



**IP MOBILENET, INC. ADDENDUM TO FC01-064**

**FOR THE**

**VHF LAND MOBILE TRANSCEIVER, IP1**

**FCC PART 90 SUBPART I AND  
FCC PART 15 SUBPART B SECTIONS 15.109 CLASS B & 15.111**

**COMPLIANCE**

**DATE OF ISSUE: OCTOBER 15, 2001**

**PREPARED FOR:**

IP MobileNet, Inc.  
11909 E. Telegraph Rd.  
Santa Fe Springs, CA 90670

P.O. No.: 001286-00  
W.O. No.: 77374

**PREPARED BY:**

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

Date of test: August 7-28 and October 3, 2001

**Report No.: FC01-064A**

This report contains a total of 54 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc.

## TABLE OF CONTENTS

|                                                                                        |    |
|----------------------------------------------------------------------------------------|----|
| Administrative Information .....                                                       | 3  |
| Summary of Results.....                                                                | 4  |
| Modifications Required for Compliance .....                                            | 4  |
| Approvals.....                                                                         | 4  |
| Equipment Under Test (EUT) Description.....                                            | 5  |
| Equipment Under Test.....                                                              | 5  |
| Peripheral Devices .....                                                               | 5  |
| 2.1033(c)(3) User's Manual .....                                                       | 6  |
| 2.1033(c)(4) Type of Emissions .....                                                   | 6  |
| 2.1033(c)(5) Frequency Range .....                                                     | 6  |
| 2.1033(c)(6) Operating Power.....                                                      | 6  |
| 2.1033(c)(7) Maximum Power Rating.....                                                 | 6  |
| 2.1033(c)(8) DC Voltages .....                                                         | 6  |
| 2.1033(c)(9) Tune-Up Procedure .....                                                   | 6  |
| 2.1033(c)(10) Schematics and Circuitry Description .....                               | 6  |
| 2.1033(c)(11) Label and Placement.....                                                 | 7  |
| 2.1033(c)(12) Submittal Photos.....                                                    | 7  |
| 2.1033(c)(13) Modulation Information .....                                             | 7  |
| 2.1033(c)(14)/2.1046/90.205(d) - RF Power Output.....                                  | 8  |
| 2.1033(c)(14)/2.1047(b) - Modulation Characteristics - Audio Frequency Response.....   | 10 |
| 2.1033(c)(14)/2.1047(b) - Modulation Characteristics - Modulation Limiting Response .. | 10 |
| 2.1033(c)(14)/2.1049(i)/90.209 & 90.210(c) - Occupied Bandwidth .....                  | 11 |
| 2.1033(c)(14)/2.1051/90.210(c) - Spurious Emissions at Antenna Terminal .....          | 18 |
| 2.1033(c)(14)/2.1053/90.210(c) - Field Strength of Spurious Radiation .....            | 25 |
| 2.1033(c)(14)/2.1055/90.213 - Frequency Stability .....                                | 30 |
| 2.1033(c)(14)/2.1055/90.214– Transient Frequency Behavior .....                        | 34 |
| 15.109 – Radiated Emissions – Digital Portion.....                                     | 38 |
| 15.111 – Antenna Power Conducted - Receiver.....                                       | 48 |

**CKC Laboratories, Inc. has received Certificates of Accreditation from the following agencies:**

A2LA (USA); DATech (Germany); BSMI (Taiwan); Nemko (Norway); and GOST (Russia).

**CKC Laboratories, Inc has received test site Registration Acceptance from the following agencies:**

FCC (USA); VCCI (Japan); and Industry Canada.

**CKC Laboratories, Inc. has received Letters of Acceptance through an MRA for the following agencies:**

ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); Radio Communications Agency (RA); HOKLAS (Hong Kong); Bakom (Swiss); BIPT (Belgium); Denmark Telestyrelsen; RvA (Netherlands); SEE (Luxembourg) SITTEL (Bolivia); and UKAS (UK).

## ADMINISTRATIVE INFORMATION

**DATE OF TEST:** August 7-28 and October 3, 2001

**DATE OF RECEIPT:** August 7, 2001

**PURPOSE OF TEST:** To demonstrate the compliance of the VHF Land Mobile Transceiver, IP1 with the requirements for FCC Part 90 Subpart I and FCC Part 15 Subpart B Sections 15.109 Class B & 15.111 devices. The addendum is to remove “/m” in the spec & correction headers and correct the test type on the data sheet on page 8.

**TEST METHOD:** Part 90, TIA/EIA 603 and ANSI C63.4 (1992)

**MANUFACTURER:** IP MobileNet, Inc.  
11909 E. Telegraph Rd.  
Santa Fe Springs, CA 90670

**REPRESENTATIVE:** Jim Jesse

**TEST LOCATION:** CKC Laboratories, Inc.  
5473A Clouds Rest  
Mariposa, CA 95338  
110 Olinda Place  
Brea, CA 92621

## SUMMARY OF RESULTS

As received, the IP MobileNet, Inc. VHF Land Mobile Transceiver, IP1 was found to be fully compliant with the following standards and specifications:

### United States

- FCC Part 90 Subpart I
  - TIA/EIA 603
- FCC Part 15 Subpart B Sections 15.109 Class B & 15.111
  - ANSI C63.4 (1992) method

The results in this report apply only to the items tested, as identified herein.

## MODIFICATIONS REQUIRED FOR COMPLIANCE

No modifications were required for compliance.

## APPROVALS

### QUALITY ASSURANCE:



---

Dennis Ward, Quality Manager



---

Septimiu Apahidean, EMC/Lab Manager



---

Chuck Kendall, EMC/Lab Manager

### TEST PERSONNEL:



---

Eddie Wong, EMC Engineer



---

Randy Clark, EMC Engineer

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

Land mobile transceiver operating in the 150 to 174 MHz frequency range, including a non-broadcast transmitter with maximum power output of 60 W, was a production unit.

The following model has been tested by CKC Laboratories:

### **IPV**

The following additional model is identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they comply to the level of testing equivalent to the tested models.

### **IP1**

## **EQUIPMENT UNDER TEST**

### **VHF Land Mobile Transceiver**

Manuf: IP MobileNet  
Model: IPI  
Serial: Radio#1  
FCC ID: MI7-IPMNIP1 (pending)

## **PERIPHERAL DEVICES**

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

### **Laptop**

Manuf: CTX  
Model: EZBook700E  
Serial: V92A266-8100028  
FCC ID: DoC

### **DC Power Supply**

Manuf: Samplex  
Model: Sec1223  
Serial: 03061-0D01-0631  
FCC ID: DoC



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

The necessary information is contained in a separate document.

### **2.1033(c)(4) TYPE OF EMISSIONS**

The emissions designator for this product is 20K0F1D

### **2.1033(c)(5) FREQUENCY RANGE**

The lowest frequency is 150 MHz and the highest is 174 MHz.

### **2.1033(c)(6) OPERATING POWER**

60 watts maximum.

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

The limit is 178Watts, or 160dBuV.

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

The necessary information is contained in a separate document.

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

There is no tune procedure required over the power range or at specific operating power levels because the unit is software controlled.

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

The necessary information is contained in a separate document.

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

The necessary information is contained in a separate document.

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

The necessary information is contained in a separate document.

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

The necessary information is contained in a separate document.

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

Test Location: CKC Laboratories Inc. • 180 N Olinda Place • Brea CA, 92823 • 714-993-6112

Customer: **IP Mobilenet**  
 Specification: **FCC Part 90.205(d)**  
 Work Order #: **77374** Date: 08/07/2001  
 Test Type: **Power Output** Time: 11:41:41  
 Equipment: **VHF Land Mobile Transceiver** Sequence#: 1  
 Manufacturer: IP Mobilenet Tested By: Eddie Wong  
 Model: IPV  
 S/N: Radio#1

### **Test Equipment:**

| Equipment           | Asset # | Manufacturer | Model # | Serial #   | Cal Date | Cal Due |
|---------------------|---------|--------------|---------|------------|----------|---------|
| Spectrum Analyzer   | 02462   | HP           | 8568B   | 2928A04874 | 032901   | 032902  |
| Directional Coupler | 00714   | Werlatone    | C2630   | 3806       | 020901   | 020902  |
| Attenuator          | 01705   | HP           | 8496B   | 1350A01241 | 020901   | 020902  |

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

### **Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

### **Test Conditions / Notes:**

EUT placed on the test bench. RS 232 port connected to RS232 port of a laptop. Antenna port is connected to a 50 Ohm load via a directional coupler. DC input port is connected to a DC power supply. Receiver port 2 and programming port are left unconnected. Limit is 178Watts, or 160dBuV. Test program sends command to the EUT to turn on transmission. 15 Seconds of data burst per command sent. The Directional coupler has a 40 dB attenuation, and external attenuator is set at 20 dB. Total attenuation between the load and the measuring instrument = 60 dB. (attenuation is compensated). 12VDC

**Measurement Data:** Reading listed by margin. Test Distance: None

| # | Freq<br>MHz | Rdng<br>dBμV | dB | dB | dB | dB | Dist<br>Table | Corr<br>dBμV | Spec<br>dBμV | Margin<br>dB | Polar<br>Anten |
|---|-------------|--------------|----|----|----|----|---------------|--------------|--------------|--------------|----------------|
| 1 | 152.990M    | 154.8        |    |    |    |    | +0.0          | 154.8        | 160.0        | -5.2         | Anten          |
| 2 | 150.015M    | 154.7        |    |    |    |    | +0.0          | 154.7        | 160.0        | -5.3         | Anten          |
| 3 | 156.005M    | 154.4        |    |    |    |    | +0.0          | 154.4        | 160.0        | -5.6         | Anten          |



