



ADDENDUM TO FC03-077

FOR THE

DATA MOBILE RADIO, M32450-25

FCC PART 90

COMPLIANCE

DATE OF ISSUE: JANUARY 26, 2004

PREPARED FOR:

IP Mobilenet
16842 Von Karman Avenue
Irvine, CA 92606

P.O. No.: 003041-00
W.O. No.: 81654

PREPARED BY:

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

Date of test: December 9-19, 2003

Report No.: FC03-077A

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ADMINISTRATIVE INFORMATION

DATE OF TEST: December 9-19, 2003

DATE OF RECEIPT: December 9, 2003

PURPOSE OF TEST: To demonstrate the compliance of the Data Mobile Radio, M32450-25 with the requirements for FCC Part 90 devices.
Addendum A is to revised the emissions designator.

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 Data Mobile Radio, M32450-25 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:



Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:



Mike Wilkinson, Lab Manager

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit

EQUIPMENT UNDER TEST

Data Mobile Radio

Manuf: IP Mobilenet
Model: M32450-25
Serial: 03483373
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

11K3F1D

FCC 2.1033 (c)(5) FREQUENCY RANGE

450 MHz – 480 MHz.

FCC 2.1033 (c)(6) OPERATING POWER

42.66 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 2.

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)
465	39.89
450	42.66
480	36.30

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: 21°C

Humidity: 35%

Antenna Conducted Setup Photo



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

**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.

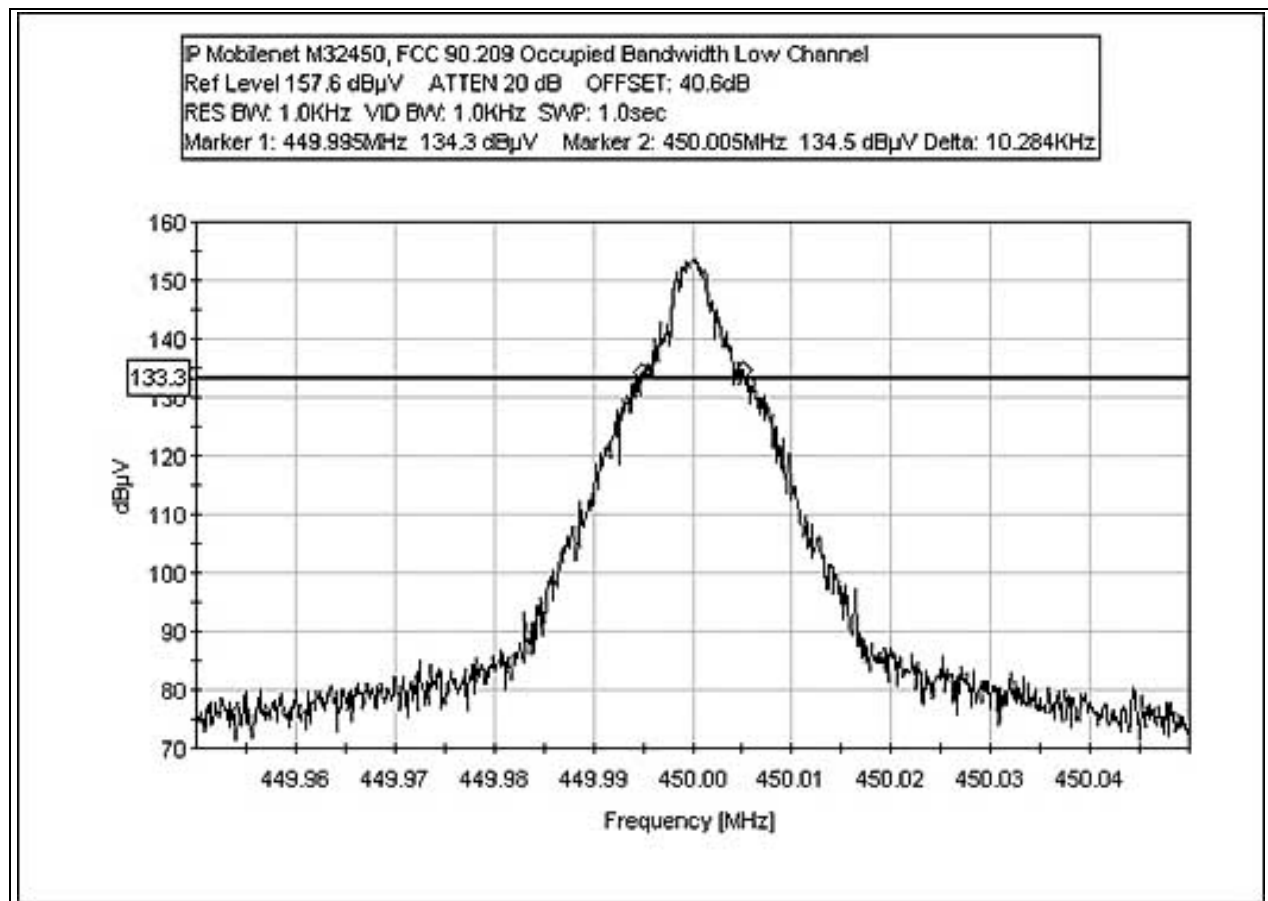
FCC 2.1033(c)(14)/2.1049(i)/90.209- OCCUPIED BANDWIDTH

Test Conditions: 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 spectrum analyzer.

