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Electromagnetic Emissions Test Report and Request for Class II Permissive Change pursuant to FCC Part 15, Subpart C Specifications for an Intentional Radiator on the DDell Corporation Model: PP04S

FCC ID:	E2K24CLNS
GRANTEE:	Dell Corporation One Dell Way Round Rock, TX 78682
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	June 10, 2003
FINAL TEST DATE:	June 5, 2003
AUTHORIZED SIGNATORY:	Mark Briggs Director of Engineering

ACCREDITED

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SCOPE

An electromagnetic emissions test has been performed on the Dell Corporation model PP04S system pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Dell Corporation model PP04S system and therefore apply only to the tested sample. The sample was selected and prepared by Dell Corporation.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

STATEMENT OF COMPLIANCE

The tested sample of Dell Corporation model PP04S system complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

SUMMARY OF RESULTS

FCC Part 15 Section	Description	Measured Value	Comments	Result
15.247(a)		Systems uses Direct Sequence Spread Spectrum techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	6dB Bandwidth	Not performed	The proposed changes will not affect the bandwidth of the transmitted signal	Complies
15.247 (b) (3)	Output Power, 2400 - 2483.5 MHz	16.5 dBm (0.045 Watts) EIRP = 0.06 W	Although the proposed changes will not affect the output power from the radio, the output power was verified.	Complies
15.247(d)	Power Spectral Density	Not performed	The proposed changes will not affect the conducted spurious emissions	Complies
15.247(c)	Spurious Emissions – Antenna Conducted 30MHz – 25GHz	Not performed	The proposed changes will not affect the conducted spurious emissions	Complies
15.247(c) / 15.209	Radiated Spurious Emissions 30MHz – 25GHz	-3.3dB @ 2483.5 MHz	Emissions in restricted bands must meet the radiated emissions limits detailed in 15.207. All others must be < -20dBc	Complies
15.207	AC Conducted Emissions	-12.4dB @ 0.215MHz	Emissions measured from AC-DC adapter of new host system	Complies
15.247 (b) (5)	RF Exposure Requirements	MPE Calculation	MPE calculation indicates rf power density is below 1mW/cm^2 20cm from the antennas	Complies
15.203	RF Connector	Antenna and connector is integral to the host device	Integral antenna or specialized connector required	Complies

EIRP calculated using antenna gain of 1.7dBi for the Hitachi Antennas and 1.2dBi for the Westron Neweb Antennas.

The output power reported during the original application was 16.4dBm. The verified output power was within 0.1dB of this value.

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Dell Corporation model PP04S system is an Intel Corporation model WM3A2100 802.11b Mini PCI wireless networking card installed in a Dell PP04S laptop chassis. Normally, the EUT would be placed on a tabletop during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The EUT receives power from an external AC-DC adapter.

The sample was received on June 4, 2003 and tested on June 5, 2003.

The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Dell Corporation PP04S Laptop	KR-03Y639-36521-34S-Z223
Intel WM3A2100 802.11b Mini PCI Transceiver	None

OTHER EUT DETAILS

The test data in this report was made for two configurations of the unit under test. One configuration used a Hitachi 1.7dBi antenna system and the second used a Wistron NuWeb 1.22dBi antenna system. The antenna systems consisted of two identical antennas, only one of which can be active at a time. Two antennas are provided for spatial diversity. For both systems the two antennas were integrated into the laptop and located immediately above the display.

The Intel Corporation model WM3A2100 already has a modular approval for use in a Dell PP05L chassis. This report is being issued to support an application for a Class II Permissive Change to add the Dell PP04S chassis to the approval.

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

The EUT did not require modifications in order to comply with the emission specifications

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer/Model/Description	Serial Number
Dell Proto 3a Config 223 Laptop (Host Chassis)	KR-03Y639-36521-34S-Z223

EXTERNAL I/O CABLING

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Adapter AC Power	Mains	3 wire	Unshielded	0.6
DC Power to laptop	AC Adapter	2 wire w/ Ferrite	Unshielded	1.6

EUT OPERATION

EUT was set to continuously transmit at maximum power at low, middle, and high channel.

PROPOSED MODIFICATION DETAILS

The modification to the being proposed is the addition of a new host chassis (the PP04S) that will use two new antenna systems.

The original device was for the Wireless LAN card installed in a Dell PP05L laptop chassis and configured with either a Hitachi Bondi antenna with 0.6dBi of gain in the 2.4GHz band or a Wistron Neweb Bondi antenna with a gain of 1.45dBi in the 2.4GHz band. As both of these of configurations had the antenna located in the base of the host laptop the host system was considered to be a portable device and SAR data was provided to support the original application.

