

Nemko Test Report No.:

2L0092EUS1

Applicant:

Internet Telemetry
5311 S.122nd East Avenue
Tulsa, OK 74146

Equipment Under Test:

Model TIM 15 Version G4

In Accordance With:

FCC Part 15, Subpart B
Radio Receivers

Tested By:

Nemko Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

A handwritten signature in blue ink, appearing to read "Tom Tidwell", is written over a horizontal line.

Authorized By:

Tom Tidwell, Wireless Group Manager

Date:

6/5/02

Total Number of Pages:

20

EQUIPMENT: **Model TIM 15 Version G4** PROJECT NO.: **2L0092EUS1**

TABLE OF CONTENTS

Section 1. Summary of Test Results..... 3

Section 2. Equipment Under Test (E.U.T.) 5

Section 3. Equipment Configuration 7

Section 4. Conducted Emissions..... 9

Section 5. Radiated Emissions..... 13

Section 6. Sample Calculations..... 17

Section 7. Block Diagrams 18

Section 8. Test Equipment List 20

EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1**

Section 1. Summary of Test Results**General:****All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B. Measurement procedure ANSI C63.4-1992 was used for all tests. Radiated Emissions were measured on an open area test site.

☐

Declaration of Conformity

☐

Production Unit

☐

Verification

☒

Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST
SPECIFICATIONS HAVE BEEN MADE.

See “ Summary of Test Data”.

**NVLAP LAB CODE: 100426-0**

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This report applies only to the items tested.

EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1**

Summary Of Test Data

Name Of Test	Para. No.	Results
Antenna Conducted Emissions	15.111	Not Tested ¹
Radiated Emissions	15.109	Complies
Powerline Conducted Emissions	15.107	Complies

Footnotes:¹The unit contains an integral antenna.**Measurement uncertainty for each test configuration is expressed to 95% probability.**

EQUIPMENT: **Model TIM 15 Version G4** PROJECT NO.: **2L0092EUS1**

Section 2. Equipment Under Test (E.U.T.)

Manufacturer: Internet Telemetry

Model No.: TIM 15 version G4

Serial No.: None

Equipment Details

Frequency Range:	906.5 – 927.875 MHz
Number of Channels:	50 channels per hop table
Operating Frequency(ies) of Sample:	Tuned to 906.5 MHz, 917,25 MHz, and 927.875 MHz for testing.
Power Supply Requirement:	Battery or external supply
Type of Modulation:	FSK
Bandwidth:	50.8 kHz
Intermediate Frequencies:	None

EQUIPMENT: **Model TIM 15 Version G4** PROJECT NO.: **2L0092EUS1**

Description of E.U.T.

The Telemetry Interface Module (TIM) is a data-collection-wireless-transceiver module. The receiver hops in synchronization with a companion transmitter.

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

EQUIPMENT: **Model TIM 15 Version G4** PROJECT NO.: **2L0092EUS1**

Section 3. Equipment Configuration**Equipment Configuration List:**

Item	Description	Model No.	Serial.	Rev.
(A)	Transceiver module	TIM 15	None(S#01)	G4
(B)	Laptop computer	Dell		
(C)	Power Adapter	DV-091A-5720	None	
(D)				
(E)				
(F)				
(G)				

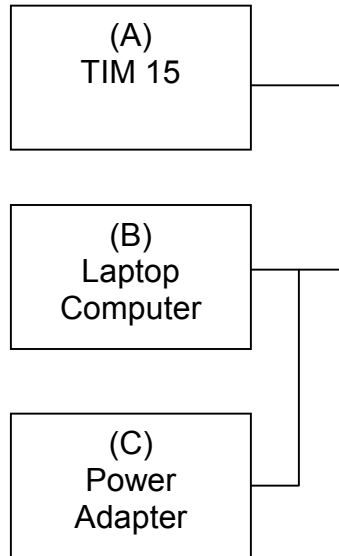
Inter-connection Cables:

Item	Description	Length (m)
(1)	Power/Data cable. 6 conductors, unshielded.	1.5
(2)		
(3)		
(4)		
(5)		
(6)		
(7)		
(8)		

