

EMC EMISSION - TEST REPORT

UNITED STATES STANDARD 47 CFR PART 15, SUBPART B*

Test Report File No. : **1008c-06** Date of Issue: 23 January 2001

Model / Serial No. : CR31000 / See Appendix B

Product Type : 31 GHz ODU

Applicant : ENSEMBLE COMMUNICATIONS

Manufacturer : ENSEMBLE COMMUNICATIONS

License holder : ENSEMBLE COMMUNICATIONS

Address : 9890 Town Centre Drive
: San Diego, CA 92121

Test Result : ☒ **Positive*** ☐ **Negative**

Test Project Number
Reference(s) : 1008c-06

Total pages - Test Report : 21

(*) Tested Radiated Emissions only. EUT receives power from host.

NOTE: All test equipment used during testing is calibrated and traceable to NIST.

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

- | | | |
|--|--|--|
| ☐ - EN 50081-1 / 1991 | | |
| ☐ - EN 55011 / 1998 | ☐ - Group 1
☐ - Class A | ☐ - Group 2
☐ - Class B |
| ☐ - EN 55014 / 1993 | ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices | |
| ☐ - EN 55022 / 1987 | ☐ - Class A | ☐ - Class B |
| ☐ - EN 55022 / 1998 | ☐ - Class A | ☐ - Class B |
| ☐ - VCCI | ☐ - Class A ITE | ☐ - Class B ITE |
| ☒ - 47 CFR Part 15, Subpart B* | | |
| ☐ - 107(b) | | |
| ☐ - 107(a) | | |
| ☐ - 107(e) | ☐ - Class A | ☐ - Class B |
| ☐ - 109(b) | | |
| ☒ - 109(a) | | |
| ☐ - 109(g) | ☐ - Class A | ☐ - Class B |
| ☐ - AS/NZS 3548: 1995 | ☐ - Class A | ☐ - Class B |
| ☐ - CISPR 11 (1997) | ☐ - Group 1
☐ - Class A | ☐ - Group 2
☐ - Class B |
| ☐ - CISPR 22 (1997) | ☐ - Class A | ☐ - Class B |

(*) Tested Radiated Emissions only. EUT receives power from host.

Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	: 8 °C
Relative Humidity:	: 66 %
Atmospheric Pressure:	: 100.0 kPa

Power Supply Utilized:

Power supply system : 115 V / 60 Hz / 1 ϕ

Symbol Definitions:

- - Applicable
- - Not Applicable

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - Test not applicable

■ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego (Calibration Due Date: 20 May 2001)

Testing was performed at a test distance of :

■ - 3 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
LPB 2520/A	739	Antenna Bilog	Antenna Research	1170	04/01
ESVS 30	427	EMI Test Receiver	Rohde & Schwarz	830350/006	03/01

Remarks: One year calibration cycle for all test equipment.

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

The equipment under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test Program (H - Pattern)
- ☐ - Test Program (Color Bar)
- ☐ - Test Program (Customer Specified)
- ☐ - Practice Operation
- ☒ - Normal Operating Mode
- ☐ - _____

Configuration of the equipment under test:

- ☐ - See Constructional Data Form in Appendix B - Page B2
- ☒ - See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

- | | |
|---|----------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - unshielded power cable | |
| ☐ - unshielded cables | |
| ☐ - shielded cables | MPS.No.: _____ |
| ☐ - customer specific cables | |
| ☐ - _____ | |
| ☐ - _____ | |

Emissions Test Results:

Radiated Emissions (Electric Field), 30 MHz - 1000 MHz

☒ - PASS ☐ - FAIL ☐ - NOT APPLICABLE

Minimum limit margin 1.6 dB at 480 MHz
Maximum limit exceeding dB at MHz

Remarks: _____

GENERAL REMARKS:

NOTE: All photographs are representative of setup for maximum emissions.

(*) Tested Radiated Emissions only. EUT receives power from host.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed*

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.*

□ - **Does not** fulfill the general approval requirements cited on page 3.

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. The measurement uncertainty is calculated to be ± 2 dB for conducted emissions and ± 4 dB for radiated emissions.

