FCC CERTIFICATION TEST REPORT

for

Dassault AT
9, rue Elsa Triolet
78373 PLAISIR cedex
France

FCC ID: PB8P4432-050

January 26, 2001

WLL PROJECT #: 5569X

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WASHINGTON LABORATORIES, LTD.
7560 Lindbergh Drive • Gaithersburg, Maryland 20879 • (301) 417-0220 • Fax (301) 417-9069 • (800) 839-1649
website: http://www.wll.com • e-mail: info@wll.com

STATEMENT OF QUALIFICATIONS

for

Chad M. Beattie

Washington Laboratories, Ltd.

I am a NARTE-Accredited EMC Test Laboratory Engineer with an Associates in Electronic Systems Technology. I have nine years of electronics experience, the last five years being directly involved in EMI testing. I am qualified to perform EMC testing to the methods described in this test report. The measurements taken within this report are accurate within my ability to perform the tests and within the tolerance of the measuring instrumentation.

By: _____
Chad M. Beattie
Compliance Engineer

Date: JUNE 5, 2000

FCC CERTIFICATION TEST REPORT

for

FCC ID: PB8P4432-050

1.0 Introduction

This report has been prepared on behalf of Dassault A.T. to support the attached Application for Equipment Authorization. The test and application are submitted for a Frequency Hopping Spread Spectrum Transmitter under Part 15.247 of the FCC Rules and Regulations. The Equipment Under Test was the Dassault A.T. *ARTEMA US Portable* EFT/POS Radio, M/N: P4432-050 and P4432-052

All measurements herein 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. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

All measurements are 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.

All results reported herein relate only to the equipment tested. The measurement uncertainty of the data contained herein is ±2.3 dB. Refer to Appendix A for Statement of Measurement Uncertainty. This report shall not be used to claim product endorsement by NVLAP or any agency of the US Government.

1.1 Summary

The Dassault A.T. *ARTEMA US Portable EFT/POS Radio* complies with the requirements for a Frequency Hopping Spread Spectrum Transmitter under Part 15.247 of the FCC Rules and Regulations.

2.0 Description of Equipment Under Test (EUT)

The Dassault A.T. *ARTEMA US Portable EFT/POS* Transmitter (EUT) is a portable hand-held, battery-powered Electronic Fund Transfer/Point of Sale terminal. The radio is a Frequency Hopping Spread Spectrum transmitter operating in the 902 – 928 MHz frequency band. The EUT incorporates a 17 key keypad, magnetic card reader, removable/re-chargeable battery pack, and a printer. The two hand-held terminal models: P4432-050 and P4432-052 are identical except that the –052 has secured keyboard circuitry. Both the P4432-050 and P4432-052 *ARTEMA US Portables* are marketed with two different Base Chargers (M/N: P4432-160 and P4432-150). The model P4432-150 Base Charger contains a separate FHSS radio and telecom ports for use with communicating to the hand-held. The P4432-150 unit will be submitted as a separate FCC application.

3.0 Test Configuration

To complete the test configuration required by the FCC, the transmitter was tested in all three orthogonal planes. The unit is a self-contained unit with no I/O ports.

3.1 Testing Algorithm

The transmitter was configured to continuously transmit during testing. The unit was fixed (hopping disabled) to the Low Channel, Middle Channel and High Channel during the emissions testing. The system was tested in all three orthogonal planes. The unit was also tested while being placed on the charger base, however, worst case emissions were obtained while the unit was in standalone operation.

Worst case emissions are recorded in the data tables.

3.2 Radiated Emissions Testing

The EUT was placed on an 80 cm high 1 x 1.5 meters non-conductive motorized turntable for radiated testing on a 3 meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Biconical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.4-1992. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak or peak, as appropriate. The measurement bandwidth on the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. For measurements above 1 GHz, the measurement bandwidth was set to 1MHz.

3.2.1 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are grouped into a composite antenna factor (AFc) and are supplied in the AFc column of Table 1. The AFc in dB/m is algebraically added to the Spectrum Analyzer Voltage in dbµV to obtain the Radiated Electric Field in dBµV/m. This level is then compared with the FCC limit.

Example:

Spectrum Analyzer Voltage:	VdBµV
Composite Antenna Factor:	AFcdB/m
Electric Field:	EdBµV/m = VdBµV + AFcdB/m
To convert to linear units:	EµV/m = antilog (EdBµV/m/20)

Average and peak data for all the three channels tested are located in Tables 1a, 1b and 1c.