EQUIPMENT: **Model TIM 15 Version G4**

PROJECT NO.: **2L0092EUS1**

Diagram of the Equipment Under Test (E.U.T)



EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1****Section 4. Conducted Emissions**

(1)

NAME OF TEST: Radiated Emissions

FARA. NO.: 15.109(a)

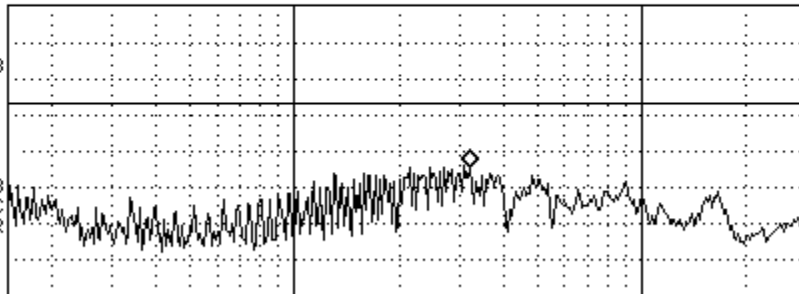
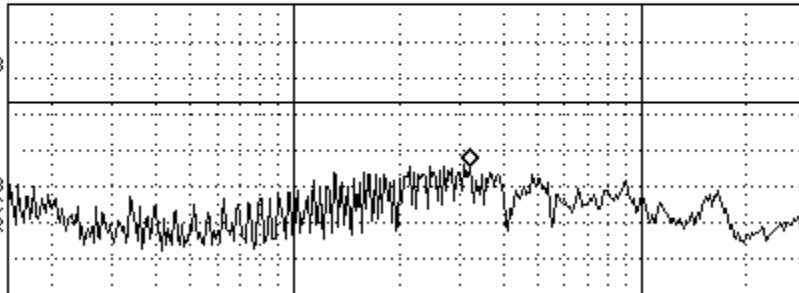
TESTED BY: Tom Tidwell

DATE: 7/2/02

Minimum Standard:

Frequency(MHz)	Level (dB μ V/m)
.450 - 30	48.0

Test Results: Complies.**Measurement Data:** See attached table.**Measurement Uncertainty:** +/- 1.8 dB**Temperature:** 25 °C**Relative Humidity:** 52 %

EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1**12:04:03 JUL 02, 2002
~~17~~MARKER
3.22 MHz
30.15 dBµVACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 3.22 MHz
30.15 dBµVLOG REF 75.0 dBµV
10
dB/
ATN
10 dB**Phase Conductor 60 Hz/120 Vac**DL
48.0
dBµV
VA SB
SC FC
CORRSTART 150 kHz STOP 30.00 MHz
RL #IF BW 9.0 kHz AVG BW 30 kHz SWP 1.40 sec12:07:11 JUL 02, 2002
~~17~~MARKER
3.22 MHz
30.15 dBµVACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 3.22 MHz
30.15 dBµVLOG REF 75.0 dBµV
10
dB/
ATN
10 dB**Neutral Conductor 60 Hz/120 Vac**DL
48.0
dBµV
VA SB
SC FC
CORRSTART 150 kHz STOP 30.00 MHz
RL #IF BW 9.0 kHz AVG BW 30 kHz SWP 1.40 sec

