



Radio test report 99807631 - rev 1.0

based on:

- FCC Part 15 Subpart C, sections 15.215 & 15.249 (10-1-05 Edition)
- FCC Part 15 Subpart B section 15.107 & 15.109 (10-1-05 Edition)
- RSS-Gen, Issue 1 (Sept. 2005 edition)
- RSS-210, Issue 6 (Sept. 2005 edition)

Cordless Mouse
Logitech
M-RBP123 & L-LM12

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This report comprises of four modules. The total number of pages is: 21

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication B.V.
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 : 27 September 2006

2 Product

A sample of the following product was submitted for testing:

Product description	: Cordless Mouse
Manufacturer	: Logitech Technology Co., Ltd.
Trade mark	: Logitech
Type designation	: M-RBP123 & L-LM12
FCC ID	: DZL202797
IC ID	: 1807B-202797
Hardware version	: --
Serial number	: --
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:

- 9 October 2006

Tests were carried out between:

- 12 and 23 October 2006

4 Product documentation

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

Description:	Date:	Identification:
Testing indications	10 Oct. 2006	M-RBP123
Product description	10 Oct. 2006	M-RBP123
Block diagram (clock freq. distribution)	--	M-RBP123Block_diagram.pdf
Circuit diagram (M-RBP123), rev. 101	August 2006	DOC ID: SCH-222797-0000
PCB lay out (M-RBP123), rev.101	August 2006	--
Bill of materials (L-LM12)	October 2006	L-LM12_BOM_061009.pdf
Circuit diagram (L-LM12), rev. A0	April 2006	SCH-222457-0000
Bill of materials (M-RBP123)	October 2006	M-RBP123_BOM_061004.pdf

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

Initially an appointment has been made for final measurements of unwanted emissions 30 - 1000 MHz on the Open Area Test Site of TNO EPS in Nieuwerkerk

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

FCC listed : 90828
Industry Canada : IC3501

Exploratory measurements (section 2.4) revealed that these final measurements are unnecessary.

All measurements were performed in test mode with the RF power level set at 0 dBm.

Peak emission limits, as shown in the plots, have been converted to effective isotropic radiated power by using: $P(\text{dBm}) = E(\text{dB}\mu\text{V/m}) - 95.2 (\text{dB})$.

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):

RECEIVER AND 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 15.215 & 15.249 (10-1-05 Edition);
FCC Part 15 Subpart B, sections 15.107 & 15.109 (10-1-05 Edition);
RSS-Gen, Issue 1 (Sept. 2005 edition);
RSS-210, Issue 6 (Sept. 2005 edition).

8 Conclusions

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

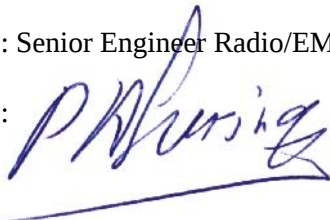
The results of the tests as stated in this report, are exclusively applicable to the product items as identified in this test report. Telefication does not accept any responsibility for the results stated in this test report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : ing. P.A. Suringa

function : Senior Engineer Radio/EMC

signature :



Review of test report by:

name : ing. S.J. van Spijker

function : Test Engineer

signature :



The above conclusions have been verified by the following signatory:

Date : 14 December 2006

name : J.P. van de Poll

function : Co-ordinator Test Group

signature :



Test results module

1 General information

1.1 Equipment information

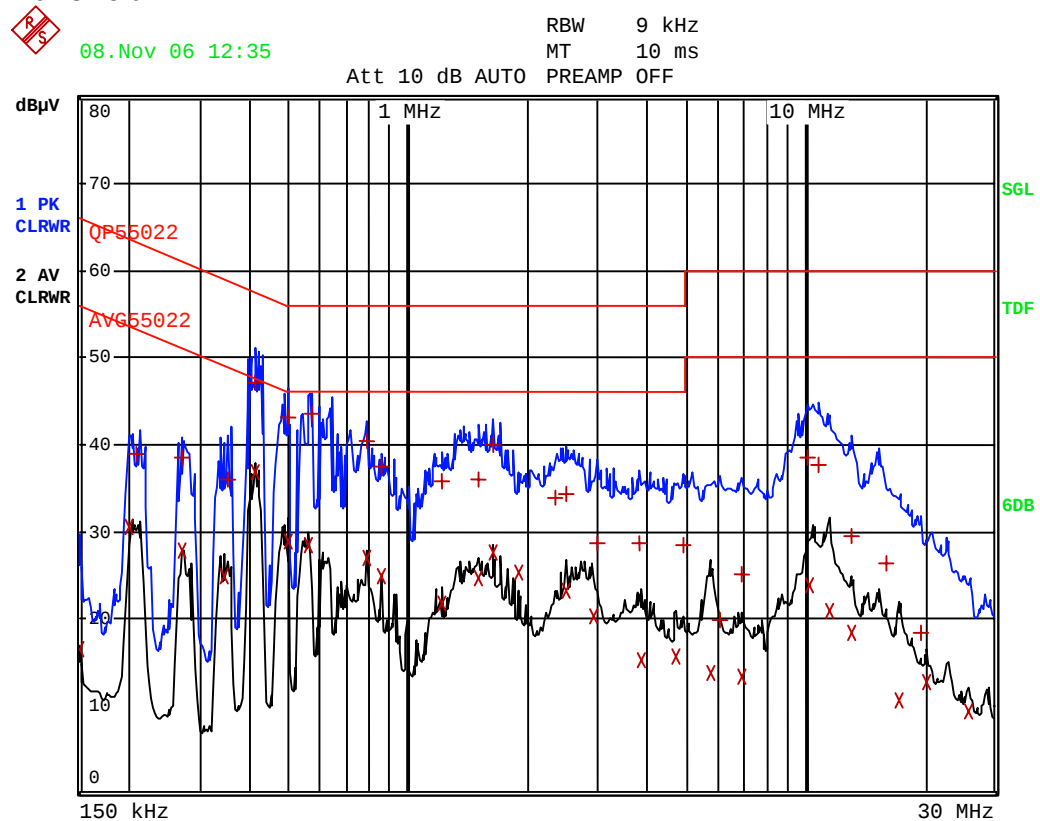
Rated RF output power	n.a., integral antenna
Rated radiated RF power	1 mW
Operating frequency range	2402 MHz to 2479 MHz (24 channels)
Modulation	GFSK
Modulation bit rate	1 Mbits/s
ITU emission class	1M00F1D
Duty cycle (during testing)	6.9 %
FCC ID	DZL202797
IC ID	1807B-202797