Front View of Test Setup



Back View of Test Setup

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

**Not applicable to this unit.**

**2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS – MODULATION LIMITING RESPONSE**

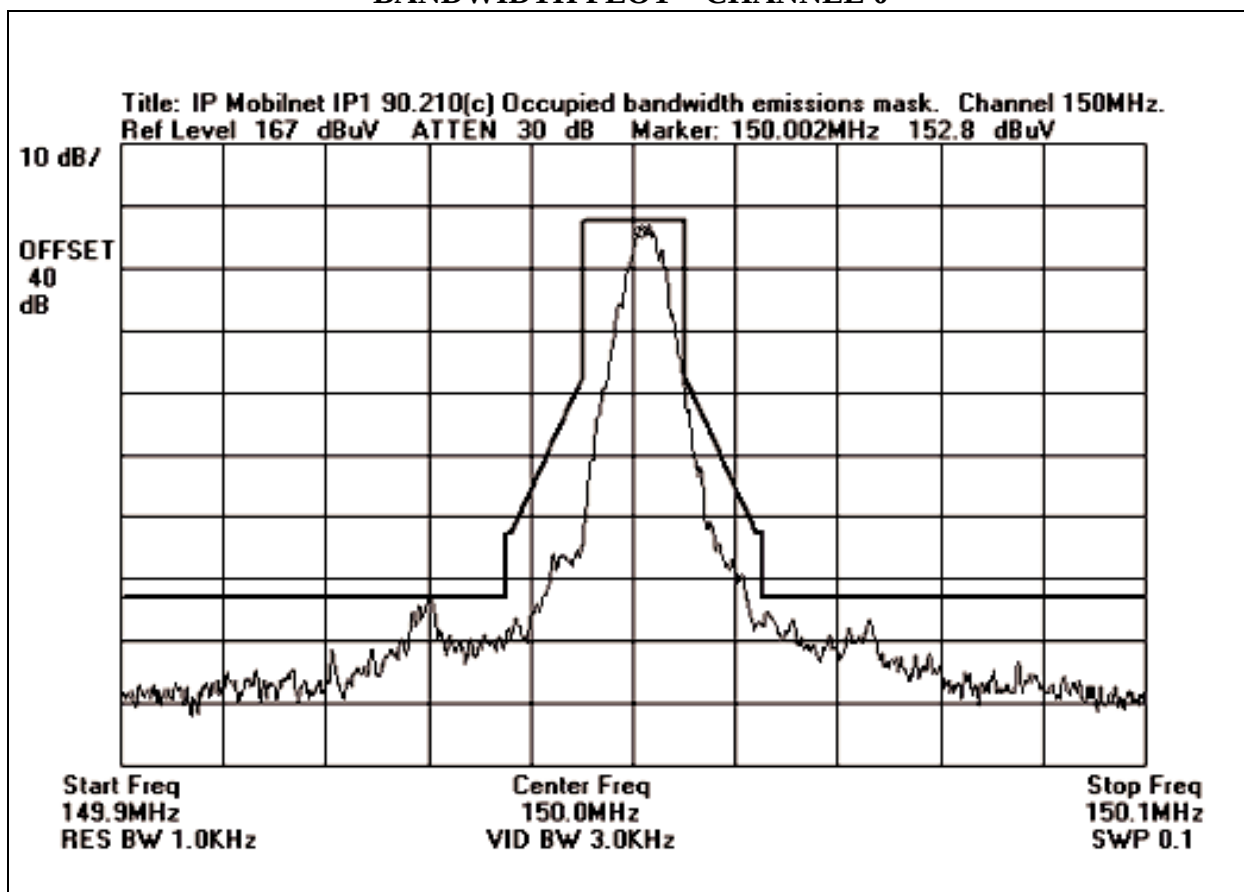
**Not applicable to this unit.**

## 2.1033(c)(14)/2.1049(i)/90.209 & 90.210(c)- OCCUPIED BANDWIDTH

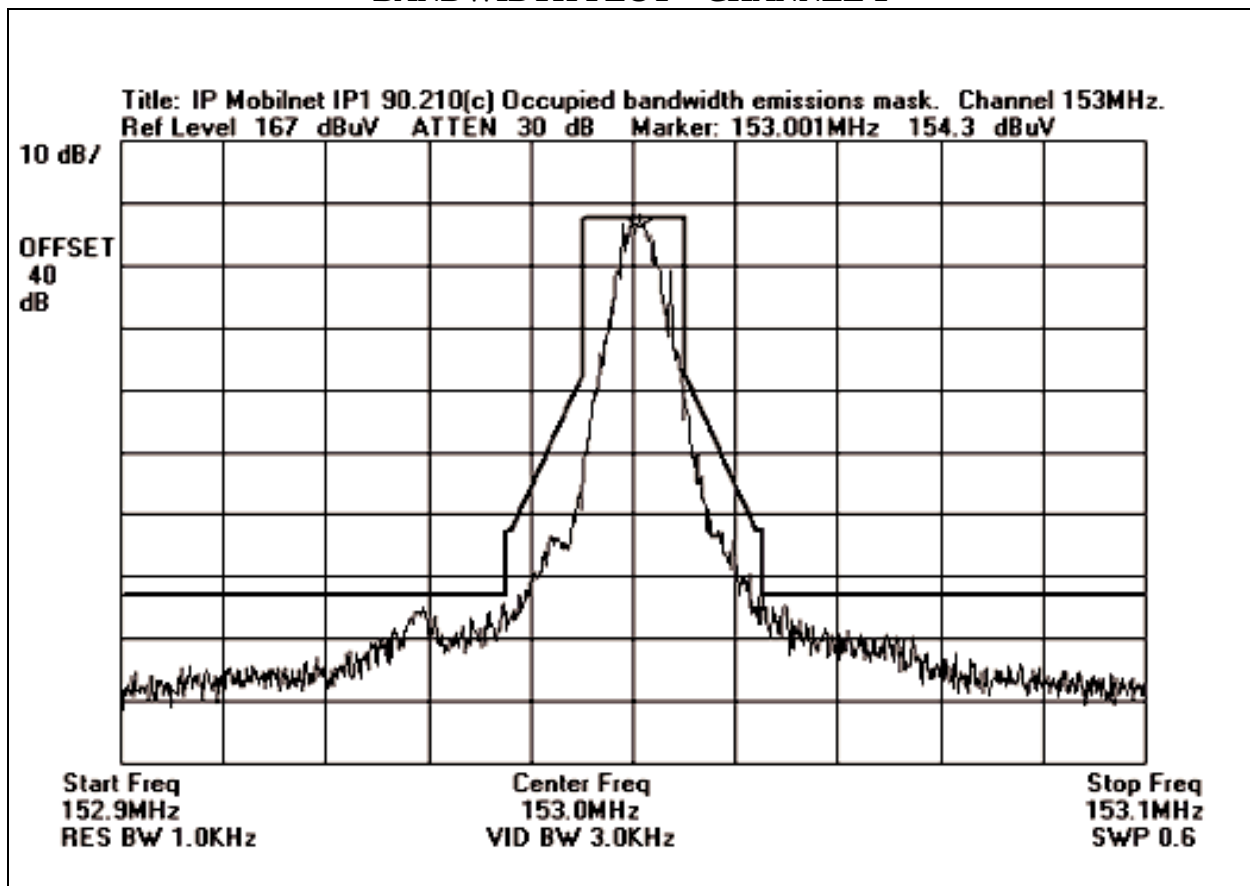
### Test Equipment Used:

| Equipment           | Asset # | Manufacturer | Model # | Serial #   | Cal Date | Cal Due |
|---------------------|---------|--------------|---------|------------|----------|---------|
| Spectrum Analyzer   | 02462   | HP           | 8568B   | 2928A04874 | 032901   | 032902  |
| Directional Coupler | 00714   | Werlatone    | C2630   | 3806       | 020901   | 020902  |
| Attenuator          | 01705   | HP           | 8496B   | 1350A01241 | 020901   | 020902  |

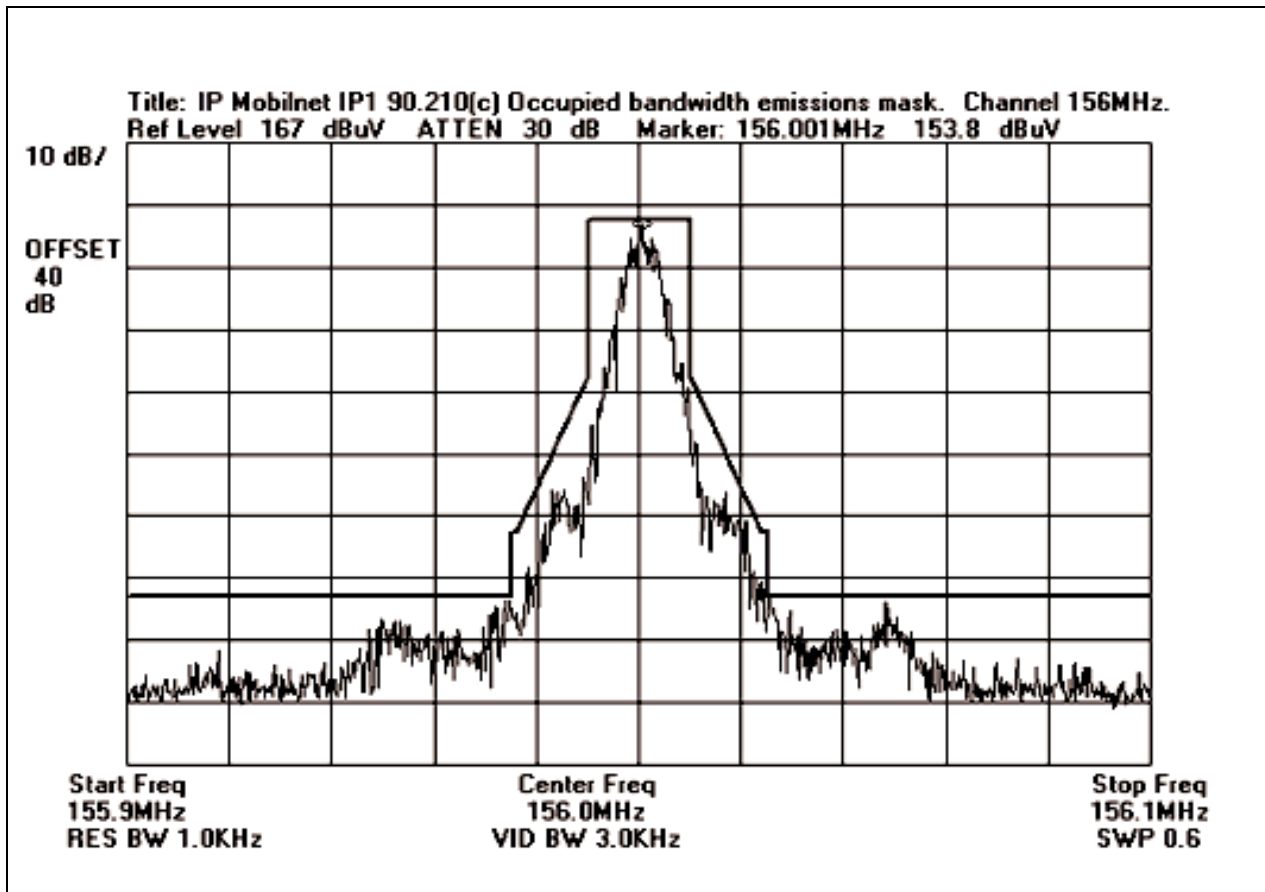
### BANDWIDTH PLOT – CHANNEL 0



## BANDWIDTH PLOT – CHANNEL 1



## BANDWIDTH PLOT – CHANNEL 2



## Part 90.210c Mask C

Fundamental Frequency: 150.00 MHz  
 Corrected Measured Output: 154.50 dBuV (Direct Reading)  
 56.23 Watts (P)

**Authorized Bandwidth**  
 Start Freq. 149.990 MHz  
 Stop Freq. 150.010 MHz

### Calculations:

**250% of Authorized Bandwidth**  
 Start Freq. 149.975 MHz  
 Stop Freq. 150.025 MHz

**Frequency:** 5kHz - 10kHz:  
 10kHz - 250%  
 >±250%

**Limit:** 83log (fd/5)  
 the lesser of 29log (fd<sup>2</sup>/11) or 50dB  
 43+10log (P)

**dBc Calculations:**  
 83Log(fd/5) = 25.0 dB @ 10 kHz removed  
 29Log(fd<sup>2</sup>/11) = 50.0 dB @ 24.14 kHz removed  
 43+10Log(P) = 60.5 dB @ >250% of the authorized band

**Turn point:**  
 29 LOG (fd<sup>2</sup>/11) = 50  
 fd(t) = SQRT(11\*10<sup>5</sup>/29)  
 fd(t) = 24.14155877 kHz

### Emissions Mask for EMITest:

| MHz      | dBuV   | fd (MHz) | dBc              |
|----------|--------|----------|------------------|
| 0.009    | 94.00  |          | 60.5             |
| 149.975  | 94.00  |          | 60.5 43+10Log(P) |
| 149.975  | 104.50 | (250%)   | 50.0             |
| 149.976  | 104.50 |          | 50.0             |
| 149.976  | 104.50 | 0.024    | 50.0 50dBc       |
| 149.990  | 129.51 | 0.010    | 25.0             |
| 149.990  | 154.50 |          | Fundamental      |
| 150.010  | 154.50 |          | Fundamental      |
| 150.010  | 129.51 | 0.010    | 25.0             |
| 150.024  | 104.50 | 0.024    | 50.0 50dBc       |
| 150.024  | 104.50 |          | 50.0             |
| 150.025  | 104.50 | (250%)   | 50.0             |
| 150.025  | 94.00  |          | 60.5 43+10Log(P) |
| 2000.000 | 94.00  |          | 60.5             |

## Part 90.210c Mask C

Fundamental Frequency: 153.00 MHz  
Corrected Measured Output: 154.50 dBuV (Direct Reading)  
56.23 Watts (P)

### Authorized Bandwidth

Start Freq. 152.990 MHz  
Stop Freq. 153.010 MHz

### Calculations:

#### 250% of Authorized Bandwidth

Start Freq. 152.975 MHz  
Stop Freq. 153.025 MHz

#### Frequency:

5kHz - 10kHz:  
10kHz - 250%  
>±250%

#### Limit:

83log (fd/5)  
the lesser of 29log (fd<sup>2</sup>/11) or 50dB  
43+10log (P)

#### dBc Calculations:

83Log(fd/5) = 25.0 dB @ 10 kHz removed  
29Log(fd<sup>2</sup>/11) = 50.0 dB @ 24.14 kHz removed  
43+10Log(P) = 60.5 dB @ >250% of the authorized band

#### Turn point:

29 LOG (fd<sup>2</sup>/11) = 50  
fd(t) = SQRT(11\*10<sup>50</sup>/29)  
fd(t) = 24.14155877 kHz

#### Emissions Mask for EMITest:

| MHz      | dBuV   | fd (MHz) | dBc              |
|----------|--------|----------|------------------|
| 0.009    | 94.00  |          | 60.5             |
| 152.975  | 94.00  |          | 60.5 43+10Log(P) |
| 152.975  | 104.50 | (250%)   | 50.0             |
| 152.976  | 104.50 |          | 50.0             |
| 152.976  | 104.50 | 0.024    | 50.0 50dBc       |
| 152.990  | 129.51 | 0.010    | 25.0             |
| 152.990  | 154.50 |          | Fundamental      |
| 153.010  | 154.50 |          | Fundamental      |
| 153.010  | 129.51 | 0.010    | 25.0             |
| 153.024  | 104.50 | 0.024    | 50.0 50dBc       |
| 153.024  | 104.50 |          | 50.0             |
| 153.025  | 104.50 | (250%)   | 50.0             |
| 153.025  | 94.00  |          | 60.5 43+10Log(P) |
| 2000.000 | 94.00  |          | 60.5             |

## Part 90.210c Mask C

Fundamental Frequency: 156.00 MHz  
 Corrected Measured Output: 154.50 dBuV (Direct Reading)  
 56.23 Watts (P)

**Authorized Bandwidth**  
 Start Freq. 155.990 MHz  
 Stop Freq. 156.010 MHz

### Calculations:

**250% of Authorized Bandwidth**  
 Start Freq. 155.975 MHz  
 Stop Freq. 156.025 MHz

**Frequency:** 5kHz - 10kHz: 83log (fd/5)  
 10kHz - 250% the lesser of 29log (fd^2/11) or 50dB  
 >±250% 43+10log (P)

**dBc Calculations:**  
 83Log(fd/5) = 25.0 dB @ 10 kHz removed  
 29Log(fd^2/11) = 50.0 dB @ 24.14 kHz removed  
 43+10Log(P) = 60.5 dB @ >250% of the authorized band

**Turn point:**  
 29 LOG (fd^2/11) = 50  
 fd(t) = SQRT(11\*10^(50/29))  
 fd(t) = 24.14155877 kHz

### Emissions Mask for EMITest:

| MHz      | dBuV   | fd (MHz) | dBc              |
|----------|--------|----------|------------------|
| 0.009    | 94.00  |          | 60.5             |
| 155.975  | 94.00  |          | 60.5 43+10Log(P) |
| 155.975  | 104.50 | (250%)   | 50.0             |
| 155.976  | 104.50 |          | 50.0             |
| 155.976  | 104.50 | 0.024    | 50.0 50dBc       |
| 155.990  | 129.51 | 0.010    | 25.0             |
| 155.990  | 154.50 |          | Fundamental      |
| 156.010  | 154.50 |          | Fundamental      |
| 156.010  | 129.51 | 0.010    | 25.0             |
| 156.024  | 104.50 | 0.024    | 50.0 50dBc       |
| 156.024  | 104.50 |          | 50.0             |
| 156.025  | 104.50 | (250%)   | 50.0             |
| 156.025  | 94.00  |          | 60.5 43+10Log(P) |
| 2000.000 | 94.00  |          | 60.5             |



