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November 22, 2005

Blanca Piedra
Plantronics
345 Encinal Street
Santa Cruz, CA 95061-0635

Subject: FCC Emissions Report, CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC)

Dear Ms. Piedra:

A report has been created detailing the results of the FCC electromagnetic emissions testing performed on the CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC). Please find this report enclosed.

Per Federal Communication Commission regulations, the signature of an official of the company responsible for marketing the CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC) is required, for this report, to be acceptable for determining compliance. We recommend filing this report in a safe place for future reference.

Once an official has signed page 4 of this report, you may begin shipping the CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC). Each unit must be manufactured with any modifications described in the report, the proper FCC label should be attached and the appropriate FCC statement should be included in the operator's manual.

If you have any questions, please don't hesitate to call us at 408-245-7800.

Sincerely,

Mark Briggs
Principal Engineer

MB/dmg
Enclosure: Emissions Report

File: R61958

Elliott

Test Certificate

A sample of the following product received on November 1, 2005 and tested on November 8 and November 11, 2005 complied with the requirements of FCC part 15 subpart B and ICES-003 for a class B product given the measurement uncertainties as detailed in Elliott report R61958.

Plantronics
Model CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC)

Mark Briggs
Principal Engineer

Blanca Piedra
Plantronics

ACCREDITED

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Electromagnetic Emissions Test Report for Verification of Compliance per FCC Part 15, Subpart B Specifications for a Class B Digital Device and ICES-003 Class B and Subpart D – Unlicensed Personal Communications Devices on the Plantronics Model: CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC)

MANUFACTURER:	Plantronics 345 Encinal Street Santa Cruz, CA 95061-0635
TEST SITE:	Elliott Laboratories, Inc. 41039 Boyce Road Fremont, CA. 94538-2435
REPORT DATE:	November 22, 2005
FINAL TEST DATES:	November 8 and November 11, 2005
AUTHORIZED SIGNATORY:	Mark Briggs Principal Engineer

ACCREDITED
2016-01

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SCOPE

The Federal Communications Commission (FCC) establishes rules and regulations regarding the electromagnetic emissions of all electronic devices. An electromagnetic emissions test has been performed on the Plantronics model CS55 pursuant to Subpart B of Part 15 of FCC Rules for digital devices and Subpart D of FCC rules for intentional devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-2003 as outlined in Elliott Laboratories test procedures. The test data has been provided as an appendix to this report for reference.

The digital device 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 Plantronics models CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC) and therefore apply only to the tested samples. The samples were selected and prepared by Blanca Piedra of Plantronics.

VALIDATING SIGNATURES

The tested sample of the cable location and Class B digital device submitted to and tested by Elliott Laboratories complied with the requirements of subpart B of Part 15 of the Federal Communications Commissions Rules as specified in this report.

Mark Briggs
Principal Engineer
Elliott Laboratories, Inc.

The official of the company responsible for marketing the device tested.

Blanca Piedra
Principal Engineer
Plantronics

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart D for intentional devices and Subpart B of Part 15 of FCC Rules for the radiated and conducted emissions of digital devices. Since the subject device is intended for operation in any environment including residential areas, equipment verification is required.

Equipment verification is a procedure where the manufacturer or a contracted laboratory makes measurements and takes necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or test data to the FCC is not required unless specifically requested by the Commission. Once equipment verification has been obtained, a label indicating compliance must be attached to all identical units subsequently manufactured. Specific cautionary information must also be included in the operator's manual. These FCC labeling requirements are included as an appendix to this report.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product that 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 and/or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Plantronics model CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC). The actual test results are contained in an appendix of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.107(a) and 15.315.

The following measurement was extracted from the data recorded during the conducted emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

Frequency MHz	Level dBuV	Power Lead	FCC 15.109 Class B Limit	Margin	Detector QP/Ave	Comments
1.221	33.6	Neutral	46.0	-12.4	Peak	Peak Reading Average Limit

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.109(g).

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

Frequency MHz	Level dBuV/m	Pol v/h	Class B Limit	Margin	Detector Pk/QP/Avg	Azimuth Degrees	Height Meters	Comments
207.345	33.7	H	43.5	-9.8	QP	242	1.0	

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 UKAS document LAB 34.