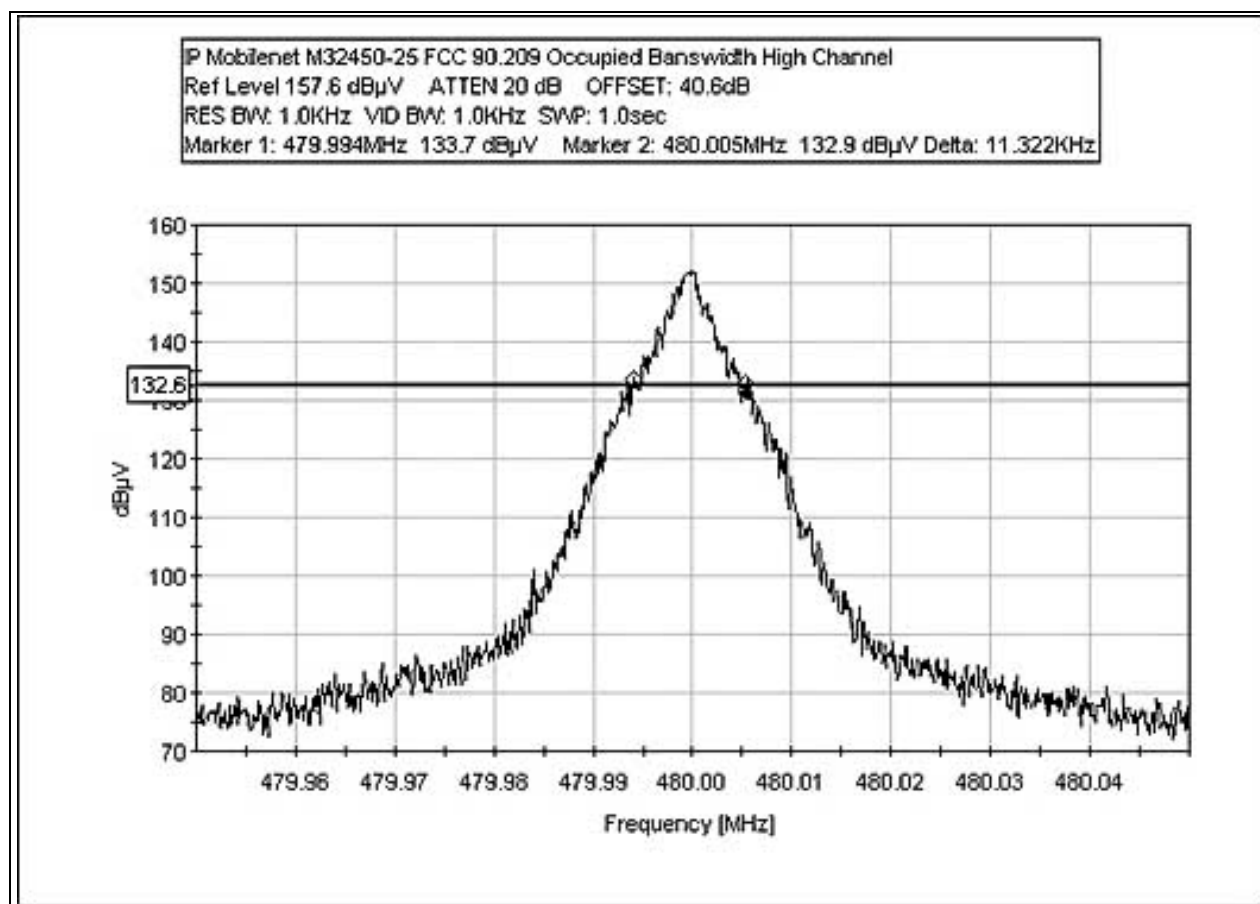
Temperature: 21°C

Humidity: 35%

Frequency Range Investigated: Carrier



FCC 90.209 20dB OCCUPIED BANDWIDTH HIGH CHANNEL



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	

Antenna Conducted Setup Photo



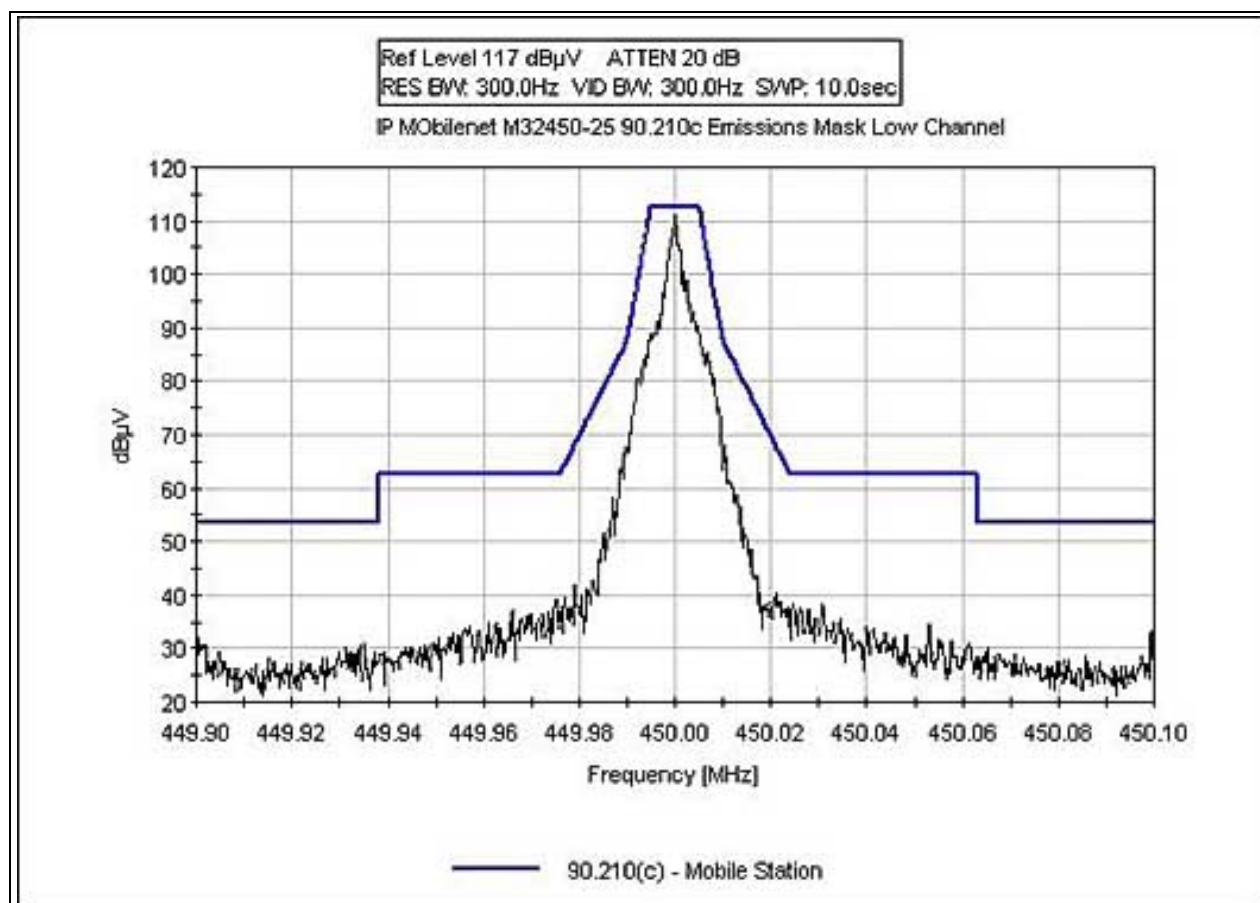
FCC 90.210(c) EMISSIONS MASK LOW CHANNEL

Test Conditions: 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 spectrum analyzer.

