1 Exhibit K-RF Exposure

Following is the test procedure and the test results from Rubicom Systems, Inc.

RUBICOM SYSTEMS, INC.

FCC TEST REPORT

(INTENTIONAL RADIATOR)

FOR THE

ROCKWELL COLLINS, INC.

DME-4000 COMMUNICATIONS TRANSCEIVER

(962-1213MHz)

NOVEMBER 2001

Rubicom Systems, Inc.
284 West Drive, Suite B
Melbourne, FL 32904

THIS REPORT SHALL NOT BE REPRODUCED
EXCEPT IN FULL WITHOUT THE WRITTEN
APPROVAL OF THE TESTING LABORATORY

FCC TEST REPORT

(INTENTIONAL RADIATOR)

FOR THE

ROCKWELL COLLINS, INC.

DME-4000 TRANSCEIVER

S/N: GK4H

Prepared by: _____
Joseph G. Barbee

Tested by: _____
Alex Belardinelli

Performed by:

RUBICOM SYSTEMS, INC.
284 West Drive, Suite B
Melbourne, Florida 32904

Performed for:

ROCKWELL COLLINS, INC.
1100 W. Hibiscus Blvd.
Melbourne, Florida 32901

Received: November 1, 2001

Completed: November 5, 2001

TABLE OF CONTENTS

Paragraph		Title	Page
		ABSTRACT	3
1.0		**INTRODUCTION**	4
	1.1	Purpose	4
	1.2	Requirements	4
	1.3	Equipment Under Test Description	5
	1.4	Summary of Results	5
2.0		**APPLICABLE DOCUMENTS**	6
3.0		**TEST SITE DESCRIPTION**	7
	3.1	Environmental Conditions	7
4.0		**TEST INSTRUMENTATION**	8
5.0		**TEST SAMPLE SETUP AND CONFIGURATION**	9
6.0		**PROCEDURES AND RESULTS**	12
	6.1	Radiated Emissions	12
	6.2	Spurious Emissions (Transmitter)	12
	6.3	Results	12
	6.4	Preliminary Scans	12
APPENDIX A		**COMPLIANCE LETTER**	51

ABSTRACT

This report presents test results of emanations found emitting from the Rockwell Collins DME-4000 and the comparison of these emissions to the requirements of FCC, Title 47, Part 15, Subpart C for spurious radiated emissions.

This testing was performed on a 3 meter open area test site at Rubicom Systems, Inc. (RSI). The testing was performed for Rockwell Collins, Inc. under purchase order 4500585492 and is filed under JA-1869 at RSI. The results of this test effort demonstrate compliance of the Rockwell Collins, DME-4000 to FCC, Title 47, Part 15, Subpart C intentional radiators.

Equipment under test (EUT) was a Rockwell Collins DME-4000 Transceiver, s/n: GK4H.

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to show compliance of the Rockwell Collins, Inc. Model DME-4000 to the requirements of Part 15 of the FCC Rules and Regulations (47CFR, Part 15, Subpart C) for intentional radiators. The tests were performed on a 3 meter site.

1.2 Requirements

The test requirements are as follows:

RADIATED RX MODE (15.209A)

Frequency (MHz)	3 Meter Field Strength (µV/m)	3 Meter (dBµV/m)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
960 - Above	500	54 Avg. 74 Peak

CONDUCTED TX MODE (CFR 87)

Harmonics of transmitter attenuated by at least 20dB. This test was performed as a conducted test on the antenna port up to the 10th harmonic. No signals appear at the antenna port other than the intended transmit signal.

1.3 Equipment Under Test

The DME-4000 Transceiver is a remote mounted unit which measures the slant range (line-of-sight) distance from the aircraft to the ground station and outputs digital distance data in nautical miles for display on a companion indicator, HIS, or EFIS display. In addition, the system computes the relative closure rate and time to station (TTS), and provides a decoded station identifier.

1.4 Summary of Results

Results are presented in Paragraph 6.0. The DME-4000 meets the requirements stated in Paragraph 1.2.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this report to the extent expressed herein:

FCC Code of Federal Regulations Title 47, Part 15
FCC Procedure for Measuring RF Emissions from Computing Devices FCC/OET MP-4, July 1987
ANSI C63.4-1992
FCC Characteristics of Open Field Test Sites Bulletin OET 55, October 1989

3.0 TEST SITE DESCRIPTION

This testing was performed at Rubicom Systems, Inc. 3 meter open area test site. The description of the measurement facility was found to be compliant with the requirements of Section 2.948 of the FCC rules. A copy of the compliance letter is attached to this report as Appendix A.

3.1 Environmental Conditions

Environmental conditions during testing of the EUT were as follows:

Date: November 5, 2001

Temperature: 83º

Barometer: 29.35 inches

Humidity: 70%

4.0 TEST INSTRUMENTATION

The following test equipment was used to perform this testing.

Qty.	Description	Manufacturer	Model No.	Last Cal.	Cal. Cycle
1	Spectrum Analyzer	Advantest	R3271	01/18/01	1 Yr.
1	BiLog Antenna	Chase	CLB6111B	07/17/01	1 Yr.
1	Amplifier	Hewlett Packard	8449B	05/01/01	1 Yr.
1	Ridge Guide Horn	A.H. Systems	SAS-200/571	05/08/01	1 Yr.
1	Plotter	Hewlett Packard	7440A	NCR	N/A

5.0 TEST SAMPLE SETUP AND CONFIGURATION

The Rockwell Collins, Inc. DME-4000 was placed on the nonconductive 80cm high manual turntable. The unit was configured with a DC power supply. The antenna port was connected to an IFR model ATC1400 DME test set (located 20 ft. from the EUT. The system cable was coiled on the table with the EUT and power supply.

Photo 1 presents the equipment setup for radiated emissions. Photo 2 presents the equipment setup for antenna conducted emissions.

PHOTO 1

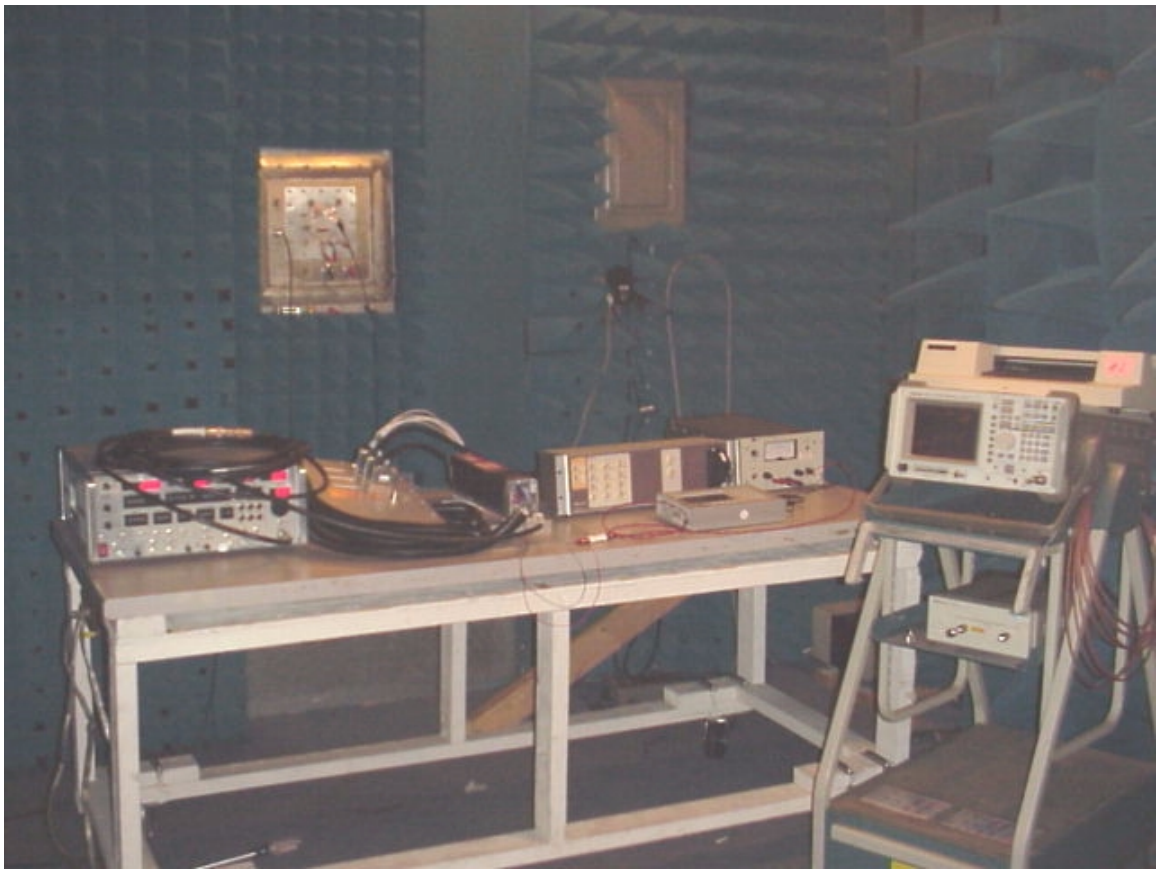


PHOTO 2

6.0 PROCEDURES AND RESULTS

6.1 Radiated Emissions

The transmitter was operated at 1150MHz for the radiated emissions. The measurements were performed from 30MHz to 12GHz. Only one signal was found at 35.9MHz and measured 6dB below the limit in the vertical polarization. Data Sheets 6.1-1 through 6.1-14 present the quasi-peak sweeps to 1GHz and average and peak sweeps from 1-12GHz.