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 Plantronics models CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC); CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC) are from the SupraPlus Wireless family of Wireless Telephone Headset Adaptors which are designed to use the UPCS (Unlicensed Personal Communications Service) band and operate under FCC Part 15 Subpart D. The systems are comprised of a headset and associated base unit. The base unit is common to all of these systems, the differences in the units are in the headsets, specifically the headphone type (monaural or binaural) and the microphone (Voice Tube or Noise Canceling).

The four models in the series are: CS351 Monaural Voice Tube Headset and Base (CS351 Mon VT) CS361 Binaural Voice Tube Headset and Base (CS361 Bin VT) CS351N Monaural Noise Canceling Headset and Base (CS351N Mon NC) CS361N Binaural Noise Canceling Headset and Base (CS361N Bin NC). This test report covers the Noise Canceling versions.

Measurements were made on each model in the series, with the combination of base and headset configured on the top channel with accessories connected to the base unit and on the bottom channel without accessories connected to the base unit to determine the worst case configuration with respect to channel. The base units are electrically identical to those for the Plantronics CS55 series of devices, with minor mechanical changes to accommodate the headsets.

Preliminary tests on the CS55 series of devices demon started that the digital device emissions from the base units were independent of the operating channel, therefore only one of the base units in each test had accessories connected to the two available accessory ports. The second base unit was used to set the associated headset to the required channel. Systems (base/headset combinations) were tested in pairs (CS 351N with CS 361N) as follows (the operating frequency is determined by the base unit):

CS351N on low channel, without accessories connected to the associated base unit and CS361N on high channel, with accessories connected to the base unit;
CS351N on high channel, with accessories connected to the base unit and CS361N on low channel, without accessories connected to the base unit.

Normally, the base unit would be placed on a tabletop during operation. The headset is worn on the head or placed in a cradle on the base. The base unit was treated as tabletop equipment during testing to simulate the end-user environment. The headset was tested in the cradle of its respective base unit and also on its own, out of the cradle and oriented as best as possible to represent its intended, on the head use.
The electrical rating of the base unit is 120 V, 60 Hz, 62.5mAmps (via an external AC-DC adapter). The headset is battery-powered and the batteries are charged from the base unit when the headset is installed in the cradle.

The samples were received on November 1, 2005 and tested on November 8 and November 18, 2005. The EUT consisted of the following component(s):

CS351N Mon NC

Manufacturer	Model	Description	Serial Number
Plantronics	CS351N Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)
Plantronics	CS351N Base	Wireless Telephone Adapter Base	BI1500007 (High channel)
Plantronics	CS351N Headset	Wireless Telephone Adapter Headset Monaural NC	HI500003-F

CS361N Bin NC

Manufacturer	Model	Description	Serial Number
Plantronics	CS361N Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)
Plantronics	CS361N Base	Wireless Telephone Adapter Base	BI1500007 (High channel)
Plantronics	CS361N Headset	Wireless Telephone Adapter Headset Binaural NC	HI500004-F

OTHER EUT DETAILS

The low channel is 1921.536MHz, the high channel is 1928.448MHz. The receiver LO operates at 864kHz above the operating frequency. The handset links to the frequency of the base.
The antenna is integral to both headset and base unit, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The base unit enclosure is primarily constructed of plastic. It measures approximately 10.7 cm wide by 10.4 cm deep by 12.2 cm high.
The CS361 & CS361N binaural and CS351 & CS351N monaural headset enclosures are primarily constructed of plastic. The binaural headset measures approximately 18 cm wide by 18 cm long by 5.5 cm deep. The monaural headset measures approximately 17 cm wide by 18 cm long by 5.5 cm deep.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

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

System with Accessories

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	HL10	Lifter	EMI LTU #1	N/A
Plantronics	OLI	OLI	EMI OTU #1	N/A
AT&T	Z7303S01B	Telephone	88SP05	N/A

System without Accessories

Manufacturer	Model	Description	Serial Number	FCC ID
Lucent	6416D02A	Telephone		N/A

No support equipment was used during emissions testing.

