




# 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

<p><b>This Supplementary Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director:</b></p> <div style="text-align: center; margin-top: 20px;">  </div>	<p><b>Checked By:</b></p> <div style="text-align: center; margin-top: 20px;">  </div>
<p><b>Tested By:</b></p> <div style="text-align: center; margin-top: 20px;">  </div> <p>PP</p>	<p><b>Release Version No:     PDF01</b></p>
<p><b>Issue Date: 06 July 2001</b></p>	

**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.**

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**RADIO FREQUENCY INVESTIGATION LTD.**

**Conformance Testing Department**

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

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**Issue Date: 06 July 2001**

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## **1. Client Information**

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

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## **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.

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**2.4. Additional Information Related To Testing**

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

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**2.5. Support Equipment**

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

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

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### **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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/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



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**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

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### **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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4889	Vert.	28.17	24.0	1.2	53.37	84.0	30.63	Complied

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### **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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4889	Vert.	29.05	24.0	1.2	54.25	84.0	29.75	Complied

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### **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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4889	Vert.	28.17	24.0	1.2	53.37	84.0	30.63	Complied

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**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

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### **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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Average Level (dBmV/m)	Average Limit (dBmV/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 (dBmV)	Antenna factor (dB)	Cable loss (dB)	Actual Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Peak Margin (dB)	Result
2.4979	Vert.	29.21	24.0	1.2	54.41	84.0	29.59	Complied

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## **Appendix 1. Graphical Test Results**

This appendix contains the following graphs:

<b>Graph Reference Number</b>	<b>Title</b>
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.**

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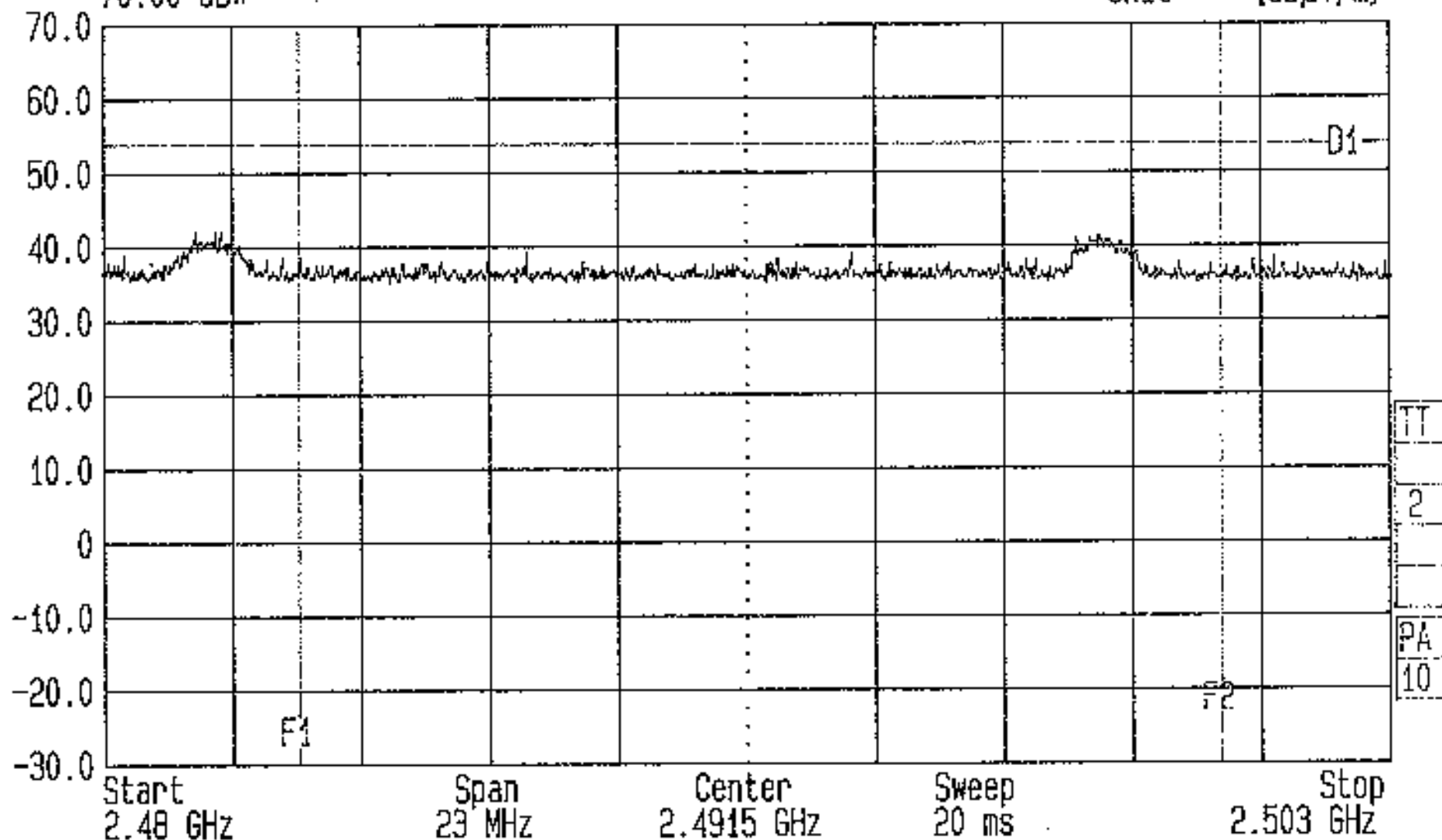
**Issue Date: 06 July 2001**

