TEST REPORT
FROM
RADIO FREQUENCY
INVESTIGATION LTD.

Test of: John Falck Associates.
Group 4 Technology Proximity
Reader Device 8000-5219-S

To: F.C.C. Part 15:1997 Subpart C
Sections 15.207 and 15.209
(Intentional Radiators)

Test Report Serial No:
RFI/EMCB1/RP38147A

This Test Report Is Issued Under The Authority Of Brian Watson Technical Director: 	**Checked By:** 
Tested By:  **p.p.**	**Release Version No: PDF01**
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Group 4 Technology Proximity Reader Device 8000-5219-S
To: **F.C.C. Part 15:1997 Subpart C Section 15.207 and 15.209 (Intentional Radiators)**

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1. Client Information

Company Name:	John Falck Associates
Address:	36 New Barns Road Ely Cambs CB7 4PN
Contact Name:	Mr J Falck

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:	Securitas Technology
Model Name or Number:	8000-5219-S
Unique Type Identification:	Proximity Detector
Serial Number:	9840007
Country of Manufacture:	UK
FCC ID Number:	Pending
Date of Receipt:	20 December 1998

2.2. Description Of EUT

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

2.3. Modifications Incorporated In EUT

For the purpose of testing, the EUT was modified to provide a continuous carrier transmit signal.

2.4. Additional Information Related To Testing

Power Supply Requirement:	+ 12 volt DC
Intended Operating Environment:	Commercial, Light Industry
Weight:	210 g
Dimensions:	125 mm x 100 mm x 45 mm
Interface Ports:	20 mA Current Loop Single Input/Output Line to Door Interface Module

2.5. Support Equipment

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

Description:	Power Supply Unit
Brand Name:	Lascar
Model Name or Number:	PSU 20112 (110 V AC)
Serial Number:	QA Batch TAH 24/3/98
FCC ID Number:	None stated by the client
Cable Length And Type:	3m Multicore Shielded
Connected to Port:	DC + 12 V Input on EUT

3. Test Specification, Methods And Procedures

3.1. Test Specification

Reference:	F.C.C. Part 15 Subpart C. Section 15.207 and 15.209 - Intentional Radiators*
Title:	Code of Federal Regulations, Part 15 (47CFR15), 1997 Radio Frequency Devices: Intentional Radiators.
Comments:	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.
Purpose of Test:	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.

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.

4. Deviations From The Test Specification

None

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 a client supplied mains power supply unit. Screened cables terminated with dummy loads were connected to the data interface.

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.

6. Summary Of Test Results

6.1. Conducted Emissions

Range Of Measurements	Specification Reference	Compliancy Status
AC Powerline Conducted Emissions, 450 kHz to 30 MHz	Section 15.207 of C.F.R. 47: 1997	Complied

6.2. Radiated Emissions

Range Of Measurements	Specification Reference	Compliancy Status
Magnetic Field Strength 100 kHz to 30 MHz	Section 15.209 of C.F.R. 47: 1997	Complied
Electric Field Strength, 30 MHz to 1000 MHz	Section 15.209 of C.F.R. 47: 1997	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.

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.

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
0.480	Live	24.0	48.0	24.0	Complied
0.480	Neutral	23.9	48.0	24.1	Complied
0.500	Live	22.8	48.0	25.2	Complied
0.500	Neutral	22.2	48.0	25.8	Complied
0.520	Live	20.8	48.0	27.2	Complied
0.520	Neutral	20.1	48.0	27.9	Complied
0.540	Live	19.0	48.0	29.0	Complied
0.540	Neutral	17.9	48.0	30.1	Complied
19.611	Live	32.0	48.0	16.0	Complied
19.611	Neutral	32.4	48.0	15.6	Complied
27.657	Live	28.5	48.0	19.5	Complied
27.657	Neutral	27.1	48.0	20.9	Complied

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:

Frequency (MHz)	Line	Q-P Level (dBmV)	Q-P Limit (dBmV)	Margin (dB)	Result
0.480	Live	24.4	48.0	23.6	Complied
0.480	Neutral	24.2	48.0	23.8	Complied
0.500	Live	23.0	48.0	25.0	Complied
0.500	Neutral	22.5	48.0	25.5	Complied
0.520	Live	21.1	48.0	26.9	Complied
0.520	Neutral	20.2	48.0	27.8	Complied
0.540	Live	19.3	48.0	28.7	Complied
0.540	Neutral	18.2	48.0	29.8	Complied
19.611	Live	32.8	48.0	15.2	Complied
19.611	Neutral	31.7	48.0	16.3	Complied
27.657	Live	28.0	48.0	20.0	Complied
27.657	Neutral	27.0	48.0	20.9	Complied

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 125kHz. Therefore radiated emission preliminary scans were performed from 100kHz.

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 10m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Av. Level (dBmV/m)	Av. Limit (dBmV/m)	Margin (dB)	Result
0.1263	0°	51.5	84.7	33.2	Complied. Note 1
0.2529	0°	44.4	78.6	34.2	Complied. Note 1
0.3800	0°	10.7	45.6	64.4	Complied. Note 2

Frequency (MHz)	Ant. Pol.	Peak Level (dBmV/m)	Peak Limit (dBmV/m)	Margin (dB)	Result
0.1263	0°	54.0	104.7	50.7	Complied. Note 1
0.2529	0°	49.0	98.6	49.6	Complied. Note 1
0.3800	90°	22.4	65.6	72.7	Complied. Note 2

Note 1. Each limit has been calculated at 10m from 300m using the following square of an inverse linear distance extrapolation factor (40dB/decade).

Note 2. Each limit has been calculated at 10m from 300m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.4.1.4. 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 125kHz. 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 10m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Av Level (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Result
0.1263	0°	49.4	84.7	35.3	Complied. Note 1
0.2529	0°	44.2	78.6	23.9	Complied. Note 1
0.3800	0°	9.9	45.6	65.2	Complied. Note 2

Frequency (MHz)	Ant. Pol.	Peak Level (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Result
0.1263	0°	51.4	104.7	53.3	Complied. Note 1
0.2529	00°	50.1	98.6	48.5	Complied. Note 1
0.3800	90°	21.5	65.6	73.6	Complied. Note 2

Note 1. Each limit has been calculated at 10m from 300m using the following square of an inverse linear distance extrapolation factor (40dB/decade).

Note 2. Each limit has been calculated at 10m from 300 or 30m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.4.2.4. 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: 0.1 to 30 MHz

7.5.1. Standby Mode

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

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

7.5.1.3. The following table lists frequencies at which emissions were measured using a Quasi-Peak detector at a test distance of 10m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
0.6307	0°	37.4	41.2	3.8	Note 1 and 2
0.8827	90°	44.2	38.0	-6.2	Note 1 and 2

Note 1. The above measured level's, as identified from the preliminary scans were performed at a test distance of 10m on the Open Area Test Site and were noted to be of an ambient source. Therefore a further measurement was performed at a test distance of 3m to demonstrate compliance.

Note 2. Each limit has been calculated at 10m from 30m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.5.1.4. The following table lists frequencies at which the ambient 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.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
0.6307	0°	37.9	51.6	13.7	Complied. Note 1
0.8827	90°	42.8	48.7	5.9	Complied. Note 1

Note 1. Each limit has been calculated at 3m from 30m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.5.2. Operate Mode

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

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 10m. (results incorporate antenna factors and cable losses).

Frequency (MHz)	Ant. Pol.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
0.6307	0°	36.2	41.2	5.0	Note 1 & 2
0.8827	90°	44.4	38.0	-6.4	Note 1 & 2

Note 1. The above measured level's, as identified from the preliminary scans were performed at a test distance of 10m on the Open Area Test Site and were noted to be of an ambient source. Therefore a further measurement was performed at a test distance of 3m to demonstrate compliance.

Note 2. Each limit has been calculated at 10m from 30m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.5.2.4. The following table lists frequencies at which the ambient 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.	Quasi-Peak Level (dBmV/m)	Quasi-Peak Limit (dBmV/m)	Margin (dB)	Result
0.6307	0°	36.0	41.2	15.5	Complied. Note 1
0.8827	90°	42.1	38.0	6.5	Complied. Note 1

Note 1. Each limit has been calculated at 3m from 30m using the following square of an inverse linear distance extrapolation factor (20dB/decade).

7.6. Test Results For Radiated Emissions.

7.6.1. Electric Field Strength Measurements of Spurious Emissions

7.6.2. Standby Mode

7.6.2.1. The client has stated that the highest frequency generated or used in the EUT was 4.0 MHz. Therefore tests were performed up to 1000 MHz.

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

7.6.2.3. 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
59.588	Vert.	21.2	40.0	18.8	Complied
67.633	Vert.	25.9	40.0	14.1	Complied
72.033	Vert.	22.4	40.0	17.6	Complied
80.832	Vert.	32.9	40.0	7.1	Complied
87.369	Vert.	16.6	40.0	23.4	Complied
91.769	Vert.	28.9	43.5	14.6	Complied
101.449	Vert.	26.3	43.5	17.2	Complied
116.660	Vert.	25.3	43.5	18.2	Complied

7.6.3. Operate Mode

7.6.3.1. The client has stated that the highest frequency generated or used in the EUT was 4.0 MHz. Therefore tests were performed up to 1000 MHz.

