telefication bv
The Netherlands
Chamber of Commerce
09076358
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telefication

Radio test report
99816830

based on:
- FCC Part 15 Subpart C, section 15.247 (10-1-05 Edition)
- RSS-210, Issue 6 (Sept. 2005 edition)

2.4GHz Darr79 ASIC design
3141 130 00291

Contents

This report comprises of four modules. The total number of pages is: 27

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	:	Philips Innovative Applications NV
Address	:	Hoogveld 50
Zipcode	:	9200
City/town	:	Dendermonde
Country	:	Belgium
Date of order	:	24 October 2006

2 Product

A sample of the following product was submitted for testing:

Product description	:	2.4GHz Darr79 ASIC design
Manufacturer	:	In-Tech Electronics Ltd
Trade mark	:	--
Type designation	:	3141 130 00291
FCC ID	:	TZG314113000291
Hardware version	:	--
Serial number	:	--
Software release	:	--

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 are received on:

- 1 November 2006

Tests are carried out from:

- 6 November 2006 to 16 November 2006

4 Product documentation

For production of this report the following product documentation has been used:

Description:	Date:	Identification:
Test description	--	Quick Start DWAM79 D2D GUI for FCC measurements.doc

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

For all tests the default RF power setting has been used.
This was enabled by the Atheros test tool named DARR 79 GUI Configuration Software (GUI Version 9.0 Demo)

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.

6 Modifications to the sample

No modifications have been 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 has been tested according to the following specification(s):

FCC Part 15 Subpart C, section 15.247 (10-1-05 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. K.A. Roes

function : Test Engineer

signature :

Review of test report by:

name : J.P. van de Poll

function : Co-ordinator Test Group

signature :

The above conclusions have been verified by the following signatory:

Date : 16 November 2006

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

function : Manging Director

signature :

Test results module

1.1 Equipment information

Operating frequency range	2412 – 2464 MHz
Occupied bandwidth (measured)	9.1 MHz
ITU emission class	9M1G1D
FCC ID	TZG314113000291

1.2 Tested channels

Channel 1	Channel 2	Channel 3
2412 MHz	2438 MHz	2464 MHz

1.3 Summary of test data

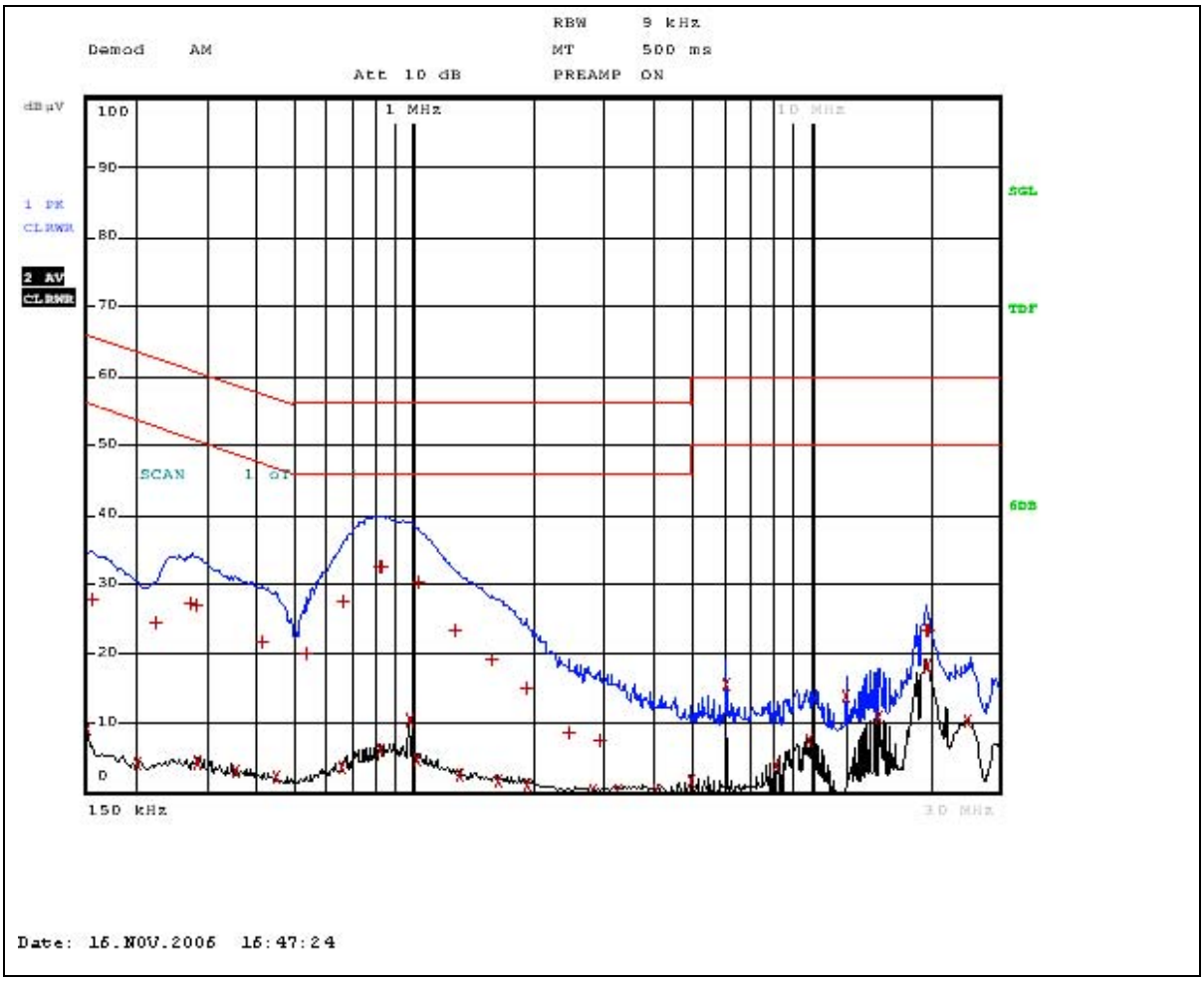
NAME OF TEST	PARA. NO.	Limit	MEAS.	RESULT
Power line conducted emissions	15.207(a)	56 dBµV	33 dBµV	Complies
Minimum 6 dB bandwidth	15.247(a)(2)	500 kHz	9.1 MHz	Complies
Maximum Peak Power Output	15.247(b)(3)	36 dBm E.I.R.P.	16.1 dBm E.I.R.P.	Complies
Peak Power Spectral Density	15.247(e)	8 dBm/3 kHz	-1.7 dBm/3 kHz	Complies
Spurious Emissions (Radiated)	15.247(d)	> 20 dB below fundamental	≥ 20 dB	Complies
Restricted band edge emission levels (radiated)	15.205(a)	54 dBµV/m(av) 74 dBµV/m(pk)	37.3 dBµV/m 65.1 dBµV/m	Complies
4.5 -5.15 GHz restricted band emission	15.205(a)	54 dBµV/m(av) 74 dBµV/m(pk)	48.4 dBµV/m 59.0 dBµV/m	Complies

