FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

900 MHZ CORDLESS BASE UNIT

MODEL NUMBER: CS50

BRAND NAME: PLANTRONICS

FCC ID: AL8CS50XXXX

REPORT NUMBER: 03U2166-1A

ISSUE DATE: AUGUST 11, 2003

Prepared for
PLANTRONICS, INC.
345 ENCINAL STREET
SANTA CRUZ, CA 95060
USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
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1. TEST RESULT CERTIFICATION

COMPANY NAME: PLANTRONICS, INC.
345 ENCINAL STREET
SANTA CRUZ, CA 95060, USA

EUT DESCRIPTION: 900 MHz Cordless Base Unit

MODEL: CS50

DATE TESTED: Aug.1 – Aug.8, 2003

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

THANH NGUYEN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

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2. EUT DESCRIPTION

The EUT is the 900MHz Cordless Base Amplifier unit operates in frequency range from 902 to 928 MHz. The Base has the maximum output power 15.94dBm with antenna gain of 2.1dBi.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/1992, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

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5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

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5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Quasi-Peak Adaptor	**HP**	**85650A**	**2521A01038**	**7/16/2004**
SA Display Section 3	**HP**	**85662A**	**2314A04793**	**7/16/2004**
SA RF Section, 1.5 GHz	**HP**	**85680A**	**2314A02604**	**11/26/2003**
Preamplifier, 1300 MHz	**HP**	**8447D**	**2944A06550**	**8/22/2003**
Antenna, Log Periodic 200 ~ 1000 MHz	**EMCO**	**3146**	**9107-3163**	**3/6/2004**
Antenna, Biconical	**Eaton**	**94455-1**	**1214**	**3/6/2004**
EMI Test Receiver	**R & S**	**ESHS 20**	**827129/006**	**7/18/2004**
LISN, 10 kHz ~ 30 MHz	**Solar**	**8012-50-R-24-BNC**	**837990**	**9/6/2003**
LISN, 10 kHz ~ 30 MHz	**FCC**	**50/250-25-2**	**114**	**9/6/2003**
Line Filter	**Lindgren**	**LMF-3489**	**497**	**NCR**
Spectrum Analyzer	**Agilent**	**E4446A**	**US42070220**	**1/13/2004**
Spectrum Analyzer	**Agilent**	**E4440A**	**US41421507**	**5/8/2004**
Power Meter	**Agilent**	**E4416A**	**GB41291160**	**9/5/2003**

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6. SETUP OF EQUIPMENT UNDER TEST

6.1. SETUP OF THE BASE

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Telephone set	Panasonic	KX-T7220	4KCIA019501	N/A

I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Phone	1	RJ11	Unshielded	2m	N/A
2	DC	1	DC Power	Unshielded	2m	N/A

TEST SETUP

The Base was connected to the telephone set and communicates to the remote Head set.

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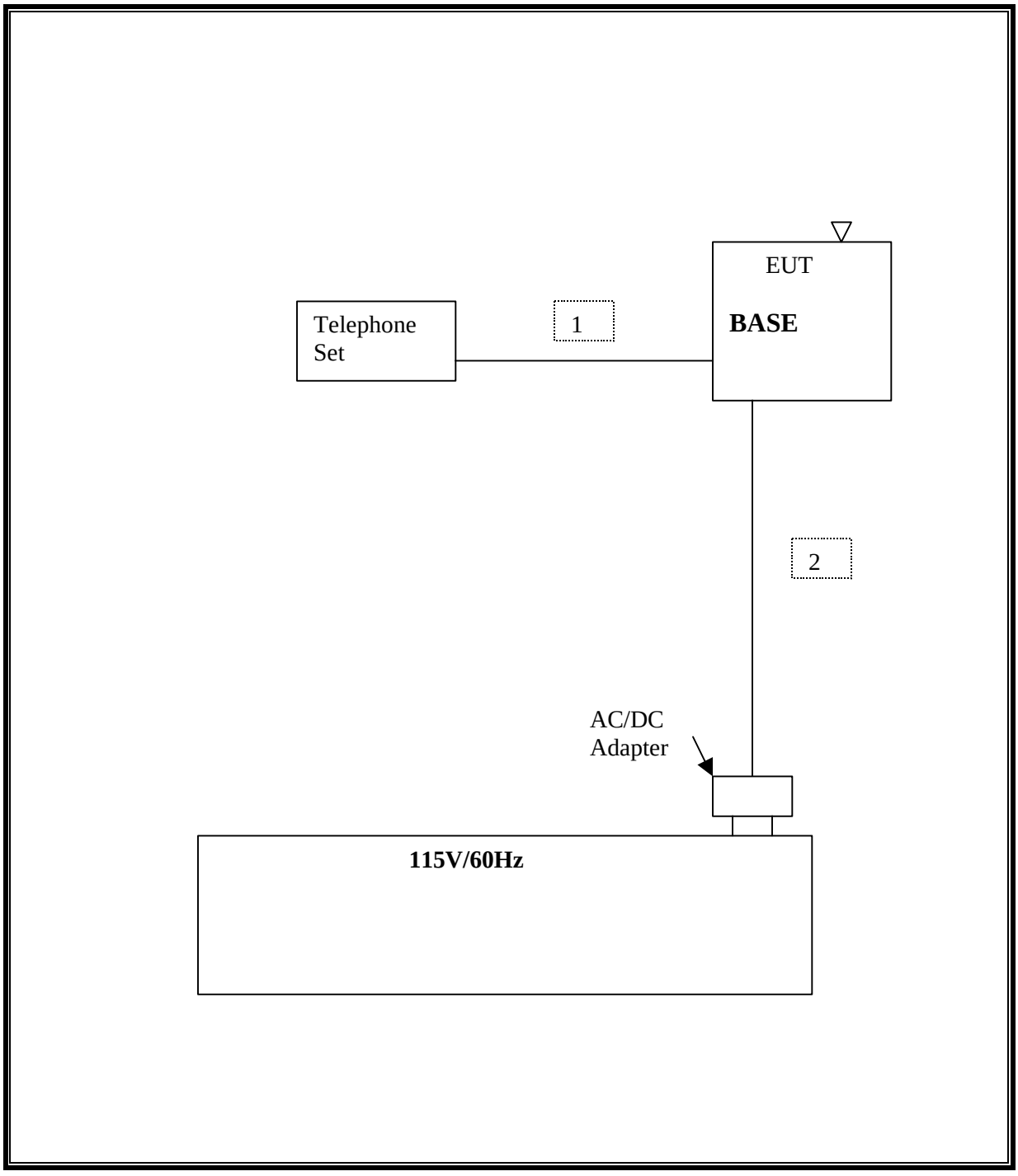
SETUP DIAGRAM BASE



