



REVISION:

Samsung Telecommunications America Inc.
11250 Westpark Blvd
Dallas, TX 75243
214-343-2000

Customer Order: T-1000
(0111)

Model: T-1000 Version: Hardware

PCC ID:

01111111

In Accordance With:

Section 24, Subpart F
of the FCC Base Station

Tested By:

KTL Dallas Inc.
602 N. Kealy
Louisville, TX 75057-3136
USA

Authorized By:

W. Waterhouse
W. Waterhouse, RF Engineering Lab Manager

10th November 1998

test report

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Table of Contents

Section 1. Summary of Test Results

General
Summary of Test Data

Section 2. General Equipment Specification

Specifications
Description of Modifications for Class II Permissive Change
Modifications Made During Testing
Theory of Operation
System Diagram

Section 3. RF Power Output

Test Results
Measurement Data
Power Over Bandwidth Graphs

Section 4. Occupied Bandwidth

Occupied Bandwidth (CDMA)
Test Results
CDMA Input and Output Graphs
Occupied Bandwidth (GSM)
Test Results
GSM Input and Output Graphs
Occupied Bandwidth (NADC)
Test Results
NADC Input and Output Graphs

Section 5. Spurious Emissions at Antenna Terminals

Test Results
Test Data
Graphs

Section 6. Field Strength of Spurious

Test Results
Test Data
Test Data - Radiated Emissions - Uplink
Test Data - Radiated Emissions - Downlink
Photographs of Test Setup
Pre-Scan Data

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Table of Contents, continued

Section 7. Frequency Stability

Test Results
Measurement Data
Graphs

Section 8. Test Equipment List

Annex A - Test Methodologies

RF Power Output
Occupied Bandwidth (CDMA)
Occupied Bandwidth (GSM)
Occupied Bandwidth (NADC)
Spurious Emission at Antenna Terminals
Field Strength of Spurious
Frequency Stability

Annex B - Test Diagrams

R.F. Power Output
Occupied Bandwidth
Spurious Emissions at Antenna Terminals
Field Strength of Spurious
Frequency Stability

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 1. Summary of Test Results

Manufacturer: Samsung Telecommunications America

Model No.: 5 Watt PRU with P4 Version Hardware

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 24, Subpart E.

- New Submission Production Unit
- Class II Permissive Change Pre-Production Unit

P	C	B
---	---	---

 Equipment Code (Licensed Part 24 Transmitter)

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP

NVLAP LAB CODE: 100351-0

TESTED BY: Tom Tidwell DATE: 4 Nov. 1998
Tom Tidwell, Wireless Group Manager

KTL Dallas Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. KTL Dallas Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report applies only to the items tested.

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	5.6W	Complies
Occupied Bandwidth (CDMA)	24.238	-45 dBc	Plots	Complies
Occupied Bandwidth (GSM)	24.238	N/A	N/A	N/A
Occupied Bandwidth (NADC)	24.238	N/A	N/A	N/A
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-14 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	-33.9 dBm E.I.R.P.	Complies
Frequency Stability	24.235	± 0.05 ppm	0.04 ppm	Complies

Note: Waveform Quality was measured under voltage and temperature extremes in order to characterize the modulation characteristics as per FCC Part 2.987. This data is reported with Frequency Stability data.

Footnotes For N/A's:

Test Conditions: **LAB:** Temperature: 23 °C
 Humidity: 29.8 %

OATS: Temperature: 22 °C
 Humidity: 42 %

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 2. General Equipment Specification

Supply Voltage Input: 120 VAC to PMU

Frequency Range(s): Blocks A,D, B,E,C & F

Type of Modulation and Designator:

CDMA (F9W)	GSM (GXW)	NADC (DXW)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Emission & Bandwidth Designator: 1M25F9W

Output Impedance: 50 ohm

RF Output (Rated): 5 Watts (+37.0 dBm)

Band Selection:

Software	Duplexer Change	Fullband Coverage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Description of Modifications For Class II Permissive Change

NOT APPLICABLE

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Modifications Made During Testing

NOT APPLICABLE

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

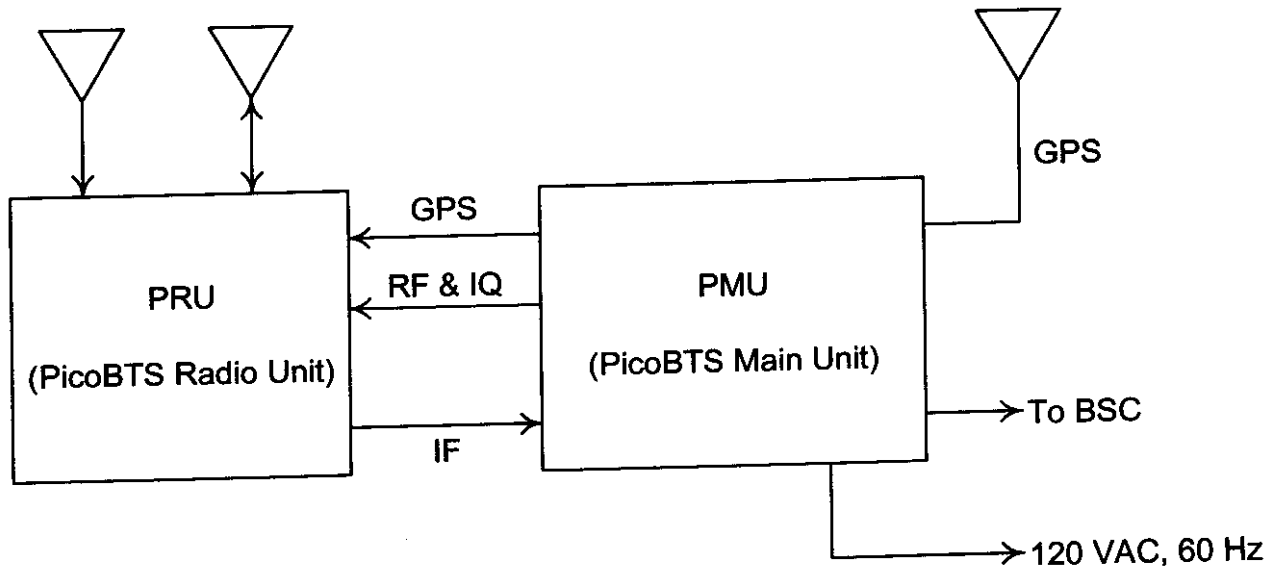
System Description

The PicoBTS (Base Transceiver Subsystem) identifies the complete system which consists of Tx/Rx antenna, PMU (PicoBTS Main Unit) and PRU (PicoBTS Radio Unit).

The PMU controls the overall operation of the system, provides frequency and time references via an internal GPS receiver and serves as the interface between the PRU and the BSC (Base Station Controller).

The PRU is the radio transceiver unit. Maximum power output is 5 watts. This version of the PRU is for single channel operation only.

System Diagram



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Tom Tidwell	DATE: October 19, 1998

Test Results: Complies.

Measurement Data:

Modulation Type	Measured Output Power (dBm)	Rated Output Power (w)
CDMA	+37.5	+37.0
GSM	N/A	N/A
NADC	N/A	N/A

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

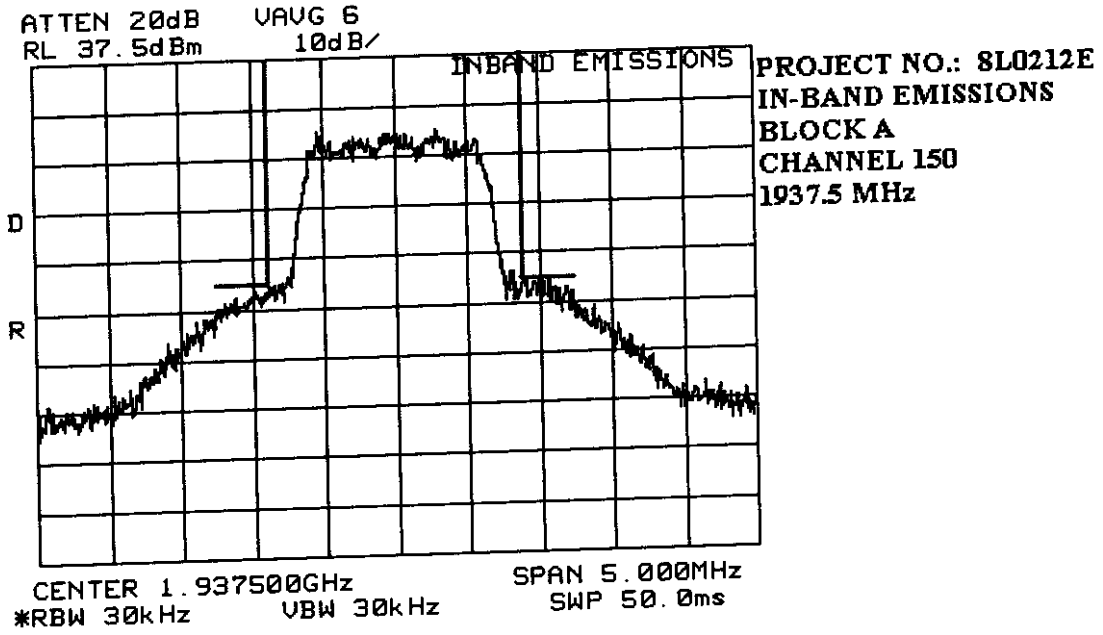
Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.917(c)
TESTED BY: Tom Tidwell	DATE: October 19, 1998

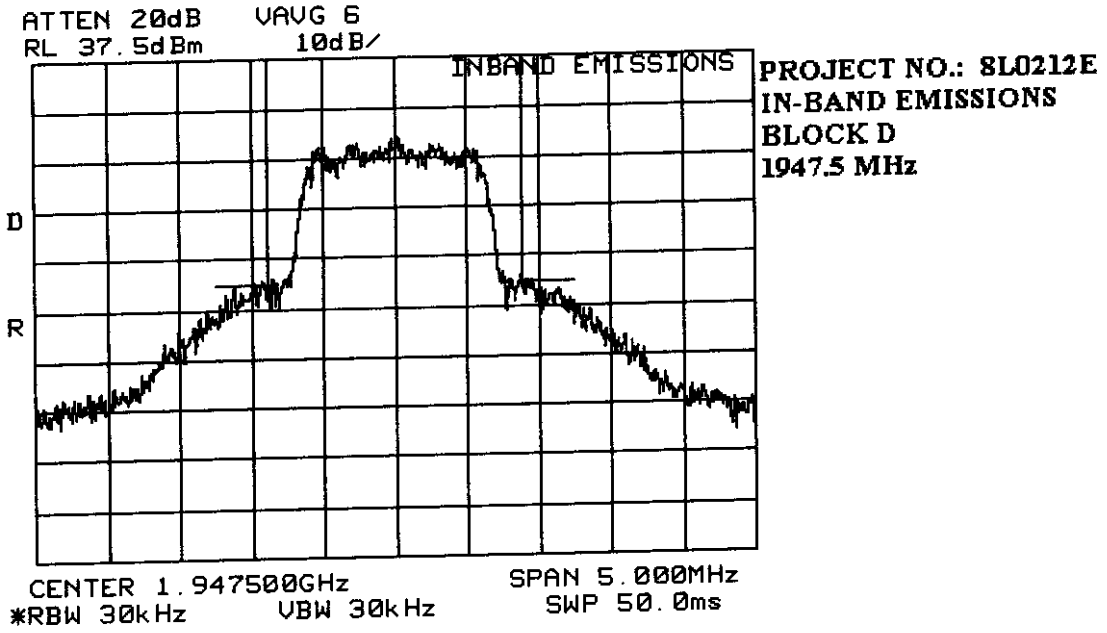
Test Results: Complies.

Test Data: See attached graph(s).