EUT INTERFACE PORTS

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

System with Accessories

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Base DC power	External AC-DC adapter	2 wire	unshielded	2
Base PSB bus port	Lifter PSB in	integral to lifter	unshielded	1
Lifter PSB out	OLI	integral to OLI	unshielded	1
Base handset in	Phone handset port	2-wire	unshielded	0.3
Base handset out	Phone handset	integral to handset	unshielded	1

System without Accessories

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Base DC power	External AC-DC adapter	2 wire	unshielded	2
Base handset in	Phone handset port	2-wire	unshielded	0.3
Base handset out	Phone handset	integral to handset	unshielded	1

EUT OPERATION

For radiated emissions tests below 1GHz the system under test was configured to operate in transmit/receive mode, with a link between headset and base unit on the specified channel. The headsets were operating from a freshly-charged battery pack.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken November 11, 2005 at the Elliott Laboratories Semi Anechoic Chamber #3 located at 41039 Boyce Road, Fremont, 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 C63.4-2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is 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 non-anechoic shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an Open Area Test Site or semi anechoic chamber. 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 7 GHz. 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 & 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.

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 that 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 up to 12 mm thick 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 appendix 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 or 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 that 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 that have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted and radiated emissions given below are taken from the first edition of CISPR Pub. 22 (1997), "Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment." 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 limits are based on the use of an average or quasi-peak detector as indicated.

CONDUCTED EMISSIONS SPECIFICATION LIMITS,

Frequency Range (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

RADIATED EMISSIONS SPECIFICATION LIMITS

Frequency Range (MHz)	Class B Limit (uV/m @ 3m)	Class B Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

RADIATED EMISSIONS SPECIFICATION LIMITS

Note: The limits for radiated emissions above 1000 MHz are based on the use of an average detector. In addition, limits based on the use of a peak detector are specifed as 20 dB above the limits based on the use of an average detector.

Frequency (MHz)	Average Limit (uV/m @ 3m)	Average Limit (dBuV/m @ 3m)
above 1000	500	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

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

APPENDIX A: Test Equipment Calibration Data

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Preliminary Radiated Emissions, 30 - 1,000 MHz, 01-Nov-05
Engineer: David Bare

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	Log Periodic Antenna 300-1000 MHz	EL300.1000	297	31-Jan-07
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-May-06
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	03-Aug-06
Hewlett Packard	RF Preamplifier, 100 kHz - 1.3 GHz	8447E	1606	05-Aug-06

Conducted Emissions - AC Power Ports, 08-Nov-05
Engineer: Juan Martinez

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	FCC / CISPR LISN	LISN-3, OATS	304	08-Jul-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	787	17-Dec-05
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	23-May-06
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	11-Feb-06

Radiated Emissions, 30 - 1,000 MHz, 11-Nov-05
Engineer: Mark Briggs

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	07-Mar-07
Elliott Laboratories	Log Periodic Antenna 300-1000 MHz	EL300.1000	297	31-Jan-07
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30	1337	12-Jan-06

Radiated Emissions, 30 - 1,000 MHz, 18-Nov-05
Engineer: Adam LaCourse

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20Hz-7GHz	ESIB7	1538	08-Jun-06
Sunol Sciences	Biconilog, 30-3000MHz	JB3	1549	26-Apr-06

APPENDIX B: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T61720 11 Pages

Elliott

EMC Test Data

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	Test-Log Number:	T61720
		Project Manager:	Juan Martinez
Contact:	Blanca Piedra		
Emissions Spec:	FCC Part 15	Class:	B
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Plantronics

Model

CS351, CS361, CS351N, & CS361N

Date of Last Test: 11/18/2005

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	Test-Log Number:	T61720
		Project Manager:	Juan Martinez
Contact:	Blanca Piedra		
Emissions Spec:	FCC Part 15	Class:	B
Immunity Spec:	-	Environment:	-

EUT INFORMATION

The following information was collected during the test sessions(s).

General Description

The EUTs are a series of Wireless Telephone Headset Adaptors which are designed to use the UPCS (Unlicensed Personal Communications Service) band and operate under FCC Part 15 Subpart D. The systems are comprised of a headset and associated base unit. The base unit is common to all of these systems, the differences in the units are in the headsets, specifically the headphone type (monaural or binaural) and the microphone (Voice Tube or Noise Cancelling).