The location of the antennas for the two, new, additional configurations proposed in this application is above the display of the host laptop. This proposed antenna configuration should classify the host device as a mobile device, and so only MPE calculations are being provided to support the FCC's rf exposure requirements in this application. The PP04S chassis may also contain a wireless BlueTooth module, approved as a modular device under FCC ID IXMUB22111S. The grant for this module prohibits co-location with other transmitters. The RF safety exhibits for this application argue that the separation between the antennas of the two devices (BlueTooth and Wireless LAN), combined with the substantially higher output power of the 802.11b device demonstrate that the two modules are not considered to have been co-located.

In addition, output power measurements and radiated spurious emissions measurements from the intentional radiator are also being submitted to demonstrate continued compliance with the FCC's rules. All other parameters that were reported to the FCC in the original application (bandwidth, power spectral density, AC conducted emissions and signal bandwidth) remain unaffected by the proposed changes and so have not been included with this application.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on June 5, 2003 at the Elliott Laboratories Open Area Test Site #1 & 4 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal standardized RF impedance, provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

POWER METER

A power meter and peak power sensor are used for all direct output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors, which are programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS, SECTION 15.207

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level- Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30MHz - 10 GHz, 04-Jun-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	1242	12	10/9/2002	10/9/2003
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12	1/10/2003	1/10/2004
Hewlett Packard	EMC Spectrum Analyzer, Opt. 026 9 KHz -26.5GHz	8593EM	1141	12	3/19/2003	3/19/2004
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz), system 2	84125C	1410	12	4/2/2003	4/2/2004

Power Measurment, 04-Jun-03
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	12	9/6/2002	9/6/2003
Rohde & Schwarz	Power Sensor 100uW - 10 Watts	NRV-Z53	1236	12	8/15/2002	8/15/2003

Conducted and Radiated Emissions, 06-Jun-03
Engineer: Rafael

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	LISN 2 x (Solar 8028 LISN + 6512 Caps)	LISN-5,Support	379	12	8/20/2002	8/20/2003
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	12	5/13/2003	5/13/2004
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	12	9/12/2002	9/12/2003
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	12	1/10/2003	1/10/2004
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12	12/27/2002	12/27/2003
Solar Electronics Co	LISN	8028-50-TS-24-BNC	904	12	6/19/2002	6/19/2003

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T51415 23 Pages

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Emissions Spec:	FCC 15.247 and RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Dell Corporation

Model

PP04S

Date of Last Test: 6/5/2003

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Emissions Spec:	FCC 15.247 and RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is an Intel wireless networking card (802.11b) which is designed to be installed in a Dell laptop computer. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end-user environment. The EUT receives power from the laptop.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Dell Corporation	PP04S	Laptop	KR-03Y639-36521-34S-Z223	E2K24CLNS

Other EUT Details

The EUT maybe used with either a Hitachi 1.7dBi antenna or 1.22dBi Wistron NuWeb antenna.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer.

Modification History

Mod. #	Test	Date	Modification
1			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

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EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Emissions Spec:	FCC 15.247 and RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Proto 3a Config 223	Laptop	KR-03Y639-36521-34S-Z223	

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Adapter AC Power	Mains	3 wire	Unshielded	0.6
DC Power to laptop	AC Adapter	2 wire w/ Ferrite	Unshielded	1.6

Note: The ports were not connected as this is not requred during the transmitter test portion.

EUT Operation During Emissions

EUT was set to transmit at maximum power at low, middle, and high channel.

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Emissions Spec:	FCC 15.247 and RSS-210	Class:	Radio
Immunity Spec:	-	Environment:	-

Test Configuration #2

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Proto 3a Config 223	Laptop	KR-03Y639-36521-34S-Z223	
Hewlett Packard	Deskjet 3820	USB Printer	CN2451B1YS	

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Adapter AC Power	Mains	3 wire	Unshielded	0.6
DC Power to laptop	AC Adapter	2 wire w/ Ferrite	Unshielded	1.6
Printer USB	Laptop USB	USB Cord	Shielded	1

Note: Minimum configuration for the Laptop since only USB port was availble.

EUT Operation During Emissions

EUT was set to worst case transmitter parameters and H pattern scrolling on display.

