POWERWAVE TECHNOLOGIES TEST REPORT

FOR THE

SINGLE CHANNEL AMPLIFIER, NTGS86AB

FCC PART 22 AND PART 15 SUBPART B SECTION 15.109 CLASS B

COMPLIANCE

DATE OF ISSUE: OCTOBER 18, 2002

PREPARED FOR:

Powerwave Technologies
1801 E. St. Andrew Place
Santa Ana, CA 92705

P.O. No.: 60553
W.O. No.: 79685

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: October 8-9, 2002

Report No.: FC02-096

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

DATE OF TEST:	October 8-9, 2002
DATE OF RECEIPT:	October 8, 2002
PURPOSE OF TEST:	To demonstrate the compliance of the Single Channel Amplifier, NTGS86AB with the requirements for FCC Part 22 and Part 15 Subpart B Section 15.109 Class B devices.
TEST METHOD:	ANSI C63.4 (1992) and Part 22
FREQUENCY RANGE TESTED:	10 MHz - 10 GHz
MANUFACTURER:	Powerwave Technologies 1801 E. St. Andrew Place Santa Ana, CA 92705
REPRESENTATIVE:	Jeffrey Dale
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the Powerwave Technologies Single Channel Amplifier, NTGS86AB was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 22 and Part 15 Subpart B Section 15.109 Class B using:
- ANSI C63.4 (1992) method

Canada

- RSS-131 (see matrix below)

FCC	Canada	Description
1.1307 / 2.1093	RSS 131 (3.6) / RSS 102	RF Exposure Requirements
22.917 / 2.1049	RSS 131 (5.1)	Occupied Bandwidth
N/A	RSS 131 (5.1)	Passband Gain requirements
22.913 / 2.1046	RSS 131 (5.2)[1,2,3]	RF Power Output
Inter-modulation Test	RSS 131 (5.3)	Amplifier Non-Linearity
22.917	RSS 131 (5.4)	Field Strength of Spurious Radiation
N/A	RSS 131 (5.5)	Frequency Stability for Band Translators

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply. Conducted emissions not required for this device.

APPROVALS

QUALITY ASSURANCE:

Steve Behm, Director of Engineering Services

Joyce Walker, Quality Assurance Administrative Manager

Chuck Kendall, EMC/Lab Manager

TEST PERSONNEL:

Randy Clark, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The Single Channel RF Power Amplifier for use in cell phone base stations.tested by CKC Laboratories was a production unit.

EQUIPMENT UNDER TEST

Single Channel Amplifier
Manuf: Powerwave
Model: NTGS86AB
Serial: TBD
FCC ID: E675JS0061 (pending)

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Input Preamp
Manuf: MiniCircuits
Model: ZHL-10423-SMA
Serial: DO61698-4
FCC ID: DoC

ESG-D
Manuf: Agilent
Model: E4433B
Serial: US40051329
FCC ID: DoC

Power Sensor
Manuf: HP
Model: 8481A
Serial: US37298131
FCC ID: DoC

Power Meter
Manuf: HP
Model: E4418B
Serial: US39251692
FCC ID: DoC

Preamp DC Power Supply
Manuf: HP
Model: E3615A
Serial: KR83507998
FCC ID: NA

EUT DC Power Supply
Manuf: Agilent
Model: 6674A
Serial: US36371542
FCC ID: NA

TEMPERATURE AND HUMIDITY DURING TESTING
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

2.1033(c)(3) USER'S MANUAL
The necessary information is contained in a separate document.

2.1033 (c)(4) TYPE OF EMISSIONS
CDMA (F9W)

2.1033(c)(5) FREQUENCY RANGE
869-894 MHz

2.1033(c)(6) OPERATING POWER
0-25 Watts, output dependent on input signal level.

2.1033(c)(7) MAXIMUM POWER RATING
500 Watts ERP

2.1033(c)(8) DC VOLTAGES
The voltage into the output transistors is 26 VDC and the current is 3 A each (6 A total) at the maximum output power of 25 Watts.

2.1033(c)(9) TUNE-UP PROCEDURE
The necessary information is contained in a separate document.

2.1033(c)(10) SCHEMATICS AND CIRCUITRY DESCRIPTION
The necessary information is contained in a separate document.

2.1033(c)(11) LABEL AND PLACEMENT
The necessary information is contained in a separate document.

2.1033(c)(12) SUBMITTAL PHOTOS
The necessary information is contained in a separate document.

2.1033(c)(13) MODULATION INFORMATION
Not applicable because the unit is a power amplifier only.

2.1033(c)(14)/2.1046/22.913 - RF POWER OUTPUT

Test Conditions: EUT is a single-channel amplifier with an operating band of 868-894 MHz. The input to the amplifier is tuned such that the output is 25Watts. The output of the EUT is connected directly to a power meter through suitable attenuation.

Bandwidth Settings: Bandwidths used for spurious emissions test in accordance with 22.917(h)(2). 300 Hz within 60 kHz from the fundamental and 30 kHz for all other measurements. Higher measurement bandwidths were used to obtain spurious emissions plots, however proper bandwidths were used to gather tabular data.

22.913 RF Output Power

Channel Frequency (MHz)	RF Output Power (Watts)
869.675	25.00
881.500	25.00
893.225	25.00

Note: The output power is measured with a power meter. The input to the amplifier is tuned such that the output power is 25 Watts.

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
Attenuator, High power 3dB	Weinschel	50-3	21016	P01289	3/21/02	3/21/03
Attenuator, High power 6dB	Weinschel	50-6	58099	P01239	3/21/02	3/21/03
Attenuator	Bird	100-SA-MFN-30	9949	P01572	3/21/02	3/21/03
Directional Coupler	Werlatone	C2630	3805	00713	4/16/02	4/16/03
Power Meter	HP	435B	2342A08531	00174	5/29/02	5/29/03
Power Sensor	HP	7560	1551A01004	02036	5/29/02	5/29/03

Direct Connect

2.1033(c)(14)/2.1047(a) - MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE

Not applicable to this unit.

2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS – Modulation Limiting Response