Table 1a: FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Low Channel: 903.8 MHz

Average Measurements (QP below 1GHz)

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (AVG) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
331.76	V	90.00	1.0	8.5	17.0	25.5	18.7	200.0	-20.6	
331.77	H	270.00	1.0	18.2	17.0	35.2	57.3	200.0	-10.9	
405.50	H	315.00	1.0	12.6	18.8	31.4	37.0	200.0	-14.7	
2711.40	V	315.00	1.0	41.7	-4.9	36.8	69.2	500.0	-17.2	
2711.40	H	90.00	1.0	41.5	-4.9	36.6	67.7	500.0	-17.4	
3615.20	V	180.00	1.0	41.5	-3.7	37.8	77.6	500.0	-16.2	
3615.20	H	225.00	1.0	40.3	-3.7	36.6	67.5	500.0	-17.4	
4519.00	V	0.00	1.0	40.7	-2.8	37.9	78.6	500.0	-16.1	Amb
4519.00	H	225.00	1.0	40.0	-2.8	37.2	72.6	500.0	-16.8	Amb
5422.82	H	315.00	1.0	43.7	-2.0	41.7	121.1	500.0	-12.3	
5422.82	V	225.00	1.0	42.2	-2.0	40.2	101.9	500.0	-13.8	
8134.61	V	0.00	1.0	40.5	2.2	42.7	136.5	500.0	-11.3	Amb
8134.61	H	225.00	1.0	39.0	2.2	41.2	114.8	500.0	-12.8	Amb
9038.02	V	0.00	1.0	41.0	2.2	43.2	145.4	500.0	-10.7	Amb
9038.02	H	225.00	1.0	40.8	2.2	43.0	142.0	500.0	-10.9	Amb

Table 1a (Cont'd.): FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Low Channel: 903.8 MHz
Peak Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
1807.60	V	0.00	1.0	56.2	-7.1	49.1	283.7	5000.0	-24.9	
1807.60	H	180.00	1.0	56.0	-7.1	48.9	277.2	5000.0	-25.1	
2711.40	V	180.00	1.0	54.2	-4.9	49.3	291.9	5000.0	-24.7	
2711.40	H	180.00	1.0	53.8	-4.9	48.9	278.8	5000.0	-25.1	
3615.20	V	45.00	1.0	54.0	-3.7	50.3	327.1	5000.0	-23.7	
3615.20	H	180.00	1.0	53.4	-3.7	49.7	305.2	5000.0	-24.3	
4519.00	V	0.00	1.0	53.5	-2.8	50.7	343.3	5000.0	-23.3	Amb
4519.00	H	225.00	1.0	53.2	-2.8	50.4	330.5	5000.0	-23.6	Amb
5422.82	H	315.00	1.0	54.5	-2.0	52.5	420.0	5000.0	-21.5	
5422.82	V	90.00	1.0	53.7	-2.0	51.7	383.1	5000.0	-22.3	
6326.60	H	180.00	1.0	53.2	-0.3	52.9	442.4	5000.0	-21.1	
6326.60	V	0.00	1.0	53.4	-0.3	53.1	452.7	5000.0	-20.9	
7230.39	H	225.00	1.0	54.2	2.2	56.4	660.7	5000.0	-17.6	Amb
7230.39	V	225.00	1.0	53.2	2.2	55.4	588.8	5000.0	-18.6	Amb
8134.61	V	0.00	1.0	52.5	2.2	54.7	543.3	5000.0	-19.3	Amb
8134.61	H	0.00	1.0	51.6	2.2	53.8	489.8	5000.0	-20.2	Amb
9038.02	H	225.00	1.0	53.5	2.2	55.7	613.0	5000.0	-18.2	Amb
9038.02	H	225.00	1.0	53.5	2.2	55.7	613.0	5000.0	-18.2	Amb

Table 1b: FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Mid Channel: 907.4 MHz

Average Measurements (QP below 1GHz)

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (AVG) DBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
331.76	V	90.00	1.0	9.7	17.0	26.7	21.5	200.0	-19.4	
331.77	H	270.00	1.0	15.8	17.0	32.8	43.4	200.0	-13.3	
2722.20	V	180.00	1.0	41.5	-4.9	36.6	67.8	500.0	-17.4	
2722.20	H	180.00	1.0	41.0	-4.9	36.1	64.0	500.0	-17.9	
3629.60	H	180.00	1.0	41.2	-3.7	37.5	75.1	500.0	-16.5	
3629.60	V	180.00	1.0	41.1	-3.7	37.5	74.8	500.0	-16.5	
4537.00	V	0.00	1.0	40.5	-2.8	37.7	77.0	500.0	-16.2	Amb
4537.00	H	180.00	1.0	40.3	-2.8	37.5	75.2	500.0	-16.4	
5444.40	H	180.00	1.0	44.7	-2.0	42.7	136.2	500.0	-11.3	
5444.40	V	180.00	1.0	41.7	-2.0	39.7	96.4	500.0	-14.3	
6351.78	H	180.00	1.0	41.5	-0.2	41.3	116.4	500.0	-12.7	
6351.80	V	0.00	1.0	40.3	-0.2	40.1	101.3	500.0	-13.9	Amb
7259.20	V	225.00	1.0	41.2	2.2	43.4	147.9	500.0	-10.6	Amb
8166.60	V	225.00	1.0	38.7	2.2	40.9	110.9	500.0	-13.1	Amb
9074.00	V	225.00	1.0	40.3	2.3	42.6	134.8	500.0	-11.4	Amb

