



Radio test report 99666431

based on:

- FCC Part 15 Subpart C, sections 15.209 and 15.249 (10-1-04 Edition)
- RSS-210, Issue 5 (Nov. 2001 edition)

Cordless Mouse
Logitech Cordless Mouse
M-RBL117



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This report comprises of four modules. The total number of pages is: 16



Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:1999. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie). The contents of this test report, if reproduced, shall be copied in full, unless special consent in writing for reproduction in part is granted by Telefication. Copyright of this test report is reserved to Telefication.

Ordering party:

Company name : Logitech Europe S.A.
Address : Z.I. Moulin du Choc D
Zipcode : 1122
City/town : Romanel sur Morges
Country : Switzerland
Date of order : 22 July 2005

2 Product

A sample of the following product was submitted for testing:

Product description	: Cordless Mouse
Manufacturer	: Logitech Europe S.A.
Trade mark	: Logitech Cordless Mouse
Type designation	: M-RBL117
FCC ID	: DZL201992
Hardware version	: --
Serial number	: B1173-F270 TDE007
Software release	: --

3 Test schedule

Tests were carried out in accordance with the specification detailed in chapter 7 “Summary” of this report.

Tests were carried out at the following location:

- Telefication, Zevenaar

The samples of the product were received on:

- 15 August 2005

Tests were carried out from:

- 16 August 2005 to 23 August 2005



4 Product documentation

For production of this report the following product documentation was used:

Description:	Date:	Identification:
Product description	15 Augustus 2005	M-RBL117_Description_GB.doc
Circuit diagrams	14 July 2005	Schematic_M-RBL117_a0.pdf
Block diagram	15 Augustus 2005	M-RBL117 block diagram.pdf
Parts list	15 Augustus 2005	M-RBL117 BOM rev_A0.XLS
PCB layout drawings Main PCB	12 July 2005	Layouts_M-RBL117.pdf
Testing indications	12 Augustus 2005	Testing indications for the Cordless Optical Mouse M-RBL117.doc

The above-mentioned documentation will be filed at Telefication for a period of 10 years following the issue of this test report.

5 Observations and comments

A reservation was made to perform radiated emission measurement on the following Open Area Test Site:

TNO Electronic Products & Services (EPS) B.V
Smidshornerweg 18
9822 TL Niekerk
The Netherlands

FCC listed : 90828
Industry Canada : IC3501

Since the exploratory measurements revealed no emissions in the frequency range 30 - 1000 MHz, the final measurements on the Open Area Test Site, as listed above, were judged unnecessary. Refer to chapter 2.3 "*Field strength of unwanted emissions 30 - 1000 MHz*" for details.

6 Modifications to the sample

No modifications were made to the sample.

7 Summary

The product is intended for use in the following application area(s):

INTENTIONAL RADIATOR OPERATING IN THE FREQUENCY BAND 2400 - 2483.5 MHz

The sample was tested according to the following specification(s):

FCC Part 15 Subpart C, section 15.209 (10-1-04 Edition);
RSS-210, Issue 5 (Nov. 2001 edition).



8 Conclusions


The samples of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product items as identified in this test report. Telefication does not accept any responsibility for the results stated in this test report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : H.H. Lodewijk


function : Test engineer Radio/EMC

signature : 

Review of test report by:

name : ing. J.C. le Clercq

function : Test engineer

signature : 

The above conclusions have been verified by the following signatory:

Date : 1 September 2005

name : J.P. van de Poll

function : Co-ordinator Test Group

signature : 

Test results module

1 General information

1.1 Equipment information

Rated RF output power	n.a., integral antenna
Rated radiated RF power	not specified
Operating frequency range	2402 MHz to 2479 MHz (24 channels)
Modulation	GFSK
Modulation bit rate	1 Mbits/s
ITU emission class	1M20F1D
FCC ID	DZL201992

2 Emission tests

2.1 Field strength of intentional signal

Compliance standard : FCC part 15, subpart C, section 15.249 (a) & (e)
 Method of test : ANSI C63.4-2003, sections 5.5 & 8.2.4
 Ambient temperature : 20 °C
 Relative humidity : 42 %

Test results :

average field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (AV)	Polarisation	Limit (dB μ V/m)
2.402	86.7	H	94.0
2.402	84.2	V	94.0
2.448	85.9	H	94.0
2.448	80.0	V	94.0
2.479	84.9	H	94.0
2.479	80.5	V	94.0

peak field strength:

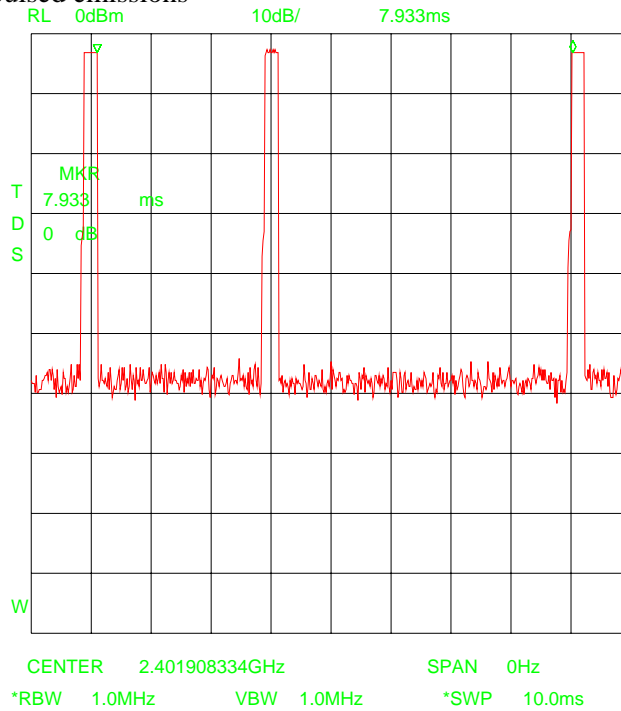
Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)
2.402	86.7	H	114.0
2.402	84.2	V	114.0
2.448	85.9	H	114.0
2.448	80.0	V	114.0
2.479	84.9	H	114.0
2.479	80.5	V	114.0

Measurement uncertainty: +4.5 dB / -6.0 dB

2.2 Calculation of average power

The applicant stated that the transmitter uses pulsed transmissions. Therefore an examination of the pulsed emission was performed and a correction factor (duty cycle) was determined.

Plot of pulsed emissions



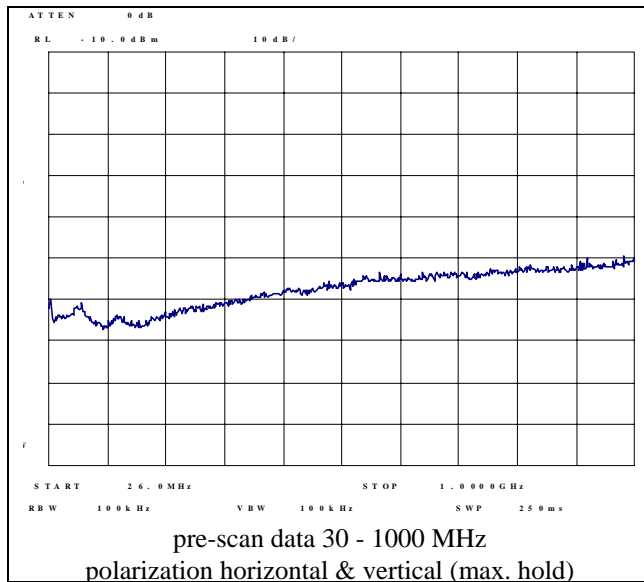
On state	200 μ S
Off state	2800 μ S
Calculated duty cycle (On / On + Off)	6.67%
Calculated Average power correction factor	peak power - 11.7 dB

2.3 Field strength of unwanted emissions 30 - 1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.209 (a)
 Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
 FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
 Ambient temperature : 20 °C
 Relative humidity : 42 %

EUT condition : 2448 MHz channel
 Test results :

Exploratory measurements of unwanted emissions 30 - 1000 MHz



No unwanted emissions in the frequency range 30 - 1000 MHz were detected during the exploratory measurements. Accordingly, measurements on an Open Area Test Site were judged unnecessary.