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7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 6 dB BANDWIDTH

LIMIT

§15.247 (a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

Base

Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Minimum Limit (kHz)	Margin (kHz)
Low	906	1200	500	700
Middle	915	1210	500	710
High	924	1210	500	710

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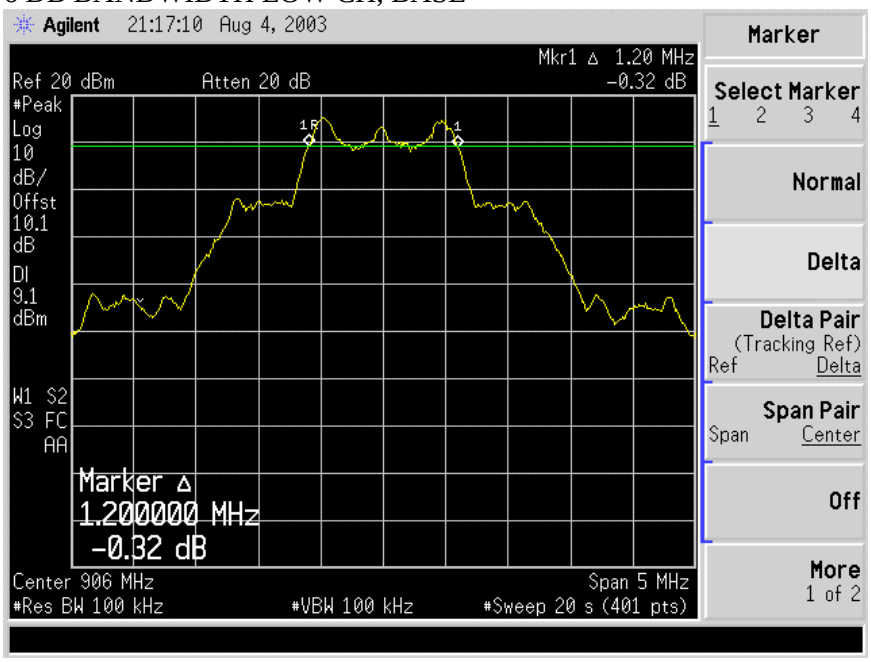
6 DB BANDWIDTH BASE

6 DB BANDWIDTH LOW CH, BASE



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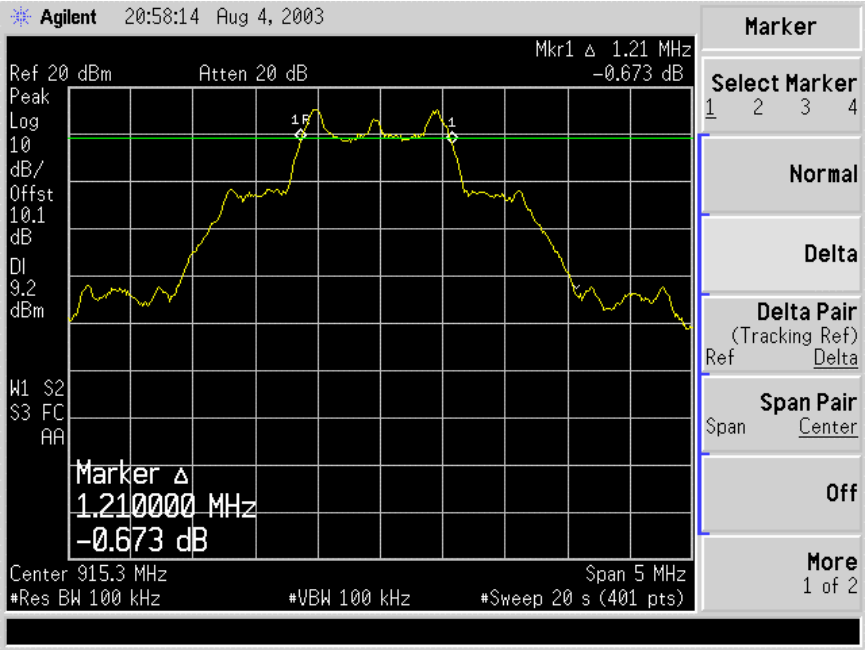
6 DB BANDWIDTH MID CH BASE



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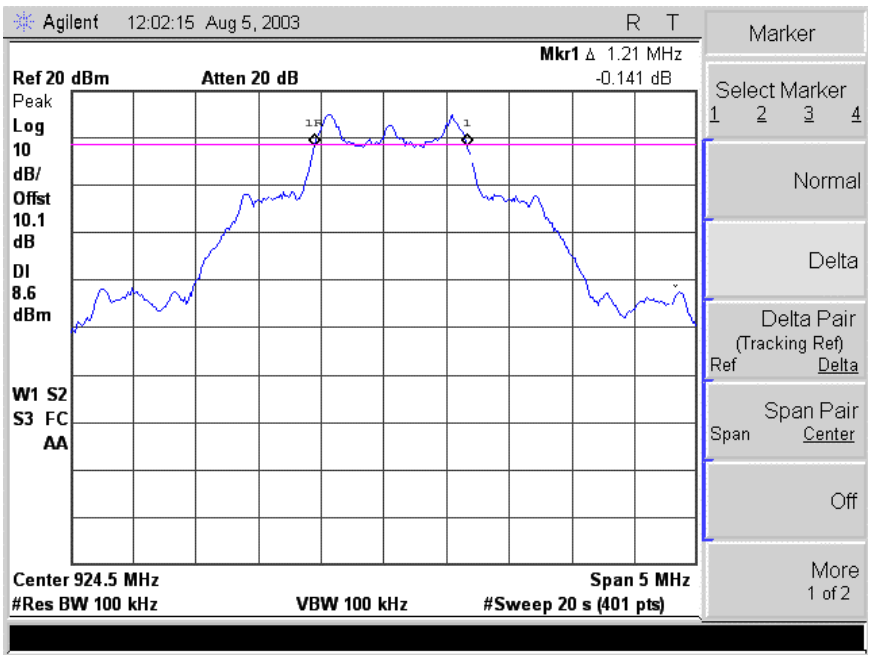
6 DB BANDWIDTH HIGH CH BASE



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7.2. 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

No non-compliance noted:

BASE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	906	2.2311
Middle	915	2.2694
High	924	2.2637