Table 1b (Cont'd.): FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Mid Channel: 907.4 MHz
Peak Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
1814.80	V	0.00	1.0	56.3	-7.1	49.2	288.2	5000.0	-24.8	
1814.80	H	180.00	1.0	55.6	-7.1	48.5	265.9	5000.0	-25.5	
2722.20	V	180.00	1.0	54.2	-4.9	49.3	292.5	5000.0	-24.7	
2722.20	H	90.00	1.0	53.4	-4.9	48.5	266.7	5000.0	-25.5	
3629.60	V	180.00	1.0	54.8	-3.7	51.1	360.5	5000.0	-22.8	
3629.60	H	180.00	1.0	53.8	-3.7	50.1	320.2	5000.0	-23.9	
4537.00	H	180.00	1.0	52.8	-2.8	50.0	317.3	5000.0	-23.9	
4537.00	V	225.00	1.0	51.2	-2.8	48.4	263.9	5000.0	-25.5	Amb
5444.40	H	180.00	1.0	55.2	-2.0	53.2	456.1	5000.0	-20.8	
5444.40	V	180.00	1.0	54.6	-2.0	52.7	429.1	5000.0	-21.3	
7259.20	V	225.00	1.0	54.0	2.2	56.2	645.7	5000.0	-17.8	Amb
8166.60	V	225.00	1.0	53.2	2.2	55.4	588.8	5000.0	-18.6	Amb
8166.60	H	180.00	1.0	54.2	2.2	56.4	660.7	5000.0	-17.6	Amb
9074.00	V	225.00	1.0	52.7	2.3	55.0	562.0	5000.0	-19.0	Amb

Table 1c: FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

High Channel: 911.15 MHz

Average Measurements (QP below 1GHz)

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (AVG) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
331.76	V	90.00	1.0	10.8	17.0	27.8	24.4	200.0	-18.3	
331.77	H	270.00	1.0	17.7	17.0	34.7	54.1	200.0	-11.4	
405.50	H	315.00	1.0	14.3	18.8	33.1	45.0	200.0	-13.0	
405.50	V	270.00	1.0	10.4	18.8	29.2	28.7	200.0	-16.9	
2733.45	V	180.00	1.0	42.2	-4.9	37.3	73.6	500.0	-16.6	
2733.45	H	180.00	1.0	40.8	-4.9	35.9	62.7	500.0	-18.0	
3644.60	V	180.00	1.0	41.7	-3.7	38.0	79.7	500.0	-16.0	
3644.60	H	180.00	1.0	41.7	-3.7	38.0	79.7	500.0	-16.0	
4555.75	H	180.00	1.0	40.0	-2.8	37.2	72.8	500.0	-16.7	
4555.75	V	180.00	1.0	40.2	-2.8	37.4	74.3	500.0	-16.6	
7289.20	V	225.00	1.0	41.2	2.2	43.4	147.9	500.0	-10.6	Amb
8200.40	V	225.00	1.0	38.7	2.2	40.9	110.9	500.0	-13.1	Amb
9112.00	V	225.00	1.0	40.3	2.3	42.6	134.8	500.0	-11.4	Amb

Table 1c (Cont'd.): FCC 15.247 3M Radiated Emissions Data

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

High Channel: 911.15 MHz
Peak Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
1822.30	V	180.00	1.0	56.2	-7.1	49.1	286.2	5000.0	-24.8	
1822.30	H	180.00	1.0	55.2	-7.1	48.1	255.1	5000.0	-25.8	
2733.45	H	180.00	1.0	53.8	-4.9	48.9	279.9	5000.0	-25.0	
2733.45	V	180.00	1.0	53.8	-4.9	48.9	279.9	5000.0	-25.0	
3644.60	H	180.00	1.0	54.5	-3.7	50.8	347.8	5000.0	-23.2	
3644.60	V	180.00	1.0	54.0	-3.7	50.3	328.3	5000.0	-23.7	
4555.75	V	180.00	1.0	53.3	-2.8	50.6	337.9	5000.0	-23.4	
4555.75	H	180.00	1.0	52.0	-2.8	49.2	290.0	5000.0	-24.7	
5466.90	H	315.00	1.0	55.2	-2.0	53.2	457.0	5000.0	-20.8	
5466.90	V	270.00	1.0	54.2	-2.0	52.2	407.3	5000.0	-21.8	
6378.10	V	225.00	1.0	53.2	2.2	55.4	588.8	5000.0	-18.6	Amb
7289.20	V	225.00	1.0	54.0	2.2	56.2	645.7	5000.0	-17.8	Amb
8200.41	V	0.00	1.0	52.5	2.2	54.7	543.3	5000.0	-19.3	Amb
9111.50	V	225.00	1.0	52.7	2.3	55.0	562.0	5000.0	-19.0	Amb

