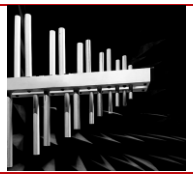
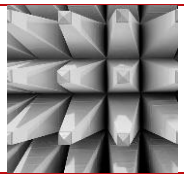




CETECOM™

CETECOM ICT Services

consulting - testing - certification ➤➤➤

TEST REPORT

Test report no.: 1-0228/15-02-02-A

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

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 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

NEUTRIK AG
Im alten Riet 143
9494 Schaan / LIECHTENSTEIN
Phone: +42 32 37 24 24
Fax: +42 32 32 53 93
Contact: Markus Natter
e-mail: natter@neutrik.com
Phone: +42 32 37 24 18

Manufacturer

NEUTRIK AG
Im alten Riet 143
9494 Schaan / LIECHTENSTEIN

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

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

Test Item

Kind of test item:	**Digital Wireless Audio Network**
Model name:	**XIRIUM PRO**
FCC ID:	**2ABA7XPT**
Frequency:	Band 1: 5150 MHz to 5250 MHz (lowest channel: 5180 MHz; highest channel 5240 MHz) Band 2: 5725 MHz to 5850 MHz (lowest channel: 5745 MHz; highest channel 5825 MHz)
Technology tested:	Proprietary
Antenna:	External antenna
Power supply:	100.0 V to 240.0 V AC
Temperature range:	0°C to +50°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 authorized:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-150828, email=marco.bertolino@cetecom.com, c=DE
2015.12.10 06:47:24 +01'00'

Marco Bertolino
Lab Manager
Radio Communications & EMC

Test performed:

David Lang
cn=David Lang, o=CETECOM ICT Services GmbH, ou=LNG-141031, email=david.lang@cetecom.com, c=DE
2015.12.09 17:32:40 +01'00'

David Lang
Lab Manager
Radio Communications & EMC

1 Table of contents

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.

This test report replaces the test report with the number 1-0228/15-02-02 and dated 2015-10-16

2.2 Application details

Date of receipt of order:	2015-10-05
Date of receipt of test item:	2015-10-06
Start of test:	2015-10-06
End of test:	2015-10-13
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	-/-	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

3.1 Measurement guidance

Guidance	Version	Description
UNII: KDB 789033 D02	v01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests +50 °C during high temperature tests (not performed) 0 °C during low temperature tests (not performed)
Relative humidity content	:		55 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	120.0 V AC 240.0 V 100.0 V

5 Test item

5.1 General description

Kind of test item	:	Digital Wireless Audio Network
Type identification	:	XIRIUM PRO
PMN	:	NXP2TX
HVIN	:	NXP2TX
FVIN	:	-/-
HMN	:	-/-
S/N serial number	:	-/-
HW hardware status	:	A
SW software status	:	-/-
Frequency band	:	Band 1: 5150 MHz to 5250 MHz (lowest channel: 5180 MHz; highest channel 5240 MHz) Band 2: 5725 MHz to 5850 MHz (lowest channel: 5745 MHz; highest channel 5825 MHz)
Type of radio transmission Use of frequency spectrum	: :	OFDM
Type of modulation	:	BPSK, QPSK, 16-QAM, 64-QAM
Antenna	:	External antenna
Power supply	:	100.0 V to 240.0 V AC, 50/60 Hz
Temperature range	:	0°C to +50°C

5.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-0228/15-02-01_AnnexA
1-0228/15-02-01_AnnexB
1-0228/15-02-01_AnnexD

6 Test laboratories sub-contracted

None

7 Description of the test setup

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 signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

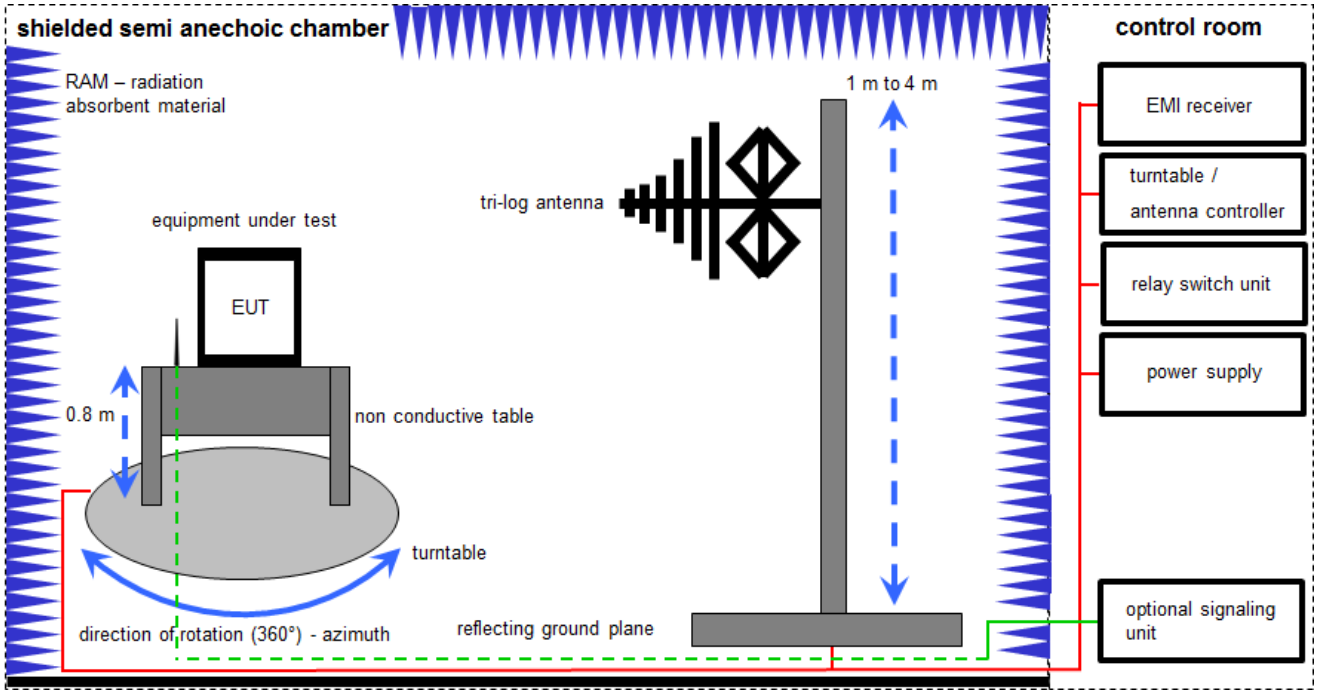
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

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

7.1 Shielded semi anechoic chamber

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 analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter

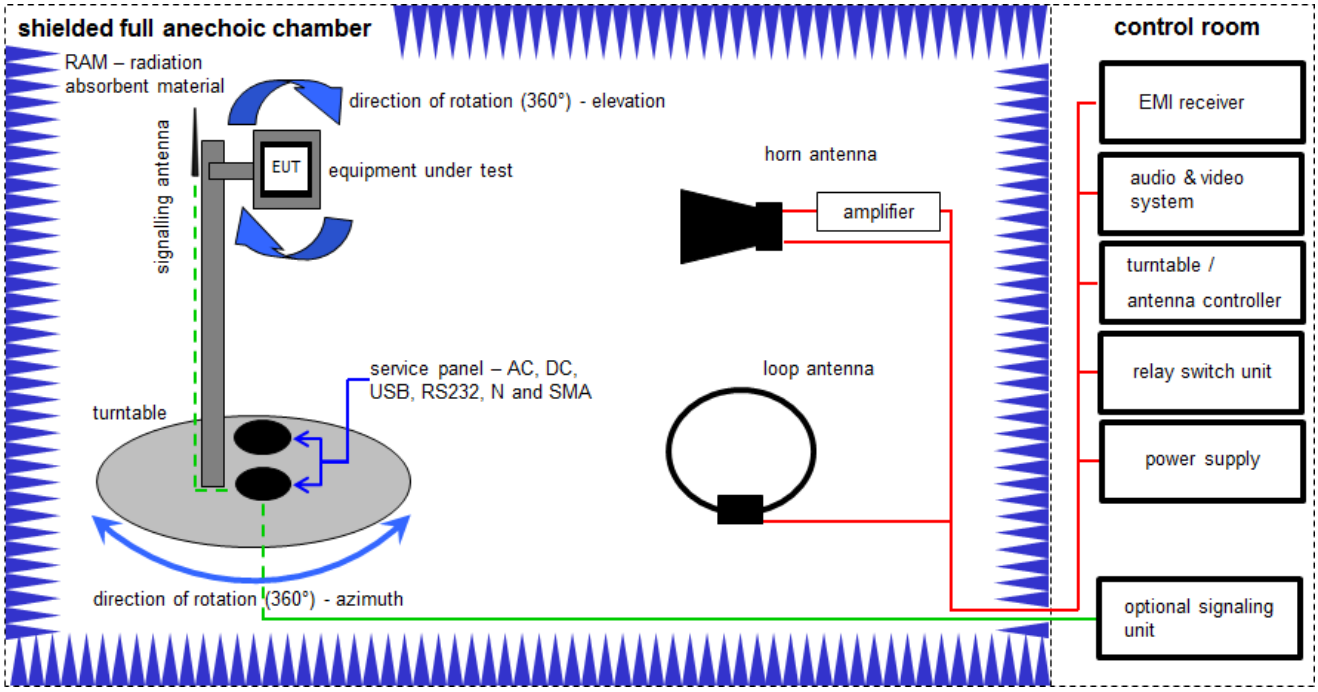
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	26.01.2015	26.01.2016
2	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
3	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
4	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
5	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016

7.2 Shielded fully anechoic chamber



Measurement distance: horn antenna 3 meter; loop antenna 3 meter

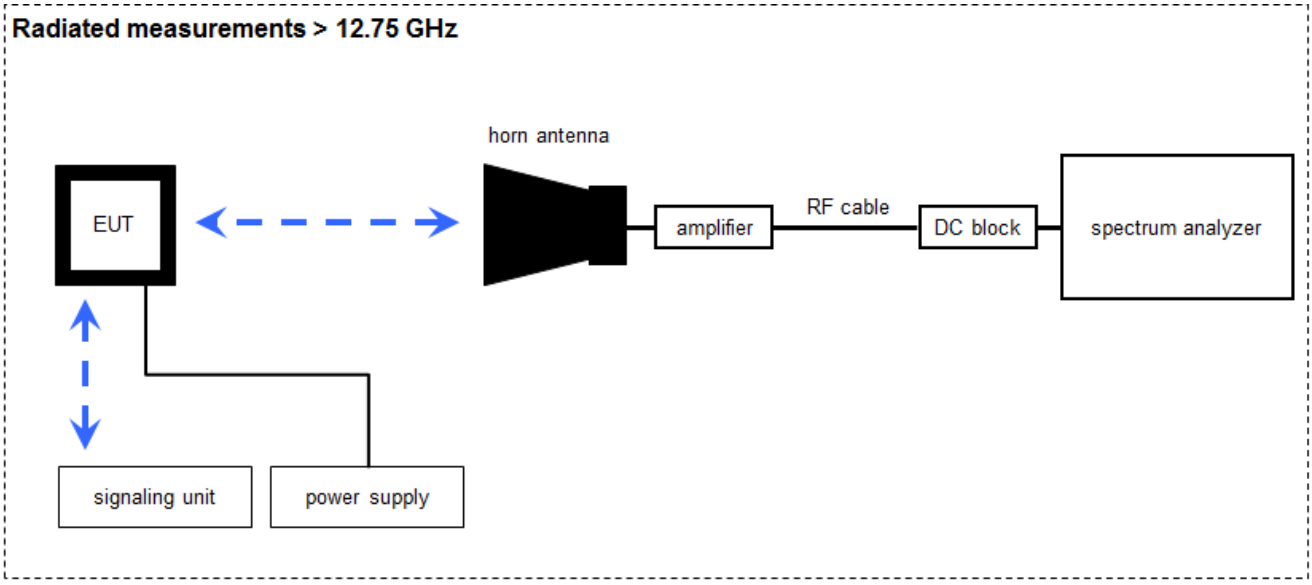
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	B	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
2	C	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9709-5290	300000212	k	13.08.2015	13.08.2017
3	B+C	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	22.01.2015	22.01.2016
4	C	Highpass Filter	WHK1.1/15G-10SS	Wainwright	37	400000148	ne	-/-	-/-
5	C	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne	-/-	-/-
6	C	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22050	300004482	ev	-/-	-/-
7	B+C	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000032	300004510	ne	-/-	-/-
8	B+C	Messrechner und Monitor	Intel Core i3 3220/3,3 GHz, Prozessor	Agilent Technologies	2V2403033A5421	300004591	ne	22.01.2015	22.01.2016
9	B+C	NEXIO EMV-Software	BAT EMC	EMCO	2V2403033A5421	300004682	ne	-/-	-/-

7.3 Radiated measurements > 12.75 GHz



Measurement distance: horn antenna 50 cm

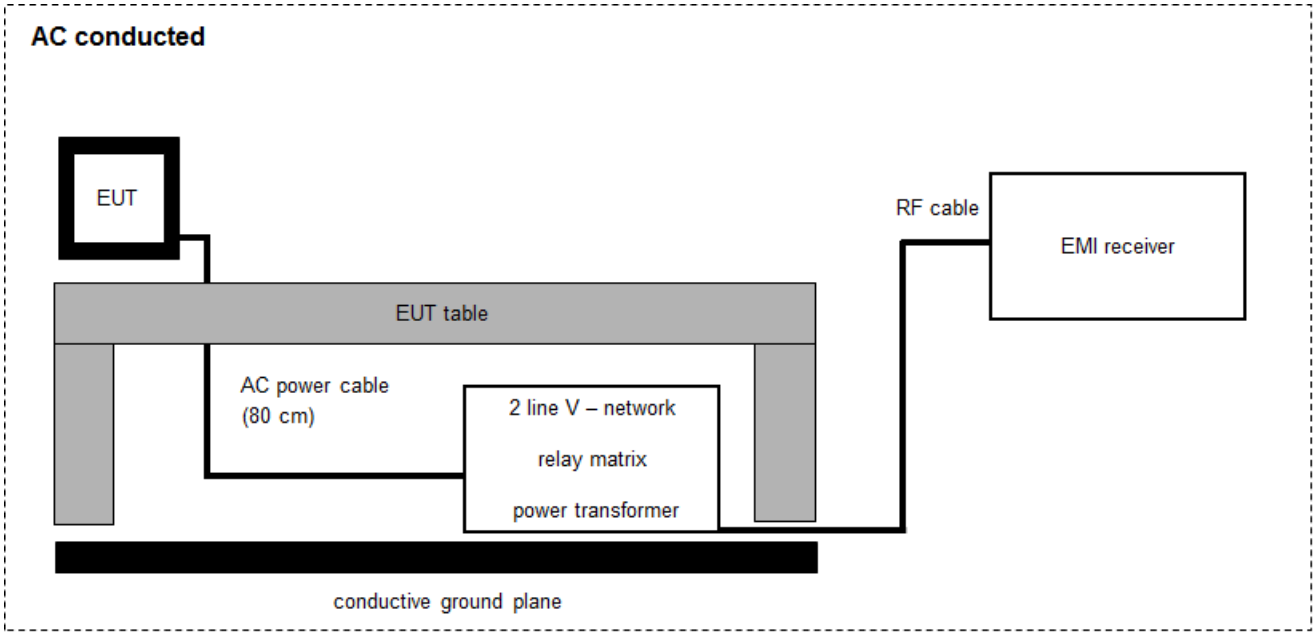
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-60.1) [dB] + 36.74 [dB/m] = 16.64 [dBµV/m] (6.79 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	D	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.01.2015	22.01.2016
2	D	Amplifier 2-40 GHz	JS32-02004000-57-5P	MITEQ	1777200	300004541	ev	-/-	-/-
3	D	RF-Cable	ST18/SMAm/SMAm/72	Huber & Suhner	Batch no. 699714	400001184	ev	-/-	-/-
4	D	Horn Antenna 18,0-40,0 GHz	LHAF180	Microw.Devel	39180-103-022	300001748	k	22.05.2015	22.05.2018
5	D	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	14.08.2015	14.08.2017

7.4 AC conducted



FS = UR + CF + VC
(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

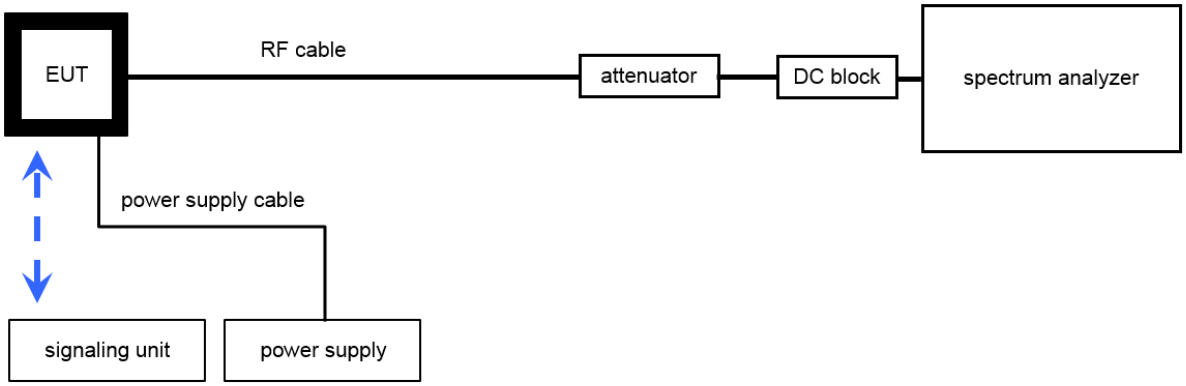
Example calculation:
FS [dBµV/m] = 37.62 [dBµV/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dBµV/m] (244.06 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	E	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	11.02.2014	11.02.2016
2	E	Netznachbildung	ESH3-Z5	R&S	892475/017	300002209	k	17.06.2014	17.06.2016
3	E	EMI-Receiver	8542E	HP	3617A00170	300000568	k	28.01.2015	28.01.2016

7.5 Conducted measurements

Conducted measurements normal conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	F+G	PC-WLAN Tester	Intel Core i3 3220/3,3 GHz, Prozessor	MITEQ	2V2403033A4523	300004589	ne	-/-	-/-
2	F	Teststand	Teststand Custom Sequence Editor	National Instruments GmbH	2V2403033A4523	300004590	ne	-/-	-/-
3	F+G	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev	-/-	-/-
4	F	DC-Blocker 0.1-40 GHz	8141A	Inmet	Batch no. 699714	400001185	ev	17.06.2014	17.06.2016
5	F+G	Coax Attenuator 10 dB 2W 0-40 GHz	MCL BW-K10-2W44+	Mini Circuits	Batch no. 699714	400001186	ev	28.01.2015	28.01.2016
6	G	Power Sensor	NRP-Z81	R&S	100010	300003780	k	08.12.2014	08.12.2016
7	F	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.01.2015	22.01.2016

8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.5 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the premeasurement are maximized by the software by rotating the turntable from 0° to 360°. In case of the 2-axis positioner is used the elevation axis is also rotated from 0° to 360°.
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.3 Sequence of testing radiated spurious 1 GHz to 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.4 Sequence of testing radiated spurious above 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet.
- The measurement distance is as appropriate (e.g. 0.5 m).
- The EUT is set into operation.

Premeasurement

- The test antenna is handheld and moved carefully over the EUT to cover the EUT's whole sphere and different polarizations of the antenna.

Final measurement

- The final measurement is performed at the position and antenna orientation causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty	
Test case	**Uncertainty**
Antenna gain	± 3 dB
Power spectral density	± 1.5 dB
DTS bandwidth	± 100 kHz (depends on the used RBW)
Occupied bandwidth	± 100 kHz (depends on the used RBW)
Maximum output power	± 1.5 dB
Detailed spurious emissions @ the band edge - conducted	± 1.5 dB
Band edge compliance radiated	± 3 dB
Spurious emissions conducted	± 3 dB
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB
Spurious emissions radiated above 12.75 GHz	± 4.5 dB
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB

10 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15	see table	2015-12-09	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	C	NC	NA	NP	Remark
-/-	Gain	Nominal	Nominal	☐	☐	☐	☐	Provided by manufacturer!
U-NII Part 15	Duty cycle	Nominal	Nominal	☐	☐	☐	☐	No passed / fail criteria!
§15.407(a)	Maximum output power	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(a)	Power spectral density	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(a)	Spectrum bandwidth 26dB bandwidth	Nominal	Nominal	☐	☐	☐	☐	-/-
KDB789033 D02	Spectrum bandwidth 99% bandwidth	Nominal	Nominal	☐	☐	☐	☐	No passed / fail criteria!
§15.407(a)	Peak excursion measurements	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.205	Band edge compliance radiated	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.407(b)	TX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	*1
§15.109	RX spurious emissions radiated	Nominal	Nominal	☐	☐	☐	☒	Transmitter only!
§15.209(a)	Spurious emissions radiated < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Spurious emissions conducted emissions < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	-/-

Note: C = Compliant; NC = Not Compliant; NA = Not Applicable; NP = Not Performed; *1 = worst case configuration tested (with regards to the output power).

11 Additional comments

Reference documents: Antenna specification: MobileMark antenna solutions ECO9-5500-BLK.

Special test descriptions: None

Configuration descriptions: The DUT supports two modulation schemes for Stereo or Mono audio broadcast. All tests were performed with both modulation schemes except the radiated spurious emission measurements. Spurious measurements were performed with the X-Rock modulation scheme due to the higher output power.

Power settings depending on channel configuration:

Channel	Power setting [dB]
Ch 36	-15.0
Ch 40	- 8.0
Ch 48	- 2.0
Ch 149	- 2.0
Ch 157	- 2.0
Ch 165	- 2.0

Test mode:

☐ No test mode available.

☒ Special software is used.
EUT is transmitting pseudo random data by itself

12 Measurement results

12.1 Gain

9 dBi as declared by manufacturer (see reference in section 10).

12.2 Duty cycle

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 MHz
Video bandwidth:	10 MHz
Span:	Zero
Trace-Mode:	Video trigger / view / single sweep
Test setup:	See sub clause 7.5 (Item F)
Measurement uncertainty	See sub clause 9

Results:

Duty cycle and correction factor:

OFDM / X-Rock ON:	54.2 % duty cycle	=>	2.7 dB
OFDM / X-Rock OFF:	43.0 % duty cycle	=>	3.7 dB

12.3 Maximum output power conducted

Description:

Measurement of the maximum output power conduced

Measurement:

Measurement parameter	
Detector:	Peak power meter used!
Sweep time:	
Resolution bandwidth:	
Video bandwidth:	
Span:	
Integration bandwidth:	
Trace mode:	
Measurement function:	
Test setup:	See sub clause 7.5 (Item G)
Measurement uncertainty	See sub clause 9

Limits:

Radiated output power	Conducted output power
Conducted power + 6dBi antenna gain	1W 5.150-5.250 GHz 1W 5.725-5.85 GHz

Result: OFDM / X-Rock ON

OFDM	Maximum output power conducted [dBm]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	11.7	18.1	19.8	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	20.8	20.7	20.1	-/-

OFDM	Maximum calculated EIRP [dBm]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	20.7	27.1	28.8	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	29.8	29.7	29.1	-/-

Result: OFDM / X-Rock OFF

OFDM Channel	Maximum output power conducted [dBm]			
	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	11.6	18.1	19.9	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	20.5	20.7	20.3	-/-

OFDM Channel	Maximum calculated EIRP [dBm]			
	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	20.6	27.1	28.9	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	29.5	29.7	29.3	-/-

12.4 Power spectral density

Description:

Measurement of the power spectral density of a digital modulated system. The measurement is repeated at the lowest, middle and highest channel.

Measurement:

Measurement parameter	
Detector:	RMS
Sweep time:	≥10*(swp points)*(total on/off time)
Resolution bandwidth:	1 MHz (500 kHz for 5.8 GHz band)
Video bandwidth:	≥ 3xRBW
Span:	> EBW
Trace-Mode:	Max hold
Test setup:	See sub clause 7.5 (Item F)
Measurement uncertainty	See sub clause 9

Limits:

Power Spectral Density
power spectral density conducted ≤ 17 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 30 dBm in any 1 MHz band (band 5725 – 5850 MHz)

Result: OFDM / X-Rock ON

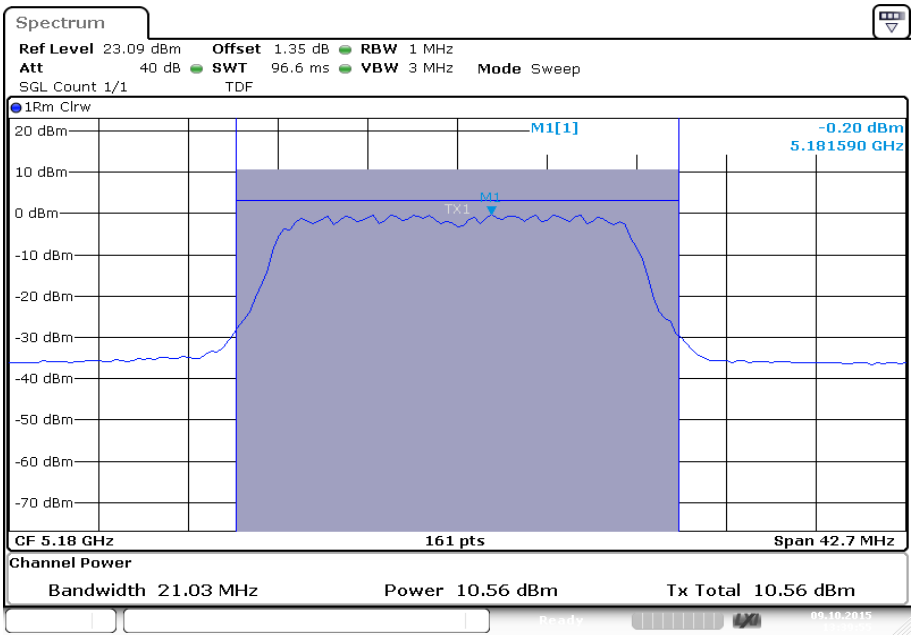
OFDM	Power Spectral density [dBm/MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
including duty cycle correction (2.7 dB)	1.2	7.7	13.1	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
including duty cycle correction (2.7 dB)	11.2	10.6	10.6	-/-

Result: OFDM / X-Rock OFF

OFDM	Power Spectral density [dBm/MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
including duty cycle correction (3.7 dB)	-0.2	6.4	12.6	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
including duty cycle correction (3.7 dB)	10.3	10.2	10.0	-/-

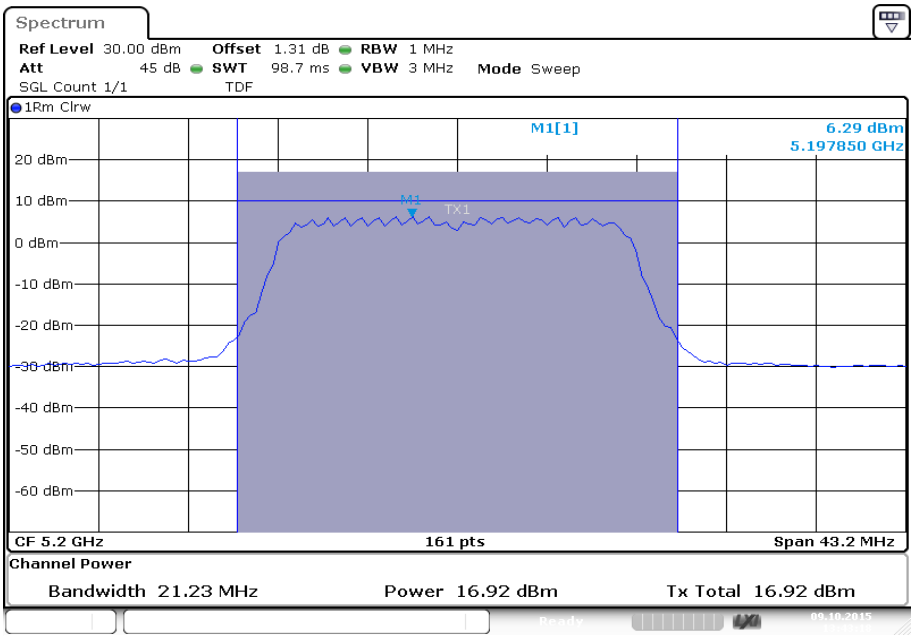
Plots: OFDM / X-Rock ON

Plot 1: 5180 MHz



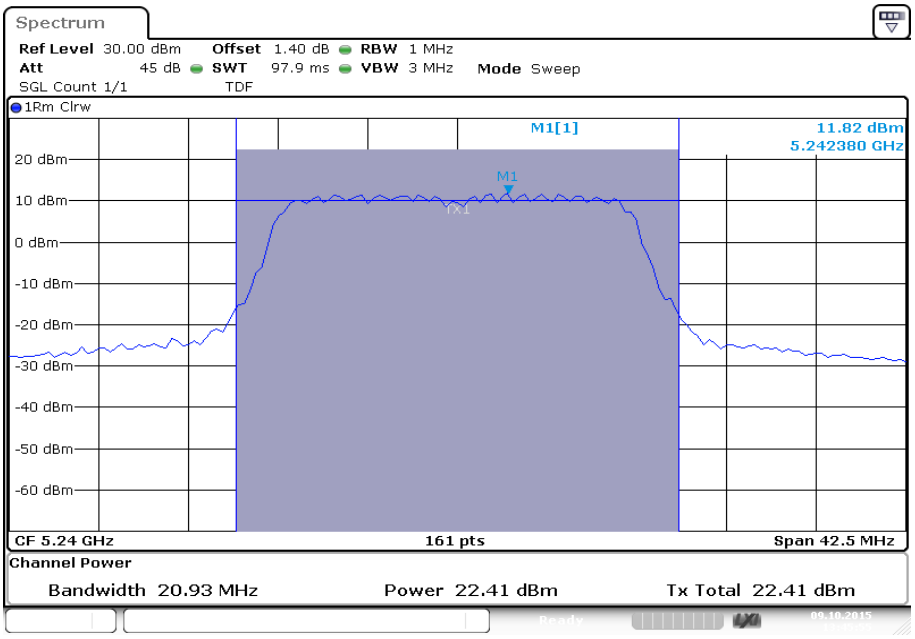
Date: 9.OCT.2015 13:39:56

Plot 2: 5200 MHz



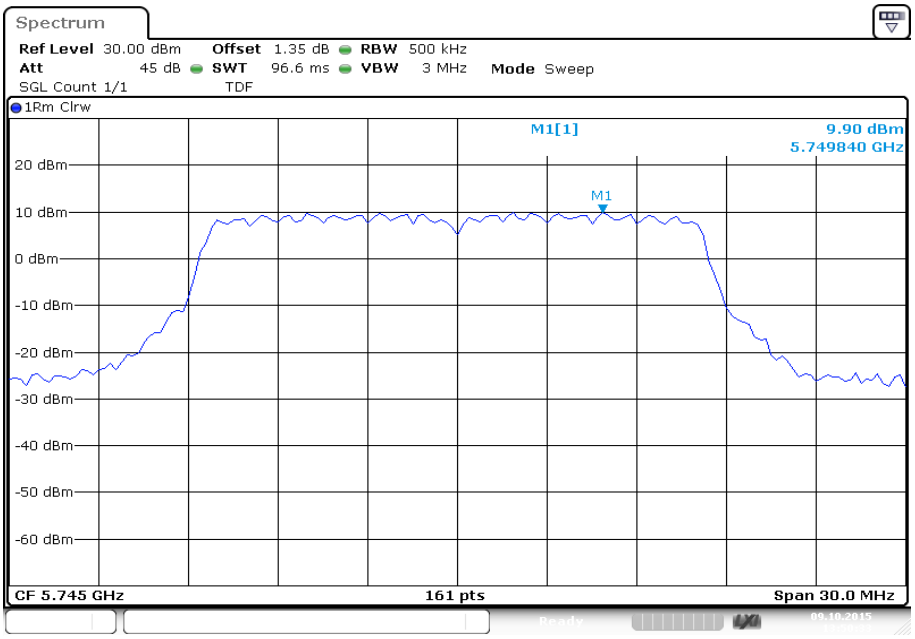
Date: 9.OCT.2015 13:43:18

Plot 3: 5240 MHz



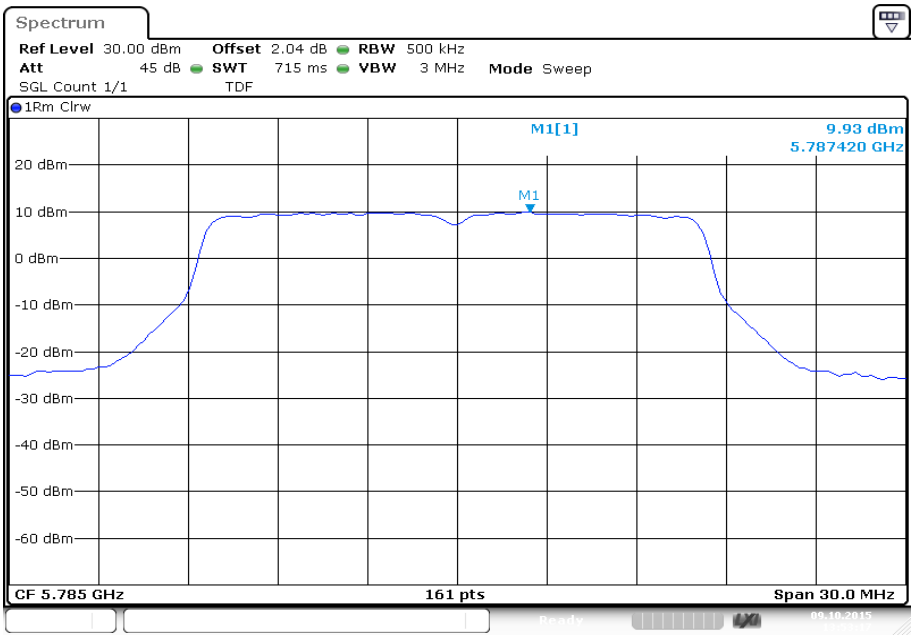
Date: 9.OCT.2015 13:45:56

Plot 4: 5745 MHz



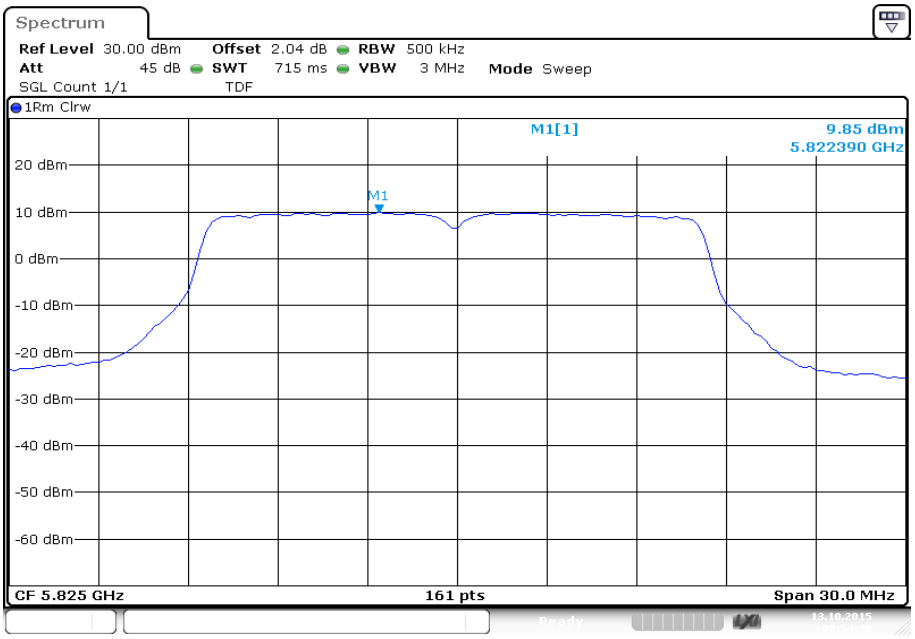
Date: 9.OCT.2015 13:50:33

Plot 5: 5785 MHz



Date: 9.OCT.2015 13:53:18

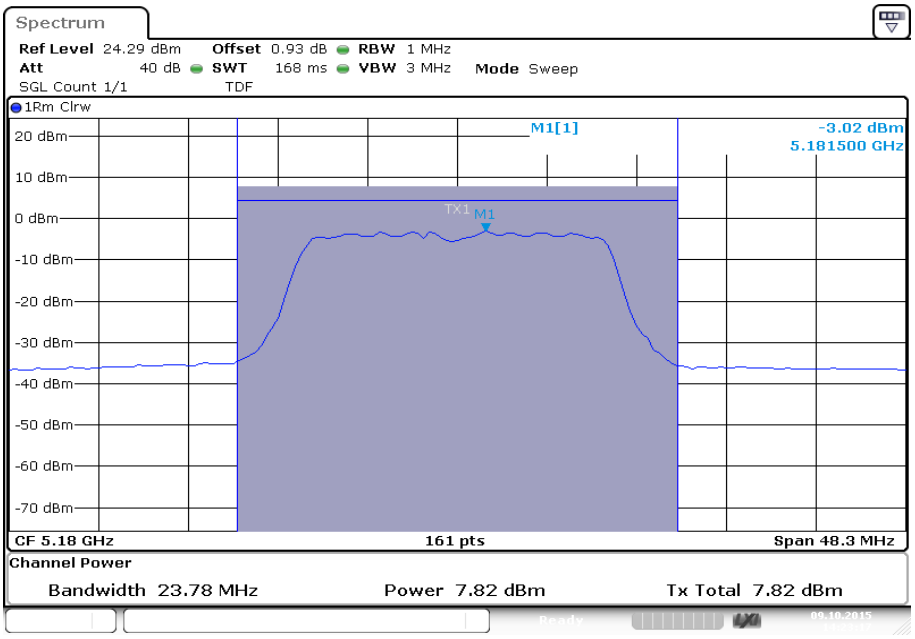
Plot 6: 5825 MHz



Date: 13.OCT.2015 08:54:30

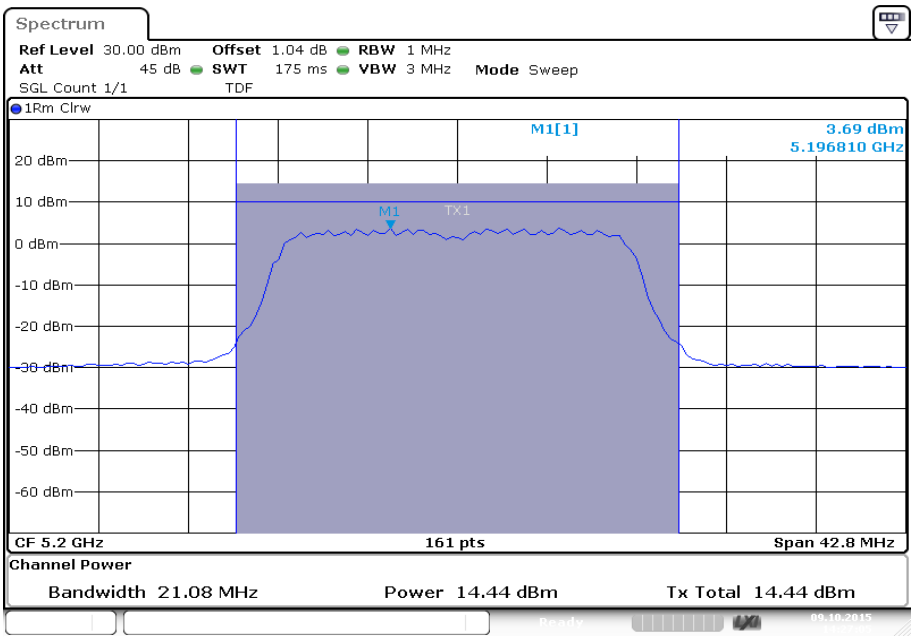
Plots: OFDM / X-Rock OFF

Plot 7: 5180 MHz



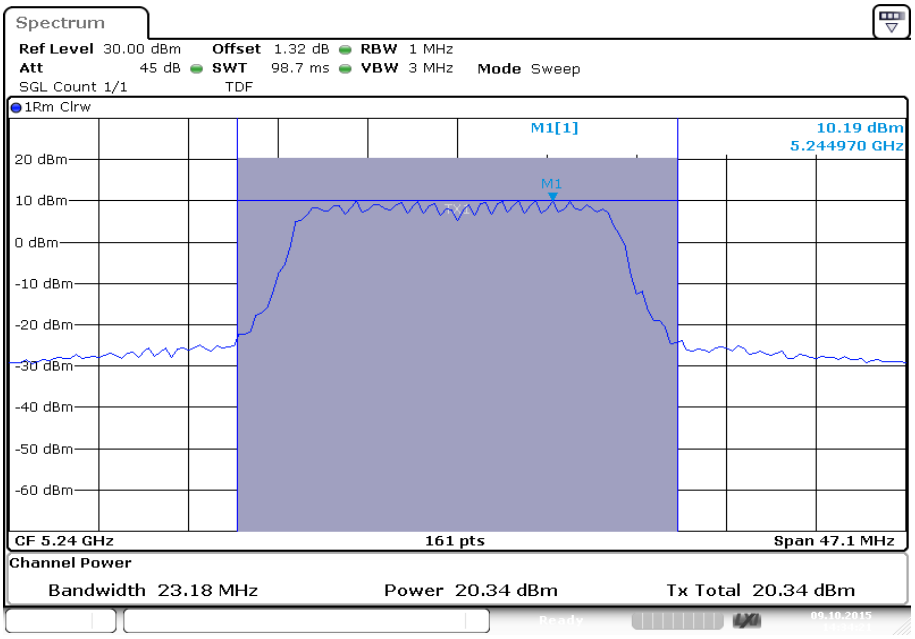
Date: 9.OCT.2015 14:23:18

Plot 8: 5200 MHz



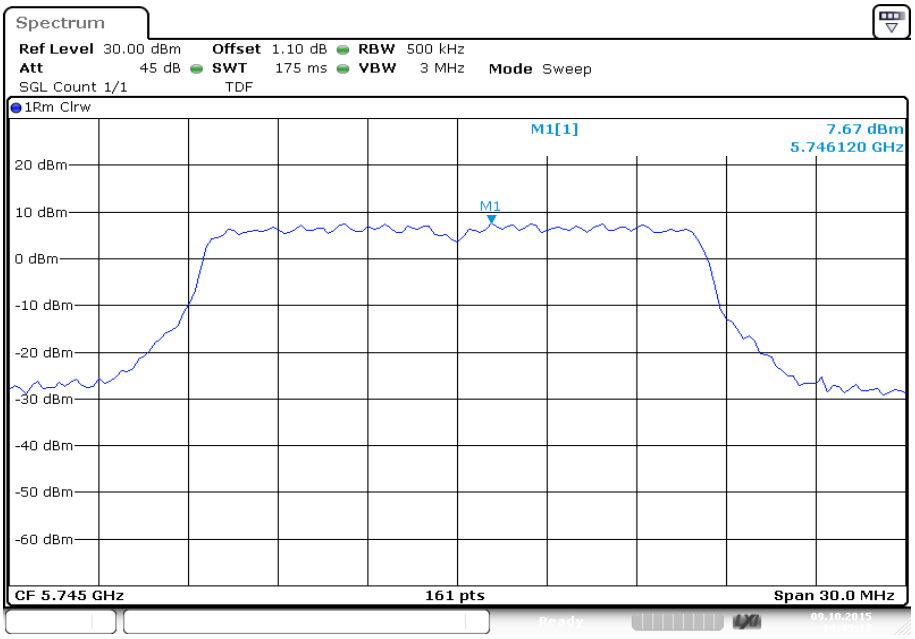
Date: 9.OCT.2015 14:27:06

Plot 9: 5240 MHz



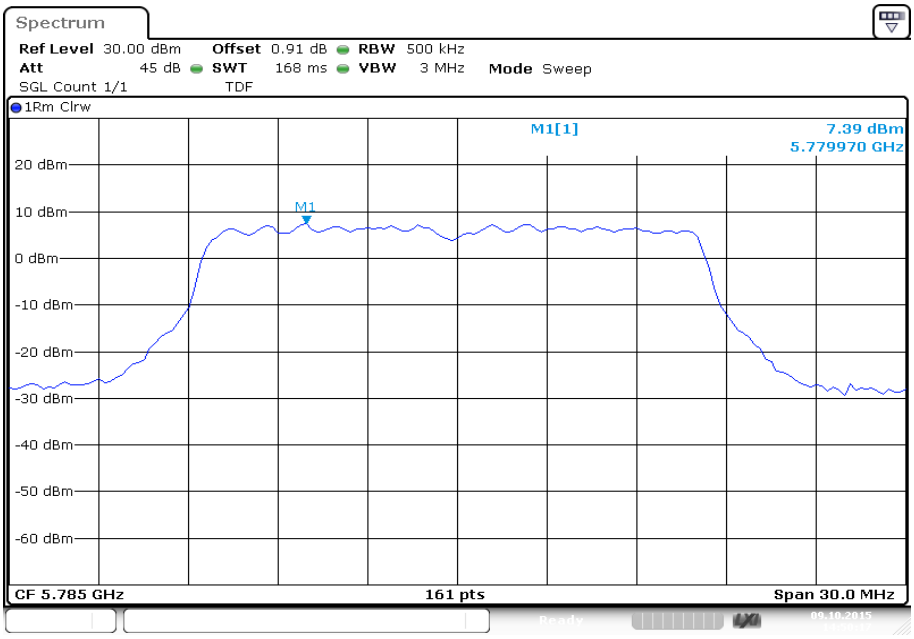
Date: 9.OCT.2015 14:34:22

Plot 10: 5745 MHz



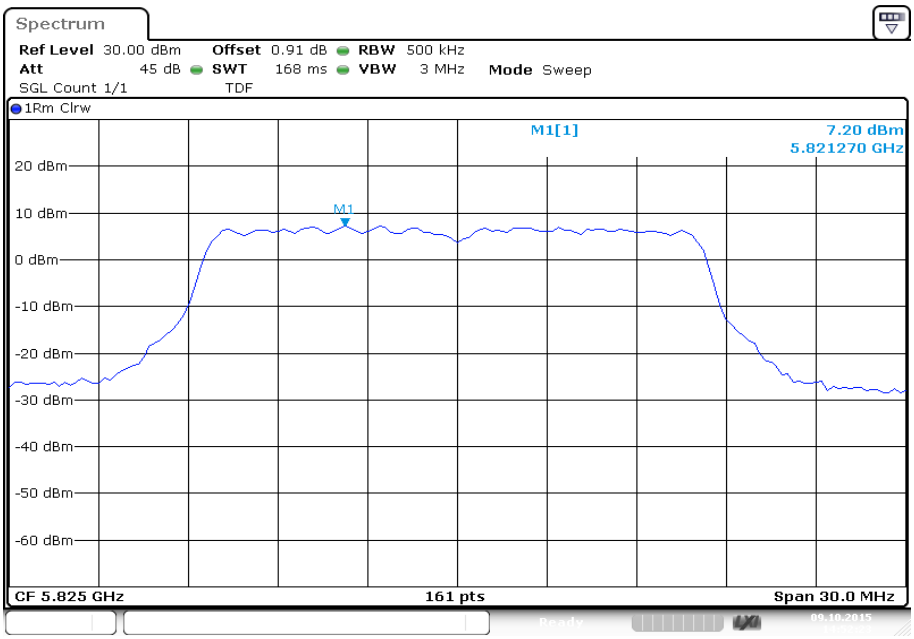
Date: 9.OCT.2015 14:45:18

Plot 11: 5785 MHz



Date: 9.OCT.2015 14:50:17

Plot 12: 5825 MHz



Date: 9.OCT.2015 14:52:23

12.5 Spectrum bandwidth – 26 dB bandwidth

Description:

Measurement of the 26 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1% EBW
Video bandwidth:	≥ RBW
Span:	> complete signal!
Trace-Mode:	Max hold
Test setup:	See sub clause 7.5 (Item F)
Measurement uncertainty	See sub clause 9

Limits:

Spectrum Bandwidth – 26 dB Bandwidth
-/-

Result: OFDM / X-Rock ON

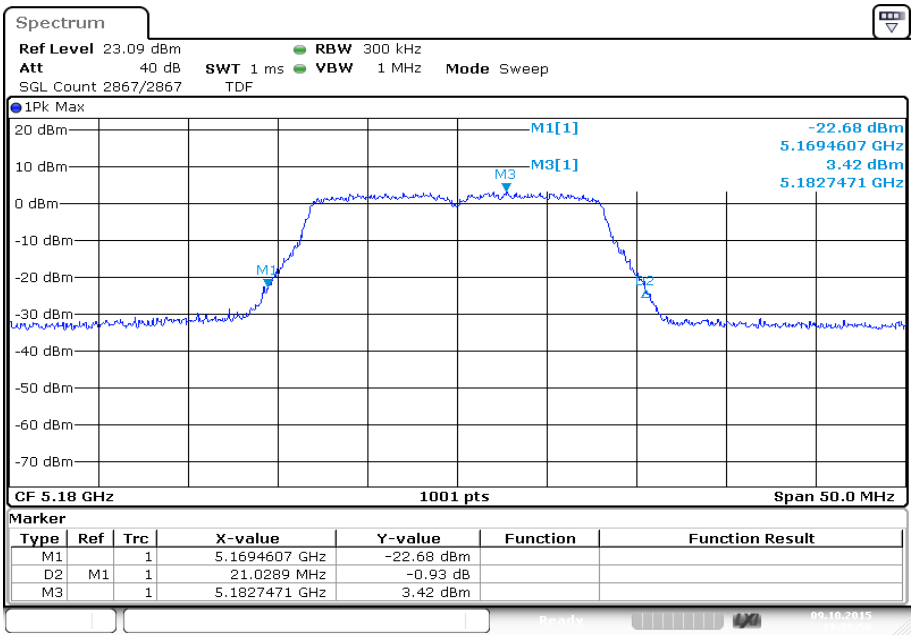
OFDM	26 dB BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	21.0	21.2	20.9	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	25.2	24.6	21.3	-/-

Result: OFDM / X-Rock OFF

OFDM	26 dB BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	23.8	21.1	23.2	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	25.3	21.0	21.3	-/-

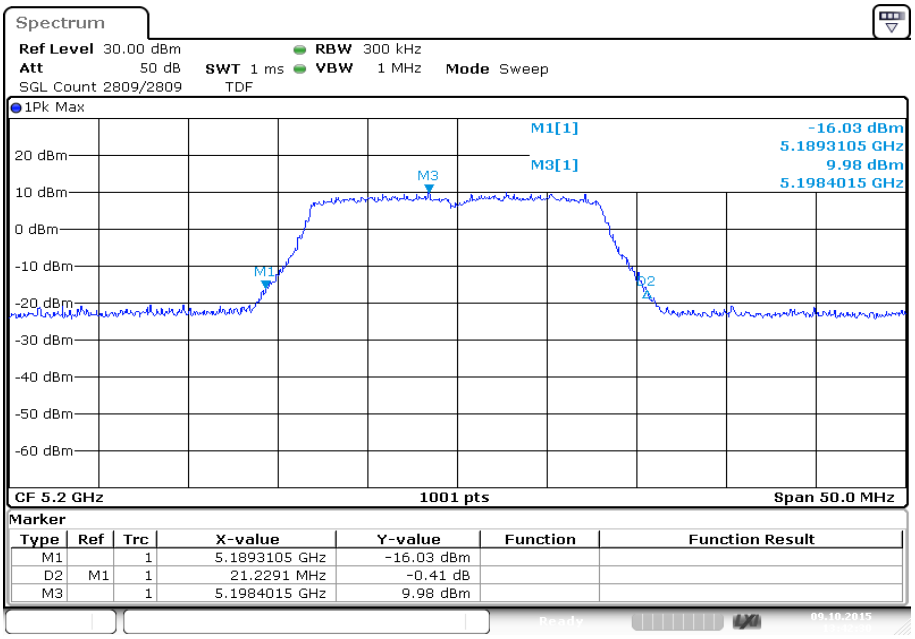
Plots: OFDM / X-Rock ON

Plot 1: 5180 MHz



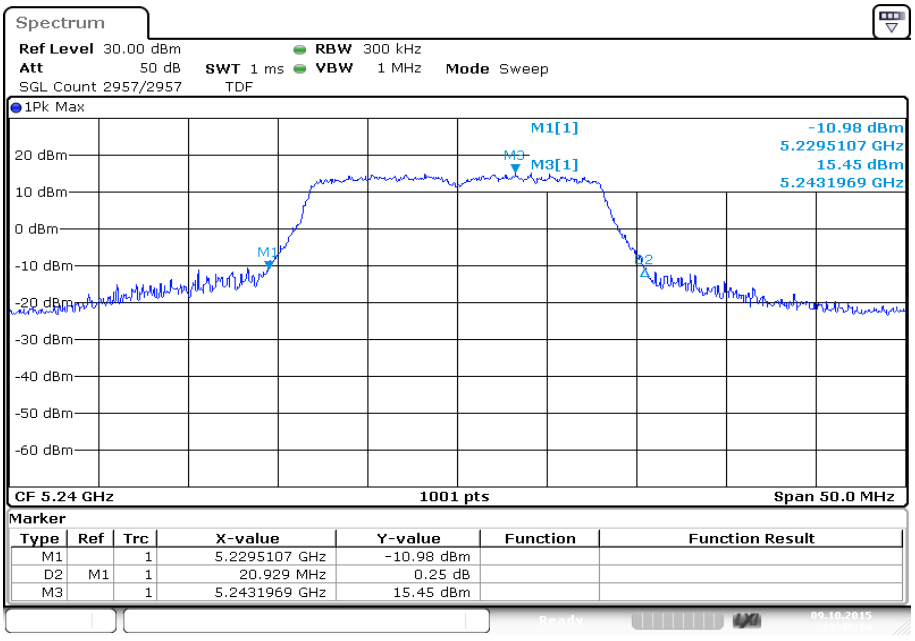
Date: 9.OCT.2015 13:38:59

Plot 2: 5200 MHz



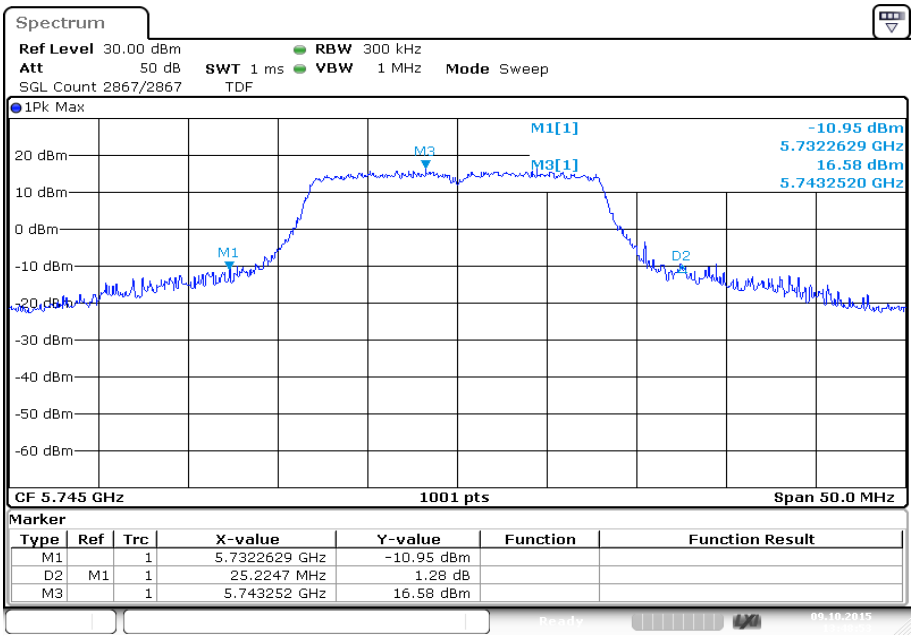
Date: 9.OCT.2015 13:42:31

Plot 3: 5240 MHz



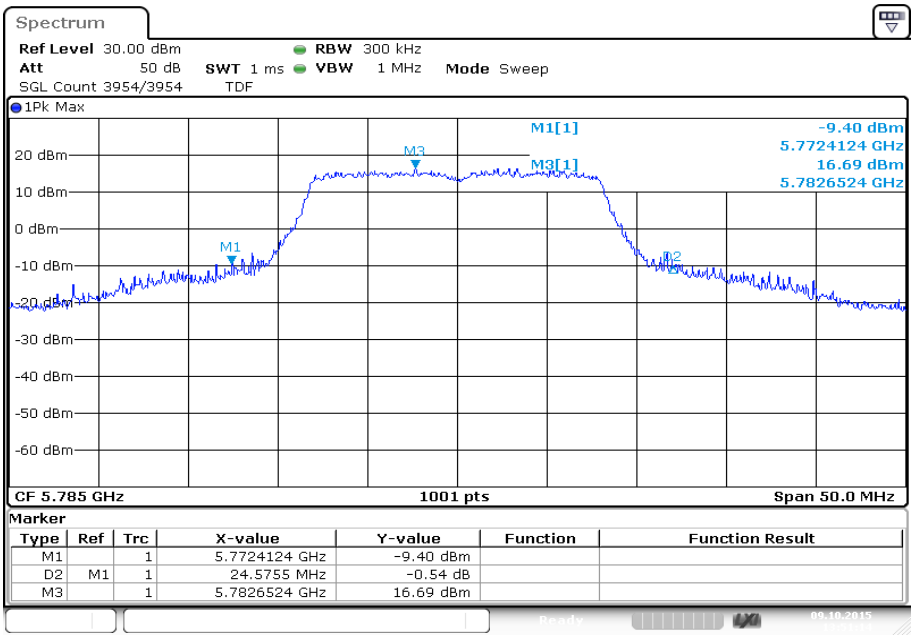
Date: 9.OCT.2015 13:45:15

Plot 4: 5745 MHz



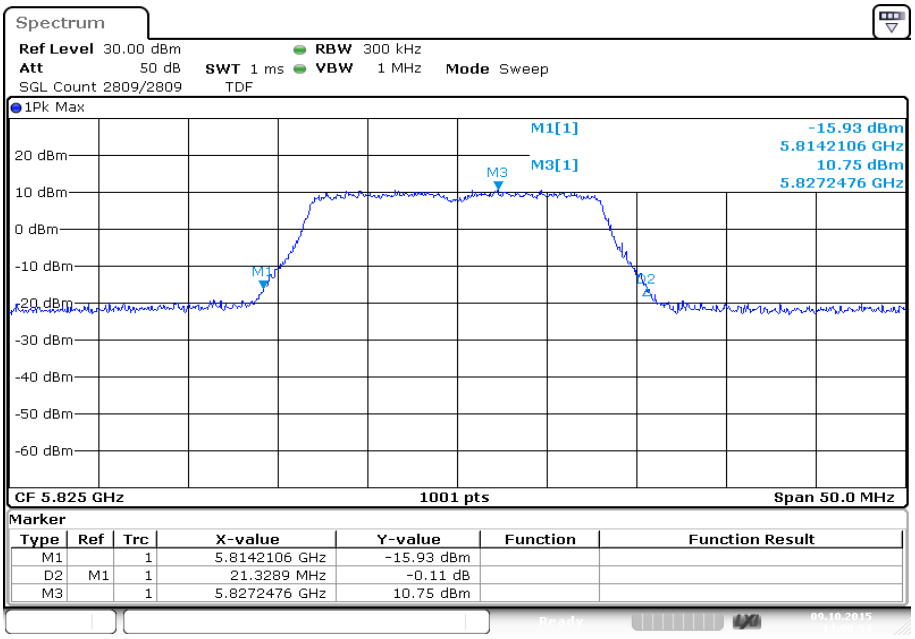
Date: 9.OCT.2015 13:48:53

Plot 5: 5785 MHz



Date: 9.OCT.2015 13:51:15

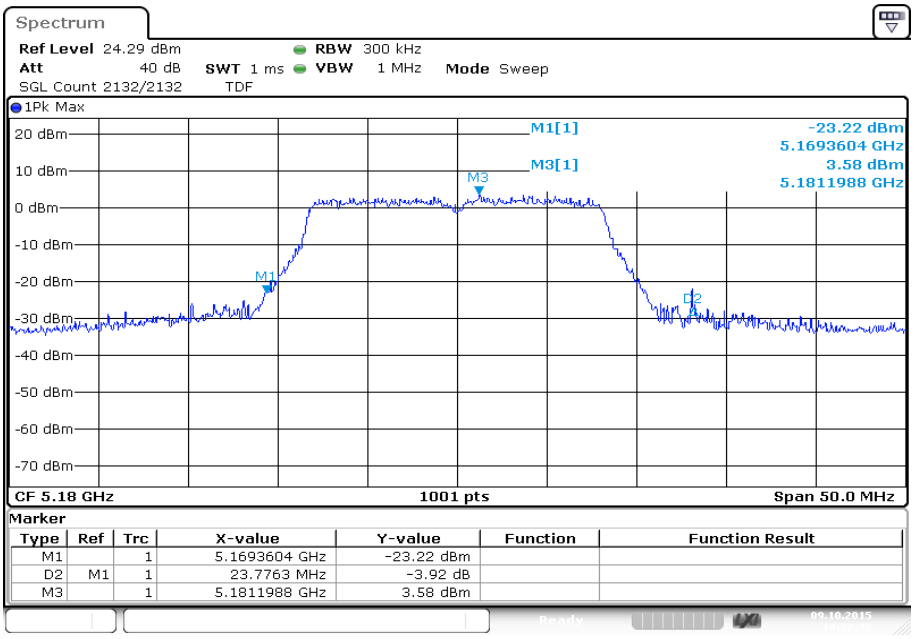
Plot 6: 5825 MHz



Date: 9.OCT.2015 14:00:54

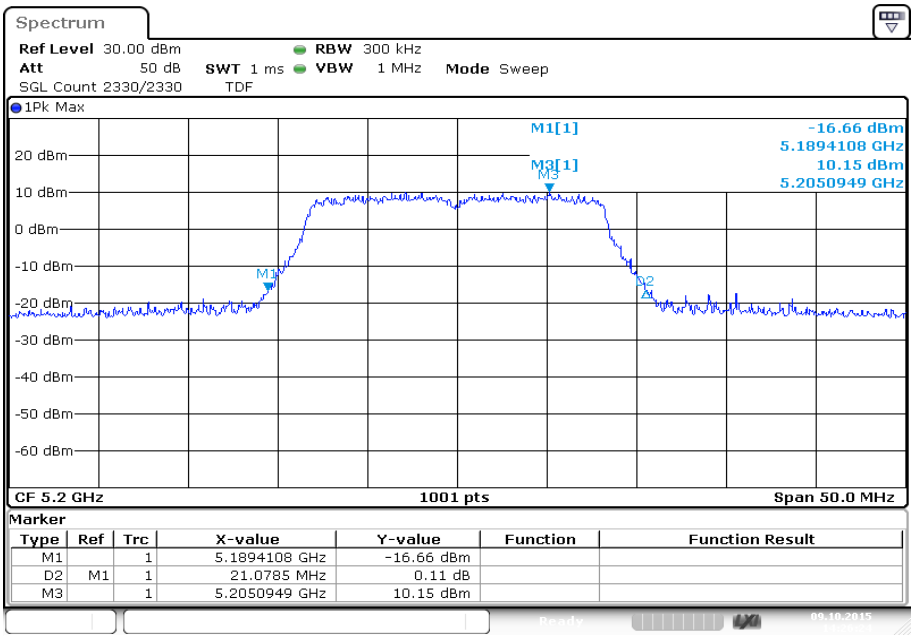
Plots: OFDM / X-Rock OFF

Plot 7: 5180 MHz



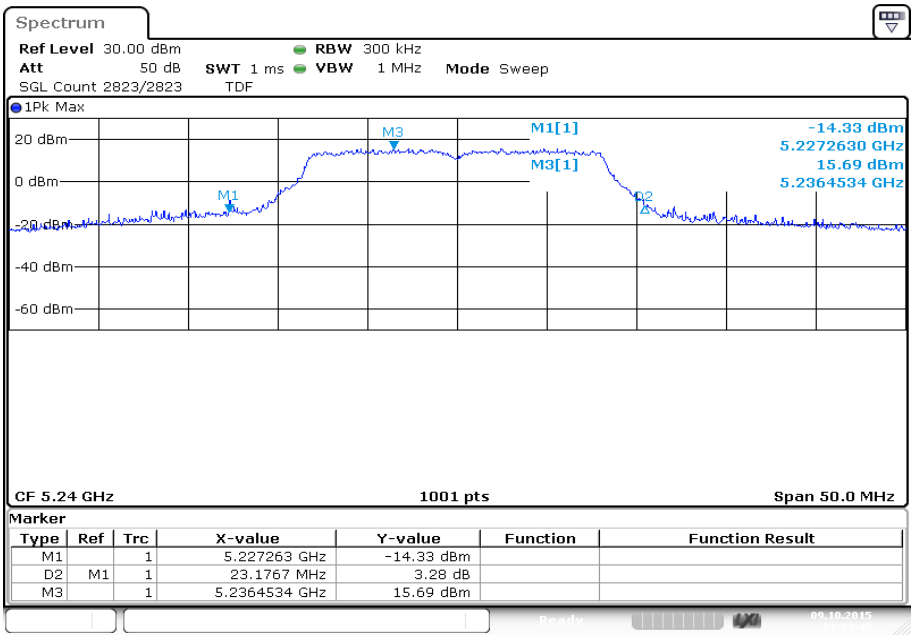
Date: 9.OCT.2015 14:22:32

Plot 8: 5200 MHz



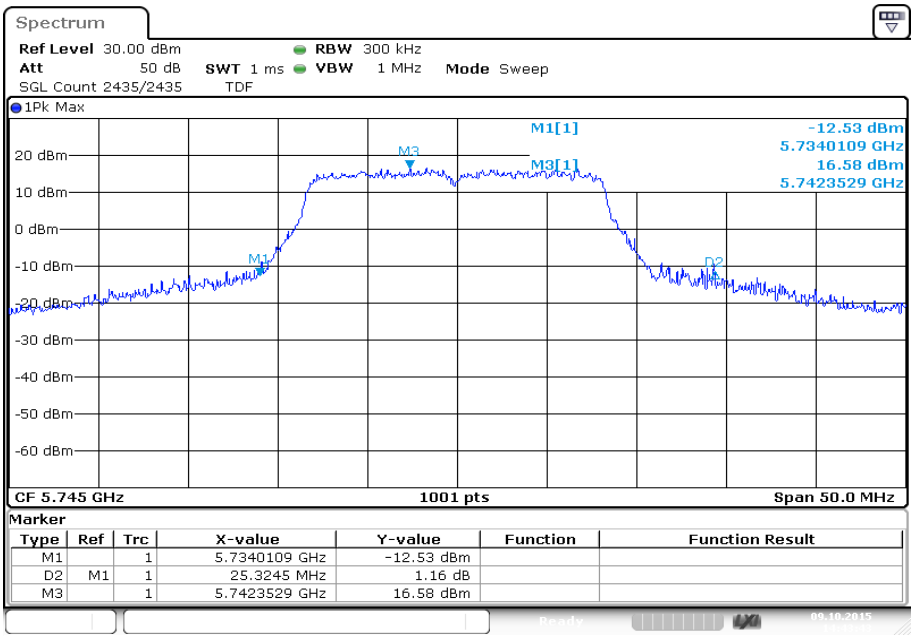
Date: 9.OCT.2015 14:26:25

Plot 9: 5240 MHz



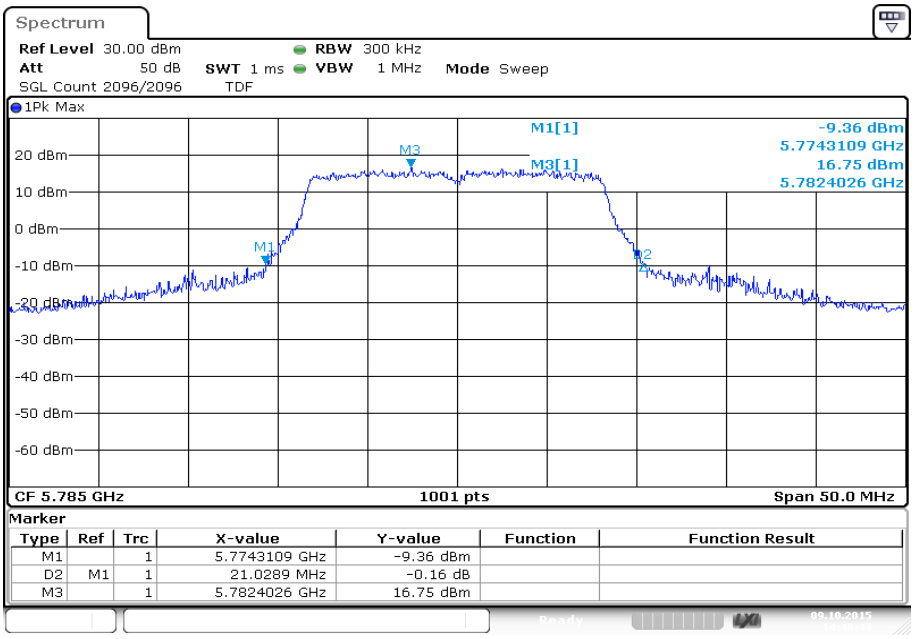
Date: 9.OCT.2015 14:33:42

Plot 10: 5745 MHz



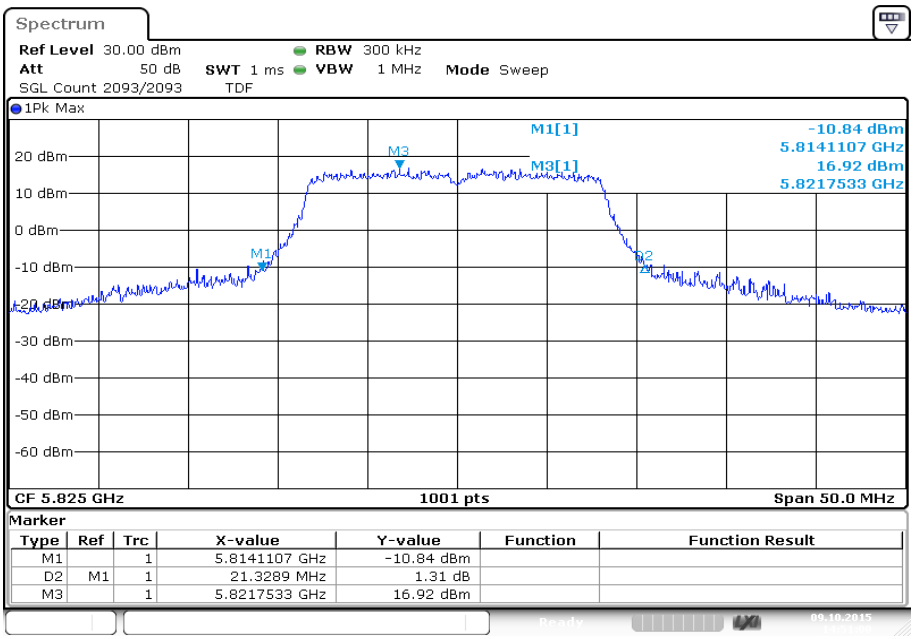
Date: 9.OCT.2015 14:43:43

Plot 11: 5785 MHz



Date: 9.OCT.2015 14:48:44

Plot 12: 5825 MHz



Date: 9.OCT.2015 14:51:01

12.6 Occupied bandwidth – 99% emission bandwidth

Description:

Measurement of the 99% bandwidth of the modulated signal acc. KDB789033 D02

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	300 kHz / 500 kHz
Video bandwidth:	1 MHz / 3 MHz
Span:	50 MHz / 100 MHz
Measurement procedure:	Measurement of the 99% bandwidth using the integration function of the analyzer
Trace-Mode:	Max hold (allow trace to stabilize)
Test setup:	See sub clause 7.5 (Item F)
Measurement uncertainty	See sub clause 9

Usage:

-/-	IC
Occupied Bandwidth – 99% emission bandwidth	
OBW is necessary for output power measurement	

Result: OFDM / X-Rock ON

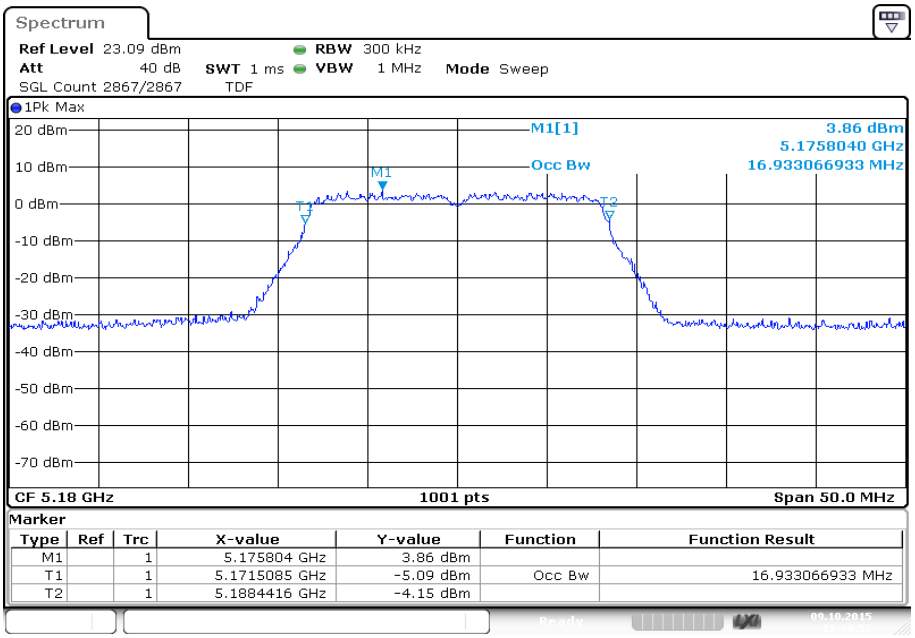
OFDM	99% BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	16.9	16.9	17.0	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	17.0	17.0	16.9	-/-

Result: OFDM / X-Rock OFF

OFDM	99% BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Middle 5200 MHz	Highest 5240 MHz	-/-
	16.8	16.9	16.9	-/-
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	16.9	16.9	16.9	-/-

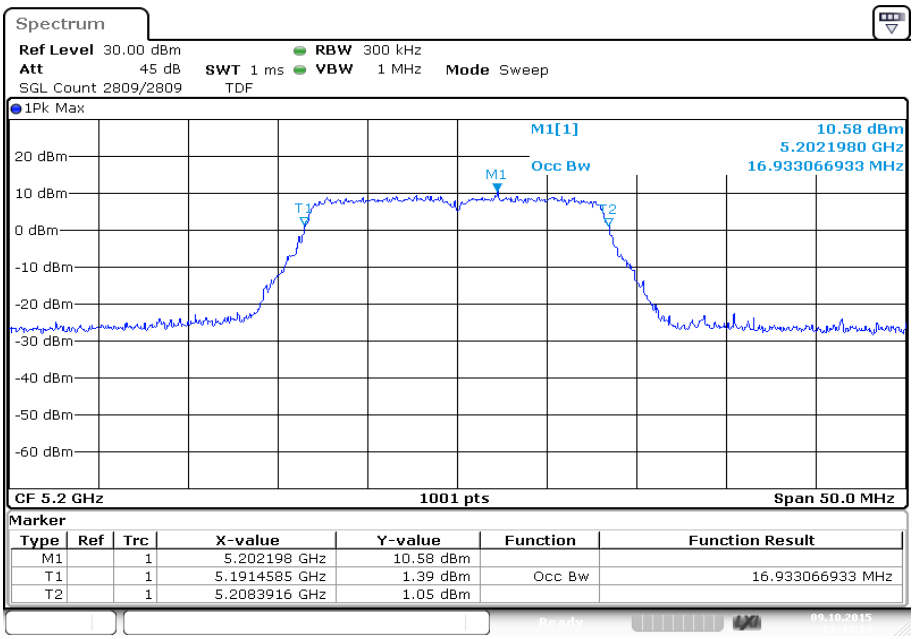
Plots: OFDM / X-Rock ON

Plot 13: 5180 MHz



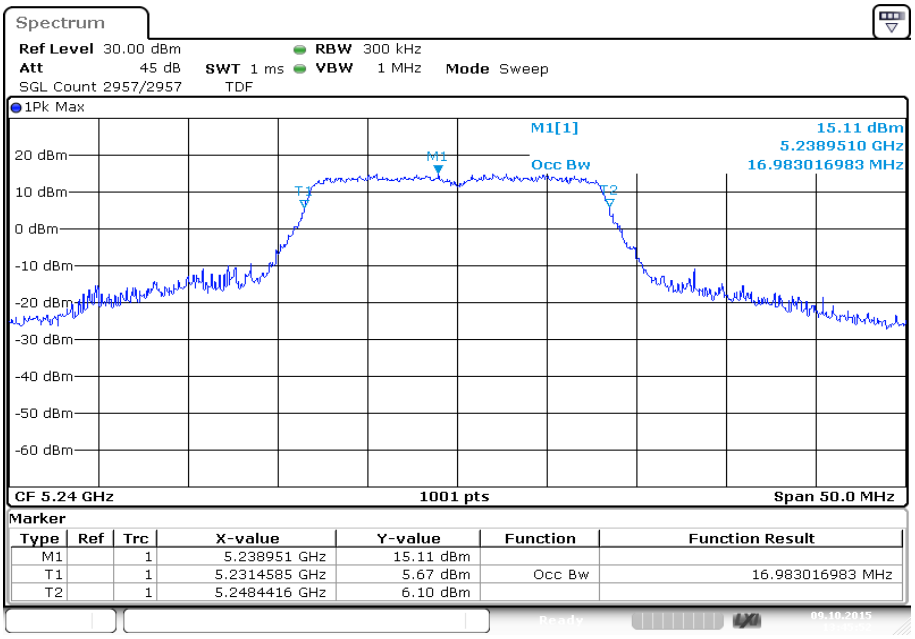
Date: 9.OCT.2015 13:39:52

Plot 14: 5200 MHz



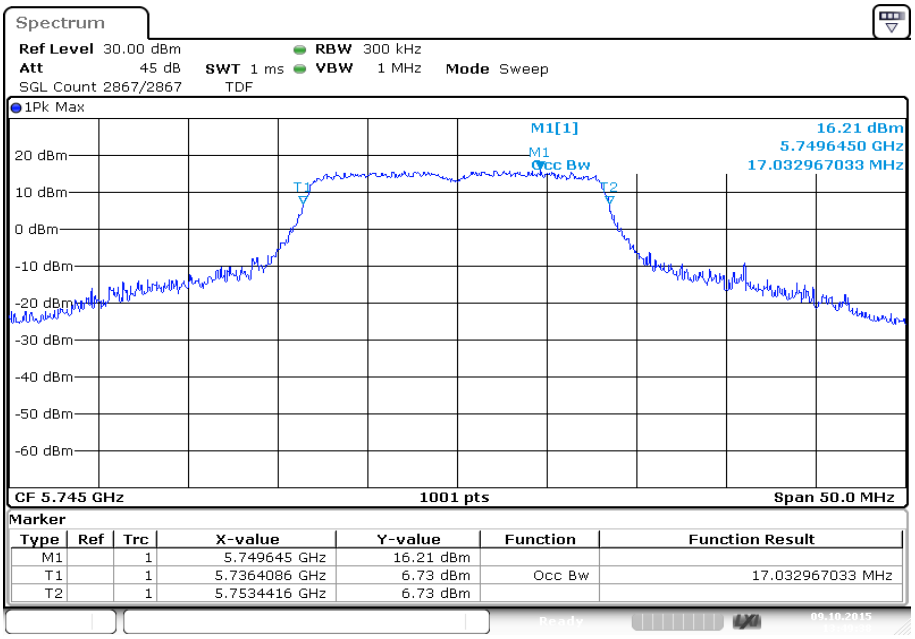
Date: 9.OCT.2015 13:43:15

Plot 15: 5240 MHz



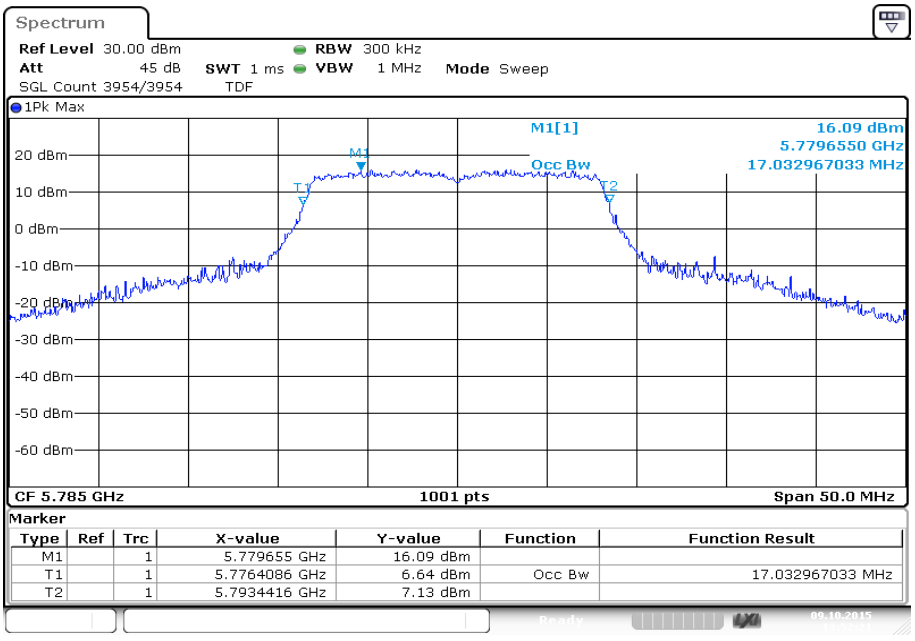
Date: 9.OCT.2015 13:45:52

Plot 16: 5745 MHz



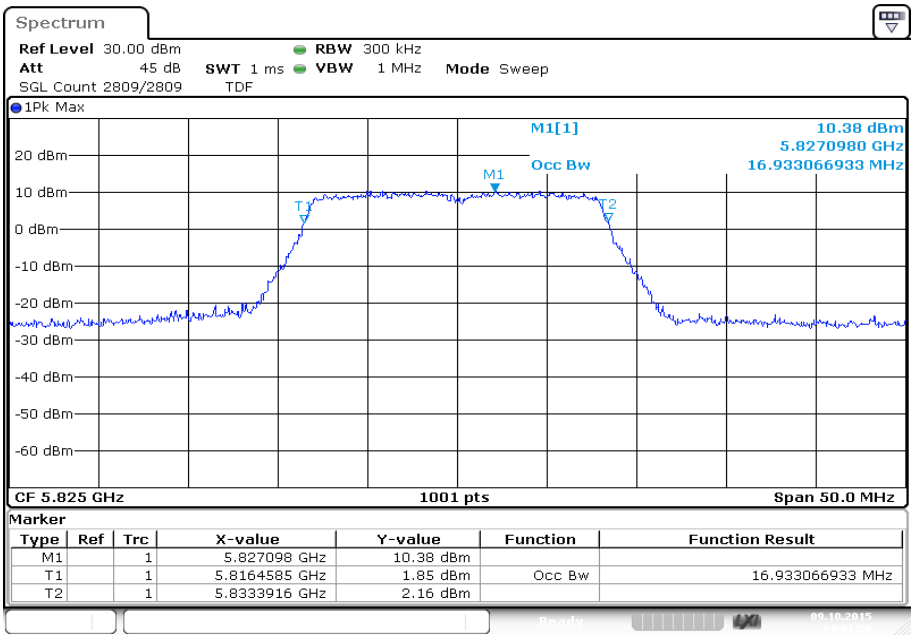
Date: 9.OCT.2015 13:49:39

Plot 17: 5785 MHz



Date: 9.OCT.2015 13:52:22

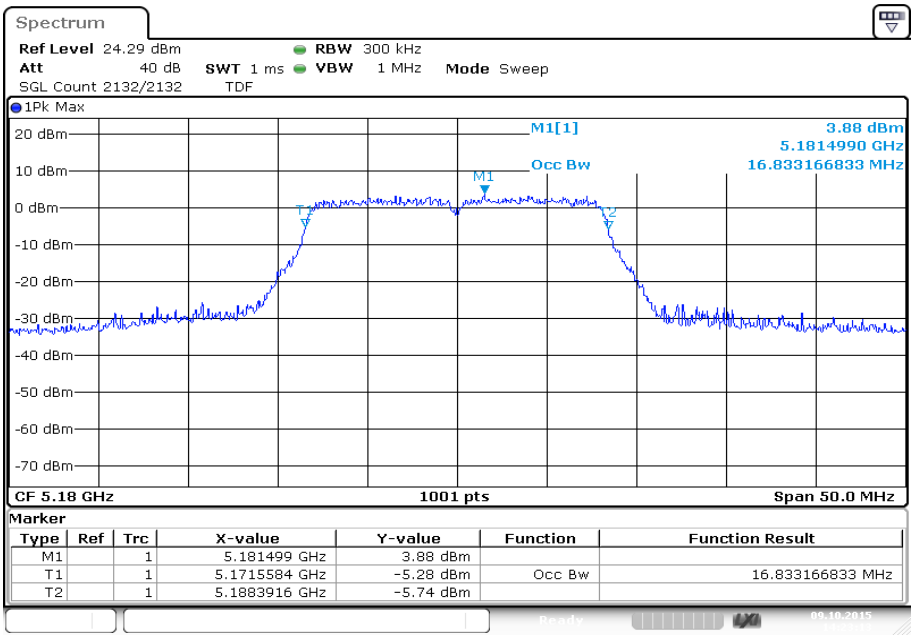
Plot 18: 5825 MHz



Date: 9.OCT.2015 14:01:28

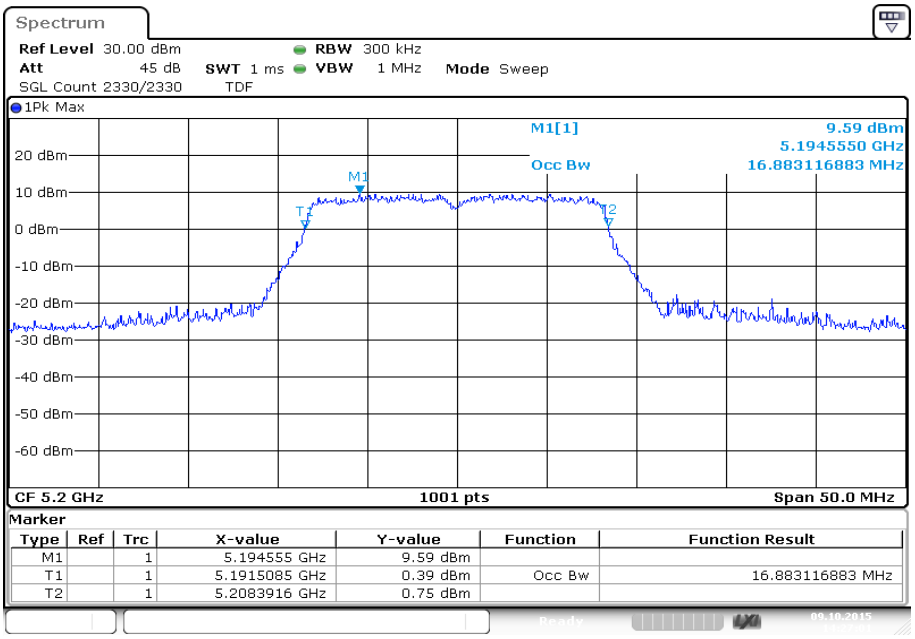
Plots: OFDM / X-Rock OFF

Plot 19: 5180 MHz



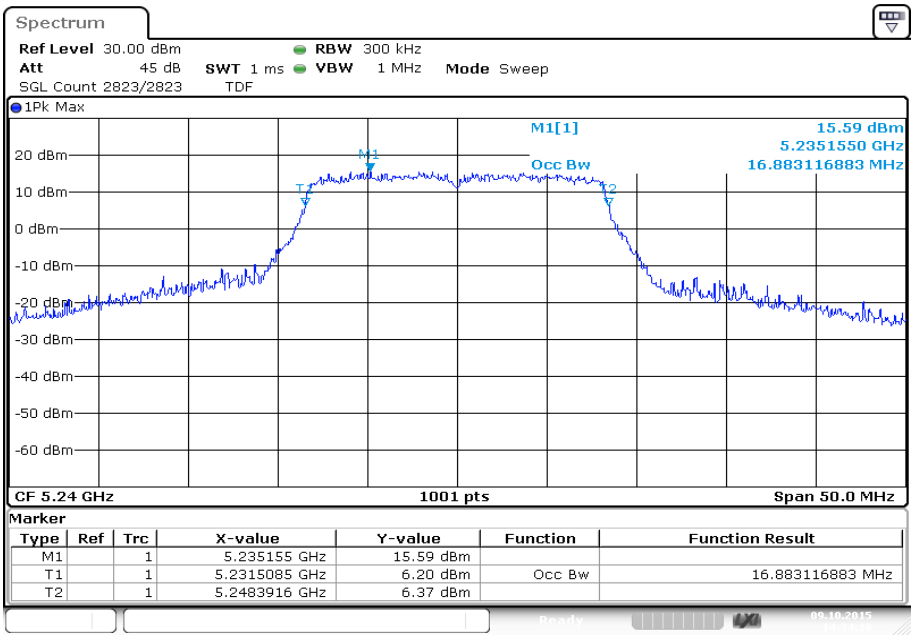
Date: 9.OCT.2015 14:23:14

Plot 20: 5200 MHz



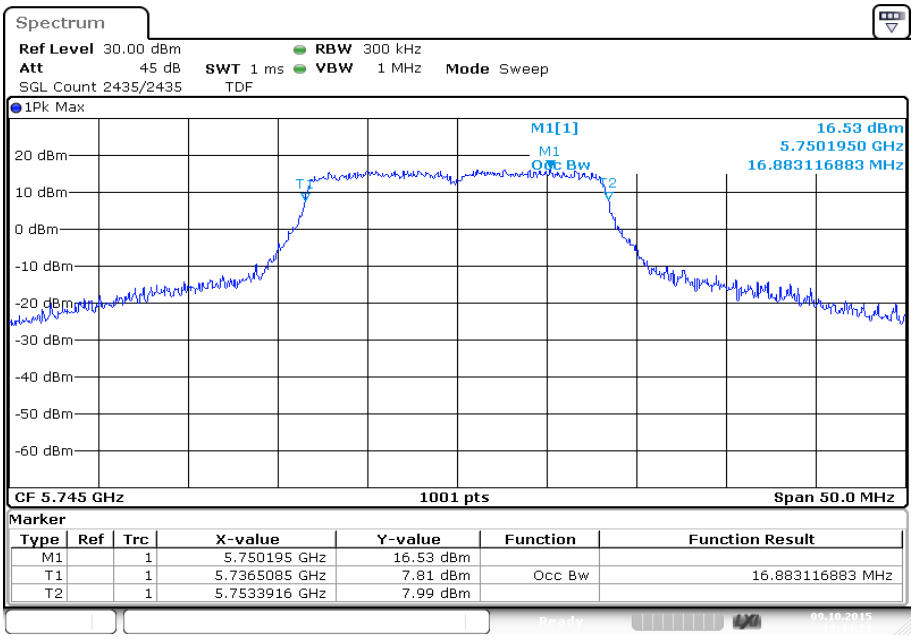
Date: 9.OCT.2015 14:27:02

Plot 21: 5240 MHz



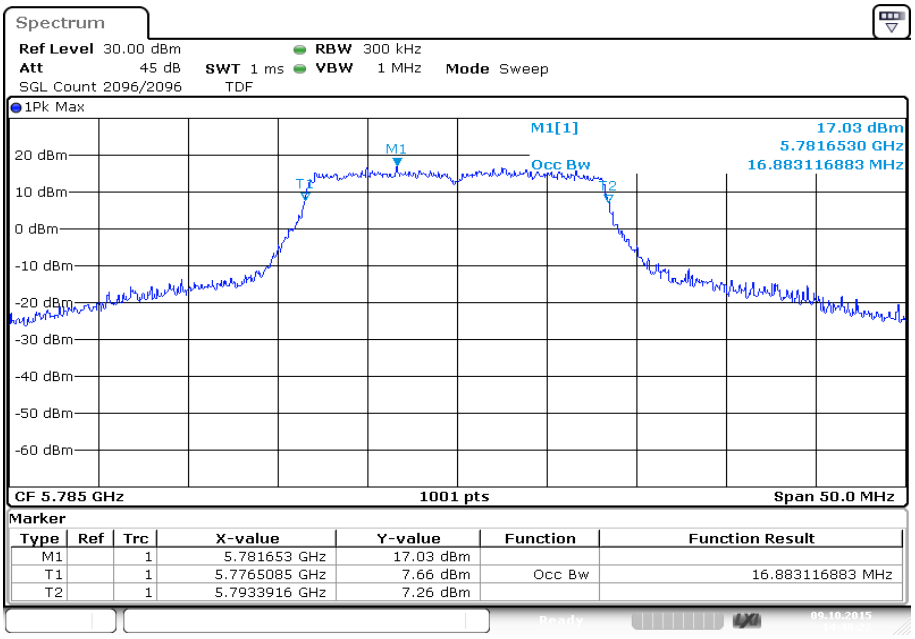
Date: 9.OCT.2015 14:34:18

Plot 22: 5745 MHz



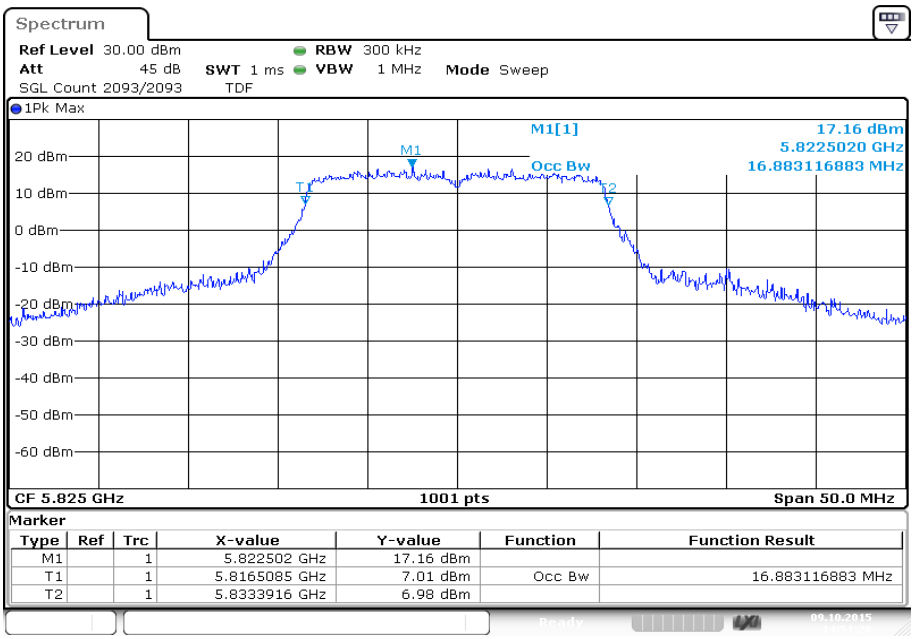
Date: 9.OCT.2015 14:44:23

Plot 23: 5785 MHz



Date: 9.OCT.2015 14:49:23

Plot 24: 5825 MHz



Date: 9.OCT.2015 14:51:28

12.7 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to the lowest channel for the lower restricted band and to the highest channel for the upper restricted band. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak / RMS
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz / 10 Hz
Span:	See plots!
Trace-Mode:	Max Hold
Test setup:	See sub clause 7.2 (Lab item C)
Measurement uncertainty	See sub clause 9

Limits:

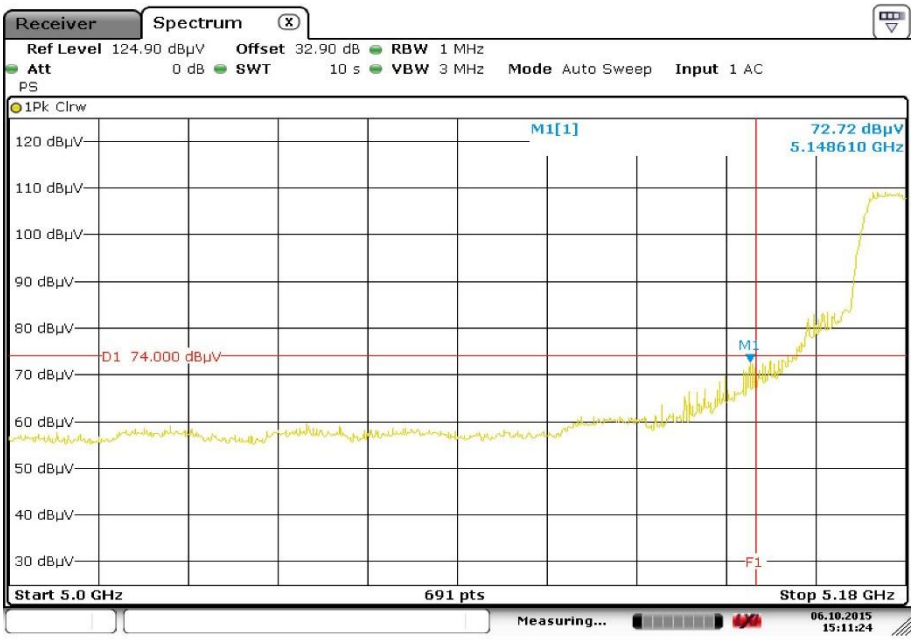
Band Edge Compliance Radiated
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).
74 dBµV/m PEAK 54 dBµV/m AVG

Result:

Scenario	Band Edge Compliance Radiated [dBµV/m]
band edge	< 54 dBµV/m (AVG) < 74 dBµV/m (PEAK)

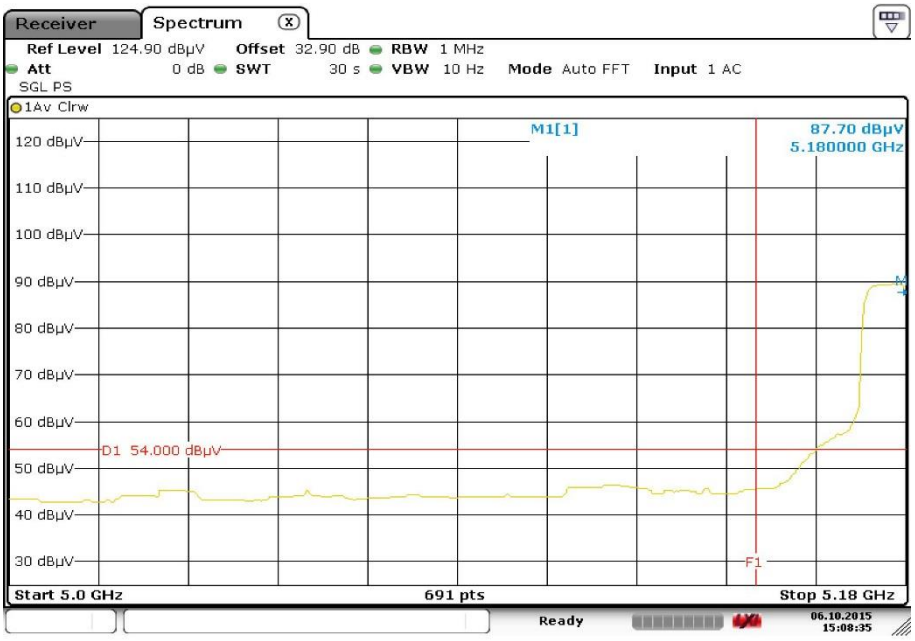
Plots:

Plot 1: lower band edge, vertical & horizontal polarization (X-Rock ON), channel 36 (PEAK)



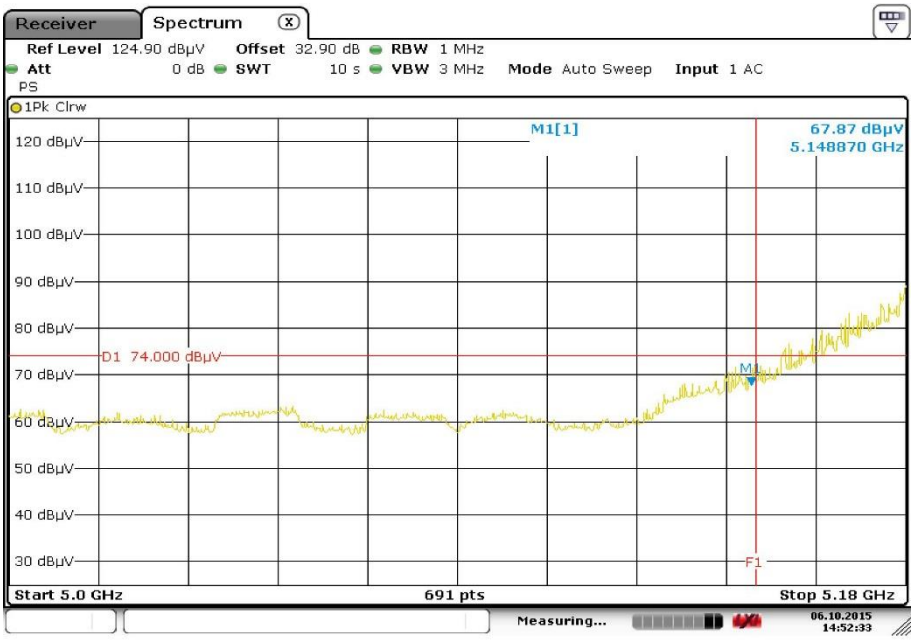
Date: 6.OCT.2015 15:11:24

Plot 2: lower band edge, vertical & horizontal polarization (X-Rock ON), channel 36 (AVG)



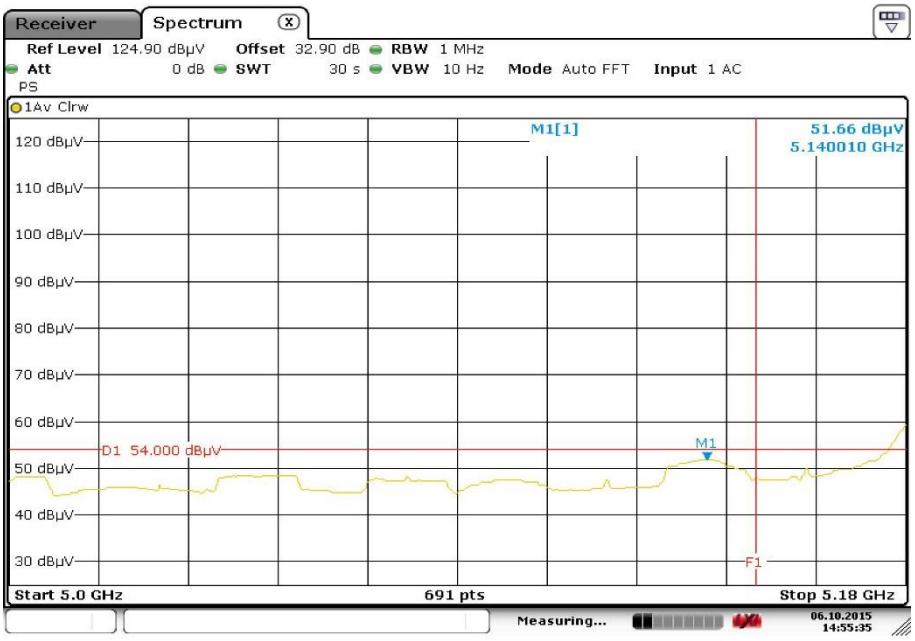
Date: 6.OCT.2015 15:08:35

Plot 3: upper band edge, vertical & horizontal polarization (X-Rock ON), channel 40 (PEAK)



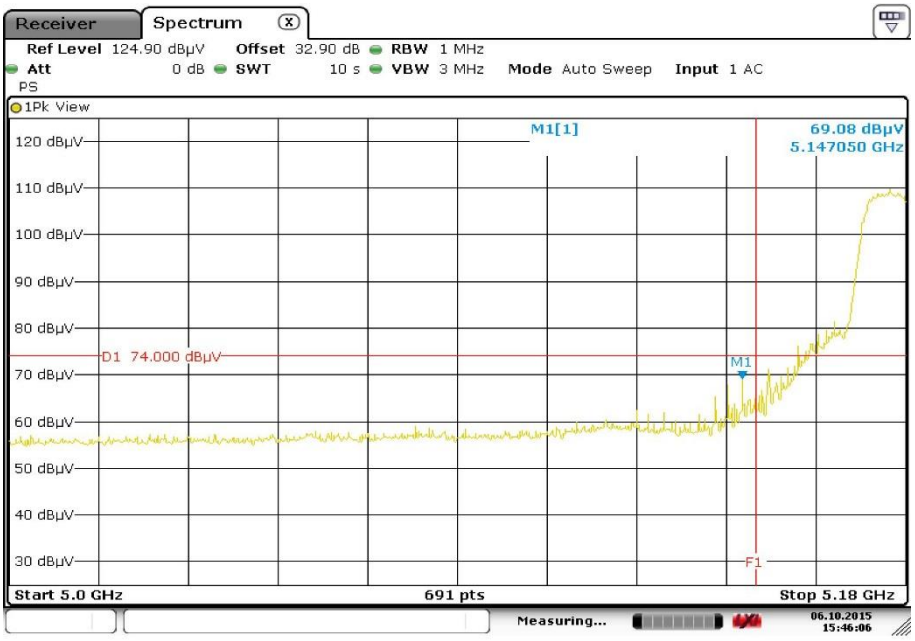
Date: 6.OCT.2015 14:52:34

Plot 4: upper band edge, vertical & horizontal polarization (X-Rock ON), channel 40 (AVG)



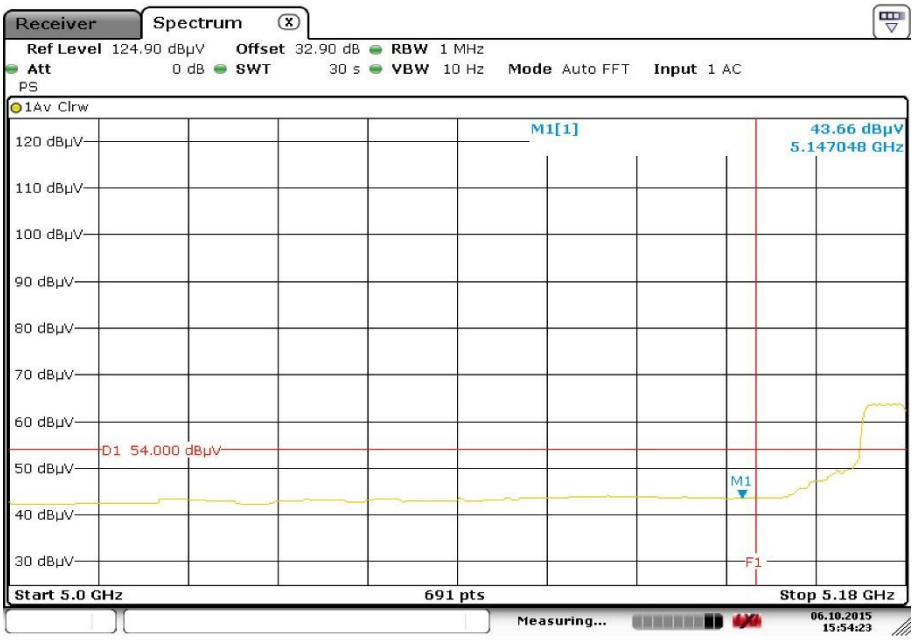
Date: 6.OCT.2015 14:55:35

Plot 5: lower band edge, vertical & horizontal polarization (X-Rock OFF), channel 36 (PEAK)



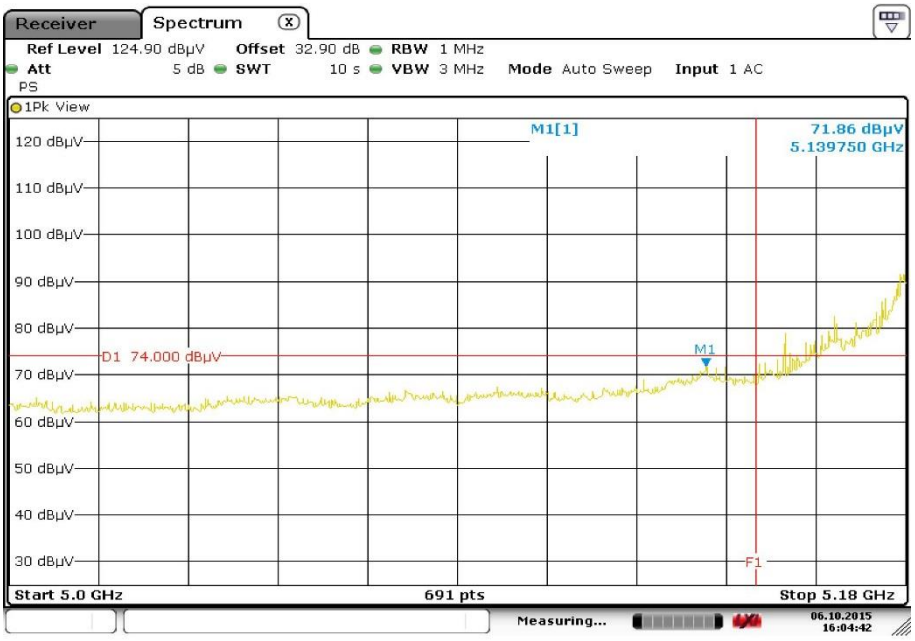
Date: 6.OCT.2015 15:46:06

Plot 6: lower band edge, vertical & horizontal polarization (X-Rock OFF), channel 36 (AVG)



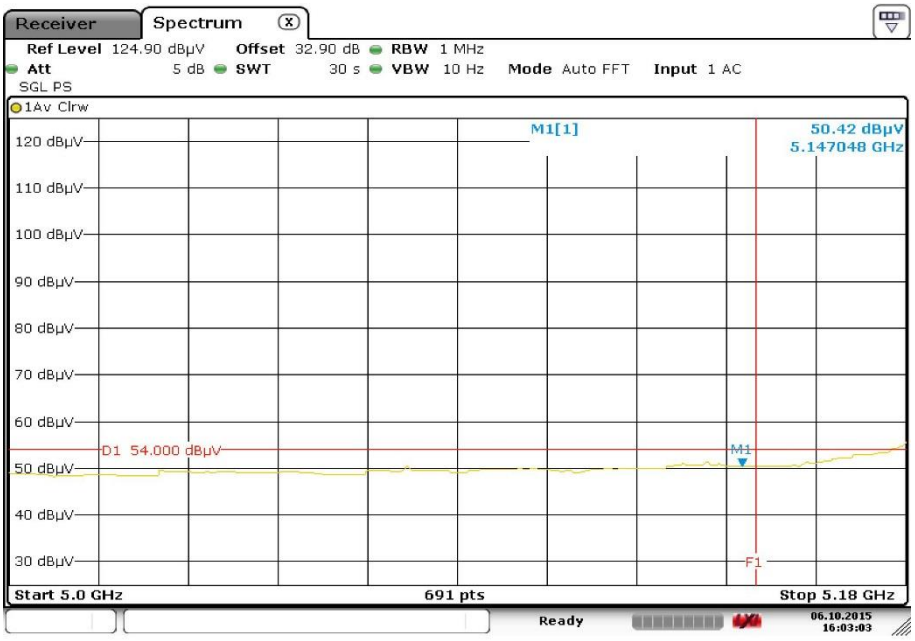
Date: 6.OCT.2015 15:54:24

Plot 7: lower band edge, vertical & horizontal polarization (X-Rock OFF), channel 40 (PEAK)



Date: 6.OCT.2015 16:04:42

Plot 8: lower band edge, vertical & horizontal polarization (X-Rock OFF), channel 40 (AVG)



Date: 6.OCT.2015 16:03:03

12.8 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at lowest, middle and highest channel.

Measurement:

Measurement parameter	
Detector:	Quasi Peak below 1 GHz (alternative Peak) Peak above 1 GHz / RMS
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	F < 1 GHz: 300 kHz F > 1 GHz: 3 MHz
Span:	30 MHz to 40 GHz
Trace-Mode:	Max Hold / Average with 100 counts + 20 log (1 / X) for duty cycle lower than 100 %
Test setup:	See sub clause 7.1 (Item A), 7.2 (Item B+C) and 7.3 (Item D)
Measurement uncertainty	See sub clause 9

Limits:

TX Spurious Emissions Radiated		
§15.209		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
30 – 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3
§15.407		
Outside the restricted bands!	-27 dBm / MHz	

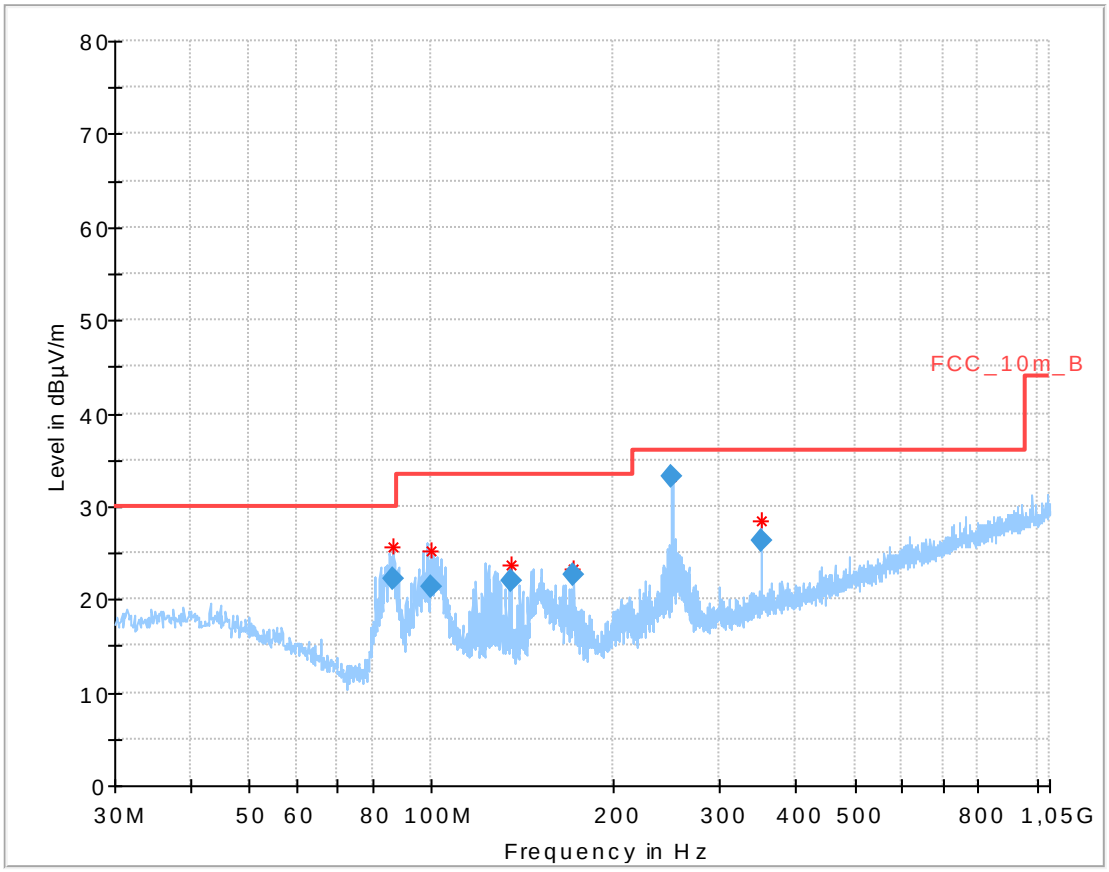
Results: OFDM / X-Rock ON

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM								
Lowest 5180 MHz			Middle 5200 MHz			Highest 5240 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
For results < 1GHz see table below plots.			For results < 1GHz see table below plots			For results < 1GHz see table below plots		
2408	Peak	43.9	15602	Peak	30.8	2412	Peak	40.6
15531	Peak	29.7	19544	Peak	33.1	17228	Peak	48.3
24089	Peak	34.7	39825	Peak	38.7	39825	Peak	38.7
39839	Peak	38.5	-/-	-/-	-/-	39798	Peak	37.9

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM								
Lowest 5745 MHz			Middle 5785 MHz			Highest 5825 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
For results < 1GHz see table below plots			For results < 1GHz see table below plots			For results < 1GHz see table below plots		
2416	Peak	39.2	2411	Peak	46.7	2409	Peak	43.3
17228	Peak	48.3	17341	Peak	47.2	17483	Peak	37.2
21175	Peak	33.8	22129	Peak	32.9	21351	Peak	33.1
39856	Peak	38.2	39780	Peak	38.0	39862	Peak	38.3

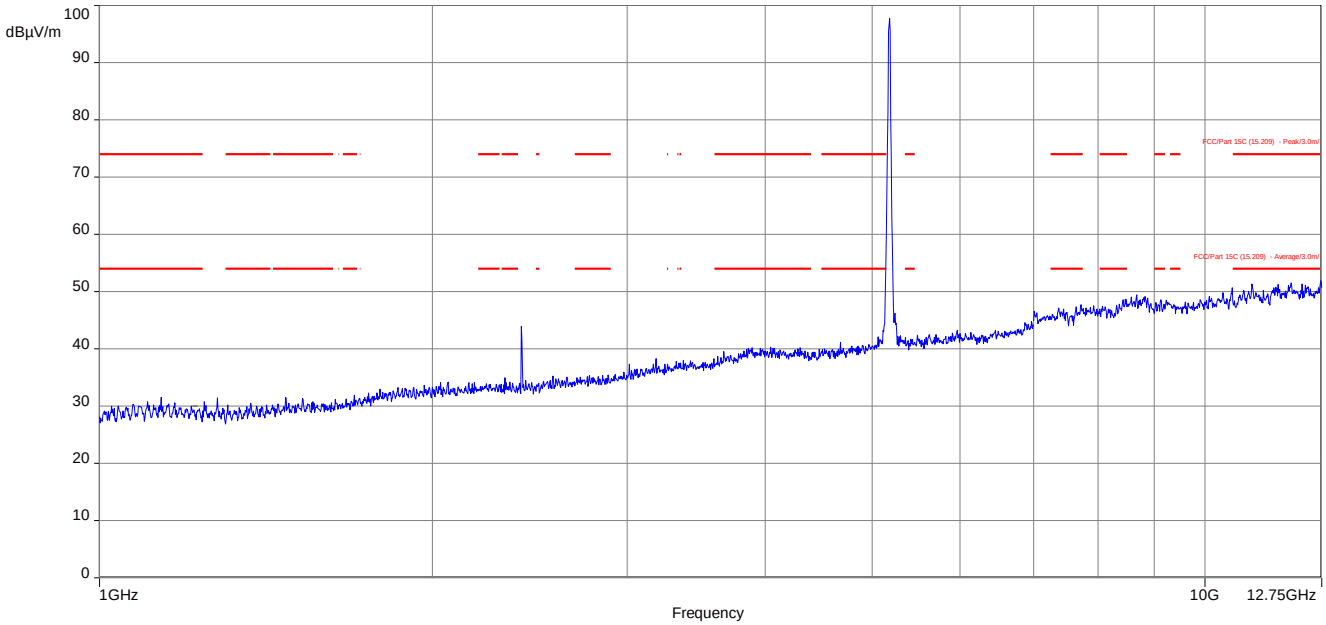
Plots: OFDM / X-Rock ON

Plot 1: 30 MHz to 1 GHz, 5180 MHz, vertical & horizontal polarization

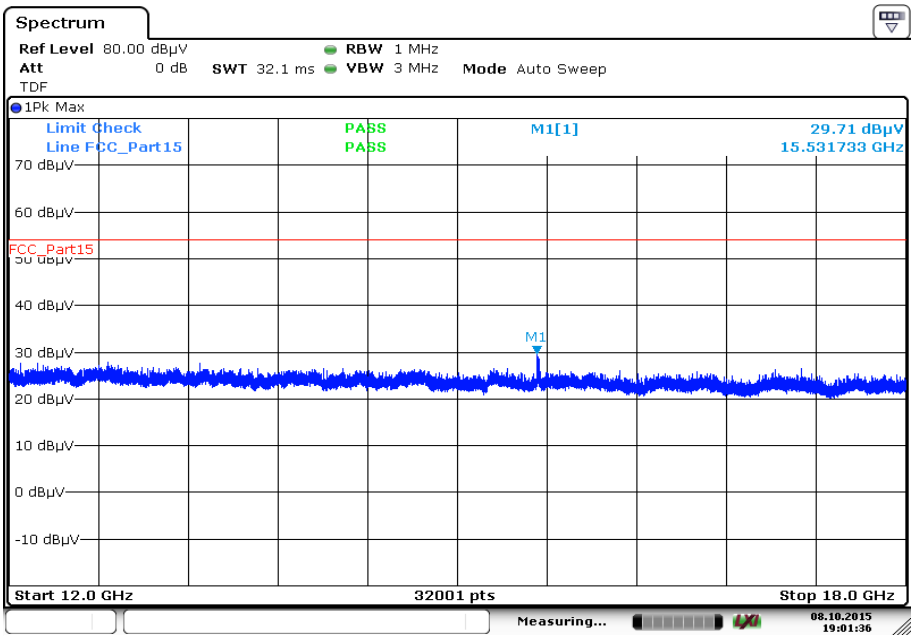


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
86.750400	22.22	30.00	7.78	1000.0	120.000	98.0	V	359	9.7
99.971250	21.45	33.50	12.05	1000.0	120.000	98.0	V	192	12.2
135.155550	22.09	33.50	11.41	1000.0	120.000	98.0	V	142	9.0
172.021350	22.65	33.50	10.85	1000.0	120.000	98.0	V	237	9.9
249.995100	33.22	36.00	2.78	1000.0	120.000	98.0	V	96	13.3
349.989750	26.30	36.00	9.70	1000.0	120.000	98.0	V	13	16.0

Plot 2: 1 GHz to 12.75 GHz, 5180 MHz, vertical & horizontal polarization

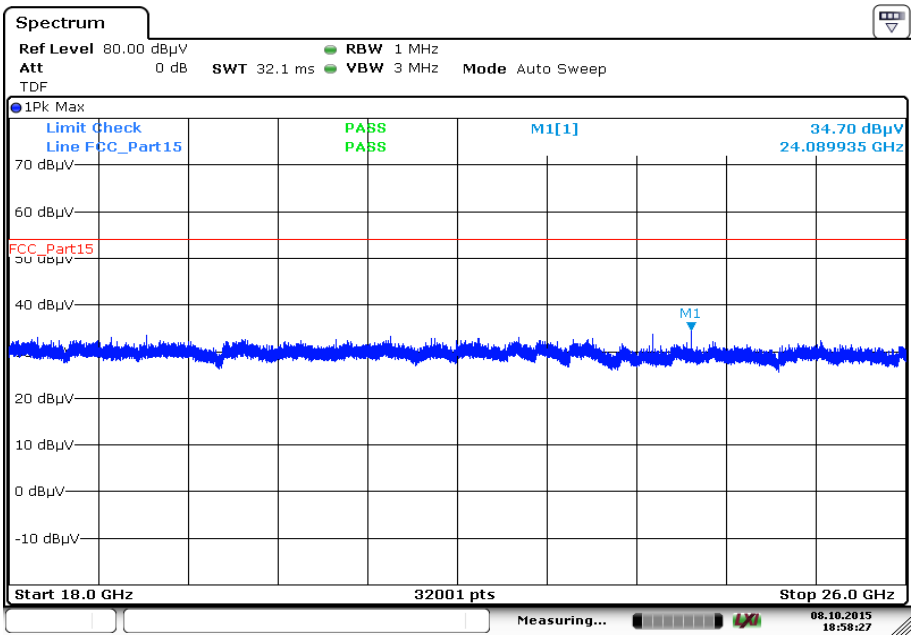


Plot 3: 12 GHz to 18 GHz, 5180 MHz, vertical & horizontal polarization



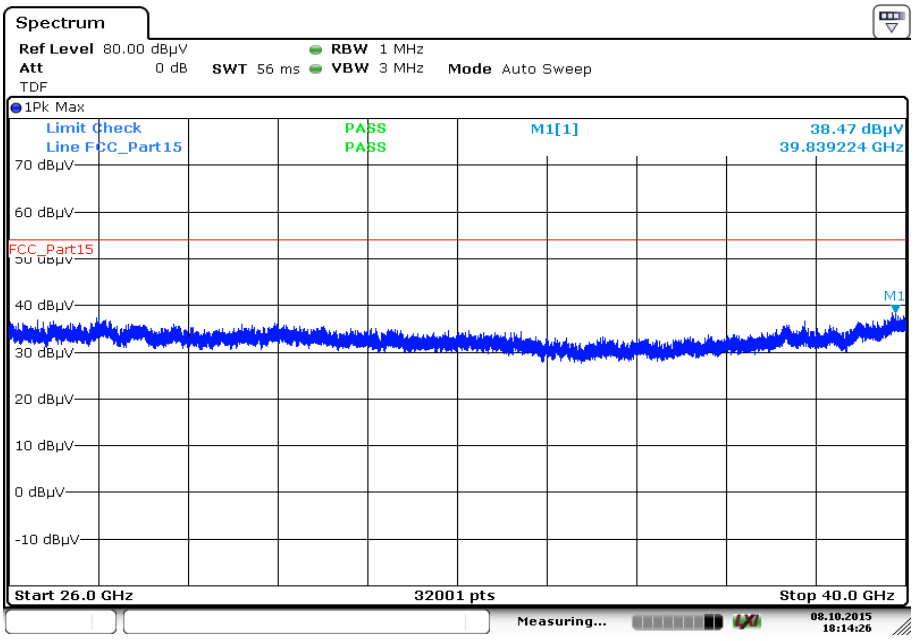
Date: 8.OCT.2015 19:01:36

Plot 4: 18 GHz to 26 GHz, 5180 MHz, vertical & horizontal polarization



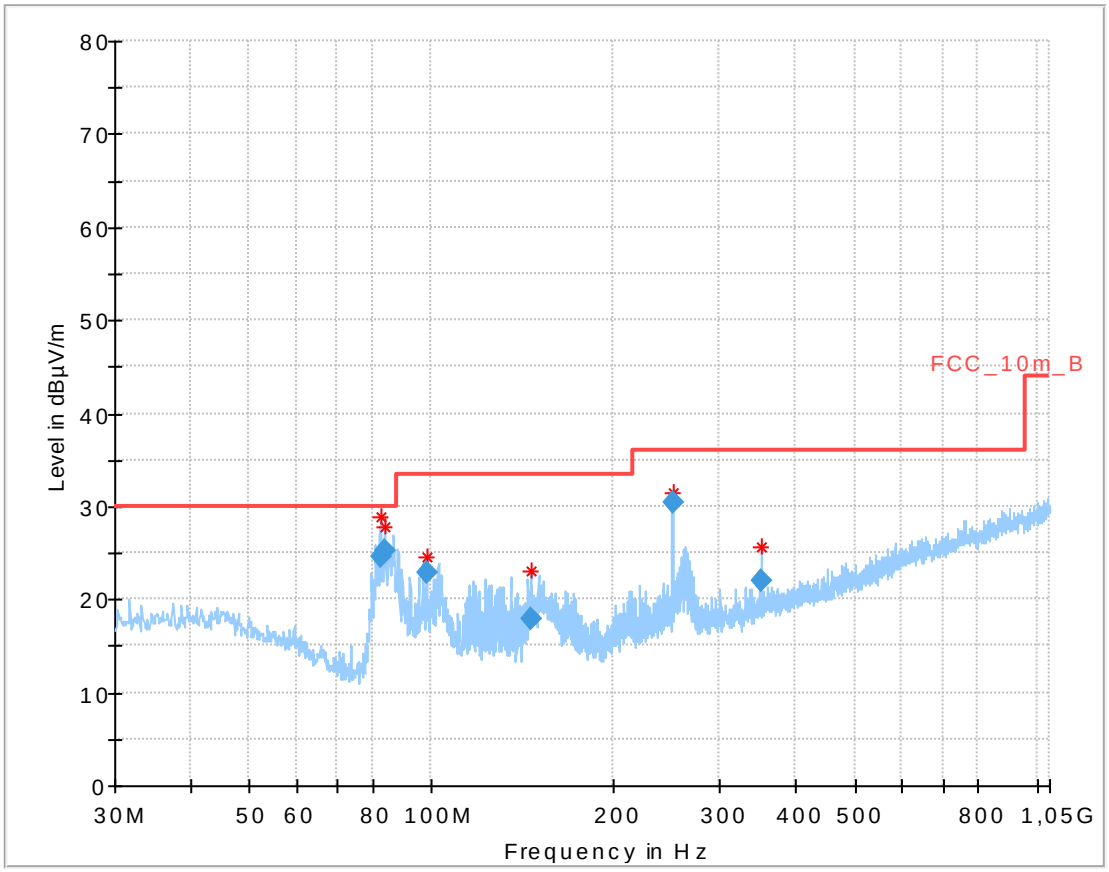
Date: 8.OCT.2015 18:58:27

Plot 5: 26 GHz to 40 GHz, 5180 MHz, vertical & horizontal polarization



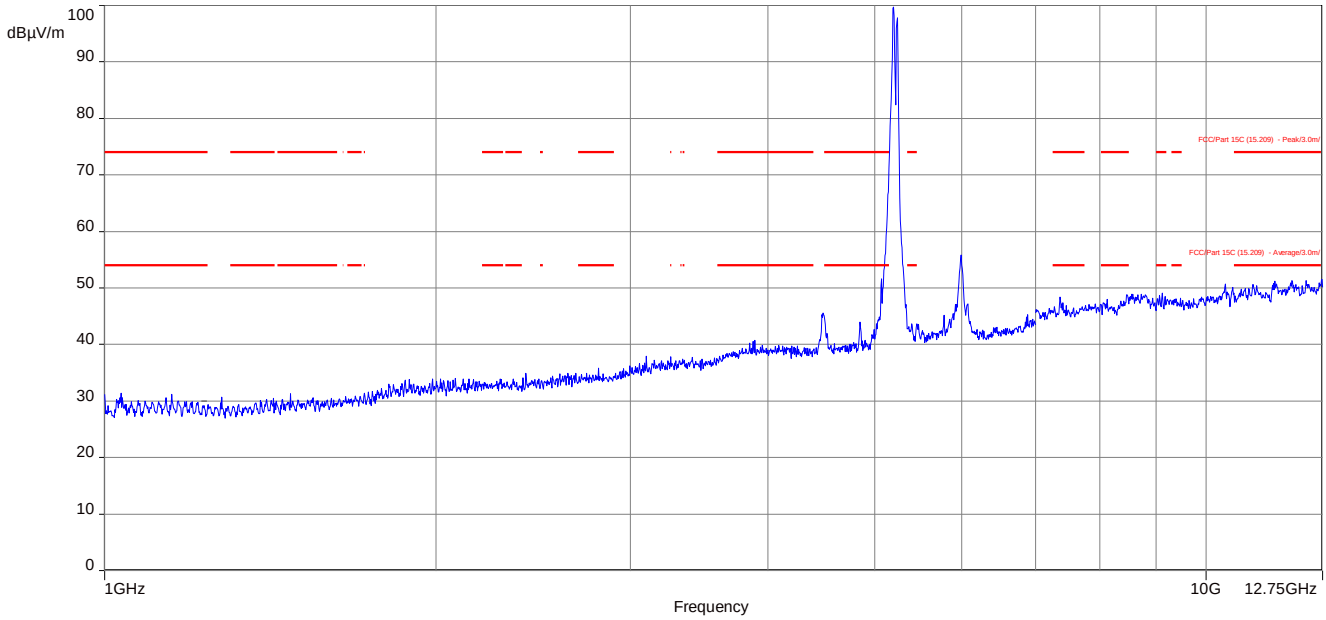
Date: 8.OCT.2015 18:14:26

Plot 6: 30 MHz to 1 GHz, 5200 MHz, vertical & horizontal polarization

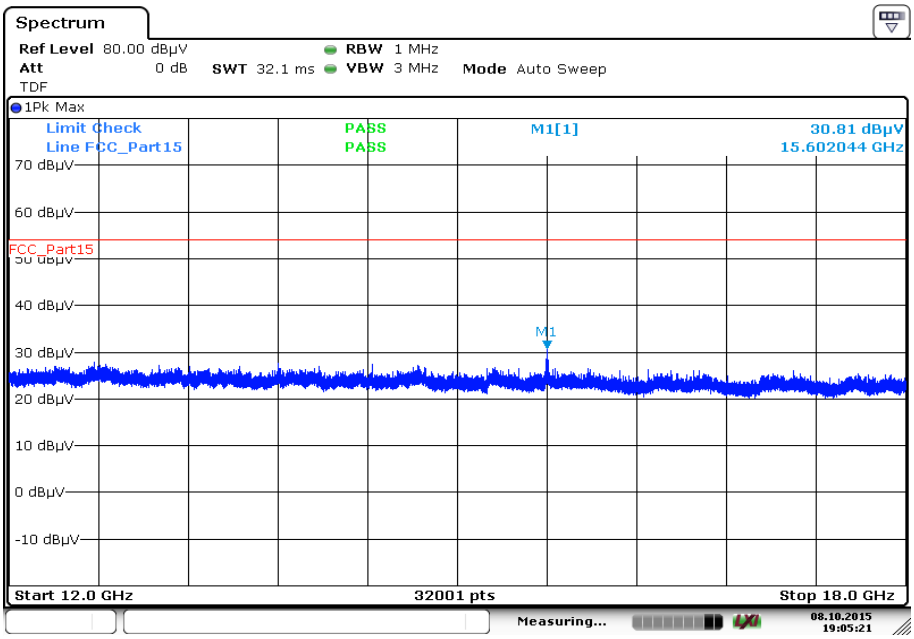


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
82.344750	24.64	30.00	5.36	1000.0	120.000	170.0	V	345	8.7
83.891850	25.29	30.00	4.71	1000.0	120.000	101.0	V	357	9.0
98.303850	22.75	33.50	10.75	1000.0	120.000	170.0	V	243	11.9
145.996050	18.00	33.50	15.50	1000.0	120.000	98.0	V	205	8.8
250.010700	30.46	36.00	5.54	1000.0	120.000	98.0	V	144	13.4
350.004150	22.07	36.00	13.93	1000.0	120.000	98.0	V	0	16.0

Plot 7: 1 GHz to 12.75 GHz, 5200 MHz, vertical & horizontal polarization

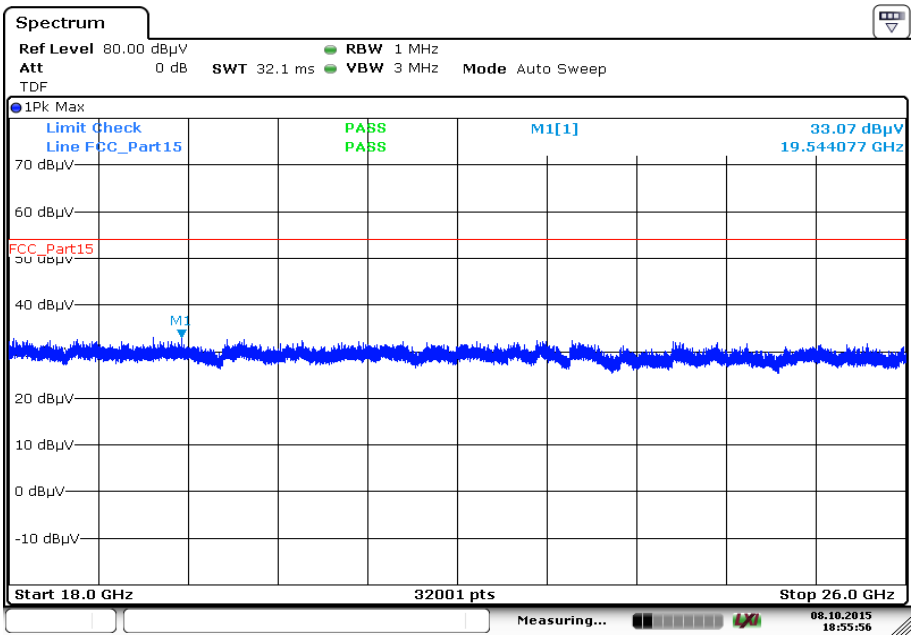


Plot 8: 12 GHz to 18 GHz, 5200 MHz, vertical & horizontal polarization



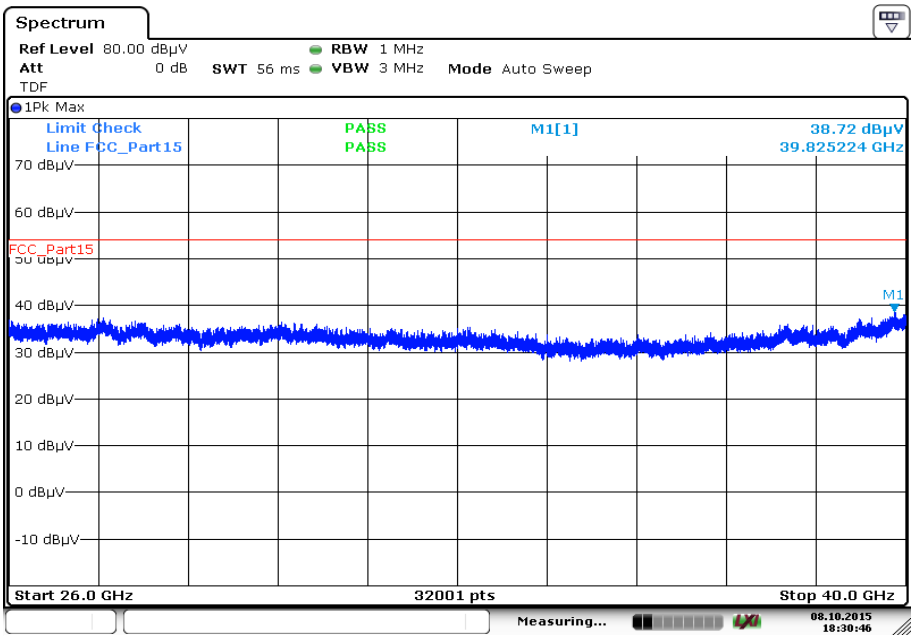
Date: 8.OCT.2015 19:05:21

Plot 9: 18 GHz to 26 GHz, 5200 MHz, vertical & horizontal polarization



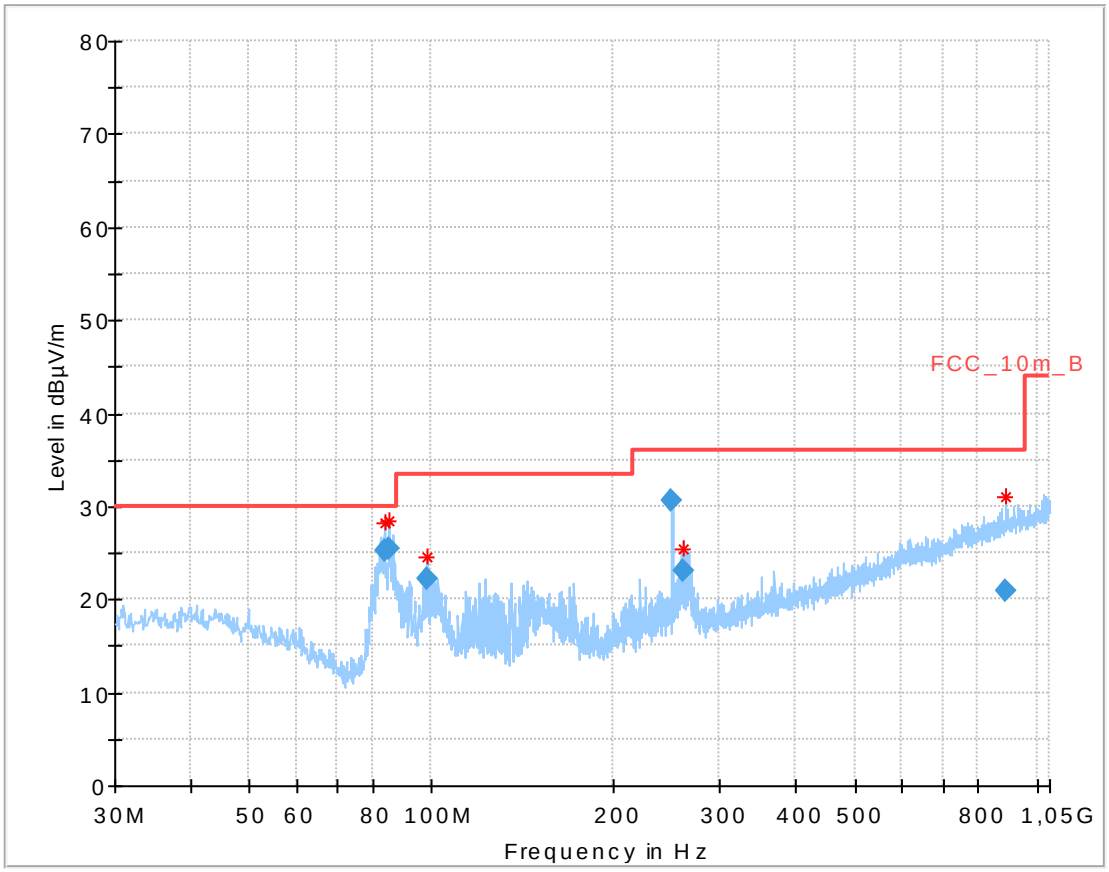
Date: 8.OCT.2015 18:55:56

Plot 10: 26 GHz to 40 GHz, 5200 MHz, vertical & horizontal polarization



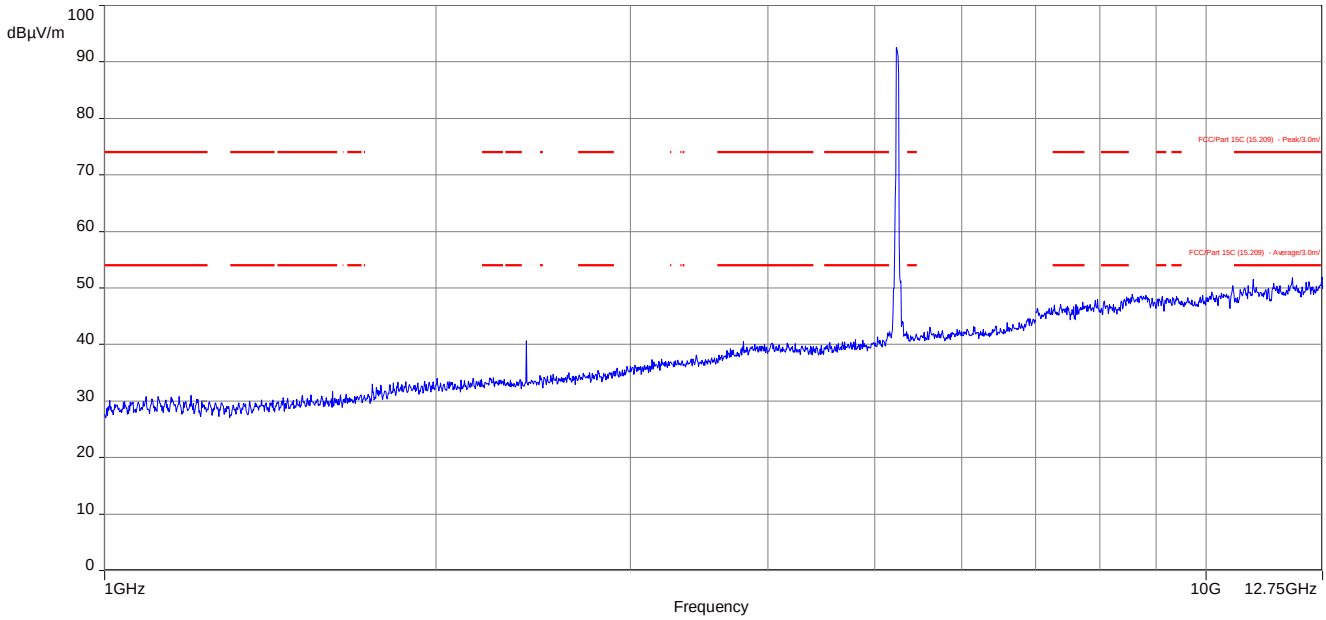
Date: 8.OCT.2015 18:30:46

Plot 11: 30 MHz to 1 GHz, 5240 MHz, vertical & horizontal polarization

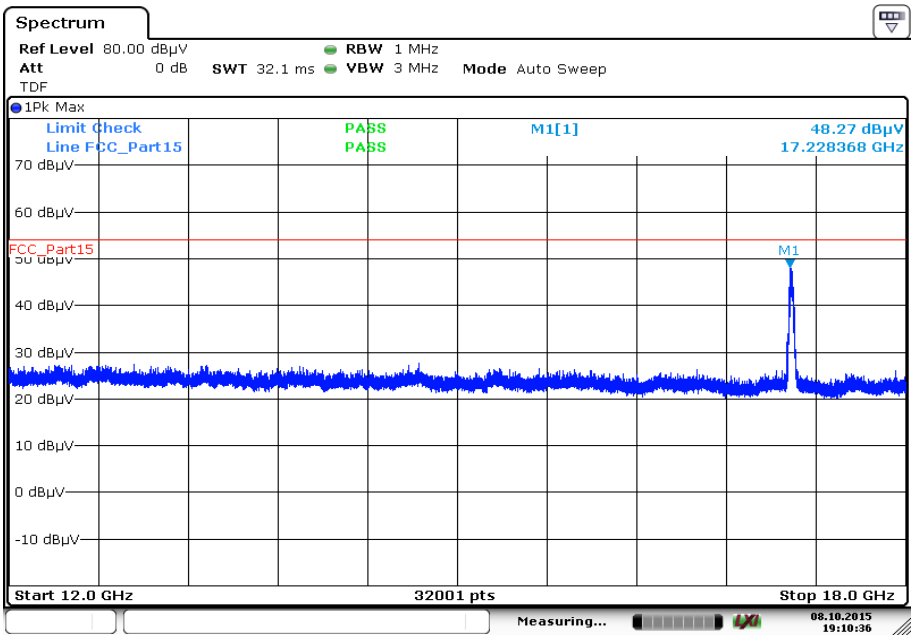


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
83.876100	25.30	30.00	4.70	1000.0	120.000	170.0	V	356	9.0
85.294950	25.44	30.00	4.56	1000.0	120.000	101.0	V	209	9.4
98.324100	22.18	33.50	11.32	1000.0	120.000	98.0	V	278	11.9
249.992100	30.56	36.00	5.44	1000.0	120.000	98.0	V	175	13.3
261.507000	23.17	36.00	12.83	1000.0	120.000	98.0	V	106	13.6
887.013900	20.88	36.00	15.12	1000.0	120.000	170.0	V	278	23.9

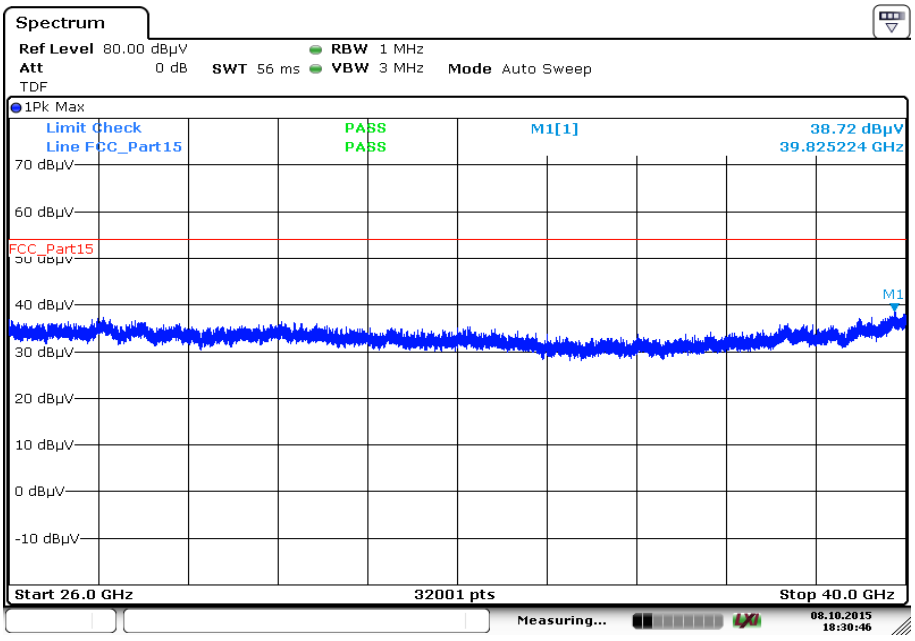
Plot 12: 1 GHz to 12.75 GHz, 5240 MHz, vertical & horizontal polarization



Plot 13: 12 GHz to 18 GHz, 5240 MHz, vertical & horizontal polarization

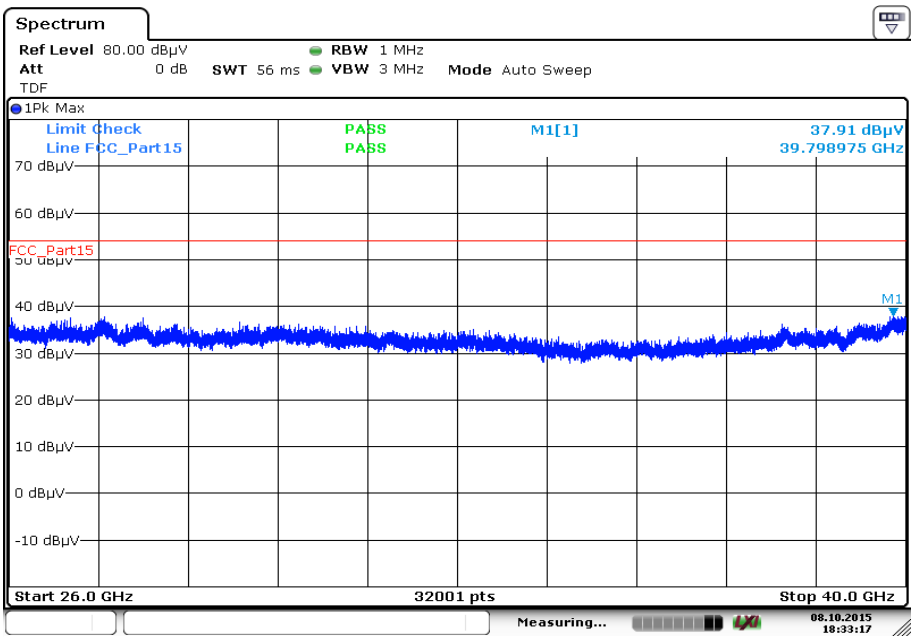


Plot 14: 18 GHz to 26 GHz, 5240 MHz, vertical & horizontal polarization



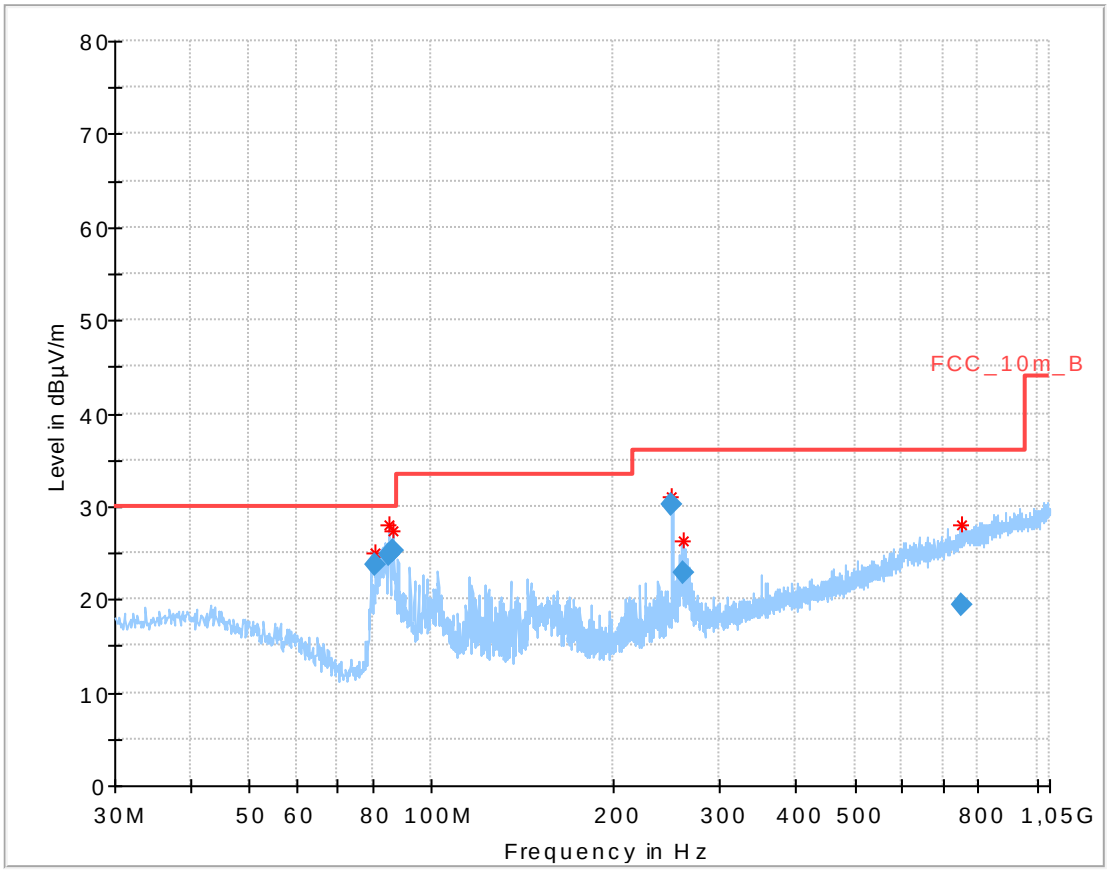
Date: 8.OCT.2015 18:30:46

Plot 15: 26 GHz to 40 GHz, 5240 MHz, vertical & horizontal polarization



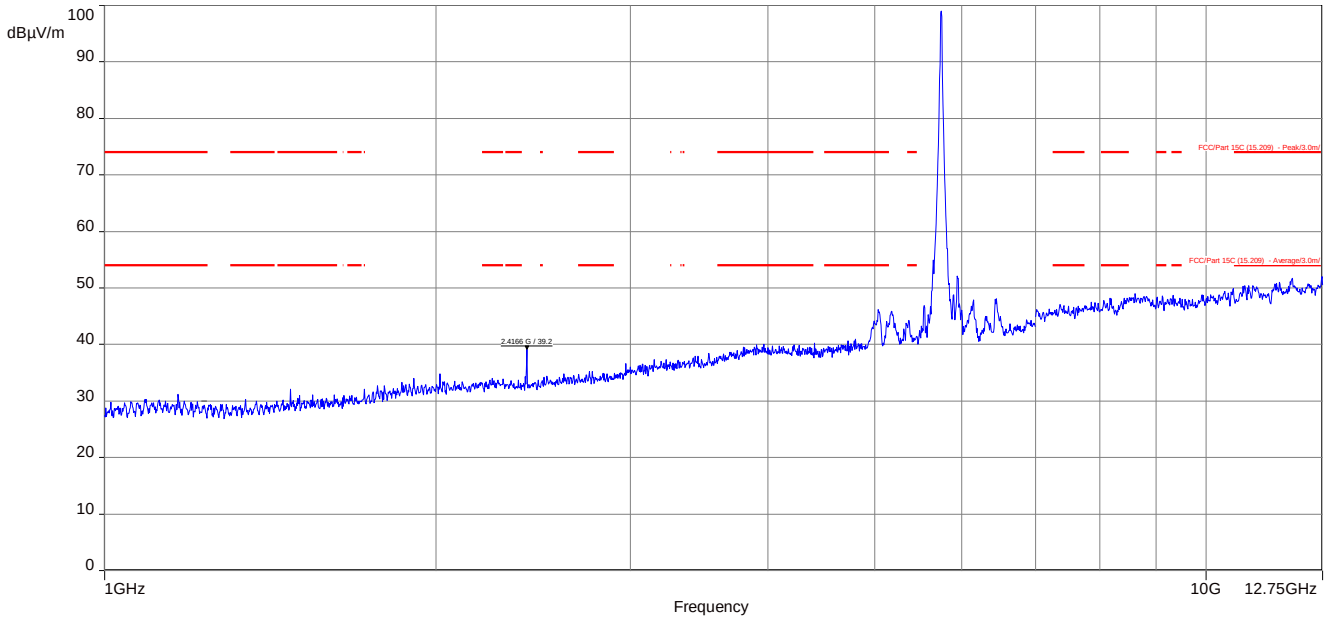
Date: 8.OCT.2015 18:33:17

Plot 16: 30 MHz to 1 GHz, 5745 MHz, vertical & horizontal polarization

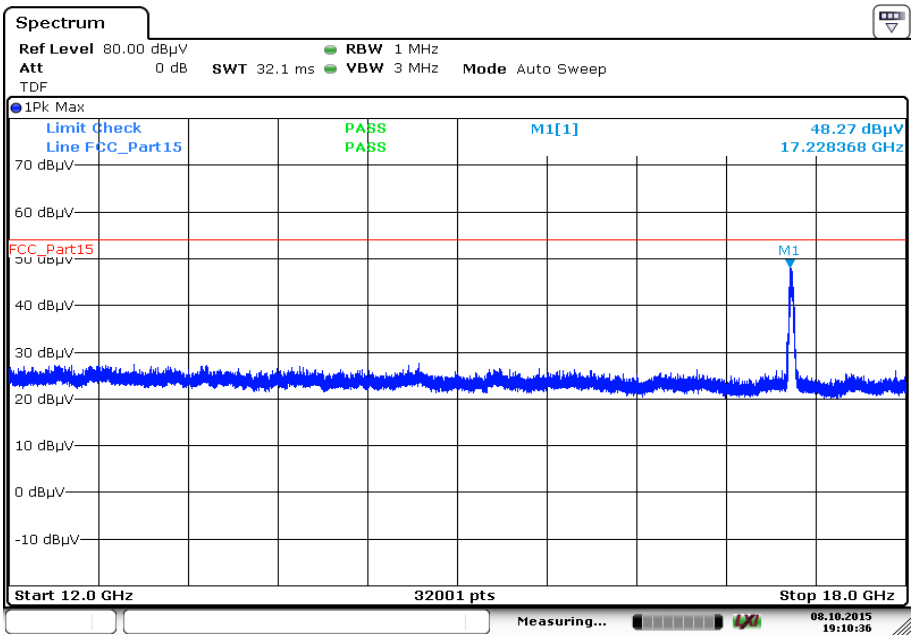


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
80.820300	23.72	30.00	6.28	1000.0	120.000	170.0	V	218	8.3
85.249650	24.75	30.00	5.25	1000.0	120.000	101.0	V	280	9.4
86.593800	25.25	30.00	4.75	1000.0	120.000	101.0	V	338	9.7
249.988050	30.23	36.00	5.77	1000.0	120.000	98.0	V	120	13.3
260.163750	22.76	36.00	13.24	1000.0	120.000	98.0	V	113	13.6
750.679950	19.47	36.00	16.53	1000.0	120.000	170.0	V	160	22.7

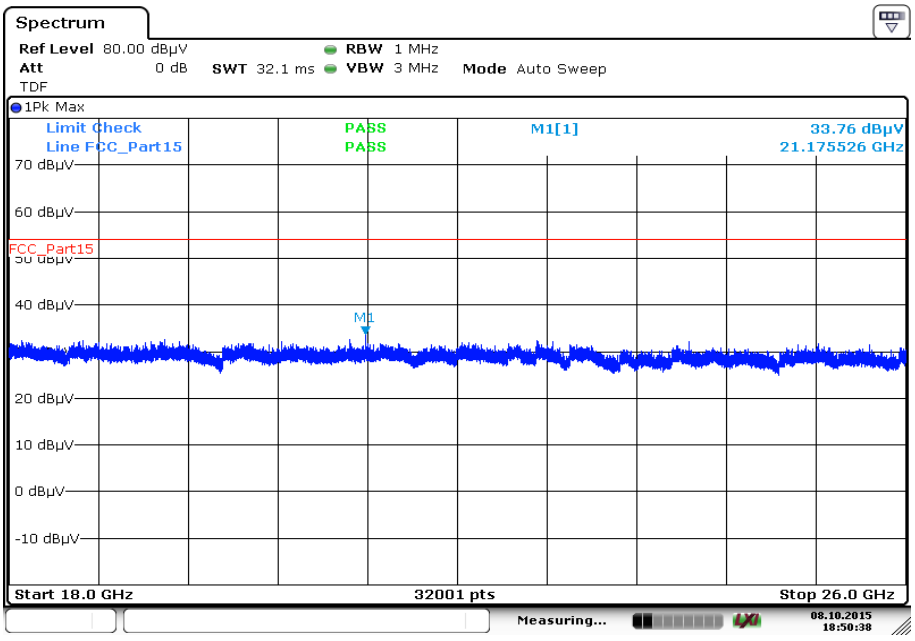
Plot 17: 1 GHz to 12.75 GHz, 5745 MHz, vertical & horizontal polarization



Plot 18: 12 GHz to 18 GHz, 5745 MHz, vertical & horizontal polarization

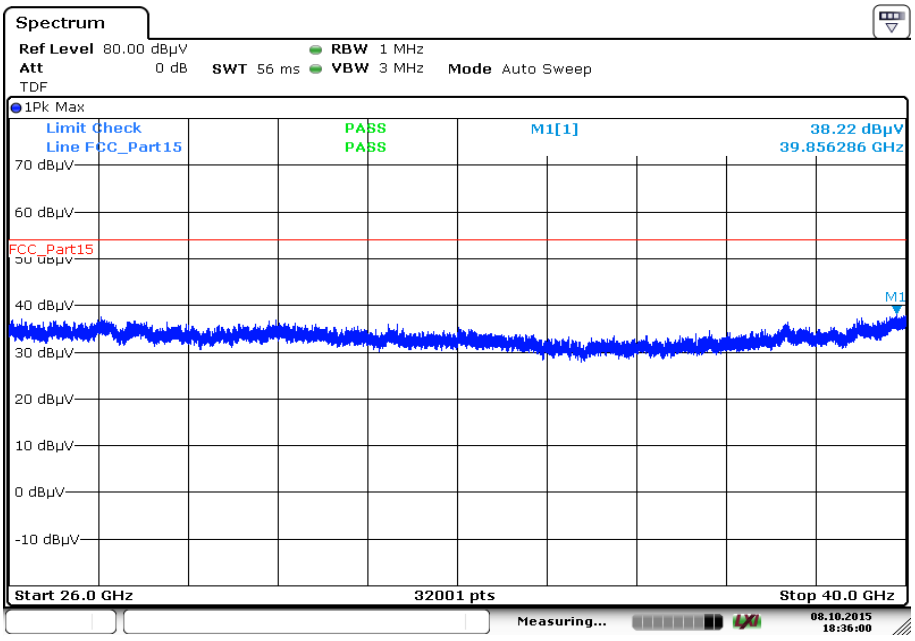


Plot 19: 18 GHz to 26 GHz, 5745 MHz, vertical & horizontal polarization



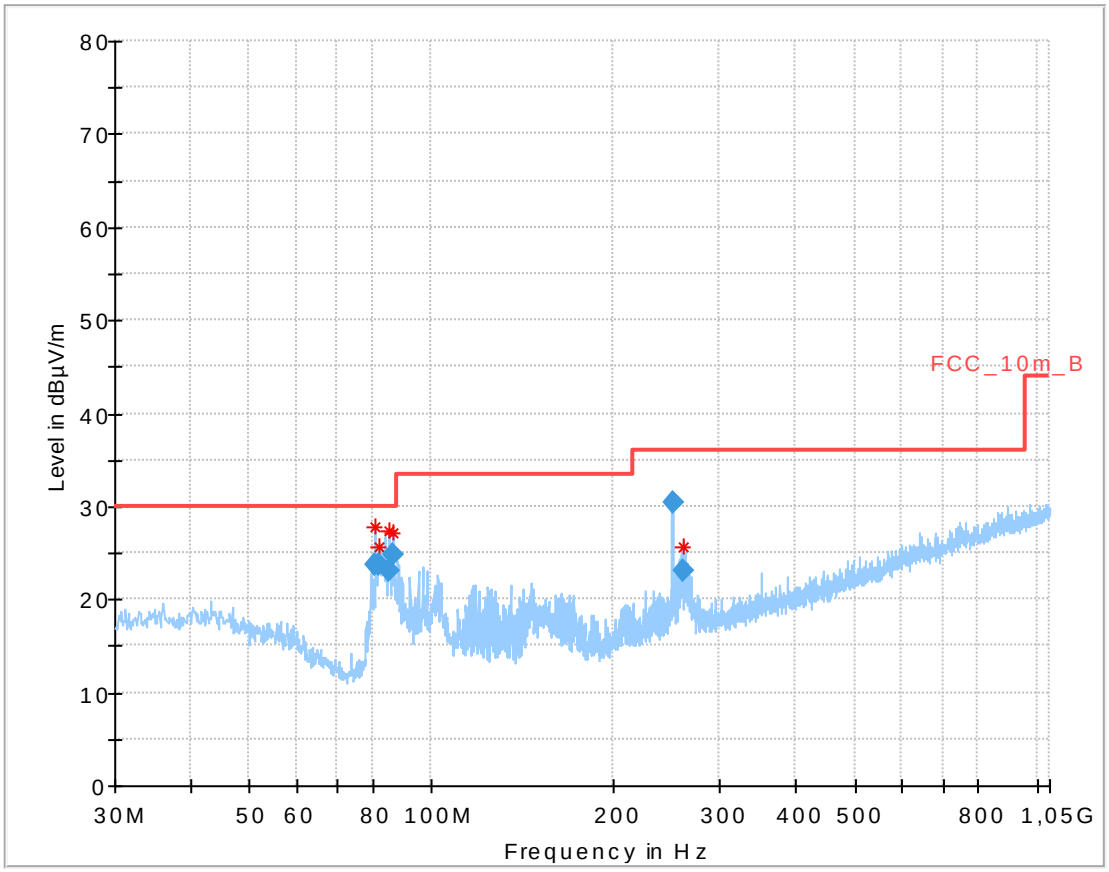
Date: 8.OCT.2015 18:50:38

Plot 20: 26 GHz to 40 GHz, 5745 MHz, vertical & horizontal polarization



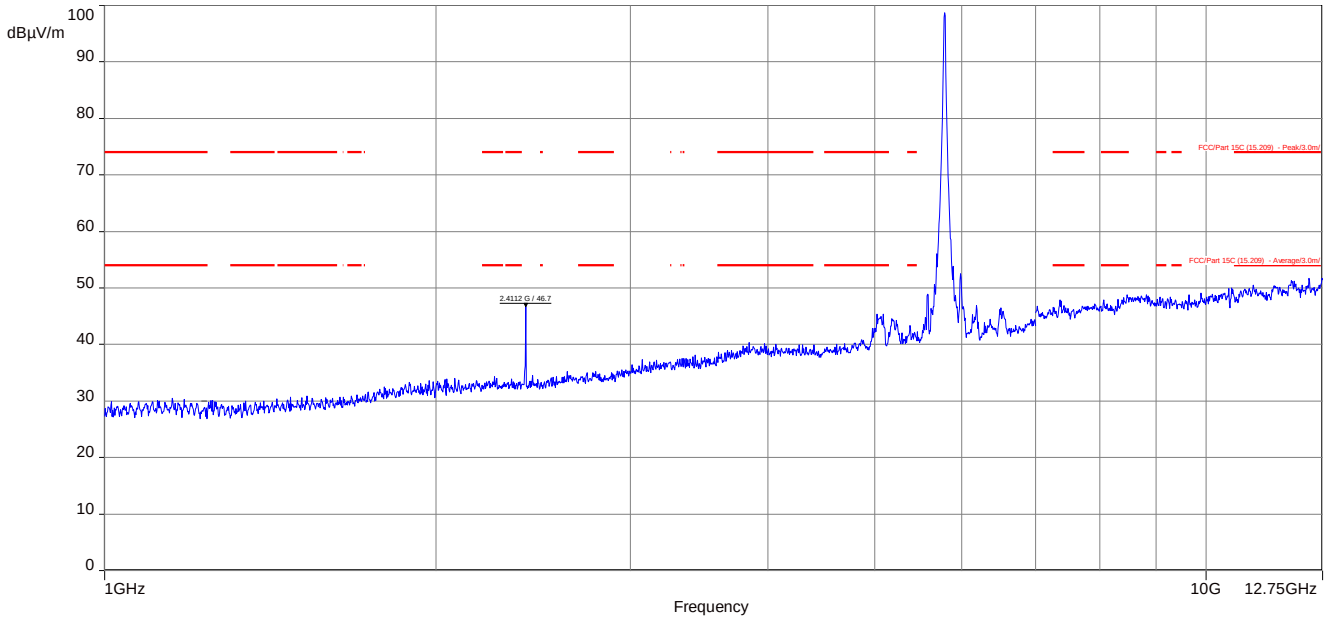
Date: 8.OCT.2015 18:36:00

Plot 21: 30 MHz to 1 GHz, 5785 MHz, vertical & horizontal polarization

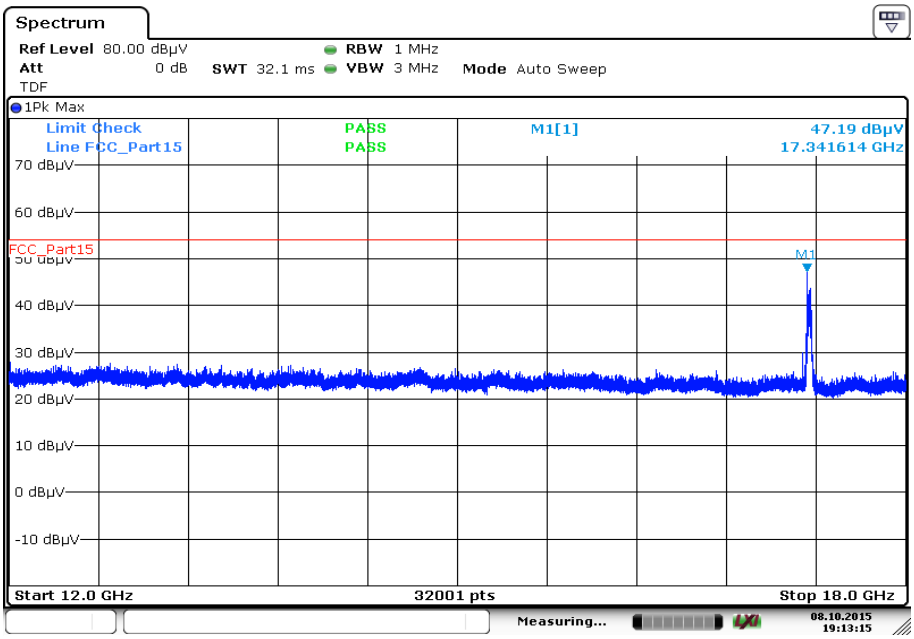


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
80.837850	23.79	30.00	6.21	1000.0	120.000	170.0	V	229	8.3
82.200600	23.82	30.00	6.18	1000.0	120.000	170.0	V	354	8.6
85.228350	23.06	30.00	6.94	1000.0	120.000	98.0	V	296	9.3
86.607000	24.89	30.00	5.11	1000.0	120.000	101.0	V	284	9.7
250.008450	30.36	36.00	5.64	1000.0	120.000	98.0	V	160	13.4
259.967400	22.97	36.00	13.03	1000.0	120.000	98.0	V	141	13.6

Plot 22: 1 GHz to 12.75 GHz, 5785 MHz, vertical & horizontal polarization

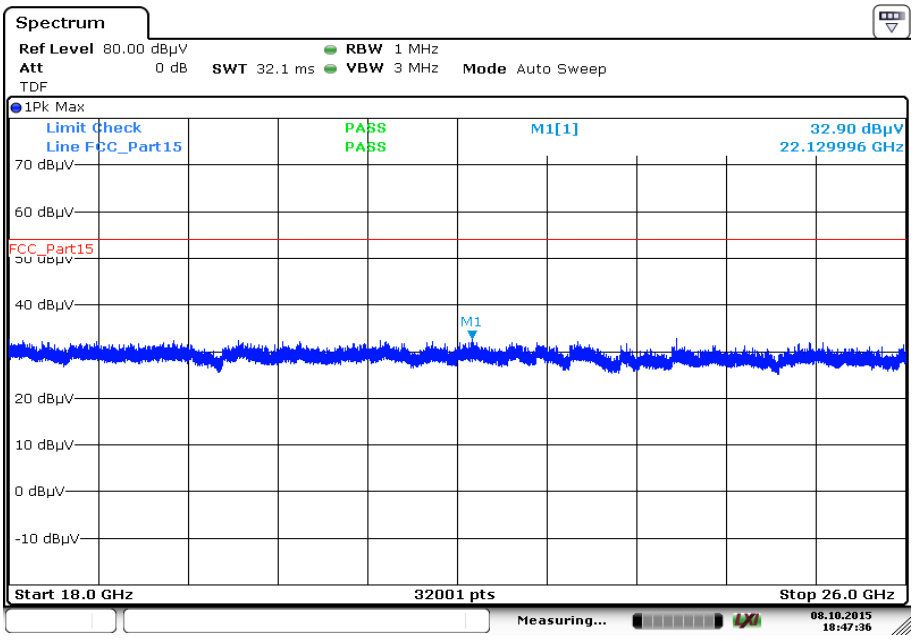


Plot 23: 12 GHz to 18 GHz, 5785 MHz, vertical & horizontal polarization



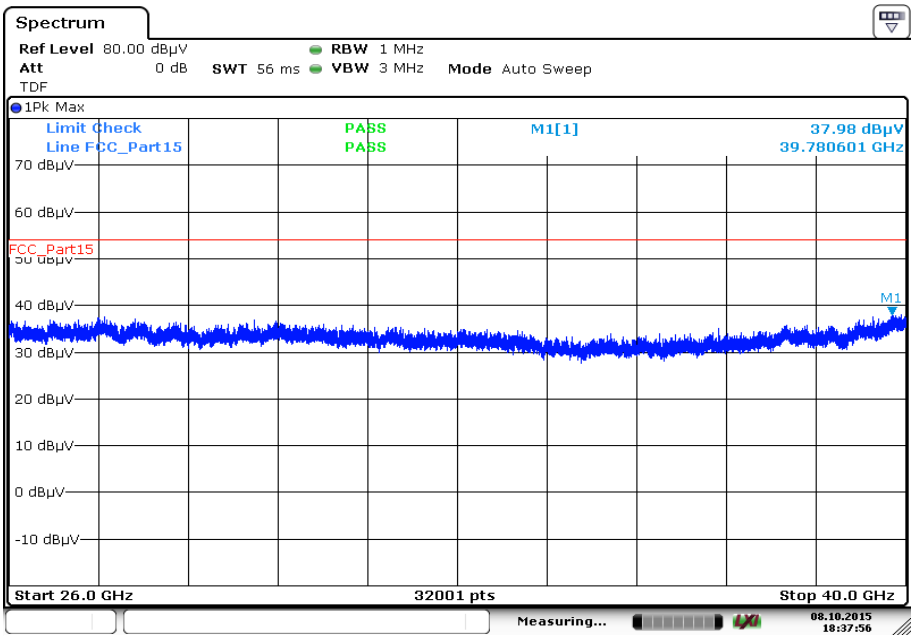
Date: 8.OCT.2015 19:13:15

Plot 24: 18 GHz to 26 GHz, 5785 MHz, vertical & horizontal polarization



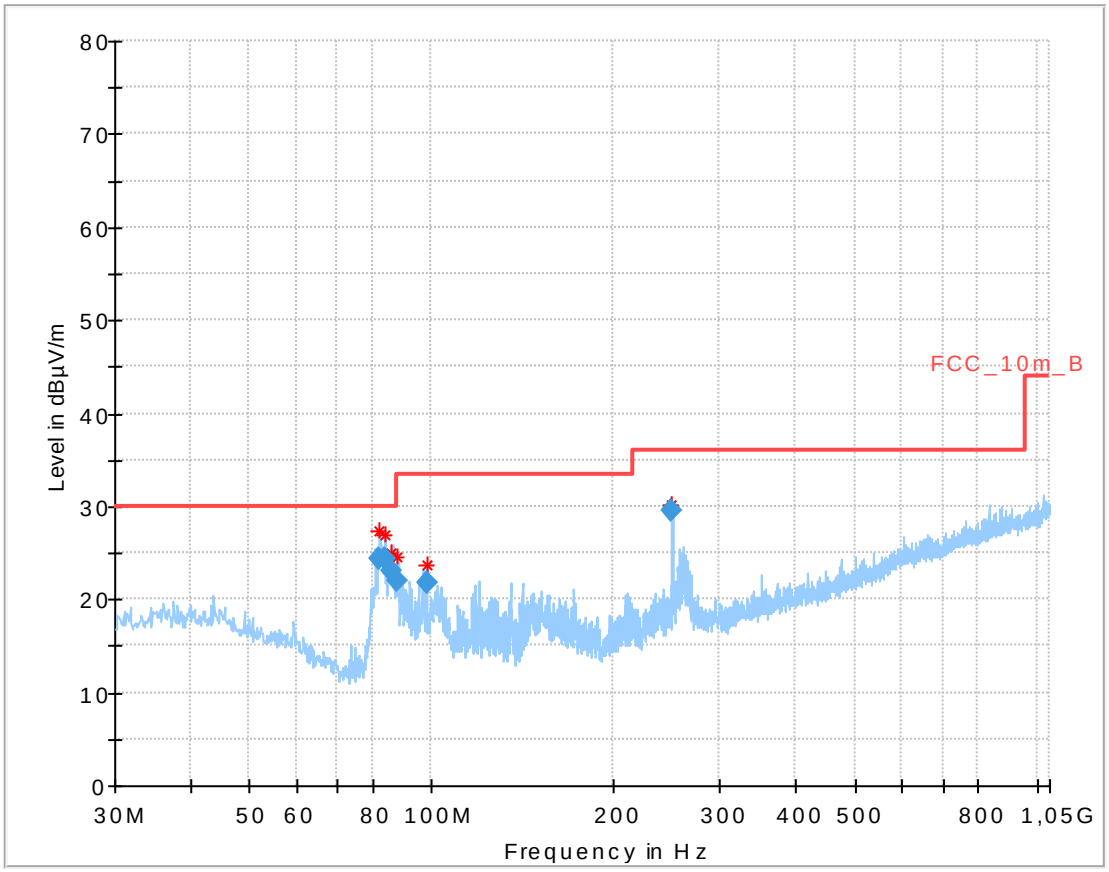
Date: 8.OCT.2015 18:47:36

Plot 25: 26 GHz to 40 GHz, 5785 MHz, vertical & horizontal polarization



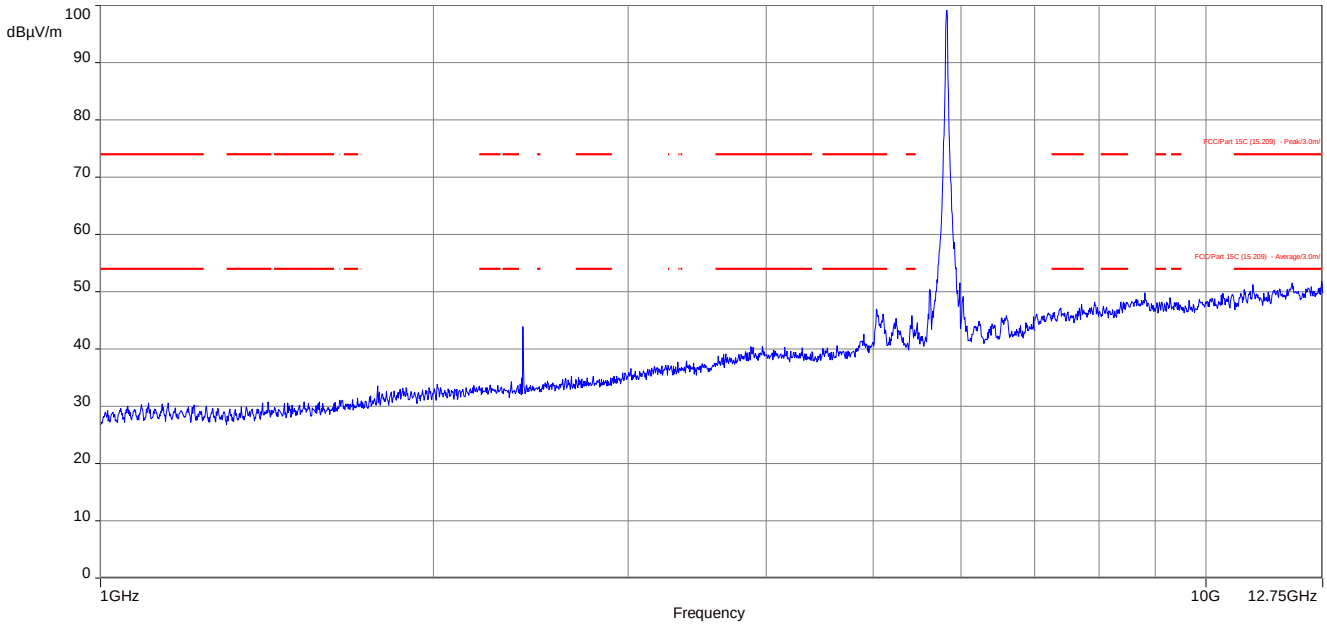
Date: 8.OCT.2015 18:37:56

Plot 26: 30 MHz to 1 GHz, 5825 MHz, vertical & horizontal polarization

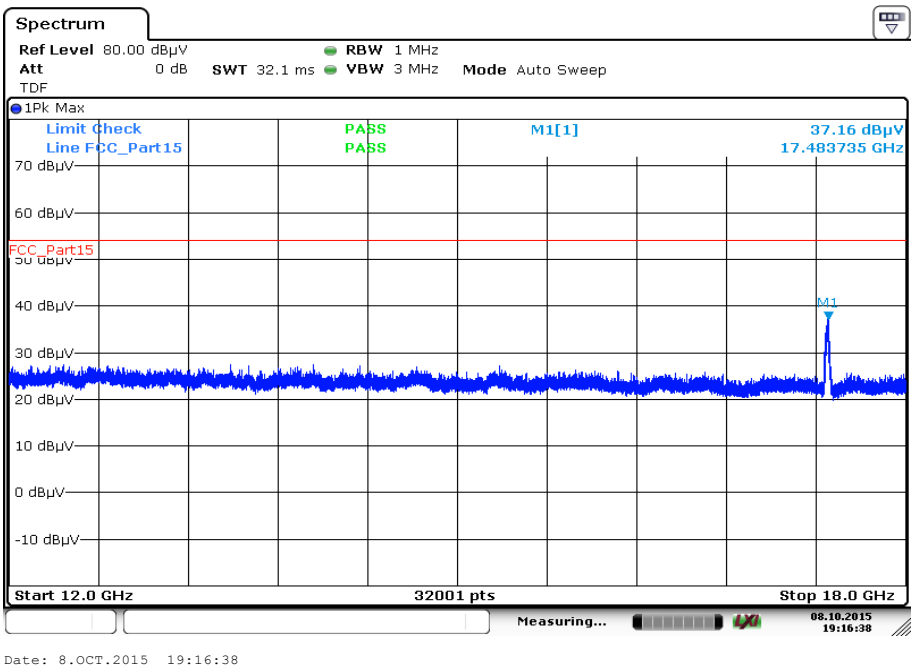


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
82.170900	24.43	30.00	5.57	1000.0	120.000	170.0	V	323	8.6
83.841000	24.34	30.00	5.66	1000.0	120.000	101.0	V	359	9.0
86.041200	23.18	30.00	6.82	1000.0	120.000	101.0	V	288	9.5
87.940350	21.95	30.00	8.05	1000.0	120.000	101.0	V	197	10.0
98.302350	21.70	33.50	11.80	1000.0	120.000	170.0	V	288	11.9
249.995100	29.48	36.00	6.52	1000.0	120.000	98.0	V	288	13.3

Plot 27: 1 GHz to 12.75 GHz, 5825 MHz, vertical & horizontal polarization

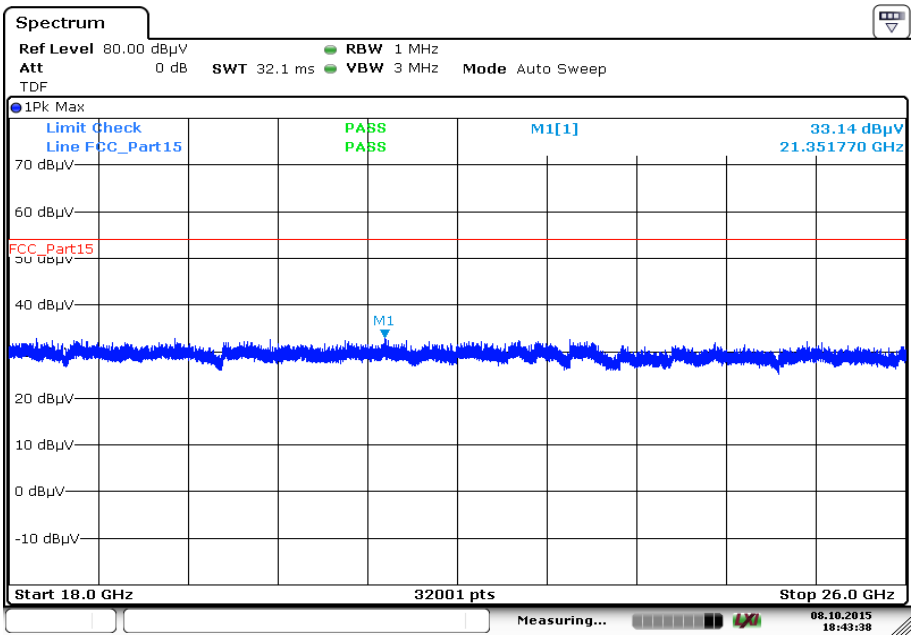


Plot 28: 12 GHz to 18 GHz, 5825 MHz, vertical & horizontal polarization



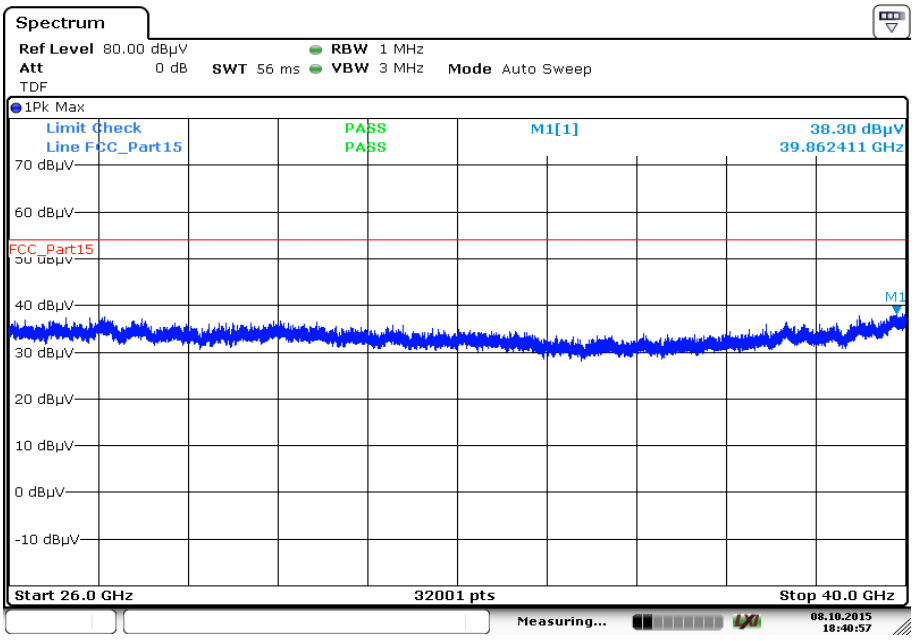
Date: 8.OCT.2015 19:16:38

Plot 29: 18 GHz to 26 GHz, 5825 MHz, vertical & horizontal polarization



Date: 8.OCT.2015 18:43:38

Plot 30: 26 GHz to 40 GHz, 5825 MHz, vertical & horizontal polarization



Date: 8.OCT.2015 18:40:57

12.9 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode and receive mode below 30 MHz. The EUT is set first to middle channel. This measurement is representative for all channels and modes. If critical peaks are found the lowest channel and the highest channel will be measured too. Then the EUT is set to receive or idle mode. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold
Test setup:	See sub clause 7.2 (Item B)
Measurement uncertainty	See sub clause 9

Limits:

Spurious Emissions Radiated < 30 MHz		
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

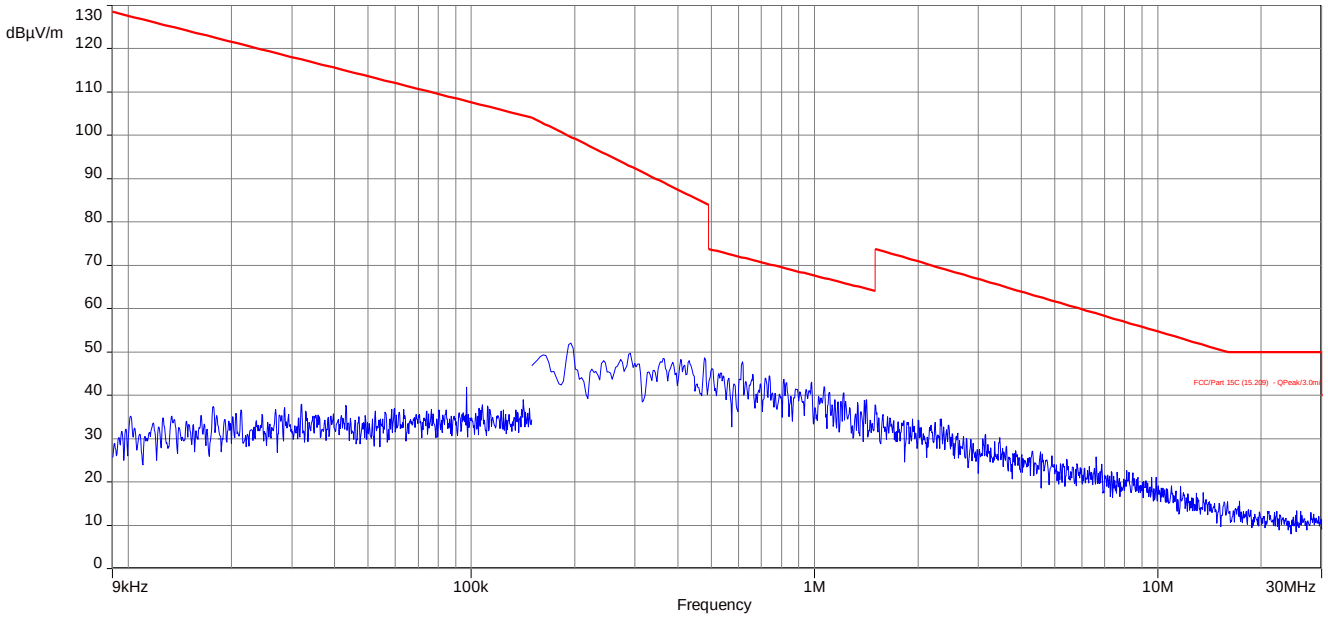
Results:

Spurious Emissions Radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
All peaks > 20 dB below limit.		

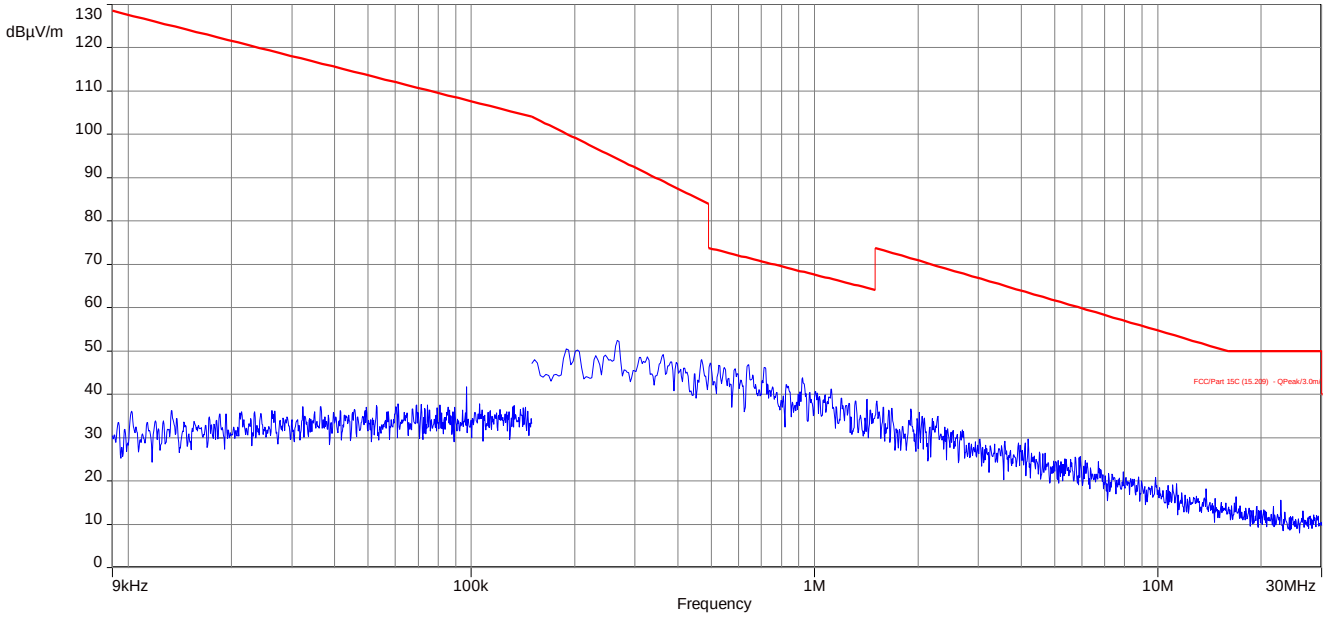
Note: The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

Plots: OFDM / X-Rock ON

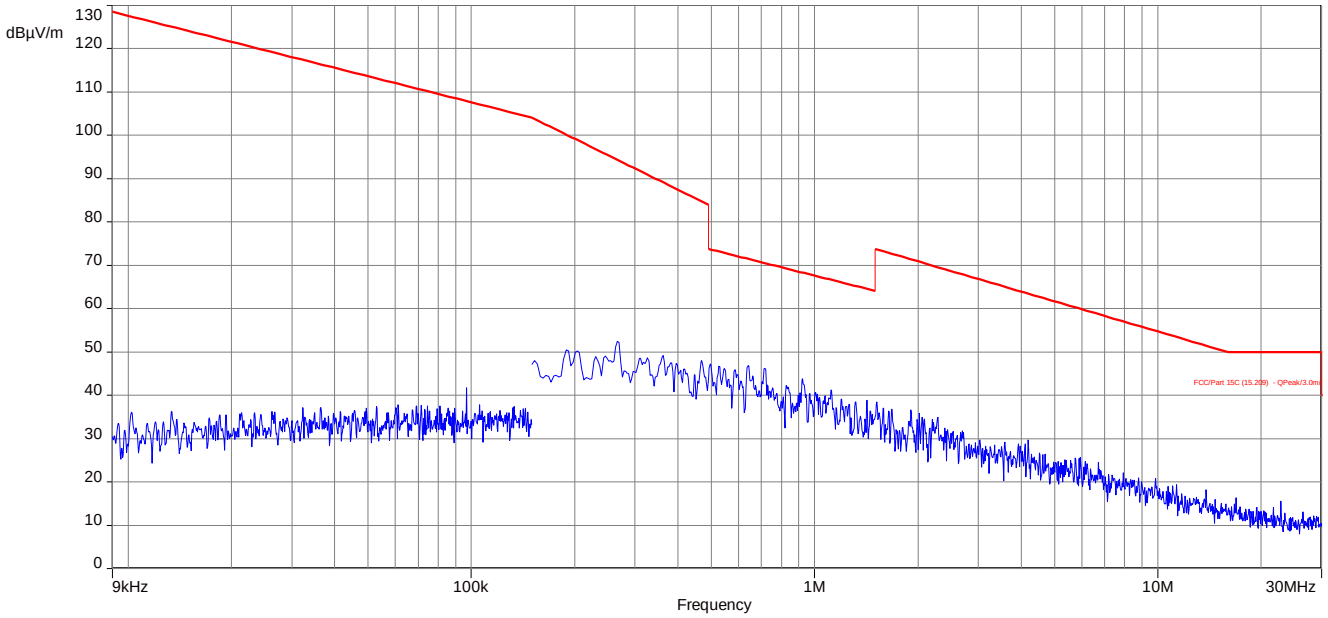
Plot 1: 9 kHz to 30 MHz, TX mode – 5180 MHz



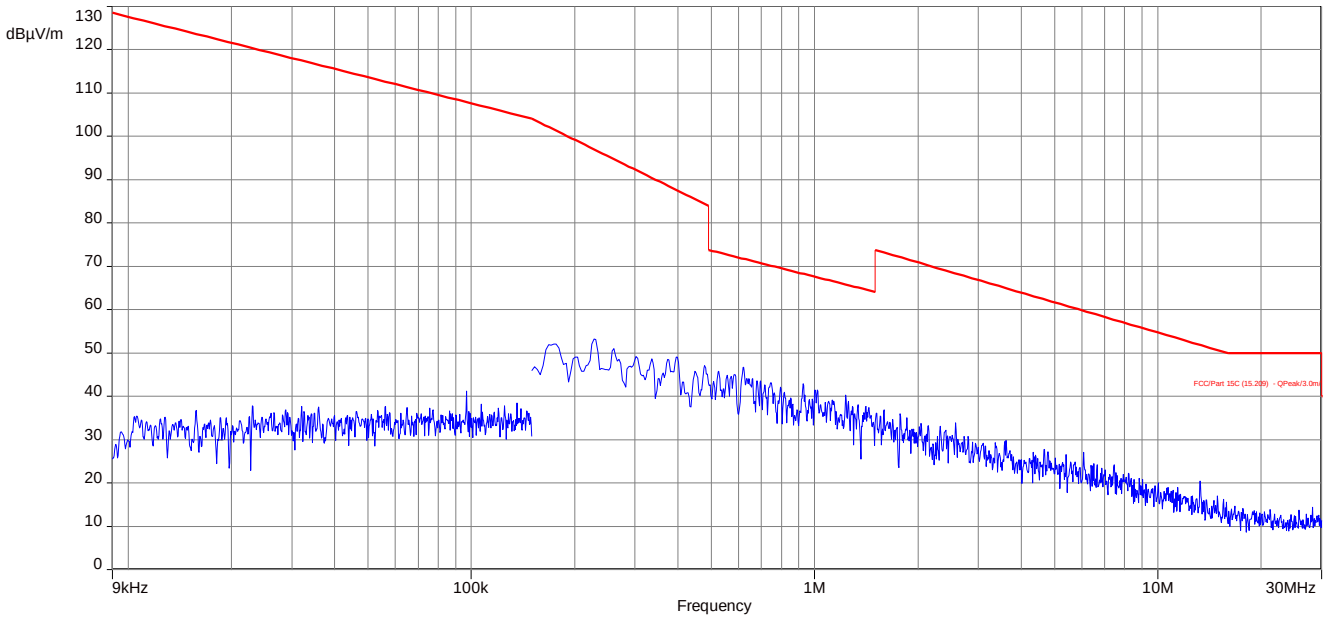
Plot 2: 9 kHz to 30 MHz, TX mode – 5200 MHz



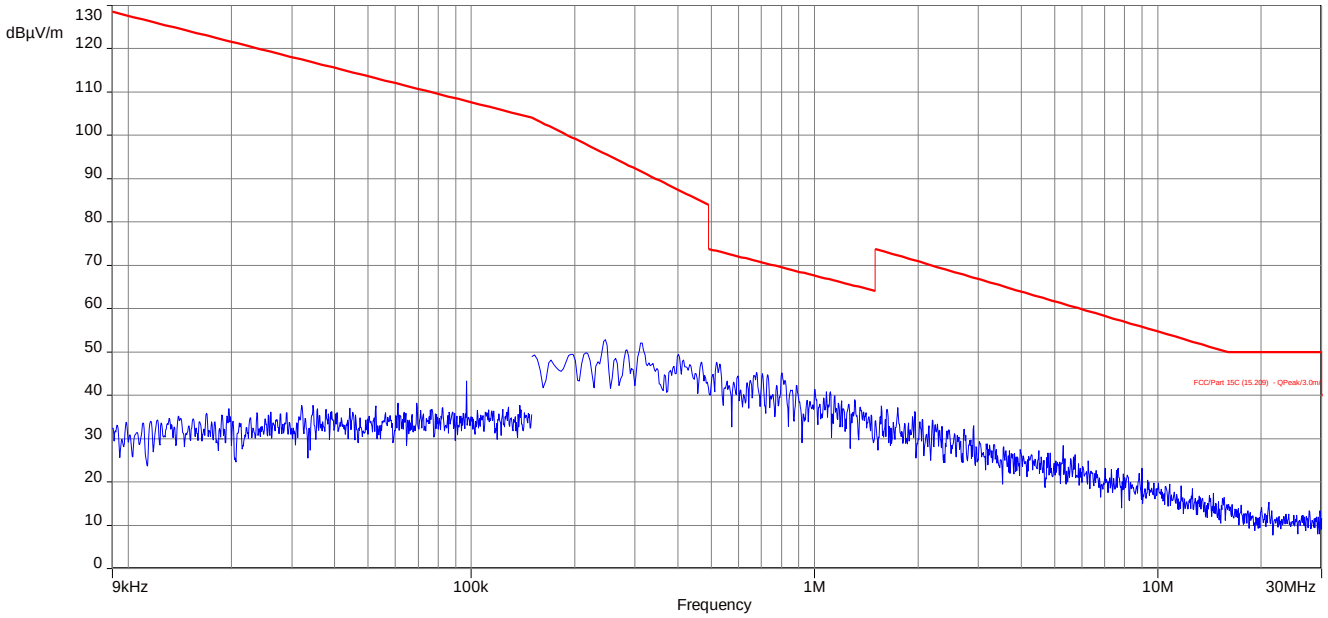
Plot 3: 9 kHz to 30 MHz, TX mode – 5240 MHz



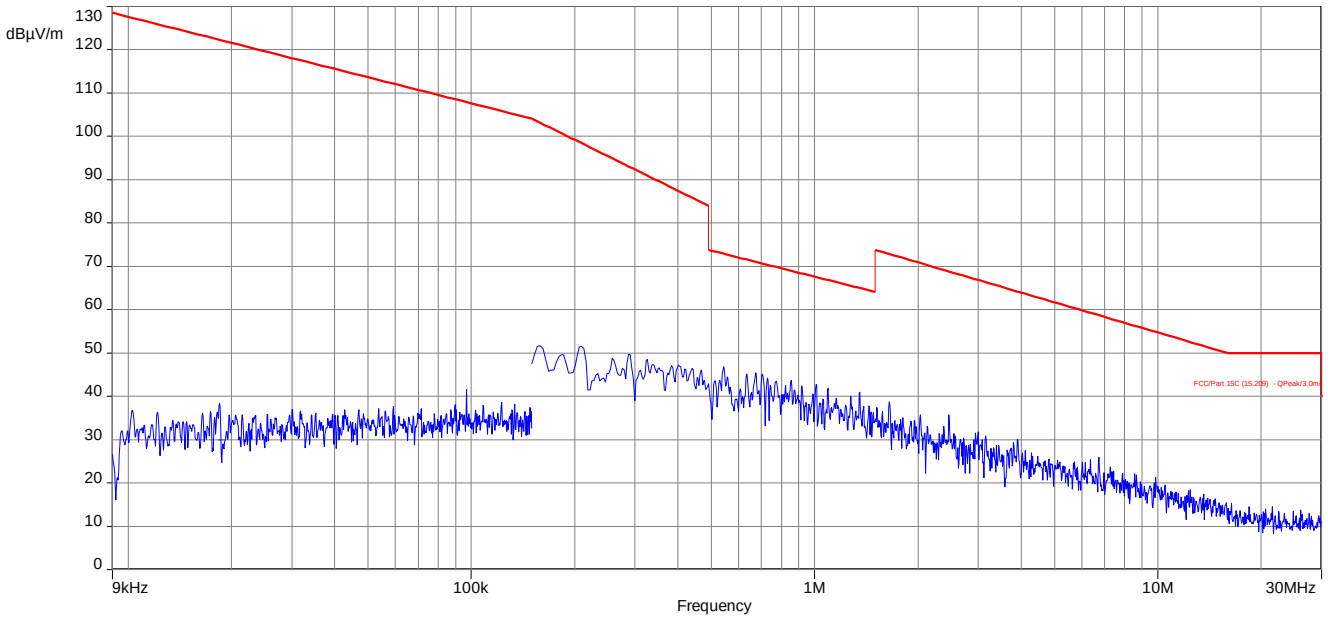
Plot 4: 9 kHz to 30 MHz, TX mode – 5745 MHz



Plot 5: 9 kHz to 30 MHz, TX mode – 5785 MHz



Plot 6: 9 kHz to 30 MHz, TX mode – 5825 MHz



12.10 Spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to middle channel. If critical peaks are found the lowest channel and the highest channel will be measured too. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

Measurement:

Measurement parameter	
Detector:	Peak – Quasi Peak / Average
Sweep time:	Auto
Video bandwidth:	F > 150 kHz: 9 kHz
Resolution bandwidth:	F > 150 kHz: 100 kHz
Span:	150 kHz to 30 MHz
Trace-Mode:	Max Hold
Test setup:	See sub clause 7.4 (Item E)
Measurement uncertainty	See sub clause 9

Limits:

Spurious Emissions Conducted < 30 MHz		
Frequency (MHz)	Quasi-Peak (dBµV/m)	Average (dBµV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

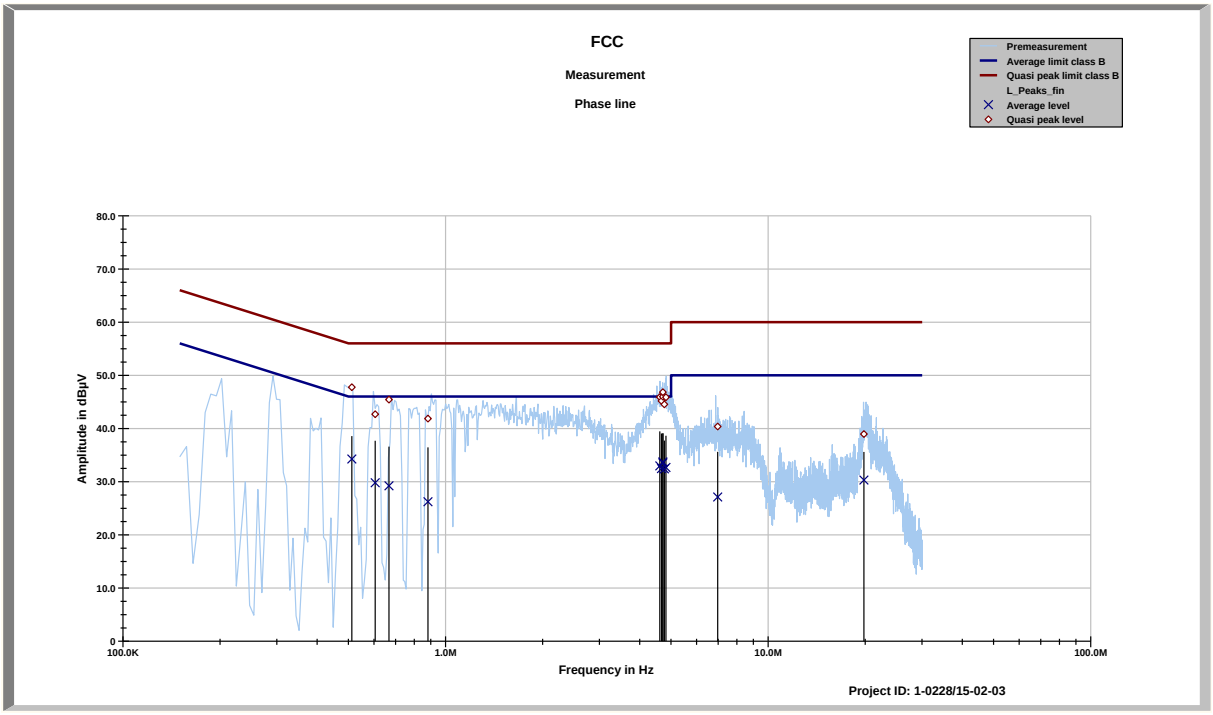
*Decreases with the logarithm of the frequency

Results:

Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
See table below plots!		

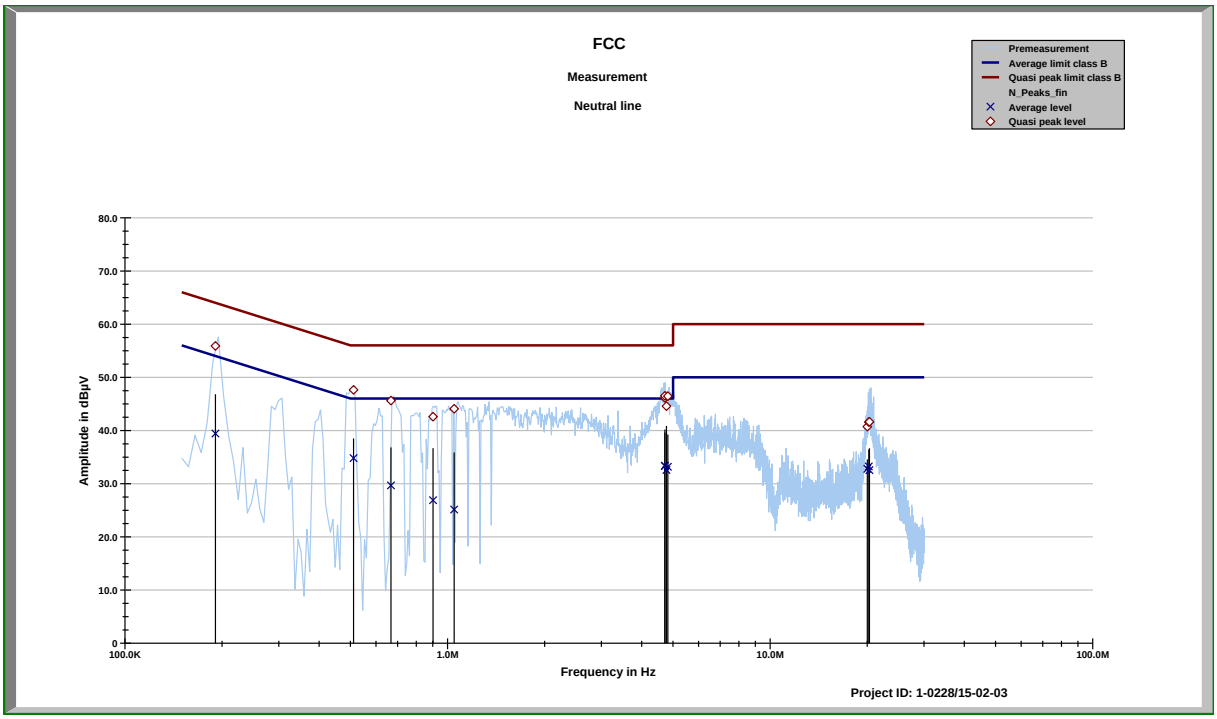
Plots:

Plot 1: 150 kHz to 30 MHz / phase Line, TX mode



Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.51215	47.75	8.25	34.26	11.74
0.60507	42.69	13.31	29.80	16.20
0.66759	45.42	10.58	29.21	16.79
0.88189	41.86	14.14	26.22	19.78
4.6123	45.90	10.10	32.96	13.04
4.6689	45.18	10.82	32.45	13.55
4.7138	45.99	10.01	33.52	12.48
4.7157	46.83	9.17	33.71	12.29
4.7672	44.54	11.46	32.40	13.60
4.8197	45.86	10.14	32.66	13.34
6.974	40.37	19.63	27.11	22.89
19.797	38.95	21.05	30.30	19.70

Plot 2: 150 kHz to 30 MHz / neutral Line, TX mode



Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.1908	55.90	8.11	39.43	15.41
0.51113	47.64	8.36	34.79	11.21
0.66788	45.62	10.38	29.67	16.33
0.90125	42.59	13.41	26.88	19.12
1.04804	44.08	11.92	25.14	20.86
4.7163	46.13	9.87	33.37	12.63
4.7167	46.51	9.49	33.33	12.67
4.7688	44.57	11.43	32.58	13.42
4.818	46.44	9.56	33.17	12.83
19.999	40.72	19.28	32.79	17.21
20.204	41.57	18.43	33.25	16.75
20.303	41.63	18.37	32.55	17.45

13 Observations

No observations except those reported with the single test cases have been made.

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2015-10-16
-A	Editorial changes (FCC ID corrected), PSD values corrected	2015-12-09

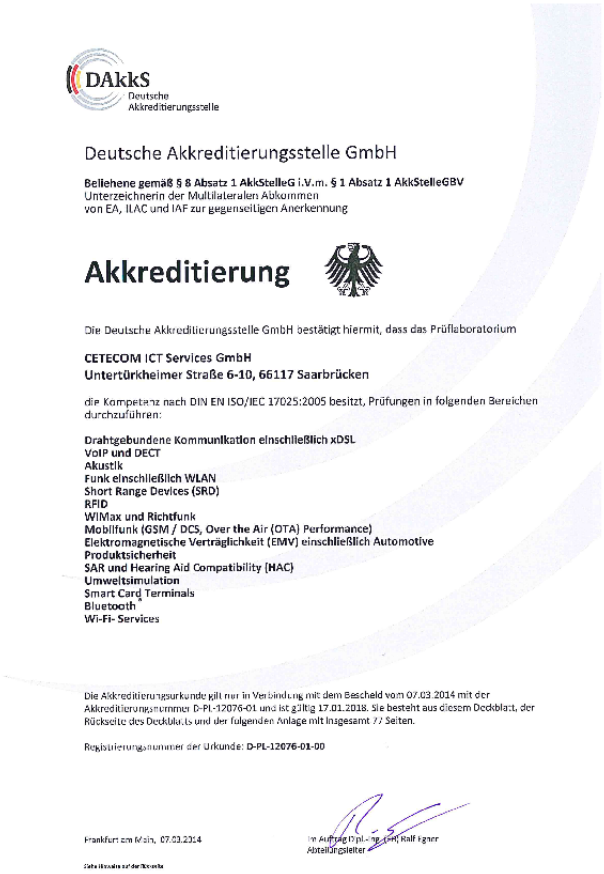
Annex B Further information

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
PMN Product marketing name
HMN Host marketing name
HVIN Hardware version identification number
FVIN Firmware version identification number

Annex C Accreditation Certificate

Front side of certificate



DAkkS
Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene 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 / DCS, Over the Air (OTA) 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 Anlage mit insgesamt 77 Seiten.

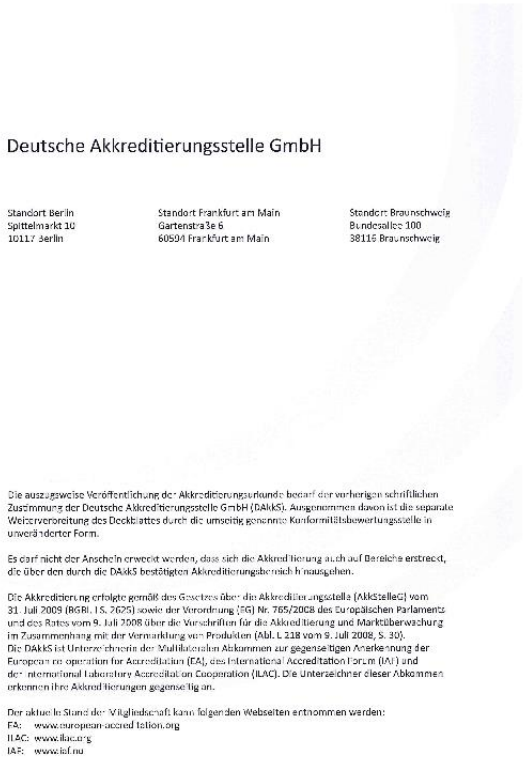
Registrierungsnummer der Urkunde: **D-PL-12076-01-00**

Frankfurt am Main, 07.03.2014

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter

Zeile Hinweis auf der Rückseite

Back side of certificate



Deutsche Akkreditierungsstelle GmbH

Standort Berlin
Spittelmarkt 10
10117 Berlin

Standort Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Standort Braunschweig
Bundesallee 100
38116 Braunschweig

Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen Zustimmung der Deutsche Akkreditierungsstelle GmbH (DAkkS). Ausgenommen davon ist die separate Weiterverarbeitung 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. 2625) 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 (Abl. L 218 vom 9. Juli 2008, S. 30).
Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der European co-operation 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:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Note:

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

https://www.cetecom.com/en/cetecom-group/europe/germany-saarbruecken/accreditations.html