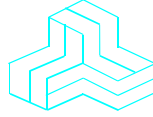


# VERIFICATION CERTIFICATE



## NOT TRANSFERABLE

This Verification Certificate is hereby issued to the named GRANTEE and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below:

<b>GRANTEE:</b>	Extreme Networks
Address:	3585 Monroe Street Santa Clara, CA 95051 United States
Contact Person:	Mr. Mark Darula Phone #: 408 579-3249 Fax #: 408 579-3000 Email Address: <a href="mailto:mdarula@extremenetworks.com">mdarula@extremenetworks.com</a>

<b>Equipment Type:</b>	Unintentional Radiators
<b>Product Name:</b>	Altitude 350-2 Access Point
<b>Model No.:</b>	Altitude 350-2
<b>Year of manufacture:</b>	2005

<b>The above product was tested by UltraTech Engineering Labs Inc. and found to comply with:</b>	<b>FCC Part 15, Subpart B - Class B Unintentional Radiators</b>
--	---

- Note(s):** See attached report, UltraTech's File No.: CNI-027FCC15B, dated June 8, 2005 for details and conditions of Verification Compliance.



Approved by: Tri M. Luu, P.Eng.  
V.P. – Engineering

## UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4  
Tel.: (905) 829-1570 Fax.: (905) 829-8050  
Website: [www.ultratech-labs.com](http://www.ultratech-labs.com) Email: [vic@ultratech-labs.com](mailto:vic@ultratech-labs.com), Email: [tri@ultratech-labs.com](mailto:tri@ultratech-labs.com)



# ENGINEERING TEST REPORT



## Altitude 350-2 Access Point Model No.: Altitude 350-2

*Applicant:*

**Extreme Networks**  
3585 Monroe Street  
Santa Clara, CA 95051  
United States

*Tested in Accordance With*

**Federal Communications Commission (FCC)  
CFR 47, Part 15, Subpart B  
Class B Unintentional Radiators**

**UltraTech's File No.: CNI-027FCC15B**

This Test report is Issued under the Authority of  
Tri M. Luu, Professional Engineer,  
Vice President of Engineering  
UltraTech Group of Labs

Date: June 8, 2005



Report Prepared by: Dan Huynh

Tested by: Phuong Ngo & Raheel, EMI/EMC Technicians

Issued Date: June 8, 2005

Test Dates: April 11, 12, 2005

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

## UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4  
Tel.: (905) 829-1570 Fax.: (905) 829-8050  
Website: [www.ultratech-labs.com](http://www.ultratech-labs.com) Email: [vic@ultratech-labs.com](mailto:vic@ultratech-labs.com), Email: [tri@ultratech-labs.com](mailto:tri@ultratech-labs.com)



31040/SIT



C-1376



46390-2049



200093-0



SL2-IN-E-1119R



00-034



## TABLE OF CONTENTS

<b>EXHIBIT 1.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1.	SCOPE .....	1
1.2.	RELATED SUBMITTAL(S)/GRANT(S).....	1
1.3.	NORMATIVE REFERENCES .....	1
<b>EXHIBIT 2.</b>	<b>PERFORMANCE ASSESSMENT .....</b>	<b>2</b>
2.1.	CLIENT INFORMATION.....	2
2.2.	EQUIPMENT UNDER TEST (EUT) INFORMATION.....	2
2.3.	LIST OF COMPONENTS/PARTS OF THE EUT.....	3
2.4.	LIST OF EUT’S PORTS.....	3
2.5.	ANCILLARY EQUIPMENT .....	4
<b>EXHIBIT 3.</b>	<b>EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS.....</b>	<b>5</b>
3.1.	CLIMATE TEST CONDITIONS .....	5
3.2.	OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS .....	5
3.3.	BLOCK DIAGRAM OF TEST SETUP FOR AC POWERLINE CONDUCTED EMISSION & RADIATED EMISSION MEASUREMENTS .....	6
3.4.	PHOTOGRAPHS OF TEST SETUP FOR AC CONDUCTED EMISSION MEASUREMENTS .....	8
3.5.	PHOTOGRAPHS OF TEST SETUP FOR RADIATED EMISSION MEASUREMENTS.....	11
<b>EXHIBIT 4.</b>	<b>SUMMARY OF TEST RESULTS.....</b>	<b>13</b>
4.1.	LOCATION OF TESTS.....	13
4.2.	APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS .....	13
4.3.	MODIFICATIONS REQUIRED FOR COMPLIANCE .....	13
4.4.	DEVIATION OF THE STANDARD TEST PROCEDURES.....	13
<b>EXHIBIT 5.</b>	<b>MEASUREMENTS, EXAMINATIONS &amp; TEST DATA FOR EMC EMISSIONS .....</b>	<b>14</b>
5.1.	TEST PROCEDURES .....	14
5.2.	MEASUREMENT UNCERTAINTIES .....	14
5.3.	MEASUREMENT EQUIPMENT USED .....	14
5.4.	AC POWERLINE CONDUCTED EMISSIONS @ FCC PART 15, SUBPART B, PARA. 15.107(a).....	15
5.5.	RADIATED EMISSIONS FROM CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICES) @ FCC 15.109(a).....	22
<b>EXHIBIT 6.</b>	<b>MEASUREMENT UNCERTAINTY.....</b>	<b>25</b>
6.1.	LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY.....	25
6.2.	RADIATED EMISSION MEASUREMENT UNCERTAINTY.....	26
<b>EXHIBIT 7.</b>	<b>LABELLING &amp; VERIFICATION REQUIREMENTS.....</b>	<b>27</b>
7.1.	SECTION 15.19 – LABELLING REQUIREMENTS .....	27
7.2.	SECTIONS 15.21 & 15.105 – INFORMATION TO USER.....	27
7.3.	SECTION 2.906 - VERIFICATION .....	28
7.4.	SECTION 2.909 – RESPONSIBLE PARTY .....	28
7.5.	SECTION 2.945 – SAMPLING TEST OF EQUIPMENT COMPLIANCE .....	28
7.6.	SECTION 2.946 – PENALTY FOR FAILURE TO PROVIDE TEST SAMPLES AND DATA.....	28
7.7.	LIMITATION ON VERIFICATION: FCC PART 2, SUBPART J, SECTION 2.952.....	29
7.8.	RESPONSIBILITY OF MANUFACTURER OR IMPORTER: FCC PART 2, SUBPART J, SECTION 2.953 .....	29
7.9.	IDENTIFICATION: FCC PART 2, SUBPART J, SECTION 2.954.....	30
7.10.	RETENTION OF RECORDS: FCC PART 2, SUBPART J, SECTION 2.955.....	30
7.11.	FCC INSPECTION & SUBMISSION OF EQUIPMENT FOR TESTING: FCC PART 2, SUBPART J, SECTION 2.956.....	30
7.12.	SAMPLING TESTS OF EQUIPMENT COMPLIANCE: FCC PART 2, SUBPART J, SECTION 2.957.....	30

