




# TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test of: John Falck Associates.  
Group 4 Securitas  
S680 Proximity Reader Device 8000-5ZZ0-A

To: F.C.C. Part 15:1998 Subpart C  
(Intentional Radiators)  
Sections 15.207 and 15.209

**Test Report Serial No:**  
RFI/EMCB/RP39126A

<b>This Test Report Is Issued Under The Authority Of Brian Watson Technical Director:</b> 	<b>Checked By:</b> 
<b>Tested By:</b> 	<b>Release Version No: PDF01</b>
<b>Issue Date: 22 July 1999</b>	<b>Test Date: 30 June 1999 to 1 July 1999</b>

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**RADIO FREQUENCY INVESTIGATION LTD.**

**TEST REPORT**

**EMC Department**

**S.No: RFI/EMCB/RP39126A**

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**Issue Date: 22 July 1999**

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## **1. Client Information**

<b>Company Name:</b>	John Falck Associates
<b>Address:</b>	36 New Barns Road Ely Cams CB7 4PN
<b>Contact Name:</b>	Mr J Falck

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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:	Group 4 Securitas
Model Name or Number:	8000-5ZZ0-A
Unique Type Identification:	S680
Serial Number:	9920002
Country of Manufacture:	UK
FCC ID Number:	0E5S680
Date of Receipt:	30 June 1999

### **2.2. Description Of EUT**

The equipment under test is a proximity reader device for access control. It transmits a pulsed carrier signal at 125 kHz from an integral loop antenna. When an access control tag is brought within range of the reader, it is activated and returns its unique code. This message is decoded in the receiver and output to the host system.

### **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:	+ 12 Volt DC
Intended Operating Environment:	Commercial, Light Industry
Weight:	110 g
Dimensions:	126 mm x 46 mm x 25 mm
Interface Ports:	Tx/Rx Interface 20 mA Current Loop 12 V / 0 V Power Input Connections

#### 2.5. Support Equipment

Description	12V DC Power Supply Unit
Brand Name:	Lascar
Model Name or Number:	PSU 20112
Serial Number:	None Stated by Client
Country of Manufacture:	None Stated by Client
FCC ID Number:	None Stated by Client
Cable Length and Type	6 Core Screened (2 used for PSU)
Connected to Port	EUT Power In

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### **3. Test Specification, Methods And Procedures**

#### **3.1. Test Specification**

<b>Reference:</b>	F.C.C. Part 15 Subpart C. Intentional Radiators* Section 15.207 and 15.209
<b>Title:</b>	Code of Federal Regulations, Part 15 (47CFR15), 1997 Radio Frequency Devices: Intentional Radiators.
<b>Comments:</b>	A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules.
<b>Purpose of Test:</b>	To determine whether the equipment complied with the applicable requirements of the specification for the purposes of certification.

\*Sections 15.209 (Radiated Emissions; general requirements). Section 15.207 (Conducted emissions; General Requirements).

#### **3.2. Methods And Procedures**

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (1992)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16 (1987)

Title: Specification for Radio Interference measuring apparatus and measurement methods.

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### **3.3. Definition Of Measurement Equipment**

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

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#### **4. Deviations From The Test Specification**

None.

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## **5. Operation Of The EUT During Testing**

### **5.1. Operating Conditions**

The EUT was tested in a normal laboratory environment.

During testing, the EUT was powered by a +12 volt DC power supply, which in turn was powered from a 110 volt, 60 Hz, AC mains supply.

### **5.2. Operating Modes**

The EUT was tested in the following operating modes:

- 1). Operate Mode: The EUT was fully operational with a valid tag placed within the field.
- 2). Standby Mode: The EUT was fully operational with no tag in the field.

The reason for choosing this mode was that it was defined by the client as being likely to be the worst case with regards EMC.

### **5.3. Configuration And Peripherals**

The EUT was tested in the following configuration:

The EUT was connected to 3 m of screened twisted pair cable. The transmitter connections of the current loop from the EUT were terminated with a 220  $\Omega$  dummy load resistor.

The reason for choosing this configuration was that it was defined by the client as being likely to be the worst case with regards EMC.

NB Section 2 of this report contains a full list of support equipment used and Appendix 3 contains a schematic diagram of the test configuration.

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## **6. Summary Of Test Results**

### **6.1. Conducted Emissions**

<b>Range Of Measurements</b>	<b>Specification Reference</b>	<b>Compliance Status</b>
AC Powerline Conducted Emissions, 450 kHz to 30 MHz	Section 15.207 of C.F.R. 47: 1998	Complied

### **6.2. Radiated Emissions**

<b>Range Of Measurements</b>	<b>Specification Reference</b>	<b>Compliance Status</b>
Magnetic Field Strength 100 kHz to 30 MHz	Section 15.209 of C.F.R. 47: 1998	Complied
Electric Field Strength, 30 MHz to 1000 MHz	Section 15.209 of C.F.R. 47: 1998	Complied

### **6.3. Location Of Tests**

All the measurements described in this report were performed at the premises of Radio Frequency Investigation Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RG. England.

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## **7. Measurements, Examinations And Derived Results**

### **7.1. General Comments**

7.1.1. This section contains test results only. Details of the test methods and procedures can be found in Appendix 2 of this report.

7.1.2. The measurement uncertainties stated were calculated in accordance with the requirements of NAMAS Document NIS 81 with a confidence level of 95%. Please refer to Section 8 for details of measurement uncertainties.

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## **7.2. Test Results For AC Mains Conducted Emissions.**

### **7.2.1. Quasi-Peak Detector Measurements On Live And Neutral Lines**

#### **7.2.2. Standby Mode**

7.2.2.1. Plots of the initial scans can be found in Appendix 4.

7.2.2.2. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector:

Frequency (MHz)	Line	Q-P Level (dBmV)	Q-P Limit (dBmV)	Margin (dB)	Result
0.882	Live	29.7	48.0	18.3	Complied
0.884	Neutral	27.6	48.0	20.4	Complied
2.144	Live	28.8	48.0	19.2	Complied
2.144	Neutral	28.4	48.0	19.6	Complied
6.175	Live	29.8	48.0	18.2	Complied
6.175	Neutral	30.3	48.0	17.7	Complied
19.913	Live	46.1	48.0	1.9	Complied
19.914	Neutral	44.8	48.0	3.2	Complied
21.930	Neutral	45.5	48.0	2.5	Complied
21.940	Live	46.3	48.0	1.7	Complied
28.357	Live	46.6	48.0	1.4	Complied
28.357	Neutral	46.1	48.0	1.9	Complied

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### **7.3. Test Results For AC Mains Conducted Emissions.**

#### **7.3.1. Operate Mode**

7.3.1.1. Plots of the initial scans can be found in Appendix 4.

7.3.1.2. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector:

<b>Frequency (MHz)</b>	<b>Line</b>	<b>Q-P Level (dBmV)</b>	<b>Q-P Limit (dBmV)</b>	<b>Margin (dB)</b>	<b>Result</b>
0.882	Neutral	29.7	48.0	18.3	Complied
0.884	Live	29.1	48.0	18.9	Complied
1.891	Live	29.2	48.0	18.8	Complied
1.891	Neutral	28.8	48.0	19.2	Complied
5.671	Live	30.0	48.0	18.0	Complied
5.671	Neutral	30.4	48.0	17.6	Complied
19.912	Live	46.0	48.0	2.0	Complied
20.165	Neutral	44.4	48.0	3.6	Complied
21.928	Live	46.5	48.0	1.5	Complied
21.928	Neutral	45.3	48.0	2.7	Complied
28.100	Neutral	46.4	48.0	1.6	Complied
28.400	Live	46.7	48.0	1.3	Complied

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## **7.4. Test Results For Radiated Magnetic Emissions: 0.1 to 30 MHz**

### **7.4.1. Standby Mode**

7.4.1.1. The client has stated that the fundamental and lowest operating frequency of the device is 125 kHz. Therefore radiated emission preliminary scans were performed from 100 kHz.

7.4.1.2. Plots of the initial scans can be found in Appendix 4.

7.4.1.3. The following table lists frequencies at which emissions were measured using both Average and Peak detectors at a test distance of 3 m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Av. Level (dBmV/m)	Av. Limit (dBmV/m)	Margin (dB)	Result
0.126	0°	81.6	105.5	23.9	Complied Note 1
0.252	90°	73.9	99.5	25.6	Complied Note 1
0.377	0°	57.8	96.0	38.2	Complied Note 1

Frequency (MHz)	Ant. Pol.	Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Margin (dB)	Result
0.126	0°	81.6	125.5	43.4	Complied Note 1
0.252	90°	80.9	119.5	38.6	Complied Note 1
0.377	0°	58.5	116.0	57.5	Complied Note 1

7.4.1.4. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3 m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Q-P Level (dBmV/m)	Q-P Limit (dBmV/m)	Margin (dB)	Result
0.6287	0°	55.5	71.6	16.4	Complied. Note 1
0.8822	90°	58.6	68.6	10.3	Complied. Note 1
24.0050	0°	24.2	69.5	45.3	Complied. Note 1

Note 1. Each limit has been calculated at 3m from 300m using the following square of an inverse linear distance extrapolation factor (40dB/decade).