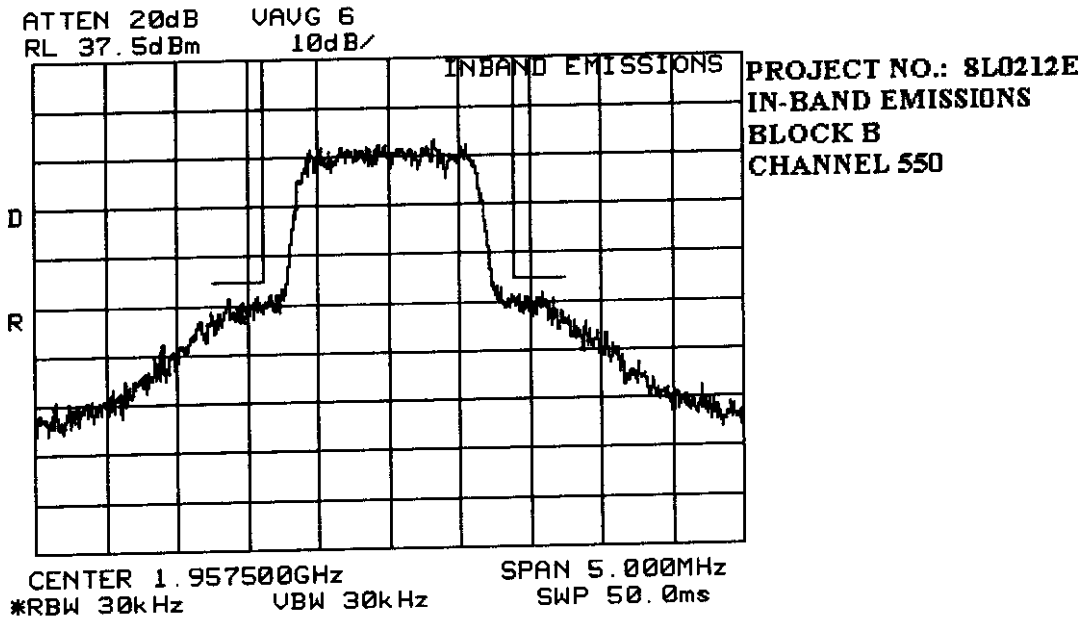
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



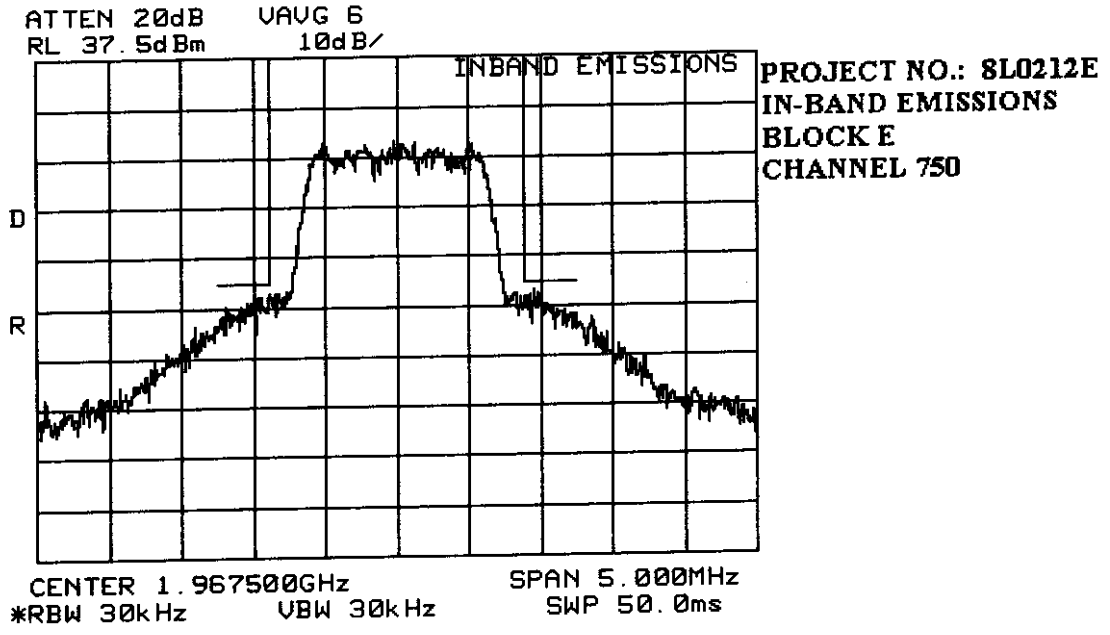
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



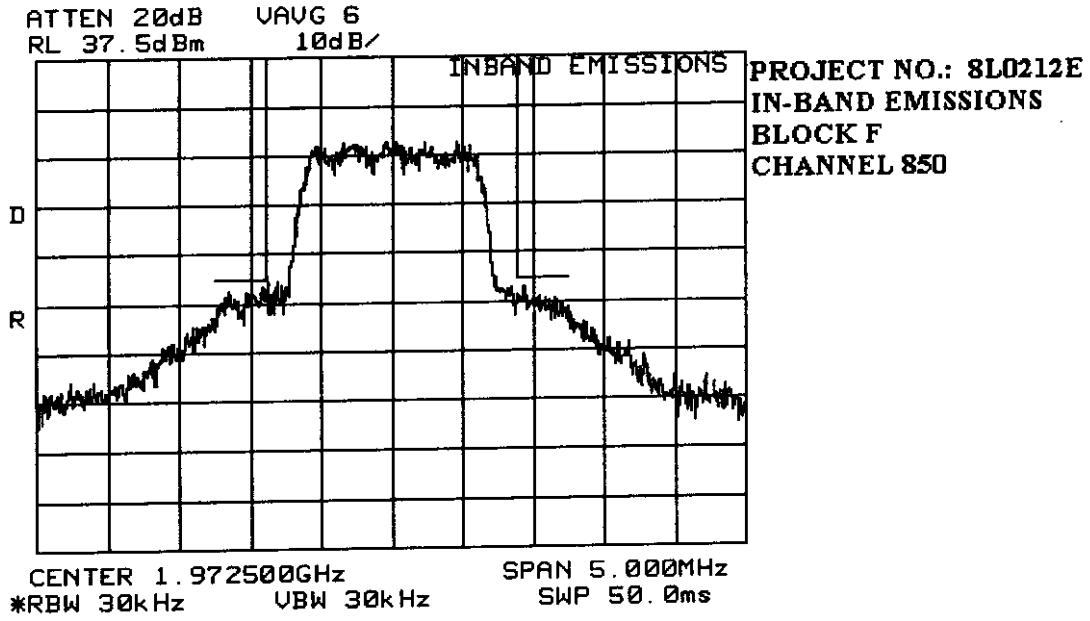
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



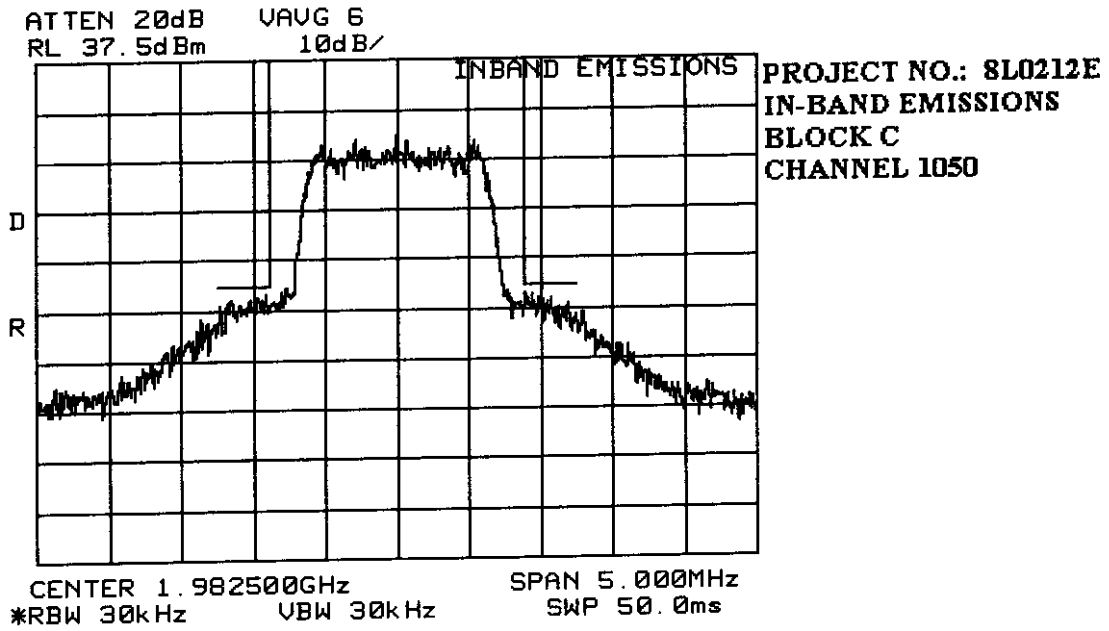
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.917(c)
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.
Test Data: See attached graph(s).

NOT APPLICABLE

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Occupied Bandwidth (NADC)	PARA. NO.: 2.917(c)
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Test Data: See attached graph(s).

NOT APPLICABLE

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 5. Spurious Emissions at Antenna Terminals

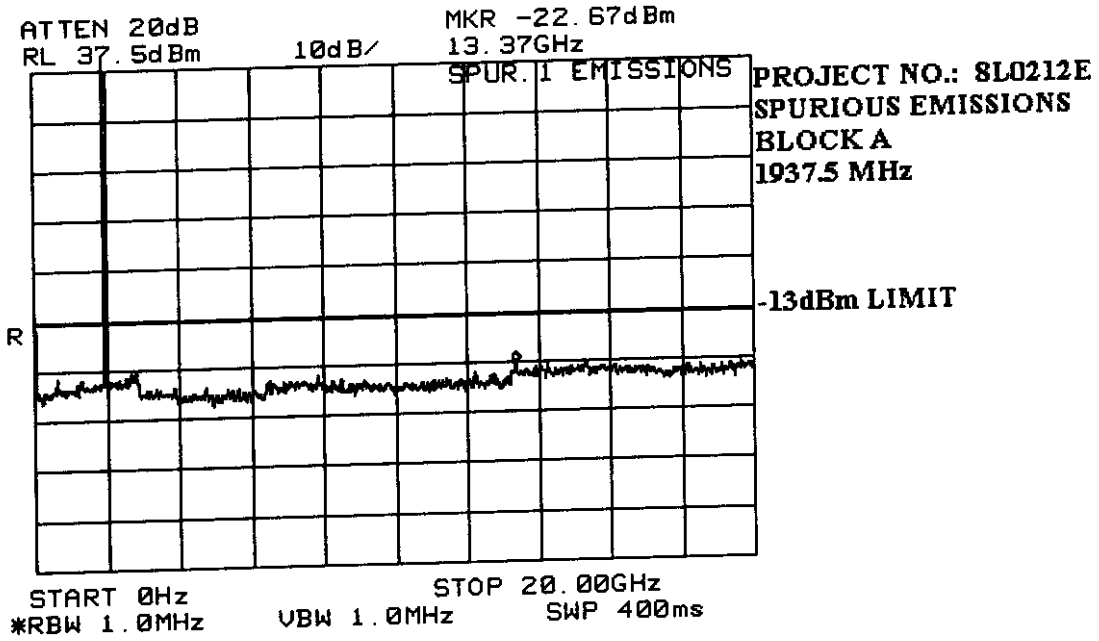
NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Tom Tidwell	DATE: October 19, 1998

Test Results: Complies.

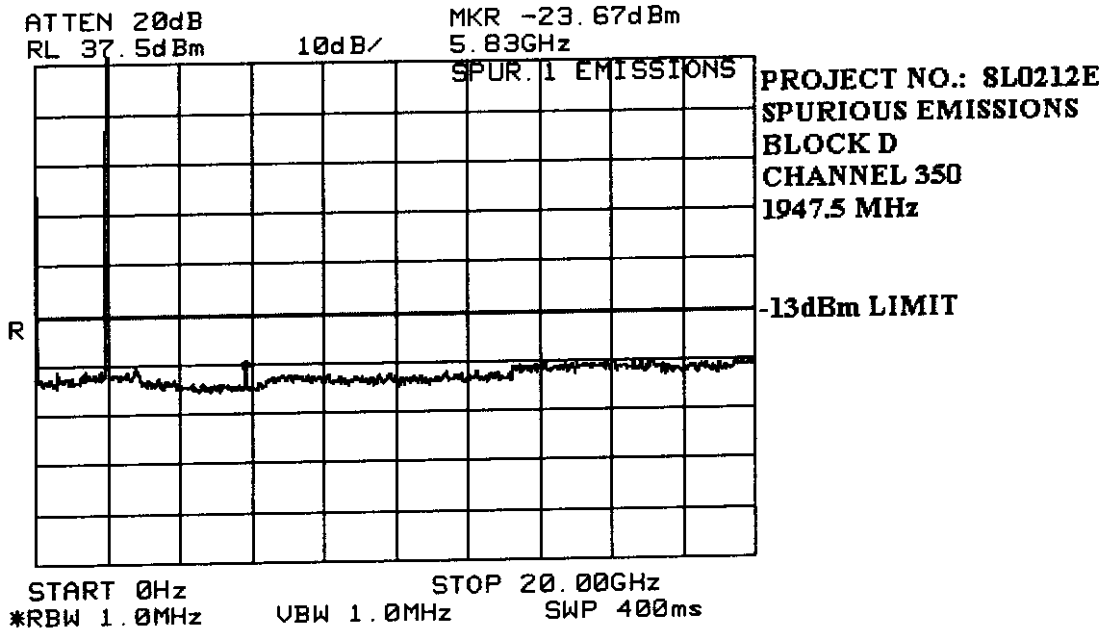
Test Data:

NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-21.7
Lower Band Edge	-15.0
Upper Band Edge	-14.0

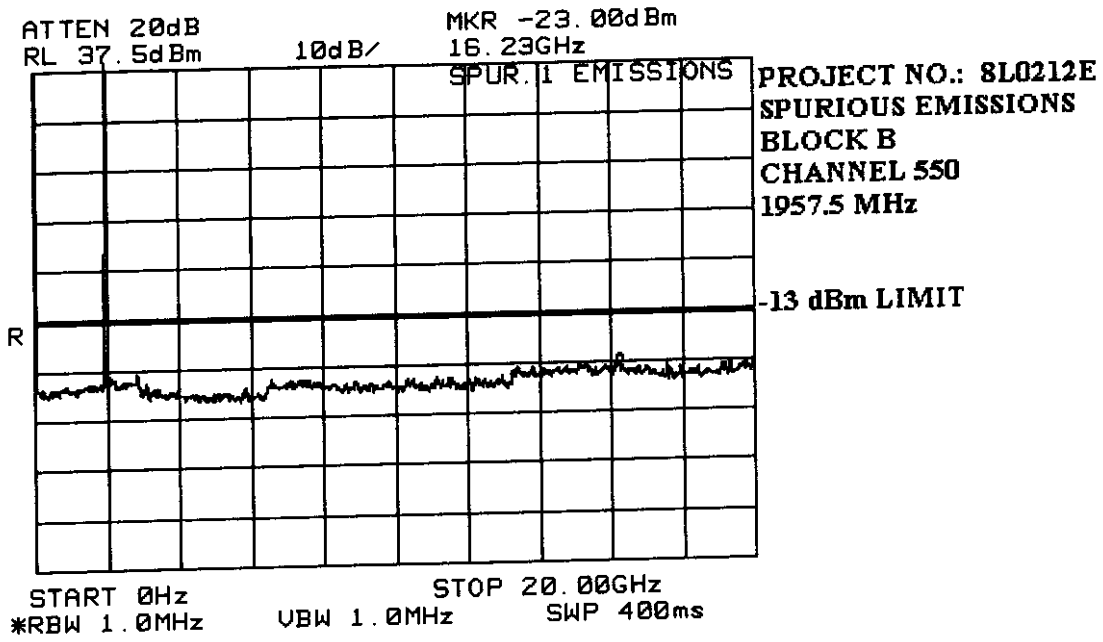
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



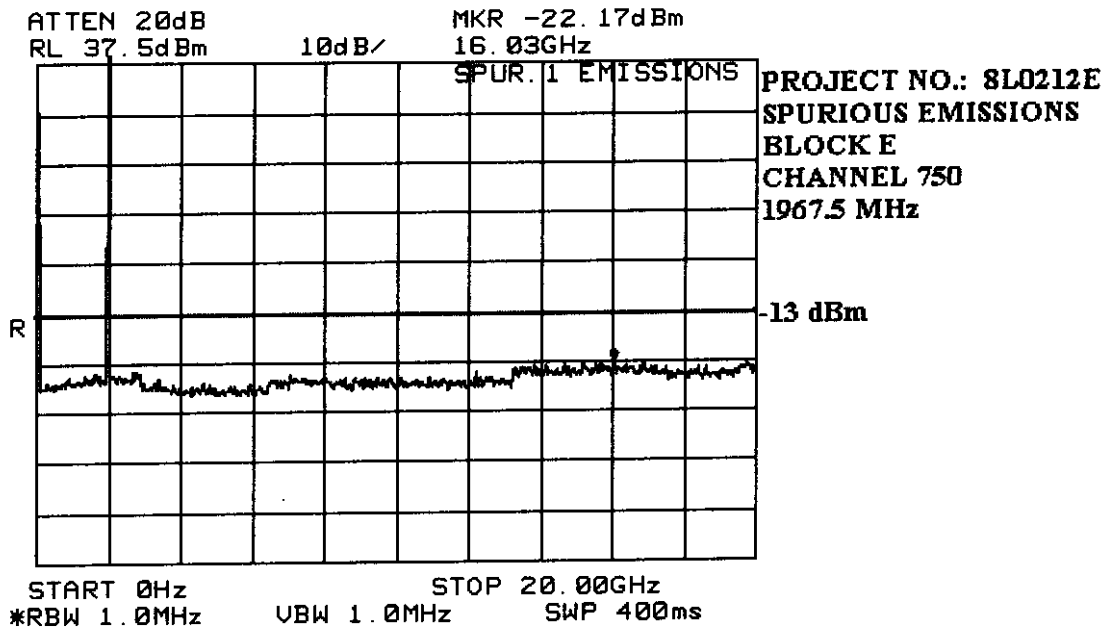
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



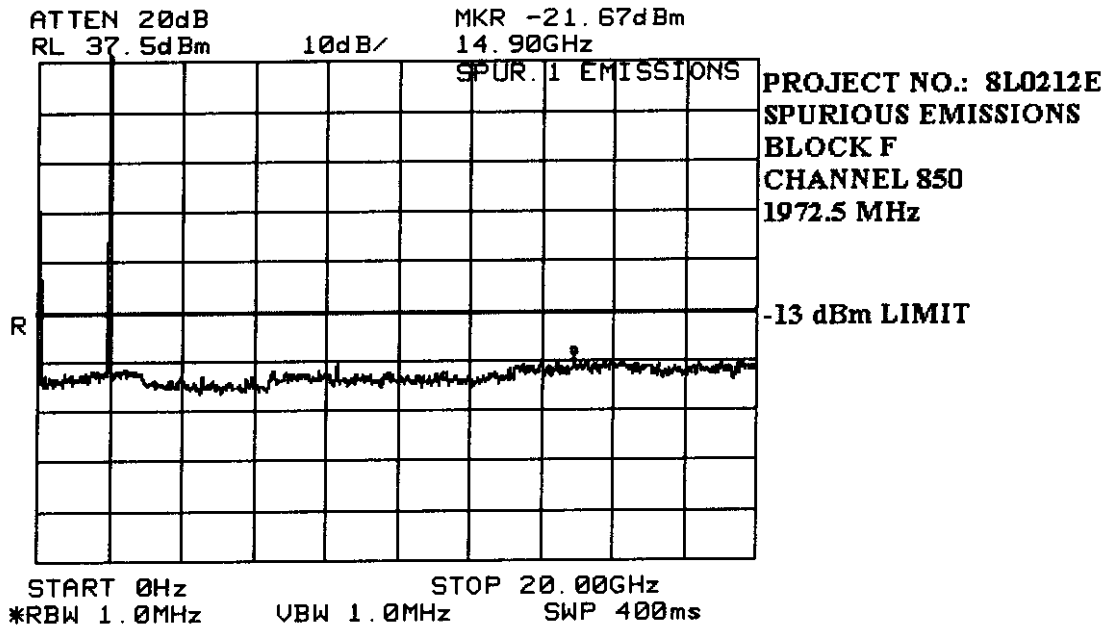
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



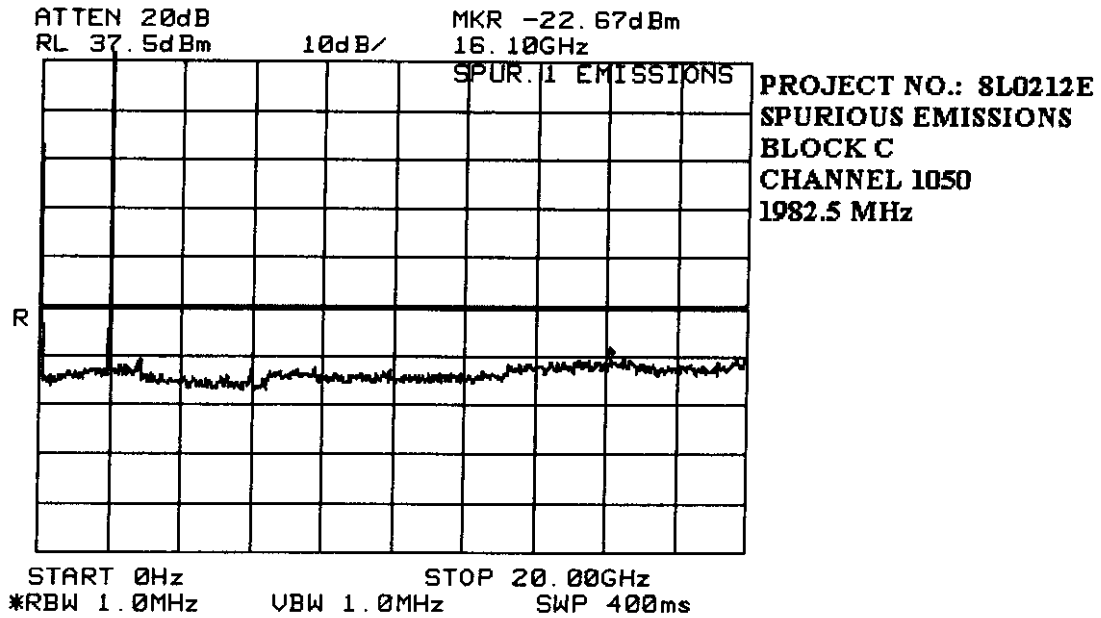
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



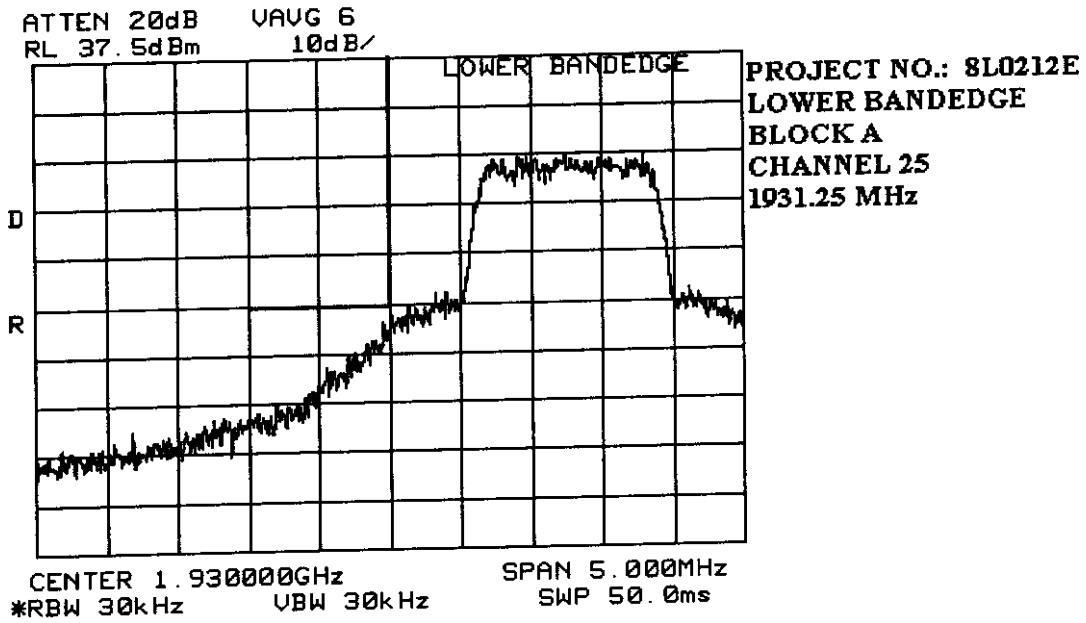
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