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EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Radiated Emissions

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: 6/4/2003
Test Engineer: jmartinez
Test Location: SVOATS #4

Config. Used: 1
Config Change: None
Host Unit Voltage 120Vac, 60Hz

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 16°C
Rel. Humidity: 84%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Output Power	15.247(b)	Pass	16.5 dBm

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Run #1: Output Power

Channel	Frequency	Power	Rate	Antenna	Step	Gain	Bias	scale
	(MHz)	(dBm)	(Mb/s)					
1	2412	16.5	11	2	0	11	36	12
6	2437	16.4	11	2	0	10	36	12
11	2462	16.4	11	2	0	10	38	12

Output power was measured using a peak power meter

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Radiated Emissions - Wistron Neweb Antenna

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:	6/4/2003	Config. Used:	1
Test Engineer:	jmartinez/Rafael	Config Change:	None
Test Location:	SVOATS #4	Host Unit Voltage	120V/60Hz

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 16°C

Rel. Humidity: 84%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 24000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-3.3dB @ 2483.5 MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Run #1: Output Power

Channel	Frequency	Power	Rate	Antenna	Step	Gain	Bias	scale
	(MHz)	(dBm)	(Mb/s)					
1	2412	16.5	11	2	0	11	36	12
6	2437	16.4	11	2	0	10	36	12
11	2462	16.4	11	2	0	10	38	12

Run #1: Radiated Spurious Emissions, 30-24000 MHz.

Fundamental signal measurements (to calculate the band edge field strengths):

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2412.000	115.3	H	-	-	Pk	235	1.2	RBW = VBW = 1 MHz
2412.000	106.1	H	-	-	Avg	235	1.2	RBW = 1MHz, VBW = 10Hz
2412.000	113.8	V	-	-	Pk	270	1.1	RBW = VBW = 1 MHz
2412.000	104.7	V	-	-	Avg	270	1.1	RBW = 1MHz, VBW = 10Hz
2462.000	114.3	H	-	-	Pk	235	1.1	RBW = VBW = 1 MHz
2462.000	104.9	H	-	-	Avg	235	1.1	RBW = 1MHz, VBW = 10Hz
2462.000	112.5	V	-	-	Pk	270	1.1	RBW = VBW = 1 MHz
2462.000	102.8	V	-	-	Avg	270	1.1	RBW = 1MHz, VBW = 10Hz

Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.0	60.0	v	74.0	-14.0	Pk	-	-	Note 1
2390.0	47.8	v	54.0	-6.2	Avg	-	-	Note 1
2390.0	61.5	h	74.0	-12.5	Pk	-	-	Note 1
2390.0	49.8	h	54.0	-4.2	Avg	-	-	Note 1
2483.5	60.2	v	74.0	-13.8	Pk	-	-	Note 2
2483.5	48.6	v	54.0	-5.4	Avg	-	-	Note 2
2483.5	62.0	h	74.0	-12.0	Pk	-	-	Note 2
2483.5	50.7	h	54.0	-3.3	Avg	-	-	Note 2

Note 1:	EUT operating on the lowest channel available in the 2390 - 2412 MHz band. Signal level calculated using the relative measurements(-53.8 dBc for peak and -56.3 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.
Note 2:	EUT operating on highest channel available in the 2462 -2483.5 MHz band. Signal level calculated using the relative measurements(-52.33 dBc for peak and -54.17 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Low Channel @ 2412 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.000	48.8	h	74.0	-25.2	Pk	345	1.5	
4824.000	37.1	h	54.0	-16.9	Avg	345	1.5	
7236.000	51.3	h	74.0	-22.7	Pk	115	1.4	
7236.000	38.9	h	54.0	-15.1	Avg	115	1.4	
9648.000		h	74.0	-74.0	Pk			Noise Floor
9648.000		h	54.0	-54.0	Avg			Noise Floor
12060.000		h	74.0	-74.0	Pk			Noise Floor
12060.000		h	54.0	-54.0	Avg			Noise Floor
4824.000	49.1	v	74.0	-24.9	Pk	190	1.8	
4824.000	39.8	v	54.0	-14.2	Avg	190	1.8	
7236.000	53.2	v	74.0	-20.8	Pk	360	1.0	
7236.000	41.4	v	54.0	-12.6	Avg	360	1.0	
9648.000		v	74.0	-74.0	Pk			Noise Floor
9648.000		v	54.0	-54.0	Avg			Noise Floor
12060.000		v	74.0	-74.0	Pk			Noise Floor
12060.000		v	54.0	-54.0	Avg			Noise Floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2438.316	115.2	H	-	-	Pk	230	1.1	RBW = VBW = 1 MHz
2438.066	105.6	H	-	-	Avg	230	1.1	RBW = 1MHz, VBW = 10Hz
2438.316	113.6	V	-	-	Pk	270	1.1	RBW = VBW = 1 MHz
2438.072	104.1	V	-	-	Avg	270	1.1	RBW = 1MHz, VBW = 10Hz
4874.000	48.7	h	74.0	-25.3	Pk	0	1.4	
4874.000	37.7	h	54.0	-16.3	Avg	0	1.4	
7311.000	48.5	h	74.0	-25.5	Pk	0	1.0	
7311.000	37.1	h	54.0	-16.9	Avg	0	1.0	
9748.000		h	74.0	-74.0	Pk			Noise Floor
9748.000		h	54.0	-54.0	Avg			Noise Floor
12185.000		h	74.0	-74.0	Pk			Noise Floor
12185.000		h	54.0	-54.0	Avg			Noise Floor
4874.000	50.3	V	74.0	-23.7	Pk	35	1.7	
4874.000	40.2	V	54.0	-13.8	Avg	35	1.7	
7311.000	53.1	V	74.0	-20.9	Pk	35	1.0	
7311.000	41.3	V	54.0	-12.7	Avg	35	1.0	
9748.000		V	74.0	-74.0	Pk			Noise Floor
9748.000		V	54.0	-54.0	Avg			Noise Floor
12185.000		V	74.0	-74.0	Pk			Noise Floor
12185.000		V	54.0	-54.0	Avg			Noise Floor

