IP MOBILENET TEST REPORT

FOR THE

BASE STATION DATA RADIO, B32150-25

FCC PART 90

COMPLIANCE

DATE OF ISSUE: DECEMBER 5, 2003

PREPARED FOR:

IP Mobilenet
16842 Von Karman Avenue
Irvine, CA 92606

P.O. No.: 003041-00
W.O. No.: 81580

PREPARED BY:

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

Date of test: November 25 - December 3, 2003

Report No.: FC03-074

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

DATE OF TEST:	November 25 - December 3, 2003
DATE OF RECEIPT:	November 25, 2003
PURPOSE OF TEST:	To demonstrate the compliance of the Base Station Data Radio, B32150-25 with the requirements for FCC Part 90 devices.
TEST METHOD:	FCC Part 90
FREQUENCY RANGE TESTED:	150 kHz - 1000 MHz
MANUFACTURER:	IP Mobilenet 16842 Von Karman Avenue Irvine, CA 92606
REPRESENTATIVE:	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, B32150-25 was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 90

FCC Site File No.: 90477

CONDITIONS FOR COMPLIANCE

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

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Randy Clark, EMC Engineer

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: B32150-25
Serial: 03412695
FCC ID: Pending

PERIPHERAL DEVICES

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

Laptop Computer
Manuf: Compaq
Model: 1456VQLIN
Serial: 1V96CLS8W8PV
FCC ID: DoC

Mouse
Manuf: Microsoft
Model: 93633
Serial: 02608451
FCC ID: DoC

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

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°C and + 35°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
19K0F1D

FCC 2.1033 (c)(5) FREQUENCY RANGE
151 MHz – 157 MHz.

FCC 2.1033 (c)(6) OPERATING POWER
69.2 Watts

FCC 2.1033 (c)(7) MAXIMUM POWER RATING
Max power rating is listed per antenna height and is subject to secondary licensing requirements. For max power rating see 90.205(d) Table 1.

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
4 level FSK.

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

Frequency (MHz)	RF Power Output (Watts)
151	69.2
157	69.2

EUT is a data radio for mobile use in the VHF 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: 20ºC
Humidity: 30%

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

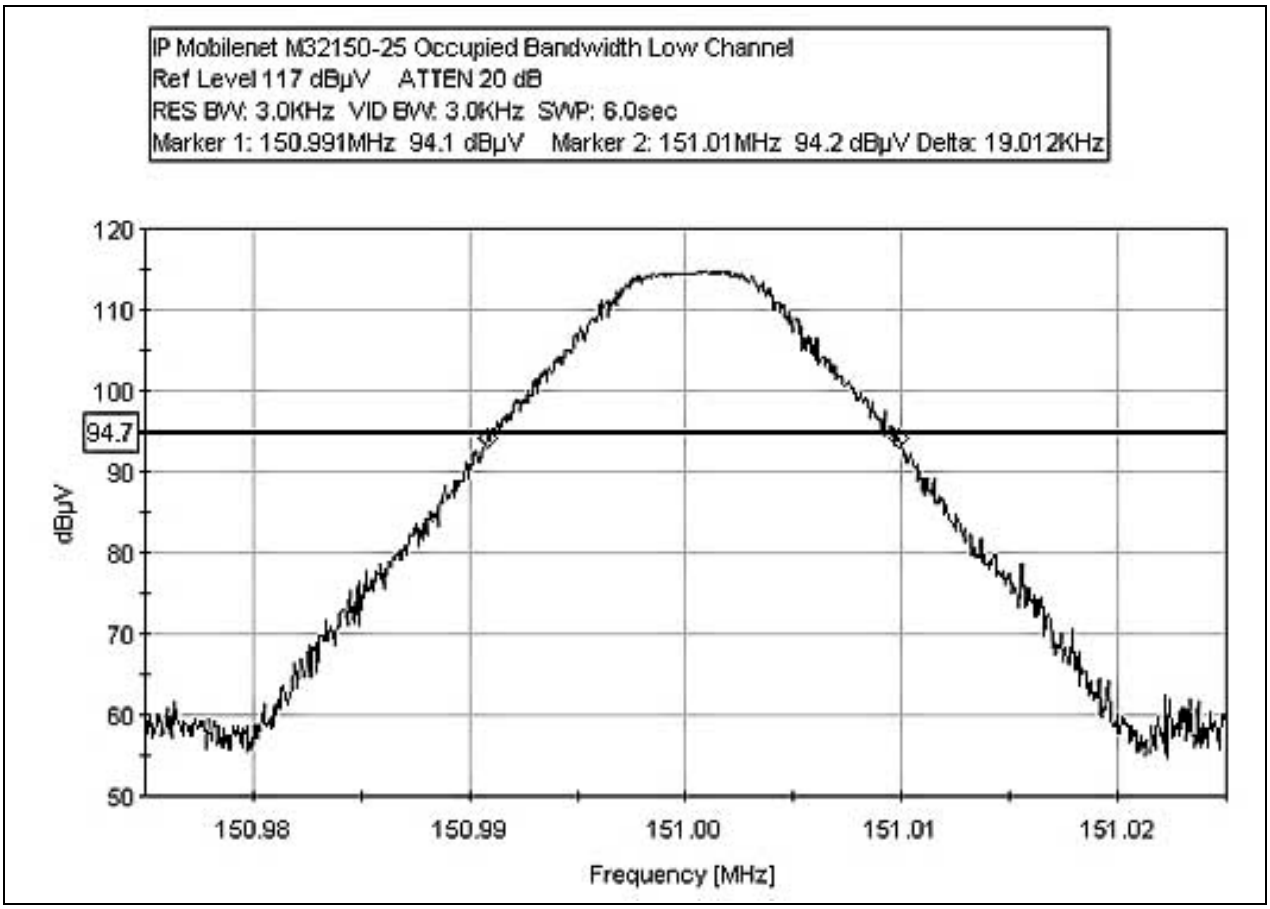
Not applicable to this unit.