Data Sheets 6.1-15 through 6.1-28 present the ambient data over the 30MHz-12GHz frequency range.

6.2 Spurious Emissions (Transmitter)

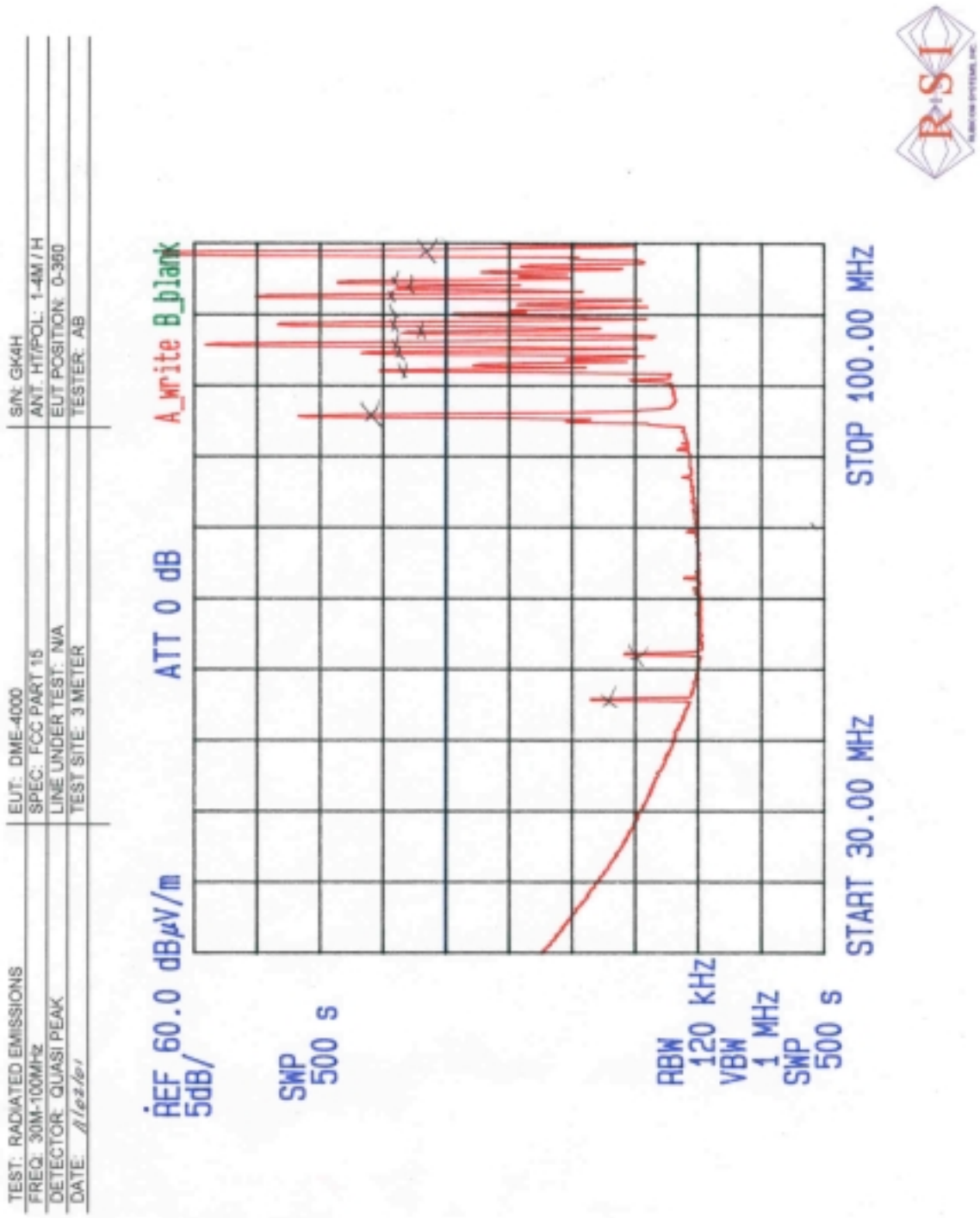
Spurious emissions were measured at the antenna port to prove the harmonic attenuation to be 20dB below the fundamental as required in Part 87. Data Sheets 6.2-1 and 6.2-2 present the levels for the fundamental and up to the 10th harmonic. The transmitter frequency was tested at a low channel 1025MHz, mid channel 1080MHz and high channel 1150MHz.

6.3 Results

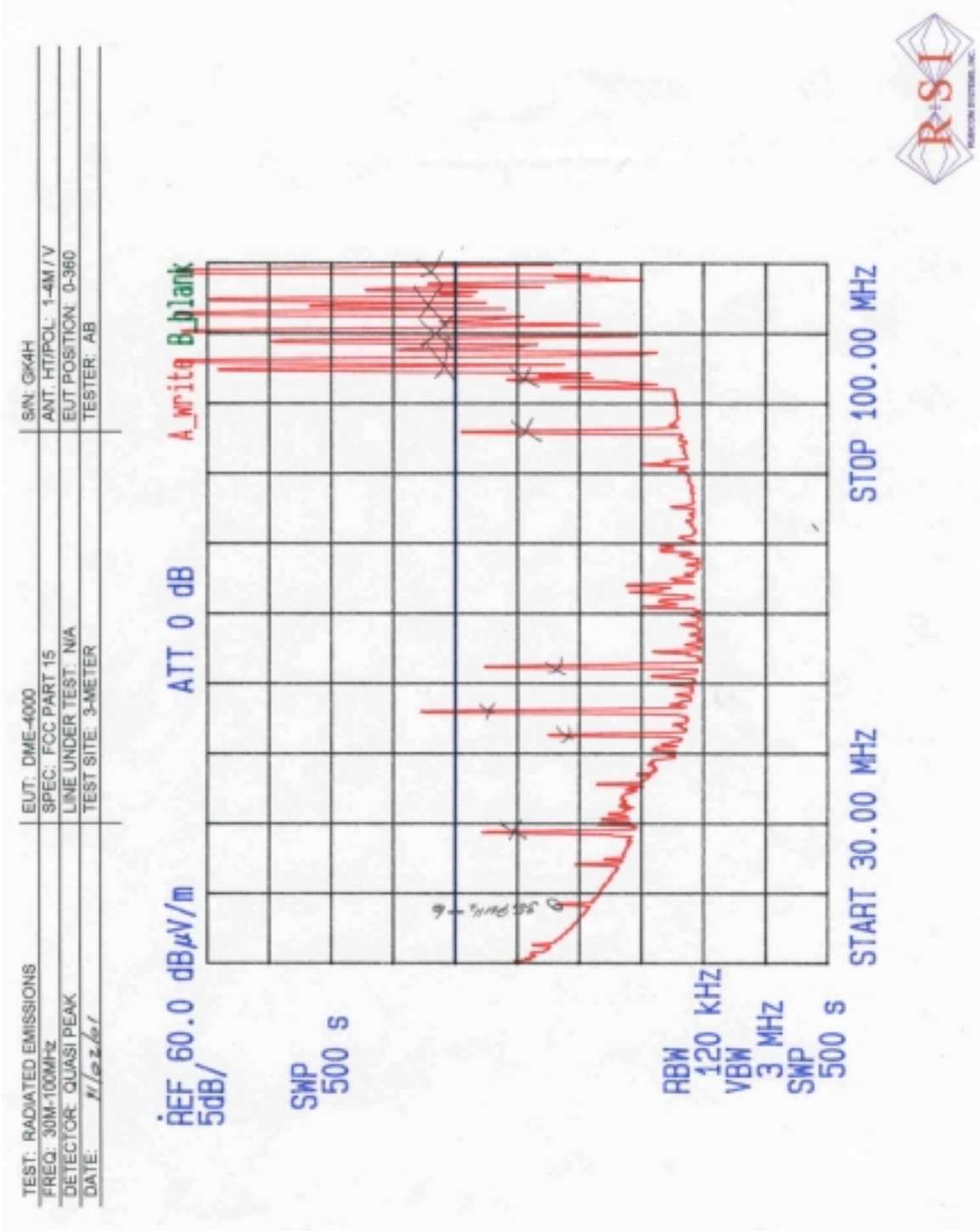
No signals were found to be above the requirements for radiated or spurious emissions. No modifications were required.

