

SUPPLEMENTARY TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test Of: Red-M (Communications) Ltd.
3000AS Wireless Internet Server
with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000
(Intentional Radiators)
Section 15.247

Supplementary Test Report Serial No.:
RFI/MPTB1/SUP42465A

This Supplementary Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director: 	Checked By: 
Tested By:  PP	Release Version No: PDF01
Issue Date: 06 July 2001	

This supplementary report is issued as an addendum to RFI Test Report Serial No: RFI/MPTB1/RP42177B. It has been issued to identify possible spurious emissions in the restricted frequency band closest to the operating frequency band. It shows compliance to FCC Part 15.209 Radiated emission limits and the general requirements for FCC Part 15.205 Restricted bands of operation.

This supplementary report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the supplementary report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields. Furthermore, the date of creation must match the issue date stated above. This supplementary report may be copied in full.

RADIO FREQUENCY INVESTIGATION LTD.

Conformance Testing Department

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

SUPPLEMENTARY TEST REPORT

S.No: RFI/MPTB1/SUP42465A

Page 2 of 16

Issue Date: 06 July 2001

This page has been left intentionally blank.

Test Of: **Red-M (Communications) Ltd.**
 3000AS Wireless Internet Server
 with Access Server External Aerial (3000-501)

To: **F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247**

CONTENTS

1. Client Information4

2. Equipment Under Test (EUT).....5

3. Test Results.....8

Appendix 1. Graphical Test Results15

1. Client Information

Company Name:	Red-M (Communications) Ltd.
Address:	Wexham Springs Framewood Road Wexham Slough SL3 6PJ.
Contact Name:	Mark Bailey.

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification Of Equipment Under Test (EUT)

Brand Name:	Red-M
Model Name or Number:	3000AS
Unique Type Identification:	None given
Serial Number:	00028110400A0
Country of Manufacture:	UK
FCC ID Number:	Pending
Date of Receipt:	11 May 2001

Brand Name:	Red-M
Model Name or Number:	Access Server External Aerial (3000-501)
Unique Type Identification:	Not applicable
Serial Number:	1
Country of Manufacture:	UK
FCC ID Number:	Pending
Date of Receipt:	11 May 2001

2.2. Description Of EUT

The 3000AS is a Bluetooth Access Server. It provides connectivity between Bluetooth devices, LAN and WAN. The product has an in-built Bluetooth antenna and the option for the connection of an external antenna.

2.3. Modifications Incorporated In EUT

The EUT has not been modified from what is described by the Model Name and Unique Type Identification stated above.

Test Of: Red-M (Communications) Ltd.**3000AS Wireless Internet Server****with Access Server External Aerial (3000-501)****To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247**

2.4. Additional Information Related To Testing

Power Supply Requirement:	115 V, 60 Hz AC Mains supply
Intended Operating Environment:	Commercial, Light Industry
Weight:	3.8 kg
Dimensions:	245 x 145 x 334
Interface Ports:	RS232 (x2) 10/100 Fast Ethernet (x3) AC Mains Input ISDN BRI S-i/f External Antenna

Test Of: Red-M (Communications) Ltd.**3000AS Wireless Internet Server****with Access Server External Aerial (3000-501)****To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247**

2.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	10/100 Switch
Brand Name:	3COM
Model Name or Number:	3 Com Office Connect Dual Speed Hub 8
Serial Number:	0101/7P1F67471
FCC ID Number:	None stated
Cable Length And Type:	3m, 10/100 Type
Connected to Port:	10/100

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3. Test Results

3.1. Radiated Emissions: Top Channel – Internal Antenna

3.1.1. Electric Field Strength Measurements (above 1 GHz)

3.1.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.1.1.2. Plots of the initial scans can be found in Appendix 1.

3.1.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB _{mV/m})	Average Limit (dB _{mV/m})	Average Margin (dB)	Result
2.4835	Vert.	18.83	24.0	1.2	44.03	64.0	19.97	Complied
2.4958	Vert.	14.92	24.0	1.2	40.12	64.0	23.88	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB _{mV/m})	Peak Limit (dB _{mV/m})	Peak Margin (dB)	Result
2.4835	Vert.	31.62	24.0	1.2	56.82	84.0	27.18	Complied
2.4958	Vert.	30.49	24.0	1.2	55.69	84.0	28.31	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.2. Radiated Emissions: Top Channel – External Antenna**3.2.1. Electric Field Strength Measurements (above 1 GHz)**

3.2.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.2.1.2. Plots of the initial scans can be found in Appendix 1.

