



ADDENDUM TO FC03-062

FOR THE

BASE STATION, B-800-25

FCC PART 90

COMPLIANCE

DATE OF ISSUE: OCTOBER 27, 2003

PREPARED FOR:

IP MobileNet
16842 Von Karman Avenue
Irvine, CA 92606

P.O. No.: 003041-00
W.O. No.: 81196

PREPARED BY:

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

Date of test: September 26 - October 9, 2003

Report No.: FC03-062A

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ADMINISTRATIVE INFORMATION

DATE OF TEST: September 26 - October 9, 2003

DATE OF RECEIPT: September 26, 2003

PURPOSE OF TEST: To demonstrate the compliance of the Base Station, B-800-255 with the requirements for FCC Part 90 devices.
Addendum A is to revise the operating power on page 6 and to add bandwidth limitation calculations on page 8.

TEST METHOD: FCC Part 90

FREQUENCY RANGE TESTED: 1 MHz – 9 GHz

MANUFACTURER: IP MobileNet
16842 Von Karman Avenue
Irvine, CA 92606

REPRESENTATIVE: Jim Lukes

TEST LOCATION: CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92621

SUMMARY OF RESULTS

As received, the IP MobileNet Base Station, B-800-25 was found to be fully compliant with the following standards and specifications:

United States

➤ FCC Part 90

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

TEST PERSONNEL:



Joyce Walker, Quality Assurance Administrative Manager



Randy Clark, EMC Engineer



Mike Wilkinson, Lab Manager

MEASUREMENT UNCERTAINTY

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

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

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was representative of a production unit.
The following model was tested by CKC Laboratories: **B32800N25**

Since the time of testing the manufacturer has chosen to use the following model name in its place. Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets: **B-800-25**

In regards to the new model number system not matching the documentation, IPMobileNet will be identifying products using a MODEL number system. This system allows accurately defining the configuration of the product as it is delivered to the customer. The documentation will retain our previous PART NUMBER system. The part number system will define a family of products that operate in the same frequency band, same PC boards, parts and package. Example: the IPB8 is a base station in the 800 MHz range, with tuning and or software settings parameters can be changed, such as data rate, frequency.

EQUIPMENT UNDER TEST

Base Station

Manuf: IP Mobilenet
Model: B-800-25
Serial: 03392459
FCC ID: MI7-IPB800 (pending)

PERIPHERAL DEVICES

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

Power Supply

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

Laptop Power Supply

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

Mouse

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

Laptop Computer

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

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

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

The necessary information is contained in a separate document.

FCC 2.1033 (c)(4) TYPE OF EMISSIONS

20K0F1D

FCC 2.1033 (c)(5) FREQUENCY RANGE

851-866 MHz

FCC 2.1033 (c)(6) OPERATING POWER

20.3 Watts.

FCC 2.1033 (c)(7) MAXIMUM POWER RATING

Subject to secondary licensing.

FCC 2.1033(c)(8) DC VOLTAGES

13.8 VDC.

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

The necessary information is contained in a separate document.

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

The necessary information is contained in a separate document.

FCC 2.1033(c)(11) LABEL AND PLACEMENT

The necessary information is contained in a separate document.

FCC 2.1033(c)(12) SUBMITTAL PHOTOS

The necessary information is contained in a separate document.

FCC 2.1033(c)(13) MODULATION INFORMATION

FSK.

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

Test Conditions: EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 1-30 MHz. Channel Selected: Low. Temperature: 21°C Humidity: 43%. No EUT emissions detected within 20dB of the limit in this frequency range.

Bandwidth settings used: 100 kHz.

Frequency (MHz)	RF Power Output (Watts)
851	20.3
860	20.0
866	19.1

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS >1 GHz



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

Not applicable to this unit.

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

Not applicable to this unit.