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

High Channel @ 2462 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	48.9	h	74.0	-25.1	Pk	0	1.0	
4924.000	36.9	h	54.0	-17.1	Avg	0	1.0	
7386.000	50.4	h	74.0	-23.6	Pk	55	1.0	
7386.000	37.7	h	54.0	-16.3	Avg	55	1.0	
9848.000		h	74.0	-74.0	Pk			Noise floor
9848.000		h	54.0	-54.0	Avg			Noise floor
12310.000		h	74.0	-74.0	Pk			Noise floor
12310.000		h	54.0	-54.0	Avg			Noise floor
4924.000	50.5	v	74.0	-23.5	Pk	130	1.4	
4924.000	40.9	v	54.0	-13.1	Avg	130	1.4	
7386.000	54.5	v	74.0	-19.5	Pk	20	1.2	
7386.000	43.1	v	54.0	-10.9	Avg	20	1.2	
9848.000	52.3	v	74.0	-21.7	Pk	180	1.3	
9848.000	40.1	v	54.0	-13.9	Avg	180	1.3	
12310.000		v	74.0	-74.0	Pk			Noise floor
12310.000		v	54.0	-54.0	Avg			Noise floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Radiated Spurious Emissions - Hitachi Antenna

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: 6/4/2003 Config. Used: 1
Test Engineer: jmartinez/Rafael Config Change: None
Test Location: SVOATS #4 Host Unit Voltage 120V/60Hz

General Test Configuration

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

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 16°C
Rel. Humidity: 84%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 24000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	-6.0dB @ 2483.5 MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Run #1: Output Power

Channel	Frequency	Power	Rate	Antenna	Step	Gain	Bias	scale
	(MHz)	(dBm)	(Mb/s)					
1	2412	16.5	11	1	0	3	37	14
6	2437	16.5	11	1	0	3	40	13
11	2462	16.4	11	1	0	3	40	13

Run #1: Radiated Spurious Emissions, 30-24000 MHz.

Fundamental signal measurements (to calculate the band edge field strengths):

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2412.000	112.2	H	-	-	Pk	120	1.2	RBW = VBW = 1 MHz
2412.000	102.8	H	-	-	Avg	120	1.2	RBW = 1MHz, VBW = 10Hz
2412.000	111.6	V	-	-	Pk	0	0.0	RBW = VBW = 1 MHz
2412.000	102.1	V	-	-	Avg	0	0.0	RBW = 1MHz, VBW = 10Hz
2462.000	111.4	H	-	-	Pk	120	1.2	RBW = VBW = 1 MHz
2462.000	102.2	H	-	-	Avg	120	1.2	RBW = 1MHz, VBW = 10Hz
2462.000	110.3	V	-	-	Pk	100	1.1	RBW = VBW = 1 MHz
2462.000	100.9	V	-	-	Avg	100	1.1	RBW = 1MHz, VBW = 10Hz

Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.0	57.8	v	74.0	-16.2	Pk	-	-	Note 1
2390.0	45.8	v	54.0	-8.2	Avg	-	-	Note 1
2390.0	58.4	h	74.0	-15.6	Pk	-	-	Note 1
2390.0	46.5	h	54.0	-7.5	Avg	-	-	Note 1
2483.5	58.0	v	74.0	-16.0	Pk	-	-	Note 2
2483.5	46.7	v	54.0	-7.3	Avg	-	-	Note 2
2483.5	59.1	h	74.0	-14.9	Pk	-	-	Note 2
2483.5	48.0	h	54.0	-6.0	Avg	-	-	Note 2

Note 1:	EUT operating on the lowest channel available in the 2390 - 2412 MHz band. Signal level calculated using the relative measurements(-53.8 dBc for peak and -56.3 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.
Note 2:	EUT operating on highest channel available in the 2462 -2483.5 MHz band. Signal level calculated using the relative measurements(-52.33 dBc for peak and -54.17 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Low Channel @ 2412 MHz