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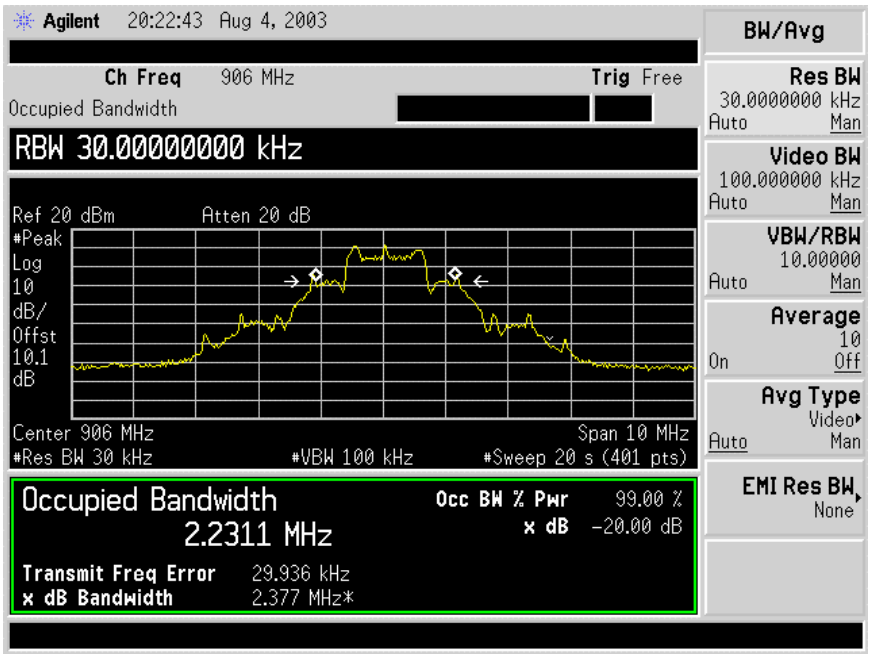
99% BANDWIDTH BASE

99% BANDWIDTH LOW CH BASE



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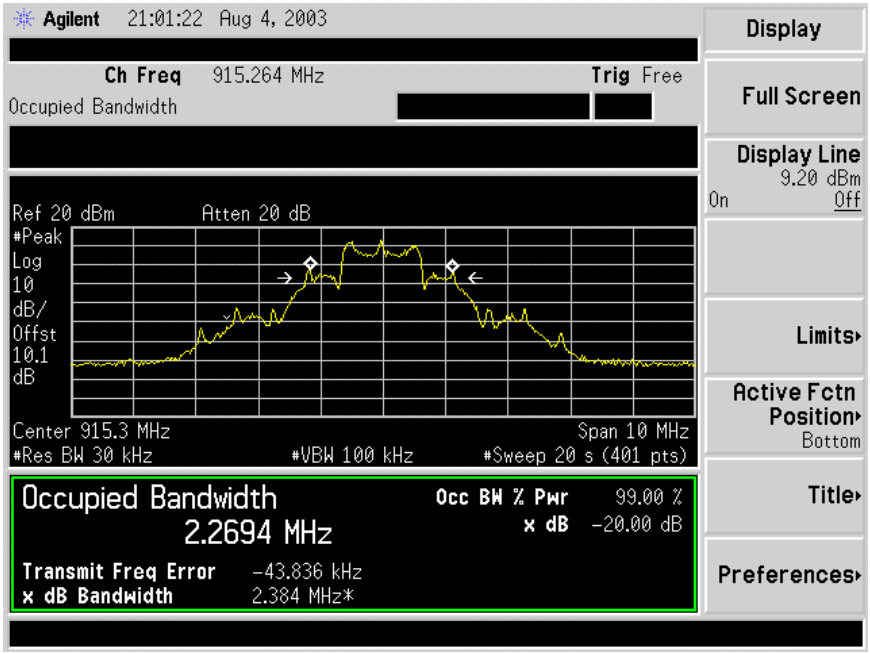
99% BANDWIDTH MID CH BASE



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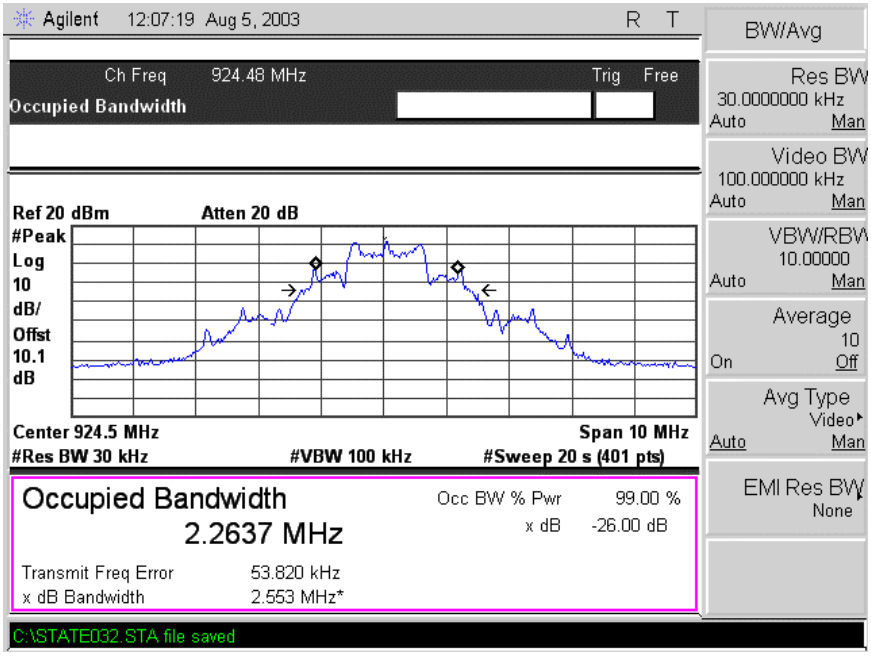
99% BANDWIDTH HIGH CH BASE



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7.3. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 2.1 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over the 99% bandwidth.