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### **Standby Mode (continued)**

7.4.1.5. Due to the nature of the EUT operation, measurements stated in section 15.35(c) of C.F.R. 47, for EUTs employing pulsed operation, are required. Radiated emission measurements were performed using a Peak detector. As the Peak level complies with the Average limit, the EUT was deemed to meet the requirements.

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#### **7.4.2. Operate Mode**

7.4.2.1. The client has stated that the fundamental and lowest operating frequency of the device is 125 kHz. Therefore radiated emission preliminary scans were performed from 100kHz.

7.4.2.2. Plots of the initial scans can be found in Appendix 4.

7.4.2.3. The following table lists frequencies at which emissions were measured using an Average and Peak detector at a test distance of 3m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Av Level (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Result
0.126	90°	81.0	105.5	24.5	Complied Note 1
0.252	0°	73.4	99.5	26.1	Complied Note 1
0.377	90°	57.6	96.0	39.0	Complied Note 1

Frequency (MHz)	Ant. Pol.	Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Margin (dB)	Result
0.126	90°	81.6	125.5	43.9	Complied Note 1
0.252	0°	81.0	119.5	38.5	Complied Note 1
0.377	90°	58.5	116.0	57.5	Complied Note 1

7.4.2.4. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3 m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Q-P Level (dBmV/m)	Q-P Limit (dBmV/m)	Margin (dB)	Result
0.6287	90°	51.8	71.6	19.8	Complied. Note 1
0.8822	90°	52.5	68.6	16.4	Complied. Note 1

Note 1. Each limit has been calculated at 3m from 300m using the following square of an inverse linear distance extrapolation factor (40dB/decade).

Due to the nature of the EUT measurements stated in section 15.35(c) of C.F.R. 47, for EUTs employing pulsed operation, are required. Radiated emission measurements were performed using a Peak detector. As the Peak level complies with the Average limit, the EUT was deemed to meet the requirements.

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## **7.5. Test Results For Radiated Emissions.**

### **7.5.1. Electric Field Strength Measurements of Spurious Emissions**

#### **7.5.2. Standby Mode**

7.5.2.1. The client has stated that the highest frequency generated or used in the EUT was 7.3728 MHz. Therefore tests were performed up to 1000 MHz.

7.5.2.2. Plots of the initial scans can be found in Appendix 4.

7.5.2.3. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3m. (results incorporate antenna factors and cable losses):

Frequency (MHz)	Ant. Pol.	Q-P Level (dBmV/m)	Q-P Limit (dBmV/m)	Margin (dB)	Result
55.301	Vert.	34.1	40.0	5.9	Complied
62.675	Vert.	32.5	40.0	7.5	Complied
64.520	Vert.	23.4	40.0	16.6	Complied
123.260	Vert.	18.1	43.5	25.4	Complied
141.409	Vert.	16.4	43.5	27.1	Complied
761.200	Vert.	25.9	46.0	20.1	Complied

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### **7.5.3. Operate Mode**

7.5.3.1. The client has stated that the highest frequency generated or used in the EUT was 7.3728 MHz. Therefore tests were performed up to 1000 MHz.

7.5.3.2. Plots of the initial scans can be found in Appendix 4.

7.5.3.3. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 3m. (results incorporate antenna factors and cable losses):

<b>Frequency (MHz)</b>	<b>Ant. Pol.</b>	<b>Q-P Level (dBmV/m)</b>	<b>Q-P Limit (dBmV/m)</b>	<b>Margin (dB)</b>	<b>Result</b>
47.519	Vert.	25.1	40.0	14.9	Complied
55.301	Vert.	33.9	40.0	6.1	Complied
62.675	Vert.	32.6	40.0	7.4	Complied
64.518	Vert.	23.7	40.0	16.3	Complied
125.550	Vert.	19.5	43.5	24.0	Complied
141.410	Vert.	16.1	43.5	27.4	Complied

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## **8. Measurement Uncertainty**

8.1. Company Policy, as based on the NAMAS Accreditation Standard, M10, paragraph 12.11 (o), states that Test Reports shall include estimated uncertainty of the calibration or test result (this information need only appear in test reports and test certificates where it is relevant to the validity or application of the test result, where a client's instructions so require or where uncertainty affects compliance to a specification or limit).

8.2. The global uncertainties have been calculated in accordance with NAMAS NIS 81 (Edition 1, May 1994) as follows:

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level</b>	<b>Calculated Uncertainty</b>
Conducted Emissions	450 kHz to 30 MHz	95%	+/- 2.2 dB
Radiated Magnetic Field Emissions	100 kHz to 30 MHz	95%	+/- 2.6 dB
Radiated Electric Field Emissions	30 MHz to 1000 MHz	95%	+/- 4.9 dB

8.3. Measurement uncertainties have been applied in accordance with NAMAS document NIS 81 (edition 1, May 1994), and in the absence of any specification criteria, guidance, or code of practice, compliance has been judged on the basis of shared risk.

8.4. In the case of emissions tests, the measured value of the disturbance from the product sample shall be compared directly with the limits. If the measured value is equal to or less than the limit the product is deemed to pass the test.

8.5. In the case of immunity tests, the equipment is deemed to pass the test if it fulfils the stated performance criteria at the required or a higher severity level. The measurement uncertainty has been taken into account in the calibration procedures stated in the relevant basic standard.

8.6. The methods used to calculate the above uncertainties are in line with those used for calibration laboratories contained in NAMAS document NIS 3003 Edition 8 "The Expression of Uncertainty and Confidence in Measurement" May 1995, which align with international recommendations "Guide to the Expression of Uncertainty in Measurement" ISO/IEC/OIML/BIPM (Prepared by ISO/TAG 4: January 1993).

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### Appendix 1. Test Equipment Used

Instrument	Manufacturer	Model	RFI No.
L.I.S.N.	R & S	ESH3-Z5	A004
Loop Antenna	R & S	HFH2-Z2	A007
Attenuator	Narda	771-03	A262
Mast Controller	R & S	HCC	A276
Antenna Mast	R & S	HCM	A277
Pulse Limiter	R & S	ESH3-Z2	A287
Test Receiver	R & S	ESVP	M002
Spectrum Monitor	R & S	EZM	M003
Test Receiver	R & S	ESH3	M023
Receiver	R & S	ESBI	M008
Site 9	RFI	9	S209
Site 1	RFI	1	S201
Bilog Antenna	Chase EMC	CBL6112B	A1037
Cable	Rosenberger	UFA210A-1-1969-704704	C458

**NB** In accordance with NAMAS requirements, all the measurement equipment is on a calibration schedule.

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## Appendix 2. Measurement Methods

### A2.1. AC Mains Conducted Emissions: FCC Part 15

A2.1.1. AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

A2.1.2. The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane and with the EUT powered via a 60 Hz AC mains supply.

A2.1.3. Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

A2.1.4. Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

A2.1.5. The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)*
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz	9 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

\* In some instances an Average detector function may also have been used.

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## **A2.2. Radiated Emissions, 30 to 1000 MHz**

A2.2.1. Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

A2.2.2. Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

A2.2.3. The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested on the open area test site, at the appropriate distance, using a measuring receivers with a Quasi-Peak detector.

A2.2.4. For the main (final) measurements the EUT was arranged on a non-conducting table on an open area test site, as detailed in the specification.

A2.2.5. All measurements on the open area test site were performed using broadband antennas.

A2.2.6. On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

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A2.2.7. The test equipment settings for radiated emissions measurements were as follows:

<b>Receiver Function</b>	<b>Initial Scan</b>	<b>Final Measurements</b>
Detector Type:	Peak	Quasi-Peak (CISPR)
Mode:	Max Hold	Not applicable
Bandwidth:	100 kHz	120 kHz
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

Spurious radiated emissions were measured against the limits specified in Section 15.209 of C.F.R. 47 Part 15 Subpart C - Intentional Radiators.

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### **A2.3 Radiated Magnetic Field Strength, 0.1 to 30 MHz**

A2.3.1 An initial 3 metre scan was performed in a screened enclosure in order to minimise the effect of background radiation and to identify any emissions from the EUT.