6.4 Preliminary Scans

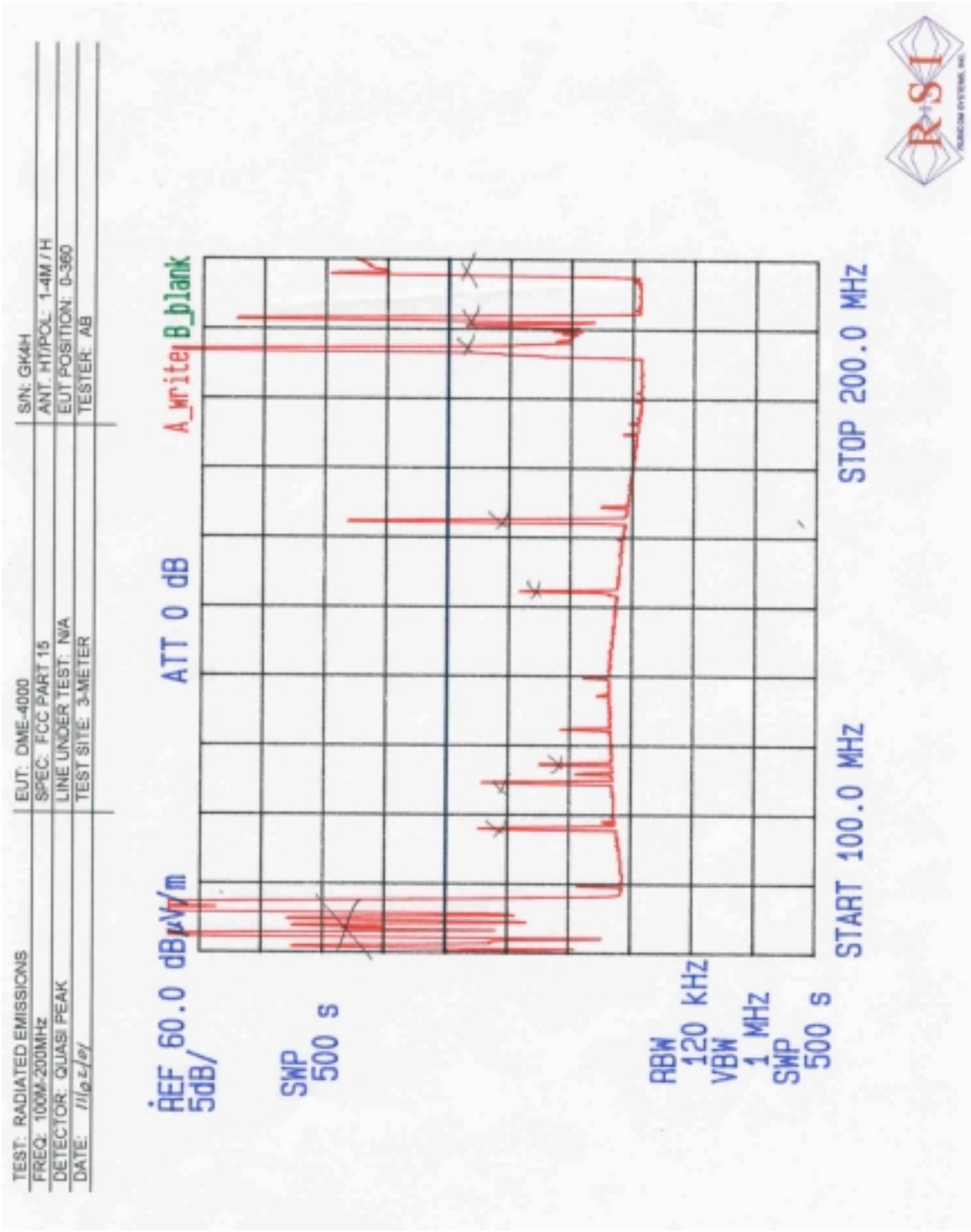
Data Sheets 6.4-1 through 6.4-8 are plots made inside the shielded enclosure for frequency identification of signals that were emitted without the ambient interference.