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RESULTS

No non-compliance noted:

BASE

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	906	15.94	30	-14.06
Middle	915	15.89	30	-14.11
High	924	15.66	30	-14.34

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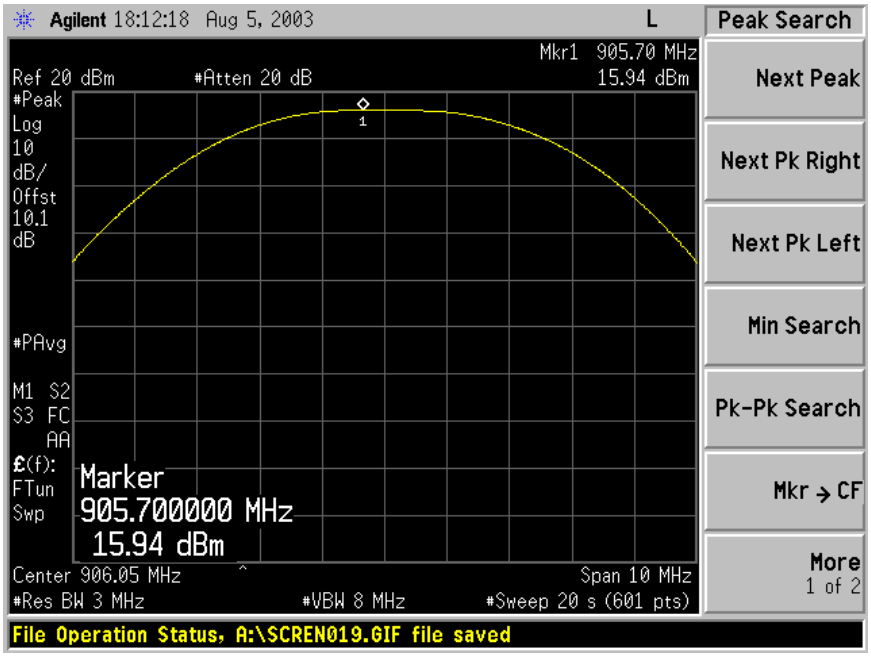
OUTPUT POWER BASE

PEAK POWER LOW CH BASE



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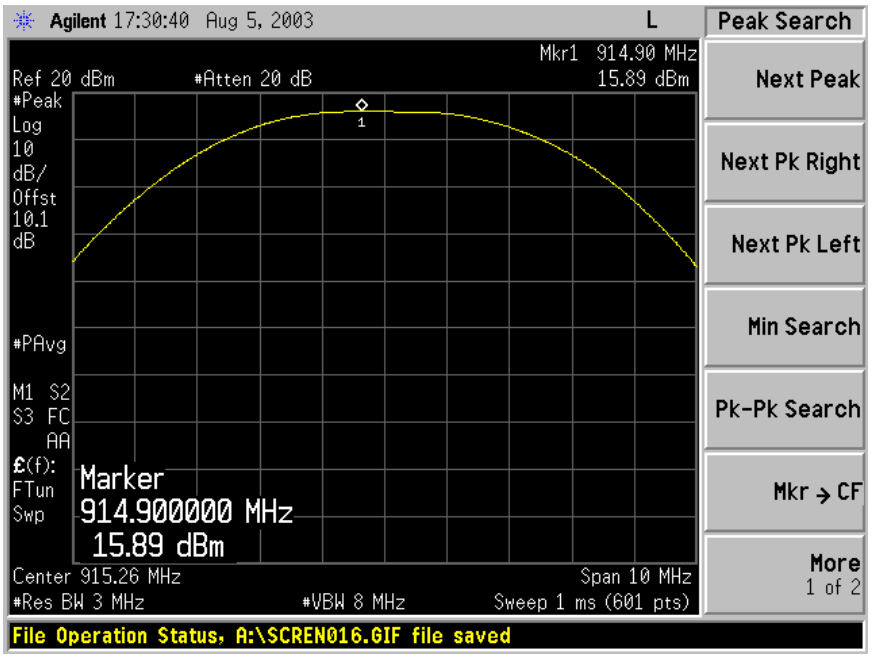
PEAK POWER MID CH BASE



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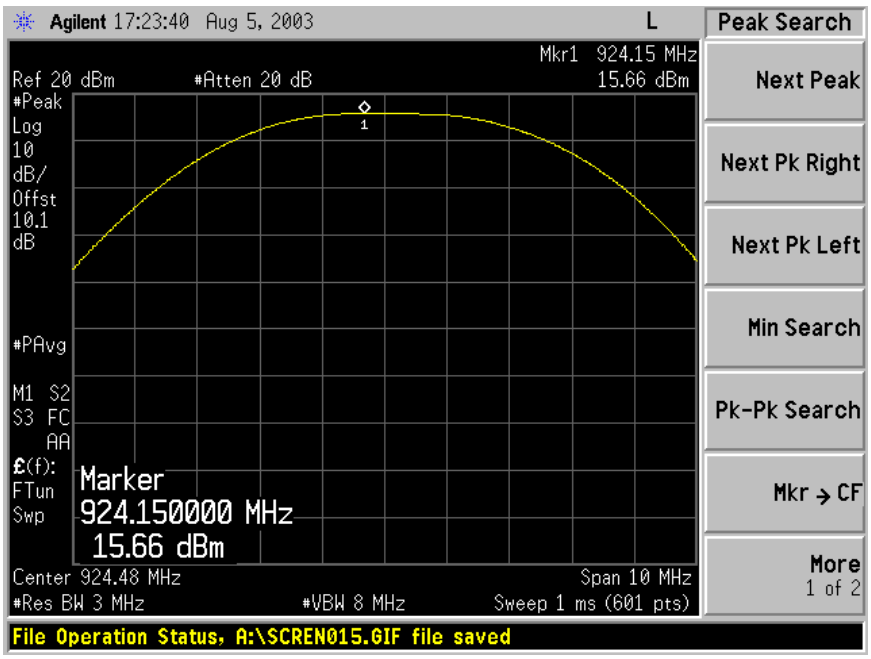
PEAK POWER HIGH CH BASE



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7.4. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 10.1 dB (including 10 dB pad and .1dB cable) was entered as an offset in the power meter to allow for direct reading of power.