FCC 90.209 BANDWIDTH LIMITATION/NECESSARY BANDWIDTH CALCULATION

Necessary bandwidth calculation is $B_n = 2D + 2M$ Where

B_n = Necessary Bandwidth

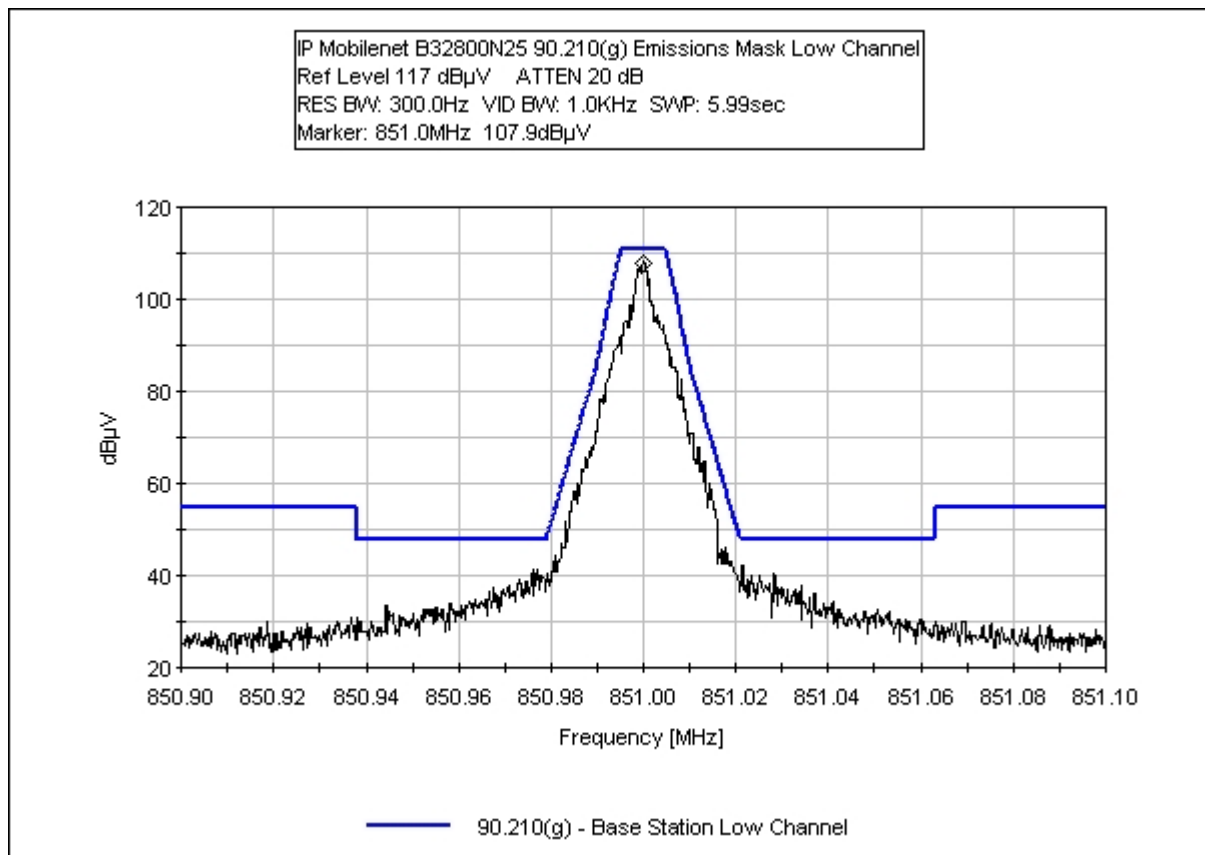
D (peak deviation) = 2.2kHz

M (Max modulation frequency) = 7.8kHz

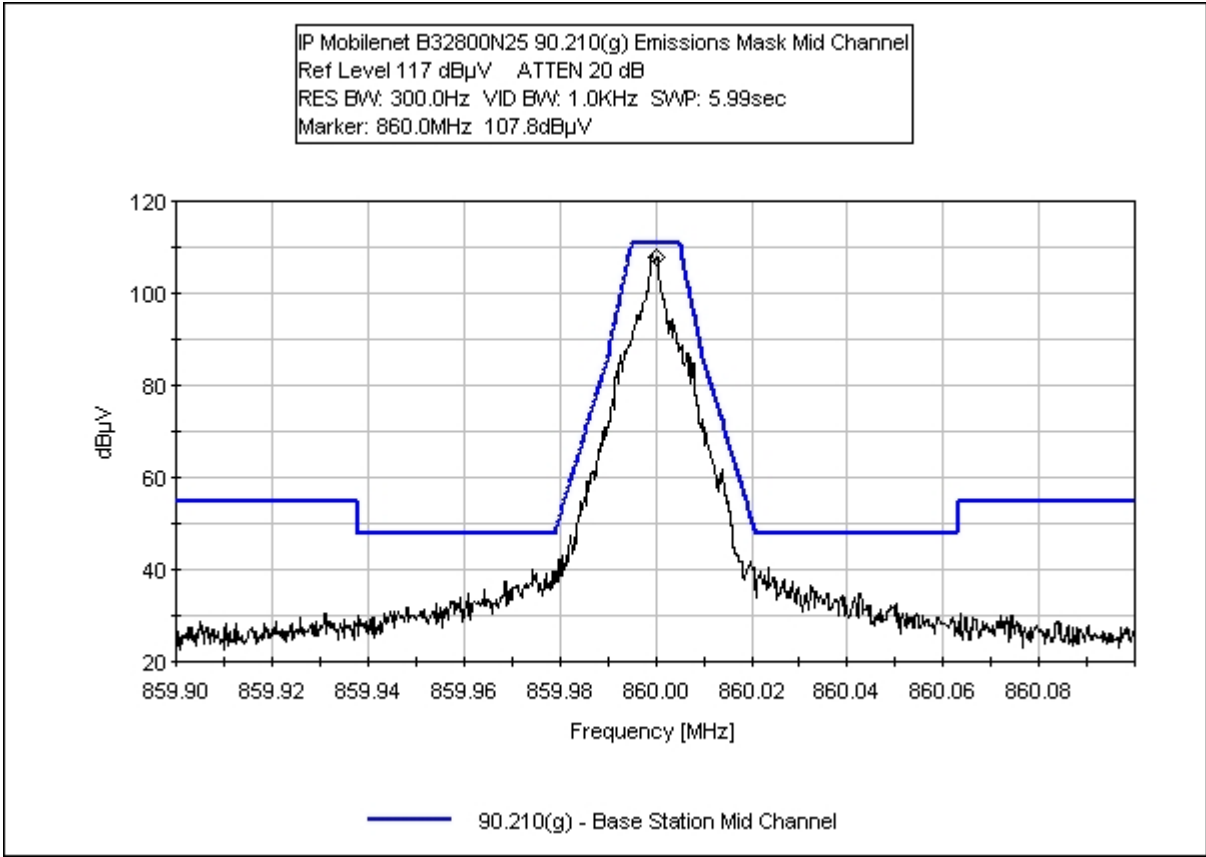
$2D + 2M = 20\text{kHz}$

FCC 2.1033(c)(14)/2.1049(i)/90.210(g)- EMISSIONS MASK LOW CHANNEL

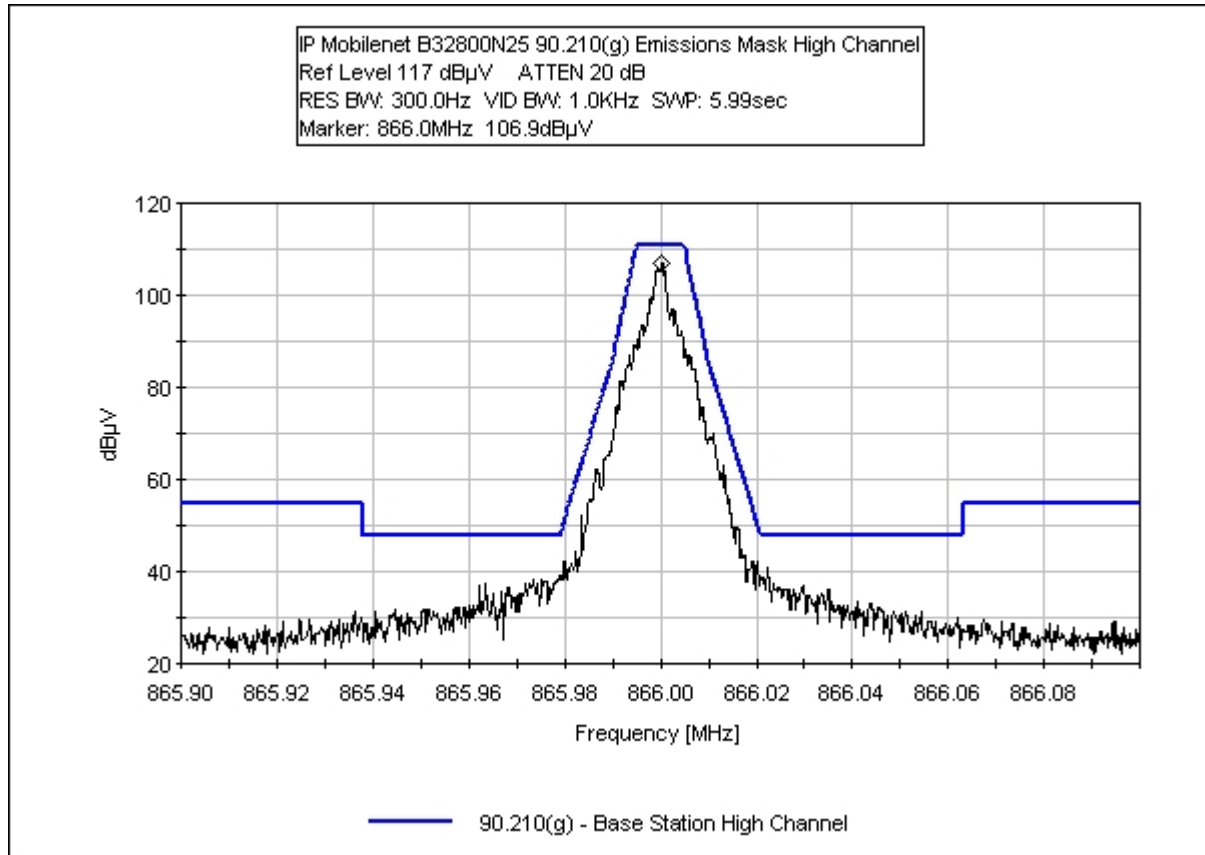
Test Conditions: EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 1-30 MHz. Channel Selected: Low. Temperature: 21°C Humidity: 43%. No EUT emissions detected within 20dB of the limit in this frequency range.



FCC 90.210(g) EMISSIONS MASK MID CHANNEL



FCC 90.210(g) EMISSIONS MASK HIGH CHANNEL



47 CFR 90.210(g)