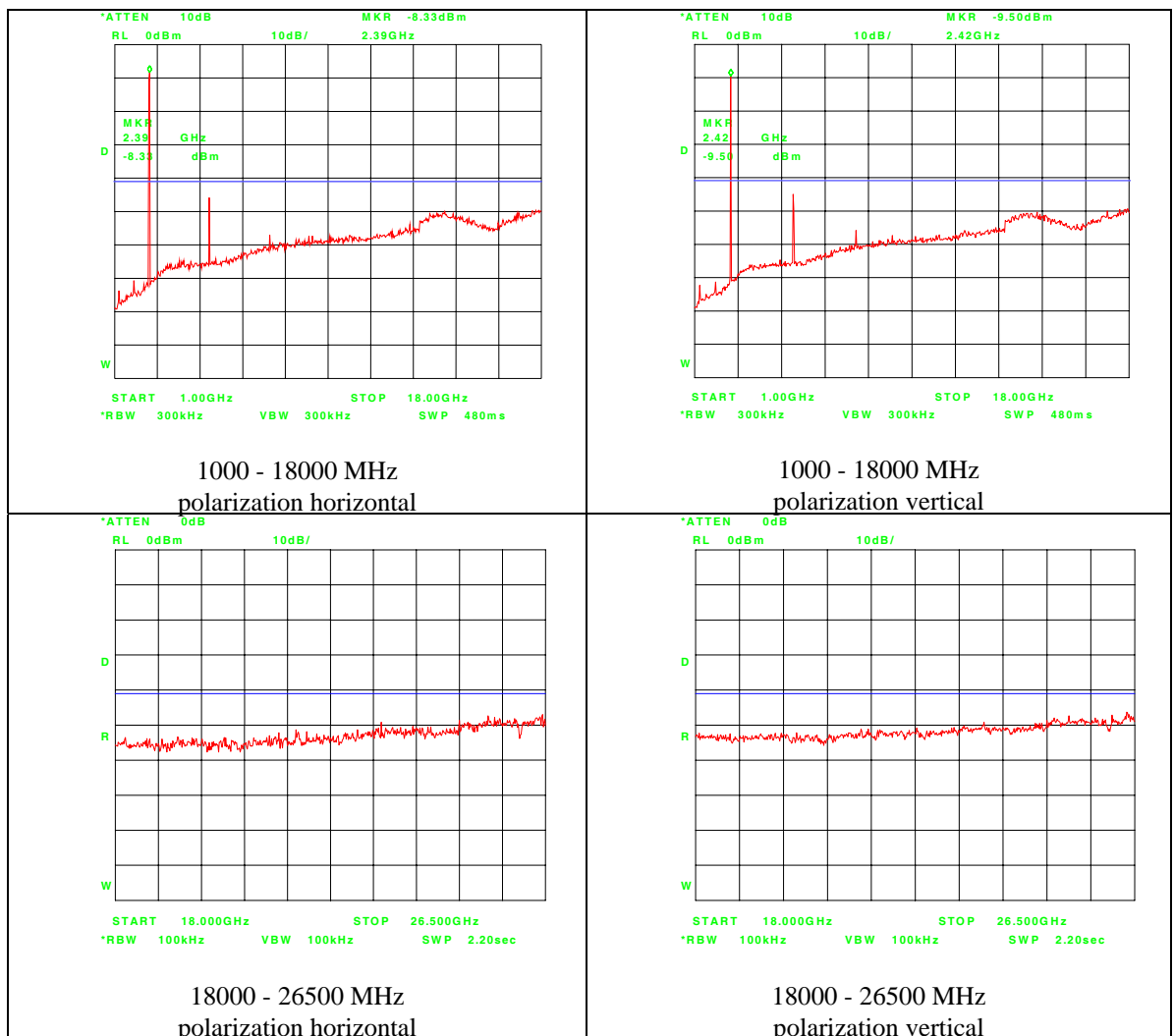
Measurement uncertainty: N/A

2.4 Field strength of unwanted emissions > 1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.109 (a), 15.209 (a) & 15.249 (a) & (e)
 Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
 FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
 Ambient temperature : 20 °C
 Relative humidity : 42 %
 Test results :

