



Radio test report 99659031

based on:

- FCC Part 15 Subpart C, sections 15.209 & 15.249 (10-1-04 Edition)
- FCC Part 15 Subpart B sections 15.107 & 15.109 (10-1-04 Edition)
- RSS-210, Issue 5 (Nov. 2001 edition)

Logitech Cordless Transceiver
C-UX34 & L-LH9

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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 bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

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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	:	21 June 2005

2 Product

A sample of the following product was submitted for testing:

Product description	: USB dongle & extension cable with integrated battery charger
Product category	: Part 15 low power transceiver & computer peripheral
Manufacturer	: Logitech Europe S.A.
Trade mark	: Logitech Cordless Transceiver
Type designation	: C-UX34 & L-LH9
Hardware version	: --
Serial number	: LZ52248
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:

- 24 June 2005

Tests were carried out from:

- 29 June 2005 to 13 July 2005

4 Product documentation

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

Description:	Date:	Identification:
Product description	06-2005	C-UX34 : Product Description
Circuit diagrams	30-05-2005	SCH 221963-0000 Rev A0
Parts list	23-05-2005	C-UX34 EE BOM ver01.xls
PCB layout drawings	31-05-2005	C-UX34 GER-211963-0000_A0.pdf
Testing indications	24-06-2005	Testing indications for the transceiver C-UX34

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 2.2 “*Field strength of unwanted emissions 30 - 1000 MHz*” for details.

The EUT was connected to a notebook computer via the USB port.

The RF power was set to -5 dBm.

During the tests the USB dongle (C-UX34) was inserted in the USB extension cable with integrated battery charger (L-LH9).

During the transmitter tests the modulation was absent.

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 & 15.249(10-1-04 Edition);
FCC Part 15 Subpart B sections 15.107 & 15.109 (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.

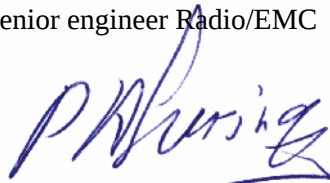
The results of the tests as stated in this report, are exclusively applicable to the product items as identified in this test report. Telefication does not accept any responsibility for the results stated in this test report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : 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 : 4 August 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
Duty cycle (during testing)	1 %
ITU emission class	1M00F1D
FCC ID	DZL201963

1.2 Test conditions

Temperature: 28 °C

Humidity: 48 %

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	64.15	H	93.98
2.402	69.15	V	93.98
2.448	66.82	H	93.98
2.448	72.82	V	93.98
2.479	66.32	H	93.98
2.479	72.88	V	93.98

peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)
2.402	84.15	H	113.98
2.402	89.15	V	113.98
2.448	86.82	H	113.98
2.448	92.82	V	113.98
2.479	86.32	H	113.98
2.479	92.88	V	113.98

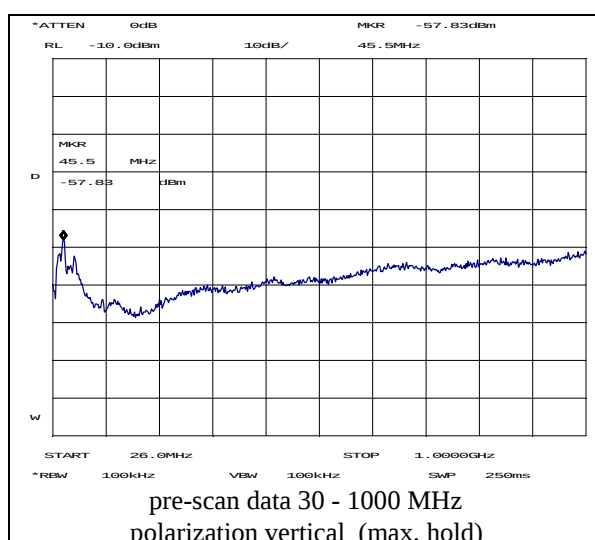
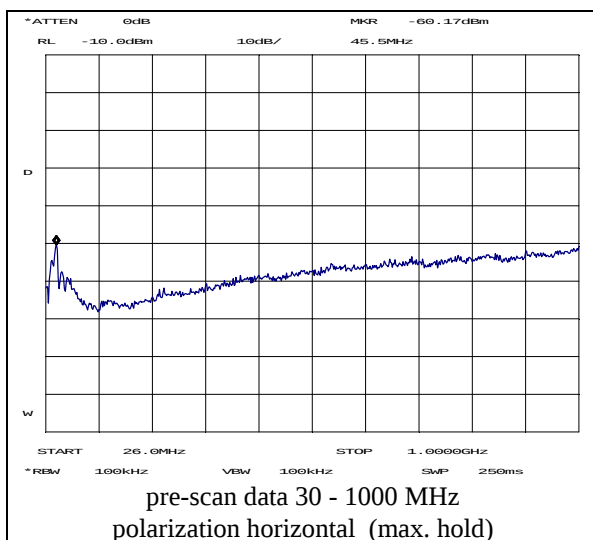
Measurement uncertainty: +4.5 dB / -6.1 dB

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 : 2479 MHz channel
Test results :

Exploratory measurements of unwanted emissions 30 - 1000 MHz



The emission peak at 45.5 MHz and the broadband emissions in the neighbourhood thereof were found to be originating from the notebook computer.