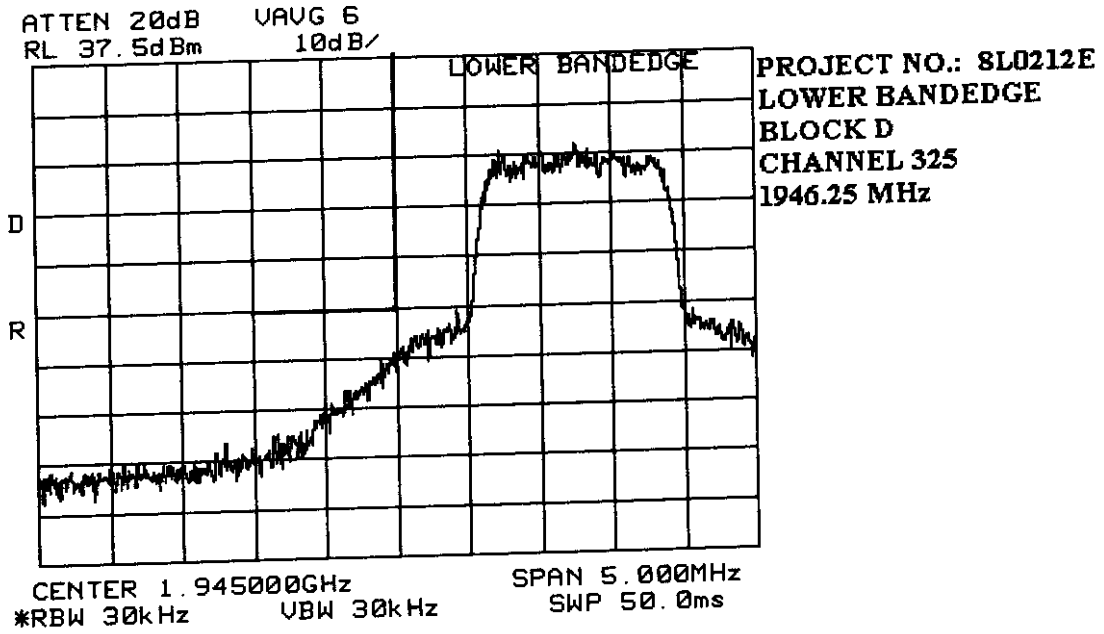
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



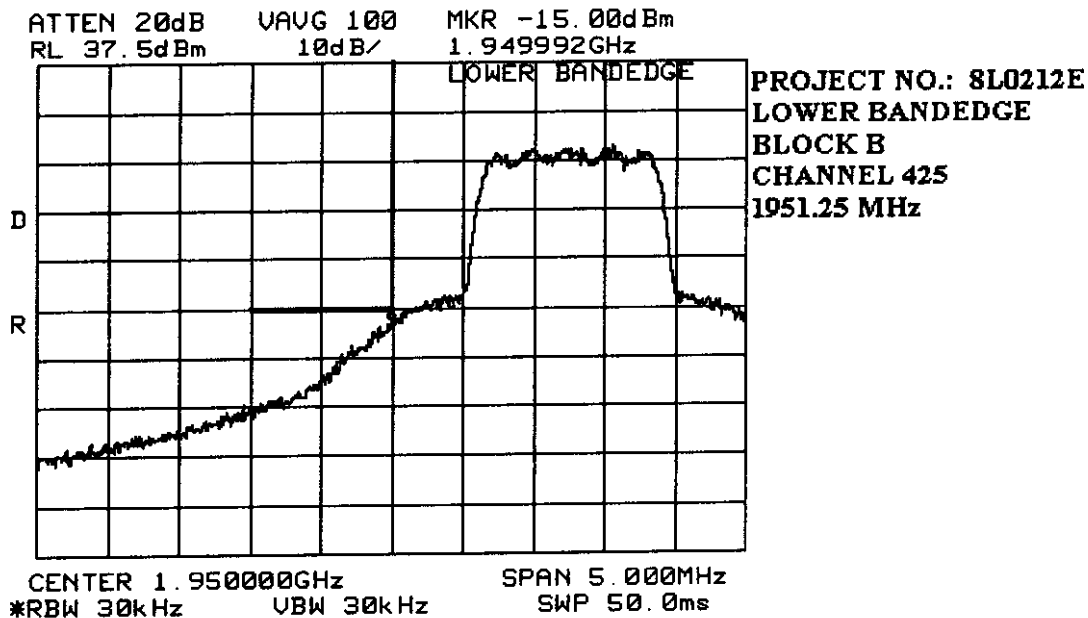
KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

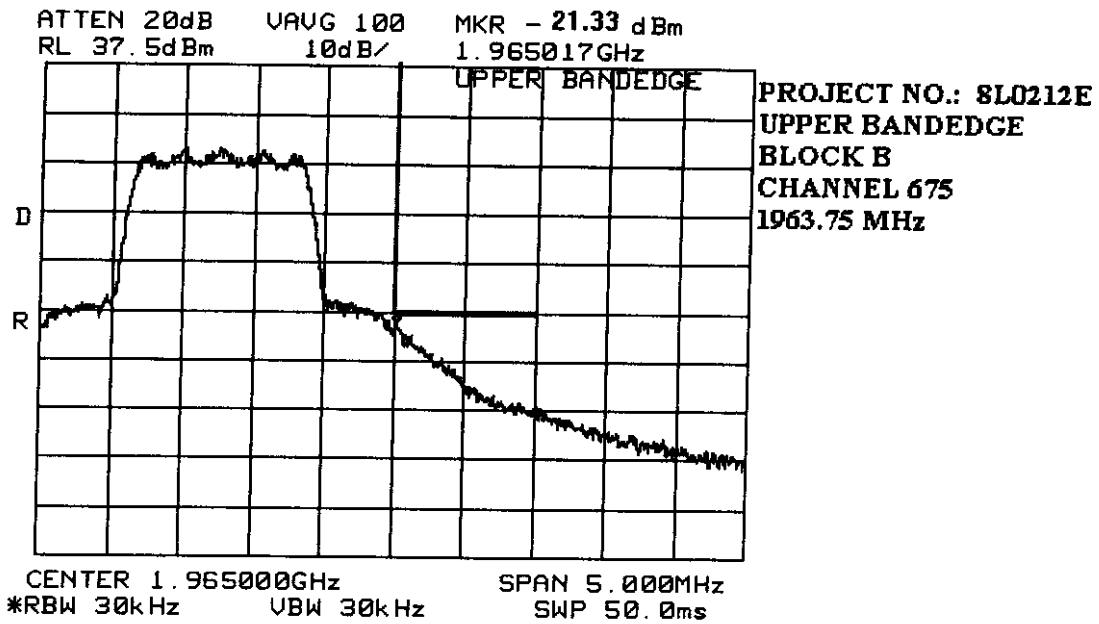
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



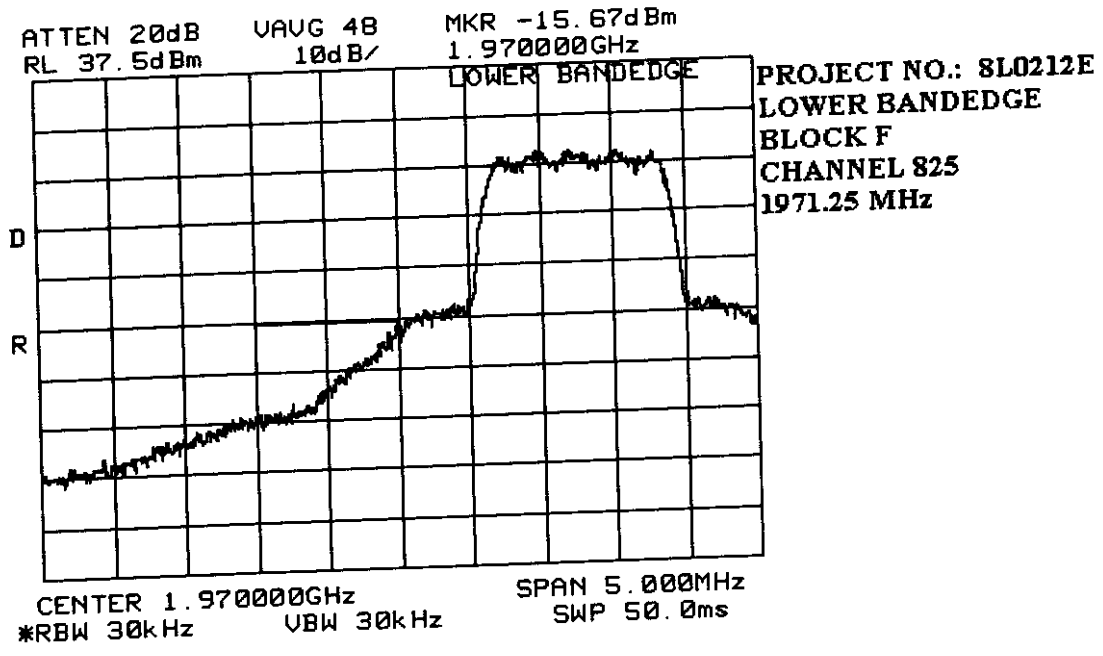
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



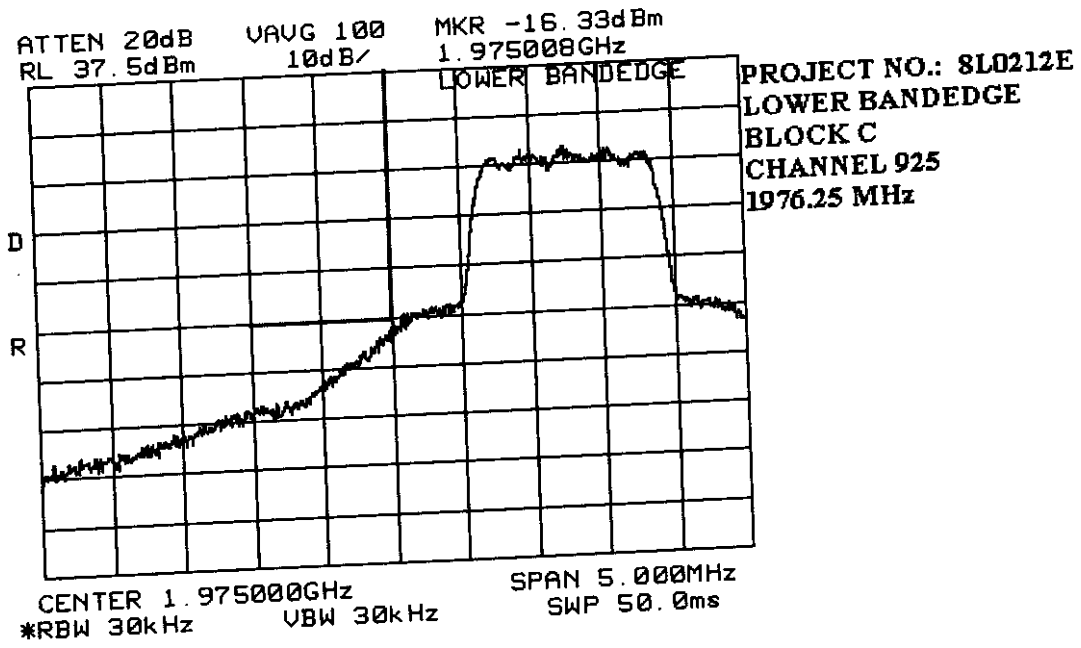
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



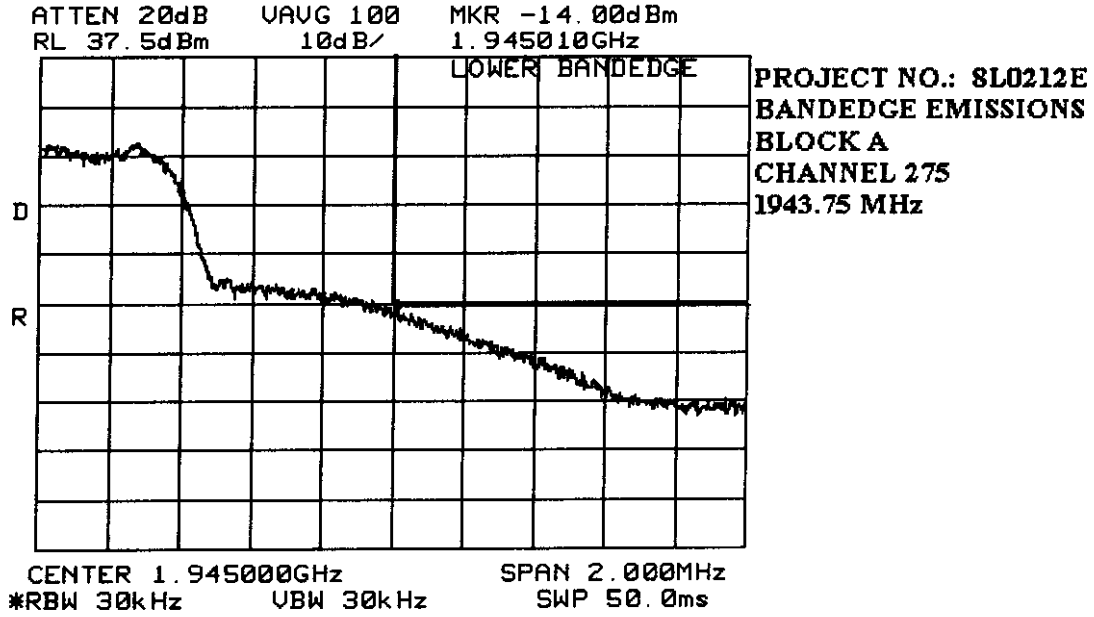
KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