A2.3.2 Once emissions were identified from the initial scan, then for the actual measurements, the EUT was arranged on the turntable of an open area test site as detailed in the specification.

A2.3.3 Unless otherwise stated, all measurements were performed at a 3 metre measurement distance using the appropriate limits. Where final measurements were performed at a distance other than that specified in section 15.209 of C.F.R. 47, the limit was extrapolated to the specified distance by the two square of the inverse linear extrapolation factor: 40dB/decade.

A2.3.4 At each frequency where a signal was found, the level was maximised by initially rotating the turntable through 360 degrees and then rotating the loop antenna through 90 degrees.

A2.3.5 At this point, any signal found to be between the limit and a level 6 dB below it was further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

A2.3.6 The test equipment settings for radiated magnetic emissions measurements were as follows:

<b>Receiver Function</b>	<b>Initial Scan</b>	<b>Measurement</b>
Detector Type:	Peak	Quasi-Peak (CISPR) , Average or Peak. (Depending on frequency range).
Mode:	Max Hold	Not applicable
Bandwidth:	200 Hz (Frequency <0.15 MHz) 10 kHz (Frequency >0.15 MHz)	200 Hz (Frequency <0.15 MHz) 9 kHz (Frequency >0.15 MHz)
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

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### **Appendix 3. Test Configuration Drawings**

This appendix contains the following drawings:

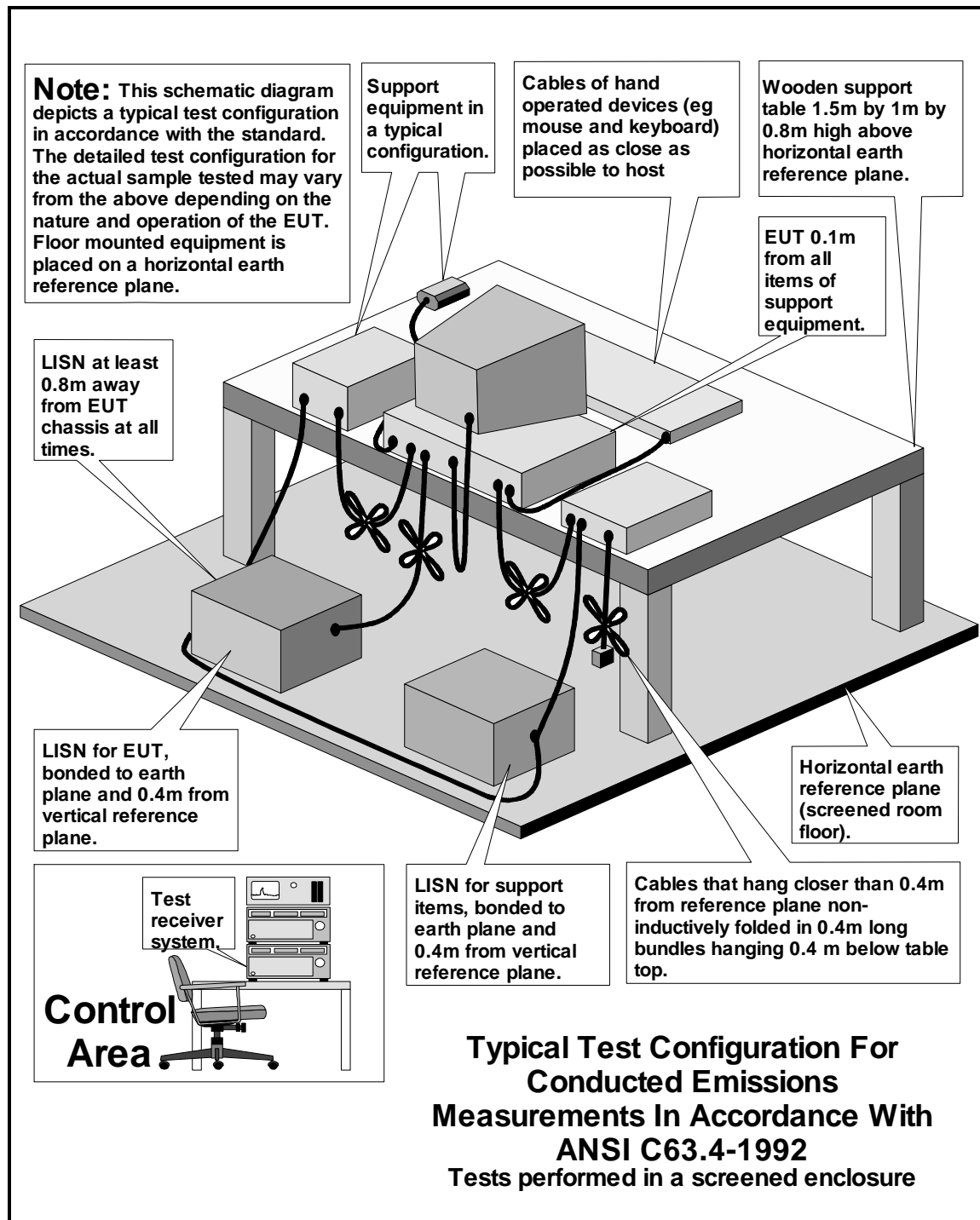
<b>Drawing Reference Number</b>	<b>Title</b>
DRG\39126ETF03\EMICON	Test configuration for measurement of conducted emissions
DRG\39126ETF03\EMIRAD	Test configuration for measurement of radiated emissions
DRG\39126ETF03\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