No unwanted emissions in the remaining 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

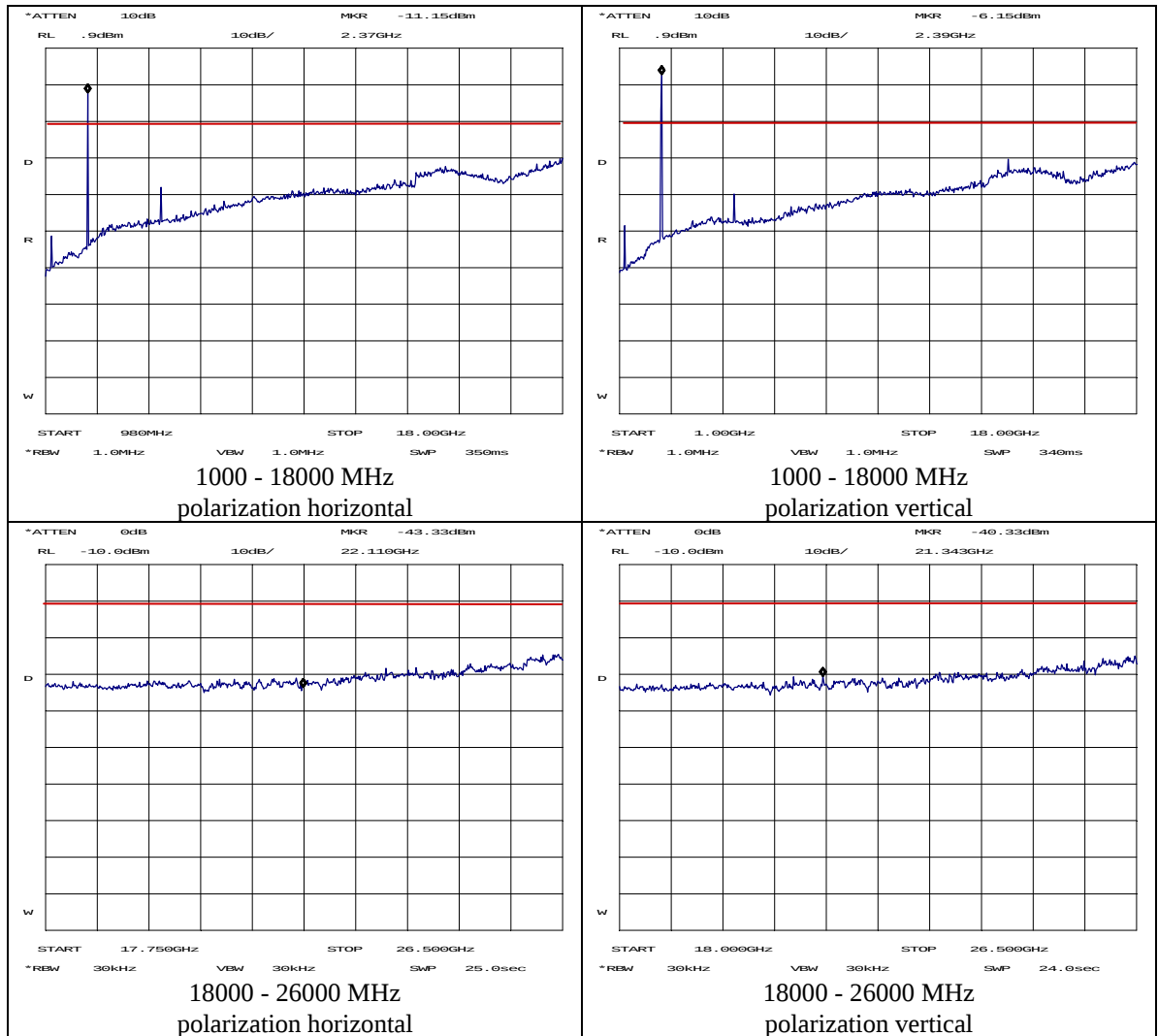
2.3 Field strength of unwanted emissions > 1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.109 (a), 15.209 (a) & 15.249 (a) & (e); 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.