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.000	51.1	h	74.0	-22.9	Pk	315	1.2	
4824.000	38.9	h	54.0	-15.1	Avg	315	1.2	
7236.000	51.6	h	74.0	-22.4	Pk	210	1.0	
7236.000	38.8	h	54.0	-15.2	Avg	210	1.0	
9648.000		h	74.0	-74.0	Pk			Noise Floor
9648.000		h	54.0	-54.0	Avg			Noise Floor
12060.000		h	74.0	-74.0	Pk			Noise Floor
12060.000		h	54.0	-54.0	Avg			Noise Floor
4824.000	51.3	v	74.0	-22.7	Pk	210	1.0	
4824.000	40.3	v	54.0	-13.7	Avg	210	1.0	
7236.000	52.2	v	74.0	-21.8	Pk	275	1.6	
7236.000	40.6	v	54.0	-13.4	Avg	275	1.6	
9648.000		v	74.0	-74.0	Pk			Noise Floor
9648.000		v	54.0	-54.0	Avg			Noise Floor
12060.000		v	74.0	-74.0	Pk			Noise Floor
12060.000		v	54.0	-54.0	Avg			Noise Floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

Center Channel @ 2437 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2438.290	113.4	H	-	-	Pk	0	0.0	RBW = VBW = 1 MHz
2438.689	103.6	H	-	-	Avg	0	0.0	RBW = 1MHz, VBW = 10Hz
2438.317	112.2	V	-	-	Pk	255	1.1	RBW = VBW = 1 MHz
2438.067	102.8	V	-	-	Avg	255	1.1	RBW = 1MHz, VBW = 10Hz
4874.000	49.7	h	74.0	-24.3	Pk	320	1.1	
4874.000	38.1	h	54.0	-15.9	Avg	320	1.1	
7311.000	49.6	h	74.0	-24.4	Pk	210	1.6	
7311.000	37.5	h	54.0	-16.5	Avg	210	1.6	
9748.000		h	74.0	-74.0	Pk			Noise Floor
9748.000		h	54.0	-54.0	Avg			Noise Floor
12185.000		h	74.0	-74.0	Pk			Noise Floor
12185.000		h	54.0	-54.0	Avg			Noise Floor
4874.000	50.1	v	74.0	-23.9	Pk	155	1.8	
4874.000	40.5	v	54.0	-13.5	Avg	155	1.8	
7311.000	49.8	v	74.0	-24.2	Pk	275	1.7	
7311.000	37.6	v	54.0	-16.4	Avg	275	1.7	
9748.000		v	74.0	-74.0	Pk			Noise Floor
9748.000		v	54.0	-54.0	Avg			Noise Floor
12185.000		v	74.0	-74.0	Pk			Noise Floor
12185.000		v	54.0	-54.0	Avg			Noise Floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Proj Eng:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	N/A

High Channel @ 2462 MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	48.9	h	74.0	-25.1	Pk	230	1.7	
4924.000	36.4	h	54.0	-17.6	Avg	230	1.7	
7386.000	49.5	h	74.0	-24.5	Pk	210	1.7	
7386.000	37.2	h	54.0	-16.8	Avg	210	1.7	
9848.000		h	74.0	-74.0	Pk			Noise Floor
9848.000		h	54.0	-54.0	Avg			Noise Floor
12310.000		h	74.0	-74.0	Pk			Noise Floor
12310.000		h	54.0	-54.0	Avg			Noise Floor
4924.000	49.4	v	74.0	-24.6	Pk	140	1.9	
4924.000	40.2	v	54.0	-13.8	Avg	140	1.9	
7386.000	50.6	v	74.0	-23.4	Pk	300	2.0	
7386.000	37.4	v	54.0	-16.6	Avg	300	2.0	
9848.000		v	74.0	-74.0	Pk			Noise Floor
9848.000		v	54.0	-54.0	Avg			Noise Floor
12310.000		v	74.0	-74.0	Pk			Noise Floor
12310.000		v	54.0	-54.0	Avg			Noise Floor

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	Radio

Conducted Emissions - Power Ports

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: 6/5/2003
Test Engineer: Rafael
Test Location: SVOATS #1

Config. Used: 2
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 77 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 B	Pass	-7.5dB @ 0.532MHz
2	CE, AC Power,120V/60Hz	EN 55022 B	Pass	-12.4dB @ 0.215MHz

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	Radio

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.532	38.5	L	46.0	-7.5	Average	
0.213	43.8	L	53.1	-9.3	Average	
0.642	35.6	N	46.0	-10.4	Average	
3.090	35.4	L	46.0	-10.6	Average	
0.213	51.2	L	63.1	-11.9	QP	
0.341	34.3	N	49.2	-14.9	Average	
3.090	39.8	L	56.0	-16.2	QP	
0.532	39.4	L	56.0	-16.6	QP	
0.213	36.3	N	53.1	-16.8	Average	
0.213	43.9	N	63.1	-19.2	QP	
0.642	36.6	N	56.0	-19.4	QP	
0.341	36.2	N	59.2	-23.0	QP	

