Measurement of RF Interference from a Model RRRF-01 Transceiver

For : Responsive Innovations
Akron, OH

P.O. No. : 1037
Date Received : May 16, 2005
Date Tested : May 16, 2005 through May 20, 2005
Test Personnel : Mark E. Longinotti
Specification : FCC "Code of Federal Regulations" Title 47
Part 15, Subpart B and
Subpart C, Section 15.249 for Intentional Radiators
Operating within the 2400-2483.5MHz band

Test Report By : Mark E. Longinotti

Mark E. Longinotti

Witnessed by :
Kevin G. Adkins
Responsive Innovations

Approved By : Raymond J. Klouda
Registered Professional Engineer of
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Measurement of RF Emissions from a Transceiver RRRF-01

1.0 INTRODUCTION:

1.1 Description of Test Item - This document represents the results of the series of radio interference measurements performed on a model Transceiver, Part No.RRRF-01, Serial No. None Assigned, (hereinafter referred to as the test item). The test item was designed to transmit and receive in the 2400MHz to 2483.5MHz band using an internal antenna. The test item was manufactured and submitted for testing by Responsive Innovations located in Akron, OH.

1.2 Purpose - The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5MHz band. Testing was performed in accordance with ANSI C63.4-2001.

1.3 Deviations, Additions and Exclusions - There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 Applicable Documents - The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, dated 1 October 2004

- ANSI C63.4-2001, "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"

1.5 Subcontractor Identification - This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

1.6 Laboratory Conditions The temperature at the time of the test was 21C and the relative humidity was 35%.

2.0 TEST ITEM SETUP AND OPERATION:

The test item is a Transceiver, Part No.RRRF-01. A block diagram of the test item setup is shown as Figure 1.

2.1 Power Input - The test item obtained 3VDC power from the USB port of a laptop computer. The laptop computer was powered with 20VDC via a 1.8 meter-long, 2 wire, unshielded cable from an AC adaptor. The AC adaptor obtained 115V 60Hz power through a 1.8 meter-long, 2 wire, unshielded power cable. For conducted emissions tests, each AC power lead to the AC adaptor was connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2001.

2.2 Grounding - The test item was ungrounded during the tests.

2.3 Peripheral Equipment - The following peripheral equipment was submitted with the test item:

Item	Description
Laptop Computer	Dell PPI Inspiron 7000
AC Adaptor for computer	Dell ADP-70BB Model PA-4, P/N: 1243C, 20VDC output

2.4 Interconnect Cables - The following interconnect cables were submitted with the test item:

Item	Description
USB Cable	Standard USB Cable, approximately 30ft. (used for radiated emissions tests only)

2.5 Operational Mode - For conducted emissions tests, the laptop computer was placed on an 80cm high non-conductive stand. The test item was installed directly into the USB port of the laptop computer. Conducted emissions tests were performed with the test item transmitting at 2441MHz.

For radiated emissions tests, the test item was placed on an 80cm high non-conductive stand. The test item was connected to the USB port of the laptop computer via a 30 foot long USB cable. The laptop computer was external to the test chamber. Radiated emissions tests were performed separately with the test item transmitting at 2401MHz, 2441MHz, and 2482MHz.

2.6 Test Item Modifications - No modifications were required for compliance to the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 requirements.

3.0 TEST EQUIPMENT:

3.1 Test Equipment List - A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

3.2 Calibration Traceability Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

3.3 Measurement Uncertainty - All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty budgets were based on guidelines in "ISO Guide to the Expression of Uncertainty in Measurements" and NAMAS NIS81 "The Treatment of Uncertainty in EMC Measurements".

The measurement uncertainty for these tests is presented below:

Conducted Emission Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

4.0 REQUIREMENTS, PROCEDURES AND RESULTS:

4.1 Powerline Conducted Emissions

4.1.1 Requirements - Per 15.101(b), receivers operating above 960MHz are exempt from complying with the conducted emissions requirements of 15.107. Therefore no conducted emissions tests were performed with the test item operating in the receive mode.

All radio frequency voltages on the power lines for any frequency or frequencies of an intentional radiator shall not exceed the limits in the following table:

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

4.1.2 Procedures - The interference on each power lead of the laptop computer was measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. The meter terminal of the LISN not under test was terminated with 50 ohm. Measurements were first made over the entire frequency range from 150kHz through 30MHz with a peak detector and the results were automatically plotted. The data thus obtained was then searched by the computer for the highest levels. Quasi-peak measurements were automatically performed at the frequencies selected from the highest peak measurements, and the results printed. Photographs of the test setup are shown as Figure 2.

4.1.3 Results - The plots of the peak preliminary conducted voltage levels on each power line from the Dell laptop computer **without** the test item installed in the USB port, are presented on pages 14 and 15. The conducted limits for intentional radiators and Class B devices are shown as a reference. The final quasi-peak results are presented on pages 16 and 17.

The plots of the peak preliminary conducted voltage levels on each power line from the Dell laptop computer **with** the test item installed in the USB port and transmitting at 2441MHz, are presented on pages 18 and 19. The conducted limits for intentional radiators are shown as a reference. The final quasi-peak results are presented on pages 20 and 21.

As can be seen from the data, all conducted emission levels met the requirements for Class B devices and for intentional radiators.

4.2 Duty Cycle Factor Measurements:

4.2.1 Procedures: The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 5msec/div. The amplitude settings are adjusted so that

the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period is less than 100msec, the display is set to show at least one word. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

4.2.2 Results: Plots of the duty cycle at 2401MHz, 2441MHz, and 2482MHz are shown on data pages 22 through 24. The duty cycle factor was computed to be -40dB at all three frequencies.

4.3 Radiated Measurements

4.3.1 Requirements - Per 15.101(b), receivers operating above 960MHz are exempt from complying with the radiated emissions requirements of 15.109. Therefore no radiated emissions tests were performed with the test item operating in the receive mode.

The test item must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.205 et seq.

Paragraph 15.249 has the following radiated emission limits:

Fundamental Frequency MHz	Field Intensity uV/m @ 3 meters	Field Strength Harmonics and Spurious @ 3 meters
2400-2483.5	50,000	500

The field strength limits are based on average limits. However, the peak field strength of any emission shall mot exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

4.3.2 Procedures - Radiated emissions measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the test item. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 18GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final radiated emission tests were then manually performed over the frequency range of

30MHz to 25GHz. A broadband double ridged waveguide antenna was used as the pick-up device for all frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

(1) The test item was rotated so that all of its sides were exposed to the receiving antenna.
(2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
(3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
(4) For hand-held or body-worn devices, the test item was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

4.3.3 Results - The preliminary plots, with the test item transmitting at 2401MHz throguh 2482MHz, are presented on data pages 25 through 30. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the test item transmitting, are presented on data pages 31 through 36. As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closet to the limit (worst case) occurred at 2441MHz. The emissions level at this frequency was 7.8dB within the limit. See data page 33 for details. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 3.

4.4 Band Edge Compliance

4.4.1 Requirement - In accordance with paragraph 15.249(d), emissions outside of the specified frequency bands shall be below the general radiated emissions limits of 15.209. Therefore the radiated emissions at the band edges (2400MHz and 2483.5MHz) must meet the general limits of 15.209.

4.4.2 Procedures - For radiated emissions at the band edges, the “marker-delta” method described in Public Notice DA 00-705 was used.

The test item was placed on an 80cm high non-conductive stand. The unit was set to transmit

continuously. A broadband measuring antenna was placed at a test distance of 3 meters from the test item. Initially radiated emissions were performed at the lowest transmit frequency and the highest transmit frequency using a 1MHz bandwidth. Next, the band edge emissions were plotted using a peak detector and a 30kHz bandwidth. The "max-hold" function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a "screen-dump" utility. The "delta" limit was applied to this plot to determine compliance at the band edge.

4.4.3 Results - Pages 37 and 38 show the radiated band-edge compliance results using the marker-delta method. As can be seen from these plots, the emissions at the band-edge are within the general limits.

5.0 CONCLUSIONS:

It was determined that the Responsive Innovations Transceiver, Part No. RRRF-01, Serial No. None Assigned, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5MHz band, when tested per ANSI C63.4-2001.

6.0 CERTIFICATION:

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the test item at the test date. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

7.0 ENDORSEMENT DISCLAIMER:

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

TABLE I: TEST EQUIPMENT LIST

ELITE ELECTRONIC ENG. INC. Page: 1

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XOB1	ADAPTER	HEWLETT PACKARD	K281C	10422	18-26.5GHZ		NOTE 1	
XZG3	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2421A03059	---		N/A	
XZG4	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2223A01683	---		N/A	
Equipment Type: AMPLIFIERS								
APK3	PREAMPLIFIER	AGILENT TECHNOL	8449B	3008A01593	1-26.5GHZ	06/03/05	12	06/03/06
APK4	PREAMPLIFIER OPT H02	HEWLETT PACKARD	8449B	3008A00329	1-26.5GHZ	01/27/05	12	01/27/06
Equipment Type: ANTENNAS								
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ		NOTE 1	
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	07/12/04	12	07/12/05
NWI1	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	09/05/04	12	09/05/05
Equipment Type: ATTENUATORS								
T1E6	10DB, 25W ATTENUATOR	WEINSCHEL	46-10-34	BG3488	DC-18GHZ	05/27/05	12	05/27/06
Equipment Type: PROBES; CLAMP-ON & LISNS								
PLL9	50UH LISN 462D	ELITE	462D/70A	010	0.01-400MHZ	03/04/05	12	03/04/06
PLLA	50UH LISN 462D	ELITE	462D/70A	011	0.01-400MHZ	03/04/05	12	03/04/06
Equipment Type: RECEIVERS								
RAC2	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3638A08770	100HZ-22GHZ	02/09/05	12	02/09/06
RACA	RF PRESELECTOR	HEWLETT PACKARD	85685A	2926A00980	20HZ-2GHZ	02/05/05	12	02/05/06
RACD	RF PRESELECTOR	HEWLETT PACKARD	85685A	3010A01205	20HZ-2GHZ	02/09/05	12	02/09/06
RAEC	SPECTRUM ANALYZER	HEWLETT PACKARD	8566B	3014A06690	100HZ-22GHZ	02/02/05	12	02/02/06
RAF4	QUASIPEAK ADAPTER	HEWLETT PACKARD	85650A	2043A00320	0.01-1000MHZ	02/09/05	12	02/09/06
RAF5	QUASIPEAK ADAPTOR W/ RECEI	HEWLETT PACKARD	85650A	2043A00151	0.01-1000MHZ	01/31/05	12	01/31/06
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	09/20/04	12	09/20/05

Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

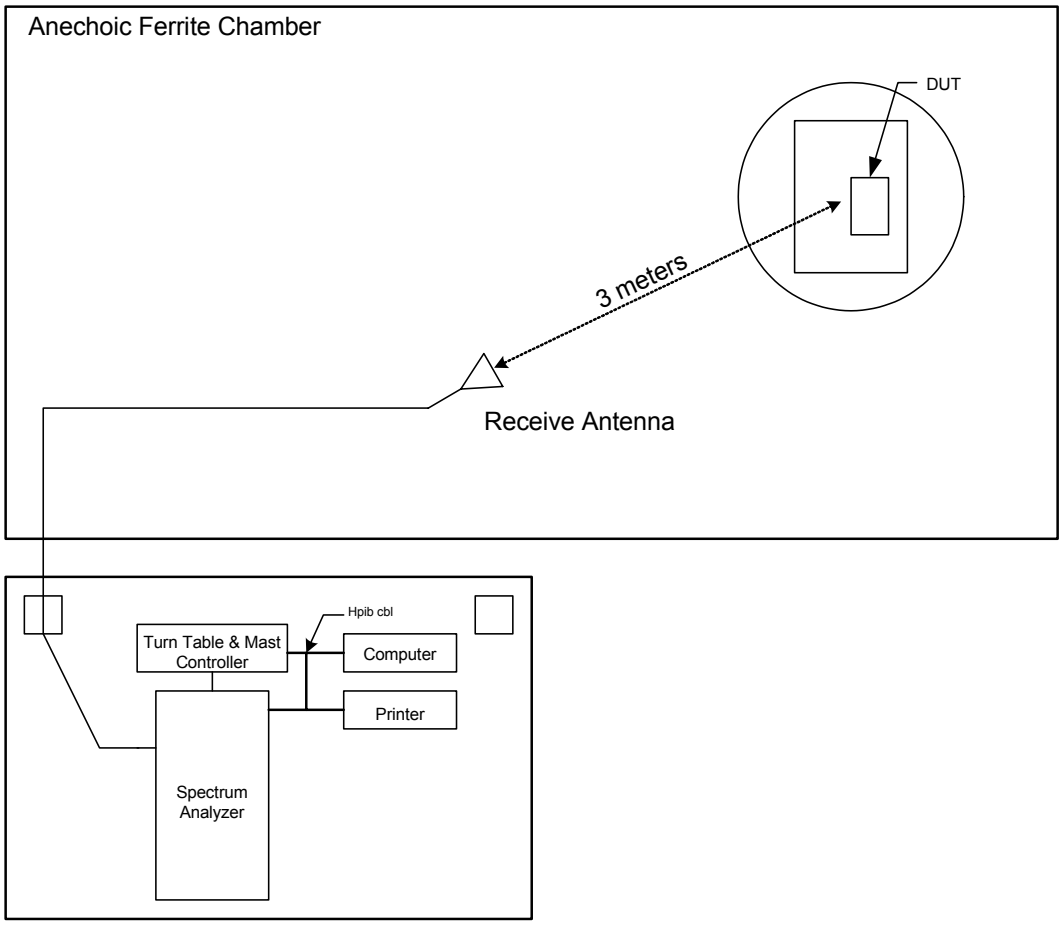


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

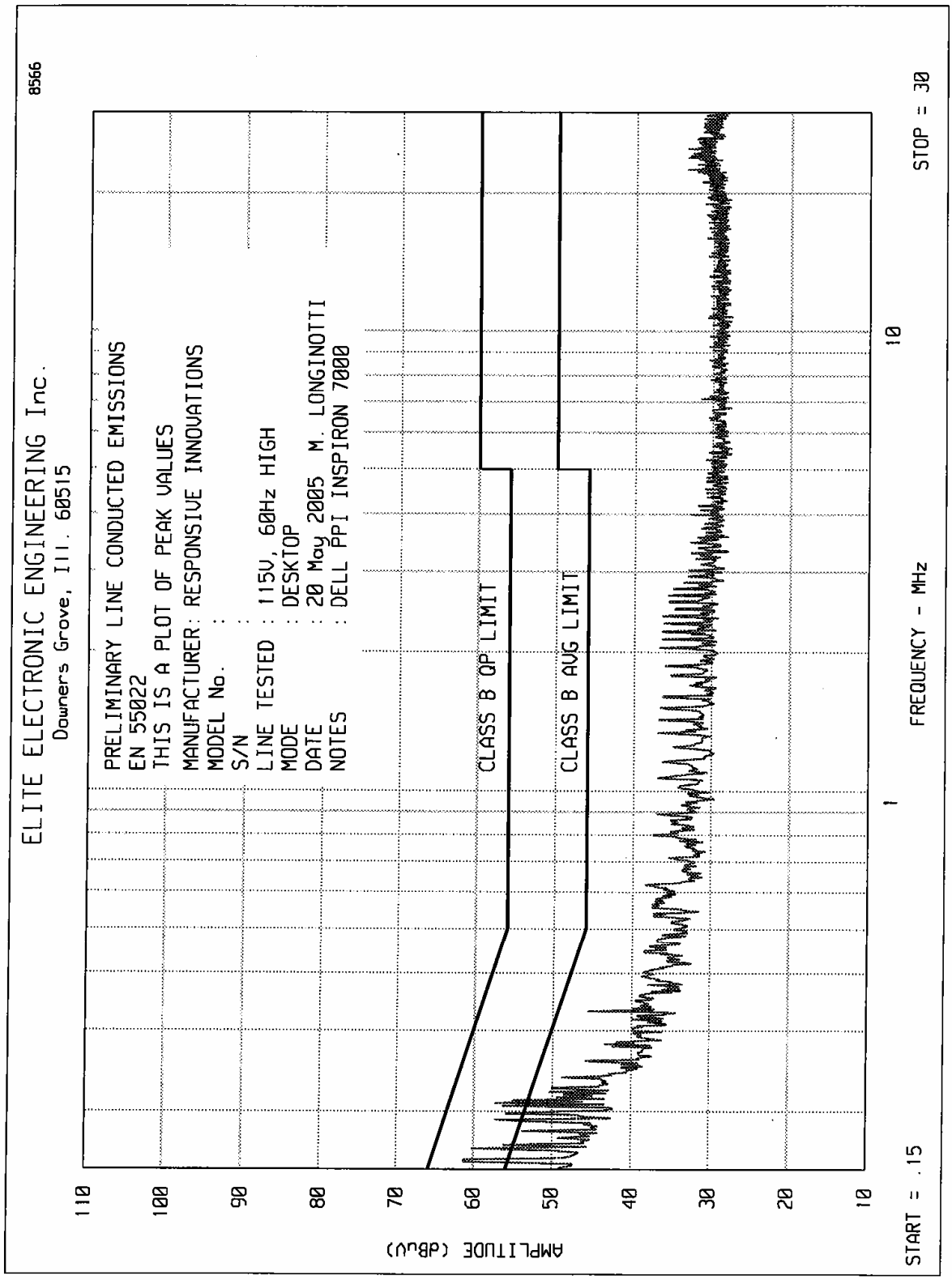
Figure 2

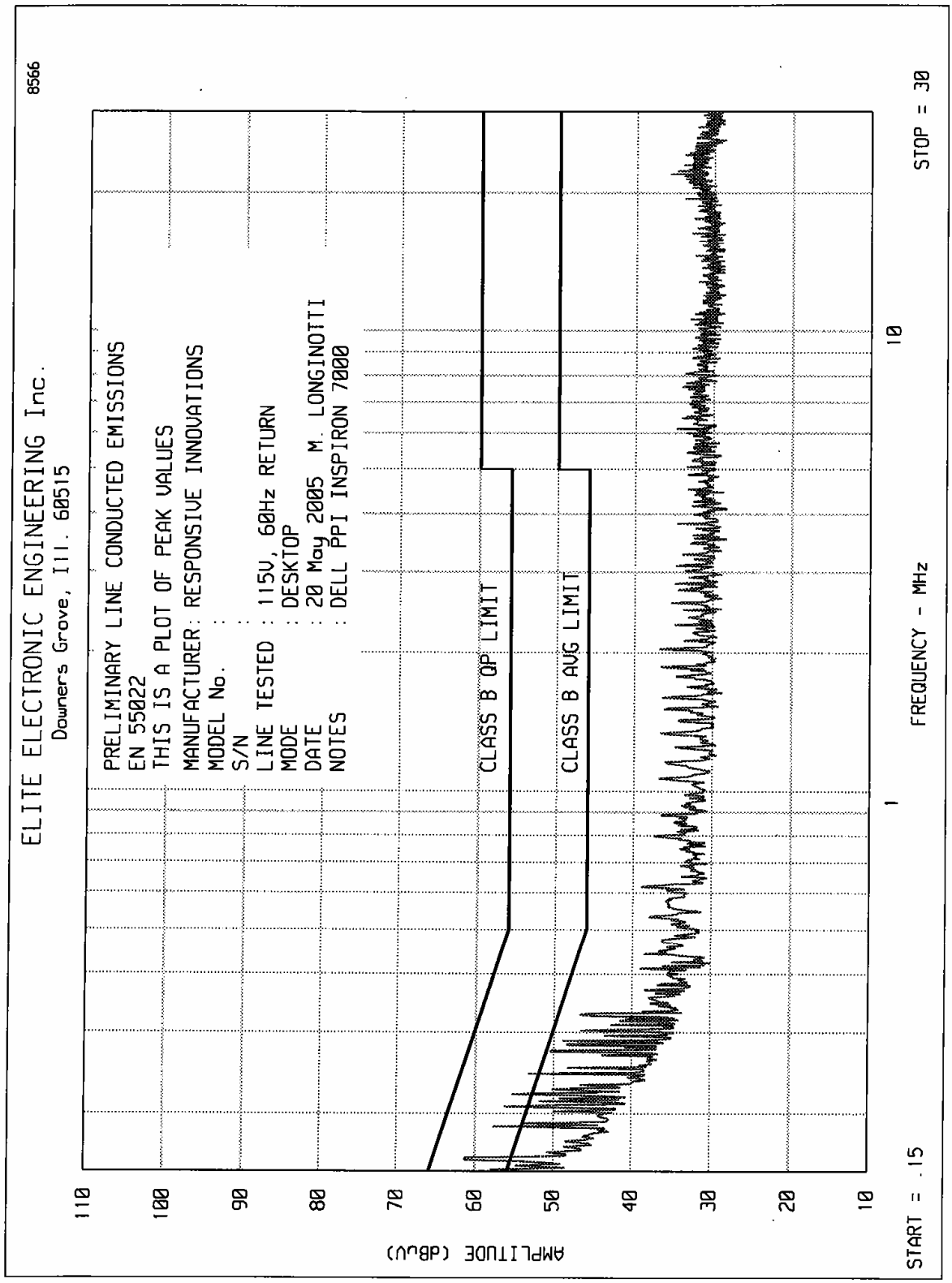
Test Setup for Conducted Emissions

Figure 3

Test Setup for Radiated Emissions – Horizontal Polarization

Test Setup for Radiated Emissions – Vertical Polarization


8566
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. :
S/N :
LINE TESTED : 115V, 60Hz HIGH
MODE : DESKTOP
DATE : 20 May 2005 M. LONGINOTTI
NOTES : DELL PPI INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz


8566
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. :
S/N :
LINE TESTED : 115V, 60Hz RETURN
MODE : DESKTOP
DATE : 20 May 2005 M. LONGINOTTI
NOTES : DELL PPI INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz

ETR No.
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL :
S/N :
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz HIGH
MODE : DESKTOP
DATE : 20 May 2005
NOTES : DELL PPI INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.157	43.2	65.6		55.6	
.248	33.6	61.8		51.8	
.358	34.2	58.8		48.8	
.447	36.5	56.9		46.9	
.565	34.4	56.0		46.0	
.624	35.0	56.0		46.0	
.802	35.5	56.0		46.0	
.890	34.4	56.0		46.0	
1.069	35.5	56.0		46.0	
2.046	34.9	56.0		46.0	
2.401	31.1	56.0		46.0	
3.023	32.6	56.0		46.0	
4.710	29.1	56.0		46.0	
7.108	27.6	60.0		50.0	
9.239	27.5	60.0		50.0	
13.088	26.9	60.0		50.0	
15.898	27.0	60.0		50.0	
18.881	27.0	60.0		50.0	
21.673	27.7	60.0		50.0	
24.959	28.5	60.0		50.0	
27.164	27.6	60.0		50.0	

