

FCC TEST REPORT

according to

FCC Rules and Regulations

Part 15 Subpart C & E

Applicant	Firetide Inc.
Address	16795 Lark Ave., Ste. 200, Los Gatos, CA 95032
Equipment	HotPort Wireless Mesh Node
Model No.	3100
FCC ID	REP-3100-1
Trade Name	Firetide

Laboratory accreditation



1332

ILAC MRA

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **Exclusive Certification Corp.** the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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CERTIFICATE OF COMPLIANCE

according to

FCC Rules and Regulations

Part 15 Subpart C & E

Applicant	Firetide Inc.
Address	16795 Lark Ave., Ste. 200, Los Gatos, CA 95032
Equipment	HotPort Wireless Mesh Node
Model No.	3100
FCC ID	REP-3100-1

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4**. The equipment was **passed** the test performed according to **FCC Rules and Regulations Part 15 Subpart C& E (2003)**. The test was carried out on Feb. 24, 2005 at *Exclusive Certification Corp.*

Signature


Anson Chou / Manager Feb. 25, 2005

1. Report of Measurements and Examinations

1.1. List of Measurements and Examinations

For Frequency 5.15GHz ~ 5.35GHz

Applied Standard : FCC Part 15, Subpart E (Section 15.407)		
FCC Rule	Description of Test	Result
15.407(b)(5)	. Conducted Emission	Pass
15.407(b)(1/2/3)(b)(5)	. Radiated Emission	Pass
15.407(a)(1/2/3)	. Peak Transmit Power	Pass
15.407(a)(6)	. Peak Power Excursion	Pass
15.407(a)(1/2/3)	. Peak Power Spectral Density	Pass
15.407(g)	. Frequency Stability	Pass

For Frequency 5.725GHz ~ 5.85GHz

Applied Standard : FCC Part 15, Subpart C (Section 15.247)		
FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209	. Radiated Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak Output Power	Pass
15.247(c)	. 100kHz Bandwidth of Frequency Band Edges	Pass
15.247(d)	. Power Spectral Density	Pass
1.1307 1.1310 2.1091 2.1093	. RF Exposure Compliance	Pass

Test by: Jerry Feb. 17. 2005

2. Test Configuration of Equipment under Test

2.1. Test Mode and Test Software

The following test mode and test software was performed for conduction and radiation test:

- 802.11 a (CH 36: Test Define CH1: 5180MHz)
- 802.11 a (CH 48: Test Define CH4: 5240MHz)
- 802.11 a (CH 52: Test Define CH5: 5260MHz)
- 802.11 a (CH 64: Test Define CH8: 5320MHz)
- 802.11 a (CH 149: Test Define CH9: 5745MHz)
- 802.11 a (CH 161: Test Define CH12: 5805MHz)
- An executive programs, "Hyper Terminal" Application under WIN XP.

