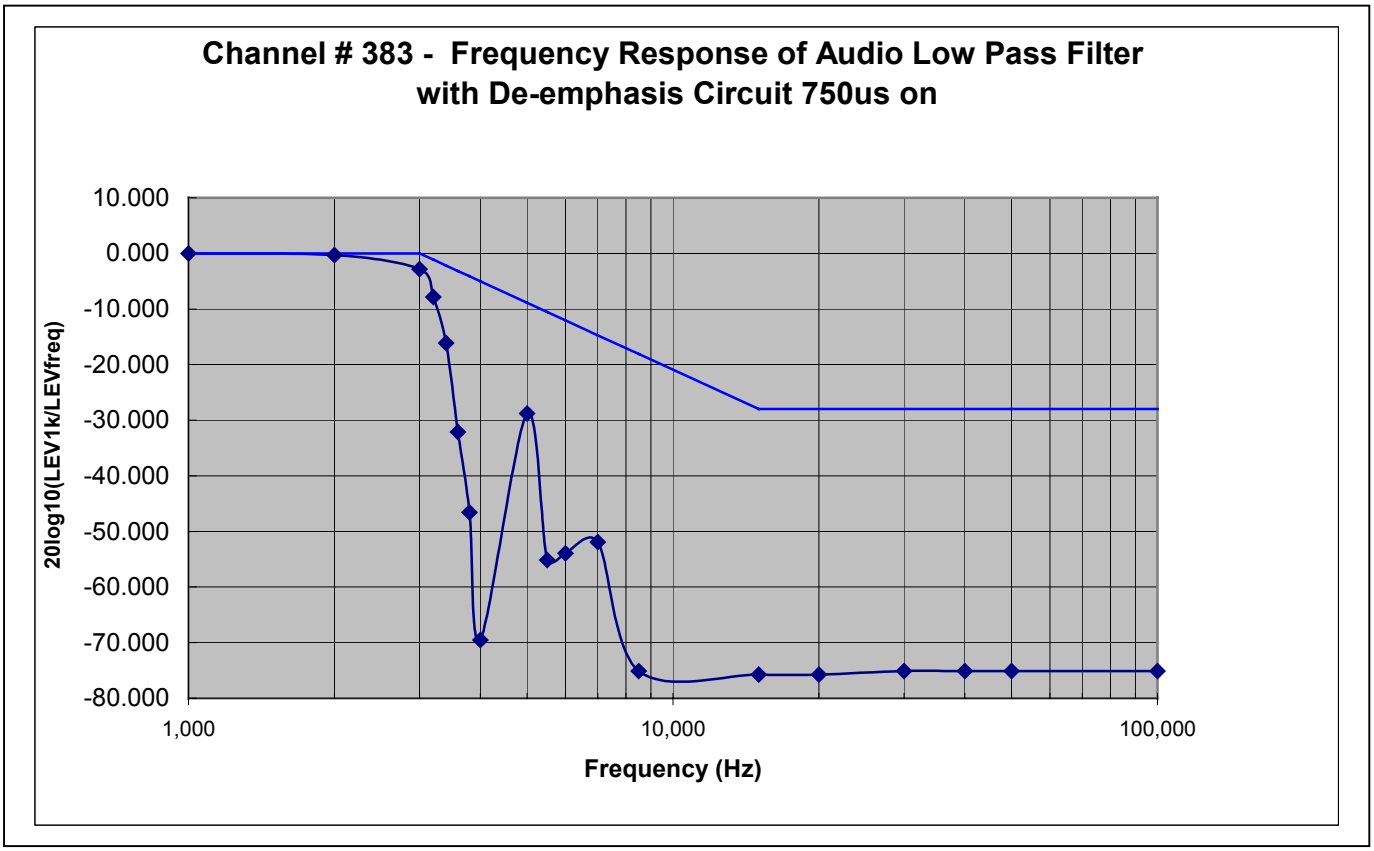
a). Modulation Limit:



b). Audio Frequency Response:

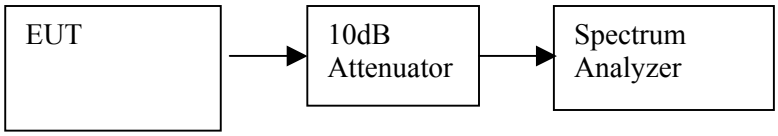


c). Audio low pass filter response:



7.2. SECTION 2.1049: OCCUPIED BANDWIDTH

TEST SETUP



TEST PROCEDURE

The EUT's output RF connector (made solely for the purpose of the test) was connected with a short cable to the spectrum analyzer, RES BW was set to about 1% of emission BW , -26 dBc display line was placed on the screen (or 99% bandwidth), the occupied BW is the delta frequency between the two points where the display line intersects the signal trace.

RESULT

No non-compliance noted, reference only.

CDMA:

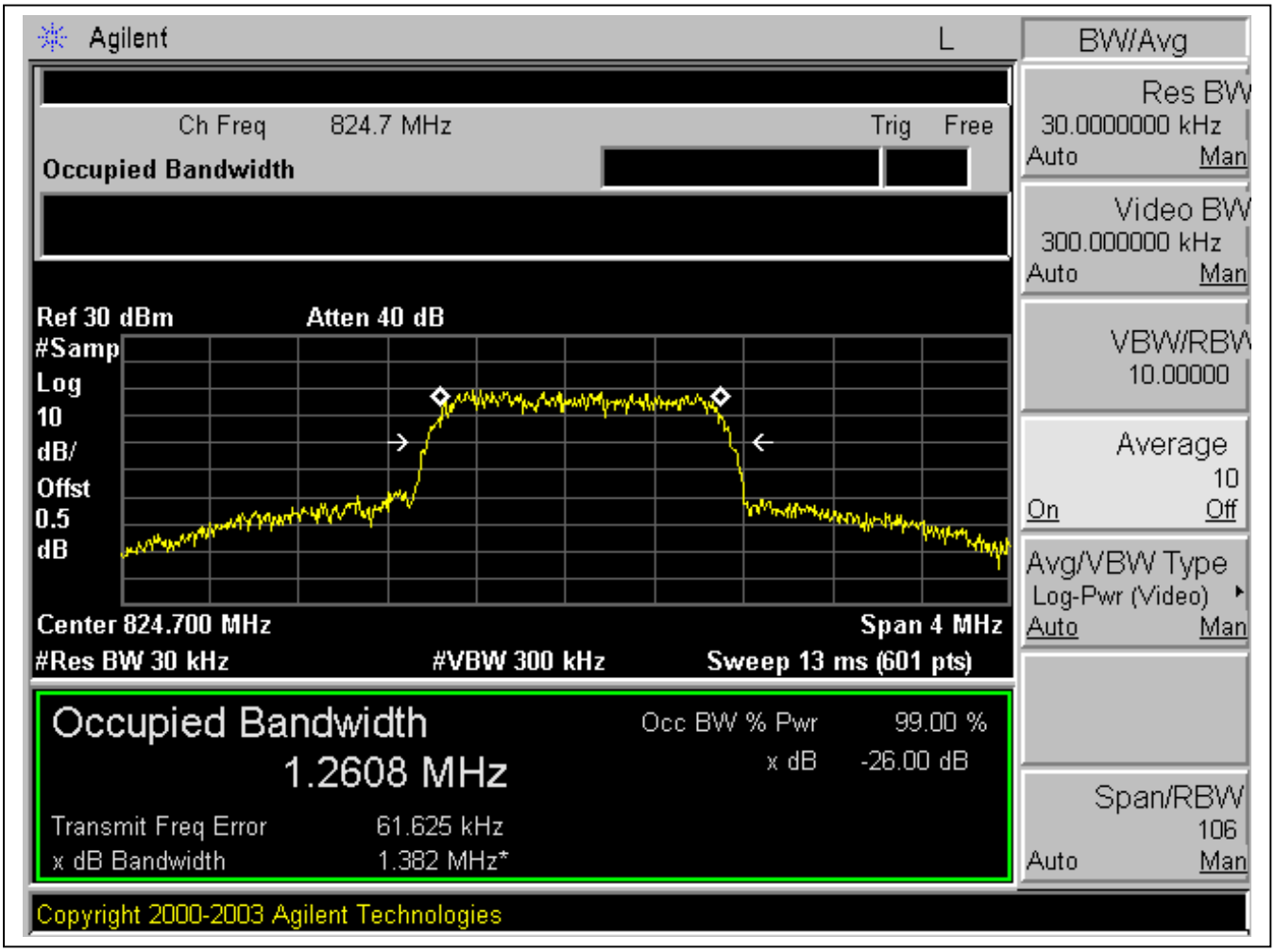
Channel	Frequency (MHz)	99% BW (MHz)	-26dBc BW (MHz)
Low	824.70	1.2608	1.382
Middle	835.89	1.2583	1.405
High	848.31	1.2644	1.385

PCS:

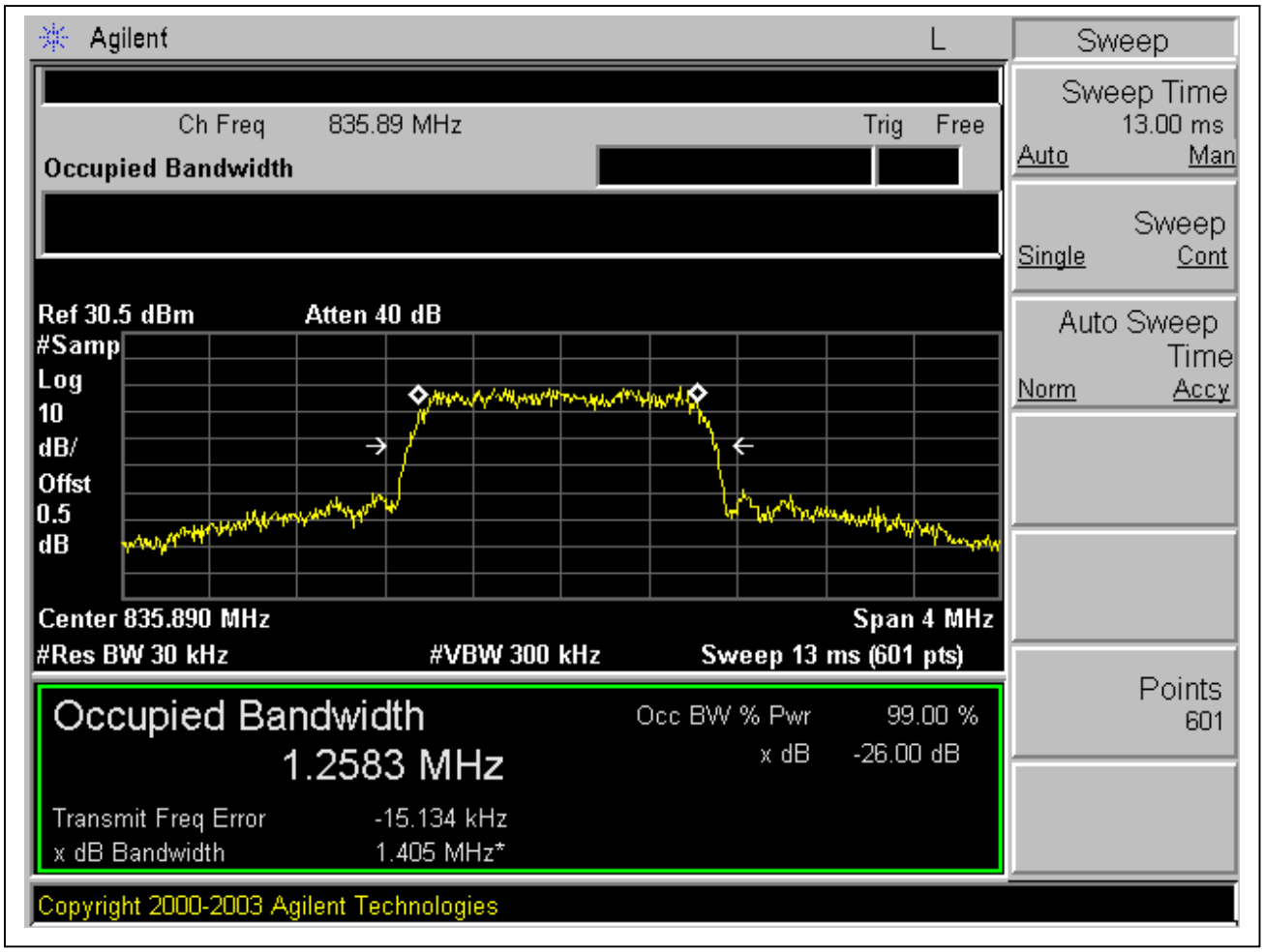
Channel	Frequency (MHz)	99% BW (MHz)	-26dBc BW (MHz)
Low	1851.25	1.2698	1.390
Middle	1880	1.2704	1.402
High	1908.75	1.2719	1.383

OCCUPIED BANDWIDTH FOR CDMA MODULATION:

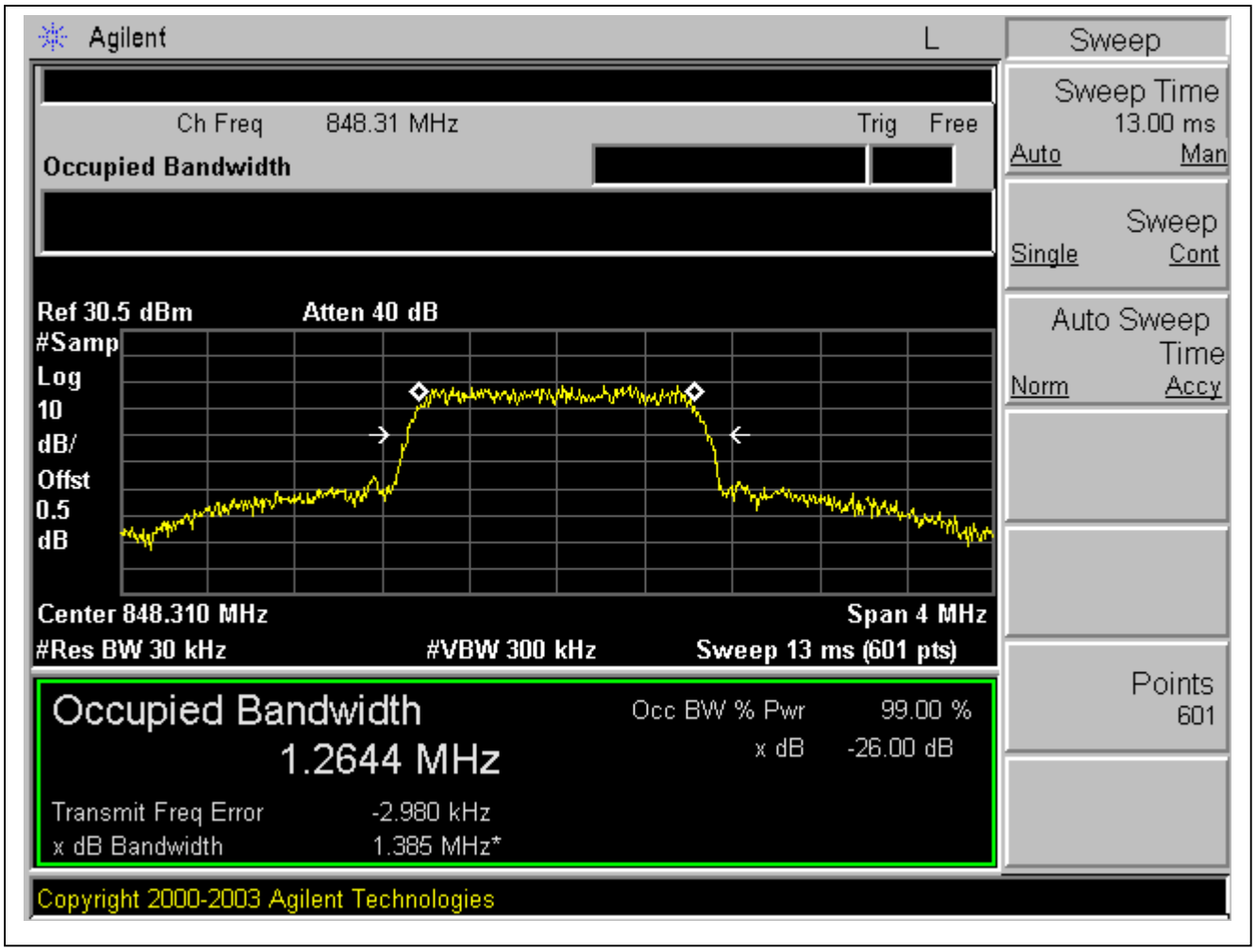
CDMA, Low Channel:



CDMA, Mid Channel:

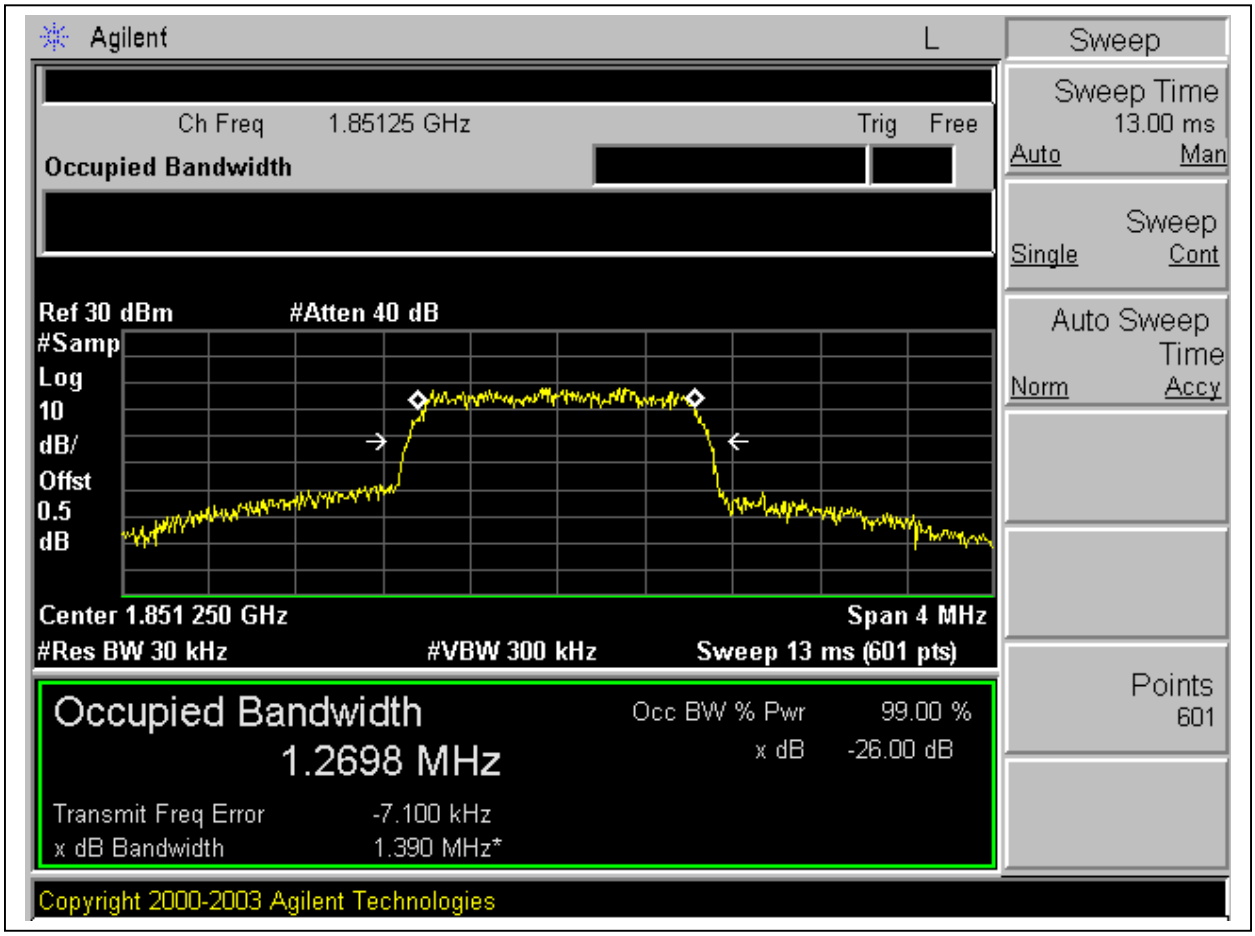


CDMA, High Channel:

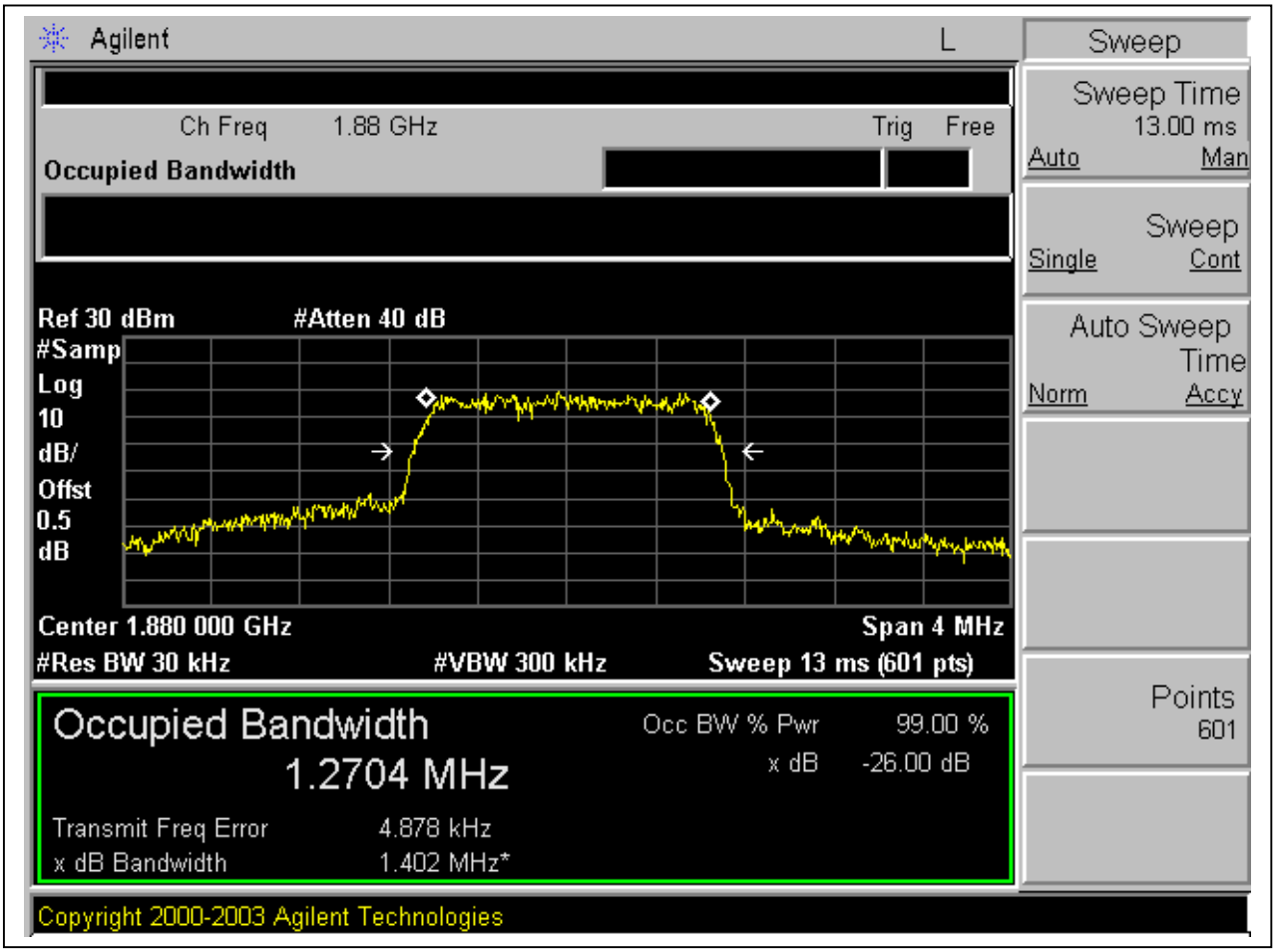


OCCUPIED BANDWIDTH FOR PCS MODULATION:

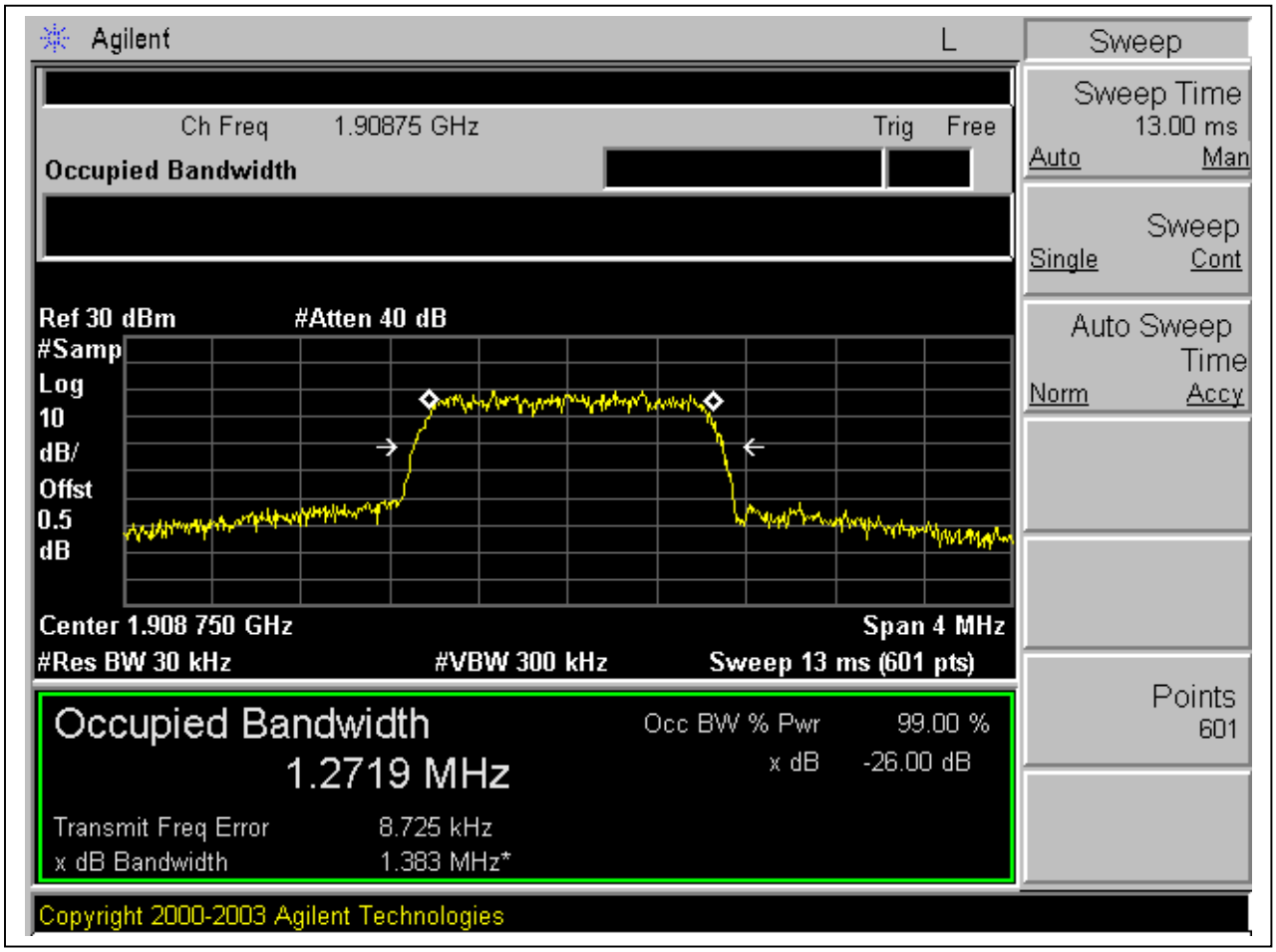
PCS, Low Channel:



PCS, Mid Channel:

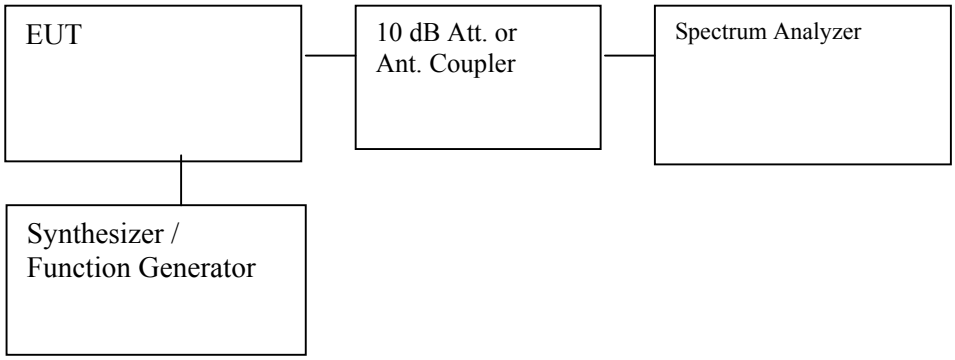


PCS, High Channel:



7.3. OCCUPIED BANDWIDTH FOR AMPS MODULATION:

PROVISIONS APPLICABLE
According to CFR 47 section 22.917, the authorized bandwidth for emission type of F3E unit is 20 KHz.



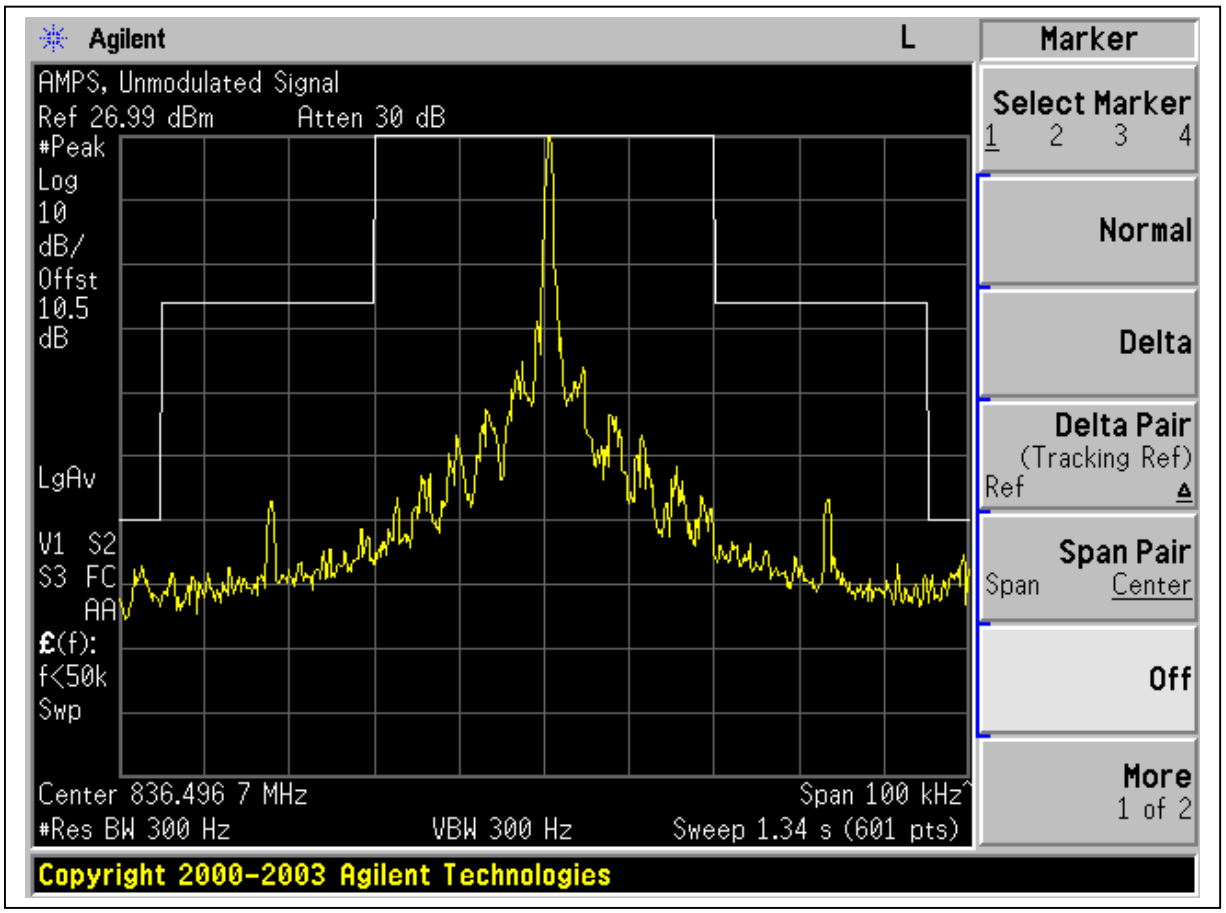
Set-up Photo

7.3.1. Un-modulated Signal

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz

Limit:
N/A

Test Result:



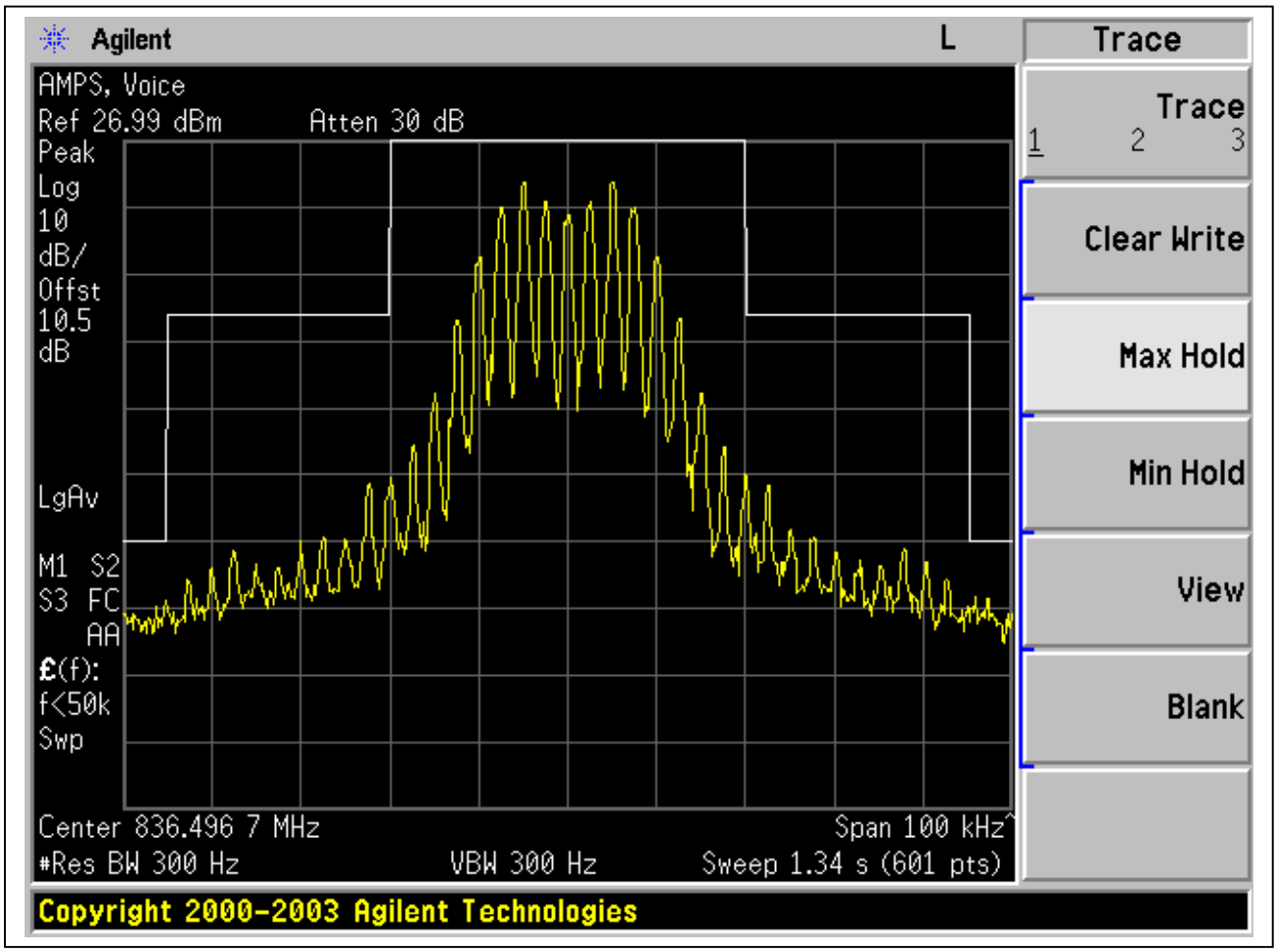
7.3.2. Voice

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz
Audio Tone = 2.5KHz
Audio Level = 16dB greater than level required to produce ±6KHz

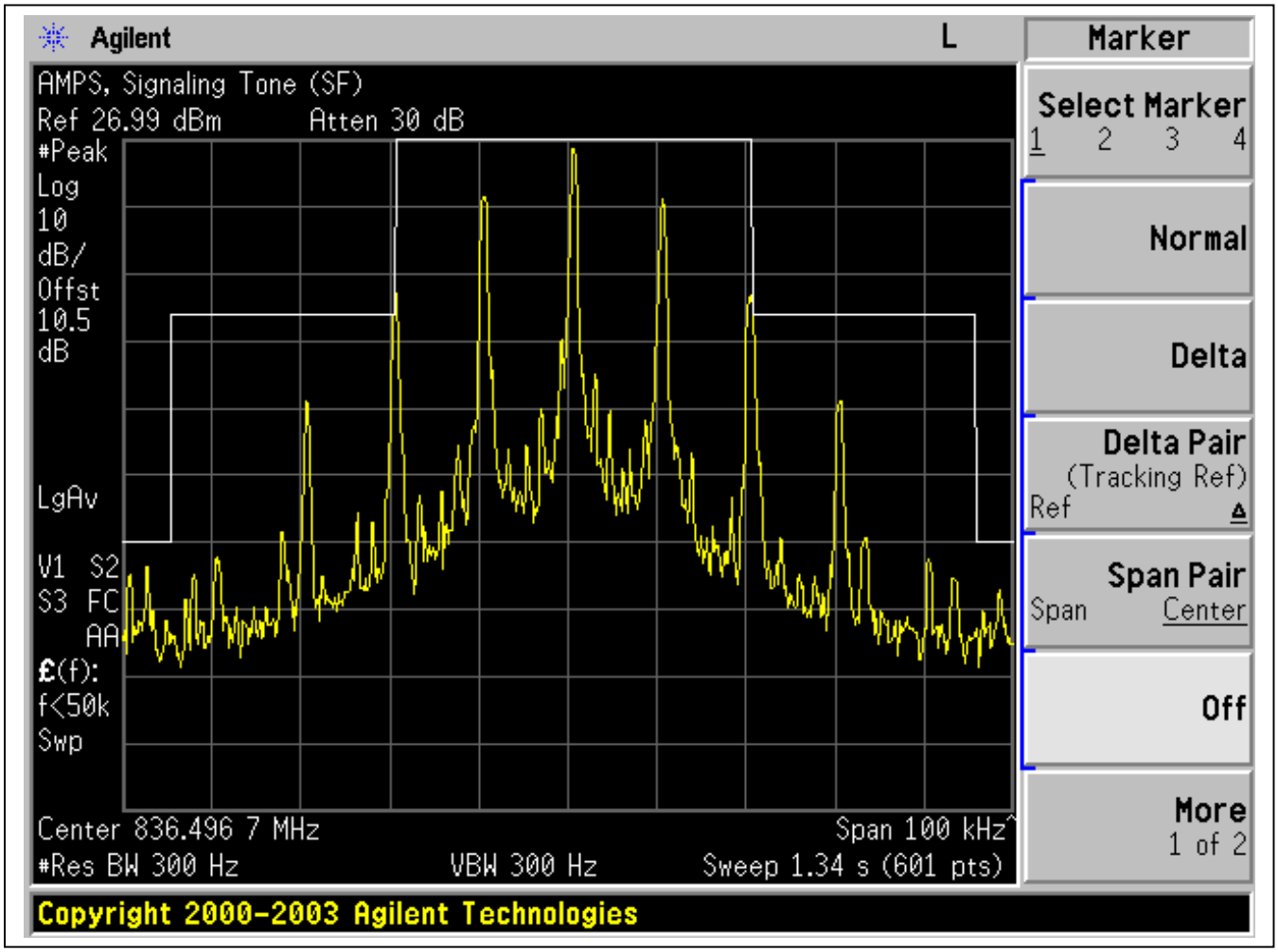
Limit (22.917b):

a. On any frequency removed from the assigned carrier frequency by more than 20KHz, up to and including 45KHz, the sideband is at least 26dB below the carrier.
b. On any frequency removed from the assigned carrier frequency by more than 45Khz, up to the first multiple of the carrier frequency, the sideband is at least 60dB below the carrier or 43 +10 $\log_{10}$ (mean output power in W) dB, whichever is the smaller attenuation

