RUBICOM SYSTEMS, INC.

FCC TEST REPORT

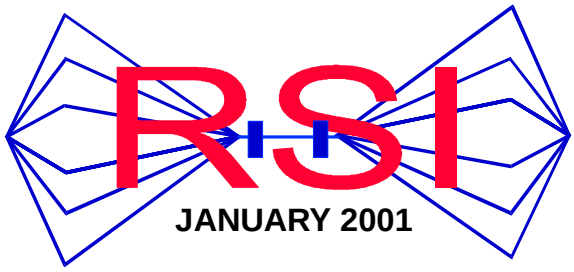
INTENTIONAL RADIATOR

FOR THE

INTERSIL CORPORATION

MODEL 36342U PRISM II USB

2.4GHz WIRELESS TRANSMITTER



JANUARY 2001

Rubicom Systems, Inc.
284 West Drive, Suite B
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JA-1758

FCC TEST REPORT

(INTENTIONAL RADIATOR)

FOR THE

INTERSIL CORPORATION

MODEL 36342U

PRISM II USB

2.4GHz WIRELESS TRANSMITTER

S/N: 00470005

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CERTIFICATION

Rubicom Systems, Inc. certifies the information obtained in this report was performed consistent with the requirements of ANSI C63.4-1992. The Intersil Corporation Model 36342U, PRISM II USB, 2.4GHz Wireless Transmitter complies with the requirements of CFR 47 Part 15 for Intentional Radiators as required in Paragraph 15.247(a)(2)(b)(1)(c) and (d).

This data was obtained while testing a 2.4GHz Wireless Transmitter, s/n: 00470005 furnished by Intersil Corporation. Any modifications to the unit as tested may invalidate the data and void this report.

ABSTRACT

This report presents test results of the emanations found emitting from the Intersil Corporation 2.4GHz Wireless Transmitter and the comparison of these emissions to the requirements of FCC Title 47, Part 15, Subpart C for Intentional Radiators as required for direct sequence type spread spectrum systems operating in the 2.4 to 2.4835GHz range.

The testing was performed on a 3-meter open field test site at Rubicom Systems, Inc. (RSI). The testing was performed for Intersil under purchase order 040-0257435. The results of this test effort demonstrate compliance of the Intersil Corporation Model 36342U PRISM II USB, 2.4GHz Wireless Transmitter to FCC Title 47, Part 15, Subpart C for Intentional Radiators (Paragraph 247(2). The unit under test was serial number 00470005 for radiated and conducted measurements.

1.0 INTRODUCTION

1.1 Purpose

The purpose of the report is to show compliance of the Intersil Corporation Model 36342U PRISM II USB, 2.4GHz Wireless Transmitter to the requirements of Part 15 of the FCC Rules and Regulations (47CFR, Part 15, Subpart C) for Intentional Radiators. The applicable paragraphs covered by this report are 15.247(2)(b)(c) and (d).

1.2 Requirements

The test requirements for an intentional radiator are as follows:

RADIATED (15.205/15.209)

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009-0.490MHz	2400/F (KHz)	300
0.490-1.705MHz	240000/F (KHz)	30
1.705-30.0MHz	30	30
30-88MHz	100	3
88-216MHz	150	3
216-960MHz	200	3
Above 960MHz	500 Average	3

CONDUCTED (15.207)

Frequency (MHz)	μ Volts	dB>μV
.450-30MHz	250	48

DIREST SEQUENCE SPREAD SPECTRUM SYSTEM

15.247(2) Bandwidth

The minimum 6dB bandwidth shall be greater than 500KHz.

15.247(2)(b) Maximum Peak Power

The Maximum peak output power of the transmitter shall not exceed 1 watt.

15.247(2)(c) Out of Band Emissions, Radiated and Conducted

Power produced by Modulation Products of the Spreading Sequence, Information Sequence and the Carrier Frequency.

Levels in any 100KHz outside of the frequency band shall be 20dB below that of any 100KHz band within the band that contains the highest level of desired power or the requirements of 15.209, whichever results in lesser attenuation. All other emissions shall not exceed the limits of Section 15.209(a). Section 15.205 requirements are applicable.

15.247(d) Power Density

Transmitted power density averaged over any one (1) second interval shall not be greater than 8dBm in any 3KHz bandwidth.

1.3 Unit Under Test Description

The Intersil Corporation Model 36342U PRISM II USB, 2.4GHz Wireless Transmitter is a Direct Sequence Spread Spectrum (DSSS) unit that incorporates the Intersil PRISM II chip set. The transmitter with antenna is an external peripheral for a laptop computer. Power to the card is provided by an AC/DC converter. Control of the Model 36342U is via the USB port of the host computer. Software control is provided with the computer. Data rates of 1, 2, 5.5, and 11 MBPS applications are based on IEEE 802.11 global standard for WLAN applications.

1.4 Summary of Results

Paragraph 6.0 of this document presents the detailed results of each required test for the transmitter.

No modifications were required of the unit under test for this test effort.

The data shows compliance to the requirements stated in Paragraph 1.2 of this document.

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 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

This test effort was performed from 09 January 2001 through 12 January 2001. Typical conditions for the test site during this testing was:

Temperature: 62°

Barometer: 29.50 inches

Humidity: 65%

4.0 TEST INSTRUMENTATION

The following test equipment was used to perform this testing.

Qty.	Description	Manufacturer	Model No.	Cal. Due Date	Cal. Cycle
1	Spectrum Analyzer	Advantest	R3271A	12/19/01	1 Yr.
2	Bi-Log Antenna	Chase	CLB6111B	07/17/01	1 Yr.
1	Plotter	Hewlett Packard	7440A	NCR	N/A
1	Peak Power Meter	Wavetek	1018B	06/01/01	1 Yr.
1	Ridge Guide Horn Antenna	A.H. Systems	SAS-200/571	04/25/01	1 Yr.
1	Pre-Amplifier	Hewlett Packard	8449B	05/25/01	1 Yr.
1	Standard Gain Horn	NARDA	638	NCR	N/A
1	Bandreject Filter	Lorch Microwave	6BR6-2440	03/04/01	1 Yr.

5.0 TEST SAMPLE SETUP AND CONFIGURATIONS

The transmitter was placed on a nonconductive table inside a shielded enclosure. The transmitter was connected to an IBM ThinkPad laptop computer. During conducted measurements the output was coupled directly to the spectrum analyzer. Both the power to the EUT and the laptop computer were measured.

During radiated emissions the transmitter was placed on the turntable. The transmitter was put into operation with a 1MBPS modulation during the radiated measurements. Figure 5.0-1 is the test configuration of the equipment.

Photo 1 presents the unit placed on the turntable during radiated testing.

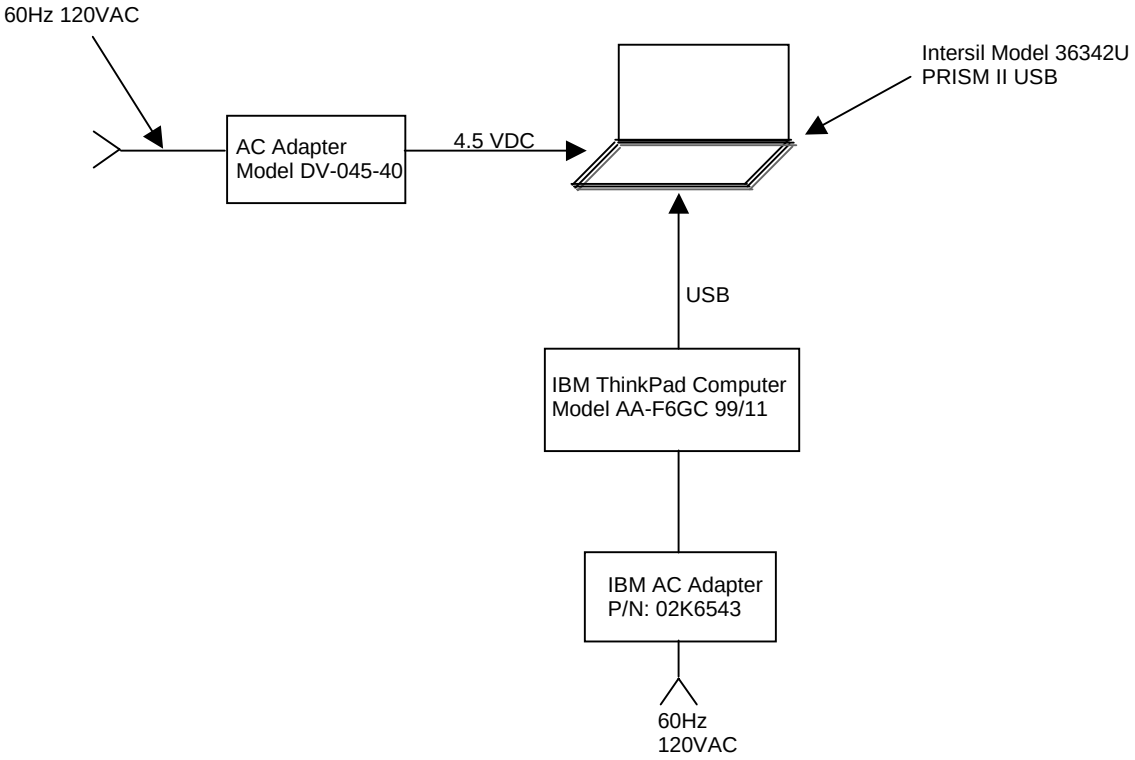


FIGURE 5.0-1

PHOTO 1

6.0 PROCEDURES AND RESULTS

6.1 General

The data presented in this report is provided using the Advantest Spectrum Analyzer. The analyzer allows the antenna factors/cable loss, etc., to be listed in tables on a memory card. The setups for recall are programmed. This method allows the tester to record data instantaneously against the specification requirement. The specification limits are presented with the extrapolation for distance (20dB/decade) where necessary. When external attenuation is required for analyzer protection, the reference level offset is used.

Signal identification is partially accomplished by turning the system power “on” and “off” while observing the spectrum. All signals found to be emitting from the EUT are maximized in azimuth and elevation. The maximized signal levels are recorded in the tabulated list of signals (see Paragraph 6.3.2).

The displayed levels are calculated in the analyzer as followed: MTR Reading + Antenna Factor + Cable Loss - Gain (where appropriate) = Signal Level.

NOTE: The correction factors and conversion factors are combined in the memory card.

6.2 Power Line Conducted 15.207

The unit was installed in a Gateway laptop computer. Power line conducted was then run on the laptop. Both the phase and neutral leads were tested using a Solar Model 8012-50-24-BNC PLISN (50μH/50ohm). Photo 2 presents the conducted emissions setup. Data Sheets 6.2-1 through 6.2-4 present the 450KHz-30MHz quasi-peak sweeps.