BASE

Channel	Frequency (MHz)	Average Power (dBm)
Low	906	2.00
Middle	915	1.27
High	924	1.00

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7.5. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.247 (d) For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

RESULTS

No non-compliance noted:

BASE

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	906	2.74	8	-5.27
Middle	915	3.82	8	-4.18
High	924	3.65	8	-4.35

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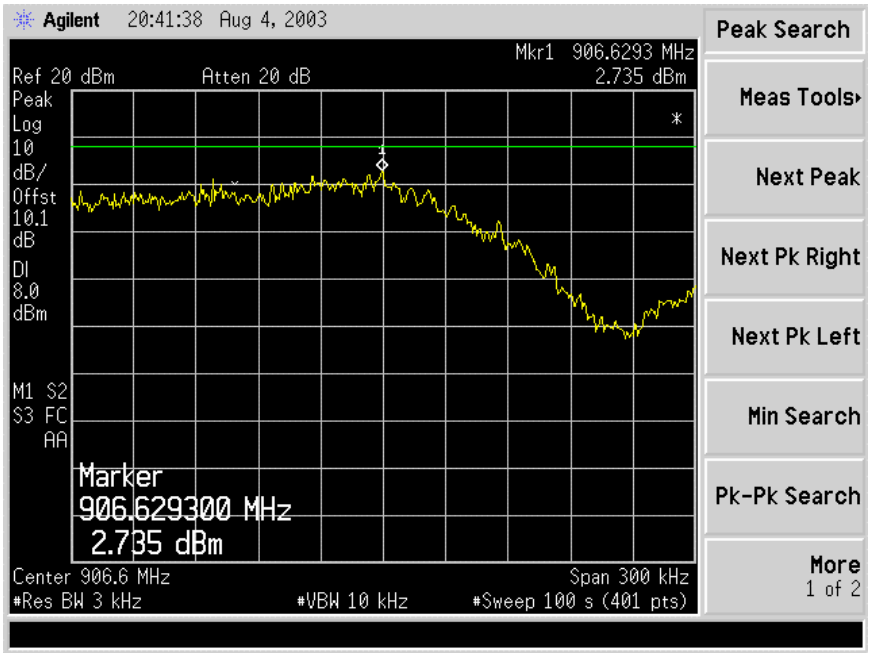
PEAK POWER SPECTRAL DENSITY BASE

PPSD LOW CH BASE



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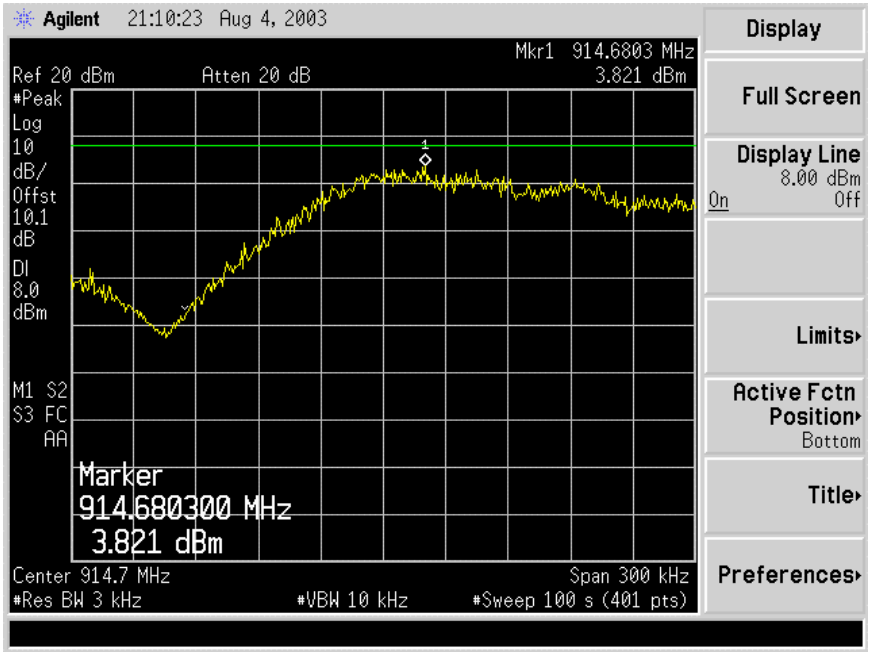
PPSD MID BASE



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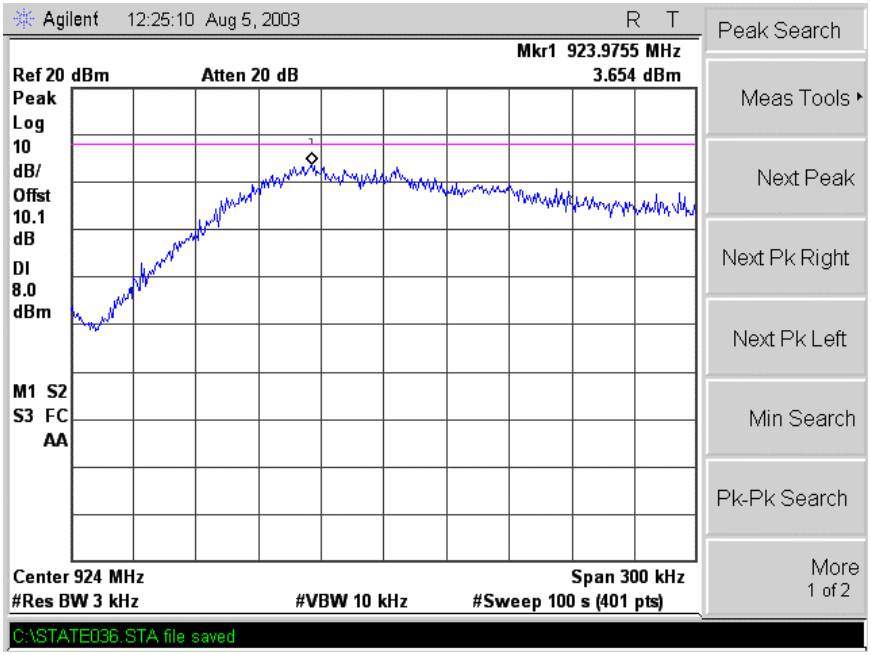
PPSD HIGH CH BASE



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7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

No non-compliance noted:

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SPURIOUS EMISSIONS, BASE LOW CHANNEL

LOW CH BANDEDGE, BASE

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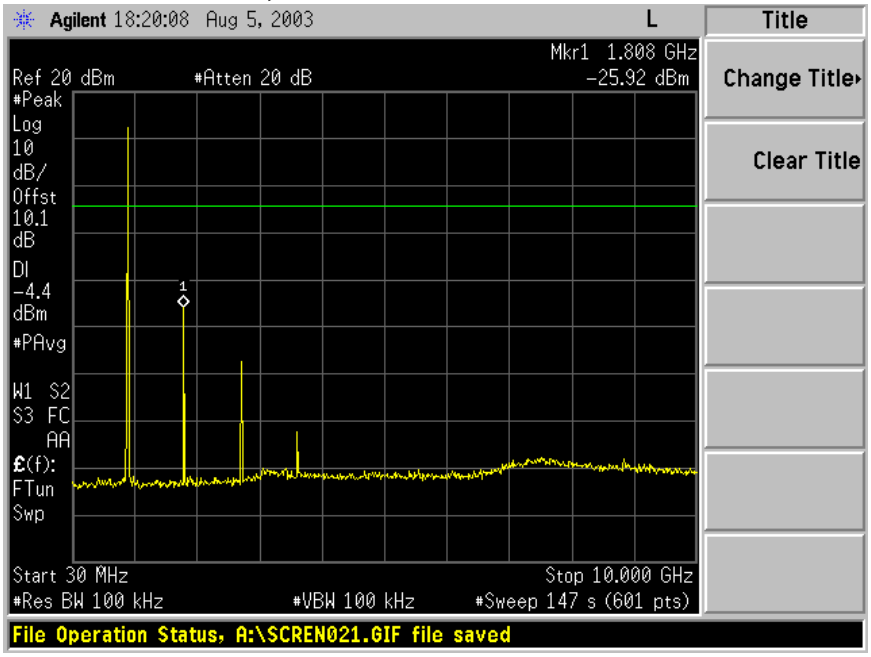
LOW CH SPURIOUS, BASE