Test Setup of Bandwidth Plot Testing – Front View



Test Setup of Bandwidth Plot Testing – Back View

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

### **FCC CFR 47 Part 2.1051 & 90.210(C)**

CFR 47 Part 2.1051 & 90.210(c) Measurements required: Spurious emission at Antenna terminal,  
Emission mask C

Spurious Emission acquired with:

RBW=30 KHz, VBW = 30 KHz for Freq < 1 GHz

RBW= 1 MHz , VBW = 1 MHz for Freq > 1 GHz

Channel : 0

Tx Frequency : 150 MHz

|    | Freq     | Reading in | Reading in  | Reading in  | Spec Limit | Margin       | Pass/Fail |
|----|----------|------------|-------------|-------------|------------|--------------|-----------|
|    | (MHz)    | dBuV       | V           | Watts       | Watts      |              |           |
| 1  | 104      | 89.7       | 0.030549211 | 0.000018665 | 0.00005    | -0.000031335 | Pass      |
| 2  | 148.355  | 89.1       | 0.028510183 | 0.000016257 | 0.0006     | -0.000583743 | Pass      |
| 3  | 149.19   | 94.6       | 0.053703180 | 0.000057681 | 0.0006     | -0.000542319 | Pass      |
| 4  | 149.305  | 101.6      | 0.120226443 | 0.000289088 | 0.0006     | -0.000310912 | Pass      |
| 5  | 196.01   | 87.4       | 0.023442288 | 0.000010991 | 0.00005    | -0.000039009 | Pass      |
| 6  | 300.01   | 85         | 0.017782794 | 0.000006325 | 0.00005    | -0.000043675 | Pass      |
| 7  | 450.01   | 86.2       | 0.020417379 | 0.000008337 | 0.00005    | -0.000041663 | Pass      |
| 8  | 1199.997 | 87.4       | 0.023442288 | 0.000010991 | 0.00005    | -0.000039009 | Pass      |
| 9  | 1349.997 | 88.6       | 0.026915348 | 0.000014489 | 0.00005    | -0.000035511 | Pass      |
| 10 | 1499.997 | 88.6       | 0.026915348 | 0.000014489 | 0.00005    | -0.000035511 | Pass      |
| 11 | 1649.997 | 88.6       | 0.026915348 | 0.000014489 | 0.00005    | -0.000035511 | Pass      |
| 12 | 1799.997 | 88.6       | 0.026915348 | 0.000014489 | 0.00005    | -0.000035511 | Pass      |
| 13 | 1949.997 | 88.6       | 0.026915348 | 0.000014489 | 0.00005    | -0.000035511 | Pass      |

Note: See next page for calculations.

## Calculation

Note: The data taken is the power level of each spurious emission with reference to the modulated carrier power output of the transmitter.

Spec limit

**FCC Part 90.210 ( c ) (1)**, For  $5 \text{ KHz} < (f_d = F - F_c) < 10 \text{ KHz}$ ,

Required attenuation =  $83 \text{ Log } (f_d / 5) \text{ dB}$

**FCC Part 90.210 ( c ) (2)** For  $f_d < \pm 250\%$  Authorized Bandwidth

Required attenuation =  $29 \text{ Log } (f_d^2 / 11)$  or 50 dB (whichever is lesser)

Spurious emission limit (dBW) =  $10 \text{ Log } P - 50 = 10 \text{ Log } (60) - 50 = -32.2 \text{ dBW}$

Spurious emission limit (W) =  $10^{(-32.2/10)} = 0.000600$

**FCC Part 90.210 ( c ) (3)** For  $f_d > \pm 250\%$  Authorized bandwidth,

Required attenuation =  $43 + 10 \text{ Log } ( \text{Power} ) \text{ dB}$

Spurious Emissions Limit (dBW) =  $10 \text{ log } P - (43 + 10 \text{ log } P) = 10 \text{ Log } (60) - (43 + 10 \text{ Log } 60) - 43 \text{ dBW}$

Spurious Emissions Limit (W) =  $10^{(-43/10)} = 50 * 10^{-6} \text{ W}$ .

Power Calculation

R = 50 Ohm

V = Measured antenna terminal voltage across a 50 Ohm load.

Power =  $V^2 / R$

dB to Linear Conversion

$V = 1 \text{ e-}6 * 10^{(dBuV/20)}$

# **FCC CFR 47 Part 2.1051 & 90.210(C)**

CFR 47 Part 2.1051 & 90.210(c) Measurements required: Spurious emission at Antenna terminal, emission mask C

Spurious Emission acquired with:

RBW=30 KHz, VBW = 30 KHz for Freq < 1 GHz

RBW= 1 MHz , VBW = 1 MHz for Freq > 1 GHz

Channel : 1

Tx Frequency : 153 MHz

|    | Freq     | Reading in | Reading in  | Reading in  | Spec Limit | Margin       | Pass/Fail |
|----|----------|------------|-------------|-------------|------------|--------------|-----------|
|    | (MHz)    | dBuV       | V           | Watts       | Watts      |              |           |
| 1  | 107.009  | 89.3       | 0.029174270 | 0.000017023 | 0.00005    | -0.000032977 | Pass      |
| 2  | 198.998  | 89.1       | 0.028510183 | 0.000016257 | 0.00005    | -0.000033743 | Pass      |
| 3  | 306.006  | 86.9       | 0.022130947 | 0.000009796 | 0.00005    | -0.000040204 | Pass      |
| 4  | 458.994  | 88.8       | 0.027542287 | 0.000015172 | 0.00005    | -0.000034828 | Pass      |
| 5  | 1070.878 | 86.9       | 0.022130947 | 0.000009796 | 0.00005    | -0.000040204 | Pass      |
| 6  | 1223.905 | 88.4       | 0.026302680 | 0.000013837 | 0.00005    | -0.000036163 | Pass      |
| 7  | 1376.902 | 88.7       | 0.027227013 | 0.000014826 | 0.00005    | -0.000035174 | Pass      |
| 8  | 1529.902 | 86.5       | 0.021134890 | 0.000008934 | 0.00005    | -0.000041066 | Pass      |
| 9  | 1682.902 | 87.8       | 0.024547089 | 0.000012051 | 0.00005    | -0.000037949 | Pass      |
| 10 | 1835.902 | 87.8       | 0.024547089 | 0.000012051 | 0.00005    | -0.000037949 | Pass      |
| 11 | 1988.902 | 87.8       | 0.024547089 | 0.000012051 | 0.00005    | -0.000037949 | Pass      |

Note: See next page for calculations.

## Calculation

Note: The data taken is the power level of each spurious emission with reference to the modulated carrier power output of the transmitter.

Spec limit

**FCC Part 90.210 ( c ) (1)**, For 5 KHz < (fd = F-Fc) < 10 KHz,

Required attenuation =  $83 \text{ Log } (f_d / 5) \text{ dB}$

**FCC Part 90.210 ( c ) (2)** For  $f_d < \pm 250\%$  Authorized Bandwidth

Required attenuation =  $29 \text{ Log } (F_d^2 / 11)$  or 50 dB (whichever is lesser)

Spurious emission limit (dBW) =  $10 \text{ Log } P - 50 = 10 \text{ Log } (60) - 50 = -32.2 \text{ dBW}$

Spurious emission limit (W) =  $10^{(-32.2/10)} = 0.000600$

**FCC Part 90.210 ( c ) (3)** For  $F_d > \pm 250\%$  Authorized bandwidth,

Required attenuation =  $43 + 10 \text{ Log } ( \text{Power} ) \text{ dB}$

Spurious Emissions Limit (dBW) =  $10 \text{ log } P - (43 + 10 \text{ log } P) = 10 \text{ Log } (60) - (43 + 10 \text{ Log } 60) = -43 \text{ dBW}$

Spurious Emissions Limit (W) =  $10^{(-43/10)} = 50 * 10^{-6} \text{ W}$ .

Power Calculation

R = 50 Ohm

V = Measured antenna terminal voltage across a 50 Ohm load.

Power =  $V^2 / R$

# **FCC CFR 47 Part 2.1051 & 90.210(C)**

CFR 47 Part 2.1051 & 90.210(c) Measurements required: Spurious emission at Antenna terminal, emission mask C

Spurious Emission acquired with:

RBW=30 KHz, VBW = 30 KHz for Freq < 1 GHz

RBW= 1 MHz , VBW = 1 MHz for Freq > 1 GHz

Channel : 2  
Tx Frequency : 156 MHz

|    | Freq<br>(MHz) | Reading in<br>dBuV | Reading in<br>V | Reading in<br>Watts | Spec Limit<br>Watts | Margin       | Pass/Fail |
|----|---------------|--------------------|-----------------|---------------------|---------------------|--------------|-----------|
| 1  | 110.001       | 90.2               | 0.032359366     | 0.000020943         | 0.00005             | -0.000029057 | Pass      |
| 2  | 148.021       | 92.6               | 0.042657952     | 0.000036394         | 0.00005             | -0.000013606 | Pass      |
| 3  | 202.005       | 88.9               | 0.027861212     | 0.000015525         | 0.00005             | -0.000034475 | Pass      |
| 4  | 312           | 87.9               | 0.024831331     | 0.000012332         | 0.00005             | -0.000037668 | Pass      |
| 5  | 468.002       | 90.3               | 0.032734069     | 0.000021430         | 0.00005             | -0.000028570 | Pass      |
| 6  | 779.997       | 75.5               | 0.005956621     | 0.000000710         | 0.00005             | -0.000049290 | Pass      |
| 7  | 935.997       | 75.1               | 0.005688529     | 0.000000647         | 0.00005             | -0.000049353 | Pass      |
| 8  | 1091.995      | 87.3               | 0.023173946     | 0.000010741         | 0.00005             | -0.000039259 | Pass      |
| 9  | 1247.999      | 88.4               | 0.026302680     | 0.000013837         | 0.00005             | -0.000036163 | Pass      |
| 10 | 1403.997      | 88.2               | 0.025703958     | 0.000013214         | 0.00005             | -0.000036786 | Pass      |
| 11 | 1559.991      | 88.1               | 0.025409727     | 0.000012913         | 0.00005             | -0.000037087 | Pass      |
| 12 | 1715.991      | 87                 | 0.022387211     | 0.000010024         | 0.00005             | -0.000039976 | Pass      |
| 13 | 1871.991      | 89.4               | 0.029512092     | 0.000017419         | 0.00005             | -0.000032581 | Pass      |

Note: See next page for calculations.

## Calculation

Note: The data taken is the power level of each spurious emission with reference to the modulated carrier power output of the transmitter.

Spec limit

**FCC Part 90.210 (c) (1)**, For  $5 \text{ KHz} < (f_d = F - F_c) < 10 \text{ KHz}$ ,

Required attenuation =  $83 \text{ Log} (f_d / 5) \text{ dB}$

**FCC Part 90.210 (c) (2)** For  $f_d < \pm 250\%$  Authorized Bandwidth

Required attenuation =  $29 \text{ Log} (F_d^2 / 11)$  or 50 dB (whichever is lesser)

Spurious emission limit (dBW) =  $10 \text{ Log } P - 50 = 10 \text{ Log} (60) - 50 = -32.2 \text{ dBW}$

Spurious emission limit (W) =  $10^{(-32.2/10)} = 0.000600$

**FCC Part 90.210 (c) (3)** For  $F_d > \pm 250\%$  Authorized bandwidth,

Required attenuation =  $43 + 10 \text{ Log} (\text{Power}) \text{ dB}$

Spurious Emissions Limit (dBW) =  $10 \text{ Log } P - (43 + 10 \text{ Log } P) = 10 \text{ Log} (60) - (43 + 10 \text{ Log } 60) - 43 \text{ dBW}$

Spurious Emissions Limit (W) =  $10^{(-43/10)} = 50 \times 10^{-6} \text{ W}$ .

Power Calculation

R = 50 Ohm

V = Measured antenna terminal voltage across a 50 Ohm load.

