

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.

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Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, ENGLAND. Tel: +44 (0) 1256 851193 Fax: +44 (0) 1256 851192	Registered in England, No. 211 7901. Registered Office: Ewhurst Park, Ramsdell, Basingstoke, Hampshire RG26 5RQ	 UKAS TESTING 0644
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Conformance Testing Department

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1. Client Information

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

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

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

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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

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.

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S.No: RFI/MPTB1/SUP42465A

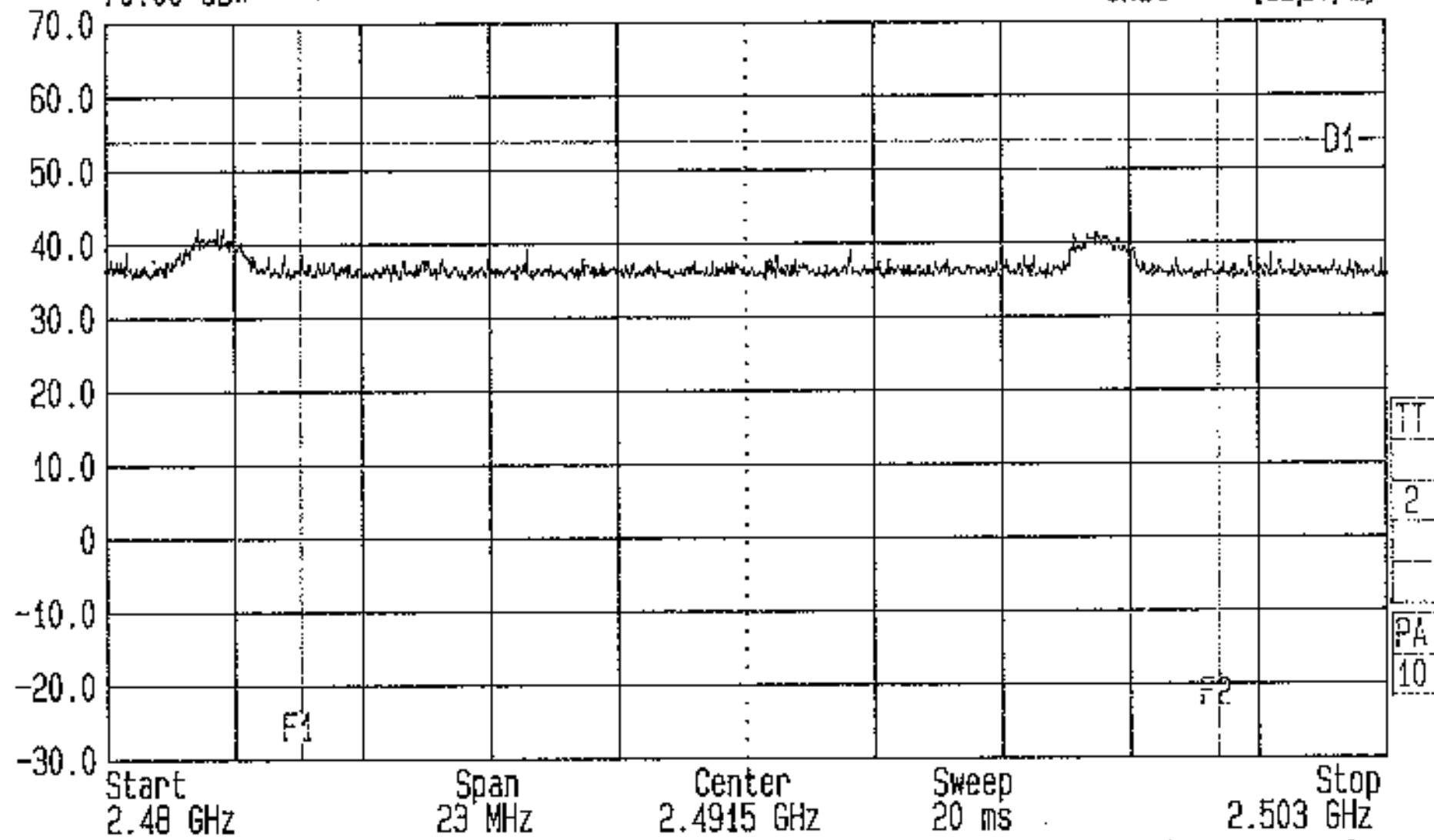
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LVLOFF
Date 02.Jul.'01 Time 17:48:08
Ref.Lvl
70.00 dB*

