ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT

OF

FCC ID: JWSB55R55

PRINTER HUB and PRINTER STATION TRANSCEIVER

MODEL NO: H55/S55

REPORT NO: 01U0706-1

MARCH 14, 2001

Prepared for
WORTHINGTON DATA SOLUTIONS
623 SWIFT STREET
SANTA CRUZ, CA 95060 U.S.A.

Prepared by
COMPLIANCE ENGINEERING SERVICES, INC.
561F MONTEREY ROAD, ROUTE 2
MORGAN HILL, CA 95037, U.S.A.
TEL: (408) 463-0885
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LAB CODE:200065-0

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1. VERIFICATION OF COMPLIANCE

COMPANY NAME	:	Worthington Data Solutions 623 Swift Street Santa Cruz, CA 95060, USA
CONTACT PERSON	:	BRUCE SMITH
TELEPHONE NO	:	(831) 458-6044
EUT DESCRIPTION	:	Printer HUB and Printer STATION TRANCEIVER
MODEM NAME	:	H55/S55
DATE TESTED	:	March 13 & 14, 2001

LIMITS APPLY TO: FCC PART 15 SECTION 15.249	
TECHNICAL LIMITS	**TEST RESULT**
Radiated Emission of fundamental Frequency	No tested; RF radiation remain no change, same as before
Radiated Emission of Harmonic Frequency	Same as above
Radiated Emission Outside the Band	Same as above
LIMITS APPLY TO: FCC PART 15 SECTION 15.209	
Radiated Emission Digital Device	COMPLIES
LIMITS APPLY TO: FCC PART 15 SECTION 15.207	
AC Line Conducted Emission	COMPLIES

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in CFR 47 PART 15 SUBPART C. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

Released For CCS By:

STEVE CHENG
EMC DEPARTMENT MANAGER
COMPLIANCE CERTIFICATION SERVICES

Test By:

KERWIN CORPUZ
EMC ASSOCIATE ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Warning : 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.

2. CLASS II PERMISSIVE CHANGE

2.1 Change made from the last grant:

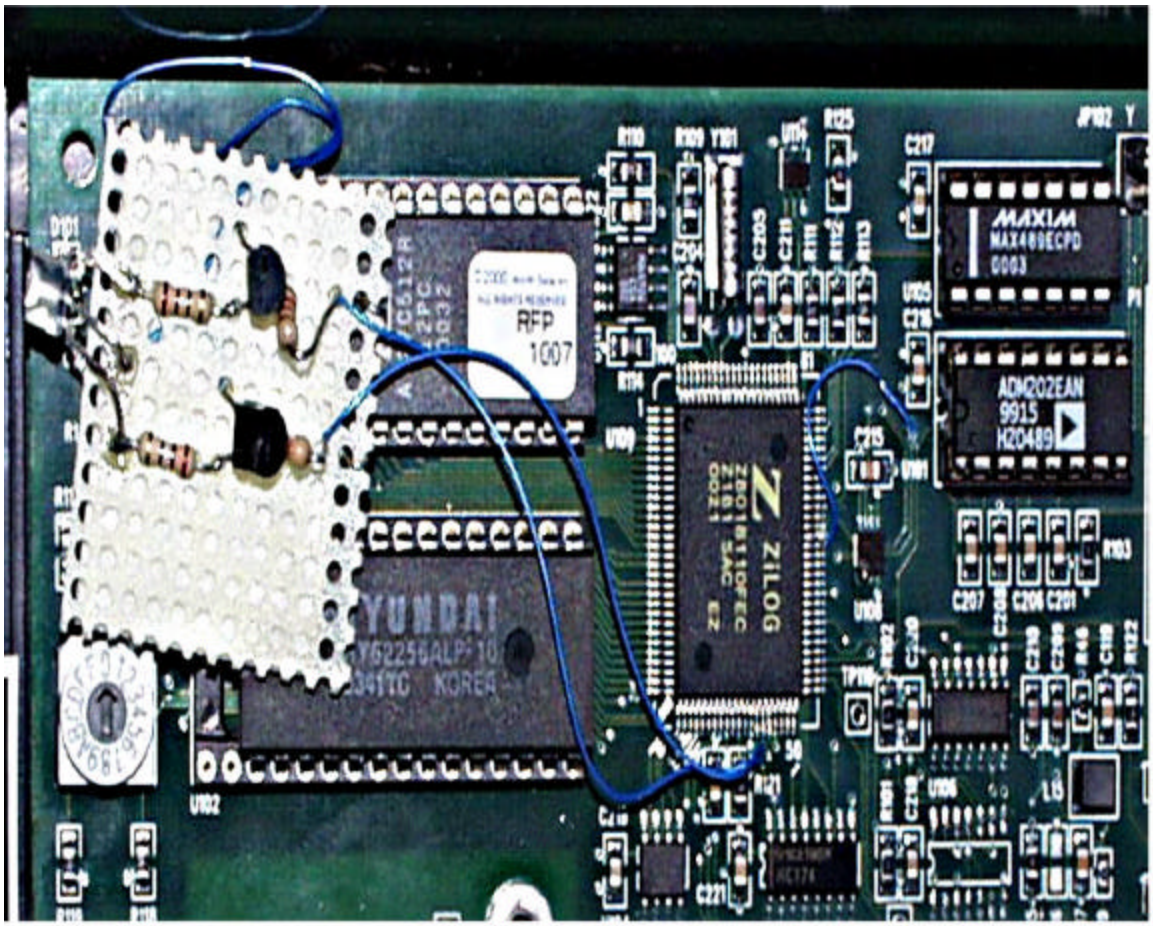
The H55 Printer Hub is a firmware change only, no hardware changes.