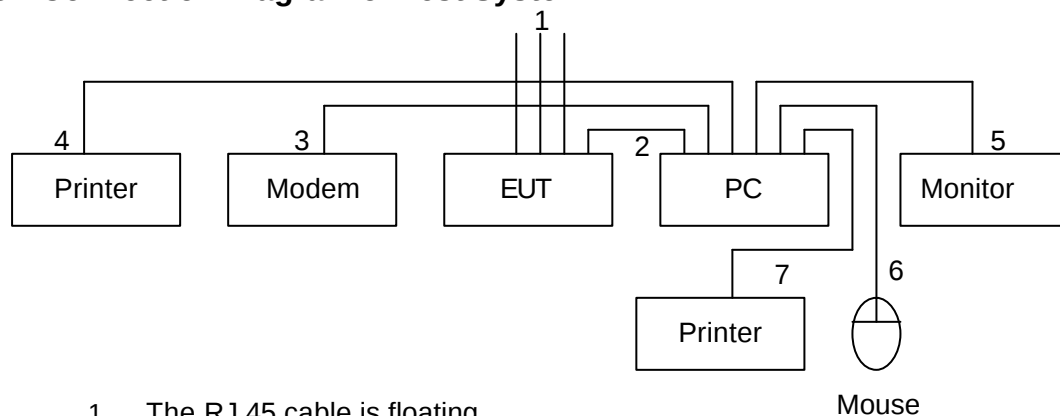
2.2. Description of Test System

Device	Manufacturer	Model No.	Description
PC	IBM	IGV	Power Cable, Unshielding 1.8 m
Monitor	SlimAGE	510A	Power Cable, Adapter Unshielding 1.8 m Data Cable, VGA shielding 1.35 m
Keyboard	IBM	KB-0225	Data Cable, PS2 shielding 1.85 m
Mouse	IBM	MO28VO	Data Cable, USB shielding 1.85 m
Modem	ACEXX	DM-1414	Power Cable, Adapter Unshielding 1.8 m Data Cable, RS232 Unshielding 1.35 m
Printer	HP	Desk Jet400	Power Cable, Adapter Unshielding 1.8 m Data Cable, PRINT shielding 1.6 m
Notebook (Remote site)	IBM	R40(2723-BV1)	Power Cable, Adapter Unshielding 1.8 m

Use Cable:

Cable	Description
RJ-45	Unshielding, 10m
RJ-45*3	Unshielding, 1.8m

2.3. Connection Diagram of Test System



1. The RJ 45 cable is floating.
2. The I/O cable is connected from PC to the EUT.
3. The I/O cable is connected from PC to the Modem.
4. The I/O cable is connected from PC to the Printer.
5. The I/O cable is connected from PC to the Monitor.
6. The I/O cable is connected from PC to the Mouse.
7. The I/O cable is connected from PC to the Printer.

2.4. Feature of Equipment under Test

Protocol Firetide Mesh Routing Protocol (FMRP) Encryption 40 bit, 128 bit WEP keys 128 bit, 256 bit AES keys Network ports - Four 10/100 Base-TX (RJ-45) - IEEE 802.3, 802.3u compliant - CSMA/CD 10/100 autosense Enclosure - Two antenna connectors (SMA reverse polarity) - One power connector - Four Ethernet data connectors (RJ-45) - System indicator LEDs (power, status, mesh, fault). - Ethernet indicator LEDs (link status, activity) - Security slot for physical locking device - Reset button (recessed) - Weight: 2.1 lbs (.95 Kg) without external transformer - Dimensions: 10" x 6" x 1" (25.4 cm x 15.2 cm x 2.5 cm)	Power 5 VDC input 100-240 VAC, 50/60 Hz (external transformer) 13 W power consumption Regulatory Agency Certifications See Appendix C and D for countries of operation and regulatory agency information Environmental specifications - Operating temperature: 0° C to +50° C - Storage temperature: -20° C to +70° C - Humidity (non-condensing) 10% to 90% - Storage Humidity (non-condensing): 10% to 90% Warranty One year limited warranty (see warranty card for details)
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2.5. RF Module Specifications

Wireless interface 2.4 GHz spectrum 2.4–2.497 GHz (actual range available for use is subject to country-specific regulatory approvals) - Radio TX Power: Maximum 100mW - Ad Hoc Mode support 5 GHz spectrum 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.75 – 5.825 GHz (actual range available for use is subject to country-specific regulatory approvals) - Radio TX Power: Maximum 100mW - Dynamic Frequency Selection (DFS) - Transmit Power Control (TPC) - Ad Hoc Mode support	Antennas - Two detachable, omni directional, vertical polarization antennas - Spectrum: 2.4 GHz and 5 GHz - Connectors: SMA reverse polarity - Length: 6.25 in. (15.5 cm) - Range: up to 0.2 Miles (300 Meters) - Gain: up to 6 dBi
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2.6. History of this test report

ORIGINAL.

