

TEST REPORT FROM RADIO FREQUENCY INVESTIGATION LTD.

Test Of: Valeo Electronique
Key Fob Transmitter

To: FCC Part 15 Subpart C: 2000
(Intentional Radiators)
Section 15.231

Test Report Serial No:
RFI/EMCB1/RP43022A

| | |
|---|---|
| This Test Report Is Issued Under The Authority Of Richard Jacklin, Operations Director:  | Checked By:  |
| Tested By:  | Release Version No: PDF01 |
| Issue Date: 05 February 2002 | Test Date: 19 December 2001 |

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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 |
|---|---|--|

RADIO FREQUENCY INVESTIGATION LTD.

EMC Department

Test Of: Valeo Electronique
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To: FCC Part 15 Subpart C: 2000
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1. Client Information

| | |
|----------------------|--|
| Company Name: | Valeo Electronique |
| Address: | Devision Electronique 42 rue Le Corbusier Europarc Creteil 94042 France |
| Contact Name: | Mr P Nahon |

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2. Equipment Under Test (EUT)

The client has supplied the following information (with the exception of the Date of Receipt):

2.1. Identification Of Equipment Under Test (EUT)

| | |
|------------------------------------|----------------------|
| Brand Name: | Valeo Electronique |
| Model Name or Number: | Key Fob Transmitter |
| Unique Type Identification: | 736 566-A |
| Serial Number: | Not stated by client |
| Country of Manufacture: | USA |
| FCC ID Number: | Not Applicable |
| Date of Receipt: | 19 December 2001 |

2.2. Description Of EUT

The EUT is a Remote Keyless control intended to be used for the locking/unlocking of vehicle's doors.

2.3. Modifications Incorporated In EUT

An EUT was supplied with modifications which enabled a constant transmit mode for test purposes.

2.4. Support Equipment

No support equipment was used to exercise the EUT during testing:

2.5. Additional Information Related To Testing

| | |
|--|-------------------------------|
| Power Supply Requirement: | Internal Battery Supply of 3V |
| Intended Operating Environment: | Portable |
| Weight: | 20g |
| Dimensions: | 40 x 50 x 10 mm |
| Interface Ports: | None |

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3. Test Specification, Methods And Procedures

3.1. Test Specification

| | |
|-------------------------|---|
| Reference: | FCC Part 15 Subpart C: 2000 (Intentional Radiators). Section 15.231. (Periodic Operation within the Band 40.66 to 40.70 MHz and above 70 MHz). |
| Title: | Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices: Digital Devices. |
| 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 requirements of the specification for the purposes of certification. |

3.2. Methods And Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1996)

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

ANSI C63.4 (2001)

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 (1998)

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 16-1 (1999)

Title: Specification for radio disturbance and immunity measuring apparatus and methods. Part 1. Radio disturbance and immunity measuring apparatus.

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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 an Internal Battery Supply of 3V.

5.2. Operating Modes

The EUT was tested in the following operating mode:

Transmit Mode.

Two EUT's were supplied for testing. Depending on the test being performed, a EUT was set to operate either as intended (i.e. a single transmission) and a second (modified) EUT was set to operate in a constant transmit mode.

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:

Standalone

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. Radiated Emissions

| Measurement Type | Specification Reference | Compliancy Status |
|---|-----------------------------------|-------------------|
| Transmitter Deactivation Time | C.F.R. 47 Part 15.231(a(1)): 2000 | Complied |
| Electric Radiated Field Strength 30 MHz to 4000 MHz | C.F.R. 47 Part 15.231(b): 2000 | Complied |
| Occupied Bandwidth | C.F.R. 47 Part 15.231(c): 2000 | Complied |

6.2. 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 5RQ, 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. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

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7.2. Transmitter Deactivation Time

7.2.1. The test was performed with a standard unmodified EUT.

7.2.2. Tests were performed to the limits specified in section 15.231 (a(1)).

7.2.3. Plots of the initial scans can be found in Appendix 4 as follows:

Plot 001: Sweep Time: 2 Seconds. Transmitter Activated Once Only.

Plot 002: Sweep Time: 30 Seconds. Transmitter Activated Once Only.

Plot 003: Sweep Time: 10 Seconds. Transmitter Activated with Button Held On.

Plot 004: Sweep Time: 10 Seconds. Transmitter Activated with Button Held On.

7.2.4. In each instance, it is demonstrated that the transmitter automatically deactivates transmission within 1 second of being activated regardless of the position of the activation button. It is also demonstrated that the EUT does not reactivate transmission with the button held on.

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7.3. Occupied Bandwidth

7.3.1. The test was performed with a modified EUT set to continuously transmit with the correct modulation.

7.3.2. Tests were performed to the limits specified in section 15.231 (c).

7.3.3. Plots of the initial scans can be found in Appendix 4 as follows:

Plot 005: 20dB Bandwidth Measured with a 120 kHz Resolution Bandwidth.

Plot 006: 20dB Bandwidth Measured with a 10 kHz Resolution Bandwidth.

Results:

| Frequency (MHz) | Instrument Resolution Bandwidth (kHz) | 20dB Bandwidth (kHz) | 0.25% Centre Frequency (kHz) | Margin (kHz) | Result |
|-----------------|---------------------------------------|----------------------|------------------------------|--------------|----------|
| 314.9785 | 120 | 399.05566 | 787.456 | 388.40034 | Complied |
| 314.9998 | 10 | 68.444420 | 787.456 | 719.01158 | Complied |

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7.4. Radiated Emissions

7.4.1. Electric Field Strength Measurements: Fundamental Emission

7.4.1.1. The client has stated that the transmitter frequency for the EUT 315 MHz.

7.4.1.2. The test was performed with a modified EUT set to continuously transmit with the correct modulation.

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

7.4.1.4. Measurements were performed against the limits specified in section 15.231 (b).

7.4.1.5. The following table lists the measurement of the fundamental emission in the worse case antenna polarisation, using an average detector function at a test distance of 3m (results incorporate antenna factors and cable losses):

| Frequency (MHz) | Ant. Pol. | Av. Level (dBmV/m) | Av. Limit (dBmV/m) | Margin (dB) | Result |
|-----------------|-----------|--------------------|--------------------|-------------|----------|
| 315.038 | Horiz. | 69.0 | 75.6 | 6.6 | Complied |

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7.4.2. Electric Field Strength Measurements: 30 to 1000 MHz

7.4.2.1. The client has stated that the highest clock frequency for the EUT was 315 MHz. Therefore tests were performed up to 4000 MHz.

7.4.2.2. Radiated emission spurious limits stated in section 15.231 (b) shall not exceed a level of 20dB below the fundamental carrier limit, or the limit specified in section 15.209, whichever is the higher limit. If the frequency of the spurious emission is located in one of the Restricted Bands of operation stated in section 15.205, then the level of emissions shall not exceed the limit specified in section 15.209.

7.4.2.3. The test was performed with a modified EUT set to continuously transmit with the correct modulation.

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

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

| Frequency (MHz) | Ant. Pol. | Q-P Level (dB _m V/m) | Q-P Limit (dB _m V/m) | Margin (dB) | Result |
|-----------------|-----------|---------------------------------|---------------------------------|-------------|----------|
| 629.973 | Vert. | 42.9 | 55.6 | 12.7 | Complied |
| 944.910 | Vert. | 48.6 | 55.6 | 7.0 | Complied |

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7.4.3. Electric Field Strength Measurements (1000 to 4000 MHz)

7.4.3.1. The client has stated that the highest clock frequency for the EUT was 315 MHz. Therefore tests were performed up to 4000 MHz.