Power =  $V^2 / R$

dB to Linear Conversion

$V = 1 \text{ e-}6 \times 10^{(\text{dBuV}/20)}$

## VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

| BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
|---------------------|------------------|-------------------|
| 4 MHz               | 30 MHz           | 9 kHz             |
| 30 MHz              | 1000 MHz         | 120 kHz           |
| 1000 MHz            | 2 GHz            | 1 MHz             |

## Test Equipment Used:

| Equipment           | Asset # | Manufacturer | Model # | Serial #   | Cal Date | Cal Due |
|---------------------|---------|--------------|---------|------------|----------|---------|
| Spectrum Analyzer   | 02462   | HP           | 8568B   | 2928A04874 | 032901   | 032902  |
| Spectrum Analyzer   | 02467   | HP           | E7405A  | US40240225 | 041001   | 041002  |
| Directional Coupler | 00714   | Werlatone    | C2630   | 3806       | 020901   | 020902  |
| Attenuator          | 01705   | HP           | 8496B   | 1350A01241 | 020901   | 020902  |



Front View of Test Setup



Back View of Test Setup

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

CFR 47 Part 2.1053 & 90.210(c) Measurements required: Radiated  
90.210(c) emission mask C

Channel 0  
Tx Frequency 150 MHz

These data represent the six highest readings.

|   | Freq<br>(MHz) | Reading in<br>Watts | Spec Limit<br>Watts | Pass/Fail |
|---|---------------|---------------------|---------------------|-----------|
| 1 | 450.083       | 0.000000056         | 0.00005             | Pass      |
| 2 | 600.075       | 0.000000053         | 0.00005             | Pass      |
| 3 | 750.082       | 0.000000031         | 0.00005             | Pass      |
| 4 | 300.082       | 0.000000015         | 0.00005             | Pass      |
| 5 | 1559.898      | 0.000000002         | 0.00005             | Pass      |
| 6 | 1715.942      | 0.000000002         | 0.00005             | Pass      |

Calculations:

Power Calculated from  $P = (E \cdot D)^2 / 30G$

**90.210(c) Emissions Limit**

$43 + 10 \cdot \text{LOG}(P) = 0.00005 \text{ Watts}$

CFR 47 Part 2.1053 & 90.210(c) Measurements required: Radiated spurious emissions,  
90.210(c) emission mask C

Channel 1  
Tx Frequency 153 MHz

These data represent the six highest readings.

|   | Freq    | Reading in  | Spec Limit | Pass/Fail |
|---|---------|-------------|------------|-----------|
|   | (MHz)   | Watts       | Watts      |           |
| 1 | 765.086 | 0.000000085 | 0.00005    | Pass      |
| 2 | 612.070 | 0.000000066 | 0.00005    | Pass      |
| 3 | 459.092 | 0.000000035 | 0.00005    | Pass      |
| 4 | 306.059 | 0.000000012 | 0.00005    | Pass      |
| 5 | 1988.95 | 0.000000006 | 0.00005    | Pass      |
| 6 | 918.085 | 0.000000002 | 0.00005    | Pass      |

Calculations:

Power Calculated from  $P = (E \cdot D)^2 / 30G$

**90.210(c) Emissions Limit**

$43 + 10 \cdot \text{LOG}(P) = 0.00005 \text{ Watts}$

CFR 47 Part 2.1053 & 90.210(c) Measurements required: Radiated spurious emissions,  
90.210(c) emission mask C

Channel 3  
Tx Frequency 156 MHz

These data represent the six highest readings.

|   | Freq    | Reading     | Spec Limit | Pass/Fail |
|---|---------|-------------|------------|-----------|
|   | (MHz)   | Watts       | Watts      |           |
| 1 | 624.069 | 0.000000476 | 0.00005    | Pass      |
| 2 | 780.069 | 0.000000301 | 0.00005    | Pass      |
| 3 | 624.081 | 0.000000185 | 0.00005    | Pass      |
| 4 | 468.069 | 0.000000041 | 0.00005    | Pass      |
| 5 | 312.078 | 0.000000023 | 0.00005    | Pass      |
| 6 | 936.129 | 0.000000005 | 0.00005    | Pass      |

Calculations:

Power Calculated from  $P = (E \cdot D)^2 / 30G$

**90.210(c) Emissions Limit**

$43 + 10 \cdot \text{LOG}(P) = 0.00005 \text{ Watts}$

### VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

| BEGINNING<br>FREQUENCY | ENDING<br>FREQUENCY | BANDWIDTH<br>SETTING |
|------------------------|---------------------|----------------------|
| 4 MHz                  | 30 MHz              | 9 kHz                |
| 30 MHz                 | 1000 MHz            | 120 kHz              |
| 1000 MHz               | 2 GHz               | 1 MHz                |

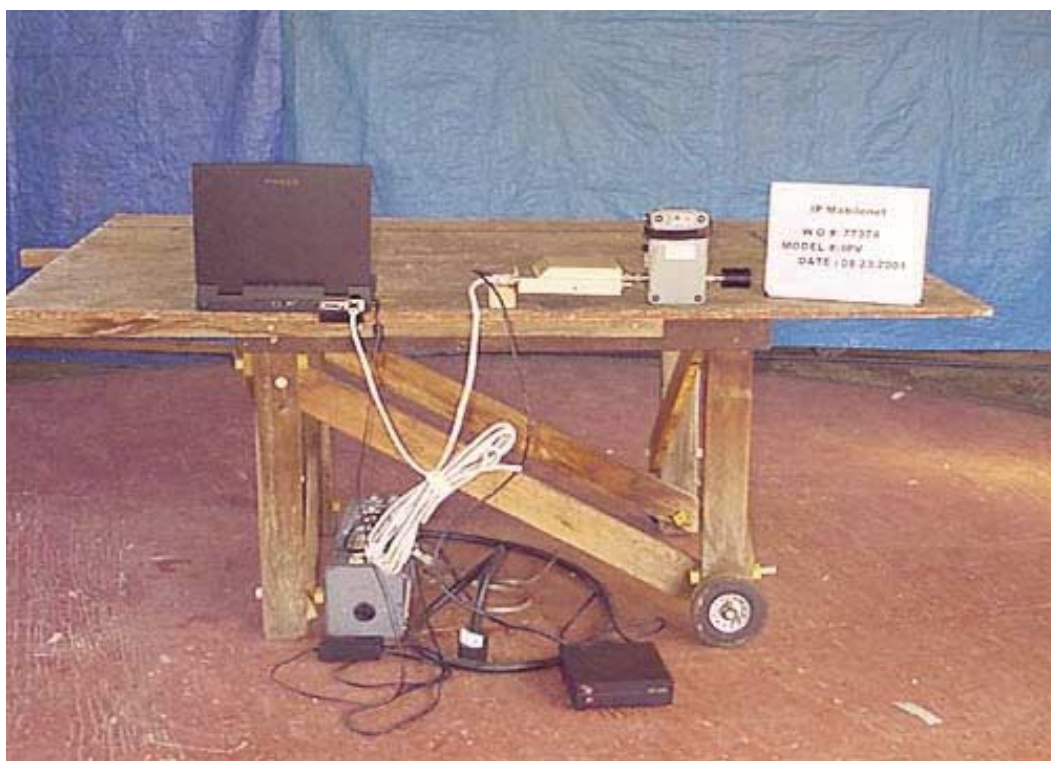
| Equipment              | Asset # | Manufacturer | Model #     | Serial #        | Cal Date | Cal Due |
|------------------------|---------|--------------|-------------|-----------------|----------|---------|
| Spectrum Analyzer      | 01865   | HP           | 8566B       | 2532A02509      | 102500   | 102501  |
| QP Adapter             | 01437   | HP           | 85650A      | 3303A01884      | 092600   | 092601  |
| Bicon Antenna          | 00306   | A.H. System  | SAS-200/540 | 220             | 092000   | 092001  |
| Log Periodic Antenna   | 00300   | A.H. System  | SAS-200/516 | 331             | 092000   | 092001  |
| Pre-amp                | 00309   | HP           | 8447D       | 1937A02548      | 091800   | 091801  |
| Antenna cable          | NA      | NA           | RG214       | Cable#15        | 122000   | 122001  |
| Pre-amp to SA cable    | NA      | Harbour      | RG223/U     | Cable#10        | 071601   | 071602  |
| Horn Antenna           | 00849   | EMCO         | 3115        | 6246            | 092500   | 092501  |
| Microwave Pre-amp      | 00798   | HP           | 83017A      | 3123A00281      | 101100   | 101101  |
| ¼" Helix Coaxial Cable | NA      | Andrew       | FSJ-50A-4   | Cable#7 (6 ft)  | 071701   | 071702  |
| ¼" Helix Coaxial Cable | NA      | Andrew       | FSJ-50A-4   | Cable#13 (25ft) | 071800   | 071801  |
| Active loop antenna    | 00314   | EMCO         | 6502        | 2014            | 073101   | 073102  |



Test Setup Front View



Test Setup Close-up of Front View



Test Setup Back View

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

|                |               |
|----------------|---------------|
| Customer:      | IP Mobilenet  |
| WO:            | 77374         |
| Model:         | IPV           |
| FCC Part:      | 2.1055/90.213 |
| Test Engineer: | R. Clark      |

|                                 |         |         |
|---------------------------------|---------|---------|
| Ambient Temperature:            | 70      | 21.1 °C |
| Relative Humidity:              | 42%     |         |
| Authorized Band:                | 150-174 | MHz     |
| CH1 Operating Frequency in MHz: | 150.0   |         |
| CH2 Operating Frequency in MHz: | 153.0   |         |
| CH3 Operating Frequency in MHz: | 156.0   |         |
| CH1 Frequency Limit in Hz:      | 750     | 5ppm    |
| CH2 Frequency Limit in Hz:      | 765     | 5ppm    |
| CH3 Frequency Limit in Hz:      | 780     | 5ppm    |
| Nominal Operating Voltage:      | 14.00   | VDC     |
| 85% of Nominal (V-)             | 11.90   | VDC     |
| 115% of Nominal (V+)            | 16.10   | VDC     |

| Channel 1 |               |                    |           |
|-----------|---------------|--------------------|-----------|
|           | Frequency MHz | Frequency Error Hz | Pass/Fail |
| -30°      | V- 150.00040  | 400                | PASS      |
|           | V 150.00031   | 310                | PASS      |
|           | V+ 150.00041  | 410                | PASS      |
| -20°      | V- 150.00068  | 680                | PASS      |
|           | V 150.00066   | 660                | PASS      |
|           | V+ 150.00064  | 640                | PASS      |
| -10°      | V- 150.00061  | 610                | PASS      |
|           | V 150.00066   | 660                | PASS      |
|           | V+ 150.00065  | 650                | PASS      |
| 0°        | V- 150.00062  | 620                | PASS      |
|           | V 150.00054   | 540                | PASS      |
|           | V+ 150.00065  | 650                | PASS      |
| +10°      | V- 150.00052  | 520                | PASS      |
|           | V 150.00048   | 480                | PASS      |
|           | V+ 150.00056  | 560                | PASS      |
| +20°      | V- 150.00043  | 430                | PASS      |
|           | V 150.00046   | 460                | PASS      |
|           | V+ 150.00036  | 360                | PASS      |
| +30°      | V- 150.00042  | 420                | PASS      |
|           | V 150.00032   | 320                | PASS      |
|           | V+ 150.00031  | 310                | PASS      |
| +40°      | V- 150.00031  | 310                | PASS      |
|           | V 150.00039   | 390                | PASS      |
|           | V+ 150.00030  | 300                | PASS      |
| +50°      | V- 150.00032  | 320                | PASS      |
|           | V 150.00029   | 290                | PASS      |
|           | V+ 150.00044  | 440                | PASS      |

| Channel 2 |               |                              |
|-----------|---------------|------------------------------|
|           | Frequency MHz | Frequency Error Hz Pass/Fail |
| -30°      | V-            | 153.00044 440 PASS           |
|           | V             | 153.00058 580 PASS           |
|           | V+            | 153.00048 480 PASS           |
| -20°C     | V-            | 153.00063 630 PASS           |
|           | V             | 153.00059 590 PASS           |
|           | V+            | 153.00065 650 PASS           |
| -10°C     | V-            | 153.00059 590 PASS           |
|           | V             | 153.00060 600 PASS           |
|           | V+            | 153.00063 630 PASS           |
| 0°C       | V-            | 153.00058 580 PASS           |
|           | V             | 153.00061 610 PASS           |
|           | V+            | 153.00055 550 PASS           |
| +10°C     | V-            | 153.00036 360 PASS           |
|           | V             | 153.00052 520 PASS           |
|           | V+            | 153.00046 460 PASS           |
| 20°C      | V-            | 153.00038 380 PASS           |
|           | V             | 153.00050 500 PASS           |
|           | V+            | 153.00043 430 PASS           |
| +30°C     | V-            | 153.00031 310 PASS           |
|           | V             | 153.00033 330 PASS           |
|           | V+            | 153.00034 340 PASS           |
| +40°C     | V-            | 153.00039 390 PASS           |
|           | V             | 153.00029 290 PASS           |
|           | V+            | 153.00034 340 PASS           |
| +50°C     | V-            | 153.00054 540 PASS           |
|           | V             | 153.00035 350 PASS           |
|           | V+            | 153.00048 480 PASS           |

| Channel 3 |               |                              |
|-----------|---------------|------------------------------|
|           | Frequency MHz | Frequency Error Hz Pass/Fail |
| -30°      | V-            | 156.00044 440 PASS           |
|           | V             | 156.00055 550 PASS           |
|           | V+            | 156.00047 470 PASS           |
| -20°C     | V-            | 156.00066 660 PASS           |
|           | V             | 156.00067 670 PASS           |
|           | V+            | 156.00064 640 PASS           |
| -10°C     | V-            | 156.00063 630 PASS           |
|           | V             | 156.00060 600 PASS           |
|           | V+            | 156.00063 630 PASS           |
| 0°C       | V-            | 156.00054 540 PASS           |
|           | V             | 156.00043 430 PASS           |
|           | V+            | 156.00058 580 PASS           |
| +10°C     | V-            | 156.00036 360 PASS           |
|           | V             | 156.00055 550 PASS           |
|           | V+            | 156.00052 520 PASS           |
| 20°C      | V-            | 156.00038 380 PASS           |
|           | V             | 156.00032 320 PASS           |
|           | V+            | 156.00047 470 PASS           |
| +30°C     | V-            | 156.00030 300 PASS           |
|           | V             | 156.00035 350 PASS           |
|           | V+            | 156.00042 420 PASS           |
| +40°C     | V-            | 156.00029 290 PASS           |
|           | V             | 156.00035 350 PASS           |
|           | V+            | 156.00036 360 PASS           |
| +50°C     | V-            | 156.00035 350 PASS           |
|           | V             | 156.00043 430 PASS           |
|           | V+            | 156.00050 500 PASS           |