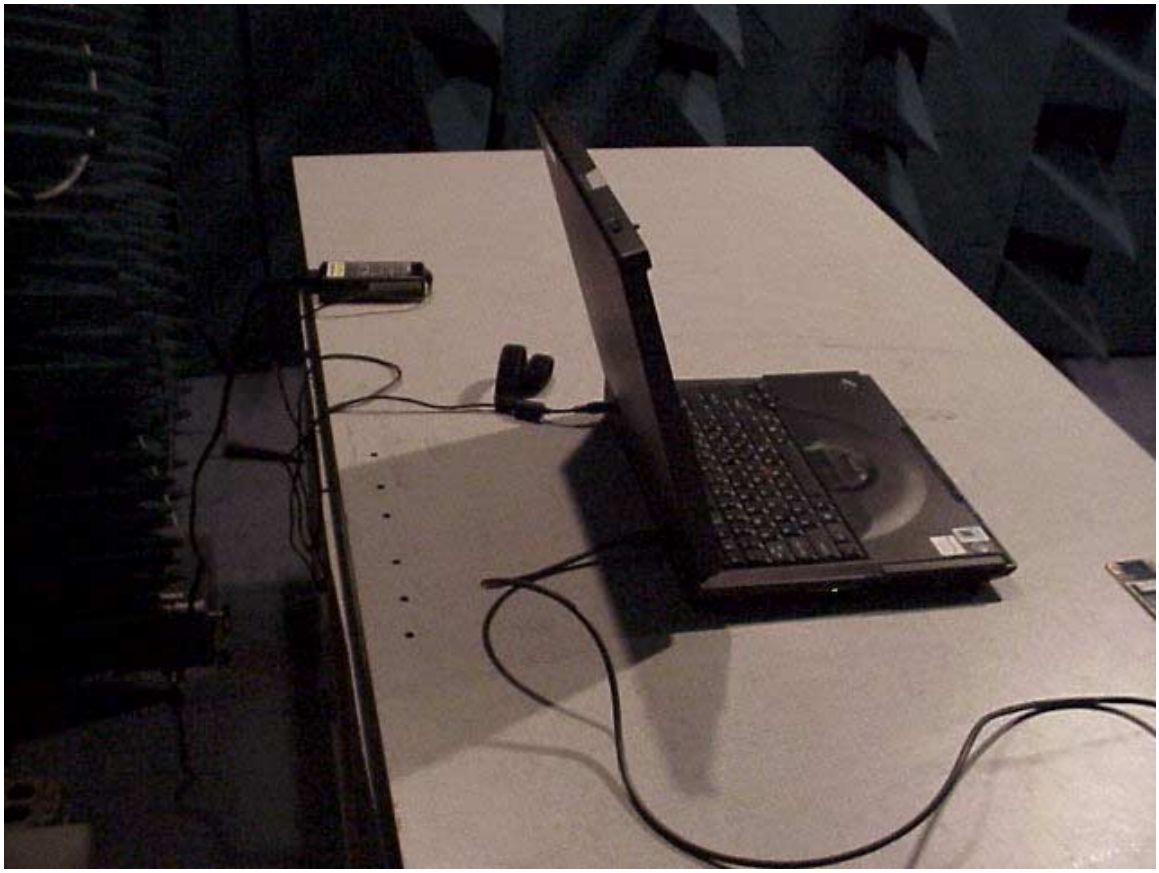
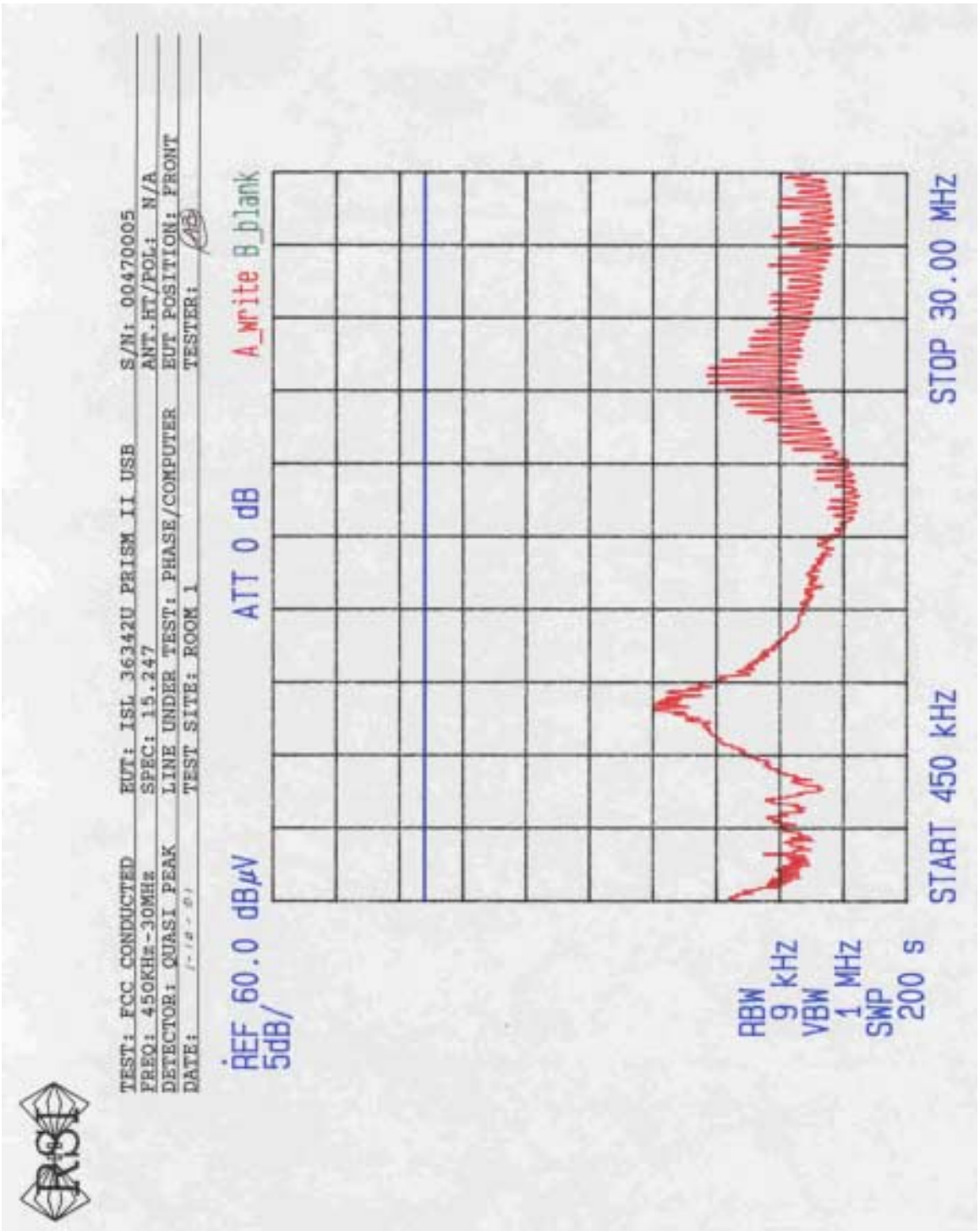
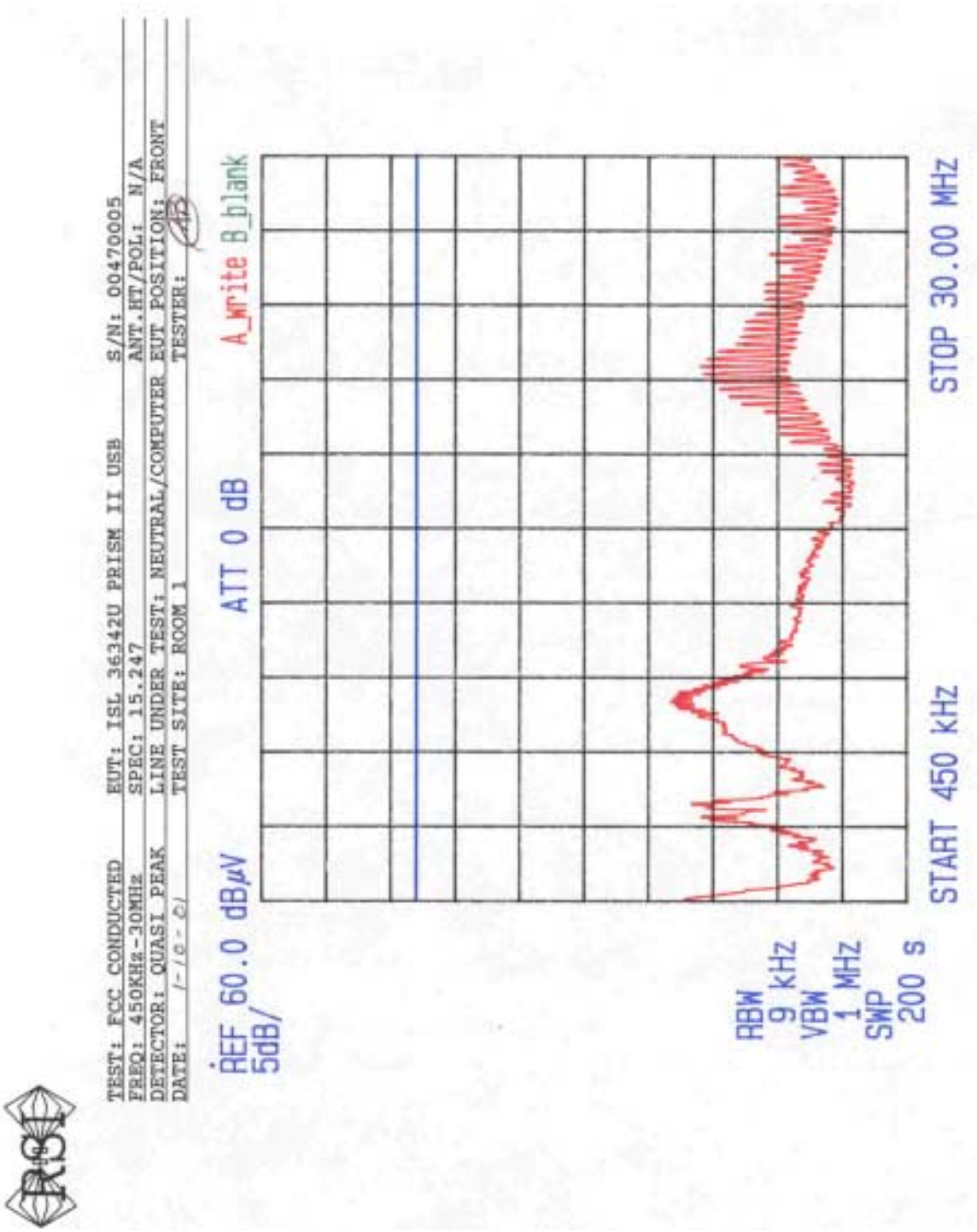


PHOTO 2



DATA SHEET 6.2-1



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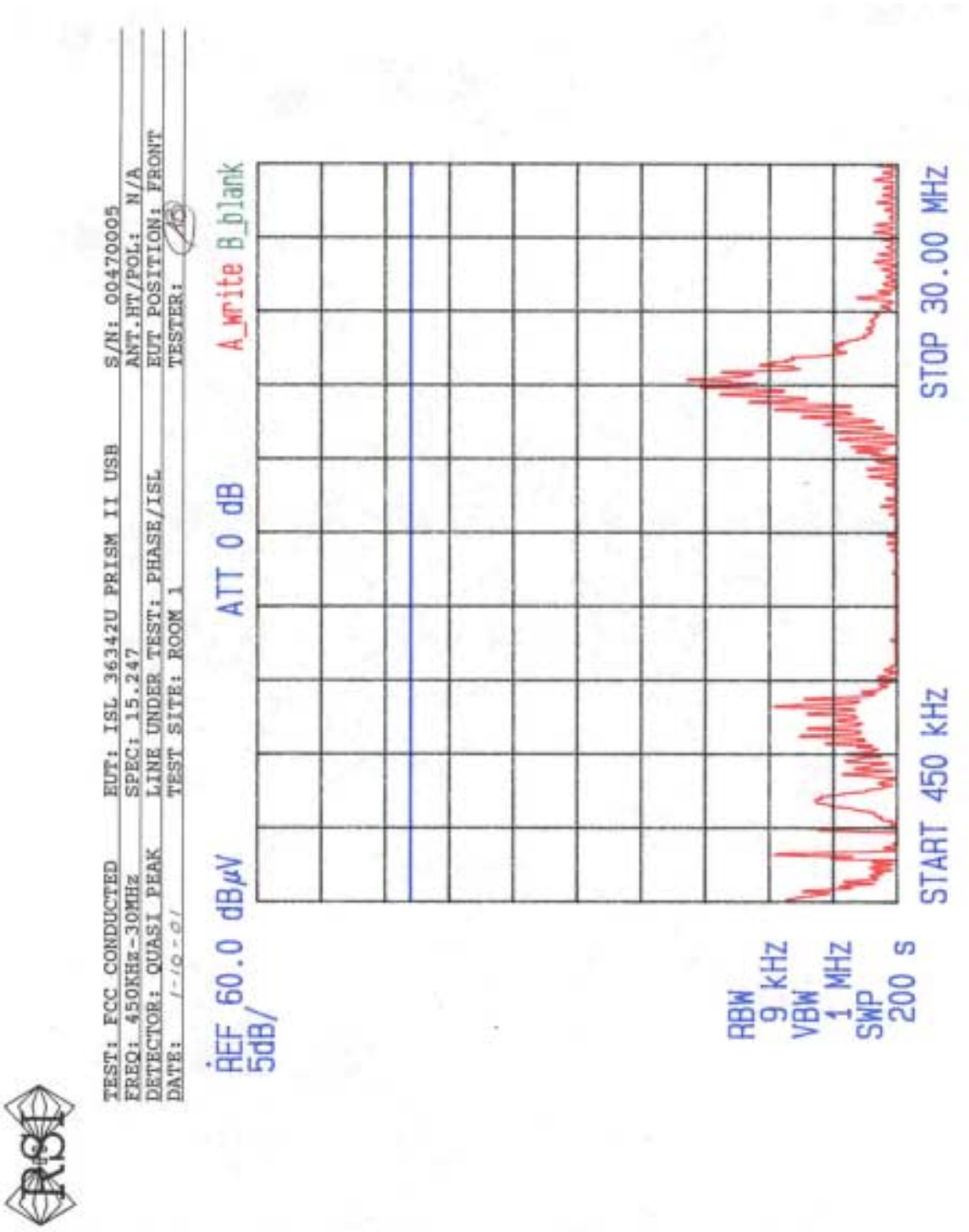
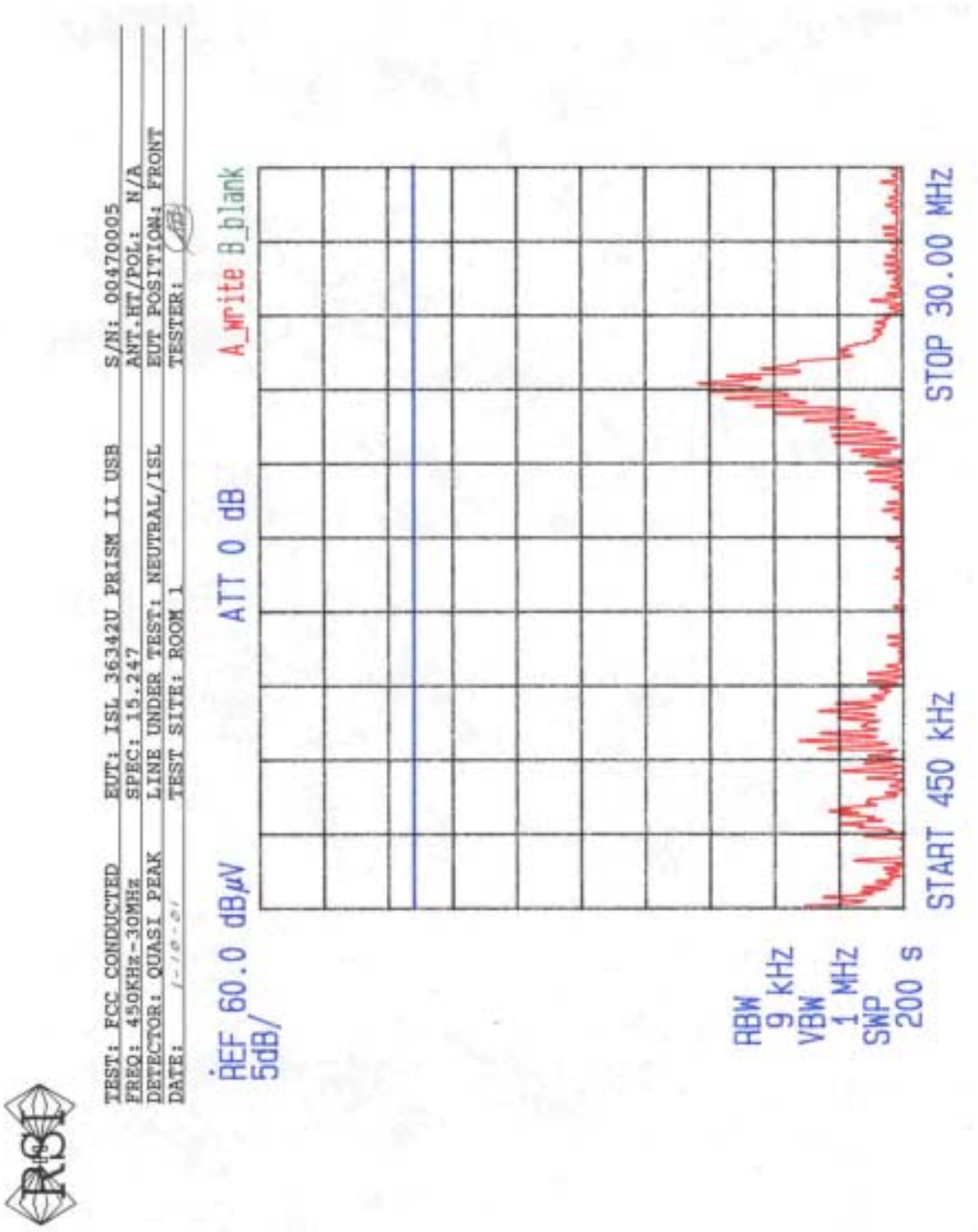