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

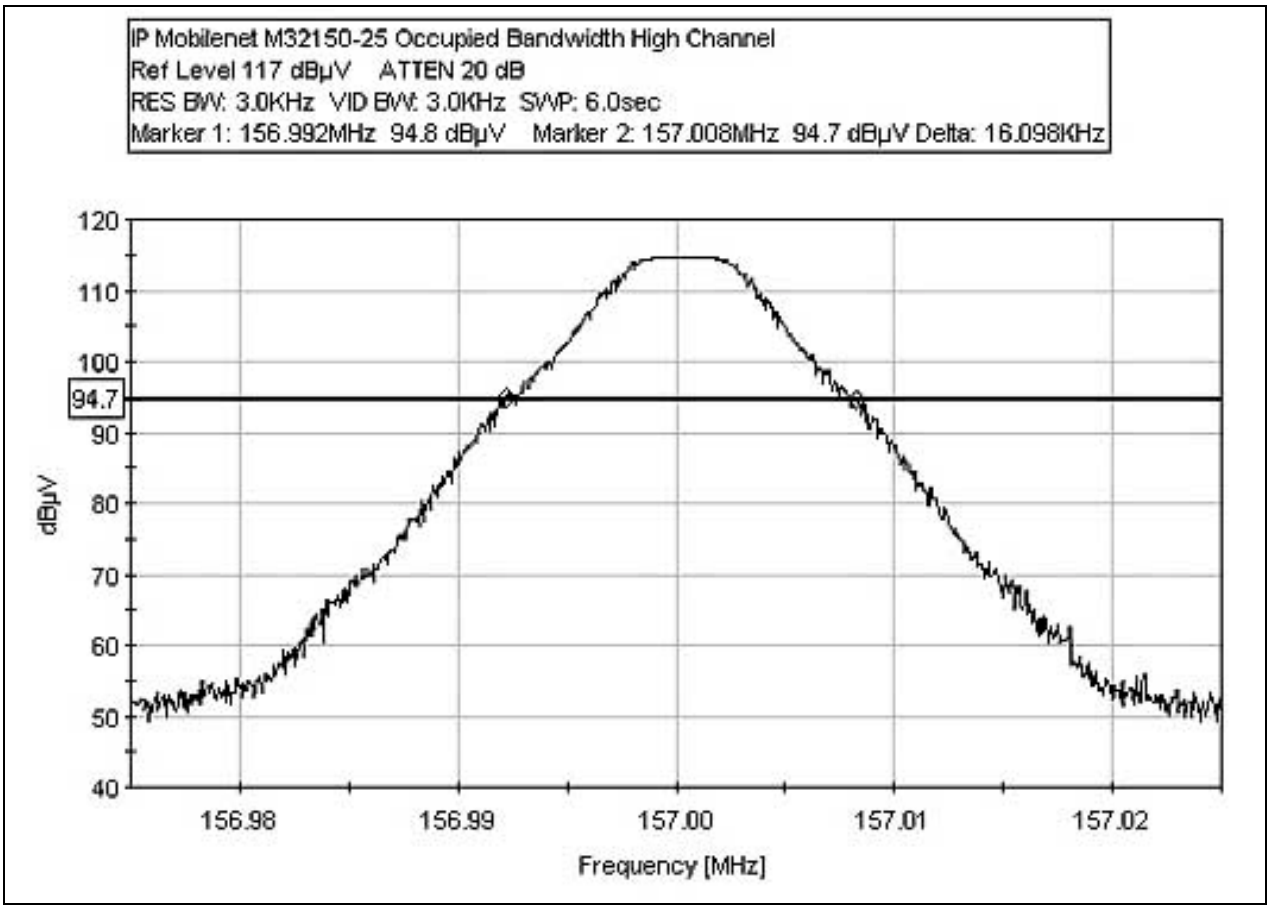
Not applicable to this unit.

