

## TEST REPORT

Test report no.: 1-8405/14-01-03



Deutsche  
 Akkreditierungsstelle  
 D-PL-12076-01-00

### Testing laboratory

**CETECOM ICT Services GmbH**  
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 e-mail: [ict@cetecom.com](mailto:ict@cetecom.com)

#### Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (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-12076-01-00

### Applicant

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 Peter-Dornier-Str. 10  
 88131 Lindau/Bodensee / GERMANY  
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 Phone: +49 8382 9699-435

### Manufacturer

**Conti Temic microelectronic GmbH**  
 Ringlerstrasse 17  
 85057 Ingolstadt / 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:** SRD for RTTT (for Blind Spot Detection)  
**Model name:** SRR3-A  
**FCC ID:** OAYSRR3A  
**IC:** -/  
**Frequency:** 24.05 - 24.25 GHz  
**Antenna:** 2 TX / 4 RX Planar Patch  
**Power Supply:** 13.5 V DC from power supply  
**Temperature Range:** -40 °C to +85 °C



### Test report authorised:

Karsten Gerald  
 Professional

### Test performed:

Meheza Walla  
 Specialist

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## 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.

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

### 2.2 Application details

Date of receipt of order:	2014-09-15
Date of receipt of test item:	2014-09-22
Start of test:	2014-09-22
End of test:	2014-10-06
Person(s) present during the test:	Mr. Martin Orlamünder

## 3 Test standard/s

Test standard	Date	Test standard description
FCC 47 CFR Part 15		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
	$T_{max}$	+85 °C during high temperature tests
	$T_{min}$	-40 °C during low temperature tests
Relative humidity:		45 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	$V_{nom}$	13.5 V DC from power supply
	$V_{max}$	16.0 V DC
	$V_{min}$	8.5 V DC

#### 5 Test item

Kind of test item	:	<b>SRD for RTTT (for Blind Spot Detection)</b>
Type identification	:	<b>SRR3-A</b>
S/N serial number	:	<b>A2C7416650400</b>
HW hardware status	:	<b>C0</b>
SW software status	:	<b>PSW 2.11</b>
Frequency band	:	<b>24.05 - 24.25 GHz</b>
Type of modulation	:	<b>FMChirp</b>
Number of channels	:	<b>1</b>
Antenna	:	<b>2 TX / 4 RX Planar Patch</b>
Power supply	:	<b>13.5 V DC from externa power supply</b>
Temperature range	:	<b>-40 °C to +85 °C</b>

#### 5.1 Additional comments

Test setup- and EUT-photos are included in test report: [1-8405/14-01-03\\_AnnexA](#)  
[1-8405/14-01-03\\_AnnexB](#)  
[1-8405/14-01-03\\_AnnexD](#)

#### 6 Test laboratories sub-contracted

None

## 7 Summary of measurement results

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

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	FCC 47 CFR Part 15 RSS-310	Passed	2014-10-14	-/-

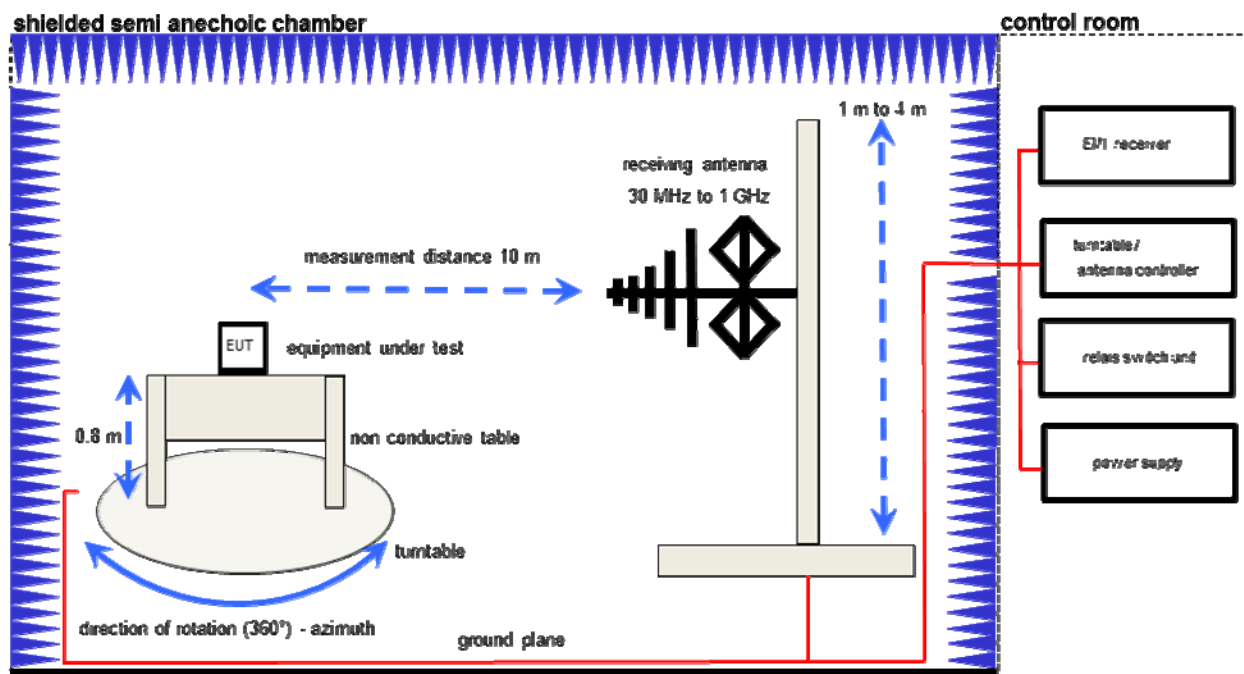
Test specification clause	Test case	Temperature conditions	Power supply	Pass	Fail	NA	NP	Results (max.)
§15.203 RSS-Gen 7.1.4	Antenna Requirement	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.249(a), (c) RSS-310, 3.10	Field strength of emissions (wanted signal)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PK: 111 dBµV/m AVG: 82 dBµV/m @ 3m
ANSI C63.4 § 13.1.7 RSS-GEN 4.6.1	Occupied bandwidth (26dB Bandwidth and 99% Bandwidth)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26dB: 194 MHz 99%: 176 MHz
§15.249(a), (d) §15.209 RSS-GEN 4.9	Field strength of emissions (spurious & harmonics)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§1.1310 §2.1091 FCC OET Bulletin 65 §15.319 (i) RSS-GEN 5.5 RSS 102	MPE Calculation	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.003 mW/cm <sup>2</sup>
§15.249 (b) (2)	Frequency Stability	Nominal and Extreme	Nominal and Extreme	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies

**Note:** NA = Not Applicable; NP = Not Performed

## 8 Description of the test setup

### 8.1 Radiated measurements chamber F

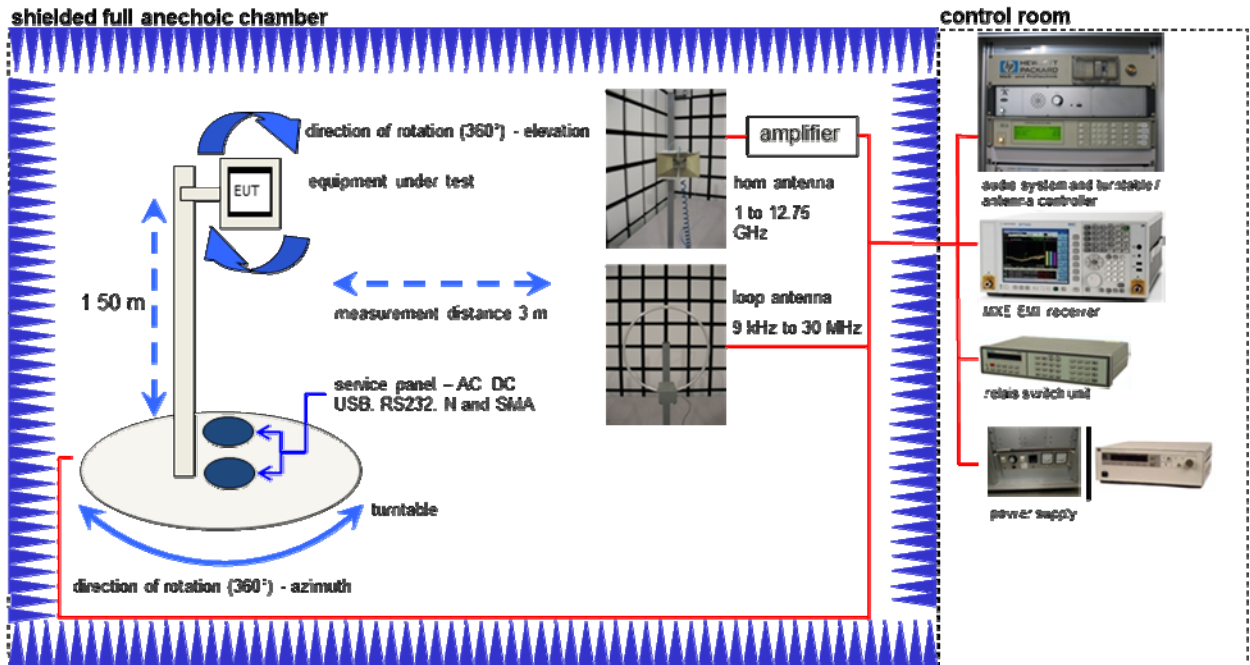
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. 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 analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



#### Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Switch-Unit	3488A	HP Meßtechnik	2719A14505	30000368
DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	30000580
EMI Test Receiver	ESCI 3	R&S	100083	300003312
Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379
Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745
Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746
Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787
Test Receiver	ESH2	R&S	871921/095	300002505
Loop Antenna 9 KHz - 30 MHz	HFH2-Z2	R&S	872096/61	300001824
EMI Test Receiver 9 kHz - 3 GHz incl. Preselector	ESPI3	R&S	101713	300004059

## 8.2 Radiated measurements chamber C

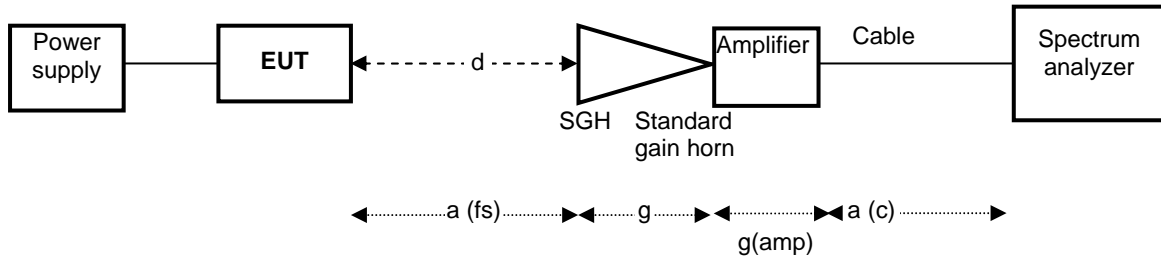


### Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789
Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032
Active Loop Antenna	6502	EMCO	8905-2342	300000256
Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155
Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997
Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143

### 8.3 Radiated measurements 12 GHz to 50 GHz

Test set-up for the measurement of spurious radiation in the frequency range 12 GHz to 50 GHz:



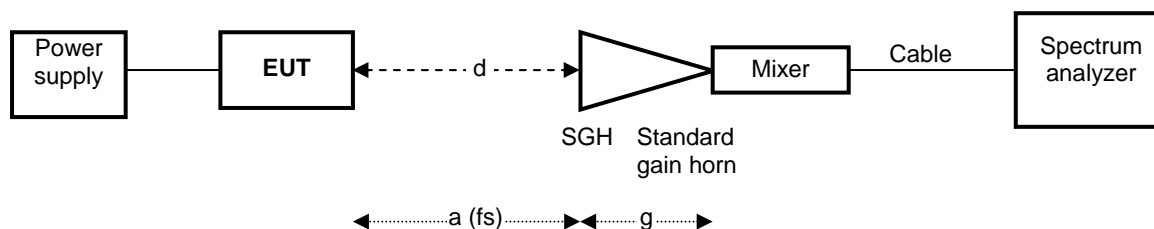
**Equipment table:**

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442
Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751
Std. Gain Horn Antenna 39.3-59.7 GHz	2424-20	Flann	75	300001979
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Broadband Low Noise Amplifier 18-50 GHz	CBL19503070-XX	CERNEX	19338	300004273
Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443



