



ADDENDUM TO FC02-067

FOR THE

HPV/GPS MOBILE RADIO, IP4HPV

FCC PART 90 AND PART 15 SUBPART B SECTIONS 15.107, 15.109 AND 15.111 CLASS B

COMPLIANCE

DATE OF ISSUE: AUGUST 30, 2002

PREPARED FOR:

PREPARED BY:

IP MobileNet, Inc. 16842 Von Karman Avenue, Suite 200 Irvine, CA 92606

P.O. No.: 002179-00 W.O. No.: 79240 Mary Ellen Clayton CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

Date of test: July 30 - August 16, 2002

Report No.: FC02-067A

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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:	July 30 - August 16, 2002
DATE OF RECEIPT:	July 30, 2002
PURPOSE OF TEST:	To demonstrate the compliance of the HPV/GPS Mobile Radio, IP4HPV with the requirements for FCC Part 90 and Part 15 Subpart B Sections 15.107, 15.109 and 15.111 devices. The purpose of Addendum A is to revise the voltage variation data and put it with the frequency stability data.
TEST METHOD:	ANSI C63.4 (1992) and FCC Part 90
FREQUENCY RANGE TESTED:	450 kHz – 5.6 GHz
MANUFACTURER:	IP MobileNet, Inc. 16842 Von Karman Avenue, Suite 200 Irvine, CA 92606
REPRESENTATIVE:	Bobby Amin, Technical Ops Manager
TEST LOCATION:	CKC Laboratories, Inc. 110 Olinda Place, Brea, CA 92621 5473A Clouds Rest, Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the IP MobileNet, Inc. HPV/GPS Mobile Radio, IP4HPV was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 90 and Part 15 Subpart B Sections 15.107, 15.109 and 15.111 Class B using:
- > ANSI C63.4 (1992) and FCC Part 90 method

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

QUALITY ASSURANCE:

Steve Behm, Director of Engineering Services

Joyce Walker, Quality Assurance Administrative Manager

a A

Septimiu Apahidean, EMC/Lab Manager

Chuck Kendall, EMC/Lab Manager

TEST PERSONNEL:

Eddie Wong, EMC Engineer

Henika Brandle

Monika Brandle, EMC Engineer/ Evaluation Engineer

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EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The Land mobile transceiver tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

DC Line Fi	<u>ilter</u>	Land Mobile Transceiver			
Manuf:	Radio Shack	Manuf:	IP MobileNet		
Model:	270-055	Model:	IP4HPV		
Serial:	NA	Serial:	NA		
FCC ID:	NA	FCC ID:	MI7-IPMNIP4 (pending)		

PERIPHERAL DEVICES

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

Lanton

Laptop		Power Sup	ply
Manuf:	Dell	Manuf:	Radio Shack
Model:	Inspiron 2500	Model:	22510
Serial:	08C6461296121A5503	Serial:	NA
FCC ID:	DoC	FCC ID:	NA

2.1033(c)(3) USER'S MANUAL

The necessary information is contained in a separate document.

2.1033 (c)(4) **TYPE OF EMISSIONS** 20K0F1D.

2.1033(c)(5) FREQUENCY RANGES

509-512 MHz Transmitter range. 506-509 MHz Receiving range.

2.1033(c)(6) OPERATING POWER 34 Watts.

2.1033(c)(7) MAXIMUM POWER RATING 150 Watts.

2.1033(c)(8) DC VOLTAGES

DC voltage applied is 13.6 VDC +/- 20%, DC Current is 11 amps.

2.1033(c)(9) TUNE-UP PROCEDURE

There is no tune-up 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

See page 7 of the owner's manual.

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

470-512 MHz. Power and height limitations are specified in 90.307 and 90.309.90.307: Protection Criteria.....90.309: Table and figure.

Note: The final product is not to be sold with an antenna and this test is not to qualify the EUT for licensing. Therefore, the antenna height and service area during actual installation is not specified.

For this test, the power limitation is selected to be **150 watts** as specified in Table C. (90.309) by assuming the mobile and control station distance between base station and protected co-channel TV station is 151 Miles.

Test setup: Conducted RF Power measurement is performed with a Power meter connected to the Tx antenna port of the EUT via a 40 dB attenuator. The RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

The EUT satisfied the RF power requirement by demonstrating the conducted power is under the 150 watts limit.

Freq	Measured RF Power
509.0 MHz	34 Watts
510.5 MHz	33 Watts
511.9 MHz	33 Watts

Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
RF Power Meter	02082	HP	435B	2445A11881	082101	082102

PHOTOGRAPH SHOWING RF POWER FC 90.210(h)





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- OCCUPIED BANDWIDTH

Test Conditions: Bandwidth measurement is performed with a power meter connected to the antenna port of the EUT via a 40 dB attenuator and a 40 dB step attenuator. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. 13.8Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.



FCC 90.209 BandWidth - 509 MHz

FCC 90.209 BandWidth - 510 MHz



FCC 90.209 BandWidth - 512 MHz



FCC 90.210 Occupied Bandwidth Mask C - 509 MHz



FCC 90.210 Occupied Bandwidth Mask C - 510 MHz







PHOTOGRAPH SHOWING DIRECT CONNECT TESTING



Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
High Pass Filter	02116	HP	84300-	3643A00027	062502	062503
(above 1.5 GHz)			80037			
¹ /4" Heliax Coaxial	NA	Andrew	FSJ-50A-4	Cable#7	071502	071503
Cable				(6 ft)		

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

Limit line for Spurious Conducted Emission

Required Attenuation	=	43+10 Log P dB
Limit line (dBµV)	=	$V_{dB\mu V}$ - Attenuation
VdBuV	=	$20 \log \frac{V}{1 \times 10^{-6}}$
	=	$20 \left(\text{Log V} - \text{Log 1 x } 10^{-6} \right)$
	=	$20 \text{ Log V} - 20 \text{ Log1 x } 10^{-6}$
	=	20 Log V - 20 (-6)
	=	20 Log V + 120
Attenuation	=	43 + 10 Log P
	=	$43 + 10 \operatorname{Log} \frac{V^2}{R}$
	=	$43 + 10 (Log V^2 - Log R)$
	=	$43 + 10(2 \log V - \log R)$
	=	43 + 20 Log V - 10 Log R
Limit line	=	V dBuV - Attenuation
	=	20 Log V + 120 - (43 + 20 Log V - 10 Log R)
	=	20 Log V + 120 - 43 - 20 Log V + 10 Log R
	=	20 Log V + 120 - 43 - 20 Log V + 10 Log R
	=	$120 - 43 + 10 \text{ Log } 50$ Note : $R = 50 \Omega$
	=	120-43 + 16.897

= $94 \text{ dB}\mu\text{V}$ at any power level

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

Customer:	IP MobileNet ECC90 210 Mask C ant terminal		
Specification.	FCC90.210 Wlask C ant terminal	Deter	07/21/2002
work Order #:	79240	Date:	07/31/2002
Test Type:	Conducted Emissions	Time:	16:39:25
Equipment:	Land Mobile Transceiver	Sequence#:	1
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		13.8Vdc
S/N:	NA		

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Sunnart Daviage			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

Measurement is performed with a spectrum analyzer connected to the antenna port of the EUT via a 40 dB attenuator and a 20 dB step attenuator. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 509.0 MHz Rx 506.0 MHz, Inj 0 551.0 MHz. Frequency range of measurement: 4 MHz - 5.6 GHz, 4 - 30 MHz RBW= VBW=9 kHz. 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend: T1=1.5 GHz HPF AN 2116

T2=Brea Cable: 6' 1/4" Heliax - Brea # 7.

Measu	rement Data:	Re	eading lis	ted by ma	by margin. Test Lead: Antenna Terminal						
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	507.200M	151.4					+0.0	151.4	94.0	+57.4	Anten
									Fundamer	ıtal	
2	1528.000M	91.5	+0.0	+0.5			+0.0	92.0	94.0	-2.0	Anten
3	3022.000M	89.3	+0.5	+1.0			+0.0	90.8	94.0	-3.2	Anten
4	1018.000M	90.3	+0.0	+0.4			+0.0	90.7	94.0	-3.3	Anten
	Ave										
^	1018.000M	93.7	+0.0	+0.4			+0.0	94.1	94.0	+0.1	Anten
6	646.000M	87.7					+0.0	87.7	94.0	-6.3	Anten
7	550.980M	83.0					+0.0	83.0	94.0	-11.0	Anten

8	11.640M	82.7			+0.0	82.7	94.0	-11.3	Anten
9	2033.000M	71.5	+0.8	+0.6	+0.0	72.9	94.0	-21.1	Anten
10	3554.000M	69.0	+0.5	+0.9	+0.0	70.4	94.0	-23.6	Anten
11	2540.000M	67.6	+0.6	+0.9	+0.0	69.1	94.0	-24.9	Anten
12	4562.000M	65.9	+0.3	+0.9	+0.0	67.1	94.0	-26.9	Anten

Test Location:	CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112						
Customer:	IP MobileNet						
Specification:	FCC90.210 Mask C ant terminal						
Work Order #:	79240	Date:	07/31/2002				
Test Type:	Conducted Emissions	Time:	16:44:39				
Equipment:	Land Mobile Transceiver	Sequence#:	2				
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong				
Model:	IP4HPV-GPS		13.8Vdc				
S/N:	NA						

Equipment Under Test (* = EUT):							
Function	Manufacturer	Model #	S/N				
DC Line Filter	Radio Shack	270-055	NA				
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA				

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

Sunnart Daviage

Measurement is performed with a spectrum analyzer connected to the antenna port of the EUT via a 40 dB attenuator and a 20 dB step attenuator. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 4 MHz - 5.6 GHz, 4 - 30 MHz RBW= VBW=9 kHz. 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend: T1=1.5 GHz HPF AN 2116

T2=Brea Cable: 6' 1/4" Heliax - Brea # 7.