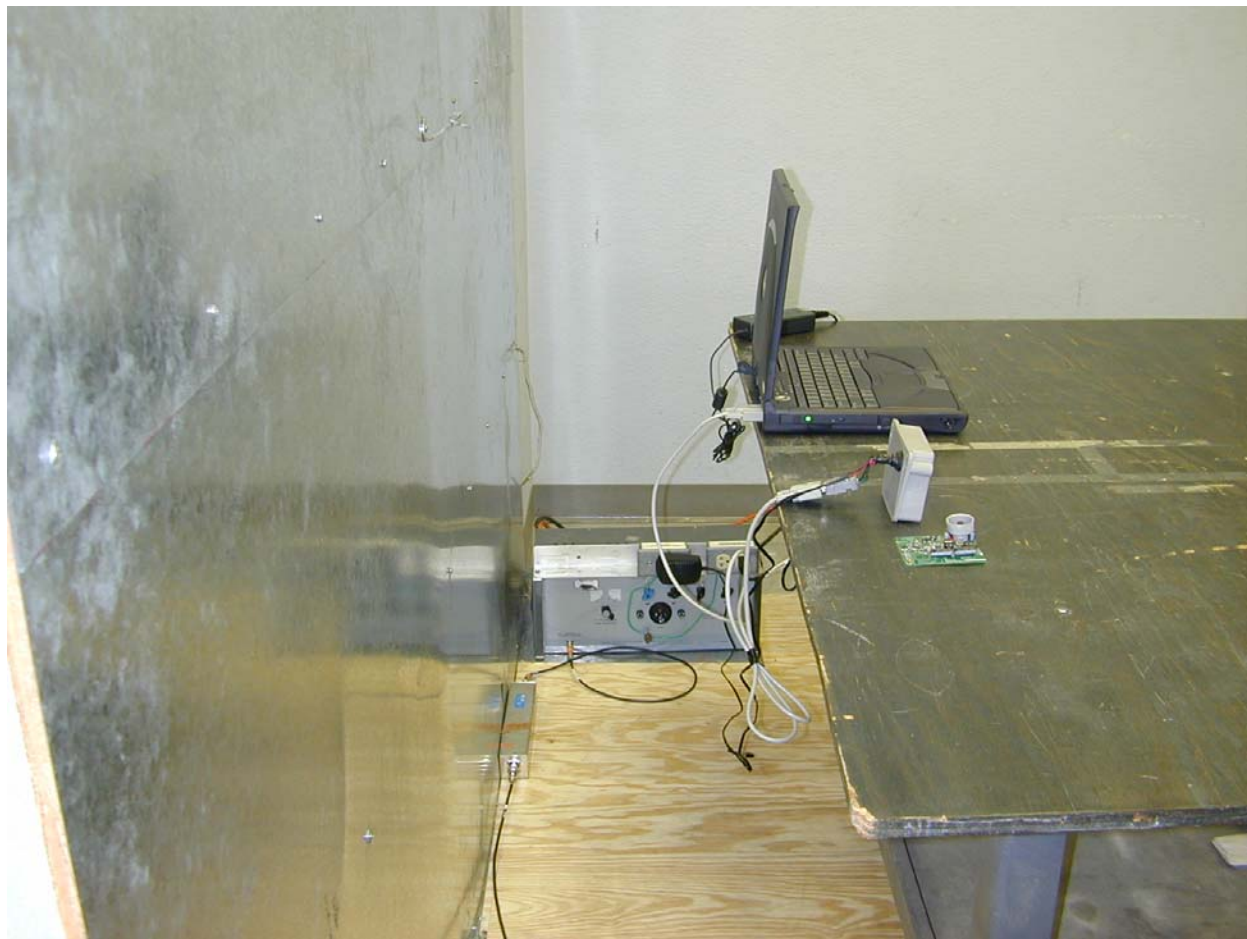
EQUIPMENT: **Model TIM 15 Version G4**

PROJECT NO.: **2L0092EUS1**



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PROJECT NO.: **2L0092EUS1**



EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1****Section 5. Radiated Emissions**

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.109(a)
TESTED BY: Kevin Rose	DATE: 5/28/02

Minimum Standard:

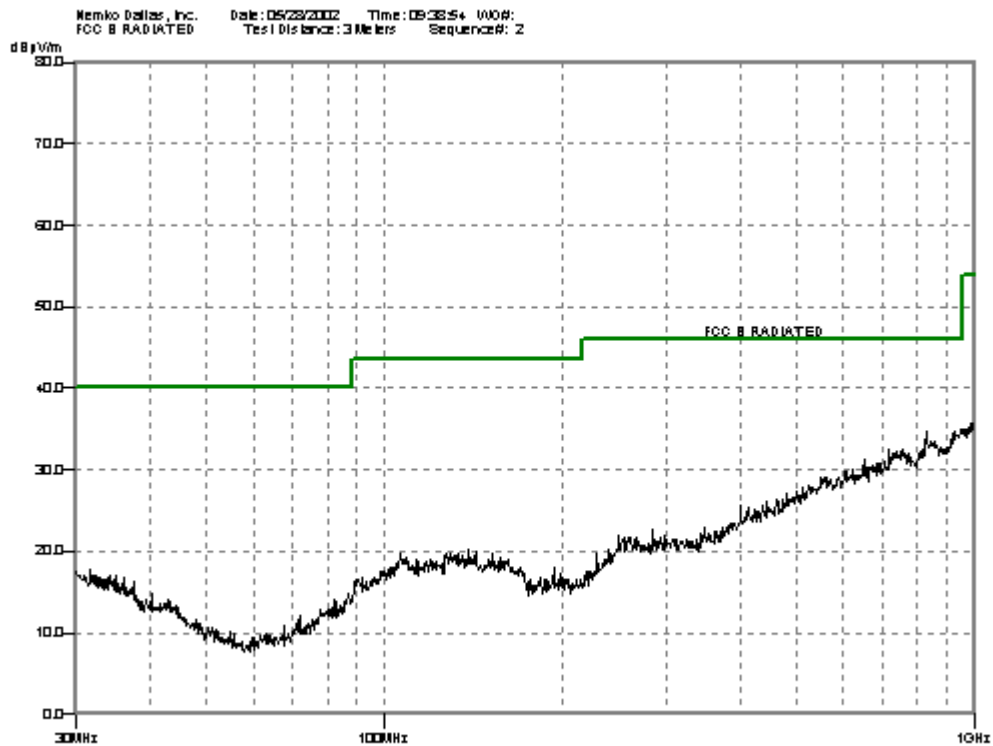
Frequency(MHz)	Field Strength (dB μ V/m @ 3m)
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0

Test Results: Complies.**Measurement Data:** See attached table.**Measurement Uncertainty:** +/- 3.6 dB**Temperature:** 23 °C**Relative Humidity:** 39 %

NOTE: The unit was tested on three frequencies. There were no emissions detected above 1 GHz. The ambient threshold of sensitivity was sufficient to detect emissions 20 dB below the specification limit.

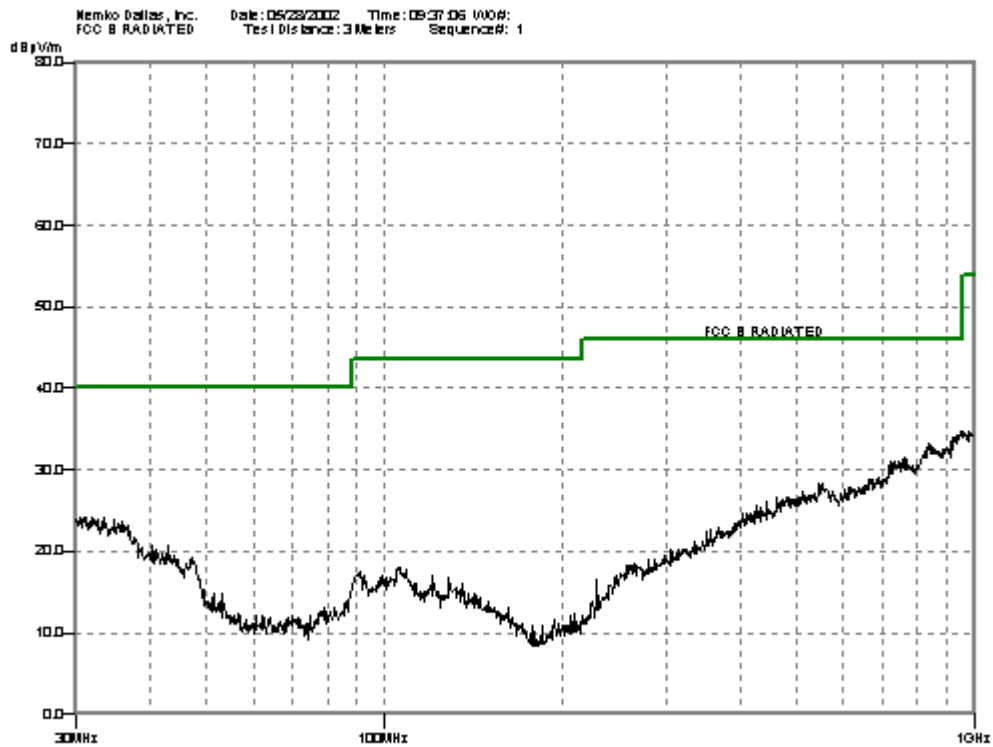
For super-regenerative receivers the receiver is cohered using a signal generator and dipole antenna.