The S55 Printer Station modification added two control lines to the RS232 port, RTS and CTS. The change requires the removal of one IC and the addition of jumper wires to reconfigure the connections to the UART port of the microprocessor. The LED is changed to a red/green bicolor LED and a pair of transistors is added to drive the LED. The firmware is changed to handle the new configuration.
The modification made does not degrade the performance characteristics of the RF section.

2.2 Engineering judgment:

As described above, the changes include only firmware protocol and two digital lines, which don't change the signal in any form to the RF section. Also, the new lines are keep reasonable far enough to prevent the changing or coupling the unwanted signal into the RF section. So engineering judgment concluded that only digital part emission is to be retested. SEE PHOTOGRAPH BELOW.

EUT MODIFICATION PHOTOGRAPH



3. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

CHASSIS TYPE	**PLASTIC**
Frequency Range	**902 – 928 MHz**
Tx and Rx Oscillator	**Worthington data solution**
Type of Transmitter	**Frequency Modulated**
Antenna Gain (dBi)	**1.6 dBi**
Antenna Requirement	**Unique connector which cannot be replace by standard antenna jack of electrical connector.**
DC voltage	**5V DC**
Number of Frequencies	**80**
Channel Bandwidth	**30kHz**

4. TEST LOCATION

All emissions tests were performed at:

Compliance Certification Services
561F Monterey Road, Route 2
Morgan Hill, CA 95037

CCS has site descriptions on file with the FCC for 10 and 3 meter site configurations.
CCS is a NVLAP accredited facility.

5. TEST RESULT SUMMARY

Radiated Emissions

Since the changes does not effect the RF output characteristic as reported on section 2. All the RF related tests (RF fundamental, harmonic and out-of-band emission measurements) were intentionally skipped. Only the digital control related tests was performed, 15.209 and 15.207 as described below.

Radiated Emissions

Test Requirement: 15.209

Measurement Equipment Used:
HP Spectrum Analyzer/8566B (Cal Due: 07/01)
HP Spectrum Display/85662A (Cal Due: 07/01)
HP Quasi-Peak Detector/85650A (Cal Due: 07/01)
HP Pre-Amp(P1)/8447D (Cal Due: 11/01)
CHASE Bilog Antenna/CBL6112 (Cal Due: 12/01)

