



FCC Certification Test Report
for
ADTRAN, Inc.
HDCTRC4305

May 22, 2002

Prepared for:

ADTRAN, Inc.
901 Explorer Blvd.
Huntsville, AL 35806

Prepared By:

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FCC Certification Test Program

FCC Certification Test Report for the ADTRAN, Inc. TRACER 4305 DS3 (UNII) HDCTRC4305

May 22, 2002

WLL JOB# 7080

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Abstract

This report has been prepared on behalf of ADTRAN, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Unlicensed National Information Infrastructure Device under Part 15, Subpart E of the FCC Rules and Regulations. This Federal Communication Commission (FCC) Certification Test Report documents the test configuration and test results for a ADTRAN, Inc. TRACER 4305 DS3 (UNII).

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The ADTRAN, Inc. TRACER 4305 DS3 (UNII) complies with the limits for an Unlicensed National Information Infrastructure Device under Part 15, Subpart E of the FCC Rules and Regulations.

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1 Introduction

1.1 Compliance Statement

The ADTRAN, Inc. TRACER 4305 DS3 (UNII) complies with the limits for a Unlicensed National Information Infrastructure Device under Part 15.407 of the FCC Rules and Regulations.

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 1992 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer: ADTRAN, Inc.

901 Explorer Blvd.

Huntsville, AL 35806

Purchase Order Number: 417933

Quotation Number: 59841

1.4 Test Dates

Testing was performed from April 29, 2002 to May 21, 2002.

1.5 Test and Support Personnel

Washington Laboratories, LTD

Greg Snyder, Santo Lavorata

1.6 Abbreviations

A	Ampere
Ac	alternating current
AM	Amplitude Modulation
Amps	Amperes
b/s	bits per second
BW	Bandwidth
CE	Conducted Emission
cm	centimeter
CW	Continuous Wave
dB	decibel
dc	direct current
EMI	Electromagnetic Interference
EUT	Equipment Under Test
FM	Frequency Modulation
G	giga - prefix for 10^9 multiplier
Hz	Hertz
IF	Intermediate Frequency
k	kilo - prefix for 10^3 multiplier
M	Mega - prefix for 10^6 multiplier
m	Meter
μ	micro - prefix for 10^{-6} multiplier
NB	Narrowband
LISN	Line Impedance Stabilization Network
RE	Radiated Emissions
RF	Radio Frequency
rms	root-mean-square
SN	Serial Number
S/A	Spectrum Analyzer
V	Volt

2 Equipment Under Test

2.1 EUT Identification & Description

The 12804305L1 (Tracer 4305 DS3 Radio) is a digital radio device that accepts a single 44.736 Mb/sec DS3 signal and transports it over a wireless carrier. In pairs, these radios form a wireless transport for DS3 digital services in the 5.8 GHz Unlicensed National Information Infrastructure (U-NII) radio band. The 12804305L1 provides the network, antenna, and control/status interface to the customer. The DS3 interface is network timed. No internal timing is available.

I/O Ports and Cables available on the TRACER 4305 DS3 Radio:

Signal/Port Name	Signal/Port Type	Cable Type	NOTES
DS3 IN	I/O	Shielded Coax	75 Ohm impedance (RG59)
DS3 OUT	I/O	Shielded Coax	75 Ohm impedance (RG59)
RS232	I/O	Shielded 25 Wire	
ALARM	CONTROL	Unshielded TP	Alarm contacts – no active power or signal
ANTENNA	I/O	Shielded Coax	50 Ohm impedance, 5.8GHz signal only
MANAGEMENT	I/O	Shielded TP	Unused in this product version (no SNMP)

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	ADTRAN, Inc.
FCC ID Number	HDCTRC4305
EUT Name:	(UNII)
Model:	TRACER 4305 DS3
FCC Rule Parts:	§15.407
Frequency Range:	5750 - 5800 MHz (User's Manual, Section 5)
Maximum Output Power:	21.7 dBm
Modulation:	QPSK
Occupied Bandwidth:	40 MHz
Keying:	Automatic
Type of Information:	Data
Number of Channels:	2
Power Output Level	Fixed
Antenna Type	Parabolic Dish
Interface Cables:	See Section 2.1
Power Source & Voltage:	21 to 60Vdc

2.2 Test Configuration

Tracer 4305 DS3 Plan A w/o SNMP, P/N:12804305L1A

Tracer 4305 DS3 Plan B w/o SNMP, P/N: 12804305L1B

2.3 Testing Algorithm

The TRACER 4305 DS3 was setup to continuously transmit during the testing.

Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

Guidelines for Assessing Unlicensed National Information Infrastructure Devices (UNII) – Part 15 Subpart E, November 2001; FCC

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ± 2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5 (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.

3 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

Table 2: Test Equipment List

Manufacturer & Model	Description	Serial Number	Property Number	Calibration Due Date
Antenna Research Associates DRG-118/A	Horn Antenna	1010	00004	11/28/03
Antenna Research Associates LPB-2520	Biconilog Antenna	1044	00007	6/13/02
Narda V637	Standard Gain Horn Antenna	N/A	00209	8/27/03
Narda V638	Standard Gain Horn Antenna	N/A	00210	8/27/03
Hewlett Packard 11970W	Harmonic Mixer	2521A01455	00055	8/27/03
Hewlett Packard 11970U	Harmonic Mixer	3003A01626	00083	7/30/03
Hewlett Packard 11970V Harmonic Mixer	Harmonic Mixer	2521A01269	00054	9/10/03
Hewlett Packard 8449B	Pre-Amplifier	3008A00729	00066	1/31/03
Hewlett Packard 8564E	Spectrum Analyzer	3643A00657	00067	4/18/03
Hewlett Packard 85650A	Q.P. Adapter	2811A01283	00068	6/29/02
Hewlett Packard 85685A	RF Preselector	3221A01395	00071	6/28/02
Hewlett Packard 8568B	Spectrum Analyzer	2928A04750	00072	6/29/02