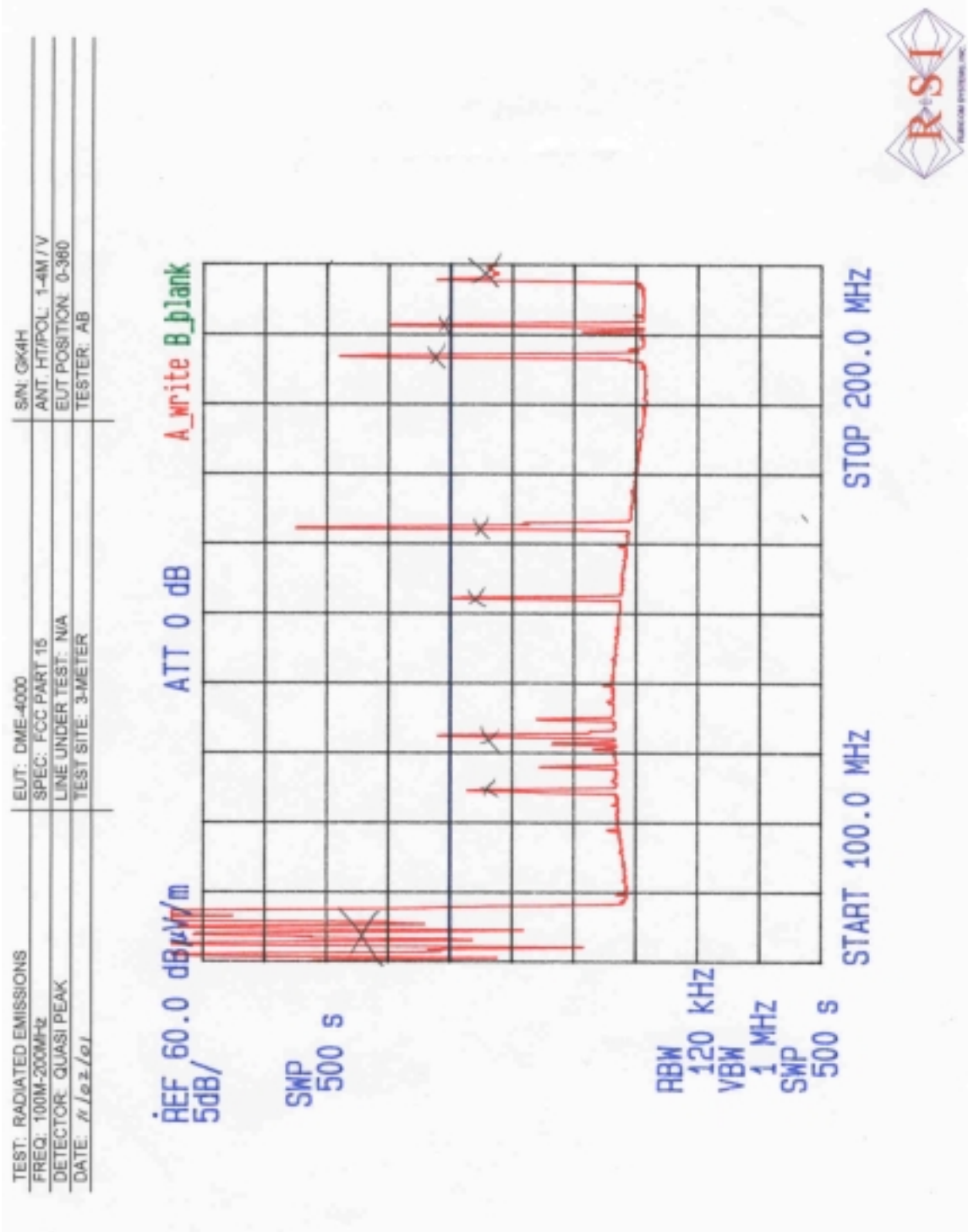
DATA SHEET 6.1-1



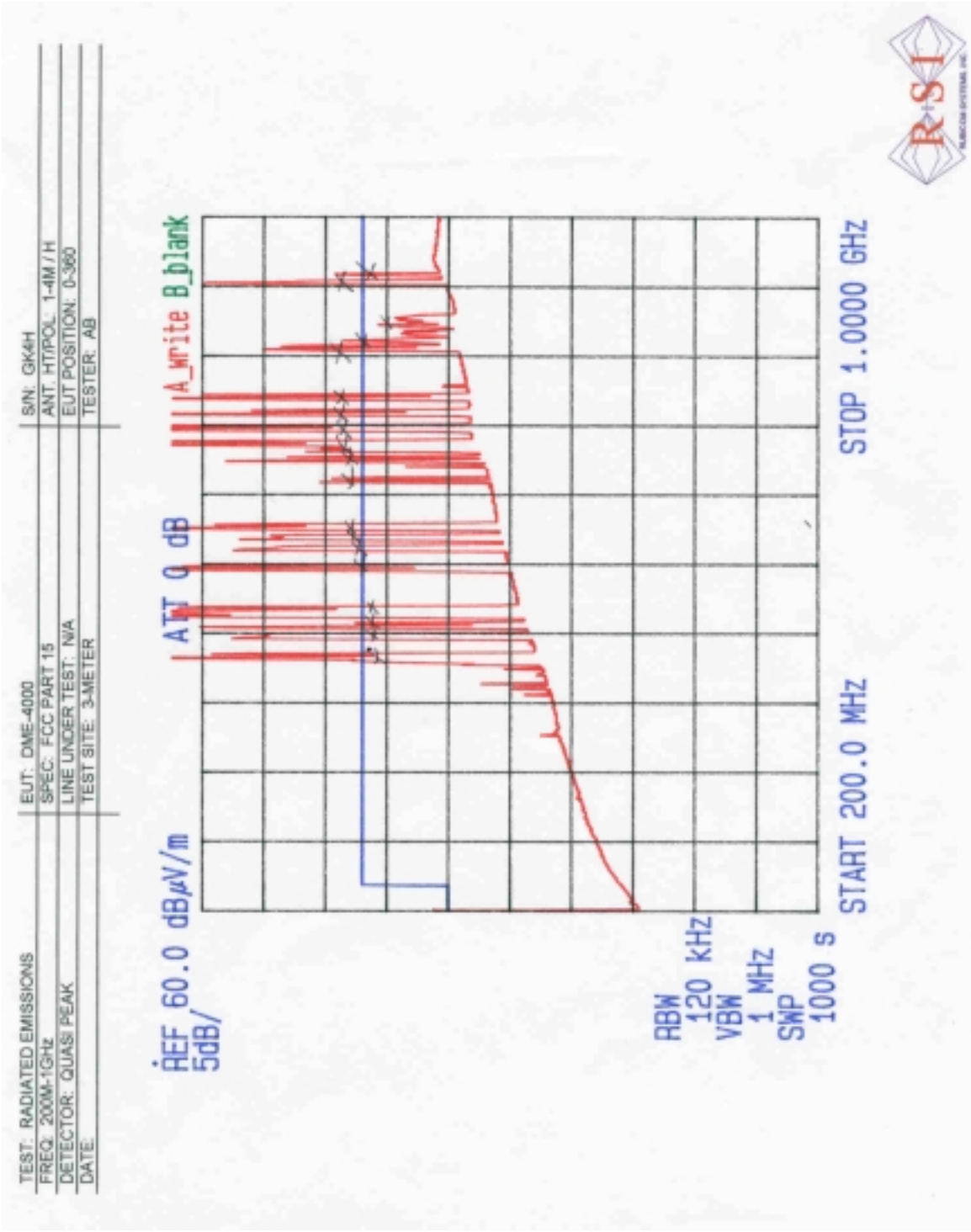
DATA SHEET 6.1-2



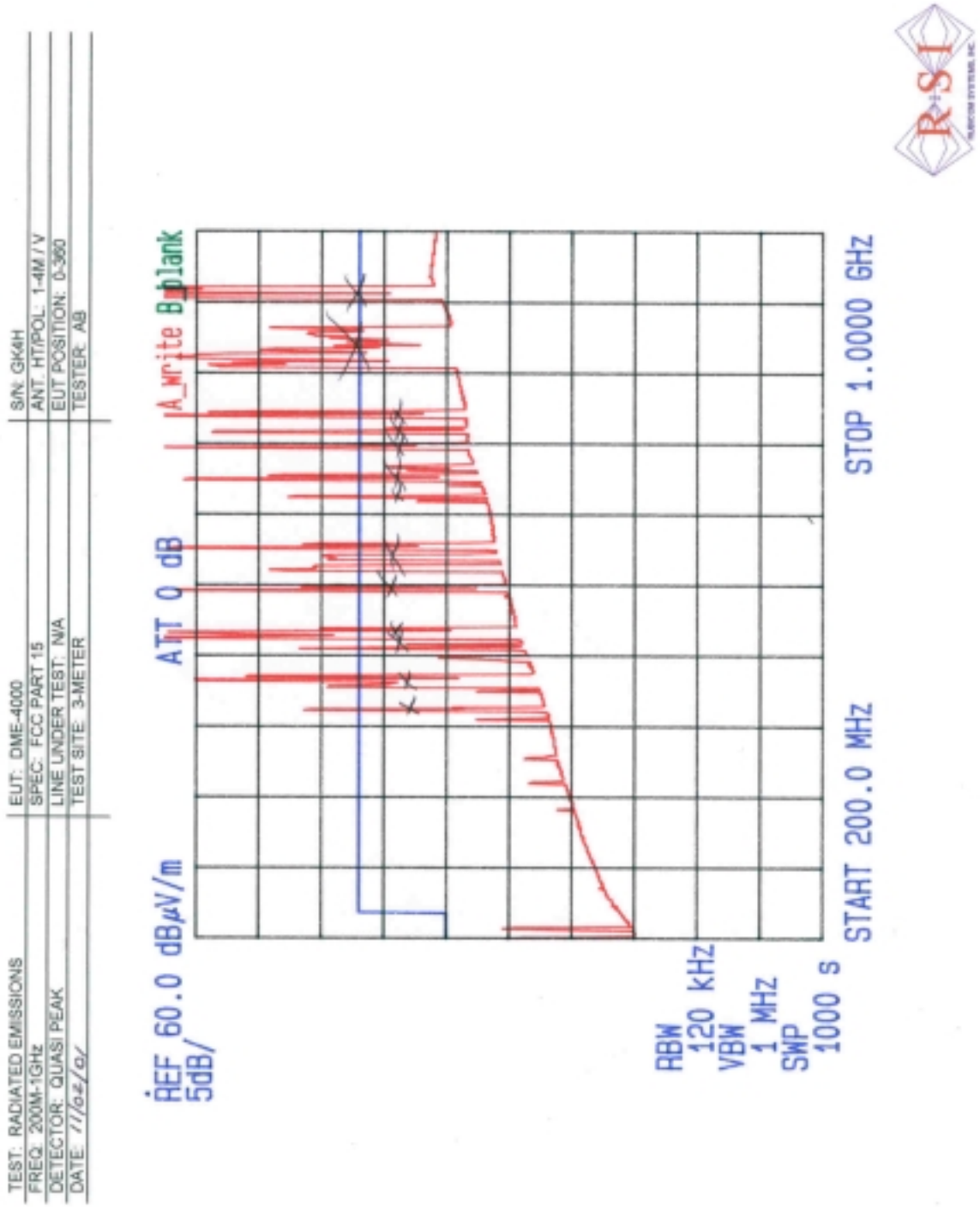
DATA SHEET 6.1-3