Example Calculation of Emissions Mask

Carrier Frequency:	851.000	MHz
Channel Spacing	25.0	kHz
Peak Unmodulated Power Output:	43.0110	dBm
Peak Unmodulated Power Output:	20.0032	Watts

Calculation of Attenuation Requirements:

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

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

90.210(g)(1)

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

$$F(fd) = 83 \cdot \text{LOG}(fd/5)$$

F(5) =	0.0	dBc
F(10) =	25.0	dBc

90.210(g)(2)

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: At least 116 log (fd/6.1) dB or 50+10 log(P) dB or 70 dB, whichever is the lesser attenuation.

Attenuation:

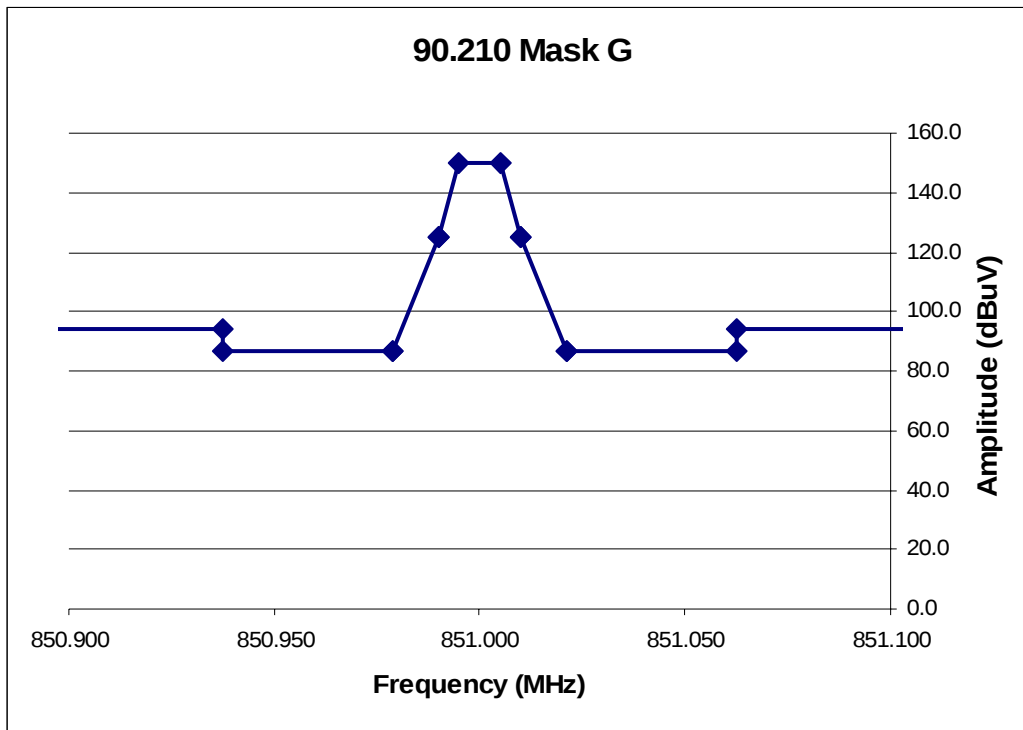
Point	fd (kHz)	116LOG(fd/6.1)	50+10LOG(P)	70
1	10	24.9	63.0	70
2	21.3	63.0	63.0	70

