
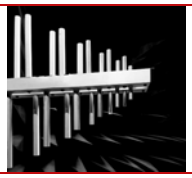
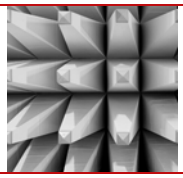

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TEST REPORT

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Test report no.: 1-3498-01-03/11-B

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited test laboratory:
The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAkkS registration number: D-PL-12076-01-01

Area of Testing: Radio/Satellite Communications

Applicant

A.D.C.
Peter Dornier Strasse 10
88131 Lindau / GERMANY
Phone: +49 8382 9699-0
Fax: +49 8382 9699-22114
Contact: Frank Gruson
e-mail: frank.gruson@continental-corporation.com
Phone: +49 8382 9699-435

Manufacturer

Conti Temic microelectronic GmbH
Ringlerstrasse 17
85057 Ingolstadt / GERMANY

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS – 210 Issue 8	Low Power Licence-exempt Radiocommunication Devices Annex 13, Section A13.1 Vehicle -Mounted Field Disturbance Sensors in the Band 76.0 - 77.0 GHz

For further applied test standards please refer to section 3 of this test report.

Test item

Kind of test item:	**77 GHz Automotive Radar (adaptive cruise control for vehicles)**
Model name:	**ARS3-B**
FCC ID:	**OAYARS3-B**
IC:	**4135A-ARS3B**
Frequency:	**76 GHz – 77 GHz**
Power supply:	**12.0 V DC from power supply**
Temperature range:	**-40 °C to +85 °C**

Test report authorised:

2011-12-12 Karsten Geraldy

Test performed:

2011-11-15 Meheza Walla

CETECOM Cetecom ICT Services Accredited Test Laboratory Untertürkheimer Str. 6-10 D-66117 Saarbrücken

1 Table of contents

2 General information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2011-05-16
Date of receipt of test item:	2011-05-16
Start of test:	2011-05-16
End of test:	2011-07-08
Person(s) present during the test:	Frank Gruson

3 Test standard/s

Test standard	Version	Test standard description
47 CFR Part 15	2010-12	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS – 210 Issue 8	2010-12	Low Power Licence-exempt Radiocommunication Devices Annex 13, Section A13.1 Vehicle -Mounted Field Disturbance Sensors in the Band 76.0 - 77.0 GHz

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+85 °C during high temperature tests
	T_{min}	-40 °C during low temperature tests
Relative humidity content:		55 %
Air pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	12.0 V DC from power supply
	V_{max}	13.8 V DC
	V_{min}	10.2 V DC

5 Test item

Kind of test item	:	**77 GHz Automotive Radar (adaptive cruise control for vehicles)**
Type identification	:	**ARS3-B**
S/N serial number	:	**FM407568101**
HW hardware status	:	**PV**
SW software status	:	**5.4.1.PSW**
Frequency band [MHz]	:	**76 GHz – 77 GHz**
Type of modulation	:	**FMCW**
Number of channels	:	**1**
Antenna	:	**Spinning grating antenna**
Power supply	:	**12.0 V DC from power supply**
Temperature range	:	**-40 °C to +85 °C**

6 Test laboratories sub-contracted

None

7 Summary of measurement results

☒	**No deviations from the technical specifications were ascertained**
☐	There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	47 CFR Part 15 / RSS – 210 Issue 8, Annex 13	Passed	2011-11-15	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	Pass	Fail	NA	NP	Results (max.)
§15.253 (b) (1)(2)	Power density	Nominal and Extreme	Nominal and Extreme	☒	☐	☐	☐	59.8 mW EIRP
§1.1310	MPE Calculation	Nominal and Extreme	Nominal and Extreme	☒	☐	☐	☐	0.012mW/cm² = 0.12 W/m²
§2.1049	Occupied bandwidth (99% bandwidth 26 dB bandwidth)	Nominal and Extreme	Nominal and Extreme	☒	☐	☐	☐	806.09 MHz
§15.253 (c)(2)(ii) §15.253 (3) / §15.209 (a)	Field strength of emissions (radiated spurious)	Nominal	Nominal	☒	☐	☐	☐	complies
§15.253 (e)	Frequency stability	Nominal	Nominal	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

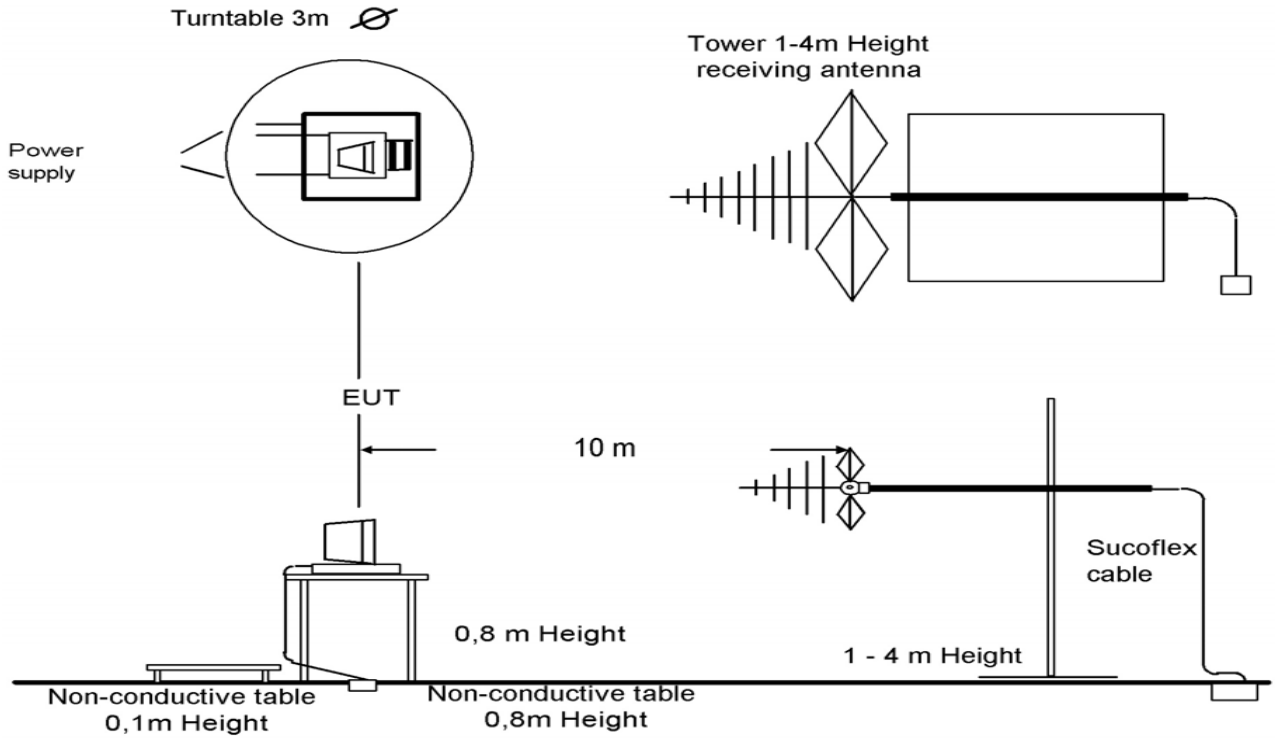
8 RF measurement testing

8.1 Description of test setup

8.1.1 Radiated measurements

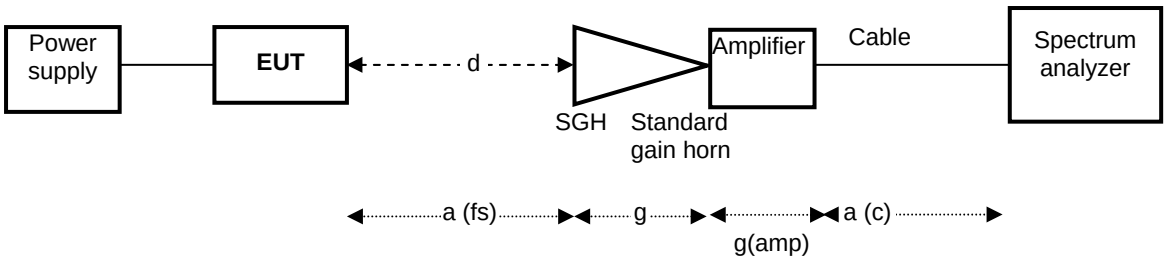
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2009 clause 4.2.
Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



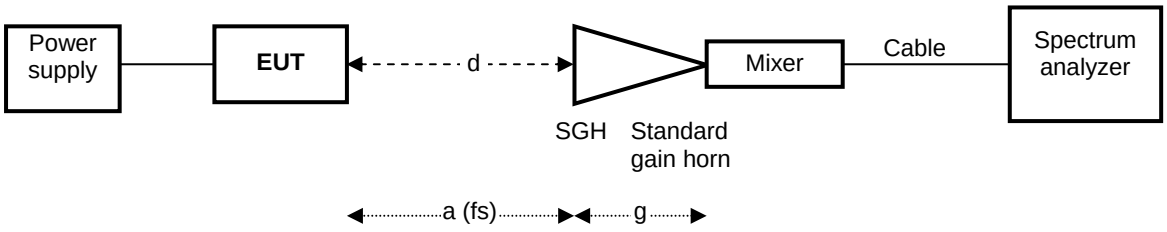
Picture 1: Diagram radiated measurements (Up to 15 GHz)

Test set-up for the measurement of spurious radiation in the frequency range 15 GHz to 50 GHz:



Picture 2: Diagram radiated measurements (15 GHz – 50 GHz)

Test set-up for the measurement of spurious radiation and EIRP in the frequency range 50 GHz to 325 GHz:



Picture 3: Diagram radiated measurements (50 GHz – 325 GHz)

8.1.2 Conducted measurements

Not applicable!

8.1.3 Additional comments

A Mode switch box is used to switch between 10 different operation modes of ARS device:

* Normal mode, bandwidth 200 MHz
* Normal mode, bandwidth 400 MHz
* Normal mode, bandwidth 800 MHz high power
* Normal mode, bandwidth 800 MHz low power
* cw mode, lower frequency high power
* cw mode, lower frequency low power
* cw mode, centre frequency high power
* cw mode, centre frequency low power
* cw mode, upper frequency high power
* cw mode, upper frequency low power

For the requirements being tested in this test report, CW and normal operation modes were used. The radiated spurious emissions were performed on the high power CW modes.

9 Measurement results

9.1 Power density (in motion / not in motion mode)

Results: **normal test conditions**

TEST CONDITIONS (T_{nom} / V_{nom})	TRANSMITTER EIRP		
	EIRP (Average) [dBm/MHz]	bw corr. [dB]	EIRP [dBm]
lower frequency, high power	6.74	5.94 dB @ 3.93 MHz	12.68
lower frequency, low power	-12.31	10.37 dB @ 10.93 MHz	-1.94
centre frequency, high power	12.98	4.79 dB @ 3.01 MHz	17.77
centre frequency, low power	-6.54	10.37 dB @ 10.90 MHz	3.83
upper frequency, high power	8.67	4.77 dB @ 3.00 MHz	13.44
upper frequency, low power	-10.86	10.77 dB @ 11.93 MHz	-0.09

TEST CONDITIONS (T_{nom} / V_{nom})	TRANSMITTER EIRP		
	EIRP (RMS) [dBm/MHz]	bw corr. [dB]*	EIRP [dBm]
normal mode 200 MHz	-2.22	5.94 dB @ 3.93 MHz	3.72
normal mode 400 MHz	-5.50	5.94 dB @ 3.93 MHz	0.44
normal mode 800 MHz high power	-7.20	5.94 dB @ 3.93 MHz	-1.26

*bw corr. [dB] = 10 x log (measured 99%occ.bw** @ test cw-mode / resbw), resbw = 1 MHz
** worst case at high power

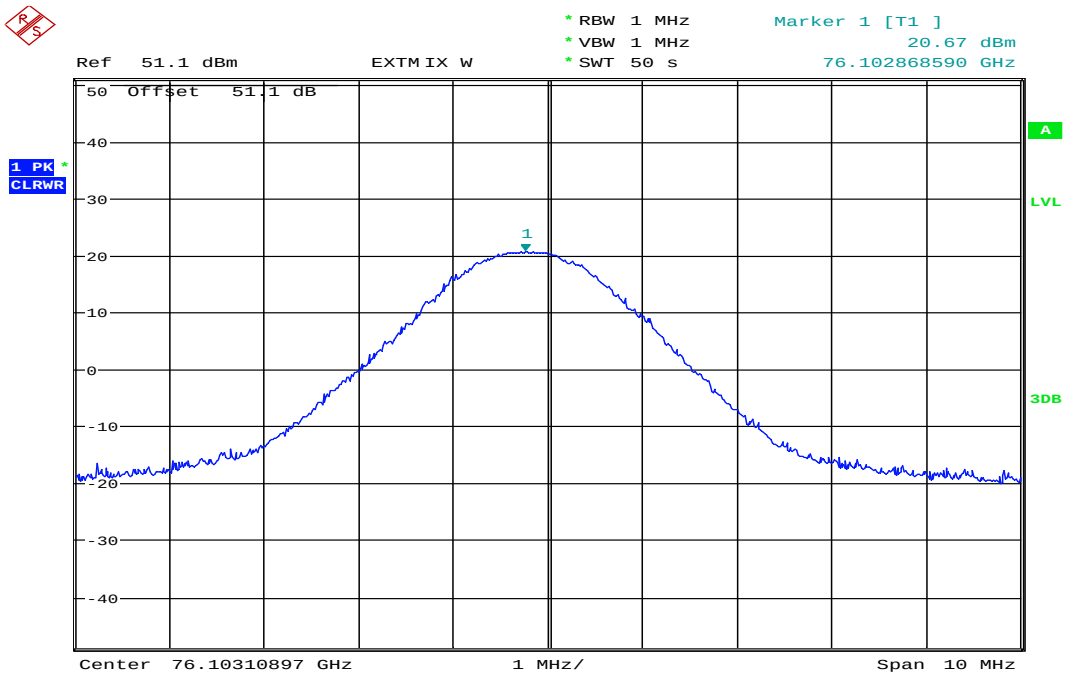
Limits: **FCC §15.253 (b) (1) (2)**

76.0 GHz to 77.0 GHz	Measurement distance	Power Density ➔ EIRP
Vehicle in motion	3.0 m	60 µW/cm^2 → 48.3 dBm
Vehicle not in motion	3.0 m	200 nW/cm^2 → 23.5 dBm

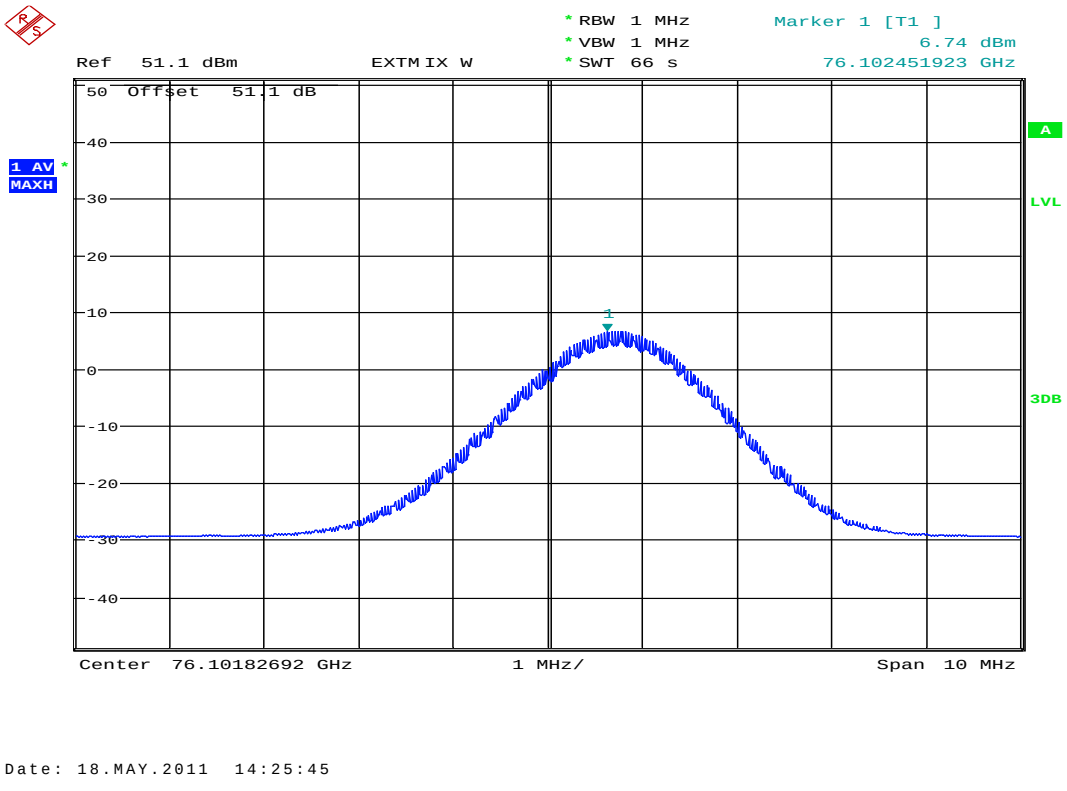
Note:
Both, high power mode and low power mode meet the requirements for "not in motion".

Result: **The measurement is passed.**

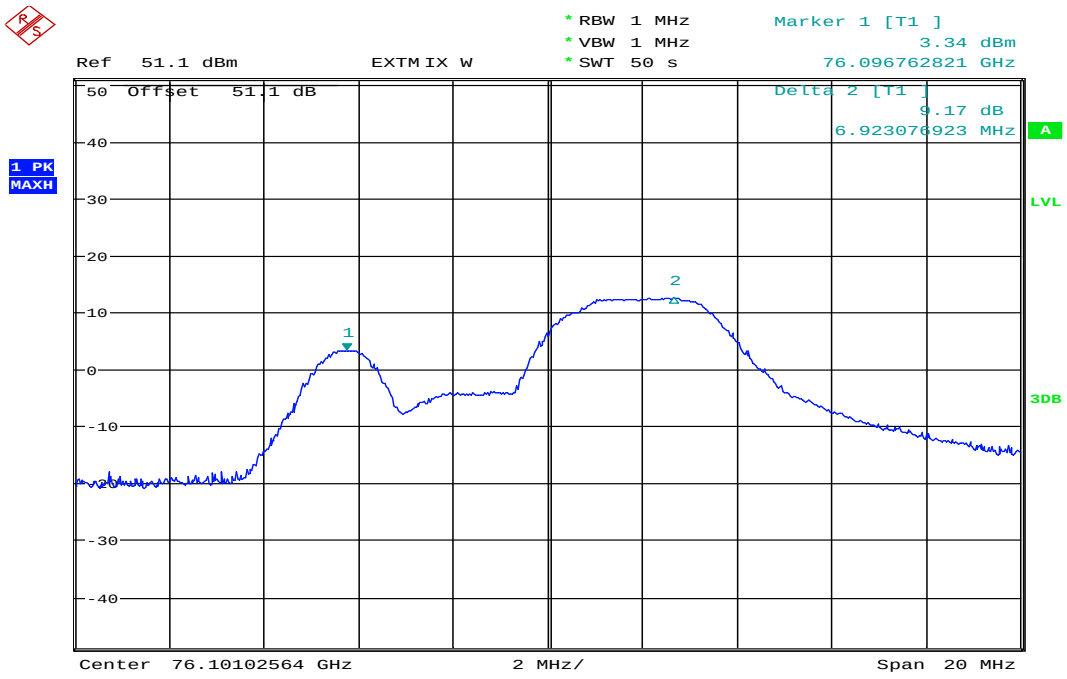
Plot 1: EIRP (Peak detector), T_{nom} / V_{nom}, lower frequency, high power



Plot 2: EIRP (Average detector), T_{nom} / V_{nom}, lower frequency, high power

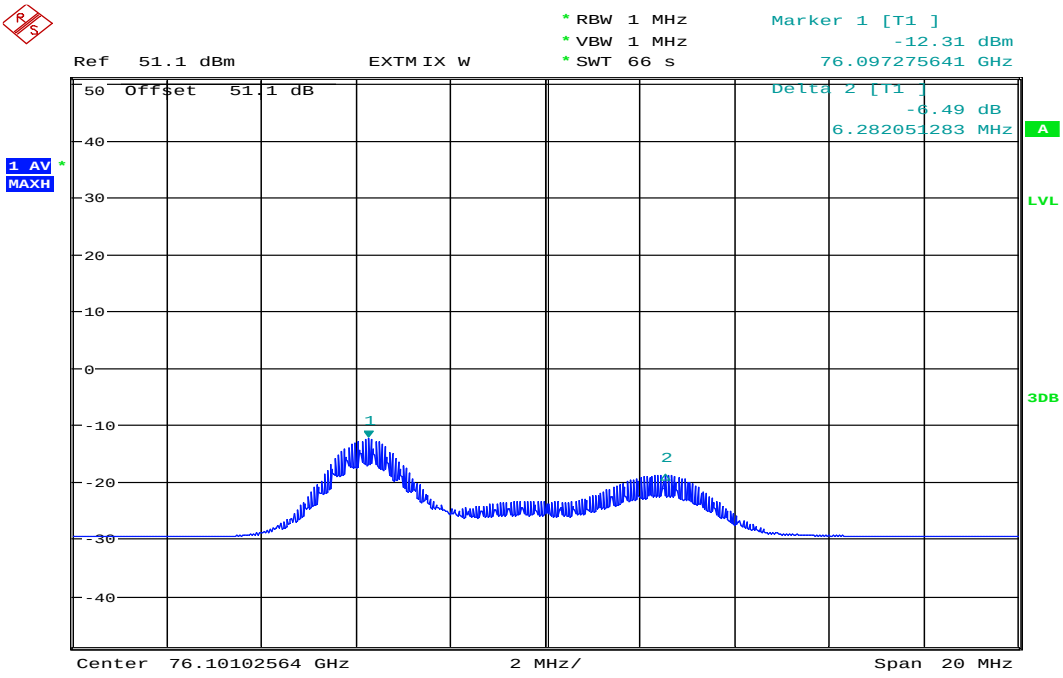


Plot 3: EIRP (Peak detector), T_{nom} / V_{nom}, lower frequency, low power



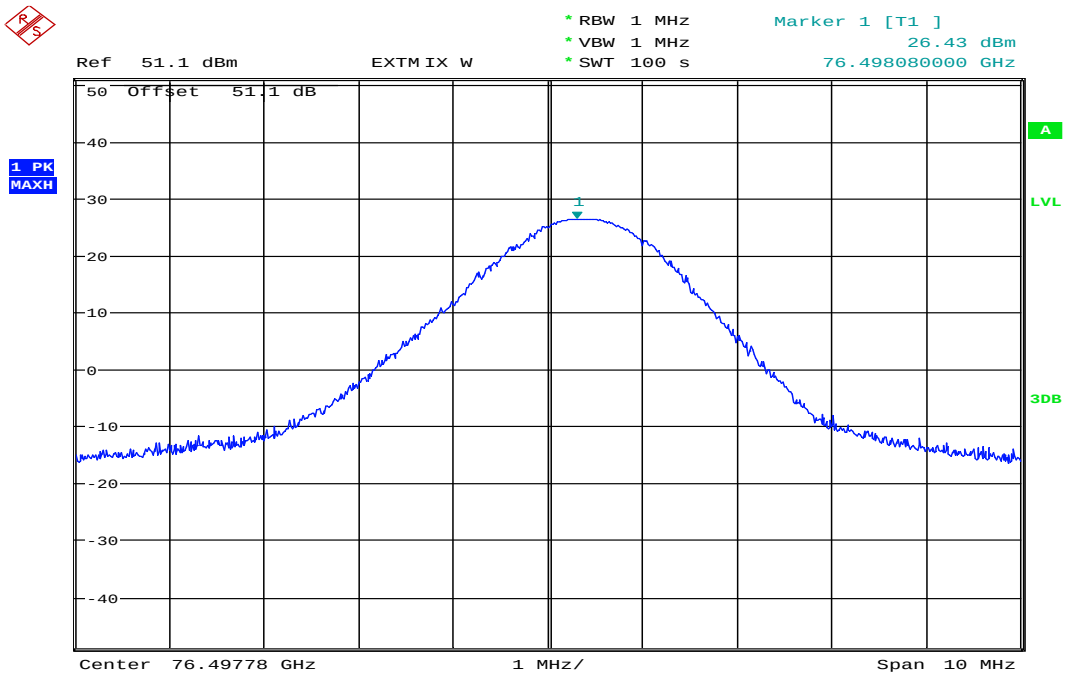
Date: 18.MAY.2011 14:54:01

Plot 4: EIRP (Average detector), T_{nom} / V_{nom}, lower frequency, low power



Date: 18.MAY.2011 14:53:03

Plot 5: EIRP (Peak detector), T_{nom} / V_{nom}, centre frequency, high power



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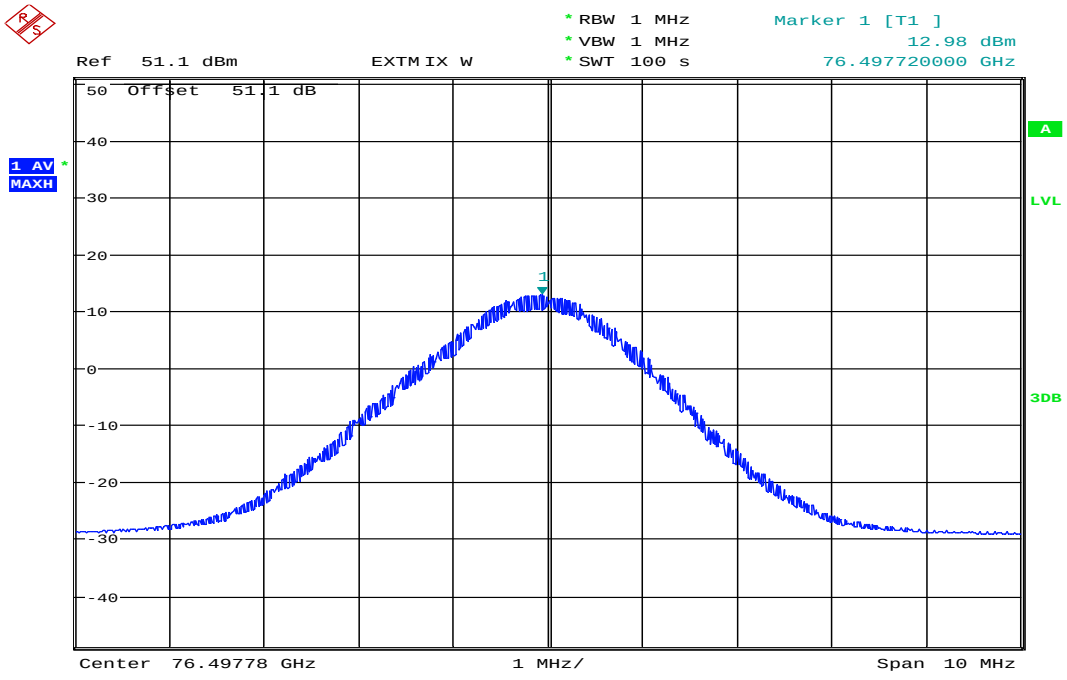
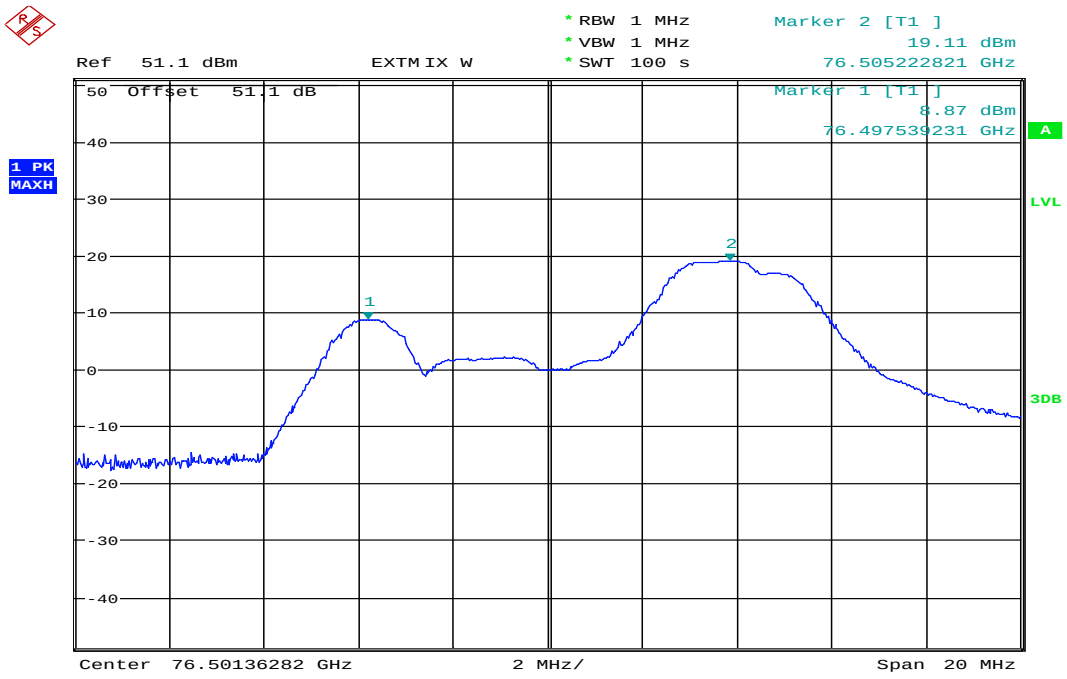
Plot 6: EIRP (Average detector), T_{nom} / V_{nom}, centre frequency, high power