All four models in the series are:

CS351 Monaural Voice Tube Headset and Base (CS351 Mon VT)
CS361 Binaural Voice Tube Headset and Base (CS361 Bin VT)
CS351N Monaural Noise Cancelling Headset and Base (CS351N Mon NC)
CS361N Binaural Noise Cancelling Headset and Base (CS361N Bin NC)

Preliminary measurements were made on each model in the series, with the unit configured on the top channel with accessories connected and on the bottom channel without accessories to determine the worst case configuration with respect to channel and connected accessories. Units were tested in pairs (CS351 with CS 361, CS 351N with CS 361N) as follows:

CS351 on low channel, without accessories and CS361 on high channel, with accessories
CS351 on high channel, with accessories and CS361 on low channel, without accessories
CS351N on low channel, without accessories and CS361N on high channel, with accessories
CS351N on high channel, with accessories and CS361N on low channel, without accessories

(Note - the operating frequency is determined by the base unit).

Normally, the base unit would be placed on a tabletop during operation. The headset is worn on the head or placed in a cradle on the base. The base unit was treated as tabletop equipment during testing to simulate the end-user environment. The headset was tested in the cradle of its respective base unit and also on its own, out of the cradle and oriented as best as possible to represent its intended, on the head use.

The electrical rating of the base unit is 120 V, 60 Hz, 62.5mAmps (via an external AC-DC adapter). The headset is battery-powered and the batteries are charged from the base unit when the headset is installed in the cradle.

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EMC Test Data

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	Test-Log Number:	T61720
		Project Manager:	Juan Martinez
Contact:	Blanca Piedra		
Emissions Spec:	FCC Part 15	Class:	B
Immunity Spec:	-	Environment:	-

Equipment Under Test

CS351 Mon VT

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	CS351 Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)	-
Plantronics	CS351 Base	Wireless Telephone Adapter Base	BI1500007 (High channel)	-
Plantronics	CS351 Headset	Wireless Telephone adapter Headset Monaural VT	HI500001-F	-

CS361 Bin VT

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	CS361 Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)	-
Plantronics	CS361 Base	Wireless Telephone Adapter Base	BI1500007 (High channel)	-
Plantronics	CS361 Headset	Wireless Telephone adapter Headset Binaural VT	HI500002-F	-

CS351N Mon NC:

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	CS351N Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)	-
Plantronics	CS351N Base	Wireless Telephone Adapter Base	BI1500007 (High channel)	-
Plantronics	CS351N Headset	Wireless Telephone Adapter Headset Monaural NC	HI500003-F	-

CS361N Bin NC:

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	CS361N Base	Wireless Telephone Adapter Base	BI1500166 (Low channel)	-
Plantronics	CS361N Base	Wireless Telephone Adapter Base	BI1500007 (High channel)	-
Plantronics	CS361N Headset	Wireless Telephone Adapter Headset Binaural NC	HI500004-F	-

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	Test-Log Number:	T61720
		Project Manager:	Juan Martinez
Contact:	Blanca Piedra		
Emissions Spec:	FCC Part 15	Class:	B
Immunity Spec:	-	Environment:	-

Other EUT Details

The low channel is 1921.536MHz, the high channel is 1928.448MHz. The receiver LO operates at 864kHz above the operating frequency. The handset links to the frequency of the base.
Models family name: SupraPlus Wireless

EUT Antenna

The antenna is integral to both headset and base unit, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The base unit enclosure is primarily constructed of plastic. It measures approximately 10.7 cm wide by 10.4 cm deep by 12.2 cm high.
The CS361 & CS361N binaural and CS351 & CS351N monaural headset enclosures are primarily constructed of plastic. The binaural headset measures approximately 18 cm wide by 18 cm long by 5.5 cm deep. The monaural headset measures approximately 17 cm wide by 18 cm long by 5.5 cm deep.

Modification History

Mod. #	Test	Date	Modification
1			

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

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Project Manager:	Juan Martinez
Contact:	Blanca Piedra		
Emissions Spec:	FCC Part 15	Class:	B
Immunity Spec:	-	Environment:	-

Test Configuration #1

The following information was collected during the test sessions(s).

