

	Report No: R1482_1	FCC ID: P26RDSTXUS1	
	Test No: T0548	Test Report	Page: 1 of 17



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REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at:
TWENTY PENCE TEST SITE

Twenty Pence Road,
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on

Thermo Life Sciences Ltd.

RDSTXUS1

dated

12 December 2001

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Equipment Under Test (EUT): RDSTXUS1

Test Commissioned by: Thermo Life Sciences Ltd.
Unit 5, The Ringway Centre,
Edison Road
Basingstoke
Hampshire
RG21 6YH

Representative: Jerry Walker

Test Started: 16 November 2001

Test Completed: 12 December 2001

Test Engineer: Dave Smith

Date of Report: 12 December 2001

Report:

Written by: _ _ _ _ Dave Smith _ _ _ _ . Checked by: _ _ _ _ Derek Barlow _ _ _ _ .

Signature: _ _ _ _ _ . Signature: _ _ _ _ _ .

Date: _ _ _ _ 12 December 2001 _ . Date: _ _ _ _ 12 December 2001 _ .

Test Standards Applied

CFR 47 : 2001 <i>Code of Federal Regulations: Pt 15 Subpart C - Radio Frequency Devices - PASS</i> <i>Intentional Radiators</i>
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Emissions Test Results Summary

CFR 47 : 2001

PASS

Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions	ac power	ANSI C63.4:1992	FCC_C	N/A	#1
Radiated Emissions		ANSI C63.4:1992	FCC_C	PASS	#2

- #1 Test not applicable because EUT was battery powered and had no ac power port.
#2 Tested to limits of section 15.249.

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1 EUT Details

1.1 General

The EUT was a Thermo Life Sciences RDSTXUS1. The device is an electronic temperature probe with a radio transmitter which relays temperature readings back to a receiving station (RDSRXUS1). The radio link operates at a frequency of 914.5MHz and was tested under the requirements of section 15.249 of the CFR 47 rules. The unit is battery powered. The antenna is fixed and not user changeable.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	FCC ID
1	Thermo Life Sciences	RDSTXUS1 with RF module MKT6-914.5	EUT	P13	P26RDSTXUS1
2			PT100 probe		

1.2 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

Mod No:	Details
0	Original unit - no modifications were made during the course of testing.

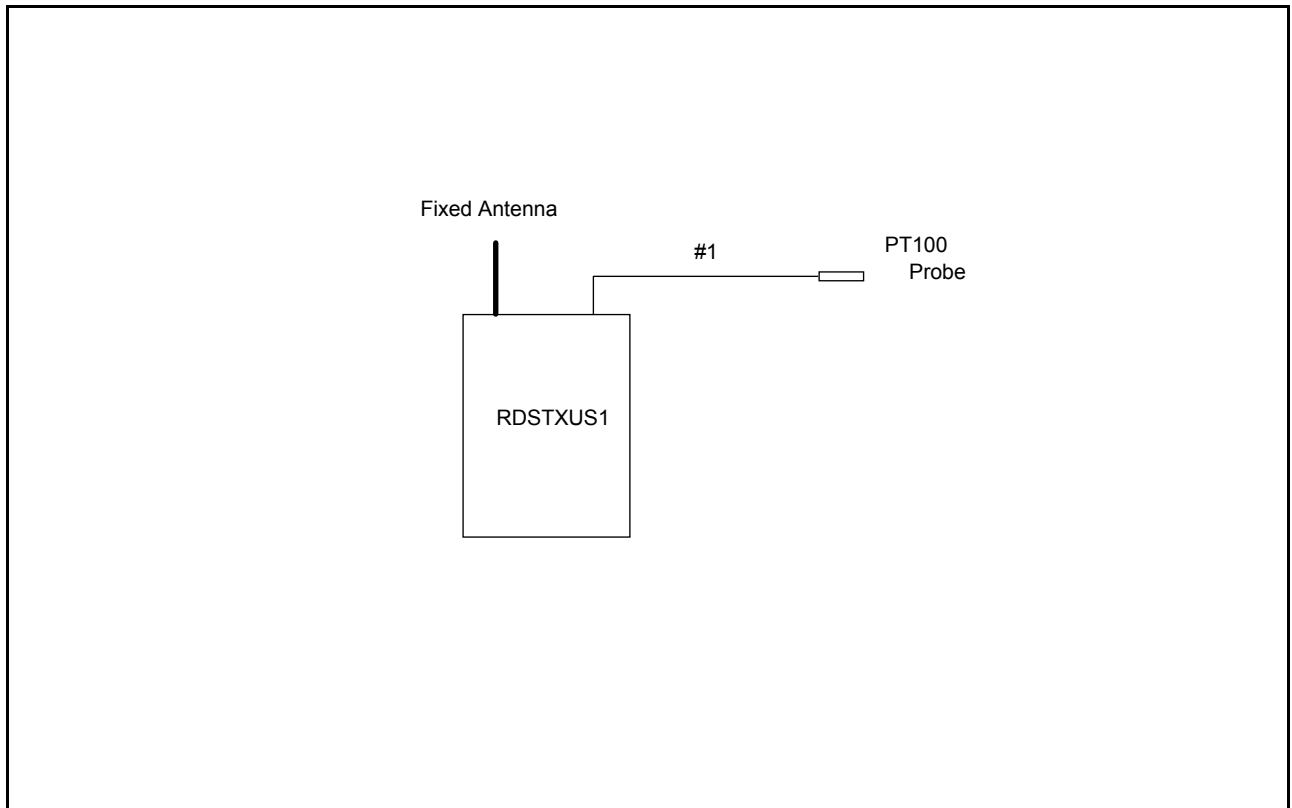
1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual

Operating Mode	Details
1	Normal transmitting mode.

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Figure 1 General Arrangement of EUT and Peripherals



#1 1m unscreened twisted pair temperature probe wire.

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Photograph 1 General Arrangement of EUT - Back



Photograph 2 General Arrangement of EUT - Front

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2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Manufacturer	Model	Description	Serial Number	Cal Due
R4	Rohde and Schwarz	ESVS10	RF Receiver (20MHz - 1GHz)	843744/00	4 December 2001
R5	Hewlett Packard	HP 8595E	Spectrum Analyser	3412A00701	5 November 2002
R5B	Hewlett Packard	HP87405A	Pre-amp	3207A00322	5 November 2002
R6	Marconi Instruments	2390	Spectrum Analyser	23901010	9 September 2002
A3	EMCO	3147	HF Log Per. Antenna (200MHz - 5GHz)	9207-1096	20 May 2002
A4	Chase	CBL6112	Bilog Antenna (30MHz - 2GHz)	2027	20 May 2002
A5	Chase	CBL111A	Bilog Antenna (30MHz - 1GHz)	1760	20 May 2002
A8	EMCO	3115	DR Waveguide Horn (1GHz - 18GHz)	0002-6070	5 November 2002

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3 Test Methods

3.1 Radiated Emissions

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of 3m. Scans are performed over the frequency range specified in the test standard with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360° and cable positions adjusted to obtain maximum emissions. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report.

For frequencies below 1GHz, significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using a CISPR16 quasi-peak receiver. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

For frequencies above 1GHz the methods used to obtain final measurements are indicated in the individual results sections.

4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

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4.1 Radiated Emissions Results

Test Equipment:	Factor Set 1:	HFBIOLOG	RG214	25 m cable
	Factor Set 2:	DR_GUIDE	MIC_CABLE	3 m cable