## 8.4 Radiated measurements above 50 GHz

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



### Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 49.9-75.8 GHz	2524-20	Flann	*	300001983
Std. Gain Horn Antenna 60-90 GHz	COR 60_90	Thomson CSF	*	300000814
Std. Gain Horn Antenna 73.8-112 GHz	2724-20	Flann	*	300001991
Std. Gain Horn Antenna 114-173 GHz	2924-20	Flann	*	300001999
Std. Gain Horn Antenna 145-220 GHz	3024-20	Flann	*	300002000
Std. Gain Horn Antenna 145-220 GHz	3024-20	Flann	*	300002001
Harmonic mixer 50 - 75 GHz for spectrum analyzers	FS-Z75	R&S	100099	300003949
Harmonic mixer 60 - 90 GHz for spectrum analyzers	FS-Z90	R&S	101555	300004691
Spectrum Analyzer Mixer 2-Port, 75-110 GHz	SAM-110-7	Radiometer Physics GmbH	002	300004155

## 8.5 Conducted measurements

**Not applicable!**

## 9 Measurement results

### 9.1 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### Limits:

FCC / IC
47 CFR Part 15.203 / RSS-GEN 7.1.4

**Result:** The measurement is passed.

## 9.2 Field strength of emissions (wanted signal)

### Description:

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

### Measurement:

Measurement parameter	
Detector:	Pos-Peak / Average
Sweep time:	100s
Video bandwidth:	3 MHz
Resolution bandwidth:	1 MHz (6 dB Bandwidth)
Span:	300 MHz
Trace-Mode:	Max Hold

### Limits:

FCC / IC		
47 CFR Part 15.249(a), (c) / 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 [ dB $\mu$ V/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:**

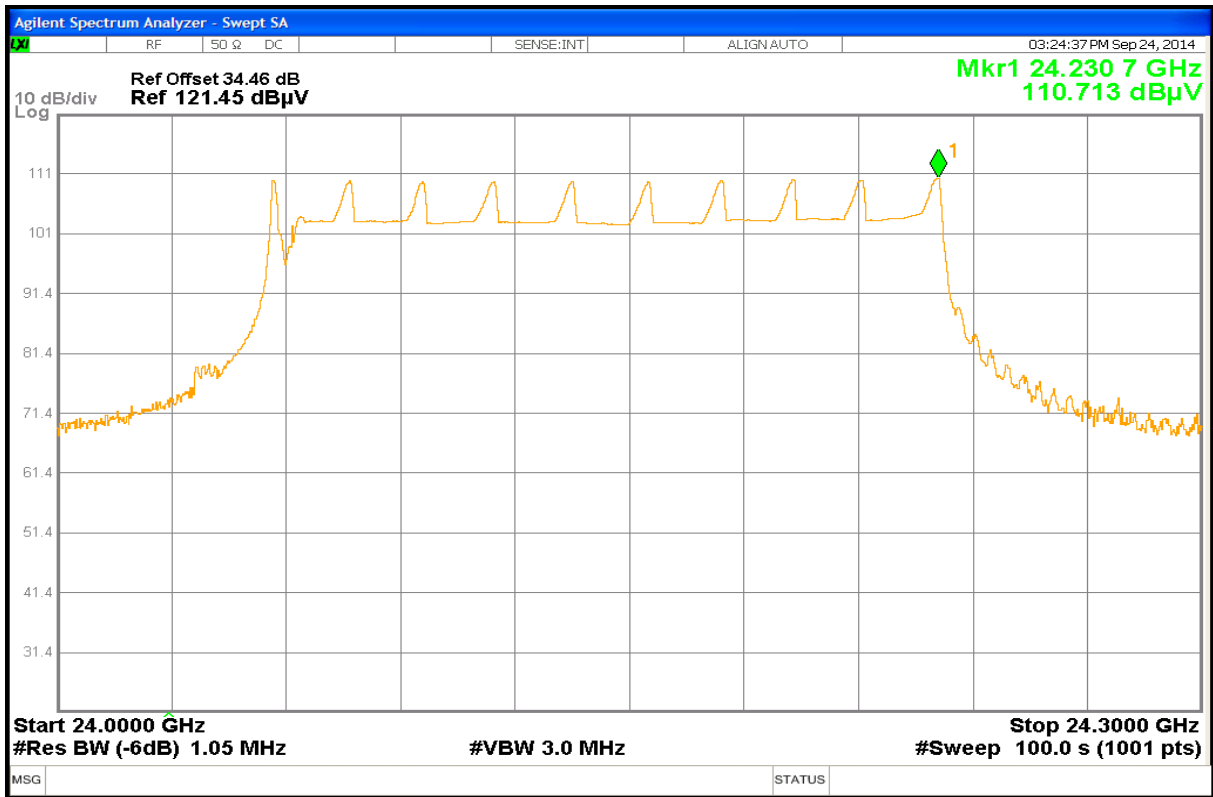
Test condition Tnom / Vnom	Frequency [ GHz ]	Maximum field strength (Peak) measured values [dB $\mu$ V/m] @ 3 m
normal operation mode	24.15	110.7
stopped mode, low frequency	24.06	110.2
stopped mode, mid frequency	24.15	109.9
stopped mode, high frequency	24.23	110.8
Measurement uncertainty	$\pm 3$ dB	

**Average-Measurement:**

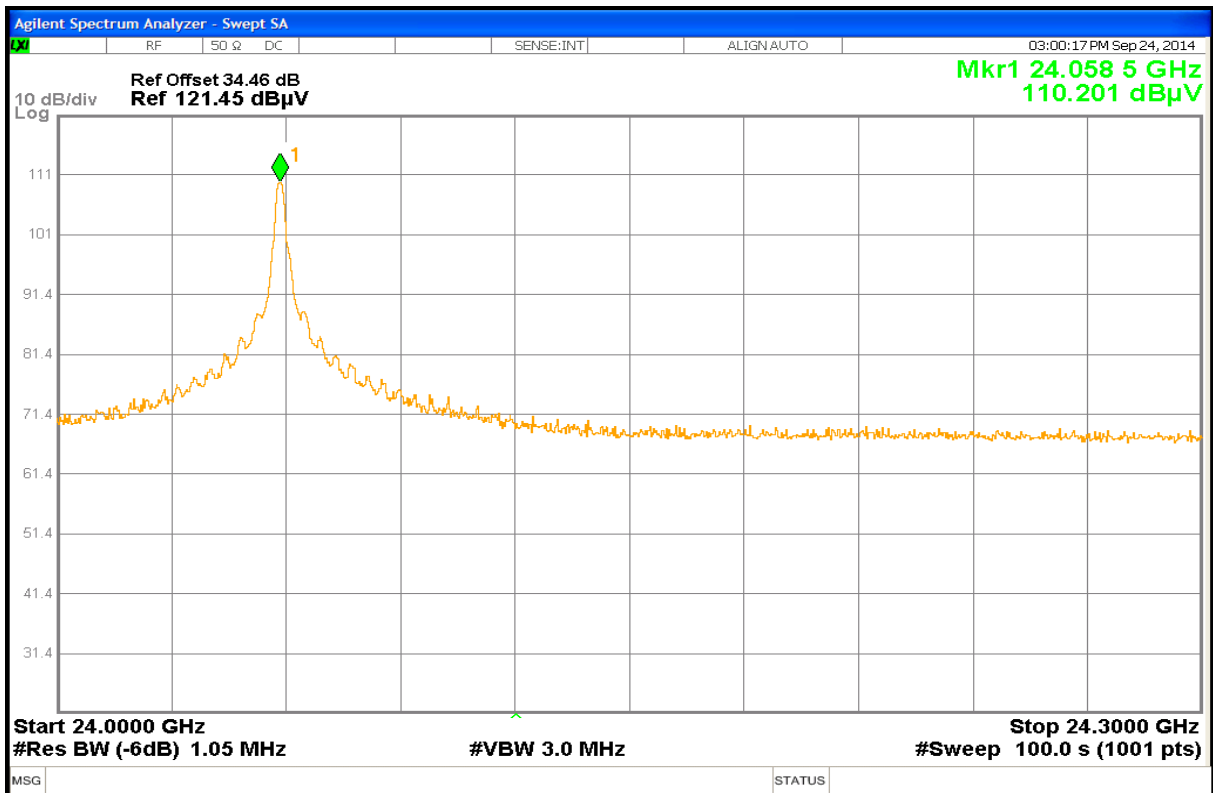
Test condition Tnom / Vnom	Frequency [ GHz ]	Maximum field strength (AVG) measured values [dB $\mu$ V/m] @ 3 m
normal operation mode	24.15	82.1
stopped mode, low frequency	24.06	102.7
stopped mode, mid frequency	24.15	101.9
stopped mode, high frequency	24.23	102.5
Measurement uncertainty	$\pm 3$ dB	

**Result:** The measurement is passed.

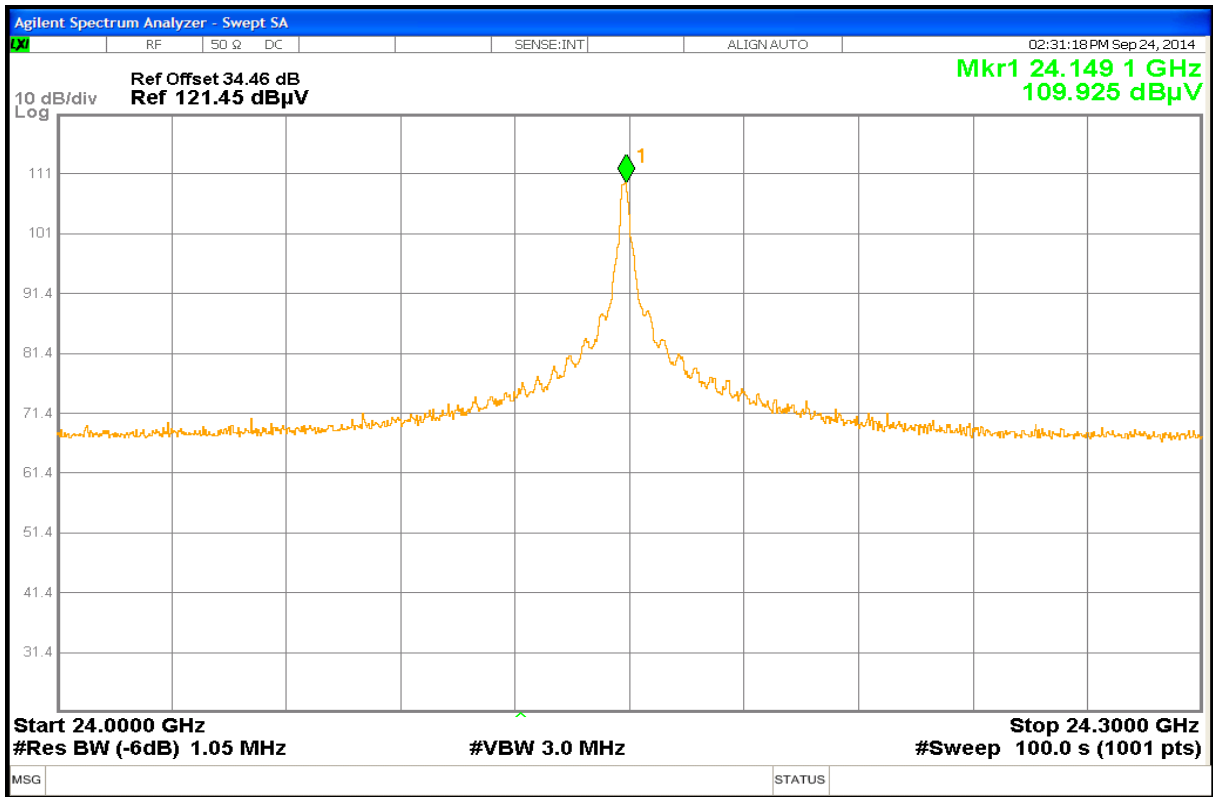
Plot No. 1: Peak measurement, normal operation mode