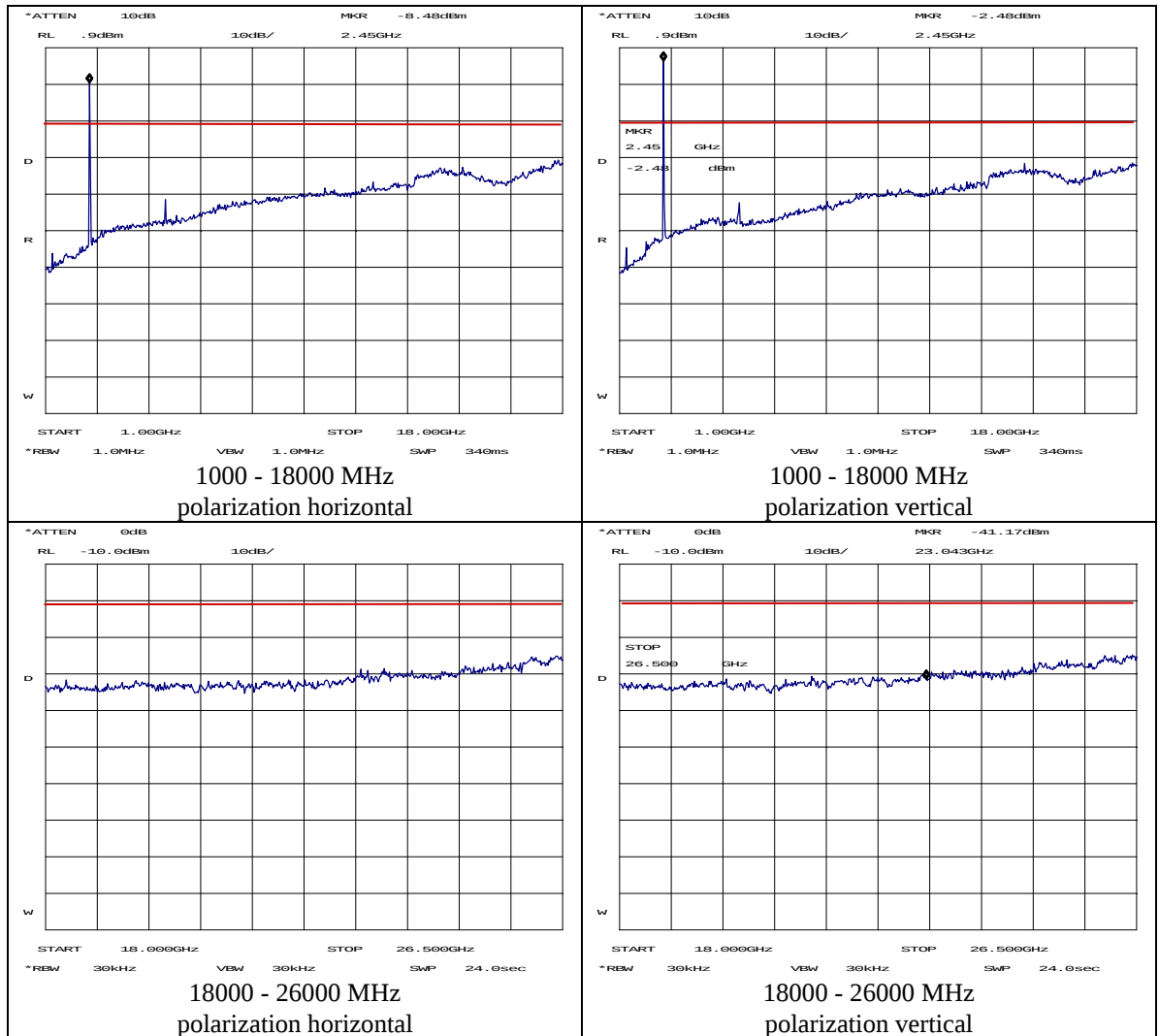
Test results :

Unwanted emissions (dBm e.i.r.p.) transmitter:

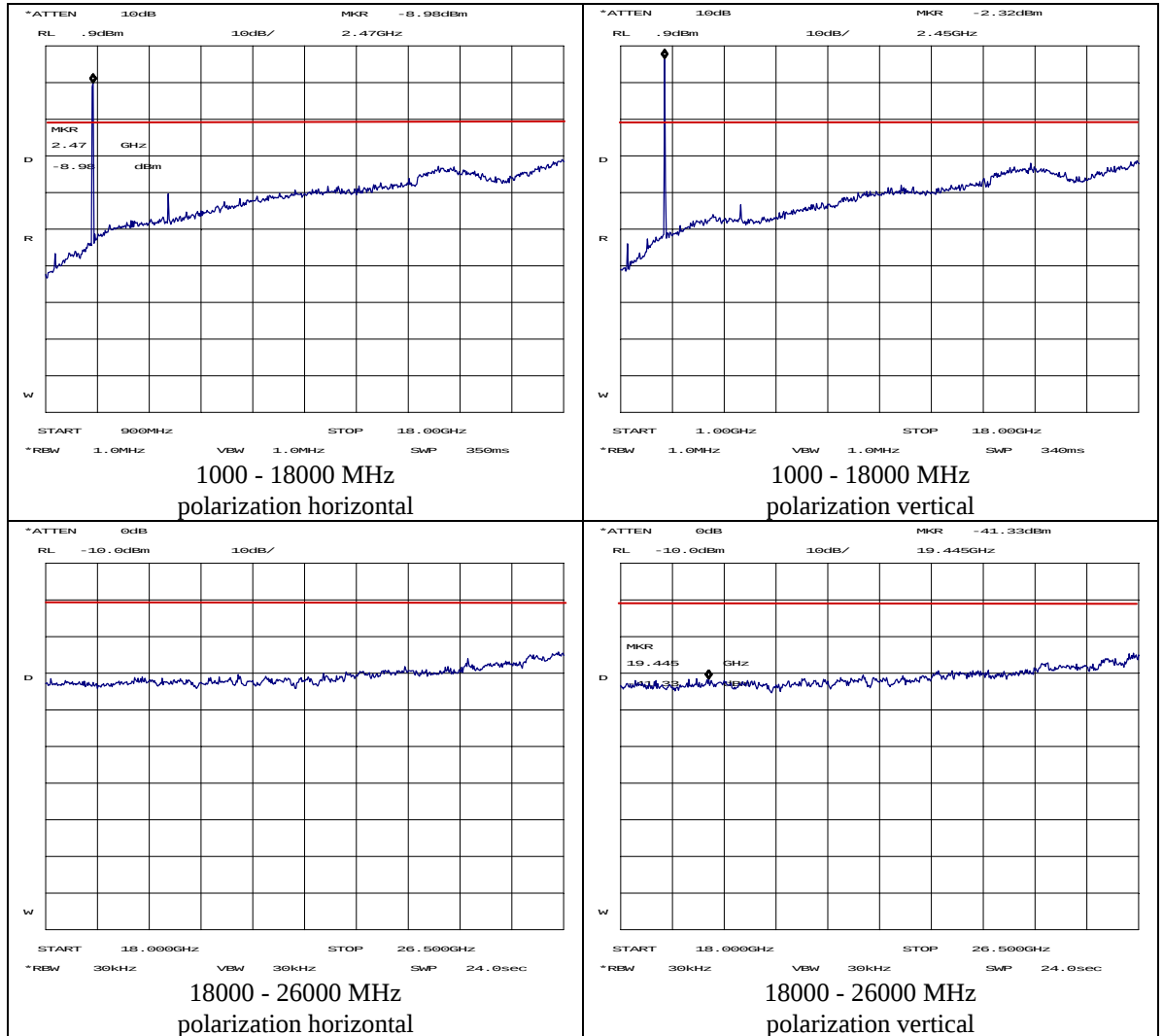
Low channel 2402 MHz:



Mid channel 2448 MHz:



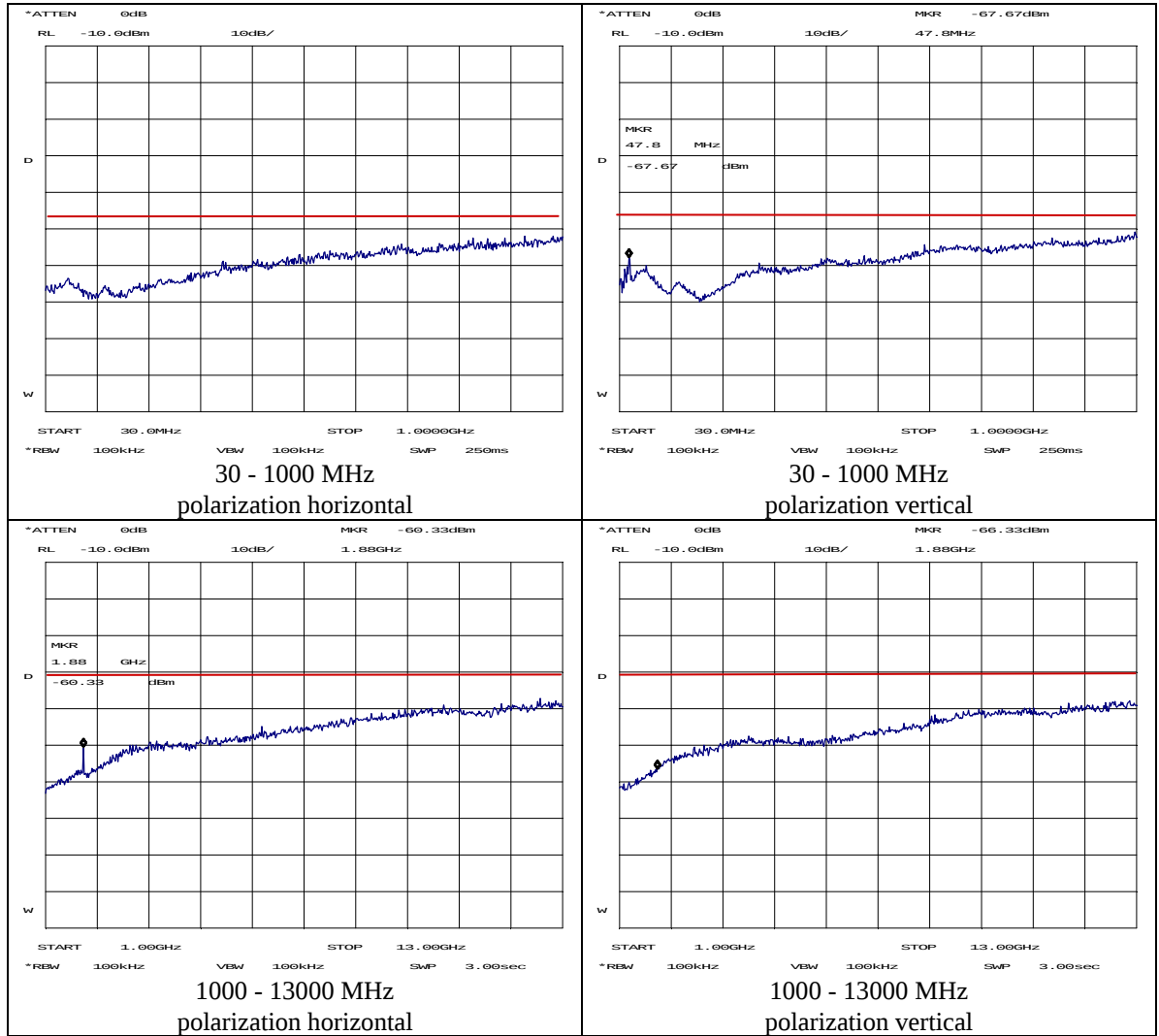
High channel 2479 MHz:



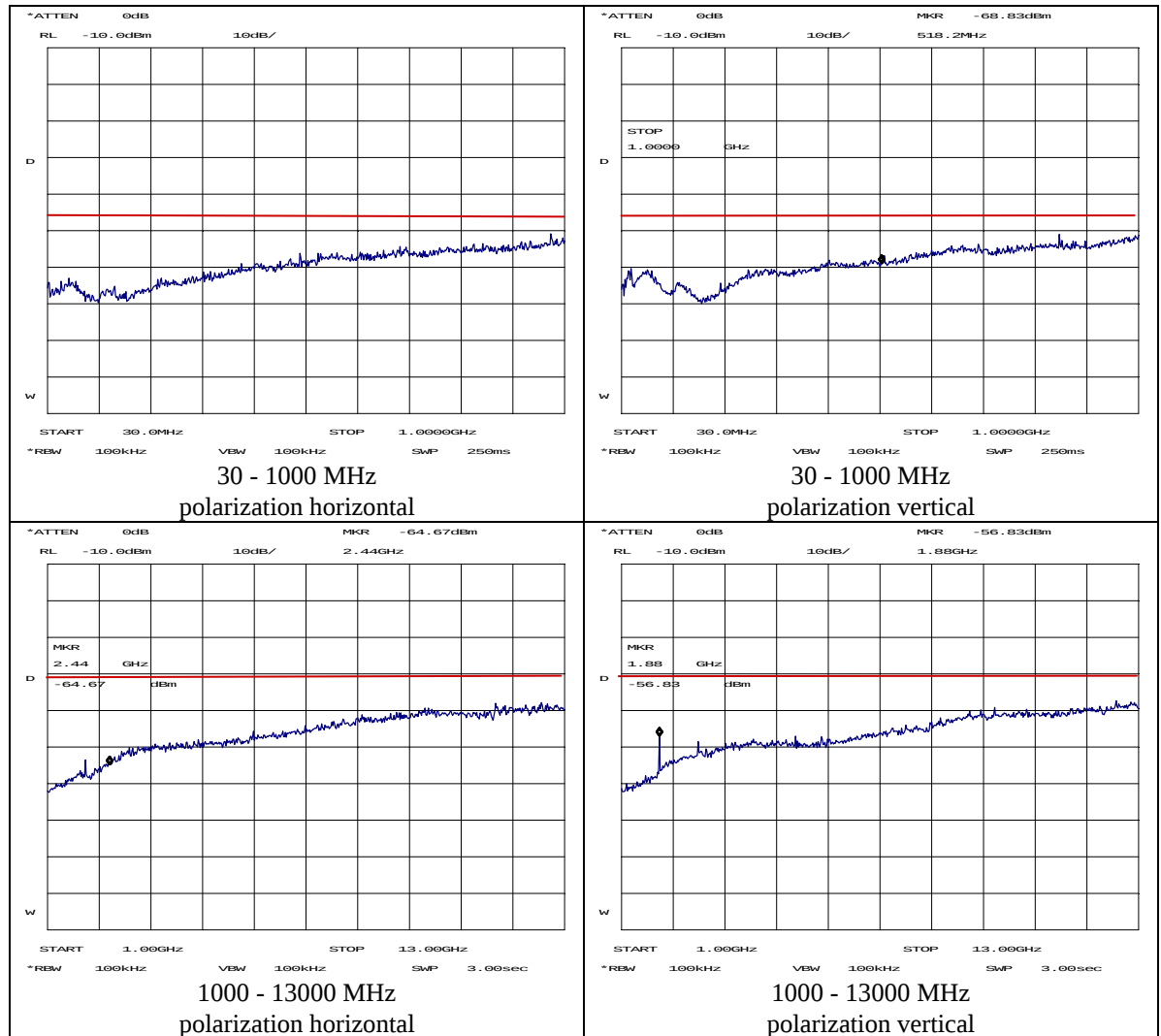
Spurious Emission Levels		
Frequency (MHz)	RBW(kHz)	Level (dBm e.i.r.p.) (AV)
4804	1000	-57
14412	1000	-50
4896	1000	-61
4958	1000	-60
Measurement uncertainty	f > 1 GHz: +4.5/-6.1 dB	
Note: RBW (kHz); refers to the bandwidth of the measuring receiver or spectrum analyzer		

