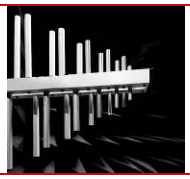
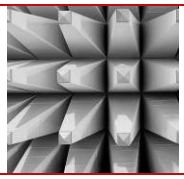




CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-5579/12-02-12-B

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

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-12076-01-01
Area of Testing: Radio/Satellite Communications

Applicant

Research In Motion Limited
305 Phillip Street
Waterloo, ON N2L 3W8 / CANADA
Phone: +1 51 98 88 74 65
Fax: +1 51 98 88 69 06
Contact: Masud Attayi
e-mail: mattayi@rim.com
Phone: +1 51 98 88 74 65

Manufacturer

Research In Motion Limited
305 Phillip Street
Waterloo, ON N2L 3W8 / CANADA

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

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

Test Item

Kind of test item:	**Blackberry GSM Phones**
Model name:	**RFM121LW**
FCC ID:	**L6ARFM120LW**
IC:	**2503A-RFM120LW**
Frequency:	UNII bands: 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz (lowest channel 5180 MHz, highest channel 5700 MHz)
Technology tested:	WLAN (OFDM / a – & n – mode)
Antenna:	Integrated antenna
Power Supply:	3.8 V DC by Li - Ion battery
Temperature Range:	No extreme conditions needed!

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:

cn=Stefan Boes, o=CETECOM ICT Services GmbH, ou=BOE-111011, email=Stefan.Boes@cetecom.com, c=DE
2013.06.13 09:41:37 +02'00'

Stefan Bös
Senior Testing Manager

Test performed:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2013.06.13 08:38:09 +02'00'

Marco Bertolino
Testing Manager

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.

2.2 Application details

Date of receipt of order:	2013-01-04
Date of receipt of test item:	2013-03-12
Start of test:	2013-03-12
End of test:	2013-03-27
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	2012-10	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

3.1 Measurement guidance

UNII: KDB 789033	2011-10	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E

4 Test environment

Temperature:	T_{nom}	+22	°C during room temperature tests
	T_{max}	-/-	°C during high temperature tests
	T_{min}	-/-	°C during low temperature tests
Relative humidity content:		42 %	
Barometric pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.8 V	DC by Li - Ion battery
	V_{max}	-/- V	
	V_{min}	-/- V	

5 Test item

Kind of test item	**:**	**Blackberry GSM Phones**
Type identification	**:**	**RFM121LW**
S/N serial number	**:**	**Radiated unit: IMEI 990002430036416; PIN 303E5B50** **IMEI 990002430036317; PIN 303E5B4F** **Conducted unit: IMEI 990002430036333; PIN 303E5851**
HW hardware status	**:**	**CER-53013-001Rev2-905-00**
SW software status	**:**	**127.0.1.4429**
Frequency band [MHz]	**:**	**UNII bands: 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz (lowest channel 5180 MHz, highest channel 5700 MHz)**
Type of radio transmission **Use of frequency spectrum**	**:** **:**	**OFDM**
Type of modulation	**:**	**QPSK, 16 – QAM, 64 – QAM**
Number of channels	**:**	**19**
Antenna	**:**	**Integrated antenna**
Power supply	**:**	**3.8 V DC by Li - Ion battery**
Temperature range	**:**	**Not needed – normal test conditions only!**

5.1 Additional information

Test setup- and EUT-photos are included in test reports: 1-5579/12-02-01_AnnexA
1-5579/12-02-01_AnnexD

6 Test laboratories sub-contracted

None

7 Summary of measurement results

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

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 9	Passed	2013-06-11	Reduced tests according to manufacturer test plan!

Test specification clause	Test case	Temperature conditions	Power source voltages	Pass	Fail	NA	NP	Remark
-/-	Output power verification (conducted)	Nominal	Nominal	☐	☐	☐	☒	No passed / fail criteria!
-/-	Gain	Nominal	Nominal	☐	☐	☐	☒	No passed / fail criteria!
RSS GEN 4.7	Frequency deviation	Nominal Low High	Nominal Low High	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	not rated
U-NII Part 15	Duty cycle	Nominal	Nominal	☐	☐	☐	☐	No passed / fail criteria!
§15.407(a) RSS-210	Maximum output power (conducted & radiated)	Nominal	Nominal	☒	☐	☐	☐	complies
§15.407(a) RSS-210	Power spectral density	Nominal	Nominal	☒	☐	☐	☐	complies
§15.407(a) RSS-210	Spectrum bandwidth 26dB bandwidth	Nominal	Nominal	☒	☐	☐	☐	complies
§15.407(a) RSS-210	Peak excursion measurements	Nominal	Nominal	☒	☐	☐	☐	complies
§15.205 RSS-210	Band edge compliance radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.407(b) RSS-210	TX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	Spurious emissions radiated < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	complies
§15.107(a)	Spurious emissions conducted emissions < 30 MHz	Nominal	Nominal	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

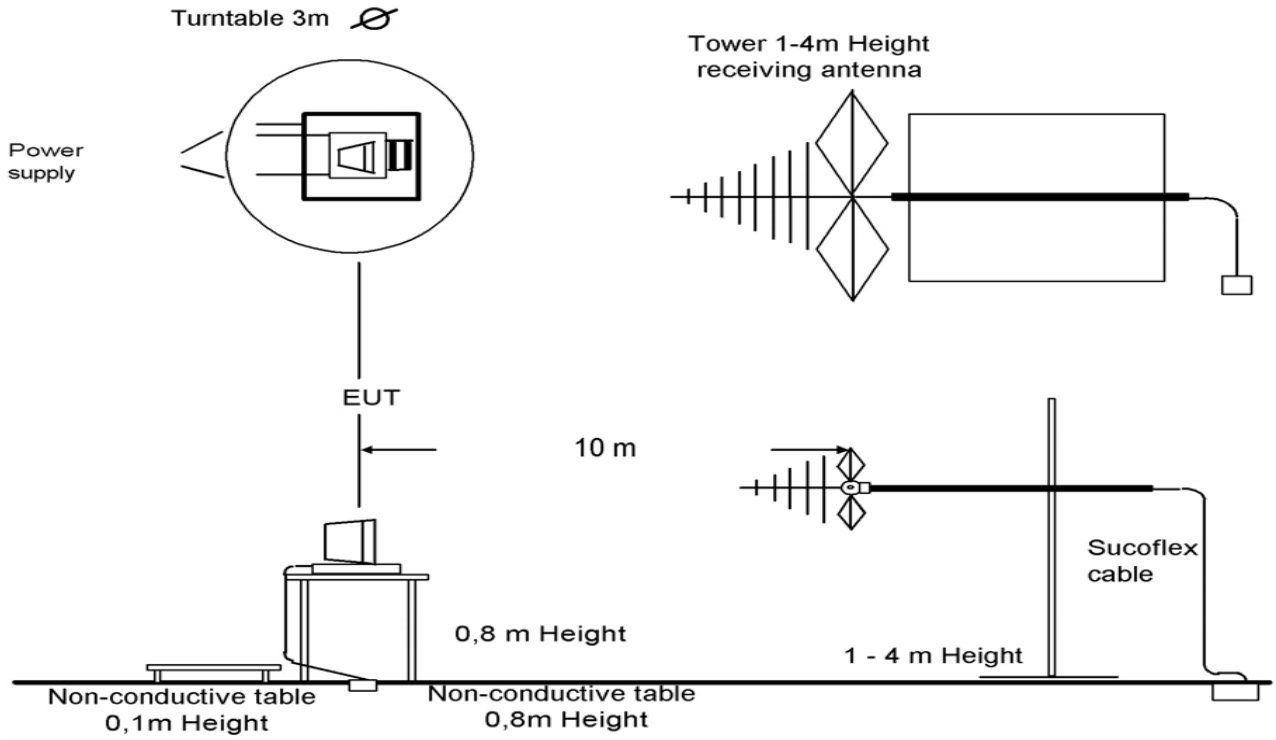
8 RF measurements

8.1 Description of test setup

8.1.1 Radiated measurements

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

Semi anechoic chamber



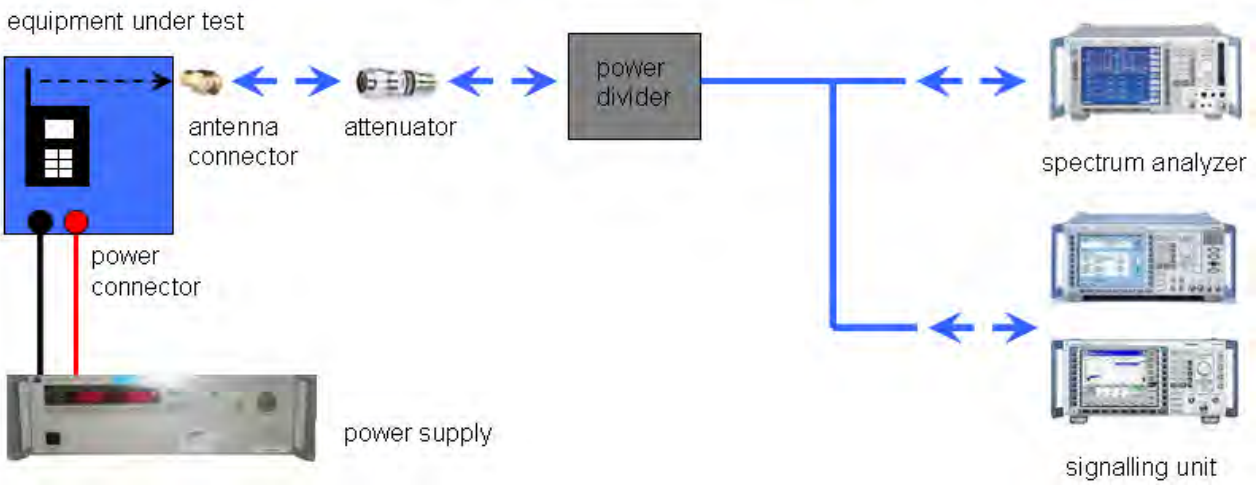
Picture 1: Diagram radiated measurements

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

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

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 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

9 Measurement results

9.1 Output power verification (conducted)

Not performed! Tests according to manufacturer test plan!

9.2 Gain

Not performed! Tests according to manufacturer test plan!

9.3 Frequency deviation

Description:

Frequency deviation from the defined centre frequency.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 kHz
Video bandwidth:	≥ 3 x RBW
Span:	10 kHz
Trace-Mode:	Max hold (allow trace to fully stabilize)

Results:

Frequency deviation				
Frequency	Input voltage	Temperature	TX mode	Frequency error / ppm
5180 MHz	3.6 V DC	20 C°	Modulated carrier	-4 kHz / -0.77
	4.1 V DC	20 C°		-4 kHz / -0.77
	4.35 V DC	20 C°		-7 kHz / -1.35
	3.6 V DC	-30 C°		22.8 kHz / 4.40
	4.1 V DC	-30 C°		22.2 kHz / 4.29
	4.35 V DC	-30 C°		22.2 kHz / 4.29
	3.6 V DC	+60 C°		-28.0 kHz / -5.41
	4.1 V DC	+60 C°		-28.6 kHz / -5.52
	4.35 V DC	+60 C°		-28.6 kHz / -5.52
5240 MHz	3.6 V DC	20 C°	Modulated carrier	-8.4 kHz / -1.60
	4.1 V DC	20 C°		-8.8 kHz / -1.68
	4.35 V DC	20 C°		-9.2 kHz / -1.76
	3.6 V DC	-30 C°		23.4 kHz / 4.47
	4.1 V DC	-30 C°		23.0 kHz / 4.39
	4.35 V DC	-30 C°		23.4 kHz / 4.47
	3.6 V DC	+60 C°		-29.6 kHz / -5.65
	4.1 V DC	+60 C°		-29.4 kHz / -5.61
	4.35 V DC	+60 C°		-29.8 kHz / -5.69
5320 MHz	3.6 V DC	20 C°	Modulated carrier	-12.4 kHz / -2.33
	4.1 V DC	20 C°		-12.8 kHz / -2.41
	4.35 V DC	20 C°		-12.4 kHz / -2.33
	3.6 V DC	-30 C°		23.2 kHz / 4.36
	4.1 V DC	-30 C°		23.4 kHz / 4.40
	4.35 V DC	-30 C°		23.2 kHz / 4.36
	3.6 V DC	+60 C°		-30.2 kHz / -5.68
	4.1 V DC	+60 C°		-29.8 kHz / -5.60
	4.35 V DC	+60 C°		-29.4 kHz / -5.53
5500 MHz	3.6 V DC	20 C°	Modulated carrier	-12.4 kHz / -2.26
	4.1 V DC	20 C°		-13.2 kHz / -2.40
	4.35 V DC	20 C°		-14.0 kHz / -2.55
	3.6 V DC	-30 C°		23.8 kHz / 4.33
	4.1 V DC	-30 C°		24.0 kHz / 4.36
	4.35 V DC	-30 C°		24.2 kHz / 4.40
	3.6 V DC	+60 C°		-30.0 kHz / -5.46
	4.1 V DC	+60 C°		-29.8 kHz / -5.42
	4.35 V DC	+60 C°		-30.6 kHz / -5.56
5700 MHz	3.6 V DC	20 C°	Modulated carrier	-13.6 kHz / -2.39
	4.1 V DC	20 C°		-14.4 kHz / -2.53
	4.35 V DC	20 C°		-13.6 kHz / -2.39
	3.6 V DC	-30 C°		24.6 kHz / 4.32
	4.1 V DC	-30 C°		24.8 kHz / 4.35
	4.35 V DC	-30 C°		24.6 kHz / 4.32
	3.6 V DC	+60 C°		-31.2 kHz / -5.47
	4.1 V DC	+60 C°		-30.8 kHz / -5.40
	4.35 V DC	+60 C°		-30.8 kHz / -5.40
Measurement uncertainty = RBW				

Result: **Not rated**

9.4 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

Results:

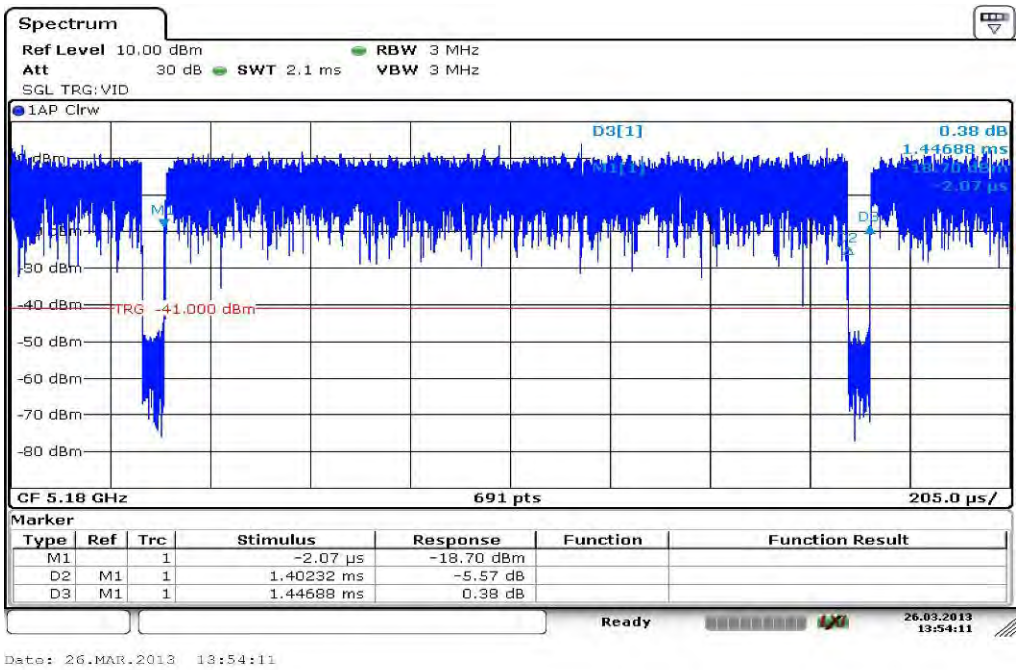
Duty cycle and correction factor:

OFDM / a – mode: 96.92 % duty cycle => 0.14 dB

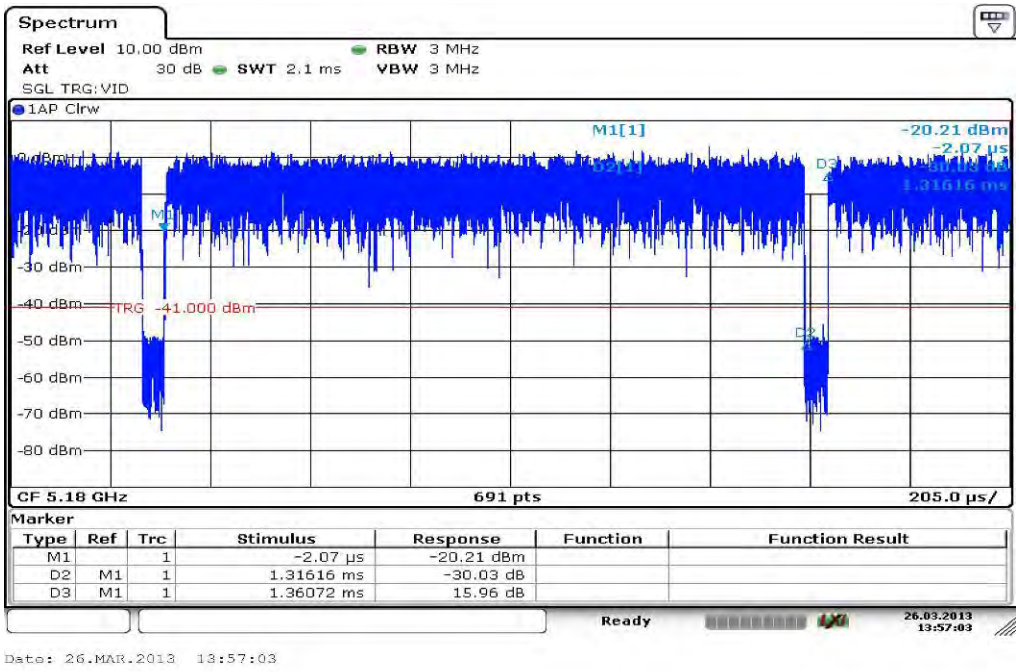
OFDM / n – mode HT20: 96.73 % duty cycle => 0.15 dB

Plots:

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



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



9.5 Maximum output power conducted and radiated

Description:

Measurement of the maximum output power conduced and radiated

Measurement:

Measurement parameter	
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

Limits:

Radiated output power	Conducted output power
Conducted power + 6dBi antenna gain	The lesser one of 50mW or 4 dBm + 10 log Bandwidth 5.150-5.250 GHz 250mW or 11 dBm + 10 log Bandwidth 5.250-5.350 GHz 250mW or 11 dBm + 10 log Bandwidth 5.470-5.725 GHz 1W or 17 dBm + 10 log Bandwidth 5.725-5.825 GHz (where Bandwidth is the 26dB Bandwidth [MHz])

Result: OFDM / a – mode 6 Mbps

OFDM / a – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	11.84	11.90	12.76	10.79
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	10.69			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / a – mode 24 Mbps

OFDM / a – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	11.66	11.49	12.28	10.50
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	10.29			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / a – mode 54 Mbps

OFDM / a – mode	Maximum output power conducted [dBm]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	11.16	10.93	11.87	9.78
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	9.78			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / n – mode HT20 MCS0

OFDM / n – mode HT20	Maximum output power conducted [dBm]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	11.88	12.67	10.81	10.72
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / n – mode HT20 MCS4

OFDM / n – mode HT20	Maximum output power conducted [dBm]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	11.33	12.04	10.17	9.97
Measurement uncertainty	± 1 dB			

Result: Passed

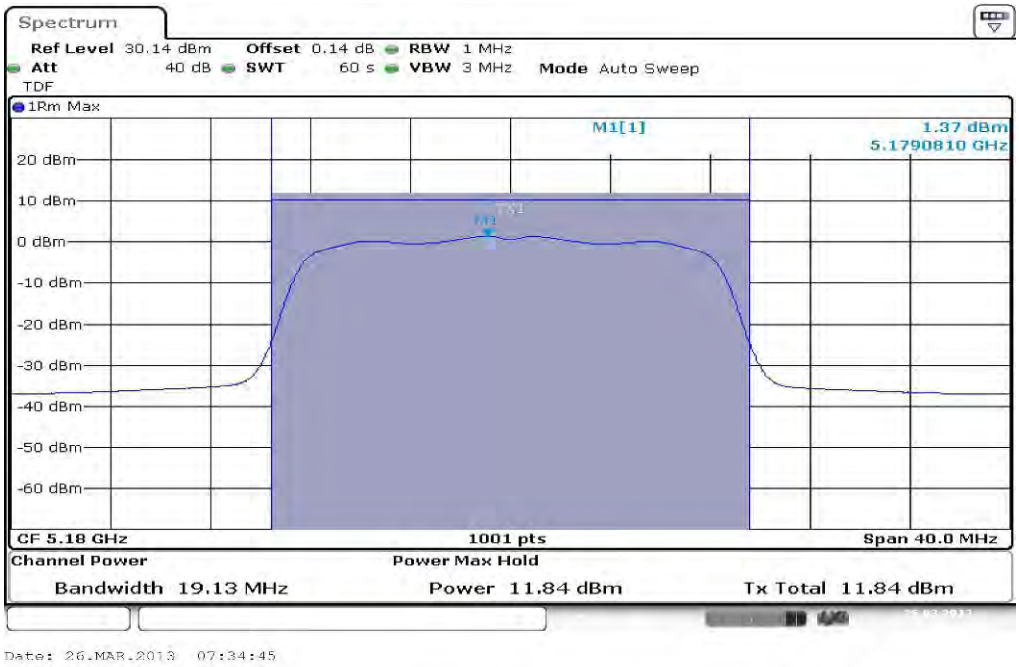
Result: OFDM / n – mode HT20 MCS7

OFDM / n – mode HT20	Maximum output power conducted [dBm]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	10.97	11.7	9.79	9.62
Measurement uncertainty	± 1 dB			

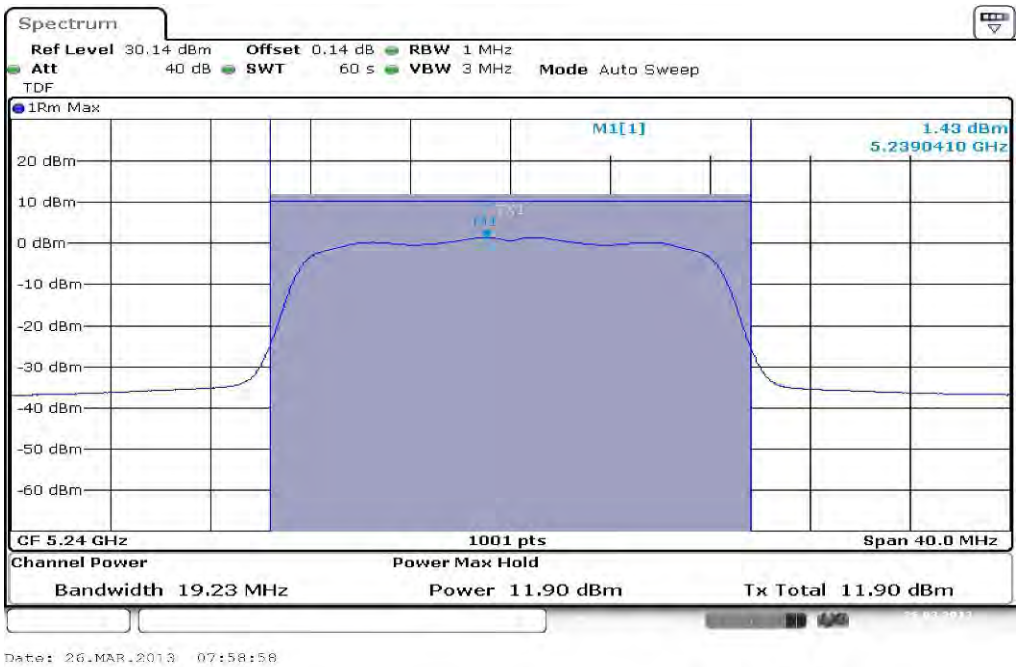
Result: Passed

Plots: OFDM / a – mode 6 Mbps

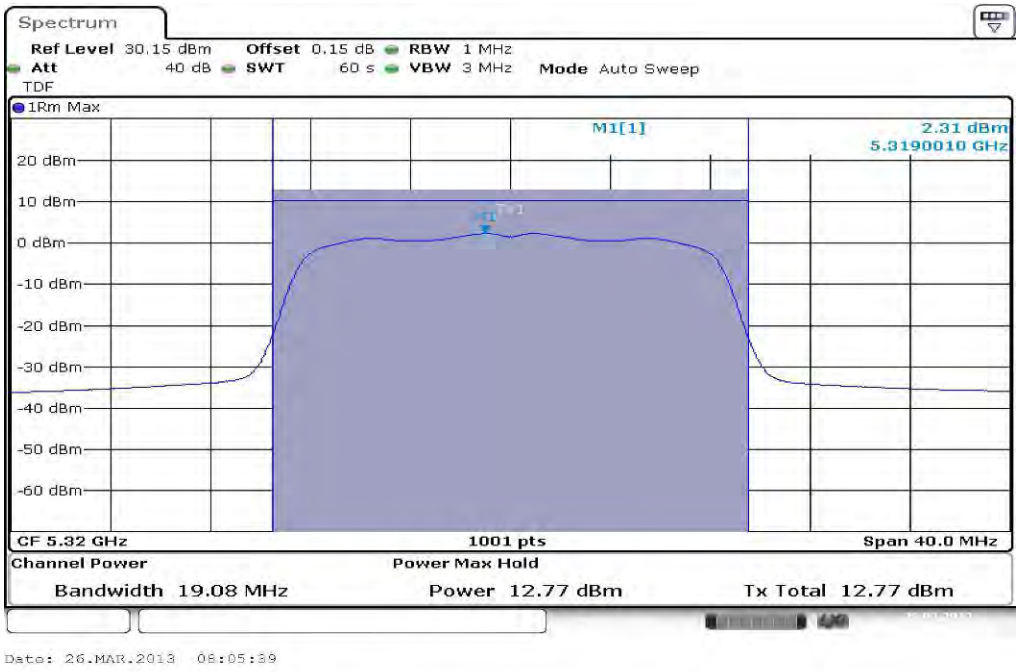
Plot 1: 5180 MHz



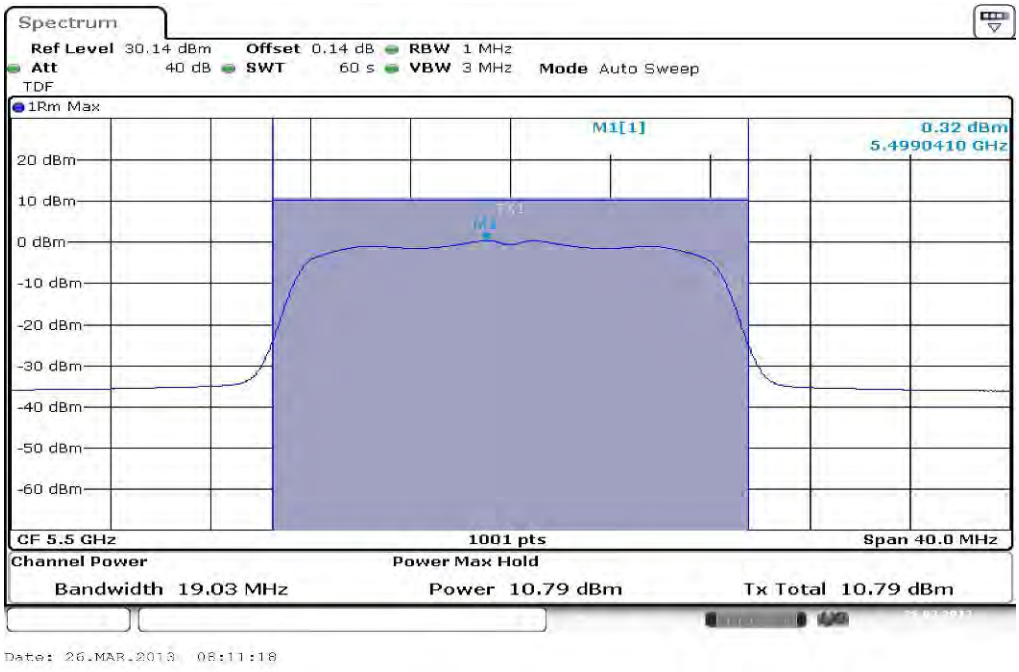
Plot 2: 5240 MHz



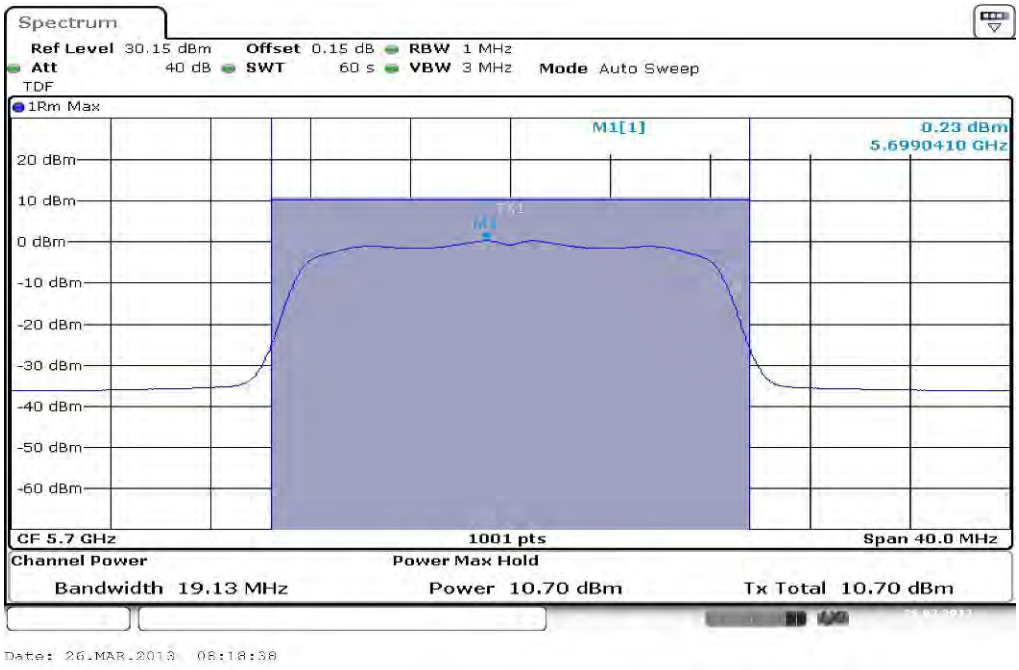
Plot 3: 5320 MHz



Plot 4: 5500 MHz

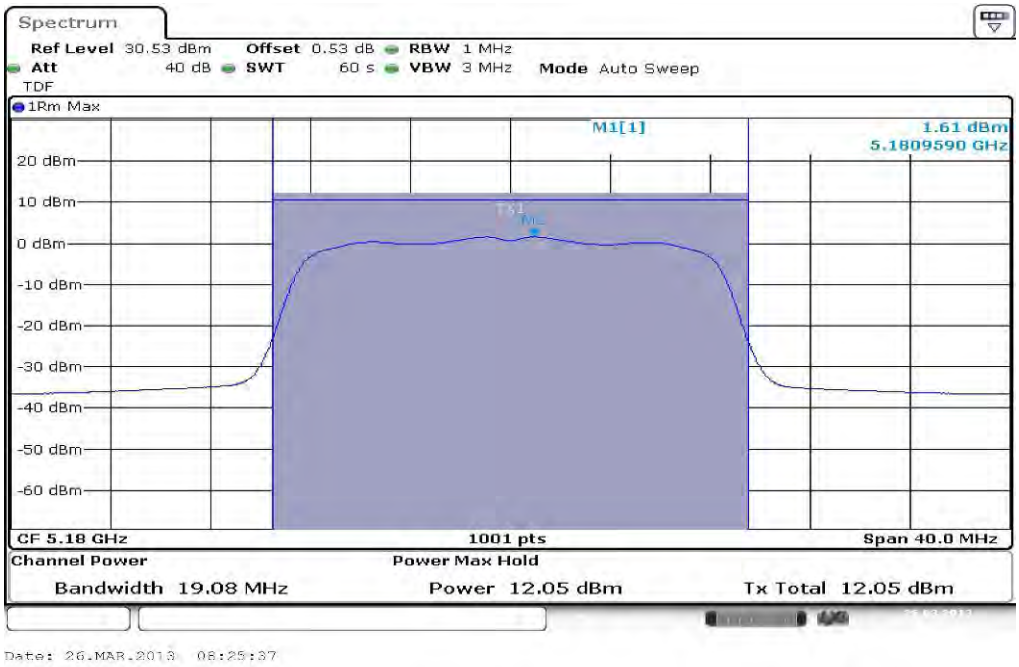


Plot 5: 5700 MHz

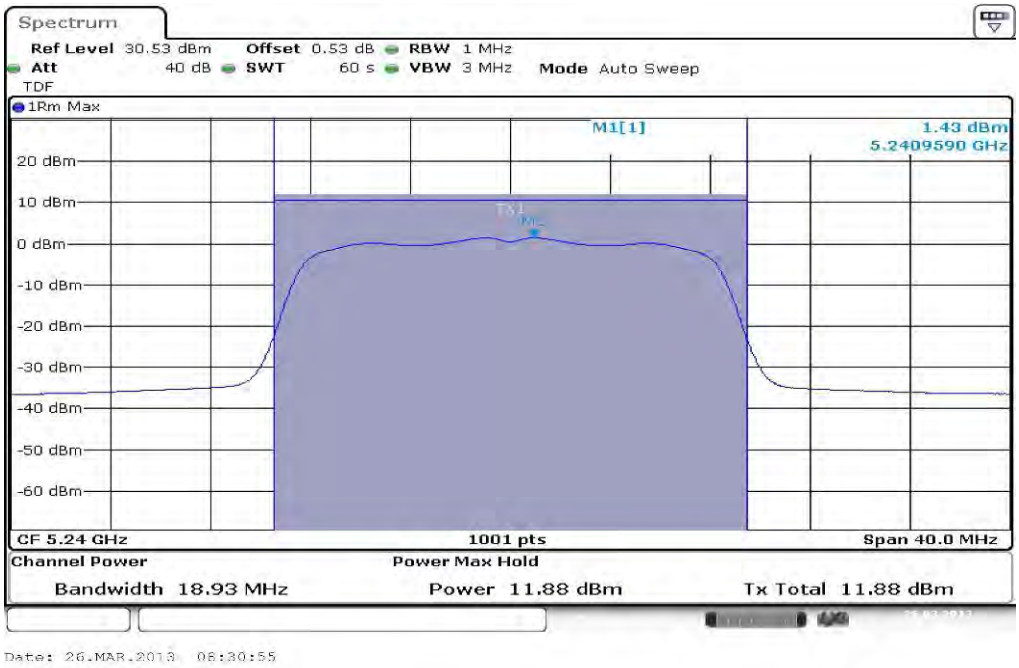


Plots: OFDM / a – mode 24 Mbps

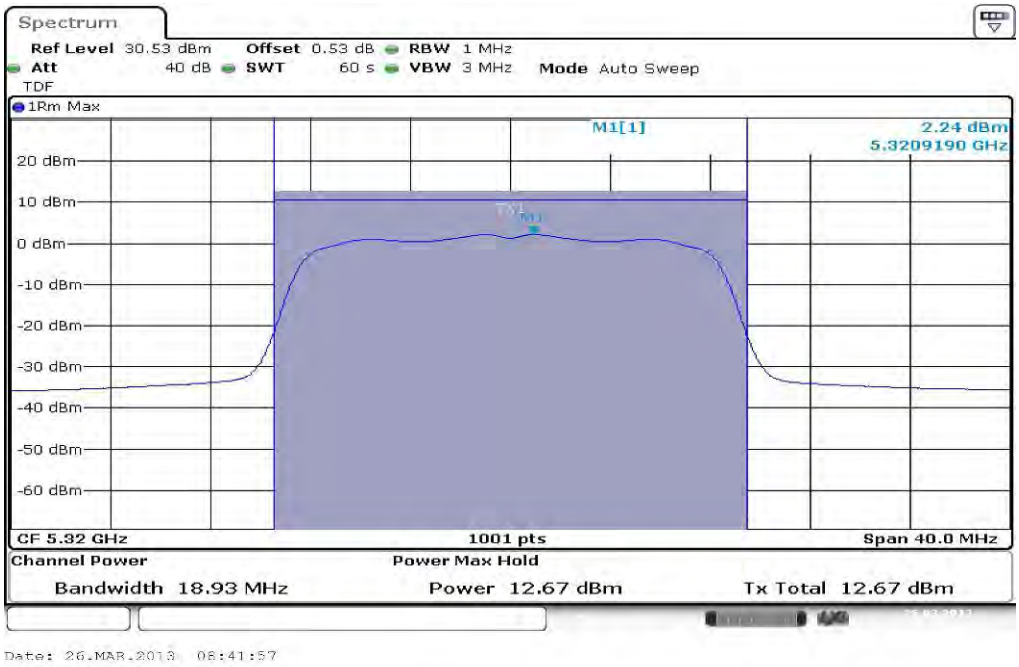
Plot 1: 5180 MHz



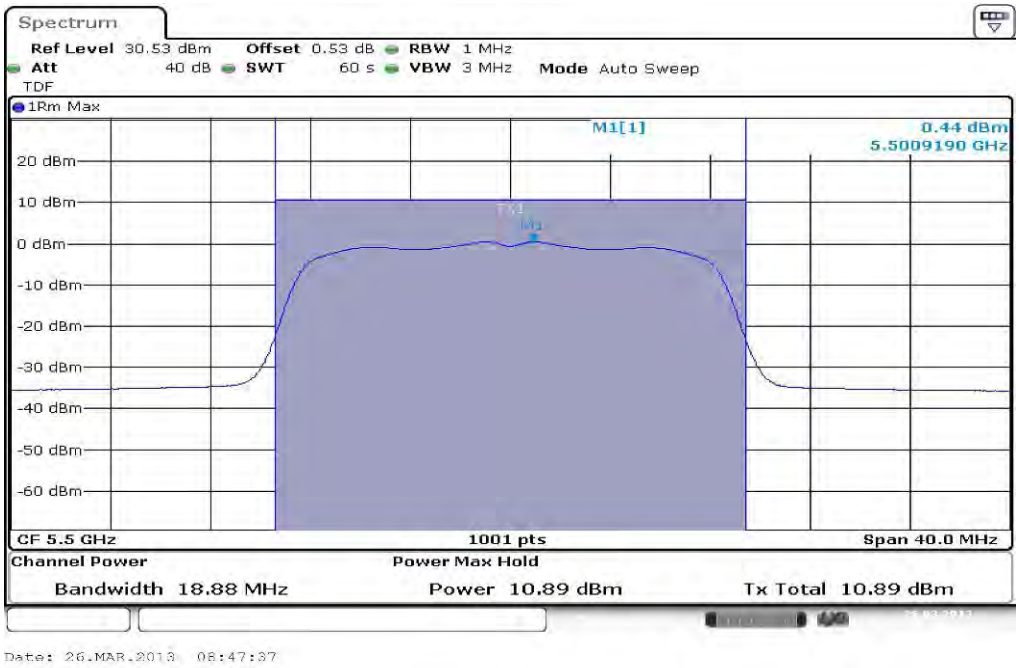
Plot 2: 5240 MHz



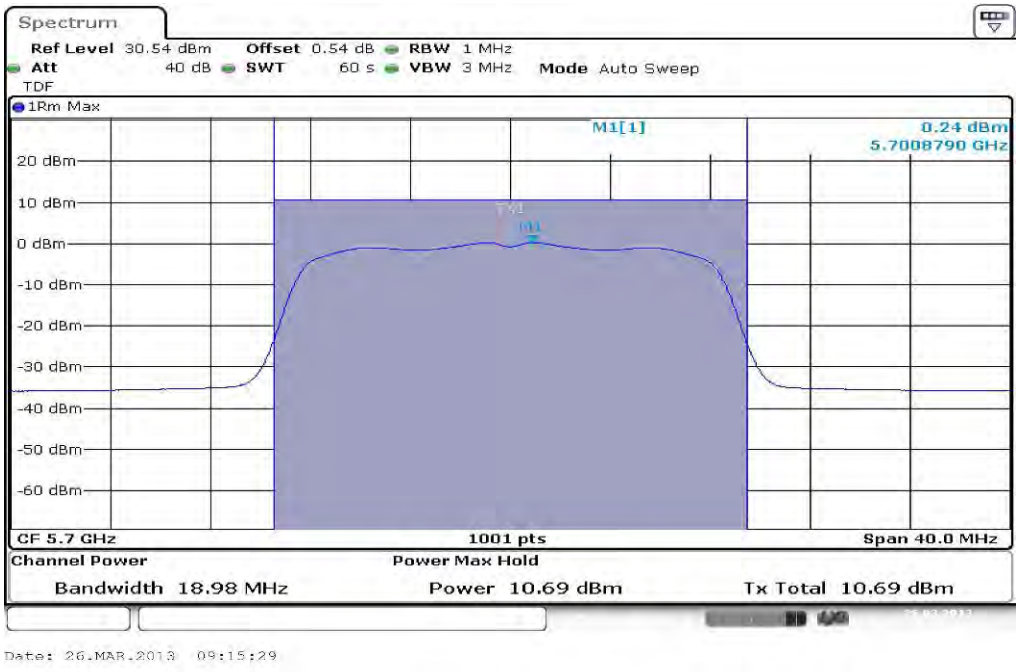
Plot 3: 5320 MHz



Plot 4: 5500 MHz

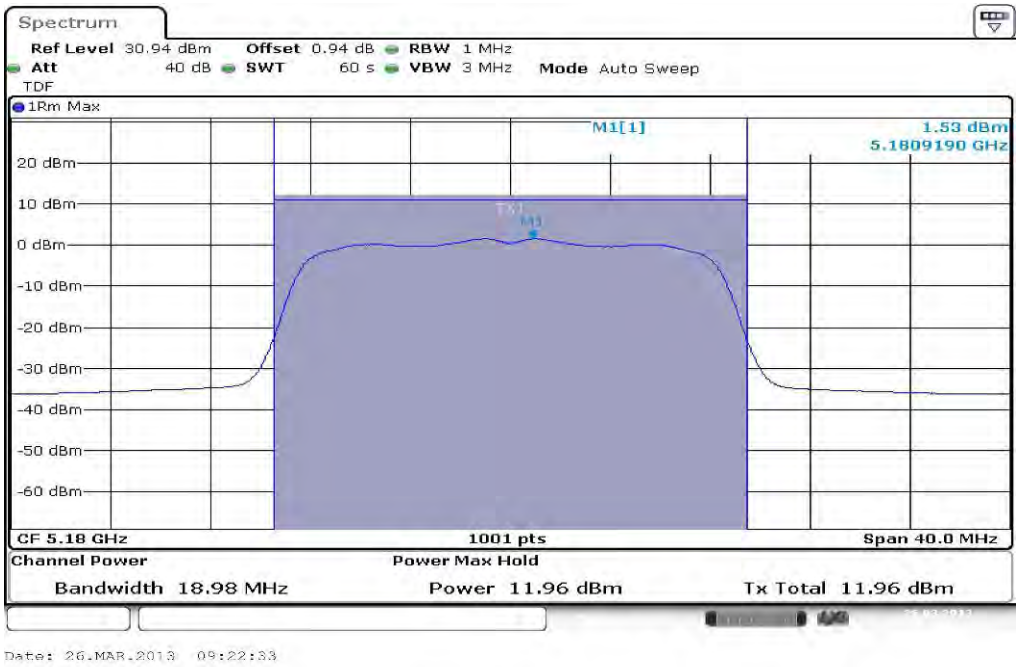


Plot 5: 5700 MHz

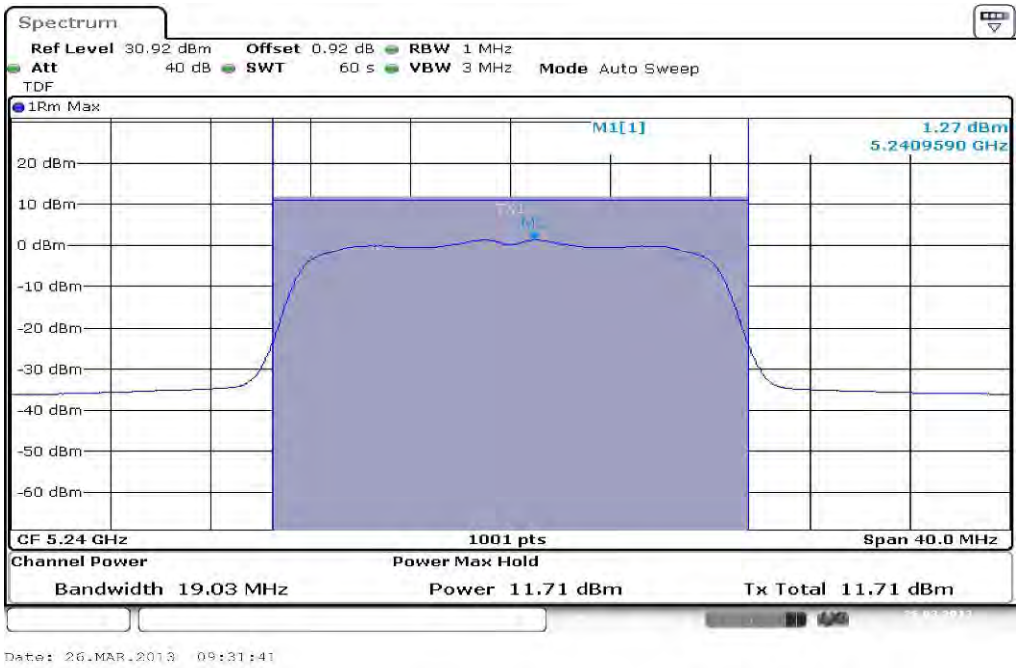


Plots: OFDM / a – mode 54 Mbps

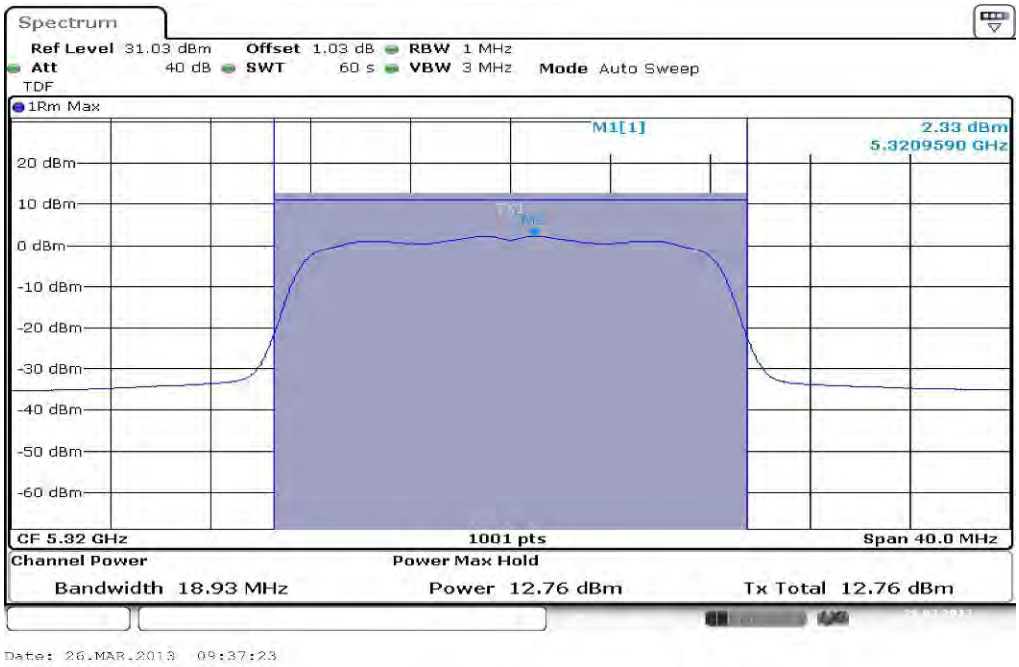
Plot 1: 5180 MHz



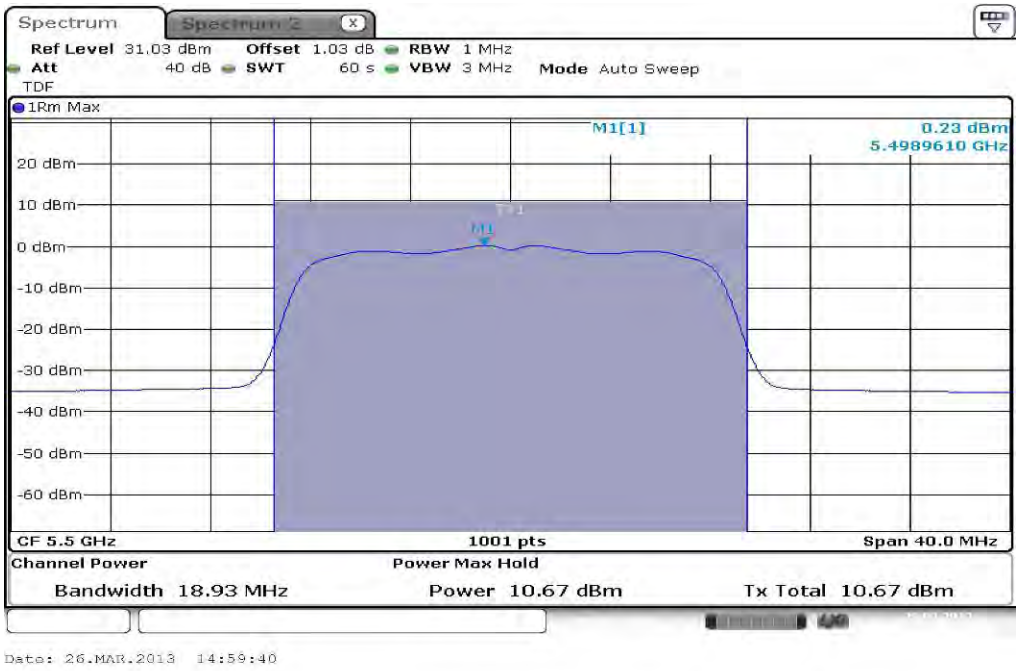
Plot 2: 5240 MHz



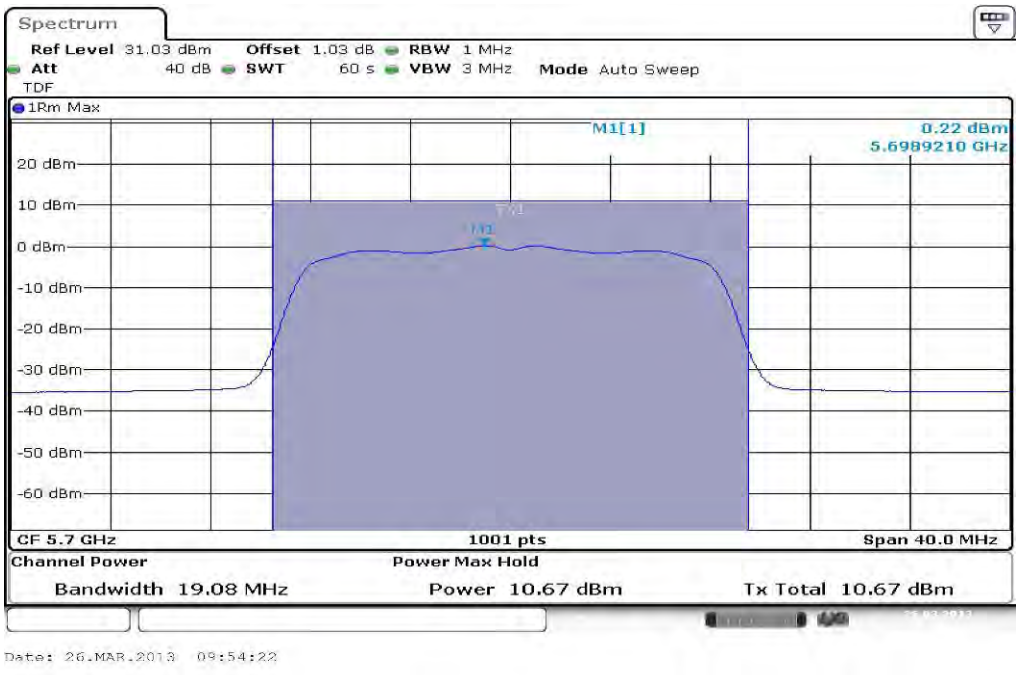
Plot 3: 5320 MHz



Plot 4: 5500 MHz

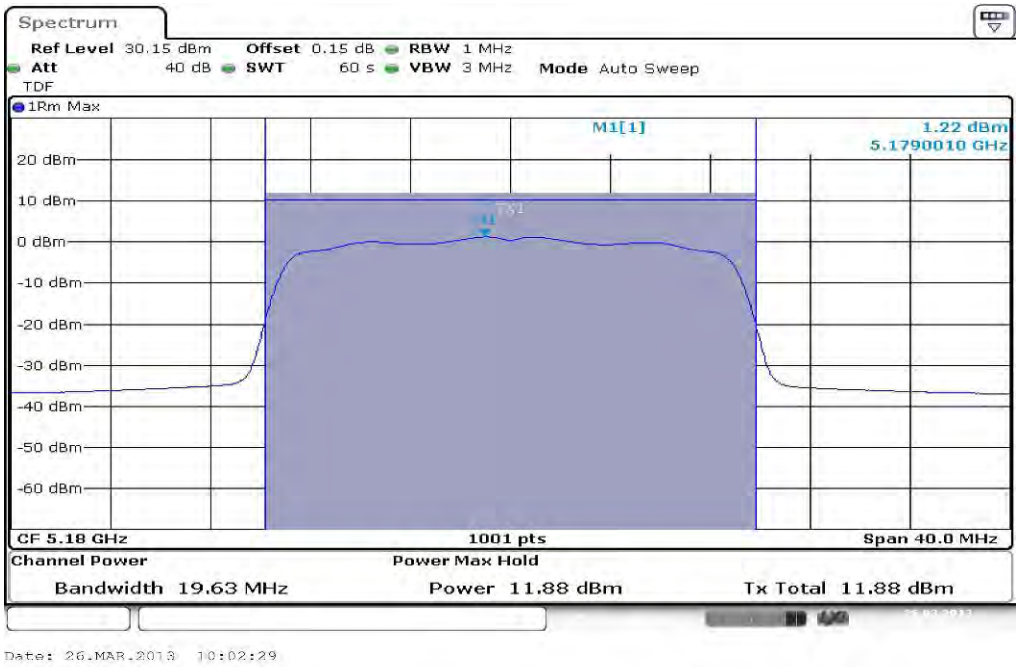


Plot 5: 5700 MHz

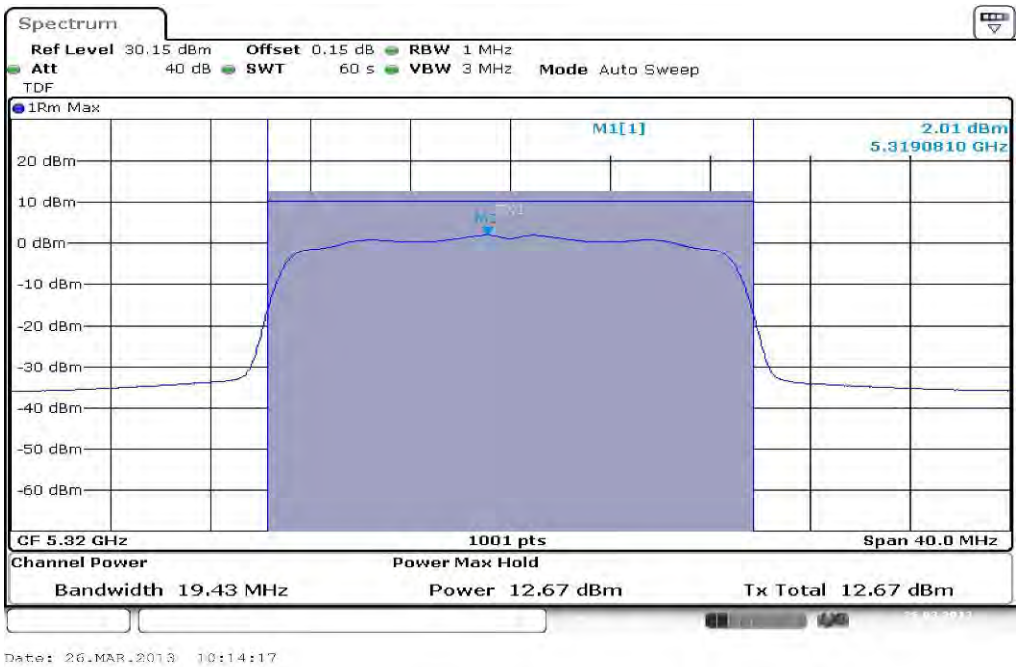


Plots: OFDM / n – mode HT20 MCS0

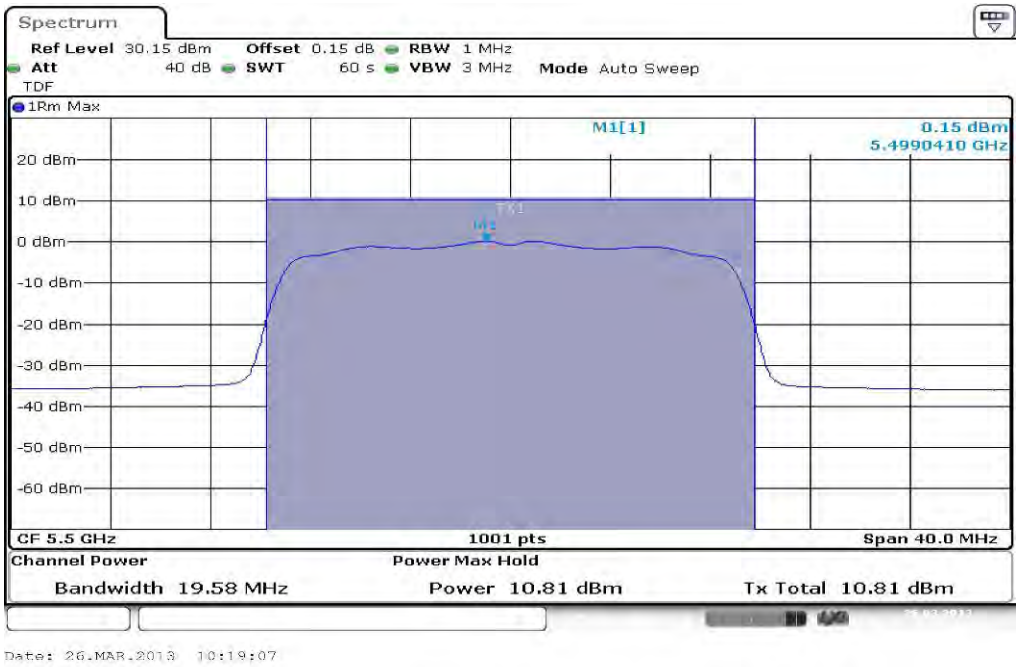
Plot 1: 5180 MHz



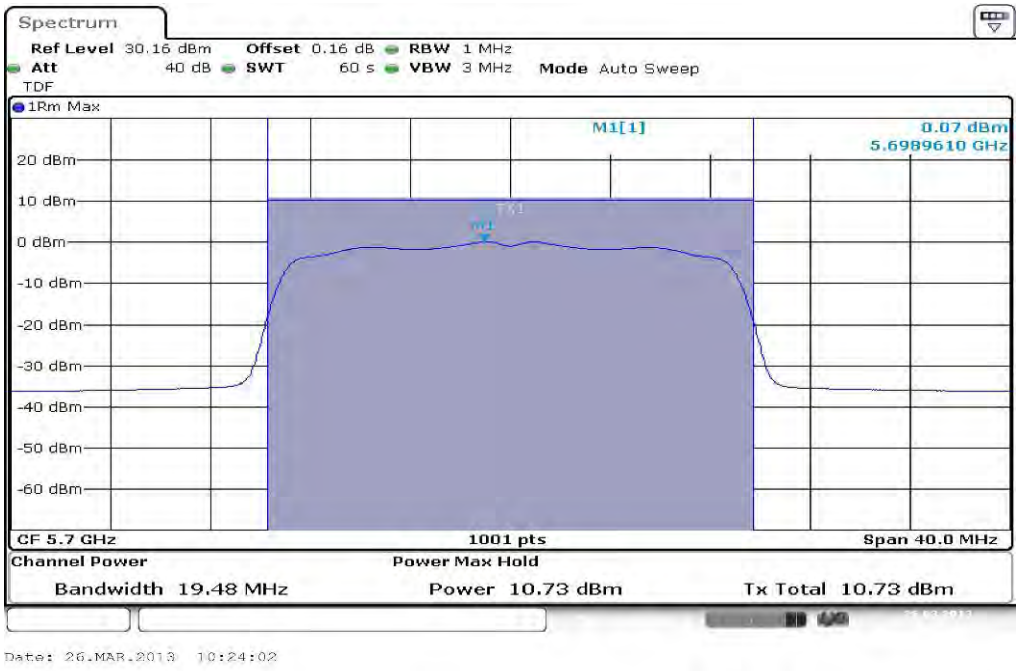
Plot 2: 5320 MHz



Plot 3: 5500 MHz

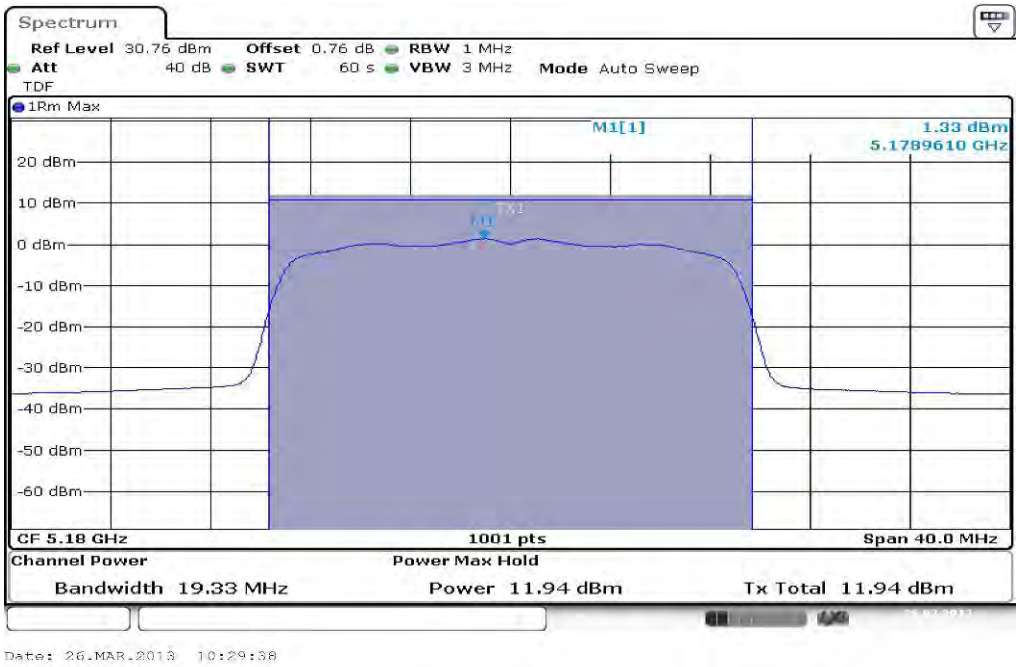


Plot 4: 5700 MHz

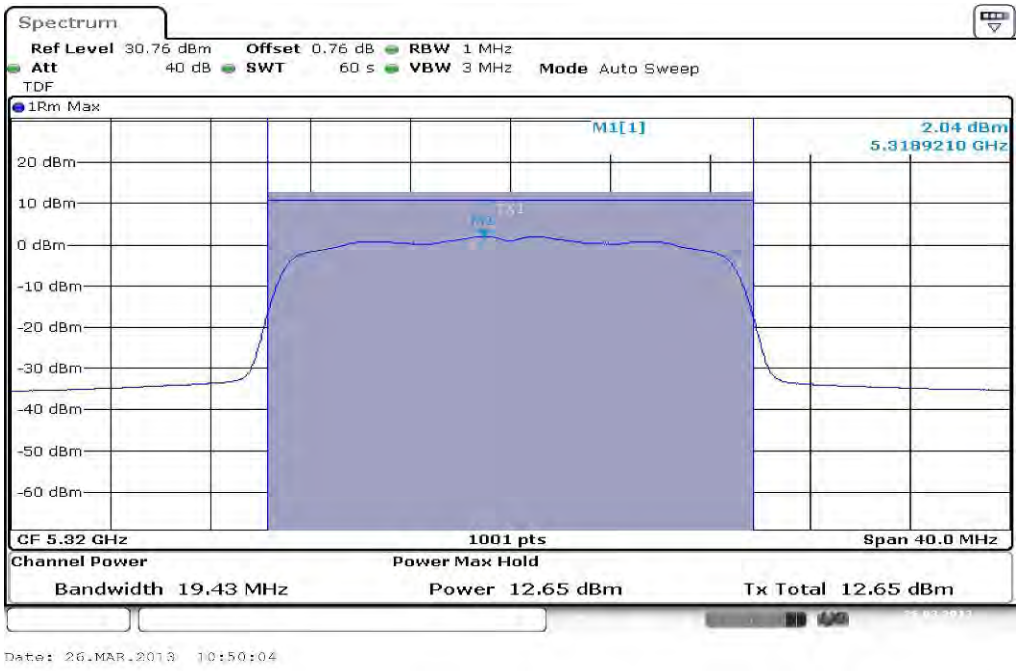


Plots: OFDM / n – mode HT20 MCS4

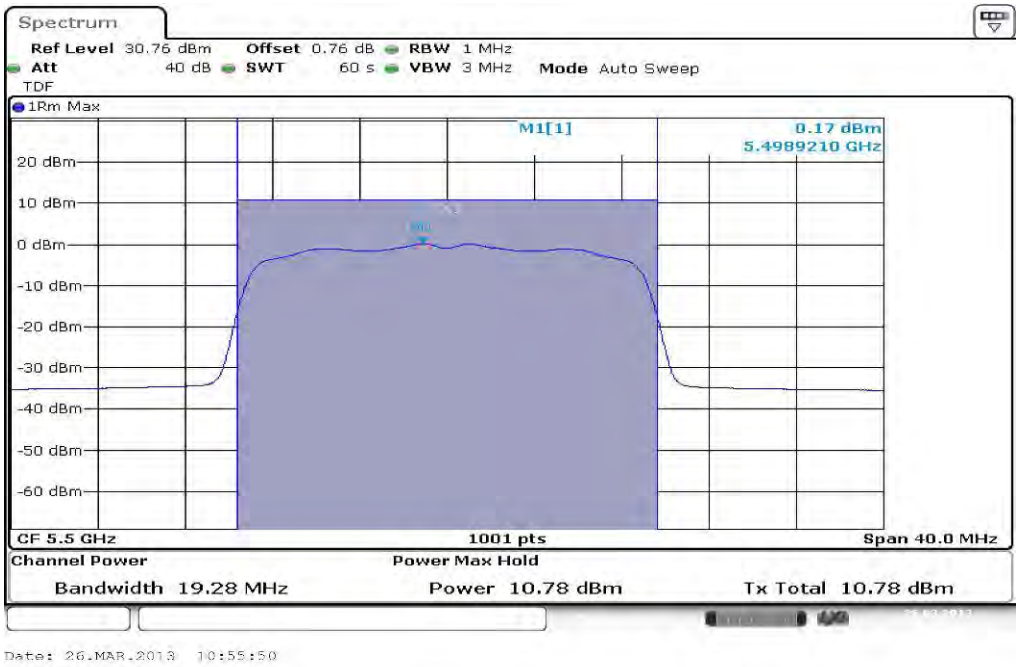
Plot 5: 5180 MHz



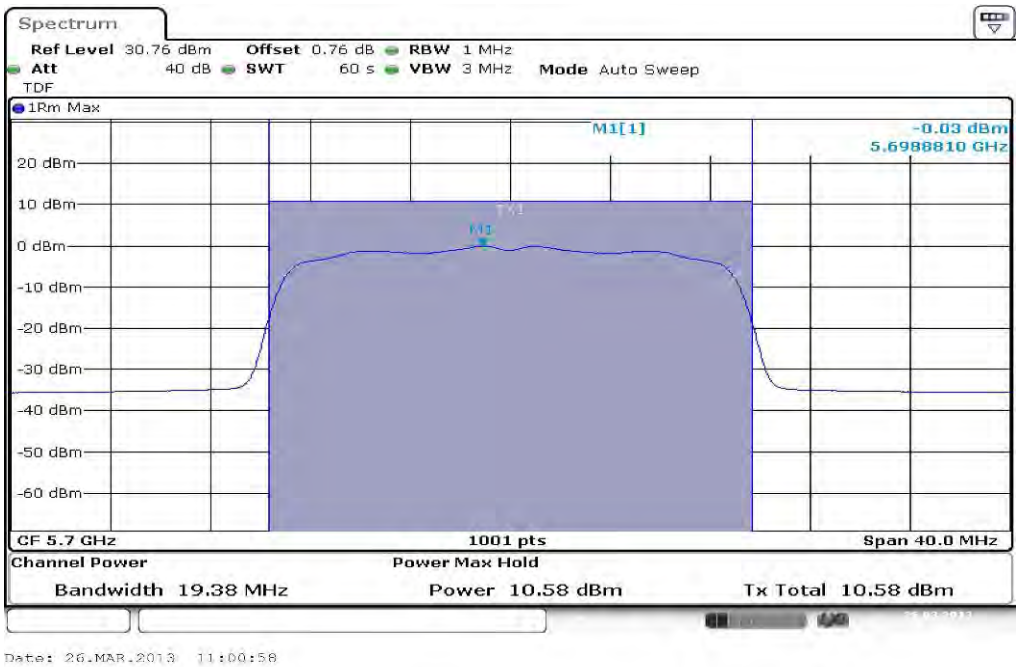
Plot 6: 5320 MHz



Plot 7: 5500 MHz

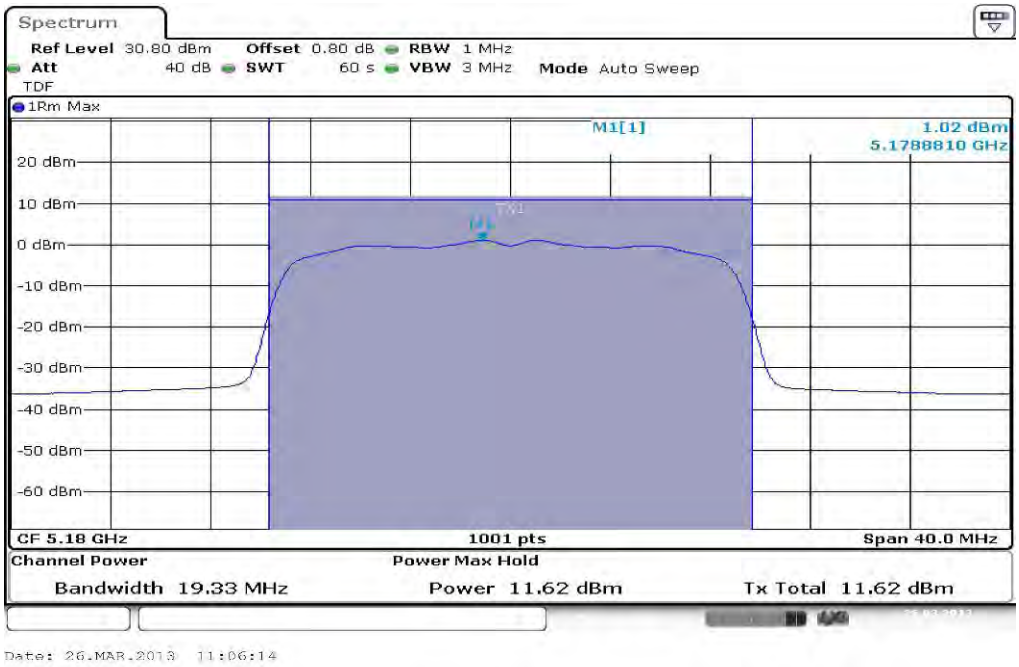


Plot 8: 5700 MHz

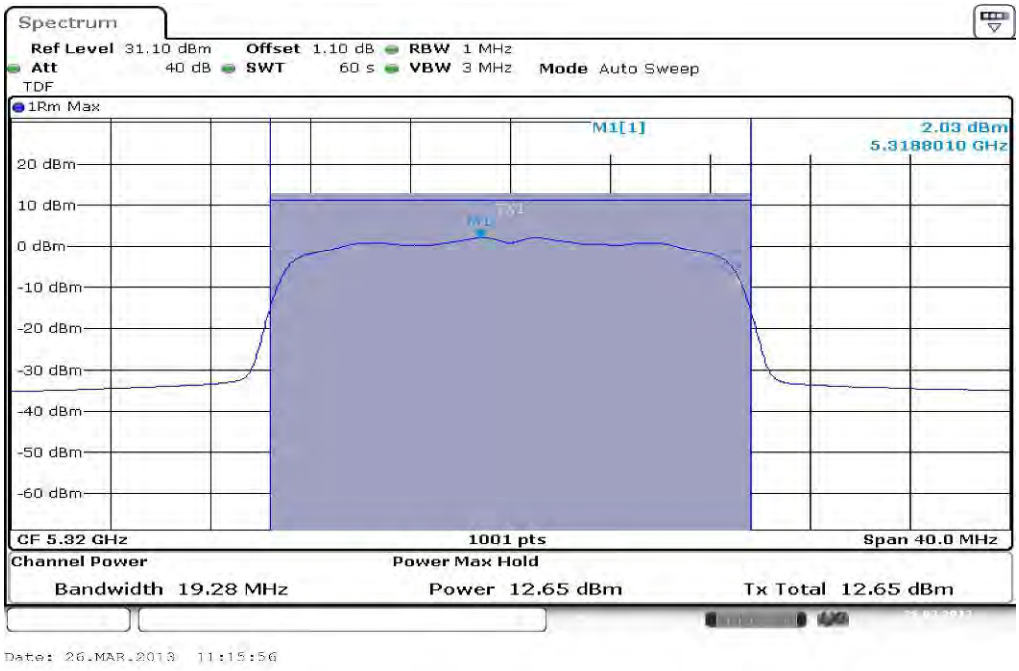


Plots: OFDM / n – mode HT20 MCS7

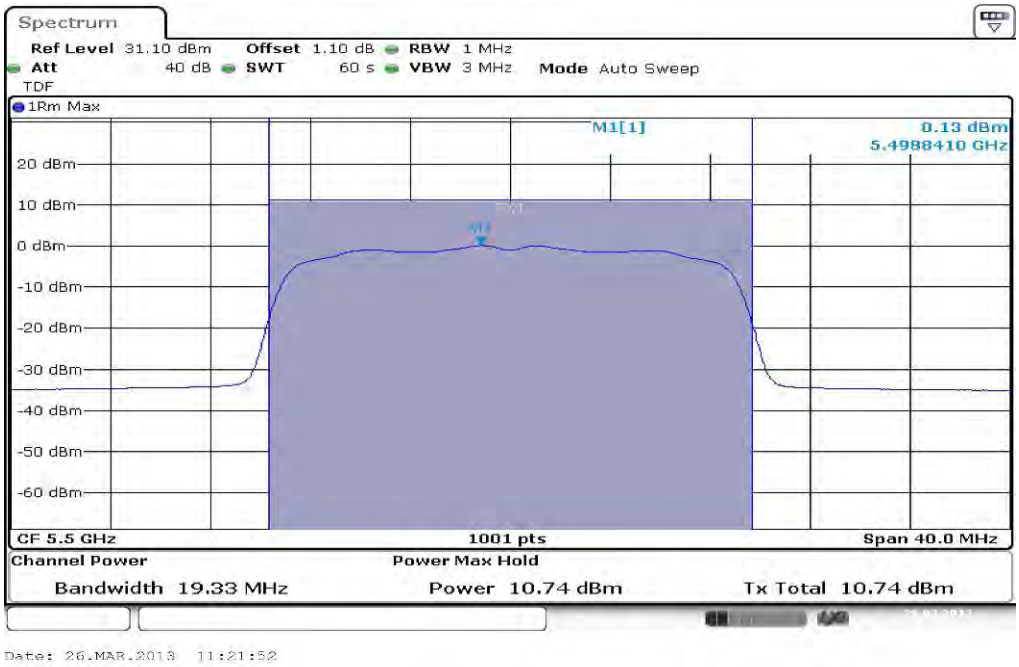
Plot 1: 5180 MHz



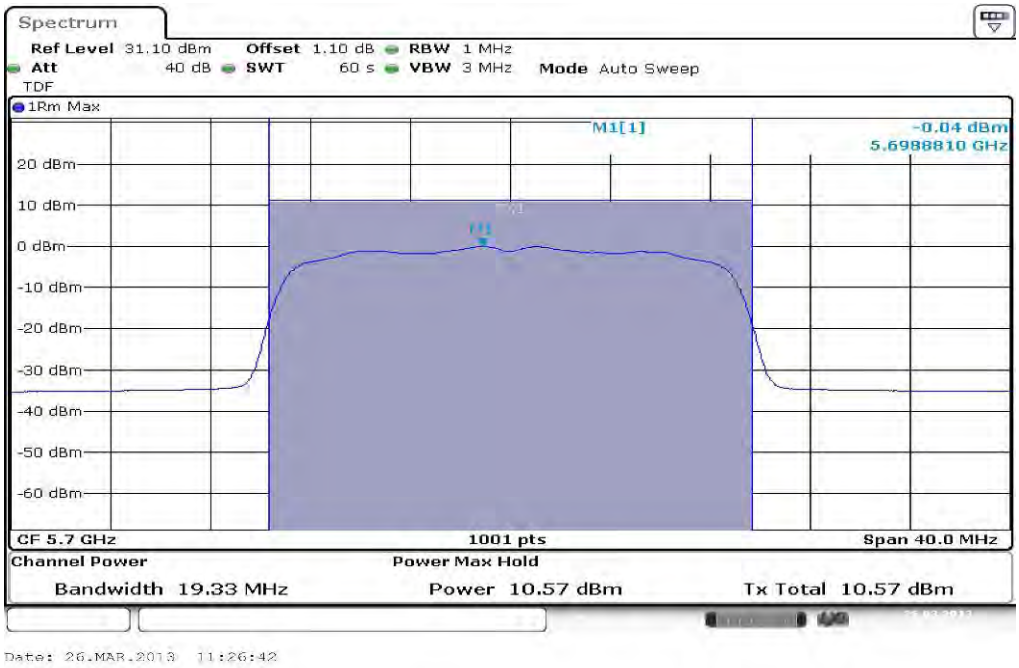
Plot 2: 5320 MHz



Plot 3: 5500 MHz



Plot 4: 5700 MHz



9.6 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:	60 s / 120 s
Resolution bandwidth:	1 MHz
Video bandwidth:	≥ 3 MHz
Span:	> EBW
Trace-Mode:	Max hold

Limits:

Power Spectral Density
power spectral density conducted ≤ 4 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) power spectral density conducted ≤ 17 dBm in any 1 MHz band (band 5725 – 5825 MHz)

Result: OFDM / a – mode 6 Mbps

OFDM / a – mode	Power Spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	1.47	1.48	2.38	0.35
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	0.27			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / a – mode 24 Mbps

OFDM / a – mode	Power Spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	1.29	1.11	1.90	0.10
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	-0.10			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / a – mode 54 Mbps

OFDM / a – mode	Power Spectral density [dBm/MHz]			
Channel	5180 MHz	5240 MHz	5320 MHz	5500 MHz
+0.14 dB duty cycle correction	0.84	0.59	1.53	-0.49
Channel	5700 MHz	-/-	-/-	-/-
+0.14 dB duty cycle correction	-0.55			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / n – mode HT20 MCS0

OFDM / n – mode HT20	Power Spectral density [dBm/MHz]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	1.25	2.13	0.19	0.09
Measurement uncertainty	± 1 dB			

Result: **Passed**

Result: OFDM / n – mode HT20 MCS4

OFDM / n – mode HT20	Power Spectral density [dBm/MHz]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	0.77	1.51	-0.38	-0.55
Measurement uncertainty	± 1 dB			

Result: **Passed**

Result: OFDM / n – mode HT20 MCS7

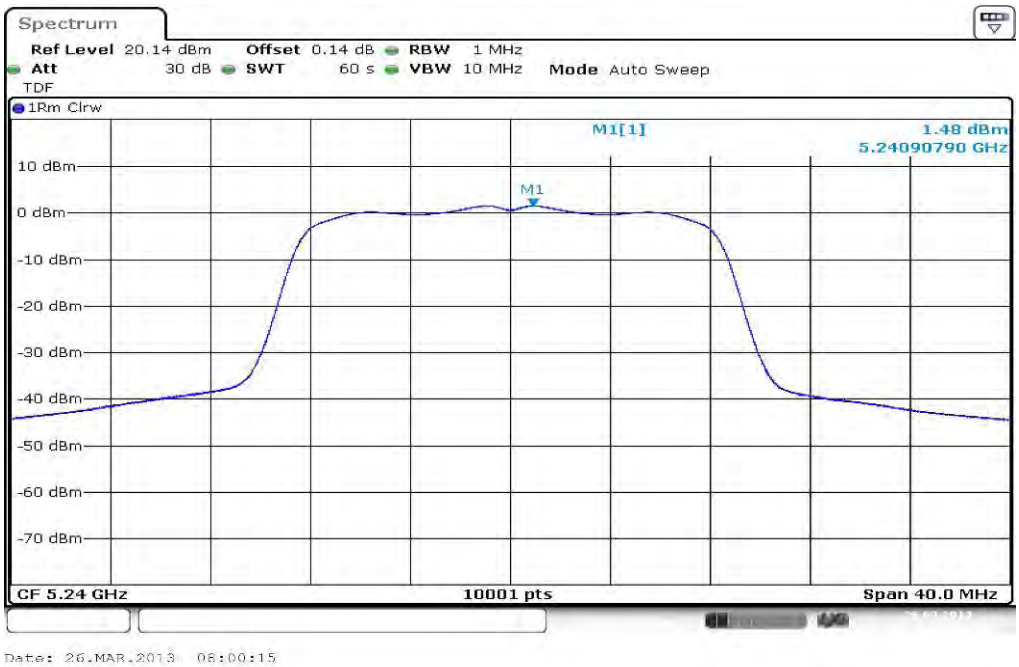
OFDM / n – mode HT20	Power Spectral density [dBm/MHz]			
Channel	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
+0.15 dB duty cycle correction	0.43	1.14	-0.73	-0.88
Measurement uncertainty	± 1 dB			

Result: **Passed**

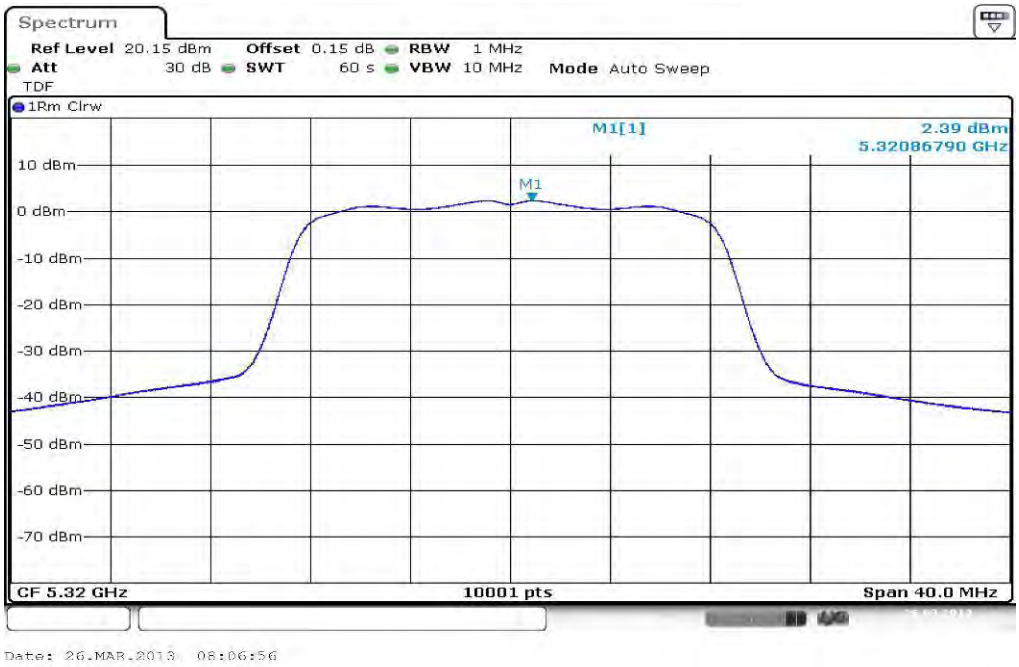
Plots: OFDM / a – mode 6 Mbps

Plot 1: 5180 MHz

Plot 2: 5240 MHz



Plot 3: 5320 MHz

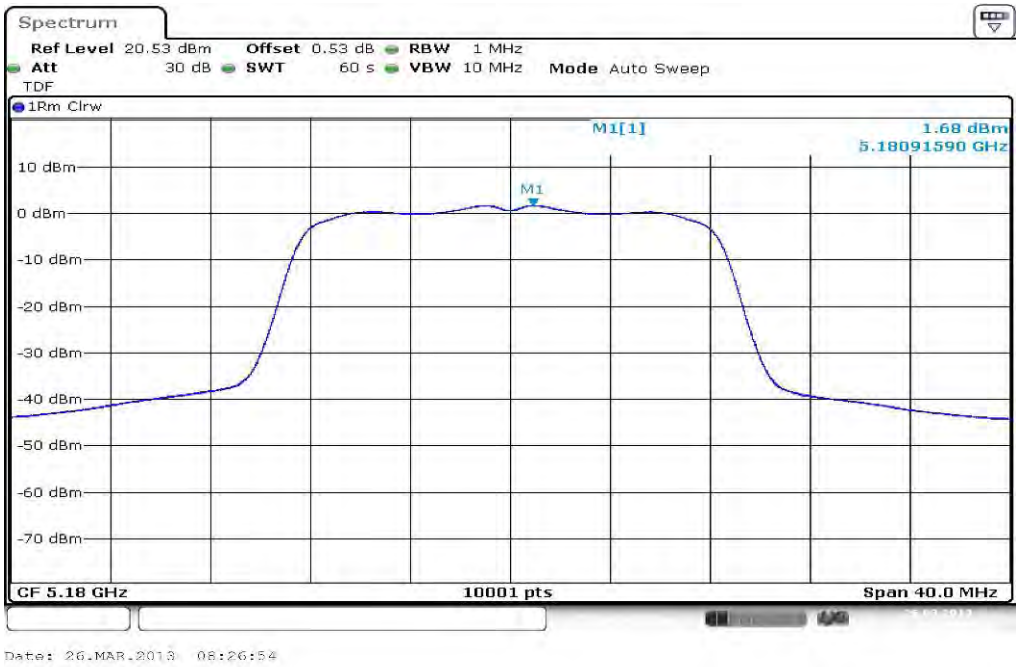


Plot 4: 5500 MHz

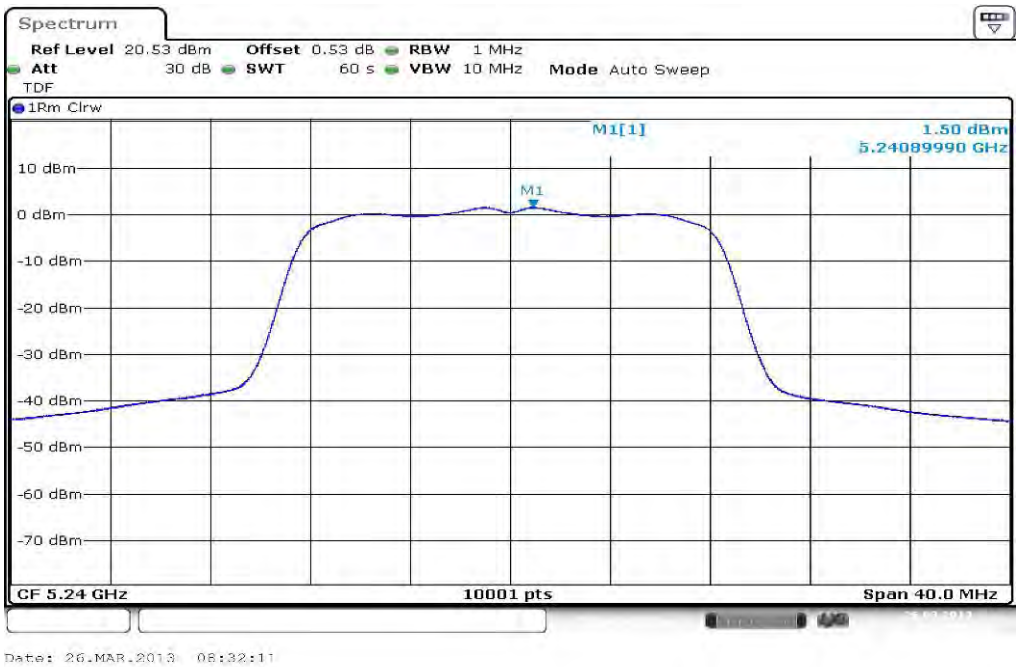
Plot 5: 5700 MHz

Plots: OFDM / a – mode 24 Mbps

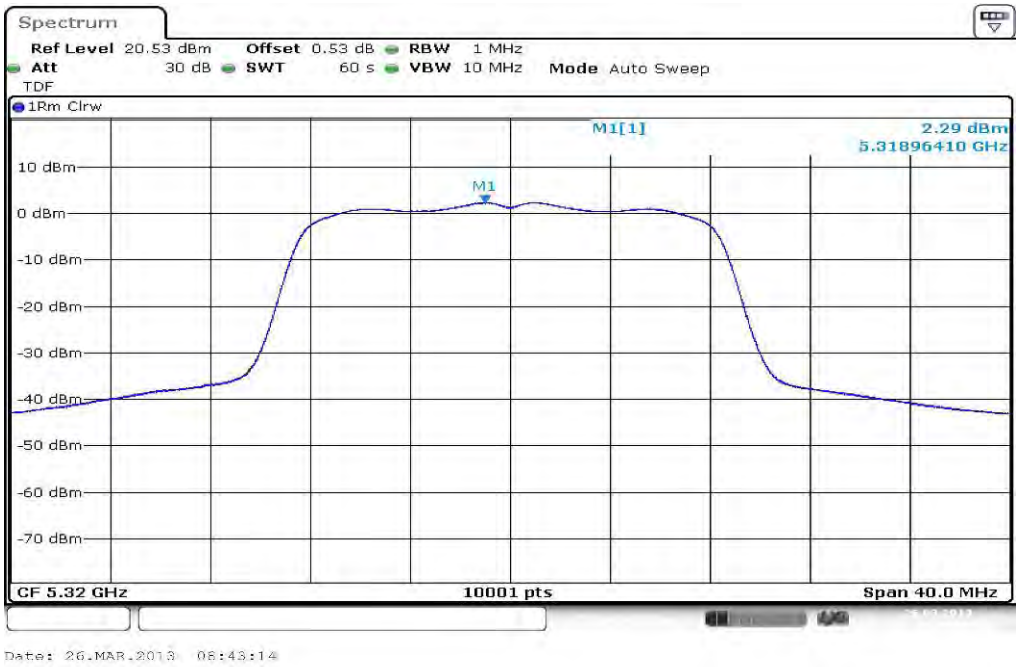
Plot 1: 5180 MHz



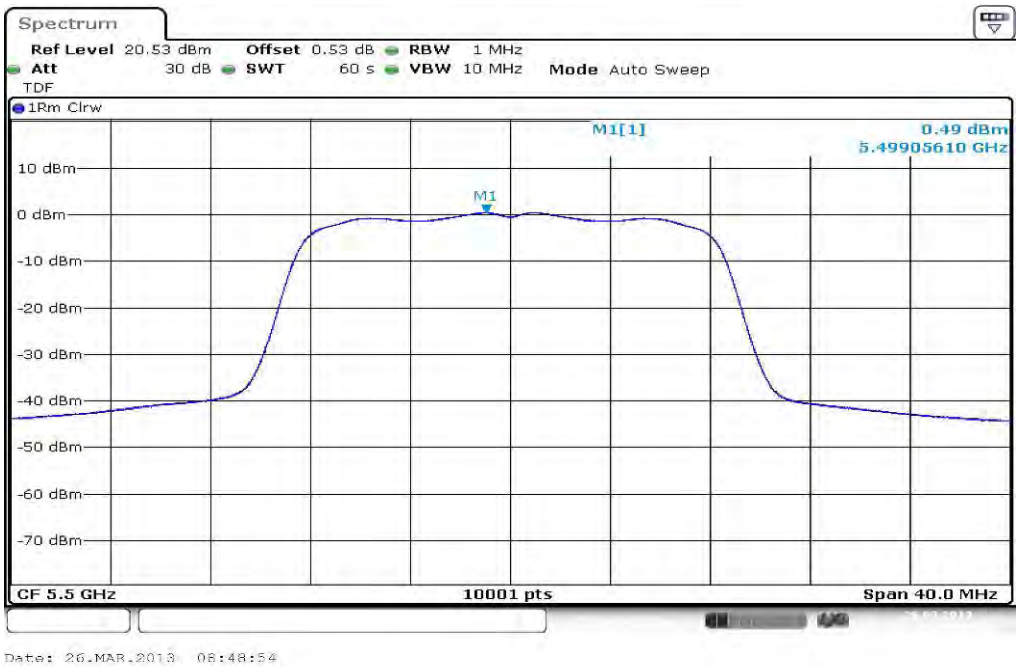
Plot 2: 5240 MHz



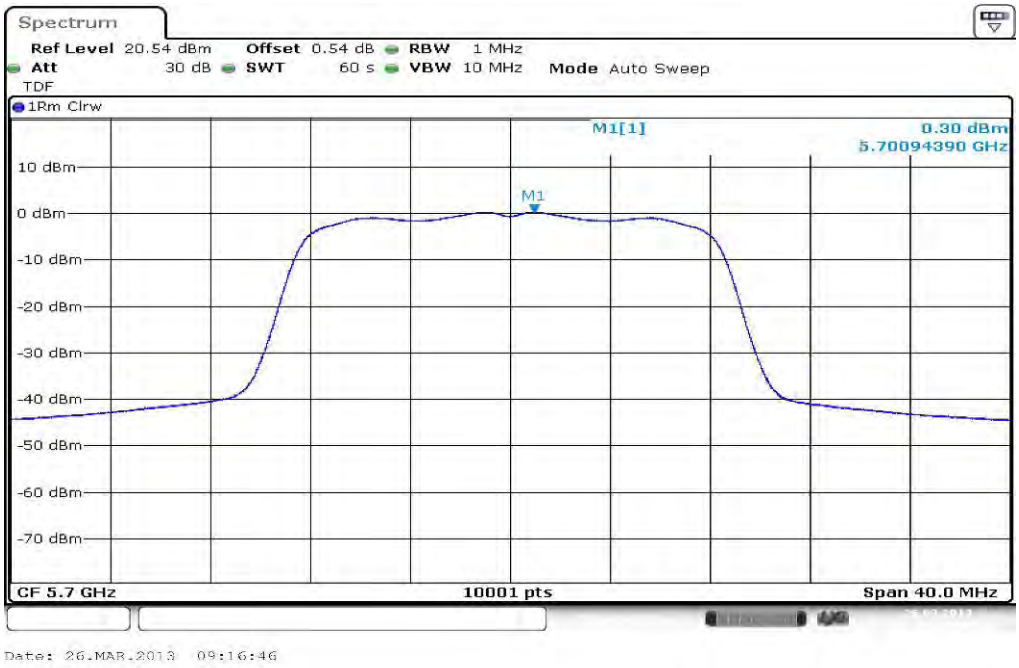
Plot 3: 5320 MHz



Plot 4: 5500 MHz



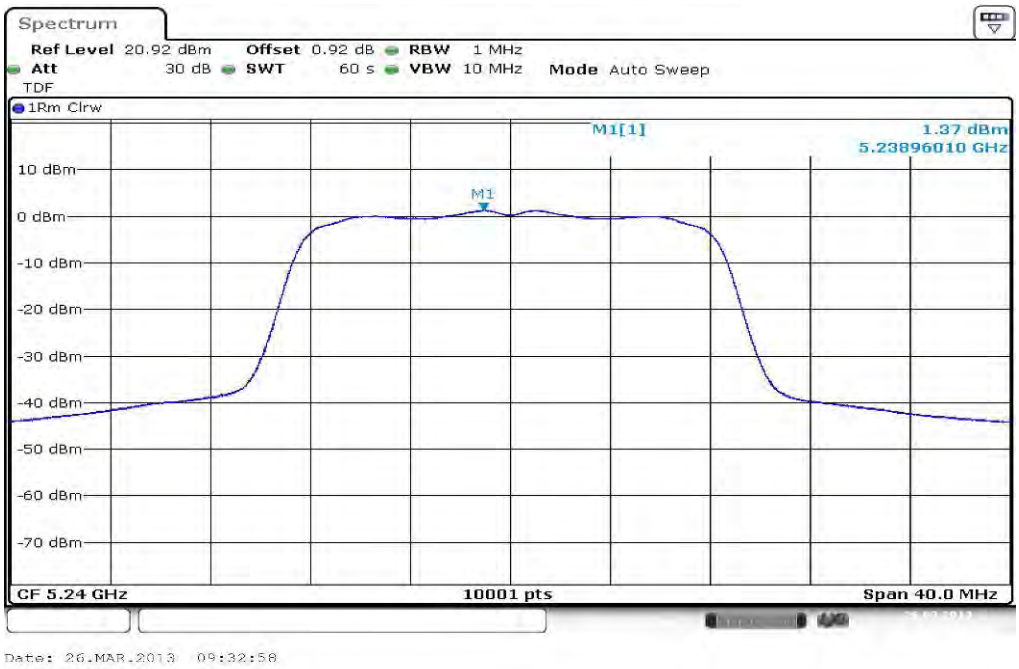
Plot 5: 5700 MHz



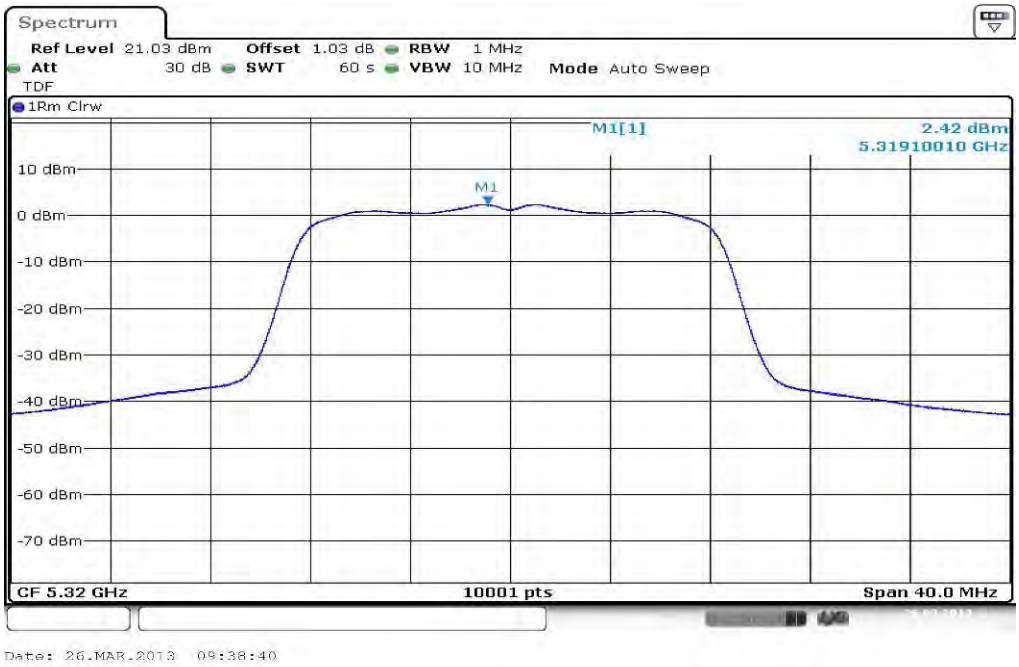
Plots: OFDM / a – mode 54 Mbps

Plot 1: 5180 MHz

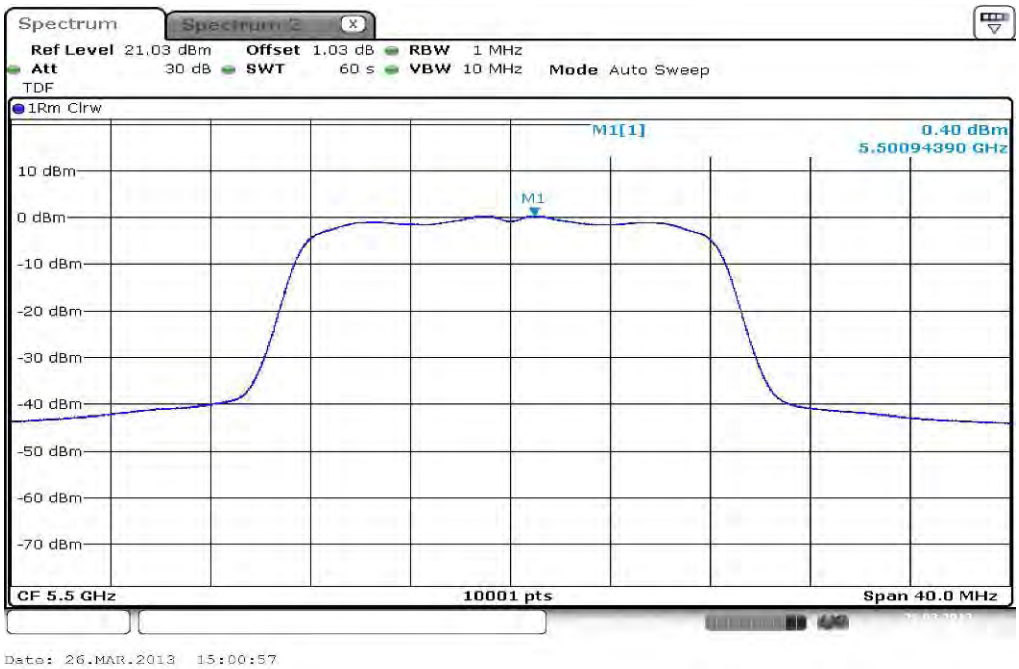
Plot 2: 5240 MHz



Plot 3: 5320 MHz



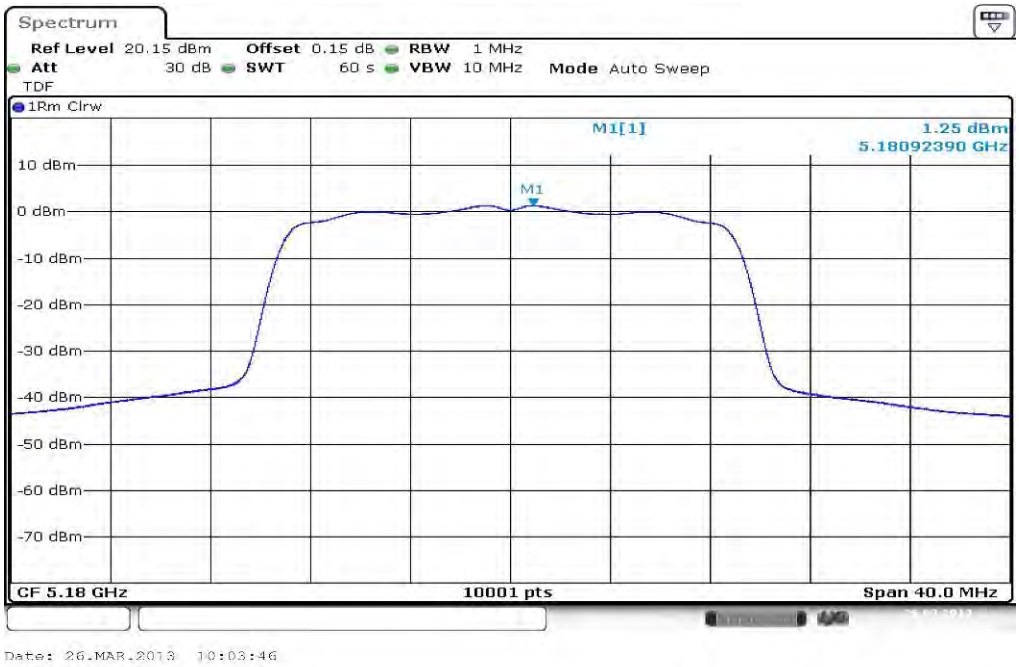
Plot 4: 5500 MHz



Plot 5: 5700 MHz

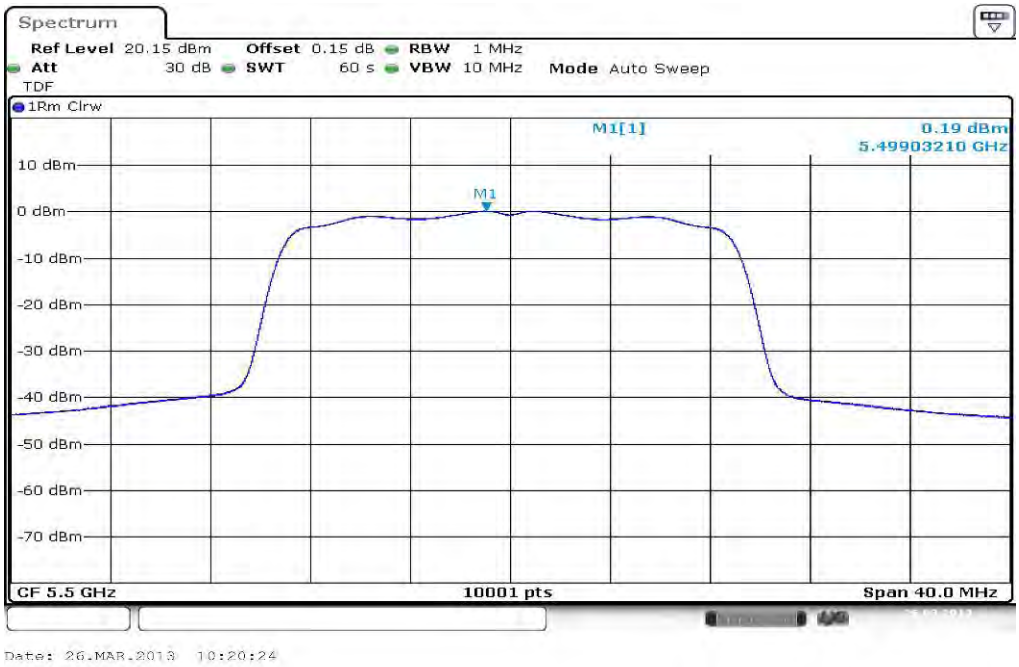
Plots: OFDM / n – mode HT20 MCS0

Plot 1: 5180 MHz

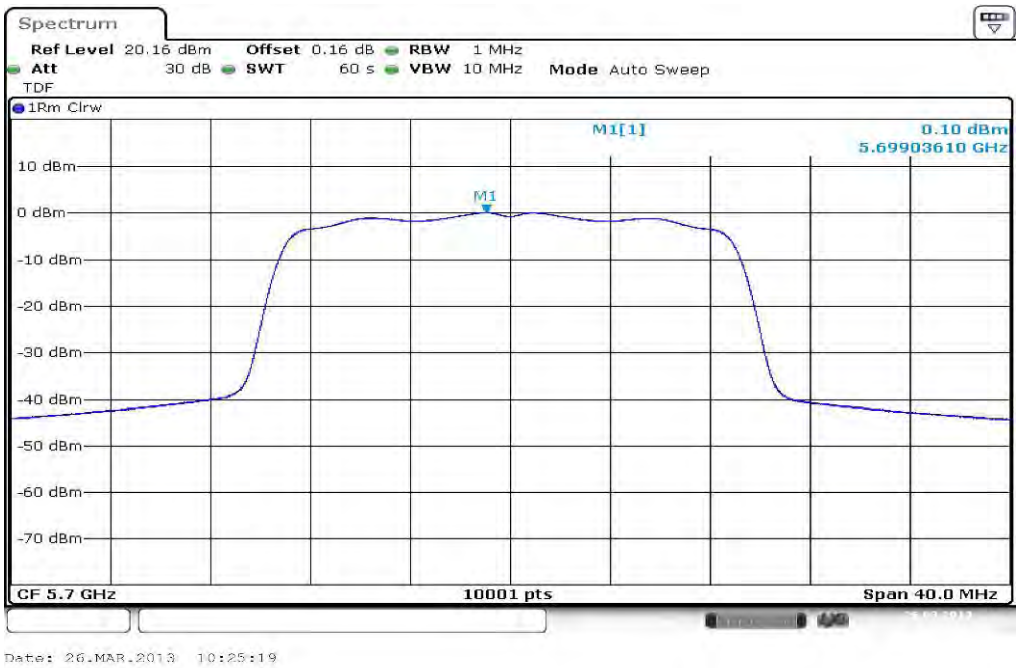


Plot 2: 5320 MHz

Plot 3: 5500 MHz

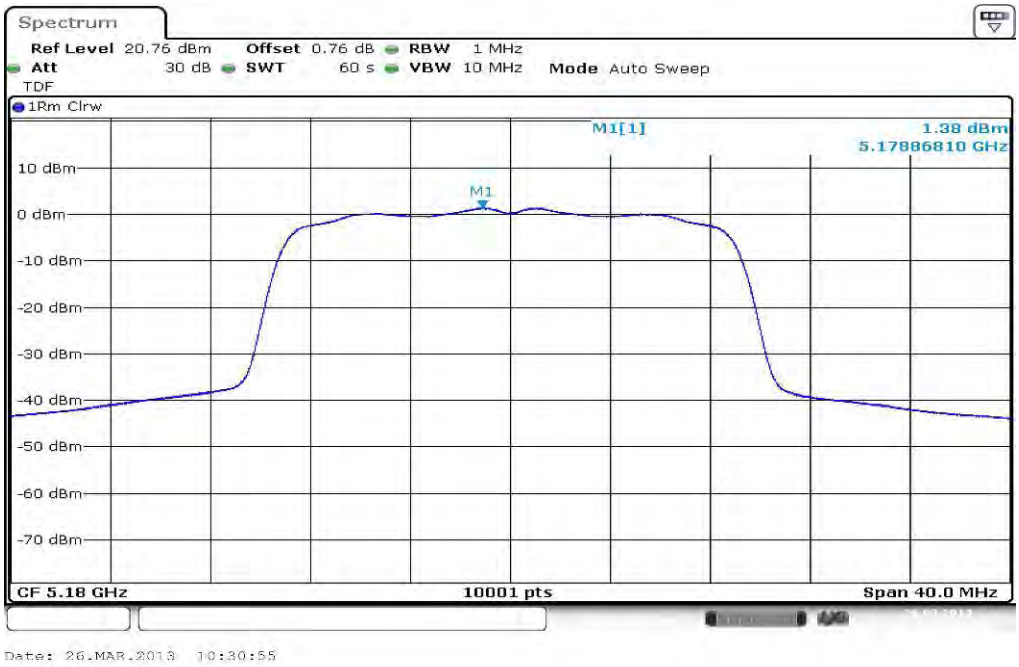


Plot 4: 5700 MHz

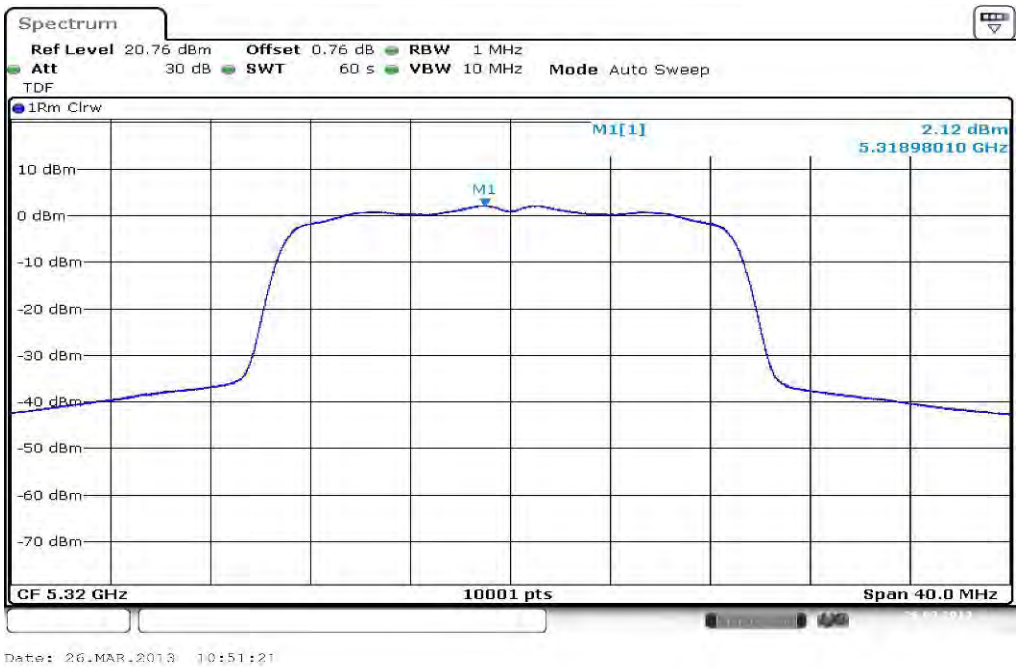


Plots: OFDM / n – mode HT20 MCS4

Plot 1: 5180 MHz

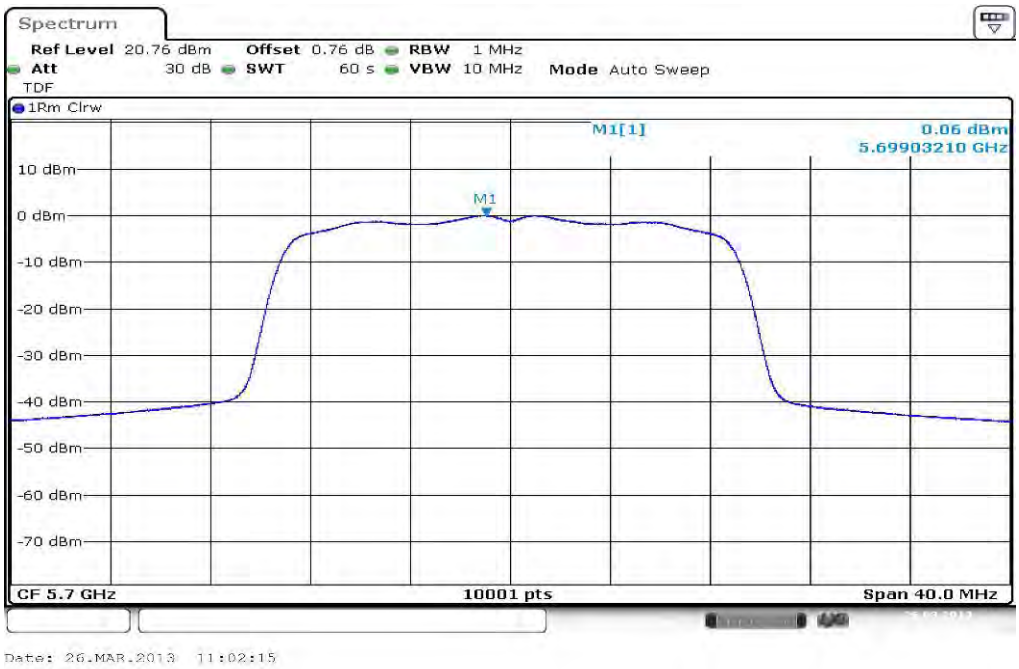


Plot 2: 5320 MHz



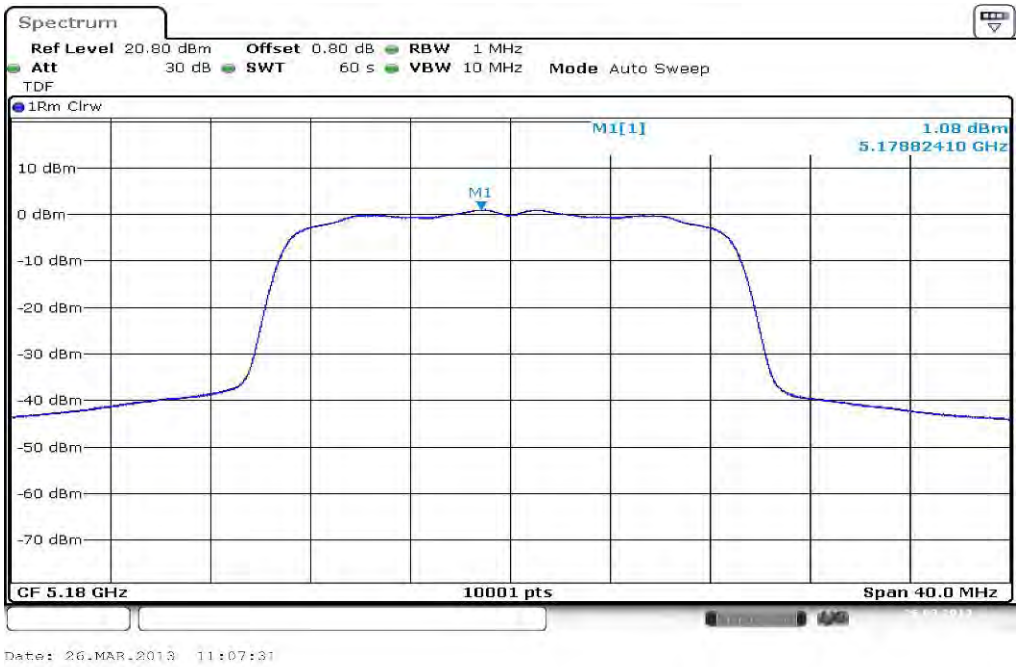
Plot 3: 5500 MHz

Plot 4: 5700 MHz

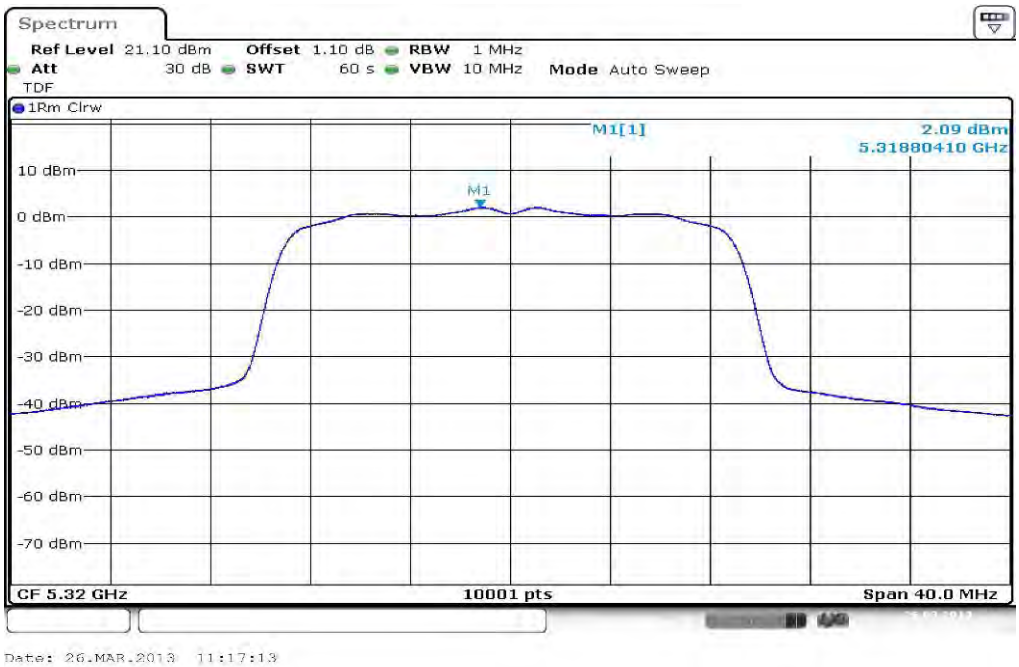


Plots: OFDM / n – mode HT20 MCS7

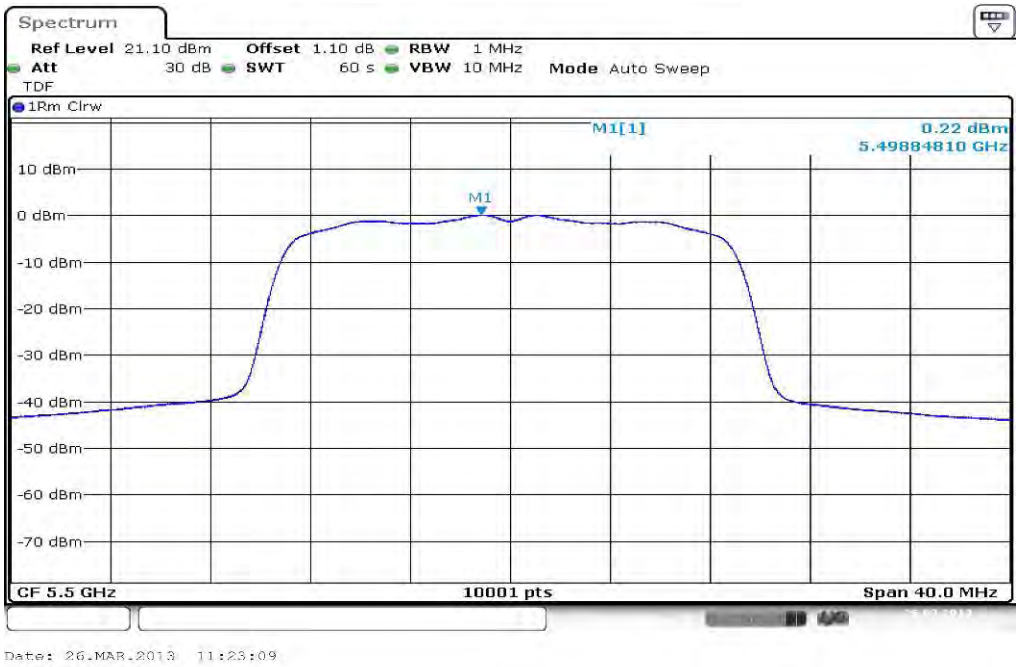
Plot 1: 5180 MHz



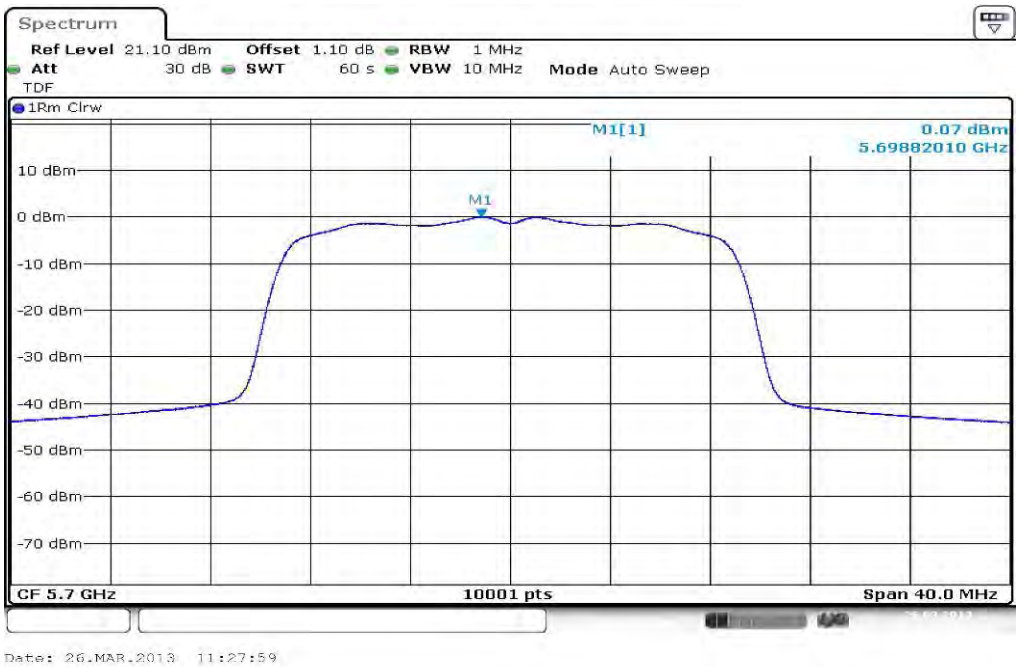
Plot 2: 5320 MHz



Plot 3: 5500 MHz



Plot 4: 5700 MHz



9.7 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

Limits:

Spectrum Bandwidth – 26 dB Bandwidth
-/-

Result: OFDM / a – mode 6 Mbps

OFDM / a – mode	26 dB BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Highest 5240 MHz	Highest 5320 MHz	Lowest 5500 MHz
	19.13	19.23	19.08	19.03
Channel	Highest 5700 MHz			
	19.13			
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / a – mode 24 Mbps

OFDM / a – mode	26 dB BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Highest 5240 MHz	Highest 5320 MHz	Lowest 5500 MHz
	19.08	18.93	18.93	18.88
Channel	Highest 5700 MHz			
	18.98			
Measurement uncertainty	± 1 dB			

Result: **Passed**

Result: OFDM / a – mode 54 Mbps

OFDM / a – mode	26 dB BANDWIDTH [MHz]			
Channel	Lowest 5180 MHz	Highest 5240 MHz	Highest 5320 MHz	Lowest 5500 MHz
	18.98	19.03	18.93	18.98
Channel	Highest 5700 MHz			
	19.08			
Measurement uncertainty	± 1 dB			

Result: **Passed**

Result: OFDM / n – mode HT20 MCS0

OFDM / n – mode HT20 Channel	26 dB BANDWIDTH [MHz]			
	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
	19.63	19.43	19.58	19.48
Measurement uncertainty	± 1 dB			

Result: Passed

Result: OFDM / n – mode HT20 MCS4

OFDM / n – mode HT20 Channel	26 dB BANDWIDTH [MHz]			
	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
	19.33	19.43	19.28	19.38
Measurement uncertainty	± 1 dB			

Result: Passed

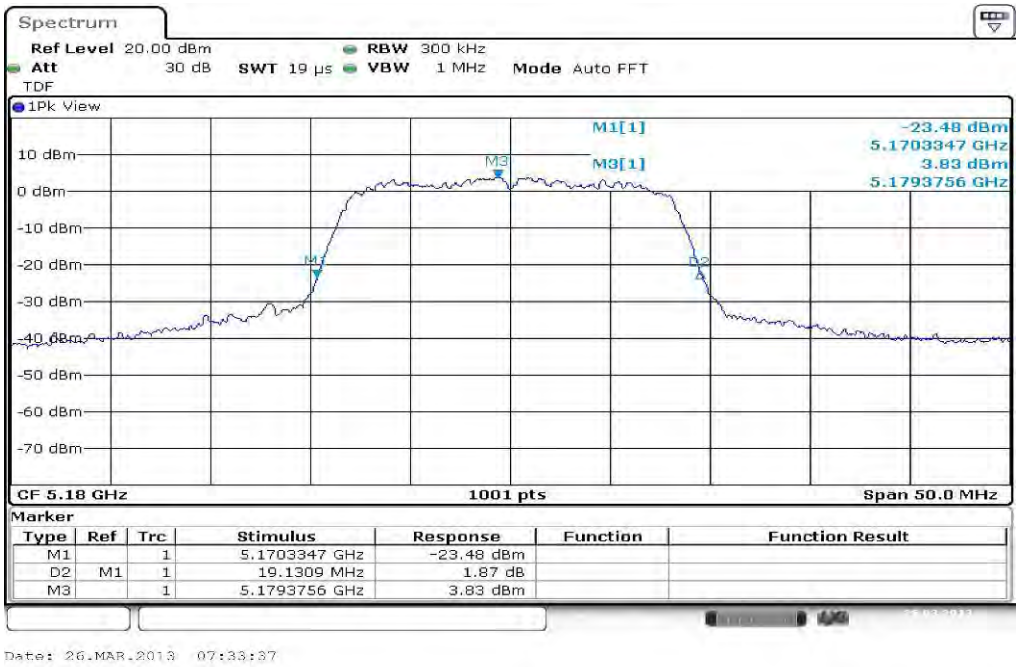
Result: OFDM / n – mode HT20 MCS7

OFDM / n – mode HT20 Channel	26 dB BANDWIDTH [MHz]			
	Lowest 5180 MHz	Highest 5320 MHz	Lowest 5500 MHz	Highest 5700 MHz
	19.33	19.28	19.33	19.33
Measurement uncertainty	± 1 dB			

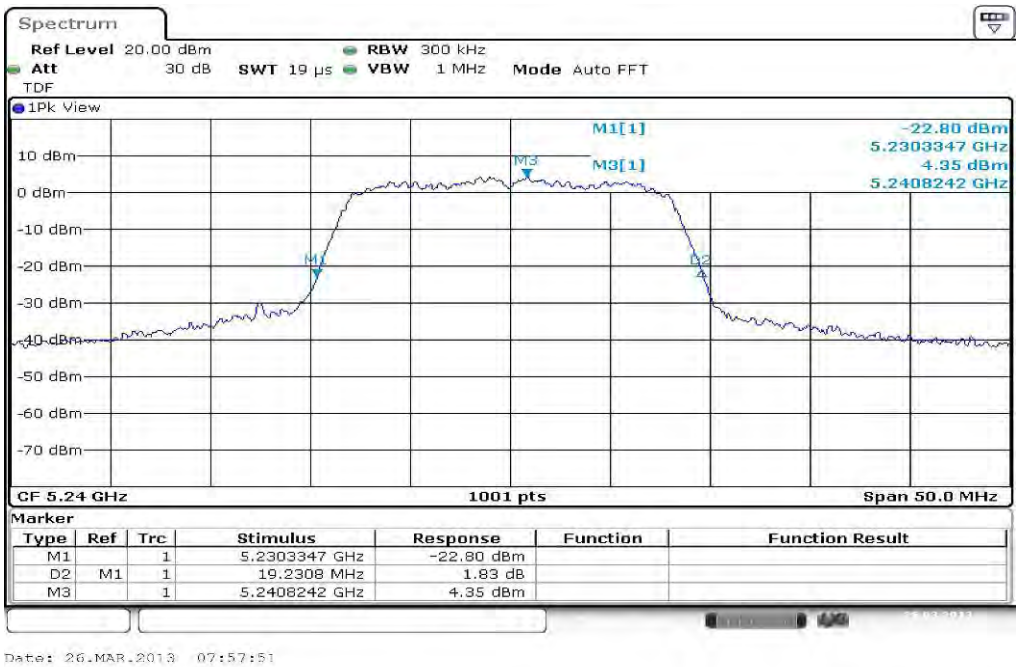
Result: Passed

Plots: OFDM / a – mode 6 Mbps

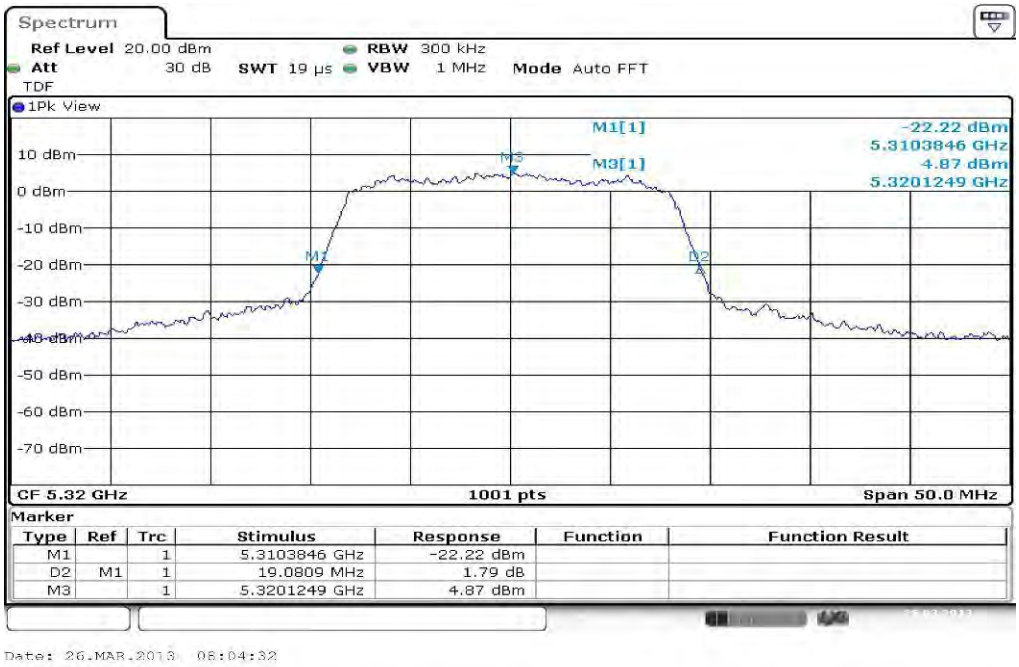
Plot 1: 5180 MHz



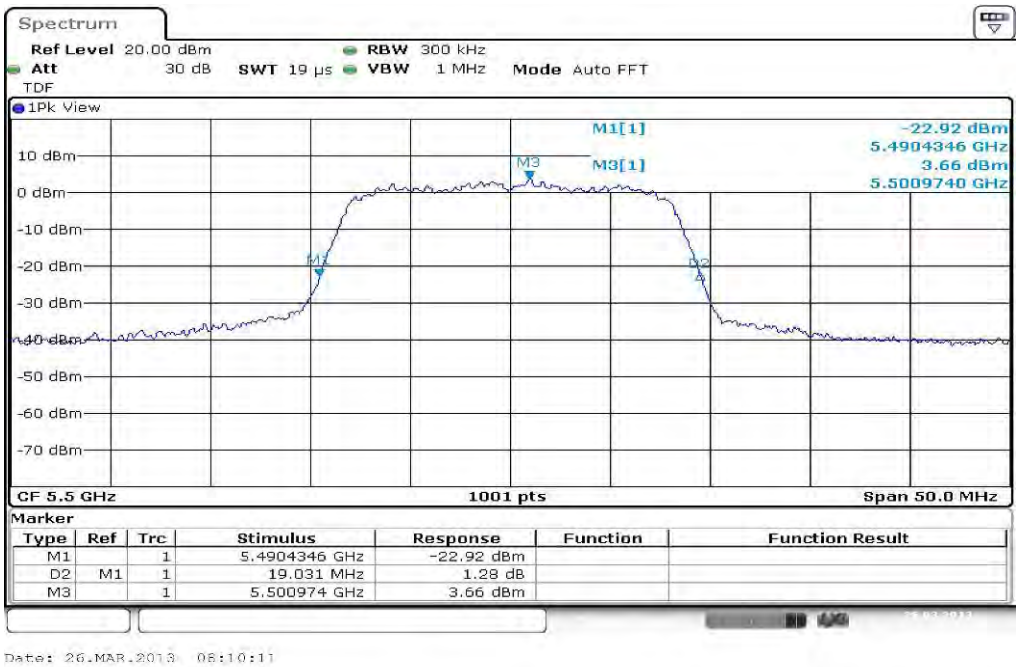
Plot 2: 5240 MHz



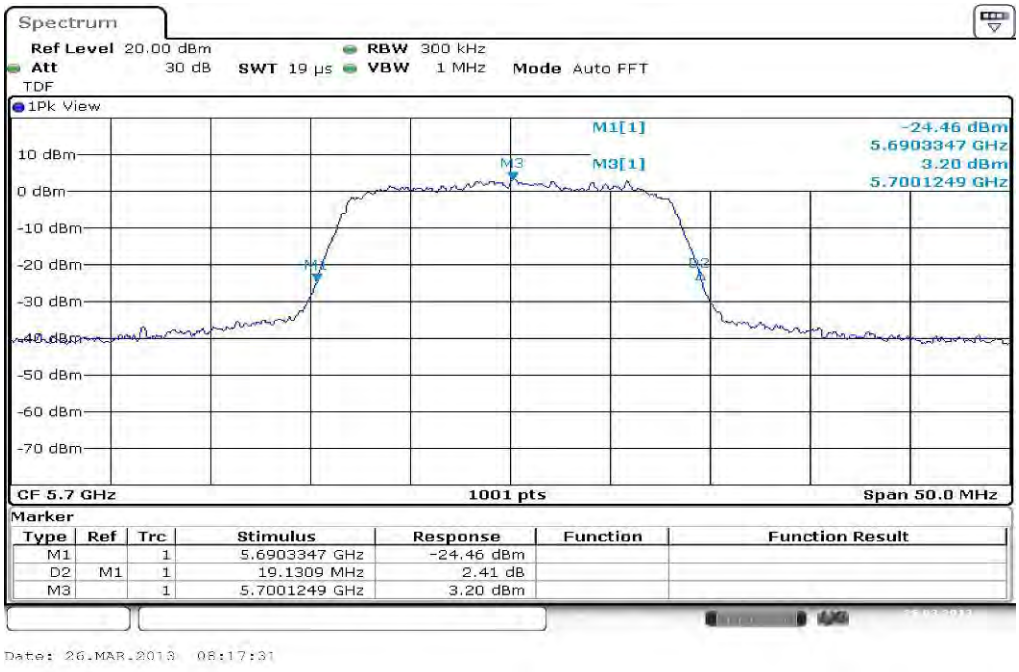
Plot 3: 5320 MHz



Plot 4: 5500 MHz

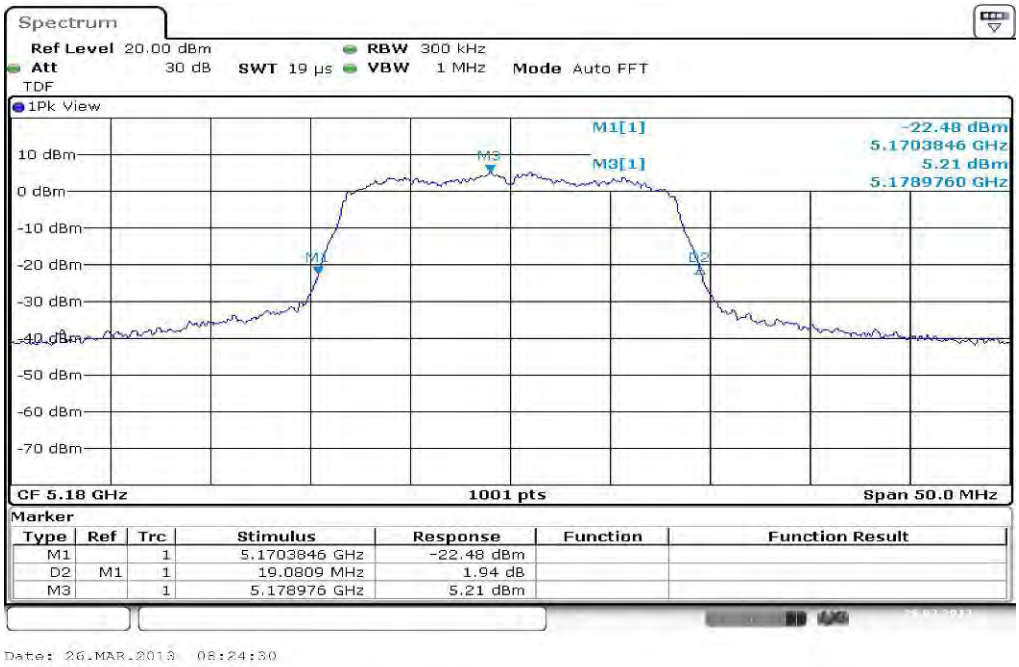


Plot 5: 5700 MHz

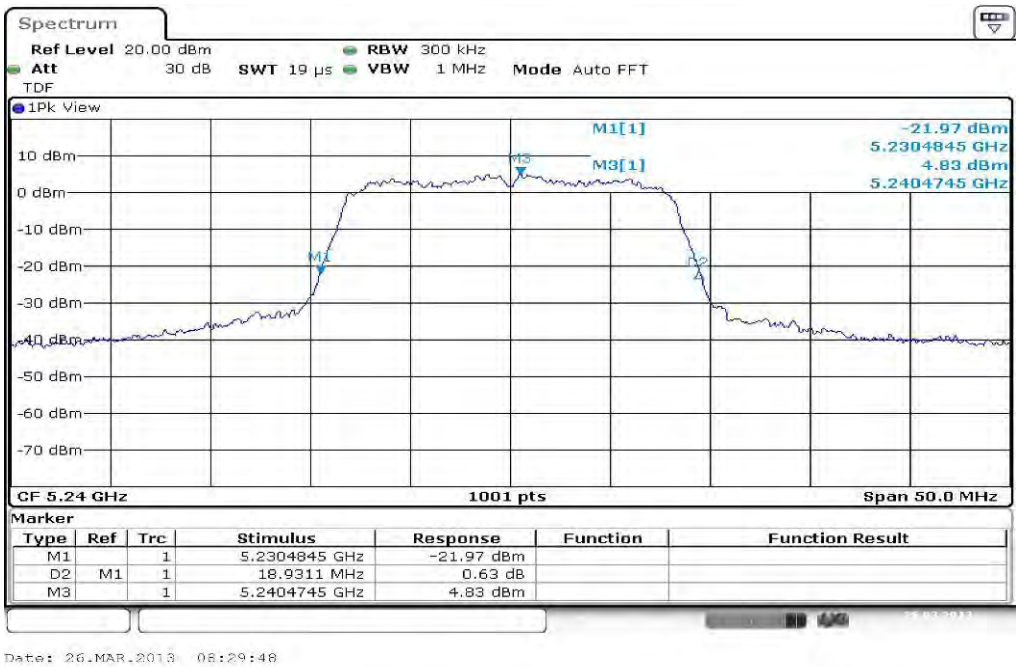


Plots: OFDM / a – mode 24 Mbps

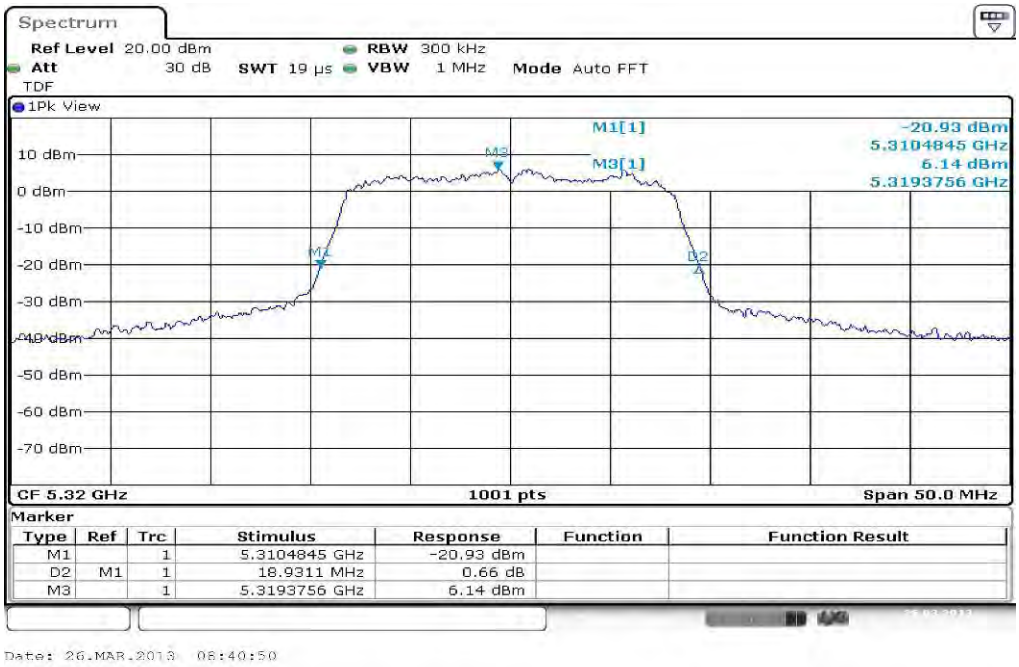
Plot 1: 5180 MHz



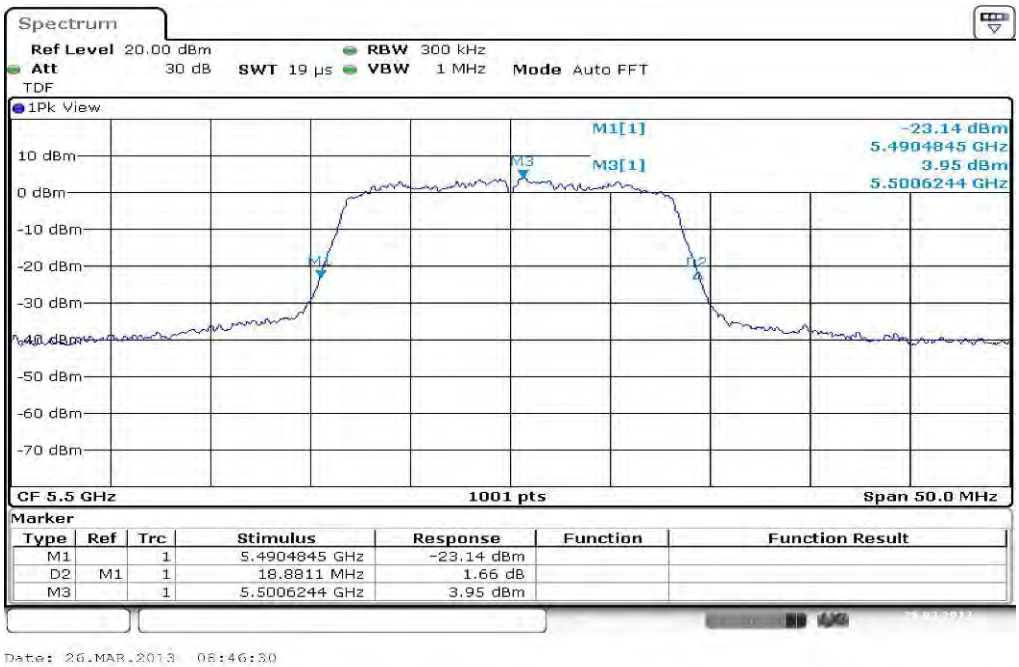
Plot 2: 5240 MHz



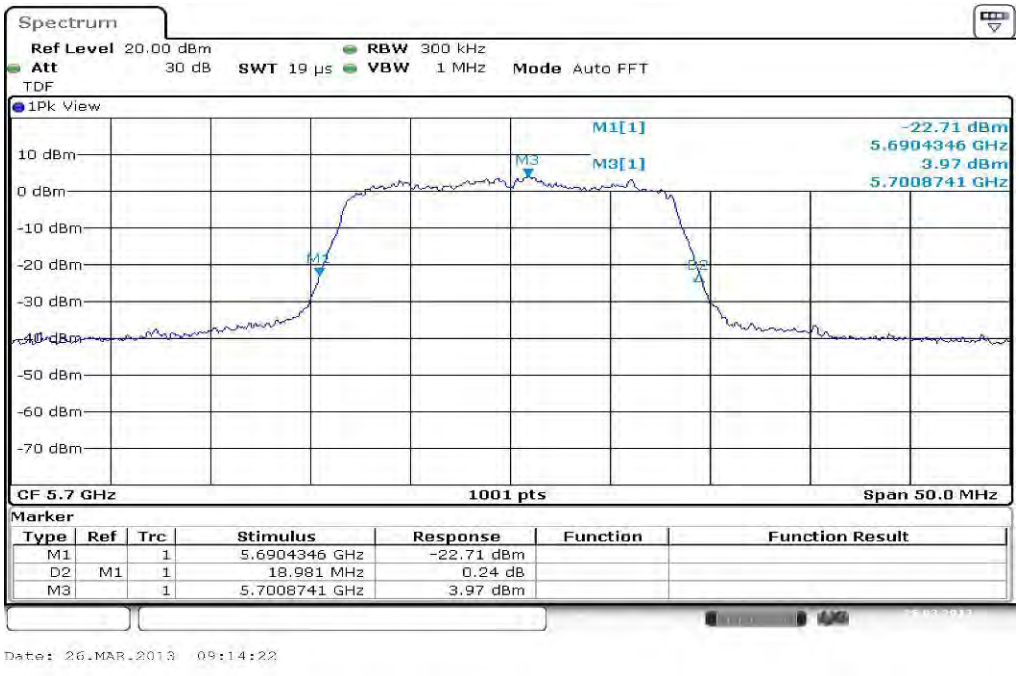
Plot 3: 5320 MHz



Plot 4: 5500 MHz

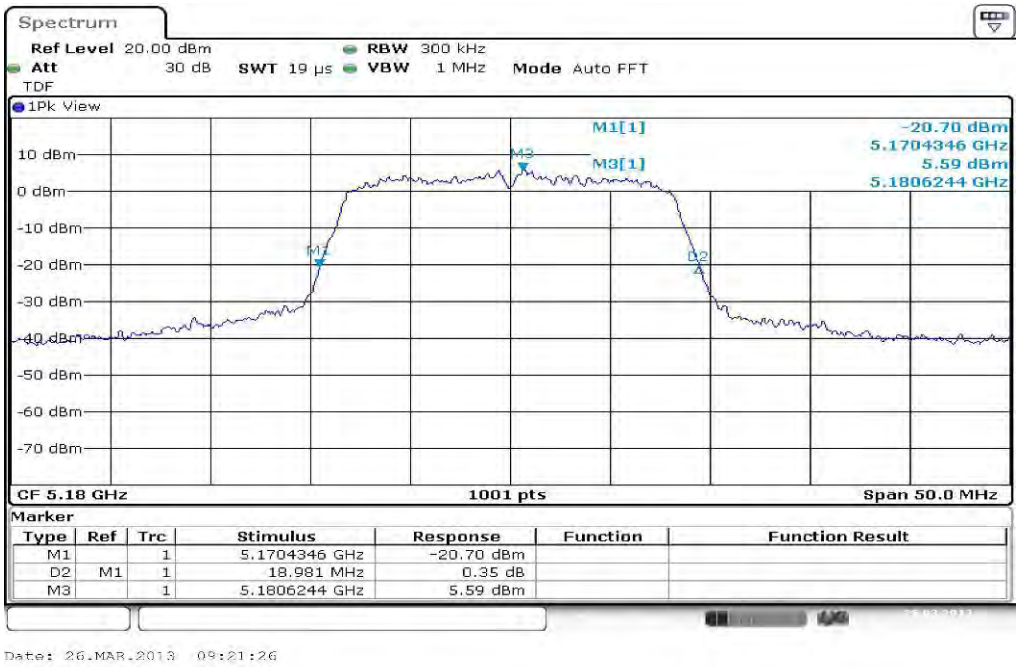


Plot 5: 5700 MHz

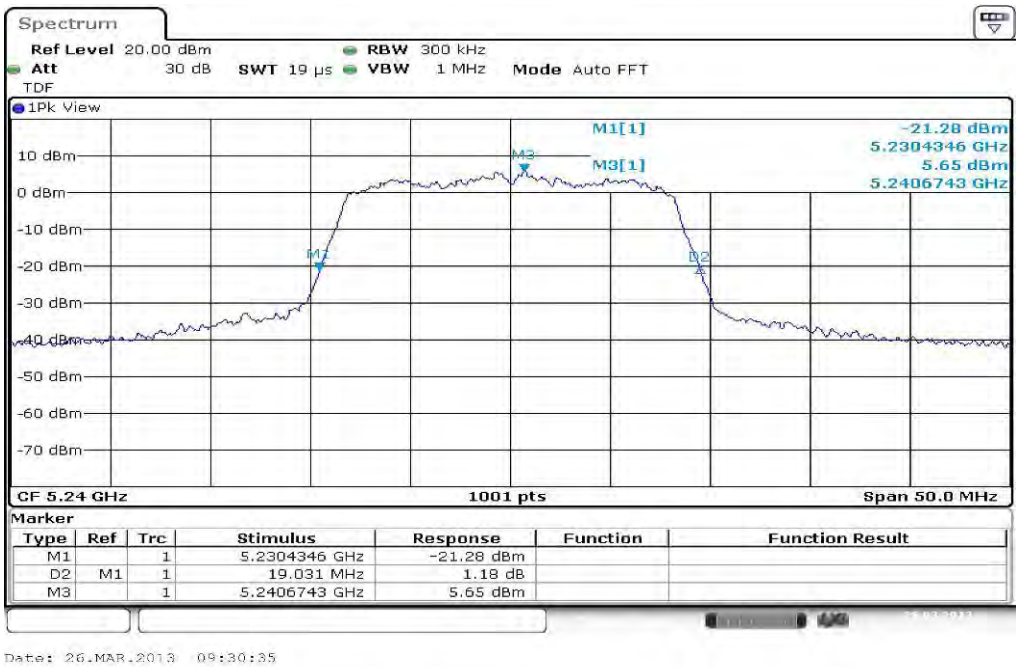


Plots: OFDM / a – mode 54 Mbps

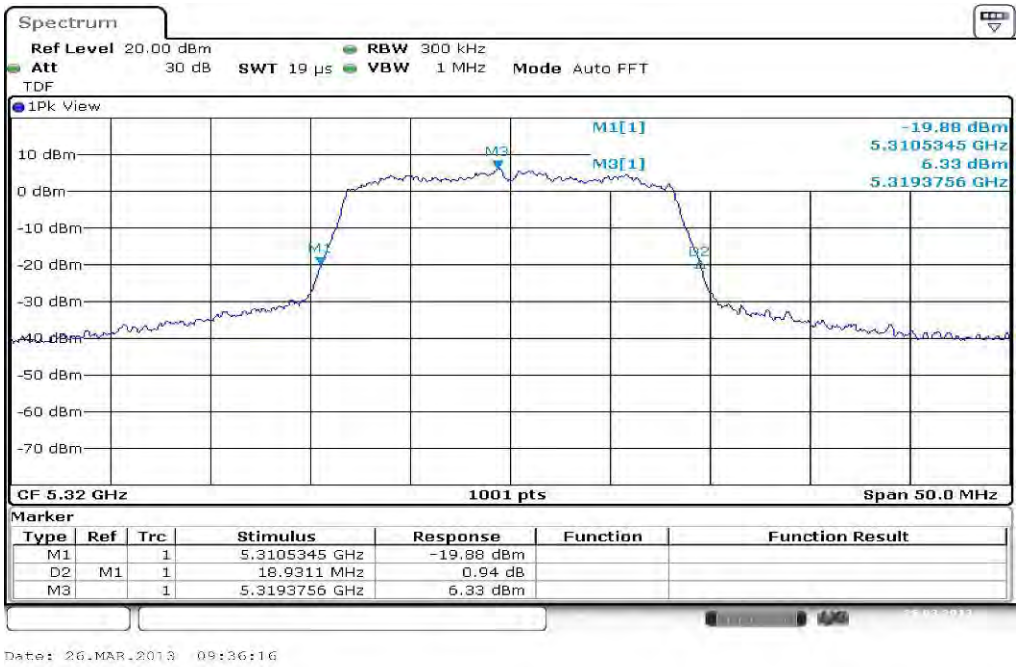
Plot 1: 5180 MHz



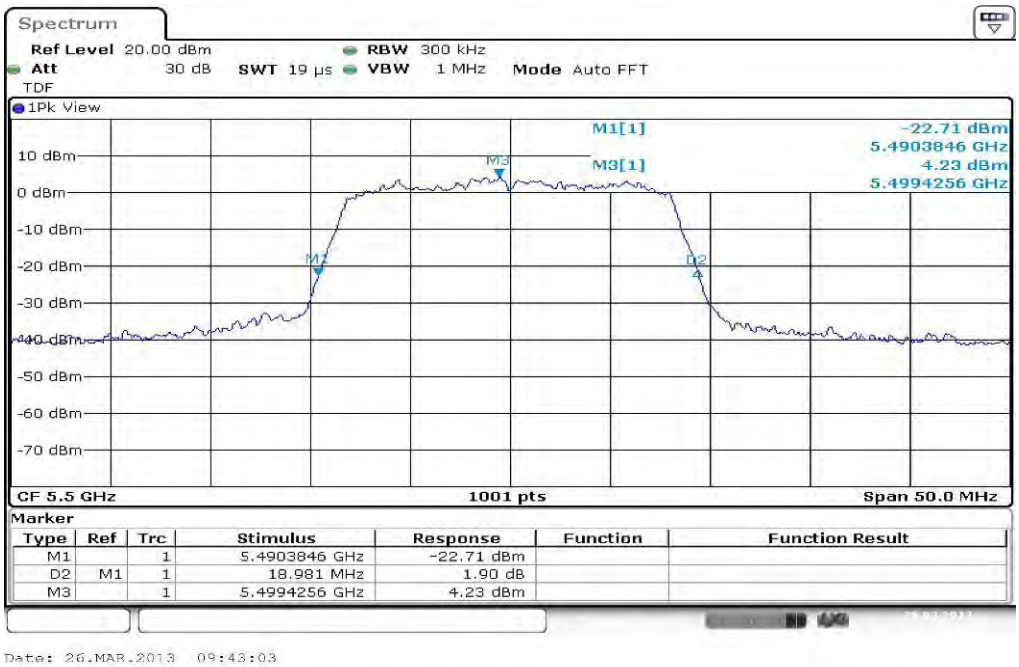
Plot 2: 5240 MHz



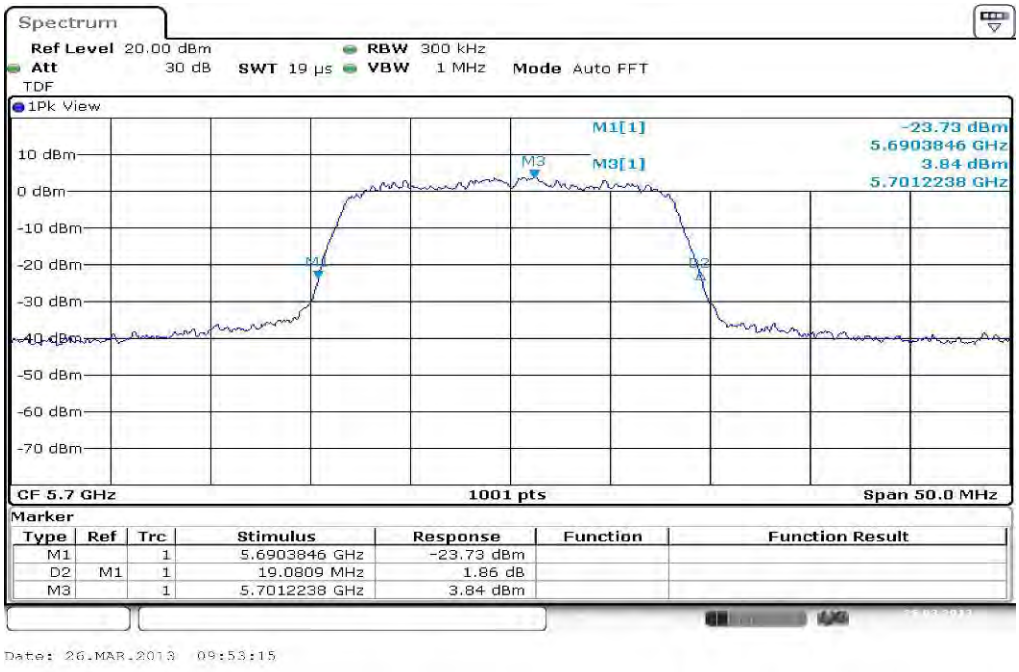
Plot 3: 5320 MHz



Plot 4: 5500 MHz

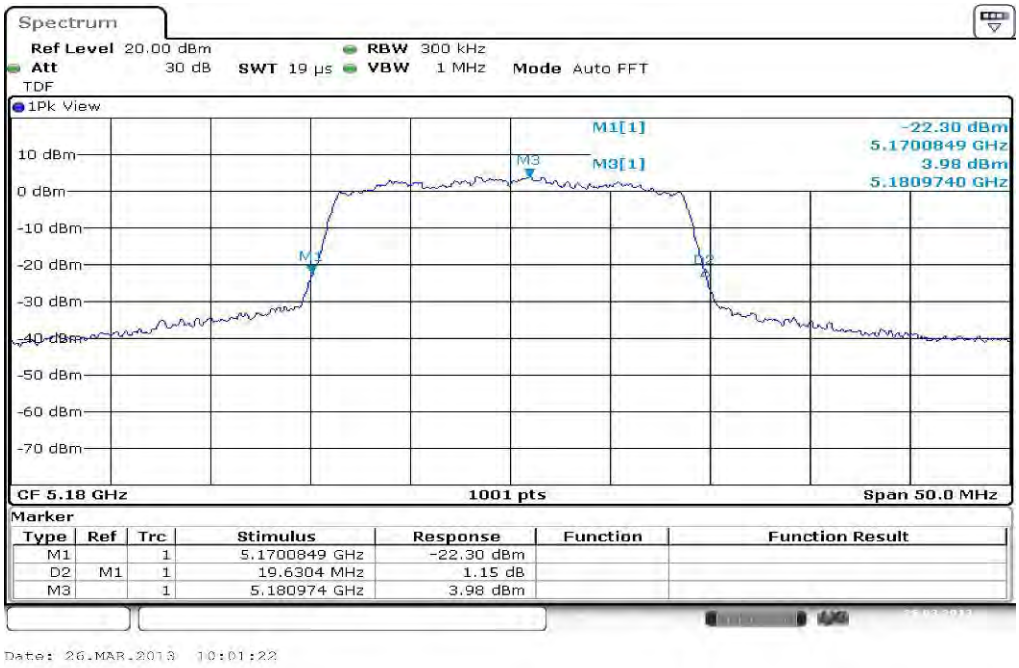


Plot 5: 5700 MHz

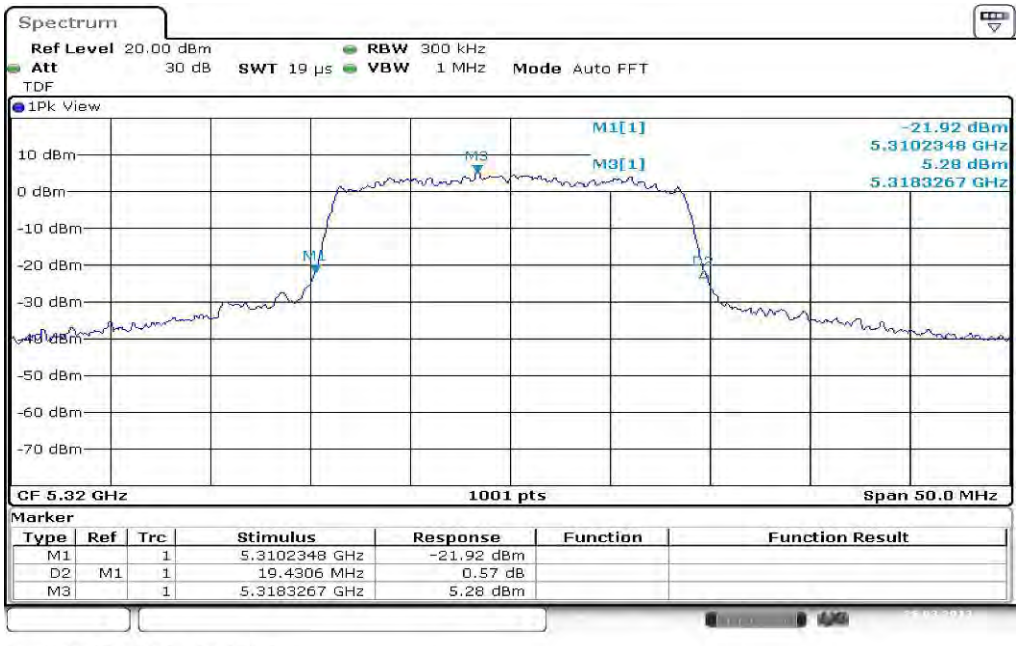


Plots: OFDM / n – mode HT20 MCS0

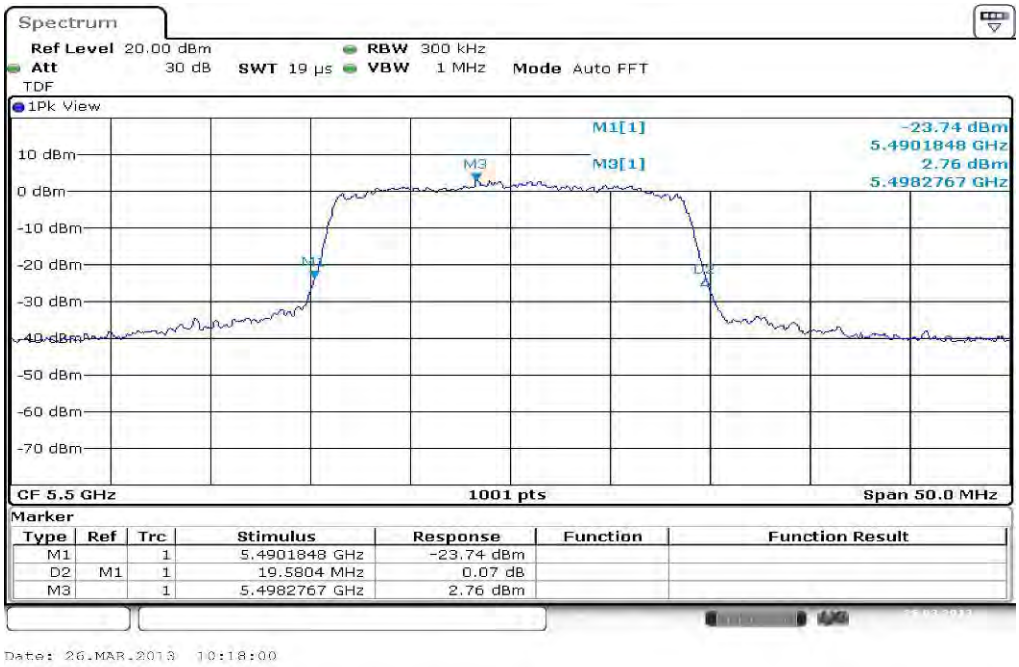
Plot 1: 5180 MHz



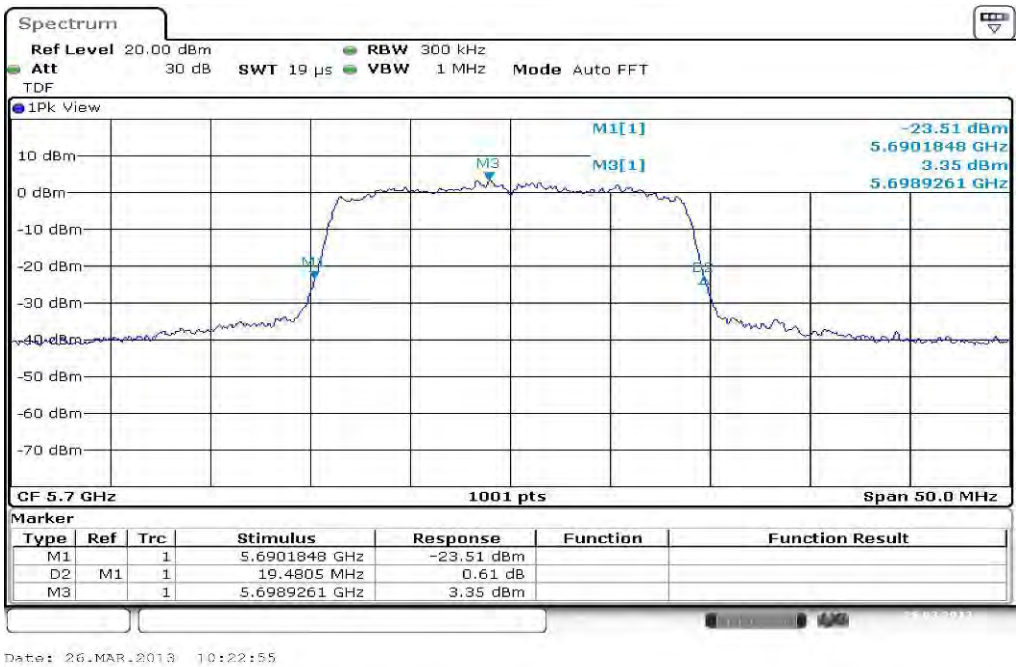
Plot 2: 5320 MHz



Plot 3: 5500 MHz

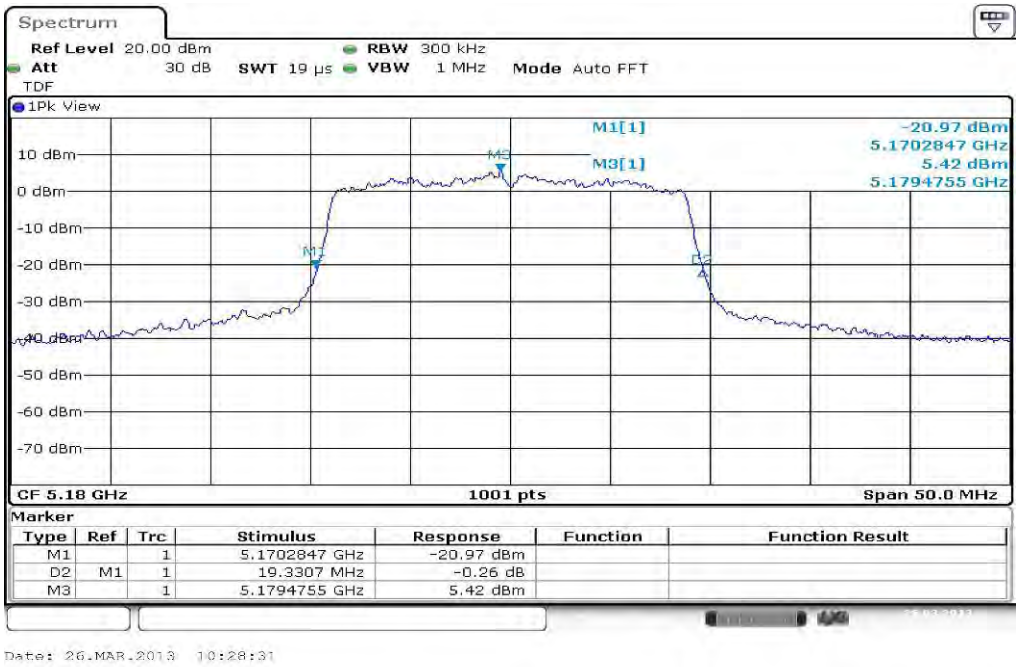


Plot 4: 5700 MHz

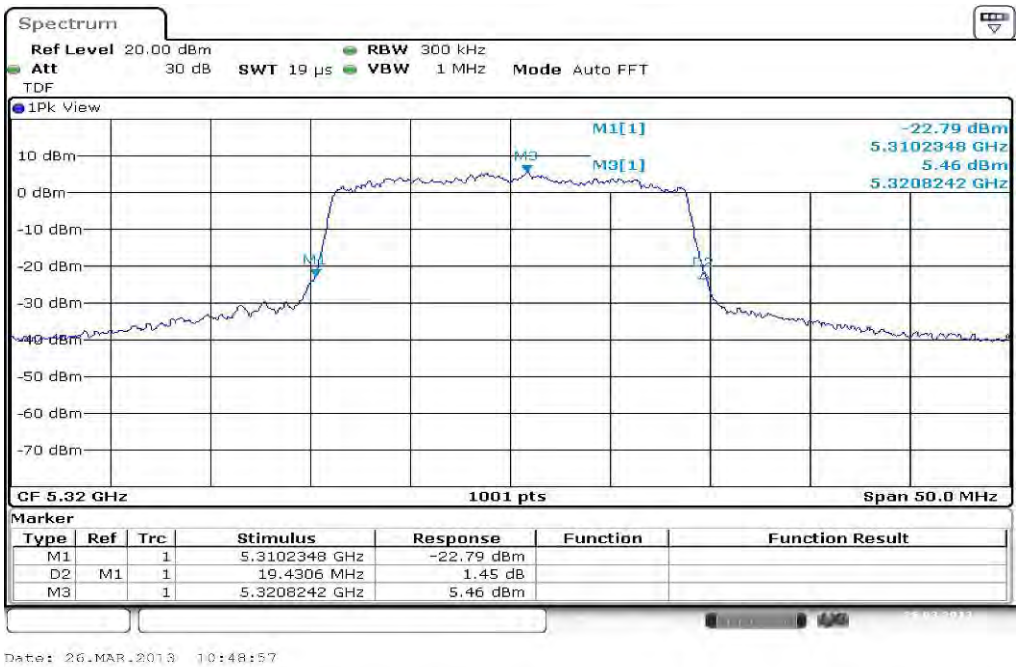


Plots: OFDM / n – mode HT20 MCS4

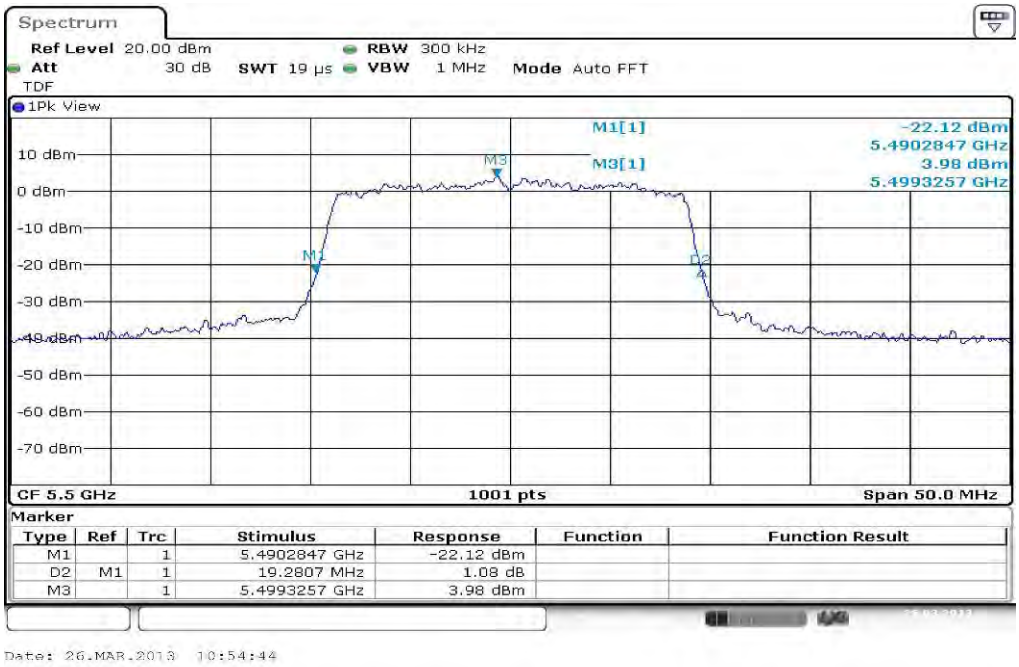
Plot 5: 5180 MHz



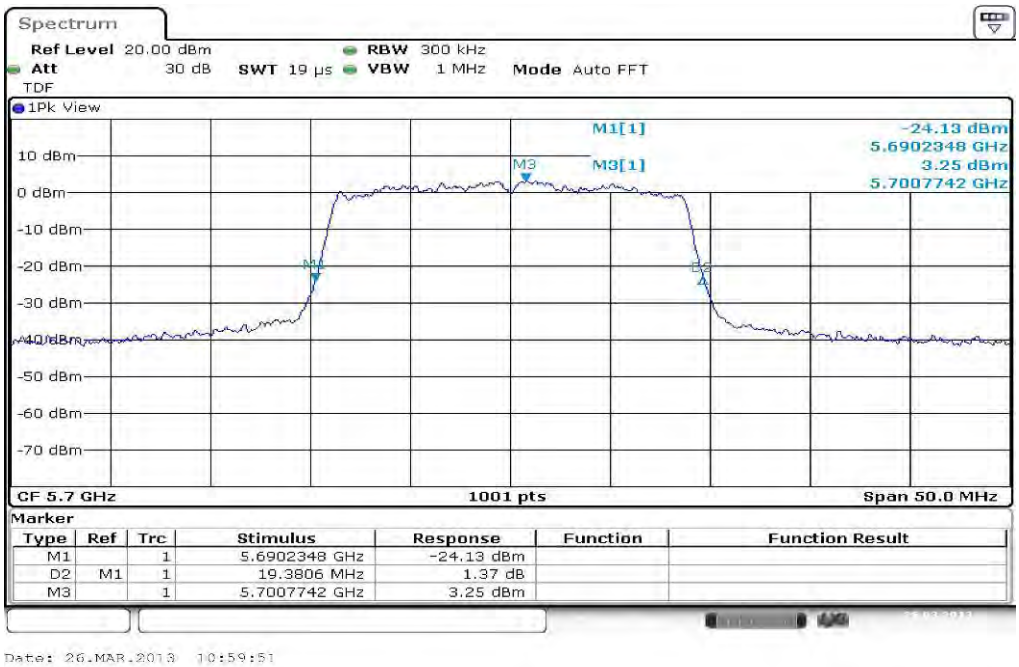
Plot 6: 5320 MHz



Plot 7: 5500 MHz

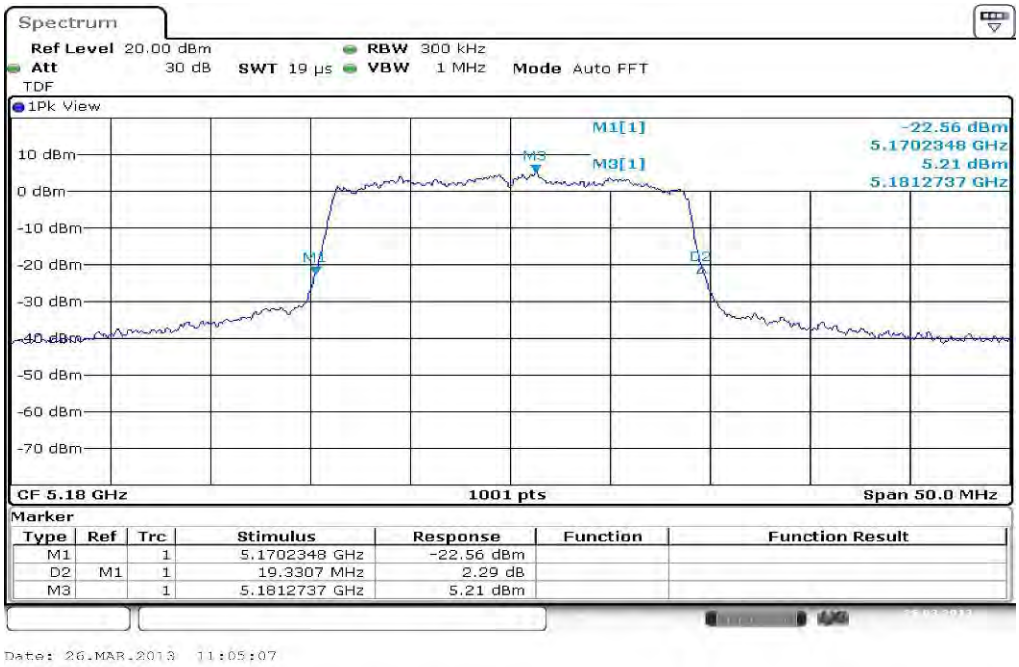


Plot 8: 5700 MHz

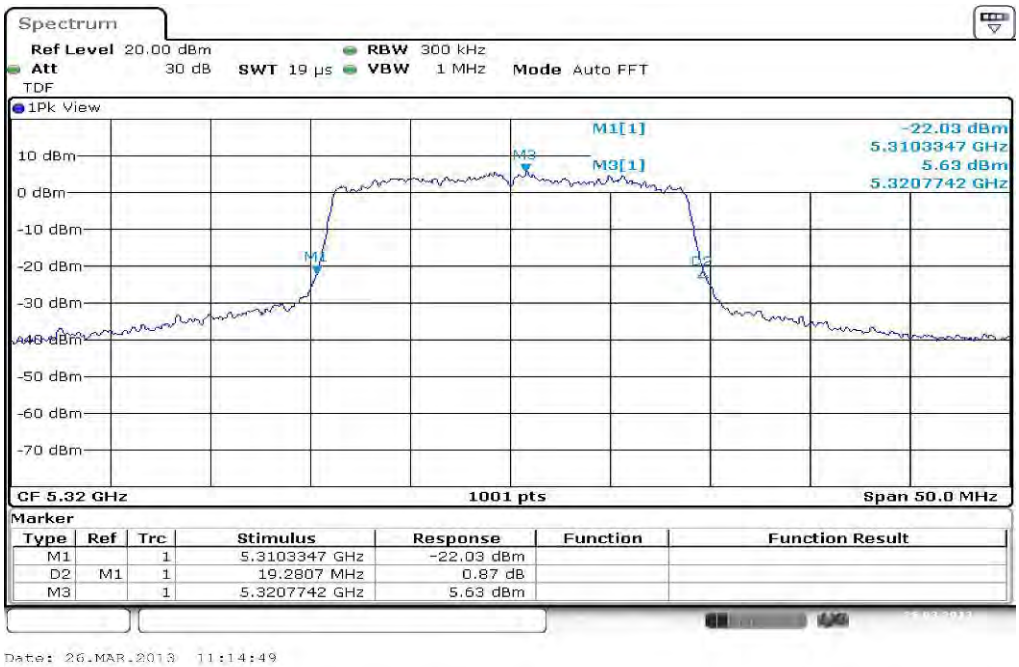


Plots: OFDM / n – mode HT20 MCS7

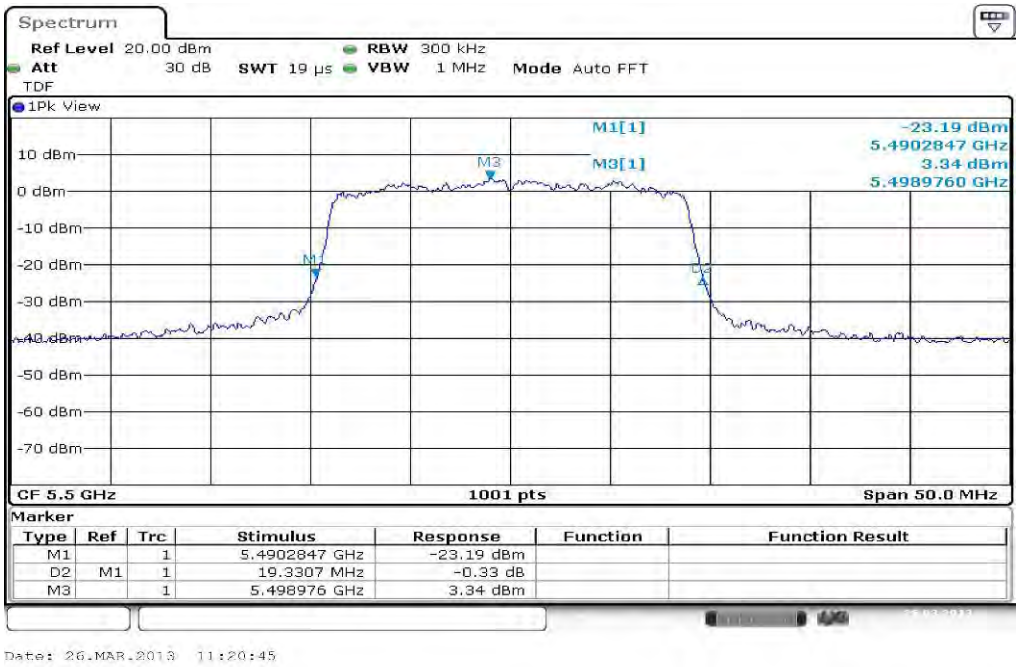
Plot 9: 5180 MHz



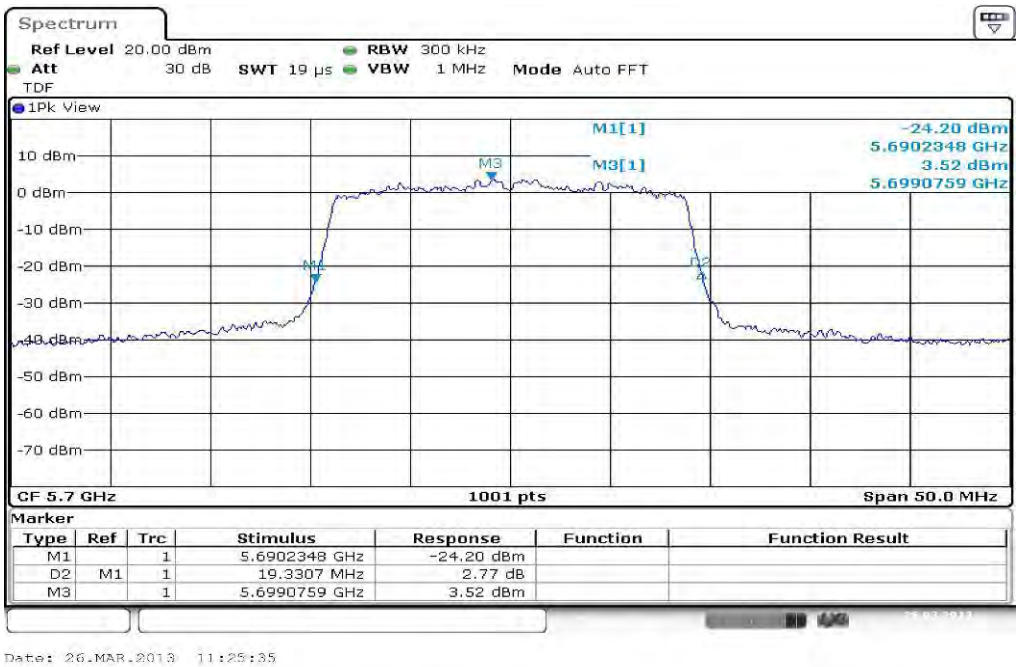
Plot 10: 5320 MHz



Plot 11: 5500 MHz



Plot 12: 5700 MHz



9.8 Peak excursion measurements

Not performed! Tests according to manufacturer test plan!

9.9 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:	10 Hz / 1 MHz
Span:	See plots!
Trace-Mode:	Max Hold

Limits:

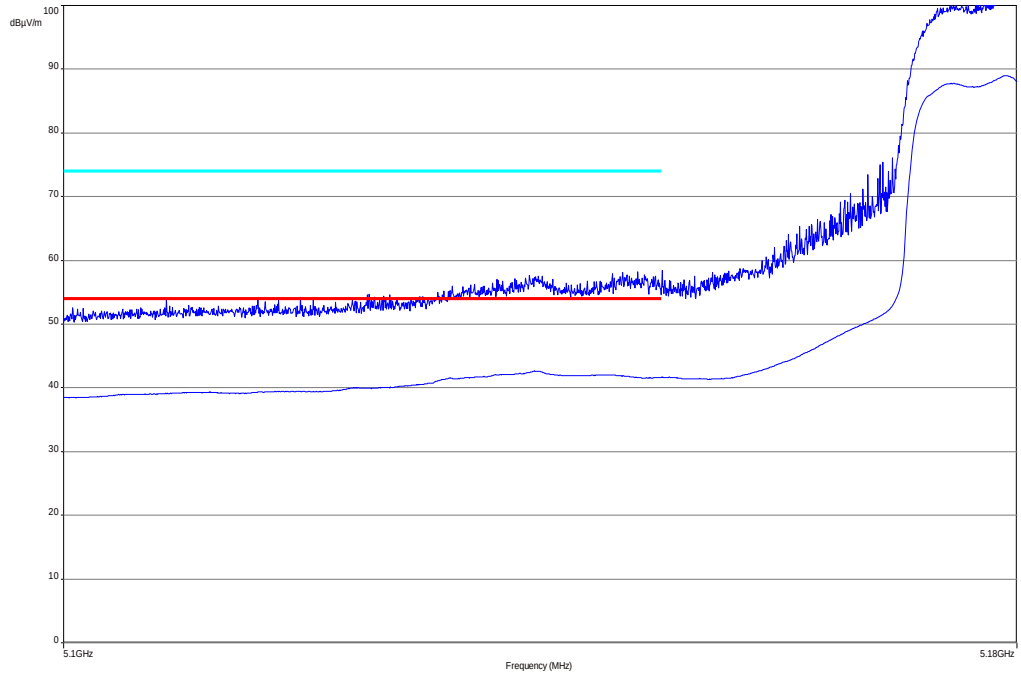
Band Edge Compliance Radiated
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within 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 -27 dBm / MHz PEAK

Result:

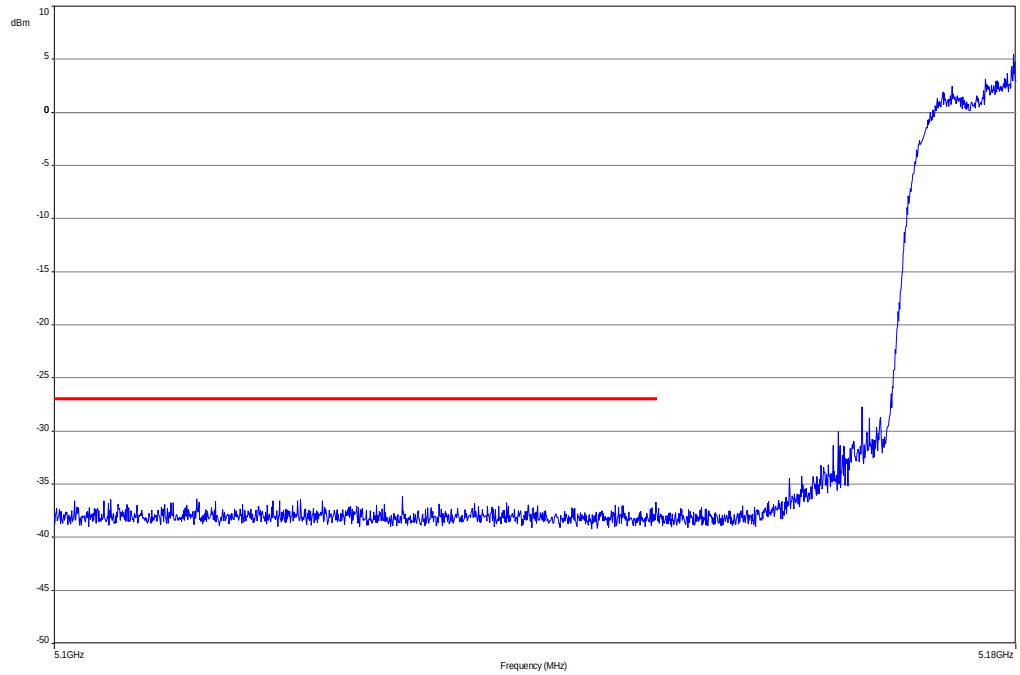
Scenario	Band Edge Compliance Radiated [dBµV/m]
band edge	< 74 dBµV/m (AVG) < 54 dBµV/m (PEAK) < -27 dBm / MHz PEAK
Measurement uncertainty	± 3 dB

Plots:

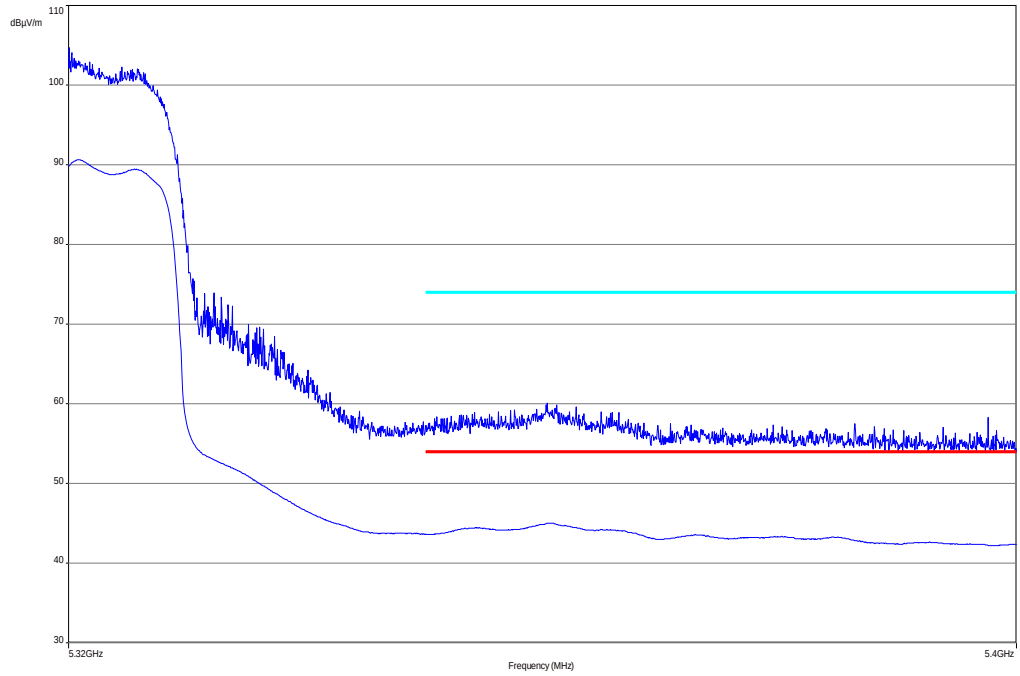
Plot 1: lower band edge, vertical & horizontal polarization (a mode), channel 36, according Part 15.247



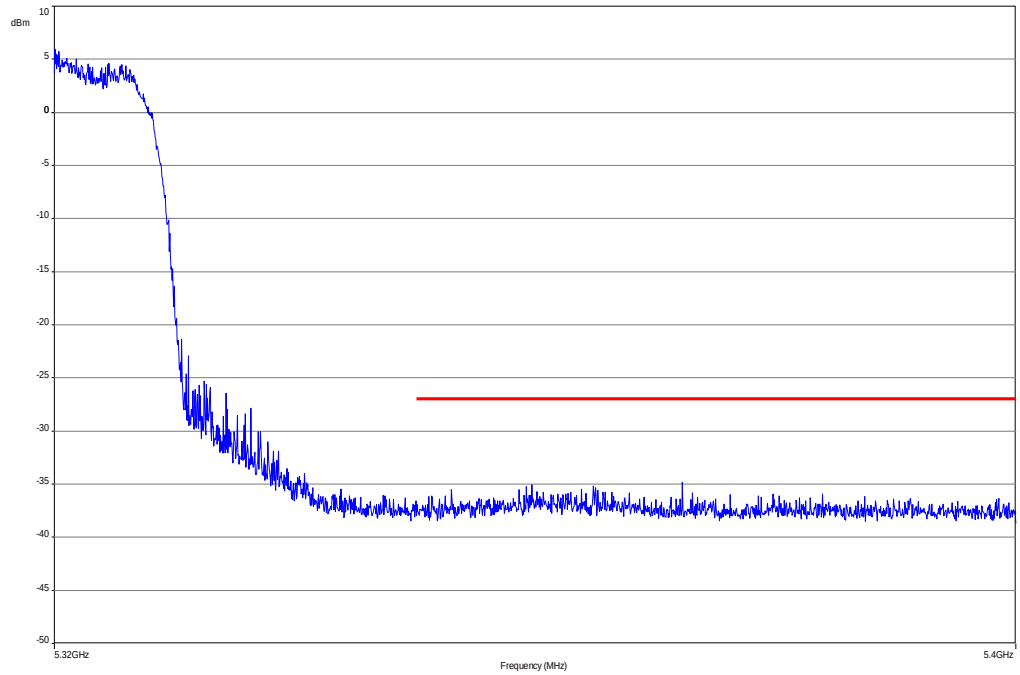
Plot 2: lower band edge, vertical & horizontal polarization (a mode), channel 36, according Part 15.407



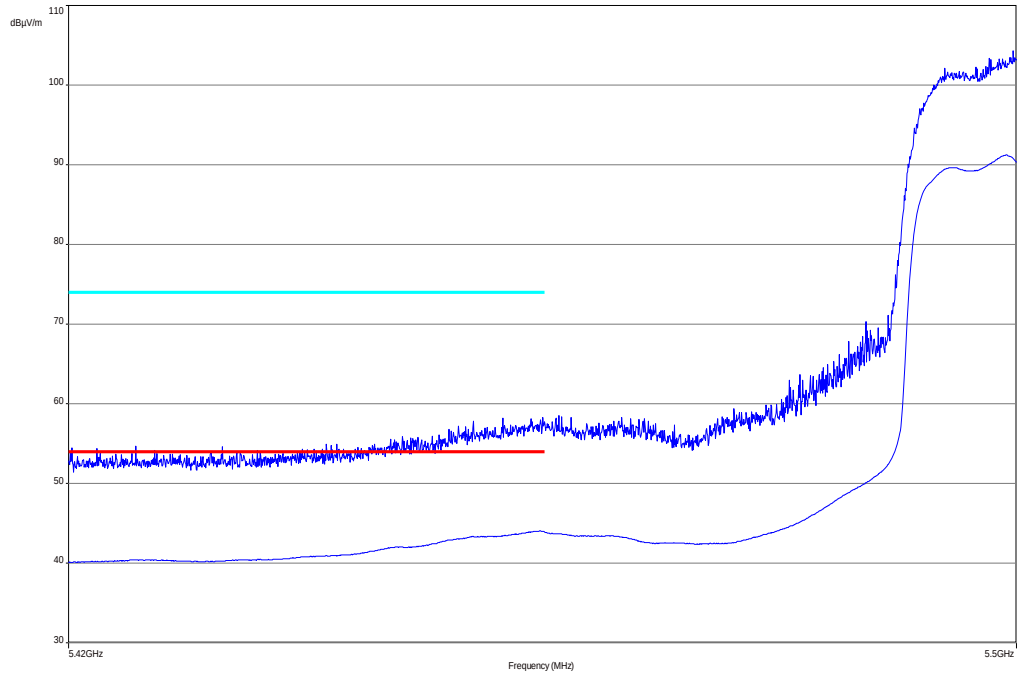
Plot 3: upper band edge, vertical & horizontal polarization (a mode), channel 64, according Part 15.247



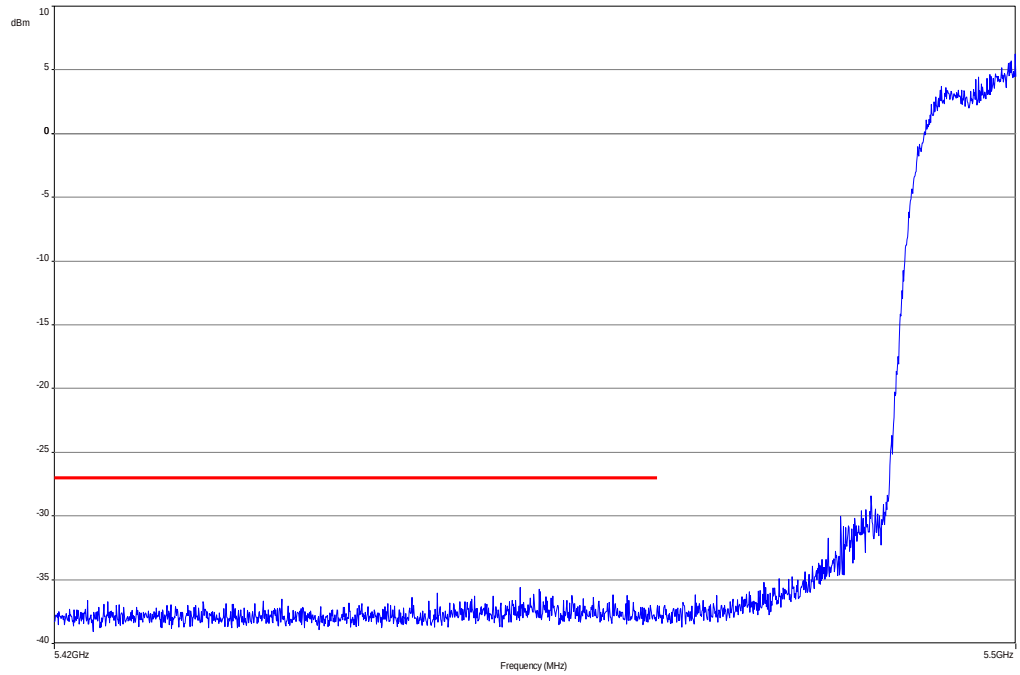
Plot 4: upper band edge, vertical & horizontal polarization (a mode), channel 64, according Part 15.407



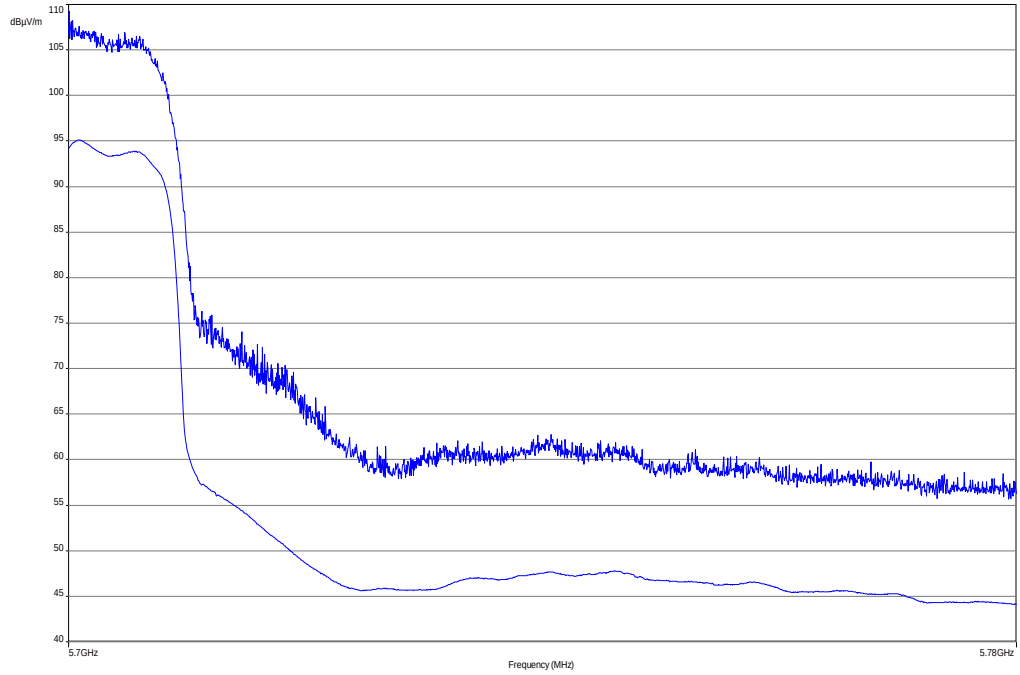
Plot 5: lower band edge, vertical & horizontal polarization (a mode), channel 100, according Part 15.247



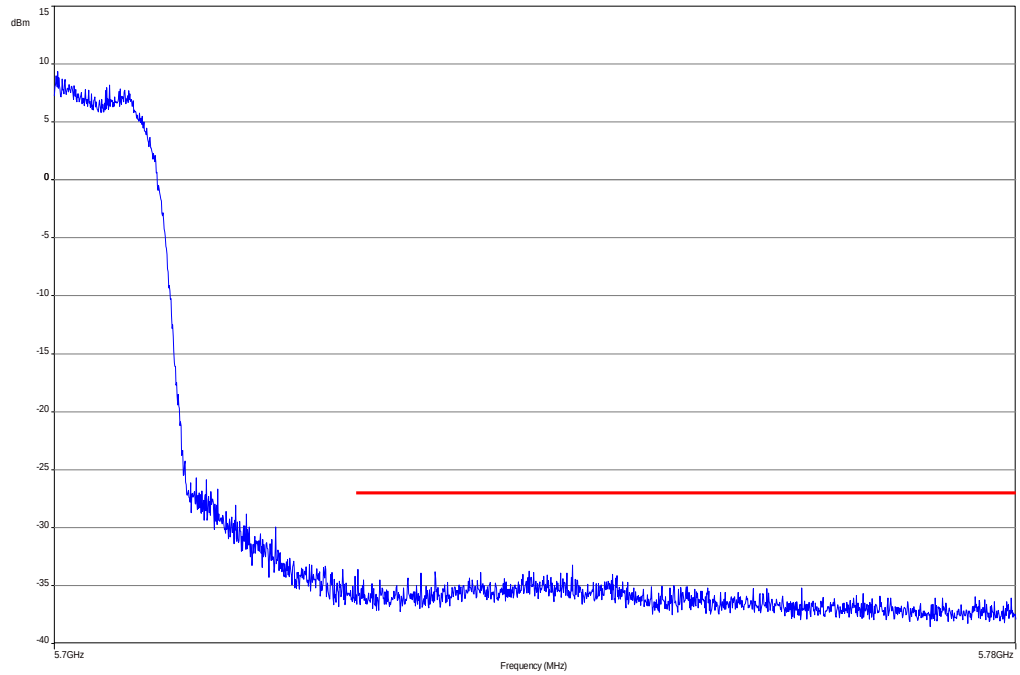
Plot 6: lower band edge, vertical & horizontal polarization (a mode), channel 100, according Part 15.407



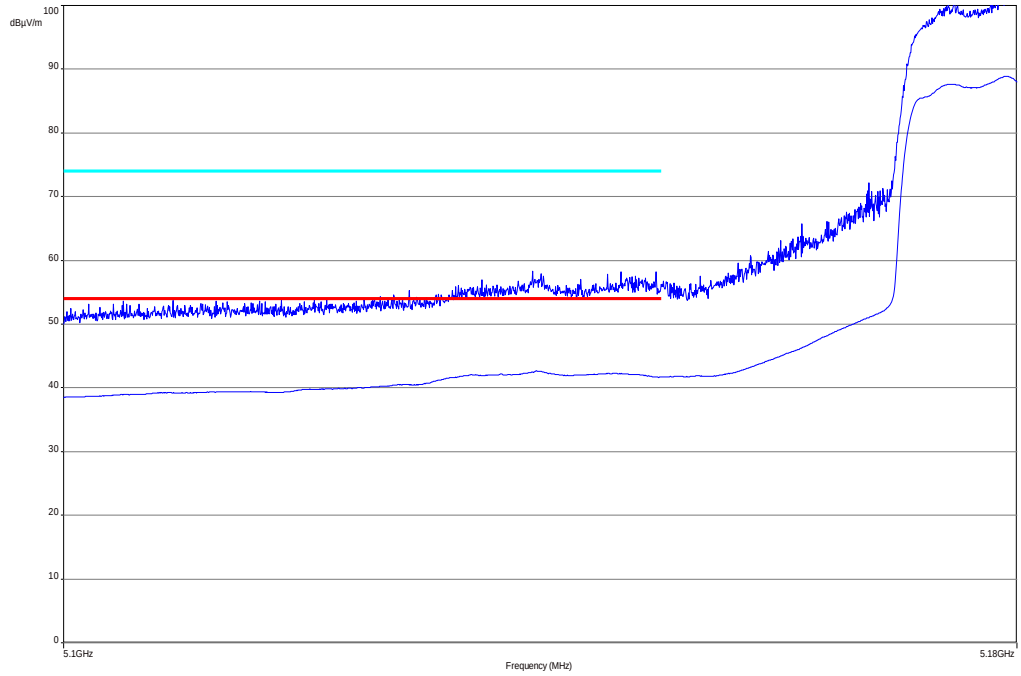
Plot 7: upper band edge, vertical & horizontal polarization (a mode), channel 140, according Part 15.247



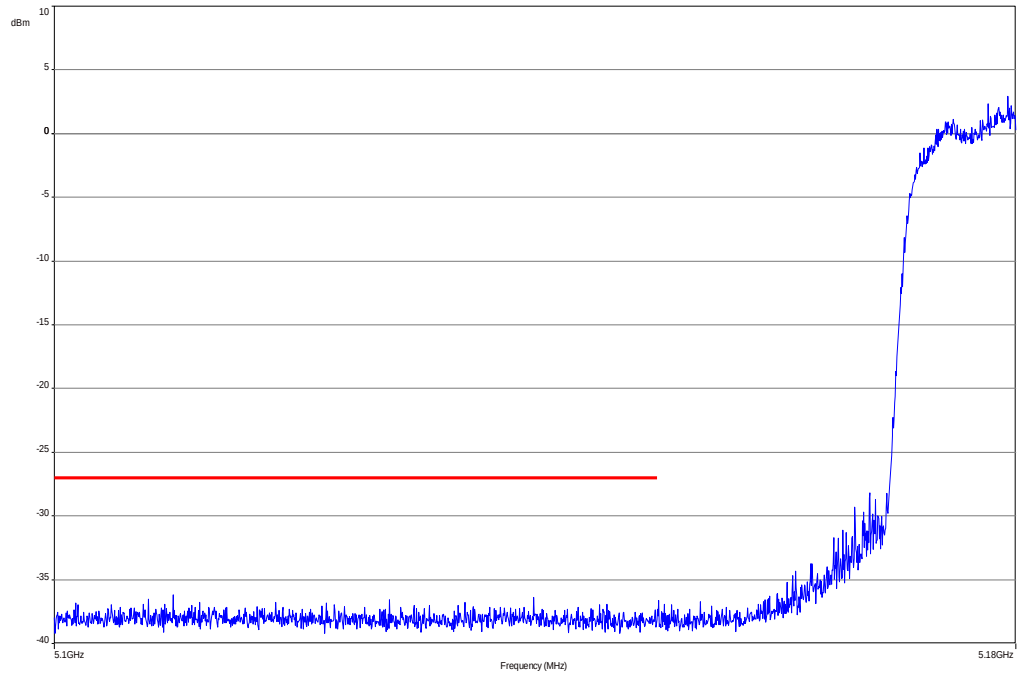
Plot 8: upper band edge, vertical & horizontal polarization (a mode), channel 140, according Part 15.407



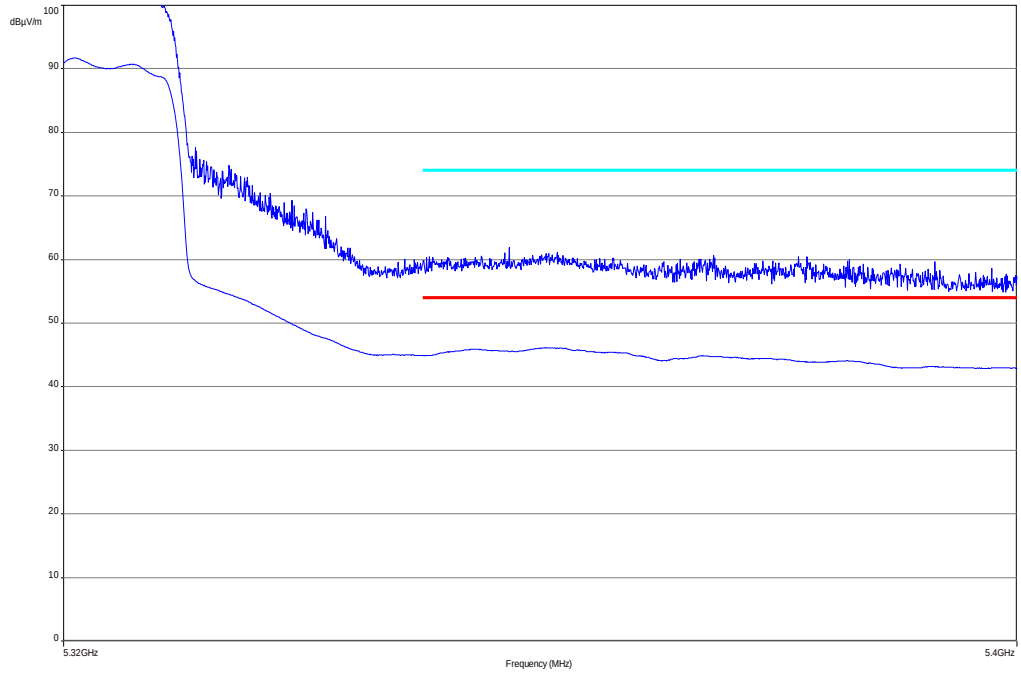
Plot 9: lower band edge, vertical & horizontal polarization (n mode), channel 36, according Part 15.247



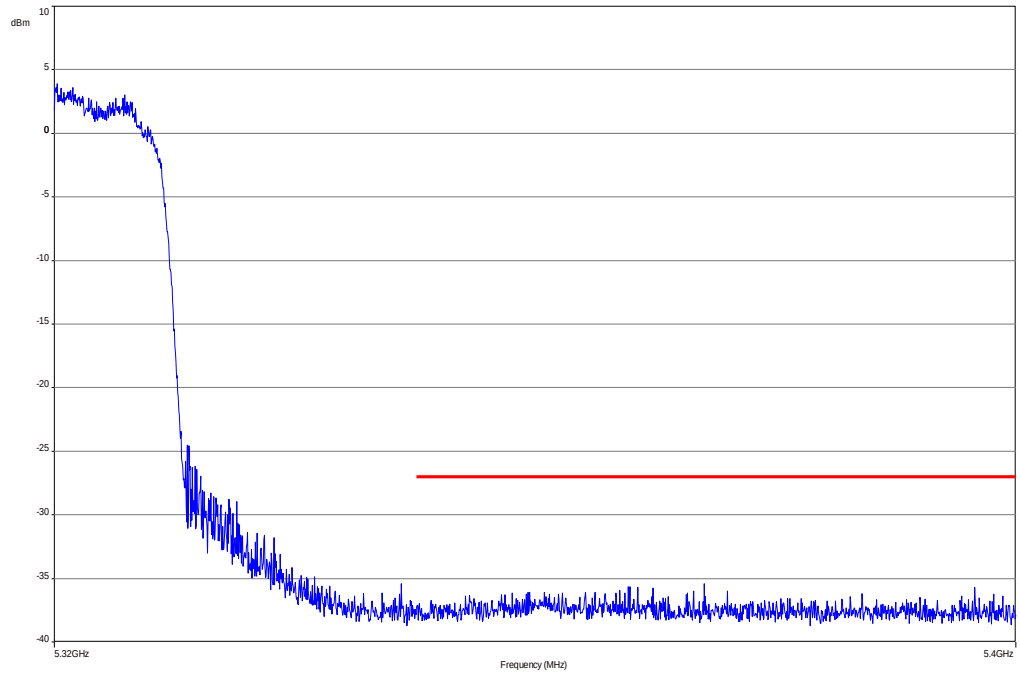
Plot 10: lower band edge, vertical & horizontal polarization (n mode), channel 36, according Part 15.407



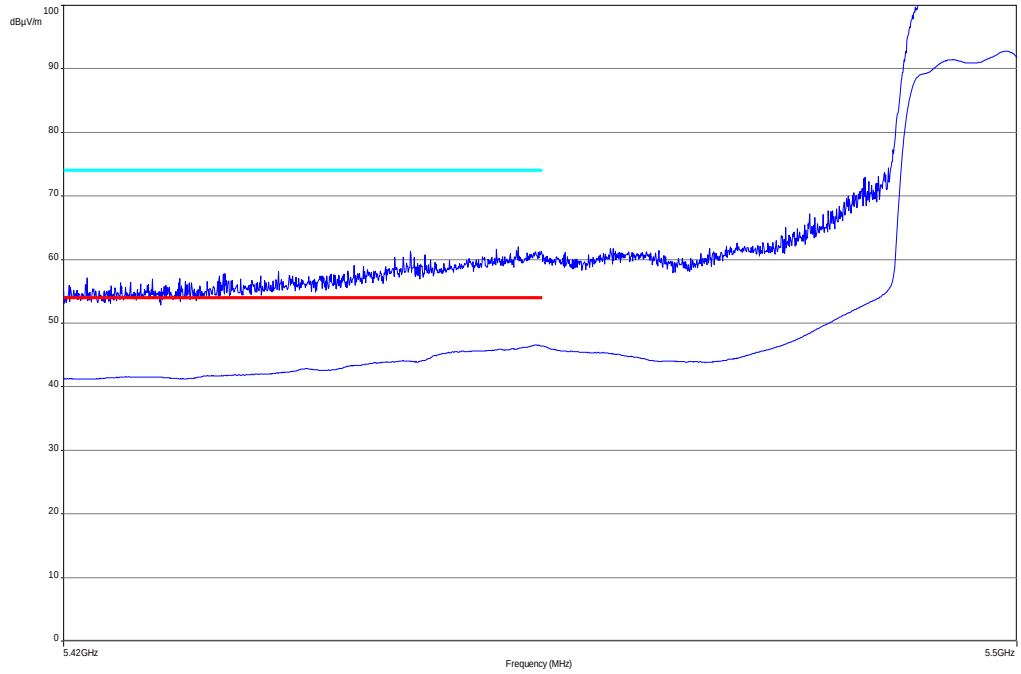
Plot 11: upper band edge, vertical & horizontal polarization (n mode), channel 64, according Part 15.247



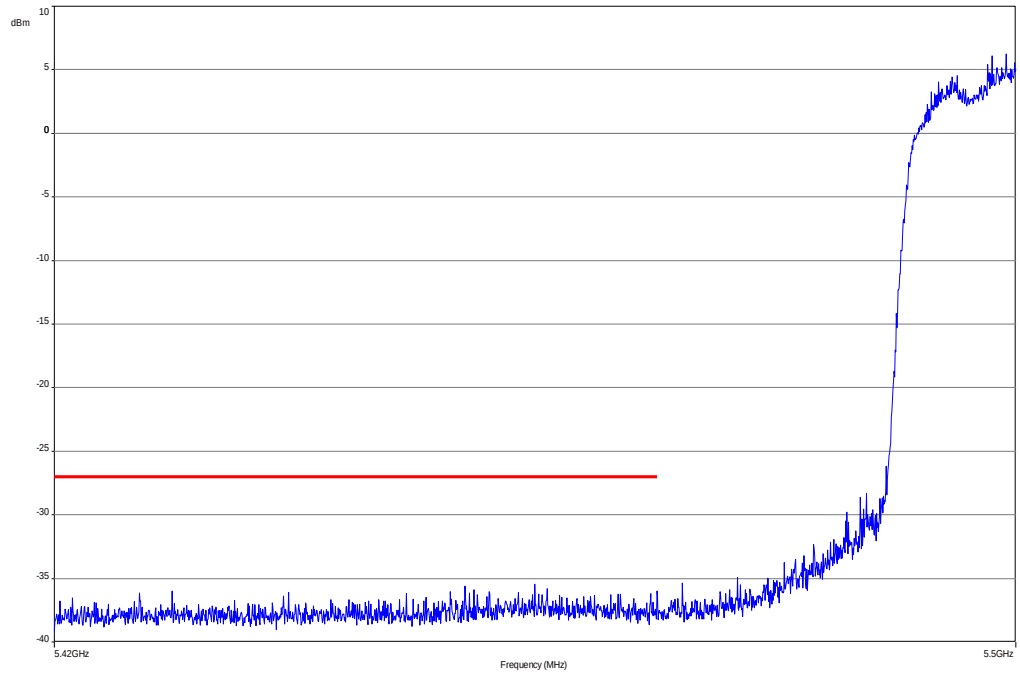
Plot 12: upper band edge, vertical & horizontal polarization (n mode), channel 64, according Part 15.407



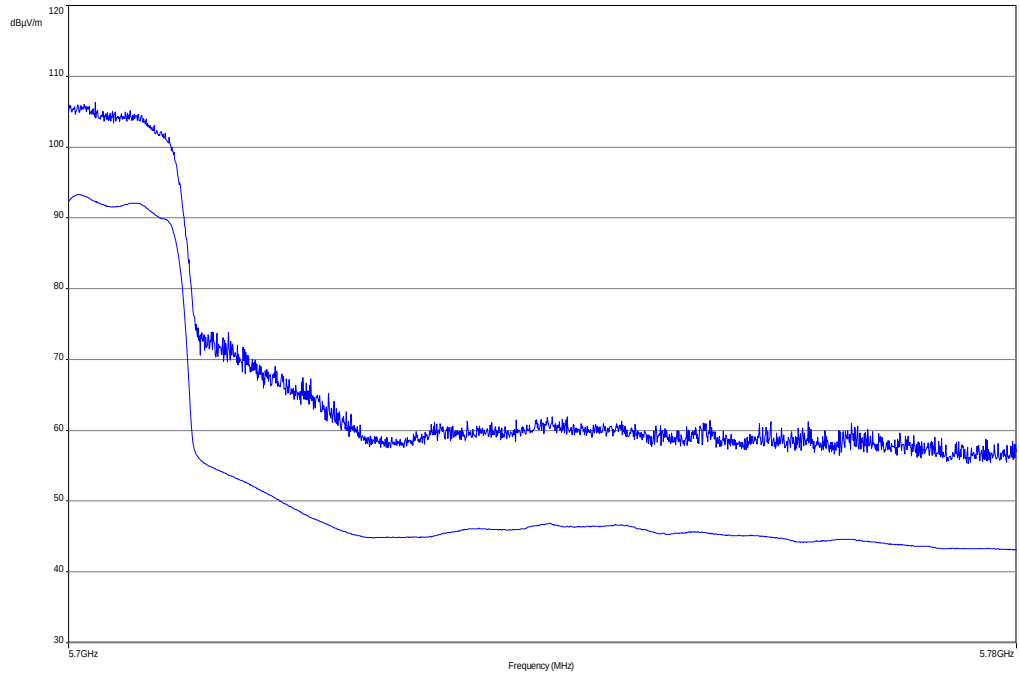
Plot 13: lower band edge, vertical & horizontal polarization (n mode), channel 100, according Part 15.247



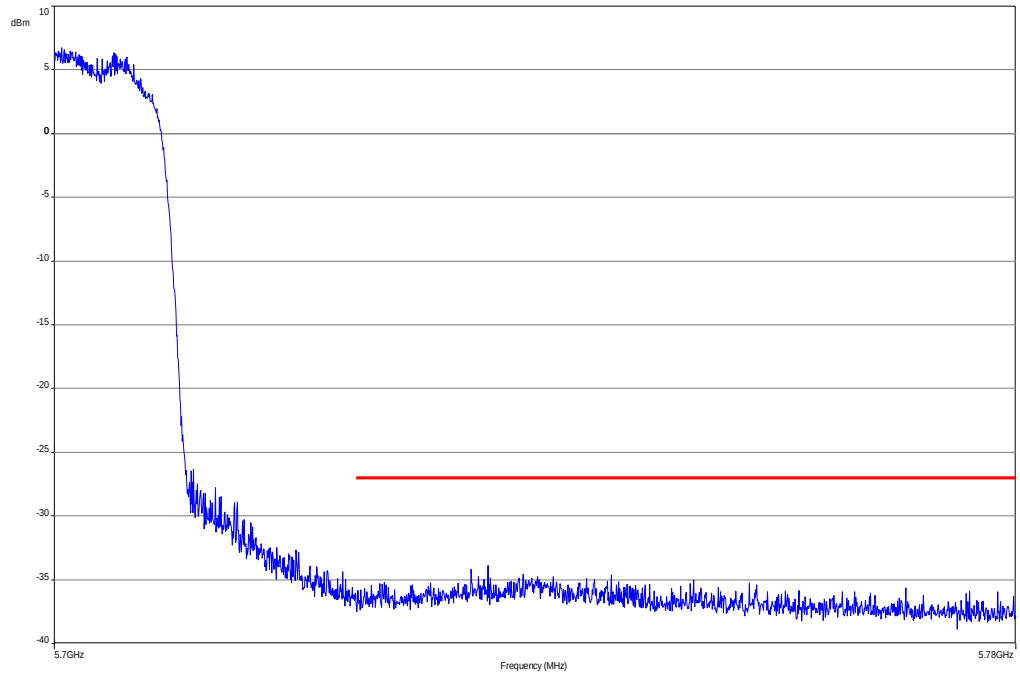
Plot 14: lower band edge, vertical & horizontal polarization (n mode), channel 100, according Part 15.407



Plot 15: upper band edge, vertical & horizontal polarization (n mode), channel 140, according Part 15.247



Plot 16: upper band edge, vertical & horizontal polarization (n mode), channel 140, according Part 15.407



Result: **Passed**

9.10 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	

Results: OFDM / a – mode

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM a – mode								
Lowest 5180 MHz			-/-			Highest 5240 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM a – mode								
-/-			-/-			Highest 5320 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM a – mode								
Lowest 5500 MHz			Middle 5600 MHz			Highest 5700 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

Result: **Passed**

Results: OFDM / n – modeHT20

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM n – mode HT20								
Lowest 5180 MHz			-/-			Highest 5240 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM n – mode HT20								
-/-			-/-			Highest 5320 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM n – mode HT20								
Lowest 5500 MHz			Middle 5600 MHz			Highest 5700 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [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.			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 above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!			All detected peak emissions above 1 GHz are below the average limit!		
Measurement uncertainty			± 3 dB					

Result: **Passed**

Plots: OFDM / a – mode

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

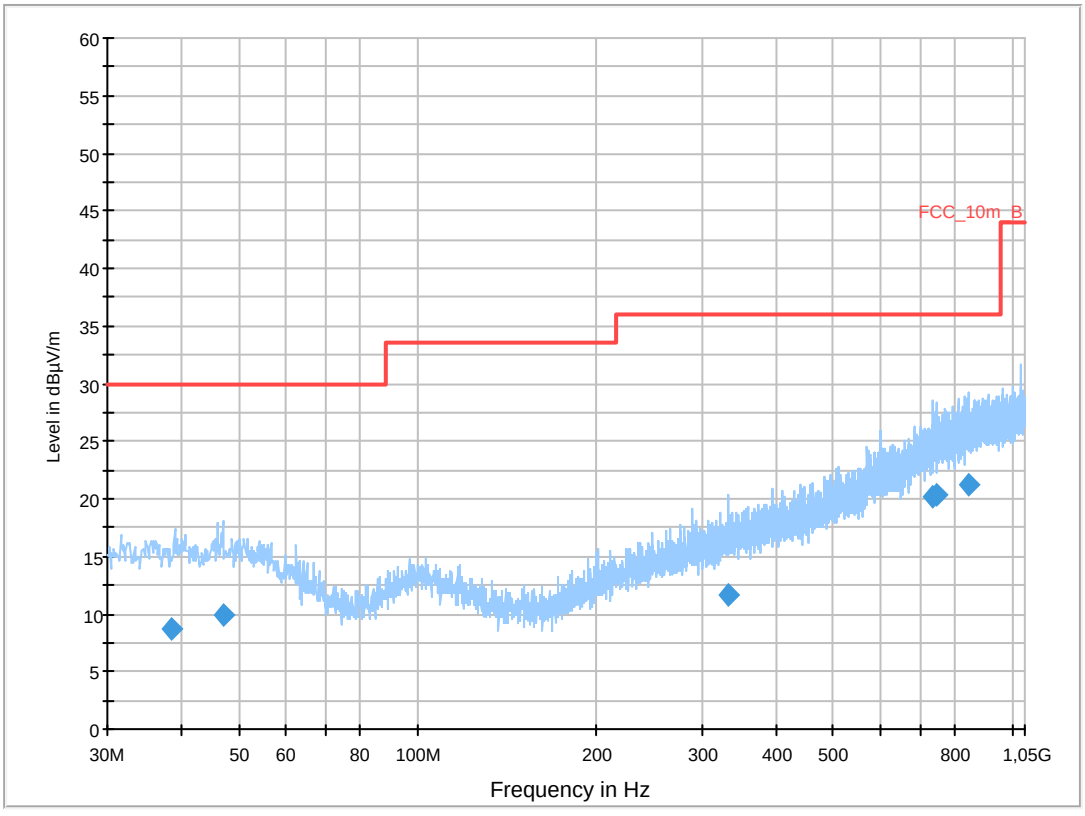
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH36 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

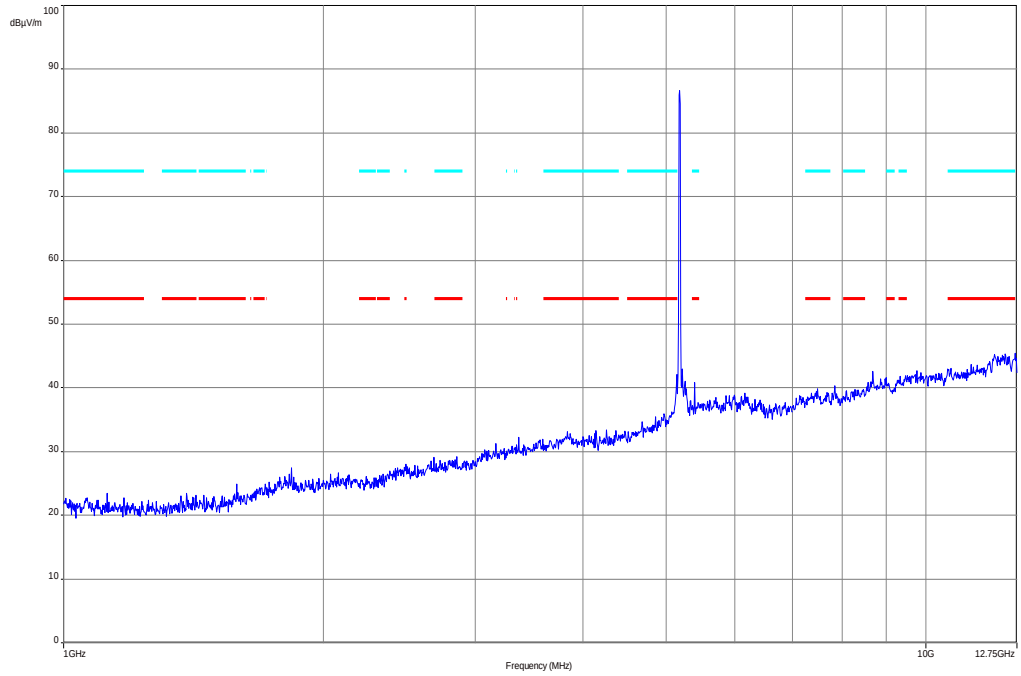
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



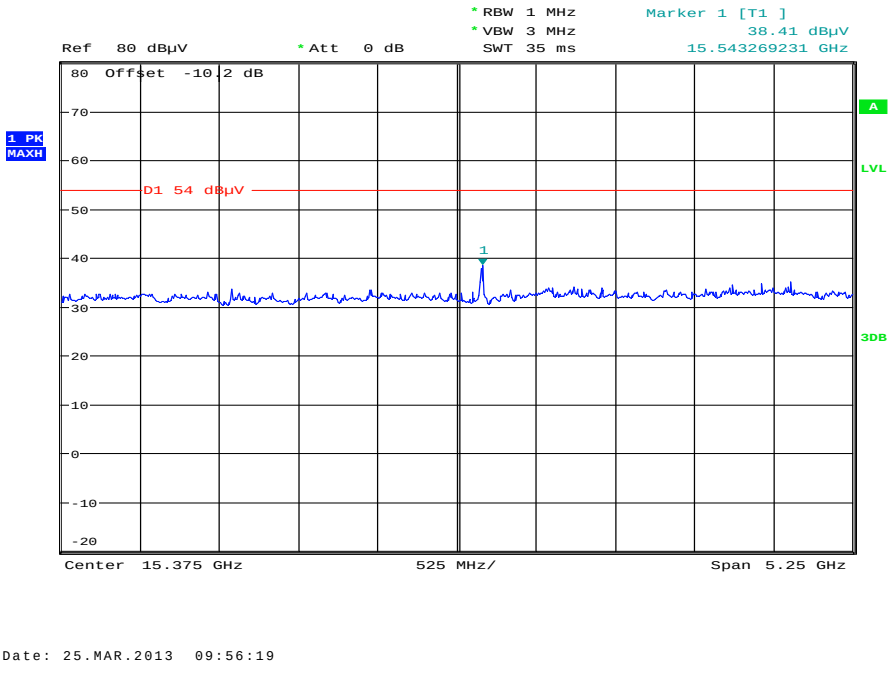
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.586000	8.7	1000.0	120.000	170.0	H	273.0	13.3	21.3	30.0	
47.091900	9.9	1000.0	120.000	105.0	V	190.0	13.3	20.1	30.0	
333.750300	11.7	1000.0	120.000	170.0	H	10.0	15.6	24.3	36.0	
733.233450	20.1	1000.0	120.000	161.0	V	178.0	23.3	15.9	36.0	
747.445800	20.3	1000.0	120.000	170.0	H	2.0	23.6	15.7	36.0	
845.292300	21.2	1000.0	120.000	170.0	V	-9.0	24.5	14.8	36.0	

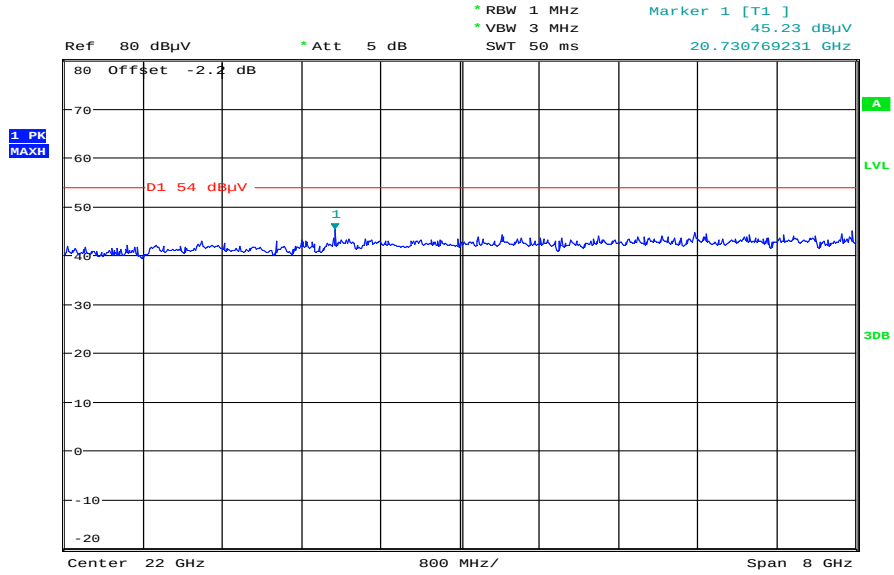
Plot 2: 1 GHz to 12.75 GHz, 5180 MHz, vertical & horizontal polarization



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

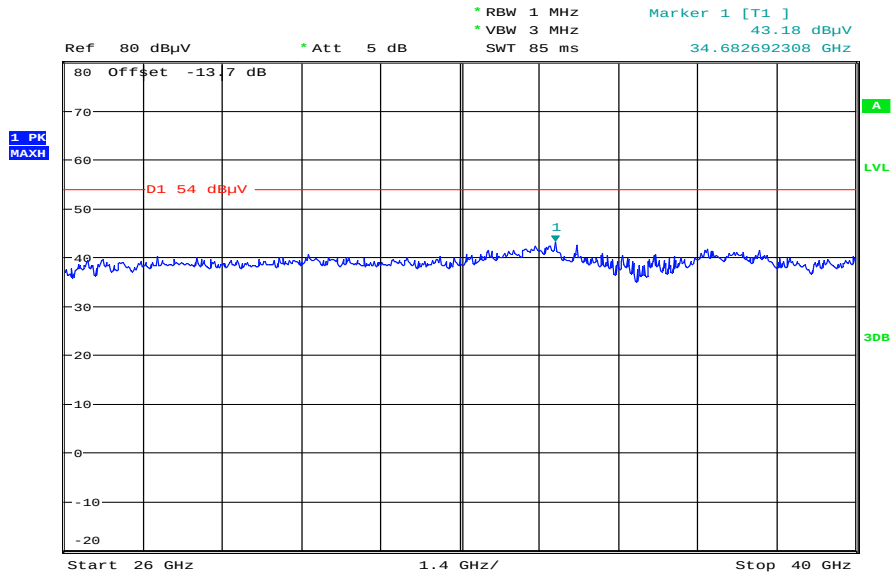


Plot 4: 18 GHz to 26 GHz, 5180 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:19:11

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



Date: 25.MAR.2013 10:37:25

Plot 6: 30 MHz to 1 GHz, 5240 MHz, vertical & horizontal polarization

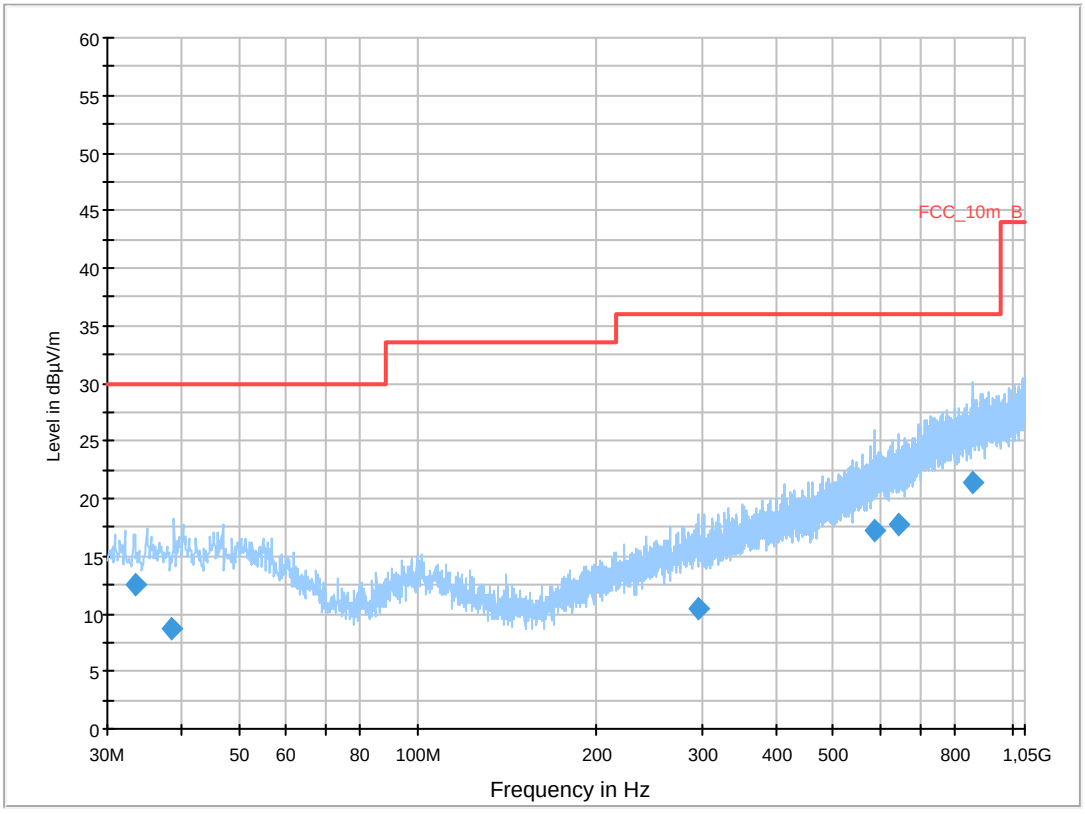
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH48 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

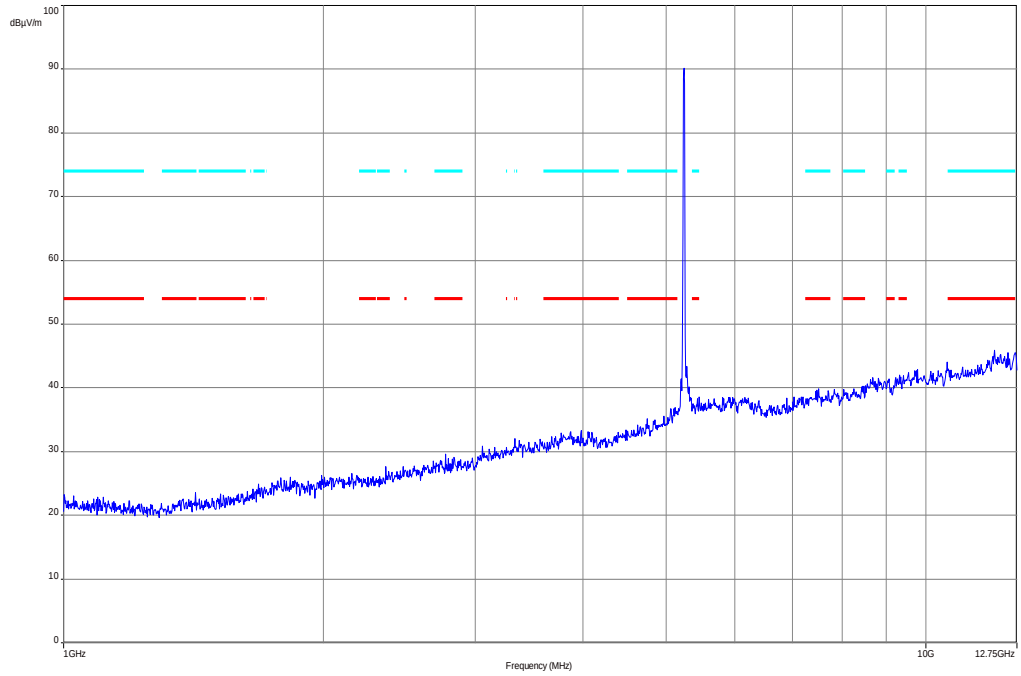
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



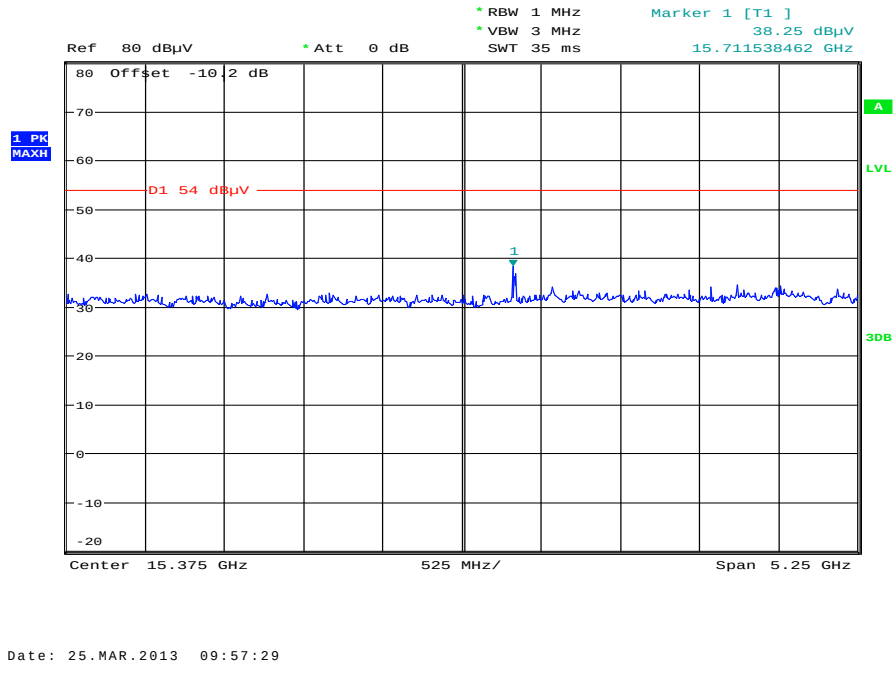
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.371850	12.5	1000.0	120.000	98.0	V	-9.0	12.9	17.5	30.0	
38.455200	8.8	1000.0	120.000	170.0	V	81.0	13.3	21.2	30.0	
296.852100	10.4	1000.0	120.000	98.0	V	280.0	14.4	25.6	36.0	
584.447100	17.2	1000.0	120.000	170.0	V	2.0	20.4	18.8	36.0	
644.650500	17.8	1000.0	120.000	98.0	H	261.0	21.1	18.2	36.0	
855.618600	21.4	1000.0	120.000	161.0	H	10.0	24.6	14.6	36.0	

Plot 7: 1 GHz to 12.75 GHz, 5240 MHz, vertical & horizontal polarization

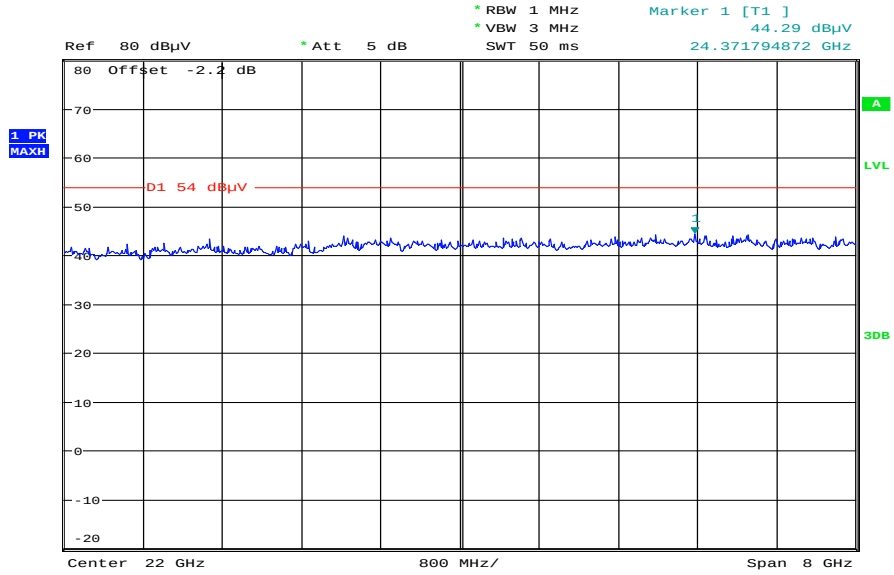


Plot 8: 12 GHz to 18 GHz, 5240 MHz, vertical & horizontal polarization



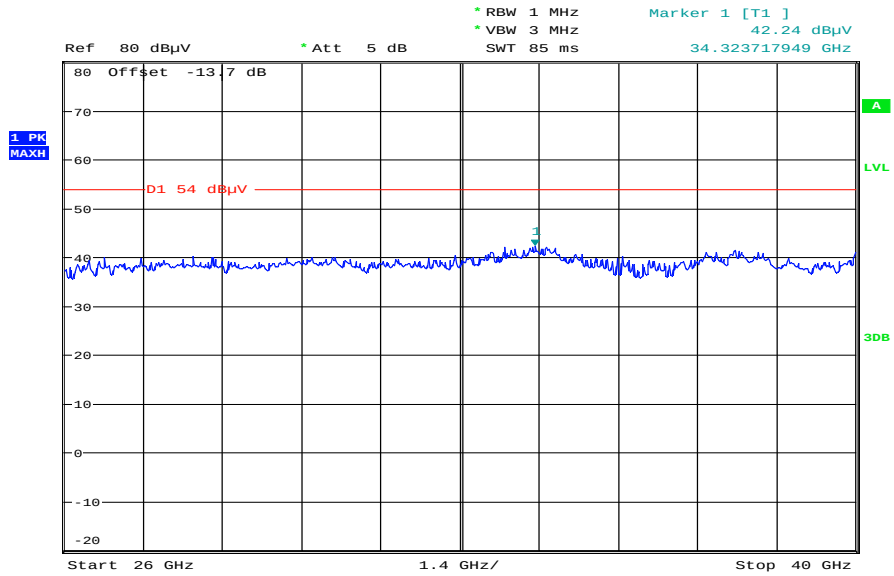
Date: 25.MAR.2013 09:57:29

Plot 9: 18 GHz to 26 GHz, 5240 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:20:34

Plot 10: 26 GHz to 40 GHz, 5240 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:38:51

Plot 11: 30 MHz to 1 GHz, 5320 MHz, vertical & horizontal polarization

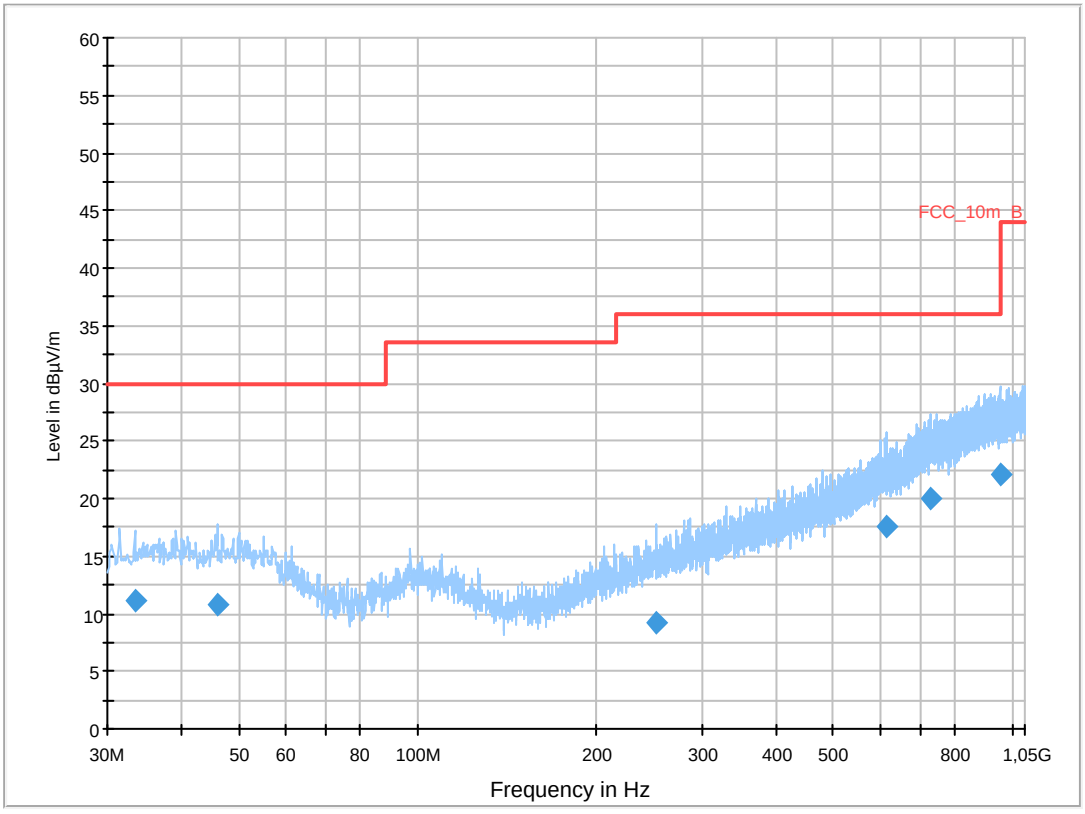
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH64 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

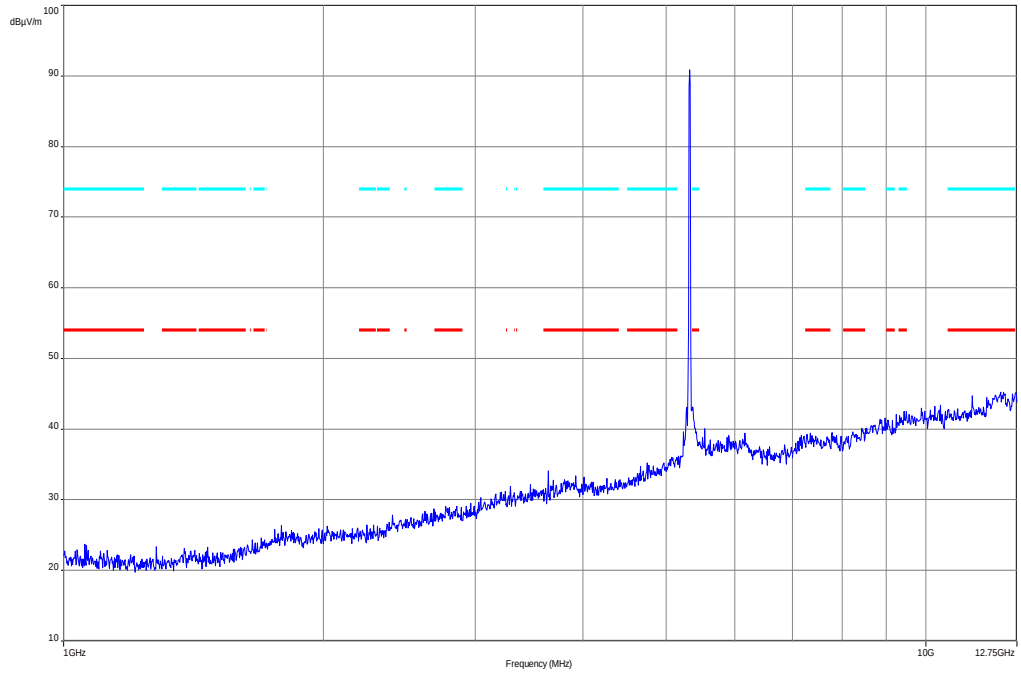
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



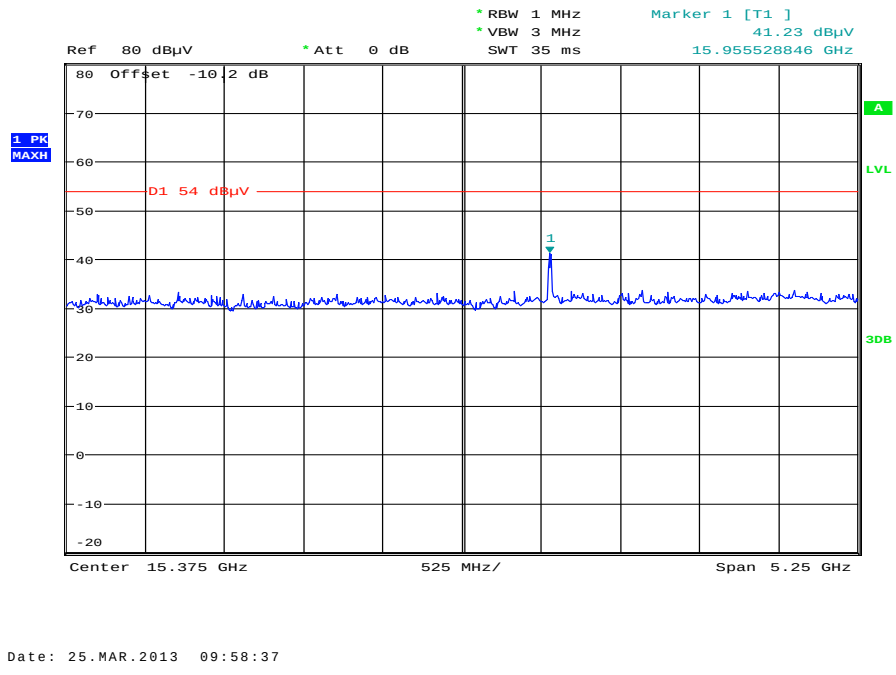
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.423300	11.1	1000.0	120.000	98.0	V	88.0	12.9	19.0	30.0	
46.061550	10.7	1000.0	120.000	98.0	V	88.0	13.3	19.3	30.0	
251.162700	9.2	1000.0	120.000	170.0	V	270.0	13.3	26.8	36.0	
613.824000	17.5	1000.0	120.000	170.0	V	85.0	20.9	18.5	36.0	
729.037950	20.0	1000.0	120.000	170.0	V	-10.0	23.2	16.0	36.0	
953.246100	22.0	1000.0	120.000	170.0	H	10.0	25.4	14.0	36.0	

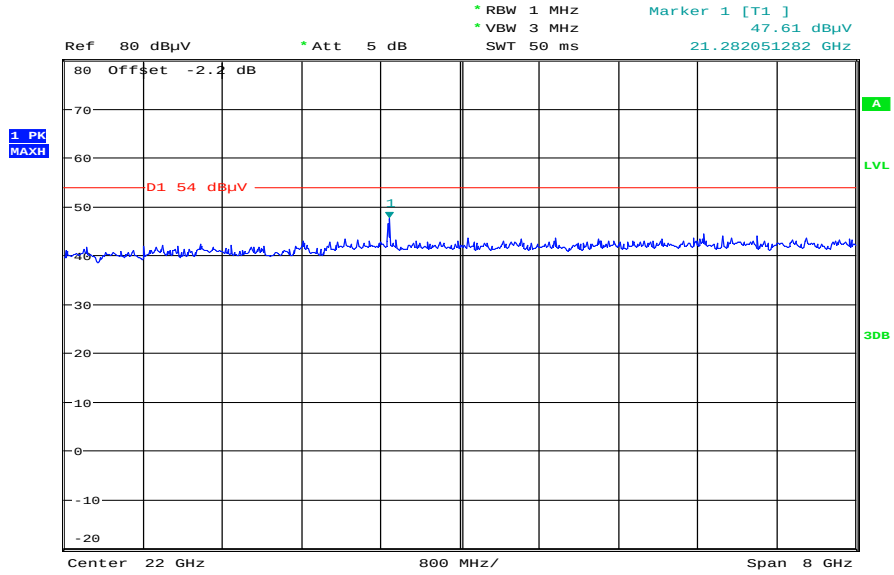
Plot 12: 1 GHz to 12.75 GHz, 5320 MHz, vertical & horizontal polarization



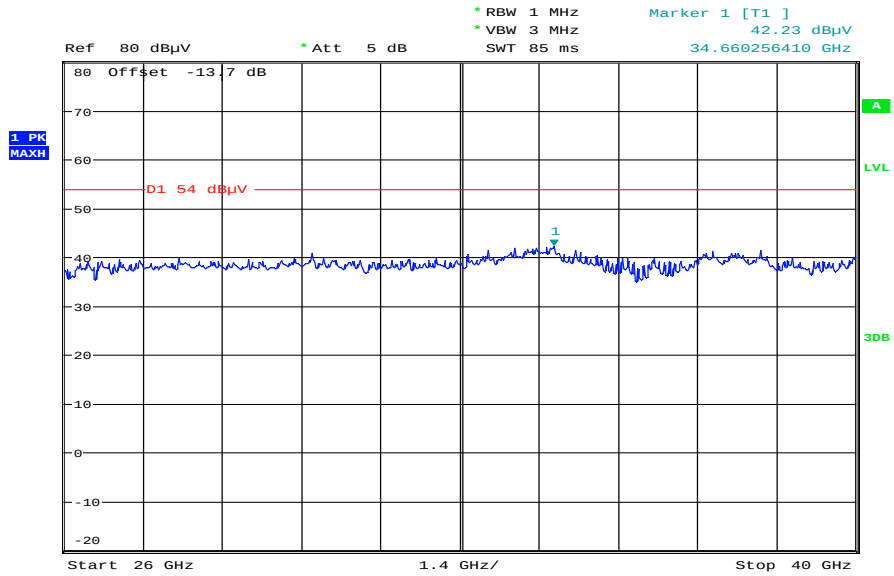
Plot 13: 12 GHz to 18 GHz, 5320 MHz, vertical & horizontal polarization



Plot 14: 18 GHz to 26 GHz, 5320 MHz, vertical & horizontal polarization



Plot 15: 26 GHz to 40 GHz, 5320 MHz, vertical & horizontal polarization



Plot 16: 30 MHz to 1 GHz, 5500 MHz, vertical & horizontal polarization

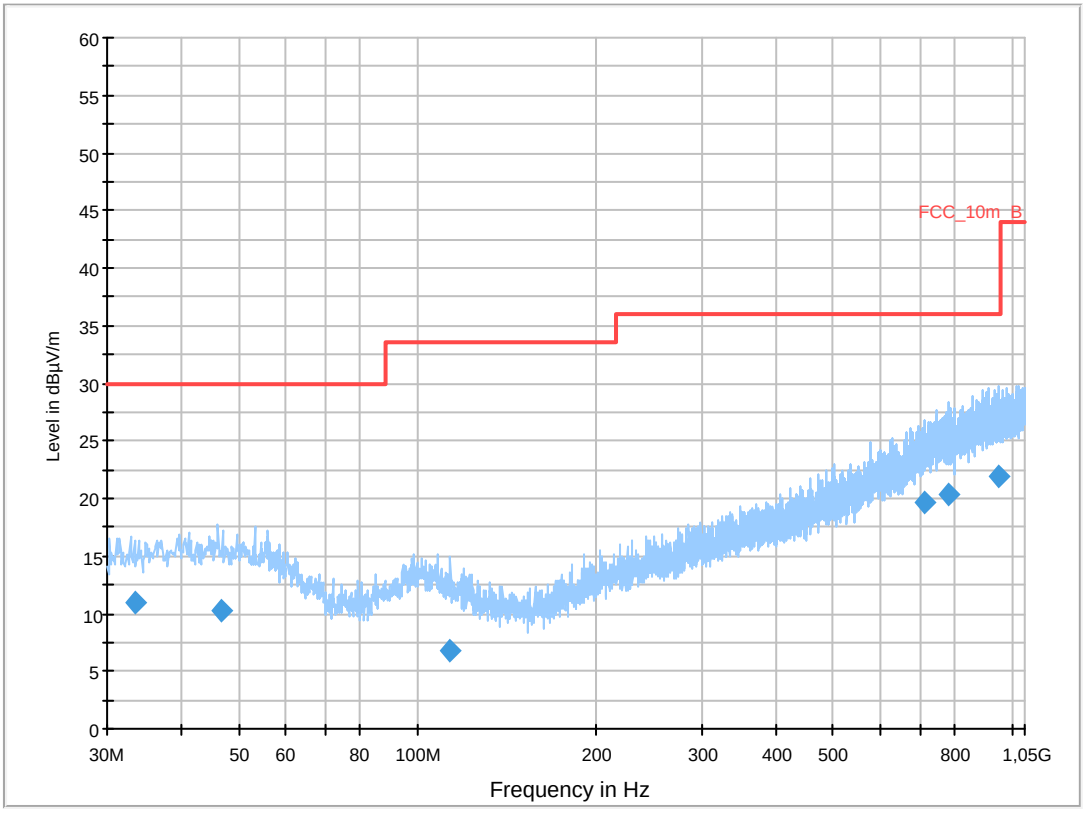
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH100 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

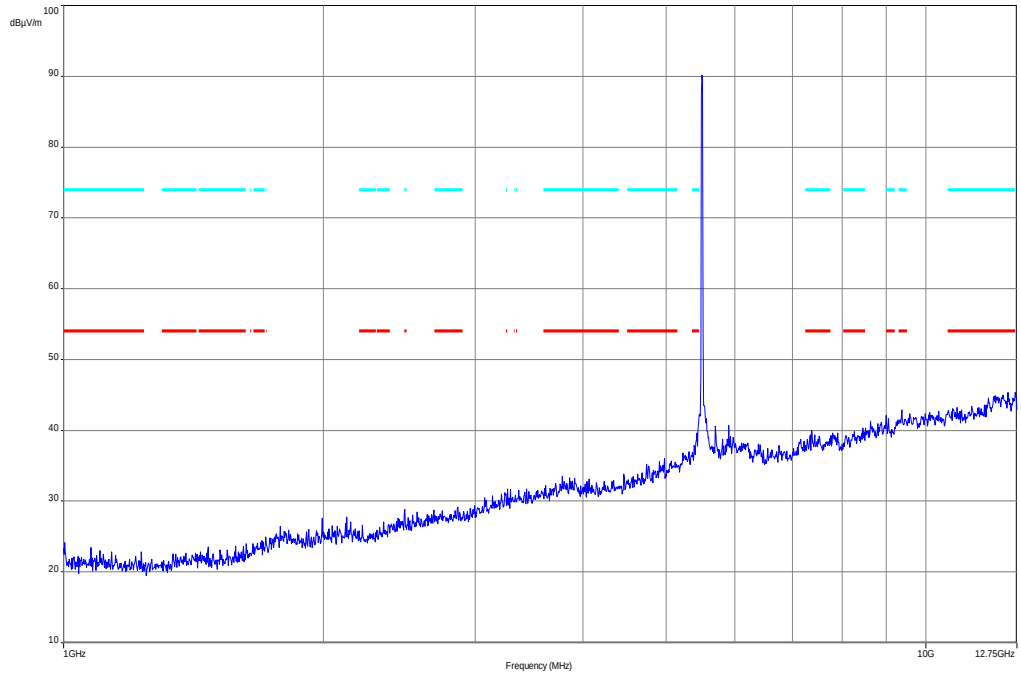
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



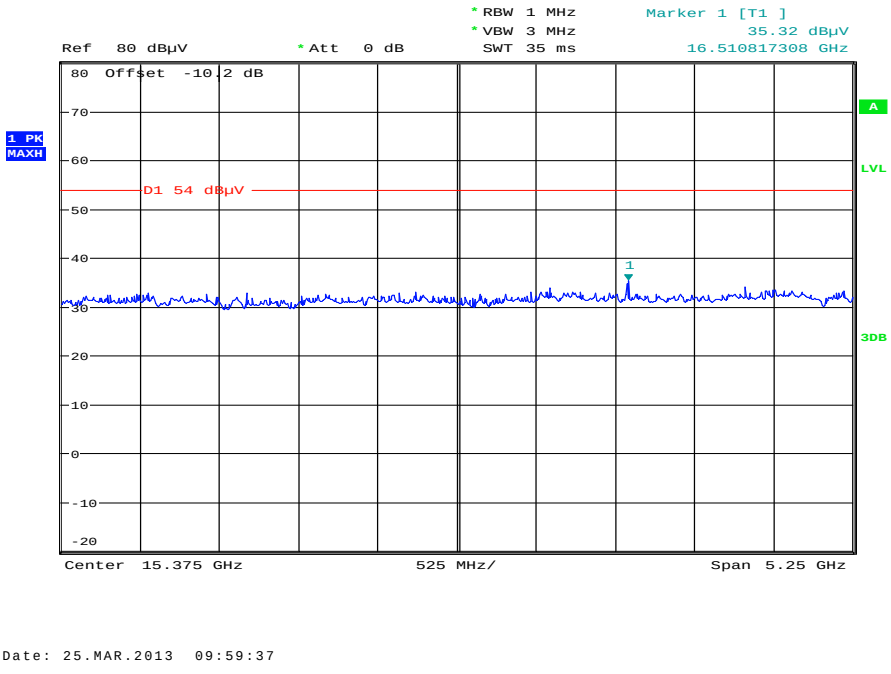
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.322500	11.0	1000.0	120.000	170.0	V	182.0	12.9	19.0	30.0	
46.630350	10.2	1000.0	120.000	98.0	V	261.0	13.3	19.8	30.0	
113.109300	6.8	1000.0	120.000	170.0	V	92.0	10.8	26.7	33.5	
711.024750	19.6	1000.0	120.000	98.0	H	280.0	22.8	16.4	36.0	
778.975500	20.4	1000.0	120.000	170.0	H	93.0	23.7	15.6	36.0	
952.008450	22.0	1000.0	120.000	170.0	V	190.0	25.4	14.0	36.0	

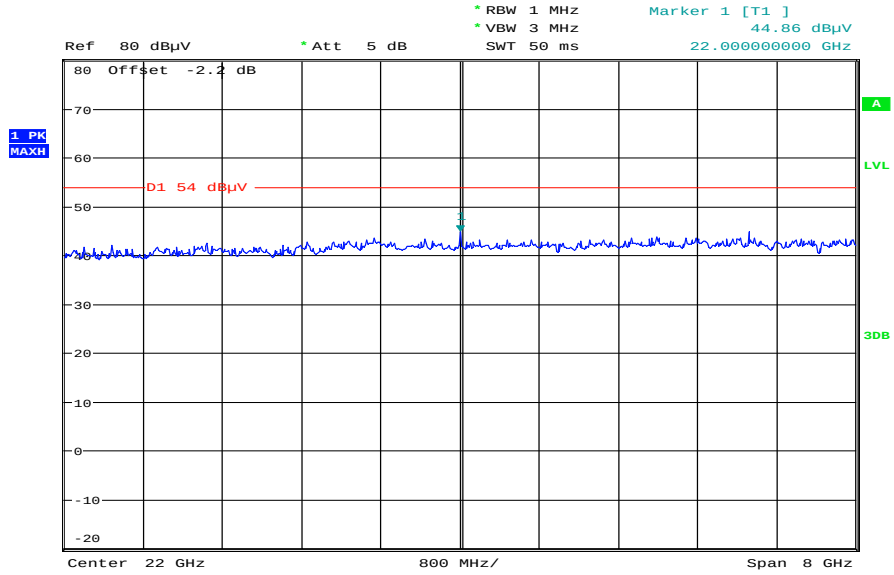
Plot 17: 1 GHz to 12.75 GHz, 5500 MHz, vertical & horizontal polarization



Plot 18: 12 GHz to 18 GHz, 5500 MHz, vertical & horizontal polarization

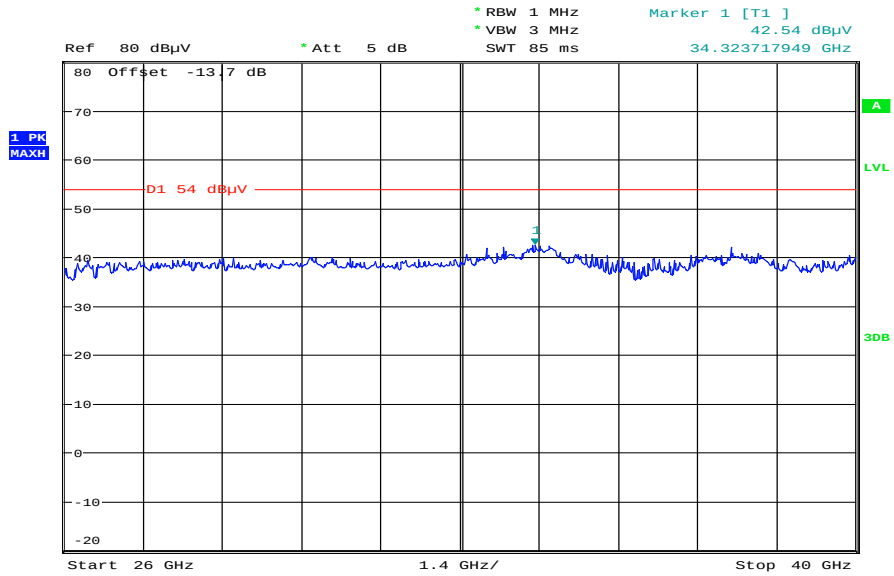


Plot 19: 18 GHz to 26 GHz, 5500 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:22:39

Plot 20: 26 GHz to 40 GHz, 5500 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:41:36

Plot 21: 30 MHz to 1 GHz, 5600 MHz, vertical & horizontal polarization

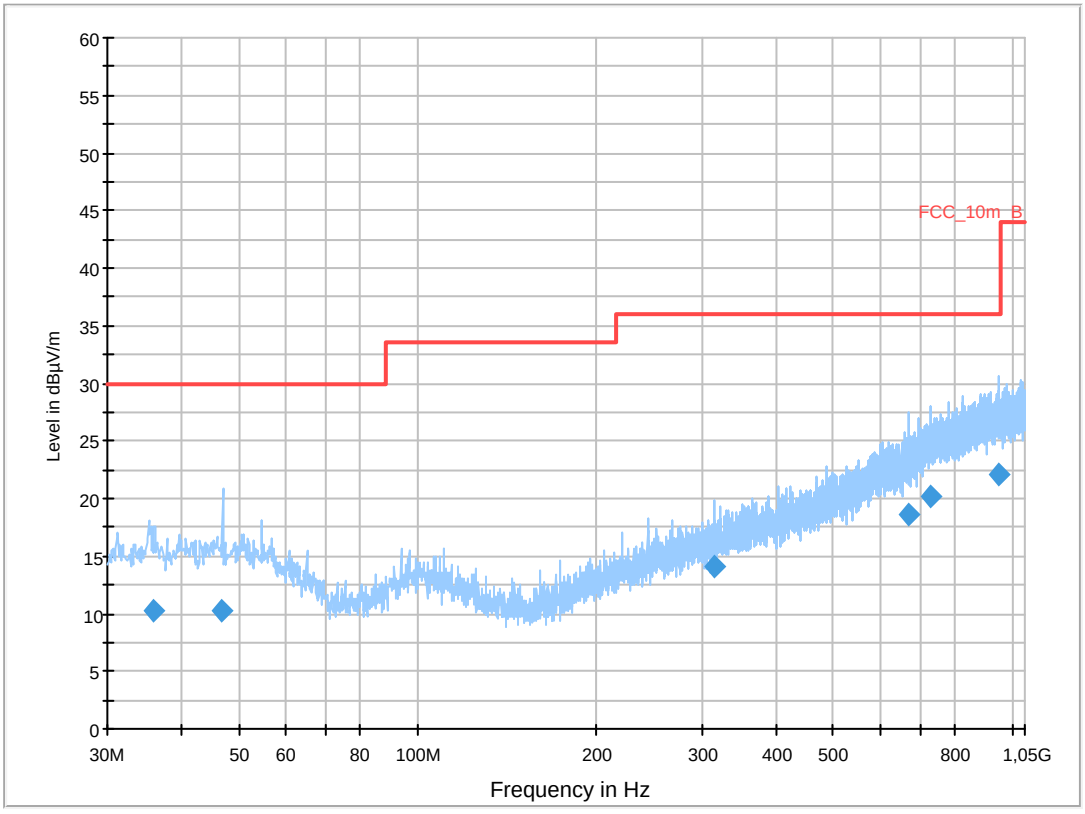
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH120 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

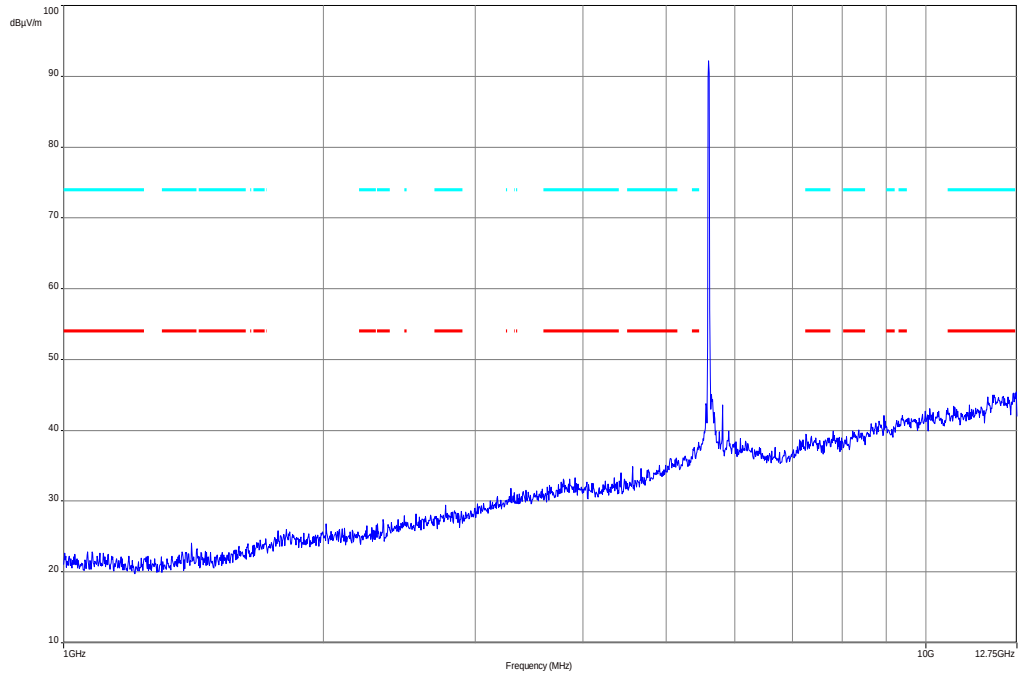
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



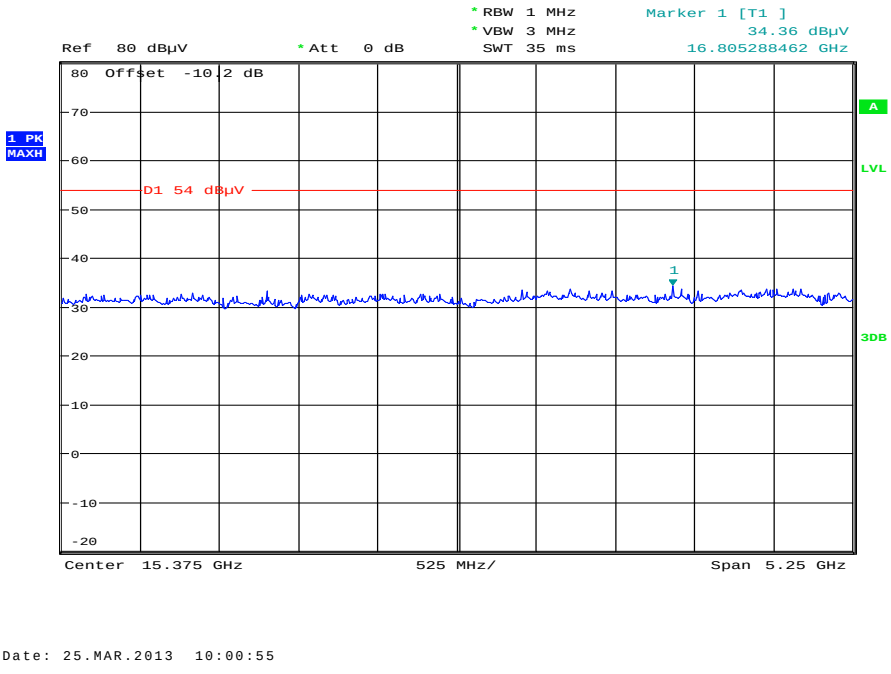
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.753100	10.3	1000.0	120.000	111.0	V	-10.0	13.1	19.7	30.0	
46.631400	10.3	1000.0	120.000	104.0	V	190.0	13.3	19.7	30.0	
315.018300	14.0	1000.0	120.000	104.0	V	10.0	15.0	22.0	36.0	
667.717650	18.5	1000.0	120.000	170.0	V	100.0	21.6	17.5	36.0	
729.147300	20.2	1000.0	120.000	170.0	H	-10.0	23.2	15.8	36.0	
949.452750	22.2	1000.0	120.000	170.0	H	261.0	25.3	13.8	36.0	

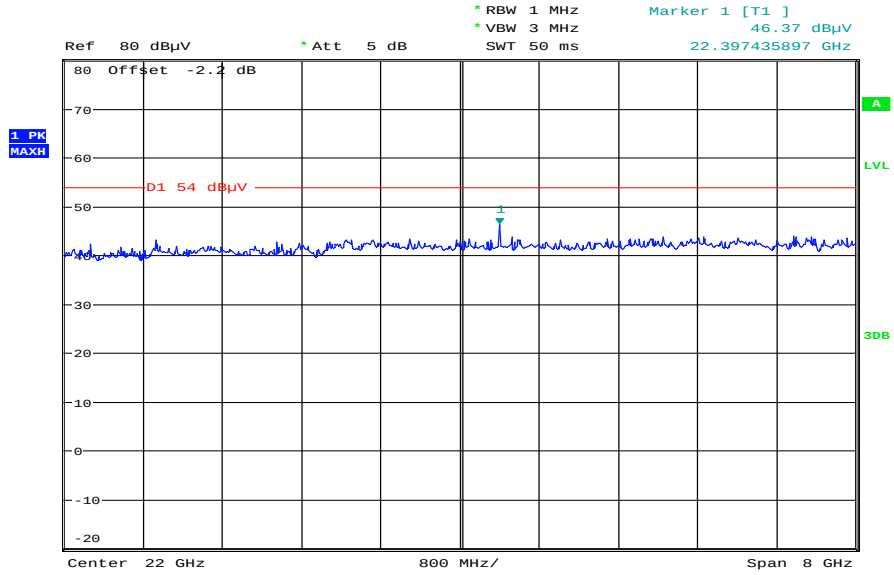
Plot 22: 1 GHz to 12.75 GHz, 5600 MHz, vertical & horizontal polarization



Plot 23: 12 GHz to 18 GHz, 5600 MHz, vertical & horizontal polarization

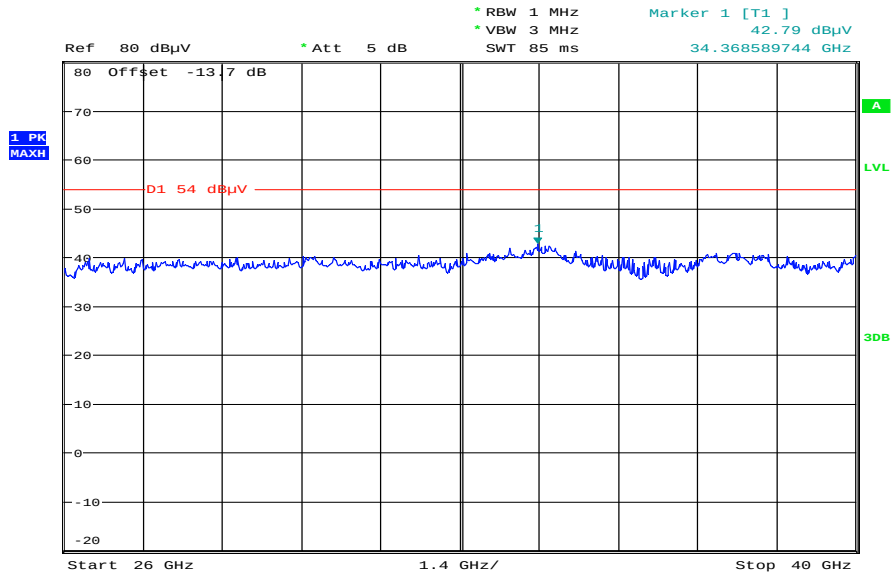


Plot 24: 18 GHz to 26 GHz, 5600 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:23:29

Plot 25: 26 GHz to 40 GHz, 5600 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:43:28

Plot 26: 30 MHz to 1 GHz, 5700 MHz, vertical & horizontal polarization

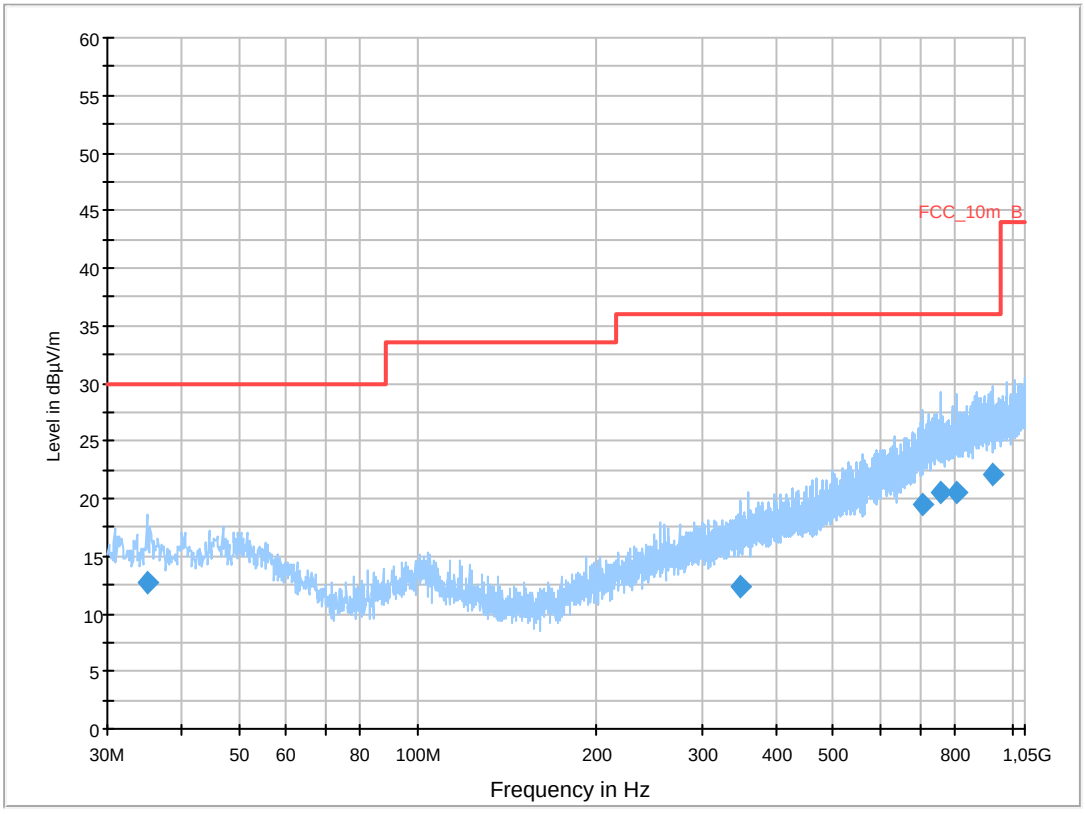
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan a mode CH140 6Mbps
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

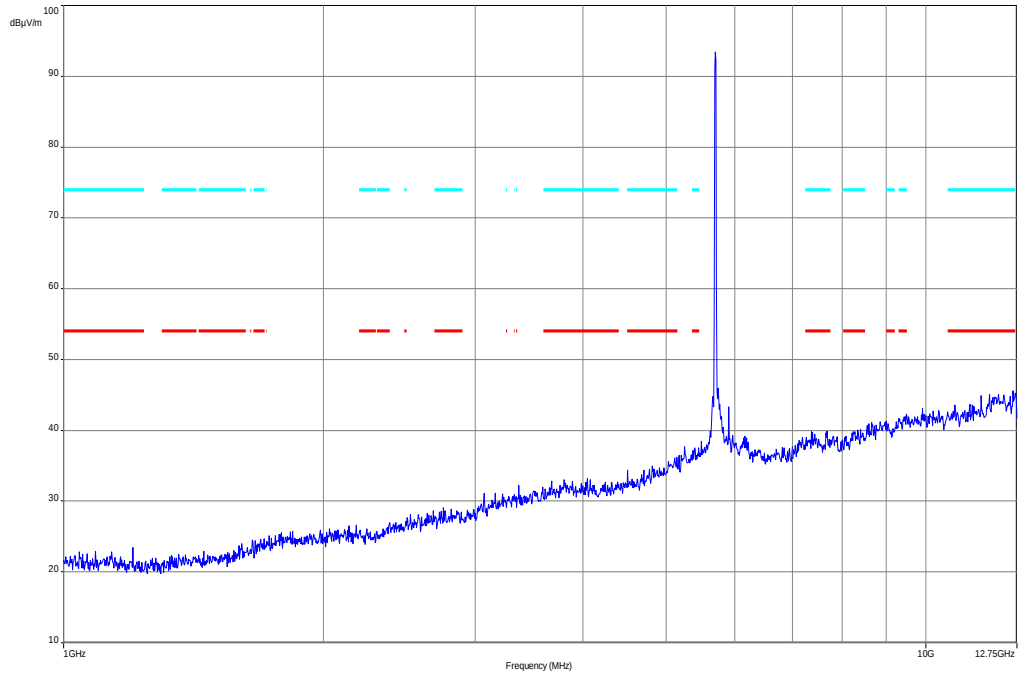
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



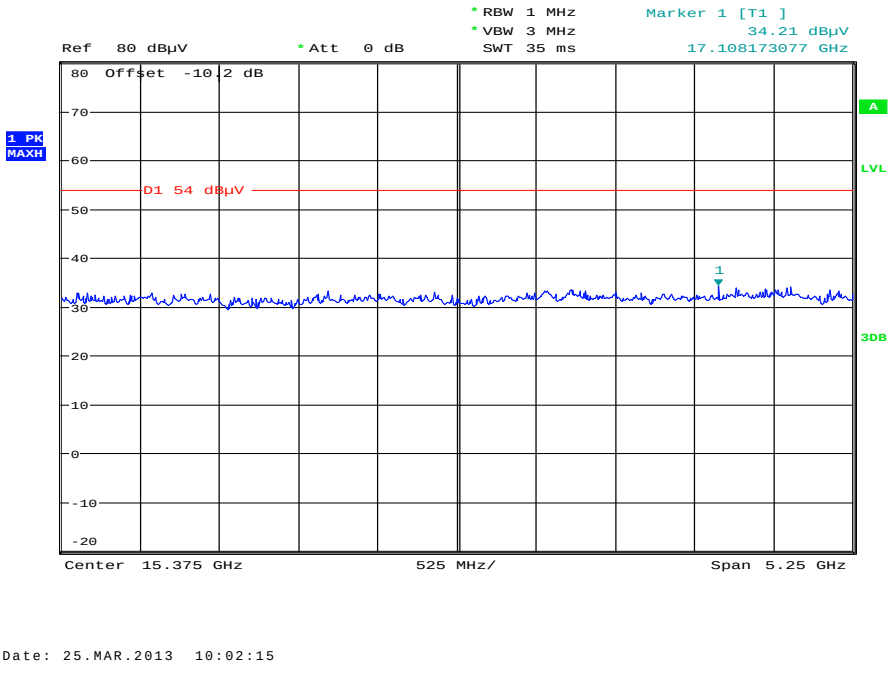
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.005950	12.7	1000.0	120.000	170.0	V	-10.0	13.0	17.3	30.0	
347.922000	12.4	1000.0	120.000	170.0	V	176.0	16.0	23.6	36.0	
704.384550	19.5	1000.0	120.000	170.0	V	10.0	22.6	16.5	36.0	
756.543900	20.5	1000.0	120.000	170.0	H	-10.0	23.7	15.5	36.0	
804.467550	20.6	1000.0	120.000	131.0	V	280.0	23.9	15.4	36.0	
930.496200	22.1	1000.0	120.000	170.0	V	-9.0	25.3	13.9	36.0	

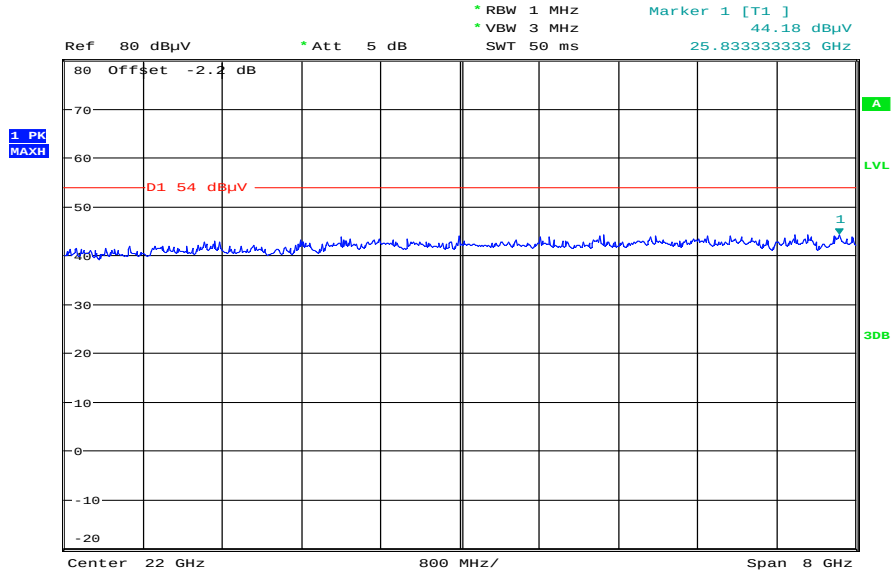
Plot 27: 1 GHz to 12.75 GHz, 5700 MHz, vertical & horizontal polarization



Plot 28: 12 GHz to 18 GHz, 5700 MHz, vertical & horizontal polarization

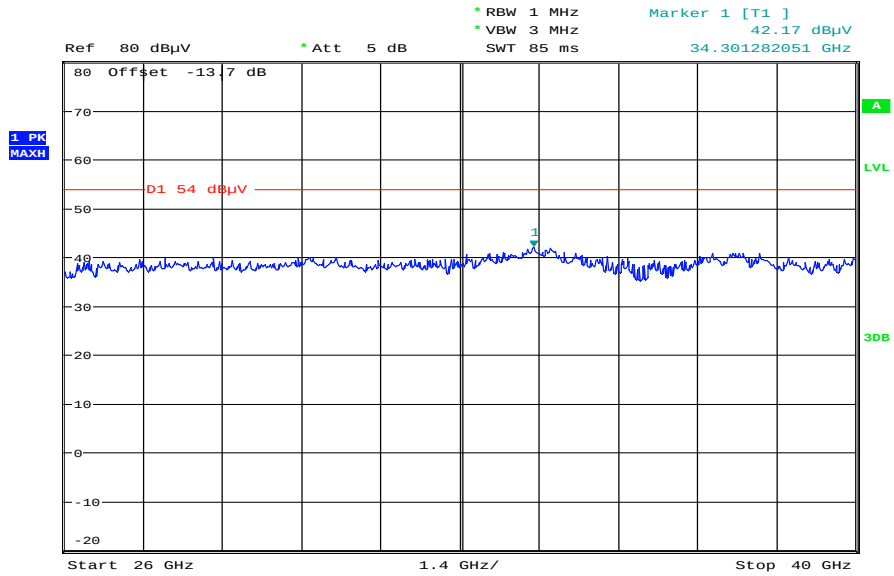


Plot 29: 18 GHz to 26 GHz, 5700 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:24:55

Plot 30: 26 GHz to 40 GHz, 5700 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:44:55

Plots: OFDM / n – mode HT20

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

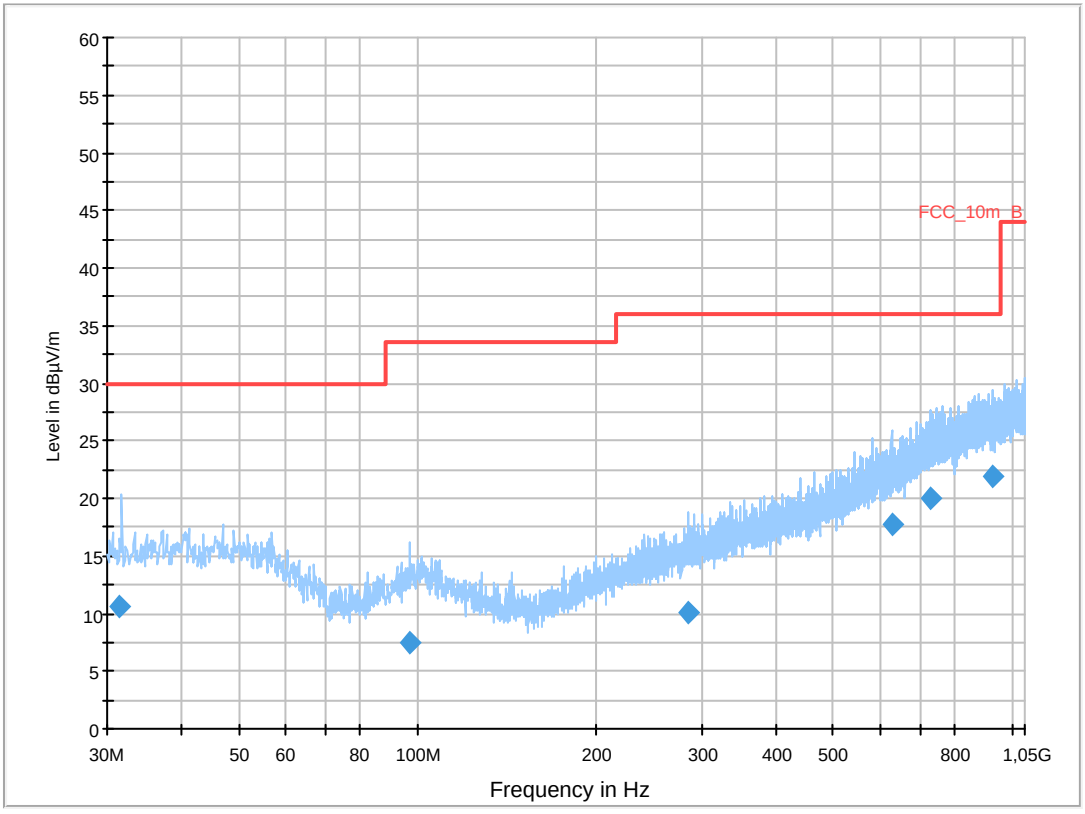
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH36 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

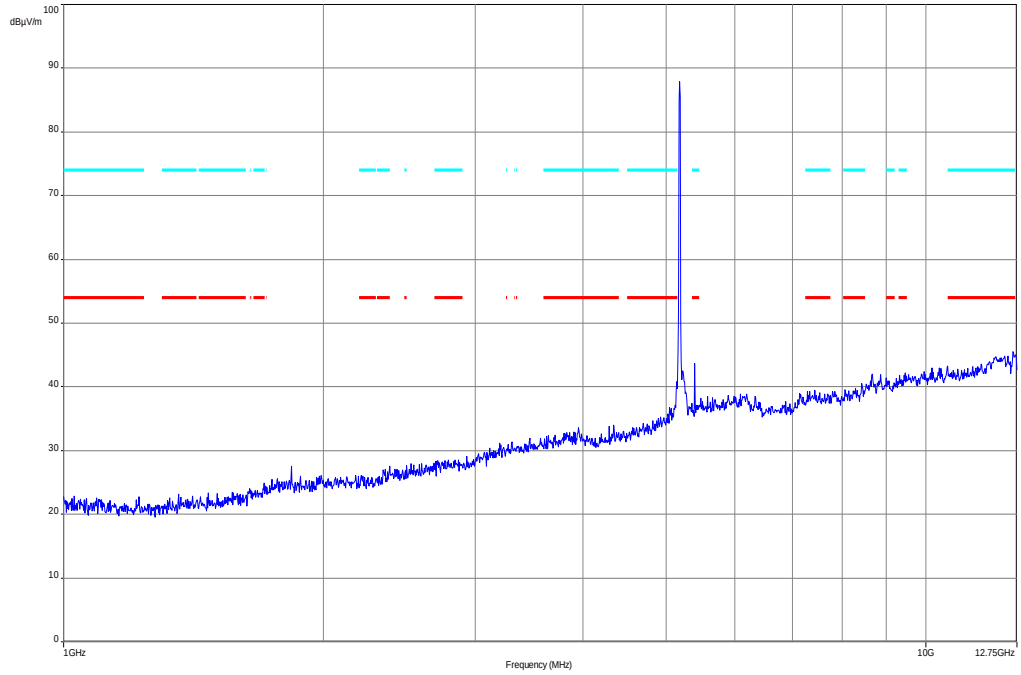
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



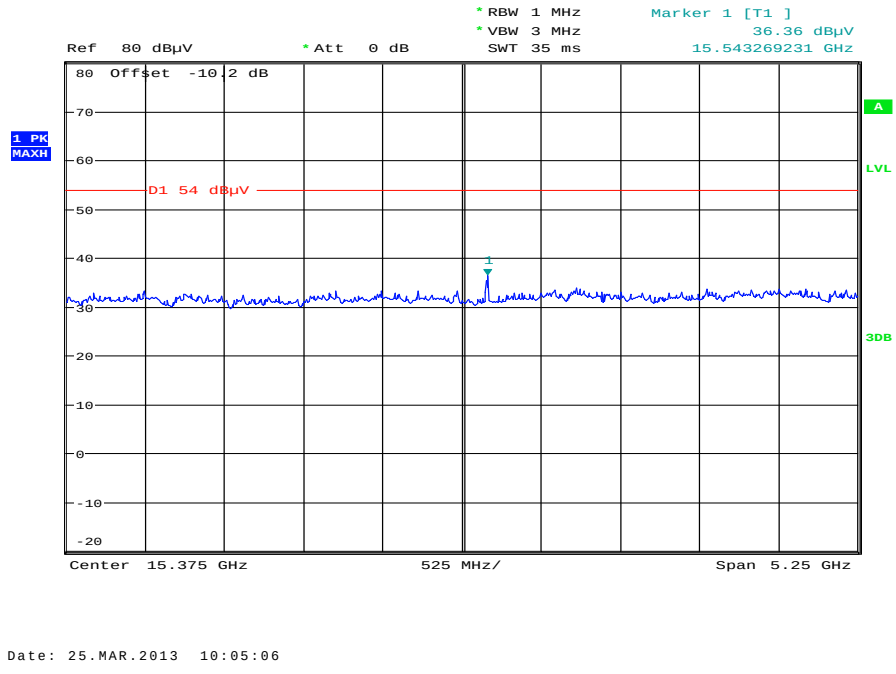
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.309050	10.5	1000.0	120.000	98.0	V	-10.0	12.6	19.5	30.0	
97.117950	7.6	1000.0	120.000	170.0	V	-10.0	11.5	25.9	33.5	
285.437850	10.1	1000.0	120.000	145.0	V	-10.0	14.2	25.9	36.0	
626.777700	17.7	1000.0	120.000	170.0	H	2.0	21.0	18.3	36.0	
729.554400	20.0	1000.0	120.000	155.0	V	10.0	23.2	16.0	36.0	
927.863400	21.9	1000.0	120.000	170.0	V	92.0	25.3	14.1	36.0	

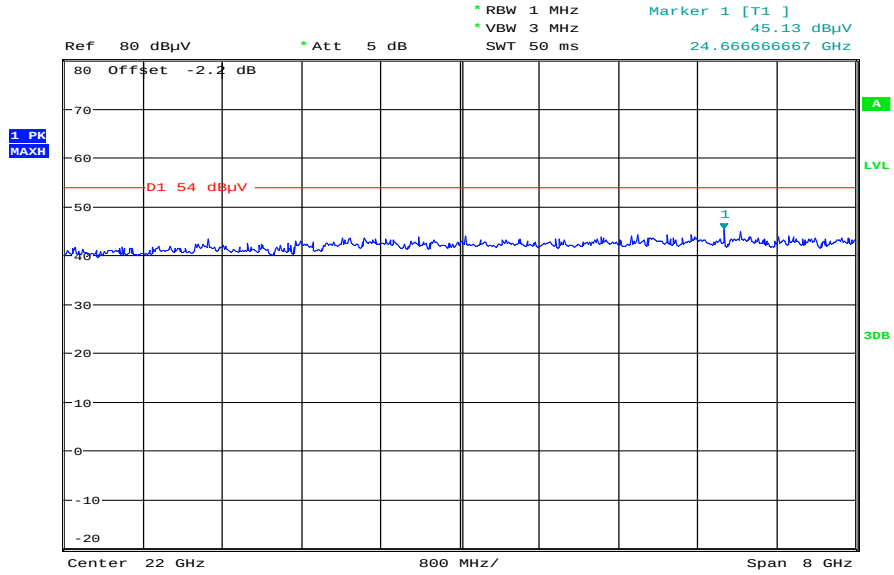
Plot 2: 1 GHz to 12.75 GHz, 5180 MHz, vertical & horizontal polarization



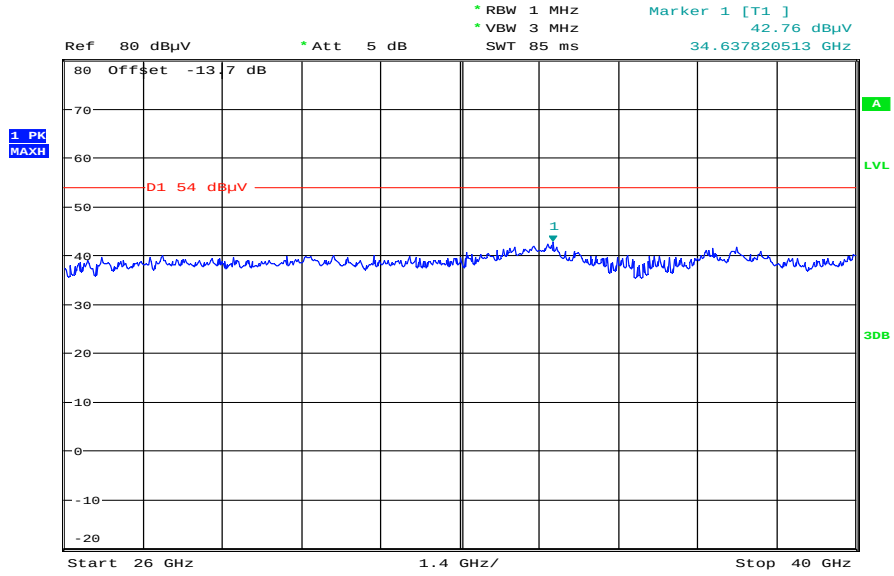
Plot 3: 12 GHz to 18 GHz, 5180 MHz, vertical & horizontal polarization



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



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



Plot 6: 30 MHz to 1 GHz, 5240 MHz, vertical & horizontal polarization

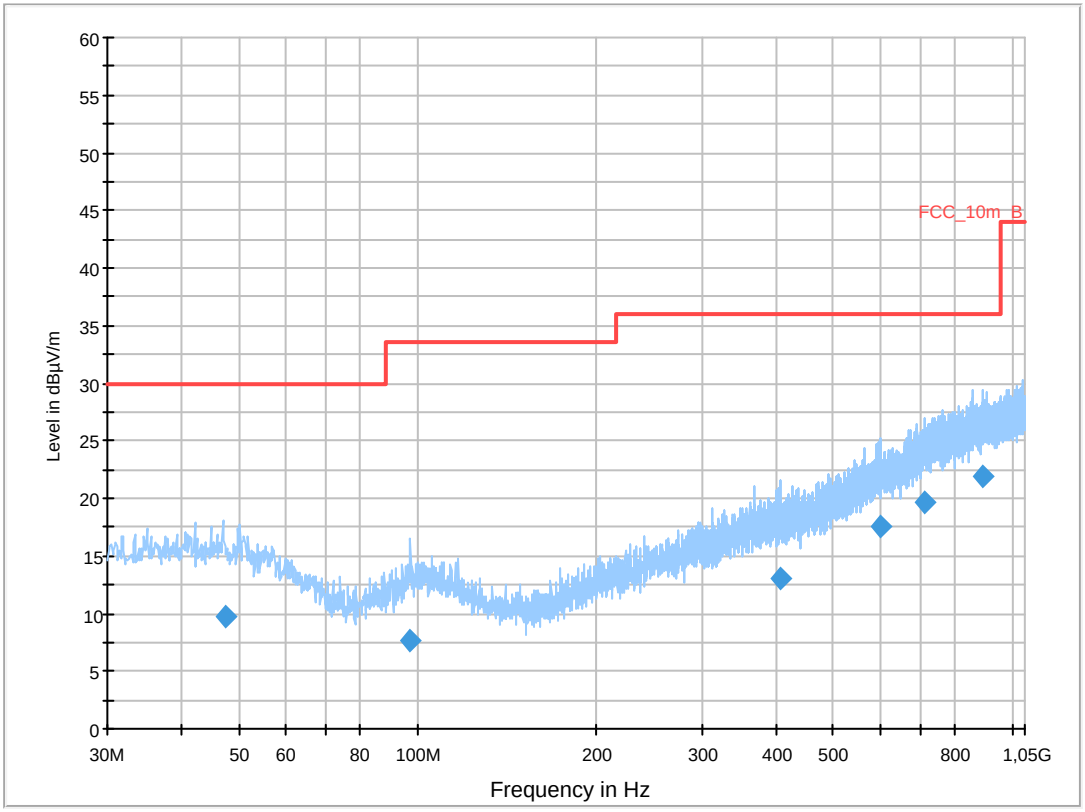
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH48 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

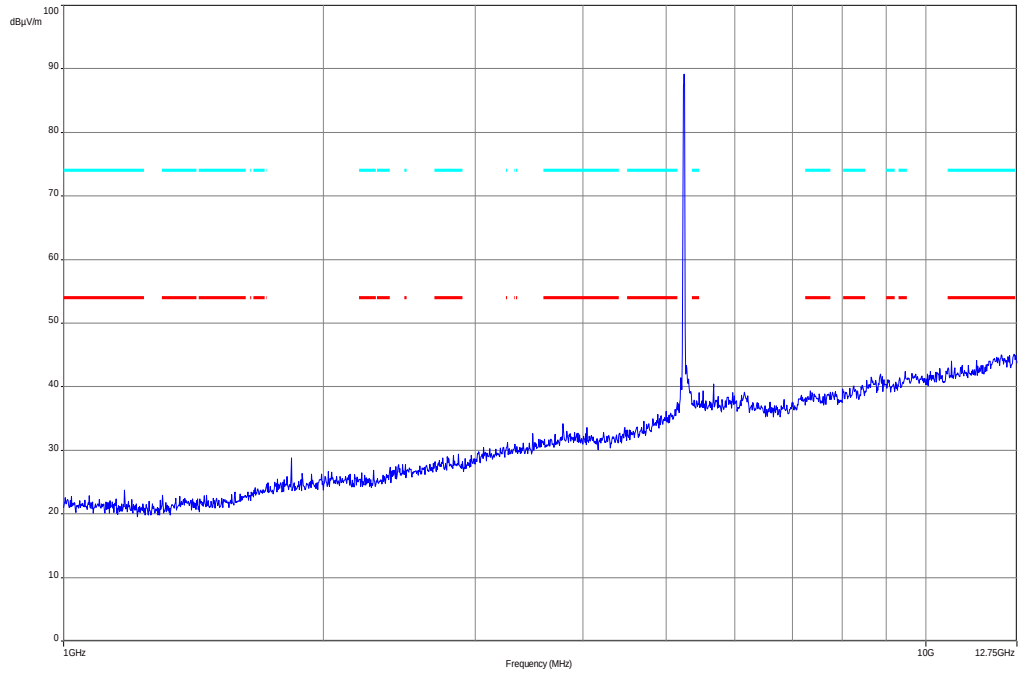
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



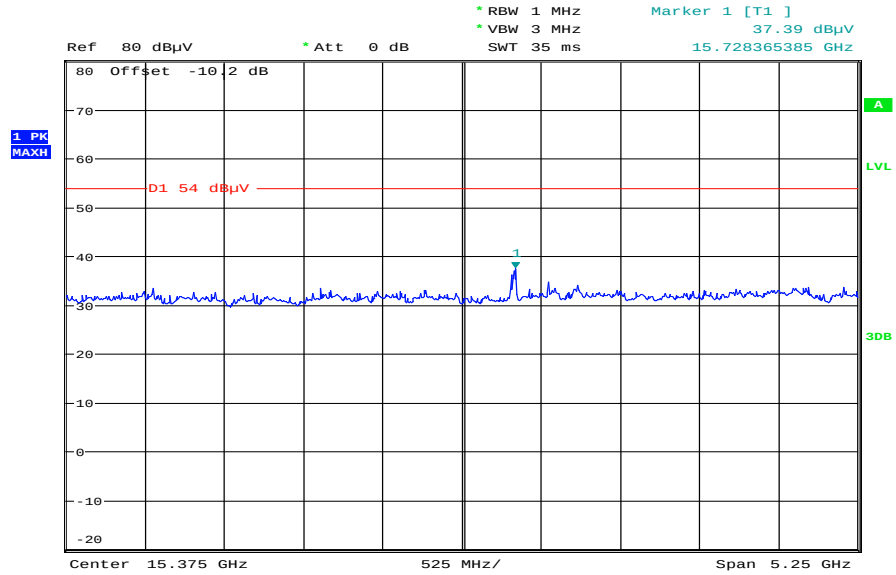
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
47.375400	9.7	1000.0	120.000	98.0	V	260.0	13.3	20.3	30.0	
96.593850	7.6	1000.0	120.000	145.0	H	190.0	11.5	25.9	33.5	
408.266100	13.1	1000.0	120.000	170.0	V	182.0	17.0	22.9	36.0	
599.638950	17.6	1000.0	120.000	120.0	V	100.0	20.8	18.4	36.0	
712.255500	19.7	1000.0	120.000	98.0	V	272.0	22.8	16.3	36.0	
894.775200	21.8	1000.0	120.000	170.0	H	10.0	25.1	14.2	36.0	

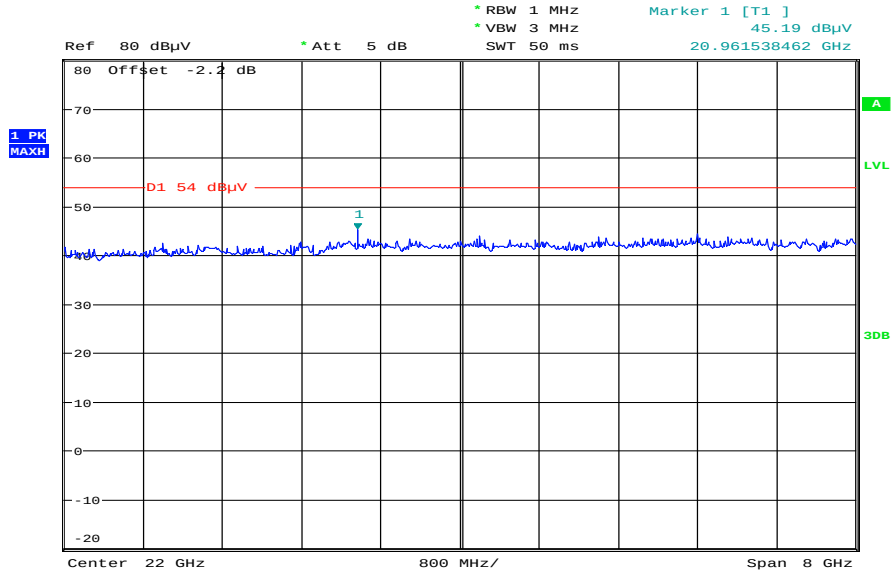
Plot 7: 1 GHz to 12.75 GHz, 5240 MHz, vertical & horizontal polarization



Plot 8: 12 GHz to 18 GHz, 5240 MHz, vertical & horizontal polarization

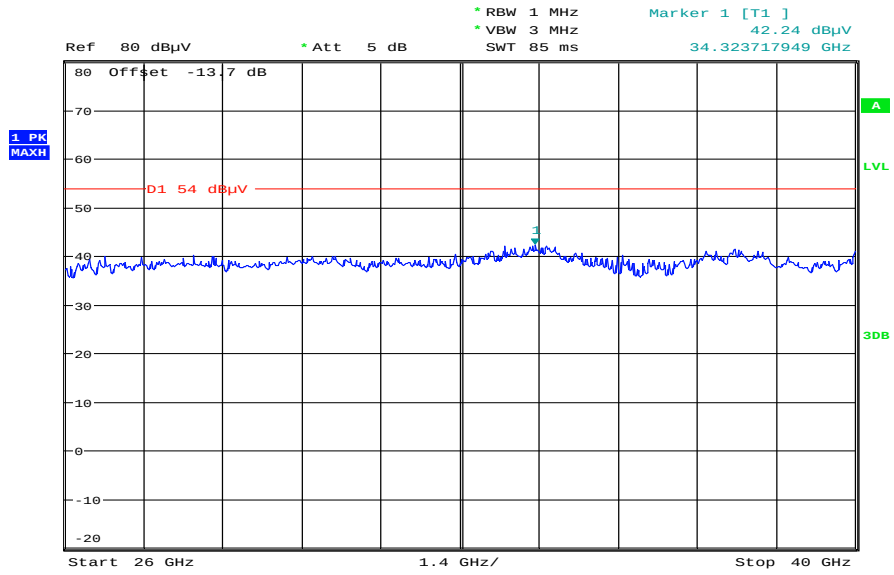


Plot 9: 18 GHz to 26 GHz, 5240 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:27:54

Plot 10: 26 GHz to 40 GHz, 5240 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:38:51

Plot 11: 30 MHz to 1 GHz, 5320 MHz, vertical & horizontal polarization

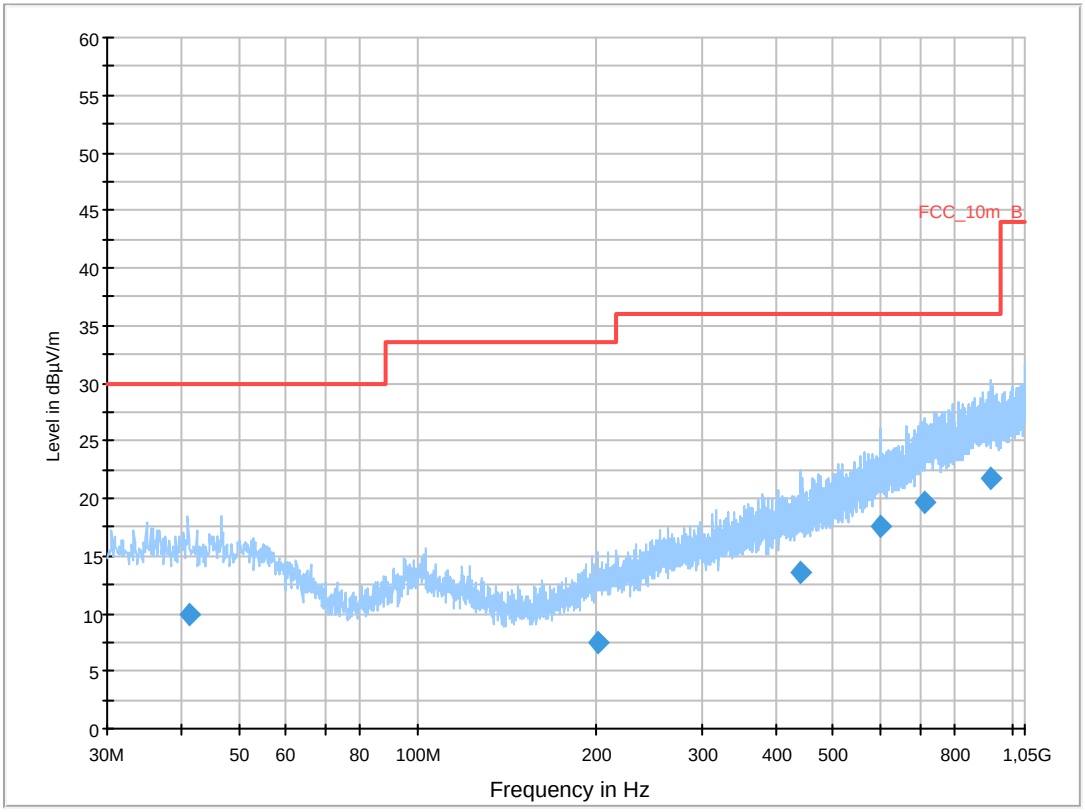
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH64 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

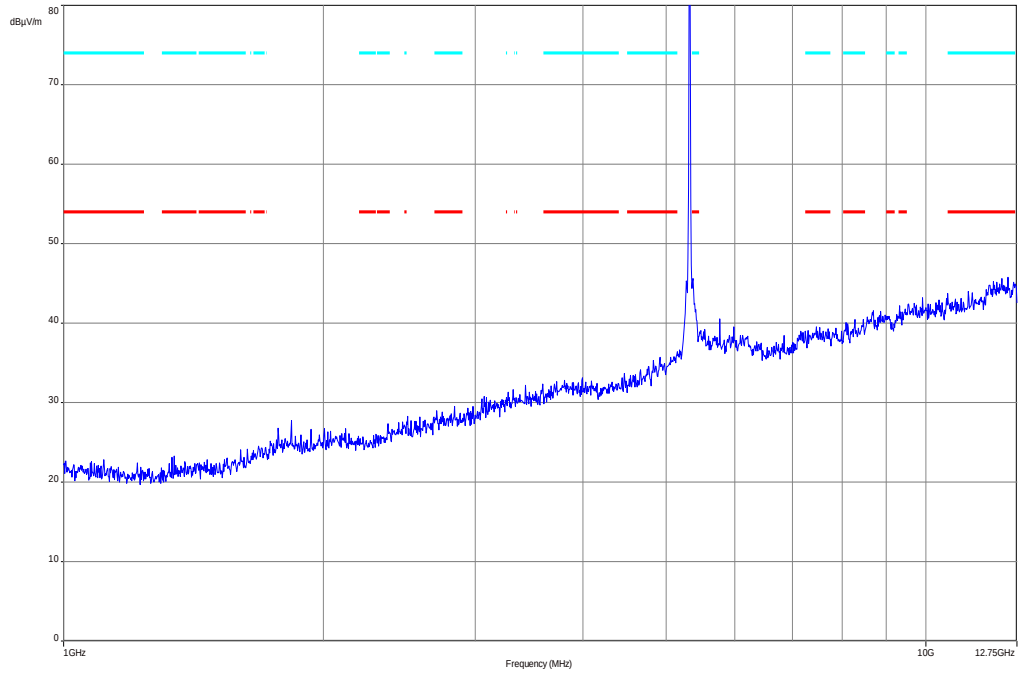
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



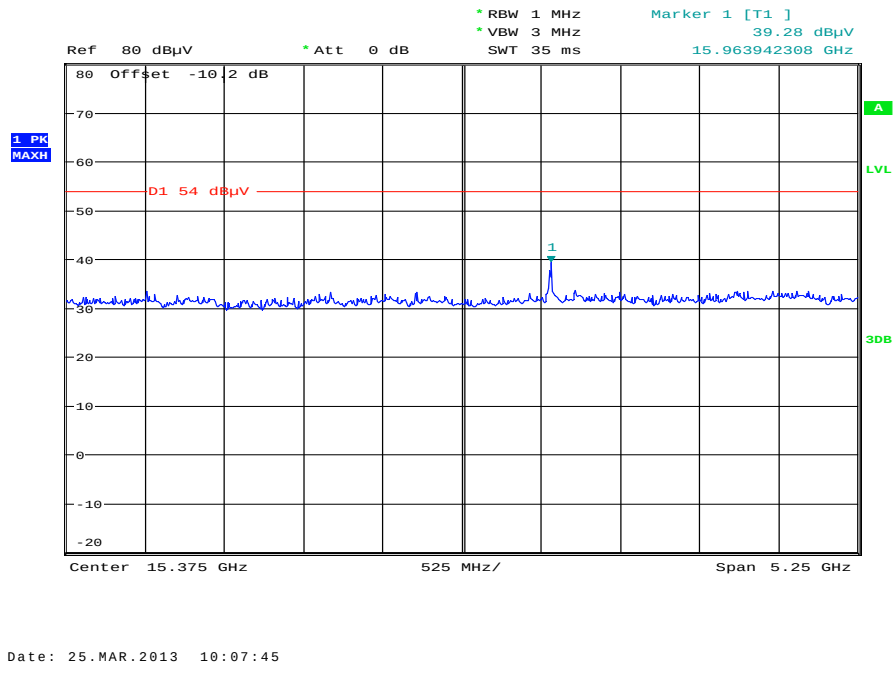
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
41.165250	10.0	1000.0	120.000	104.0	V	261.0	13.4	20.0	30.0	
201.073800	7.4	1000.0	120.000	130.0	V	10.0	11.7	26.1	33.5	
441.101250	13.6	1000.0	120.000	170.0	V	280.0	17.5	22.4	36.0	
601.729800	17.6	1000.0	120.000	170.0	H	280.0	20.8	18.4	36.0	
713.505150	19.7	1000.0	120.000	170.0	H	90.0	22.8	16.3	36.0	
916.800900	21.8	1000.0	120.000	104.0	H	85.0	25.3	14.2	36.0	

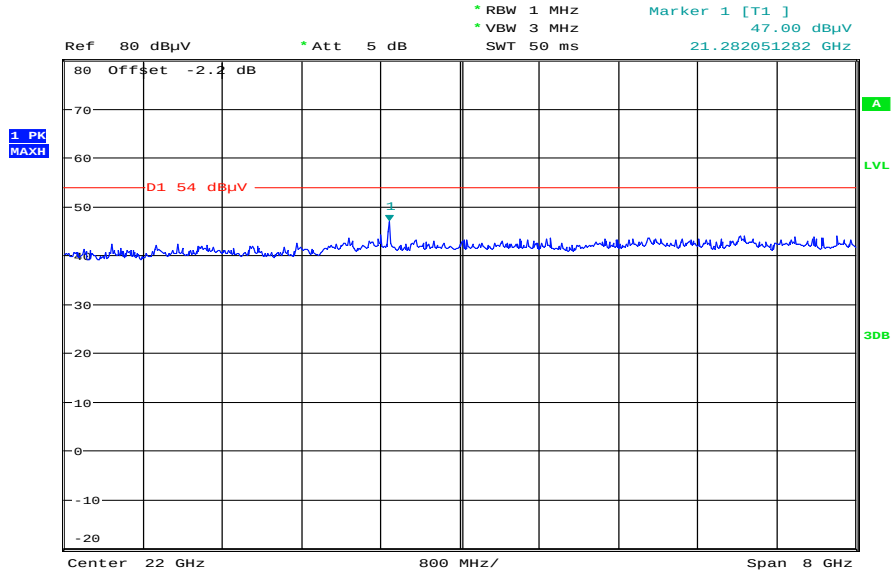
Plot 12: 1 GHz to 12.75 GHz, 5320 MHz, vertical & horizontal polarization



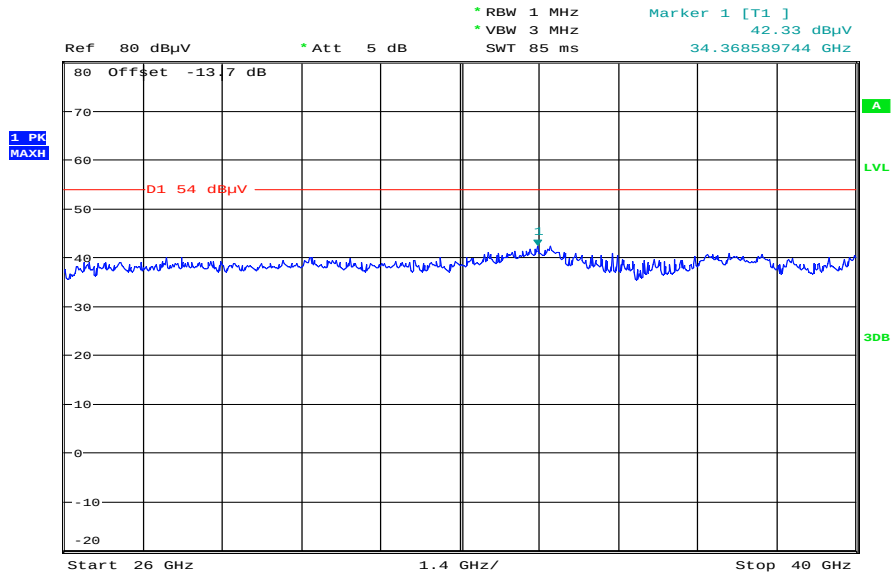
Plot 13: 12 GHz to 18 GHz, 5320 MHz, vertical & horizontal polarization



Plot 14: 18 GHz to 26 GHz, 5320 MHz, vertical & horizontal polarization



Plot 15: 26 GHz to 40 GHz, 5320 MHz, vertical & horizontal polarization



Plot 16: 30 MHz to 1 GHz, 5500 MHz, vertical & horizontal polarization

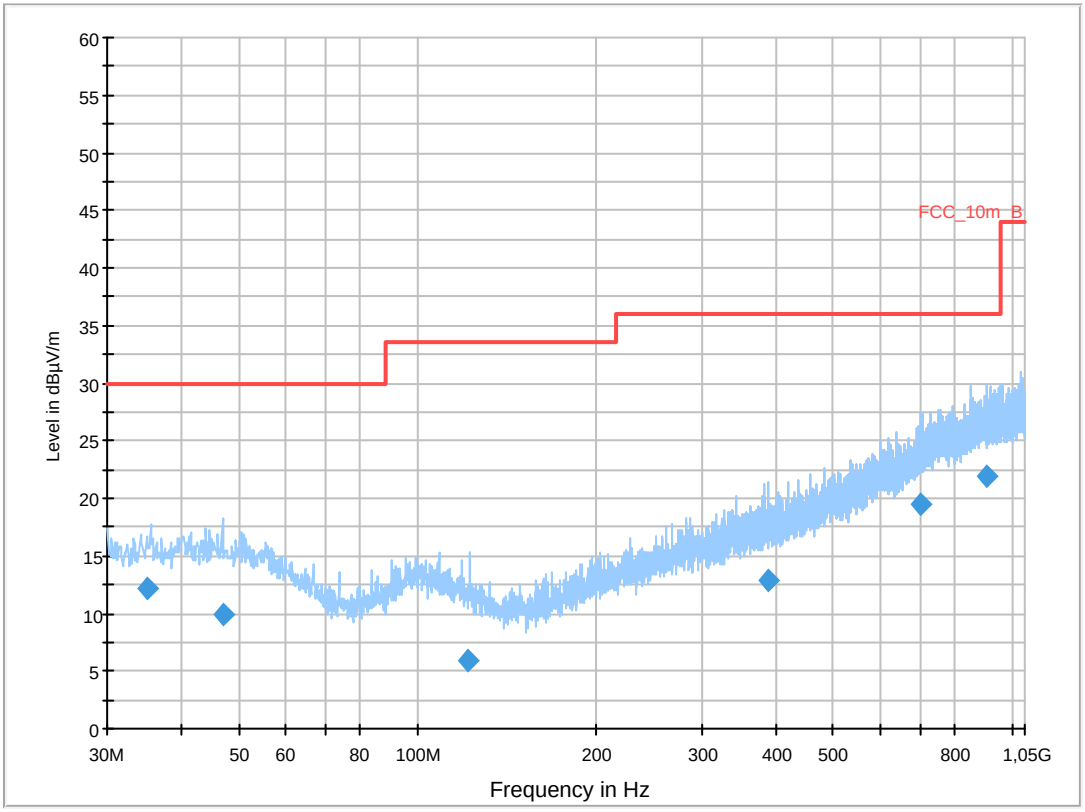
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH100 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

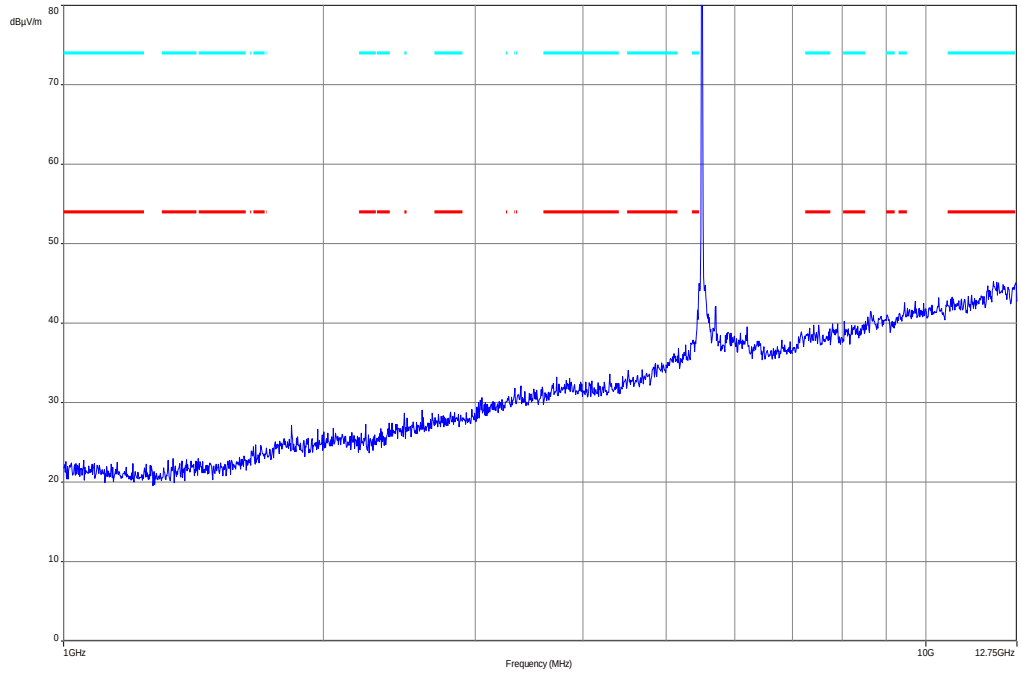
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



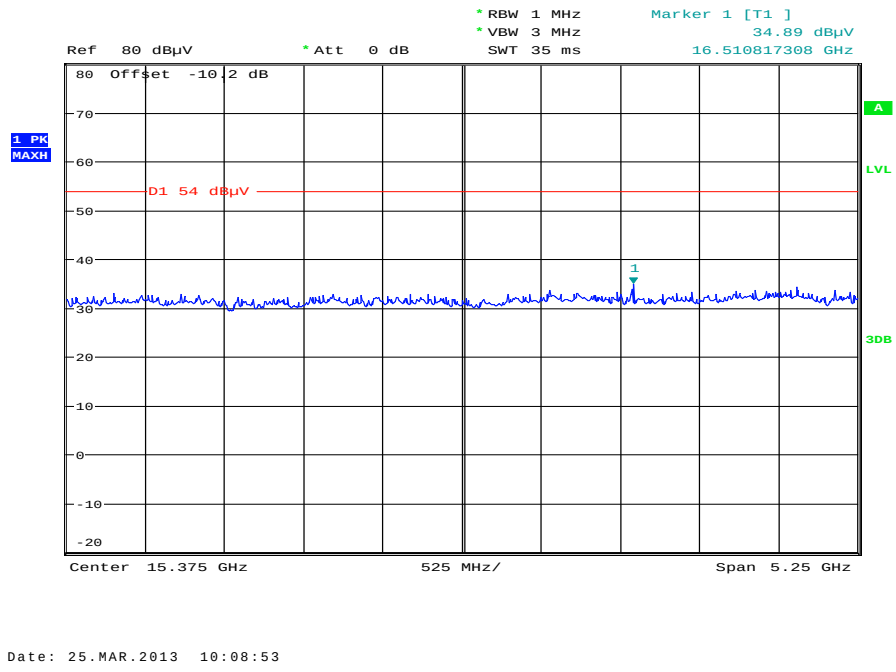
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.042700	12.2	1000.0	120.000	143.0	V	-5.0	13.0	17.8	30.0	
47.232150	9.8	1000.0	120.000	98.0	V	81.0	13.3	20.2	30.0	
121.732950	6.0	1000.0	120.000	143.0	H	100.0	10.1	27.5	33.5	
389.032950	12.8	1000.0	120.000	120.0	H	261.0	16.7	23.2	36.0	
701.330100	19.4	1000.0	120.000	170.0	V	85.0	22.5	16.6	36.0	
907.711950	21.9	1000.0	120.000	120.0	V	10.0	25.2	14.1	36.0	

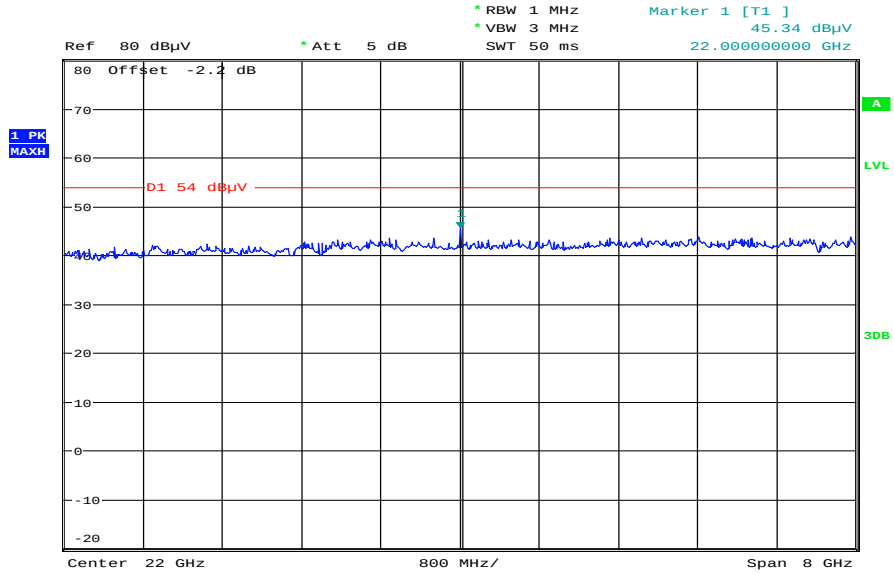
Plot 17: 1 GHz to 12.75 GHz, 5500 MHz, vertical & horizontal polarization



Plot 18: 12 GHz to 18 GHz, 5500 MHz, vertical & horizontal polarization

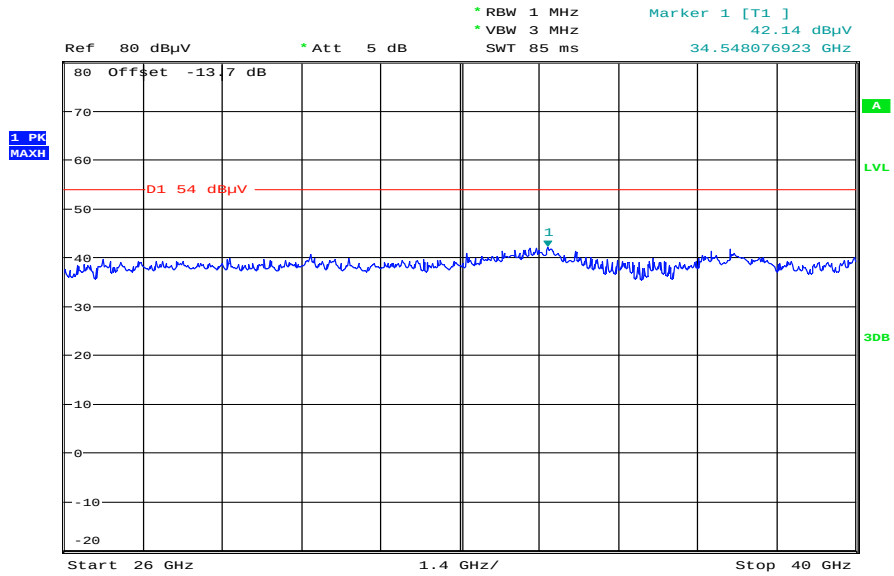


Plot 19: 18 GHz to 26 GHz, 5500 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:29:32

Plot 20: 26 GHz to 40 GHz, 5500 MHz, vertical & horizontal polarization



Date: 25.MAR.2013 10:56:53

Plot 21: 30 MHz to 1 GHz, 5600 MHz, vertical & horizontal polarization

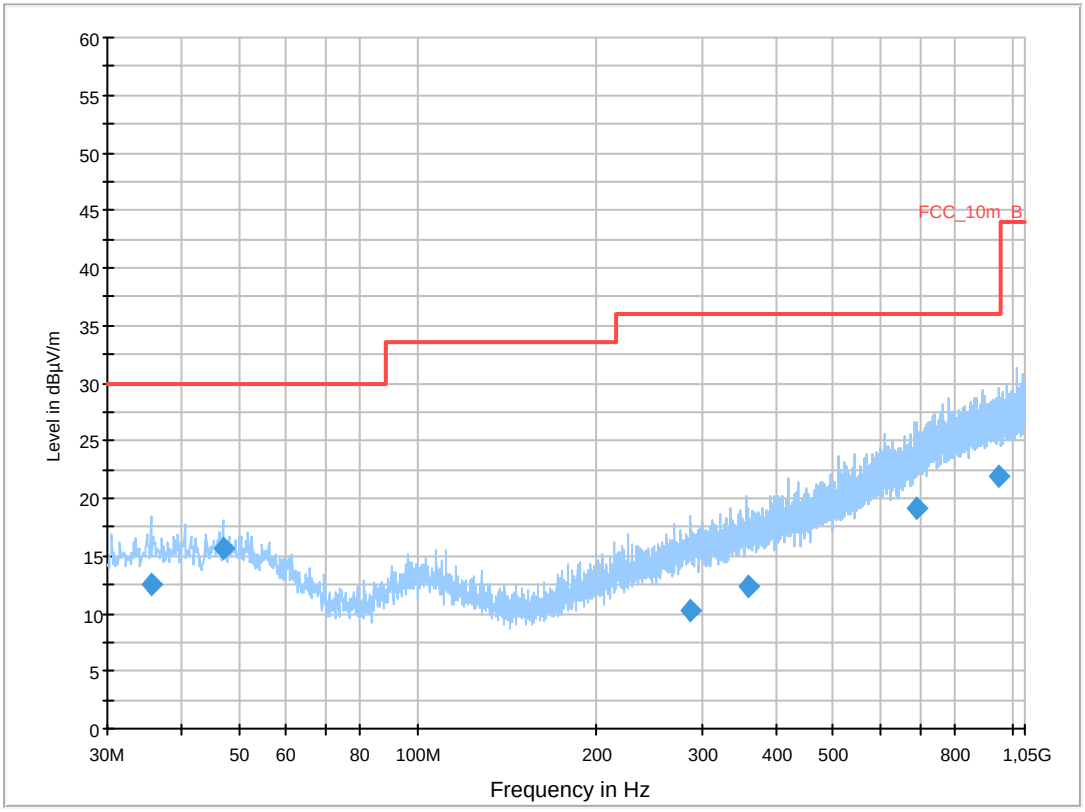
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH120 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

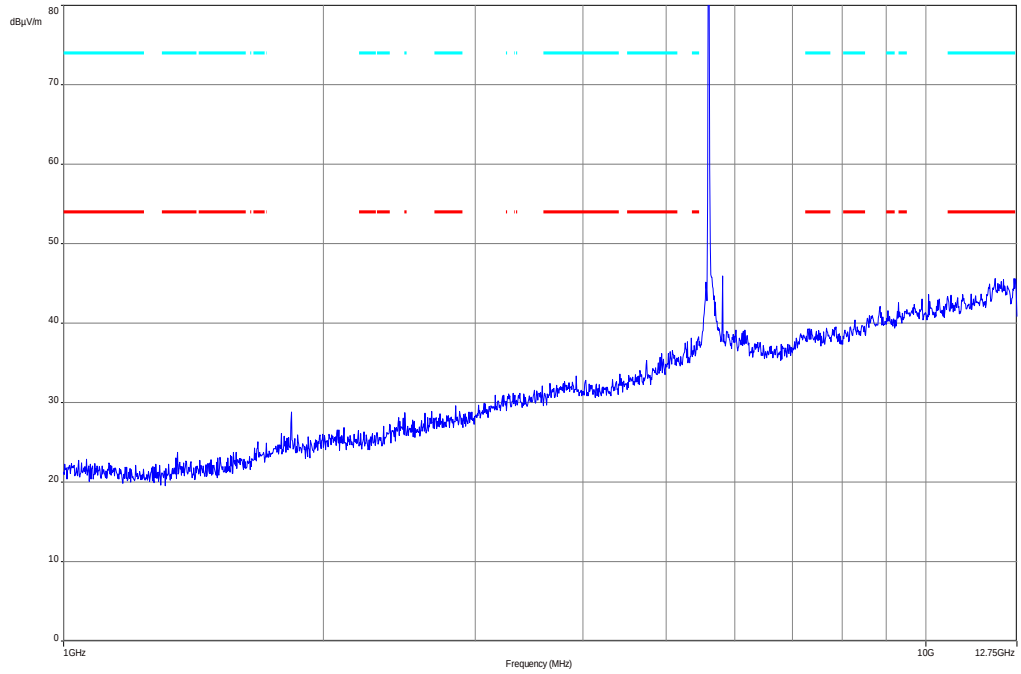
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



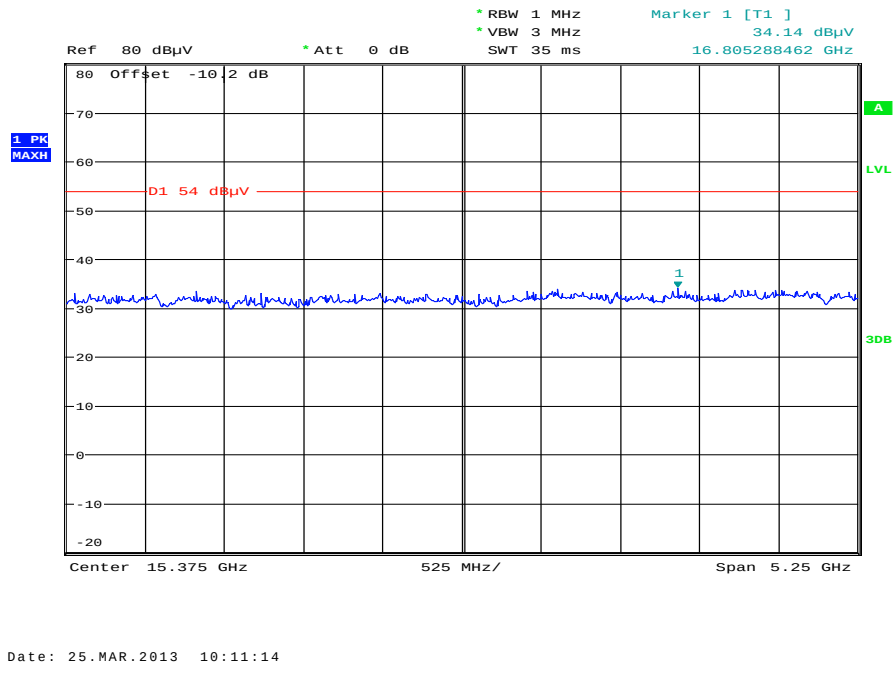
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.482200	12.5	1000.0	120.000	135.0	V	10.0	13.1	17.5	30.0	
46.978800	15.6	1000.0	120.000	98.0	V	261.0	13.3	14.4	30.0	
286.291950	10.3	1000.0	120.000	170.0	V	100.0	14.2	25.7	36.0	
358.479750	12.3	1000.0	120.000	170.0	V	280.0	16.2	23.7	36.0	
692.815500	19.1	1000.0	120.000	170.0	V	270.0	22.3	16.9	36.0	
947.095650	21.9	1000.0	120.000	132.0	V	261.0	25.3	14.1	36.0	

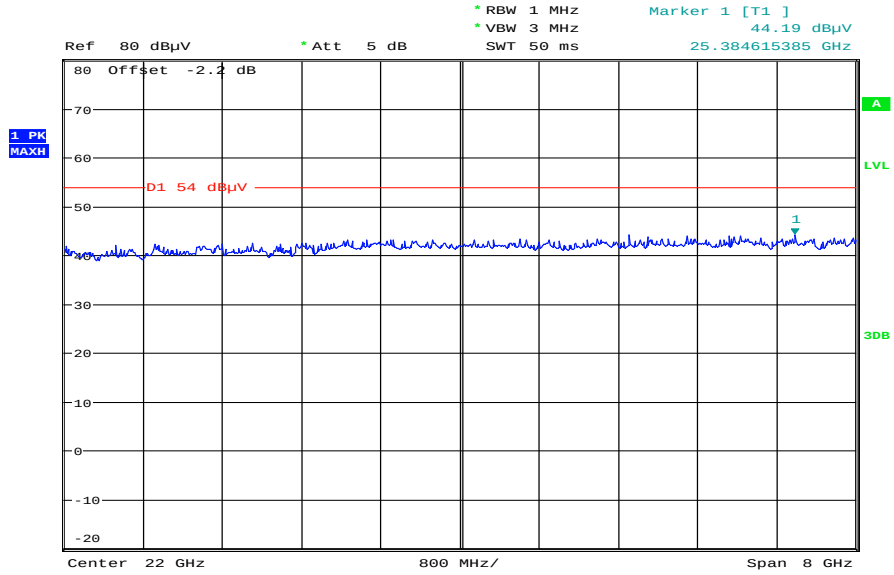
Plot 22: 1 GHz to 12.75 GHz, 5600 MHz, vertical & horizontal polarization



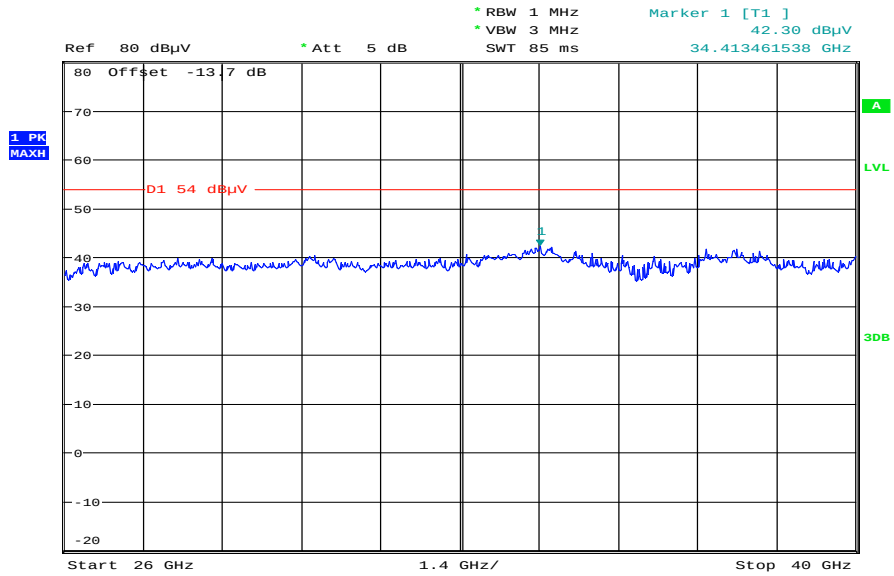
Plot 23: 12 GHz to 18 GHz, 5600 MHz, vertical & horizontal polarization



Plot 24: 18 GHz to 26 GHz, 5600 MHz, vertical & horizontal polarization



Plot 25: 26 GHz to 40 GHz, 5600 MHz, vertical & horizontal polarization



Plot 26: 30 MHz to 1 GHz, 5700 MHz, vertical & horizontal polarization

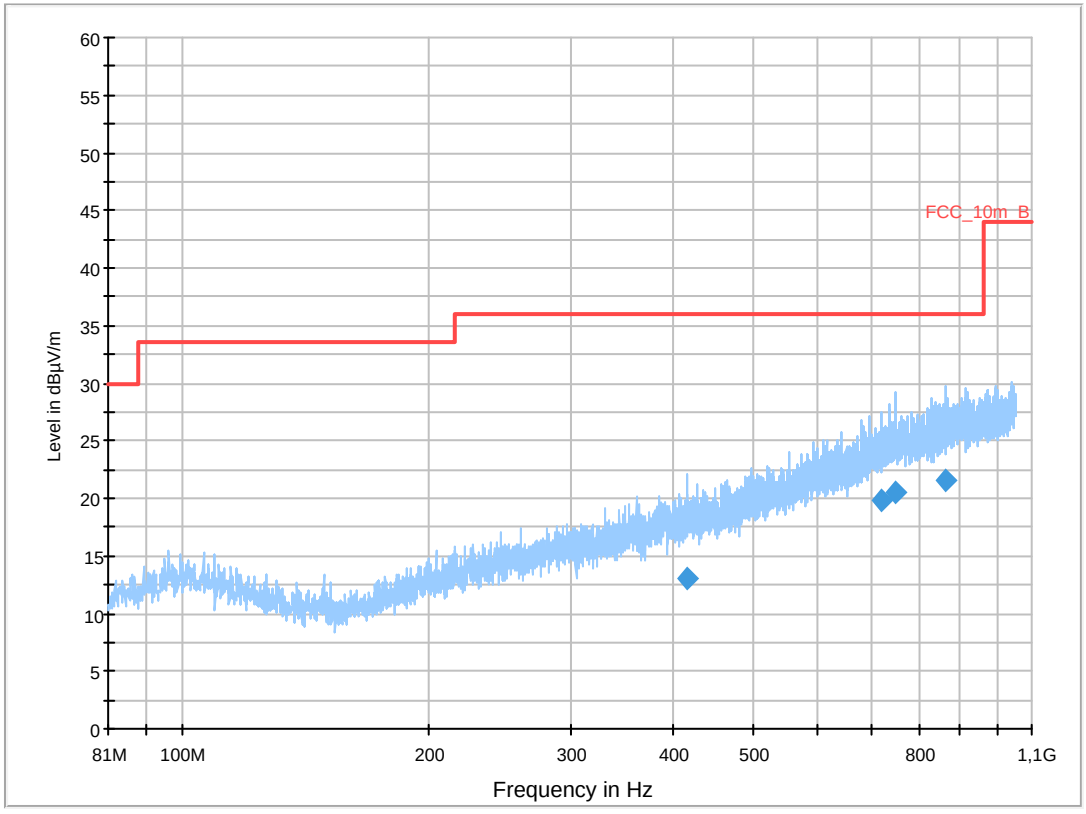
Common Information

EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 C class B @ 10 m
Operating Conditions:	w-lan n mode CH140 mcs0
Operator Name:	Wolsdorfer
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

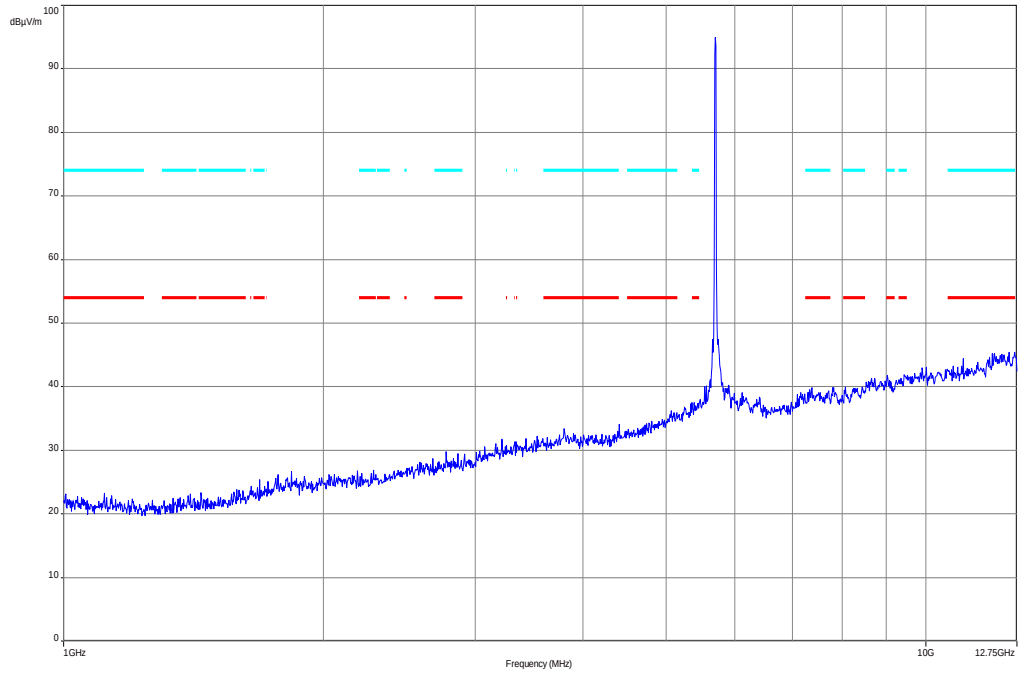
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



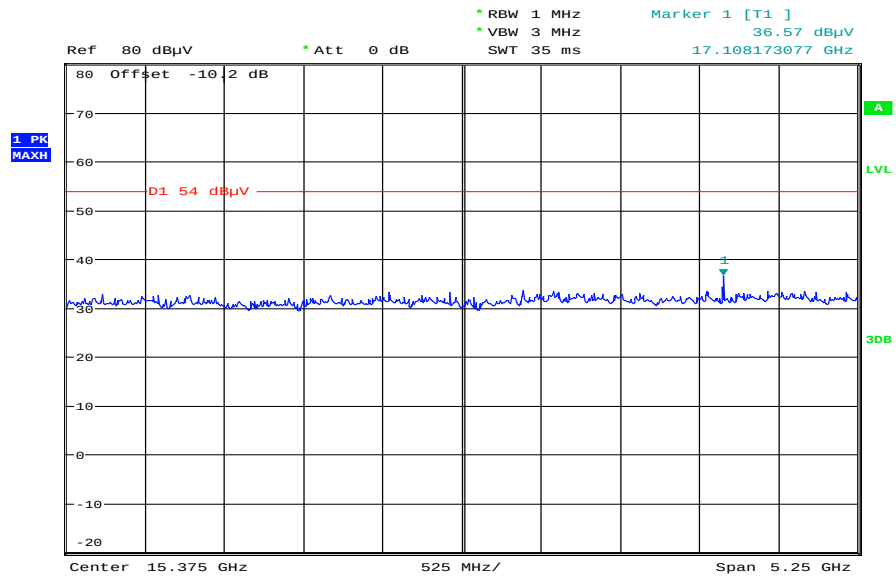
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.494350	12.1	1000.0	120.000	143.0	V	260.0	13.1	17.9	30.0	
46.042200	11.7	1000.0	120.000	98.0	V	80.0	13.3	18.3	30.0	
414.690000	13.1	1000.0	120.000	170.0	V	175.0	17.1	22.9	36.0	
721.842300	19.8	1000.0	120.000	170.0	H	270.0	23.0	16.2	36.0	
749.217600	20.4	1000.0	120.000	170.0	V	183.0	23.6	15.6	36.0	
862.322100	21.6	1000.0	120.000	170.0	H	2.0	24.7	14.4	36.0	

Plot 27: 1 GHz to 12.75 GHz, 5700 MHz, vertical & horizontal polarization

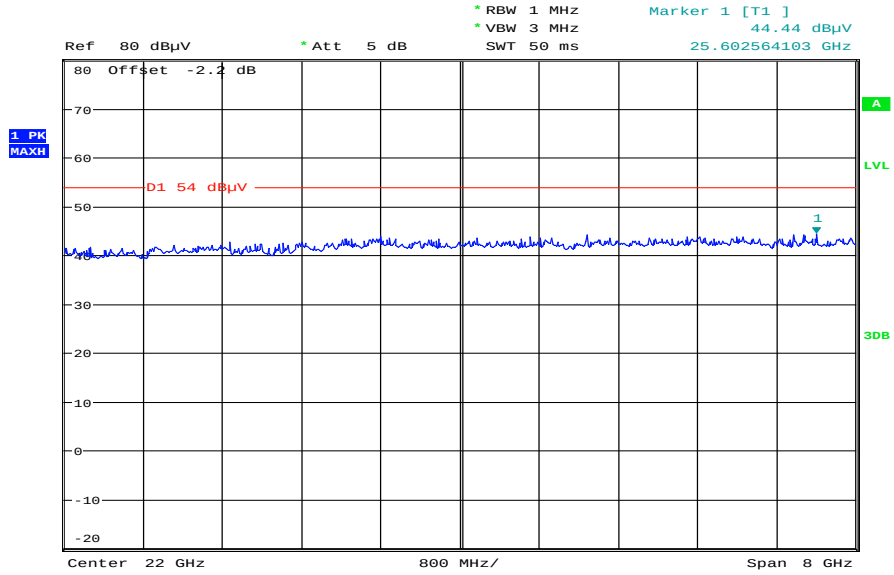


Plot 28: 12 GHz to 18 GHz, 5700 MHz, vertical & horizontal polarization

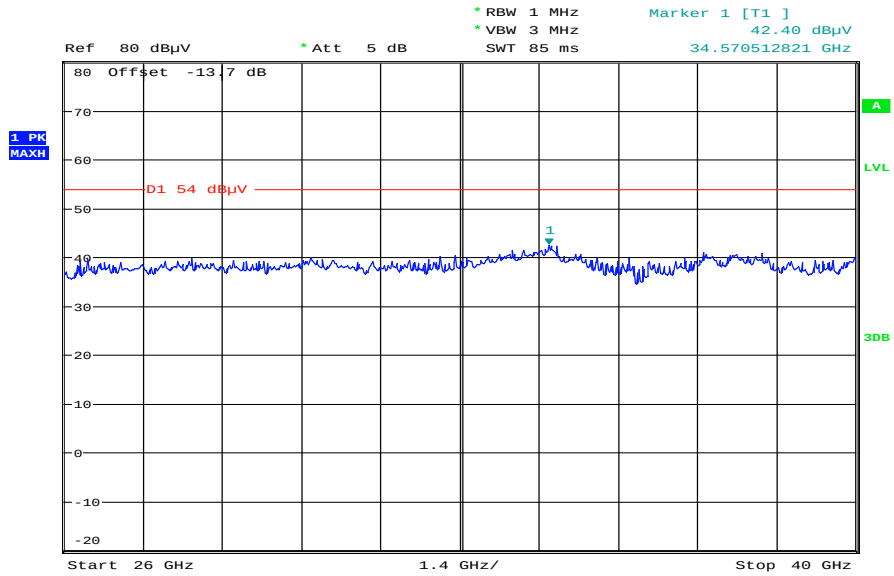


Date: 25.MAR.2013 10:12:23

Plot 29: 18 GHz to 26 GHz, 5700 MHz, vertical & horizontal polarization



Plot 30: 26 GHz to 40 GHz, 5700 MHz, vertical & horizontal polarization



9.11 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 above 1 GHz are below the average limit!		
Measurement uncertainty	± 3 dB	

Result: **Passed**

Plots: RX / Idle – mode

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

Common Information

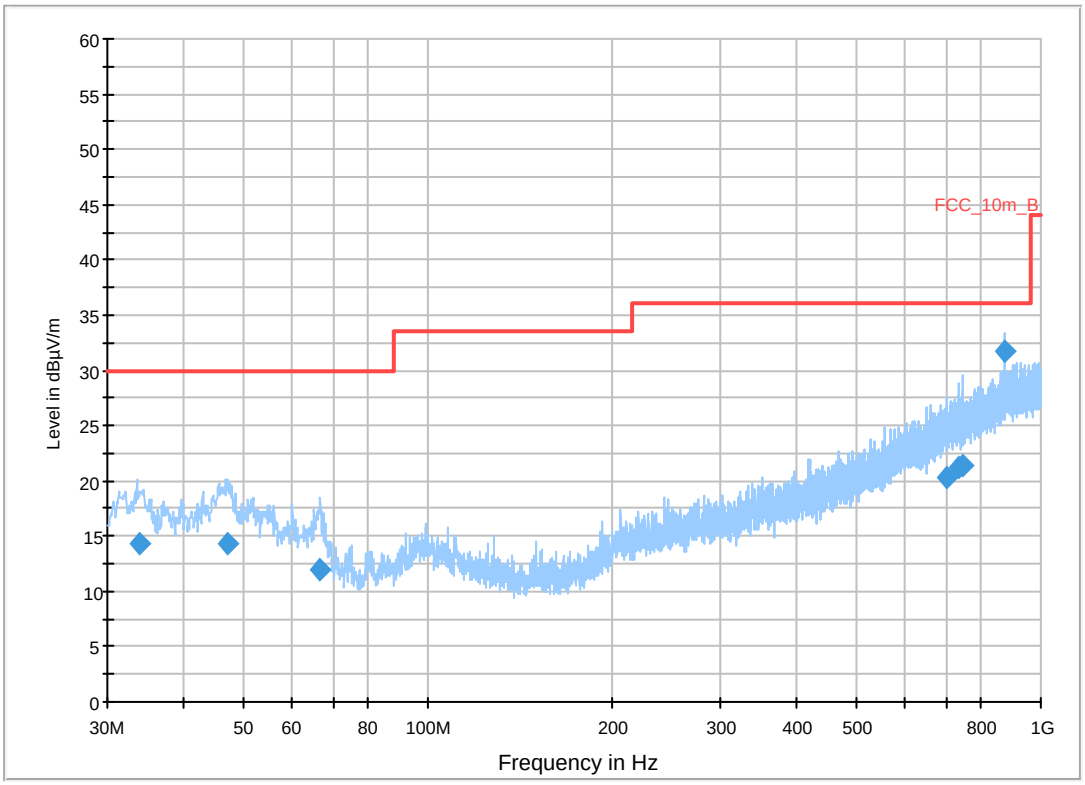
EUT:	RFM121LW
Serial Number:	Imei:990002430036317
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	Idle + charging
Operator Name:	Wolsdorfer
Comment:	AC: 115 V / 60 Hz

Scan Setup: GSM_N85_Fin [EMI radiated]

Hardware Setup:	Electric Field (N850)
Receiver:	[ESCI 3]
Level Unit:	dBµV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	60 kHz	QPK	120 kHz	5 s	20 dB

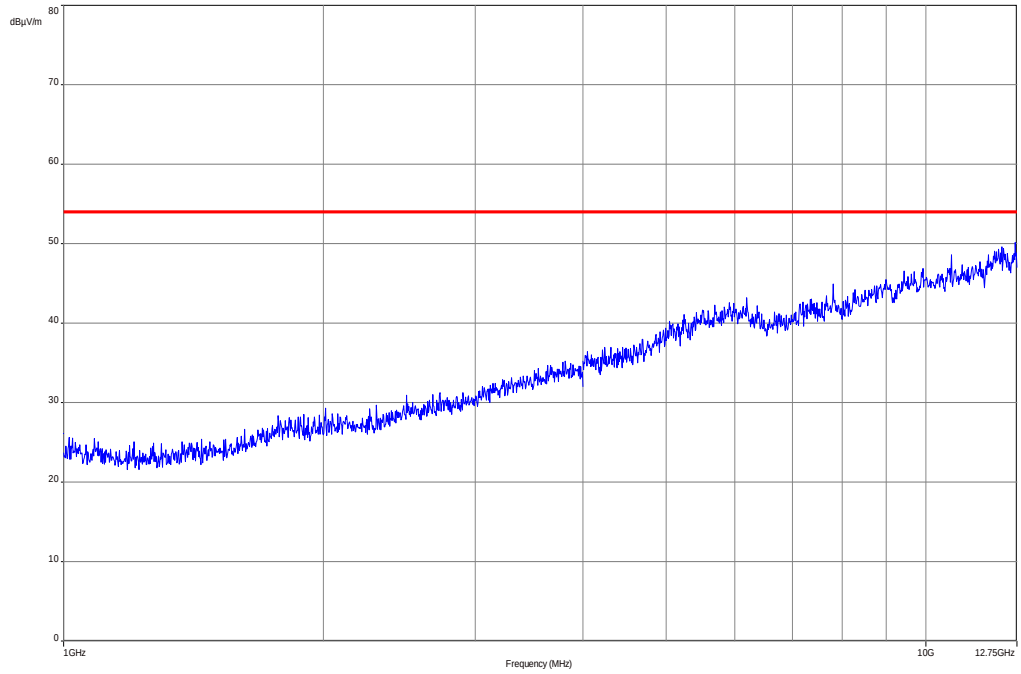
GSM_850TCH



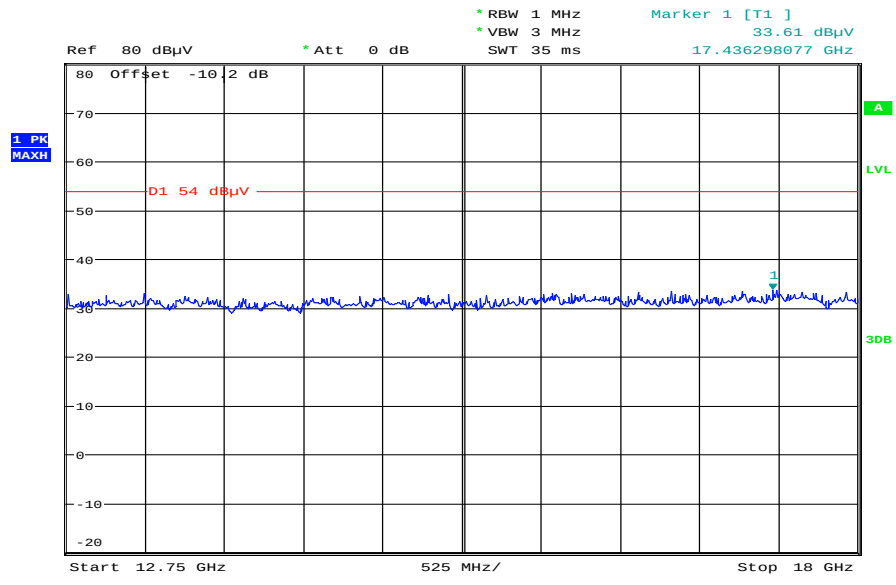
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.720550	14.3	5000.0	120.000	185.0	V	253.0	13.0	15.7	30.0	
47.292000	14.3	5000.0	120.000	145.0	V	127.0	13.4	15.7	30.0	
66.778650	12.0	5000.0	120.000	400.0	V	214.0	10.1	18.0	30.0	
701.084300	20.4	5000.0	120.000	239.0	H	232.0	23.1	15.6	36.0	
736.429550	21.2	5000.0	120.000	200.0	H	117.0	24.0	14.8	36.0	
744.357000	21.3	5000.0	120.000	200.0	H	185.0	24.1	14.7	36.0	
876.072550	31.8	5000.0	120.000	100.0	H	228.0	25.8	4.2	36.0	

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

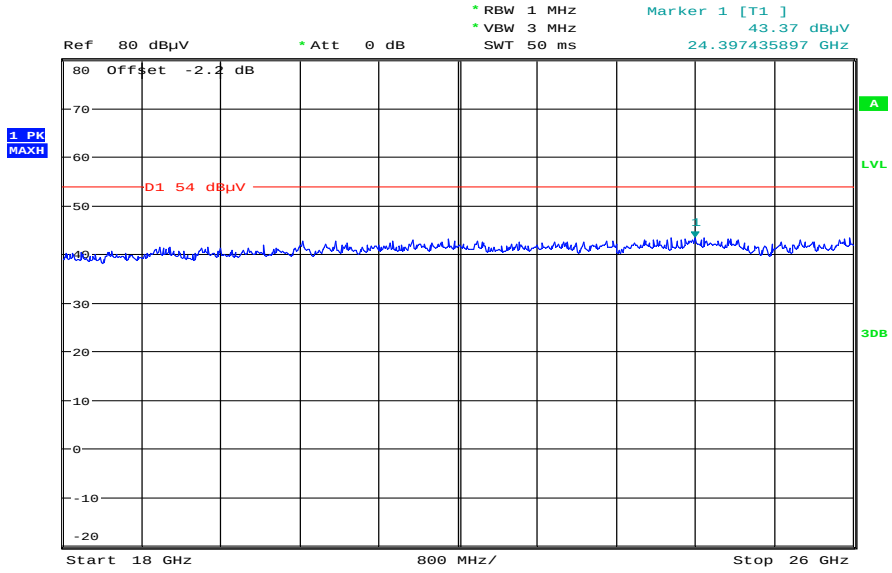


Plot 3: 12.75 GHz to 18 GHz, vertical & horizontal polarization



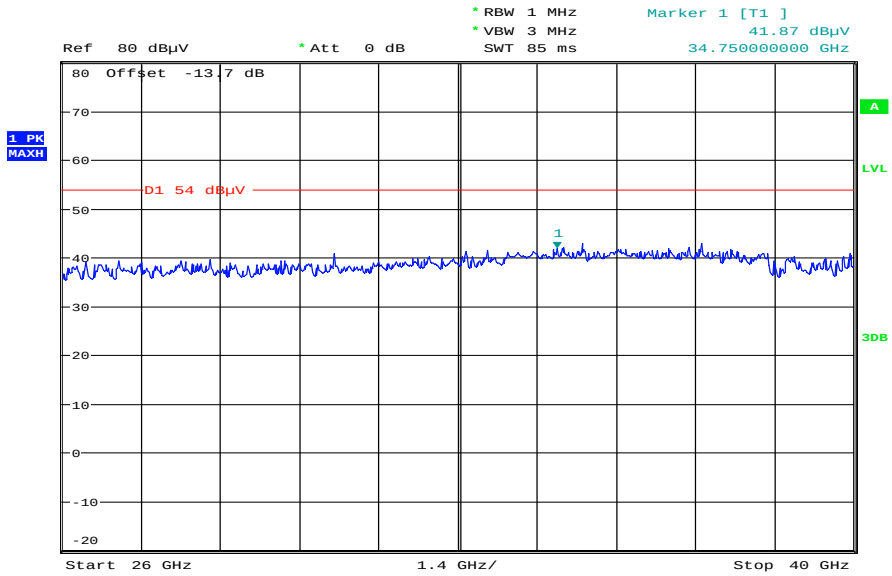
Date: 25.MAR.2013 16:25:55

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



Date: 25.MAR.2013 16:26:54

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



Date: 25.MAR.2013 16:51:15

9.12 Spurious emissions radiated < 30 MHz

Not performed! Tests according to manufacturer test plan!

9.13 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

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

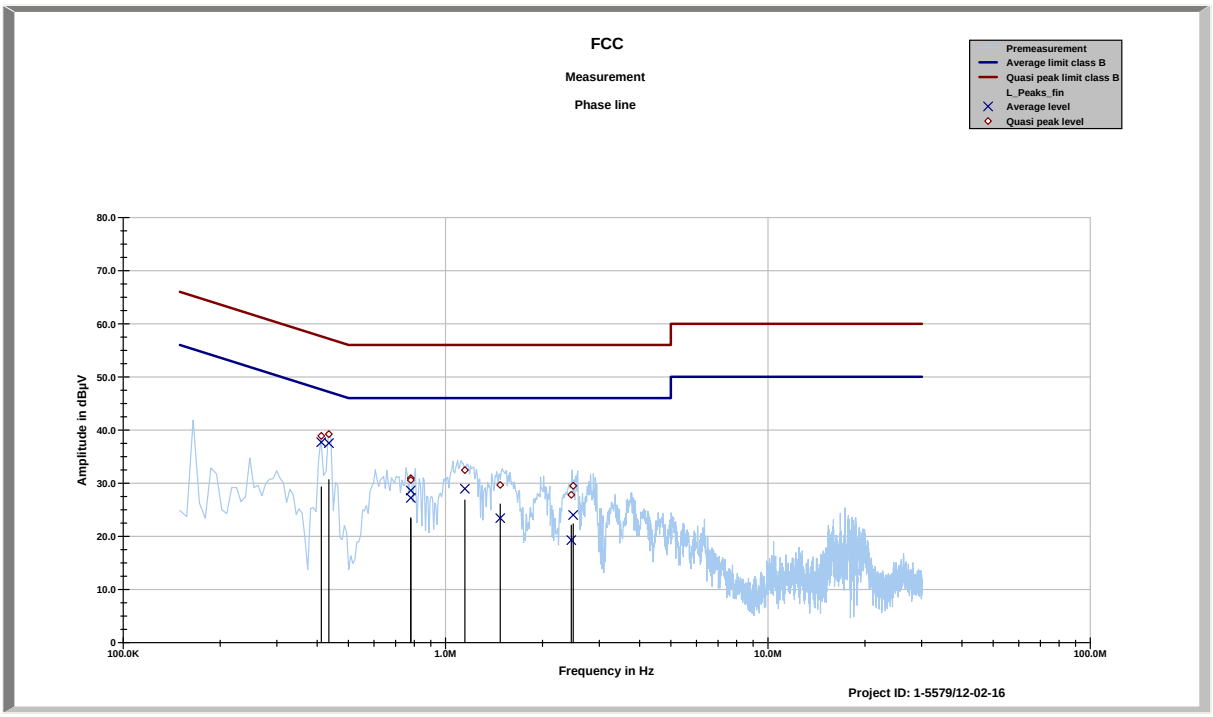
*Decreases with the logarithm of the frequency

Results:

Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No critical peaks detected. All detected peak values are below the average limits.		
Measurement uncertainty	± 3 dB	

Result: **Passed**

Plots:



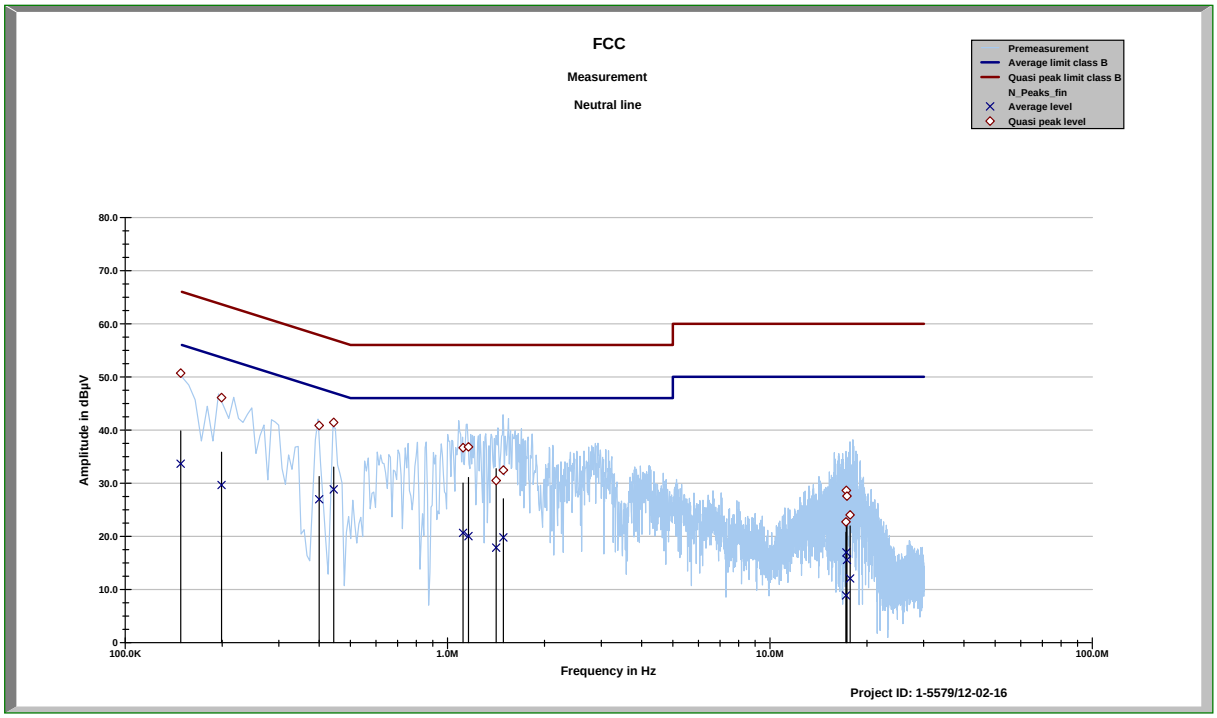
FCC
Phase line tbl

Project ID: 1-5579/12-02-33

01:58:36 PM, Thursday, February 28, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.41168	38.89	18.72	37.71	10.82
0.43466	39.23	17.94	37.54	10.33
0.77974	30.94	25.06	28.63	17.37
0.7807	30.59	25.41	27.23	18.77
1.14802	32.45	23.55	28.94	17.06
1.4781	29.66	26.34	23.42	22.58
2.4551	27.82	28.18	19.29	26.71
2.4866	29.49	26.51	24.01	21.99

Project ID - 1-5579/12-02-33
EUT - RFM121LW
Serial Number - 990002430024636
Operating mode - W-LAN a-mode + 2x charging; 115V AC/60Hz



FCC
Neutral line tbl

Project ID: 1-5579/12-02-33

01:58:36 PM, Thursday, February 28, 2013

Frequency	Quasi peak level	Margin quasi peak	Average level	Margin average
MHz	dBµV	dBµV	dBµV	dBµV
0.14874	50.70	NAN	33.66	NAN
0.19902	46.09	17.56	29.65	24.95
0.39975	40.86	16.99	26.97	21.89
0.4435	41.43	15.56	28.84	18.78
1.11728	36.67	19.33	20.65	25.35
1.161	36.83	19.17	20.04	25.96
1.4156	30.48	25.52	17.87	28.13
1.4896	32.45	23.55	19.79	26.21
17.204	22.72	37.28	8.86	41.14
17.237	28.63	31.37	16.97	33.03
17.317	27.57	32.43	15.58	34.42
17.716	24.04	35.96	12.07	37.93

Project ID - 1-5579/12-02-33
EUT - RFM121LW
Serial Number - 990002430024636
Operating mode - W-LAN a-mode + 2x charging; 115V AC/60Hz

10 Test equipment and ancillaries used for tests

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

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

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	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.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
4	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	09.01.2013	09.01.2014
5	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
6	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
7	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
8	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
9	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
10	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	12.04.2012	12.04.2014
11	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	16.01.2013	16.01.2014
12	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
13	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	11.05.2011	11.05.2013
14	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
15	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
16	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
17	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
18	9	Isolating Transformer	MPL IEC625 Bus Regeltrennt ravo	Erfi	91350	300001155	ne		
19	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
20	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
21	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
22	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vlKI!	14.10.2011	14.10.2014
23	n. a.	MXE EMI	N9038A	Agilent	MY51210197	300004405	k	21.02.2013	21.02.2014

		Receiver 20 Hz bis 26,5 GHz		Technologies					
24	CR 79	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751	ne		
25	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
26	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
27	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		
28	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	Ve	09.10.2012	09.10.2014
29	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503 070-XX	CERNEX	19338	300004273	ne		
30	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.10.2012	22.10.2013

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

11 Observations

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

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-03-27
-A	Addition of PIN	2013-04-02
-B	Changed standard version	2013-04-04

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

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 18.01.2013 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 80 Seiten.

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

Frankfurt am Main, 18.01.2013

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

Siehe Hinweise 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 Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in unveränderter Form.

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

Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom 31. Juli 2009 (BGBl. I S. 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.

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