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ETR No.
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL :
S/N :
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz RETURN
MODE : DESKTOP
DATE : 20 May 2005
NOTES : DELL PPI INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.155	42.7	65.7		55.7	
.263	31.9	61.3		51.3	
.404	31.5	57.8		47.8	
.623	35.7	56.0		46.0	
.801	34.9	56.0		46.0	
.889	34.6	56.0		46.0	
1.067	35.0	56.0		46.0	
2.043	34.0	56.0		46.0	
2.575	33.4	56.0		46.0	
3.018	32.7	56.0		46.0	
3.107	31.5	56.0		46.0	
4.882	30.1	56.0		46.0	
5.923	29.9	60.0		50.0	
6.832	30.5	60.0		50.0	
8.784	28.9	60.0		50.0	
12.750	27.8	60.0		50.0	
16.283	27.6	60.0		50.0	
19.407	28.2	60.0		50.0	
21.338	28.8	60.0		50.0	
24.196	28.7	60.0		50.0	
27.768	27.8	60.0		50.0	

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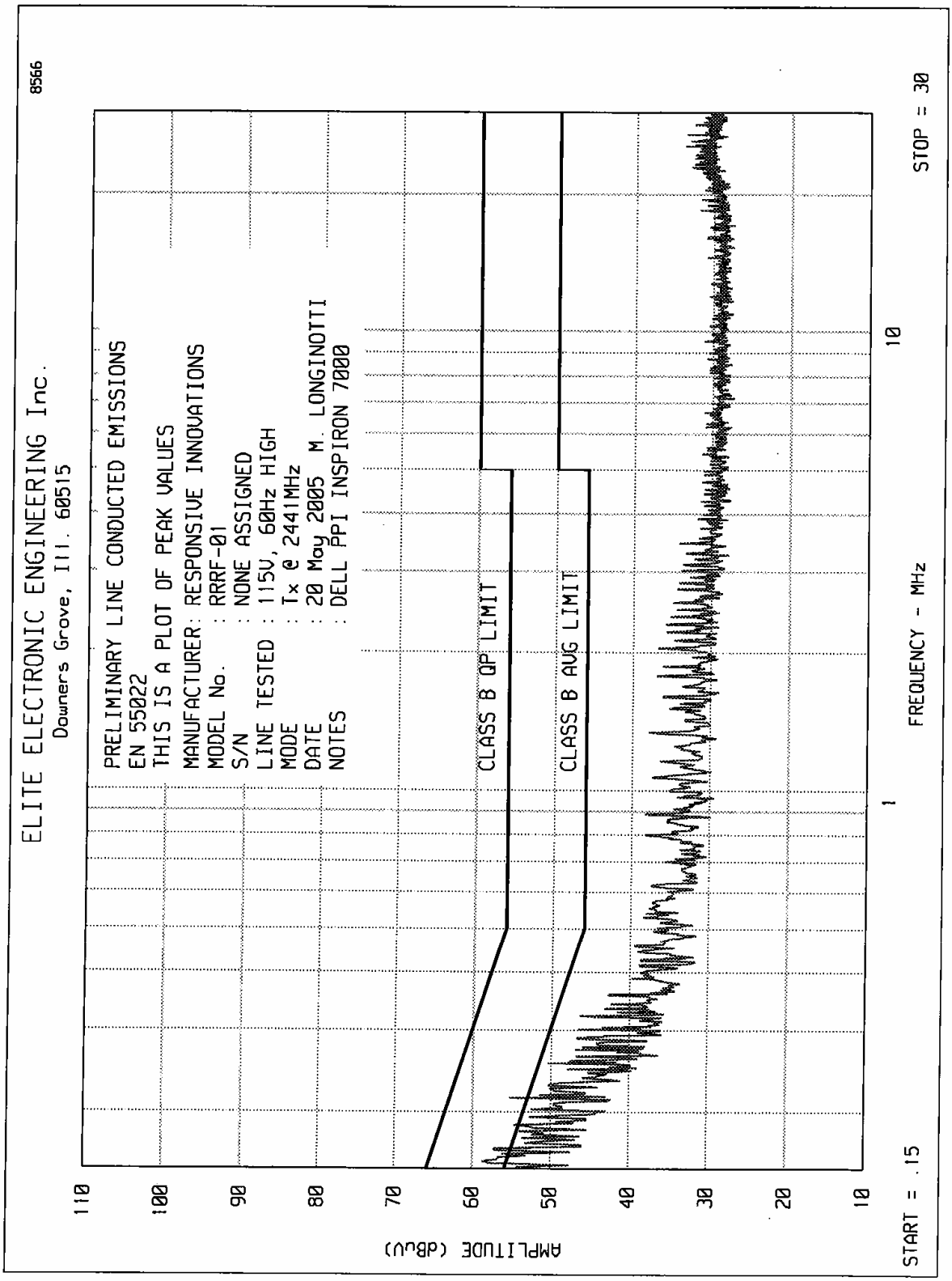
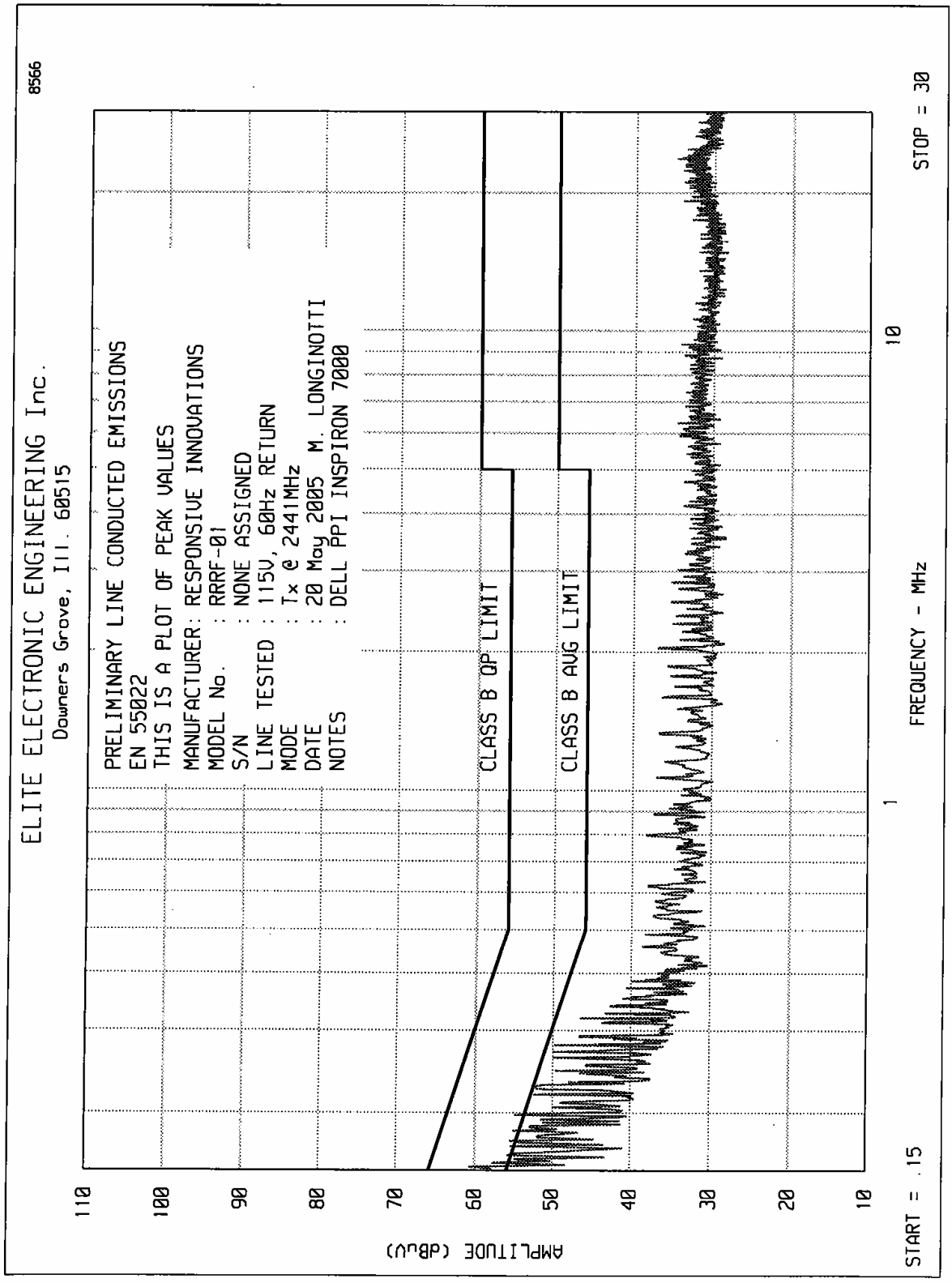
M. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
LINE TESTED : 115V, 60Hz HIGH
MODE : Tx @ 2441MHz
DATE : 20 May 2005 M. LONGINOTTI
NOTES : DELL PPI INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz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Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
LINE TESTED : 115V, 60Hz RETURN
MODE : Tx @ 2441MHz
DATE : 20 May 2005 M. LONGINOTTI
NOTES : DELL PPI INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
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60
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START = .15
1
10
STOP = 30
FREQUENCY - MHz

ETR No.
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RRRF-01
S/N : NONE ASSIGNED
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz HIGH
MODE : Tx @ 2441MHz
DATE : 20 May 2005
NOTES : DELL PPI INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.160	45.6	65.5		55.5	
.264	34.1	61.3		51.3	
.357	34.1	58.8		48.8	
.466	33.3	56.6		46.6	
.558	35.1	56.0		46.0	
.801	35.5	56.0		46.0	
.890	35.2	56.0		46.0	
1.067	35.1	56.0		46.0	
1.334	35.9	56.0		46.0	
1.778	34.5	56.0		46.0	
2.399	31.4	56.0		46.0	
3.020	32.5	56.0		46.0	
3.464	31.6	56.0		46.0	
4.884	29.2	56.0		46.0	
7.900	27.9	60.0		50.0	
9.500	27.5	60.0		50.0	
11.861	26.9	60.0		50.0	
15.975	26.9	60.0		50.0	
18.403	26.9	60.0		50.0	
21.569	27.7	60.0		50.0	
24.762	28.6	60.0		50.0	
26.896	27.8	60.0		50.0	