Local Support Equipment - System with Accessories

Manufacturer	Model	Description	Serial Number	FCC ID
Plantronics	HL10	Lifter	EMI LTU #1	N/A
Plantronics	OLI	OLI	EMI OTU #1	N/A
AT&T	Z7303S01B	Telephone	88SP05	N/A

Local Support Equipment - System without Accessories

Manufacturer	Model	Description	Serial Number	FCC ID
Lucent	6416D02A	Telephone		N/A

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports - System with Accessories

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Base DC power	External AC-DC adapter	2 wire	unshielded	2
Base PSB bus port	Lifter PSB in	integral to lifter	unshielded	1
Lifter PSB out	OLI	integral to OLI	unshielded	1
Base handset in	Phone handset port	2-wire	unshielded	0.3
Base handset out	Phone handset	integral to handset	unshielded	1

Interface Cabling and Ports - System without Accessories

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Base DC power	External AC-DC adapter	2 wire	unshielded	2
Base handset in	Phone handset port	2-wire	unshielded	0.3
Base handset out	Phone handset	integral to handset	unshielded	1

EUT Operation During Emissions Tests

For radiated emissions tests below 1GHz the system under test was configured to operate in transmit/receive mode, with a link between headset and base unit on the specified channel. The headsets were operating from a freshly-charged battery pack.

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

AC Port Conducted Emissions - CS351N

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: 11/8/2005
Test Engineer: Juan Martinez
Test Location: SVOATS #2
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN.

Ambient Conditions:

Temperature: 13 °C
Rel. Humidity: 88 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	EN55022 B	Pass	33.6dBµV @ 1.221MHz (-12.4dB)

Modifications Made During Testing:

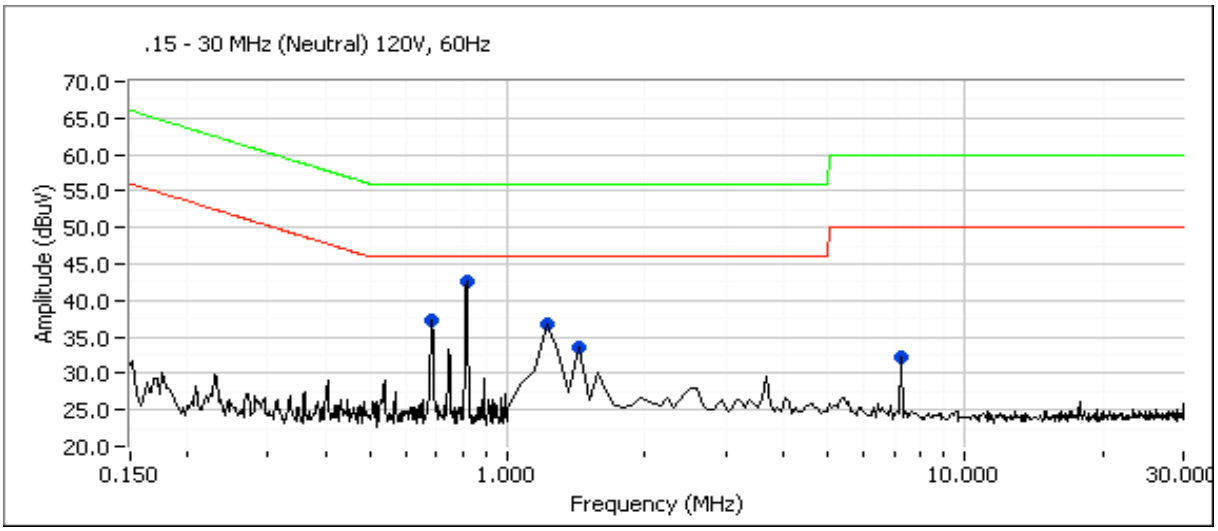
No modifications were made to the EUT during testing