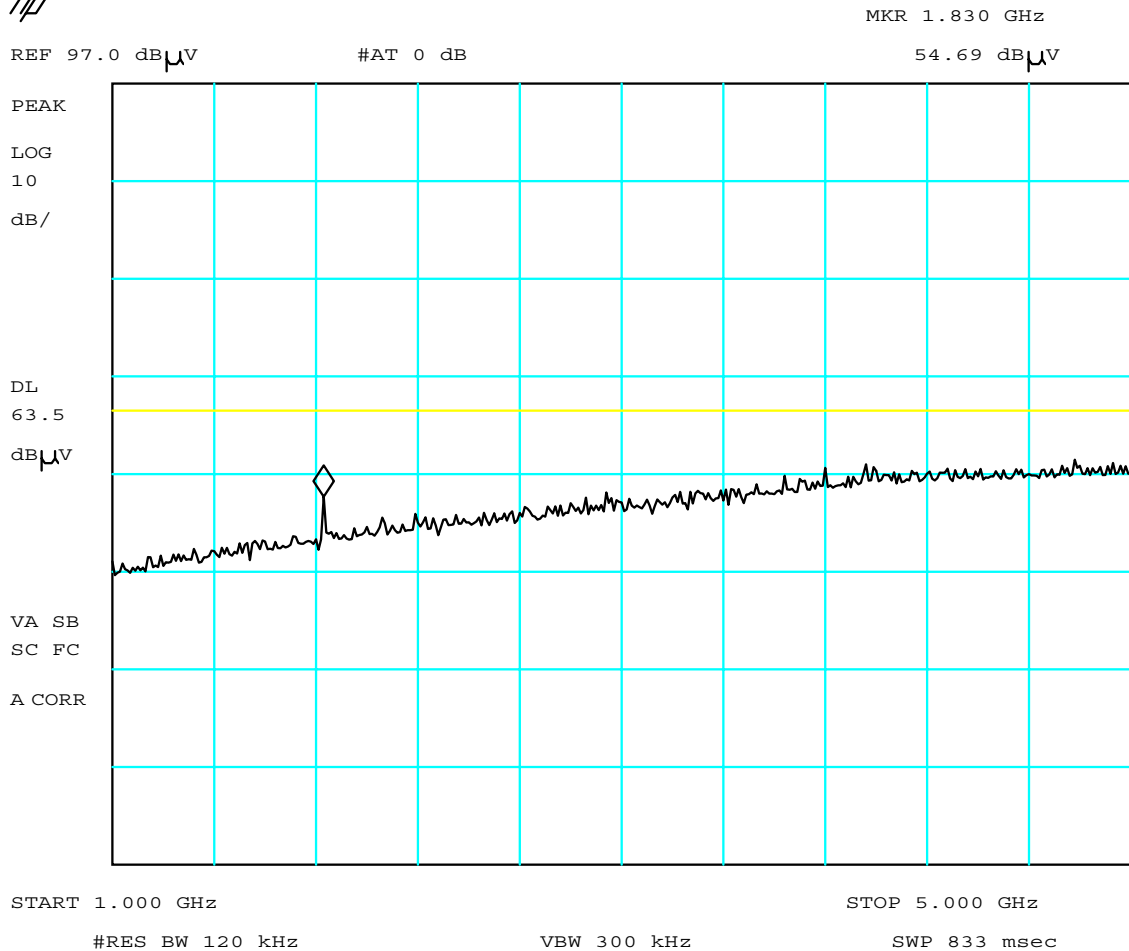
Radiated Emissions

<i>Company:</i>	Thermo Life Sciences Ltd.	<i>Product:</i>	RDSTXUS1
<i>Date:</i>	16 Nov & 12 Dec 2001	<i>Test Eng:</i>	Dave Smith
<i>Ports:</i>			
<i>Test:</i>	ANSI C63.4:1992	using limits of	FCC C
<i>Ports:</i>			
<i>Test:</i>			

Test	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Total Level dBuV/m	Limit FCC_C dBuV/m	Margin FCC_C dB	Limit	Margin	Notes
	1	0	3	1	914.500	V	64.2	26.7	90.9	94.0	3.1			
	1	0	3	1	914.500	H	55.1	26.7	81.8	94.0	12.2			
	1	0	1	2	1829.080	V	30.4	27.9	58.3	63.5	5.2			#1
	1	0	1	2	1829.080	H	29.5	27.9	57.5	63.5	6.1			#1
	1	0	1	2	2743.630	V	21.6	31.6	53.2	63.5	10.3			#1
	1	0	1	2	2743.630	H	21.0	31.6	52.6	63.5	10.9			#1
	1	0	1	2	3658.160	V	23.1	35.1	58.2	63.5	5.4			#1
	1	0	1	2	3658.160	H	22.1	35.1	57.2	63.5	6.3			#1
	1	0	1	2	4572.700	V	24.8	35.1	59.8	63.5	3.7			#1
	1	0	1	2	4572.700	H	23.1	35.1	58.2	63.5	5.3			#1
	1	0	0.5	2	5487.000	V	21.3	37.4	58.7	69.5	10.9			#1
	1	0	0.5	2	6401.500	V	17.1	38.1	55.2	69.5	14.3			#1
	1	0	0.5	2	7316.000	V	16.4	39.7	56.1	69.5	13.5			#1
	1	0	0.5	2	8230.500	V	17.5	40.6	58.1	69.5	11.5			#1
	1	0	0.5	2	9145.000	V	16.1	41.7	57.8	69.5	11.8			#1
Results					Minimum Margin PASS/FAIL					3.1 dB PASS				

Notes	Comments and Observations
#1	Results of screened room scans shown in plot 1 to plot 7. Limits of section 15.249 were applied. Measurement of harmonics made at a distance of 1m or 0.5m to improve signal to noise floor ratio. Limits adjusted accordingly. Measurements made with 1MHz bandwidth peak detector. The radio signal is pulsed but the "on period" exceed 100msecs and therefore average measurements were not made.