Point 2 is when 116LOG(fd/6.1) is equal to the lesser of 50+10LOG(P) or 70dB

90.210(g)(3)

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

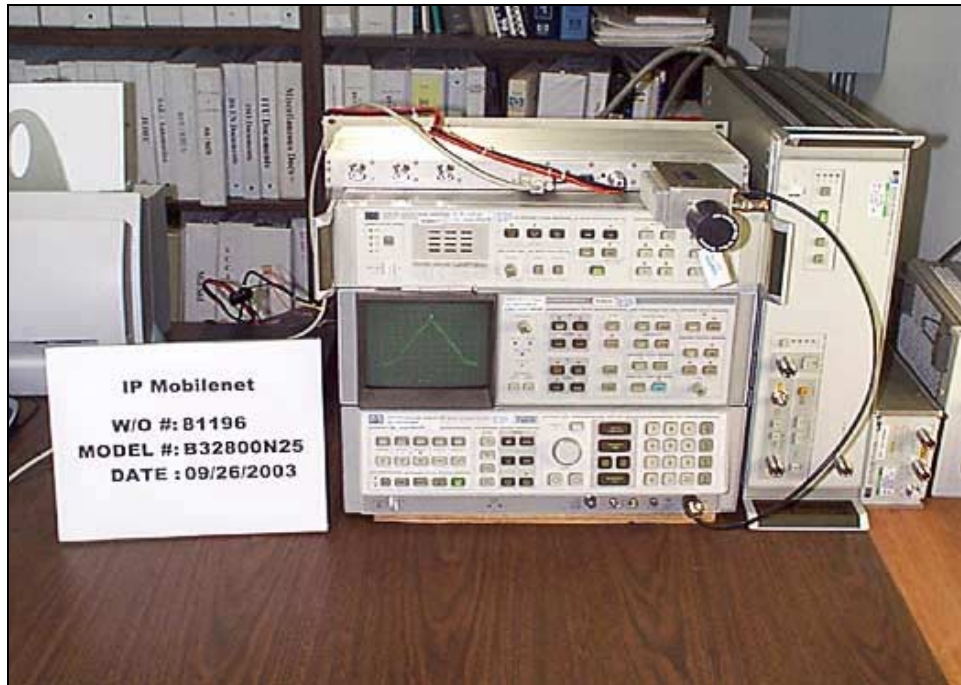
$$43+10\text{LOG}(P) = \boxed{56.0}$$



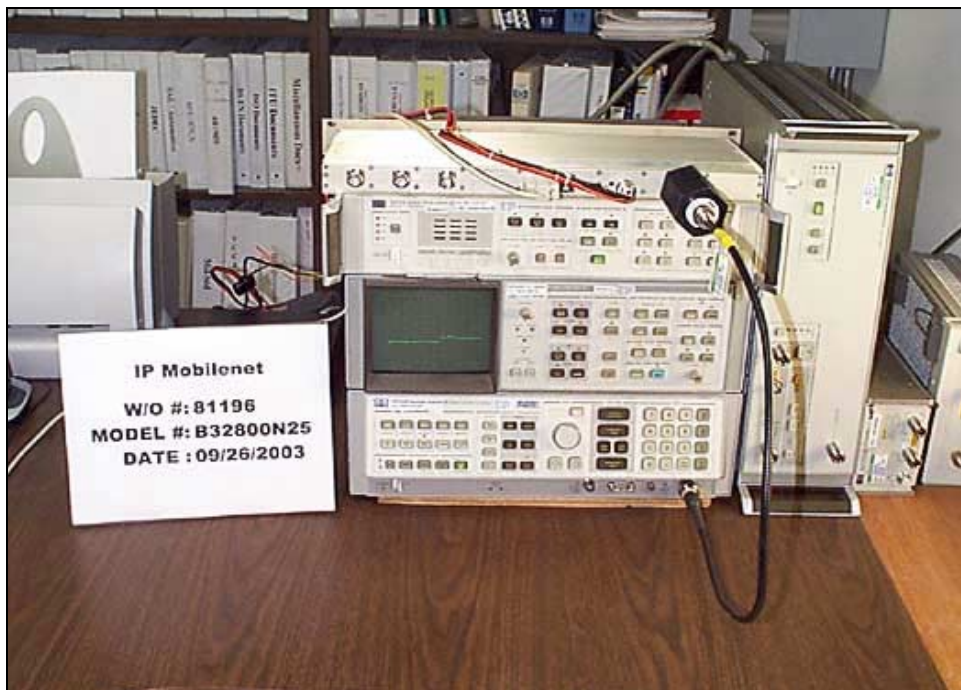
Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS >1 GHz



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

Bandwidth settings used: 100 kHz.

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

Customer: **IP Mobilenet**
Specification: **90.210(g) - Base Station Low Channel**
Work Order #: **81196** Date: 09/26/2003
Test Type: **Antenna Terminals** Time: 2:11:08 PM
Equipment: **Base Station Data Radio** Sequence#: 4
Manufacturer: IP Mobilenet Tested By: Randal Clark
Model: B32800N25
S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 1-30 MHz. Channel Selected: Low. Temperature: 21°C Humidity: 43%. No EUT emissions detected within 20dB of the limit in this frequency range.

