Elliott

EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Emissions Spec:	FCC 90.210	Class:	N/A
Immunity Spec:		Environment:	

EMC Test Data

For The

Wireless Networks

Model

FPR-U20-110 & FPR-U20-120

Elliott

EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Emissions Spec:	FCC 90.210	Class:	N/A
Immunity Spec:	Enter immunity spec on cover	Environment:	

TEST SUMMARY

Date	Test Performed	Level	Results	Margin
9/21/2000	Key-on	90.214 (12.5 kHz Channel)	Pass	N/A
9/21/2000	Key-off	90.214 (12.5 kHz Channel)	Pass	N/A
9/20/2000	461.98 MHz (Fundamental	FCC 90.205 (Table 2)	30.84 dBm	N/A
9/20/2000	99% Bandwidth	90.209	Pass	N/A
9/20/2000	Emission Mask	90.210(d)(1)(2)(3)	Pass	N/A
9/20/2000	Emission Mask	90.210(d)(1)(2)(3)	Pass	N/A
9/20/2000	Out-of-Band Measurement	FCC 90.210(d)(3)	Pass	N/A
9/20/2000	Out-of-Band Measurement	FCC 90.210(d)(3)	Pass	N/A
9/20/2000	RE, Harmonic from Fo to 10th of Fundamental	90.210(d)(3)	Pass	-22.3dB @ 1385.914 MHz
9/22/2000	Temperature Vs. Frequency	90.213	Pass	N/A
9/22/2000	Temperature Vs. Voltage	90.213	Pass	N/A
9/21/2000	MPE Routing Evaluation	.300 mW/cm^2	Pass	Refer to individual runs
9/21/2000	MPE Routing Evaluation	.300 mW/cm^2	Pass	Refer to individual runs

Abbreviations Used: RE - Radiated Emissions, CE- Conducted Emissions, RI - Radiated Immunity, CI - Conducted Immunity, ESD - Electrostatic Discharge, EFT - Electrical Fast Transients, VDI - Voltage Dips and Interrupts

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Contact:	Micheal Hu		
Emissions Spec:	FCC 90.210	Class:	N/A
Immunity Spec:	Enter immunity spec on cover	Environment:	

EUT INFORMATION

General Description

The EUT is a wireless modem which is designed to be used as a LAN modem for transmittion of data. The EUT was, therefore, treated as table-top equipment during testing to simulate the end user environment. The electrical rating of the EUT is 120 V, 60 Hz, .8 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Wireless-Network	FPR-U20-110 & FPR-U20-120	Wireless modem	n/a	O8J-FPR-U20

Other EUT Details

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 5 cm wide by 1 cm deep by 5 cm high.

Modification History

Mod. #	Test	Date	Modificaiton
1			
2			
3			

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EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Part 90.214 (Transient Frequency Behavior)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 9/21/2000
Test Engineer: jmartinez
Test Location: SVOATS #1

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was setup per TIA/EIA 603 (Paragaph 2.2.19.2). The Spectrum Analyzer replaced the power meter.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Plots #	Test Performed	Limit	Result	
1	Key-on	90.214 (12.5 kHz Channel)	Pass	
2	Key-off	90.214 (12.5 kHz Channel)	Pass	

Modifications Made During Testing: None

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EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

RF Power Output (Section 2.1047)

Test Specifics

Objective: This test is required per FCC rule Part 2 certification procedure. The objective of this test session is to perform final qualification testing of the EUT relative to the specification(s) defined above.

Date of Test: 9/20/2000
Test Engineer: jmartinez
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

A spectrum analyzer, support equipment, and the EUT were all place on top of a table. The EUT was connected directly to the spectrum analyzer by a low loss coaxial cable, so as to perform the conducted mesurements at the antenna terminal.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Plot #	Test Performed	Limit	Result	Margin
3	461.98 MHz (Fundamental Frequency)	FCC 90.205 (Table 2)	30.84 dBm	Pass

Modifications Made During Testing: None

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EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Occupied Bandwidth (Section 2.1049)

Test Specifics

Objective: This test is required per FCC rule part 2 certification procedure. The objective of this test session is to perform final qualification testing of the EUT relative to the specification(s) defined above.

Date of Test: 9/20/2000
Test Engineer: jmartinez
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

A spectrum analyzer, support equipment, and EUT were all placed on top of a table. The EUT was connected directly to the spectrum analyzer by a low loss coaxial cable, so as to perform the conducted measurements at the antenna terminal.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Plots #	Test Performed	Limit	Result	
4	99% Bandwidth	90.209	Pass	
5	Emission Mask	90.210(d)(1)(2)(3)	Pass	
6	Emission Mask	90.210(d)(1)(2)(3)	Pass	

Modifications Made During Testing: None

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EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Conducted Emissions at the Antenna Terminal (Section 2.1051)

Test Specifics

Objective: This test is required per the FCC rule part 2 certification procedure. The objective of this test session is to perform final qualification testing of the EUT relative to the specification(s) defined above.

Date of Test: 9/20/2000
Test Engineer: jmartinez
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

A spectrum analyzer, support equipment, and EUT were all place on top of a table. The EUT was connected directly to the spectrum analyzer by a low loss coaxial cable, so as to perform the conducted measurements at the antenna terminal.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Plot #	Test Performed	Limit	Result	
7	Out-of-Band Measurement	FCC 90.210(d)(3)	Pass	
8	Out-of-Band Measurement	FCC 90.210(d)(3)	Pass	

Modifications Made During Testing: None

Elliott

EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Radiated Emissions (Section 2.1053)

Test Specifics

Objective: This test is required per the FCC rule part 2 certification procedure. The objective of this test session is to perform final qualification testing of the EUT relative to the specification(s) defined above.

