

TEST REPORT

Test report no.: 1-6234/13-08-07



Deutsche
Akkreditierungsstelle
D-PL-12076-01-01

Testing laboratory

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Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Area of Testing: Radio/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

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: RGF111LW

FCC ID: L6ARGF110LW

IC: 2503A-RGF110LW

Frequency: UNII bands: 5150 MHz to 5250 MHz
5250 MHz to 5350 MHz
5470 MHz to 5725 MHz

Technology tested: WLAN (OFDM / a & n HT 20 - 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:

Andreas Luckenbill
Expert

Test performed:

Marco Bertolino
Testing Manager

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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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2.2 Application details

Date of receipt of order:	2013-08-19
Date of receipt of test item:	2013-08-23
Start of test:	2013-08-23
End of test:	2013-09-02
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
RSS - 210 Issue 8	01.12.2010	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	2013-04	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
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4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	No tests under extreme conditions!
	T_{min}	No tests under extreme conditions!
Relative humidity content:		53 %
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	:	RGF111LW
S/N serial number	:	Radiated units: IMEI EUT 1: 004402242479081 IMEI EUT 2: 004402242479065
HW hardware status	:	CER-57711-001 Rev. 2
SW software status	:	10.2.0.1155
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	:	OFDM
Use of frequency spectrum	:	
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 reports: 1-6234/13-08-01_AnnexA
1-6234/13-08-01_AnnexD