3.2.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/m)	Average Margin (dB)	Result
2.4835	Vert.	19.85	24.0	1.2	45.05	64.0	18.95	Complied
2.4958	Vert.	15.96	24.0	1.2	41.16	64.0	22.84	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4835	Vert.	33.25	24.0	1.2	58.45	84.0	25.55	Complied
2.4958	Vert.	32.77	24.0	1.2	57.97	84.0	26.03	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.3. Radiated Emissions: Middle Channel – Internal Antenna**3.3.1. Electric Field Strength Measurements (above 1 GHz)**

3.3.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.3.1.2. Plots of the initial scans can be found in Appendix 1.

3.3.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB _{mV/m})	Average Limit (dB _{mV/m})	Average Margin (dB)	Result
2.4889	Vert.	16.45	24.0	1.2	41.65	64.0	22.35	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB _{mV/m})	Peak Limit (dB _{mV/m})	Peak Margin (dB)	Result
2.4889	Vert.	28.17	24.0	1.2	53.37	84.0	30.63	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.4. Radiated Emissions: Middle Channel – External Antenna**3.4.1. Electric Field Strength Measurements (above 1 GHz)**

3.4.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.4.1.2. Plots of the initial scans can be found in Appendix 1.

3.4.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB _m V)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB _m V/m)	Average Limit (dB _m V/m)	Average Margin (dB)	Result
2.4889	Vert.	18.01	24.0	1.2	43.27	64.0	20.73	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB _m V)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB _m V/m)	Peak Limit (dB _m V/m)	Peak Margin (dB)	Result
2.4889	Vert.	29.05	24.0	1.2	54.25	84.0	29.75	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.5. Radiated Emissions: Middle Channel – External Antenna**3.5.1. Electric Field Strength Measurements (above 1 GHz)**

3.5.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.5.1.2. Plots of the initial scans can be found in Appendix 1.

3.5.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB _{mV/m})	Average Limit (dB _{mV/m})	Average Margin (dB)	Result
2.4889	Vert.	16.45	24.0	1.2	41.65	64.0	22.35	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB _{mV/m})	Peak Limit (dB _{mV/m})	Peak Margin (dB)	Result
2.4889	Vert.	28.17	24.0	1.2	53.37	84.0	30.63	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.6. Radiated Emissions: Bottom Channel – Internal Antenna**3.6.1. Electric Field Strength Measurements (above 1 GHz)**

3.6.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.6.1.2. Plots of the initial scans can be found in Appendix 1.

3.6.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/m)	Average Margin (dB)	Result
2.4979	Vert.	19.74	24.0	1.2	44.94	64.0	19.06	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4979	Vert.	30.12	24.0	1.2	55.32	84.0	28.68	Complied

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

3.7. Radiated Emissions: Bottom Channel – External Antenna**3.7.1. Electric Field Strength Measurements (above 1 GHz)**

3.7.1.1. The client has stated that the highest clock frequency for the EUT was 2.480 GHz. Therefore tests were performed up to 26 GHz.

3.7.1.2. Plots of the initial scans can be found in Appendix 1.

3.7.1.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions at a distance of 1 metre:

Highest Average Level:

Frequency (GHz)	Antenna Polarity (H/V)	Average Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dB _{mV/m})	Average Limit (dB _{mV/m})	Average Margin (dB)	Result
2.4979	Vert.	19.21	24.0	1.2	44.41	64.0	19.59	Complied

Highest Peak Level:

Frequency (GHz)	Antenna Polarity (H/V)	Peak Detector level (dB _{mV})	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dB _{mV/m})	Peak Limit (dB _{mV/m})	Peak Margin (dB)	Result
2.4979	Vert.	29.21	24.0	1.2	54.41	84.0	29.59	Complied

**Test Of: Red-M (Communications) Ltd.
3000AS Wireless Internet Server
with Access Server External Aerial (3000-501)**

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

Appendix 1. Graphical Test Results

This appendix contains the following graphs:

Graph Reference Number	Title
GPH/42465/01/01/001	Spurious Radiated Emissions, Bottom Channel (2.48 GHz to 2.503 GHz), Internal Antenna, FCC Part 15.209
GPH/42465/01/01/002	Spurious Radiated Emissions, Middle Channel (2.48 GHz to 2.503 GHz), Internal Antenna, FCC Part 15.209
GPH/42465/01/01/003	Spurious Radiated Emissions, Top Channel (2.48 GHz to 2.503 GHz), Internal Antenna, FCC Part 15.209
GPH/42465/01/01/004	Spurious Radiated Emissions, Top Channel (2.48 GHz to 2.503 GHz), External Antenna, FCC Part 15.209
GPH/42465/01/01/005	Spurious Radiated Emissions, Middle Channel (2.48 GHz to 2.503 GHz), External Antenna, FCC Part 15.209
GPH/42465/01/01/006	Spurious Radiated Emissions, Bottom Channel (2.48 GHz to 2.503 GHz), External Antenna, FCC Part 15.209

These pages are not included in the total number of pages for this supplementary report.