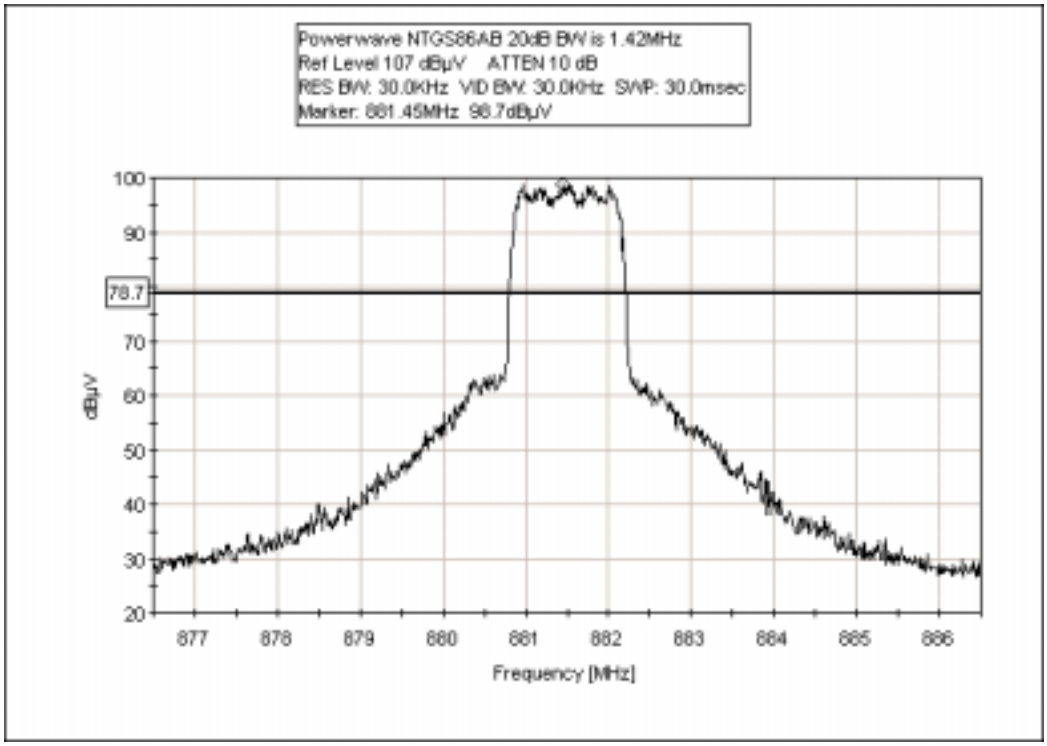
CDMA IS-95A only

2.1033(c)(14)/2.1049(i)/22.917- OCCUPIED BANDWIDTH

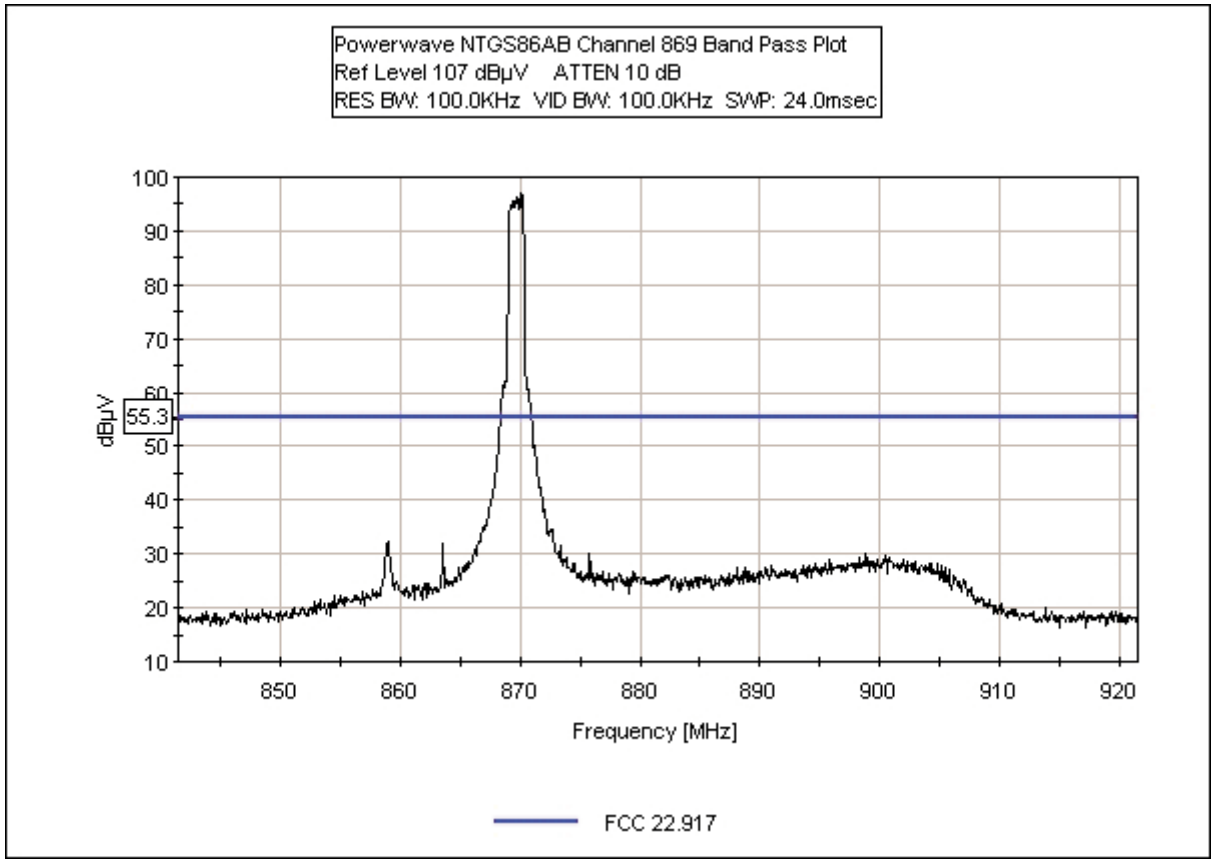
Test Conditions: EUT is a single-channel amplifier with an operating band of 868-894 MHz. The input to the amplifier is tuned such that the output is 25Watts. The output of the EUT is connected directly to a spectrum analyzer through suitable attenuation.

Bandwidth Settings: Measurement Bandwidths used for occupied bandwidth test were 1% of the 20dB bandwidth or 30 kHz.

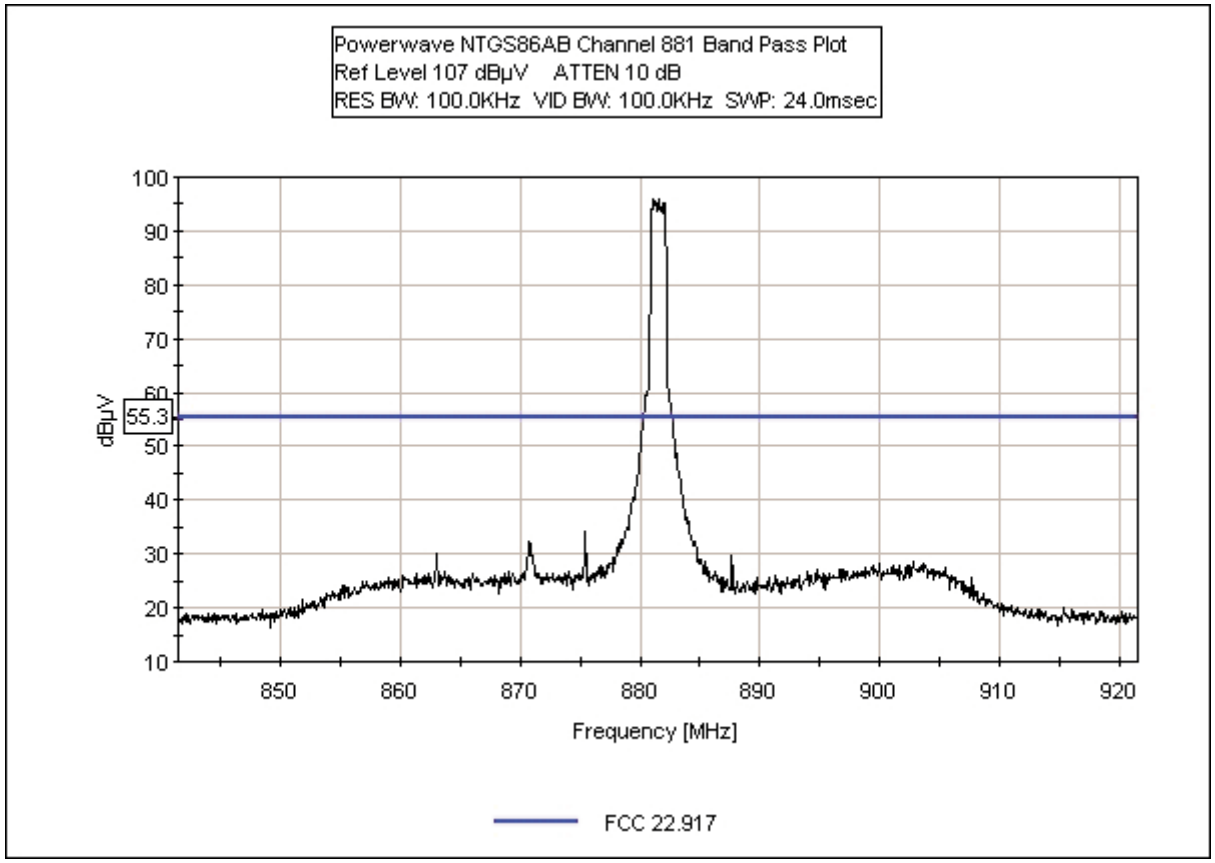
CHANNEL 881.5 MHz CDMA 20dB OCCUPIED BANDWIDTH



