FCC CFR47 CERTIFICATION

PART 22H

TEST REPORT

FOR

PICO 850 BASESTATION

MODEL: WAVE 2000 PICO BS PLUS

FCC ID: OEW-AGBBP0

REPORT NUMBER: 03U2223-1

ISSUE DATE: SEPTEMBER 30, 2003

Prepared for
INTERWAVE COMMUNICATIONS
2495 LEGHORN STREET
MOUNTAINT VIEW, CA 94043
USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD, ROUTE 2
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

TABLE OF CONTENT

1. TEST RESULT CERTIFICATION

COMPANY NAME: INTERWAVE COMMUNICATIONS
2495 LEGHORN STREET
MOUNTAINT VIEW, CA 94043, USA

EUT DESCRIPTION: PICO 850 BASESTATION

MODEM NAME: WAVE 2000 PICO BS PLUS

DATE TESTED: SEPTEMBER 30, 2003

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	LICENSED TX MODULE IN MOBILE APPLICATION
MEASUREMENT PROCEDURE	ANSI 63.4 / 2001, TIA/EIA 603
PROCEDURE	CERTIFICATION
FCC RULE	CFR 47 PART 22 SUBPART H

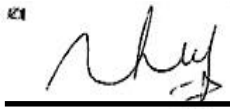
Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 22 Subpart H-Cellular Radiotelephone Service. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do 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:

VIEN TRAN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

Released For CCS By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The 800MHz CDMA Cellular Base Station has:
- an output power 26.1dBm (ERP)
- a dual omni direction, which is helical pattern type antenna, with 0dBi gain
- the transmitting of frequency range 869-894MHz

3. ENGINEERING JUSTIFICATION

A 2-turn ferrite was added to the power supply cable, at EUT side. (Manufacturing by Steward, P/N 28A2024-0A0).

4. 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.

5. 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.

6. 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))

7. 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.

8. TEST SETUP, PROCEDURE AND RESULT

8.1. SECTION 2.1046: RF POWER OUTPUT

INSTRUMENTS LIST

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/2004**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**CNR**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/2004**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**4/17/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**2238**	**2/4/2004**
Quasi-Peak Adaptor	**HP**	**85650A**	**2811A01155**	**5/16/2004**
SA RF Section, 1.5 GHz	**HP**	**85680B**	**2732A03661**	**5/16/2004**
Preamplifier, 1300 MHz	**HP**	**8447D**	**2944A06589**	**8/22/2004**
Antenna, Bilog	**Chase**	**CBL6112B**	**2586**	**3/6/2004**
SA Display Section 2	**HP**	**85662A**	**2816A16696**	**5/16/2004**
Spectrum Analyzer	**HP**	**E4446A**	**US42070220**	**1/13/2004**
Dipole Antenna	**ETS**	**DB-4**	**1629**	**5/15/2004**
EMI Receiver, 9 kHz ~ 2.9 GHz	**HP**	**8542E**	**3942A00286**	**11/20/2004**
RF Filter Section	**HP**	**85420E**	**3705A00256**	**11/21/2004**
Bilog Antenna	**A.R.A**	**LPB-2520/A**	**1185**	**6/24/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**9001-3245**	**2/4/2004**
Signal Generator, 2 ~ 40 GHz	**R & S**	**SMP04**	**DE 34210**	**05/25/04**

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 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 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.

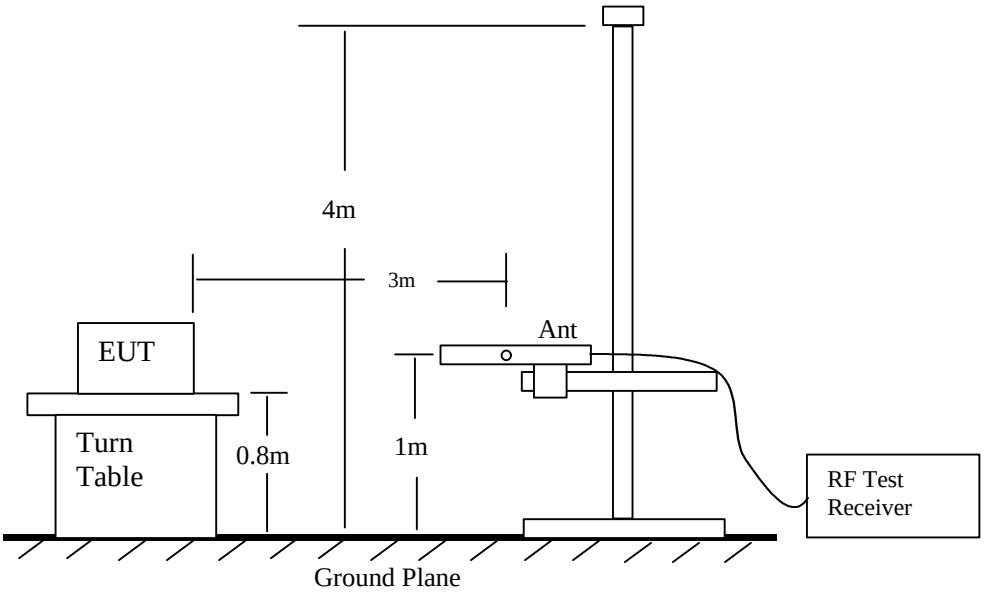
13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

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.

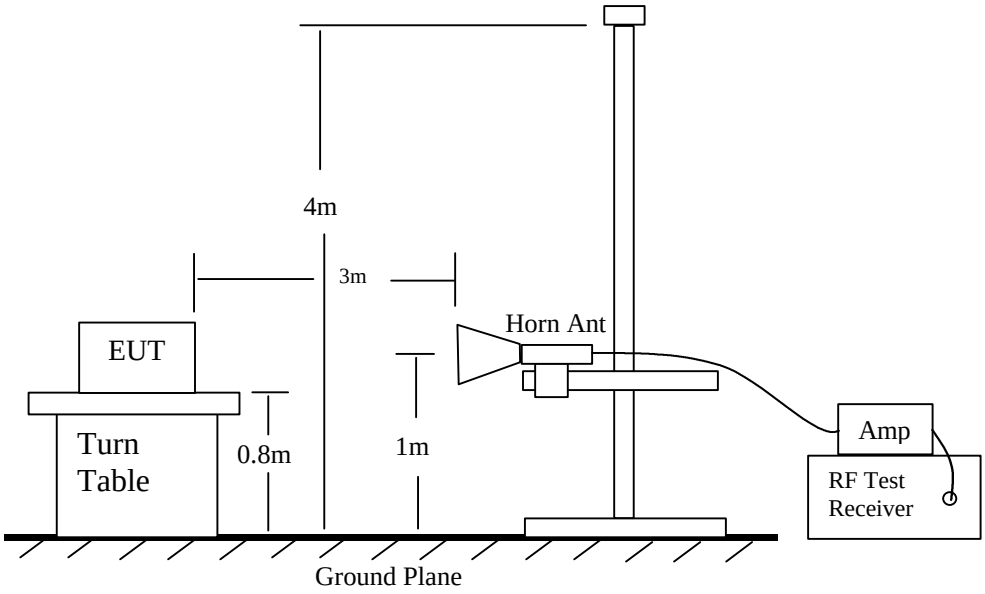
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

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

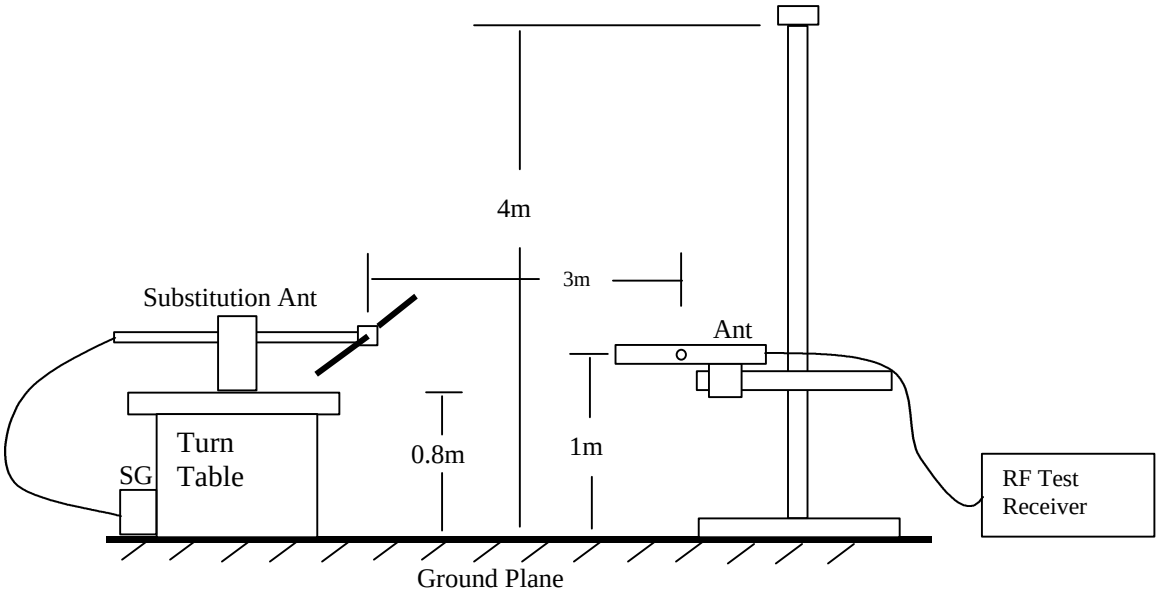
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.