3. General Information of Test

Test Site:	Exclusive Certification Corp. 4F-2, No. 28, Lane 78, Xing-Ai Rd. Nei-hu, Taipei City 114 Taiwan R.O.C.
Test Site Location (OATS1-SD):	No.68-1, Shihbachongsi, shihding Township, Taipei County 223, Taiwan, R.O.C.
Test Voltage:	AC 110V/ 60Hz
Test in Compliance with:	ANSI C63.4-2003 FCC Part 15 Subpart C & E
Frequency Range Investigated:	AC Power Conducted Emission : from 150kHz to 30 MHz Radiated and conducted Emission: from 30 MHz to 40 GHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.

4. Antenna Requirements

4.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2. Antenna Construction and Directional Gain

Antenna type: Reverse SMA connector, dipole antenna.

Antenna Gain: 3 dBi @ 2.4 GHz.

4 dBi @ 5 GHz.

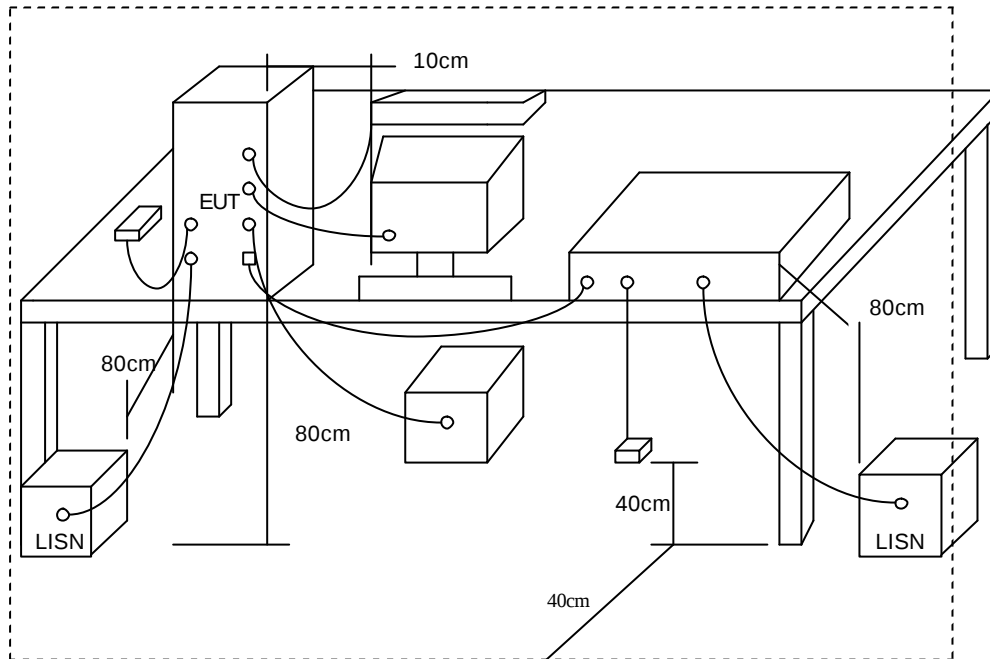
5. Test of Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 1.3.1. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.1. Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.2. Typical Test Setup Layout of Conducted Emission



5.3. Conducted Emission Requirement

Except for A digital devices, for equipment that is designed to be connected to the public utility (AC) power line on any frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150KHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the Radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