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

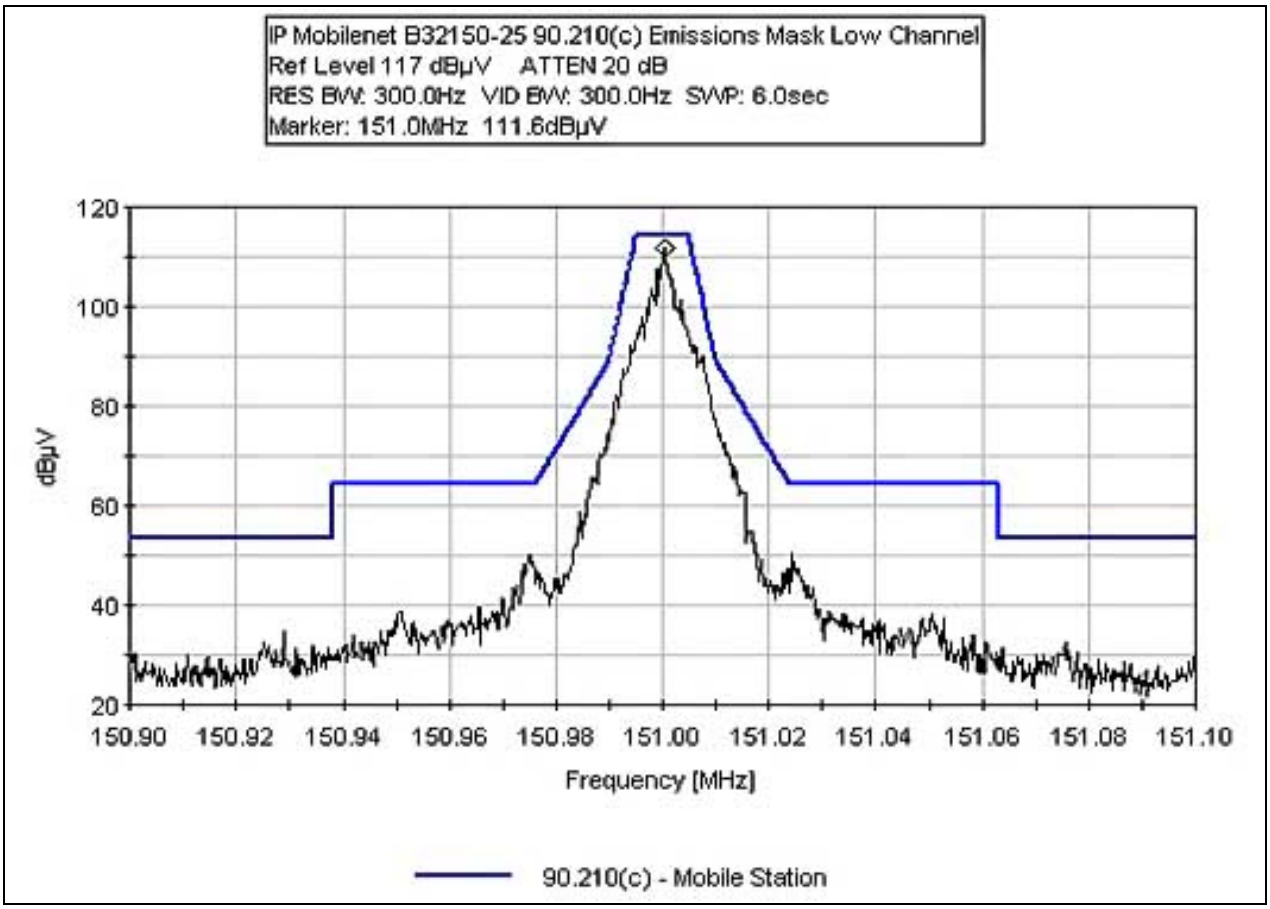
OCCUPIED BANDWIDTH LOW CHANNEL



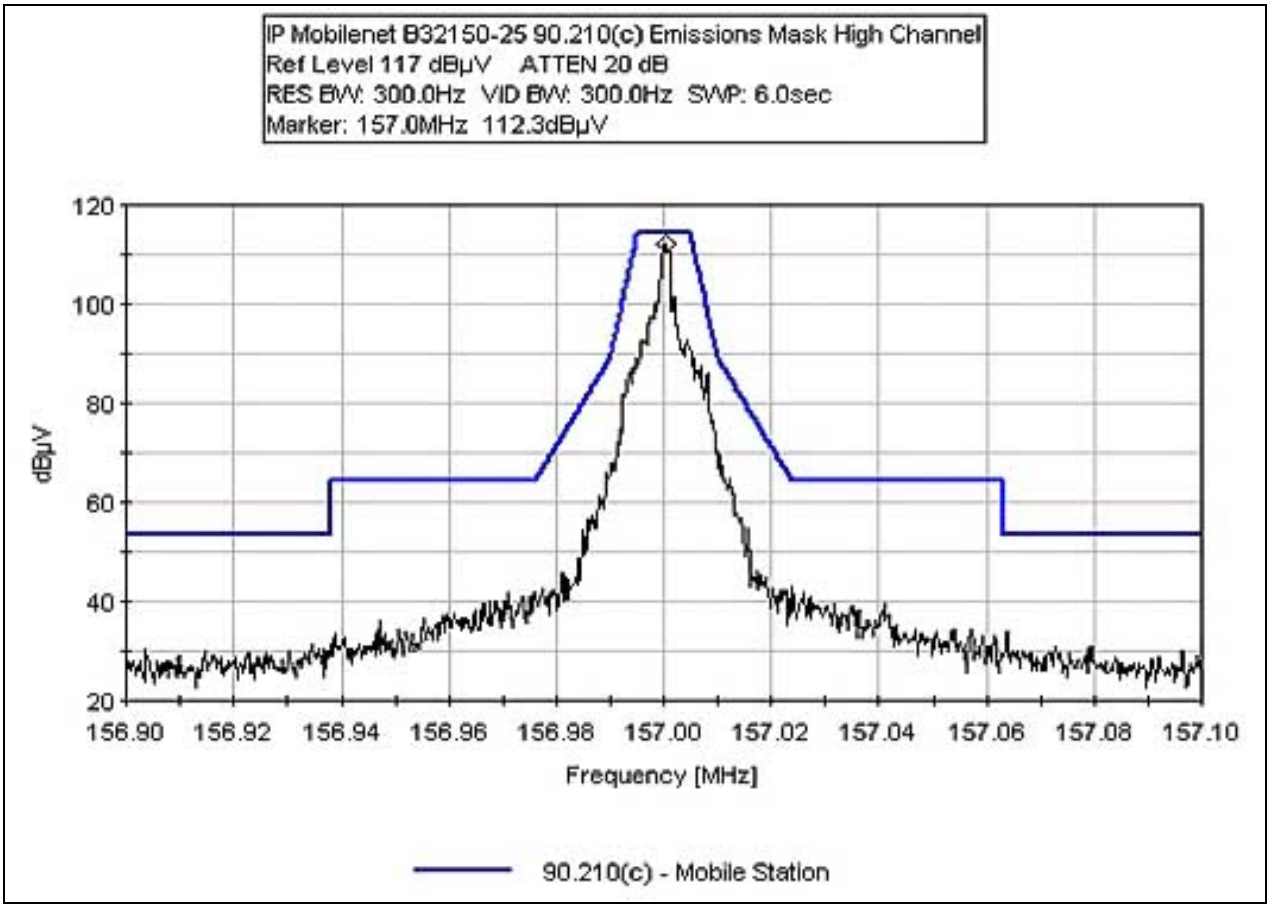
OCCUPIED BANDWIDTH HIGH CHANNEL



FCC 90.210(c) EMISSIONS MASK LOW CHANNEL



FCC 90.210c EMISSIONS MASK HIGH CHANNEL



PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS

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

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

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

Customer:	**IP Mobilenet**		
Specification:	**90.210(c) - Mobile Station**		
Work Order #:	**81580**	Date:	11/26/2003
Test Type:	**Antenna Terminals Conducted Emissions**	Time:	14:17:57
Equipment:	**Base Station Data Radio**	Sequence#:	2
Manufacturer:	IP Mobilenet	Tested By:	Mike Wilkinson
Model:	B32150-25		13.8 VDC
S/N:	03412695		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	00490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	00489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	00478
Attenuator, PE7021-40	NA	10/20/2003	10/20/2004	

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

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32150-25	03412695

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 base station use in the VHF 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: 157 MHz. Temperature: 20ºC, Humidity: 30%. Frequency Range Investigated: 5 MHz to 2000 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

Measurement Data: Reading listed by margin. Test Lead: RF Output

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	156.999M	114.7	+40.6				+0.0	155.3	155.3 Carrier	+0.0	RF Ou
2	471.000M Ave	51.3	+40.6				+0.0	91.9	94.0	-2.1	RF Ou
^	471.000M	53.5	+40.6				+0.0	94.1	94.0	+0.1	RF Ou

4	314.000M	50.4	+40.6	+0.0	91.0	94.0	-3.0	RF Ou
5	627.999M	45.5	+40.7	+0.0	86.2	94.0	-7.8	RF Ou
6	785.002M	44.4	+40.7	+0.0	85.1	94.0	-8.9	RF Ou
7	144.100M	39.0	+40.6	+0.0	79.6	94.0	-14.4	RF Ou