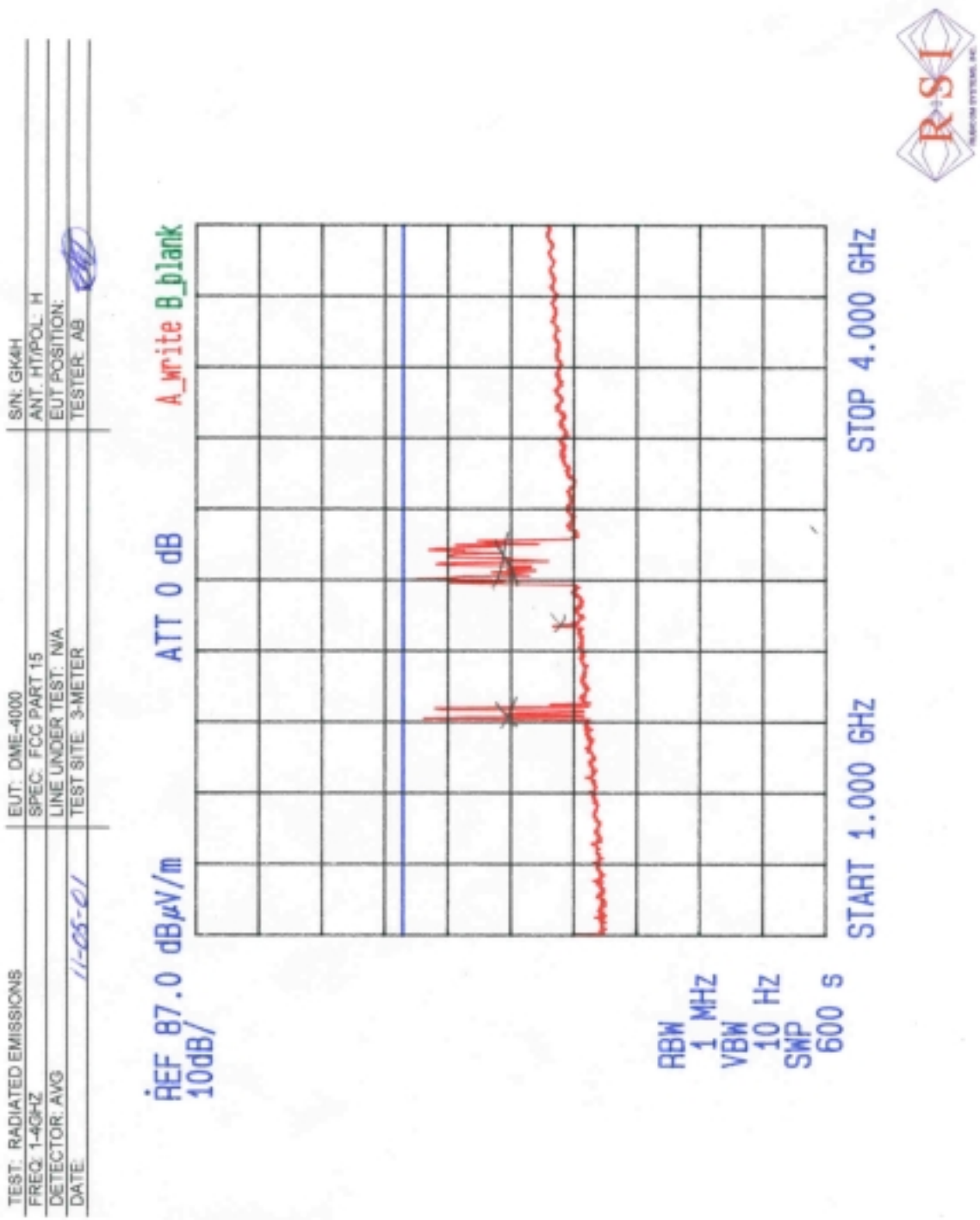
DATA SHEET 6.1-4



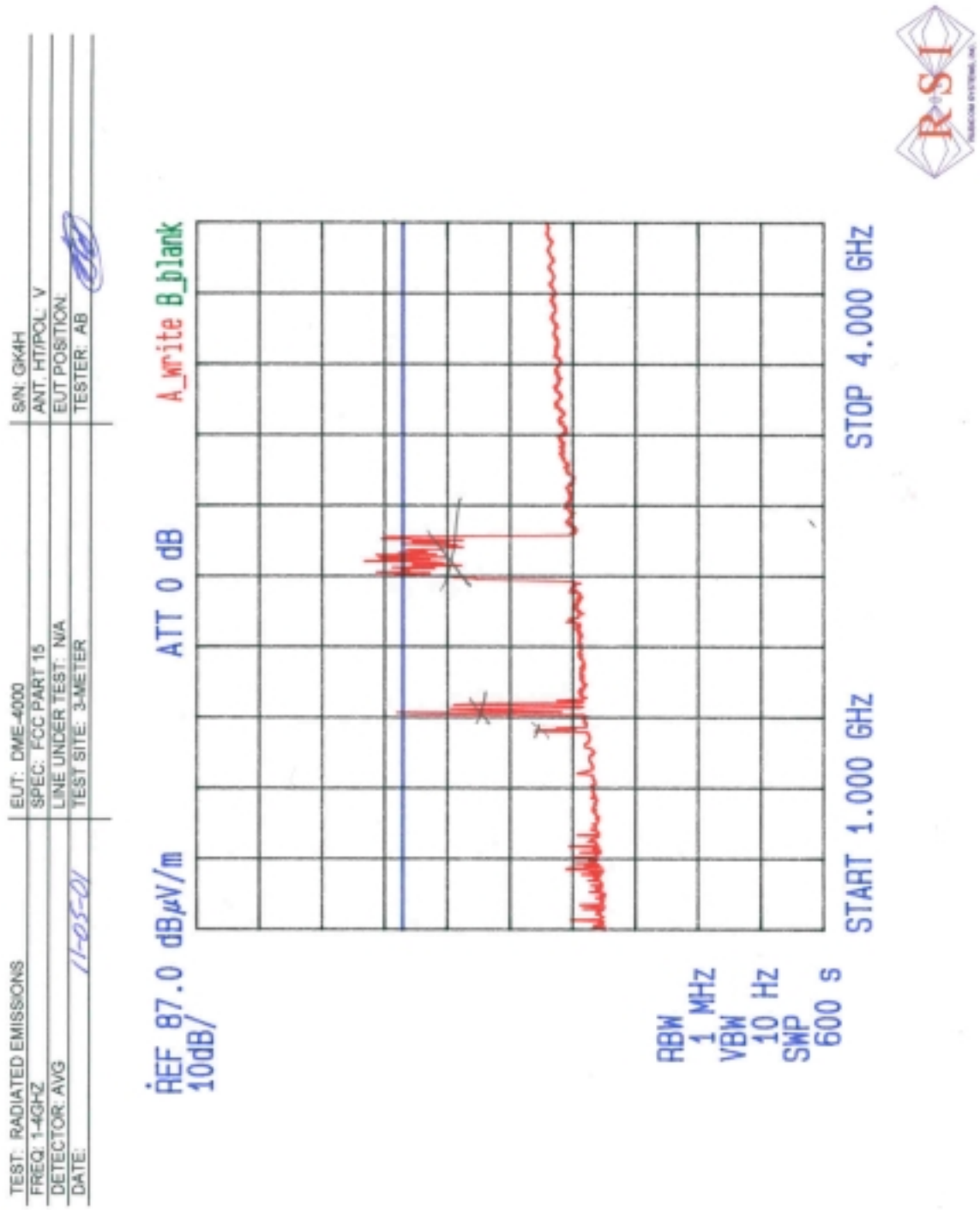
DATA SHEET 6.1-5



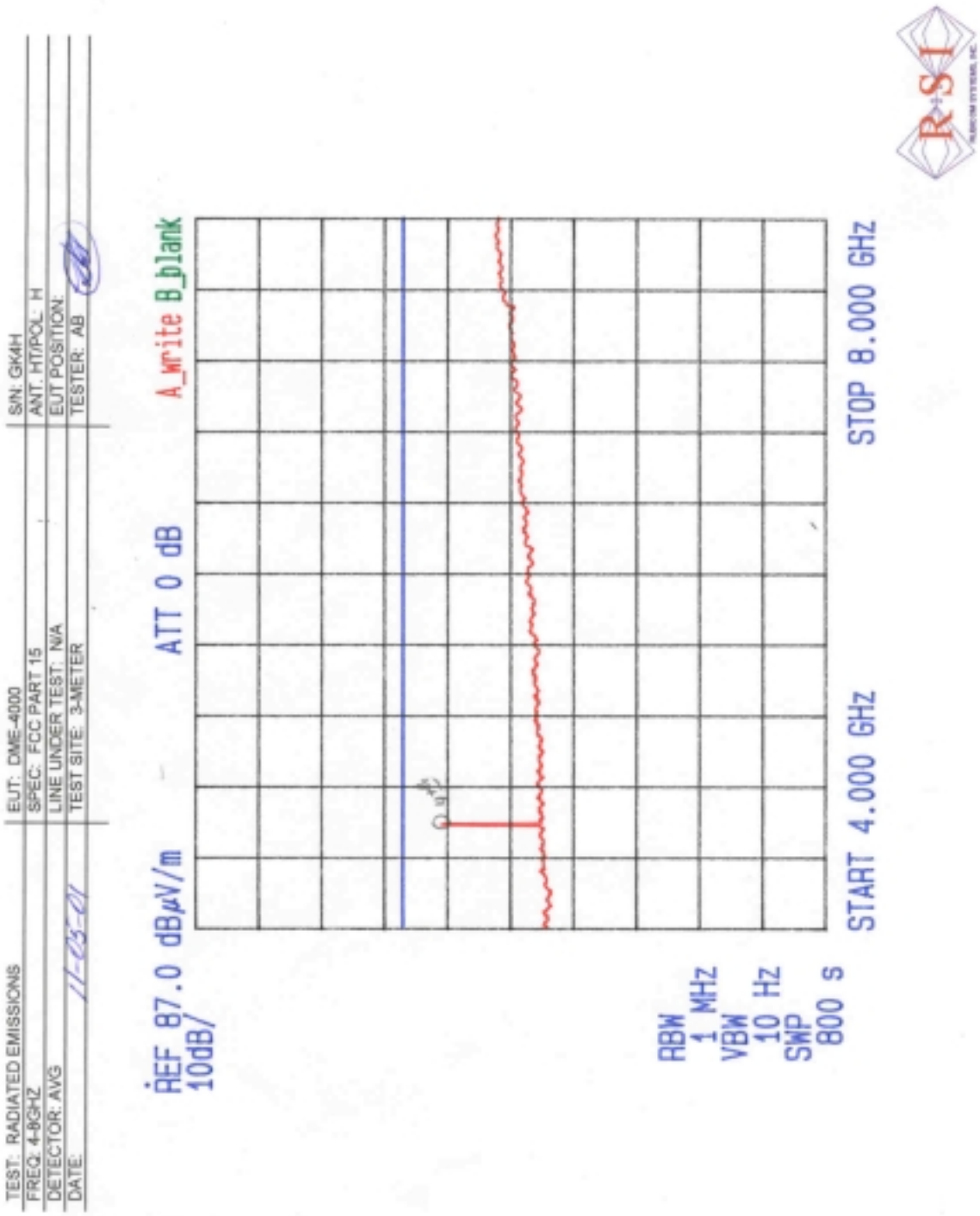
DATA SHEET 6.1-6