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DRG\39126ETF03\EMICON

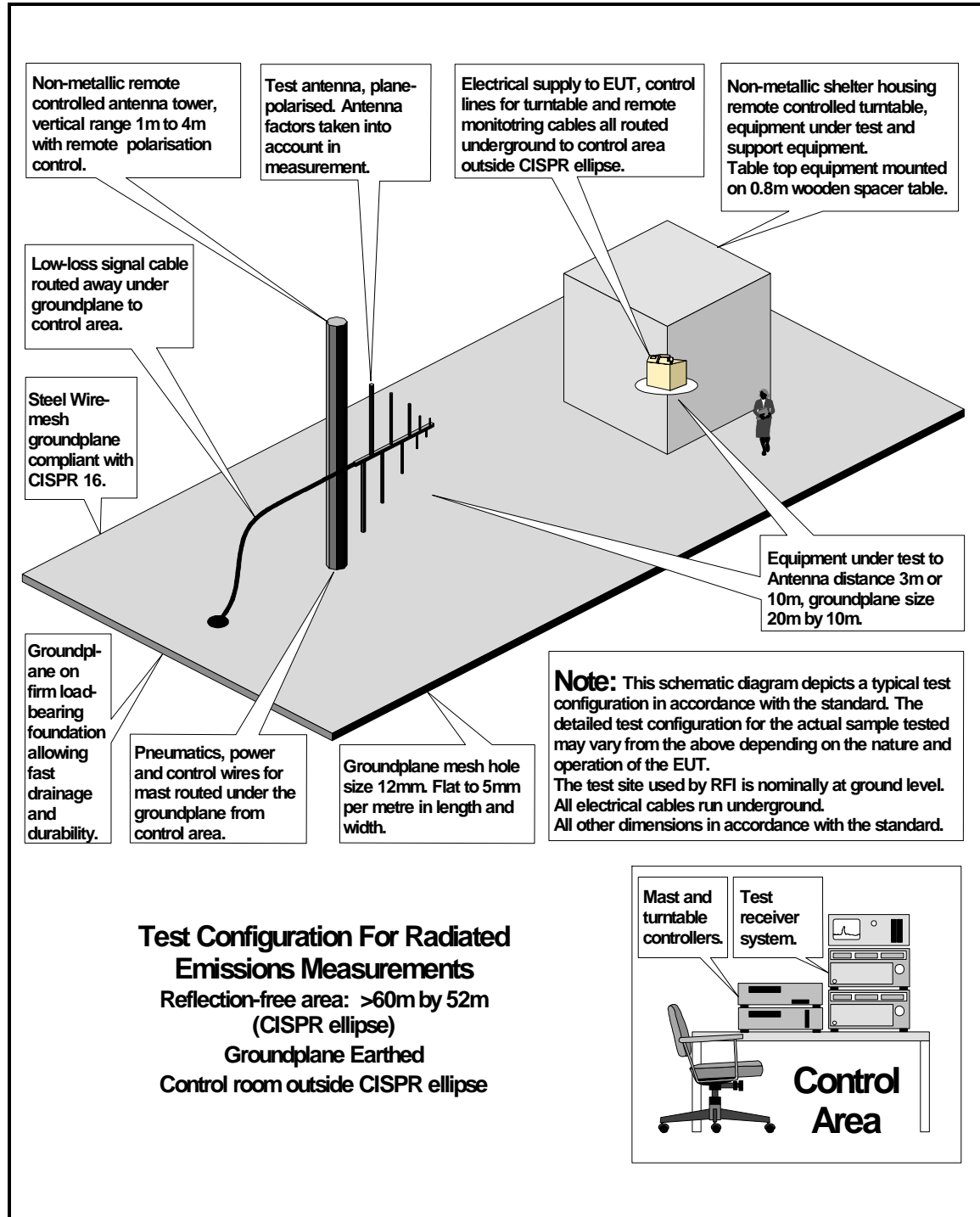


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DRG\39126ETF03\EMIRAD



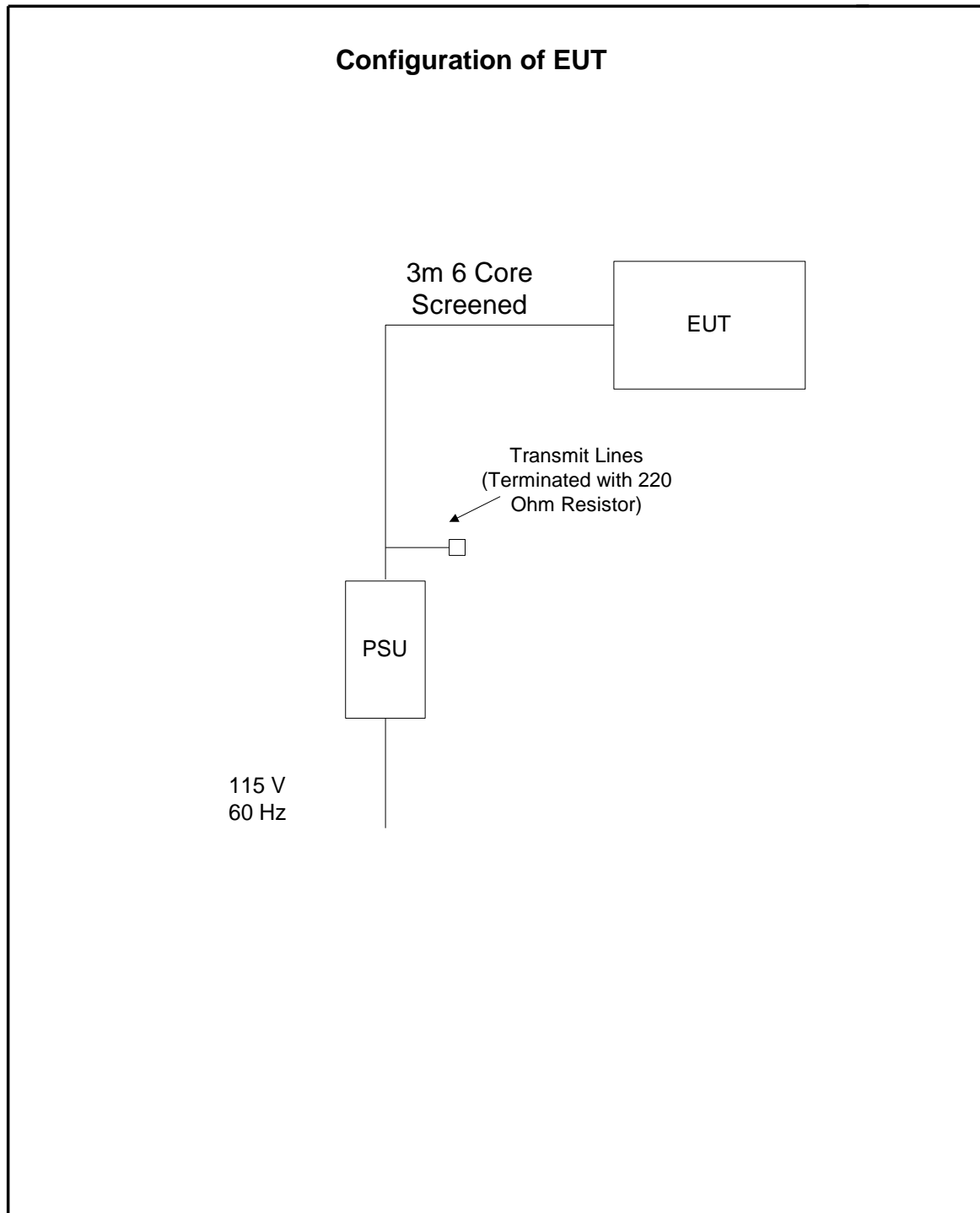
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### Configuration of EUT



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#### **Appendix 4. Graphical Test Results**

This appendix contains the following graphs:

<b>Graph Reference Number</b>	<b>Title</b>
GPH\39126\JD03\001	Scan of Conducted Emissions: 0.45 to 30 MHz. Standby mode. Live Line
GPH\39126\JD03\002	Scan of Conducted Emissions: 0.45 to 30 MHz. Standby mode. Neutral Line
GPH\39126\JD03\003	Scan of Conducted Emissions: 0.45 to 30 MHz. Operate mode. Live Line
GPH\39126\JD03\004	Scan of Conducted Emissions: 0.45 to 30 MHz. Operate mode. Neutral Line
GPH\39126\JD03\005	Scan of Radiated Electric Field: 100 kHz to 30MHz. Operate Mode.
GPH\39126\JD03\006	Scan of Radiated Electric Field: 100 kHz to 30MHz. Standby Mode
GPH\39126\JD03\007	Scan of Radiated Electric Field: 30 MHz to 1000 MHz. Both Polarisation's. Operate Mode
GPH\39126\JD03\008	Scan of Radiated Electric Field: 30 MHz to 1000 MHz. Both Polarisation's. Standby Mode

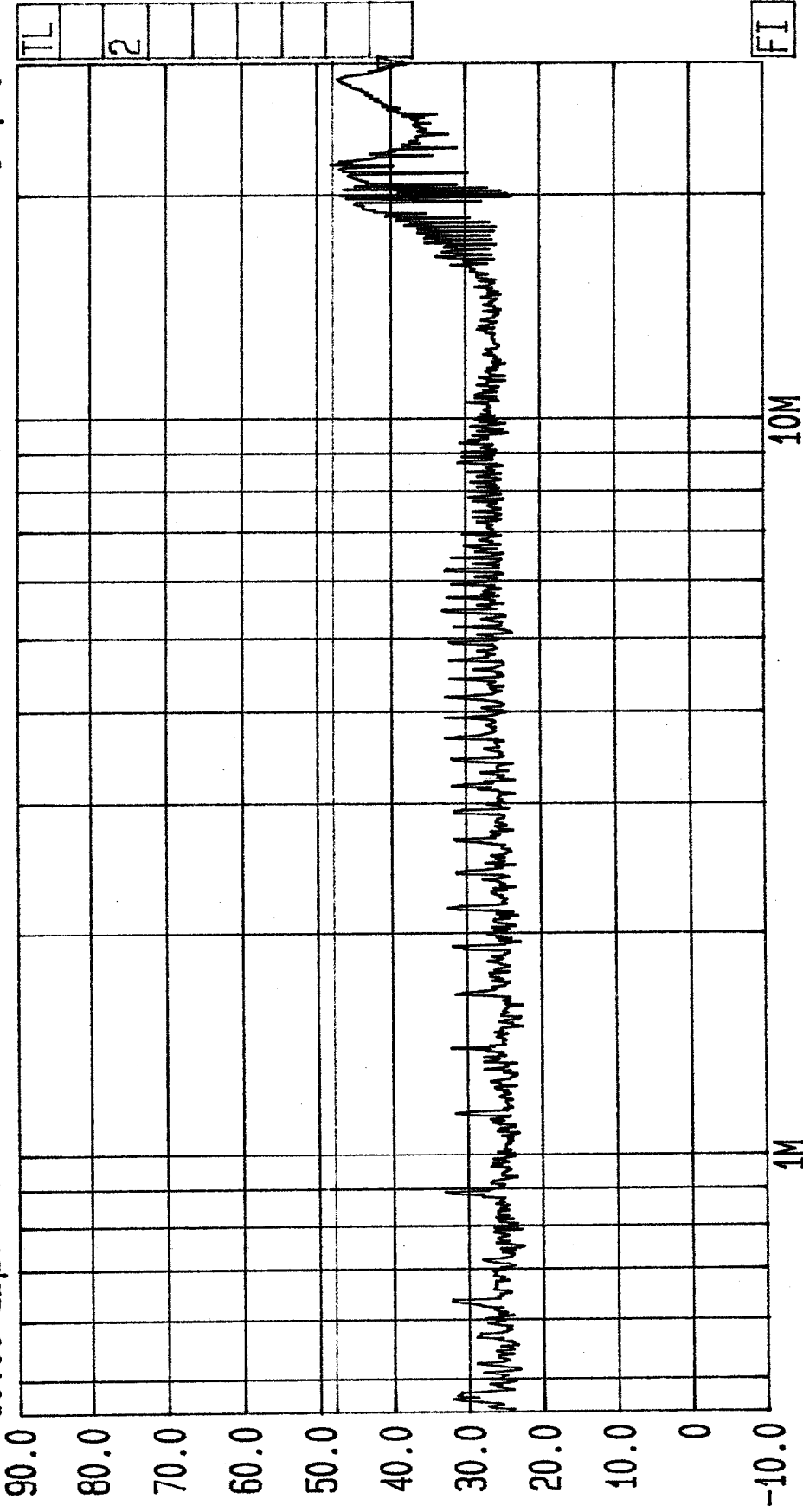
**These pages are not included in the total number of pages for this report.**