3.4 RF Antenna Conducted Spurious Emissions Testing

At the time of testing the antenna was permanently attached on the EUT and therefore the alternate radiated test method was used for the Conducted Spurious Emissions Testing. The EUT was setup as per Section 3.3 of this report, except the spectrum analyzer resolution bandwidth was set to 100 kHz and the video bandwidth was set to 1 MHz. The amplitude of the EUT carrier was measured to determine the emissions limit (20dB below the carrier frequency amplitude). All of the emissions outside the allocated frequency band of 902 MHz to 928 MHz were scanned up to the 10^{th} harmonic. At each frequency, an external attenuator or filter was used to confirm that the signal was not overloading the spectrum analyzer input.

Data for the three channels tested are recorded in Tables 2a, 2b and 2c.

Table 2a: FCC RF Radiated Spurious Emissions Data

Alternate Method to Confirm Compliance with Section 15.247(c)

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Low Channel: 903.5 MHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak 100 kHz) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
903.80	H	225.00	1.0	77.1	28.1	105.2	182604.0	N/A	N/A	
903.80	V	135.00	1.5	73.5	28.1	101.6	120645.2	N/A	N/A	
1807.60	V	0.00	1.0	54.8	-7.1	47.7	241.4	18260.4	-37.6	
1807.60	H	180.00	1.0	54.0	-7.1	46.9	220.2	18260.4	-38.4	
2711.40	V	180.00	1.0	52.3	-4.9	47.4	234.6	18260.4	-37.8	
2711.40	H	180.00	1.0	51.8	-4.9	46.9	221.5	18260.4	-38.3	
3615.20	V	45.00	1.0	52.2	-3.7	48.5	265.8	18260.4	-36.7	
3615.20	H	180.00	1.0	51.4	-3.7	47.7	242.5	18260.4	-37.5	
4519.00	V	0.00	1.0	51.7	-2.8	48.9	279.0	18260.4	-36.3	Amb
4519.00	H	225.00	1.0	51.2	-2.8	48.4	263.4	18260.4	-36.8	Amb
5422.82	H	315.00	1.0	52.6	-2.0	50.6	337.5	18260.4	-34.7	
5422.82	V	90.00	1.0	51.4	-2.0	49.4	293.9	18260.4	-35.9	
6326.60	H	180.00	1.0	51.1	-0.3	50.8	347.4	18260.4	-34.4	
6326.60	V	0.00	1.0	51.8	-0.3	51.5	376.6	18260.4	-33.7	
7230.39	H	225.00	1.0	53.6	2.2	55.8	616.6	18260.4	-29.4	Amb
7230.39	V	225.00	1.0	53.2	2.2	55.4	588.8	18260.4	-29.8	Amb
8134.61	V	0.00	1.0	52.5	2.2	54.7	543.3	18260.4	-30.5	Amb
8134.61	H	0.00	1.0	51.6	2.2	53.8	489.8	18260.4	-31.4	Amb
9038.02	H	225.00	1.0	53.5	2.2	55.7	613.0	18260.4	-29.5	Amb
9038.02	V	0.00	1.0	53.5	2.2	55.7	613.0	18260.4	-29.5	Amb

Table 2b: FCC RF Radiated Spurious Emissions Data

Alternate Method to Confirm Compliance with Section 15.247(c)

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

Mid Channel: 907.4 MHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak 100 kHz) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
907.40	H	225.00	1.0	76.6	28.2	104.8	173589.3	N/A	N/A	
907.40	V	135.00	1.5	74.5	28.2	102.7	136308.5	N/A	N/A	
1814.80	V	0.00	1.0	54.6	-7.1	47.5	237.0	17358.9	-37.3	
1814.80	H	180.00	1.0	53.9	-7.1	46.8	218.6	17358.9	-38.0	
2722.20	V	180.00	1.0	52.6	-4.9	47.7	243.3	17358.9	-37.1	
2722.20	H	90.00	1.0	51.7	-4.9	46.8	219.3	17358.9	-38.0	
3629.60	V	180.00	1.0	52.00	-3.7	48.3	260.3	17358.9	-36.5	
3629.60	H	180.00	1.0	51.4	-3.7	47.7	242.9	17358.9	-37.1	
4537.00	H	180.00	1.0	52.80	-2.8	50.0	317.3	17358.9	-34.8	
4537.00	V	225.00	1.0	50.60	-2.8	47.8	246.3	17358.9	-37.0	Amb
5444.40	H	180.00	1.0	53.90	-2.0	51.9	392.7	17358.9	-32.9	
5444.40	V	180.00	1.0	52.70	-2.0	50.7	342.0	17358.9	-34.1	
7259.20	V	225.00	1.0	52.2	2.2	54.4	524.8	17358.9	-30.4	Amb
8166.60	V	225.00	1.0	51.6	2.2	53.8	489.8	17358.9	-31.0	Amb
8166.60	H	180.00	1.0	51.80	2.2	54.0	501.2	17358.9	-30.8	
9074.00	V	225.00	1.0	50.8	2.3	53.1	451.6	17358.9	-31.7	Amb