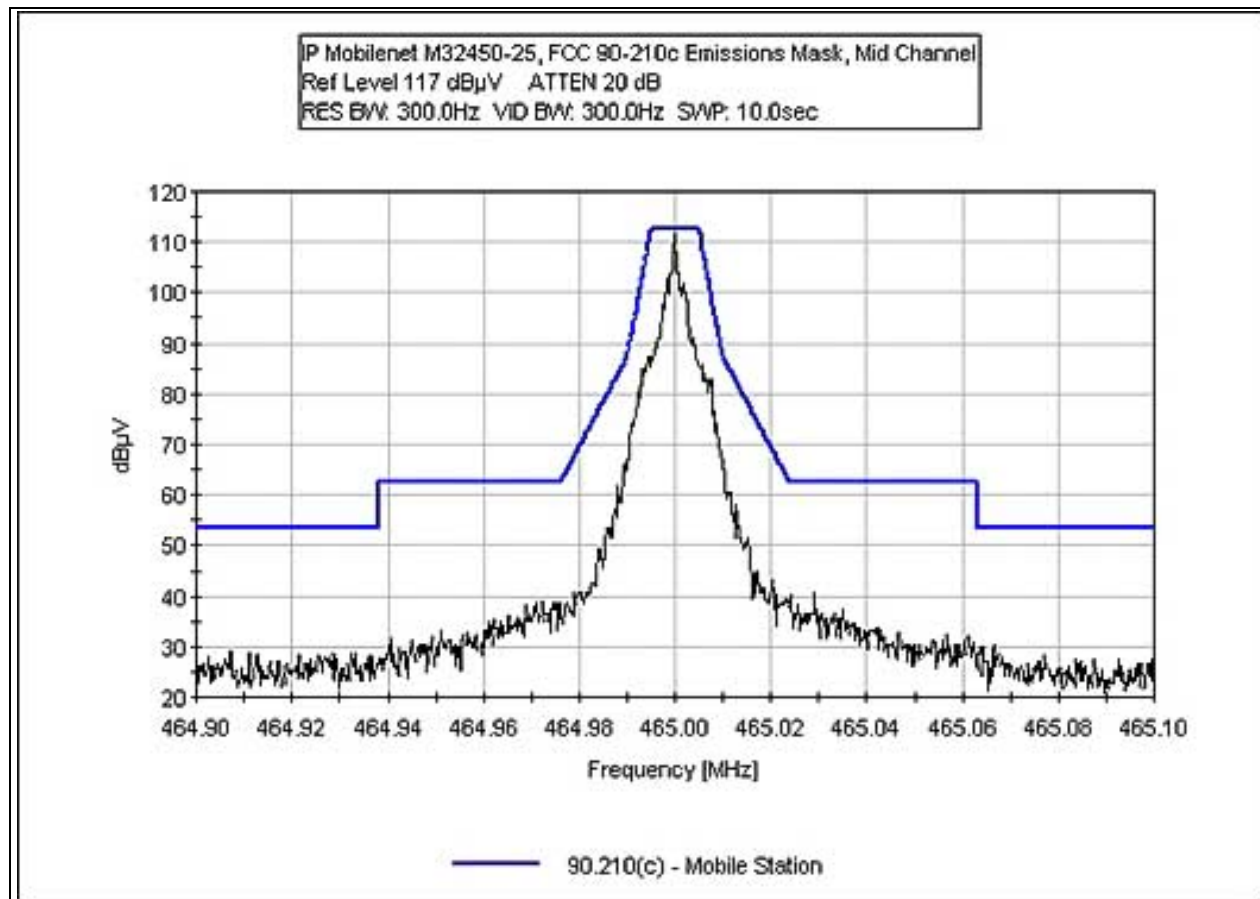
Temperature: 21°C

Humidity: 35%

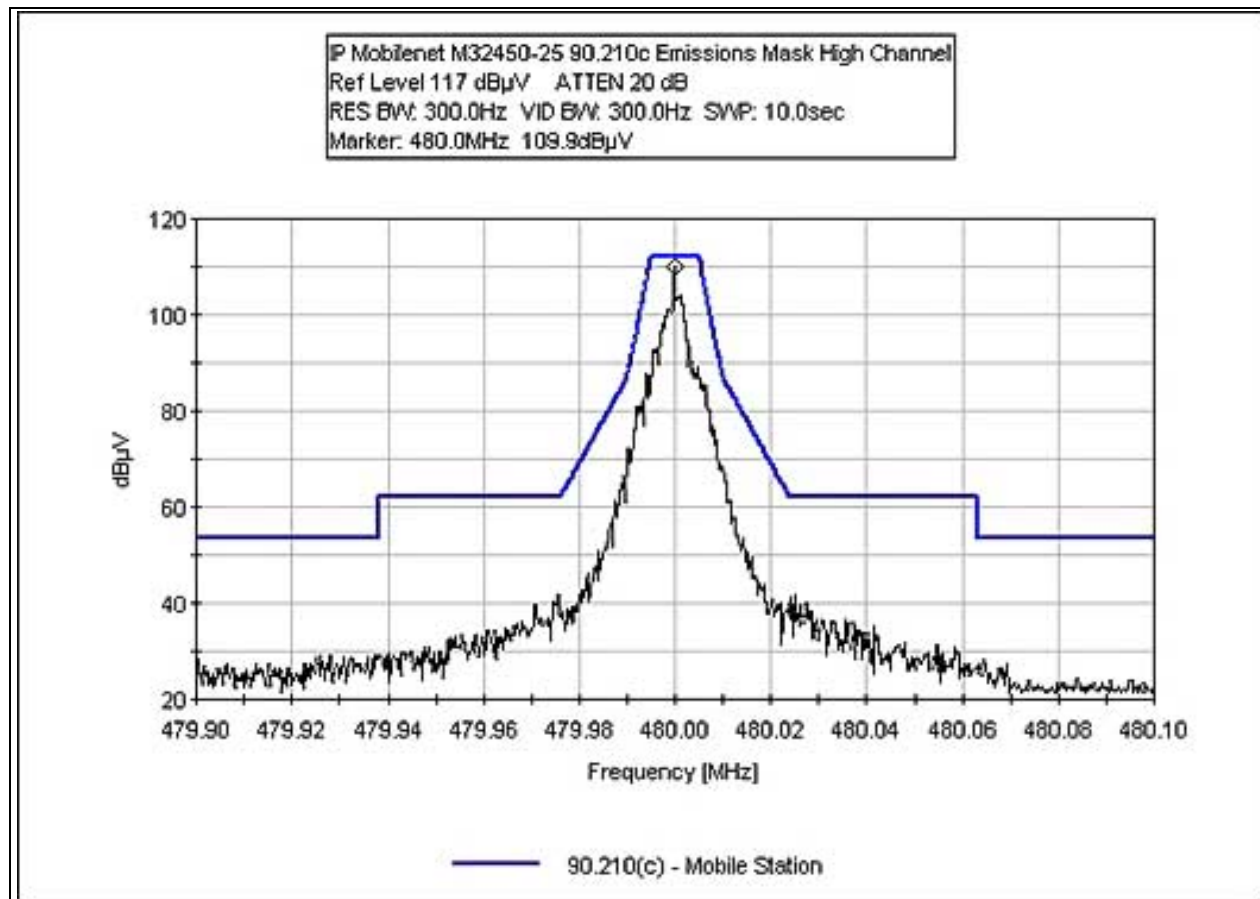
Frequency Range Investigated: Carrier



FCC 90.210(c) EMISSIONS MASK MID CHANNEL



FCC 90.210(c) EMISSIONS MASK HIGH CHANNEL



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	

Antenna Conducted Setup Photo



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 #: **81654** Date: 12/16/2003
 Test Type: **Antenna Terminals Conducted Emissions** Time: 15:51:16
 Equipment: **Data Mobile Radio** Sequence#: 4
 Manufacturer: IP Mobilenet Tested By: Mike Wilkinson
 Model: M32450-25 13.8 VDC
 S/N: 03493579

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	2403A08241	02/26/2003	02/26/2004	00489
Display				
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
Data Mobile Radio*	IP Mobilenet	M32450-25	03493579

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 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 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.