Unwanted emissions (dBm e.(i).r.p.) receiver:

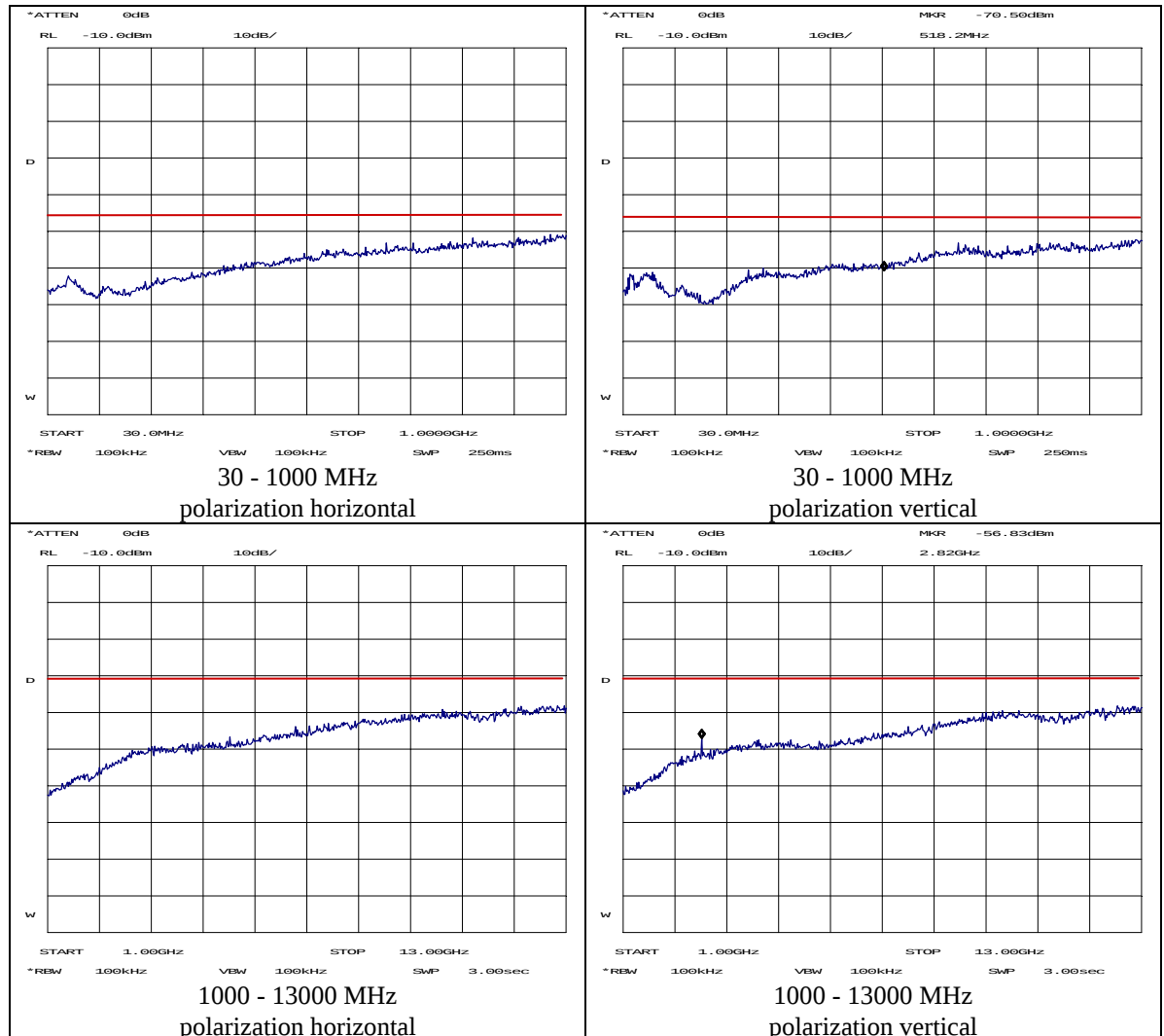
Low channel 2402 MHz:



Mid channel 2448 MHz:



High channel 2479 MHz:



Spurious Emission Levels		
Frequency (MHz)	RBW(kHz)	Level (dBm) (AV)
1880	100	-76.8
Measurement uncertainty	f ≤ 1 GHz: +2.6/-3.3 dB; f > 1 GHz: +4.5/-6.1 dB	
Note: RBW (kHz); refers to the bandwidth of the measuring receiver or spectrum analyzer		

2.4 Conducted emissions

Compliance standard : FCC part 15, subpart B, section 15.107 (a).
 Configuration : Host computer without EUT (reference measurement)
 Remark : Computer CRT was disconnected and removed from test environment during test
 Method of test : ANSI C63.4-2003, sections 5.2 & 6.2.2;
 FCC part 15, subpart A, section 15.35.
 Test results :

Time: 13:58:09 Date: 22-07-2004

Signal measured on AC-mains port, "Neutral-wire".

Measurement =>		QPeak		Av		
Frequency	Level	Limit	Frequency	Level	Limit	
(MHz)	dB	dB	(MHz)	dB	dB	
Range	(uV)	(uV)		(uV)	(uV)	
01	0.19970	46.9	63.7	0.19970	44.8	53.7
02	0.20030	46.9	63.6	0.20030	44.4	53.6
03	0.29980	42.6	60.3	0.29980	40.3	50.3
04	0.40020	40.3	57.9	0.40020	38.7	47.9
05	0.50040	39.5	56	0.50040	37.8	46
06	0.60020	33.8	56	0.60040	33.7	46
07	0.90050	34.1	56	0.90050	34.1	46
08	1.00050	35.6	56	1.00050	35.2	46
09	1.60140	30.4	56	1.60140	30.4	46
10	1.70200	31.3	56	1.70200	31.3	46
11	Below	30.0	56	Below	30.0	46
12	Below	30.0	56	Below	30.0	46
13	Below	30.0	56	Below	30.0	46
14	Below	30.0	60	Below	30.0	50
15	7.71280	27.7	60	7.71280	18.2	50
16	Below	30.0	60	Below	30.0	50
17	Below	30.0	60	Below	30.0	50
18	Below	30.0	60	Below	30.0	50
19	Below	30.0	60	Below	30.0	50
20	24.1256	27.5	60	24.1374	15.8	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: 14:08:31

Date: 22-07-2004

Signal measured on AC-mains port, "Life-wire".

Measurement => Range	Frequency (MHz)	QPeak		Frequency (MHz)	Av	
		Level dB (uV)	Limit dB (uV)		Level dB (uV)	Limit dB (uV)
01	0.19970	46.8	63.7	0.19970	44.1	53.7
02	0.20050	46.8	63.6	0.20050	44.1	53.6
03	0.29960	42.4	60.3	0.29980	40.0	50.3
04	0.40020	40.2	57.9	0.40020	38.3	47.9
05	0.50000	39.3	56	0.50000	37.2	46
06	0.59960	32.4	56	0.59960	32.2	46
07	0.90070	34.6	56	0.90070	34.6	46
08	1.00110	35.5	56	1.00110	35.4	46
09	1.60020	30.7	56	1.60020	30.7	46
10	1.70200	32.4	56	1.70200	32.4	46
11	2.40310	30.4	56	2.40310	30.4	46
12	3.00410	30.4	56	3.00410	29.4	46
13	3.70550	29.6	56	3.70550	29.5	46
14	Below	30.0	60	Below	30.0	50
15	7.21180	29.9	60	7.21180	28.4	50
16	Below	30.0	60	Below	30.0	50
17	Below	30.0	60	Below	30.0	50
18	Below	30.0	60	Below	30.0	50
19	Below	30.0	60	Below	30.0	50
20	24.1244	27.2	60	24.1306	12.0	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