Handheld equipment and equipment not designed to be mounted in any fixed orientation is tested in three orthogonal axis to obtain worst case results.

EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1****Test Data - Radiated Emissions**

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PROJECT NO.: **2L0092EUS1**



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PROJECT NO.: **2L0092EUS1**

Radiated Photographs (Worst Case Configuration)



EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1**

Section 6. Sample Calculations

Conducted Emissions:

If the Quasi-Peak to Average ratio is greater than 6 dB, then the emission is classified as broadband and its Quasi-Peak level is reduced by 13 dB for comparison to the limit.

- i.e. Quasi-Peak level = 40 dB μ V
 Average level = 34 dB μ V
 Corrected level = 40 - 13 = 27 dB μ V

Radiated Emissions

Emissions are measured at a distance of 3 meters and corrected for antenna factor and cable loss.

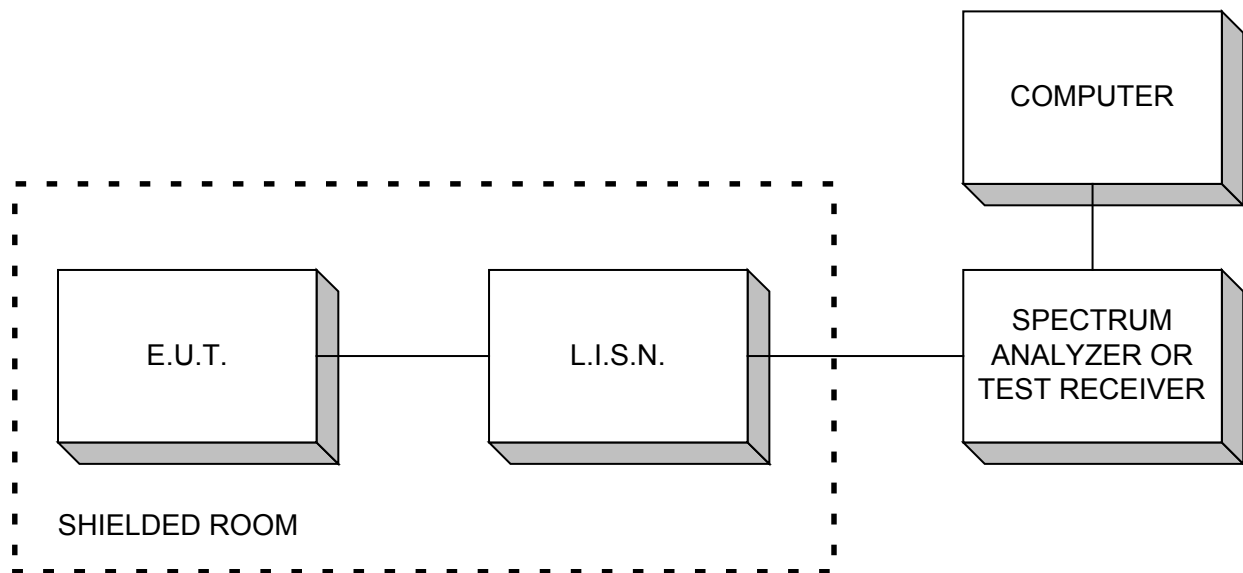
- i.e. Received Signal = 25 dB μ V @ 100 MHz
 Antenna Factor & Cable Loss = 9.8 dB
 Field Intensity = 25 + 9.8 = 34.8 dB μ V/m @ 3 m