2 Emission tests

2.1 Conducted emissions

Compliance standard : FCC part 15, subpart B, section 15.107 (a).
EUT condition : Charging mode
Method of test : ANSI C63.4-2003, sections 5.2 & 6.2.2;
FCC part 15, subpart A, section 15.35.
Port : Adapter AC Mains port
Atmospheric pressure : Between 86 kPa and 106 kPa
Temperature : 22 °C
Relative humidity : 48 %

Mains Port L1

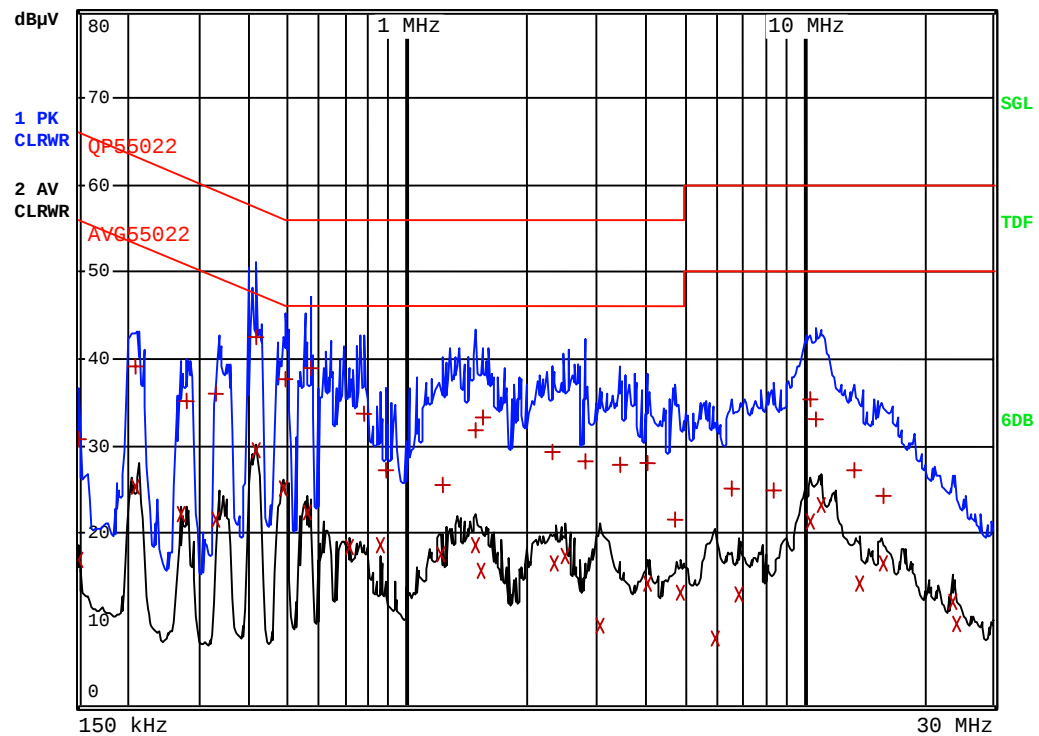


Mains Port N



08.Nov 06 12:31

RBW 9 kHz
MT 10 ms
Att 10 dB AUTO PREAMP OFF



Remark: x = Average values
+ = Quasi Peak values

Measurement uncertainty : ± 3.6 dB.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approx. 95%, but excluding the effect of measurement system repeatability.

Measurement equipment : 28, 30, 31

(The numbers listed refer to the module 'Used test equipment').

2.2 Field strength of intentional signal

Compliance standard : FCC part 15, subpart C, section 15.249 (a) & (e)
Method of test : FCC procedure on DTS measurement (issue May 9 2005)

Test results :
(only the highest of the two polarizations are stated)

Average field strength*:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (AV)	Polarisation	Limit (dB μ V/m)
2402	81.43	V	94
2448	81.93	V	94
2479	81.1	V	94

* based on duty cycle factor of 6.9%

Peak field strength:

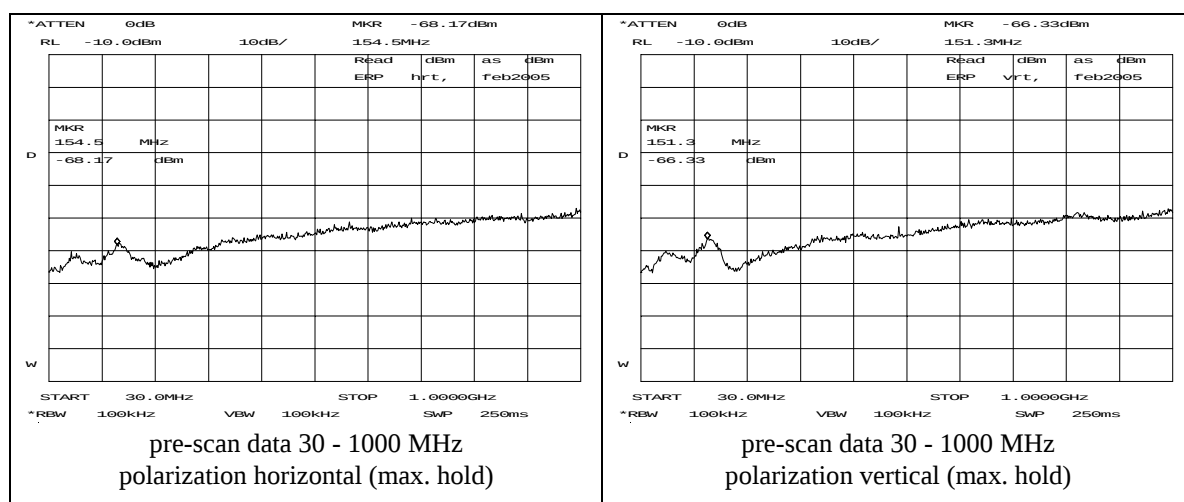
Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)
2402	94.9	V	114
2448	94.9	V	114
2479	94.5	V	114

Measurement uncertainty: +4.5 dB / -6.1 dB

2.3 Field strength of unwanted emissions 30 - 1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.249 (d)
Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.1;
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
EUT condition : 2448 MHz channel
Test results :

Exploratory measurements of unwanted emissions 30 - 1000 MHz



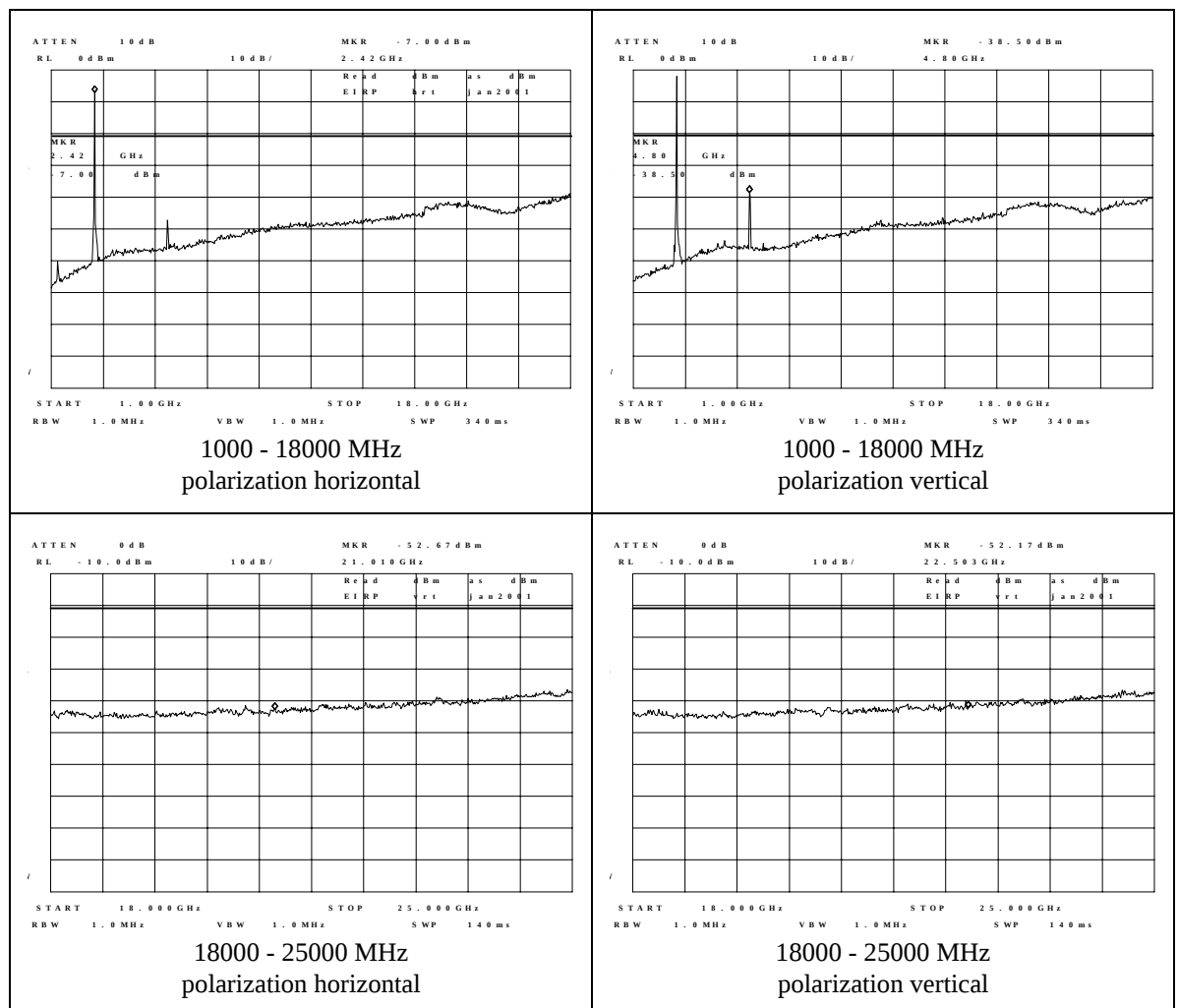
As there were no emissions detected above measurement system noise floor, measurements on an OATS (Open Area Test Site) are considered unnecessary.

