

Radio test report

20114433301 rev. 1.0

based on:

- FCC part 15; subpart C; section 15.209 & 15.249 (10-1-11 edition)
- FCC part 15, subpart B, section 15.109 (10-1-11 edition)

Wireless motion tracker
MTw
MTw sensor
AWDDNG

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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 17025:2005. 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 : Xsens technologies B.V.
Address : Pantheon 6a
Zipcode : 7521 PR
City/town : Enschede
Country : The Netherlands
Date of order : 12 June 2012

2 Product

Samples of the following products were submitted for testing:

Product description	:	Wireless motion tracker
Manufacturer	:	Xsens technologies B.V.
Trade mark	:	MTw
Type designation	:	MTw sensor
FCC ID	:	QILMTW
Hardware version	:	MTW100610
Serial number	:	00340572
Software release	:	1.0.10

Product description	:	Wireless dongle
Manufacturer	:	Xsens technologies B.V.
Trade mark	:	MTw
Type designation	:	AWDDNG
FCC ID	:	QILMTW
Hardware version	:	AD110610
Serial number	:	00210119
Software release	:	1.0.10

3 Test schedule

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

Tests are carried out at the following location:

- Telefication, Zevenaar

The samples of the product were received on:

- 20 September 2012

Tests are carried out between:

- 25 September and 10 October 2012

4 Product documentation

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

Identification	Date
MTw_UserManual.docx	2012-05-24
MTw_SDK_UserManual.docx	2012-05-24

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

The manufacturer, Xsens technologies B.V., has stated that the radio module in the wireless motion tracker and the USB dongle is identical. Therefore only the radio parameters of the motion tracker have been tested. See declarations in the Additional information module of this test report.

6 Modifications to the sample

No modifications as a result of the tests 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 is tested according to the following specification(s):

FCC part 15; subpart C; section 15.209 & 15.249 (10-1-11 edition)

FCC part 15, subpart B, section 15.109 (10-1-11 edition)

8 Conclusions

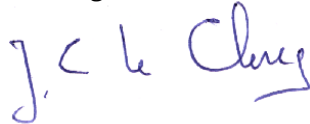
The samples of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication accepts no responsibility for any stated properties of product items in this test report, which are not supported by the tests as specified in chapter 7 “*Summary*”

All tests are performed by:

name : ing. J.C. le Clercq

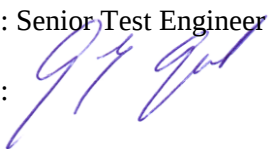
function : Test Engineer

signature : 

Review of test methods and report by:

name : G.J. Gort

function : Senior Test Engineer

signature : 

The above conclusions have been verified by the following signatory:

date : 14 January 2013

name : ing. A. van der Valk

function : Manager Laboratory

signature : 

Test results module

1 General information

1.1 Equipment information

Rated RF output power	n.a., integral antenna
Rated radiated RF power	10 mW
Operating frequency range	2405 MHz to 2475 MHz (15 channels)
Modulation	GFSK
Modulation bit rate	--
ITU emission class	--
Duty cycle (during testing)	100 %
FCC ID	QILMTW

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, Annex H.4j)

Test results :

(only the highest of the two polarizations are stated)

Peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)
2405	87.7	H	114
2440	88.7	H	114
2475	87.4	H	114

Average field strength*:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (AV)	Polarisation	Limit (dB μ V/m)
2405	87.7	H	94
2440	88.7	H	94
2475	87.4	H	94