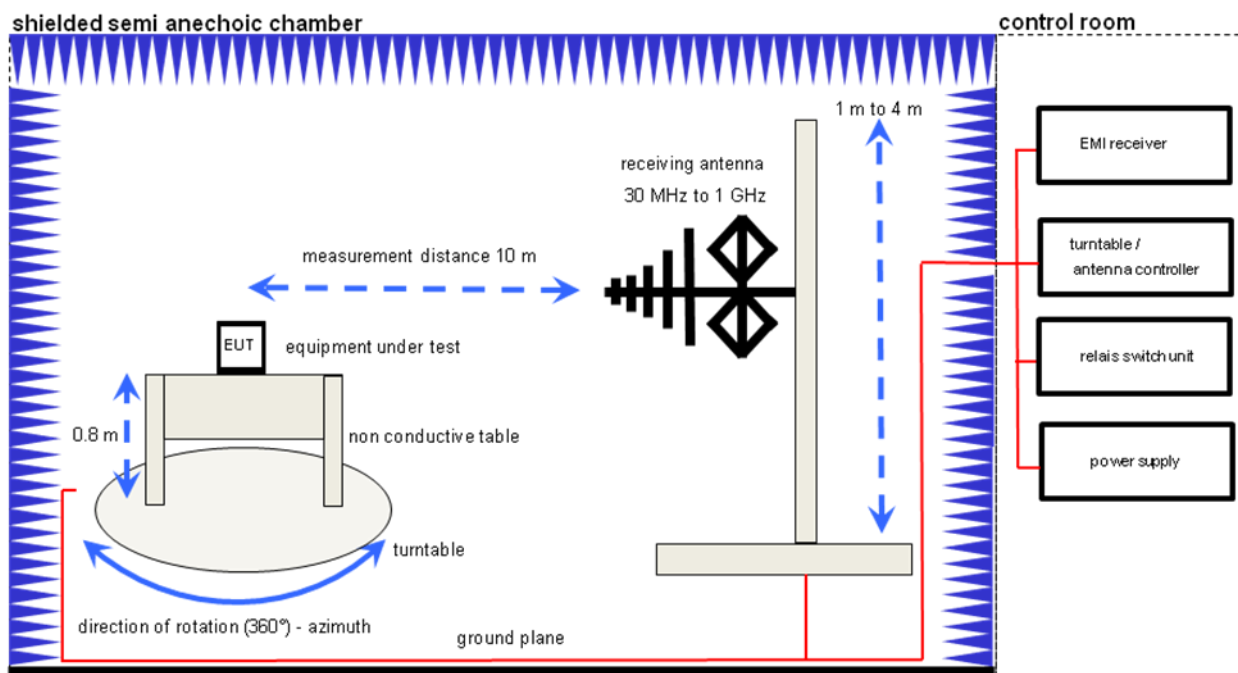
6 Test laboratories sub-contracted

None

7 Description of the test setup

7.1 Radiated measurements chamber F

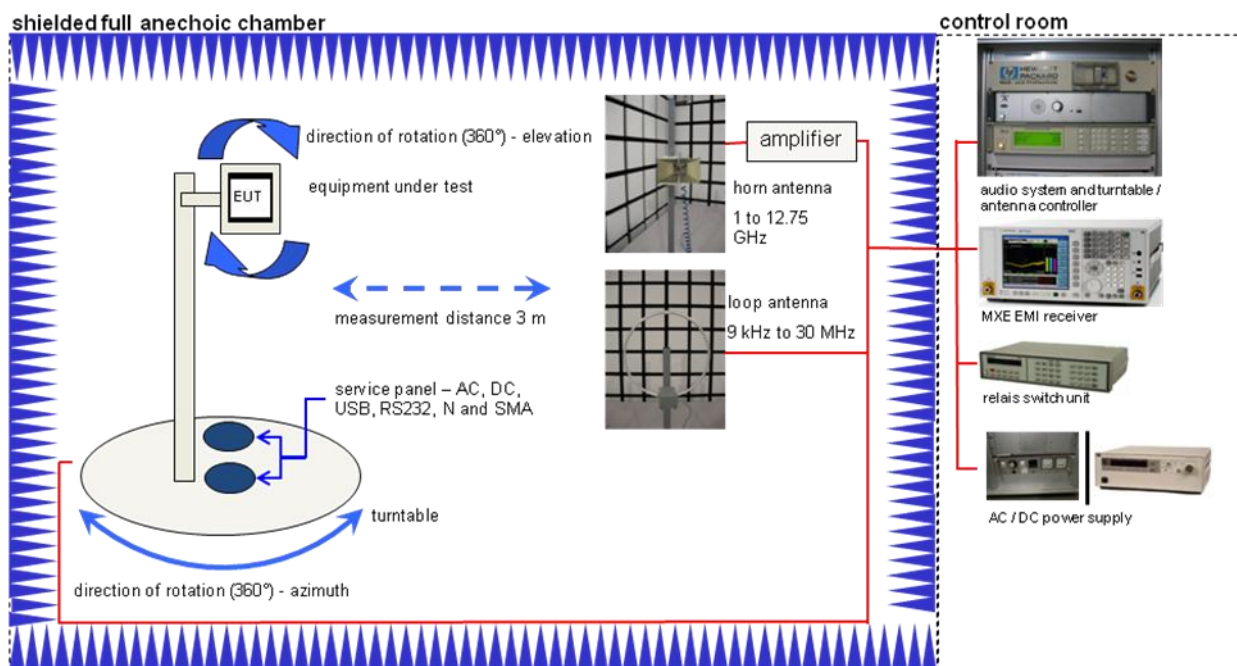
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas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



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
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