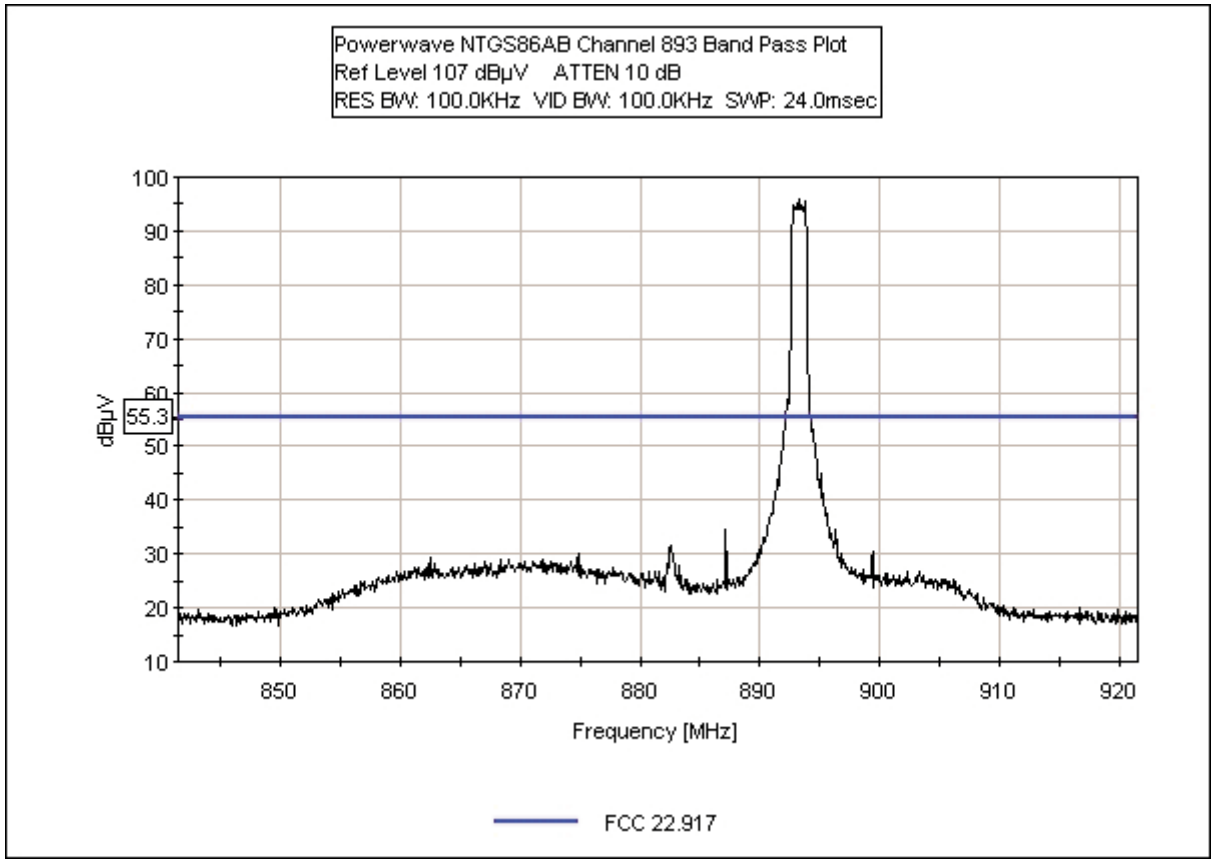
CHANNEL 869 BAND PASS PLOT



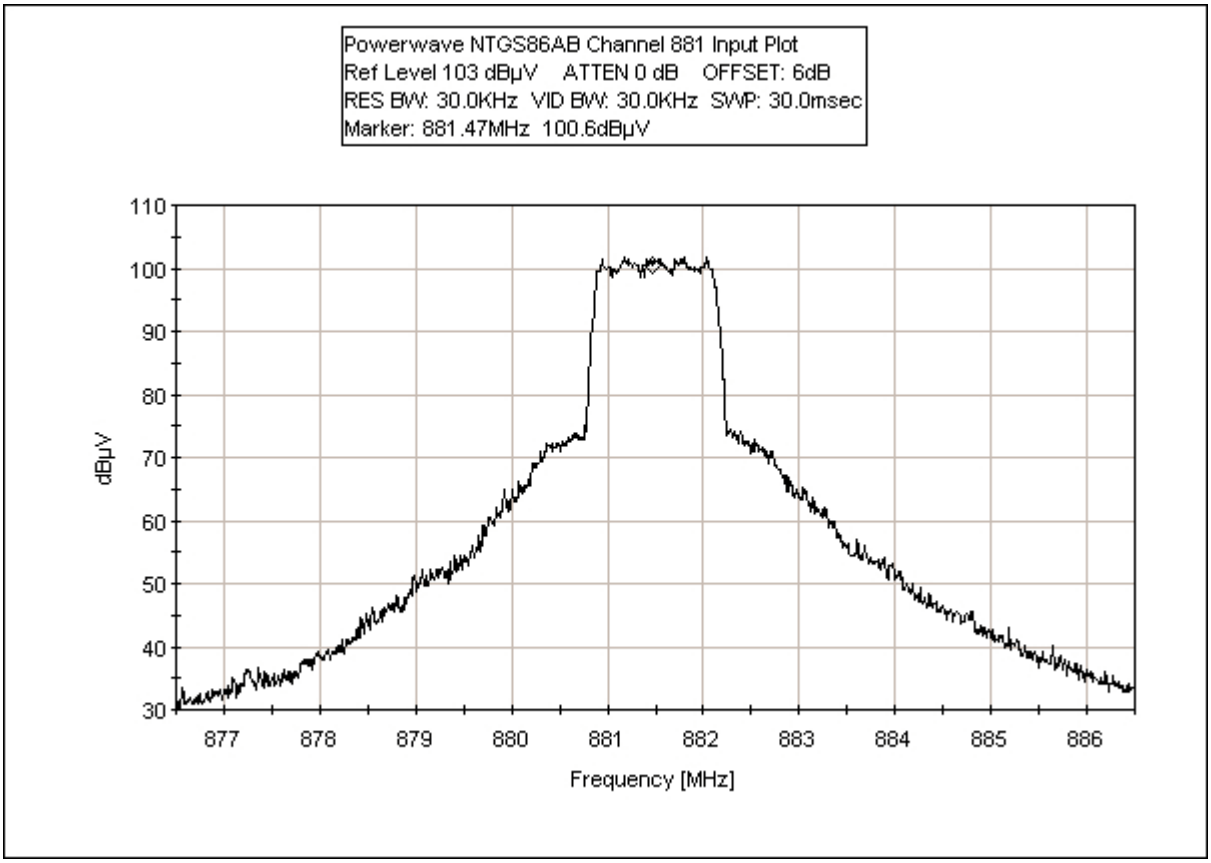
CHANNEL 881 BAND PASS PLOT



CHANNEL 893 BAND PASS PLOT



CHANNEL 881.5 MHz CDMA INPUT PLOT



Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
Attenuator, High power 3dB	Weinschel	50-3	21016	P01289	3/21/02	3/21/03
Attenuator, High power 6dB	Weinschel	50-6	58099	P01239	3/21/02	3/21/03
Directional Coupler	Narda	3002-30	436	P01906	7/17/02	7/17/03
Directional Coupler	Narda	3004-30	285	P01905	7/17/02	7/17/03
Directional Coupler	Narda	3003-30	886	P01904	7/17/02	7/17/03
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/03
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/03
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/03
Attenuator	Bird	100-SA-MFN-30	9949	P01572	3/21/02	3/21/03
Directional Coupler	Werlatone	C2630	3805	00713	4/16/02	4/16/03

Direct Connect

2.1033(c)(14)/2.1051/22.917 - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

Bandwidth Settings: Bandwidths used for spurious emissions test in accordance with 22.917(h)(2). 300 Hz within 60 kHz from the fundamental and 30 kHz for all other measurements. Higher measurement bandwidths were used to obtain spurious emissions plots, however proper bandwidths were used to gather tabular data.

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer:	**Powerwave**		
Specification:	**FCC 22.917**		
Work Order #:	**79685**	Date:	10/08/2002
Test Type:	**Antenna Conducted**	Time:	4:23:45 PM
Equipment:	**Single Channel Amplifier**	Sequence#:	2
Manufacturer:	Powerwave	Tested By:	Randal Clark
Model:	NTGS86AB		-48VDC
S/N:	TBD		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 881.5 MHz Frequency Range Investigated: 10-1000 MHz.

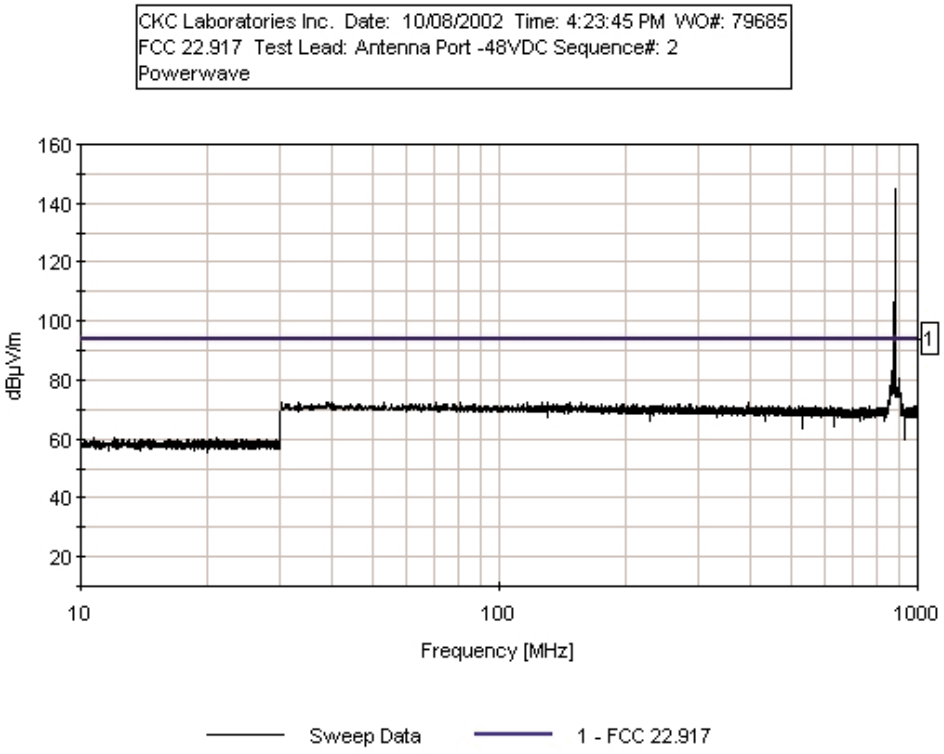
Transducer Legend:

T1=DC S/N 3805

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	881.500M	106.2	+38.7				+0.0	144.9	151.0 Fundamental	-6.1	Anten
2	870.640M	44.7	+38.7				+0.0	83.4	94.0	-10.6	Anten
3	902.572M	41.9	+38.7				+0.0	80.6	94.0	-13.4	Anten
4	392.863M	33.2	+39.5				+0.0	72.7	94.0	-21.3	Anten

5	39.610M	31.6	+40.9	+0.0	72.5	94.0	-21.5	Anten
6	116.987M	32.0	+40.4	+0.0	72.4	94.0	-21.6	Anten
7	130.500M	31.9	+40.4	+0.0	72.3	94.0	-21.7	Anten
8	265.836M	31.8	+39.9	+0.0	71.7	94.0	-22.3	Anten
9	520.890M	32.1	+39.2	+0.0	71.3	94.0	-22.7	Anten
10	616.186M	32.2	+38.9	+0.0	71.1	94.0	-22.9	Anten
11	976.917M	32.4	+38.7	+0.0	71.1	94.0	-22.9	Anten
12	762.800M	32.2	+38.7	+0.0	70.9	94.0	-23.1	Anten
13	991.776M	32.2	+38.7	+0.0	70.9	94.0	-23.1	Anten
14	632.302M	31.9	+38.9	+0.0	70.8	94.0	-23.2	Anten
15	10.771M	19.7	+41.0	+0.0	60.7	94.0	-33.3	Anten
16	21.139M	19.7	+41.0	+0.0	60.7	94.0	-33.3	Anten
17	10.040M	19.6	+41.0	+0.0	60.6	94.0	-33.4	Anten
18	11.982M	19.6	+41.0	+0.0	60.6	94.0	-33.4	Anten


CKC Laboratories Inc. Date: 10/08/2002 Time: 4:23:45 PM WO#: 79685
FCC 22.917 Test Lead: Antenna Port -48VDC Sequence#: 2
Powerwave
160
140
120
100
80
60
40
20
dBµV/m
1
10
100
1000
Frequency [MHz]
Sweep Data
1 - FCC 22.917

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Powerwave**
Specification: **FCC 22.917**
Work Order #: **79685** Date: 10/09/2002
Test Type: **Antenna Conducted** Time: 15:21:44
Equipment: **Single Channel Amplifier** Sequence#: 3
Manufacturer: Powerwave Tested By: Randal Clark
Model: NTGS86AB -48VDC
S/N: TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 881.5 MHz Frequency Range Investigated: 1-10 GHz.

