



Radio test report 99744231

based on:

- FCC Part 15 Subpart C, sections 15.209 and 15.249 (10-1-05 Edition)
- FCC Part 15 Subpart B sections 15.107 and 15.109 (10-1-05 Edition)
- RSS-Gen, Issue 1 (Sept. 2005 edition)
- RSS-210, Issue 6 (Sept. 2005 edition)

Cordless Mouse; Cradle
Logitech
M-RBQ124; L-LN13



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This report comprises of four modules. The total number of pages is: 22

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 : 1 May 2006

2 Product

A sample of the following product was submitted for testing:

Product description	: Cordless Mouse; Cradle
Manufacturer	: Logitech Technology Co., Ltd
Trade mark	: Logitech
Type designation	: M-RBQ124
FCC ID	: DZL202311
Hardware version	: --
Serial number	: --
Software release	: --

Product description	: Cradle
Manufacturer	: Logitech Technology Co., Ltd
Trade mark	: Logitech
Type designation	: L-LN13
FCC ID	: DZL202311
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:

- 1 June 2006

Tests were carried out between:

- 7 June 2006 and 9 June 2006

4 Product documentation

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

Description:	Date:	Identification:
Testing indications	30 May 2006	M-RBQ124, 6 pages
Product description	June 2006	M-RBQ124, 1 page
Block diagram	--	M-RBQ124, 1 page
Circuit diagram	10 May 2006	M-RBQ124 le Corbusien Main PCB (4 sheets)
PCB lay out	05/10/06	M-RBQ124, main PCB
PCB lay out	05/10/06	M-RBQ124, secondary PCB
Circuit diagram	April 12, 2006	222457-000, a0, Vesuvio
PCB lay out	04/12/06	Vesuvio-A0 L-LN13
Bill of materials	April 12, 2006	Vesuvio, revision a0

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

Final measurements of unwanted emissions 30 - 1000 MHz have been performed on the Open Area Test Site of TNO EPS in Niekkerk

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

FCC listed : 90828
Industry Canada : IC3501

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

8 Conclusions

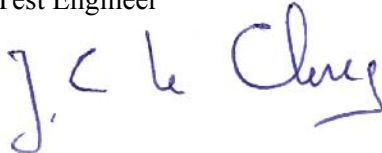
The samples of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report.

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. J.C. le Clercq

function : Test Engineer

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 July 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	not specified
Operating frequency range	2402 MHz to 2479 MHz (24 channels)
Modulation	GFSK
Modulation bit rate	1 Mbits/s
ITU emission class	1M00F1D
Duty cycle	5 %
FCC ID	DZL202311

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 (dB μ V/m) (AV)	Polarisation	Limit (dB μ V/m)
2.402	91.5	H	94
2.402	86.0	V	94
2.448	87.9	H	94
2.448	85.9	V	94
2.479	88.7	H	94
2.479	83.5	V	94

Peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)
2.402	91.5	H	114
2.402	86.0	V	114
2.448	87.9	H	114
2.448	85.9	V	114
2.479	88.7	H	114
2.479	83.5	V	114

Measurement uncertainty: +4.5 dB / -6.1 dB

2.2 Conducted emissions

Compliance standard : FCC part 15, subpart B, section 15.107 (a).
 Configuration : Cordless Mouse M-RBQ124 with Cradle L-LN13 and AC mains adaptor
 Remark : None
 Method of test : ANSI C63.4-2003, sections 5.2 & 6.2.2;
 FCC part 15, subpart A, section 15.35
 Test results :

Time: 13:56:56			Date: 09-06-2006			
Signal measured on "Neutral".						
Measurement => Range	QPeak			Av		
	Frequency (MHz)	Level dB (uV)	Limit dB (uV)	Frequency (MHz)	Level dB (uV)	Limit dB (uV)
01	0.19480	34.0	63.9	0.19480	21.7	53.9
02	0.25690	34.8	61.6	0.25690	21.4	51.6
03	0.33260	39.4	59.4	0.32120	21.7	49.7
04	0.36880	43.0	58.6	0.37400	25.7	48.5
05	0.45480	37.8	56.8	0.44500	21.6	47.0
06	0.60020	38.8	56	0.58000	18.1	46
07	0.73150	32.6	56	0.93190	13.5	46
08	0.98510	35.9	56	1.18090	17.6	46
09	1.40080	33.8	56	1.33500	14.2	46
10	1.86560	31.5	56	1.86560	14.8	46
11	2.26850	32.6	56	2.70110	16.6	46
12	3.07470	30.4	56	2.76470	18.0	46
13	4.42490	29.1	56	3.62610	14.2	46
14	5.03770	29.7	60	5.66170	16.9	50
15	6.33500	28.2	60	6.33500	12.0	50
16	9.93920	26.5	60	9.93920	11.7	50
17	10.8100	25.2	60	11.0660	13.5	50
18	14.3778	23.2	60	16.2866	10.5	50
19	Below	30.0	60	Below	30.0	50
20	Below	30.0	60	Below	30.0	50

This product is in compliance with
 FCC part 15, subpart B, section 15.107(a)

* ==> exceeding the limit

The frequency range 0.15 - 30 MHz is divided into 20 subranges.
 For every subrange the highest emission component is given in the
 table.