Equipment Received Date: 10 January 2001

Testing Start Date: 11 January 2001

Testing End Date: 11 January 2001

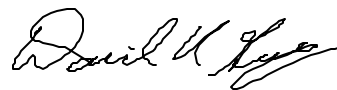
- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Jim Owen
(EMC Lead Engineer)

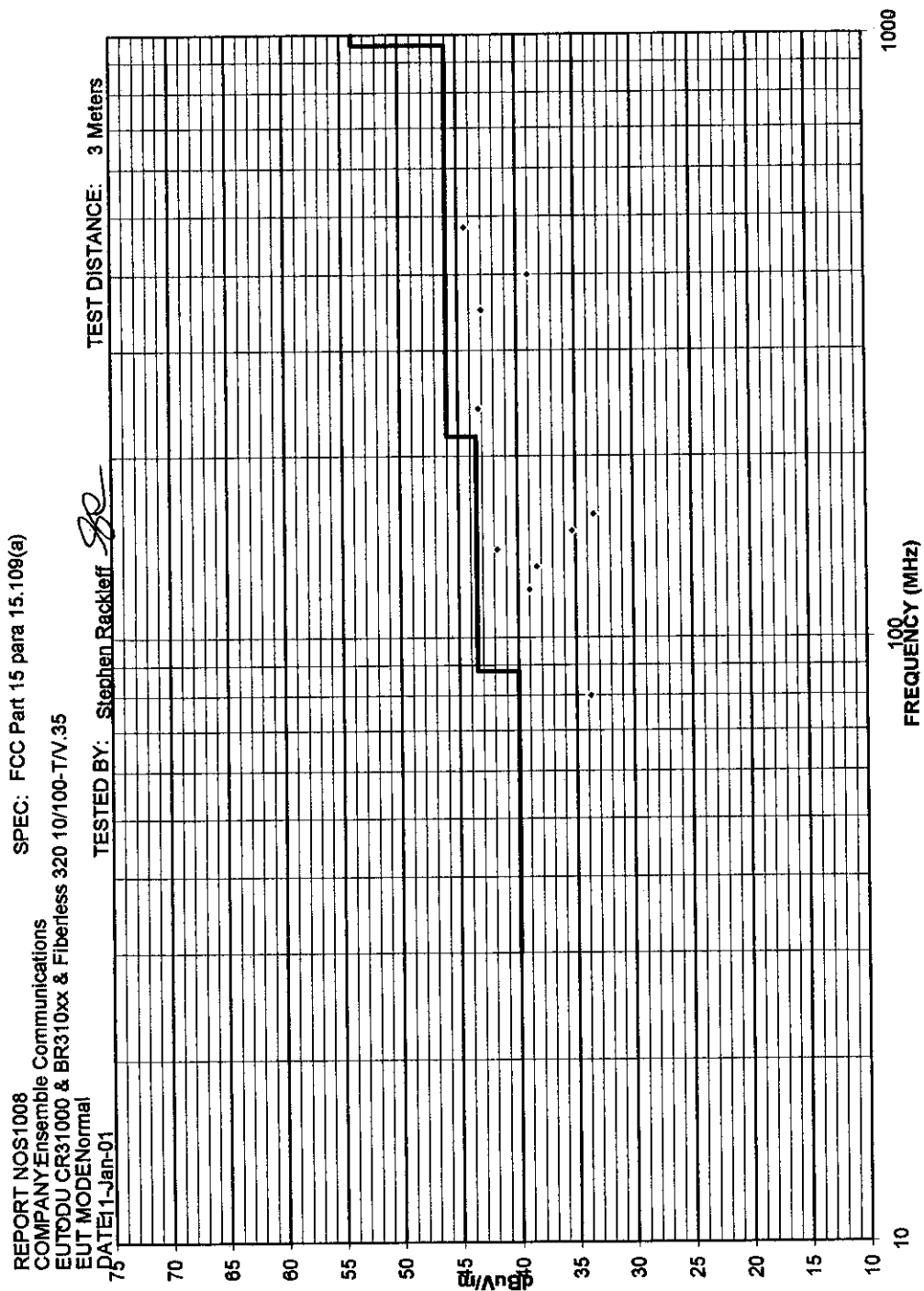
Responsible Engineer:



David Gray
(EMC Engineer)

Technical Documentation

Test Data Sheets
and
Test Setup Drawing(s)