Meası	rement Data:	R	eading lis	ted by ma	argin.			Test Lea	d: Antenna	Terminal	
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	510.577M	151.8	+0.0				+0.0	151.8	94.0	+57.8	Anten
									Fundamen	ıtal	
2	1021.000M	89.9	+0.0	+0.4			+0.0	90.3	94.0	-3.7	Anten
	Ave										
^	1021.000M	94.7	+0.0	+0.4			+0.0	95.1	94.0	+1.1	Anten
4	1531.590M	89.0	+0.0	+0.5			+0.0	89.5	94.0	-4.5	Anten
5	1534.000M	84.2	+0.0	+0.5			+0.0	84.7	94.0	-9.3	Anten
6	14.430M	84.3	+0.0				+0.0	84.3	94.0	-9.7	Anten
7	3058.000M	74.4	+0.5	+1.0			+0.0	75.9	94.0	-18.1	Anten
8	3058.000M	74.3	+0.5	+1.0			+0.0	75.8	94.0	-18.2	Anten
9	2043.000M	71.9	+0.8	+0.6			+0.0	73.3	94.0	-20.7	Anten
10	2547.000M	71.0	+0.6	+1.0			+0.0	72.6	94.0	-21.4	Anten

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

Customer: Specification:	IP MobileNet FCC90.210 Mask C ant terminal		
Work Order #:	79240	Date:	07/31/2002
Test Type:	Conducted Emissions	Time:	16:48:45
Equipment:	Land Mobile Transceiver	Sequence#:	3
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		13.8Vdc
S/N:	NA		

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Daviaas			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

Measurement is performed with a spectrum analyzer connected to the antenna port of the EUT via a 40 dB attenuator and a 20 dB step attenuator. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 511.9 MHz, Rx 508.9 MHz, Inj 2 553.9 MHz. Frequency range of measurement: 4 MHz - 5.6 GHz, 4 - 30 MHz RBW= VBW=9 kHz. 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend: T1=1.5 GHz HPF AN 2116

T2=Brea Cable: 6' 1/4" Heliax - Brea # 7.

Measu	<i>Measurement Data:</i> Reading listed by margin.						Test Lead: Antenna Terminal				
#	Freq	Rdng	T1	T2			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	511.968M	151.4	+0.0				+0.0	151.4	94.0	+57.4	Anten
									Fundamen	ntal	
2	1023.800M	89.3	+0.0	+0.4			+0.0	89.7	94.0	-4.3	Anten
	Ave										
^	1023.800M	93.9	+0.0	+0.4			+0.0	94.3	94.0	+0.3	Anten
4	1535.000M	85.9	+0.0	+0.5			+0.0	86.4	94.0	-7.6	Anten
5	5.600M	82.7	+0.0				+0.0	82.7	94.0	-11.3	Anten
6	2043.000M	76.0	+0.8	+0.6			+0.0	77.4	94.0	-16.6	Anten
7	3066.000M	74.1	+0.5	+1.1			+0.0	75.7	94.0	-18.3	Anten
8	3577.000M	72.3	+0.5	+1.0			+0.0	73.8	94.0	-20.2	Anten

PHOTOGRAPH SHOWING DIRECT CONNECT TESTING



Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
High Pass Filter	02116	HP	84300-	3643A00027	062502	062503
(above 1.5 GHz)			80037			
¹ /4" Heliax Coaxial	NA	Andrew	FSJ-50A-4	Cable#7	071502	071503
Cable				(6 ft)		

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

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. Receiver antenna port is connected to an antenna.

The laptop is running test program to exercise the EUT.

Spec limit = 82.23 dBuV@3meter

Channel	Tx	Rx	Inj
0	509.0 MHz	506.0 MHz	551.0 MHz
1	510.5 MHz	507.5 MHz	552.5 MHz
2	511.9 MHz	508.9 MHz	553.9 MHz

Frequency range of measurement: 4 MHz - 5.6 GHz

4 - 30 MHz RBW= VBW=9 kHz 30 MHz - 1GHz RBW=VBW=120 kHz 1 - 5.6 GHz RBW=VBW=1 MHz

13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Limit line for Spurious Radiated Emission

Required Attenuation = 43+10 Log P (dB)

For radiated spurious emission measured at 3 meter test distance,

Required attenuation= $43+10 \text{ Log } P_{t \text{ at } 3 \text{ meter}} dB$ Limit line (dBuV)= E_{dBuv} - Attenuation

 E_{dBuv} = Measured field strength at 3 meter in dBuV/m

Power Density (Isotropic)

$$P_{\rm D} = \frac{P_{\rm t}}{4\pi r^2}$$

 P_D = Power Density in Watts /m² Pt = Average Transmit Power r = Test distance

Field Intensity E (V/m)

 $E = \sqrt{P_D \times 377}$

$$E = \frac{\sqrt{P_t \times 377}}{4\pi r^2}$$

$$E = \sqrt{\frac{P_t \times 30}{r^2}}$$

$$P_t = \left(\frac{E^2 x r^2}{30}\right)$$

10 Log P_t = 10 Log E 2 (V/m)+ 10 Log $\,r\,^2$ – 10 Log 30 $\,$

 $10 \text{ Log } P_t = 20 \text{ Log } E (V/m) + 20 \text{ Log } r - 10 \text{ Log } 30$

At 3 meter, r = 3 m

 $10 \text{ Log } P_t = 20 \text{ Log } E \ (V/m) + 20 \text{ Log } 3 - 10 \text{ Log } 30$

 $10 \text{ Log } P_t = 20 \text{ Log } E (V/m) + 9.54 - 14.77$

Operating Frequency: <u>509 MHz</u> Channel: Low Highest Measured Output Power: <u>45.31</u> ERP(dBm)= <u>34</u> ERP(Watts) Distance: <u>3</u> meters Limit: 43+10Log(P) 58.31 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
1,018.00	-40.6	Horiz	85.91
1,527.07	-40.70	Vert	86.01
1,527.00	-40.80	Horiz	86.11
3,054.04	-45.00	Vert	90.31
3,563.06	-46.00	Vert	91.31
1,018.07	-46.60	Vert	91.91
31.84	-48.70	Vert	94.01
1,527.00	-49.10	Horiz	94.41
2,544.80	-49.10	Vert	94.41
3,054.00	-49.60	Horiz	94.91
3,563.40	-50.80	Horiz	96.11
522.84	-51.30	Horiz	96.61
4,071.90	-51.50	Vert	96.81
523.00	-53.00	Horiz	98.31
2,544.60	-53.30	Horiz	98.61
1,889.00	-56.20	Vert	101.51
1,897.70	-56.60	Vert	101.91
2,036.10	-57.20	Vert	102.51
29.22	-59.00		104.31
111.60	-59.50	Vert	104.81
446.55	-59.70	Horiz	105.01
319.05	-60.40	Horiz	105.71
830.80	-60.50	Horiz	105.81
190.75	-61.20	Horiz	106.51
307.00	-61.90	Horiz	107.21
214.50	-62.40	Vert	107.71
53.50	-62.90	Horiz	108.21
826.35	-64.30	Horiz	109.61
55.75	-64.30	Horiz	109.61

Operating Frequency: <u>510.5 MHz</u> Channel: <u>Middle</u> Highest Measured Output Power: <u>45.19</u> ERP(dBm)= <u>33</u> ERP(Watts) Distance: <u>3</u> meters Limit: <u>43+10Log(P)</u> <u>58.19</u> dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
29.28	-58.9		104.09
29.40	-70.50	Horiz	115.69
30.03	-50.80	Vert	95.99
54.70	-63.10	Horiz	108.29
59.35	-53.60	Vert	98.79
59.60	-63.10	Horiz	108.29
110.40	-65.90	Horiz	111.09
111.55	-59.90	Vert	105.09
1,021.10	-47.70	Vert	92.89
1,023.76	-54.50	Horiz	99.69
1,531.48	-43.60	Vert	88.79
1,535.40	-48.20	Horiz	93.39
2,559.80	-55.80	Horiz	100.99
3,063.03	-41.40	Vert	86.59
3,071.40	-48.50	Horiz	93.69
3,573.50	-50.10	Vert	95.29
3,583.80	-51.40	Horiz	96.59
5,119.40	-53.00	Horiz	98.19

Operating Frequency: <u>511.9 MHz</u> Channel: <u>High</u> Highest Measured Output Power: <u>45.19</u> ERP(dBm)= <u>33</u> ERP(Watts) Distance: <u>3</u> meters Limit: <u>43+10Log(P)</u> <u>58.19</u> dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
29.17	-61.5		106.69
33.45	-46.90	Vert	92.09
52.80	-61.80	Horiz	106.99
53.55	-55.40	Vert	100.59
56.90	-65.50	Horiz	110.69
59.15	-52.90	Vert	98.09
86.15	-60.70	Vert	105.89
111.05	-62.10	Horiz	107.29
111.15	-59.20	Vert	104.39
193.15	-61.90	Horiz	107.09
1,023.70	-50.30	Horiz	95.49
1,023.76	-46.90	Vert	92.09
1,535.66	-40.50	Horiz	85.69
1,535.74	-41.60	Vert	86.79
2,559.42	-52.40	Vert	97.59
2,559.50	-53.20	Horiz	98.39
3,071.10	-49.20	Horiz	94.39
3,071.50	-40.00	Vert	85.19
3,583.40	-49.30	Vert	94.49





Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
4 MHz – 30 MHz						
Loop Antenna	00314	EMCO	6502	2014	072302	072303
Antenna cable	NA	NA	RG214	Cable#15	122001	122002
30 MHz – 1000 MHz						
Bicon Antenna	306	AH	SAS200/540	220	092401	092402
Log Periodic Antenna	331	AH	SAS 00/516	330	092401	092402
Pre-amp	00309	HP	8447D	1937A02548	090501	090502
Antenna cable	NA	NA	RG214	Cable#15	122001	122002
Pre-amp to SA cable	NA	Harbour	RG223/U	Cable#10	070802	070803
1000-5600 MHz						
Horn Antenna	0849	EMCO	3115	6246	091201	091202
Microwave Pre-amp	00786	HP	83017A	3123A00281	091201	091202
¹ /4" Heliax Coaxial	NA	Andrew	LDF1-50	Cable#18 (70	091101	091102
Cable				ft)		

2.1033(c)(14)/2.1055/90.205(h)/90.213 FREQUENCY STABILITY AND VOLTAGE VARIATIONS

Test Conditions: EUT is located inside of the temperature chamber with support equipment located outside. Spectrum analyzer is connected directly to the antenna port of the EUT. Temperature monitoring equipment is affixed to the outside of the EUT enclosure. EUT is powered through an external DC power source.