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.215	40.6	N	53.0	-12.4	Average	
1.620	32.2	N	46.0	-13.8	Average	
0.214	48.9	L	63.0	-14.1	QP	
0.214	38.7	L	53.0	-14.3	Average	
0.215	48.3	N	63.0	-14.7	QP	
0.322	34.2	N	49.7	-15.5	Average	
0.550	30.4	L	46.0	-15.6	Average	
0.322	38.8	N	59.7	-20.9	QP	
1.620	33.7	N	56.0	-22.3	QP	
0.550	33.1	L	56.0	-22.9	QP	
11.920	26.5	L	50.0	-23.5	Average	
11.920	33.1	L	60.0	-26.9	QP	

Elliott

EMC Test Data

Client:	Dell Corporation	Job Number:	J51343
Model:	PP04S	T-Log Number:	T51415
		Account Manager:	Christine Vu
Contact:	Robert Paxman		
Spec:	FCC 15.247 and RSS-210	Class:	Radio

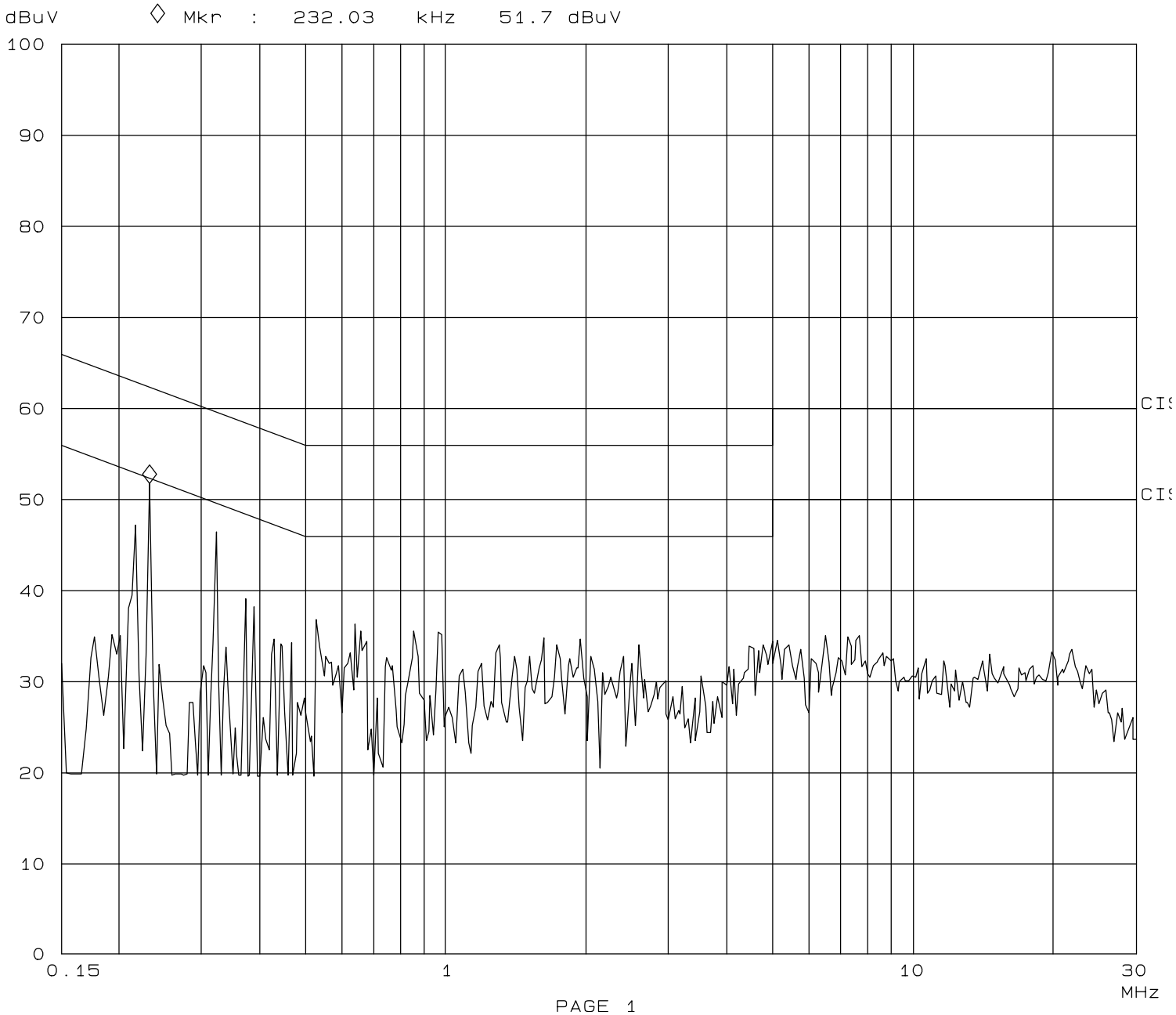
Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz (RSS 210 limits)