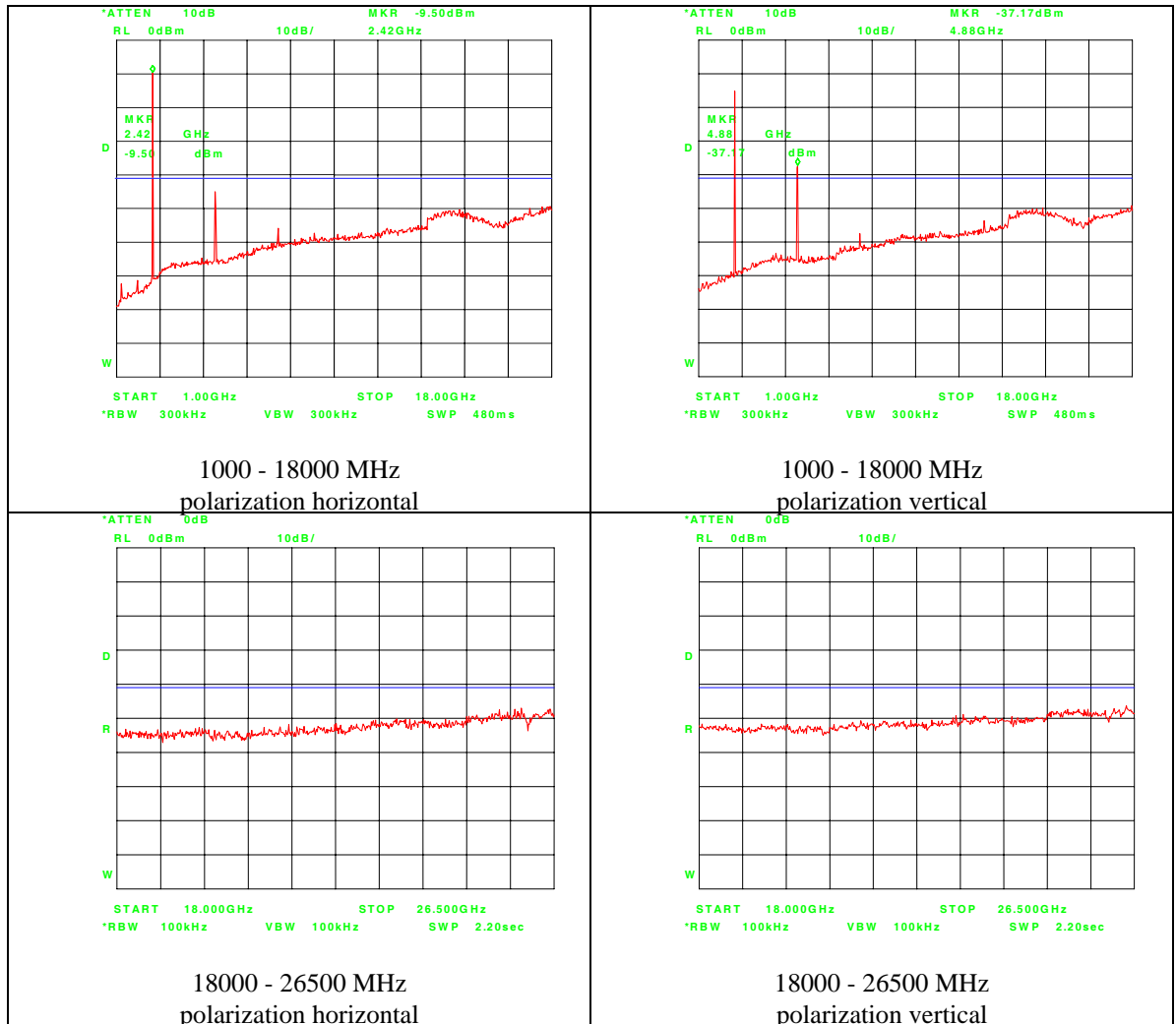
Unwanted emissions transmitter:

Low channel 2402 MHz TX:



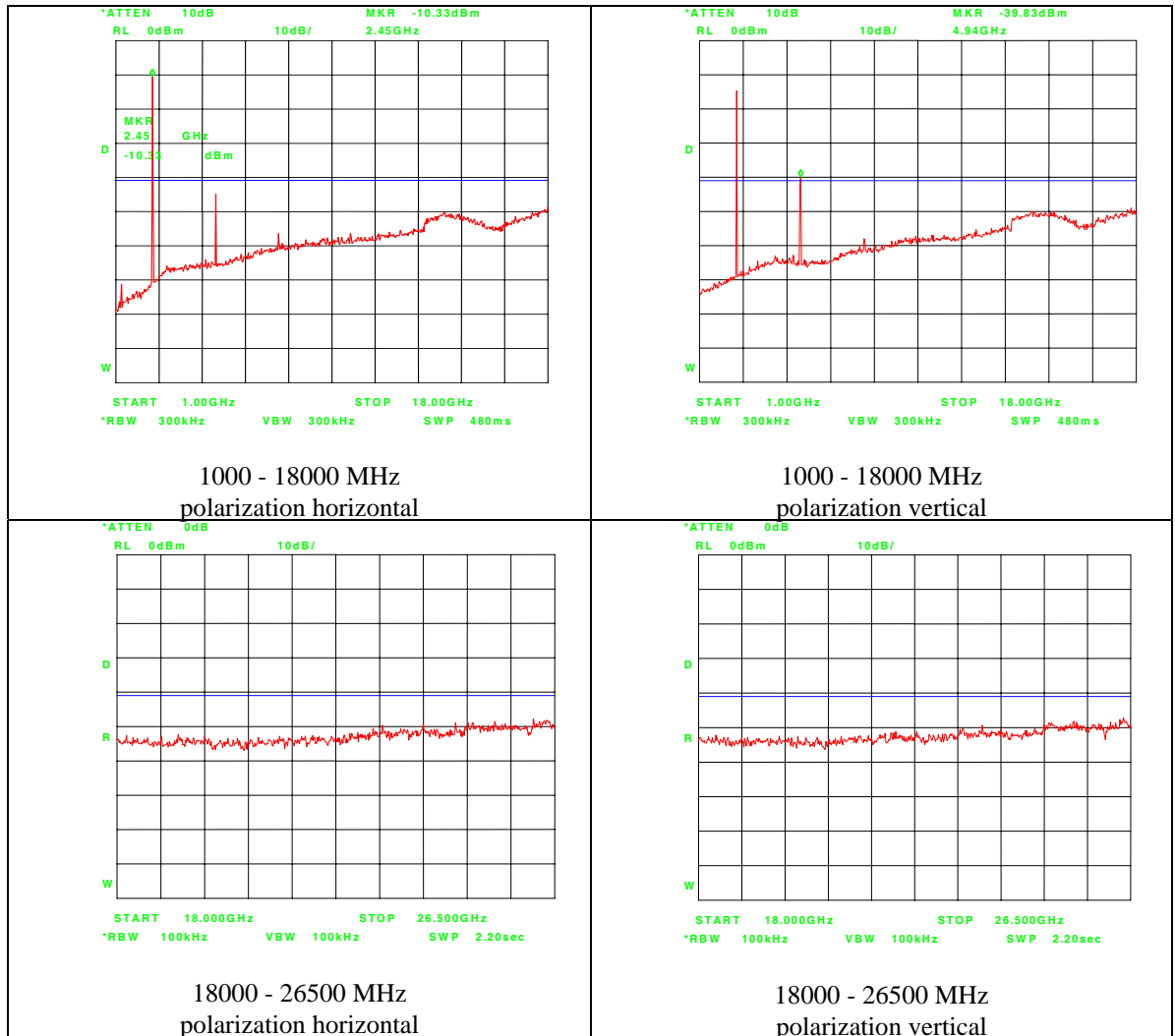
Reference level is 95.2 dB μ V/m
 To convert from dBm to dB μ V/m : reading in dBm + 95.2
 Measurement uncertainty: +4.5 dB / -6.0 dB
 Limit for harmonics = measured level - 11.7 dB

Mid channel 2448 MHz TX:



Reference level is 95.2 dB μ V/m
 To convert from dBm to dB μ V/m : reading in dBm + 95.2
 Measurement uncertainty: +4.5 dB / -6.0 dB
 Limit for harmonics = measured level - 11.7 dB

High channel 2479 MHz TX:



Reference level is 95.2 dB μ V/m
 To convert from dBm to dB μ V/m : reading in dBm + 95.2
 Measurement uncertainty: +4.5 dB / -6.0 dB
 Limit for harmonics = measured level - 11.7 dB

Used test equipment module

The following measurement equipment was used:

Description	ID / SN	Manufacturer	Model
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E
RF Pre-amplifier up to 1000 MHz	TE 00098	Rohde & Schwarz	ESV-Z3
RF Pre-amplifier 1 - 26.5 GHz	TE 00093	Hewlett Packard	HP8449B
Biconilog antenna	TE 00700	Emco	3143
Horn Antenna 1 - 18 GHz	TE 00532	Emco	3115
Horn Antenna 18 - 40 GHz	TE 00533	Emco	3116
Anechoic Chamber	TE 01064	Euroshield	RFD-F-100
Digital Thermometer	TE 00388	Fluke	Fluke 51
Antenna tower	--	HD	AS 620p
Turntable	--	HD	DS 412
Turntable controller	--	HD	HD 050

Cross reference table

Transmitter	
CNR RSS-210 Issue 5	FCC 47 CFR Ch. 1 part 15, subpart C (10-1-04 Edition)
Table 3	§ 15.209 & § 15.249