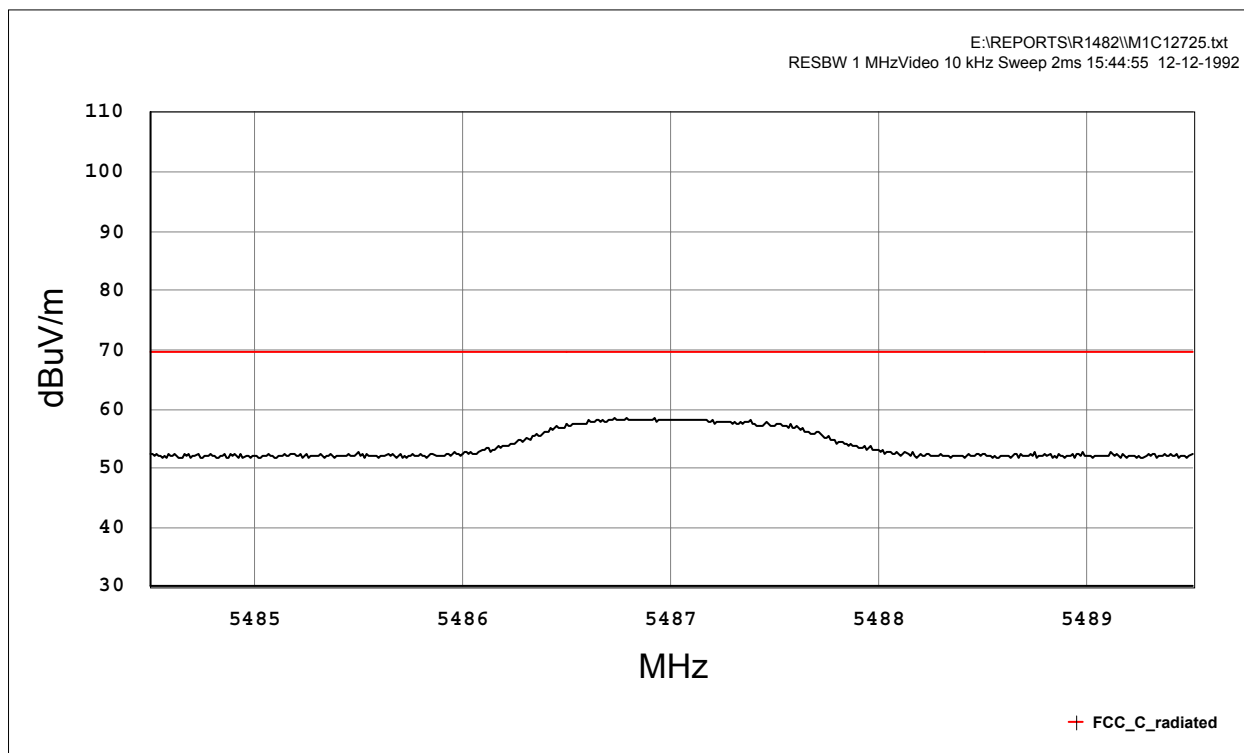
hp



PLOT 2 Radiated Emissions - 1GHz to 5GHz

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	16 Nov 01	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 1.0m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	1.0m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