Table 2c: FCC RF Radiated Spurious Emissions Data

Alternate Method to Confirm Compliance with Section 15.247(c)

CLIENT: Dassault A.T.
MODEL NO: Artema Portable
TYPE/PART: 15.247
DATE: 04/18/2000
BY: Greg Snyder
JOB #: 5569x

High Channel: 911.2 MHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak 100 kHz) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
911.15	H	135.00	1.1	73.3	28.3	101.6	119577.2	N/A	N/A	
911.15	V	225.00	1.5	75.2	28.3	103.5	148815.6	N/A	N/A	
1822.30	V	180.00	1.0	54.3	-7.1	47.2	230.0	14881.6	-36.2	
1822.30	H	180.00	1.0	52.9	-7.1	45.8	195.7	14881.6	-37.6	
2733.45	H	180.00	1.0	52.2	-4.9	47.3	232.8	14881.6	-36.1	
2733.45	V	180.00	1.0	51.7	-4.9	46.8	219.8	14881.6	-36.6	
3644.60	H	180.00	1.0	52.0	-3.7	48.3	260.8	14881.6	-35.1	
3644.60	V	180.00	1.0	52.3	-3.7	48.6	270.0	14881.6	-34.8	
4555.75	V	180.00	1.0	51.8	-2.8	49.0	283.4	14881.6	-34.4	
4555.75	H	180.00	1.0	51.1	-2.8	48.3	261.4	14881.6	-35.1	
5466.90	H	315.00	1.0	54.0	-2.0	52.0	398.1	14881.6	-31.5	
5466.90	V	270.00	1.0	53.4	-2.0	51.4	371.5	14881.6	-32.1	
6378.10	H	180.00	1.0	49.8	-0.1	49.7	306.1	14881.6	-33.7	Amb
6378.10	V	0.00	1.0	50.4	-0.1	50.3	328.0	14881.6	-33.1	Amb
7290.00	H	225.00	1.0	53.3	2.2	55.5	595.7	14881.6	-28.0	Amb
8200.00	H	0.00	1.0	52.0	2.2	54.2	512.9	14881.6	-29.3	Amb
9111.62	H	225.00	1.0	53.2	2.3	55.5	598.5	14881.6	-27.9	Amb

3.5 Carrier Bandwidth Testing

The EUT antenna was removed and connected directly into the spectrum analyzer input with a short length of coaxial cable. The analyzer resolution bandwidth was set to 10 kHz and the video bandwidth was set to 30 kHz. The highest peak of the carrier was centered on the analyzer display. An external attenuator or filter was used to confirm that the transmitter input was not overloading the spectrum analyzer input. The 20dB bandwidth of the modulated carrier was measured and compared to the FCC limit of 1MHz. Spectrum analyzer plots of the bandwidths are located in Exhibit 1.

The measured 20dB bandwidth was:

Low Channel: 117 kHz
Mid Channel: 117 kHz
High Channel: 123 kHz

3.6 Power Output Testing

The EUT antenna was removed and connected directly into the spectrum analyzer input with a short length of coaxial cable. The analyzer resolution and video bandwidths were set to 2 MHz and 3 MHz respectively (greater than the 20dB bandwidth). The highest peak of the carrier was centered on the analyzer display. An external attenuator or filter was used to confirm that the transmitter input was not overloading the spectrum analyzer input. The peak power in dBm was measured and compared to the FCC limit.