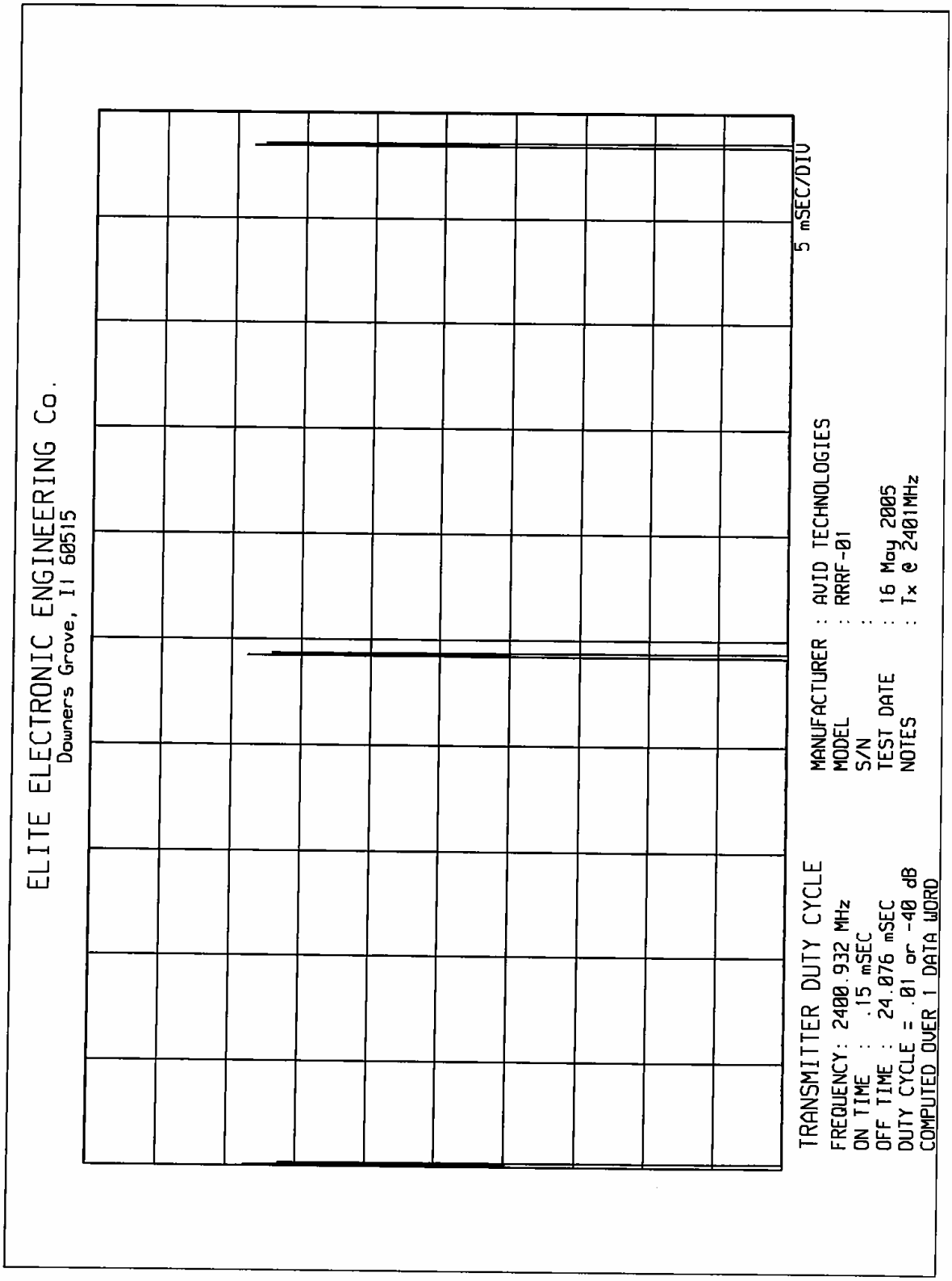
CHECKED BY: Mark E. Longinotti
M. LONGINOTTI

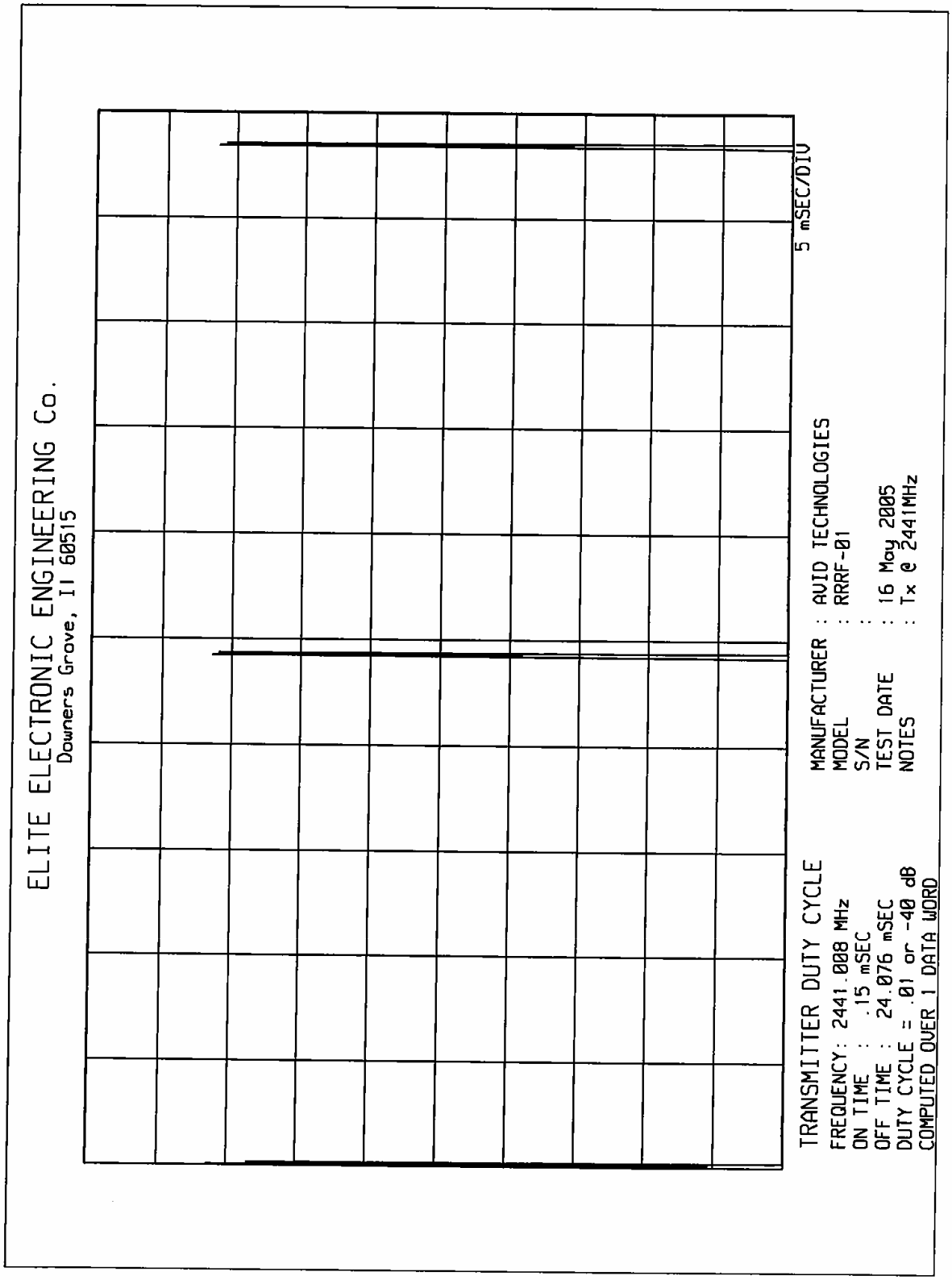
ETR No.
ELITE ELECTRONIC ENGINEERING CO.

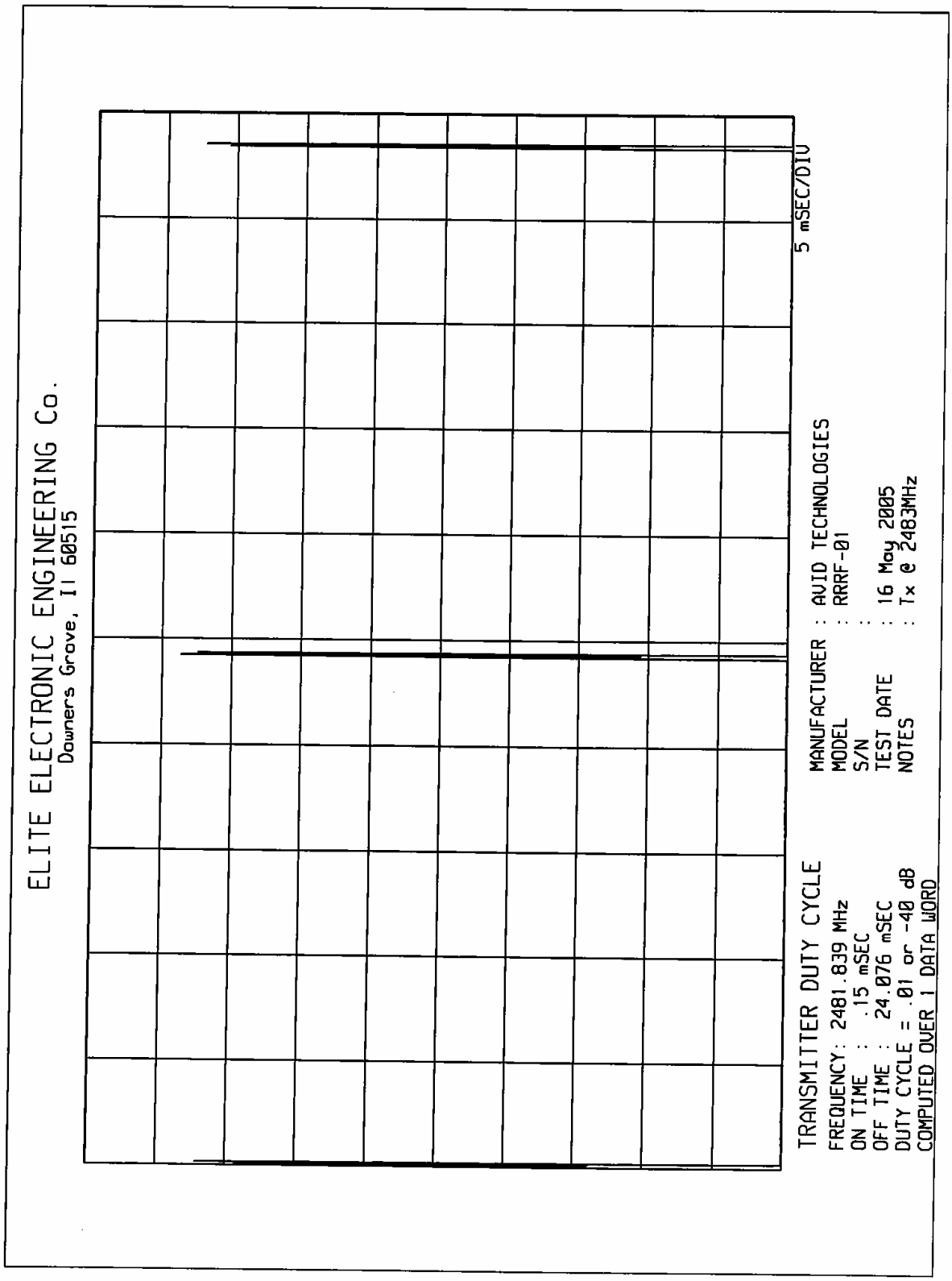
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RRRF-01
S/N : NONE ASSIGNED
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz RETURN
MODE : Tx @ 2441MHz
DATE : 20 May 2005
NOTES : DELL PPI INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