7.4.3.2. Radiated emission spurious limits stated in section 15.231 (b) shall not exceed a level of 20dB below the fundamental carrier limit, or the limit specified in section 15.209, whichever is the higher limit. If the frequency of the spurious emission is located in one of the Restricted Bands of operation stated in section 15.205, then the level of emissions shall not exceed the limit specified in section 15.209.

7.4.3.3. The test was performed with a modified EUT set to continuously transmit with the correct modulation.

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

7.4.3.5. The following table lists frequencies at which emissions were measured using an Average and Peak detector function.

Average Levels

| Frequency (GHz) | Antenna Polarity (H/V) | Average Level (dBmV) | Antenna Factor (dB) | Cable Loss (dB) | Average Level (dBmV/m) | Average Limit (dBmV/m) | Average Margin (dB) | Result |
|-----------------|------------------------|----------------------|---------------------|-----------------|------------------------|------------------------|---------------------|----------|
| 1.259940 | Vert | 23.80 | 21.92 | 0.7 | 46.42 | 55.60 | 9.18 | Complied |
| 1.574928 | Vert | 30.64 | 21.46 | 0.7 | 52.80 | 54.00 | 1.20 | Complied |

Note: The frequency of 1.574928 GHz falls within a restricted band as specified in section 15.205. Therefore the limit specified in section 15.209 has been applied.

Peak Levels

| Frequency (GHz) | Antenna Polarity (H/V) | Peak Level (dBmV) | Antenna Factor (dB) | Cable Loss (dB) | Peak Level (dBmV/m) | Peak Limit (dBmV/m) | Peak Margin (dB) | Result |
|-----------------|------------------------|-------------------|---------------------|-----------------|---------------------|---------------------|------------------|----------|
| 1.259940 | Vert | 34.00 | 21.92 | 0.7 | 56.62 | 75.60 | 18.98 | Complied |
| 1.574928 | Vert | 37.50 | 21.46 | 0.7 | 59.66 | 74.00 | 14.34 | Complied |

Note: The frequency of 1.574928 GHz falls within a restricted band as specified in section 15.205. Therefore the limit specified in section 15.209 has been applied.

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8. Measurement Uncertainty

8.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

8.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

8.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

8.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

| Measurement Type | Range | Confidence Level | Calculated Uncertainty |
|----------------------------------|--------------------------|------------------|------------------------|
| Transmitter Deactivation Time | 315 MHz (Max 30 seconds) | 95% | +/- 4.76% |
| Occupied Bandwidth | 315 MHz | 95% | +/- 5.14% |
| Radiated Emissions at 3.0 metres | 30 MHz to 1000 MHz | 95% | +/- 5.26 dB |
| Radiated Emissions at 3.0 metres | 1 GHz to 4 GHz | 95% | +/- 4.18 dB |

8.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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Appendix 1. Test Equipment Used

| Instrument | Manufacturer | Model | RFI No. |
|-------------------------------------|--------------------------|-----------------------|---------|
| 1 to 2 GHz Horn Antenna | Eaton | 91888-2 | A028 |
| 2 to 4 GHz Horn Antenna | Eaton | 91889-2 | A031 |
| Site 2 Controller SC144 | Unknown | SC144 | A197 |
| Bilog Antenna | Chase | CBL6111 | A259 |
| Bilog Antenna | Chase | CBL6111A | A553 |
| C563-N-2 | Rosenberger | UFA 210A-1-0787-70x70 | C563 |
| C565-N-3 | Rosenberger | UFA 210A-1-1181-70x70 | C565 |
| Spectrum Monitor | Rohde & Schwarz | EZM | M003 |
| ESVP Receiver | Rohde & Schwarz | ESVP | M023 |
| ESMI Spectrum Analyser / Receiver | Rohde & Schwarz | ESMI | M069 |
| Receiver / Spectrum Analyser System | Rohde & Schwarz | ESBI | M090 |
| Temperature/Humidity Meter | RS Components | 212-146 | M115 |
| Temperature/Humidity Meter | RS Components | 212-146 | M116 |
| Turntable Controller | R.H. Electrical Services | RH351 | M173 |
| OATS Turntable | British Turntable Ltd | S36069 | M174 |
| Site 1 | RFI | 1 | S201 |
| Site 2 | RFI | 2 | S202 |
| Site 9 | RFI | 9 | S209 |

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

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Appendix 2. Measurement Methods

A2.1. Radiated Emissions

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

A2.1.2. 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.

A2.1.3. 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 or Average detector (below 1000 MHz) where applicable, for measurements above 1000 MHz average and peak detectors were used.

A2.1.4. 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.

A2.1.5. All measurements on the open area test site were performed using broadband antennas.

A2.1.6. 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°. For frequencies below 1000 MHz, the antenna was varied in height between 1 m and 4 m. For frequencies above 1000 MHz, the antenna was fixed at a height of 1.5m. 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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A2.1.7. The test equipment settings for radiated emissions measurements were as follows:

| Receiver Function | Initial Scan Below 1000 MHz | Final Measurements Below 1000 MHz |
|--------------------------|--|--|
| Detector Type: | Peak | Quasi-Peak (CISPR) or Average |
| 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 |

| Receiver Function | Initial Scan Above 1000 MHz | Final Measurements Above 1000 MHz |
|--------------------------|--|--|
| Detector Type: | Peak | Peak/Average |
| Mode: | Max Hold | Not applicable |
| Bandwidth: | 1 MHz | 1 MHz |
| Amplitude Range: | 60 dB | 20 dB (typical) |
| 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 OR those of Section 15.231(b) depending upon whichever permitted a higher field strength. Unless otherwise stated, the limits given in this report correspond to those specified in Section 15.209 as these are the most stringent.

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A2.2. Transmitter Deactivation Time

A2.2.1. The test was performed on an unmodified EUT.

A2.2.2. Tests were performed to the limits specified in section 15.231 (a(1)).

A2.2.3. The test receiver was configured with a zero span and a sweep time wide enough to display the transmission time and subsequent transmissions after.

A2.2.4. The sweep was started and the transmitter activated once only (button pushed and released). At the end of the trace the scan was stopped. The transmission time was noted. Where the transmission time from activation to deactivation was less than 5 seconds, the EUT was shown to comply.

A2.2.5. The test was repeated with the button of the transmitter held down to check for unintentional re-transmissions.

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A2.3. Occupied Bandwidth

A2.3.1. The test was performed on a modified EUT, set to constant transmit mode with the correct modulation.

A2.3.2. Tests were performed to the limits specified in section 15.231 (c).

A2.3.3. The receiver was tuned to the centre frequency of the transmitter and a span set to show the total emission. The test was performed twice, once with a resolution bandwidth of 10 kHz and once with a 120 kHz resolution bandwidth.

A2.3.4. The EUT was activated and a max hold trace generated to capture the entire emission.

A2.3.5. The 20dB bandwidth of the emission was then determined.