The measured peak power was:

Low Channel: 10.67 dBm (11.67mW)
Mid Channel: 10.5 dBm (11.22mW)
High Channel: 10.17 dBm (10.4mW)

3.7 Radio Frequency Radiation Exposure

Based on the above data, the worst case RF output power of the unit occurs at the Low Channel, 903.8 MHz. According to Section 1.1310 of the FCC rules, the uncontrolled RF exposure limit for this frequency range is $0.61 mW/cm^2$. To comply with the exposure limits for this section, humans must not be too close to the transmit antenna. The following formula was used to calculate the Power Density (no time averaging was used):

$S = (PG)/(4\pi R^2)$

Where,

S = Power Density
P = Output Power at the Antenna Terminals in mW
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna in cm

For this device, the calculation is as follows:

$S = (PG)/(4\pi R^2)$
P = Output Power = 11.7 mW
G = Antenna Gain = 0 dBi = INVLOG(0/10) = 1
R = 1.5cm from antenna to outside of case

Therefore: $S = (11.7mW \times 1)/(4\pi(1.5cm)^2) = 0.414\ mW/cm^2$

EUT Power Density = $0.414\ mW/cm^2$
FCC Limit = $0.61mW/cm^2$

Table 3: System Under Test

FCC ID: PB8P4432-050

EUT: Dassault A.T. ARTEMA EFT/POS Transmitter

FCC ID: PB8P4432-050

Table 4: Interface Cables Used

The EUT has no I/O ports and therefore no interface cables were used.

Table 5: Measurement Equipment Used

The following equipment is used to perform measurements:

Hewlett-Packard Spectrum Analyzer: HP8564E

Hewlett-Packard Spectrum Analyzer: HP8568B

Hewlett-Packard Spectrum Analyzer: HP8593A

Hewlett-Packard Quasi-Peak Adapter: HP85650A

Hewlett-Packard Preselector: HP85685A

Hewlett-Packard Preamplifier: HP8449B

Antenna Research Associates, Inc. Biconical Log Periodic Antenna: LPB-2520A

Antenna Research Associates, Inc. Horn Antenna: DRG-118/A

Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8012-50-R-24-BNC

Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8028-50-TS-24-BNC

AH Systems, Inc. Portable Antenna Mast: AMS-4

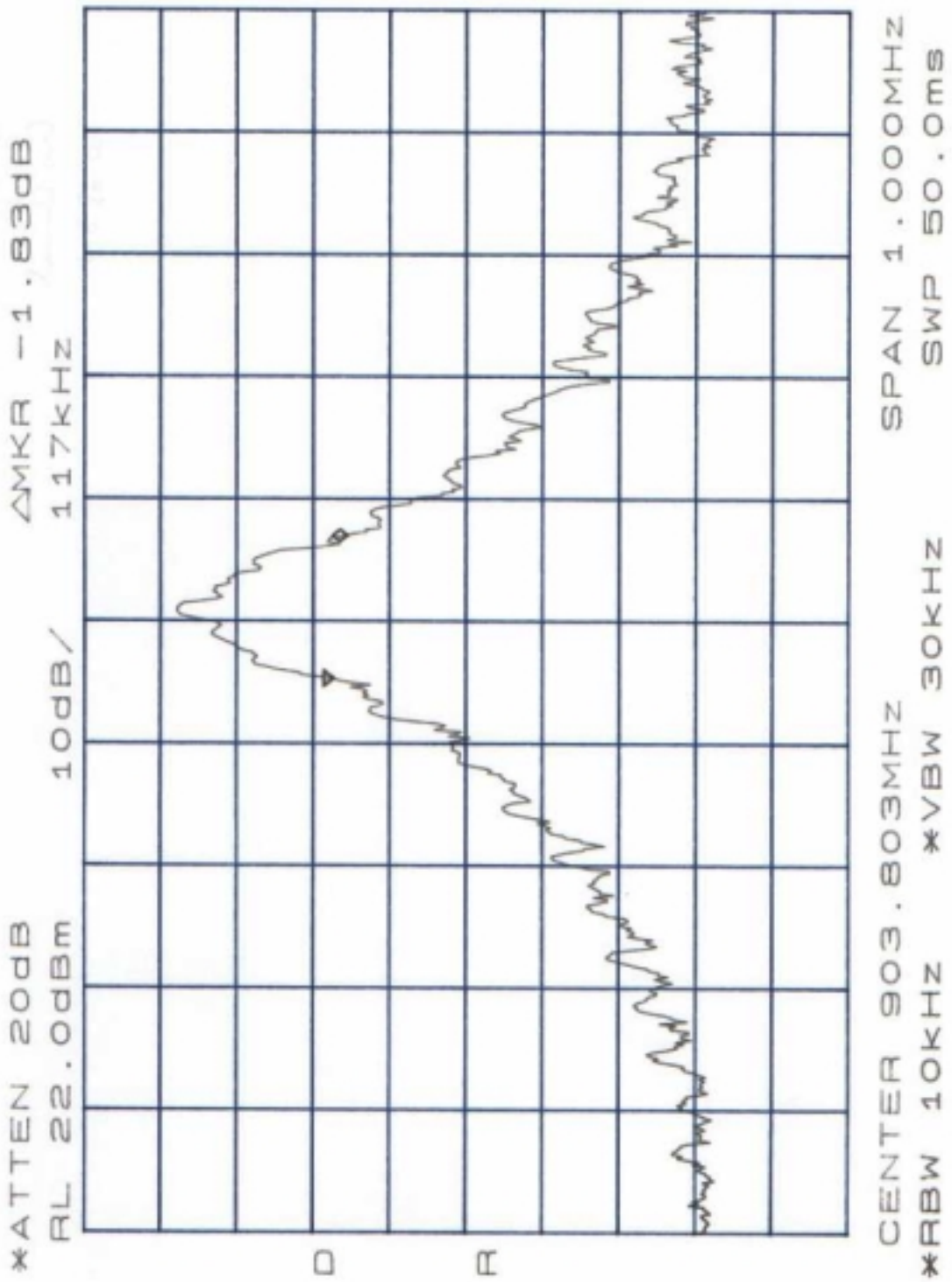
AH Systems, Inc. Motorized Turntable

RG-214 semi-rigid coaxial cable

RG-223 double-shielded coaxial cable

Exhibit 1: Carrier Bandwidth Data

Low Channel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RL 22.0dBm
10dB/
ΔMKR -1.83dB
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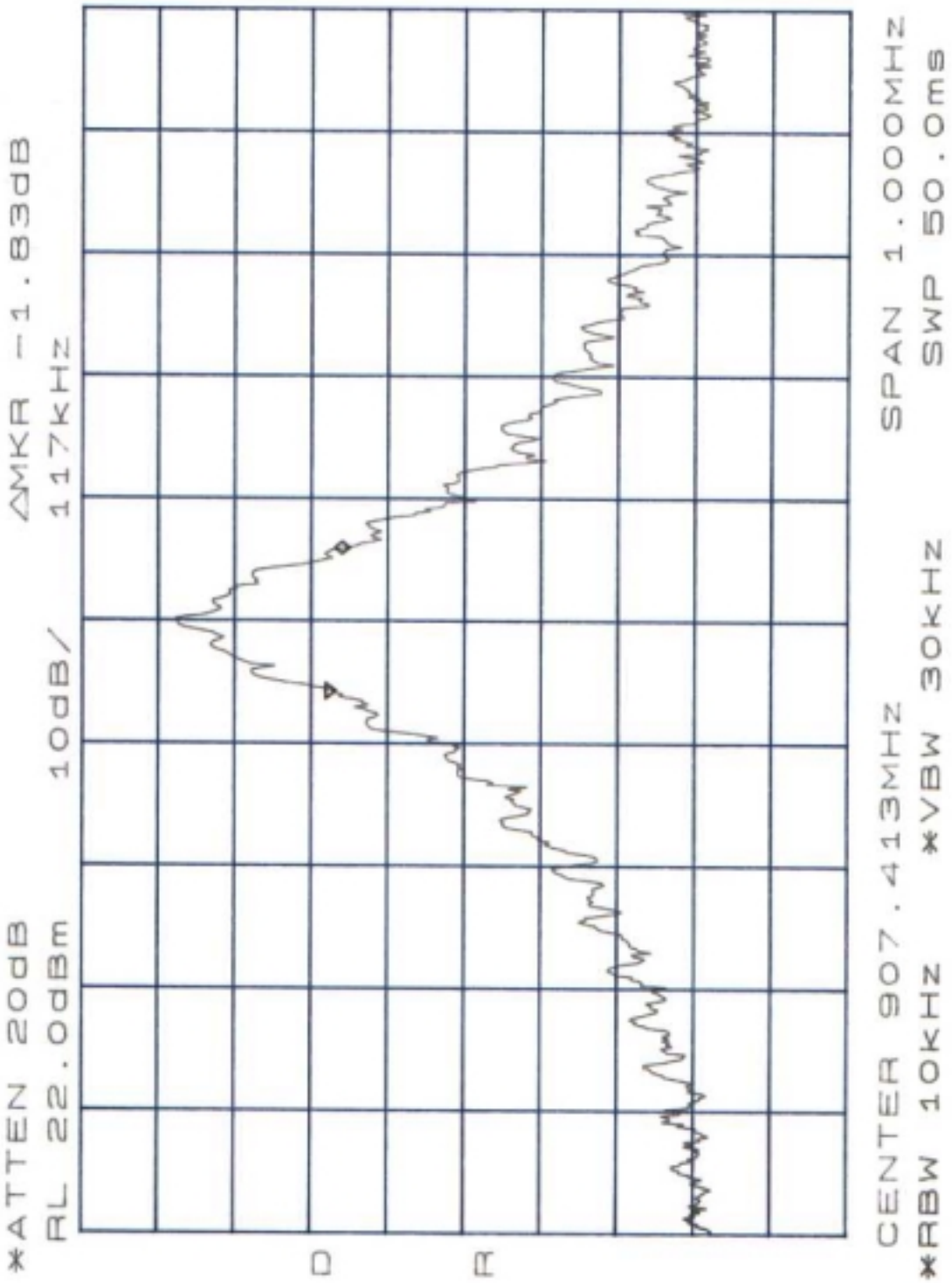
SPAN 1.000MHz
SWP 50.0ms
CENTER 903.803MHz
*RBW 10kHz
*VBW 30kHz