Radiated Emission Measurement 30 to 1000 MHz



Radiated Emission Above 1000 MHz



Radiated Emission – Substitution Method Set-up

MEASUREMENT RESULT:

Output Power Measurement:

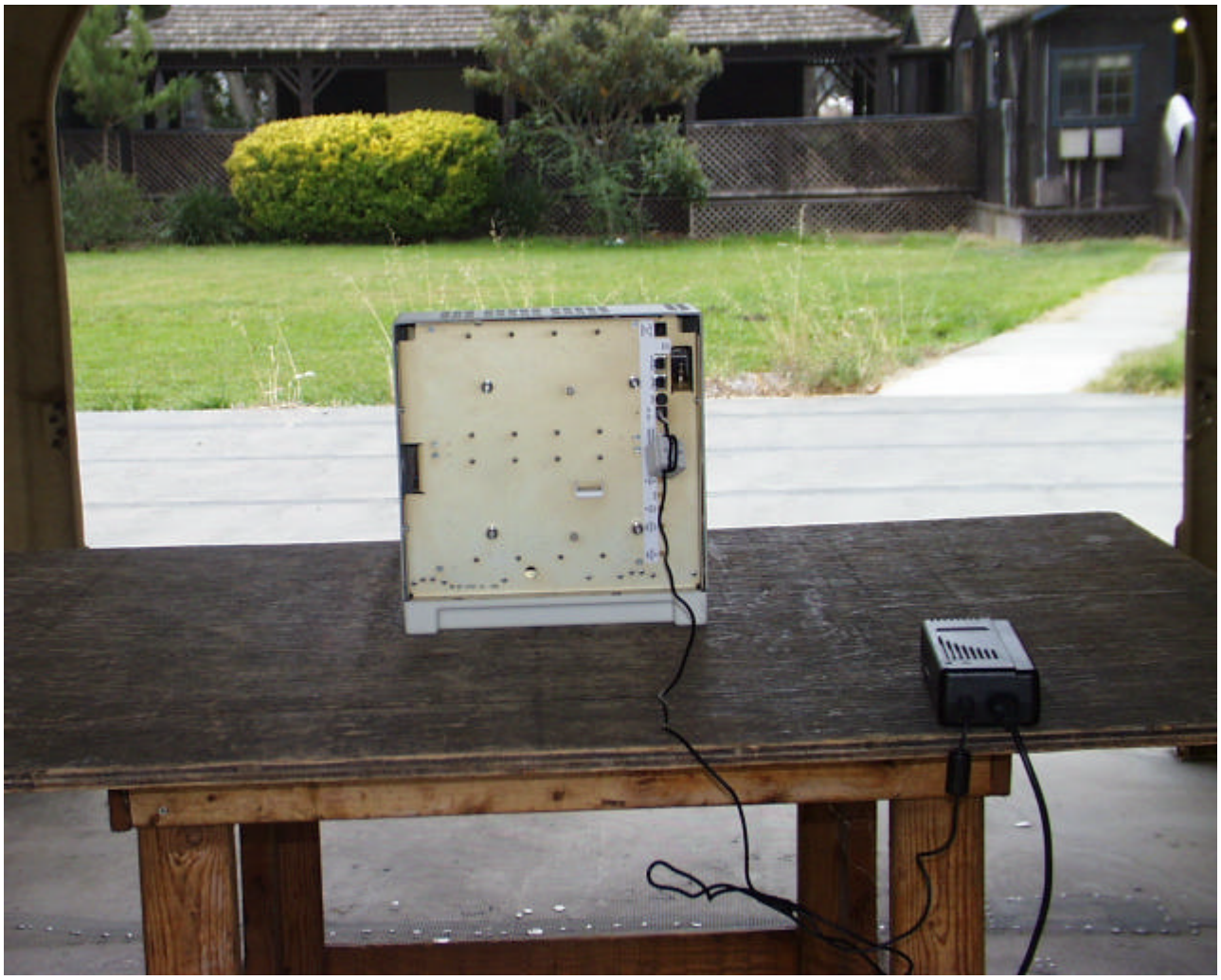
		RF CONDUCTED	ERP
	FREQUENCY	AVERAGE	PEAK
CHANNELS	(MHz)	(dBm)	(dBm)
LOW	896.70	17.05	23.00
MID	881.50	17.23	26.10
HI	893.31	17.04	23.10

THE ANTENNA GAIN IS 0dBi

Radiated Emissions

Configuration 1, front view:

Configuration 2, Back view:



BACK

FUNDAMENTAL OUTPUT POWER (ERP) LOW, MID AND HIGH CHANNELS

9/12/2003 Compliance Certification Services, Morgan Hill Open Field Site

Test Engineer: VIEN TRAN
Project #: 03U2223-1
Company: INTERWAVE COMMUNICATIONs
EUT Description: PICO 800MHz CDMA CELLULAR BASESTATION
EUT M/N: WAVE 2000 BS PLUS _ 800MHz PICO
Test Target: FCC PART 22
Mode Operation: Tx- FUNDAMENTAL _ SUBSTITUTION _ LOW, MID, HI CHANNELS

Test Equipment:

EMCO Horn 1-18GHz | Pre-amplifer 1-26GHz | Spectrum Analyzer | Horn > 18GHz | Limit: ERP

Hi Frequency Cables: ☐ (2 ft) ☐ (2 – 3 ft) ☑ (4 – 6 ft) ☐ (12 ft)

Peak Measurements:
Fundamental: RBW>99% or 26dB Emissions BW, VBW=RBW=3MHZ
Bandedge: RBW=>1% Emissions BW, VBW=> 3*RBW
Spurious: RBW=1MHz, VBW=1MHz

f GHz	SA reading (dBuV)	SG reading (dBm)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
0.870	91.2	23.2	0.2	0.0	0.0	23.0	38.5	-15.5	V
0.870	84.2	13.6	0.2	0.0	0.0	13.4	38.5	-25.1	H
0.882	94.6	26.3	0.2	0.0	0.0	26.1	38.5	-12.4	V
0.882	87.5	17.2	0.2	0.0	0.0	17.0	38.5	-21.5	H
0.893	91.9	23.3	0.2	0.0	0.0	23.1	38.5	-15.4	V
0.893	85.0	14.0	0.2	0.0	0.0	13.8	38.5	-24.7	H

VBW=RBW=3MHZ

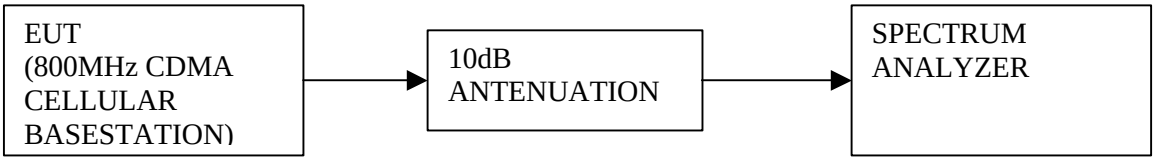
8.2. SECTION 2.1047: MODULATION CHARACTERISTICS

Not Applicable.

8.3. SECTION 2.1049: EMISSION MASK & OCCUPIED BANDWIDTH

PROVISIONS APPLICABLE
According to CFR 47 section 22.917.

