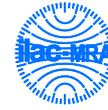




TEST REPORT

Test report no.: 1-6965/13-20-35



Deutsche
Akkreditierungsstelle
D-PL-12076-01-01

Testing laboratory

CETECOM ICT Services GmbH
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66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
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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-12076-01-01
Area of Testing:
Radio Communications & EMC (RCE)

Applicant

Sony Mobile Communications Inc.
Nya Vattentornet
22188 Lund / SWEDEN
Phone: +46 46 19 30 00
Fax: -/-
Contact: Mikael Nilsson
e-mail: Micke.nilsson@sonymobile.com
Phone: +46 7 03 22 75 03

Manufacturer

Sony Mobile Communications Inc.
1-8-15 Kohnan, Minato-ku,
Tokyo, 108-0075 Japan

Test standard/s

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

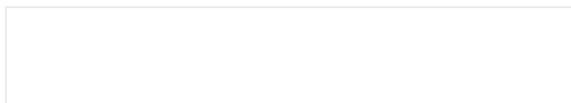
For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item: Smart Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/II/V/VIII; LTE FDD2/3/4/7/13; CDMA 2K BC0/BC1; WLAN b/g/n/a/ac; BT 4.0; RFID; A-GPS
FCC ID: PY7PM-0742
IC: -/-
Frequency: UNII band 5725 MHz to 5850 MHz
(lowest channel 149 MHz – 5745 MHz; highest channel 165 – 5825 MHz)
Technology tested: WLAN (OFDM/a – mode; n/ac HT20 – mode; n/ac HT40 – mode and ac HT80 – mode)
Antenna: Integrated PCB antenna
Power supply: 4.2 V DC by Li - polymer battery
Temperature range: -30°C to +50°C

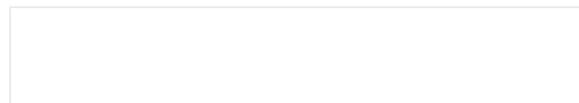
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorised:



Andreas Luckenbill
Specialist

Test performed:



Marco Bertolino
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.

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2014-05-19
Date of receipt of test item:	2014-07-08
Start of test:	2014-07-09
End of test:	2014-07-10
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

UNII: KDB 789033	2014-06	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
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4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+50 °C during high temperature tests
	T_{min}	-30 °C during low temperature tests
Relative humidity content:		60 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	4.2 V DC by Li - polymer battery
	V_{max}	4.2 V
	V_{min}	3.3 V

5 Test item

Kind of test item	:	Smart Phone GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/III/V/VIII; LTE FDD2/3/4/7/13; CDMA 2K BC0/BC1; WLAN b/g/n/a/ac; BT 4.0; RFID; A-GPS
S/N serial number	:	Radiated units: CB5A1Z1Y2Y; CB5A1Z1Y8P Conducted unit: CB5A1Z1Y82
HW hardware status	:	TP3.0
SW software status	:	RF test software
Frequency band [MHz]	:	UNII band 5725 MHz to 5850 MHz (lowest channel 149 MHz – 5745 MHz; highest channel 165 – 5825 MHz)
Type of radio transmission	:	OFDM
Use of frequency spectrum	:	
Type of modulation	:	BPSK, QPSK, 16 – QAM, 64 – QAM and 256 – QAM
Number of channels	:	5
Antenna	:	Integrated PCB antenna
Power supply	:	4.2V DC by Li - polymer battery
Temperature range	:	-30°C to +50°C

5.1 Additional information

Test setup- and EUT-photos are included in test report: 1-6965/13-20-01_AnnexA
1-6965/13-20-01_AnnexB
1-6965/13-20-01_AnnexD

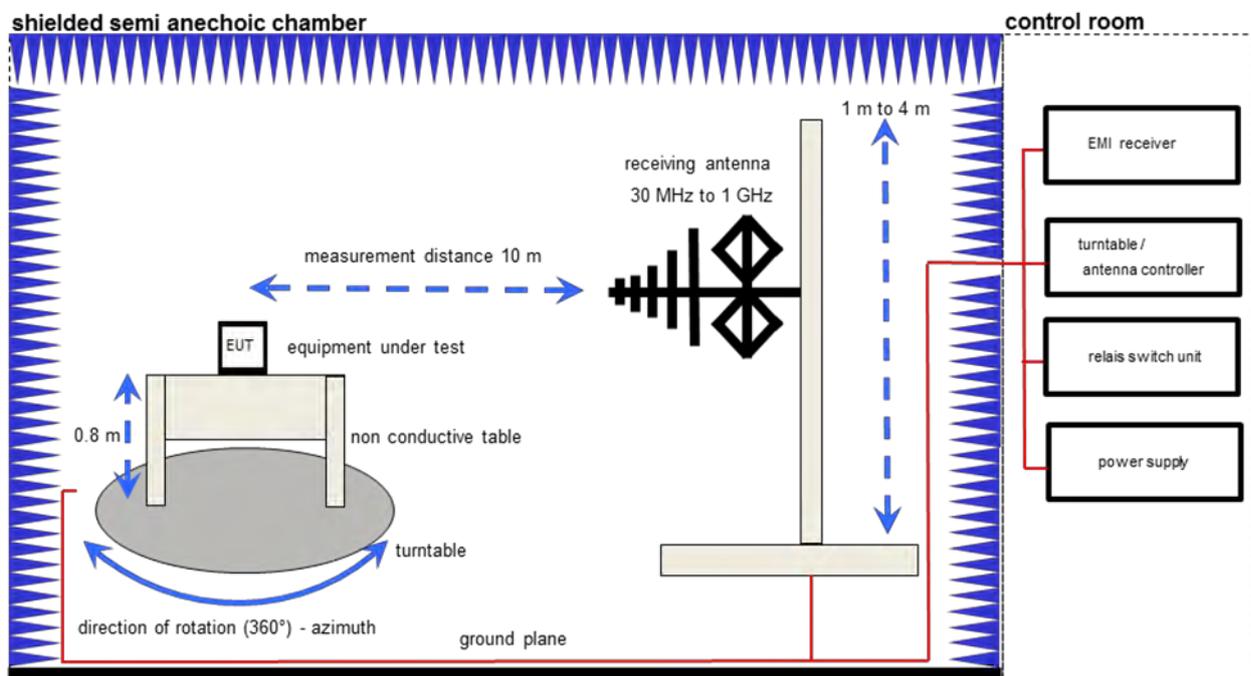
6 Test laboratories sub-contracted

None

7 Description of the test setup

7.1 Radiated measurements chamber F

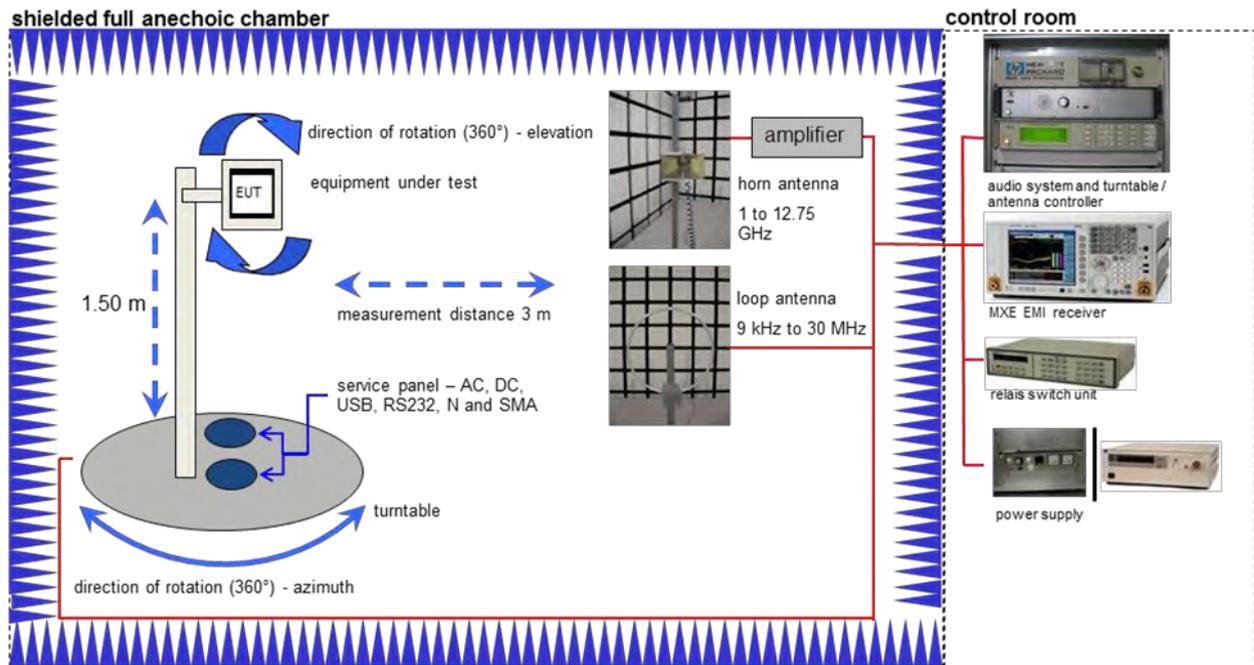
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas 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
Software	EMC32 V. 9.12.05	R&S	-/-	-/-
Switch-Unit	3488A	HP Meßtechnik	2719A14505	300003368
DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580
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

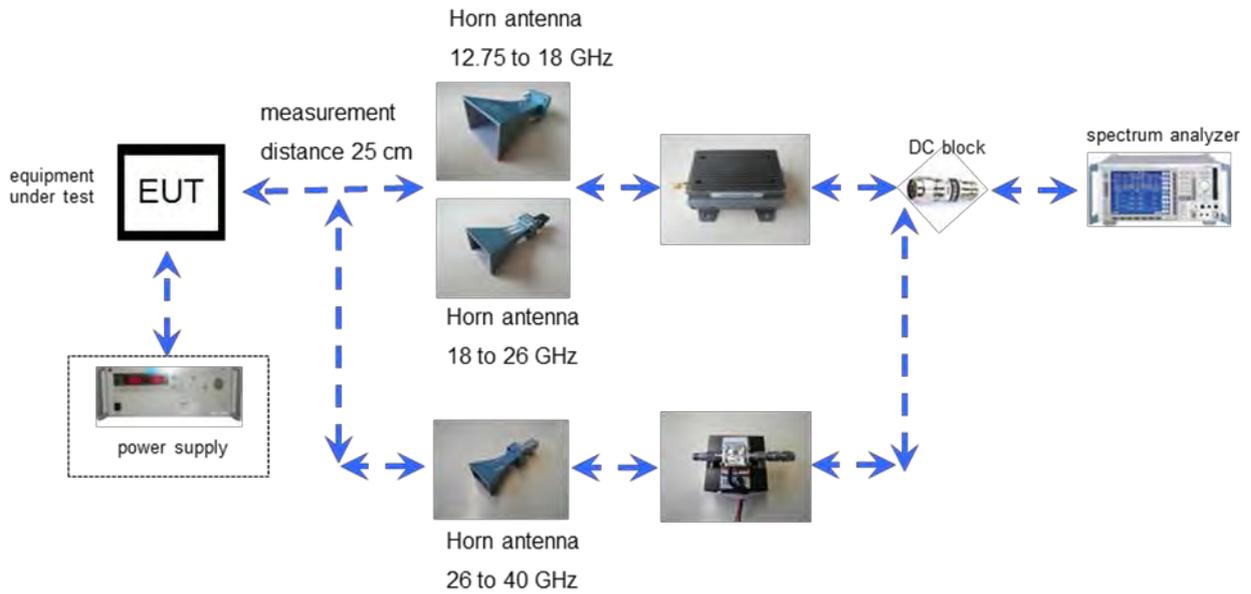
7.2 Radiated measurements chamber C



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

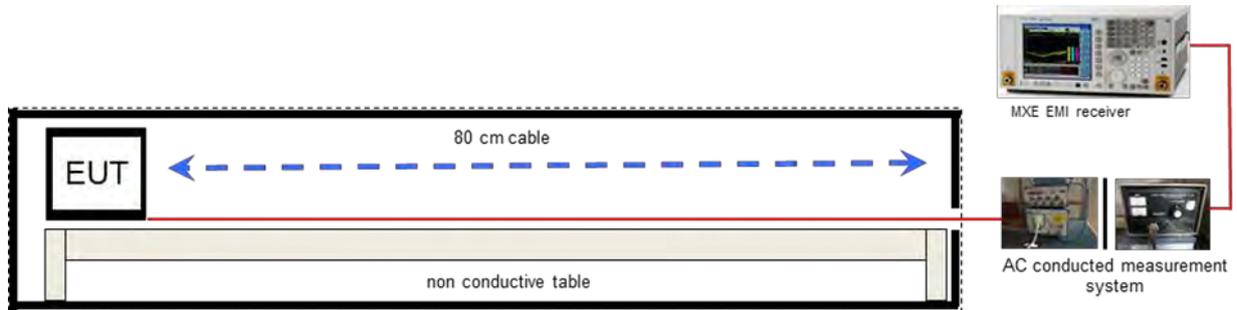
7.3 Radiated measurements 12.75 GHz to 40 GHz



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
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751
Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273
Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443

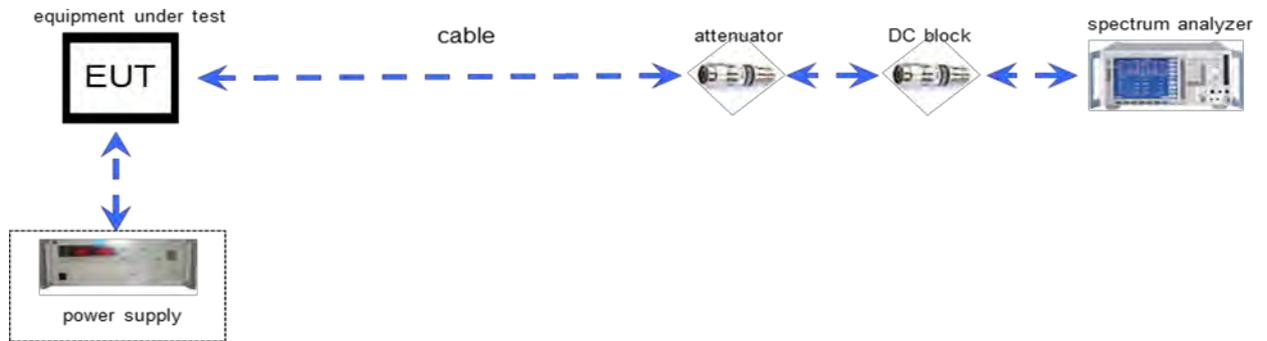
7.4 AC conducted



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001168
Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210

7.5 Conducted measurements



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517

8 Summary of measurement results

- No deviations from the technical specifications were ascertained
- There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15	Passed	2014-07-11	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	Pass	Fail	NA	NP	Remark
-/-	Output power verification (conducted)	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No passed / fail criteria!
-/-	Gain	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Necessary measurement for Output power & Spectral density.
KDB 789033	Duty cycle	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No passed / fail criteria!
§15.407(a)	Maximum output power (conducted & radiated)	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.407(a)	Power spectral density	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.407(e)	6 dBc bandwidth	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
KDB 789033	99 % bandwidth	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No passed / fail criteria!
§15.407(a)	Spectrum bandwidth 26 dBc bandwidth	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.407(b)	TX spurious emissions radiated	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
15.109	RX spurious emissions radiated	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a)	Spurious emissions radiated < 30 MHz	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a) §15.207	Spurious emissions conducted emissions < 30 MHz	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies

Note: NA = not applicable; NP = not performed

9 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode: No test mode available.

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

10 Measurement results

10.1 Identify worst case data rate

Measurement:

All modes of the module will be measured with an average power meter to identify the maximum transmission power on low, mid and high channel. In the case that only one or two channels are available, only these will be measured.

In further tests only the identified worst case modulation scheme or bandwidth will be measured. Additional the band edge compliance test will be performed in the lowest and highest modulation scheme.

Measurement parameters:

Average Power Meter

Results:

Modulation	Modulation scheme / bandwidth 5725 MHz to 5850 MHz		
	5745 MHz	5785 MHz	5825 MHz
Frequency	5745 MHz	5785 MHz	5825 MHz
OFDM / a – mode	6Mbit/s	6Mbit/s	6Mbit/s
OFDM / n/ac – mode HT20	MCS6	MCS6	MCS6
Frequency	5755 MHz	-/-	5795 MHz
OFDM / n/ac – mode HT40	MCS5	-/-	MCS5
Frequency	5775 MHz		
OFDM / ac – mode HT80	MCS9		

10.2 Gain

Limits:

Antenna Gain
Maximum 6 dBi
If the limit is reached, the measurements for output power and power spectral density have to be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Result:

OFDM Band 5725 MHz to 5850 MHz Channel	Gain		
	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz
Gain Declared by the manufacture	1.0	0.1	0.2
Measurement uncertainty	± 3 dB		

Result: No reduction of output power limits or spectral density limits necessary!

10.3 Duty cycle

Measurement:

Measurement parameter	
KDB 789033 D02 UNII Guidance – chapter 2 B	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 MHz
Video bandwidth:	10 MHz
Span:	Zero
Trace-Mode:	Video trigger / view / single sweep

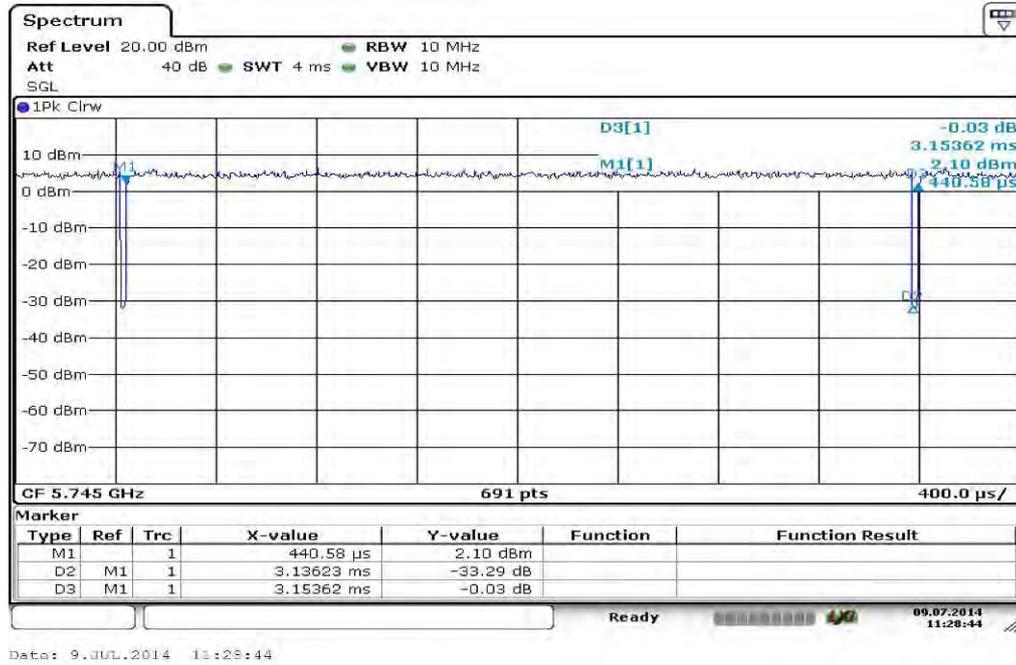
Results:

Duty cycle and correction factor:

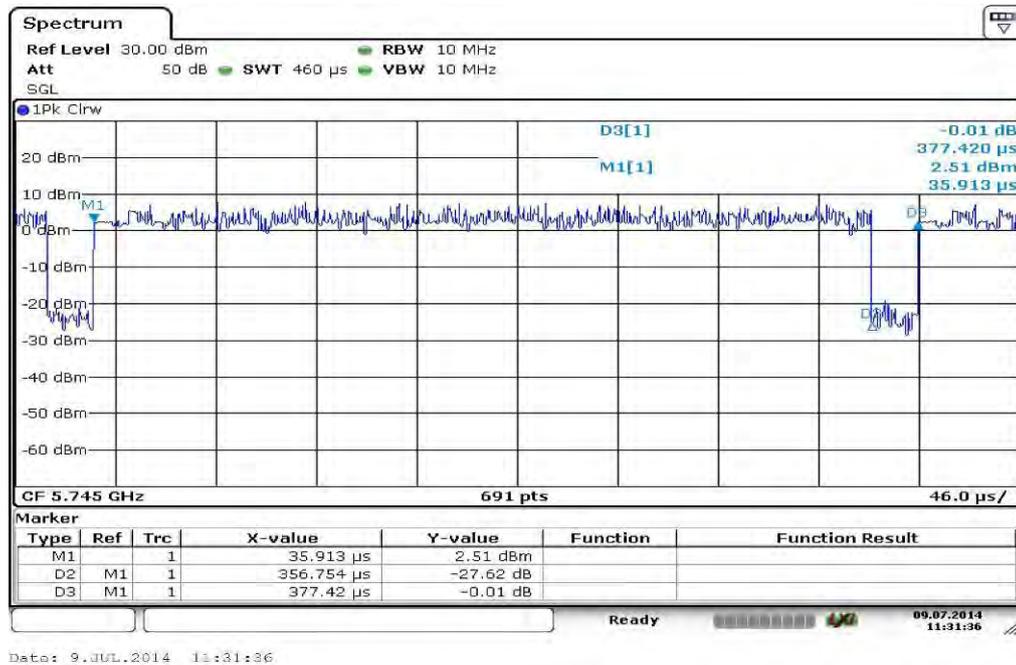
OFDM / a – mode:	99.45 % duty cycle	=>	0.02 dB
OFDM / n/ac – mode HT20:	94.52 % duty cycle	=>	0.24 dB
OFDM / n/ac – mode HT40:	89.74 % duty cycle	=>	0.47 dB
OFDM / ac – mode HT80:	81.02 % duty cycle	=>	0.91 dB

Plots:

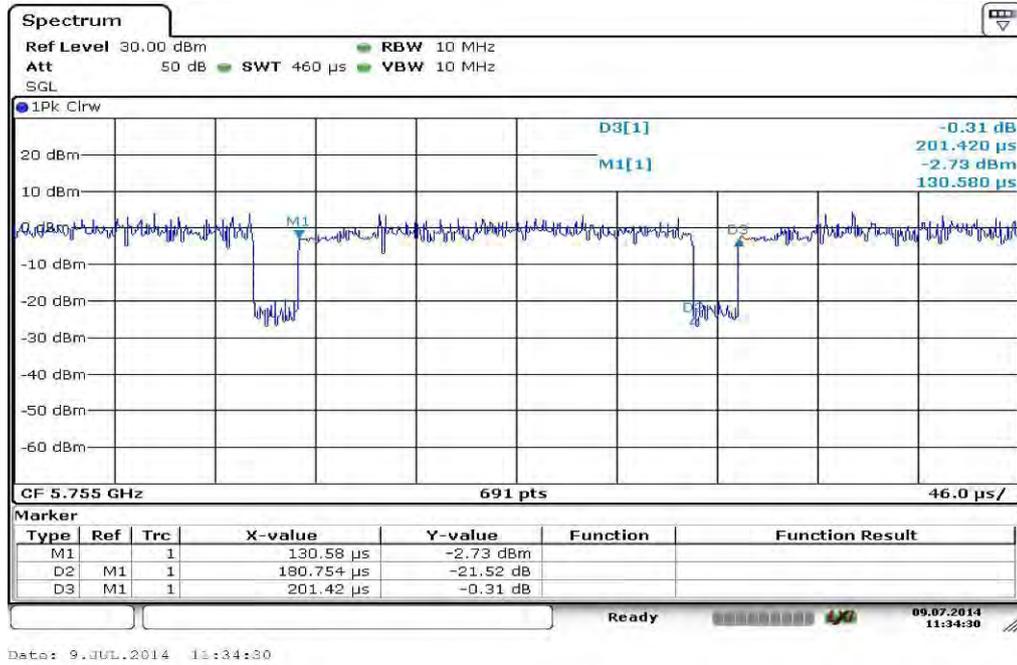
Plot 1: duty cycle of the transmitter – OFDM / a – mode



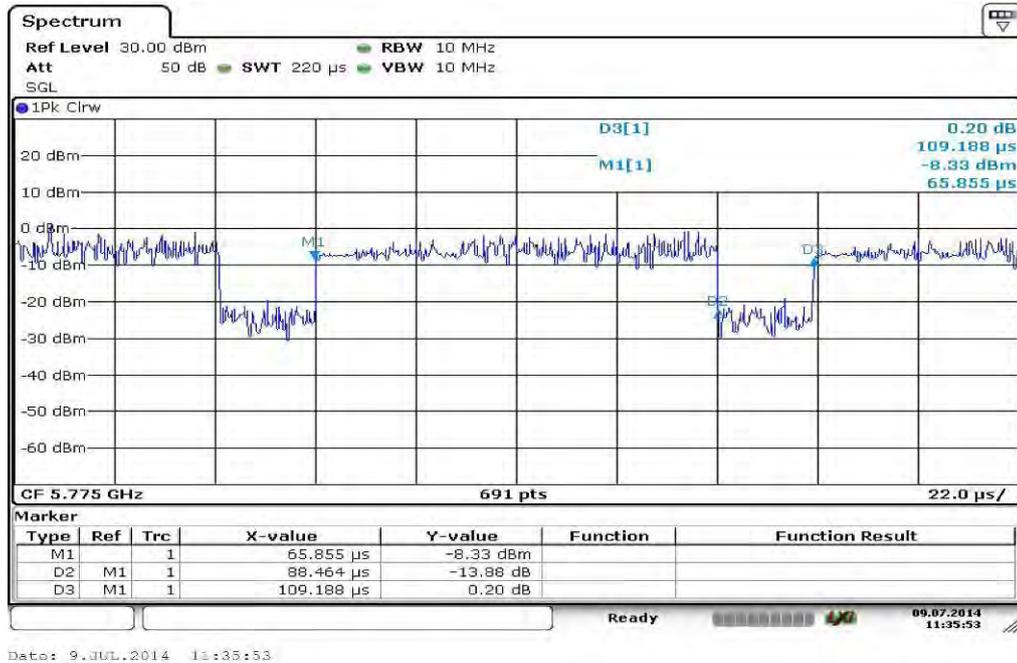
Plot 2: duty cycle of the transmitter – OFDM / n/ac – mode HT20



Plot 3: duty cycle of the transmitter – OFDM / n/ac – mode HT40



Plot 4: duty cycle of the transmitter – OFDM / ac – mode HT80



10.4 Maximum output power & maximum power spectral density

Description:

Measurement of the maximum output power conducted and the maximum power spectral density.

Measurement:

Measurement parameter	
KDB 789033 D02 UNII Guidance – chapter 2 E (method SA-2 alternative) chapter 2 F (method SA-2 alternative)	
Detector:	RMS
Sweep time:	60s
Resolution bandwidth:	1 MHz
Video bandwidth:	≥ 3 MHz
Span:	> EBW
Trace-Mode:	Max hold
Analyzer function:	Band power / channel power Interval > 26 dB EBW
Duty cycle:	Add the duty cycle correction factor 10 log(1/X)
Power density	Set marker to peak and record the value. (Band 4 with RBW = 500 kHz)

Limits:

Maximum radiated output power	Maximum conducted output power
Maximum conducted power + 6 dBi antenna gain	The lesser one of 250 mW 5.150-5.250 GHz 250mW or 11 dBm + 10 log EBW 5.250-5.350 GHz 250mW or 11 dBm + 10 log EBW 5.470-5.725 GHz 1W 5.725-5.850 GHz
Maximum power spectral density	
11 dBm in any 1 MHz band (band 5150 – 5250 MHz) 11 dBm in any 1 MHz band (band 5250 – 5350 MHz) 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)	

Result: OFDM / a – mode

OFDM / a – mode		Maximum output power conducted and maximum power spectral density [dBm]			
Channel		Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
+0.02 dB duty cycle correction	Output power conducted	13.33	12.06	12.91	-/-
	Power spectral density	-1.41	-2.54	-1.72	-/-
Measurement uncertainty		± 1 dB			

OFDM / a – mode		Maximum output power radiated - EIRP [dBm]			
Channel		Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
Calculated conducted power + gain		14.33	12.16	13.11	-/-
Measurement uncertainty		± 3 dB			

Result: Passed

Result: OFDM / n/ac – mode HT20

OFDM / n/ac – mode HT20		Maximum output power conducted and maximum power spectral density [dBm]			
Channel		Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
+0.24 dB duty cycle correction	Output power conducted	13.87	12.34	13.10	-/-
	Power spectral density	-0.97	-2.43	-1.55	-/-
Measurement uncertainty		± 1 dB			

OFDM / n/ac – mode HT20		Maximum output power radiated - EIRP [dBm]			
Channel		Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
Calculated conducted power + gain		14.87	12.44	13.30	-/-
Measurement uncertainty		± 3 dB			

Result: Passed

Result: OFDM / n/ac – mode HT40

OFDM / n/ac – mode HT40		Maximum output power conducted and maximum power spectral density [dBm]			
Channel		Lowest 5755 MHz	Highest 5795 MHz	-/-	-/-
+0.47 dB duty cycle correction	Output power conducted	12.86	12.49	-/-	-/-
	Power spectral density	-4.81	-4.91	-/-	-/-
Measurement uncertainty		± 1 dB			

OFDM / n/ac – mode HT40		Maximum output power radiated - EIRP [dBm]			
Channel		Lowest 5755 MHz	Highest 5795 MHz	-/-	-/-
Calculated conducted power + gain		13.86	12.59	-/-	-/-
Measurement uncertainty		± 3 dB			

Result: Passed

Result: OFDM / ac – mode HT80

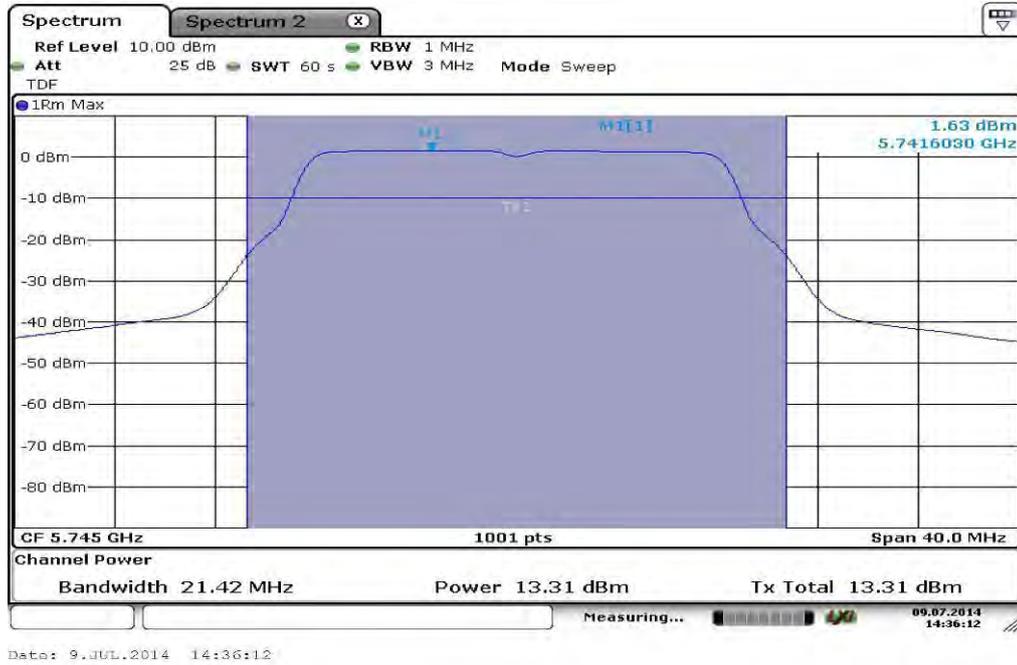
OFDM / ac – mode HT80		Maximum output power conducted and maximum power spectral density [dBm]			
Channel		Middle 5775 MHz	-/-	-/-	-/-
+0.91 dB duty cycle correction	Output power conducted	12.40	-/-	-/-	-/-
	Power spectral density	-7.31	-/-	-/-	-/-
Measurement uncertainty		± 1 dB			

OFDM / ac – mode HT80		Maximum output power radiated - EIRP [dBm]			
Channel		Middle 5775 MHz	-/-	-/-	-/-
Calculated conducted power + gain		12.50	-/-	-/-	-/-
Measurement uncertainty		± 3 dB			