5.4. Test Result and Data

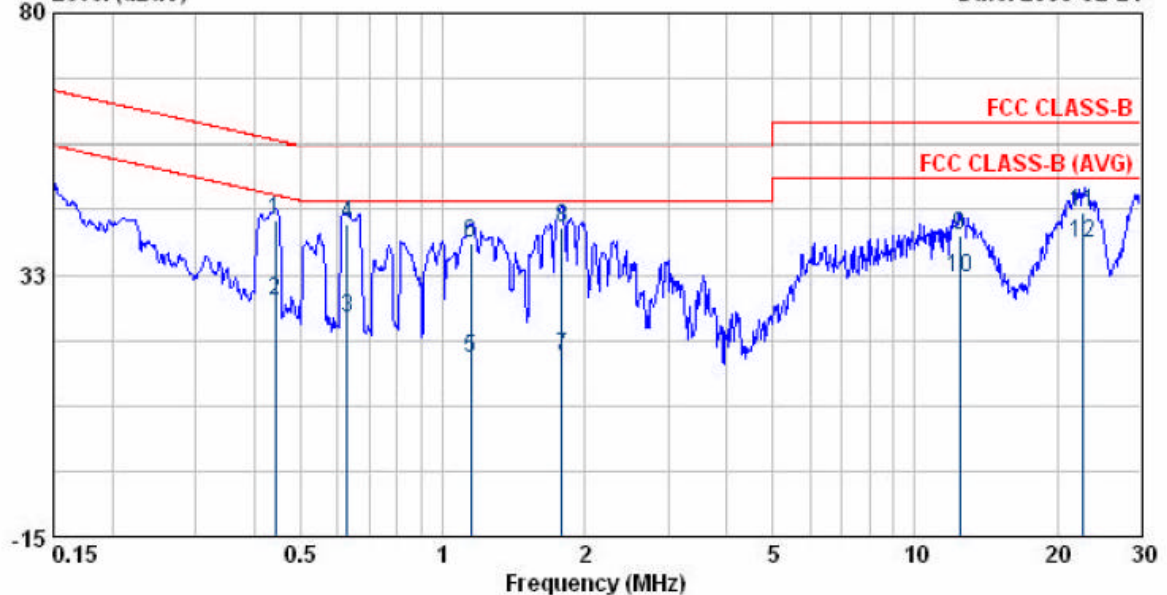
EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 36
 Memo :

Pol/Phase : NEUTRAL
 Temperature : 26 °C
 Humidity : 61 %

Data: 14

Level (dBuV)

Date: 2005-02-24



Freq	Read	Factor	Level	Limit	Over	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.441	41.84	0.49	42.33	57.04	-14.71	QP
0.441	27.48	0.49	27.97	47.04	-19.07	AVERAGE
0.628	24.34	0.45	24.79	46.00	-21.21	AVERAGE
0.628	41.32	0.45	41.77	56.00	-14.23	QP
1.146	17.04	0.42	17.46	46.00	-28.54	AVERAGE
1.146	37.67	0.42	38.09	56.00	-17.91	QP
1.786	17.07	0.48	17.55	46.00	-28.45	AVERAGE
1.786	40.41	0.48	40.89	56.00	-15.11	QP
12.424	38.84	0.66	39.50	60.00	-20.50	QP
12.424	31.23	0.66	31.89	50.00	-18.11	AVERAGE
22.766	43.04	0.76	43.80	60.00	-16.20	QP
22.766	37.39	0.76	38.15	50.00	-11.85	AVERAGE

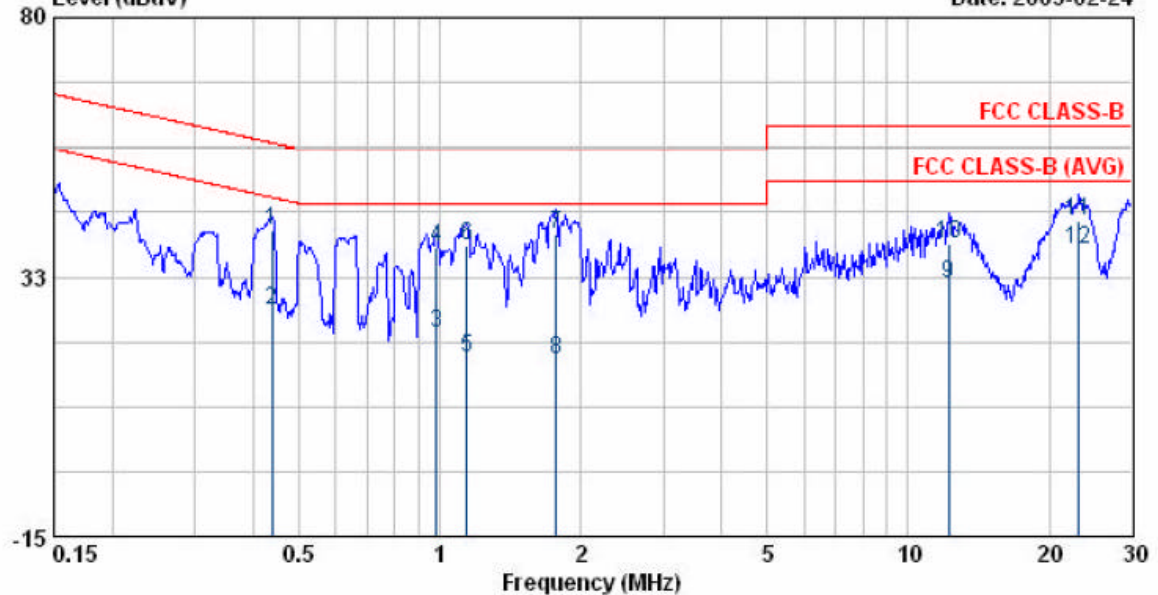
Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss

EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 36
 Memo :

Pol/Phase : LINE
 Temperature : 26 °C
 Humidity : 61 %

Data: 16
 Level (dBuV)

Date: 2005-02-24



Freq	Read Level	Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.439	40.61	0.49	41.10	57.09	-15.99	QP
0.439	26.00	0.49	26.49	47.09	-20.60	AVERAGE
0.985	21.79	0.40	22.19	46.00	-23.81	AVERAGE
0.985	37.45	0.40	37.85	56.00	-18.15	QP
1.141	17.27	0.42	17.69	46.00	-28.31	AVERAGE
1.141	37.84	0.42	38.26	56.00	-17.74	QP
1.771	39.97	0.48	40.45	56.00	-15.55	QP
1.771	17.01	0.48	17.49	46.00	-28.51	AVERAGE
12.178	30.64	0.59	31.23	50.00	-18.77	AVERAGE
12.178	38.01	0.59	38.60	60.00	-21.40	QP
23.139	41.65	0.96	42.61	60.00	-17.39	QP
23.139	36.54	0.96	37.50	50.00	-12.50	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss

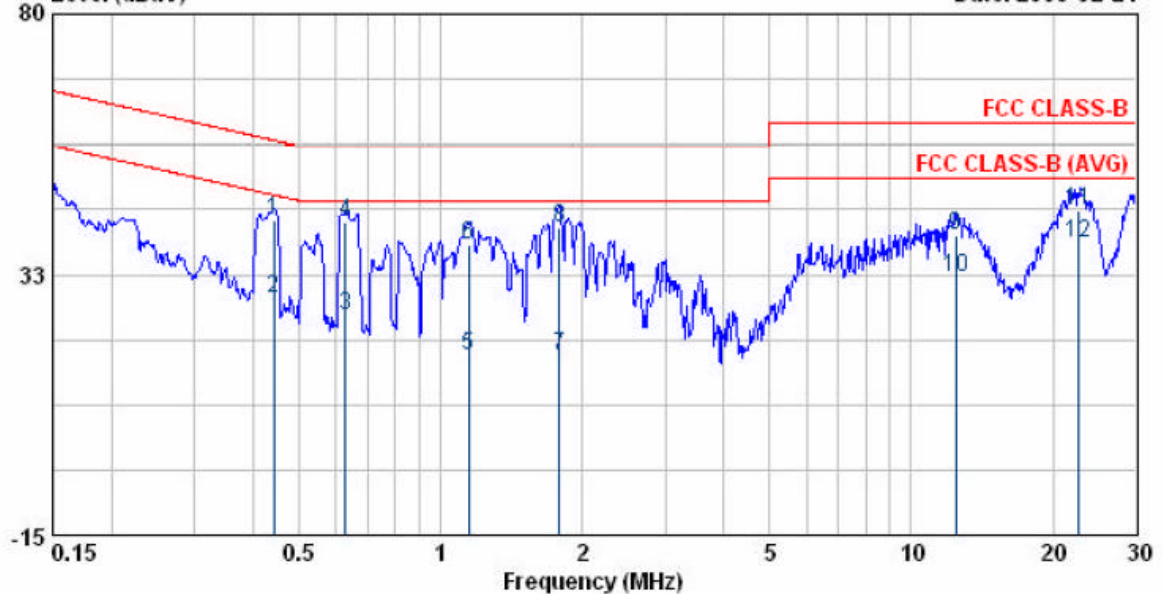
EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 48
 Memo :

