

Test Report

Electromagnetic Compatibility



DAT- P-121 / 02-00

Test report file no:	E-0017-1301-04 JP
Applicant:	FELLOWES MANUFACTURING COMPANY 1789 Norwood AVE., Itasca, Illinois 60143-1095 USA
Contact person:	Eric Jong
Model:	Prowler Cordless Mouse
Kind of Product:	Wireless Mouse
Manufacturer:	ARESON TECHNOLOGY CORP. 12F, No.111-6, Hsing-De RD, San Chung, Taipei Hsien, TAIWAN, R.O.C.
Contact person:	Eric Jong
Test result Emission tests:	Compliance with FCC Part 15 Subpart C, Section 15.227 and IC RSS-210, Section 8.6 (Category II Equipment)
Date of issue:	2004-June-21

The testresult only responds to the tested sample.
It is not allowed to copy this report partly without the allowance of the test laboratory.

DIRECTORY

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IDENTIFICATION OF THE TEST LABORATORY

Company name: *emitel* AG

Address: Landshuter Str. 211a
D-94315 Straubing
Germany

Contact person: Dieter Fröhlich

Contact address: Phone: +49 9421 9746-0
Fax.: +49 9421 9746-70
eMail: germany@emitel.de
Homepage: www.emitel.de

FCC Registration number: 765810
IC Registration number: IC5066

DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT):

Date of receipt of test sample: 2004-April-14

Testing Start Date: 2004-May-28

Testing End Date: 2004-June-21

Number of received/tested samples: 1

Serial Number: none

FCC-ID: IDHFEL5

Voltage consumption: 3V DC (battery supply)

Product status:

- ☒ Development Sample
- ☐ Preproduction Sample
- ☐ Production Sample

Dimensions: L x W x H: 12cm x 6.5cm x 4.5cm

Following system devices are parts of the EUT and were connected during the measurement:

none

Following cables were connected during the measurement:

none

OPERATION MODES

OPERATION MODES:

Transmitting mode at 27.045MHz with a channel bandwidth of 5kHz

EUT MONITORING

none

ENVIRONMENTAL CONDITIONS

Temperature	20 °C
Humidity	50 %
Atmospheric pressure:	860-1060 mbar

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report according to NIS 81 /5.1994 „The Treatment of Uncertainty in EMC Measurements“ and is documented in the emitel quality system according to EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

TEST SPECIFICATION

The tests were performed according to the following specifications:

- | | | | |
|-------------------------------------|-----------------------|--|----------------|
| ☒ | FCC Part 15 Subpart A | Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC) | December, 2003 |
| ☒ | FCC Part 15 Subpart C | Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC) | December, 2003 |
| ☒ | RSS-210 | Radio Standards Specification RSS-210 Issue 5 for Low Power Licence-Exempt Radiocommunication Devices of Industry Canada | November, 2001 |
| ☒ | ANSI C63.4 | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz - 40 GHz | 2001 |

FCC Part 15 Subpart C

Specification	Result	Remarks
§15.207 Conducted emission	limit kept	NA
§15.209 Radiated emission	limit kept	Limit kept
§15.227 Field strength within the band 26.96-27.28 MHz	limit kept	Limit kept

RSS-210

Specification	Result	Remarks
Section 6.3 Transmitter Radiated Emissions	limit kept	Limit kept
Section 6.6 Transmitter AC Wireline Conducted Emissions	limit kept	NA
Section 8.6.1 Low Power Device for the band 26.96-27.28 MHz	limit kept	Limit kept

SUMMARY:

FINAL JUDGEMENT

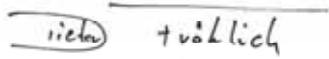
The tested sample meets the requirements according to the technical regulations of

**Code of Regulations Part 15 Subpart C (intentional radiators)
of the Federal Communication Commission (FCC)**

**Radio Standards Specification RSS-210 Issue 5
for Low Power Licence-Exempt Radiocommunication Devices
of Industry Canada**

Straubing, 2004-June-21

emitel AG



Dieter Fröhlich
Dipl. Ing. (FH)
Director

Test engineer:



Jürgen Pessinger

Emission test

Conducted emission

(150 kHz - 30 MHz)

TEST CONDITIONS AND RESULTS:

Conducted emissions were measured in the frequency range 0.15 MHz to 30 MHz. The bandwidth of the EMI-Receiver was set to 10 kHz and the detector-function was set to CISPR quasi-peak.