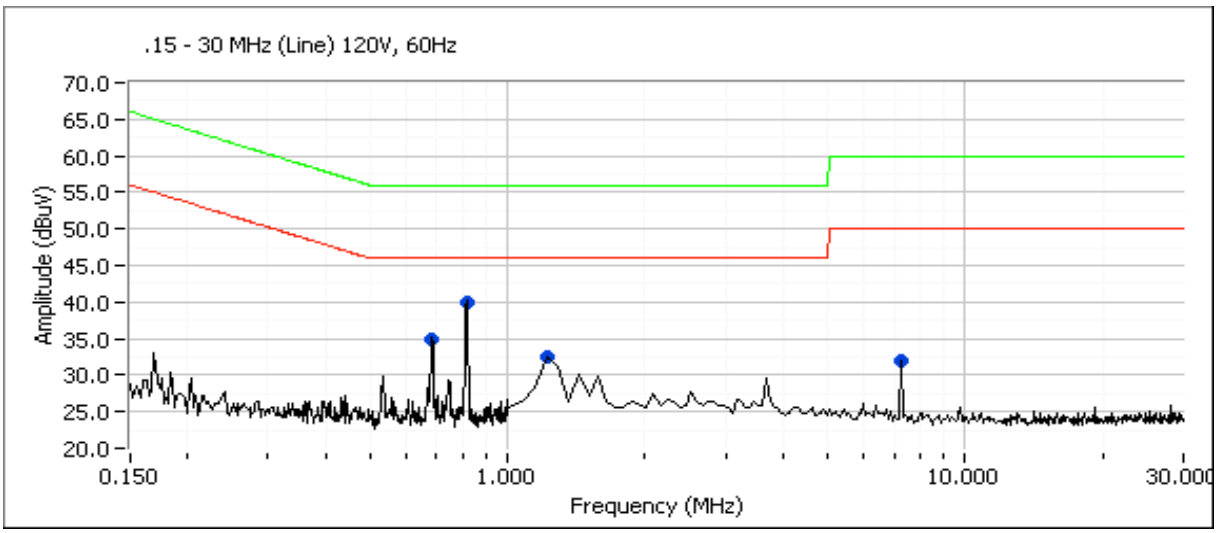
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz
CS361N Binaural NC (Base SN: BI1500007) with accessories





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EMC Test Data

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
1.221	33.6	Neutral	46.0	-12.4	Peak	Note 1
0.808	32.5	Line	46.0	-13.5	Peak	Note 1
7.235	32.2	Neutral	50.0	-17.9	Peak	Note 1
7.235	32.0	Line	50.0	-18.0	Peak	Note 1
0.681	37.3	Neutral	46.0	-8.7	Peak	AM radio ambient, Peak Reading Average Limit
0.811	42.6	Neutral	46.0	-3.4	Peak	AM radio ambient, Peak Reading Average Limit
1.170	36.8	Neutral	46.0	-9.2	Peak	AM radio ambient, Peak Reading Average Limit
0.810	40.1	Line	46.0	-5.9	Peak	AM radio ambient, Peak Reading Average Limit
0.680	35.0	Line	46.0	-11.0	Peak	AM radio ambient, Peak Reading Average Limit

Note 1:	No QP measurements taken since peak reading is more then 6-dB below the average limit.

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

Radiated Emissions - NC Configurations

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

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: 11/18/2005
Test Engineer: Adam LaCourse
Test Location: Fremont Chamber #3
Config. Used: #2 (run 1,2); #1 (run 3,4)
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing.

Unless otherwise specified, the measurement antenna was located 3m meters from the EUT for the measurement range 30 - 1000 MHz and 3m from the EUT for the frequency range 1 - 10 GHz.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Ambient Conditions:

Temperature: 17.7 °C
Rel. Humidity: 43 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin	Note
1	RE, 30 - 1000 MHz, Maximized Emissions	FCC B	Pass	33.7dBµV/m @ 207.345MHz (-9.8dB)	2 Units @ same time