2 Emission tests

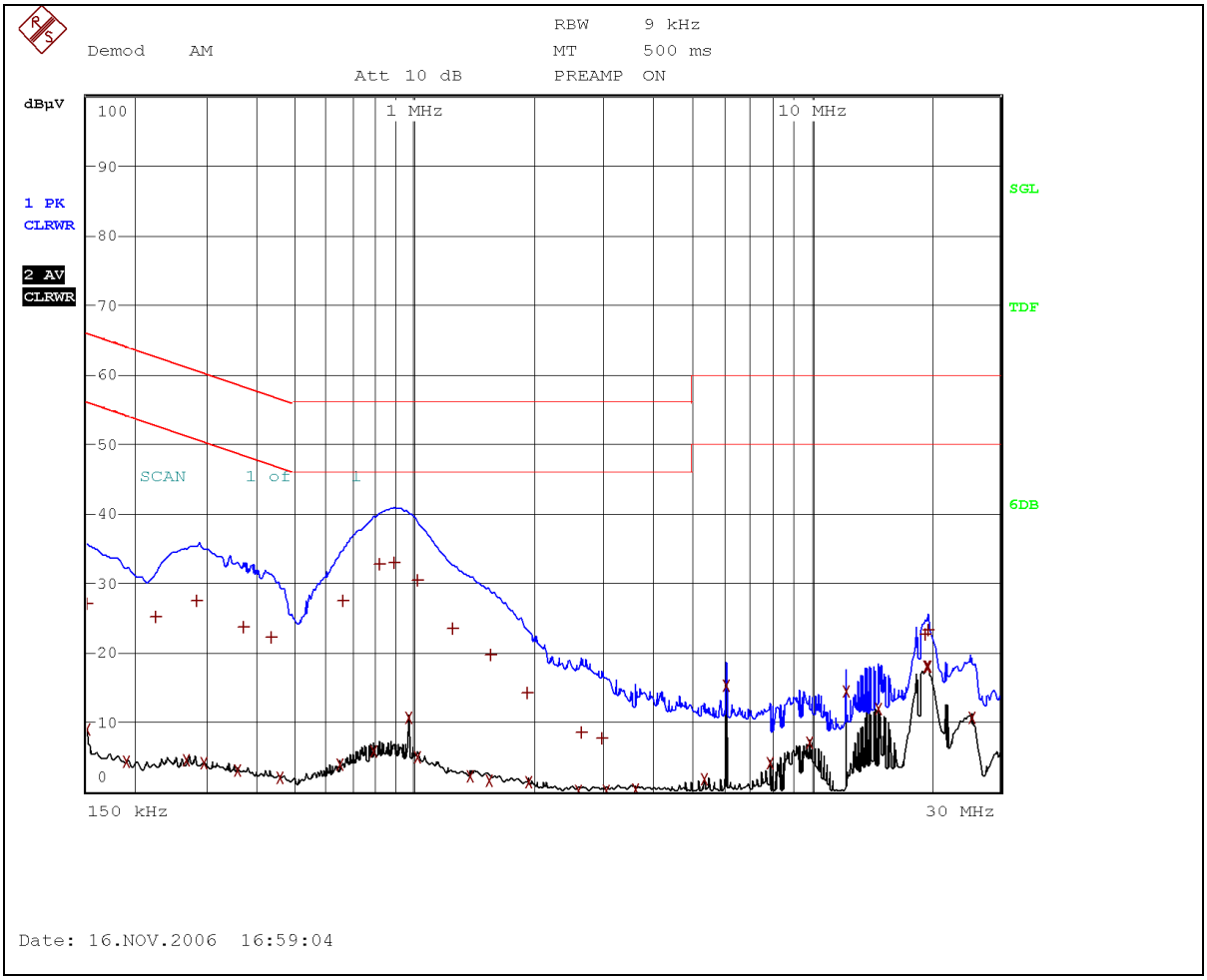
2.1 Power line conducted emissions

Compliance standard	:	FCC part 15, subpart C, section 15.207 (a)
Method of test	:	ANSI C63.4-2003, sections 7 & 11.5
Ambient temperature	:	23 °C
Relative humidity	:	38 %
EUT condition	:	Transmitting

Mains port – line



Mains port – Neutral



Measurement uncertainty: +3.70/-3.70 dB

3 Emission tests

3.1 Minimum 6 dB bandwidth

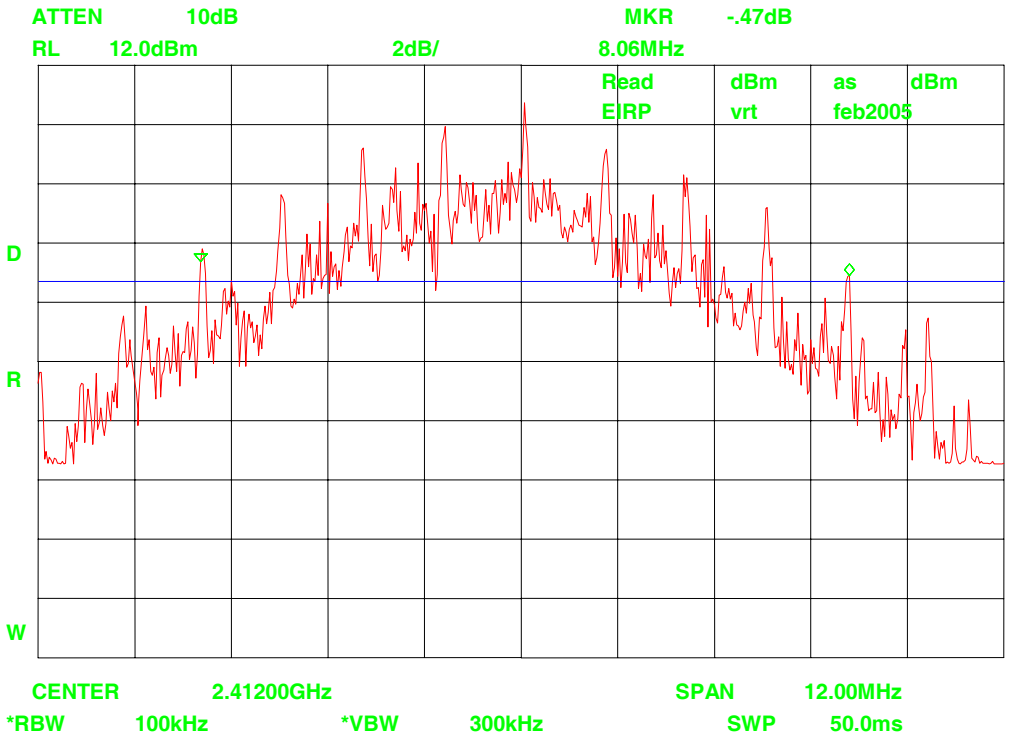
Compliance standard : FCC part 15, subpart C, section 15.247 (a)(2)
Method of test : KDB Publication No. 558074