**Test Equipment Used:**

| Equipment          | Asset # | Manufacturer | Model #       | Serial #   | Cal Date  | Cal Due |
|--------------------|---------|--------------|---------------|------------|-----------|---------|
| Spectrum Analyzer  | 00490   | HP           | 8566B         | 2209A01404 | 11/3/00   | 11/3/01 |
| SA Display         | 00489   | HP           | 8566B         | 2403A08241 | 11/3/00   | 11/3/01 |
| QP Adapter         | 00478   | HP           | 85650A        | 2811A01267 | 11/03/00  | 11/3/01 |
| Digital Multimeter | 01241   | Radio Shack  | 22-183        | NA         | 08/30/00  | 8/30/01 |
| Temp Chamber       | 01879   | Thermotron   | S-1.2 MiniMax | 11899      | 3/29/2001 | 3/29/02 |
| Power Supply, DC   | 00765   | Sorensen     | DCR-60-30B    | 176        | 7/17/01   | 7/17/02 |
| Thermometer        | 02242   | Omega        | HH-26K        | T-202884   | 7/26/01   | 7/26/02 |

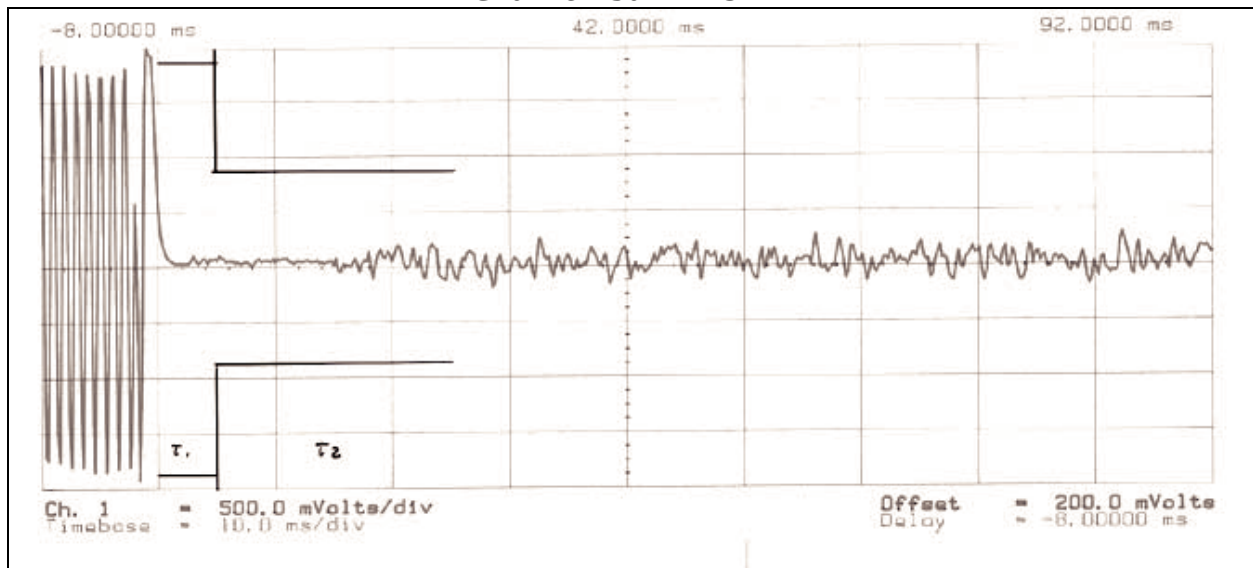


Test Setup Photo

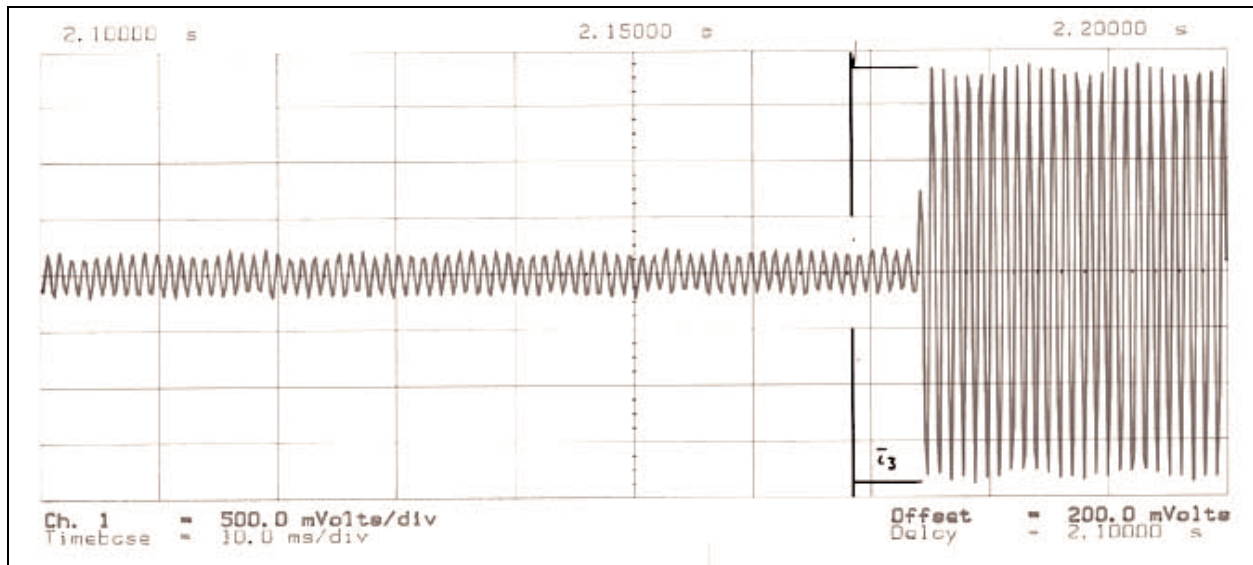
**2.1033(c)(14)/2.1055/90.214– Transient Frequency Behavior**

Testing was performed in accordance with TIA/EIA 603.