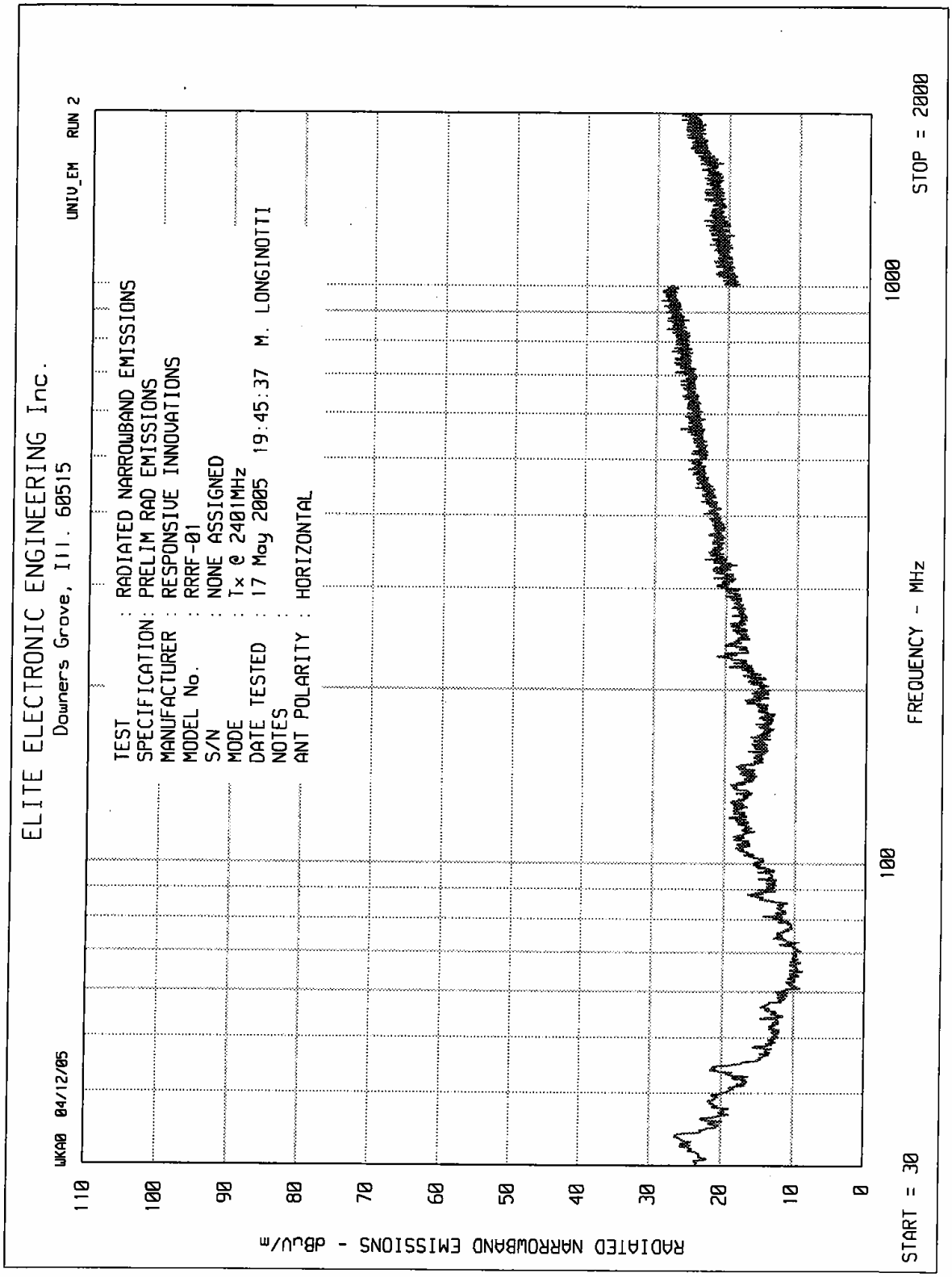
FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.150	40.3	66.0		56.0	
.259	33.8	61.5		51.5	
.357	35.0	58.8		48.8	
.467	32.4	56.6		46.6	
.623	35.6	56.0		46.0	
.801	35.1	56.0		46.0	
.890	35.3	56.0		46.0	
1.067	34.9	56.0		46.0	
2.043	34.1	56.0		46.0	
2.575	33.0	56.0		46.0	
3.018	32.5	56.0		46.0	
4.172	30.9	56.0		46.0	
6.301	32.4	60.0		50.0	
9.317	29.5	60.0		50.0	
11.823	27.9	60.0		50.0	
15.905	27.5	60.0		50.0	
18.146	27.7	60.0		50.0	
22.268	29.0	60.0		50.0	
23.688	29.3	60.0		50.0	
27.059	28.2	60.0		50.0	

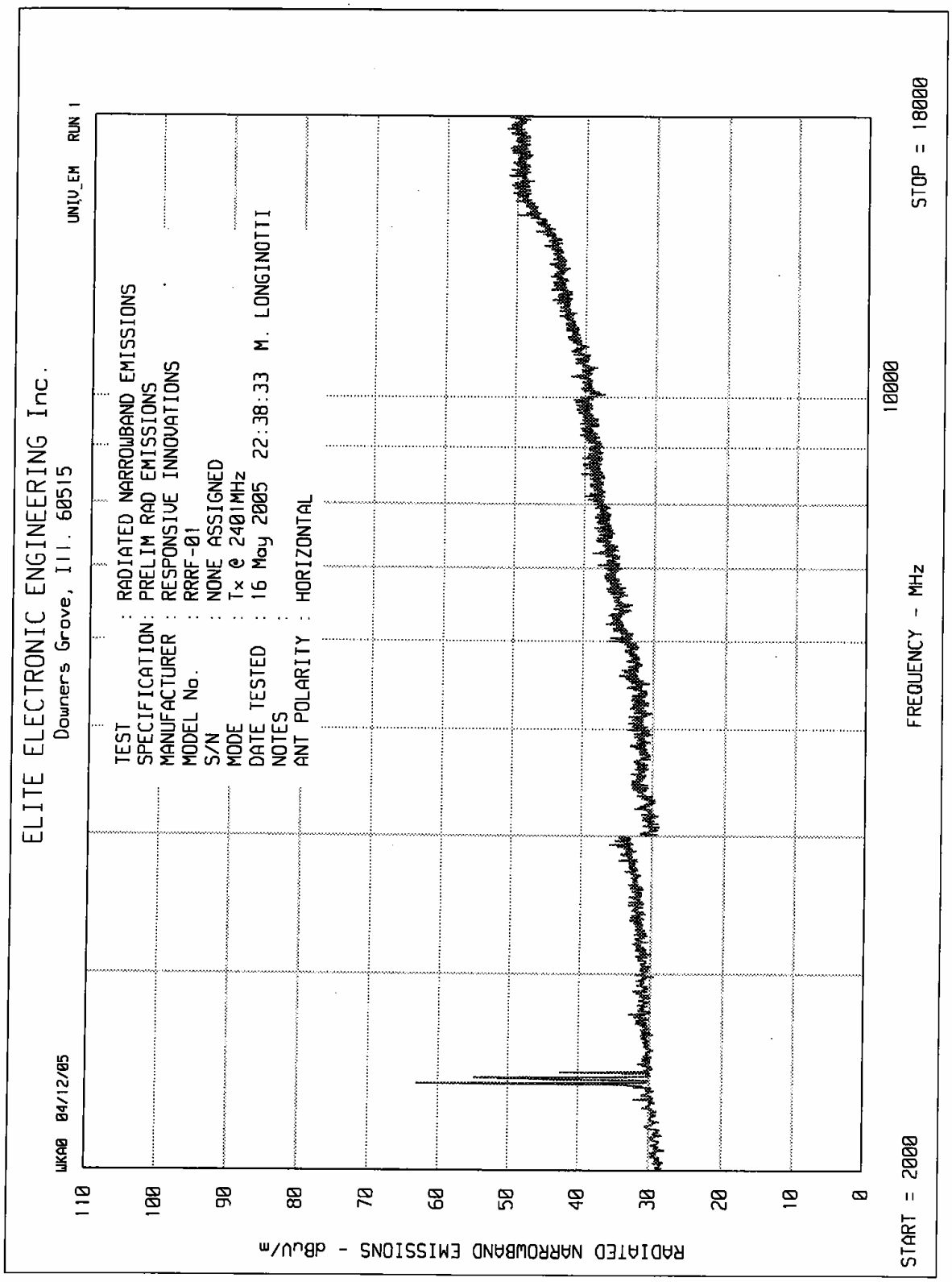
CHECKED BY: Mark E Longinotti
M. LONGINOTTI

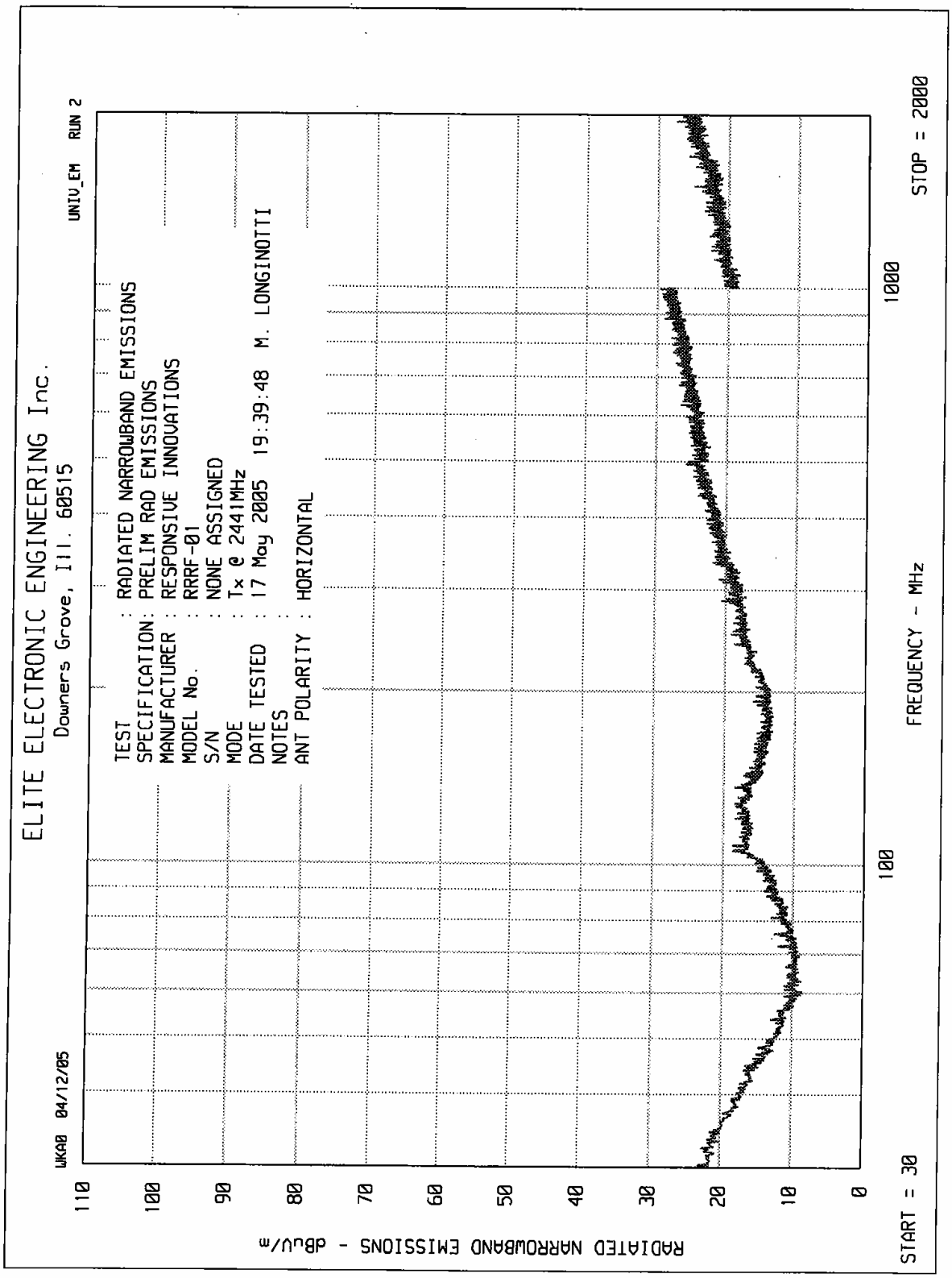

ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
TRANSMITTER DUTY CYCLE
FREQUENCY: 2400.932 MHz
ON TIME : .15 mSEC
OFF TIME : 24.076 mSEC
DUTY CYCLE = .01 or -40 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : AVID TECHNOLOGIES
MODEL : RRRF-01
S/N :
TEST DATE : 16 May 2005
NOTES : Tx @ 2401MHz
5 mSEC/DIV