Ambient temperature : 23 °C
Relative humidity : 38 %

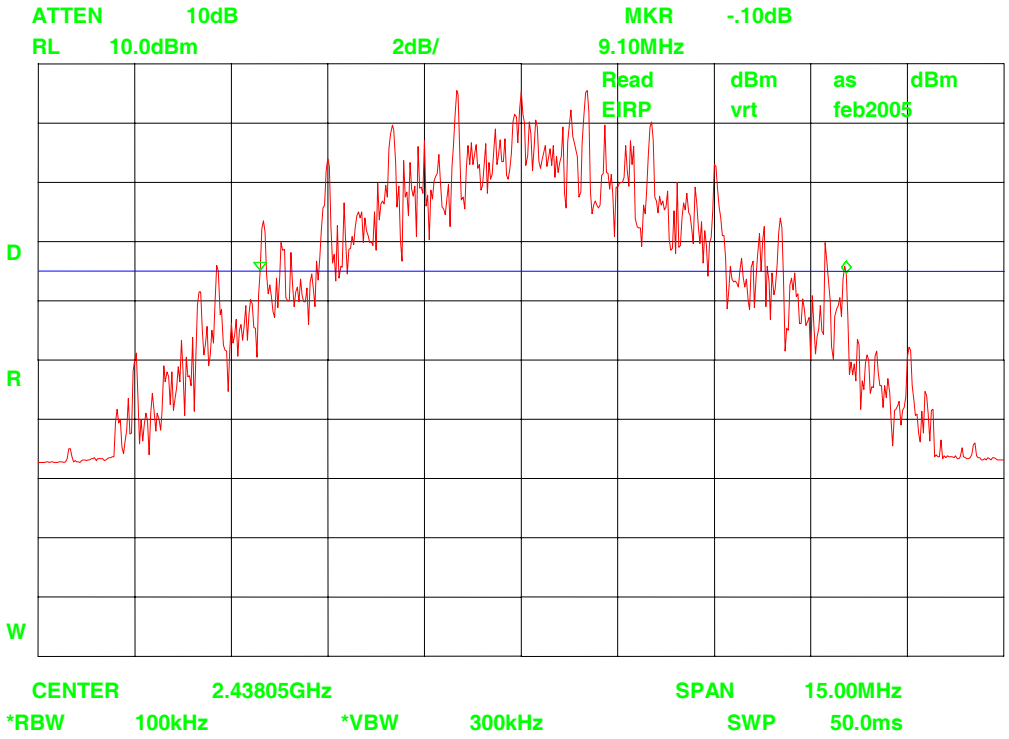
Test results :

Channel 1	Channel 2	Channel 3
8.06 MHz	9.1 MHz	8.06 MHz

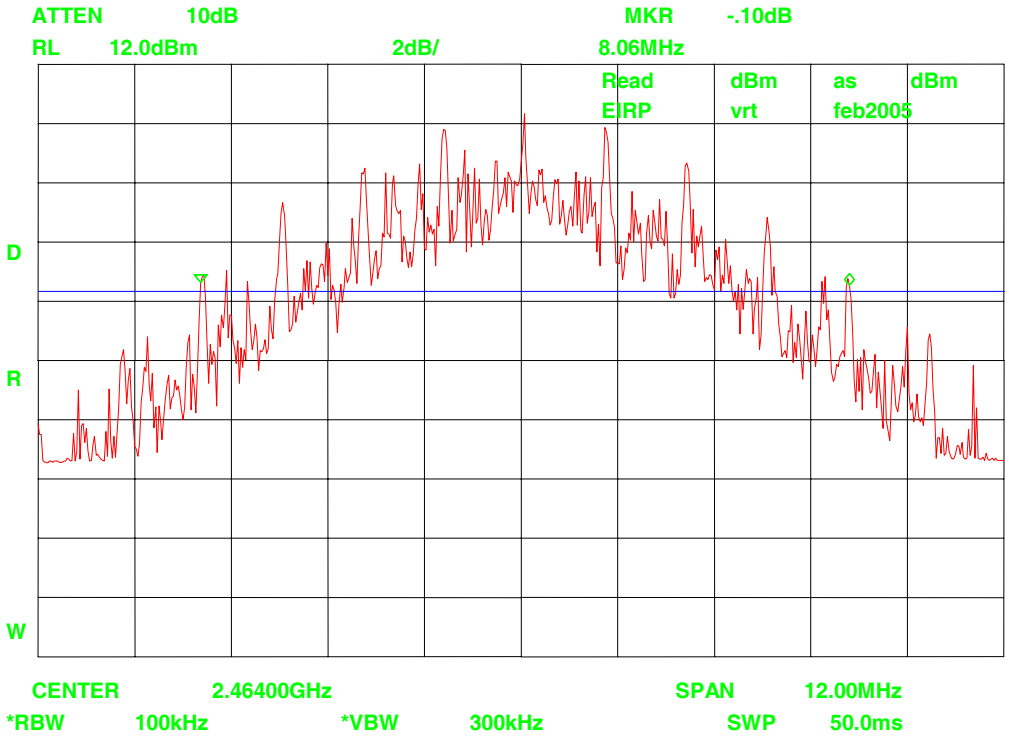
Channel 1 plot



Channel 2 plot



Channel 3 plot



Measurement uncertainty: + 23/- 23 kHz

3.2 Peak power output

Compliance standard : FCC part 15, subpart C, section 15.247 (b)(3)
Method of test : KDB Publication No. 558074 (alternative procedures)

Ambient temperature : 23 °C
Relative humidity : 38 %

Test results :

Channel 1	Channel 2	Channel 3
16.0 dBm e.i.r.p.	16.1 dBm e.i.r.p.	14.7 dBm e.i.r.p.