DATA SHEET 6.2-3

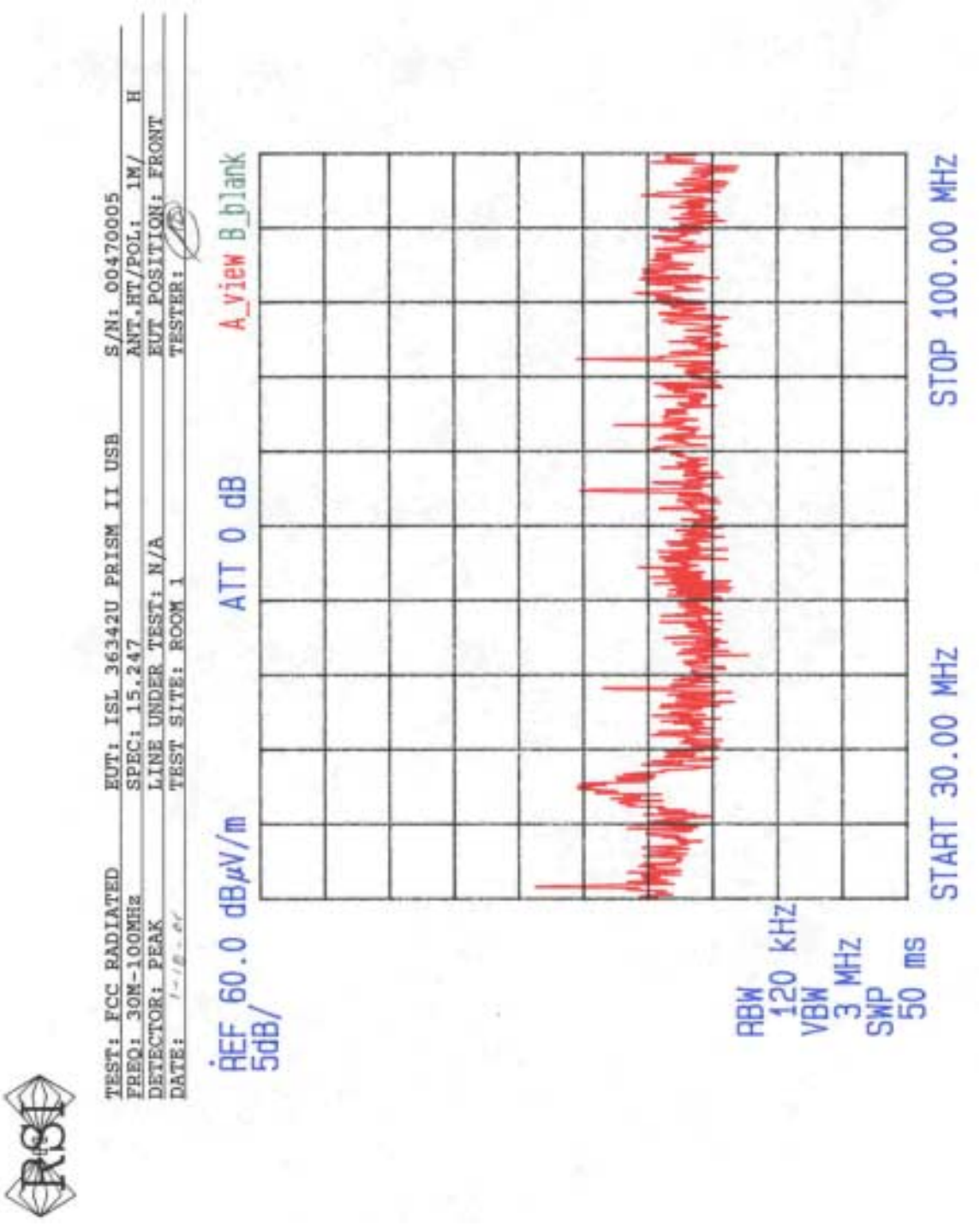


DATA SHEET 6.2-4

6.3 Radiated Emissions 15.209/15.205

6.3.1 Radiated Emissions (Pre-Scans)

Radiated emission pretesting was performed on the system inside the shielded enclosure. Pre-scans were performed over the frequency range of 30MHz-1GHz. These scans are for frequency content in the high ambient range. This test is performed at 1 meter. Data Sheets 6.3.1-1 through 6.3.1-12 present the results of this testing.



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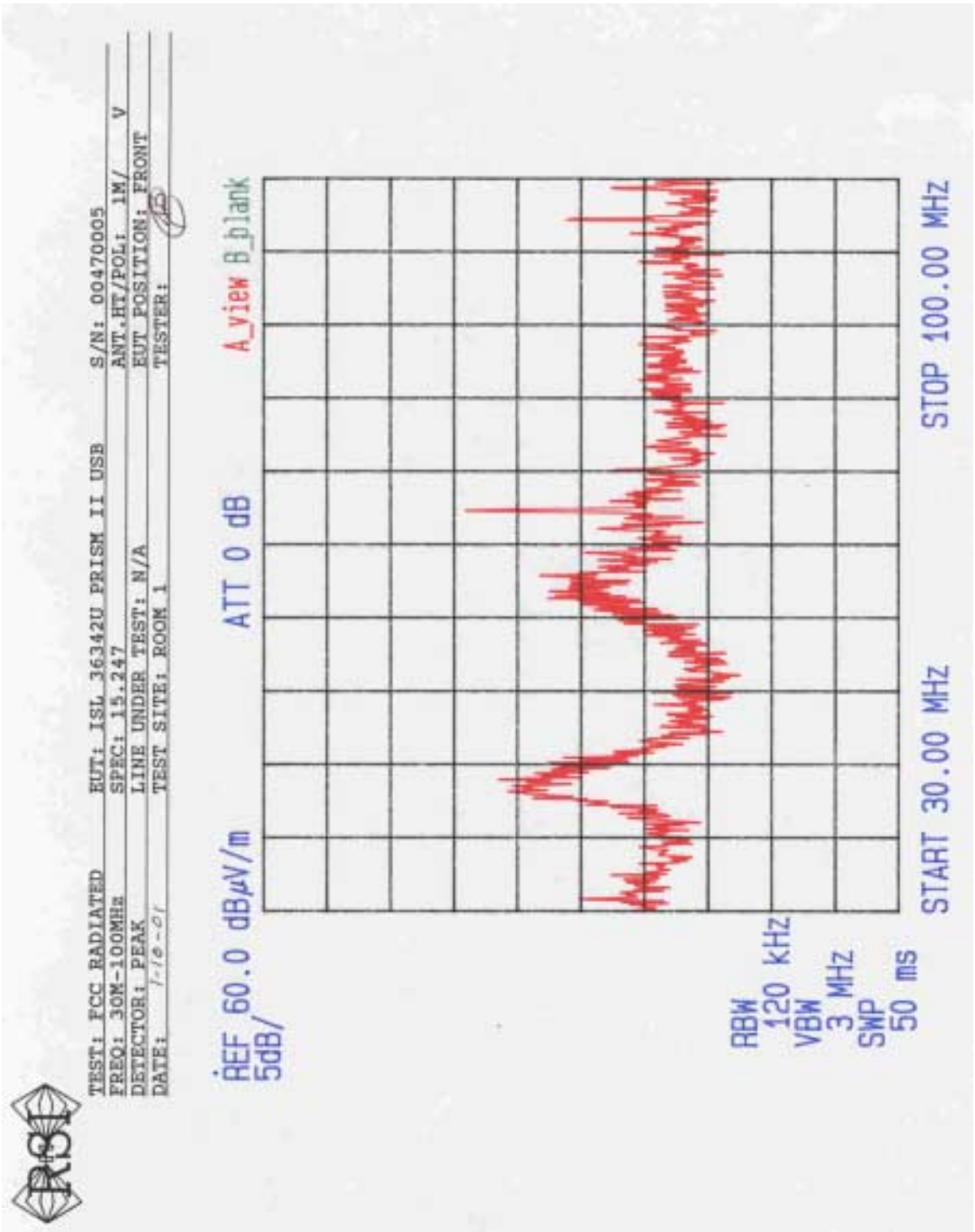