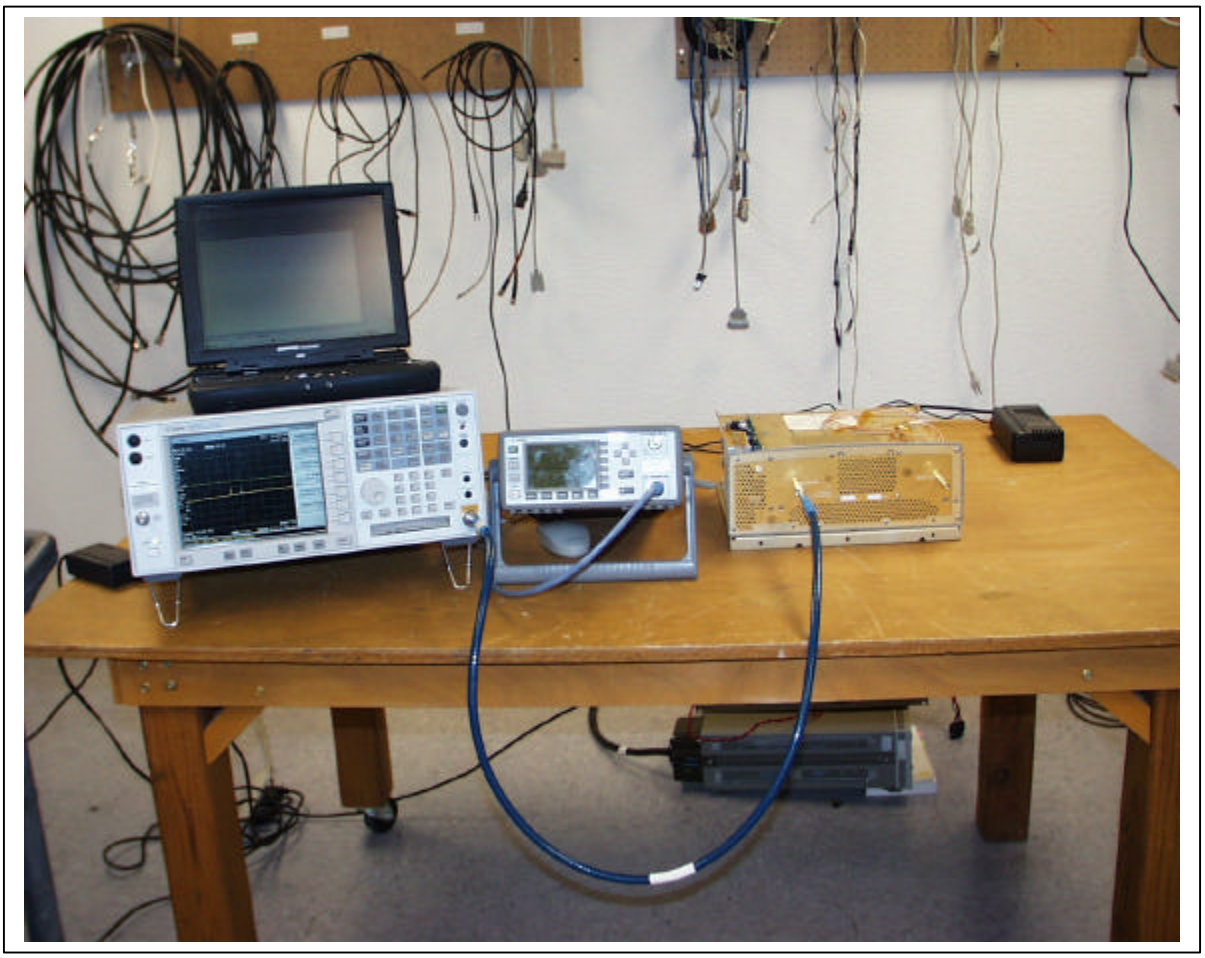
TEST SETUP



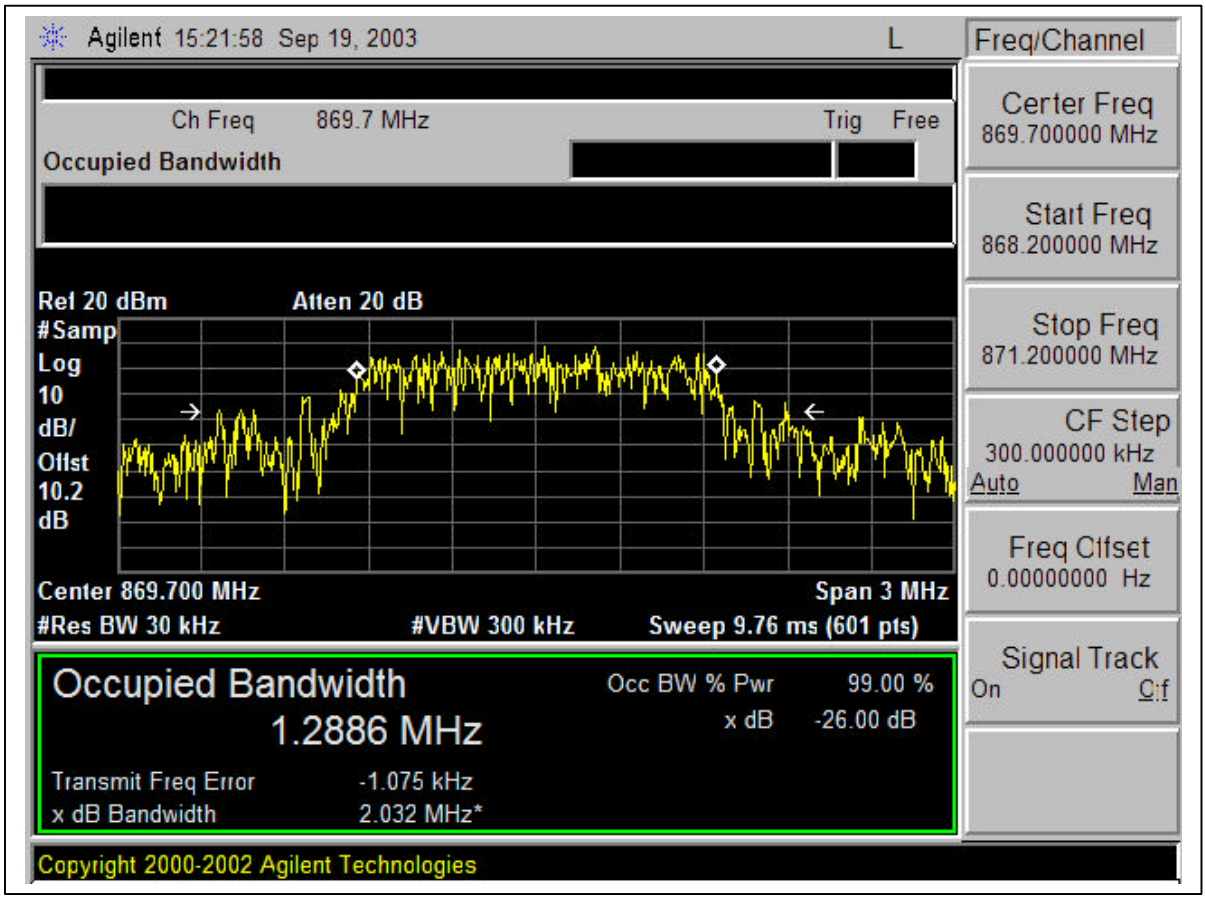
MEASUREMENT RESULT:

	FREQUENCY	99% BW	-26dBc BW
CHANNEL	(MHz)	(KHz)	(KHz)
LOW	869.7	1288.6	2032
MID	881.5	1287.3	1916
HI	893.31	1268.3	1542

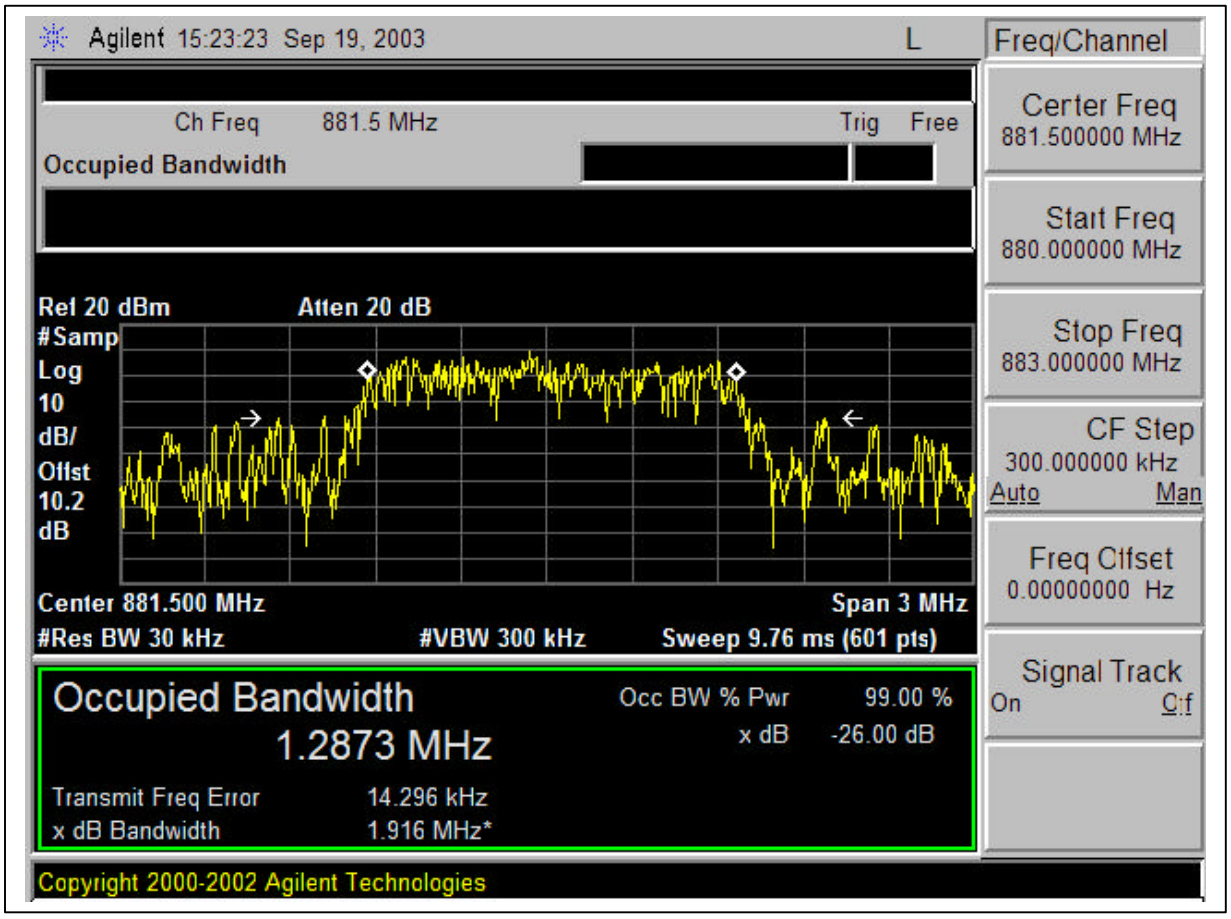
Set-up Configuration



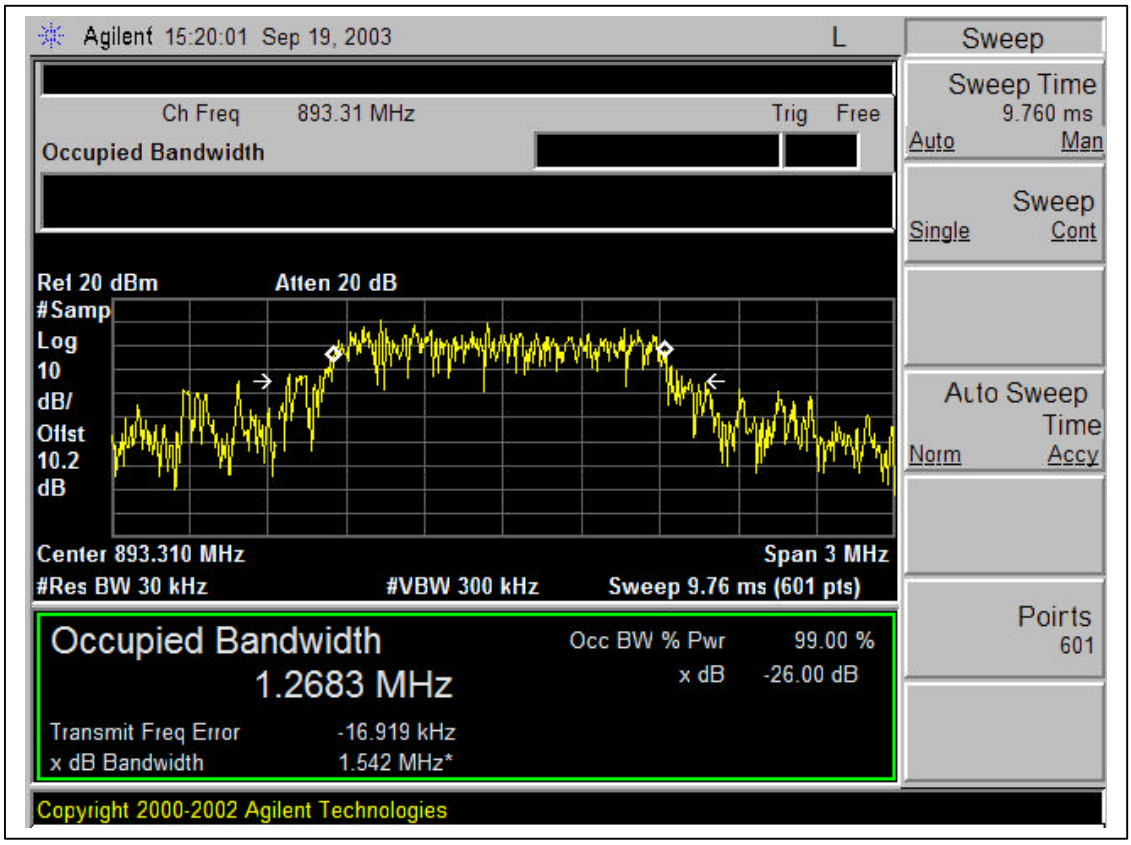
Low Channel Occupied Bandwidth:



Mid Channel Occupied Bandwidth:



Hi Channel Occupied Bandwidth:

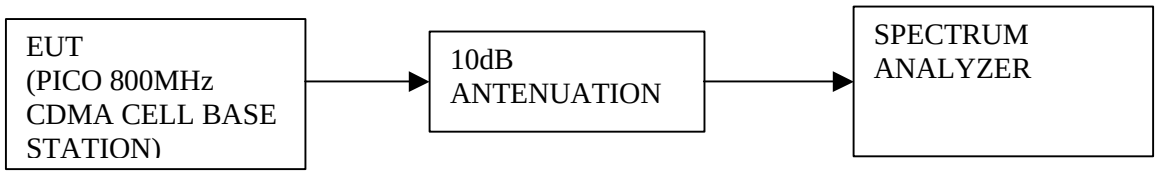


8.4. SECTION 2.1051: SPURIOUS EMISSION AT ANTENNA TERMINAL

INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	SERIAL NO.	CAL. DUE DATE
PSA Analyzer	Agilent	E446A	US42070220	1/13/04
10dB Attenuator	Agilent	8493C	59028	N/A

TEST SETUP



Set-up Configuration

TEST PROCEDURE

1) EUT's RF output connector (made solely for the purpose of the test) is connected to the spectrum analyzer, and 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.