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

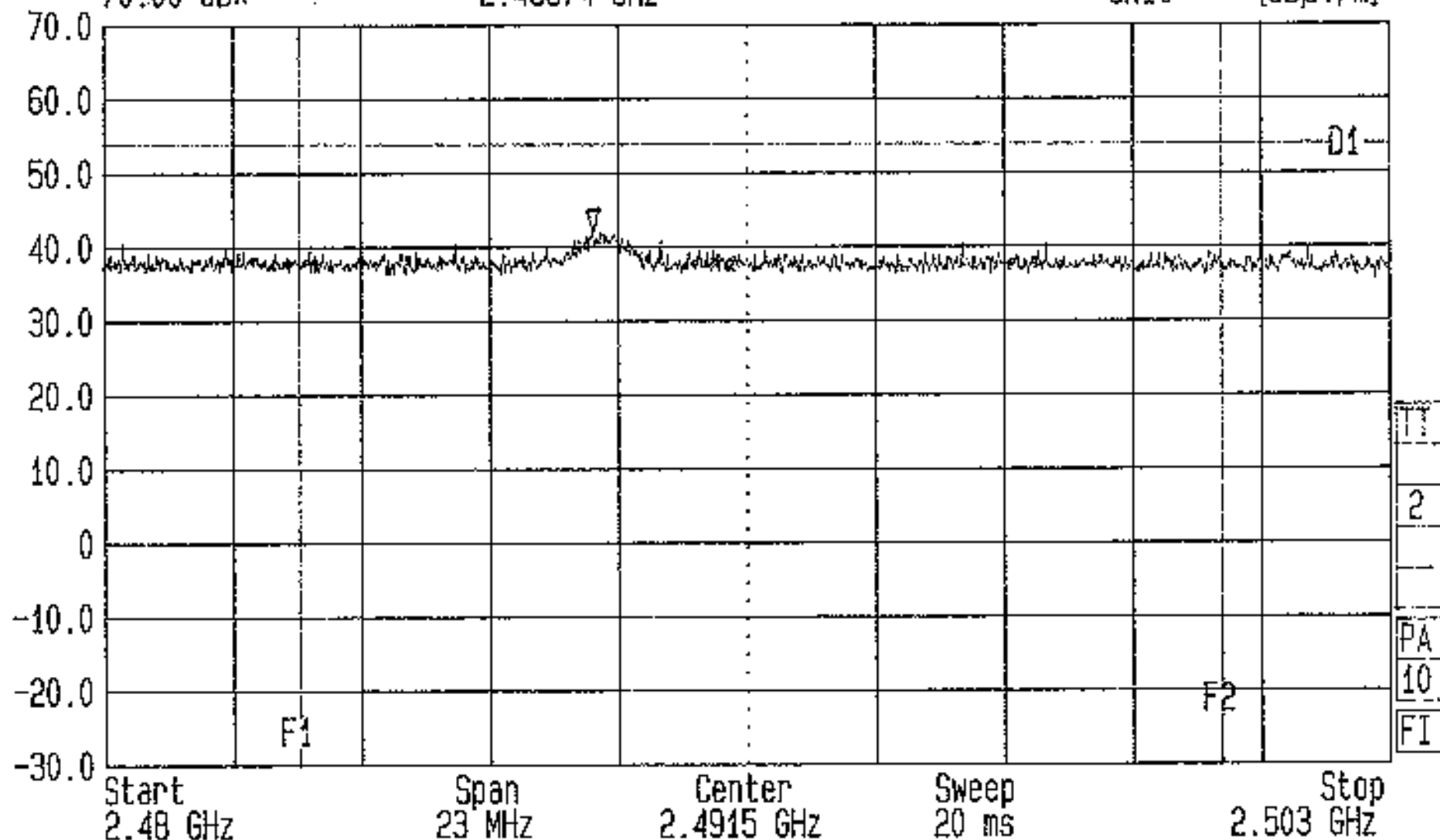
Res.Bw 1 MHz [imp] Vid.Bw 1 MHz  
TG.Lvl off  
CF.Stp 2.300 MHz RF.Att 0 dB  
Unit [dB $\mu$ V/m]