Pol/Phase : NEUTRAL
 Temperature : 26 °C
 Humidity : 61 %

Data: 27

Level (dBuV)

Date: 2005-02-24



Freq	Read	Factor	Level	Limit	Over	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.441	41.92	0.49	42.41	57.04	-14.63	QP
0.441	27.51	0.49	28.00	47.04	-19.04	AVERAGE
0.628	24.41	0.45	24.86	46.00	-21.14	AVERAGE
0.628	41.52	0.45	41.97	56.00	-14.03	QP
1.146	17.25	0.42	17.67	46.00	-28.33	AVERAGE
1.146	37.62	0.42	38.04	56.00	-17.96	QP
1.786	17.25	0.48	17.73	46.00	-28.27	AVERAGE
1.786	40.62	0.48	41.10	56.00	-14.90	QP
12.424	38.95	0.66	39.61	60.00	-20.39	QP
12.424	31.36	0.66	32.02	50.00	-17.98	AVERAGE
22.766	43.25	0.76	44.01	60.00	-15.99	QP
22.766	37.46	0.76	38.22	50.00	-11.78	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss

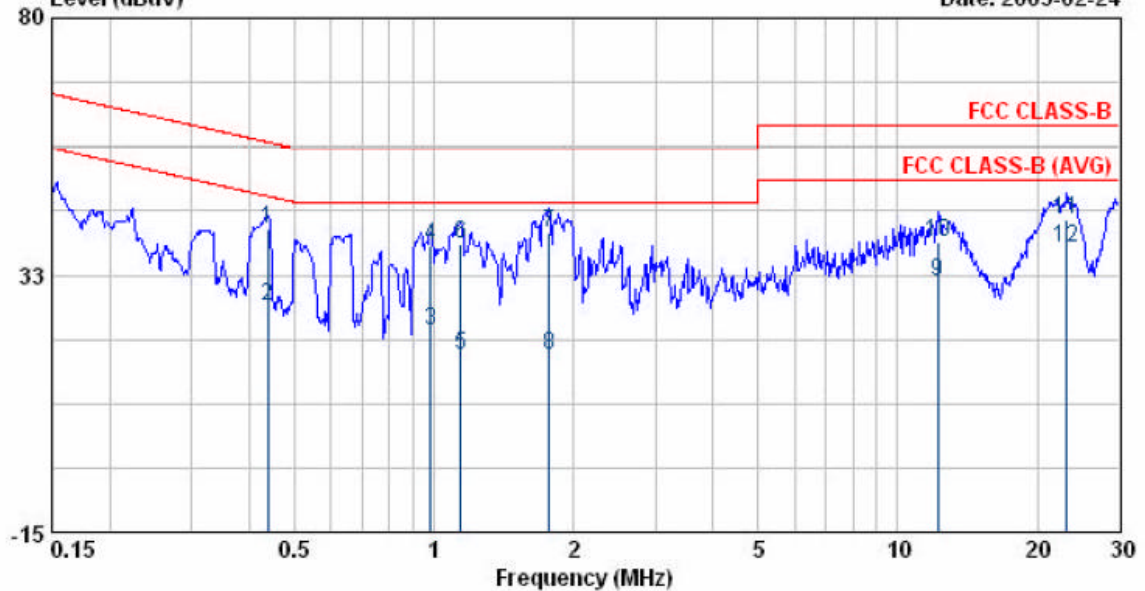
EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 48
 Memo :

Pol/Phase : LINE
 Temperature : 26 °C
 Humidity : 61 %

Data: 18

Level (dBuV)