TEST SETUP FOR MEASUREMENT OF DIGITAL DEVICE

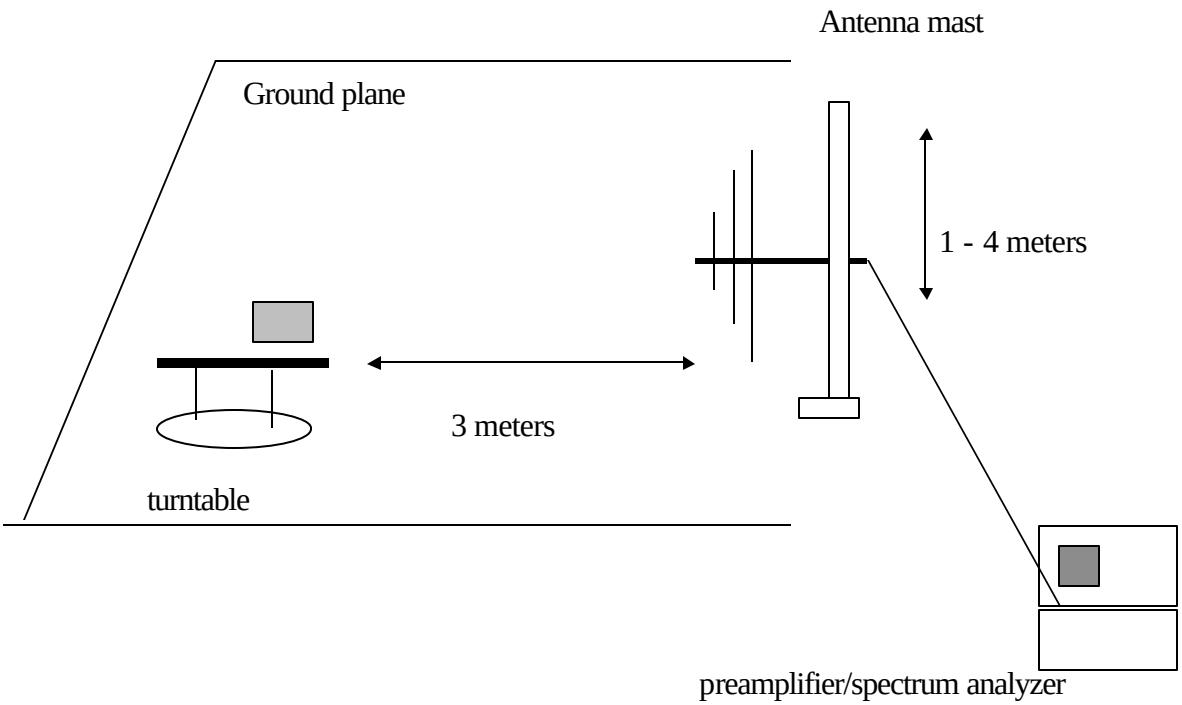


Fig. 4

Test Procedures

Place the EUT on the 1x1.5 meter turntable with a height of 0.8 meter as shown in figure 4. The EUT was placed as close as possible to the edge of the turntable with the peripheral printer of 10 centimeter away. Activated Eut to transmit.

The Bilog search antenna was place at a distance of 3 meters. The antenna was raised and lowered and the EUT rotated on the turntable to produce maximum emission levels on the spectrum analyzer.

Test Results: Please refer to attached data.

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 #: 01U0706-1
Report #: 031301A1
Date& Time: 03/13/01 9:58 AM
Test Engr: KERWIN CORPUZ

Company: WORTH DATA,INC. BRUCE
EUT Description: Wireless Printer System for Barcode Labels(S55 Printer Station)
Test Configuration : EUT/THERMAL PRINTER
Type of Test: FCC CLASS B
Mode of Operation: PRINTING

(•) A-Site ( ) B-Site ( ) C-Site ( ) F-Site [6 Worst Data] [Descending]