2.4 Field strength of unwanted emissions > 1000 MHz

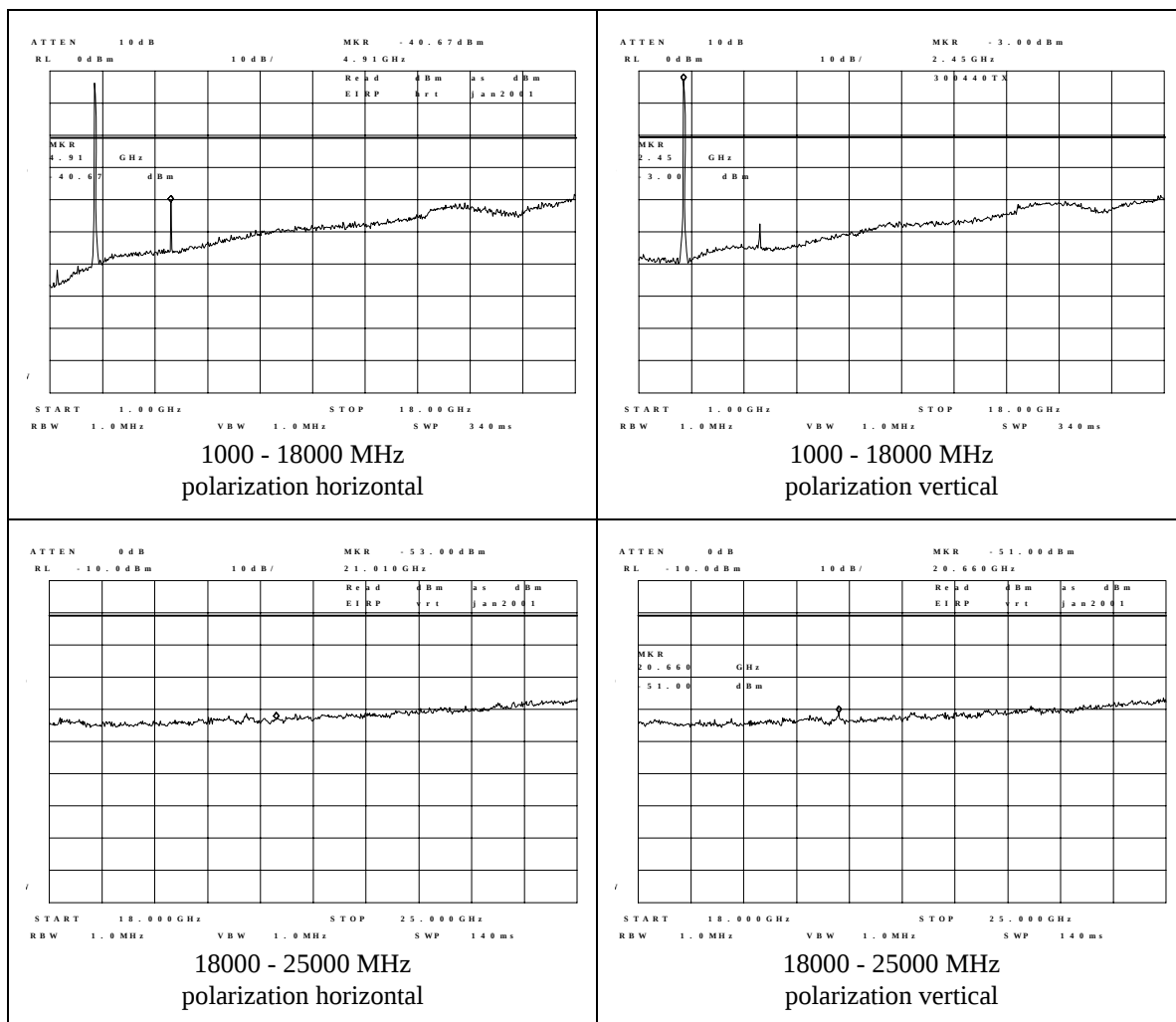
Compliance standard : FCC part 15, subpart B, section 15.109 (a),
subpart C section 15.249 (a), (d) & (e)
Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35;
FCC procedure on DTS measurement (issue May 9 2005).
Measuring distance : 1 m
Test results :

Unwanted emissions transmitter (peak values):