Measurement uncertainty: + 1.6/ -1.9 dB

3.3 Peak power spectral density

Compliance standard : FCC part 15, subpart C, section 15.247 (e)
Method of test : FCC KDB Publication No. 558074 (alternative procedures)

Ambient temperature : 23 °C
Relative humidity : 38 %

Test results :

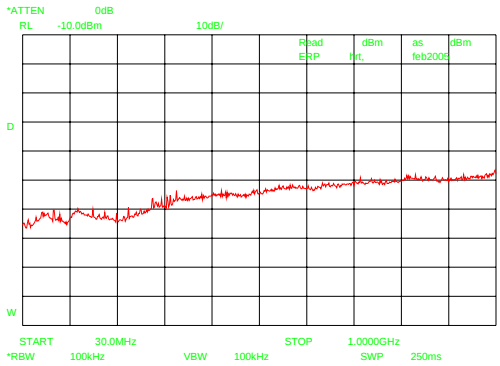
Channel 1	Channel 2	Channel 3
-2.7 dBm/3 kHz	-1.7 dBm/3 kHz	-2.8 dBm/3 kHz

Measurement uncertainty: + 3.7/ -4.5 dB

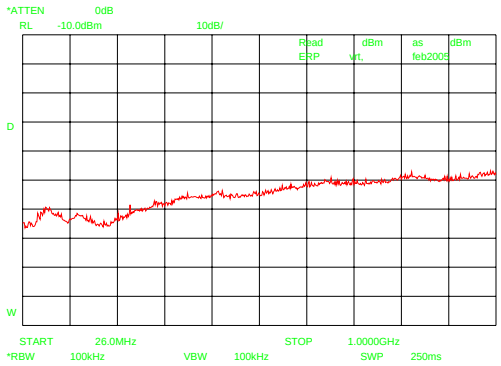
3.4 Field strength of unwanted emissions 30 - 1000 MHz (exploratory)

Compliance standard	:	FCC part 15, subpart C, section 15.209 (d)
Method of test	:	ANSI C63.4-2003, sections 5.4, 8.2.3, 8.2.4 & 8.3.1.2; FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
Ambient temperature	:	23 °C
Relative humidity	:	38 %
EUT condition	:	Transmitting
Test results	:	

WLAN on

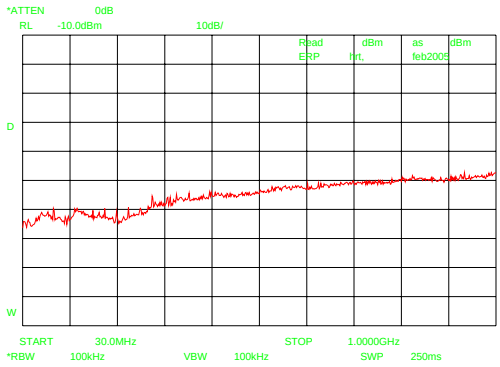


pre-scan data 30 - 1000 MHz
polarization horizontal

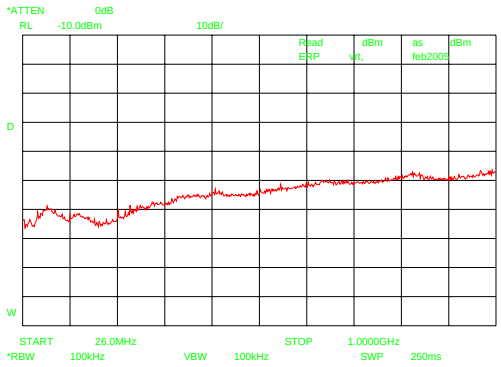


scan pre-scan data 30 - 1000 MHz
polarization vertical

WLAN off



pre-scan data 30 - 1000 MHz
polarization horizontal



scan pre-scan data 30 - 1000 MHz
polarization vertical

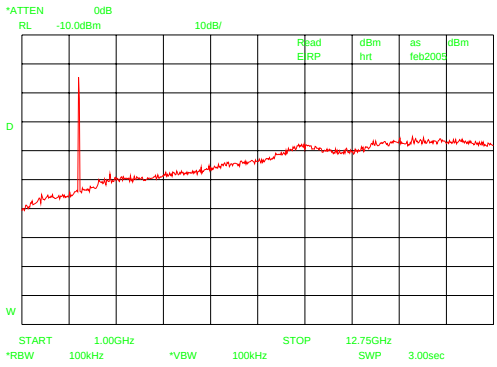
No unwanted emissions in the frequency range 30 - 1000 MHz as a result of the delta measurement (WLAN on/off) were detected during the exploratory measurements. Accordingly, measurements on an Open Area Test Site were judged unnecessary.

Measurement uncertainty: N/A

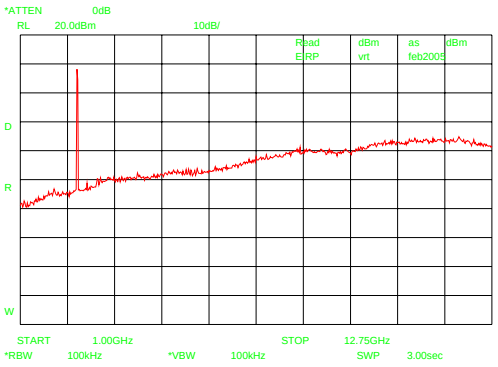
3.5 Field strength of unwanted emissions > 1000 MHz

Compliance standard	:	FCC part 15, subpart C, section 15.247(d)
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.
Ambient temperature	:	23 °C
Relative humidity	:	38 %
Test results	:	

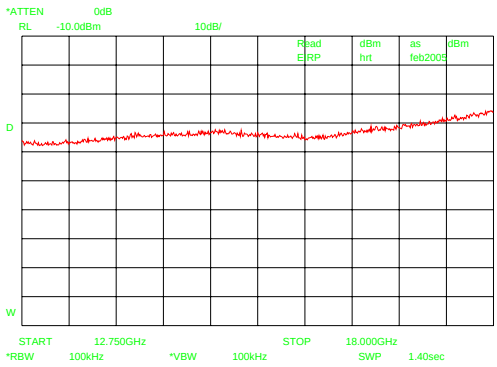
CH 1 TX:



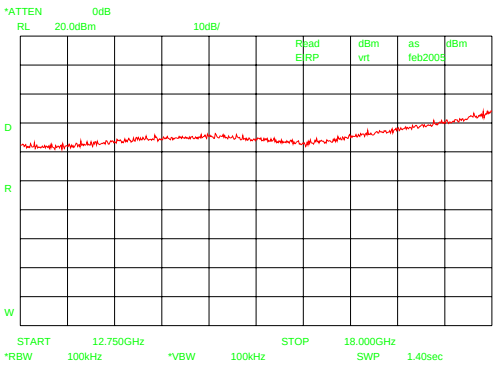
1000 - 12750 MHz
polarization horizontal