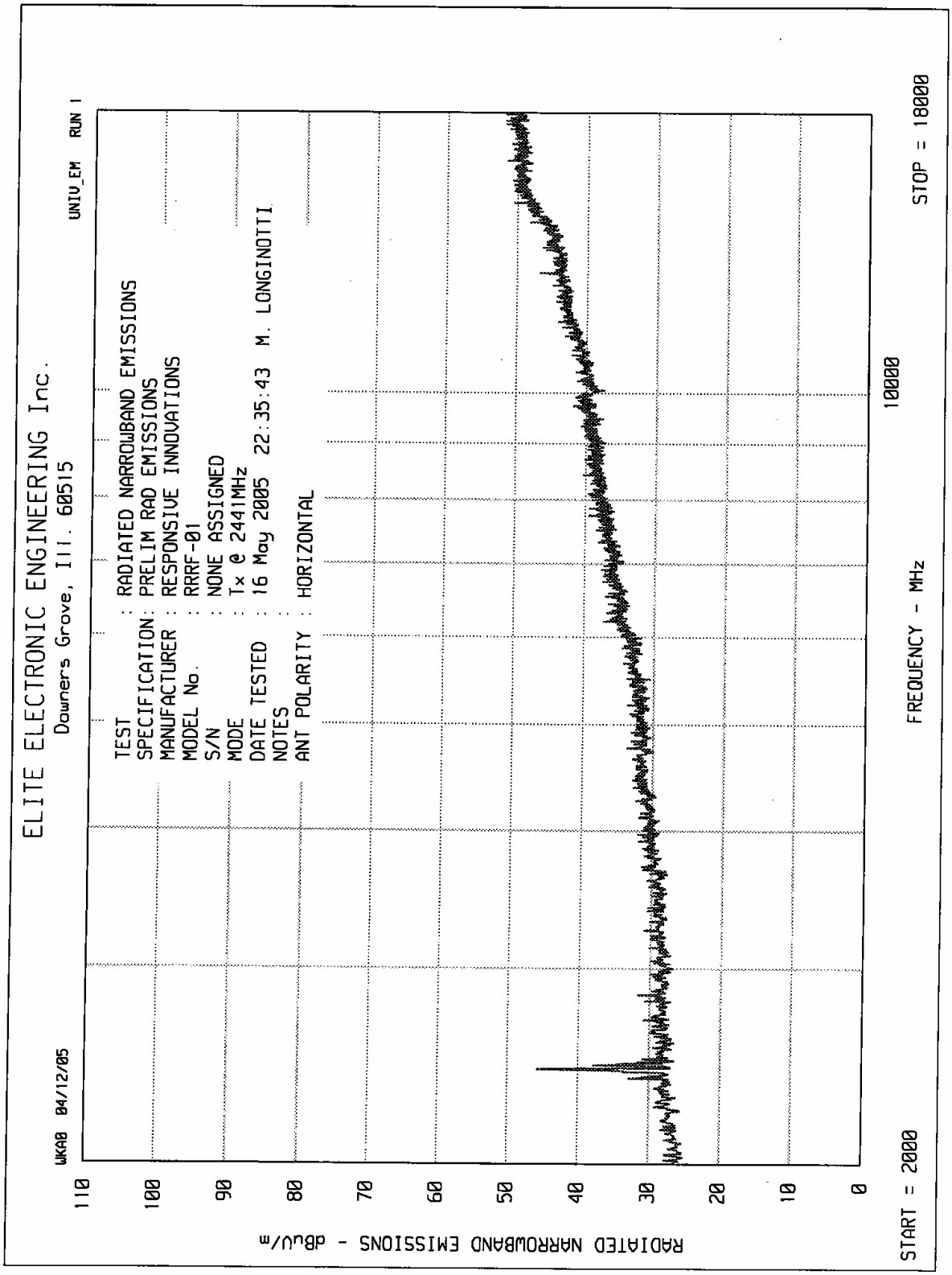

ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
5 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 2441.000 MHz
ON TIME : .15 mSEC
OFF TIME : 24.076 mSEC
DUTY CYCLE = .01 or -40 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : AVID TECHNOLOGIES
MODEL : RRRF-01
S/N : :
TEST DATE : 16 May 2005
NOTES : Tx @ 2441MHz

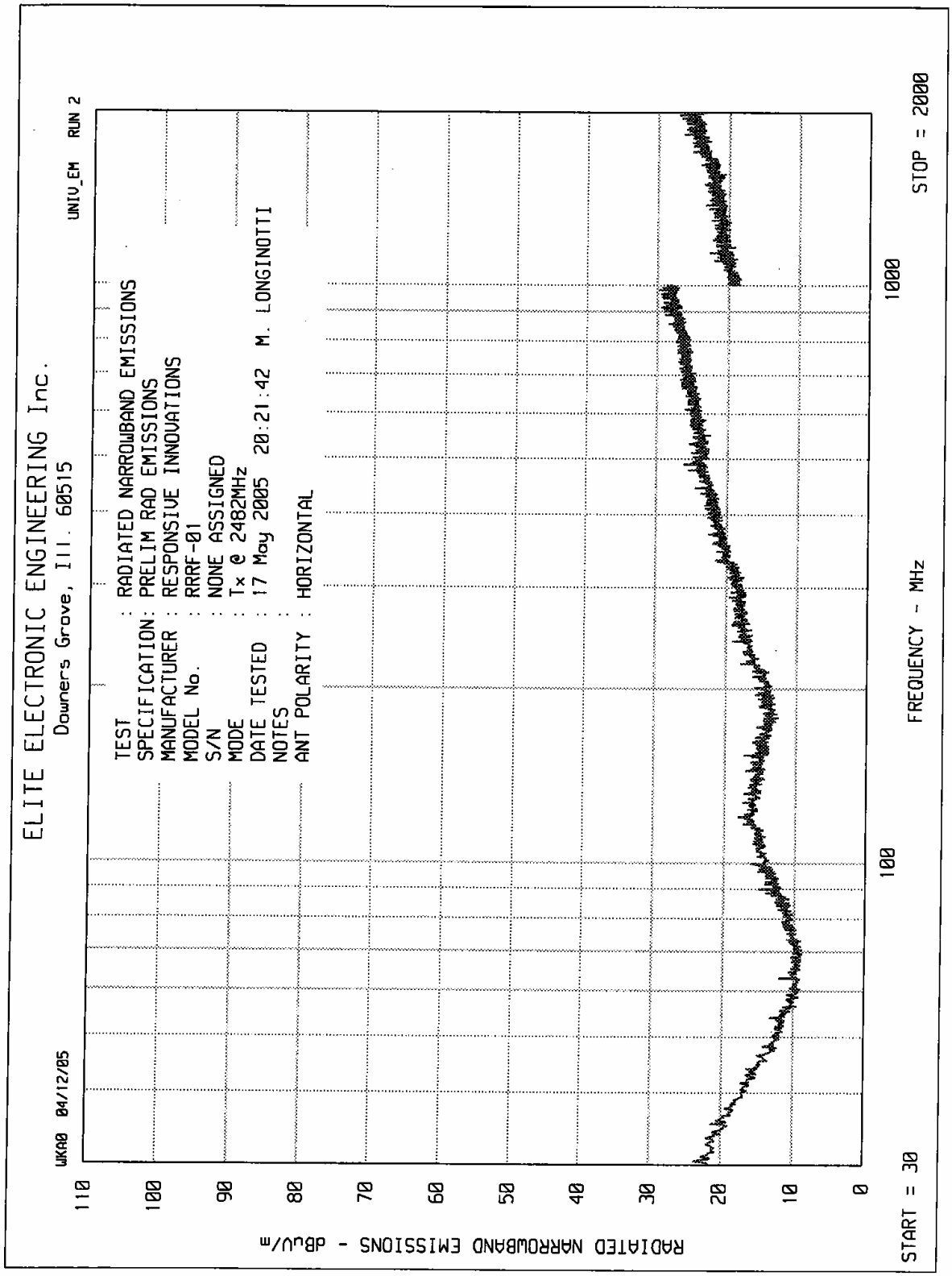

ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
5 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 2481.839 MHz
ON TIME : .15 mSEC
OFF TIME : 24.076 mSEC
DUTY CYCLE = .01 or -40 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : AVID TECHNOLOGIES
MODEL : RRRF-01
S/N :
TEST DATE : 16 May 2005
NOTES : Tx @ 2483MHz