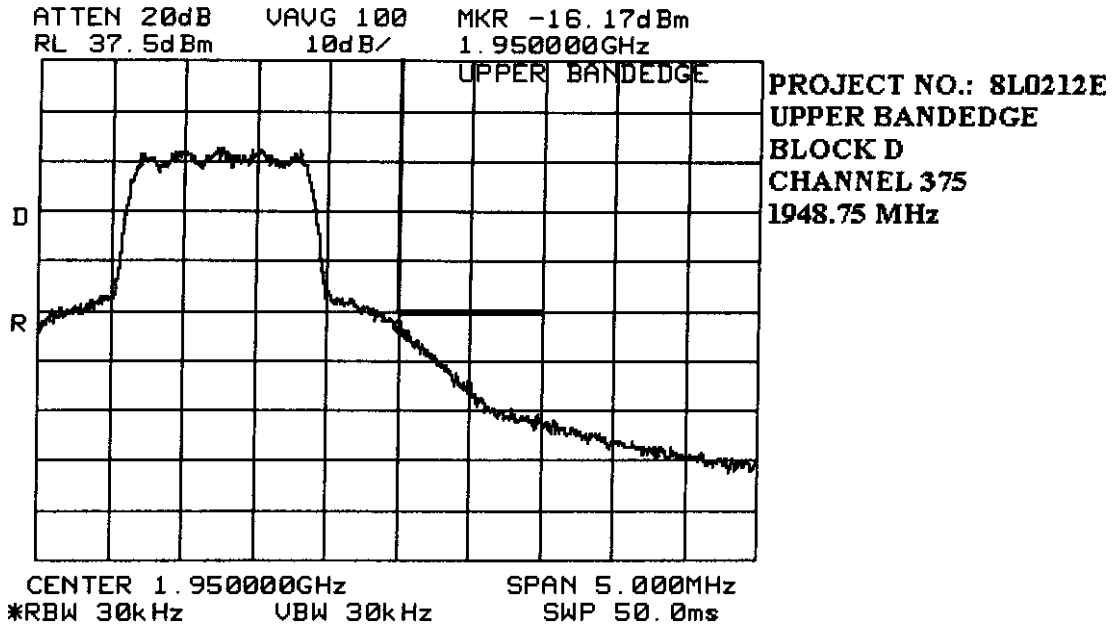
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



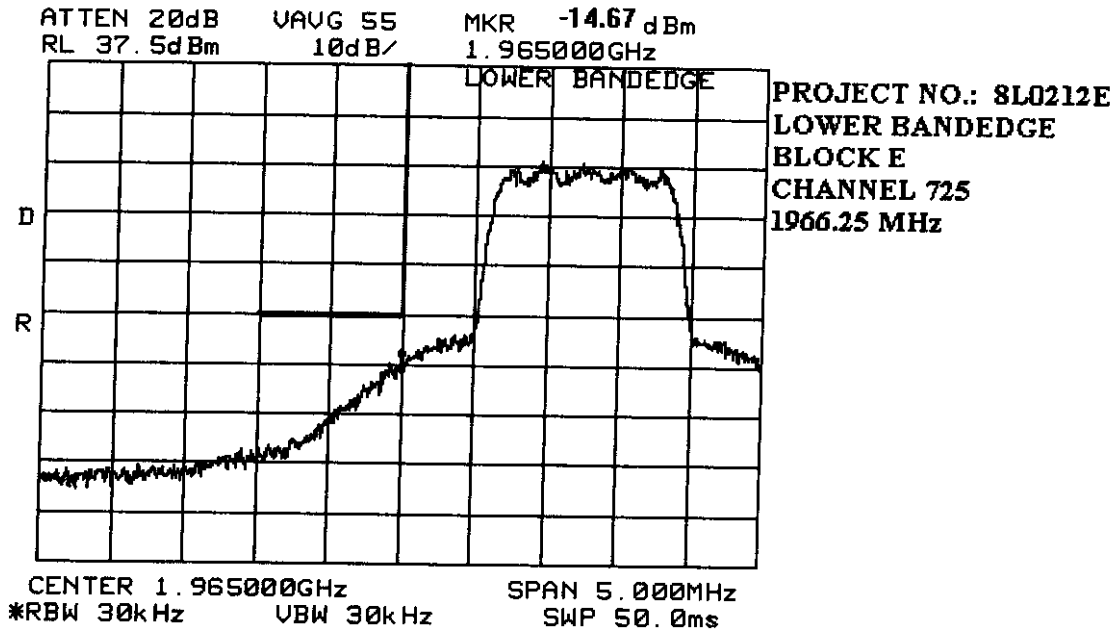
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



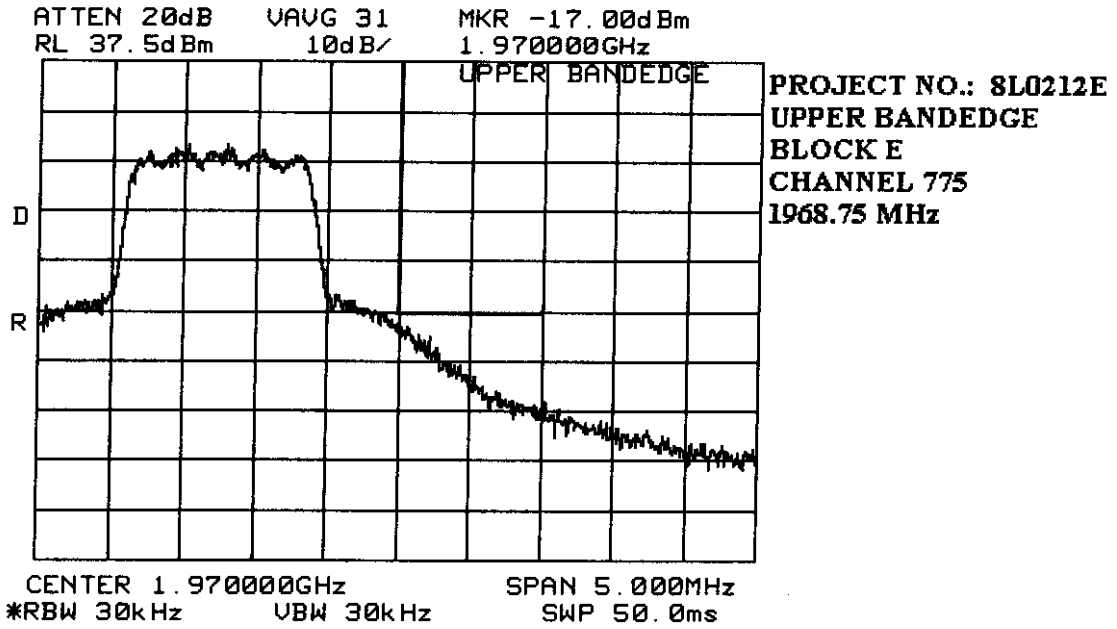
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



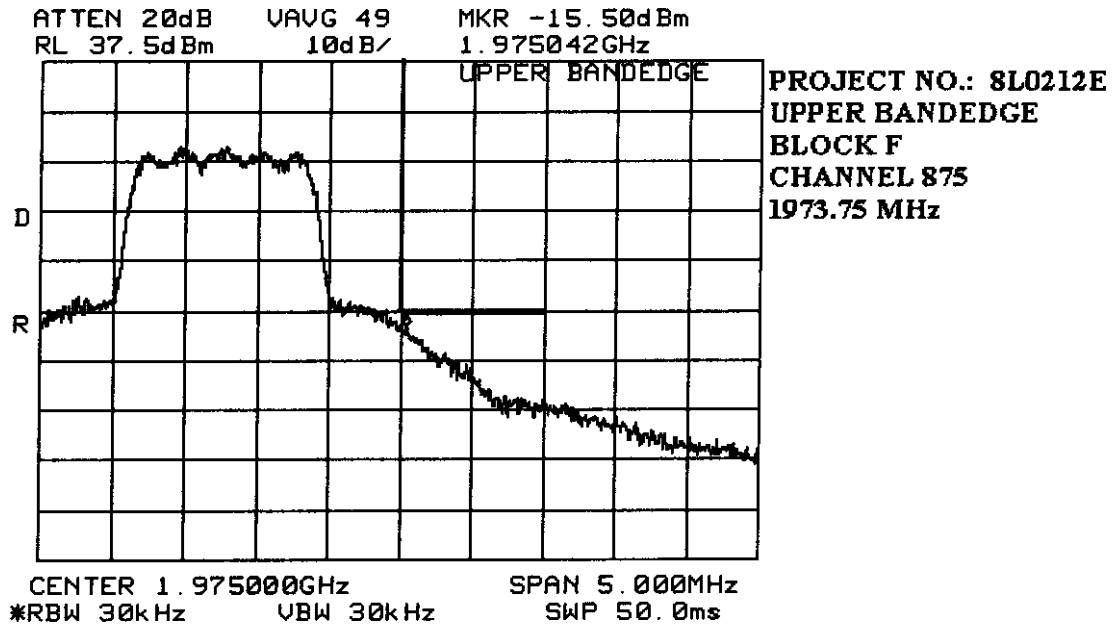
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



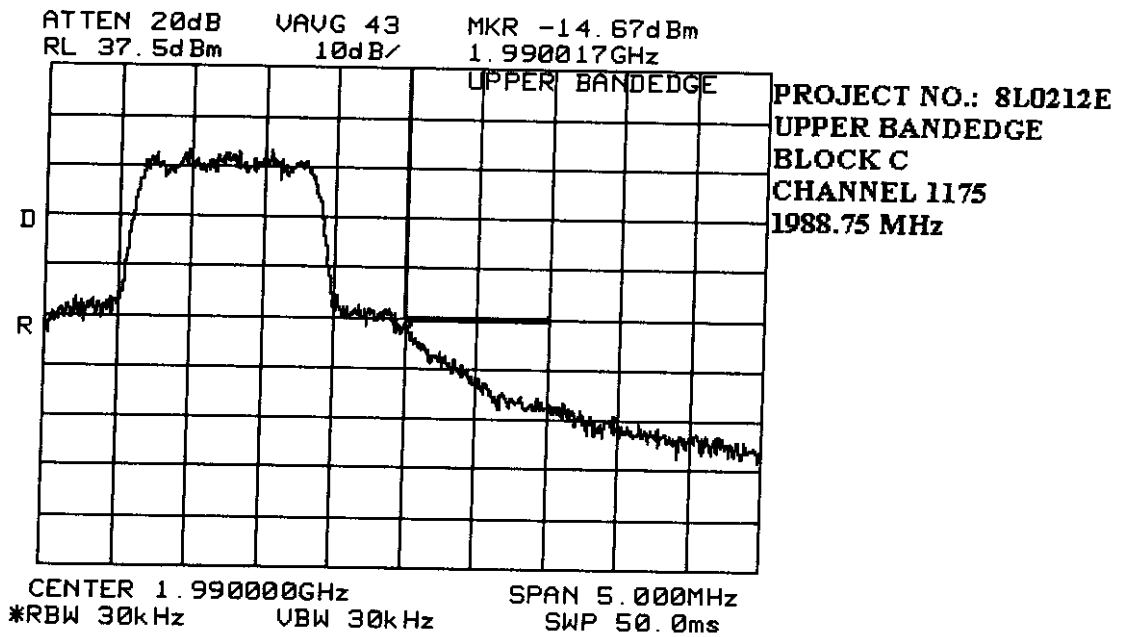
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.917(e)
TESTED BY: Ron Gayton	DATE: October 28, 1998

Test Results: Complies.
The maximum field strength is 61.3 dB μ V/m @ 3m. This is 20.9 dB below the specification limit.

Test Data: See attached table.

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
 FCC ID: NP85WPRU



KTL Dallas, Inc.