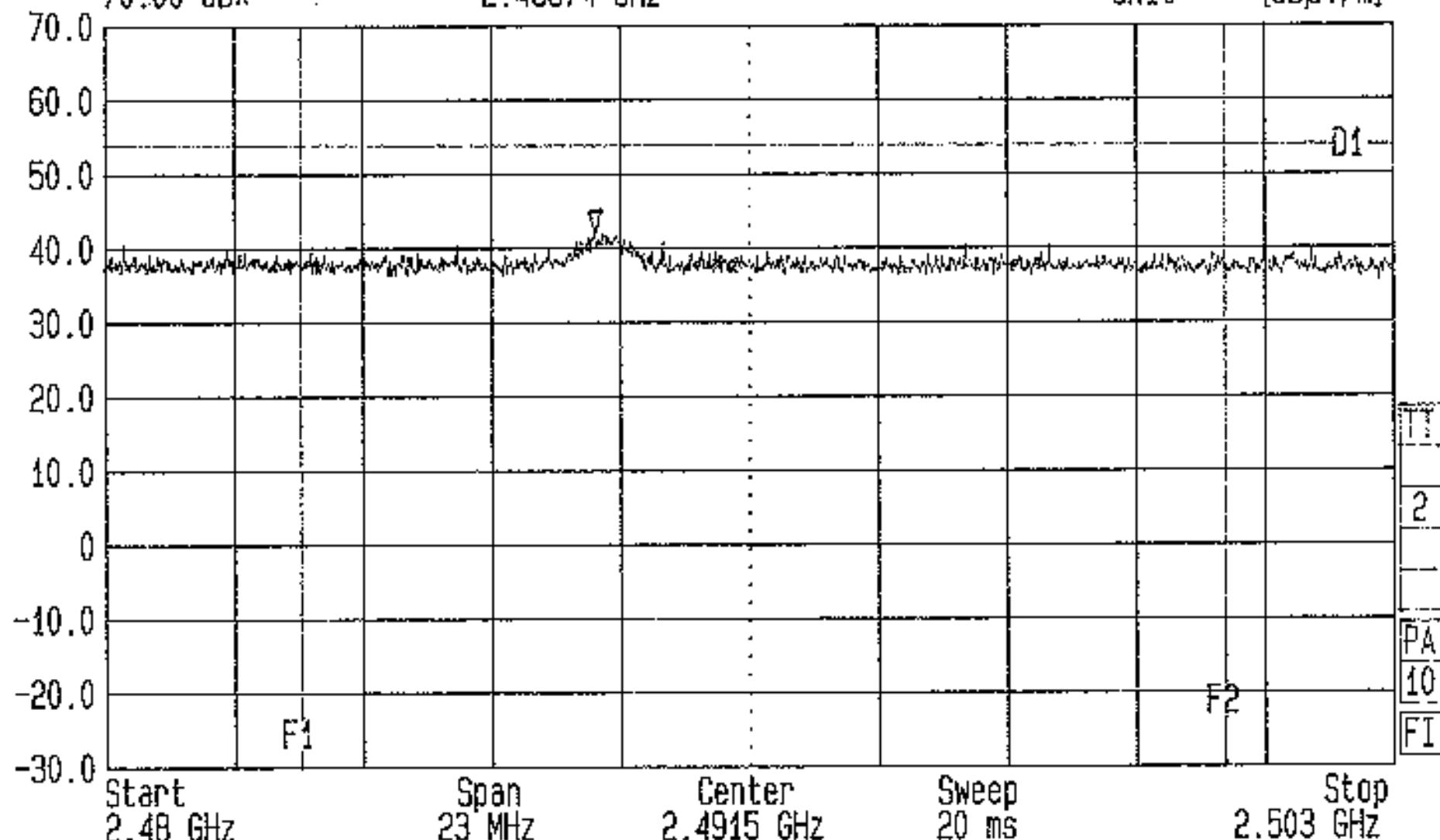
Res.BW
TG.Lvl
CF.Stp
1 MHz [imp] off
2.300 MHz RF.Att
Vid.Bw Unit
1 MHz
0 dB
[dB μ V/m]