8	174.150M	39.0	+40.6	+0.0	79.6	94.0	-14.4	RF Ou
9	15.540M	38.9	+40.6	+0.0	79.5	94.0	-14.5	RF Ou
10	165.500M	38.7	+40.6	+0.0	79.3	94.0	-14.7	RF Ou
11	63.460M	38.1	+40.6	+0.0	78.7	94.0	-15.3	RF Ou
12	113.470M	38.1	+40.6	+0.0	78.7	94.0	-15.3	RF Ou
13	941.996M	31.9	+40.7	+0.0	72.6	94.0	-21.4	RF Ou
14	1098.995M	28.7	+40.6	+0.0	69.3	94.0	-24.7	RF Ou
15	1256.004M	27.5	+40.8	+0.0	68.3	94.0	-25.7	RF Ou
16	1413.016M	25.2	+40.8	+0.0	66.0	94.0	-28.0	RF Ou
17	1570.019M	21.3	+40.7	+0.0	62.0	94.0	-32.0	RF Ou
18	1726.998M	20.7	+40.7	+0.0	61.4	94.0	-32.6	RF Ou

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

Customer: **IP Mobilenet**
Specification: **90.210(c)**
Work Order #: **81580** Date: 11/26/2003
Test Type: **Antenna Terminals Conducted Emissions** Time: 13:42:38
Equipment: **Base Station Data Radio** Sequence#: 1
Manufacturer: IP Mobilenet Tested By: Mike Wilkinson
Model: B32150-25 13.8 VDC
S/N: 03412695

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	00490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	00489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	00478
Attenuator, PE7021-40	NA	10/20/2003	10/20/2004	

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

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32150-25	03412695

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 base station use in the VHF 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: 151 MHz. Temperature: 20ºC, Humidity: 30%. Frequency Range Investigated: 5 MHz to 2000 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

Measurement Data: Reading listed by margin. Test Lead: RF Output

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	150.998M	114.8	+40.6				+0.0	155.4	155.4 Carrier	+0.0	RF Ou
2	604.008M	51.1	+40.7				+0.0	91.8	94.0	-2.2	RF Ou
3	452.997M	44.7	+40.6				+0.0	85.3	94.0	-8.7	RF Ou
4	301.999M	42.6	+40.6				+0.0	83.2	94.0	-10.8	RF Ou
5	755.020M	41.0	+40.7				+0.0	81.7	94.0	-12.3	RF Ou