In ranges marked "Below" the maximum level of the components measured,
 is below 30 dBuV. For this evaluation, peak detection is used.

Time: 14:19:10 Date: 09-06-2006

Signal measured on "Life".

Measurement => Range	QPeak			Av		
	Frequency (MHz)	Level dB (uV)	Limit dB (uV)	Frequency (MHz)	Level dB (uV)	Limit dB (uV)
01	0.19610	35.7	63.8	0.18880	25.8	54.1
02	0.24530	36.7	62.0	0.25300	24.3	51.7
03	0.33320	40.8	59.4	0.32480	24.7	49.6
04	0.36760	44.1	58.6	0.37760	29.8	48.4
05	0.45080	38.6	56.9	0.44140	23.7	47.1
06	0.59980	39.1	56	0.57800	21.6	46
07	0.73210	34.0	56	0.93950	16.3	46
08	0.98330	35.6	56	1.18090	19.5	46
09	1.39780	33.3	56	1.33200	16.0	46
10	1.78140	31.8	56	1.90760	18.7	46
11	2.13290	33.2	56	2.26770	17.5	46
12	3.06670	30.3	56	2.79790	19.5	46
13	3.99890	29.2	56	3.62290	16.1	46
14	4.97630	28.8	56	5.59290	20.1	50
15	6.39880	27.2	60	6.32880	14.0	50
16	8.10540	23.4	60	8.10540	12.1	50
17	11.1164	24.9	60	11.1164	13.9	50
18	Below	30.0	60	Below	30.0	50
19	Below	30.0	60	Below	30.0	50
20	Below	30.0	60	Below	30.0	50

This product is in compliance with
FCC part 15, subpart B, section 15.107(a).

* ==> exceeding the limit

The frequency range 0.15 - 30 MHz is divided into 20 subranges.
For every subrange the highest emission component is given in the
table.

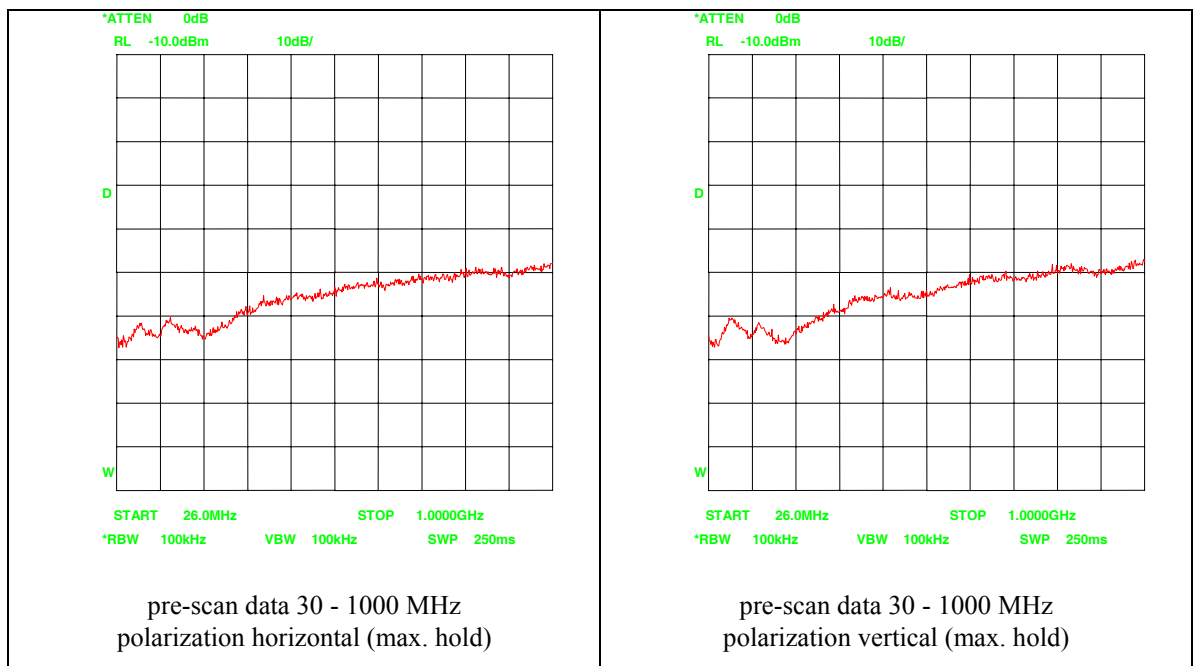
In ranges marked "Below" the maximum level of the components measured,
is below 30 dBuV. For this evaluation, peak detection is used.