RADIO FREQUENCY INVESTIGATION LTD.

Conformance Testing Department

Test Of: Red-M (Communications) Ltd.

3000AS Wireless Internet Server

with Access Server External Aerial (3000-501)

To: F.C.C. Part 15 Subpart C: 2000 (Intentional Radiators) Section 15.247

SUPPLEMENTARY TEST REPORT

S.No: RFI/MPTB1/SUP42465A

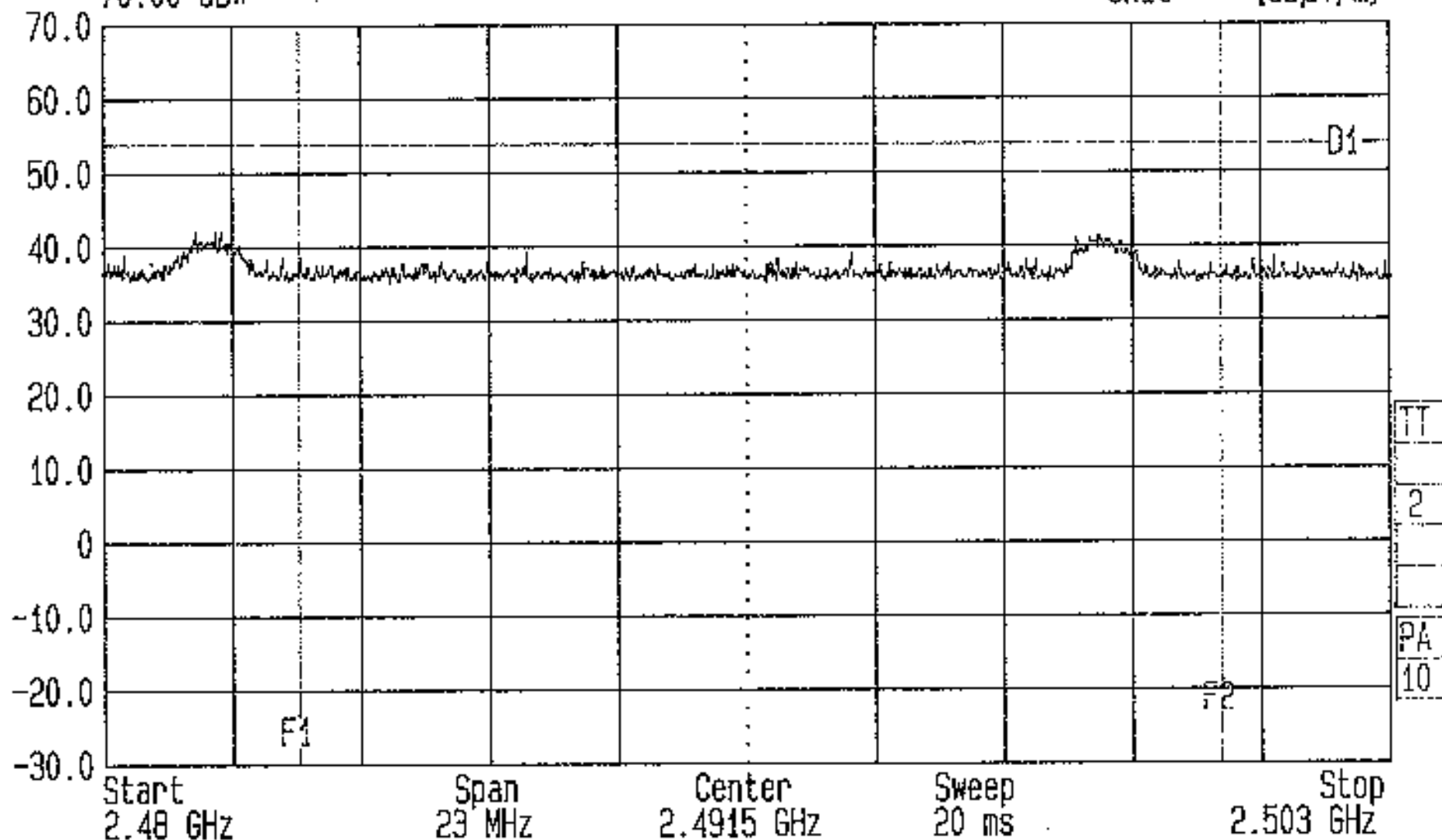
Page 16 of 16

Issue Date: 06 July 2001

This page has been left intentionally blank.