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)
18.432 / 4 = 4.608 MHz											
59.90	47.30	8.14	1.02	27.83	28.63	40.00	-11.37	3mV	180.00	1.00	P
64.51	48.40	7.65	1.05	27.82	29.28	40.00	-10.72	3mV	180.00	1.00	P
69.12	43.50	7.19	1.07	27.80	23.96	40.00	-16.04	3mV	180.00	1.00	P
73.73	41.40	7.51	1.12	27.81	22.21	40.00	-17.79	3mV	180.00	1.00	P
152.06	47.50	12.06	1.63	27.63	33.56	43.50	-9.94	3mV	270.00	1.00	P
304.12	43.90	15.07	2.42	27.24	34.15	46.00	-11.85	3mV	45.00	1.00	P
608.25	37.00	19.73	3.56	28.79	31.51	46.00	-14.49	3mV	45.00	1.00	P
64.51	42.80	7.65	1.05	27.82	23.68	40.00	-16.32	3mH	225.00	2.50	P
69.12	39.20	7.19	1.07	27.80	19.66	40.00	-20.34	3mH	225.00	2.50	P
184.32	45.70	10.49	1.79	27.50	30.48	43.50	-13.02	3mH	270.00	2.50	P
304.12	45.00	15.07	2.42	27.24	35.25	46.00	-10.75	3mH	180.00	2.50	P
359.42	35.20	16.07	2.66	27.66	26.26	46.00	-19.74	3mH	225.00	2.50	P
COMPLETED SCAN 30 - 1000 MHz, VERTICAL AND HORIZONTAL POLARIZATION											
Total data #: 12											
V.2a											

AC Line Conducted Emissions

Test Requirement: 15.207

Measurement Equipment Used:

Rhode & Schwarz EMI Receiver ESHS-20 (Cal Due: 4/02)
Fischer Custom Communication LISN, FCC-LISN-50/250-25-2 (Cal Due: 7/01)

Test Set-up

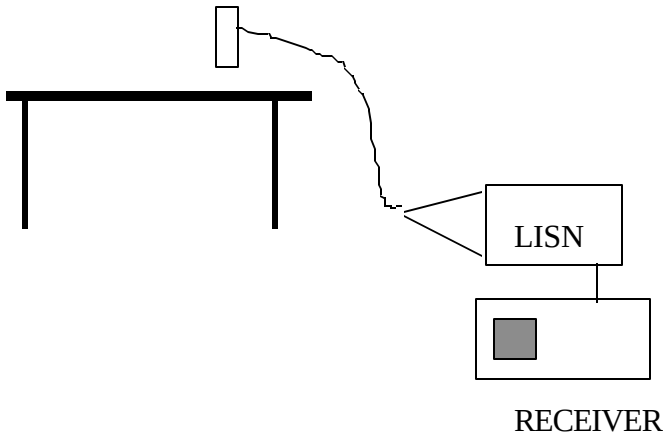


Fig. 5

Test Procedure

The DC is supplied by a AC adapter. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a normal tone and charge the battery at the same time.

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

Test Results
Refer to attached graph.

561 F Monterey Road, Route 2
Morgan Hill, CA 95037-9001 USA
Tel: (408) 463-0885
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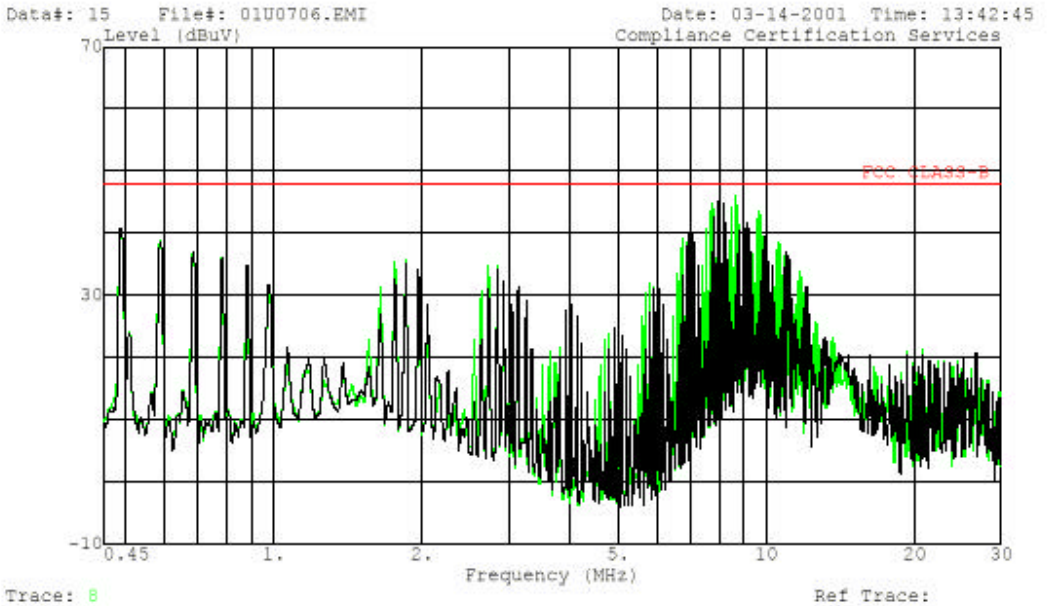