6	906.006M	40.9	+40.7	+0.0	81.6	94.0	-12.4	RF Ou
7	146.010M	39.5	+40.6	+0.0	80.1	94.0	-13.9	RF Ou
8	120.150M	30.8	+40.6	+0.0	71.4	94.0	-22.6	RF Ou
9	1207.987M	29.4	+40.7	+0.0	70.1	94.0	-23.9	RF Ou
10	153.410M	26.2	+40.6	+0.0	66.8	94.0	-27.2	RF Ou
11	148.660M	26.1	+40.6	+0.0	66.7	94.0	-27.3	RF Ou
12	1510.038M	24.2	+40.7	+0.0	64.9	94.0	-29.1	RF Ou
13	1811.986M	23.7	+40.8	+0.0	64.5	94.0	-29.5	RF Ou
14	1056.993M	22.7	+40.6	+0.0	63.3	94.0	-30.7	RF Ou
15	96.250M	20.6	+40.6	+0.0	61.2	94.0	-32.8	RF Ou
16	31.160M	18.2	+40.6	+0.0	58.8	94.0	-35.2	RF Ou

PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS

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

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

Customer:	**IP Mobilenet**		
Specification:	**FCC 90.210**		
Work Order #:	**81580**	Date:	12/01/2003
Test Type:	**Maximized Emissions**	Time:	11:20:08
Equipment:	**Base Station Data Radio**	Sequence#:	3
Manufacturer:	IP Mobilenet	Tested By:	Mike Wilkinson
Model:	B32150-25		
S/N:	03412695		

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

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32150-25	03412695

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 base station use in the VHF 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 151 MHz & 157 MHz. Temperature: 20ºC, Humidity: 30%. Frequency Range Investigated: 5 MHz to 2000 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:

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	dBµV	dB	Ant

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

FCC 90.210 OATS Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

FCC 90.210 Oats - Back View

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

Test Conditions:

Frequency Stability

Customer: IP Mobilenet
WO#: 81580
Date: 03-Dec-03
Test Engineer: Mike Wilkinson

Device Model #: B32150-25
Operating Voltage: 13.8 **VDC**
Frequency Limit: 50 **PPM**

Temperature Variations

Channel Frequency:		Channel 1 (MHz) 151	Dev. (MHz)	Channel 2 (MHz) 157	Dev. (MHz)
Temp (C)	Voltage				
-30	13.8	151.00042	0.00042	157.00059	0.00059
-20	13.8	151.00050	0.00050	157.00027	0.00027
-10	13.8	151.00043	0.00043	157.00069	0.00069
0	13.8	151.00057	0.00057	157.00079	0.00079
10	13.8	151.00054	0.00054	157.00069	0.00069
20	13.8	151.00029	0.00029	157.00041	0.00041
30	13.8	151.00030	0.00030	157.00074	0.00074
40	13.8	151.00060	0.00060	157.00028	0.00028
50	13.8	151.00083	0.00083	157.00057	0.00057

Voltage Variations (±15%)

20	11.7	151.00027	0.00027	157.00035	0.00035
20	13.8	151.00029	0.00029	157.00041	0.00041
20	15.9	151.00030	0.00030	157.00043	0.00043

Max Deviation (MHz)	**0.00083**		**0.00079**
Max Deviation (PPM)	**5.49669**		**5.03185**
	PASS		**PASS**

PHOTOGRAPH SHOWING TEMPERATURE TESTING

FCC 90.213 Frequency Stability

Test Equipment

Description	*Asset #*	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Digital Multimeter	01241	Radio Shack	22-183	NA		NCR
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
Temp Chamber	01879	Thermotron	S-1.2 MiniMax	11899	1/31/03	1/31/04
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

FCC 2.1091 – MPE CALCULATIONS

Maximum Permissible Exposure Calculations

Date of Report: 10/29/03

Calculations prepared for:

IP Mobilenet

Calculations prepared by:

Mike Wilkinson
CKC Laboratories, Inc.
5473A Clouds Rest Road
Mariposa, CA 95338

Model Number: B32150-25

Fundamental Operating Frequency: 151-157 MHz

Maximum Rated Output Power: 69.2 Watts
Measured Output Power: 69.2 Watts

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

MPE Limit = 0.2 (mW/cm^2)