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

7.6.3.3. 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):

Frequency (MHz)	Ant. Pol.	Q-P Level (dBmV/m)	Limit (dBmV/m)	Margin (dB)	Result
59.588	Vert.	20.9	40.0	19.1	Complied
67.633	Vert.	25.0	40.0	15.0	Complied
72.033	Vert.	23.0	40.0	17.0	Complied
80.832	Vert.	32.1	40.0	7.9	Complied
87.369	Vert.	18.0	40.0	22.0	Complied
91.769	Vert.	29.1	43.5	14.4	Complied
101.449	Vert.	27.4	43.5	16.1	Complied
116.660	Vert.	25.1	43.5	18.4	Complied

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:

Measurement Type	Range	Confidence Level	Calculated Uncertainty
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).

Appendix 1. Test Equipment Used

Instrument	Manufacturer	Model	RFI No.
Screened Enclosure: Emissions			
Receiver	R & S	ESH3	M032
L.I.S.N.	R & S	ESH3-Z5	A191
Loop Antenna	R & S	HFH2-Z2	A007
Metal Tripod	R & S	HFU-Z	A008
Site 12	RFI	12	S212
Receiver	R & S	ESVP	M002
Spectrum Monitor	R & S	EZM	M004
Pulse Limiter	R & S	ESH3-Z2	A287
Cable	RFI	RG58	C370
Bilog Antenna	Chase	CBL6111A	A490
Open Area Test Site			
Receiver	R & S	ESVP	M023
Spectrum Monitor	R & S	EZM	M003
Receiver	R & S	ESH3	M032
Spectrum Monitor	R & S	EZM	M004
Loop Antenna	R & S	HFH2-Z2	A007
Bilog Antenna	Chase	CBL6111	A259
OATS Positioning Controller	R & S	HCC	A276
OATS Antenna Mast	R & S	HCM	A277
HovAir Turntable	HovAir	TT(3)-3.5T	A443
Attenuator	Narda	771-03	A262

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Test Equipment Used (continued)

Instrument	Manufacturer	Model	RFI No.
Open Area Test Site (continued)			
Temperature/Humidity Meter	RS Comp	212-214	M117
Site 1	RFI	1	S201
Metal Tripod	R & S	HFU-Z	A008

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

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.

A2.2. Radiated Emissions, 30 to 1000 MHz: FCC Part 15

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:

Receiver Function	**Initial Scan**	**Final Measurements**
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.

A2.3 Radiated Magnetic Field Strength, 0.1 to 30 MHz FCC Part 15

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 10 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 using either of the two square of the inverse linear extrapolation factors. For frequencies below 300kHz: 40dB/decade. For frequencies above 300kHz: 20dB/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:

Receiver Function	**Initial Scan**	**Measurement**
Detector Type:	Peak	Quasi-Peak (CISPR) , Average or Peak. (Depending on frequency range).
Mode:	Max Hold	Not applicable
Bandwidth:	300 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

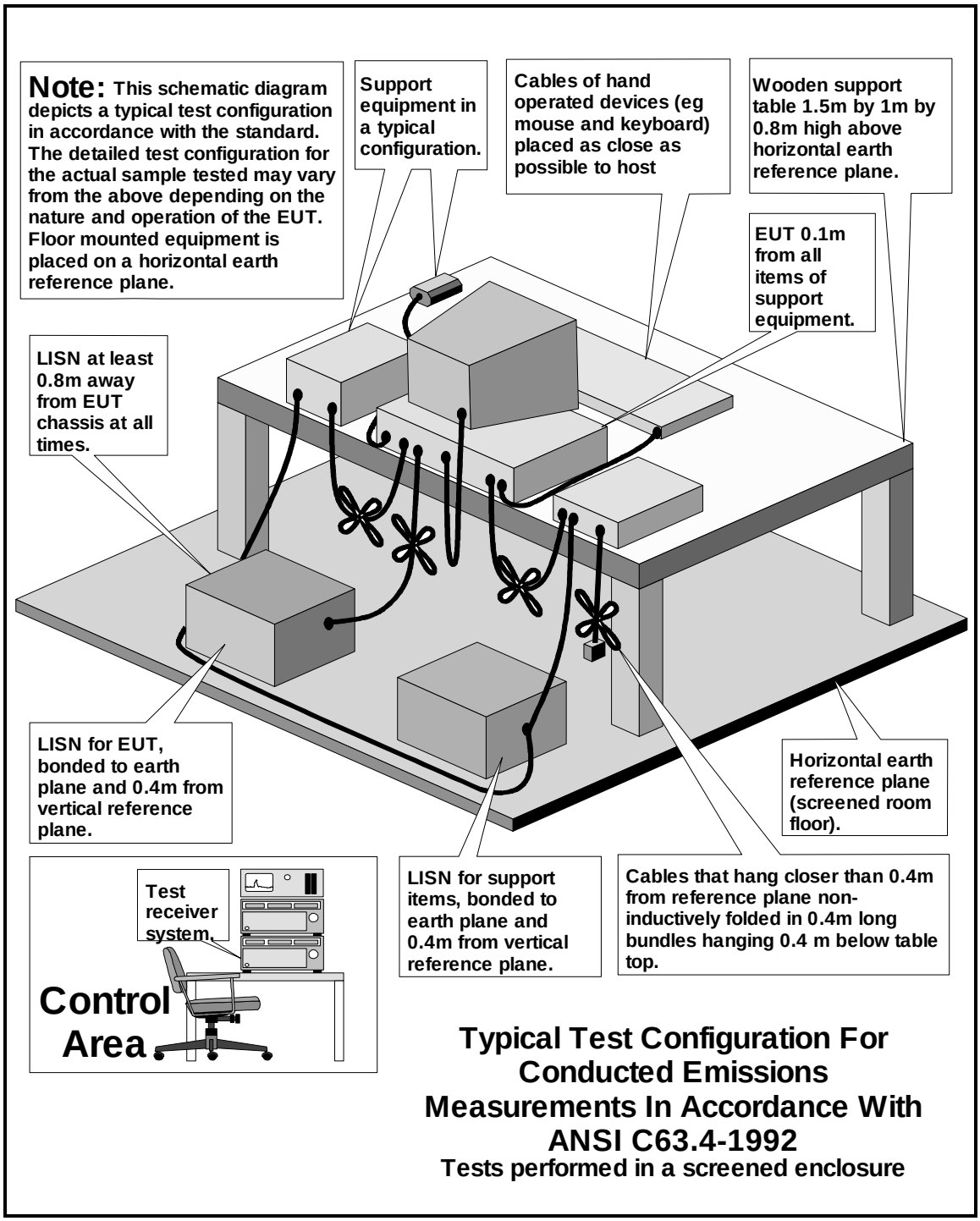
Appendix 3. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\38147ETF03\EMICON	Test configuration for measurement of conducted emissions
DRG\38147ETF03\EMIRAD	Test configuration for measurement of radiated emissions
DRG\38147ETF03\001	Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

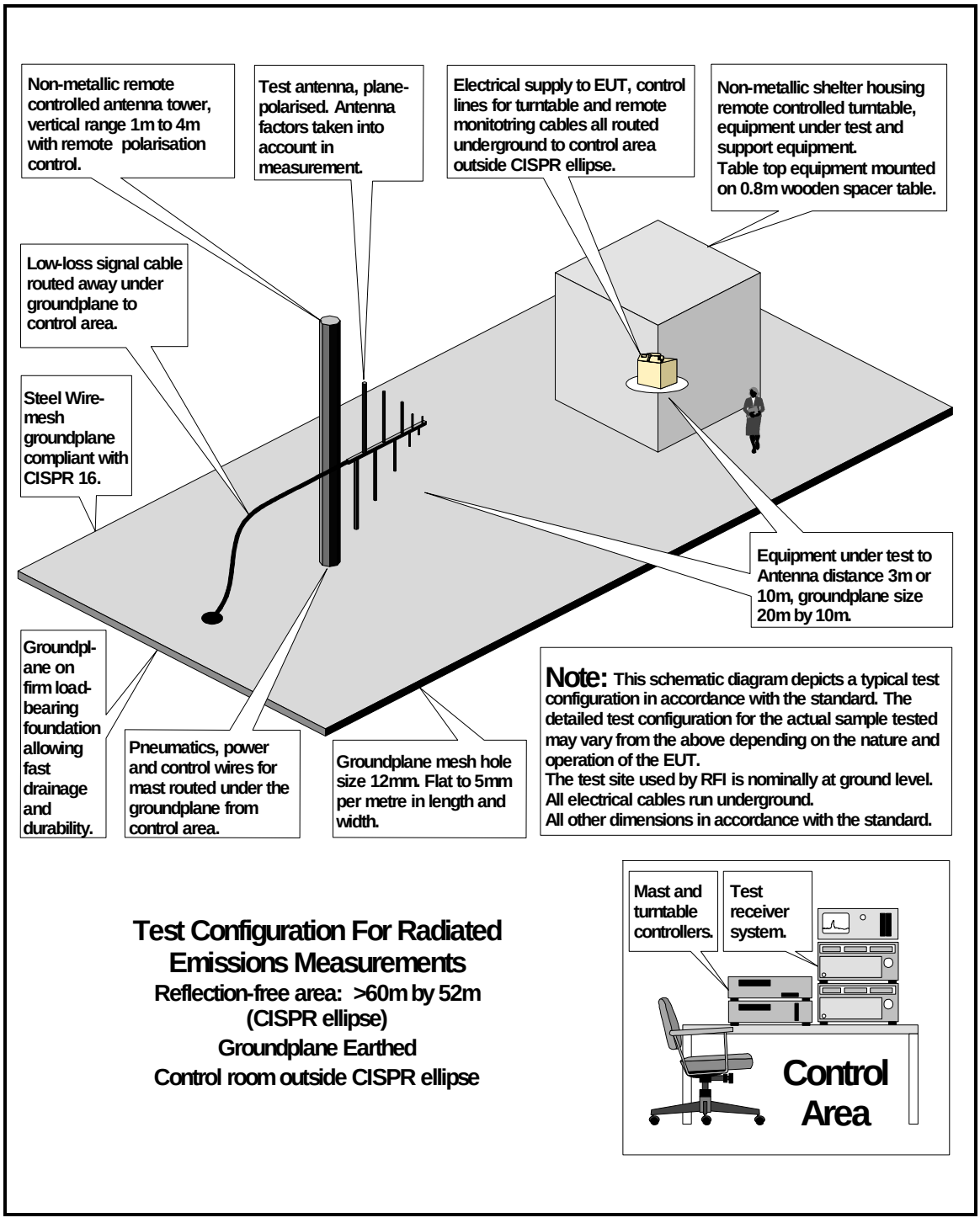
Test Of: **John Falck Associates.**
Group 4 Technology Proximity Reader Device 8000-5219-S
To: **F.C.C. Part 15:1997 Subpart C Section 15.207 and 15.209 (Intentional Radiators)**