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Date 30 Jun. '99 Time 13:42:32  
 Ref. Lvl 90.00 dBµV  
 Marker 38.74 dBµV  
 29.99 MHz

Res. Bw 9 kHz [imp]  
 TG. Lvl 1 Off  
 CF. Stp 2.955 MHz  
 Vid. Bw 100 kHz  
 RF. Att 20 dB  
 Unit [dBµV]



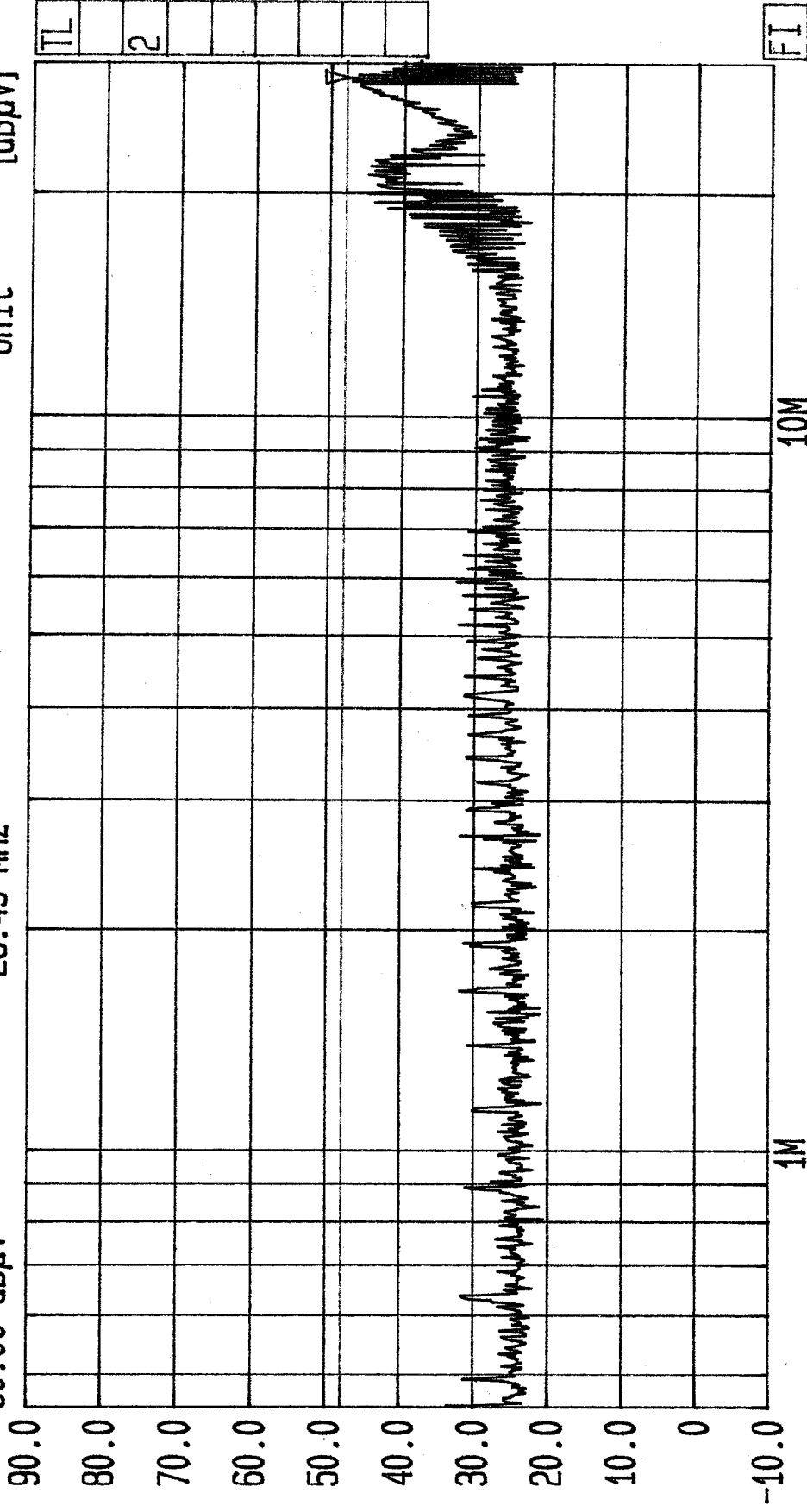
Start 450 kHz  
 Stop 30 MHz  
 Span 29.55 MHz  
 Center 3.67423 MHz  
 Sweep 2.2 s  
 Conducted Tested By RFI For John Falck Assoc. EUT: S680  
 Class B Limit Standby Mode Live Line  
 FCC Part 15 Sub. C  
 GPH: 39126/04/001

2/89



Date 30 Jun '99 Time 13:54:52  
 Ref.Lvl 47.93 dBµV  
 Marker 28.49 MHz  
 90.00 dBµV

Res.Bw 9 kHz [imp] Off  
 TG.Lvl 2.955 MHz  
 CF.Stp 20 dB  
 Vid.Bw 100 kHz  
 AF.Att 20 dB  
 Unit [dBµV]



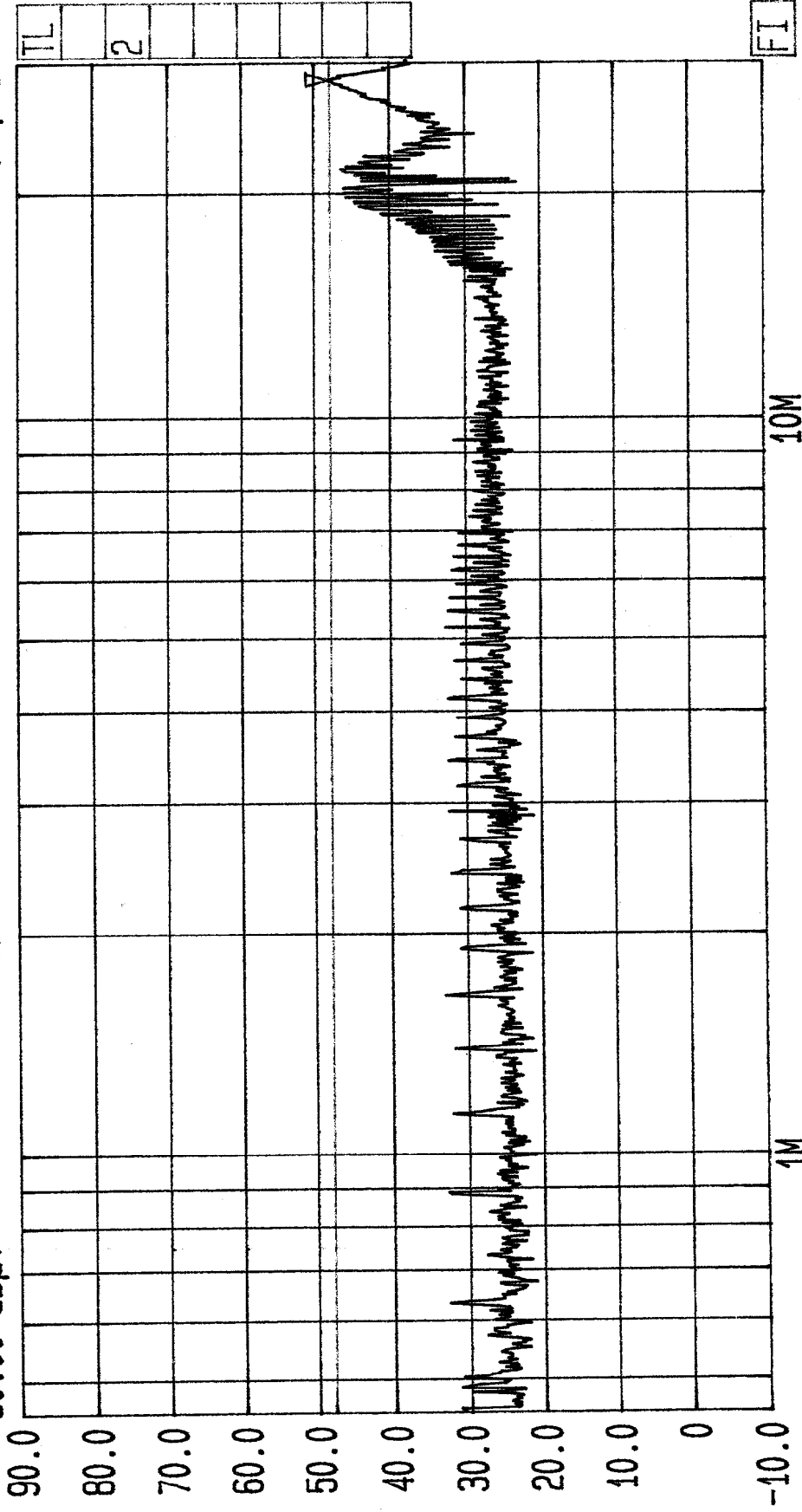
Start 450 kHz Stop 30 MHz  
 Span 29.55 MHz Center 3.67423 MHz Sweep 2.2 s  
 Conducted Tested By RFI For John Falck Assoc. EUT: S680 FCC Part 15 Sub. C  
 Class B Limit Standby Mode Neutral Line GPH: 39126/04/002  
 3/2