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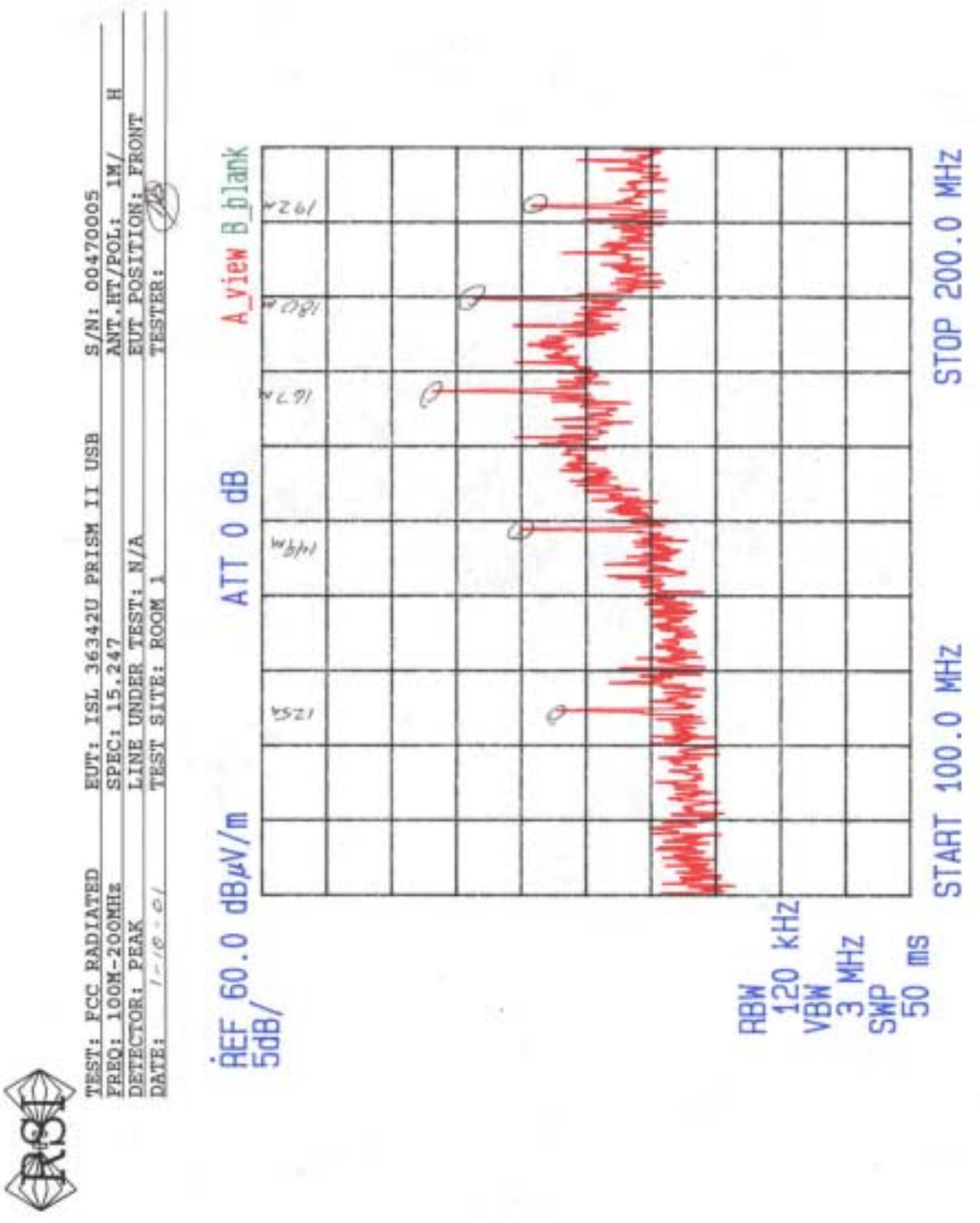
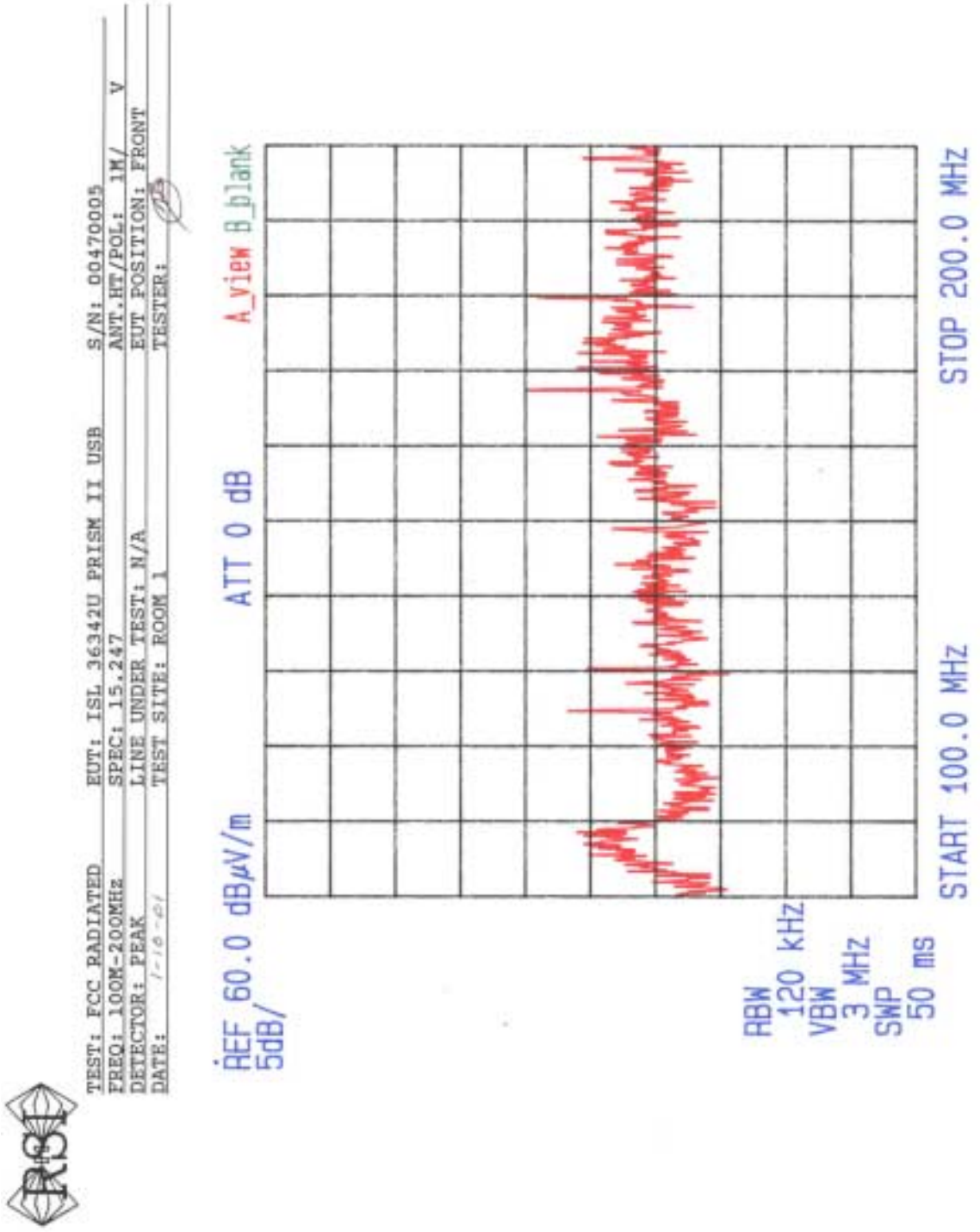


DATA SHEET 6.3.1-3



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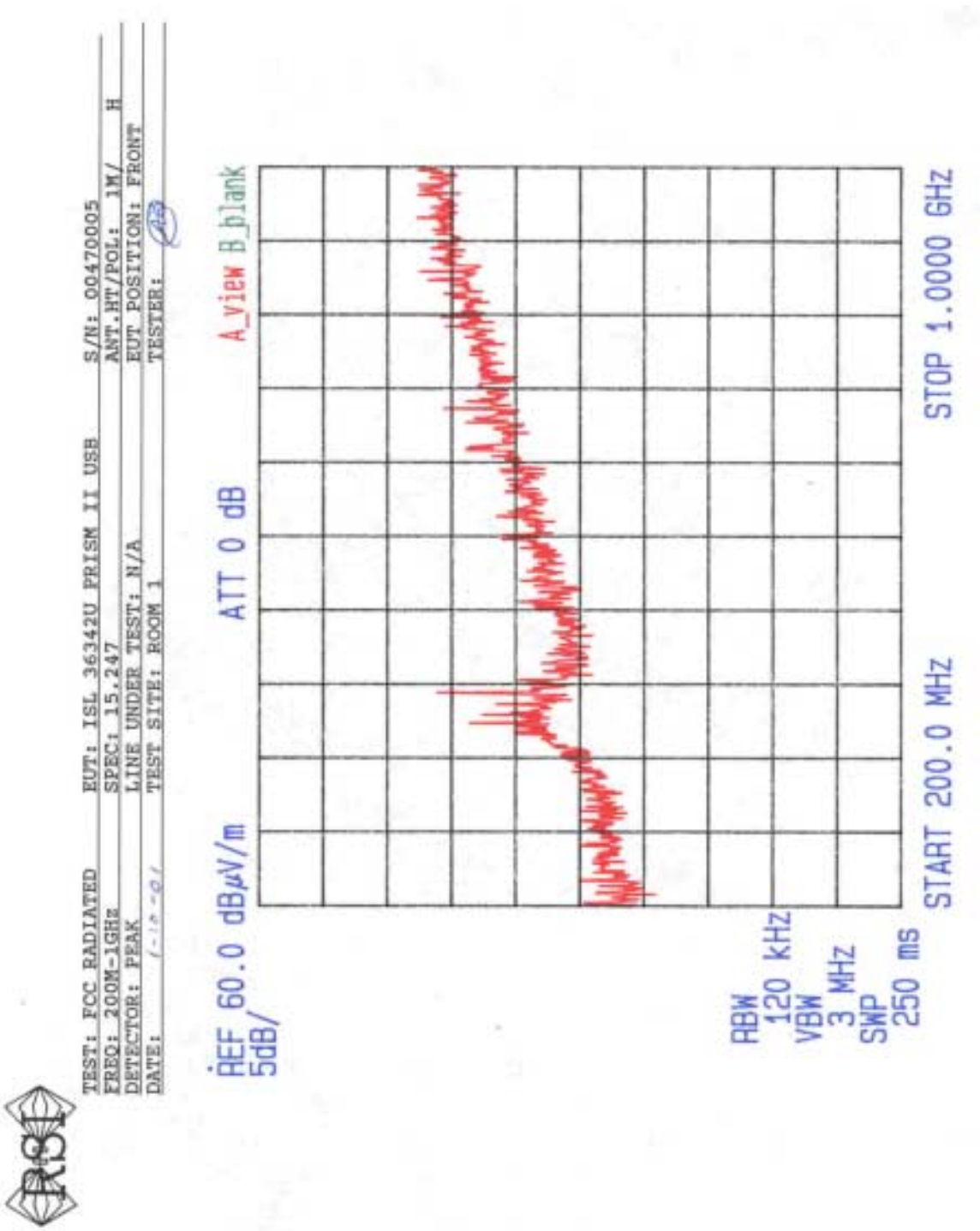