## EXHIBIT 1. INTRODUCTION

### 1.1. SCOPE

<b>Reference:</b>	FCC Part 15, Subpart B, Sections 15.107 & 15.109
<b>Title:</b>	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
<b>Purpose of Test:</b>	To gain FCC Verification Authorization for a Class B Unintentional Radiator.
<b>Test Procedures:</b>	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
<b>Environmental Classification:</b>	Residential, Light-industry, Commercial & Industry

### 1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

### 1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-15	2005	Code of Federal Regulations – Telecommunication
ANSI C63.4	2004	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 +A1 EN 55022	2003-04-10 2004-10-14 2003	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-2-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement
CISPR 16-2-3	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Radiated disturbance measurement

## EXHIBIT 2. PERFORMANCE ASSESSMENT

### 2.1. CLIENT INFORMATION

<b>APPLICANT:</b>	
<b>Name:</b>	Extreme Networks
<b>Address:</b>	3585 Monroe Street Santa Clara, CA 95051 United States
<b>Contact Person:</b>	Mr. Mark Darula Phone #: 408 579-3249 Fax #: 408 579-3000 Email Address: <a href="mailto:mdarula@extremenetworks.com">mdarula@extremenetworks.com</a>

<b>MANUFACTURER:</b>	
<b>Name:</b>	Celestica Inc.
<b>Address:</b>	9 Northeastern Blvd Salem, New Hampshire 03079 USA
<b>Contact Person:</b>	Kirit Patel Phone #: 1-603-890-8158 Fax #: n/a Email Address: <a href="mailto:kiritbh@celestica.com">kiritbh@celestica.com</a>

### 2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

<b>Brand Name:</b>	Extreme Networks
<b>Product Name:</b>	Altitude 350-2 Access Point
<b>Model Name or Number:</b>	<b>Altitude 350-2</b> , there are two internal models to differentiate between the detachable antennas and integral antennas. Integral antennas unit will be identified and labeled as " <b>15938 Altitude 350-2 Integ. Ant AP</b> " and detachable antennas will be identified and labeled as " <b>15939 Altitude 350-2 Detach. Ant. AP</b> "
<b>Part Number:</b>	S30122-X8000-X10 / S30122-X8000-X11
<b>Serial Number:</b>	0409920201201529 / 0406920201201263
<b>Type of Equipment:</b>	Unintentional Radiators
<b>Oscillators' Frequencies:</b>	<b>802.11b/g:</b> IF is 672Mhz (fixed) LO adjusts between 1704MHz-1812MHz for channel 1 – 14.  <b>802.11a:</b> IF adjusts between 1727-1747MHz for channels 36-48; 1753-1773MHz for channels 52-64; 1833-1900MHz for channels 100-140; 1915-1935MHz for channels 149-161.  40MHz for CPU, and 25MHz for Fast Ethernet Phyceiver.
<b>CPUs' Frequencies:</b>	200MHz
<b>Associated Devices:</b>	AC to DC Sunny Power Supply, Model: SYS 1298-1506-W2, P/N: SYS1298-1206
<b>Power input source:</b>	Input: 100-240Vac / 1Amp Max, ,50-60Hz; Output: 6VDC @ 2A

**2.3. LIST OF COMPONENTS/PARTS OF THE EUT**

Index Number	Parts Description	Parts Number/ Model Number	Serial Number	FCC/CE Compliance (FCC & CE)
1	Motherboard	150086 (AP 2610) 150135 (AP 2620)	04099202012201529 / 0406920201201263	N/A
2	Power Supply (*) America Australia United Kingdom European China	SYS1298-1206 / SYS1298-1506-W2, SYS1298-1506-W2A, SYS1298-1506-W3U, SYS1298-1506-W2E, SYS1298-1506-W2C		FCC Logo & CE
3	Power over Ethernet (**)	PW 130	61-0127-001	CE Logo

**Notes:**

- (\*) The power supply is optional and the model type can be ordered by customers depending on the country plug configuration. All power supplies have the same internal circuit except for the AC plug.
- (\*\*) The HUB is not sold with system under test.

**2.4. LIST OF EUT'S PORTS**

**Test Configuration #1**

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Length	Cable Type (Shielded/Non-shielded)
1	LAN Ethernet port	1	RJ45	< 3m	Non-shielded
2	DC Input	1	Barrel Jack	< 3m	Non-shielded

**Test Configuration #2**

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Length	Cable Type (Shielded/Non-shielded)
1	Ethernet with DC Power	1	RJ45	< 3m	Non-shielded

## 2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

<b>Ancillary Equipment # 1</b>	
Brand Name:	Dell
Model Name or Number:	Notebook
Serial Number:	UN-0G5152-48643-498-7352
Cable Type:	Ethernet CAT5 RJ45 x-over, Non-shielded
Connected to PC Port:	LAN Ethernet port

<b>Ancillary Equipment # 2</b>	
Brand Name:	IBM
Model Name or Number:	Notebook
Serial Number:	FX-48018
Cable Type:	N/A
Connected to:	Wireless connection

<b>Ancillary Equipment # 3</b>	
Brand Name:	3COM
Model Name or Number:	PW130
Serial Number:	61-0127-001
Cable Type:	Ethernet CAT5 RJ45 x-over, Non-shielded
Connected to EUT's Port:	LAN Ethernet port

## EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

### 3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	23°C
Humidity:	20%
Pressure:	102 kPa
Power input source:	6 VDC @ 2.0A, Via 120Vac all Adaptor

### 3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

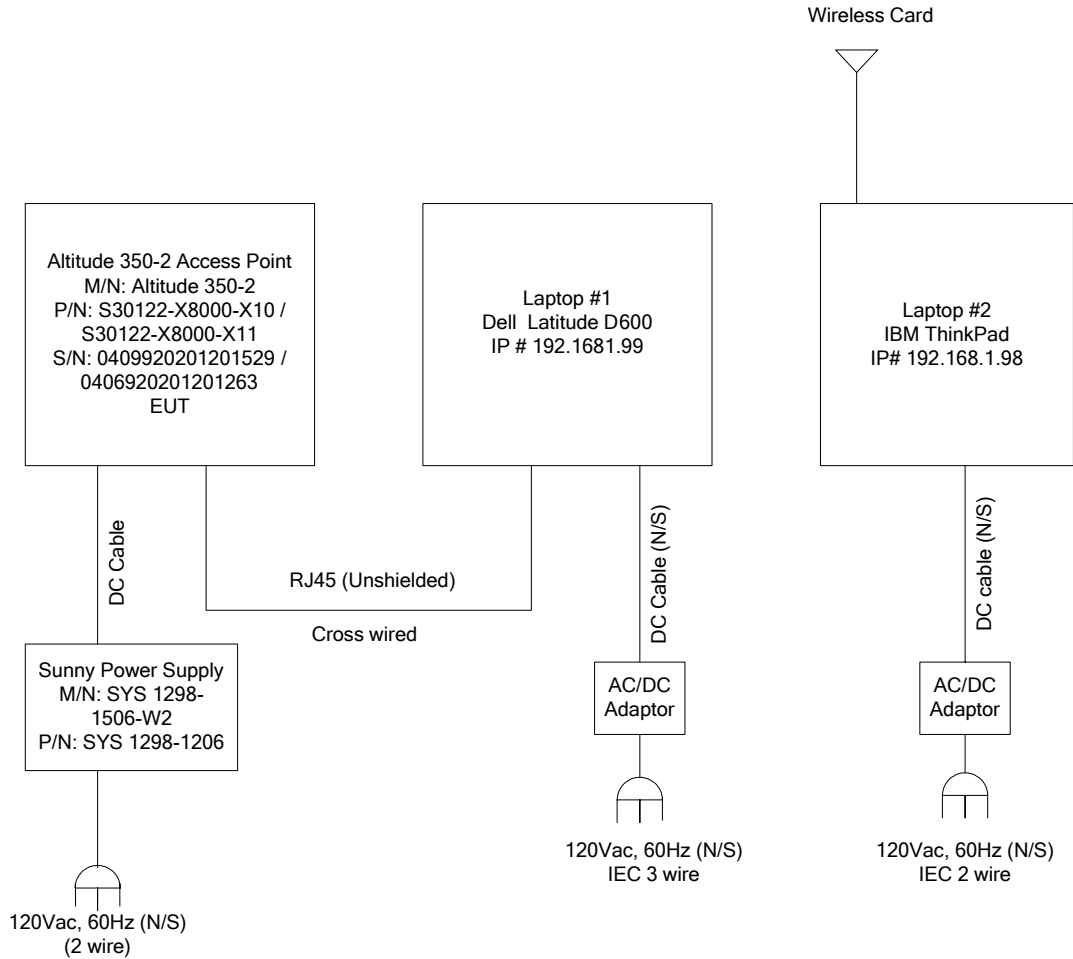
The DUT was connected in two different configurations. In one setup the DUT was connected via a Cat 5 cable to a laptop and power supply. In the other set up the DUT was connected to a HUB from which it derived its power.