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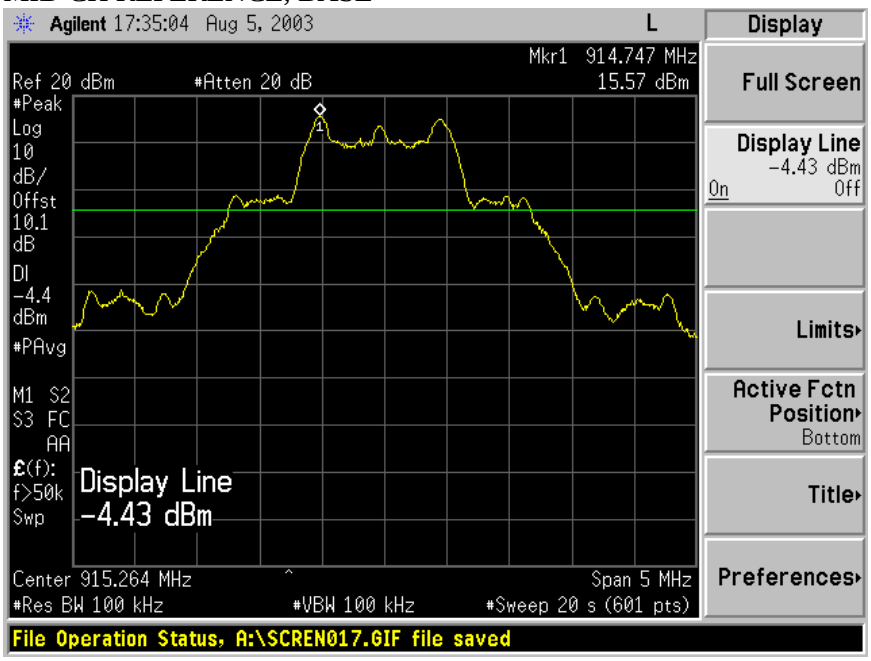
SPURIOUS EMISSIONS, MID CHANNEL BASE

MID CH REFERENCE, BASE



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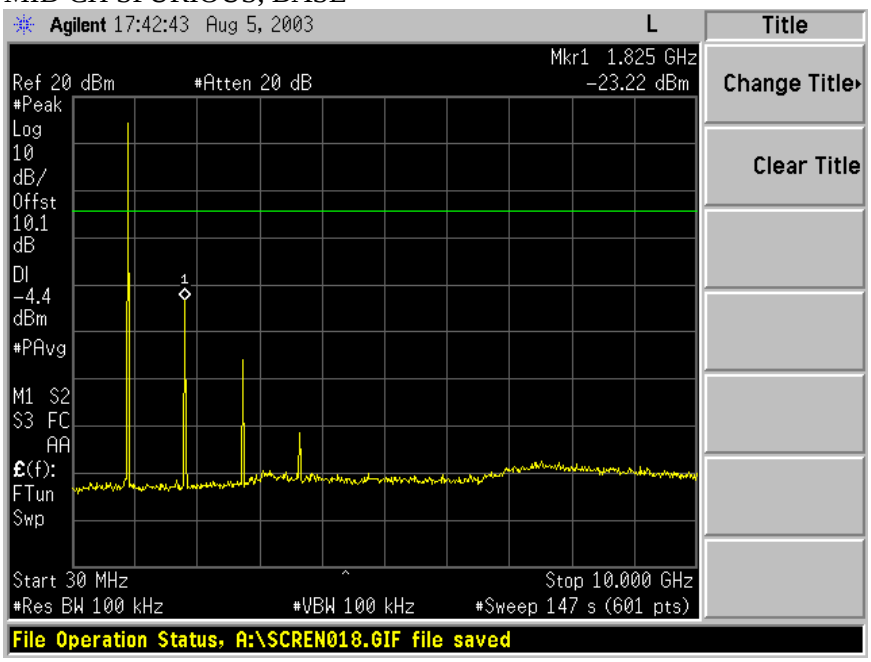
MID CH SPURIOUS, BASE



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SPURIOUS EMISSIONS, HIGH CHANNEL BASE

HIGH CH BANDEDGE, BASE

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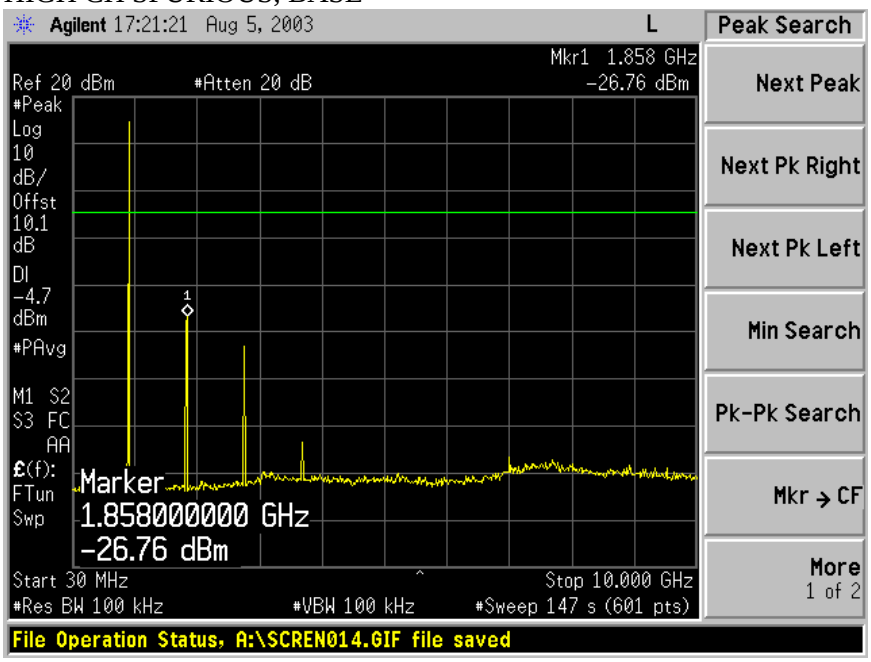
HIGH CH SPURIOUS, BASE