Customer:	IP Mobile Net			
WO#:	79240			
Date:	30-Aug-02			
Test Engineer: Monika Brandle				

Device Model #:	IP4HPV-GPS
Operating Voltage:	13 VDC
Frequency Limit:	1.5 PPM / %

Temperature Variations

		Channel 1	Dev.	Channel 2	Dev.	Channel 3	Dev.
Ch	annel	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Freq	uency:	509.00004		510.50012		511.90012	
Temp							
(C)	Voltage						
-30	13	509.00003	0.00001	510.50007	0.00005	511.90009	0.00003
-20	13	509.00011	0.00007	510.50007	0.00005	511.90002	0.00010
-10	13	508.99995	0.00009	510.49993	0.00019	511.89997	0.00015
0	13	508.99994	0.00010	510.49991	0.00019	511.89992	0.00020
10	13	508.99995	0.00009	510.49993	0.00019	511.89991	0.00021
20	13	509.00002	0.00002	510.49998	0.00019	511.89999	0.00013
30	13	509.00000	0.00004	510.50003	0.00009	511.90004	0.00008
40	13	509.00002	0.00002	510.50006	0.00009	511.90007	0.00005
50	13	509.00004	0.00000	510.50007	0.00005	511.90009	0.00003

Voltage Variations (±15%)

20	11.1	509.00001	0.00003	510.50000	0.00012	511.89999	0.00013
20	13	509.00004	0.00000	510.50012	0.00000	511.90012	0.00000
20	15.0	508.99993	0.00011	510.49997	0.00015	511.89993	0.00019

Max Deviation (MHz)	0.00011	0.00019	0.00021
Max Deviation (PPM)	0.21611	0.37218	0.41024
	PASS	PASS	PASS

PHOTOGRAPH SHOWING FREQUENCY STABILITY AND VOLTAGE VARIATIONS



Test Equipment

Equipment	Manufacturer	Model #	Serial #	Asset #	Cal Date	Cal Due
Temp Chamber	Thermotron	S-1.2 MiniMax	11899	01879	2/7/02	020703
Frequency Counter	HP	5340A	1532A03198	01253	4/30/02	043003
DC, Power Supply	Leader	LPS-2801	6030090	P01889	6/5/02	060503

90.214 TRANSIENT FREQUENCY BEHAVIOR

Test Conditions: Test performed in accordance with TIA/EIA 603.









PHOTOGRAPH SHOWING TRANSIENT FREQUENCY BEHAVIOR



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Test Equipment

Equipment	Manufacturer	Model #	Serial #	Asset #	Cal Date	Cal Due
Generator, Signal	Marconi	2022D	119259/016	01870	9/5/01	090502
Analyzer/Modulation	HP	8901A	2751A05181	02072	11/20/01	112002
Oscilloscope, Digital	HP	54111D	3051A03191	02008	9/28/01	092802
Power Supply, DC	Sorensen	DCR-60-30B	176	00765	7/17/02	071703
Attenuator	Bird	100-SA-MFN-30	9949	P01572	3/21/02	032103
Power Meter	HP	435B	2342A08531	00174	5/29/02	052903
Power Sensor	HP	7560	1551A01004	02036	5/29/02	052903
Splitter	Motorola		549TR18HE	P01314	4/05/02	040503
Attenuator	JFW	50FHC-014-20		P01631	3/21/02	032103
Attenuator, High power 3dB	Weinschel	50-3 21016		P01289	3/21/02	032103
Attenuator, High power 6dB	Weinschel	50-6 58099		P01239	3/21/02	032103

15.107 – AC CONDUCTED EMISSIONS

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

Customer:	IP MobileNet		
Specification:	FCC 15.107 Class B		
Work Order #:	79240	Date:	08/01/2002
Test Type:	Conducted Emissions	Time:	2:06:41 PM
Equipment:	Land Mobile Transceiver	Sequence#:	6
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		120V 60Hz
S/N:	NA		

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA

Manufacturer	Model #	S/N
Dell	Inspiron 2500	08C6461296121A5503
Radio Shack	22510	NA
	Manufacturer Dell Radio Shack	ManufacturerModel #DellInspiron 2500Radio Shack22510

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 450kHz - 30MHz RBW=VBW=9 kHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Measur	ement Data:	Re Re	eading l	isted by n	nargin.			Test Lea	d: Black		
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	10.515M	37.7					+0.0	37.7	48.0	-10.3	Black
2	9.587M	35.9					+0.0	35.9	48.0	-12.1	Black
3	9.326M	35.6					+0.0	35.6	48.0	-12.4	Black
4	9.893M	35.3					+0.0	35.3	48.0	-12.7	Black
5	10.155M	35.3					+0.0	35.3	48.0	-12.7	Black
6	17.290M	35.3					+0.0	35.3	48.0	-12.7	Black
7	18.155M	34.8					+0.0	34.8	48.0	-13.2	Black
8	17.380M	34.6					+0.0	34.6	48.0	-13.4	Black

9	17.578M	34.6	+	0.0	34.6	48.0	-13.4	Black
10	17.668M	34.6	+	0.0	34.6	48.0	-13.4	Black
11	18.056M	34.5	+	0.0	34.5	48.0	-13.5	Black
12	18.245M	34.5	+	0.0	34.5	48.0	-13.5	Black
13	17.191M	34.3	+	0.0	34.3	48.0	-13.7	Black
14	17.767M	34.2	+	0.0	34.2	48.0	-13.8	Black
15	18.443M	33.9	+	0.0	33.9	48.0	-14.1	Black



- Sweep Data - FCC 15.107 Class B

Test Location:	CKC Laboratories, Inc.	•110 N. Olinda Place	• Brea, CA 92823	• (714) 993-6112
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Customer: Specification: Work Order #:	IP MobileNet FCC 15.107 Class B 79240 Conducted Emissions	Date:	08/01/2002 2:02:32 PM
Test Type:	Conducted Emissions	Time:	2:02:52 PM
Equipment:	Land Mobile Transceiver	Sequence#:	5
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		120V 60Hz
S/N:	NA		

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Daviaas			

Support Devices.			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 450kHz - 30MHz RBW=VBW=9 kHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Measur	ement Data:	Re	eading l	isted by n	nargin.			Test Lead	d: White		
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	9.912M	36.9					+0.0	36.9	48.0	-11.1	White
2	9.596M	36.1					+0.0	36.1	48.0	-11.9	White
3	10.533M	36.1					+0.0	36.1	48.0	-11.9	White
4	18.137M	35.6					+0.0	35.6	48.0	-12.4	White
5	18.722M	35.1					+0.0	35.1	48.0	-12.9	White
6	18.047M	34.6					+0.0	34.6	48.0	-13.4	White
7	9.497M	34.5					+0.0	34.5	48.0	-13.5	White
8	19.110M	34.5					+0.0	34.5	48.0	-13.5	White
9	17.659M	34.4					+0.0	34.4	48.0	-13.6	White

10	18.632M	34.3		+0.0	34.3	48.0	-13.7	White
11	10.263M	34.0		+0.0	34.0	48.0	-14.0	White
12	17.479M	34.0		+0.0	34.0	48.0	-14.0	White
13	17.758M	34.0		+0.0	34.0	48.0	-14.0	White
14	17.857M	34.0		+0.0	34.0	48.0	-14.0	White
15	452.000k	25.5		+0.0	25.5	48.0	-22.5	White





Customer: Specification:	IP MobileNet FCC 15.107 Class B		
Work Order #:	79240	Date:	08/01/2002
Test Type:	Conducted Emissions	Time:	1:38:06 PM
Equipment:	Land Mobile Transceiver	Sequence#:	6
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		110Vac 60Hz
S/N:	NA		

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

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Devices:			

Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Laptop	Dell	Inspiron 2500	NCN-08C646-12961-21A- 5472

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a section of serial cable, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a remote lap top via UTP. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT and pinging the ethernet connection of the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 450kHz - 30MHz RBW=VBW=9 kHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Measur	ement Data:	Re	eading l	isted by n	nargin.			Test Lead	d: Black		
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	18.065M	38.4					+0.0	38.4	48.0	-9.6	Black
2	17.587M	37.6					+0.0	37.6	48.0	-10.4	Black
3	17.389M	37.3					+0.0	37.3	48.0	-10.7	Black
4	18.641M	37.2					+0.0	37.2	48.0	-10.8	Black
5	19.128M	37.0					+0.0	37.0	48.0	-11.0	Black
6	18.164M	36.9					+0.0	36.9	48.0	-11.1	Black
7	17.290M	36.8					+0.0	36.8	48.0	-11.2	Black
8	18.830M	36.8					+0.0	36.8	48.0	-11.2	Black

9	17.776M	36.7	+0	.0	36.7	48.0	-11.3	Black
10	18.353M	36.7	+0	.0	36.7	48.0	-11.3	Black
11	17.488M	36.6	+0	.0	36.6	48.0	-11.4	Black
12	17.677M	36.6	+0	.0	36.6	48.0	-11.4	Black
13	18.254M	36.6	+0	.0	36.6	48.0	-11.4	Black
14	18.452M	36.6	+0	.0	36.6	48.0	-11.4	Black
15	18.740M	36.5	+0	.0	36.5	48.0	-11.5	Black





Customer: Specification: Work Order #:	IP MobileNet FCC 15.107 Class B 79240	Date:	08/01/2002
Test Type:	Conducted Emissions	Time:	13:48:13
Equipment:	Land Mobile Transceiver	Sequence#:	7
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		110Vac 60Hz
S/N:	NA		

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

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Devices:			

Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Laptop	Dell	Inspiron 2500	NCN-08C646-12961-21A-
			5472