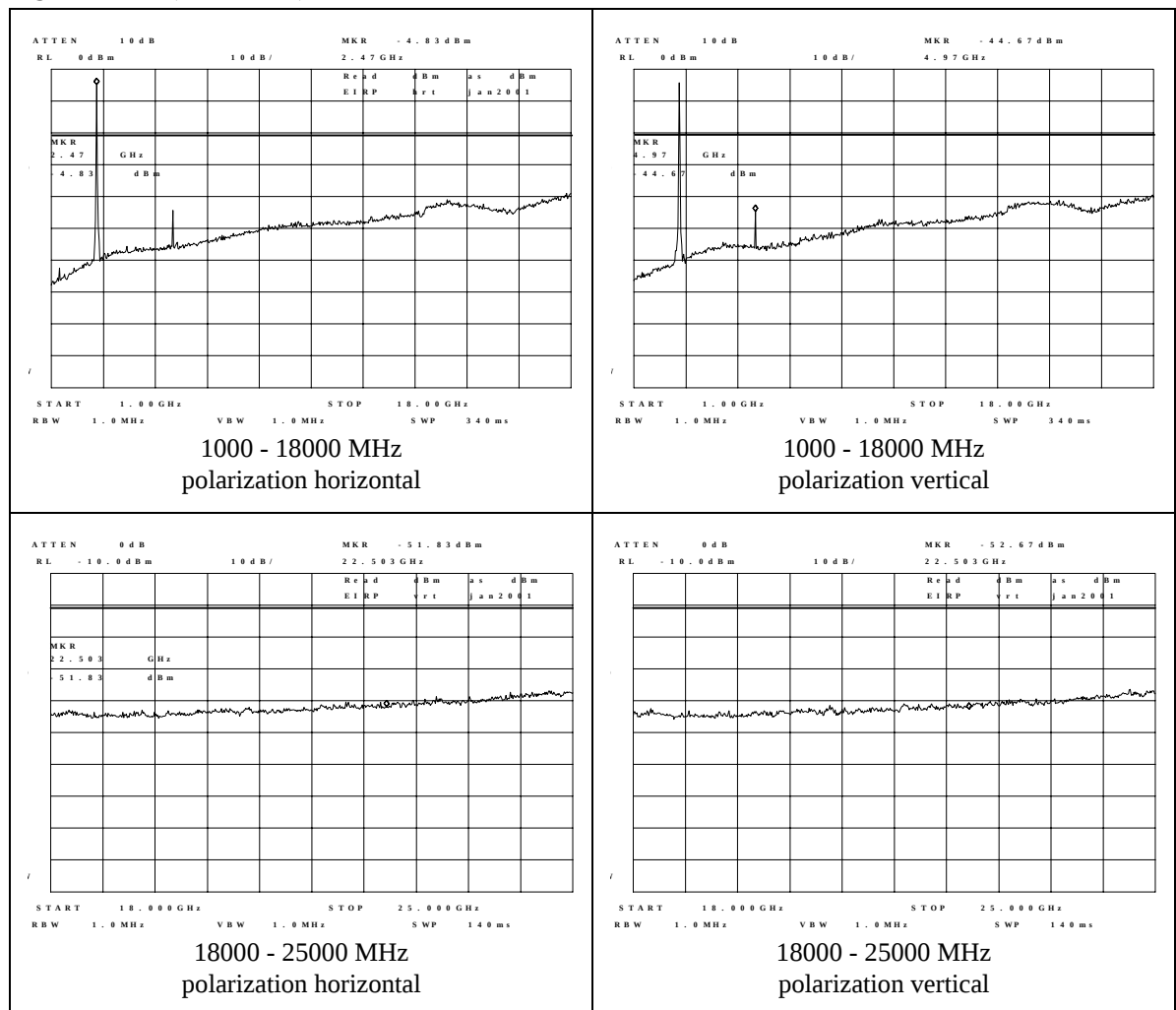
Low channel (2402 MHz)



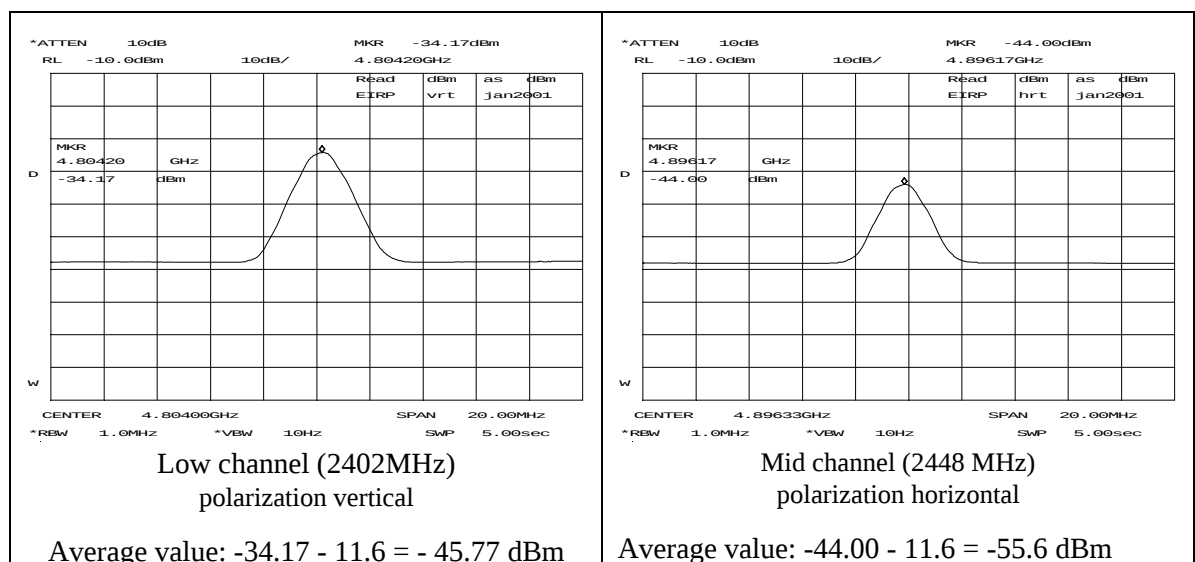
Mid channel (2448 MHz)



High channel (2479 MHz)