Modifications Made During Testing

No modifications were made to the EUT during testing

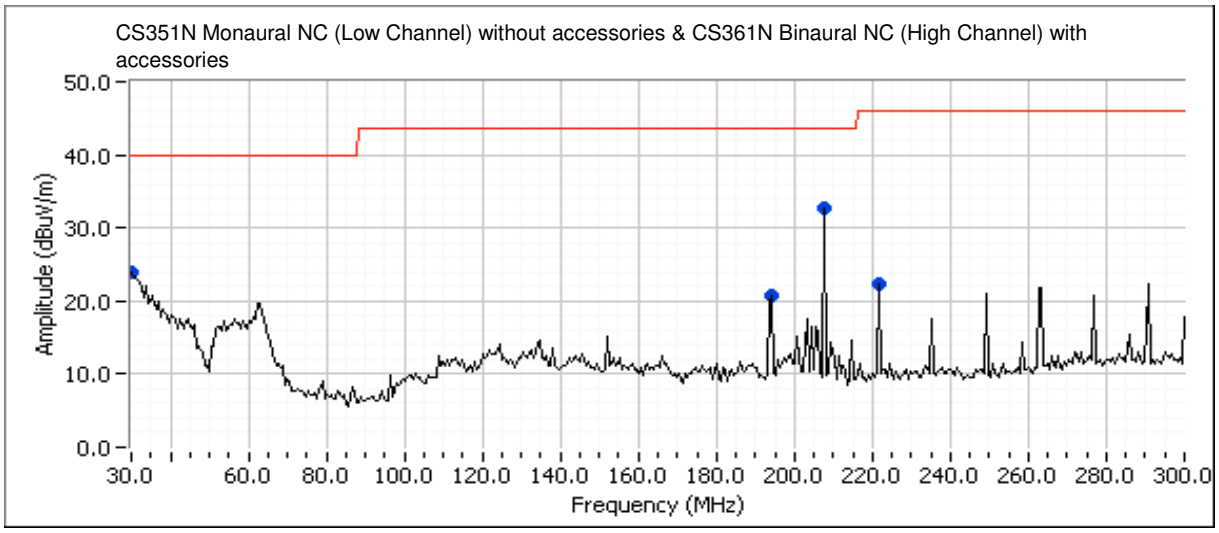
Deviations From The Standard

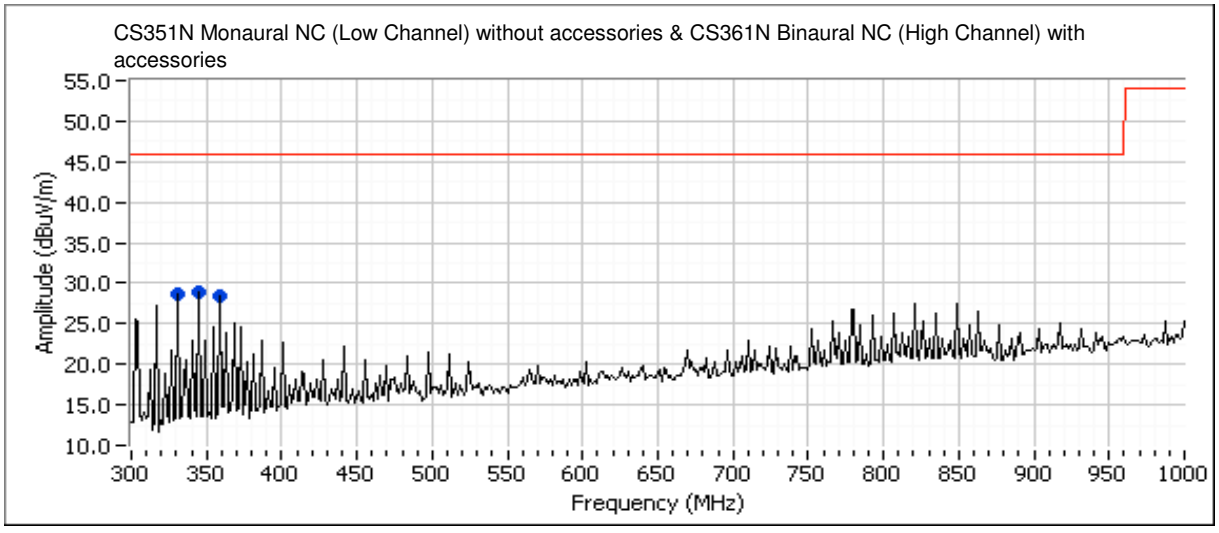
No deviations were made from the requirements of the standard.

Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

CS351N Monaural NC (Low Channel) without accessories & CS361N Binaural NC (High Channel) with accessories
Refer to Test Configuration #1.





