telefication bv
The Netherlands
Chamber of Commerce
09076358
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Radio test report
99538331

based on:
FCC part 15; subpart C; sections 15.209 and 15.249
(10-1-03 edition)

Cordless Mouse
Logitech Cordless Mouse
M-RAN100

Contents

This report comprises of three modules. The total number of pages is: 11

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Ordering party:

Company name	:	Logitech Europe S.A.
Address	:	Z.I. Moulin du Choc D
Zipcode	:	CH-1122
City/town	:	Romanel sur Morges
Country	:	Switzerland
Date of order	:	27 August 2004

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-RAN100
FCC ID	:	DZL201866
Hardware version	:	--
Serial number	:	PB3-168
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:

Radiated measurements <1 GHz:

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

  FCC listed : 90828
  Industry Canada : IC3501

All other measurements:

- Telefication, Zevenaar

The samples of the product were received on:

- 1 September 2004

Tests were carried out from:

- 2 September 2004 to 28 September 2004

4 Product documentation

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

Description:	Date:	Identification:
Product description	August, 2004	M-RAN100 (1 page)
Testing indications for Cordless Optical Mouse	August 31, 2004	M-RAN100 (4 pages)
Circuit diagram	August 18, 2004	SCH-221886-0000, 3 sheets
Main PCB lay-out	08/17/04	1 page
Led PCB lay-out	08/17/04	10 pages
Bill of materials	August 17, 2004	Capri Power&MCU Rev A0
Block diagram	August 31, 2004	Logitech M-RAN100 Electrical diagram

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

None.

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; sections 15.209 and 15.249 (10-1-03 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 : J.P. van de Poll

function : Co-ordinator Test Group

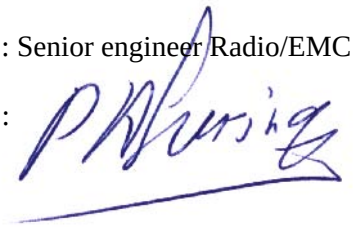
signature :

Review of test report by:

name : ing. P.A. Suringa

function : Senior engineer Radio/EMC

signature :



The above conclusions have been verified by the following signatory:

Date : 30 September 2004

name : drs. ir. W.B.A. Blom

function : Managing Director

signature :

Test results module

1 General information

1.1 Equipment information

Rated RF output power	n.a., integral antenna
Rated radiated RF power	1 mW
Operating frequency range	2402 MHz to 2473 MHz (18 channels)
Modulation	GFSK
Modulation bit rate	24 kbit/s
ITU emission class	1M00F1D / 71M00F1D
FCC ID	DZL201866

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

Test results :

average field strength:

Frequency (MHz)	Test result @ 3 m distance (dBµV/m) (AV)	Polarisation	Limit (dBµV/m)
2.402	90.53	H	93.98
2.402	92.40	V	93.98
2.448	91.03	H	93.98
2.448	93.37	V	93.98
2.473	90.53	H	93.98
2.473	93.37	V	93.98

peak field strength:

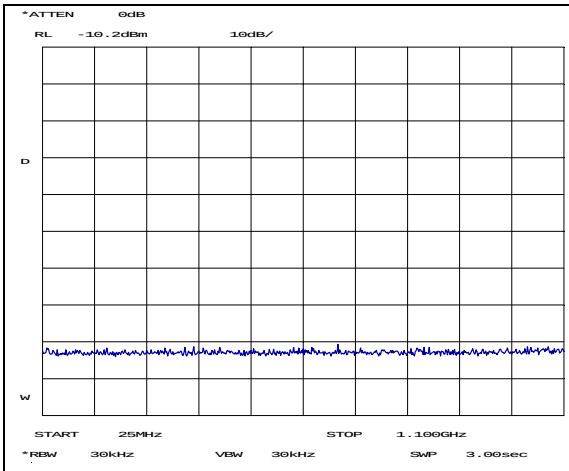
Frequency (MHz)	Test result @ 3 m distance (dBµV/m) (PK)	Polarisation	Limit (dBµV/m)
2.402	90.53	H	113.98
2.402	92.40	V	113.98
2.448	91.03	H	113.98
2.448	93.37	V	113.98
2.473	90.53	H	113.98
2.473	93.37	V	113.98

Measurement uncertainty: +1.26 dB / -1.34 dB

2.2 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.
EUT condition	:	2473 MHz channel
Test results	:	