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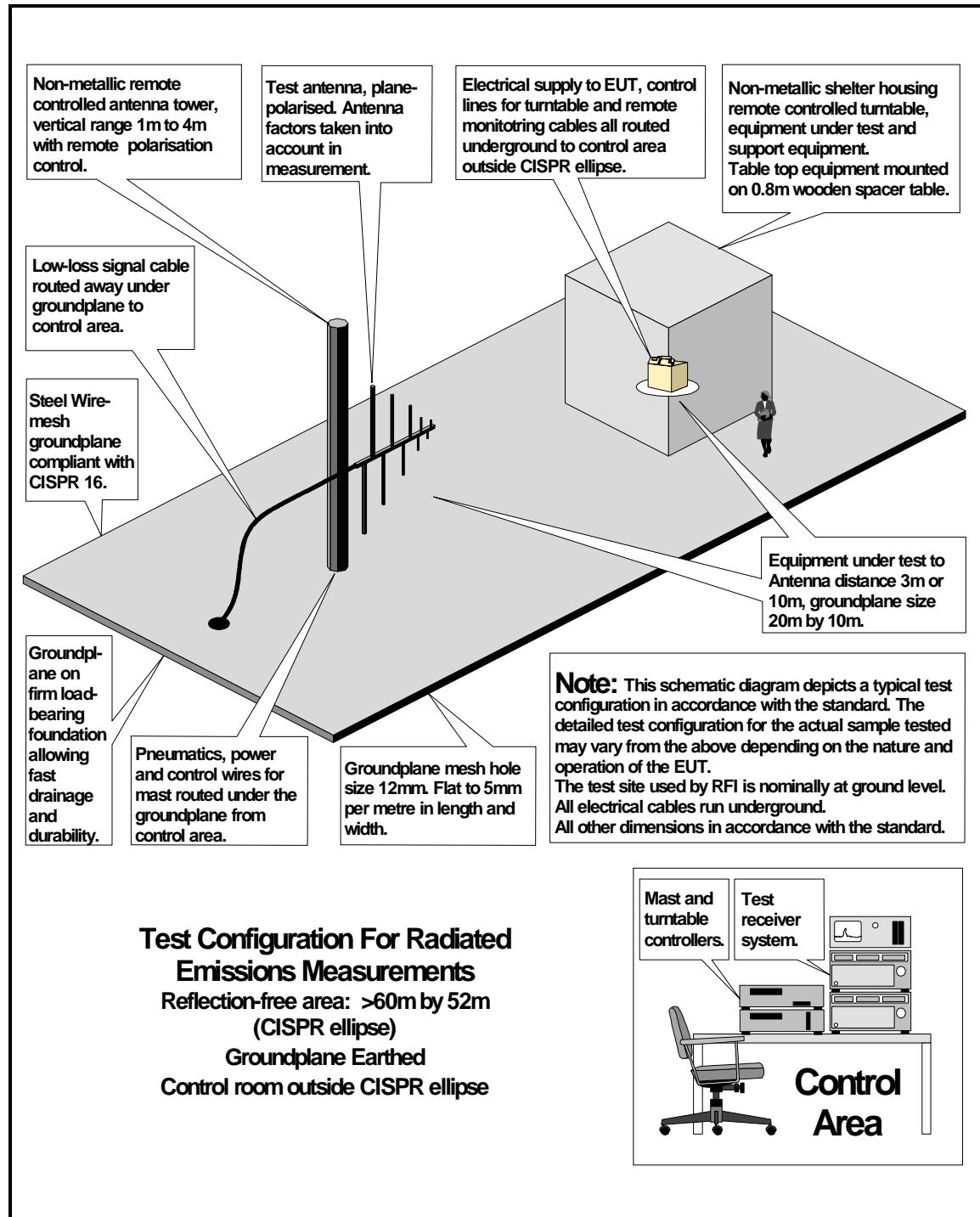
Appendix 3. Test Configuration Drawings

This appendix contains the following drawings:

| Drawing Reference Number | Title |
|---------------------------------|--|
| DRG\43022\EMIRAD | Test configuration for measurement of radiated emissions |
| DRG\43022\001 | Schematic diagram of the EUT, support equipment and interconnecting cables used for the test |

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DRG\43022\EMIRAD



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DRG\43022\001

Configuration of EUT and Local Support Equipment

EUT

Configuration of Remote Support Equipment

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Appendix 4. Graphical Test Results

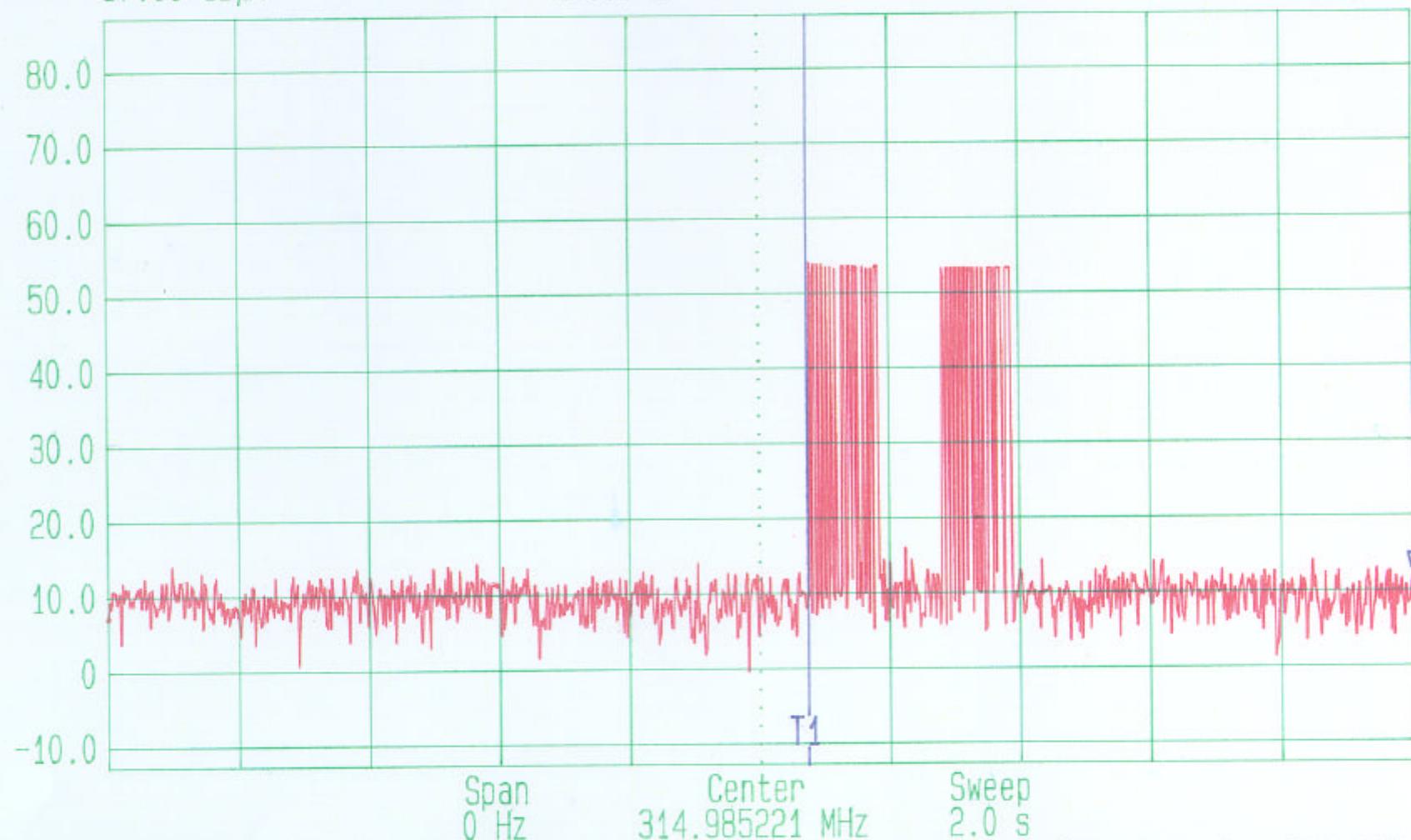
This appendix contains the following graphs:

| Graph Reference Number | Title |
|------------------------|--|
| GPH\43022\01\001 | Transmitter Deactivation Time. Tx Operated and Released. Sweep Time 2 Seconds. |
| GPH\43022\01\002 | Transmitter Deactivation Time. Tx Operated and Released. Sweep Time 30 Seconds. |
| GPH\43022\01\003 | Transmitter Deactivation Time. Tx Operated and Held On. Sweep Time 10 Seconds. |
| GPH\43022\01\004 | Transmitter Deactivation Time. Tx Operated and Held On. Sweep Time 30 Seconds. |
| GPH\43022\01\005 | Occupied Bandwidth. 120 kHz Resolution Bandwidth. |
| GPH\43022\01\006 | Occupied Bandwidth. 120 kHz Resolution Bandwidth. |
| GPH\43022\01\007 | Radiated Emissions. 30 MHz to 1 GHz. |
| GPH\43022\01\008 | Radiated Emissions. 1 GHz to 2 GHz. |
| GPH\43022\01\009 | Radiated Emissions. 2 GHz to 4 GHz. |



Date 19.Dec.'01 Time 11:47:28
Ref.Lvl Marker 11.94 dB μ V
87.00 dB μ V 2.000 s

Res.Bw 120.0 kHz [3dB] Vid.Bw 100 kHz
TG.Lvl off RF.Att 0 dB
CF.Stp 12.005 kHz Unit [dB μ V]

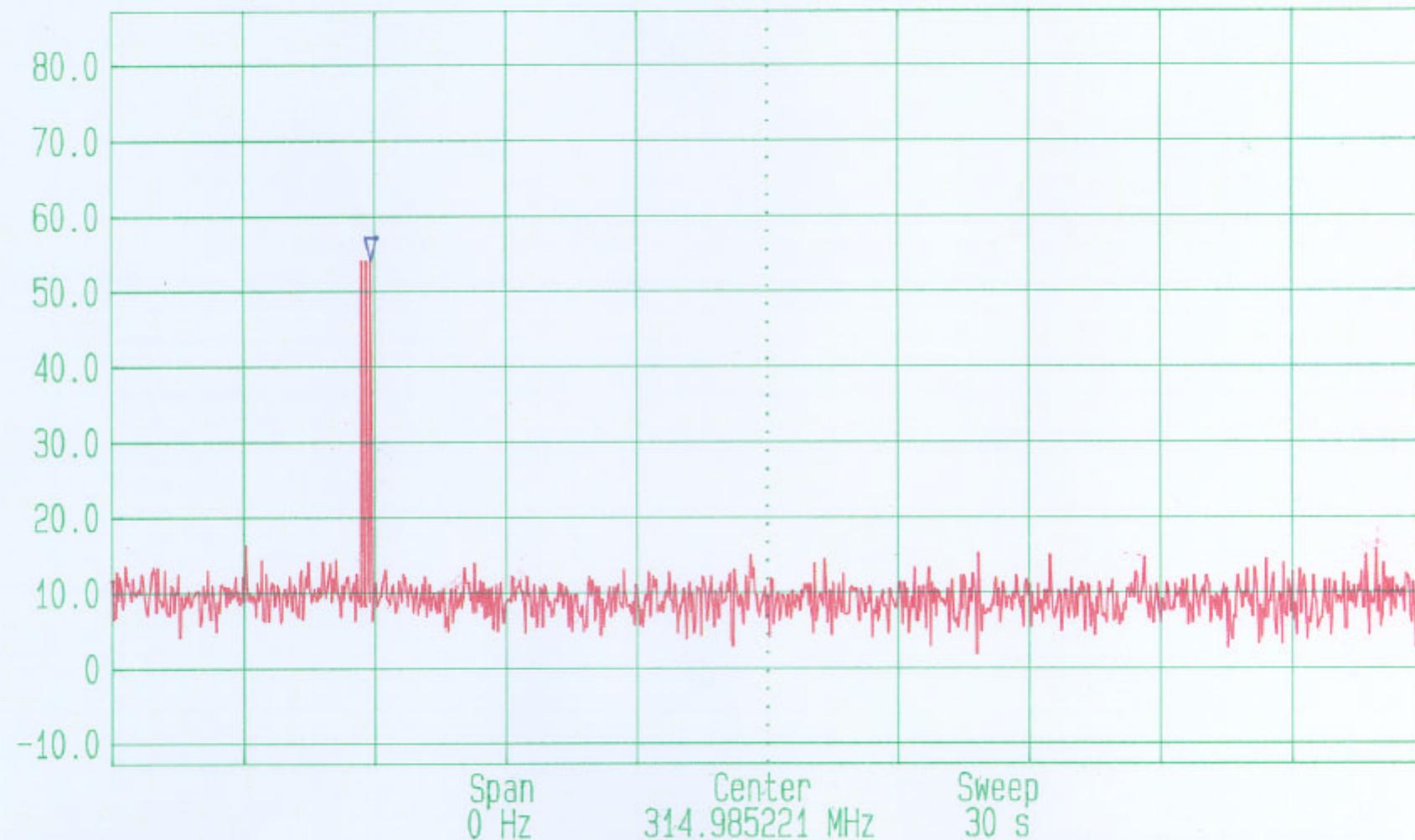


Operation Time. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(a1). T1. Tx Activated. GPH/43022/01/001



Date 19.Dec.'01 Time 13:20:24
Ref.Lvl Marker 54.09 dB μ V
87.00 dB μ V 5.900 s

Res.Bw 120.0 kHz [3dB]
TG.Lvl off
CF.Stp 12.005 kHz
Vid.Bw 100 kHz
RF.Att Unit
0 dB [dB μ V]