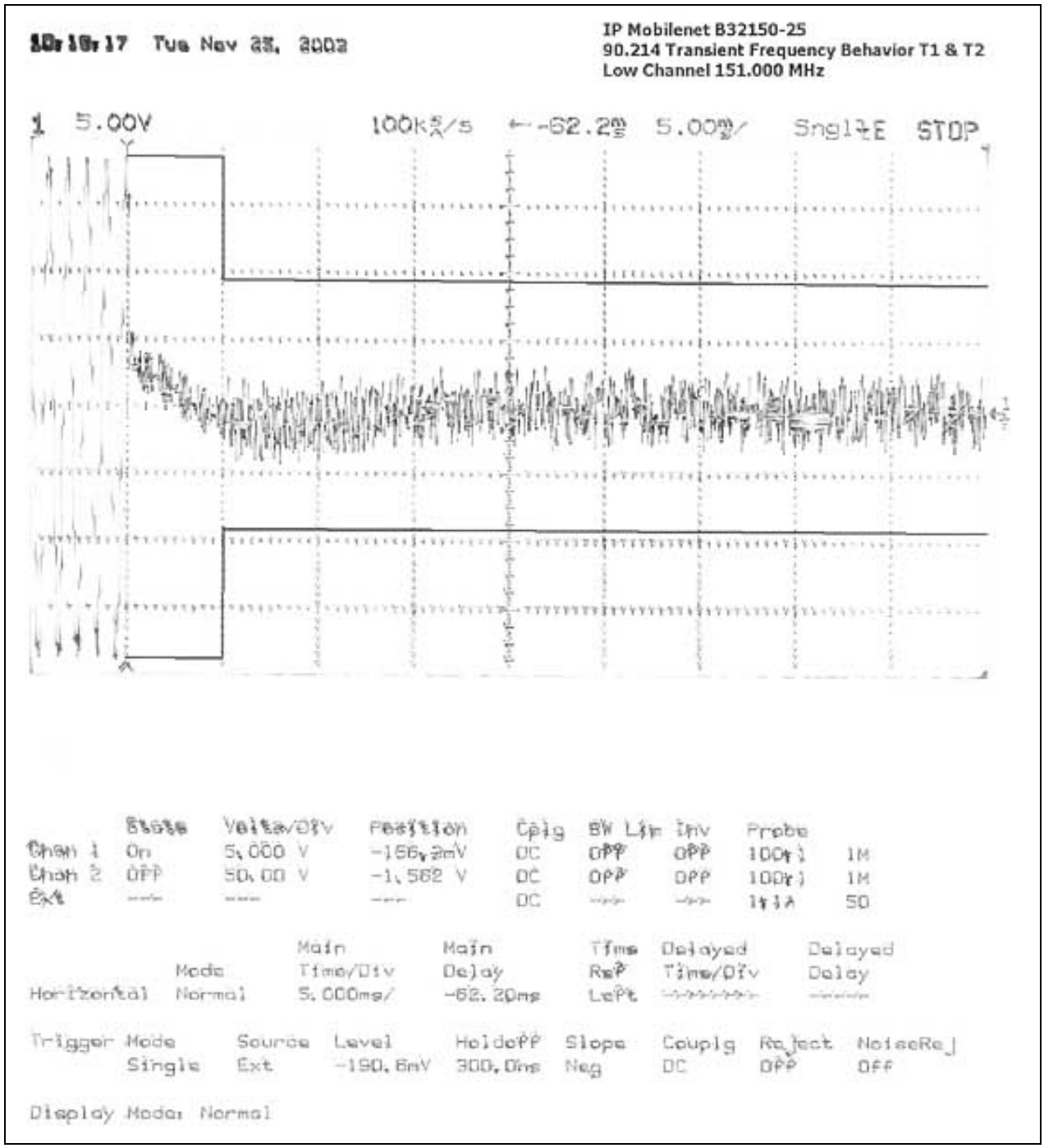
EIRP (mW)	Distance (meters)	Power Density (mW/cm^2)	Result
69200.00	1.66	0.2	Pass

$$PowerDensity(mW/cm^2) = \frac{EIRP}{4\pi d^2}$$ Given: **EIRP** in *mW* and **d** in *cm*

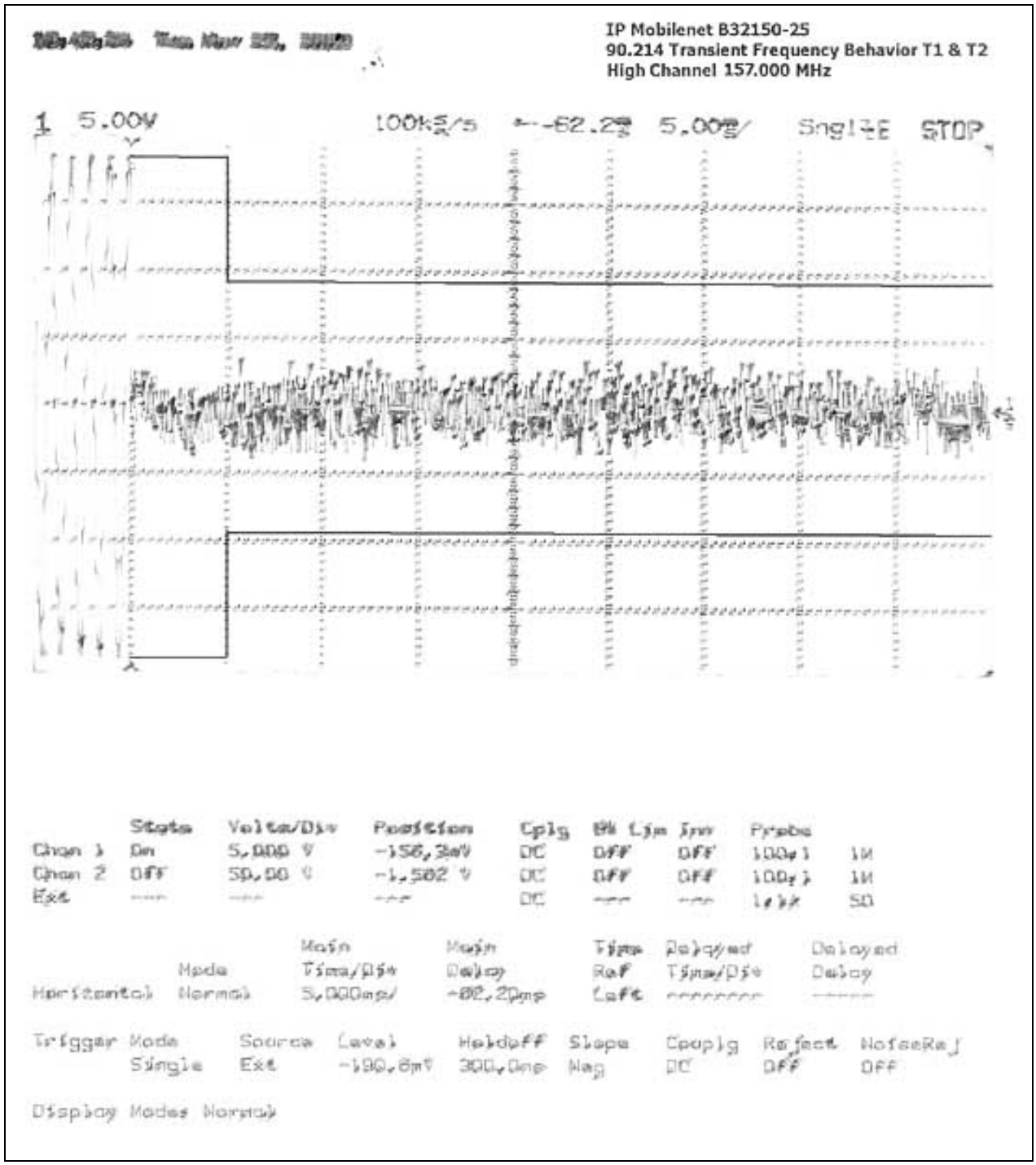
Note: Antennae are not sold with this equipment; EIRP is listed assuming a 0dBi gain antenna.