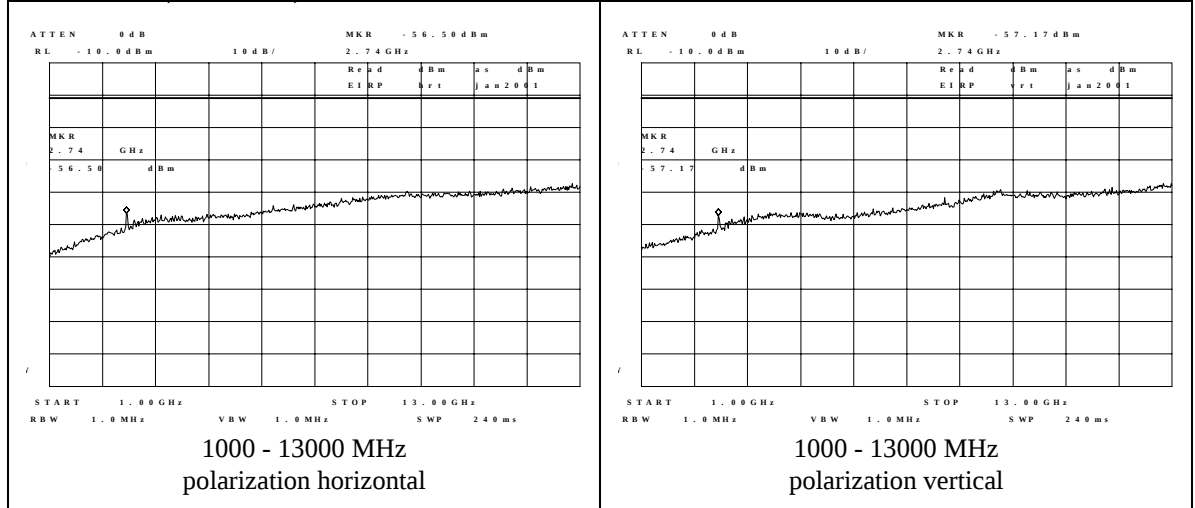


Unwanted emissions transmitter (average values):

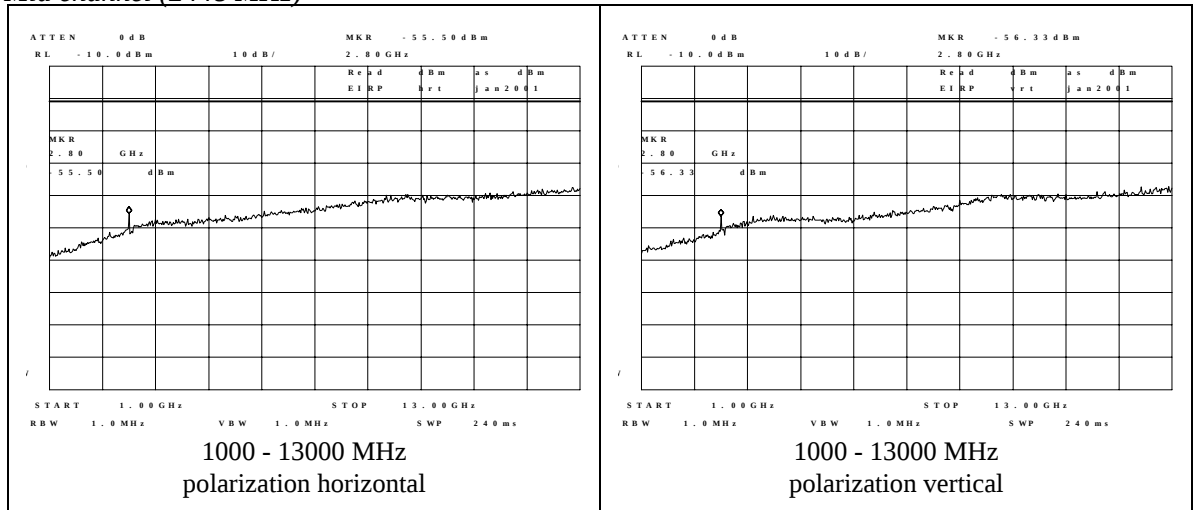


Unwanted emissions receiver (peak values)

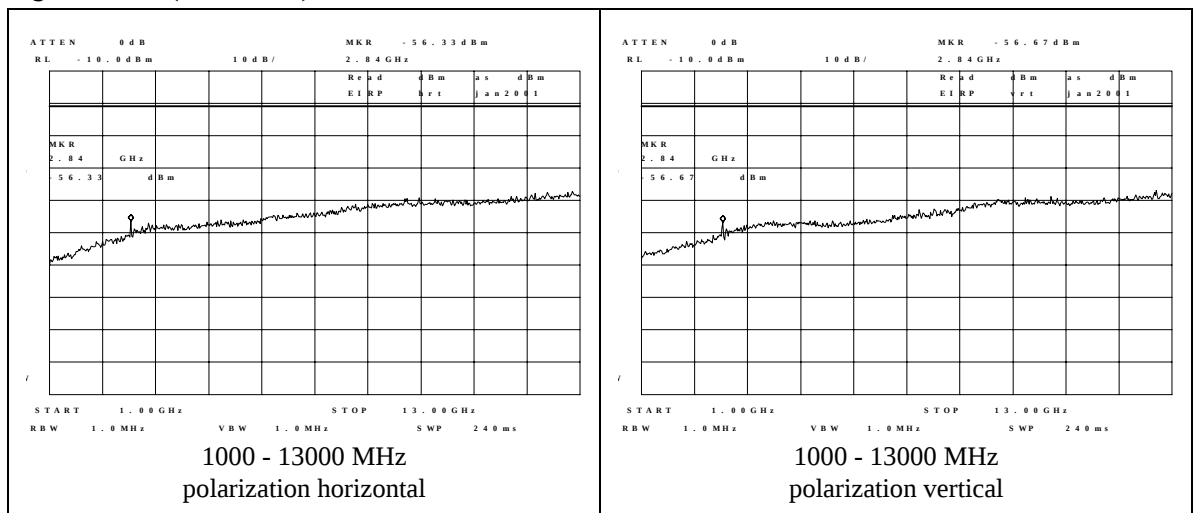
Low channel (2402 MHz)