Compliance standard : FCC part 15, subpart B, section 15.107 (a) & 15.107(d).
 Configuration : Host computer with EUT
 Remark : Computer CRT was disconnected and removed from test environment during test
 Method of test : ANSI C63.4-2003, sections 5.2 & 6.2.2;
 FCC part 15, subpart A, section 15.35.
 EUT condition : C-UX34 in L-LH9 connected, normal operation
 Test results :

Time: 09:28:20

Date: 04-08-2005

Signal measured on "Neutral".

Measurement =>		QPeak		Av		
Range	Frequency (MHz)	Level dB (uV)	Limit dB (uV)	Frequency (MHz)	Level dB (uV)	Limit dB (uV)
01	0.19730	46.6	63.8	0.19730	46.6	53.8
02	0.19730	46.7	63.8	0.19730	46.7	53.8
03	0.29540	41.5	60.4	0.29540	41.5	50.4
04	0.39420	38.6	58.0	0.39420	38.6	48.0
05	0.49380	35.7	56.2	0.49300	35.6	46.2
06	0.57500	28.9	56	0.57500	28.9	46
07	0.78930	35.9	56	0.88830	34.3	46
08	0.98750	33.2	56	0.98750	33.2	46
09	1.58000	34.1	56	1.58000	31.8	46
10	1.67940	29.4	56	1.67940	29.4	46
11	2.36930	31.8	56	2.17290	30.1	46
12	2.86750	33.4	56	2.94070	30.5	46
13	3.65690	30.1	56	3.87170	27.7	46
14	5.23970	29.3	60	5.23970	24.6	50
15	7.31520	31.7	60	7.31520	28.6	50
16	Below	30.0	60	Below	30.0	50
17	Below	30.0	60	Below	30.0	50
18	Below	30.0	60	Below	30.0	50
19	19.7848	35.1	60	19.7848	35.1	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: 09:44:08

Date: 04-08-2005

Signal measured on "Life".

Measurement => Range	Frequency (MHz)	QPeak Level dB (uV)	Limit dB (uV)	Frequency (MHz)	Av Level dB (uV)	Limit dB (uV)
01	0.19790	46.3	63.7	0.19790	46.3	53.7
02	0.19730	46.5	63.8	0.19730	46.5	53.8
03	0.29600	41.8	60.4	0.29600	41.8	50.4
04	0.35780	39.3	58.8	0.35780	39.3	48.8
05	0.49440	36.9	56.1	0.49420	36.9	46.1
06	0.57560	31.9	56	0.57560	31.7	46
07	0.79110	34.9	56	0.88950	34.5	46
08	0.98830	33.8	56	0.98830	33.8	46
09	1.58120	31.6	56	1.58120	31.5	46
10	1.68100	30.3	56	1.68120	30.2	46
11	2.17550	29.4	56	2.17550	29.4	46
12	2.86870	30.3	56	2.86870	28.8	46
13	Below	30.0	56	Below	30.0	46
14	Below	30.0	60	Below	30.0	50
15	7.31840	28.1	60	7.31840	21.4	50
16	Below	30.0	60	Below	30.0	50
17	Below	30.0	60	Below	30.0	50
18	Below	30.0	60	Below	30.0	50
19	19.7870	34.5	60	19.7870	34.4	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

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	TE 00532	Emco	3115
Horn Antenna	TE 00533	Emco	3116
Anechoic Chamber	TE 01064	Euroshield	RFD-F-100
Thermo-hygrometer	TE 00096	Lufft	B145
Antenna tower	--	HD	AS 620p
Turntable	--	HD	DS 412
Turntable controller	--	HD	HD 050
Test receiver	TE 00205	Rohde & Schwarz	ESH3
Pulse limiter	TE 00227	Rohde & Schwarz	ESH3-Z2
Artificial mains network	TE 00208	Rohde & Schwarz	ESH2-Z5
Test (host) computer	N18S0	Dell	Optiplex GXa

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
Category II non - scanning receiver	
CNR RSS-210 Issue 5	FCC 47 CFR Ch. 1 part 15 subpart B (10-1-04 Edition)
Par. 6.6	§ 15.107
Par. 7.3	§ 15.109