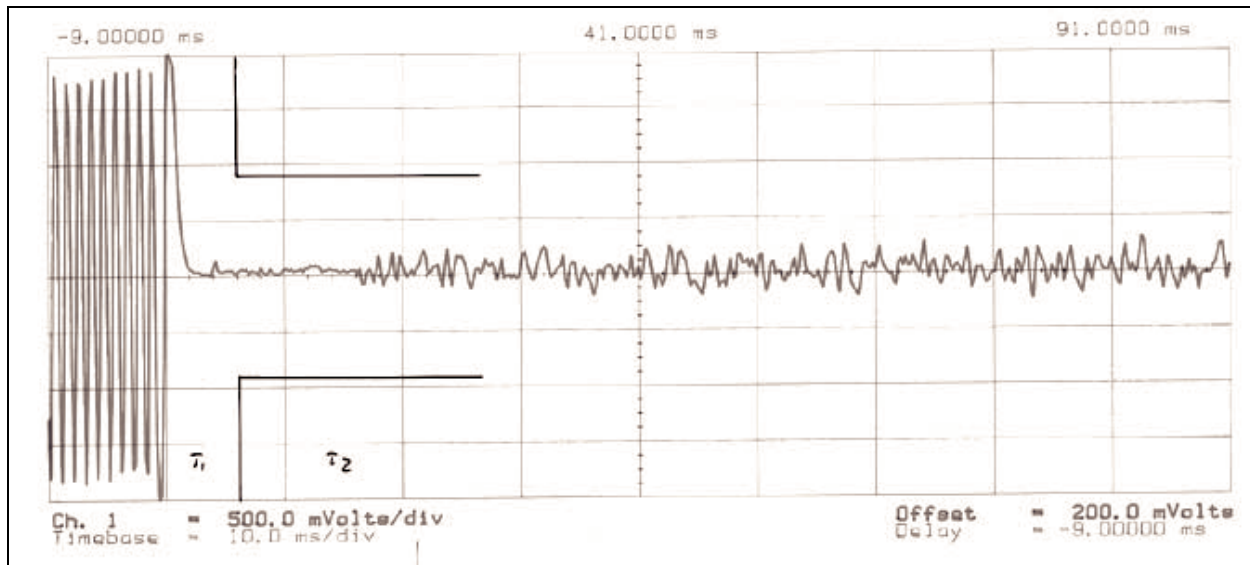
**Channel 150 – T1 & T2**



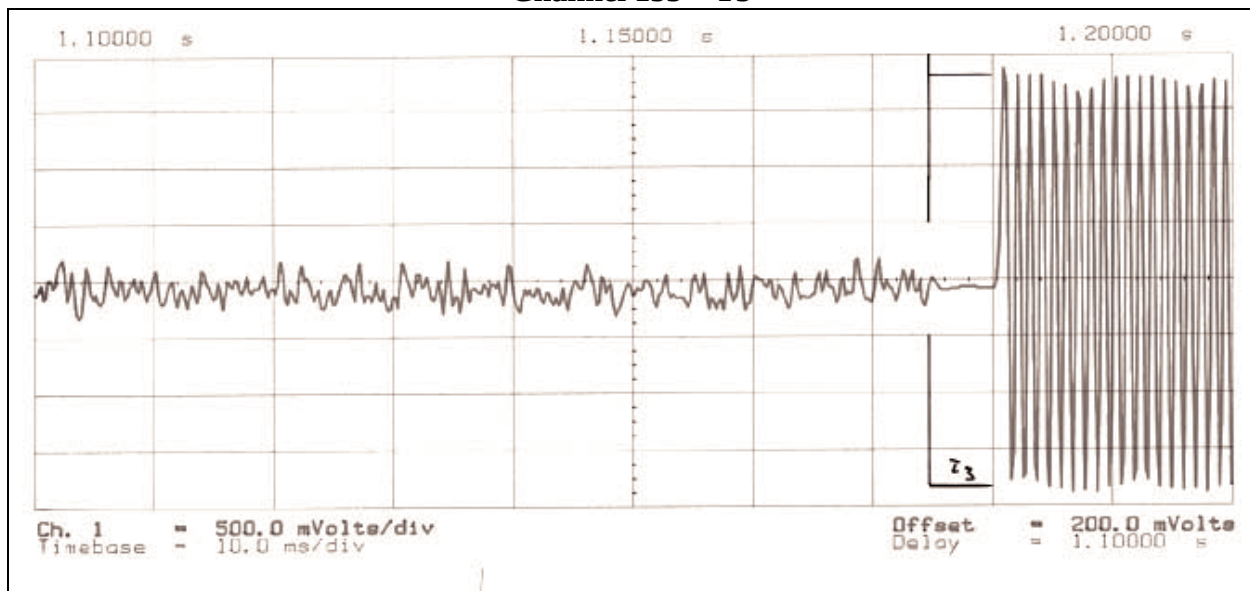
**Channel 150 – T3**



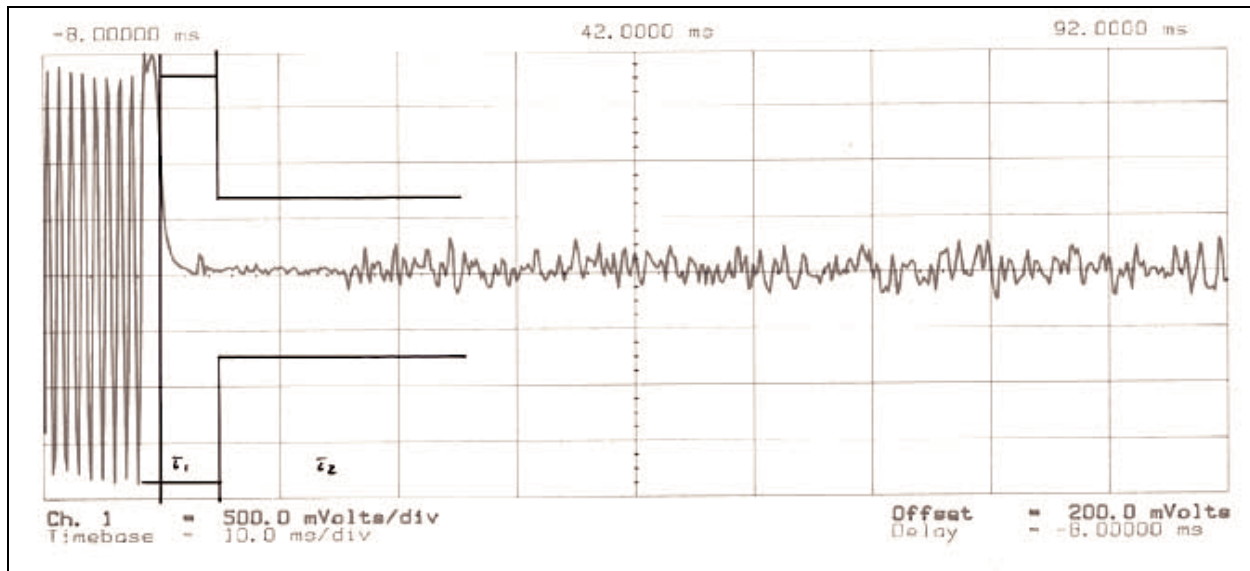
### Channel 153 – T1 & T2



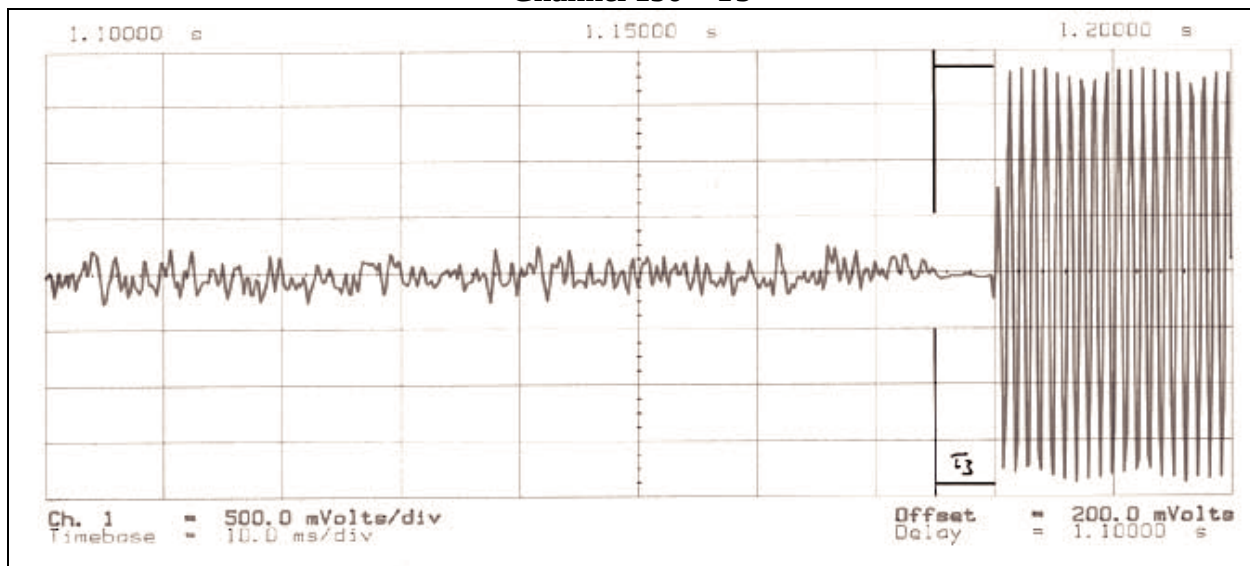
### Channel 153 – T3



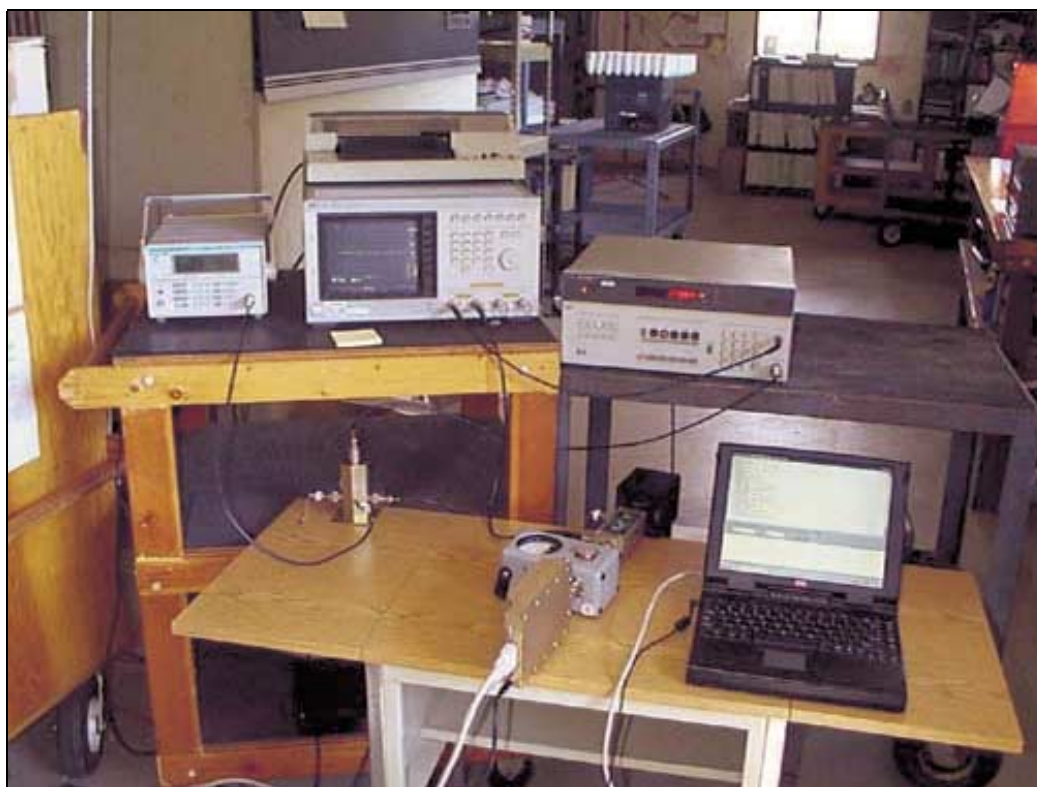
### Channel 156 – T1 & T2



### Channel 156 – T3



| Equipment             | Manufacturer | Model # | Serial #   | Asset # | Cal Date | Cal Due  |
|-----------------------|--------------|---------|------------|---------|----------|----------|
| Directional Coupler   | Werlatone    | C2630   | 3805       | 00713   | 04/16/01 | 04/16/02 |
| Generator, Signal,    | Marconi      | 2022D   | 119259/016 | 01870   | 09/05/01 | 09/05/02 |
| Modulation Analyzer   | HP           | 8901A   | 2751A05181 | 02072   | 10/09/00 | 10/09/01 |
| Oscilloscope, Digital | HP           | 54111D  | 3051A03191 | 02008   | 09/28/01 | 09/28/02 |
| SA Display            | HP           | 85662A  | 2237A04323 | 00091   | 02/26/01 | 02/26/02 |
| Spectrum Anal (RF)    | HP           | 8568B   | 2235A02425 | 00092   | 02/26/01 | 02/26/02 |



Setup Photo of Transient Behavior Testing

## 15.109 – RADIATED EMISSIONS – DIGITAL PORTION

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **IP Mobilenet**  
 Specification: **FCC 15.109**  
 Work Order #: **77374** Date: 08/10/2001  
 Test Type: **Maximized Emissions** Time: 12:08:33  
 Equipment: **VHF Land Mobile Transceiver** Sequence#: 7  
 Manufacturer: IP Mobilenet Tested By: Eddie Wong  
 Model: IPV  
 S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

### ***Support Devices:***

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

### ***Test Conditions / Notes:***

EUT placed on the test bench. RS 232 port connected to RS232 port of a laptop. Antenna port is connected to a 50 Ohm load. A RF power meter is placed inline between the EUT and the 50 Ohm load for visual indication. DC input port is connected to a DC power supply. Receiver port 2 and programming port are left unconnected. Test program sent command to the EUT to setup Transmit channel. EUT tested in stand by mode. Channel 0, 150 MHz. 12VDC.

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

| # | Freq<br>MHz | Rdng<br>dBμV | Log_3<br>Pream<br>dB | Bicon<br>dB | Cable<br>dB | Cable<br>dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|----------------------|-------------|-------------|-------------|---------------|----------------|----------------|--------------|--------------|
| 1 | 195.983M    | 52.6         | +0.0                 | +16.4       | +0.3        | +2.4        | +0.0          | 43.1           | 43.5           | -0.4         | Horiz        |
|   | QP          |              | -28.6                |             |             |             | 258           |                |                |              | 137          |
| ^ | 196.011M    | 53.1         | +0.0                 | +16.4       | +0.3        | +2.4        | +0.0          | 43.6           | 43.5           | +0.1         | Horiz        |
|   |             |              | -28.6                |             |             |             | 258           |                |                |              | 137          |
| 3 | 195.984M    | 47.5         | +0.0                 | +16.4       | +0.3        | +2.4        | +0.0          | 38.0           | 43.5           | -5.5         | Vert         |
|   | QP          |              | -28.6                |             |             |             | 360           |                |                |              | 163          |
| ^ | 195.985M    | 47.8         | +0.0                 | +16.4       | +0.3        | +2.4        | +0.0          | 38.3           | 43.5           | -5.2         | Vert         |
|   |             |              | -28.6                |             |             |             | 360           |                |                |              | 163          |
| 5 | 588.005M    | 38.5         | +19.0                | +0.0        | +0.4        | +4.5        | +0.0          | 34.4           | 46.0           | -11.6        | Vert         |
|   |             |              | -28.0                |             |             |             | 360           |                |                |              | 100          |
| 6 | 391.999M    | 43.2         | +15.1                | +0.0        | +0.4        | +3.6        | +0.0          | 34.2           | 46.0           | -11.8        | Horiz        |
|   |             |              | -28.1                |             |             |             | 326           |                |                |              | 117          |
| 7 | 59.997M     | 45.8         | +0.0                 | +8.2        | +0.1        | +1.3        | +0.0          | 27.0           | 40.0           | -13.0        | Vert         |
|   |             |              | -28.4                |             |             |             | 79            |                |                |              | 163          |
| 8 | 600.025M    | 36.5         | +19.2                | +0.0        | +0.4        | +4.5        | +0.0          | 32.7           | 46.0           | -13.3        | Vert         |
|   |             |              | -27.9                |             |             |             |               |                |                |              | 100          |
| 9 | 599.975M    | 36.0         | +19.2                | +0.0        | +0.4        | +4.5        | +0.0          | 32.2           | 46.0           | -13.8        | Horiz        |
|   | QP          |              | -27.9                |             |             |             | 23            |                |                |              | 117          |
| ^ | 599.990M    | 38.3         | +19.2                | +0.0        | +0.4        | +4.5        | +0.0          | 34.5           | 46.0           | -11.5        | Horiz        |
|   |             |              | -27.9                |             |             |             | 338           |                |                |              | 100          |

|    |          |      |                |       |      |      |             |      |      |       |              |
|----|----------|------|----------------|-------|------|------|-------------|------|------|-------|--------------|
| 11 | 449.977M | 40.1 | +16.1<br>-28.3 | +0.0  | +0.4 | +3.9 | +0.0<br>360 | 32.2 | 46.0 | -13.8 | Vert<br>156  |
| 12 | 851.030M | 30.6 | +22.5<br>-27.3 | +0.0  | +0.6 | +5.4 | +0.0<br>260 | 31.8 | 46.0 | -14.2 | Horiz<br>100 |
| 13 | 300.026M | 33.6 | +22.4<br>-28.3 | +0.0  | +0.3 | +3.0 | +0.0<br>114 | 31.0 | 46.0 | -15.0 | Horiz<br>117 |
| 14 | 599.971M | 34.5 | +19.2<br>-27.9 | +0.0  | +0.4 | +4.5 | +0.0<br>1   | 30.7 | 46.0 | -15.3 | Vert<br>100  |
| 15 | 193.537M | 36.4 | +0.0<br>-28.6  | +16.4 | +0.3 | +2.4 | +0.0<br>172 | 26.9 | 43.5 | -16.6 | Horiz<br>144 |
| 16 | 392.024M | 38.2 | +15.1<br>-28.1 | +0.0  | +0.4 | +3.6 | +0.0<br>133 | 29.2 | 46.0 | -16.8 | Vert<br>100  |
| 17 | 200.010M | 36.4 | +0.0<br>-28.6  | +16.2 | +0.3 | +2.4 | +0.0<br>261 | 26.7 | 43.5 | -16.8 | Horiz<br>138 |
| 18 | 284.874M | 33.7 | +0.0<br>-28.4  | +20.0 | +0.3 | +2.9 | +0.0<br>99  | 28.5 | 46.0 | -17.5 | Horiz<br>138 |
| 19 | 615.269M | 31.5 | +19.4<br>-27.9 | +0.0  | +0.4 | +4.6 | +0.0<br>227 | 28.0 | 46.0 | -18.0 | Vert<br>100  |
| 20 | 350.035M | 37.7 | +14.7<br>-28.2 | +0.0  | +0.3 | +3.4 | +0.0<br>14  | 27.9 | 46.0 | -18.1 | Horiz<br>117 |
| 21 | 49.985M  | 40.6 | +0.0<br>-28.4  | +8.3  | +0.1 | +1.2 | +0.0<br>58  | 21.8 | 40.0 | -18.2 | Vert<br>163  |
| 22 | 239.973M | 35.5 | +0.0<br>-28.5  | +16.9 | +0.3 | +2.6 | +0.0<br>215 | 26.8 | 46.0 | -19.2 | Horiz<br>138 |
| 23 | 215.491M | 33.7 | +0.0<br>-28.6  | +16.5 | +0.3 | +2.4 | +0.0<br>358 | 24.3 | 43.5 | -19.2 | Horiz<br>138 |
| 24 | 179.999M | 33.1 | +0.0<br>-28.6  | +17.0 | +0.3 | +2.3 | +0.0<br>4   | 24.1 | 43.5 | -19.4 | Vert<br>163  |
| 25 | 226.530M | 35.5 | +0.0<br>-28.5  | +16.7 | +0.3 | +2.4 | +0.0<br>6   | 26.4 | 46.0 | -19.6 | Horiz<br>138 |
| 26 | 326.250M | 32.5 | +18.2<br>-28.2 | +0.0  | +0.3 | +3.2 | +0.0<br>172 | 26.0 | 46.0 | -20.0 | Horiz<br>117 |
| 27 | 190.422M | 32.4 | +0.0<br>-28.6  | +16.6 | +0.3 | +2.4 | +0.0<br>140 | 23.1 | 43.5 | -20.4 | Horiz<br>144 |
| 28 | 239.987M | 33.3 | +0.0<br>-28.5  | +16.9 | +0.3 | +2.6 | +0.0<br>224 | 24.6 | 46.0 | -21.4 | Vert<br>163  |
| 29 | 432.000M | 32.6 | +15.8<br>-28.2 | +0.0  | +0.4 | +3.8 | +0.0<br>290 | 24.4 | 46.0 | -21.6 | Vert<br>100  |
| 30 | 149.990M | 30.9 | +0.0<br>-28.6  | +17.2 | +0.2 | +2.1 | +0.0<br>79  | 21.8 | 43.5 | -21.7 | Vert<br>100  |
| 31 | 150.190M | 30.3 | +0.0<br>-28.6  | +17.2 | +0.2 | +2.1 | +0.0<br>282 | 21.2 | 43.5 | -22.3 | Vert<br>163  |
| 32 | 279.993M | 28.8 | +0.0<br>-28.4  | +19.6 | +0.3 | +2.9 | +0.0<br>270 | 23.2 | 46.0 | -22.8 | Vert<br>163  |

|    |          |      |                |       |      |      |             |      |      |       |              |
|----|----------|------|----------------|-------|------|------|-------------|------|------|-------|--------------|
| 33 | 444.022M | 30.3 | +16.0<br>-28.3 | +0.0  | +0.4 | +3.9 | +0.0<br>70  | 22.3 | 46.0 | -23.7 | Vert<br>100  |
| 34 | 112.478M | 32.0 | +0.0<br>-28.5  | +13.8 | +0.2 | +1.8 | +0.0<br>170 | 19.3 | 43.5 | -24.2 | Vert<br>100  |
| 35 | 110.878M | 31.8 | +0.0<br>-28.5  | +13.6 | +0.2 | +1.8 | +0.0<br>67  | 18.9 | 43.5 | -24.6 | Horiz<br>144 |
| 36 | 65.250M  | 35.0 | +0.0<br>-28.5  | +7.3  | +0.1 | +1.4 | +0.0<br>19  | 15.3 | 40.0 | -24.7 | Vert<br>100  |

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **IP Mobilenet**

Specification: **FCC 15.109**

Work Order #: **77374**

Date: 08/10/2001

Test Type: **Maximized Emissions**

Time: 15:01:24

Equipment: **VHF Land Mobile Transceiver**

Sequence#: 8

Manufacturer: IP Mobilenet

Tested By: Eddie Wong

Model: IPV

S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

**Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

**Test Conditions / Notes:**

EUT placed on the test bench. RS 232 port connected to RS232 port of a laptop. Antenna port is connected to a 50 Ohm load. A RF power meter is placed inline between the EUT and the 50 Ohm load for visual indication. DC input port is connected to a DC power supply. Receiver port 2 and programming port are left unconnected. Test program sent command to the EUT to set transmit channel. EUT tested in stand by mode. Channel 1, 153 MHz. 12VDC.

