

#### **IP MOBILENET TEST REPORT**

## FOR THE

### BASE STATION DATA RADIO, B32450-25

## FCC PART 90

# COMPLIANCE

#### DATE OF ISSUE: JANUARY 21, 2004

#### **PREPARED FOR:**

#### **PREPARED BY:**

IP MobileNet 16842 Von Karman Avenue Irvine, CA 92606

P.O. No.: 003041-00 W.O. No.: 81737 Mary Ellen Clayton CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

Date of test: January 14-19, 2004

Report No.: FC04-009

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# **ADMINISTRATIVE INFORMATION**

DATE OF TEST:	January 14-19, 2004
DATE OF RECEIPT:	January 14, 2004
PURPOSE OF TEST:	To demonstrate the compliance of the Base Station Data Radio, B32450-25 with the requirements for FCC Part 90 devices.
TEST METHOD:	FCC Part 90
FREQUENCY RANGE TESTED:	5 MHz - 5000 MHz
MANUFACTURER:	IP MobileNet 16842 Von Karman Avenue Irvine, CA 92606
<b>REPRESENTATIVE:</b>	Jim Lukes
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

#### SUMMARY OF RESULTS

As received, the IP MobileNet Base Station Data Radio, B32450-25 was found to be fully compliant with the following standards and specifications:

#### **United States**

➢ FCC Part 90

#### **CONDITIONS FOR COMPLIANCE**

No modifications to the EUT were necessary to comply.

#### APPROVALS

Steve Behm, Director of Engineering Services

#### **QUALITY ASSURANCE:**

**TEST PERSONNEL:** 

Joyce Walker, Quality Assurance Administrative Manager

Randy Clark, EMC Engineer

which Wich

Mike Wilkinson, Lab Manager

## **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

The EUT tested by CKC Laboratories was a production unit

## **EQUIPMENT UNDER TEST**

#### **Base Station Data Radio**

Manuf:	IP Mobilenet
Model:	B32450-25
Serial:	04020176
FCC ID:	Pending

## **PERIPHERAL DEVICES**

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

### Laptop Computer

Manuf:CompaqModel:1456VQLINSerial:1V96CLS8W8PVFCC ID:DoC

## Laptop Power Supply

Manuf:	Go Forward Enterprise Corp.
Model:	NT24-1S1220
Serial:	NA
FCC ID:	NA

# MouseManuf:MicrosoftModel:93633Serial:02608451FCC ID:DoC

**Power Supply** 

Manuf:	Samlex America
Model:	SEC 1223
Serial:	03061-2G04-00695
FCC ID:	NA

## **MEASUREMENT UNCERTAINTY**

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB
Conducted Emissions	+/- 1.56 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Statements of compliance are based on the nominal values only.

# TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within  $+15^{\circ}$ C and  $+35^{\circ}$ C. The relative humidity was between 20% and 75%.

#### FCC 2.1033(c)(3) USER'S MANUAL

The necessary information is contained in a separate document.

FCC 2.1033 (c)(4) TYPE OF EMISSIONS 15K0F1D.

FCC 2.1033 (c)(5) FREQUENCY RANGE 450 MHz & 465 MHz.

**FCC 2.1033 (c)(6) OPERATING POWER** 45.71 Watts.

#### FCC 2.1033 (c)(7) MAXIMUM POWER RATING

Subject to secondary site licensing. See FCC Part 90.205.

## FCC 2.1033 (c)(8) DC VOLTAGES

The necessary information is contained in a separate document.

#### FCC 2.1033 (c)(9) TUNE-UP PROCEDURE

The necessary information is contained in a separate document.

#### FCC 2.1033(c)(10) SCHEMATICS AND CIRCUITRY DESCRIPTION

The necessary information is contained in a separate document.

#### FCC 2.1033(c)(11) LABEL AND PLACEMENT

The necessary information is contained in a separate document.

#### FCC 2.1033(c)(12) SUBMITTAL PHOTOS

The necessary information is contained in a separate document.