Transducer Legend:

T1=Pad 40dB Atten

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

#	Freq MHz	Rdng dBμV	T1 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	449.998M	112.7	+40.6	+0.0	153.3	153.3	+0.0	RF Ou
2	4050.004M	48.7	+40.8	+0.0	89.5	94.0	-4.5	RF Ou

3	900.003M	47.2	+40.7	+0.0	87.9	94.0	-6.1	RF Ou
4	4500.010M	45.4	+40.8	+0.0	86.2	94.0	-7.8	RF Ou
5	449.690M	44.5	+40.6	+0.0	85.1	94.0	-8.9	RF Ou
6	450.306M	43.1	+40.6	+0.0	83.7	94.0	-10.3	RF Ou
7	3150.008M	39.2	+40.8	+0.0	80.0	94.0	-14.0	RF Ou
8	1350.000M	36.3	+40.8	+0.0	77.1	94.0	-16.9	RF Ou
9	2699.993M	35.8	+40.8	+0.0	76.6	94.0	-17.4	RF Ou
10	4950.003M	34.6	+40.8	+0.0	75.4	94.0	-18.6	RF Ou
11	1800.000M	34.6	+40.8	+0.0	75.4	94.0	-18.6	RF Ou
12	3600.004M	34.3	+40.8	+0.0	75.1	94.0	-18.9	RF Ou
13	417.800M	33.0	+40.7	+0.0	73.7	94.0	-20.3	RF Ou
14	2250.001M	32.6	+40.8	+0.0	73.4	94.0	-20.6	RF Ou
15	11.030M	29.0	+40.6	+0.0	69.6	94.0	-24.4	RF Ou
16	46.450M	28.9	+40.6	+0.0	69.5	94.0	-24.5	RF Ou

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 #: **81654**
 Test Type: **Antenna Terminals Conducted Emissions**

Date: 12/10/2003
 Time: 11:21:12

Equipment: **Data Mobile Radio**
 Manufacturer: IP Mobilenet
 Model: M32450-25
 S/N: 03483373

Sequence#: 2
 Tested By: Mike Wilkinson
 13.8 VDC

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	2403A08241	02/26/2003	02/26/2004	00489
Display				
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
Data Mobile Radio*	IP Mobilenet	M32450-25	03483373

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 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 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

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	464.997M	112.4	+40.6				+0.0	153.0	153.0 Carrier	+0.0	RF Ou
2	1860.000M	44.0	+40.8				+0.0	84.8	94.0	-9.2	RF Ou
3	1395.000M	42.6	+40.8				+0.0	83.4	94.0	-10.6	RF Ou
4	930.000M	39.9	+40.7				+0.0	80.6	94.0	-13.4	RF Ou

5	454.500M	31.1	+40.6	+0.0	71.7	94.0	-22.3	RF Ou
6	11.630M	30.6	+40.6	+0.0	71.2	94.0	-22.8	RF Ou
7	295.700M	29.1	+40.6	+0.0	69.7	94.0	-24.3	RF Ou
8	19.100M	28.0	+40.6	+0.0	68.6	94.0	-25.4	RF Ou
9	102.200M	27.9	+40.6	+0.0	68.5	94.0	-25.5	RF Ou
10	3255.000M	47.5	+0.0	+0.0	47.5	94.0	-46.5	RF Ou
11	2789.991M	41.8	+0.0	+0.0	41.8	94.0	-52.2	RF Ou
12	3720.010M	36.6	+0.0	+0.0	36.6	94.0	-57.4	RF Ou
13	2325.010M	33.2	+0.0	+0.0	33.2	94.0	-60.8	RF Ou

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 #: **81654**
 Test Type: **Antenna Terminals Conducted Emissions**

Date: 12/19/2003
 Time: 08:07:10

Equipment: **Data Mobile Radio**
 Manufacturer: IP Mobilenet
 Model: M32450-25
 S/N: 03503580

Sequence#: 5
 Tested By: Mike Wilkinson
 13.8 VDC

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	2403A08241	02/26/2003	02/26/2004	00489
Display				
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
Data Mobile Radio*	IP Mobilenet	M32450-25	03503580

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 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 spectrum analyzer. Transmit Frequency: 480 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

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	479.998M	112.0	+40.6				+0.0	152.6	152.6 Carrier	+0.0	RF Ou
2	1919.995M	48.3	+40.8				+0.0	89.1	94.0	-4.9	RF Ou
3	1439.994M	46.9	+40.8				+0.0	87.7	94.0	-6.3	RF Ou
4	3360.008M	46.4	+40.8				+0.0	87.2	94.0	-6.8	RF Ou

5	3840.003M	45.8	+40.8	+0.0	86.6	94.0	-7.4	RF Ou
6	479.859M	44.9	+40.6	+0.0	85.5	94.0	-8.5	RF Ou
7	2399.992M	44.3	+40.8	+0.0	85.1	94.0	-8.9	RF Ou
8	2880.004M	43.5	+40.8	+0.0	84.3	94.0	-9.7	RF Ou
9	480.144M	42.9	+40.6	+0.0	83.5	94.0	-10.5	RF Ou
10	479.602M	39.7	+40.6	+0.0	80.3	94.0	-13.7	RF Ou
11	480.405M	39.1	+40.6	+0.0	79.7	94.0	-14.3	RF Ou
12	479.699M	38.7	+40.6	+0.0	79.3	94.0	-14.7	RF Ou
13	4320.002M	37.9	+40.8	+0.0	78.7	94.0	-15.3	RF Ou
14	959.995M	32.6	+40.7	+0.0	73.3	94.0	-20.7	RF Ou
15	4799.988M	31.4	+40.8	+0.0	72.2	94.0	-21.8	RF Ou
16	478.010M	29.6	+40.6	+0.0	70.2	94.0	-23.8	RF Ou
17	344.200M	28.9	+40.6	+0.0	69.5	94.0	-24.5	RF Ou
18	58.630M	28.3	+40.6	+0.0	68.9	94.0	-25.1	RF Ou
19	15.230M	27.2	+40.6	+0.0	67.8	94.0	-26.2	RF Ou

Antenna Conducted Setup Photo



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: 12/11/2003

Test Type: **Maximized Emissions**

Time: 11:47:34

Equipment: **Data Mobile Radio**

Sequence#: 5

Manufacturer: IP Mobilenet

Tested By: Mike Wilkinson

Model: M32450-25

S/N: 03493579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Data Mobile Radio*	IP Mobilenet	M32450-25	03493579

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 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 terminated with 50 Ohm termination through a 40 dB attenuator. Transmit Frequency 450.000 MHz, Low Channel Temperature: 19.7°C, Humidity: 37%. 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:

--

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

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

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: 12/11/2003

Test Type: **Maximized Emissions**

Time: 11:47:34

Equipment: **Data Mobile Radio**

Sequence#: 3

Manufacturer: IP Mobilenet

Tested By: Mike Wilkinson

Model: M32450-25

S/N: 03483373

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Data Mobile Radio*	IP Mobilenet	M32450-25	03483373

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 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 terminated with 50 Ohm termination through a 40 dB attenuator. Transmit Frequency 465.000 MHz, Mid Channel. Temperature: 21.3°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:

--

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

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

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

Test Equipment

<i>Description</i>	<i>Asset #</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Antenna, Biconilog	01991	Chase	CBL6111C	2456	12/13/02	12/12/04
Antenna, Loop	00226	EMCO	6502	1074	5/21/03	5/20/05
Antennna, Horn 1-18 GHz	00326	EMCO	3115	3413	4/25/03	4/25/05
Preamplifier	02010	HP	8449B	3008A00301	10/18/02	10/17/04
Preamplifier	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

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

Test Conditions: 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 spectrum analyzer. Input supply voltage is varied $\pm 15\%$ of nominal.