Dallas Headquarters:
 802 N. Kealy
 Lewisville, TX 75057
 Tel: (972) 436-9600
 Fax: (972) 436-2667

Microwave Radiated Emissions Data

Page 1 of 1

Complete Preliminary

Client: SAMSUNG Test #: MW-3A W.O.#: 8L0212e

EUT: 5 WATT PRU P4 VERSION HARDWARE S/N: NONE Photo ID: 8L0212E MW-3

Technician: R. GAYTAN Specification: CFR 47 Part 2.993 Lab: BOATS Date: 10/28/98

Equipment Used: CF01, CF30, 494, G2624, 421, 103, 430, 425

Configuration: Full Power (Changed 3 Duplexer Rf cables to shipped product)

Bandwidth: 1MHz Video Bandwidth: 1MHz Antenna Distance 3 m Detector:

Climatic Conditions: EUT Power: 115 V.A.C. 60 Hz Peak
 Temperature: 22 C 208 V.A.C. 50 Hz Average
 Relative Humidity: 42 % 230 V.A.C.
 Atmospheric Pressure: 998 mbar Other 9V DC 1 Phase 3 Phase
 Conversion: N/A dBpW= N/A dBuV/m @ N/A m

Freq. (GHz)	Meter Reading (dBm)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments:
1.0	-78	23.4	2.5	22.9	107.0	32.0	82.2	V	
1.927	-38	28.8	3.6	22.7	107.0	78.7	82.2	V	Fundamental Freq.
4	-72	32.7	5.9	19.8	107.0	53.8	82.2	V	
5.192	-70	35.4	6.6	36.5	107.0	42.5	82.2	V	
7	-70	37.3	8.0	38.1	107.0	44.2	82.2	V	
13.0	-66	40.7	11.8	44.0	107.0	49.5	82.2	V	
13.9	-64	42.0	11.6	45.2	107.0	51.4	82.2	V	
17.0	-66	45.1	12.7	46.9	107.0	51.9	82.2	V	
18	-66	46.2	14.2	46.9	107.0	54.5	82.2	V	
1.0	-78	23.4	2.5	22.9	107.0	32.0	82.2	H	
1.927	-36	28.8	3.6	22.7	107.0	80.7	82.2	H	Fundamental Freq.
4	-72	32.7	5.9	19.8	107.0	53.8	82.2	H	
5.192	-70	35.4	6.6	36.5	107.0	42.5	82.2	H	
7	-70	37.3	8.0	38.1	107.0	44.2	82.2	H	
13.0	-66	40.7	11.8	44.0	107.0	49.5	82.2	H	
17.0	-66	45.1	12.7	46.9	107.0	51.9	82.2	H	
18	-66	46.2	14.2	46.9	107.0	54.5	82.2	H	
									Scanned 1GHz to 18 GHz.

DATACOMMONFORMS\TESTDATASHEETS\MICRORE REV 030597

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
 FCC ID: NP85WPRU



KTL Dallas, Inc.

Dallas Headquarters:
 802 N. Kealy
 Lewisville, TX 75057
 Tel: (972) 436-9600
 Fax: (972) 436-2667

Microwave Radiated Emissions Data

Complete Preliminary Page 1 of 1

Client: SAMSUNG Test #: MW-4A W.O.#: 8L0212e

EUT: 5 WATT PRU P4 VERSION HARDWARE S/N: NONE Photo ID: 8L0212E MW-4

Technician: R. GAYTAN Specification: CFR Part 2.993 Lab: BOATS Date: 10/28/98

Equipment Used: CF01, CF30, Horn Antenna Emco 3160, Wave Guide P/N RA42-K-F-4B-C, G2624

Configuration: Full Power (Changed 3 Duplexer Rf cables to shipped product)

Bandwidth: 1MHz Video Bandwidth: 1MHz Antenna Distance 3 m Detector:

Climatic Conditions: EUT Power: 115 V.A.C. 60 Hz Peak
 Temperature: 22 C 208 V.A.C. 50 Hz Average
 Relative Humidity: 42 % 230 V.A.C.
 Atmospheric Pressure: 998 mbar Other 9V DC 1 Phase 3 Phase
 Conversion: N/A dBpW= N/A dBuV/m @ N/A m

Freq. (GHz)	Meter Reading (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuV/m)	Spec. Limit (dBuV/m)	Pol.	Comments:
18	44	40.3	12.2	40	0	56.5	82.2	V	Peak Noise Floor
19	44.6	40.3	13.6	40	0	58.5	82.2	V	Noise Floor
20	46	40.3	15	40	0	61.3	82.2	V	Noise Floor
18	35	40.3	12.2	40	0	47.5	82.2	V	Video Avg. N F
19	35.6	40.3	13.6	40	0	49.5	82.2	V	Noise Floor
20	37	40.3	15	40	0	52.3	82.2	V	Noise Floor
18	44	40.3	12.2	40	0	56.5	82.2	H	Peak Noise Floor
19	44.6	40.3	13.6	40	0	58.5	82.2	H	Noise Floor
20	46	40.3	15	40	0	61.3	82.2	H	Noise Floor
18	35	40.3	12.2	40	0	47.5	82.2	H	Video Avg. N F
19	35.6	40.3	13.6	40	0	49.5	82.2	H	Noise Floor
20	37	40.3	15	40	0	52.3	82.2	H	Noise Floor
									Scanned 18 GHz to 20 GHz.

DATACOMMONFORMSITESTDATASHEETSMICRORE REV 030597

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: Tom Tidwell	DATE: October 20, 1998

Test Results: Complies.

Measurement Data: Standard Test Frequency: 1951.25 MHz
Standard Test Voltage: 120 VAC

See attached tables.

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Frequency Stability

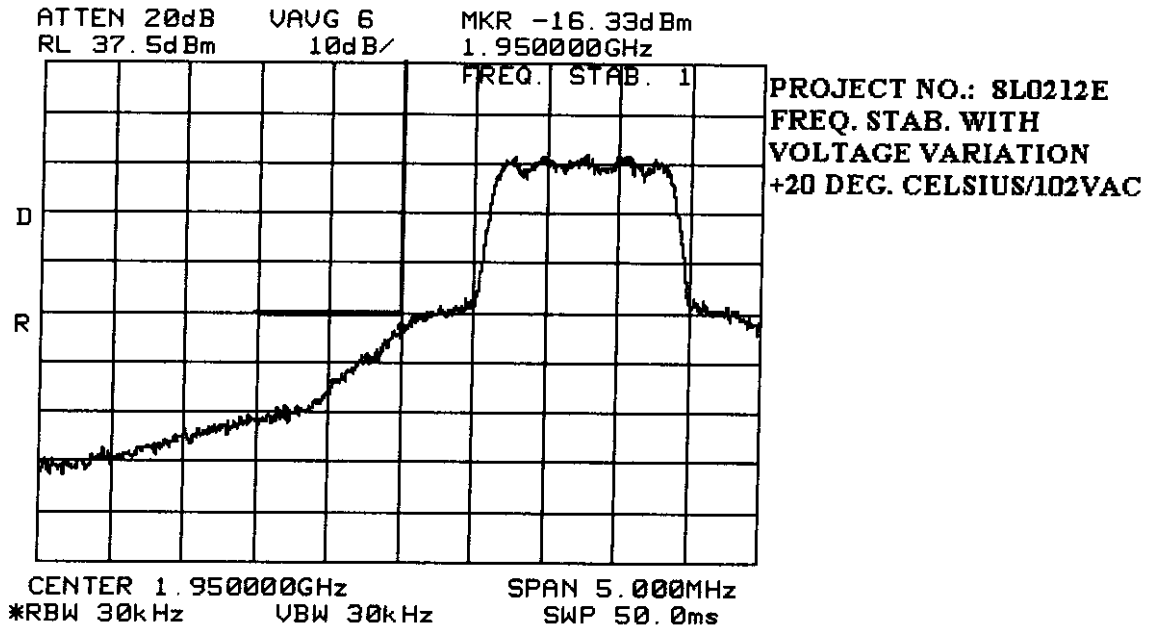
VOLTAGE VARIATION

VOLTAGE	FREQUENCY TOLERANCE(Hz)	TIME REF.(μSec.)	RHO	POWER (dBm)
85% S.T.V.	-85.7	-2.12	0.9902	37.1
100% S.T.V.	-60.4	-2.12	0.9904	37.0
115% S.T.V.	-55.9	-2.13	0.9933	37.4

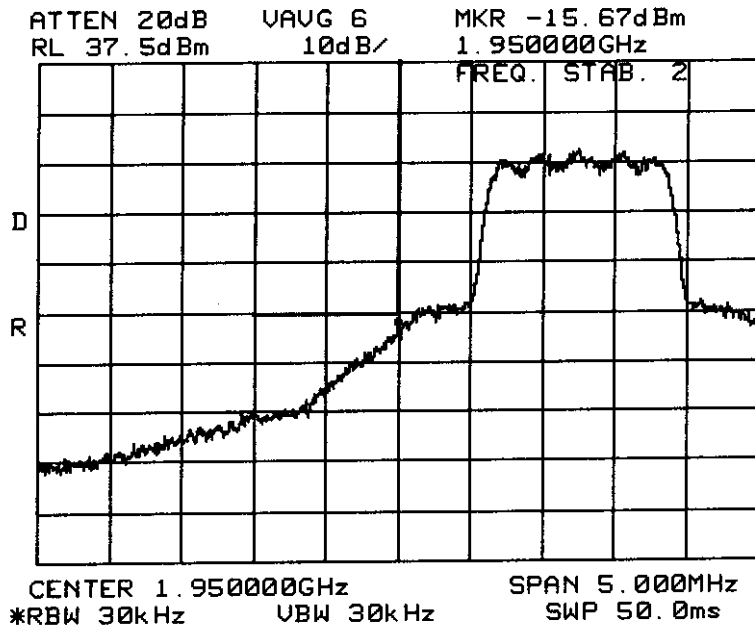
TEMPERATURE VARIATION

TEMPERATURE (°C)	FREQUENCY TOLERANCE(Hz)	TIME REF.(μSec.)	RHO	POWER (dBm)
-30	47.0	-2.11	0.978	38.9
-20	-25.7	-1.91	0.979	38.3
-10	58.0	-2.12	NOT MEASURED	
0	86.0	-2.12	NOT MEASURED	
10	-41.7	-2.09	0.948	37.0
30	-47.3	-2.12	0.983	37.4
40	-78.5	-2.12	0.982	36.5
50	-24.1	-2.12	0.983	36.2

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



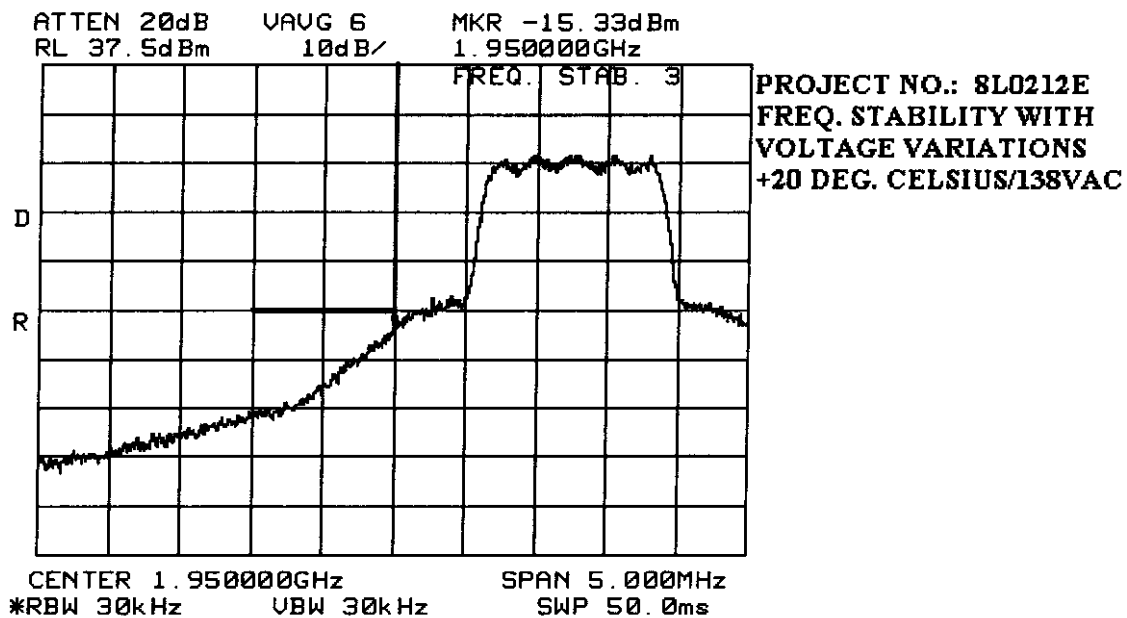
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