Trace: 8 Ref Trace:

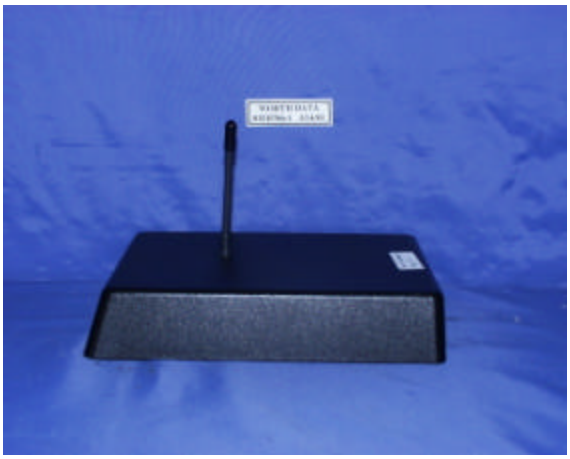
Project No.	: 01U0706-1
Report No.	: 010313LC
Test Engr	: KERWIN CORPUZ
Company	: WORTH DATA, INC. BRUCE
EUT Description	: Wireless Printer System for Barcode
	: Labels
Model	: S55 PRINTER STATION
EUT Config.	: EUT/THERMAL PRINTER
Type of Test	: FCC CLASS B
Mode of Operation	: PRINTER
	: QUASI-PEAK: L1(green), L2(black)
	: 115Vac, 60Hz