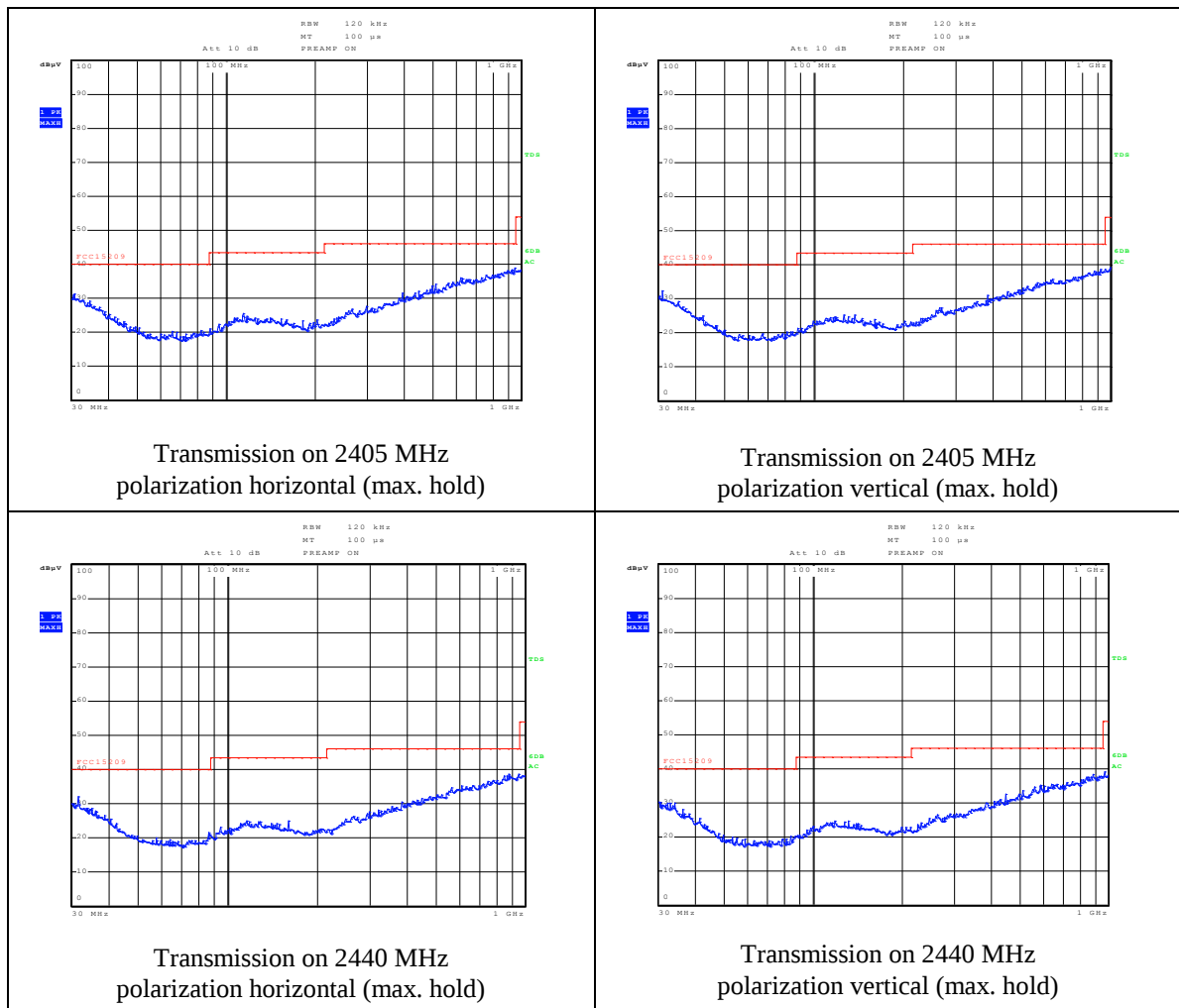
* based on duty cycle factor of 100 %

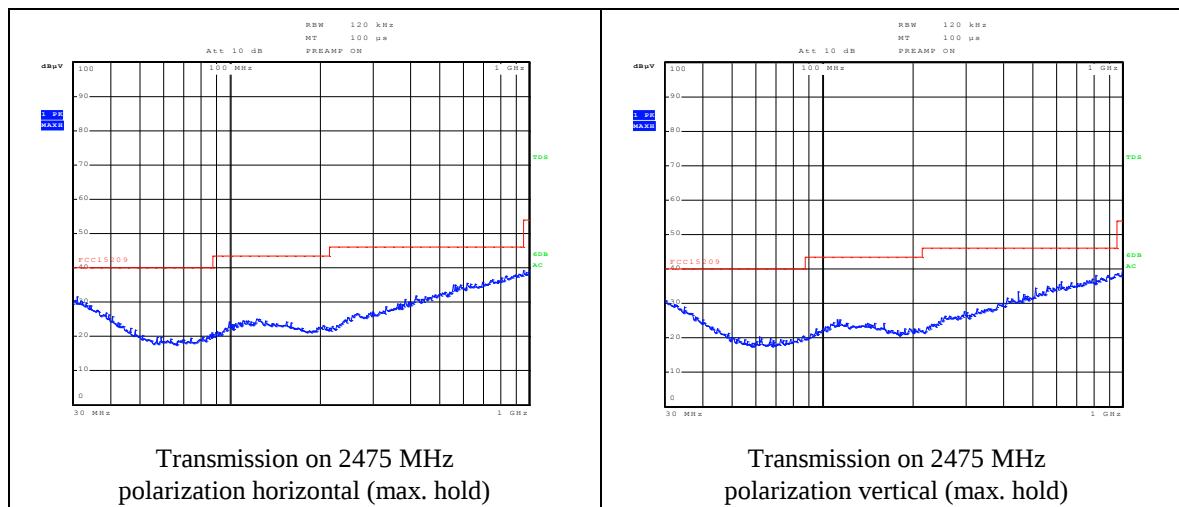
Measurement uncertainty	+4.5 dB / -6.1 dB.
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Measurement equipment used (item numbers refer to section “used test equipment”)	2, 16, 24, 37, 39, 48, 49.
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2.2 Field strength of unwanted emissions 30 - 1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.209 (a) & 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 : transmitting
Test results :