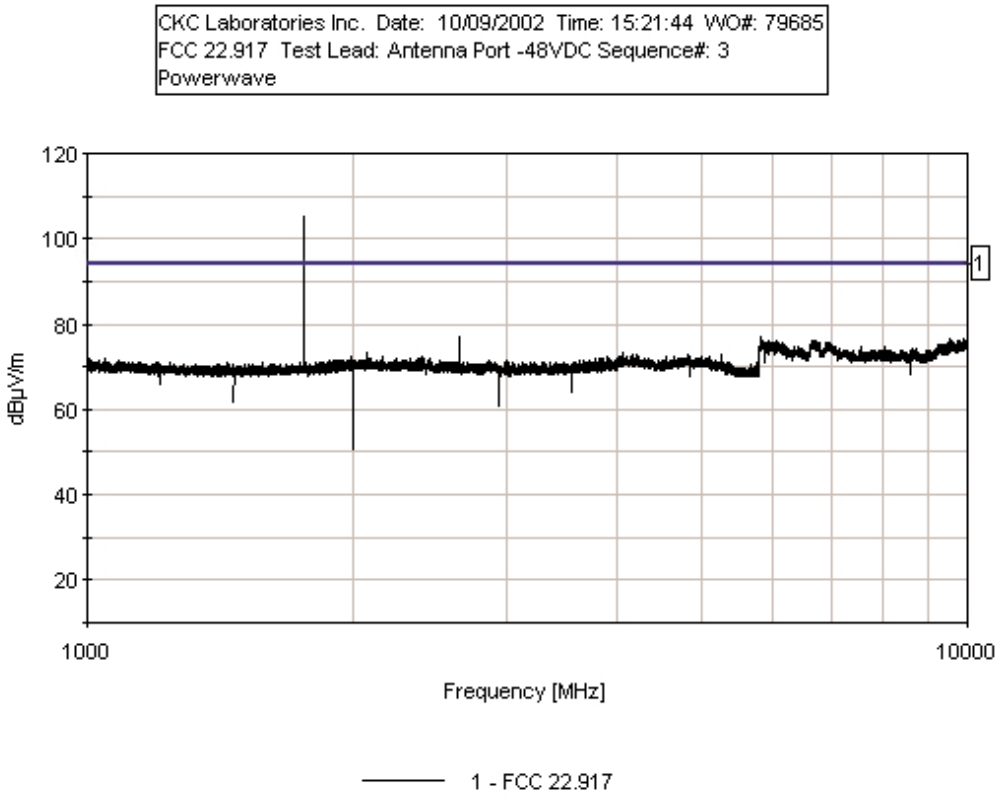
Transducer Legend:

T1=DC	Narda 1-2GHz	T2=DC	Narda 2-4GHz
T3=DC	Narda 4-10GHz		

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2645.425M	47.8	+0.0	+29.4	+0.0		+0.0	77.2	94.0	-16.8	Anten
2	5831.025M	47.6	+0.0	+0.0	+29.2		+0.0	76.8	94.0	-17.2	Anten
3	9549.142M	46.8	+0.0	+0.0	+29.8		+0.0	76.6	94.0	-17.4	Anten
4	1763.000M Ave	46.6	+29.6	+0.0	+0.0		+0.0	76.2	94.0	-17.8	Anten
^	1763.040M	68.8	+29.6	+0.0	+0.0		+0.0	98.4	94.0	+4.4	Anten
6	6652.218M	48.1	+0.0	+0.0	+28.0		+0.0	76.1	94.0	-17.9	Anten
7	5930.616M	46.5	+0.0	+0.0	+29.4		+0.0	75.9	94.0	-18.1	Anten
8	7577.736M	46.9	+0.0	+0.0	+28.0		+0.0	74.9	94.0	-19.1	Anten
9	8069.544M	46.3	+0.0	+0.0	+28.5		+0.0	74.8	94.0	-19.2	Anten
10	2076.986M	42.9	+0.0	+30.5	+0.0		+0.0	73.4	94.0	-20.6	Anten

11	5242.675M	43.3	+0.0	+0.0	+29.6	+0.0	72.9	94.0	-21.1	Anten
12	1990.906M	42.1	+30.4	+0.0	+0.0	+0.0	72.5	94.0	-21.5	Anten
13	3526.681M	42.0	+0.0	+30.4	+0.0	+0.0	72.4	94.0	-21.6	Anten
14	1046.741M	41.4	+30.6	+0.0	+0.0	+0.0	72.0	94.0	-22.0	Anten
15	2448.113M	42.2	+0.0	+29.7	+0.0	+0.0	71.9	94.0	-22.1	Anten
16	2996.358M	42.2	+0.0	+29.1	+0.0	+0.0	71.3	94.0	-22.7	Anten
17	5748.000M	42.0	+0.0	+0.0	+29.0	+0.0	71.0	94.0	-23.0	Anten
18	1439.774M	41.5	+29.4	+0.0	+0.0	+0.0	70.9	94.0	-23.1	Anten



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Powerwave**
Specification: **FCC 22.917**
Work Order #: **79685** Date: 10/09/2002
Test Type: **Antenna Conducted** Time: 8:36:53 AM
Equipment: **Single Channel Amplifier** Sequence#: 4
Manufacturer: Powerwave Tested By: Randal Clark
Model: NTGS86AB -48VDC
S/N: TBD

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 869.675 MHz Frequency Range Investigated: 10-1000 MHz.

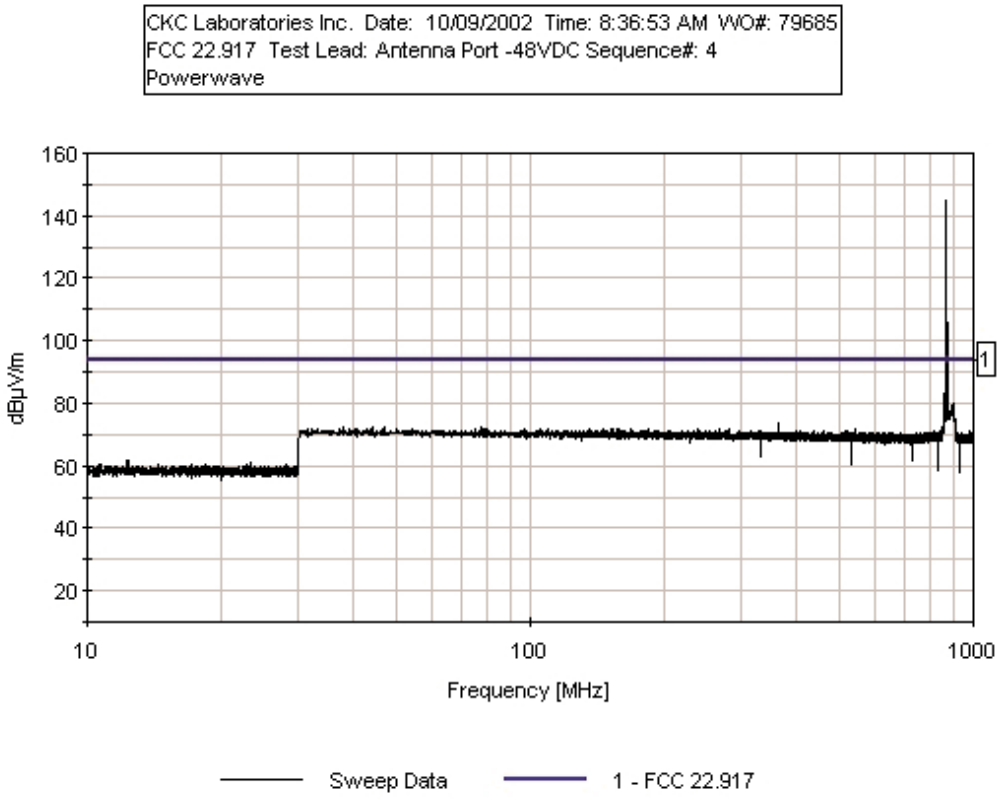
Transducer Legend:

T1=DC S/N 3805

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	869.539M	106.1	+38.7				+0.0	144.8	151.0 Fundamental	-6.2	Anten
2	858.928M	44.1	+38.7				+0.0	82.8	94.0	-11.2	Anten
3	864.434M	41.9	+38.7				+0.0	80.6	94.0	-13.4	Anten
4	902.672M	41.5	+38.7				+0.0	80.2	94.0	-13.8	Anten
5	863.533M	40.5	+38.7				+0.0	79.2	94.0	-14.8	Anten
6	363.233M	34.3	+39.6				+0.0	73.9	94.0	-20.1	Anten
7	37.708M	31.6	+40.9				+0.0	72.5	94.0	-21.5	Anten
8	268.138M	32.0	+39.9				+0.0	71.9	94.0	-22.1	Anten
9	185.355M	31.7	+40.1				+0.0	71.8	94.0	-22.2	Anten

10	539.009M	32.4	+39.1	+0.0	71.5	94.0	-22.5	Anten
11	977.332M	32.5	+38.7	+0.0	71.2	94.0	-22.8	Anten
12	437.407M	31.7	+39.4	+0.0	71.1	94.0	-22.9	Anten
13	813.300M	32.1	+38.8	+0.0	70.9	94.0	-23.1	Anten
14	653.022M	31.7	+38.8	+0.0	70.5	94.0	-23.5	Anten
15	12.332M	20.7	+41.0	+0.0	61.7	94.0	-32.3	Anten
16	23.467M	20.0	+41.0	+0.0	61.0	94.0	-33.0	Anten



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Powerwave**
Specification: **FCC 22.917**
Work Order #: **79685** Date: 10/09/2002
Test Type: **Antenna Conducted** Time: 15:23:57
Equipment: **Single Channel Amplifier** Sequence#: 5
Manufacturer: Powerwave Tested By: Randal Clark
Model: NTGS86AB -48VDC
S/N: TBD

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 869.675 MHz Frequency Range Investigated: 1-10 GHz.