DRG\38147ETF03\EMICON



Test Of: **John Falck Associates.**
Group 4 Technology Proximity Reader Device 8000-5219-S
To: **F.C.C. Part 15:1997 Subpart C Section 15.207 and 15.209 (Intentional Radiators)**

DRG\38147ETF03\EMIRAD

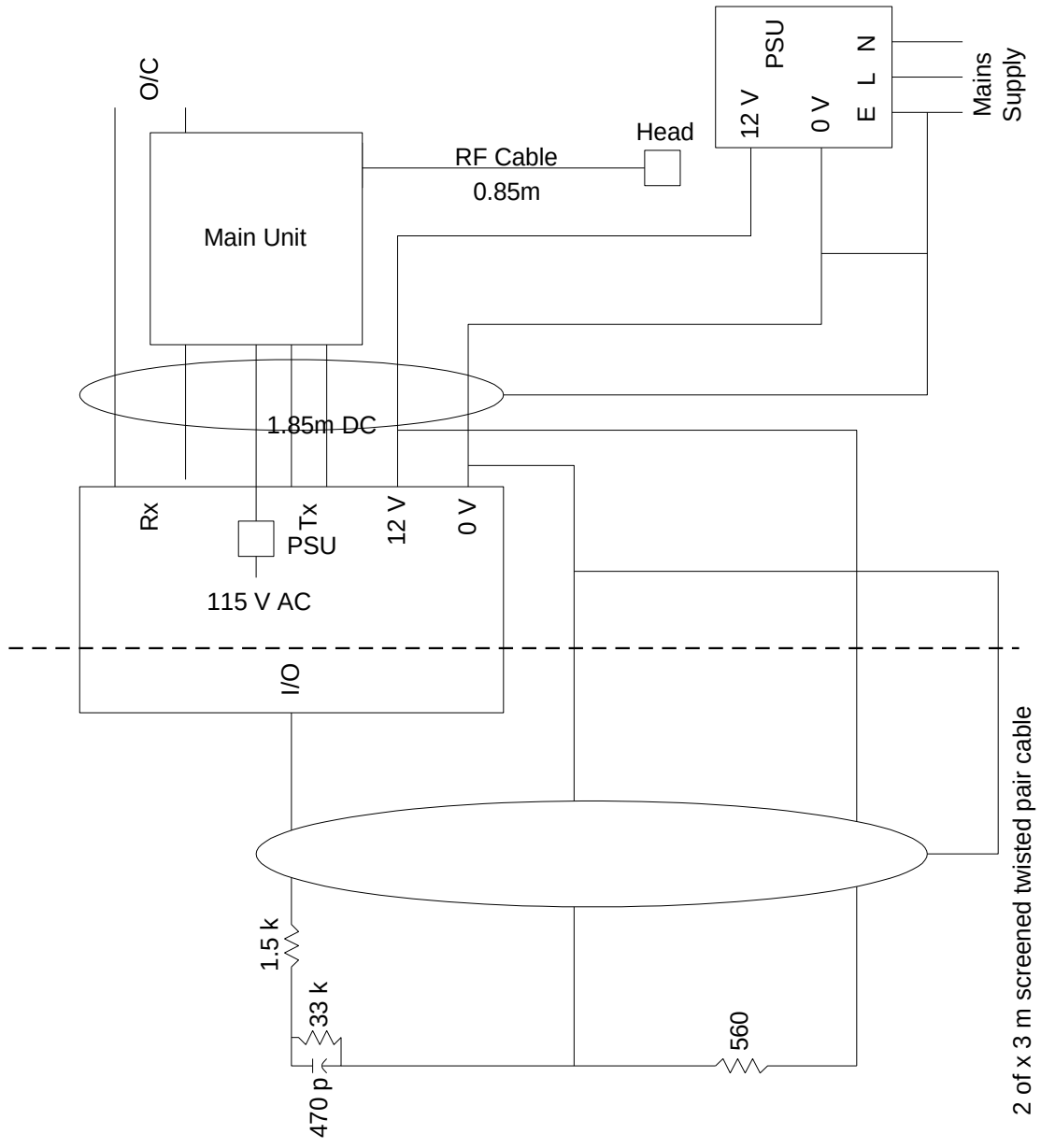


Test Configuration For Radiated Emissions Measurements
Reflection-free area: >60m by 52m (CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse

Test Of: **John Falck Associates.**
Group 4 Technology Proximity Reader Device 8000-5219-S
To: **F.C.C. Part 15:1997 Subpart C Section 15.207 and 15.209 (Intentional Radiators)**

DRG\38147ETF03\001

Configuration of EUT and Local Support Equipment



Configuration of Remote Support Equipment

Appendix 4. Graphical Test Results

This appendix contains the following graphs:

Graph Reference Number	Title
GPH\38147\JD03\001	Scan of radiated magnetic field: 100kHz to 30MHz. Standby mode
GPH\38147\JD03\002	Scan of radiated magnetic field: 100kHz to 30MHz. Operate mode
GPH\38147\JD03\003	Scan of conducted emissions: 0.45 to 30 MHz. Standby mode. Live line
GPH\38147\JD03\004	Scan of conducted emissions: 0.45 to 30 MHz. Standby mode. Neutral line
GPH\38147\JD03\005	Scan of conducted emissions: 0.45 to 30 MHz. Operate mode. Live line
GPH\38147\JD03\006	Scan of conducted emissions: 0.45 to 30 MHz. Operate mode. Neutral line
GPH\38147\JD03\007	Scan of radiated electric field: 30 to 200 MHz. Both Polarisation's. Standby mode
GPH\38147\JD03\008	Scan of radiated electric field: 200 to 1000 MHz. Both Polarisation's. Standby mode
GPH\38147\JD03\009	Scan of radiated electric field: 30 to 200 MHz. Both Polarisation's. Operate mode
GPH\38147\JD03\010	Scan of radiated electric field: 200 to 1000 MHz. Both Polarisation's. Operate mode