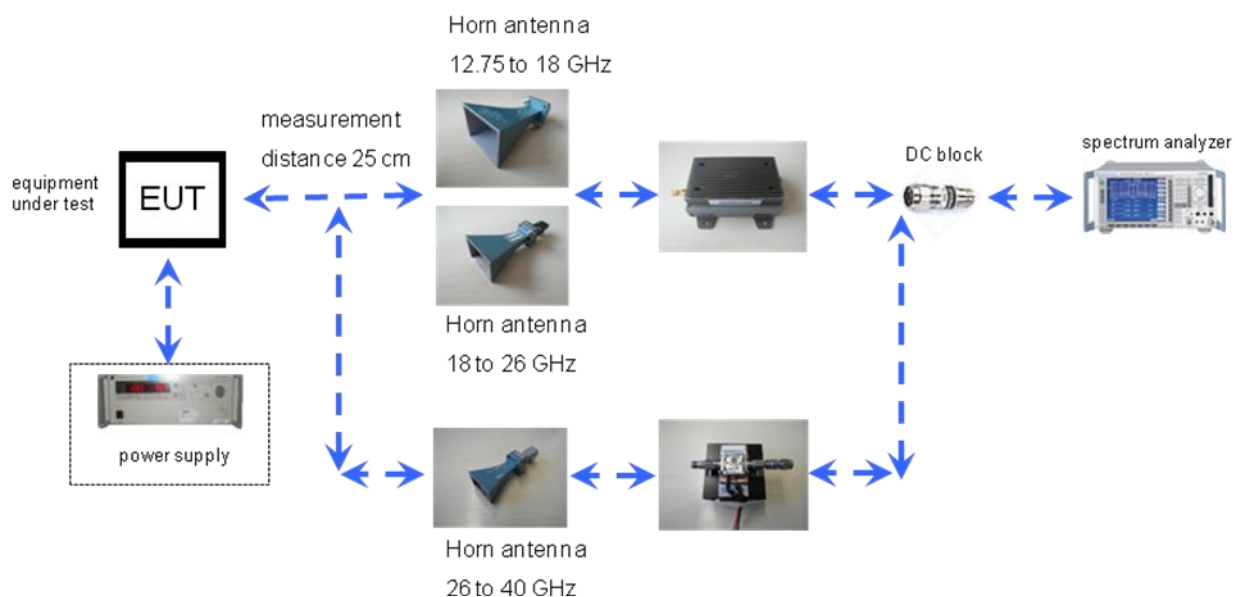
7.2 Radiated measurements chamber C



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

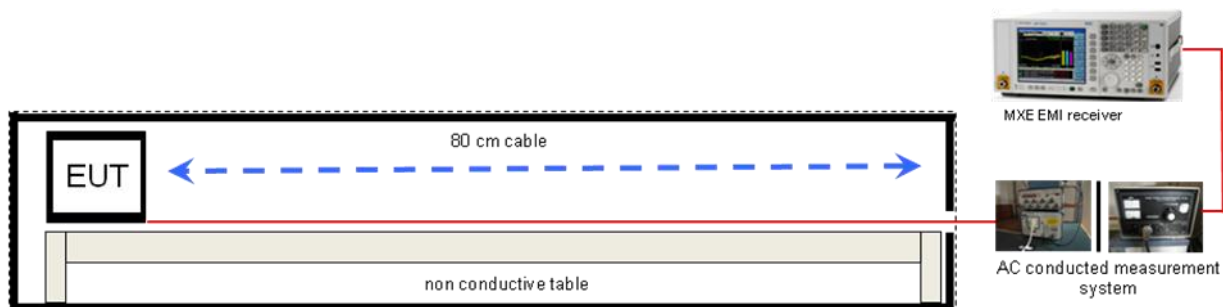
7.3 Radiated measurements 12.75 GHz to 40 GHz



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751
Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273
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 RSS 210, Issue 8, Annex 9	Passed	2013-09-03	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	☐	☐	☐	☒	-/-
-/-	Gain	Nominal	Nominal	☐	☐	☐	☒	-/-
U-NII Part 15	Duty cycle	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) RSS-210	Maximum output power (conducted & radiated)	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) RSS-210	Power spectral density	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) RSS-210	Spectrum bandwidth 26dB bandwidth	Nominal	Nominal	☐	☐	☐	☒	-/-
§15.407(a) RSS-210	Peak excursion measurements	Nominal	Nominal	☐	☐	☐	☒	-/-
§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	☐	☐	☐	☒	-/-
§15.209(a) RSS-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: RIM_EMI_Matrix for Cetecom_King_RGF111LW (Aug-12-2013)

Special test descriptions: Tests according to manufacturer test plan.