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq<br>MHz | Rdng<br>dBμV | Log_3<br>Pream<br>dB | Bicon<br>dB | Cable<br>dB | Cable<br>dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|----------------------|-------------|-------------|-------------|---------------|----------------|----------------|--------------|--------------|
| 1 | 199.023M    | 52.3         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 42.6           | 43.5           | -0.9         | Horiz        |
|   | QP          |              | -28.6                |             |             |             | 257           |                |                |              | 151          |
| ^ | 199.039M    | 53.4         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 43.7           | 43.5           | +0.2         | Horiz        |
|   |             |              | -28.6                |             |             |             | 257           |                |                |              | 151          |
| 3 | 198.990M    | 47.1         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 37.4           | 43.5           | -6.1         | Vert         |
|   |             |              | -28.6                |             |             |             | 222           |                |                |              | 209          |
| 4 | 397.986M    | 46.7         | +15.2                | +0.0        | +0.4        | +3.6        | +0.0          | 37.8           | 46.0           | -8.2         | Vert         |
|   |             |              | -28.1                |             |             |             | 308           |                |                |              | 173          |
| 5 | 398.030M    | 42.1         | +15.2                | +0.0        | +0.4        | +3.6        | +0.0          | 33.2           | 46.0           | -12.8        | Horiz        |
|   |             |              | -28.1                |             |             |             | 338           |                |                |              | 205          |
| 6 | 323.966M    | 37.6         | +18.6                | +0.0        | +0.3        | +3.2        | +0.0          | 31.4           | 46.0           | -14.6        | Horiz        |
|   |             |              | -28.3                |             |             |             | 100           |                |                |              | 139          |
| 7 | 305.996M    | 33.3         | +21.4                | +0.0        | +0.3        | +3.1        | +0.0          | 29.8           | 46.0           | -16.2        | Horiz        |
|   |             |              | -28.3                |             |             |             | 60            |                |                |              | 139          |
| 8 | 300.020M    | 32.4         | +22.4                | +0.0        | +0.3        | +3.0        | +0.0          | 29.8           | 46.0           | -16.2        | Horiz        |
|   |             |              | -28.3                |             |             |             | 101           |                |                |              | 139          |
| 9 | 323.990M    | 35.7         | +18.6                | +0.0        | +0.3        | +3.2        | +0.0          | 29.5           | 46.0           | -16.5        | Vert         |
|   |             |              | -28.3                |             |             |             | 30            |                |                |              | 100          |

|    |          |      |                |       |      |      |             |      |      |       |              |
|----|----------|------|----------------|-------|------|------|-------------|------|------|-------|--------------|
| 10 | 305.997M | 32.2 | +21.4<br>-28.3 | +0.0  | +0.3 | +3.1 | +0.0<br>310 | 28.7 | 46.0 | -17.3 | Vert<br>100  |
| 11 | 349.968M | 38.3 | +14.7<br>-28.2 | +0.0  | +0.3 | +3.4 | +0.0<br>7   | 28.5 | 46.0 | -17.5 | Horiz<br>139 |
| 12 | 360.016M | 38.2 | +14.8<br>-28.2 | +0.0  | +0.3 | +3.4 | +0.0<br>259 | 28.5 | 46.0 | -17.5 | Vert<br>100  |
| 13 | 500.015M | 32.8 | +16.9<br>-28.0 | +0.0  | +0.4 | +4.1 | +0.0<br>88  | 26.2 | 46.0 | -19.8 | Horiz<br>124 |
| 14 | 233.988M | 32.4 | +0.0<br>-28.5  | +16.8 | +0.3 | +2.5 | +0.0<br>116 | 23.5 | 46.0 | -22.5 | Vert<br>100  |

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **IP Mobilenet**

Specification: **FCC 15.109**

Work Order #: **77374**

Date: 08/10/2001

Test Type: **Maximized Emissions**

Time: 16:36:04

Equipment: **VHF Land Mobile Transceiver**

Sequence#: 9

Manufacturer: IP Mobilenet

Tested By: Eddie Wong

Model: IPV

S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

**Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

**Test Conditions / Notes:**

EUT placed on the test bench. RS 232 port connected to RS232 port of a laptop. Antenna port is connected to a 50 Ohm load. A RF power meter is placed inline between the EUT and the 50 Ohm load for visual indication. DC input port is connected to a DC power supply. Receiver port 2 and programming port are left unconnected. Test program sent command to the EUT to set transmit channel. EUT tested in stand by mode. Channel 2, 156 MHz. 12VDC.

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

| #  | Freq<br>MHz | Rdng<br>dBμV | Log_3<br>Pream<br>dB | Bicon<br>dB | Cable<br>dB | Cable<br>dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|----|-------------|--------------|----------------------|-------------|-------------|-------------|---------------|----------------|----------------|--------------|--------------|
| 1  | 467.982M    | 51.6         | +16.4                | +0.0        | +0.4        | +4.0        | +0.0          | 44.2           | 46.0           | -1.8         | Horiz        |
|    | QP          |              | -28.2                |             |             |             | 325           |                |                |              | 100          |
| ^  | 467.994M    | 52.2         | +16.4                | +0.0        | +0.4        | +4.0        | +0.0          | 44.8           | 46.0           | -1.2         | Horiz        |
|    |             |              | -28.2                |             |             |             | 325           |                |                |              | 100          |
| 3  | 467.985M    | 50.1         | +16.4                | +0.0        | +0.4        | +4.0        | +0.0          | 42.7           | 46.0           | -3.3         | Vert         |
|    | QP          |              | -28.2                |             |             |             | 360           |                |                |              | 100          |
| ^  | 468.002M    | 50.3         | +16.4                | +0.0        | +0.4        | +4.0        | +0.0          | 42.9           | 46.0           | -3.1         | Vert         |
|    |             |              | -28.2                |             |             |             | 360           |                |                |              | 100          |
| 5  | 201.980M    | 48.8         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 39.1           | 43.5           | -4.4         | Vert         |
|    | QP          |              | -28.6                |             |             |             | 245           |                |                |              | 101          |
| ^  | 201.976M    | 49.6         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 39.9           | 43.5           | -3.6         | Vert         |
|    |             |              | -28.6                |             |             |             | 245           |                |                |              | 101          |
| 7  | 201.982M    | 48.7         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 39.0           | 43.5           | -4.5         | Horiz        |
|    | QP          |              | -28.6                |             |             |             | 137           |                |                |              | 164          |
| ^  | 201.988M    | 49.6         | +0.0                 | +16.2       | +0.3        | +2.4        | +0.0          | 39.9           | 43.5           | -3.6         | Horiz        |
|    |             |              | -28.6                |             |             |             | 137           |                |                |              | 164          |
| 9  | 404.016M    | 44.1         | +15.3                | +0.0        | +0.4        | +3.6        | +0.0          | 35.3           | 46.0           | -10.7        | Vert         |
|    |             |              | -28.1                |             |             |             | 320           |                |                |              | 182          |
| 10 | 404.013M    | 42.9         | +15.3                | +0.0        | +0.4        | +3.6        | +0.0          | 34.1           | 46.0           | -11.9        | Horiz        |
|    |             |              | -28.1                |             |             |             | 312           |                |                |              | 110          |
| 11 | 624.004M    | 36.5         | +19.4                | +0.0        | +0.4        | +4.6        | +0.0          | 33.0           | 46.0           | -13.0        | Horiz        |
|    |             |              | -27.9                |             |             |             | 18            |                |                |              | 113          |

|    |          |      |                |       |      |      |             |      |      |       |              |
|----|----------|------|----------------|-------|------|------|-------------|------|------|-------|--------------|
| 12 | 623.988M | 36.2 | +19.4<br>-27.9 | +0.0  | +0.4 | +4.6 | +0.0<br>231 | 32.7 | 46.0 | -13.3 | Vert<br>100  |
| 13 | 179.992M | 37.8 | +0.0<br>-28.6  | +17.0 | +0.3 | +2.3 | +0.0<br>185 | 28.8 | 43.5 | -14.7 | Vert<br>113  |
| 14 | 200.010M | 36.2 | +0.0<br>-28.6  | +16.2 | +0.3 | +2.4 | +0.0<br>244 | 26.5 | 43.5 | -17.0 | Horiz<br>136 |
| 15 | 155.984M | 34.4 | +0.0<br>-28.6  | +17.4 | +0.2 | +2.2 | +0.0<br>247 | 25.6 | 43.5 | -17.9 | Horiz<br>136 |
| 16 | 159.019M | 32.1 | +0.0<br>-28.6  | +17.7 | +0.2 | +2.2 | +0.0<br>127 | 23.6 | 43.5 | -19.9 | Vert<br>113  |
| 17 | 229.493M | 34.8 | +0.0<br>-28.5  | +16.8 | +0.3 | +2.5 | +0.0<br>80  | 25.9 | 46.0 | -20.1 | Vert<br>113  |
| 18 | 350.005M | 34.6 | +14.7<br>-28.2 | +0.0  | +0.3 | +3.4 | +0.0<br>20  | 24.8 | 46.0 | -21.2 | Vert<br>100  |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **IP Mobilenet**  
 Specification: **15.109 CLASS B**  
 Work Order #: **77374**  
 Test Type: **Maximized Emissions**  
 Equipment: **VHF Land Mobile Transceiver**  
 Manufacturer: IP Mobilenet  
 Model: IPV  
 S/N: Radio#1

Date: 08/28/2001  
 Time: 09:10:24  
 Sequence#: 17  
 Tested By: Randal Clark

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

**Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

**Test Conditions / Notes:**

EUT is a transmitter operating on 150-156MHz and is terminated in a shielded dummy load. EUT is set to the indicated channel, but is not transmitting. RS 232 port is connected to the laptop. EUT is powered by 14VDC from the DC power supply. Frequency Range Tested: 1-2GHz.

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq<br>MHz | Rdng<br>dBμV | Amp<br>Cable<br>dB | Horn<br>dB | Cable<br>dB | Cable<br>dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m      | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|--------------------|------------|-------------|-------------|---------------|----------------|---------------------|--------------|--------------|
| 1 | 1248.042M   | 50.1         | -35.3<br>+1.7      | +25.0      | +0.2        | +3.5        | +0.0          | 45.2           | 54.0<br>Channel 156 | -8.8         | Horiz        |
| 2 | 1050.090M   | 50.2         | -35.6<br>+1.5      | +24.4      | +0.1        | +3.3        | +0.0          | 43.9           | 54.0<br>Channel 150 | -10.1        | Horiz        |
| 3 | 1199.940M   | 48.8         | -35.4<br>+1.7      | +25.0      | +0.1        | +3.5        | +0.0          | 43.7           | 54.0<br>Channel 150 | -10.3        | Horiz        |
| 4 | 1223.990M   | 48.5         | -35.4<br>+1.7      | +25.0      | +0.1        | +3.5        | +0.0          | 43.4           | 54.0<br>Channel 153 | -10.6        | Horiz        |
| 5 | 1071.290M   | 49.5         | -35.6<br>+1.6      | +24.4      | +0.1        | +3.3        | +0.0          | 43.3           | 54.0<br>Channel 153 | -10.7        | Horiz        |
| 6 | 1223.960M   | 47.4         | -35.4<br>+1.7      | +25.0      | +0.1        | +3.5        | +0.0          | 42.3           | 54.0<br>Channel 153 | -11.7        | Vert         |
| 7 | 1199.770M   | 46.9         | -35.4<br>+1.7      | +25.0      | +0.1        | +3.5        | +0.0          | 41.8           | 54.0<br>Channel 150 | -12.2        | Vert         |
| 8 | 1092.002M   | 47.6         | -35.5<br>+1.6      | +24.5      | +0.1        | +3.3        | +0.0          | 41.6           | 54.0<br>Channel 156 | -12.4        | Horiz        |
| 9 | 1050.250M   | 47.4         | -35.6<br>+1.5      | +24.4      | +0.1        | +3.3        | +0.0          | 41.1           | 54.0<br>Channel 150 | -12.9        | Vert         |