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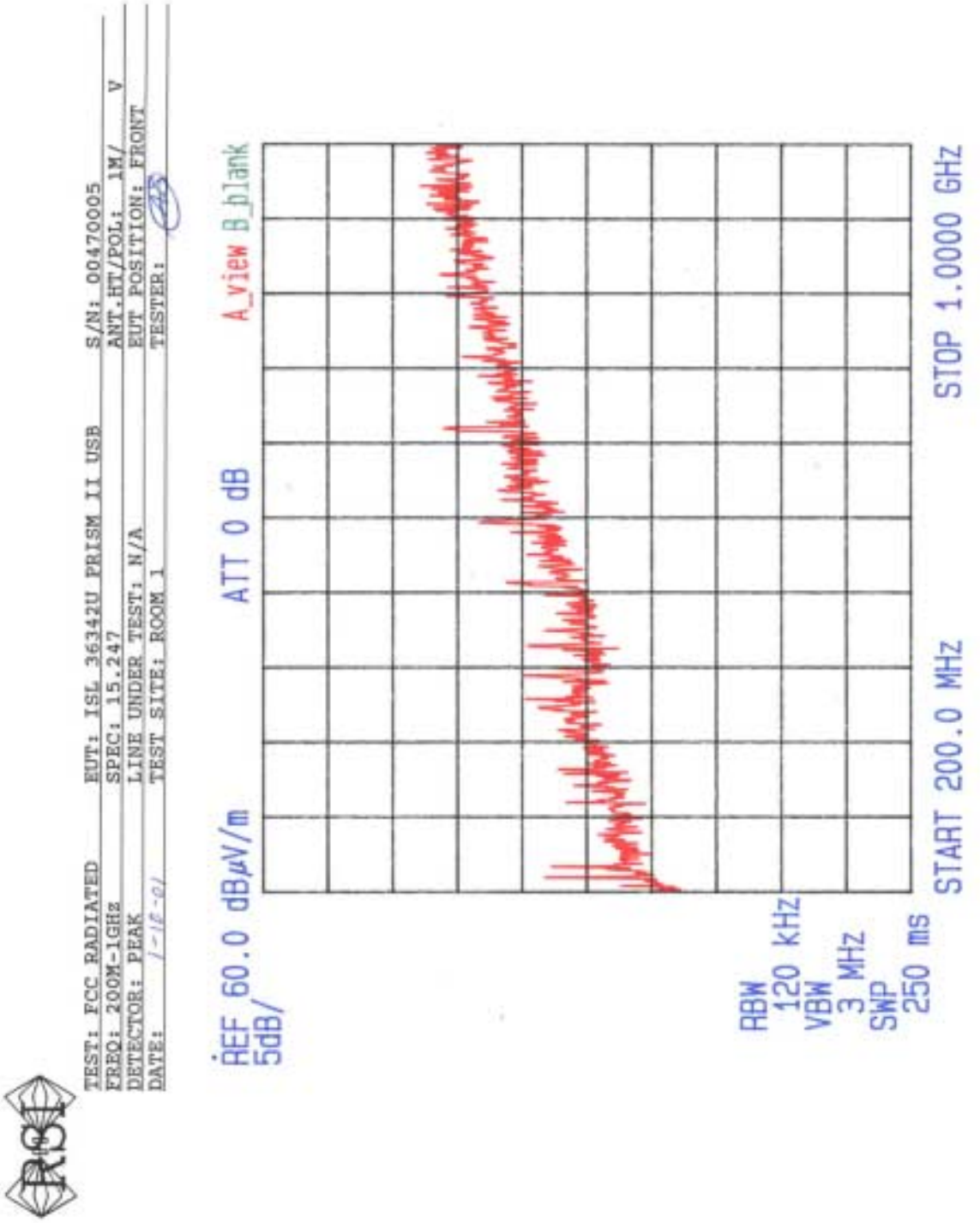
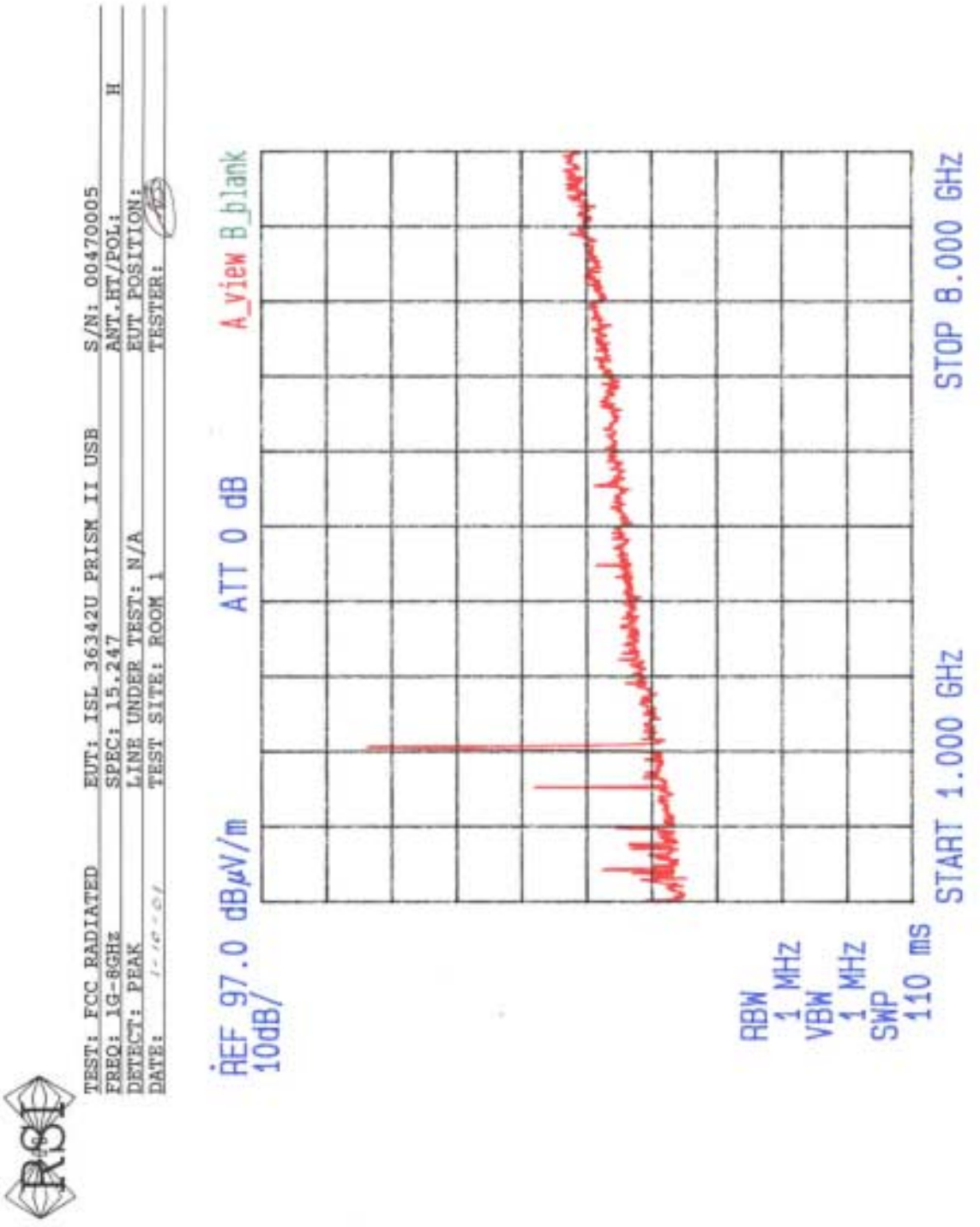
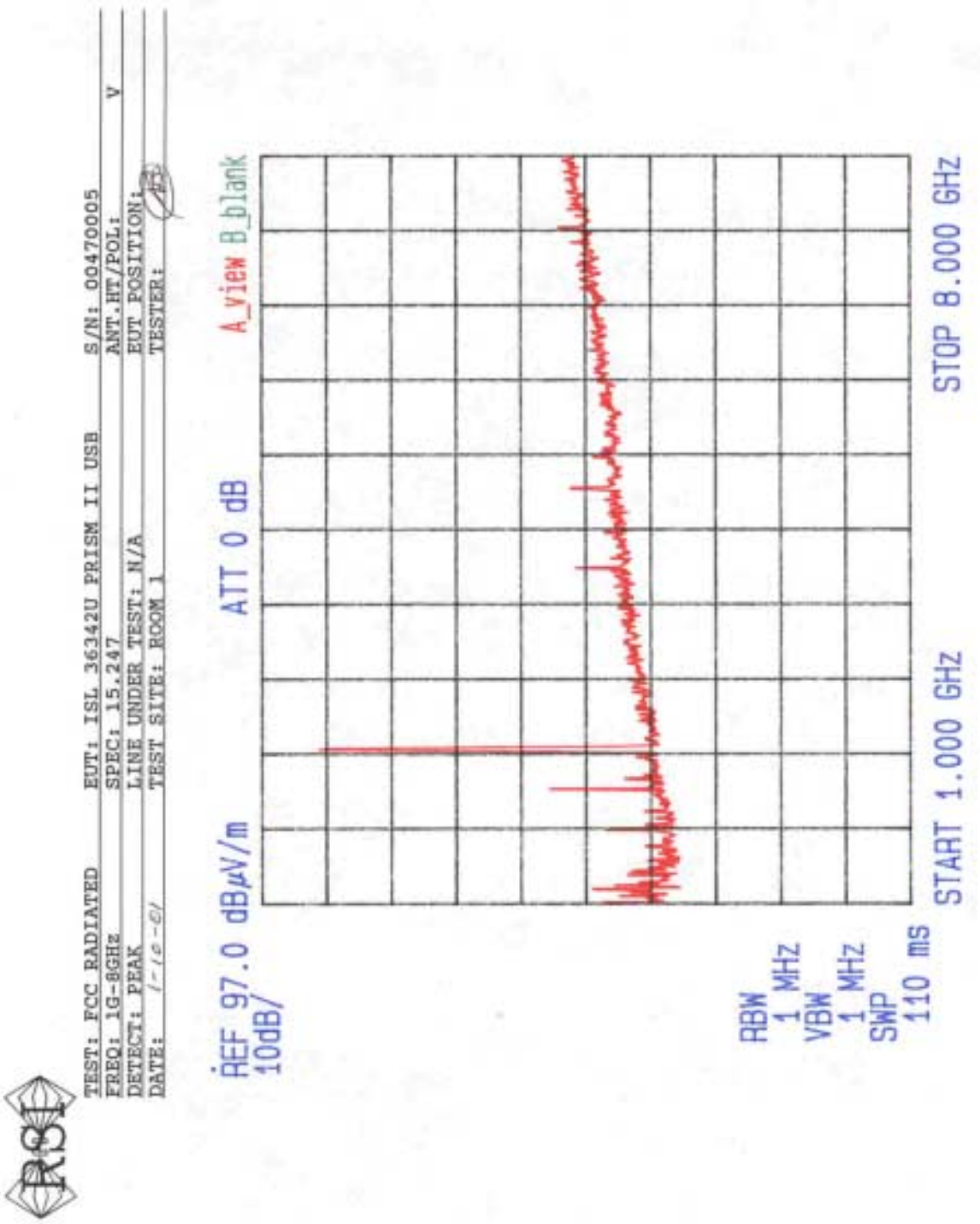


DATA SHEET 6.3.1-6



DATA SHEET 6.3.1-7



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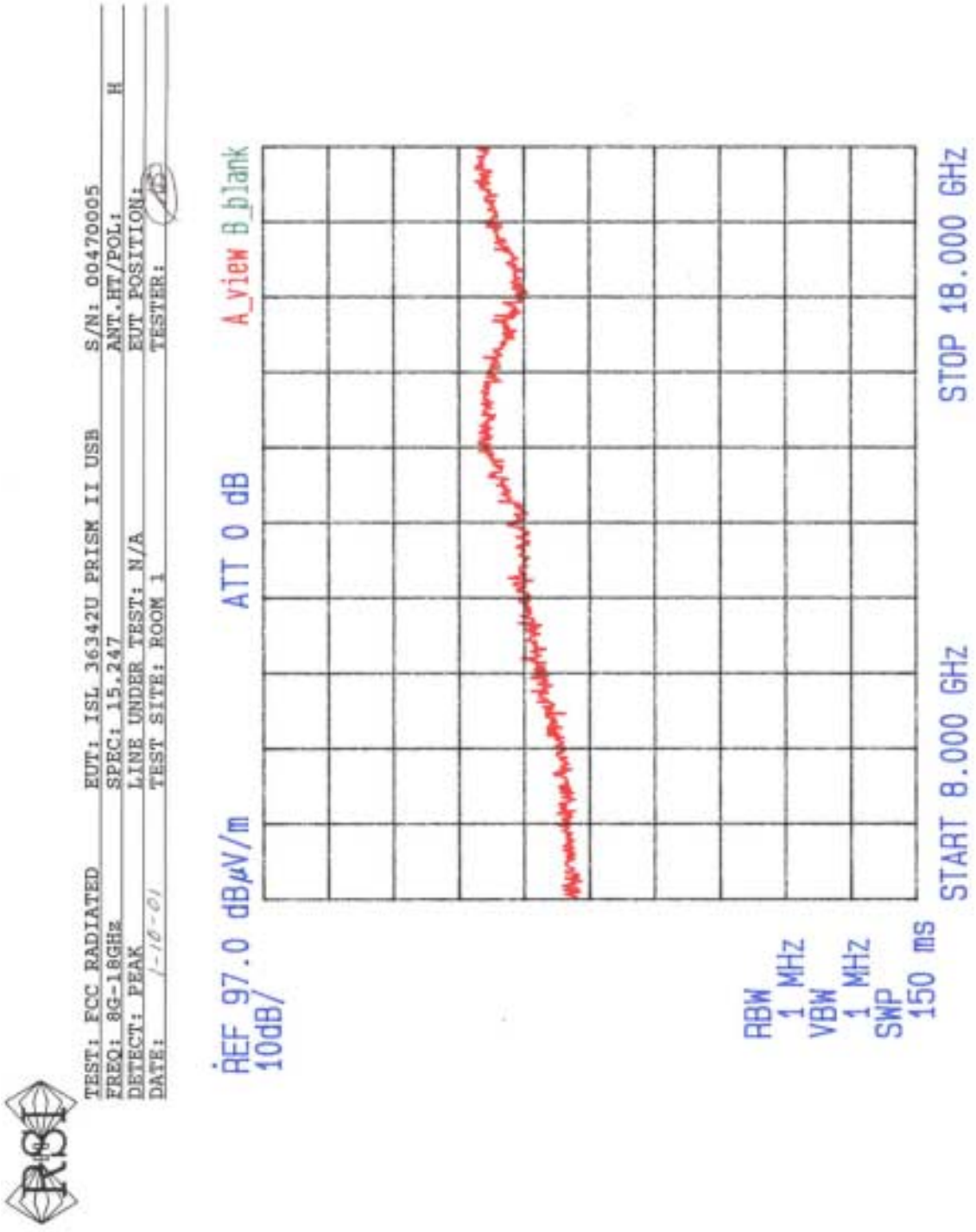