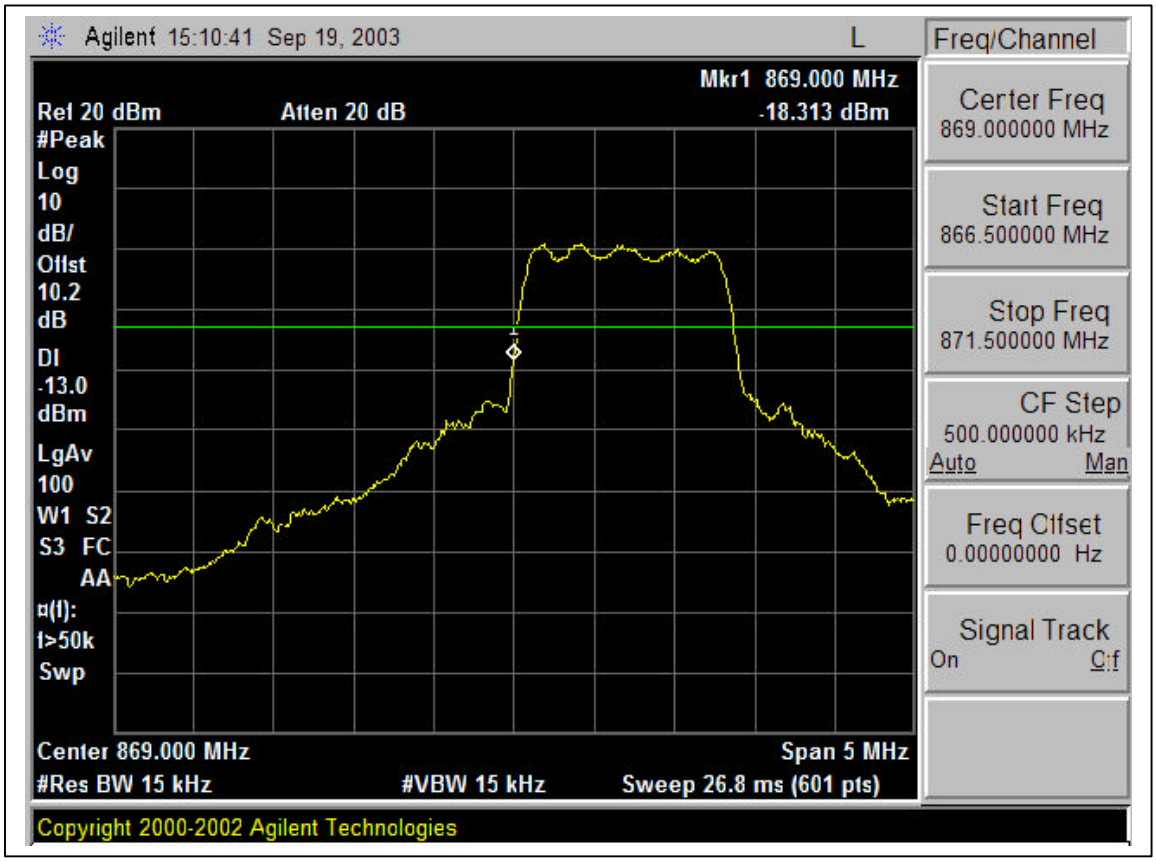
2) For the Out-of-Band measurements a 1 MHz RES BW was used to scan from 15 MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at –13dBm to show compliance for spurious, and harmonics.

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.

MEASUREMENT RESULT:

BAND EDGE

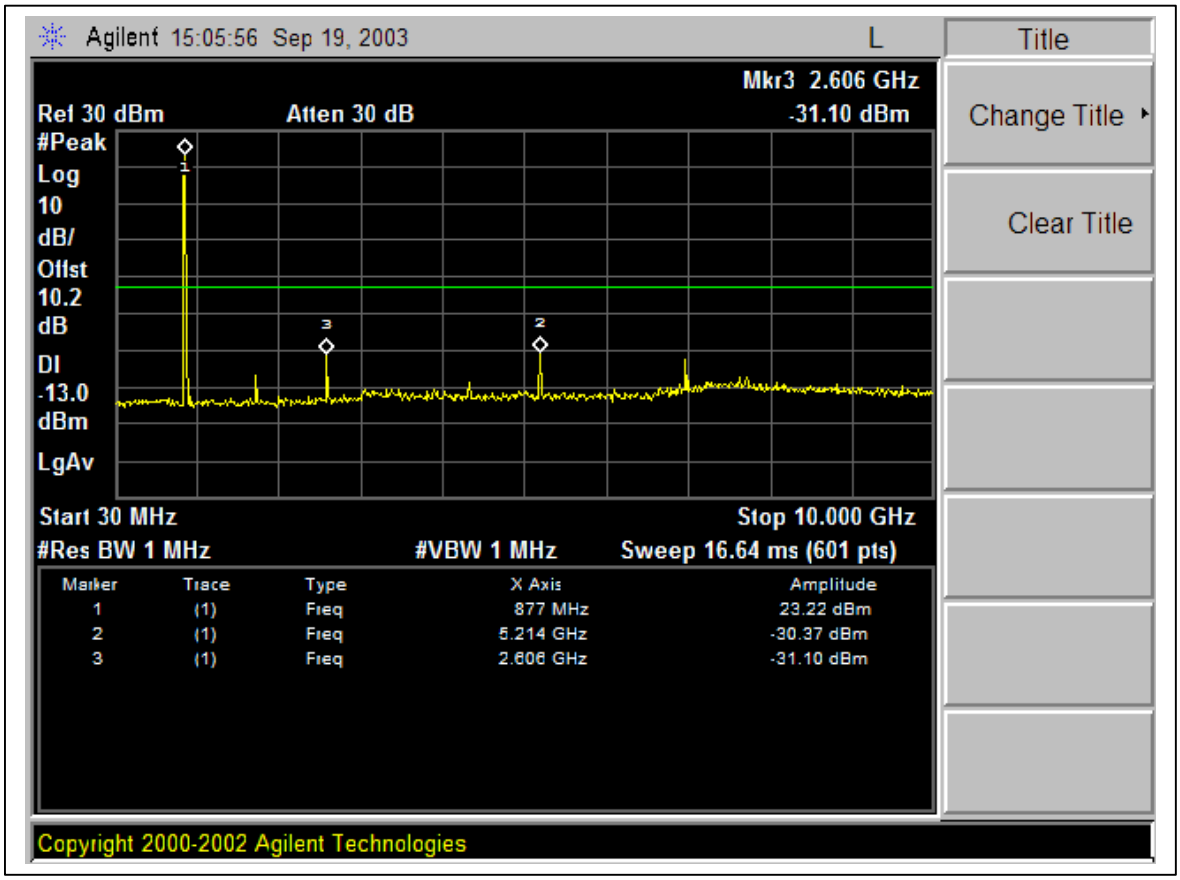
LOW BAND EDGE LOW CH 1013 – CENTER FREQUENCY: 869MHz



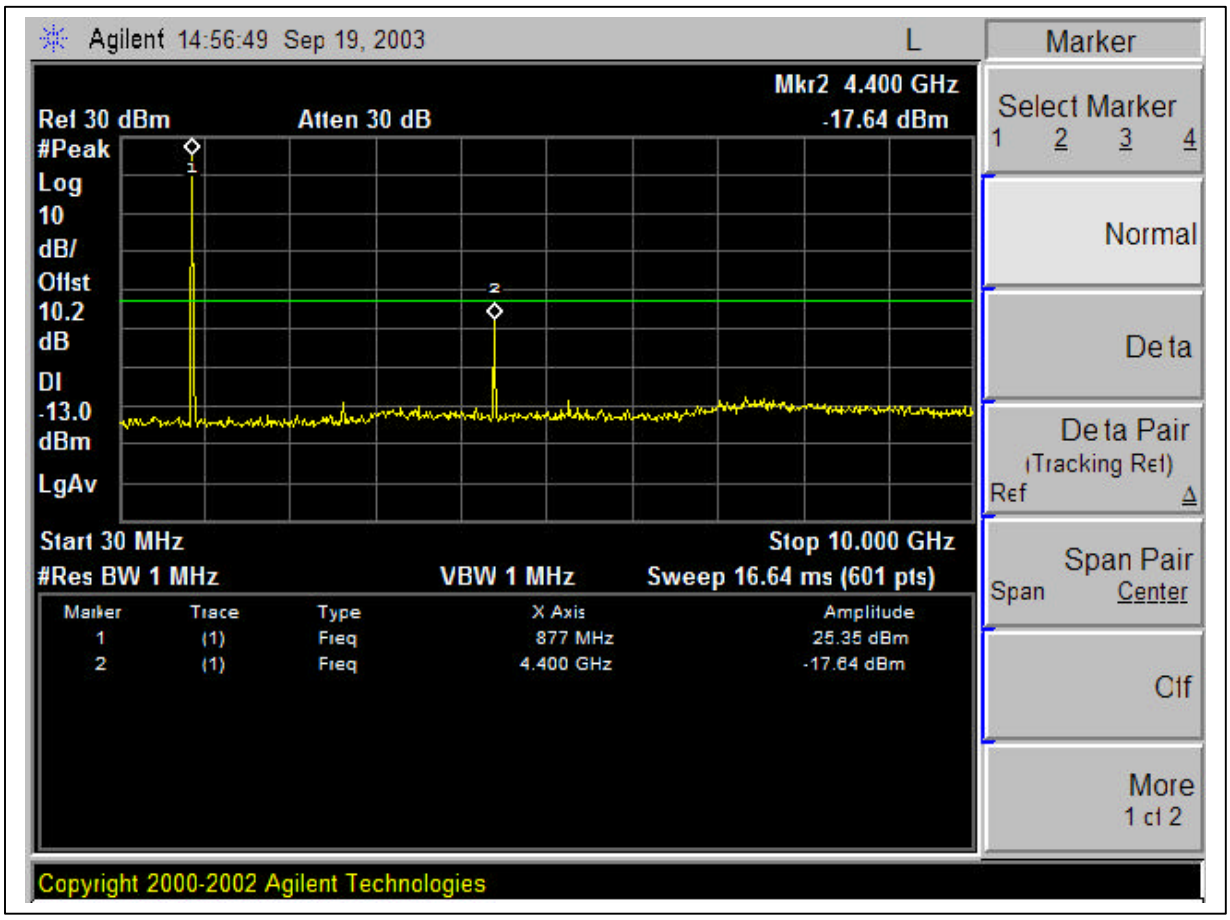
HI BAND EDGE LOW CH 777 – CENTER FREQUENCY: 894MHz

SPURIOUS

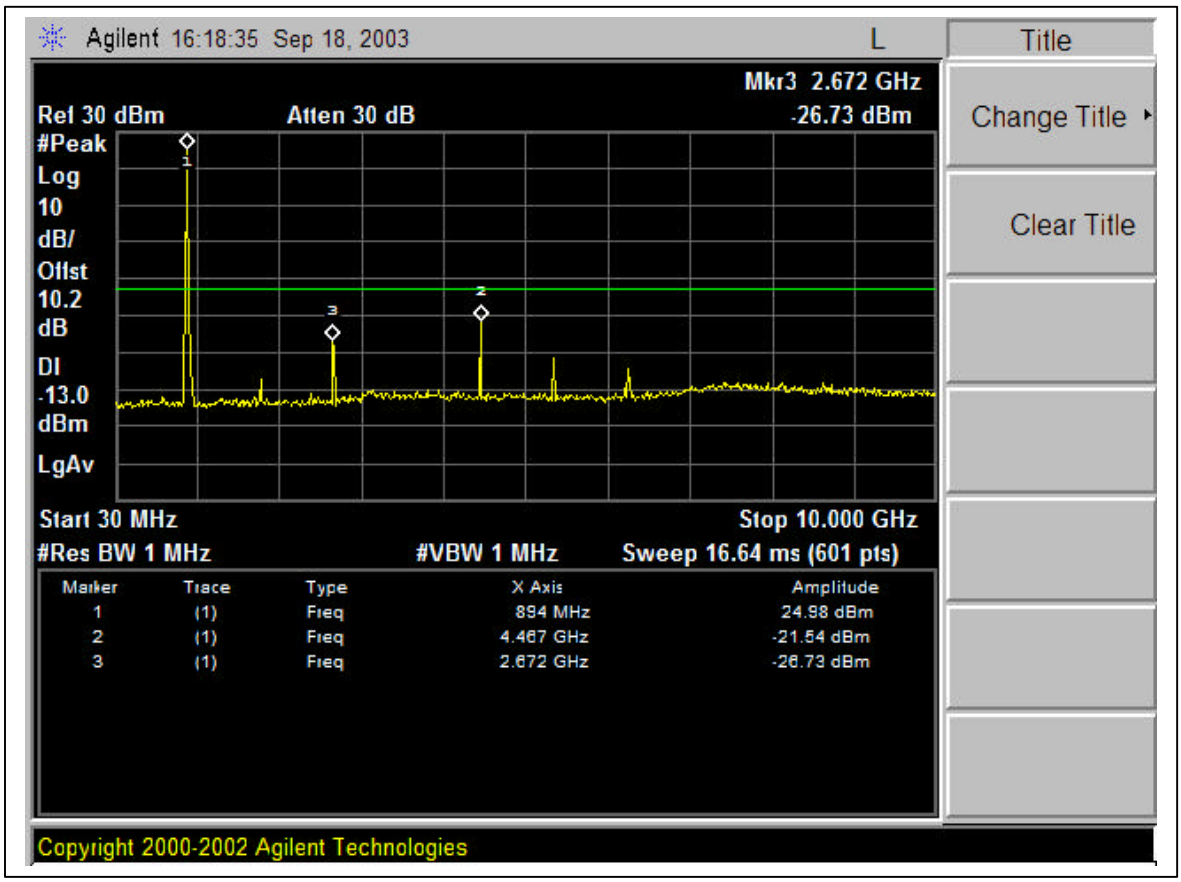
OUT OF BAND EMISSON – LOW CHANNEL



OUT OF BAND EMISSON – MID CHANNEL



OUT OF BAND EMISSON – HI CHANNEL



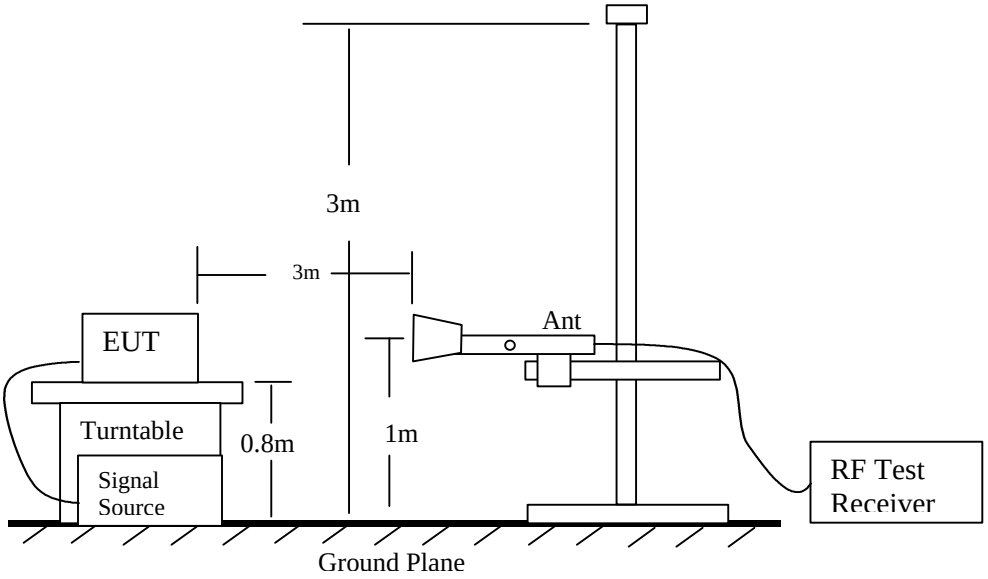
8.5. SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION

INSTRUMENTS LIST

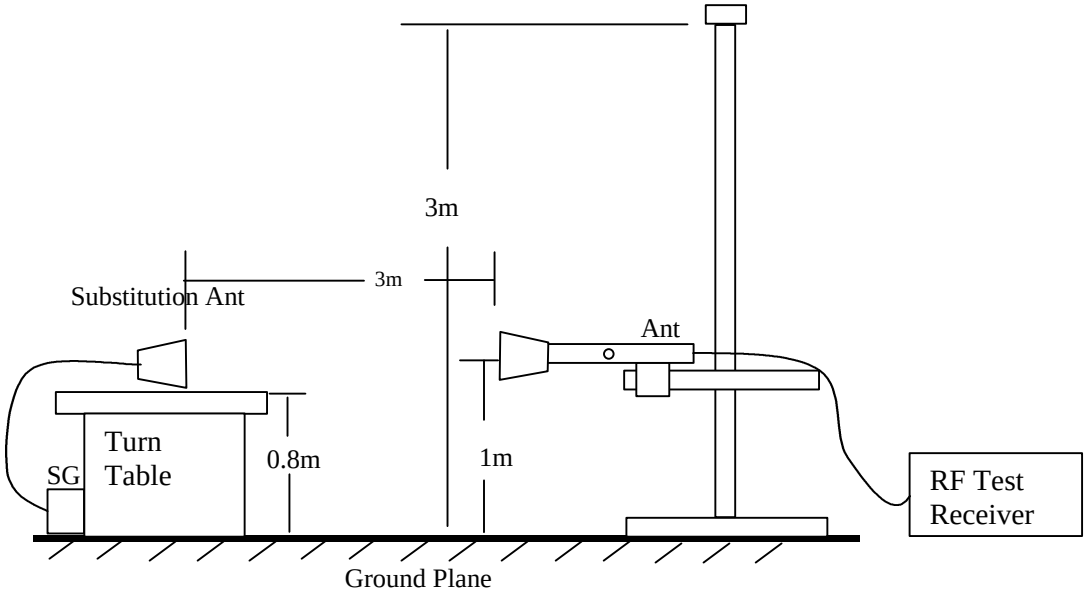
TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/2004**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**CNR**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/2004**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**4/17/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**2238**	**2/4/2004**
Quasi-Peak Adaptor	**HP**	**85650A**	**2811A01155**	**5/16/2004**
SA RF Section, 1.5 GHz	**HP**	**85680B**	**2732A03661**	**5/16/2004**
Preamplifier, 1300 MHz	**HP**	**8447D**	**2944A06589**	**8/22/2004**
Antenna, Bilog	**Chase**	**CBL6112B**	**2586**	**3/6/2004**
SA Display Section 2	**HP**	**85662A**	**2816A16696**	**5/16/2004**
Spectrum Analyzer	**HP**	**E4446A**	**US42070220**	**1/13/2004**
Dipole Antenna	**ETS**	**DB-4**	**1629**	**5/15/2004**
EMI Receiver, 9 kHz ~ 2.9 GHz	**HP**	**8542E**	**3942A00286**	**11/20/2004**
RF Filter Section	**HP**	**85420E**	**3705A00256**	**11/21/2004**
Bilog Antenna	**A.R.A**	**LPB-2520/A**	**1185**	**6/24/2004**
Antenna, Horn 1 ~ 18 GHz	**EMCO**	**3115**	**9001-3245**	**2/4/2004**
Signal Generator, 2 ~ 40 GHz	**R & S**	**SMP04**	**DE 34210**	**05/25/04**

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



Radiated Emission Measurement



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.

MEASUREMENT RESULT

No non-compliance noted, as shown below

Harmonics / Spurious and Substitution Emissions (EIRP), Low / Mid / High Channels:

09/17/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:VIEN TRAN
Project #: 03U2223-1
Company: INTERWAVE COMMUNICATION
EUT Descrip.: CELLULAR BASESTATION
EUT M/N: WAVE 2000 BS PLUS _ 800MHz PICO
Test Target: FCC PART 22 _ SUBSTITUTION HARMONIC & SPUR
Mode Oper: Tx @ LOW/MID/HI CHANNELS

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T59; S/N: 3245 @3n	T63 Miteq 646456	Agilent E4446A Analyzer		ERP

Hi Frequency Cables: ☐ (2 ft) ☐ (2 ~ 3 ft) ☑ (4 ~ 6 ft) ☐ (12 ft)