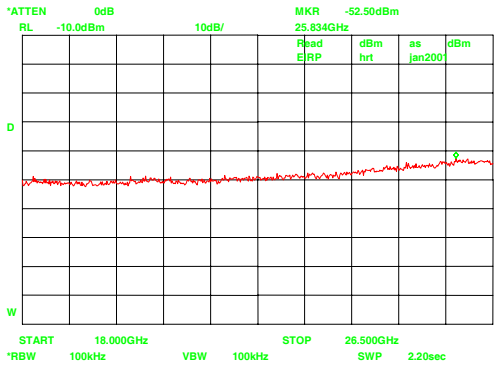
1000 - 12750 MHz
polarization vertical



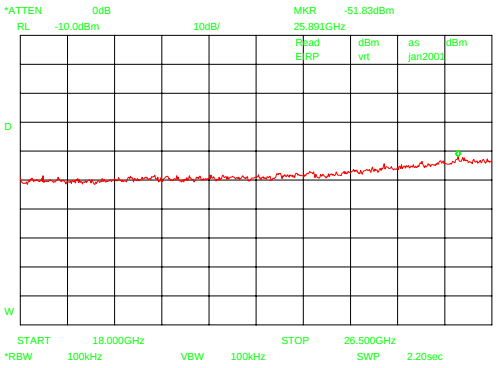
12750 - 18000 MHz
polarization horizontal



12750 - 18000 MHz
polarization vertical

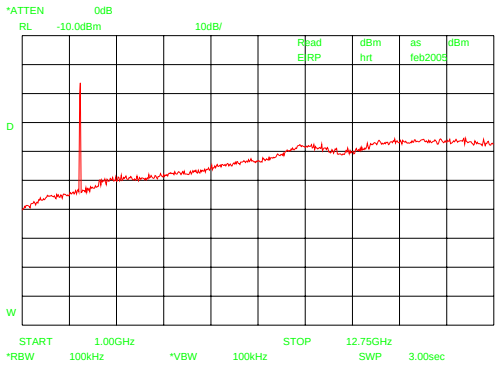


18000 - 26500 MHz
polarization horizontal

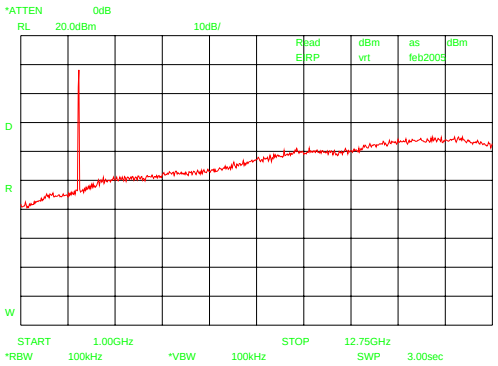


18000 - 26500 MHz
polarization vertical

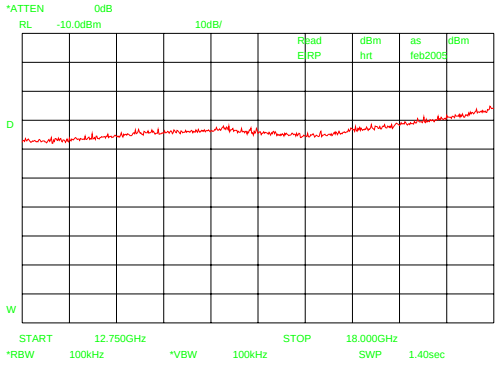
CH 2 TX:



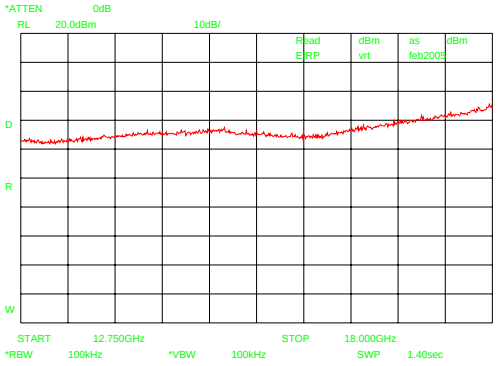
1000 – 12750 MHz
polarization horizontal



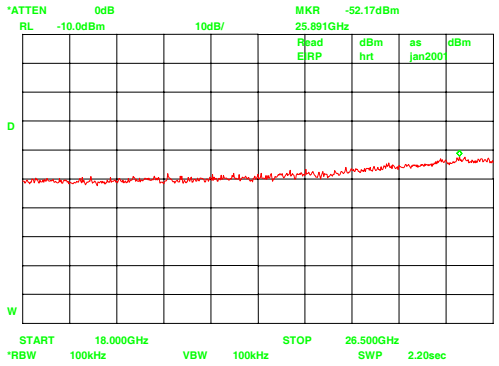
1000 – 12750 MHz
polarization vertical



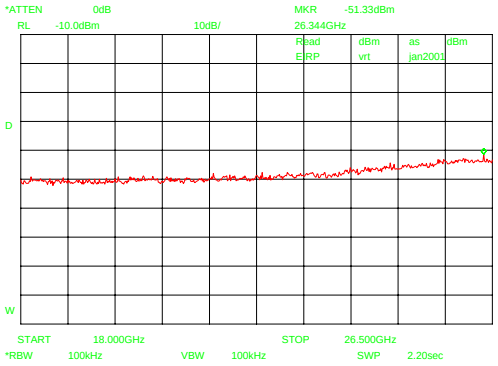
12750 - 18000 MHz
polarization horizontal