On both configurations the DUT was set "ping" commands to establish connection maintain via the DUT's wireless link between two auxiliary devices (laptops).

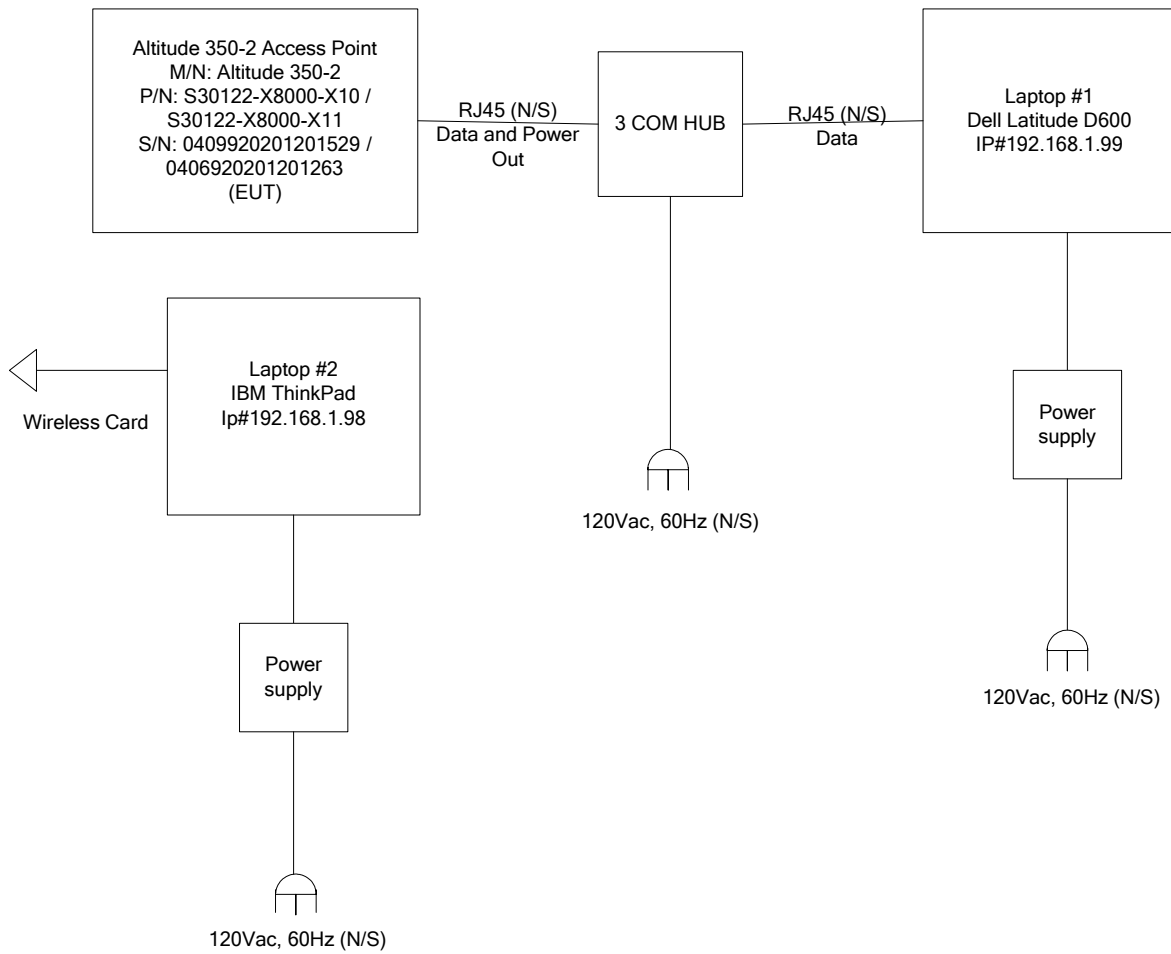


### 3.3. BLOCK DIAGRAM OF TEST SETUP FOR AC POWERLINE CONDUCTED EMISSION & RADIATED EMISSION MEASUREMENTS

Test setup Configuration #1: The EUT is powered by an external power Supply



**Test Setup Configuration #2: The EUT is powered by the HUB**



### 3.4. PHOTOGRAPHS OF TEST SETUP FOR AC CONDUCTED EMISSION MEASUREMENTS

Test setup Configuration #1: The EUT is powered by an external power Supply (Internal Antenna Unit)





Test setup Configuration #2: The EUT is powered by the HUB (External Antenna Unit)



### 3.5. PHOTOGRAPHS OF TEST SETUP FOR RADIATED EMISSION MEASUREMENTS





## EXHIBIT 4. SUMMARY OF TEST RESULTS

### 4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).
- Radiated Emissions were performed at the Ultratech's 10 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, Province of Ontario.
- The above sites have been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville Open Field Test Site has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049). Last Date of Site Calibration: Jan. 10, 2005.

### 4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Part 15, Subpart B	Test Requirements	Margin Below (-) / Above (+) the Limits	Compliance (Yes/No)
15.107(a), Class B	AC Power Line Conducted Emissions Measurements	- 10.1 dB @ 0.40 MHz	Yes
15.109(a), Class B	Radiated Emissions from Unintentional Radiators (Digital Devices)	- 1.6 dB @ 551.1 MHz	Yes

### 4.3. MODIFICATIONS REQUIRED FOR COMPLIANCE

None.

### 4.4. DEVIATION OF THE STANDARD TEST PROCEDURES

None.