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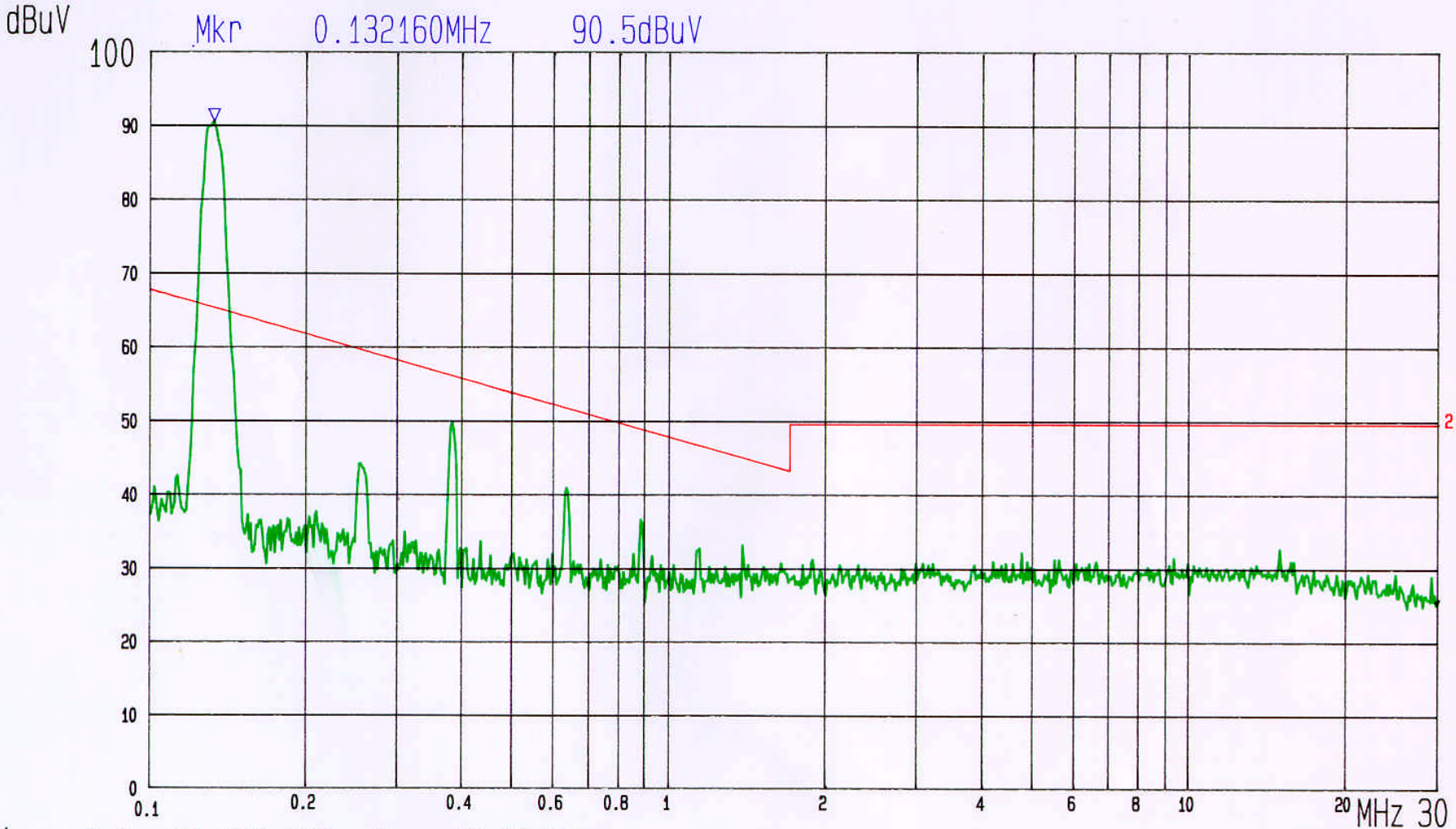
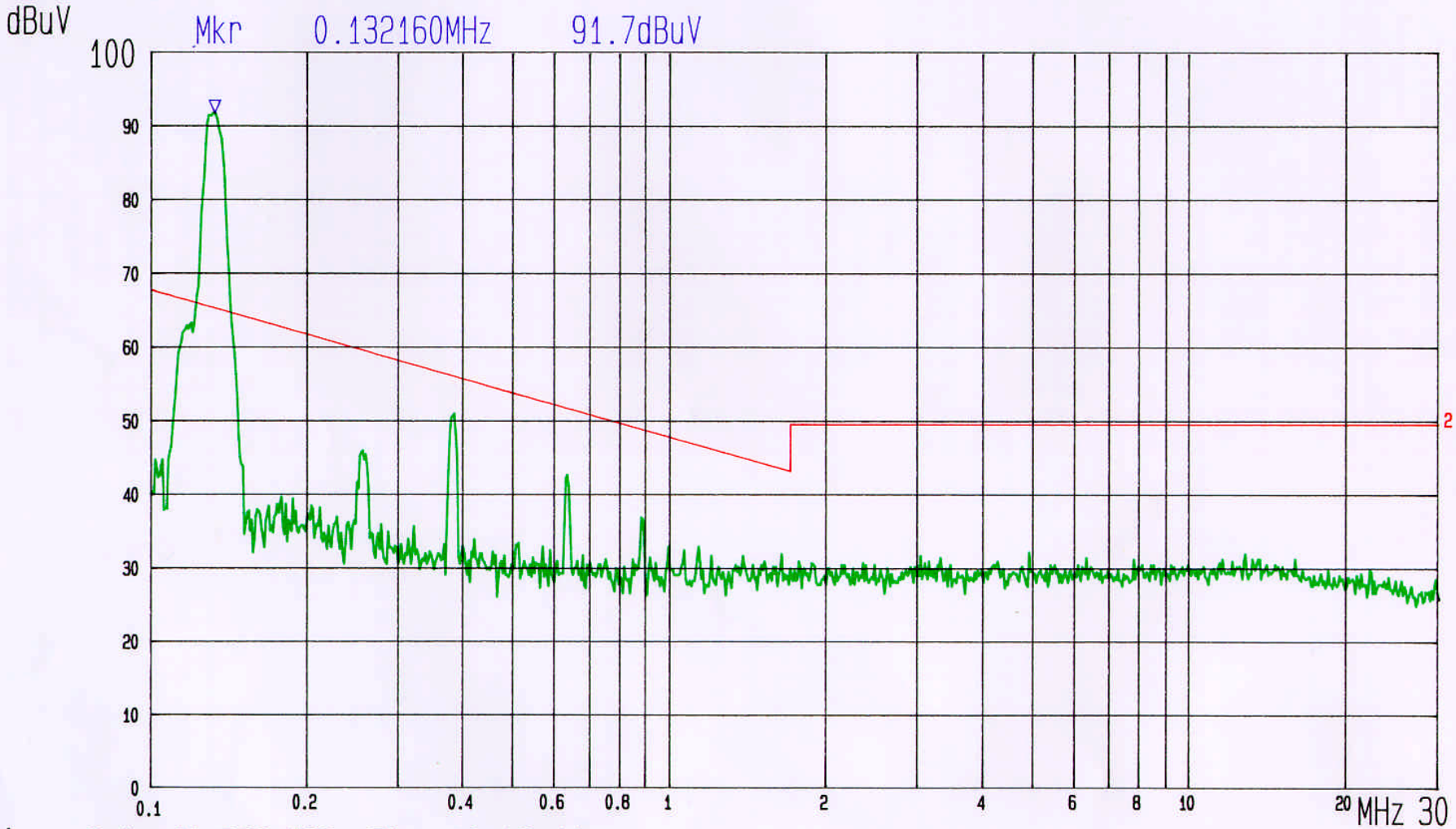
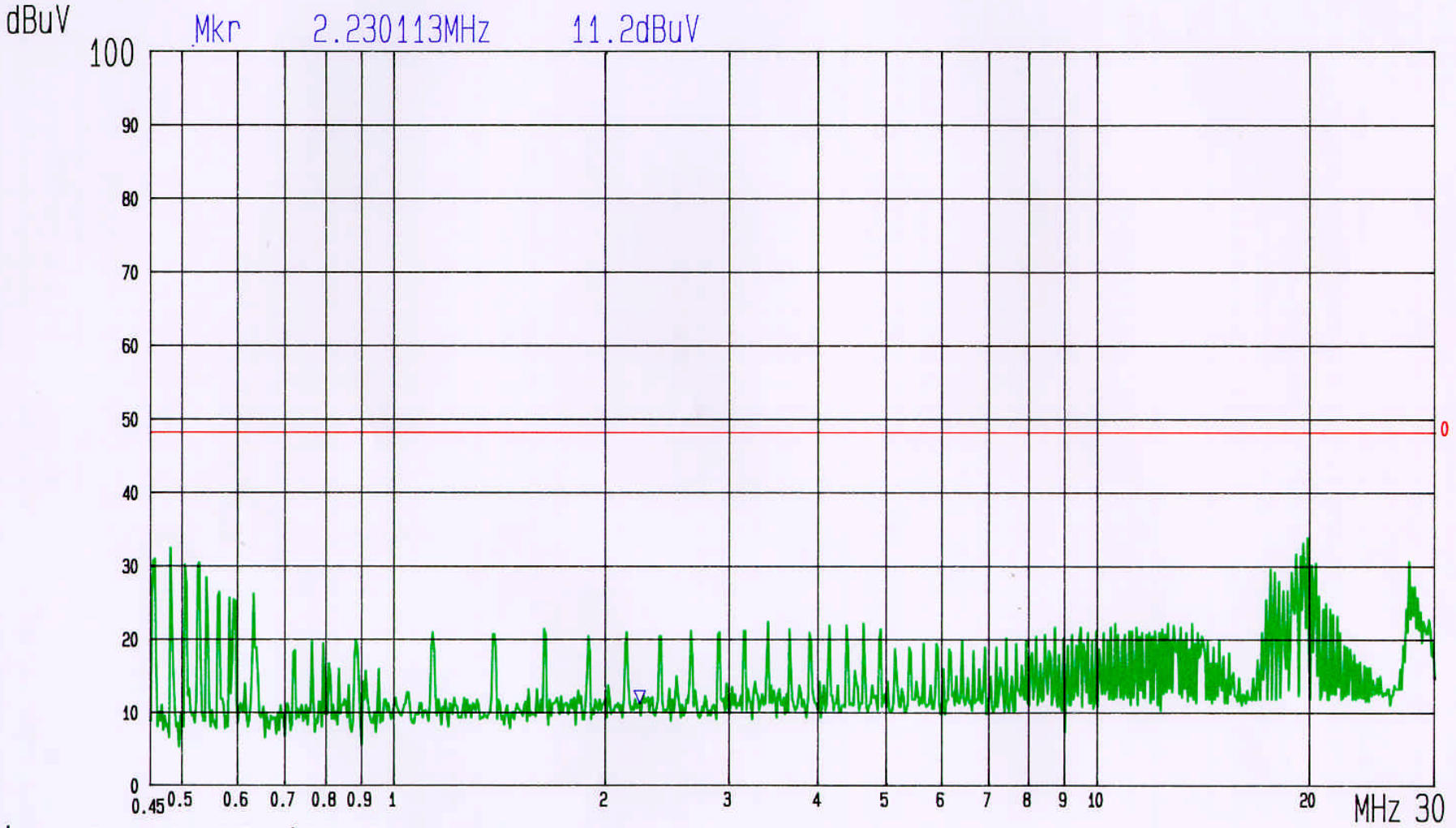