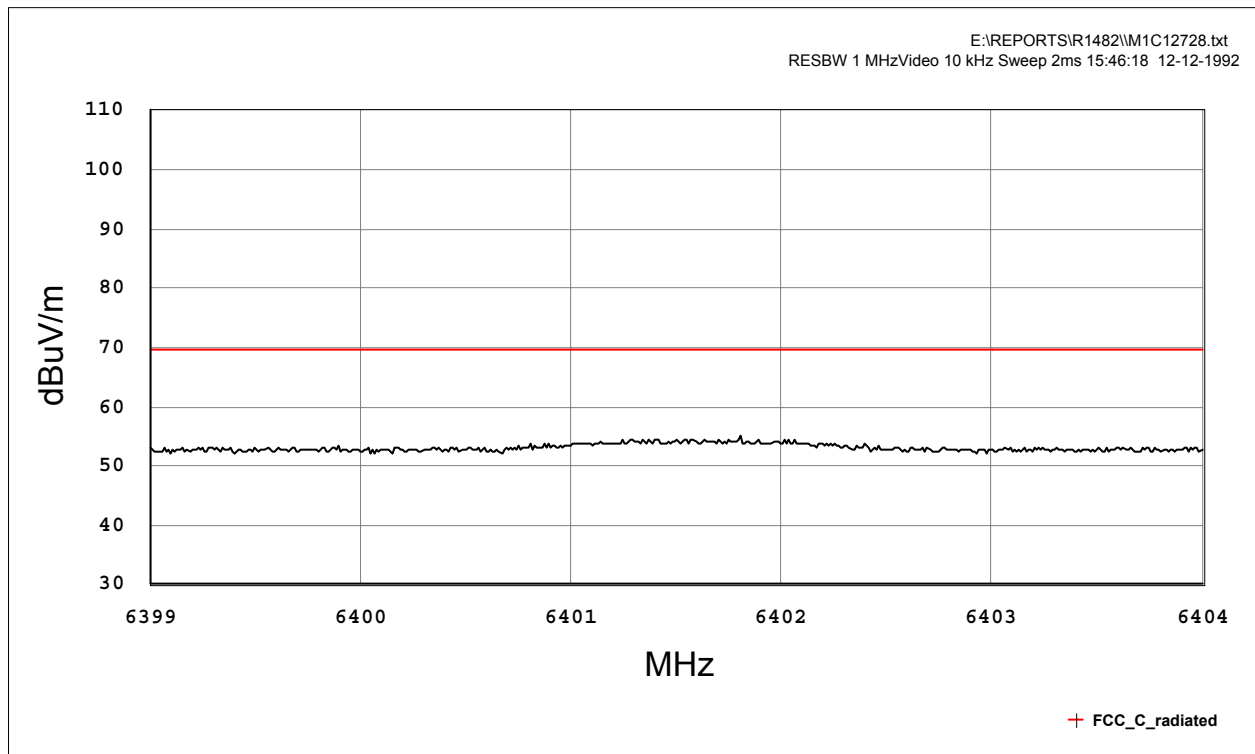
Frequency List (MHz)



PLOT 3 Radiated Emissions - Centered on 6th Harmonic of Transmitter

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	12 December 2001	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 0.5m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	0.5m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

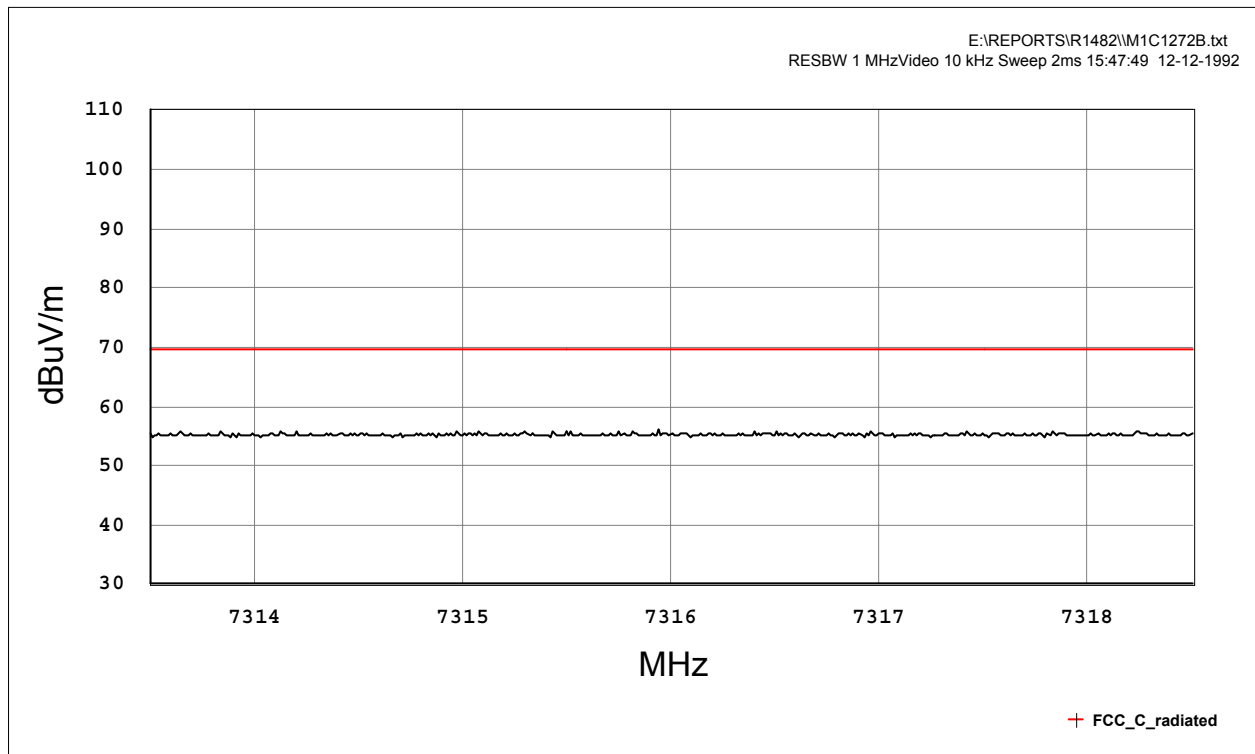
Frequency List (MHz)