Transducer Legend:

T1=DC AN 02576

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

#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1.628M	25.3	+39.7				+0.0	65.0	94.0	-29.0	None
2	27.113M	25.3	+39.7				+0.0	65.0	94.0	-29.0	None

3	13.690M	25.0	+39.6	+0.0	64.6	94.0	-29.4	None
4	29.115M	24.9	+39.7	+0.0	64.6	94.0	-29.4	None
5	3.650M	24.8	+39.6	+0.0	64.4	94.0	-29.6	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station Mid Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 2:14:18 PM
 Equipment: **Base Station Data Radio** Sequence#: 5
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 1-30 MHz. Channel Selected: Mid. Temperature: 21°C Humidity: 43%. No EUT emissions detected within 20dB of the limit in this frequency range.

Transducer Legend:

T1=DC AN 02576

Measurement Data:		Reading listed by margin.					Test Distance: None				
#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	27.555M	25.7	+39.7				+0.0	65.4	94.0	-28.6	None
2	28.624M	25.4	+39.7				+0.0	65.1	94.0	-28.9	None
3	2.894M	25.3	+39.7				+0.0	65.0	94.0	-29.0	None
4	4.017M	25.2	+39.6				+0.0	64.8	94.0	-29.2	None
5	10.510M	25.2	+39.6				+0.0	64.8	94.0	-29.2	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station High Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 2:16:04 PM
 Equipment: **Base Station Data Radio** Sequence#: 6
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 1-30 MHz. Channel Selected: High. Temperature: 21°C Humidity: 43%. No EUT emissions detected within 20dB of the limit in this frequency range.

Transducer Legend:

T1=DC AN 02576

Measurement Data: Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1.971M	25.4	+39.7				+0.0	65.1	94.0	-28.9	None
2	4.966M	25.4	+39.6				+0.0	65.0	94.0	-29.0	None
3	13.951M	25.3	+39.6				+0.0	64.9	94.0	-29.1	None
4	7.821M	25.2	+39.6				+0.0	64.8	94.0	-29.2	None
5	28.094M	25.0	+39.7				+0.0	64.7	94.0	-29.3	None
6	20.915M	24.9	+39.7				+0.0	64.6	94.0	-29.4	None

7	3.840M	24.9	+39.6	+0.0	64.5	94.0	-29.5	None
8	17.924M	24.8	+39.7	+0.0	64.5	94.0	-29.5	None
9	3.127M	24.7	+39.7	+0.0	64.4	94.0	-29.6	None
10	4.482M	24.6	+39.6	+0.0	64.2	94.0	-29.8	None
11	6.158M	24.6	+39.6	+0.0	64.2	94.0	-29.8	None
12	7.382M	24.6	+39.6	+0.0	64.2	94.0	-29.8	None
13	15.726M	24.5	+39.7	+0.0	64.2	94.0	-29.8	None
14	15.149M	24.4	+39.7	+0.0	64.1	94.0	-29.9	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station Low Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 2:05:29 PM
 Equipment: **Base Station Data Radio** Sequence#: 3
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 30-1000 MHz. Channel Selected: Low. Temperature: 21°C Humidity: 43%.

Transducer Legend:

T1=DC AN 02576

Measurement Data: Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	851.000M	110.0	+39.1				+0.0	149.1	150.0	-0.9	None
									Fundamental		
2	840.499M	37.9	+39.1				+0.0	77.0	94.0	-17.0	None
3	280.013M	35.1	+39.5				+0.0	74.6	94.0	-19.4	None
4	422.883M	34.5	+39.7				+0.0	74.2	94.0	-19.8	None
5	961.363M	35.1	+39.0				+0.0	74.1	94.0	-19.9	None
6	168.440M	34.2	+39.8				+0.0	74.0	94.0	-20.0	None

7	497.494M	34.2	+39.8	+0.0	74.0	94.0	-20.0	None
8	582.284M	34.2	+39.7	+0.0	73.9	94.0	-20.1	None
9	79.040M	34.1	+39.7	+0.0	73.8	94.0	-20.2	None
10	778.768M	34.0	+38.9	+0.0	72.9	94.0	-21.1	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station Mid Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 1:59:26 PM
 Equipment: **Base Station Data Radio** Sequence#: 2
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 30-1000 MHz. Channel Selected: Mid. Temperature: 21°C Humidity: 43%.

Transducer Legend:

T1=DC AN 02576

Measurement Data: Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	860.000M	110.0	+39.1				+0.0	149.1	150.0	-0.9	None
									Fundamental		
2	115.836M	34.7	+39.6				+0.0	74.3	94.0	-19.7	None
3	161.594M	34.6	+39.7				+0.0	74.3	94.0	-19.7	None
4	420.119M	34.5	+39.7				+0.0	74.2	94.0	-19.8	None
5	476.356M	34.3	+39.8				+0.0	74.1	94.0	-19.9	None
6	67.662M	33.9	+39.7				+0.0	73.6	94.0	-20.4	None

7	597.537M	33.9	+39.7	+0.0	73.6	94.0	-20.4	None
8	250.228M	33.8	+39.5	+0.0	73.3	94.0	-20.7	None
9	767.118M	34.1	+38.9	+0.0	73.0	94.0	-21.0	None
10	950.092M	33.8	+39.0	+0.0	72.8	94.0	-21.2	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station High Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 1:05:19 PM
 Equipment: **Base Station Data Radio** Sequence#: 1
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Directional Coupler C5571	11363	11/06/2002	11/06/2003	2579

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load through a directional coupler, the output of the directional coupler is fed to a spectrum analyzer. Frequency Range Investigated: 30-1000 MHz. Channel Selected: High. Temperature: 21°C Humidity: 43%.