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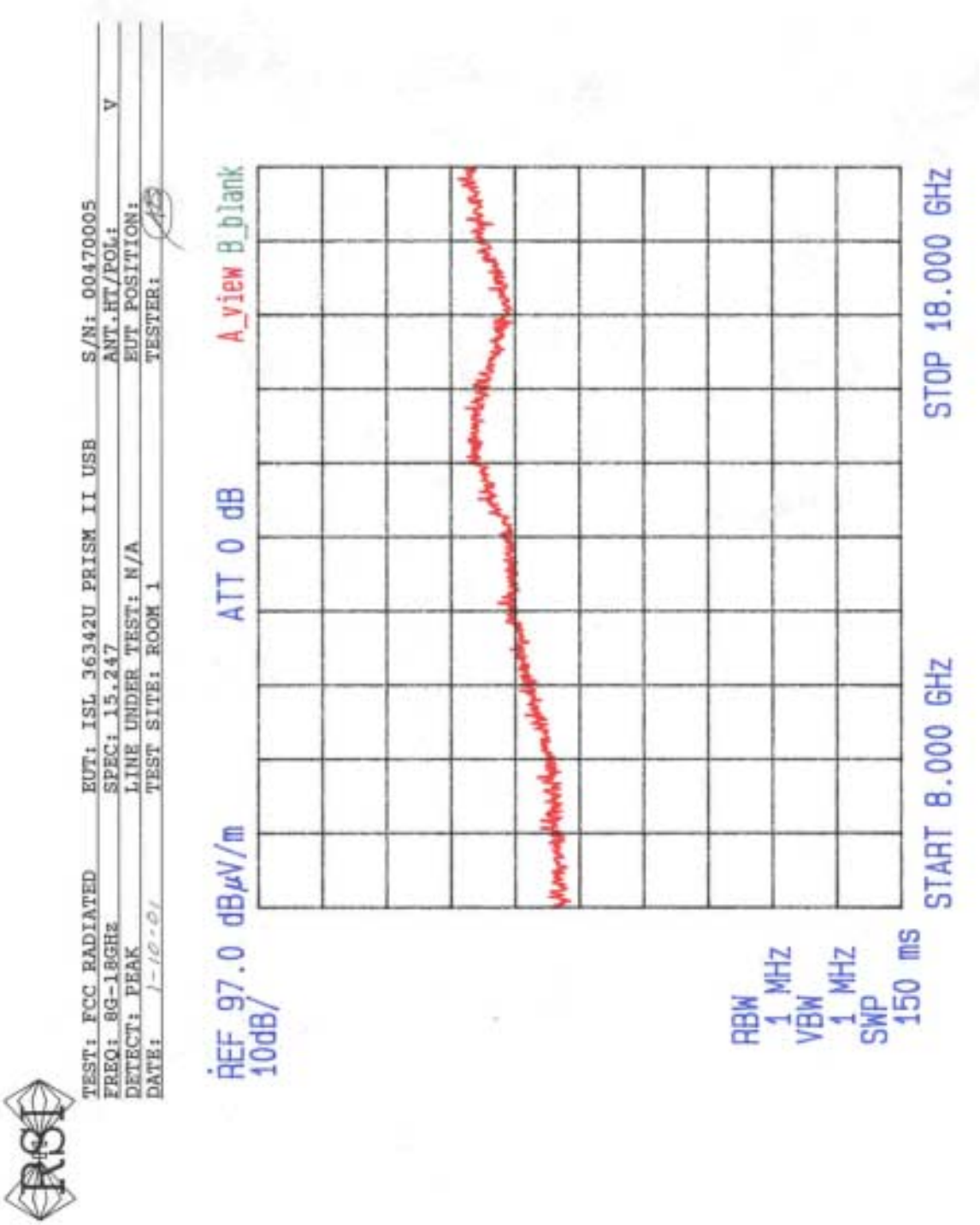
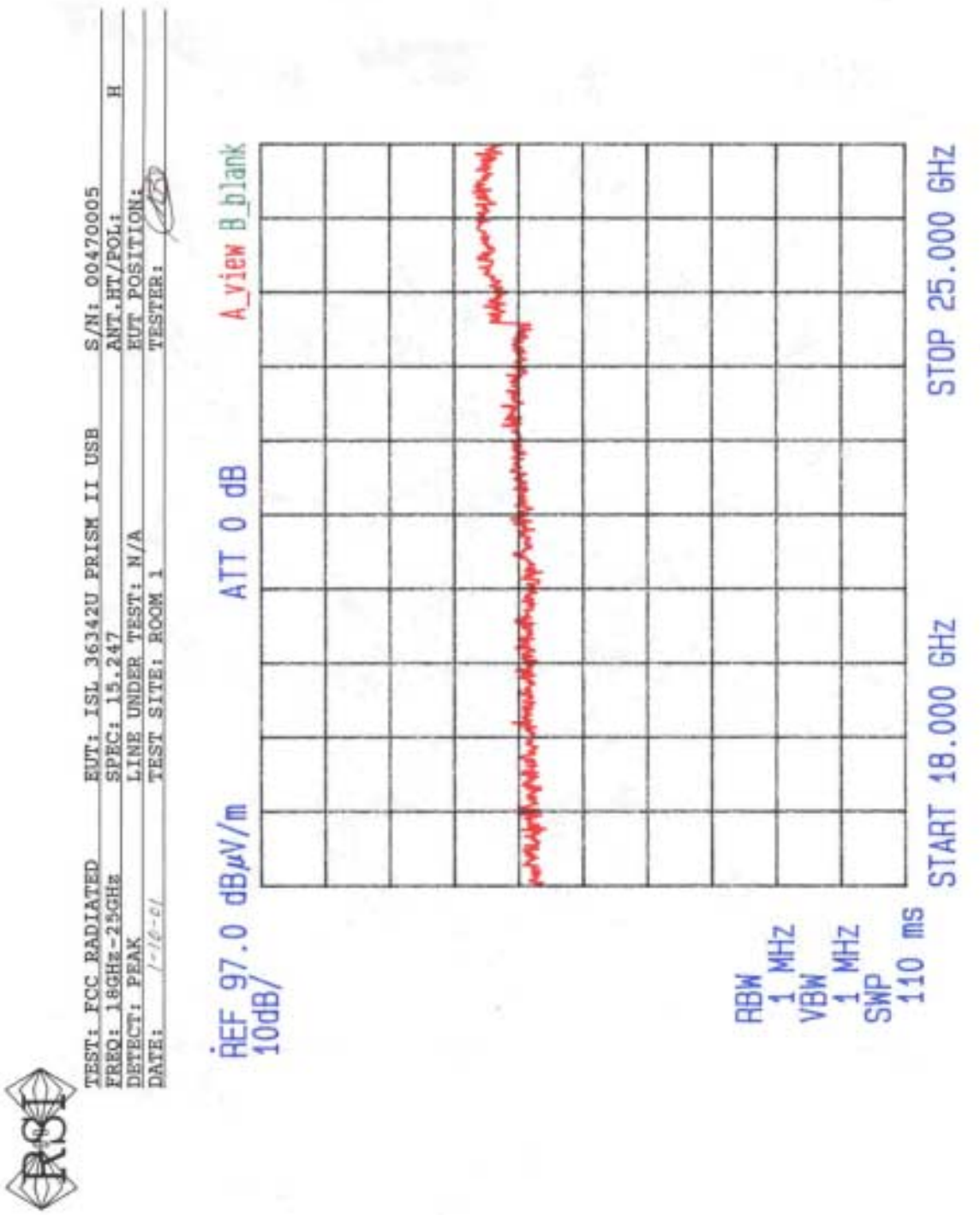
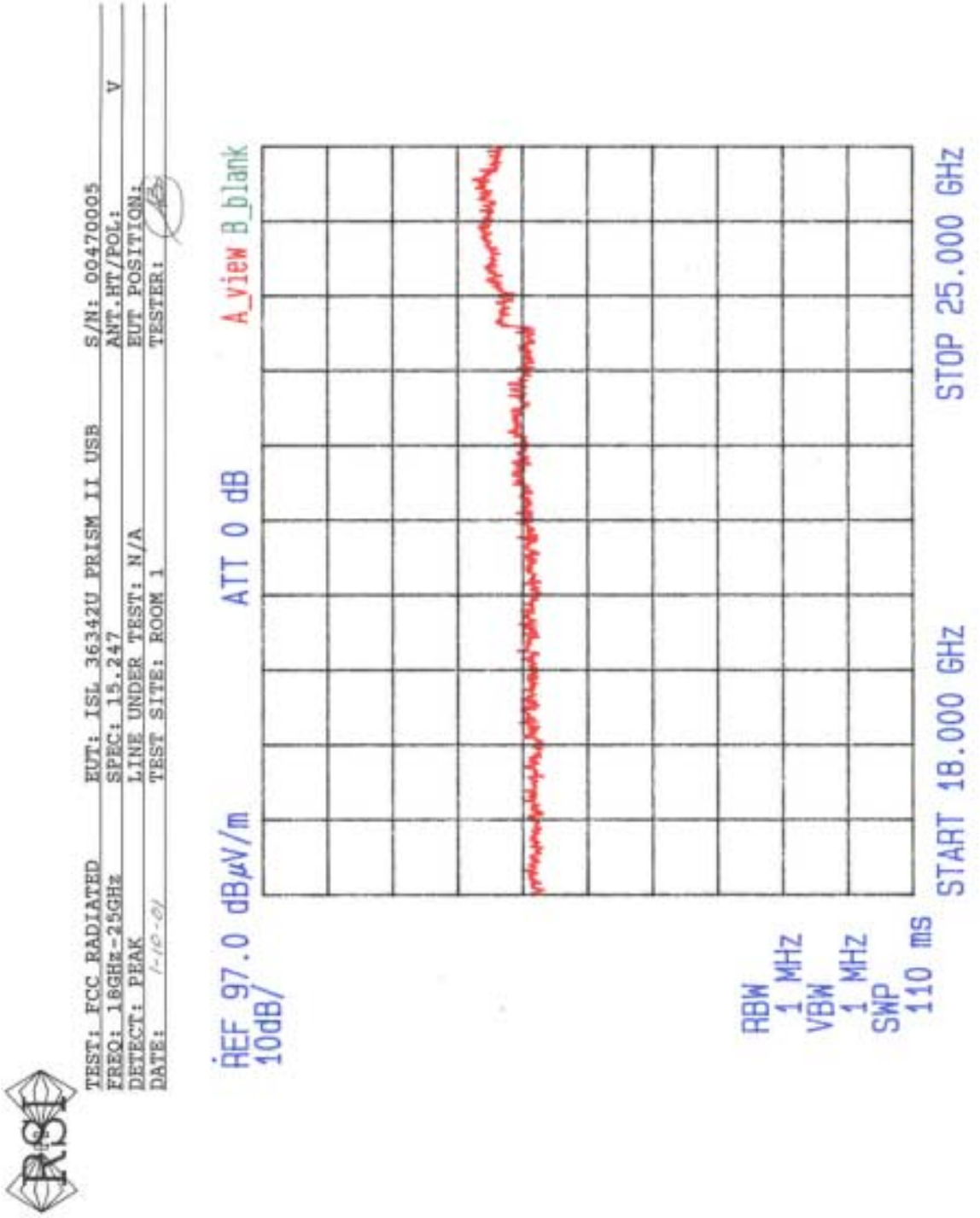


DATA SHEET 6.3.1-10



DATA SHEET 6.3.1-11



DATA SHEET 6.3.1-12

6.3.2 Radiated Emissions 15.209/15.205

Radiated emissions were performed on the H02C1 transmitter over the frequency range of 30MHz-25GHz. The transmit frequency was 2.437GHz (or channel 6). Data plots are presented in three groups:

Data Sheets 6.3.2-1 - 6.3.2-6 30MHz-1GHz Quasi-Peak Detector
Data Sheets 6.3.2-7 - 6.3.2-12 1GHz-25GHz Peak Plots (1MHz-RBW, 1MHz-VBW)
Data Sheets 6.3.2-13 - 6.3.2-24 1GHz-25GHz Average Plots (1MHz-RBW, 10Hz-VBW)