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
1.620	33.7	N	48.0	-14.3	QP	
0.550	33.1	L	48.0	-14.9	QP	
11.920	33.1	L	48.0	-14.9	QP	

Elliott Laboratories
Conducted Emissions

06. Jun 03 00:21

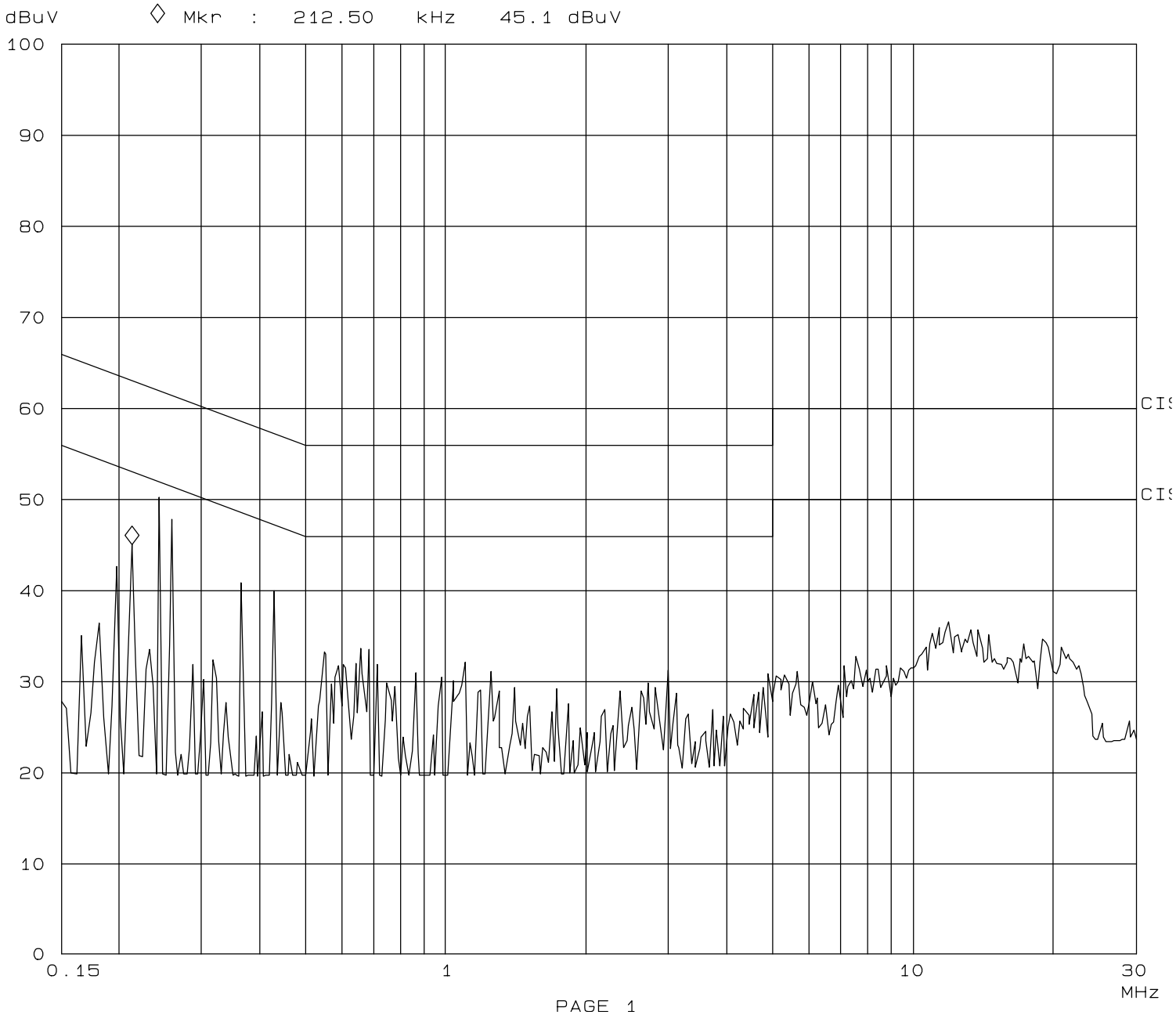
EUT: Dell 2.4GHz Systems
Manuf: Intel Corporation
Op Cond: 120V/60Hz, Neutral
Operator: Rafael Varelas
Test Spec: EN 55022 B