Customer: IP Mobilenet
 WO#: 81654
 Test Engineer: Mike Wilkinson

Device Model #: M32450-25
 Operating Voltage: 13.8 VDC/VAC
 Frequency Limit: 5 PPM/%

Temperature Variations

Channel Frequency:	Channel 1 (MHz)	Dev. (MHz)	Channel 2 (MHz)	Dev. (MHz)	Channel 3 (MHz)	Dev. (MHz)
Temp (C) Voltage	465		450		480	
-30 13.8	465.00019	0.00018	450.00067	0.00067	480.00096	0.00096
-20 13.8	465.00019	0.00018	450.00066	0.00066	480.00051	0.00051
-10 13.8	465.00022	0.00022	450.00051	0.00051	480.00030	0.00030
0 13.8	465.00003	0.00003	450.00030	0.00030	480.00016	0.00016
10 13.8	465.00005	0.00005	450.00020	0.00020	479.99987	0.00013
20 13.8	465.00005	0.00005	450.00017	0.00017	479.99970	0.00030
30 13.8	465.00004	0.00004	450.00015	0.00015	479.99990	0.00010
40 13.8	465.00008	0.00008	450.00018	0.00018	480.00000	0.00000
50 13.8	465.00016	0.00016	450.00023	0.00023	480.00048	0.00048

Voltage Variations ($\pm 15\%$)

20 11.7	464.99997	0.00004	450.00017	0.00017	479.99970	0.00030
20 13.8	464.99997	0.00004	450.00017	0.00017	479.99970	0.00030
20 15.9	464.99997	0.00004	450.00018	0.00018	479.99970	0.00030
Max Deviation (MHz)	0.00022		0.00067		0.00096	
Max Deviation (PPM)	0.47312		1.48889		2.00000	
	PASS		PASS		PASS	

Note: EUT settings were changed as follows:

Txsynctime=2000, was 7

Txtailtime=50, was 12

Txquiettime=50, 5

FCC 90.213 FREQUENCY STABILITY TEST SETUP



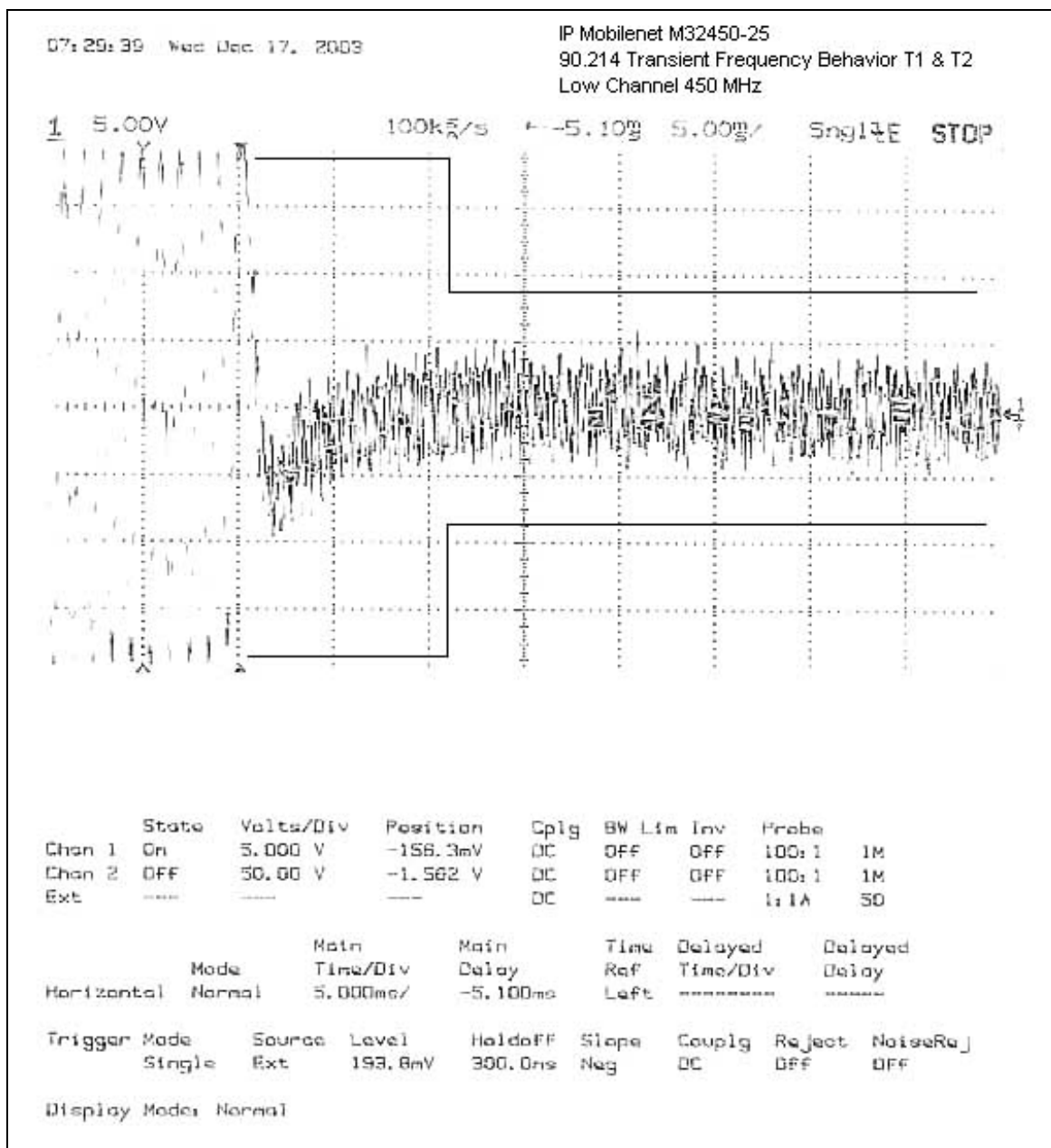
Test Equipment

<i>Description</i>	<i>Asset #</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Cal Date</i>	<i>Cal Due</i>
Digital Multimeter	01241	Radio Shack	22-183	NA	NR	NR
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