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a section of serial cable, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a remote lap top via UTP. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT and pinging the ethernet connection of the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 450 kHz – 30 MHz RBW=VBW=9 kHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Measur	ement Data:	: Re	eading l	isted by n	nargin.			Test Lead	d: White		
#	Freq	Rdng					Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	18.065M	38.0					+0.0	38.0	48.0	-10.0	White
2	18.551M	37.3					+0.0	37.3	48.0	-10.7	White
3	18.155M	37.1					+0.0	37.1	48.0	-10.9	White
4	17.776M	37.0					+0.0	37.0	48.0	-11.0	White
5	19.128M	37.0					+0.0	37.0	48.0	-11.0	White
6	18.254M	36.9					+0.0	36.9	48.0	-11.1	White
7	17.686M	36.8					+0.0	36.8	48.0	-11.2	White
8	18.650M	36.8					+0.0	36.8	48.0	-11.2	White

	9	17.975M	36.7		+0.0	36.7	48.0	-11.3	White
	10	19.227M	36.5		+0.0	36.5	48.0	-11.5	White
	11	18.740M	36.4		+0.0	36.4	48.0	-11.6	White
	12	18.830M	36.4		+0.0	36.4	48.0	-11.6	White
	13	17.587M	36.3		+0.0	36.3	48.0	-11.7	White
	14	18.452M	36.3		+0.0	36.3	48.0	-11.7	White
	15	452.000k	28.1		+0.0	28.1	48.0	-19.9	White
1									





Mains Conducted Emissions - Front View - RS232



Mains Conducted Emissions - Back View - RS232



Mains Conducted Emissions - Front View - UTP



Mains Conducted Emissions - Back View - UTP

1 est Equipment						
Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
LISN	02128	EMCO	3816/2NM	9809-1090	032002	032003
LISN	00847	EMCO	3816/2NM	1104	101501	101502

Test Equipment

15.109 – RADIATED EMISSIONS

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

Customer: Specification:	IP MobileNet FCC 15 109 Class B			
Work Order #:	79240	Date:	07/31/2002	
Test Type:	Maximized emission	Time:	15:59:37	
Equipment:	Land Mobile Transceiver	Sequence#:	4	
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong	
Model:	IP4HPV-GPS			
S/N:	NA			
Equipment Under Test (* = EUT):				

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT. Channel Tx 510.5 MHz, Rx 552.5 MHz, Inj 1 507.5 MHz. Frequency range of measurement: 30 MHz - 5.6 GHz, 30 - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend:	
T1=Bicon 092401	T2=Log 331 092401
T3=Cable #10 070803	T4=Cable #15 120602
T5=Preamp 8447D 090501	T6=Horn Antenna sn6246
T7=HP3017A sn3123A00281 11-Sept-01	T8=Heliax #18 70' 11Sept2001

Measu	rement Data:	Re	eading lis	ted by ma	argin.		Т	est Distance	e: 3 Meters		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
	MHz	dBµV	dB	dB	dB	dB	Table	$dB\mu V/m$	$dB\mu V/m$	dB	Ant
1	552.561M	48.0	+0.0	+18.0	+0.4	+4.6	+0.0	42.4	46.0	-3.6	Vert
	QP		-28.6	+0.0	+0.0	+0.0					
^	552.562M	48.1	+0.0	+18.0	+0.4	+4.6	+0.0	42.5	46.0	-3.5	Vert
			-28.6	+0.0	+0.0	+0.0					
3	184.004M	46.8	+17.2	+0.0	+0.2	+2.5	+0.0	38.4	43.5	-5.1	Horiz
			-28.3	+0.0	+0.0	+0.0					
4	552.560M	46.0	+0.0	+18.0	+0.4	+4.6	+0.0	40.4	46.0	-5.6	Horiz
	QP		-28.6	+0.0	+0.0	+0.0					
^	552.578M	46.0	+0.0	+18.0	+0.4	+4.6	+0.0	40.4	46.0	-5.6	Horiz
			-28.6	+0.0	+0.0	+0.0					

6	184 602M	46.1	+17.2	+0.0	+0.2	+2 5	+0.0	37.7	43.5	-5.8	Horiz
Ū	OP	10.1	-28.3	+0.0	+0.2	+0.0	10.0	51.1	15.5	5.0	HOLE
^	$\frac{184}{184}$ 602M	/8.2	±17.2	+0.0	+0.2	+0.0	+0.0	30.8	/3.5	-3.7	Horiz
	104.002101	40.2	-28.3	+0.0	+0.2	+0.0	10.0	57.0	тэ.э	-5.7	HOHL
8	214 316M	45.8	+17.1	+0.0	+0.2	+2.7	+0.0	37.5	43.5	-6.0	Horiz
0	214.51000	-5.0	-28.3	+0.0	+0.0	+0.0	10.0	51.5	-13.5	0.0	HOLL
9	214.816M	45.6	+17.1	+0.0	+0.2	+2.7	+0.0	37.3	43.5	-6.2	Horiz
	211.010101	1010	-28.3	+0.0	+0.2	+0.0	10.0	57.5	10.0	0.2	HOLE
10	208.302M	45.8	+17.0	+0.0	+0.2	+2.6	+0.0	37.2	43.5	-6.3	Horiz
	OP		-28.4	+0.0	+0.0	+0.0					
^	208.302M	48.0	+17.0	+0.0	+0.2	+2.6	+0.0	39.4	43.5	-4.1	Horiz
			-28.4	+0.0	+0.0	+0.0					
12	192.853M	45.7	+17.0	+0.0	+0.2	+2.5	+0.0	37.1	43.5	-6.4	Horiz
			-28.3	+0.0	+0.0	+0.0					
13	95.032M	53.2	+10.3	+0.0	+0.1	+1.7	+0.0	37.0	43.5	-6.5	Vert
			-28.3	+0.0	+0.0	+0.0					
14	188.352M	45.4	+17.1	+0.0	+0.2	+2.5	+0.0	36.9	43.5	-6.6	Horiz
	QP		-28.3	+0.0	+0.0	+0.0					
۸	188.338M	47.3	+17.1	+0.0	+0.2	+2.5	+0.0	38.8	43.5	-4.7	Horiz
			-28.3	+0.0	+0.0	+0.0					
16	31.726M	43.8	+16.2	+0.0	+0.1	+1.0	+0.0	32.6	40.0	-7.4	Vert
			-28.5	+0.0	+0.0	+0.0					
17	36.750M	43.6	+15.6	+0.0	+0.1	+1.1	+0.0	32.0	40.0	-8.0	Vert
	QP		-28.4	+0.0	+0.0	+0.0					
^	36.750M	47.1	+15.6	+0.0	+0.1	+1.1	+0.0	35.5	40.0	-4.5	Vert
			-28.4	+0.0	+0.0	+0.0					
19	90.317M	52.4	+9.2	+0.0	+0.1	+1.6	+0.0	35.2	43.5	-8.3	Horiz
			-28.1	+0.0	+0.0	+0.0					
20	213.740M	43.4	+17.1	+0.0	+0.2	+2.7	+0.0	35.1	43.5	-8.4	Horiz
			-28.3	+0.0	+0.0	+0.0					
21	115.874M	46.4	+14.6	+0.0	+0.2	+1.9	+0.0	34.7	43.5	-8.8	Vert
			-28.4	+0.0	+0.0	+0.0					
22	37.602M	42.9	+15.3	+0.0	+0.1	+1.1	+0.0	31.0	40.0	-9.0	Horiz
	QP		-28.4	+0.0	+0.0	+0.0					
^	37.602M	47.0	+15.3	+0.0	+0.1	+1.1	+0.0	35.1	40.0	-4.9	Horiz
			-28.4	+0.0	+0.0	+0.0					
24	92.124M	51.3	+9.6	+0.0	+0.1	+1.6	+0.0	34.4	43.5	-9.1	Horiz
			-28.2	+0.0	+0.0	+0.0					
25	197.154M	42.9	+16.9	+0.0	+0.2	+2.6	+0.0	34.2	43.5	-9.3	Horiz
			-28.4	+0.0	+0.0	+0.0					
26	91.027M	51.2	+9.4	+0.0	+0.1	+1.6	+0.0	34.2	43.5	-9.3	Horiz
			-28.1	+0.0	+0.0	+0.0					
27	88.700M	51.8	+8.8	+0.0	+0.1	+1.6	+0.0	34.2	43.5	-9.3	Horiz
-	00 1000 /		-28.1	+0.0	+0.0	+0.0	0.0	24.2	40.7	6.2	X 7
28	89.132M	51.7	+8.9	+0.0	+0.1	+1.6	+0.0	34.2	43.5	-9.3	Vert
	22.00014	41.0	-28.1	+0.0	+0.0	+0.0	.0.0	20.5	40.0	0.7	X 7 ·
29	33.000M	41.8	+16.1	+0.0	+0.1	+1.0	+0.0	30.5	40.0	-9.5	vert
^	22,00014	16.0	-28.5	+0.0	+0.0	+0.0	.0.0	25.5	40.0	A =	V.
~	33.000M	46.8	+16.1	+0.0	+0.1	+1.0	+0.0	35.5	40.0	-4.5	vert
			-28.5	+0.0	+0.0	+0.0					