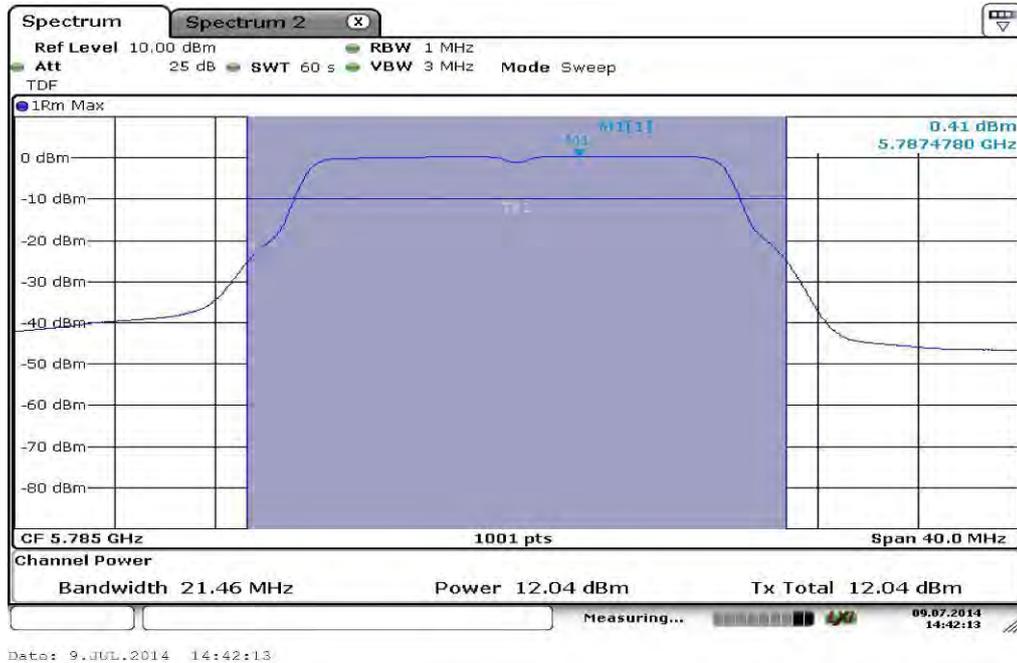
Result: Passed

Plots: OFDM / a – mode

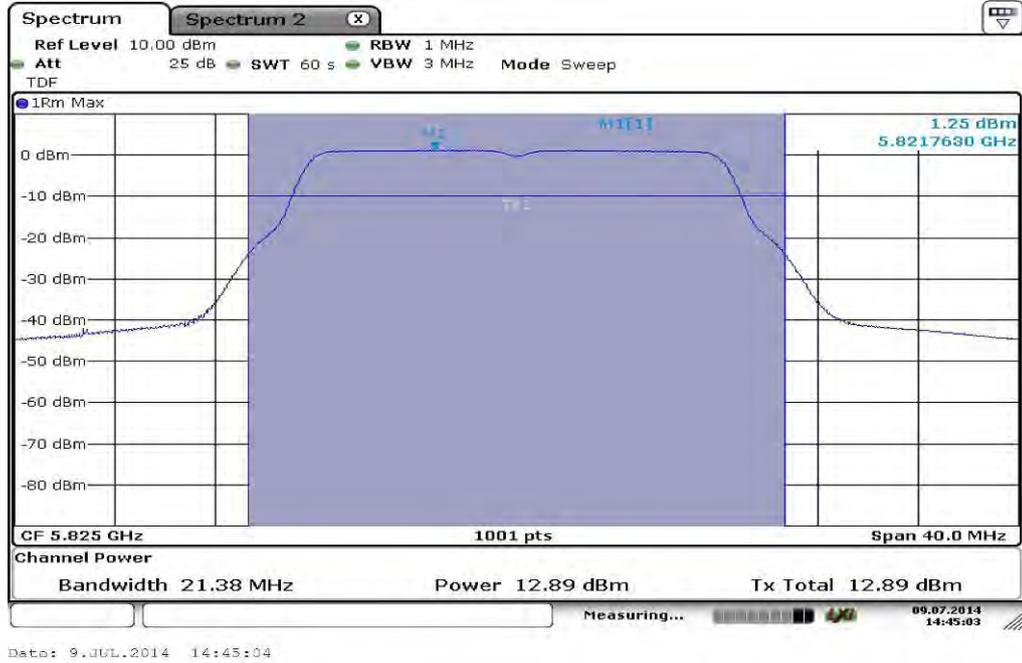
Plot 1: 5745 MHz



Plot 2: 5785 MHz

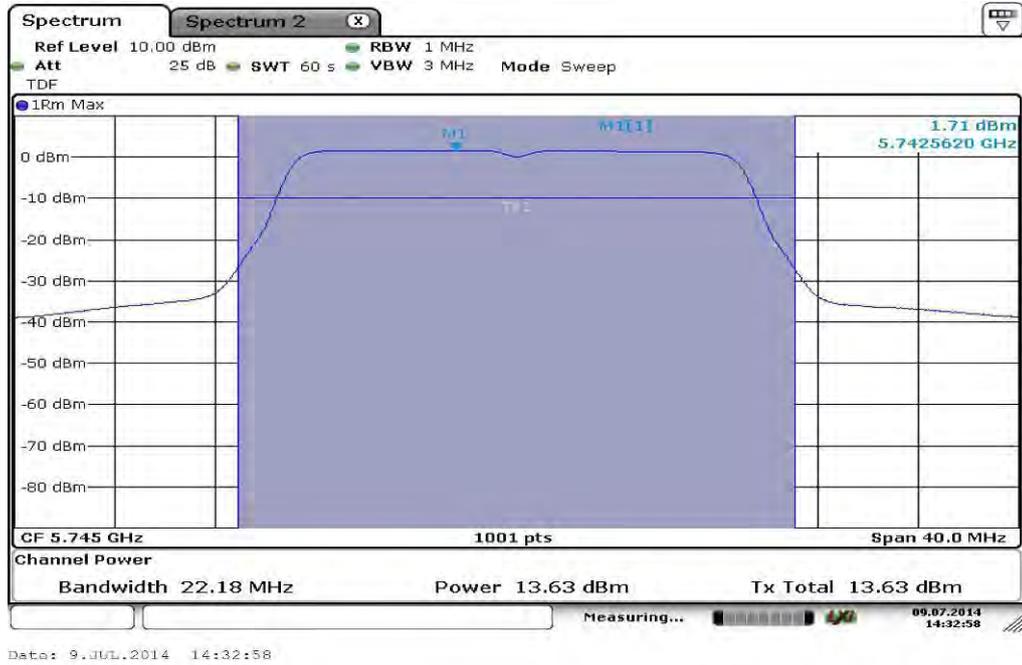


Plot 3: 5825 MHz

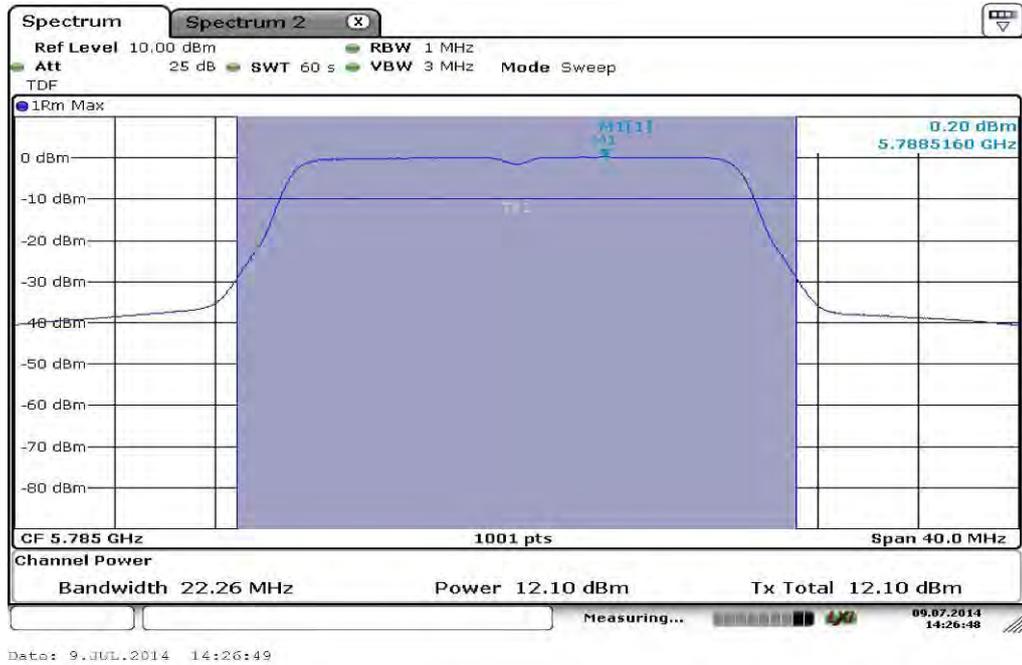


Plots: OFDM / n/ac – mode HT20

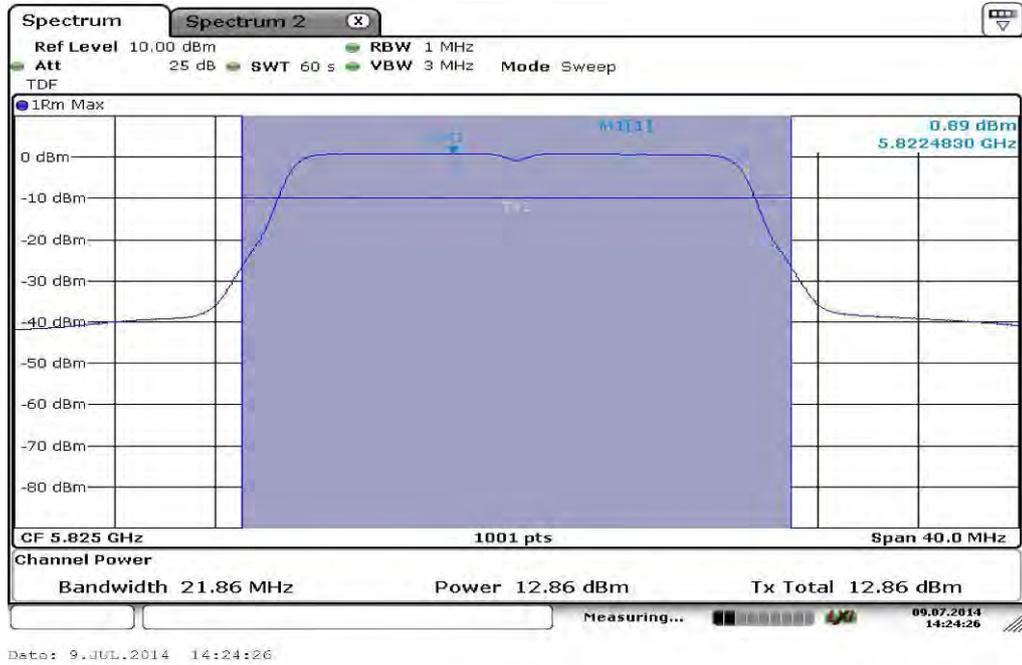
Plot 1: 5745 MHz



Plot 2: 5785 MHz

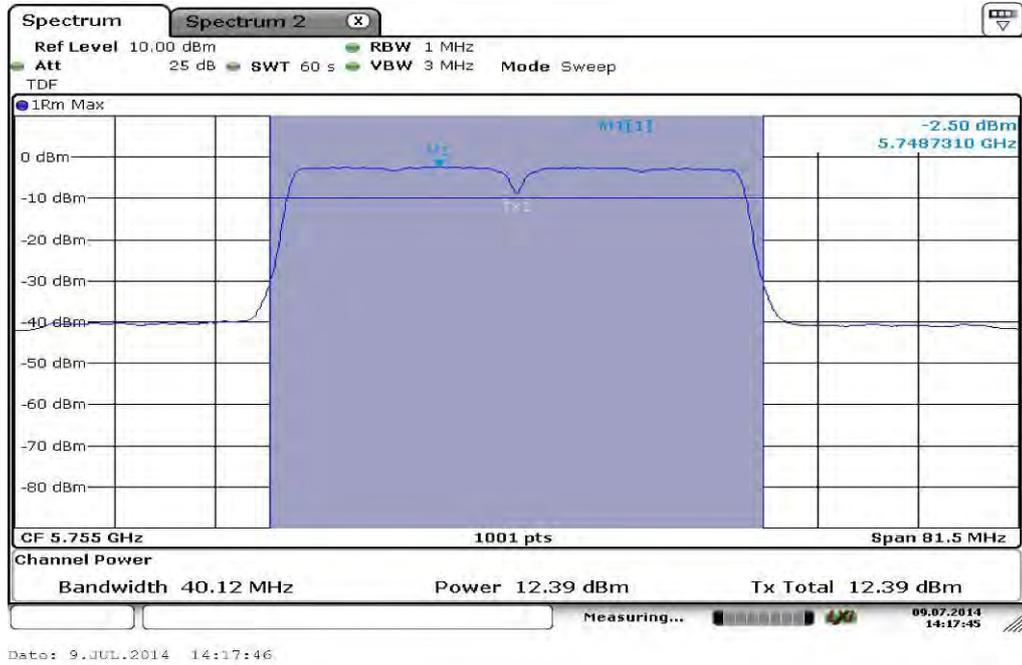


Plot 3: 5825 MHz

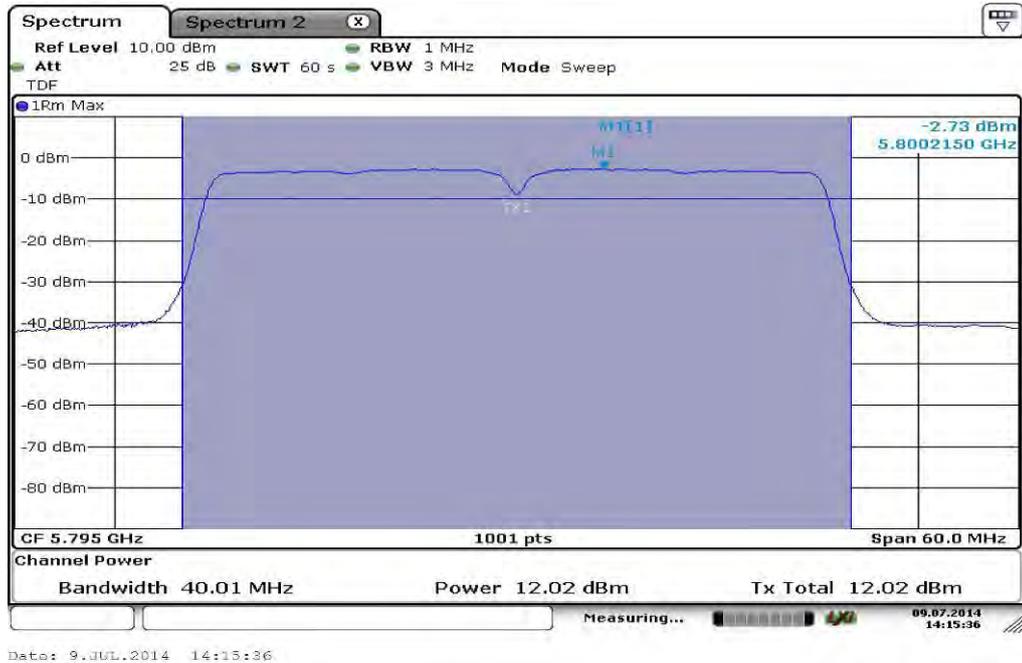


Plots: OFDM / n/ac – mode HT40

Plot 1: 5755 MHz

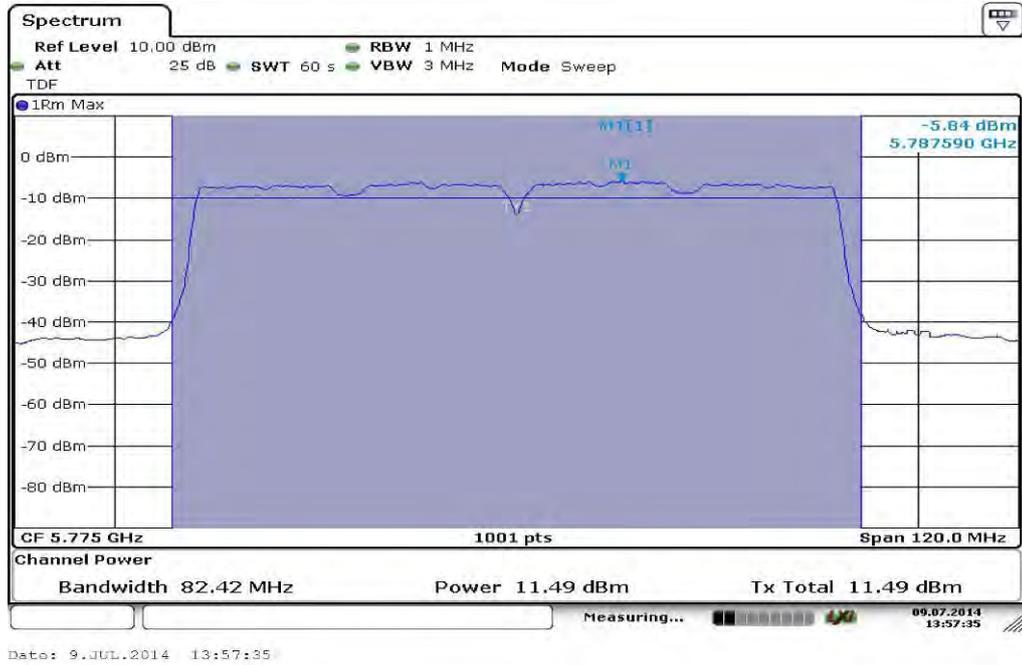


Plot 2: 5795 MHz



Plots: OFDM / ac – mode HT80

Plot 1: 5775 MHz



10.5 Minimum emission bandwidth (MEBW) – 6 dBc bandwidth

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Mandatory for the frequency range 5725 MHz to 5850 MHz!

Measurement:

Measurement parameter	
KDB 789033 D02 UNII Guidance – chapter 2 C (2)	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	≥ 3 x RBW
Span:	> complete signal
Trace-Mode:	Max hold

Limits:

Minimum emission bandwidth – 6 dBc bandwidth
> 500 kHz

Result: OFDM / a – mode

OFDM / a – mode	6 dBc bandwidth [MHz]			
	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
Channel	16.38	16.34	16.38	-/-
Measurement uncertainty	± RBW			

Result: Passed

Result: OFDM / n/ac – mode HT20

OFDM / n/ac – mode HT20 Channel	6 dBc bandwidth [MHz]			
	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	17.74	17.78	17.78	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

Result: OFDM / n/ac – mode HT40

OFDM / n/ac – mode HT40 Channel	6 dBc bandwidth [MHz]			
	Lowest 5755 MHz	Highest 5795 MHz	-/-	-/-
	36.56	36.55	-/-	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

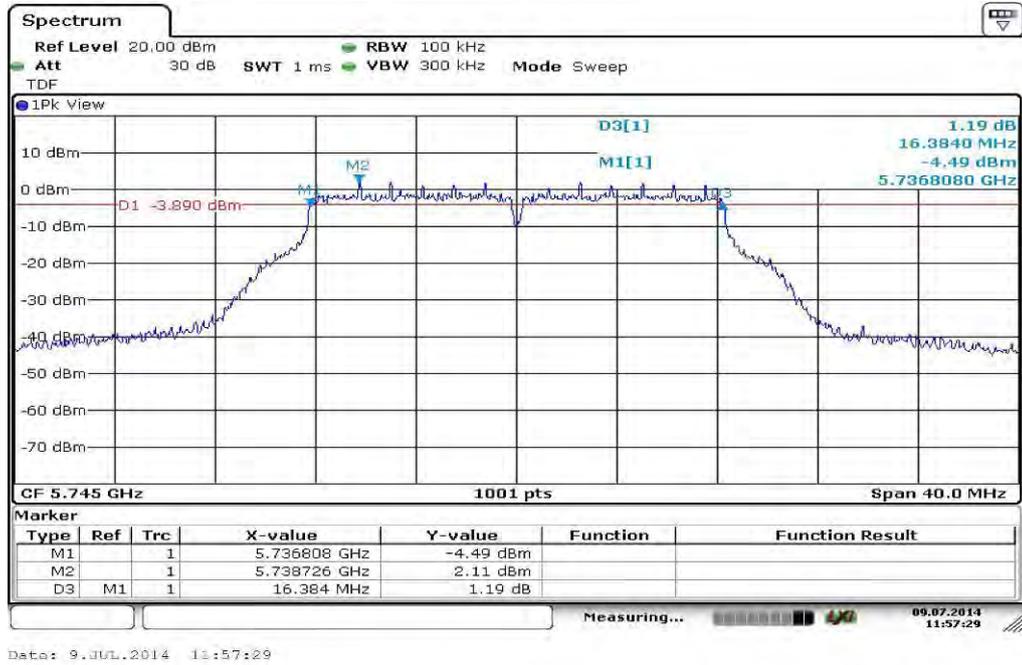
Result: OFDM / ac – mode HT80

OFDM / ac – mode HT80 Channel	6 dBc bandwidth [MHz]			
	Middle 5775 MHz	-/-	-/-	-/-
	76.51	-/-	-/-	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

Plots: OFDM / a – mode

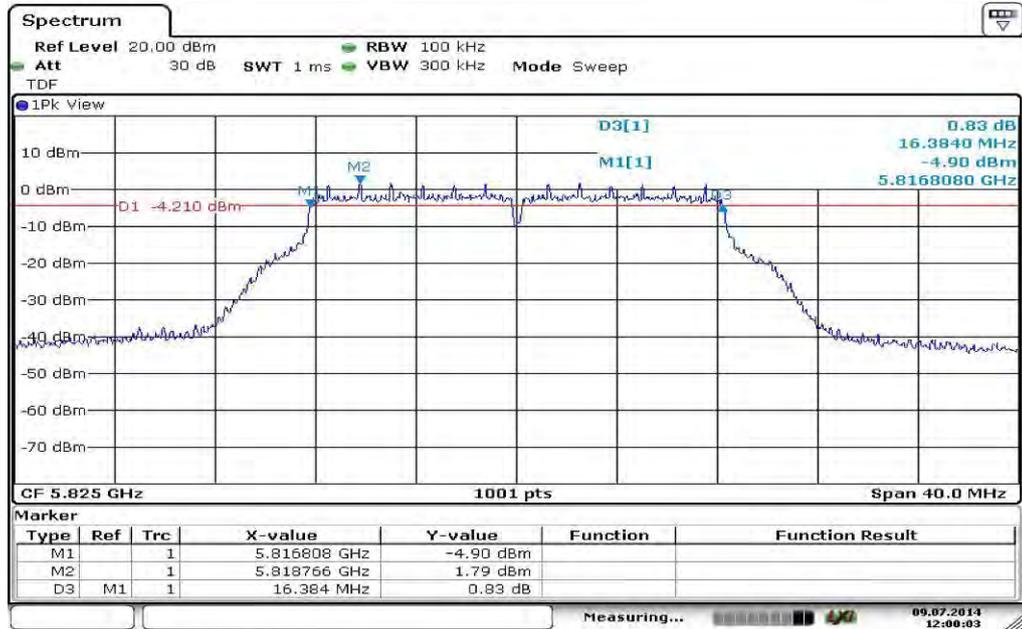
Plot 1: 5745 MHz



Plot 2: 5785 MHz



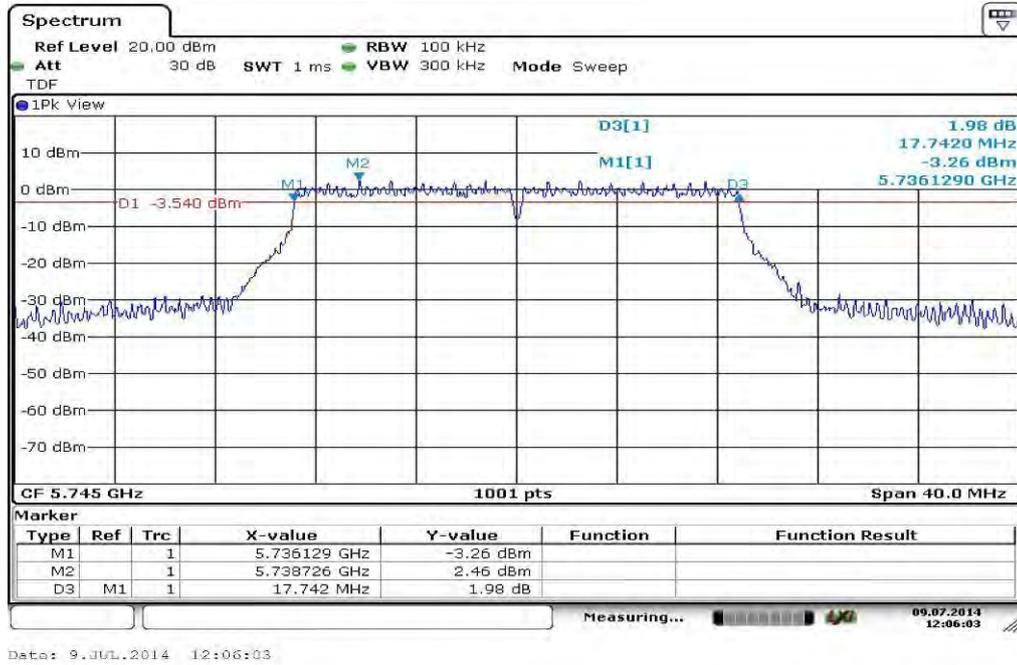
Plot 3: 5825 MHz



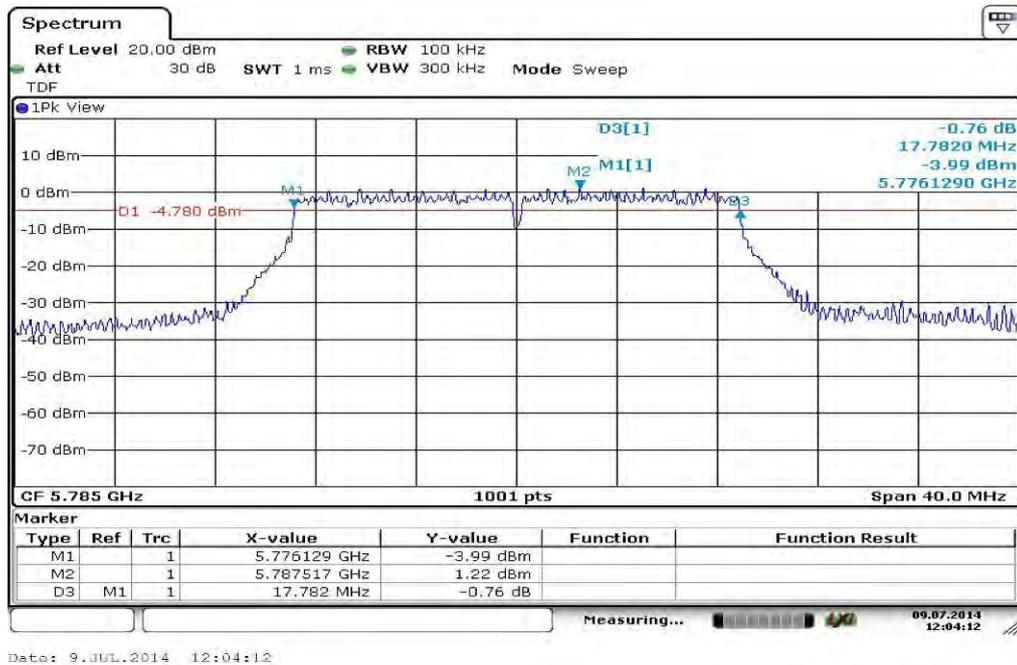
Date: 9.JUL.2014 12:00:03

Plots: OFDM / n/ac – mode HT20

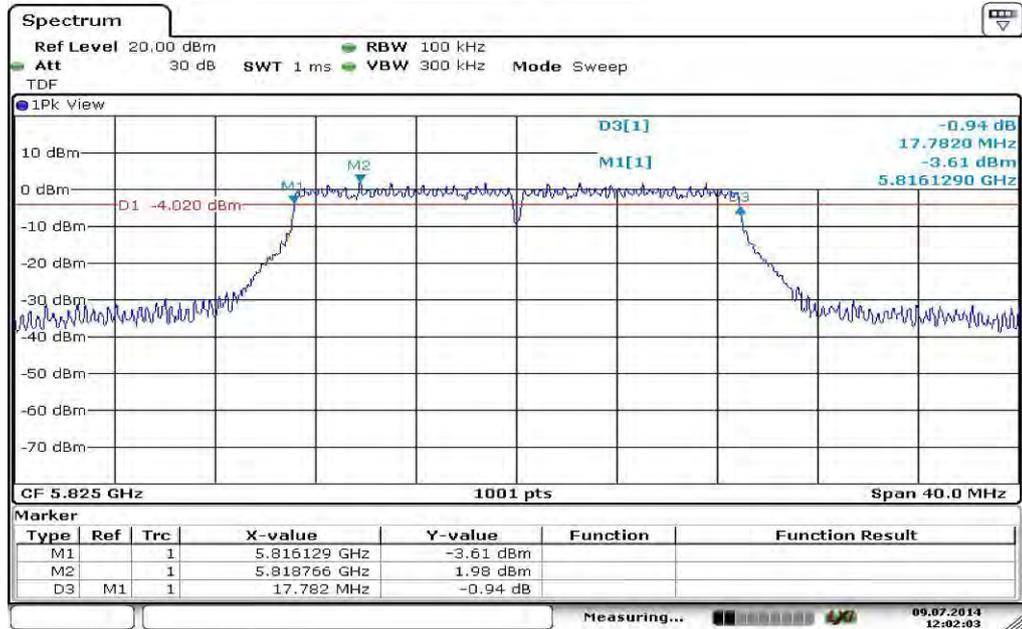
Plot 1: 5745 MHz



Plot 2: 5785 MHz



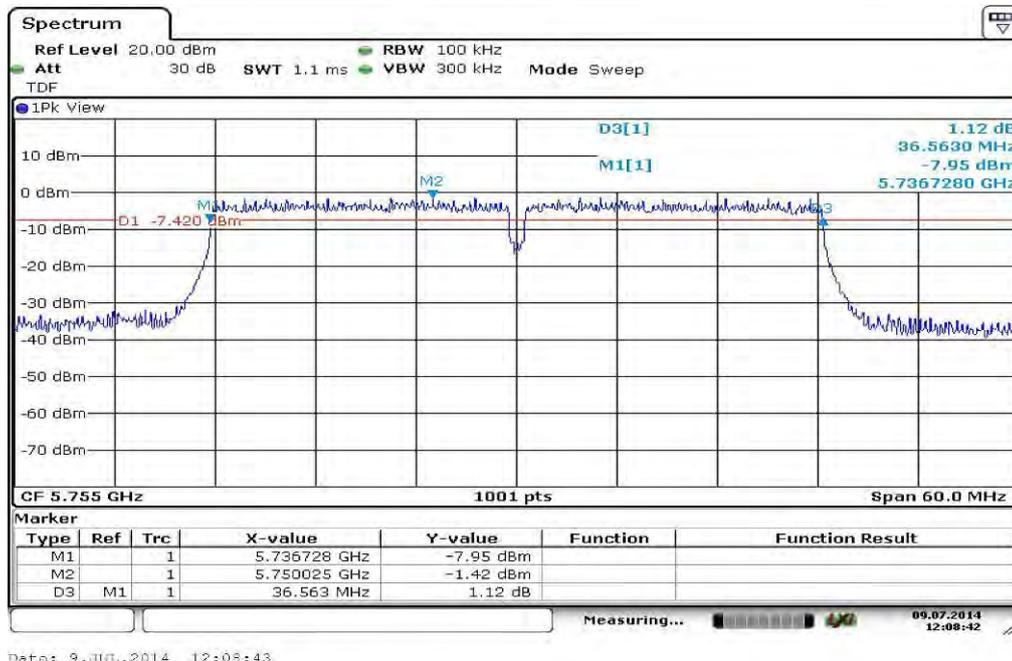
Plot 3: 5825 MHz



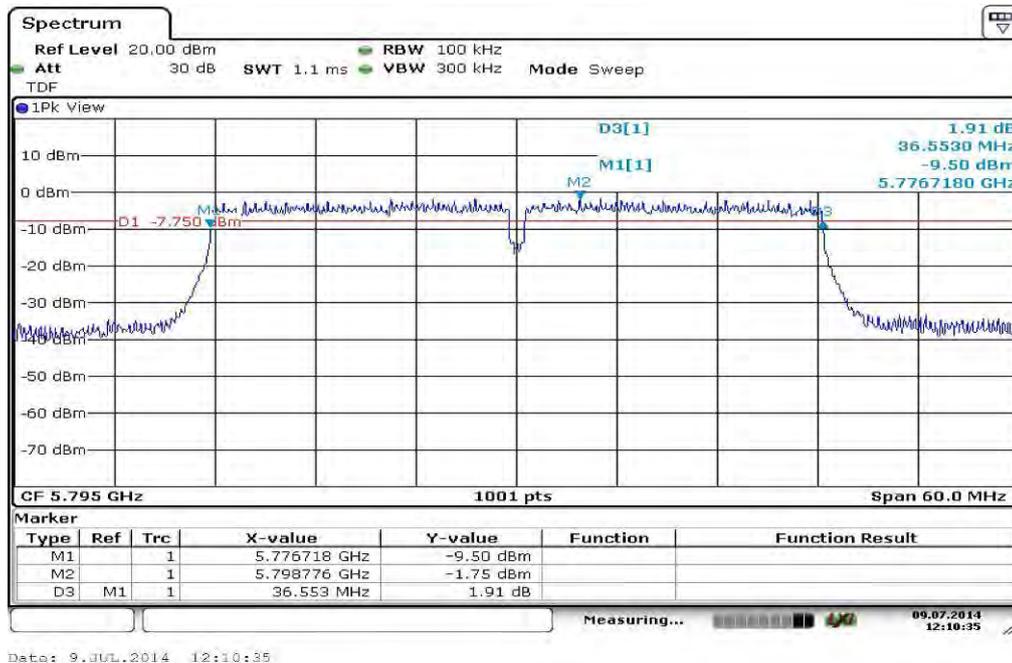
Date: 9.JUL.2014 12:02:04

Plots: OFDM / n/ac – mode HT40

Plot 1: 5755 MHz

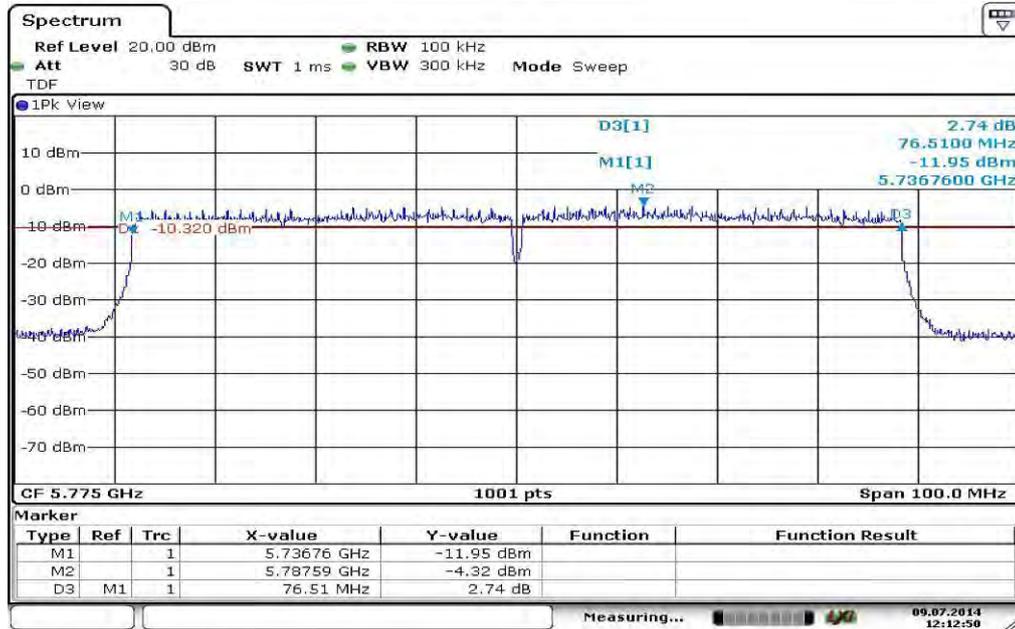


Plot 2: 5795 MHz



Plots: OFDM / ac – mode HT80

Plot 1: 5775 MHz



Date: 9.JUL.2014 12:12:50

10.6 Occupied bandwidth (OBW) – 99 % bandwidth

Description:

Measurement of the 99 % occupied bandwidth of the modulated signal.

Measurement:

Measurement parameter	
KDB 789033 D02 UNII Guidance – chapter 2 D	
Centre frequency:	Nominal EUT frequency
Detector:	Peak / sample detector
Sweep time:	Auto
Resolution bandwidth:	1 % to 5 % of the OBW
Video bandwidth:	≥ 3 x RBW
Span:	1.5 to 5.0 times of the OBW
Trace-Mode:	Max hold / single sweep
Analyser function:	99 % integration function

Limits:

Occupied bandwidth – 99 % bandwidth
-/-

Result: OFDM / a – mode

OFDM / a – mode	99 % bandwidth [MHz]			
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	16.94	16.94	16.94	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

Result: OFDM / n/ac – mode HT20

OFDM / n/ac – mode HT20	99 % bandwidth [MHz]			
	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
Channel	18.10	18.10	18.10	-/-
Measurement uncertainty	± RBW			

Result: Passed

Result: OFDM / n/ac – mode HT40

OFDM / n/ac – mode HT40	99 % bandwidth [MHz]			
	Lowest 5755 MHz	Highest 5795 MHz	-/-	-/-
Channel	36.50	36.44	-/-	-/-
Measurement uncertainty	± RBW			

Result: Passed

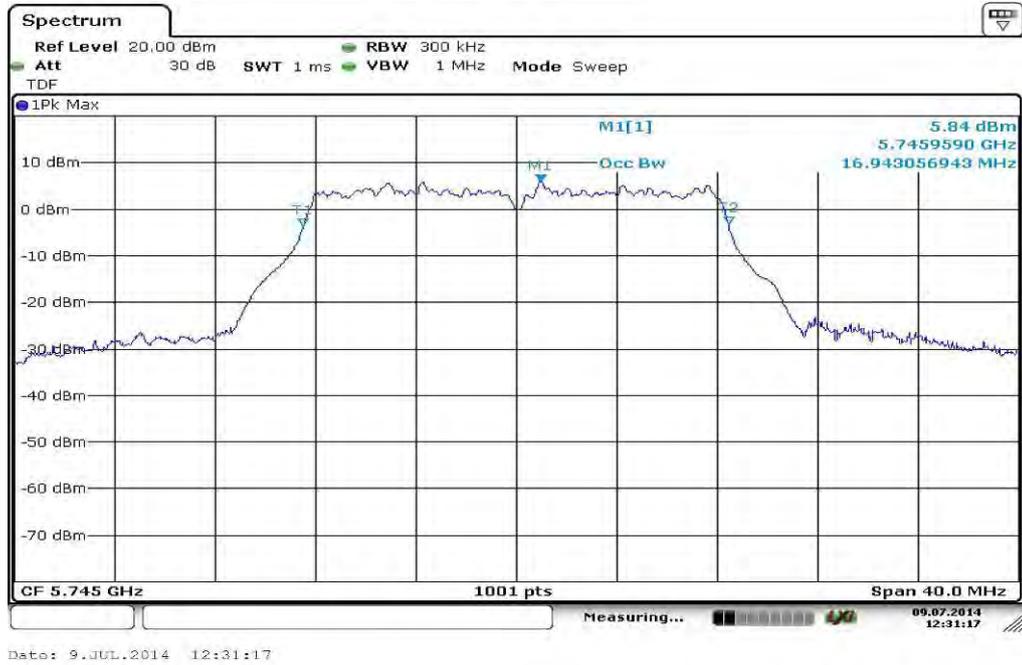
Result: OFDM / ac – mode HT80

OFDM / ac – mode HT80	99 % bandwidth [MHz]			
	Middle 5775 MHz	-/-	-/-	-/-
Channel	76.24	-/-	-/-	-/-
Measurement uncertainty	± RBW			

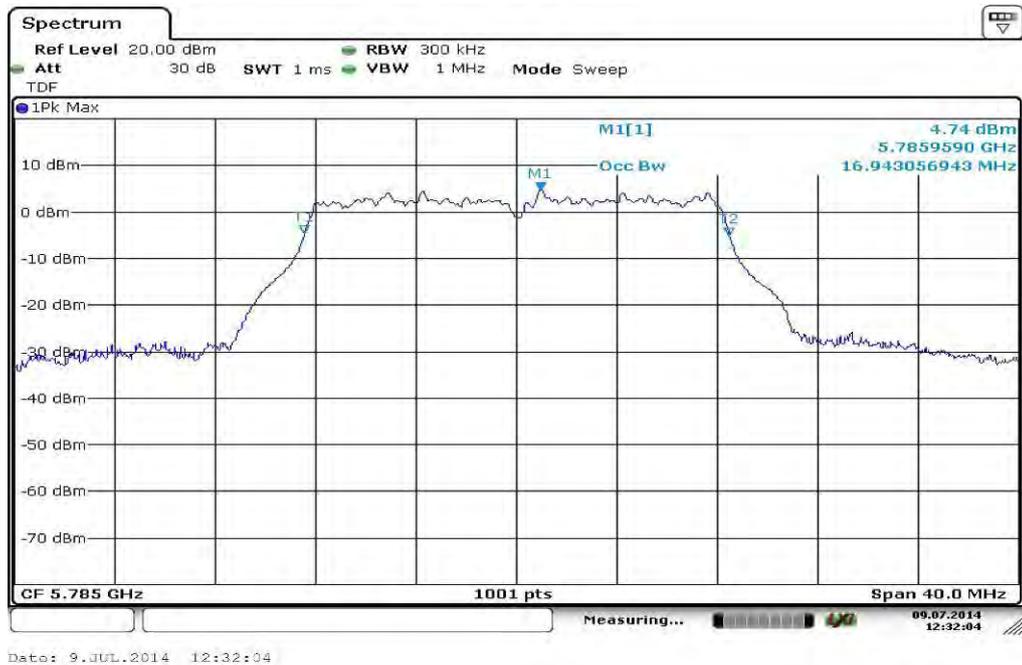
Result: Passed

Plots: OFDM / a – mode

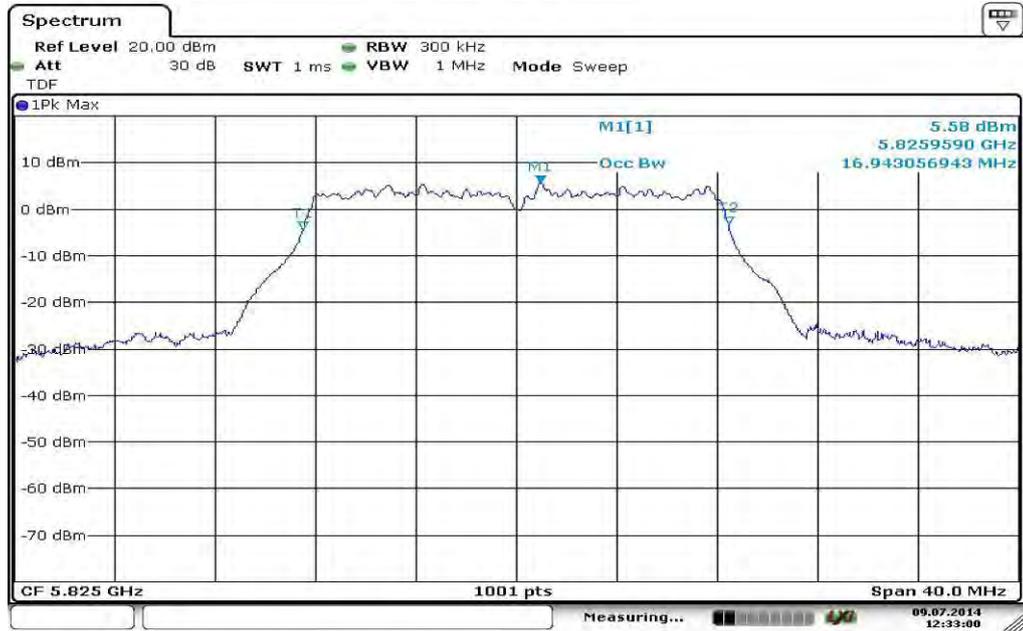
Plot 1: 5745 MHz



Plot 2: 5785 MHz



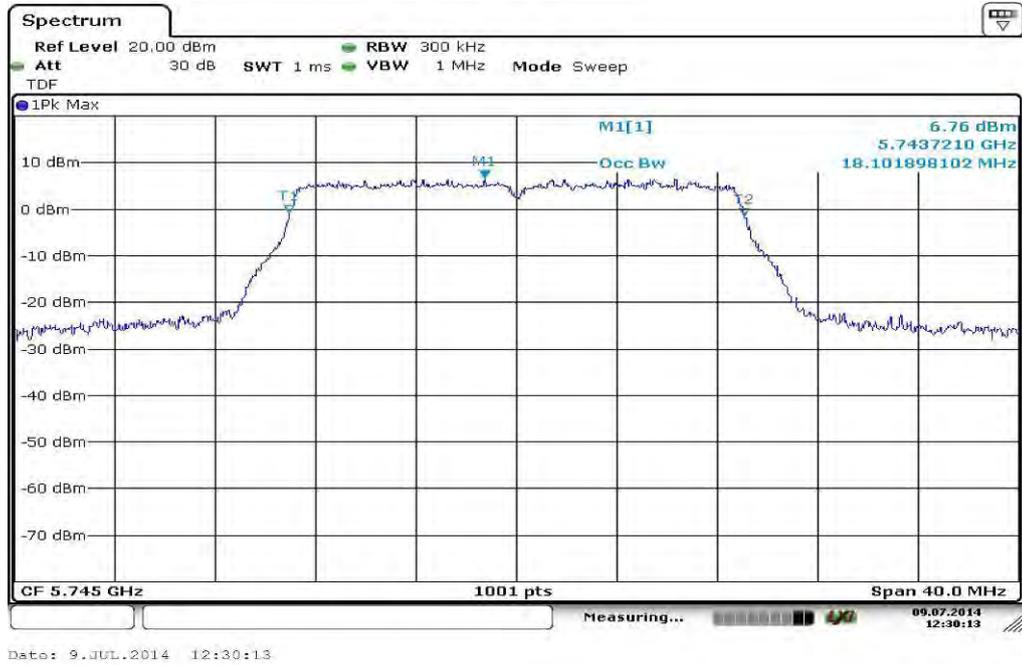
Plot 3: 5825 MHz



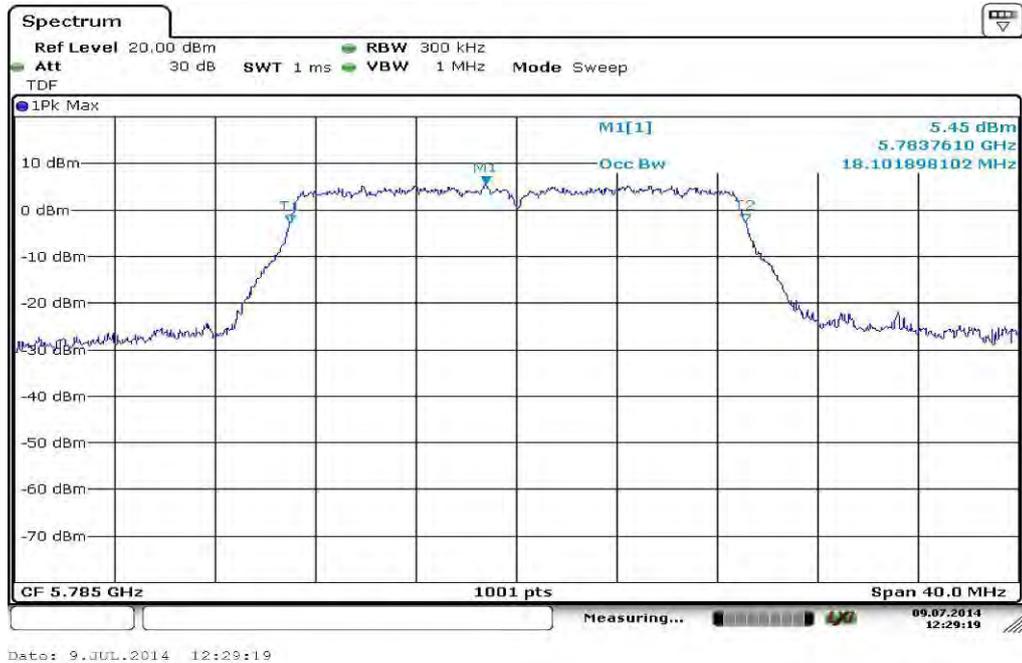
Date: 9.JUL.2014 12:33:00

Plots: OFDM / n/ac – mode HT20

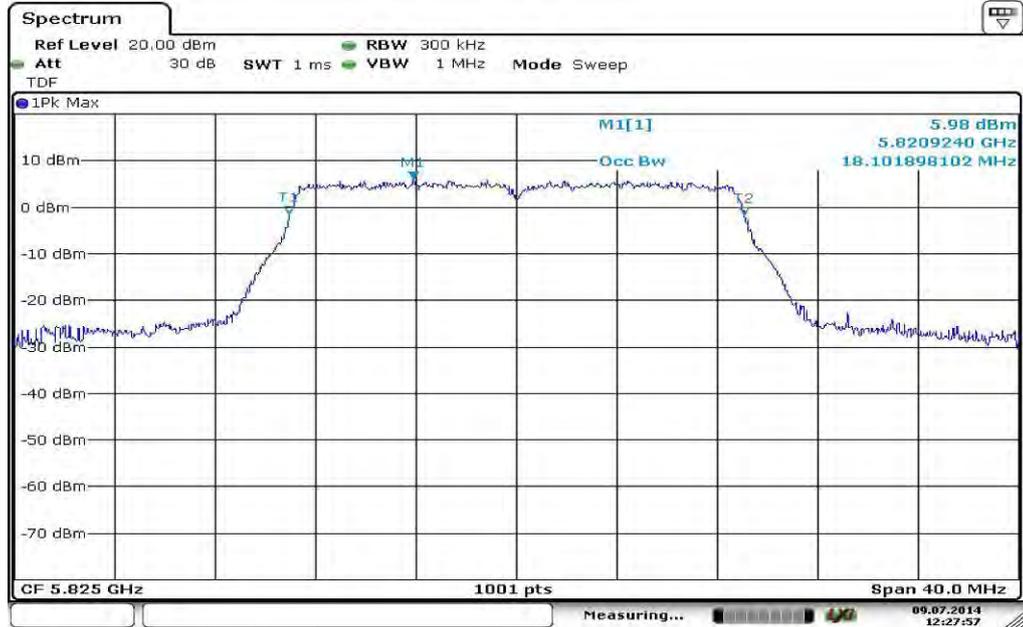
Plot 1: 5745 MHz



Plot 2: 5785 MHz



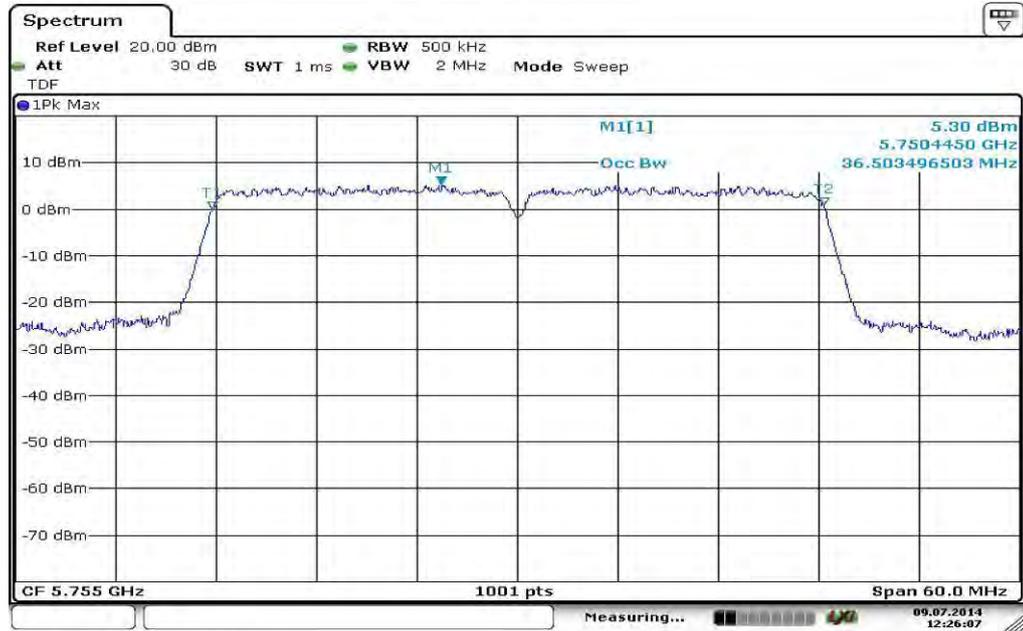
Plot 3: 5825 MHz



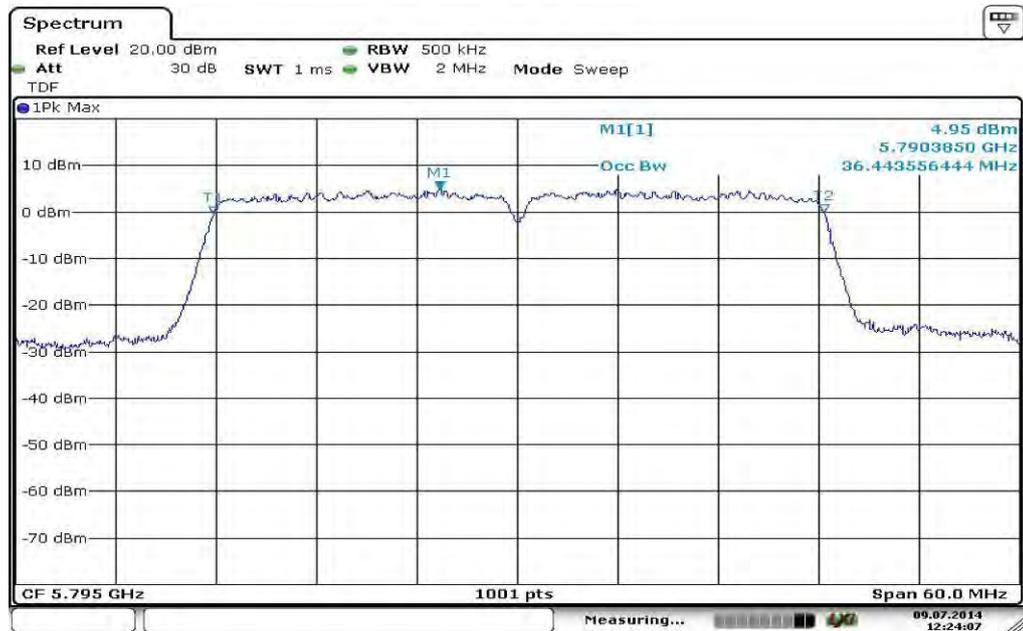
Date: 9.JUL.2014 12:27:57

Plots: OFDM / n/ac – mode HT40

Plot 1: 5755 MHz

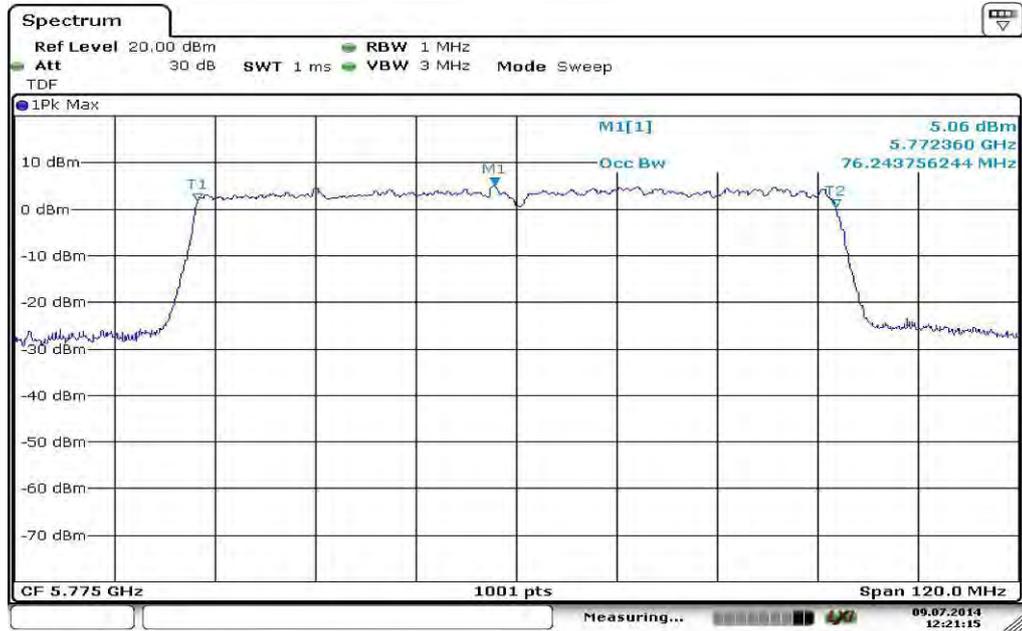


Plot 2: 5795 MHz



Plots: OFDM / ac – mode HT80

Plot 1: 5775 MHz



10.7 Emission bandwidth (EBW) – 26 dBc bandwidth

Description:

Measurement of the 26 dBc bandwidth of the modulated signal.

Measurement:

Measurement parameter	
KDB 789033 D02 UNII Guidance – chapter 2 C (1)	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	Approximately 1% EBW
Video bandwidth:	> RBW
Span:	> complete signal
Trace-Mode:	Max hold

Limits:

Emissions bandwidth – 26 dBc bandwidth
-/-

Result: OFDM / a – mode

OFDM / a – mode	26 dBc bandwidth [MHz]			
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	21.42	21.46	21.38	-/-
Measurement uncertainty	± RBW			

Result: Passed

Result: OFDM / n/ac – mode HT20

OFDM / n/ac – mode HT20	26 dBc bandwidth [MHz]			
Channel	Lowest 5745 MHz	Middle 5785 MHz	Highest 5825 MHz	-/-
	22.18	22.26	21.86	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

Result: OFDM / n/ac – mode HT40

OFDM / n/ac – mode HT40	26 dBc bandwidth [MHz]			
Channel	Lowest 5755 MHz	Highest 5795 MHz	-/-	-/-
	40.12	40.01	-/-	-/-
Measurement uncertainty	± RBW			

Result: **Passed**

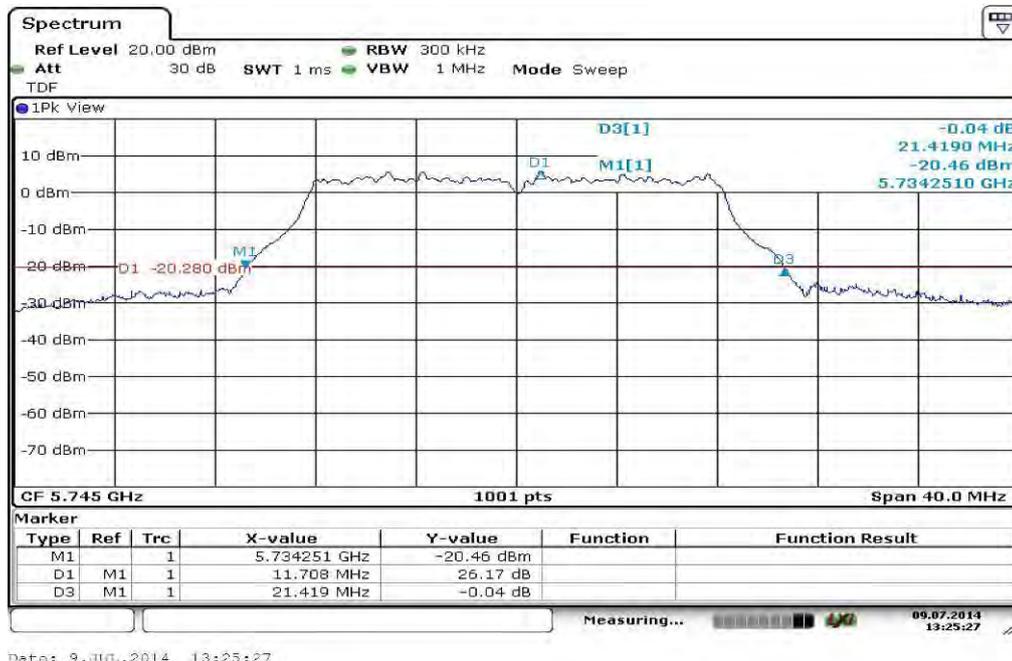
Result: OFDM / ac – mode HT80

OFDM / ac – mode HT80	26 dBc bandwidth [MHz]			
Channel	Middle 5775 MHz	-/-	-/-	-/-
	82.42	-/-	-/-	-/-
Measurement uncertainty	± RBW			

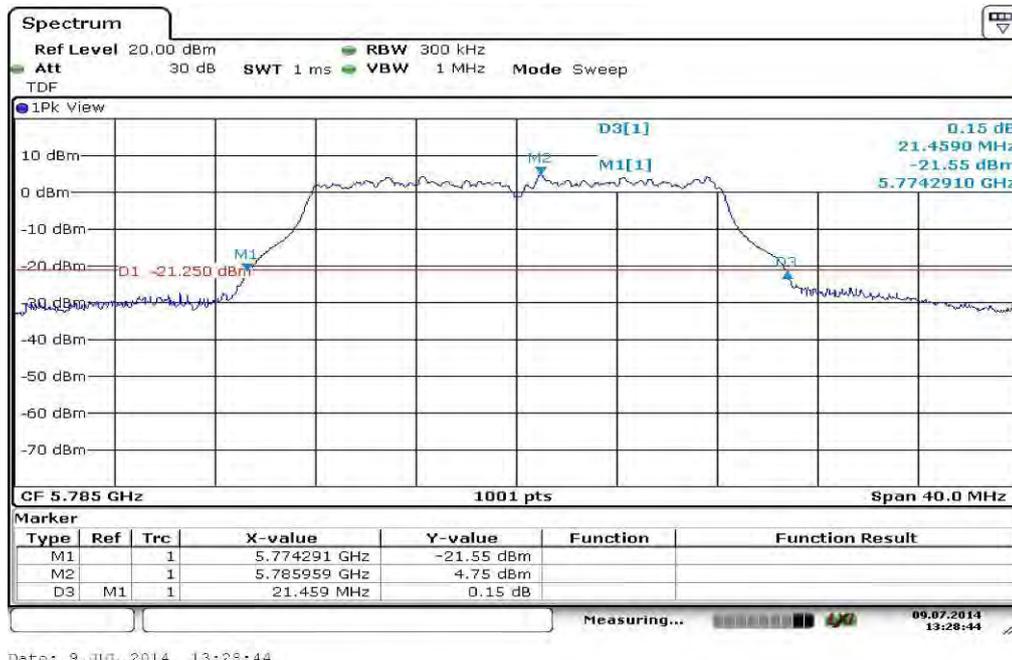
Result: **Passed**

Plots: OFDM / a – mode

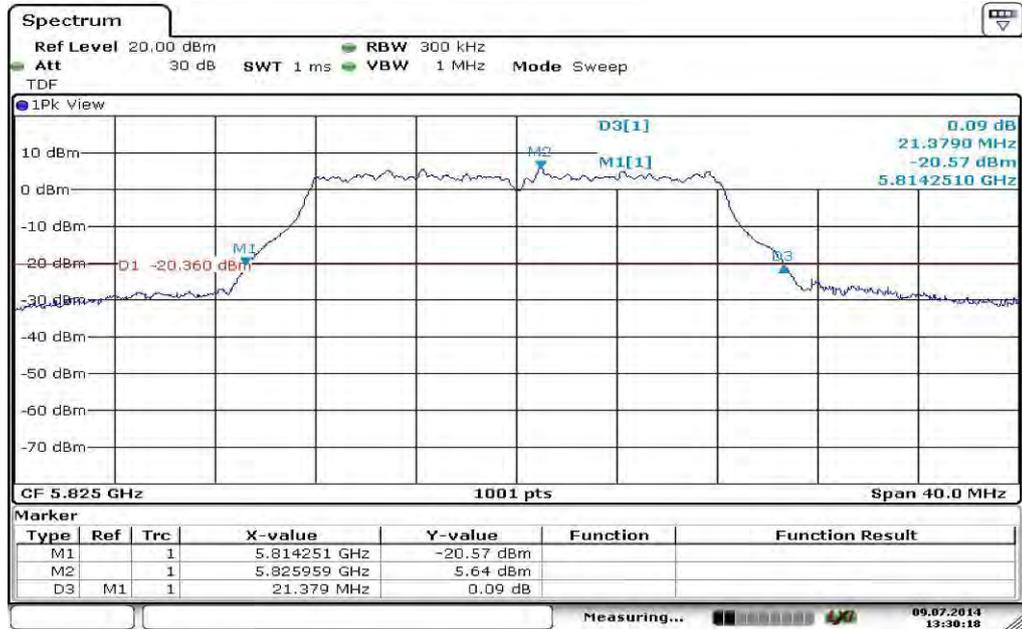
Plot 1: 5745 MHz



Plot 2: 5785 MHz



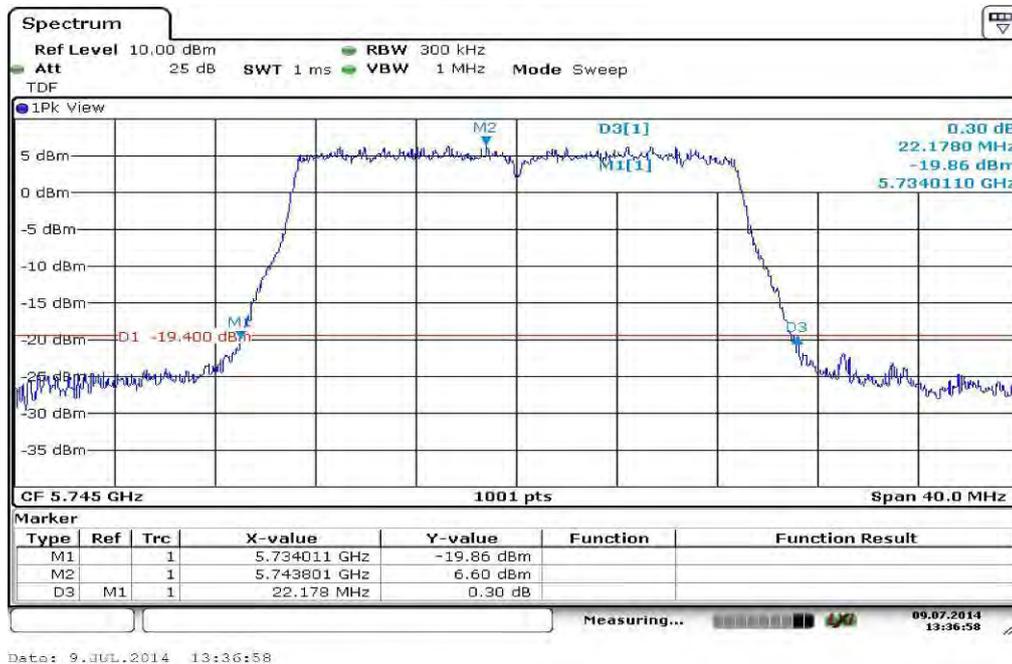
Plot 3: 5825 MHz



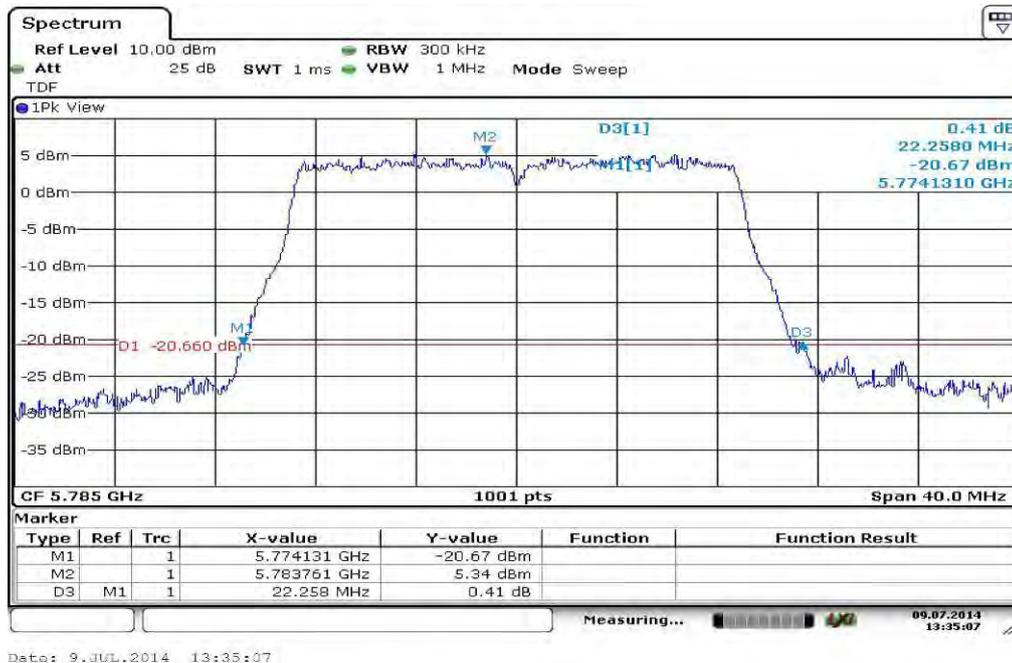
Date: 9.JUL.2014 13:30:18

Plots: OFDM / n/ac – mode HT20

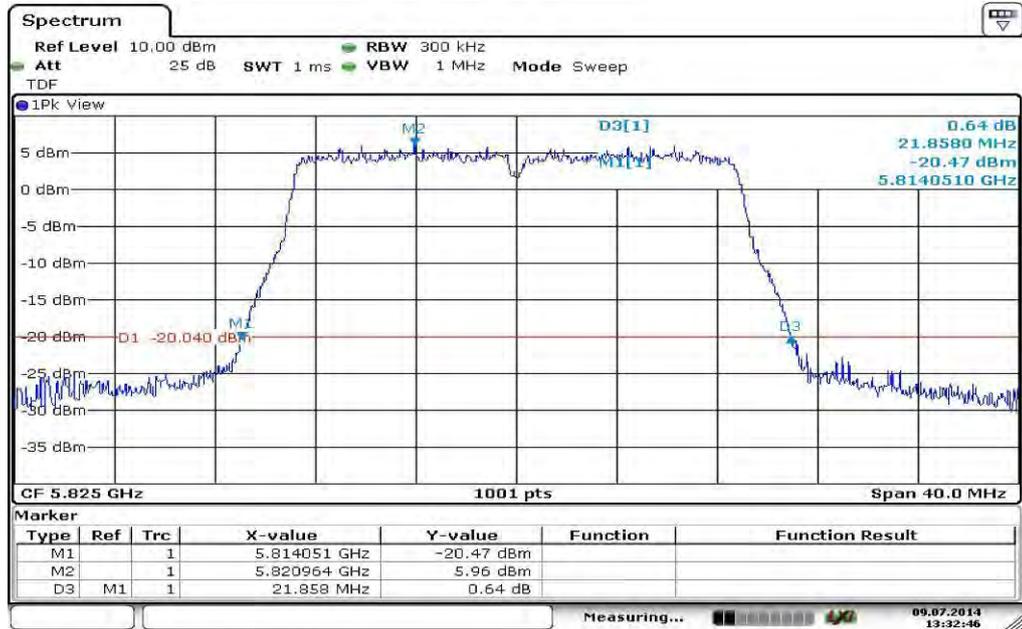
Plot 1: 5745 MHz



Plot 2: 5785 MHz



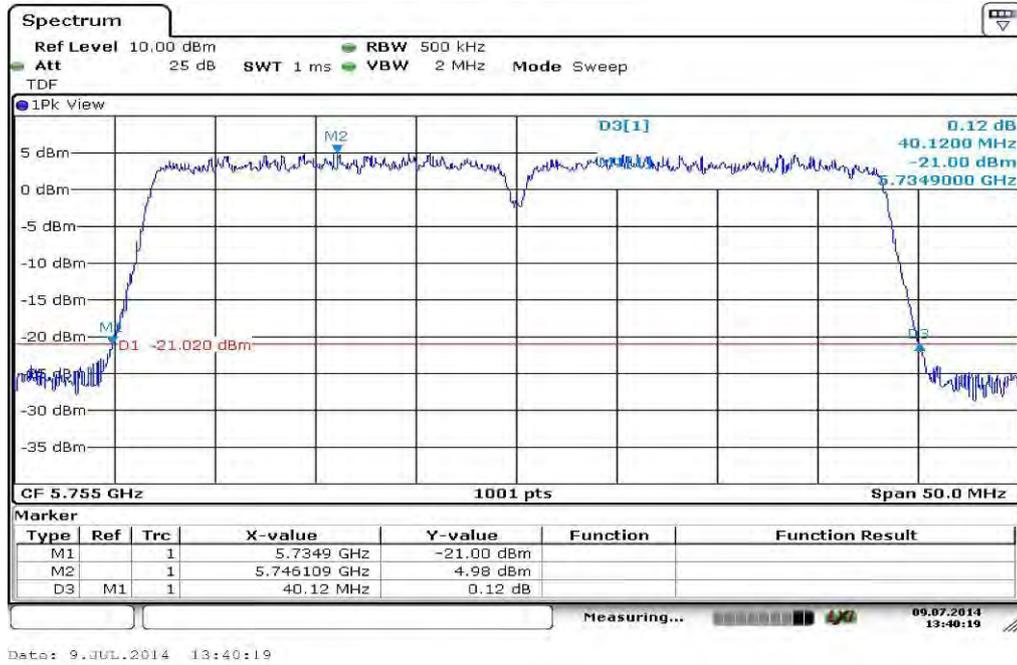
Plot 3: 5825 MHz



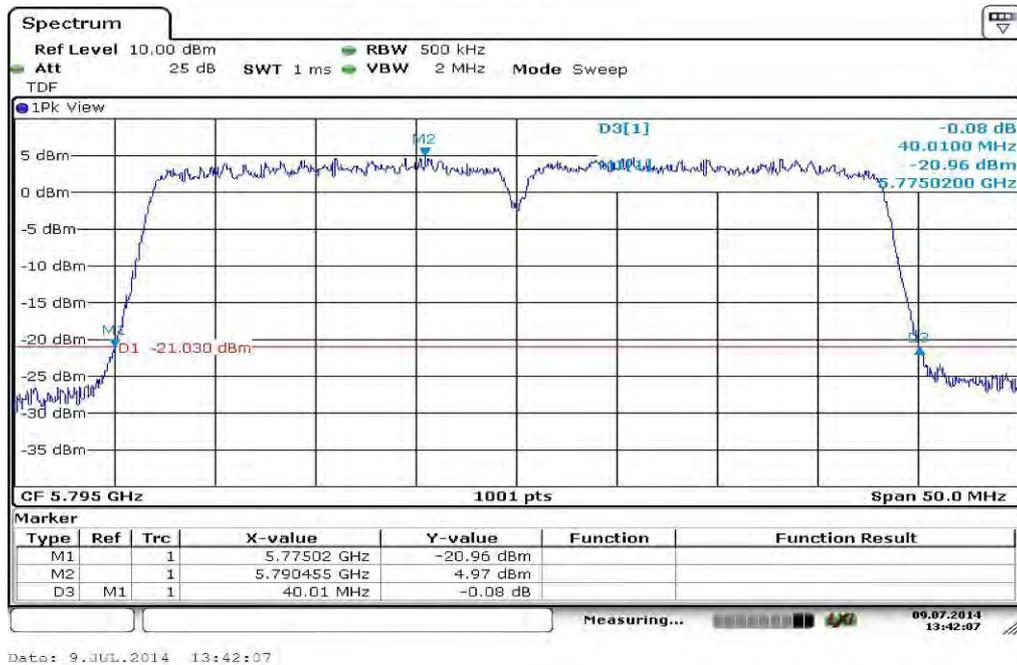
Date: 9.JUL.2014 13:32:46

Plots: OFDM / n/ac – mode HT40

Plot 1: 5755 MHz

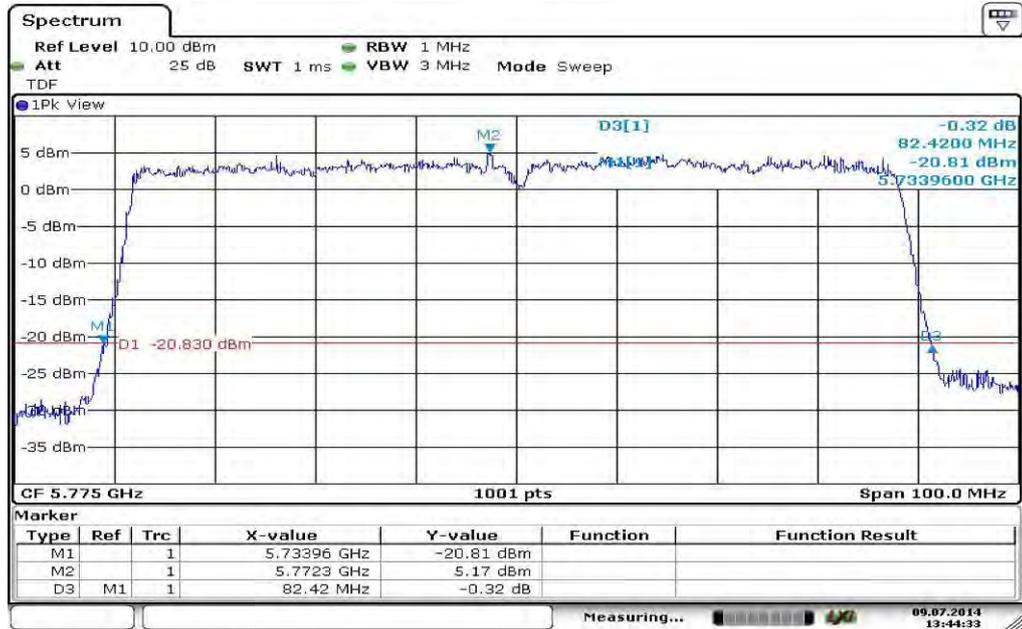


Plot 2: 5795 MHz



Plots: OFDM / ac – mode HT80

Plot 1: 5775 MHz



Date: 9.JUL.2014 13:44:33

10.8 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: 100 kHz F > 1 GHz: ≥ 3 MHz / 10 Hz
Span:	30 MHz to 40 GHz
Trace-Mode:	Max Hold / Average with 100 counts + 20 log (1 / X) for duty cycle lower than 100 %

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 -17 dBm / MHz ± 10 MHz from the highest band	

Results: OFDM / a – mode

TX Spurious Emissions Radiated [dB μ V/m] / dBm								
OFDM a – mode								
Lowest 5745 MHz			Middle 5785 MHz			Highest 5825 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All detected peak emissions are below the average limit!			All detected peak emissions are below the average limit!			All detected peak emissions are below the average limit!		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / n/ac – modeHT20

TX Spurious Emissions Radiated [dB μ V/m] / dBm								
OFDM n/ac – mode HT20								
Lowest 5745 MHz			Middle 5785 MHz			Highest 5825 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All detected peak emissions are below the average limit!			All detected peak emissions are below the average limit!			All detected peak emissions are below the average limit!		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / n/ac – modeHT40

TX Spurious Emissions Radiated [dB μ V/m] / dBm								
OFDM n/ac – mode HT40								
Lowest 5745 MHz			-/-			Highest 5795 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			-/-			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All detected peak emissions are below the average limit!						All detected peak emissions are below the average limit!		
Measurement uncertainty			± 3 dB					

Result: **Passed**

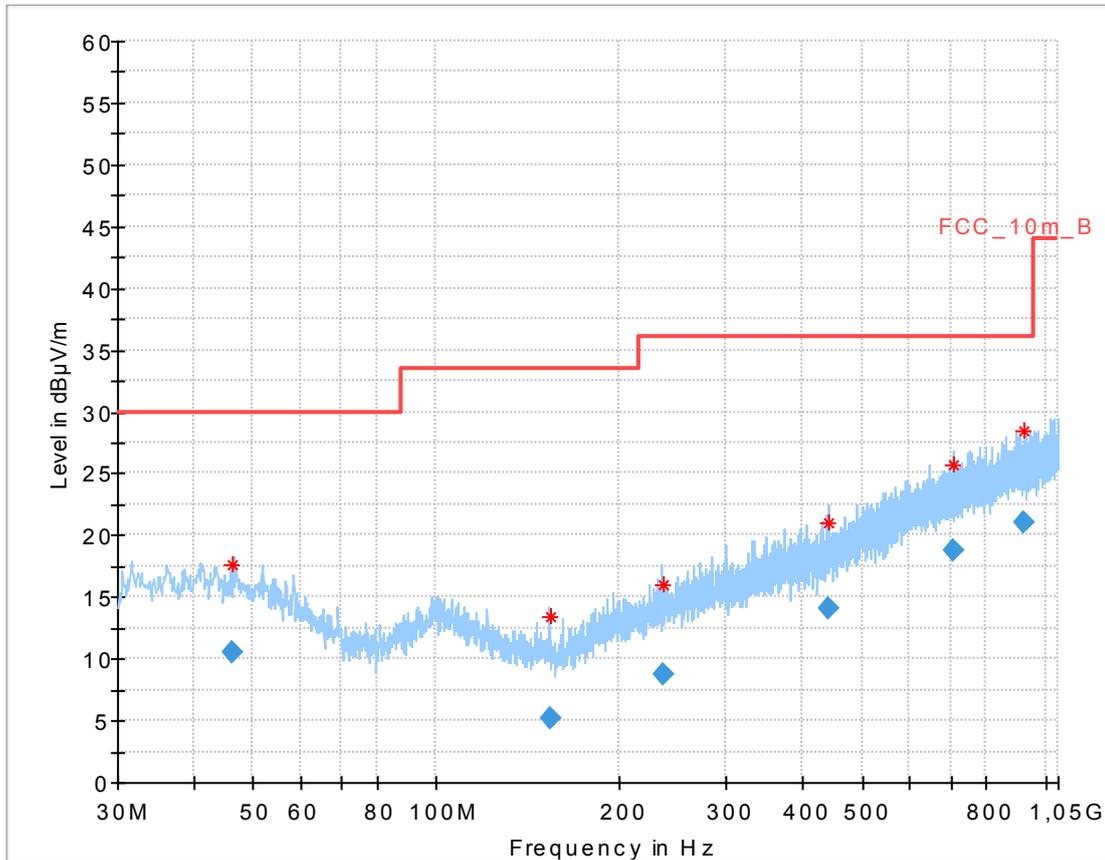
Results: OFDM / n/ac – modeHT80

TX Spurious Emissions Radiated [dB μ V/m] / dBm								
OFDM n/ac – mode HT80								
-/-			Middle 5775 MHz			-/-		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
-/-			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			-/-		
			All detected peak emissions are below the average limit!					
Measurement uncertainty			± 3 dB					

Result: **Passed**

Plots: OFDM / a – mode

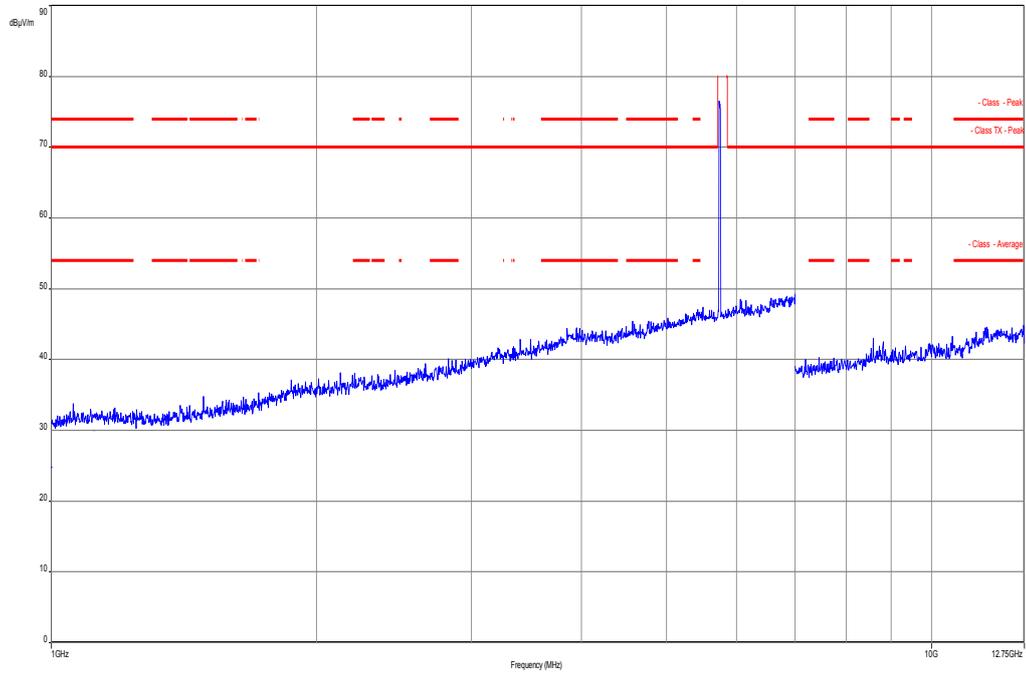
Plot 1: Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



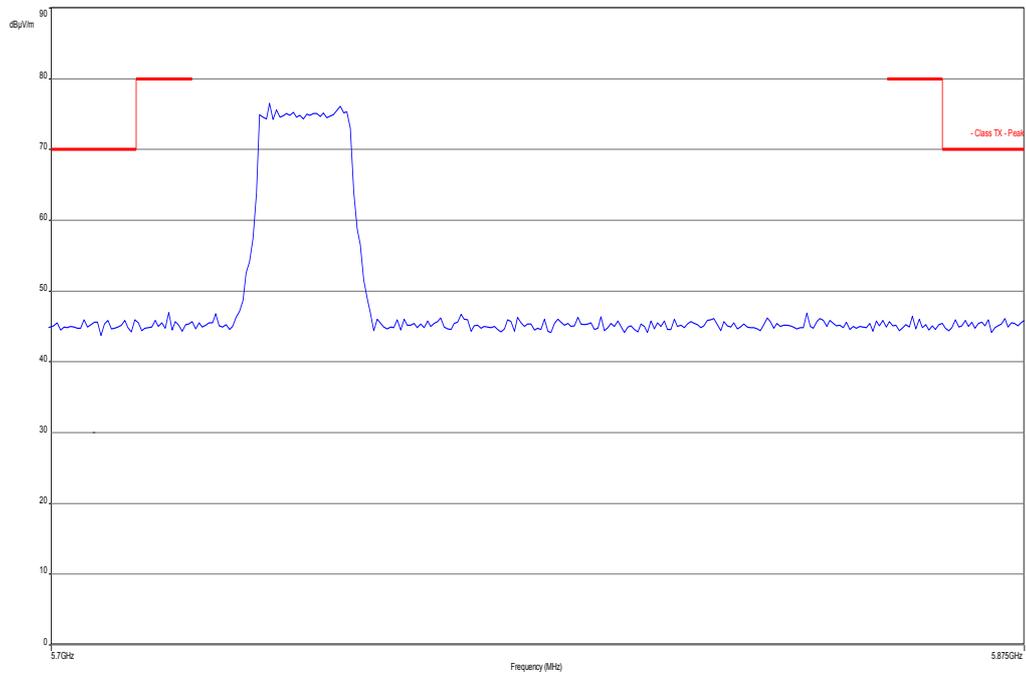
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
46.379700	10.55	30.00	19.45	1000.0	120.000	98.0	V	260.0	13.8
153.735150	5.18	33.50	28.32	1000.0	120.000	170.0	H	182.0	9.0
235.278600	8.75	36.00	27.25	1000.0	120.000	170.0	H	190.0	12.9
440.329200	14.00	36.00	22.00	1000.0	120.000	135.0	H	88.0	17.5
706.138200	18.73	36.00	17.27	1000.0	120.000	155.0	V	280.0	21.7
920.037750	20.95	36.00	15.05	1000.0	120.000	170.0	V	170.0	24.2

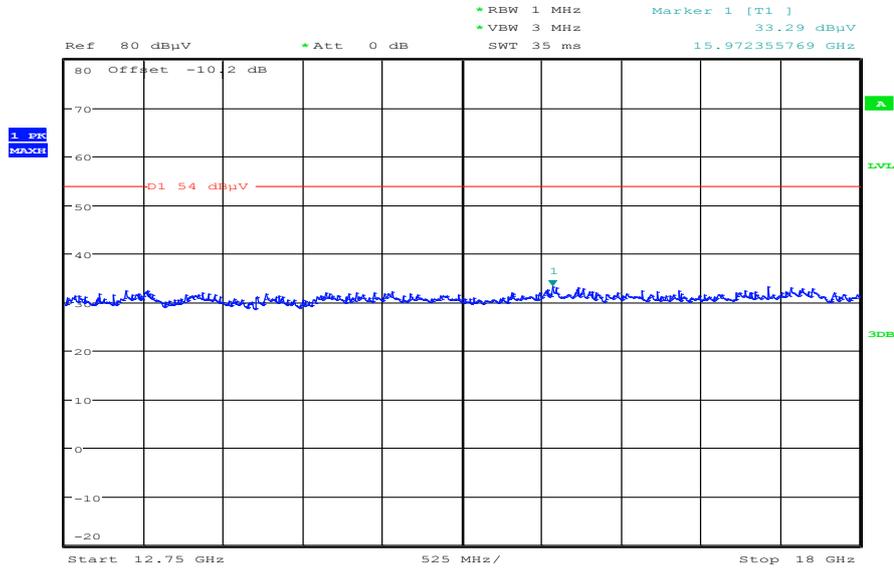
Plot 2: Lowest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



Plot 3: Lowest channel, vertical & horizontal polarization, mask

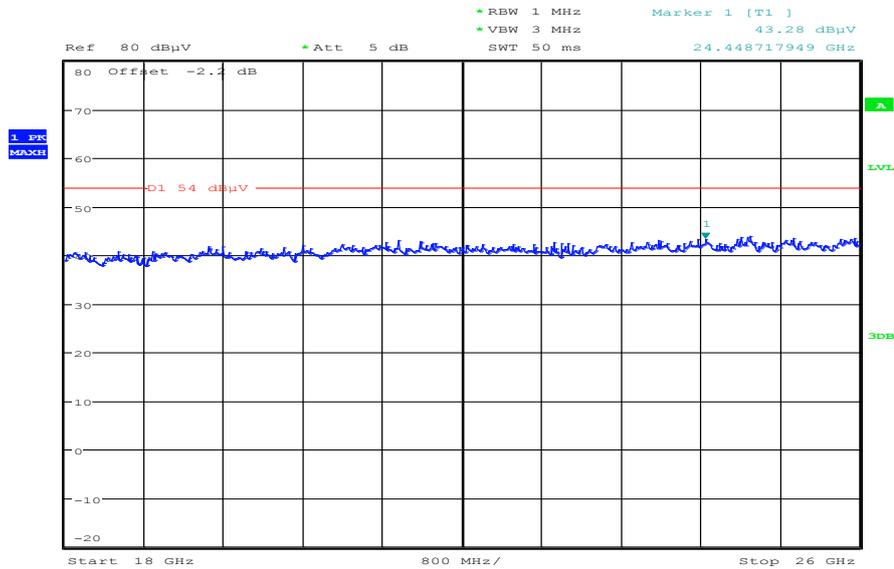


Plot 4: Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



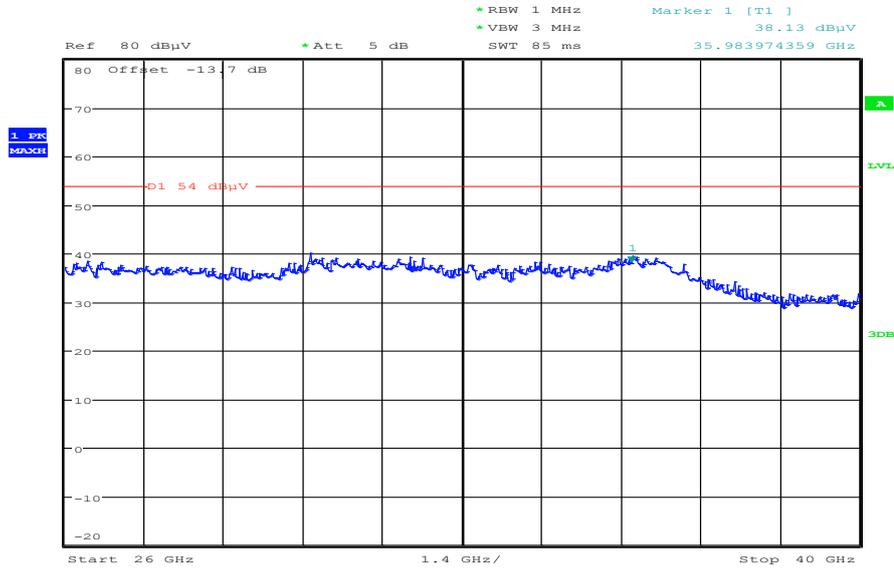
Date: 28.MAY.2014 11:54:51

Plot 5: Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



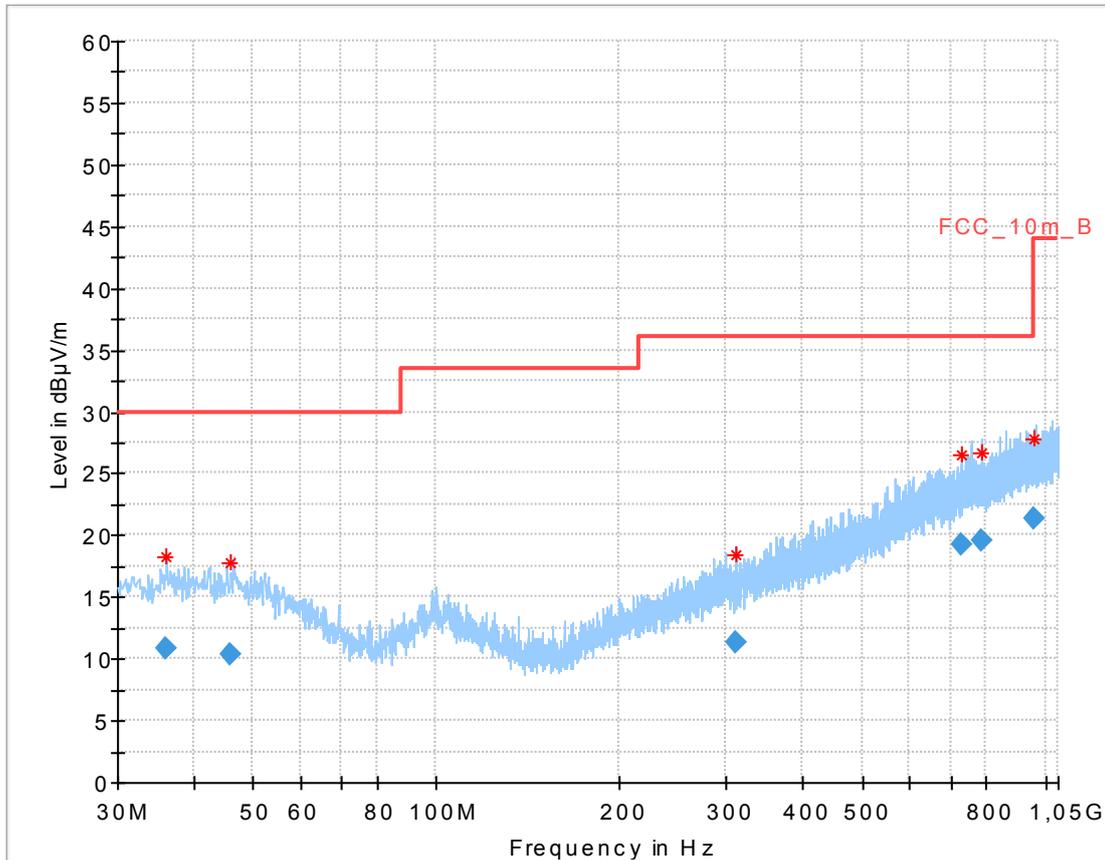
Date: 28.MAY.2014 13:42:09

Plot 6: Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 14:54:27

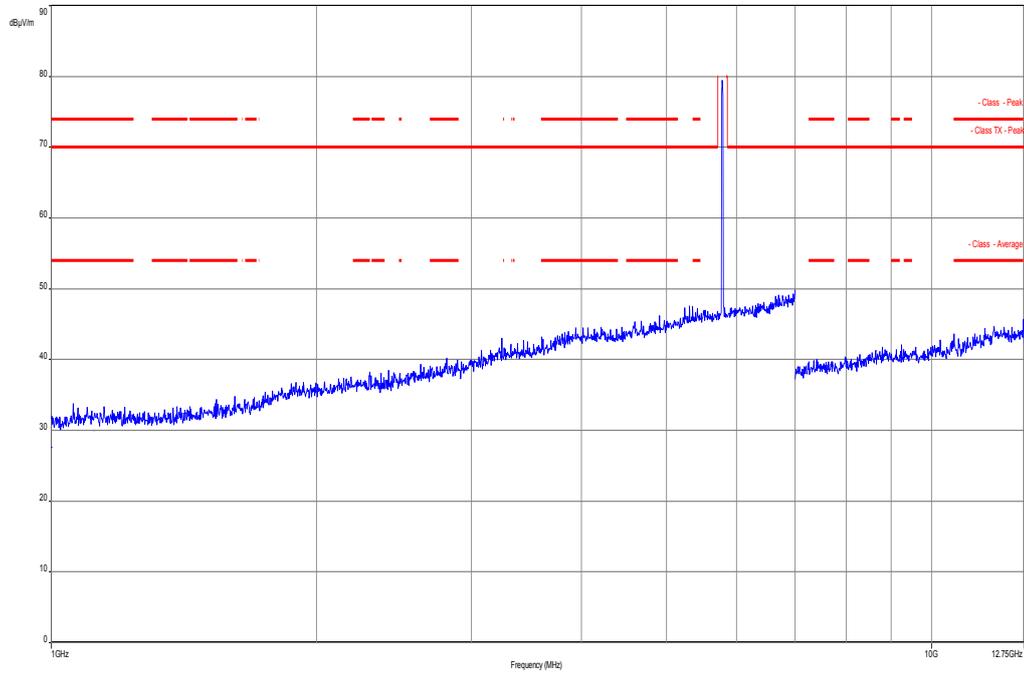
Plot 7: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization



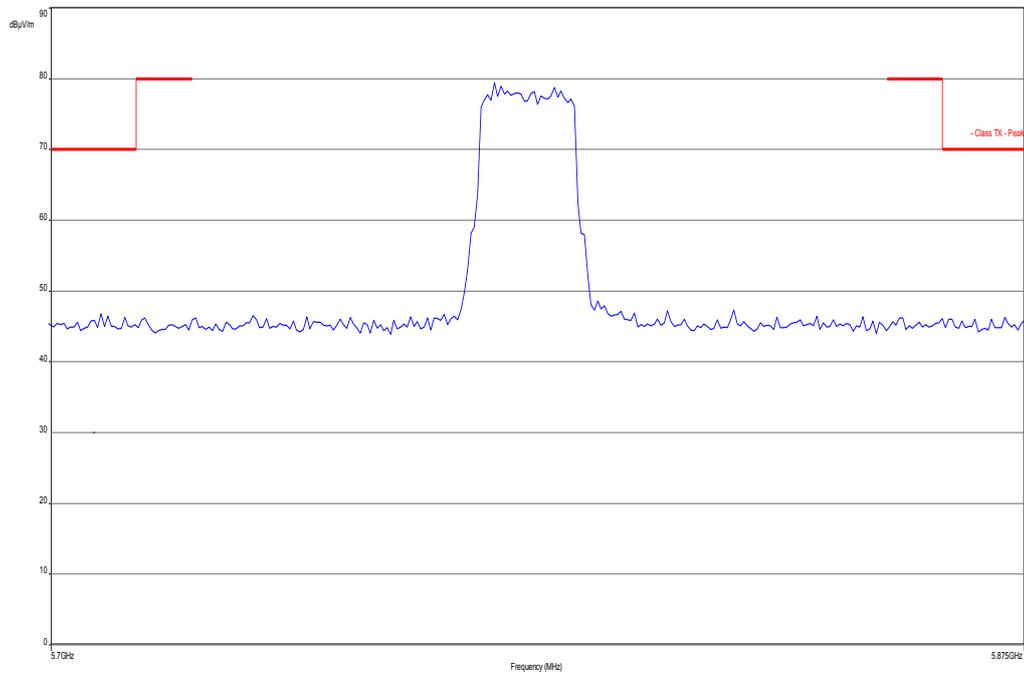
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.132000	10.89	30.00	19.11	1000.0	120.000	170.0	V	269.0	13.9
46.017900	10.32	30.00	19.68	1000.0	120.000	170.0	H	100.0	13.8
311.343000	11.25	36.00	24.75	1000.0	120.000	98.0	V	86.0	14.8
730.134450	19.30	36.00	16.70	1000.0	120.000	170.0	V	173.0	22.2
786.366750	19.53	36.00	16.47	1000.0	120.000	98.0	H	274.0	22.7
957.082500	21.34	36.00	14.66	1000.0	120.000	170.0	H	91.0	24.3

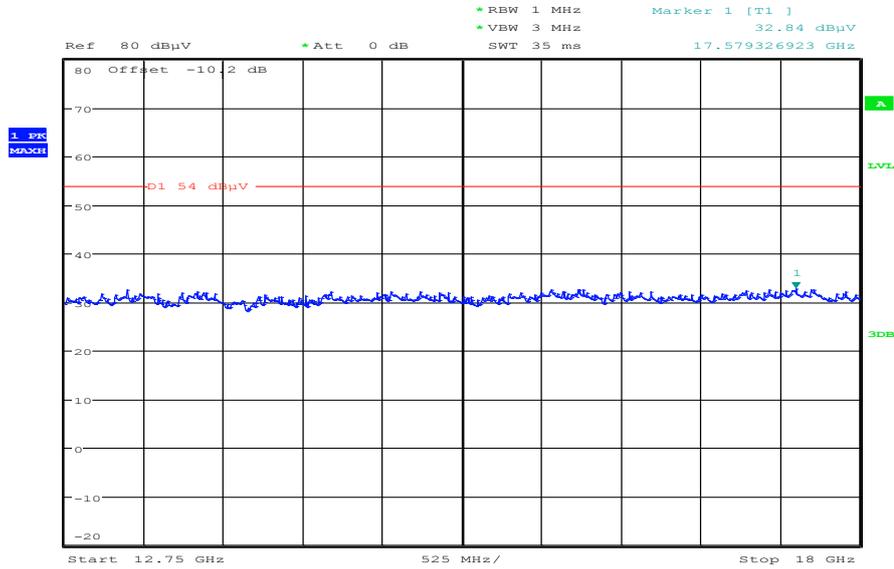
Plot 8: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



Plot 9: Middle channel, vertical & horizontal polarization, mask

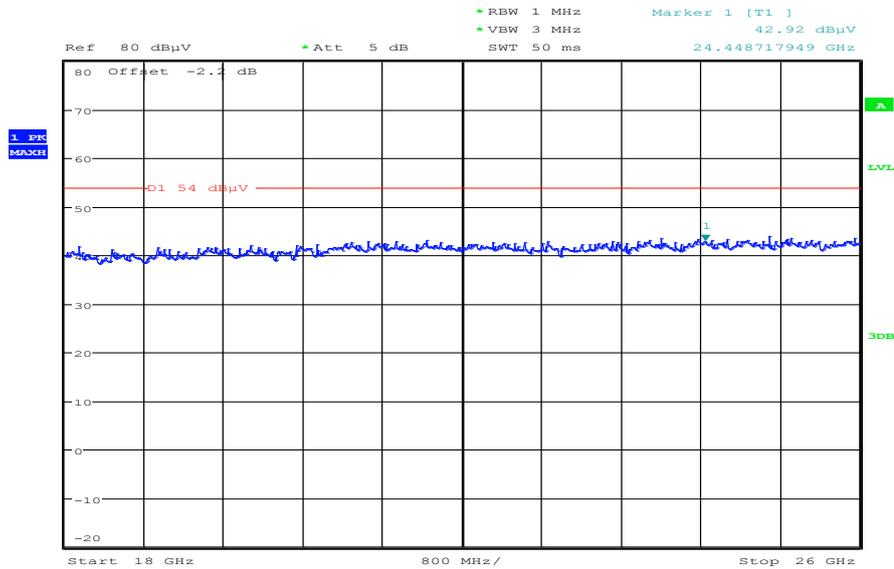


Plot 10: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



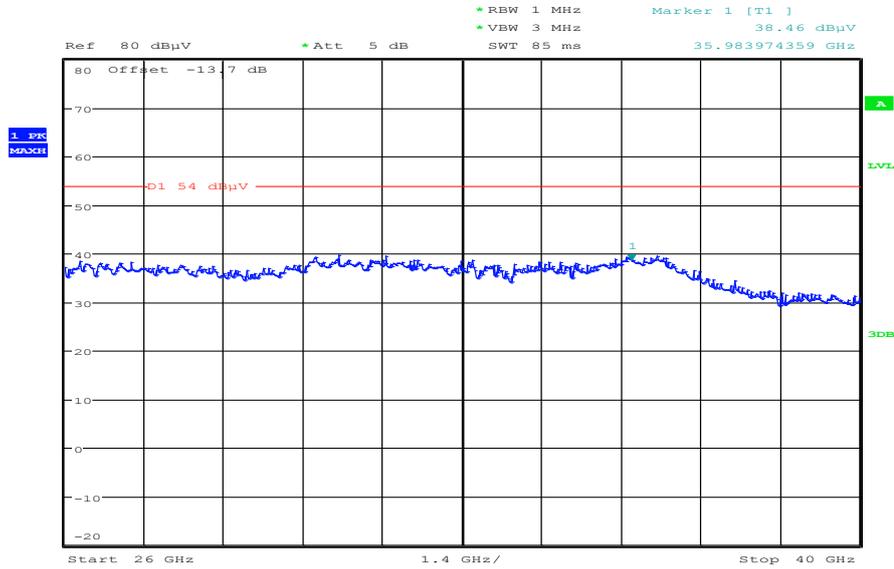
Date: 28.MAY.2014 11:56:18

Plot 11: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



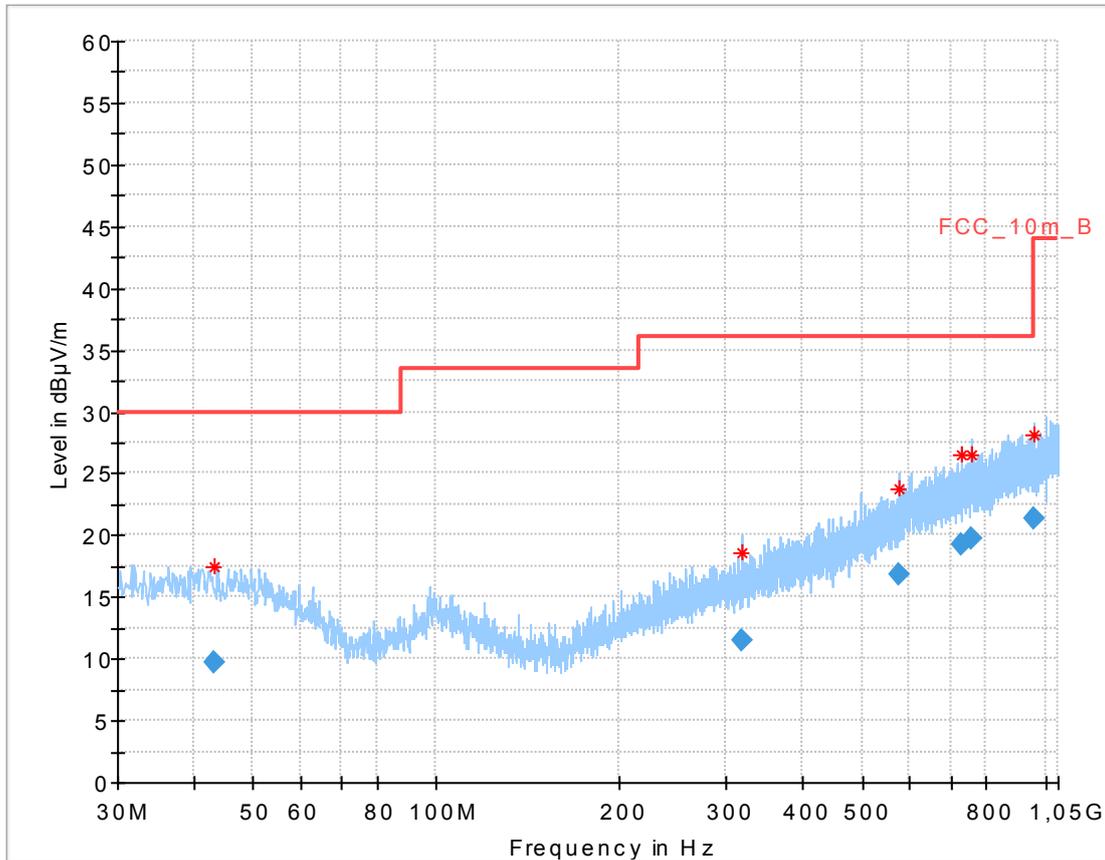
Date: 28.MAY.2014 13:44:00

Plot 12: Middle channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 14:55:57

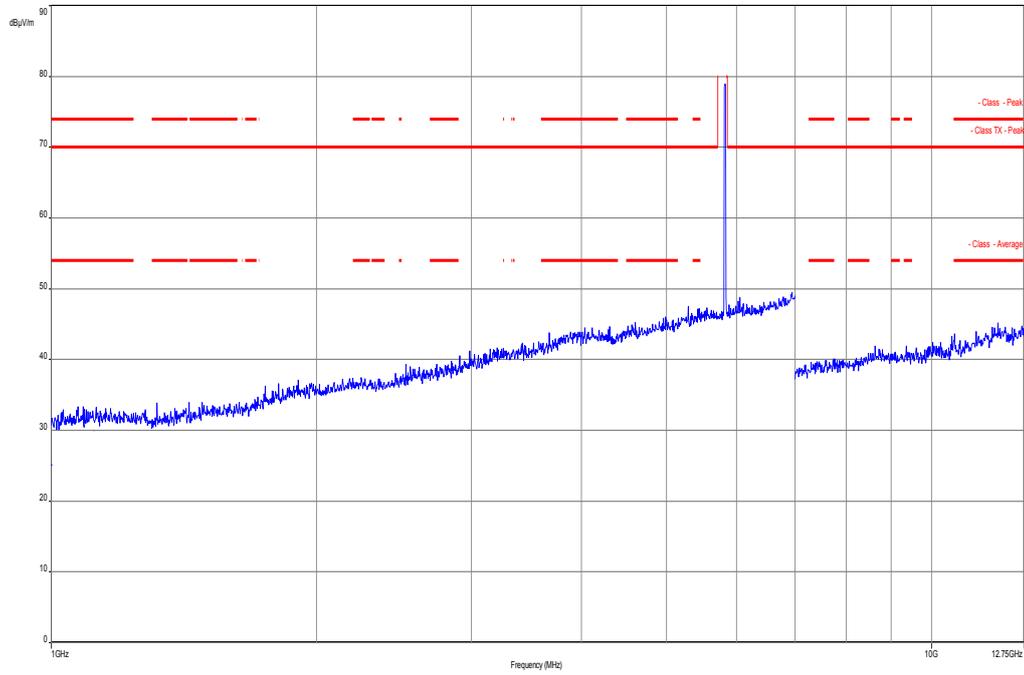
Plot 13: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



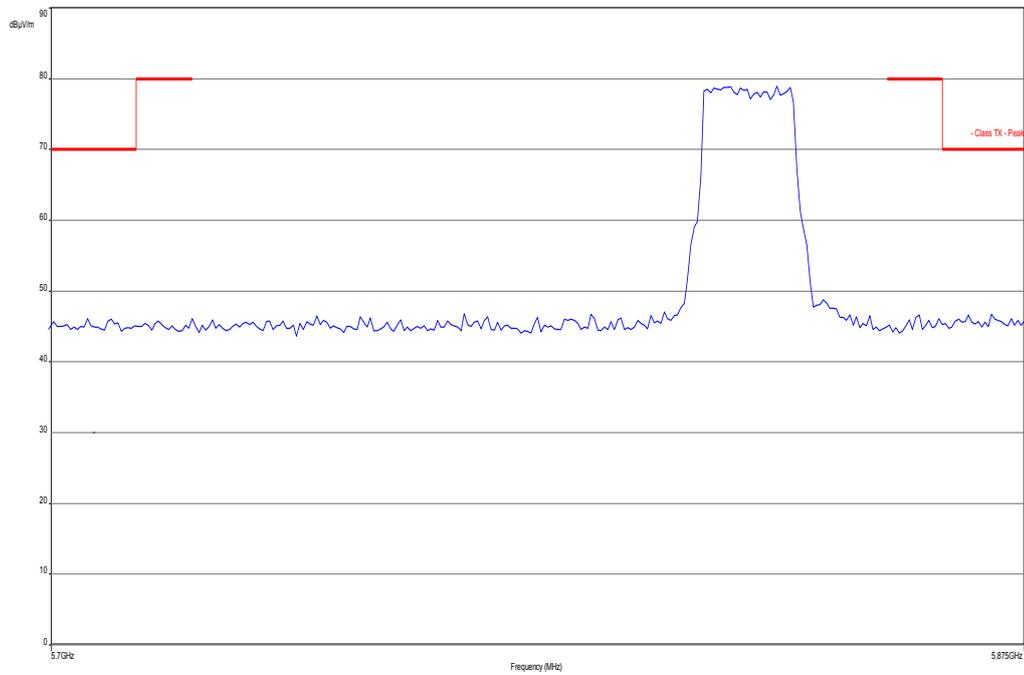
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
43.320150	9.77	30.00	20.23	1000.0	120.000	170.0	V	80.0	13.9
318.479700	11.47	36.00	24.53	1000.0	120.000	98.0	V	80.0	15.1
574.712550	16.89	36.00	19.11	1000.0	120.000	105.0	H	176.0	20.0
729.475950	19.24	36.00	16.76	1000.0	120.000	170.0	H	261.0	22.2
758.877150	19.70	36.00	16.30	1000.0	120.000	170.0	H	10.0	22.7
958.185900	21.31	36.00	14.69	1000.0	120.000	170.0	V	274.0	24.3

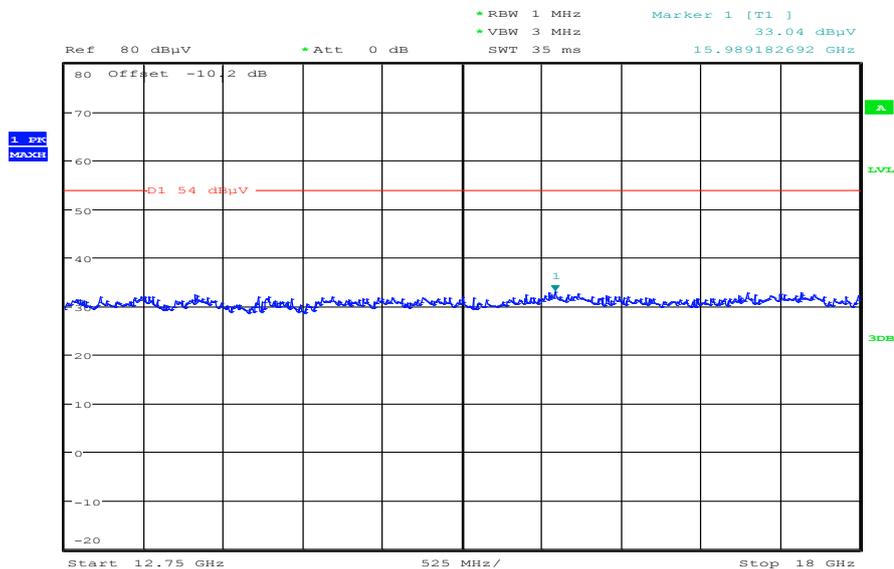
Plot 14: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



Plot 15: Highest channel, vertical & horizontal polarization, mask

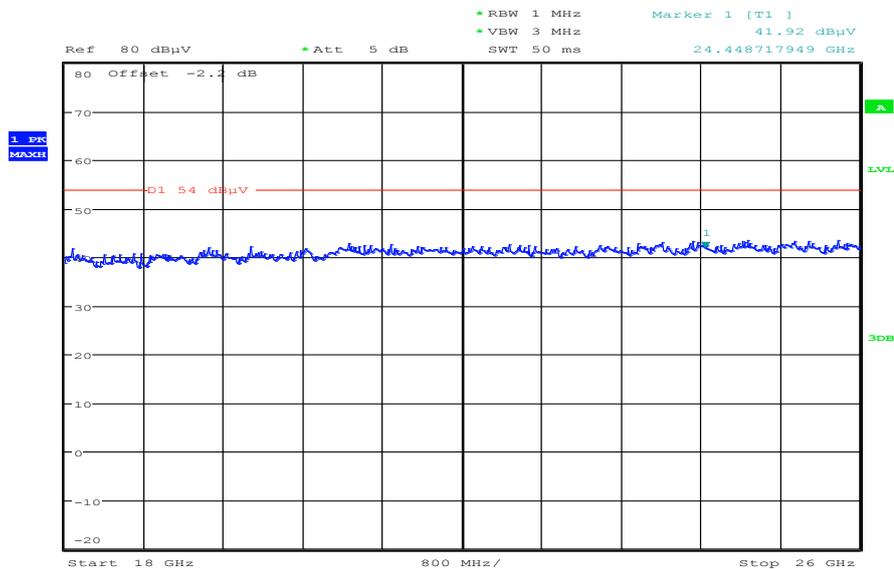


Plot 16: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



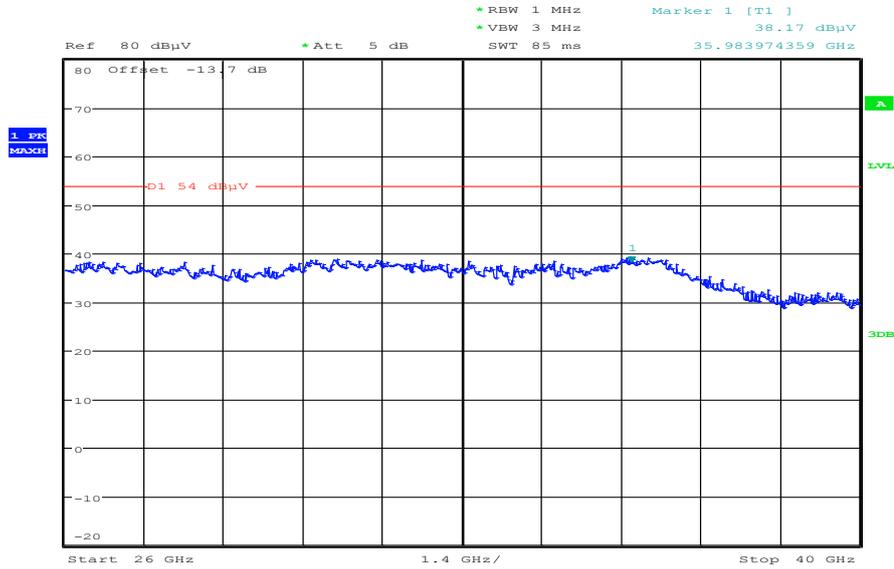
Date: 28.MAY.2014 11:58:00

Plot 17: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 13:45:16

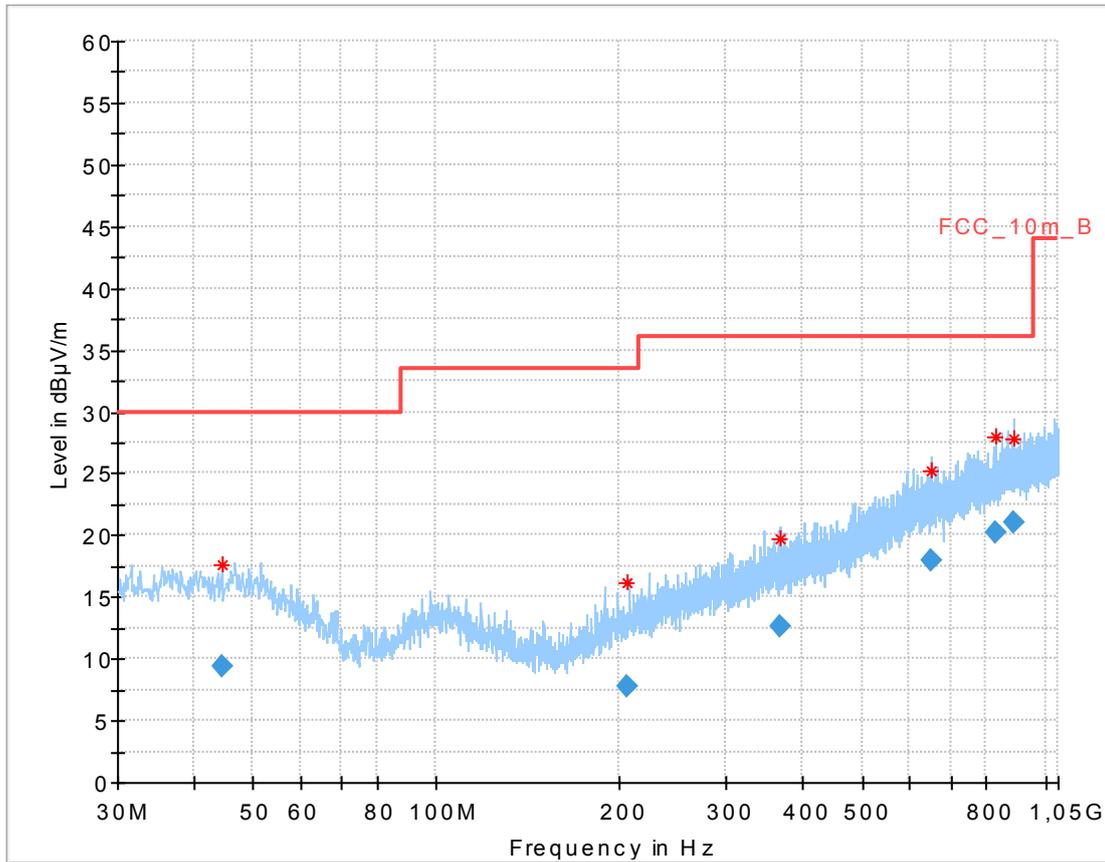
Plot 18: Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 14:57:02

Plots: OFDM / n/ac HT20 – mode

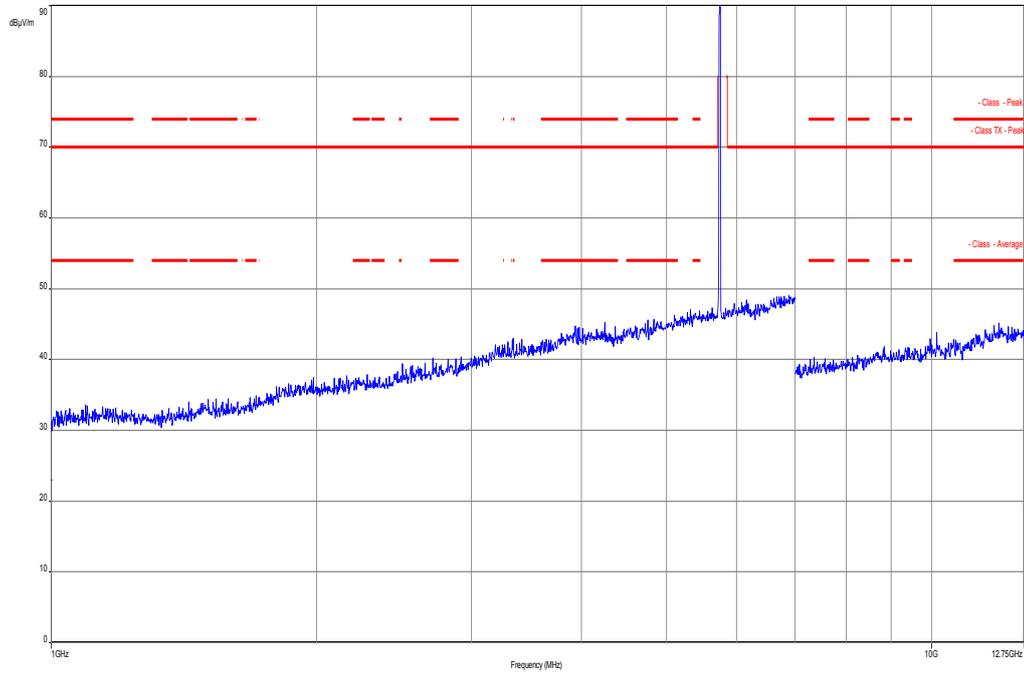
Plot 1: Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



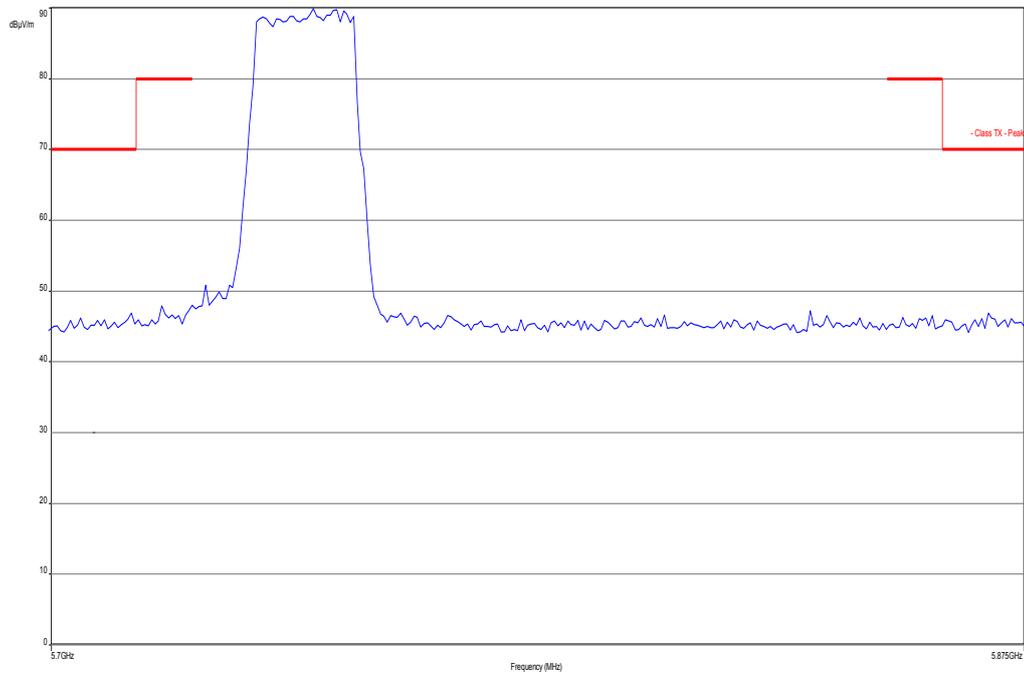
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
44.631600	9.41	30.00	20.59	1000.0	120.000	116.0	H	280.0	13.9
206.666100	7.76	33.50	25.74	1000.0	120.000	170.0	H	273.0	11.9
366.309150	12.56	36.00	23.44	1000.0	120.000	162.0	H	-2.0	16.3
650.245500	17.98	36.00	18.02	1000.0	120.000	133.0	V	83.0	21.1
831.107400	20.20	36.00	15.80	1000.0	120.000	170.0	V	280.0	23.2
889.784850	20.99	36.00	15.01	1000.0	120.000	170.0	V	181.0	24.0

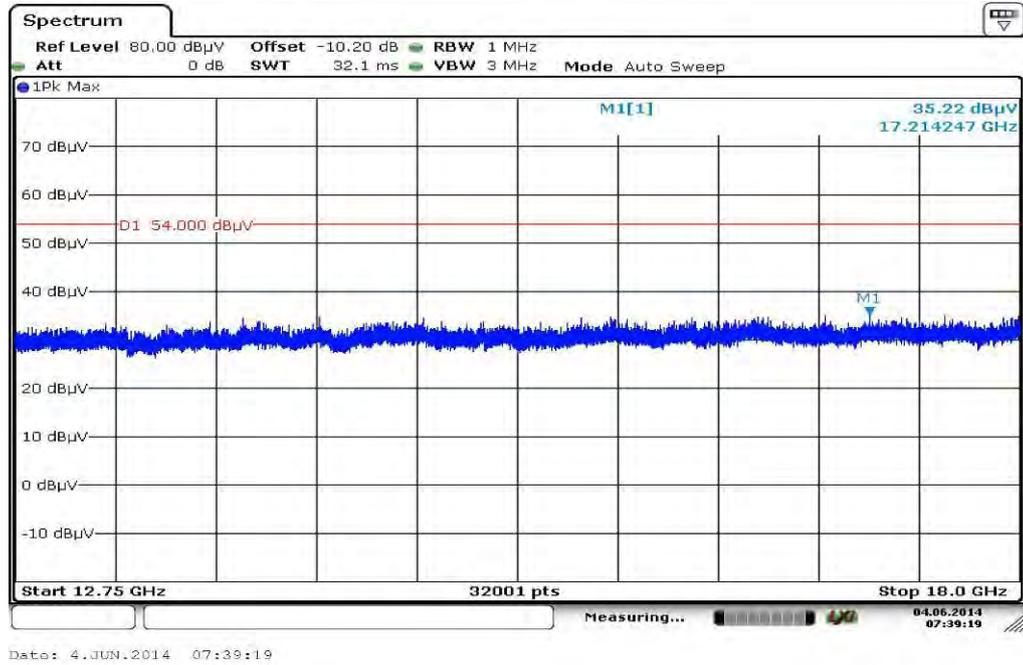
Plot 2: Lowest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



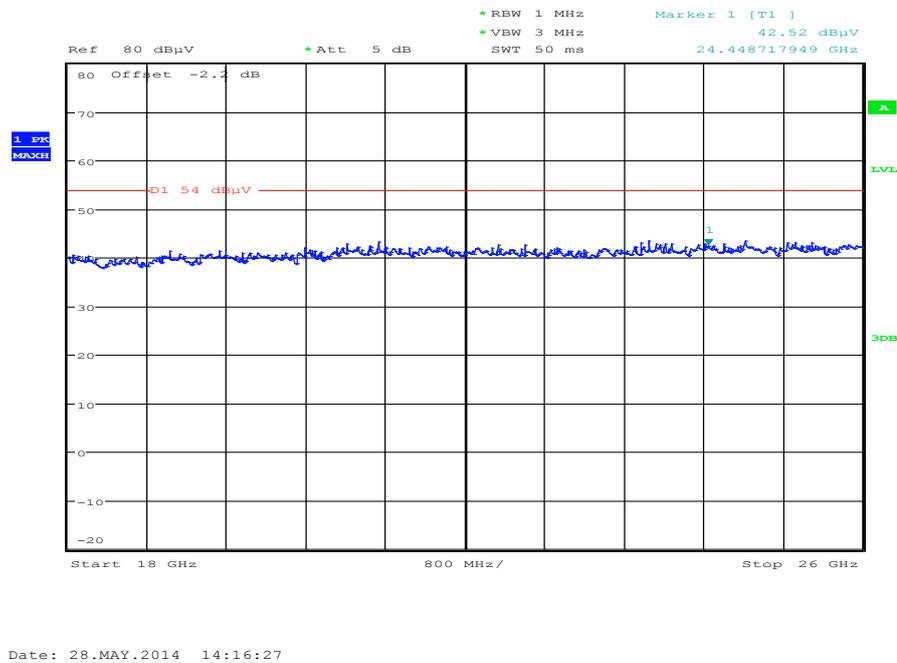
Plot 3: Lowest channel, vertical & horizontal polarization, mask



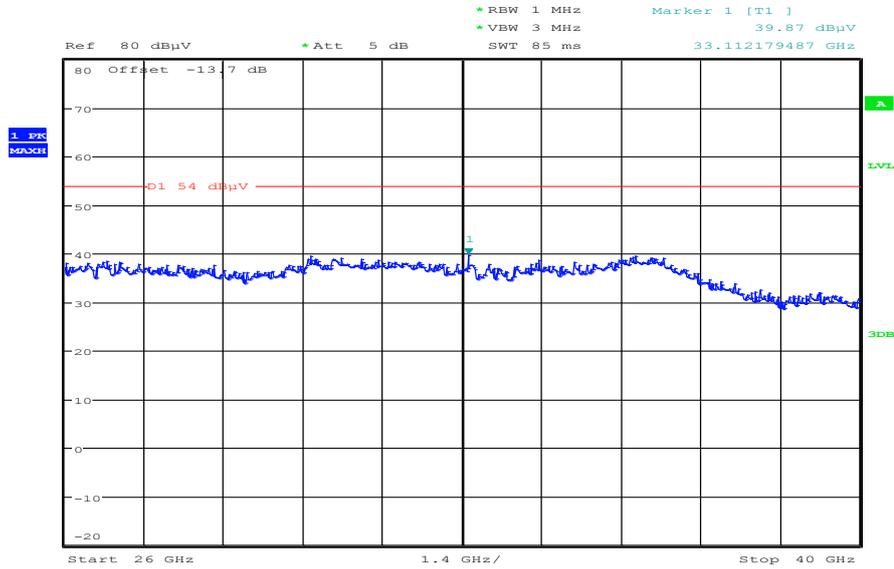
Plot 4: Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 5: Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization

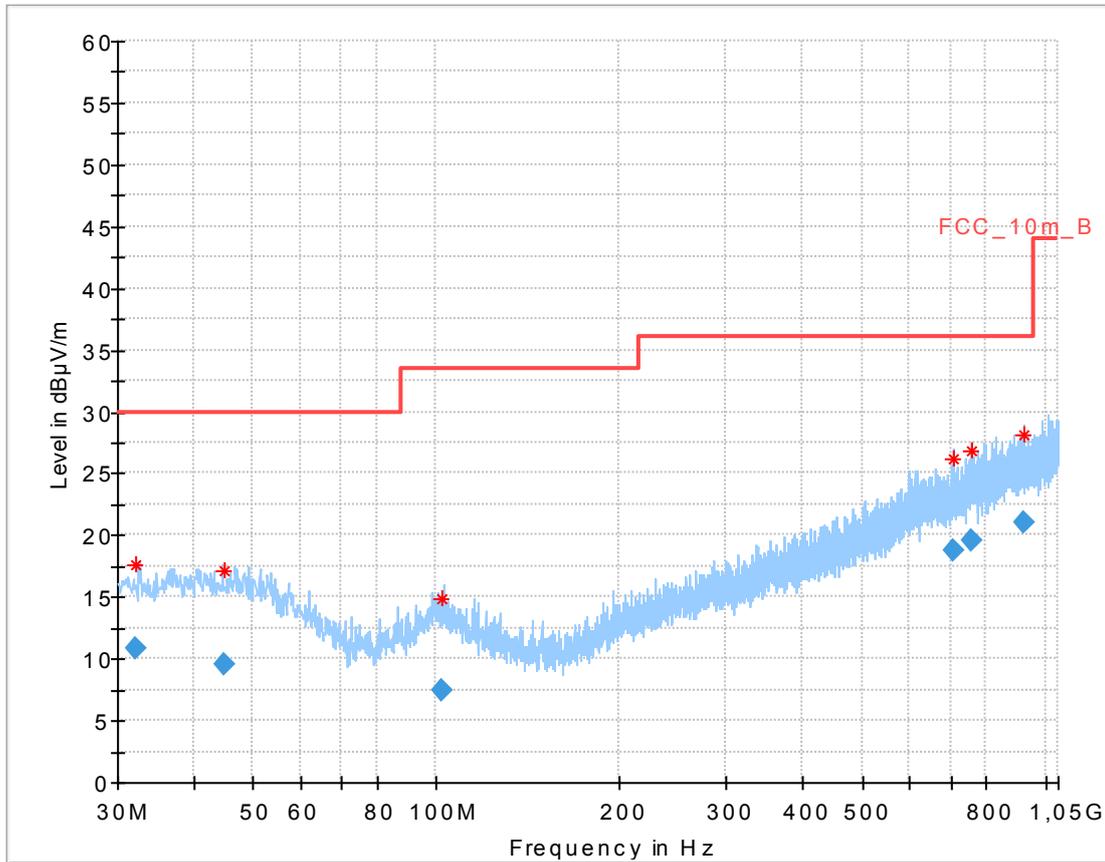


Plot 6: Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:09:32

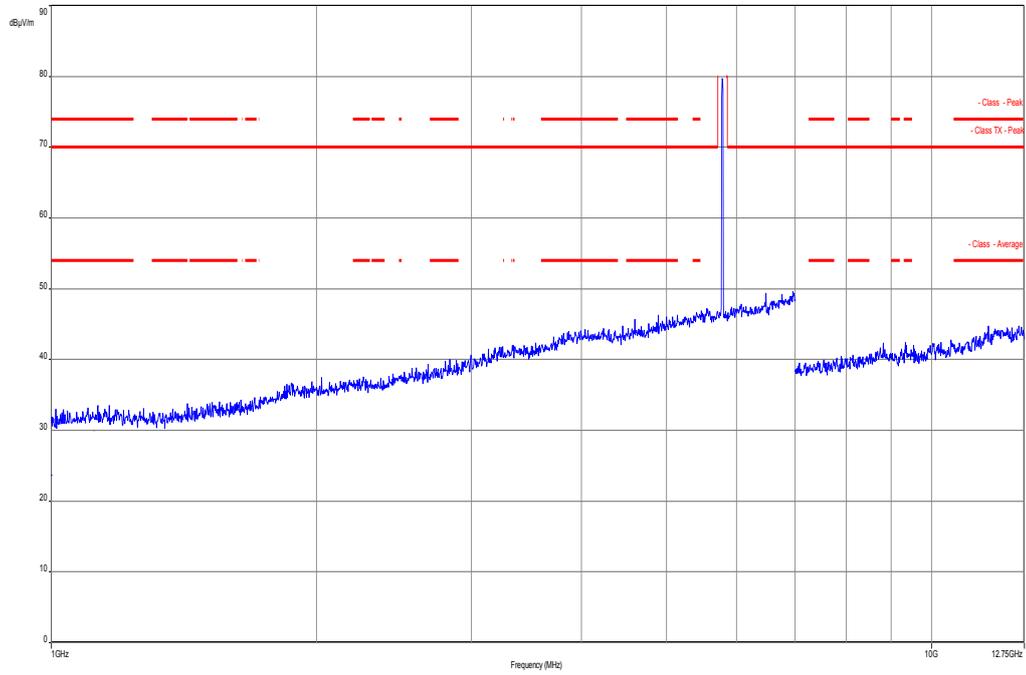
Plot 7: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization



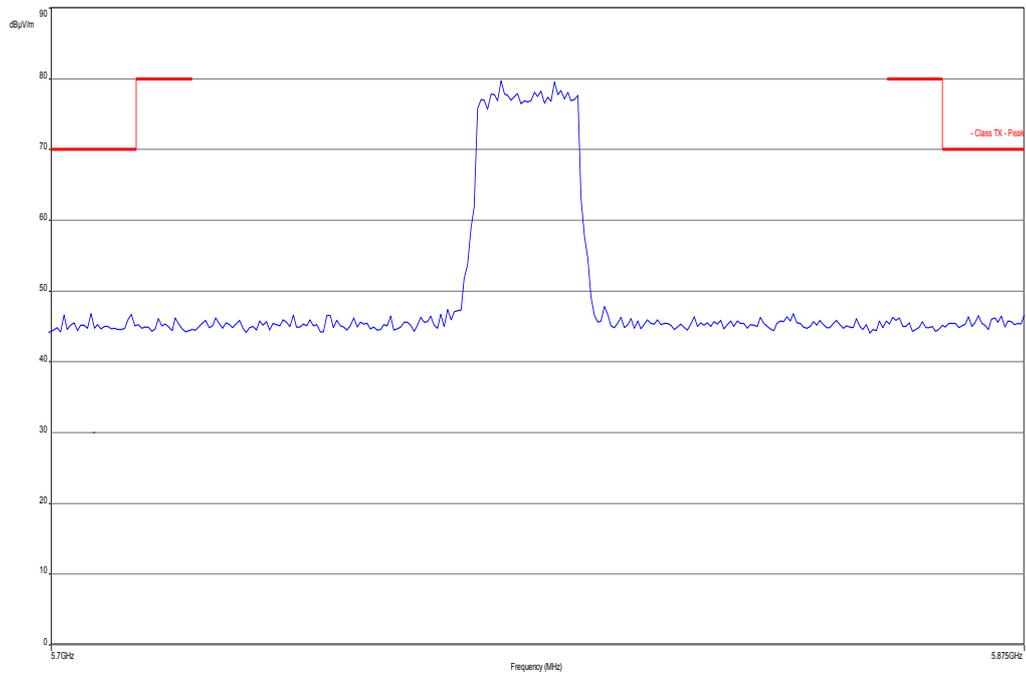
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.091600	10.88	30.00	19.12	1000.0	120.000	170.0	V	86.0	13.5
45.067350	9.62	30.00	20.38	1000.0	120.000	170.0	H	10.0	13.9
102.216150	7.39	33.50	26.11	1000.0	120.000	163.0	H	171.0	11.9
708.259350	18.78	36.00	17.22	1000.0	120.000	105.0	V	261.0	21.7
757.373550	19.59	36.00	16.41	1000.0	120.000	170.0	H	83.0	22.7
923.082600	21.10	36.00	14.90	1000.0	120.000	170.0	V	261.0	24.2

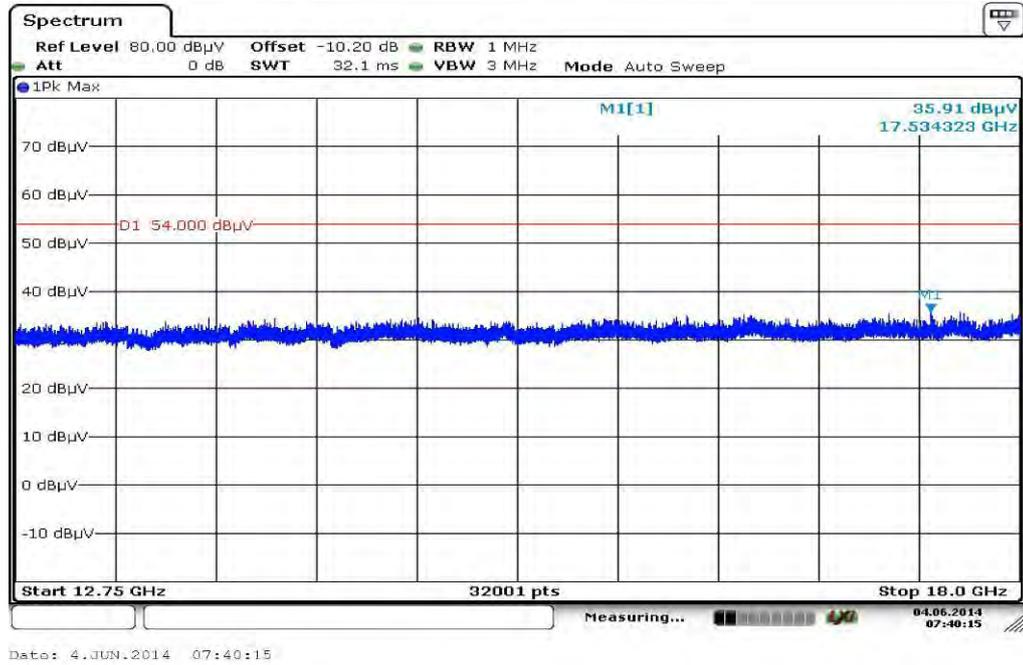
Plot 8: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



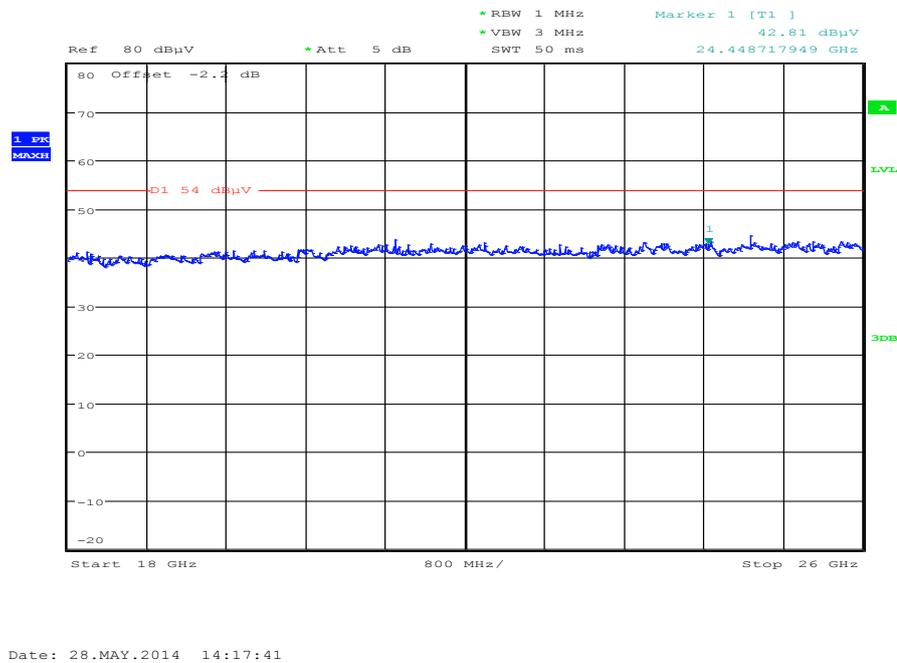
Plot 9: Middle channel, vertical & horizontal polarization, mask



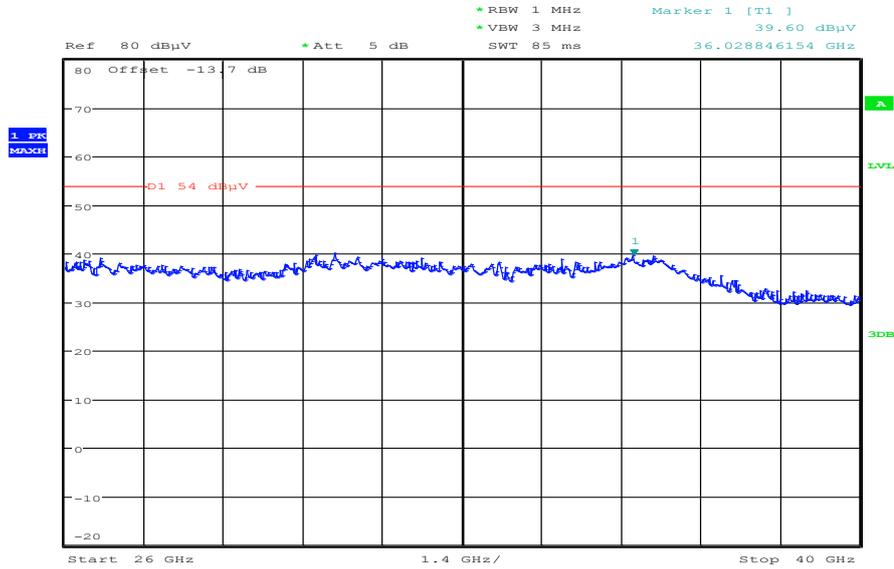
Plot 10: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 11: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization

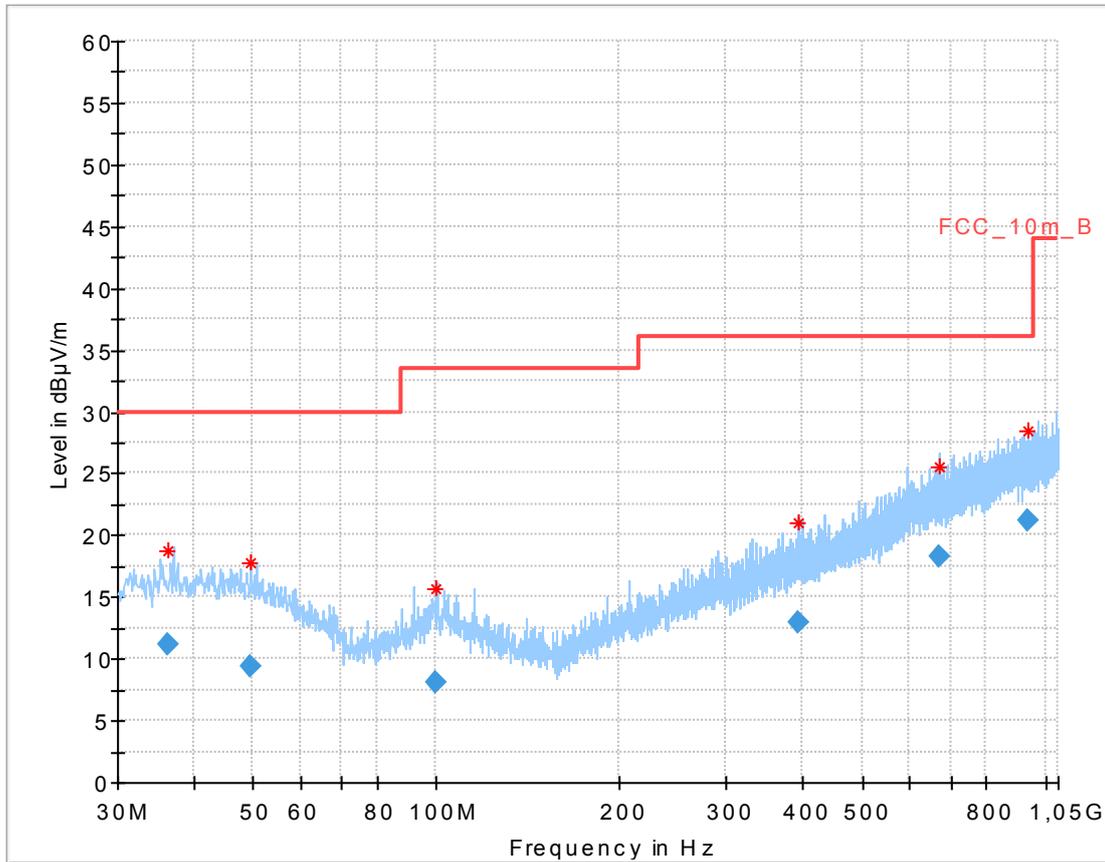


Plot 12: Middle channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:11:04

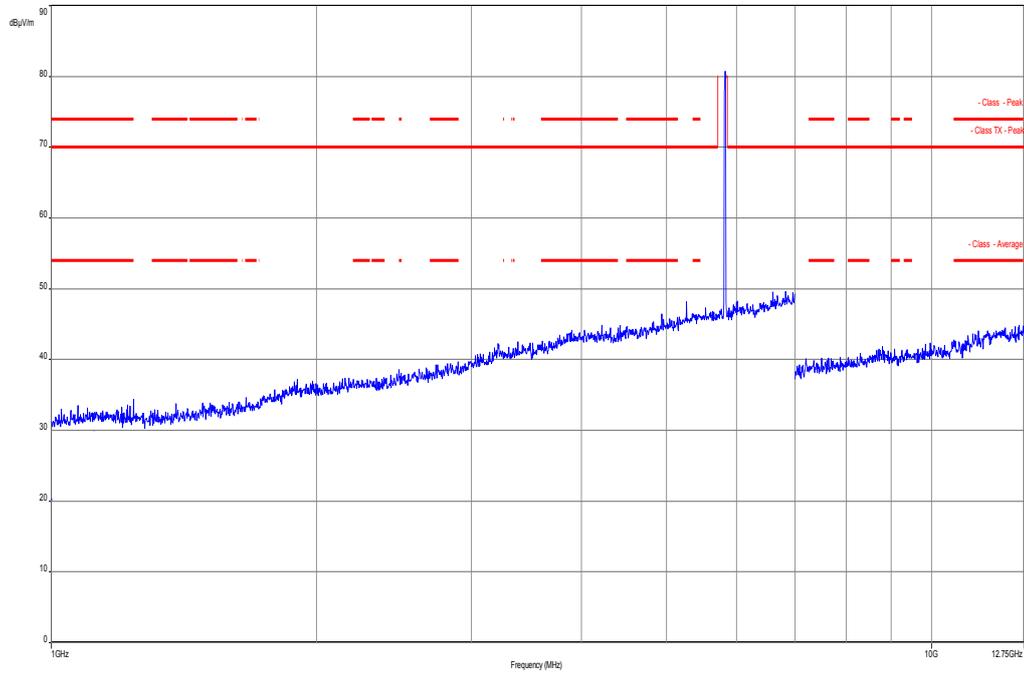
Plot 13: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



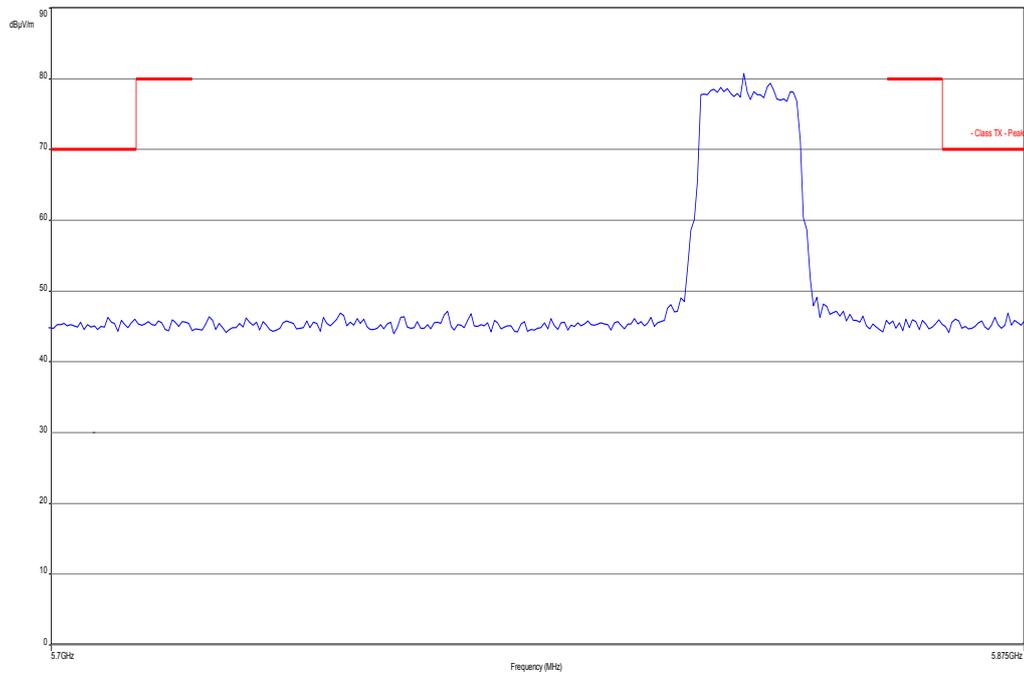
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.420900	11.09	30.00	18.91	1000.0	120.000	170.0	V	190.0	13.9
49.709700	9.36	30.00	20.64	1000.0	120.000	170.0	V	-7.0	13.7
100.255050	8.15	33.50	25.35	1000.0	120.000	125.0	H	4.0	12.2
392.121600	12.98	36.00	23.02	1000.0	120.000	170.0	V	271.0	16.7
669.576750	18.26	36.00	17.74	1000.0	120.000	132.0	V	-10.0	21.3
938.299350	21.14	36.00	14.86	1000.0	120.000	170.0	V	100.0	24.2

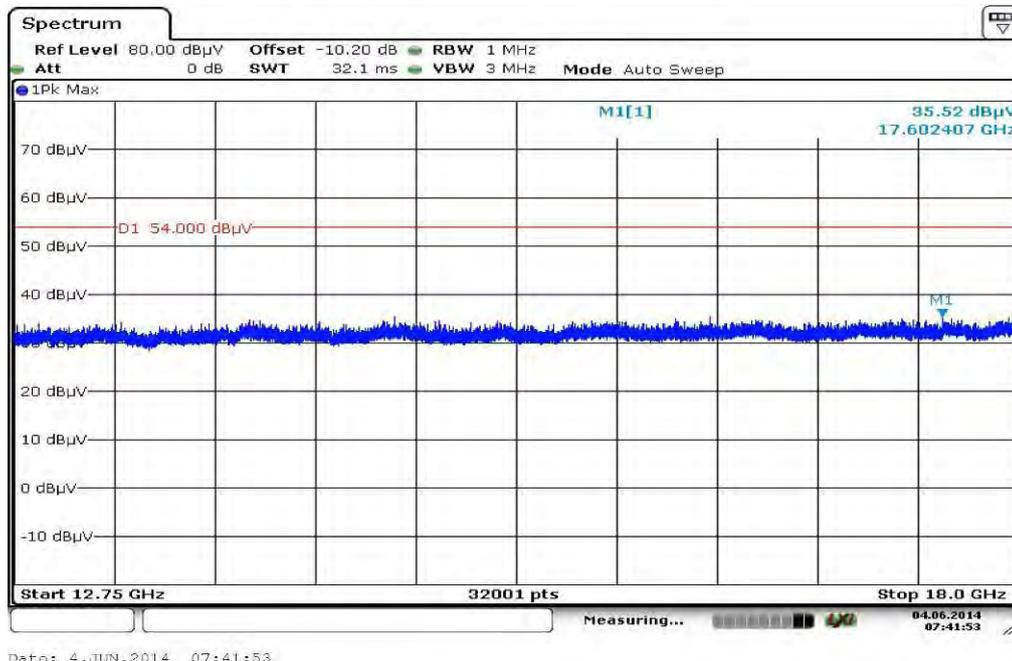
Plot 14: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



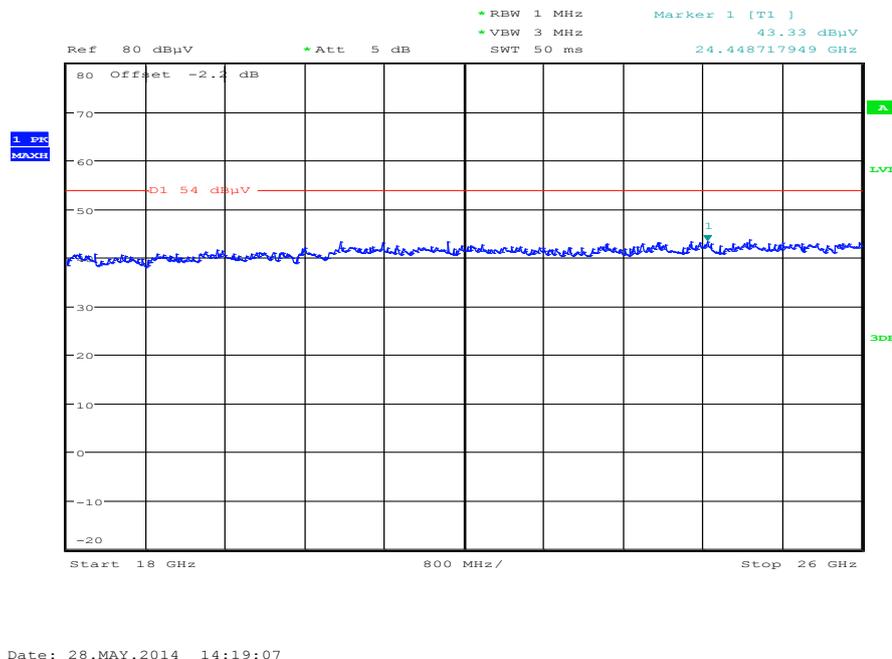
Plot 15: Highest channel, vertical & horizontal polarization, mask



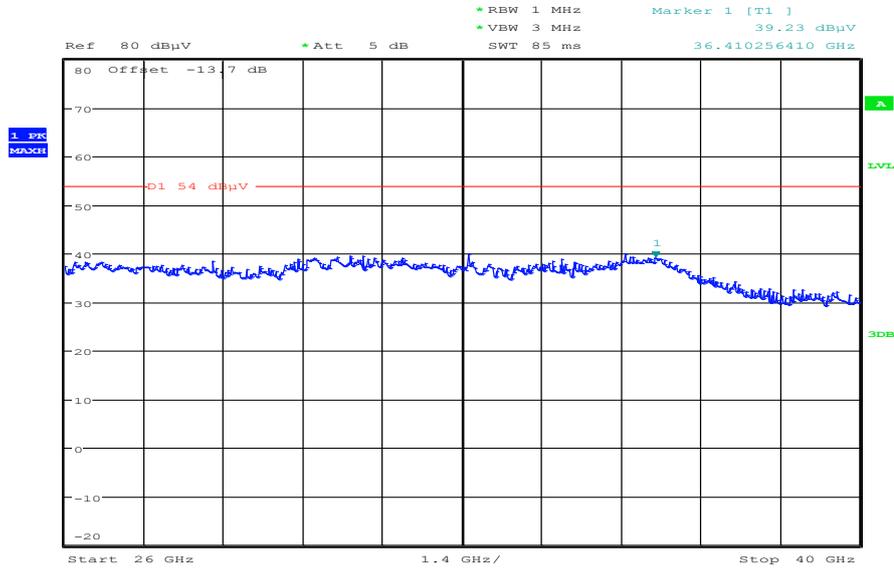
Plot 16: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 17: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



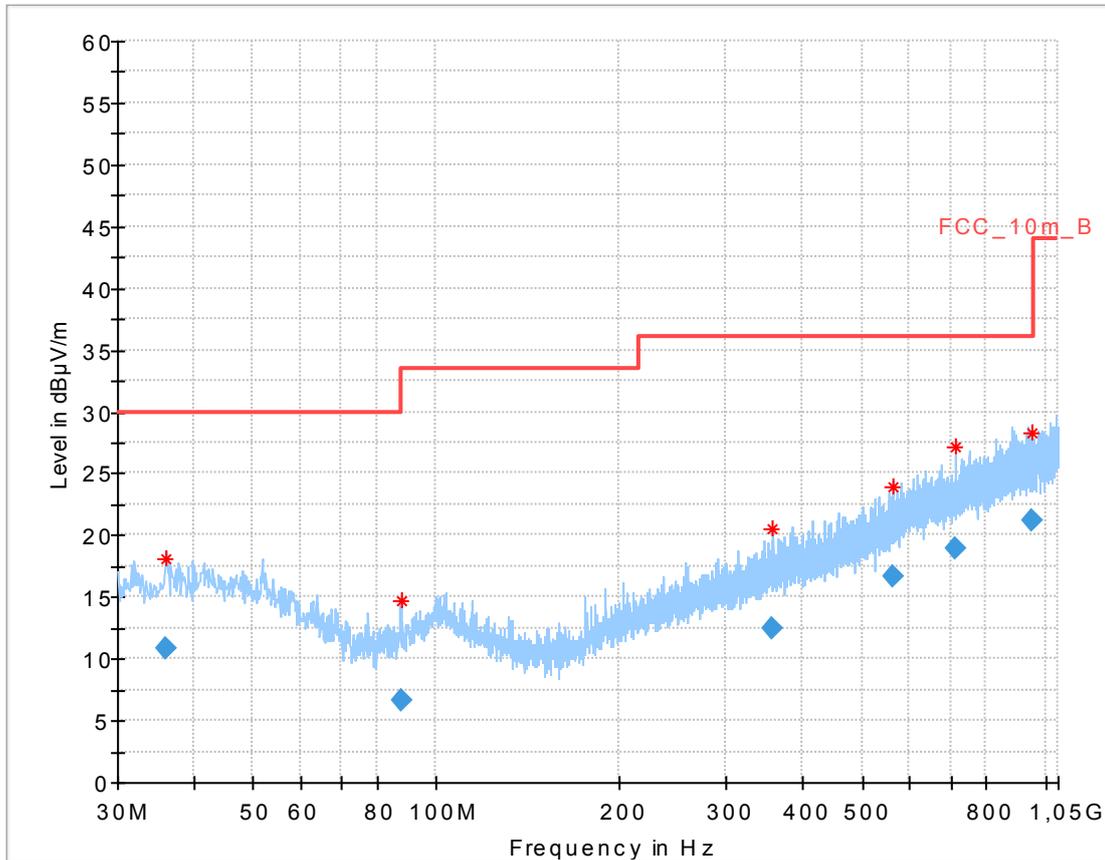
Plot 18: Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:12:36

Plots: OFDM / n/ac HT40 – mode

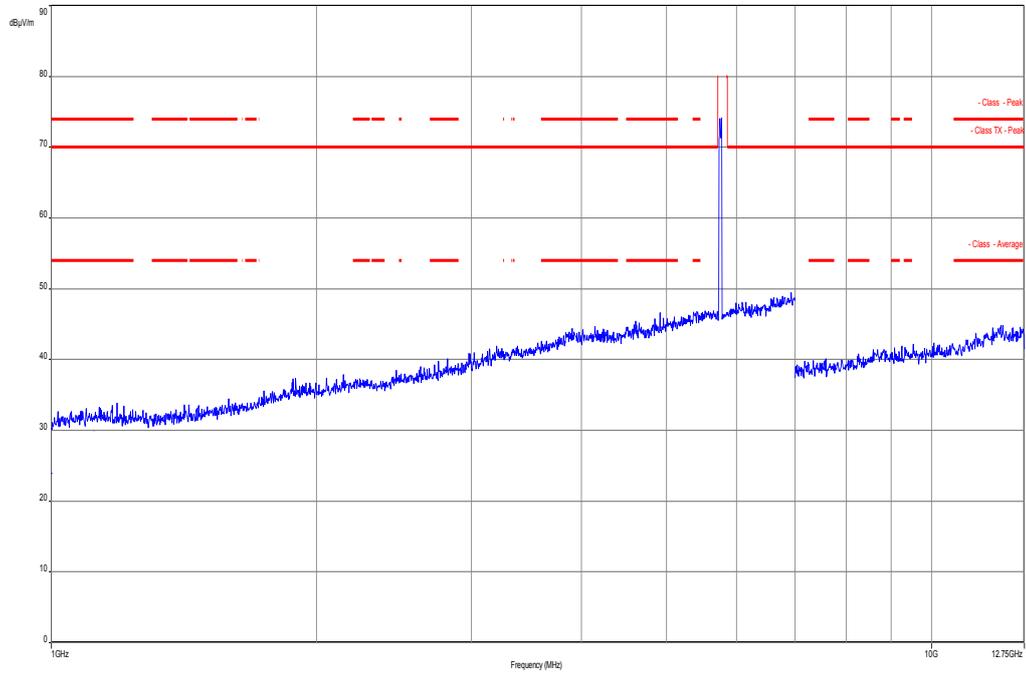
Plot 1: Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



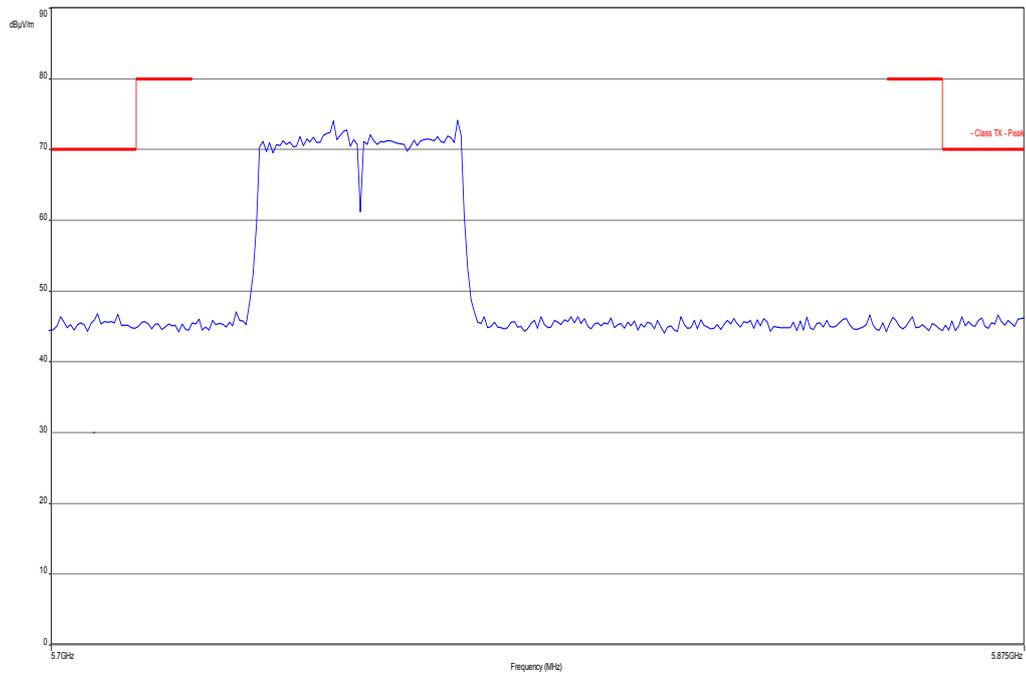
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.130950	10.88	30.00	19.12	1000.0	120.000	137.0	V	260.0	13.9
87.638100	6.56	30.00	23.44	1000.0	120.000	170.0	H	-4.0	10.1
357.409650	12.45	36.00	23.55	1000.0	120.000	170.0	V	91.0	16.2
562.198950	16.64	36.00	19.36	1000.0	120.000	170.0	H	10.0	19.6
711.932850	18.87	36.00	17.13	1000.0	120.000	101.0	V	280.0	21.8
947.953200	21.12	36.00	14.88	1000.0	120.000	170.0	H	260.0	24.3

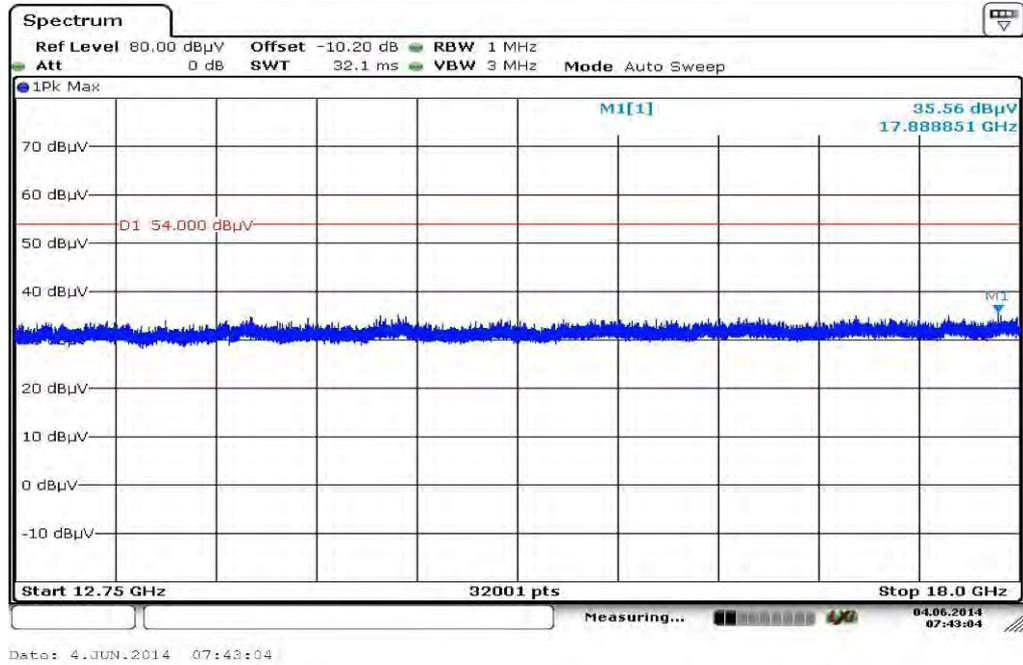
Plot 2: Lowest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



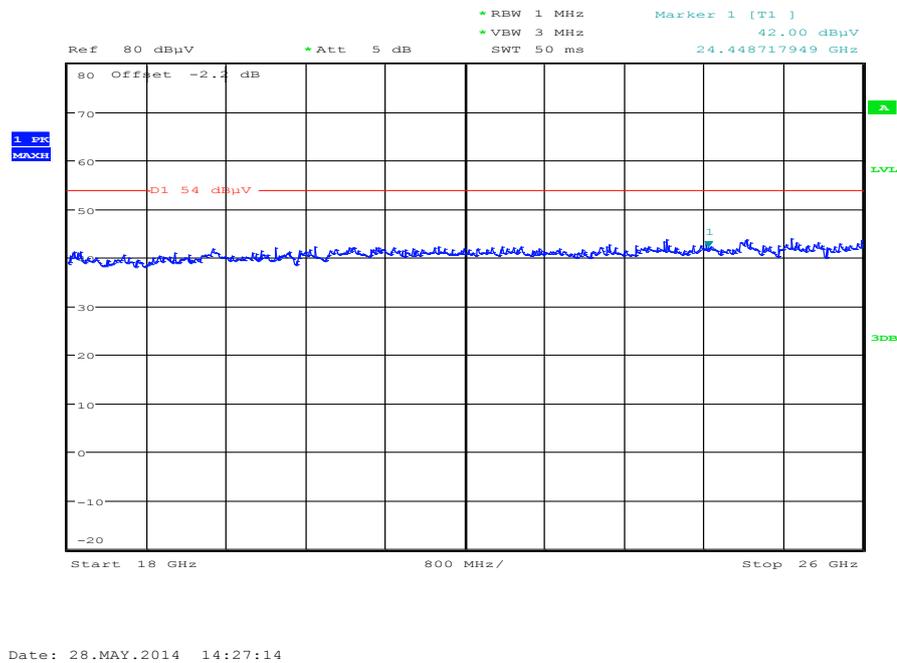
Plot 3: Lowest channel, vertical & horizontal polarization, mask



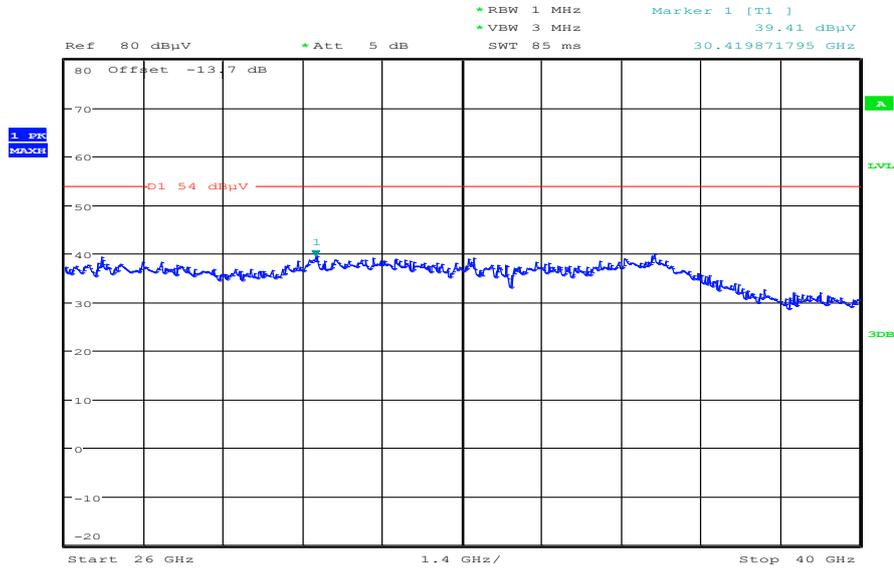
Plot 4: Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 5: Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization

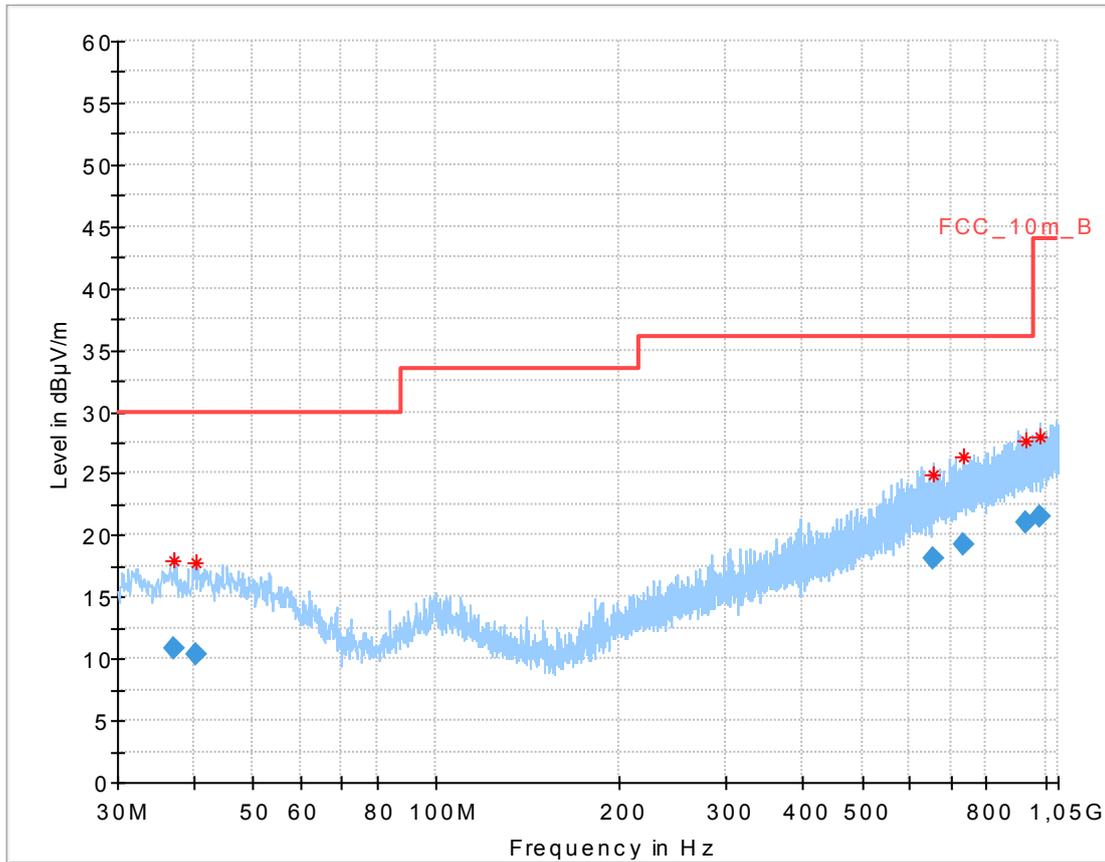


Plot 6: Lowest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:23:37

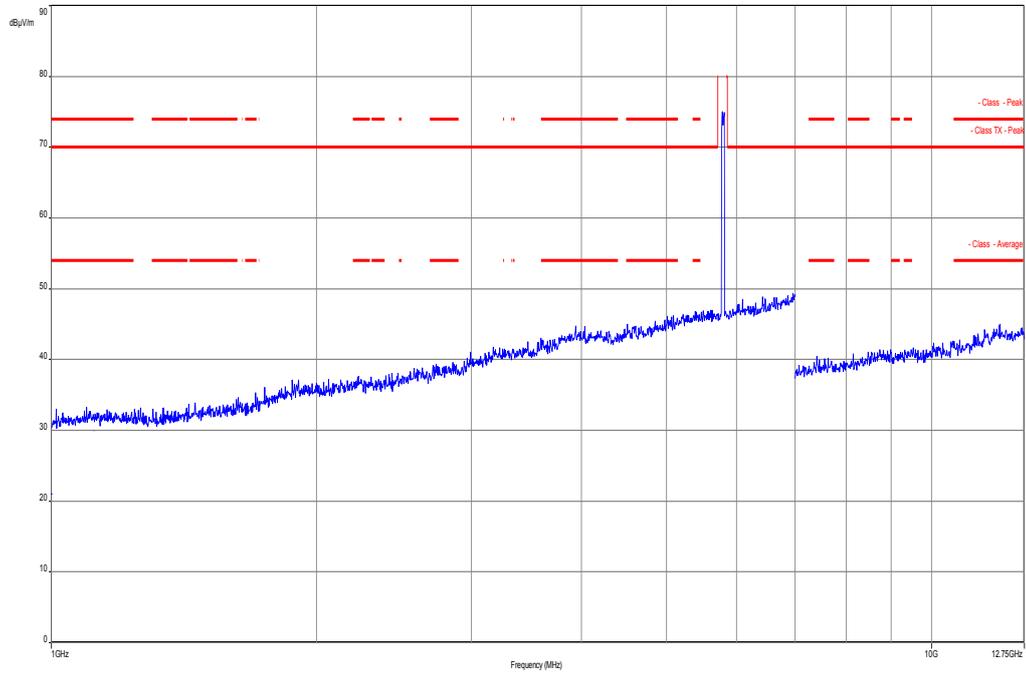
Plot 7: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization



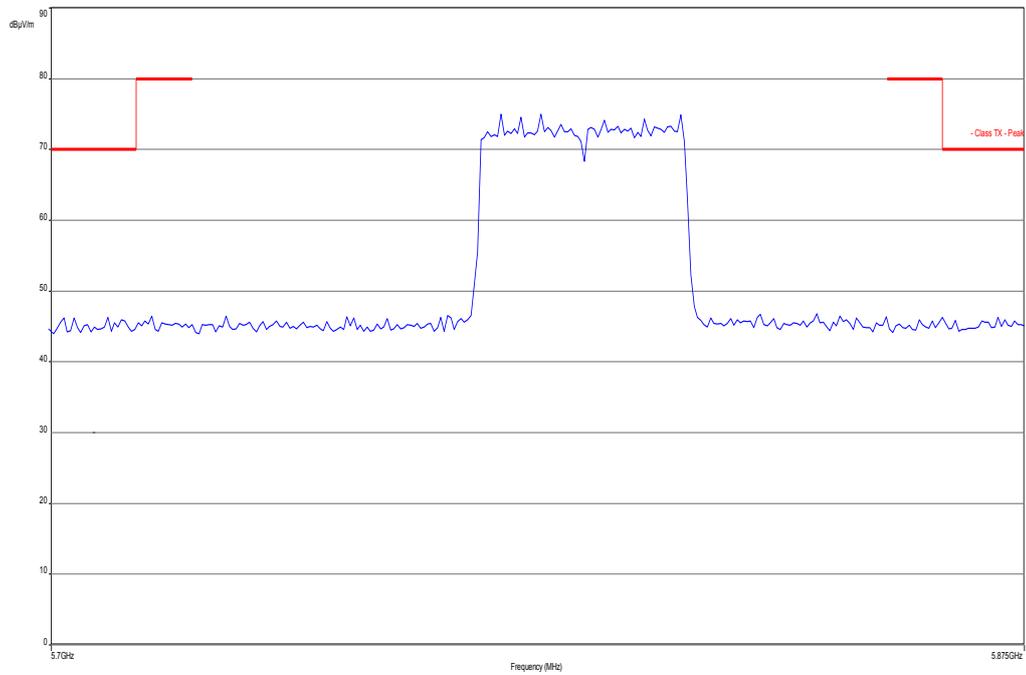
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.136100	10.83	30.00	19.17	1000.0	120.000	170.0	H	-4.0	13.9
40.329150	10.38	30.00	19.62	1000.0	120.000	170.0	V	10.0	14.0
655.954950	18.07	36.00	17.93	1000.0	120.000	98.0	H	280.0	21.2
732.390600	19.31	36.00	16.69	1000.0	120.000	135.0	V	171.0	22.3
930.150900	21.06	36.00	14.94	1000.0	120.000	170.0	V	81.0	24.2
978.605550	21.50	44.00	22.50	1000.0	120.000	170.0	H	173.0	24.6

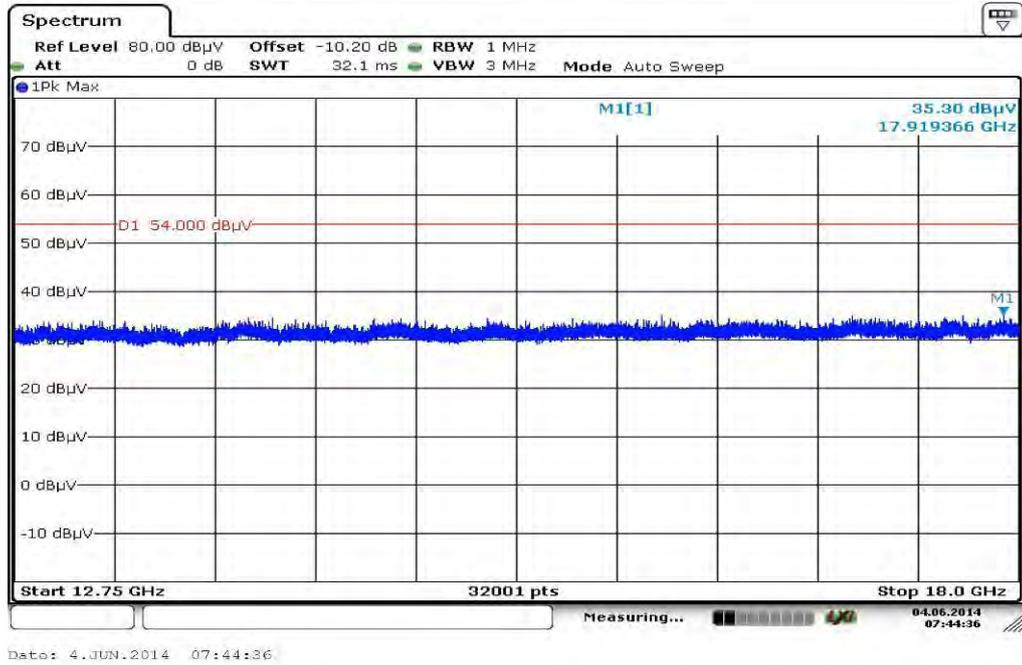
Plot 8: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



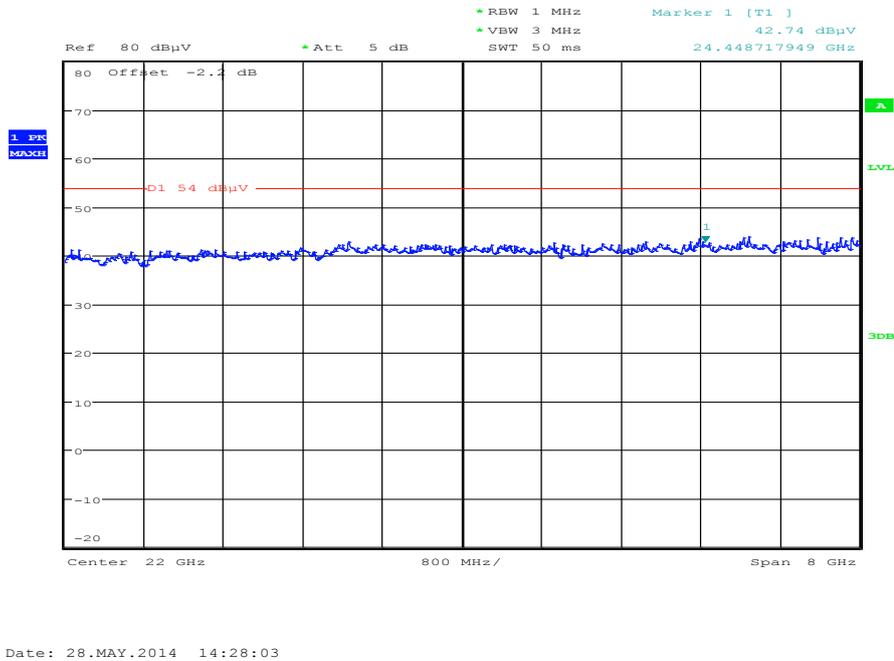
Plot 9: Highest channel, vertical & horizontal polarization, mask



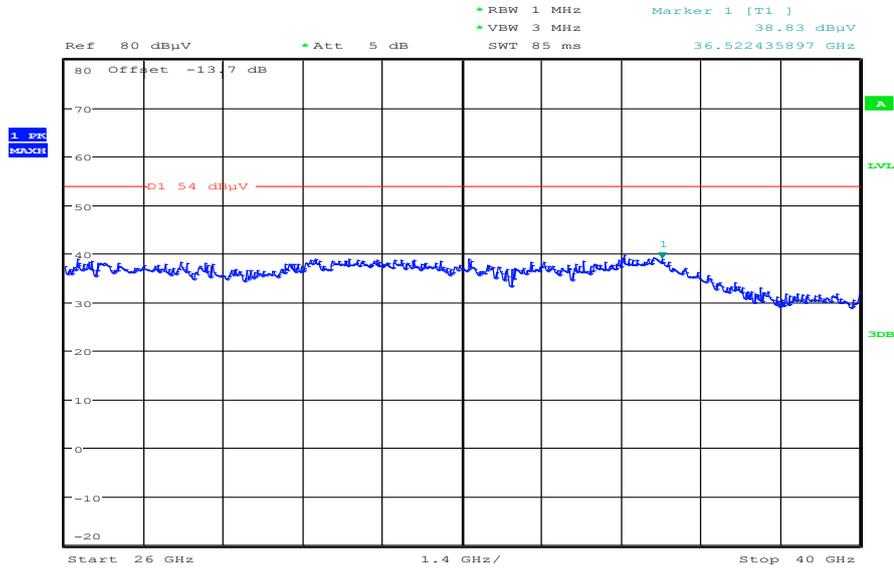
Plot 10: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Plot 11: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



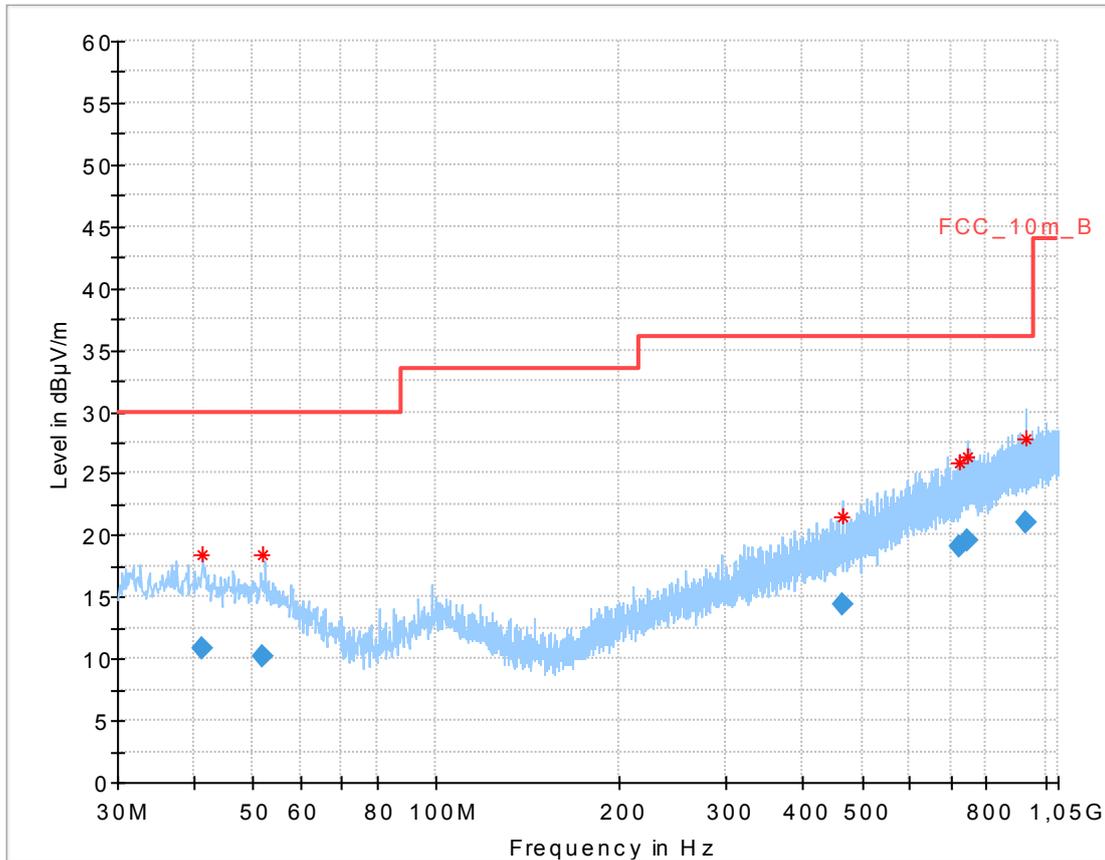
Plot 12: Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:24:51

Plots: OFDM / ac HT80 – mode

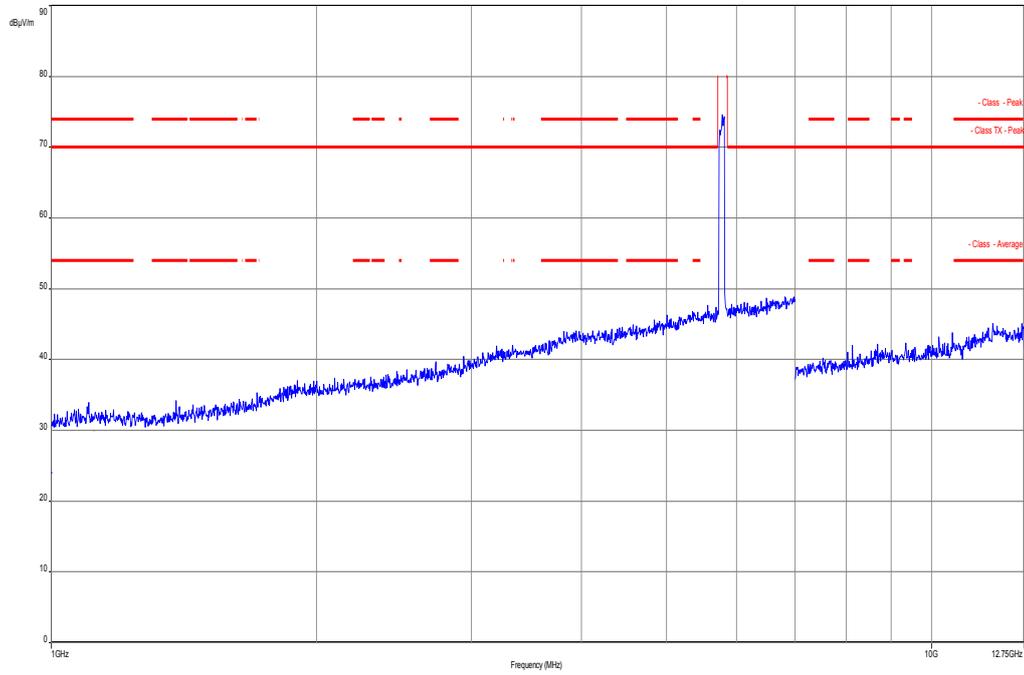
Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization



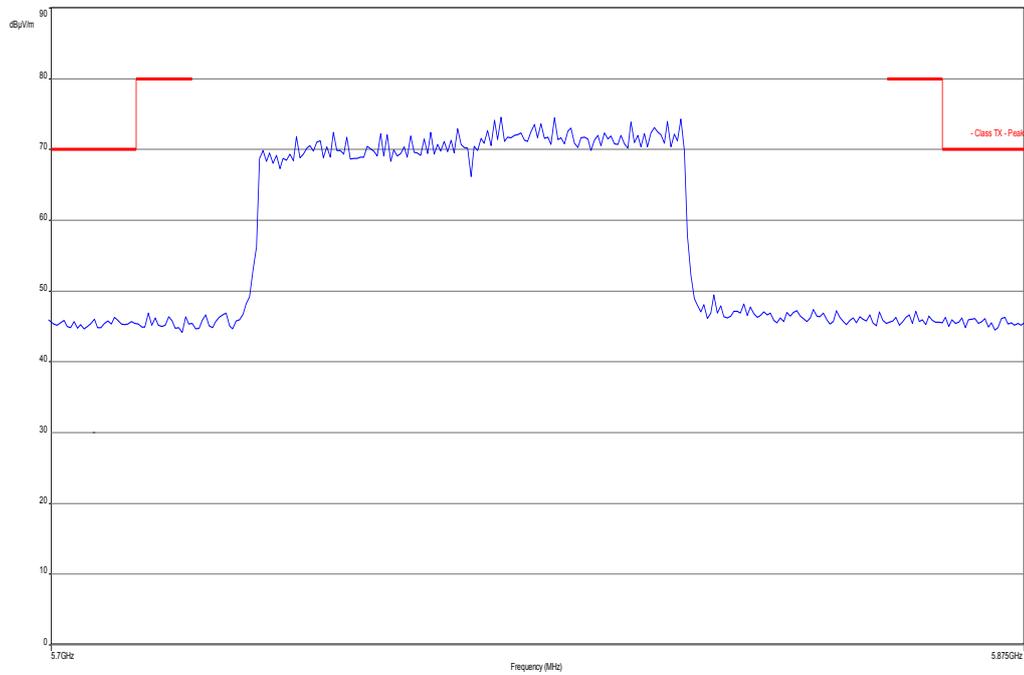
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.205600	10.85	30.00	19.15	1000.0	120.000	105.0	V	182.0	14.0
51.860700	10.14	30.00	19.86	1000.0	120.000	163.0	V	10.0	13.3
466.208550	14.34	36.00	21.66	1000.0	120.000	170.0	V	190.0	18.0
724.283250	19.07	36.00	16.93	1000.0	120.000	170.0	H	4.0	22.1
746.461500	19.53	36.00	16.47	1000.0	120.000	135.0	V	263.0	22.6
931.977900	21.03	36.00	14.97	1000.0	120.000	170.0	H	100.0	24.2

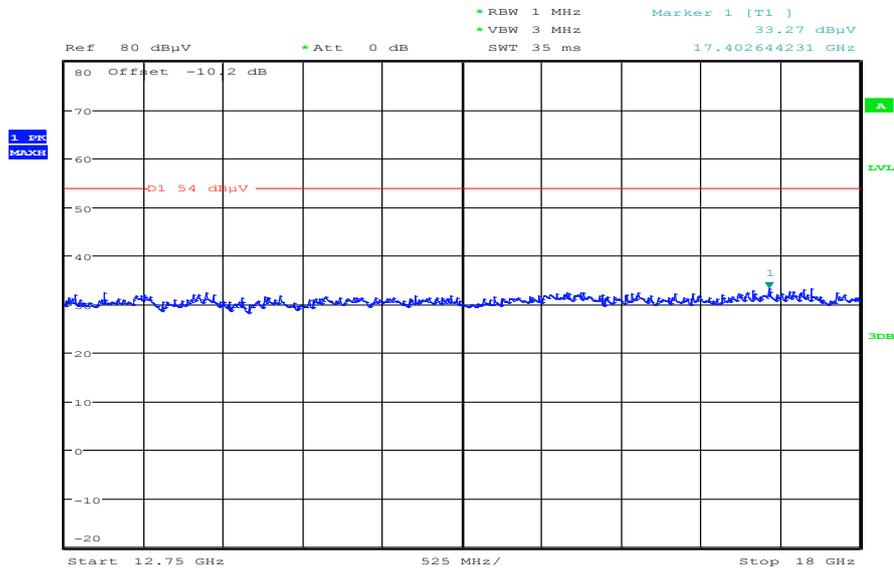
Plot 2: 1 GHz to 12.75 GHz, vertical & horizontal polarization



Plot 3: vertical & horizontal polarization, mask

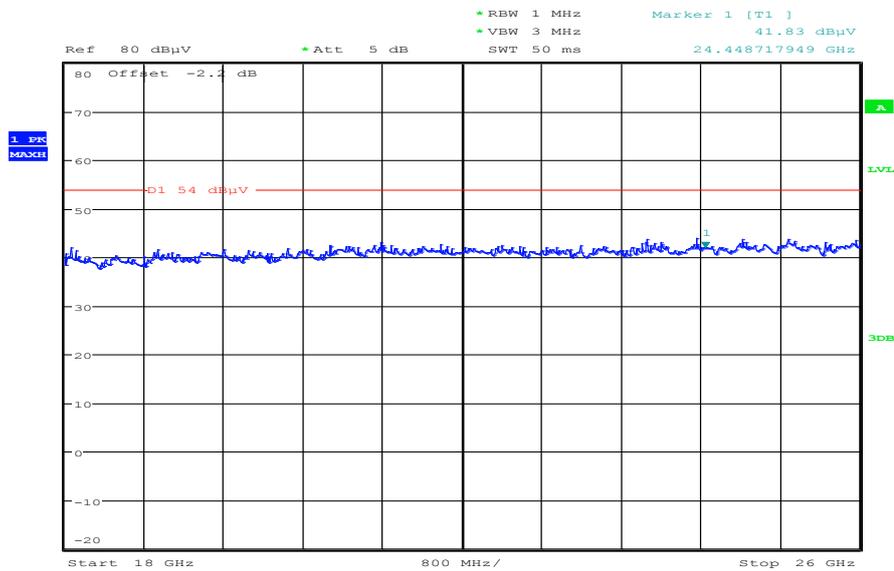


Plot 4: 12.75 GHz to 18 GHz, vertical & horizontal polarization



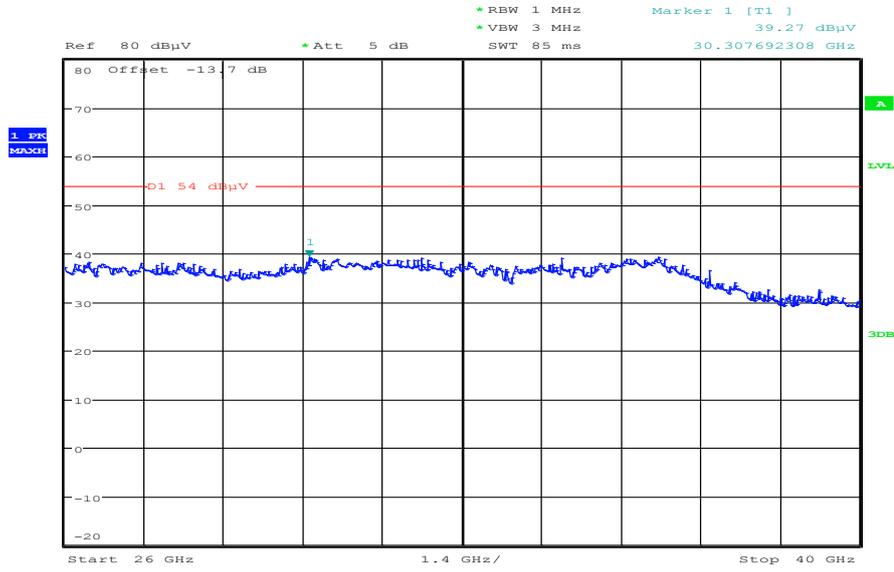
Date: 28.MAY.2014 13:26:03

Plot 5: 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 14:32:44

Plot 6: 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 28.MAY.2014 15:30:29

10.9 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode.

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: 100 kHz F > 1 GHz: ≥ 3 MHz /10 Hz
Span:	30 MHz to 40 GHz
Trace-Mode:	Max Hold / Average with 100 counts + 20 log (1 / X) for duty cycle lower than 100 %

Limits:

RX Spurious Emissions Radiated		
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

Results:

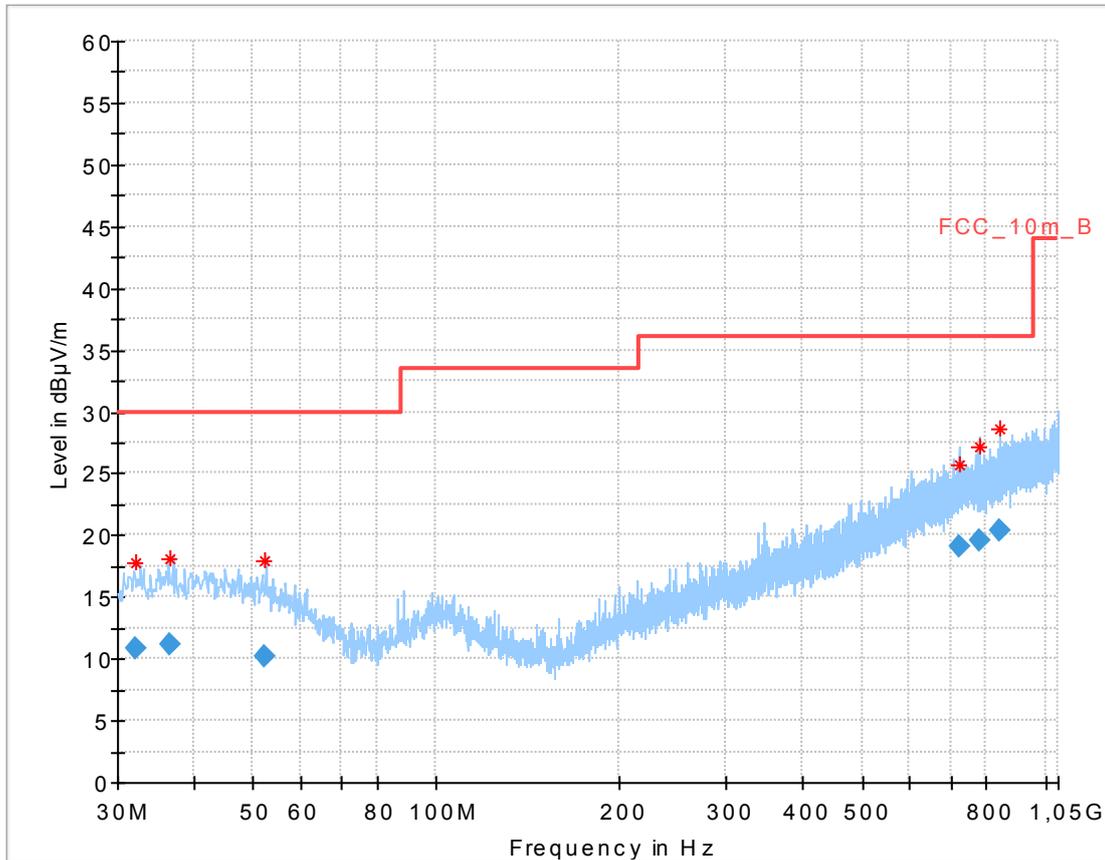
RX Spurious Emissions Radiated [dBμV/m]		
F [MHz]	Detector	Level [dBμV/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
All detected peak emissions are below the average limit!		
Measurement uncertainty	± 3 dB	

Result: **Passed**

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: RX / Idle – mode

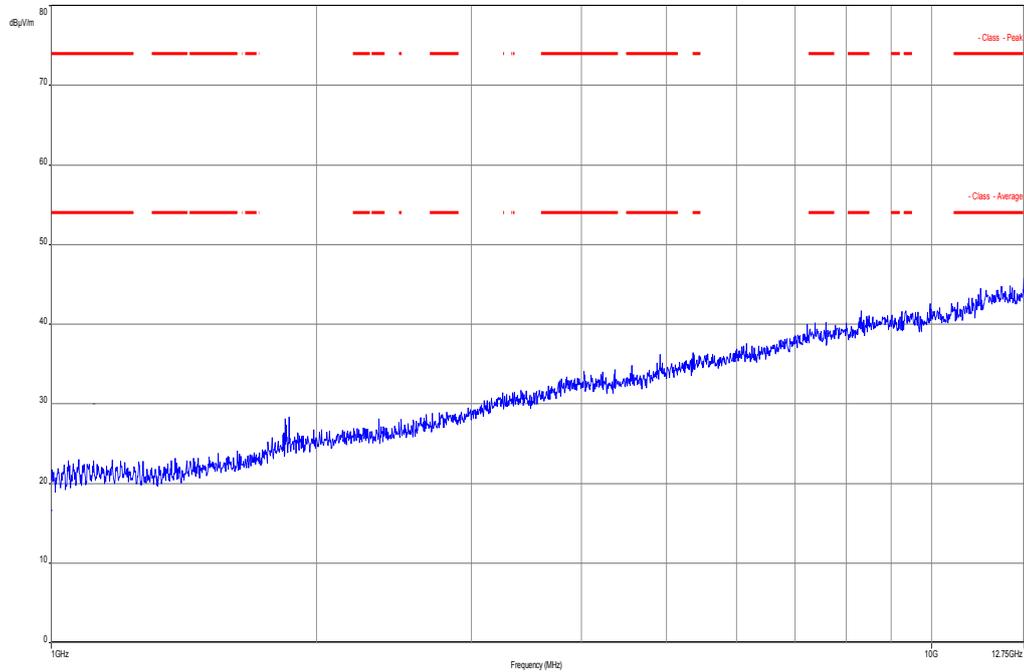
Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization



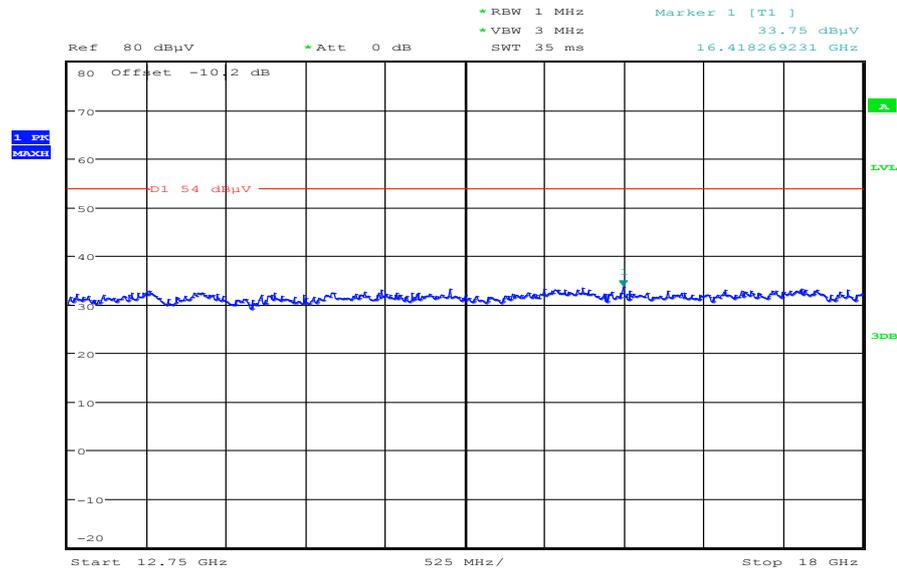
Final result:

Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.143050	10.87	30.00	19.13	1000.0	120.000	105.0	H	93.0	13.5
36.593550	11.15	30.00	18.85	1000.0	120.000	170.0	V	10.0	13.9
52.201650	10.19	30.00	19.81	1000.0	120.000	101.0	V	190.0	13.3
720.973500	19.03	36.00	16.97	1000.0	120.000	170.0	V	88.0	22.0
779.729550	19.58	36.00	16.42	1000.0	120.000	170.0	H	91.0	22.7
841.501800	20.31	36.00	15.69	1000.0	120.000	146.0	V	1.0	23.3

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

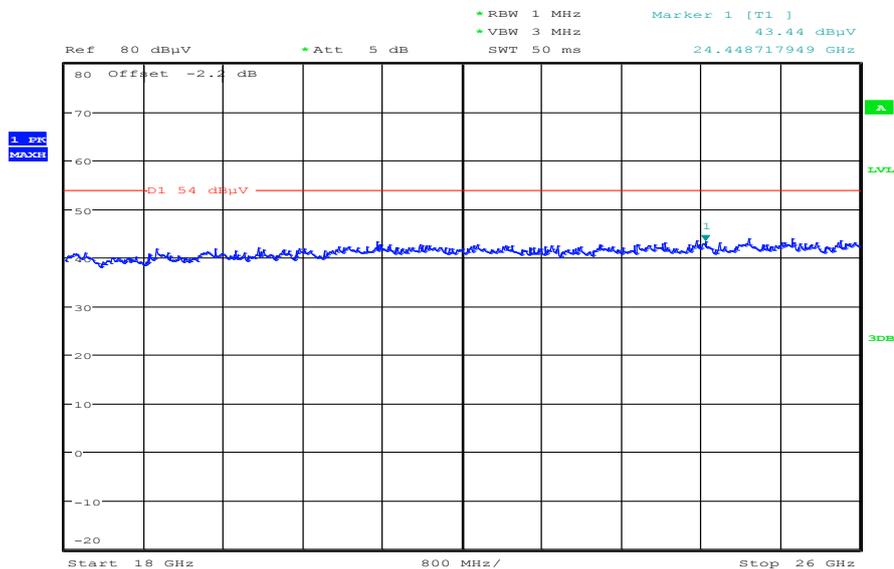


Plot 3: 12 GHz to 18 GHz, vertical & horizontal polarization



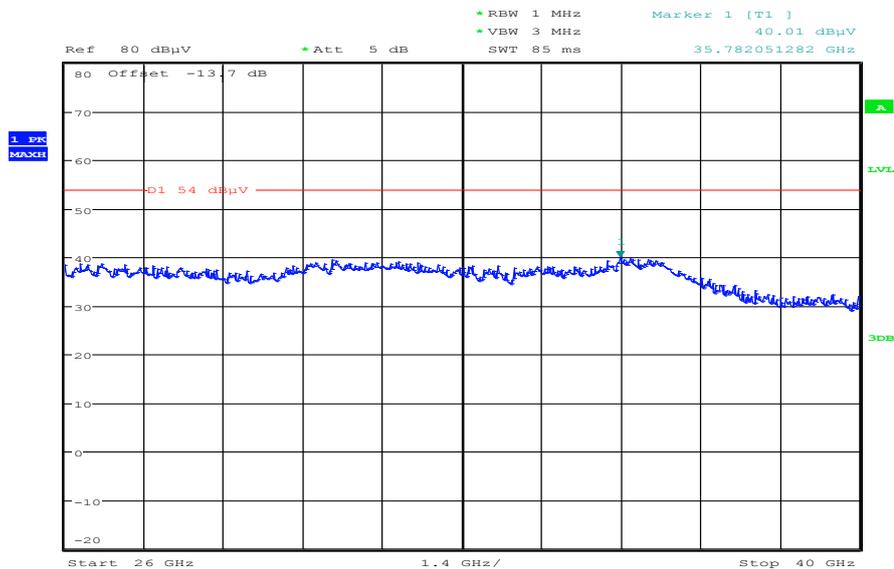
Date: 28.MAY.2014 12:01:53

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



Date: 28.MAY.2014 13:46:53

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



Date: 28.MAY.2014 14:58:46

10.10 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 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

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:

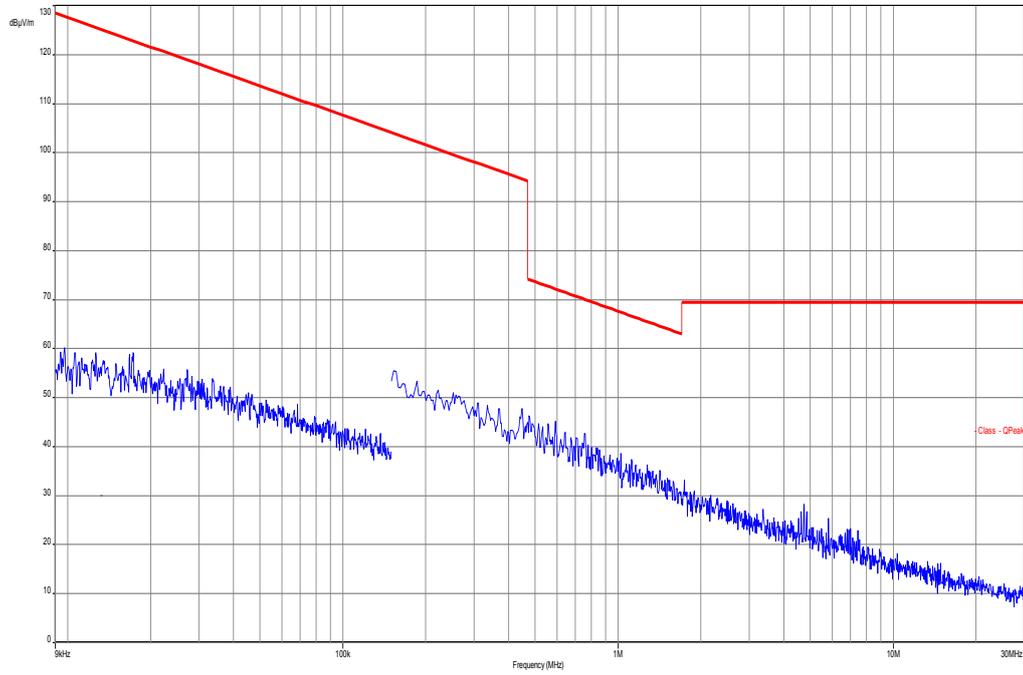
Spurious Emissions Radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No spurious emissions detected.		
Measurement uncertainty	± 3 dB	

Result: Passed

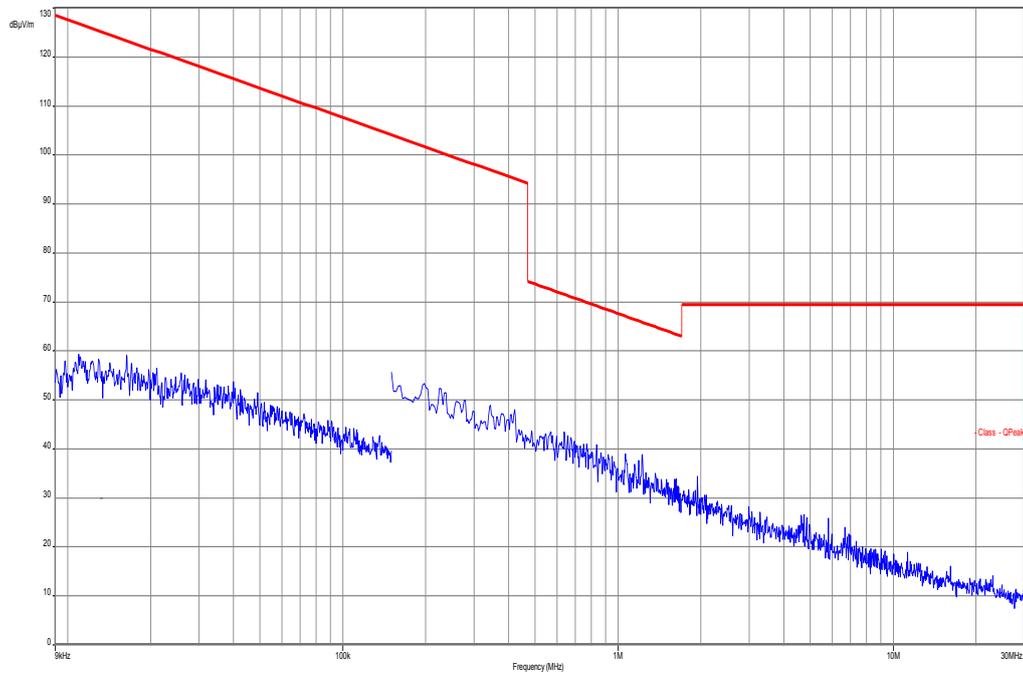
Note: The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

Plots:

Plot 1: 9 kHz to 30 MHz, TX mode



Plot 2: 9 kHz to 30 MHz, RX mode



10.11 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 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

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

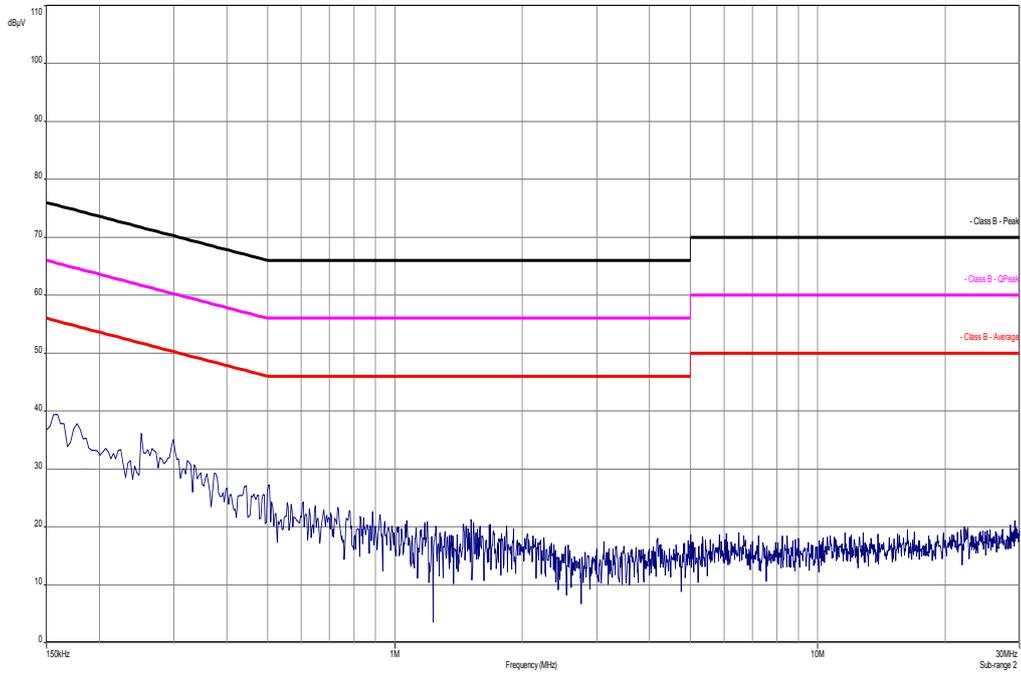
Results:

Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No spurious emissions detected.		
Measurement uncertainty	± 3 dB	

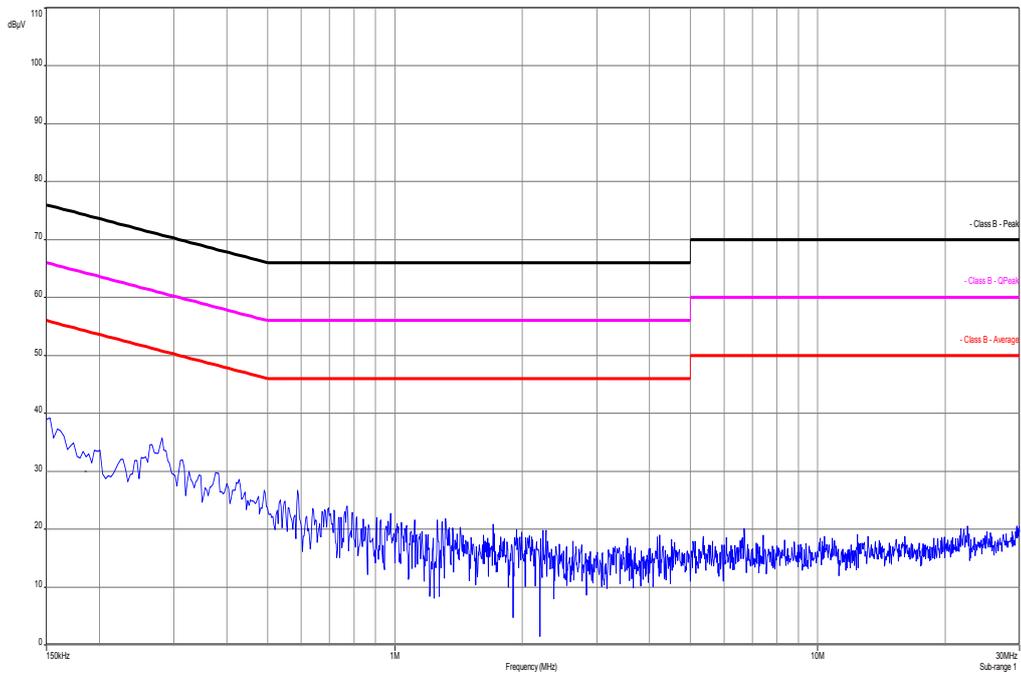
Result: Passed

Plots:

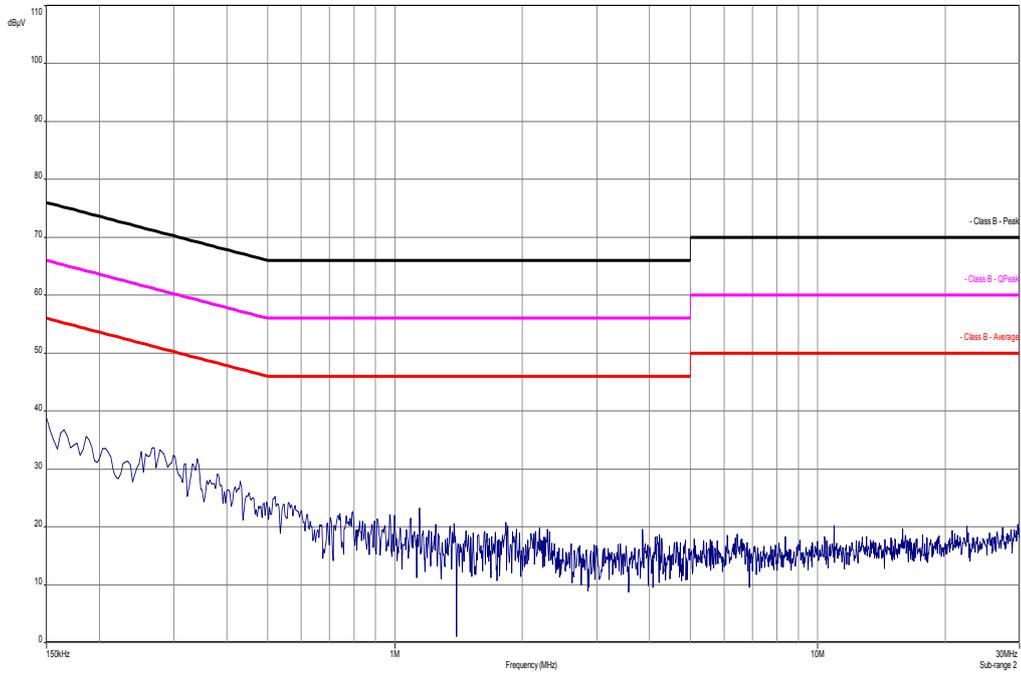
Plot 1: 150 kHz to 30 MHz / phase Line, TX mode



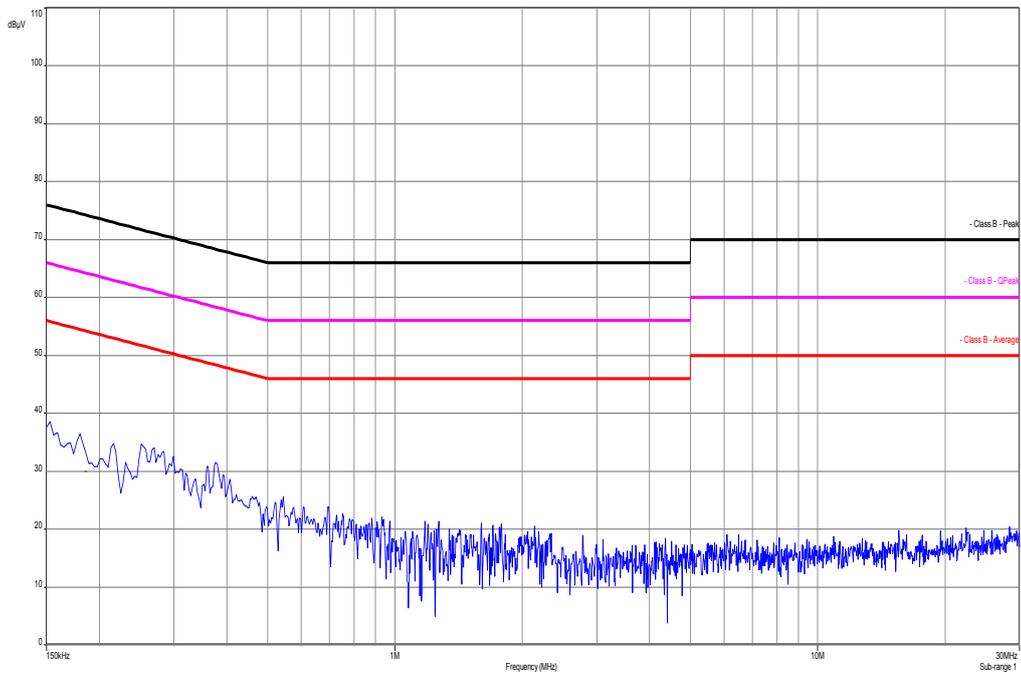
Plot 2: 150 kHz to 30 MHz / neutral Line, TX mode



Plot 3: 150 kHz to 30 MHz / phase Line, RX mode



Plot 4: 150 kHz to 30 MHz / neutral Line, RX mode



11 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 (Lab/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
3	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	27.01.2014	27.01.2015
4	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
5	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
6	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
7	n. a.	TRIOLOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	295	300003787	k	22.04.2014	22.04.2016
8	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	08.05.2013	08.05.2015
9	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
10	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
11	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	30.01.2014	30.01.2016
12	9	Isolating Transformer	MPL IEC625 Bus Regeltrennt ravo	Erfi	91350	300001155	ne		
13	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
14	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG240 0/2483- 2375/2505- 50/10SS	Wainwright	11	300003351	ev		
16	n. a.	TRIOLOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	371	300003854	vIKI!	14.10.2011	14.10.2014
17	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	13.03.2014	13.03.2015
18	11b	Microwave System Amplifier, 0.5- 26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
19	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
20	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
21	A031	Std. Gain Horn Antenna 26.5 to 40.0 GHz	637	Narda		300000510	k	19.07.2013	19.07.2015

22	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	Ve	02.07.2014	02.07.2016
23	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503 070-XX	CERNEX	19338	300004273	ne		
24	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	21.01.2014	21.01.2015

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

12 Observations

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

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2014-07-11

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

Bellehene 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 / 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

Signature of the certificate

in Auftrag gegeben von: CETECOM ICT Services GmbH

Deutsche Akkreditierungsstelle GmbH

Standort Berlin
 Spittelmarkt 10
 10117 Berlin

Standort Frankfurt am Main
 Gartenstraße 6
 60504 Frankfurt am Main

Standort Braunschweig
 Bundesallee 100
 38116 Braunschweig

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Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstellen (AkkStelleG) vom 21. Juli 2009 (BGBl. I S. 2025) 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 228 vom 9. Juli 2008), S. 30f. Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der Ergebnisse spezifiziert für Accreditation (EA), aus 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
 IAF: www.iaf.or.jp
 ILAC: 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.

<http://www.cetecom.com/eu/de/cetecom-group/europa/deutschland-saarbruecken/akkreditierungen.html>