Date 30 Jun. '99 Time 14:26:58  
 Ref.Lvl 90.00 dBµV  
 Marker 48.08 dBµV  
 28.36 MHz

Res.Bw 9 kHz [imp]  
 TG.Lvl Off  
 CF.Stp 2.955 MHz  
 Vid.Bw 100 kHz  
 RF.Att 20 dB  
 Unit [dBµV]

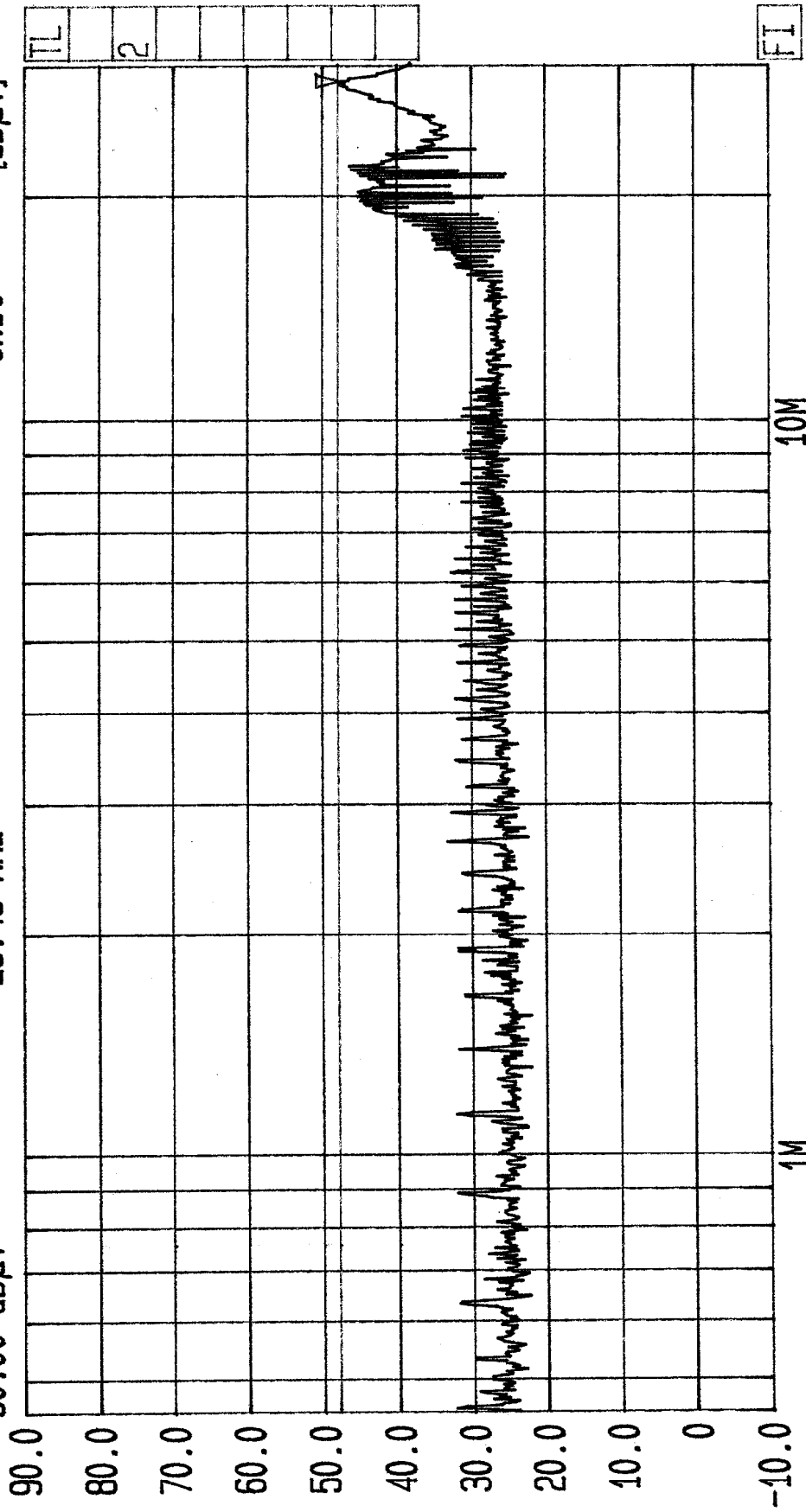


Start 450 kHz Stop 30 MHz  
 Span 29.55 MHz Center 3.67423 MHz Sweep 2.2 s  
 Conducted Tested By RFI For John Falck Assoc. EUT: S680 FCC Part 15 Sub. C  
 Class B Limit Standby Mode Live Line Operate ~~RF~~ GPH: 39126/03/003



Date 30. Jun. '99 Time 14:32:43  
 Ref.Lvl1 90.00 dBµV  
 Marker 47.83 dBµV  
 28.49 MHz

Res.Bw 9 kHz [imp] Vid.Bw 100 kHz  
 TG.Lvl1 Off  
 CF.Stp 2.955 MHz RF.Att 20 dB  
 Unit [dBµV]