Date: 2005-02-24



Freq	Read Level	Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.439	40.65	0.49	41.14	57.09	-15.95	QP
0.439	26.12	0.49	26.61	47.09	-20.48	AVERAGE
0.985	21.75	0.40	22.15	46.00	-23.85	AVERAGE
0.985	37.51	0.40	37.91	56.00	-18.09	QP
1.141	17.31	0.42	17.73	46.00	-28.27	AVERAGE
1.141	37.81	0.42	38.23	56.00	-17.77	QP
1.771	39.95	0.48	40.43	56.00	-15.57	QP
1.771	17.21	0.48	17.69	46.00	-28.31	AVERAGE
12.178	30.69	0.59	31.28	50.00	-18.72	AVERAGE
12.178	38.12	0.59	38.71	60.00	-21.29	QP
23.139	41.69	0.96	42.65	60.00	-17.35	QP
23.139	36.59	0.96	37.55	50.00	-12.45	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss

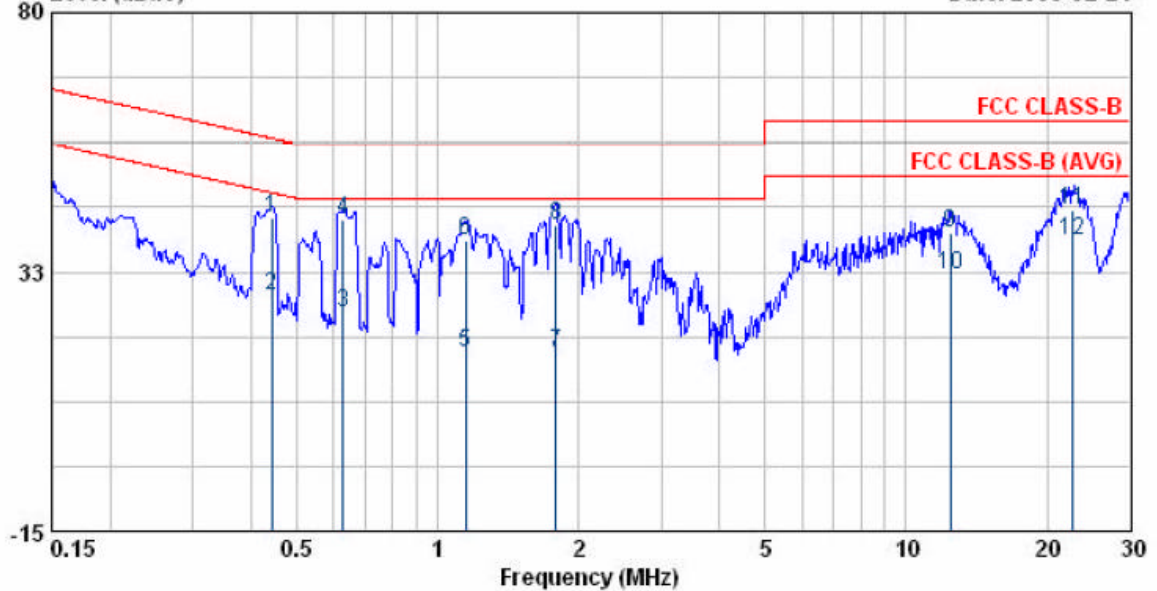
EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 52
 Memo :

Pol/Phase : NEUTRAL
 Temperature : 26 °C
 Humidity : 61 %

Data: 28

Level (dBuV)

Date: 2005-02-24



Freq	Read Level	Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.441	41.96	0.49	42.45	57.04	-14.59	QP
0.441	27.59	0.49	28.08	47.04	-18.96	AVERAGE
0.628	24.46	0.45	24.91	46.00	-21.09	AVERAGE
0.628	41.56	0.45	42.01	56.00	-13.99	QP
1.146	17.32	0.42	17.74	46.00	-28.26	AVERAGE
1.146	37.69	0.42	38.11	56.00	-17.89	QP
1.786	17.32	0.48	17.80	46.00	-28.20	AVERAGE
1.786	40.71	0.48	41.19	56.00	-14.81	QP
12.424	38.96	0.66	39.62	60.00	-20.38	QP
12.424	31.41	0.66	32.07	50.00	-17.93	AVERAGE
22.766	43.00	0.76	43.76	60.00	-16.24	QP
22.766	37.51	0.76	38.27	50.00	-11.73	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(1SN) Factor + Cable Loss