Date of Test: 9/20/2000
Test Engineer: jmartinez
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on the turntable for radiated emissions testing.

For radiated emissions testing between 30 and 1000 MHz, the measurement antenna was located at 10 meters distance from the EUT, unless otherwise noted. For testing above 1 GHz, the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Harmonic from Fo to 10th of Fundamental Frequency	90.210(d)(3)	Pass	-22.3dB @ 1385.914 MHz

Modifications Made During Testing: None

Elliott

EMC Test Data

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Run #1: Fundamental Harmonic radiated emissions
Fundamental frequency: 461.99 MHz (Unit# 1)

Frequency	Level	Pol	90.210(d)(3)		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
923.975	43.0	H	77.4	-34.4	Pk	151	1.0		
923.975	47.0	V	77.4	-30.4	Pk	182	1.1		
1385.914	55.1	V	77.4	-22.3	Pk	203	1.1		
1847.817	53.2	V	77.4	-24.2	Pk	184	1.1		
2309.987	53.1	V	77.4	-24.3	Pk	174	1.1		
1385.631	49.6	H	77.4	-27.8	Pk	253	1.2		
1847.904	51.6	H	77.4	-25.8	Pk	184	1.2		
2309.920	52.5	H	77.4	-24.9	Pk	91	1.4		

Note 1:	Add note here
Note 2:	

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Frequency Stability (Section 2.1055)

Test Specifics

Objective: This test is required per FCC rule part 2 certification procedure. The objective of this test session is to perform final qualification testing the EUT relative to the specification(s) defined above.

Date of Test: 9/22/2000
Test Engineer: jmartinez
Test Location: Chamber #2

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

A spectrum analyzer, a combiner, and support equipment were all place on top of a table. The EUT was connected directly to the spectrum analyzer by a low loss coaxial cable, so as to measure the frequency drift. The EUT was placed inside the temperature chamber with all support equipment outside.

Ambient Conditions:

Temperature: 22°C
Rel. Humidity: 42%

Summary of Results

Run #	Test Performed	Limit	Result	
1	Temperature Vs. Frequency	90.213	Pass	
2	Temperature Vs. Voltage	90.213	Pass	

Modifications Made During Testing: None

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Run# 1: Temperature Vs. Frequency

Temp(Celsius)	Drift (Hz)	Limit (Hz)
-30	17	1154.95
-20	67	1154.95
-10	42	1154.95
0	83	1154.95
10	-33	1154.95
20	-17	1154.95
30	17	1154.95
40	-58	1154.95
50	-83	1154.95

Run# 2: Temperature Vs. Voltage

Voltage (AC)	Drift (Hz)	Limit (Hz)
85%	-64	1154.95
115%	75	1154.95

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

RF Hazard (Section 2.1091): Mobile Devices

Test Specifics

Objective: This test is required per FCC rule part 2 certification procedure. The objective of this test session is to perform final qualification testing the EUT relative to the specification(s) defined above.

Date of Test: 9/21/2000
Test Engineer: jmartinez
Test Location: Chamber #1

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on the turntable for MPE evaluation testing. The transmit antenna was placed in the middle of the table. The Probe was placed 20 cm from the antenna. Tests were performed inside a Chamber.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 45%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	MPE Routing Evaluation	.300 mW/cm^2	Pass	Refer to individual runs
2	MPE Routing Evaluation	.300 mW/cm^2	Pass	Refer to individual runs

Modifications Made During Testing: None

Client:	Wireless Networks	Job Number:	J39607
Model:	FPR-U20-110 & FPR-U20-120	T-Log Number:	T39676
		Proj Eng:	David Bare
Contact:	Micheal Hu		
Spec:	FCC 90.210	Class:	N/A

Section 1.1310 RF Hazard MPE limits
Uncontrolled/polupoated

Frequency (MHz)	**Limit (mW/cm^2)**
300 - 1500 MHz	Freq. **/** 1500

450 MHz / 1500 = .300 mw/cm^2

Run #1: RF Hazard Evaluation Test
Fundamental frequency: 461.99 MHz (Unit# 1)

Measured	Position	1.1310		Comment
mW/cm^2	Degrees	Limit (mW/cm^2)	Margin	Note
0.127	0	0.300	-0.173	1 and 2
0.144	90	0.300	-0.156	1 and 2
0.163	180	0.300	-0.137	1 and 2
0.106	270	0.300	-0.194	1 and 2

Note 1:	Measured at 20 cm distance as required by OET 65 C, procedure for RF Hazard evaluation for mobile devices
Note 2:	Modulation applied and set to maximum output power.

Run #2: RF Hazard Evaluation Test
Fundamental frequency: 461.99 MHz (Unit# 1)

Measured	Position	1.1310		Comment
mW/cm^2	Degrees	Limit (mW/cm^2)	Margin	Note
0.129	0	0.300	-0.171	1 and 2
0.142	90	0.300	-0.158	1 and 2
0.167	180	0.300	-0.133	1 and 2
0.102	270	0.300	-0.198	1 and 2

Note 1:	Measured at 20 cm distance as required by OET 65 C, procedure for RF Hazard evaluation for mobile devices
Note 2:	CW only and set to maximum output power.