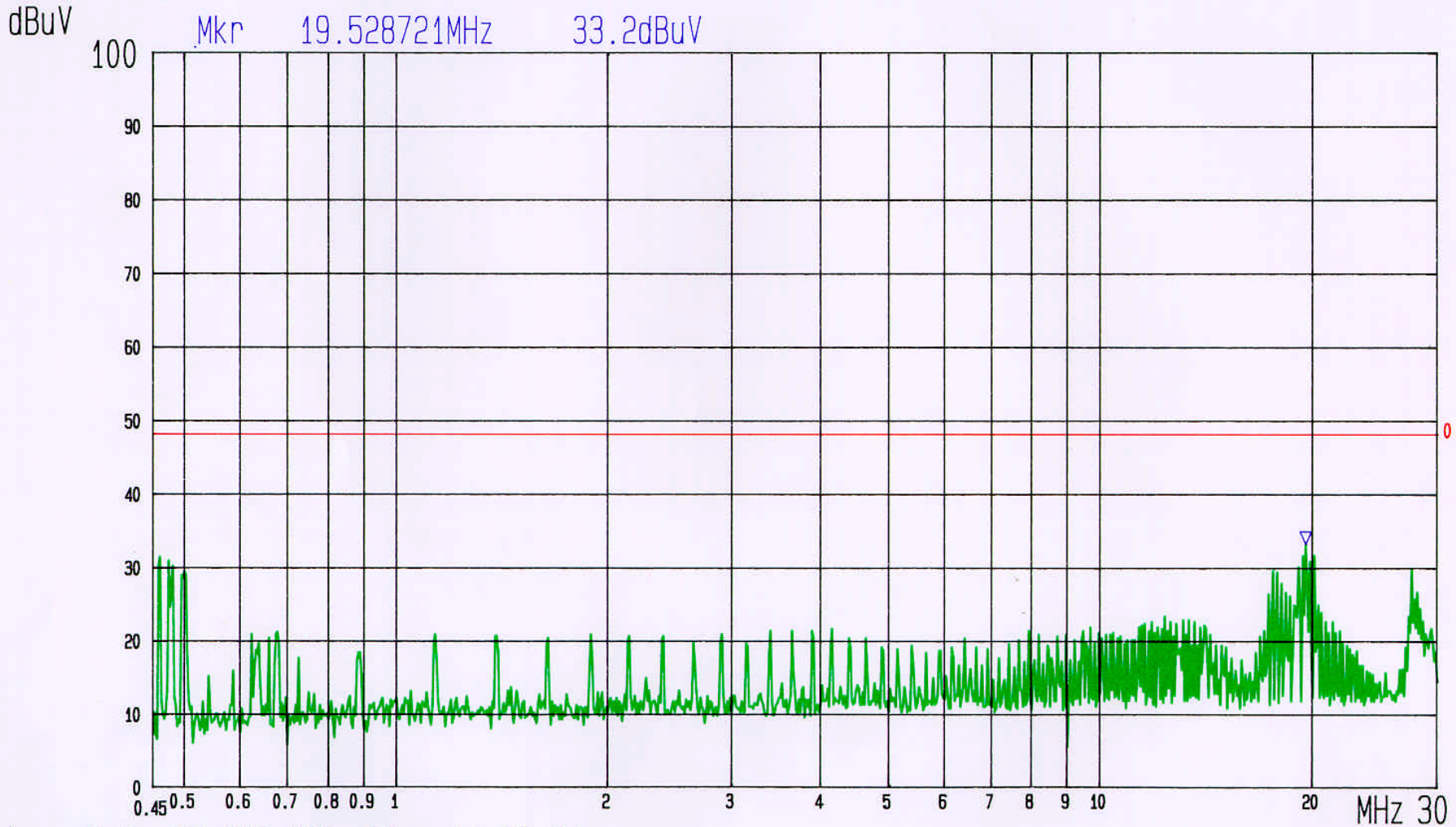
|--- Date 20.DEC.'99 Time 10:09:27
Radiated. Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 at 3m. STANDBY MODE. GPH/38147/JD03/001



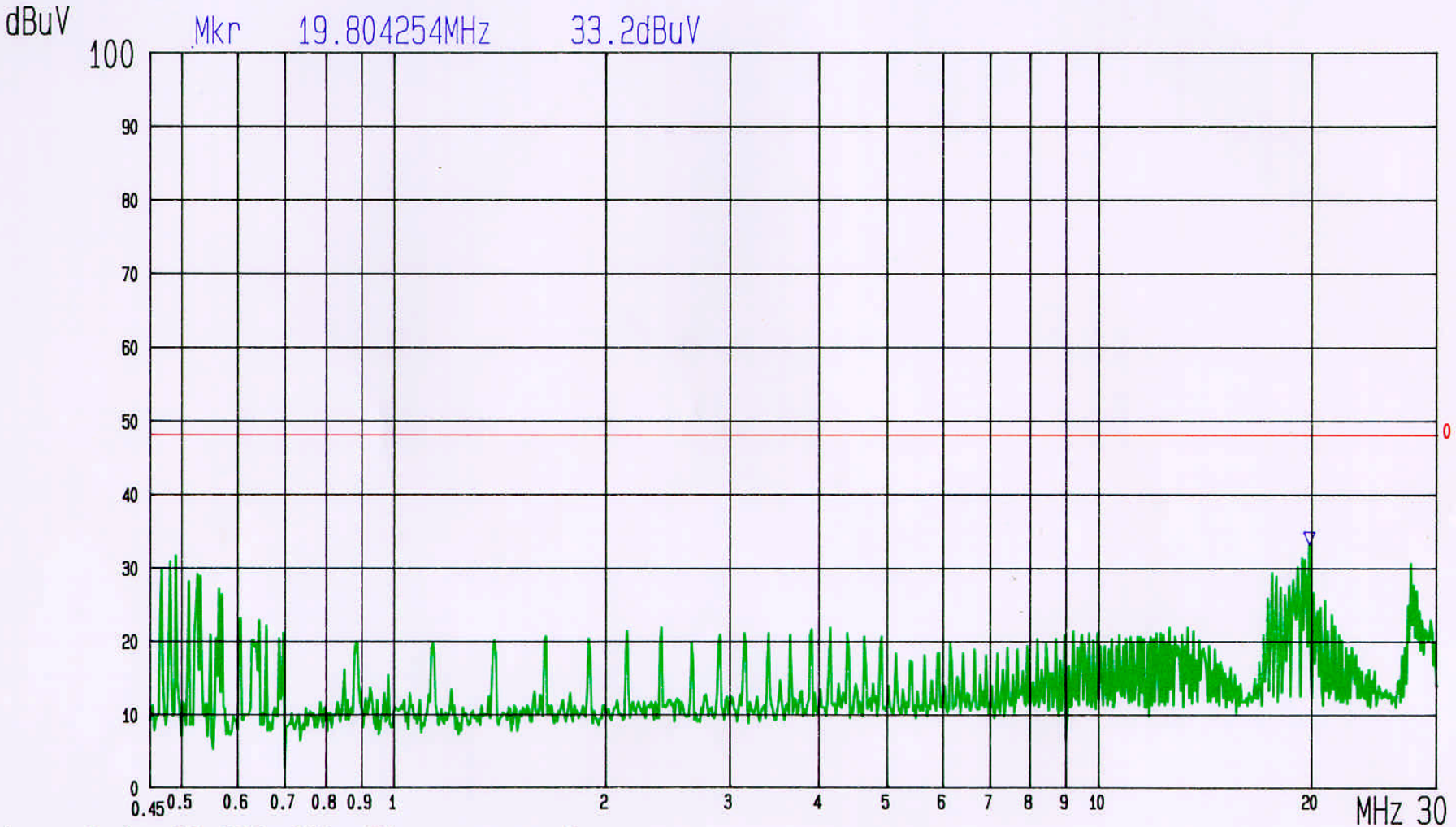
|--- Date 20.DEC.'99 Time 10:18:44
Radiated. Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 at 3m. OPERATE MODE. GPH/38147/JD03/002