Spurious Radiated Emissions Test For Red-X 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.JUL.01 Time 18:06:00
Ref.Lvl Marker 42.17 dB*
70.00 dB* 2.48874 GHz

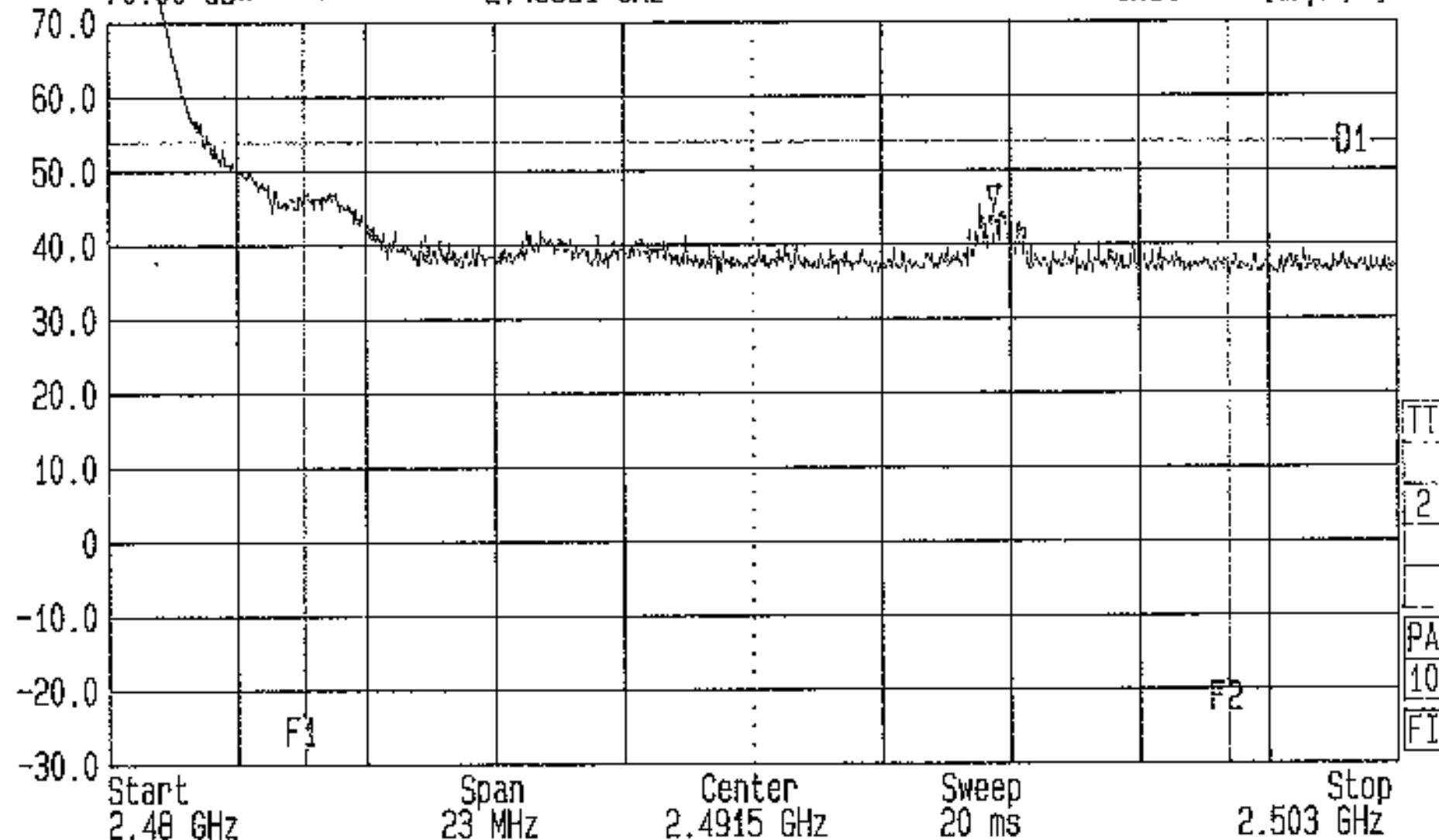
Res.Bw 1 MHz [imp] Vid.Bw 1 MHz
TG.Lvl off RF.Att 0 dB
CF.Slp 2.300 MHz Unit [dB μ V/m]