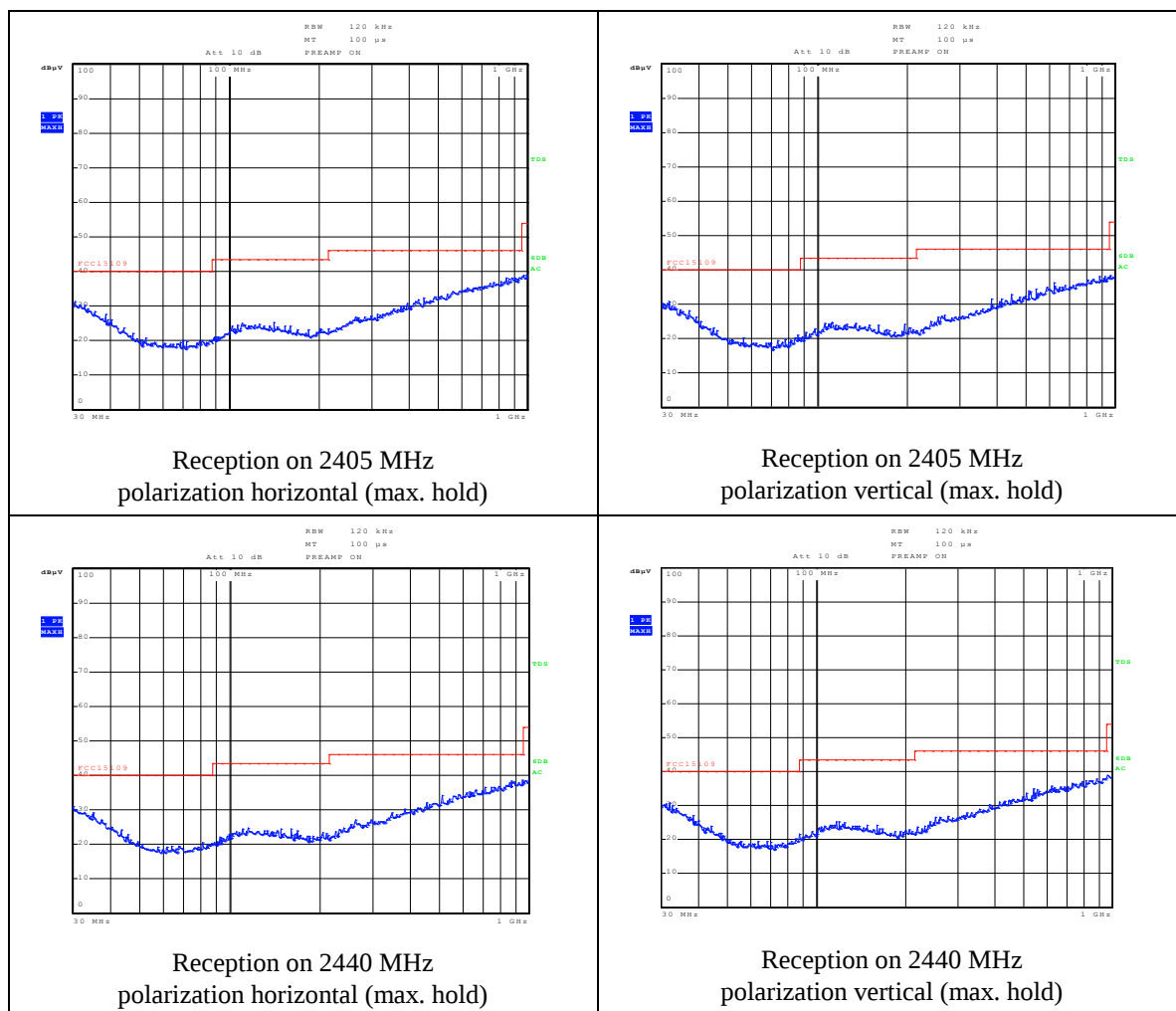


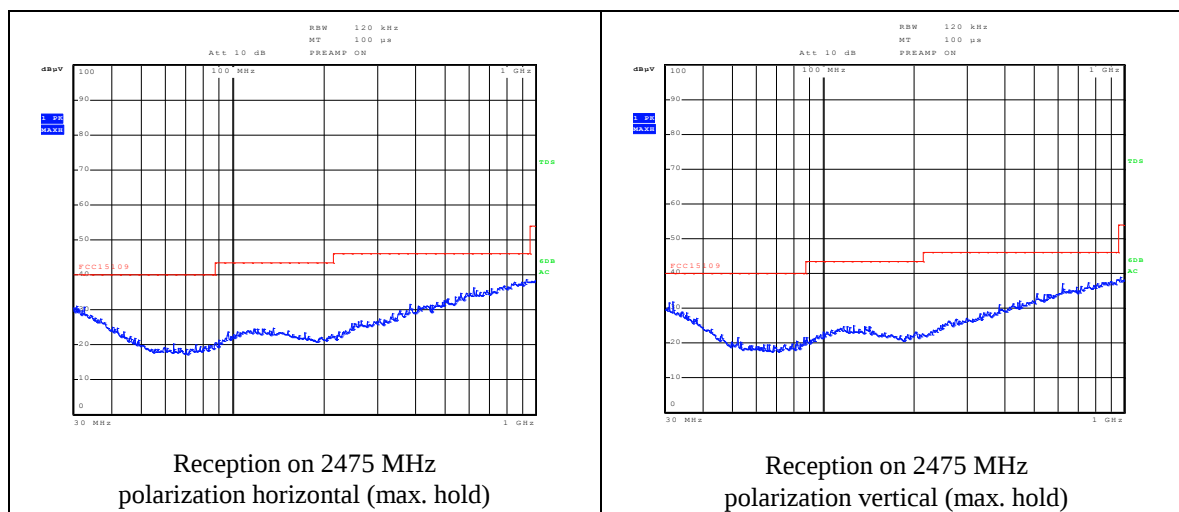


Measurement uncertainty	Vertical polarisation:	
	30 – 200 MHz	5.4 dB
	200 -1000 MHz	4.6 dB
	Horizontal polarisation:	
	30 – 200 MHz	4.5 dB
	200 -1000 MHz	3.6 dB

Measurement equipment used (item numbers refer to section “used test equipment”	34, 36, 43, 50, 51.
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Compliance standard : FCC part 15, subpart B, section 15.109
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 : receiving
Test results :





Measurement uncertainty	+4.5 dB / -6.1 dB.
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Measurement equipment used (item numbers refer to section “used test equipment”)	34, 36, 43, 50, 51.
---	---------------------

Measurement uncertainty	Vertical polarisation:	
	30 – 200 MHz	5.4 dB
	200 -1000 MHz	4.6 dB
	Horizontal polarisation:	
	30 – 200 MHz	4.5 dB
	200 -1000 MHz	3.6 dB