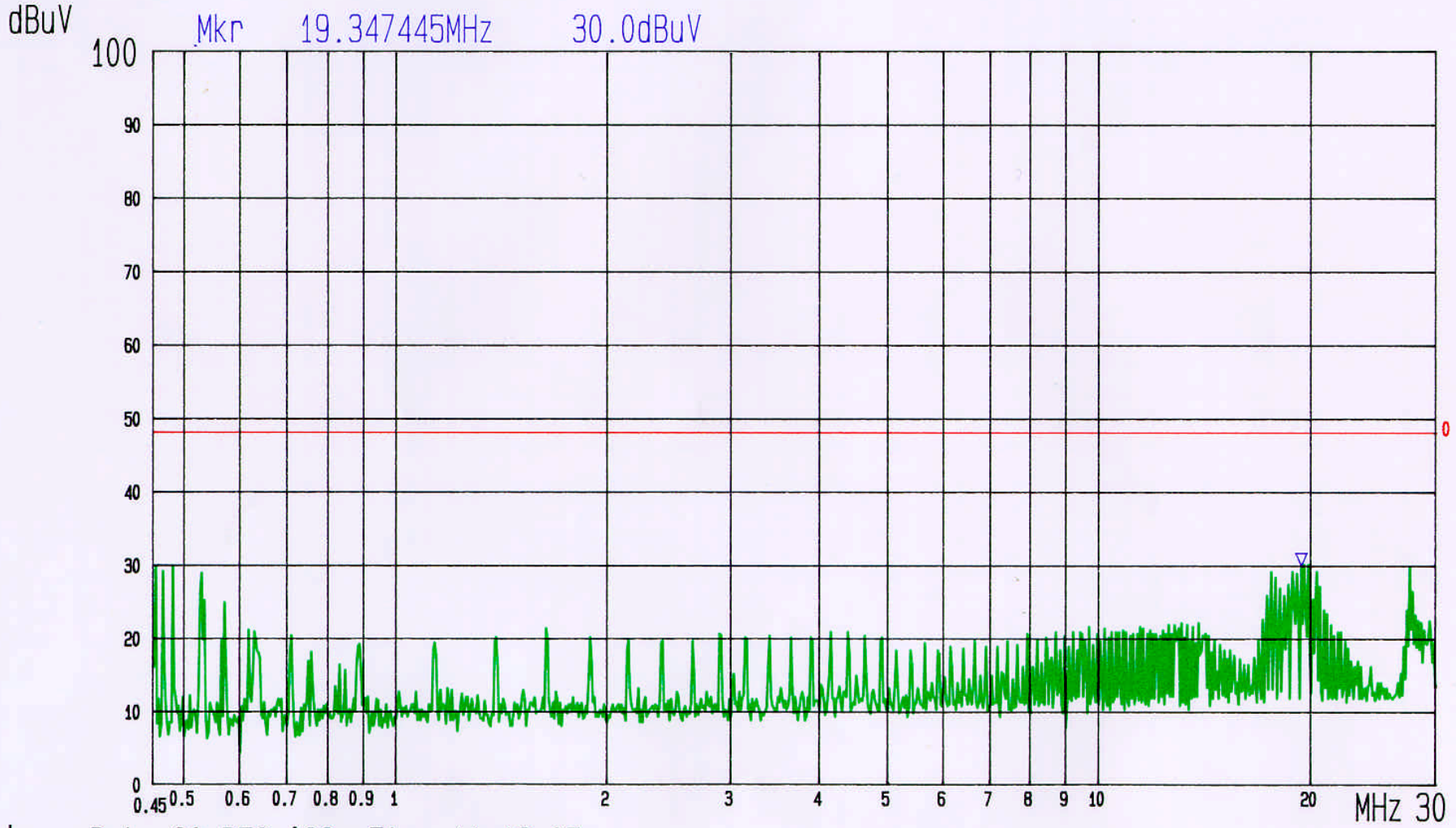
|--- Date 20.DEC.'99 Time 10:49:51
Conducted Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.207 Standby Mode Live Line GPH/38147/JD03/003



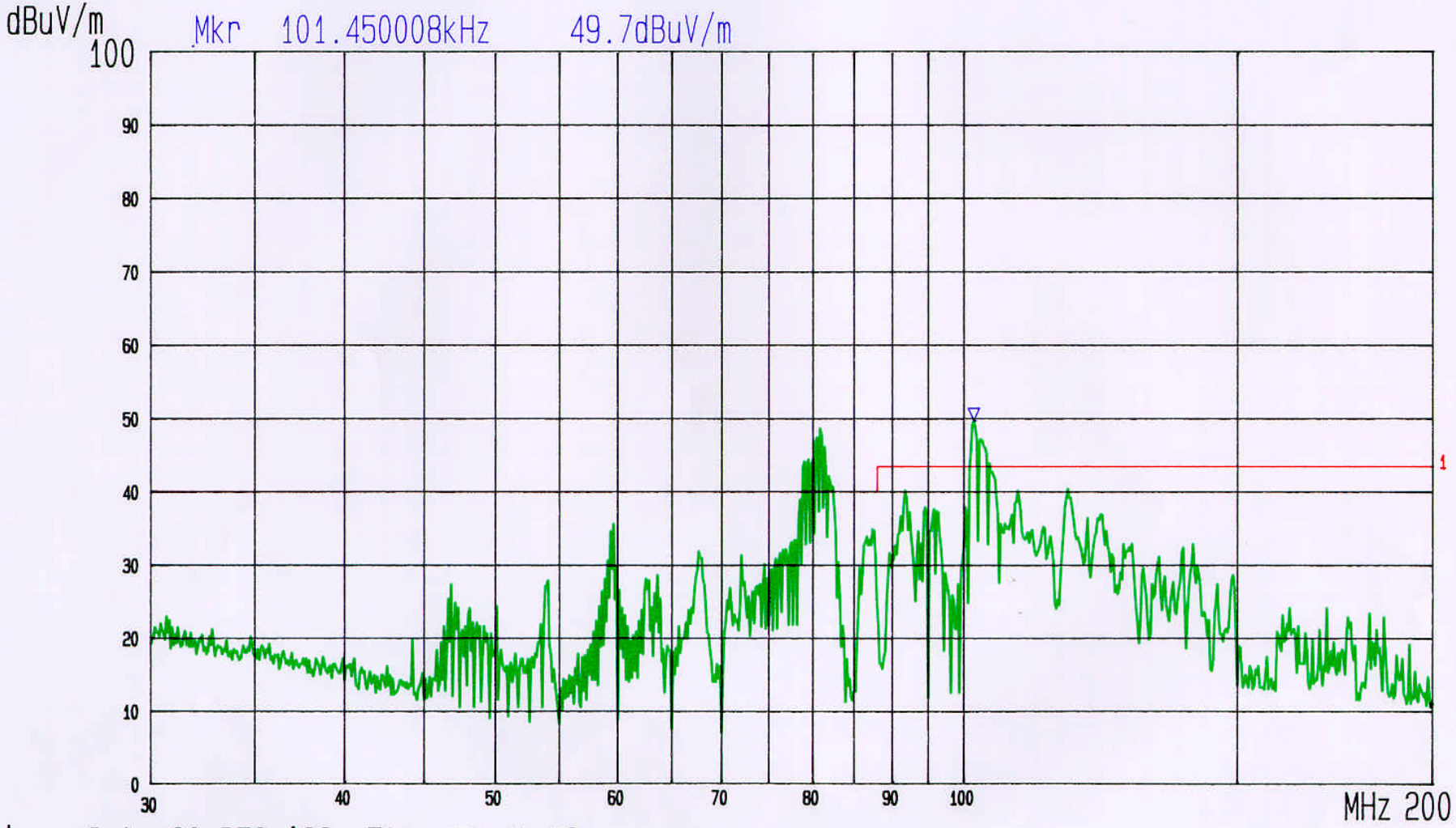
|--- Date 20.DEC.'99 Time 11:02:04
Conducted Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.207 Standby Mode Neutral Line GPH/38147/JD03/004



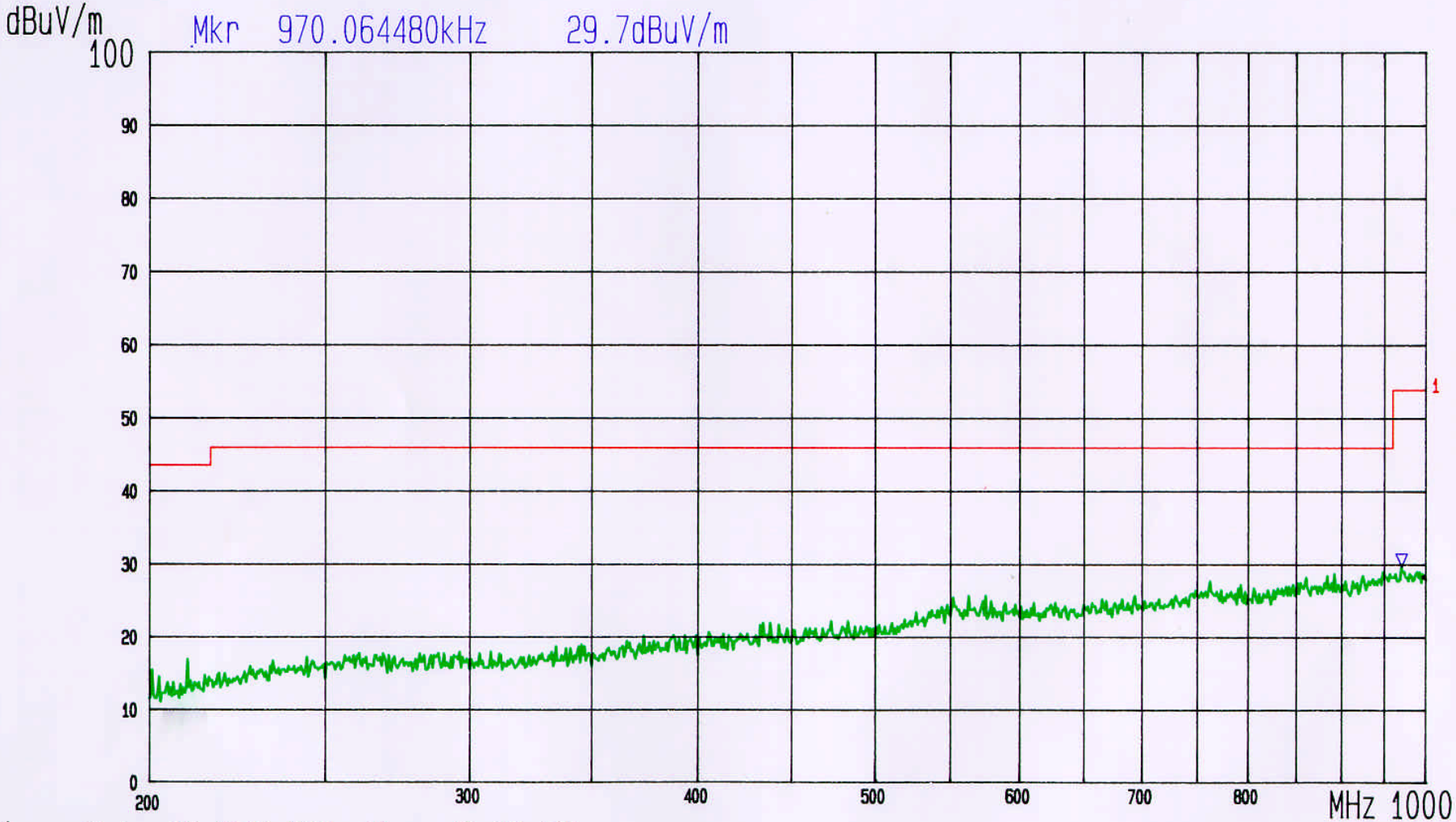
|--- Date 20.DEC.'99 Time 11:11:13
Conducted Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.207 Operate Mode Live Line GPH/38147/JD03/005