Transducer Legend:

T1=DC AN 02576

Measurement Data: Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB				Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	866.000M	110.0	+39.2				+0.0	149.2	150.0	-0.8	None
									Fundamental		
2	855.512M	36.5	+39.1				+0.0	75.6	94.0	-18.4	None
3	855.272M	35.8	+39.1				+0.0	74.9	94.0	-19.1	None
4	604.503M	34.8	+39.7				+0.0	74.5	94.0	-19.5	None
5	42.643M	34.8	+39.6				+0.0	74.4	94.0	-19.6	None
6	196.543M	34.8	+39.5				+0.0	74.3	94.0	-19.7	None

7	395.237M	34.4	+39.7	+0.0	74.1	94.0	-19.9	None
8	985.535M	35.0	+38.9	+0.0	73.9	94.0	-20.1	None
9	532.923M	34.0	+39.8	+0.0	73.8	94.0	-20.2	None
10	224.647M	33.9	+39.5	+0.0	73.4	94.0	-20.6	None
11	787.535M	34.0	+38.9	+0.0	72.9	94.0	-21.1	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station Low Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 16:45:45
 Equipment: **Base Station Data Radio** Sequence#: 9
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Cable, Andrews Hardline	NA	06/04/2003	06/04/2005	0
Bird Attenuator, 25A-MFN-30	9724	05/08/2003	05/08/2005	0

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive attenuator which is routed to a spectrum analyzer. Frequency Range Investigated: 1-9 GHz. Channel Selected: Low. Temperature: 21°C Humidity: 43%.

Transducer Legend:

T1=Cable HF P01527	T2=Pad 30dB
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Measurement Data:		Reading listed by margin.				Test Distance: None				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB		Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1700.700M	57.8	+0.4	+30.2		+0.0	88.4	94.0	-5.6	None
2	3403.401M	52.3	+0.6	+29.7		+0.0	82.6	94.0	-11.4	None
3	5105.101M	52.7	+0.9	+28.2		+0.0	81.8	94.0	-12.2	None
4	1168.168M	49.2	+0.3	+30.3		+0.0	79.8	94.0	-14.2	None
5	2551.550M	46.9	+0.5	+30.0		+0.0	77.4	94.0	-16.6	None
6	4254.251M	47.2	+0.8	+29.1		+0.0	77.1	94.0	-16.9	None

7	5957.953M	41.6	+0.7	+27.8	+0.0	70.1	94.0	-23.9	None
8	8506.968M	40.8	+2.0	+23.4	+0.0	66.2	94.0	-27.8	None
9	6804.799M	36.9	+1.0	+27.1	+0.0	65.0	94.0	-29.0	None
10	7657.651M	34.6	+1.4	+25.4	+0.0	61.4	94.0	-32.6	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station Mid Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 3:32:28 PM
 Equipment: **Base Station Data Radio** Sequence#: 8
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Cable, Andrews Hardline	NA	06/04/2003	06/04/2005	0
Bird Attenuator, 25A-MFN-30	9724	05/08/2003	05/08/2005	0

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive attenuator which is routed to a spectrum analyzer. Frequency Range Investigated: 1-9 GHz. Channel Selected: Mid. Temperature: 21°C, Humidity: 43%.

Transducer Legend:

T1=Cable HF P01527	T2=Pad 30dB
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Measurement Data:		Reading listed by margin.				Test Distance: None				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB		Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1718.718M	57.2	+0.4	+30.2		+0.0	87.8	94.0	-6.2	None
2	5159.155M	53.4	+0.8	+28.2		+0.0	82.4	94.0	-11.6	None
3	3439.437M	49.3	+0.6	+29.8		+0.0	79.7	94.0	-14.3	None
4	1199.199M	48.4	+0.3	+30.3		+0.0	79.0	94.0	-15.0	None
5	4299.296M	47.3	+0.8	+29.0		+0.0	77.1	94.0	-16.9	None
6	2578.577M	46.0	+0.5	+30.0		+0.0	76.5	94.0	-17.5	None

7	6020.015M	41.6	+0.7	+27.8	+0.0	70.1	94.0	-23.9	None
8	8597.240M	41.7	+1.9	+23.8	+0.0	67.4	94.0	-26.6	None
9	6876.871M	36.8	+1.0	+27.1	+0.0	64.9	94.0	-29.1	None
10	6485.480M	34.3	+1.0	+27.2	+0.0	62.5	94.0	-31.5	None
11	7120.114M	33.6	+1.1	+26.8	+0.0	61.5	94.0	-32.5	None

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

Customer: **IP Mobilenet**
 Specification: **90.210(g) - Base Station High Channel**
 Work Order #: **81196** Date: 09/26/2003
 Test Type: **Antenna Terminals** Time: 3:24:31 PM
 Equipment: **Base Station Data Radio** Sequence#: 7
 Manufacturer: IP Mobilenet Tested By: Randal Clark
 Model: B32800N25
 S/N: 03392459

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Cable, Andrews Hardline	NA	06/04/2003	06/04/2005	0
Bird Attenuator, 25A-MFN-30	9724	05/08/2003	05/08/2005	0

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Base Station Data Radio*	IP Mobilenet	B32800N25	03392459

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	Samlex America	SEC 1223	03061-2G04-00695
Laptop Power Supply	Go Forward Enterprise Corp.	NT24-1S1220	NA
Mouse	Microsoft	93633	02608451
Laptop Computer	Compaq	1456VQLIN	1V96CLS8W8PV

Test Conditions / Notes:

EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive attenuator which is routed to a spectrum analyzer. Frequency Range Investigated: 1-9 GHz. Channel Selected: High. Temperature: 21°C, Humidity: 43%.