REPORT No: S1008

SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: Ensemble Communications

TEST DIST: 3 Meters

E U T: ODU CR31000

TEST SITE: 2

EUT MODE: Normal

BICONICAL: 739

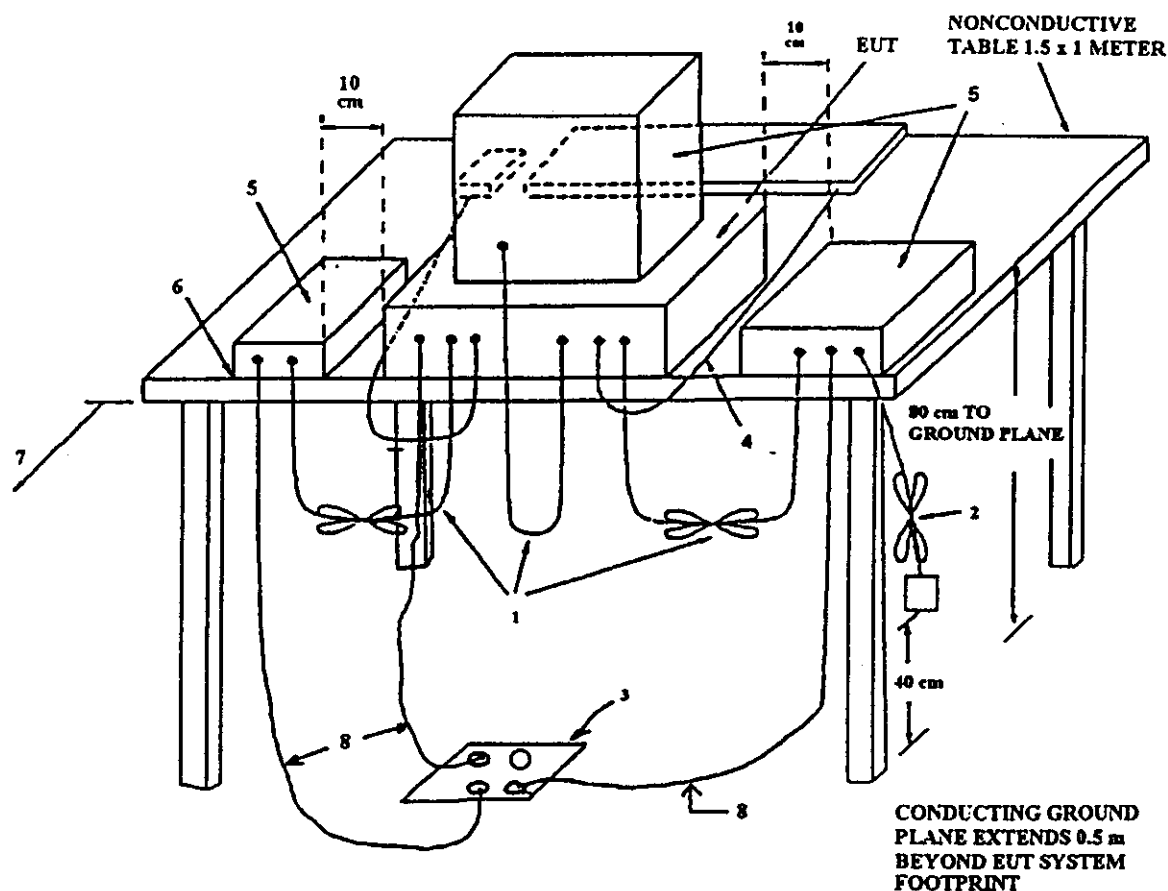
DATE: 11-Jan-01 TESTED BY: Stephen Rackleff LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth. RCVR: 427
115 VAC, 60 Hz

Temperature: 8 Relative Humidity: 66

[illegible]

Radiated Emissions Test Setup, 30 to 1000 MHz



LEGEND:

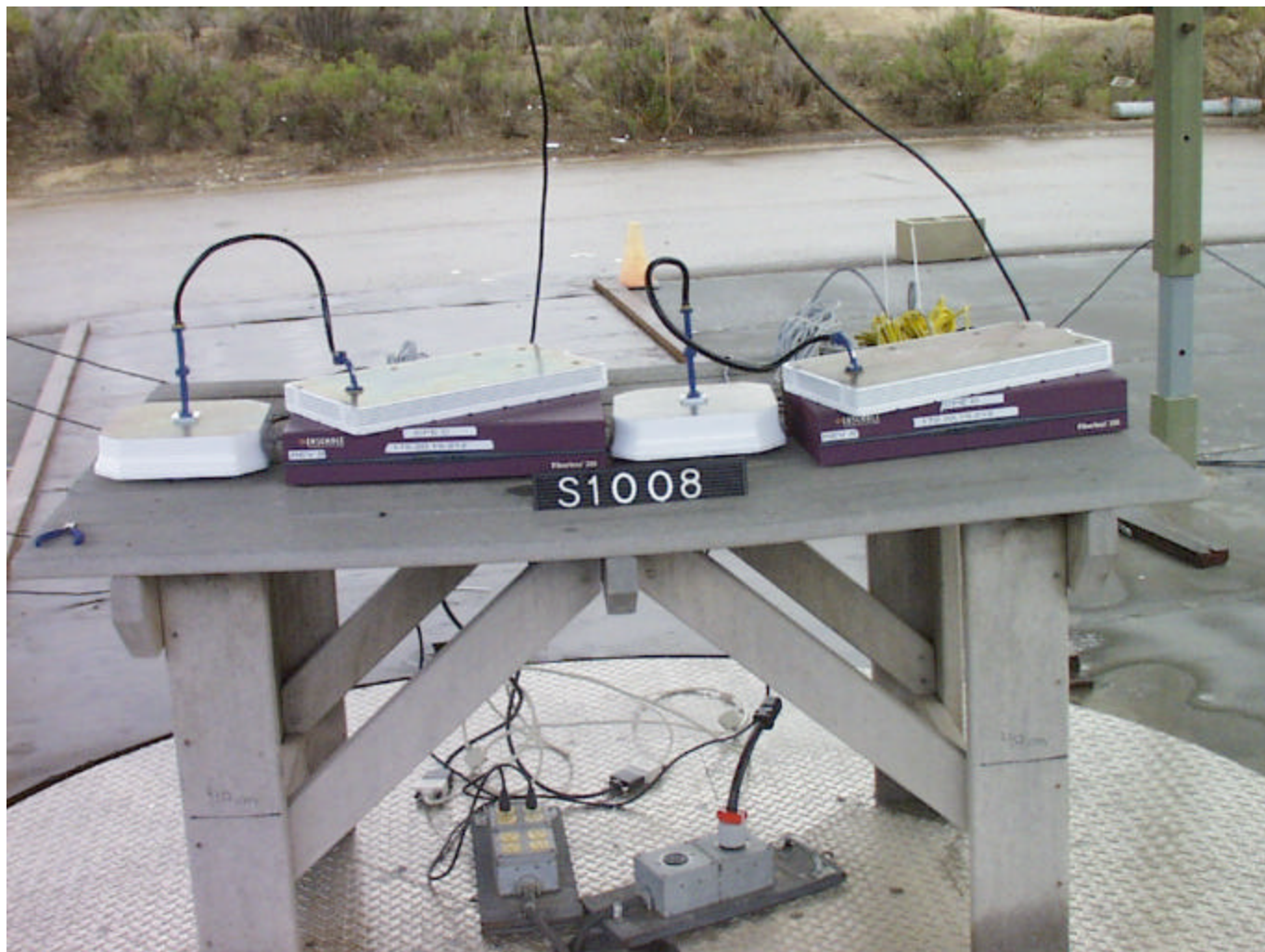
1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mice, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

Appendix A

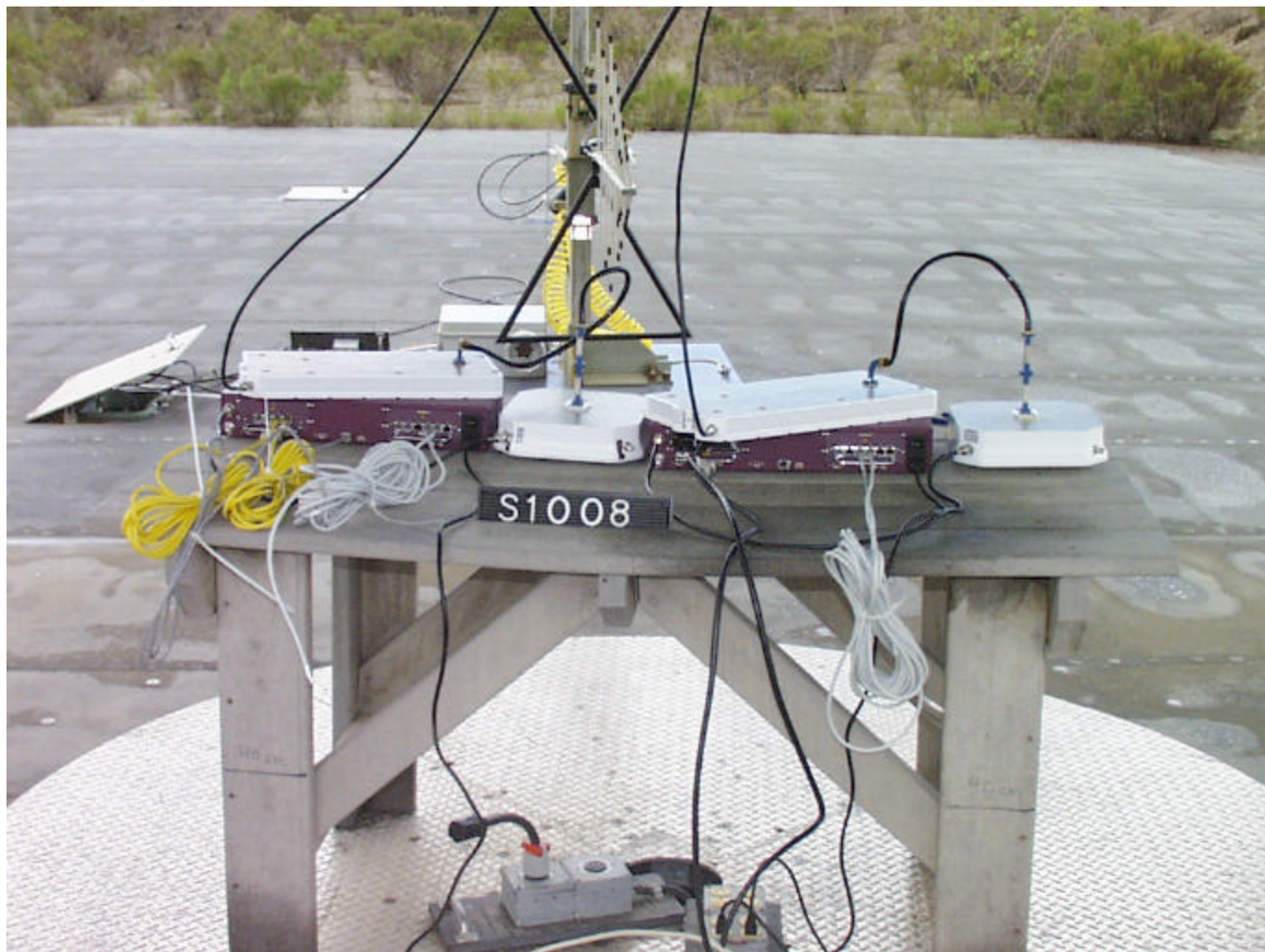
Test Setups (Photographs)