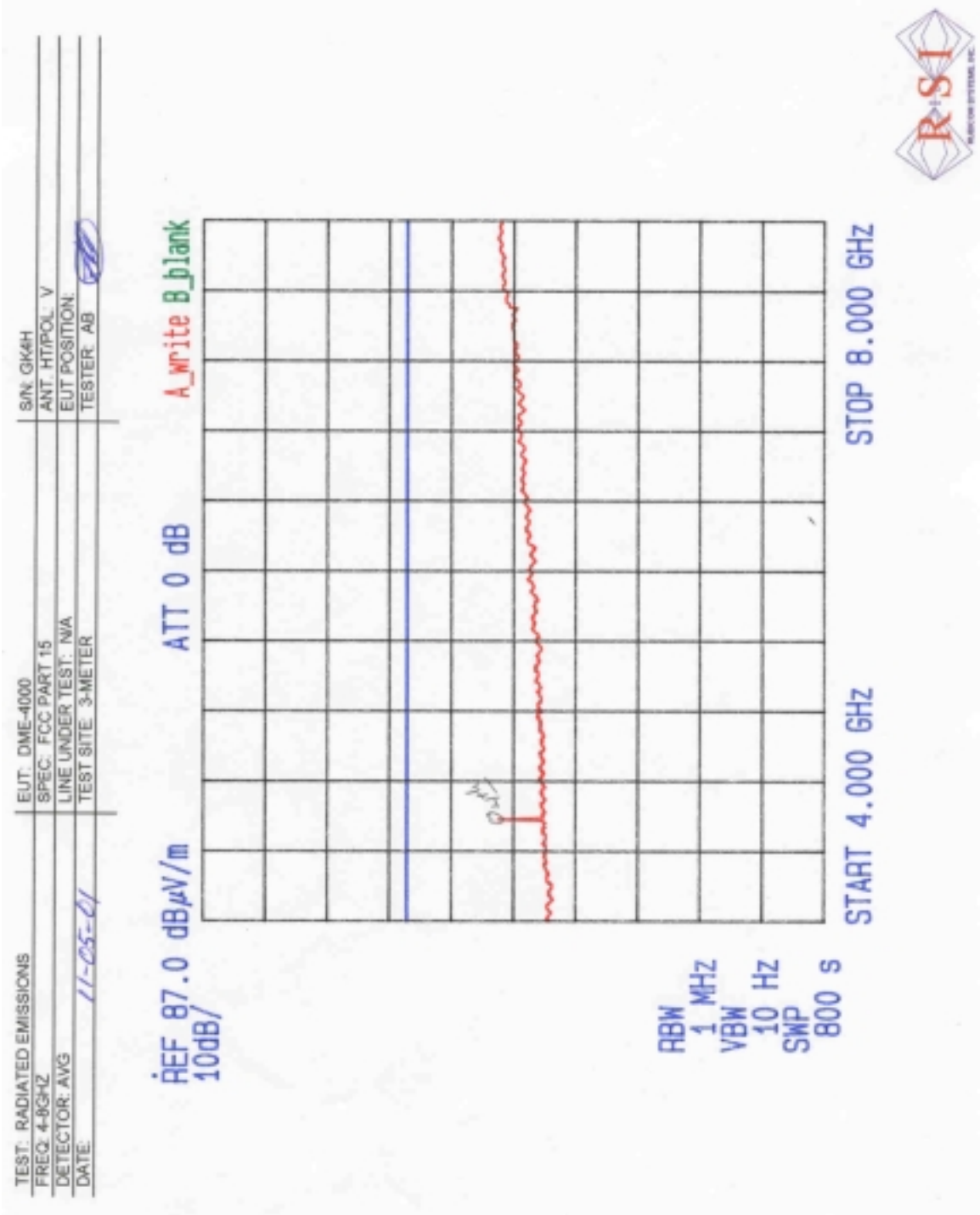
DATA SHEET 6.1-7



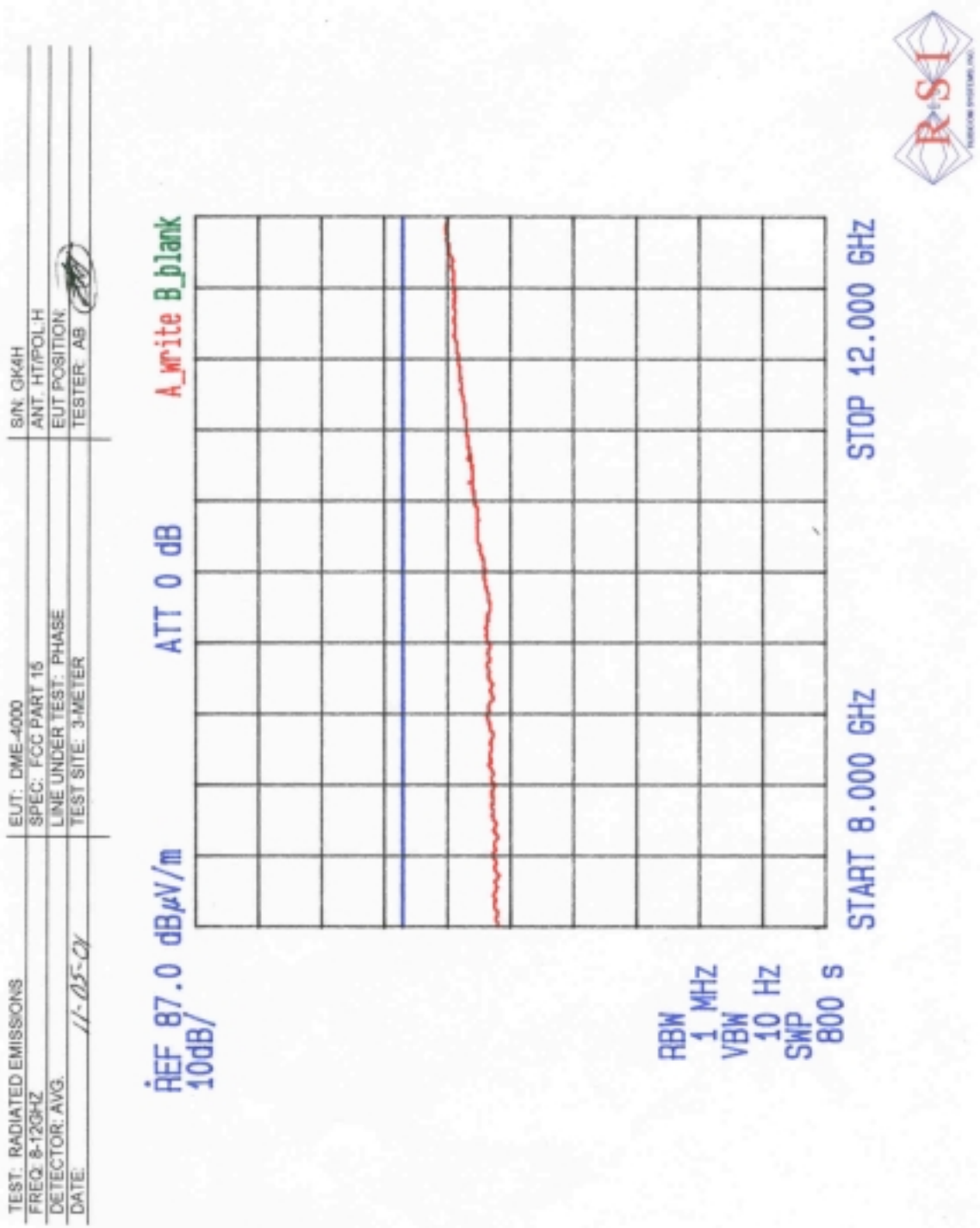
DATA SHEET 6.1-8



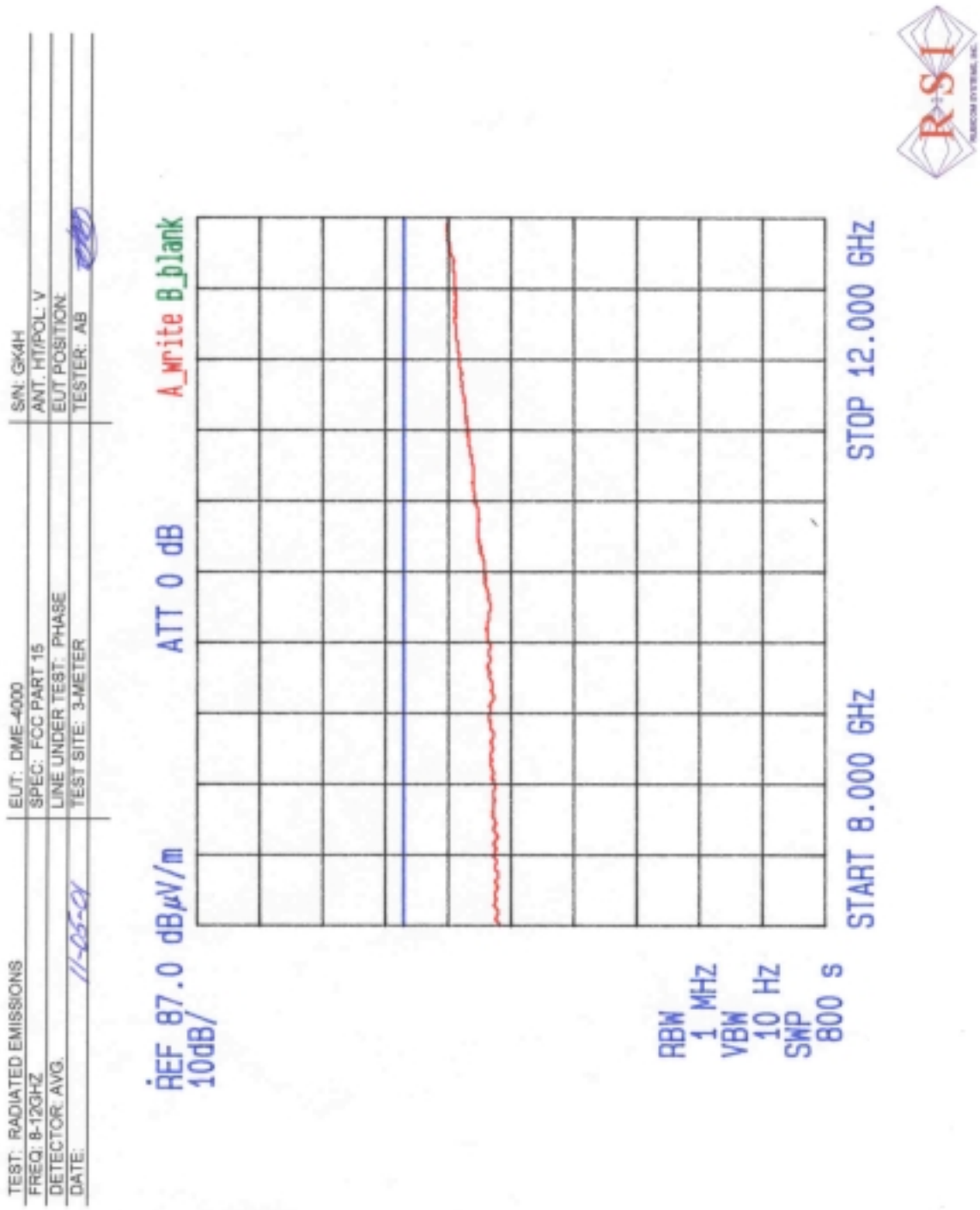
DATA SHEET 6.1-9