The test setup was made in accordance with ANSI C63.4-2001.

Measurements were performed on phase and neutral lines of the power-cords of the tested system. Preliminary scans were taken with the detector-function of the EMI-receiver set to peak to determine the conducted EMI-profile of the EUT. At the final test the cables and equipment were placed and moved within the range of positions likely to find their maximum emissions.

The measurements were performed in a shielded room.

☒ Test not applicable

Testlocation: ☐ Shielded room 1
☐ Shielded room 2
☐ Shielded room 3
☐ Shielded room 4

Used test instruments and test accessories:

Test instrument	Type	Manufacturer	ID - No.
Test receiver	ESH 3	Rohde & Schwarz	01-01/01-01-065
LISN	ESH2-Z5	Rohde & Schwarz	01-01/01-01-041
LISN	NSLK 8128	Schwarzbeck	01-01/01-01-056
HF-cable	RG 223	Emitel	01-05/02-01-046
HF-cable	RG 214	Emitel	01-05/02-01-038

TEST RESULTS:

The requirements are: ☐ MET ☐ NOT MET

Remarks: _____

Radiated emission

(25 MHz – 1000 MHz)

TEST CONDITIONS AND RESULTS:

Radiated emissions are measured over the frequency range from 25 MHz to 1 GHz. The bandwidth of the EMI-receiver is set to 120 kHz and the detector-function is set to CISPR quasi-peak.

The test setup is made in accordance with ANSI C63.4-2001. Measurements are made in both the horizontal and vertical planes of polarization. Preliminary scans are taken in a full-anechoic room using a spectrum analyzer with the detector function set to peak. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.

All tests are performed at a test-distance of 3 meters. For final testing an open-area test-site is used. During the tests the EUT is rotated all around and the receiving-antenna is raised and lowered from 1 meter to 4 meters to find the maximum levels of emissions. The cables and equipment is placed and moved within the range of position likely to find their maximum emissions.

☐ Test not applicable

Test location: ☒ Shielded room 2, Pretest
☒ Open site, Final test

Antenna EuT distance: ☒ 3 m, Pretest
☒ 3 m, Final test

Used test instruments and test accessories:

Test instrument	Type	Manufacturer	ID - No.
Pretest:			
Spectrum Analyser	FSP 30	Rohde & Schwarz	01-01/01-01-063
Antenna	3142 B	EMCO	01-01/01-01-067
HF-Cable	RG 213	Suhner	01-05/02-01-043
HF-Cable	RG 213	Emitel	01-05/02-01-038
Preamplifier	TVV 695	MTS	01-05/02-01-016
Final test:			
Receiver	ESVP	Rohde & Schwarz	01-01/01-01-035
Antenna	VULB 9163	Schwarzbeck	01-01/01-01-059
HF-Cable	RG 217	Suhner	01-05/02-01-048
HF-Cable	RG 214	Emitel	01-05/02-01-050

TEST RESULTS:

The requirements are: ☒ MET ☐ NOT MET

Remarks:

SCAN RADIATED EMISSIONS:

Horizontal Antenna Polarization

Test distance: 3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 28.05.2004
Operator: Rupert Kohlhäufel