12750 - 18000 MHz
polarization vertical

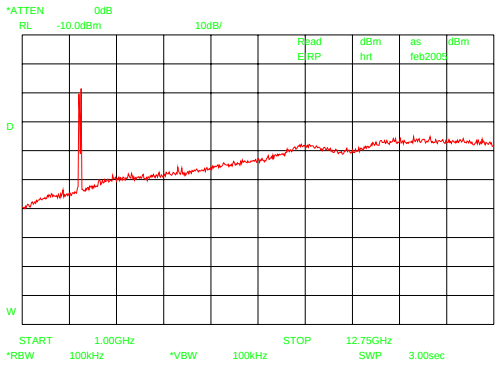


18000 - 26500 MHz
polarization horizontal

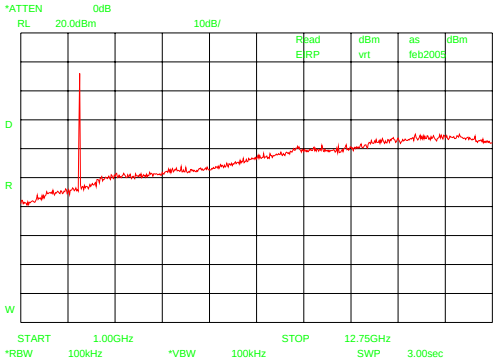


18000 - 26500 MHz
polarization vertical

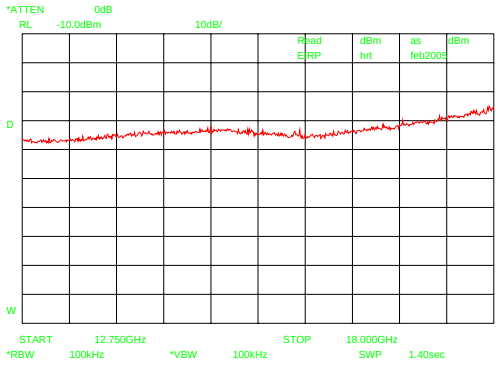
CH 3 TX:



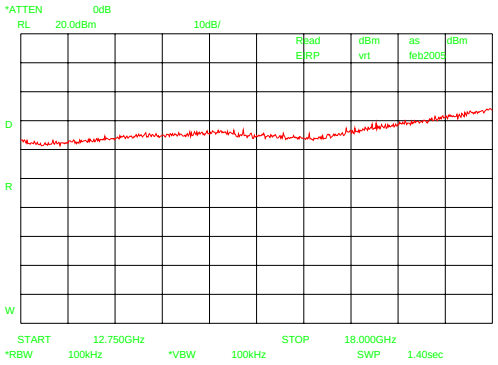
1000 - 12750 MHz
polarization horizontal



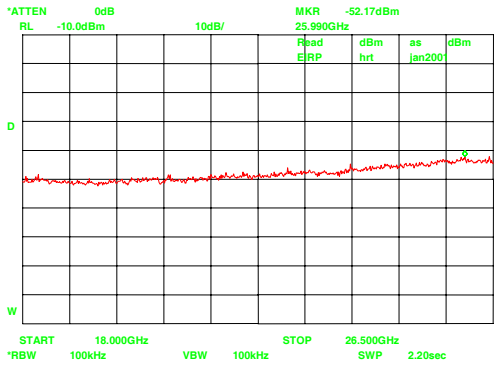
1000 - 12750 MHz
polarization vertical



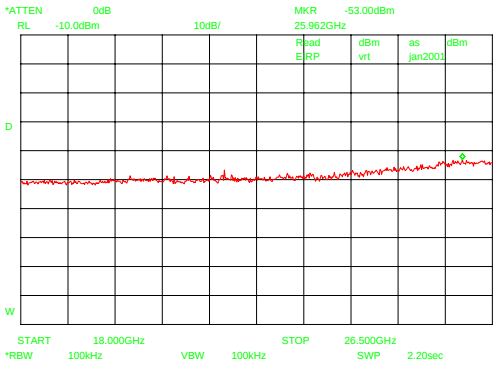
12750 - 18000 MHz
polarization horizontal



12750 - 18000 MHz
polarization vertical



18000 - 26500 MHz
polarization horizontal



18000 - 26500 MHz
polarization vertical

To convert from dBm to dBµV/m : reading in dBm + 95.2

Measurement uncertainty: +4.5 dB / -6.0 dB

3.6 Field strength of unwanted emissions in restricted band 4.5 – 5.15 GHz

Compliance standard : FCC part 15, subpart C, section 15.205(a)
Method of test : FCC Public Notice DA 00-705

Ambient temperature : 23 °C
Relative humidity : 38 %

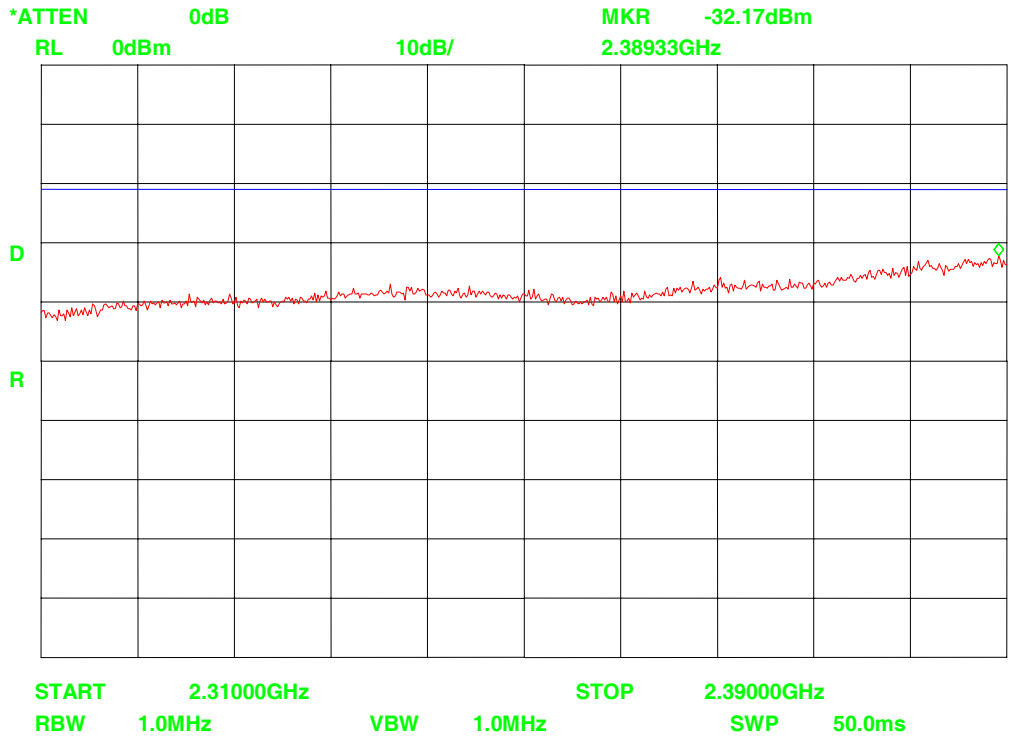
	Peak value (dBµV/m)	Average value (dBµV/m)
CH 1, 2nd harm.	-36.24 + 95.2 = 59.0	-46.83 +95.2 = 48.4
CH 2, 2nd harm	-40.34 + 95.2 = 54.9	-51.02 + 95.2 = 44.2
CH 3, 2nd harm.	-41.21 + 95.2 = 54.0	-52.47 + 95.2 = 42.7