31	92.896M	50.5	+9.8	+0.0	+0.1	+1.7	+0.0	33.9	43.5	-9.6	Vert
32	89.628M	51.1	+9.0	+0.0 +0.0	+0.1	+1.6	+0.0	33.7	43.5	-9.8	Horiz
33	97.031M	49.4	+10.8	+0.0 +0.0	+0.0 +0.1	+0.0 +1.7	+0.0	33.7	43.5	-9.8	Vert
34	93.780M	50.0	+10.0	+0.0 +0.0	+0.0 +0.1	+0.0 +1.7	+0.0	33.6	43.5	-9.9	Horiz
35	205.336M	41.7	+16.9	+0.0 +0.0	+0.0 +0.2	+0.0 +2.6	+0.0	33.0	43.5	-10.5	Horiz
36	86.348M	47.4	-28.4 +8.3	+0.0 +0.0	+0.0 +0.1	+0.0 +1.6	+0.0	29.3	40.0	-10.7	Vert
37	195.160M	41.4	-28.1 +16.9	+0.0 +0.0	+0.0 +0.2	+0.0 +2.6	+0.0	32.7	43.5	-10.8	Horiz
38	210.086M	41.2	-28.4 +17.0	+0.0 +0.0	+0.0 +0.2	+0.0 +2.6	+0.0	32.6	43.5	-10.9	Vert
39	87.158M	46.8	+8.5	+0.0 +0.0	+0.0 +0.1	+0.0 +1.6	+0.0	28.9	40.0	-11.1	Horiz
40	62.548M	48.0	+7.8	+0.0 +0.0	+0.0 +0.1	+0.0 +1.4 +0.0	+0.0	28.7	40.0	-11.3	Vert
41	206.820M	40.6	+17.0 -28.4	+0.0 +0.0	+0.2 +0.0	+0.0 +2.6 +0.0	+0.0	32.0	43.5	-11.5	Vert
42	184.118M	38.9	+17.2 -28.3	+0.0 +0.0	+0.2 +0.0	+2.5 +0.0	+0.0	30.5	43.5	-13.0	Vert
43	116.798M	42.0	+14.7 -28.4	+0.0 +0.0	+0.2 +0.0	+1.9 +0.0	+0.0	30.4	43.5	-13.1	Horiz
44	180.129M	38.6	+17.3 -28.2	+0.0 +0.0	+0.2 +0.0	+2.4 +0.0	+0.0	30.3	43.5	-13.2	Horiz
45	52.306M	43.7	+10.2 -28.4	+0.0 +0.0	+0.1 +0.0	+1.2 +0.0	+0.0	26.8	40.0	-13.2	Vert
46	75.100M	46.5	+6.8 -28.4	+0.0 +0.0	+0.1 +0.0	+1.6 +0.0	+0.0	26.6	40.0	-13.4	Horiz
47	182.864M	38.2	+17.2 -28.3	+0.0 +0.0	+0.2 +0.0	+2.5 +0.0	+0.0	29.8	43.5	-13.7	Vert
48	119.292M	40.7	+15.2 -28.4	$^{+0.0}_{+0.0}$	+0.2 +0.0	+2.0 +0.0	+0.0	29.7	43.5	-13.8	Vert
49	113.046M	41.8	+14.1 -28.4	$^{+0.0}_{+0.0}$	+0.2 +0.0	+1.9 +0.0	+0.0	29.6	43.5	-13.9	Horiz
50	132.133M	39.1	+16.4 -28.4	$^{+0.0}_{+0.0}$	+0.2 +0.0	+2.1 +0.0	+0.0	29.4	43.5	-14.1	Horiz
51	139.714M	38.3	+17.1 -28.4	+0.0 +0.0	+0.2 +0.0	+2.1 +0.0	+0.0	29.3	43.5	-14.2	Horiz
52	128.052M	39.4	+16.1 -28.4	+0.0 +0.0	+0.2 +0.0	+2.0 +0.0	+0.0	29.3	43.5	-14.2	Horiz
53	129.076M	39.3	+16.2 -28.4	+0.0 +0.0	+0.2 +0.0	+2.0 +0.0	+0.0	29.3	43.5	-14.2	Vert
54	74.174M	45.5	+6.9 -28.4	+0.0 +0.0	+0.1 +0.0	+1.5 +0.0	+0.0	25.6	40.0	-14.4	Vert
55	510.564M	37.9	+0.0 -28.5	+17.1 +0.0	+0.4 +0.0	+4.4 +0.0	+0.0	31.3	46.0	-14.7	Vert

56	120.950M	39.4	+15.4	+0.0	+0.2	+2.0	+0.0	28.6	43.5	-14.9	Horiz
57	119 65 AM	20.7	-20.4	+0.0	+0.0	+0.0	+0.0	28.6	12 5	14.0	Uoria
57	110.03410	39.1	+13.1 -28.4	+0.0 +0.0	+0.2 +0.0	+2.0 +0.0	+0.0	28.0	45.5	-14.9	HOUL
58	122.397M	39.1	+15.5	+0.0	+0.2	+2.0	+0.0	28.4	43.5	-15.1	Horiz
			-28.4	+0.0	+0.0	+0.0					
59	110.406M	41.1	+13.6	+0.0	+0.1	+1.9	+0.0	28.3	43.5	-15.2	Horiz
			-28.4	+0.0	+0.0	+0.0					
60	321.216M	34.5	+0.0	+20.8	+0.3	+3.4	+0.0	30.7	46.0	-15.3	Vert
			-28.3	+0.0	+0.0	+0.0					
61	135.542M	37.4	+16.7	+0.0	+0.2	+2.1	+0.0	28.0	43.5	-15.5	Horiz
			-28.4	+0.0	+0.0	+0.0					
62	510.582M	37.0	+0.0	+17.1	+0.4	+4.4	+0.0	30.4	46.0	-15.6	Horiz
			-28.5	+0.0	+0.0	+0.0					
63	110.719M	40.7	+13.6	+0.0	+0.1	+1.9	+0.0	27.9	43.5	-15.6	Vert
	2011 2001 6		-28.4	+0.0	+0.0	+0.0		20.2		1.5.5	
64	2844.700M	42.4	+0.0	+0.0	+0.0	+0.0	+0.0	38.3	54.0	-15.7	Horiz
	224.07016	24.0	+0.0	+29.3	-38.0	+4.6	0.0	20.1	16.0	15.0	X 7 .
65	324.079M	34.0	+0.0	+20.6	+0.3	+3.4	+0.0	30.1	46.0	-15.9	Vert
	70 46714	12 7	-28.2	+0.0	+0.0	+0.0	.0.0	24.0	40.0	16.0	V
66	/9.46/M	43.7	+0.8	+0.0	+0.1	+1.0	+0.0	24.0	40.0	-16.0	vert
67	202 40214	26.1	-28.2	+0.0	+0.0	+0.0		27.4	12 5	16.1	Homin
07	205.492101	50.1	+10.9	+0.0	+0.2	+2.0	+0.0	27.4	45.5	-10.1	HOLIZ
68	178 274M	35.7	-20.4	+0.0	+0.0	+0.0		27.4	13.5	16.1	Horiz
00	1/0.2/411	55.7	-28.2	+0.0 +0.0	+0.2	+2.4	± 0.0	27.4	45.5	-10.1	HOHZ
69	292 876M	33.0	+21.6	+0.0	+0.3	+3.2	+0.0	29.8	46.0	-16.2	Horiz
07	2)2.070101	55.0	-28.3	+0.0	+0.0	+0.0	10.0	27.0	40.0	10.2	HOLL
70	75.029M	43.5	+6.8	+0.0	+0.1	+1.6	+0.0	23.6	40.0	-16.4	Vert
10	,0102,111	1010	-28.4	+0.0	+0.0	+0.0		2010		1011	
71	1714.700M	47.0	+0.0	+0.0	+0.0	+0.0	+0.0	37.4	54.0	-16.6	Horiz
			+0.0	+25.4	-38.6	+3.6					
72	315.100M	32.6	+0.0	+21.3	+0.3	+3.4	+0.0	29.3	46.0	-16.7	Horiz
			-28.3	+0.0	+0.0	+0.0					
73	74.226M	42.6	+6.9	+0.0	+0.1	+1.5	+0.0	22.7	40.0	-17.3	Horiz
			-28.4	+0.0	+0.0	+0.0					
74	147.539M	34.8	+17.3	+0.0	+0.2	+2.2	+0.0	26.1	43.5	-17.4	Vert
			-28.4	+0.0	+0.0	+0.0					
75	83.513M	41.4	+7.6	+0.0	+0.1	+1.6	+0.0	22.5	40.0	-17.5	Horiz
			-28.2	+0.0	+0.0	+0.0					
76	325.804M	32.3	+0.0	+20.5	+0.3	+3.4	+0.0	28.3	46.0	-17.7	Vert
			-28.2	+0.0	+0.0	+0.0					
77	318.254M	31.7	+0.0	+21.1	+0.3	+3.4	+0.0	28.2	46.0	-17.8	Vert
			-28.3	+0.0	+0.0	+0.0					
78	294.984M	31.1	+21.8	+0.0	+0.3	+3.3	+0.0	28.2	46.0	-17.8	Vert
	40 6 5000 6		-28.3	+0.0	+0.0	+0.0	0.0	20.0	16.0	10.0	** •
79	486./08M	35.2	+0.0	+16.7	+0.4	+4.3	+0.0	28.0	46.0	-18.0	Horiz
90	00 51714	40.7	-28.0	+0.0	+0.0	+0.0		25.4	12 5	10.1	Haria
80	98.51/M	40.7	+11.2	+0.0	+0.1	+1.8	+0.0	25.4	43.5	-18.1	Horiz
			-28.4	+0.0	+0.0	+0.0					