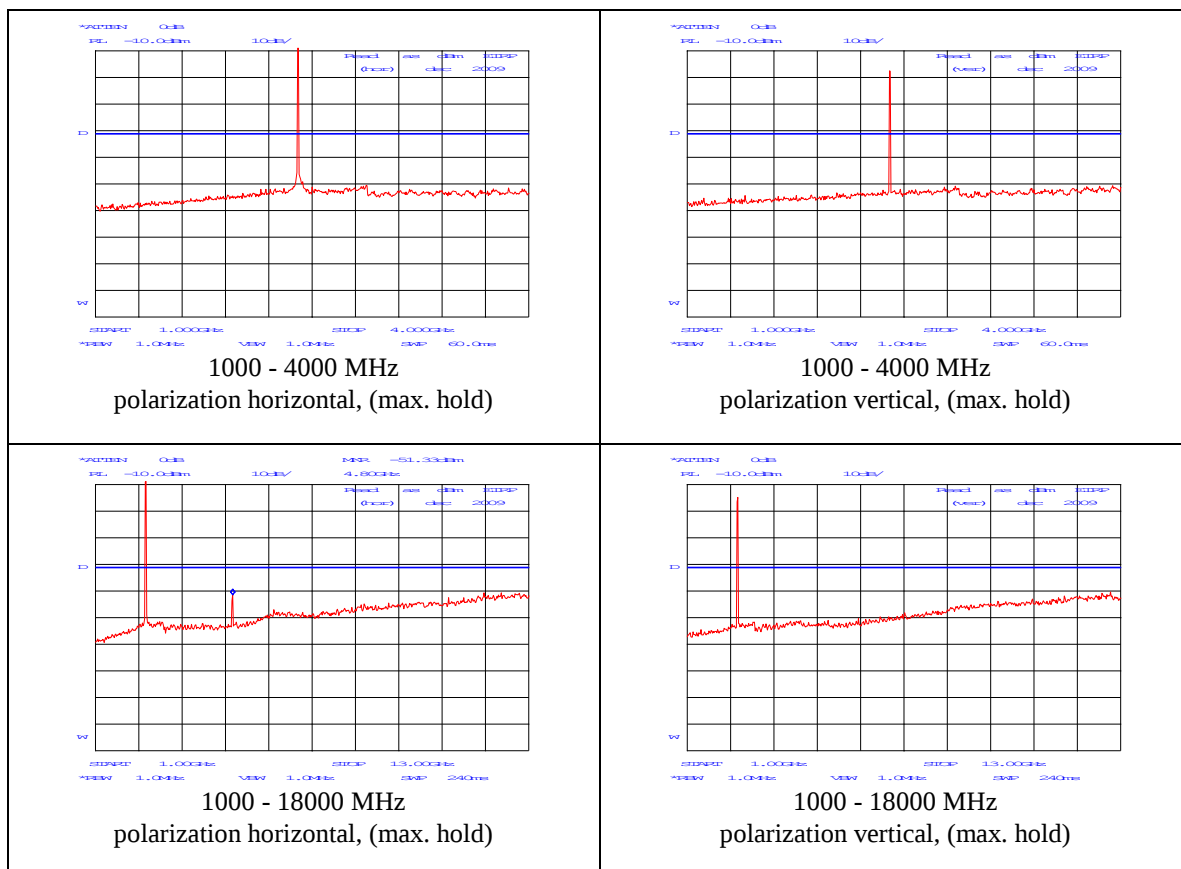
Measurement equipment used (item numbers refer to section “used test equipment”)	34, 36, 43, 50, 51, 53.
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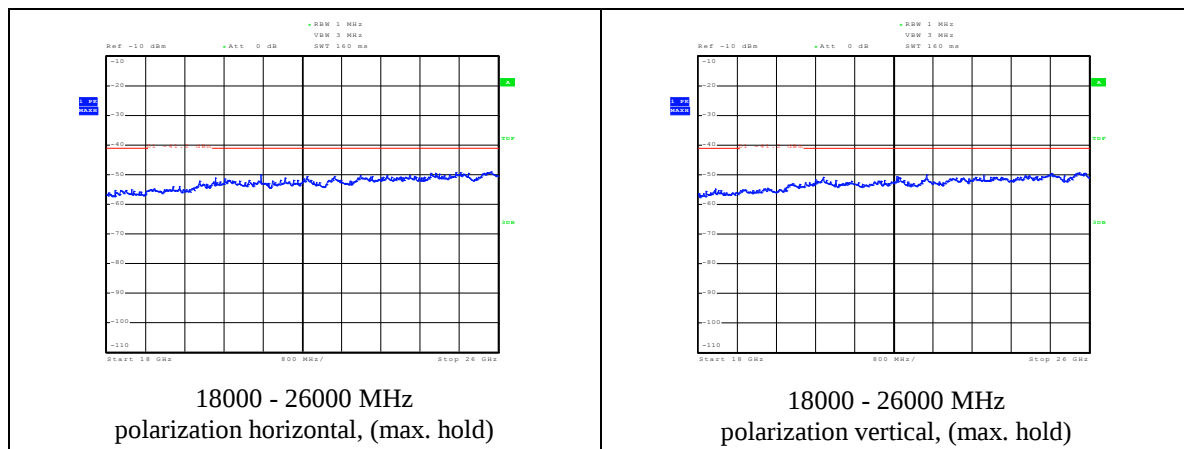
2.3 Field strength of unwanted emissions > 1000 MHz

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;
 Measuring distance : 3 m
 EUT condition : transmitting
 Test results :

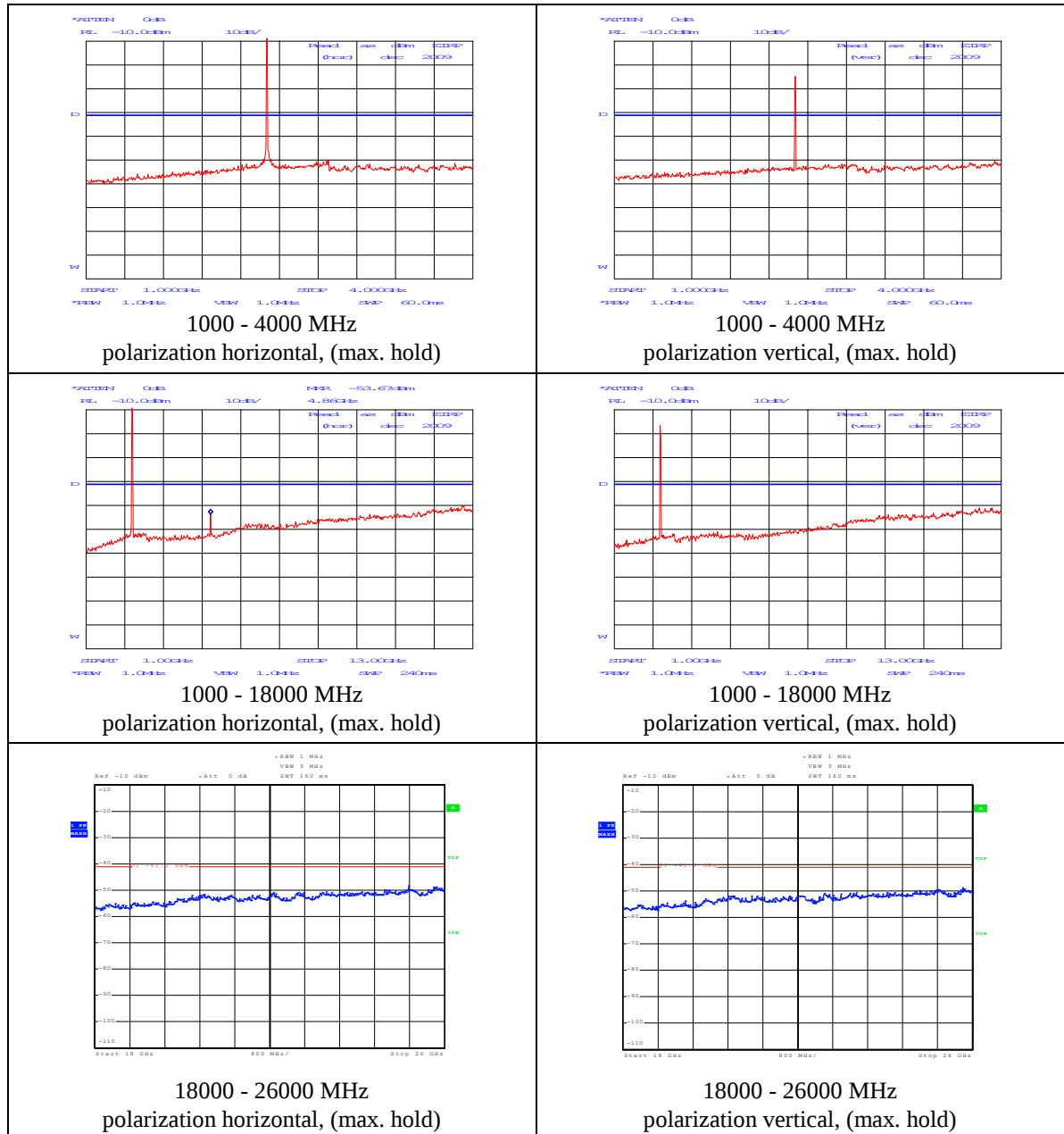
Unwanted emissions transmitter (peak values):