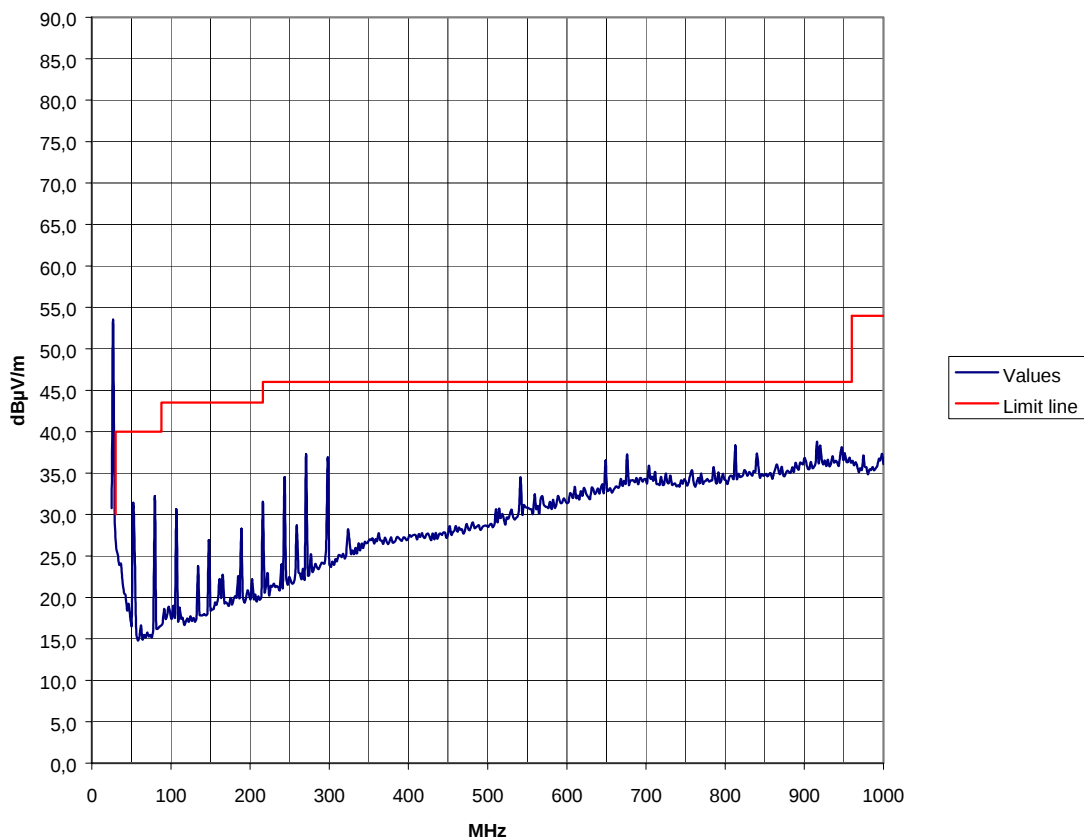
Mode:
Cordless Mouse in transmitting mode

Detector: MaxPeak
Result: **SCAN**

FCC Part 15

Subpart C, Limit QP

Horizontal Polarization



SCAN RADIATED EMISSIONS:

Vertical Antenna Polarization

Test distance: 3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 28.05.2004
Operator: Rupert Kohlhäufel

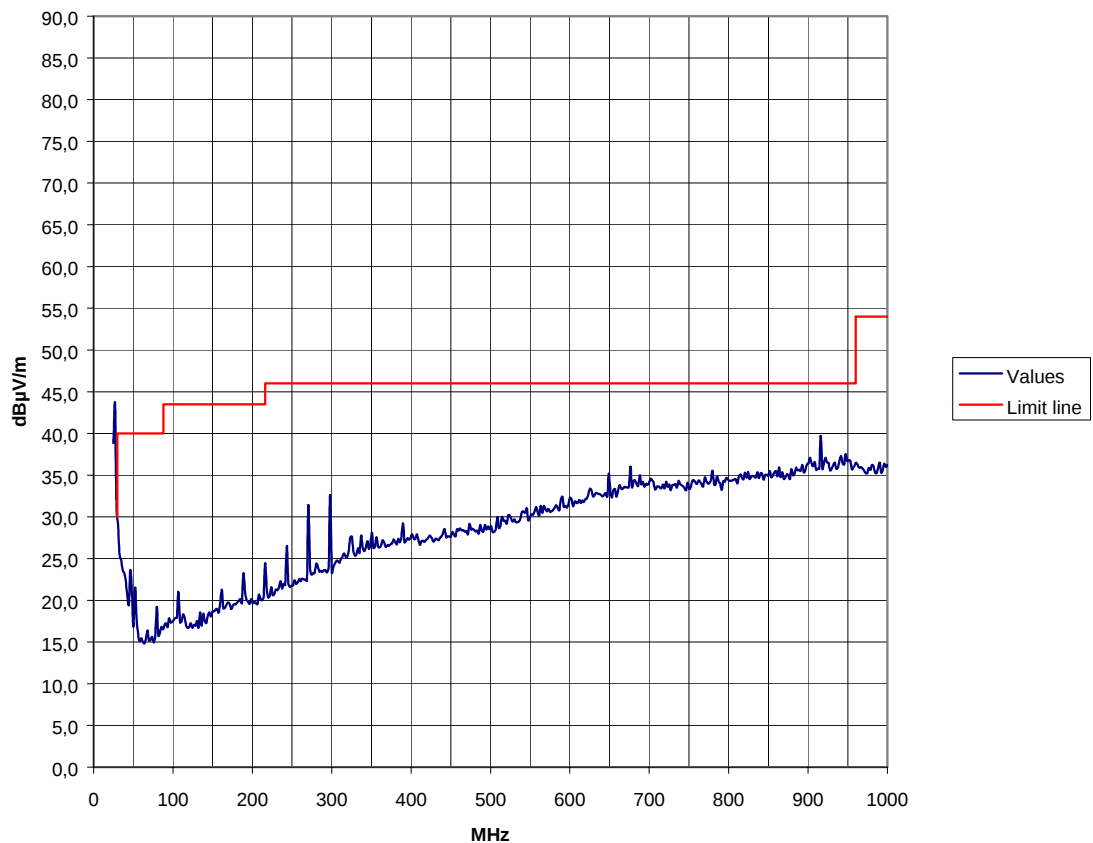
Mode:
Cordless Mouse in transmitting mode