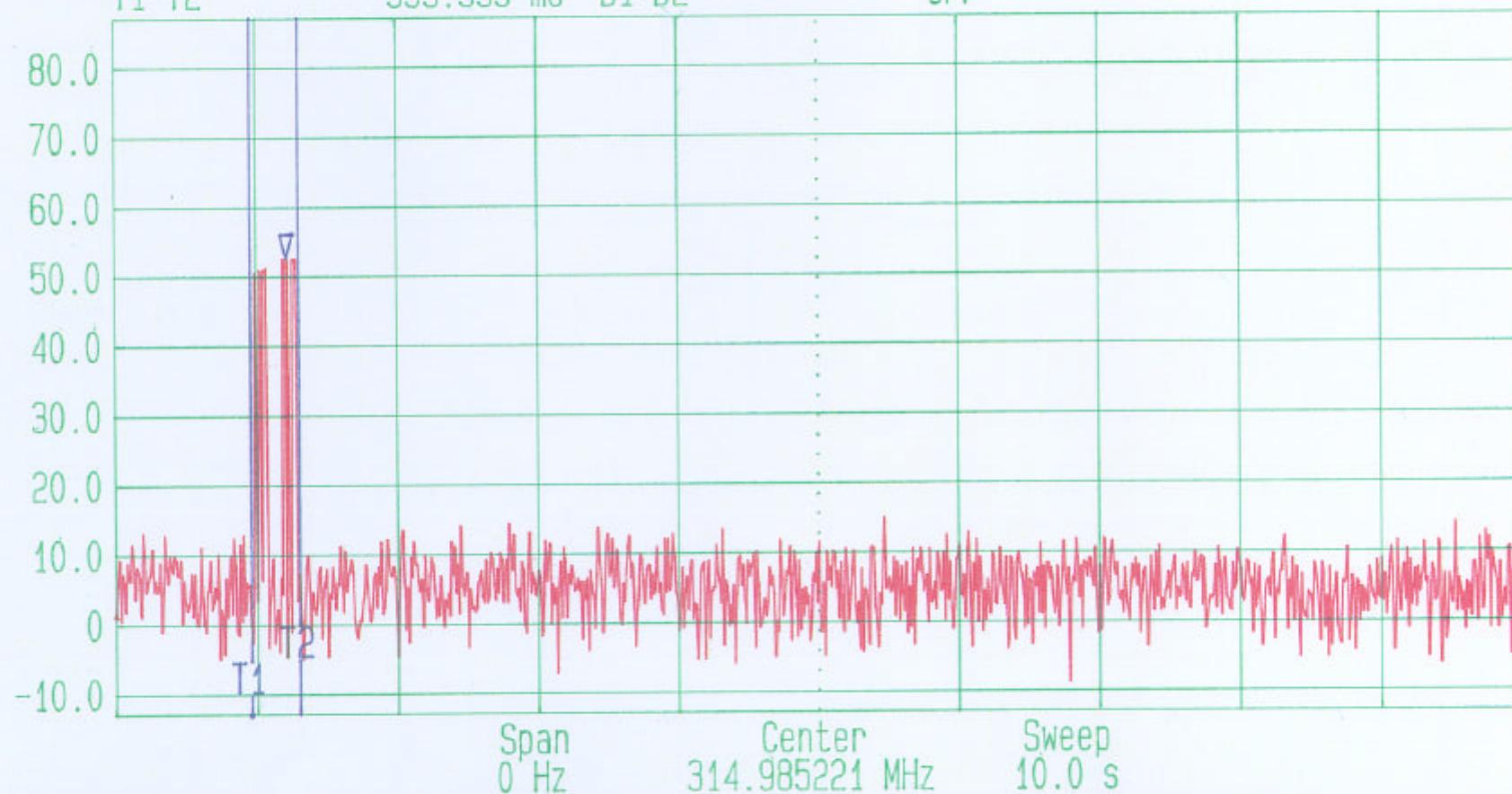


Operation Time. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(a1). TX Activated Once Only. GPH/43022/01/002



Date 19.Dec.'01 Time 13:26:44
Ref.Lvl Marker 52.65 dB μ V
87.00 dB μ V 1.222 s

Res.Bw 120.0 kHz [3dB] Vid.Bw 100 kHz
TG.Lvl off RF.Att Unit 0 dB
CF.Stp 12.005 kHz [dB μ V]
T1 966.666 ms D1 OFF
T2 1.300 s D2 OFF
T1-T2 333.333 ms D1-D2 OFF



Operation Time. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(a1). TX Activated and Held On. GPH/43022/01/003

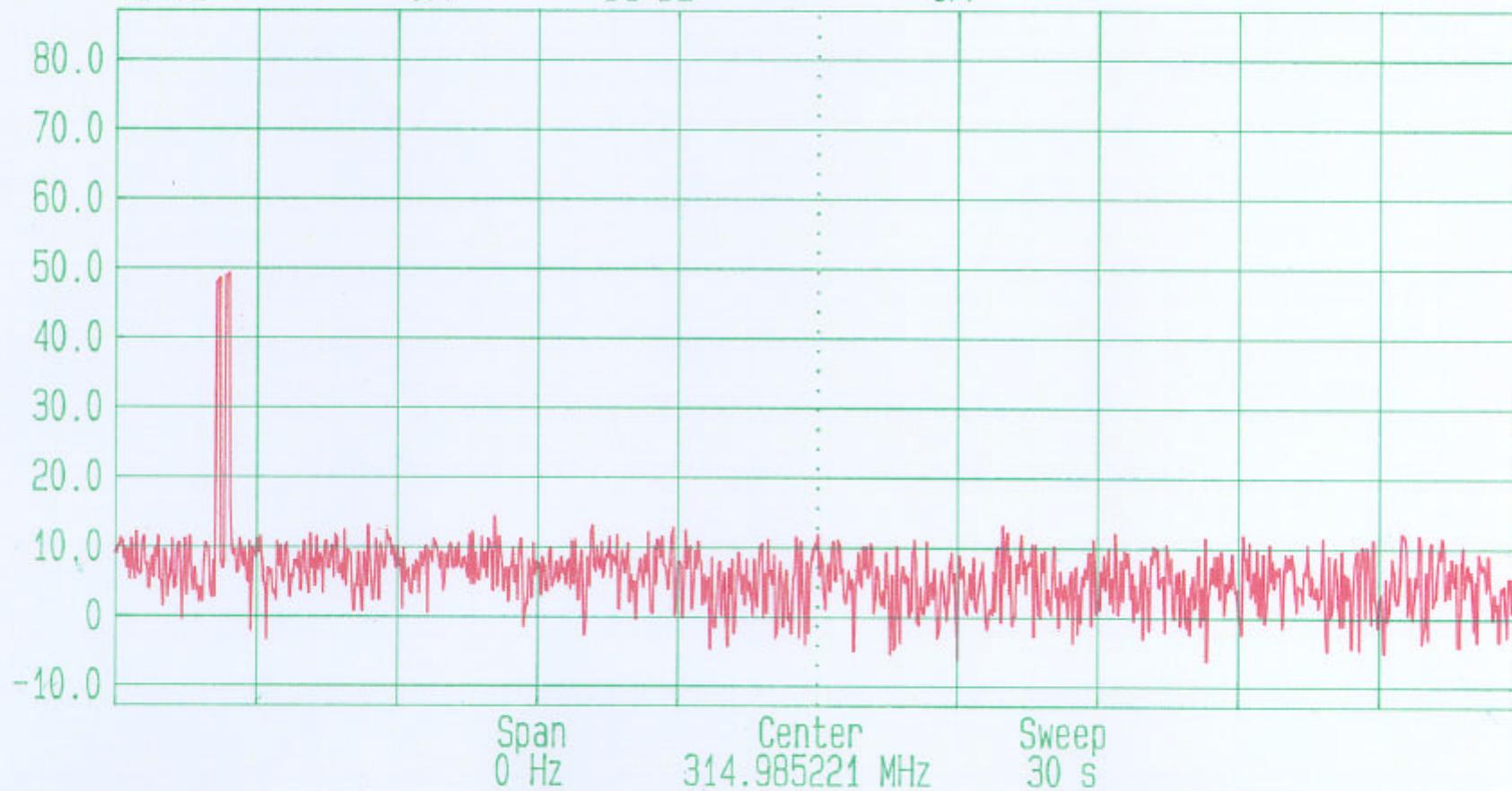


Date 19.Dec.'01 Time 13:31:26

Ref. Lvl
87.00 dB μ V

Res. Bw 120.0 kHz [3dB] Vid. Bw 100 kHz
TG Lvl off
CF. Stp 12.005 kHz RF Att 0 dB
Unit [dB μ V]

T1 OFF D1 OFF
T2 OFF D2 OFF
T1-T2 OFF D1-D2 OFF



Operation Time. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231 (a1). TX Activated and Held On. GPH/43022/01/004