Low channel (2405 MHz)

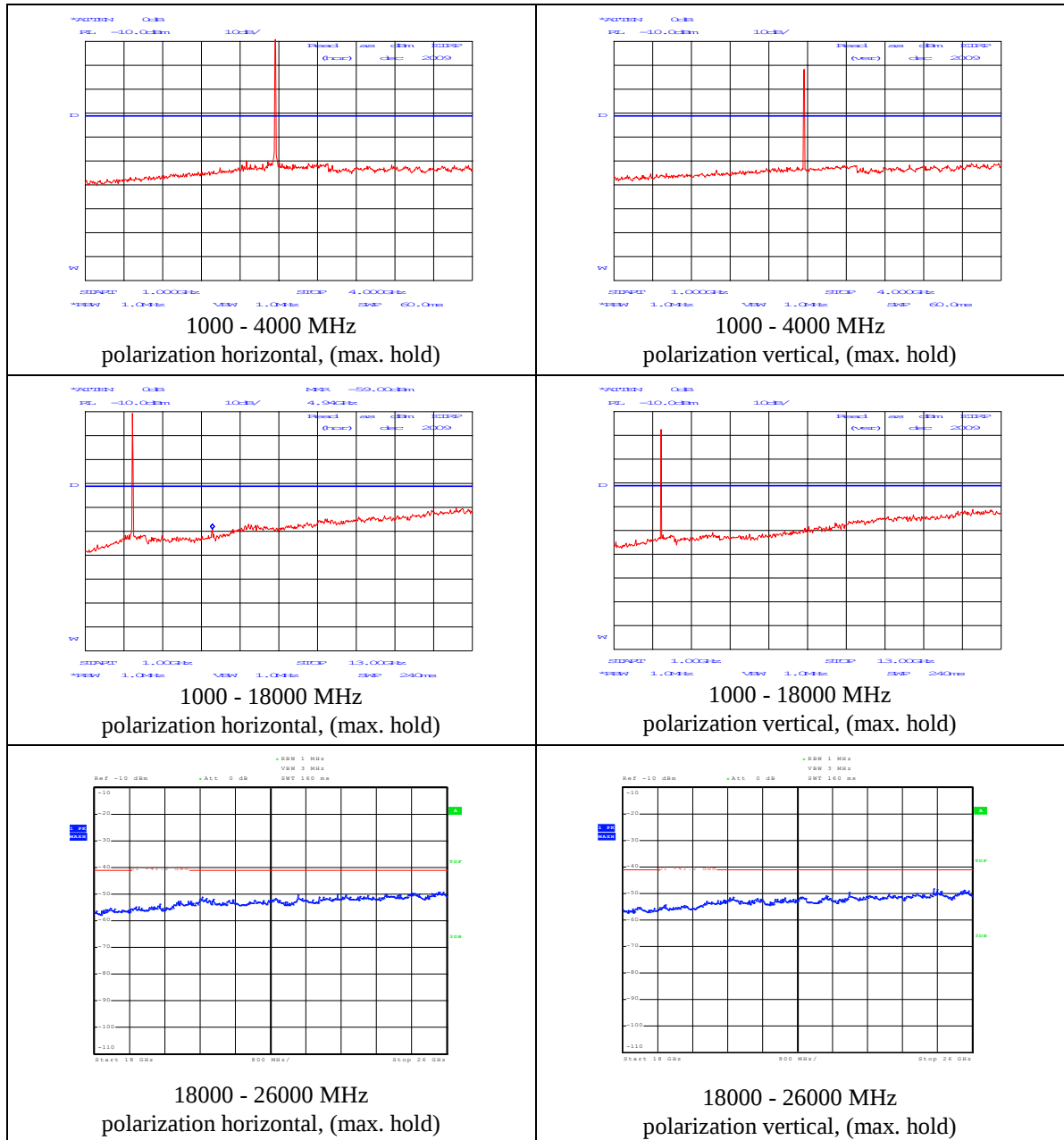




Mid channel (2440 MHz)



High channel (2475 MHz)



Measurement uncertainty

+4.5 dB / -6.1 dB.