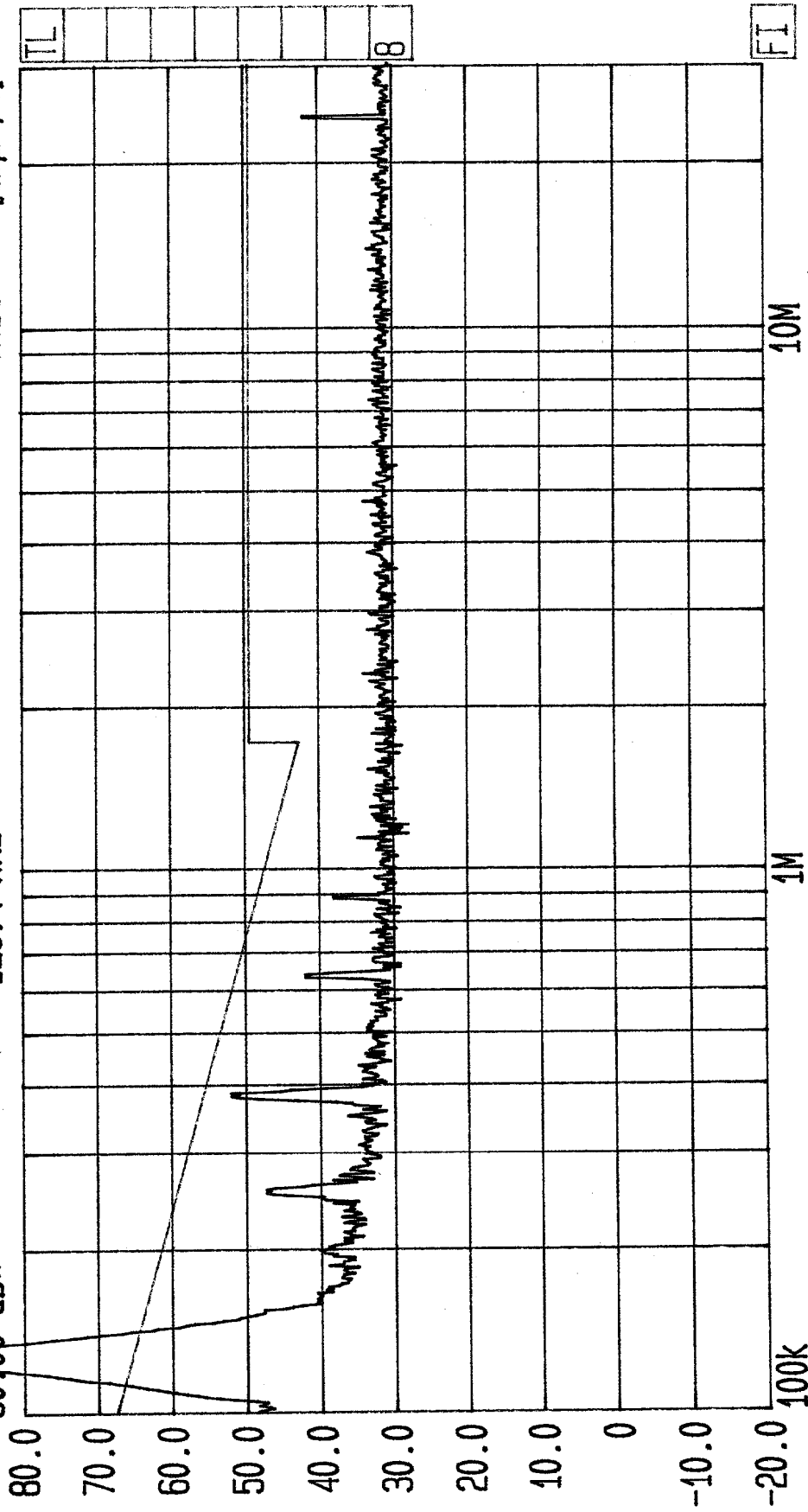


Start 450 kHz Stop 30 MHz  
 Span 29.55 MHz Center 3.67423 MHz Sweep 2.2 s  
 Conducted Tested By RFI For John Falck Assoc. EUT: S680 FCC Part 15 Sub. C  
 Class B Limit Standby Mode Neutral Line GPH: 39126/03/004  
 Operate *SS*



Date 30. Jun. '99 Time 15:56:50  
 Ref. Lvl 80.98 dB\* Marker  
 80.90 dB\* 126.4 kHz

Res. Bw 10 kHz [imp] Vid. Bw 100 kHz  
 TG. Lvl Off  
 CF. Stp 2.990 MHz RF. Att 10 dB  
 Unit [dBµV/m]



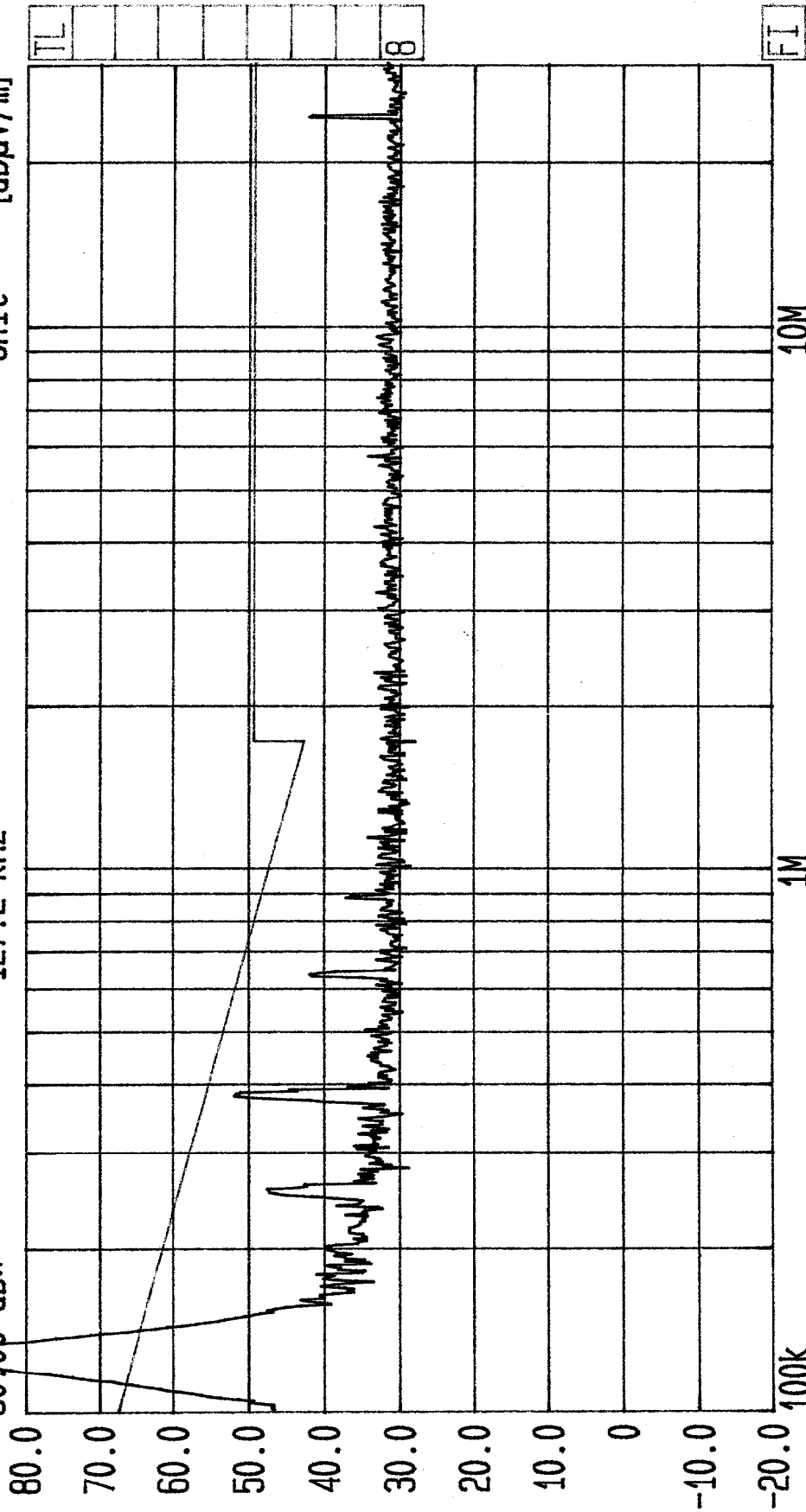
Start 100 kHz Stop 30 MHz  
 Span 29.9 MHz Center 1.73205 MHz Sweep 260 ms  
 Radiated Limit 15.209 @ 3m Tested By RFI For John Falck Assoc. EUT: S680 FCC Part 15 Sub. C  
 Operate Mode GPH: 39126/03/005



Date 30 Jun. '99 Time 16:14:53  
 Ref.Lvl1 83.98 dB\*  
 Marker 127.2 kHz

Res.Bw 10 kHz [imp] Off  
 TG.Lvl1 2.990 MHz  
 CF.Stp 10 dB  
 Unit [dBµV/m]

Vid.Bw 100 kHz



Start 100 kHz  
 Span 29.9 MHz  
 Center 1.73205 MHz  
 Sweep 1.62 s  
 Stop 30 MHz