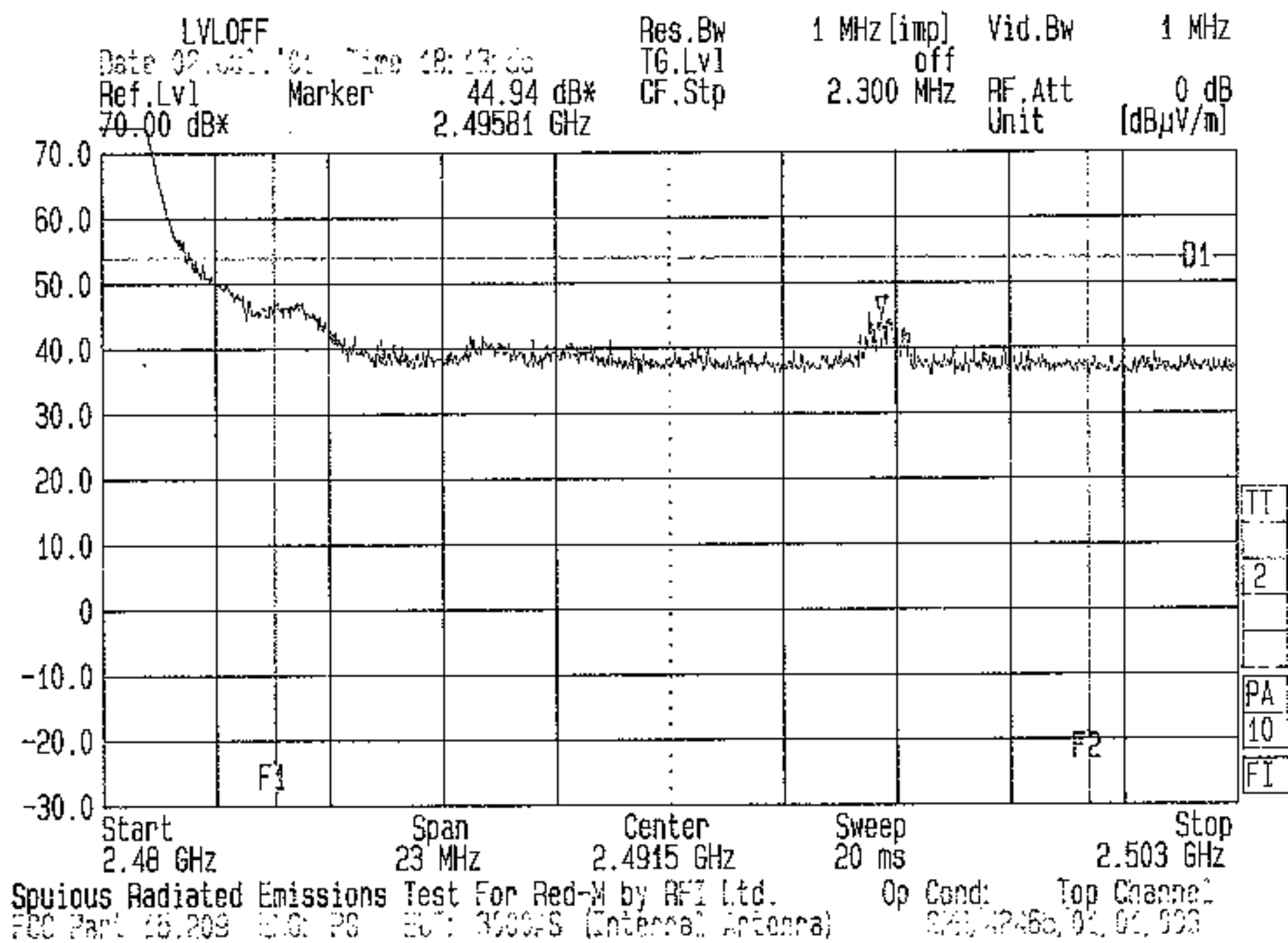
Spurious Radiated Emissions Test For Red-M by RFI Ltd. Op Cond: Bottom Channel  
FCC Part 15.209 ENG: PG EUT: 3000AS (Internal Antenna) GPH/42465/01/01/001