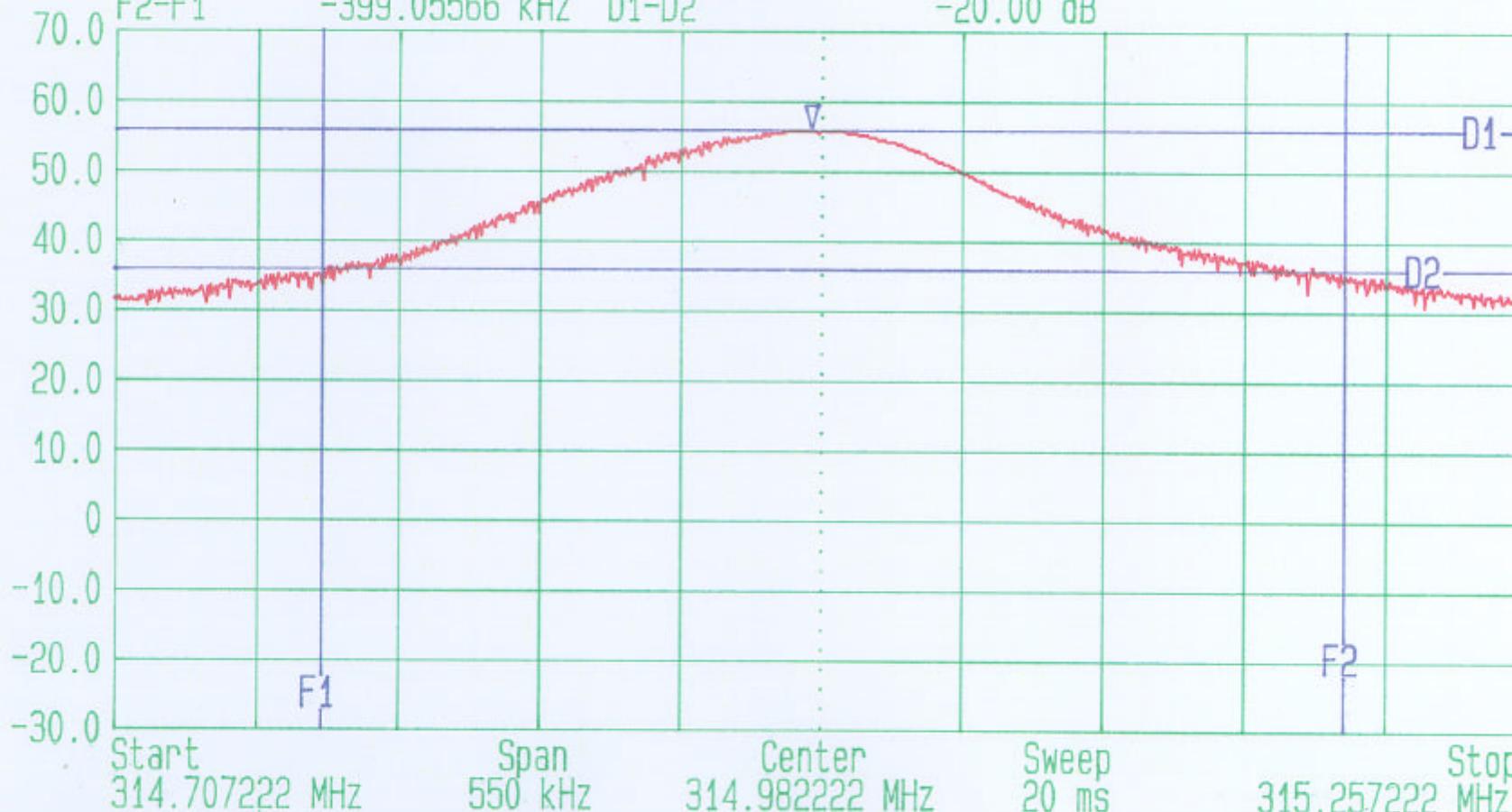


Date 19.Dec.'01 Time 15:37:28
Ref.Lvl 55.99 dB μ V
70.00 dB μ V Marker 314.9785 MHz

Res.Bw 120 kHz [imp] Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 55.000 kHz RF.Att 0 dB
[dB μ V]

F1 314.78783208 MHz D1
F2 315.18688774 MHz D2
F2-F1 -399.05566 kHz D1-D2

55.99 dB μ V
35.99 dB μ V
-20.00 dB



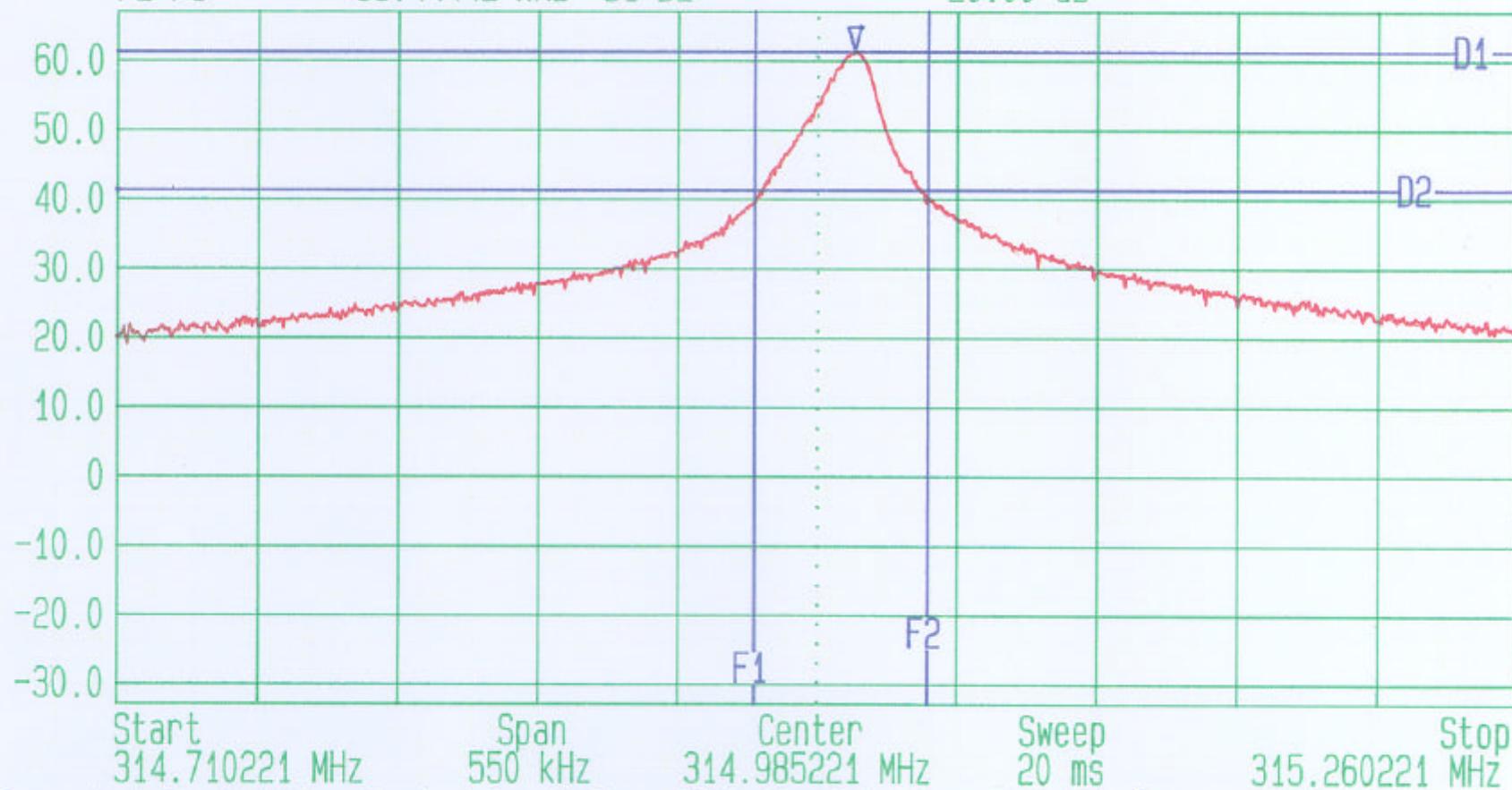
Occupied Bandwidth. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(c). Modulated Carrier. Limit: 787.456kHz
GPH/43022/01/005