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

LVLOFF

Date 02.02.11 Ct Time 18:13:38

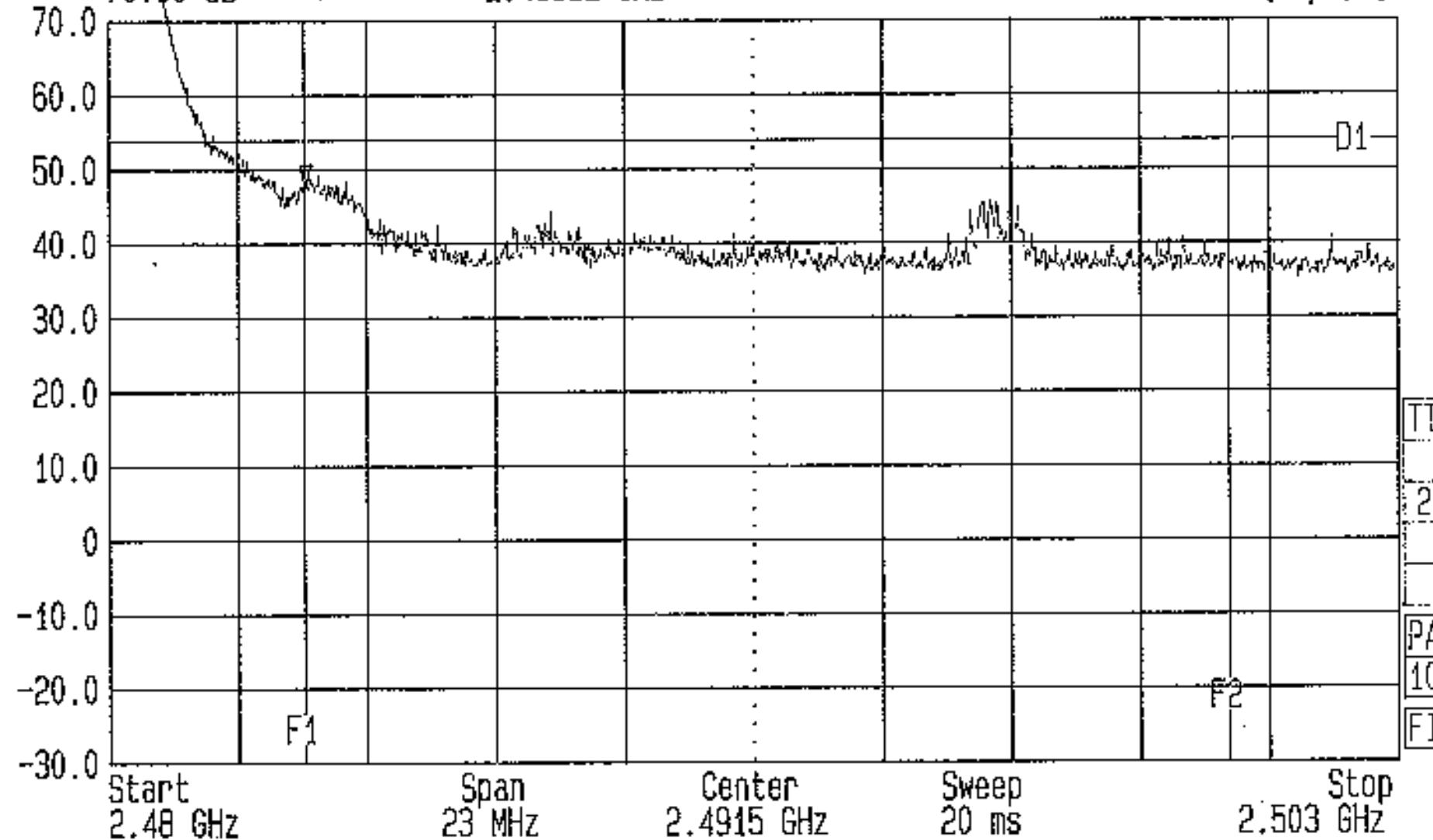
Ref.Lvl Marker 44.94 dB*
70.00 dB* 2.49581 GHzRes.BW
TG.Lvl
CF,Stp1 MHz [imp]
off
2.300 MHzVid.Bw
RF.Att
Unit1 MHz
0 dB
[dB μ V/m]