LVLOFF
Date 02.Jul.'01 Time 17:48:08
Ref.Lvl
70.00 dB*

Res.Bw 1 MHz [imp] Vid.Bw 1 MHz
TG.Lvl off
CF.Stp 2.300 MHz RF.Att 0 dB
Unit [dB μ V/m]

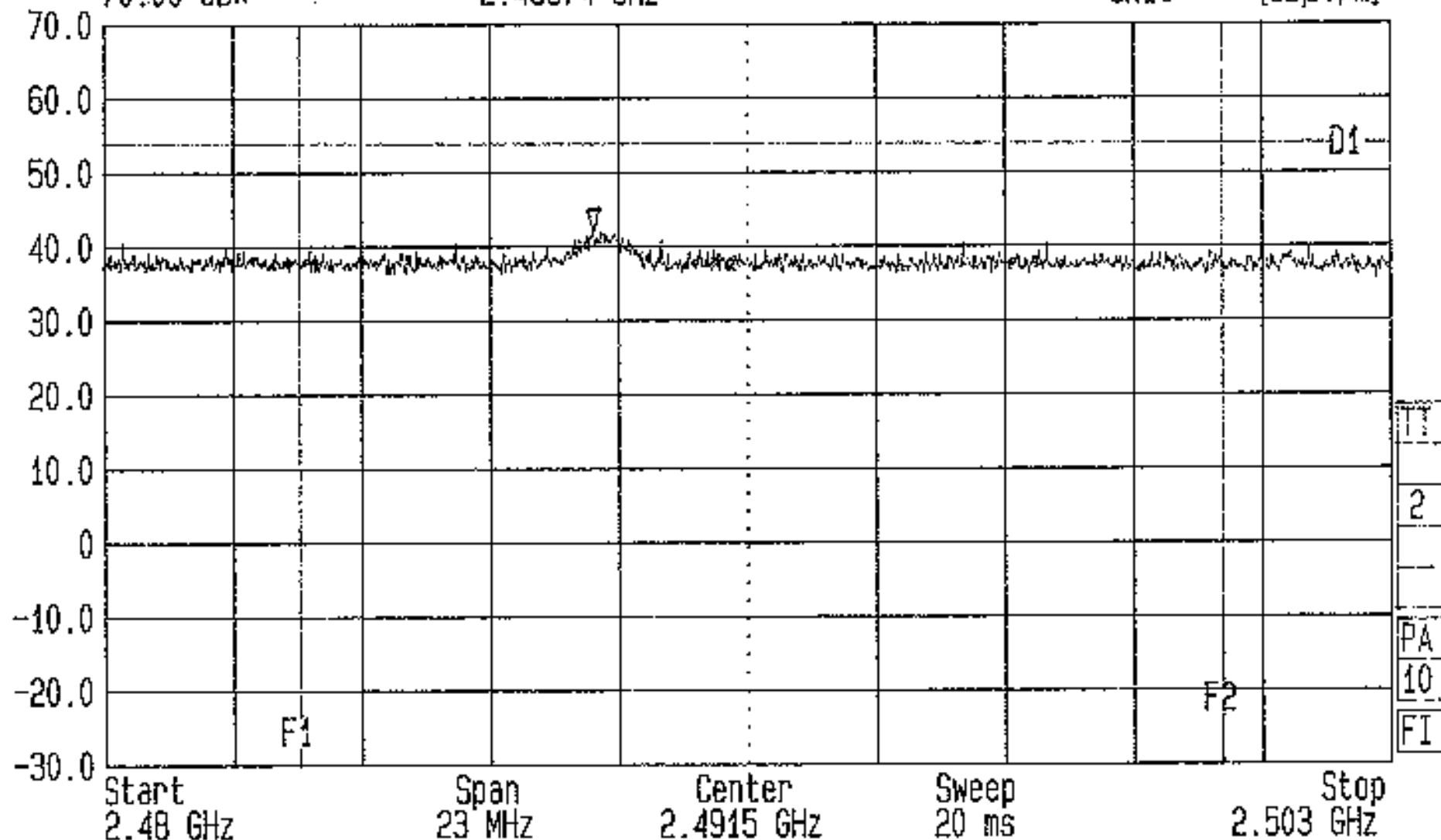


Spurious Radiated Emissions Test For Red-M by RFI Ltd.
FCC Part 15.209 ENG: PG EUT: 3000AS (Internal Antenna)