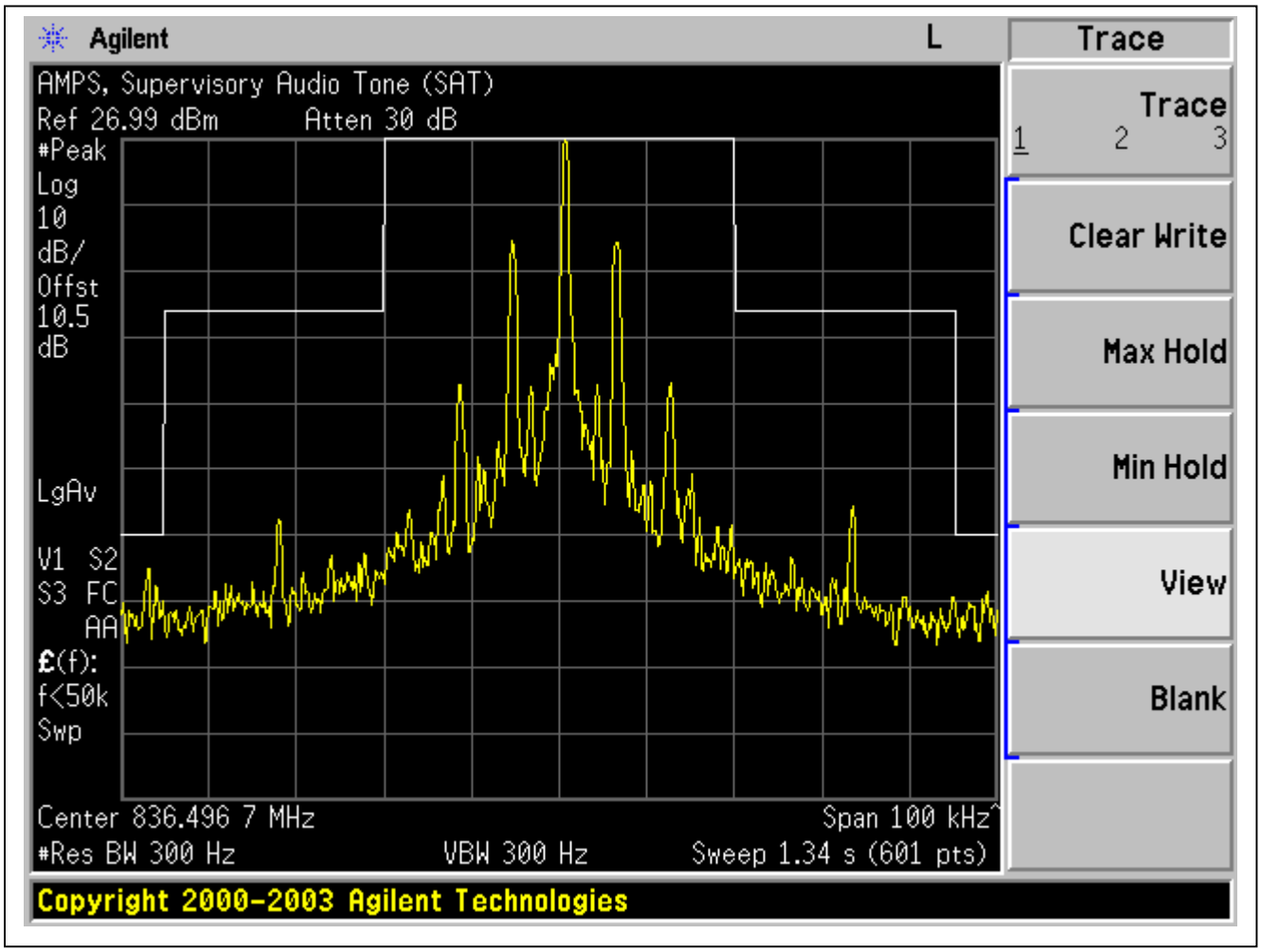
Test Result:



Signaling Tone (ST)



Supervisory Audio Tone (SAT)



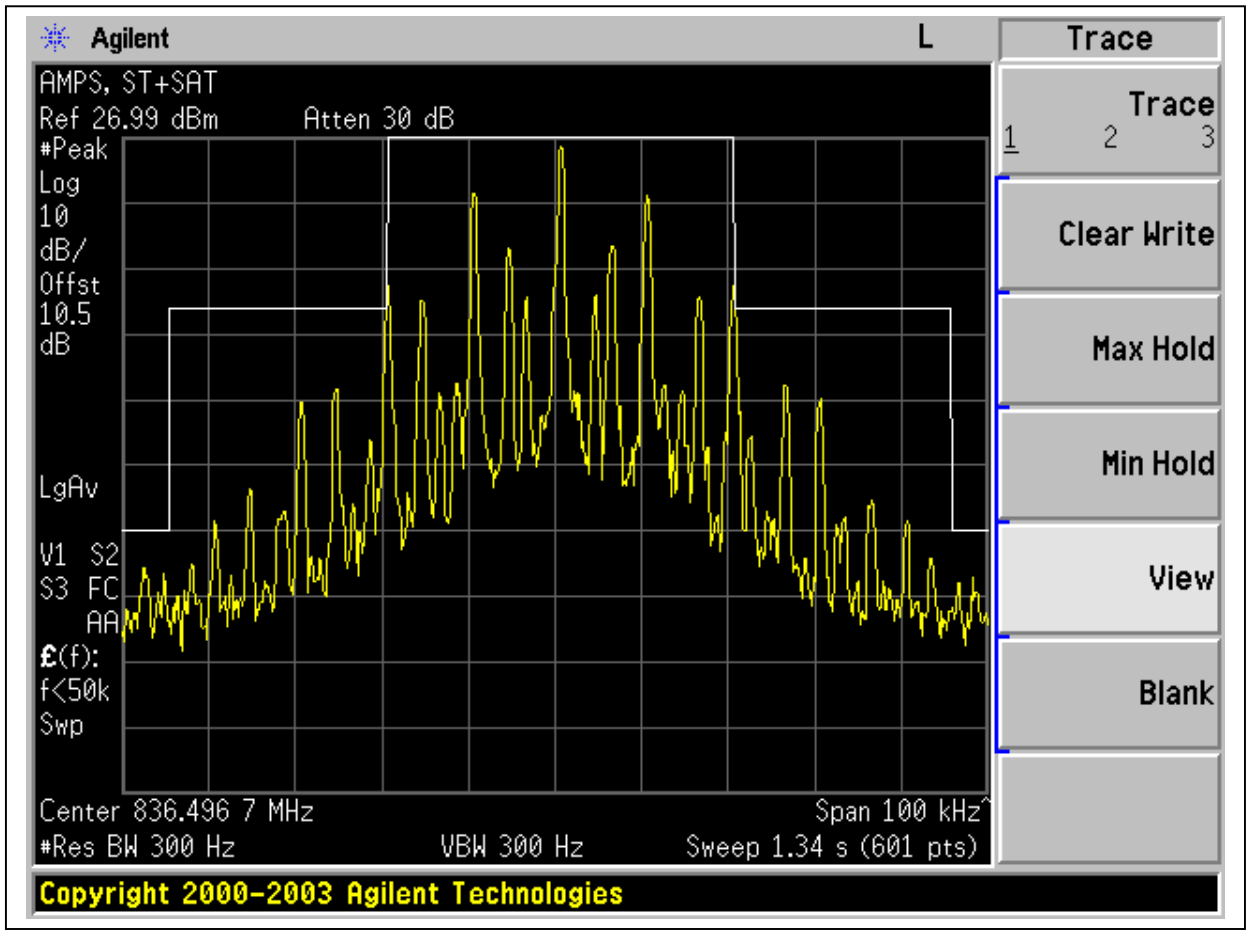
7.3.3. Signaling Tone (ST) + Supervisory Audio Tone (SAT)

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz
Signal Tone = 10KHz

Limit (22.917d):

a. On any frequency removed from the assigned carrier frequency by more than 20KHz, up to and including 45KHz, the sideband is at least 26dB below the carrier.
b. On any frequency removed from the assigned carrier frequency by more than 45Khz, up to and including 90KHz, the sideband is at least 45dB below the carrier.
c. On any frequency removed from the assigned carrier frequency by more than 90KHz, up to the first multiple of the carrier frequency, the sideband is at least 60dB below the carrier or 43 +10 $\log_{10}$ (mean output power in W) dB, whichever is the smaller attenuation.

Test Result:



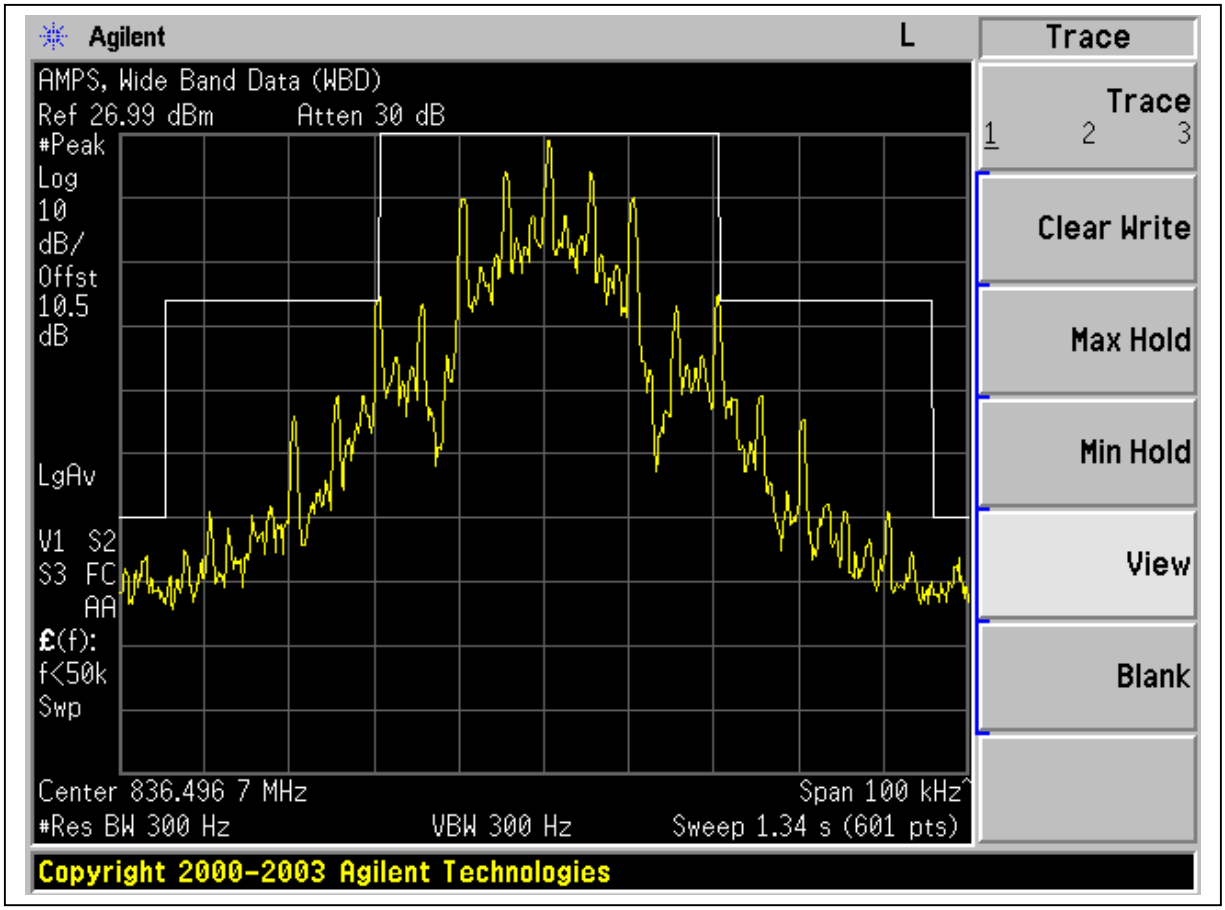
7.3.4. Wide Band Data (WBD)

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz

Limit (22.917d):

a. On any frequency removed from the assigned carrier frequency by more than 20KHz, up to and including 45KHz, the sideband is at least 26dB below the carrier.
b. On any frequency removed from the assigned carrier frequency by more than 45Khz, up to and including 90KHz, the sideband is at least 45dB below the carrier.
c. On any frequency removed from the assigned carrier frequency by more than 90KHz, up to the first multiple of the carrier frequency, the sideband is at least 60dB below the carrier or 43 +10 $\log_{10}$ (mean output power in W) dB, whichever is the smaller attenuation.

Test Result:



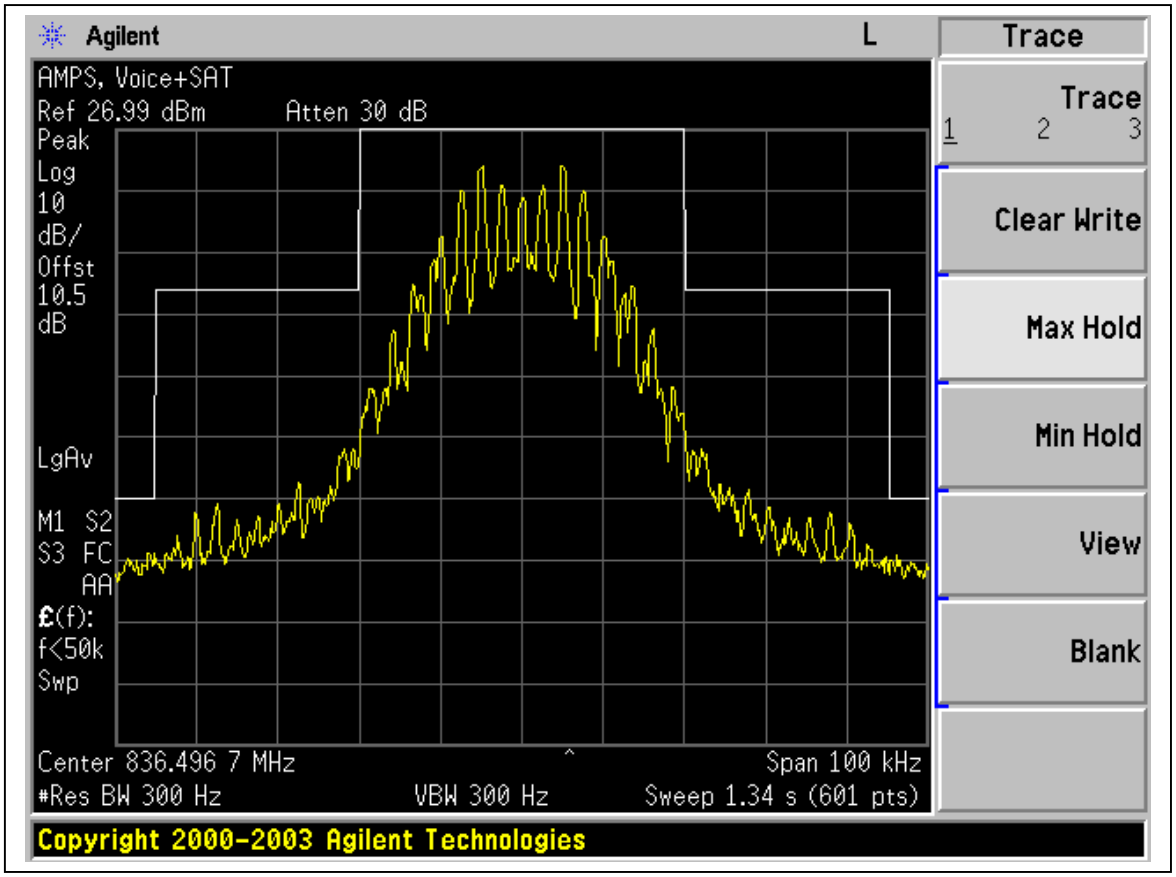
7.3.5. Voice + Supervisory Audio Tone (SAT)

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz
Audio Tone = 2.5KHz
Audio Level = 16dB greater than level required to produce ±8KHz (Minimum level from technical specifications)

Limit (22.917b):

b. On any frequency removed from the assigned carrier frequency by more than 20KHz, up to and including 45KHz, the sideband is at least 26dB below the carrier.
c. On any frequency removed from the assigned carrier frequency by more than 45Khz, up to the first multiple of the carrier frequency, the sideband is at least 60dB below the carrier or 43 +10 $\log_{10}$ (mean output power in W) dB, whichever is the smaller attenuation

Test Result:



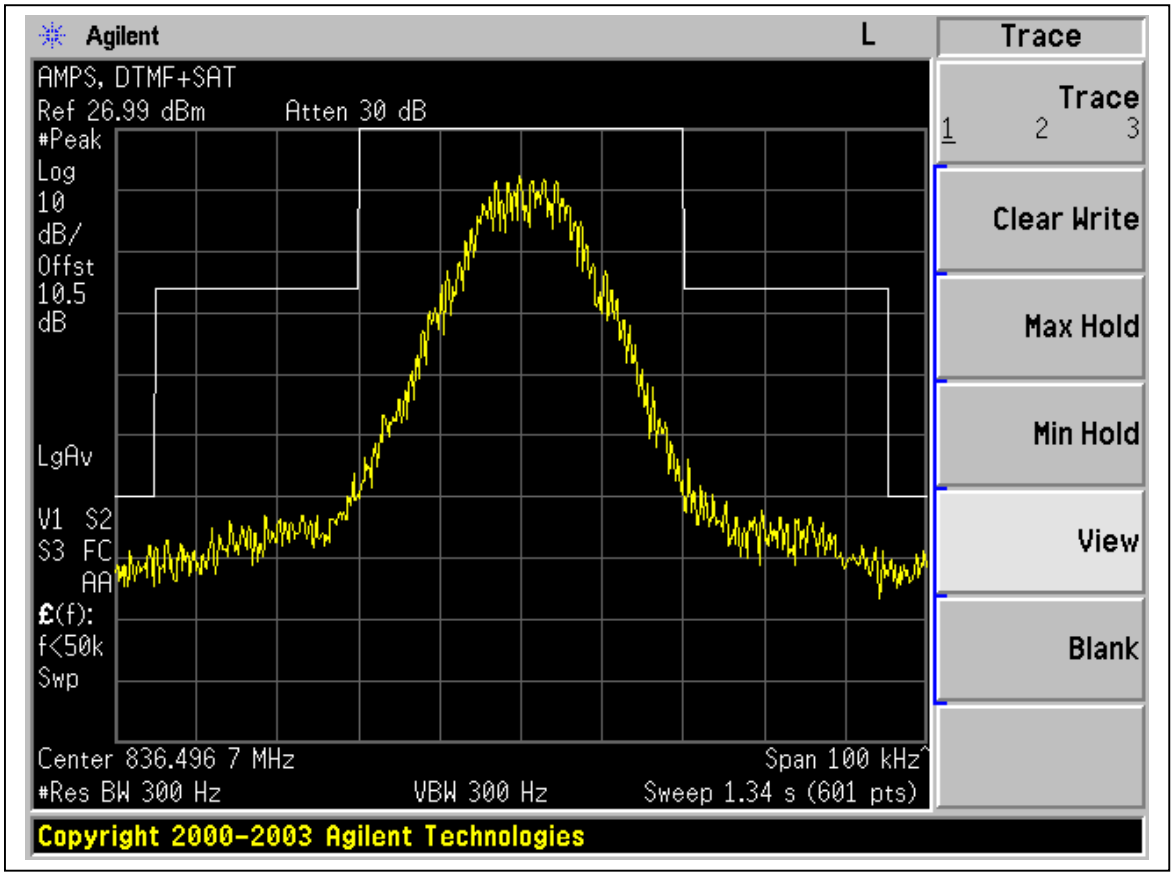
7.3.6. DTMF + Supervisory Audio Tone (SAT)

INSTRUMENT SETTING:
Resolution Bandwidth = 300Hz
Video Bandwidth = 300Hz

Limit (22.917d):

a. On any frequency removed from the assigned carrier frequency by more than 20KHz, up to and including 45KHz, the sideband is at least 26dB below the carrier.
b. On any frequency removed from the assigned carrier frequency by more than 45Khz, up to and including 90KHz, the sideband is at least 45dB below the carrier.
c. On any frequency removed from the assigned carrier frequency by more than 90KHz, up to the first multiple of the carrier frequency, the sideband is at least 60dB below the carrier or 43 +10 $\log_{10}$ (mean output power in W) dB, whichever is the smaller attenuation.