Detector: MaxPeak
Result: **SCAN**

FCC Part 15

Subpart C, Limit QP

Vertical Polarization



FINAL TEST RADIATED EMISSIONS:

Horizontal Antenna Polarization

Test distance: 3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 28.05.2004
Operator: Rupert Kohlhäufel

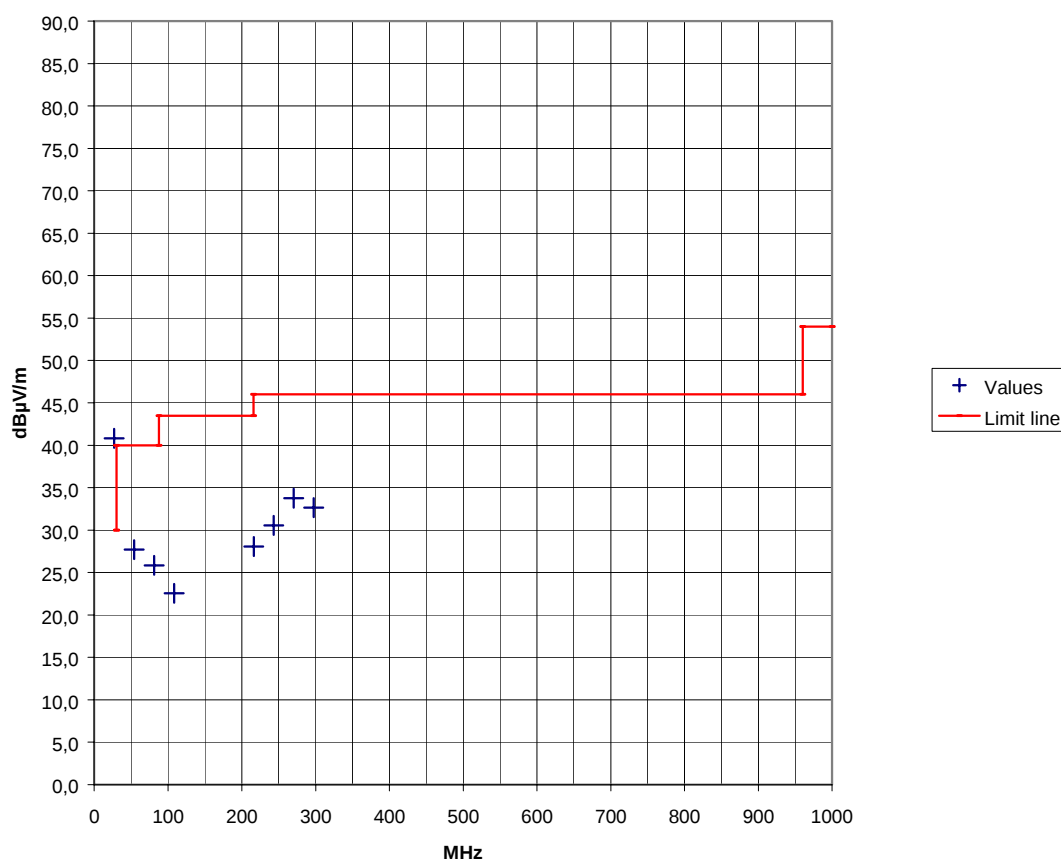
Mode:
Cordless Mouse in transmitting mode