Elliott Laboratories
Conducted Emissions

06. Jun 03 00:26

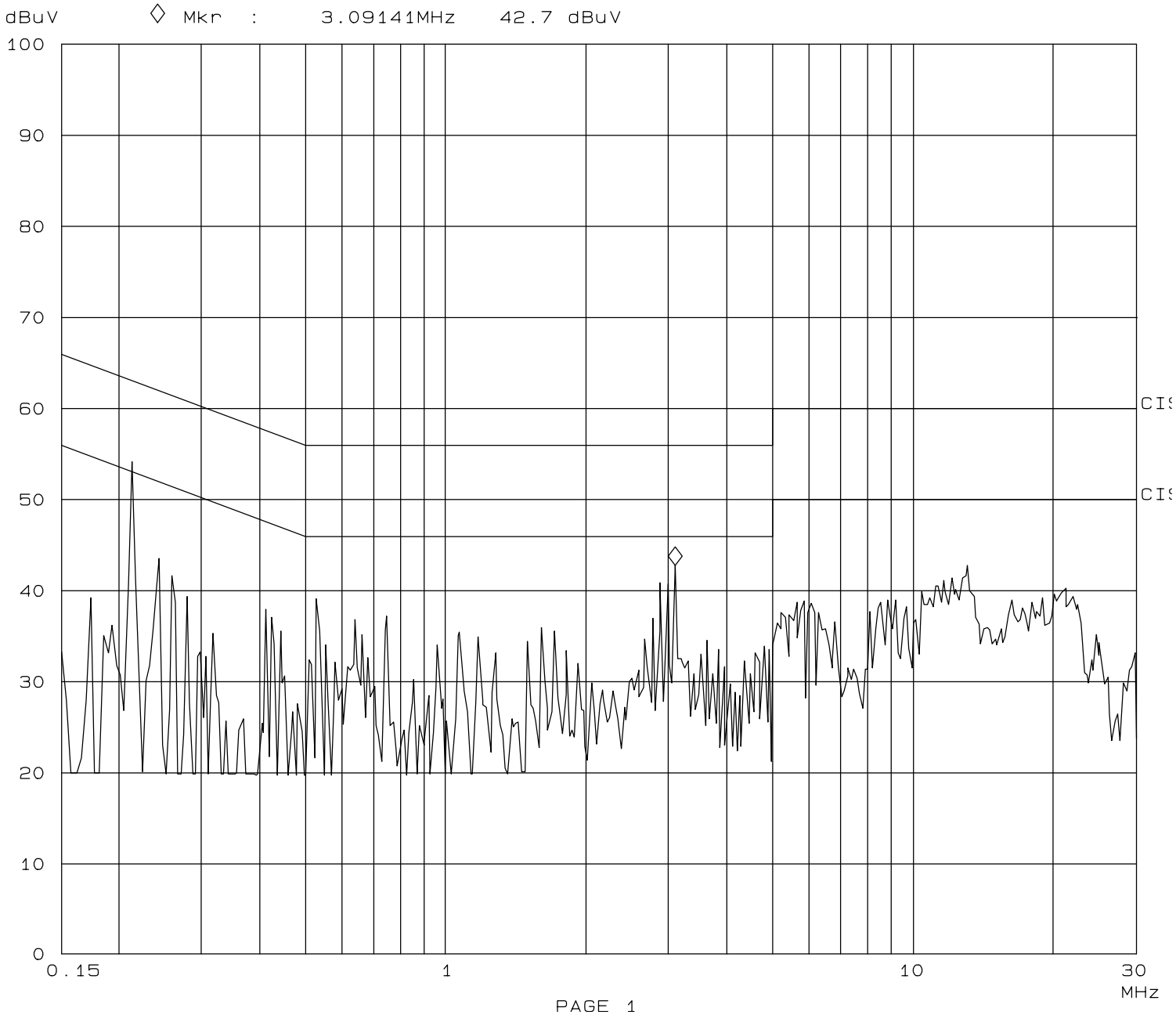
EUT: Dell 2.4GHz Systems
Manuf: Intel Corporation
Op Cond: 120V/60Hz, Line
Operator: Rafael Varelas
Test Spec: EN 55022 B



Elliott Laboratories
Conducted Emissions

05. Jun 03 23:30

EUT: Dell 2.4Ghz Systems
Manuf: Intel Corporation
Op Cond: 230V/50Hz, Line
Operator: Rafael Varelas
Test Spec: EN 55022 B



Elliott Laboratories
Conducted Emissions

06. Jun 03 00:11

EUT: Dell 2.4GHz Systems
Manuf: Intel Corporation
Op Cond: 230V/50Hz, Neutral
Operator: Rafael Varelas
Test Spec: EN 55022 B