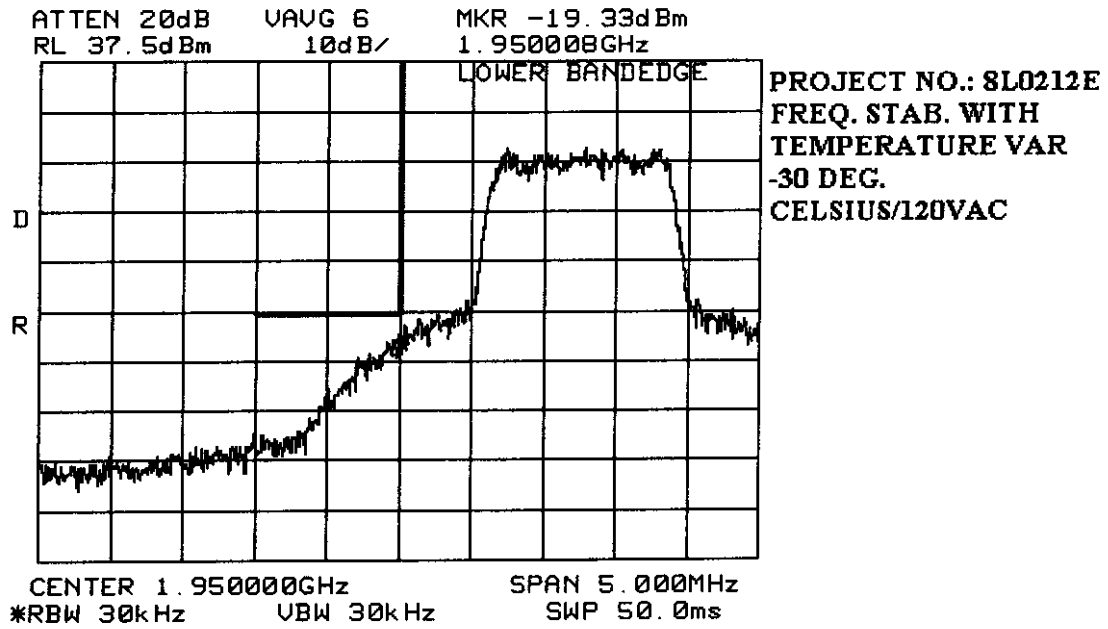
PROJECT NO.: 8L0212E
FREQ. STABILITY WITH
VOLTAGE VARIATION
+20 DEG. CELSIUS/120VAC

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware

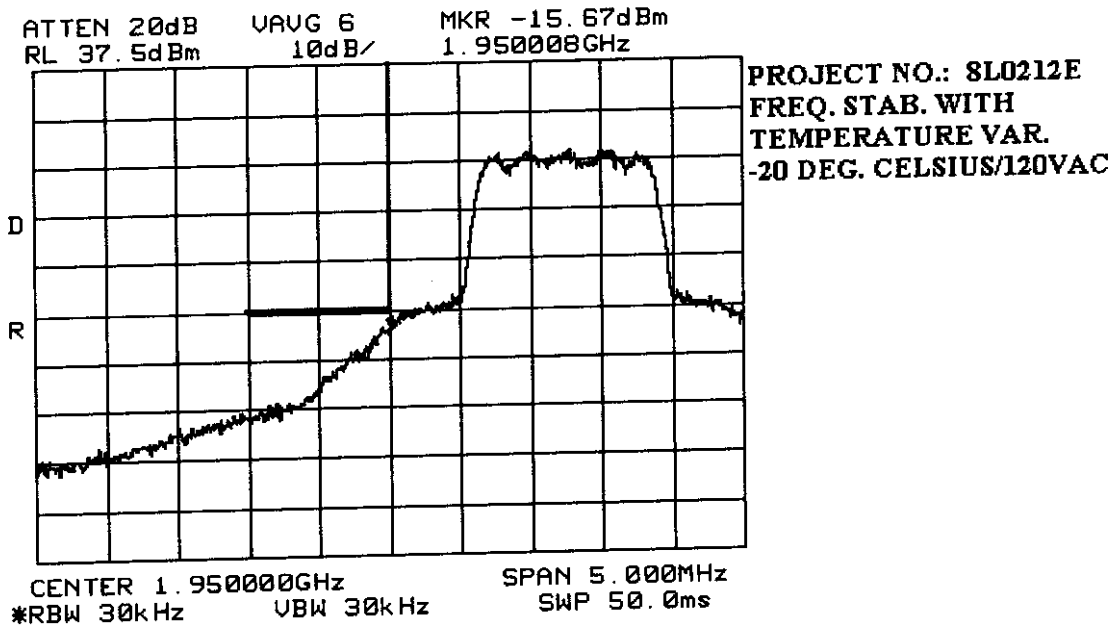
FCC ID: NP85WPRU



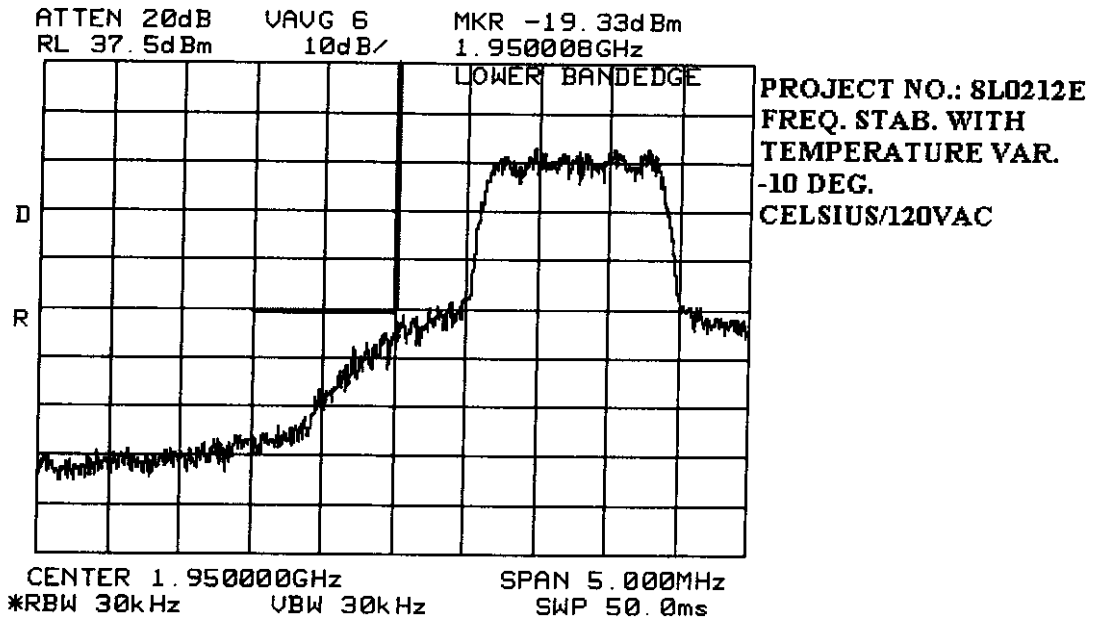
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



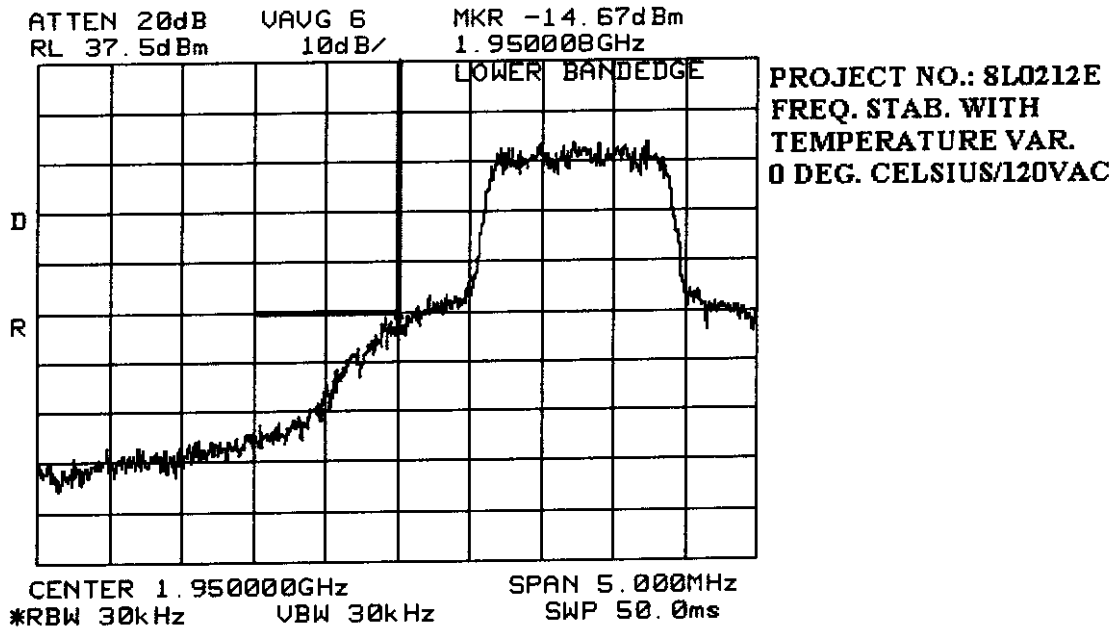
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



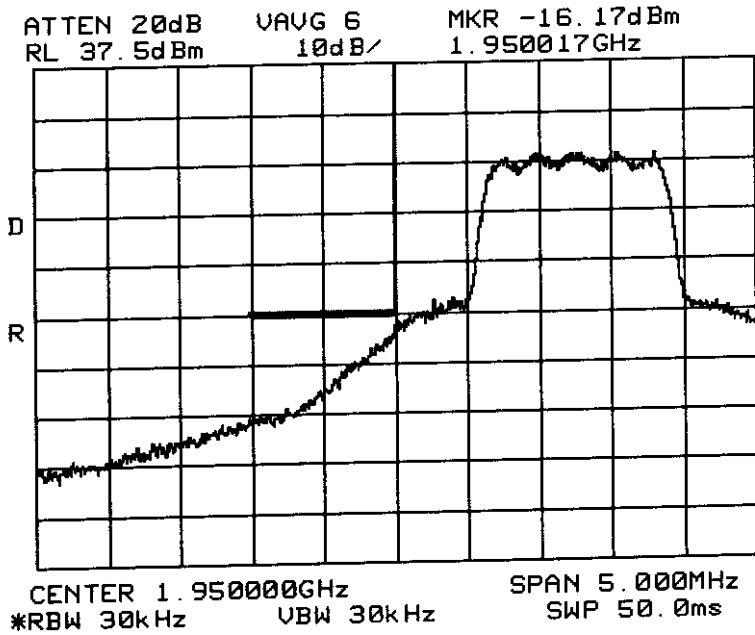
EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