## FCC 2.1033 (c)(13) MODULATION INFORMATION

The necessary information is contained in a separate document.

# FCC 2.1033(c)(14)/2.1046/90.205 - RF POWER OUTPUT

Frequency (MHz)	RF Power Output (Watts)		
450	39.81		
465	45.71		

EUT is a data radio for Fixed/Base use in the UHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is fed through suitable external attenuation to a power meter.

Temperature: 22°C Humidity: 38%

**Test Equipment** 

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Attenuator, 40dB		Pasternack	PE7021-40		10/20/03	10/19/05
Power Meter	00613	HP	435B	2702A16632	8/12/02	8/11/04
Power Sensor	02392	HP	8482A	2652A16108	1/31/03	1/30/05

# PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



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

Not applicable to this unit.

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

Not applicable to this unit.

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### FCC 2.1033(c)(14)/2.1049(i)/90.209- OCCUPIED BANDWIDTH

**Test Conditions**: EUT is a data radio for Fixed/Base use in the UHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is fed through suitable external attenuation to a spectrum analyzer. Temperature: 21°C, Humidity: 35%. Frequency Range Investigated: Carrier.

## FCC 90.209 20dB OCCUPIED BANDWIDTH, LOW CHANNEL



## FCC 90.209 20dB OCCUPIED BANDWIDTH, HIGH CHANNEL



#### 47 CFR 90.210(c) Calculation of Spurious Emissions Mask

Carrier Frequency:	450.000	MHz
Authorized Bandwidth:	25.0	kHz
Peak Unmodulated Power Output:	46.0000	dBm
Peak Unmodulated Power Output:	39.8107	Watts

#### **Calculation of Attenuation Requirements:**

P is the peak unmodulated carrier output power in Watts. and fd is the displacement frequency from the center of the authorized bandwidth in kHz.

*NOTE:* Only the endpoints are calculated. The limit line is linearly interpolated between the two points on a LOG - Linear scale.

#### 90.210(c)(1)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz, but not more than 10 kHz: At least 83 log (fd/5) dB;

F(fd) = 83*	LOG(fd/5)	_
F(5) =	0.0	dBc
F(10) =	25.0	dBc

#### 90.210(c)(2)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 29 log (fd^2/11) dB or 50 dB, whichever is the lesser attenuation;

Point	fd (kHz)	29LOG(fd^2/11)	50
1	10	27.8	50
2	24.1	50.0	50

Point 2 is when 29LOG(fd<sup>2</sup>/11) is equal to 50

#### 90.210(c)(3)

On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P) dB$ .

43+10LOG(P) = 59.0

# FCC 2.1033(c)(14)/2.1049/90.210(c) EMISSIONS MASK, LOW CHANNEL



# FCC 90.210(c) EMISSIONS MASK, HIGH CHANNEL



#### **Test Equipment**

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer 100Hz						
- 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/26/04
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/03	2/26/04
Spectrum Analyzer QP						
Adapter	00478	HP	85650A	2811A01267	2/26/03	2/26/04
Attenuator, 40dB		Pasternack	PE7021-40		10/20/03	10/19/05

# PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



#### FCC 2.1033(c)(14)/2.1051/90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

Test Location:	CKC Lat	ooratories •5473A Clouds Re	st • Mariposa, CA 9533	8 • 1-80	0-500-4EMC (4362)	
Customer:	IP Mobi	lenet				
Specification:	90.210(c	) - Base Station				
Work Order #:	81737	, ,	Date:	01/14/2	2004	
Test Type:	Antenna	Terminals Conducted	Time:	16:48:	36	
51	Emission	18				
Equipment:	Base Sta	tion Data Radio	Sequence#:	1		
Manufacturer:	IP Mobil	enet	Tested By:	Mike V	Wilkinson	
Model:	B32450-2	25	5	13.8 V	DC	
S/N:	0402017	6				
Equipment Unde	er Test (* :	= EUT):				
Function		Manufacturer	Model #		S/N	
Base Station Data	Radio*	IP Mobilenet	B32450-25		04020176	
Support Devices:						
Function		Manufacturer	Model #		S/N	
Laptop Computer		Compaq	1456VQLIN		1V96CLS8W8PV	
Mouse		Microsoft	93633		02608451	
Laptop Power Sup	ply	Go Forward Enterprise Corp.	NT24-1S1220		NA	