PLOT 4 Radiated Emissions - Centered on 7th Harmonic of Transmitter

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	12 December 2001	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 0.5m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	0.5m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

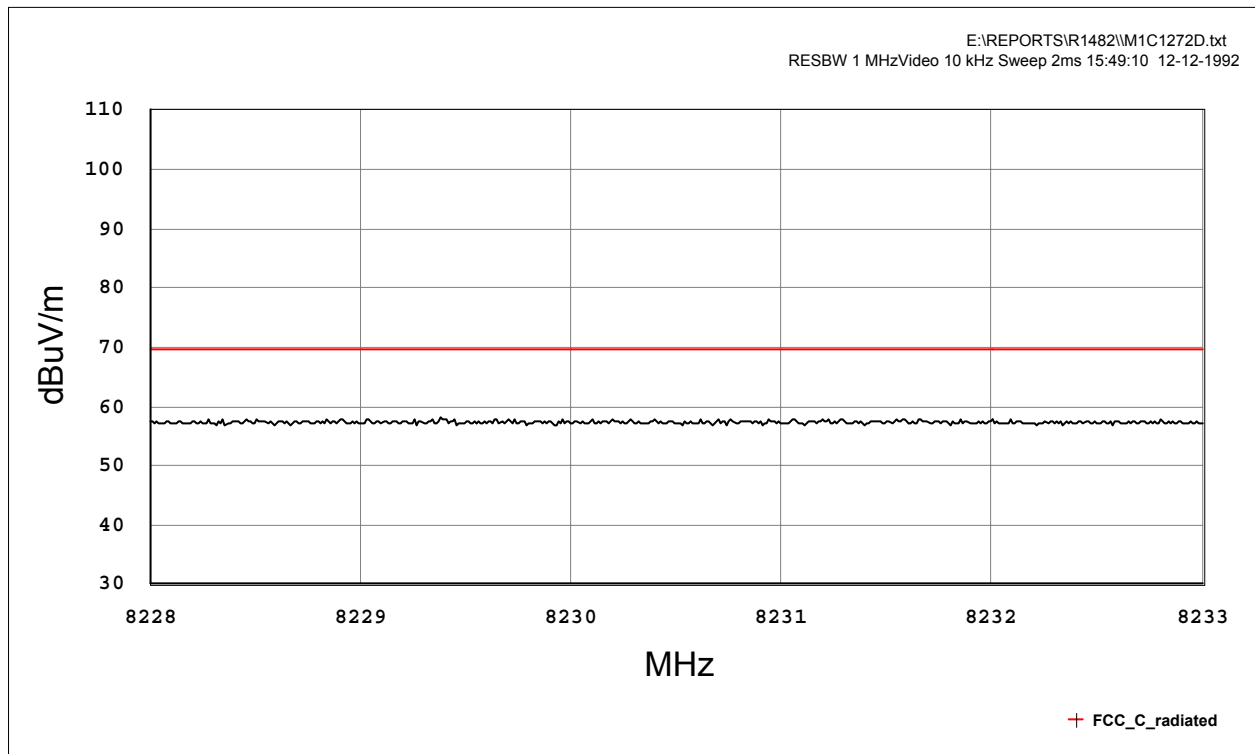
Frequency List (MHz)