Op Cond: Bottom Channel
GPH/42465/01/01/001

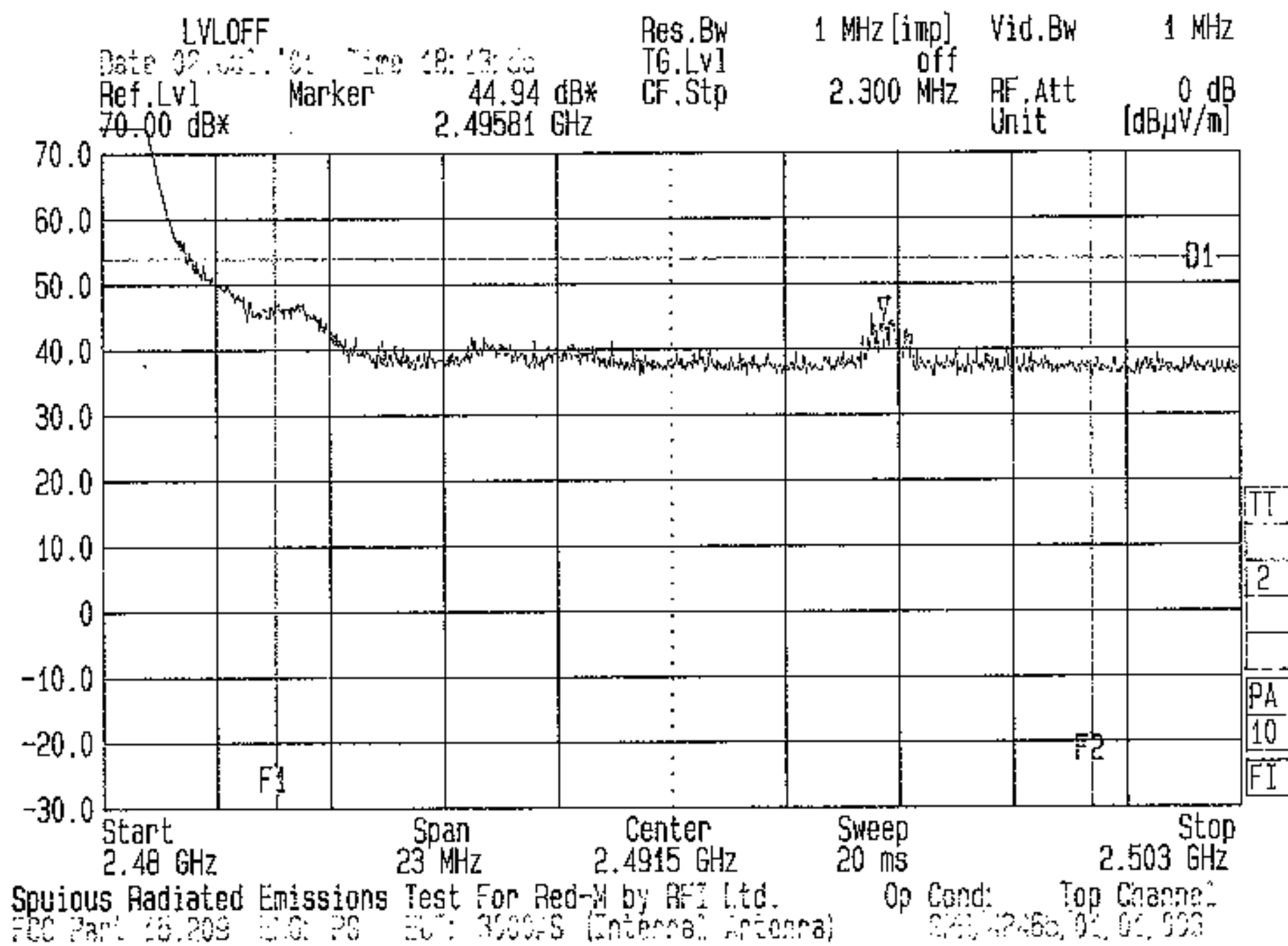
LVLOFF
Date 02.08.01 Time 18:08:00
Ref.Lvl 70.00 dBx
Marker 42.17 dBx
2.48874 GHz