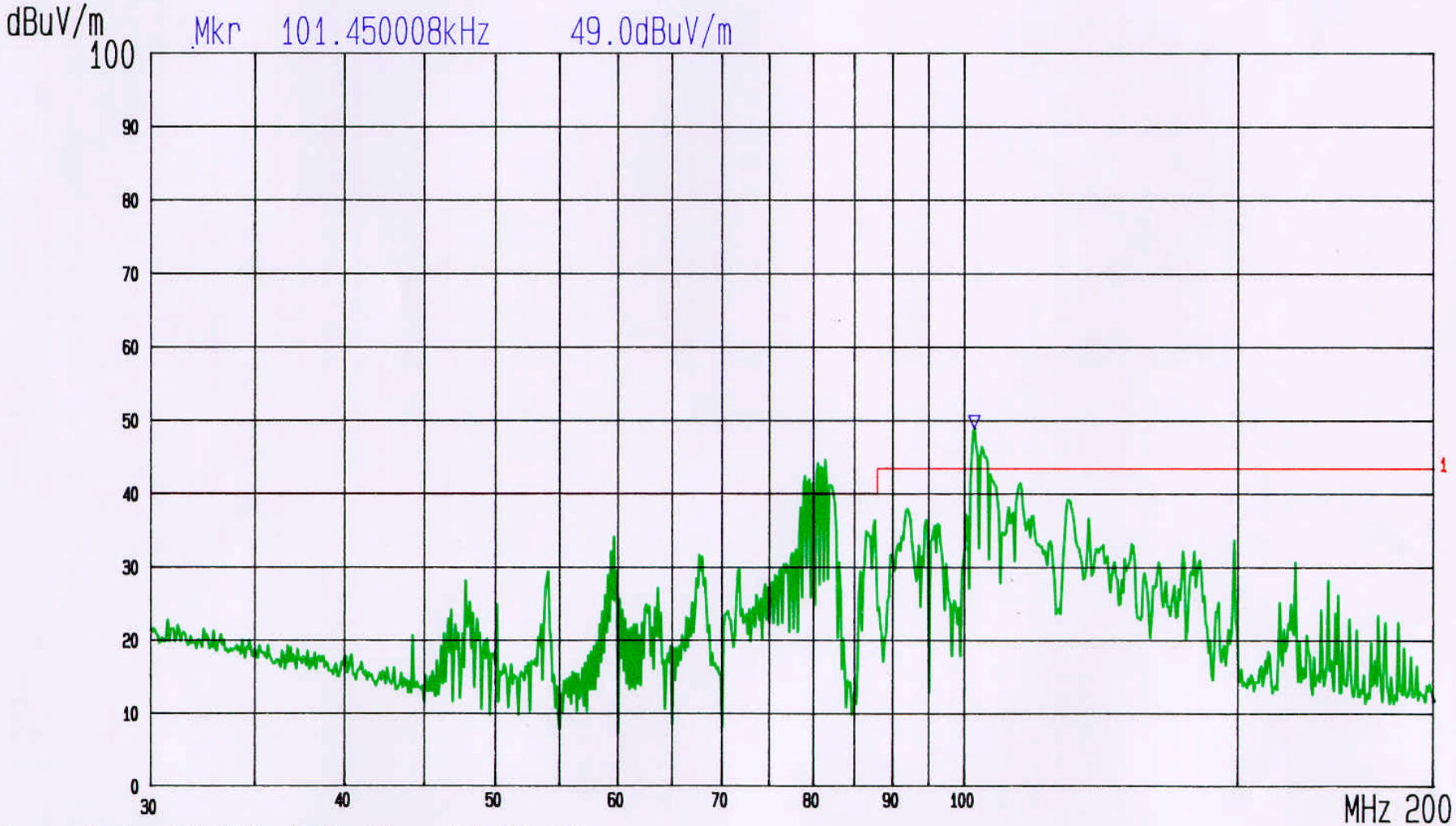
|--- Date 20.DEC.'99 Time 11:18:07
Conducted Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.207 Operate Mode Neutral Line GPH/38147/JD03/006



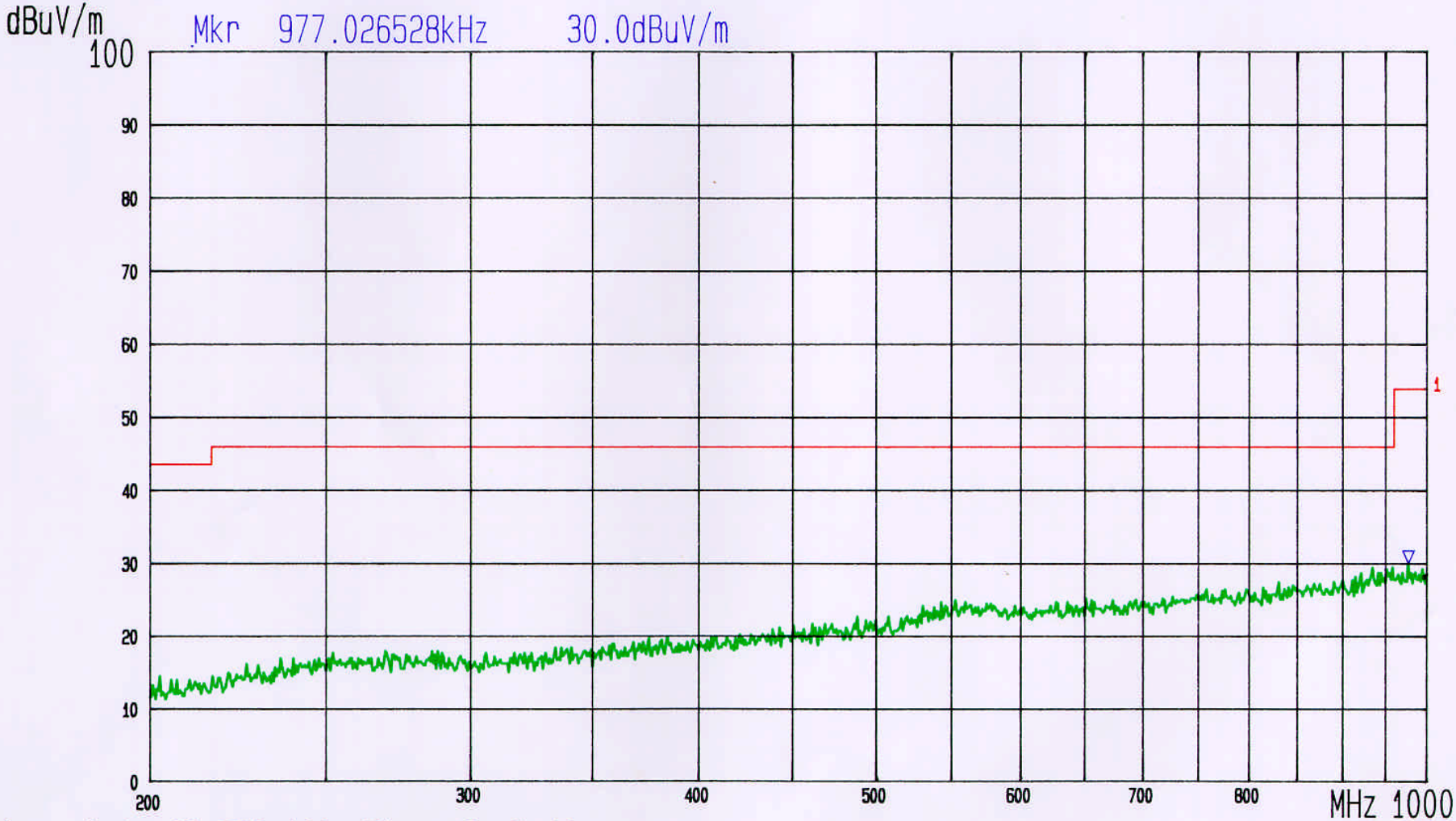
|--- Date 20.DEC.'99 Time 11:41:16
Radiated Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 Standby Mode GPH/38147/JD03/007



|--- Date 20.DEC.'99 Time 12:30:59
Radiated Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 Standby Mode GPH/38147/JD03/008



|--- Date 20.DEC.'99 Time 11:57:28
Radiated Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 Operate Mode GPH/38147/JD03/009



|--- Date 20.DEC.'99 Time 12:17:22
Radiated Tested by RFI for JOHN FALCK ASSC. EUT: 8000-5219-S. FCC Part 15 S/P C
Limit. 15.209 Operate Mode GPH/38147/JD03/010

Appendix 5. Sample Measurement Calculation

The following appendix shows a sample measurement calculation for 91.769 MHz. The calculation shows how the final level was achieved when the correct antenna factor and cable loss is applied.