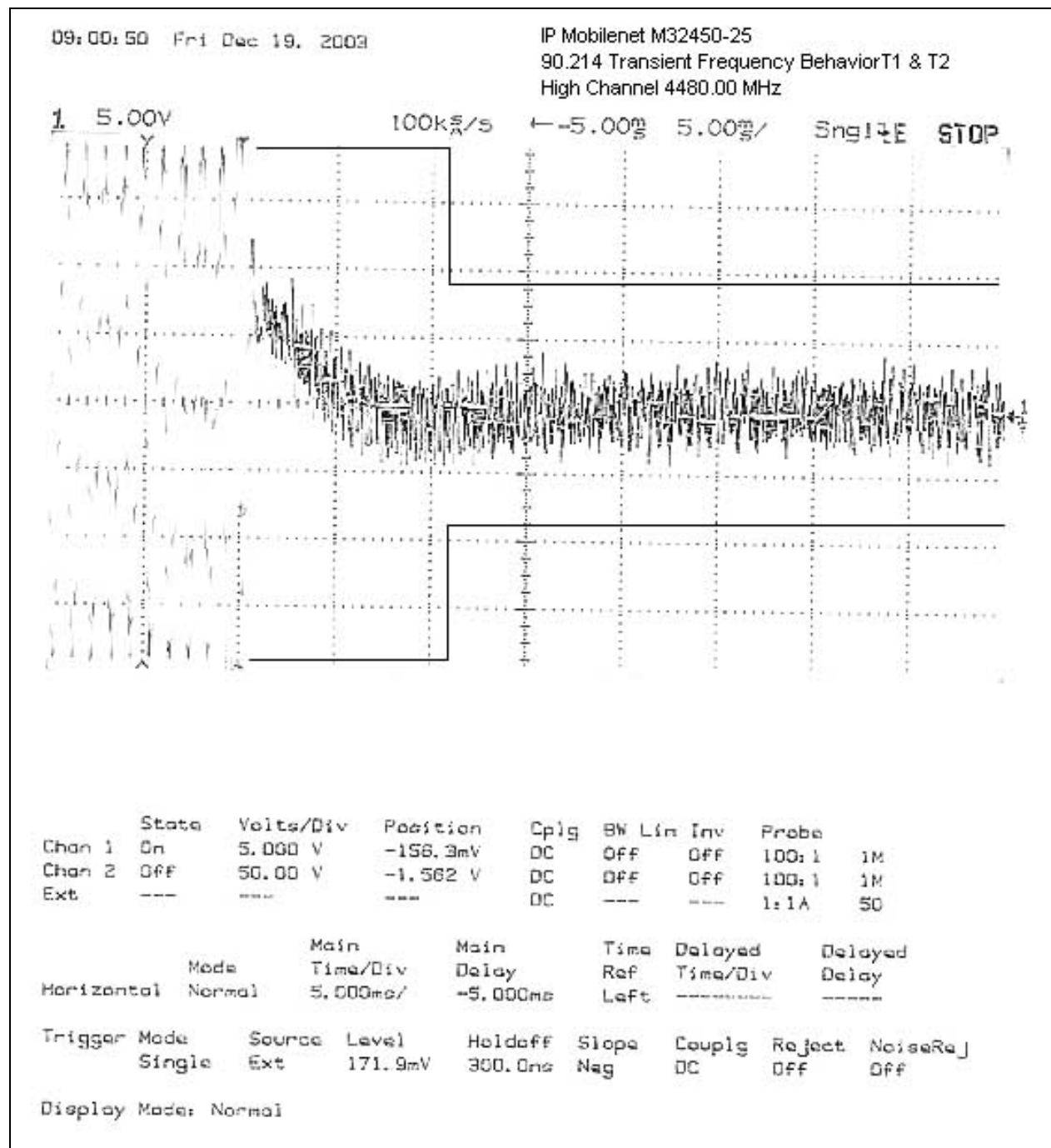
NR = Not Required

FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T1-T2 LOW CHANNEL

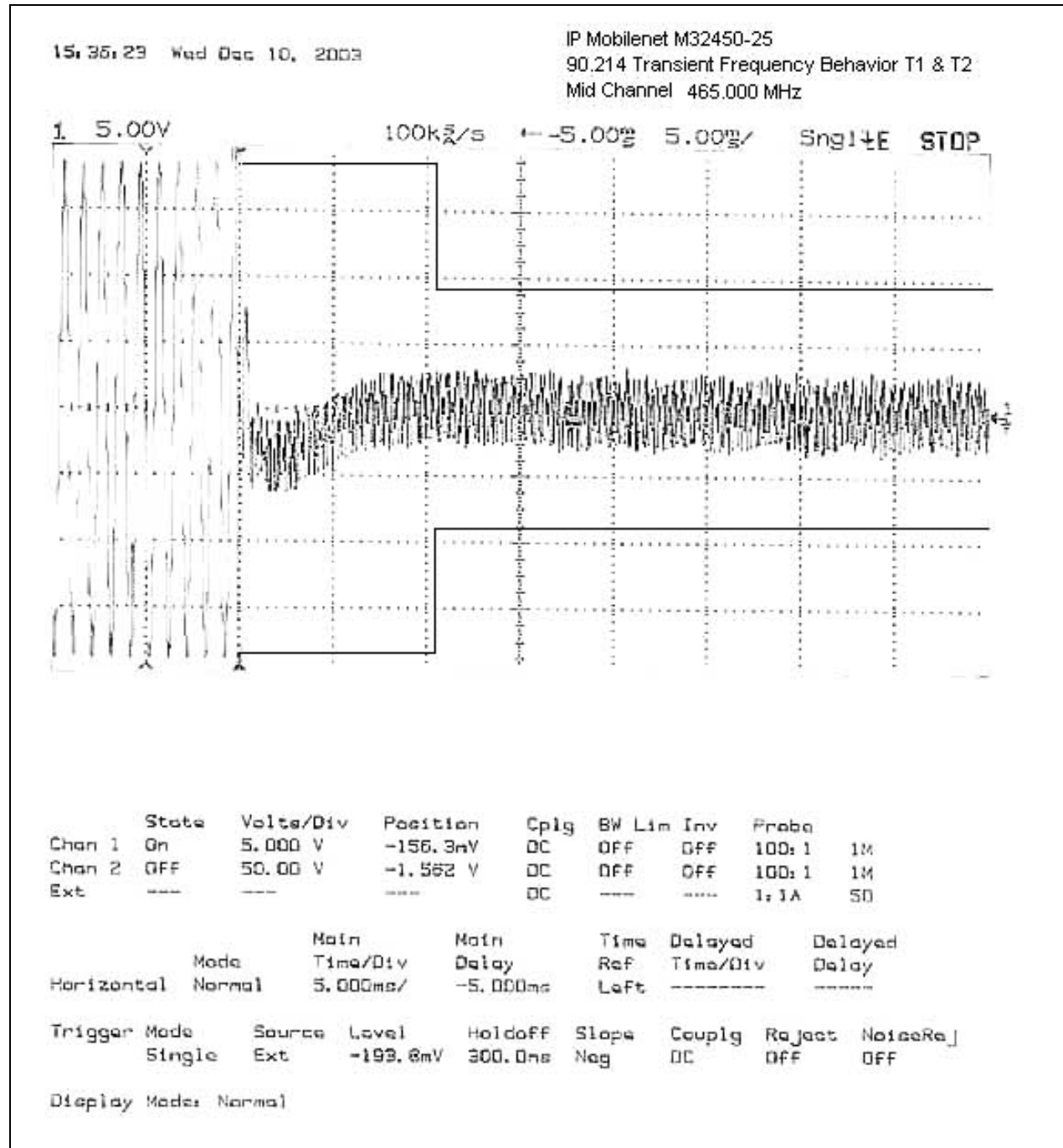
Test Conditions: EUT is a data radio for mobile use in the VHF frequency range. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Test setup IAW TIA/EIA 603 with trigger modification: RF output port is fed through suitable external attenuation to a combiner with a signal generator. Output of combiner is fed through a demodulator. The modulation output is fed to an oscilloscope. The external trigger is fed from the X channel input to the oscilloscope.