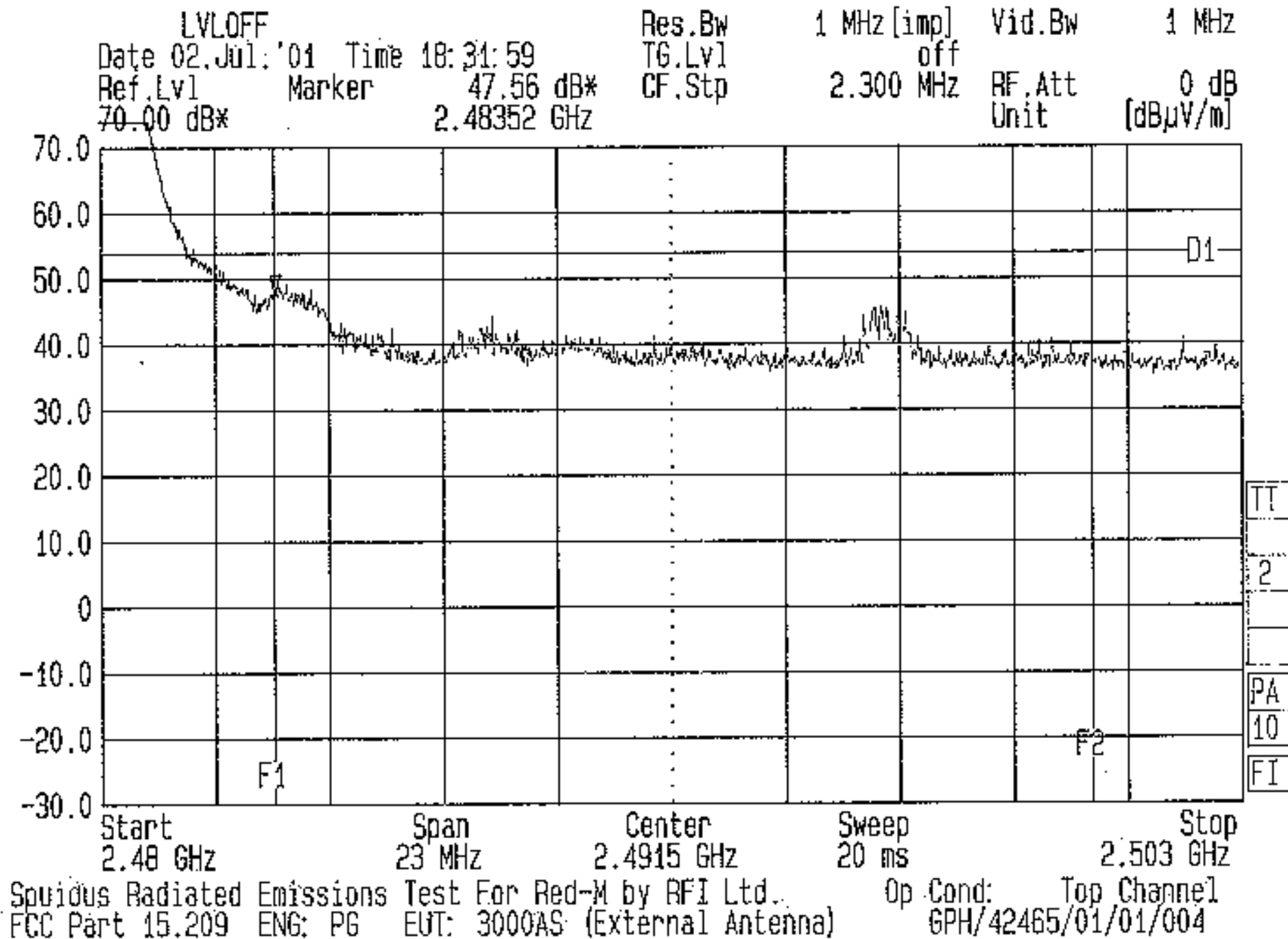
Res.Bw 1 MHz [imp]
TG.Lvl off
CF.Stp 2.300 MHz
Vid.Bw 1 MHz
RF.Att 0 dB
Unit [dBμV/m]