#### Test Conditions / Notes:

Power Supply

EUT is a data radio for Fixed/Base use in the UHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is fed through suitable external attenuation to a spectrum analyzer. Transmit Frequency: 450 MHz. Temperature: 21°C, Humidity: 35%. Frequency Range Investigated: 5 MHz to 5000 MHz. Measurement Bandwidth Settings: 10 MHz to 1000 MHz - RBW=VBW=10kHz, 1000 MHz to 2000 MHz - RBW=VBW=1MHz.

SEC 1223

Samlex America

#### Transducer Legend:

T1=Pad 40dB Atten

Measu	rement Data:	Re	eading lis	ted by 1	nargin.	. Test Lead: RF Output					
#	Freq	Rdng	T1				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	449.997M	112.4	+40.6				+0.0	153.0	153.0	+0.0	RF Ou
									Carrier-Lo	)W	
									Channel		
2	2700.003M	51.3	+40.8				+0.0	92.1	94.0	-1.9	RF Ou
3	3150.005M	50.4	+40.8				+0.0	91.2	94.0	-2.8	RF Ou
4	1799.995M	46.9	+40.8				+0.0	87.7	94.0	-6.3	RF Ou
5	4049.988M	45.2	+40.8				+0.0	86.0	94.0	-8.0	RF Ou

03061-2G04-00695

Ī	6	1349.998M	41.8	+40.8	+0.0	82.6	94.0	-11.4	RF Ou
	7	439.600M	41.0	+40.7	+0.0	81.7	94.0	-12.3	RF Ou
	8	900.001M	40.7	+40.7	+0.0	81.4	94.0	-12.6	RF Ou
	9	900.000M	39.7	+40.7	+0.0	80.4	94.0	-13.6	RF Ou
	10	4950.000M	37.8	+40.8	+0.0	78.6	94.0	-15.4	RF Ou
	11	3599.991M	35.7	+40.8	+0.0	76.5	94.0	-17.5	RF Ou
	12	480.200M	35.7	+40.6	+0.0	76.3	94.0	-17.7	RF Ou
	13	2249.992M	34.7	+40.8	+0.0	75.5	94.0	-18.5	RF Ou
	14	4500.003M	34.6	+40.8	+0.0	75.4	94.0	-18.6	RF Ou
	15	420.200M	34.1	+40.7	+0.0	74.8	94.0	-19.2	RF Ou
	16	470.200M	33.9	+40.6	+0.0	74.5	94.0	-19.5	RF Ou
	17	490.100M	33.4	+40.6	+0.0	74.0	94.0	-20.0	RF Ou
	18	460.200M	33.2	+40.6	+0.0	73.8	94.0	-20.2	RF Ou
	19	275.400M	29.4	+40.6	+0.0	70.0	94.0	-24.0	RF Ou
	20	91.390M	29.4	+40.6	+0.0	70.0	94.0	-24.0	RF Ou
	21	20.640M	28.5	+40.6	+0.0	69.1	94.0	-24.9	RF Ou
	22	4.750M	27.6	+40.6	+0.0	68.2	94.0	-25.8	RF Ou
- 1									

Test Location:	CKC Laboratories	•5473A Clouds Rest	· Mariposa,	CA	95338	•	1-800-500-4EMC (4	4362)	)
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Customer: Specification:	IP Mobilenet 90.210(c) - Base Station		
Work Order #:	81737	Date:	01/15/2004
Test Type:	Antenna Terminals Conducted	Time:	14:00:13
	Emissions		
Equipment:	Base Station Data Radio	Sequence#:	2
Manufacturer:	IP Mobilenet	Tested By:	Mike Wilkinson
Model:	B32450-25	-	13.8 VDC
S/N:	03453045		