Frequency (MHz)	Polarity (H/V)	Measured Level (dBmV)	Antenna Factor (dB)	Cable Loss (dB)	Final Result (dBmV/m)
91.769	Vertical	18.5	8.6	2.0	29.1

Appendix 6. Photographs of EUT

This appendix contains the following photographs

Photo Reference Number	Title
PHT\38147\001	Front view of conducted emissions.
PHT\38147\002	Rear view of conducted emissions.
PHT\38147\003	Front view of radiated emissions.
PHT\38147\004	Rear view of radiated emissions.

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Group 4 Technology Proximity Reader Device 8000-5219-S
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PHT\38147\001 Front view of conducted emissions.

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PHT\38147\002 Rear view of conducted emissions.

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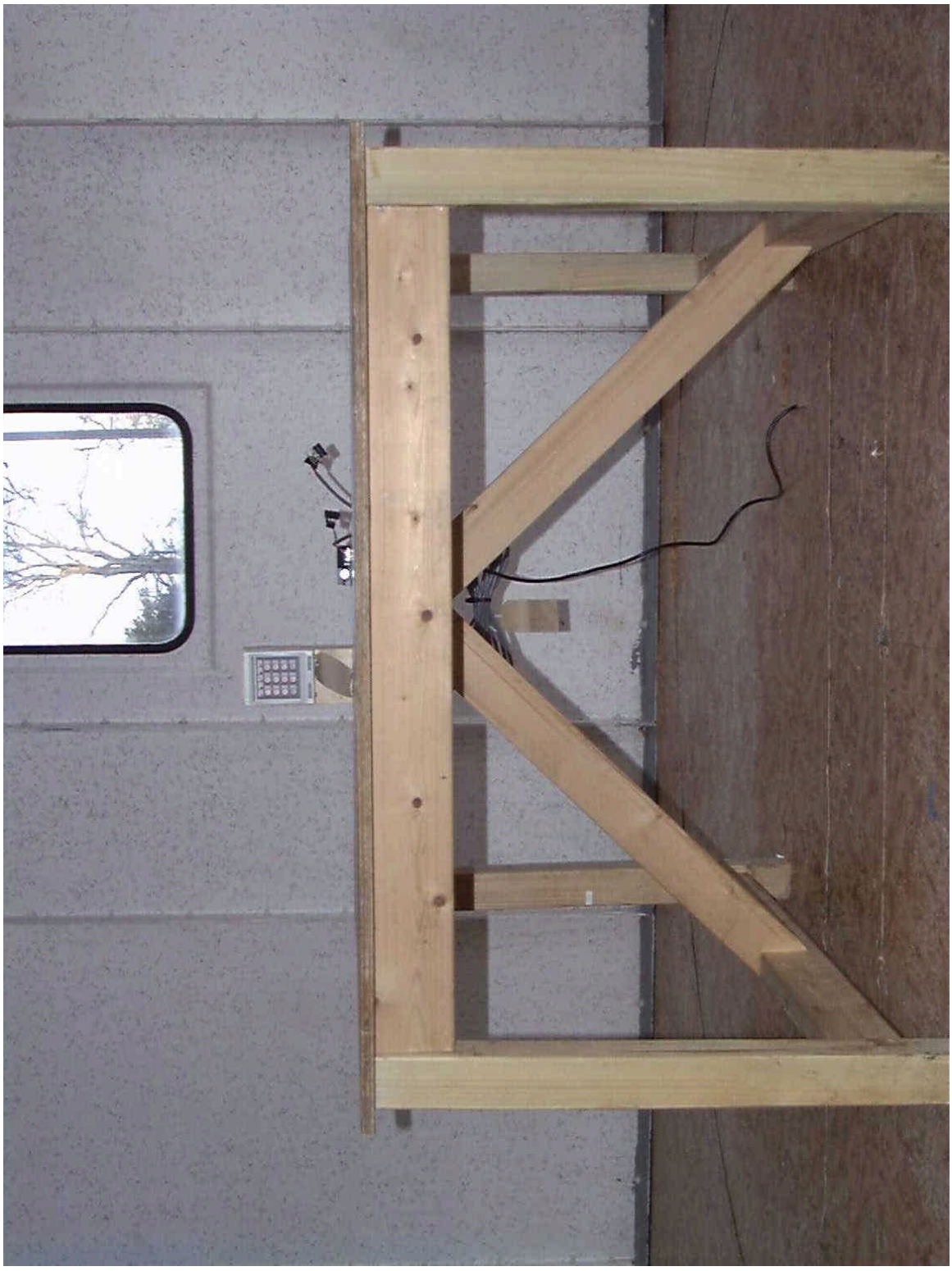
PHT\38147\003 Front view of radiated emissions.



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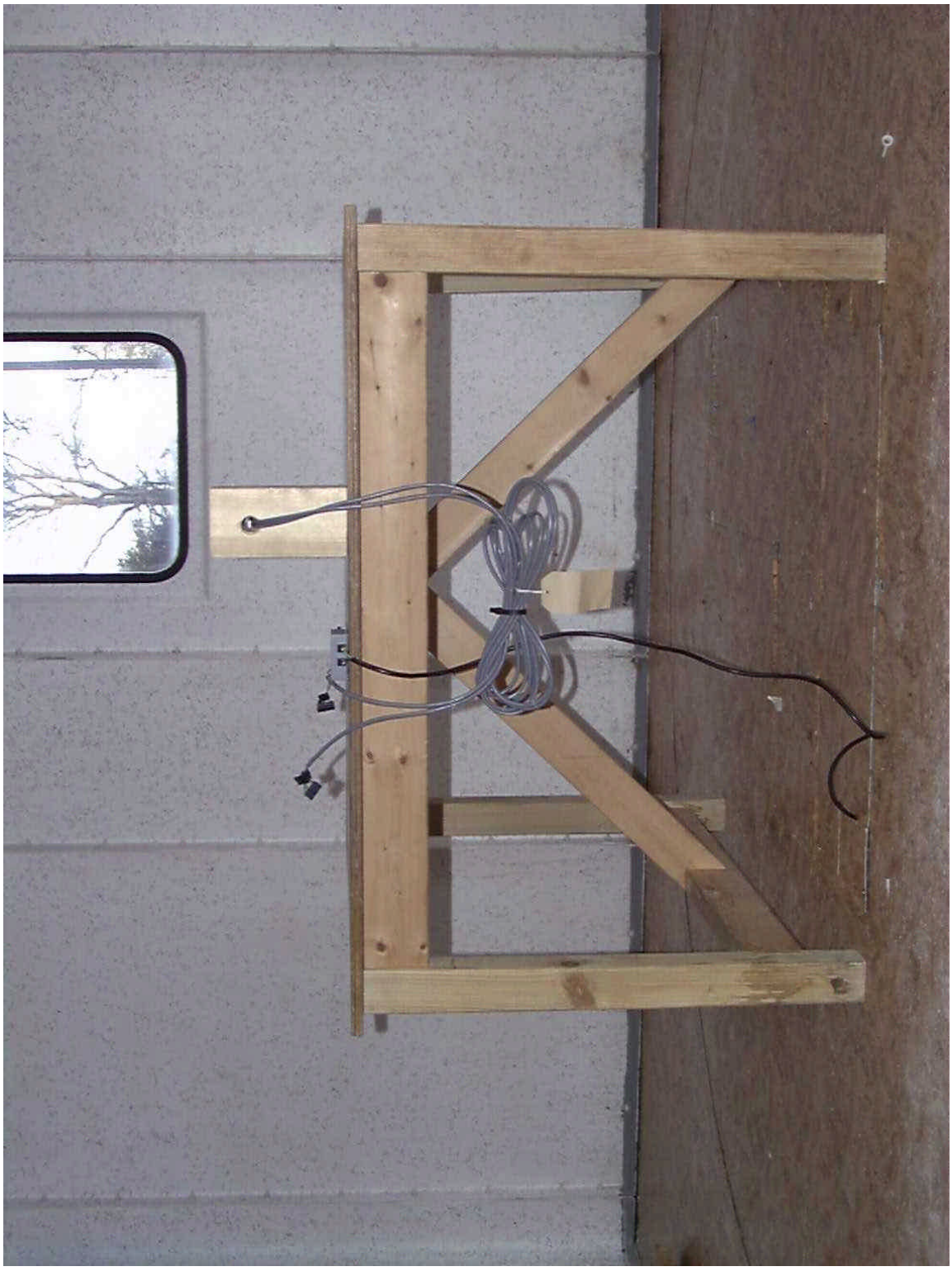
PHT\38147\004 Rear view of radiated emissions.



Test Of: **John Falck Associates.**
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To: **F.C.C. Part 15:1997 Subpart C Section 15.207 and 15.209 (Intentional Radiators)**