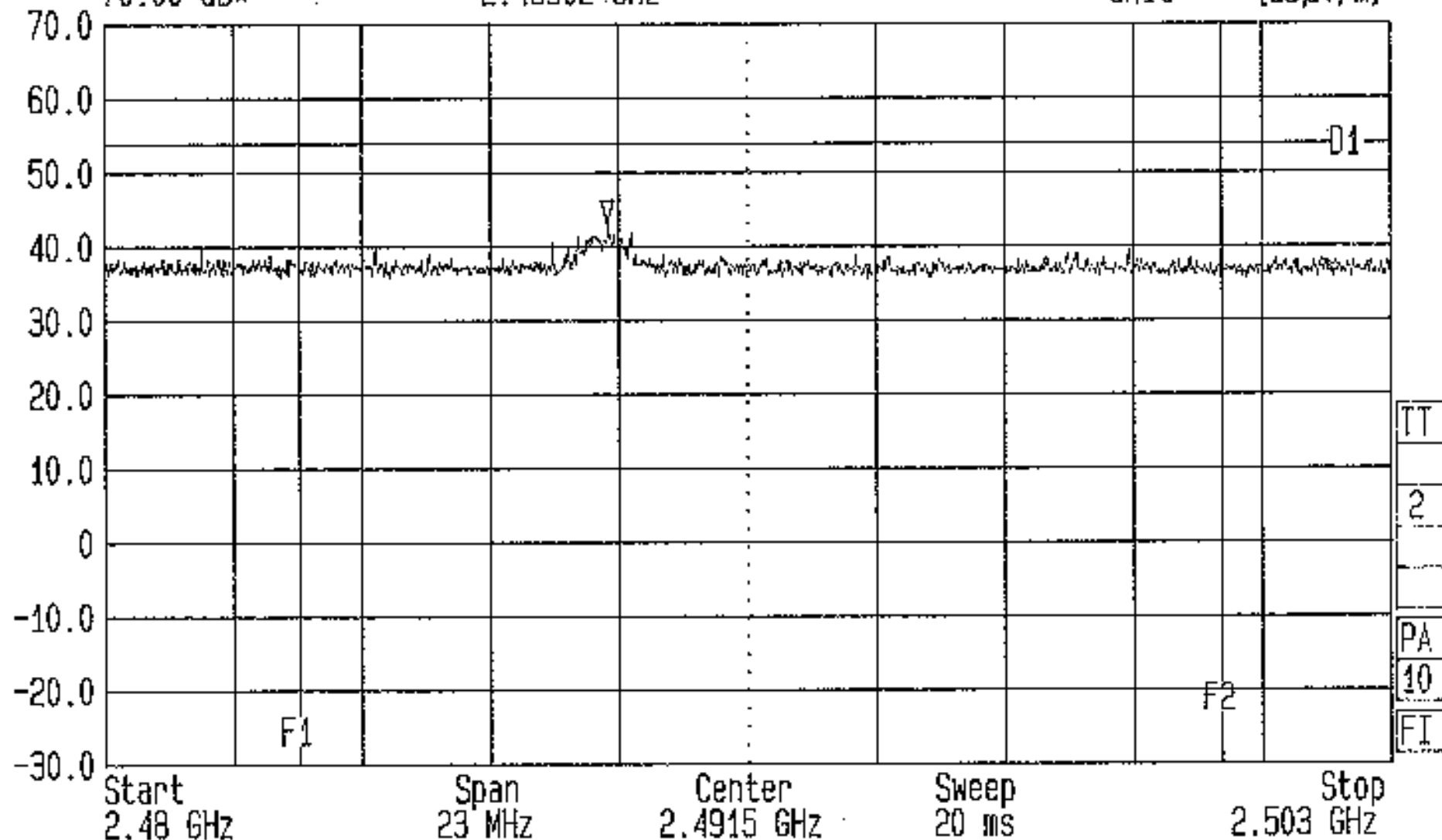
Spurious Radiated Emissions Test For Red-M by RFI Ltd.
FCC Part 15.209 ENG: PG EUT: 3000AS (Internal Antenna)