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

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32450-25	03453045
Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV
Mouse	Microsoft	93633	02608451
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Power Supply	Samlex America	SEC 1223	03061-2G04-00695

#### Test Conditions / Notes:

EUT is a data radio for Fixed/Base use in the UHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is fed through suitable external attenuation to a spectrum analyzer. Transmit Frequency: 465 MHz. Temperature: 21°C Humidity: 35%. Frequency Range Investigated: 5 MHz to 5000 MHz. Measurement Bandwidth Settings: 10 MHz to 1000 MHz - RBW=VBW=10kHz, 1000 MHz to 2000 MHz - RBW=VBW=1MHz.

Transducer Legend:

T1=Pad 40dB Atten

Measu	rement Data:	Re	eading lis	ted by m	nargin.	rgin. Test Lead: RF Output					
#	Freq	Rdng	T1				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	465.000M	113.0	+40.6				+0.0	153.6	153.6	+0.0	RF Ou
									Carrier-M	id	
									Channel		
2	1394.998M	50.0	+40.8				+0.0	90.8	94.0	-3.2	RF Ou
3	3255.005M	42.2	+40.8				+0.0	83.0	94.0	-11.0	RF Ou
4	2324.990M	38.4	+40.8				+0.0	79.2	94.0	-14.8	RF Ou
5	1859.997M	36.5	+40.8				+0.0	77.3	94.0	-16.7	RF Ou
6	930.003M	35.4	+40.7				+0.0	76.1	94.0	-17.9	RF Ou
7	4184.992M	35.2	+40.8				+0.0	76.0	94.0	-18.0	RF Ou

8	4650.024M	35.0	+40.8		+0.0	75.8	94.0	-18.2	RF Ou
9	3720.018M	32.4	+40.8		+0.0	73.2	94.0	-20.8	RF Ou
10	466.655M	30.7	+40.6		+0.0	71.3	94.0	-22.7	RF Ou
11	102.100M	25.7	+40.6		+0.0	66.3	94.0	-27.7	RF Ou
12	421.700M	23.4	+40.7		+0.0	64.1	94.0	-29.9	RF Ou
13	9.050M	20.4	+40.6		+0.0	61.0	94.0	-33.0	RF Ou

#### **Test Equipment**

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer 100Hz						
- 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/26/04
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/03	2/26/04
Spectrum Analyzer QP						
Adapter	00478	HP	85650A	2811A01267	2/26/03	2/26/04
Attenuator, 40dB		Pasternack	PE7021-40		10/20/03	10/19/05

# PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



# FCC 2.1033(c)(14)/2.1053/90.210 - FIELD STRENGTH OF SPURIOUS RADIATION

Test Location:	CKC Lal	boratories •5473A Clouds Rest	• Mariposa, CA 9533	8 • 1-800-500-4EMC (4362)			
Customer: Specification: Work Order #: Test Type: Equipment: Manufacturer: Model: S/N:	<b>IP Mobi</b> <b>FCC 90.</b> <b>81737</b> <b>Maximiz</b> <b>Base Sta</b> IP Mobil B32450- 0402017	lenet 210 zed Emissions ation Data Radio enet 25 6	Date: 01/16/2004 Time: 14:02:37 Sequence#: 3 Tested By: Mike Wilkinson				
Equipment Unde	er Test (* :	= EUT):					
Function		Manufacturer	Model #	S/N			
Base Station Data	Radio*	IP Mobilenet	B32450-25	04020176			
Support Devices:	•						
Function		Manufacturer	Model #	S/N			
Laptop Computer		Compaq	1456VQLIN	1V96CLS8W8PV			
Mouse		Microsoft	93633	02608451			
Laptop Power Sup	oply	Go Forward Enterprise Corp.	NT24-1S1220	NA			
Power Supply		Samlex America	SEC 1223	03061-2G04-00695			
Test Conditions	Notes:						
EUT is a data rad	io for Fixe	ed/Base use in the UHF frequ	ency range. Equipm	ent is DC powered by support power			
supply. Support l	laptop is u	used for configuration and test	sting purposes only.	Output of antenna port is terminated			
with 50 Ohm te	rmination	through a 40 dB attenuat	tor. Transmit Freque	ency 450.000 MHz, Low Channel.			
Temperature: 22°	C, Humic	lity: 35%. Frequency Rang	ge Investigated: 5 I	MHz to 5000 MHz. Measurement			
Bandwidth Settin	ngs: 10	) MHz to 1000 MHz -	RBW=VBW=10kH	Iz, 1000 MHz to 2000 MHz -			
RBW=VBW=1M	Hz. No E	UT emissions detected with	in 20dB of the limit.				
Transducer Lege	end:						