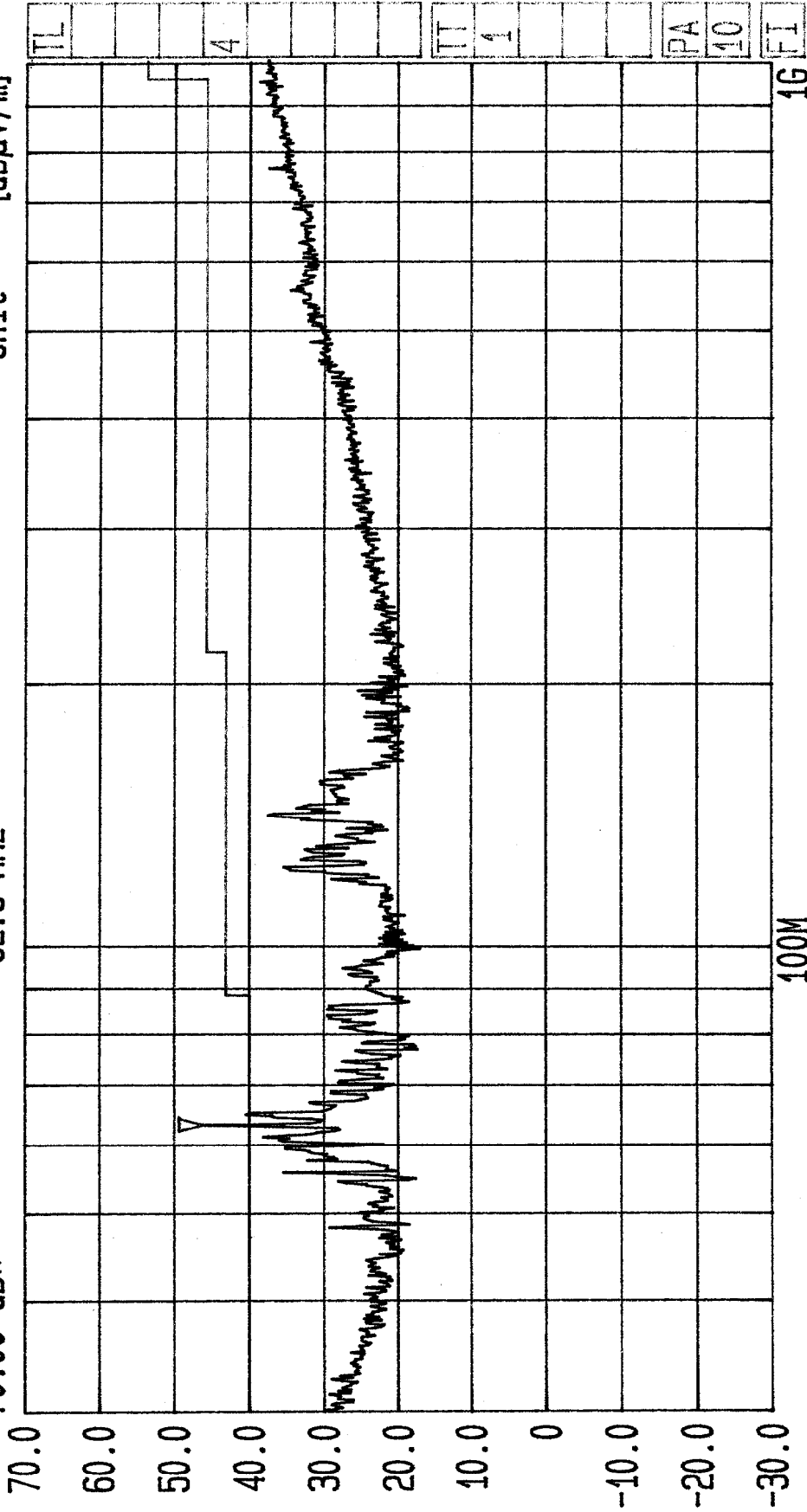
Radiated Limit 15.209 @ 3m  
 Tested By RFI For John Falck Assoc. EUT: S680  
 Standby Mode  
 FCC Part 15 Sub. C  
 GPH: 39126/03/006





Date 30 Jun. '99 Time 17:45:34  
 Ref.Lvl 70.00 dB\* Marker 46.21 dB\*  
 CF.Stp 62.8 MHz

Res.Bw 120 kHz [imp] Vid.Bw 100 kHz  
 TG.Lvl Off RF.Att 0 dB  
 Unit [dBuV/m]



Start 30 MHz Stop 1 GHz  
 Span 970 MHz Sweep 380 ms  
 Center 173.2 MHz  
 Radiated Test By RFI For John Falck Assoc. EUT: S680 FCC Part 15 Sub. C  
 Limit 15.209 @ 3m Standby Mode GPH: 39126/03/008

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### **Appendix 5. Photographs of EUT**

This appendix contains the following photographs:

<b>Photo Reference Number</b>	<b>Title</b>
PHT/39126ETF03/001	Front view of conducted emissions.
PHT/39126ETF03/002	Side view of conducted emissions.
PHT/39126ETF03/003	Front view of radiated emissions.
PHT/39126ETF03/004	Side view of radiated emissions.
PHT/39126ETF03/005	Rear view of radiated emissions.

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**RADIO FREQUENCY INVESTIGATION LTD.**

**TEST REPORT**

**EMC Department**

**S.No: RFI/EMCB/RP39126A**

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**Issue Date: 22 July 1999**

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EMC Department

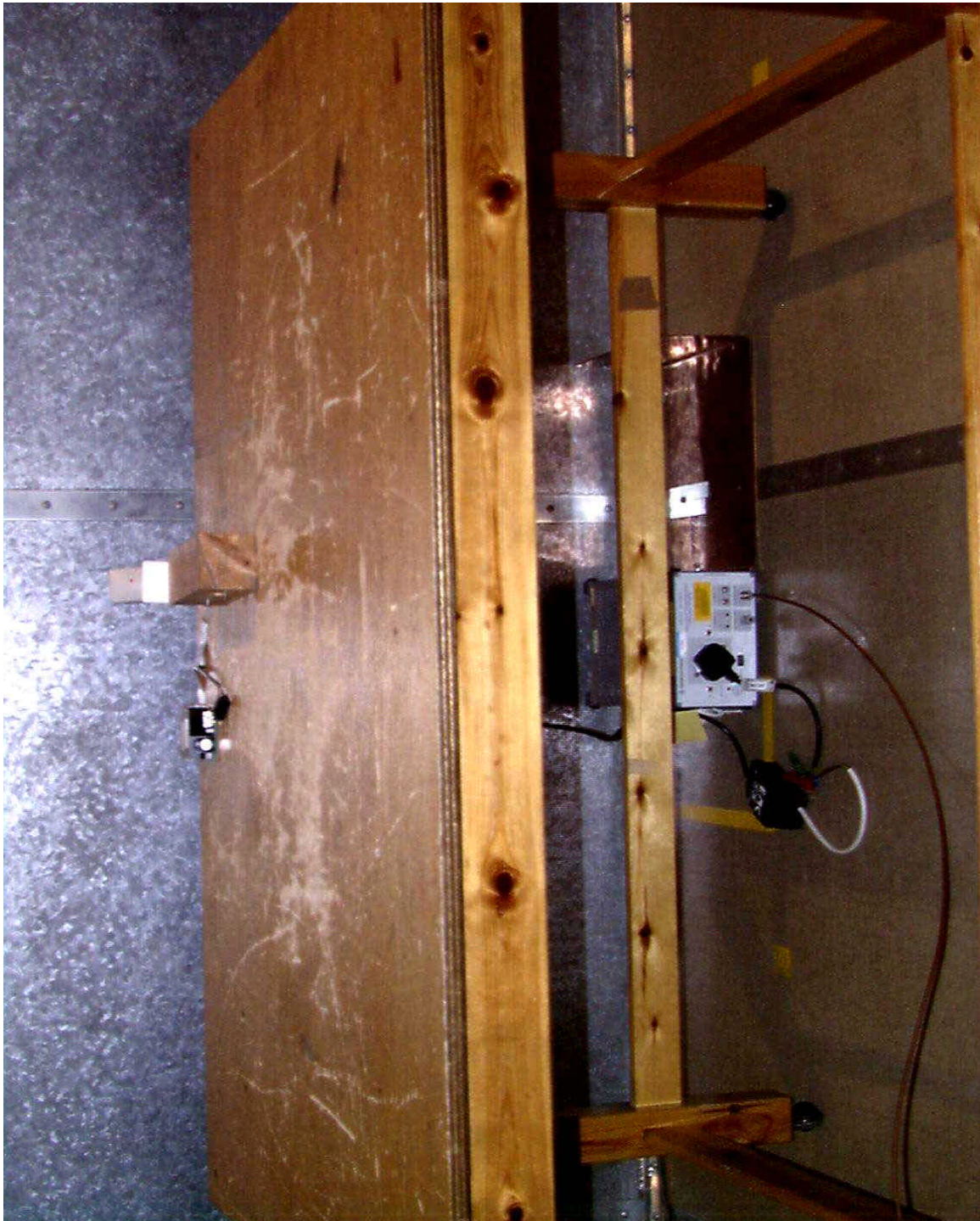
Test Of: John Falck Associates.  
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PHT/39126ETF03/001 Front view of conducted emissions.



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**PHT/39126ETF03/002 Side view of conducted emissions.**





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PHT/39126ETF03/003 Front view of radiated emissions.



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**PHT/39126ETF03/004 Side view of radiated emissions.**





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**PHT/39126ETF03/005 Rear view of radiated emissions.**