Date 19.Dec.'01 Time 14:34:39
Ref.Lvl Marker 61.22 dB μ V
67.00 dB μ V 314.9998 MHz

Res.Bw 10.0 kHz [3dB]
TG.Lvl off
CF.Stp 55.000 kHz
Vid.Bw RF.Att
100 kHz Unit
10 dB
[dB μ V]

F1 314.96016547 MHz D1
F2 315.02860989 MHz D2
F2-F1 -68.44442 kHz D1-D2

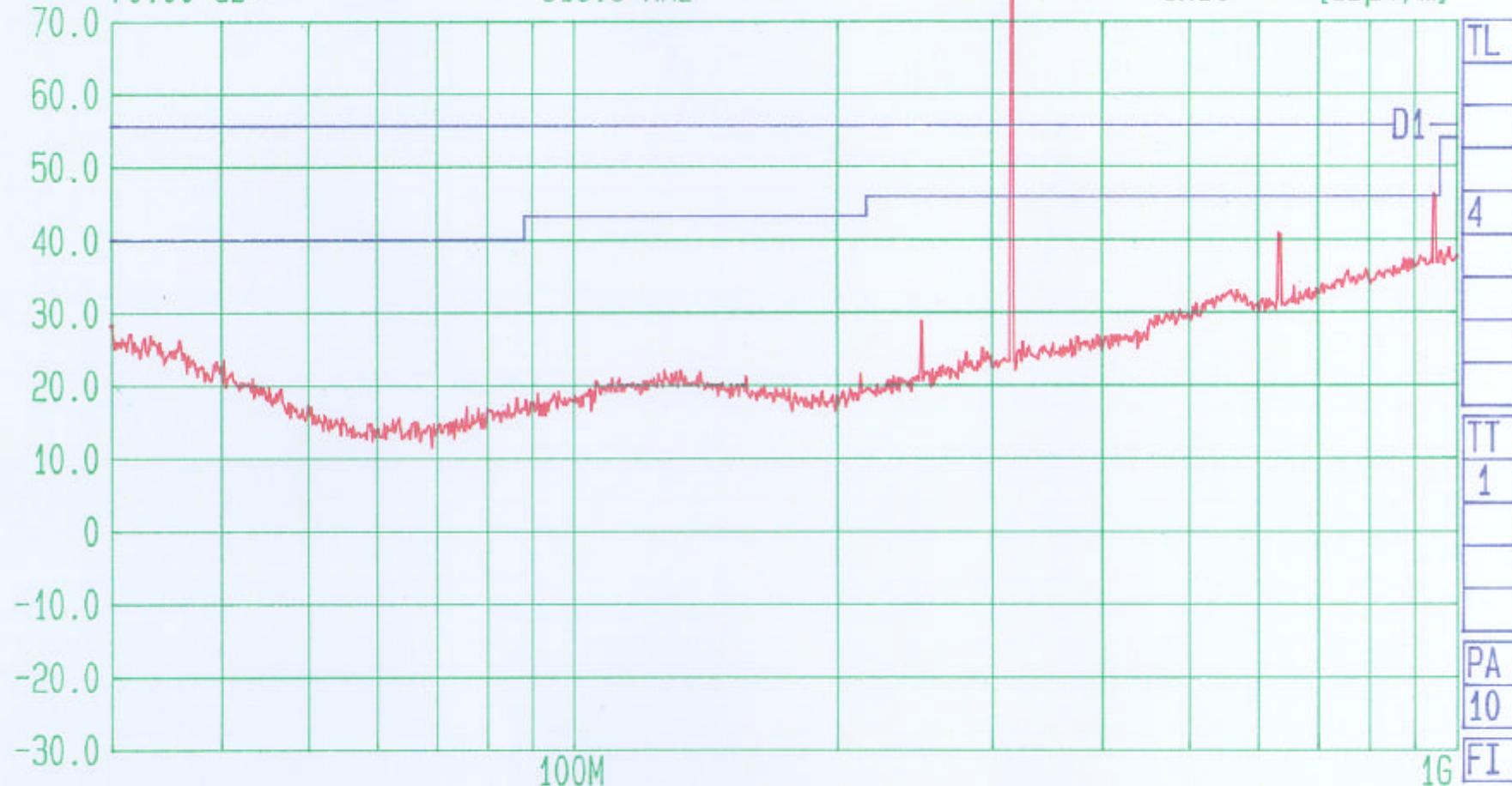


Occupied Bandwidth. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(c). Modulated Carrier. Limit: 787.456kHz. GPH/43022/01/006



Date 19.Dec.'01 Time 15:00:49
Ref.Lvl Marker 73.98 dB*
70.00 dB* 315.6 MHz

Res.Bw 120 kHz [imp] off
TG.Lvl 97.000 MHz RF.Att
CF.Stp Unit 0 dB
100 kHz [dB μ V/m]