Measur	Measurement Data:		Reading li	isted by n	margin. Test Distance: 3 Meters					5	
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant

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

Customer: Specification: Work Order #: Test Type: Equipment: Manufacturer:	IP Mobilenet FCC 90.210 81737 Maximized Emissions Base Station Data Radio IP Mobilenet	Date: Time: Sequence#: Tested By:	01/16/2004 14:06:13 4 Mike Wilkinson
Model: S/N:	B32450-25 04020176	Tested Dy.	wike wikiison

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

	,		
Function	Manufacturer	Model #	S/N
Base Station Data Radio	IP Mobilenet	B32450-25	03453045
Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV
Mouse	Microsoft	93633	02608451
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Power Supply	Samlex America	SEC 1223	03061-2G04-00695

#### Test Conditions / Notes:

EUT is a data radio for Fixed/Base use in the UHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is terminated with 50 Ohm termination through a 40 dB attenuator. Transmit Frequency 465.000 MHz, Low Channel. Temperature: 22°C, Humidity: 35%. Frequency Range Investigated: 5 MHz to 5000 MHz. Measurement Bandwidth Settings: 10 MHz to 1000 MHz - RBW=VBW=10kHz, 1000 MHz to 2000 MHz - RBW=VBW=1MHz. No EUT emissions detected within 20dB of the limit.

Transducer Legend:

Measur	rement Data:	R	eading li	sted by n	nargin.	in. Test Distance: 3 Meters					
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant

#### **Test Equipment**

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Antenna, Biconilog	01991	Chase	CBL6111C	2456	12/13/02	12/12/04
Antenna, Loop	00226	EMCO	6502	1074	5/21/03	5/20/05
Antenna, Horn 1-18 GHz	00326	EMCO	3115	3413	4/25/03	4/25/05
Preamp	02010	HP	8449B	3008A00301	10/18/02	10/17/04
Preamp	00099	HP	8447D	1937A02604	3/7/03	3/6/04
Spectrum Analyzer 100Hz						
- 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/26/04
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/03	2/26/04
Spectrum Analyzer QP						
Adapter	00478	HP	85650A	2811A01267	2/26/03	2/26/04
50 Ohm Termination	P04243	JFW	50T-022	N/A	5/9/03	5/9/05
Attenuator, 40dB		Pasternack	PE7021-40		10/20/03	10/19/05

# PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View



Radiated Emissions - Back View

## FCC 2.1033(c)(14)/2.1055/90.213- FREQUENCY STABILITY

**Test Conditions:** EUT is a data radio for Fixed/Base use in the UHF frequency range. EUT is placed inside a temperature chamber with all support equipment exterior. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Output of antenna port is fed through suitable external attenuation to a spectrum analyzer. Temperature: 21°C, Humidity: 35%.