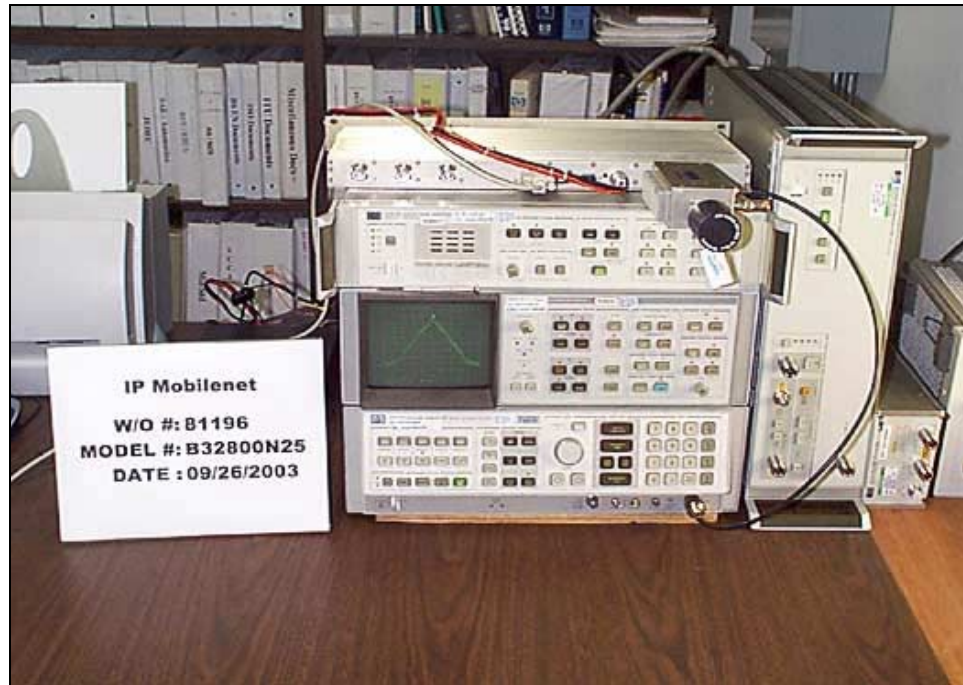
Transducer Legend:

T1=Cable HF P01527	T2=Pad 30dB
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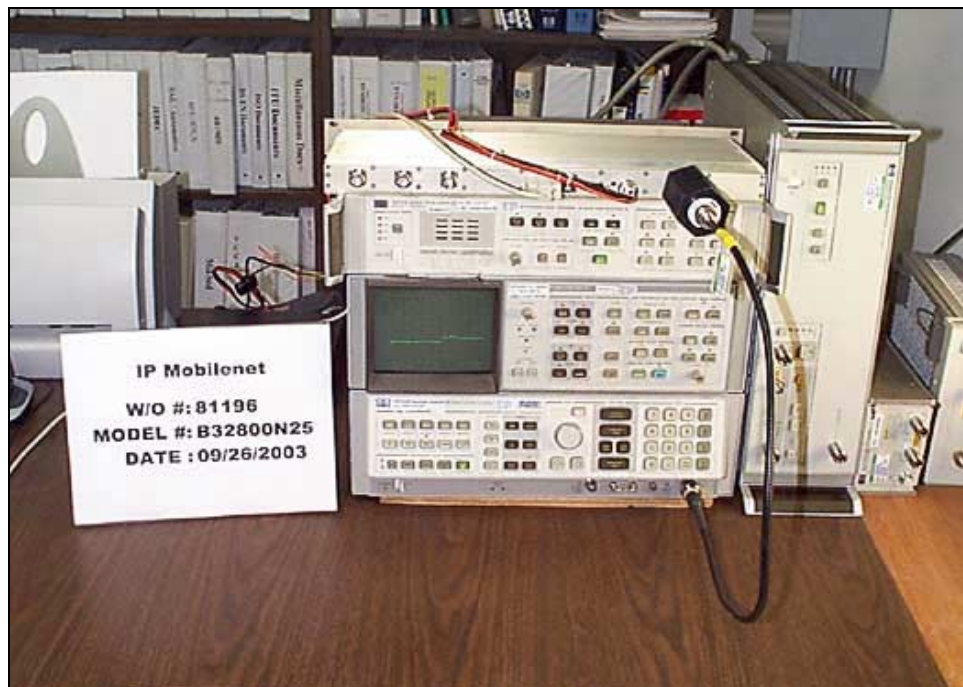
Measurement Data:		Reading listed by margin.				Test Distance: None				
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB		Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1730.730M	54.6	+0.4	+30.2		+0.0	85.2	94.0	-8.8	None
2	5195.191M	50.5	+0.8	+28.1		+0.0	79.4	94.0	-14.6	None
3	4329.326M	47.6	+0.8	+29.0		+0.0	77.4	94.0	-16.6	None
4	1220.220M	46.5	+0.3	+30.3		+0.0	77.1	94.0	-16.9	None
5	2596.595M	45.1	+0.5	+30.0		+0.0	75.6	94.0	-18.4	None
6	6924.919M	44.3	+1.0	+27.1		+0.0	72.4	94.0	-21.6	None

7	6062.057M	42.2	+0.7	+27.7	+0.0	70.6	94.0	-23.4	None
8	3462.460M	36.3	+0.6	+29.8	+0.0	66.7	94.0	-27.3	None
9	7194.188M	34.1	+1.2	+26.6	+0.0	61.9	94.0	-32.1	None
10	8656.760M	34.4	+1.9	+24.0	+0.0	60.3	94.0	-33.7	None

PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS



PHOTOGRAPH SHOWING DIRECT CONNECT EMISSIONS >1 GHz



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

Test Conditions: EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive load. Frequency Range Investigated: 1 - 9000 MHz. Channel Selected: Low, Mid and High. Temperature: 21°C, Humidity: 43%. Data represents the worst case of all channels tested. No other EUT signals detected within 20dB of the limit.

Bandwidth settings used: 100 kHz.