Detector: QuasiPeak
Result: Limit kept

FCC Part 15

Subpart C, Limit QP

Horizontal Polarization



FINAL TEST RADIATED EMISSION (TABLE):

Horizontal Antenna Polarization

Test distance:

3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 28.05.2004
Operator: Rupert Kohlhäufel

Mode:
 Cordless Mouse in transmitting mode

Detector: QuasiPeak
Result: Limit kept

FCC Part 15

Subpart C, Limit QP

Horizontal Polarization

Frequency [MHz]	Reading [dBμV]	Correction [dB]	Value [dBμV/m]	Limit [dBμV/m]	Limit exceeded [dB]
27,1	26,2	14,6	40,8	80,0	
54,1	13,6	14,1	27,7	40,0	
81,1	16,1	9,8	25,9	40,0	
108,2	8,9	13,6	22,5	43,5	
216,4	13,9	14,2	28,1	46,0	
243,4	15,2	15,3	30,5	46,0	
270,5	17,6	16,2	33,8	46,0	
297,5	15,7	16,9	32,6	46,0	

Remarks: Field strength value (dBμV/m) = Reading (dBμV) + Correction (dB)
Frequencies which are not listed have a margin more than 6dB to the limit.

FINAL TEST RADIATED EMISSION:

Vertical Antenna Polarization

Test distance: 3 m

Project file: E-0017-1301-01

Applicant: Fellowes Manufacturing Company

Model: Prowler Cordless Mouse

Date of test: 28.05.2004

Operator: Rupert Kohlhäufel

Mode:

Cordless Mouse in transmitting mode

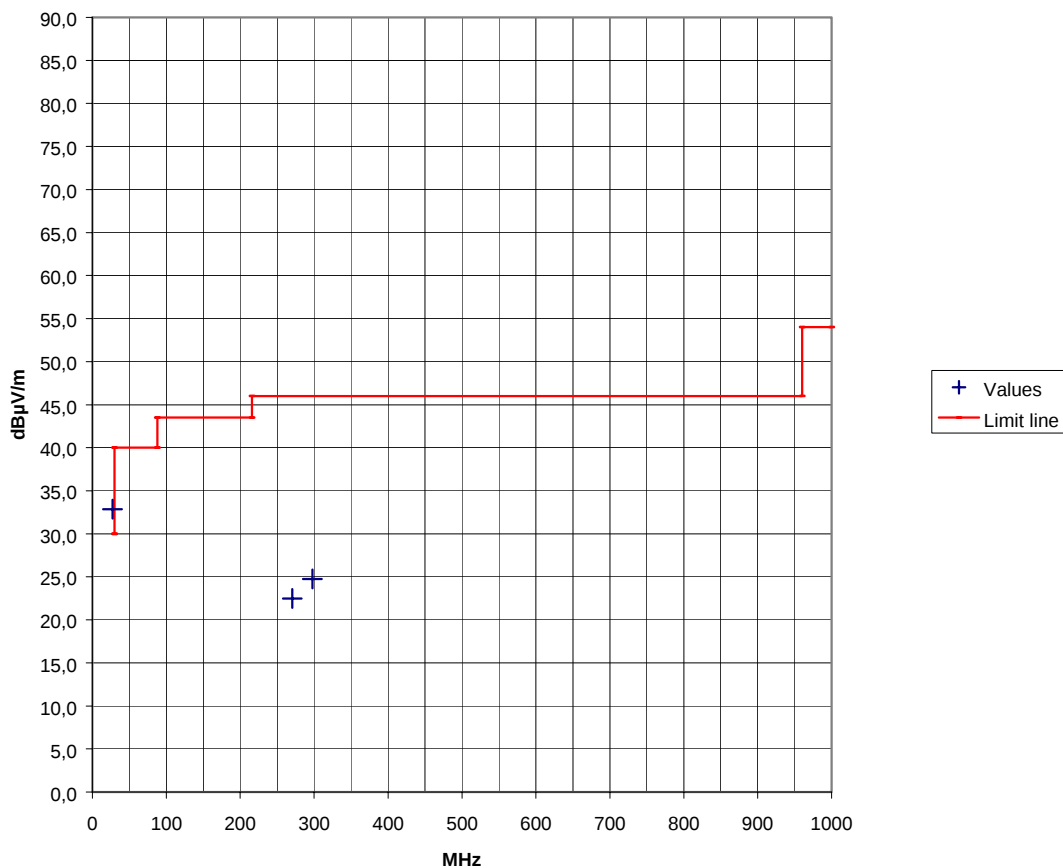
Detector: QuasiPeak

Result: Limit kept

FCC Part 15

Subpart C, Limit QP

Vertical Polarization



FINAL TEST RADIATED EMISSIONS (TABLE):

Vertical Antenna Polarization

Test distance:

3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 28.05.2004
Operator: Rupert Kohlhäufel

Mode:
 Cordless Mouse in transmitting mode

Detector: QuasiPeak
Result: Limit kept

FCC Part 15

Subpart C, Limit QP

Vertical Polarization

Frequency [MHz]	Reading [dBμV]	Correction [dB]	Value [dBμV/m]	Limit [dBμV/m]	Limit exceeded [dB]
27,1	18,2	14,6	32,8	80,0	
270,5	6,3	16,2	22,5	46,0	
297,5	7,8	16,9	24,7	46,0	

Remarks: Field strength value (dBμV/m) = Reading (dBμV) + Correction (dB)
Frequencies which are not listed have a margin more than 6dB to the limit.

Radiated Emissions

(150 kHz – 30 MHz)

TEST CONDITIONS AND RESULTS:

Radiated emissions in the frequency range 9 kHz – 30 MHz will be measured initially at a distance of 3 meters. A prescan at 3 meter distance will be performed in a shielded room with the detector of the spectrum analyser or EMI Receiver set to peak. Final measurement is the performed at 30 meter distance. In case the regulation requires testing at other distances, the result will be extrapolated. The extrapolation factor will be determined by making a second measurement at 10 meter distance. The provisions of 15.31 (d) apply.

According to section 15.209 (d) final measurements performed with the detector set to Quasi Peak except for frequency bands 9-90 kHz and 110 – 490 kHz where average detector is employed.

Used test instruments and test accessories:

Test instrument	Type	Manufacturer	ID - No.
Test receiver	ESH 3	Rohde & Schwarz	01-01/01-01-065
Antenna	FMZB 1516	Schwarzbeck	01-01/01-01-050
HF-cable	RG 223	Emitel	01-05/02-01-046
HF-cable	RG 214	Emitel	01-05/02-01-038

TEST RESULTS:

The requirements are: ☒ MET ☐ NOT MET

Remarks: The test was performed in a frequency range 150 kHz – 30 MHz due the lowest
Oscillator frequency in the EUT is 4 MHz.

SCAN RADIATED EMISSIONS:

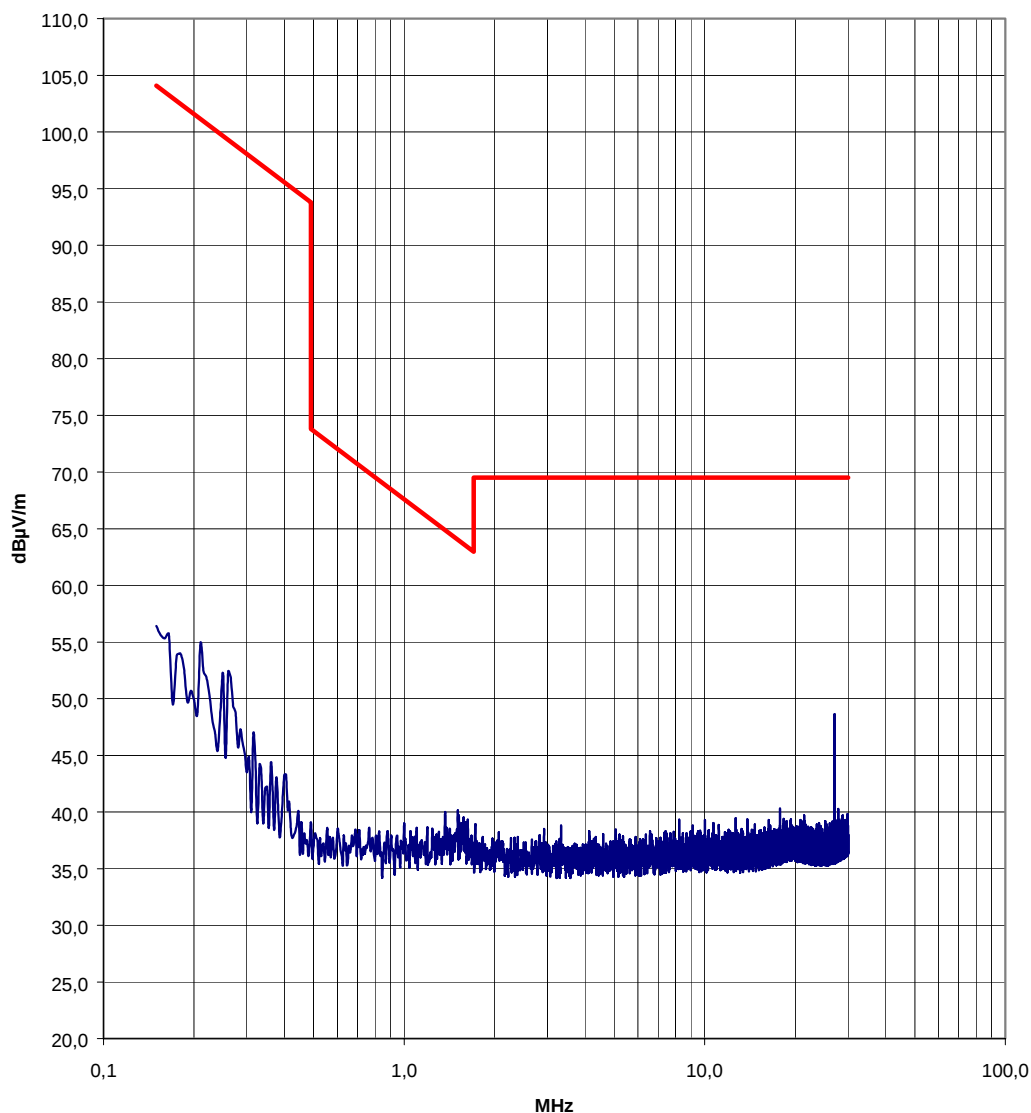
Test distance: 3 m

Project file: E-0017-1301-01
Applicant: Fellowes Manufacturing Company
Model: Prowler Cordless Mouse
Date of test: 21.06.2004
Operator: Jürgen Pessinger
Detector: PEAK
Result: **SCAN**

Mode:
Cordless Mouse in transmitting mode

FCC Part 15

Subpart C



MEASUREMENT SETUP RADIATED EMISSIONS

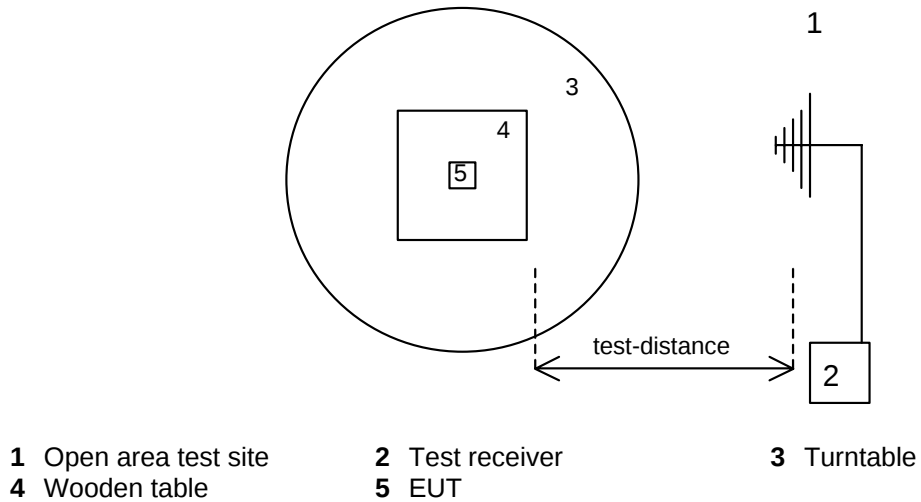


PHOTO TESTSETUP RADIATED EMISSION