Mid Channel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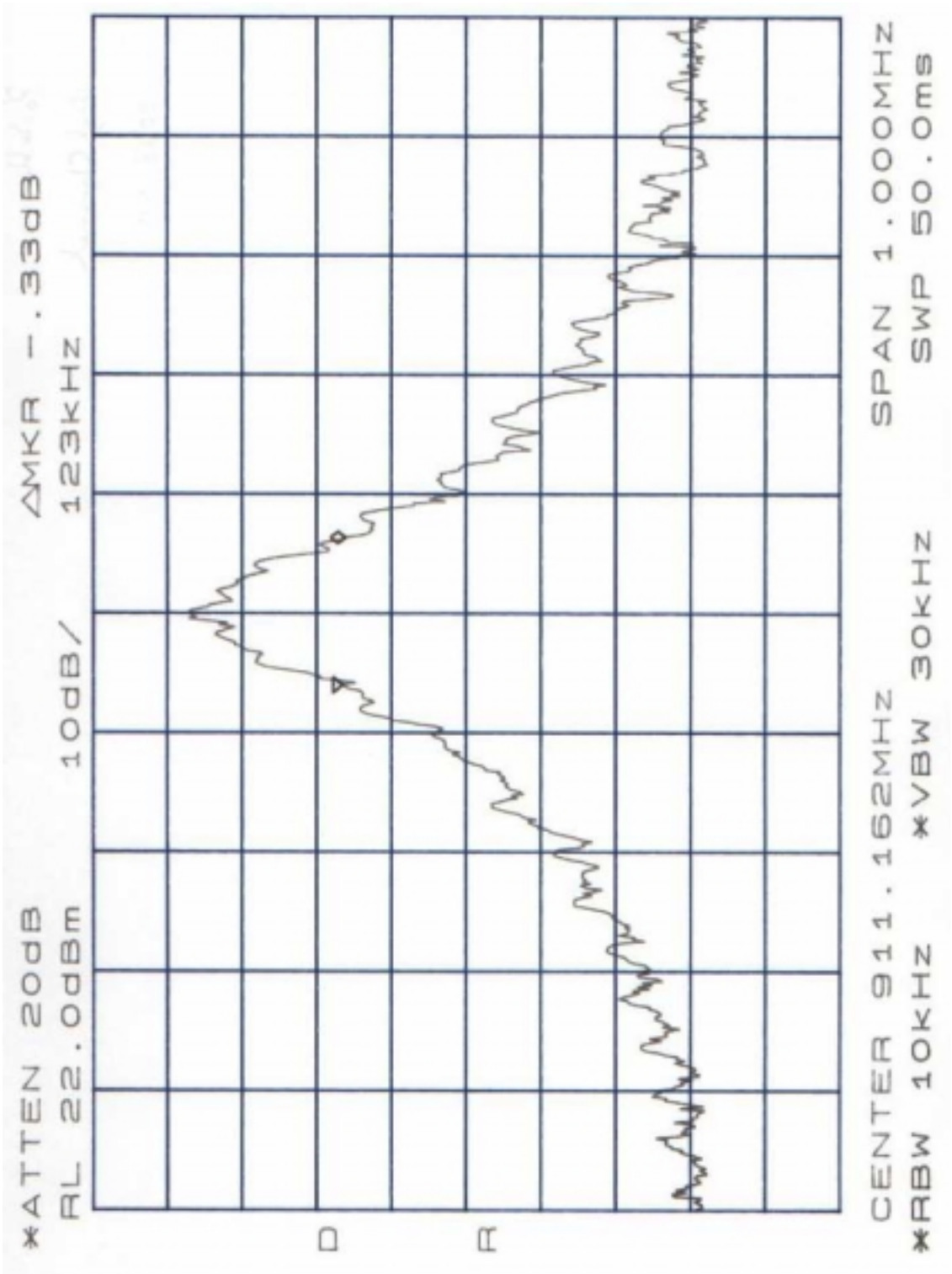
RL 22.0dBm
10dB/
ΔMKR -1.83dB
117kHz
CENTER 907.413MHz
*RBW 10kHz
*VBW 30kHz
SPAN 1.000MHz
SWP 50.0ms

High Channel



Appendix A

Statement of Measurement Uncertainty

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.