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7.7. RADIATED EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

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TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

No non-compliance noted:

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HARMONICS AND SPURIOUS EMISSIONS BASE LOW CHANNEL

08/04/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2166-1
Company: PLANTRONICS INC.
EUT Descrip.: 900MHZ Headset & Adapter. BASE UNIT
EUT M/N: CS50
Test Target: FCC Part 15 & RSS 210.
Mode Oper: TX Mode

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T59; S/N: 3245 @3m	T87 Miteq 924342	E4407B ESA	

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
Tx at LOW Channel 906.048MHz															
Spurious and Harmonics Emissions .															
1.812	9.8	80.2	59.2	27.5	1.5	-43.3	0.0	1.0	66.9	45.9	74.0	54.0	-7.1	-8.1	V
2.718	9.8	62.3	45.1	30.1	2.2	-43.2	0.0	1.0	52.4	35.2	74.0	54.0	-21.6	-18.8	V
3.624	9.8	64.5	50.2	31.9	2.7	-43.7	0.0	1.0	56.4	42.1	74.0	54.0	-17.6	-11.9	V
3.624	9.8	68.3	52.5	31.9	2.7	-43.7	0.0	1.0	60.2	44.4	74.0	54.0	-13.8	-9.6	V
4.530	9.8	69.1	53.4	32.9	3.0	-44.4	0.0	1.0	61.5	45.9	74.0	54.0	-12.5	-8.1	V
5.436	9.8	66.9	53.2	33.7	3.4	-44.8	0.0	1.0	60.1	46.4	74.0	54.0	-13.9	-7.6	V
1.812	9.8	83.0	59.2	27.5	1.5	-43.3	0.0	1.0	69.8	45.9	74.0	54.0	-4.2	-8.1	V
2.718	9.8	63.7	40.4	30.1	2.2	-43.2	0.0	1.0	53.7	30.5	74.0	54.0	-20.3	-23.5	H
3.624	9.8	71.3	57.3	31.9	2.7	-43.7	0.0	1.0	63.2	49.2	74.0	54.0	-10.8	-4.8	H
3.624	9.8	71.7	57.3	31.9	2.7	-43.7	0.0	1.0	63.6	49.2	74.0	54.0	-10.4	-4.8	H
4.530	9.8	69.1	57.8	32.9	3.0	-44.4	0.0	1.0	61.5	50.3	74.0	54.0	-12.5	-3.7	H
5.436	9.8	66.9	57.7	33.7	3.4	-44.8	0.0	1.0	60.1	50.9	74.0	54.0	-13.9	-3.1	H
No more spurious emissions up to 10th harmonic both Vertical & Horizontal mast antenna.															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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HARMONICS AND SPURIOUS EMISSIONS BASE MID CHANNEL

08/04/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2166-1
Company: PLANTRONICS INC.
EUT Descrip.: 900MHZ Headset & Adapter. BASE UNIT
EUT M/N: CS50
Test Target: FCC Part 15 & RSS 210.
Mode Oper: TX Mode

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T59; S/N: 3245 @3m	T87 Miteq 924342	E4407B ESA	

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
	Tx at MID Channel 915.256MHz														
	Spurious and Harmonics Emissions .														
1.005	9.8	84.3	62.7	23.9	1.0	-43.4	0.0	0.0	65.8	44.1	74.0	54.0	-8.2	-9.9	V
1.021	9.8	86.9	59.9	24.0	1.0	-43.4	0.0	0.0	68.5	41.4	74.0	54.0	-5.5	-12.6	V
1.040	9.8	85.4	65.0	24.1	1.0	-43.4	0.0	0.0	67.0	46.6	74.0	54.0	-7.0	-7.4	V
1.060	9.8	79.1	62.9	24.2	1.0	-43.4	0.0	0.0	60.8	44.6	74.0	54.0	-13.2	-9.4	V
1.080	9.8	78.5	60.9	24.3	1.0	-43.4	0.0	0.0	60.3	42.7	74.0	54.0	-13.7	-11.3	V
1.100	9.8	78.5	60.9	24.4	1.0	-43.4	0.0	0.0	60.5	42.9	74.0	54.0	-13.5	-11.1	V
1.120	9.8	72.2	56.2	24.5	1.0	-43.4	0.0	0.0	54.3	38.3	74.0	54.0	-19.7	-15.7	V
1.828	9.8	83.0	59.2	27.6	1.6	-43.3	0.0	1.0	69.8	46.0	74.0	54.0	-4.2	-8.0	V
2.745	9.8	63.7	40.4	30.2	2.2	-43.2	0.0	1.0	53.8	30.6	74.0	54.0	-20.2	-23.4	V
3.659	9.8	71.3	52.2	32.0	2.7	-43.7	0.0	1.0	63.2	44.1	74.0	54.0	-10.8	-9.9	V
3.661	9.8	71.7	53.4	32.0	2.7	-43.7	0.0	1.0	63.6	45.3	74.0	54.0	-10.4	-8.7	V
4.576	9.8	69.1	51.1	32.9	3.0	-44.5	0.0	1.0	61.5	43.6	74.0	54.0	-12.5	-10.4	V
5.491	9.8	66.9	52.2	33.7	3.4	-44.8	0.0	1.0	60.1	45.5	74.0	54.0	-13.9	-8.5	V
2.746	9.8	61.7	41.0	30.2	2.2	-43.2	0.0	1.0	51.9	31.2	74.0	54.0	-22.1	-22.8	H
3.661	9.8	62.3	41.8	32.0	2.7	-43.7	0.0	1.0	54.2	33.7	74.0	54.0	-19.8	-20.3	H
4.576	9.8	61.6	42.3	32.9	3.0	-44.5	0.0	1.0	54.1	34.8	74.0	54.0	-19.9	-19.2	H
No more spurious emissions up to 10th harmonic both Vertical & Horizontal mast antenna.															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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HARMONICS AND SPURIOUS EMISSIONS BASE HIGH CHANNEL

08/04/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: THANH NGUYEN
Project #: 03U2166-1
Company: PLANTRONICS INC.
EUT Descrip.: 900MHZ Headset & Adapter. BASE UNIT
EUT M/N: CS50
Test Target: FCC Part 15 & RSS 210.
Mode Oper: TX Mode