81	82.617M	41.0	+7.4	+0.0	+0.1	+1.6	+0.0	21.9	40.0	-18.1	Horiz
			-28.2	+0.0	+0.0	+0.0					
82	131.674M	35.1	+16.4	+0.0	+0.2	+2.1	+0.0	25.4	43.5	-18.1	Vert
			-28.4	+0.0	+0.0	+0.0					
83	1531.566M	46.6	+0.0	+0.0	+0.0	+0.0	+0.0	35.8	54.0	-18.2	Vert
			+0.0	+24.6	-38.8	+3.4					
84	280.050M	31.6	+20.5	+0.0	+0.3	+3.1	+0.0	27.2	46.0	-18.8	Vert
			-28.3	+0.0	+0.0	+0.0					
85	615.380M	30.1	+0.0	+19.5	+0.4	+5.0	+0.0	27.0	46.0	-19.0	Vert
			-28.0	+0.0	+0.0	+0.0					
86	320.116M	30.6	+0.0	+20.9	+0.3	+3.4	+0.0	26.9	46.0	-19.1	Vert
			-28.3	+0.0	+0.0	+0.0					
87	540.072M	32.5	+0.0	+17.7	+0.4	+4.6	+0.0	26.6	46.0	-19.4	Horiz
			-28.6	+0.0	+0.0	+0.0					
88	109.685M	37.1	+13.4	+0.0	+0.1	+1.9	+0.0	24.1	43.5	-19.4	Horiz
			-28.4	+0.0	+0.0	+0.0					
89	1531.550M	45.4	+0.0	+0.0	+0.0	+0.0	+0.0	34.6	54.0	-19.4	Horiz
			+0.0	+24.6	-38.8	+3.4					
90	360.090M	31.8	+0.0	+18.1	+0.3	+3.6	+0.0	25.6	46.0	-20.4	Vert
			-28.2	+0.0	+0.0	+0.0					
91	240.086M	33.1	+17.6	+0.0	+0.3	+2.8	+0.0	25.6	46.0	-20.4	Vert
			-28.2	+0.0	+0.0	+0.0					
92	221.257M	33.4	+17.3	+0.0	+0.2	+2.7	+0.0	25.3	46.0	-20.7	Vert
			-28.3	+0.0	+0.0	+0.0					
93	72.190M	38.3	+6.9	+0.0	+0.1	+1.5	+0.0	18.3	40.0	-21.7	Horiz
			-28.5	+0.0	+0.0	+0.0					
94	229.602M	31.9	+17.4	+0.0	+0.2	+2.7	+0.0	23.9	46.0	-22.1	Vert
			-28.3	+0.0	+0.0	+0.0					

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

Customer: Specification:	IP MobileNet FCC 15.109 Class B		
Work Order #:	79240	Date:	08/01/2002
Test Type:	Maximized emission	Time:	11:52:45
Equipment:	Land Mobile Transceiver	Sequence#:	5
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		
S/N:	NA		

Equipment Under Test (* = EUT):

	,		
Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Devices:			
	M C ·	N. 1.1.#	CAL

Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Laptop	Dell	Inspiron 2500	NCN-08C646-12961-21A-
			J472

Test Conditions / Notes:

EUT placed on the wooden table. Transmit antenna port is connected to a RF load via a power meter for visual verification. RS232 Port is connected to a section of serial cable, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a remote lap top via UTP. Receiver antenna port is terminated to a 50 ohm load. The laptop is running test program to exercise the EUT and pinging the ethernet connection of the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Frequency range of measurement: 30 MHz - 5.6 GHz, 30 - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend:	
T1=Bicon 092401	T2=Log 331 092401
T3=Cable #10 070803	T4=Cable #15 120602
T5=Preamp 8447D 090501	T6=Horn Antenna sn6246
T7=HP3017A sn3123A00281 11-Sept-01	T8=Heliax #18 70' 11Sept2001

Measu	rement Data:	R	eading lis	ted by ma	argin.		Т	est Distance	Distance: 3 MetersCorrSpecMarginIBµV/mdBµV/mdB34.840.0-5.2					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar			
			T5	T6	T7	T8								
	MHz	dBµV	dB	dB	dB	dB	Table	$dB\mu V/m$	$dB\mu V/m$	dB	Ant			
1	34.680M	45.9	+16.1	+0.0	+0.1	+1.1	+0.0	34.8	40.0	-5.2	Vert			
			-28.4	+0.0	+0.0	+0.0								
2	36.930M	46.3	+15.5	+0.0	+0.1	+1.1	+0.0	34.6	40.0	-5.4	Vert			
QP			-28.4	+0.0	+0.0	+0.0								
^	36.930M	48.6	+15.5	+0.0	+0.1	+1.1	+0.0	36.9	40.0	-3.1	Vert			
			-28.4	+0.0	+0.0	+0.0								
4	44.316M	48.0	+12.9	+0.0	+0.1	+1.1	+0.0	33.7	40.0	-6.3	Vert			
			-28.4	+0.0	+0.0	+0.0								
5	31.621M	44.2	+16.2	+0.0	+0.1	+1.0	+0.0	33.0	40.0	-7.0	Horiz			
			-28.5	+0.0	+0.0	+0.0								
6	32.190M	44.1	+16.2	+0.0	+0.1	+1.0	+0.0	32.9	40.0	-7.1	Horiz			
			-28.5	+0.0	+0.0	+0.0								

7	45.159M	46.5	+12.5	+0.0	+0.1	+1.2	+0.0	32.0	40.0	-8.0	Vert
			-28.3	+0.0	+0.0	+0.0					
8	198.928M	43.9	+16.8	+0.0 +0.0	+0.2	+2.6	+0.0	35.1	43.5	-8.4	Vert
9	331.902M	41.4	+0.0	+20.0	+0.3	+3.4	+0.0	36.9	46.0	-9.1	Vert
			-28.2	+0.0	+0.0	+0.0					
10	331.894M	41.3	+0.0	+20.0	+0.3	+3.4	+0.0	36.8	46.0	-9.2	Horiz
			-28.2	+0.0	+0.0	+0.0					
11	100.093M	48.7	+11.5	+0.0	+0.1	+1.8	+0.0	33.7	43.5	-9.8	Vert
			-28.4	+0.0	+0.0	+0.0					
12	552.580M	41.6	+0.0	+18.0	+0.4	+4.6	+0.0	36.0	46.0	-10.0	Horiz
10	100 5553 6		-28.6	+0.0	+0.0	+0.0	0.0		10.7	10.0	
13	188.775M	41.2	+17.1	+0.0	+0.2	+2.5	+0.0	32.7	43.5	-10.8	Horiz
1.4	552 59 <i>C</i> M	40.2	-28.3	+0.0	+0.0	+0.0	.0.0	24.6	16.0	11.4	V
14	552.586M	40.2	+0.0	+18.0	+0.4	+4.6	+0.0	34.0	46.0	-11.4	vert
15	208 332M	36.8	-28.0	+0.0	+0.0	+0.0		34.2	46.0	11.0	Uoriz
15	290.552101	50.8	+22.1	+0.0	+0.3	+3.3	+0.0	54.2	40.0	-11.0	HOLIZ
16	87 831M	45.0	-20.5	+0.0	+0.0	+1.6	+0.0	28.1	40.0	11.0	Horiz
10	07.051WI	43.9	-28.1	+0.0 +0.0	+0.1 +0.0	+1.0 $+0.0$	± 0.0	20.1	40.0	-11.9	HOHZ
17	184 828M	39.5	+17.2	+0.0	+0.2	+2.5	+0.0	31.1	43 5	-12.4	Vert
17	101.020101	57.5	-28.3	+0.0	+0.0	+0.0	10.0	51.1	15.5	12.1	ven
18	86.534M	45.6	+8.3	+0.0	+0.1	+1.6	+0.0	27.5	40.0	-12.5	Horiz
			-28.1	+0.0	+0.0	+0.0					
19	112.137M	43.4	+13.9	+0.0	+0.2	+1.9	+0.0	31.0	43.5	-12.5	Vert
			-28.4	+0.0	+0.0	+0.0					
20	109.388M	43.8	+13.4	+0.0	+0.1	+1.9	+0.0	30.8	43.5	-12.7	Horiz
			-28.4	+0.0	+0.0	+0.0					
21	186.053M	39.2	+17.1	+0.0	+0.2	+2.5	+0.0	30.7	43.5	-12.8	Horiz
-			-28.3	+0.0	+0.0	+0.0					
22	218.518M	41.2	+17.2	+0.0	+0.2	+2.7	+0.0	33.0	46.0	-13.0	Vert
	55.06714	44.0	-28.3	+0.0	+0.0	+0.0	. 0. 0	27.0	40.0	12.0	X 7 /
23	55.96/M	44.9	+9.2	+0.0	+0.1	+1.3	+0.0	27.0	40.0	-13.0	Vert
24	170 710M	20 5	-28.5	+0.0	+0.0	+0.0	+0.0	20.2	12 5	12.0	Homia
24	170.710101	38.3	+17.4	+0.0	+0.2	+2.4	+0.0	50.5	45.5	-15.2	HOLIZ
25	186 583M	38.7	+17.1	+0.0	+0.0	+0.0	+0.0	30.2	13.5	13.3	Vort
25	100.505101	50.7	-28.3	+0.0	+0.2	+0.0	10.0	50.2	+3.3	-15.5	ven
26	113.968M	42.2	+14.2	+0.0	+0.2	+1.9	+0.0	30.1	43.5	-13.4	Horiz
	1100 0000		-28.4	+0.0	+0.0	+0.0	1010	0011		1011	110112
27	190.711M	38.6	+17.0	+0.0	+0.2	+2.5	+0.0	30.0	43.5	-13.5	Vert
			-28.3	+0.0	+0.0	+0.0					
28	194.666M	38.6	+16.9	+0.0	+0.2	+2.6	+0.0	29.9	43.5	-13.6	Horiz
			-28.4	+0.0	+0.0	+0.0					
29	189.243M	38.4	+17.1	+0.0	+0.2	+2.5	+0.0	29.9	43.5	-13.6	Vert
			-28.3	+0.0	+0.0	+0.0					
30	115.904M	41.5	+14.6	+0.0	+0.2	+1.9	+0.0	29.8	43.5	-13.7	Vert
			-28.4	+0.0	+0.0	+0.0					
31	182.091M	38.1	+17.2	+0.0	+0.2	+2.5	+0.0	29.7	43.5	-13.8	Horiz
			-28.3	+0.0	+0.0	+0.0					