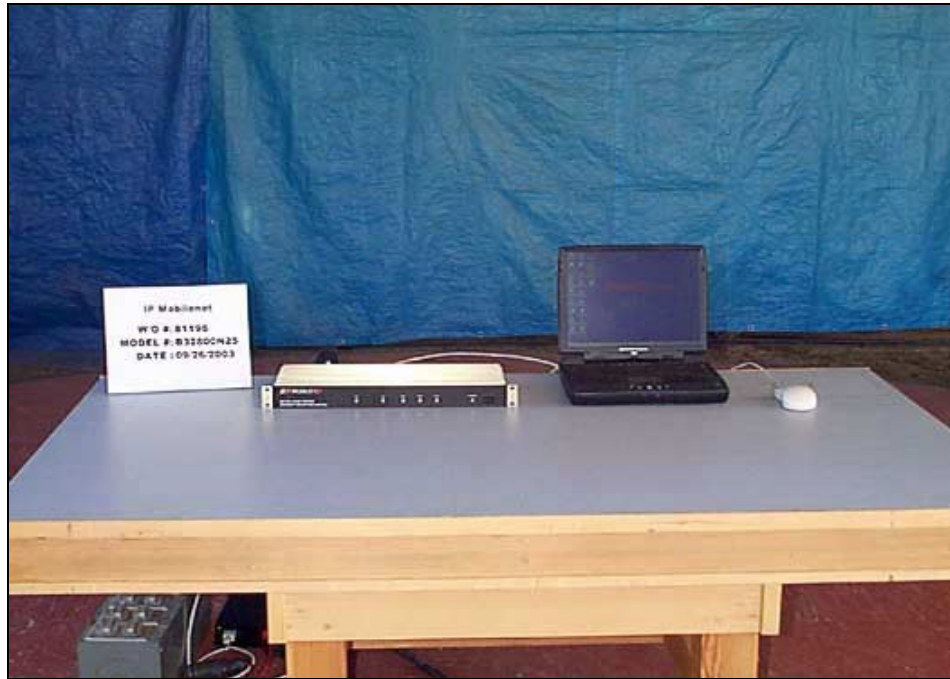
851 MHz - 866 MHz
Channels: 851 MHz, 860 MHz & 866 MHz
Highest Measured Output Power: 43.07 ERP(dBm)= 20.3 ERP(Watts)
Distance: 3 meters
Limit: $43+10\log(P)$ 56.07 dBc

Freq. (MHz)	Reference Level (dBm)	Antenna Polarity (H/V)	dBc
2,553.00	-29.00	Horiz	72.07
2,580.00	-31.30	Horiz	74.37
2,589.00	-35.40	Horiz	78.47

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B SA	2209A01404	02/26/2003	02/26/2004	490
HP 8566B SA Display	2403A08241	02/26/2003	02/26/2004	489
HP 85650A QPA	2811A01267	02/26/2003	02/26/2004	478
Cable, Site B		11/18/2002	11/18/2003	0
EMCO Loop Antenna	1074	05/21/2003	05/21/2005	226
Chase CBL6111C Bilog	2456	12/13/2002	12/13/2004	1991
HP 8447D Preamp	1937A02604	03/07/2003	03/07/2004	99
Cable H&S 35'	90148402	01/21/2003	01/21/2004	0
Cable, WL Gore 2'	149047	04/10/2003	04/10/2004	0
Cable, Andrews Hardline HF-005-20	NA	06/03/2003	06/03/2005	0
EMCO 3115 Horn Antenna	9006-3413	11/25/2002	11/25/2003	327
HP 8449B Preamp	3008A00301	10/21/2002	10/18/2003	2010

PHOTOGRAPH SHOWING OATS RADIATED EMISSIONS



Radiated Emissions - Front View



Radiated Emissions - Back View

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

Test Conditions: EUT is a data radio for fixed use operating on a frequency of 851-866 MHz. Equipment is DC powered by support power supply. Support laptop is used for configuration and testing purposes only. Antenna port is terminated into a 50 ohm resistive attenuator which is routed to a spectrum analyzer. At ambient room temperature, the input DC voltage is varied $\pm 15\%$ of nominal operating voltage.

Frequency Stability

Customer: IP Mobilenet
WO#: 81196
Date: 08-Oct-03
Test Engineer: Randal Clark

Device Model #: B32800N25
Operating Voltage: 13.8 VDC
Frequency Limit: 1.5 PPM

Temperature Variations

Channel Frequency:		Channel 1 (MHz)	Dev. (MHz)	Channel 2 (MHz)	Dev. (MHz)	Channel 3 (MHz)	Dev. (MHz)
Temp (C) Voltage		851		860		866	
-30	13.8	851.00104	0.00104	860.00112	0.00112	866.00108	0.00108
-20	13.8	851.00091	0.00091	860.00081	0.00081	866.00095	0.00095
-10	13.8	851.00081	0.00081	860.00077	0.00077	866.00084	0.00084
0	13.8	851.00062	0.00062	860.00062	0.00062	866.00052	0.00052
10	13.8	851.00035	0.00035	860.00026	0.00026	866.00031	0.00031
20	13.8	851.00010	0.00010	860.00012	0.00012	866.00021	0.00021
30	13.8	851.00001	0.00001	860.00008	0.00008	866.00005	0.00005
40	13.8	851.00002	0.00002	860.00004	0.00004	866.00001	0.00001
50	13.8	850.99979	0.00021	859.99975	0.00025	865.99962	0.00039

Voltage Variations ($\pm 15\%$)

20	11.7	851.00000	0.00000	859.99978	0.00023	865.99997	0.00003
20	13.8	851.00010	0.00010	860.00012	0.00012	866.00021	0.00021
20	15.9	851.00005	0.00005	860.00007	0.00007	866.00010	0.00009
Max Deviation (MHz)		0.00104		0.00112		0.00108	
Max Deviation (PPM)		1.21622		1.30233		1.24711	
		PASS		PASS		PASS	

PHOTOGRAPH SHOWING TEMPERATURE TESTING



Test equipment:

Description	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Temp Chamber	01879	Thermotron	S-1.2 MiniMax	11899	1/31/2003	1/31/2004
Thermometer	02242	Omega	HH-26K	T-202884	8/15/2003	8/14/2005
Power Supply, DC	00765	Sorensen	DCR-60-30B	176	7/8/2003	7/7/2005
Spectrum Analyzer 100Hz - 22.5GHz	00490	HP	8566B	2209A01404	2/26/2003	2/26/2004
Spectrum Analyzer Display	00489	HP	8566B	2403A08241	2/26/2003	2/26/2004
Spectrum Analyzer QP Adapter	00478	HP	85650A	2811A01267	2/26/2003	2/26/2004