Test Result:

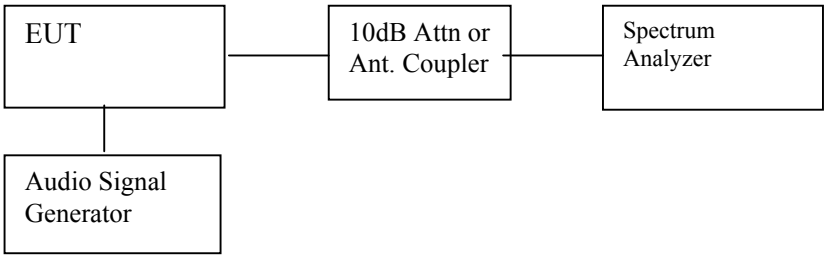


7.4. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL

INSTRUMENTS LIST

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Peak Power Meter	**Agilent**	**E4416A**	**GB41291160**	**11/7/2004**
Spectrum Analyzer	**HP**	**E4446A**	**US42510266**	**7/23/2004**
Function Generator	**HP**	**3325A**	**2652A24749**	**5/8/2005**
Modulation Analyzer	**HP**	**8901B**	**3438A05272**	**6/23/2005**

TEST SETUP



TEST PROCEDURE

1) RF signal or three balanced signals (intermodulation measurement) were applied to the RF input. One set as close as possible to the bottom of the block edge and one set as close as possible to the top of the block edge. Set the RES BW to 1% of the emission bandwidth to show compliance with the –13dBm limit, in the 1 MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

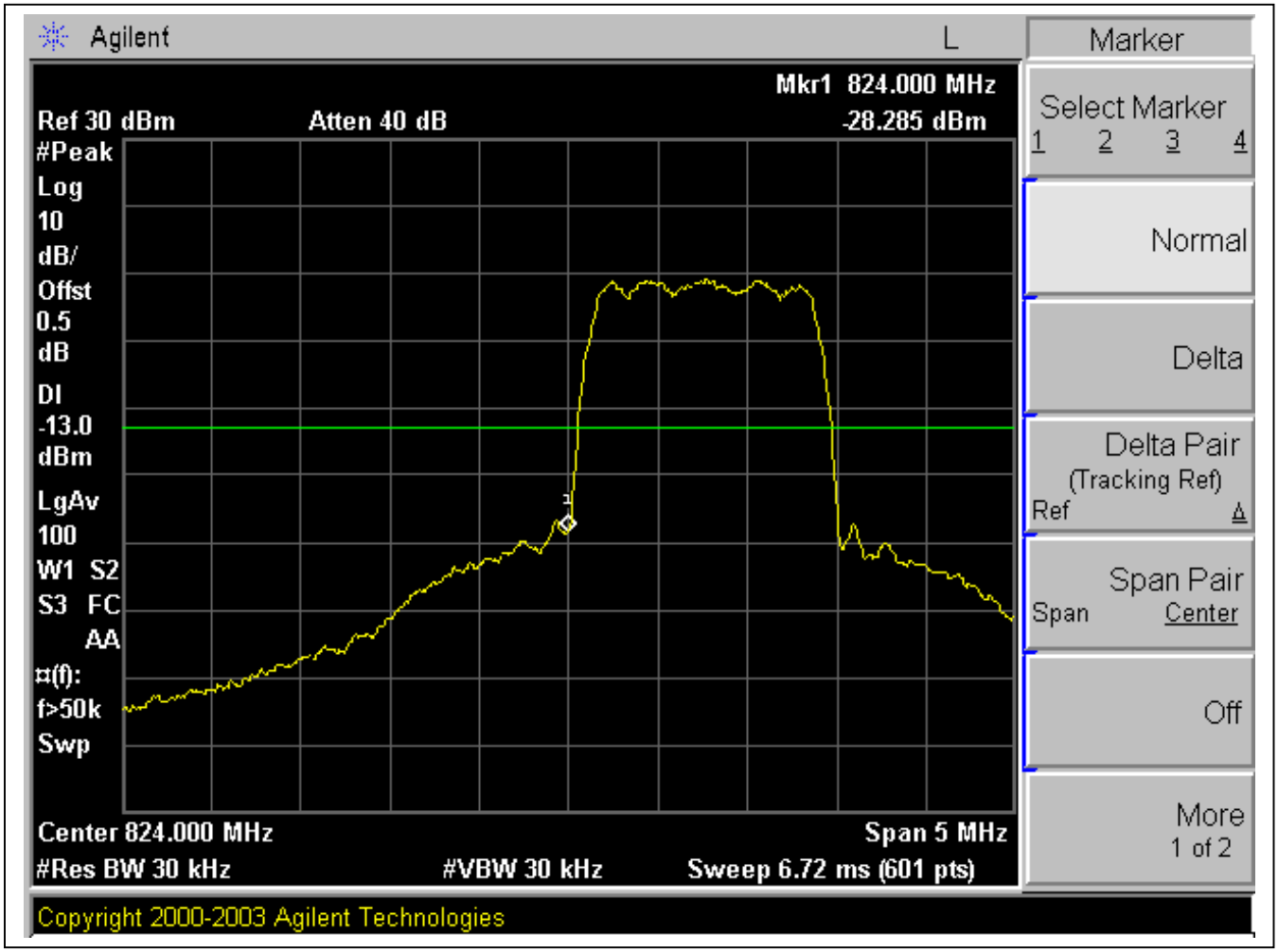
2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 15 MHz to 10x*f*o of the fundamental carrier for all frequency block. A display line was placed at –13dBm to show compliance for spurious, harmonics, and intermodulation emissions.

3) 22.917(f); Mobile emissions in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed –80dBm at the transmit antenna connector.

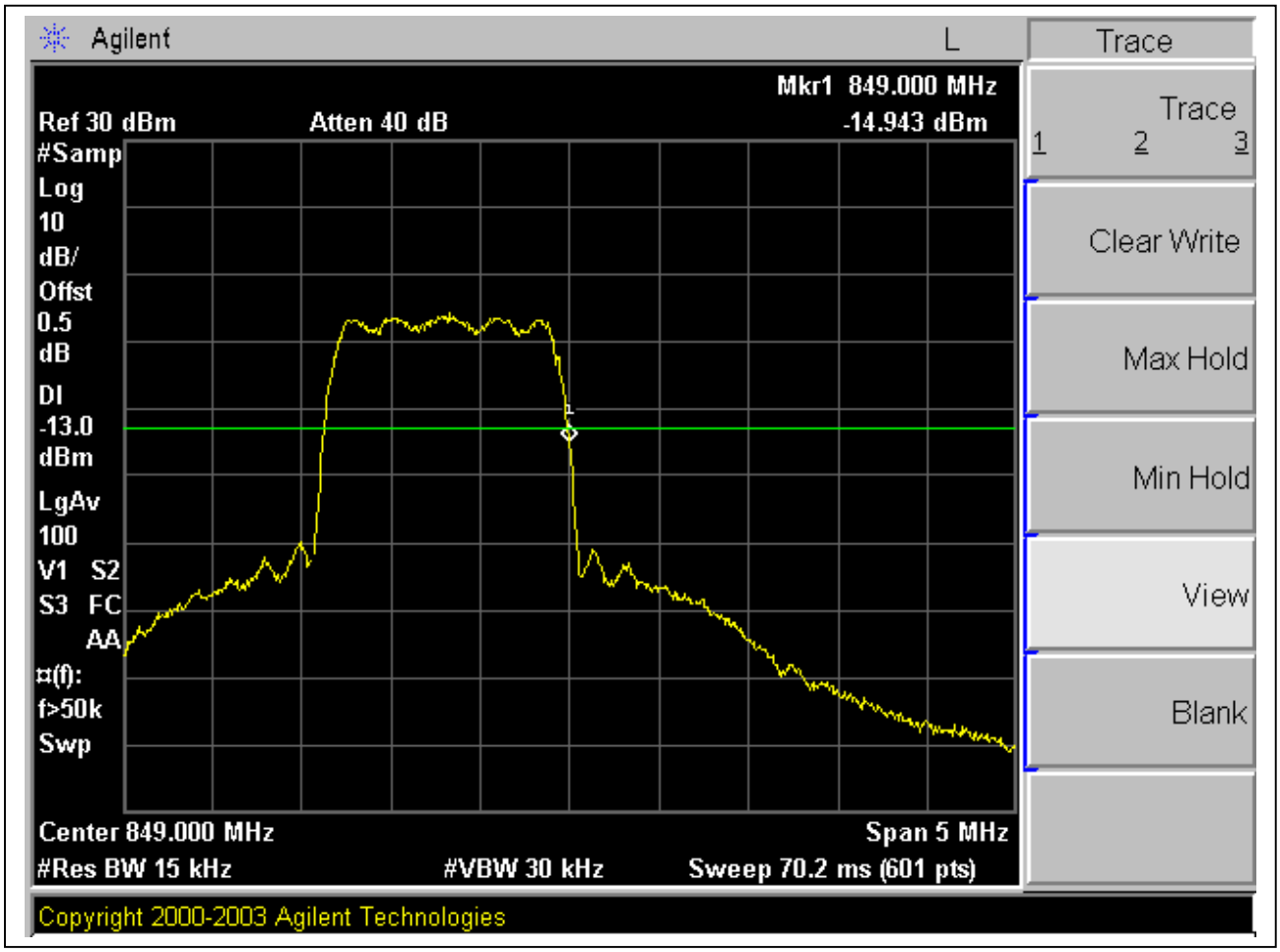
RESULT:

CDMA Modulation: Low / Mid / High, Band Edge, Out-Of-Band Emissions, Mobile Emissions in Base Frequency Range:

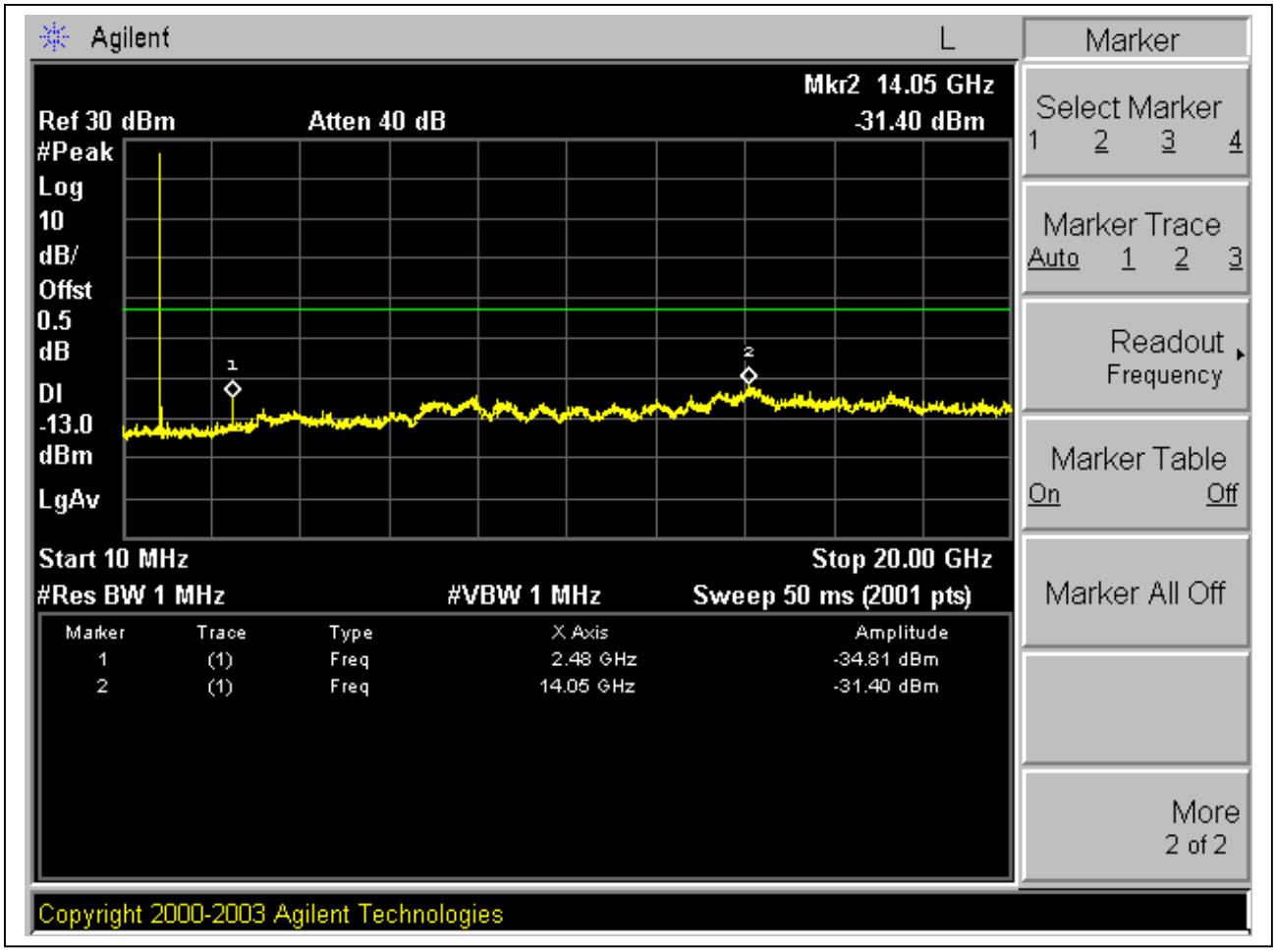
Low Channel Band Edge



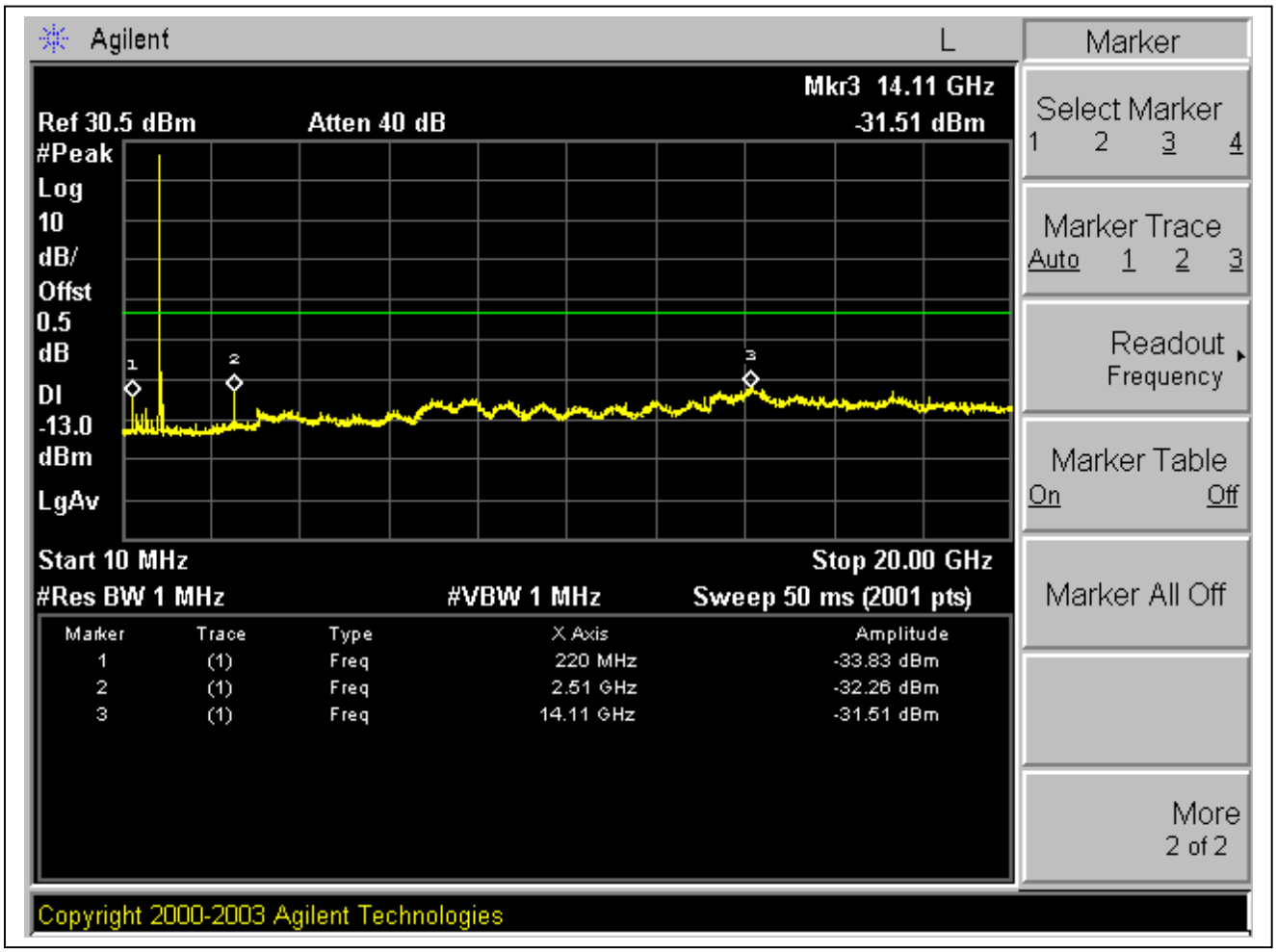
High Channel Band Edge



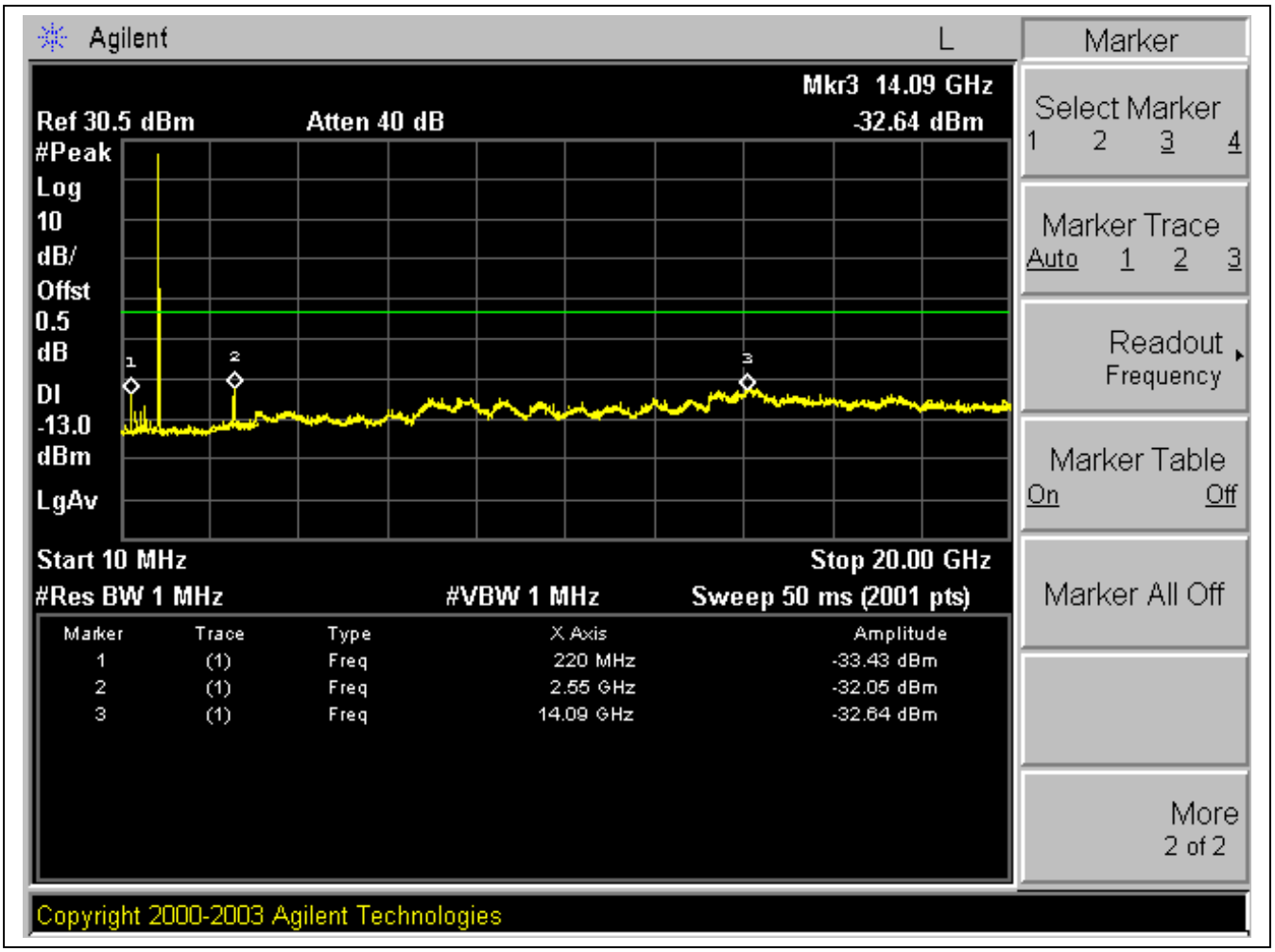
Low Channel, Out-Of-Band Emissions



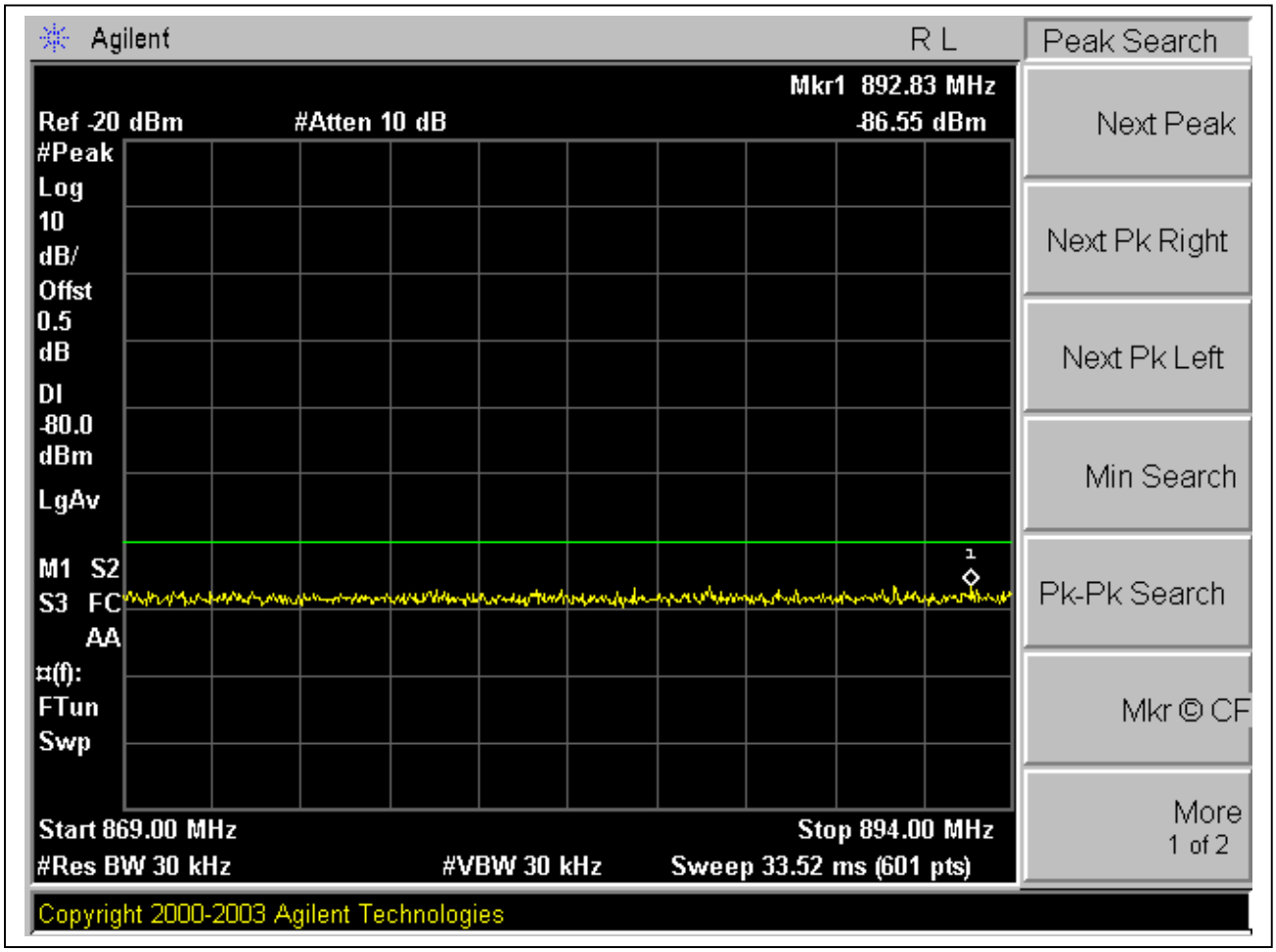
Mid Channel, Out-Of-Band Emissions



High Channel, Out-Of-Band Emissions

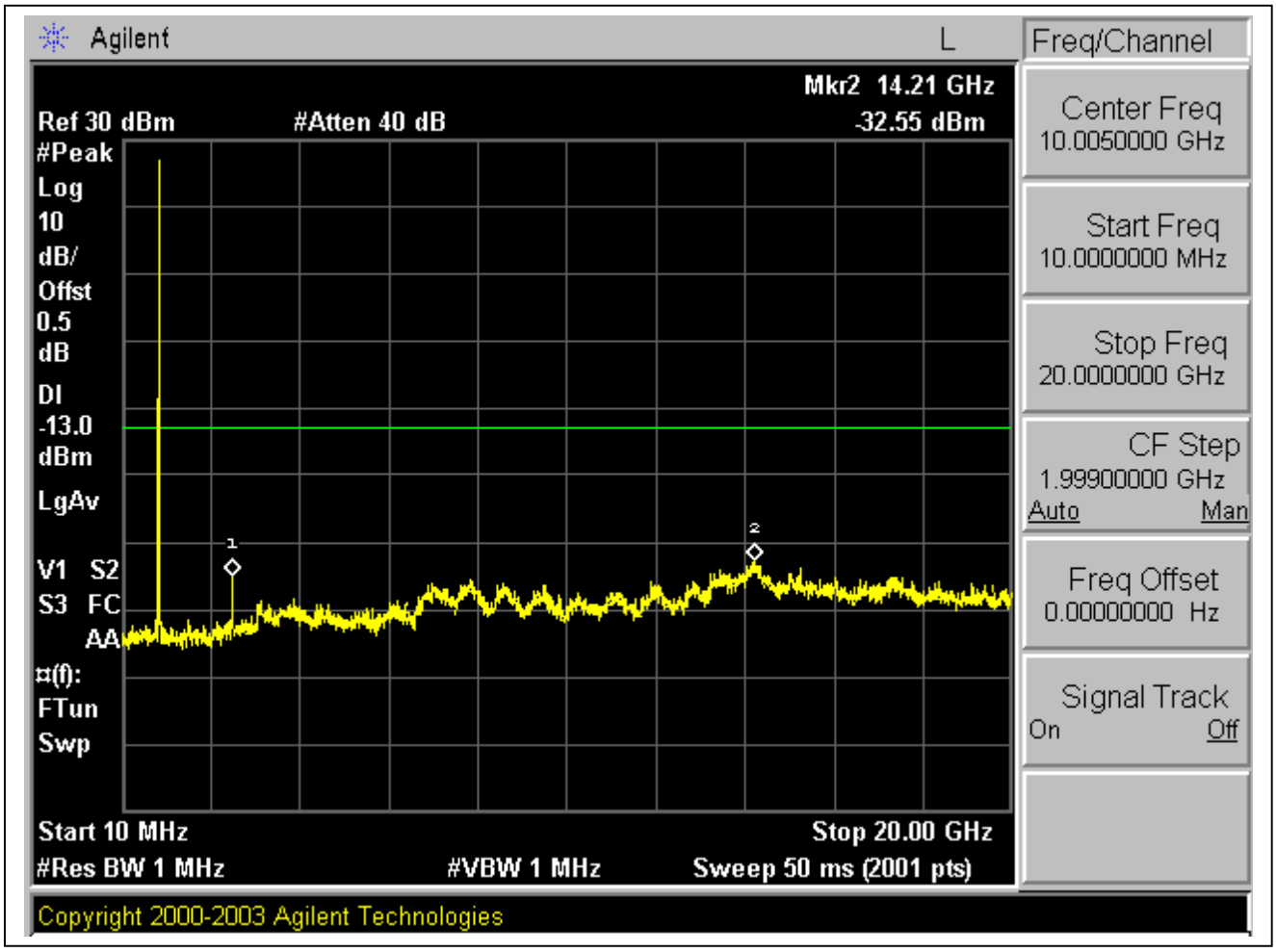


CDMA Mobile Emissions in Base Frequency Range:

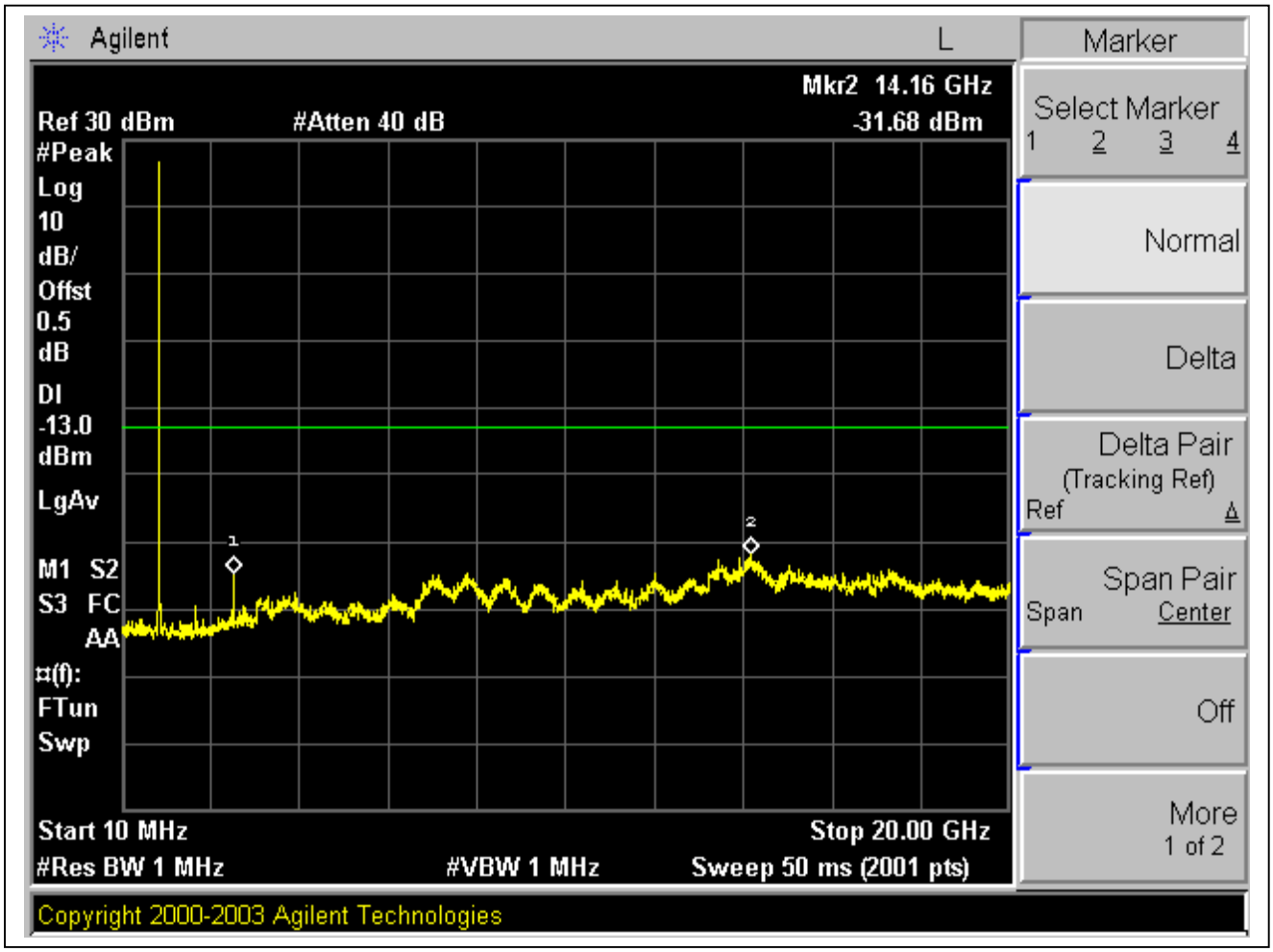


AMPS Modulation: Low / Mid / High, Out-Of-Band Emissions, Mobile Emissions in Base Frequency Range:

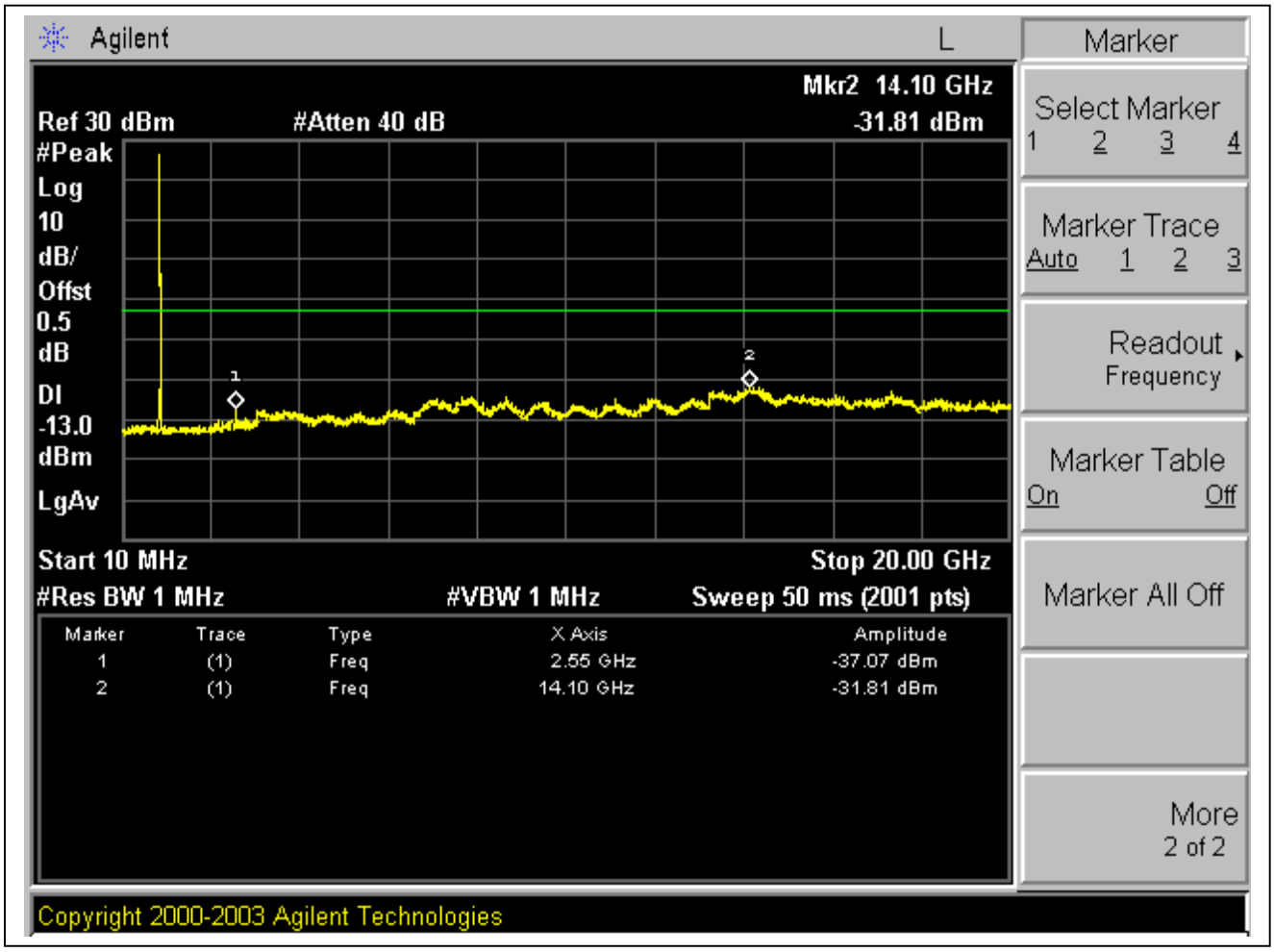
Low Channel Out-Of-Band Emissions



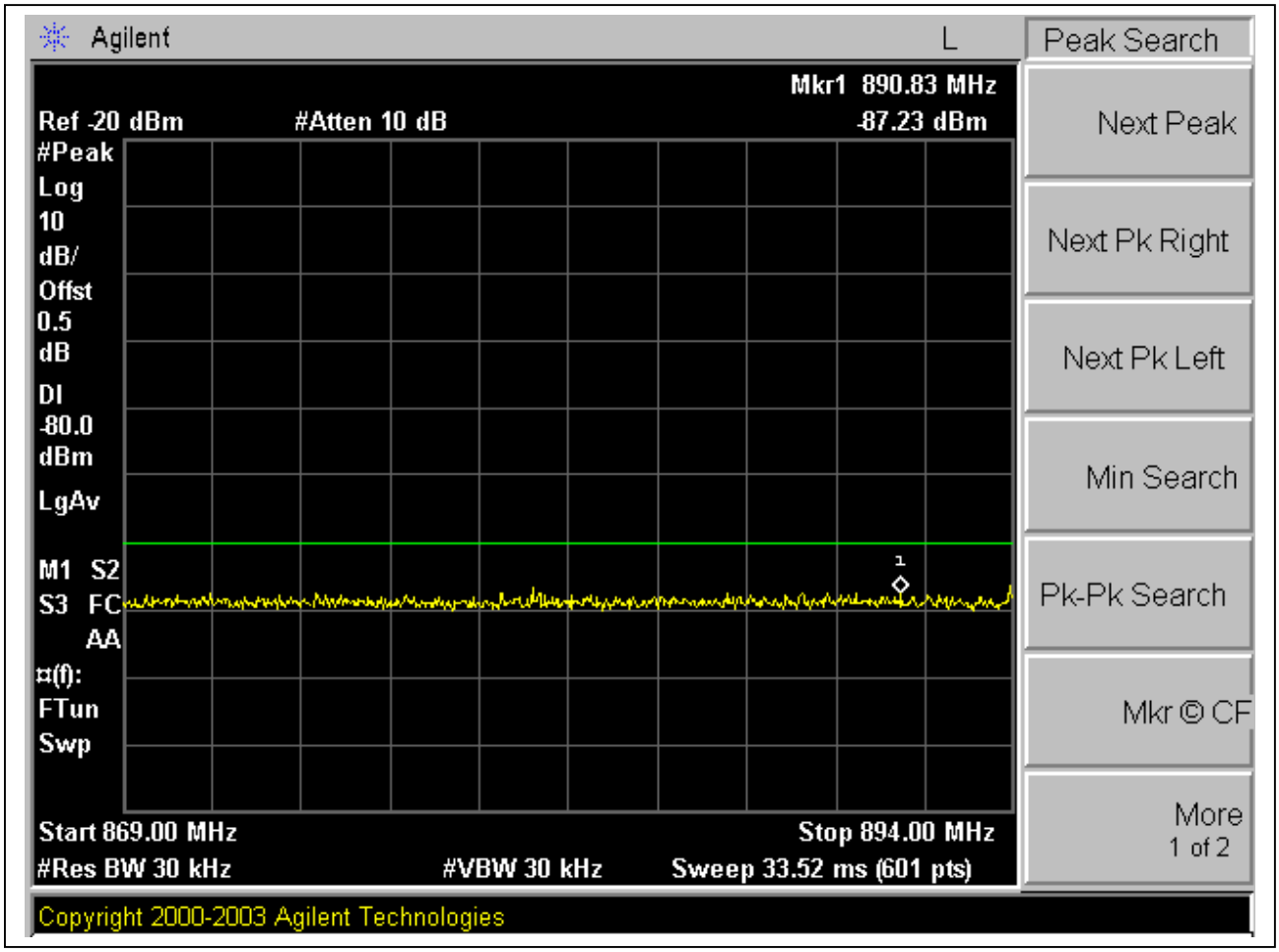
Mid Channel Out-Of-Band Emissions



High Channel Out-Of-Band Emissions

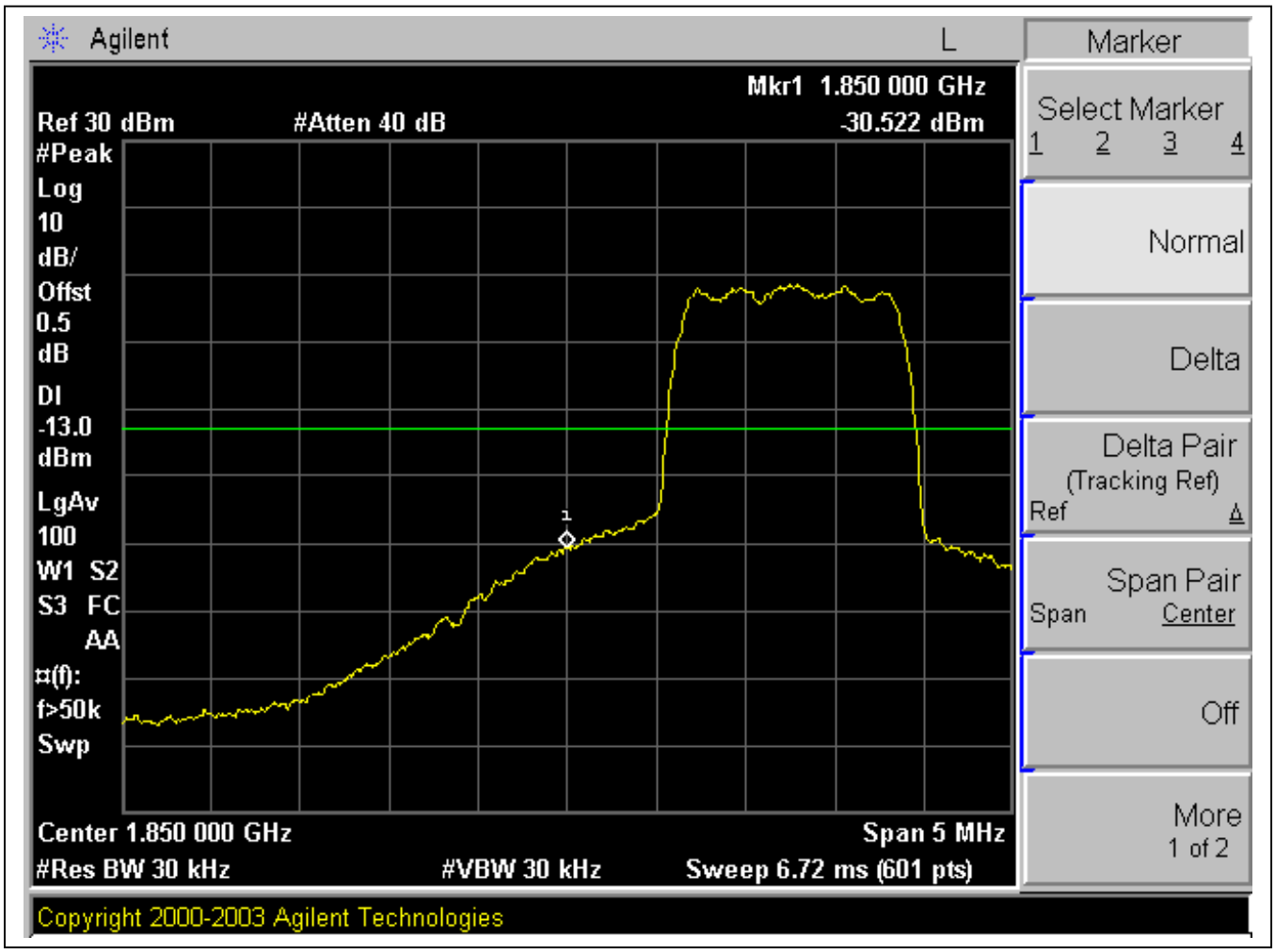


AMPS Mobile Emissions in Base Frequency Range:

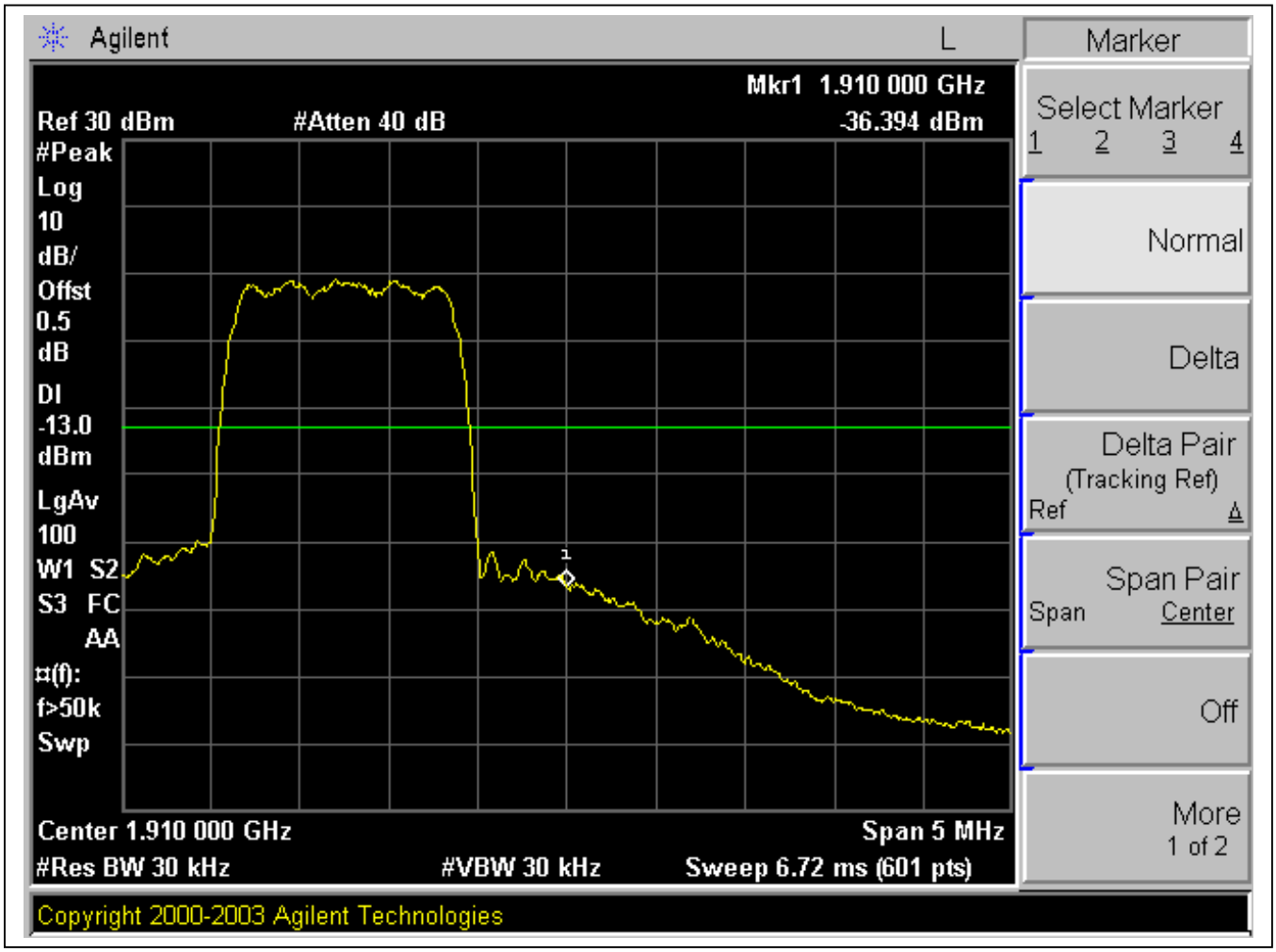


PCS Modulation: Low / Mid / High, Band Edge, Out-Of-Band Emissions:

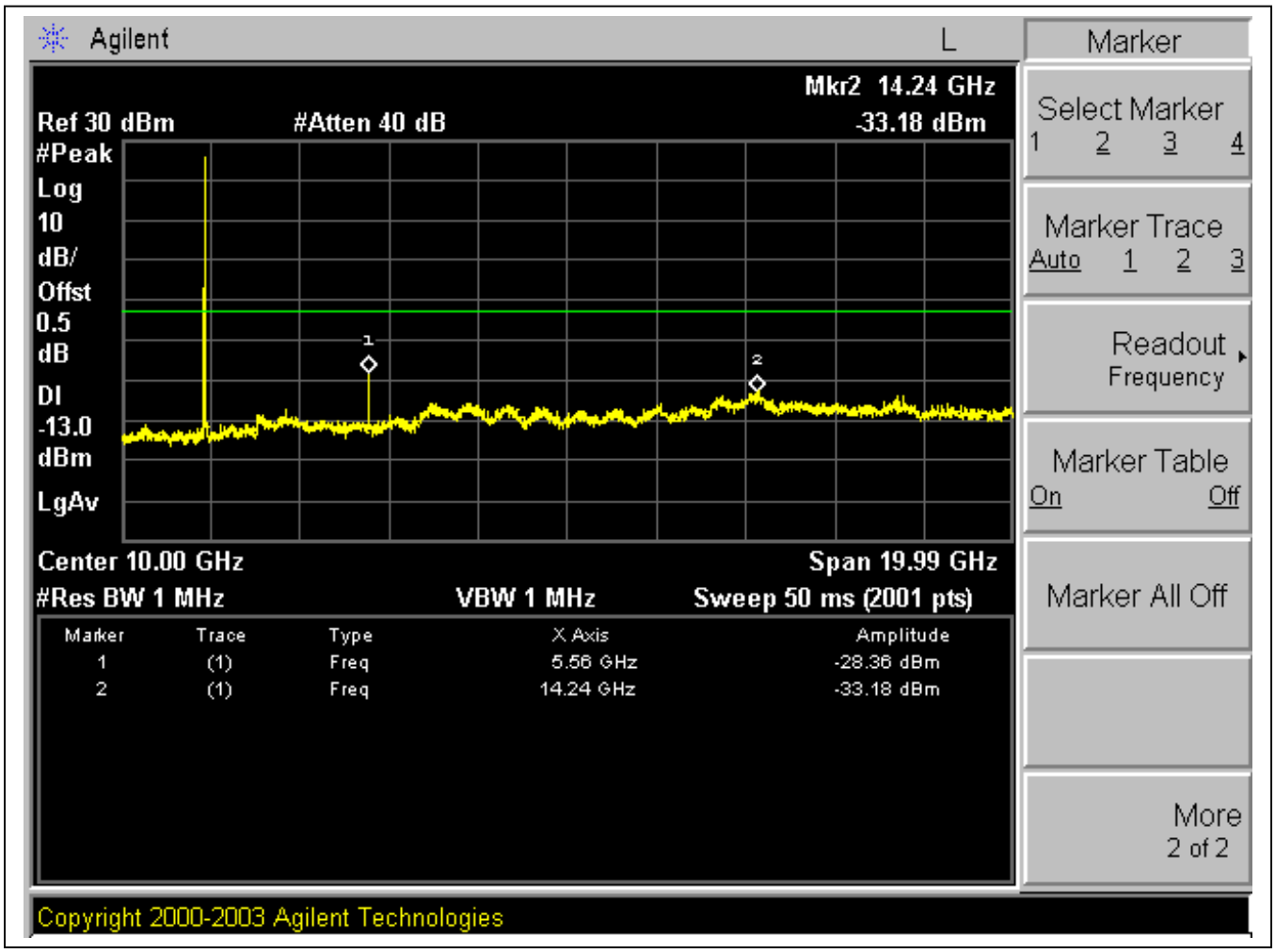
Low Channel Band Edge



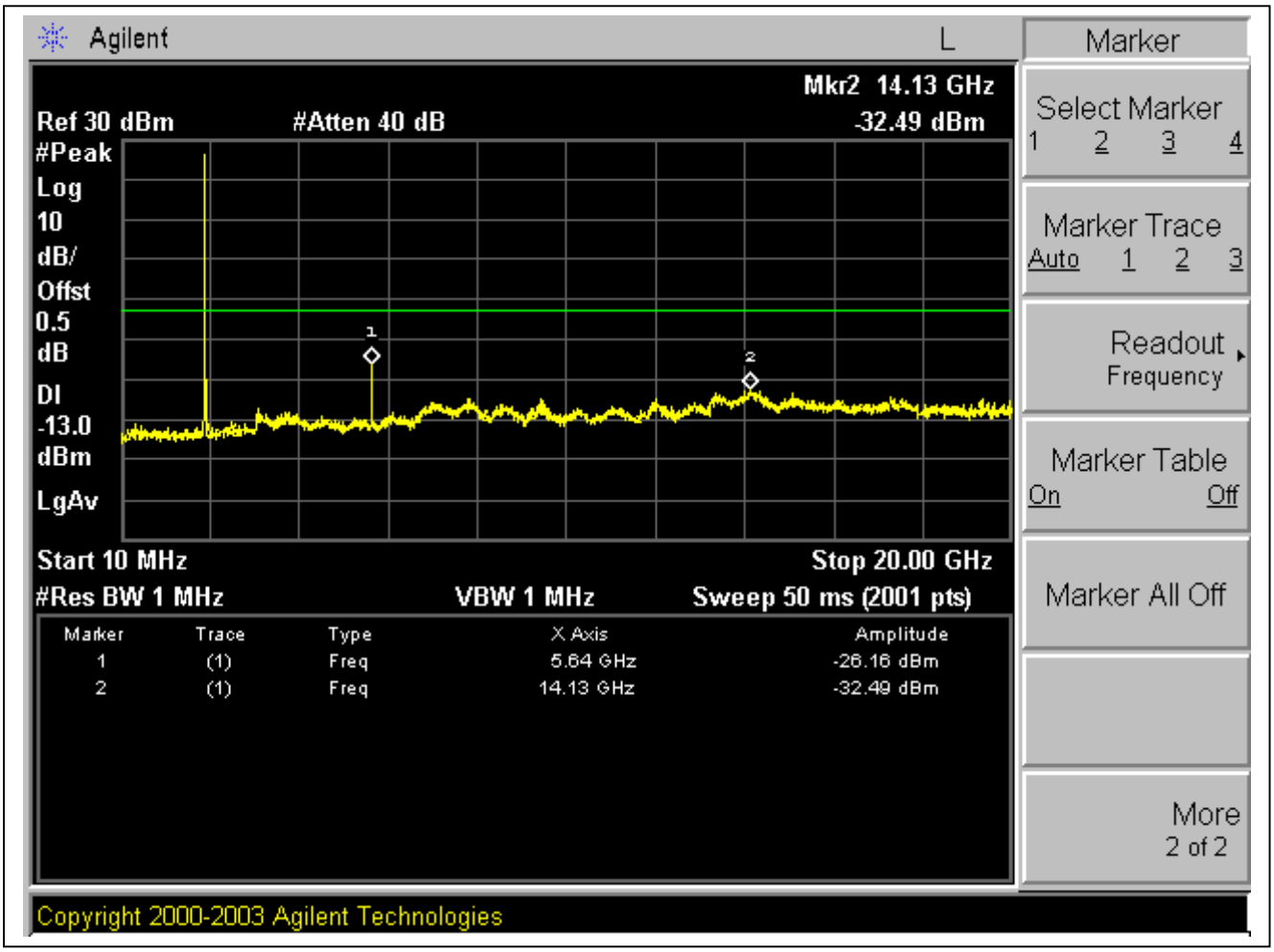
High Channel Band Edge



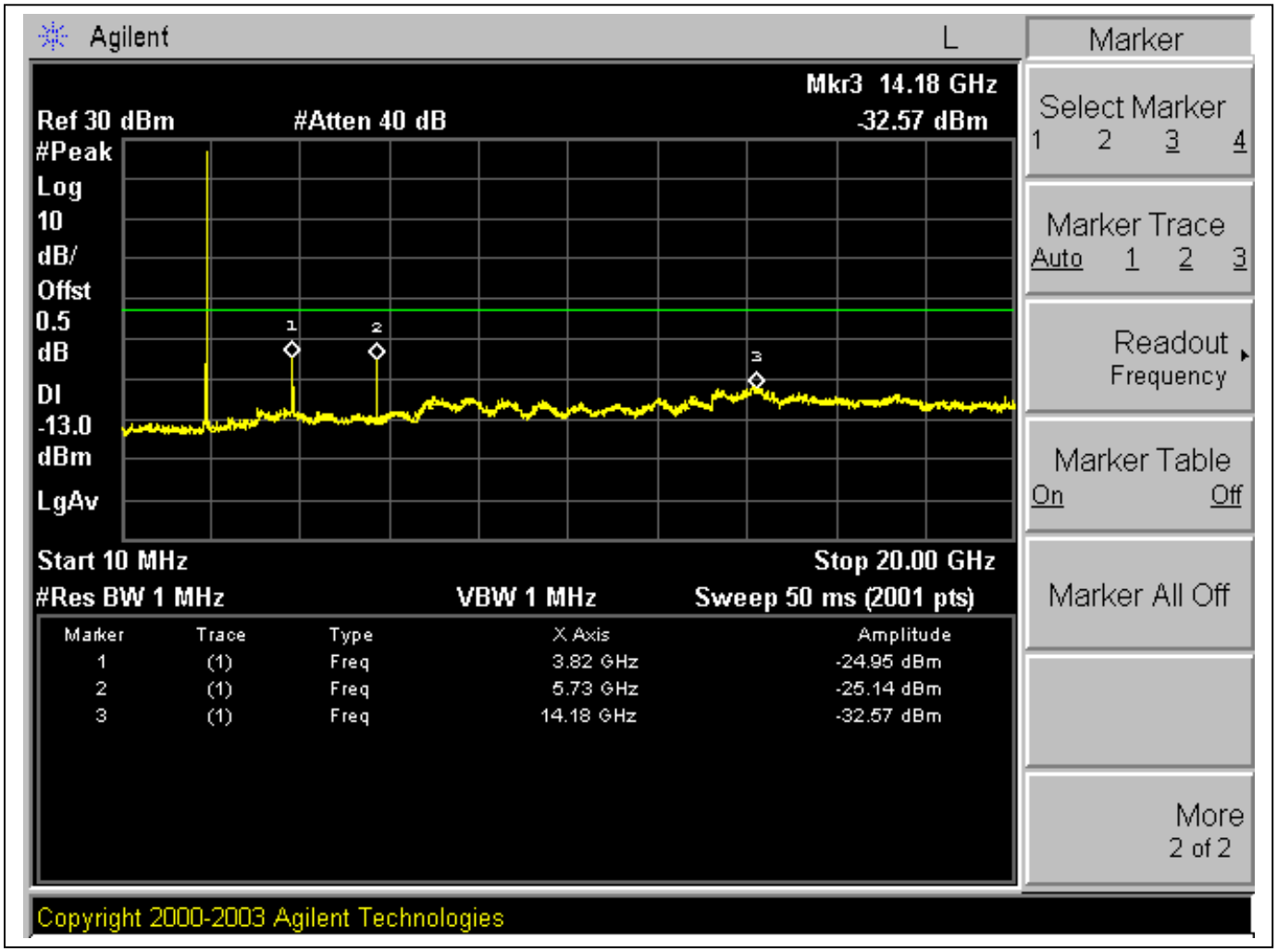
Low Channel Out-Of-Band Emissions



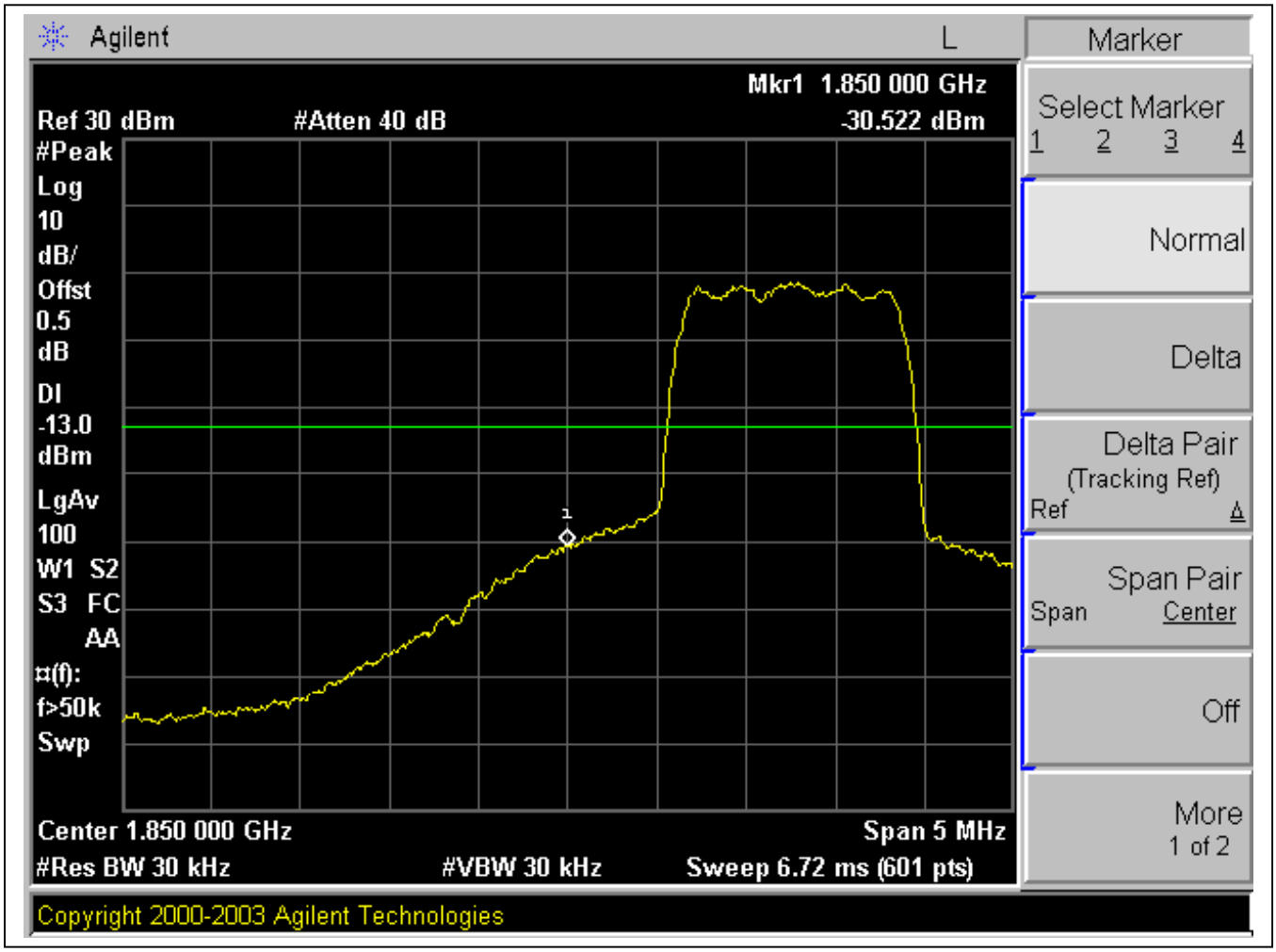
Mid Channel Out-Of-Band Emissions



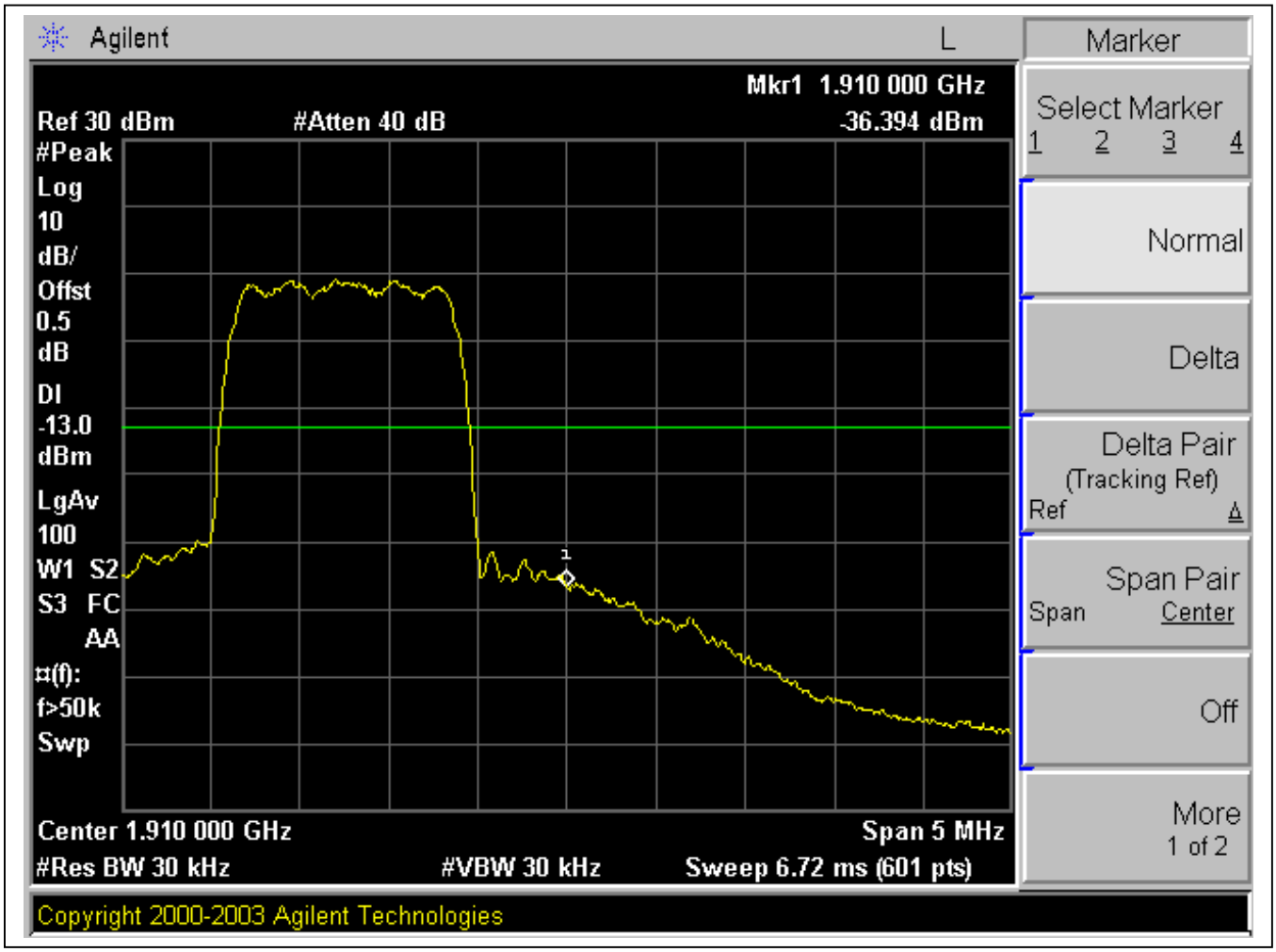
High Channel Out-Of-Band Emissions



Low Channel Band Edge



High Channel Band Edge



7.5. SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION

INSTRUMENTS LIST

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Spectrum Analyzer	**Agilent**	**E4446A**	**MY43360112**	**1/13/2005**
Amplifier 1-26GHz	**MITEQ**	**NSP2600-SP**	**924342**	**4/25/2005**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3117**	**29310**	**12/26/2004**

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP

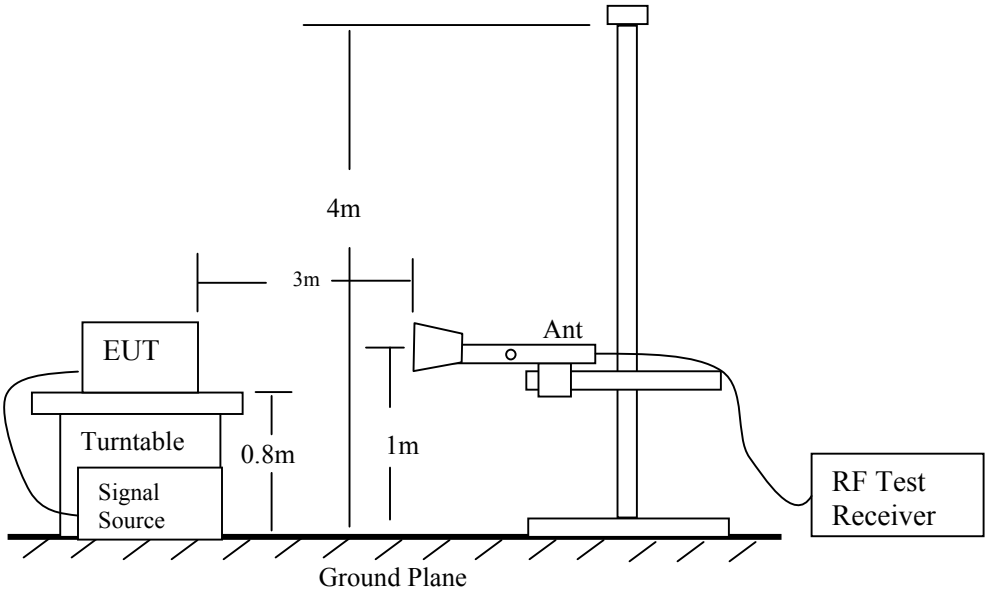


Fig 1: Radiated Emission Measurement

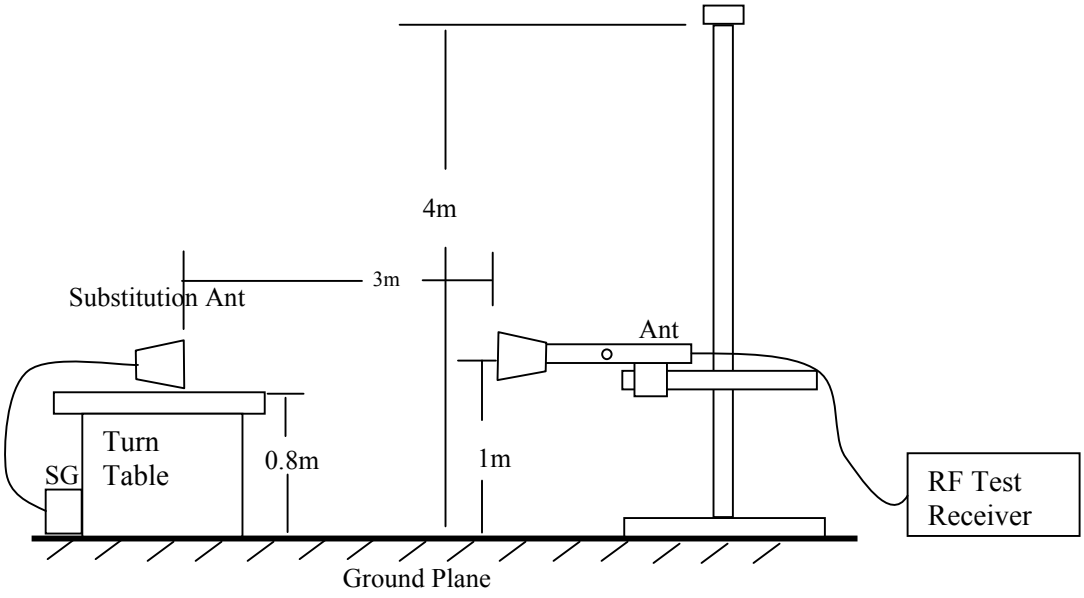


Fig 2: Radiated Emission – Substitution Method set-up

TEST PROCEDURE

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
2). The test antenna shall be oriented initially for vertical polarization located 1m from the EUT to correspond to the frequency of the transmitter.
3). The output of the test antenna shall be connected to the measuring receiver and either a peak or average detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8). The maximum signal level detected by the measuring receiver shall be noted.
9). The transmitter shall be replaced by a substitution antenna.
10). The substitution antenna shall be oriented for vertical polarization.
11). The substitution antenna shall be connected to a calibrated signal generator.
12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

RESULT

No non-compliance noted, as shown below

CDMA: Low, Mid, & High Channels:

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
CDMA, Low Ch. 824.70MHz, Y position															
1.649	9.8	52.1	41.8	29.8	1.7	-43.3	0.0	1.0	41.3	31.0	74.0	54.0	-32.7	-23.0	V
1.649	9.8	49.8	37.7	29.8	1.7	-43.3	0.0	1.0	38.9	26.8	74.0	54.0	-35.1	-27.2	H
2.474	9.8	60.8	51.2	32.7	2.2	-43.2	0.0	1.0	53.4	43.8	74.0	54.0	-20.6	-10.2	V
2.474	9.8	56.3	52.7	32.7	2.2	-43.2	0.0	1.0	49.0	45.3	74.0	54.0	-25.0	-8.7	H
3.299	9.8	44.2	32.4	33.5	2.5	-43.4	0.0	1.0	37.7	26.0	74.0	54.0	-36.3	-28.0	V, Noise Floor
3.299	9.8	43.6	31.8	33.5	2.5	-43.4	0.0	1.0	37.2	25.3	74.0	54.0	-36.8	-28.7	H, Noise Floor
CDMA, Mid Ch. 835.89MHz, Y position															
1.672	9.8	50.4	39.8	30.0	1.7	-43.3	0.0	1.0	39.7	29.1	74.0	54.0	-34.3	-24.9	V
1.672	9.8	49.1	38.6	30.0	1.7	-43.3	0.0	1.0	38.4	27.9	74.0	54.0	-35.6	-26.1	H
2.508	9.8	62.4	41.5	32.7	2.2	-43.2	0.0	1.0	55.1	34.2	74.0	54.0	-18.9	-19.8	V
2.508	9.8	56.6	37.4	32.7	2.2	-43.2	0.0	1.0	49.3	30.0	74.0	54.0	-24.7	-24.0	H
3.344	9.8	45.5	33.3	33.5	2.5	-43.4	0.0	1.0	39.0	26.9	74.0	54.0	-35.0	-27.1	V, Noise Floor
3.344	9.8	45.2	32.9	33.5	2.5	-43.4	0.0	1.0	38.7	26.5	74.0	54.0	-35.3	-27.5	H, Noise Floor
CDMA, High Ch. 848.31MHz, Y position															
1.697	9.8	50.2	39.0	30.1	1.7	-43.3	0.0	1.0	39.7	28.5	74.0	54.0	-34.3	-25.5	V
1.697	9.8	53.8	43.1	30.1	1.7	-43.3	0.0	1.0	43.3	32.6	74.0	54.0	-30.7	-21.4	H
2.545	9.8	60.9	52.1	32.8	2.2	-43.2	0.0	1.0	53.7	44.8	74.0	54.0	-20.3	-9.2	V
2.545	9.8	63.1	52.5	32.8	2.2	-43.2	0.0	1.0	55.9	45.3	74.0	54.0	-18.1	-8.7	H
3.393	9.8	46.3	34.2	33.5	2.5	-43.5	0.0	1.0	39.8	27.8	74.0	54.0	-34.2	-26.2	V, Noise Floor
3.393	9.8	45.0	33.1	33.5	2.5	-43.5	0.0	1.0	38.5	26.7	74.0	54.0	-35.5	-27.3	H, Noise Floor

AMPS: Low, Mid, & High Channels:

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
AMP, Low Ch. 824.04MHz, Y position															
1.648	9.8	47.4	37.9	29.8	1.7	-43.3	0.0	1.0	36.6	27.1	74.0	54.0	-37.4	-26.9	V
1.648	9.8	49.1	42.6	29.8	1.7	-43.3	0.0	1.0	38.3	31.8	74.0	54.0	-35.7	-22.2	H
2.472	9.8	58.1	56.8	32.7	2.2	-43.2	0.0	1.0	50.8	49.4	74.0	54.0	-23.2	-4.6	V
2.472	9.8	56.3	54.4	32.7	2.2	-43.2	0.0	1.0	49.0	47.0	74.0	54.0	-25.0	-7.0	H
3.296	9.8	45.4	36.2	33.5	2.5	-43.4	0.0	1.0	38.9	29.7	74.0	54.0	-35.1	-24.3	V, Noise Floor
3.296	9.8	44.2	33.2	33.5	2.5	-43.4	0.0	1.0	37.7	26.7	74.0	54.0	-36.3	-27.3	H, Noise Floor
AMP, Mid Ch. 836.49MHz, Y position															
1.673	9.8	50.3	46.4	30.0	1.7	-43.3	0.0	1.0	39.6	35.8	74.0	54.0	-34.4	-18.2	V
1.673	9.8	50.7	46.4	30.0	1.7	-43.3	0.0	1.0	40.0	35.7	74.0	54.0	-34.0	-18.3	H
2.509	9.8	50.2	45.8	32.7	2.2	-43.2	0.0	1.0	42.9	38.5	74.0	54.0	-31.1	-15.5	V
2.509	9.8	48.1	40.7	32.7	2.2	-43.2	0.0	1.0	40.8	33.4	74.0	54.0	-33.2	-20.6	H
3.346	9.8	45.4	33.6	33.5	2.5	-43.4	0.0	1.0	38.9	27.1	74.0	54.0	-35.1	-26.9	V, Noise Floor
3.346	9.8	45.4	32.8	33.5	2.5	-43.4	0.0	1.0	39.0	26.4	74.0	54.0	-35.0	-27.6	H, Noise Floor
AMP, High Ch. 848.97MHz, Y position															
1.698	9.8	47.9	38.4	30.1	1.7	-43.3	0.0	1.0	37.4	27.9	74.0	54.0	-36.6	-26.1	V
1.698	9.8	47.8	40.4	30.1	1.7	-43.3	0.0	1.0	37.3	29.9	74.0	54.0	-36.7	-24.1	H
2.547	9.8	62.1	60.9	32.8	2.2	-43.2	0.0	1.0	54.8	53.7	74.0	54.0	-19.2	-0.3	V
2.547	9.8	62.6	61.0	32.8	2.2	-43.2	0.0	1.0	55.3	53.8	74.0	54.0	-18.7	-0.2	H
3.396	9.8	46.0	34.2	33.5	2.5	-43.5	0.0	1.0	39.6	27.8	74.0	54.0	-34.4	-26.2	V, Noise Floor
3.396	9.8	45.5	33.4	33.5	2.5	-43.5	0.0	1.0	39.0	26.9	74.0	54.0	-35.0	-27.1	H, Noise Floor