Client:	Plantronics	Job Number:	J61697
Model:	CS351, CS361, CS351N, & CS361N	T-Log Number:	T61720
		Account Manager:	Juan Martinez
Contact:	Blanca Piedra		
Spec:	FCC Part 15	Class:	B

Run #3: Preliminary Radiated Emissions, 30 - 1000 MHzContinued…

CS351N Monaural NC (Low Channel) without accessories & CS361N Binaural NC (High Channel) with accessories

Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
207.345	32.8	H	43.5	-10.7	Peak	217	1.0	
30.238	24.0	V	40.0	-16.0	Peak	147	1.0	
340.970	28.8	H	46.0	-17.2	Peak	28	1.0	
331.758	28.6	H	46.0	-17.4	Peak	28	1.0	
359.366	28.5	H	46.0	-17.5	Peak	3	1.0	
193.559	20.8	H	43.5	-22.7	Peak	85	1.0	
221.154	22.3	H	46.0	-23.7	Peak	260	1.0	

Preliminary quasi-peak readings (no manipulation of EUT interface cables)

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
207.345	32.8	H	43.5	-10.7	QP	242	1.0	
331.758	29.3	H	46.0	-16.7	QP	18	1.0	
359.366	22.6	H	46.0	-23.4	QP	32	1.0	
193.559	20.0	H	43.5	-23.5	QP	232	1.0	
340.970	22.3	H	46.0	-23.7	QP	191	1.0	
221.154	21.8	H	46.0	-24.2	QP	86	1.0	
30.238	15.0	V	40.0	-25.0	QP	124	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
207.345	33.7	H	43.5	-9.8	QP	242	1.0	
331.758	31.0	H	46.0	-15.0	QP	18	1.0	
340.970	23.2	H	46.0	-22.8	QP	191	1.0	
359.366	22.6	H	46.0	-23.4	QP	32	1.0	
193.559	20.0	H	43.5	-23.5	QP	232	1.0	
221.154	22.1	H	46.0	-23.9	QP	86	1.0	

APPENDIX C: Test Configuration Photographs

APPENDIX D: Reference Documents

Title 47 CFR, Part 2, Subpart I	"Marketing of Radiofrequency Devices"
Title 47 CFR, Part 2, Subpart J	"Equipment Authorization Procedures"
Title 47 CFR, Part 2, Subpart K	"Importation of Devices Capable of Causing Harmful Interference"
Title 47 CFR, Part 15, Subpart B	"Unintentional Radiators"
ANSI C63.4-2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
FCC/OST Bulletin # 61 (1993)	"The FCC Equipment Authorization Program for Radio Frequency Devices"
FCC/OST Bulletin # 62 (1993)	"Understanding the FCC Regulations Concerning Computing Devices"
Title 47 USC, Sections 501-504	Penalties for Non-compliance with FCC Rules
CISPR Pub. 22 (1997)	"Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment"

APPENDIX E: FCC Labeling and User Information

The following information has been provided to clarify equipment labeling requirements and the information which must be included in the operator's manual. These requirements are found in the FCC Rules for radio frequency devices, Part 15.

LABEL

Digital Device Label

Each digital device which has been verified as complying with the Class B limits shall have permanently attached in a conspicuous location for the user to observe, a label with the following statement:

> This device complies with Part 15 of 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.

Label Location

The FCC has defined *conspicuous location* as any location readily visible to the user of the device without the use of tools.

Label Attachment

The FCC has defined *permanently attached* as a label that can normally be expected to remain fastened to the equipment during the equipment's expected useful life. A paper gum label will generally not meet this condition.

FCC Labeling and User Information

OPERATOR'S MANUAL

The following warning or similar statement shall be provided in a conspicuous location in the operator's manual such that the user of the equipment is aware of its interference potential. Additional information about corrective measures may also be provided to the user at the manufacturer's option.

> **NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device 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 instructions, 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 and correct the interference by one or more of the following measures:
> - Reorient or relocate the receiving antenna.
> - Increase the separation between the equipment and the 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.

Accessories

Where special accessories, such as shielded cables, are required in order to meet FCC emission limits, appropriate instructions regarding the need to use such accessories must be contained on the first page of text concerned with the installation of the device in the operator's manual.

Modifications

The operator's manual must caution the user that changes or modifications not expressly approved by you, the manufacturer, could void their right to operate the equipment.

Binding

The FCC has indicated that the radio interference statement be bound in the same manner as the operator's manual. Thus, a loose-leaf insert page in a bound or center-spine stapled manual would not meet this condition.