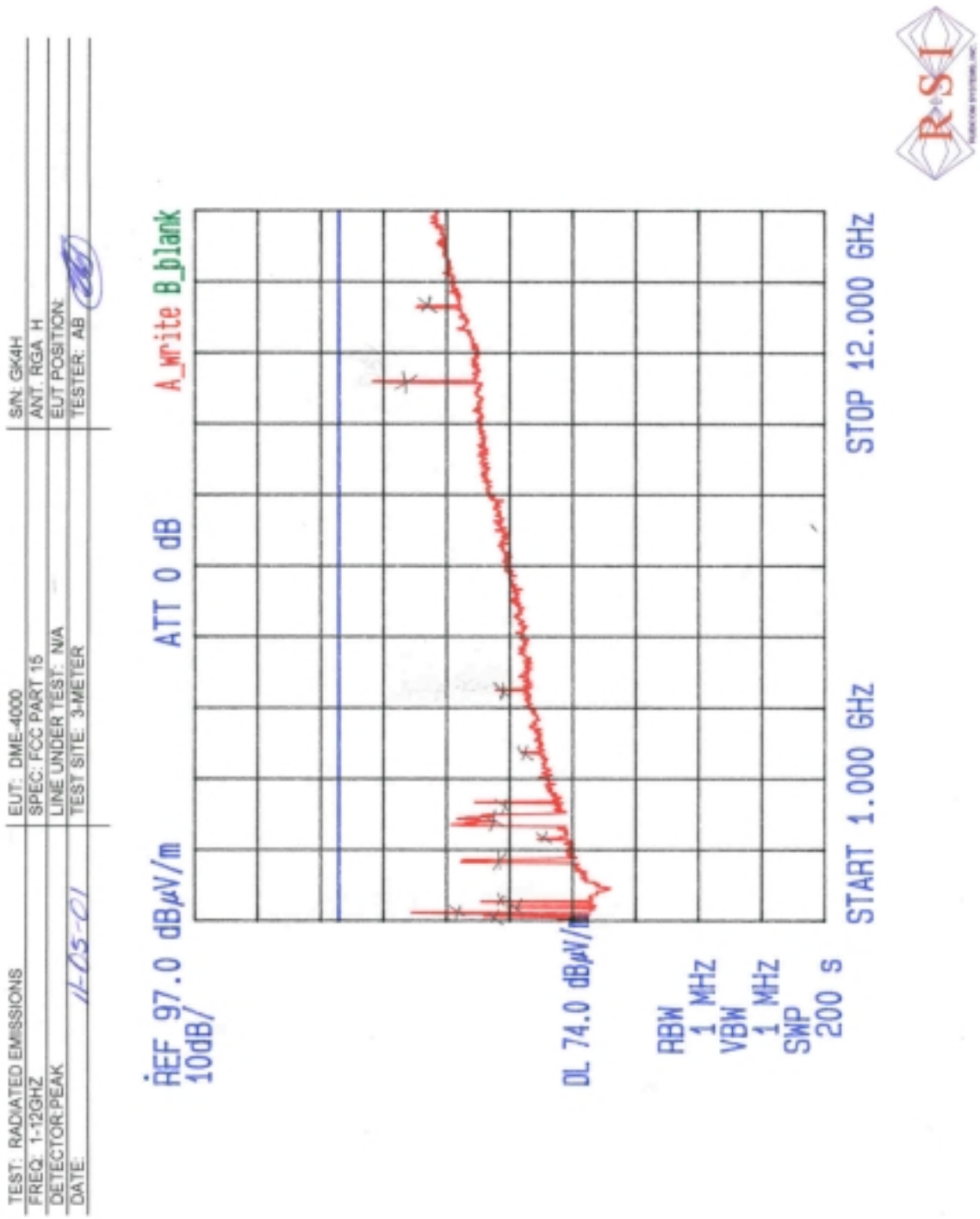
DATA SHEET 6.1-10



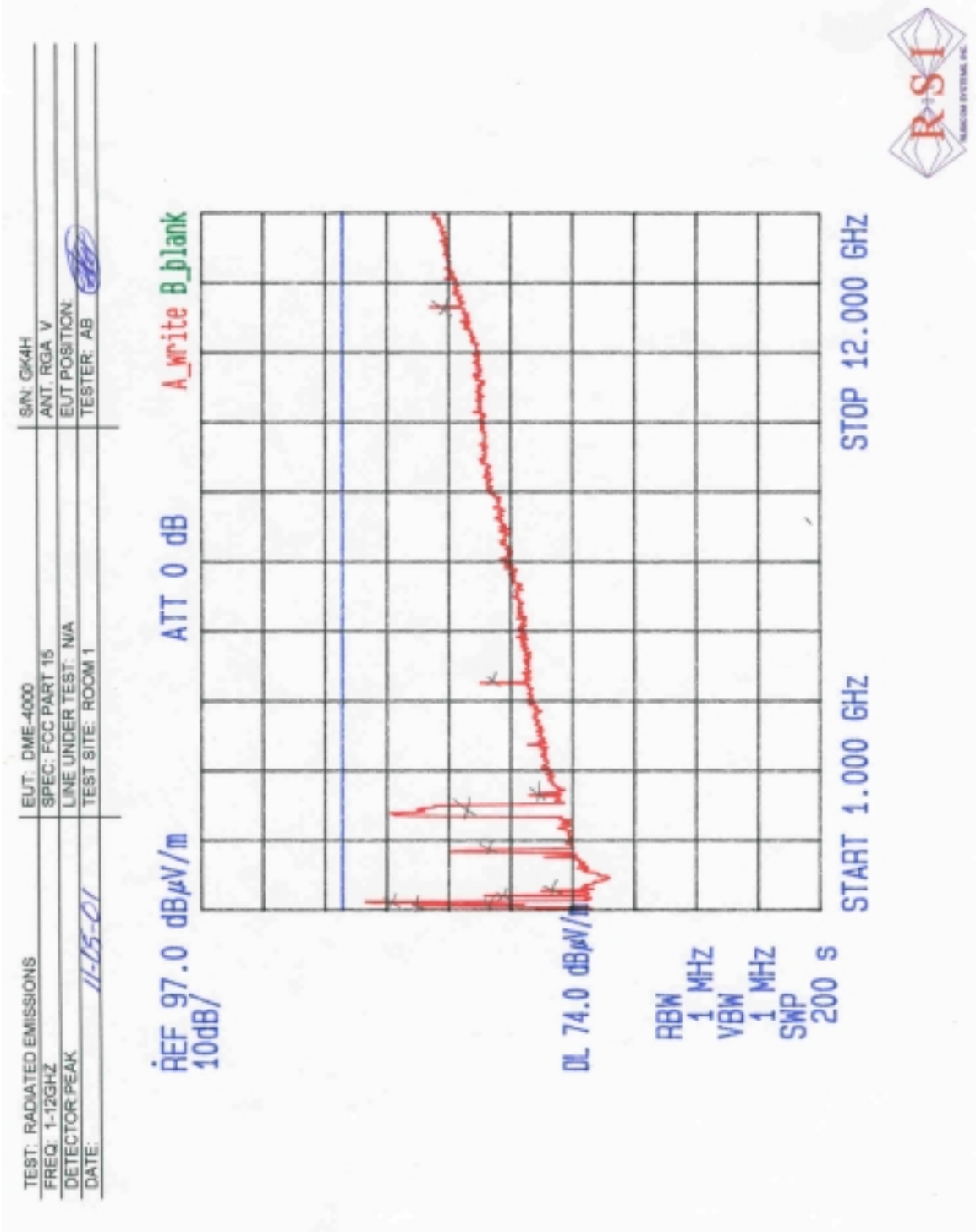
DATA SHEET 6.1-11



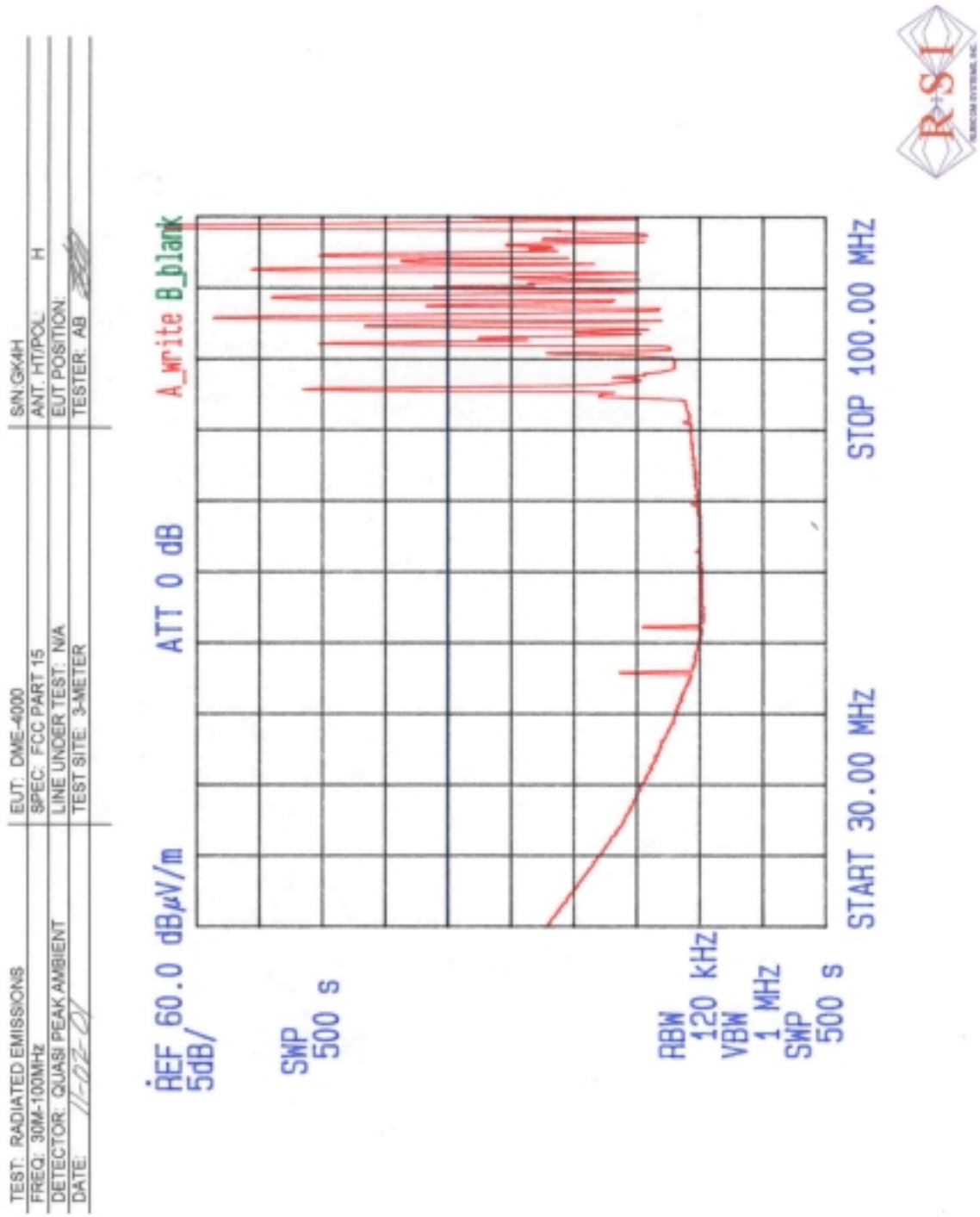
DATA SHEET 6.1-12