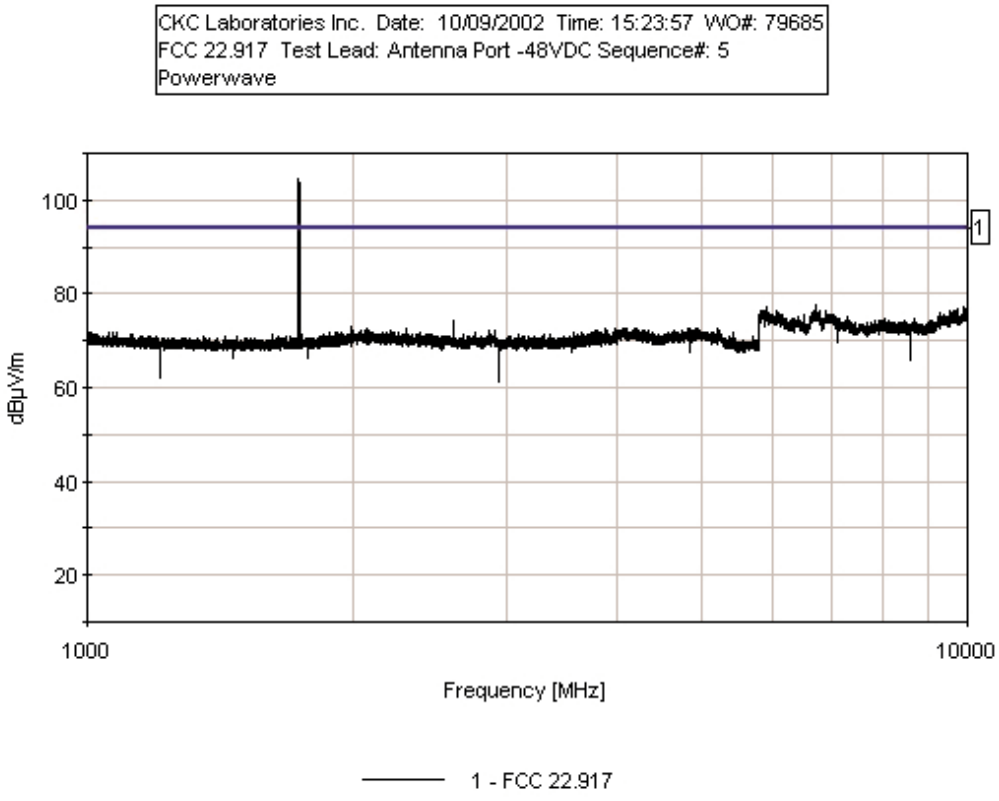
Transducer Legend:

T1=DC	Narda 1-2GHz	T2=DC	Narda 2-4GHz
T3=DC	Narda 4-10GHz		

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	6737.916M	49.3	+0.0	+0.0	+28.2		+0.0	77.5	94.0	-16.5	Anten
2	9893.509M	46.9	+0.0	+0.0	+30.3		+0.0	77.2	94.0	-16.8	Anten
3	5907.018M	47.8	+0.0	+0.0	+29.3		+0.0	77.1	94.0	-16.9	Anten
4	1739.430M Ave	47.2	+29.6	+0.0	+0.0		+0.0	76.8	94.0	-17.2	Anten
^	1739.425M	74.8	+29.6	+0.0	+0.0		+0.0	104.4	94.0	+10.4	Anten
6	5840.250M	47.2	+0.0	+0.0	+29.2		+0.0	76.4	94.0	-17.6	Anten
7	9322.330M	46.7	+0.0	+0.0	+29.2		+0.0	75.9	94.0	-18.1	Anten
8	7294.984M	46.9	+0.0	+0.0	+28.2		+0.0	75.1	94.0	-18.9	Anten

9	2609.550M	44.6	+0.0	+29.5	+0.0	+0.0	74.1	94.0	-19.9	Anten
10	1990.906M	42.5	+30.4	+0.0	+0.0	+0.0	72.9	94.0	-21.1	Anten
11	4947.475M	42.0	+0.0	+0.0	+30.6	+0.0	72.6	94.0	-21.4	Anten
12	3870.054M	42.1	+0.0	+30.4	+0.0	+0.0	72.5	94.0	-21.5	Anten
13	2863.238M	42.9	+0.0	+29.2	+0.0	+0.0	72.1	94.0	-21.9	Anten
14	2900.137M	43.0	+0.0	+29.1	+0.0	+0.0	72.1	94.0	-21.9	Anten
15	5405.650M	43.0	+0.0	+0.0	+28.9	+0.0	71.9	94.0	-22.1	Anten
16	3096.339M	42.2	+0.0	+29.2	+0.0	+0.0	71.4	94.0	-22.6	Anten
17	1436.444M	41.6	+29.4	+0.0	+0.0	+0.0	71.0	94.0	-23.0	Anten



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Powerwave**
Specification: **FCC 22.917**
Work Order #: **79685** Date: 10/09/2002
Test Type: **Antenna Conducted** Time: 15:29:50
Equipment: **Single Channel Amplifier** Sequence#: 6
Manufacturer: Powerwave Tested By: Randal Clark
Model: NTGS86AB -48VDC
S/N: TBD

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 893.225 MHz Frequency Range Investigated: 1-10 GHz.

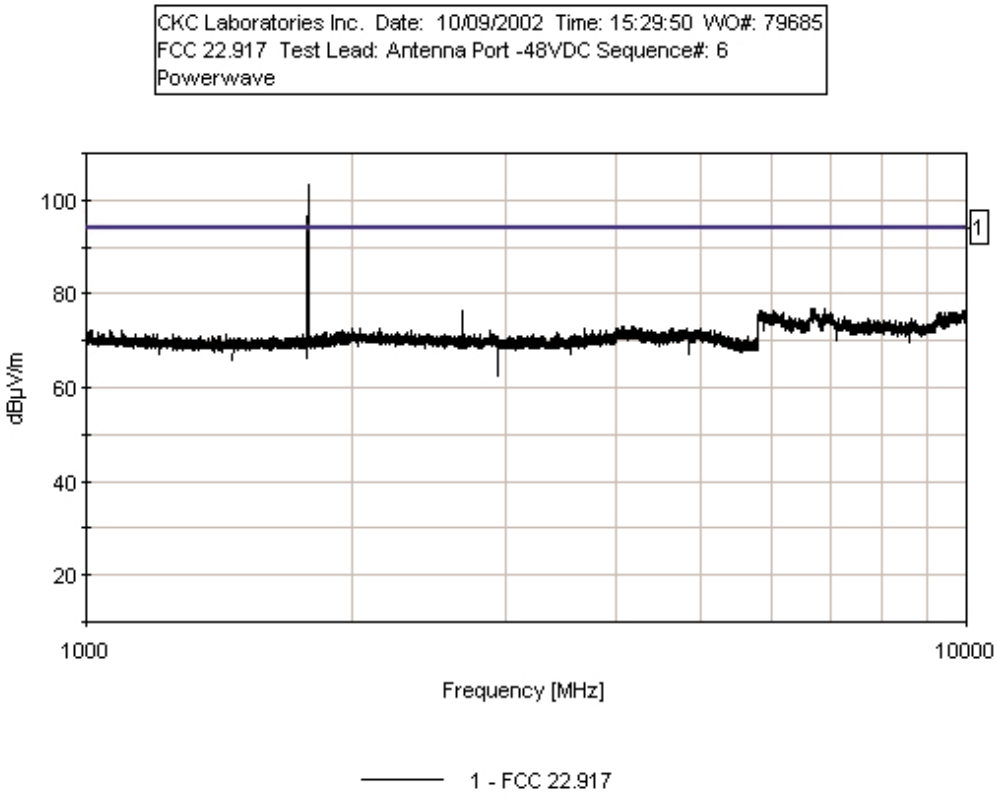
Transducer Legend:

T1=DC	Narda 1-2GHz	T2=DC	Narda 2-4GHz
T3=DC	Narda 4-10GHz		

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	6693.204M	48.9	+0.0	+0.0	+28.1		+0.0	77.0	94.0	-17.0	Anten
2	6903.102M	48.1	+0.0	+0.0	+28.5		+0.0	76.6	94.0	-17.4	Anten
3	2679.762M	47.1	+0.0	+29.4	+0.0		+0.0	76.5	94.0	-17.5	Anten
4	9994.468M	45.9	+0.0	+0.0	+30.5		+0.0	76.4	94.0	-17.6	Anten
5	5823.850M	47.1	+0.0	+0.0	+29.2		+0.0	76.3	94.0	-17.7	Anten
6	6046.122M	46.9	+0.0	+0.0	+29.3		+0.0	76.2	94.0	-17.8	Anten
7	9365.203M	46.8	+0.0	+0.0	+29.3		+0.0	76.1	94.0	-17.9	Anten
8	9441.268M	46.3	+0.0	+0.0	+29.5		+0.0	75.8	94.0	-18.2	Anten

9	1786.430M Ave	45.7	+29.7	+0.0	+0.0	+0.0	75.4	94.0	-18.6	Anten
^	1786.430M	73.5	+29.7	+0.0	+0.0	+0.0	103.2	94.0	+9.2	Anten
11	7257.384M	46.7	+0.0	+0.0	+28.3	+0.0	75.0	94.0	-19.0	Anten
12	3685.115M	42.7	+0.0	+30.1	+0.0	+0.0	72.8	94.0	-21.2	Anten
13	4976.175M	41.7	+0.0	+0.0	+30.7	+0.0	72.4	94.0	-21.6	Anten
14	3420.501M	42.1	+0.0	+29.5	+0.0	+0.0	71.6	94.0	-22.4	Anten
15	1253.261M	41.5	+29.8	+0.0	+0.0	+0.0	71.3	94.0	-22.7	Anten
16	1758.018M	41.6	+29.6	+0.0	+0.0	+0.0	71.2	94.0	-22.8	Anten
17	5640.375M	42.1	+0.0	+0.0	+28.8	+0.0	70.9	94.0	-23.1	Anten



Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer: **Powerwave**
Specification: **FCC 22.917**
Work Order #: **79685** Date: 10/09/2002
Test Type: **Antenna Conducted** Time: 9:38:02 AM
Equipment: **Single Channel Amplifier** Sequence#: 7
Manufacturer: Powerwave Tested By: Randal Clark
Model: NTGS86AB -48VDC
S/N: TBD

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Signal input is tuned such that the output of the amplifier is 25.0 Watts. EUT is operating on center channel 893.225 MHz Frequency Range Investigated: 10-1000 MHz.