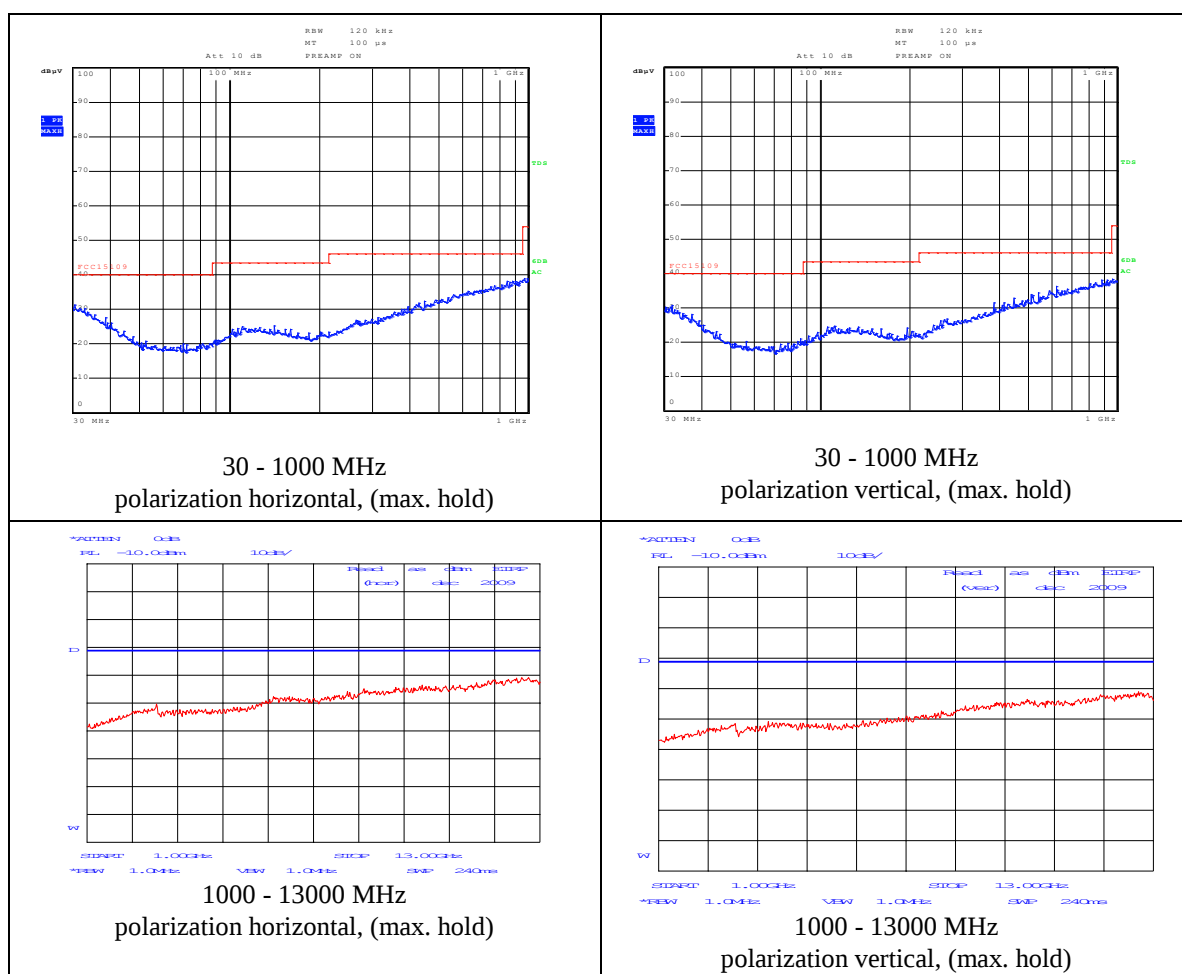
Measurement equipment used
(item numbers refer to section "used test equipment")

2, 16, 24, 31, 46.

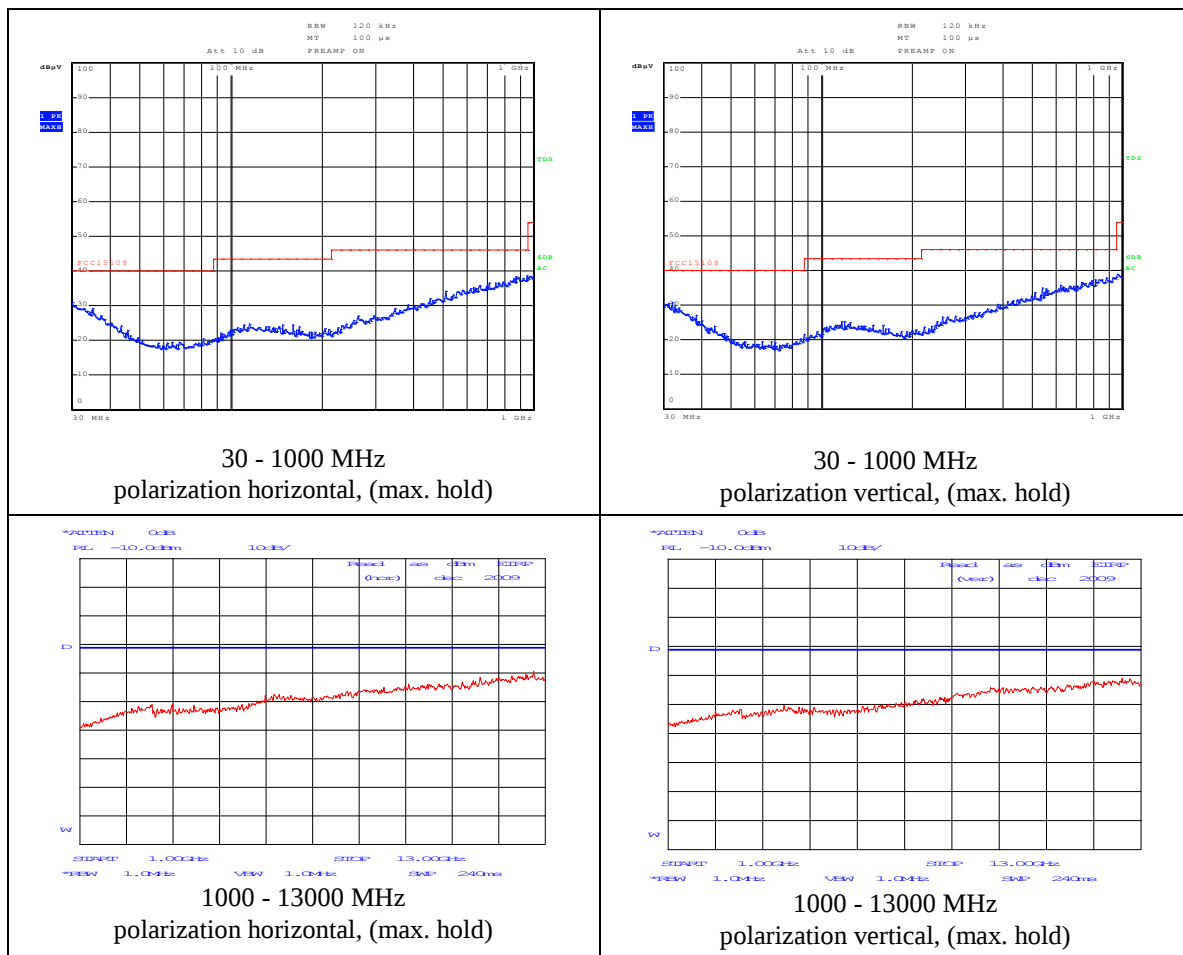
Compliance standard : FCC part 15, subpart B, section 15.109 (a)
 Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
 FCC part 15, subpart A, section 15.31(m), 15.33, 15.35;
 EUT condition : receiving
 Measuring distance : 3 m
 Test results :