Mid channel (2448 MHz)



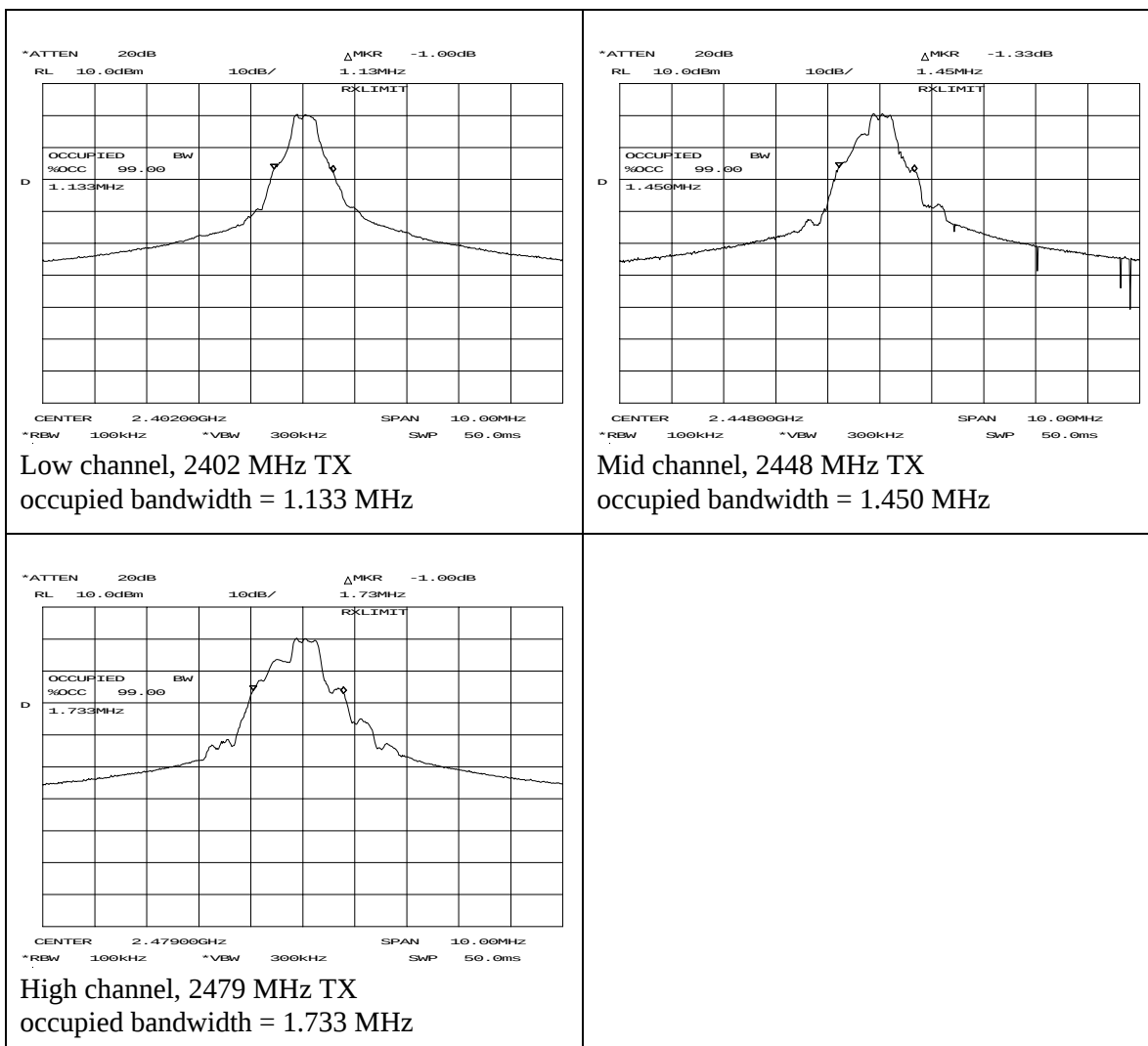
High channel (2479 MHz)