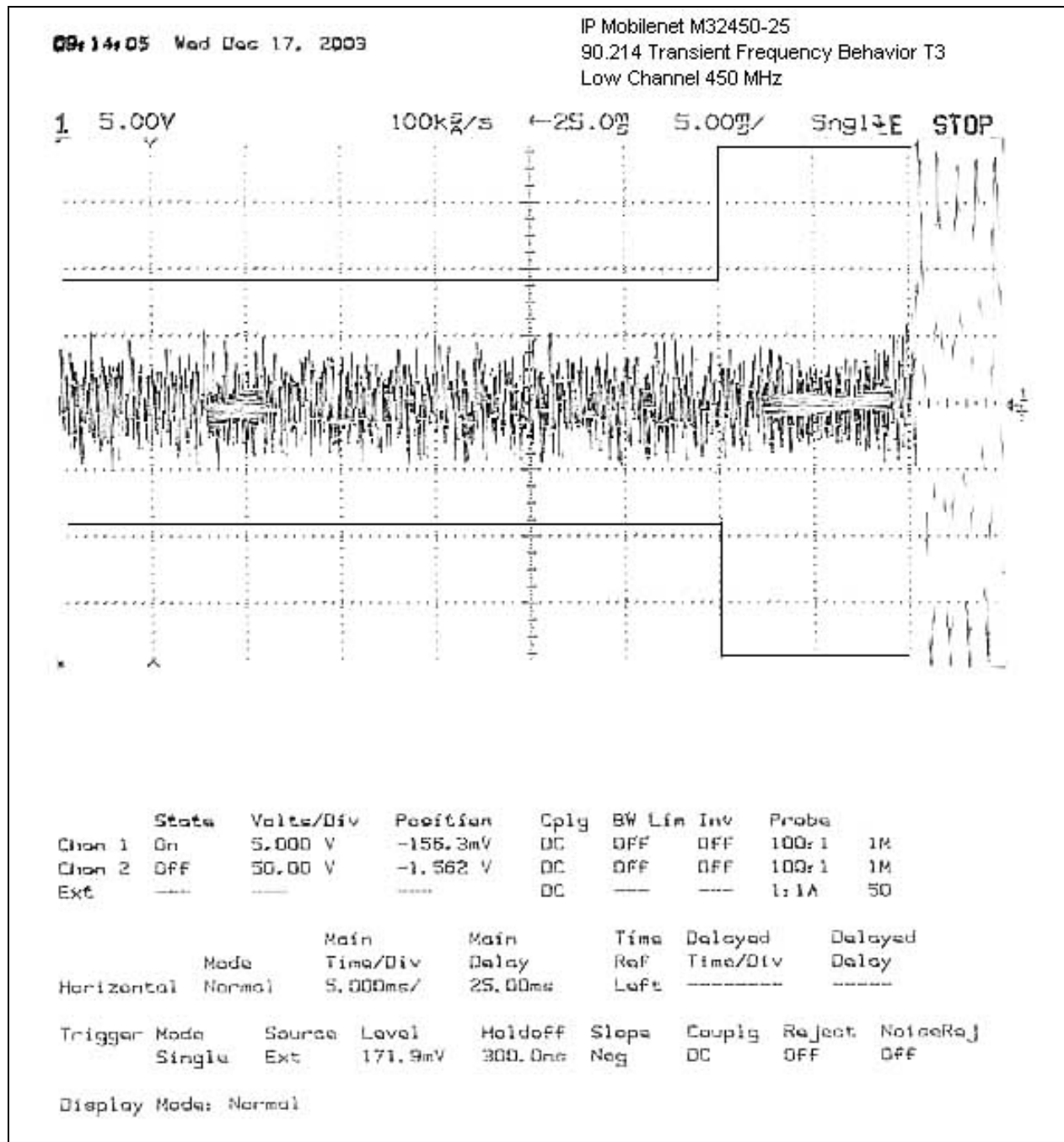
FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T1-T2 HIGH CHANNEL



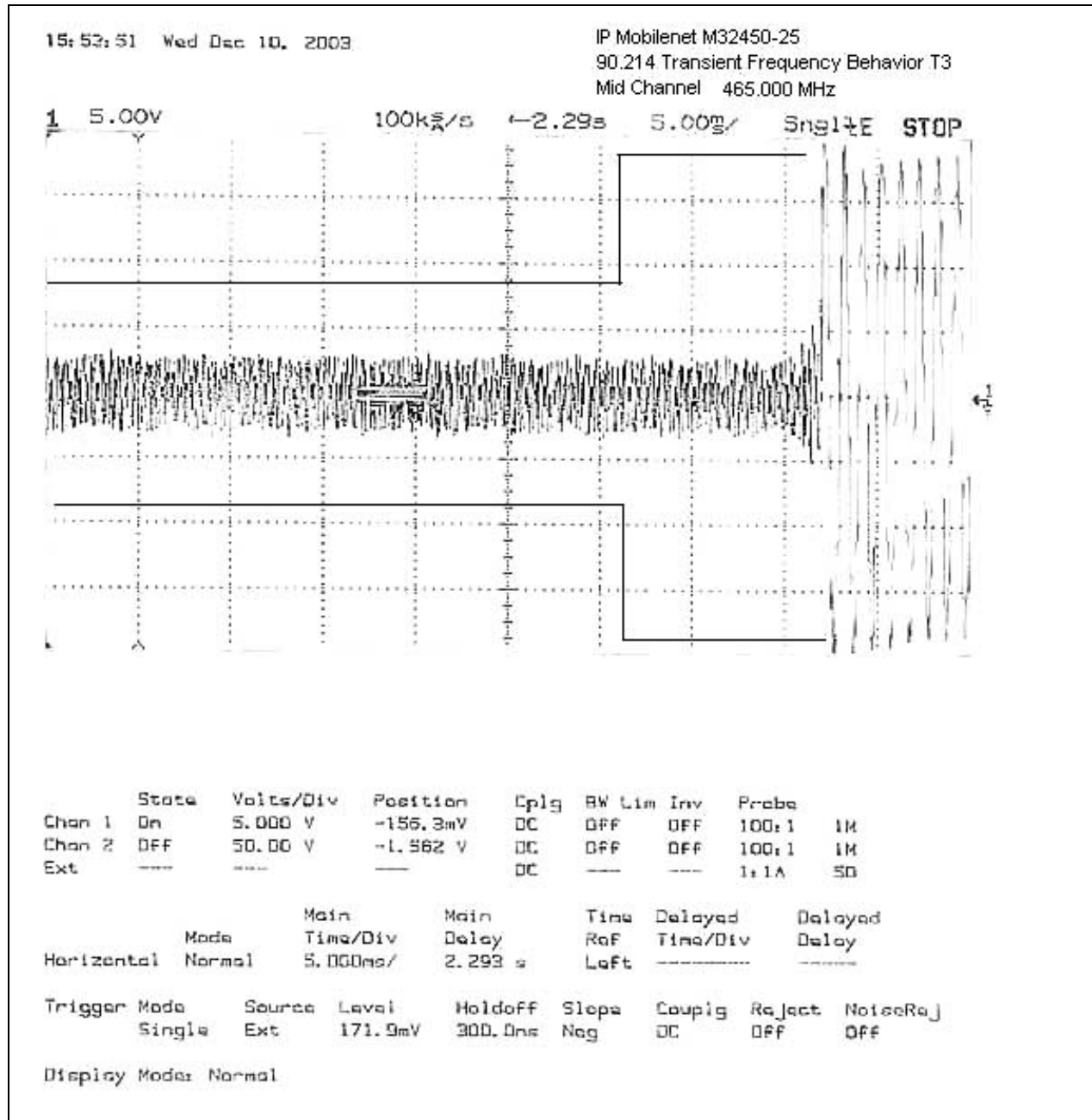
FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T1-T2 MID CHANNEL