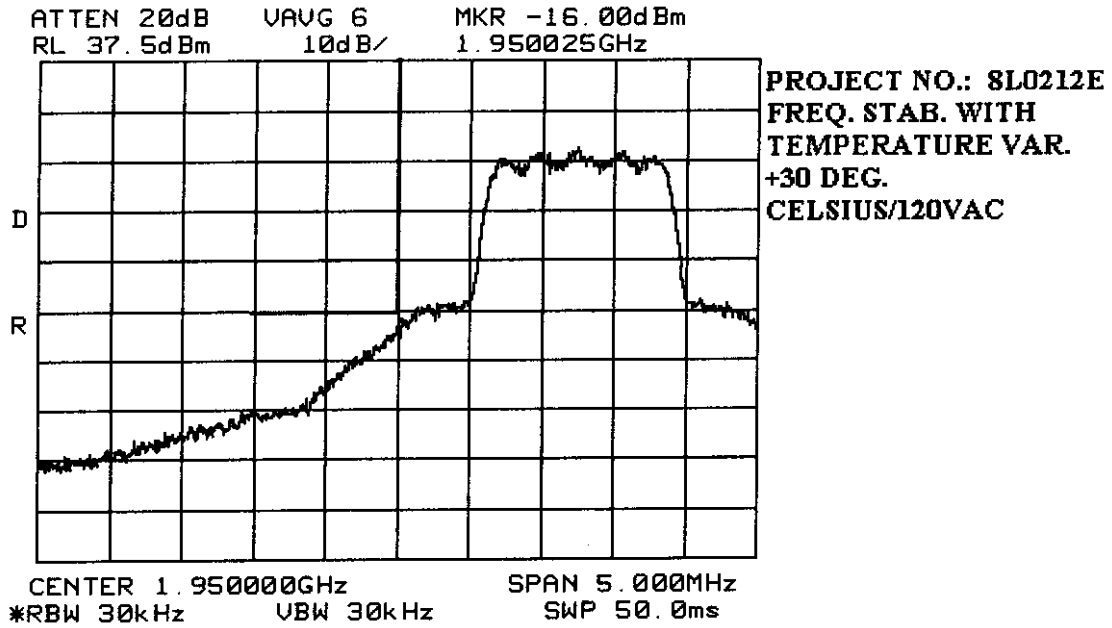


EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

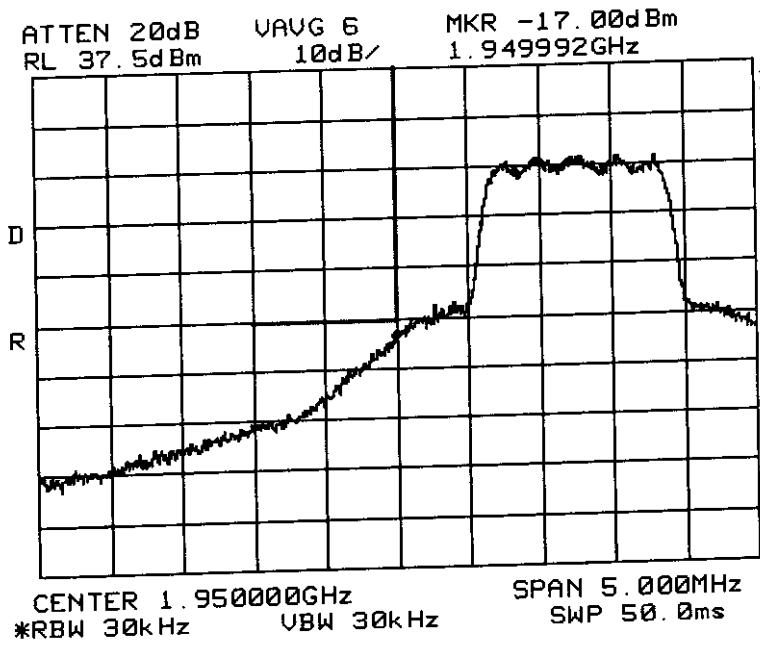


PROJECT NO.: 8L0212E
FREQ. STAB. WITH
TEMPERATURE VAR.
+10 DEG. CELSIUS/120VAC

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

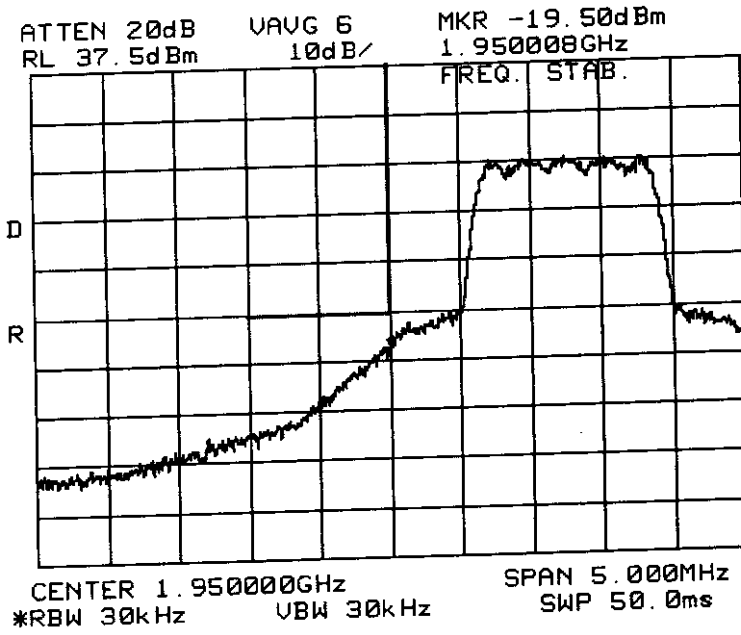


EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



PROJECT NO.: 8L0212E
FREQ. STAB. WITH
TEMPERATURE VAR.
+40 DEG. CELSIUS/120VAC

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU



PROJECT NO.: 8L0212E
FREQ. STAB. WITH TEMP.
VARIATION
+50 DEG. CELSIUS/120VAC

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
 FCC ID: NP85WPRU

Section 8. Test Equipment List

CAL Cycle	Equipment	Manufacturer	Model #	Serial/Asset #	Last Cal.	Next Cal.
1 Year	Coaxial Cable	Storm	None	CF30	Dec. 3/97	Dec. 3/98
1 Year	Coaxial Cable	Storm	None	CF31	April 28/98	April 28/99
1 Year	Coaxial Cable	Storm	None	CF32	Sept. 22/98	Sept. 22/99
1 Year	Spectrum Analyzer	Hewlett Packard	8563E	G2624	Oct. 5/98	Oct. 5/99
1 Year	Environmental Chamber	Environtronics	None	739	Nov. 6/97	Nov. 6/98
1 Year	Power Meter	Wavetek	8531	608	May 15/98	May 15/99
1 Year	Attenuator 20 dB	Narda	7768-20	None	Aug. 14/98	Aug. 14/99
1 Year	Attenuator 10 dB	Narda	7768B-10	None	June 4/98	June 4/99
1 Year	Power Head	Wavetek	85310	609	May 15/98	May 15/99
1 Year	Coaxial Cable	Storm	None	CF01	April 28/98	April 28/99
1 Year	Spectrum Analyzer	Tektronic	492P	B043495	Nov. 11/97	Nov. 11/98
1 Year	Signal Generator	Hewlett Packard	8614A	2015A08365	NCR	NCR
1 Year	RF Amplifier (5GHz-12 GHz)	ICC	None	None	April 27/98	April 27/99
1 Year	Low Noise Amplifier (1 MHz-1GHz)	ICC	None	None	April 27/98	April 27/99
1 Year	Horn Antenna	A.H. Systems	SAS-200/571	162	April 29/98	April 29/99
1 Year	Biconical Antenna	ICC	BCON-30300	210	Jan. 17/98	Jan. 17/99
1 Year	Log Periodic Antenna	EMCO	3146	1349	Jan. 24/98	Jan. 24/99
1 Year	Low Noise Amplifier	ICC	LN22	None	April 22/98	April 22/99
1 Year	Spectrum Analyzer	Hewlett Packard	8591E	3412A02996	April 22/98	April 22/99
	Waveguide	EMCO	PA42-IT-F-YB-C	None	NCR	NCR
	Horn Antenna	EMCO	3160	None	NCR	NCR
	Limitter	Fischer	FCC-45013-1.2	None	Feb. 12/98	Feb. 12/99

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E
ANNEX A

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

ANNEX A
TEST METHODOLOGIES

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: RF Power Output **PARA. NO.: 2.985**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement: CDMA Per ANSI/J-STD-014
TDMA Per ANSI/J-STD-010

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

- P = the equivalent isotropic radiated power in watts
- E = the maximum measured field strength in V/m
- R = the measurement range (3 meters)
- G = the numeric gain of the transmit antenna in relation to an isotropic radiator

KTL Dallas

FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E
ANNEX A

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.989
---	-------------------------

Minimum Standard:

Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:

CDMA Per ANSI/J-STD-014

Spectrum analyzer settings:

RBW: 30 kHz
VBW: \geq RBW
Span: 5 MHz
Sweep: Auto

GSM Per ANSI/J-STD-010

RBW: 3 kHz
VBW: \geq RBW
Span: 2 MHz
Sweep: Auto

NADC Per IS-136

RBW: 1 kHz
VBW: \geq RBW
Span: 1 MHz
Sweep: Auto

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.991

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA Per ANSI/J-STD-014

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1MHz from Band Edge)
VBW: \geq RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM Per ANSI/J-STD-010

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: \geq RBW
Sweep: Auto
Video Avg: Disabled

NADC Per IS-136

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: \geq RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Field Strength of Spurious Radiation **PARA. NO.: 2.993**

Test Conditions: Outdoor Range
Standard Test Voltage

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's
frequency block, the power of any emission shall be attenuated
below the transmitter power by at least 43 + 10 log (P) dB.

Calculation Of Field Strength Limit

An example of attenuation requirement of 43 + 10 Log P is equivalent to -13 dBm (5 x 10⁻⁵ Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$$GP/4\pi R^2 = E^2/120\pi$$

For emissions ≤ 1 GHz:

G = 1.64 (Dipole Gain)

P = 10⁻⁵ Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V / m} = 84.4 \text{ dB}\mu\text{V / m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)

P = 1 x 10⁻⁵ Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = 84.4 - 20 \text{Log} \sqrt{1.64} = 82.3 \text{ dB}\mu\text{V / m} @ 3 \text{m}$$

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

NAME OF TEST: Frequency Stability	PARA. NO.: 2.995
--	-------------------------

Test Conditions: As per measurement data.

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement: CDMA Per ANSI/J-STD-014
TDMA Per ANSI/J-STD-010
NADC Per IS-136

Frequency Stability With Voltage Variation

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

KTL Dallas

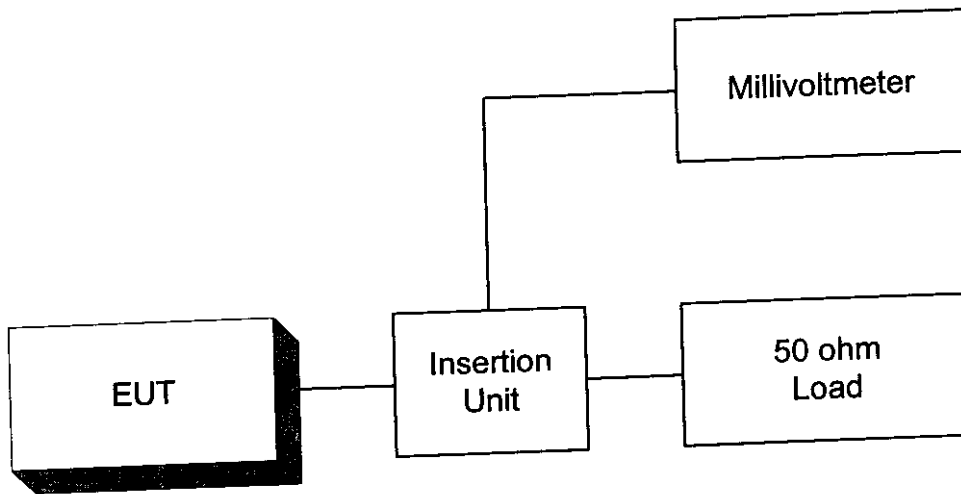
FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8L0212E
ANNEX B

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

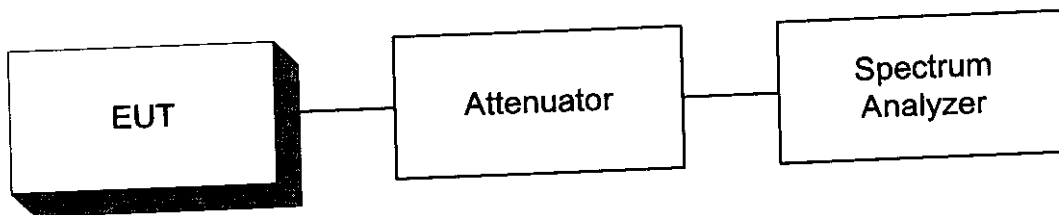
ANNEX B
TEST DIAGRAMS

EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Para. No. 2.985 - R.F. Power Output

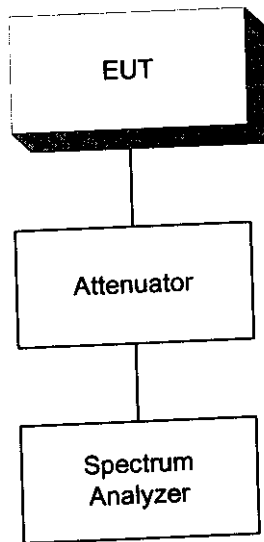


Para. No. 2.989 - Occupied Bandwidth

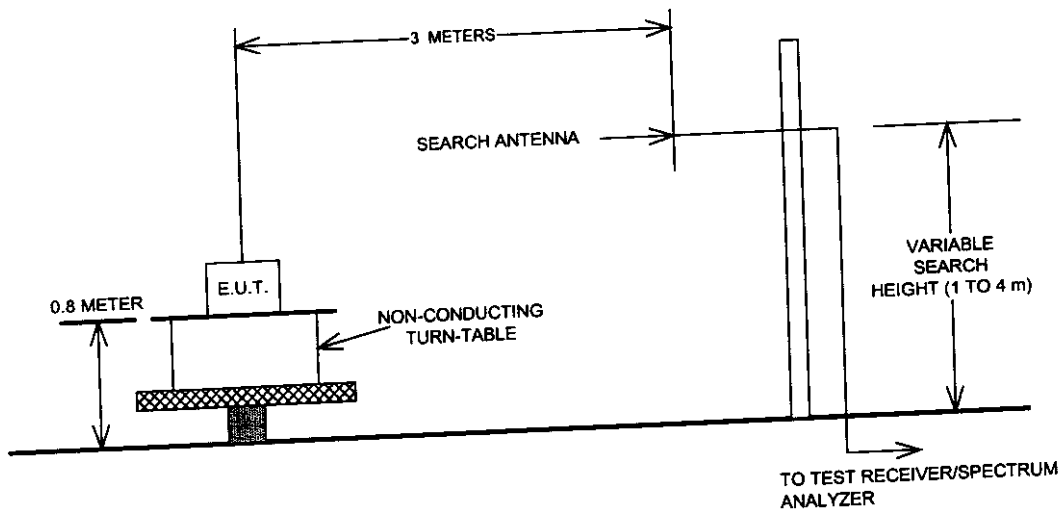


EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



EQUIPMENT: PicoBTS 5 Watt PRU with P4 Version Hardware
FCC ID: NP85WPRU

Para. No. 2.995 - Frequency Stability