PLOT 5 Radiated Emissions - Centered on 8th Harmonic of Transmitter

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	12 December 2001	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 0.5m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	0.5m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

Frequency List (MHz)

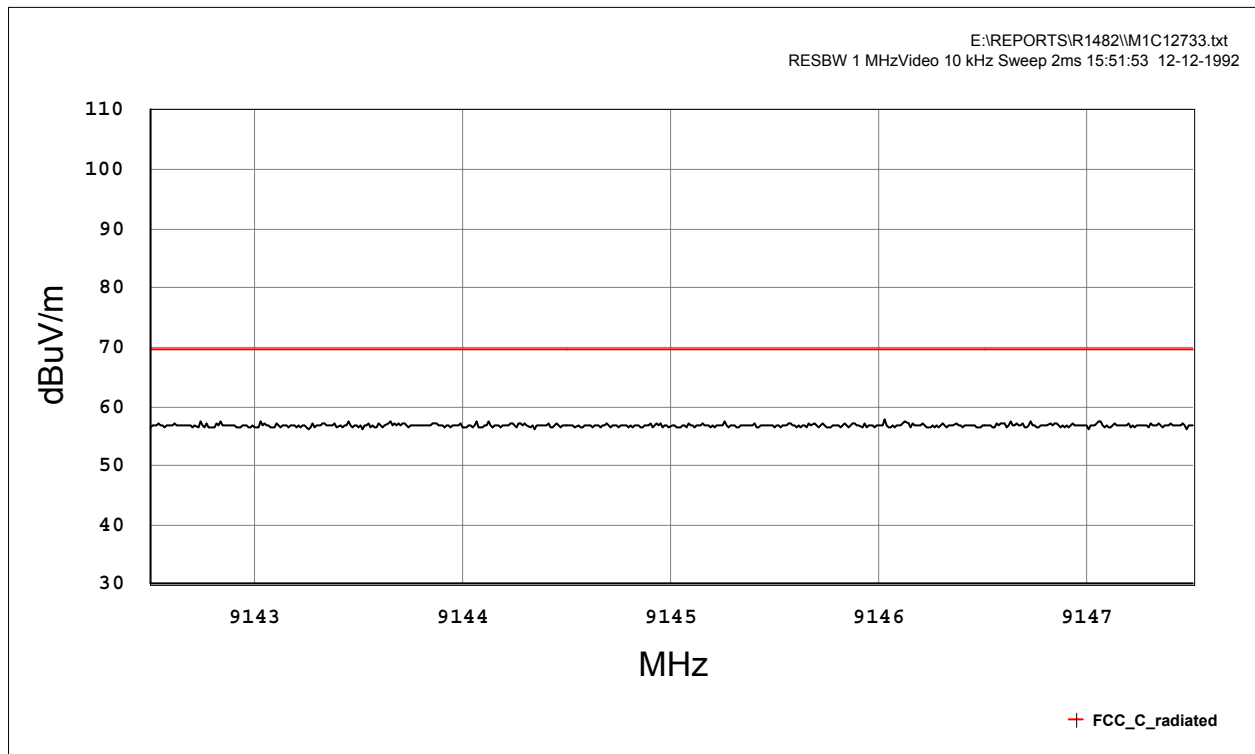


PLOT 6 Radiated Emissions - Centered on 9th Harmonic of Transmitter

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	12 December 2001	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 0.5m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	0.5m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

Frequency List (MHz)

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PLOT 7 Radiated Emissions - Centered on 10th Harmonic of Transmitter

Company:	Thermo Life Sciences	Product:	RDSTXUS1
Date:	12 December 2001	Test Engineer:	Dave Smith
Test:	FCC pt 15	Limit:	FCC (C) - harmonics
Notes:			
Limits adjusted for 0.5m test.			
Polarisation:	V + H	Orientation:	0 - 360°
Distance:	0.5m	Antenna:	DR Guide
Height:	1m	Filename:	H1B16625.plt
		Operating Mode:	1
		Mod. State:	0

Frequency List (MHz)