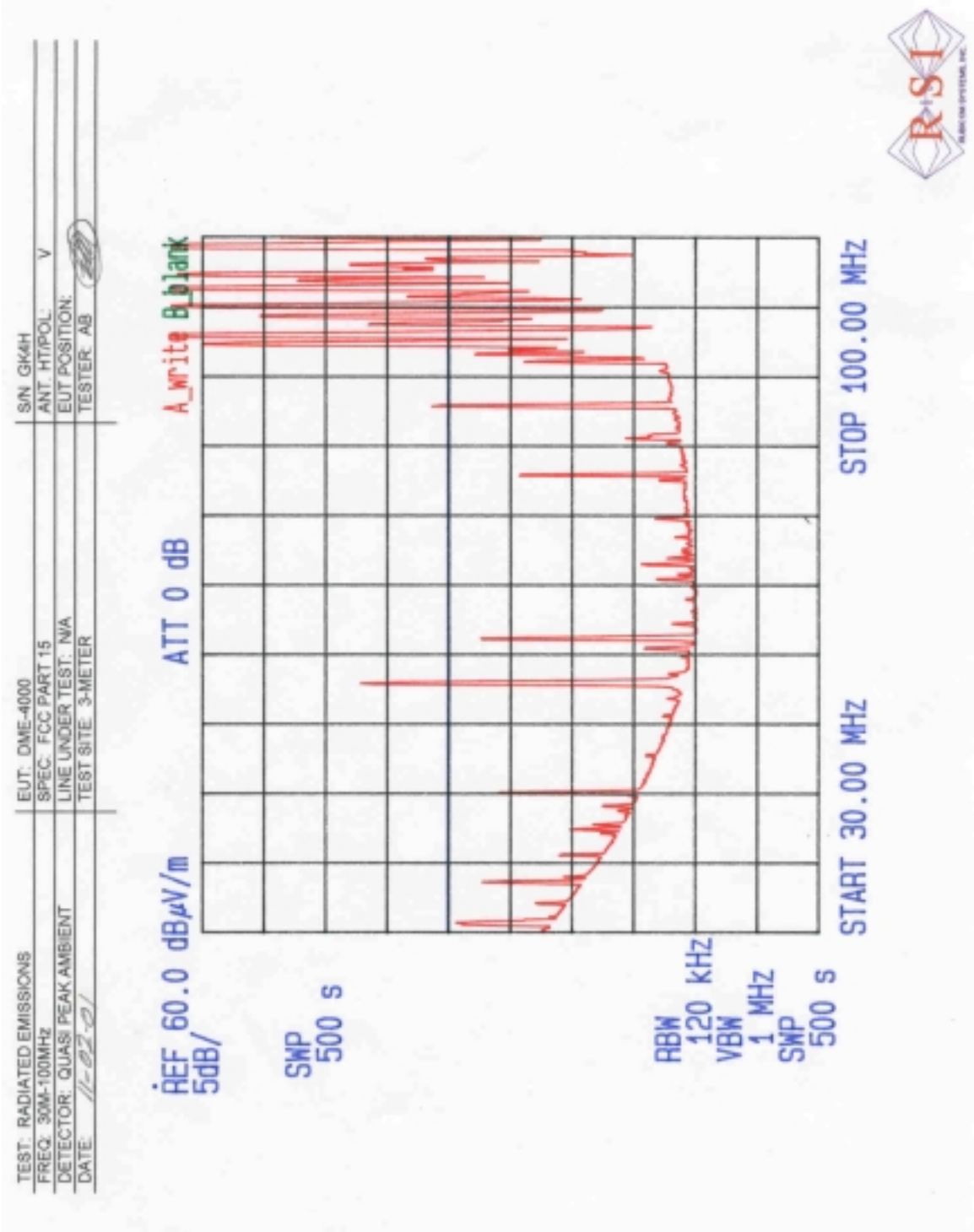
DATA SHEET 6.1-13



DATA SHEET 6.1-14



DATA SHEET 6.1-15



DATA SHEET 6.1-16

The remainder of Exhibit K is contained in file “Exhibit K-2 of 2-RF Exposure.doc”