Spurious Radiated Emissions Test For Red-X by RFI Ltd.
FCC Part 15.209 E.I.C: PS EUT: 3000-S (Internal Antenna)

Op Cond: Top Channel:
2414246c, 01, 01, 003

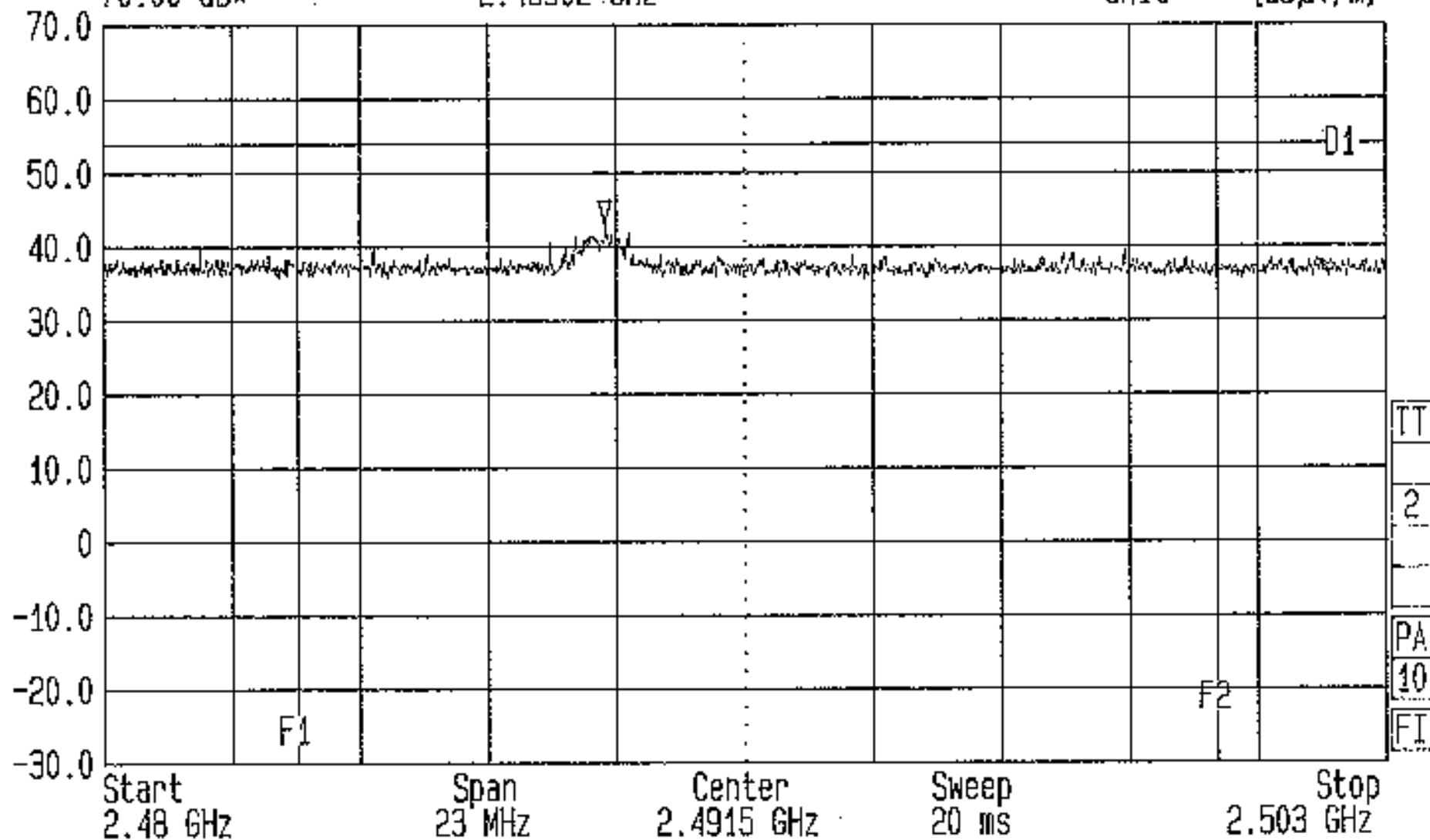
LVLOFF

Date 02.Jul.'01 Time 18:31:59

Ref.Lvl Marker 47.56 dB*
70.00 dB* 2.48352 GHzRes.Bw
TG.Lvl
CF.Stp1 MHz [imp]
off
2.300 MHzVid.Bw
RF.Att
Unit1 MHz
0 dB
[dB μ V/m]Start
2.48 GHzSpan
23 MHzCenter
2.4915 GHzSweep
20 msStop
2.503 GHzSpurious Radiated Emissions Test For Red-M by RFI Ltd.
FCC Part 15.209 ENG: PG EUT: 3000AS (External Antenna)Op Cond: Top Channel
GPH/42465/01/01/004

LVLOFF

Date 02.Jul.'01 Time 18:42:19

Ref.Lvl Marker 43.11 dB*
70.00 dB* 2.48902 GHzRes.Bw
TG.Lvl
CF,Stp1 MHz [imp]
off
2.300 MHzVid.Bw
RF.Att
Unit1 MHz
0 dB
(dB μ V/m)

Spurious Radiated Emissions Test For Red-M by RFI Ltd.

FCC Part 15.209 ENG: PG EUT: 3000AS (External Antenna)