Customer:	IP Mobilenet
WO#:	81737
Date:	17-Jan-04
Test Engineer:	Randal Clark
Device Model #:	B32450-25
<b>Operating Voltage:</b>	13.8 <b>VDC</b>
Frequency Limit:	2.5 <b>PPM</b>

#### **Temperature Variations**

	Channel 1 (MHz)	Dev. (MHz)	Channel 2 (MHz)	Dev. (MHz)
Channel Frequency:	450.000		465.000	
Temp (C) Voltage				
-30 13.8	450.00109	0.00109	465.00085	0.00085
-20 13.8	450.00090	0.00090	465.00074	0.00074
-10 13.8	450.00086	0.00086	465.00068	0.00068
0 13.8	450.00043	0.00043	465.00030	0.00029
10 13.8	450.00032	0.00032	465.00022	0.00022
20 13.8	450.00028	0.00027	465.00020	0.00020
30 13.8	450.00024	0.00023	465.00009	0.00009
40 13.8	450.00005	0.00005	464.99967	0.00033
50 13.8	449.99981	0.00019	464.99950	0.00050

#### Voltage Variations (±15%)

			PASS		PASS
Max Deviation (	PPM)		2.42222		1.82796
Max Deviation (	MHz)		0.00109		0.00085
20	15.9	450.00022	0.00022	465.00022	0.00022
20 13.8		450.00026	0.00026	465.00020	0.00020
20	11.7	450.00024	0.00024	465.00024	0.00023

#### Test Equipment

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Digital Multimeter	01241	Radio Shack	22-183	NA		NR
Spectrum Analyzer 100Hz - 22.5GHz	00490	HP	8566B	2209A01404	2/26/03	2/26/04
Spectrum Analyzer Display	00489	НР	8566B	2403A08241	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	00478	НР	85650A	2811A01267	2/26/03	2/26/04
Temp Chamber	01879	Thermotron	S-1.2 MiniMax	11899	1/31/03	1/31/05
Thermometer	02242	Omega	HH-26K	T-202884	8/15/03	8/14/05
Power Supply, DC	00765	Sorensen	DCR-60-30B	176	7/8/03	7/7/05
Attenuator, 40dB		Pasternack	PE7021-40		10/20/03	10/19/05

NR = Not Required

## PHOTOGRAPH SHOWING TEMPERATURE TESTING



# FCC 2.1091 – MPE CALCULATIONS

### Maximum Permissible Exposure Calculations Date of Report: 1-15-04

Calculations prepared for:	Calculations prepared by:
IP Mobilenet	<i>Mike Wilkinson</i> CKC Laboratories, Inc. 5473A Clouds Rest Road Mariposa, CA 95338
Model Number: B32450-25	
Fundamental Operating Frequency:	450 - 480 MHz
Maximum Rated Output Power: Measured Output Power: Low Channel, 450 MHz Measured Output Power: High Channel, 465 MHz	40 Watts 39.81 45.71

MPE Limit in accordance with 1.1310(b): Limits for general population/uncontrolled exposure

MPE Limit =  $0.3 (mW/cm^2)$ 

EIRP Distance		Power Density	Result
(mW)	(meters)	$(mW/cm^2)$	
39810.72 (450MHz)	1.0276	0.3	Pass
45708.82 (465MHz)	1.1011	0.3	Pass

 $PowerDensity(mW/cm^{2}) = \frac{EIRP}{4\pi d^{2}}$ 

Given: **EIRP** in *mW* and **d** in *cm* 

Note: Antennae are not sold with this equipment; EIRP is listed assuming a 0dBi gain antenna.

As can be seen from the MPE results, this device passes the limits specified in 1.1310 at a distance of 1.1011 meters and at a output power of 45.71 watts assuming a 0dBi gain antenna. Users and installers must be provided with appropriate antenna installation instructions and transmitter operating conditions, including antenna co-location requirements of §1.1307(b)(3), for satisfying RF exposure compliance.











#### FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR, T3 LOW CHANNEL





# Test Equipment

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Analyzer, Modulation	02072	НР	8901A	2751A05181	11/27/02	11/26/04
Oscilloscope	02313	HP	84615B	US373340347	1/2/03	1/20/05
Power Meter	00613	HP	435B	2702A16632	8/12/02	8/11/04
Power Sensor	02392	HP	8482A	2652A16108	1/31/03	1/30/05
Generator, Signal	01469	HP	8673C	2822A00551	9/13/02	9/12/04

# FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR SETUP



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