As can be seen from the MPE results, this device passes the limits specified in 1.1310 at a distance of 1.66 meters and at a output power of 69.2 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.

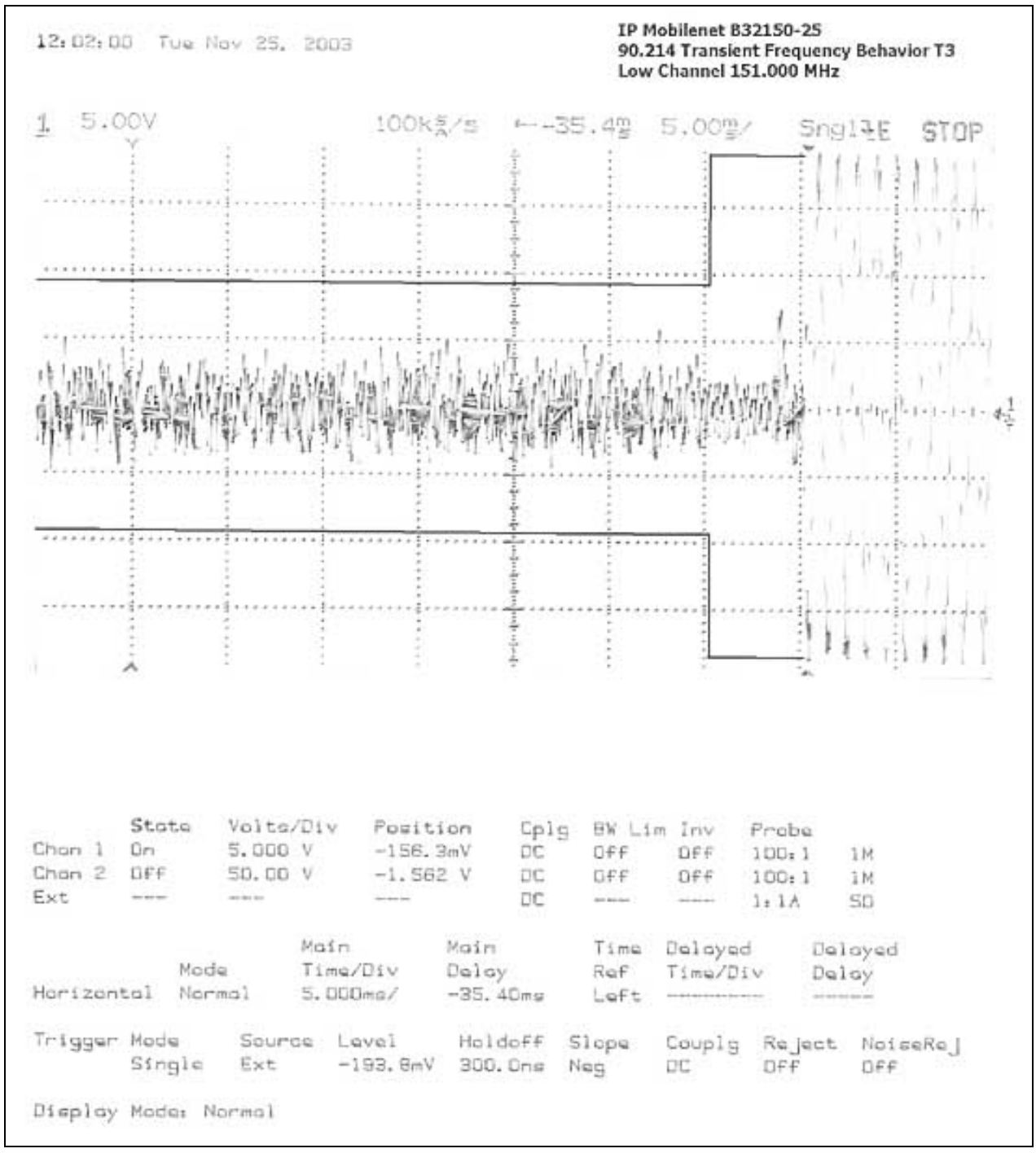
FCC 90.214 - TRANSIENT FREQUENCY BEHAVIOR T1 151 MHz



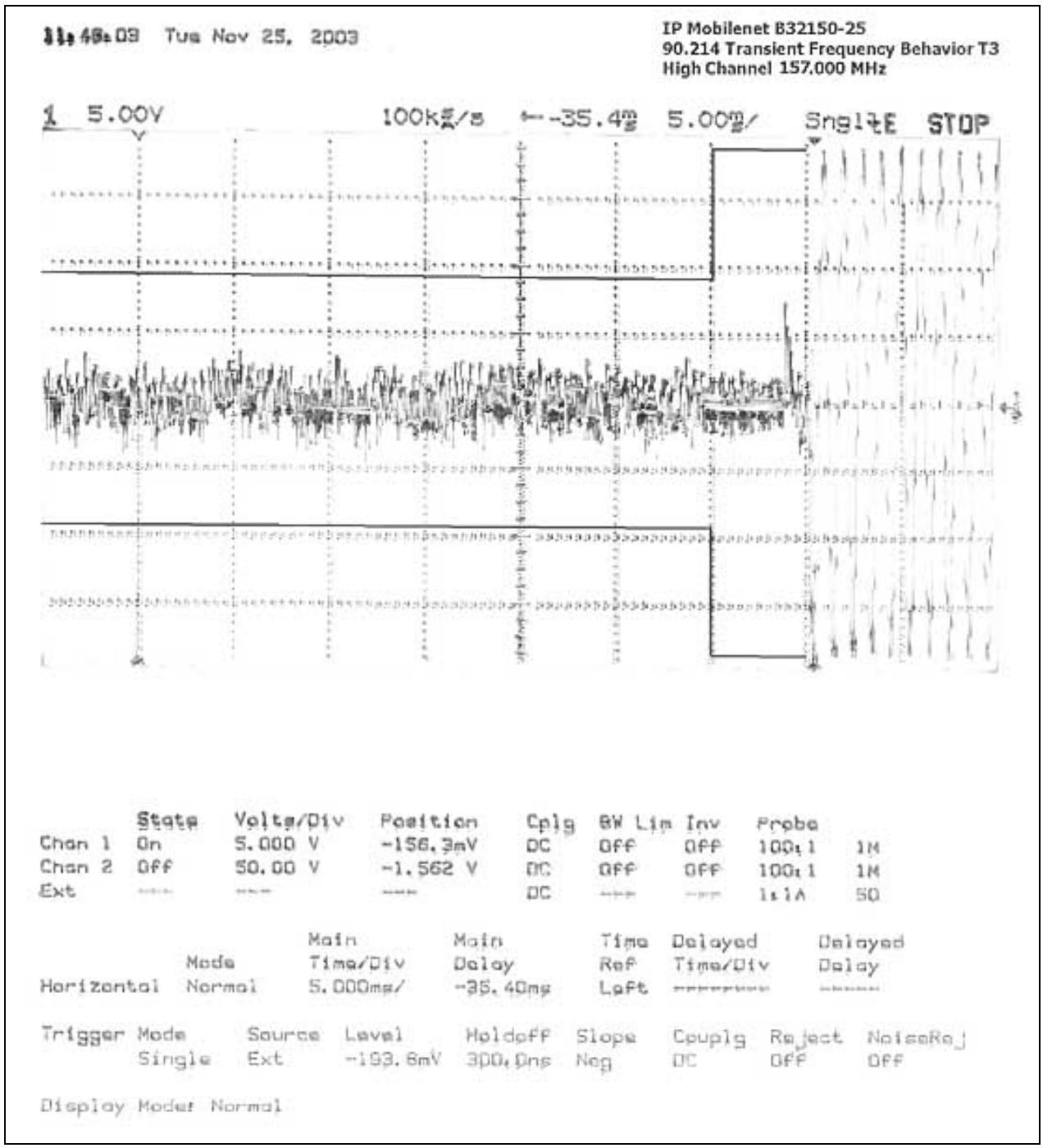
FCC 90.214 - TRANSIENT FREQUENCY BEHAVIOR T1 157 MHz



FCC 90.214 - TRANSIENT FREQUENCY BEHAVIOR T3 151 MHz



FCC 90.214 - TRANSIENT FREQUENCY BEHAVIOR T3 157 MHz



PHOTOGRAPH SHOWING TRANSIENT FREQUENCY BEHAVIOR

FCC 90.214 Transient Frequency Behavior

Test Equipment

Description	*Asset #*	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Analyzer, Modulation	02072	HP	8901A	2751A05181	11/27/02	11/26/04
Oscilloscope	02313	HP	84615B	US373340347	1/2/03	1/2/04
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