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T59; S/N: 3245 @3m	T87 Miteq 924342	E4407B ESA	

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
	Tx at HIGH Channel 924.48MHz														
	Harmonics Emissions .														
1.849	9.8	78.8	58.6	27.7	1.6	-43.3	0.0	1.0	65.7	45.5	74.0	54.0	-8.3	-8.5	V
2.773	9.8	61.2	46.2	30.2	2.2	-43.2	0.0	1.0	51.5	36.5	74.0	54.0	-22.5	-17.5	V
3.698	9.8	65.7	51.2	32.0	2.7	-43.7	0.0	1.0	57.7	43.2	74.0	54.0	-16.3	-10.8	V
4.622	9.8	66.4	50.5	33.0	3.1	-44.5	0.0	1.0	58.9	43.0	74.0	54.0	-15.1	-11.0	V
5.547	9.8	67.4	52.1	33.8	3.4	-44.8	0.0	1.0	60.8	45.5	74.0	54.0	-13.2	-8.5	V
1.849	9.8	66.9	53.2	27.7	1.6	-43.3	0.0	1.0	53.8	40.1	74.0	54.0	-20.2	-13.9	H
2.773	9.8	73.4	52.1	30.2	2.2	-43.2	0.0	1.0	63.7	42.4	74.0	54.0	-10.3	-11.6	H
3.698	9.8	63.7	40.4	32.0	2.7	-43.7	0.0	1.0	55.6	32.4	74.0	54.0	-18.4	-21.6	H
4.622	9.8	66.7	53.2	33.0	3.1	-44.5	0.0	1.0	59.2	45.7	74.0	54.0	-14.8	-8.3	H
5.547	9.8	65.1	53.2	33.8	3.4	-44.8	0.0	1.0	58.5	46.6	74.0	54.0	-15.5	-7.4	H
No more spurious emissions up to 10th harmonic both Vertical & Horizontal mast antenna.															

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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SPURIOUS EMISSIONS 30 TO 1000 MHz BASE

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #:	03U2166-1
Report #:	030801C01
Date& Time:	08/01/03 10:03 AM
Test Engr:	Frank Ibrahim

Company:	Plantronics, Inc.
EUT Description:	900MHz Cordless Telephone Headset Adapter: (Base Unit, Model: CS50)
Test Configuration :	EUT, Telephone
Type of Test:	FCC Class B
Mode of Operation:	TX ON at mid channel

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
716.10	40.20	21.27	5.02	27.85	38.64	46.00	-7.36	3mV	0.00	1.00	QP
405.00	45.00	15.48	3.58	27.14	36.92	46.00	-9.08	3mH	0.00	1.00	P
609.00	39.80	18.62	4.60	27.80	35.21	46.00	-10.79	3mH	0.00	1.00	P
990.00	38.50	23.86	6.07	27.05	41.39	54.00	-12.61	3mH	0.00	1.00	P
980.00	38.00	23.73	6.04	27.08	40.68	54.00	-13.32	3mV	0.00	1.00	P
612.00	36.50	18.70	4.61	27.81	32.00	46.00	-14.00	3mV	0.00	1.00	P
6 Worst Data											

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7.8. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

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6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	44.48	--	--	0.00	65.94	55.94	-21.46	-11.46	L1
1.20	25.20	--	--	0.00	56.00	46.00	-30.80	-20.80	L1
24.10	14.22	--	--	0.00	60.00	50.00	-45.78	-35.78	L1
0.15	43.28	--	--	0.00	65.94	55.94	-22.66	-12.66	L2
12.25	24.28	--	--	0.00	60.00	50.00	-35.72	-25.72	L2
14.69	23.36	--	--	0.00	60.00	50.00	-36.64	-26.64	L2
6 Worst Data									

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LINE 1 AND LINE 2 RESULTS

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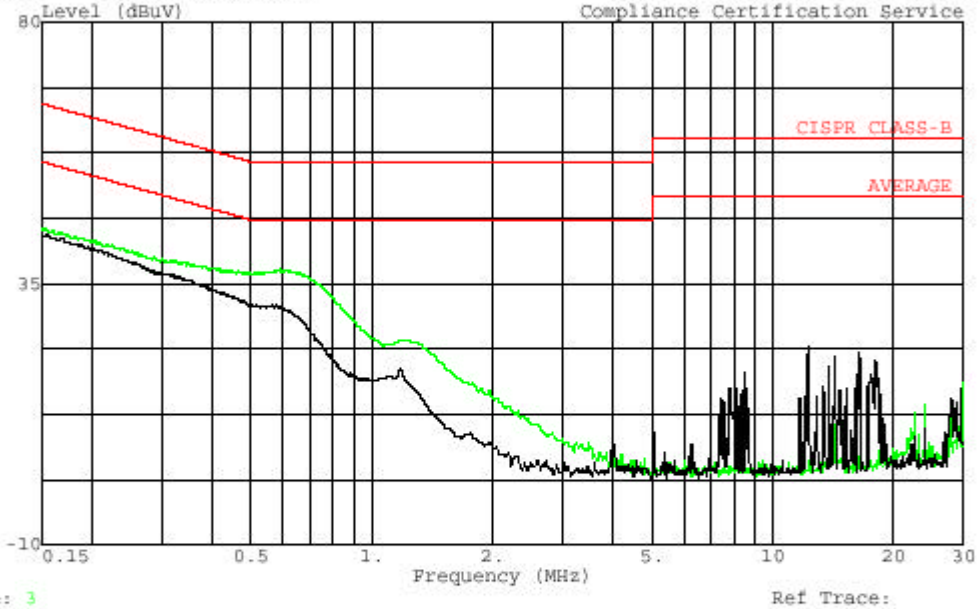
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 14 File#: PLANTRO.EMI Date: 08-04-2003 Time: 10:29:17



Trace: 3 Ref Trace:
Project # : 03U2166-1
Test Engineer : Thanh Nguyen
Company : PLANTRONICS
EUT : 900 MHz Cordless Headset Adapter
Model : CS50
Configuration : Headset docked and link to the Base
:
Mode of Operation: Charging Battery and link to the Headset
Target of Test : FCC CLASS B, IC
: Peak , Line 1(Green), Line 2 (Black)
: 115V, 60Hz.

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8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO BASE

COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
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RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO BASE

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RADIATED BACK PHOTO BASE

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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO BASE

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LINE CONDUCTED BACK PHOTO BASE

END OF REPORT

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