Measurement uncertainty : -2.2 dB / +2.0 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.
 EUT condition : 2448 MHz channel
 Test results :

Exploratory measurements of unwanted emissions 30 - 1000 MHz



Final measurements of unwanted emissions 30 - 1000 MHz, on Open Area Test Site, TNO EPS in Niekerk:

Quasi peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dBμV/m)	Polarisation	Limit (dBμV/m)
136.62	≤ 19.1	H	43.5
136.62	≤ 19.1	V	43.5

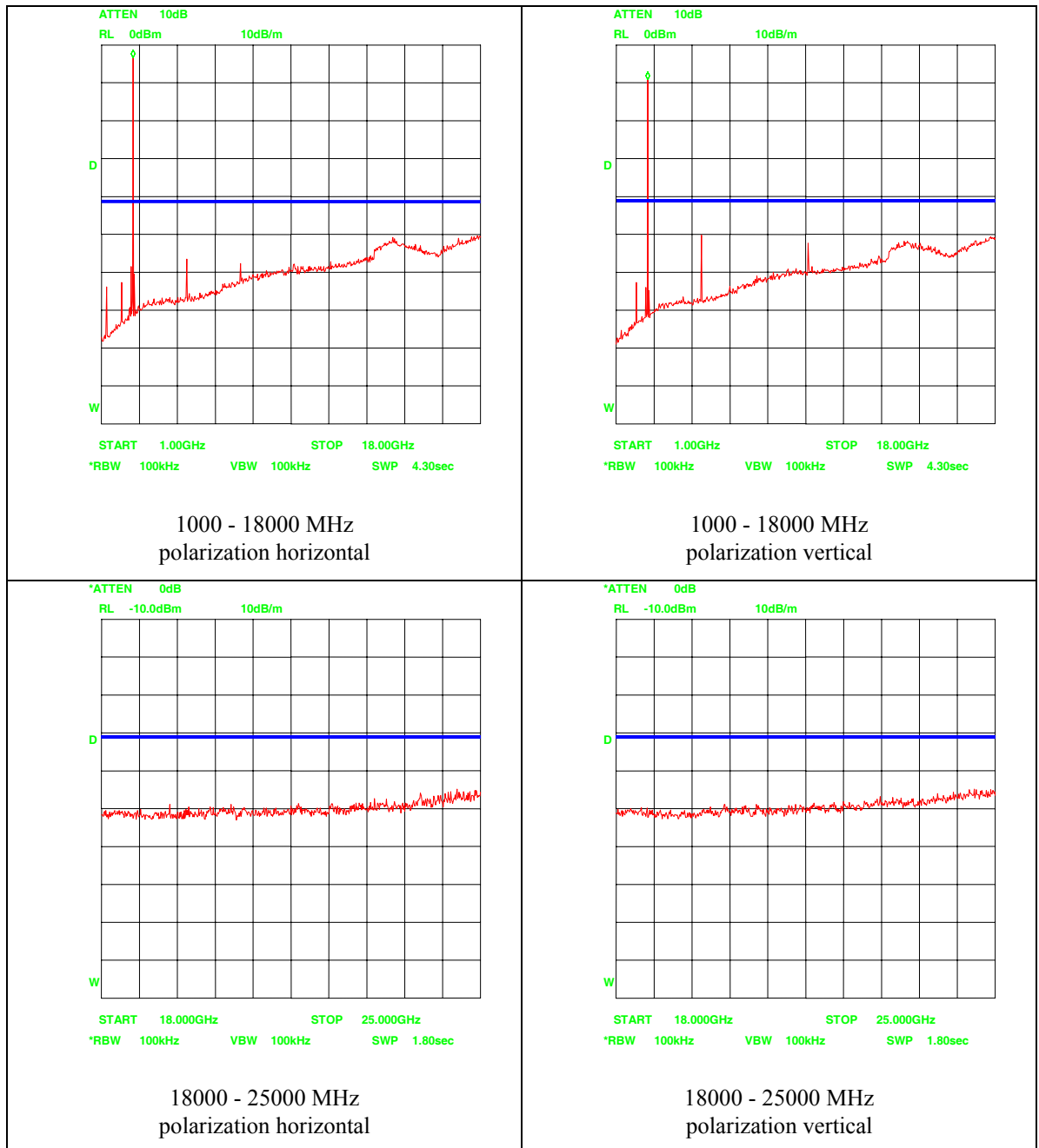
Measurement uncertainty: +1.6 / -2.4 dB

2.4 Field strength of unwanted emissions > 1000 MHz

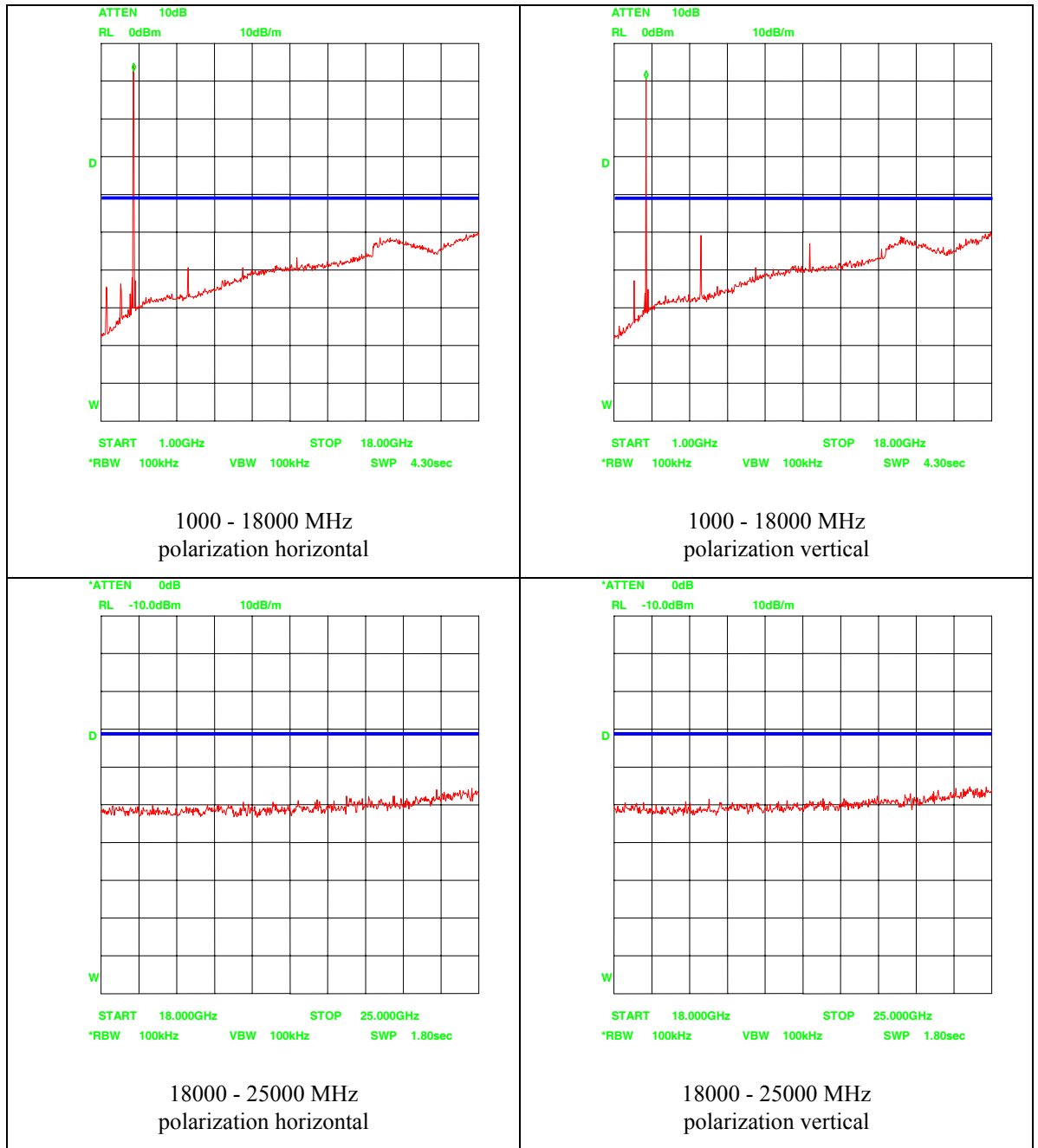
Compliance standard : FCC part 15, subpart B, section 15.109 (a),
subpart C 15.209 (a) & 15.249 (a) & (e)
Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
Test results :

Unwanted emissions transmitter:

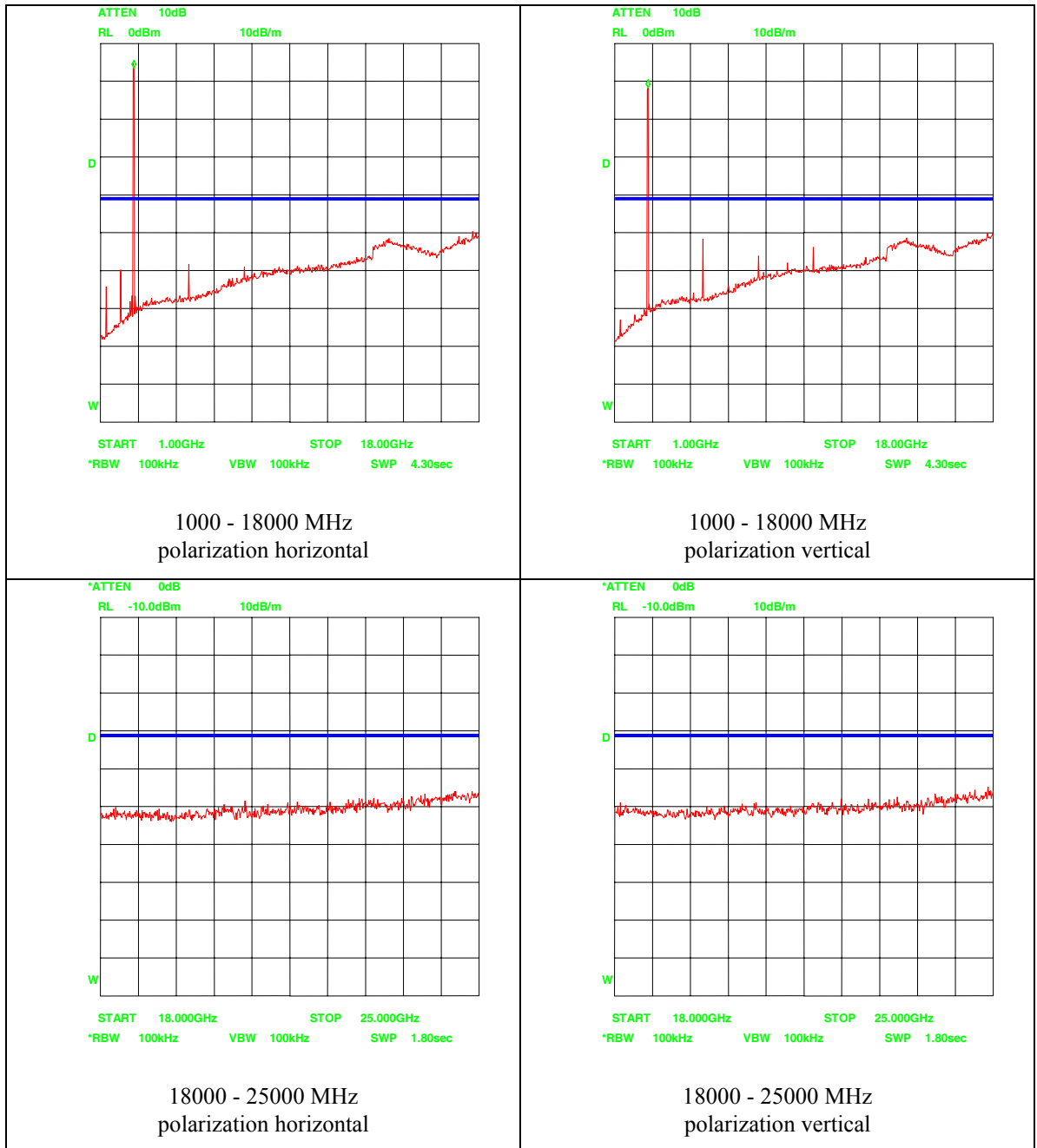
Low channel 2402 MHz TX:



Mid channel 2448 MHz TX:

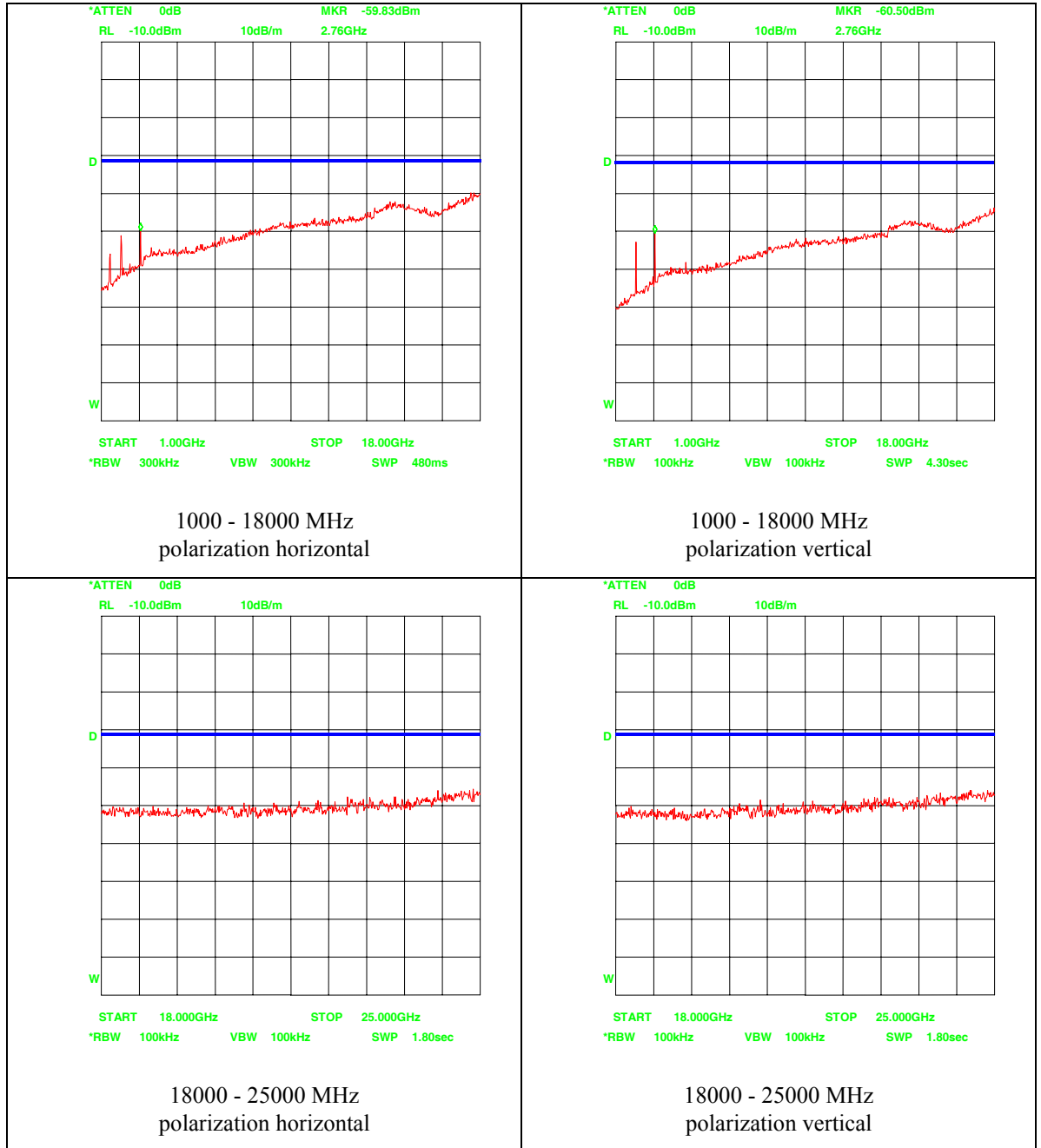


High channel 2479 MHz TX:

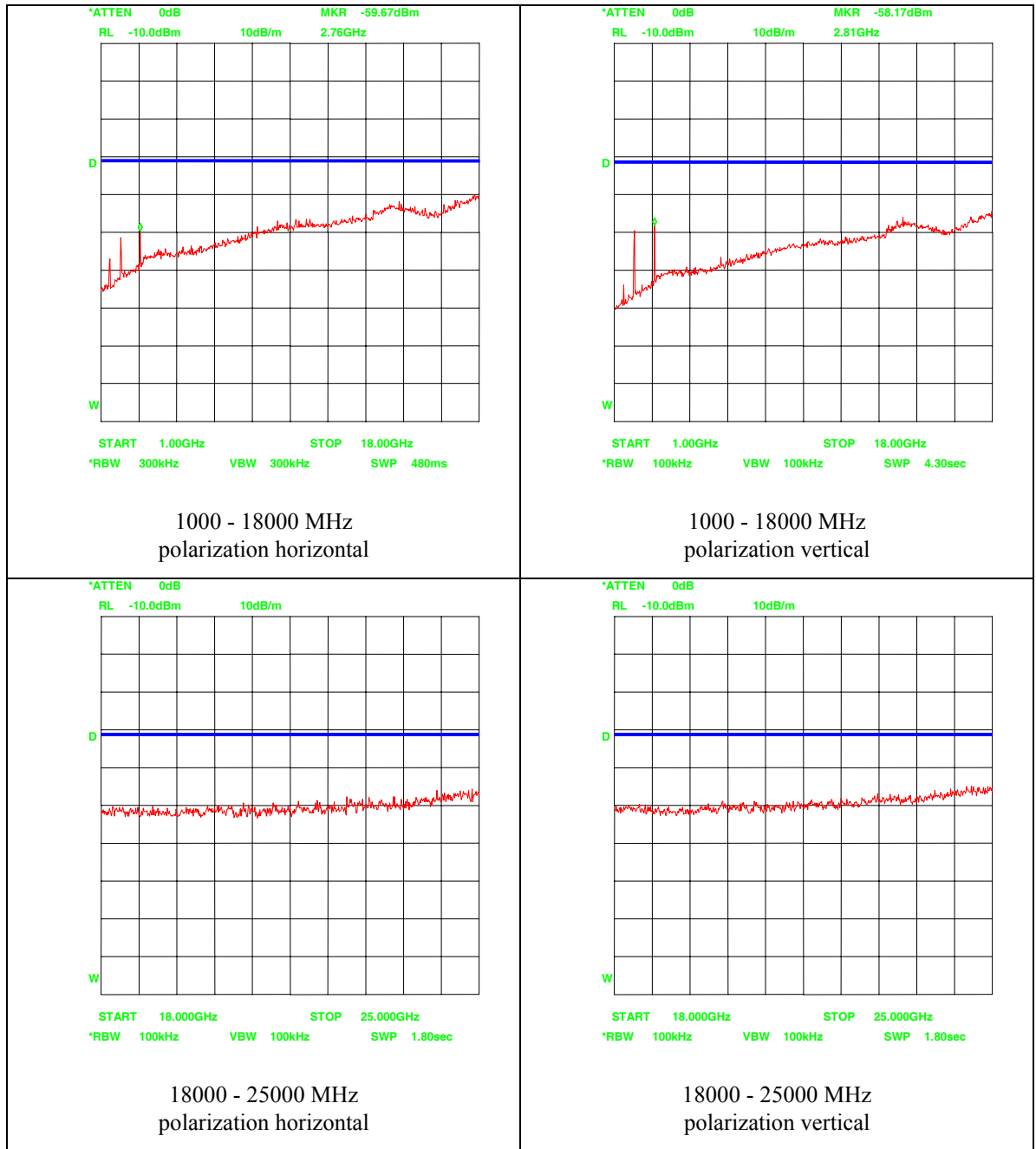


Unwanted emissions receiver:

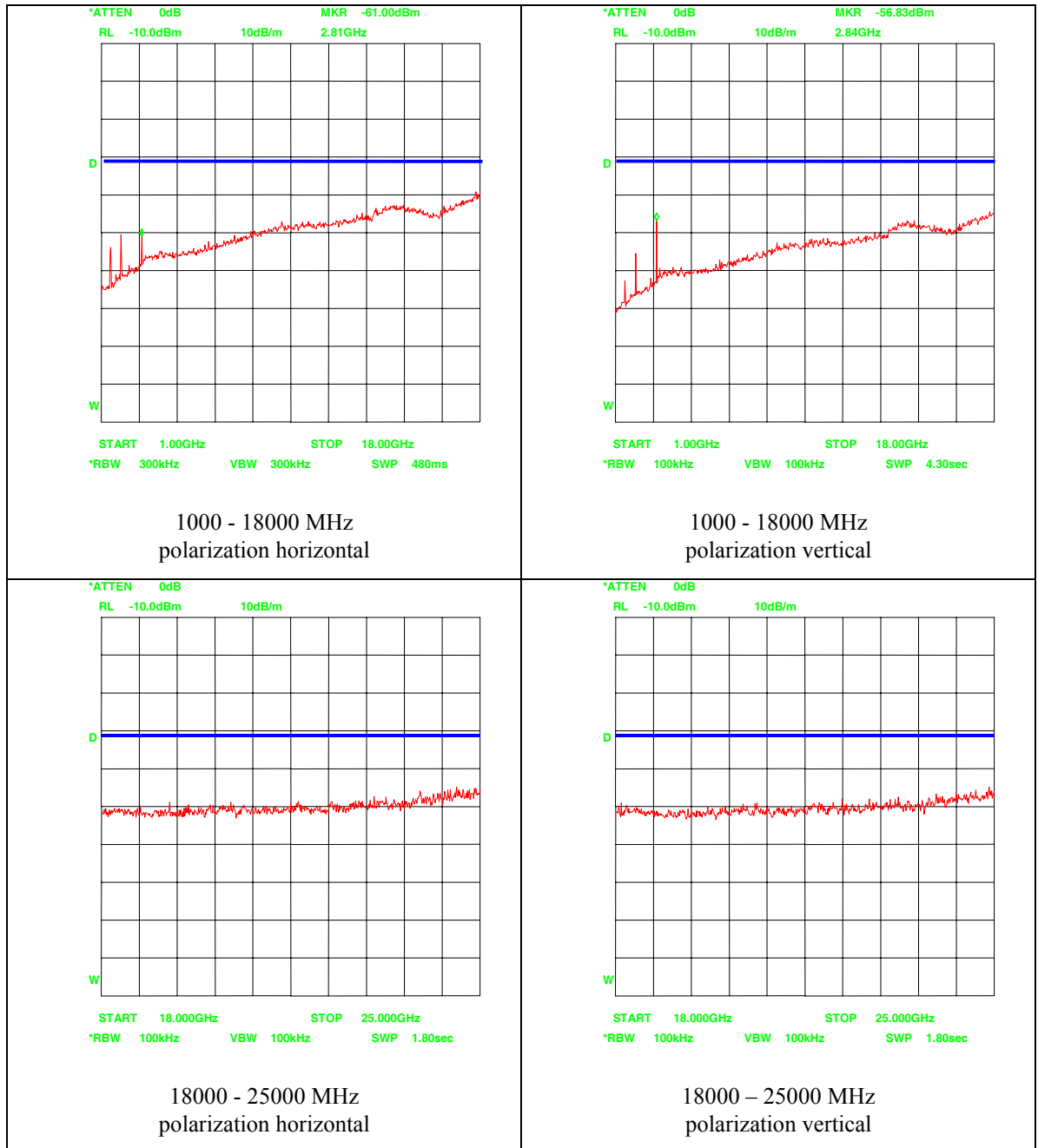
Low channel 2402 MHz RX:



Mid channel 2448 MHz RX:



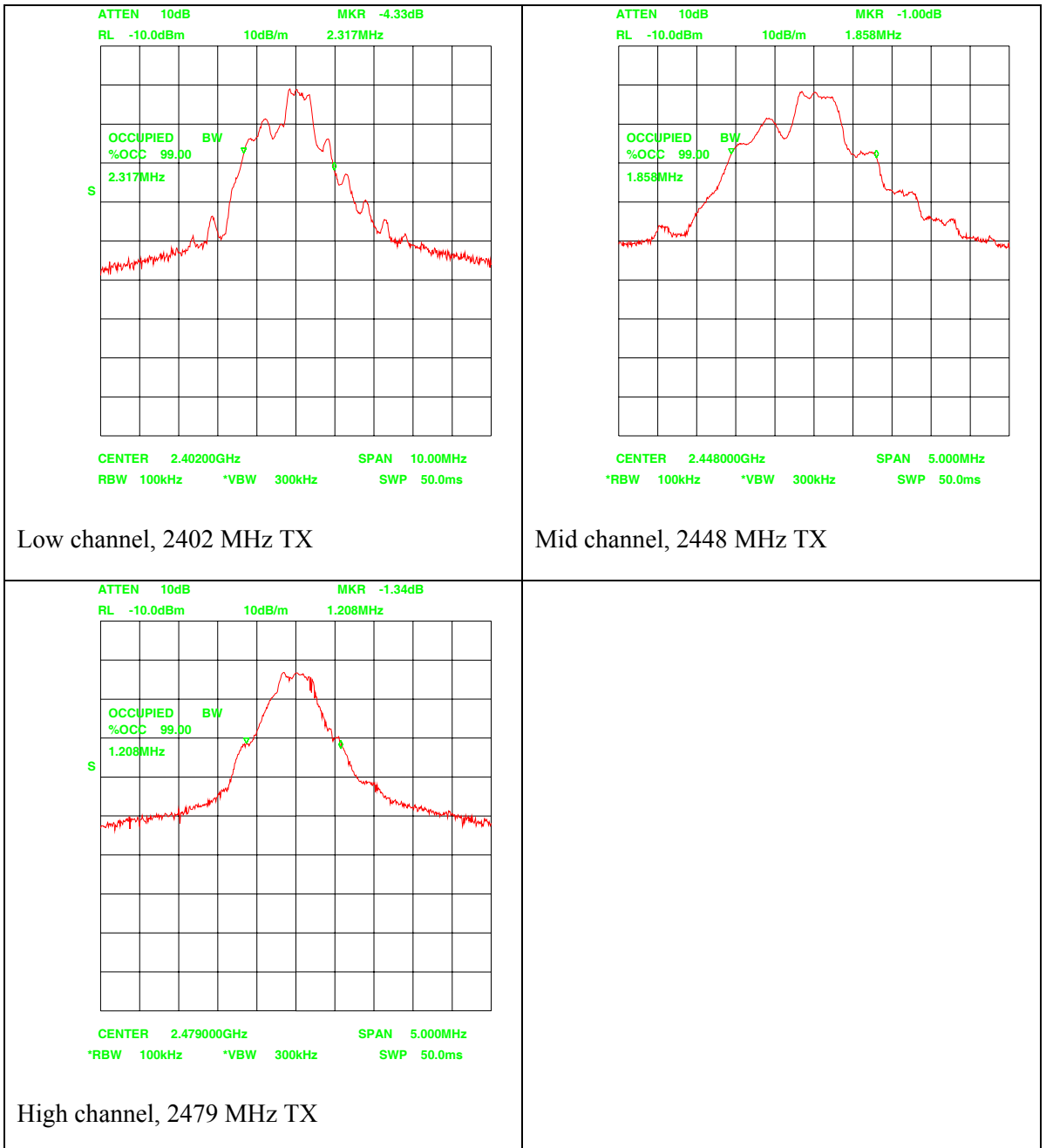
High channel 2479 MHz RX:



Measurement uncertainty: +4.5 dB / -6.1 dB

2.5 Occupied bandwidth

Compliance standard : RSS Gen par. 4.4.1
Test results :



Used test equipment module

The following measurement equipment was used:

Location Telefication Zevenaar:

Description	ID / SN	Manufacturer	Model	Used at par.
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E	2.1, 2.3, 2.4, 2.5
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	2.1, 2.4, 2.5
Biconilog antenna	TE 00700	EMCO	3143	2.3
Horn Antenna	TE 00532	EMCO	3115	2.1, 2.4, 2.5
Anechoic Chamber	TE 01064	Euroshield	RFD-F-100	2.1, 2.3, 2.4, 2.5
Thermo-hygrometer	TE 00096	Lufft	B145	2.1, 2.2, 2.4, 2.5
Tripod	--	EMCO	--	2.1, 2.4, 2.5
Antenna tower	--	HD	AS 620p	2.3
Turntable	--	HD	DS 412	2.1, 2.3, 2.4, 2.5
Turntable controller	--	HD	HD 050	2.1, 2.3, 2.4, 2.5
Test receiver	TE 00205	Rohde & Schwarz	ESH3	2.2
Pulse limiter	TE 00227	Rohde & Schwarz	ESH3-Z2	2.2
Artificial mains network	TE 00208	Rohde & Schwarz	ESH2-Z5	2.2

Logitech AGY 737569-0000.A0

Used test equipment module

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Report number: 99744231*Location TNO EPS Niekerk:*

Description	ID / SN	Manufacturer	Model	Used at par.
Plastic measurement room	12636	Polyforce	-	2.3
Open Area Test Site	13886	Comtest	-	2.3
Antenna mast 4 m	14277	Heinrich Deisel	MA240	2.3
Controller OATS	14278	Heinrich Deisel	HD100	2.3
Loop Antenna	1107	Chase	HLA6120	--
Biconilog antenna 30 MHz - 1000 MHz	15633	Chase	CBL6111B	2.3
EMI test receiver	15667	Rohde & Schwarz	ESCS 30	2.3
Turntable OATS	99108	Heinrich Deisel	HD050	2.3

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