**Test Equipment Used:**

| Equipment         | Asset # | Manufacturer | Model #  | Serial #   | Cal Date | Cal Due  |
|-------------------|---------|--------------|----------|------------|----------|----------|
| Spectrum Analyzer | 00490   | HP           | 8566B    | 2209A01404 | 11/3/00  | 11/3/01  |
| SA Display        | 00489   | HP           | 8566B    | 2403A08241 | 11/3/00  | 11/3/01  |
| QP Adapter        | 00478   | HP           | 85650A   | 2811A01267 | 11/03/00 | 11/3/01  |
| Preamp            | 00099   | HP           | 8447D    | 1937A02604 | 03/29/01 | 3/29/02  |
| Preamp            | 02010   | HP           | 8449B    | 3008A00301 | 10/13/00 | 10/13/01 |
| Cable #4 (50')    | N/A     | Andrew       | FSJ1-50A | N/A        | 4/16/01  | 4/16/02  |
| Cable #2 (2')     | N/A     | Andrew       | FSJ1-50A | N/A        | 4/16/01  | 4/16/02  |
| Cable #7 (25')    | N/A     | Andrew       | FSJ1-50A | N/A        | 4/16/01  | 4/16/02  |
| Antenna, Horn     | 00656   | EMCO         | 3115     | 4085       | 02/28/01 | 2/28/02  |

**VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:**

| BEGINNING<br>FREQUENCY | ENDING<br>FREQUENCY | BANDWIDTH<br>SETTING |
|------------------------|---------------------|----------------------|
| 30 MHz                 | 1000 MHz            | 120 kHz              |
| 1000 MHz               | 2 GHz               | 1 MHz                |



Test Setup Photo – Front View



Test Setup Photo – Back View

## 15.111 – ANTENNA POWER CONDUCTED - RECEIVER

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **IP Mobilenet**

Specification: **FCC 15.111**

Work Order #: **77374**

Date: 10/03/2001

Test Type: **Maximized Emissions**

Time: 2:01:59 PM

Equipment: **VHF Land Mobile Transceiver**

Sequence#: 18

Manufacturer: IP Mobilenet

Tested By: Randal Clark

Model: IPV

S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

### Support Devices:

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

### Test Conditions / Notes:

EUT is a transmitter operating on 150-156MHz and is terminated in a shielded dummy load. EUT is set to channel 0 (150MHz). RS 232 port is connected to the laptop. EUT is powered by 14VDC from the DC power supply. Spectrum analyzer is connected to the receiver port. Frequency Range Tested: 30MHz - 2000MHz.

### Measurement Data:

Reading listed by margin.

Test Distance: None

| #  | Freq<br>MHz | Rdng<br>dBμV |  |  |  |  | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|----|-------------|--------------|--|--|--|--|---------------|----------------|----------------|--------------|--------------|
| 1  | 1567.883M   | 38.0         |  |  |  |  | +0.0          | 38.0           | 50.0           | -12.0        | Recei        |
| 2  | 1799.717M   | 35.0         |  |  |  |  | +0.0          | 35.0           | 50.0           | -15.0        | Recei        |
| 3  | 1371.716M   | 33.9         |  |  |  |  | +0.0          | 33.9           | 50.0           | -16.1        | Recei        |
| 4  | 1764.050M   | 30.8         |  |  |  |  | +0.0          | 30.8           | 50.0           | -19.2        | Recei        |
| 5  | 196.052M    | 29.7         |  |  |  |  | +0.0          | 29.7           | 50.0           | -20.3        | Recei        |
| 6  | 1499.979M   | 29.3         |  |  |  |  | +0.0          | 29.3           | 50.0           | -20.7        | Recei        |
| 7  | 1949.243M   | 25.0         |  |  |  |  | +0.0          | 25.0           | 50.0           | -25.0        | Recei        |
| 8  | 178.244M    | 23.9         |  |  |  |  | +0.0          | 23.9           | 50.0           | -26.1        | Recei        |
| 9  | 133.566M    | 23.7         |  |  |  |  | +0.0          | 23.7           | 50.0           | -26.3        | Recei        |
| 10 | 1175.284M   | 22.3         |  |  |  |  | +0.0          | 22.3           | 50.0           | -27.7        | Recei        |
| 11 | 979.681M    | 22.0         |  |  |  |  | +0.0          | 22.0           | 50.0           | -28.0        | Recei        |

|    |           |      |      |      |      |       |       |
|----|-----------|------|------|------|------|-------|-------|
| 12 | 1650.191M | 21.8 | +0.0 | 21.8 | 50.0 | -28.2 | Recei |
| 13 | 1350.453M | 21.7 | +0.0 | 21.7 | 50.0 | -28.3 | Recei |
| 14 | 222.764M  | 21.3 | +0.0 | 21.3 | 50.0 | -28.7 | Recei |
| 15 | 1727.012M | 21.1 | +0.0 | 21.1 | 50.0 | -28.9 | Recei |
| 16 | 1621.383M | 21.1 | +0.0 | 21.1 | 50.0 | -28.9 | Recei |
| 17 | 1661.165M | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 18 | 44.555M   | 20.7 | +0.0 | 20.7 | 50.0 | -29.3 | Recei |
| 19 | 317.107M  | 20.6 | +0.0 | 20.6 | 50.0 | -29.4 | Recei |
| 20 | 169.676M  | 20.6 | +0.0 | 20.6 | 50.0 | -29.4 | Recei |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **IP Mobilenet**  
 Specification: **FCC 15.111**  
 Work Order #: **77374** Date: 10/03/2001  
 Test Type: **Maximized Emissions** Time: 2:16:09 PM  
 Equipment: **VHF Land Mobile Transceiver** Sequence#: 19  
 Manufacturer: IP Mobilenet Tested By: Randal Clark  
 Model: IPV  
 S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

**Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samplex      | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

**Test Conditions / Notes:**

EUT is a transmitter operating on 150-156MHz and is terminated in a shielded dummy load. EUT is set to channel 1 (153MHz). RS 232 port is connected to the laptop. EUT is powered by 14VDC from the DC power supply. Spectrum analyzer is connected to the receiver port. Frequency Range Tested: 30MHz - 2000MHz.

**Measurement Data:** Reading listed by margin. Test Distance: None

| #  | Freq<br>MHz | Rdng<br>dBμV | dB | dB | dB | dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|----|-------------|--------------|----|----|----|----|---------------|----------------|----------------|--------------|--------------|
| 1  | 1835.384M   | 36.8         |    |    |    |    | +0.0          | 36.8           | 50.0           | -13.2        | Recei        |
| 2  | 1592.575M   | 36.1         |    |    |    |    | +0.0          | 36.1           | 50.0           | -13.9        | Recei        |
| 3  | 1393.664M   | 34.3         |    |    |    |    | +0.0          | 34.3           | 50.0           | -15.7        | Recei        |
| 4  | 1790.115M   | 31.6         |    |    |    |    | +0.0          | 31.6           | 50.0           | -18.4        | Recei        |
| 5  | 1529.473M   | 30.4         |    |    |    |    | +0.0          | 30.4           | 50.0           | -19.6        | Recei        |
| 6  | 199.076M    | 30.1         |    |    |    |    | +0.0          | 30.1           | 50.0           | -19.9        | Recei        |
| 7  | 1987.654M   | 24.6         |    |    |    |    | +0.0          | 24.6           | 50.0           | -25.4        | Recei        |
| 8  | 1683.114M   | 23.6         |    |    |    |    | +0.0          | 23.6           | 50.0           | -26.4        | Recei        |
| 9  | 178.244M    | 23.4         |    |    |    |    | +0.0          | 23.4           | 50.0           | -26.6        | Recei        |
| 10 | 154.759M    | 23.0         |    |    |    |    | +0.0          | 23.0           | 50.0           | -27.0        | Recei        |
| 11 | 133.566M    | 23.0         |    |    |    |    | +0.0          | 23.0           | 50.0           | -27.0        | Recei        |
| 12 | 1193.312M   | 22.8         |    |    |    |    | +0.0          | 22.8           | 50.0           | -27.2        | Recei        |

|    |           |      |      |      |      |       |       |
|----|-----------|------|------|------|------|-------|-------|
| 13 | 995.004M  | 22.3 | +0.0 | 22.3 | 50.0 | -27.7 | Recei |
| 14 | 222.764M  | 21.2 | +0.0 | 21.2 | 50.0 | -28.8 | Recei |
| 15 | 161.612M  | 21.0 | +0.0 | 21.0 | 50.0 | -29.0 | Recei |
| 16 | 39.953M   | 21.0 | +0.0 | 21.0 | 50.0 | -29.0 | Recei |
| 17 | 1500.665M | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 18 | 1943.756M | 20.7 | +0.0 | 20.7 | 50.0 | -29.3 | Recei |
| 19 | 1651.563M | 20.7 | +0.0 | 20.7 | 50.0 | -29.3 | Recei |
| 20 | 1377.203M | 20.7 | +0.0 | 20.7 | 50.0 | -29.3 | Recei |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest • Mariposa, CA 95338 • 800-500-4362

Customer: **IP Mobilenet**

Specification: **FCC 15.111**

Work Order #: **77374**

Date: 10/03/2001

Test Type: **Maximized Emissions**

Time: 2:21:43 PM

Equipment: **VHF Land Mobile Transceiver**

Sequence#: 20

Manufacturer: IP Mobilenet

Tested By: Randal Clark

Model: IPV

S/N: Radio#1

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

| Function                     | Manufacturer | Model # | S/N     |
|------------------------------|--------------|---------|---------|
| VHF Land Mobile Transceiver* | IP Mobilenet | IPV     | Radio#1 |

**Support Devices:**

| Function        | Manufacturer | Model #    | S/N             |
|-----------------|--------------|------------|-----------------|
| DC Power Supply | Samlex       | Sec1223    | 03061-0D01-0631 |
| Laptop          | CTX          | EZBook700E | V92A266-8100028 |

**Test Conditions / Notes:**

EUT is a transmitter operating on 150-156MHz and is terminated in a shielded dummy load. EUT is set to channel 2 (156MHz). RS 232 port is connected to the laptop. EUT is powered by 14VDC from the DC power supply. Spectrum analyzer is connected to the receiver port. Frequency Range Tested: 30MHz - 2000MHz.

**Measurement Data:**

Reading listed by margin.

Test Distance: None

| #  | Freq<br>MHz | Rdng<br>dBμV | dB | dB | dB | dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar<br>Ant |
|----|-------------|--------------|----|----|----|----|---------------|----------------|----------------|--------------|--------------|
| 1  | 1871.051M   | 36.7         |    |    |    |    | +0.0          | 36.7           | 50.0           | -13.3        | Recei        |
| 2  | 1414.241M   | 35.4         |    |    |    |    | +0.0          | 35.4           | 50.0           | -14.6        | Recei        |
| 3  | 1817.551M   | 32.1         |    |    |    |    | +0.0          | 32.1           | 50.0           | -17.9        | Recei        |
| 4  | 1615.896M   | 30.9         |    |    |    |    | +0.0          | 30.9           | 50.0           | -19.1        | Recei        |
| 5  | 202.100M    | 30.7         |    |    |    |    | +0.0          | 30.7           | 50.0           | -19.3        | Recei        |
| 6  | 1559.652M   | 27.6         |    |    |    |    | +0.0          | 27.6           | 50.0           | -22.4        | Recei        |
| 7  | 1715.351M   | 26.2         |    |    |    |    | +0.0          | 26.2           | 50.0           | -23.8        | Recei        |
| 8  | 1211.340M   | 24.7         |    |    |    |    | +0.0          | 24.7           | 50.0           | -25.3        | Recei        |
| 9  | 178.244M    | 23.8         |    |    |    |    | +0.0          | 23.8           | 50.0           | -26.2        | Recei        |
| 10 | 133.566M    | 23.3         |    |    |    |    | +0.0          | 23.3           | 50.0           | -26.7        | Recei        |
| 11 | 1009.427M   | 23.0         |    |    |    |    | +0.0          | 23.0           | 50.0           | -27.0        | Recei        |
| 12 | 222.764M    | 21.5         |    |    |    |    | +0.0          | 21.5           | 50.0           | -28.5        | Recei        |

|    |           |      |      |      |      |       |       |
|----|-----------|------|------|------|------|-------|-------|
| 13 | 445.870M  | 21.4 | +0.0 | 21.4 | 50.0 | -28.6 | Recei |
| 14 | 1972.564M | 21.0 | +0.0 | 21.0 | 50.0 | -29.0 | Recei |
| 15 | 1799.717M | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 16 | 682.779M  | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 17 | 55.611M   | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 18 | 32.254M   | 20.9 | +0.0 | 20.9 | 50.0 | -29.1 | Recei |
| 19 | 1548.678M | 20.8 | +0.0 | 20.8 | 50.0 | -29.2 | Recei |
| 20 | 77.677M   | 20.7 | +0.0 | 20.7 | 50.0 | -29.3 | Recei |

**Test Equipment Used:**

| Equipment         | Asset # | Manufacturer | Model # | Serial #   | Cal Date | Cal Due |
|-------------------|---------|--------------|---------|------------|----------|---------|
| Spectrum Analyzer | 00490   | HP           | 8566B   | 2209A01404 | 11/3/00  | 11/3/01 |
| SA Display        | 00489   | HP           | 8566B   | 2403A08241 | 11/3/00  | 11/3/01 |
| QP Adapter        | 00478   | HP           | 85650A  | 2811A01267 | 11/03/00 | 11/3/01 |

**VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:**

| BEGINNING<br>FREQUENCY | ENDING<br>FREQUENCY | BANDWIDTH<br>SETTING |
|------------------------|---------------------|----------------------|
| 30 MHz                 | 1000 MHz            | 120 kHz              |
| 1000 MHz               | 2 GHz               | 1 MHz                |



Test Setup of Antenna Conducted - Receiver