PCS: Low, Mid, & High Channels:

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
PCS, Low Ch. 1851.25MHz, X position															
3.702	9.8	60.7	52.2	33.6	2.6	-43.7	0.0	1.0	54.1	45.6	74.0	54.0	-19.9	-8.4	V
3.702	9.8	62.9	54.5	33.6	2.6	-43.7	0.0	1.0	56.4	48.0	74.0	54.0	-17.6	-6.0	H
5.554	9.8	66.8	57.4	35.4	3.2	-44.8	0.0	1.0	61.6	52.2	74.0	54.0	-12.4	-1.8	V
5.554	9.8	64.5	54.8	35.4	3.2	-44.8	0.0	1.0	59.3	49.6	74.0	54.0	-14.7	-4.4	H
7.405	9.8	46.8	35.2	36.5	3.9	-44.5	0.0	1.0	43.8	32.1	74.0	54.0	-30.2	-21.9	V, Noise Floor
7.405	9.8	47.1	34.9	36.5	3.9	-44.5	0.0	1.0	44.0	31.9	74.0	54.0	-30.0	-22.1	H, Noise Floor
PCS, Mid Ch. 1880.00MHz, X position															
3.760	9.8	55.0	46.2	33.6	2.6	-43.8	0.0	1.0	48.5	39.6	74.0	54.0	-25.5	-14.4	V
3.760	9.8	58.8	49.7	33.6	2.6	-43.8	0.0	1.0	52.2	43.2	74.0	54.0	-21.8	-10.8	H
5.640	9.8	65.2	56.5	35.5	3.3	-44.8	0.0	1.0	60.2	51.4	74.0	54.0	-13.8	-2.6	V
5.640	9.8	69.5	58.8	35.5	3.3	-44.8	0.0	1.0	64.4	53.7	74.0	54.0	-9.6	-0.3	H
7.520	9.8	47.5	34.2	36.6	4.0	-44.4	0.0	1.0	44.6	31.3	74.0	54.0	-29.4	-22.7	V, Noise Floor
7.520	9.8	46.6	34.4	36.6	4.0	-44.4	0.0	1.0	43.8	31.5	74.0	54.0	-30.2	-22.5	H, Noise Floor
PCS, High Ch. 1908.75MHz, X position															
3.818	9.8	70.3	59.3	33.6	2.7	-43.8	0.0	1.0	63.7	52.8	74.0	54.0	-10.3	-1.2	V
3.818	9.8	70.9	60.1	33.6	2.7	-43.8	0.0	1.0	64.3	53.5	74.0	54.0	-9.7	-0.5	H
5.726	9.8	70.2	58.8	35.6	3.3	-44.8	0.0	1.0	65.3	53.9	74.0	54.0	-8.7	-0.1	V
5.726	9.8	70.9	58.8	35.6	3.3	-44.8	0.0	1.0	66.0	53.9	74.0	54.0	-8.0	-0.1	H
7.635	9.8	47.0	35.7	36.6	4.0	-44.3	0.0	1.0	44.2	33.0	74.0	54.0	-29.8	-21.0	V, Noise Floor
7.635	9.8	46.6	35.0	36.6	4.0	-44.3	0.0	1.0	43.9	32.3	74.0	54.0	-30.1	-21.7	H, Noise Floor

7.6. SECTION 2.1055: FREQUENCY STABILITY

INSTRUMENTS LIST

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Spectrum Analyzer	**Agilent**	**E4446A**	**MY43360112**	**1/13/2005**
Spectrum Analyzer, 26.5 GHz	**HP**	**8593EM**	**3710A00205**	**10/1/2004**
Temperature / Humidity Chamber	**Thermotron**	**SE 600-10-10**	**29800**	**4/26/2004**

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
800-1000	Peak	300 Hz	300 Hz

TEST SETUP

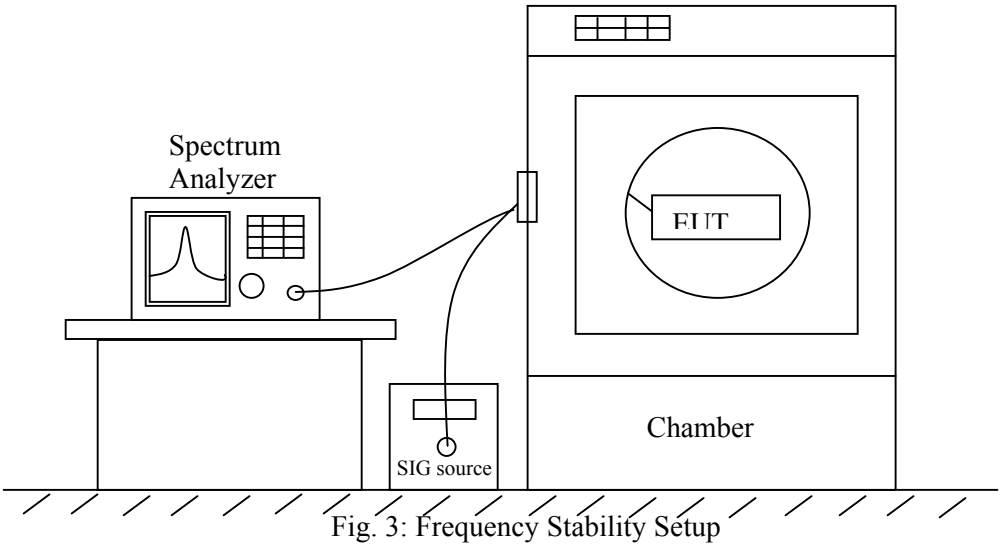
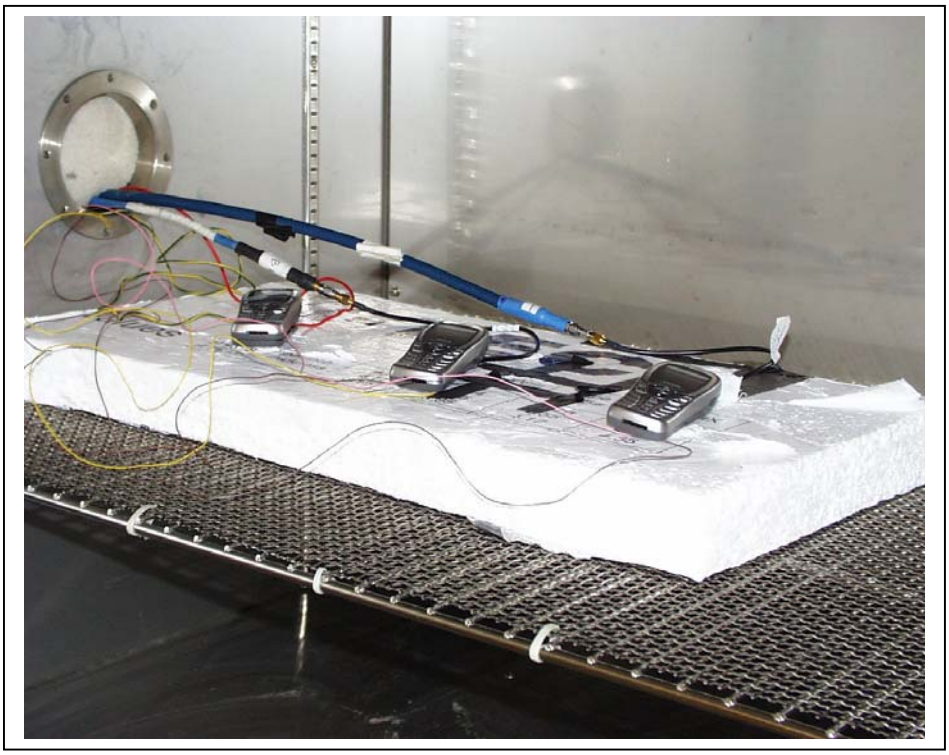


Fig. 3: Frequency Stability Setup

Test Setup Photos



TEST PROCEDURE

- **Frequency stability versus environmental temperature**

1). Setup the configuration per figure 6 for frequencies measurement inside the environmental chamber. Set the temperature of the chamber to 25°C. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Turn EUT off and set Chamber temperature to -30°C.
3). Allow sufficient time (approximately 20 to 30 minus after chamber reach the assigned temperature) for EUT to stabilize. Turn on EUT and measure the EUT operating frequency. Turn off EUT after the measurement.
4). Repeat step 3 with a 10°C increased per stage until the highest temperature of +50°C reached, record all measured frequencies on each temperature step.

- **Frequency stability versus AC input voltage**

1). Setup the configuration per figure 6 and set chamber temperature to 25°C. Use a variable AC power supply to power the EUT and set AC output voltage to EUT nominal input AC voltage. Set SA Resolution Bandwidth low enough to obtain the desired frequency resolution and measure the EUT 25°C operating frequency as reference frequency.
2). Slowly reduce the EUT input voltage to specified extreme voltage variation (±15%) and record the maximum frequency change.

RESULT

No non-compliance noted, as shown below because the EUT uses the same OSC in both receiver and transmitter LO circuit. As a result, the frequency does not shift in Frequency Stability Test.

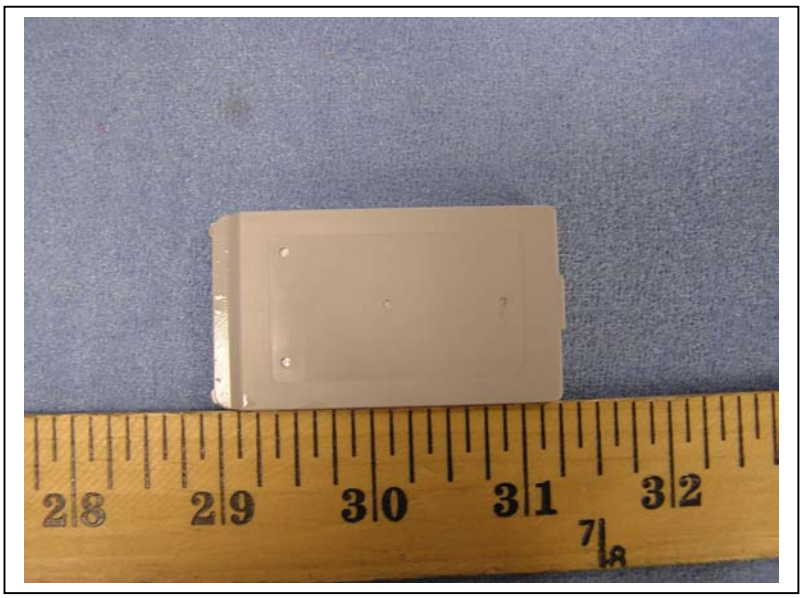
Frequency stability versus environmental temperature

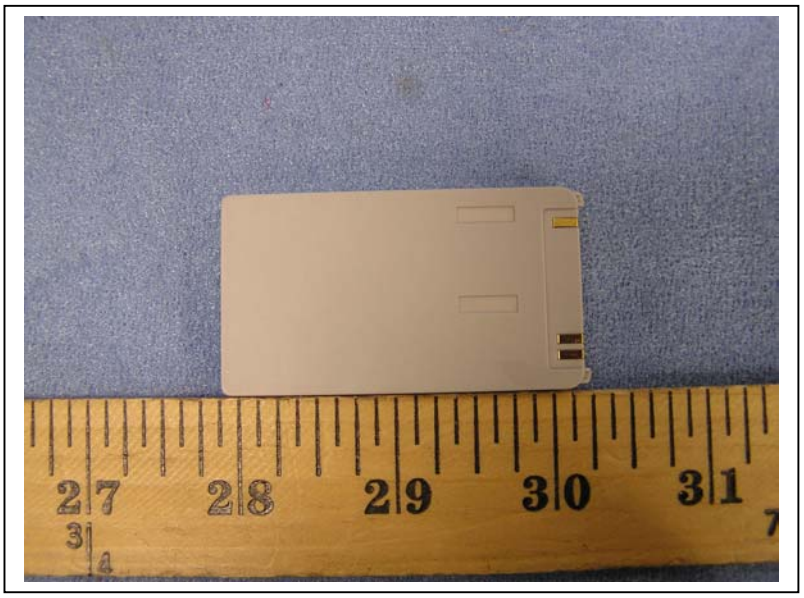
Reference Frequency: AMPS Mid Channel 836.490000MHz @ 25?C Limit: to stay ± 2.5 ppm = 2091.244 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vdc)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.70	50	836.49790	-0.194	± 2.5
3.70	40	836.49749	0.299	± 2.5
3.70	30	836.49705	0.822	± 2.5
3.70	***25***	***836.49774***	***0***	***± 2.5***
3.70	20	836.49763	0.135	± 2.5
3.70	10	836.49743	0.374	± 2.5
3.70	0	836.49714	0.717	± 2.5
3.70	-10	836.49700	0.882	± 2.5
3.70	-20	836.49684	1.076	± 2.5
3.70	-30	836.49659	1.375	± 2.5
3.00 (end point)	25	836.49666	1.292	± 2.5
3.15	25	836.49725	0.580	± 2.5
4.26	25	836.49798	-0.289	± 2.5

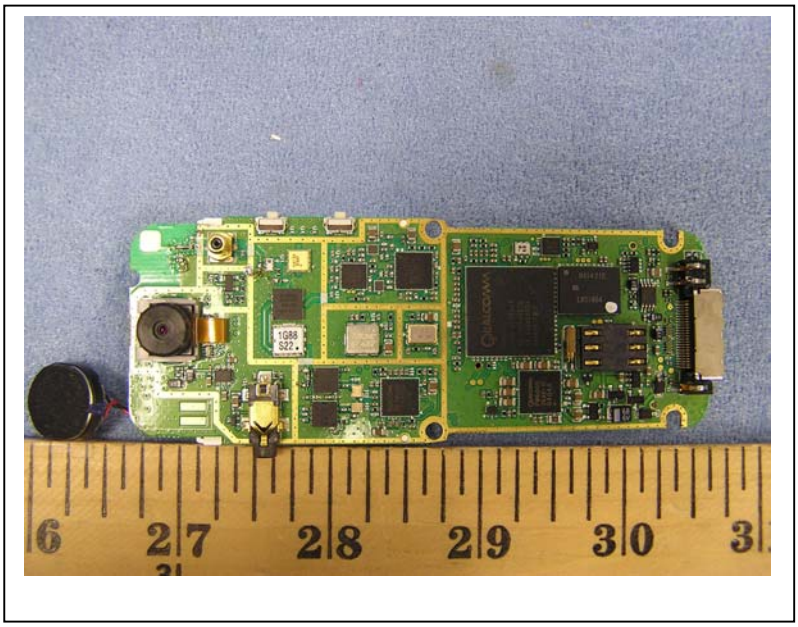
Reference Frequency: CDMA Mid Channel 835.89000MHz @ 25?C Limit: to stay ± 2.5 ppm = 2091.449 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vdc)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.70	50	836.58160	-2.301	± 2.5
3.70	40	836.57942	0.312	± 2.5
3.70	30	836.57906	0.742	± 2.5
3.70	***25***	***836.57968***	***0.000***	***± 2.5***
3.70	20	836.57977	-0.110	± 2.5
3.70	10	836.57977	-0.106	± 2.5
3.70	0	836.57892	0.910	± 2.5
3.70	-10	836.57862	1.263	± 2.5
3.70	-20	836.57838	1.546	± 2.5
3.70	-30	836.57853	1.375	± 2.5
3.14 (end point)	25	836.58173	-2.448	± 2.5
3.15	25	836.58173	-2.448	± 2.5
4.26	25	836.58000	-0.386	± 2.5

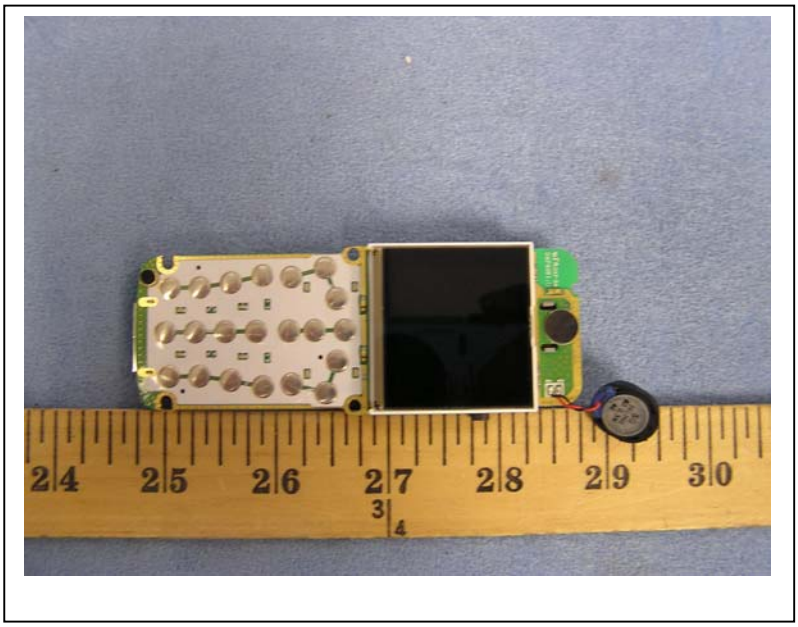
Reference Frequency: PCS Mid Channel 1880.00000MHz @ 25?C Limit: to stay ± 2.5 ppm = 4701.733 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vdc)	**Temperature (?C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.70	50	1880.69281	0.179	± 2.5
3.70	40	1880.68929	2.050	± 2.5
3.70	30	1880.69582	-1.421	± 2.5
3.70	***25***	***1880.69314***	***0***	***± 2.5***
3.70	20	1880.69060	1.351	± 2.5
3.70	10	1880.68955	1.910	± 2.5
3.70	0	1880.68936	2.010	± 2.5
3.70	-10	1880.68947	1.951	± 2.5
3.70	-20	1880.68896	2.223	± 2.5
3.70	-30	1880.68863	2.399	± 2.5
3.15 (end point)	25	1880.69769	-2.416	± 2.5
3.15	25	1880.69769	-2.416	± 2.5
4.26	25	1880.69276	0.202	± 2.5

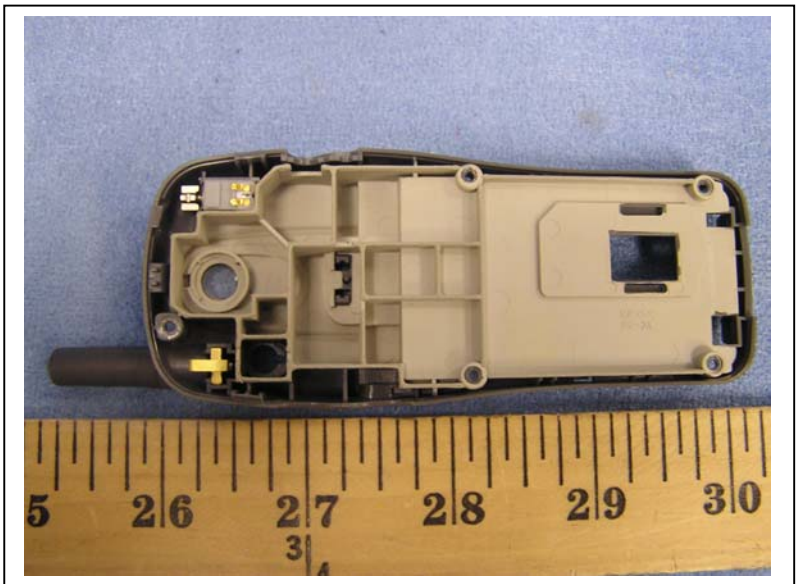
8. EXTERNAL & INTERNAL PHOTOS











9. APENDIX

9.1. SCHEMATICS

Please refer to attached sheets.

9.2. BLOCK DIAGRAM

Please refer to attached sheets.

9.3. USER MANUAL

Please refer to attached sheets.

END OF REPORT