## **EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS**

### **5.1. TEST PROCEDURES**

Please refer to Ultratech Test Procedures, File# ULTR-P001-2004, ANSI C63.4, CISPR 22 / EN 55022, CISPR 16-1-2 and CISPR 16-2-3 for Test Procedures.

### **5.2. MEASUREMENT UNCERTAINTIES**

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to Exhibit 6 for Measurement Uncertainties.

### **5.3. MEASUREMENT EQUIPMENT USED**

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CIPSR 16-1-1.

**5.4. AC POWERLINE CONDUCTED EMISSIONS @ FCC PART 15, SUBPART B, PARA. 15.107(a)**

**5.4.1. Limits**

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	CLASS B LIMITS		Measuring Bandwidth
	Quasi-Peak (dBµV)	Average (dBµV)	
0.15 to 0.5	66 to 56*	56 to 46*	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 10 Hz for Average
0.5 to 5	56	46	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 10 Hz for Average
5 to 30	60	50	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 10 Hz for Average

\* Decreasing linearly with logarithm of frequency

**5.4.2. Method of Measurements**

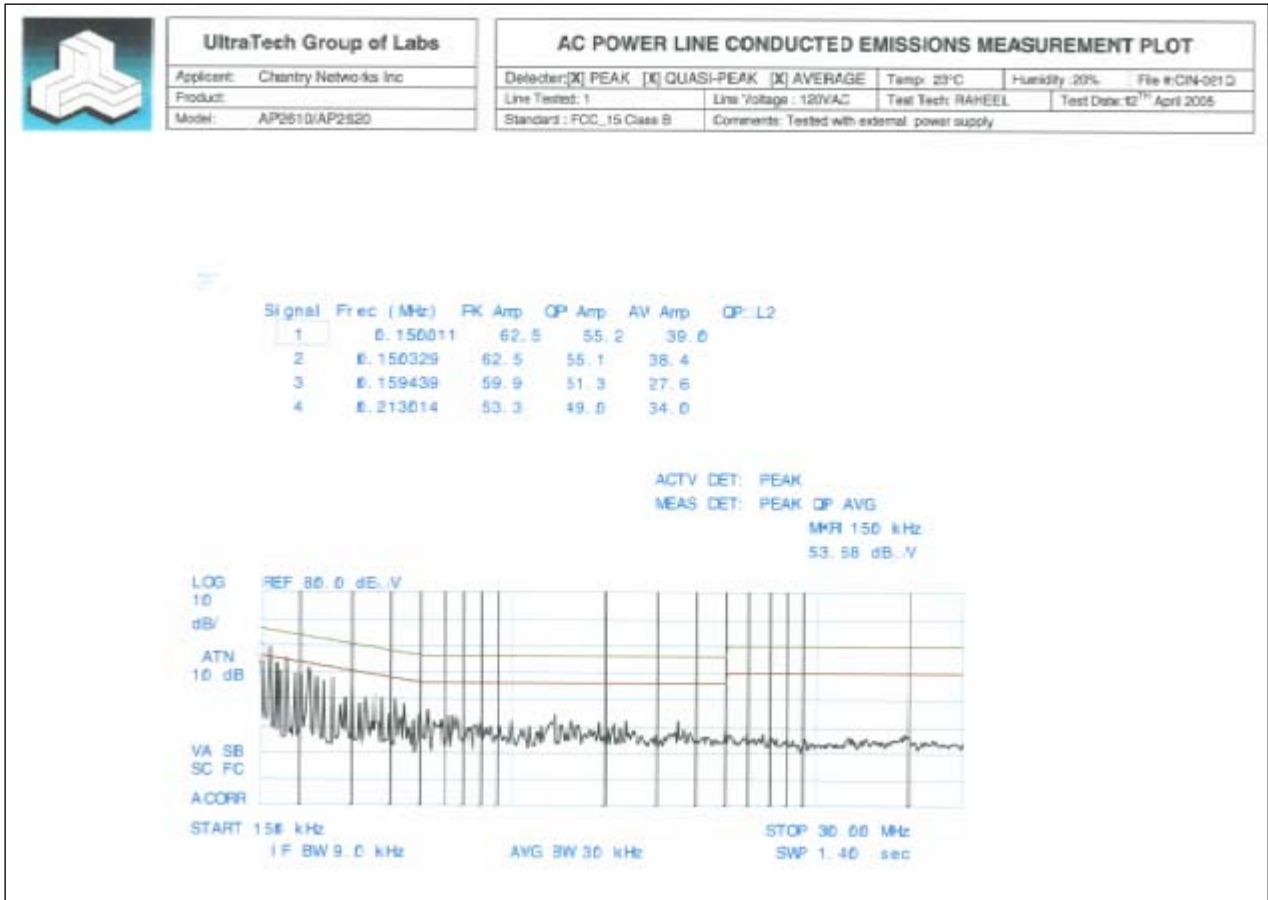
Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