Measurement uncertainty: +4.5 dB / -6.1 dB

2.5 Occupied Bandwidth (99%)

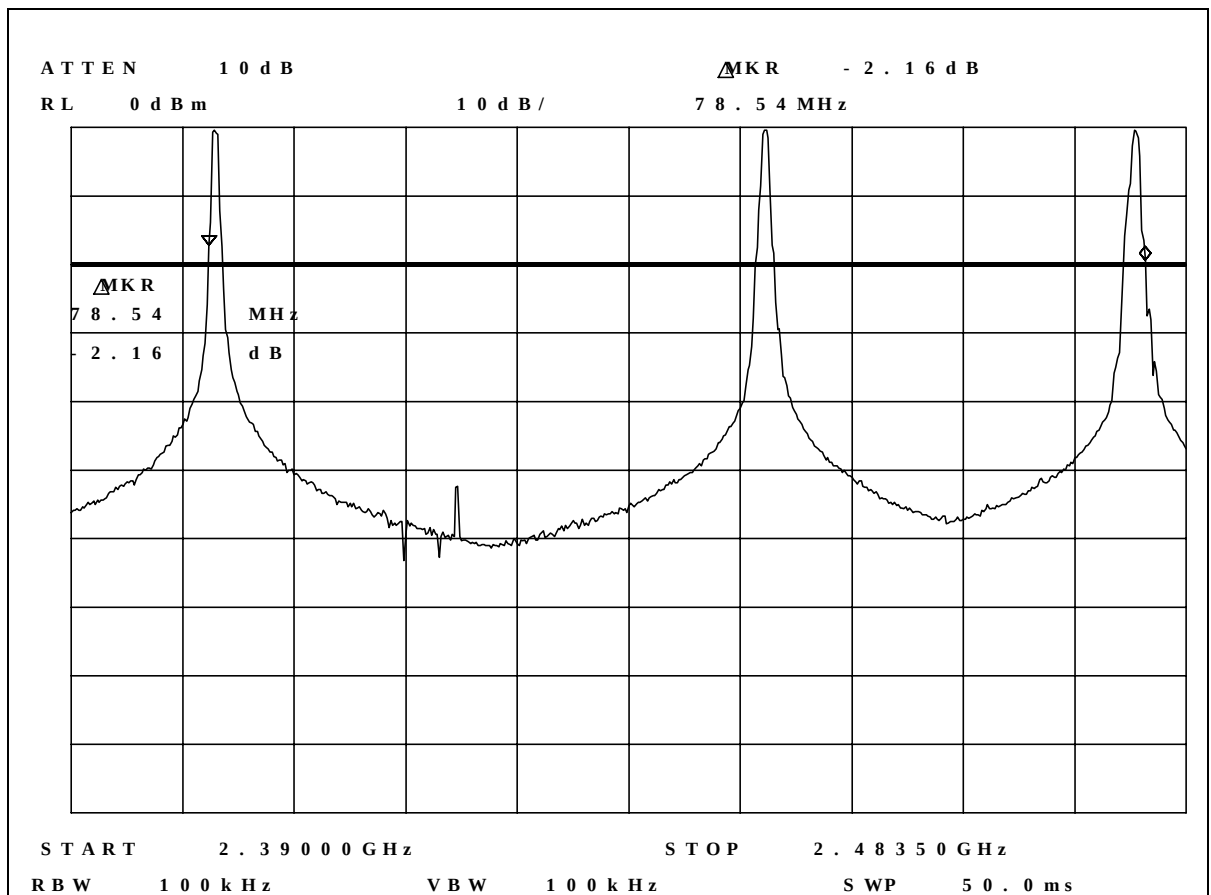
Compliance standard : RSS Gen par. 4.4.1
Test results :



Measurement uncertainty: +115/ -115 kHz

2.6 20 dB Bandwidth

Compliance standard : FCC part 15, subpart C, section 15.215(c)
Test result :



Note: left marker is 1.2 division distant from start frequency: $2390 + 1.2 \times 93.5/10 = 2401.22$ MHz.

Used test equipment module

Description	ID / SN	Manufacturer	Model	Used at par.
Artificial mains network	TE 00208	Rohde & Schwarz	ESH3-Z5	2.1
Pulse limiter	TE 00227	Rohde & Schwarz	ESH3-Z2	2.1
Test receiver	TE 11128	Rohde & Schwarz	ESCI	2.1
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E	2.3, 2.5, 2.6
RF Pre-amplifier up to 1000 MHz	TE 00098	Rohde & Schwarz	ESV-Z3	2.3
RF Pre-amplifier 1 - 26.5 GHz	TE 00093	Hewlett Packard	HP8449B	2.2, 2.4
Biconilog antenna	TE 00700	EMCO	3143	2.3
Horn Antenna	TE 00532	EMCO	3115	2.2, 2.4
Anechoic Chamber	TE 01064	Euroshield	RFD-F-100	2.2, 2.3, 2.4
Thermo-hygrometer	TE 00096	Lufft	B145	all
Tripod	--	EMCO	--	2.3, 2.4
Antenna tower	--	HD	AS 620p	2.2, 2.3, 2.4
Turntable	--	HD	DS 412	2.2, 2.3, 2.4
Turntable controller	--	HD	HD 050	2.2, 2.3, 2.4
Horn antenna	TE 00608	Scientific Atlanta	12A-18	2.4
Power meter	TE 00249	Hewlett Packard	435B	2.2
Power sensor	TE 00355	Hewlett Packard	8481A	2.2
Attenuator (10 dB setting)	TE 00499	Hewlett Packard	8495B	2.2

Cross reference table

General	
CNR RSS-Gen Issue 1	FCC 47 CFR Ch. 1 part 15 subpart B (10-1-05 Edition)
Par. 7.2.2	§ 15.107
Category I transmitter	
CNR RSS-210 Issue 6	FCC 47 CFR Ch. 1 part 15 subpart B (10-1-05 Edition)
A2.9	§ 15.209 and § 15.249
Category I receiver	
CNR RSS-Gen Issue 1	FCC 47 CFR Ch. 1 part 15 subpart B (10-1-05 Edition)
Par. 6	§ 15.109

Revision history

REVISION	DATE	REMARKS
1.0	14 December 2006	Included conducted emission test results