Peak Measurements:
Fundamental: RBW>99% or 26dB Emissions BW, VBW=RBW
Bandedge: RBW=>1% Emissions BW, VBW=> 3*RBW
Spurious: RBW=1MHz, VBW=1MHz

f GHz	SA reading (dBuV)	SG reading (dBuV)	CL (dB)	Gain (dBi)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
LOW CH = 869.70MHz									
1.740	62.3	-42.0	0.4	7.5	5.3	-37.1	-13.0	-24.1	V
2.609	64.3	-41.1	0.6	8.5	6.4	-35.3	-13.0	-22.3	V
3.479	63.0	-39.0	0.8	9.3	7.2	-32.6	-13.0	-19.6	V
4.349	56.2	-44.0	0.9	10.1	8.0	-36.9	-13.0	-23.9	V
5.219	52.2	-47.2	1.0	11.1	9.0	-39.2	-13.0	-26.2	
1.740	70.0	-38.0	0.4	7.5	5.3	-33.1	-13.0	-20.1	H
2.609	60.7	-48.0	0.6	8.5	6.4	-42.2	-13.0	-29.2	H
3.479	57.8	-50.0	0.8	9.3	7.2	-43.6	-13.0	-30.6	H
4.349	50.6	-57.7	0.9	10.1	8.0	-50.6	-13.0	-37.6	H
5.219	48.3	-59.2	1.0	11.1	9.0	-51.2	-13.0	-38.2	H
NO OTHER EMISSION FOUND AFTER 6TH HARMONIC									
MID CH = 881.5MHz									
1.763	69.0	-49.0	0.4	7.5	5.4	-44.0	-13.0	-31.0	V
2.645	71.4	-39.1	0.6	8.6	6.4	-33.3	-13.0	-20.3	V
3.526	60.7	-47.8	0.8	9.3	7.2	-41.4	-13.0	-28.4	V
4.408	76.8	-34.0	0.9	10.2	8.1	-26.8	-13.0	-13.8	V
5.289	56.5	-50.2	1.0	11.2	9.0	-42.2	-13.0	-29.2	V
1.763	76.4	-34.4	0.4	7.5	5.4	-29.4	-13.0	-16.4	H
2.645	59.6	-50.8	0.6	8.6	6.4	-45.0	-13.0	-32.0	H
3.526	56.6	-53.1	0.8	9.3	7.2	-46.7	-13.0	-33.7	H
4.408	70.0	-39.7	0.9	10.2	8.1	-32.5	-13.0	-19.5	H
5.289	54.2	-56.1	1.0	11.2	9.0	-48.1	-13.0	-35.1	H
NO OTHER EMISSION FOUND AFTER 6TH HARMONIC									
HI CH = 893.31MHz									
1.787	65.6	-43.2	0.4	7.6	5.4	-38.2	-13.0	-25.2	V
2.680	73.2	-53.2	0.6	8.6	6.5	-47.4	-13.0	-34.4	V
3.573	50.0	-58.5	0.8	9.4	7.2	-52.1	-13.0	-39.1	V
4.467	69.3	-35.3	0.9	10.3	8.1	-28.0	-13.0	-15.0	V
5.289	47.0		1.0	11.2	9.0	8.0	-13.0	21.0	V
1.787	65.8	-44.3	0.4	7.6	5.4	-39.3	-13.0	-26.3	H
2.680	62.0	-42.0	0.6	8.6	6.5	-36.2	-13.0	-23.2	H
3.573	48.5	-61.4	0.8	9.4	7.2	-55.0	-13.0	-42.0	H
4.467	68.0	-42.3	0.9	10.3	8.1	-35.0	-13.0	-22.0	H
5.289	44.0	-56.6	1.0	11.2	9.0	-48.6	-13.0	-35.6	H

Completed scan from 30MHz to 10th harmonic.

8.6. SECTION 2.1055: FREQUENCY STABILITY

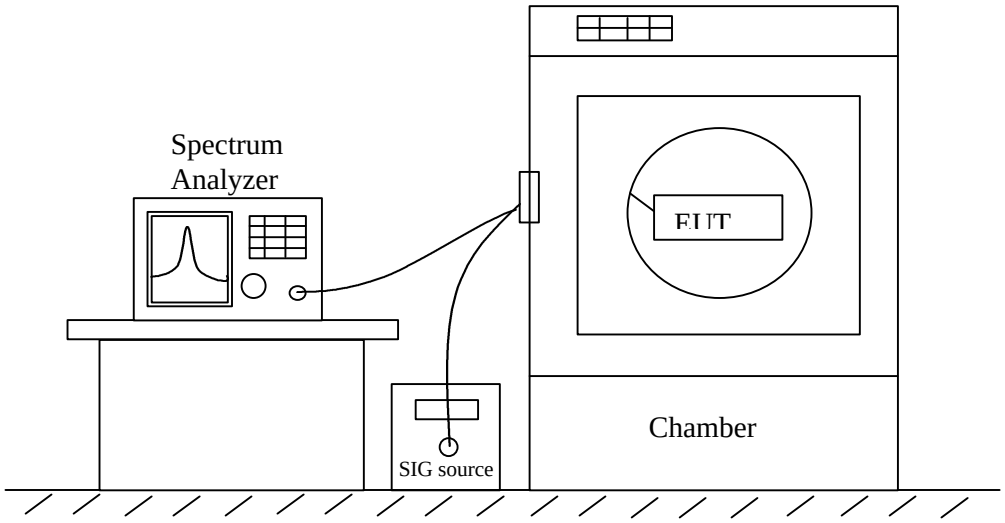
INSTRUMENTS LIST

EQUIPMENT	MANUFACTURE	MODEL NO.	SERIAL NO.	CAL. DUE DATE
PSA Analyzer	Agilent	E446A	US42070220	1/13/04
Environmental Chamber	Thermotron	SE 600-10-10	2980	4/23/04
10dB Attenuator	Agilent	8493C	59028	N/A
DC Power Supply	Kenwood	PA36-3A	7060074	N/A

Detector Function Setting of Test Receiver

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

TEST SETUP



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.

MEASUREMENT RESULT

No non-compliance noted, as shown below.

FREQUENCY STABILITY

Reference Frequency: CDMA Mid Channel 880.818320MHz @ 25˚C				
Limit: to stay ± 2.5 ppm =		2202.048	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(AC/DC ADAPTER)	Temperature (˚C)	(MHz)	Delta (ppm)	Limit (ppm)
48.00	50	880.819875	-0.630	± 2.5
48.00	40	880.819787	-0.530	± 2.5
48.00	30	880.819630	-0.352	± 2.5
48.00	***25***	***880.819320***	***0***	***± 2.5***
48.00	20	880.819149	0.194	± 2.5
48.00	10	880.819292	0.032	± 2.5
48.00	0	880.819185	0.153	± 2.5

Reference Frequency: CDMA Mid Channel 880.818320MHz @ 25˚C				
Limit: to stay ± 2.5 ppm =		2202.046	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vac)	Temperature (˚C)	(MHz)	Delta (ppm)	Limit (ppm)
120.00	***25***	***880.818320***	***0***	***± 2.5***
102	25	880.818466	*-0.166*	± 2.5
138	25	880.818326	*-0.007*	± 2.5

NOTE: Per manufacturer specification, the environmental temperature should be from 0 degree C to 50 degree C.

8.7. RADIATED EMISSION

TEST EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2004
Line Filter	Lindgren	LMF-3489	497	CNR
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	9/6/2004
EMI Test Receiver	R & S	ESHS 20	827129/006	4/17/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2004
Quasi-Peak Adaptor	HP	85650A	2811A01155	5/16/2004
SA RF Section, 1.5 GHz	HP	85680B	2732A03661	5/16/2004
Preamplifier, 1300 MHz	HP	8447D	2944A06589	8/22/2004
Antenna, Bilog	Chase	CBL6112B	2586	3/6/2004
SA Display Section 2	HP	85662A	2816A16696	5/16/2004
Spectrum Analyzer	HP	E4446A	US42070220	1/13/2004
Dipole Antenna	ETS	DB-4	1629	5/15/2004
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/2004
RF Filter Section	HP	85420E	3705A00256	11/21/2004
Bilog Antenna	A.R.A	LPB-2520/A	1185	6/24/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	9001-3245	2/4/2004
Signal Generator, 2 ~ 40 GHz	R & S	SMP04	DE 34210	05/25/04

TEST PERIPHERALS				
Device Type	Manufacturer	Model Number	Serial Number	FCC ID
AC/DC ADAPTER	UNKNOWN	AW10-3R3-4	2513721	DOC
AC/DC ADAPTER	COMPAQ	LE9702A	N/A	DOC
AC/DC ADAPTER	APX	N/A	SP130948R	DOC
LAPTOP	COMPAQ	1456VQL1N	N/A	DOC
HUB(Ethernet 10/100)	LINKSYS	EZX88W	N/A	DOC
GPS ANTENNA	CUSTOME MADE	N/A	N/A	N/A

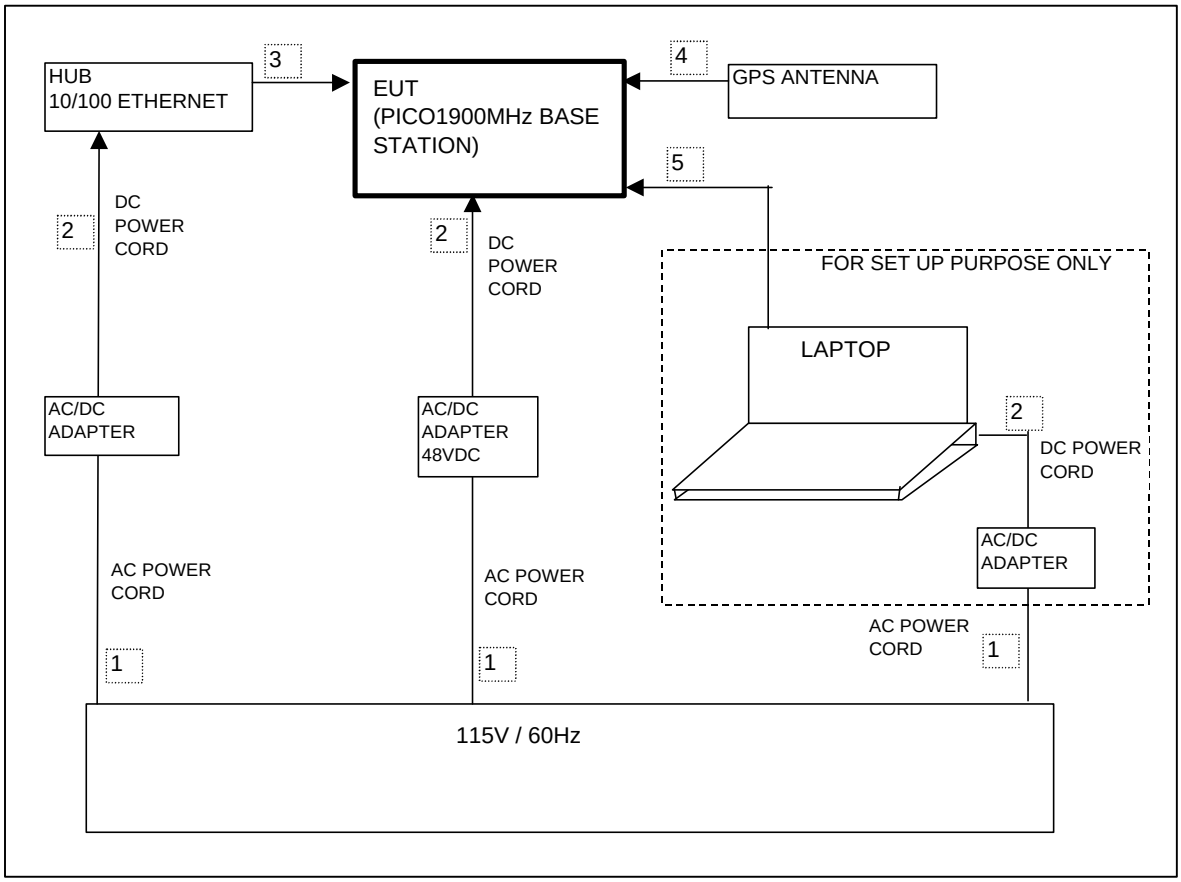
TEST I / O CABLES								
Cable No	I/O Port	# of I/O Port	Connector Type	Type of Cable	Cable Length	Data Traffic	Bundled	Remark
1	AC	3	US115V	SHIELDED	2m	NO	NO	N/A
2	DC	3	DC	SHIELDED	2m	NO	NO	Ferrites were added on both sides of EUT cable
3	ETHERNET CABLE	1	RJ45	SHIELDED	30m	YES	NO	N/A
4	COAX CABLE	1	N - TYPE	SHIELDED	30m	NO	YES	N/A
5	ETHERNET CABLE	1	RS232	UN-SHIELED	2m	YES	NO	N/A
								N/A

<u>NOTE</u>: A 2-turn ferrite was added to the power supply, at EUT side. (Manufacturing by Steward, P/N 28A2024-0A0).