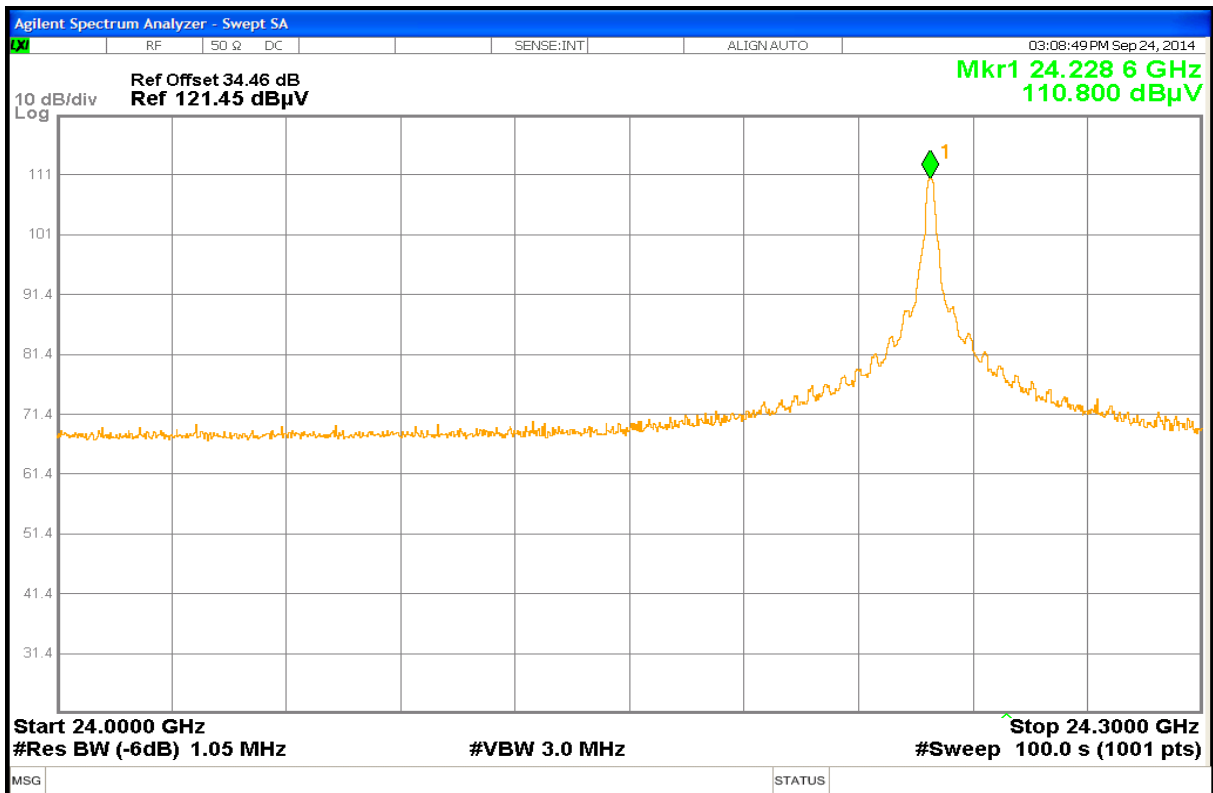
Plot No. 2: Peak measurement, stopped mode, low frequency



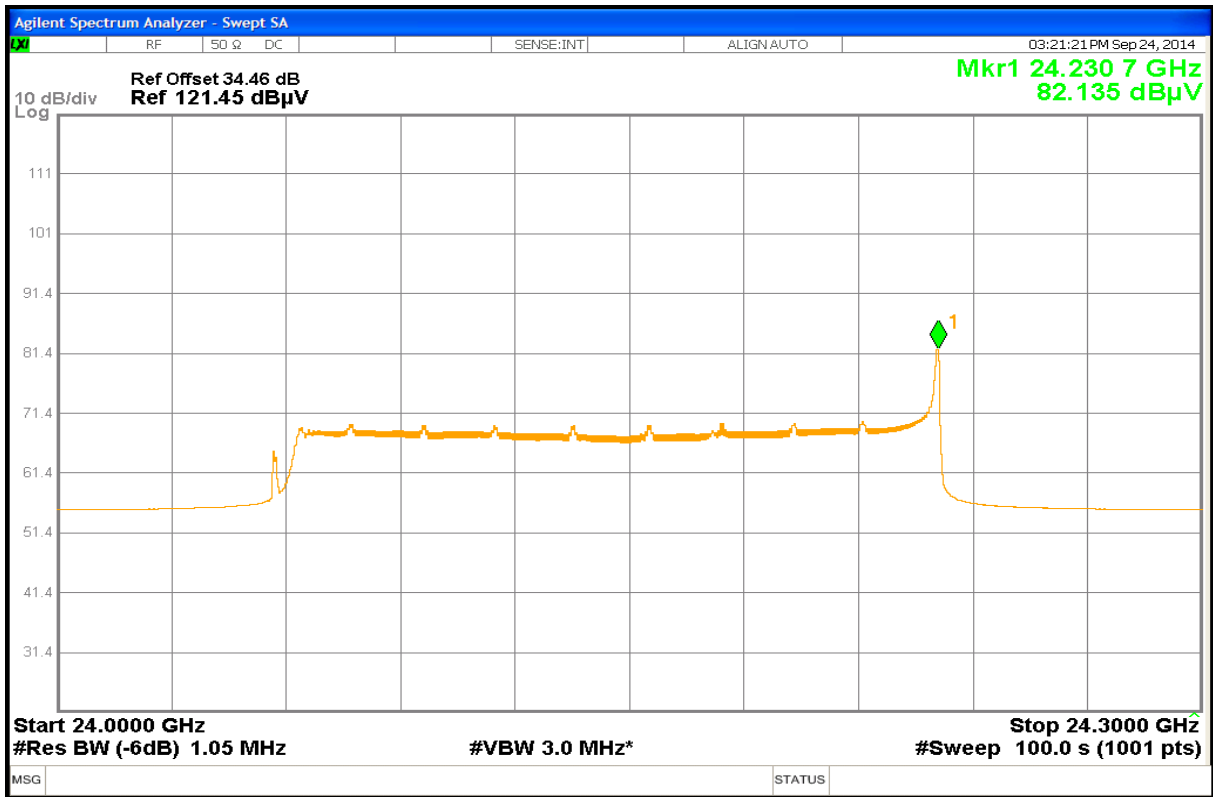
Plot No. 3: Peak measurement, stopped mode, mid frequency



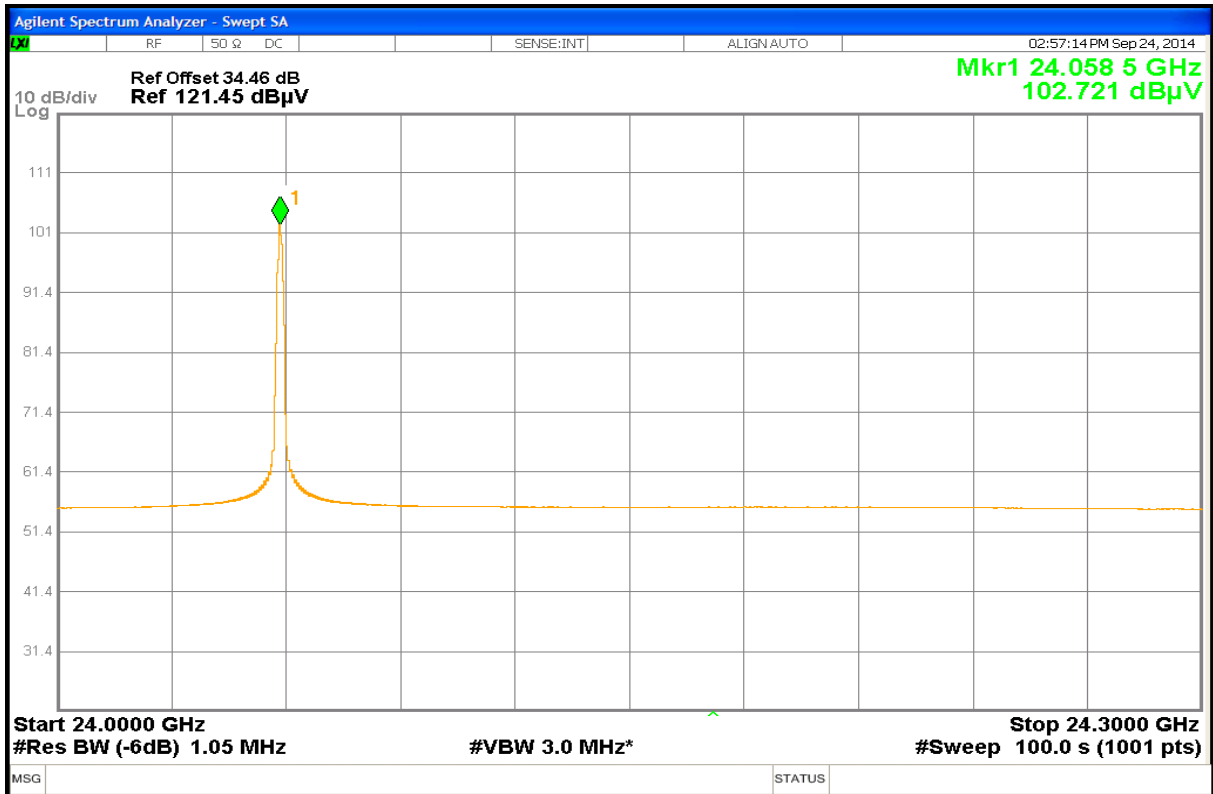
Plot No. 4: Peak measurement, stopped mode, high frequency



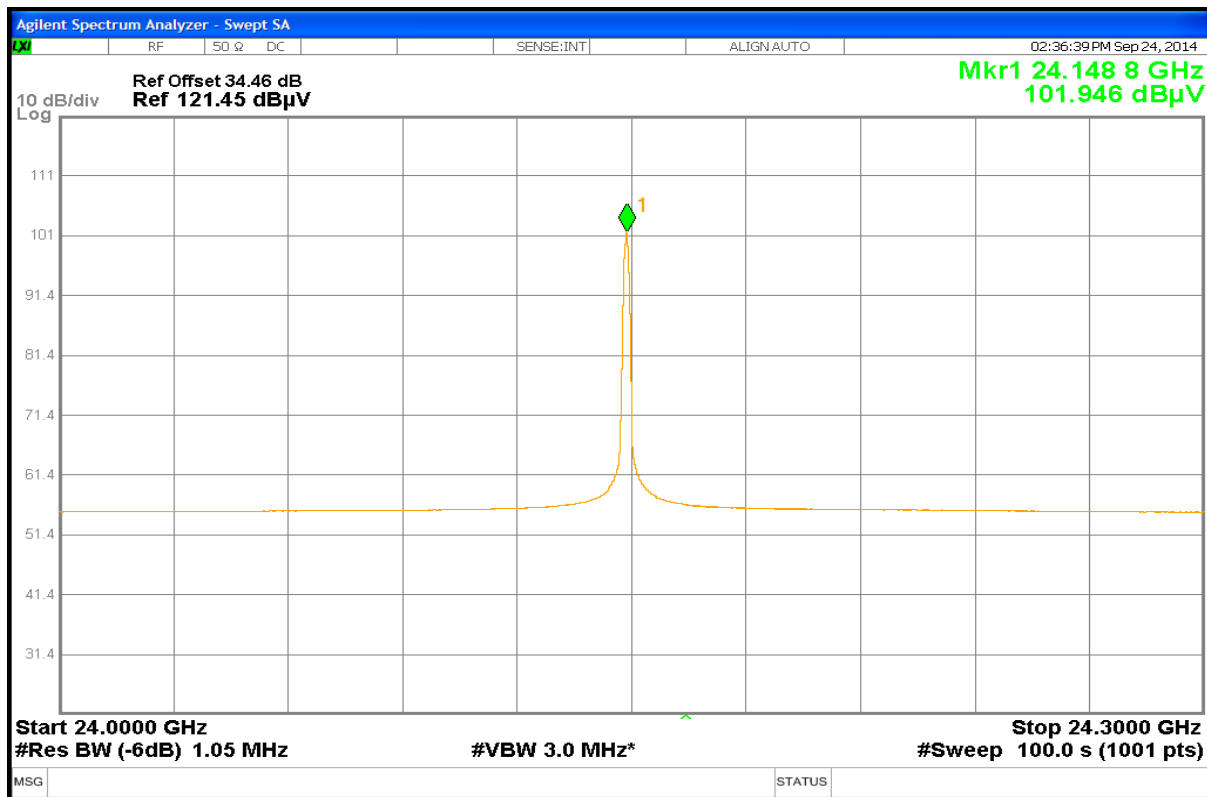
Plot No. 5: Average measurement, normal operation mode



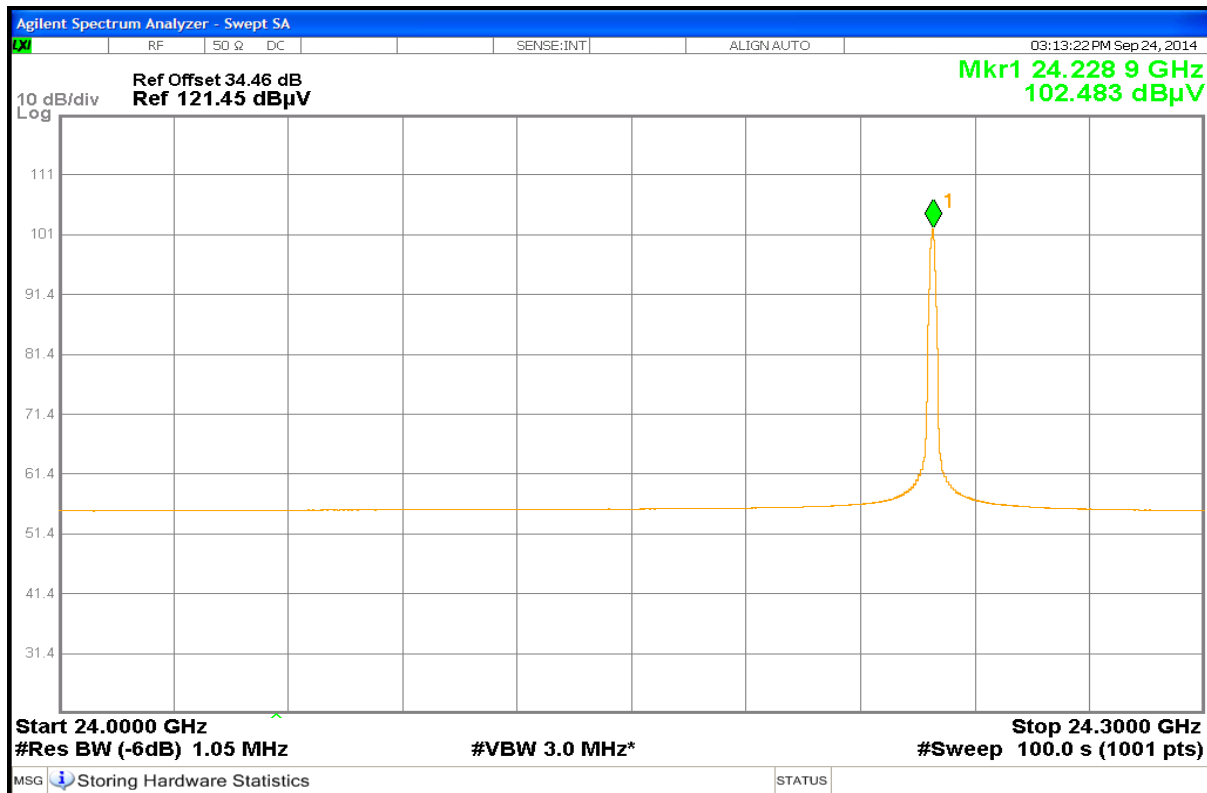
Plot No. 6: Average measurement, stopped mode, low frequency



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



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





### 9.3 Occupied bandwidth (26 dB bandwidth and 99% bandwidth)

#### Description:

##### **99% bandwidth:**

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is the 99% emissions bandwidth, as calculated or measured.

##### **26 dB bandwidth:**

The occupied bandwidth measurements on an intentional radiator shall be made in accordance with the requirements outlined in ANSI C63.4-2009, Section 13.7. If no bandwidth requirement is specified by the procuring or regulatory agency, measure the bandwidth at  $-26$  dB with respect to the reference level. The resolution bandwidth was set according to Table 5 in section 13.7 of ANSI C63.4-2009.

#### Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	100s
Video bandwidth:	1 MHz
Resolution bandwidth:	3 MHz
Span:	300 MHz
Trace-Mode:	Max Hold

#### Limits:

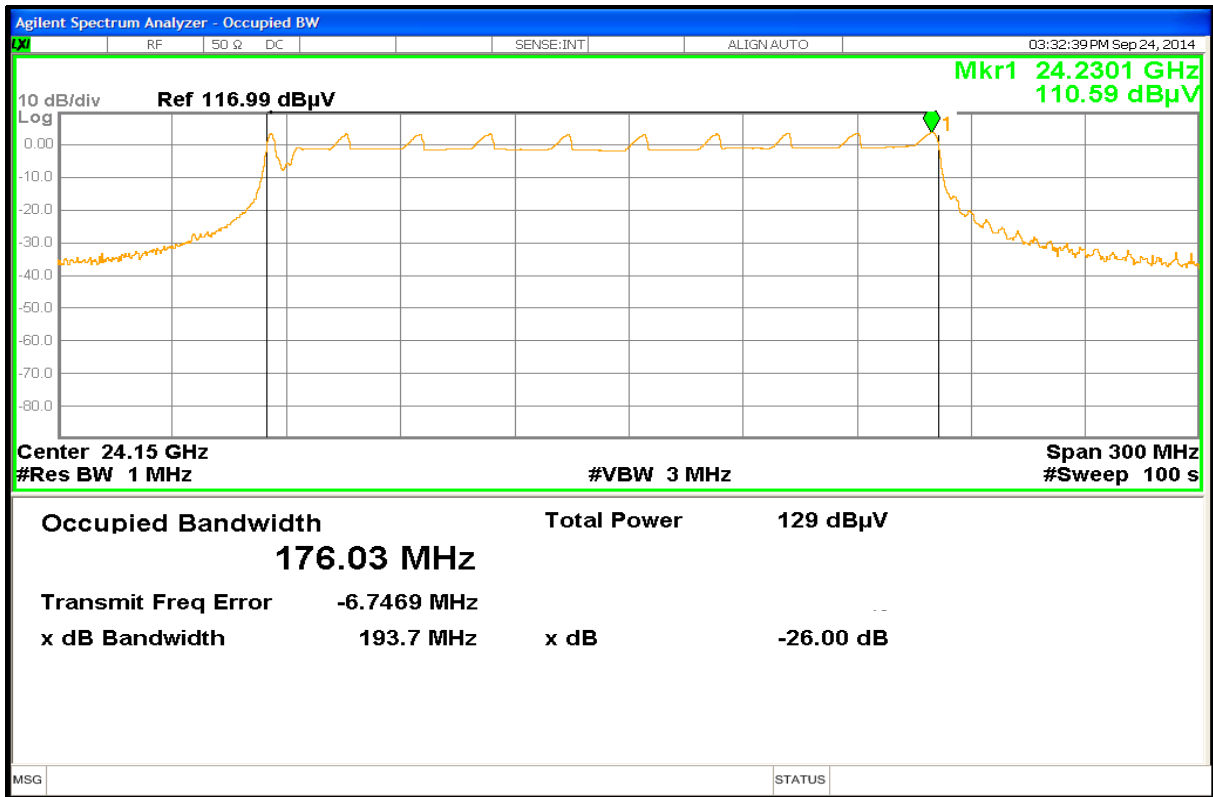
FCC / IC
ANSI C63.4 § 13.1.7 / RSS-GEN 4.6.1

#### Measurement results:

Test condition Tnom / Vnom	26 dB bandwidth [MHz]	99% bandwidth [MHz]
normal operation mode [24.15 GHz]	194	176
Measurement uncertainty	$\pm$ span/1000	

**Result: The measurement is passed.**

Plot No. 9: Peak measurement, normal operation mode



## 9.4 Field strength of emissions (radiated spurious and harmonics)

### Description:

Measurement of the radiated spurious emissions in transmit mode.

### Measurement:

Measurement parameter	
Detector:	F < 1 GHz: Quasi Peak F > 1 GHz: Average
Sweep time:	100s
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:

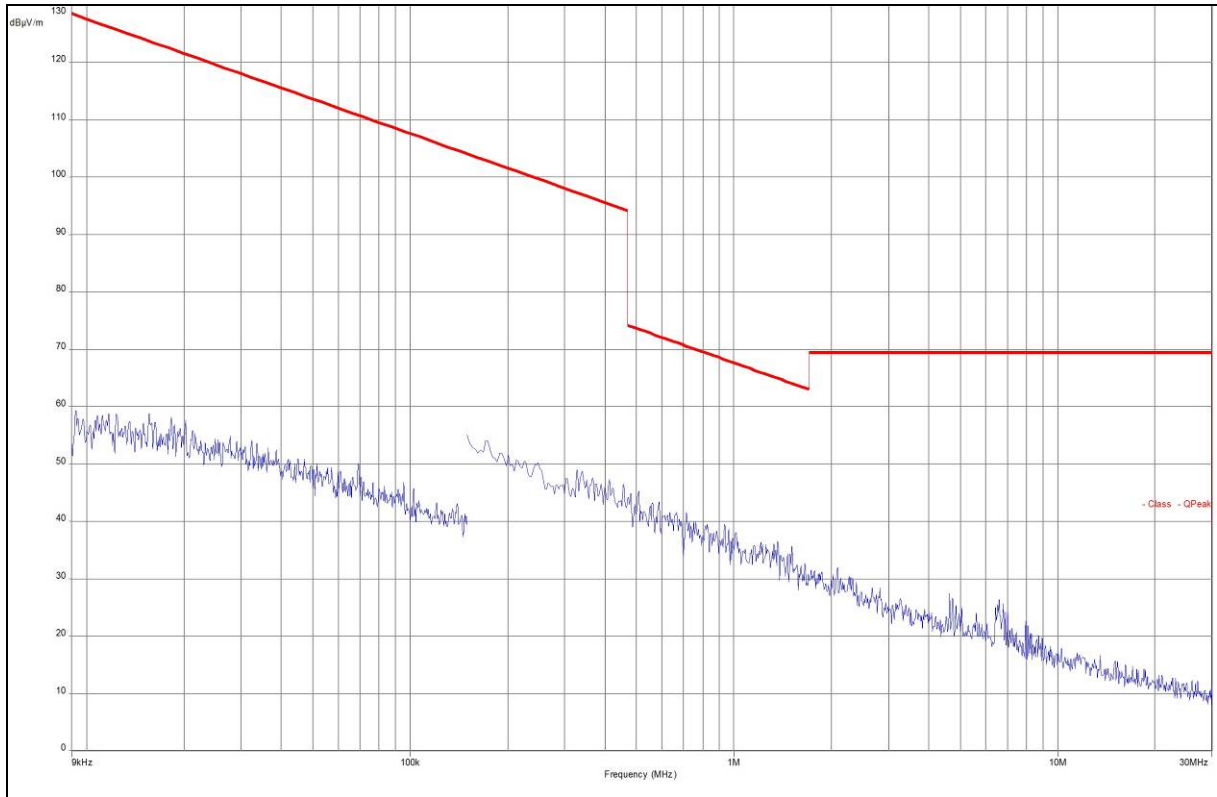
FCC / IC		
CFR Part 15.249 (a), (d); CFR Part 15.209 / RSS-GEN 4.9		
Field Strength of harmonics shall not exceed 68 dB $\mu$ V/m		
Radiated Spurious Emissions		
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.		
Frequency (MHz)	Field Strength (dB $\mu$ V/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:**

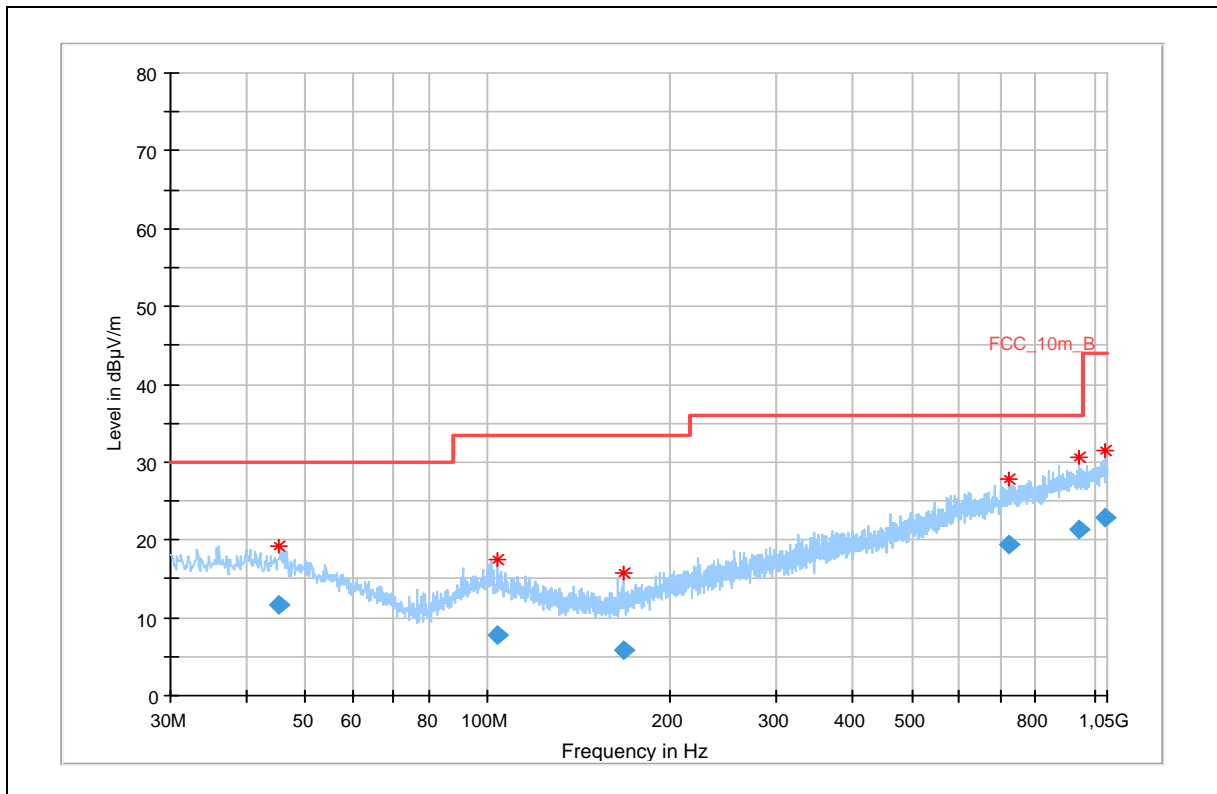
TX Spurious Emissions Radiated [dB $\mu$ V/m]								
Lowest			Middle			Highest		
F [GHz]	Detector	Level [dB $\mu$ V/m]	F [GHz]	Detector	Level [dB $\mu$ V/m]	F [GHz]	Detector	Level [dB $\mu$ V/m]
No critical peaks found			No critical peaks found			No critical peaks found		
Measurement uncertainty			± 3 dB					

**Result:** The measurement is passed.

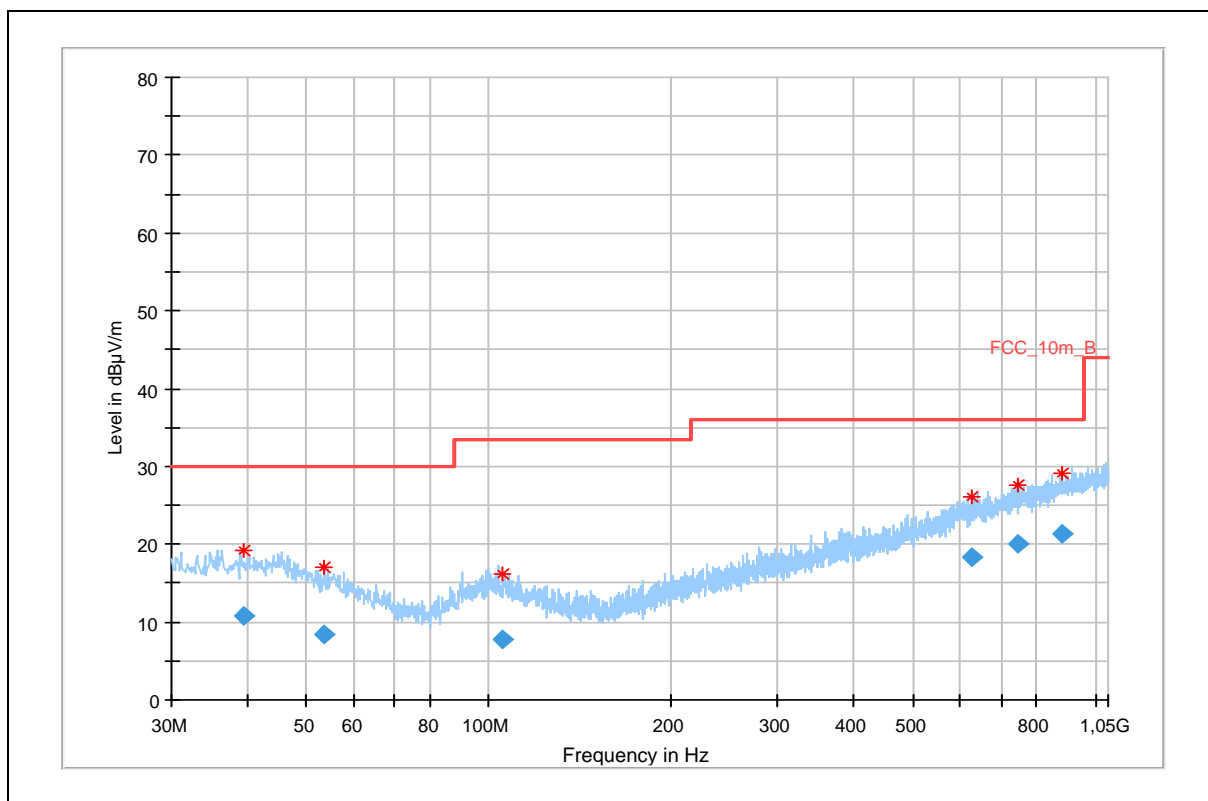
Plot No. 10: 9 kHz – 30 MHz, magnetic loop antenna, low/mid/high frequency



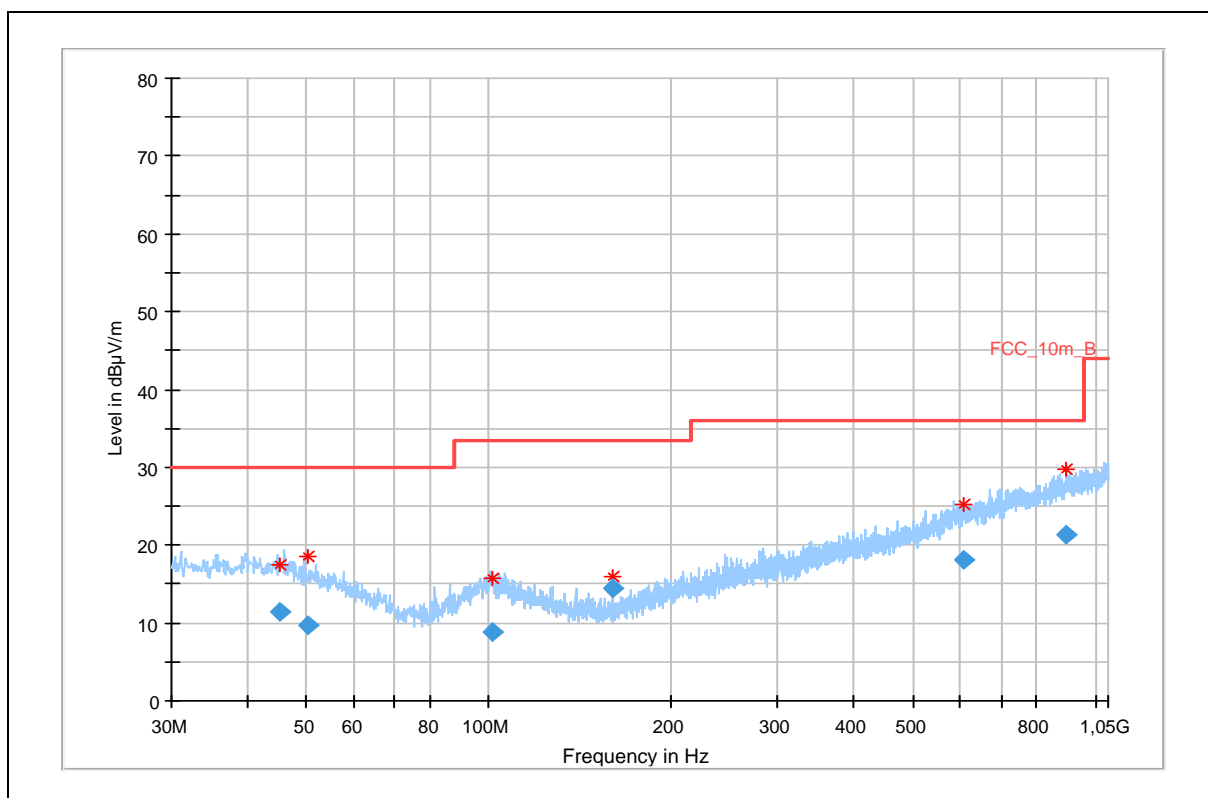
Plot No. 11: 30 MHz to 1 GHz, horizontal/vertical polarization, low frequency



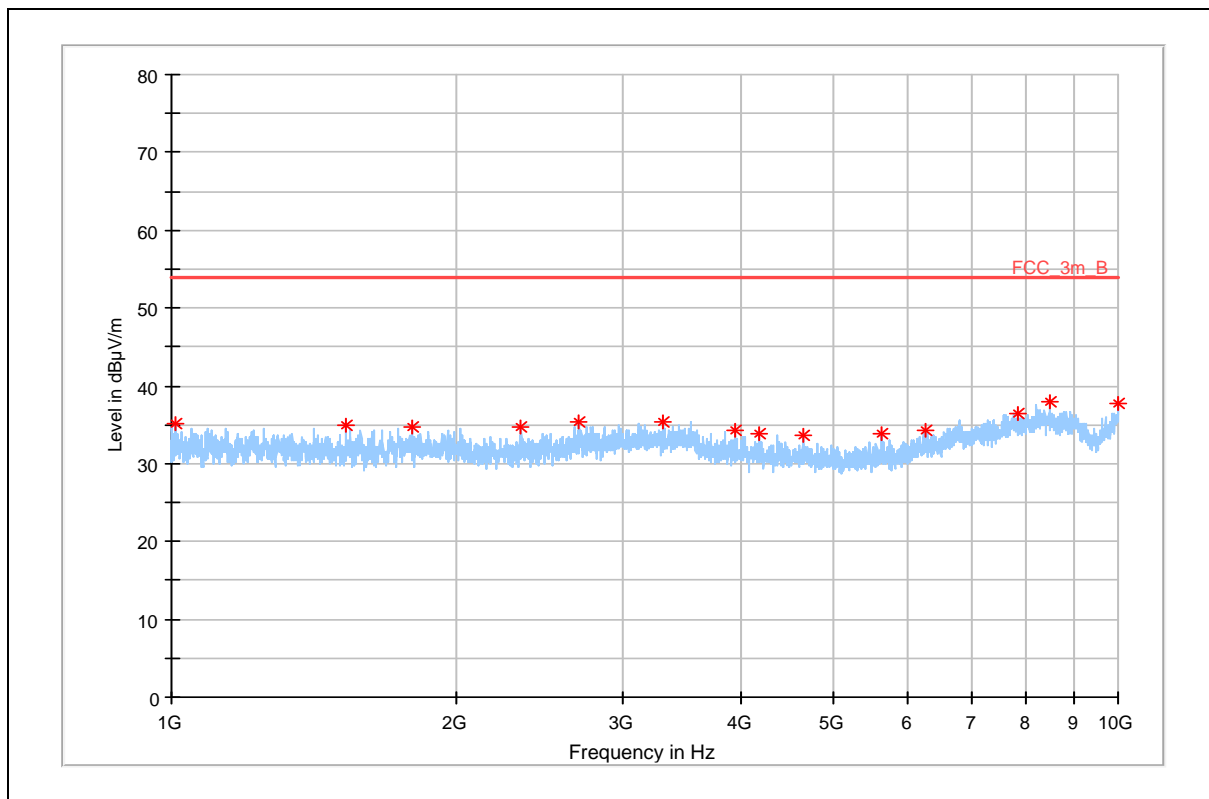
Plot No. 12: 30 MHz to 1 GHz, horizontal/vertical polarization, mid frequency



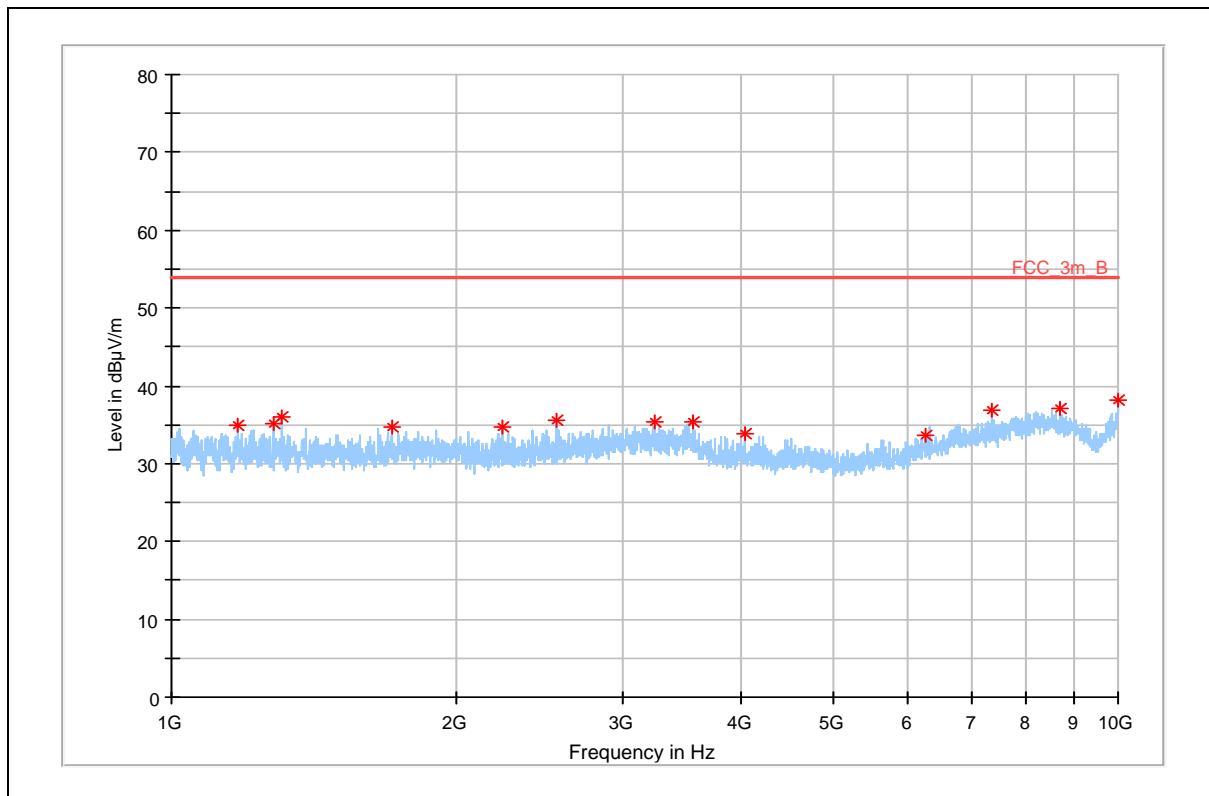
Plot No. 13: 30 MHz to 1 GHz, horizontal/vertical polarization, high frequency



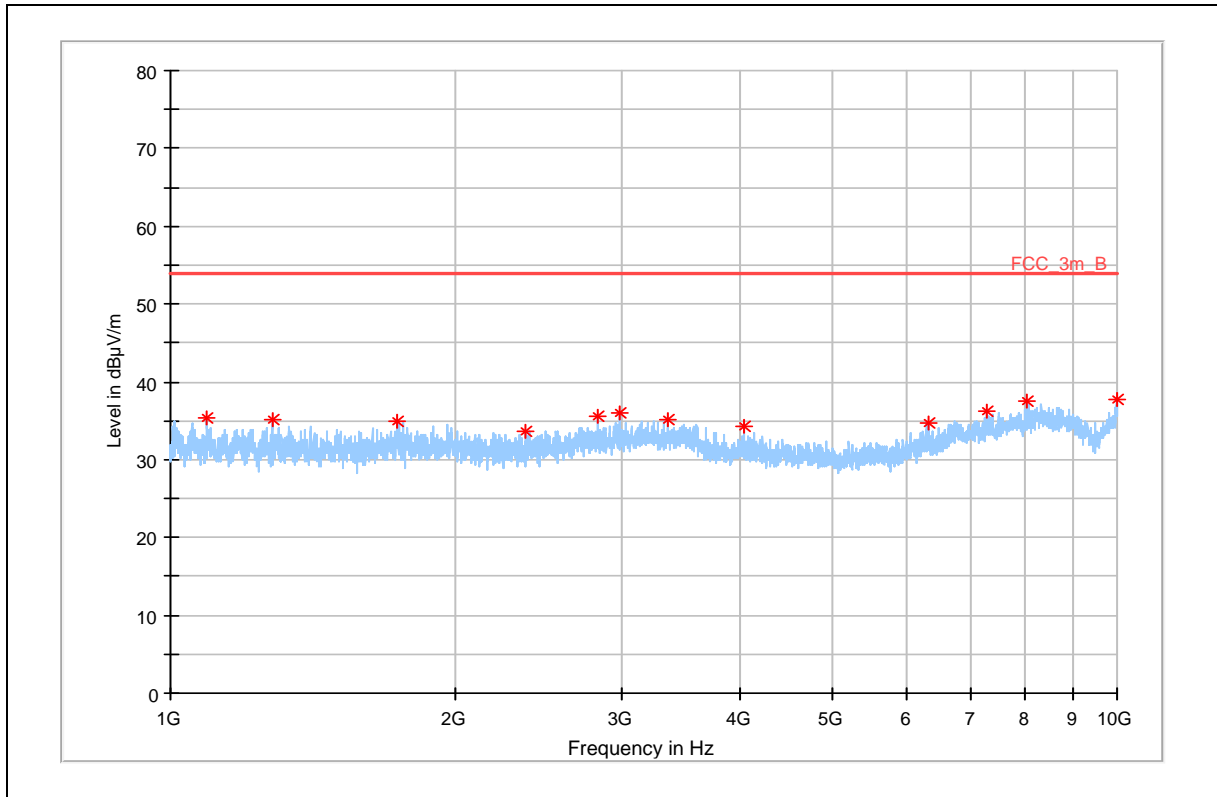
Plot No. 14: 1 GHz to 10 GHz, horizontal/vertical polarization, low frequency



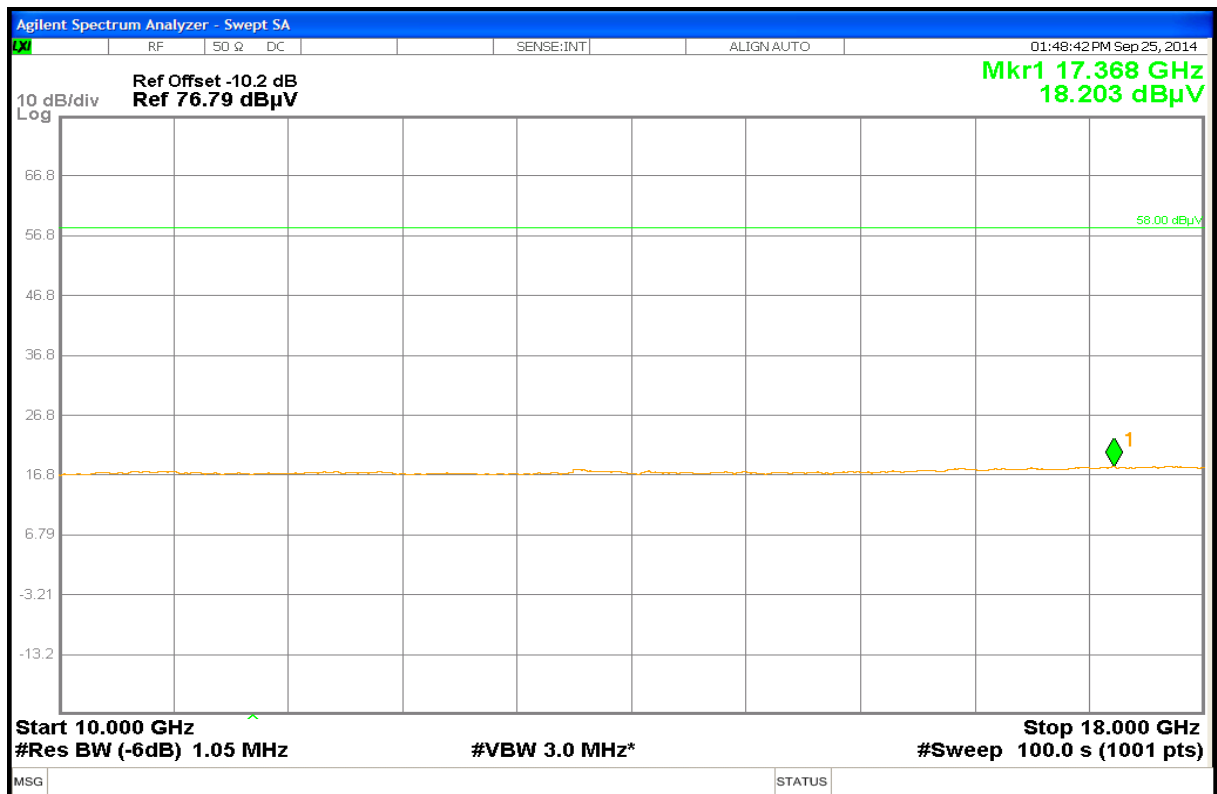
Plot No. 15: 1 GHz to 10 GHz, horizontal/vertical polarization, mid frequency



Plot No. 16: 1 GHz to 10 GHz, horizontal/vertical polarization, high frequency

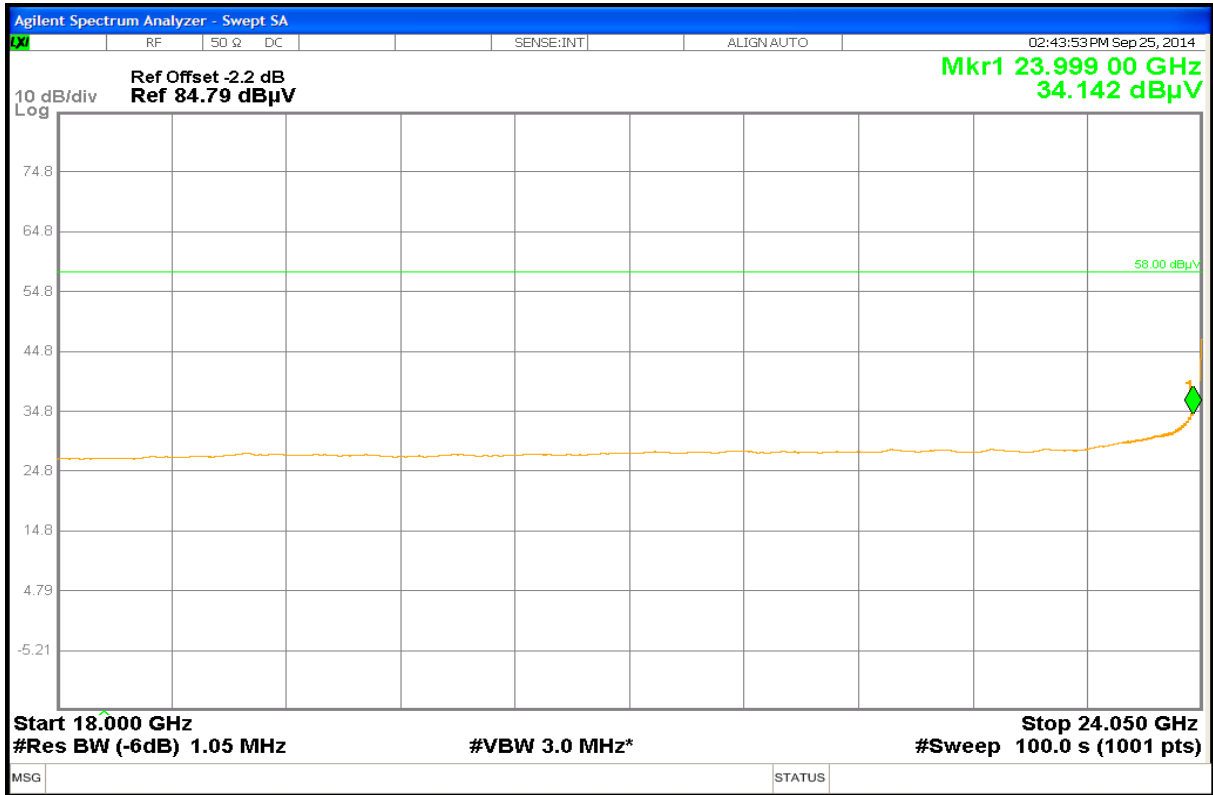


Plot No. 17: 10 GHz to 18 GHz, horizontal/vertical polarization, low/mid/high frequency

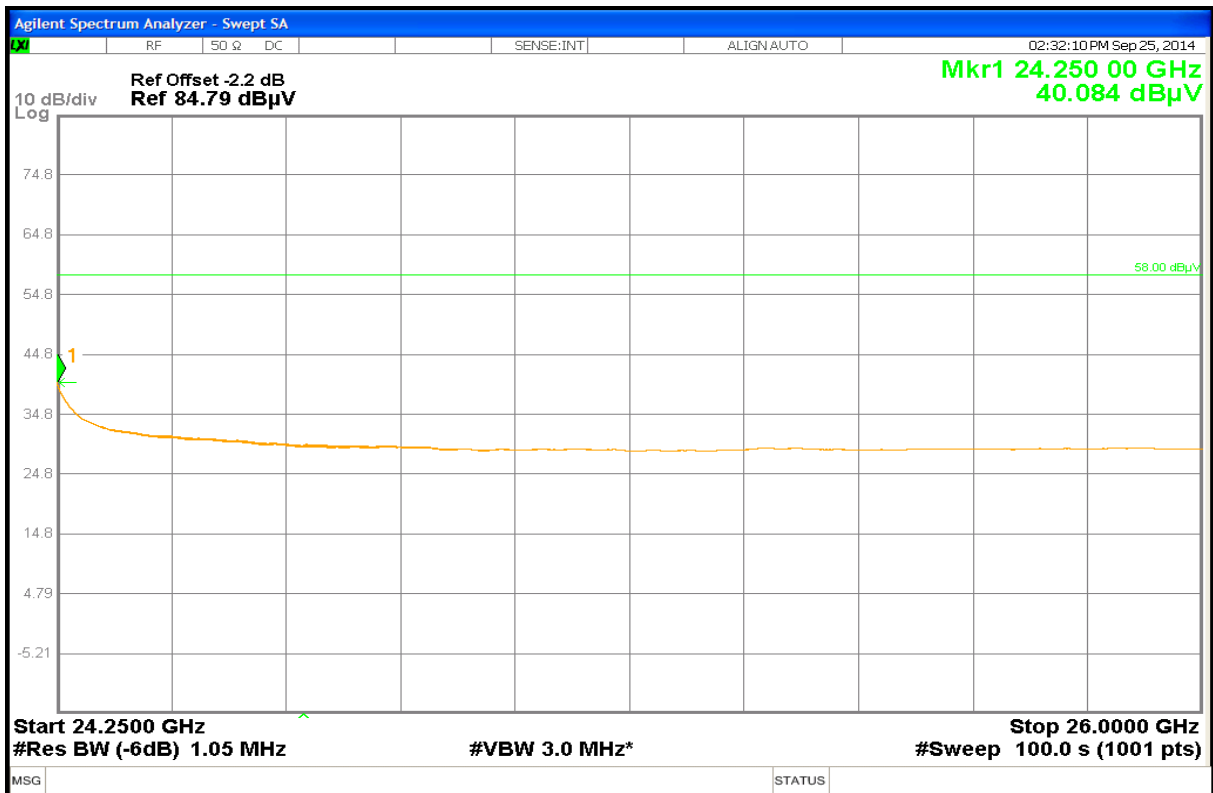




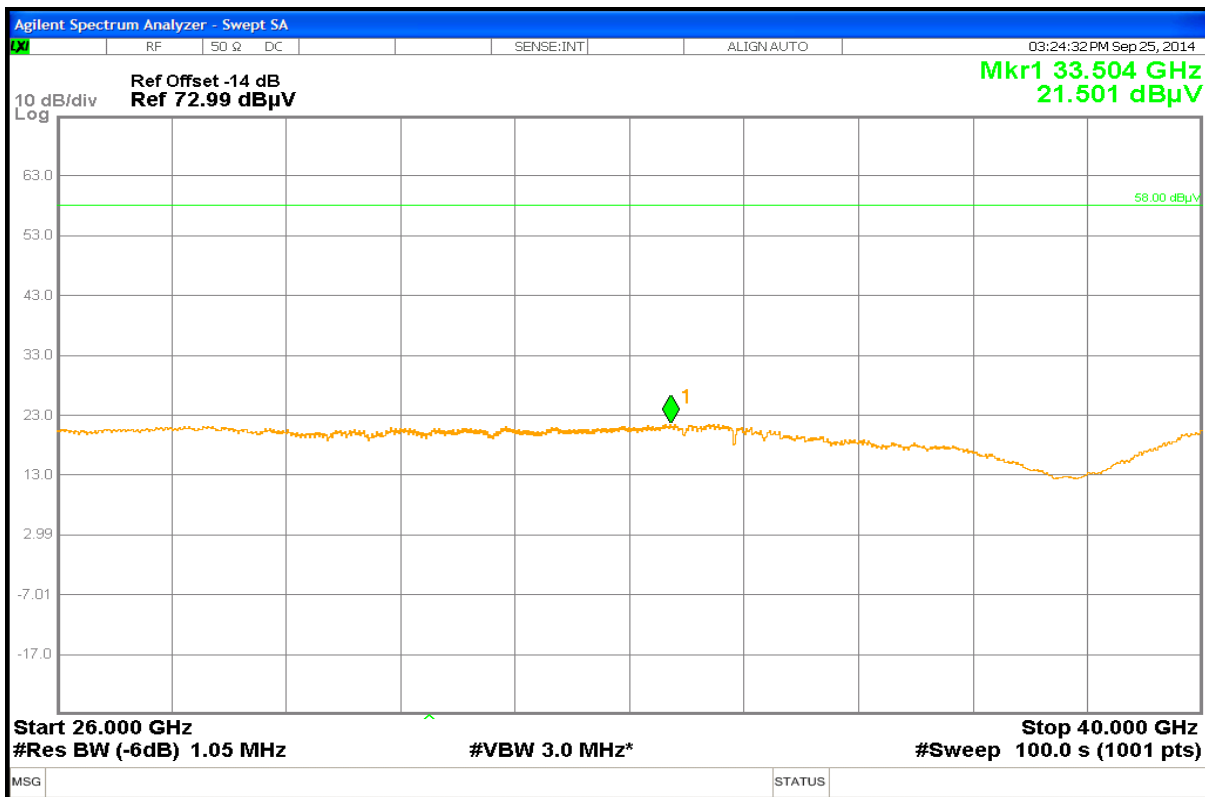
Plot No. 18: 18 GHz to 24.05 GHz, horizontal / vertical polarization, lower band edge (valid for all channels)



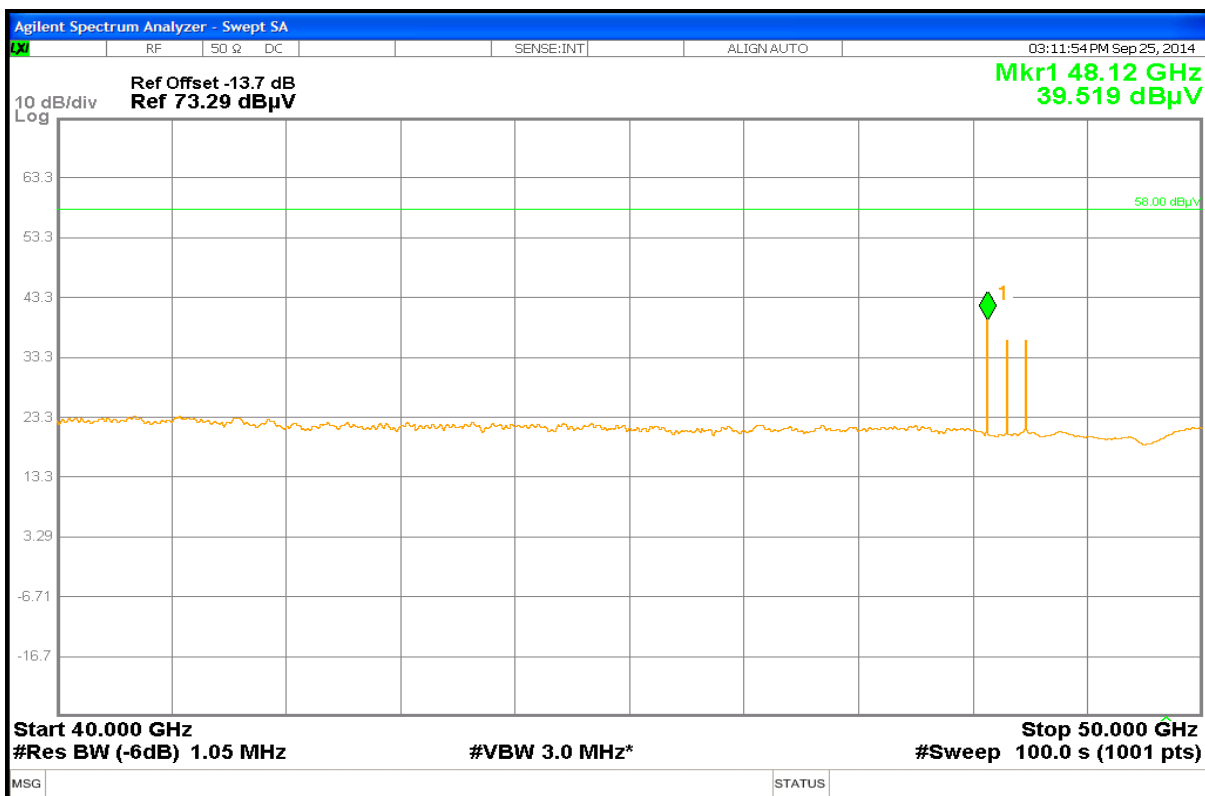
Plot No. 19: 24.25 GHz to 26 GHz, horizontal / vertical polarization, upper band edge (valid for all channels)



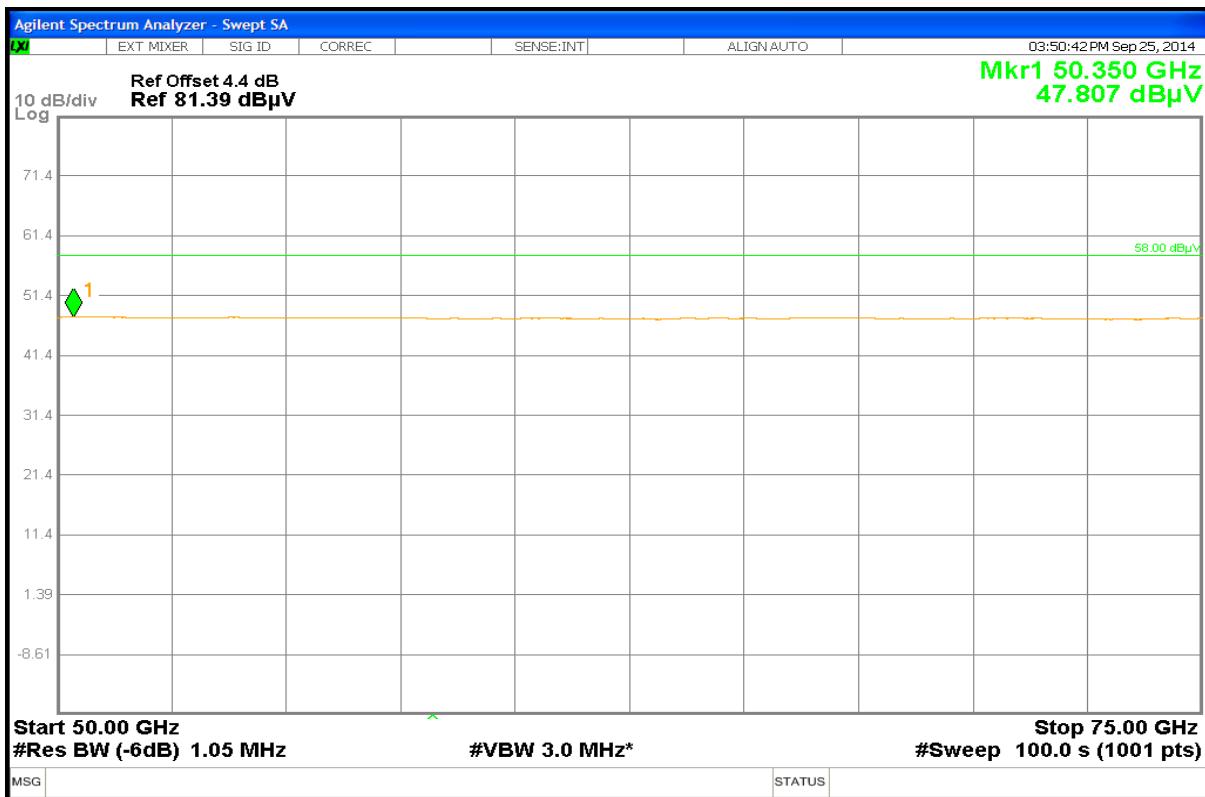
Plot No. 20: 26 GHz to 40 GHz, horizontal / vertical polarization, low/mid/high frequency



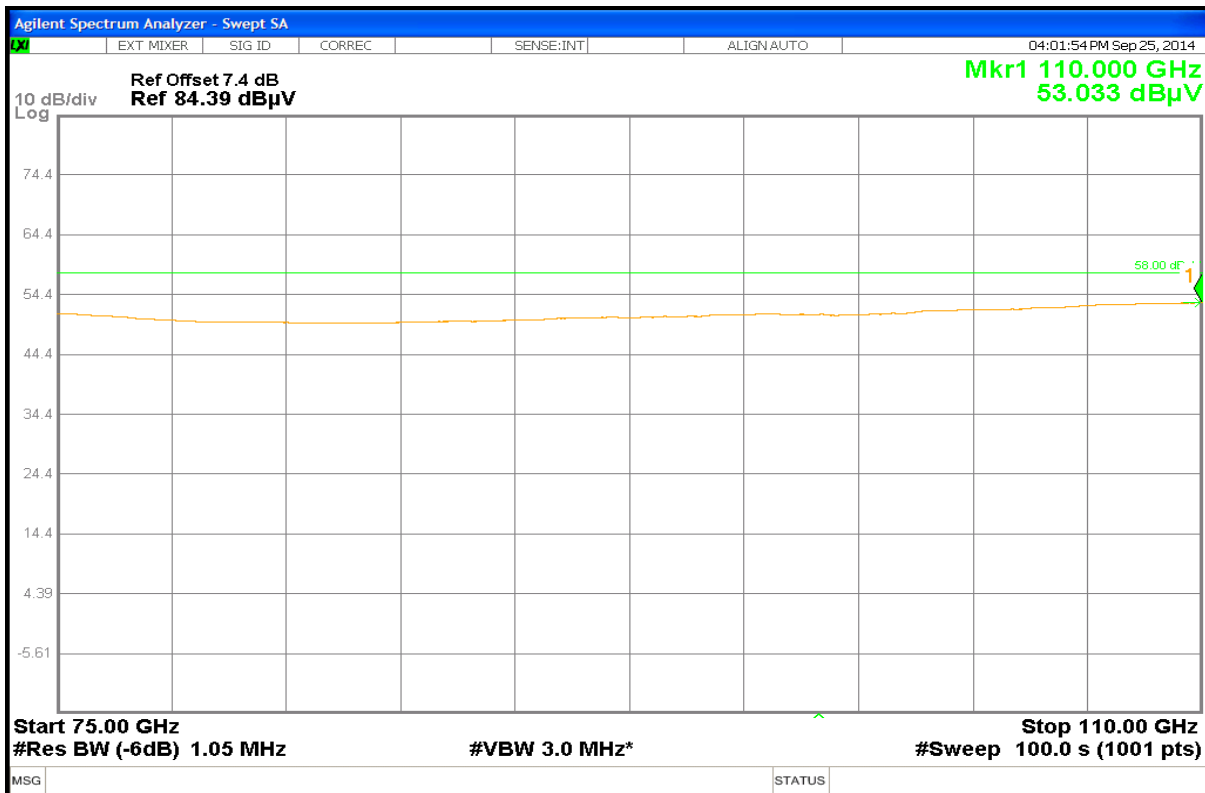
Plot No. 21: 40 GHz to 50 GHz, horizontal / vertical polarization, low/mid/high frequency



Plot No. 22: 50 GHz to 75 GHz, horizontal / vertical polarization, low/mid/high frequency



Plot No. 23: 75 GHz to 110 GHz, horizontal / vertical polarization, low/mid/high frequency



## 10 Maximum Permissible Exposure (MPE)

### MPE Calculation:

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

PD = Power Density (mW/cm<sup>2</sup>)

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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	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 5.2, the maximum peak field strength is 110.8 dB $\mu$ V/m = 2.28 mW = 3.57 dBm

d = 20 cm  
AG = 12 dBi

→ PD = 0.003 mW/cm<sup>2</sup>

**Limits:**

FCC §1.1310 (B) / RSS-GEN 5.5; RSS 102

Frequency [GHz]	Power Density [mW / cm <sup>2</sup> ]
1.500 GHz – 100.000 GHz	1 mW / cm <sup>2</sup>

**Result:** The measurement is passed.

## 11 Frequency stability

### - Low frequency

TEST CONDITIONS	Carrier Frequency
( $T_{nom} / V_{nom}$ )	24.058500 GHz
( $T_{min} / V_{min-max}$ )	24.060000 GHz
( $T_{max} / V_{min-max}$ )	24.057900 GHz

### - Mid frequency

TEST CONDITIONS	Carrier Frequency
( $T_{nom} / V_{nom}$ )	24.149100 GHz
( $T_{min} / V_{min-max}$ )	24.150000 GHz
( $T_{max} / V_{min-max}$ )	24.148200 GHz

### - High frequency

TEST CONDITIONS	Carrier Frequency
( $T_{nom} / V_{min-max}$ )	24.228600 GHz
( $T_{min} / V_{min-max}$ )	24.230400 GHz
( $T_{max} / V_{min-max}$ )	24.228600 GHz

### Limits:

FCC §15.249 (b) (2)

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.001\%$  of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

**Result:** The measurement is passed.

## 12 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.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
2	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vKI!	08.05.2013	08.05.2015
3	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
4	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
5	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	30.01.2014	30.01.2016
6	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
7	9	Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155	ne		
8	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
9	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
10	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
11	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
12	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
13	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
14	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vKI!	24.10.2011	24.10.2014
15	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	13.03.2014	13.03.2015
16	CR 79	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751	ne		
17	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
18	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL19503070-XX	CERNEX	19338	300004273	ne		
19	A022	Std. Gain Horn Antenna 26.4-40.1 GHz	2224-20	Flann	235	300001976	ne		
20	A023	Std. Gain Horn Antenna 39.3-59.7 GHz	2424-20	Flann	75	300001979	ne		
21	A025	Std. Gain Horn Antenna 49.9-75.8 GHz	2524-20	Flann	*	300001983	ne		
22	A028	Std. Gain Horn Antenna 73.8-112 GHz	2724-20	Flann	*	300001991	ne		
23	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
24	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
25	8	DC Power Supply, 60V, 10A	6038A	HP Meßtechnik	3122A11097	300001204	Ve	10.01.2012	10.01.2015

26	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	Ve	19.10.2012	19.10.2014
27	n. a.	Harmonic mixer 50 - 75 GHz for spectrum analyzers	FS-Z75	R&S	100099	300003949	k	13.03.2014	13.03.2015
28	n. a.	Harmonic mixer 60 - 90 GHz for spectrum analyzers	FS-Z90	R&S	101555	300004691	k	21.10.2013	21.10.2014
29	n. a.	Spectrum Analyzer Mixer 2-Port, 75-110 GHz	SAM-110-7	Radiometer Physics GmbH	002	300004155	k	31.01.2014	31.01.2016
30	n. a.	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne		
31	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
32	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
33	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	27.01.2014	27.01.2015
34	n. a.	Funkstörmessempfänger 20Hz- 26.5GHz	ESU26	R&S	100037	300003555	k	28.02.2014	28.02.2015
35	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
36	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
37	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
38	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016

**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
vkI!	Attention: extended calibration interval			
NK!	Attention: not calibrated		*)	next calibration ordered / currently in progress



**Annex A Document history**

Version	Applied changes	Date of release
1.0	Initial release	2014-10-14

**Annex B 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 C Accreditation Certificate

Front side of certificate

Back side of certificate



Deutsche Akkreditierungsstelle GmbH

Befehlens gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV  
 Unterzeichnerin der Multilateralen Abkommen  
 von EA, ILAC und IAF zur gegenseitigen Anerkennung

**Akkreditierung**



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

**CETECOM ICT Services GmbH**  
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

- Drahtgebundene Kommunikation einschließlich xDSL
- VoIP und DECT
- Akustik
- Funk einschließlich WLAN
- Short Range Devices (SRD)
- RFID
- WiMax und Richtfunk
- Mobilfunk (GSM / GPRS / UTRAN / UTRAN Performance)
- Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
- Produktsicherheit
- SAR und Hearing Aid Compatibility (HAC)
- Umweltsimulation
- Smart Card Terminals
- Bluetooth
- Wi-Fi Services

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 07.03.2014 mit der Akkreditierungsnummer D-PL-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlagen mit insgesamt 77 Seiten.

Registrierungsnummer der Urkunde: D-PL-12076-01-00

Frankfurt am Main, 07.03.2014

Bitte beachten Sie die Rückseite

*(Signature)*  
 Auftrag D-PL-12076-01-01, 07.03.2014  
 Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Standort Berlin  
 Spittelmarkt 10  
 10117 Berlin

Standort Frankfurt am Main  
 Gartenstraße 6  
 60504 Frankfurt am Main

Standort Braunschweig  
 Bundesallee 100  
 38115 Braunschweig

Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen Zustimmung der Deutschen Akkreditierungsstelle GmbH (DAKkS). Ausgenommen davon ist die separate Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in unveränderter Form.

Es darf nicht der Anschein erweckt werden, dass sich die Akkreditierung auch auf Bereiche erstreckt, die über den durch die DAKkS bestätigten Akkreditierungsbereich hinausgehen.

Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom 31. Juli 2009 (BGBl. I S. 2675) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung im Zusammenhang mit der Vermarktung von Produkten (Abt. L 218 vom 9. Juli 2008, S. 30). Die DAKkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der European Cooperation for Accreditation (EA), des International Accreditation Forum (IAF) und der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:  
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 IAF: [www.iaf.org](http://www.iaf.org)  
 ILAC: [www.ilac.org](http://www.ilac.org)

**Note:**

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

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