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

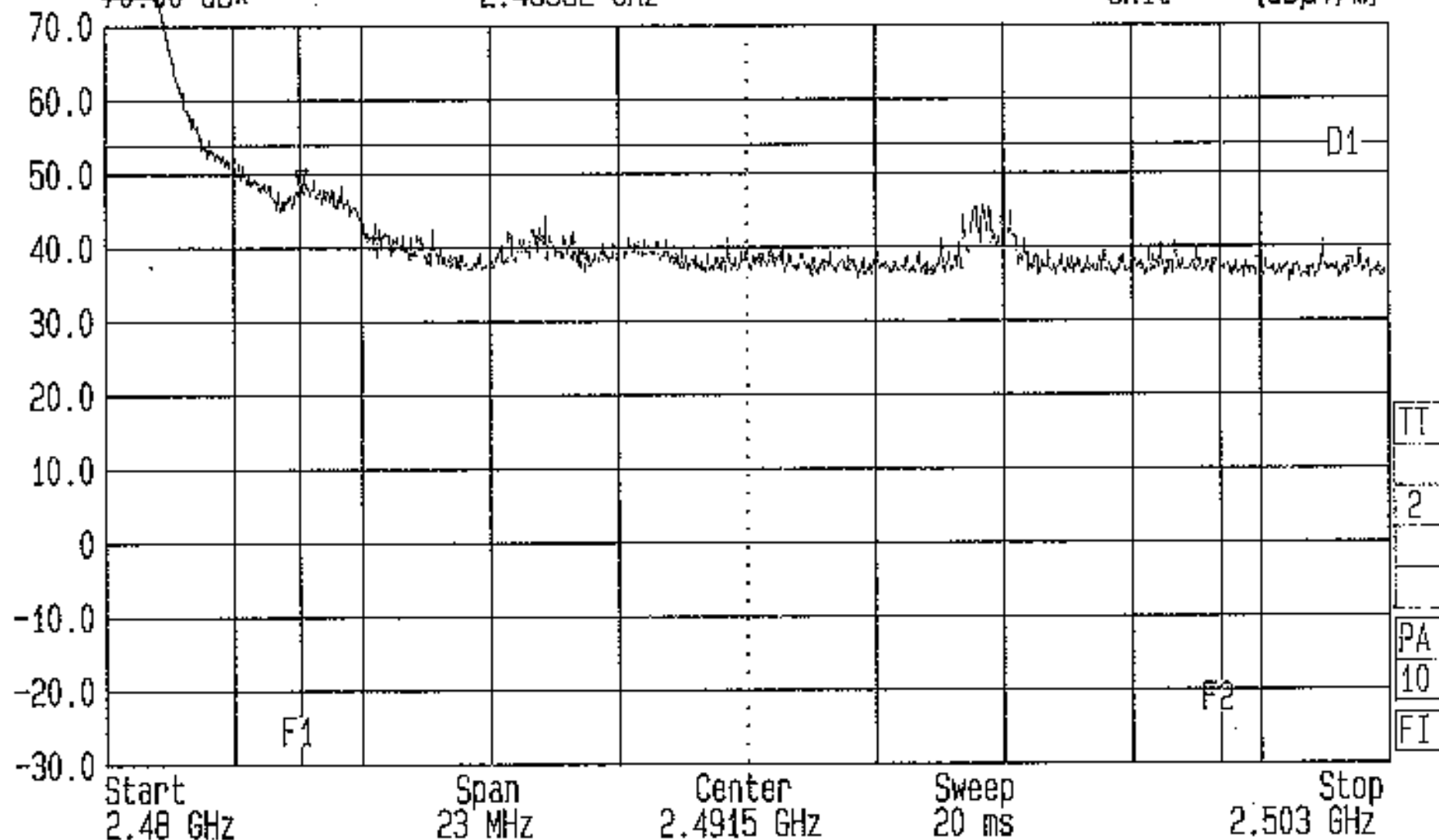
Res.Bw 1 MHz [imp]  
 TG.Lvl off  
 CF.Stp 2.300 MHz  
 Vid.Bw 1 MHz  
 RF.Att 0 dB  
 Unit [dBμV/m]