Unwanted emissions receiver (peak values):

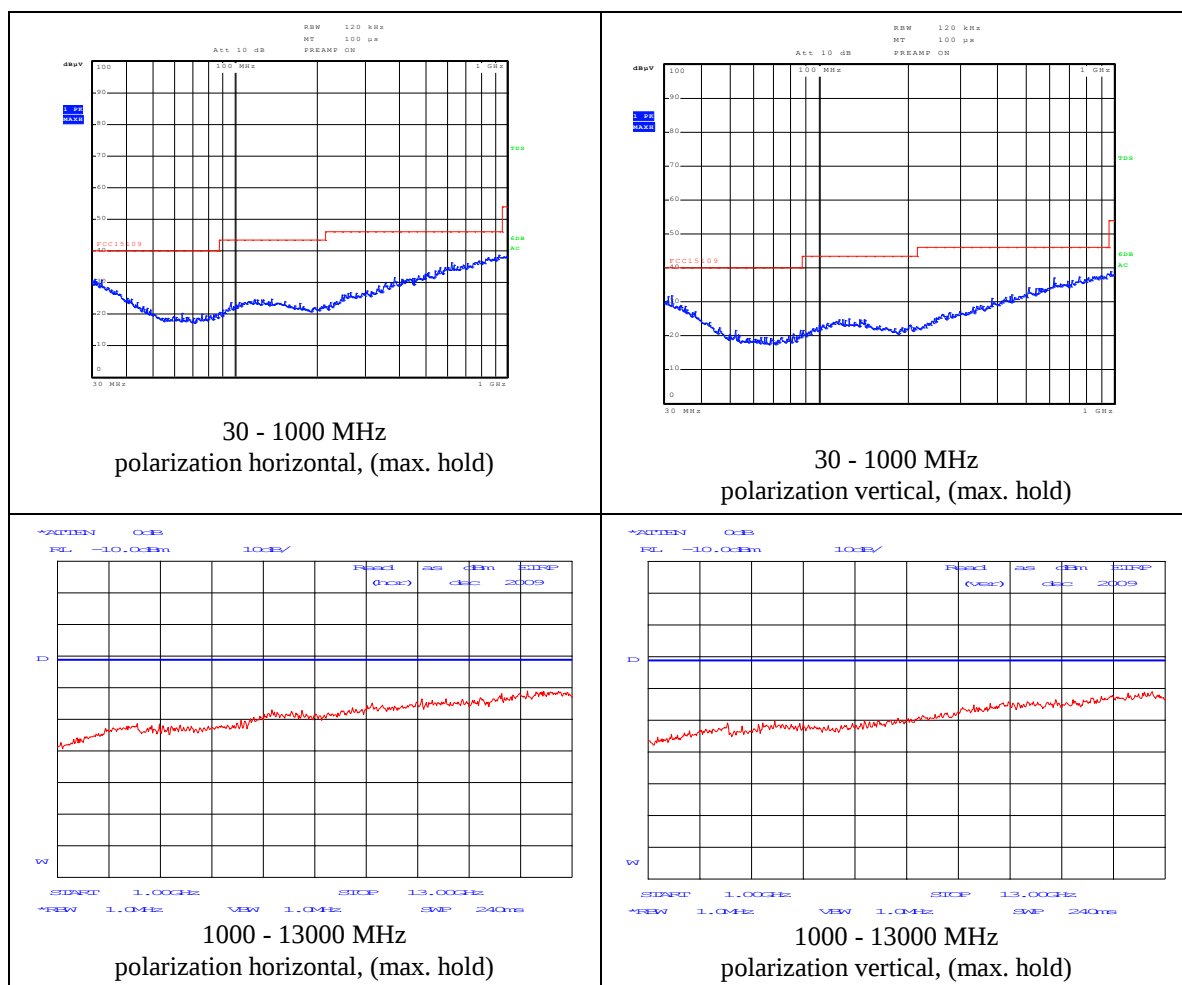
Low channel (2405 MHz)



Mid channel (2440 MHz)



High channel (2475 MHz)



Measurement uncertainty

+4.5 dB / -6.1 dB.

Measurement equipment used
(item numbers refer to section “used test equipment”)

2, 16, 24, 31, 46.