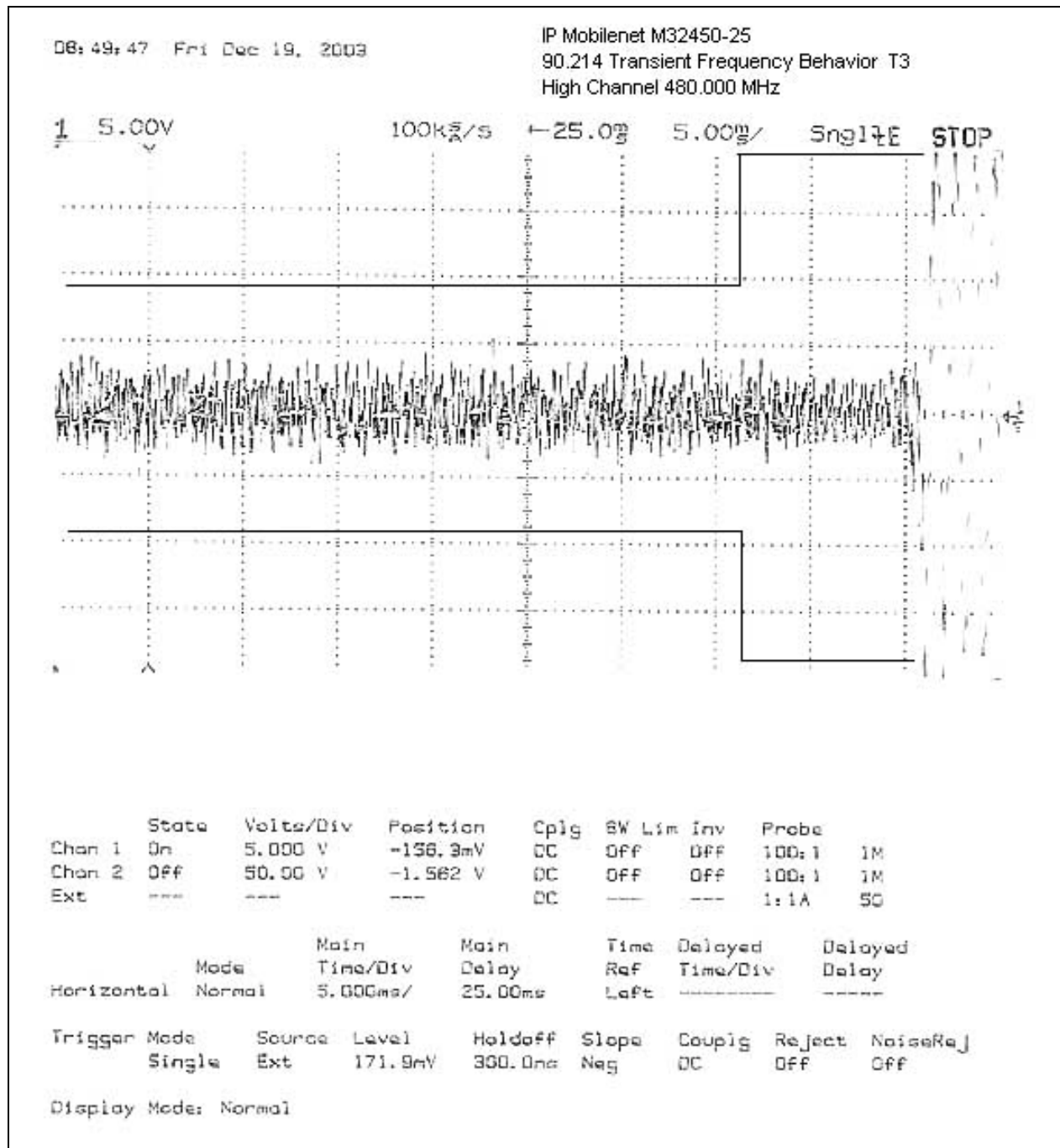
FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T3 LOW CHANNEL



FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T3 MID CHANNEL



FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR T3 HIGH CHANNEL



FCC 90.214 TRANSIENT FREQUENCY BEHAVIOR TEST SETUP



Test Equipment

<i>Description</i>	<i>Asset #</i>	<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Cal Date</i>	<i>Cal Due</i>
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

FCC 2.1091 – MPE CALCULATIONS

Maximum Permissible Exposure Calculations

Date of Report: 12/10/03

Calculations prepared for:

IP Mobilenet

Calculations prepared by:

Mike Wilkinson

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

Model Number: M32450-25

Fundamental Operating Frequency:

450 - 480 MHz

Maximum Rated Output Power:

40 Watts

Measured Output Power: Mid Channel, 465 MHz

39.89 Watts

Measured Output Power: Low Channel, 450 MHz

42.66 Watts

Measured Output Power: High Channel, 480 MHz

36.3 Watts

Power Output and Operating Frequency Information used for these calculations were from:

CKC Laboratories, Test Report #

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

$$\text{MPE Limit} = 0.3 \text{ (mW/cm}^2\text{)}$$

EIRP (mW)	Distance (meters)	Power Density (mW/cm ²)	Result
3988.41	1.0276	0.3	Pass
4266.00	1.0637	0.3	Pass
36307.81	0.9814	0.3	Pass

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

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 1.0637 meters and at a output power of 42.66 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.