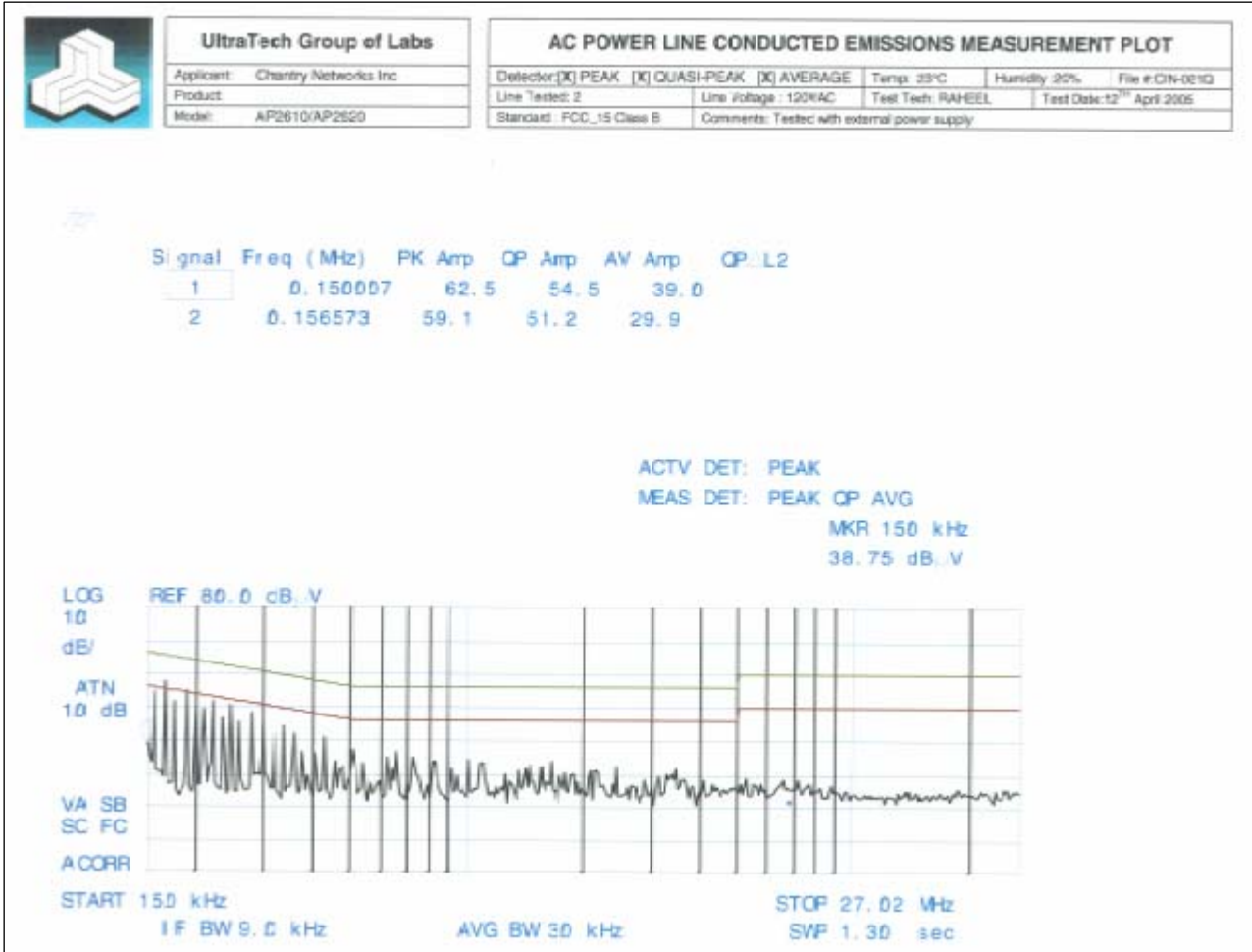
**5.4.3. Test Equipment List**

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3825/2	89071531	9 kHz – 200 MHz 50 Ohms / 50 µH
12'x16'x12' RF Shielded Chamber	RF Shielding	...	..	...

**5.4.4. Test Data****5.4.4.1. Test Configuration #1: The EUT is powered by an external power Supply (Internal Antenna Unit)**

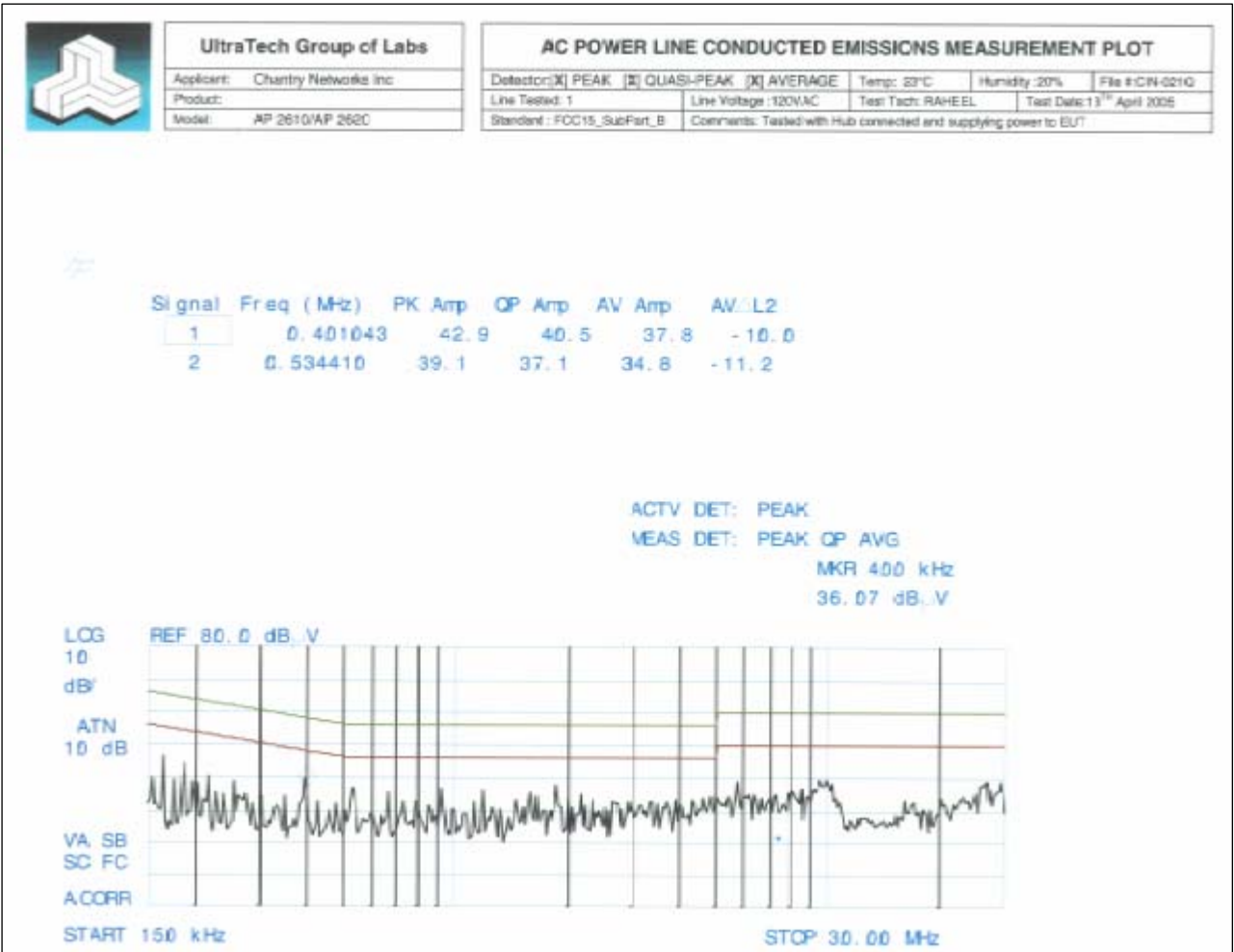
The emissions were scanned from 150 kHz to 30 MHz at AC mains Terminal via a LISN, and all emissions less than 30 dB below the limits were recorded.							
FREQUENCY (MHz)	RF LEVEL (dBuV)	RECEIVER DETECTOR (P/QP/AVG)	QP LIMIT (dBuV)	AVG LIMIT (dBuV)	MARGIN (dB)	PASS/ FAIL	LINE TESTED (L1/L2)
0.15	55.2	QP	66.0	56.0	-10.8	PASS	L1
0.15	39.0	AVG	66.0	56.0	-17.0	PASS	L1
0.15	55.1	QP	66.0	56.0	-10.9	PASS	L1
0.15	38.4	AVG	66.0	56.0	-17.6	PASS	L1
0.16	51.3	QP	65.5	55.5	-14.2	PASS	L1
0.16	27.6	AVG	65.5	55.5	-27.9	PASS	L1
0.21	49.0	QP	63.1	53.1	-14.1	PASS	L1
0.21	34.0	AVG	63.1	53.1	-19.1	PASS	L1
0.15	54.5	QP	66.0	56.0	-11.5	PASS	L2
0.15	39.0	AVG	66.0	56.0	-17.0	PASS	L2
0.16	51.2	QP	65.6	55.6	-14.4	PASS	L2
0.16	29.9	AVG	65.6	55.6	-25.7	PASS	L2