22	510 5 (0) (20. (0.0	1 7 1	0.4	4.4	0.0	22.0	16.0	110	X Z .
32	510.569M	38.6	+0.0	+17.1	+0.4	+4.4	+0.0	32.0	46.0	-14.0	Vert
22	110.0721	40.4	-20.5	+0.0	+0.0	+0.0		20.5	12 5	14.0	Hanin
	119.972101	40.4	+13.3	+0.0 +0.0	+0.2 +0.0	+2.0 +0.0	+0.0	29.3	45.5	-14.0	HOLIZ
34	93 367M	46.0	+9.9	+0.0	+0.0	+1.7	+0.0	29.5	43 5	-14.0	Vert
51	22.20711	10.0	-28.2	+0.0	+0.0	+0.0	10.0	27.5	10.0	11.0	vert
35	365.936M	38.4	+0.0	+17.7	+0.3	+3.6	+0.0	31.8	46.0	-14.2	Horiz
			-28.2	+0.0	+0.0	+0.0					
36	72.092M	45.8	+6.9	+0.0	+0.1	+1.5	+0.0	25.8	40.0	-14.2	Vert
			-28.5	+0.0	+0.0	+0.0					
37	193.724M	37.7	+17.0	+0.0	+0.2	+2.6	+0.0	29.1	43.5	-14.4	Vert
			-28.4	+0.0	+0.0	+0.0					
38	108.318M	42.0	+13.2	+0.0	+0.1	+1.9	+0.0	28.8	43.5	-14.7	Horiz
20			-28.4	+0.0	+0.0	+0.0		24.0	10.0		
39	52.085M	41.7	+10.3	+0.0	+0.1	+1.2	+0.0	24.9	40.0	-15.1	Vert
40	171 0501	265	-28.4	+0.0	+0.0	+0.0	.0.0	20.2	12 5	15.0	II
40	1/1.858M	30.5	+1/.4	+0.0	+0.2	+2.4	+0.0	28.3	43.5	-15.2	Horiz
41	02.029M	15.2	-28.2	+0.0	+0.0	+0.0		20.2	12 5	15.2	Horiz
41	92.028M	43.2	-28.2	+0.0 ±0.0	+0.1 ±0.0	+1.0 ± 0.0	+0.0	28.5	45.5	-13.2	HOLIZ
12	195 938M	36.9	+16.9	+0.0	+0.2	+2.6	+0.0	28.2	13.5	-15.3	Vert
72	175.750101	50.7	-28.4	+0.0	+0.2	+0.0	10.0	20.2	чэ.э	-15.5	ven
43	265.568M	36.2	+19.3	+0.0	+0.3	+3.0	+0.0	30.5	46.0	-15.5	Horiz
	20010 00111	00.2	-28.3	+0.0	+0.0	+0.0		00.0	1010	10.00	110112
44	147.518M	36.7	+17.3	+0.0	+0.2	+2.2	+0.0	28.0	43.5	-15.5	Horiz
			-28.4	+0.0	+0.0	+0.0					
45	84.742M	43.0	+7.9	+0.0	+0.1	+1.6	+0.0	24.4	40.0	-15.6	Vert
			-28.2	+0.0	+0.0	+0.0					
46	108.272M	41.0	+13.2	+0.0	+0.1	+1.9	+0.0	27.8	43.5	-15.7	Vert
			-28.4	+0.0	+0.0	+0.0					
47	89.217M	45.0	+8.9	+0.0	+0.1	+1.6	+0.0	27.5	43.5	-16.0	Vert
			-28.1	+0.0	+0.0	+0.0					
48	350.101M	35.6	+0.0	+18.7	+0.3	+3.5	+0.0	29.9	46.0	-16.1	Vert
40	260 1121	26.1	-28.2	+0.0	+0.0	+0.0	.0.0	20.0	16.0	161	X 7 /
49	360.112M	36.1	+0.0	+18.1	+0.3	+3.6	+0.0	29.9	46.0	-16.1	Vert
50	270 075M	25.1	-28.2	+0.0	+0.0	+0.0		20.0	16.0	16.1	Horiz
50	270.075101	55.1	-28.3	$^{+0.0}_{+0.0}$	+0.3 +0.0	+3.1 +0.0	+0.0	29.9	40.0	-10.1	HOLIZ
51	114 957M	39.3	+14.4	+0.0	+0.2	+1.9	+0.0	27.4	43.5	-16.1	Vert
51	111.997101	57.5	-28.4	+0.0	+0.2	+0.0	10.0	27.1	15.5	10.1	ven
52	510.586M	36.4	+0.0	+17.1	+0.4	+4.4	+0.0	29.8	46.0	-16.2	Horiz
_			-28.5	+0.0	+0.0	+0.0					
53	90.050M	44.6	+9.1	+0.0	+0.1	+1.6	+0.0	27.3	43.5	-16.2	Horiz
			-28.1	+0.0	+0.0	+0.0					
54	109.003M	40.3	+13.3	+0.0	+0.1	+1.9	+0.0	27.2	43.5	-16.3	Vert
			-28.4	+0.0	+0.0	+0.0					
55	192.981M	35.7	+17.0	+0.0	+0.2	+2.5	+0.0	27.1	43.5	-16.4	Vert
			-28.3	+0.0	+0.0	+0.0					
56	84.098M	42.1	+7.8	+0.0	+0.1	+1.6	+0.0	23.4	40.0	-16.6	Horiz
			-28.2	+0.0	+0.0	+0.0					

57	180.844M	35.2	+17.3	+0.0	+0.2	+2.4	+0.0	26.9	43.5	-16.6	Vert
50	94.07014	42.0	-28.2	+0.0	+0.0	+0.0	.0.0	02.2	40.0	167	V and
58	84.079M	42.0	+7.8	$^{+0.0}_{+0.0}$	+0.1 +0.0	$^{+1.6}_{+0.0}$	+0.0	23.3	40.0	-16./	Vert
59	179.166M	35.0	+17.3	+0.0	+0.2	+2.4	+0.0	26.7	43.5	-16.8	Horiz
			-28.2	+0.0	+0.0	+0.0					
60	43.520M	37.2	+13.2	+0.0	+0.1	+1.1	+0.0	23.2	40.0	-16.8	Horiz
			-28.4	+0.0	+0.0	+0.0					
61	131.116M	36.4	+16.3	+0.0	+0.2	+2.1	+0.0	26.6	43.5	-16.9	Vert
			-28.4	+0.0	+0.0	+0.0					
62	329.932M	32.9	+0.0	+20.2	+0.3	+3.4	+0.0	28.6	46.0	-17.4	Vert
			-28.2	+0.0	+0.0	+0.0					
63	3377.000M	37.2	+0.0	+0.0	+0.0	+0.0	+0.0	36.5	54.0	-17.5	Vert
			+0.0	+30.8	-37.4	+5.9					
64	280.093M	32.8	+20.5	+0.0	+0.3	+3.1	+0.0	28.4	46.0	-17.6	Horiz
	15 25225	2.6.0	-28.3	+0.0	+0.0	+0.0			10.0	1	
65	45.352M	36.8	+12.5	+0.0	+0.1	+1.2	+0.0	22.3	40.0	-17.7	Horiz
	75.04634	12.0	-28.3	+0.0	+0.0	+0.0	0.0	22.1	10.0	17.0	X 7
66	75.046M	42.0	+6.8	+0.0	+0.1	+1.6	+0.0	22.1	40.0	-17.9	Vert
(7	400.05614	26.6	-28.4	+0.0	+0.0	+0.0	.0.0	27.0	16.0	10.1	II
67	400.056M	30.0	+0.0	+15.5	+0.3	+3.8	+0.0	27.9	46.0	-18.1	Horiz
69	211 206M	21.0	-28.5	+0.0	+0.0	+0.0	+0.0	27.0	16.0	10 1	Horiz
08	511.200M	51.0	+0.0	+21.0	+0.5	+3.3	+0.0	21.9	40.0	-10.1	HOLIZ
60	224 210M	32.5	-20.5	+0.0	+0.0	+0.0		27.0	46.0	10 1	Vort
09	554.510WI	52.5	-28.2	+19.9 +0.0	+0.3	+3.4	± 0.0	21.9	40.0	-10.1	ven
70	232.090M	35.6	+17.5	+0.0	+0.2	+2.8	+0.0	27.8	46.0	-18.2	Horiz
70	252.070101	55.0	-28.3	+0.0	+0.2	+0.0	10.0	27.0	40.0	10.2	HOHL
71	62.672M	41.1	+7.8	+0.0	+0.1	+1.4	+0.0	21.8	40.0	-18.2	Vert
, 1	021072111		-28.6	+0.0	+0.0	+0.0		2110		10.2	
72	53.780M	38.8	+9.8	+0.0	+0.1	+1.2	+0.0	21.5	40.0	-18.5	Vert
			-28.4	+0.0	+0.0	+0.0					
73	365.328M	33.9	+0.0	+17.7	+0.3	+3.6	+0.0	27.3	46.0	-18.7	Vert
			-28.2	+0.0	+0.0	+0.0					
74	80.237M	40.8	+6.9	+0.0	+0.1	+1.6	+0.0	21.2	40.0	-18.8	Vert
			-28.2	+0.0	+0.0	+0.0					
75	65.494M	40.6	+7.4	+0.0	+0.1	+1.4	+0.0	20.9	40.0	-19.1	Horiz
			-28.6	+0.0	+0.0	+0.0					
76	540.116M	32.6	+0.0	+17.7	+0.4	+4.6	+0.0	26.7	46.0	-19.3	Horiz
			-28.6	+0.0	+0.0	+0.0					
77	255.107M	33.2	+18.3	+0.0	+0.3	+2.9	+0.0	26.5	46.0	-19.5	Horiz
			-28.2	+0.0	+0.0	+0.0					
78	1531.610M	44.7	+0.0	+0.0	+0.0	+0.0	+0.0	33.9	54.0	-20.1	Horiz
			+0.0	+24.6	-38.8	+3.4					
79	513.332M	32.1	+0.0	+17.2	+0.4	+4.5	+0.0	25.7	46.0	-20.3	Vert
	075 0501	22.4	-28.5	+0.0	+0.0	+0.0	.0.0	25.2	16.0	00.0	X 7 ·
80	375.056M	32.4	+0.0	+1/.1	+0.3	+3.7	+0.0	25.2	46.0	-20.8	Vert
01	07 55114	20.2	-28.5	+0.0	+0.0	+0.0		10.2	40.0	20.0	Haria
81	82.331NI	38.5	+/.4	+0.0	+0.1	+1.0	+0.0	19.2	40.0	-20.8	HOPIZ
			-20.2	+0.0	+0.0	+0.0					