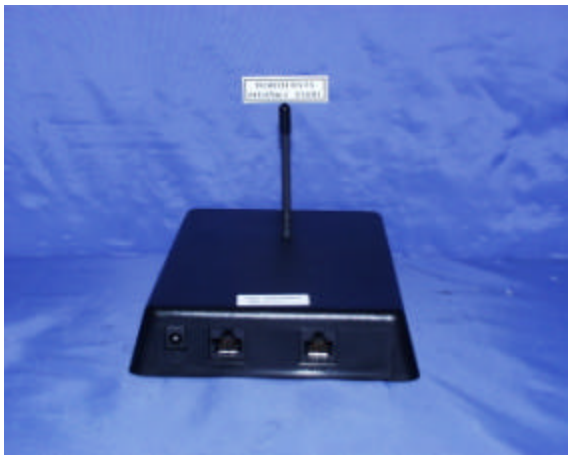
6. EUT SETUP PHOTO

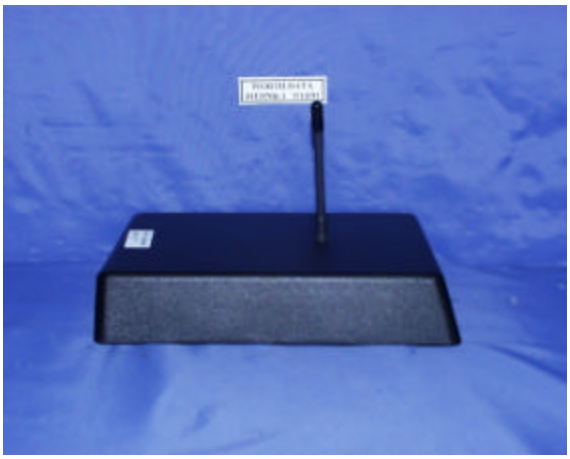
Radiated Emission Setup

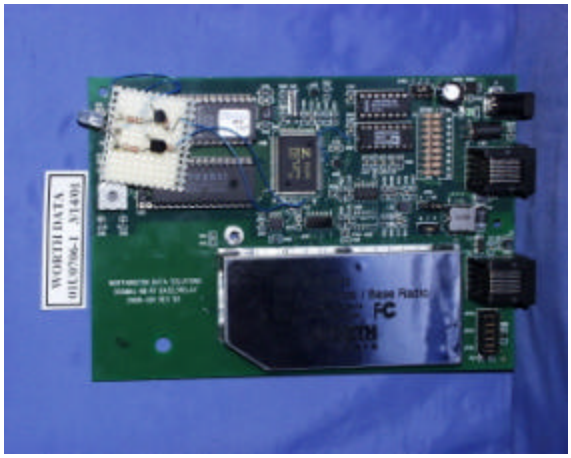
Line Conduted Setup

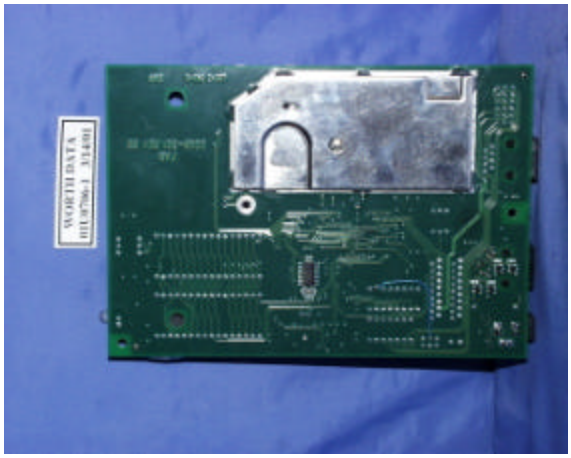
EUT PHOTOGRAPHS











SCHEMATICS

PLEASE REFER TO ATTACHED SCHEMATIC

APPENDICES

EXTERNAL PERIPHERAL DEVICES

Device Type	**Manufacturer**	**Model Number**	**Serial No.**	**FCC ID / DoC**
PC Laptop	Toshiba	PA1249U X	67014162	FCC DoC
Thermal Printer	CITIZEN	JE12-M01	JEG000076	Part 15 class A
Tranceiver	Worth Data, Inc.	H55 Printer HUB	N/A	N/A

EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION

CABLE NO: 1	
I/O Port: RS 232	Number of I/O ports of this type: 1
Number of Conductors: 8	**Connector Type: RJ45**
Capture Type: SNAP-IN	**Type of Cable used: UNSHIELDED**
Cable Connector Type: PLASTIC	**Cable Length: 0.9M**
Bundled During Test: NO	**Data Traffic Generated: YES**

CABLE NO: 2	
I/O Port: DC POWER CABLE	Number of I/O ports of this type: 1
Number of Conductors: 2	**Connector Type: DC PLUG**
Capture Type: PERMANEMT ATTACHED	**Type of Cable used: UNSHIELDED**
Cable Connector Type: MOLDING HOOD	**Cable Length: 1.8M**
Bundled During Test: YES	**Data Traffic Generated: NO**

CABLE NO: 3	
I/O Port: AC POWER CORD	Number of I/O ports of this type: 1
Number of Conductors: 2	**Connector Type: USA TYPE**
Capture Type: SNAP-IN	**Type of Cable used: UNSHIELDED**
Cable Connector Type: MOLDING HOOD	**Cable Length: 1.8M**
Bundled During Test: NO-RAD, YES-LC	**Data Traffic Generated: NO**

CABLE NO: 4	
I/O Port: AC POWER CORD	Number of I/O ports of this type: 1
Number of Conductors: 3	**Connector Type: USA TYPE**
Capture Type: SNAP-IN	**Type of Cable used: UNSHIELDED**
Cable Connector Type: MOLDING HOOD	**Cable Length:1.8M**
Bundled During Test: NO	**Data Traffic Generated: NO**

CONFIGURATION BLOCK DIAGRAM