Measurement uncertainty: +4.5 dB / -6.0 dB

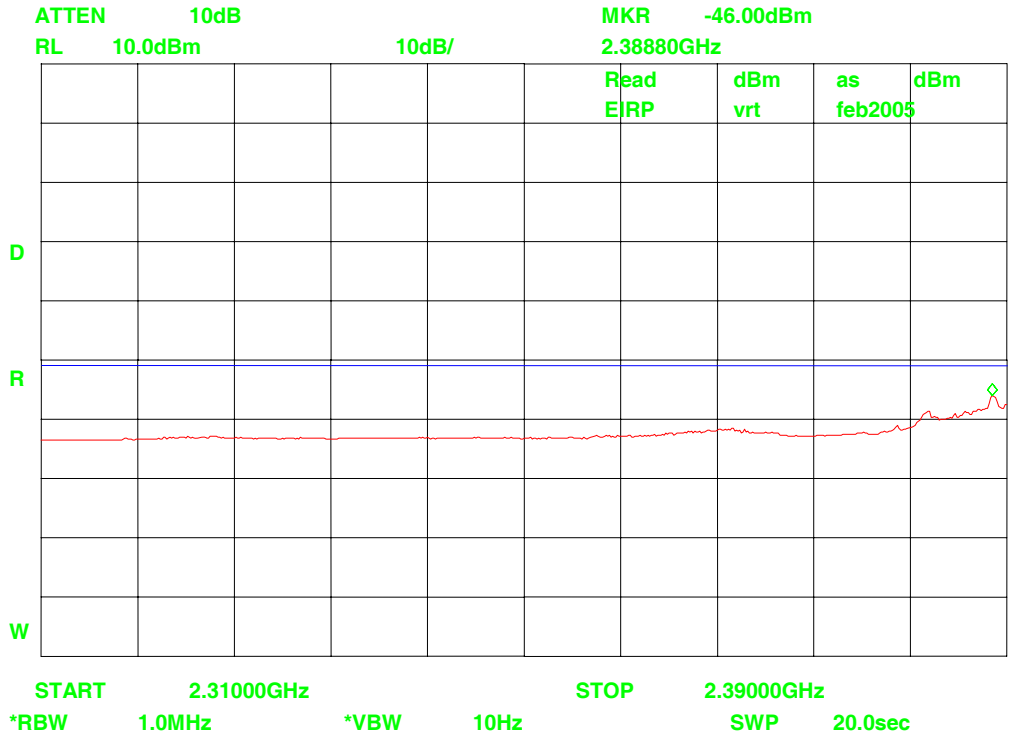
3.7 Field strength of unwanted emissions in lower adjacent restricted band

Compliance standard : FCC part 15, subpart C, section 15.205(a)
Method of test : FCC Public Notice DA 00-705

Peak detector measurement



Average detector measurement

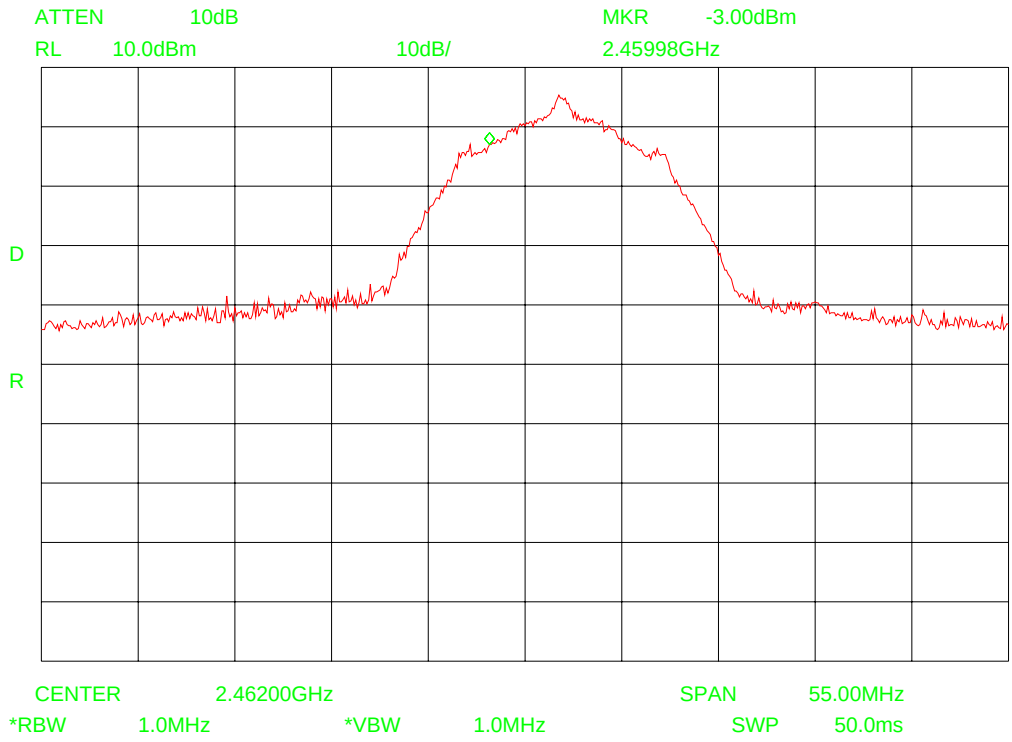


Measurement uncertainty: +4.5 dB / -6.0 dB

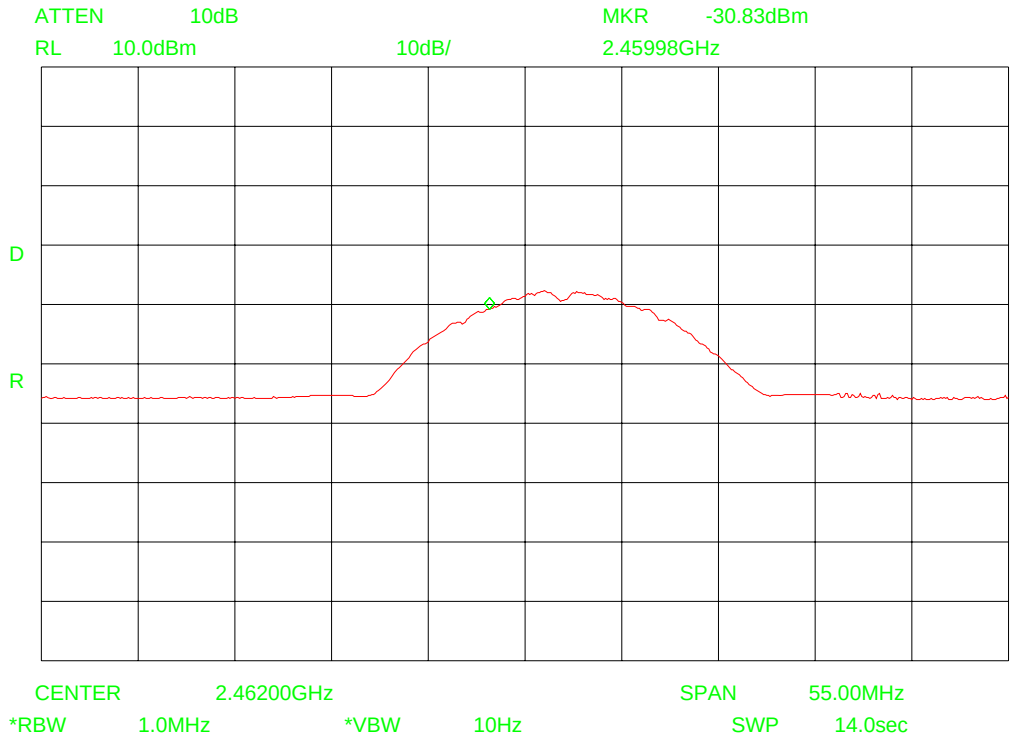
3.8 Field strength of unwanted emissions in upper adjacent restricted band

Compliance standard : FCC part 15, subpart C, section 15.205(a)
Method of test : FCC Public Notice DA 00-705

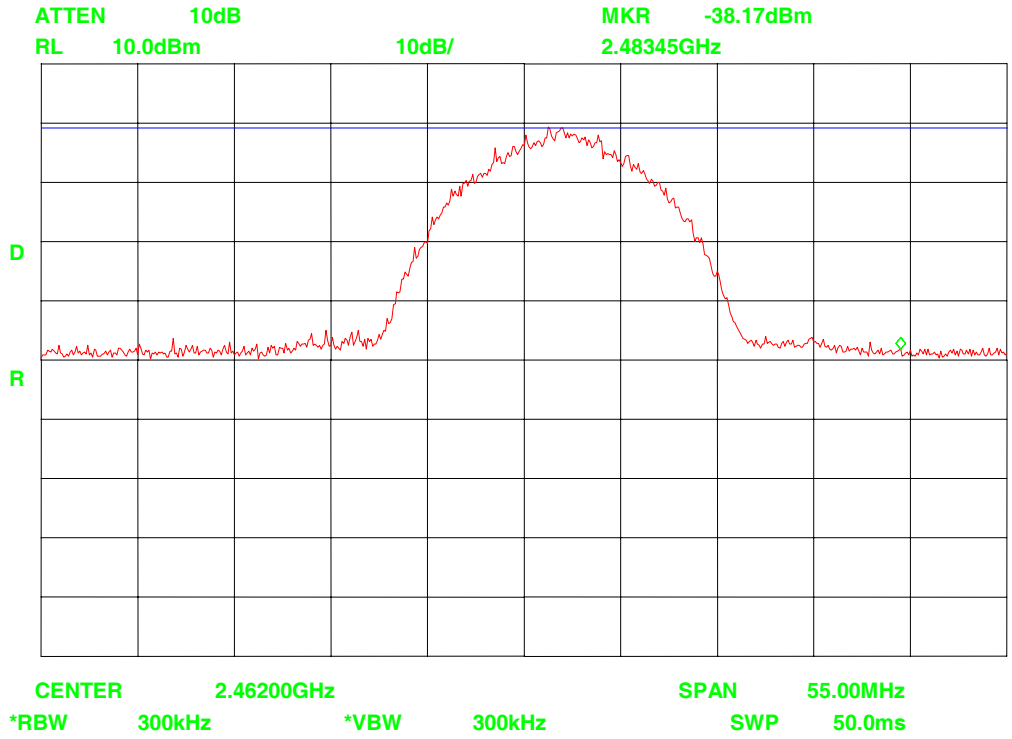
Peak detector measurement



Average detector measurement



Delta marker measurement



band edge emission level (peak): -3.0 + 95.2 – 27.1 = 65.1 dBµV/m
band edge emission level (average): -30.8 + 95.2 – 27.1 = 37.3 dBµV/m

Measurement uncertainty: +4.5 dB / -6.0 dB

Used test equipment module

Description	Telef. ID	Manufacturer	Model	Used at par.
Receiver	--	Rohde & Schwarz	ESU	2.1
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E	3.1, 3.3, 3.5, 3.6, 3.7, 3.8
Power meter	TE 00489	Hewlett Packard	437B	3.2,
Power sensor	TE 00355	Hewlett Packard	8481A	3.2,
RF Pre-amplifier up to 1000 MHz	TE 00098	Rohde & Schwarz	ESV-Z3	3.4
RF Pre-amplifier 1 - 26.5 GHz	TE 00093	Hewlett Packard	HP8449B	3.2, 3.3, 3.5, 3.6, 3.7, 3.8,
Biconilog antenna	TE 00700	Emco	3143	3.4
Horn Antenna 1 - 18 GHz	TE 00532	Emco	3115	3.5, 3.6, 3.7, 3.8,
Horn Antenna 18 - 40 GHz	TE 00533	Emco	3116	3.5,
Anechoic Chamber	TE 01064	Euroshield	RFD-F-100	3.1, 3.2, 3.3, 3.5, 3.7, 3.7, 3.8,
Antenna tower	--	HD	AS 620p	3.1, 3.2, 3.3, 3.5, 3.7, 3.7, 3.8,
Turntable	--	HD	DS 412	3.1, 3.2, 3.3, 3.5, 3.7, 3.7, 3.8,
Turntable controller	--	HD	HD 050	3.1, 3.2, 3.3, 3.5, 3.7, 3.7, 3.8,

Cross reference table

Transmitter	
IC RSS-210 Issue 6, Annex 8	**FCC 47 CFR Ch. 1 part 15, subpart C (10-1-05 Edition)**
A8.2 (1)	§ 15.247 (a) (2)
A8.4 (4)	§ 15.247 (b) (3)
A8.2 (2)	§ 15.247 (e)
A8.5	§ 15.247 (d)
IC RSS-Gen	**FCC 47 CFR Ch. 1 part 15, subpart C (10-1-05 Edition)**
7.2.2	§ 15.207 (a)