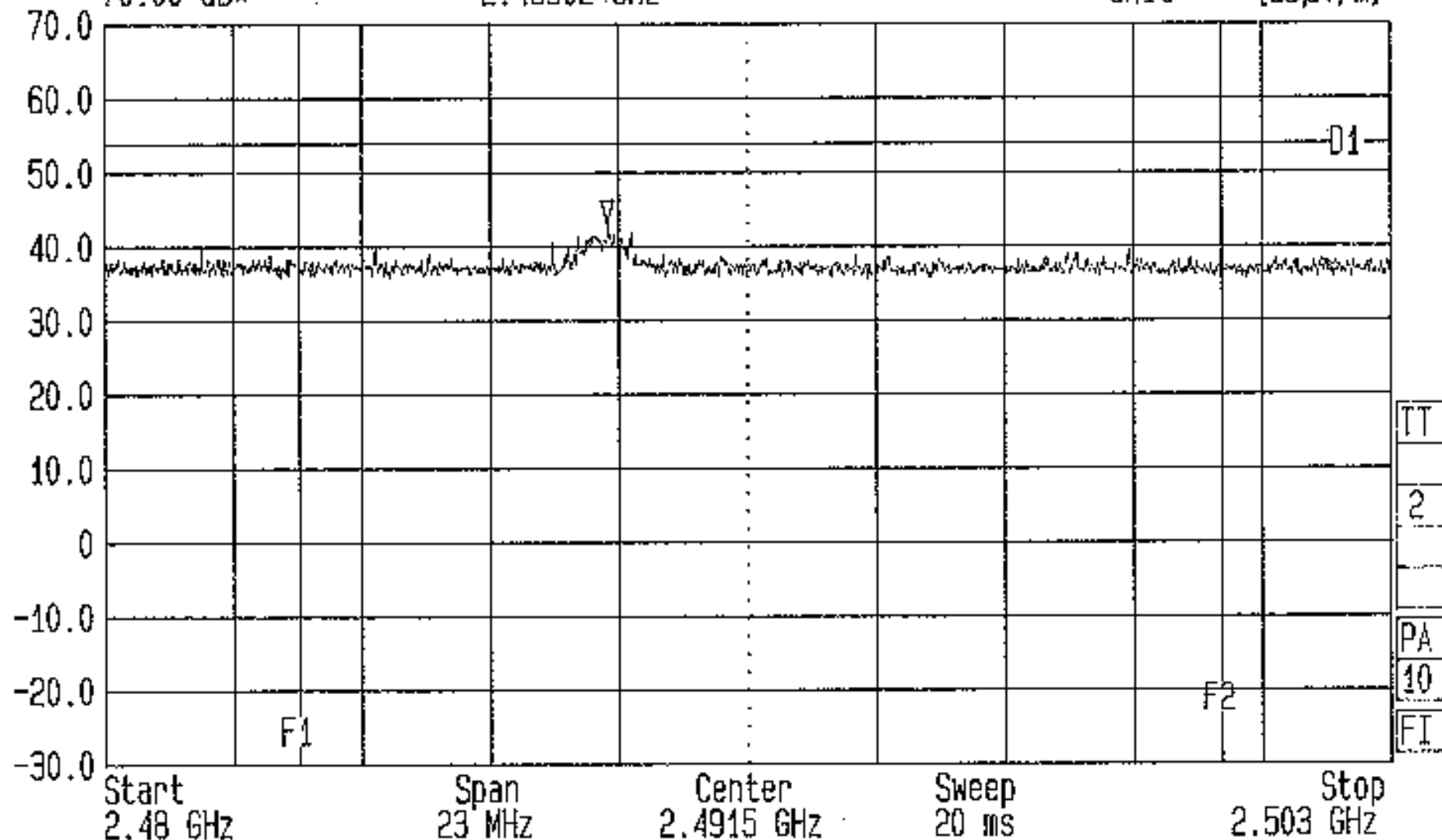
Spurious Radiated Emissions Test For Red-M by RFI Ltd. Op Cond: Middle Channel  
 FCC Part 15.209 ENG: PG EUT: 3000AS (Internal Antenna) GPH/42465/01/01/002



LVLOFF  
 Date 02.Jul.'01 Time 18:31:59  
 Ref.Lvl 70.00 dB\* Marker 47.56 dB\*  
 2.48352 GHz  
 Res.Bw 1 MHz [imp] off  
 TG.Lvl 2.300 MHz  
 CF.Stp  
 Vid.Bw 1 MHz  
 RF.Att 0 dB  
 Unit [dBμV/m]