Unwanted emissions 30 - 1000 MHz



pre-scan data 30 – 1000 MHz
polarization horizontal & vertical (max. hold)

average field strength:

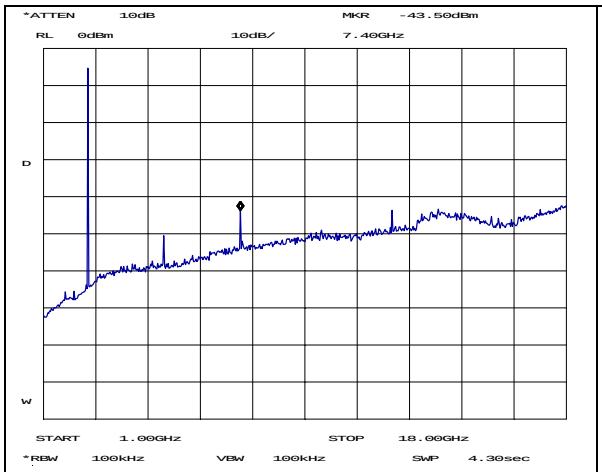
Frequency (MHz)	Test result @ 3 m distance (dBµV/m) (AV)	Polarisation	Limit (dBµV/m)
No unwanted emissions detected		H/V	53.98

Measurement uncertainty: N/A

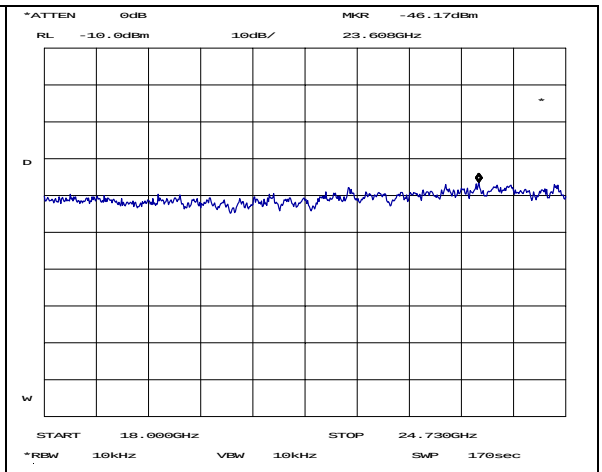
2.3 Field strength of unwanted emissions > 1000 MHz

Compliance standard	:	FCC part 15, subpart C, section 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.
EUT condition	:	2473 MHz channel
Test results	:	

Harmonics >1000 MHz



pre-scan data 1000 – 18000 MHz
polarization horizontal & vertical (max. hold)



pre-scan data 18000 – 24730 MHz
polarization horizontal & vertical (max. hold)

average field strength:

Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dBµV/m) (AV)	Polarisation	Limit (dBµV/m)
4946.03	harmonic	50.1	V	53.98
7419.04	harmonic	51.2	H	53.98
12365.07	harmonic	50.7	H	53.98

peak field strength:

Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dBµV/m) (PK)	Polarisation	Limit (dBµV/m)
4946.03	harmonic	50.1	V	73.98
7419.04	harmonic	51.2	H	73.98
12365.07	harmonic	50.7	H	73.98

Measurement uncertainty: +1.26 dB / -1.34 dB

Used test equipment module

The following measurement equipment was used:

Location Telefication Zevenaar:

Description	ID / SN	Manufacturer	Model
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E
RF Preamplifier 1 – 26.5 GHz	TE 00093	Hewlett Packard	HP8449B
Biconilog antenna	TE 00700	Emco	3143
Horn Antenna	TE 00532	Emco	3115
Horn Antenna	TE 00533	Emco	3116
Anechoic Chamber	--	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

Location TNO Niekerk:

Description	ID / SN	Manufacturer	Model
Plastic measurement room	12636	Polyforce	-
Open Area Test Site	13886	Comtest	-
Antenna mast 4m	14277	Heinrich Deisel	MA240
Controller OATS	14278	Heinrich Deisel	HD100
Loop Antenna	1107	Chase	HLA6120
Biconilog antenna 30MHz – 1000MHz	15633	Chase	CBL6111B
EMI test receiver	15667	Rohde & Schwarz	ESCS 30
Turntable OATS	99108	Heinrich Deisel	HD050