Start
30 MHz

Span
970 MHz

Center
173.2 MHz

Sweep
80 ms

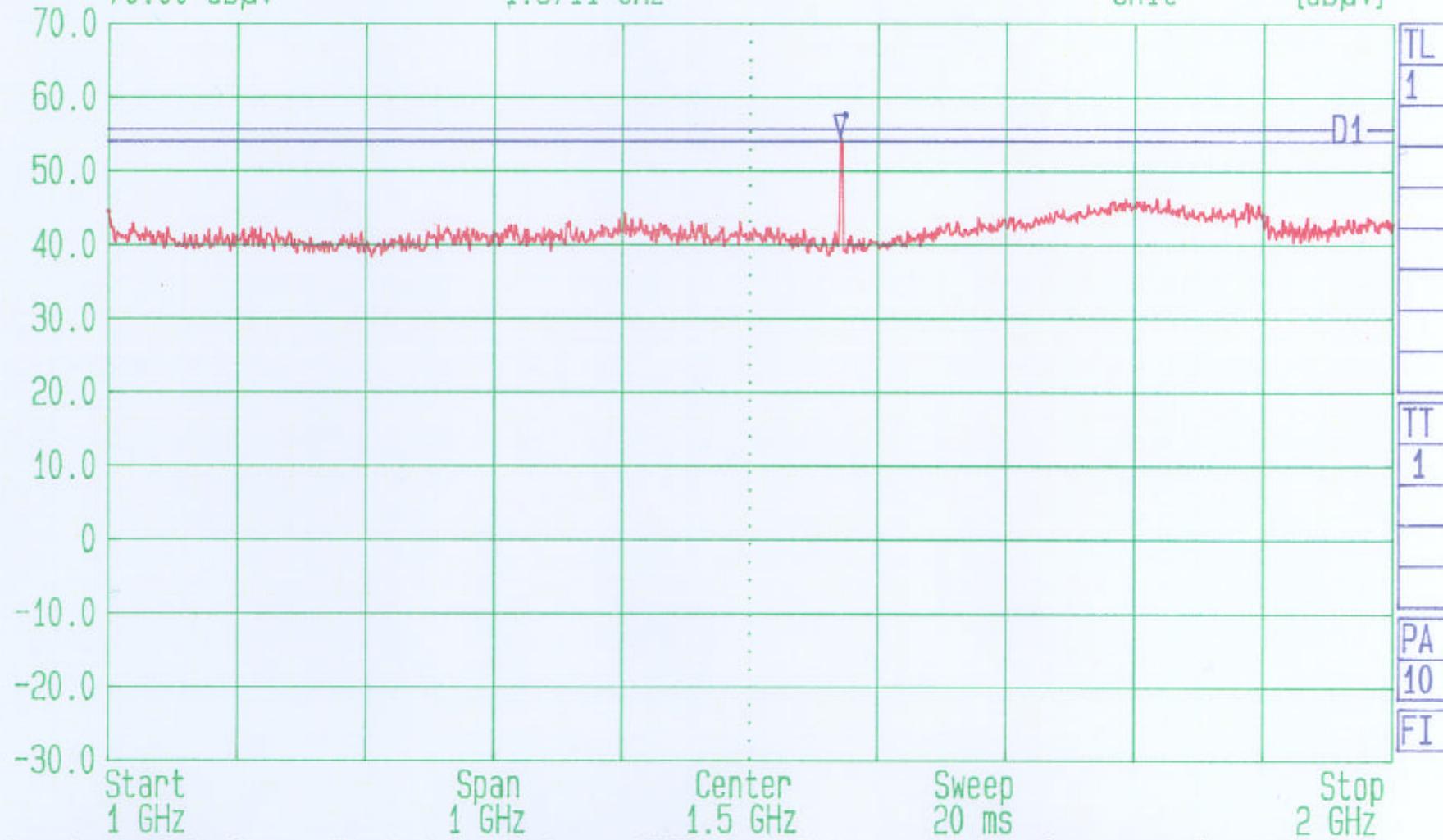
Stop
1 GHz

Spurious Emissions. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(b). CW Continuous Tx. Limit. 15.231(b) & 15.209 GPH/43022/01/007



Date 19.Dec.'01 Time 15:28:40
Ref.Lvl Marker 54.46 dB μ V
70.00 dB μ V 1.5711 GHz

Res.Bw 1 MHz [imp] off Vid.Bw 1 MHz
TG.Lvl 100.000 MHz RF.Att Unit 0 dB
CF.Stp

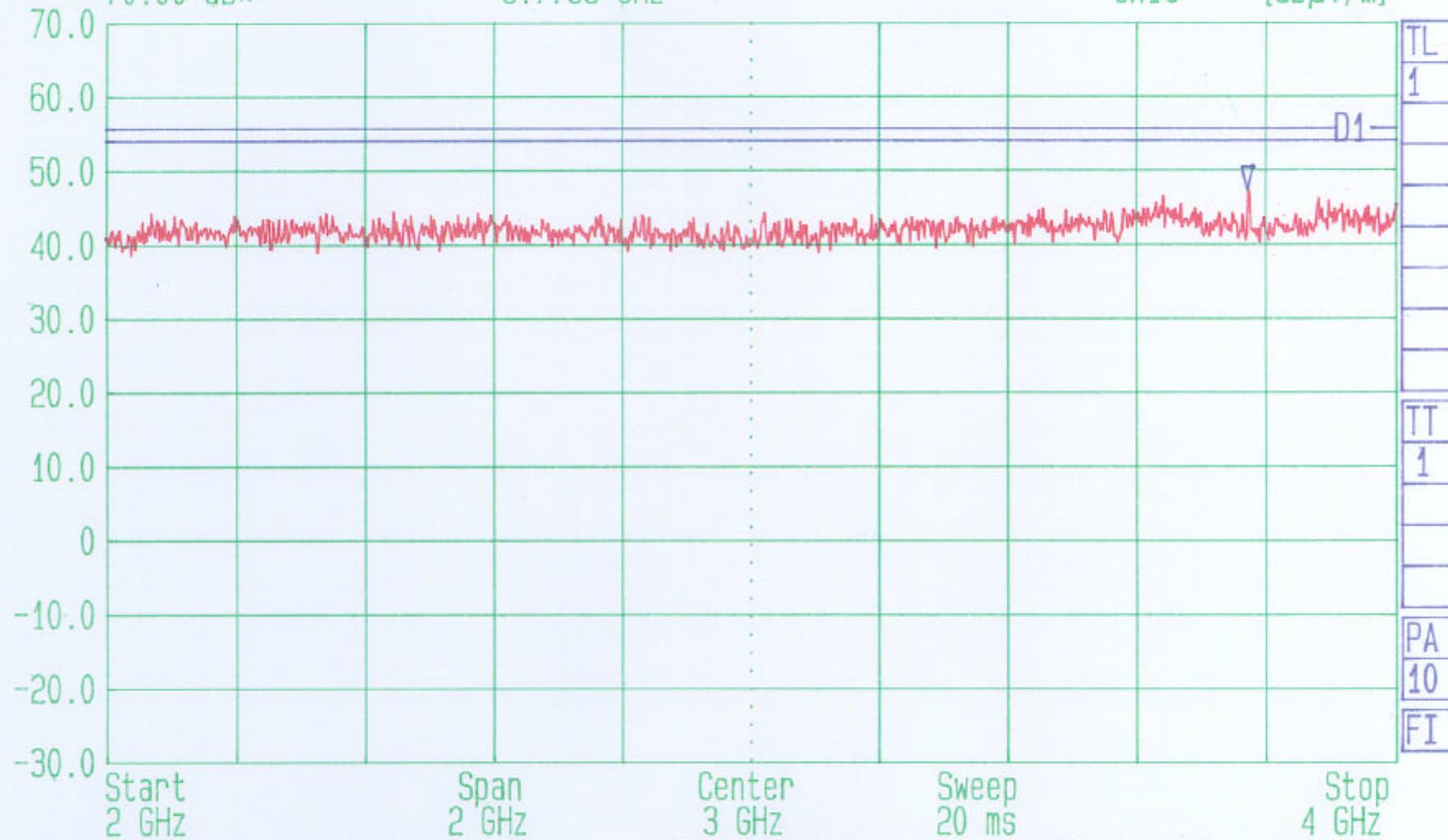


Spurious Emissions. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(b). CW Continuous Tx. Limit. 15.231(b) & 15.209 GPH/43022/01/008



Date 19.Dec.'01 Time 15:23:50
Ref.Lvl 70.00 dB* Marker 47.38 dB*
3.7733 GHz

Res.Bw 1 MHz [imp] off
TG.Lvl 200.000 MHz Vid.Bw 1 MHz
CF.Stp RF.Att Unit 0 dB
[dB μ V/m]



Spurious Emissions. Tested for Valeo. EUT: Keyfob transmitter (736 566-A). ENG: AMT
FCC Part 15.231(b). CW Continuous Tx. Limit. 15.231(b) & 15.209 GPH/43022/01/009

Test Of: Valeo Electronique
Key Fob Transmitter
To: FCC Part 15 Subpart C: 2000
(Intentional Radiators)
Section 15.231

Appendix 5. Photographs of EUT

This appendix contains the following photographs:

| Photo Reference Number | Title |
|-------------------------------|----------------------------|
| PHT\42912\001 | Close up front view of EUT |
| PHT\42912\002 | Front view of EUT |

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

RADIO FREQUENCY INVESTIGATION LTD.

EMC Department

Test Of: Valeo Electronique
Key Fob Transmitter
To: FCC Part 15 Subpart C: 2000
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PHT\42912\001 Close up front view of EUT



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PHT\42912\002 Front view of EUT