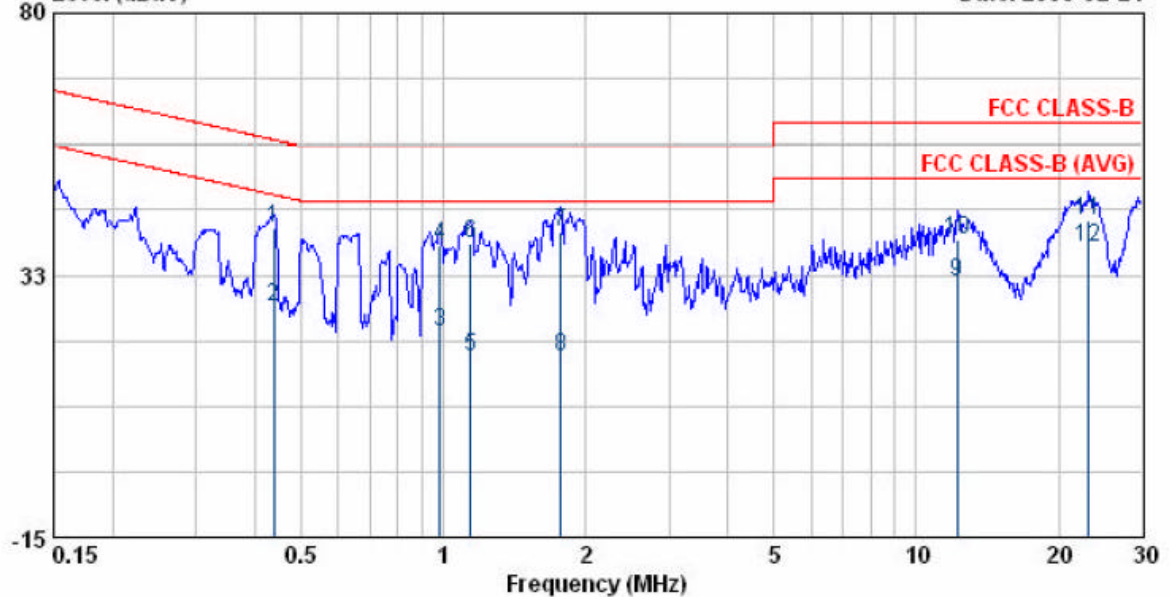
EUT : 3100
 Power : AC 110V
 Test Mode : 802.11a CH 52
 Memo :

Pol/Phase : LINE
 Temperature : 26 °C
 Humidity : 61 %

Data: 19

Level (dBuV)

Date: 2005-02-24



Freq	Read Level	Factor	Level	Limit	Over Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dBuV	
0.439	40.69	0.49	41.18	57.09	-15.91	QP
0.439	26.32	0.49	26.81	47.09	-20.28	AVERAGE
0.985	21.71	0.40	22.11	46.00	-23.89	AVERAGE
0.985	37.61	0.40	38.01	56.00	-17.99	QP
1.141	17.41	0.42	17.83	46.00	-28.17	AVERAGE
1.141	37.91	0.42	38.33	56.00	-17.67	QP
1.771	39.81	0.48	40.29	56.00	-15.71	QP
1.771	17.26	0.48	17.74	46.00	-28.26	AVERAGE
12.178	30.64	0.59	31.23	50.00	-18.77	AVERAGE
12.178	38.21	0.59	38.80	60.00	-21.20	QP
23.139	41.62	0.96	42.58	60.00	-17.42	QP
23.139	36.61	0.96	37.57	50.00	-12.43	AVERAGE

Remarks: 1. Level = Read Level + Factor
 2. Factor = LISN(ISN) Factor + Cable Loss