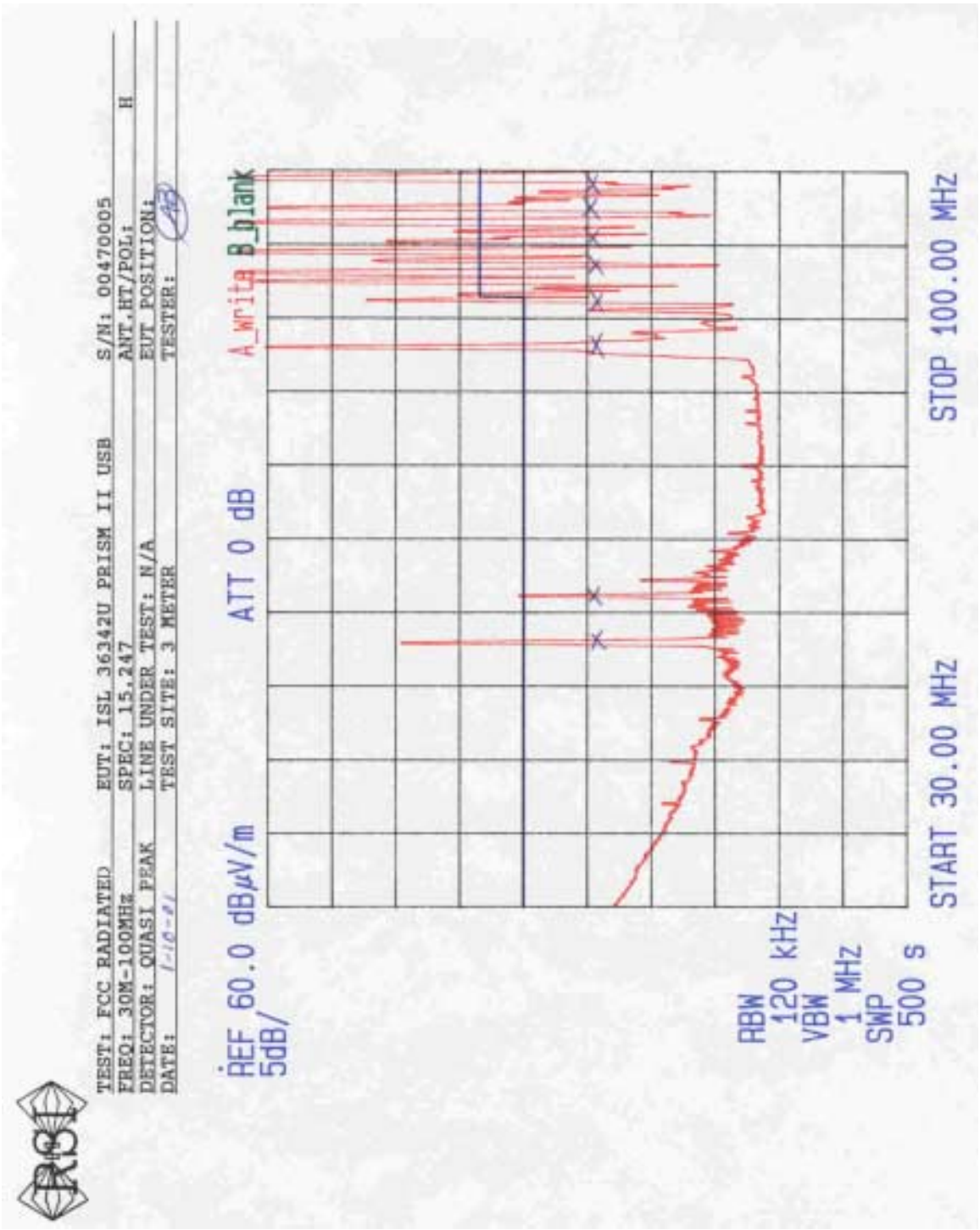
FREQUENCY	ANTENNA POL.	ELEVATION	AZIMUTH	MEASURED (dBµV/m)	Q.P.LIMIT (dBµV/m @ 3 METERS)	MARGIN (dB)
4.13GHz	V	1.25M	135º	35	54	-19
4.13GHz	H	1.25M	180º	34	54	-20
4.8GHz	V	1.25M	135º	46.25	54	-7.75
4.8GHz	H	1.25M	180º	39	54	-15
7.8GHz	V	1.25M	157º	47.5	54	-6.5
7.8GHz	H	1.25M	180º	40	54	-14

6.3.3 Peak Ambient (EUT Off/Support Equipment On)

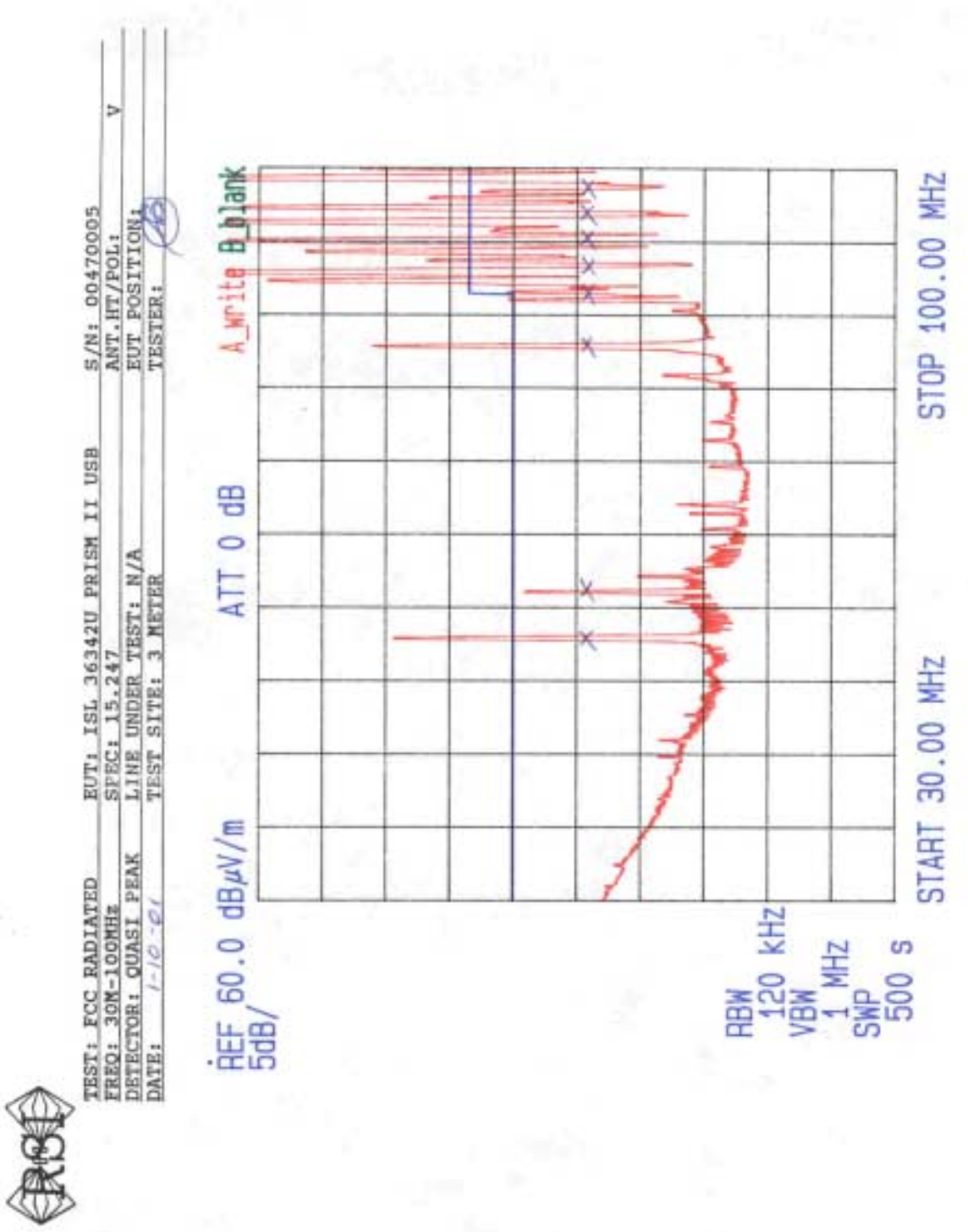
Peak and average ambient data is used to compare the peak EUT data to the environmental ambient and determine true EUT signals. The tester uses a more detailed procedure to analyze signals by investigating frequency bands of 25MHz to 50MHz. The ambient is displayed and saved on the analyzer screen. The unit is then turned on and the true EUT signals are maximized. Data plots are presented in three groups:

Data Sheets 6.3.3-1 - 6.3.3-6 30MHz-1GHz Quasi-Peak Ambient
Data Sheets 6.3.3-7 - 6.3.3-12 1GHz-25GHz Peak Ambient Plots (1MHz-RBW, 1MHz-VBW)
Data Sheets 6.3.3-13 - 6.3.3-24 1GHz-25GHz Average Ambient Plots (1MHz-RBW, 10Hz-VBW)

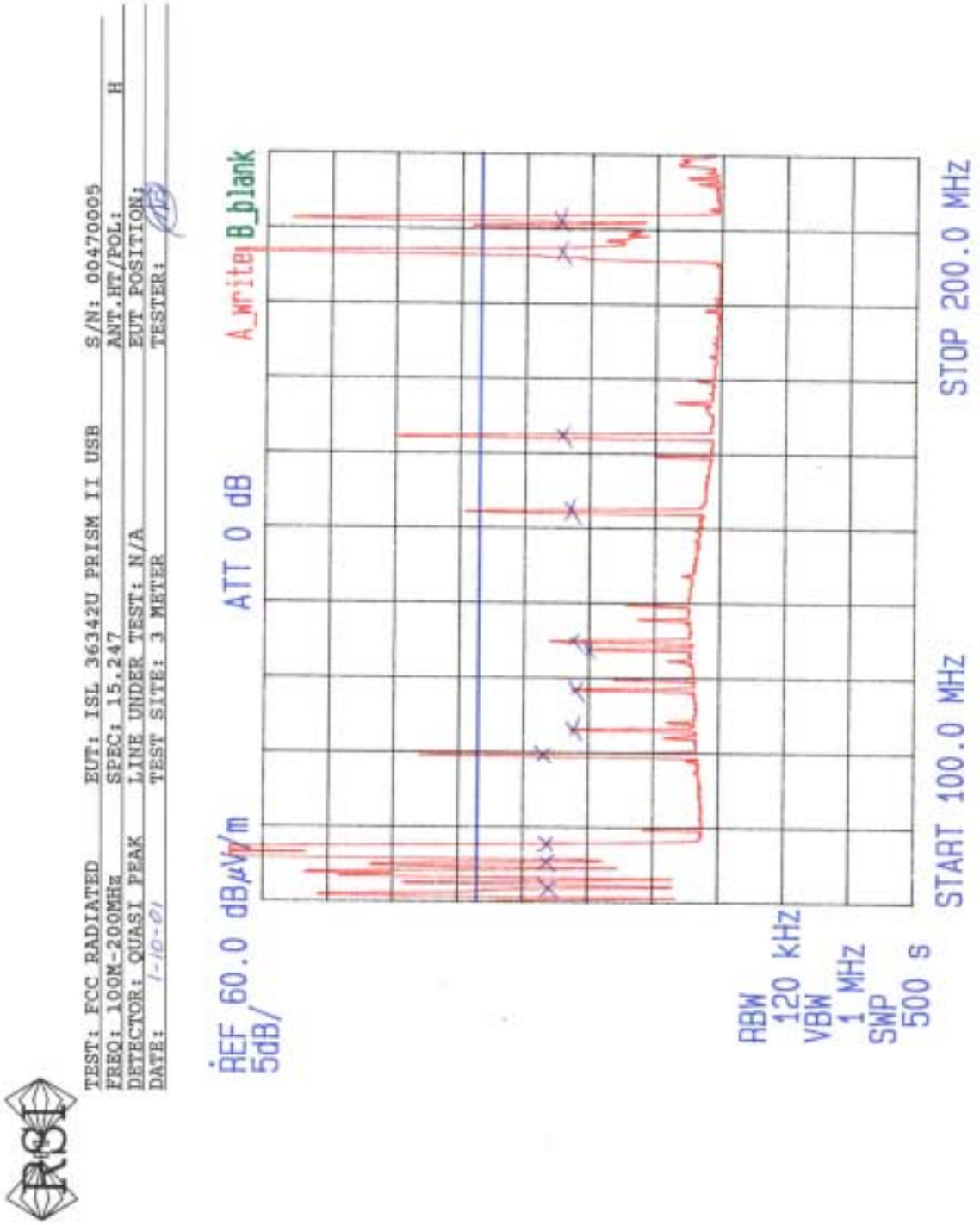
The following is a tabulated listing of the signals detected during the radiated testing. Calculation of field strength is described in Paragraph 6.1 of this document.