Op Cond: Middle Channel
GPH/42465/01/01/002





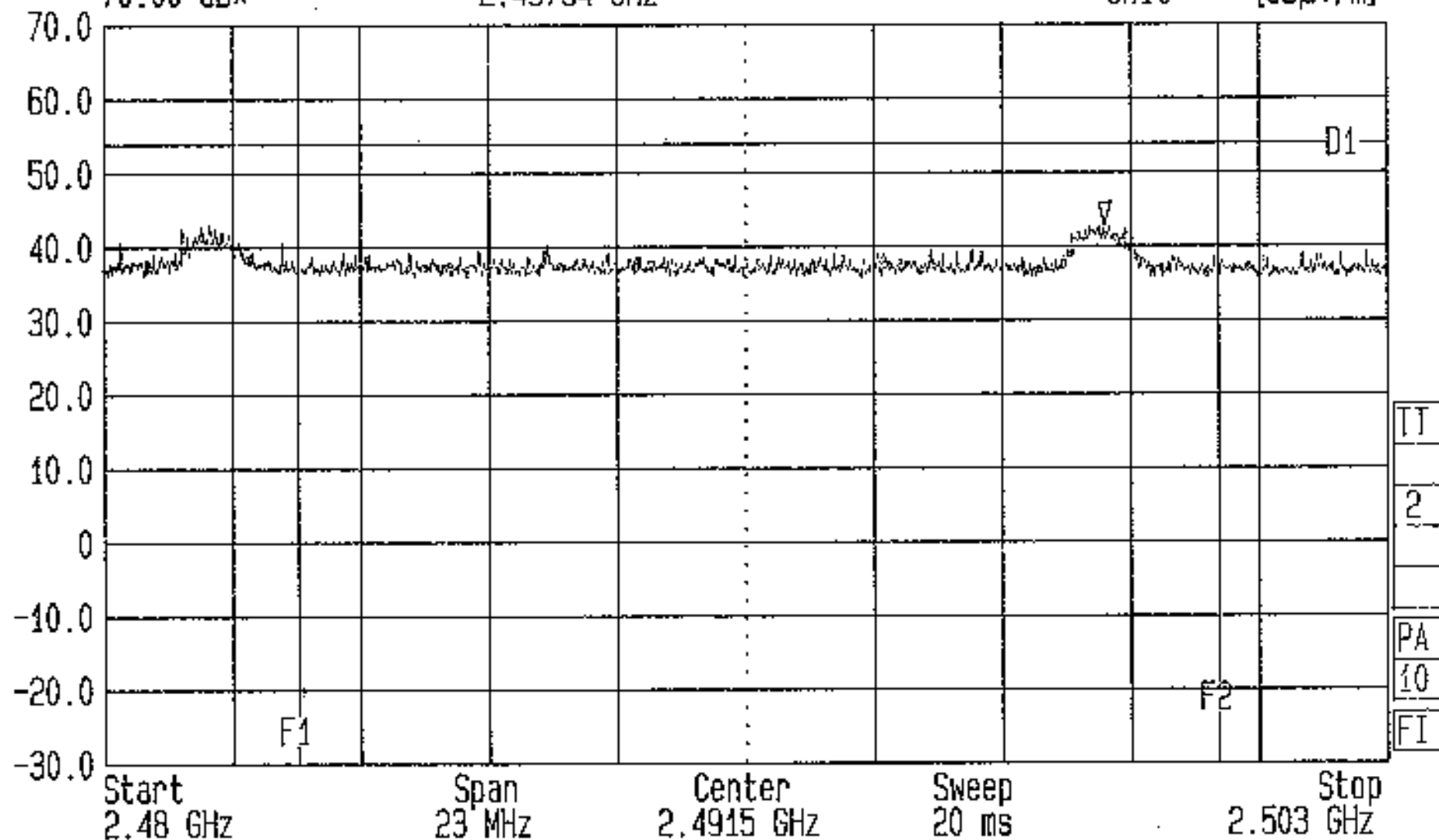
LVLOFF
 Date 02.Jul.'01 Time 18:42:19
 Ref.Lvl 70.00 dB* Marker 43.11 dB*
 Res.Bw 1 MHz [imp] TG.Lvl off
 CF.Stp 2.300 MHz RF.Att 0 dB
 Unit [dBμV/m]



Spurious Radiated Emissions Test For Red-M by RFI Ltd. Op Cond: Middle Channel
 FCC Part 15.209 ENG: PG EUT: 3000AS (External Antenna) GPH/42465/01/01/005

LVLOFF
 Date 02.Jul.'01 Time 18:48:12
 Ref.Lvl 70.00 dBx
 Marker 42.78 dBx
 2.49794 GHz

Res.Bw 1 MHz [imp]
 TG.Lvl off
 CF.Stp 2.300 MHz
 Vid.Bw 1 MHz
 RF.Att 0 dB
 Unit [dBμV/m]



Spurious Radiated Emissions Test For Red-M by RFI Ltd. Op Cond: Bottom Channel
 FCC Part 15.209 ENG: PG EUT: 3000AS (External Antenna) GPH/42465/01/01/006