Used test equipment module

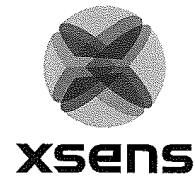
Item	Description	Manufacturer	Type	ID
1	Signal generator	Marconi	2042	TE 00030
2	Preamplifier 1 – 26.5 GHz	HP	8449B	TE 00092
3	Preamplifier 1 – 26.5 GHz	HP	8449B	TE 00093
4	Pre-amplifier 10 dB	R & S	ESV-Z3	TE 00097
5	Pre-amplifier 10 dB	R & S	ESV-Z3	TE 00098
6	Spectrum analyser	HP	8562E	TE 00099
7	Microwave amplifier	HP	HP8349A	TE 00124
8	Digital multimeter	HP	34401A	TE 00143
9	Digital multimeter	HP	3438A	TE 00215
10	Step attenuator	HP	8494A	TE 00233
11	Step attenuator	HP	8496A	TE 00234
12	Power sensor	HP	8484A	TE 00245
13	Power meter	HP	435B	TE 00249
14	Power meter	HP	437B	TE 00354
15	Power sensor	HP	8481A	TE 00355
16	Spectrum analyser	HP	8563E	TE 00359
17	Audio analyzer	HP	8903A	TE 00373
18	Signal generator	Marconi	2042	TE 00379
19	Digital thermometer	Fluke	51	TE 00388
20	Step attenuator	HP	8491A	TE 00403
21	Signal generator	HP	8642B	TE 00424
22	Signal generator	Marconi	2042	TE 00427
23	Spectrum analyser	HP	8563E	TE 00481
24	Horn antenna	EMCO	3115	TE 00531
25	Horn antenna	EMCO	3116	TE 00533
26	Biconilog antenna	EMCO	3143	TE 00700
27	Climate chamber	CTS	C-40/350	TE 00741
28	Active loop antenna	R & S	HFH2-Z2	TE 00746
29	Horn antenna	Quinstar	QWH-1900-AA	TE 00747

Item	Description	Manufacturer	Type	ID
30	Step attenuator	HP	8491A	TE 00787
31	Standard gain horn	Flann	20240-25	TE 00818
32	Power supply for amplifier	R & S	HZ-9	TE 00830
33	Power supply	Delta Elektronika	E030-1	TE 00851
34	Semi Anechoic Room	Comtest	--	TE 00861
35	Power supply	Delta Elektronika	MST030-10	TE 00886
36	Biconilog antenna	Chase	CBL6112A	TE 00967
37	Anechoic chamber	Euroshield	RFB-F-100	TE 01064
38	Triple loop antenna	Telefication	--	TE 01066
39	Temp / RH logger	MicroLog	EC 650	TE 01114
40	Broadband resistive power divider	Weinschel	1506A	TE 01120
41	Broadband resistive power divider	Weinschel	1506A	TE 01122
42	Spectrum analyser	R & S	FSP 40	TE 11125
43	EMI test receiver	R & S	ESCI	TE 11128
44	Radio Communication Service Monitor	R & S	CMS54	TE 11129
45	Pre-amplifier	Miteq	JS4-18004000	TE 11131
46	Low noise amplifier	Miteq	AFS42-041001800	TE 11132
47	Antenna tower	Heinrich Deisel	AS 620P	ANEC
48	Turntable	Heinrich Deisel	DS-412	ANEC
49	Turntable controller	Heinrich Deisel	HD-050	ANEC
50	Antenna mast	EMCO	1070	SAR
51	Turn table	EMCO	1060-2M	SAR
52	Near field probe	--	--	--
53	Digital multimeter	Fluke	87	TE 00257
54	Variable transformer	KSL	RU8	TE 00904
55	Two line V-network	R & S	ESH3-Z5	TE 00208
56	Pulse limiter	R & S	ESH3-Z2	TE 00756
57	High pass filter	Wainwright	WHK3.0/18G-10EF	TE 01140

Additional information module

Statement Radio module MTw and AWNDDNG 20130111.pdf

Telefication
Edisonstraat 12a
6902 PK Zevenaar



Enschede, January 9, 2013

Statement Radio module MTw (sensor) and AWNDDNG (USB Dongle) are equal:

We,

Company name: Xsens Technologies B.V.
Address: Pantheon 6a
7521 PR
City: Enschede
Country: The Netherlands

Declare that regarding product(s) with:
-Type Designation: MTw, AWNDDNG
-Trademark: MTw

Have the same performance and behavior of the radio module. This is based on:

Similarities:

- Radiochip, balun and chip antenna are the same.
- The radiochip uses the same clock input, settings and protocol.

Differences:

- Size of the printed circuit board
- Marginal difference in RF lay-out

The marginal difference between the MTw and AWNDDNG, will not have any influence on the radio module.

Date: 09-January-2013

City: Enschede

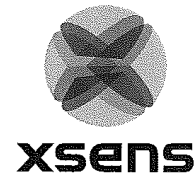
Name: Bart Kooi

Signature:

A handwritten signature in black ink, appearing to read 'Bart Kooi', with a long horizontal stroke extending to the right.

Statement Medium Access Protocol 20130111.pdf

Telefication
Edisonstraat 12a
6902 PK Zevenaar



Enschede, January 9, 2013

Statement Medium Access Protocol Usage:

We,

Company name: Xsens Technologies B.V.
Address: Pantheon 6a
7521 PR
City: Enschede
Country: The Netherlands

Declare that regarding product(s) with:

-Type Designation: MTw, AW-A, AWNDDNG
-Trademark: MTw

Use a Medium Access Protocol called Awinda. This protocol is developed by Xsens and supports:

- The data communication between the MTw and the AW-A or AWNDDNG.
- Time synchronization between MTw's

Date: 09-January-2013

City: Enschede

Name: Bart Kooi

Signature:

A handwritten signature in black ink, appearing to read 'Bart Kooi', written over a horizontal line.

Revision history

REVISION	DATE	REMARKS	REVISED BY
1.0	14 January 2013	• Addition of Wireless dongle on page 4, 5. • Declarations stating the radio module in the wireless motion tracker and the USB dongle are identical, placed in additional information module.	ing. J.C. le Clercq / A. van der Valk