Detector Setting of Spectrum Analyzer

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak ☒ Quasi Peak	☒ 100 KHz ☒ 1 MHz	☒ 100 KHz ☒ 1 MHz

TEST SETUP



TEST PROCEDURE

1. The EUT was placed on the turn table 0.8 meter above ground inside 3 meter Anechoic Chamber.
2. Set the resolution bandwidth to 120KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turn table and stop at the angle where the measurement device has maximum reading
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures (3)~(6). If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.

MEASUREMENT RESULT

No non-compliance noted, as shown below.

DIGITAL TEST

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	03U2203
Report #:	030919B1
Date& Time:	09/19/03 4:25 PM
Test Engr:	Thanh Nguyen

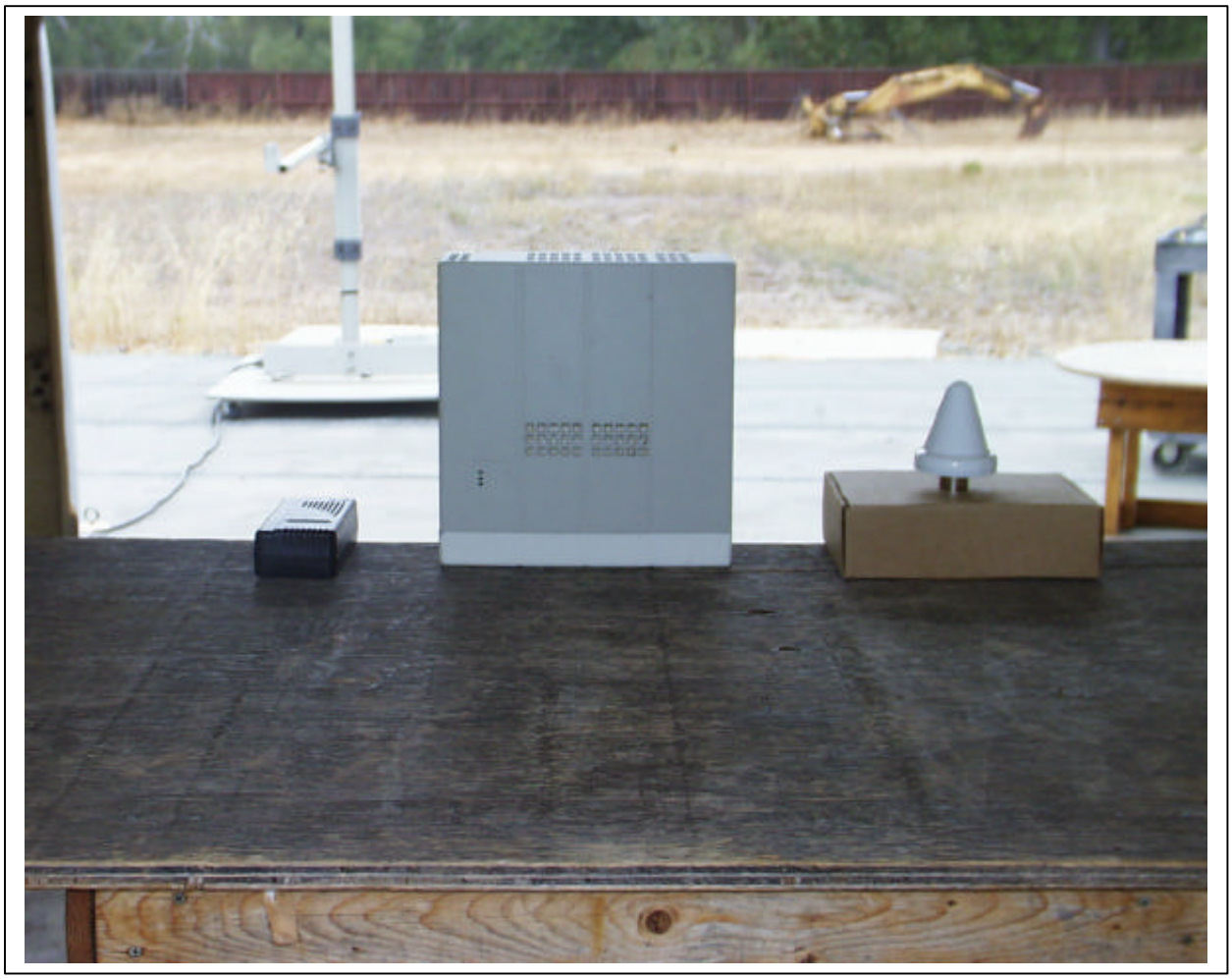
Company:	INTERWAVE COMMUNICATION
EUT Description:	CELLULAR BASESTATION 800MHz PICO
Test Configuration :	EUT/ANTENNA/48V POWER SUPPY/ETHERNET
Type of Test:	FCC CLASS A (PART 22)
Mode of Operation:	DIGITAL TEST_Tx @ WORST CASE

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_A	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
58.98	57.00	6.92	2.01	29.21	36.72	39.10	-2.38	10mV	0.00	1.00	P
33.00	45.90	16.22	1.60	29.33	35.29	39.10	-4.71	10mV	0.00	1.00	P
50.00	52.20	8.58	1.87	29.30	33.35	39.10	-5.75	10mV	180.00	1.00	P
39.34	45.90	13.98	1.69	29.30	32.28	39.10	-6.82	10mV	0.00	1.00	P
165.00	50.80	10.11	3.13	28.84	35.19	43.50	-8.31	10mV	90.00	1.50	P
198.00	51.00	8.97	3.48	28.70	34.75	43.50	-8.75	10mV	180.00	1.00	P
6 Worst Data											

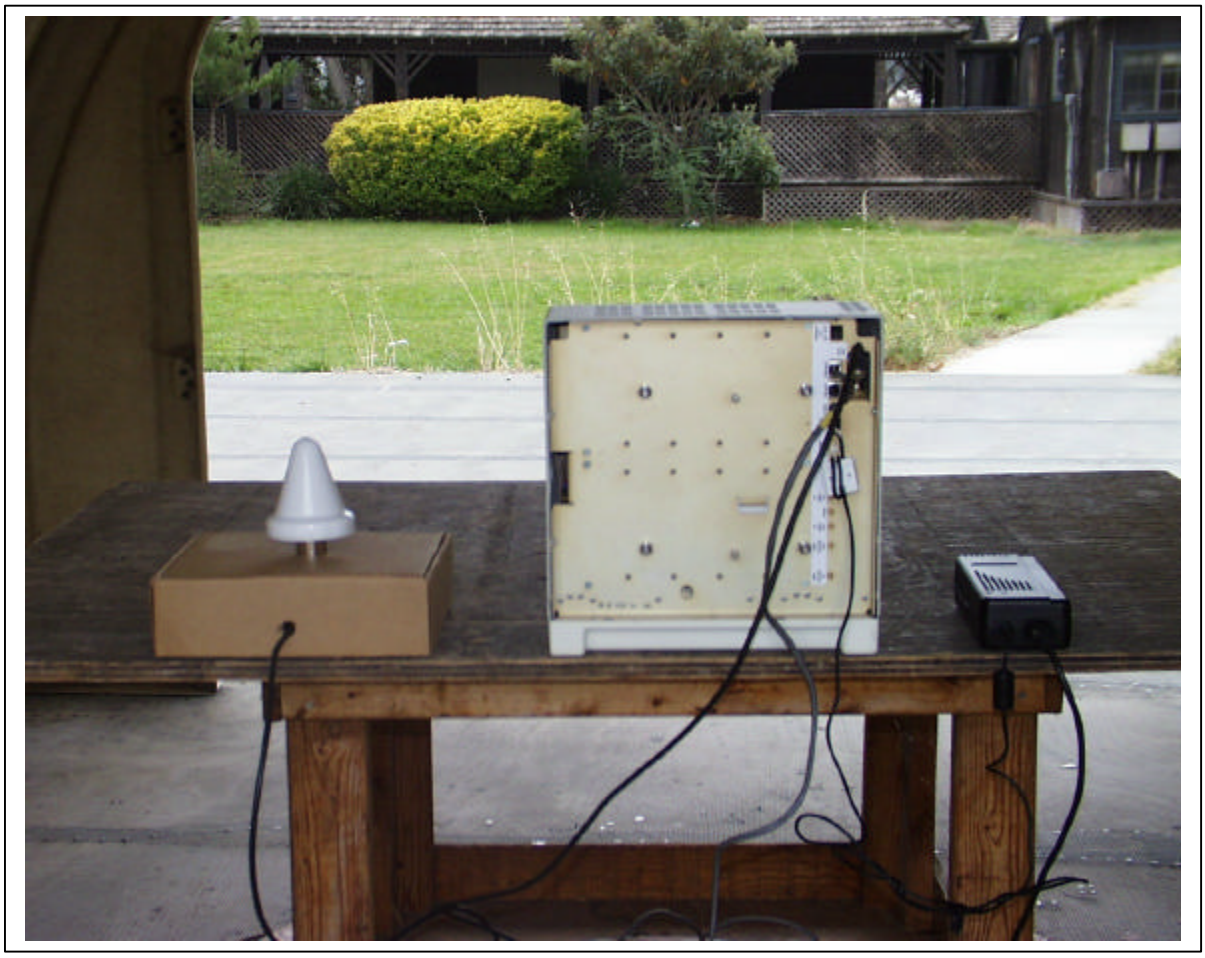
Radiated Emission photos

, front view:



***NOTES*: Tested with receiving GPS antenna**

rear view:



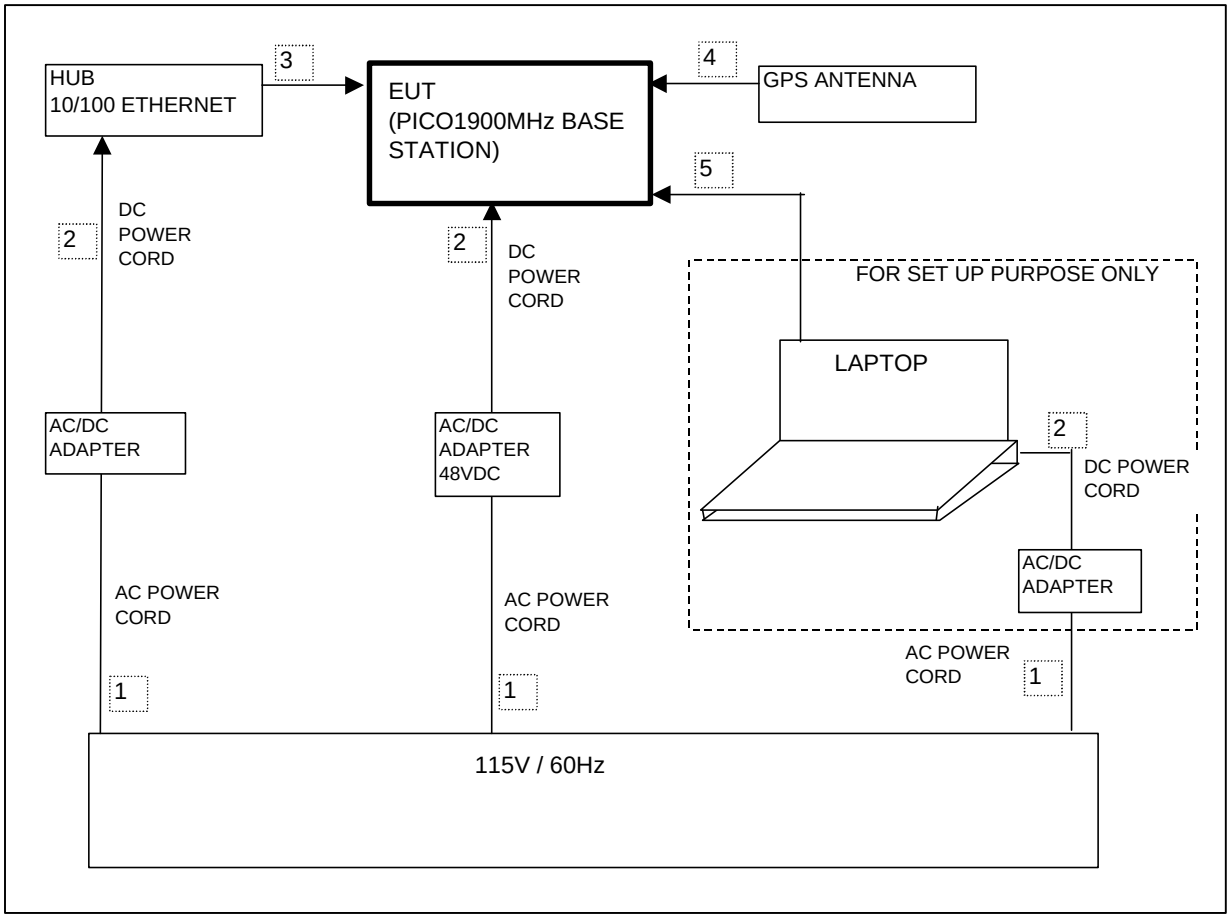
***NOTES*: Tested with receiving GPS antenna**

8.8. POWERLINE CONDUCTED EMISSION

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
150 KHz to 30 MHz	☒ Peak ☐ CISPR Quasi Peak	☒ 9 KHz	☒ 9 KHz

TEST SETUP



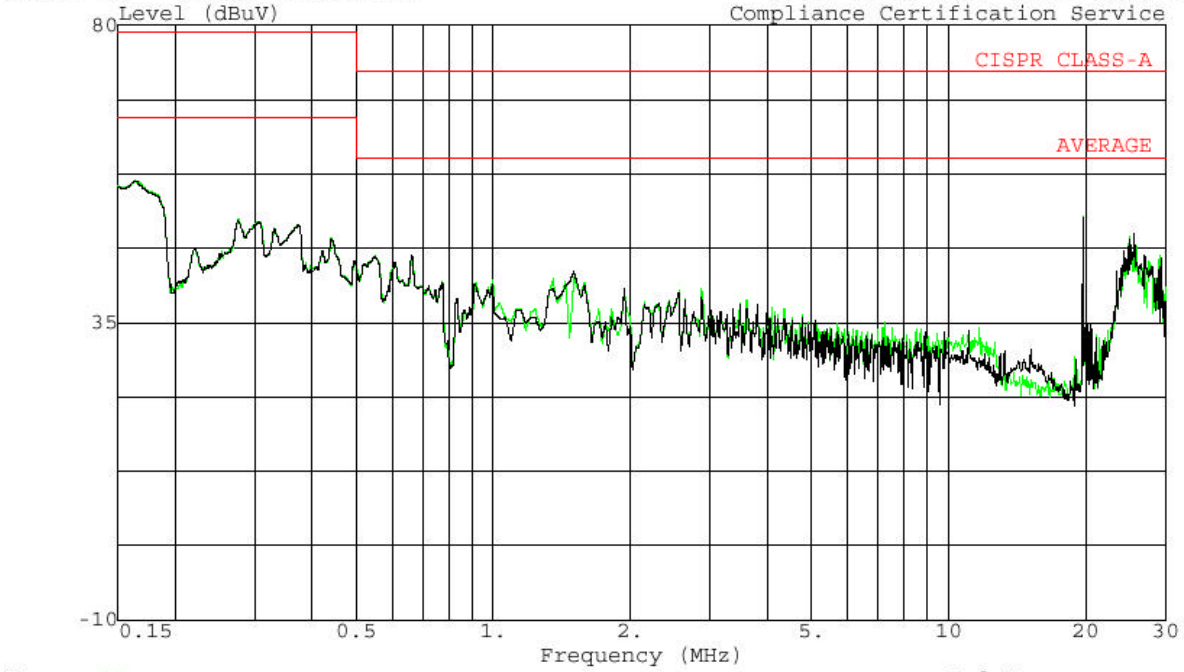
TEST PROCEDURE

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a continuous mode.

2. Line conducted data was recorded for both NEUTRAL and HOT lines.

MEASUREMENT L1 & L2 RESULTS

COMPLIANCE Engineering Service, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

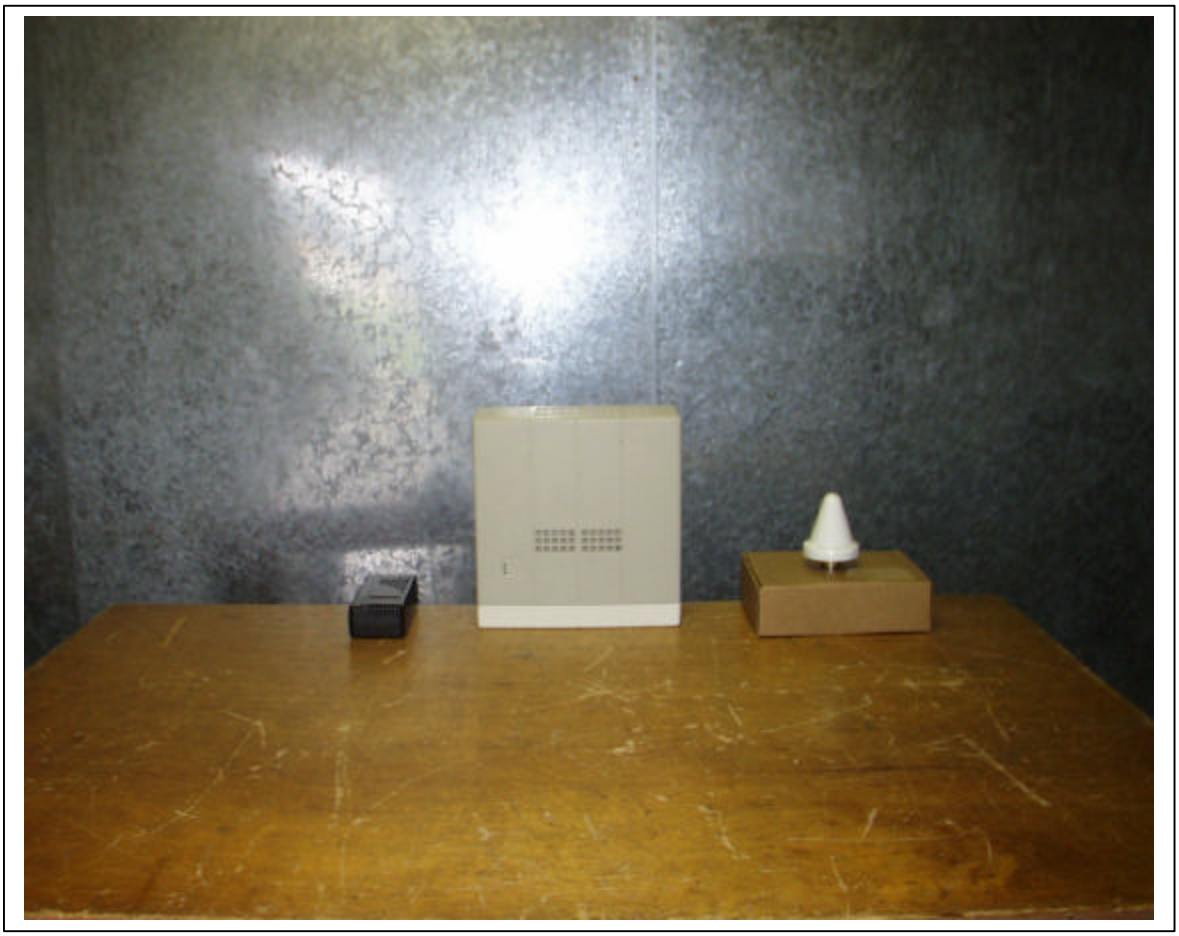


Trace: 34 Ref Trace:
Project # : 03U2203-1 _800MHz PICO_L1&L2
Test Engineer : VIEN TRAN
Company : INTERWAVE COMMUNICATION
EUT : CELLULAR BASESTATION
Model : WAVE 2000 PICO BS PLUS(800MHz PICO)
S/N : N/A
Configuration : EUT/AC ADAPTER/LAPTOP
Mode of Operation: TX (WORST CASE)
Target of Test : FCC CLASS A
Voltage : 115VAC/60Hz
: L1:Peak (Black), L2: Peak (Green)

CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	EN_A	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	56.42	--	--	0.00	79.00	66.00	-22.58	-9.58	L1
19.84	51.68	--	--	0.00	73.00	60.00	-21.32	-8.32	L1
24.60	48.52	--	--	0.00	73.00	60.00	-24.48	-11.48	L1
0.16	56.30	--	--	0.00	79.00	66.00	-22.70	-9.70	L2
19.84	52.22	--	--	0.00	73.00	60.00	-20.78	-7.78	L2
24.60	49.00	--	--	0.00	73.00	60.00	-24.00	-11.00	L2
6 Worst Data									

LINE CONDUCTION - FRONT



LINE CONDUCTION - BACK

9. APENDIX

9.1. EXTERNAL & INTERNAL PHOTOS

9.2. SCHEMATICS

9.3. BLOCK DIAGRAM

9.4. USER MANUAL

END OF REPORT