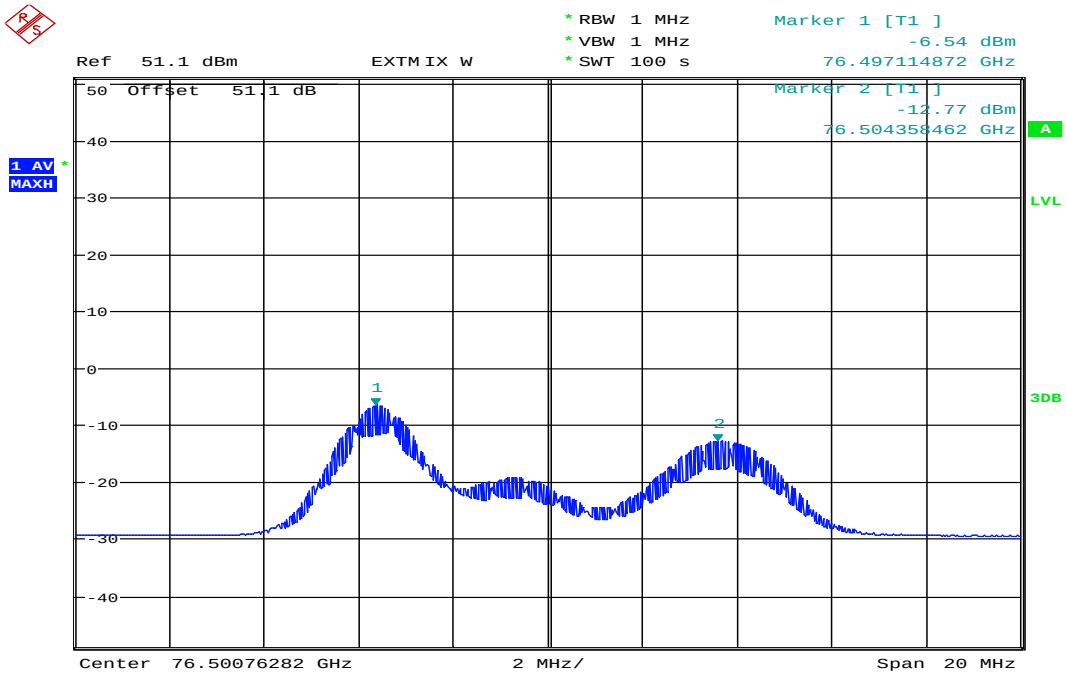
Date: 18.MAY.2011 13:30:13

Plot 7: EIRP (Peak detector), T_{nom} / V_{nom}, centre frequency, low power



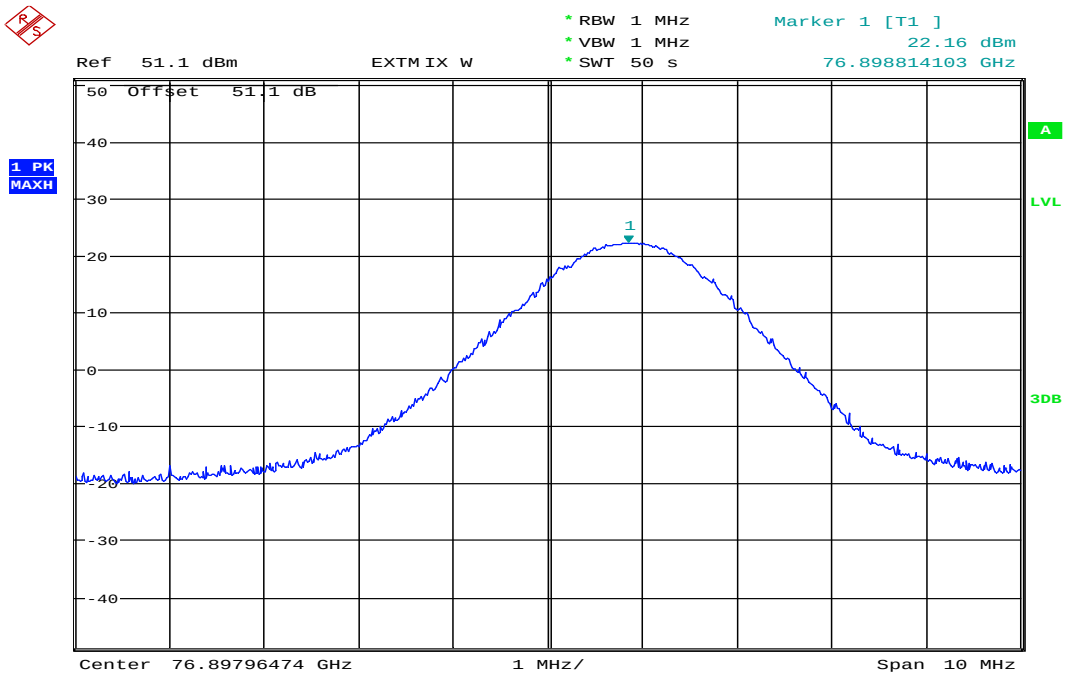
Date: 18.MAY.2011 14:03:47

Plot 8: EIRP (Average detector), T_{nom} / V_{nom}, centre frequency, low power



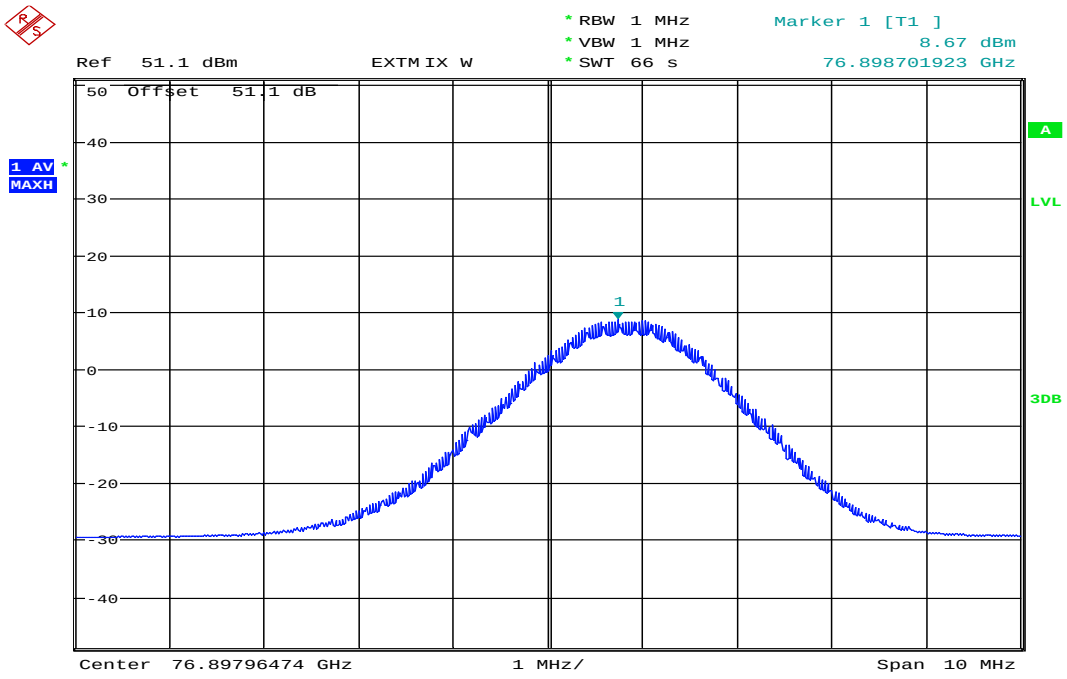
Date: 18.MAY.2011 13:52:22

Plot 9: EIRP (Peak detector), T_{nom} / V_{nom}, upper frequency, high power



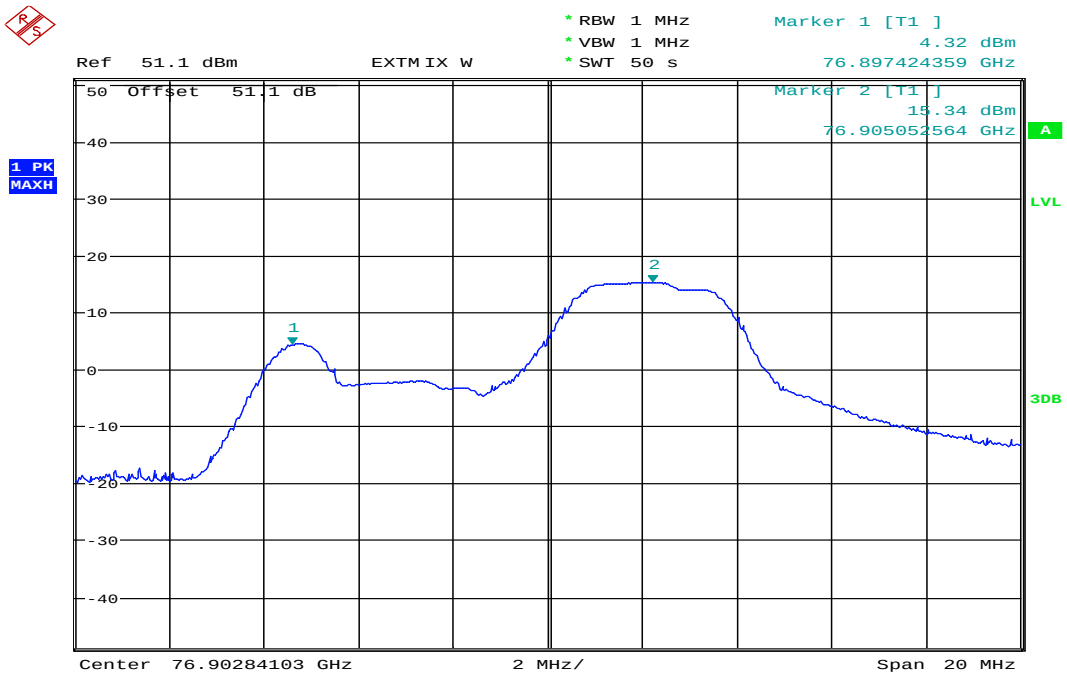
Date: 18.MAY.2011 15:09:52

Plot 10: EIRP (Average detector), T_{nom} / V_{nom}, upper frequency, high power



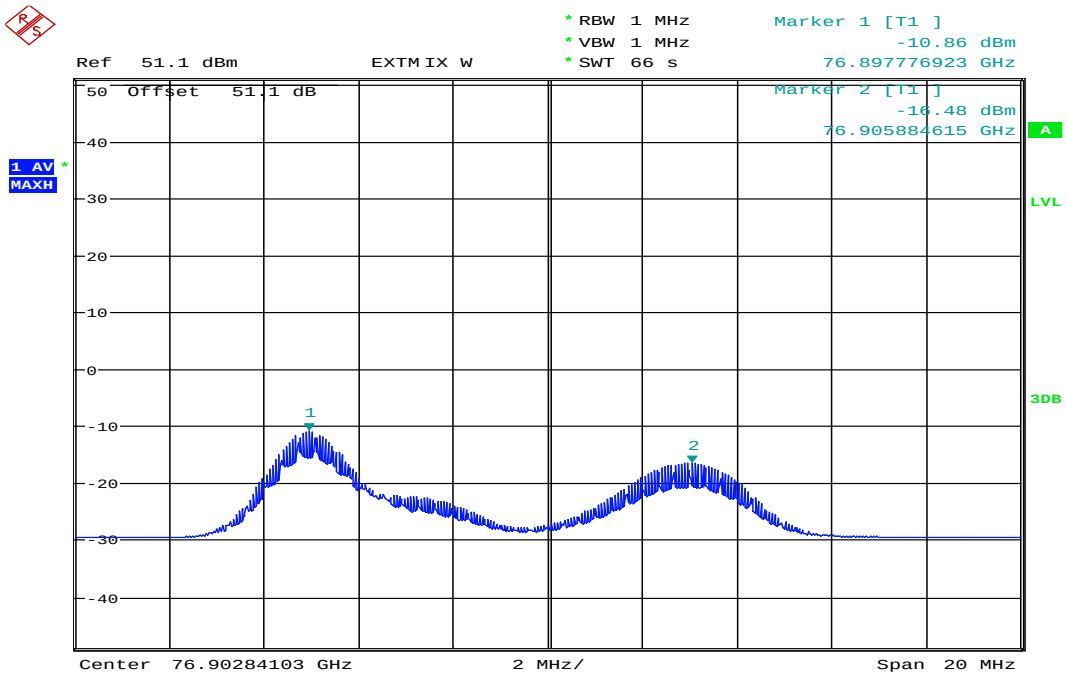
Date: 18.MAY.2011 15:08:44

Plot 11: EIRP (Peak detector), T_{nom} / V_{nom}, upper frequency, low power



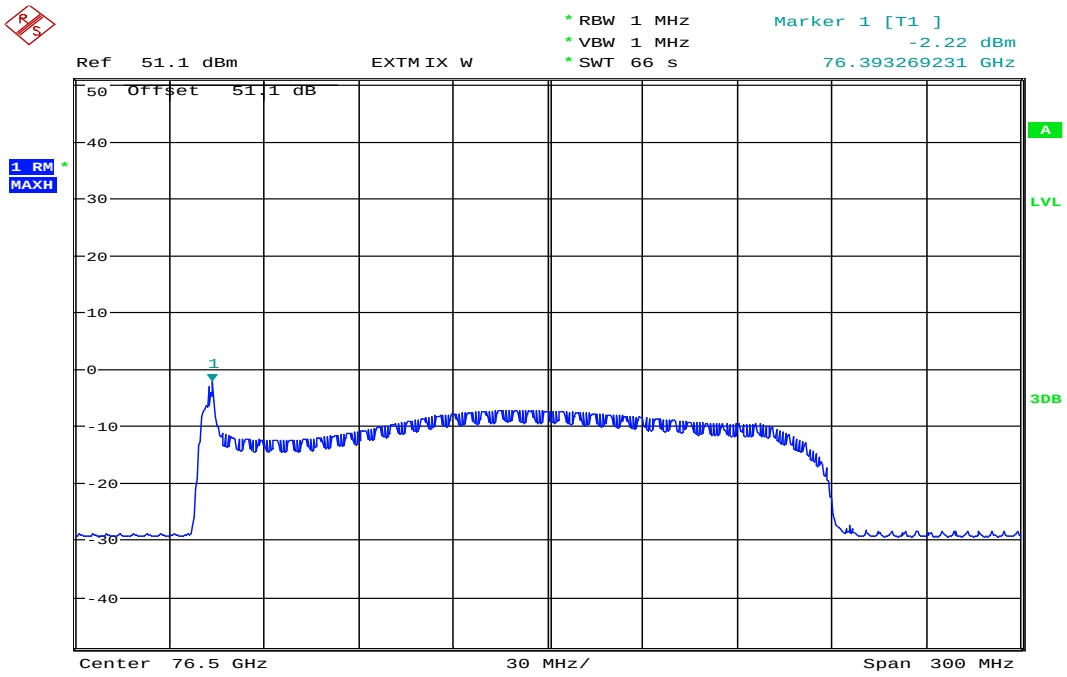
Date: 18.MAY.2011 15:20:10

Plot 12: EIRP (Average detector), T_{nom} / V_{nom}, upper frequency, low power



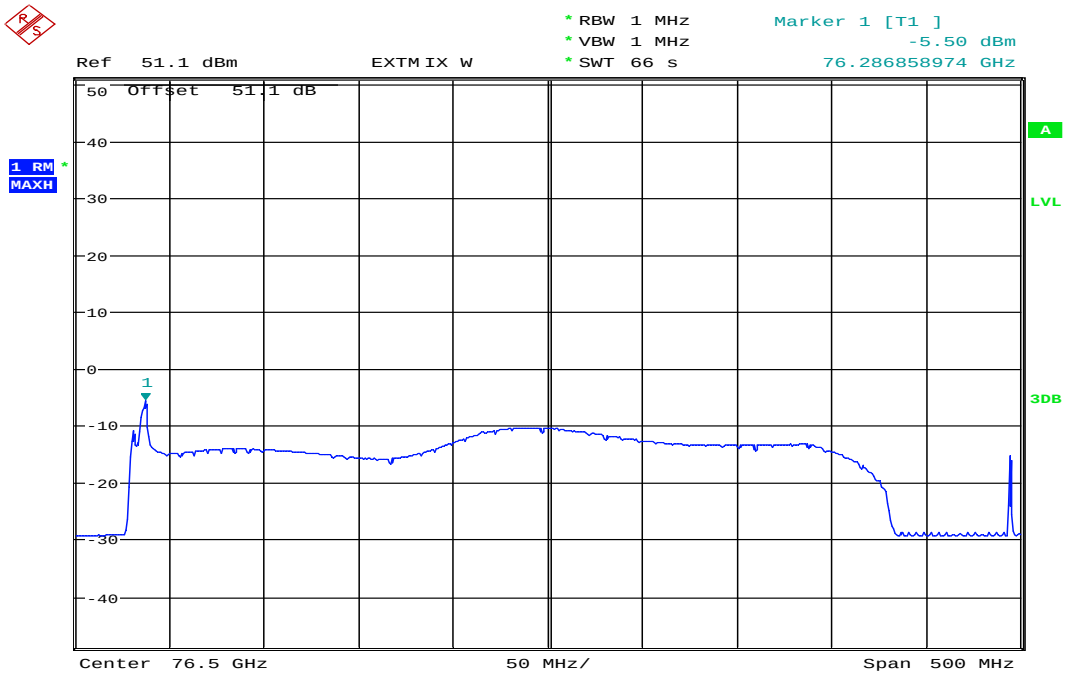
Date: 18.MAY.2011 15:19:01

Plot 13: Normal mode, bandwidth 200 MHz, RMS detector, T_{nom} / V_{nom}



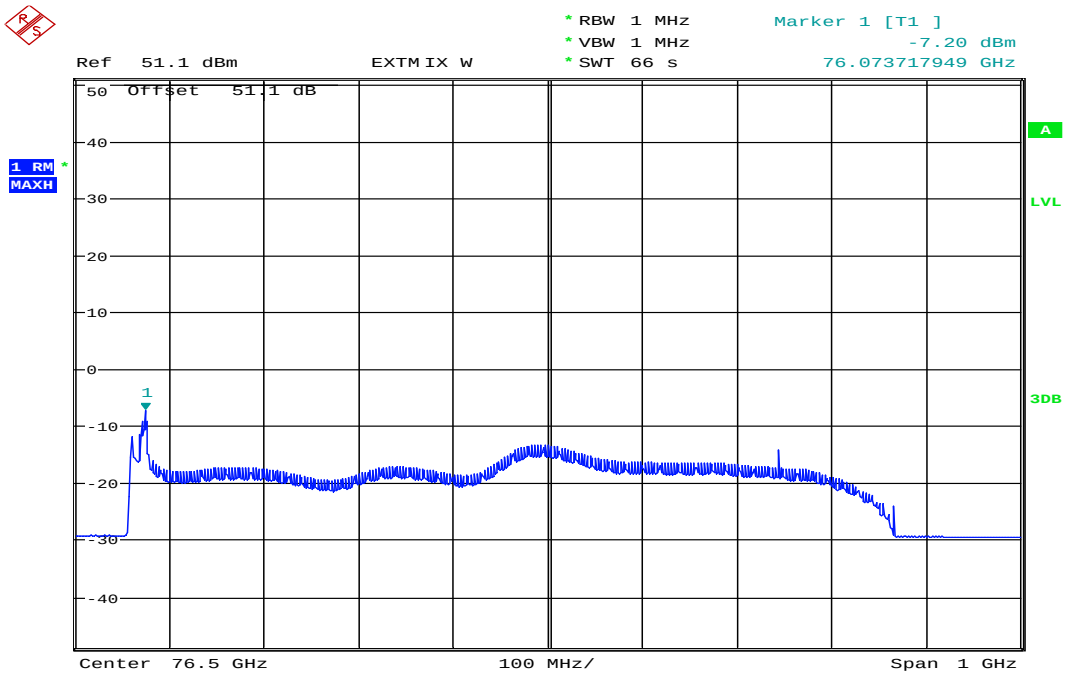
Date: 18.MAY.2011 15:49:45

Plot 14: Normal mode, bandwidth 400 MHz, RMS detector, T_{nom} / V_{nom}



Date: 18.MAY.2011 16:16:05

Plot 15: Normal mode, bandwidth 800 MHz, RMS detector, T_{nom} / V_{nom}



Results: **extreme test conditions (+85°C)**

TEST CONDITIONS (T_{max} / V_{min} – V_{max})	TRANSMITTER EIRP		
	EIRP (Average) [dBm/MHz]	bw corr. [dB]	EIRP [dBm]
lower frequency, high power	-1.21	5.06 dB @ 3.21 MHz	3.85
lower frequency, low power	-18.30	14.26 dB @ 26.67 MHz	-4.04
centre frequency, high power	5.41	4.83 dB @ 3.04 MHz	10.24
centre frequency, low power	-12.27	14.31 dB @ 26.99 MHz	2.04
upper frequency, high power	5.81	4.93 dB @ 3.11 MHz	10.74
upper frequency, low power	-11.55	14.45 dB @ 27.88 MHz	2.90

TEST CONDITIONS (T_{max} / V_{min} – V_{max})	TRANSMITTER EIRP		
	EIRP (RMS) [dBm/MHz]	bw corr. [dB]*	EIRP [dBm]
normal mode 200 MHz	-3.23	5.06 dB @ 3.21 MHz	1.83
normal mode 400 MHz	-12.53	5.06 dB @ 3.21 MHz	-7.47
normal mode 800 MHz high power	-10.54	5.06 dB @ 3.21 MHz	-5.48

*bw corr. [dB] = 10 x log (measured 99%occ.bw** @ test cw-mode / resbw), resbw = 1 MHz
** worst case at high power

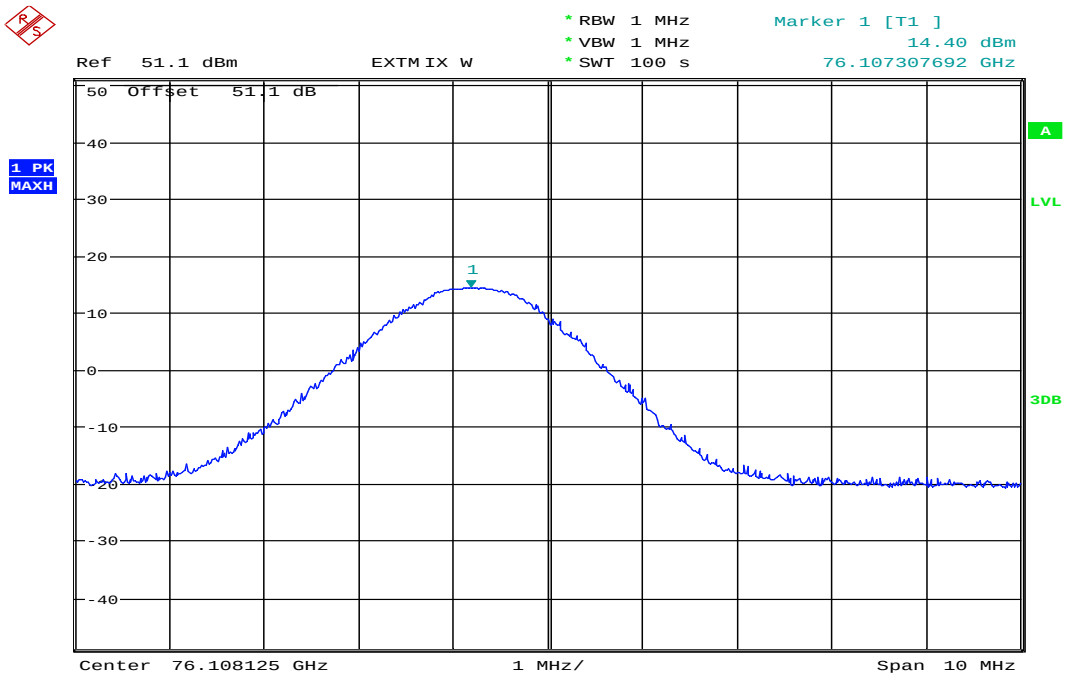
Limits: **FCC §15.253 (b) (1) (2)**

76.0 GHz to 77.0 GHz	Measurement distance	Power Density → EIRP
Vehicle in motion	3.0 m	60 µW/cm^2 → 48.3 dBm
Vehicle not in motion	3.0 m	200 nW/cm^2 → 23.5 dBm

Note:
Both, high power mode and low power mode meet the requirements for "not in motion".

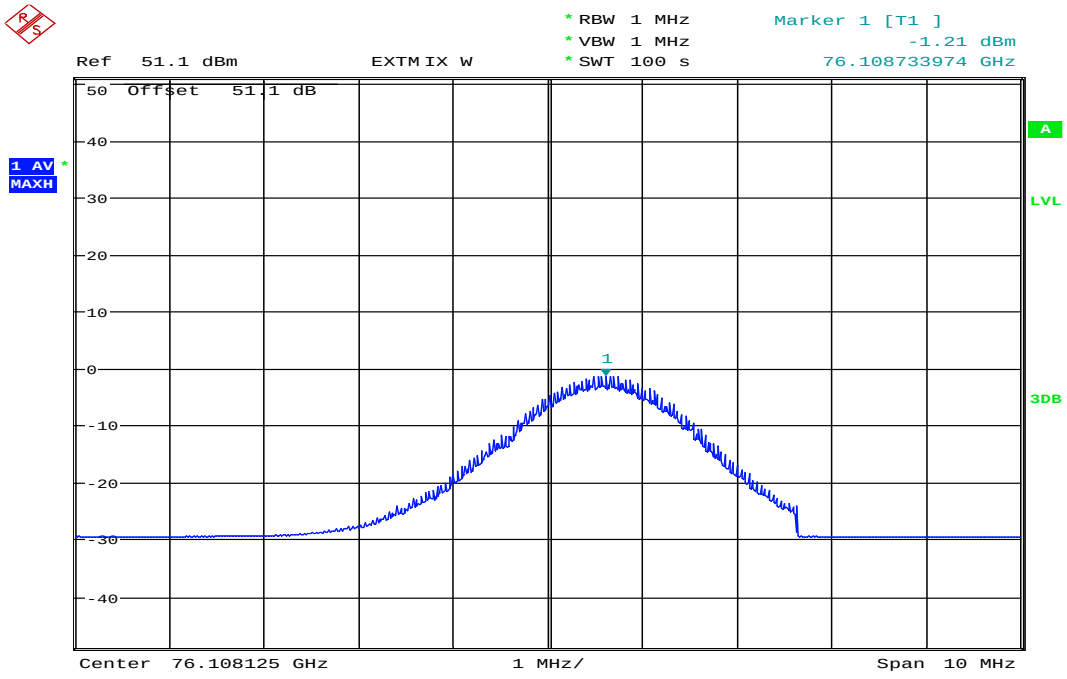
Result: **The measurement is passed.**

Plot 16: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, lower frequency, high power



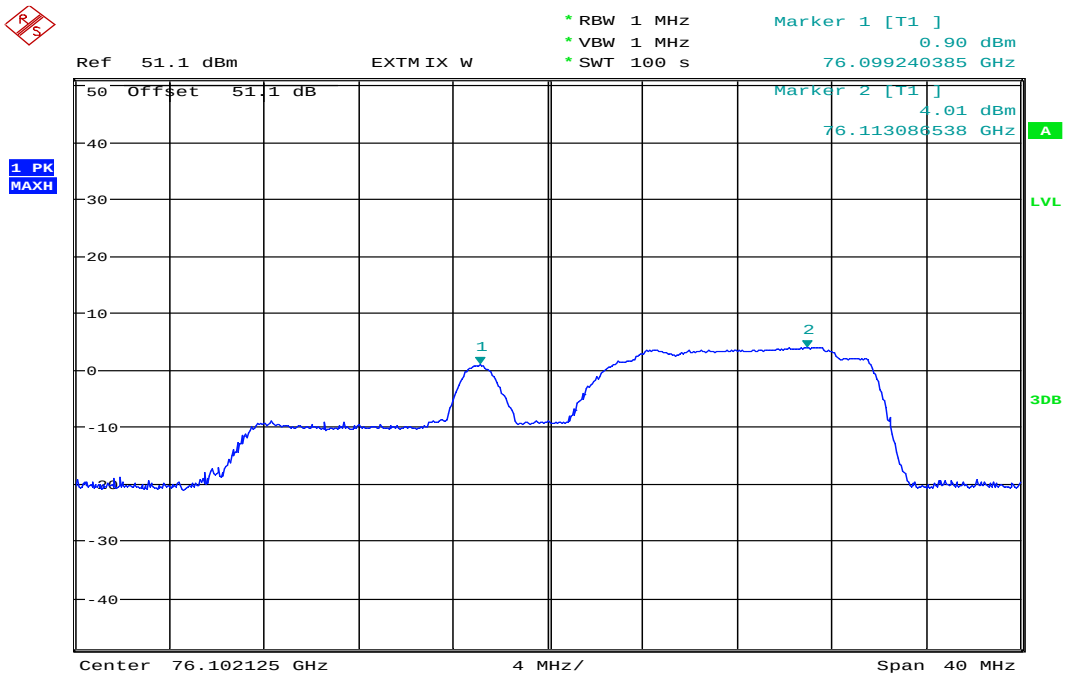
Date: 4.JUL.2011 16:52:48

Plot 17: EIRP (Average detector), T_{max} / V_{min} – V_{max}, lower frequency, high power



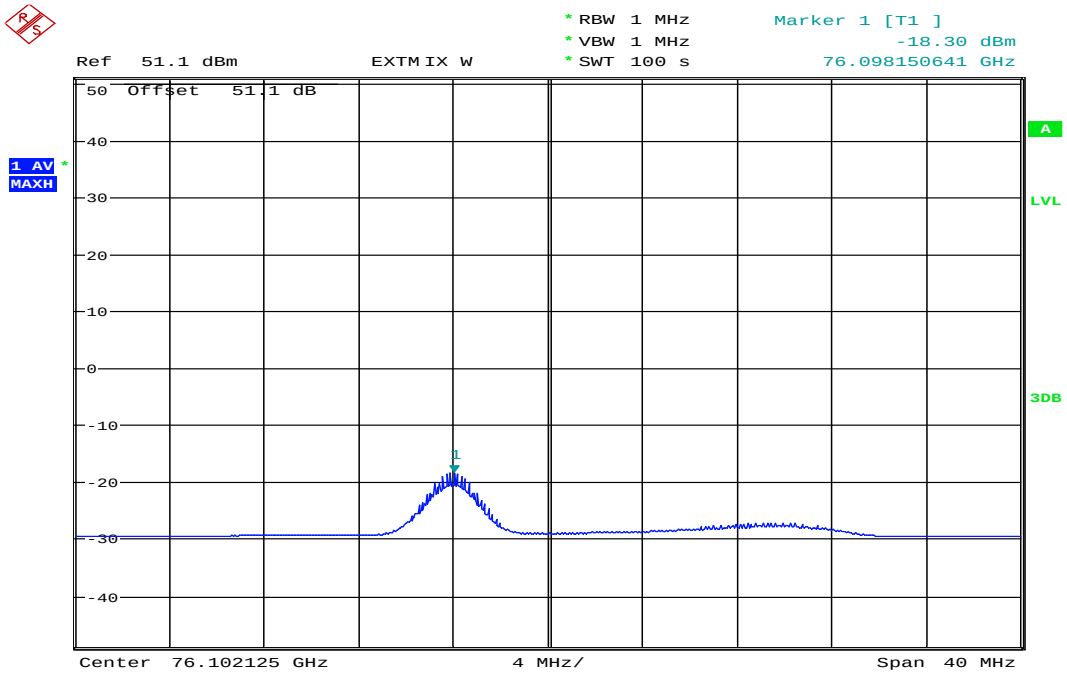
Date: 4.JUL.2011 16:50:09

Plot 18: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, lower frequency, low power



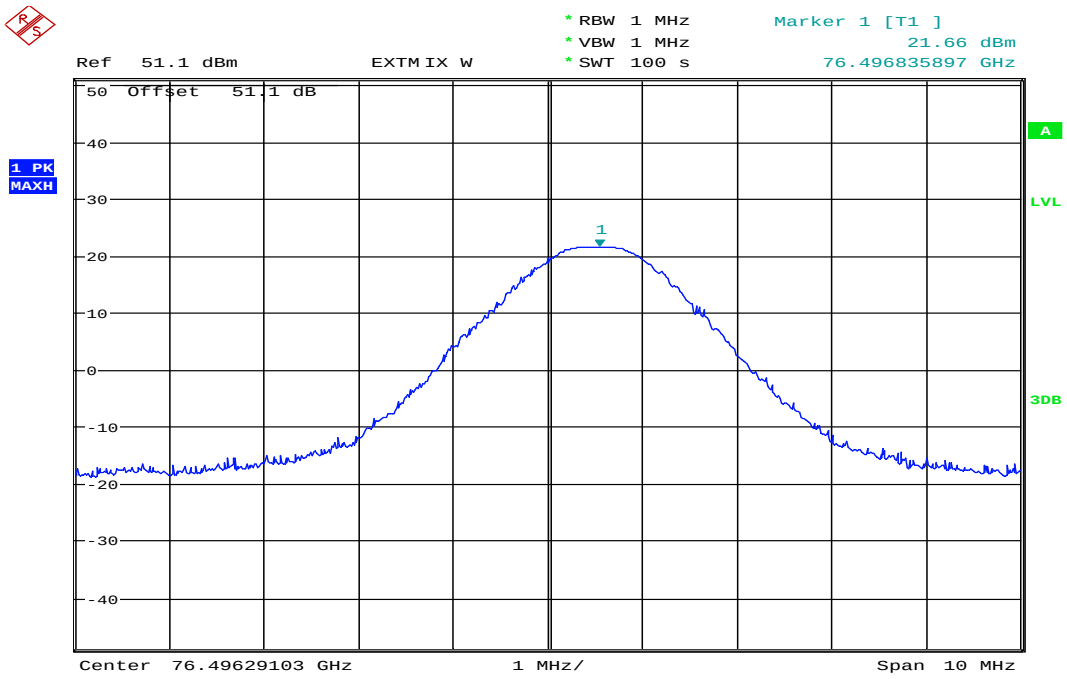
Date: 4.JUL.2011 17:02:31

Plot 19: EIRP (Average detector), T_{max} / V_{min} – V_{max}, lower frequency, low power

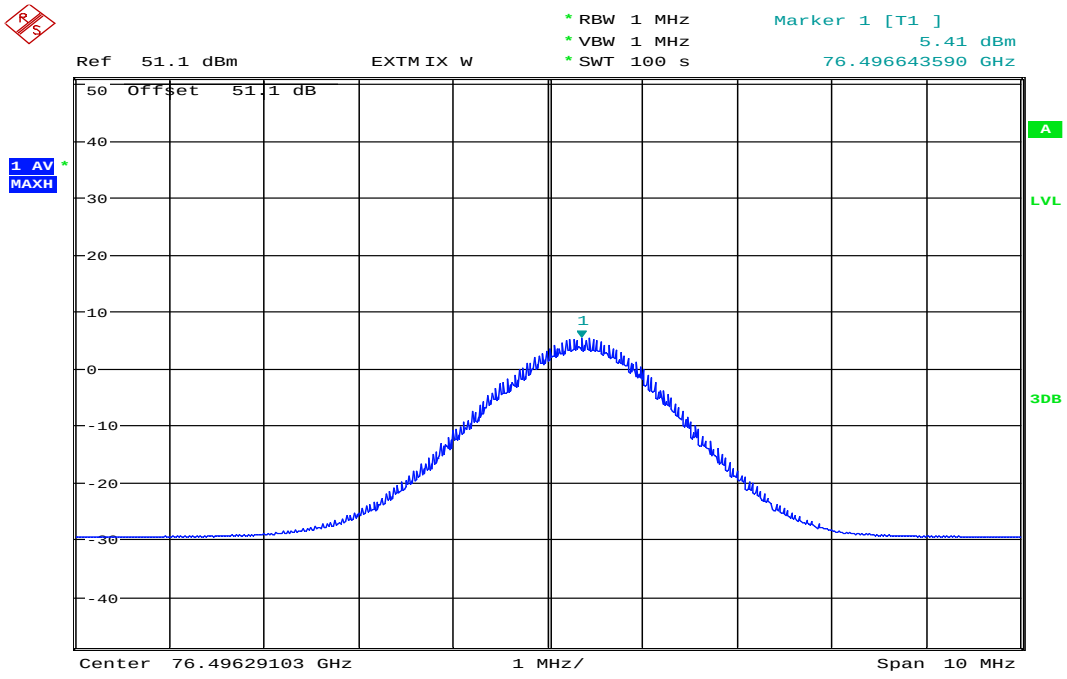


Date: 4.JUL.2011 17:00:40

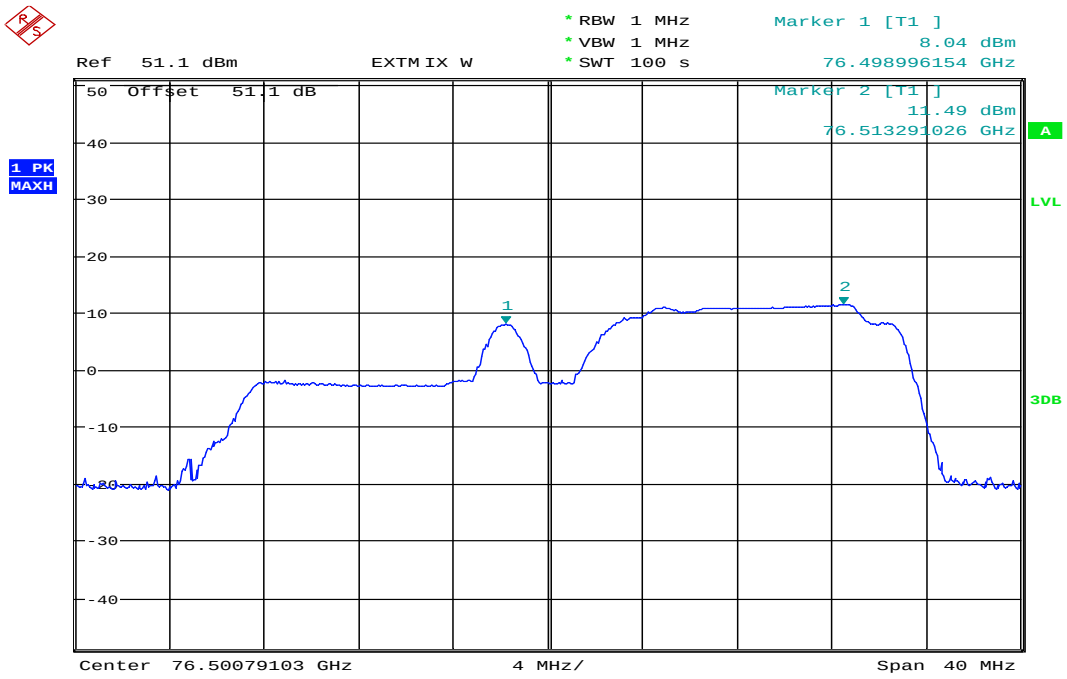
Plot 20: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, centre frequency, high power



Plot 21: EIRP (Average detector), T_{max} / V_{min} – V_{max}, centre frequency, high power

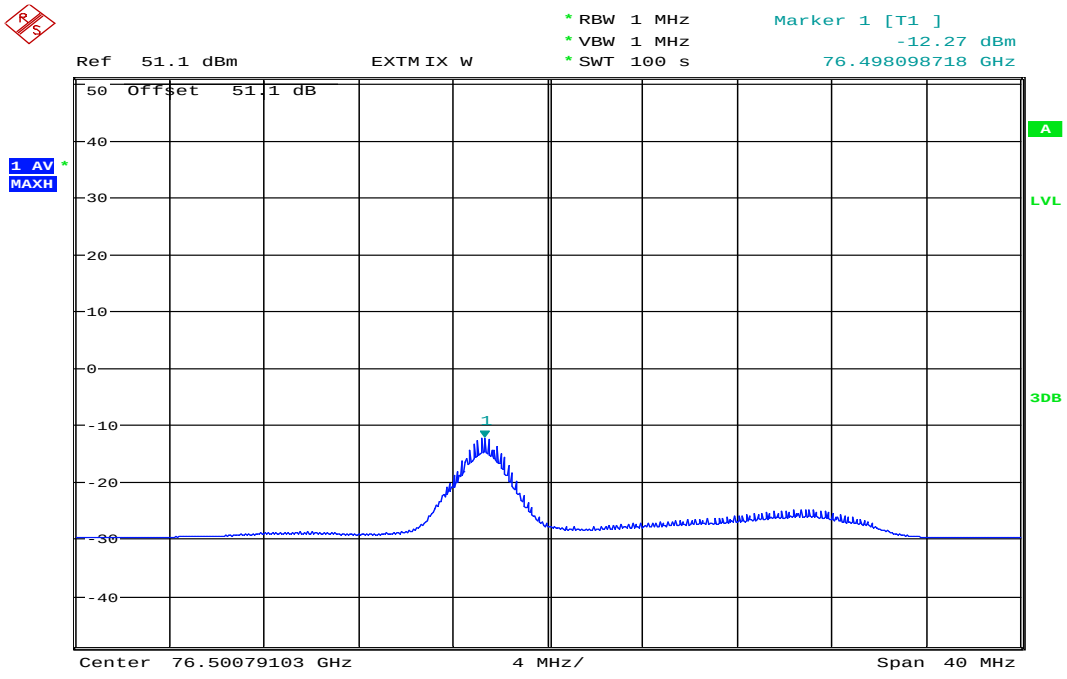


Plot 22: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, centre frequency, low power



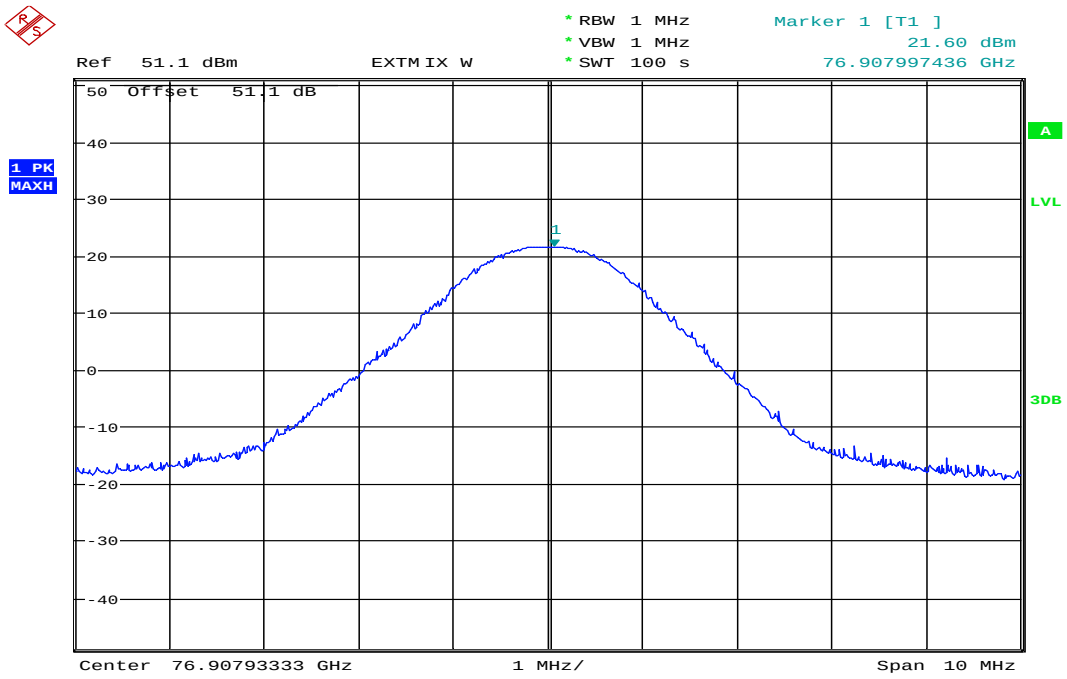
Date: 4.JUL.2011 16:40:34

Plot 23: EIRP (Average detector), T_{max} / V_{min} – V_{max}, centre frequency, low power



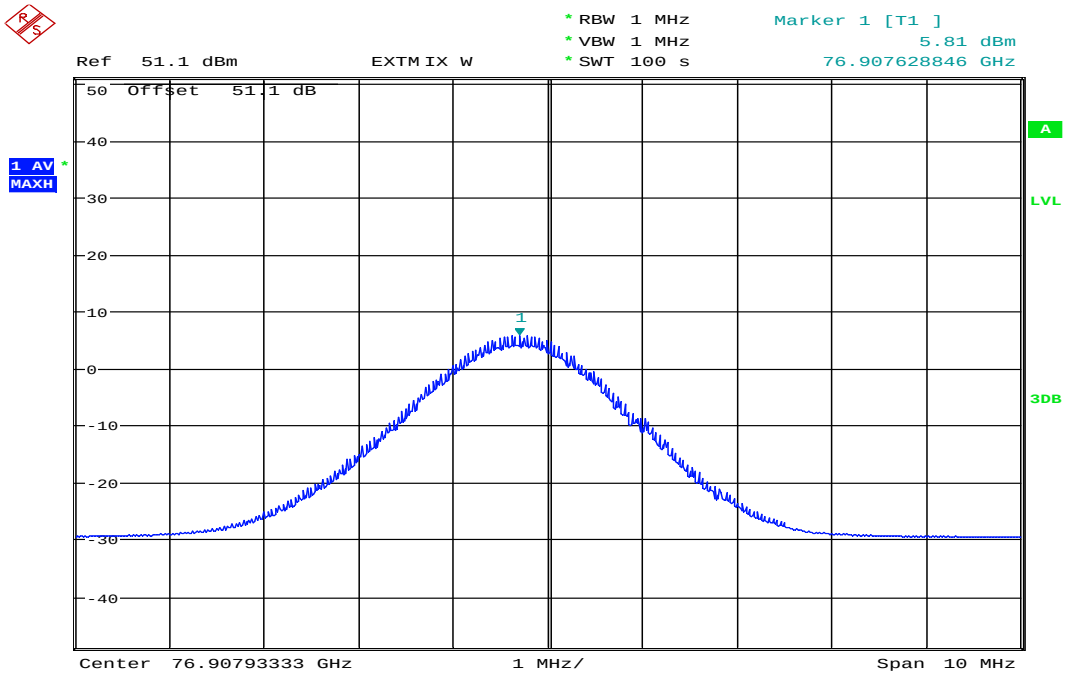
Date: 4.JUL.2011 16:38:34

Plot 24: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, upper frequency, high power



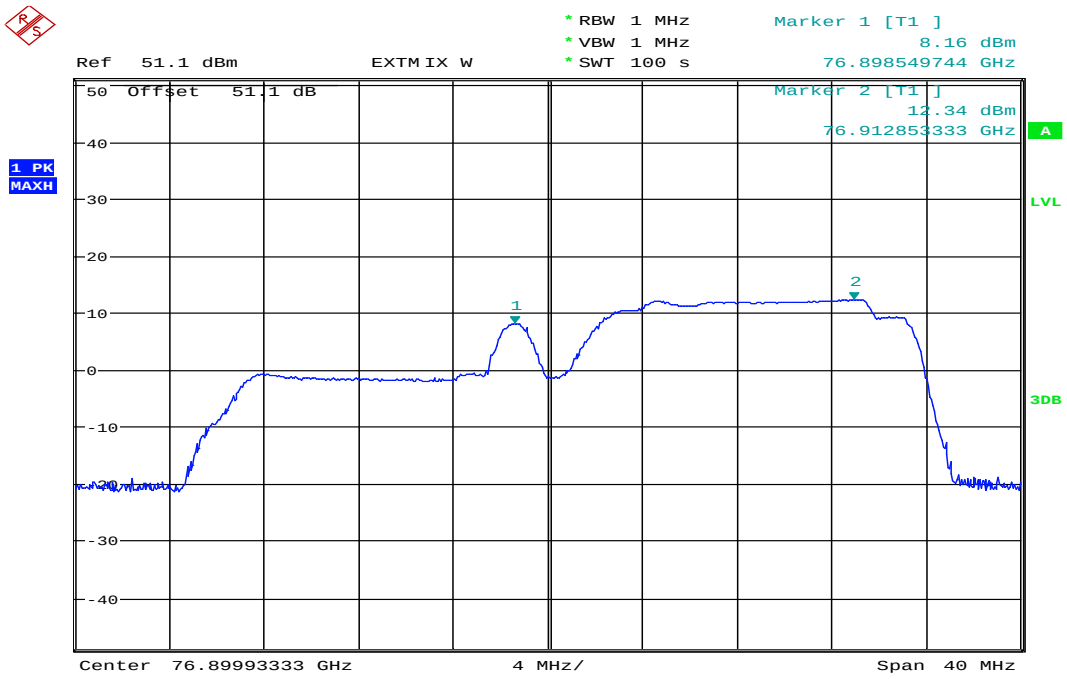
Date: 4.JUL.2011 17:17:48

Plot 25: EIRP (Average detector), T_{max} / V_{min} – V_{max}, upper frequency, high power



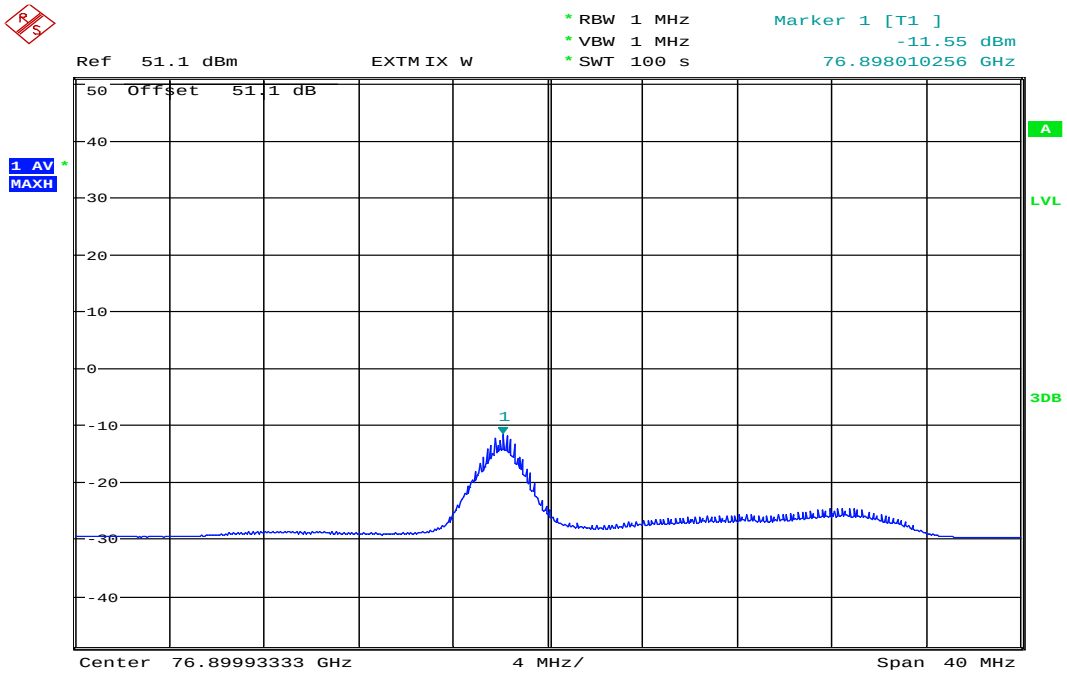
Date: 4.JUL.2011 17:15:40

Plot 26: EIRP (Peak detector), T_{max} / V_{min} – V_{max}, upper frequency, low power



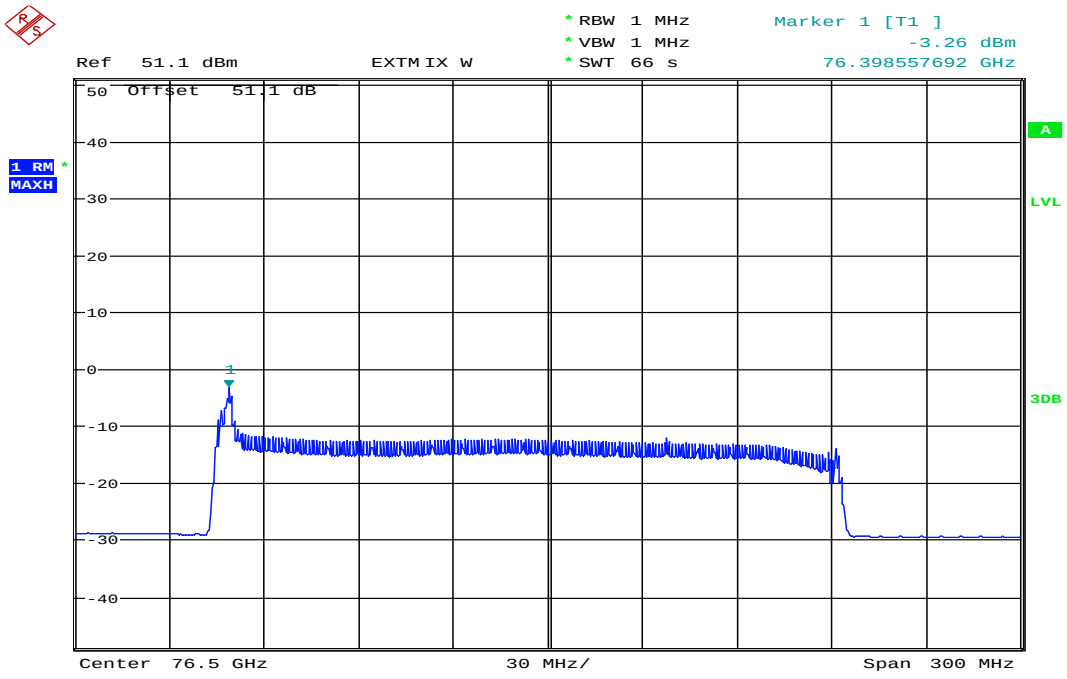
Date: 4.JUL.2011 17:27:43

Plot 27: EIRP (Average detector), T_{max} / V_{min} – V_{max}, upper frequency, low power