Op Cond: Middle Channel

GPH/42465/01/01/005

LVL0FF

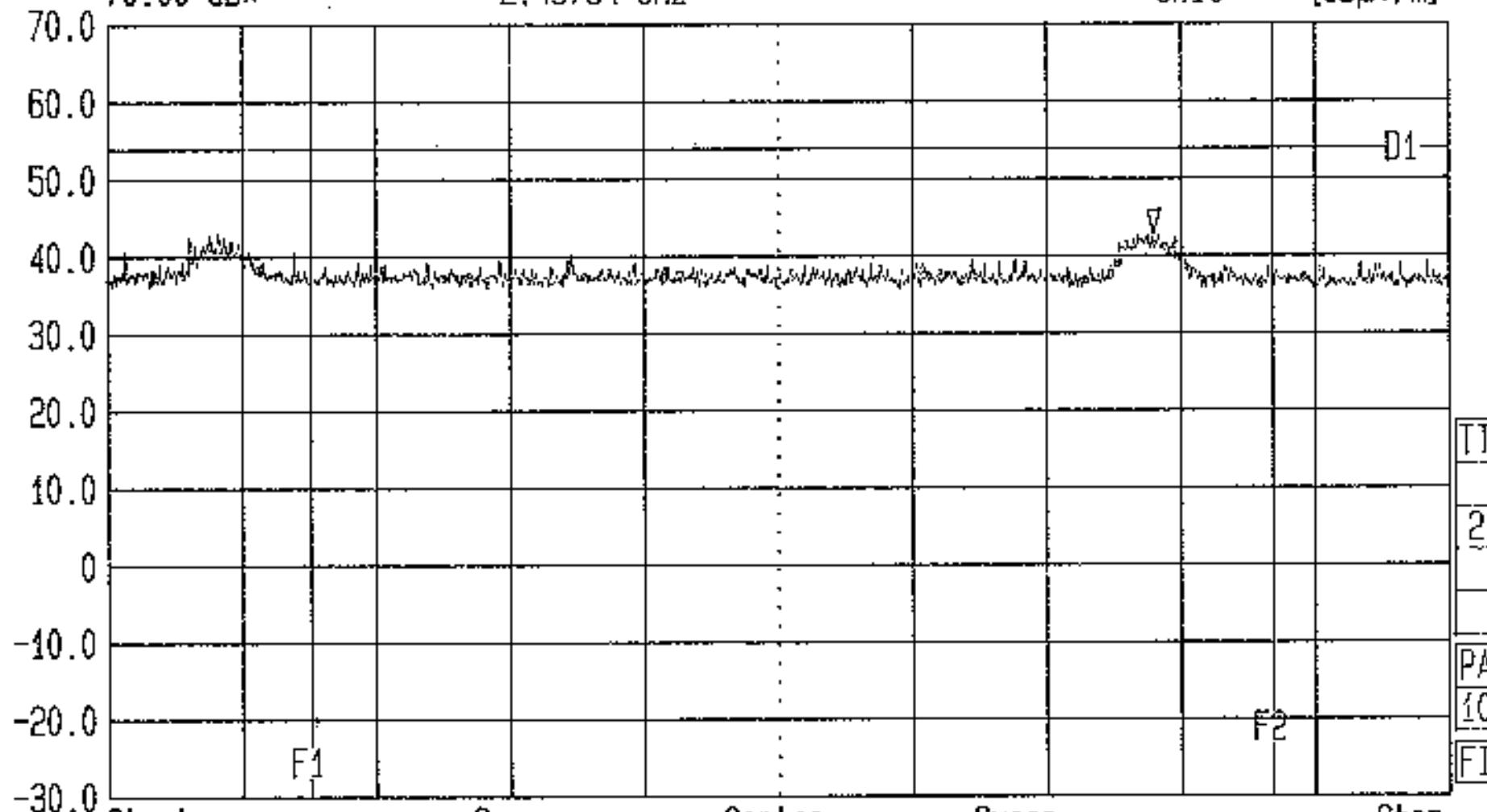
Date 02.Jul.'01 Time 18:48:12

Ref.Lvl Marker 42.78 dB*
70.00 dB* 2.49794 GHz

Res.BW
TG.Lvl
CF.Stp

1 MHz [imp] off
2.300 MHz AF.Att
Unit

1 MHz
0 dB
[dB μ V/m]



Start

2.48 GHz

Span

23 MHz

Center

2.4915 GHz

Sweep

20 ms

Stop

2.503 GHz

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