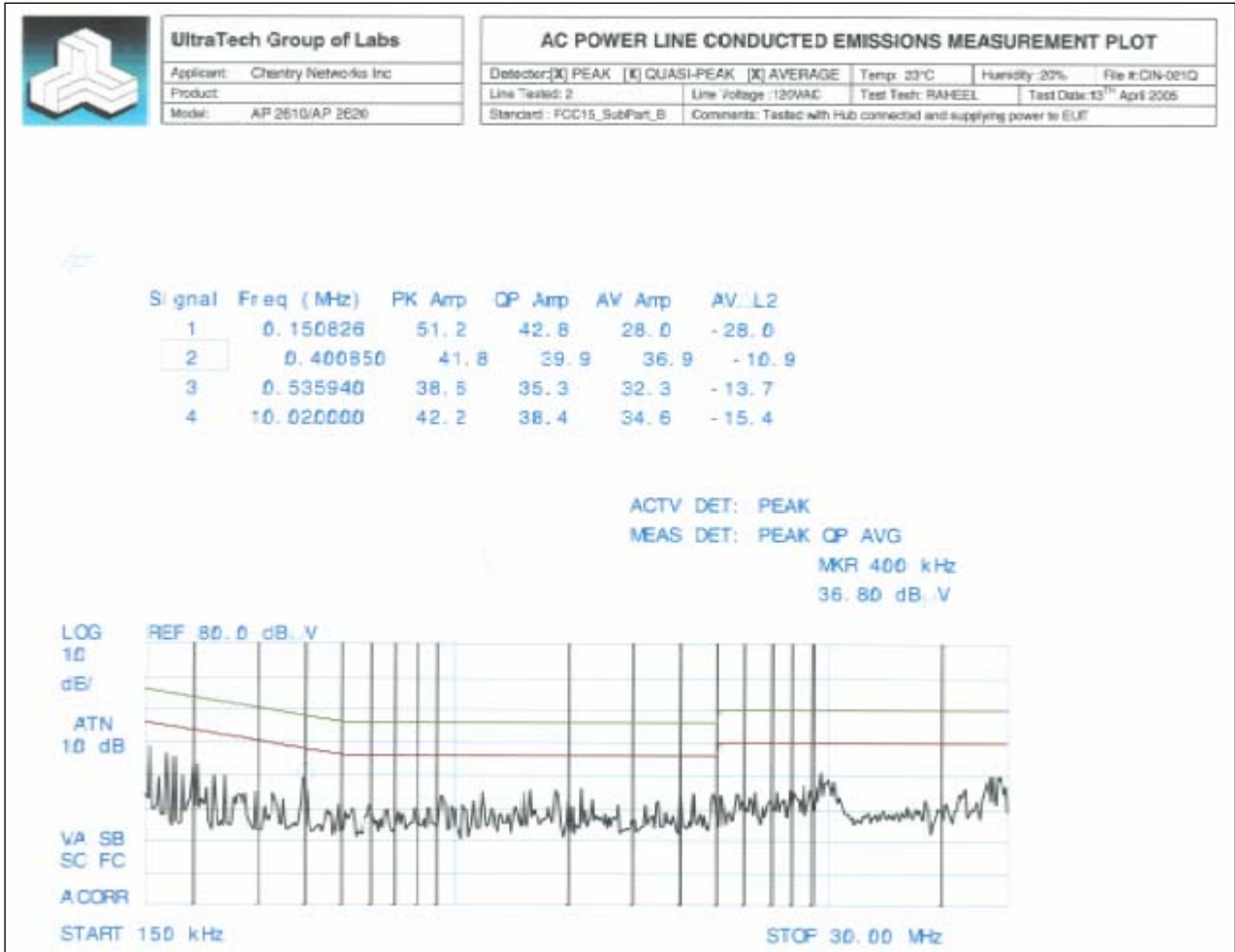




**5.4.4.2. Test Configuration #2: The EUT is powered by the HUB (External Antenna Unit)**

The emissions were scanned from 150 kHz to 30 MHz at AC mains Terminal via a LISN, and all emissions less than 20 dB below the limits were recorded.							
FREQUENCY (MHz)	RF LEVEL (dBuV)	RECEIVER DETECTOR (P/QP/AVG)	QP LIMIT (dBuV)	AVG LIMIT (dBuV)	MARGIN (dB)	PASS/ FAIL	LINE TESTED (L1/L2)
0.15	42.8	QP	66.0	56.0	-23.2	PASS	L1
0.15	28.0	AVG	66.0	56.0	-28.0	PASS	L1
0.40	39.9	QP	57.8	47.8	-17.9	PASS	L1
0.40	36.9	AVG	57.8	47.8	-10.9	PASS	L1
0.54	35.3	QP	56.0	46.0	-20.7	PASS	L1
0.54	32.3	AVG	56.0	46.0	-13.7	PASS	L1
10.02	38.4	QP	60.0	50.0	-21.6	PASS	L1
10.02	34.6	AVG	60.0	50.0	-15.4	PASS	L1
0.40	40.5	QP	57.8	47.8	-17.3	PASS	L2
0.40	37.8	AVG	57.9	47.9	-10.1	PASS	L2
0.53	37.1	QP	56.0	46.0	-18.9	PASS	L2







**5.5. RADIATED EMISSIONS FROM CLASS B UNINTENTIONAL RADIATORS (DIGITAL DEVICES) @ FCC 15.109(a)**

**5.5.1. Limits**

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Class B Limits @10 m (dB $\mu$ V/m)	EMI Detector Used	Measuring Bandwidth (kHz)
30 – 88	29.5	Quasi-Peak	RBW = 120 kHz, VBW $\geq$ 120 kHz
88 – 216	33.0	Quasi-Peak	RBW = 120 kHz, VBW $\geq$ 120 kHz
216 – 960	35.5	Quasi-Peak	RBW = 120 kHz, VBW $\geq$ 120 kHz
Above 960	43.5	Average	RBW = 1 MHz, VBW = 10 Hz

**5.5.2. Method of Measurements**

Refer to Ultratech Test Procedures ULTR-P001-200 & ANSI C63.4 for method of measurements.

The spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 -1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

**5.5.3. Test Equipment List**

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Advantest	R3271	15050203	100 Hz to 32 GHz with external mixer for frequency above 32 GHz
EMI Receiver System / Spectrum Analyzer with built-in Amplifier	Hewlett Packard	HP 8546A	3520A00248	9KHz-5.6GHz, 50 Ohms
Microwave Amplifier	Hewlett Packard	HP 83017A	311600661	1 GHz to 26.5 GHz
Biconilog Antenna	EMCO	3143	1029	20 MHz to 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz

**5.5.4. Test Data**

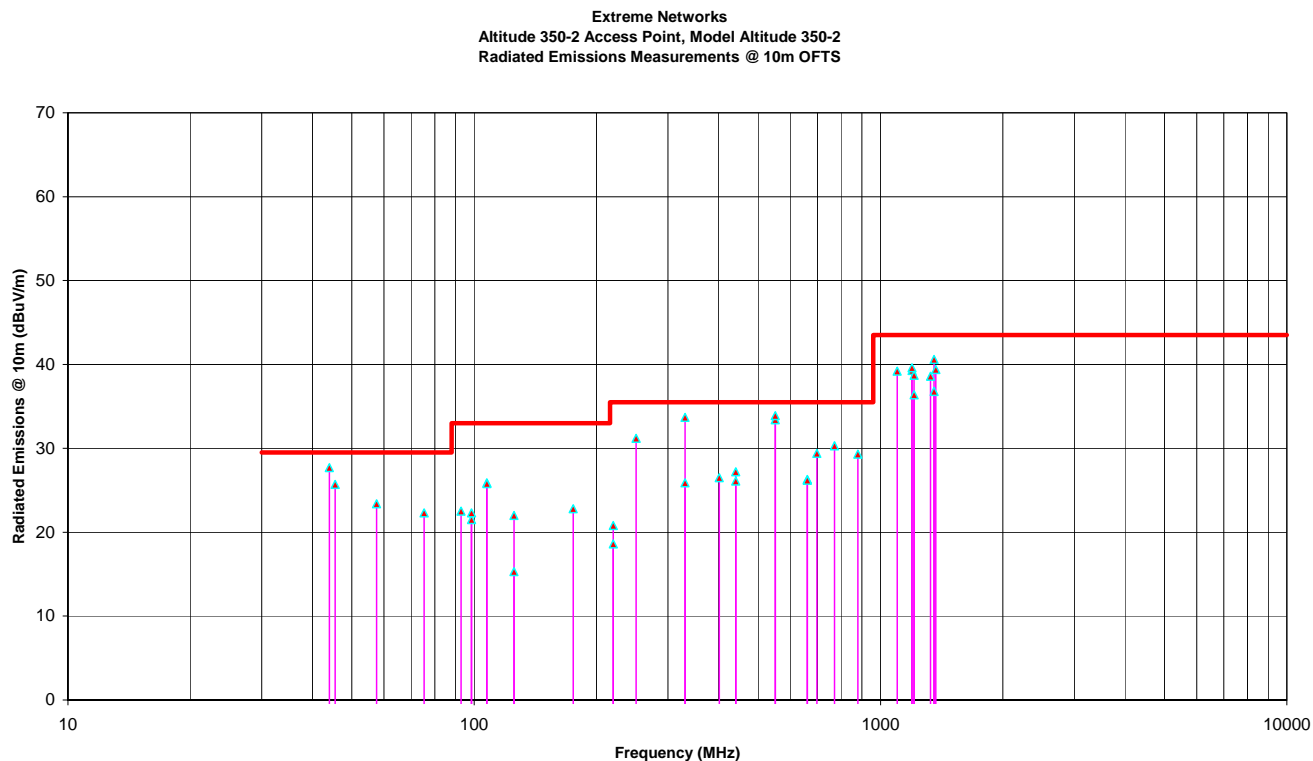
The emissions were scanned from 30 MHz to 10 GHz at 10 Meters distance and all emissions less than 20 dB below the limits were recorded.

FREQUENCY (MHz)	RF LEVEL (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA PLANE (H/V)	LIMIT (dBuV/m)	MARGIN (dB)	PASS/ FAIL
44.0	27.7	QP	V	29.5	-1.9	PASS
45.5	25.7	QP	H	29.5	-3.8	PASS
57.5	23.4	PEAK	V	29.5	-6.1	PASS
75.3	22.3	PEAK	H	29.5	-7.3	PASS
92.8	22.5	PEAK	V	33.0	-10.5	PASS
98.5	21.5	PEAK	H	33.0	-11.5	PASS
98.5	22.3	PEAK	V	33.0	-10.7	PASS
107.5	25.9	PEAK	H	33.0	-7.1	PASS
107.5	25.8	QP	V	33.0	-7.2	PASS
125.3	22.0	PEAK	H	33.0	-11.0	PASS
125.3	15.3	PEAK	V	33.0	-17.7	PASS
175.2	22.8	PEAK	H	33.0	-10.2	PASS
200.8	23.5	PEAK	H	33.0	-9.5	PASS
220.0	18.6	PEAK	H	35.5	-16.9	PASS
220.0	20.8	PEAK	V	35.5	-14.7	PASS
250.4	31.2	PEAK	H	35.5	-4.3	PASS
330.3	25.9	PEAK	H	35.5	-9.6	PASS
330.3	33.7	PEAK	V	35.5	-1.8	PASS
401.0	26.5	PEAK	H	35.5	-9.0	PASS
440.3	26.1	PEAK	V	35.5	-9.5	PASS
440.3	27.2	PEAK	H	35.5	-8.3	PASS
551.1	33.4	PEAK	V	35.5	-2.1	PASS
551.1	33.9	QP	H	35.5	-1.6	PASS
660.8	26.3	PEAK	V	35.5	-9.2	PASS
660.8	26.2	PEAK	H	35.5	-9.3	PASS
697.1	29.4	PEAK	V	35.5	-6.1	PASS
770.3	30.3	PEAK	H	35.5	-5.2	PASS
880.1	29.3	PEAK	H	35.5	-6.2	PASS
989.9	30.7	PEAK	H	43.5	-12.8	PASS
1100.0	39.2	PEAK	V	43.5	-4.3	PASS
1195.0	39.3	PEAK	V	43.5	-4.2	PASS
1195.0	39.6	PEAK	H	43.5	-3.9	PASS
1210.0	38.7	PEAK	V	43.5	-4.8	PASS
1210.0	36.4	PEAK	H	43.5	-7.1	PASS
1328.0	38.6	PEAK	V	43.5	-4.9	PASS
1355.0	40.6	PEAK	V	43.5	-2.9	PASS
1355.0	36.8	PEAK	H	43.5	-6.7	PASS
1368.0	39.4	PEAK	V	43.5	-4.1	PASS
1395.0	38.5	PEAK	V	43.5	-5.0	PASS

\* NOTE: The radiated emissions were performed on External Antenna Unit with external power supply.

5.5.5. Plots

The following plots graphically represent the test results recorded in the above Test Data Table.



## EXHIBIT 6. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and LAB 34

### 6.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	±1.5	±1.5
LISN coupling specification	Rectangular	±1.5	±1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	±0.3	±0.5
Mismatch: Receiver VRC $\Gamma_1 = 0.03$ LISN VRC $\Gamma_R = 0.8(9 \text{ kHz}) 0.2 (30 \text{ MHz})$ Uncertainty limits $20\text{Log}(1 \pm \Gamma_1 \Gamma_R)$	U-Shaped	±0.2	±0.3
System repeatability	Std. deviation	±0.2	±0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	±1.25	±1.30
Expanded uncertainty U	Normal (k=2)	±2.50	±2.60

Sample Calculation for Measurement Accuracy in 150 kHz to 30 MHz Band:

$$u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30 \text{ dB}$$

$$U = 2u_c(y) = \pm 2.6 \text{ dB}$$

**6.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY**

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	Uncertainty (dB)	
		3m	10m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivity	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67(Bi) 0.3 (Lp)$ Uncertainty limits $20\text{Log}(1 \pm \Gamma_1 \Gamma_R)$	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 10 M biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38 \text{ dB}$  And  $U = 2u_c(y) = 2x(-2.21) = -4.42 \text{ dB}$