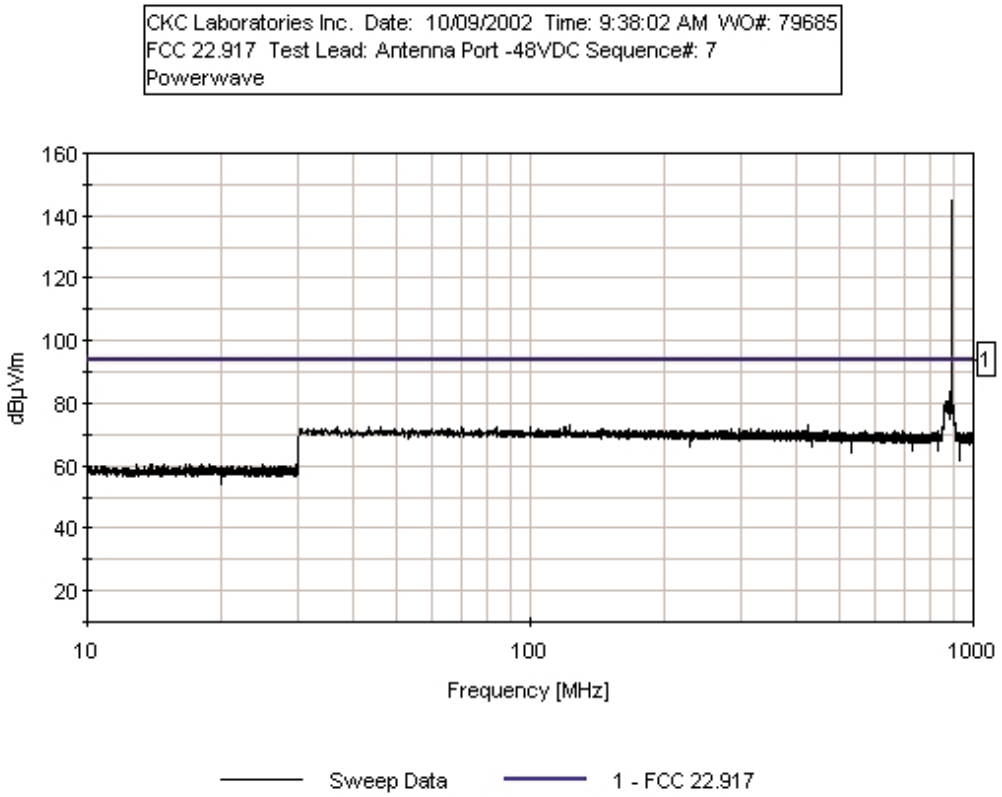
Transducer Legend:

T1=DC S/N 3805

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	893.563M	106.1	+38.7				+0.0	144.8	151.0 Fundamental	-6.2	Anten
2	882.452M	45.2	+38.7				+0.0	83.9	94.0	-10.1	Anten
3	888.958M	44.3	+38.7				+0.0	83.0	94.0	-11.0	Anten
4	870.440M	42.2	+38.7				+0.0	80.9	94.0	-13.1	Anten
5	886.956M	41.4	+38.7				+0.0	80.1	94.0	-13.9	Anten
6	122.993M	32.7	+40.4				+0.0	73.1	94.0	-20.9	Anten
7	421.992M	33.4	+39.4				+0.0	72.8	94.0	-21.2	Anten
8	315.085M	32.2	+39.7				+0.0	71.9	94.0	-22.1	Anten

9	144.114M	31.5	+40.3	+0.0	71.8	94.0	-22.2	Anten
10	667.237M	32.6	+38.7	+0.0	71.3	94.0	-22.7	Anten
11	460.030M	31.8	+39.3	+0.0	71.1	94.0	-22.9	Anten
12	567.237M	31.9	+39.1	+0.0	71.0	94.0	-23.0	Anten
13	663.833M	32.2	+38.7	+0.0	70.9	94.0	-23.1	Anten
14	969.592M	31.9	+38.7	+0.0	70.6	94.0	-23.4	Anten
15	822.700M	31.7	+38.8	+0.0	70.5	94.0	-23.5	Anten
16	17.037M	19.4	+41.0	+0.0	60.4	94.0	-33.6	Anten
17	12.893M	19.3	+41.0	+0.0	60.3	94.0	-33.7	Anten
18	14.064M	19.3	+41.0	+0.0	60.3	94.0	-33.7	Anten
19	29.461M	19.4	+40.9	+0.0	60.3	94.0	-33.7	Anten
20	13.834M	19.2	+41.0	+0.0	60.2	94.0	-33.8	Anten
21	14.835M	19.2	+41.0	+0.0	60.2	94.0	-33.8	Anten
22	18.098M	19.2	+41.0	+0.0	60.2	94.0	-33.8	Anten



Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
Attenuator, High power 3dB	Weinschel	50-3	21016	P01289	3/21/02	3/21/03
Attenuator, High power 6dB	Weinschel	50-6	58099	P01239	3/21/02	3/21/03
Directional Coupler	Narda	3002-30	436	P01906	7/17/02	7/17/03
Directional Coupler	Narda	3004-30	285	P01905	7/17/02	7/17/03
Directional Coupler	Narda	3003-30	886	P01904	7/17/02	7/17/03
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/03
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/03
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/03
Attenuator	Bird	100-SA-MFN-30	9949	P01572	3/21/02	3/21/03
Directional Coupler	Werlatone	C2630	3805	00713	4/16/02	4/16/03

Direct Connect

2.1033(c)(14)/2.1053/22.917 - FIELD STRENGTH OF SPURIOUS RADIATION

Bandwidth Settings: Bandwidths used for spurious emissions test in accordance with 22.917(h)(2). 300 Hz within 60 kHz from the fundamental and 30 kHz for all other measurements. Higher measurement bandwidths were used to obtain spurious emissions plots, however proper bandwidths were used to gather tabular data.

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer:	**Powerwave**		
Specification:	**FCC 22.917**		
Work Order #:	**79685**	Date:	10/09/2002
Test Type:	**Maximized Emissions**	Time:	15:14:52
Equipment:	**Single Channel Amplifier**	Sequence#:	9
Manufacturer:	Powerwave	Tested By:	Randal Clark
Model:	NTGS86AB		
S/N:	TBD		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542
Attenuator	Narda	766-20	N/A
Directional Coupler	HP	778D	90757A
Attenuator	Narda	769-20	03342

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. Input is tuned such that the output of the amplifier is 25 Watts. EUT is operating in the middle of the band on channel 881.5 MHz. Frequency Range Investigated: 10 MHz - 10 GHz. **No out of band emission found within 20dB of the limit.**

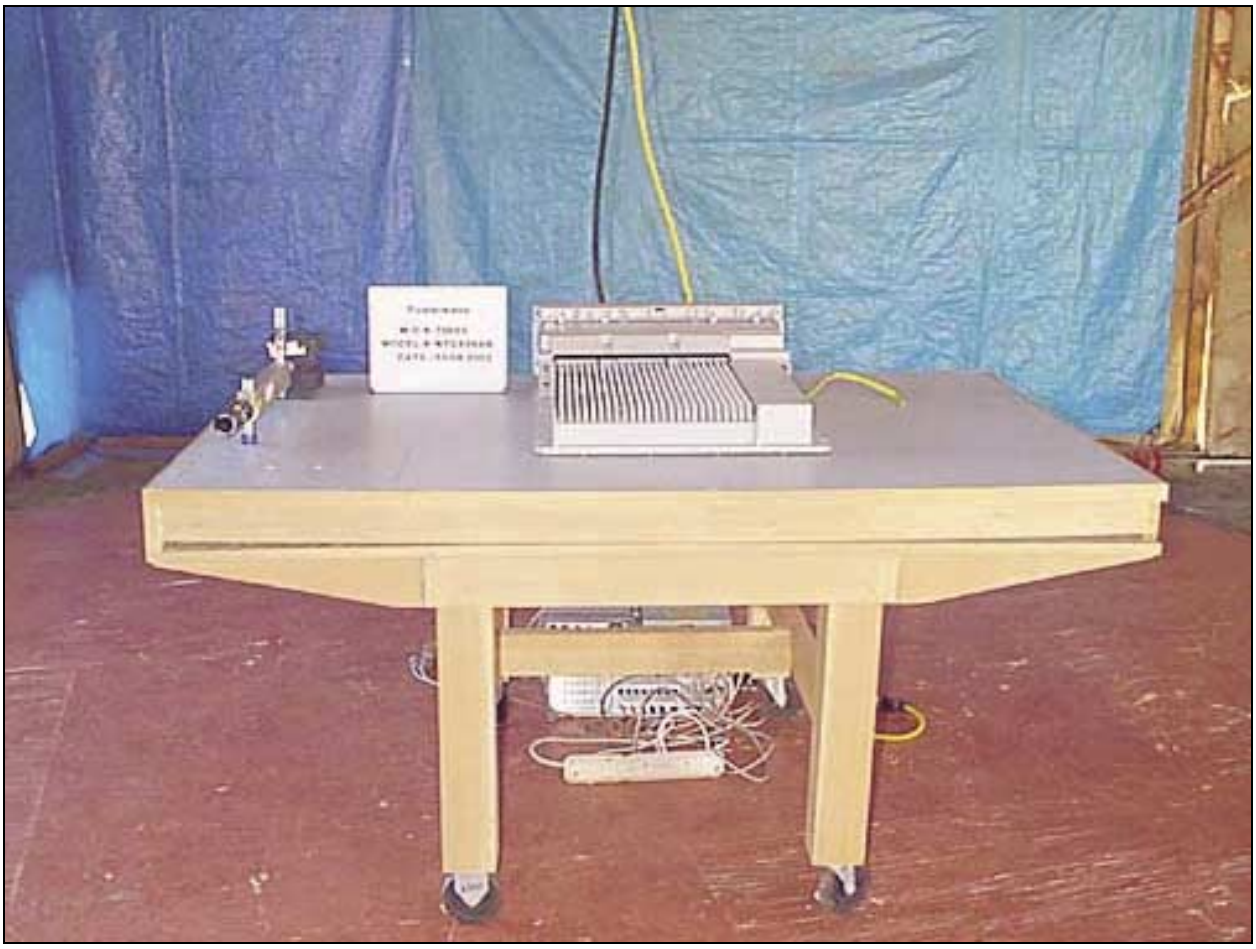
Transducer Legend:

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

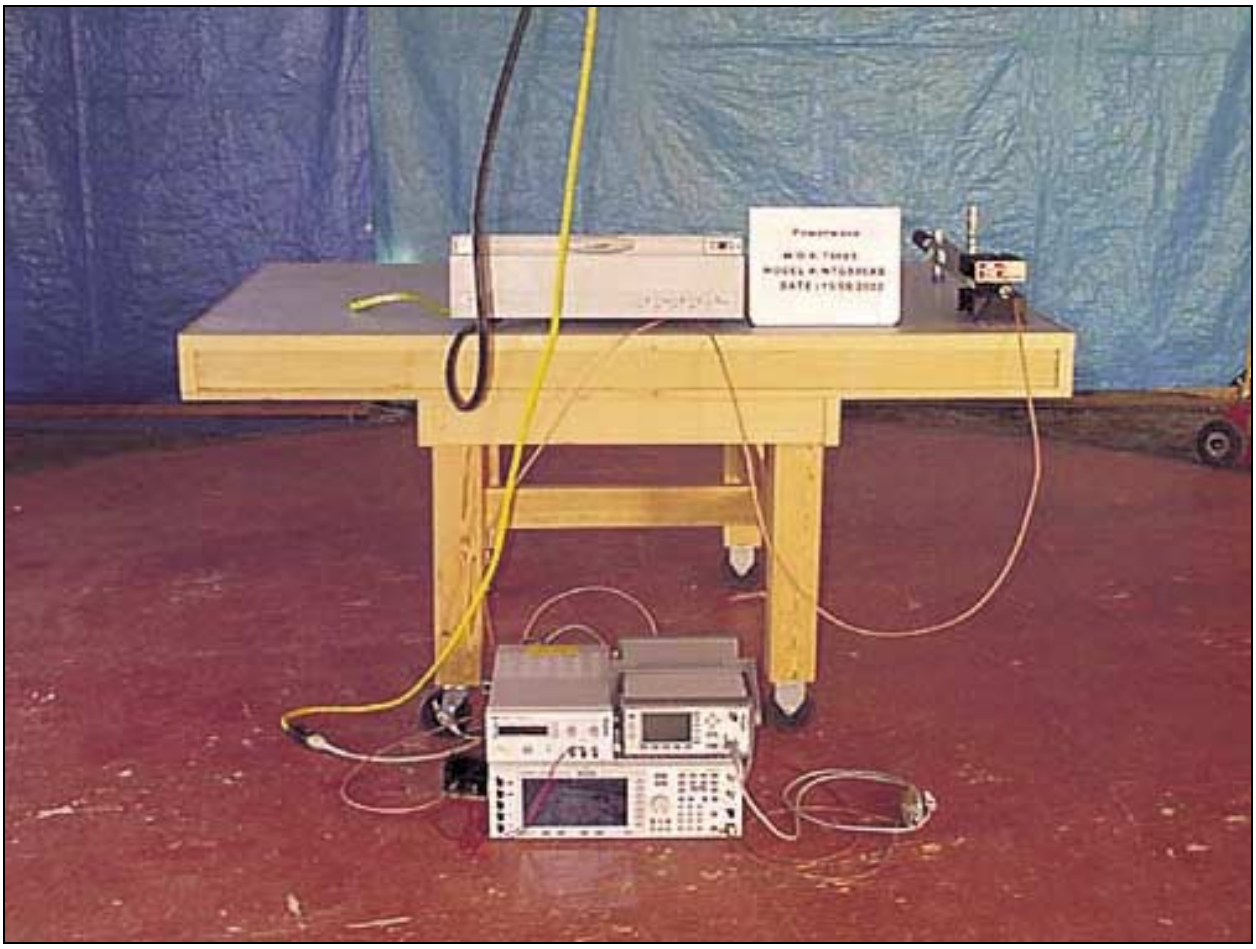
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant

Test Equipment

Description	*Manufacturer*	*Model #*	*Serial #*	*Asset #*	*Cal Date*	*Cal Due*
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/06/01	12/6/02
Antenna, Log Periodic	A&H	SAS-200/510	154	01330	6/19/02	6/19/03
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/03
Preamp	HP	8449B	3008A00301	02010	10/19/01	10/19/02
Preamp	HP	8447D	1937A02604	00099	3/21/02	3/21/03
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/03
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/03
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/03
Antenna, Horn 1-18GHz	EMCO	3115	9307-4085	00656	3/19/02	3/19/2003
Cable #1 (30')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03
Cable #2 (2')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03
Cable #4 (50')	Andrew	FSJ1-50A	N/A	N/A	4/16/02	4/16/03



Radiated Emissions - Front View



Radiated Emissions - Back View

2.1033(c)(14)/2.1055/- FREQUENCY STABILITY

Not applicable to this unit.

15.109 – RADIATED EMISSIONS – RECEIVER/DIGITAL

Bandwidth Settings: Bandwidths used for spurious emissions test in accordance with 22.917(h)(2). 300 Hz within 60 kHz from the fundamental and 30 kHz for all other measurements. Higher measurement bandwidths were used to obtain spurious emissions plots, however proper bandwidths were used to gather tabular data.

Test Location: CKC Laboratories Inc. •5473A Clouds Rest • Mariposa CA 95338 • 1 800 500 4EMC (4362)

Customer:	**Powerwave**		
Specification:	**15.109 CLASS B**		
Work Order #:	**79685**	Date:	10/09/2002
Test Type:	**Maximized Emissions**	Time:	11:21:44
Equipment:	**Single Channel Amplifier**	Sequence#:	8
Manufacturer:	Powerwave	Tested By:	Randal Clark
Model:	NTGS86AB		
S/N:	TBD		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Single Channel Amplifier*	Powerwave	NTGS86AB	TBD

Support Devices:

Function	Manufacturer	Model #	S/N
Input Preamp	MiniCircuits	ZHL-10423-SMA	DO61698-4
ESG-D	Agilent	E4433B	US40051329
Power Sensor	HP	8481A	US37298131
Power Meter	HP	E4418B	US39251692
Preamp DC Power Supply	HP	E3615A	KR83507998
EUT DC Power Supply	Agilent	6674A	US36371542

Test Conditions / Notes:

EUT is a single channel CDMA amplifier with an operating band of 869-898 MHz. EUT is operating with the input port terminated. Frequency Range Investigated: 30-1000 MHz.

Transducer Legend:

T1=Amp - S/N 604	T2=Bicon 156
T3=Cable - 10 Meter	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

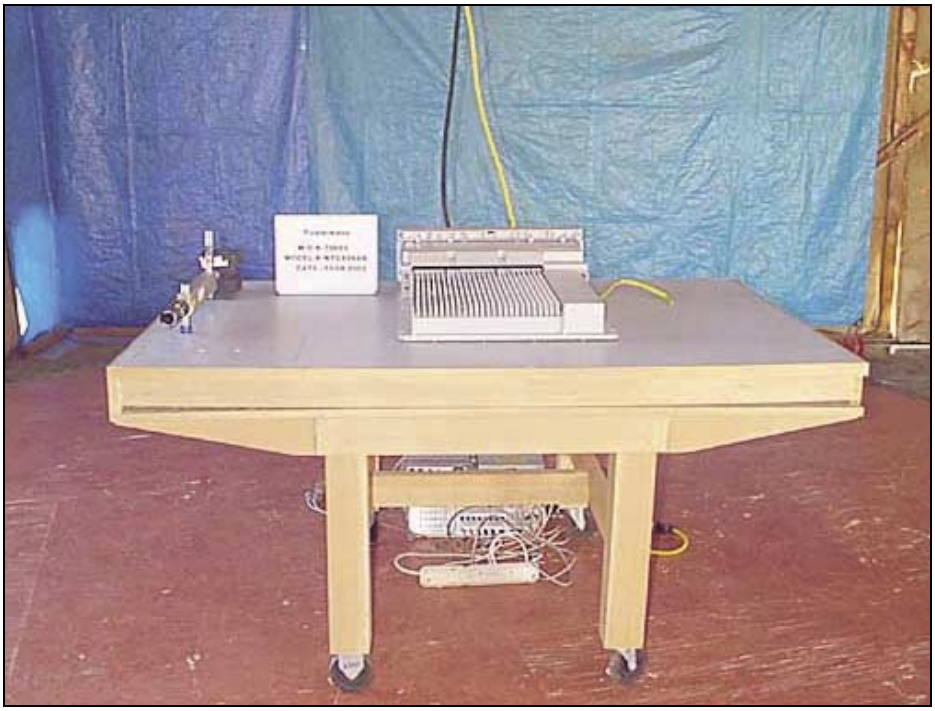
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	35.842M	44.9	-26.8	+11.0	+1.2		+0.0	30.3	40.0	-9.7	Vert