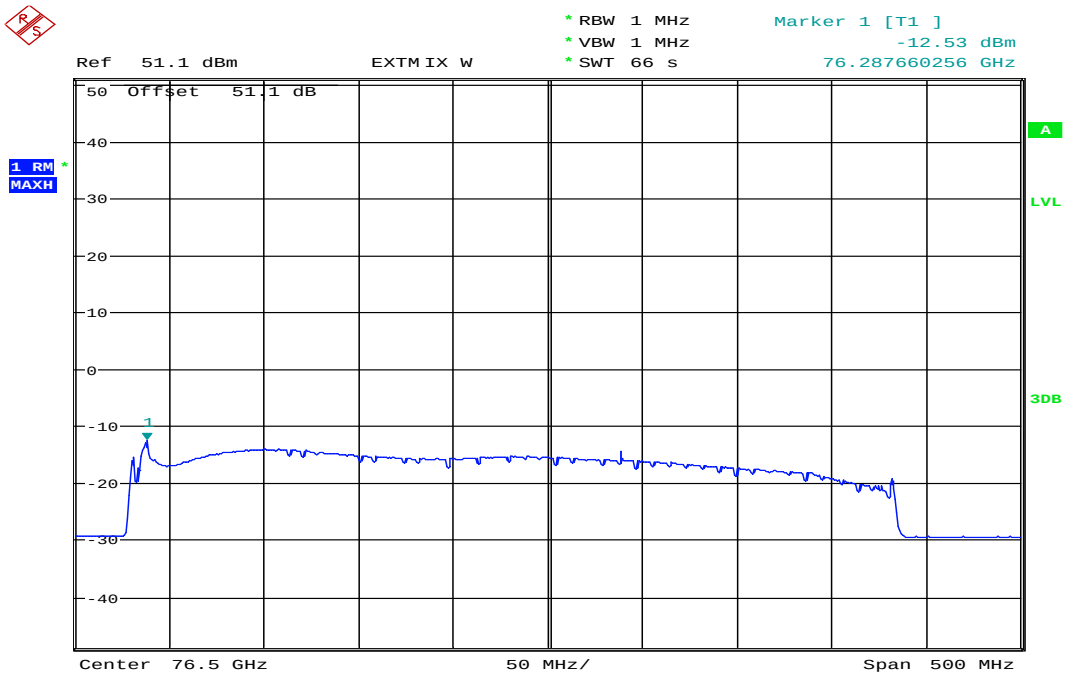
Date: 4.JUL.2011 17:22:39

Plot 28: Normal mode, bandwidth 200 MHz, RMS detector, T_{max} / V_{min} - V_{max}



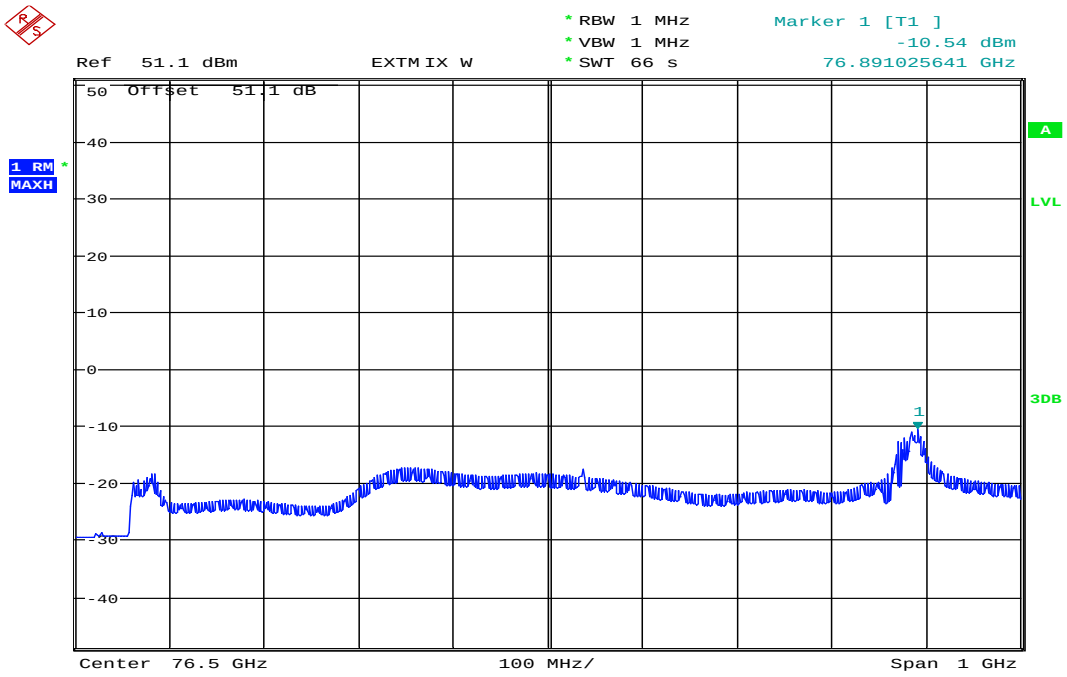
Date: 4.JUL.2011 17:40:33

Plot 29: Normal mode, bandwidth 400 MHz, RMS detector, T_{max} / V_{min} - V_{max}



Date: 4.JUL.2011 17:56:02

Plot 30: Normal mode, bandwidth 800 MHz, RMS detector, T_{max} / V_{min} - V_{max}



Date: 5.JUL.2011 09:05:14

Results: **extreme test conditions (-40 °C)**

TEST CONDITIONS (T_{min} / V_{min} – V_{max})	TRANSMITTER EIRP		
	EIRP (Average) [dBm/MHz]	bw corr. [dB]*	EIRP [dBm]
lower frequency, high power	2.13	5.12 dB @ 3.25 MHz	7.25
lower frequency, low power	-26.48	11.17 dB @ 13.08 MHz	-15.31
centre frequency, high power	8.49	5.00 dB @ 3.16 MHz	13.49
centre frequency, low power	-22.92	10.73 dB @ 11.83 MHz	-12.19
upper frequency, high power	8.89	5.04 dB @ 3.19 MHz	13.93
upper frequency, low power	-21.64	10.62 dB @ 11.54 MHz	-11.02

TEST CONDITIONS (T_{min} / V_{min} – V_{max})	TRANSMITTER EIRP, normal modes		
	EIRP (RMS) [dBm/MHz]	bw corr. [dB]*	EIRP [dBm]
normal mode 200 MHz	-1.37	5.12 dB @ 3.25 MHz	3.75
normal mode 400 MHz	-7.61	5.12 dB @ 3.25 MHz	-2.49
normal mode 800 MHz high power	-14.84	5.12 dB @ 3.25 MHz	-9.72

*bw corr. [dB] = 10 x log (measured 99%occ.bw** @ test cw-mode / resbw), resbw = 1 MHz
** worst case at high power

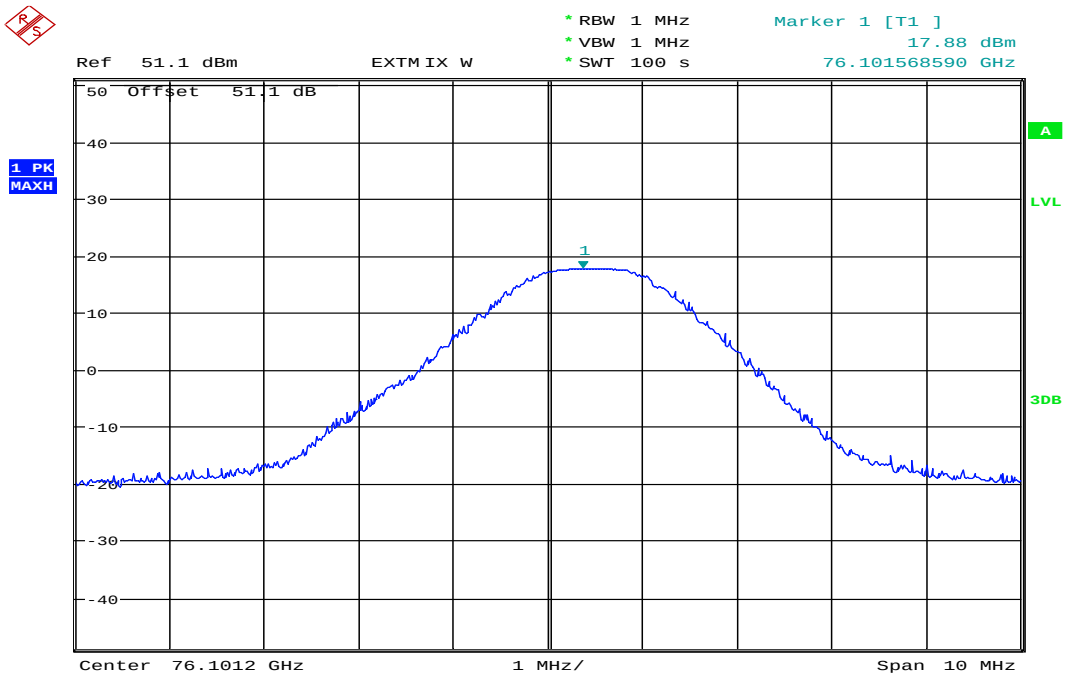
Limits: **FCC §15.253 (b) (1) (2)**

76.0 GHz to 77.0 GHz	Measurement distance	Power Density → EIRP
Vehicle in motion	3.0 m	60 µW/cm^2 → 48.3 dBm
Vehicle not in motion	3.0 m	200 nW/cm^2 → 23.5 dBm

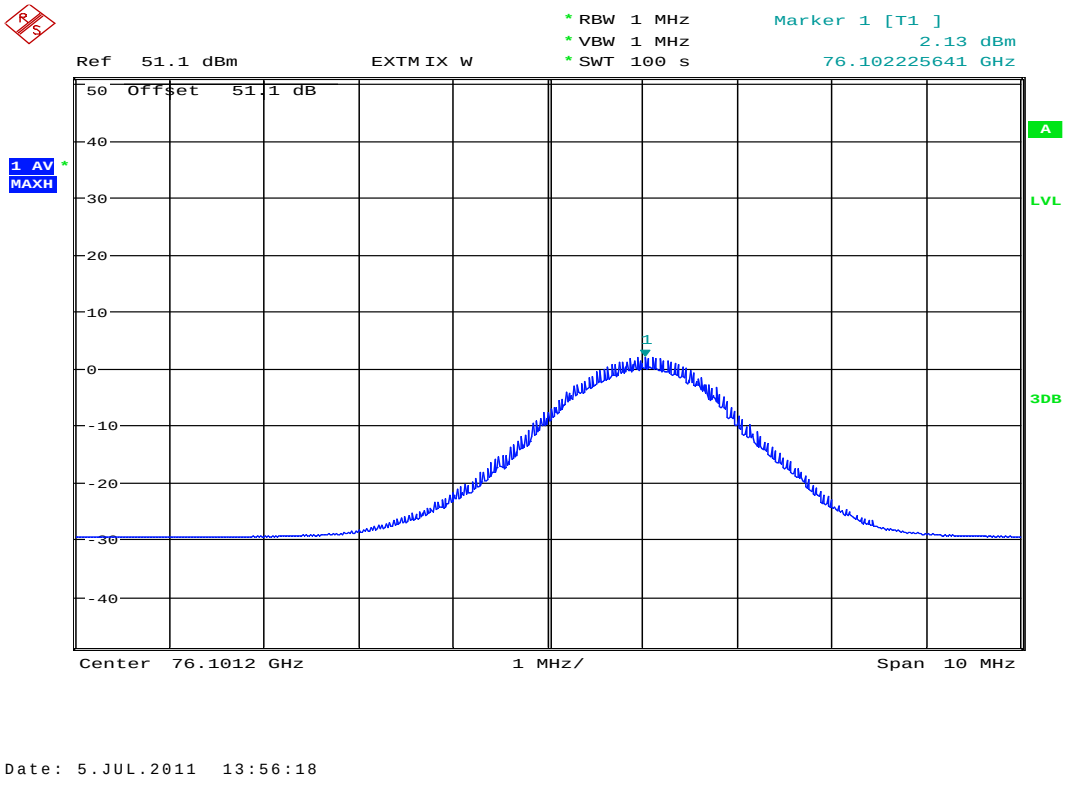
Note:
Both, high power mode and low power mode meet the requirements for "not in motion".

Result: **The measurement is passed.**

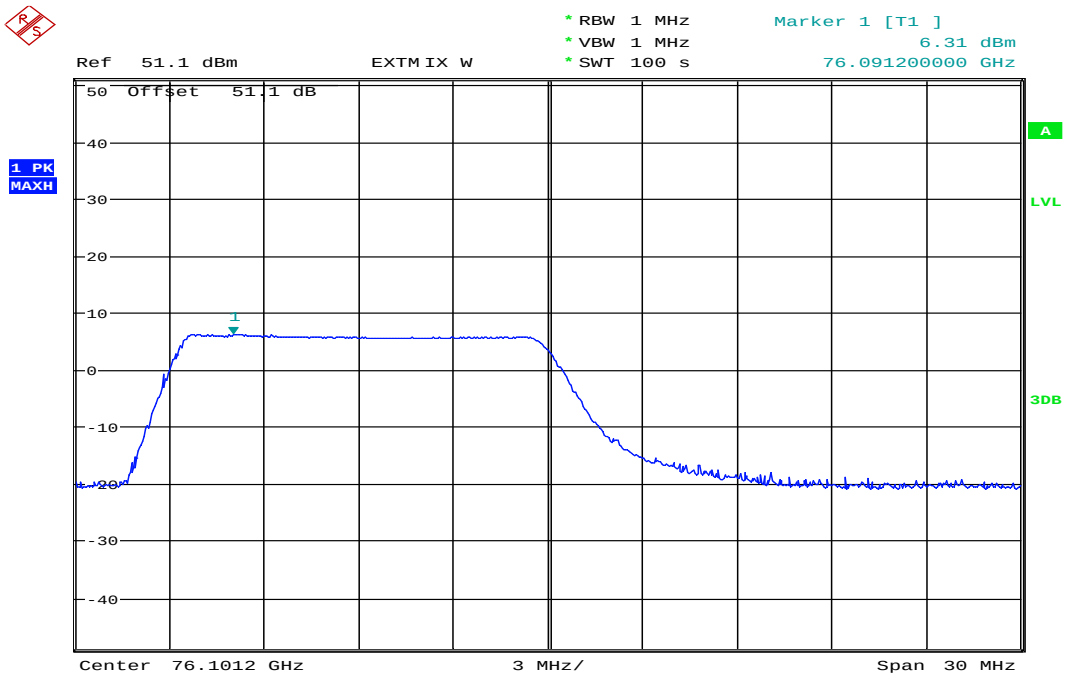
Plot 31: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, lower frequency, high power



Plot 32: EIRP (Average detector), T_{min} / V_{min} – V_{max}, lower frequency, high power

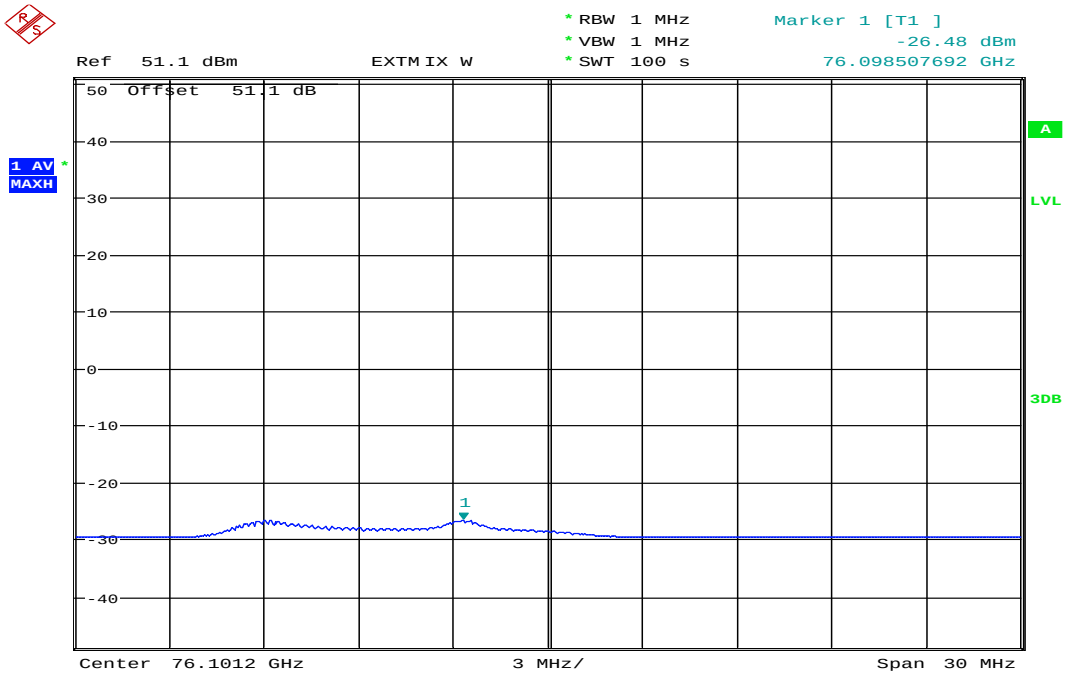


Plot 33: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, lower frequency, low power



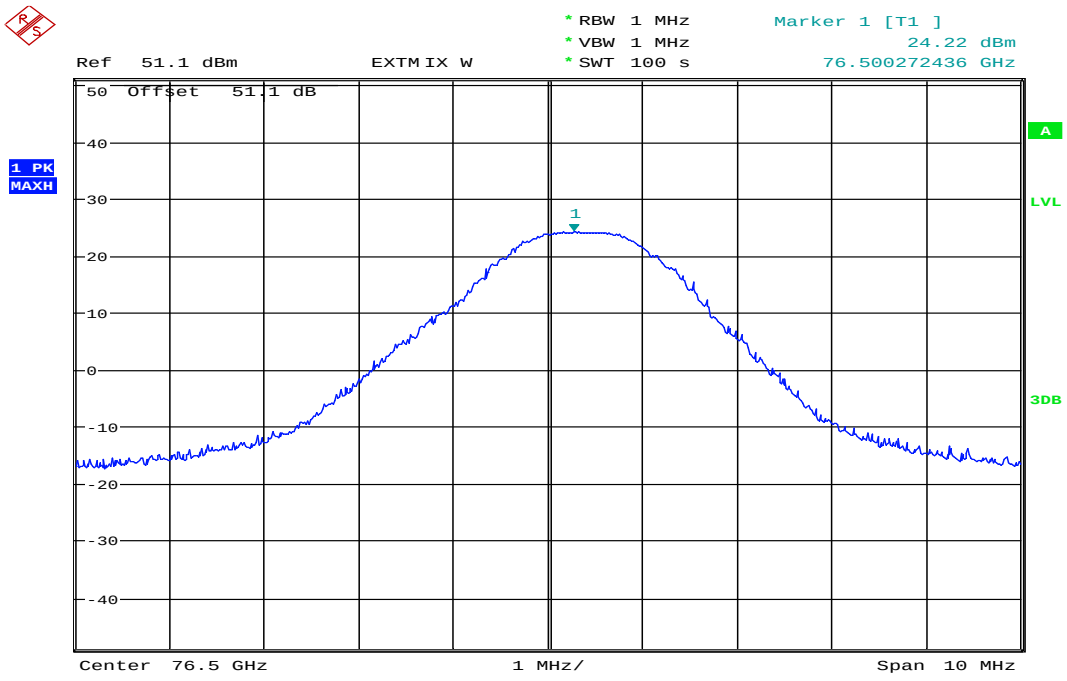
Date: 5.JUL.2011 13:59:12

Plot 34: EIRP (Average detector), T_{min} / V_{min} – V_{max}, lower frequency, low power

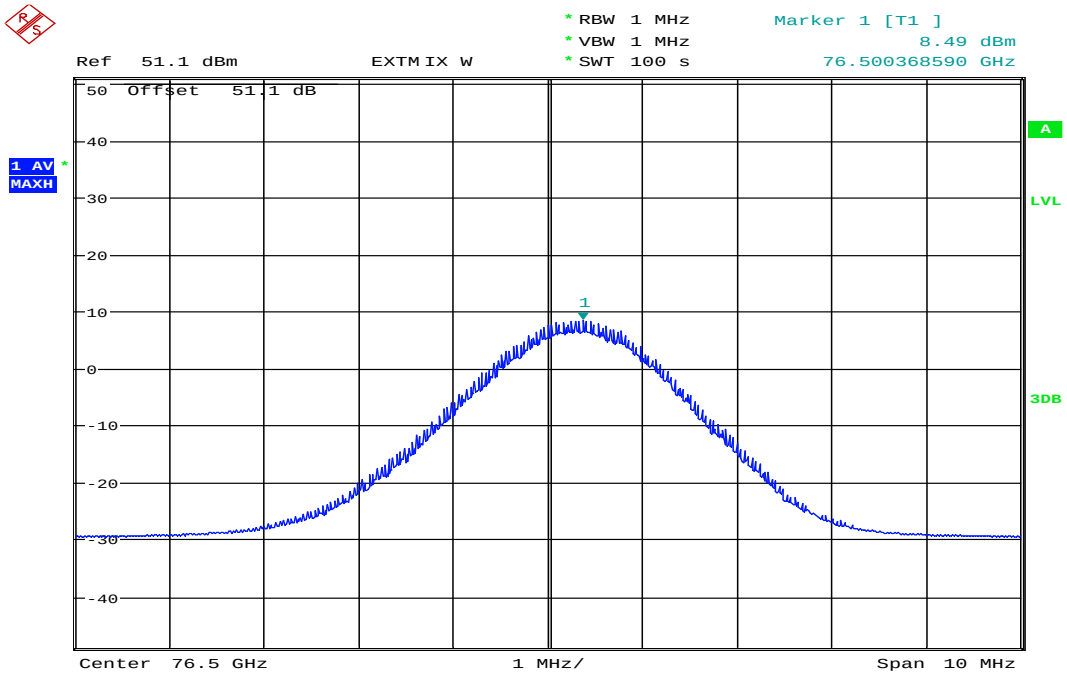


Date: 5.JUL.2011 14:06:06

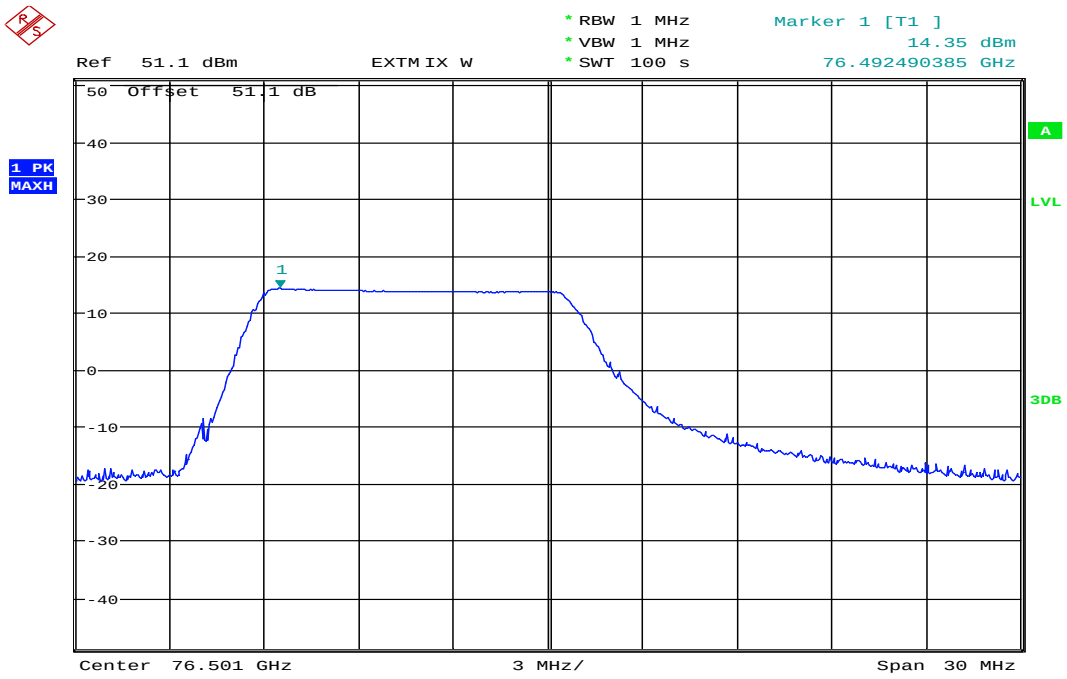
Plot 35: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, centre frequency, high power



Plot 36: EIRP (Average detector), T_{min} / V_{min} – V_{max}, centre frequency, high power

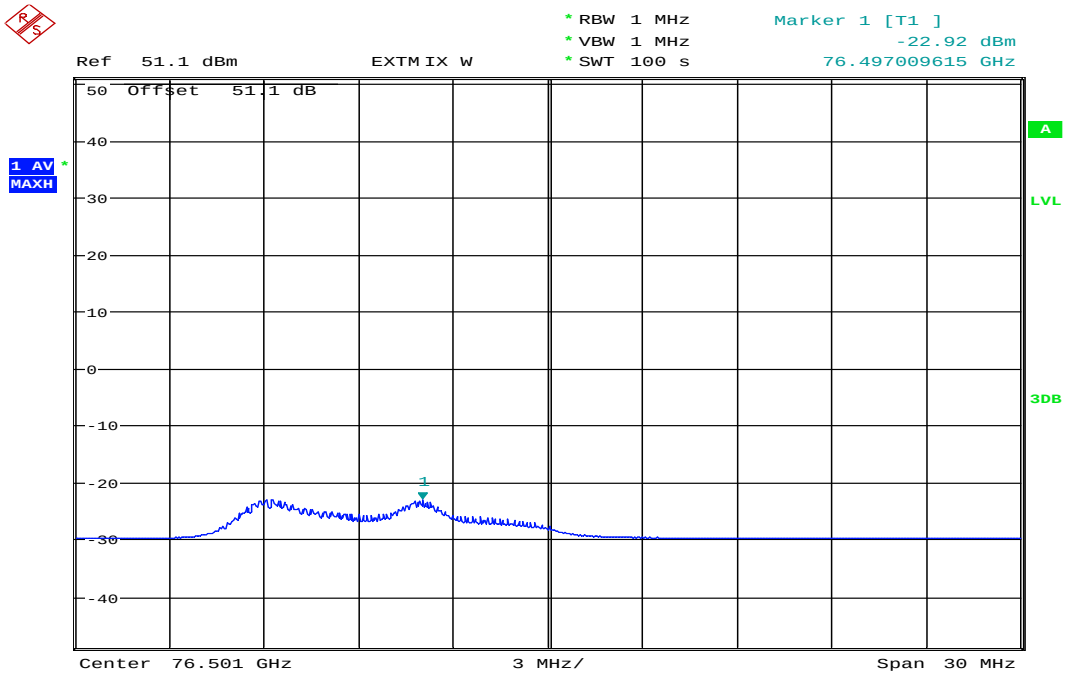


Plot 37: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, centre frequency, low power



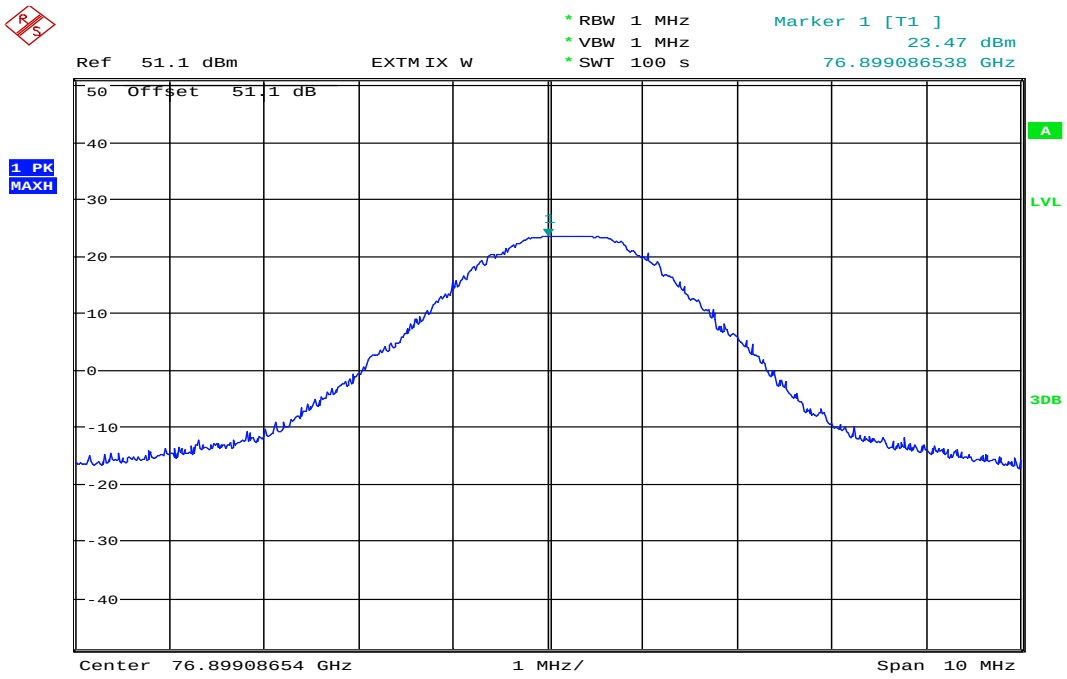
Date: 5.JUL.2011 13:38:46

Plot 38: EIRP (Average detector), T_{min} / V_{min} – V_{max}, centre frequency, low power

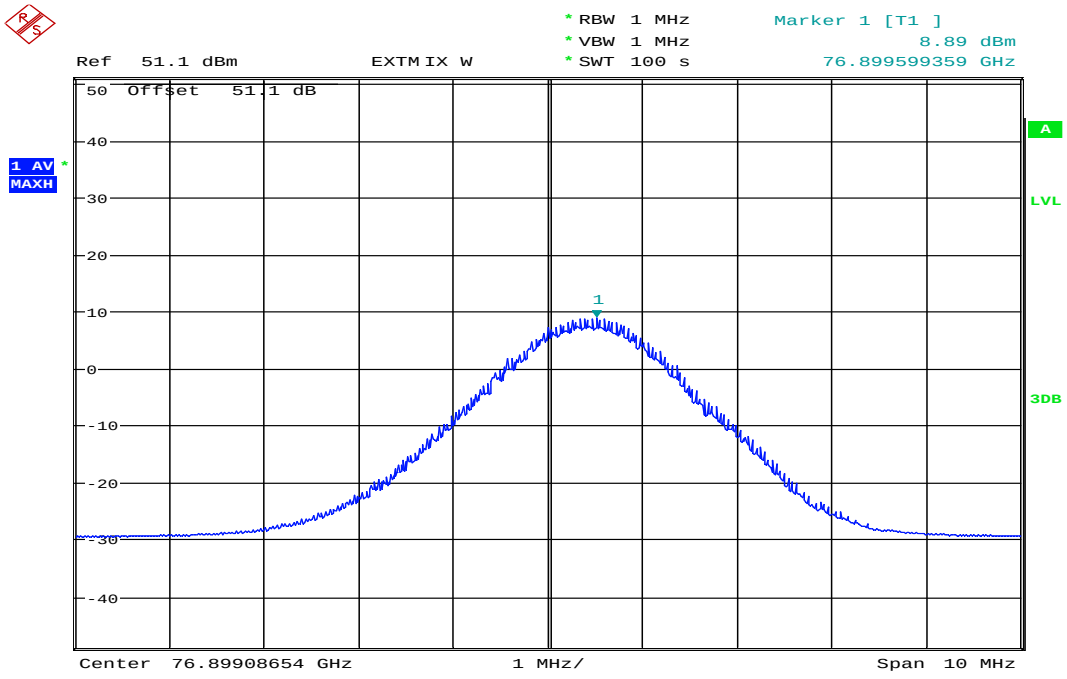


Date: 5.JUL.2011 13:46:26

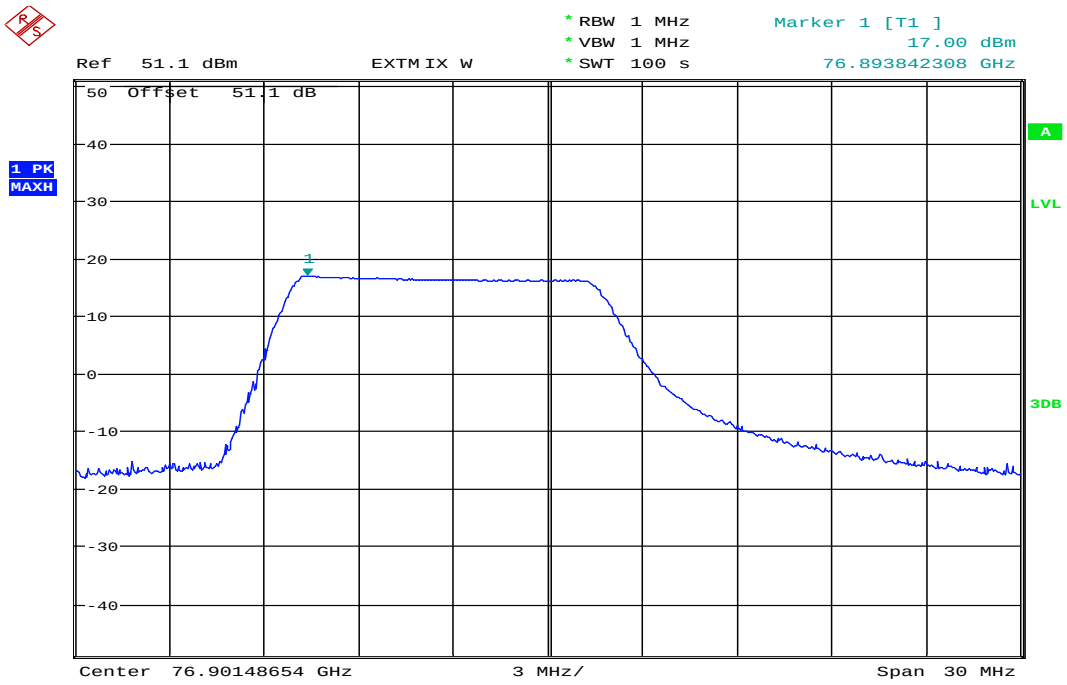
Plot 39: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, upper frequency, high power



Plot 40: EIRP (Average detector), T_{min} / V_{min} – V_{max}, upper frequency, high power

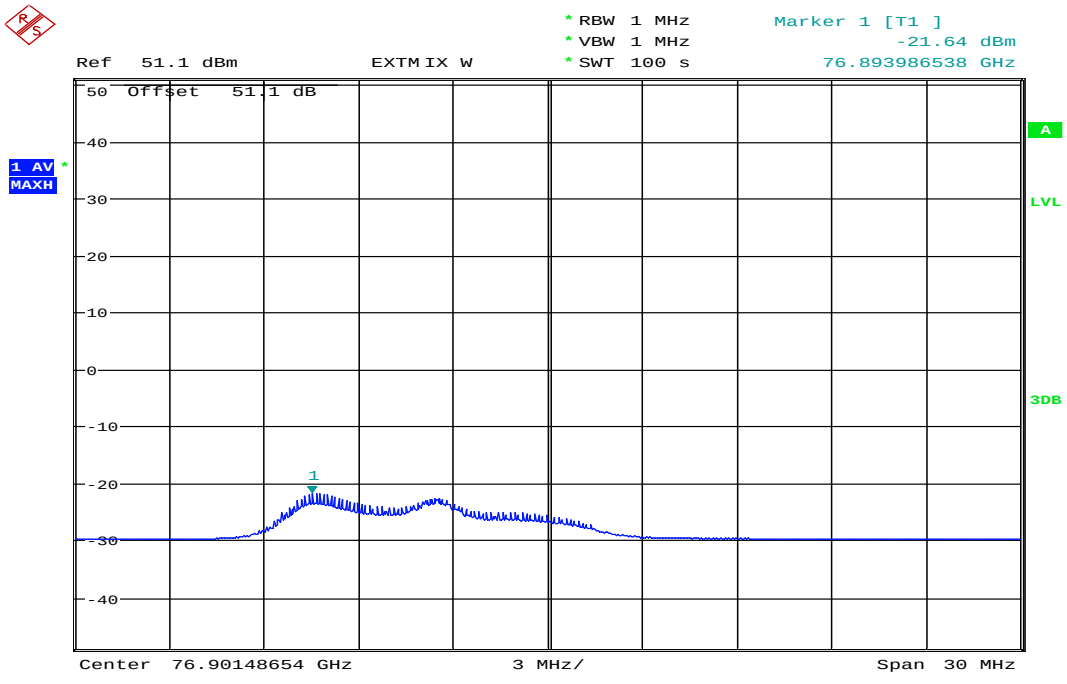


Plot 41: EIRP (Peak detector), T_{min} / V_{min} – V_{max}, upper frequency, low power



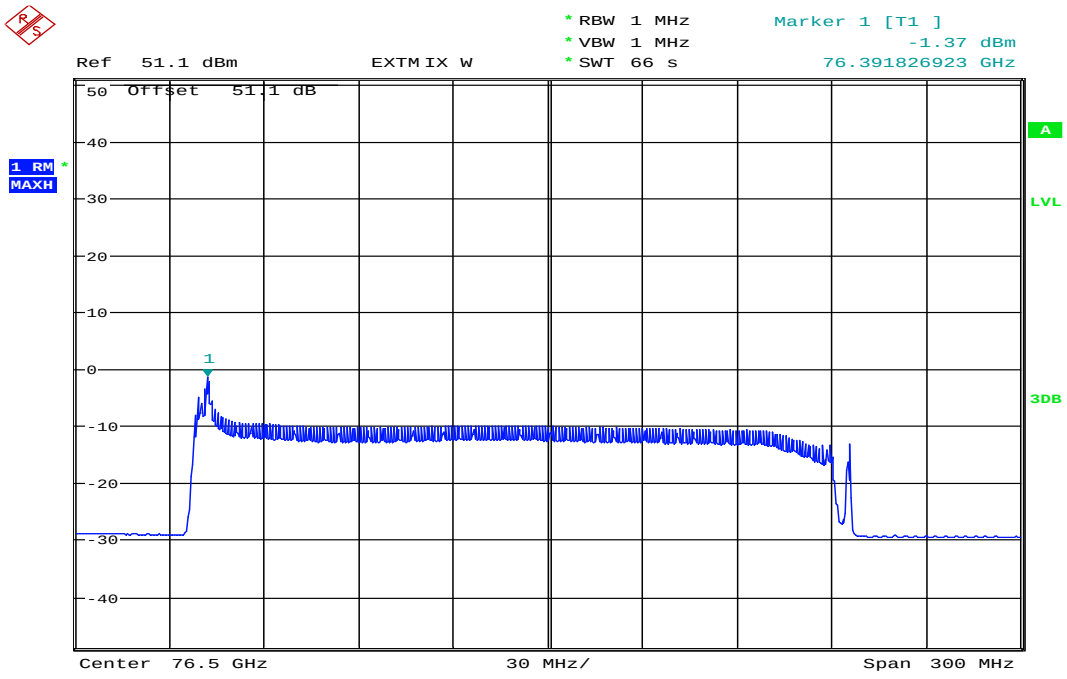
Date: 5.JUL.2011 14:22:28

Plot 42 EIRP (Average detector), T_{min} / V_{min} – V_{max}, upper frequency, low power



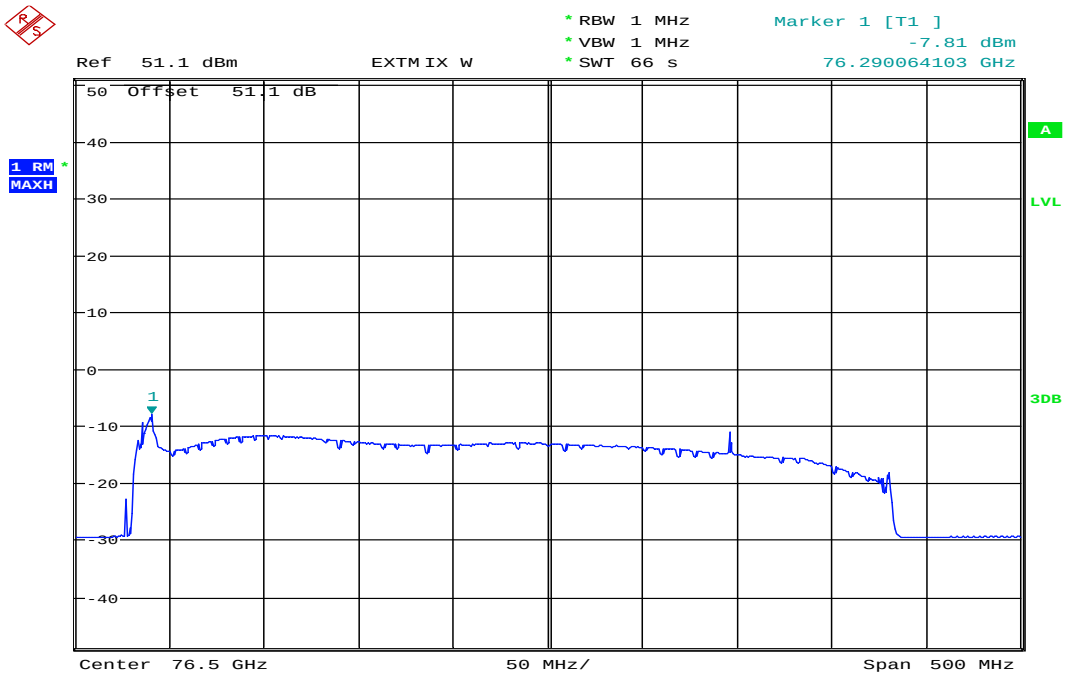
Date: 5.JUL.2011 14:31:58

Plot 43: Normal mode, bandwidth 200 MHz, RMS detector, T_{min} / V_{min} - V_{max}



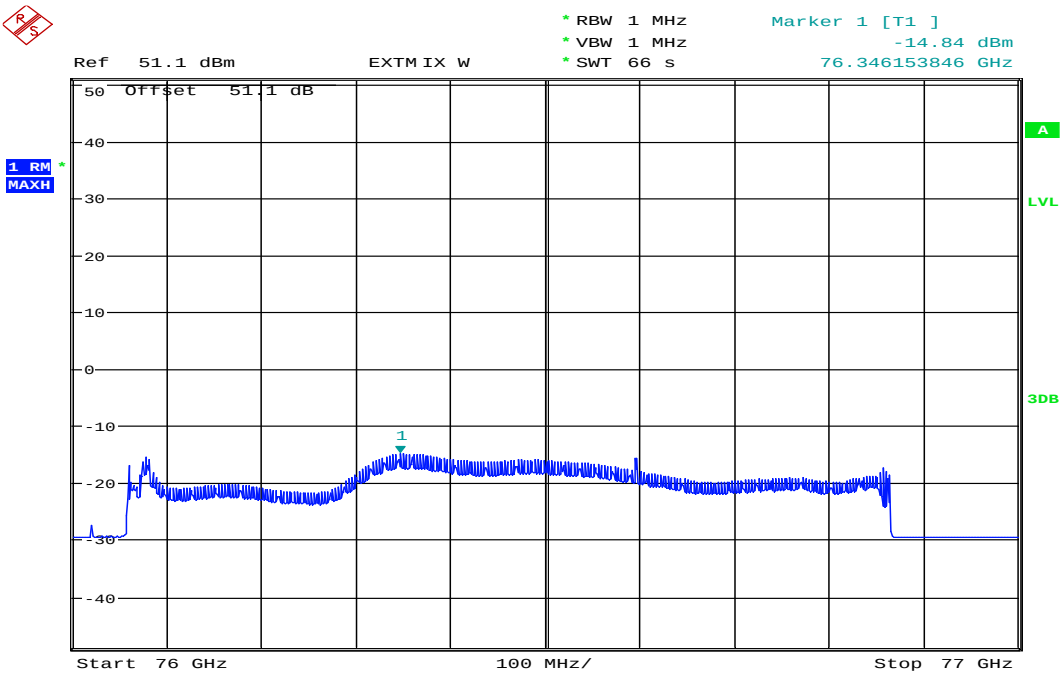
Date: 5.JUL.2011 15:06:35

Plot 44: Normal mode, bandwidth 400 MHz, RMS detector, T_{min} / V_{min} - V_{max}



Date: 5.JUL.2011 15:22:27

Plot 45: Normal mode, bandwidth 800 MHz, RMS detector, T_{min} / V_{min} - V_{max}



Date: 5.JUL.2011 16:04:17

9.2 Maximum Permissible Exposure (MPE)

MPE Calculation:

$$PD = \frac{OP + AG}{(4 \times \pi \times d^2)}$$

PD = Power Density (mW/cm2)
OP = DUT Output Power (dBm)
AG = DUT Antenna Gain (dBi)
d = MPE Distance (cm)

Note: OP [mW], AG as lin.factor

§ 1.1310 Radiofrequency radiation exposure limits.

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, ''Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation.''

NOTE TO INTRODUCTORY PARAGRAPH: These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP) in ''Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,'' NCRP Report No. 86, Sections 17.4.1, 17.4.1.1, 17.4.2 and 17.4.3.
Copyright NCRP, 1986, Bethesda, Maryland 20814. In the frequency range from 100 MHz to 1500 MHz, exposure limits for field strength and power density are also generally based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ''IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,'' ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

[61 FR 41016, Aug. 7, 1996]

Results:

Refer to 9.1 Power density, the max. EIRP measured = 17.77 dBm = 59.8 mW (centre frequency, high power, normal environment condition)

d = 20 cm

➔ PD = 0.012 mW/cm^2

Limits: **FCC §1.1310 (B)**

Frequency (GHz)	Power Density (mW/cm^2)
1.500 GHz – 100.000 GHz	1 mW/cm^2

Result: **The measurement is passed.**

9.3 Occupied bandwidth

Results: **normal test conditions**

TEST CONDITIONS (T_{nom} / V_{nom})	Occupied Bandwidth (99%)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.100 032 / 76.103 125	3.93
lower frequency, low power	76.096 474 / 76.107 404	10.93
centre frequency, high power	76.496 500 / 76.499 510	3.01
centre frequency, low power	76.497 203 / 76.508 103	10.90
upper frequency, high power	76.896 426 / 76.899 423	3.00
upper frequency, low power	76.896 078 / 76.907 905	11.93

TEST CONDITIONS (T_{nom} / V_{nom})	Occupied Bandwidth (99%)	
	nominal bandwidth [MHz]	Bandwidth [MHz]
normal mode	200 MHz	199.52
Normal mode	400 MHz	402.24
Normal mode	800 MHz	802.88

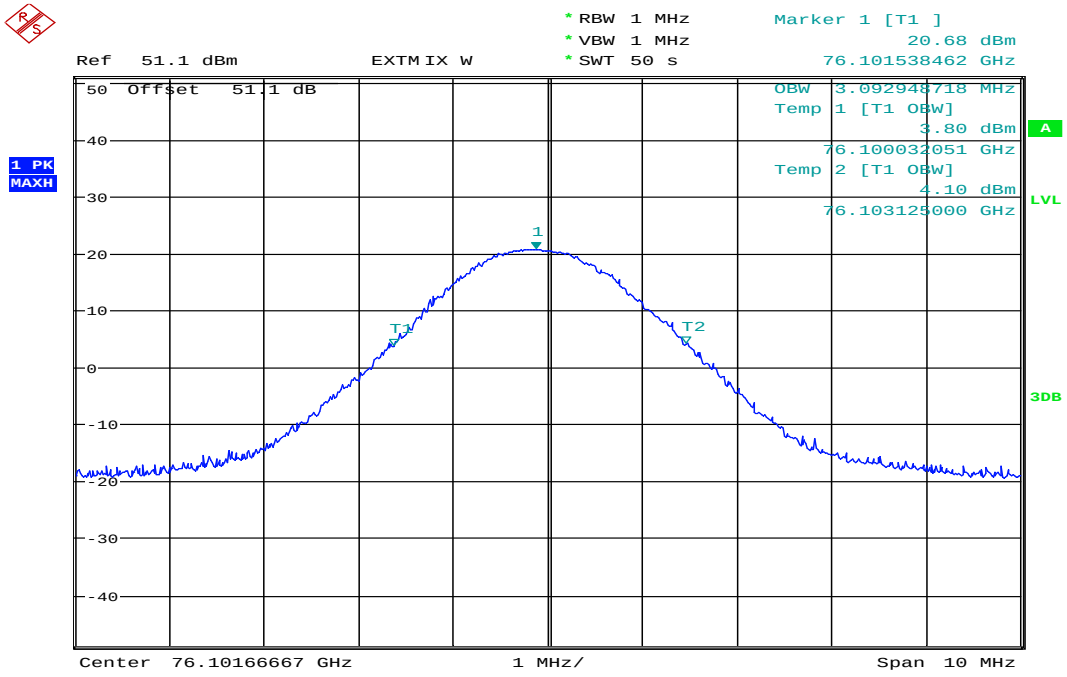
TEST CONDITIONS (T_{nom} / V_{nom})	Occupied Bandwidth (26 dB)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.100 705 / 76.105 385	4.68
lower frequency, low power	76.095 128 / 76.109 936	14.81
centre frequency, high power	76.496 360 / 76.501 110	4.75
centre frequency, low power	76.496 003 / 76.510 043	14.04
upper frequency, high power	76.896 058 / 76.900 176	4.12
upper frequency, low power	76.895 020 / 76.910 116	15.10

Limits: **FCC §2.1049**

Frequency range	f(lowest) > 76.0 GHz	f(highest) < 77.0 GHz

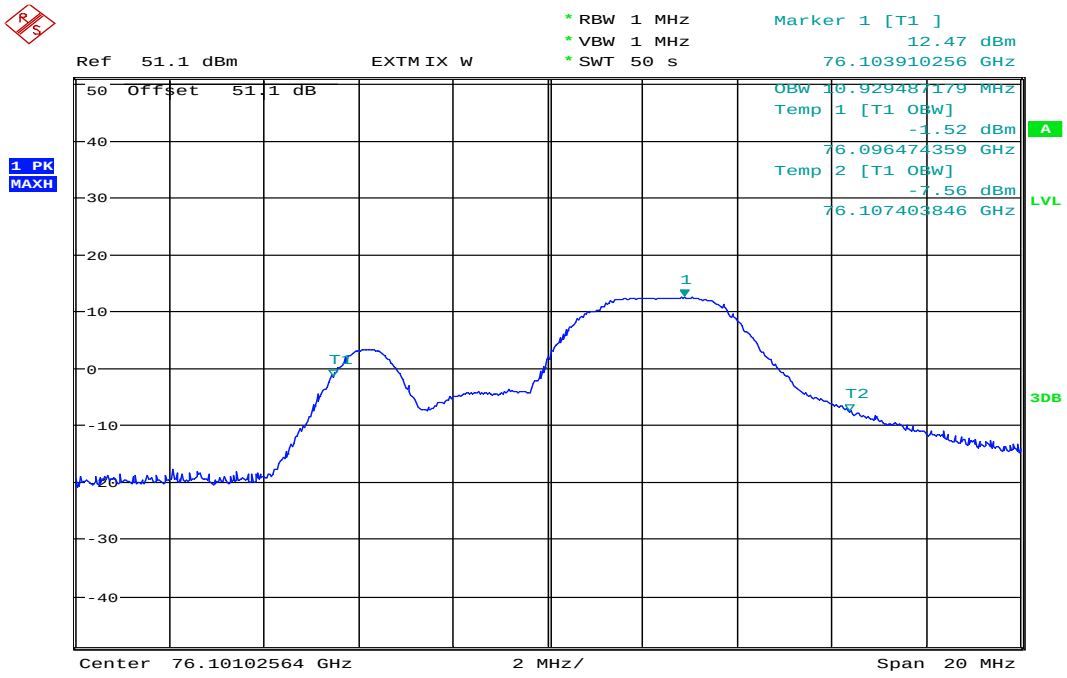
Result: **The measurement is passed.**

Plot 46: Occupied bandwidth (99 %), lower frequency, high power



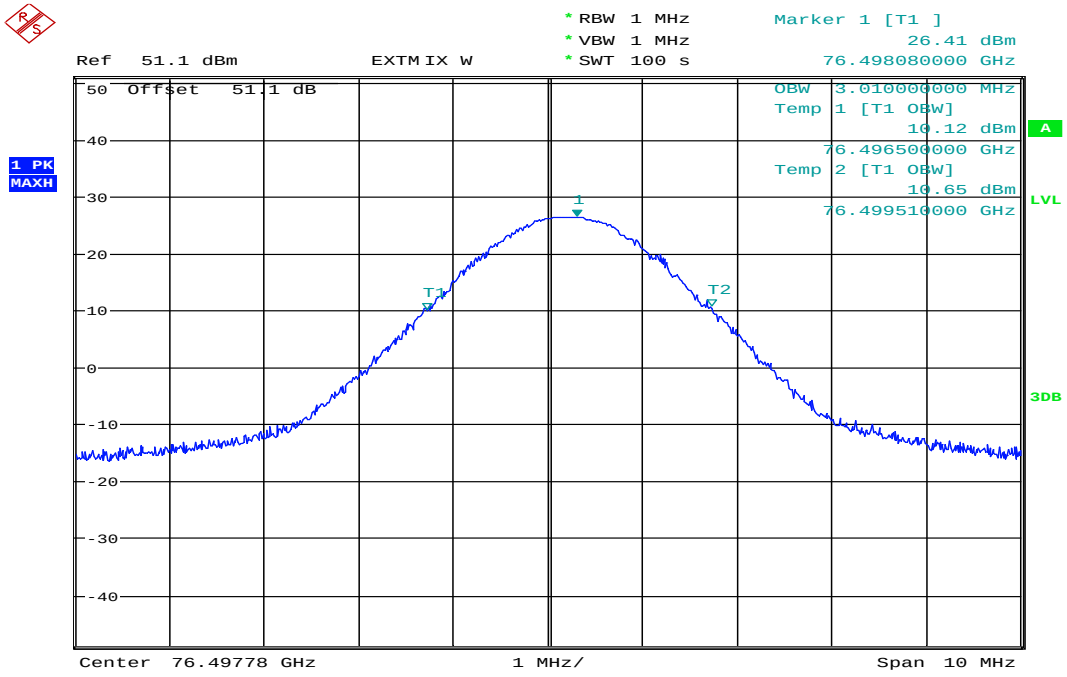
Date: 18.MAY.2011 14:43:53

Plot 47: Occupied bandwidth (99 %), lower frequency, low power

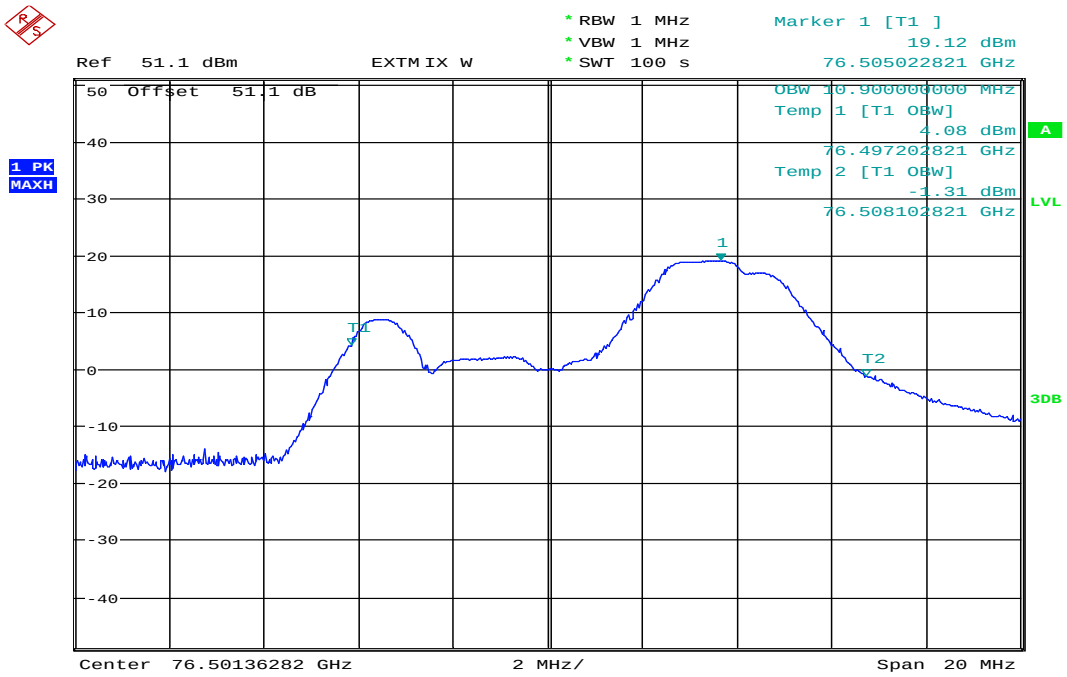


Date: 18.MAY.2011 14:59:45

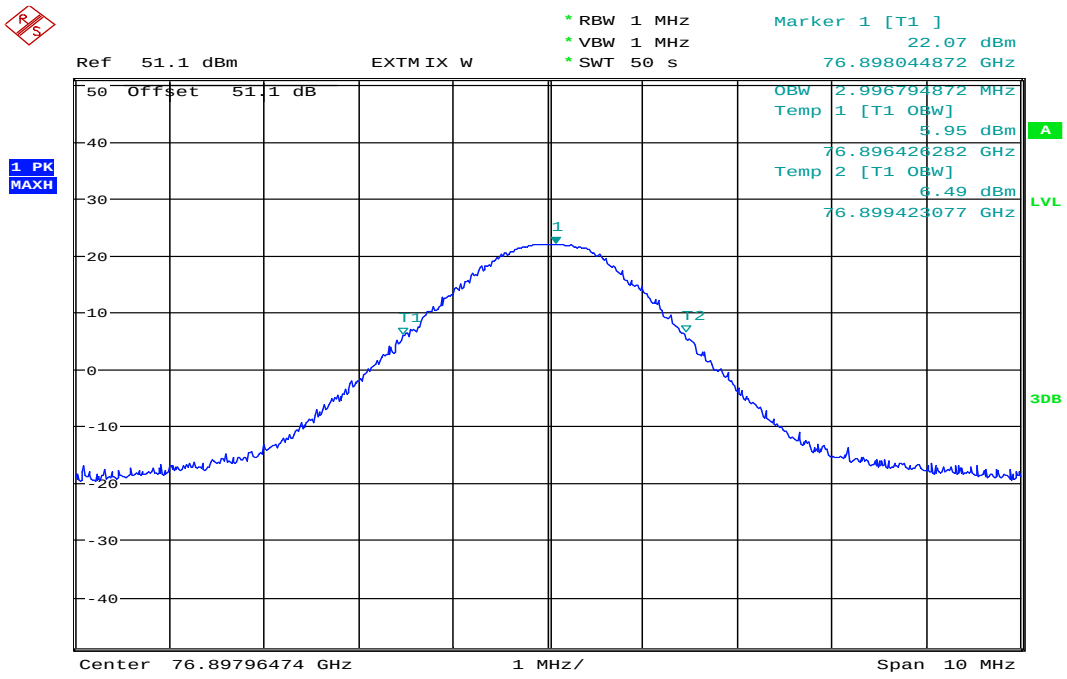
Plot 48: Occupied bandwidth (99 %), centre frequency, high power



Plot 49: Occupied bandwidth (99 %), centre frequency, low power

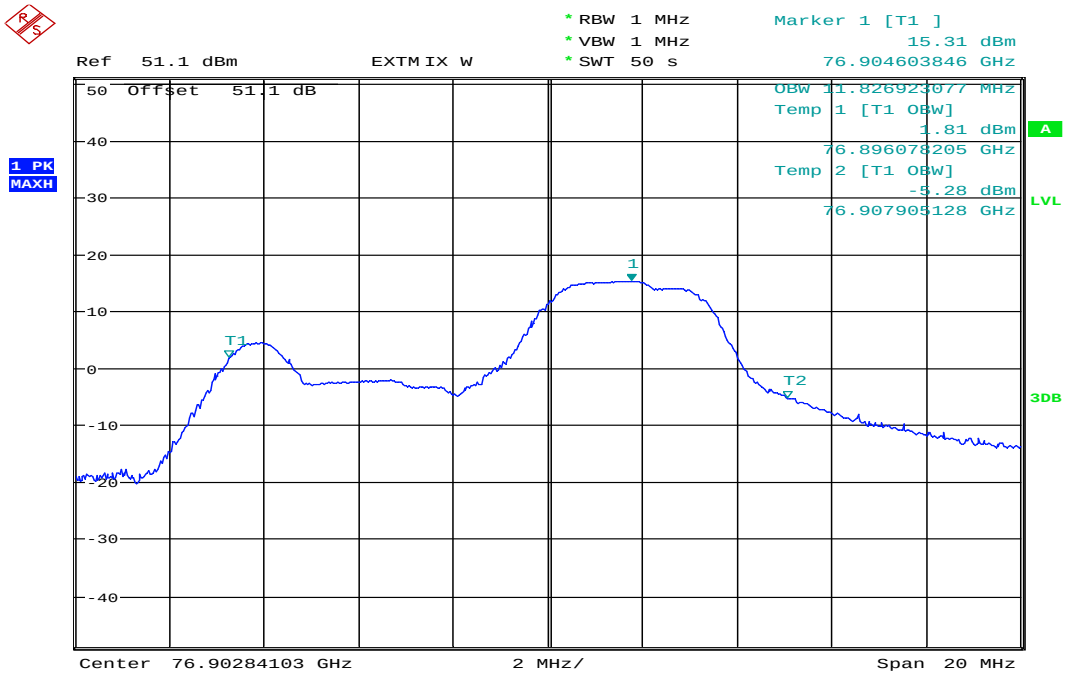


Plot 50: Occupied bandwidth (99 %), upper frequency, high power



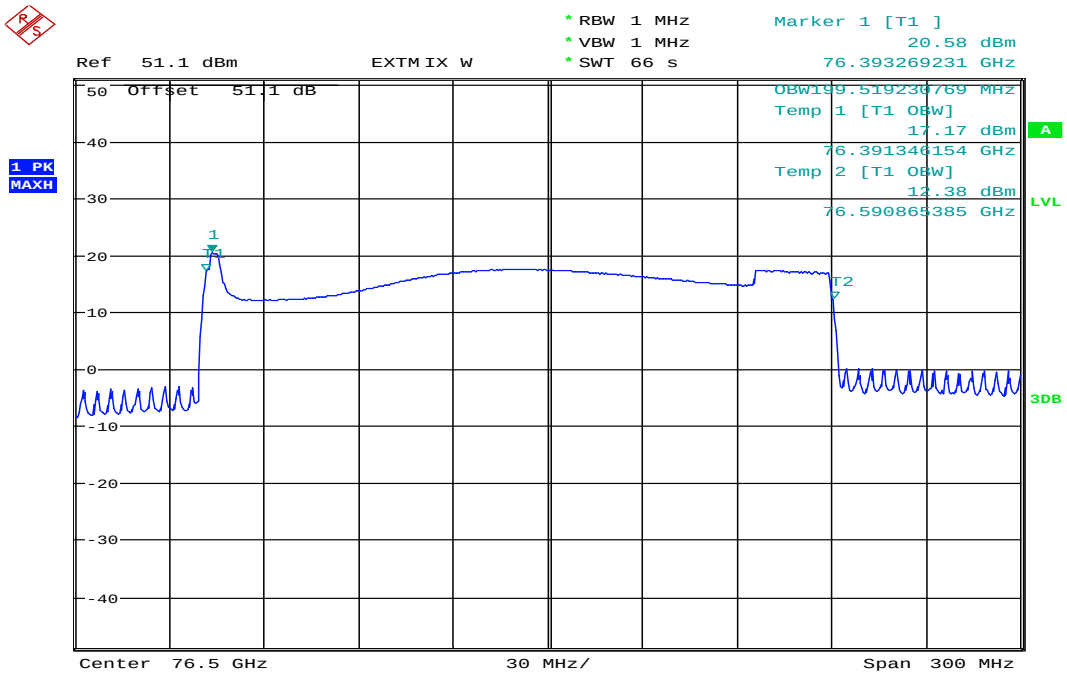
Date: 18.MAY.2011 15:12:08

Plot 51: Occupied bandwidth (99 %), upper frequency, low power



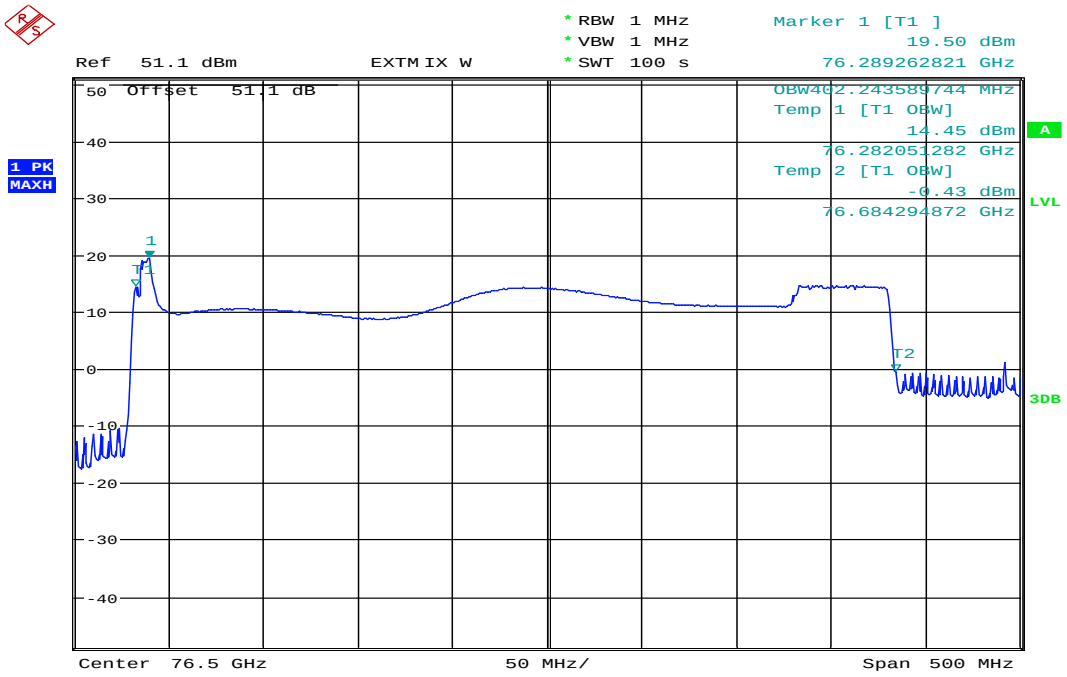
Date: 18.MAY.2011 15:22:53

Plot 52: Normal mode, bandwidth 200 MHz, T_{nom} / V_{nom}



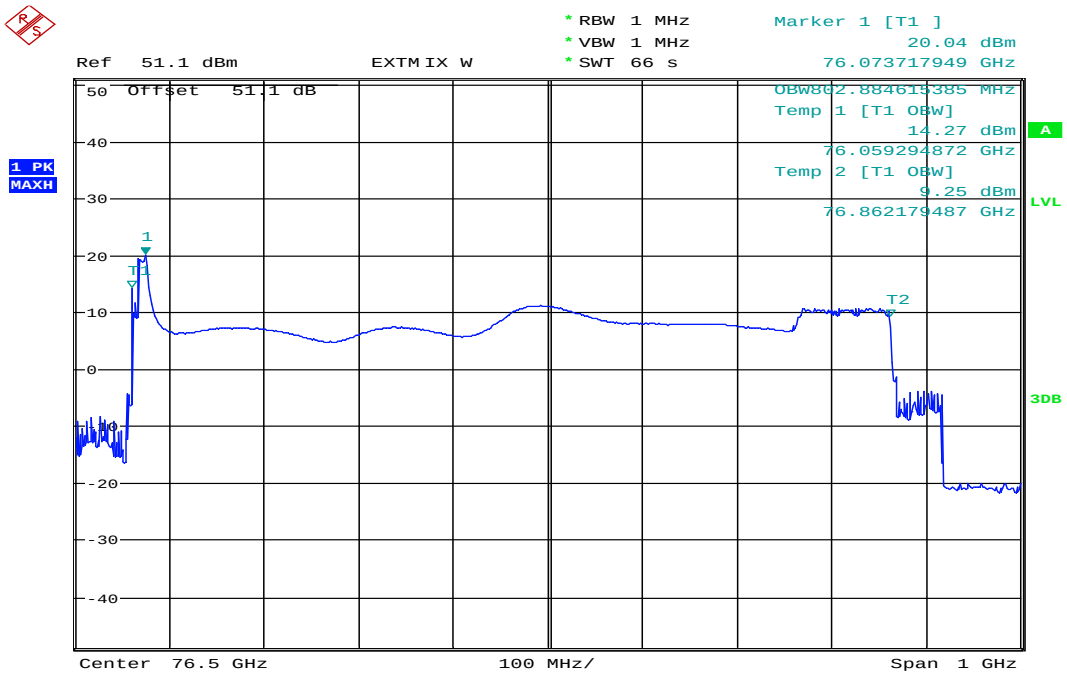
Date: 18.MAY.2011 15:35:20

Plot 53: Normal mode, bandwidth 400 MHz, T_{nom} / V_{nom}

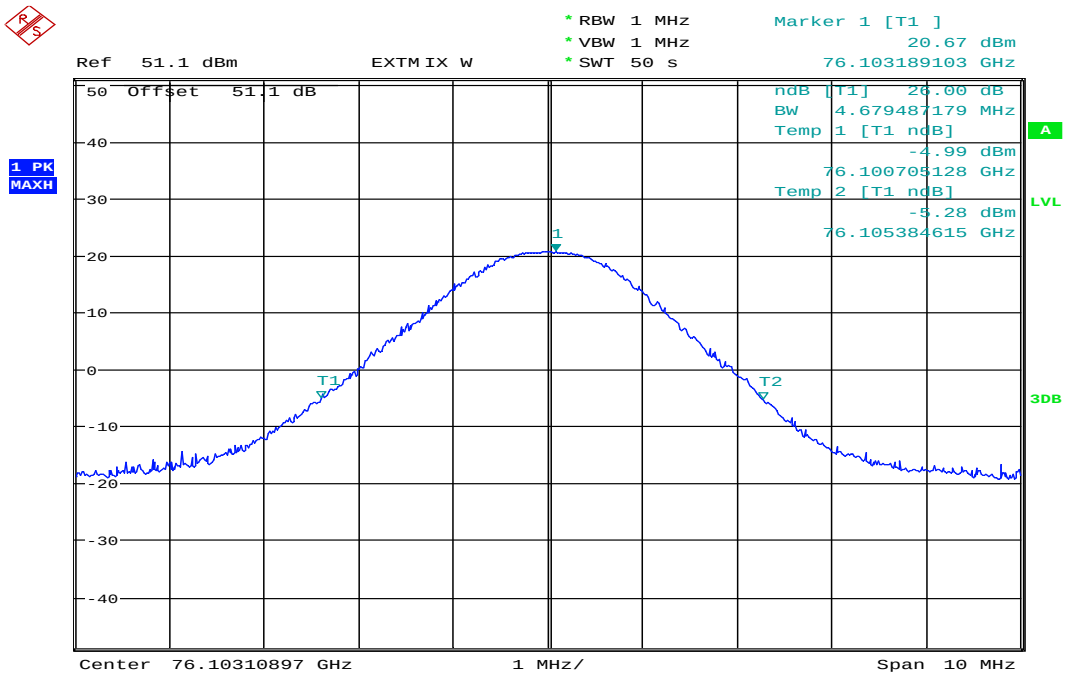


Date: 18.MAY.2011 16:08:59

Plot 54: Normal mode, bandwidth 800 MHz, T_{nom} / V_{nom}

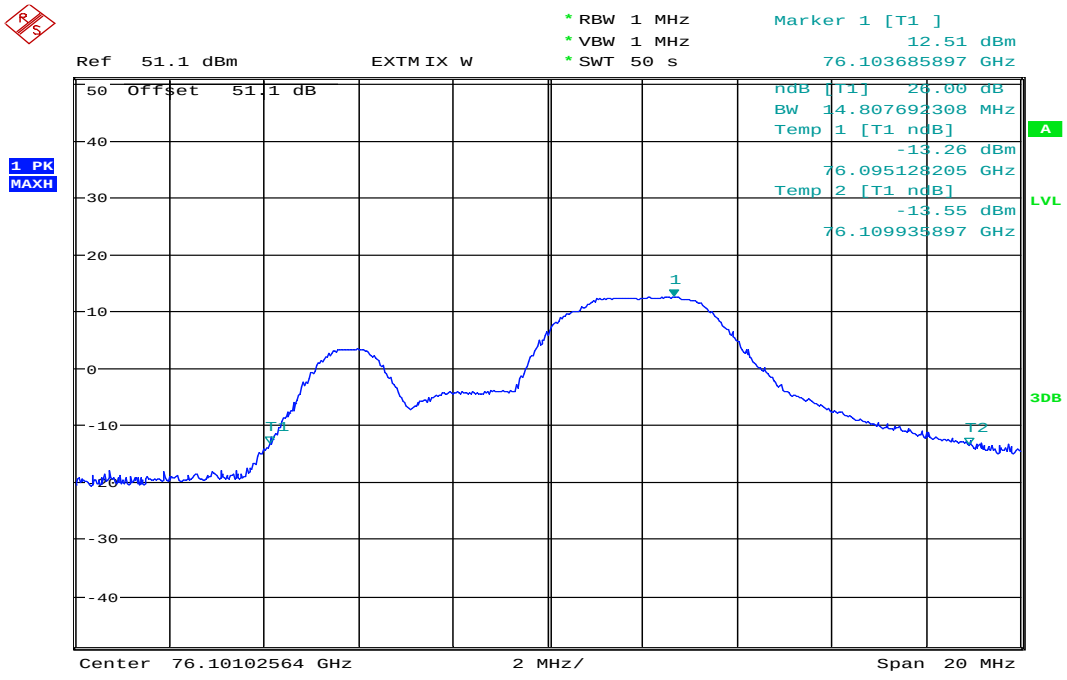


Plot 55: Occupied bandwidth (26 dB), lower frequency, high power



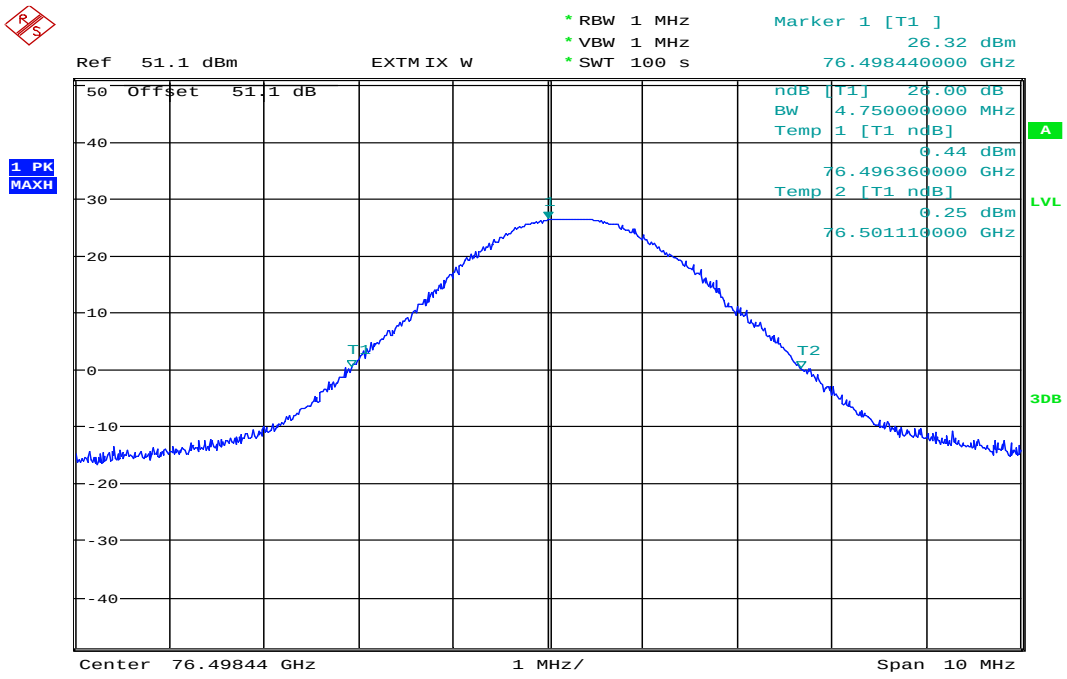
Date: 18.MAY.2011 14:32:06

Plot 56: Occupied bandwidth (26 dB), lower frequency, low power



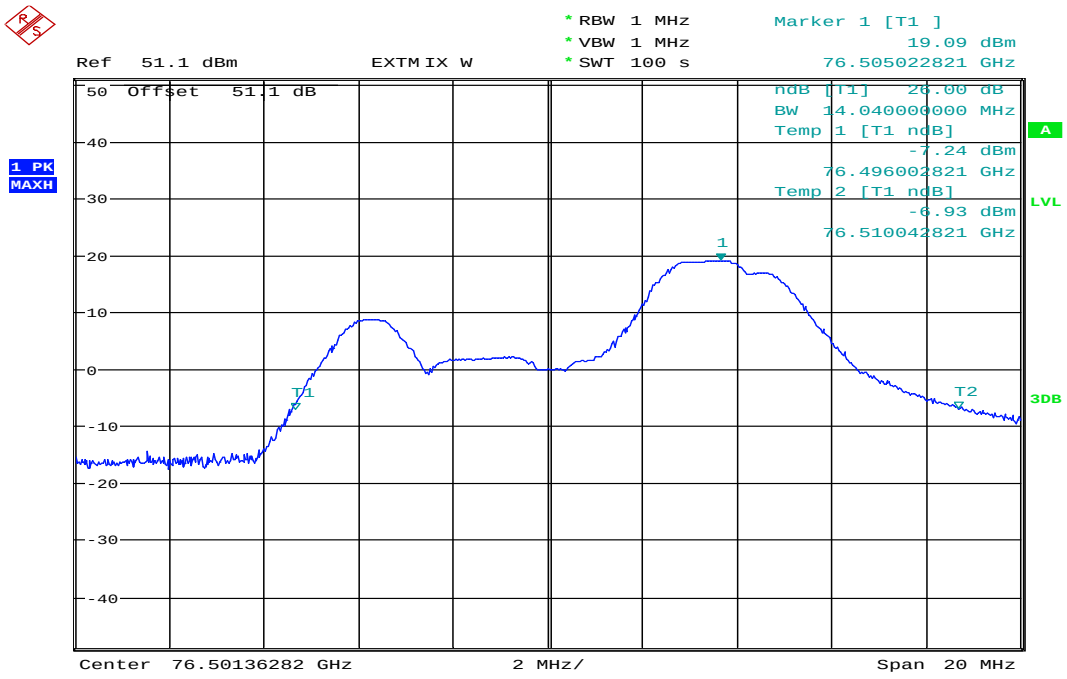
Date: 18.MAY.2011 14:54:30

Plot 57: Occupied bandwidth (26 dB), centre frequency, high power



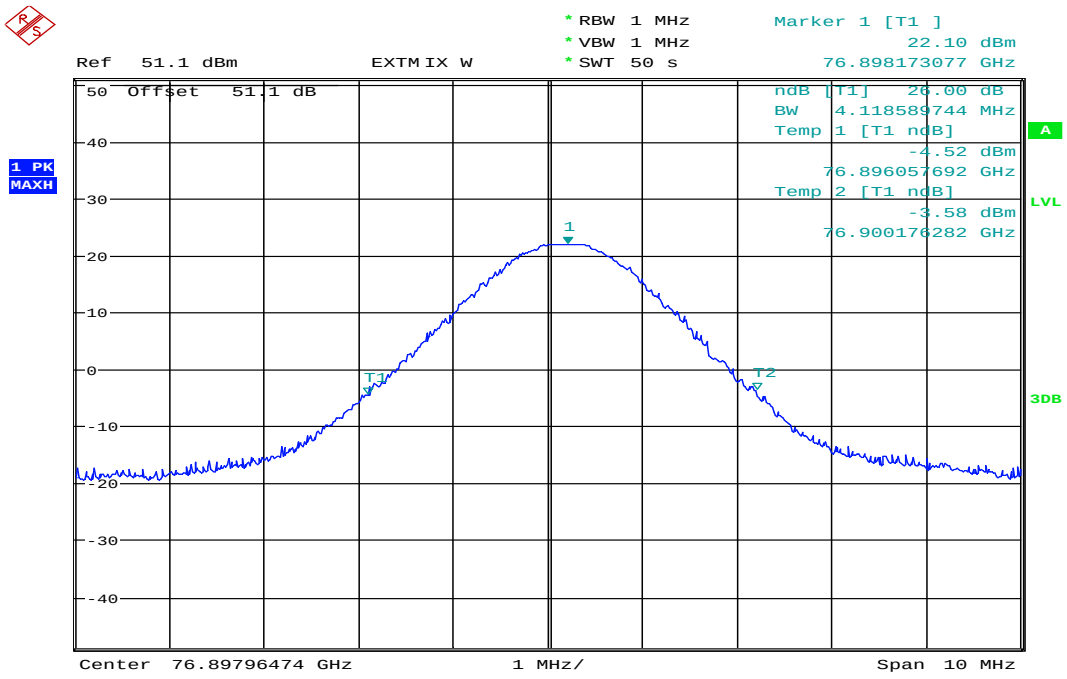
Date: 18.MAY.2011 13:39:08

Plot 58: Occupied bandwidth (26 dB), centre frequency, low power



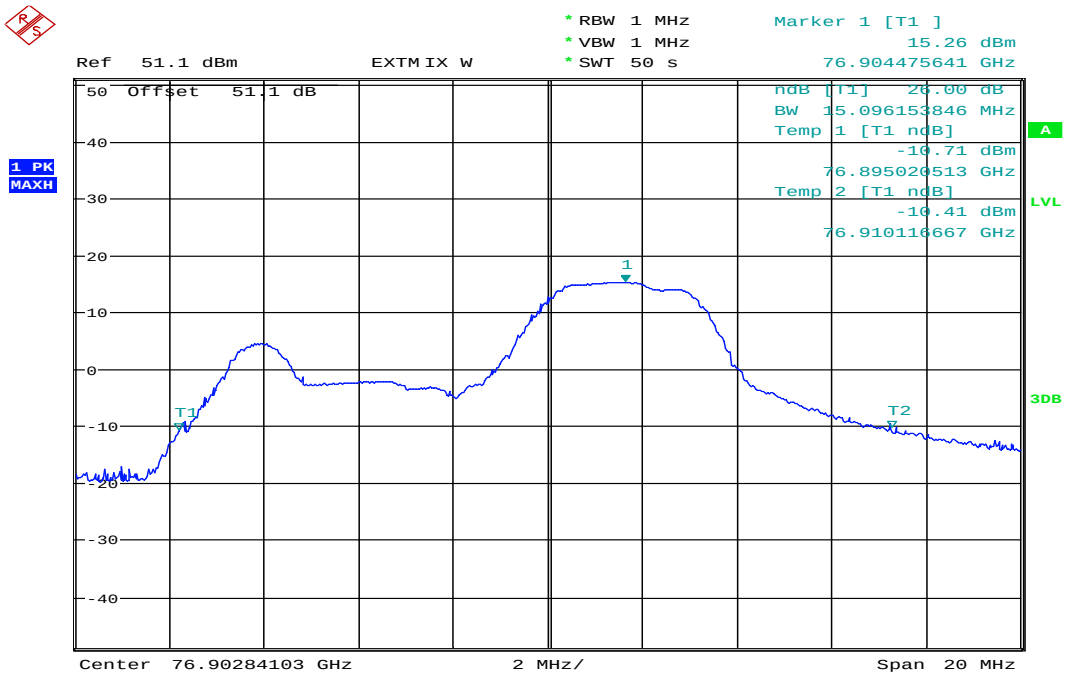
Date: 18.MAY.2011 14:12:34

Plot 59: Occupied bandwidth (26 dB), upper frequency, high power



Date: 18.MAY.2011 15:11:12

Plot 60: Occupied bandwidth (26 dB), upper frequency, low power



Date: 18.MAY.2011 15:21:27

Results: **extreme test conditions (+85 °C)**

TEST CONDITIONS (T_{max} / V_{min} – V_{max})	Occupied Bandwidth (99%)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.105 897 / 76.109 103	3.21
lower frequency, low power	76.088 728 / 76.115 394	26.67
centre frequency, high power	76.495 490 / 76.498 534	3.04
centre frequency, low power	76.488 227 / 76.515 214	26.99
upper frequency, high power	76.906 555 / 76.909 664	3.11
upper frequency, low power	76.886 853 / 76.914 733	27.88

TEST CONDITIONS (T_{max} / V_{min} – V_{max})	Occupied Bandwidth (99%)	
	nominal bandwidth [MHz]	Bandwidth [MHz]
normal mode	200 MHz	198.56
Normal mode	400 MHz	402.24
Normal mode	800 MHz	806.09

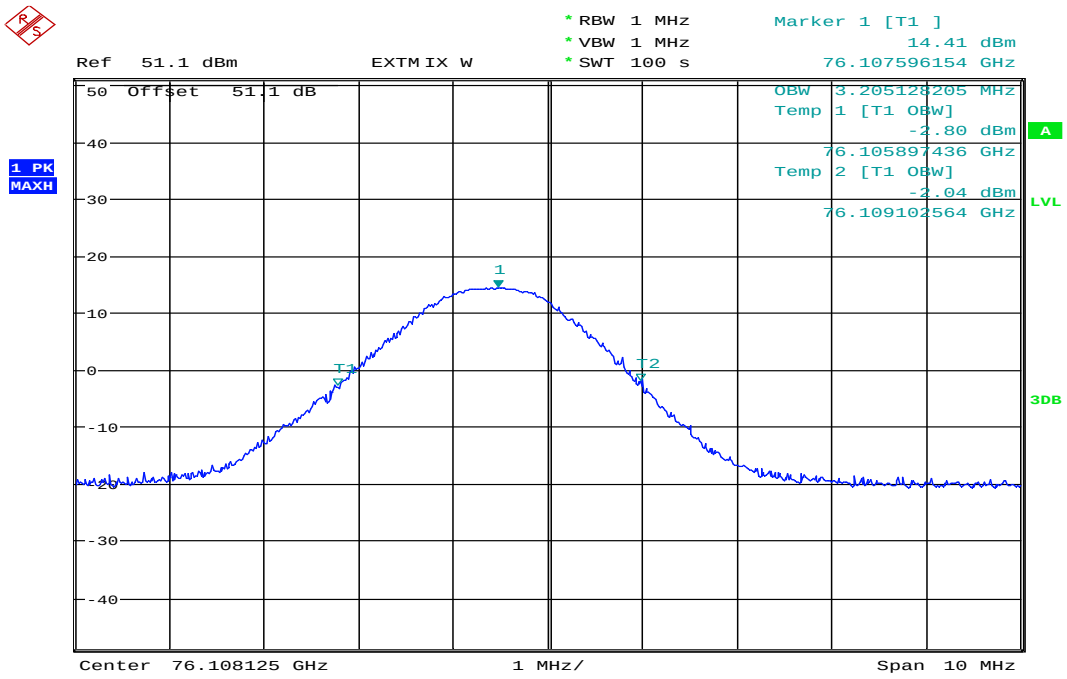
TEST CONDITIONS (T_{max} / V_{min} – V_{max})	Occupied Bandwidth (26 dB)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.104 984 / 76.109 487	4.50
lower frequency, low power	76.087 125 / 76.117 383	30.26
centre frequency, high power	76.493 839 / 76.498 022	4.18
centre frequency, low power	76.484 765 / 76.516 432	31.67
upper frequency, high power	76.905 657 / 76.910 097	4.44
upper frequency, low power	76.912 853 / 76.917 013	32.92

Limits: **FCC §15.253 (e)**

Frequency range	f(lowest) > 76.0 GHz	f(highest) < 77.0 GHz

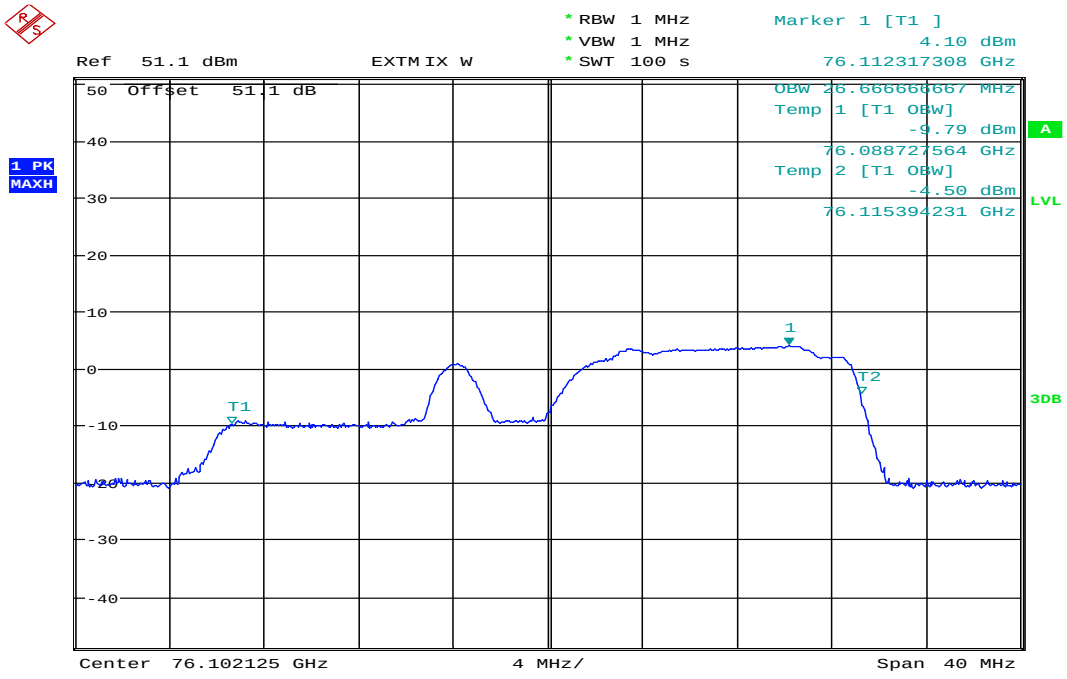
Result: **The measurement is passed.**

Plot 61: Occupied bandwidth (99 %), lower frequency, high power



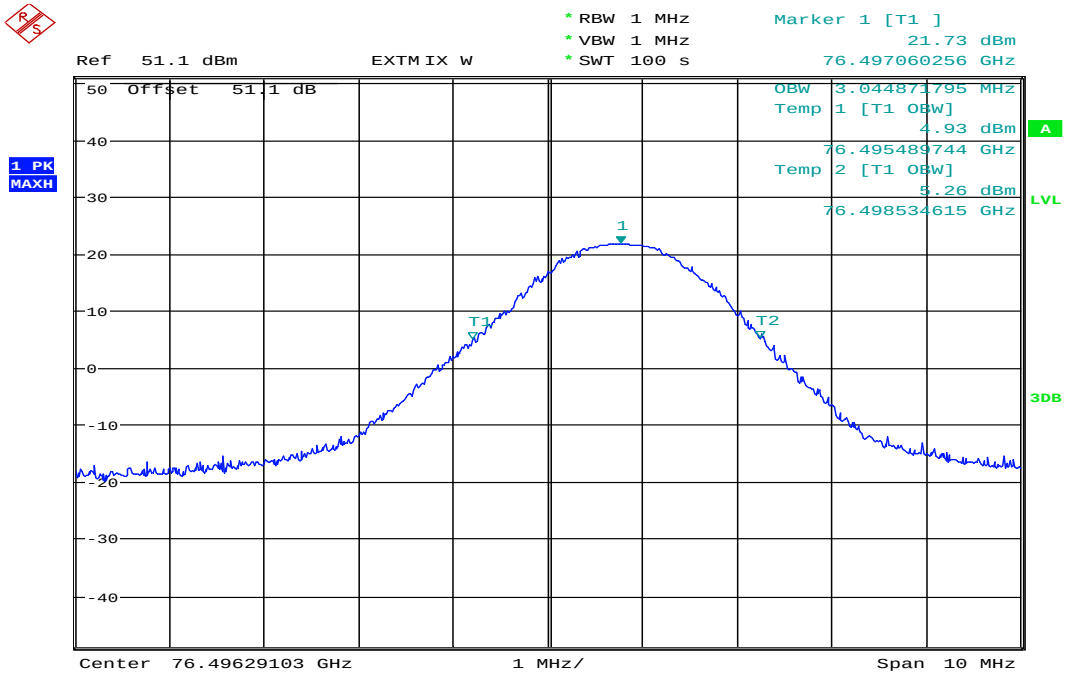
Date: 4.JUL.2011 16:55:06

Plot 62: Occupied bandwidth (99 %), lower frequency, low power



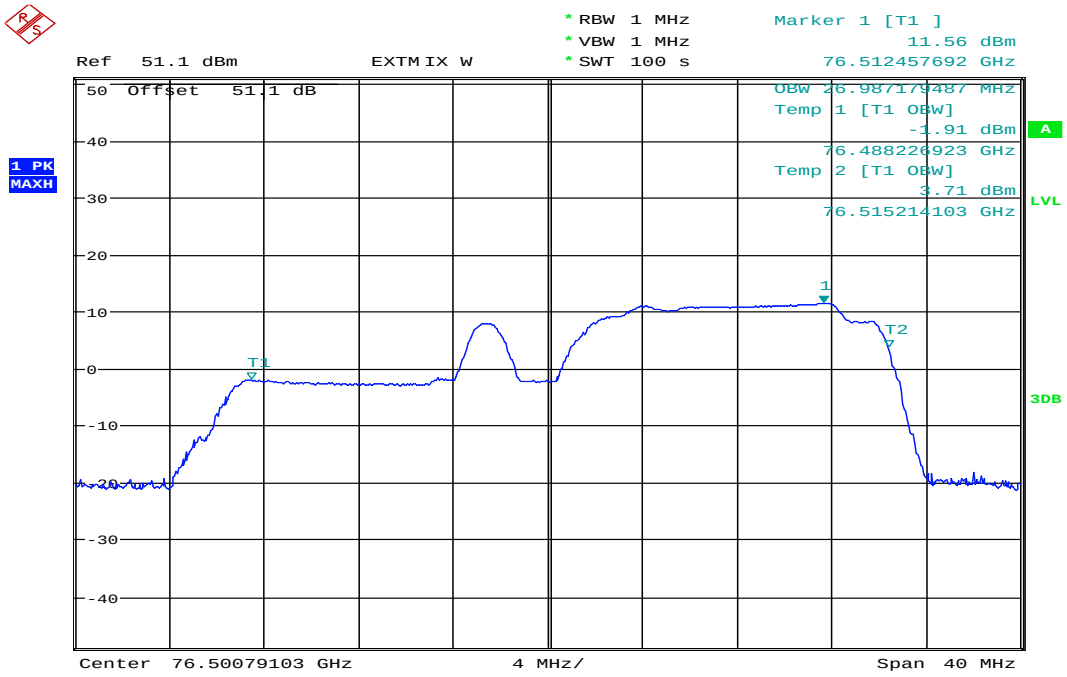
Date: 4.JUL.2011 17:05:51

Plot 63: Occupied bandwidth (99 %), centre frequency, high power



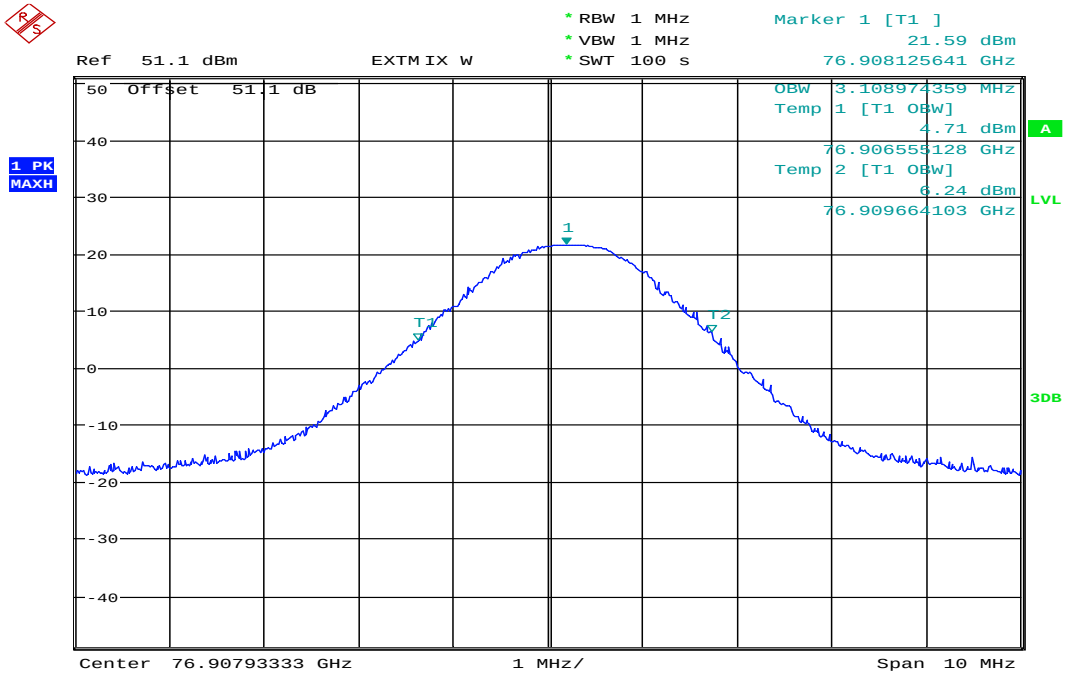
Date: 4.JUL.2011 16:28:58

Plot 64: Occupied bandwidth (99 %), centre frequency, low power



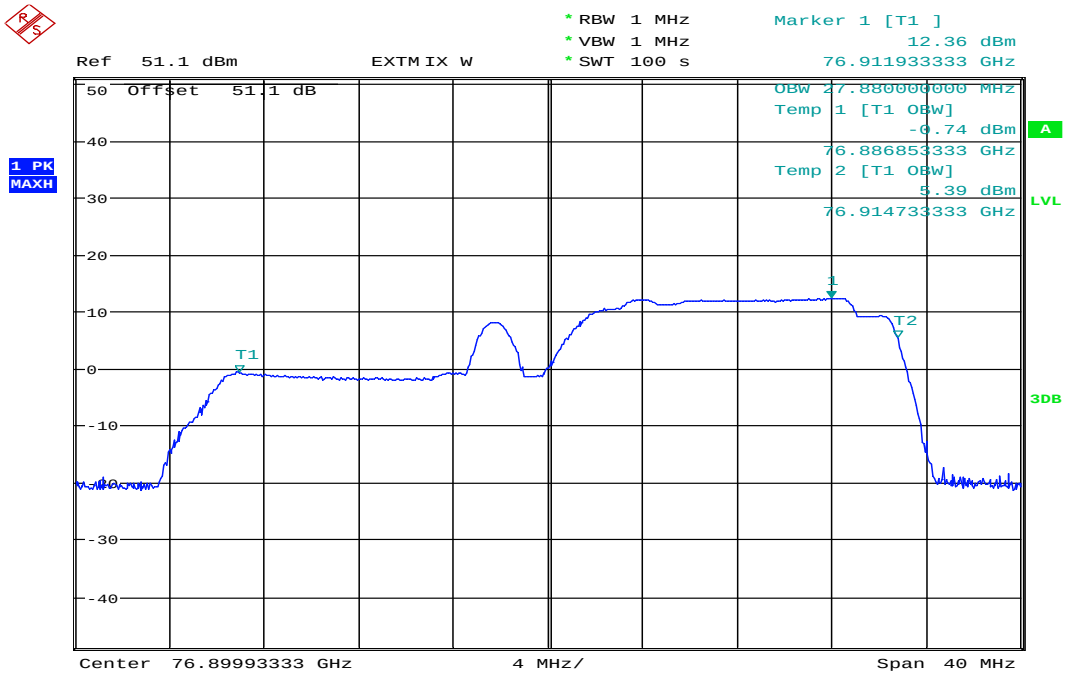
Date: 4.JUL.2011 16:42:38

Plot 65: Occupied bandwidth (99 %), upper frequency, high power



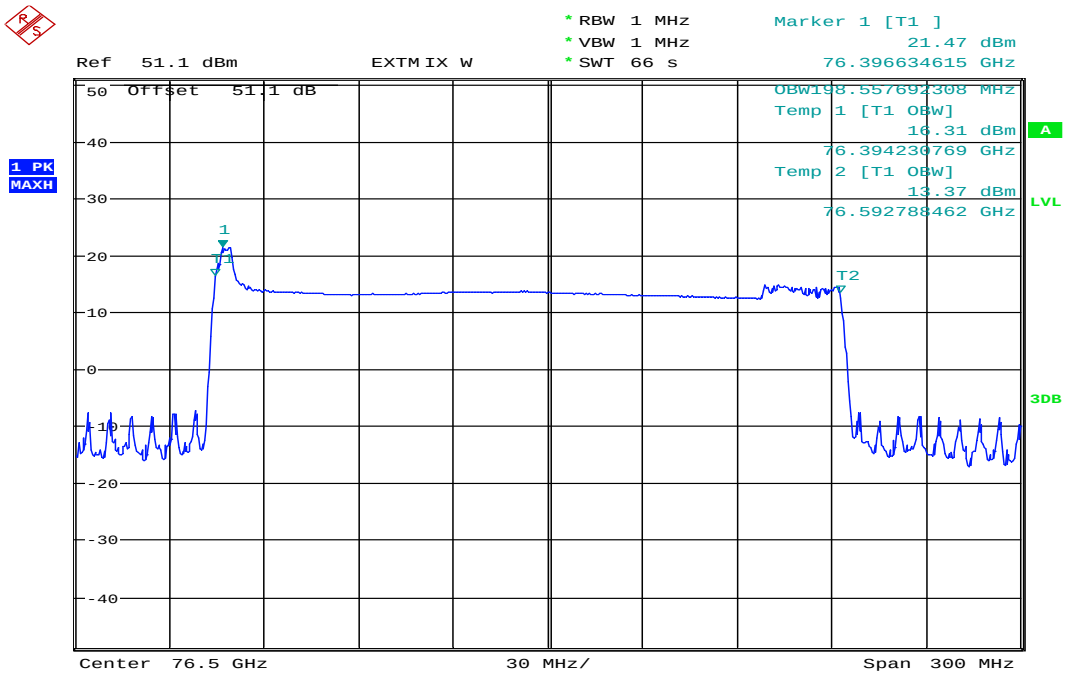
Date: 4.JUL.2011 17:20:00

Plot 66: Occupied bandwidth (99 %), upper frequency, low power



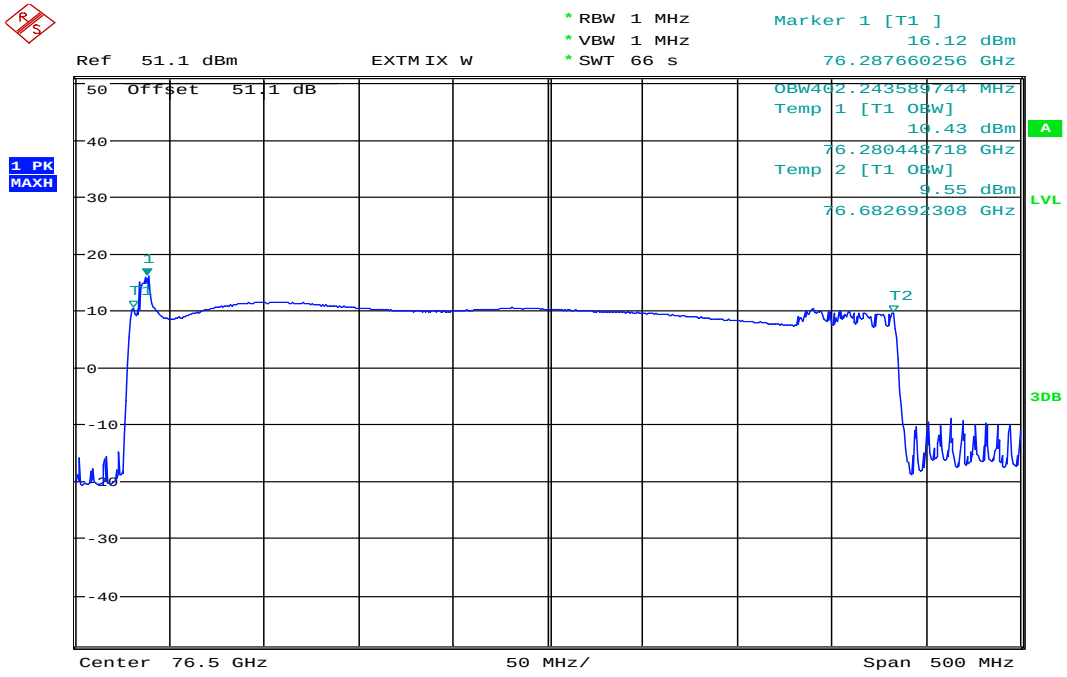
Date: 4.JUL.2011 17:30:54

Plot 67: Normal mode, bandwidth 200 MHz, T_{max} / V_{min} - V_{max}



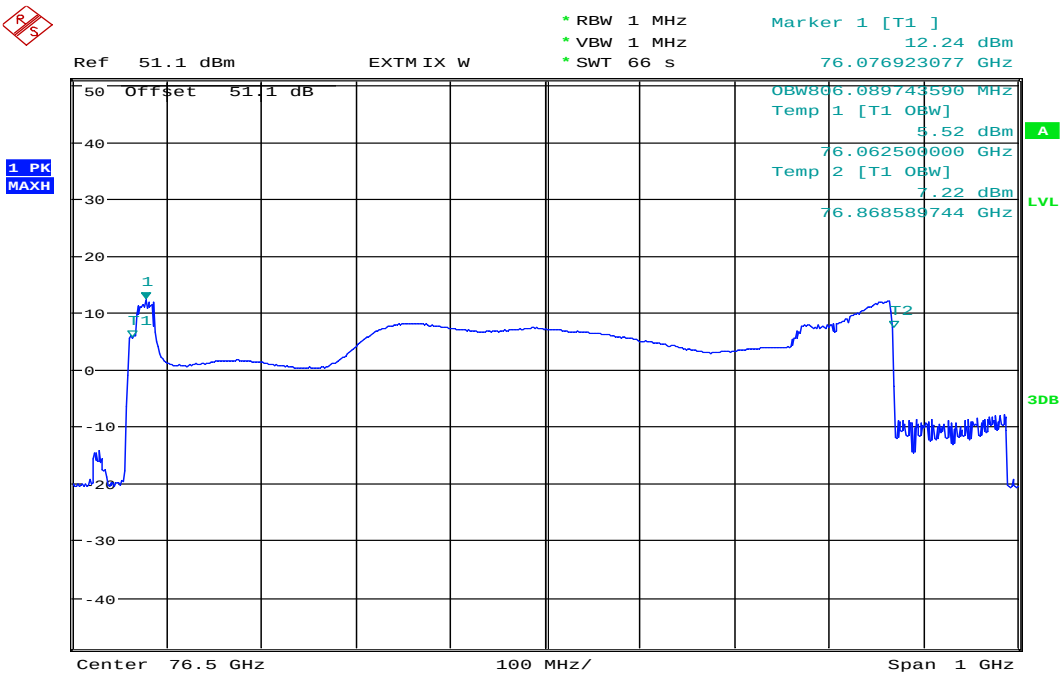
Date: 4.JUL.2011 17:39:08

Plot 68: Normal mode, bandwidth 400 MHz, T_{max} / V_{min} - V_{max}



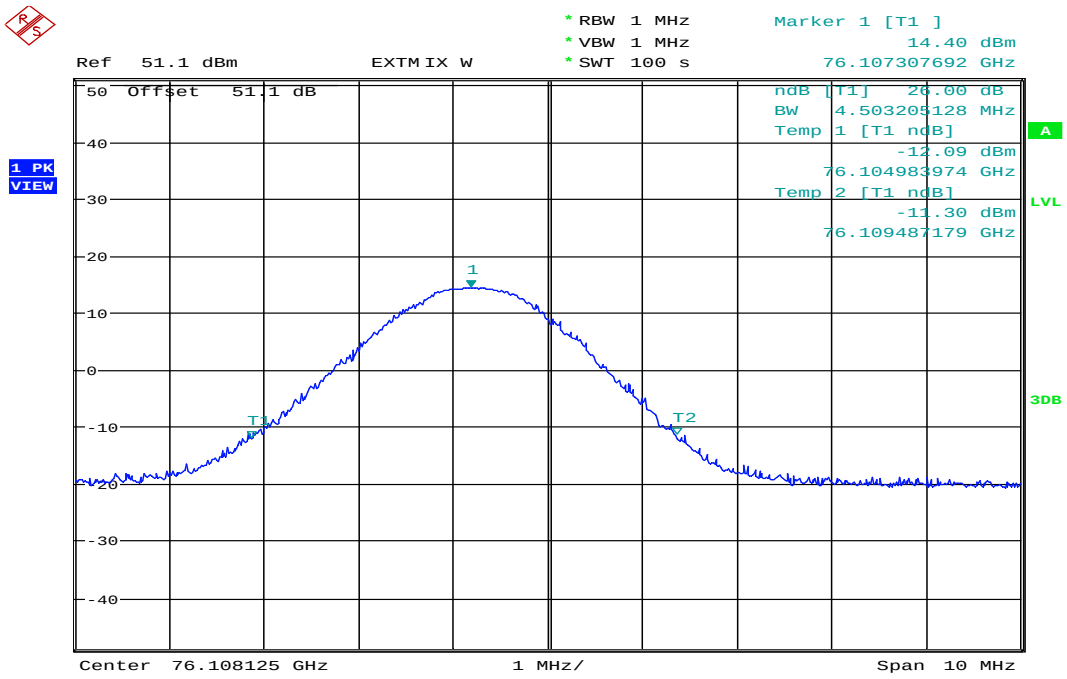
Date: 4.JUL.2011 17:52:23

Plot 69: Normal mode, bandwidth 800 MHz, T_{max} / V_{min} - V_{max}



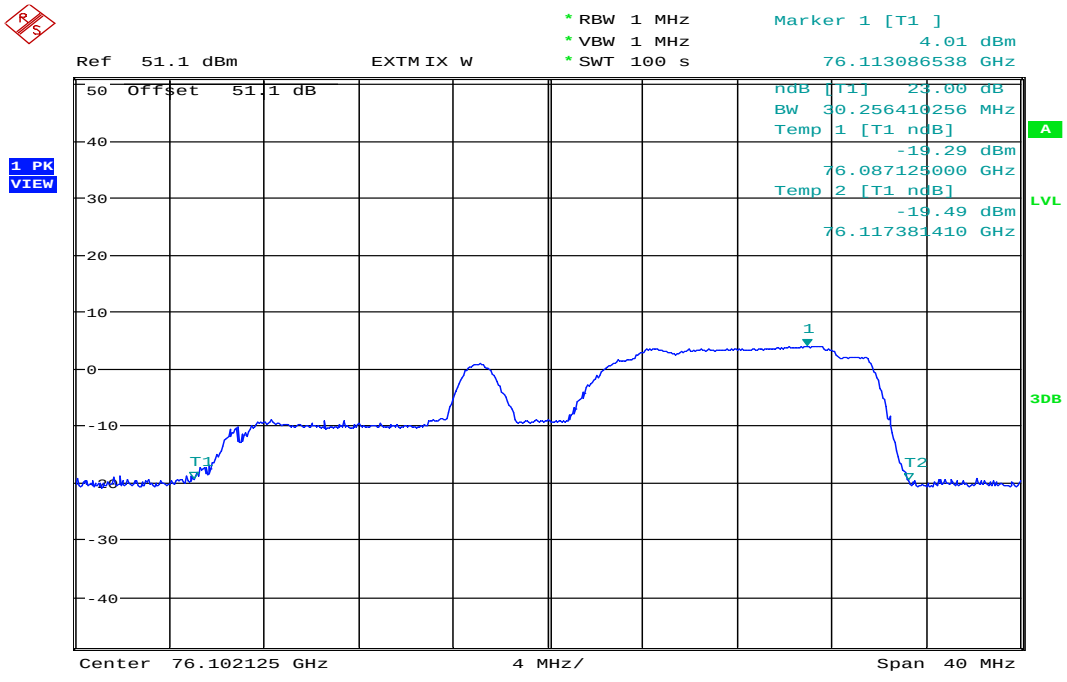
Date: 5.JUL.2011 09:19:03

Plot 70: Occupied bandwidth (26 dB), lower frequency, high power



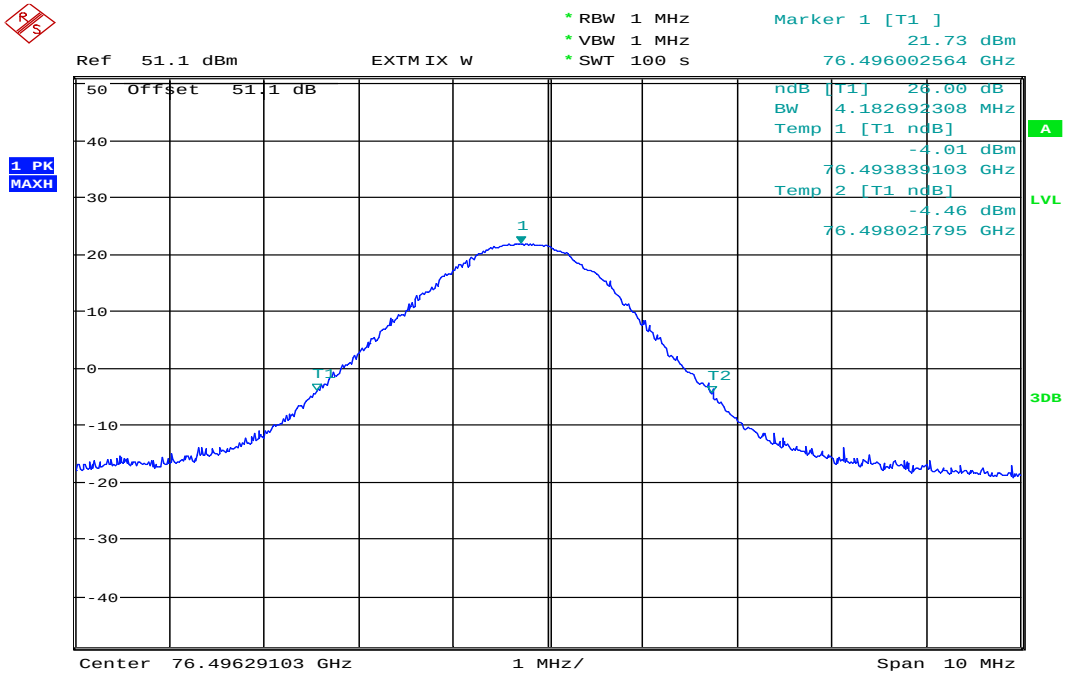
Date: 4.JUL.2011 16:53:18

Plot 71: Occupied bandwidth (26 dB), lower frequency, low power



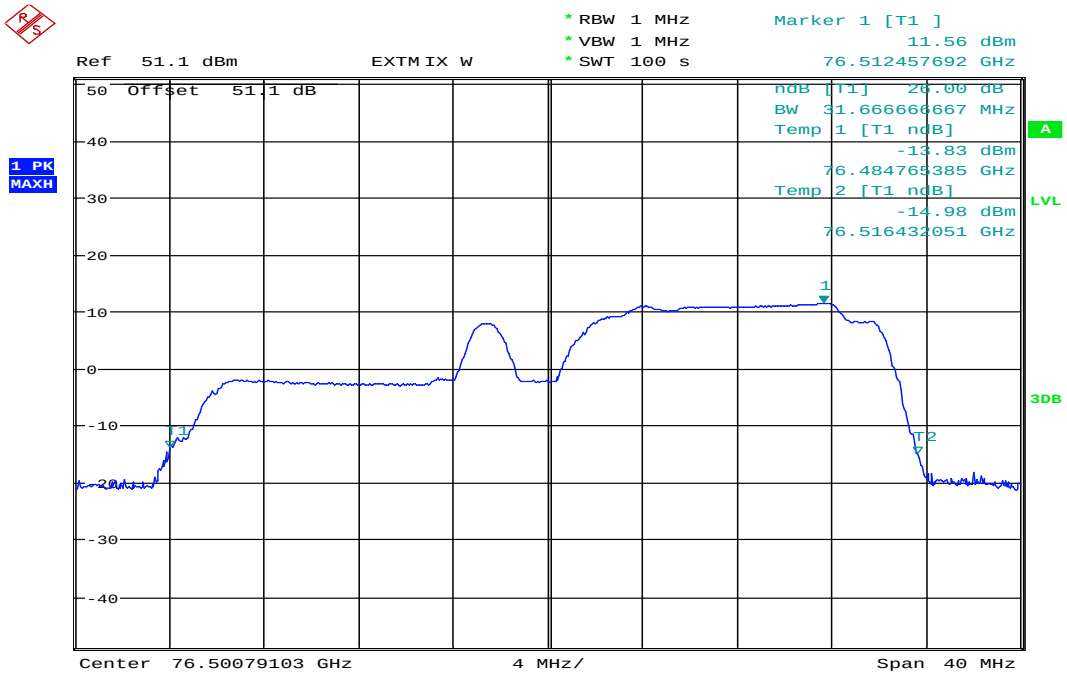
Date: 4.JUL.2011 17:03:27

Plot 72: Occupied bandwidth (26 dB), centre frequency, high power



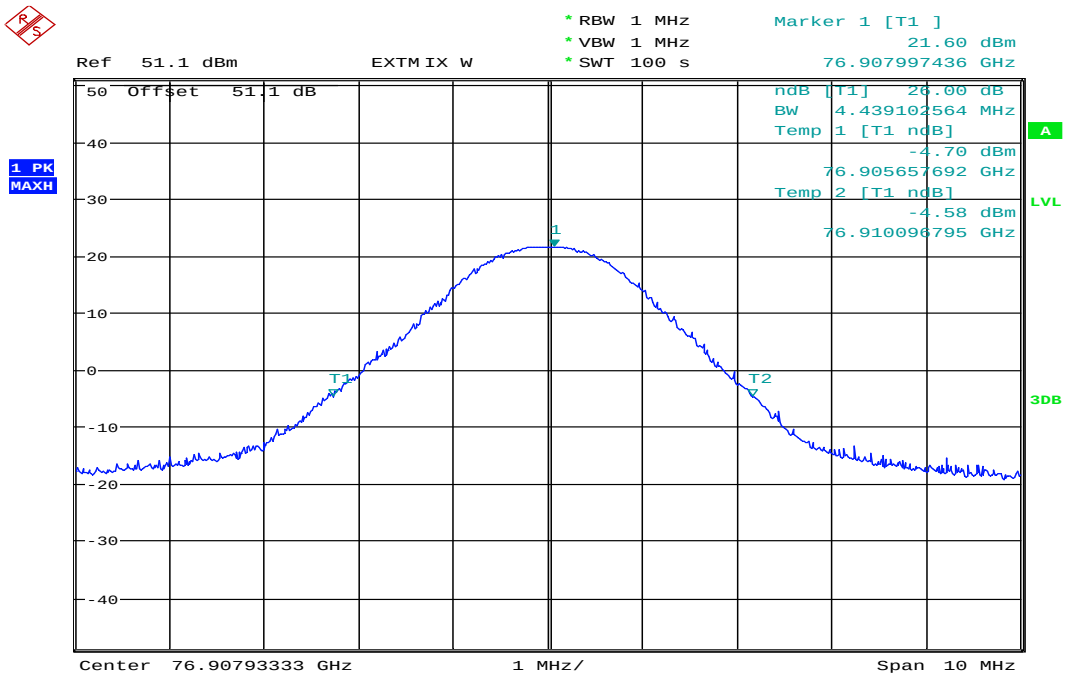
Date: 4.JUL.2011 16:26:36

Plot 73: Occupied bandwidth (26 dB), centre frequency, low power



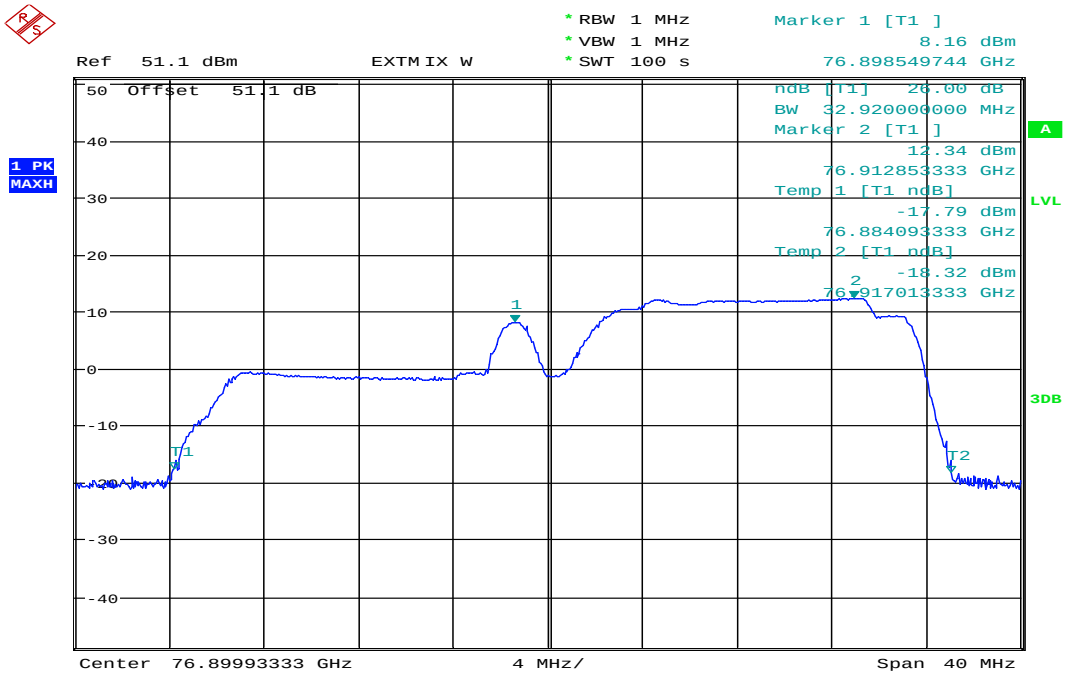
Date: 4.JUL.2011 16:43:23

Plot 74: Occupied bandwidth (26 dB), upper frequency, high power



Date: 4.JUL.2011 17:18:13

Plot 75: Occupied bandwidth (26 dB), upper frequency, low power



Date: 4.JUL.2011 17:28:07

Results: **extreme test conditions (-40 °C)**

TEST CONDITIONS (T_{min} / V_{min} – V_{max})	Occupied Bandwidth (99%)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.100 287 / 76.103 540	3.25
lower frequency, low power	76.091 248 / 76.104 325	13.08
centre frequency, high power	76.498 638 / 76.501 795	3.16
centre frequency, low power	76.490 808 / 76.502 634	11.83
upper frequency, high power	76.897 853 / 76.901 042	3.19
upper frequency, low power	76.892 592 / 76.904 131	11.54

TEST CONDITIONS (T_{min} / V_{min} – V_{max})	Occupied Bandwidth (99%)	
	nominal bandwidth [MHz]	Bandwidth [MHz]
normal mode	200 MHz	202.84
Normal mode	400 MHz	399.04
Normal mode	800 MHz	802.88

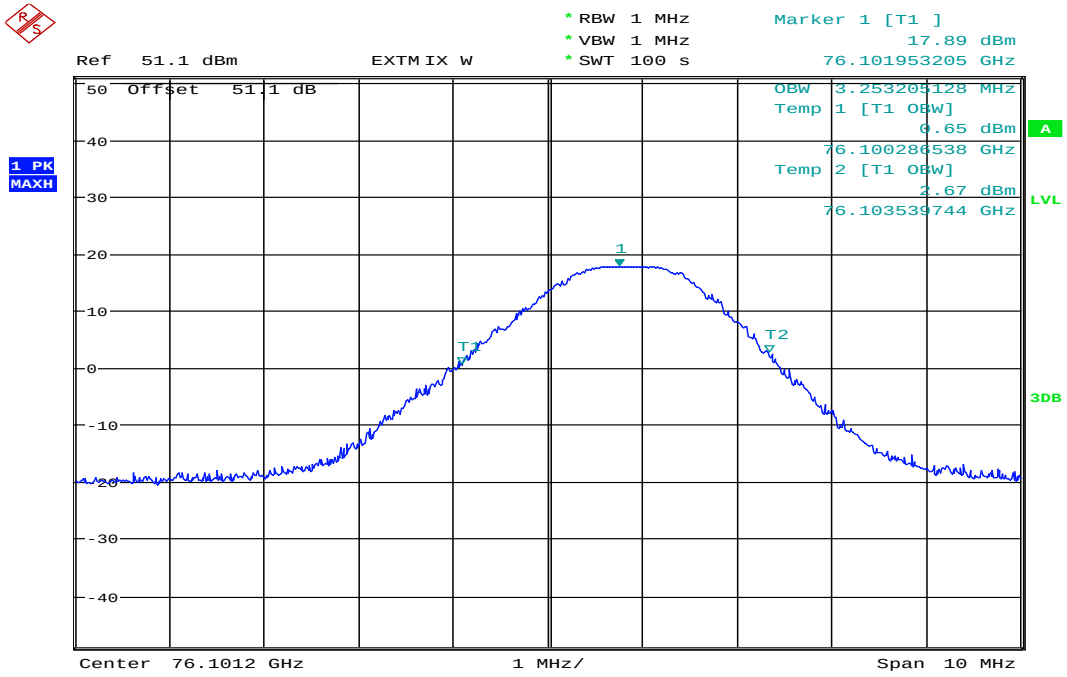
TEST CONDITIONS (T_{min} / V_{min} – V_{max})	Occupied Bandwidth (26 dB)	
	f_{low} / f_{high} [GHz]	Bandwidth [MHz]
lower frequency, high power	76.099 132 / 76.103 876	4.74
lower frequency, low power	76.087 835 / 76.107 883	20.05
centre frequency, high power	76.498 028 / 76.502 468	4.44
centre frequency, low power	76.489 846 / 76.506 096	16.25
upper frequency, high power	76.896 955 / 76.901 522	4.57
upper frequency, low power	76.891 487 / 76.907 400	15.91

Limits: **FCC §15.253 (e)**

Frequency range	f(lowest) > 76.0 GHz	f(highest) < 77.0 GHz

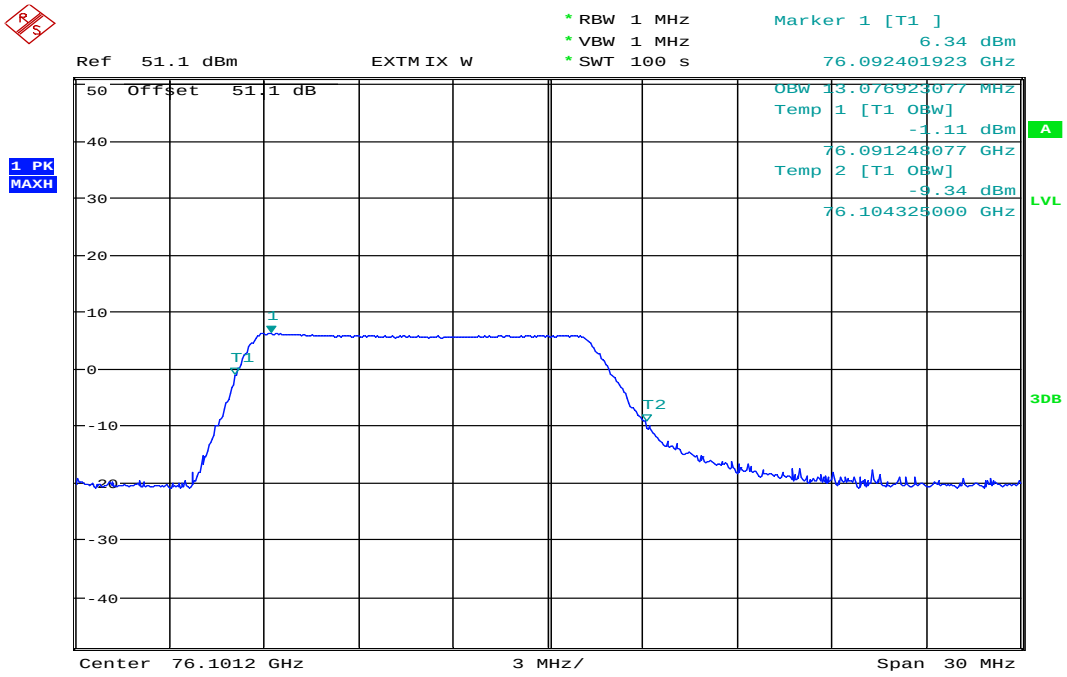
Result: **The measurement is passed.**

Plot 76: Occupied bandwidth (99 %), lower frequency, high power



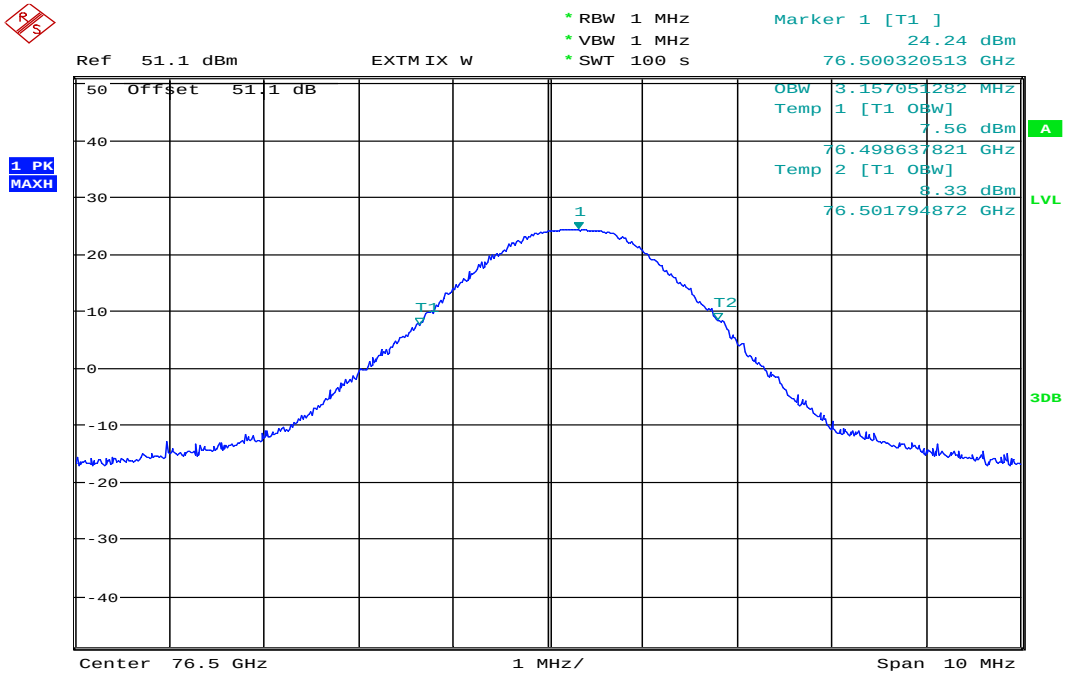
Date: 5.JUL.2011 13:52:42

Plot 77: Occupied bandwidth (99 %), lower frequency, low power



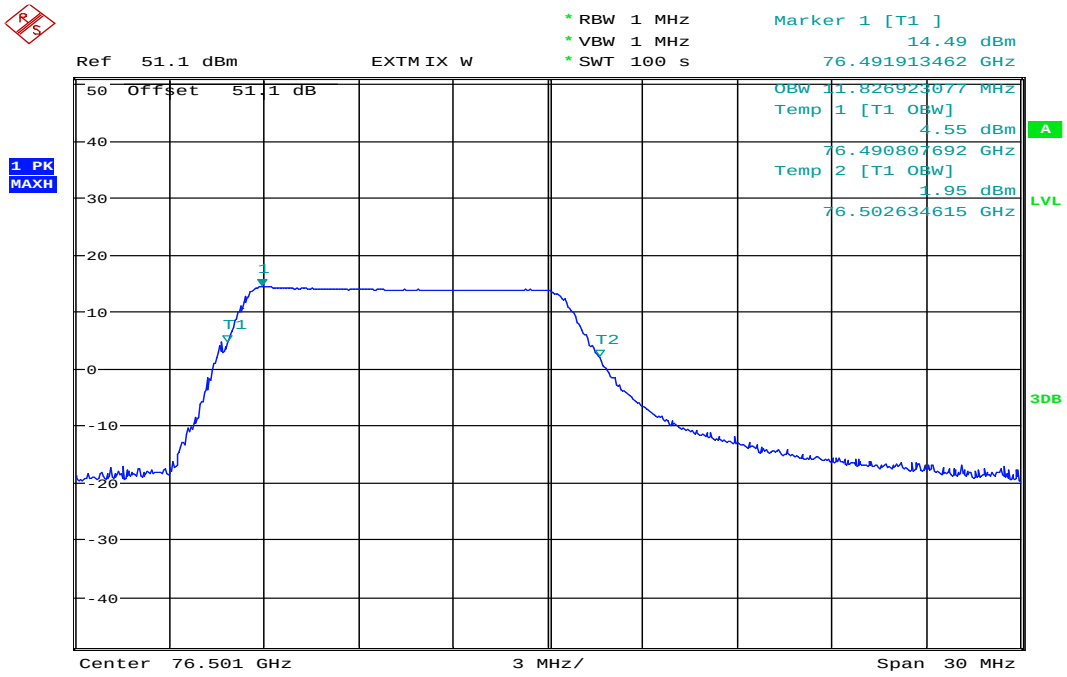
Date: 5.JUL.2011 14:01:19

Plot 78: Occupied bandwidth (99 %), centre frequency, high power



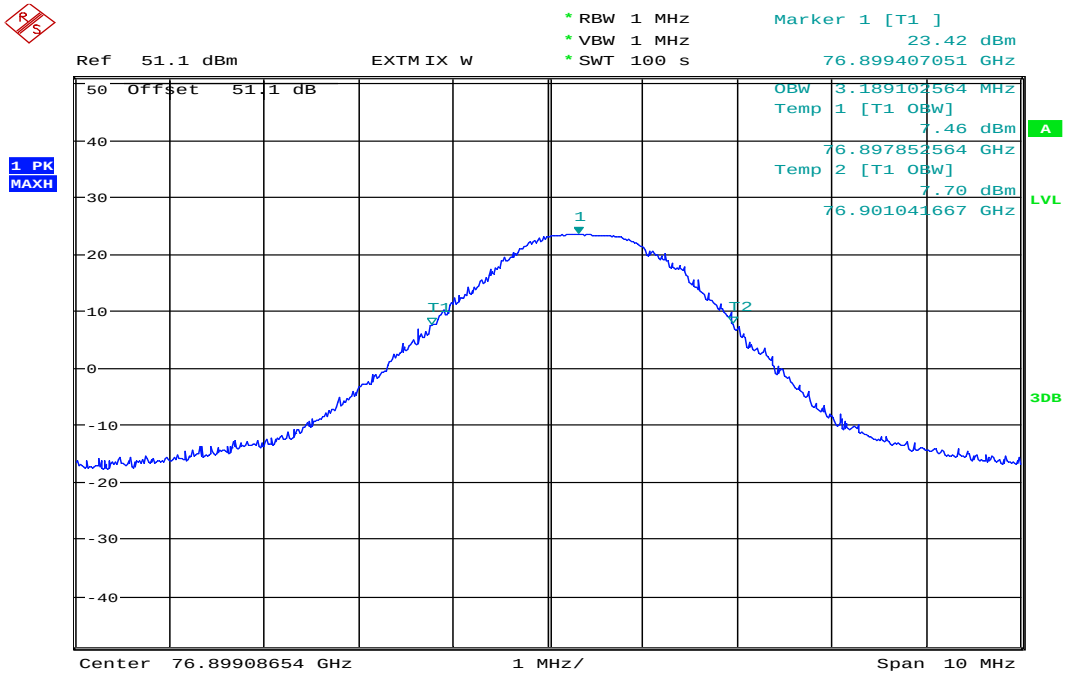
Date: 5.JUL.2011 13:29:55

Plot 79: Occupied bandwidth (99 %), centre frequency, low power



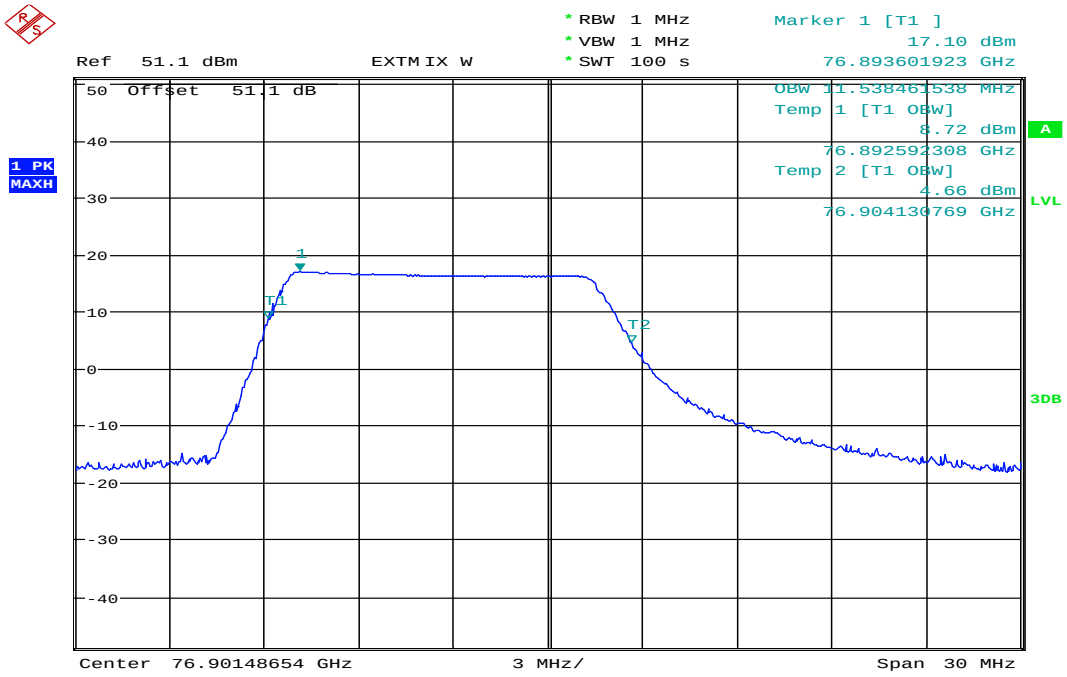
Date: 5.JUL.2011 13:41:04

Plot 80: Occupied bandwidth (99 %), upper frequency, high power



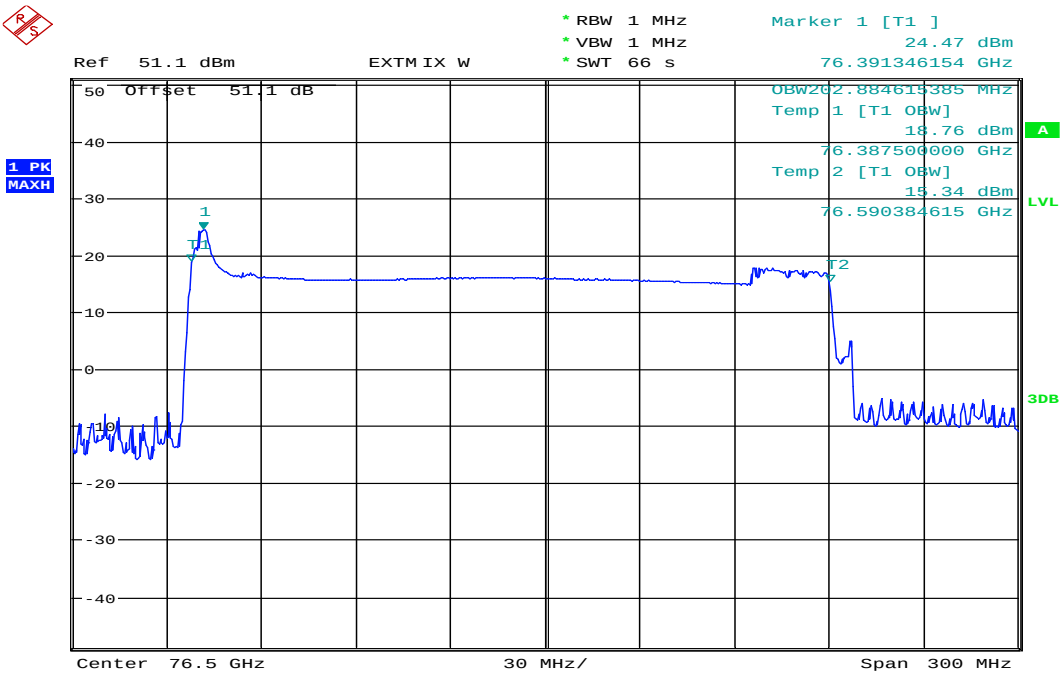
Date: 5.JUL.2011 14:14:00

Plot 81: Occupied bandwidth (99 %), upper frequency, low power



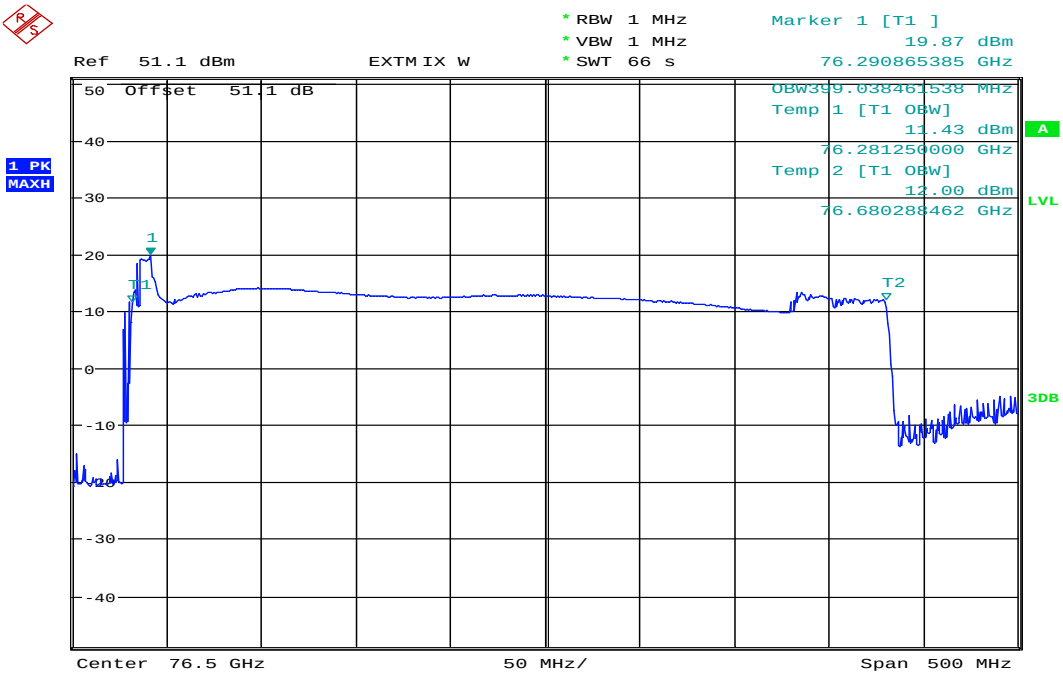
Date: 5.JUL.2011 14:28:26

Plot 82: Normal mode, bandwidth 200 MHz, T_{min} / V_{min} - V_{max}



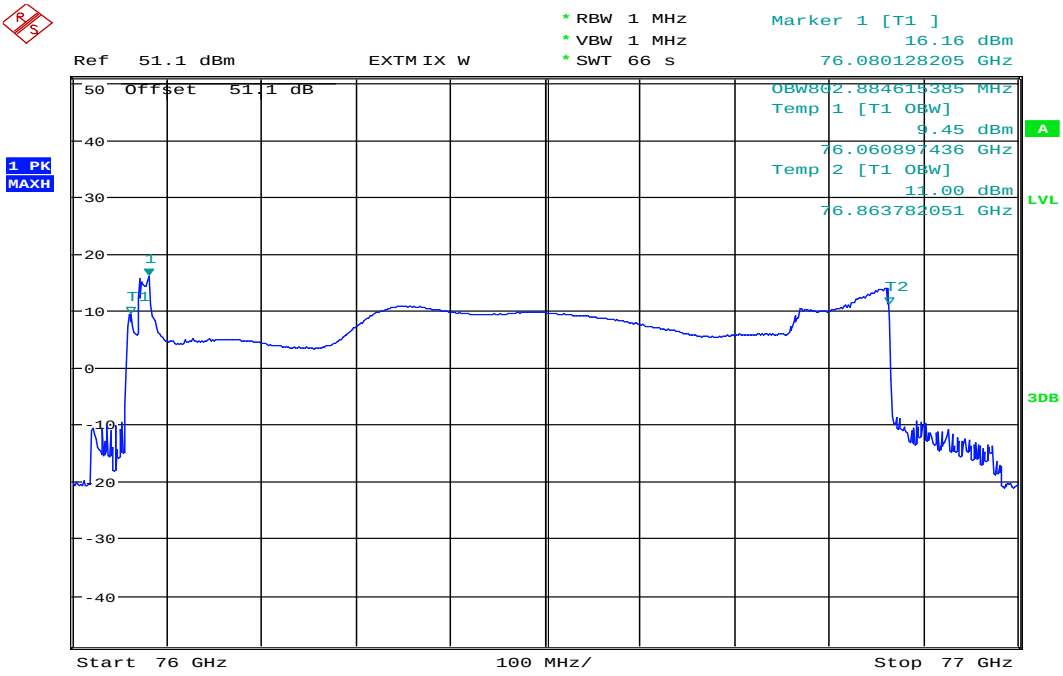
Date: 5.JUL.2011 14:47:24

Plot 83: Normal mode, bandwidth 400 MHz, T_{min} / V_{min} - V_{max}

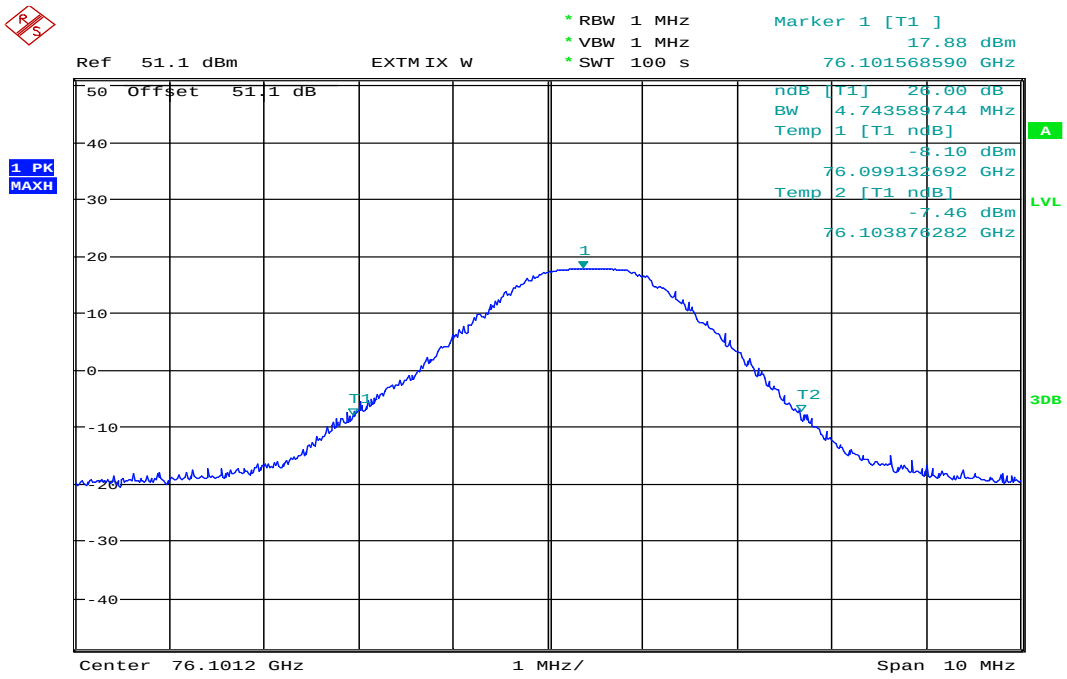


Date: 5.JUL.2011 15:19:46

Plot 84: Normal mode, bandwidth 800 MHz, T_{min} / V_{min} - V_{max}

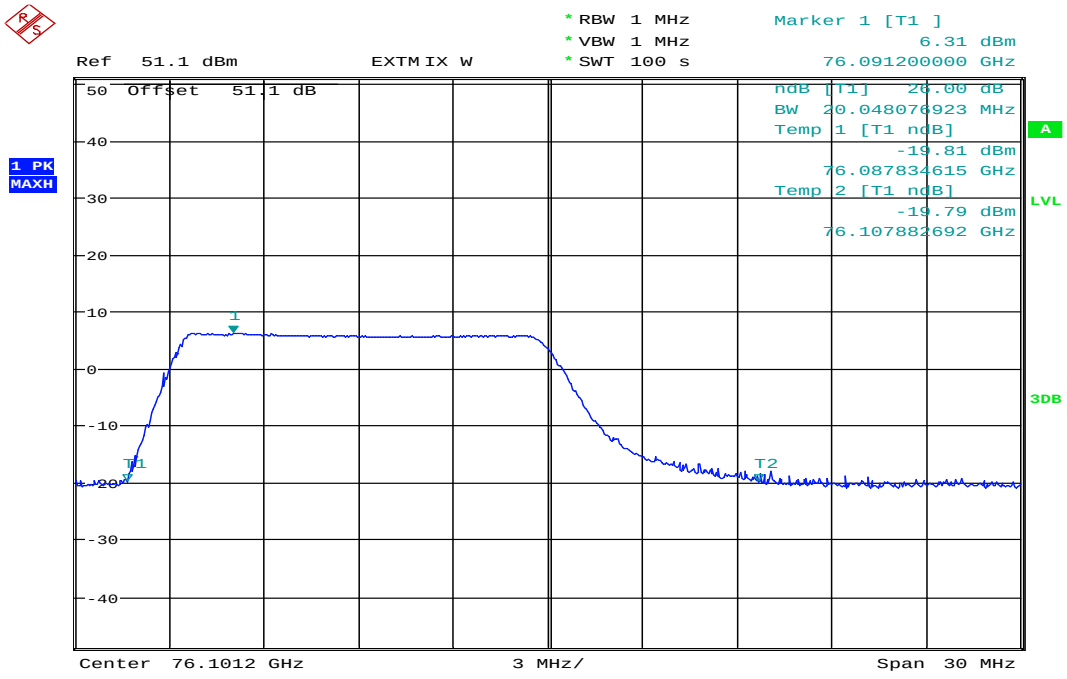


Plot 85: Occupied bandwidth (26 dB), lower frequency, high power



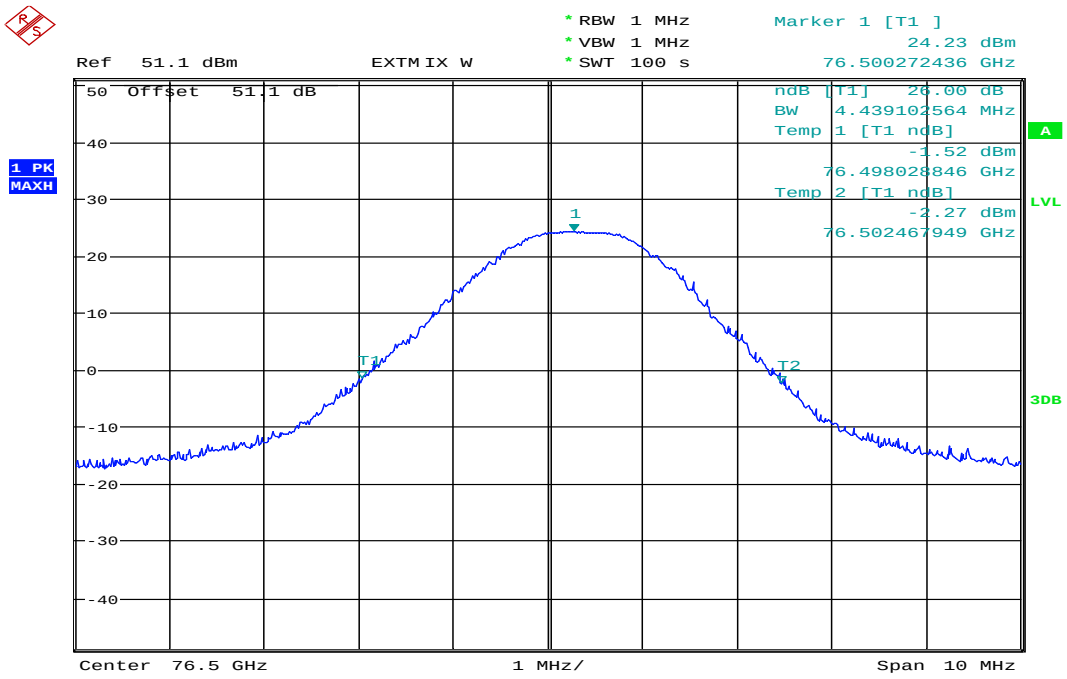
Date: 5.JUL.2011 13:50:46

Plot 86: Occupied bandwidth (26 dB), lower frequency, low power



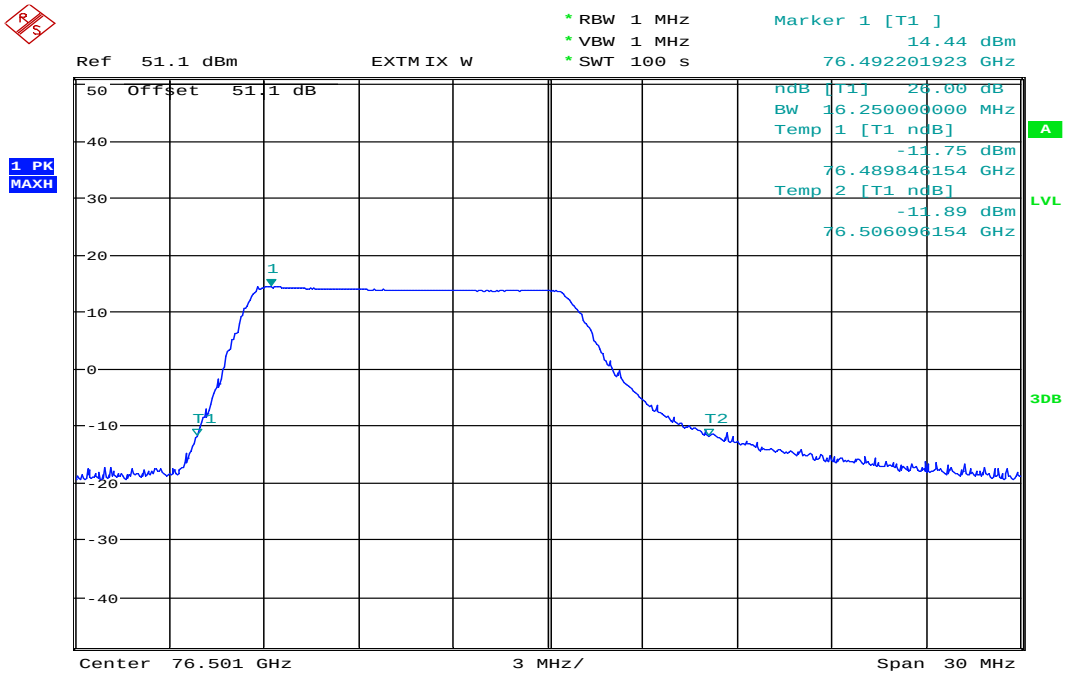
Date: 5.JUL.2011 13:59:35

Plot 87: Occupied bandwidth (26 dB), centre frequency, high power



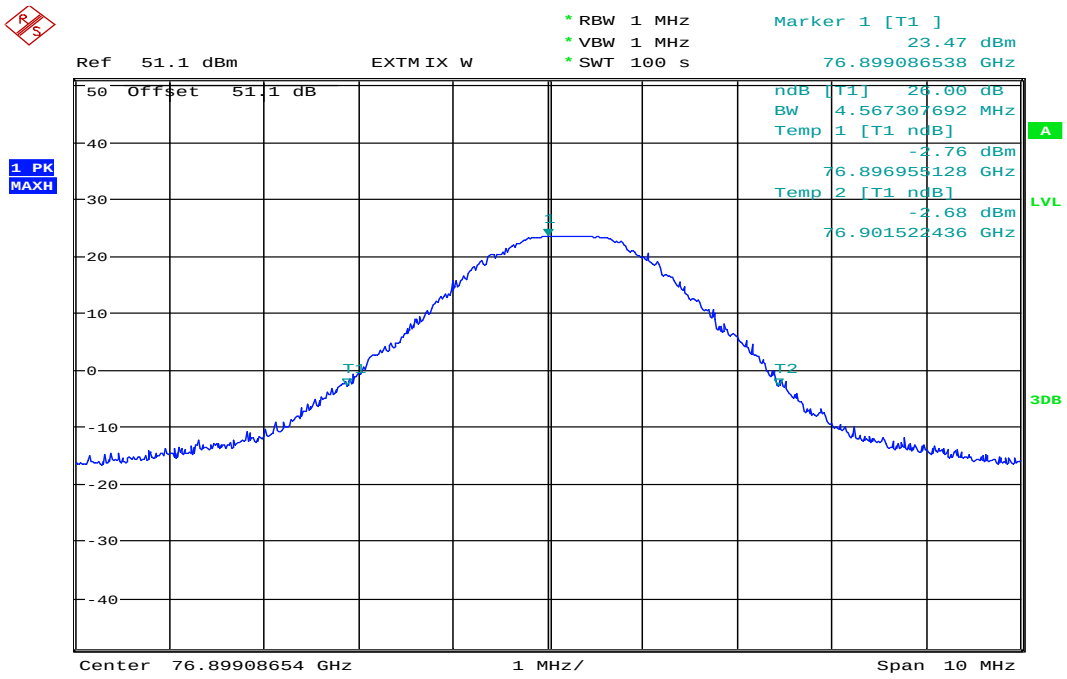
Date: 5.JUL.2011 13:26:55

Plot 88: Occupied bandwidth (26 dB), centre frequency, low power



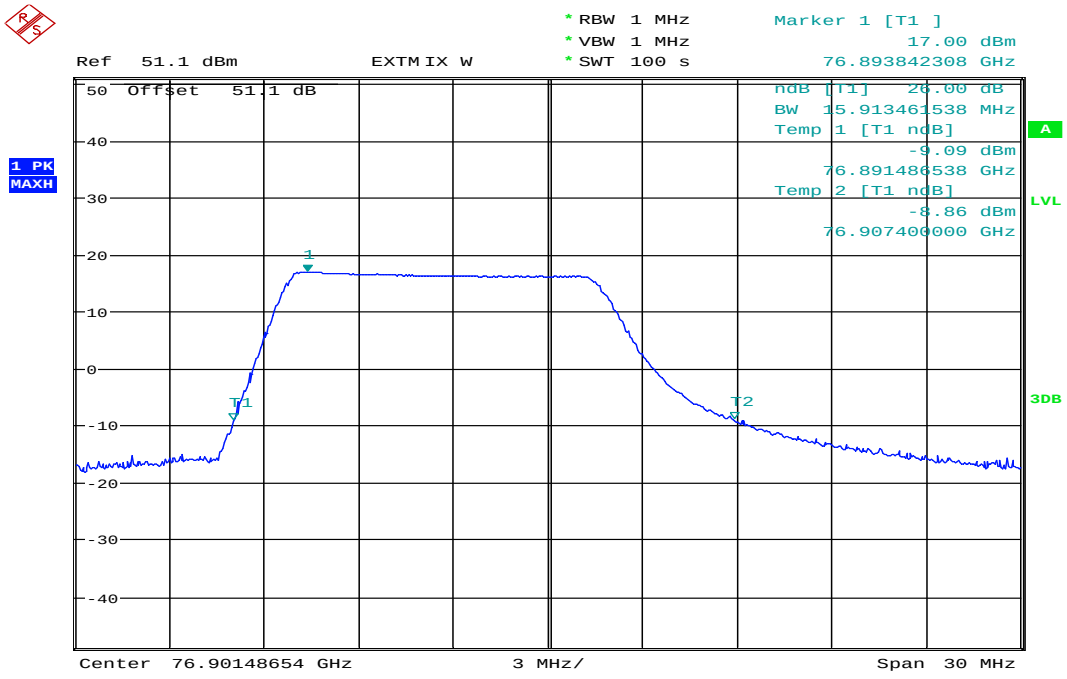
Date: 5.JUL.2011 13:39:04

Plot 89: Occupied bandwidth (26 dB), upper frequency, high power



Date: 5.JUL.2011 14:12:17

Plot 90: Occupied bandwidth (26 dB), upper frequency, low power



Date: 5.JUL.2011 14:25:08

9.4 Field strength of emissions (radiated spurious)

Description:

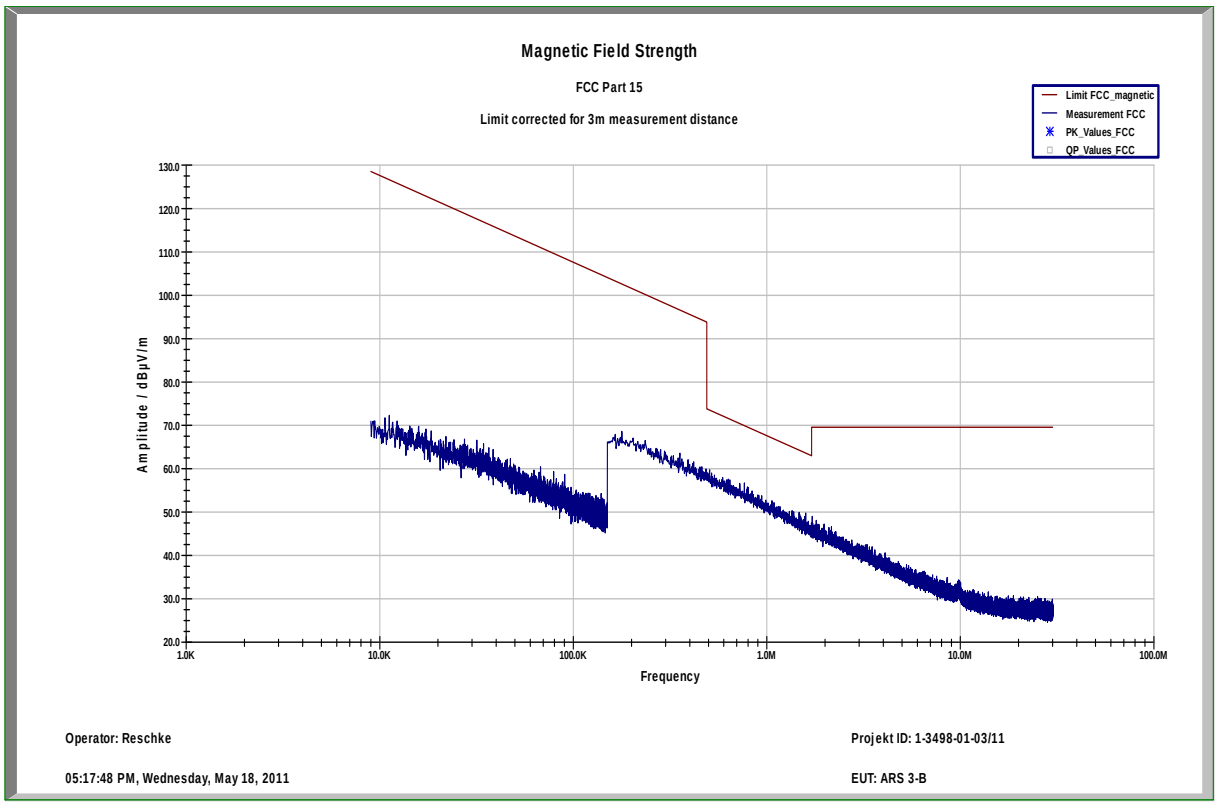
Measurement of the radiated spurious emissions in transmit mode.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Frequency range:	30 MHz to 235 GHz
Trace-Mode:	Max Hold

- **Lower frequency**

Plot 91: 9 kHz – 30 MHz, Loop antenna (valid for all modes and all frequencies)



Plot 92: 30 MHz – 1 GHz, antenna horizontal / vertical

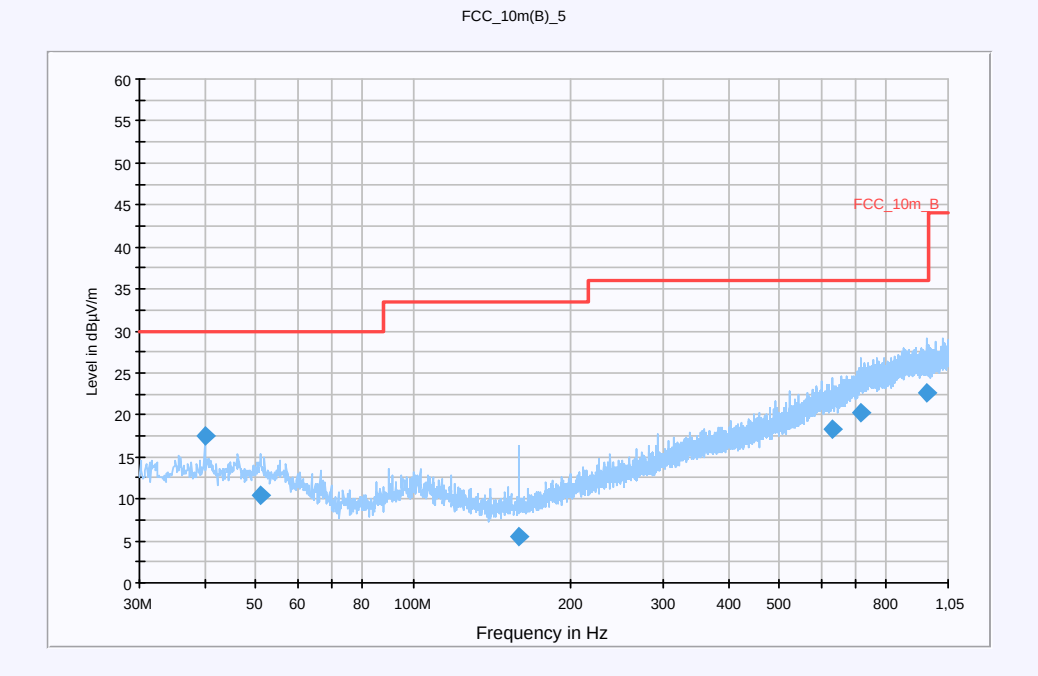
Information

EUT:	ARS 3-B
Serial Number:	
Test Description:	FCC Part 15
Operating Conditions:	CW, lower frequency, high power
Operator Name:	Kraus
Comment:	DC powered 12V

Scan Setup: STAN_Fin [EMI radiated]

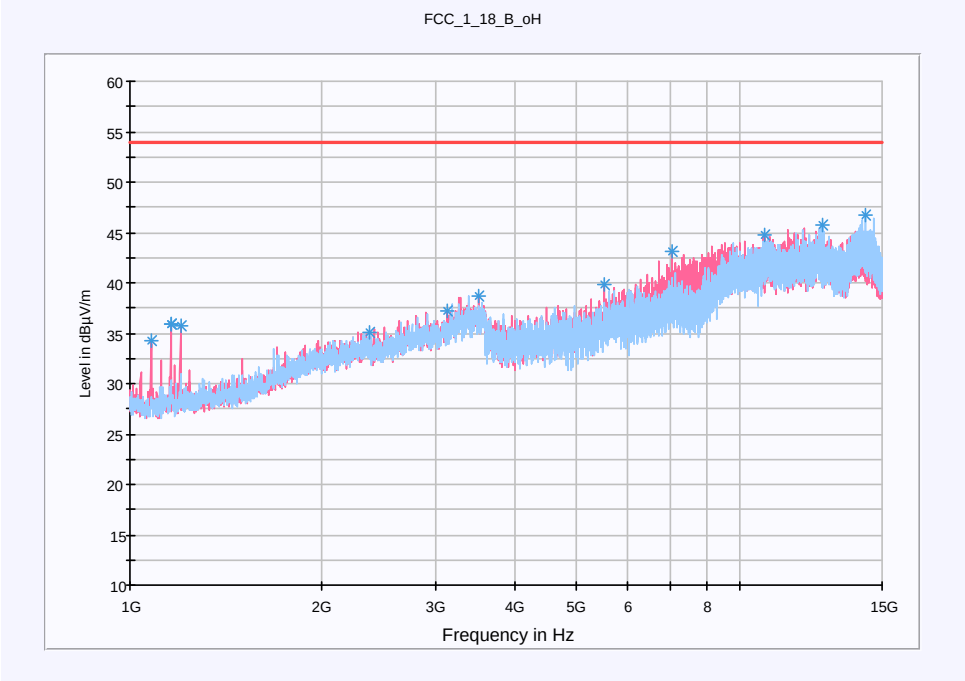
Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



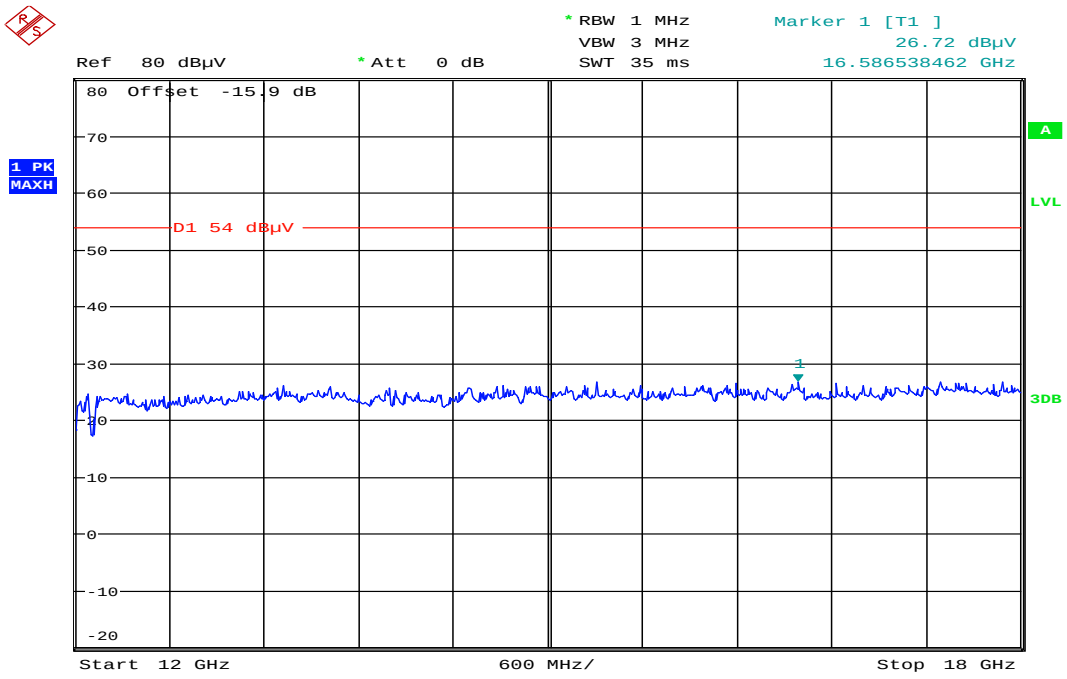
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
39.960000	17.6	15000.000	120.000	256.0	V	275.0	13.4	12.4	30.0
51.120000	10.3	15000.000	120.000	168.0	V	174.0	13.3	19.7	30.0
158.640000	5.4	15000.000	120.000	270.0	V	-2.0	9.2	28.1	33.5
630.120000	18.3	15000.000	120.000	252.0	V	219.0	21.0	17.7	36.0
714.960000	20.2	15000.000	120.000	270.0	H	188.0	22.9	15.8	36.0
959.280000	22.6	15000.000	120.000	116.0	V	201.0	25.4	13.4	36.0

Plot 93: 1 GHz – 15 GHz, antenna horizontal / vertical



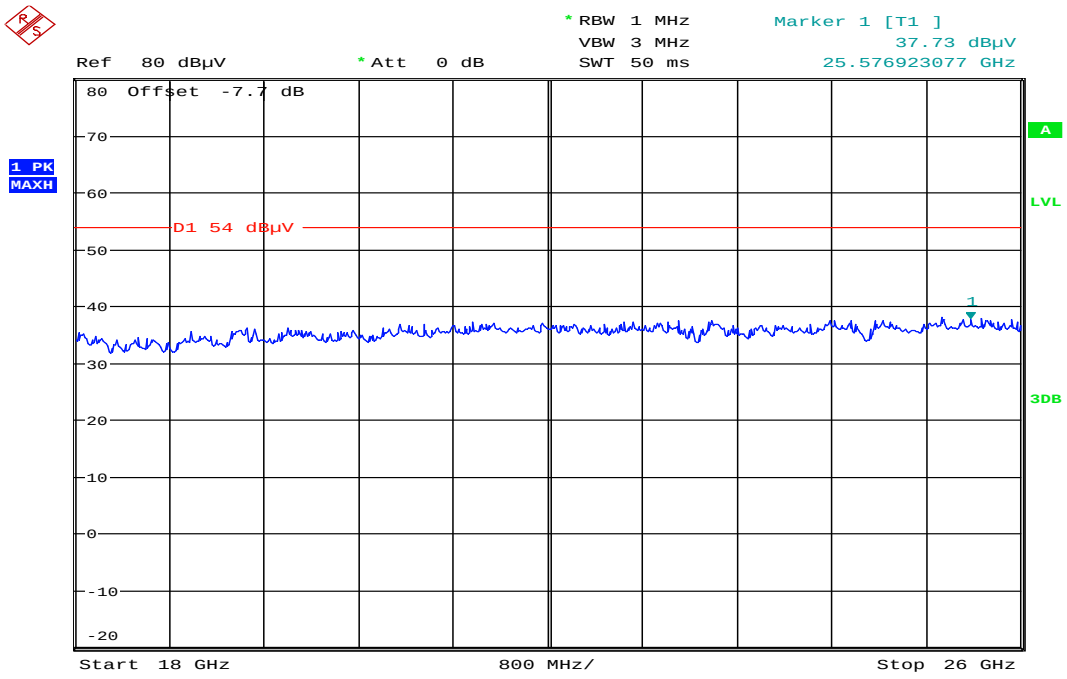
Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)
1081.600000	34.2	98.0	V	11.0	-14.4
1158.100000	35.9	98.0	V	11.0	-14.3
1161.500000	35.9	98.0	V	39.0	-14.3
1199.750000	35.8	98.0	V	26.0	-14.2
2369.350000	35.1	98.0	H	156.0	-9.2
3142.000000	37.2	98.0	V	332.0	-7.2
3519.400000	38.7	98.0	V	2.0	-6.4
5515.200000	39.9	98.0	V	2.0	-4.3
7036.700000	43.1	98.0	V	149.0	-0.1
9842.550000	44.8	98.0	V	274.0	3.8
12112.050000	45.7	98.0	H	139.0	5.3
14158.000000	46.7	98.0	H	338.0	7.4

Plot 94: 12 GHz – 18 GHz, antenna horizontal / vertical



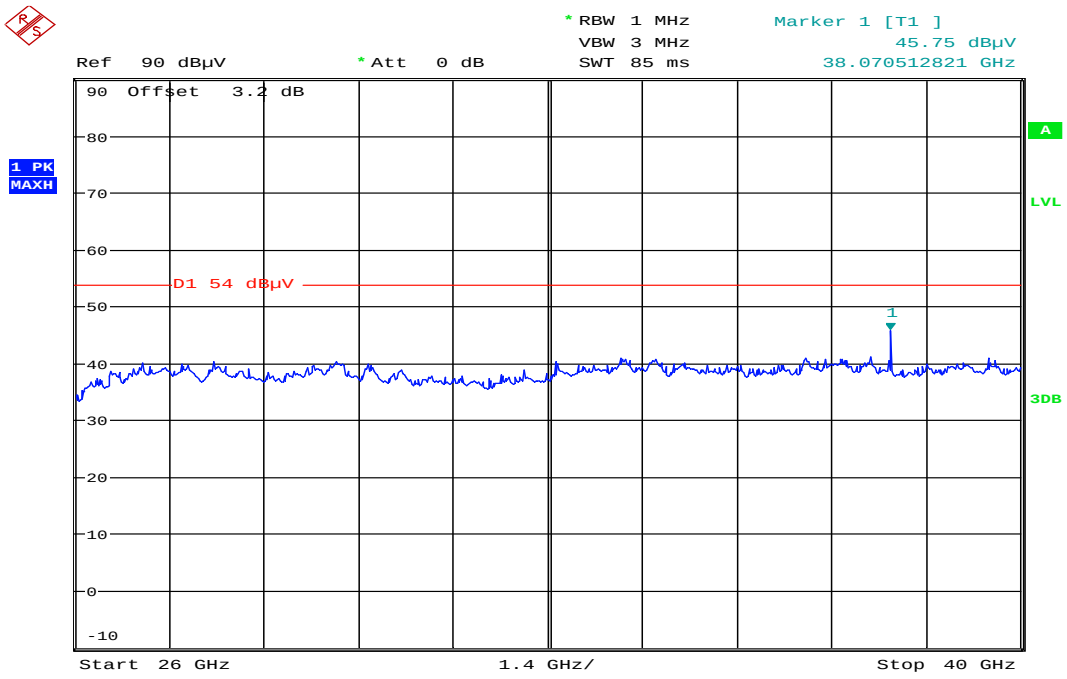
Date: 19.MAY.2011 16:03:27

Plot 95: 18 GHz – 26 GHz, antenna horizontal / vertical



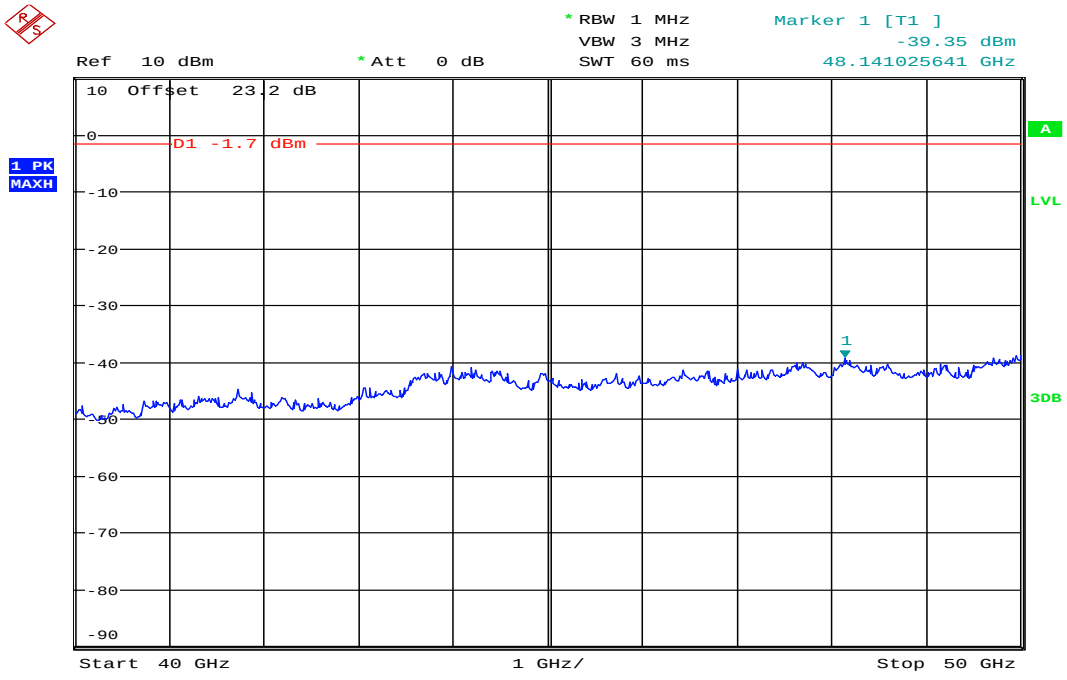
Date: 19.MAY.2011 15:59:00

Plot 96: 26 GHz – 40 GHz, antenna horizontal / vertical



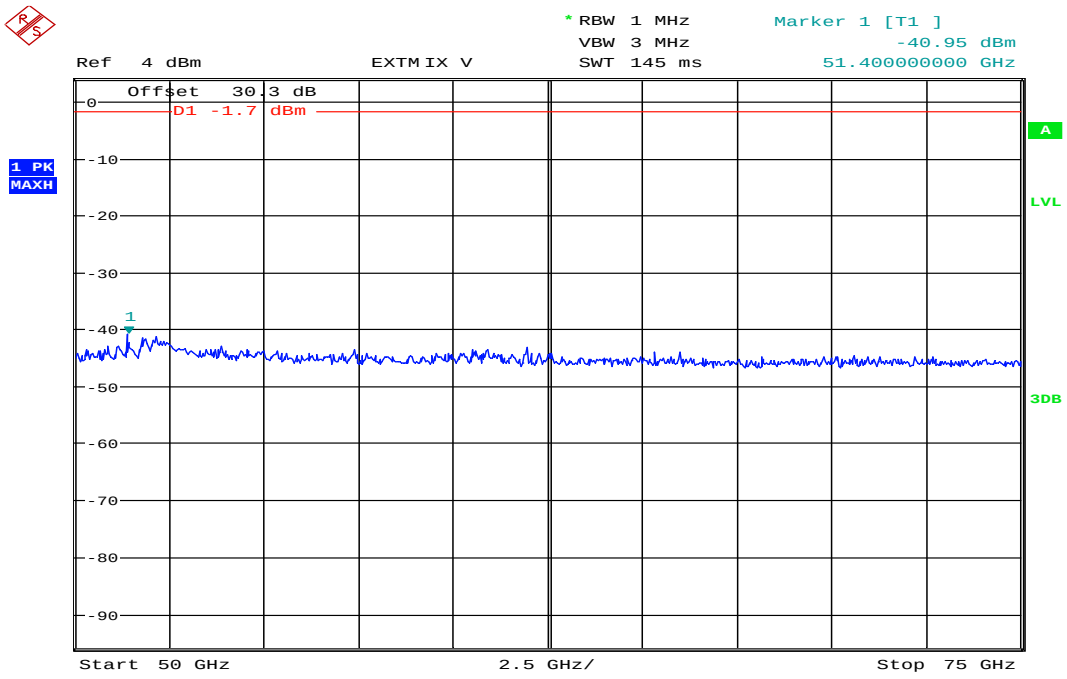
Date: 19.MAY.2011 15:52:29

Plot 97: 40 GHz – 50 GHz, antenna horizontal / vertical



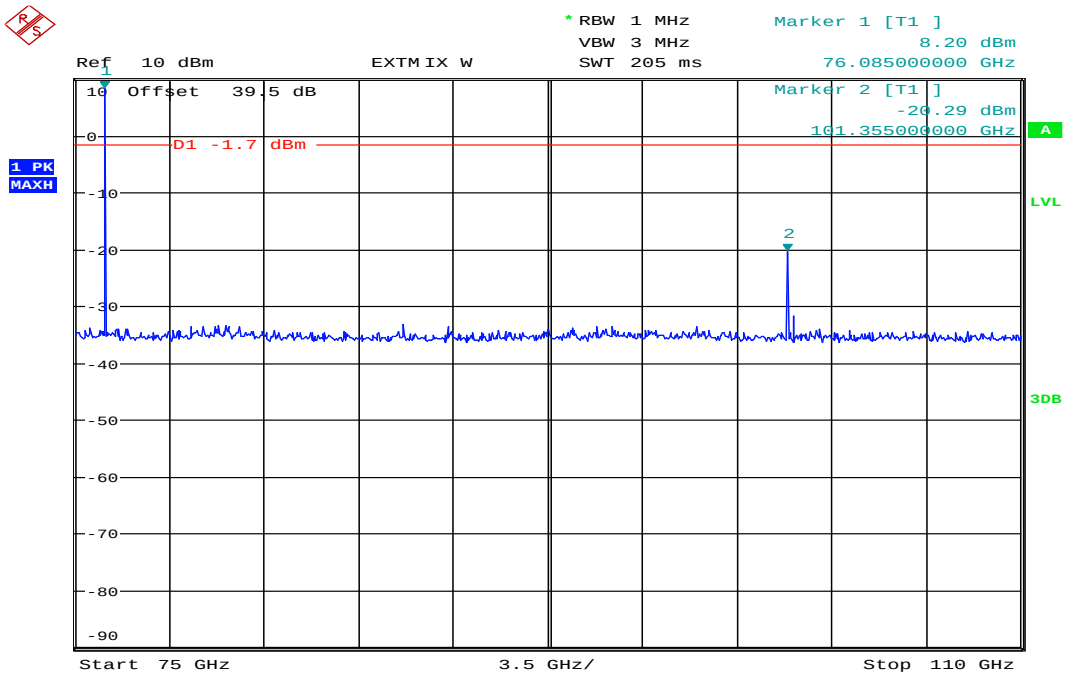
Date: 19.MAY.2011 15:43:33

Plot 98: 50 GHz – 75 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:33:40

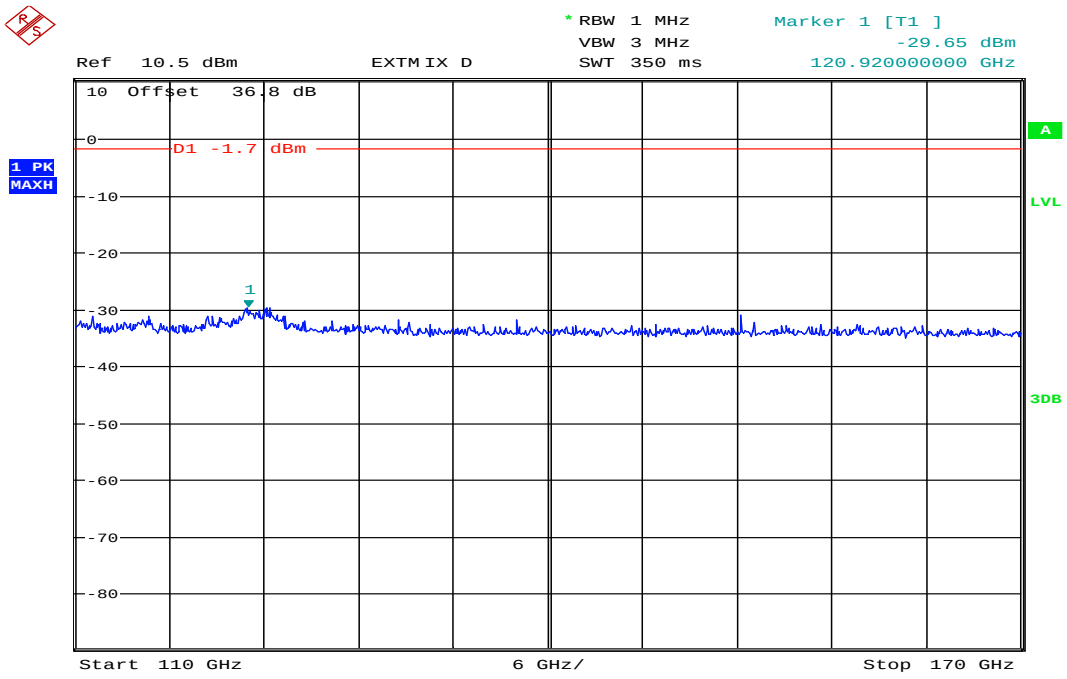
Plot 99: 75 GHz – 110 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:48:51

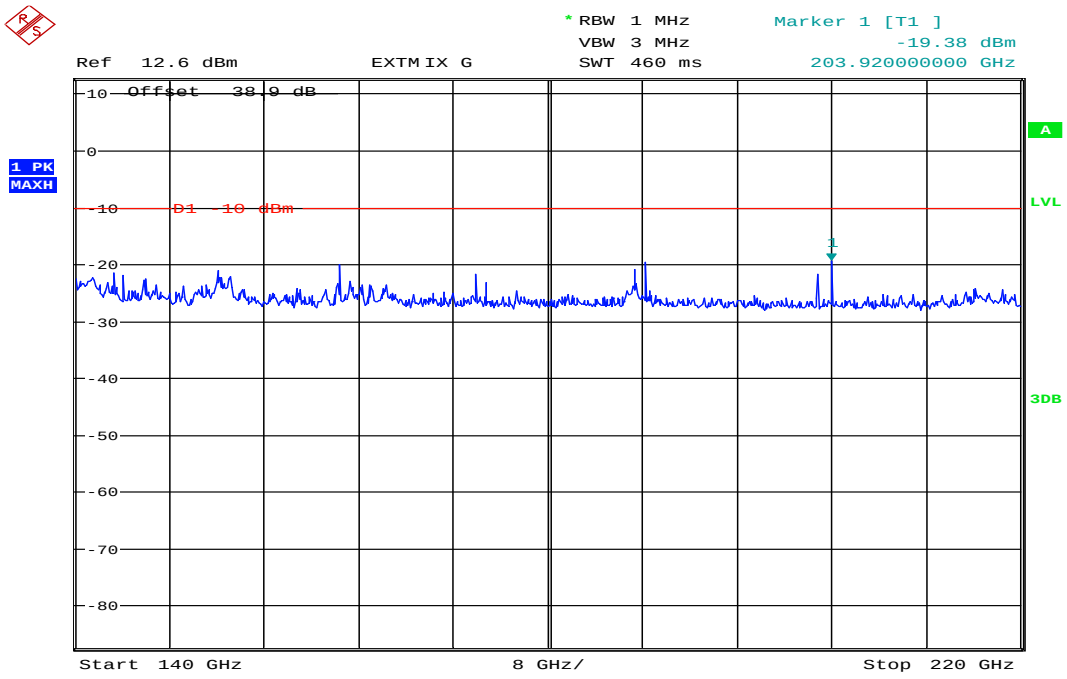
Note: Marker 1 shows the wanted signal, marker 2 shows a peak produced by the harmonic mixer!

Plot 100: 110 GHz – 170 GHz, antenna horizontal / vertical



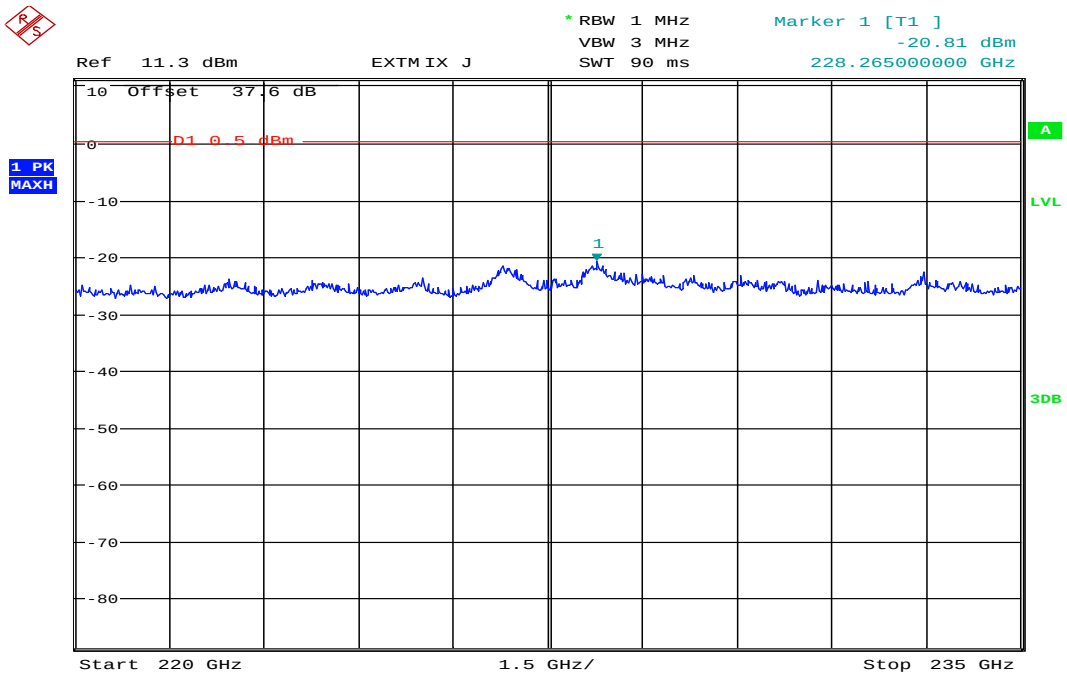
Date: 19.MAY.2011 13:40:04

Plot 101: 140 GHz – 220 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 14:04:26

Plot 102: 220 GHz – 235 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 14:25:24

- **Centre frequency**

Plot 103: 30 MHz – 1 GHz, antenna horizontal / vertical

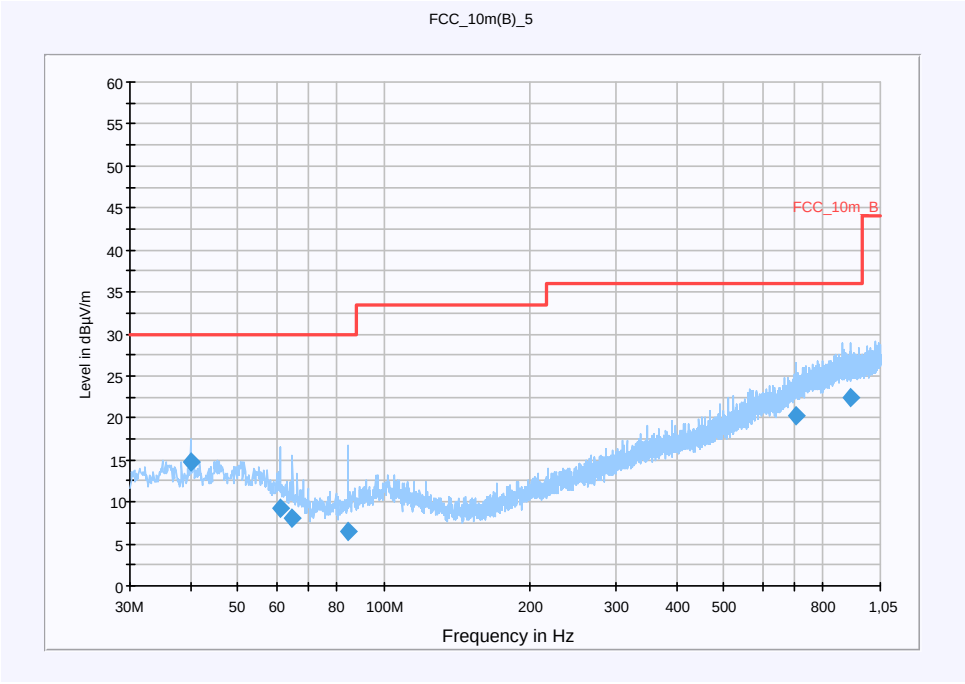
Information

EUT:	ARS 3-B
Serial Number:	
Test Description:	FCC Part 15
Operating Conditions:	CW, centre frequency, high power
Operator Name:	Kraus
Comment:	DC powered 12V

Scan Setup: STAN_Fin [EMI radiated]

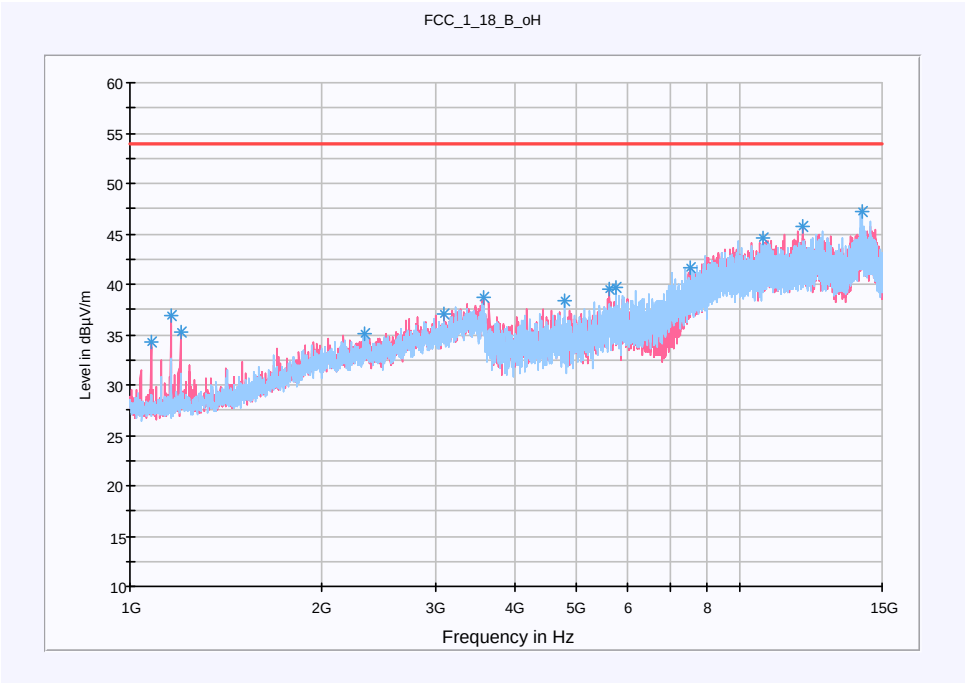
Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



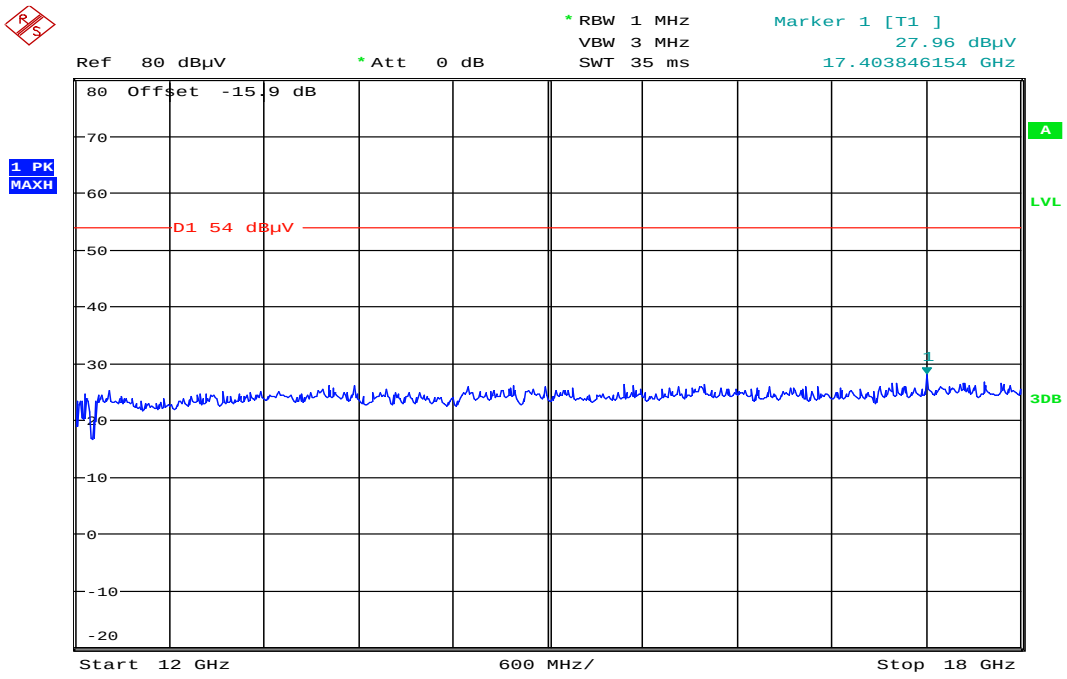
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
39.960000	14.7	15000.000	120.000	274.0	V	315.0	13.4	15.3	30.0
61.200000	9.3	15000.000	120.000	274.0	V	168.0	11.3	20.7	30.0
64.800000	8.2	15000.000	120.000	115.0	V	-2.0	10.5	21.8	30.0
84.360000	6.4	15000.000	120.000	217.0	V	66.0	9.7	23.6	30.0
704.040000	20.2	15000.000	120.000	106.0	H	196.0	22.6	15.8	36.0
908.760000	22.4	15000.000	120.000	225.0	H	156.0	25.2	13.6	36.0

Plot 104: 1 GHz – 15 GHz, antenna horizontal / vertical



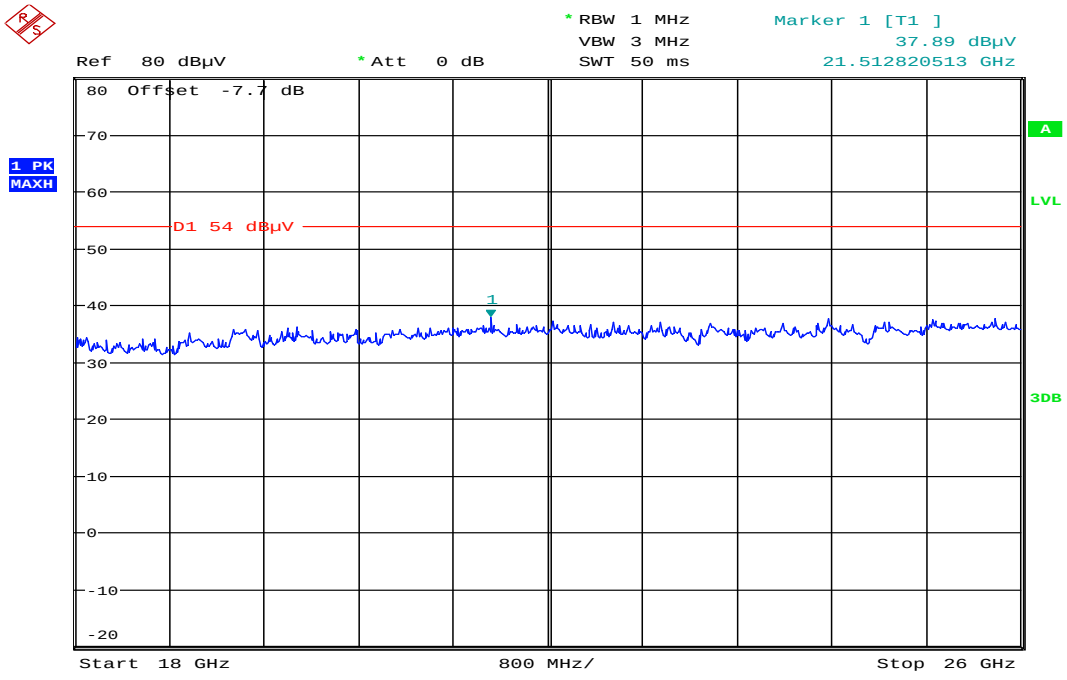
Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)
1081.600000	34.2	98.0	V	23.0	-14.4
1158.100000	36.9	98.0	V	36.0	-14.3
1199.750000	35.2	98.0	V	47.0	-14.2
2323.450000	35.1	98.0	V	147.0	-9.3
3091.000000	37.1	98.0	V	312.0	-7.3
3572.950000	38.6	98.0	V	147.0	-6.4
4771.450000	38.3	98.0	H	80.0	-6.0
5615.500000	39.4	98.0	V	353.0	-4.1
5743.000000	39.7	98.0	H	6.0	-4.0
7533.950000	41.7	98.0	V	147.0	1.1
9752.450000	44.6	98.0	H	322.0	3.6
11257.800000	45.7	98.0	V	2.0	4.8
13963.350000	47.3	98.0	H	80.0	7.4

Plot 105: 12 GHz – 18 GHz, antenna horizontal / vertical



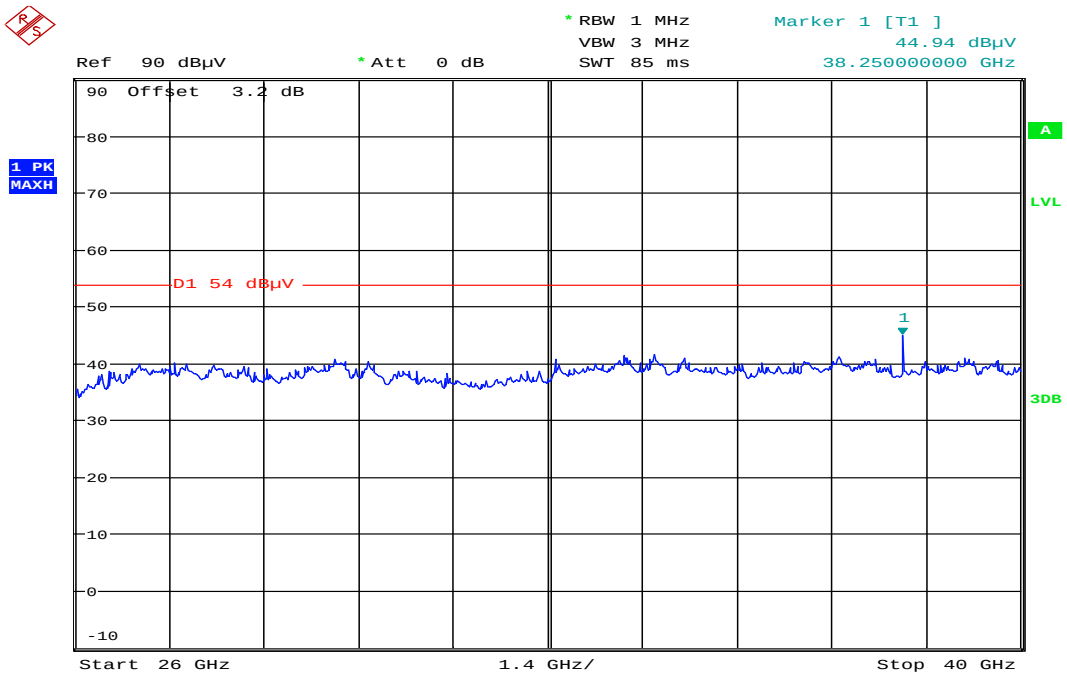
Date: 19.MAY.2011 16:03:00

Plot 106: 18 GHz – 26 GHz, antenna horizontal / vertical



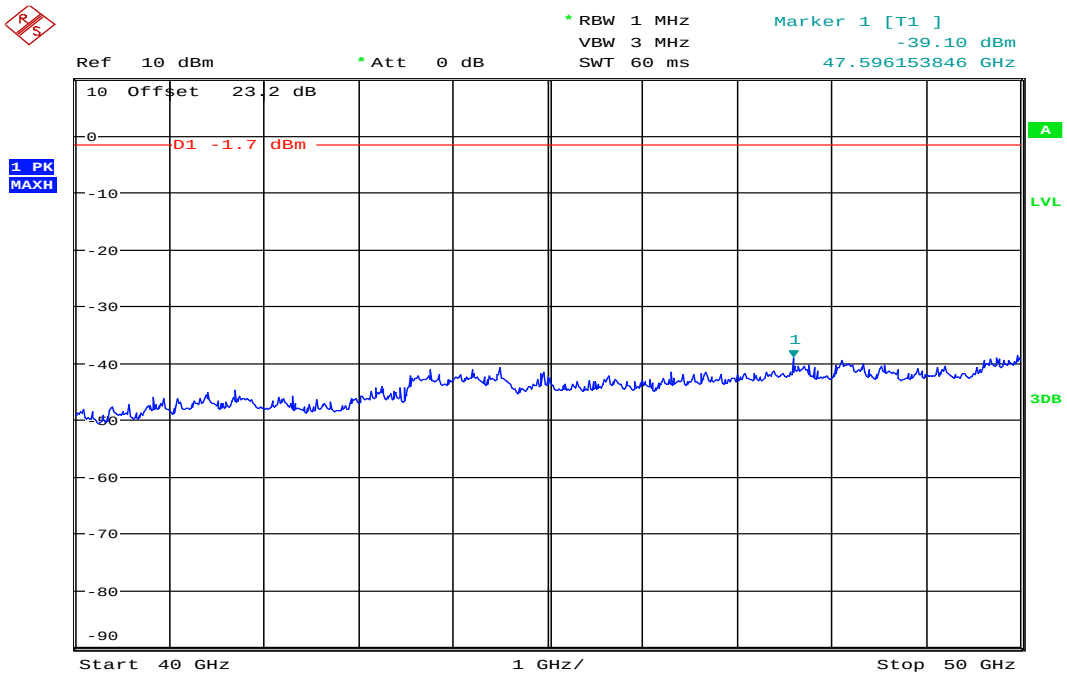
Date: 19.MAY.2011 15:59:34

Plot 107: 26 GHz – 40 GHz, antenna horizontal / vertical



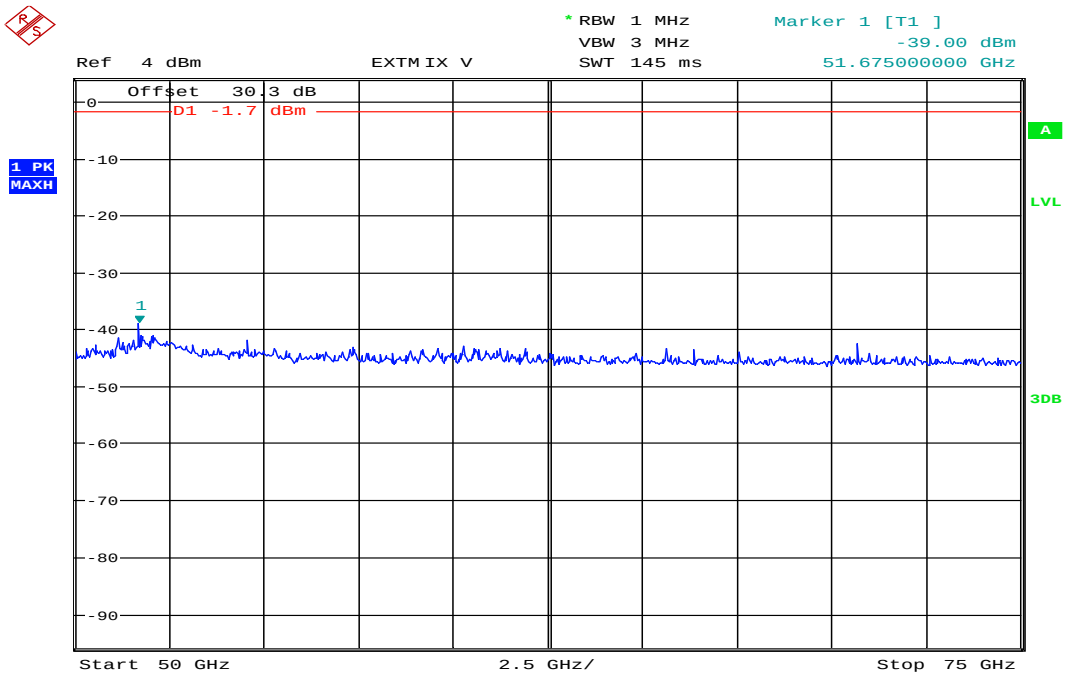
Date: 19.MAY.2011 15:51:16

Plot 108: 40 GHz – 50 GHz, antenna horizontal / vertical



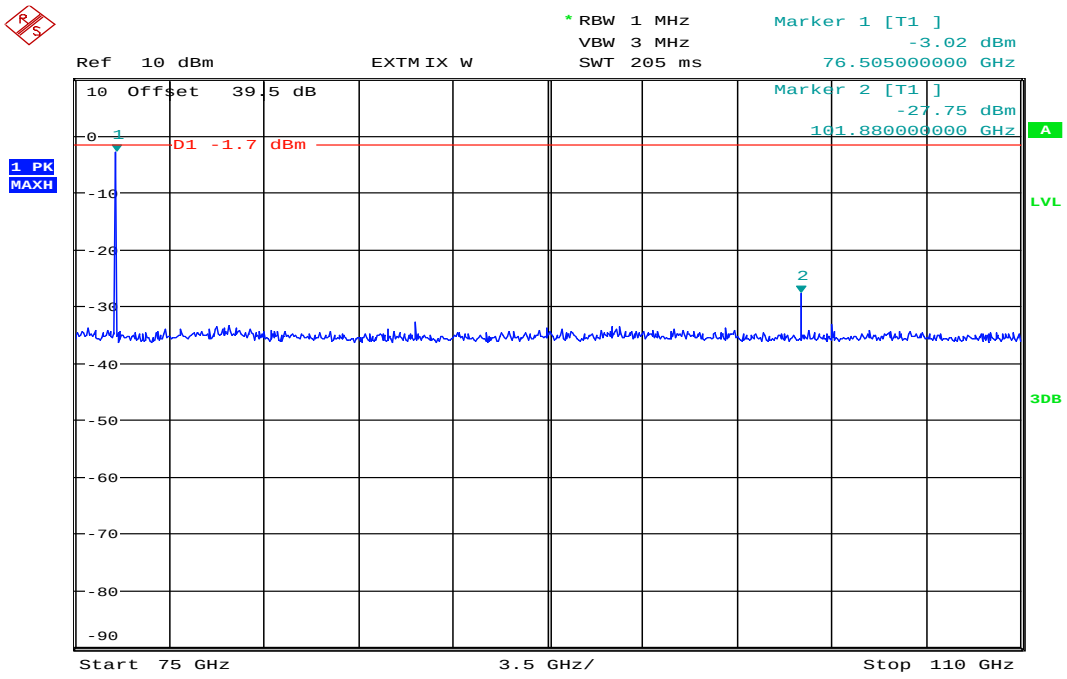
Date: 19.MAY.2011 15:44:45

Plot 109: 50 GHz – 75 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:35:19

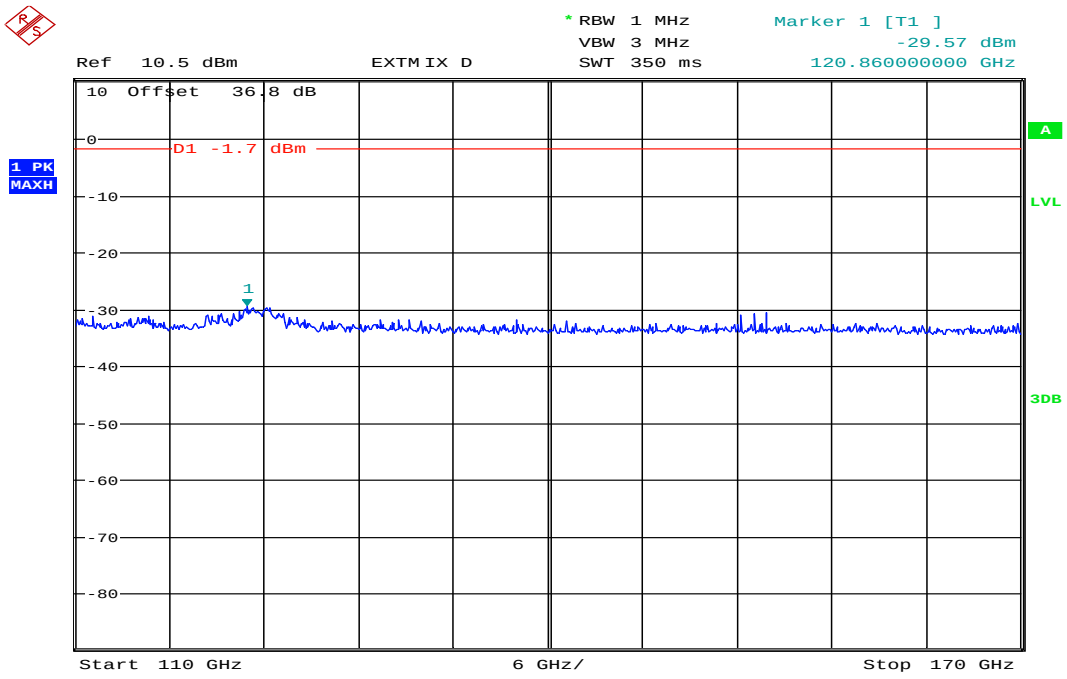
Plot 110: 75 GHz – 110 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:47:45

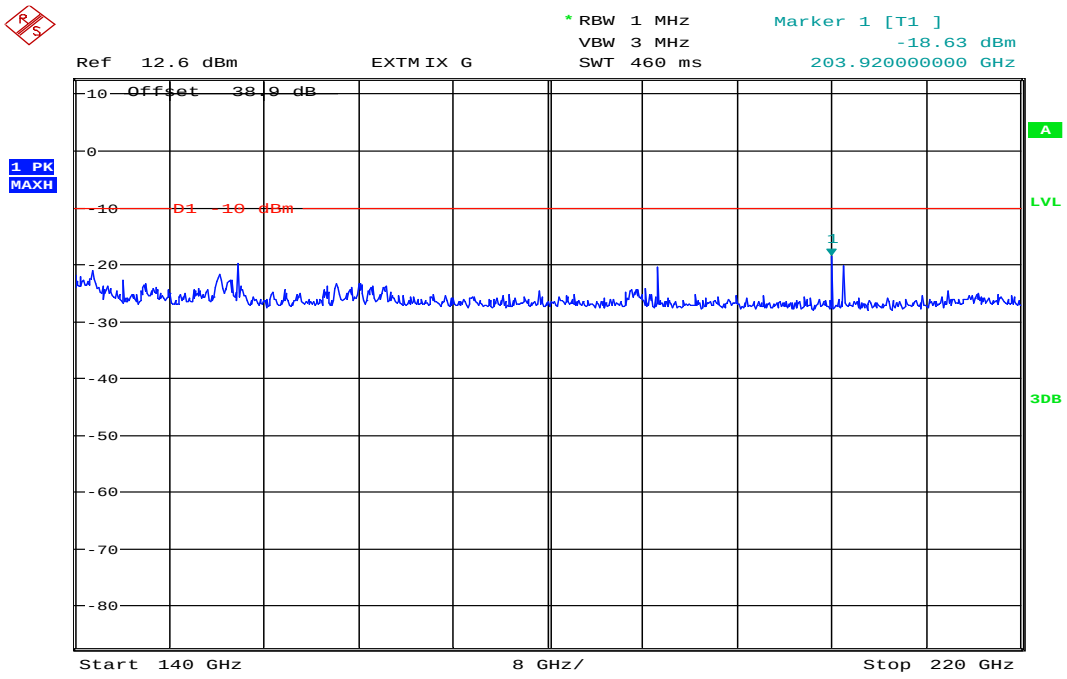
Note: Marker 1 shows the wanted signal, marker 2 shows a peak produced by the harmonic mixer!

Plot 111: 110 GHz – 170 GHz, antenna horizontal / vertical



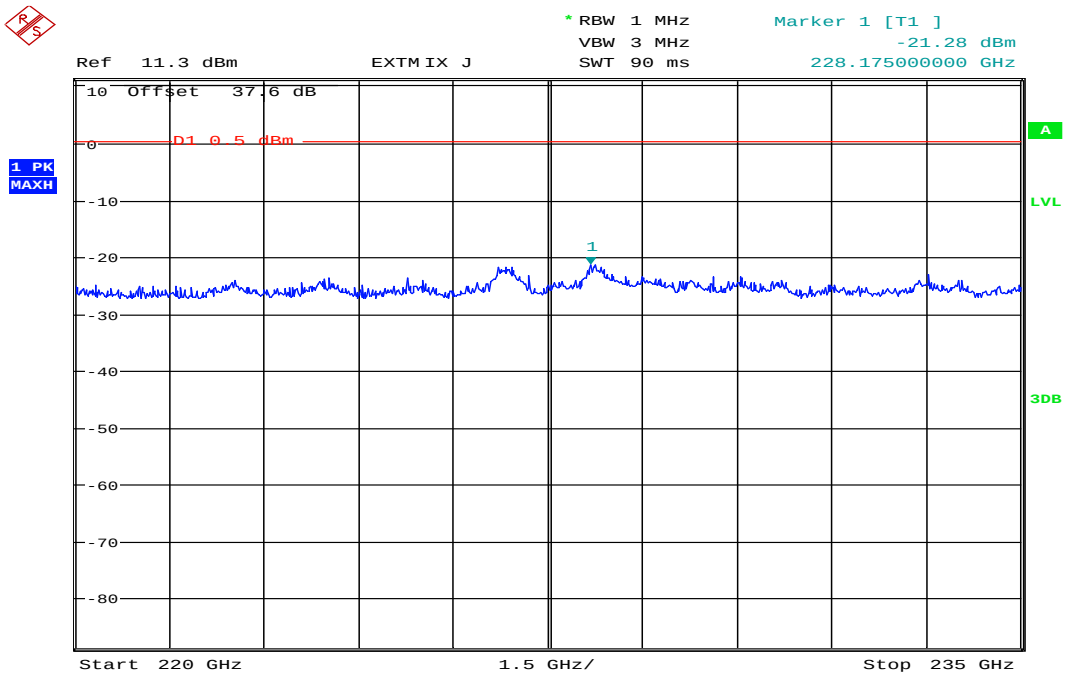
Date: 19.MAY.2011 13:44:49

Plot 112: 140 GHz – 220 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 14:05:13

Plot 113: 220 GHz – 235 GHz, antenna horizontal / vertical



- **Upper frequency**

Plot 114: 30 MHz – 1 GHz, antenna horizontal / vertical

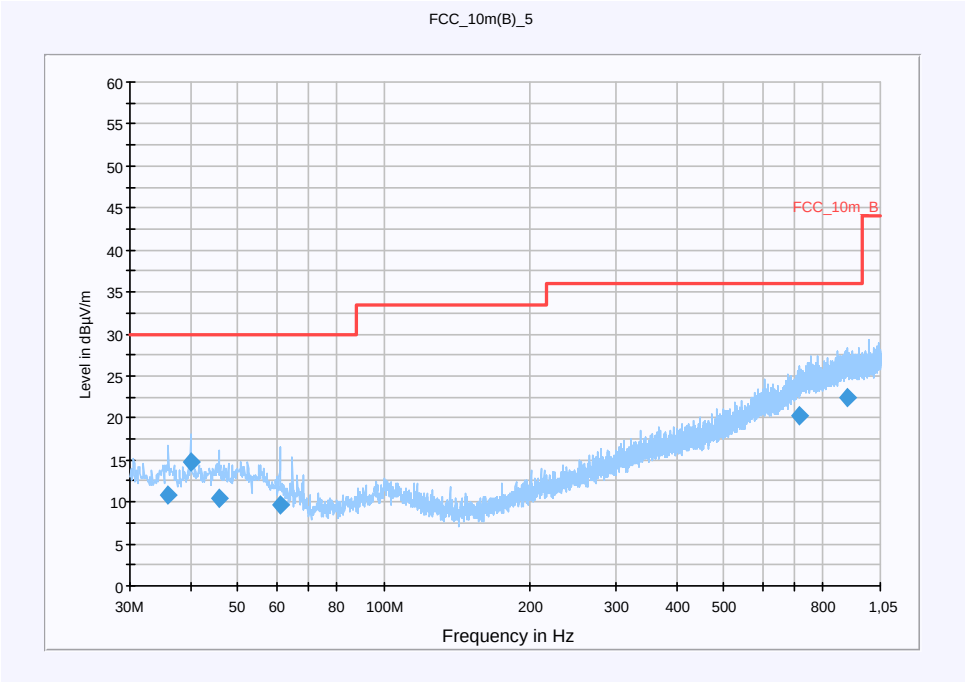
Information

EUT:	ARS 3-B
Serial Number:	
Test Description:	FCC Part 15
Operating Conditions:	CW, upper frequency, high power
Operator Name:	Kraus
Comment:	DC powered 12V

Scan Setup: STAN_Fin [EMI radiated]

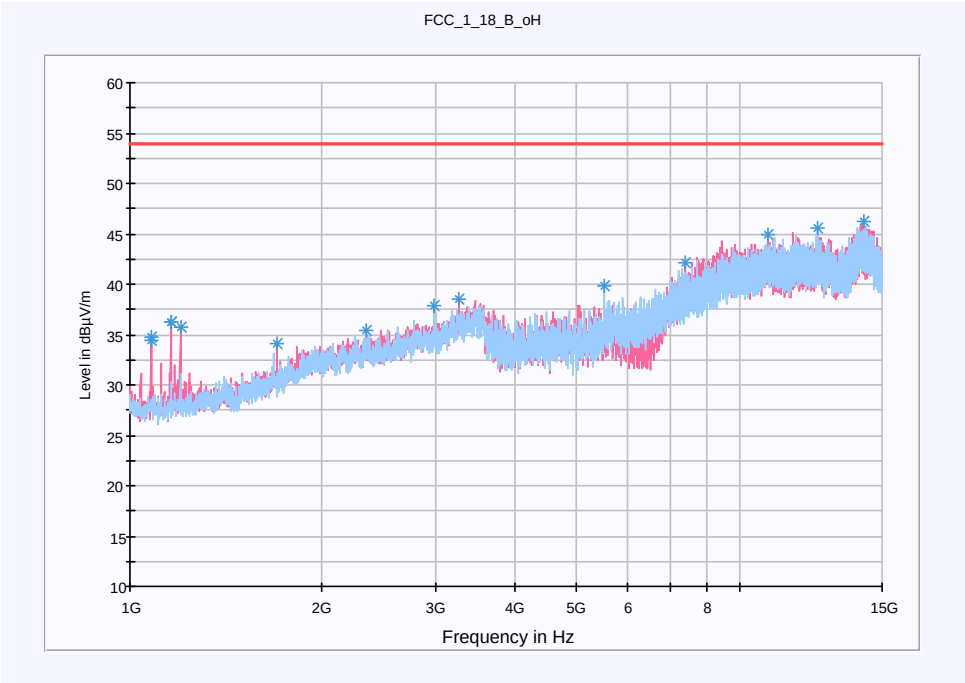
Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 2 GHz	QuasiPeak	120 kHz	15 s	Receiver



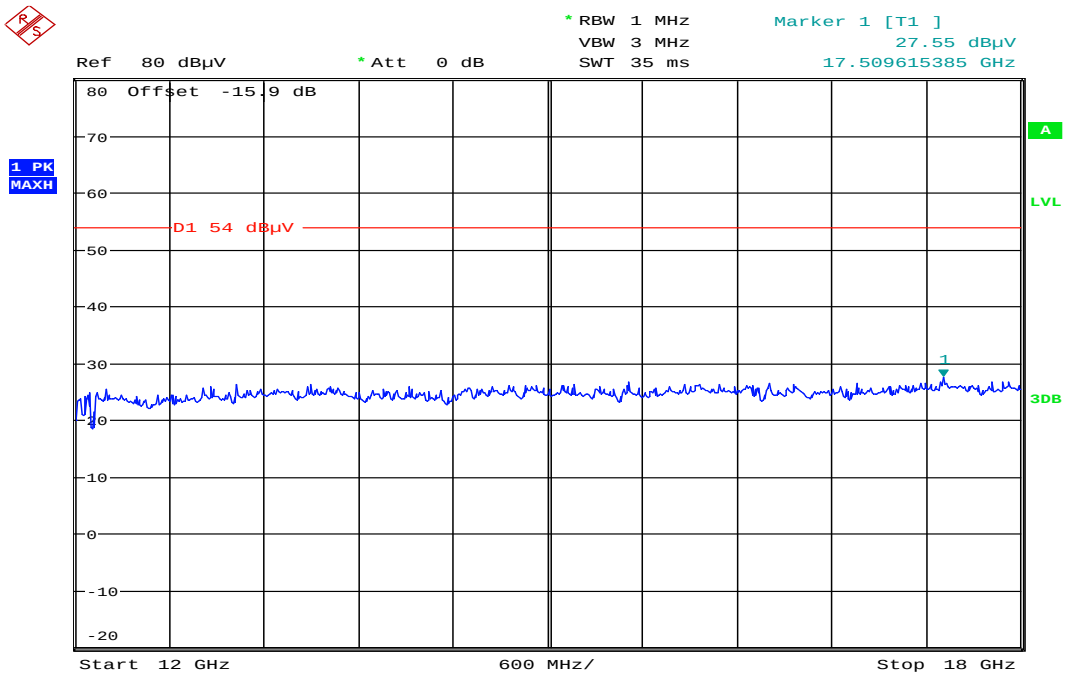
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
36.000000	10.7	15000.000	120.000	182.0	V	32.0	13.1	19.3	30.0
39.960000	14.8	15000.000	120.000	270.0	V	283.0	13.4	15.2	30.0
45.840000	10.4	15000.000	120.000	270.0	H	32.0	13.3	19.6	30.0
61.200000	9.7	15000.000	120.000	270.0	V	324.0	11.3	20.3	30.0
713.160000	20.2	15000.000	120.000	255.0	V	204.0	22.8	15.8	36.0
897.000000	22.5	15000.000	120.000	98.0	H	-2.0	25.2	13.5	36.0

Plot 115: 1 GHz – 15 GHz, antenna horizontal / vertical



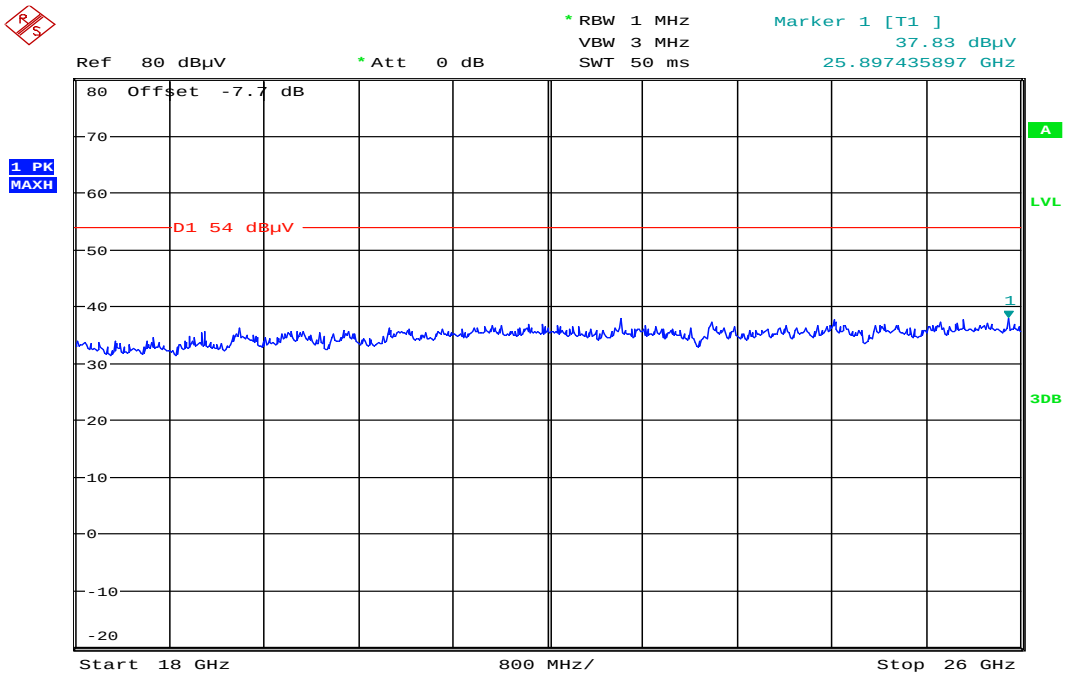
Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)
1078.200000	34.4	98.0	V	358.0	-14.4
1081.600000	34.7	98.0	V	22.0	-14.4
1158.100000	36.3	98.0	V	46.0	-14.3
1161.500000	36.2	98.0	V	2.0	-14.3
1199.750000	35.7	98.0	V	22.0	-14.2
1698.700000	34.1	98.0	V	162.0	-12.0
2339.600000	35.5	98.0	H	156.0	-9.2
2994.100000	37.8	98.0	V	46.0	-7.5
3277.150000	38.6	98.0	V	281.0	-6.9
5520.300000	39.8	98.0	H	216.0	-4.3
7383.500000	42.2	98.0	V	350.0	0.8
9947.100000	44.8	98.0	V	231.0	4.1
11898.700000	45.6	98.0	H	255.0	5.3
14066.200000	46.3	98.0	H	190.0	7.4

Plot 116: 12 GHz – 18 GHz, antenna horizontal / vertical



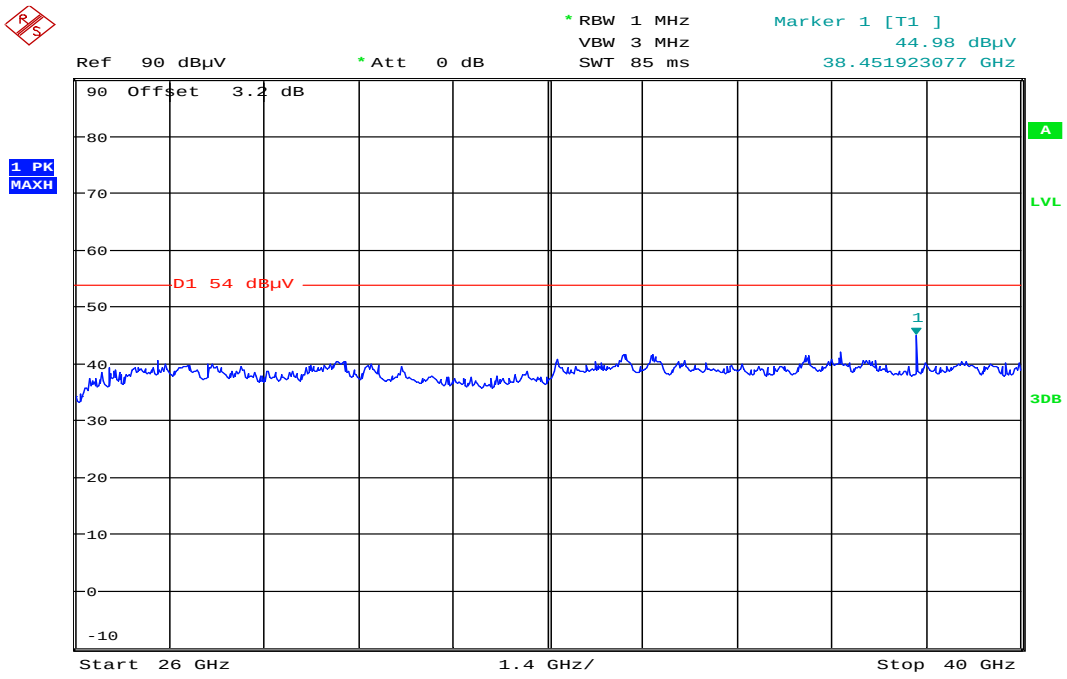
Date: 19.MAY.2011 16:02:40

Plot 117: 18 GHz – 26 GHz, antenna horizontal / vertical



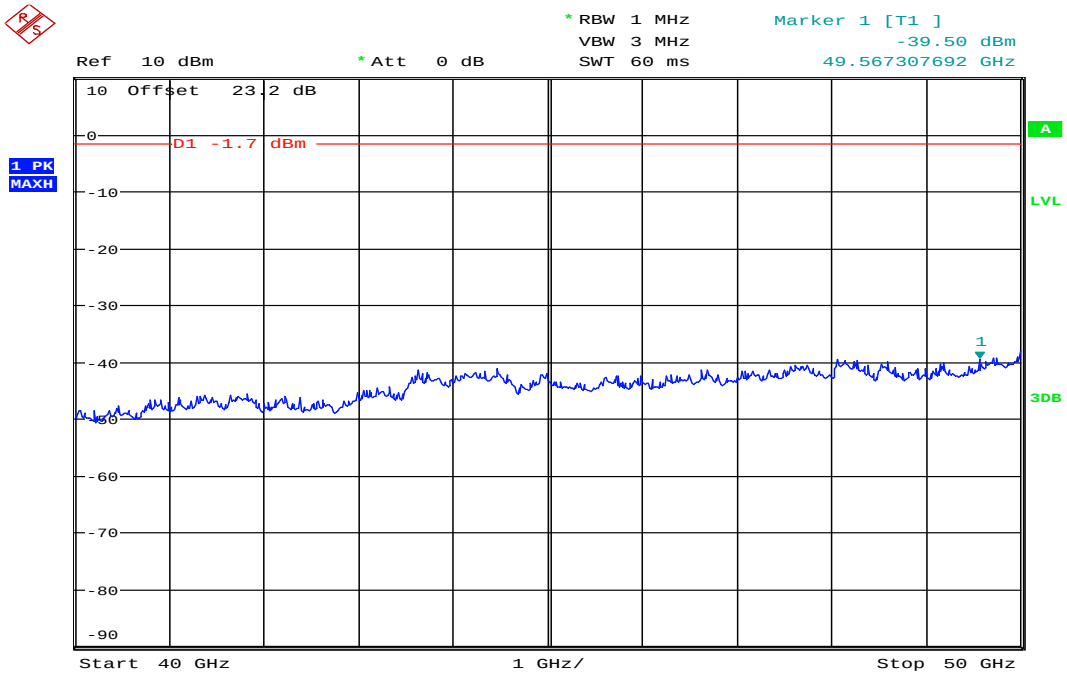
Date: 19.MAY.2011 16:00:01

Plot 118: 26 GHz – 40 GHz, antenna horizontal / vertical



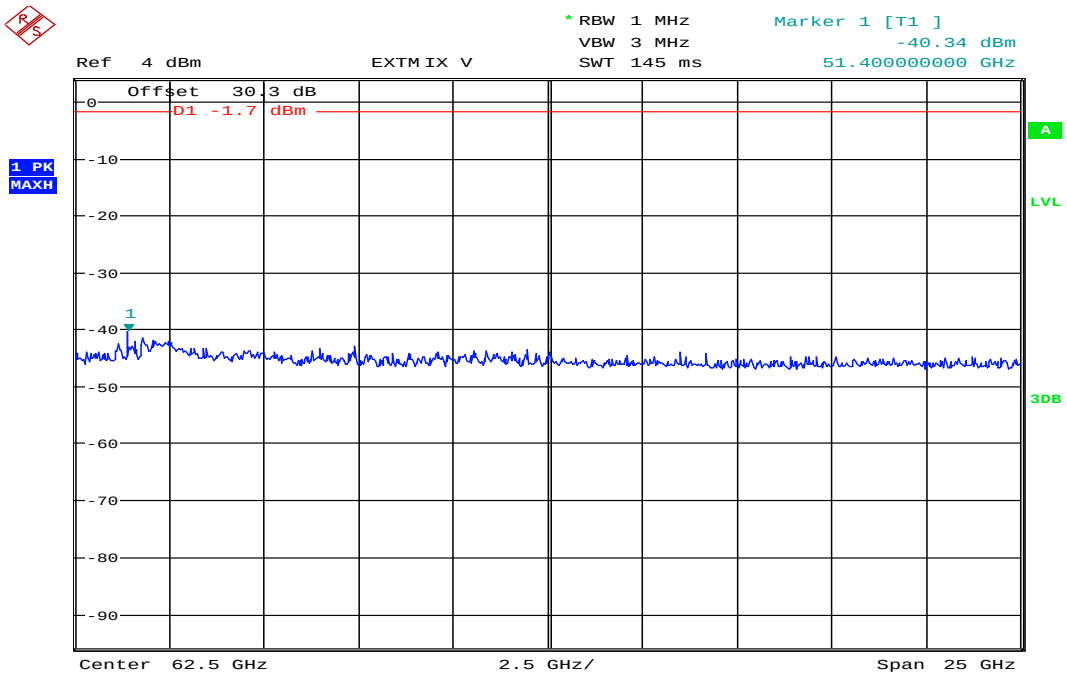
Date: 19.MAY.2011 15:50:00

Plot 119: 40 GHz – 50 GHz, antenna horizontal / vertical



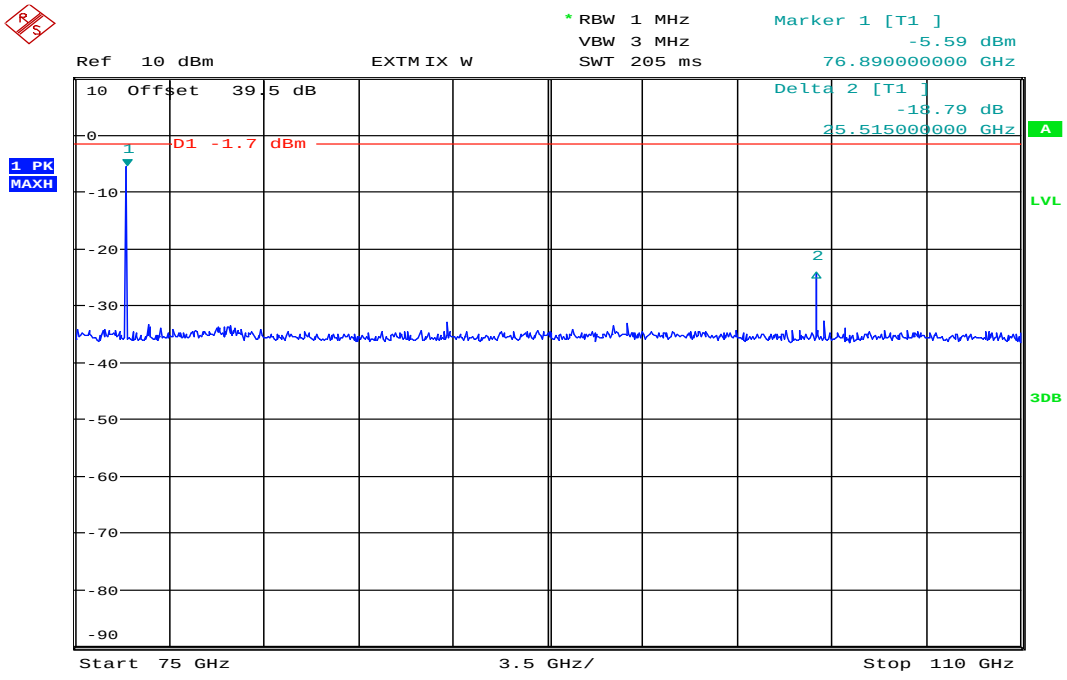
Date: 19.MAY.2011 15:45:36

Plot 120: 50 GHz – 75 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:36:20

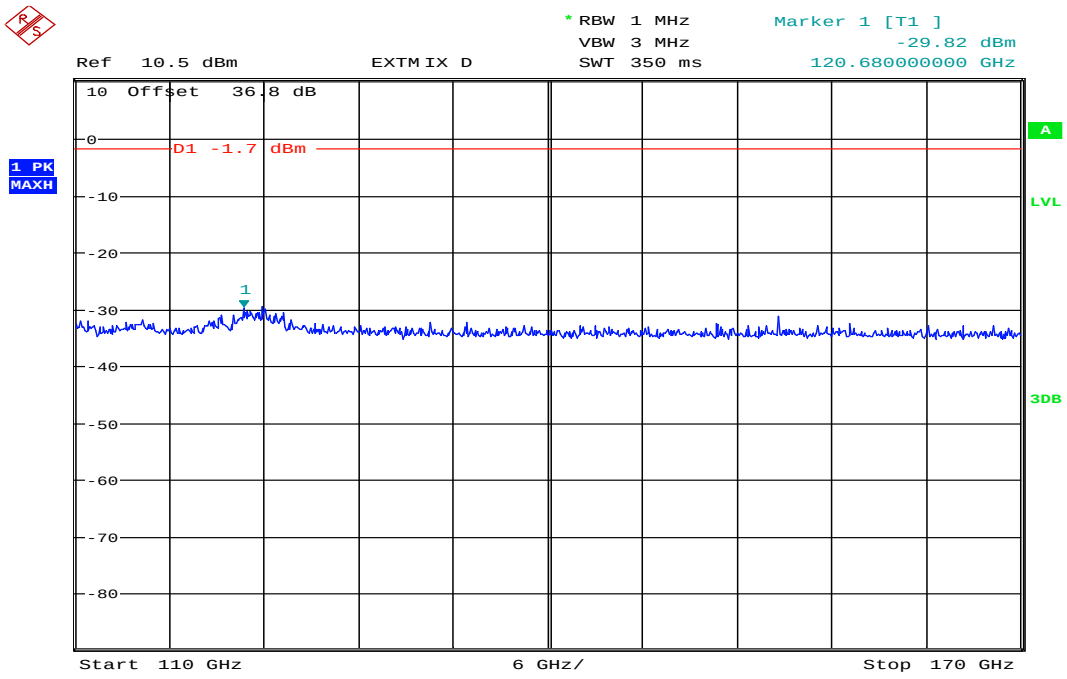
Plot 121: 75 GHz – 110 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 11:46:35

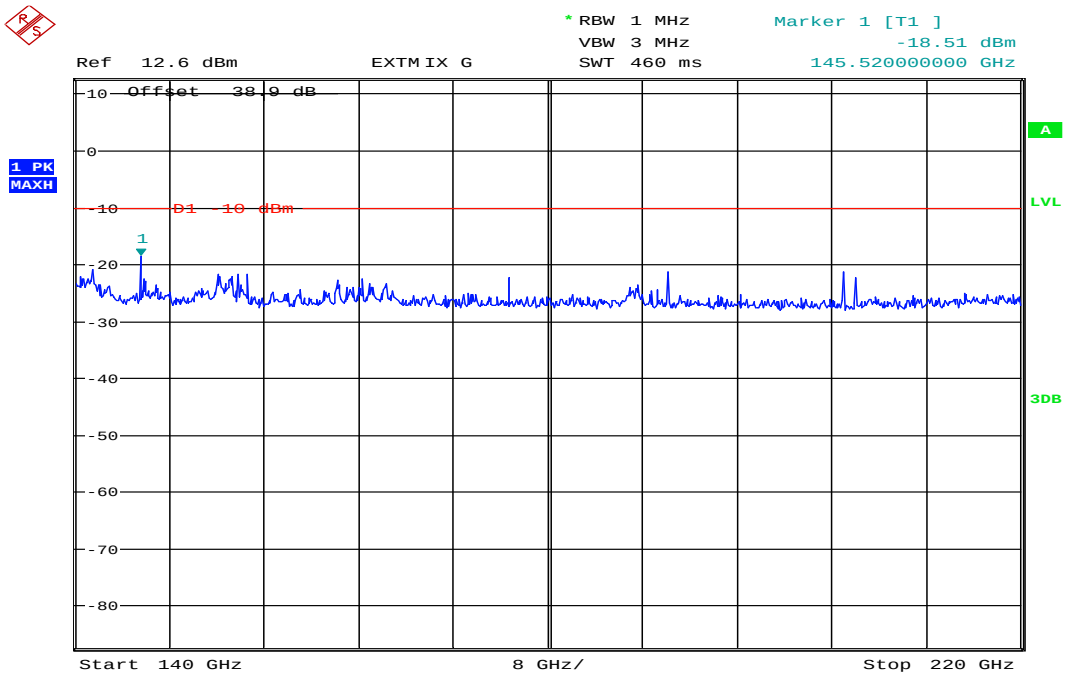
Note: Marker 1 shows the wanted signal, marker 2 shows a peak produced by the harmonic mixer!

Plot 122: 110 GHz – 170 GHz, antenna horizontal / vertical



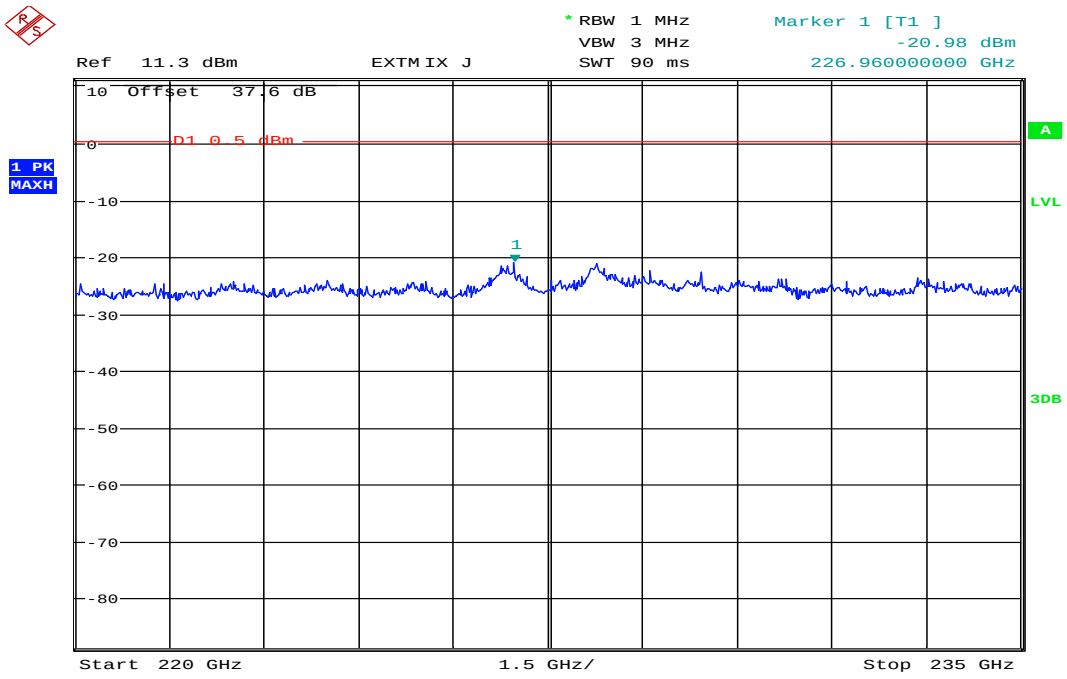
Date: 19.MAY.2011 13:46:36

Plot 123: 140 GHz – 220 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 14:05:57

Plot 124: 220 GHz – 235 GHz, antenna horizontal / vertical



Date: 19.MAY.2011 14:26:43

Results:

TX Spurious Emissions Radiated [dBµV/m]								
lower frequency			centre frequency			upper frequency		
F [GHz]	Detector	Level [dBµV/m]	F [GHz]	Detector	Level [dBµV/m]	F [GHz]	Detector	Level [dBµV/m]
No critical peaks detected!			No critical peaks detected!			No critical peaks detected!		
Measurement uncertainty			± 3 dB					

Limits: **FCC §15.253 / 15.209 / 15.205**

FCC		
CFR Part 15.253 (c) (1) / CFR Part 15.209 (a) / CFR Part 15.205		
Radiated Spurious Emissions		
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.		
Frequency [MHz]	Field Strength [dBµV/m]	Measurement distance
0.009 – 0.490	2400/F[kHz]	300
0.490 – 1.705	24000/F[kHz]	30
1.705 – 30.0	30	30
30 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
960 – 40 000	54.0	3

Limits: **FCC §15.253 (c) (2) (ii) + (3)**

Frequency Range [GHz]	Measurement distance	Power Density
40 – 200	3.0 m	600 pW/cm^2 → -1.7 dBm
200 – 231	3.0 m	1000 pW/cm^2 → +0.5 dBm

Result: **The measurement is passed.**

9.5 Frequency stability

- **Lower frequency**

TEST CONDITIONS	Frequency Stability
T_{nom} / V_{nom}	76.102 868 590
T_{max} / V_{min} - V_{max}	76.107 307 692
T_{min} / V_{min} - V_{max}	76.101 568 590

- **Centre frequency**

TEST CONDITIONS	Frequency Stability
T_{nom} / V_{nom}	76.498 080 00
T_{max} / V_{min} - V_{max}	76.496 835 897
T_{min} / V_{min} - V_{max}	76.500 272 436

- **Upper frequency**

TEST CONDITIONS	Frequency Stability
T_{nom} / V_{nom}	76.898 814 103
T_{max} / V_{min} - V_{max}	76.907 997 436
T_{min} / V_{min} - V_{max}	76.899 086 538

Limits: **FCC §15.253 (e)**

Frequency range	f(lowest) > 76.0 GHz	f(highest) < 77.0 GHz

Result: **The measurement is passed.**

10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
2	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
3	n. a.	PowerAttenuator	8325	Byrd	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	05.03.2009	
5	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
6	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
7	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
17	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
18	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
21	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
22	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
23	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vlKl!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKl!	17.12.2008	17.12.2011
25	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	Ve		

26	5	DC Power Supply, 60V, 10A	6038A	HP Meßtechnik	2848A07027	300001174	Ve	07.01.2009	07.01.2012
27	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	01.07.2010	01.07.2012
28	11b	Microwave System Amplifier, 0.5-26.5 GHz; 25 dB gain	83017A	HP Meßtechnik	00419	300002268	ev	10.03.2011	
29	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
30	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
31	A016	Std. Gain Horn Antenna 14.5-22.0 GHz	1924-20	Flann	33	300001963	ne		
32	A019	Std. Gain Horn Antenna 17.6-26.7 GHz	2024-20	Flann	156	300001968	ne		
33	A021	Std. Gain Horn Antenna 26.4-40.1 GHz	2224-20	Flann	233	300001973	ne		
34	A023	Std. Gain Horn Antenna 39.3-59.7 GHz	2424-20	Flann	75	300001979	ne		
35	n. a.	Amplifier	FLNA-28B	Farran	FTL 1067B	300002843	ne		
36	n. a.	Amplifier		HP					
37	n. a.	Harmonic Mixer Set 60-325 GHz	WM780	Tektronix	div.	300001685b	ne		
37	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
37	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
37	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
37	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	05.01.2011	05.01.2013
37	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
37	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
37	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
37	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
37	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
37	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
37	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		

Agenda: Kind of Calibration

k	calibration / calibrated		EK	limited calibration
ne	not required (k, ev, izw, zw not required)		zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification		izw	internal cyclical maintenance
Ve	long-term stability recognized		g	blocked for accredited testing
vlkl!	Attention: extended calibration interval			
NK!	Attention: not calibrated		*)	next calibration ordered / currently in progress

Annex A Photographs of the test setup

Annex B External photographs of the EUT

Annex C Internal photographs of the EUT

Not applicable!

Sensor is sealed with the housing during manufacturing and cannot be disassembled without permanent and visible damage to the structure. The sensor has no serviceable parts and therefore is not repairable.

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2011-08-12
-A	Correction of the IC number Additional measurement (MPE Calculation)	2011-11-15
-B	Measurements of occopied bandwidth and power density on normal oreration modes added	2011-12-12

Annex E Further information

Glossary

DUT - Device under Test
EMC - Electromagnetic Compatibility
EUT - Equipment under Test
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - not applicable
S/N - Serial Number
SW - Software