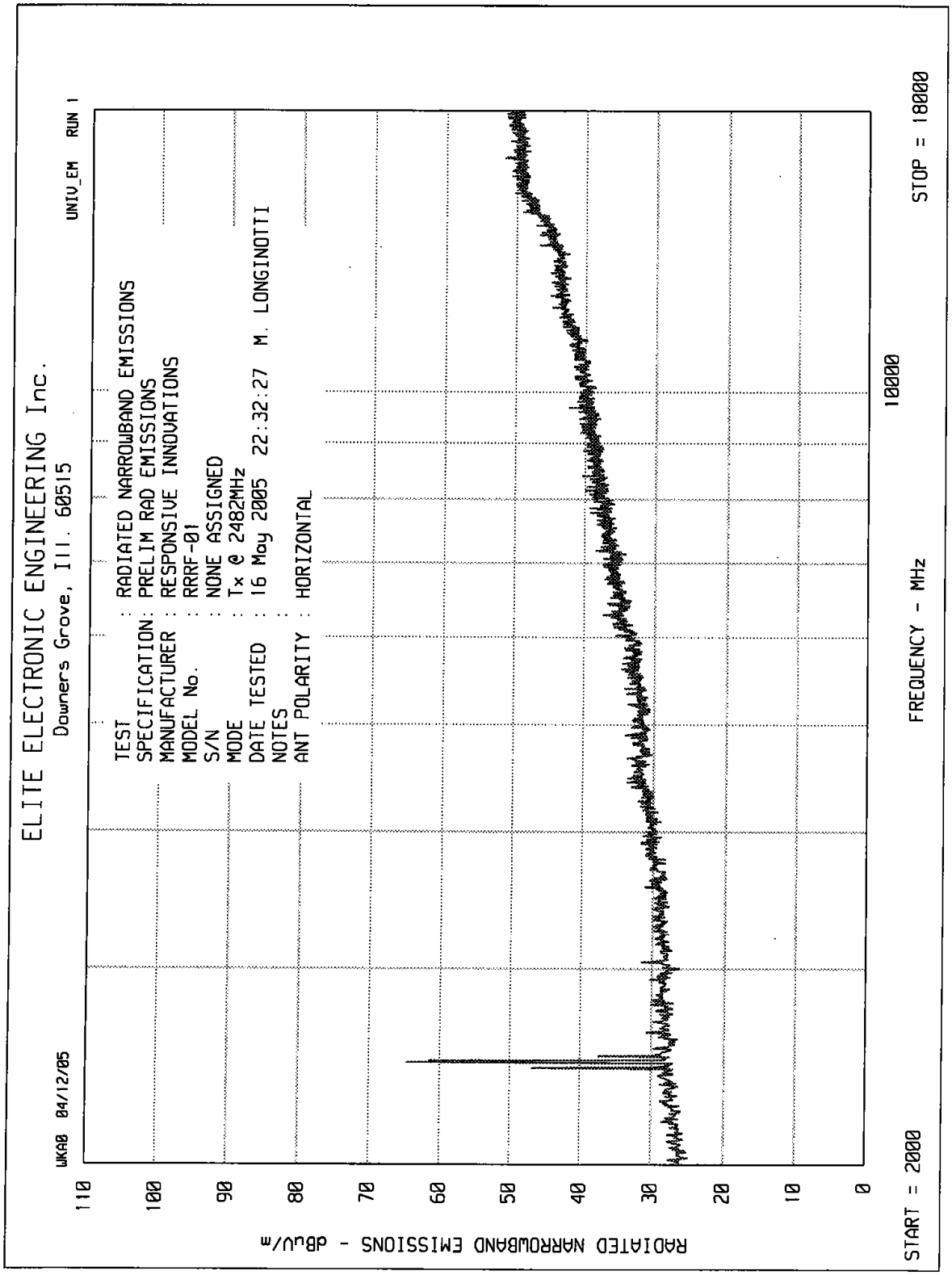

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 2
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION: PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2401MHz
DATE TESTED : 17 May 2005 19:45:37 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
WKA0 04/12/05
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 04/12/05
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION: PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2401MHz
DATE TESTED : 16 May 2005 22:38:33 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
10000
STOP = 18000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 2
WKA0 04/12/05
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION: PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2441MHz
DATE TESTED : 17 May 2005 19:39:48 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 04/12/05
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION : PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2441MHz
DATE TESTED : 16 May 2005 22:35:43 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
10000
STOP = 18000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 2
WKA0 04/12/05
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION: PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2482MHz
DATE TESTED : 17 May 2005 20:21:42 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 04/12/05
TEST : RADIATED NARROWBAND EMISSIONS
SPECIFICATION: PRELIM RAD EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RRRF-01
S/N : NONE ASSIGNED
MODE : Tx @ 2482MHz
DATE TESTED : 16 May 2005 22:32:27 M. LONGINOTTI
NOTES :
ANT POLARITY : HORIZONTAL
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
10000
STOP = 18000
FREQUENCY - MHz

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2401MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2401	H	70.1		31.1	3.5			104.7	114
	V	63.3		31.1	3.5			97.9	114
4802	H	57.9		35.1	4.9	-34.6		63.3	74
	V	56		35.1	4.9	-34.6		61.4	74
7203	H	41.9	AMBIENT	38.2	1.8	-34.5		47.4	74
	V	42.4	AMBIENT	38.2	1.8	-34.5		47.9	74
9604	H	45.1	AMBIENT	39.5	2.1	-34.9		51.8	74
	V	49.7		39.5	2.1	-34.9		56.4	74
12005	H	43.4	AMBIENT	41.4	2.4	-34.4	-9.5	43.3	74
	V	44.4	AMBIENT	41.4	2.4	-34.4	-9.5	44.3	74
14406	H	43.1	AMBIENT	43.5	2.7	-33.3	-9.5	46.5	74
	V	43.3	AMBIENT	43.5	2.7	-33.3	-9.5	46.7	74
16807	H	44.3	AMBIENT	44.6	2.9	-33.6	-9.5	48.7	74
	V	43.8	AMBIENT	44.6	2.9	-33.6	-9.5	48.2	74
19208	H	30.1	AMBIENT	40.3	0	-31.1	-9.5	29.8	74
	V	29.6	AMBIENT	40.3	0	-31.1	-9.5	29.3	74
21609	H	39.6	AMBIENT	40.6	0	-31.9	-9.5	38.8	74
	V	39.5	AMBIENT	40.6	0	-31.9	-9.5	38.7	74
24010	H	36.6	AMBIENT	40.6	0	-29.6	-9.5	38.1	74
	V	36.2	AMBIENT	40.6	0	-29.6	-9.5	37.7	74

* - Above 18GHz, Cable Loss is included with the preamp gain

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2401MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2401	H	70.1		31.1	3.5			-40	64.7	94
	V	63.3		31.1	3.5			-40	57.9	94
4802	H	57.9		35.1	4.9	-34.6		-40	23.3	54
	V	56		35.1	4.9	-34.6		-40	21.4	54
7203	H	41.9	AMBIENT	38.2	1.8	-34.5			47.4	54
	V	42.4	AMBIENT	38.2	1.8	-34.5			47.9	54
9604	H	45.1	AMBIENT	39.5	2.1	-34.9			51.8	54
	V	49.7		39.5	2.1	-34.9		-40	16.4	54
12005	H	43.4	AMBIENT	41.4	2.4	-34.4	-9.5		43.3	54
	V	44.4	AMBIENT	41.4	2.4	-34.4	-9.5		44.3	54
14406	H	43.1	AMBIENT	43.5	2.7	-33.3	-9.5		46.5	54
	V	43.3	AMBIENT	43.5	2.7	-33.3	-9.5		46.7	54
16807	H	44.3	AMBIENT	44.6	2.9	-33.6	-9.5		48.7	54
	V	43.8	AMBIENT	44.6	2.9	-33.6	-9.5		48.2	54
19208	H	30.1	AMBIENT	40.3	0	-31.1	-9.5		29.8	54
	V	29.6	AMBIENT	40.3	0	-31.1	-9.5		29.3	54
21609	H	39.6	AMBIENT	40.6	0	-31.9	-9.5		38.8	54
	V	39.5	AMBIENT	40.6	0	-31.9	-9.5		38.7	54
24010	H	36.6	AMBIENT	40.6	0	-29.6	-9.5		38.1	54
	V	36.2	AMBIENT	40.6	0	-29.6	-9.5		37.7	54

* - Above 18GHz, Cable Loss is included with the preamp gain

V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2441MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2441	H	71.5		31.2	3.5			106.2	114
	V	66		31.2	3.5			100.7	114
4882	H	55.3		35.1	5	-34.5		60.9	74
	V	54.8		35.1	5	-34.5		60.4	74
7323	H	42.5	AMBIENT	38.3	1.8	-34.5		48.1	74
	V	44.7	AMBIENT	38.3	1.8	-34.5		50.3	74
9764	H	44.3		39.7	2.1	-34.9		51.2	74
	V	48.8		39.7	2.1	-34.9		55.7	74
12205	H	41.9	AMBIENT	41.5	2.4	-34.6	-9.5	41.7	74
	V	42.7	AMBIENT	41.5	2.4	-34.6	-9.5	42.5	74
14646	H	43.7	AMBIENT	44	2.8	-33.3	-9.5	47.7	74
	V	44	AMBIENT	44	2.8	-33.3	-9.5	48	74
17087	H	43.5	AMBIENT	44.6	3	-33.4	-9.5	48.2	74
	V	43.4	AMBIENT	44.6	3	-33.4	-9.5	48.1	74
19528	H	30.4	AMBIENT	40.3	0	-31.6	-9.5	29.6	74
	V	30	AMBIENT	40.3	0	-31.6	-9.5	29.2	74
21969	H	38.7	AMBIENT	40.6	0	-28.5	-9.5	41.3	74
	V	38.7	AMBIENT	40.6	0	-28.5	-9.5	41.3	74
24410	H	40.2	AMBIENT	40.6	0	-27.8	-9.5	43.5	74
	V	38.8	AMBIENT	40.6	0	-27.8	-9.5	42.1	74

* - Above 18GHz, Cable Loss is included with the preamp gain

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2441MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2441	H	71.5		31.2	3.5			-40	66.2	94
	V	66		31.2	3.5			-40	60.7	94
4882	H	55.3		35.1	5	-34.5		-40	20.9	54
	V	54.8		35.1	5	-34.5		-40	20.4	54
7323	H	42.5	AMBIENT	38.3	1.8	-34.5			48.1	54
	V	44.7	AMBIENT	38.3	1.8	-34.5			50.3	54
9764	H	44.3		39.7	2.1	-34.9		-40	11.2	54
	V	48.8		39.7	2.1	-34.9		-40	15.7	54
12205	H	41.9	AMBIENT	41.5	2.4	-34.6	-9.5		41.7	54
	V	42.7	AMBIENT	41.5	2.4	-34.6	-9.5		42.5	54
14646	H	43.7	AMBIENT	44	2.8	-33.3	-9.5		47.7	54
	V	44	AMBIENT	44	2.8	-33.3	-9.5		48	54
17087	H	43.5	AMBIENT	44.6	3	-33.4	-9.5		48.2	54
	V	43.4	AMBIENT	44.6	3	-33.4	-9.5		48.1	54
19528	H	30.4	AMBIENT	40.3	0	-31.6	-9.5		29.6	54
	V	30	AMBIENT	40.3	0	-31.6	-9.5		29.2	54
21969	H	38.7	AMBIENT	40.6	0	-28.5	-9.5		41.3	54
	V	38.7	AMBIENT	40.6	0	-28.5	-9.5		41.3	54
24410	H	40.2	AMBIENT	40.6	0	-27.8	-9.5		43.5	54
	V	38.8	AMBIENT	40.6	0	-27.8	-9.5		42.1	54

* - Above 18GHz, Cable Loss is included with the preamp gain

V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2482MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2482	H	70.7		31.2	3.5			105.4	114
	V	65.3		31.2	3.5			100	114
4964	H	49.2		35.2	5	-34.4		55	74
	V	52		35.2	5	-34.4		57.8	74
7446	H	43.8	AMBIENT	38.3	1.9	-34.6		49.4	74
	V	46.2	AMBIENT	38.3	1.9	-34.6		51.8	74
9928	H	46.3		39.9	2.1	-34.8		53.5	74
	V	50.3		39.9	2.1	-34.8		57.5	74
12410	H	41.8	AMBIENT	41.5	2.5	-33.9	-9.5	42.4	74
	V	40.5	AMBIENT	41.5	2.5	-33.9	-9.5	41.1	74
14892	H	42.9	AMBIENT	44.6	2.8	-33.6	-9.5	47.2	74
	V	43.1	AMBIENT	44.6	2.8	-33.6	-9.5	47.4	74
17374	H	43.2	AMBIENT	44.6	3	-33.3	-9.5	48	74
	V	42.8	AMBIENT	44.6	3	-33.3	-9.5	47.6	74
19856	H	34.3	AMBIENT	40.4	0	-31.3	-9.5	33.9	74
	V	34.1	AMBIENT	40.4	0	-31.3	-9.5	33.7	74
22338	H	39.9	AMBIENT	40.6	0	-29.1	-9.5	41.9	74
	V	41.8	AMBIENT	40.6	0	-29.1	-9.5	43.8	74
24820	H	39.8	AMBIENT	40.6	0	-27.9	-9.5	43	74
	V	39.8	AMBIENT	40.6	0	-27.9	-9.5	43	74