NOTE: All photographs are representative of setup for maximum emissions.

Photograph of Test Setup:
Radiated Emissions 30 MHz - 1000 MHz



Photograph of Test Setup:
Radiated Emissions 30 MHz - 1000 MHz



Appendix B

Product Information Form(s)

General Equipment Description -- NOTE: This information will be input into your test report as shown below.			
EUT Description	Outdoor Units - 31 GHz		
EUT Name	31 GHz ODU		
Model No.:	CR31000	Serial No.:	See Below
Product Options:	--		
Configurations to be tested:	Stellex, Remec		

Power Requirements			
<i>Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)</i>			
Voltage:	-48 VDC	(If battery powered, make sure battery life is sufficient to complete testing.)	
# of Phases:	--		
Current (Amps/phase(max)):	--	Current (Amps/phase(nominal)):	--
Other	--		

Other Special Requirements	
--	

Typical Installation and/or Operating Environment	
(ie. Hospital, Small Business, Industrial/Factory, etc.)	
Small Business, Factory	

EUT Power Cable					
☐	Permanent	OR	☒	Removable	Length (in meters): 30
☒	Shielded	OR	☐	Unshielded	
☐	Not Applicable				

EUT Interface Ports and Cables												
Interface			Shielding									
	Analog	Digital	Qty	Yes	No					Length (In meters)	Removable	Permanent
Type						Type	Termination	Connector Type	Port Termination			
EXAMPLE:												
RS232	☐	☒	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	☒	☐
IF	☒	☐	1	☒	☐	Foil over Cat5	Coaxial	TNC	50 Ohm	30	☒	☐

EUT Software.	
Revision Level:	--
Description:	--

EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.	
1.	Typical - passing V.35 and DS3 over radios (via waveguide).

EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)			
Description	Model #	Serial #	FCC ID #
CPE ODU - Stellex	CR31000	B03400310032	--
CPE ODU - Remec	CR31000	A03400310020	--

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)			
<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
IBM Thinkpad Laptop	T20	78-Y9617	--
SmartBits	SMB2000	2081	--
Ensemble Fiberless 16200	--	220100500004	--
Ensemble Fiberless 320	FCH300AC	70 300300480018	--
Bay Networks Netgear Hub	DS108	45004	--

Oscillator Frequencies			
<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
--			

Power Supply					
<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>		
--			☐ Switched-mode	(Frequency)	
			☐ Linear	☐ Other	

Power Line Filters		
<i>Manufacturer</i>	<i>Model #</i>	<i>Location in EUT</i>
--		

Critical EMI Components (Capacitors, ferrites, etc.)				
<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>
--				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.	
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Appendix C

Change History

Not Applicable

Appendix D

Supplemental Information

Not Applicable