DATA SHEET 6.3.2-1



DATA SHEET 6.3.2-2



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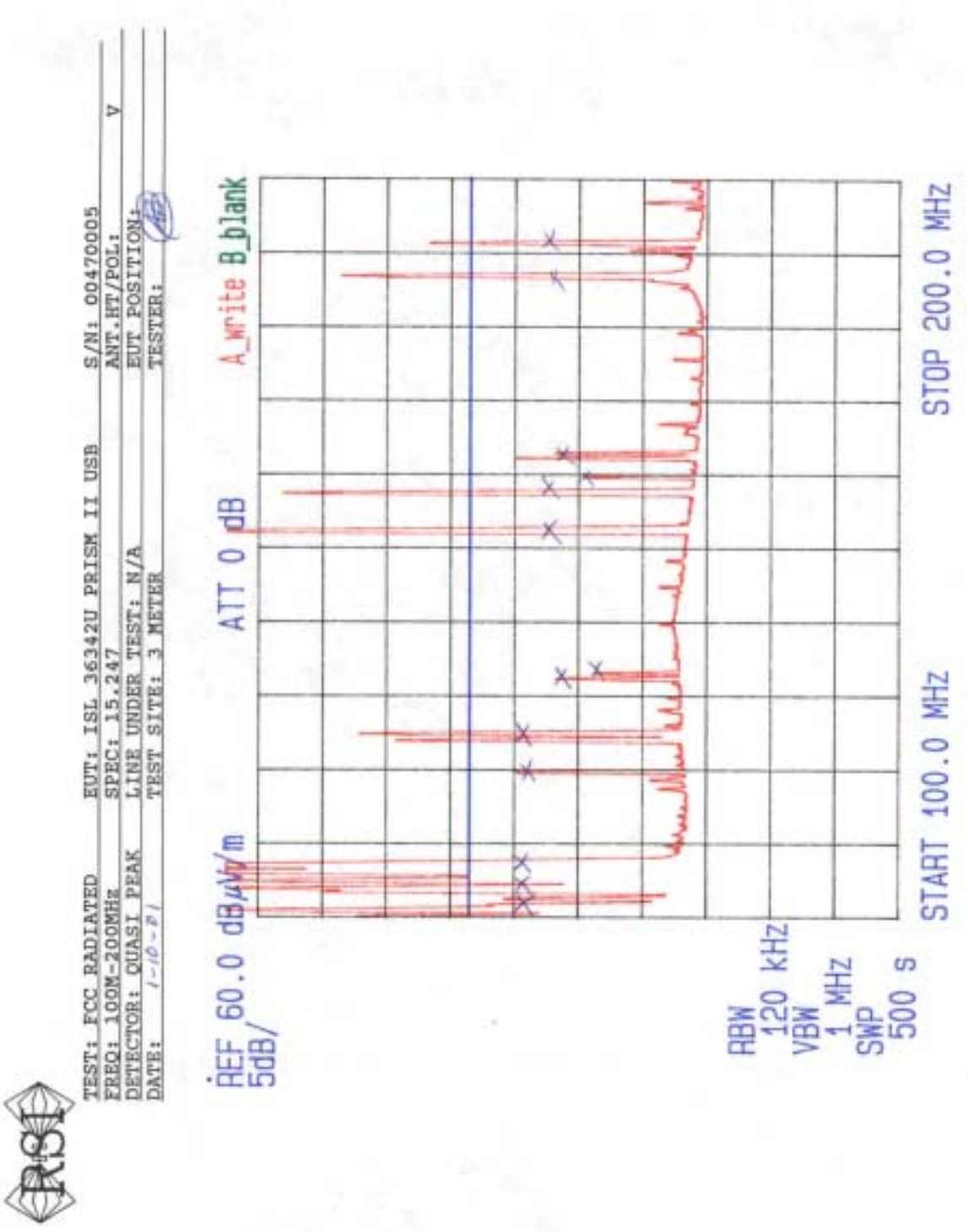
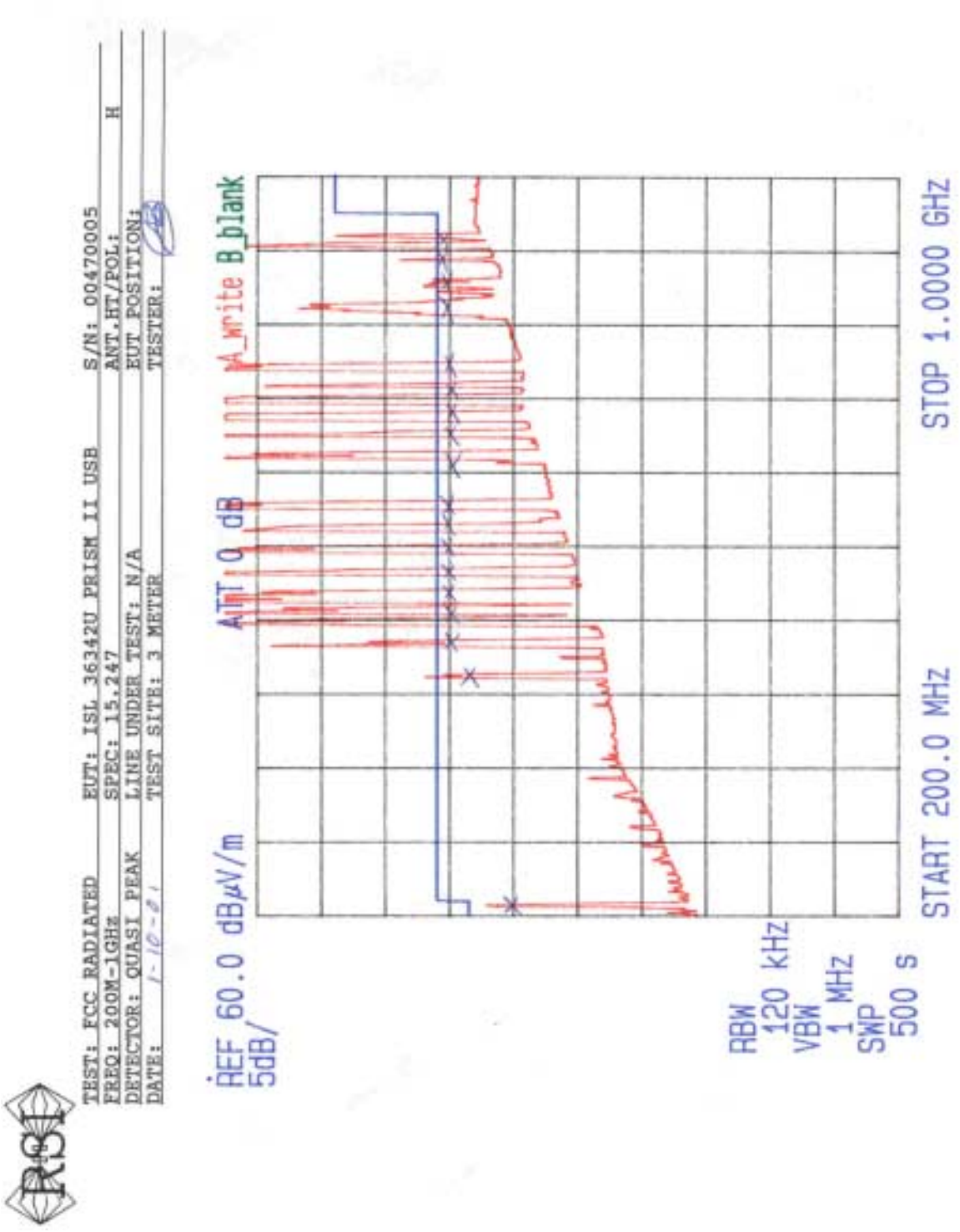


DATA SHEET 6.3.2-4



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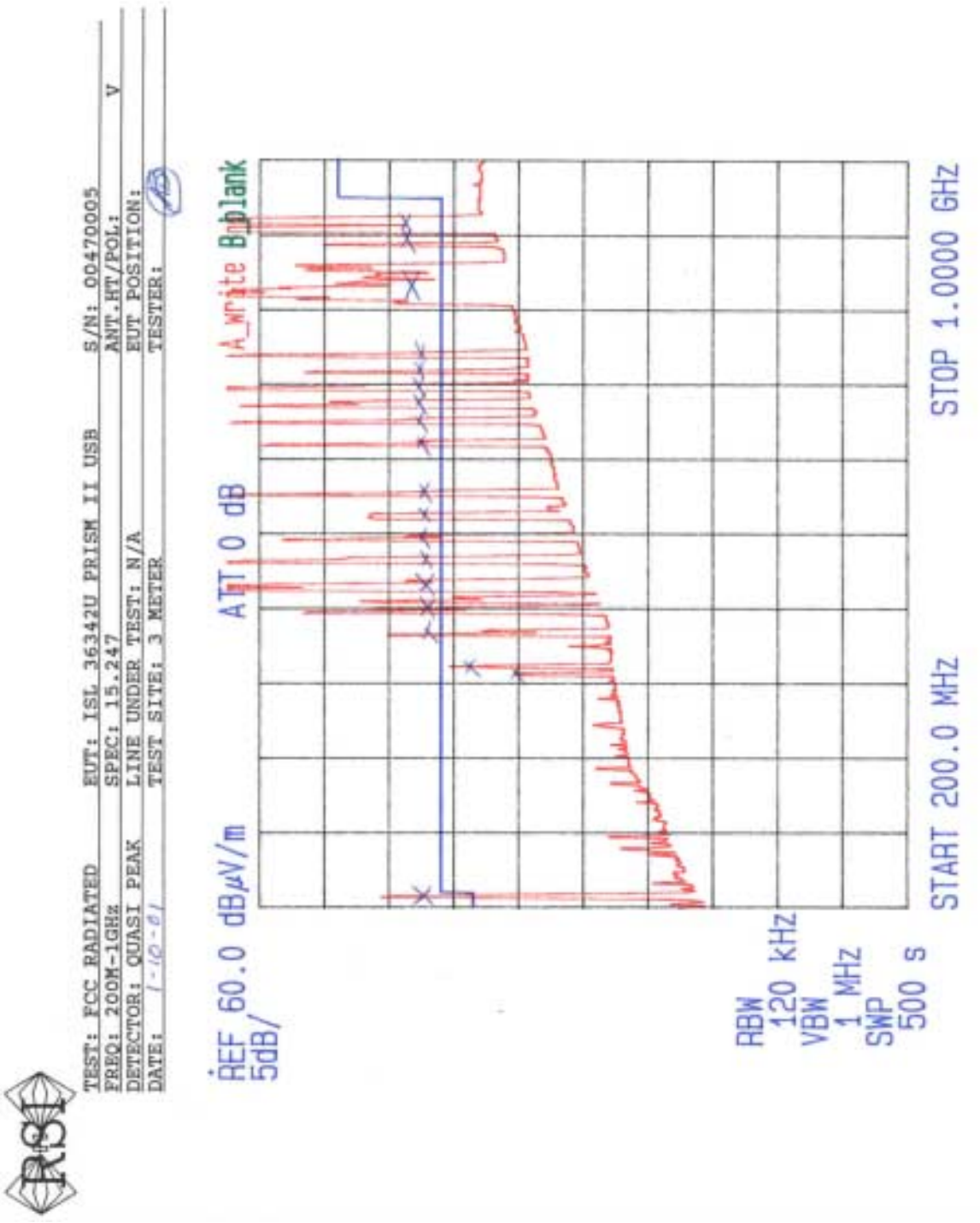
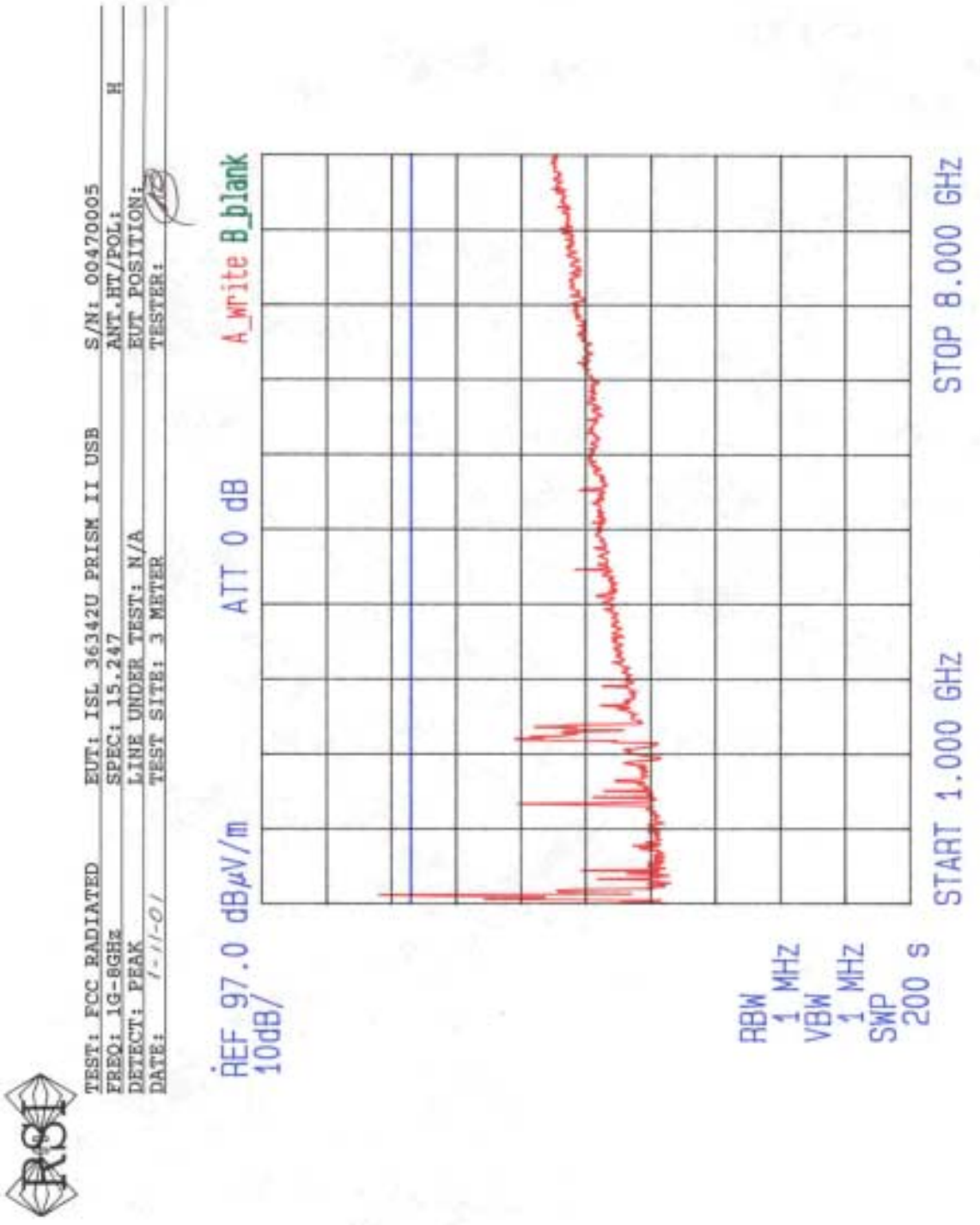


DATA SHEET 6.3.2-6



DATA SHEET 6.3.2-7