2	32.324M	44.4	-26.9	+11.4	+1.1	+0.0	30.0	40.0	-10.0	Vert
3	32.786M	43.8	-26.9	+11.3	+1.1	+0.0	29.3	40.0	-10.7	Vert
4	210.142M	38.0	-26.3	+17.5	+3.0	+0.0	32.2	43.5	-11.3	Vert
5	33.274M	43.2	-26.9	+11.2	+1.1	+0.0	28.6	40.0	-11.4	Vert
6	33.030M	42.7	-26.9	+11.3	+1.1	+0.0	28.2	40.0	-11.8	Vert
7	165.125M	41.4	-26.4	+14.2	+2.5	+0.0	31.7	43.5	-11.8	Horiz
8	180.112M	38.8	-26.4	+16.4	+2.7	+0.0	31.5	43.5	-12.0	Vert
9	34.911M	42.5	-26.8	+11.0	+1.2	+0.0	27.9	40.0	-12.1	Vert
10	150.156M	41.7	-26.5	+13.0	+2.4	+0.0	30.6	43.5	-12.9	Vert
11	164.877M	40.0	-26.4	+14.2	+2.5	+0.0	30.3	43.5	-13.2	Horiz
12	165.146M	39.6	-26.4	+14.2	+2.5	+0.0	29.9	43.5	-13.6	Vert
13	31.310M	40.6	-26.9	+11.5	+1.1	+0.0	26.3	40.0	-13.7	Vert
14	33.730M	40.3	-26.9	+11.2	+1.1	+0.0	25.7	40.0	-14.3	Vert
15	35.451M	40.1	-26.8	+11.0	+1.2	+0.0	25.5	40.0	-14.5	Vert
16	195.171M	32.9	-26.3	+17.6	+2.8	+0.0	27.0	43.5	-16.5	Vert
17	164.835M	35.9	-26.4	+14.2	+2.5	+0.0	26.2	43.5	-17.3	Vert
18	135.163M	36.6	-26.6	+13.6	+2.3	+0.0	25.9	43.5	-17.6	Vert
19	120.110M	33.8	-26.6	+14.2	+2.2	+0.0	23.6	43.5	-19.9	Vert
20	240.110M	32.8	-26.1	+16.1	+3.2	+0.0	26.0	46.0	-20.0	Vert
21	150.145M	34.6	-26.5	+13.0	+2.4	+0.0	23.5	43.5	-20.0	Horiz
22	135.152M	33.4	-26.6	+13.6	+2.3	+0.0	22.7	43.5	-20.8	Horiz
23	240.098M	31.9	-26.1	+16.1	+3.2	+0.0	25.1	46.0	-20.9	Vert
24	60.073M	34.4	-26.8	+10.0	+1.5	+0.0	19.1	40.0	-20.9	Horiz
25	225.250M	31.0	-26.2	+16.8	+3.1	+0.0	24.7	46.0	-21.3	Vert
26	118.800M	32.4	-26.6	+14.1	+2.2	+0.0	22.1	43.5	-21.4	Vert

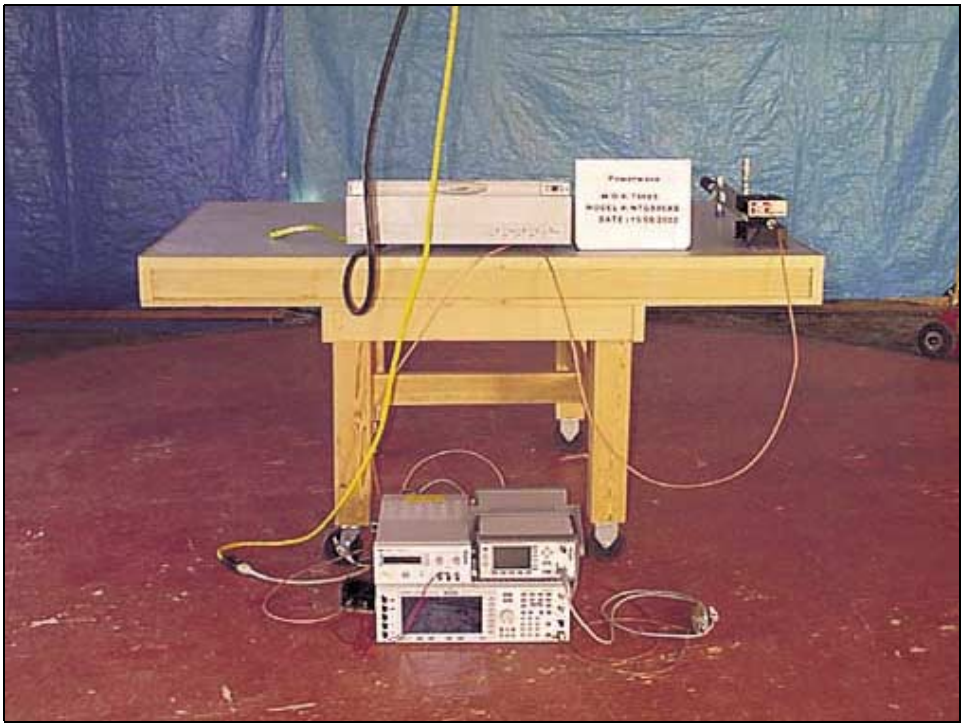
27	122.740M	31.6	-26.6	+14.3	+2.2	+0.0	21.5	43.5	-22.0	Vert
28	121.990M	31.5	-26.6	+14.3	+2.2	+0.0	21.4	43.5	-22.1	Vert
29	117.460M	31.7	-26.6	+14.0	+2.1	+0.0	21.2	43.5	-22.3	Vert
30	30.090M	29.5	-26.9	+11.7	+1.1	+0.0	15.4	40.0	-24.6	Horiz
31	44.956M	29.9	-26.8	+10.9	+1.3	+0.0	15.3	40.0	-24.7	Horiz
32	45.205M	29.7	-26.8	+10.9	+1.3	+0.0	15.1	40.0	-24.9	Horiz

Test Equipment

Description	***Manufacturer***	***Model #***	***Serial #***	***Asset #***	***Cal Date***	***Cal Due***
Antenna, Bicon	A&H	SAS-200/542	156	00225	12/06/01	12/6/2002
Antenna, Log Periodic	A&H	SAS-200/510	154	01330	6/19/02	6/19/2003
Preamp	HP	8447D	1937A02604	00099	3/21/02	3/21/2003
QP Adapter	HP	85650A	2811A01267	00478	1/30/02	1/30/2003
S/A Display	HP	8566B	2403A08241	00489	1/30/02	1/30/2003
Spectrum Analyzer	HP	8566B	2209A01404	00490	1/30/02	1/30/2003



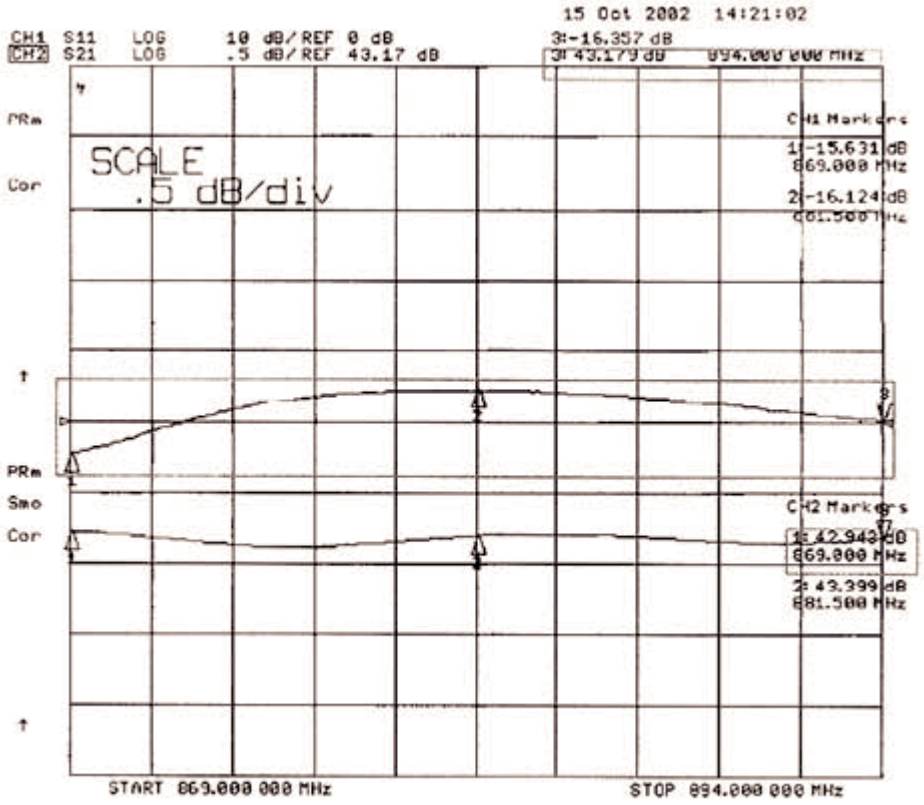
Radiated Emissions - Front View



Radiated Emissions - Back View

APPENDIX A

CUSTOMER DATA



Gain Flattness Plotted over the Passband

Test Equipment

Description	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Network Analyzer	8753ES	S/N 017790	5/31/02	5/31/03
Signal Generator	E4433B	013974	6/25/02	6/25/03
Power Meter	E4419B	016573	10/30/01	10/30/02
Power Sensor	8481A	3318A91002	6/2/02	6/2/03
DC Power Supply	6674A	004093	10/31/01	10/31/02