82	400.110M	33.8	+0.0	+15.5	+0.3	+3.8	+0.0	25.1	46.0	-20.9	Vert
			-28.3	+0.0	+0.0	+0.0					
83	75.072M	38.3	+6.8	+0.0	+0.1	+1.6	+0.0	18.4	40.0	-21.6	Horiz
			-28.4	+0.0	+0.0	+0.0					
84	381.054M	31.9	+0.0	+16.7	+0.3	+3.7	+0.0	24.3	46.0	-21.7	Vert
			-28.3	+0.0	+0.0	+0.0					
85	406.482M	32.8	+0.0	+15.6	+0.3	+3.8	+0.0	24.1	46.0	-21.9	Vert
			-28.4	+0.0	+0.0	+0.0					
86	418.086M	32.5	+0.0	+15.8	+0.3	+3.9	+0.0	24.0	46.0	-22.0	Vert
			-28.5	+0.0	+0.0	+0.0					
87	466.762M	31.2	+0.0	+16.5	+0.4	+4.1	+0.0	23.6	46.0	-22.4	Vert
			-28.6	+0.0	+0.0	+0.0					
88	458.216M	30.4	+0.0	+16.4	+0.4	+4.1	+0.0	22.6	46.0	-23.4	Vert
			-28.7	+0.0	+0.0	+0.0					
89	73.507M	35.8	+6.9	+0.0	+0.1	+1.5	+0.0	15.8	40.0	-24.2	Horiz
			-28.5	+0.0	+0.0	+0.0					

Test Equipment

Equipment Asset #		Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
4 MHz – 30 MHz						
Loop Antenna	00314	EMCO	6502	2014	072302	072303
Antenna cable	NA	NA	RG214	Cable#15	122001	122002
30 MHz – 1000 MHz						
Bicon Antenna	306	AH	SAS200/540	220	092401	092402
Log Periodic Antenna	331	AH	SAS 00/516	330	092401	092402
Pre-amp	00309	HP	8447D	1937A02548	090501	090502
Antenna cable	NA	NA	RG214	Cable#15	122001	122002
Pre-amp to SA cable	NA	Harbour	RG223/U	Cable#10	070802	070803
1000-5600 MHz						
Horn Antenna	0849	EMCO	3115	6246	091201	091202
Microwave Pre-amp	00786	HP	83017A	3123A00281	091201	091202
¹ /4" Heliax Coaxial	4" Heliax Coaxial NA Andrew		LDF1-50 Cable#18 (091101	091102
Cable				ft)		



Radiated Emissions - Loop Antenna



Radiated Emissions - Front View - RS232



Radiated Emissions - Back View - RS232



Radiated Emissions - Front View - UTP

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Radiated Emissions - Back View - UTP

15.111 – RADIATED EMISSIONS

Test Location:	CKC Laboratories, Inc. •110 N. Ol	inda Place • Brea, CA 9282	23 • (714) 993-6112
Customer:	IP MobileNet		
Specification:	FCC15.111 Antenna Power Con	ducted Limit for Receiv	er
Work Order #:	79240	Date:	07/30/2002
Test Type:	Conducted Emissions	Time:	16:03:31
Equipment:	Land Mobile Transceiver	Sequence#:	4
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong
Model:	IP4HPV-GPS		13.8Vdc
S/N:	NA		

Equipment Under Test (* = EUT):

-1r			
Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

Measurement is performed with a spectrum analyzer connected to the receiving antenna port of the EUT. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 509.0 MHz, Rx 551.0 MHz, Inj 0 506.0 MHz. Limit: 5 nWatt = 50 dBuV. Frequency range of measurement: 30 MHz - 5.6 GHz, 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend:

T1=Brea Cable: 6' 1/4" Heliax - Brea # 7.

Measu	<i>leasurement Data:</i> Reading listed by margin.					Test Lead: Antenna Terminal					
#	Freq	Rdng	T1				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	4072.090M	44.1	+1.0				+0.0	45.1	50.0	-4.9	Anten
2	4581.040M	42.2	+1.0				+0.0	43.2	50.0	-6.8	Anten
3	2545.110M	38.7	+0.9				+0.0	39.6	50.0	-10.4	Anten
4	5599.040M	35.6	+1.3				+0.0	36.9	50.0	-13.1	Anten
5	2036.060M	33.2	+0.6				+0.0	33.8	50.0	-16.2	Anten
6	509.096M	33.7	+0.0				+0.0	33.7	50.0	-16.3	Anten
7	1526.960M	32.2	+0.5				+0.0	32.7	50.0	-17.3	Anten
8	5509.800M	29.8	+1.3				+0.0	31.1	50.0	-18.9	Anten
9	1527.086M	29.3	+0.5				+0.0	29.8	50.0	-20.2	Anten

Test Location:	CKC Laboratories, Inc.	•110 N. Olinda Place	 Brea, CA 92823 	(714) 993-6112
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Customer: Specification:	IP MobileNet FCC15.111 Antenna Power Conducted Limit for Receiver								
Work Order #:	79240	Date:	07/30/2002						
Test Type:	Conducted Emissions	Time:	16:30:35						
Equipment:	Land Mobile Transceiver	Sequence#:	5						
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong						
Model:	IP4HPV-GPS		13.8Vdc						
S/N:	NA								

Equipment Under Test (* = EUT):

	-		
Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Sunnart Daviage			

Support Devices:			
Function	Manufacturer	Model #	S/N
Laptop	Dell	Inspiron 2500	08C6461296121A5503
Power Supply	Radio Shack	22510	NA

Test Conditions / Notes:

Measurement is performed with a spectrum analyzer connected to the receiving antenna port of the EUT. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 510.5 MHz, Rx 507.5 MHz, Inj 1 552.5 MHz. Limit: 5 nWatt = 50 dBuV. Frequency range of measurement: 30 MHz - 5.6 GHz, 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend:

T1=Brea Cable: 6' 1/4" Heliax - Brea # 7.

Measu	rement Data:	Reading listed by margin.				Test Lead: Antenna Terminal					
#	Freq	Rdng	T1				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	4084.160M	45.2	+1.0				+0.0	46.2	50.0	-3.8	Anten
2	4594.510M	42.1	+1.0				+0.0	43.1	50.0	-6.9	Anten
3	2552.550M	38.6	+1.0				+0.0	39.6	50.0	-10.4	Anten
4	3573.540M	38.5	+1.0				+0.0	39.5	50.0	-10.5	Anten
5	5615.410M	35.5	+1.3				+0.0	36.8	50.0	-13.2	Anten
6	5105.030M	35.4	+1.0				+0.0	36.4	50.0	-13.6	Anten
7	510.596M	34.1	+0.0				+0.0	34.1	50.0	-15.9	Anten

8 2041.930M	33.4	+0.6	+0	.0	34.0	50.0	-16.0	Anten
9 1531.340M	31.8	+0.5	+0	.0	32.3	50.0	-17.7	Anten
10 3063.040M	29.8	+1.1	+0	.0	30.9	50.0	-19.1	Anten
11 1021.040M	27.5	+0.4	+0	.0	27.9	50.0	-22.1	Anten

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

Customer: Specification:	omer: IP MobileNet ification: FCC15.111 Antenna Power Conducted Limit for Receiver							
Work Order #:	79240	Date:	07/30/2002					
Test Type:	Conducted Emissions	Time:	16:38:00					
Equipment:	Land Mobile Transceiver	Sequence#:	6					
Manufacturer:	IP MobileNet	Tested By:	Eddie Wong					
Model:	IP4HPV-GPS		13.8Vdc					
S/N:	NA							

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
DC Line Filter	Radio Shack	270-055	NA
Land Mobile Transceiver*	IP MobileNet	IP4HPV-GPS	NA
Support Daviaas			

Support Devices:							
Function	Manufacturer	Model #	S/N				
Laptop	Dell	Inspiron 2500	08C6461296121A5503				
Power Supply	Radio Shack	22510	NA				

Test Conditions / Notes:

Measurement is performed with a spectrum analyzer connected to the receiving antenna port of the EUT. RS232 Port is connected to a laptop, GPS antenna port is connected to a GPS antenna, ethernet port is connected to a section of ethernet cable. The laptop is running test program to exercise the EUT. Channel Tx 511.9 MHz, Rx 508.9 MHz, Inj 2 553.9 MHz. Limit: 5 nWatt = 50 dBuV. Frequency range of measurement: 30 MHz - 5.6 GHz, 30 MHz - 1GHz RBW=VBW=120 kHz. 1 - 5.6 GHz RBW=VBW=1 MHz. 13.8 Vdc (from a 110Vac, 60 Hz DC Power Supply), 22°C, 63% relative humidity.

Transducer Legend:

T1=Brea Cable: 6' 1/4" Heliax - Brea # 7.

<i>Measurement Data:</i> Reading listed by margin.				Test Lead: Antenna Terminal							
#	Freq	Rdng	T1				Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	4606.900M	43.2	+1.0				+0.0	44.2	50.0	-5.8	Anten
2	2769.500M	38.7	+1.3				+0.0	40.0	50.0	-10.0	Anten
3	2559.900M	38.8	+1.0				+0.0	39.8	50.0	-10.2	Anten
4	4985.700M	34.8	+1.1				+0.0	35.9	50.0	-14.1	Anten
5	2047.500M	35.2	+0.6				+0.0	35.8	50.0	-14.2	Anten
6	1535.700M	33.3	+0.5				+0.0	33.8	50.0	-16.2	Anten
7	3071.900M	32.0	+1.1				+0.0	33.1	50.0	-16.9	Anten
8	512.400M	32.9	+0.0				+0.0	32.9	50.0	-17.1	Anten
9	3323.900M	31.7	+0.9				+0.0	32.6	50.0	-17.4	Anten

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS FCC 15.111



PHOTOGRAPH SHOWING CONDUCTED EMISSIONS FCC 15.111



Test Equipment

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer	01865	HP	8566B	2532A02509	092801	092802
QP Adapter	01437	HP	85650A	3303A01884	092801	092802
High Pass Filter	02116	HP	84300-	3643A00027	062502	062503
(above 1.5 GHz)			80037			
¹ /4" Heliax Coaxial	NA	Andrew	FSJ-50A-4	Cable#7	071502	071503
Cable				(6 ft)		