## EXHIBIT 7. LABELLING & VERIFICATION REQUIREMENTS

### 7.1. SECTION 15.19 – LABELLING REQUIREMENTS

For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

***This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.***

- (1) The label shall NOT be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as described in FCC 2.925(d). "Permanently" affixed means that the label is etched, engraved, stamped, silk-screened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected life-time of the equipment in the environment in which the equipment may be operated and must not be readily detachable.
- (2) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified in this Section is required to be affixed only to the main control unit.
- (3) When the device is so small or for such use that it is not practicable to place the statement specified in this Section on it, the information required by these paragraphs shall be placed in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

### 7.2. SECTIONS 15.21 & 15.105 – INFORMATION TO USER

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- (a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

***NOTE: This equipment has been tested and found to comply with the limits for a Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:***

- ***Reorient or relocate the receiving antenna***
- ***Increase the separation between the equipment and receiver***

- **Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- **Consult the dealer or an experienced radio/TV technician for help.**

**Warning:** Changes or modifications not expressly approved by <manufacturer> could void the user's authority to operate the equipment.

### 7.3. SECTION 2.906 - VERIFICATION

- (a) A Verification is a procedure where the responsible party, as defined in Section 2.909, makes measurements or takes other necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or representative data to the Commission demonstrating compliance is not required unless specifically requested pursuant to Section 2.1076 of this part.
- (b) Verification attaches to all items subsequently marketed by the responsible party which are identical, as define in Section 2.908 of this part, to the sample tested and found acceptable by the responsible party.

### 7.4. SECTION 2.909 – RESPONSIBLE PARTY

The following parties are responsible for the compliance of radio frequency equipment with the applicable standards:

- (c) In the case of the equipment subject to authorization under the Verification procedure:
- (1) The manufacturer or, if the equipment is assembled from individual component parts and the resulting system is subject to authorization under Verification, the assembler.
  - (2) If the equipment, by itself, is subject to Verification and the equipment is imported, the importer.

### 7.5. SECTION 2.945 – SAMPLING TEST OF EQUIPMENT COMPLIANCE

The Commission will, from time to time, request the responsible party to submit equipment subject to this chapter to determine the extent to which subsequent production of such equipment continues to comply with the data filed by the applicant (or on file with the responsible party for equipment subject to notification or a Verification). Shipping costs to the Commission's laboratory and return shall be borne by the responsible party.

### 7.6. SECTION 2.946 – PENALTY FOR FAILURE TO PROVIDE TEST SAMPLES AND DATA

- (a) Any responsible party, as defined in Section 2.909 of this chapter, or nay party who markets equipment subject to the provisions of this chapter, shall provide test sample(s) or data upon request by the Commission. Failure to comply with such a request with the time frames shown below may be cause for forfeiture, pursuant to Section 1.80 of Part 1 of this chapter, or other administrative sanctions such as suspending action on any applications for equipment authorization submitted by such party while the matter is being resolved.

- (1) When the equipment is subject to authorization under Verification, data shall be provided within 14 days of delivery of the request and test sample(s) shall be provided within 60 days of delivery of the request.
  - (2) For all other devices, test sample(s) or data shall be provided within 60 days of the request.
- (b) In the case of the equipment involving harmful interference or safety of life or property, the Commission may specify that test samples subject to the provisions of this section be submitted within less than 60 days, but not less than 14 days. Failure to comply within the specified time period will be subject to the sanctions specified in paragraph (a) of this section.

### **7.7. LIMITATION ON VERIFICATION: FCC PART 2, SUBPART J, SECTION 2.952**

- (a) Verification signifies that the manufacturer or importer has determined that the equipment has been shown to be capable of compliance with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated. Compliance with these standards shall not be construed to be a finding by the manufacturer or importer with respect to matters not encompassed by the Commission's rules.
- (b) Verification of the equipment by the manufacturer or importer is effective until a termination date is otherwise established by the Commission.
- (c) No person shall, in any advertising matter, brochure, etc., use or make reference to a verification in a deceptive or misleading manner or convey the impression that such verification reflects more than a determination by the manufacturer or importer that the device or product has been shown to be capable of compliance with the applicable technical standards of the Commission's Rules.

### **7.8. RESPONSIBILITY OF MANUFACTURER OR IMPORTER: FCC PART 2, SUBPART J, SECTION 2.953**

- (a) In verifying compliance, the manufacturer or importer (in the case of imported equipment) warrants that each unit of the equipment marketed under the verification procedure will conform to the unit tested and found acceptable by the manufacturer or importer and that data on file with the manufacturer or importer continues to be representative of the equipment being produced under such verification within the variation that can be expected due to quantity production and testing on a statistical basis.
- (b) The importer of equipment subject to verification may upon receiving a written statement from the manufacturer that the equipment complies with the appropriate technical standards rely on the manufacturer or independent testing agency to verify compliance. The test records required by Section 2.955 however should be in English language and made available to the Commission upon a reasonable request.
- (c) In the case of transfer of control of equipment, as in the case of sale or merger of the grantee, the new manufacturer or importer shall bear the responsibility of continued compliance of the equipment.
- (d) Equipment verified by the manufacturer or importer shall be re-verified if the modification or change adversely affects the emanation characteristics of the modified equipment. The manufacturer or importer continues to bear the responsibility for continued compliance of subsequently produced equipment.



**7.9. IDENTIFICATION: FCC PART 2, SUBPART J, SECTION 2.954**

The identification of equipment subject to verification shall be consistent with current manufacturer or marketing practices: *Provided*, The manufacturer or importer maintains adequate identification records for each unit verified to facilitate positive identification of each equipment marketed.

**7.10. RETENTION OF RECORDS: FCC PART 2, SUBPART J, SECTION 2.955**

- (a) For each equipment subject to verification, the manufacturer (or importer) shall maintain the records listed below:
  - (1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the requirements of Section 2.953.
  - (2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by Section 2.953. (Statistical production line emission testing is not required).
- (b) The records listed in paragraphs (a) of this section shall be retained for two years after the manufacture of said equipment item has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the manufacturer or importer is officially notified that an investigation or any other administrative proceeding involving his equipment has been instituted.

**7.11. FCC INSPECTION & SUBMISSION OF EQUIPMENT FOR TESTING: FCC PART 2, SUBPART J, SECTION 2.956**

- (a) Each manufacturer or importer of equipment subject to verification shall upon receipt of reasonable request submit to the Commission the records required by Section 2.955.
- (b) The Commission may require the manufacturer or importer of equipment subject to verification to submit one or more of sample units for measurements at the Commission's Laboratory.
- (c) In the event the manufacturer believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement or for any other reason, the applicant may submit a written explanation why such shipment is impractical and should not be required.

**7.12. SAMPLING TESTS OF EQUIPMENT COMPLIANCE: FCC PART 2, SUBPART J, SECTION 2.957**

The Commission will from time to time, request the manufacturer or importer to submit to the FCC Laboratory in Columbia, Maryland, various equipment(s) for which verification has been made, to determine the extent to which subsequently produced units continue to comply with the applicable standards.