

TEST REPORT

Test report no.: 1-3132/11-03-06-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 Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 170 25 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
Area of Testing: Radio/Satellite Communications

Applicant

Valeo Schalter und Detektionssysteme GmbH
Laiernstrasse 12
74321 Bietigheim-Bissingen / GERMANY
Phone: +49 7142 916-0
Fax: +49 7142 916-4195
Contact: Eric Amiot
e-mail: Eric.Amiot@valeo.com
Phone: +49 7142 916-1195

Manufacturer

Valeo Schalter und Detektionssysteme GmbH
Laiernstrasse 12
74321 Bietigheim-Bissingen / GERMANY

Test standard/s

FCC 47 CFR Part 15 Title 47 of the Code of Federal Regulations; Chapter I
Part 15 - Radio Frequency Devices
RSS-310 Spectrum Management and Telecommunications - Radio Standards Specification
Licence-exempt Radio Apparatus (all frequency bands): Category II Equipment

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

Test Item

Kind of test item: 24 GHz Automotive Radar
Model name: MBHL TypA
Configuration: A1-A11111-AA
FCC ID: UR8303919
Frequency: 24.05 - 24.25 GHz
Antenna: integrated patch antenna
Power Supply: 12.0 V DC via external power supply
Temperature Range: -40 °C to +85 °C



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.

Test report authorised:

[Signature box]

p.o. Tobias Wittenmeier
Meheza Walla

Test performed:

[Signature box]

Karsten Gerald

1 Table of contents

1	Table of contents	2
2	General information	3
2.1	Notes and disclaimer	3
2.2	Application details	3
3	Test standard/s	3
4	Test environment	4
5	Test item	4
6	Test laboratories sub-contracted	4
7	Summary of measurement results	5
8	RF measurement testing	6
8.1	Description of test setup	6
8.1.1	Radiated measurements	6
8.1.2	Additional comments	7
9	Measurement results	8
9.1	Field strength of emissions (wanted signal)	8
9.2	Occupied bandwidth (99% bandwidth)	14
9.3	Field strength of emissions (radiated spurious)	17
10	Test equipment and ancillaries used for tests	31
Annex A	Photographs of the test setup	33
Annex B	External photographs of the EUT	36
Annex C	Internal photographs of the EUT	39
Annex D	Document history	46
Annex E	Further information	46
Annex F	Accreditation Certificate	47

2 General information

2.1 Notes and disclaimer

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 generalizations 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.

The testing service provided by CETECOM ICT Services GmbH has been rendered under the current "General Terms and Conditions for CETECOM ICT Services GmbH".

CETECOM ICT Services GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

Under no circumstances does the CETECOM ICT Services GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.

Under no circumstances does the CETECOM ICT Services GmbH test report include or imply any product or service warranties from CETECOM ICT Services GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CETECOM ICT Services GmbH.

All rights and remedies regarding vendor's products and services for which CETECOM ICT Services GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM ICT Services GmbH.

In no case this test report can be considered as a Letter of Approval.

This test report is electronically signed and valid without handwritten 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:	2011-11-30
Date of receipt of test item:	2012-03-12
Start of test:	2012-03-12
End of test:	2012-03-16
Person(s) present during the test:	Mr. Papziner

3 Test standard/s

Test standard	Date	Test standard description
FCC 47 CFR Part 15	2011-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio Frequency Devices
RSS-310	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Licence-exempt Radio Apparatus (all frequency bands): Category II Equipment

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
Relative humidity:		45 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	12.0 V DC via external power supply
	V_{max}	9.0 V DC
	V_{min}	16.0 V DC

5 Test item

Kind of test item	:	24 GHz Automotive Radar
Type identification	:	MBHL Typ A
Configuration	:	A1-A11111-AA
S/N serial number	:	309
HW hardware status	:	Processor Board: 2.x Antenna Board: 4.x
SW software status	:	DSP: 4.x PCU: 4.x
Frequency band	:	24.00 - 24.25 GHz
Type of modulation	:	FMCW
Number of channels	:	1
Antenna	:	integrated patch antenna
Power supply	:	12.0 V DC via external power supply
Temperature range	:	+22 °C (tests performed under normal conditions)

6 Test laboratories sub-contracted

None

7 Summary of measurement results

<input checked="" type="checkbox"/>	No deviations from the technical specifications were ascertained
<input type="checkbox"/>	There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	FCC 47 CFR Part 15 / IC RSS-310	Passed	2012-07-26	-/-

Test specification clause	Test case	Temperature conditions	Power supply	Pass	Fail	NA	NP	Results (max.)
§15.249(a)	Field strength of emissions (wanted signal)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PK: 108.5 dBµV/m RMS: 93.6 dBµV/m @ 3m
§2.1049	Occupied bandwidth (99% bandwidth)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	180.9 MHz
§15.209(a) / §15.249(d)	Field strength of emissions (spurious & harmonics)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

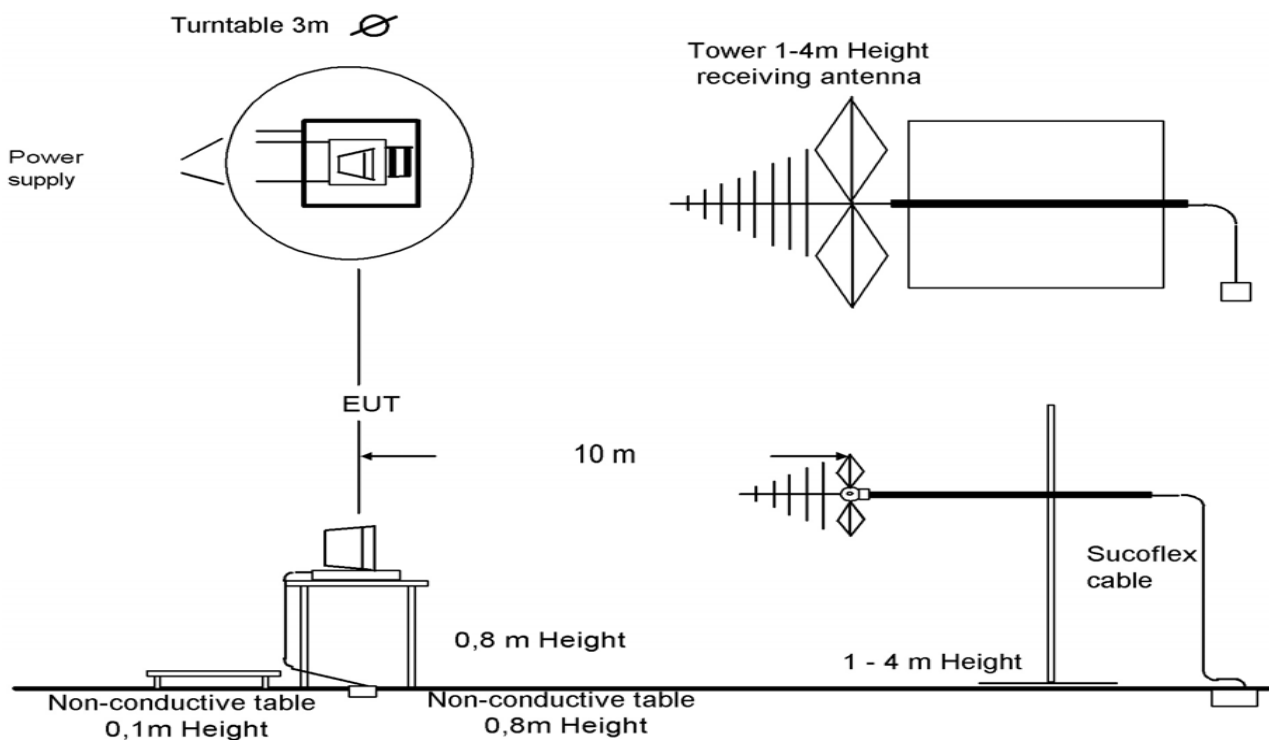
8.1 Description of test setup

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

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

The EUT is powered by an external power supply with nominal voltage

8.1.2 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode: ☐ Normal operation, no special test mode available.

☒ Special software is used to stop FMCW-sweep at low/mid/high frequency

9 Measurement results

9.1 Field strength of emissions (wanted signal)

Description:

Measurement of the maximum radiated field strength of the wanted signal.

Measurement:

Measurement parameter	
Detector:	Pos-Peak / RMS
Sweep time:	Auto
Video bandwidth:	Auto
Resolution bandwidth:	1 MHz
Span:	200 MHz
Trace-Mode:	Max Hold

Limits:

FCC / IC		
47 CFR Part 15.249(a) / RSS-310, 3.10		
Field strength of emissions		
The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:		
Frequency [GHz]	Field Strength [dBμV/m]	Measurement distance
24.00 – 24.25	108	3

(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

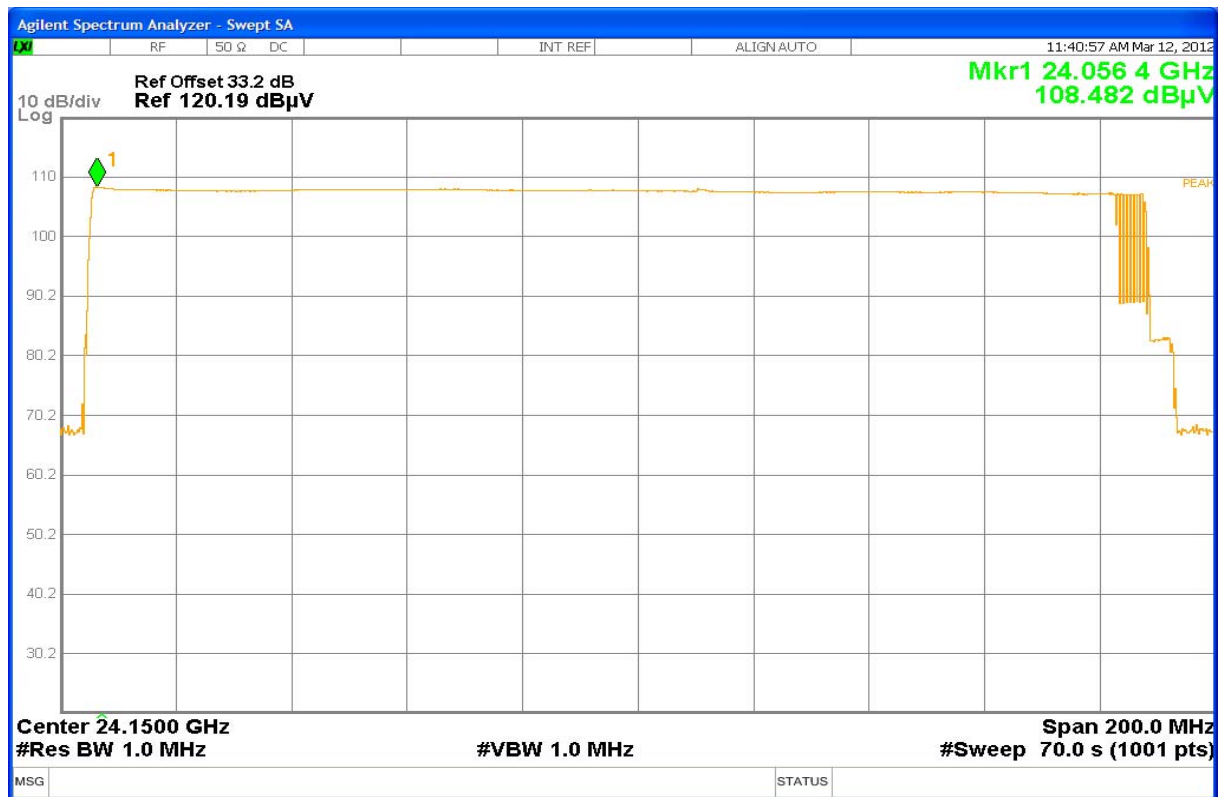
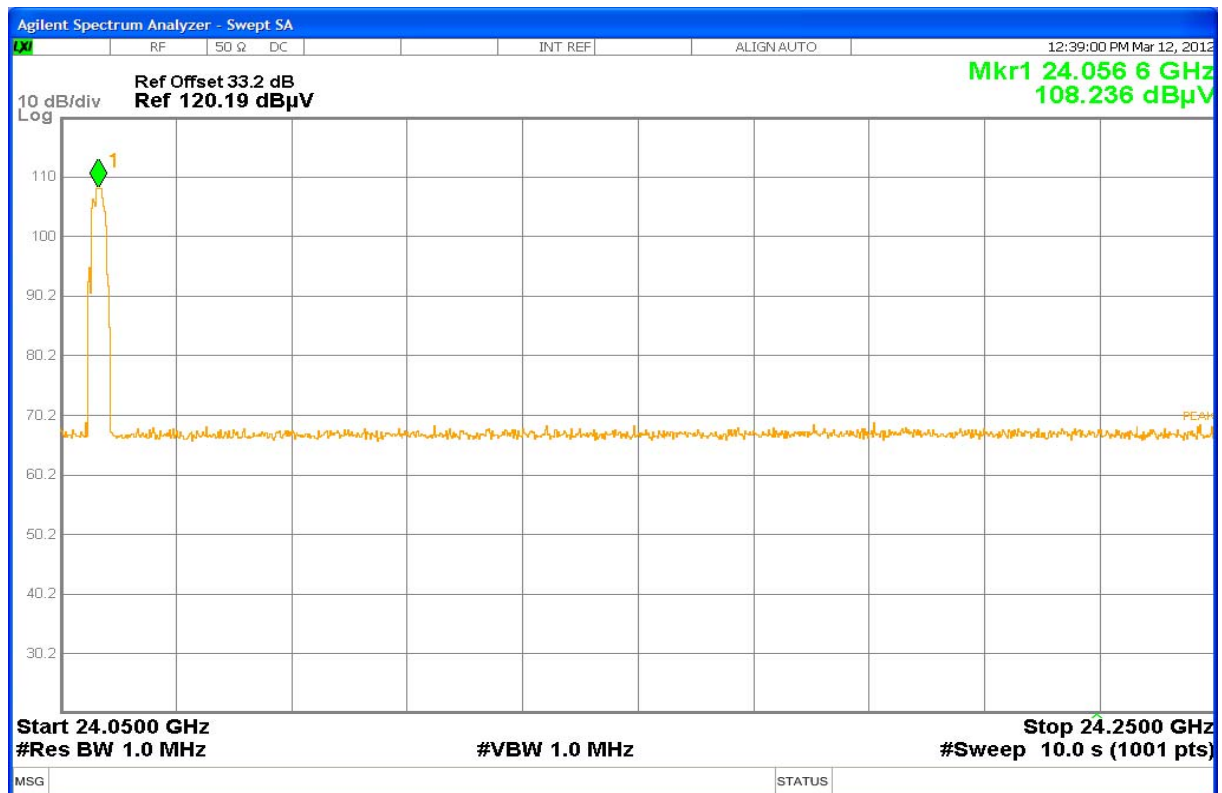
Measurement results:**Peak-Measurement:**

Test condition $t = 22\text{ }^{\circ}\text{C}$	Frequency	Maximum field strength (Peak)
	[GHz]	measured values [dB μ V/m] @ 3 m
normal operation mode $U_{DC} = 12\text{ V}$	24.056	108.5
stopped mode, low frequency $U_{DC} = 12\text{ V}$	24.057	108.2
stopped mode, mid frequency $U_{DC} = 12\text{ V}$	24.150	108.0
stopped mode, high frequency $U_{DC} = 12\text{ V}$	24.240	107.2
Measurement uncertainty	$\pm 3\text{ dB}$	

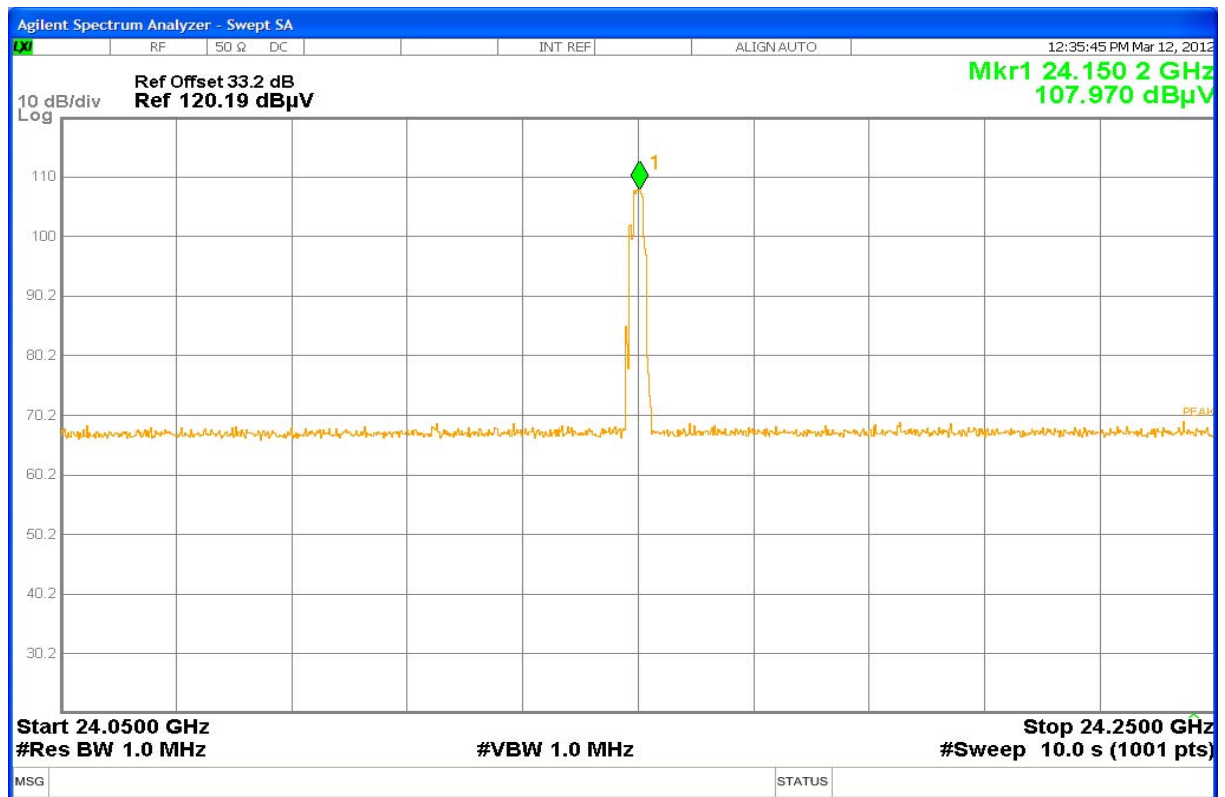
Average-Measurement:

Test condition $t = 22\text{ }^{\circ}\text{C}$	Frequency	Maximum field strength (AVG)
	[GHz]	measured values [dB μ V/m] @ 3 m
normal operation mode $U_{DC} = 12\text{ V}$	24.056	93.6
stopped mode, low frequency $U_{DC} = 12\text{ V}$	24.057	107.5
stopped mode, mid frequency $U_{DC} = 12\text{ V}$	24.150	107.9
stopped mode, high frequency $U_{DC} = 12\text{ V}$	24.240	107.1
Measurement uncertainty	$\pm 3\text{ dB}$	

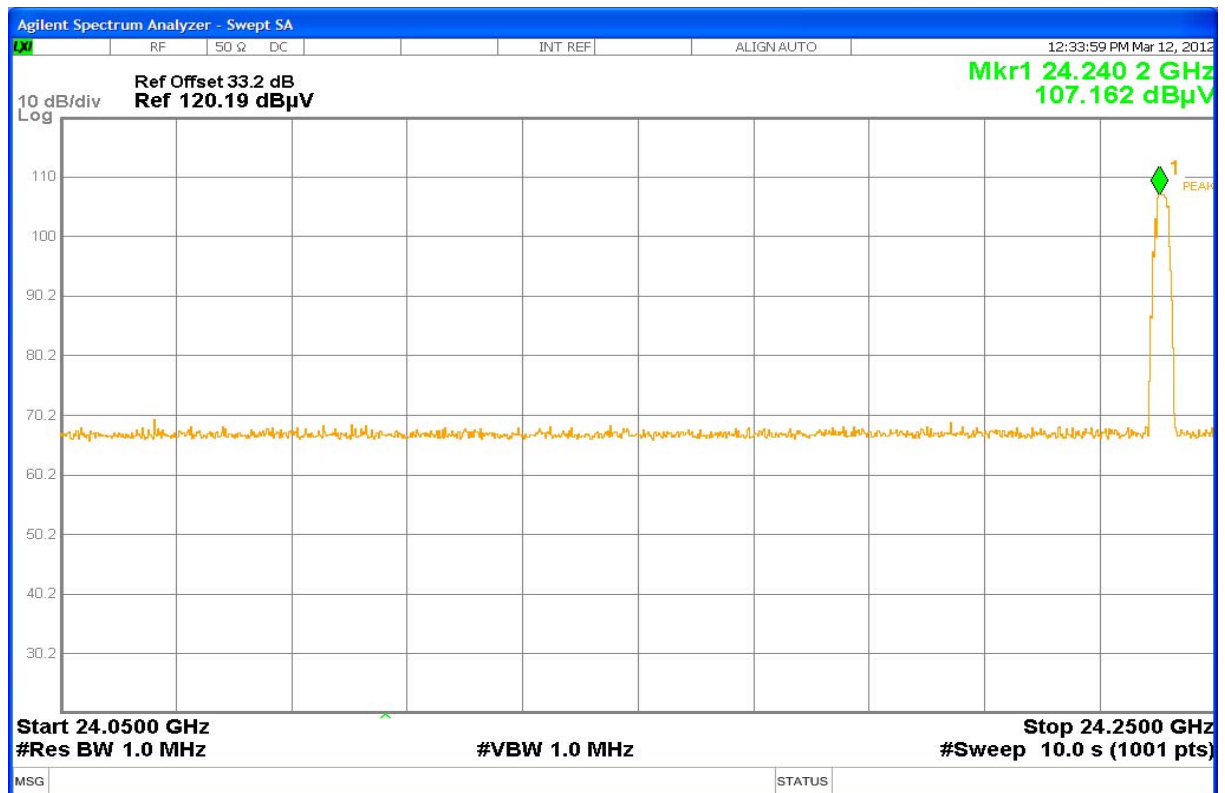
Result: The measurement is passed.

Plot No. 1: Peak measurement, normal operation mode**Plot No. 2: Peak measurement, stopped mode, low frequency**

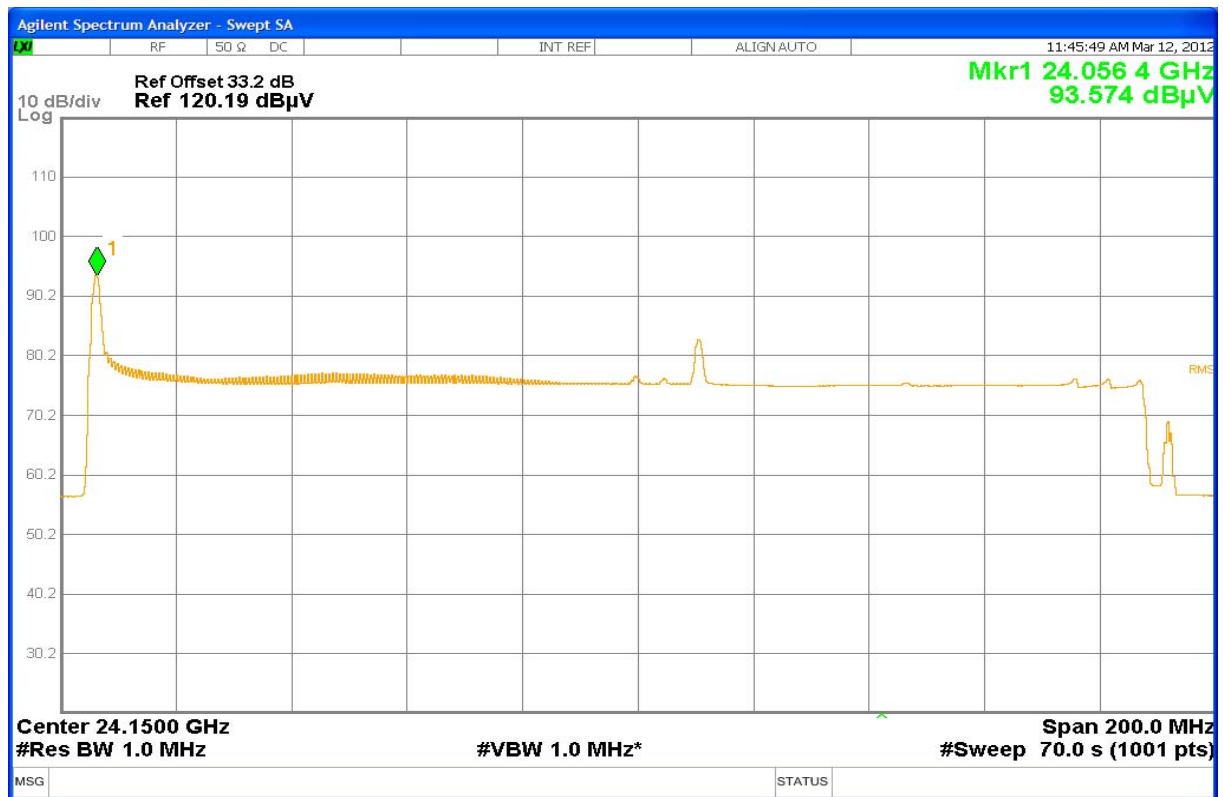
Plot No. 3: Peak measurement, stopped mode, mid frequency



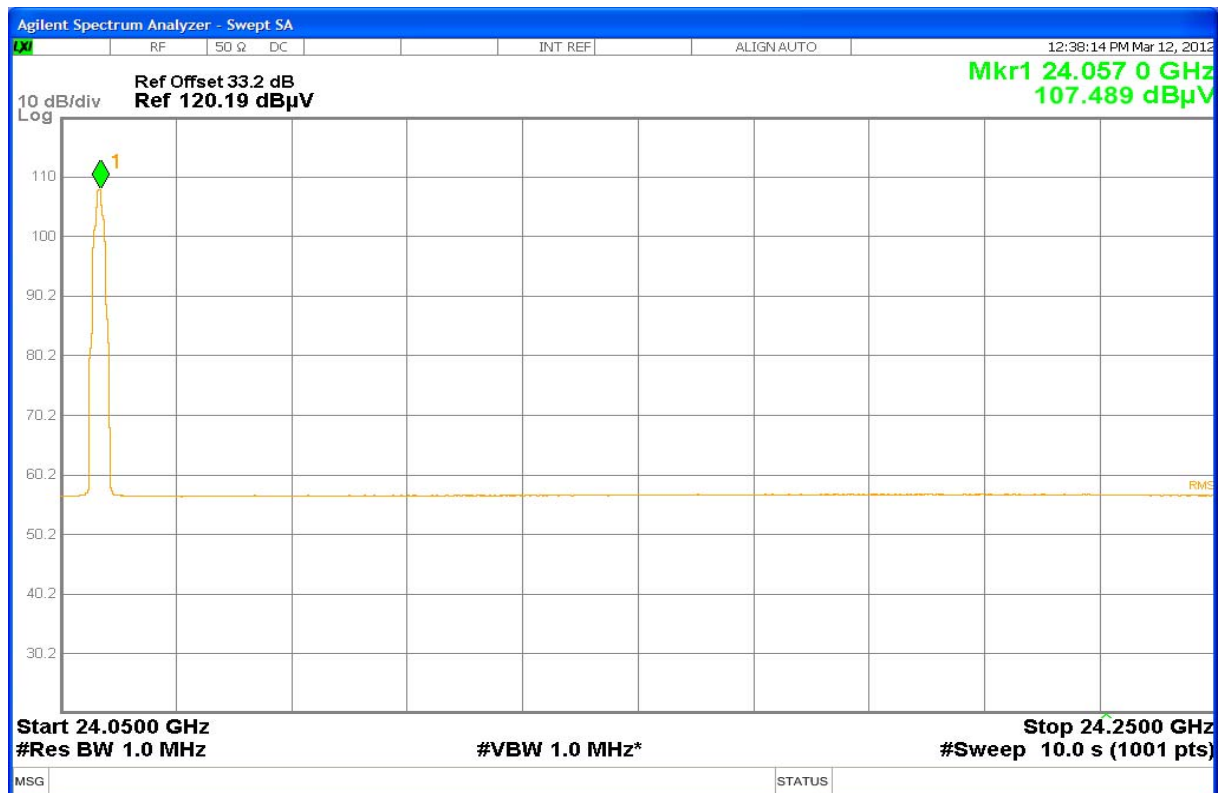
Plot No. 4: Peak measurement, stopped mode, high frequency



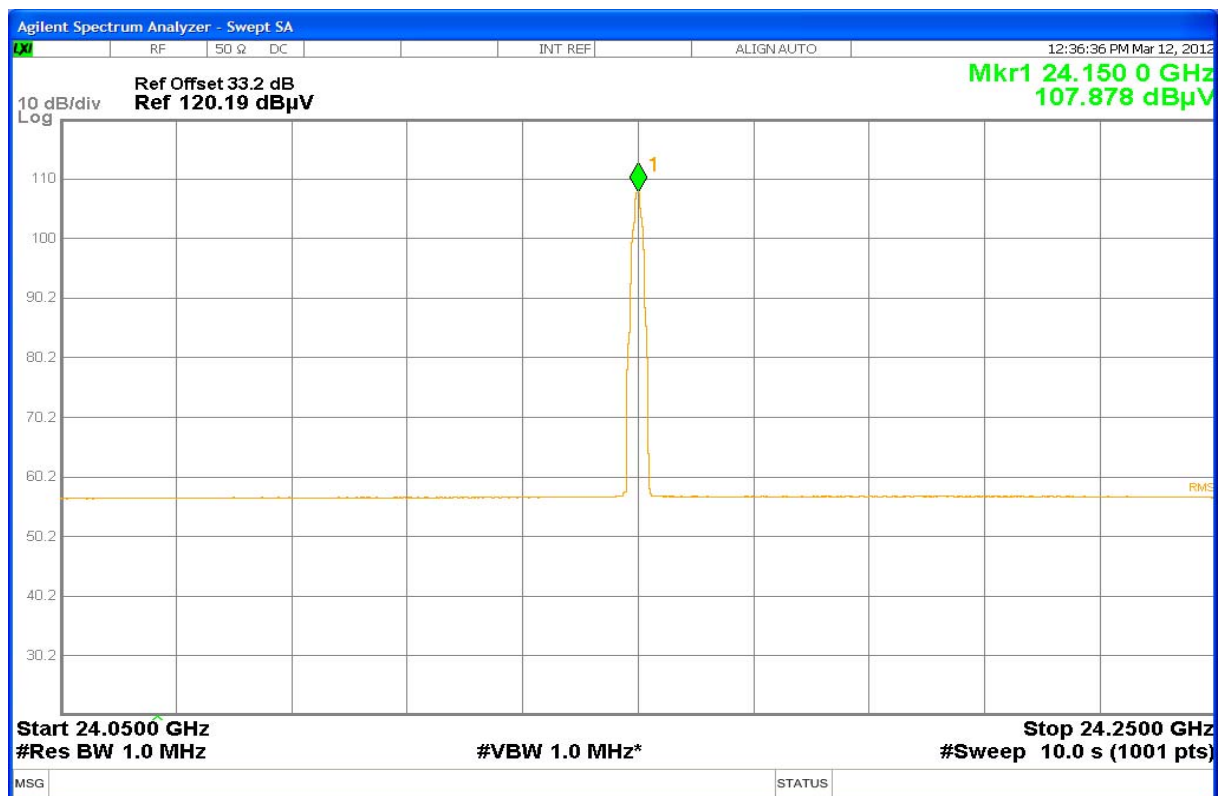
Plot No. 5: Average measurement, normal operation mode



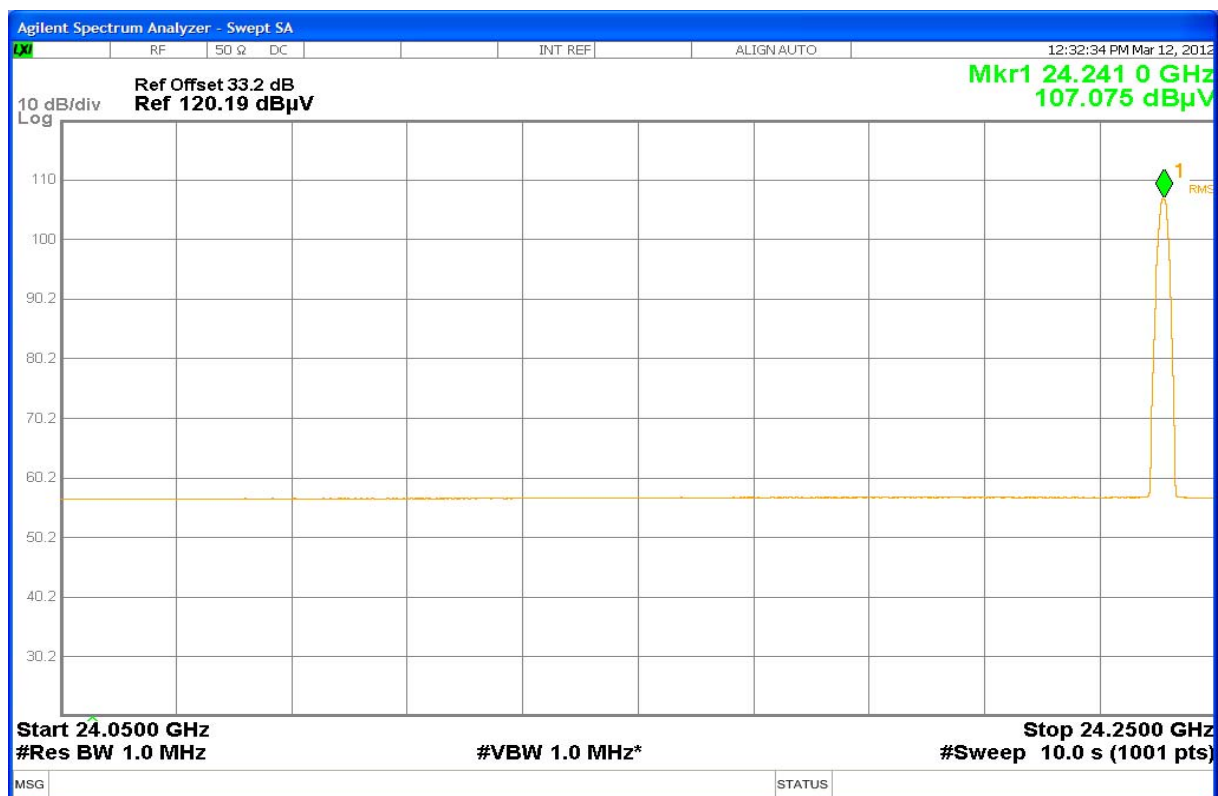
Plot No. 6: Average measurement, stopped mode, low frequency



Plot No. 7: Average measurement, stopped mode, mid frequency



Plot No. 8: Average measurement, stopped mode, high frequency



9.2 Occupied bandwidth (99% bandwidth)

Description:

Measurement of the 99% bandwidth of the wanted signal.

Measurement:

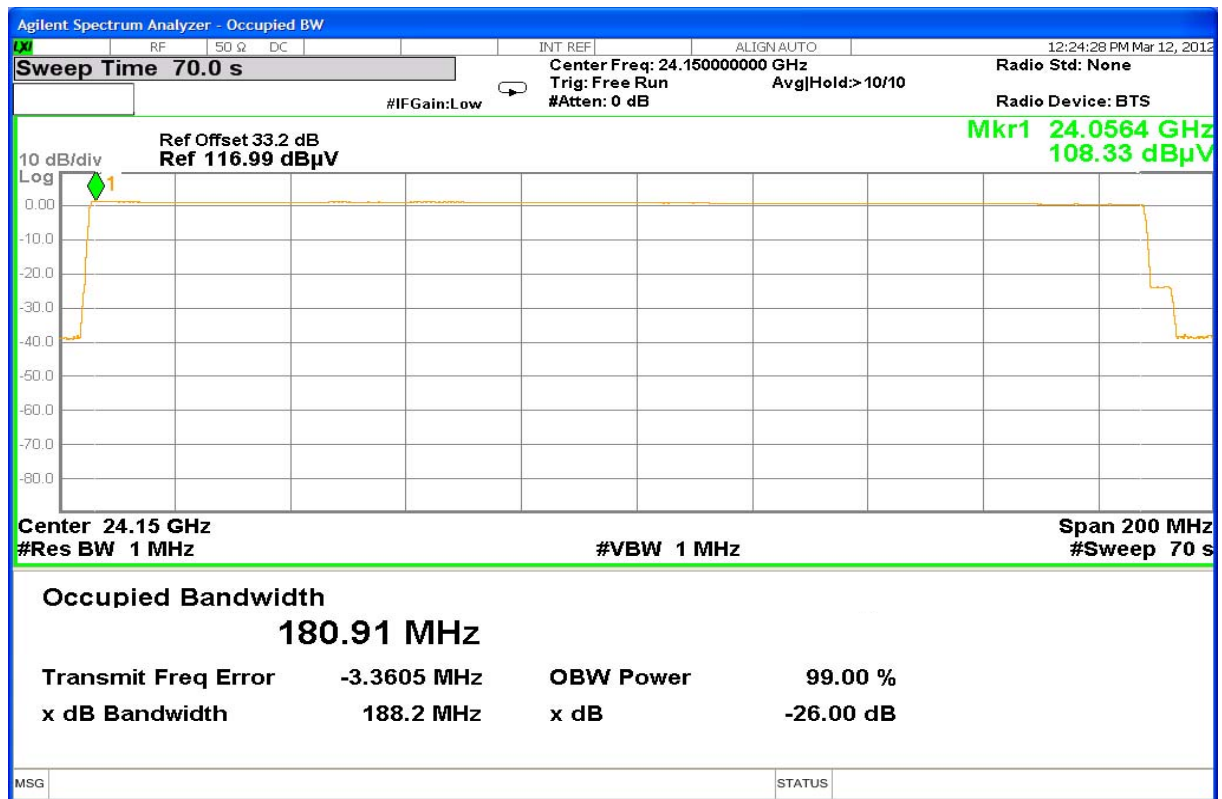
Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	30 kHz / 1 MHz
Resolution bandwidth:	30 kHz / 1 MHz
Span:	5 MHz / 200 MHz
Trace-Mode:	Max Hold

Measurement results:

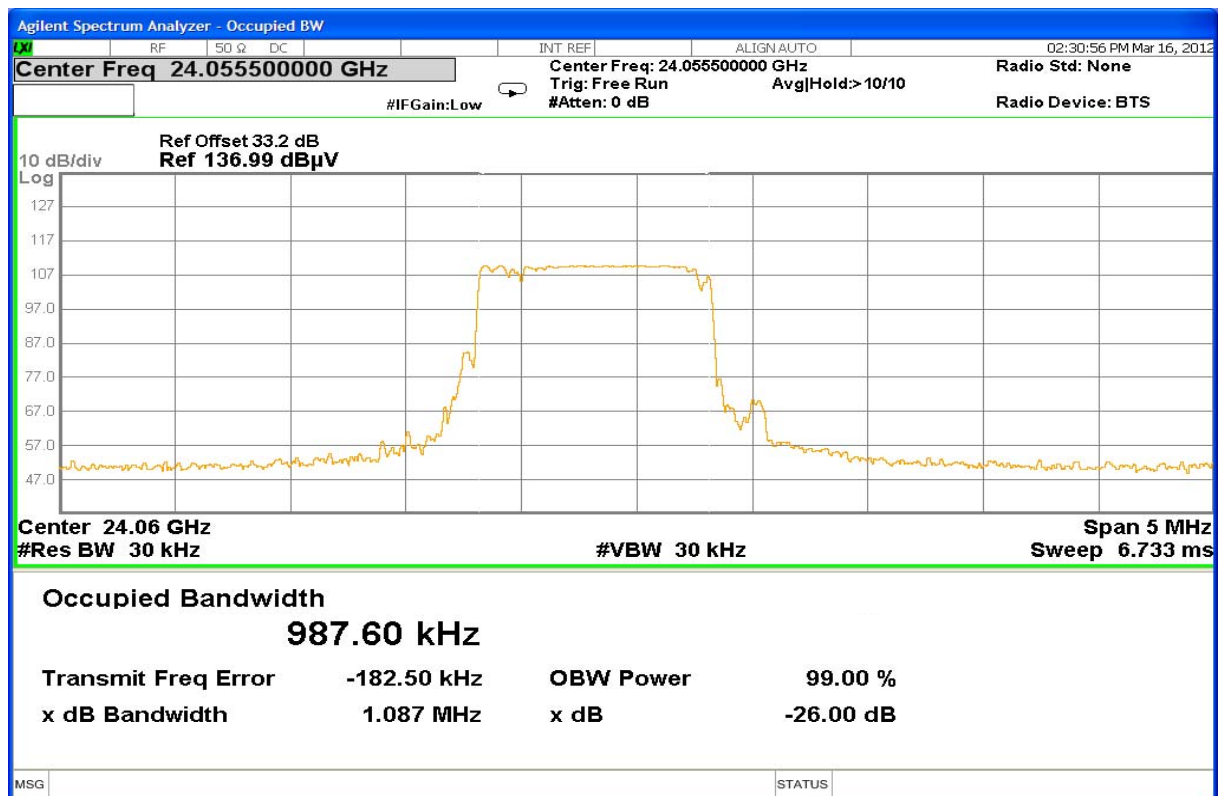
Test condition t = 22 °C	Frequency	Occupied bandwidth
	[GHz]	[MHz]
normal operation mode U _{DC} = 12 V	24.05 - 24.25	180.9
stopped mode, low frequency U _{DC} = 12 V	24.06	0.988
stopped mode, mid frequency U _{DC} = 12 V	24.15	0.967
stopped mode, high frequency U _{DC} = 12 V	24.24	1.076
Measurement uncertainty	± span/1000	

Result: The measurement is passed.

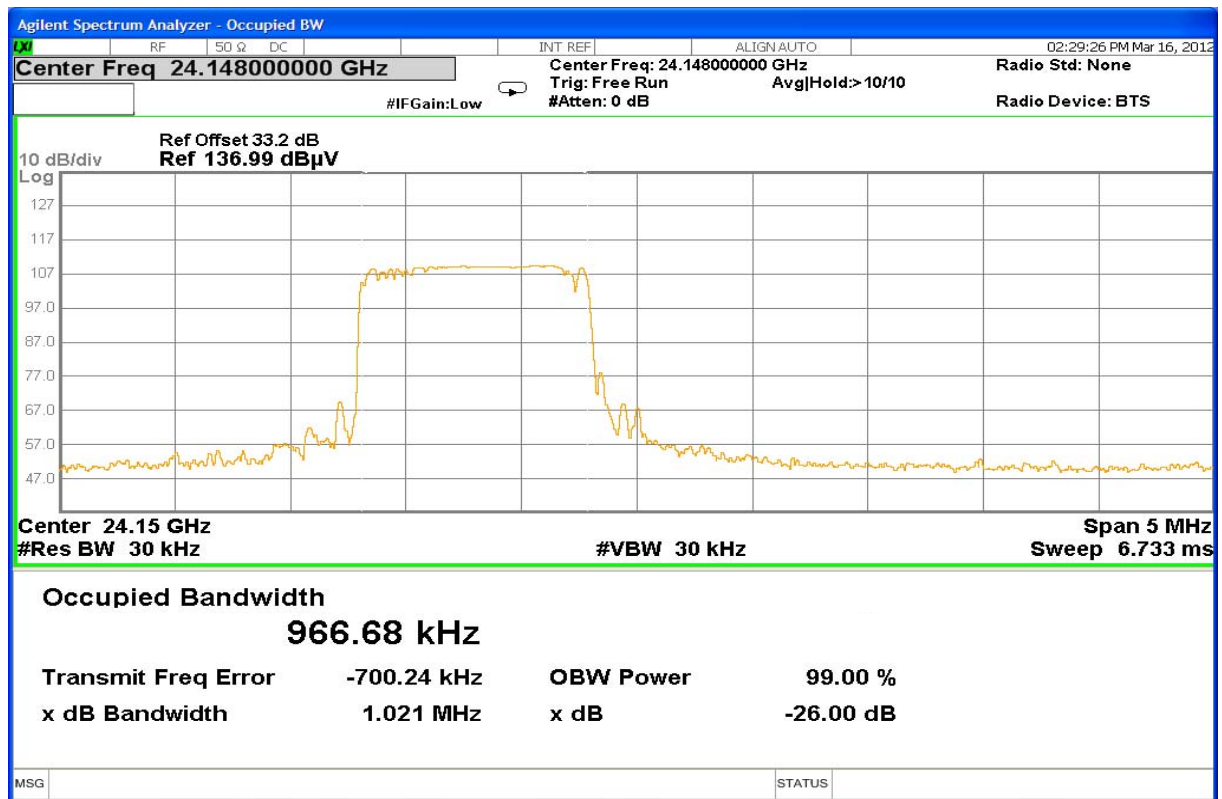
Plot No. 9: Peak measurement, normal operation mode



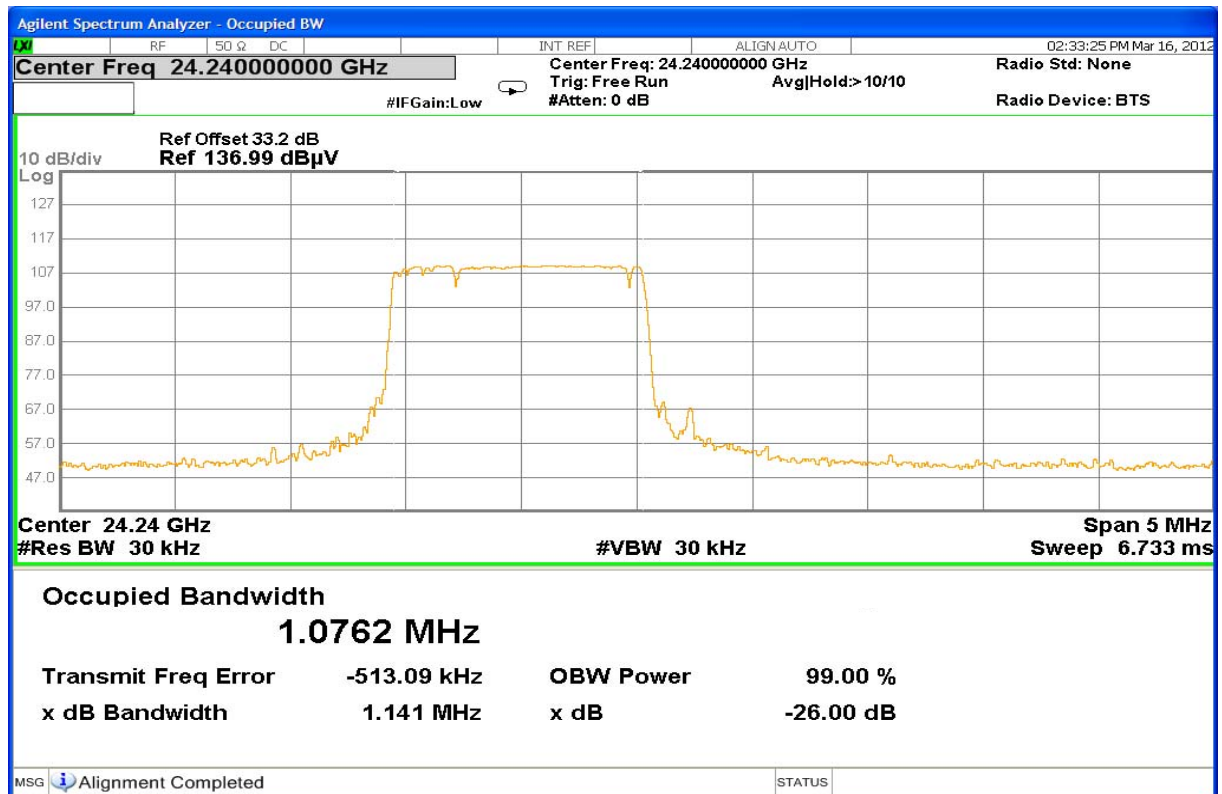
Plot No. 10: Peak measurement, stopped mode, low frequency



Plot No. 11: Peak measurement, stopped mode, mid frequency



Plot No. 12: Peak measurement, stopped mode, high frequency



9.3 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 100 GHz
Trace-Mode:	Max Hold

Limits:

FCC		
CFR Part 15.209(a)		
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
Above 960	54.0	3

Measurement results:

TX Spurious Emissions Radiated [dB μ V/m]								
Lowest			Middle			Highest		
F [GHz]	Detector	Level [dB μ V/m]	F [GHz]	Detector	Level [dB μ V/m]	F [GHz]	Detector	Level [dB μ V/m]
No critical peaks found			No critical peaks found			No critical peaks found		
12.024	RMS	47.1	12.075	RMS	45.7	12.12	RMS	44.7
			36.22	RMS	33.1			
			48.30	RMS	47.1			
Measurement uncertainty			± 3 dB					

Result: The measurement is passed.

Plot No. 13: 30 MHz to 1 GHz, horizontal/vertical polarization, low frequency

Common Information

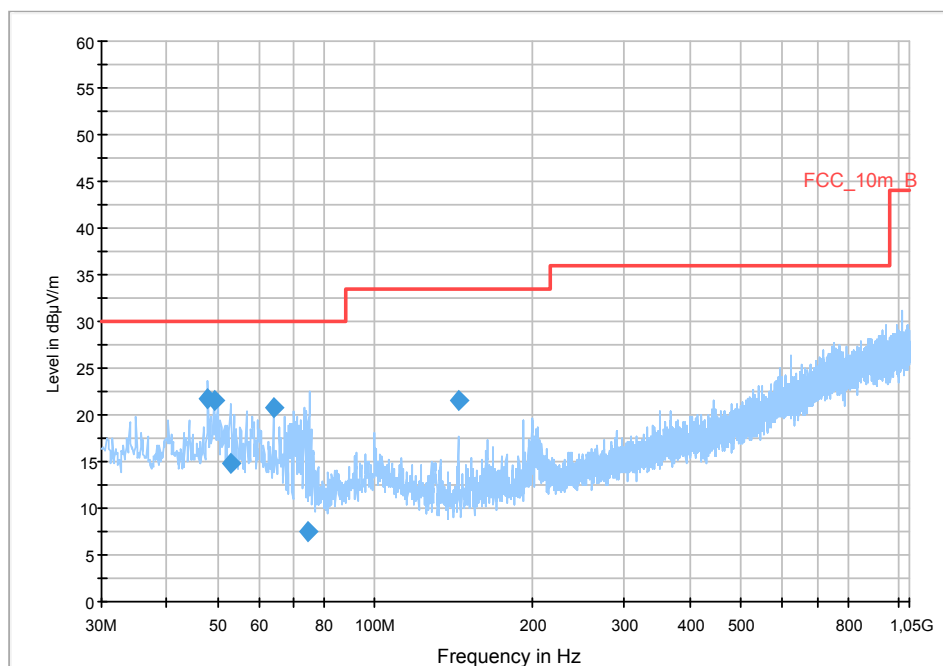
EUT:	24 GHz Radar MBH
Serial Number:	-/-
Test Description:	FCC part 15 B class B
Operating Conditions:	TX@24057MHz
Operator Name:	Wolsdorfer
Comment:	DC: 12 V; beam 4

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dB μ V/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preampl
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB

FCC_10m(B)_3



Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
47.97450	21.7	1000.0	120.000	98.0	V	272.0	13.3	8.3	30.0
49.42545	21.5	1000.0	120.000	139.0	V	274.0	13.4	8.5	30.0
52.95495	14.8	1000.0	120.000	170.0	V	183.0	13.1	15.2	30.0
63.98610	20.8	1000.0	120.000	170.0	V	4.0	10.6	9.2	30.0
74.31930	7.5	1000.0	120.000	120.0	V	283.0	9.2	22.5	30.0
143.99925	21.5	1000.0	120.000	107.0	V	173.0	8.8	12.0	33.5

Plot No. 14: 30 MHz to 1 GHz, horizontal/vertical polarization, mid frequency

Common Information

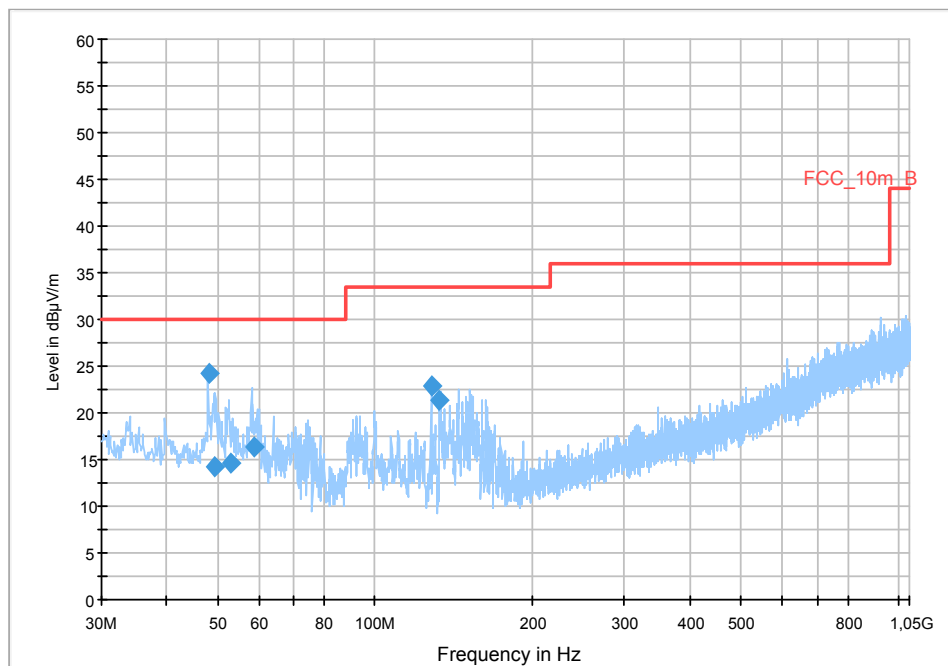
EUT:	24 GHz Radar MBH
Serial Number:	-/-
Test Description:	FCC part 15 B class B
Operating Conditions:	TX@24150MHz
Operator Name:	Wolsdorfer
Comment:	DC: 12 V; beam 4

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dB μ V/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamplifier
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB

FCC_10m(B)_3



Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
48.01125	24.2	1000.0	120.000	98.0	V	284.0	13.3	5.8	30.0
49.23015	14.3	1000.0	120.000	98.0	V	8.0	13.4	15.7	30.0
53.01825	14.5	1000.0	120.000	170.0	V	268.0	13.1	15.5	30.0
58.49565	16.3	1000.0	120.000	170.0	V	8.0	12.0	13.7	30.0
127.98465	22.8	1000.0	120.000	106.0	V	196.0	9.6	10.7	33.5
132.94770	21.4	1000.0	120.000	170.0	V	196.0	9.2	12.1	33.5

Plot No. 15: 30 MHz to 1 GHz, horizontal/vertical polarization, high frequency

Common Information

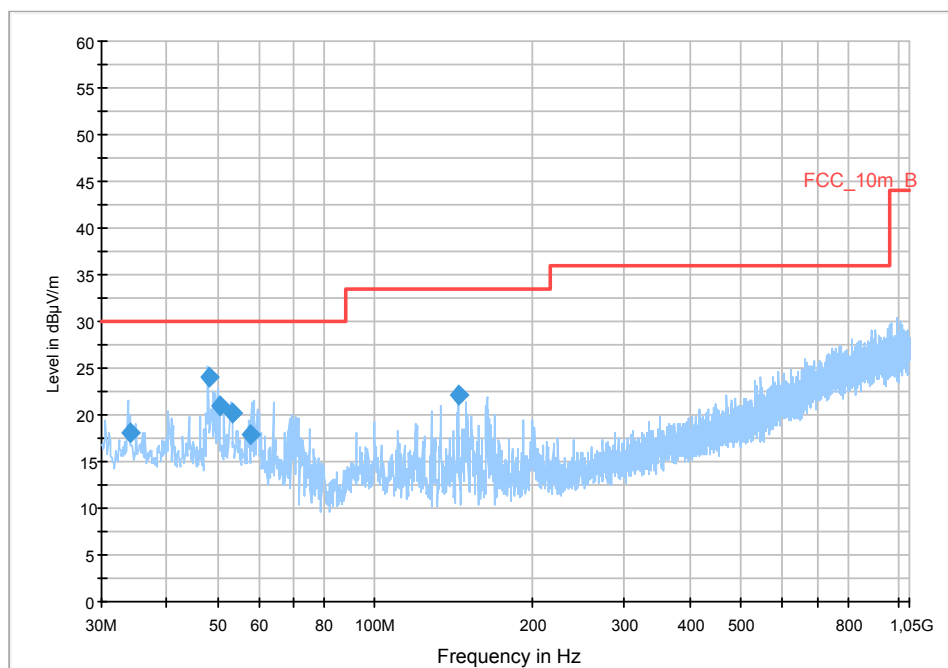
EUT:	24 GHz Radar MBH
Serial Number:	-/-
Test Description:	FCC part 15 B class B
Operating Conditions:	TX@24241MHz
Operator Name:	Wolsdorfer
Comment:	DC: 12 V; beam 4

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Receiver:	[ESCI 3]
Level Unit:	dB μ V/m

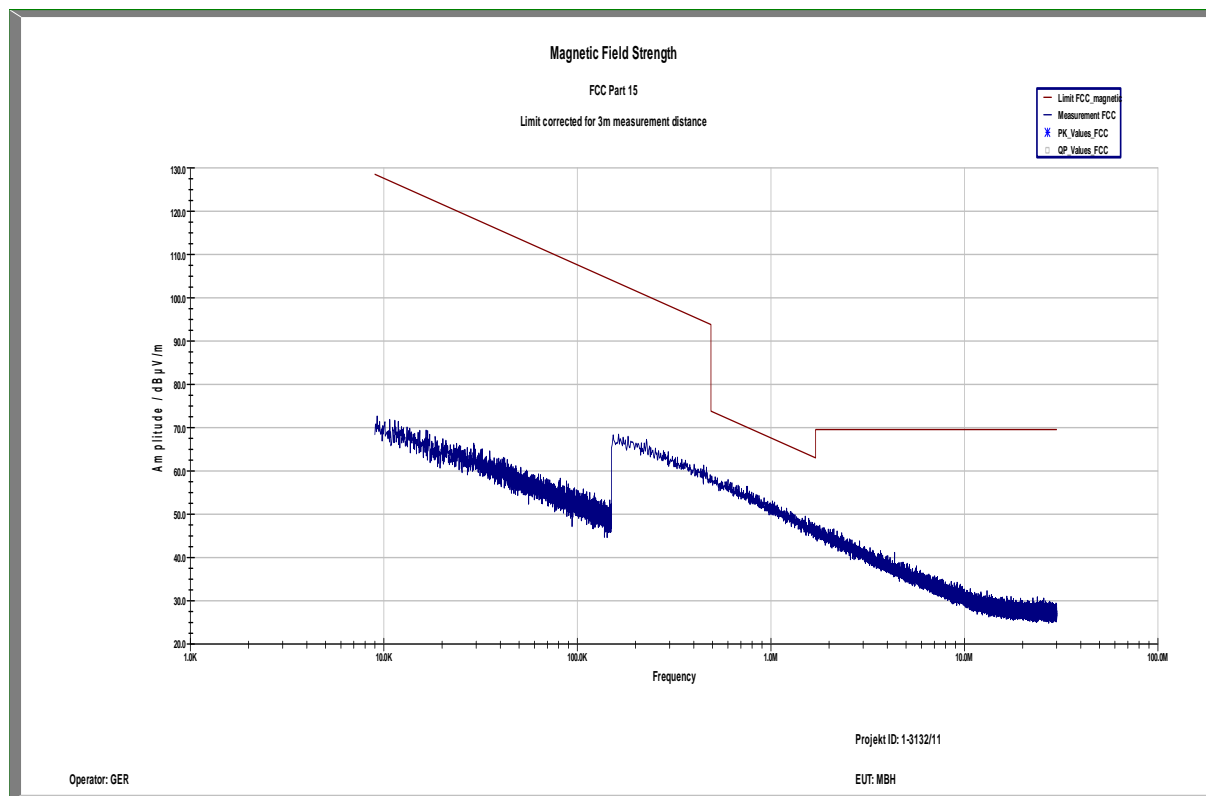
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamplifier
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB

FCC_10m(B)_3

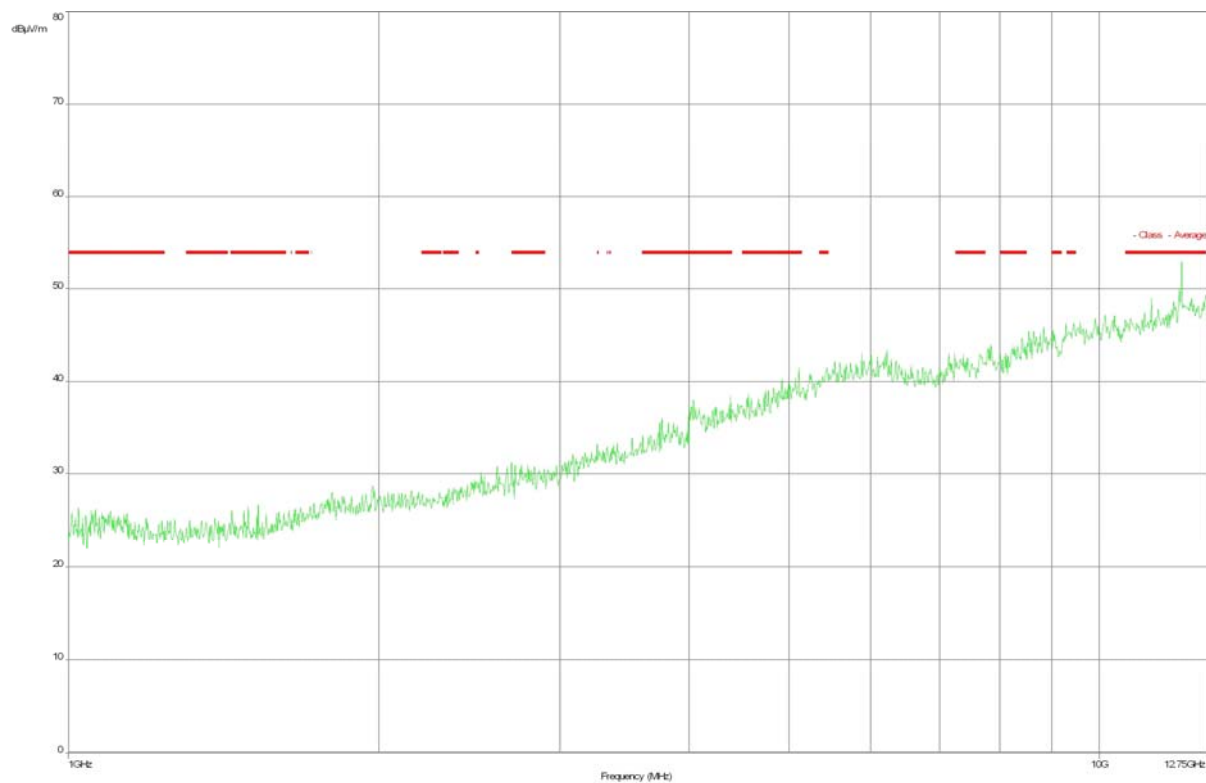


Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
34.01235	18.0	1000.0	120.000	114.0	V	192.0	12.9	12.0	30.0
48.01575	24.0	1000.0	120.000	98.0	V	182.0	13.3	6.0	30.0
50.46105	21.0	1000.0	120.000	170.0	V	283.0	13.3	9.0	30.0
53.38920	20.2	1000.0	120.000	170.0	V	270.0	13.0	9.8	30.0
57.98175	17.9	1000.0	120.000	124.0	V	192.0	12.1	12.1	30.0
144.00885	22.2	1000.0	120.000	124.0	V	192.0	8.8	11.3	33.5

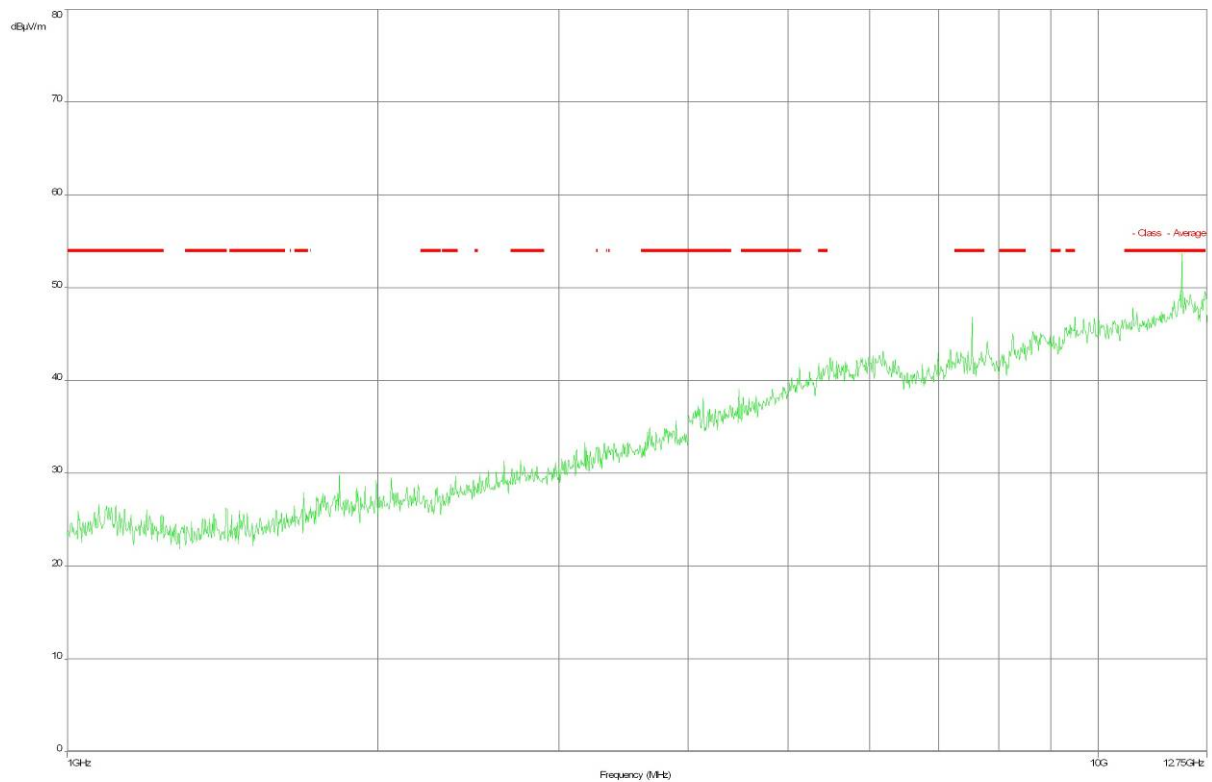
Plot No. 16: 10 kHz to 30 MHz, magnetic, low/mid/high frequency



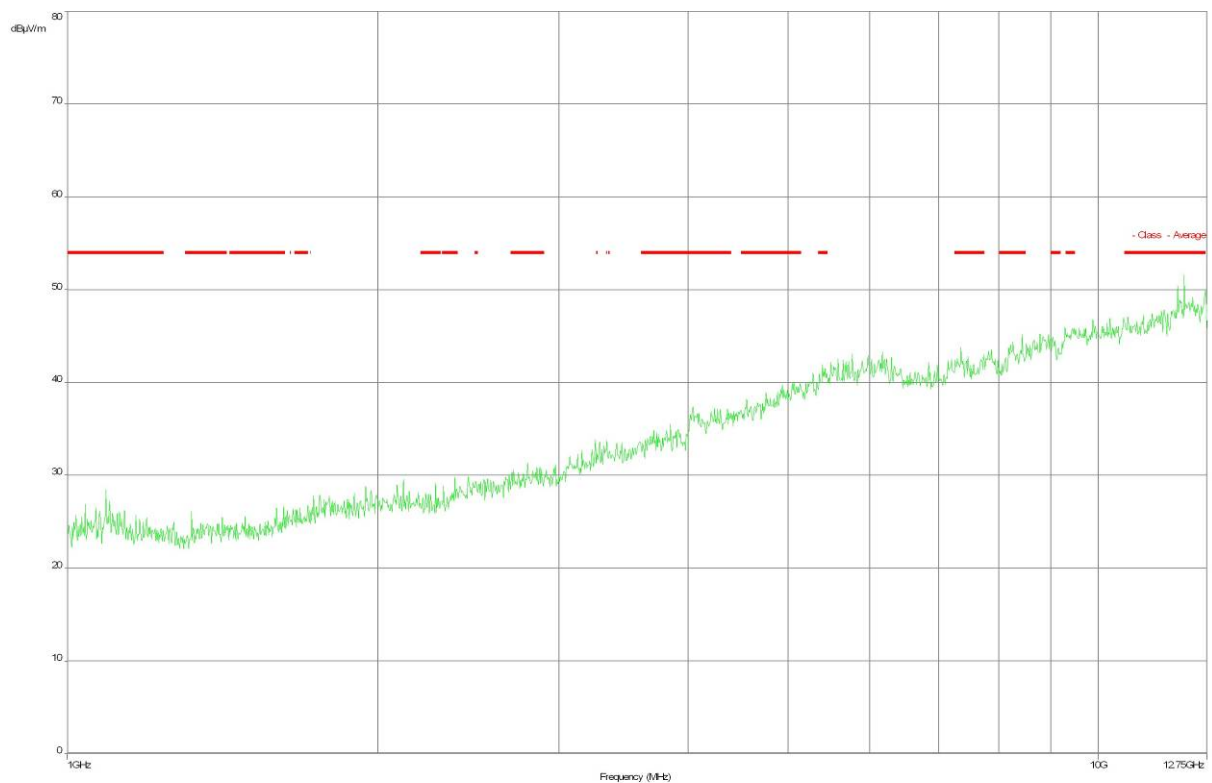
Plot No. 17: 1 GHz to 12.75 GHz, low frequency



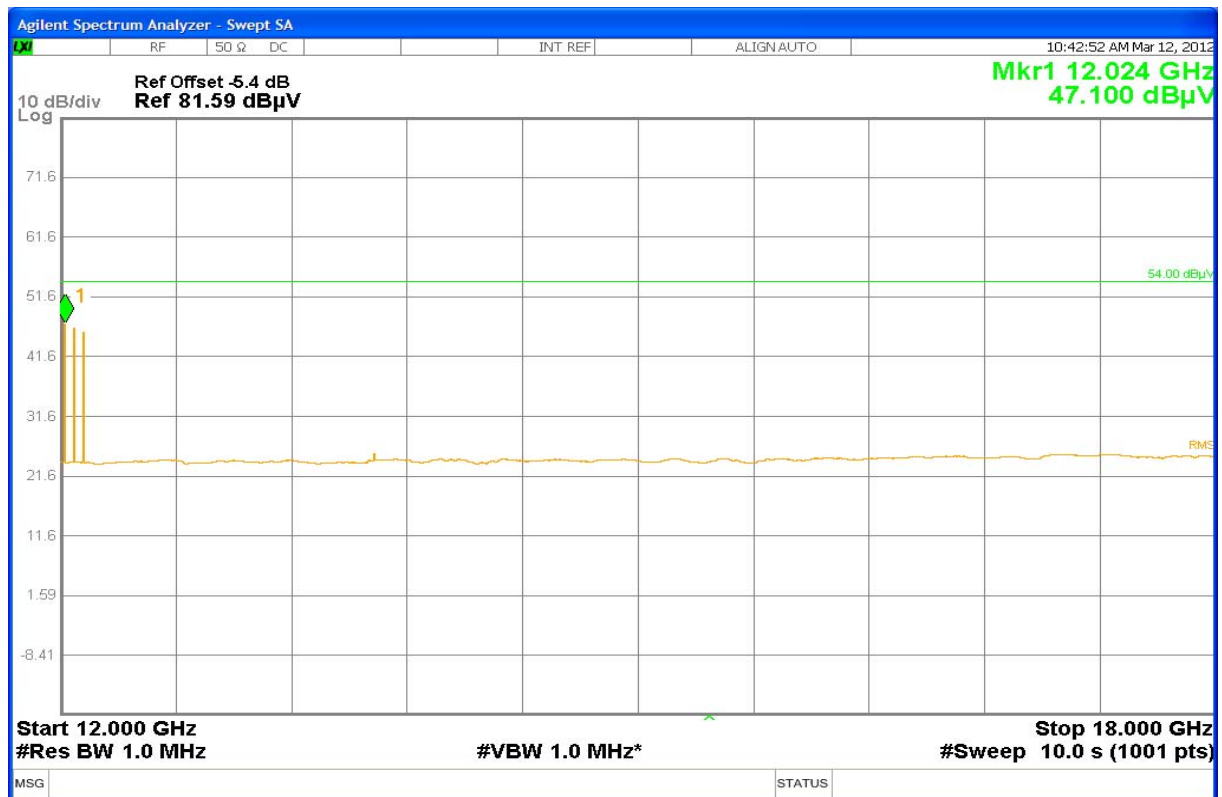
Plot No. 18: 1 GHz to 12.75 GHz, mid frequency



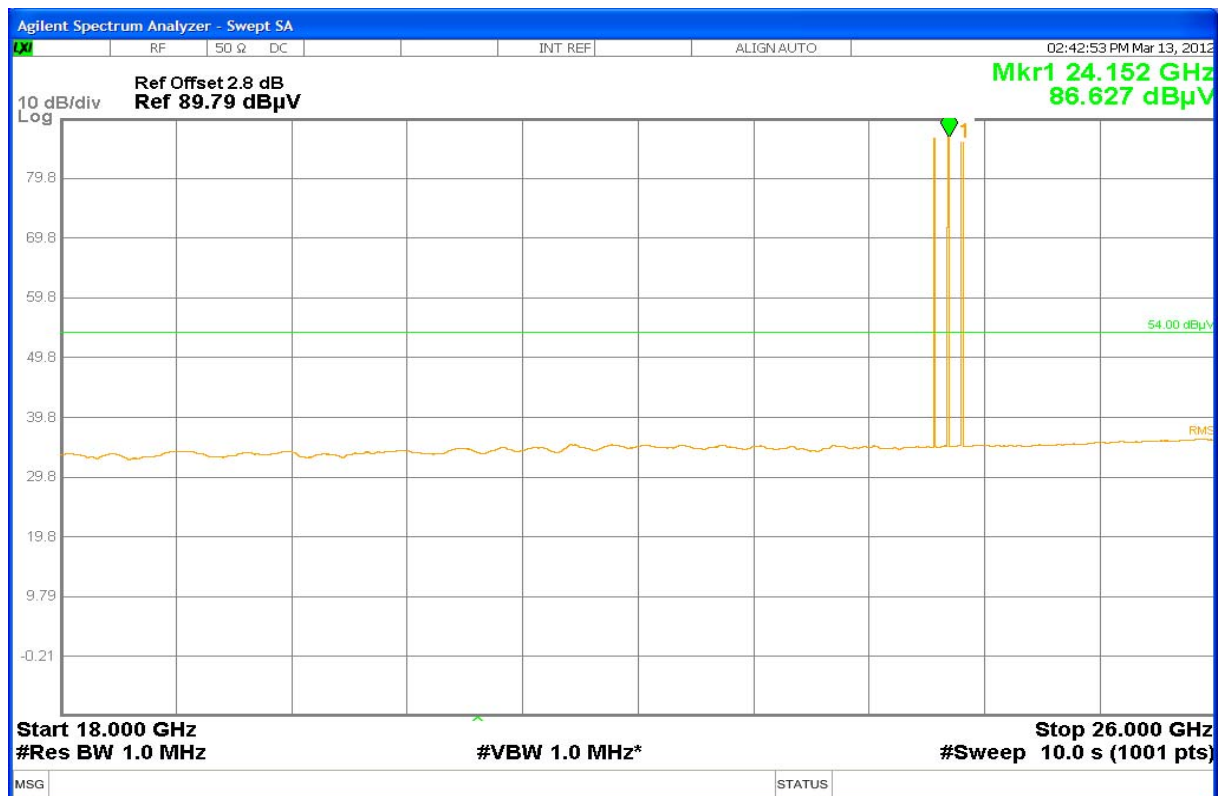
Plot No. 19: 1 GHz to 12.75 GHz, high frequency



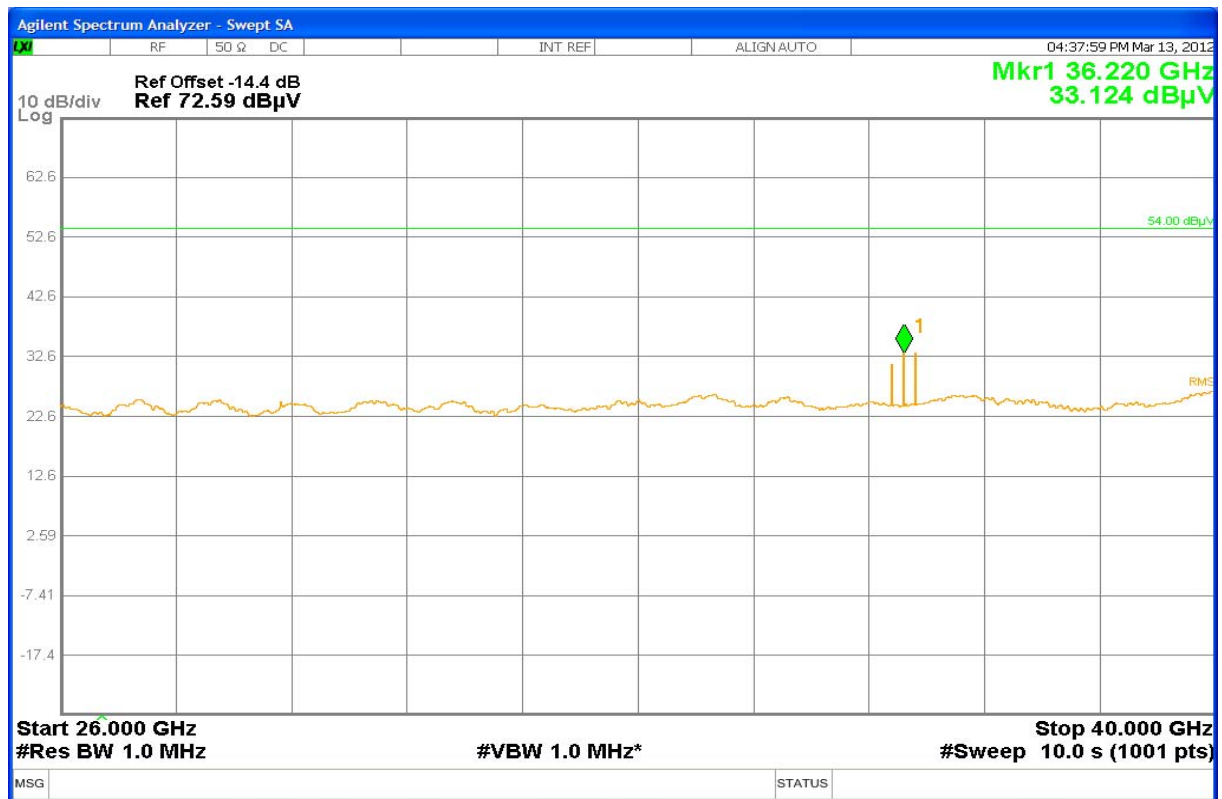
Plot No. 20: 12 GHz to 18 GHz, horizontal / vertical polarization, low/mid/high frequency



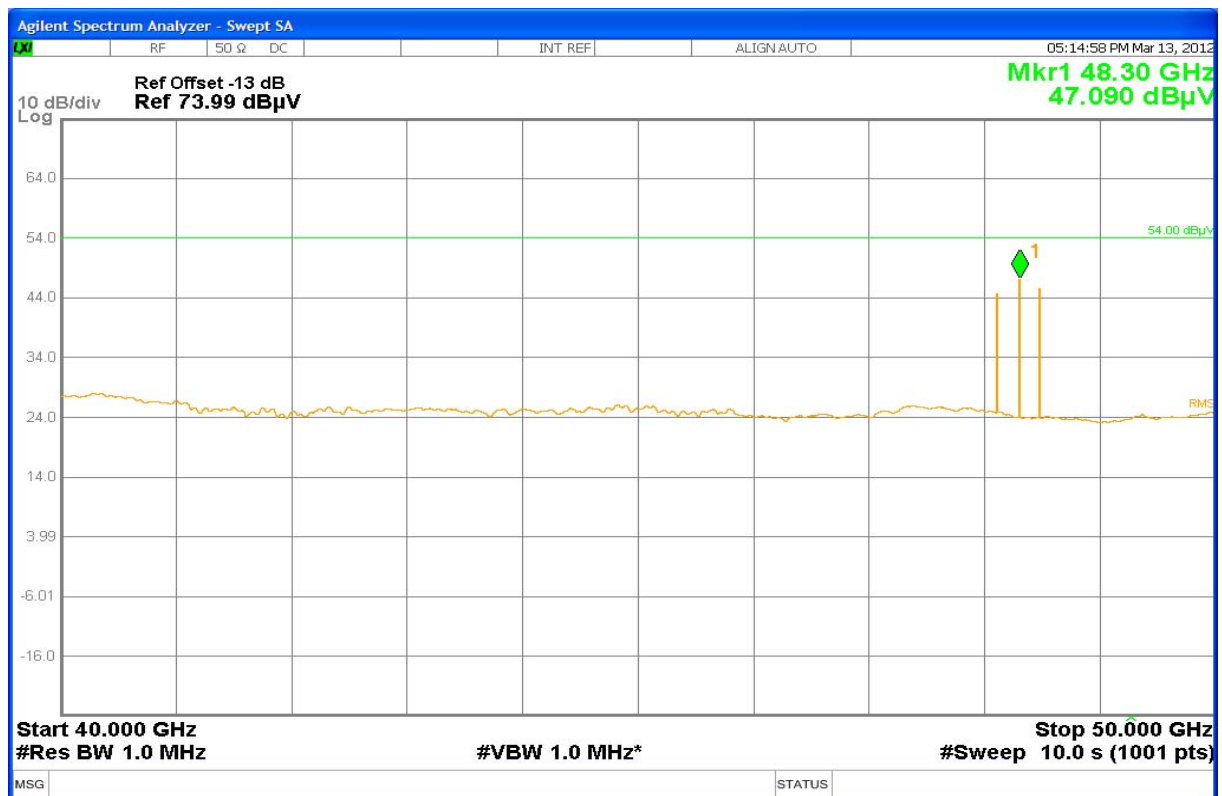
Plot No. 21: 18 GHz to 26 GHz, horizontal / vertical polarization, low/mid/high frequency



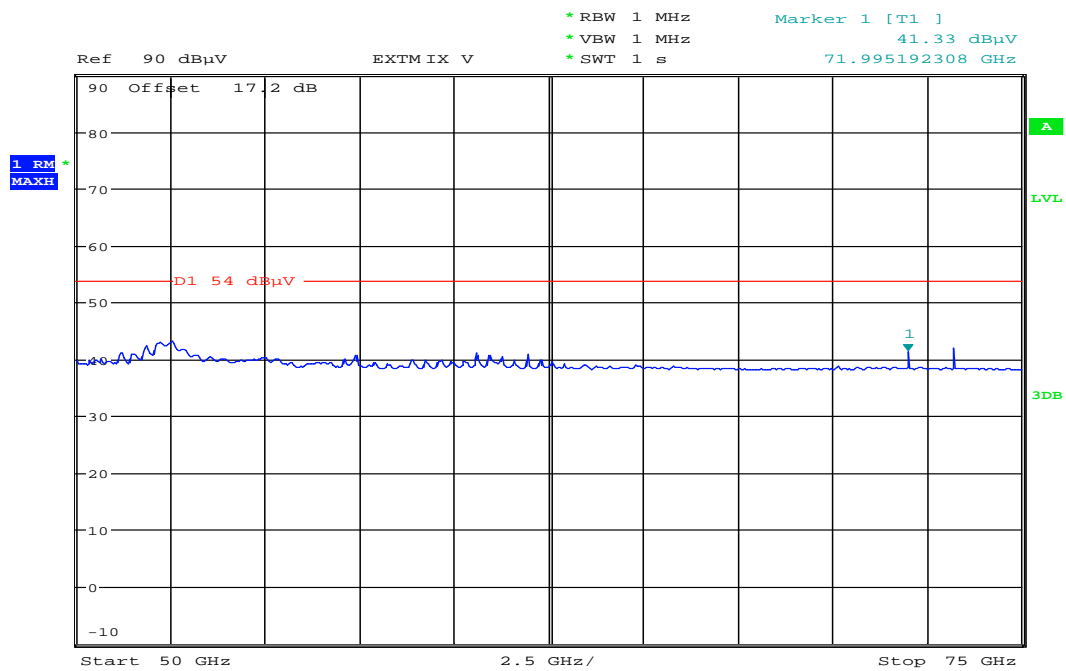
Plot No. 22: 26 GHz to 40 GHz, horizontal / vertical polarization, low/mid/high frequency



Plot No. 23: 40 GHz to 50 GHz, horizontal / vertical polarization, low/mid/high frequency

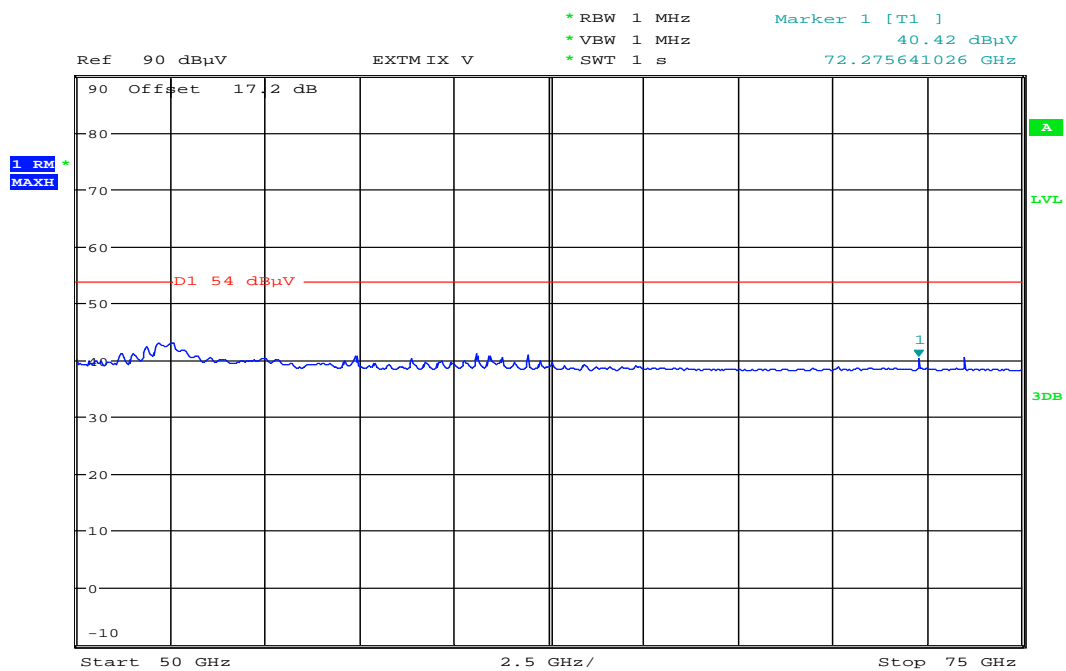


Plot No. 24: 50 GHz to 75 GHz, horizontal / vertical polarization, low frequency



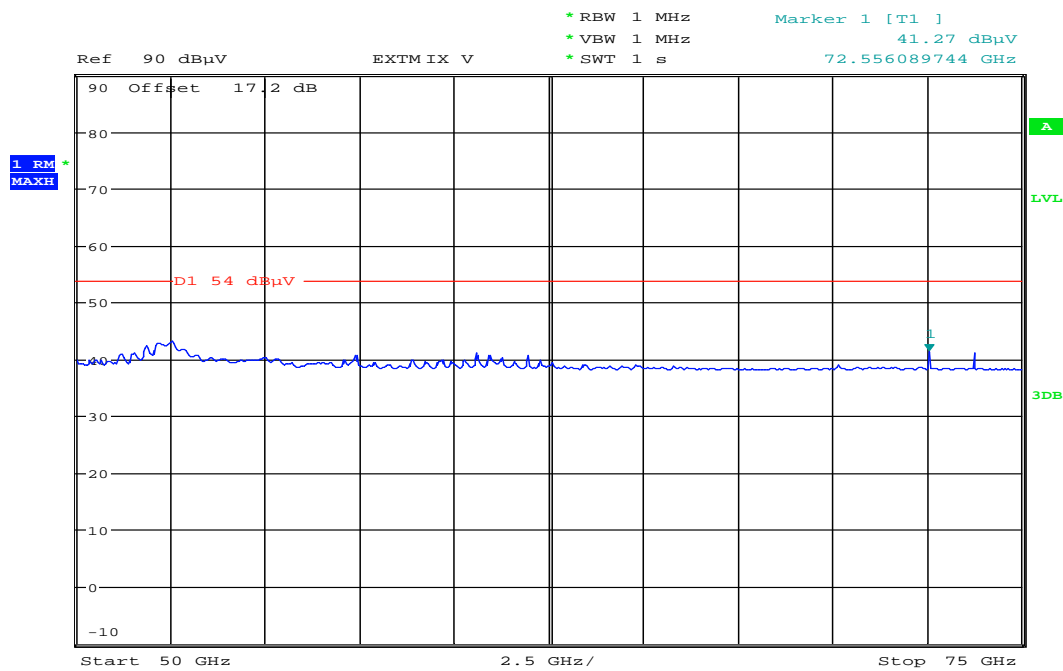
Date: 14.MAR.2012 11:27:24

Plot No. 25: 50 GHz to 75 GHz, horizontal / vertical polarization, mid frequency



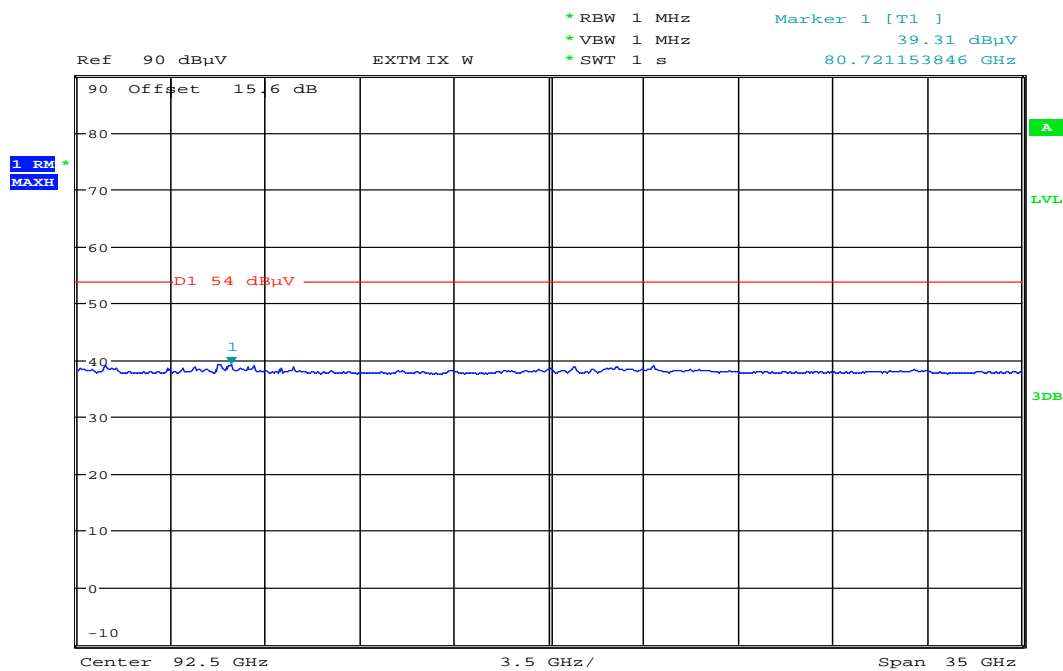
Date: 14.MAR.2012 11:25:52

Plot No. 26: 50 GHz to 75 GHz, horizontal / vertical polarization, high frequency



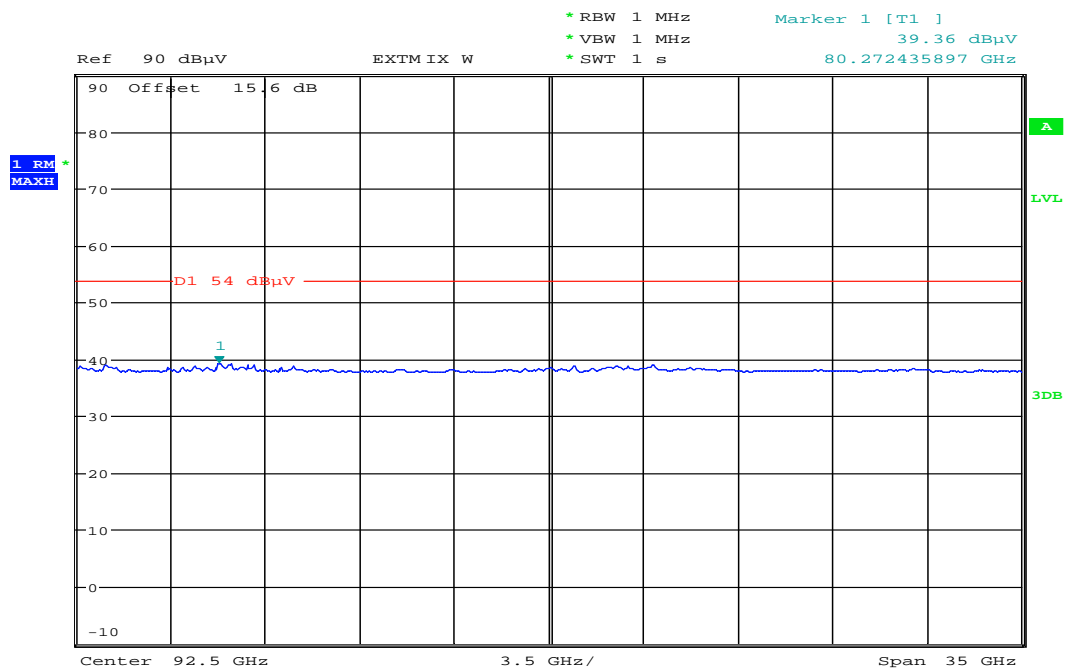
Date: 14.MAR.2012 11:28:24

Plot No. 27: 75 GHz to 110 GHz, horizontal / vertical polarization, low frequency



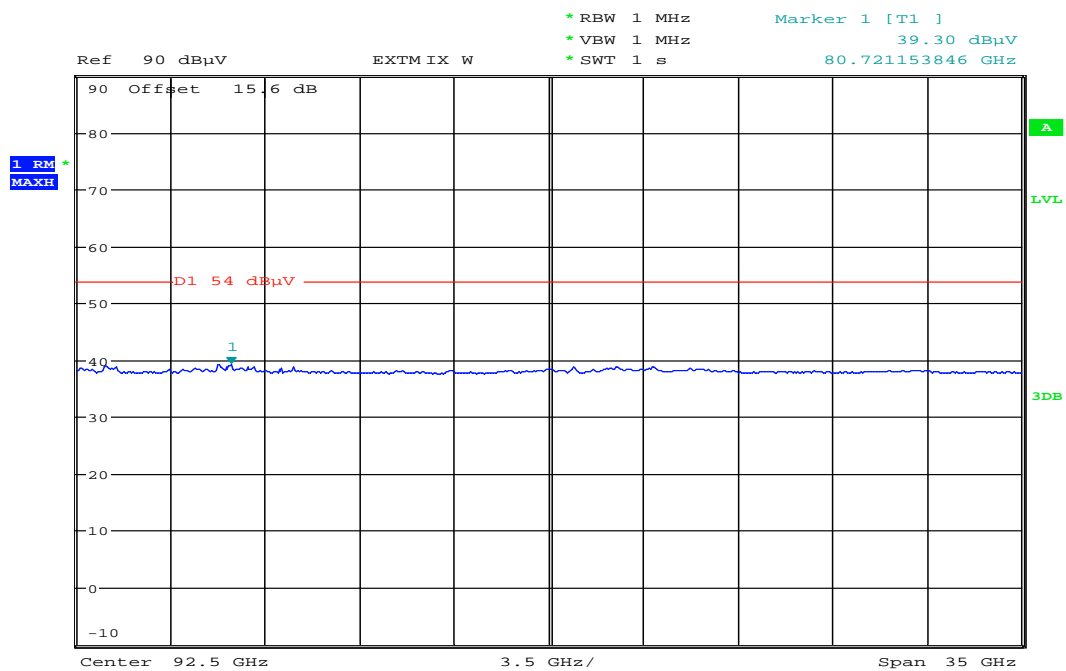
Date: 14.MAR.2012 11:44:27

Plot No. 28: 75 GHz to 110 GHz, horizontal / vertical polarization, mid frequency



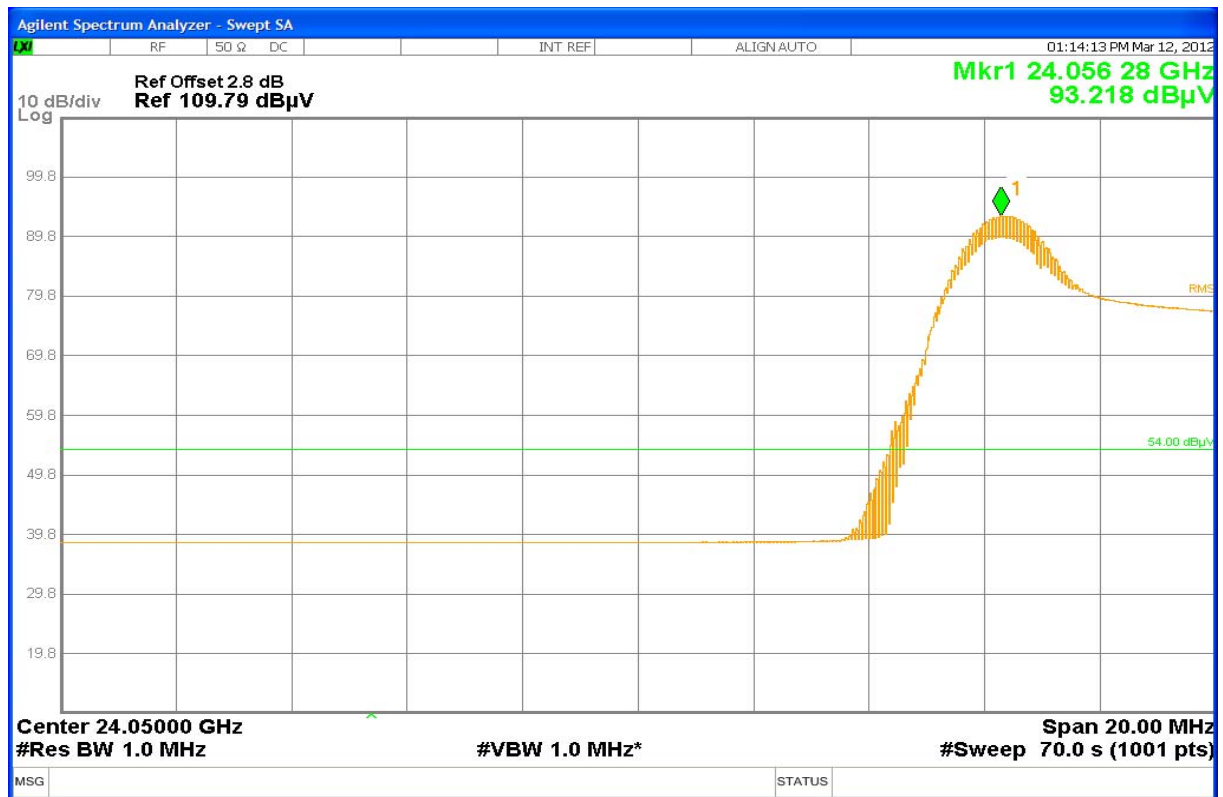
Date: 14.MAR.2012 11:48:13

Plot No. 29: 75 GHz to 110 GHz, horizontal / vertical polarization, high frequency

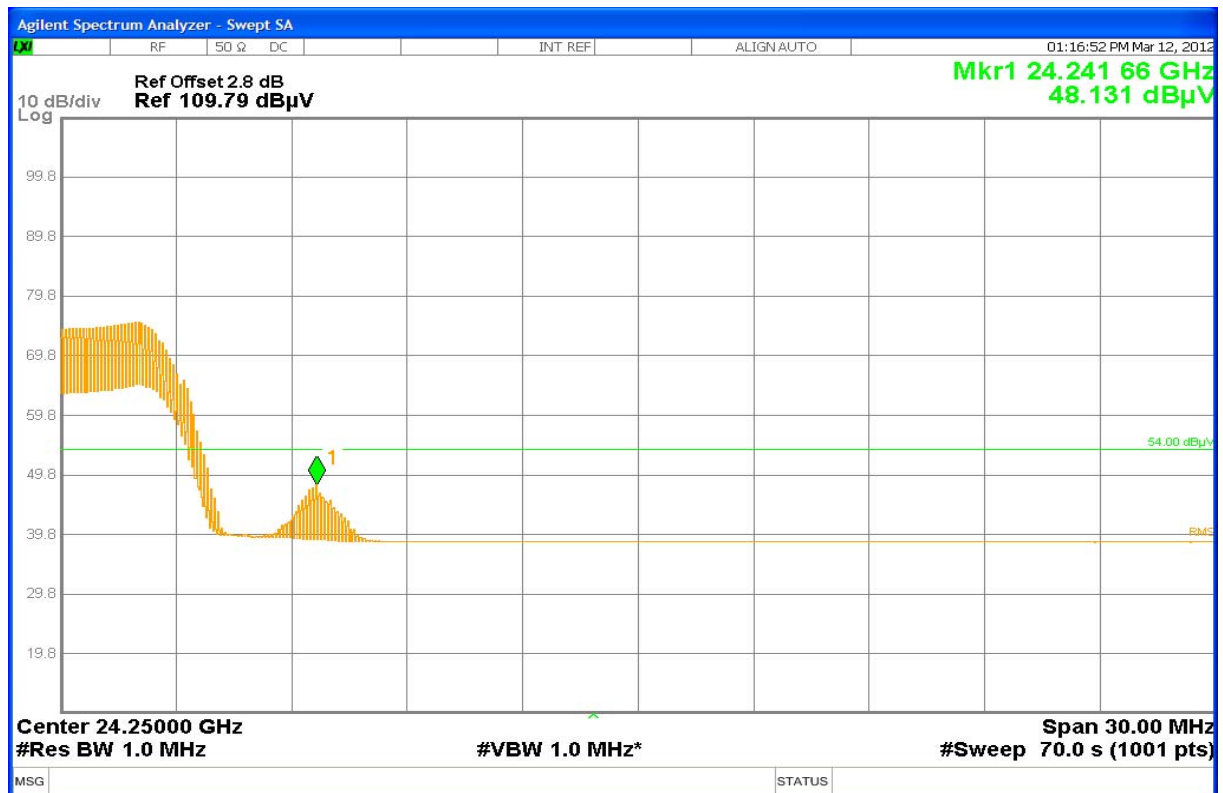


Date: 14.MAR.2012 11:33:31

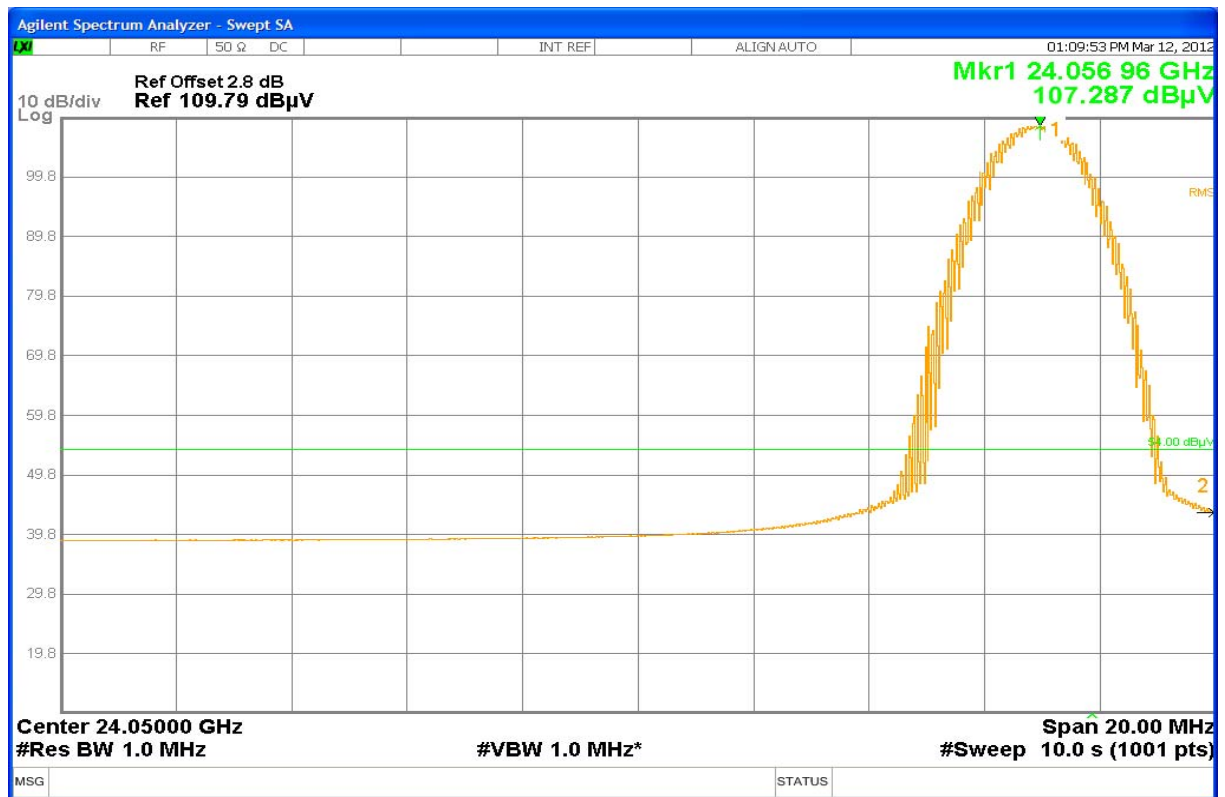
Plot No. 30: Band-Edge-Compliance, lower band-edge (24.05 GHz), normal operation mode



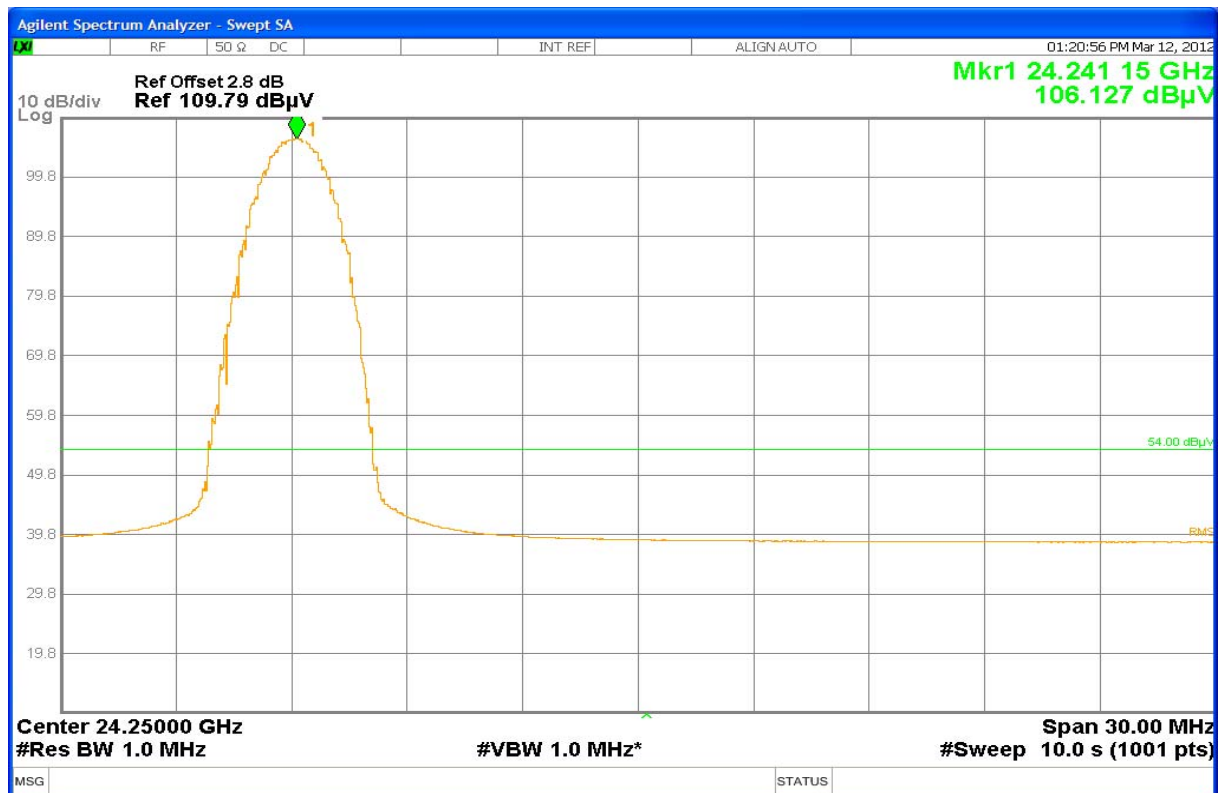
Plot No. 31: Band-Edge-Compliance, upper band-edge (24.25 GHz), normal operation mode



Plot No. 32: Band-Edge-Compliance, lower band-edge (24.05 GHz), stopped mode, low frequency



Plot No. 33: Band-Edge-Compliance, upper band-edge (24.25 GHz), stopped mode, high frequency



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	12.01.2012	12.01.2015
3	n. a.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	11.05.2011	11.05.2013
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	06.01.2012	06.01.2014
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	WRCG185 5/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG240 0/2483-2375/2505-50/10SS	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	WHKX2.9/1 8G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15 G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/1 8G-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	vIKI!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	14.10.2011	14.10.2014
25	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
26	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
27	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B597 9	300000210	ne		
28	n. a.	EMI Test Receiver	ESCI 1166.5950. 03	R&S	100083	300003312	k	04.01.2012	04.01.2014
29	n. a.	Analyzer- Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
30	n. a.	Amplifier	JS42- 00502650- 28-5A	MITEQ	1084532	300003379	ev		
31	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
32	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
33	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
34	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
35	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	10.01.2011	10.01.2013
36	5	DC Power Supply, 60V, 10A	6038A	HP Meßtechnik	2848A07027	300001174	Ve	05.01.2012	05.01.2015
37	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	01.07.2010	01.07.2012
38	11b	Microwave System Amplifier, 0.5- 26.5 GHz; 25 dB gain	83017A	HP Meßtechnik	00419	300002268	ev		
39	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
40	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
41	A021	Std. Gain Horn Antenna 26.4- 40.1 GHz	2224-20	Flann	233	300001973	ne		
42	n. a.	Std. Gain Horn Antenna 33-50 GHz	2324-20	Flann	57	-/-	ne		
43	n. a.	Broadband Low Noise Amplifier 18-50GHz	CERNEX	CBL19503070	19338	300004273	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
vIKI!	Attention: extended calibration interval			
NK!	Attention: not calibrated		*)	next calibration ordered / currently in progress

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2012-04-25
-A	FCC ID, IC, Model name updated	2012-07-03
-B	Plots 1 GHz - 12 GHz added	2012-07-26

Annex E Further information**Glossary**

AVG	-	Average
DUT	-	Device under test
EMC	-	Electromagnetic Compatibility
EN	-	European Standard
EUT	-	Equipment under test
ETSI	-	European Telecommunications Standard Institute
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	Not applicable
PP	-	Positive peak
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software

Annex F Accreditation Certificate



Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10
66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

Wired communications and DECT
Acoustic
Radio
Short Range Devices (SRD)
RFID
WiMax and Richtfunk
Mobile radio (GSM / DCS), Over the Air (OTA) Performance
Electromagnetic Compatibility (EMC) incl. Automotive
Product safety
SAR and Hearing Aid Compatibility (HAC)
Environmental simulation
Smart Card Terminals
Bluetooth
Wi-Fi-Services

The accreditation certificate shall only apply in connection with the notice of accreditation of 13.04.2011 with the accreditation number D-PL-12076-01 and is valid until 03.09.2014. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 82 pages.

Registration number of the certificate: **D-PL-12076-01-01**

Frankfurt am Main, 13.04.2011

Dipl.-Ing. (FH) Ralf Egner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.
See notes on back.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAKKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAKKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAKKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Front side of certificate

Back side of certificate

Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

http://www.cetecom.com/fileadmin/de/CETECOM_D_Saarbruecken/accreditations_Jan_2010/DAKKS_Akkredi_Urk_EN17025-En_incl_Annex.pdf