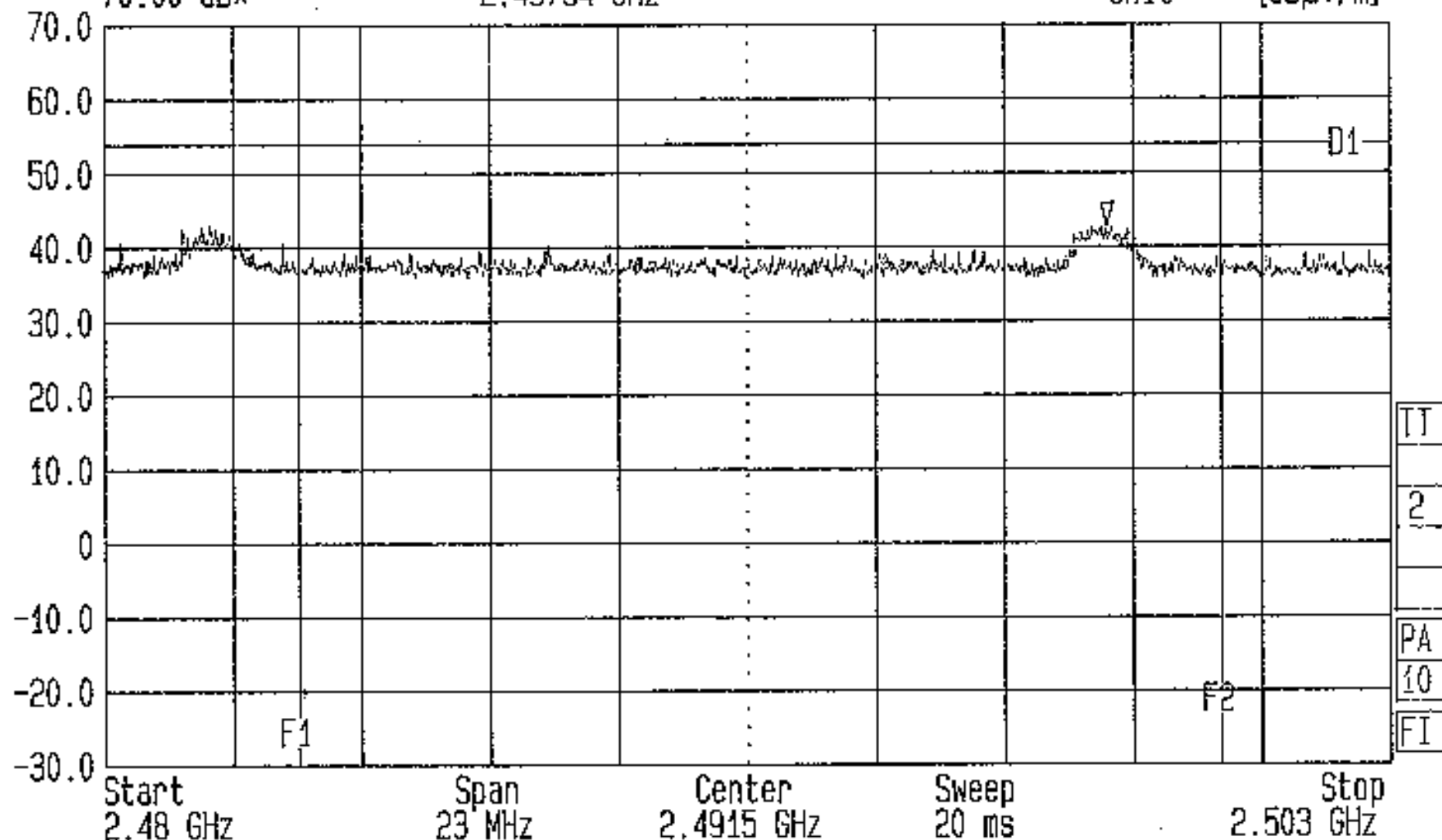


LVLOFF  
 Date 02.Jul.'01 Time 18:42:19  
 Ref.Lvl 70.00 dB\* Marker 43.11 dB\*  
 Res.Bw 1 MHz [imp] TG.Lvl off  
 CF.Stp 2.300 MHz RF.Att 0 dB  
 Unit [dBμV/m]



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.  
 FCC Part 15.209 ENG: PG EUT: 3000AS (External Antenna) Op Cond: Bottom Channel  
 GPH/42465/01/01/006