* - Above 18GHz, Cable Loss is included with the preamp gain

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RRRF-01
SERIAL NO. : None Assigned
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2482MHz
TEST DATE : May 16 through 19, 2005
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Antenna Factor dB	Cable Loss* dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2482	H	70.7		31.2	3.5			-40	65.4	94
	V	65.3		31.2	3.5			-40	60	94
4964	H	49.2		35.2	5	-34.4		-40	15	54
	V	52		35.2	5	-34.4		-40	17.8	54
7446	H	43.8	AMBIENT	38.3	1.9	-34.6			49.4	54
	V	46.2	AMBIENT	38.3	1.9	-34.6			51.8	54
9928	H	46.3		39.9	2.1	-34.8		-40	13.5	54
	V	50.3		39.9	2.1	-34.8		-40	17.5	54
12410	H	41.8	AMBIENT	41.5	2.5	-33.9	-9.5		42.4	54
	V	40.5	AMBIENT	41.5	2.5	-33.9	-9.5		41.1	54
14892	H	42.9	AMBIENT	44.6	2.8	-33.6	-9.5		47.2	54
	V	43.1	AMBIENT	44.6	2.8	-33.6	-9.5		47.4	54
17374	H	43.2	AMBIENT	44.6	3	-33.3	-9.5		48	54
	V	42.8	AMBIENT	44.6	3	-33.3	-9.5		47.6	54
19856	H	34.3	AMBIENT	40.4	0	-31.3	-9.5		33.9	54
	V	34.1	AMBIENT	40.4	0	-31.3	-9.5		33.7	54
22338	H	39.9	AMBIENT	40.6	0	-29.1	-9.5		41.9	54
	V	41.8	AMBIENT	40.6	0	-29.1	-9.5		43.8	54
24820	H	39.8	AMBIENT	40.6	0	-27.9	-9.5		43	54
	V	39.8	AMBIENT	40.6	0	-27.9	-9.5		43	54

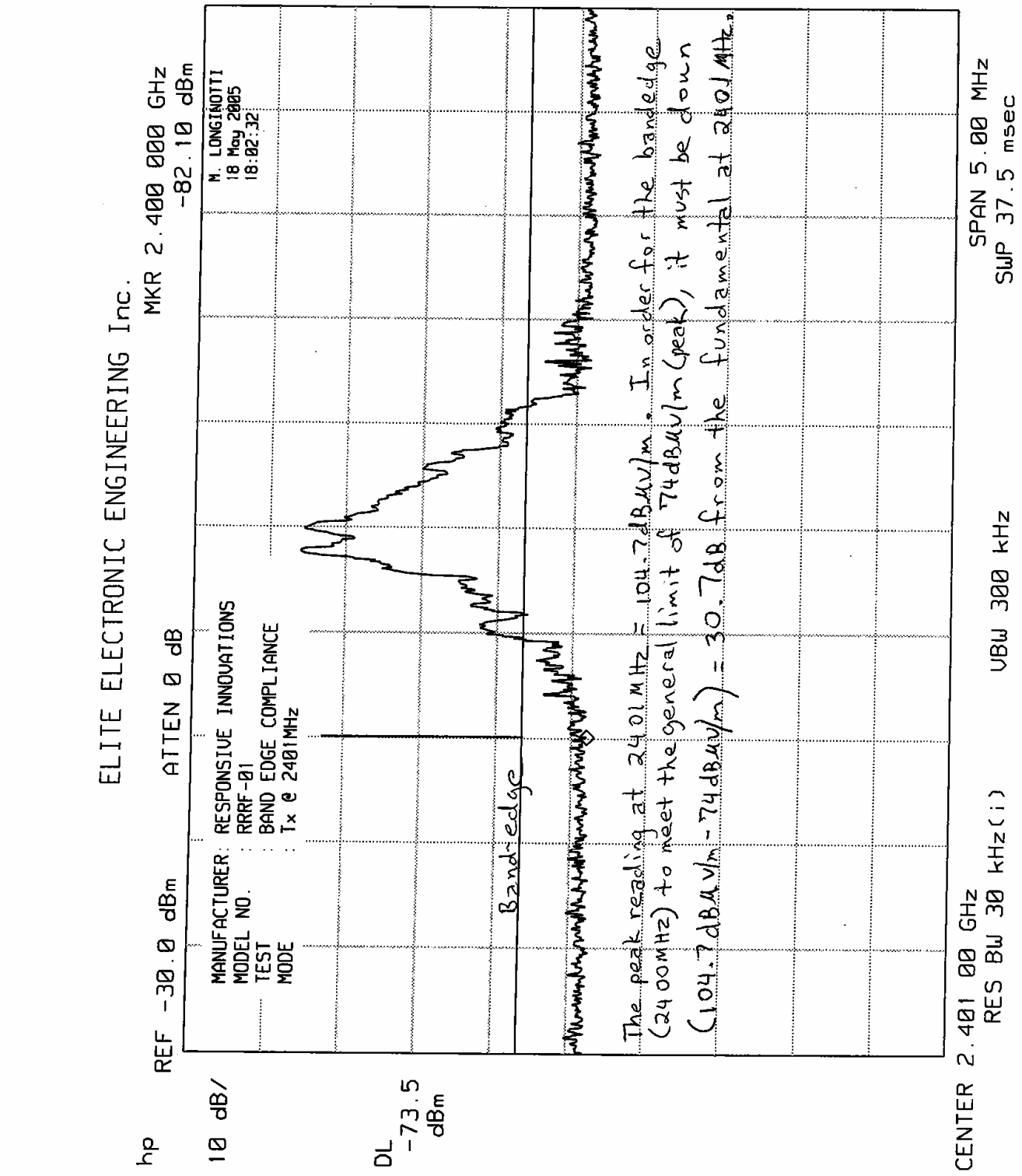
* - Above 18GHz, Cable Loss is included with the preamp gain

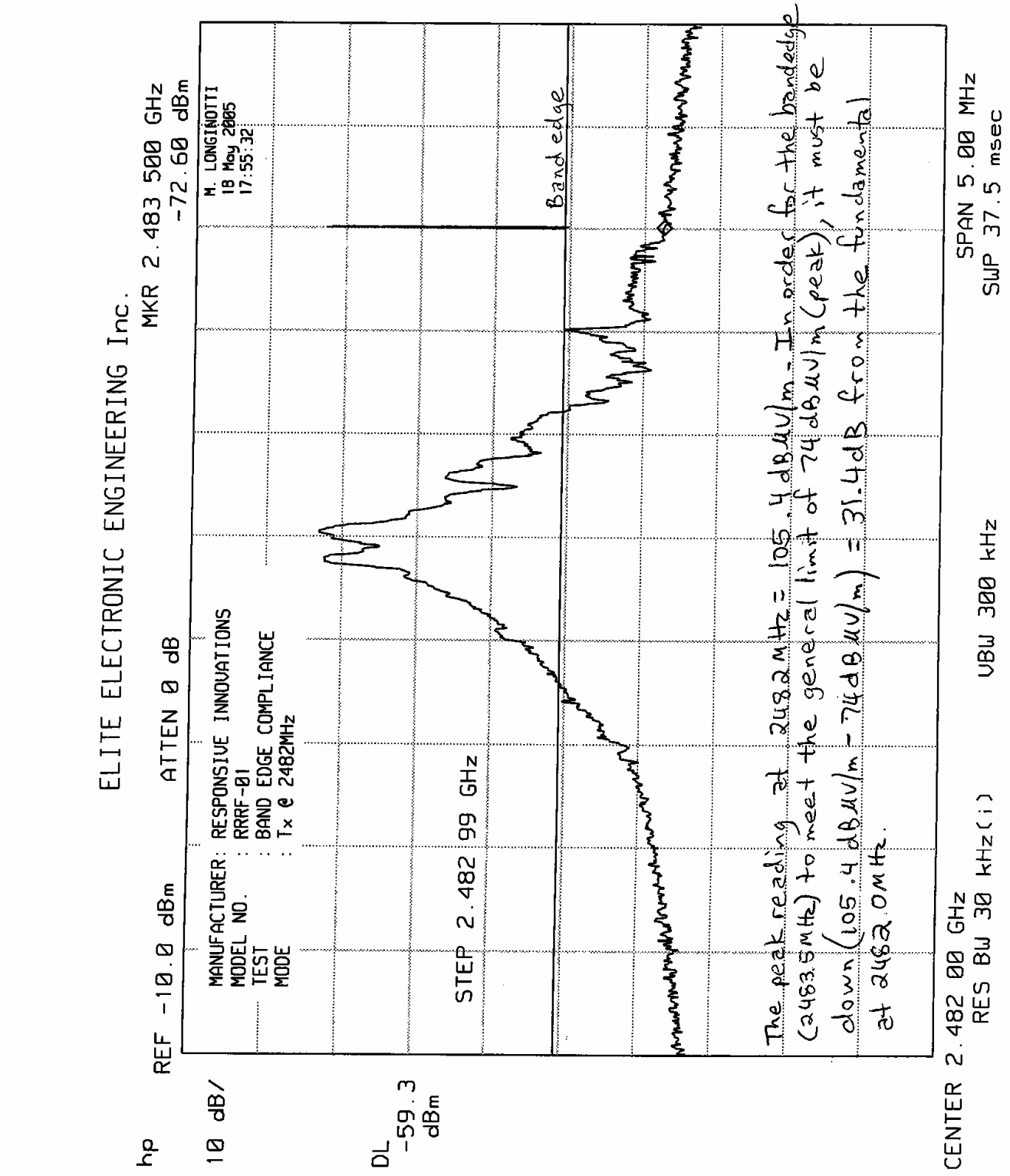
V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
MKR 2.400 000 GHz
-82.10 dBm
M. LONGINOTTI
18 May 2005
18:02:32
hp
REF -30.0 dBm
ATTEN 0 dB
10 dB/
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL NO. : RRRF-01
TEST : BAND EDGE COMPLIANCE
MODE : Tx @ 2401MHz
DL
-73.5
dBm
Bandedge
The peak reading at 2401 MHz = 104.7dBuV/m. In order for the bandedge
(2400MHz) to meet the general limit of 74dBuV/m (peak), it must be down
(104.7 dBuV/m - 74 dBuV/m) = 30.7dB from the fundamental at 2401MHz.
CENTER 2.401 00 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
MKR 2.483 500 GHz
-72.60 dBm
REF -10.0 dBm
ATTEN 0 dB
10 dB/
M. LONGINOTTI
18 May 2005
17:55:32
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL NO. : RRRF-01
TEST : BAND EDGE COMPLIANCE
MODE : Tx @ 2482MHz
Band edge
STEP 2.482 99 GHz
DL
-59.3
dBm
The peak reading at 2482 MHz = 105.4 dBμV/m. In order for the bandedge (2483.5 MHz) to meet the general limit of 74 dBμV/m (peak), it must be down (105.4 dBμV/m - 74 dBμV/m) = 31.4dB from the fundamental at 2462.0 MHz.
CENTER 2.482 00 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec