
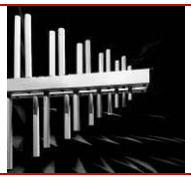
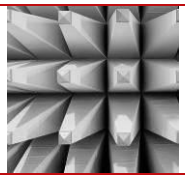

CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-6234/13-03-23-C

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

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

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:	**RFX101LW**	
FCC ID:	**L6ARFX100LW**	
Frequency:	UNII bands:	5150 MHz to 5250 MHz 5250 MHz to 5350 MHz 5470 MHz to 5725 MHz
Technology tested:	WLAN (OFDM / a & n HT20 – mode)	
Antenna:	Integrated antenna	
Power supply:	3.8 V DC by Li-Polymer battery	

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:

p.o. Geraldy Karsten

DN: cn=Karsten Geraldy, o=Cetecom ICT Services GmbH, ou=GER-101125, email=karsten.geraldy@cetecom.com, c=DE
Datum: 2013.08.20 17:24:20 +02'00'

Stefan Bös
Senior Testing Manager

Test performed:

A. Luckenbill

cn=Andreas Luckenbill, o=CETECOM ICT Services GmbH, ou=LUC-111202, email=andreas.luckenbill@cetecom.com, c=DE
2013.08.20 17:18:49 +02'00'

Andreas Luckenbill
Expert

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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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:	2013-05-29
Date of receipt of test item:	2013-07-08
Start of test:	2013-07-08
End of test:	2013-07-19
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	01.10.2012	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices

3.1 Measurement guidance

UNII: KDB 789033	2013-04	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}	no tests under extreme conditions
	T_{min}	no tests under extreme conditions
Relative humidity content:		55 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.8 V DC by Li-Polymer battery
	V_{max}	no tests under extreme conditions
	V_{min}	no tests under extreme conditions

5 Test item

Kind of test item	**:**	**Blackberry GSM Phones**
Type identification	**:**	**RFX101LW**
S/N serial number	**:**	**Radiated units: IMEI: 004402242373268**
HW hardware status	**:**	**CER-54735-001Rev2-04-02**
SW software status	**:**	**OS: 10.2.0.519** **Build: 546773**
Frequency band [MHz]	**:**	**UNII bands: 5150 MHz to 5250 MHz** **5250 MHz to 5350 MHz** **5470 MHz to 5725 MHz** **(lowest channel 36 – 5180 MHz, highest channel 140 – 5700 MHz)**
Type of radio transmission **Use of frequency spectrum**	**:** **:**	**OFDM**
Type of modulation	**:**	**BPSK, QPSK, 16 – QAM & 64 – QAM**
Number of channels	**:**	**17**
Antenna	**:**	**Integrated antenna**
Power supply	**:**	**3.8 V DC by Li-Polymer battery**

5.1 Additional information

Test setup- and EUT-photos are included in test report: 1-6234/13-03-01-AnnexA
1-6234/13-03-01-AnnexD

All tests are made according RIM testplan:
RIM_EMI_Matrix for Cetecom_RFX101LW-Revised (July-11-2013).xlsx

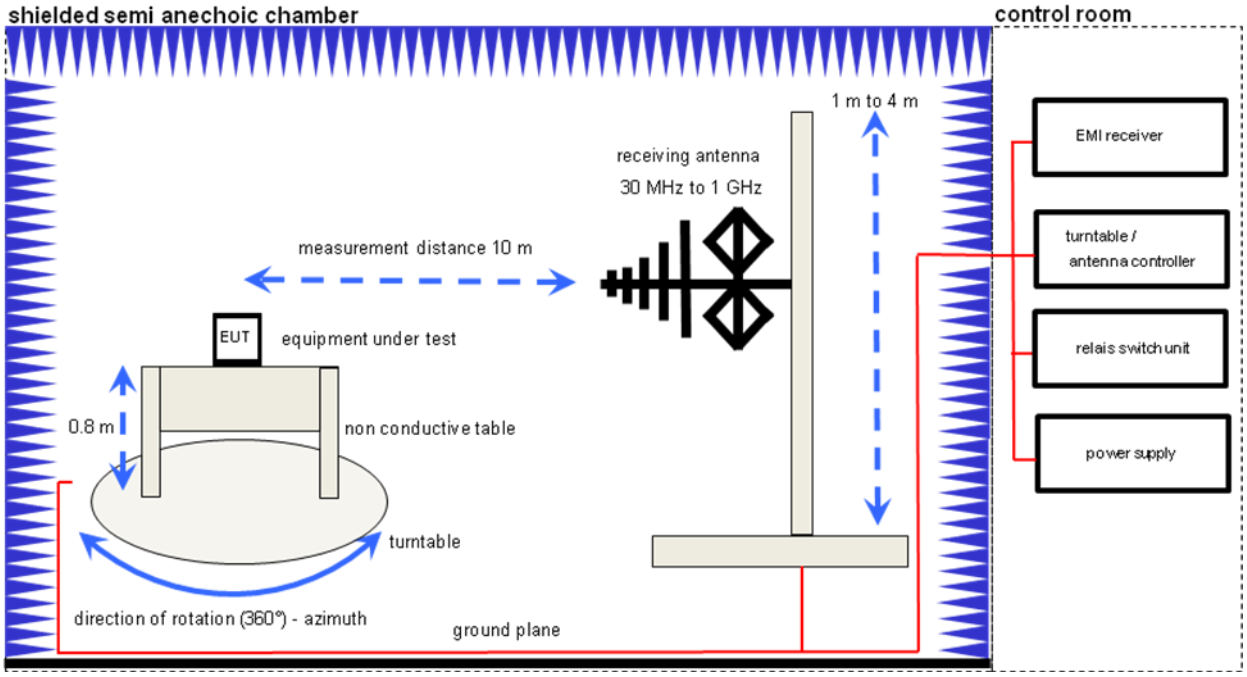
6 Test laboratories sub-contracted

None

7 Description of the test setup

7.1 Radiated measurements chamber F

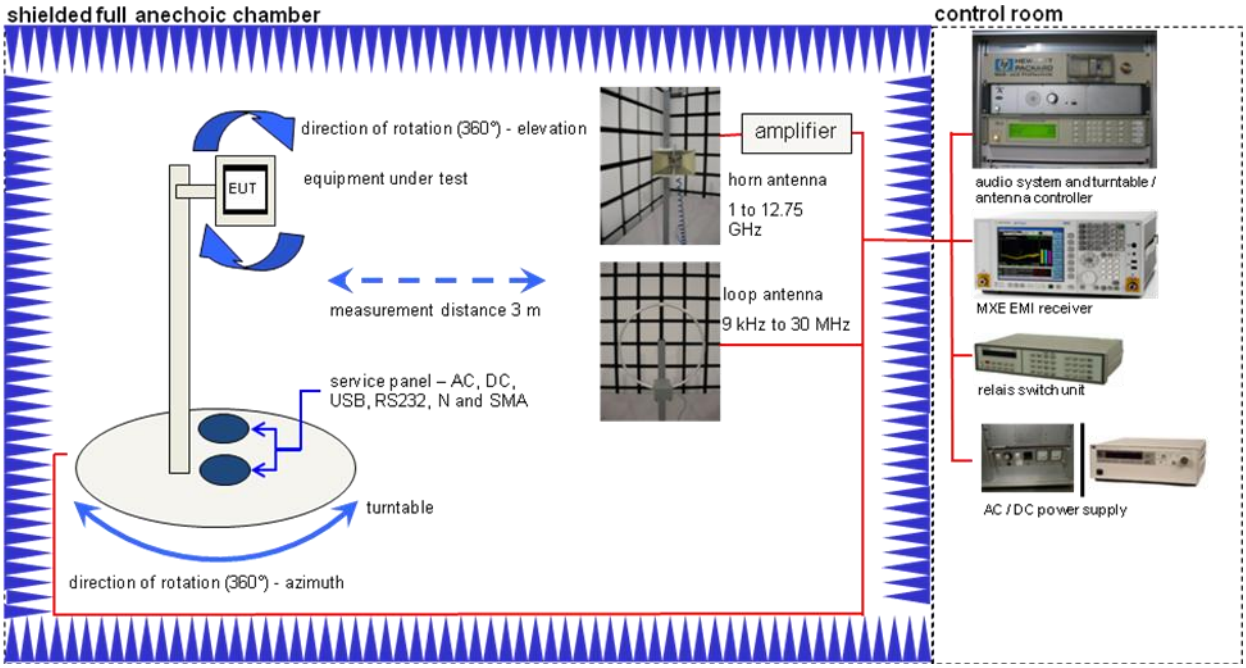
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368
DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580
EMI Test Receiver	ESCI 3	R&S	100083	300003312
Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379
Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745
Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746
Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787

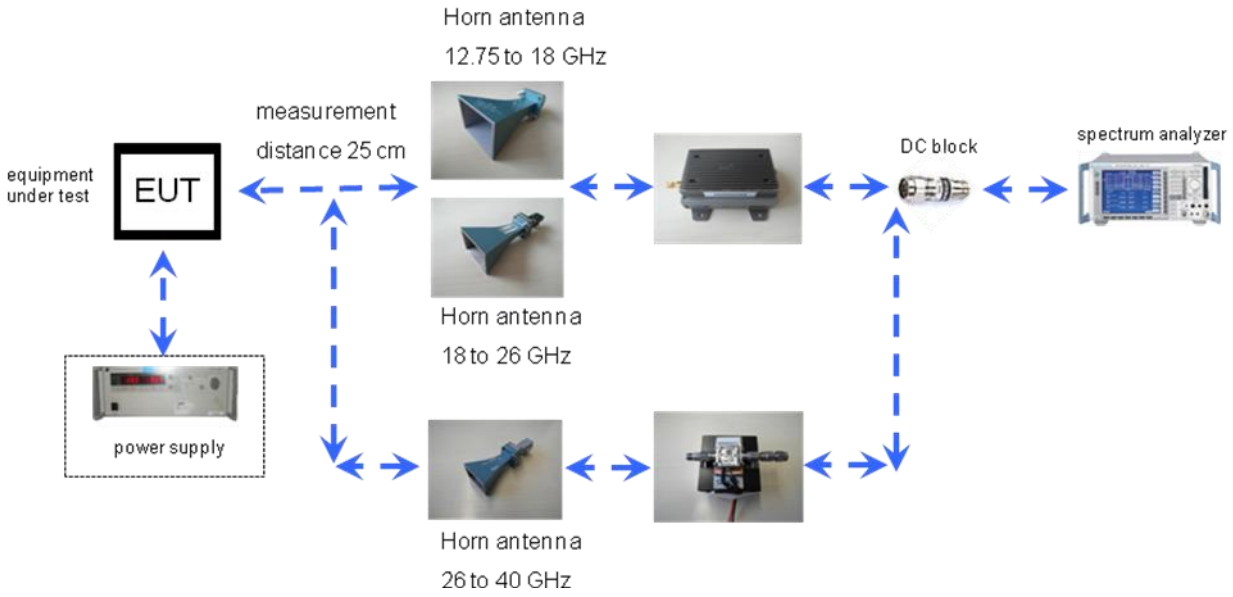
7.2 Radiated measurements chamber C



Equipment table:

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

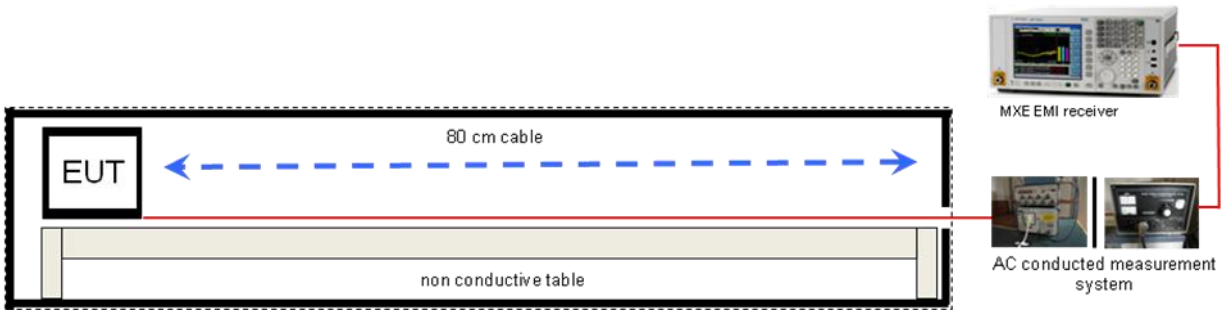
7.3 Radiated measurements 12.75 GHz to 40 GHz



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002440
Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001752
Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273
Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517

7.4 AC conducted



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001168

8 Summary of measurement results

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

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15	Passed	2013-08-20	Reduced test plan. All tests are made according RIM test plan!

Test specification clause	Test case	Temperature conditions	Power source voltages	Pass	Fail	NA	NP	Remark
-/-	Output power verification (conducted)	Nominal	Nominal	☐	☐	☐	☒	-/-
-/-	Gain	Nominal	Nominal	☐	☐	☐	☒	-/-
U-NII Part 15	Duty cycle	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) -210	Maximum output power (conducted & radiated)	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) -210	Power spectral density	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) -210	Spectrum bandwidth 26dB bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) -210	Peak excursion measurements	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.205 -210	Band edge compliance radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.407(b) -210	TX spurious emissions radiated	Nominal	Nominal	☒	☐	☐	☐	complies
§15.109 -Gen	RX spurious emissions radiated	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.209(a) -Gen	Spurious emissions radiated < 30 MHz	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.107(a)	Spurious emissions conducted emissions < 30 MHz	Nominal	Nominal	☐	☐	☐	☒	-/-

Note: NA = Not Applicable; NP = Not Performed

9 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode: ☐ No test mode available.

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

10 Measurement results

10.1 Output power verification (conducted)

Not performed! Tests according to manufacturer tests plan!

10.2 Gain

Not performed! Tests according to manufacturer tests plan!

10.3 Duty cycle

Not performed! Tests according to manufacturer tests plan!

10.4 Maximum output power conducted and radiated

Not performed! Tests according to manufacturer tests plan!

10.5 Power spectral density

Not performed! Tests according to manufacturer tests plan!

10.6 Spectrum bandwidth – 26 dB bandwidth

Not performed! Tests according to manufacturer tests plan!

10.7 Peak excursion measurements

Not performed! Tests according to manufacturer tests plan!

10.8 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:

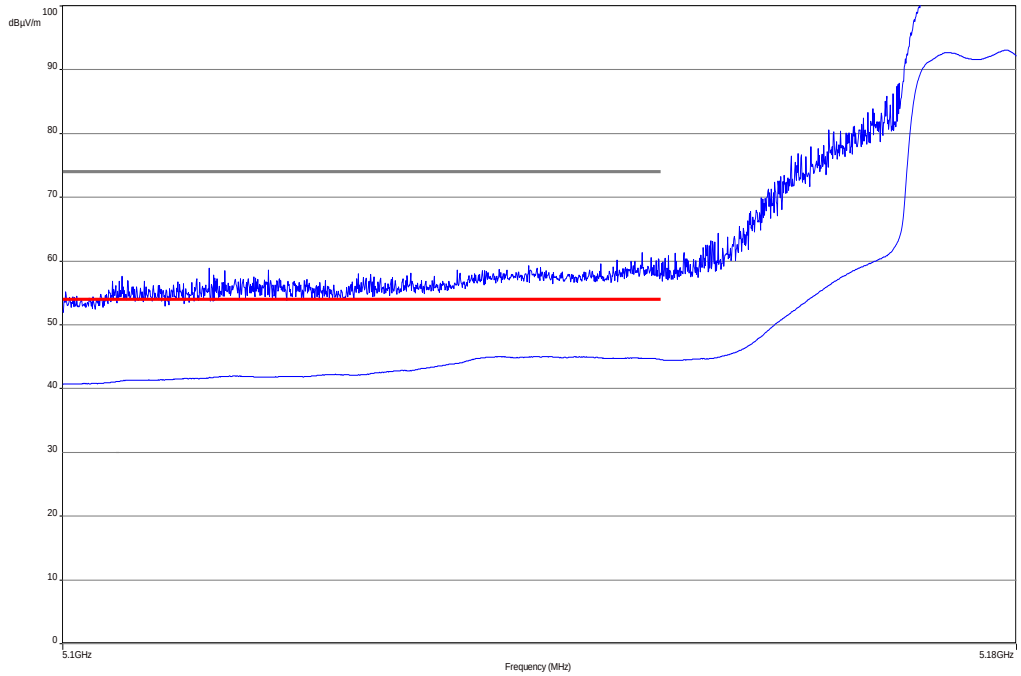
Band Edge Compliance Radiated
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within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

Result:

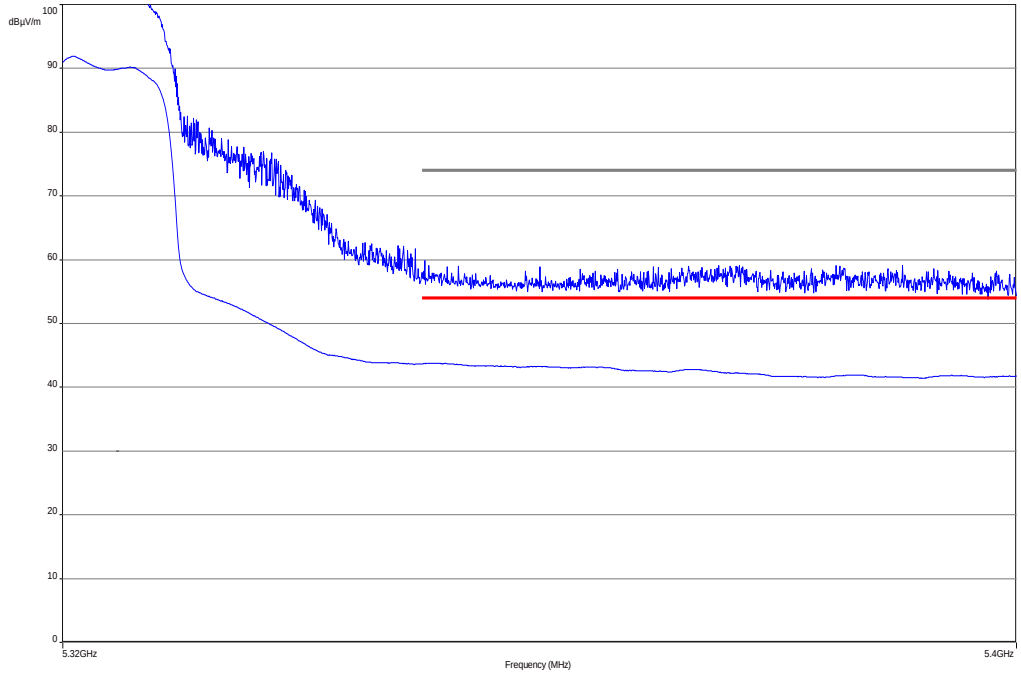
Scenario	Band Edge Compliance Radiated
band edge; a mode; channel 36	61.3 dBµV/m (PEAK) 45.0 dBµV/m (AVG)
band edge; a mode; channel 64	61.7 dBµV/m (PEAK) 43.8 dBµV/m (AVG)
band edge; a mode; channel 100	62.1 dBµV/m (PEAK) 45.7 dBµV/m (AVG)
band edge; a mode; channel 140	Value: -40 dBm Limit: -27 dBm
band edge; n mode; channel 36	61.7 dBµV/m (PEAK) 45.4 dBµV/m (AVG)
band edge; n mode; channel 64	63.4 dBµV/m (PEAK) 44.4 dBµV/m (AVG)
band edge; n mode; channel 100	61.0 dBµV/m (PEAK) 45.3 dBµV/m (AVG)
band edge; n mode; channel 140	Value: -39.6 dBm Limit: -27 dBm
Measurement uncertainty	± 3 dB

Plots:

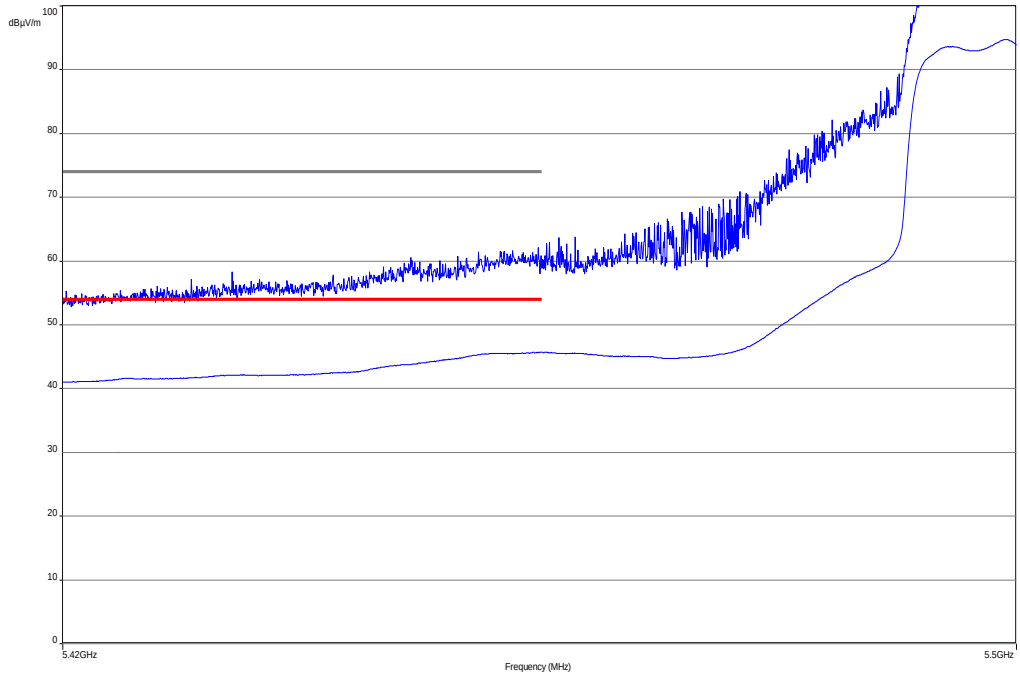
Plot 1: lower band edge, vertical & horizontal polarization (a mode), channel 36



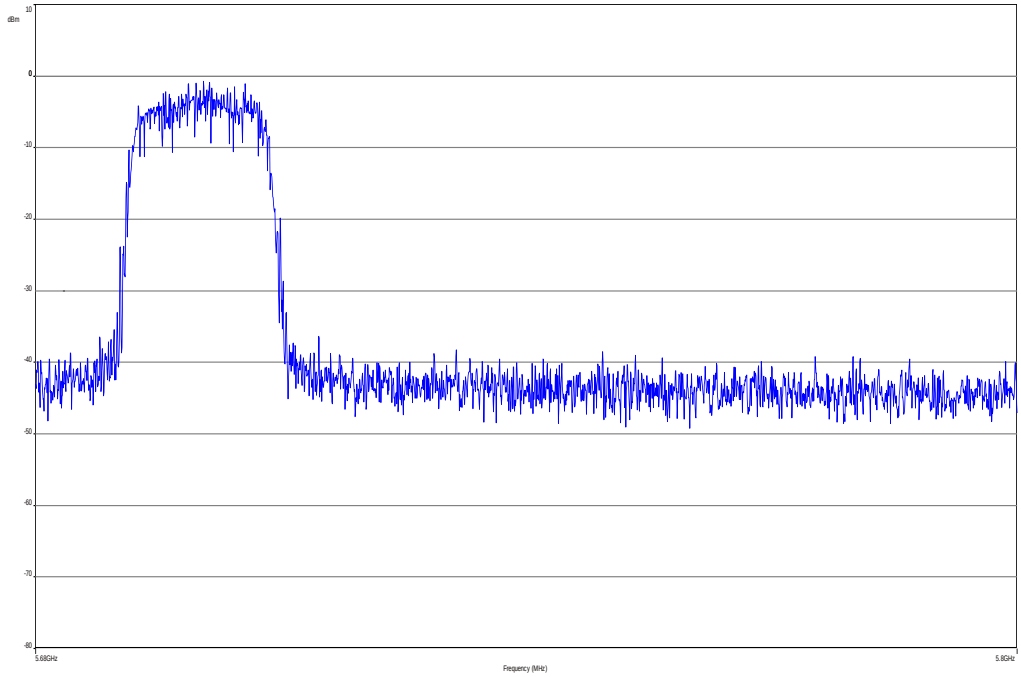
Plot 2: upper band edge, vertical & horizontal polarization (a mode), channel 64



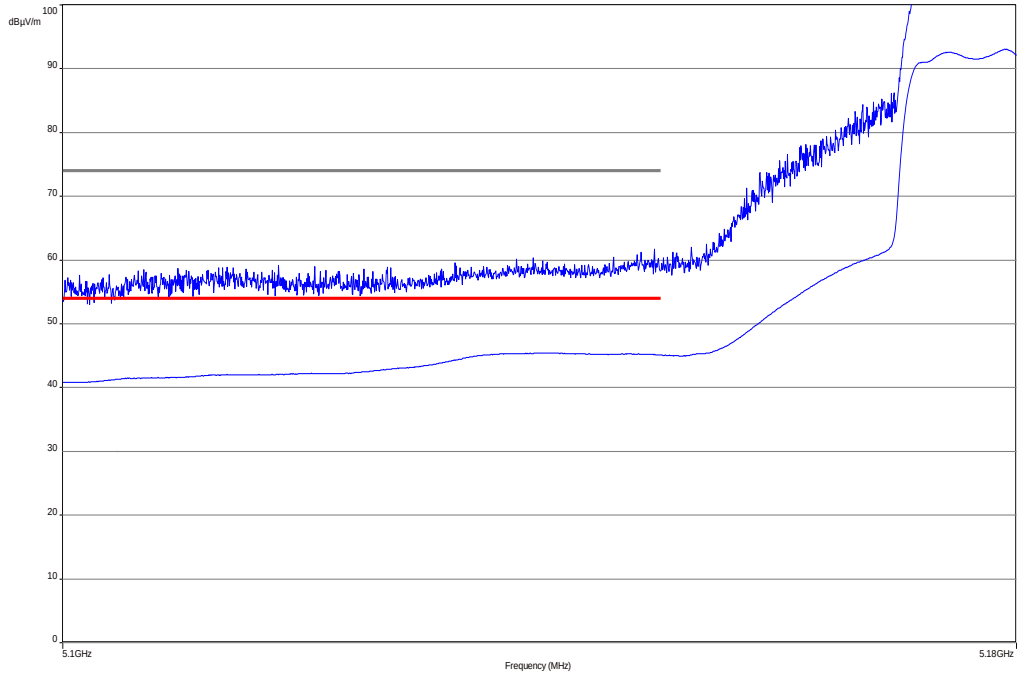
Plot 3: lower band edge, vertical & horizontal polarization (a mode), channel 100



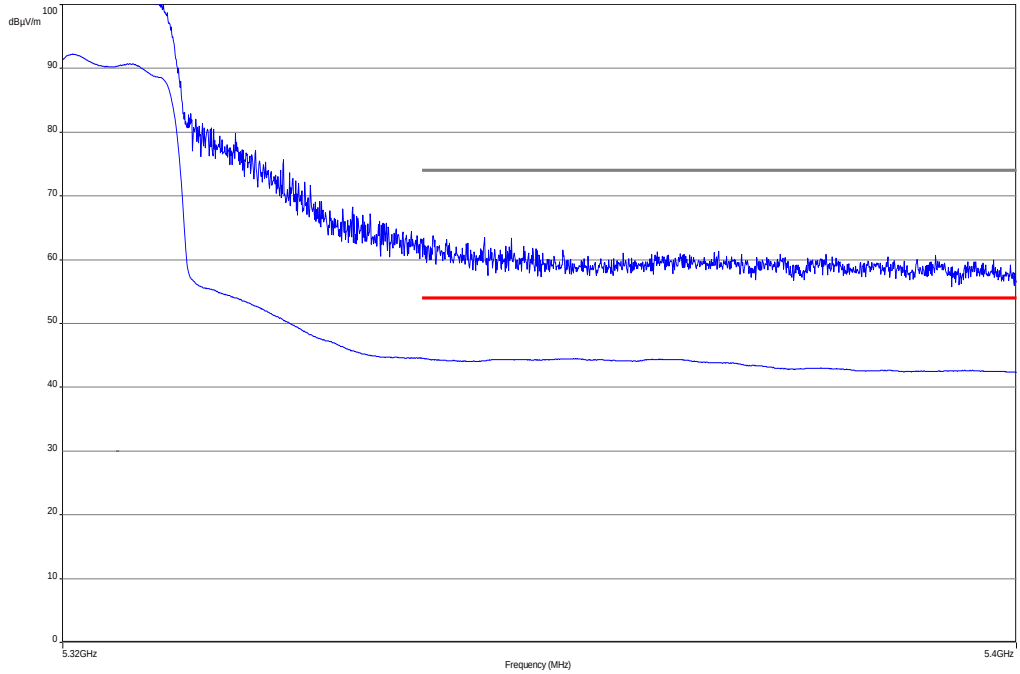
Plot 4: upper band edge, vertical & horizontal polarization (a mode), channel 140



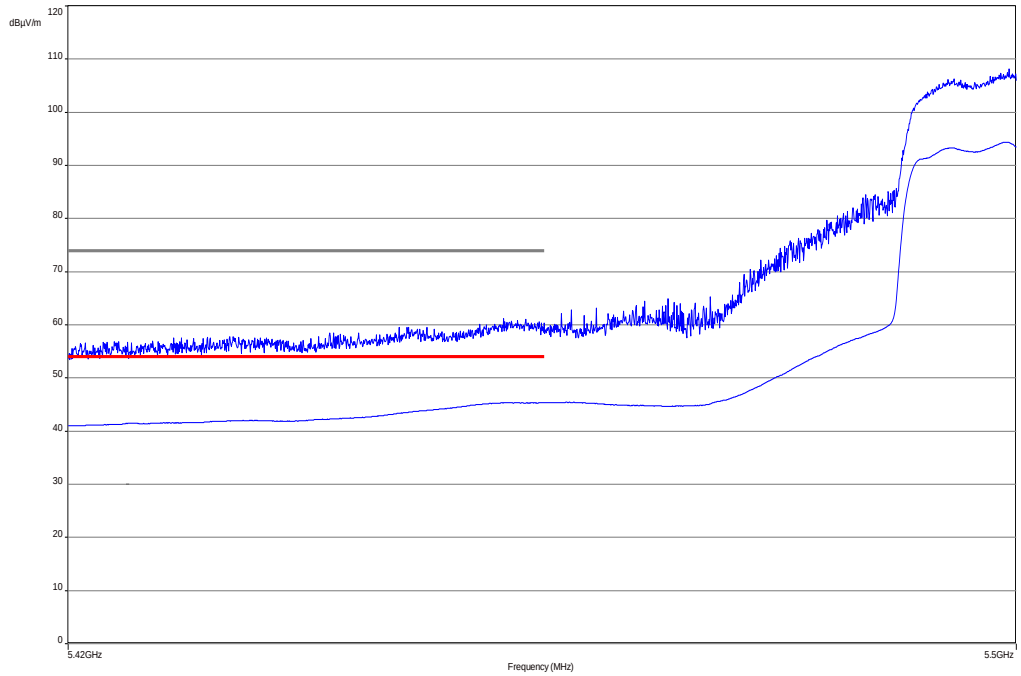
Plot 5: lower band edge, vertical & horizontal polarization (n HT 20 mode), channel 36



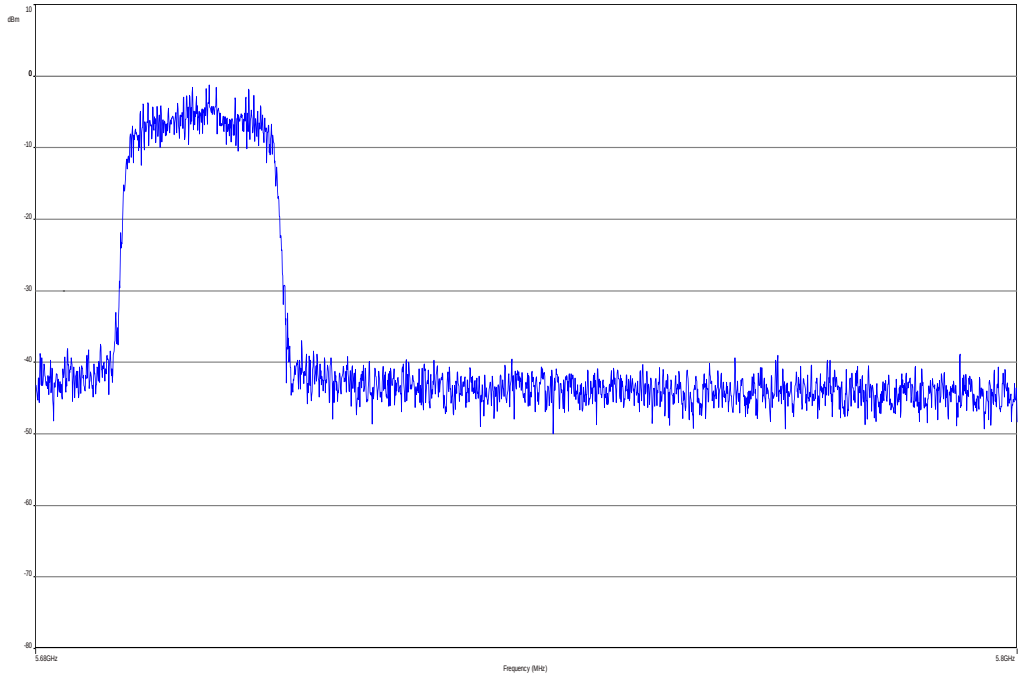
Plot 6: upper band edge, vertical & horizontal polarization (n HT 20 mode), channel 64



Plot 7: lower band edge, vertical & horizontal polarization (n HT 20 mode), channel 100



Plot 8: upper band edge, vertical & horizontal polarization (n HT 20 mode), channel 140



Result: **Passed**

10.9 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			Middle 5240 MHz			Highest 5320 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 10 dB below the limit!			All detected emissions are more than 10 dB below the limit!			All detected emissions are more than 10 dB below the limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM a – mode								
Lowest 5500 MHz						Highest 5700 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 10 dB below the limit!						All detected emissions are more than 10 dB below the 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			Middle 5240 MHz			Highest 5320 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 10 dB below the limit!			All detected emissions are more than 10 dB below the limit!			All detected emissions are more than 10 dB below the limit!		
Measurement uncertainty			± 3 dB					

TX Spurious Emissions Radiated [dBµV/m] / dBm								
OFDM n – mode HT20								
Lowest 5500 MHz						Highest 5700 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 10 dB below the limit!						All detected emissions are more than 10 dB below the limit!		
Measurement uncertainty			± 3 dB					

Result: **Passed**

Plots: OFDM / a – mode

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

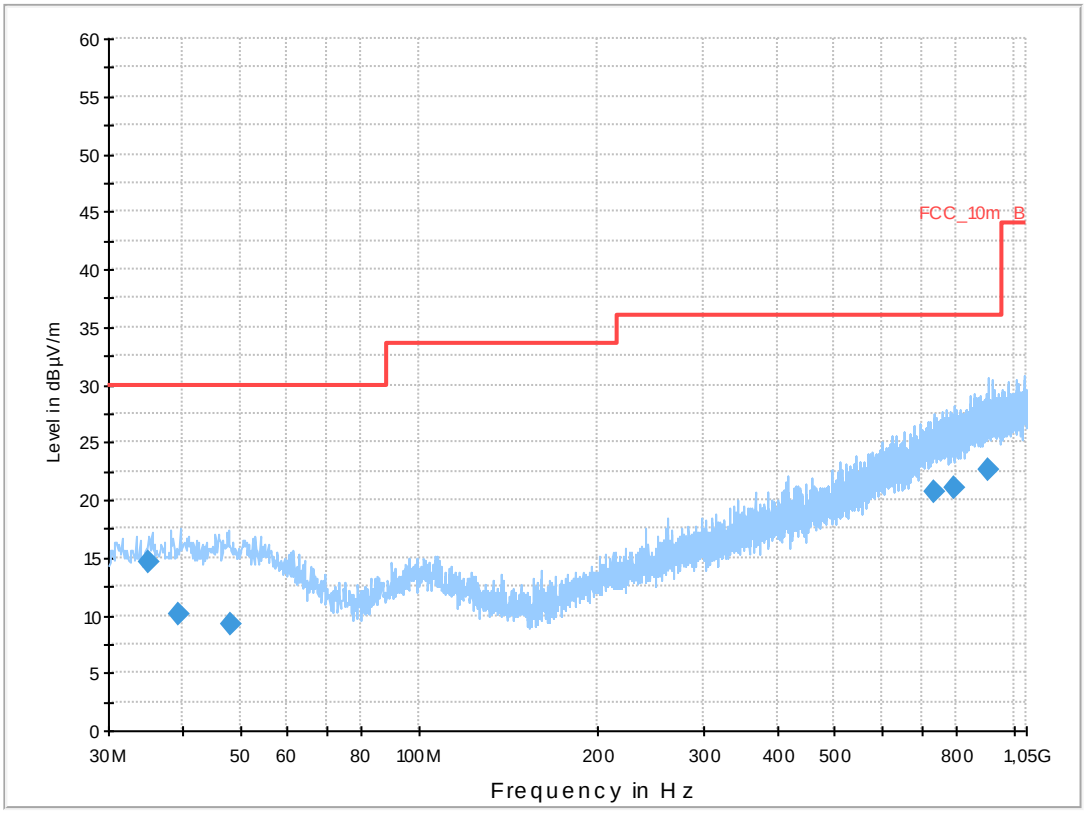
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373360
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	TX WLAN a-mode, 6 Mbit/s, Ch. 36
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

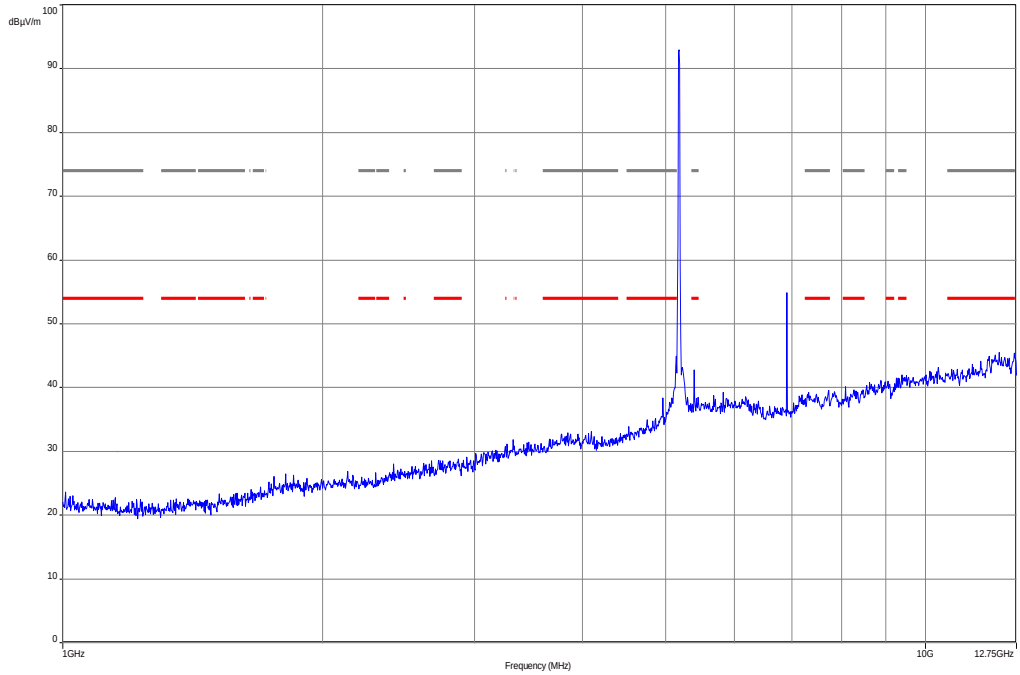
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



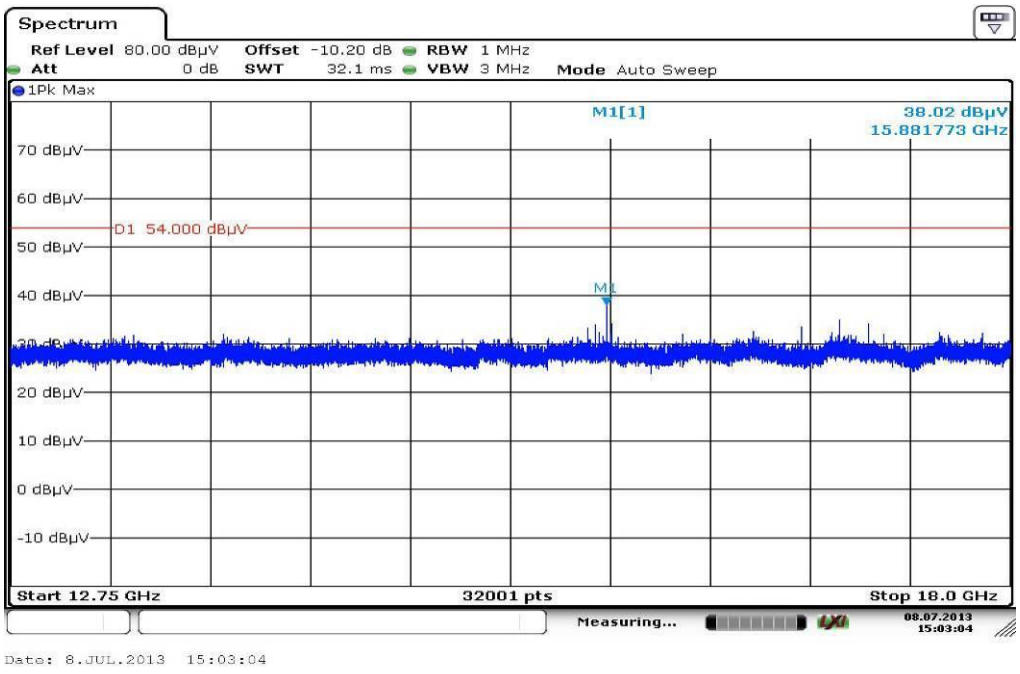
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.030400	14.7	1000.0	120.000	98.0	V	190.0	13.0	15.3	30.0	
39.420000	10.1	1000.0	120.000	170.0	H	100.0	13.4	19.9	30.0	
48.153150	9.3	1000.0	120.000	170.0	H	270.0	13.3	20.7	30.0	
733.403850	20.8	1000.0	120.000	170.0	H	80.0	23.3	15.2	36.0	
792.489150	21.1	1000.0	120.000	170.0	H	85.0	23.8	14.9	36.0	
908.742450	22.6	1000.0	120.000	170.0	H	182.0	25.2	13.4	36.0	

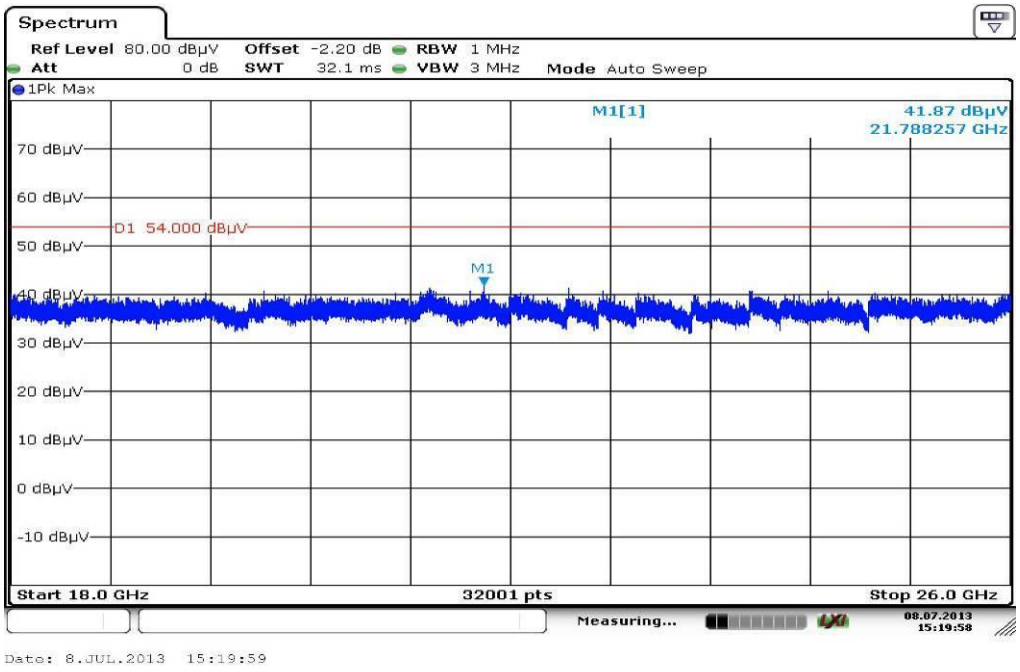
Plot 2: 1 GHz to 12.75 GHz, 5180 MHz, vertical & horizontal polarization



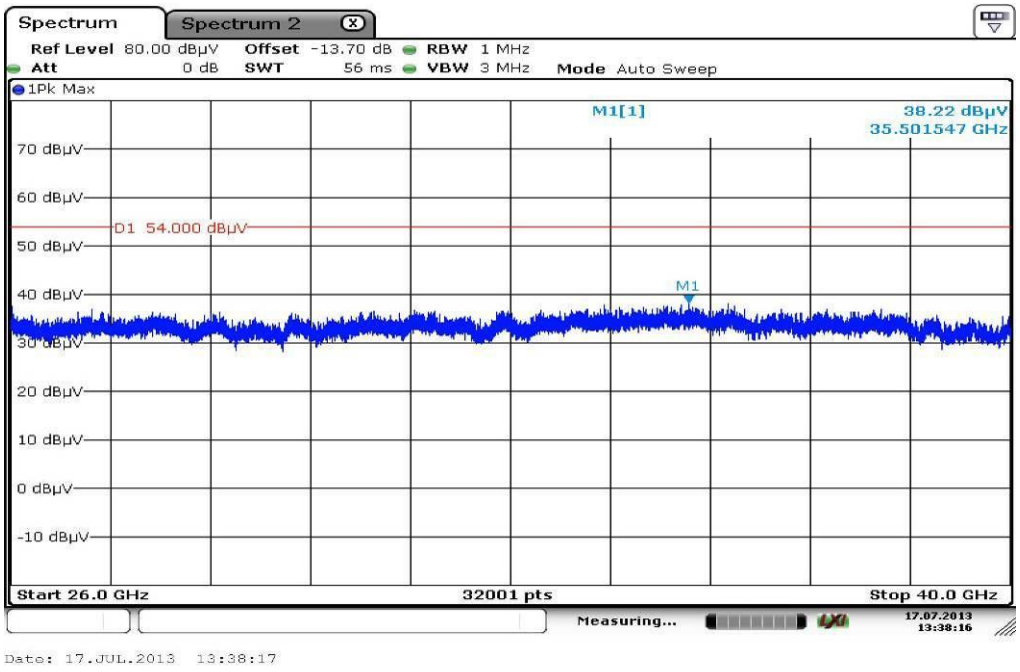
Plot 3: 12 GHz to 18 GHz, 5180 MHz, vertical & horizontal polarization



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

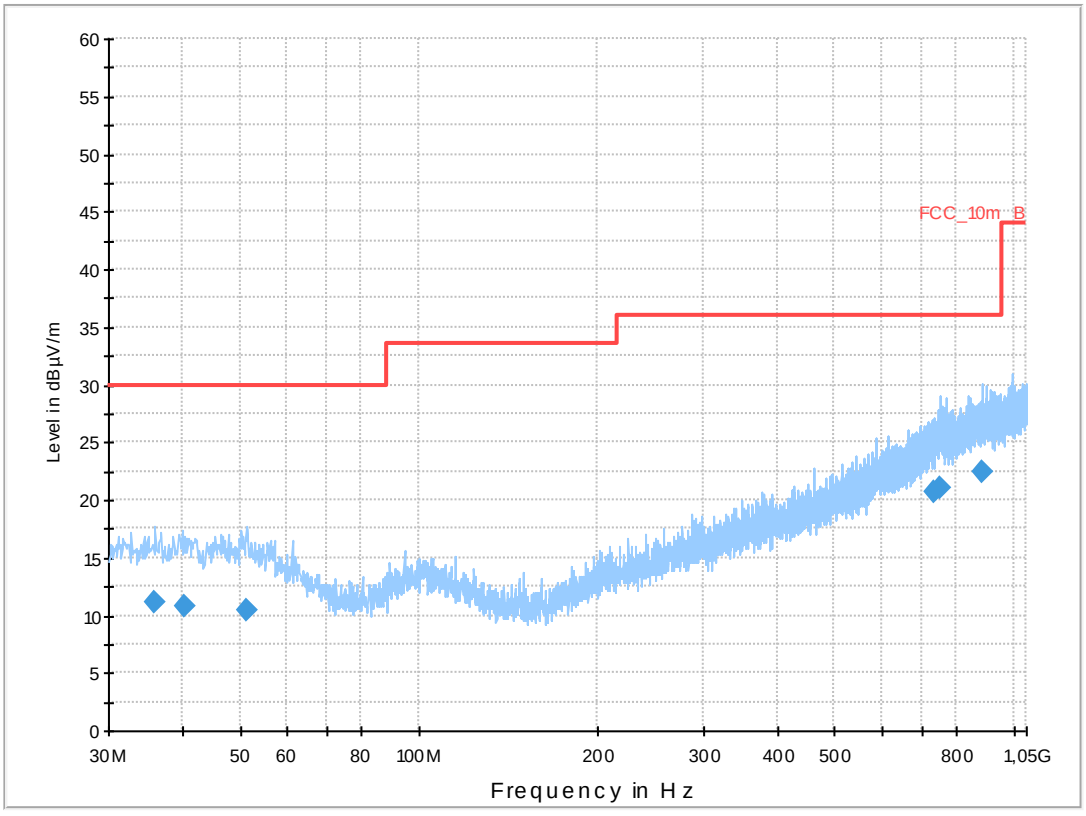
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373360
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	TX WLAN a-mode, 6 Mbit/s, Ch. 48
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

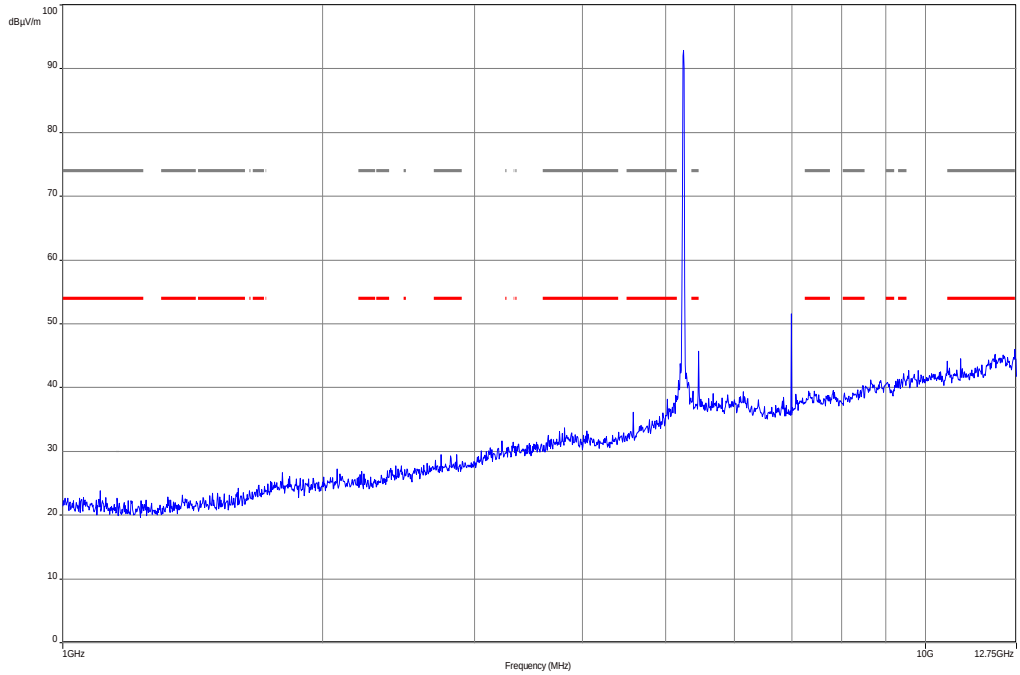
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



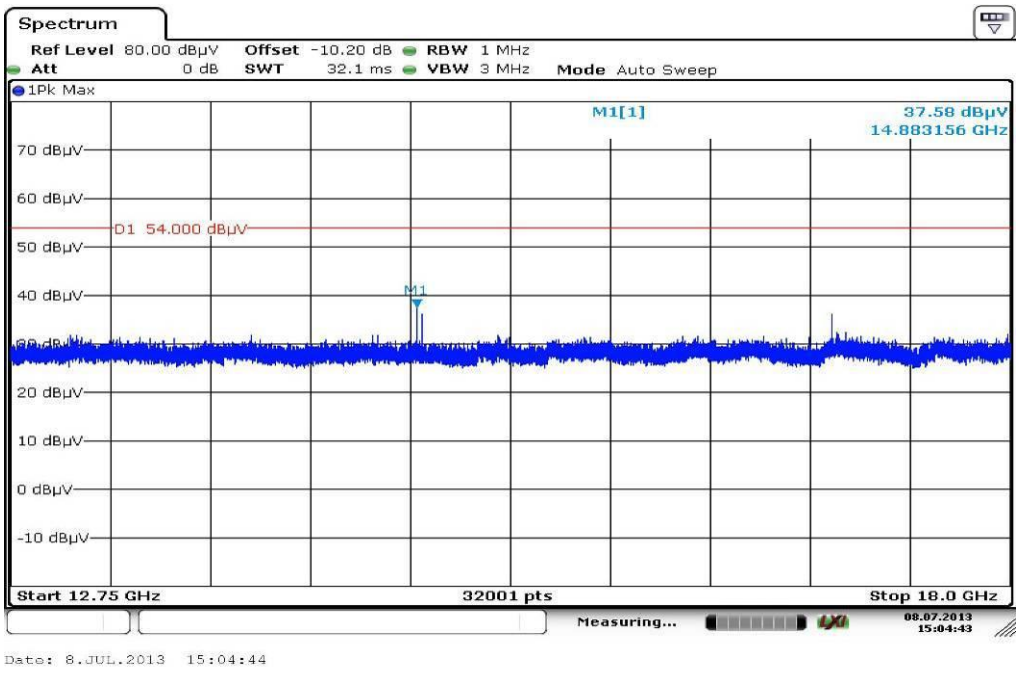
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.782950	11.1	1000.0	120.000	170.0	V	171.0	13.1	18.9	30.0	
40.355100	10.7	1000.0	120.000	143.0	H	92.0	13.4	19.3	30.0	
51.368850	10.4	1000.0	120.000	170.0	H	261.0	13.2	19.6	30.0	
733.095450	20.7	1000.0	120.000	170.0	V	280.0	23.3	15.3	36.0	
754.073550	21.0	1000.0	120.000	170.0	V	190.0	23.7	15.0	36.0	
888.525150	22.5	1000.0	120.000	170.0	V	-9.0	25.1	13.5	36.0	

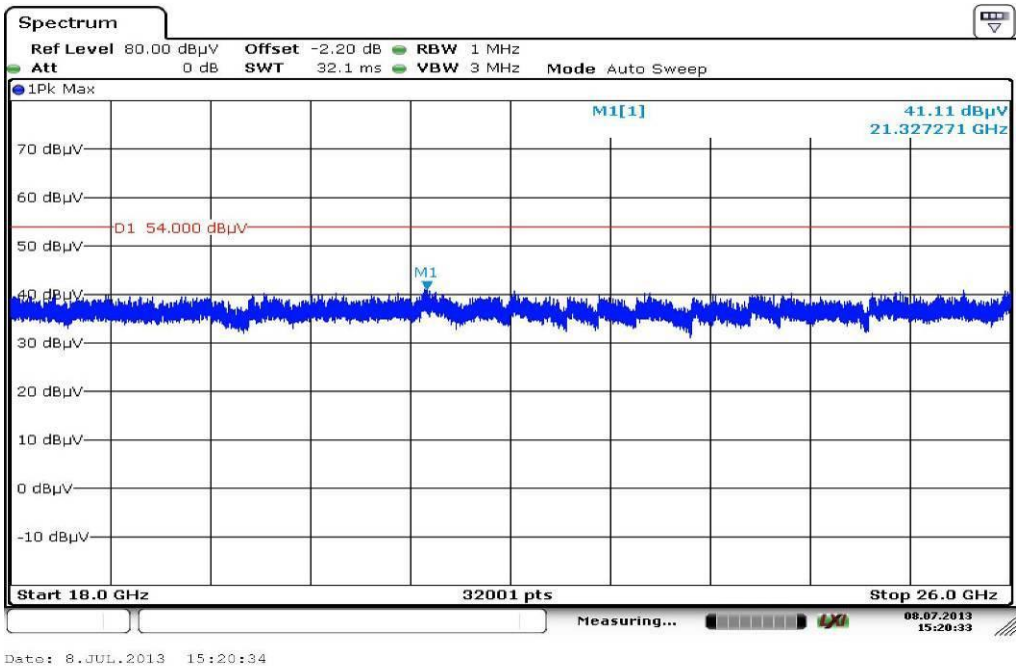
Plot 7: 1 GHz to 12.75 GHz, 5240 MHz, vertical & horizontal polarization



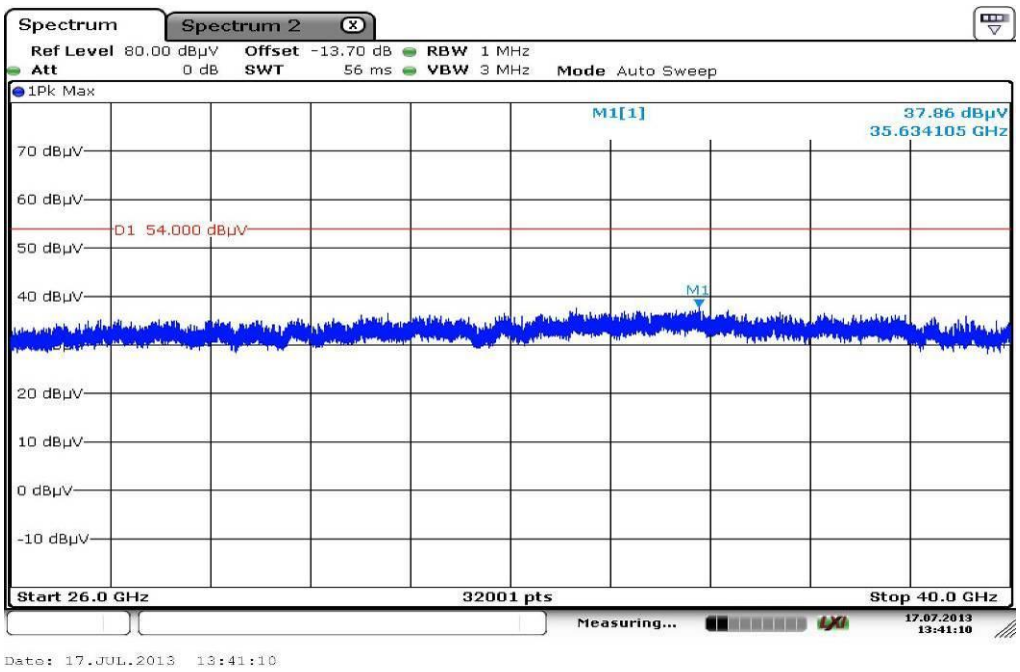
Plot 8: 12 GHz to 18 GHz, 5240 MHz, vertical & horizontal polarization



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



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



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

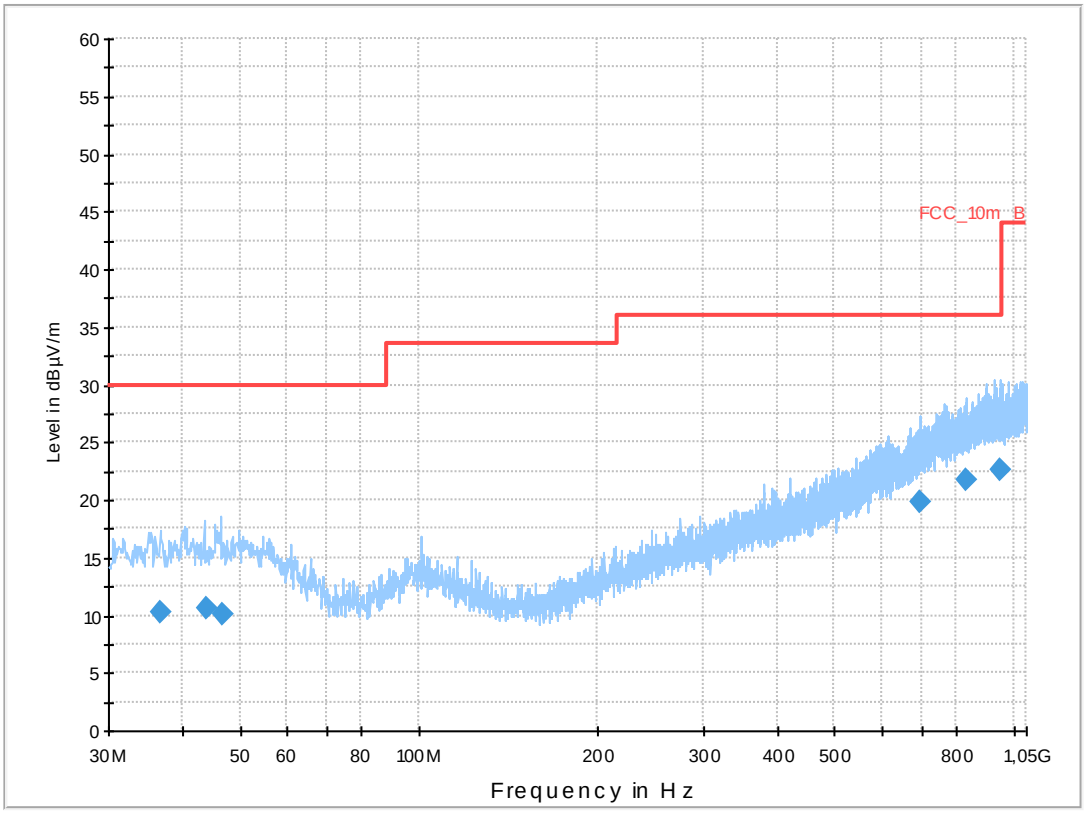
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373360
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	TX WLAN a-mode, 6 Mbit/s, Ch. 64
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

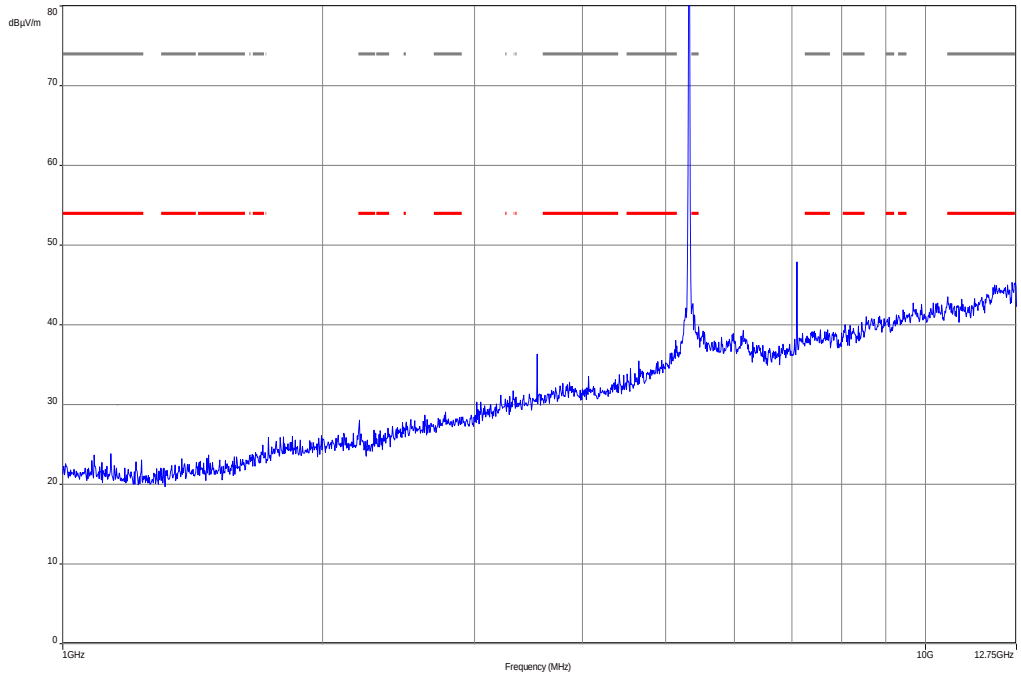
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



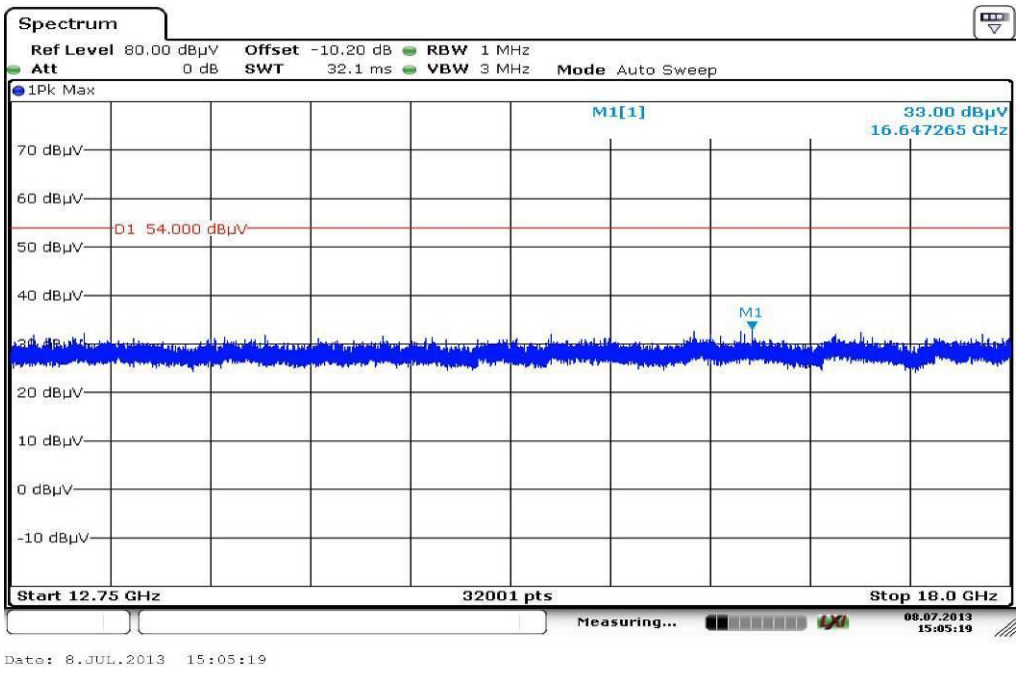
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.647250	10.3	1000.0	120.000	170.0	H	2.0	13.2	19.7	30.0	
43.791000	10.6	1000.0	120.000	170.0	V	170.0	13.3	19.4	30.0	
46.759950	10.1	1000.0	120.000	120.0	H	280.0	13.3	19.9	30.0	
697.589850	19.9	1000.0	120.000	132.0	V	100.0	22.4	16.1	36.0	
829.392300	21.7	1000.0	120.000	170.0	V	90.0	24.2	14.3	36.0	
950.342100	22.6	1000.0	120.000	170.0	V	182.0	25.4	13.4	36.0	

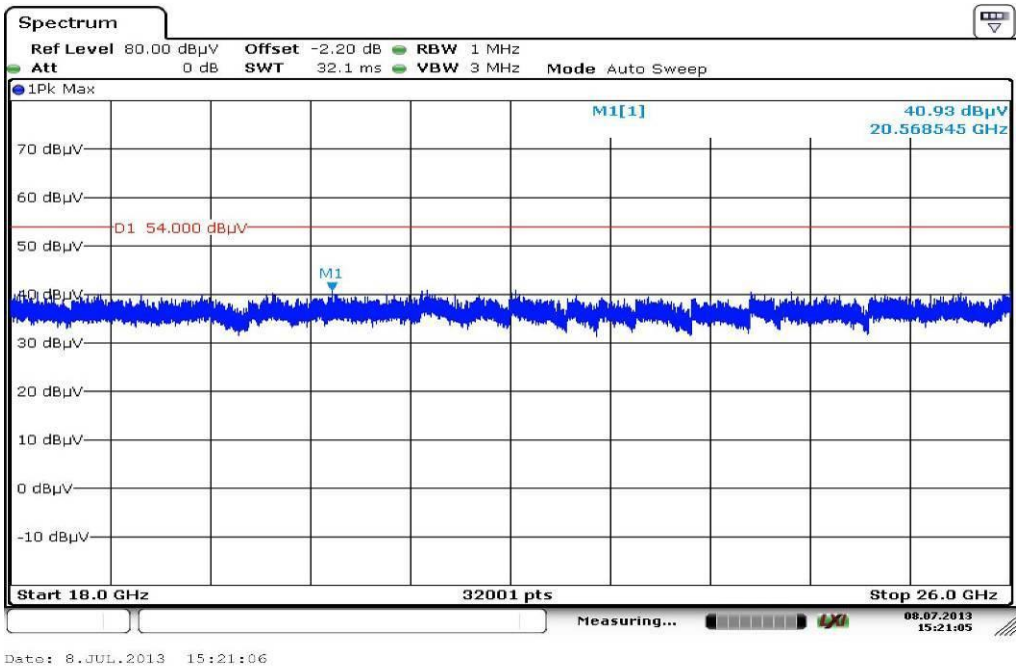
Plot 12: 1 GHz to 12.75 GHz, 5320 MHz, vertical & horizontal polarization



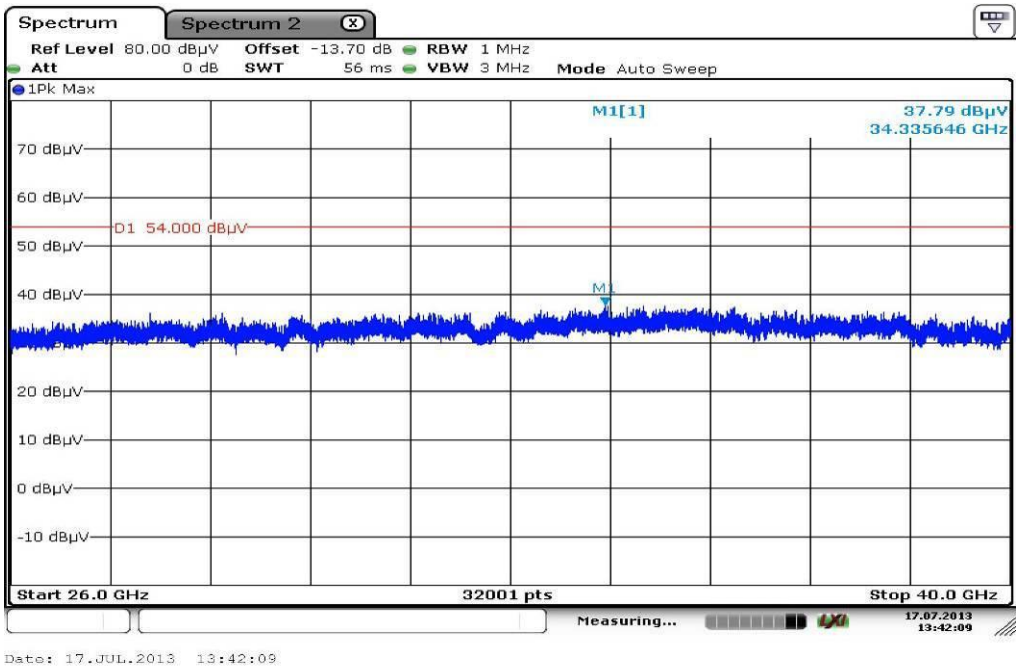
Plot 13: 12 GHz to 18 GHz, 5320 MHz, vertical & horizontal polarization



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

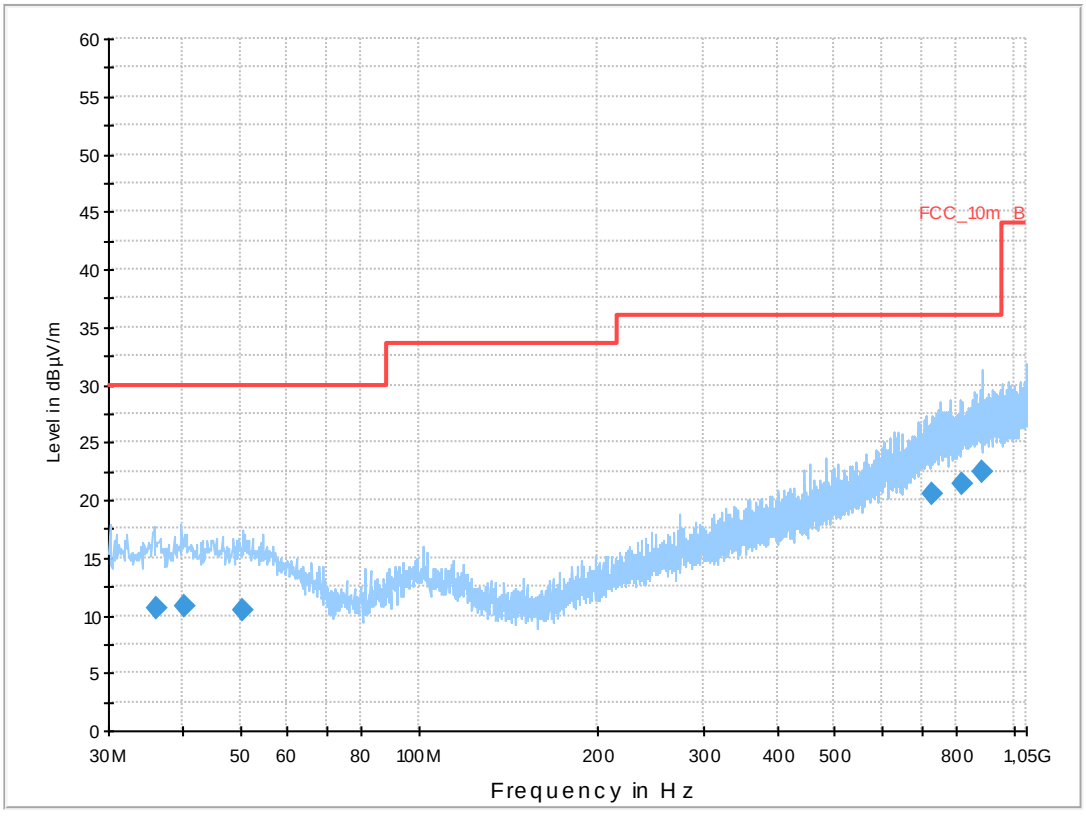
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373360
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	TX WLAN a-mode, 6 Mbit/s, Ch. 100
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

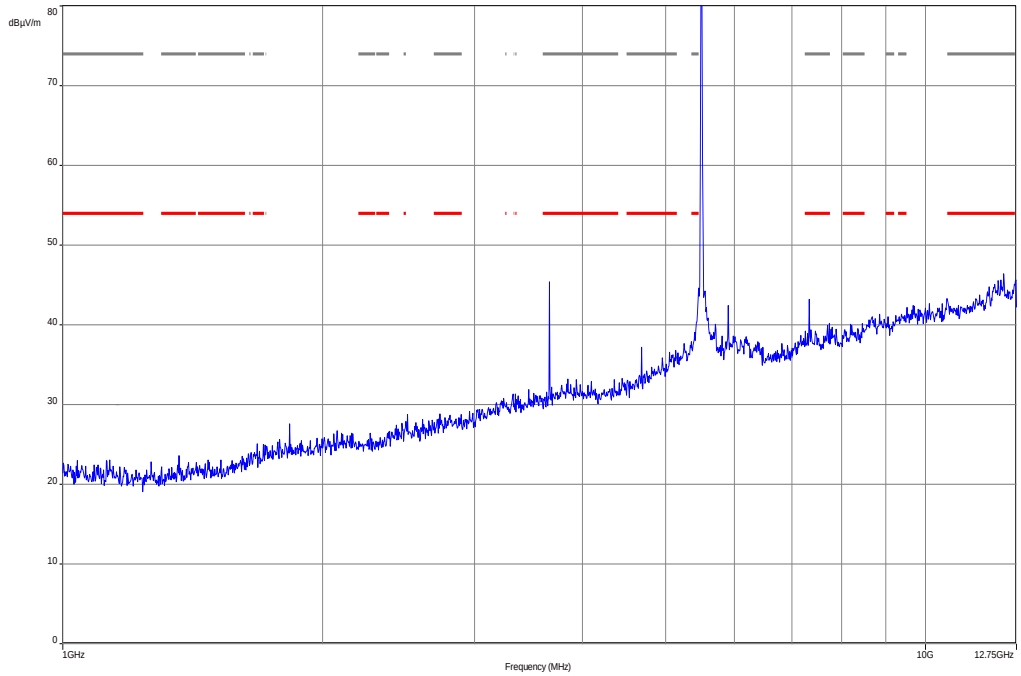
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



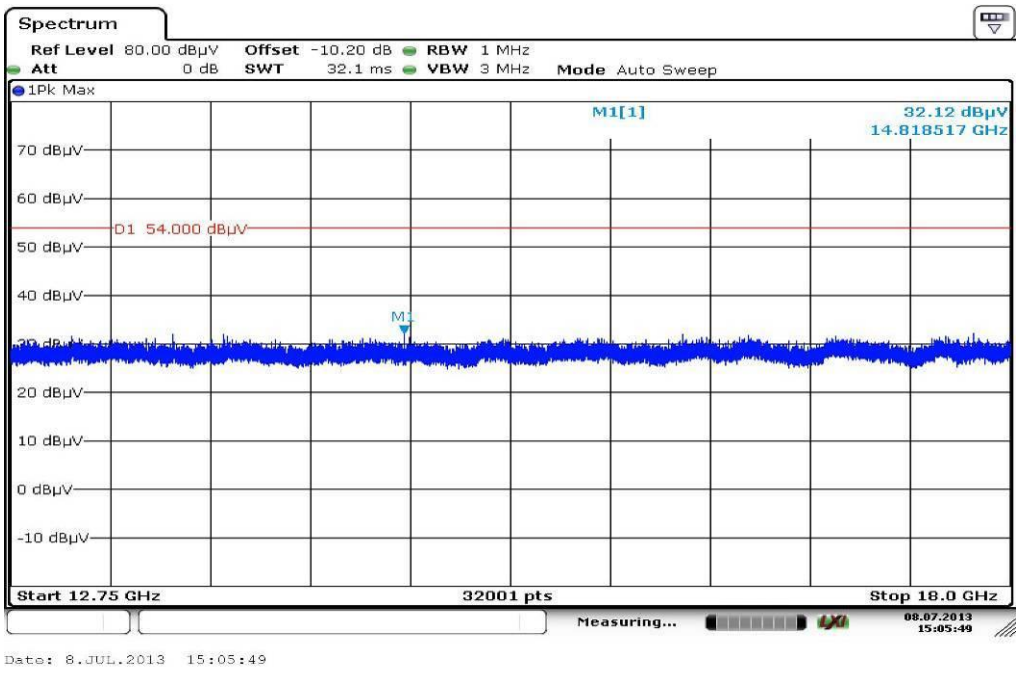
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.164400	10.5	1000.0	120.000	170.0	H	85.0	13.1	19.5	30.0	
40.250100	10.7	1000.0	120.000	98.0	V	2.0	13.4	19.3	30.0	
50.583900	10.5	1000.0	120.000	170.0	V	-9.0	13.3	19.5	30.0	
728.118750	20.6	1000.0	120.000	170.0	H	-5.0	23.2	15.4	36.0	
816.053550	21.4	1000.0	120.000	170.0	V	280.0	24.0	14.6	36.0	
885.274050	22.5	1000.0	120.000	170.0	H	2.0	25.0	13.5	36.0	

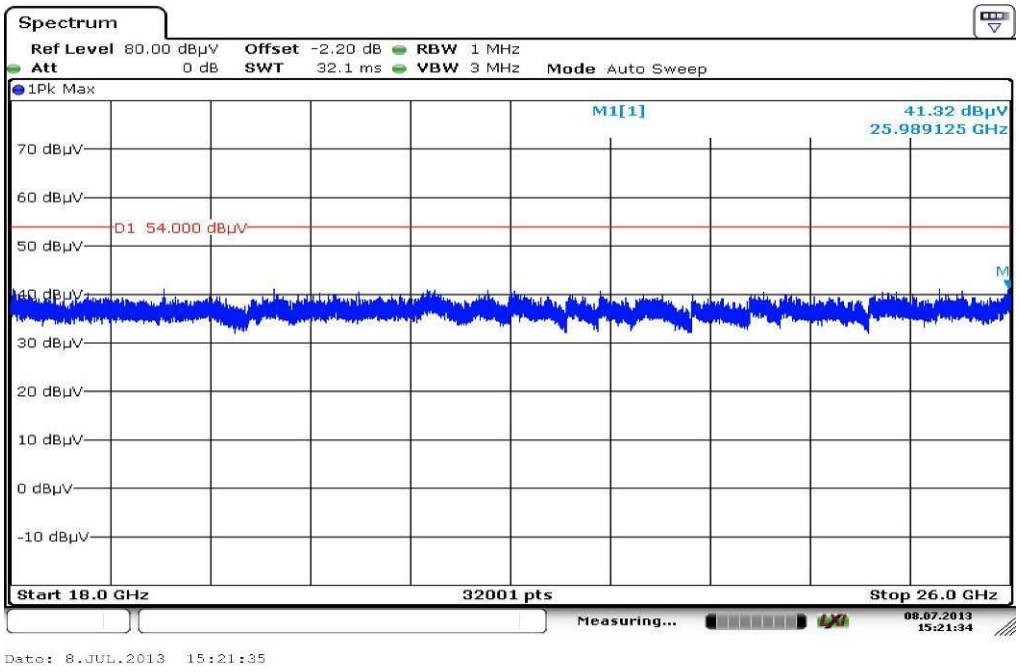
Plot 17: 1 GHz to 12.75 GHz, 5500 MHz, vertical & horizontal polarization



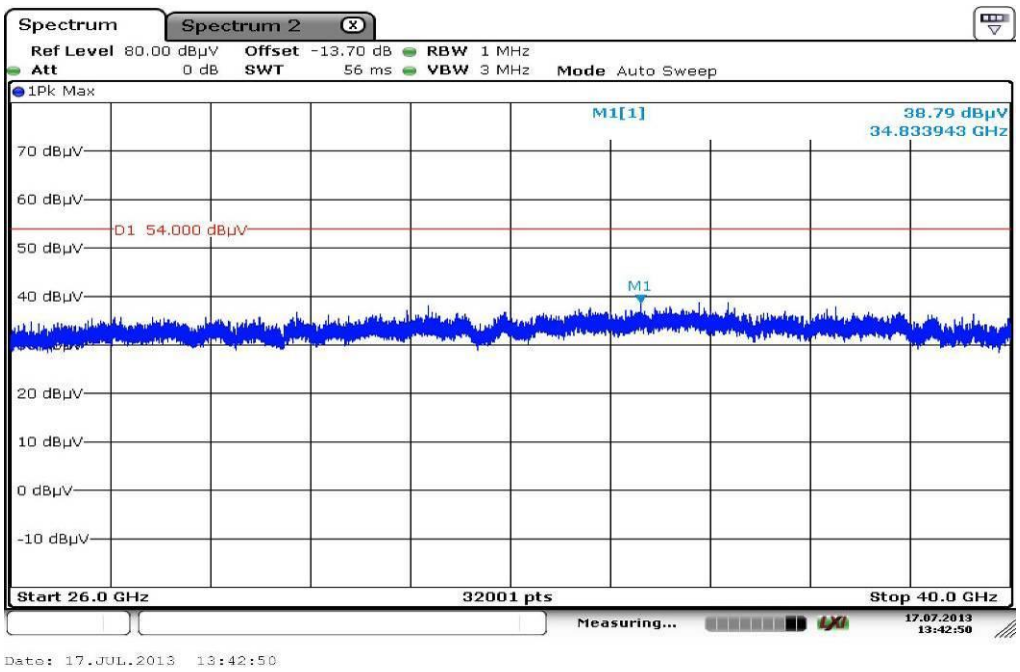
Plot 18: 12 GHz to 18 GHz, 5500 MHz, vertical & horizontal polarization



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



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



Plot 21: 30 MHz to 1 GHz, 5700 MHz, vertical & horizontal polarization

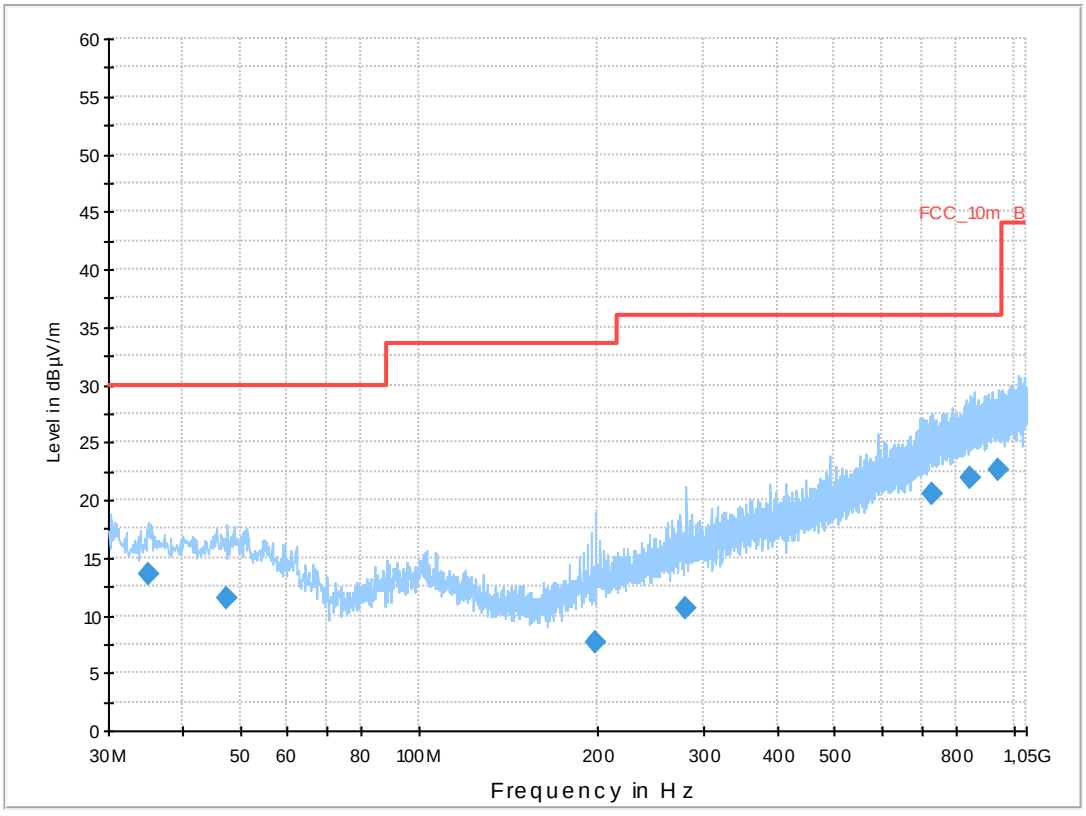
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373360
Test Description:	FCC part 15 class B @ 10 m
Operating Conditions:	TX WLAN a-mode, 6 Mbit/s, Ch. 140
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

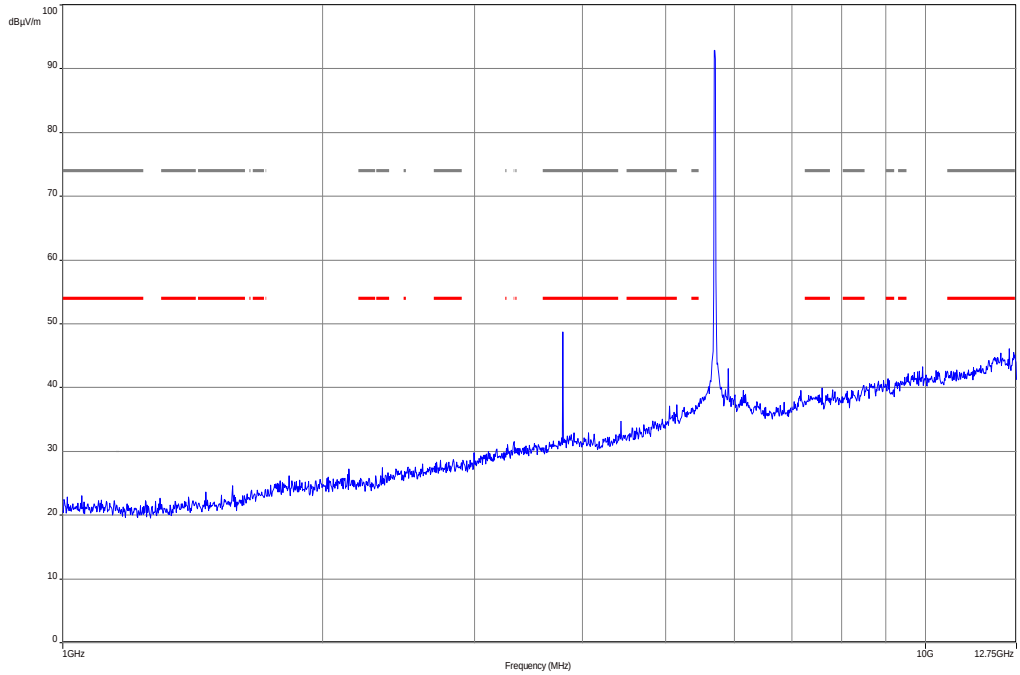
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



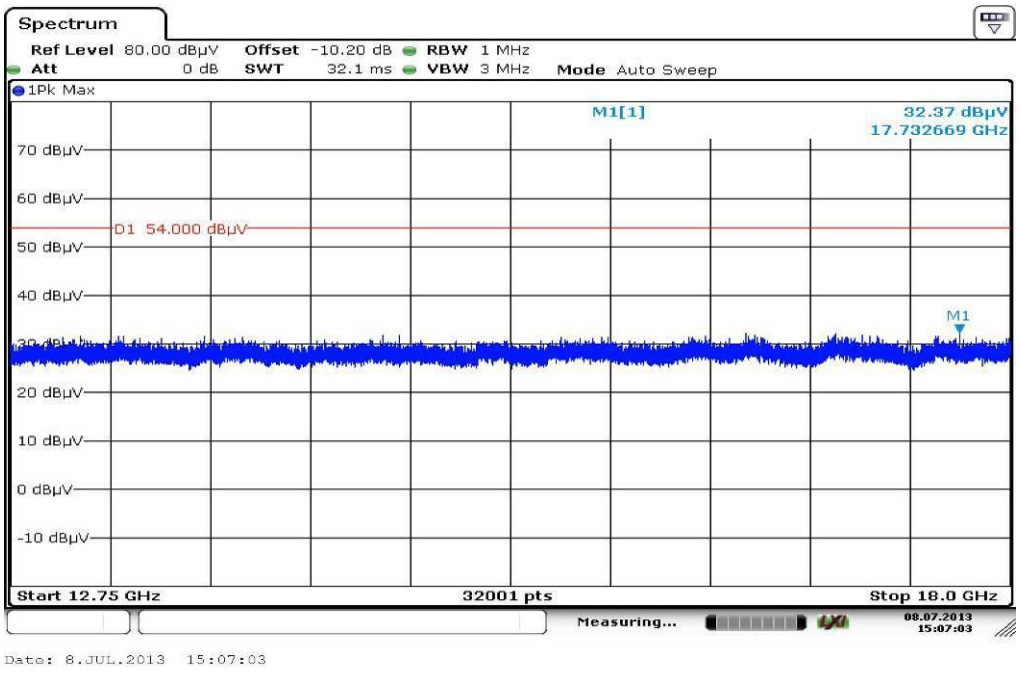
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
34.985700	13.6	1000.0	120.000	143.0	V	170.0	13.0	16.4	30.0	
47.426700	11.4	1000.0	120.000	170.0	V	-5.0	13.3	18.6	30.0	
198.408600	7.7	1000.0	120.000	132.0	V	268.0	11.6	25.8	33.5	
281.642850	10.7	1000.0	120.000	170.0	V	272.0	14.1	25.4	36.0	
730.910100	20.6	1000.0	120.000	170.0	H	180.0	23.2	15.4	36.0	
845.638800	22.0	1000.0	120.000	134.0	V	10.0	24.5	14.0	36.0	
...	...	...	...	...	...	...	...	...	...	...

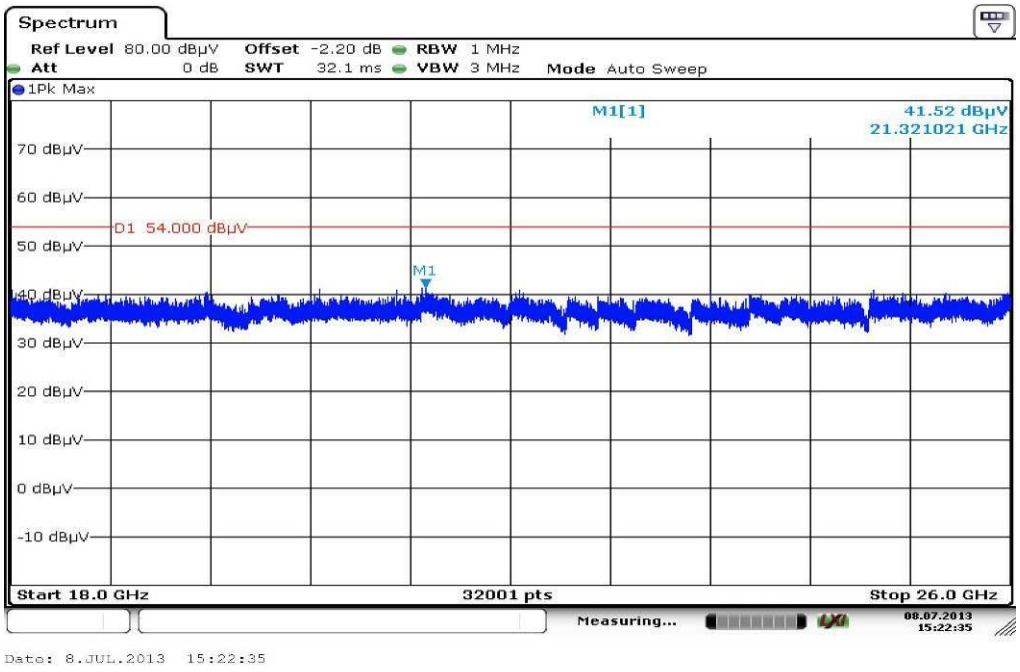
Plot 22: 1 GHz to 12.75 GHz, 5700 MHz, vertical & horizontal polarization



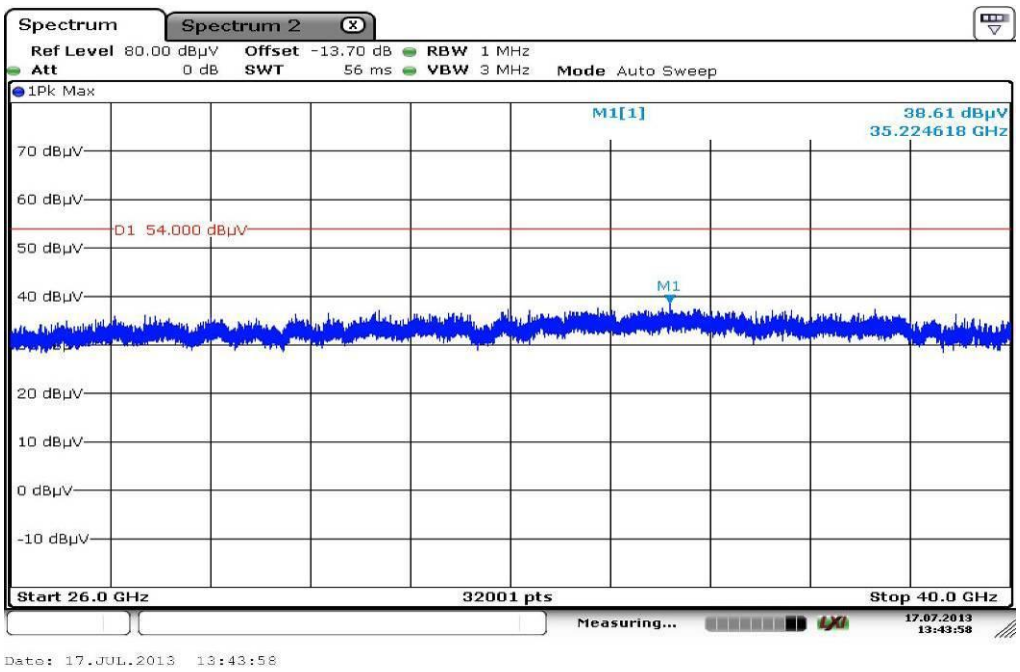
Plot 23: 12 GHz to 18 GHz, 5700 MHz, vertical & horizontal polarization



Plot 24: 18 GHz to 26 GHz, 5700 MHz, vertical & horizontal polarization



Plot 25: 26 GHz to 40 GHz, 5700 MHz, vertical & horizontal polarization



Plots: OFDM / n – mode HT20

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

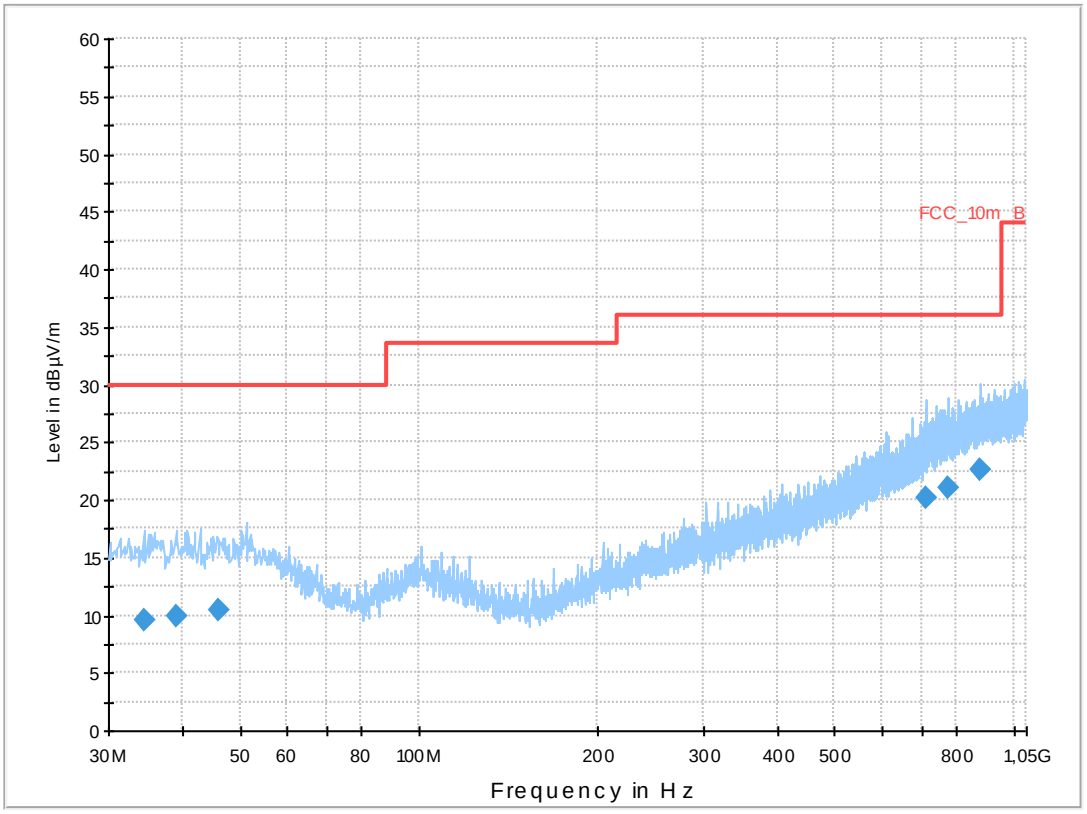
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373268
Test Description:	FCC part 15 class B
Operating Conditions:	TX WLAN n-mode, MCS0, Ch. 36
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

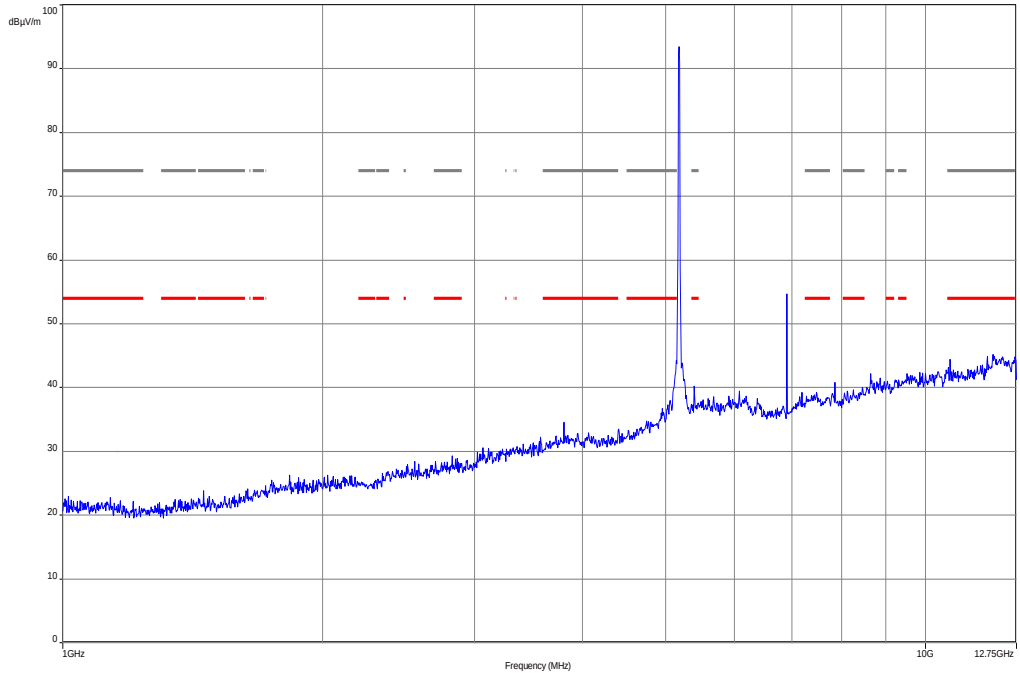
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



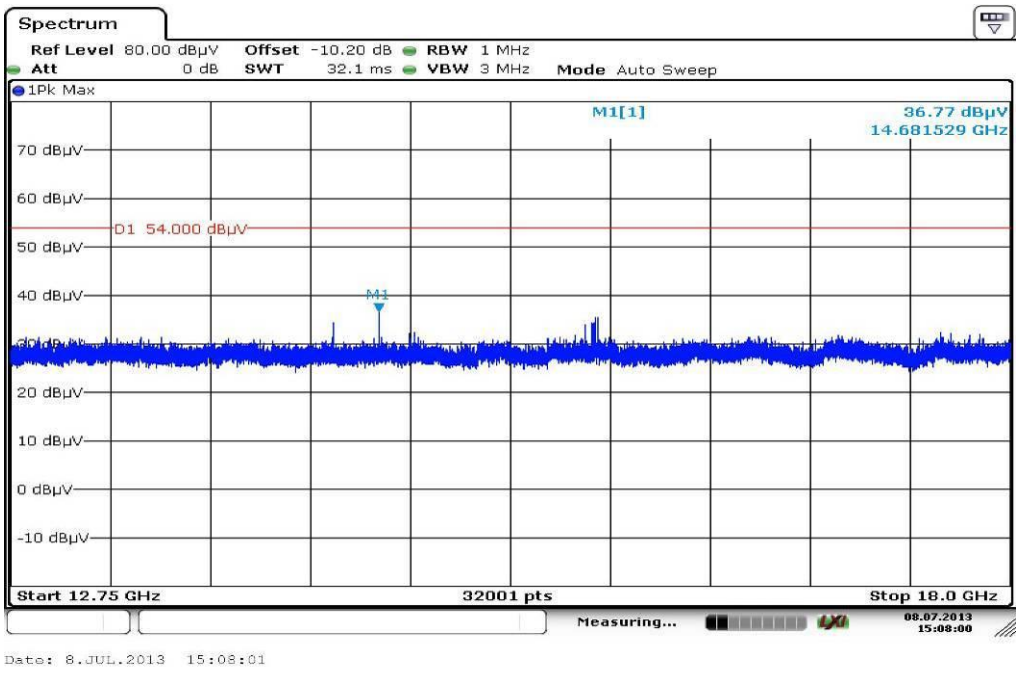
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
34.559250	9.6	1000.0	120.000	132.0	H	280.0	13.0	20.4	30.0	
38.976750	9.9	1000.0	120.000	111.0	V	190.0	13.4	20.1	30.0	
45.807900	10.5	1000.0	120.000	98.0	H	10.0	13.3	19.5	30.0	
712.751850	20.2	1000.0	120.000	121.0	H	100.0	22.8	15.8	36.0	
777.710100	21.0	1000.0	120.000	133.0	H	182.0	23.7	15.0	36.0	
880.289550	22.5	1000.0	120.000	170.0	V	100.0	24.9	13.5	36.0	

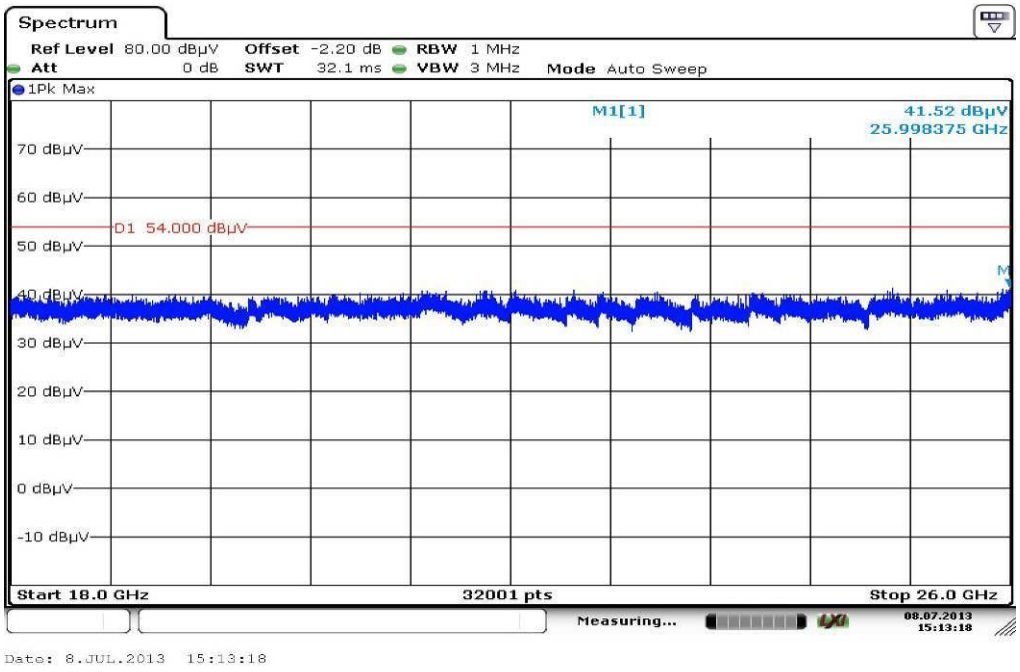
Plot 2: 1 GHz to 12.75 GHz, 5180 MHz, vertical & horizontal polarization



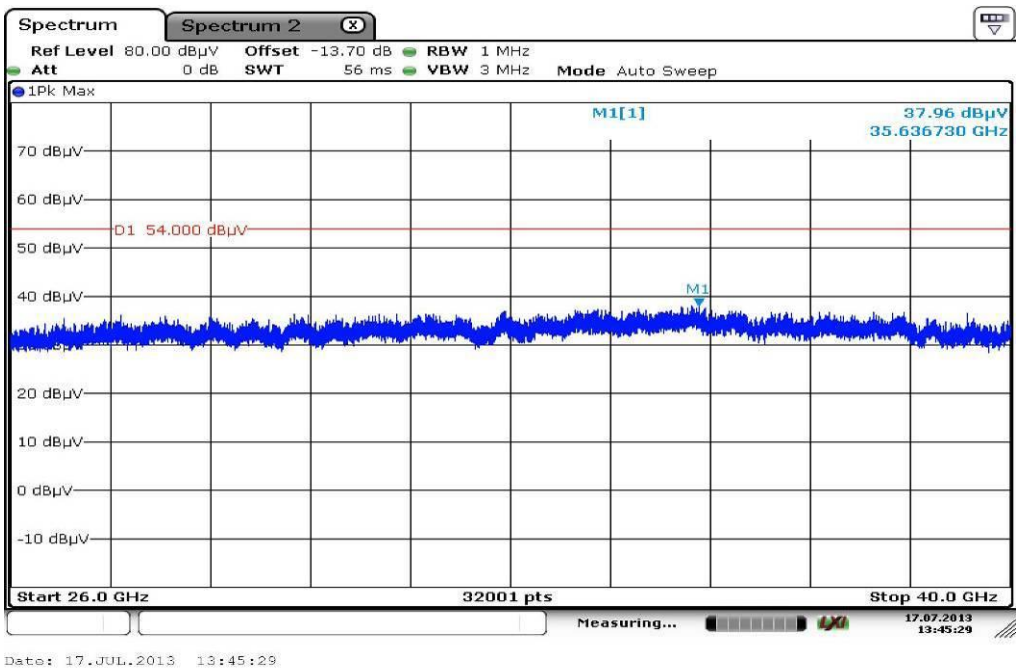
Plot 3: 12 GHz to 18 GHz, 5180 MHz, vertical & horizontal polarization



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

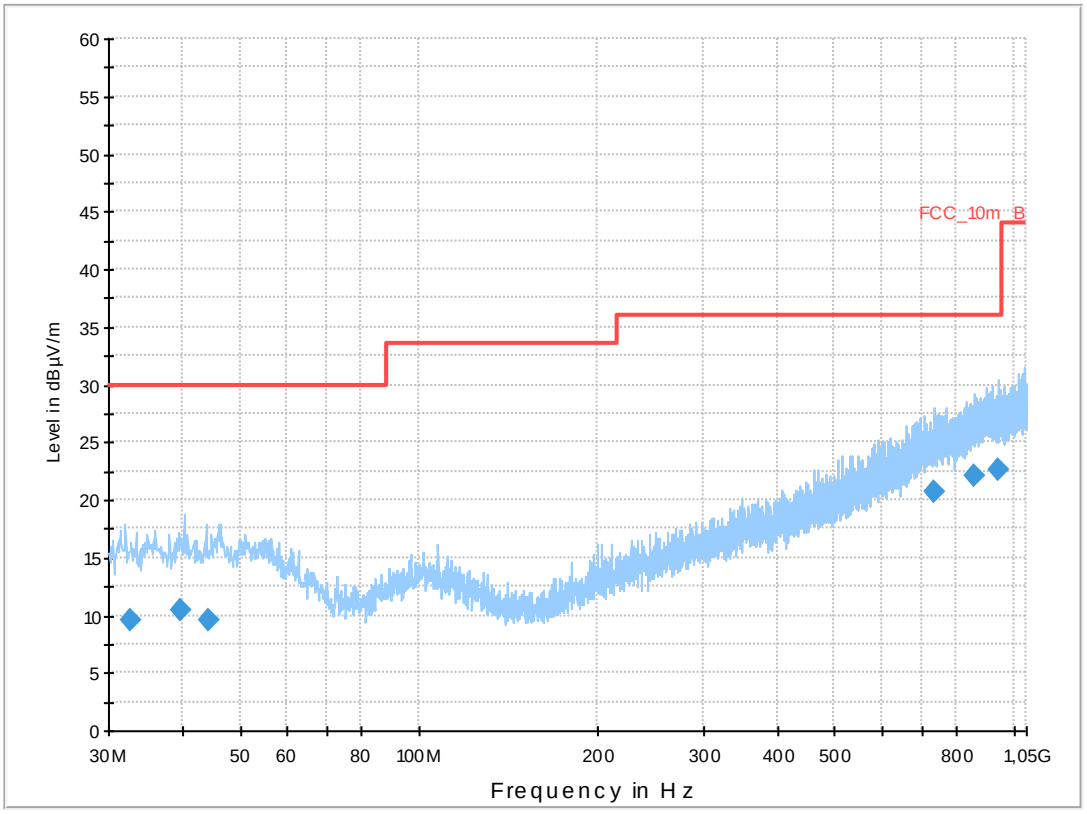
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373268
Test Description:	FCC part 15 class B
Operating Conditions:	TX WLAN n-mode, MCS0, Ch. 48
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

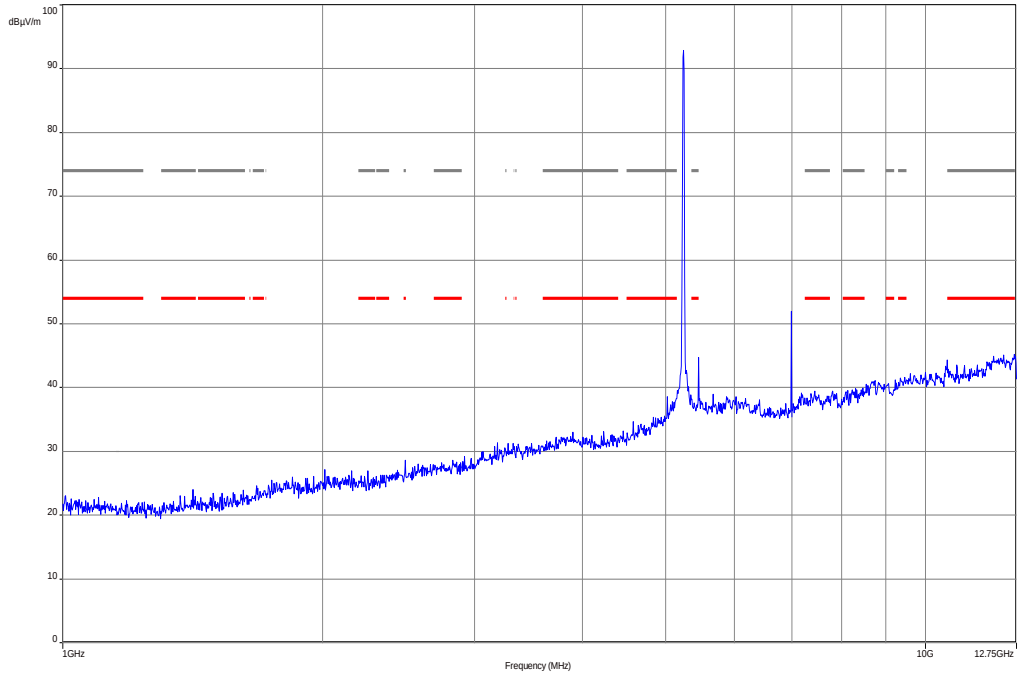
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



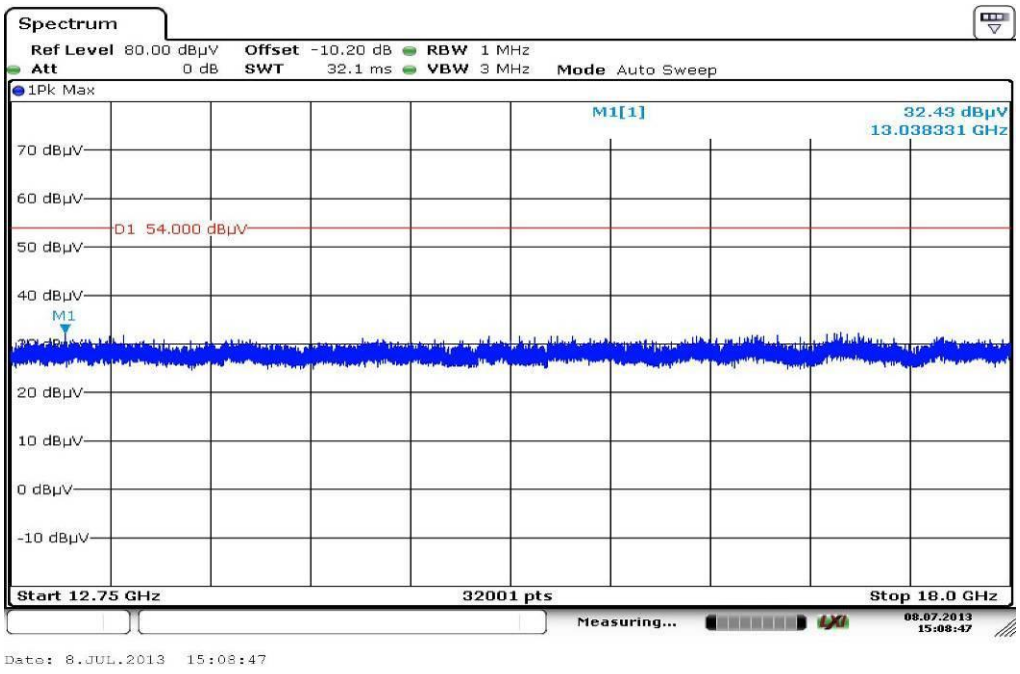
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
32.625000	9.6	1000.0	120.000	162.0	H	85.0	12.8	20.4	30.0	
39.738450	10.4	1000.0	120.000	170.0	V	-9.0	13.4	19.6	30.0	
44.166300	9.6	1000.0	120.000	170.0	H	180.0	13.3	20.4	30.0	
735.898950	20.7	1000.0	120.000	160.0	V	10.0	23.3	15.3	36.0	
856.586400	22.1	1000.0	120.000	120.0	V	265.0	24.6	13.9	36.0	
939.455100	22.6	1000.0	120.000	143.0	V	-5.0	25.3	13.4	36.0	

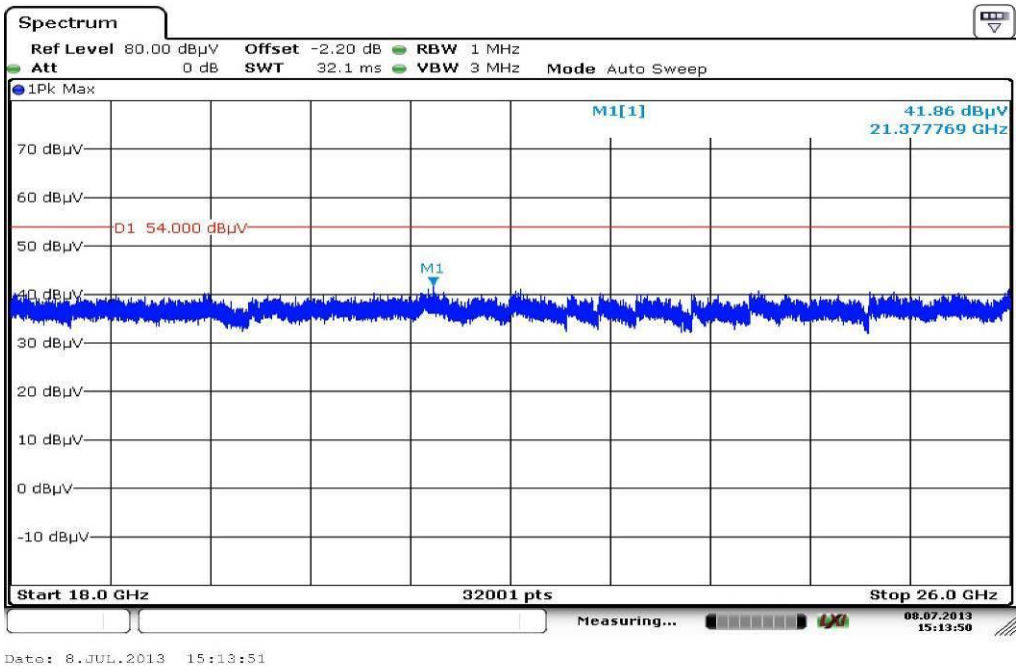
Plot 7: 1 GHz to 12.75 GHz, 5240 MHz, vertical & horizontal polarization



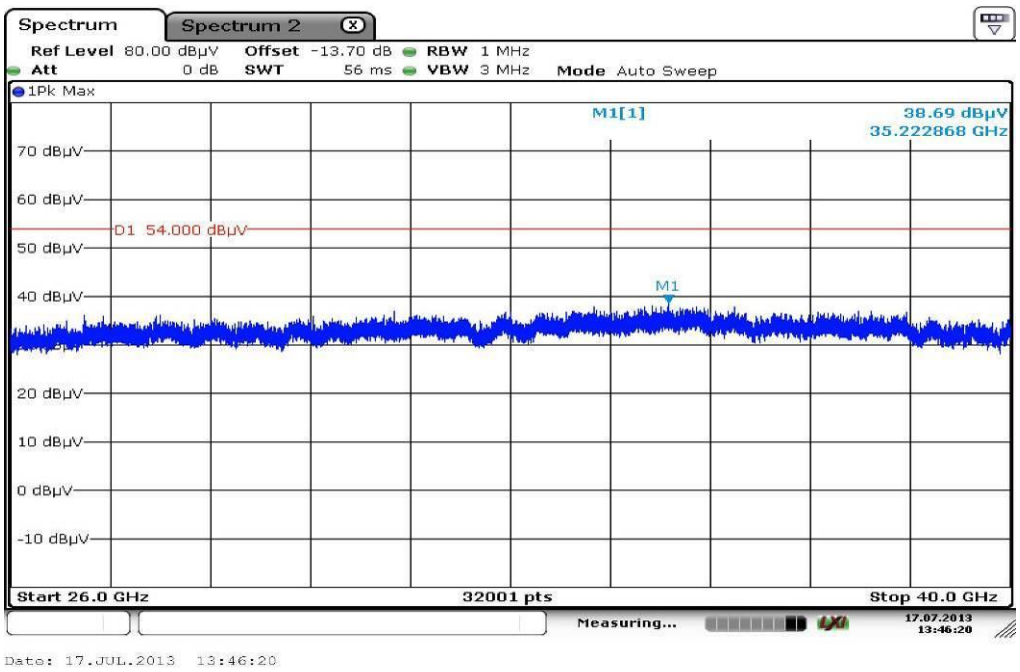
Plot 8: 12 GHz to 18 GHz, 5240 MHz, vertical & horizontal polarization



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



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



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

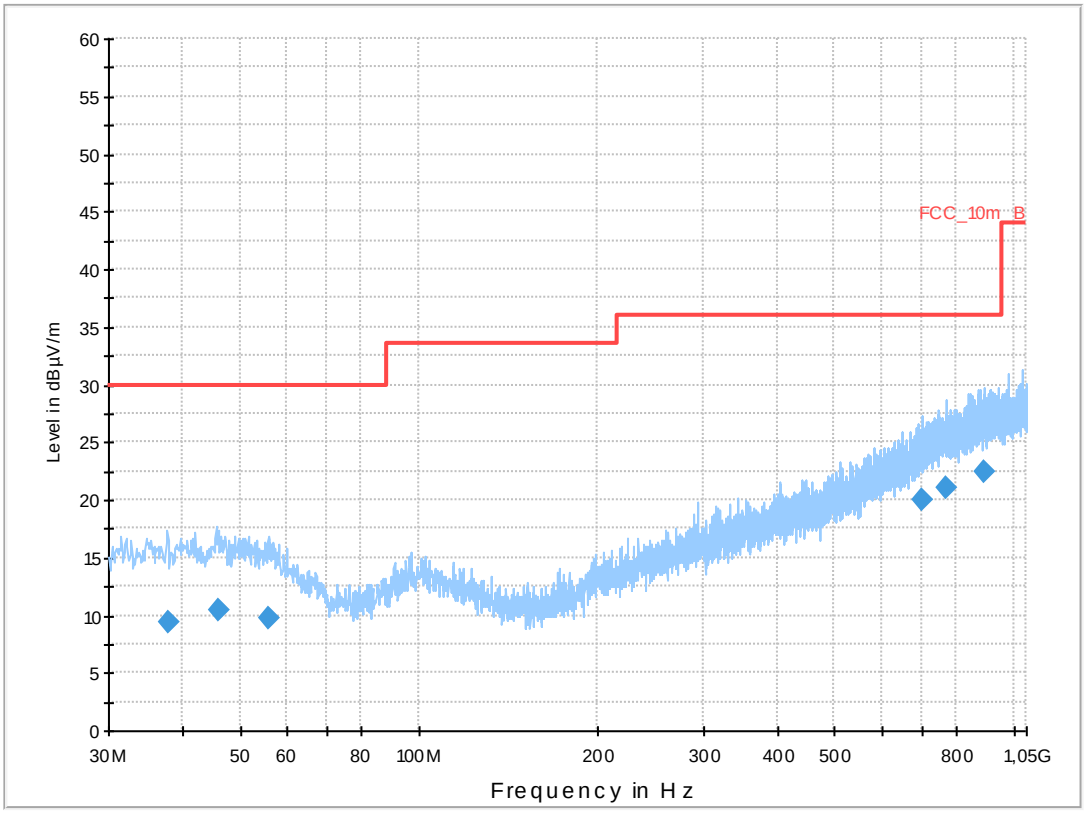
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373268
Test Description:	FCC part 15 class B
Operating Conditions:	TX WLAN n-mode, MCS0, Ch. 64
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

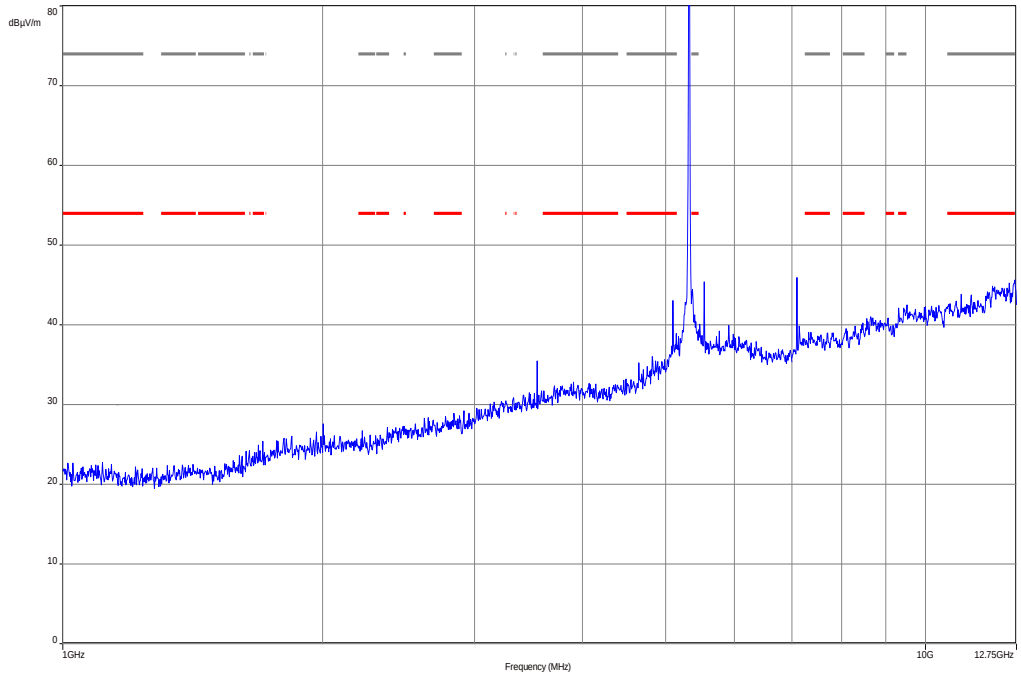
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



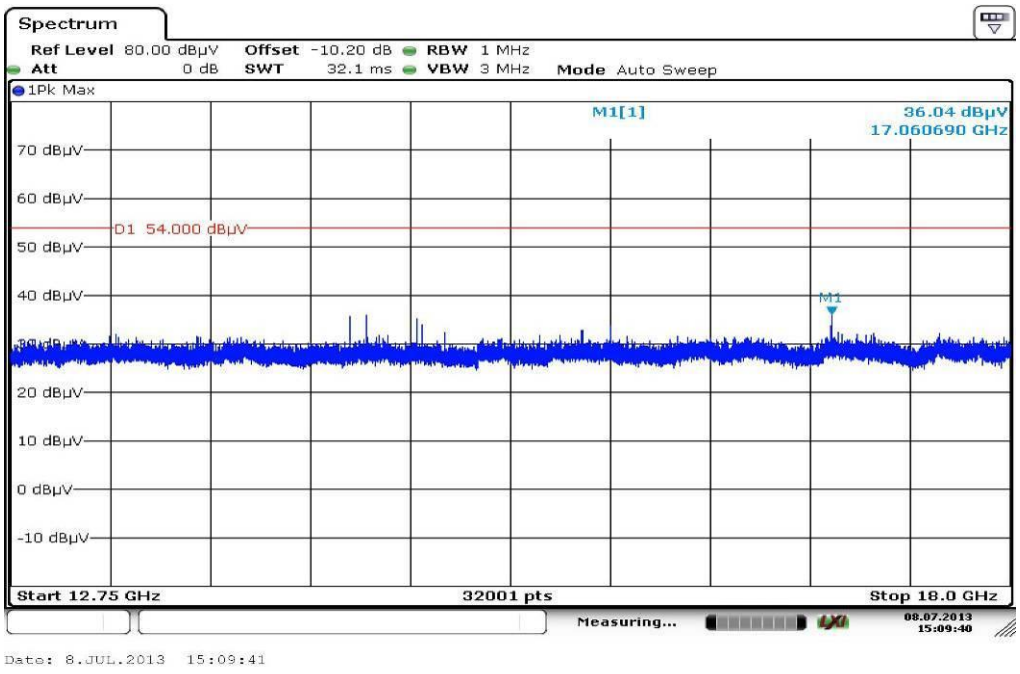
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
37.794300	9.5	1000.0	120.000	170.0	V	175.0	13.3	20.6	30.0	
45.878250	10.5	1000.0	120.000	170.0	H	10.0	13.3	19.5	30.0	
55.839450	9.8	1000.0	120.000	132.0	V	10.0	12.7	20.2	30.0	
701.448750	19.9	1000.0	120.000	170.0	H	261.0	22.5	16.1	36.0	
771.862800	21.0	1000.0	120.000	170.0	V	280.0	23.7	15.0	36.0	
894.715800	22.5	1000.0	120.000	104.0	H	267.0	25.1	13.5	36.0	

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

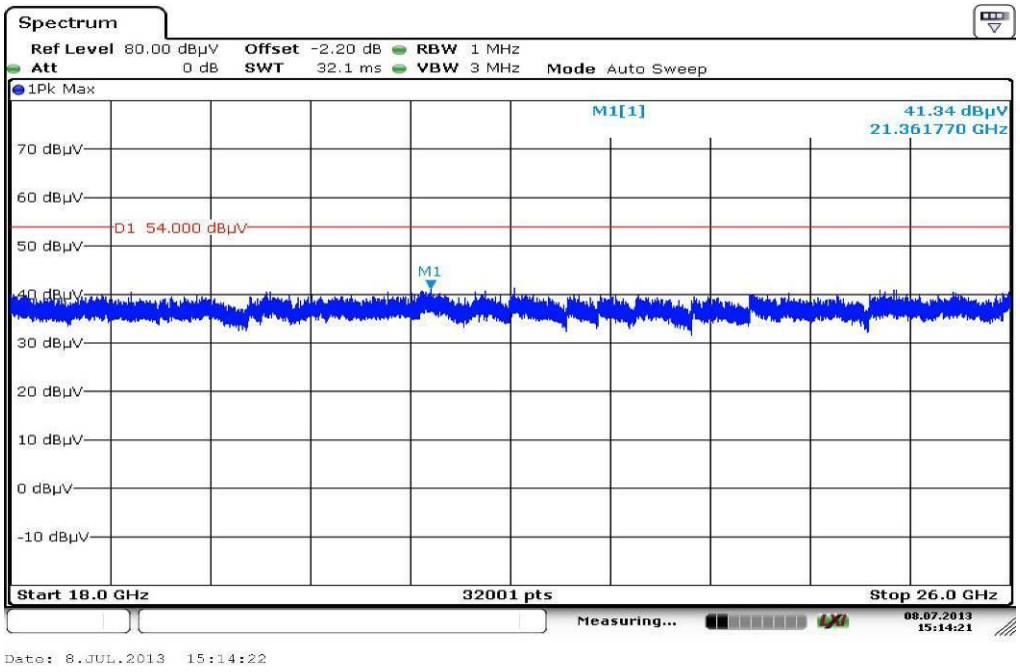


Plot 13: 12 GHz to 18 GHz, 5320 MHz, vertical & horizontal polarization

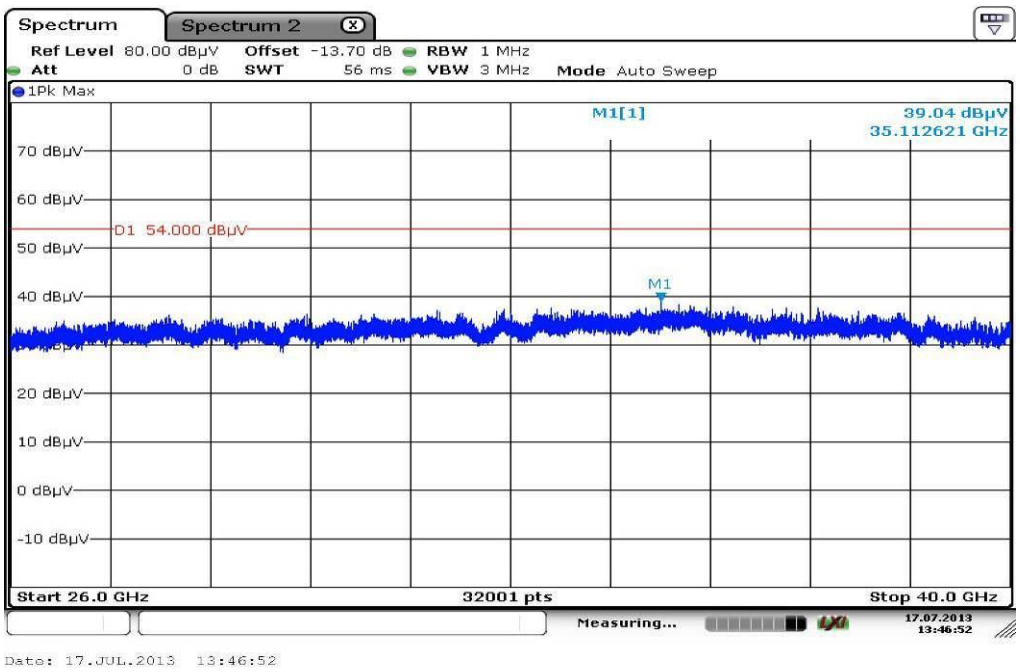


Date: 8.JUL.2013 15:09:41

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

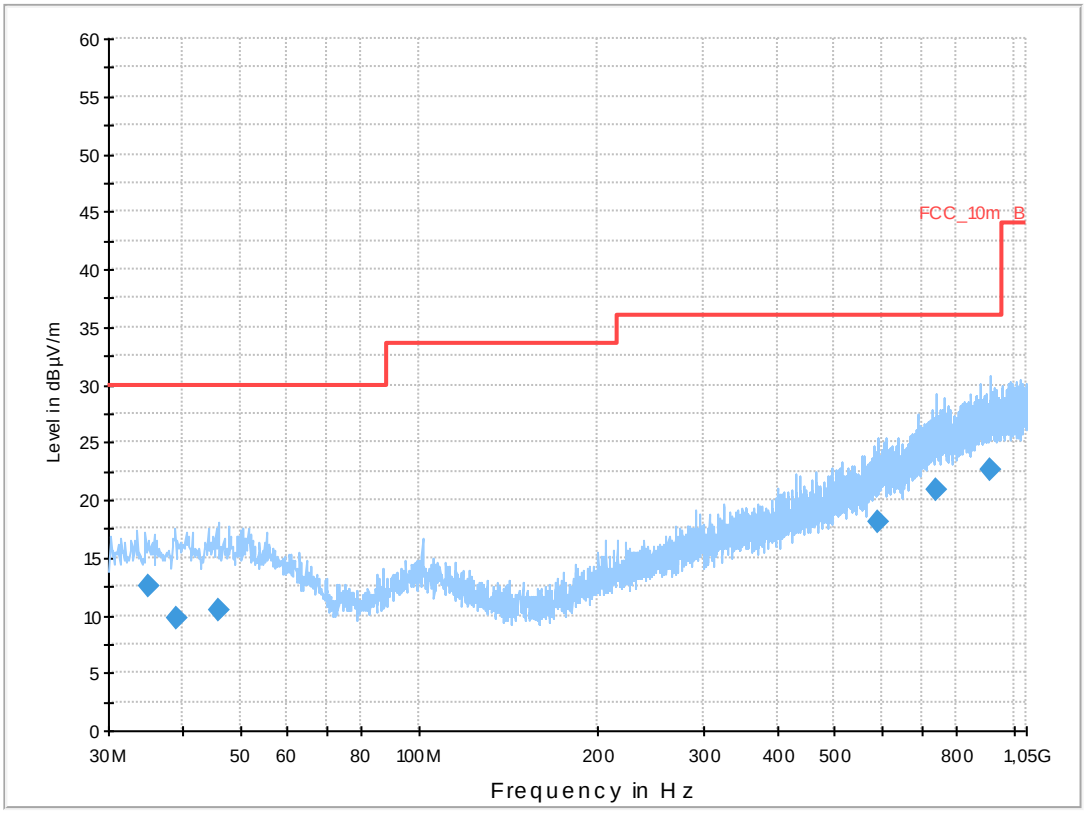
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373268
Test Description:	FCC part 15 class B
Operating Conditions:	TX WLAN n-mode, MCS0, Ch. 100
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

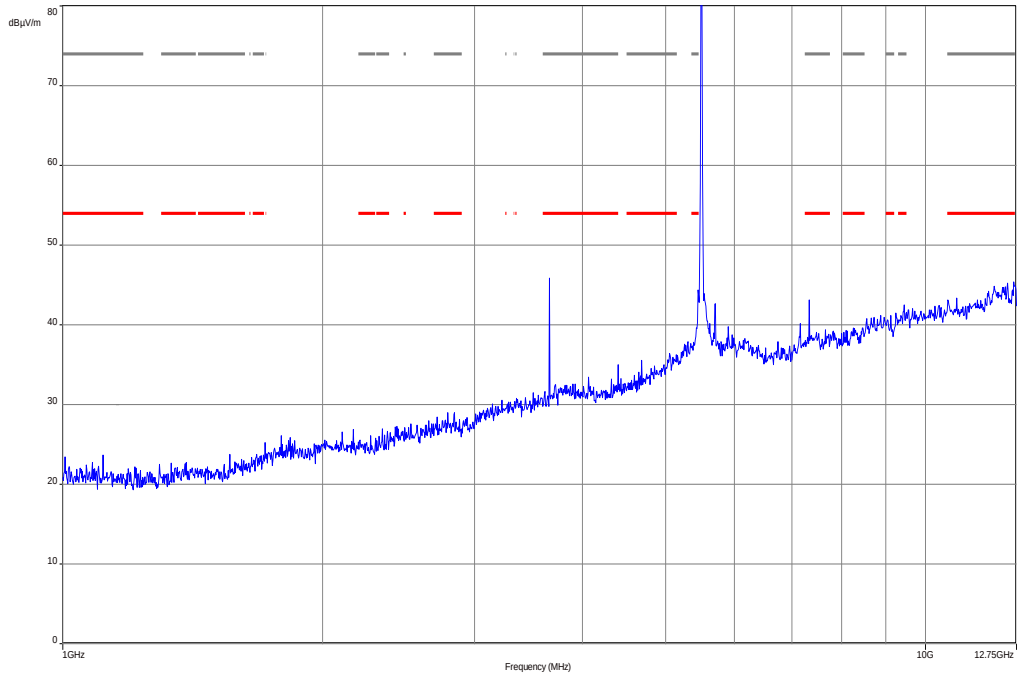
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



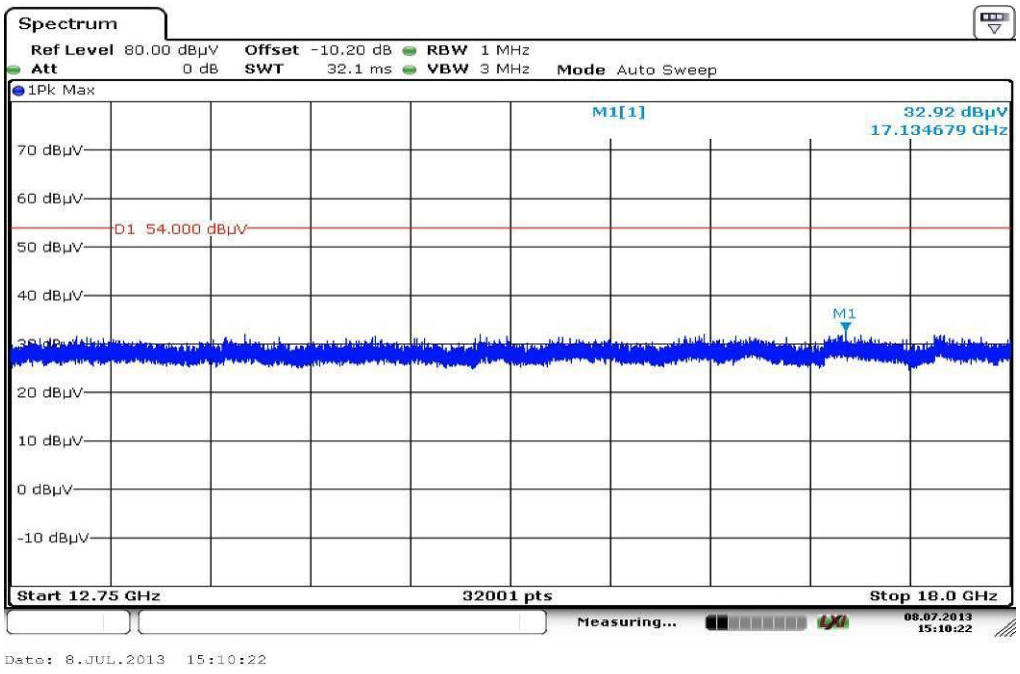
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.000250	12.5	1000.0	120.000	170.0	V	10.0	13.0	17.5	30.0	
38.946900	9.7	1000.0	120.000	170.0	V	-10.0	13.4	20.3	30.0	
45.884100	10.5	1000.0	120.000	131.0	H	10.0	13.3	19.5	30.0	
591.139050	18.1	1000.0	120.000	104.0	H	10.0	20.6	17.9	36.0	
740.515950	20.9	1000.0	120.000	170.0	H	268.0	23.4	15.1	36.0	
910.976850	22.5	1000.0	120.000	170.0	V	-3.0	25.2	13.5	36.0	

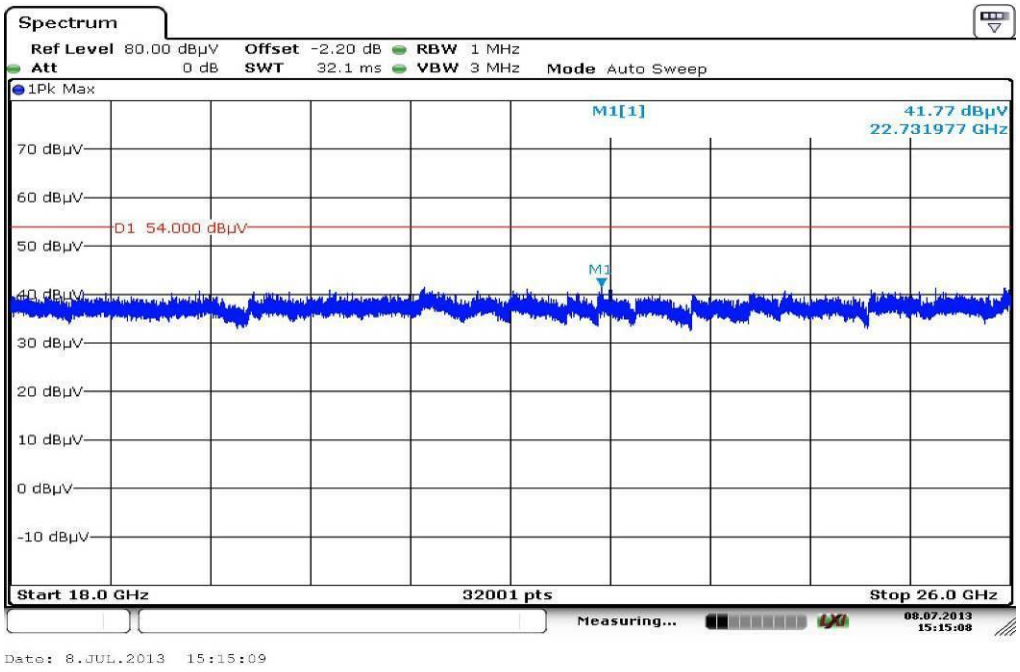
Plot 17: 1 GHz to 12.75 GHz, 5500 MHz, vertical & horizontal polarization



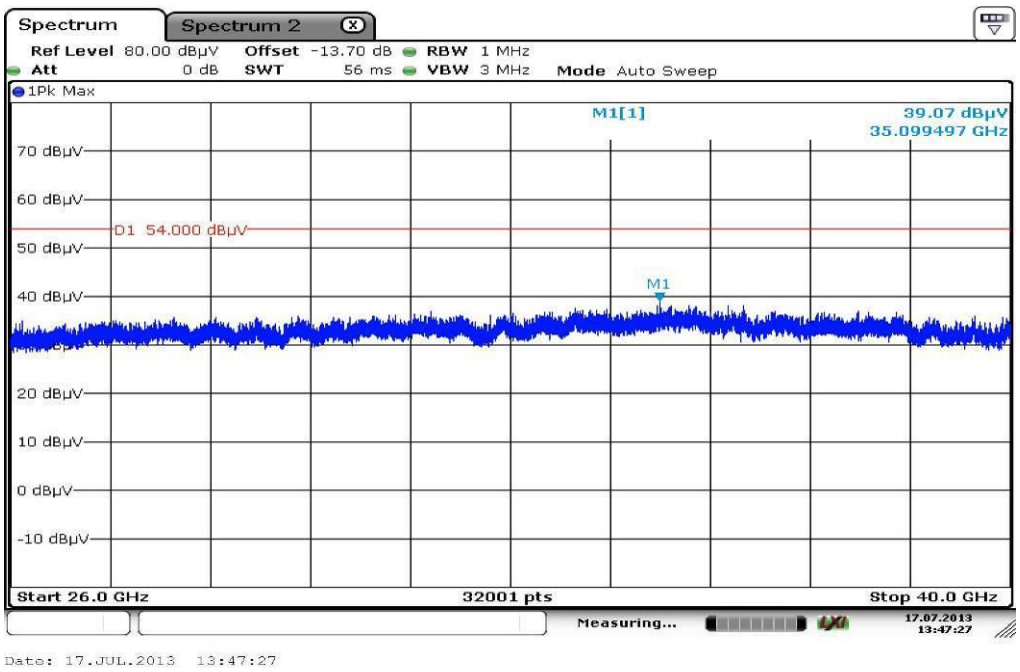
Plot 18: 12 GHz to 18 GHz, 5500 MHz, vertical & horizontal polarization



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



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



Plot 21: 30 MHz to 1 GHz, 5700 MHz, vertical & horizontal polarization

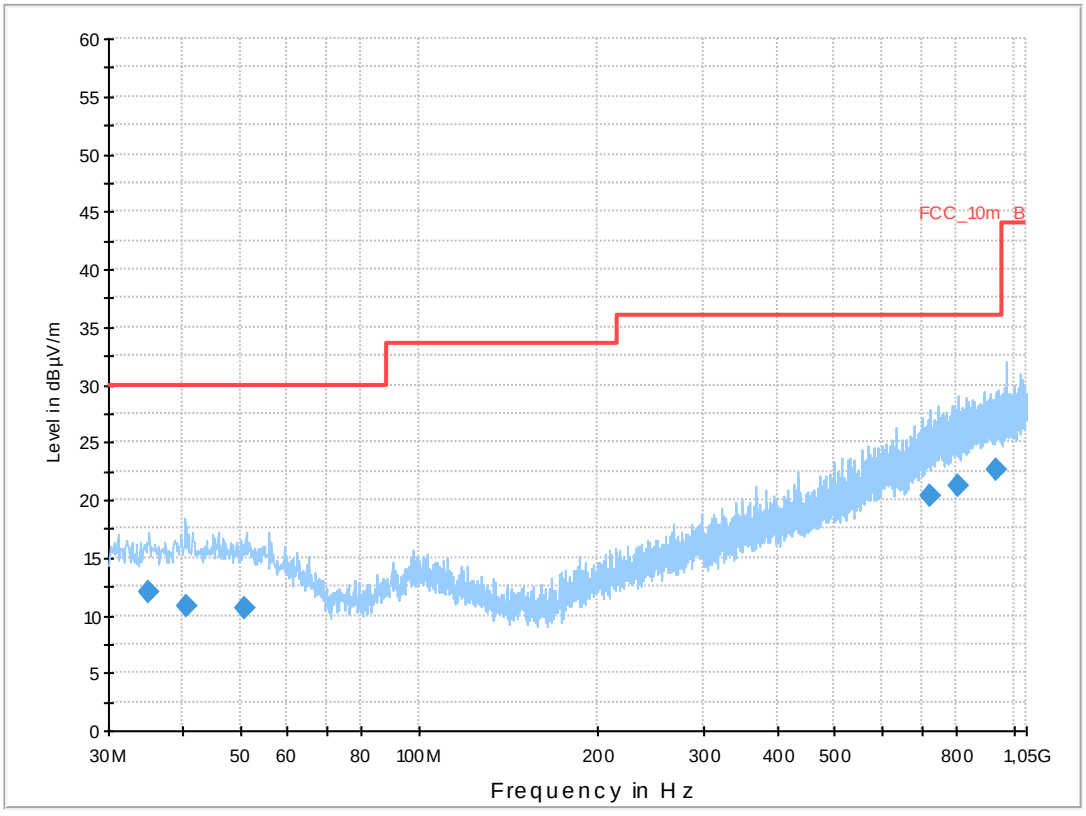
Common Information

EUT:	RFX101LW
Serial Number:	IMEI: 00044002242373268
Test Description:	FCC part 15 class B
Operating Conditions:	TX WLAN n-mode, MCS0, Ch. 140
Operator Name:	Hennemann
Comment:	battery powered

Scan Setup: STAN_Fin [EMI radiated]

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

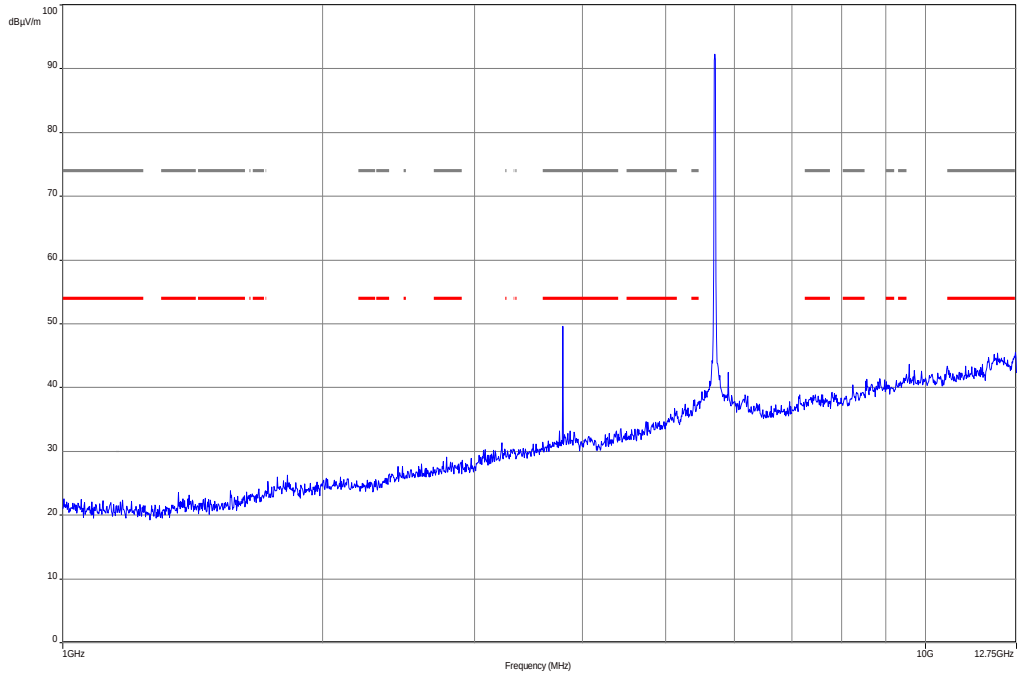
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



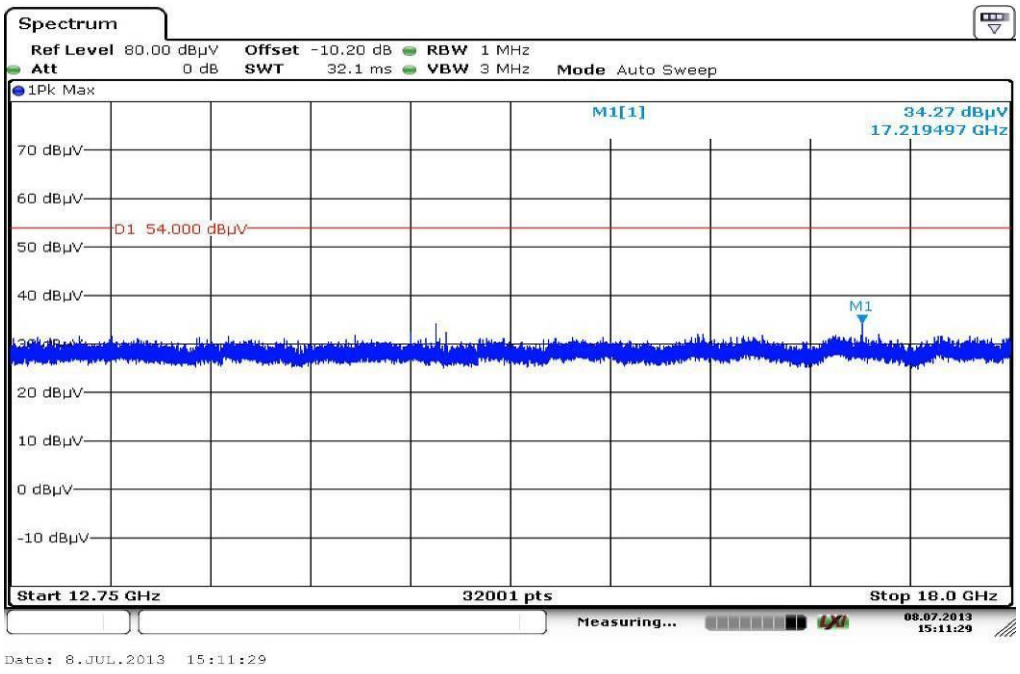
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.051550	11.9	1000.0	120.000	170.0	V	280.0	13.0	18.1	30.0	
40.579800	10.8	1000.0	120.000	170.0	H	-2.0	13.4	19.2	30.0	
50.819850	10.5	1000.0	120.000	170.0	V	280.0	13.3	19.5	30.0	
721.421700	20.4	1000.0	120.000	170.0	V	100.0	23.0	15.6	36.0	
803.343450	21.1	1000.0	120.000	170.0	V	-2.0	23.9	14.9	36.0	
938.127750	22.6	1000.0	120.000	98.0	H	80.0	25.3	13.4	36.0	

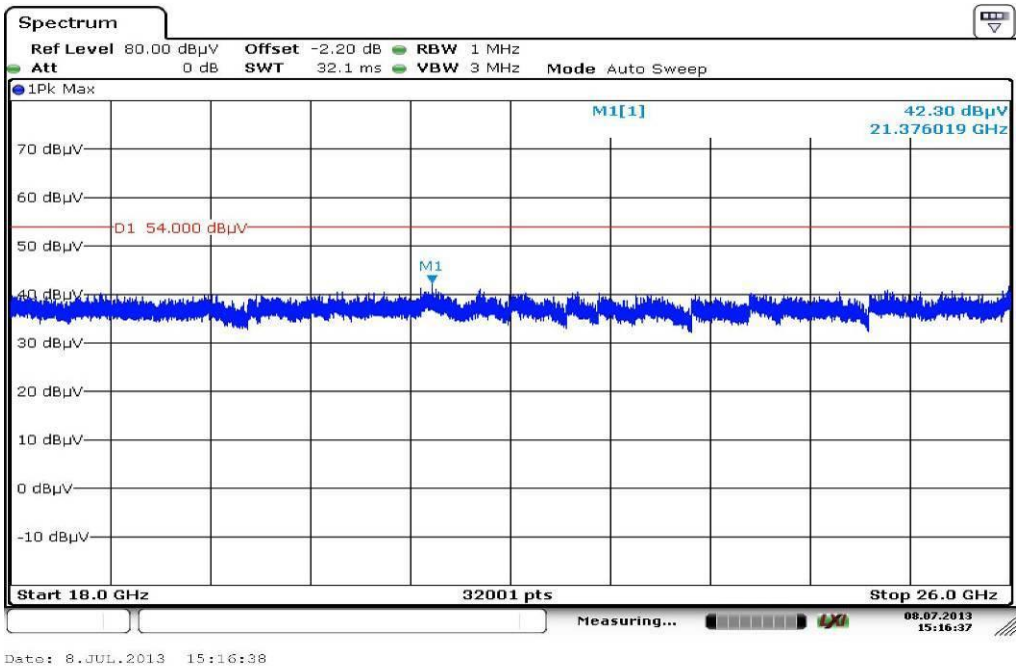
Plot 22: 1 GHz to 12.75 GHz, 5700 MHz, vertical & horizontal polarization



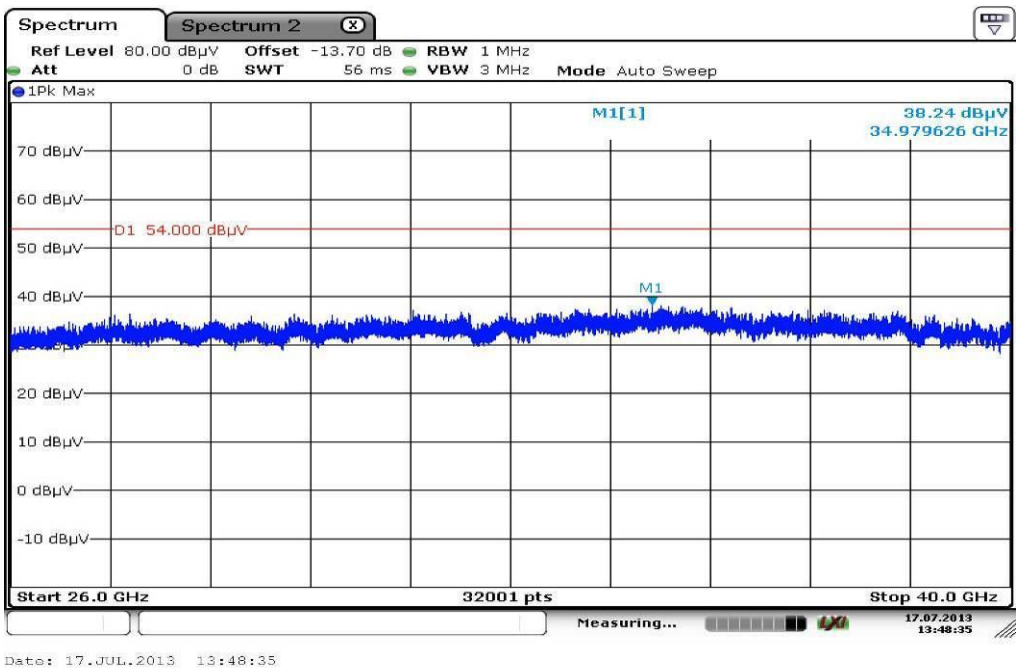
Plot 23: 12 GHz to 18 GHz, 5700 MHz, vertical & horizontal polarization



Plot 24: 18 GHz to 26 GHz, 5700 MHz, vertical & horizontal polarization



Plot 25: 26 GHz to 40 GHz, 5700 MHz, vertical & horizontal polarization



10.10 RX spurious emissions radiated

Not performed! Tests according to manufacturer tests plan!

10.11 Spurious emissions radiated < 30 MHz

Not performed! Tests according to manufacturer tests plan!

10.12 Spurious emissions conducted < 30 MHz

Not performed! Tests according to manufacturer tests plan!

11 Test equipment and ancillaries used for tests

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

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (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	14.07.2013	14.07.2015
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.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	08.05.2013	08.05.2015
13	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
14	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
15	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
16	9	Isolating Transformer	MPL IEC625 Bus Regeltrennt ravo	Erfi	91350	300001155	ne		
17	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
18	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
19	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
20	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	21.02.2013	21.02.2014
21	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
22	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	ne		

23	A028	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002440	ne		
24	n. a.	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001752	ne		
25	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503 070-XX	CERNEX	19338	300004273	ne		
26	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

12 Observations

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

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-08-01
-A	IC and RSS references removed	2013-08-08
-B	Editorial changes AC conducted removed	2013-08-16
-C	Band Edge remeasured according §15.407	2013-08-20

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) Arnt 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

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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