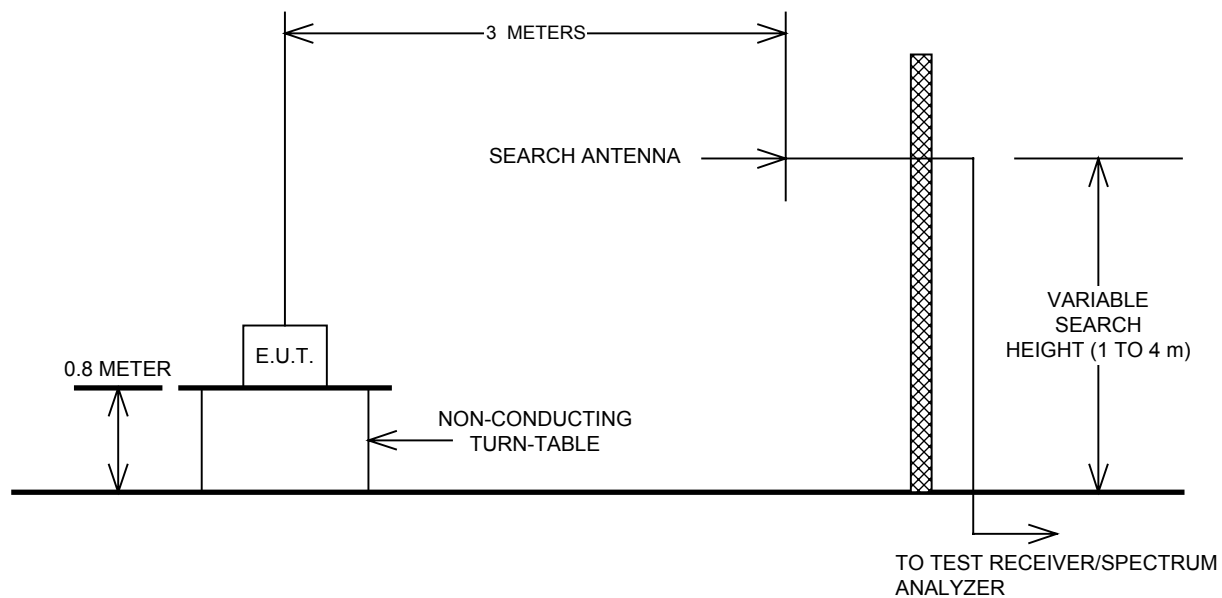
EQUIPMENT: **Model TIM 15 Version G4**

PROJECT NO.: **2L0092EUS1**

Section 7. Block Diagrams

Conducted Emissions



EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1****Outdoor Test Site For Radiated Emissions**

Measurements are made at a distance of 3 meters on the open area test site up to 18 GHz. The spectrum is searched at a distance of 1 meter for emissions in the range 18 GHz up to to the maximum search frequency required by 15.33(a). If emissions are detected at 1 meter measurement distance, the receive antenna is re-sited to 3 meters from the EUT and measurements are recorded.

EQUIPMENT: **Model TIM 15 Version G4**PROJECT NO.: **2L0092EUS1****Section 8. Test Equipment List**

ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01	01/02/03
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/30/01	06/30/02
791	PREAMP, 25dB	ICC LNA25	398	08/16/01	08/16/02
1046	Flex cable 1m	Astrolab Inc. 32022-2-29094K-1M	N/A	01/18/02	01/18/03
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	06/01/01	07/01/02
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	06/01/01	07/01/02
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	07/30/01	07/30/02
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	06/30/01	06/30/02
969	LISN	Schwarbeck 8120	8120281	07/18/01	07/18/02
1553	Cable 1m	KTL RG223	N/A	08/06/01	08/06/02
1555	High Pass Filter	Solar Electronics 7930-5.0	933125	06/06/02	06/06/03
1114	Cable 7m	KTL RG223	N/A	06/06/02	06/06/03
1603	LIMITER	FISCHER FCC-450-1.25-N	447	01/17/02	01/17/03
718	Spectrum Analyzer	Hewlett Packard 8591EM	3639A00980	12/17/01	12/17/02