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 test plan.

10.2 Gain

Not performed – tests according to manufacturer test plan.

10.3 Duty cycle

Not performed – tests according to manufacturer test plan.

10.4 Maximum output power conducted and radiated

Not performed – tests according to manufacturer test plan.

10.5 Power spectral density

Not performed – tests according to manufacturer test plan.

10.6 Spectrum bandwidth – 26 dB bandwidth

Not performed – tests according to manufacturer test plan.

10.7 Peak excursion measurements

Not performed – tests according to manufacturer test 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

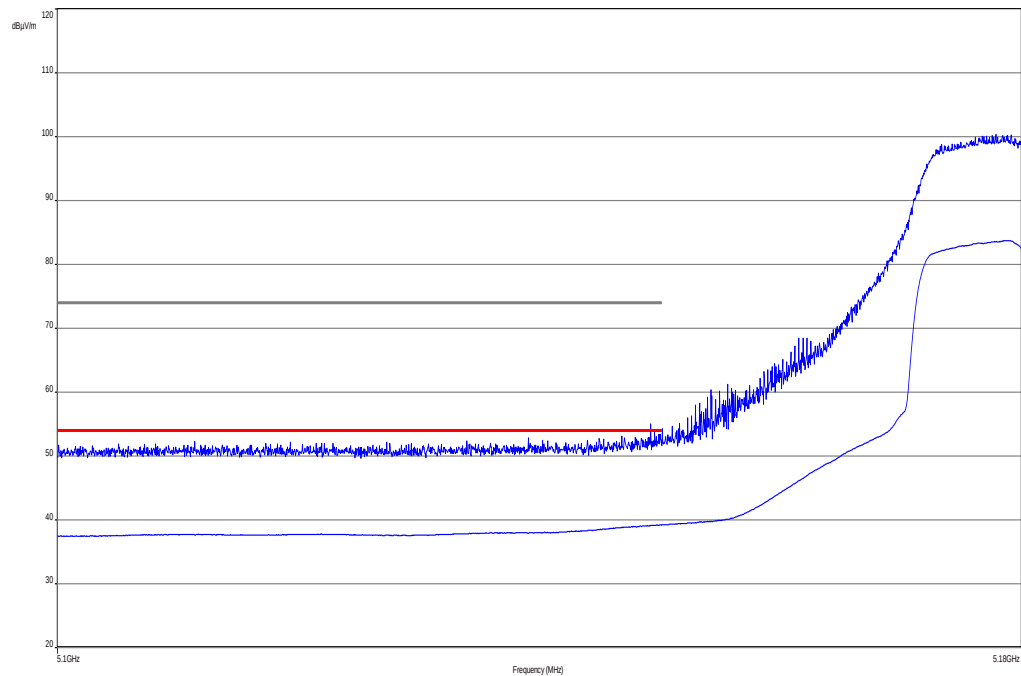
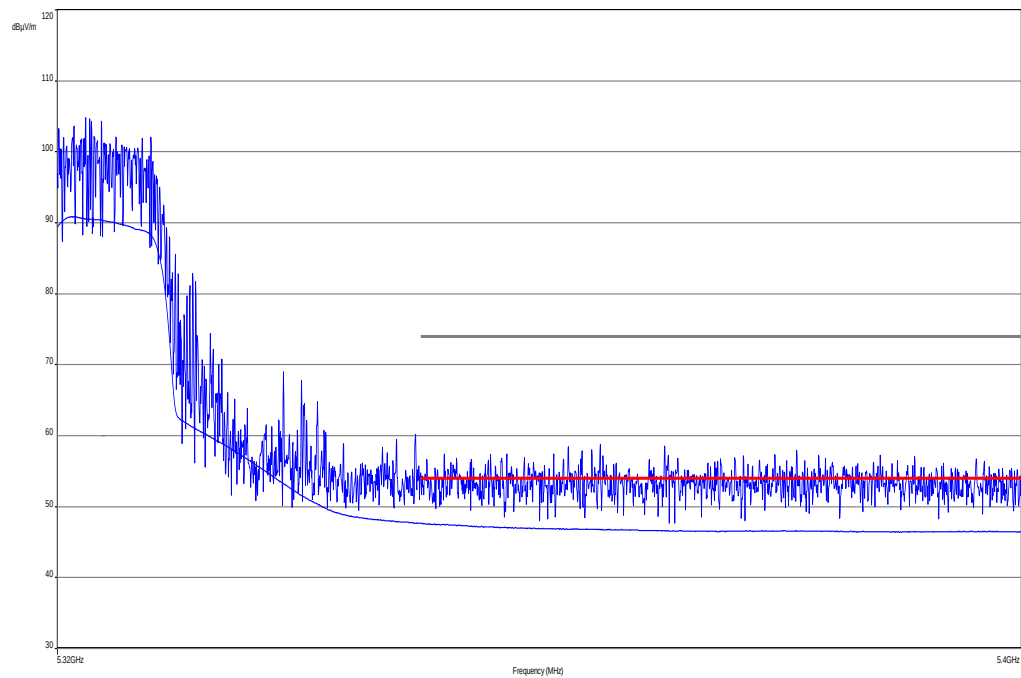
Limits:

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 27 dBm Peak

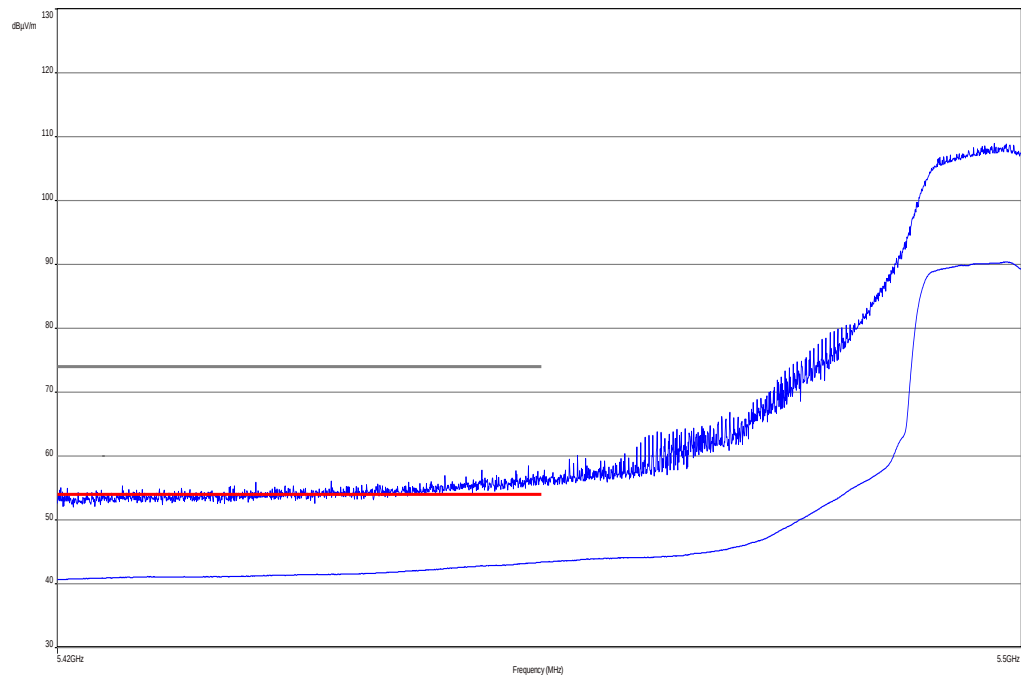
Results:

Scenario	Band Edge Compliance Radiated
band edge, a – mode, channel 36	55.0 dB μ V/m (PEAK) 39.2 dB μ V/m (AVG)
band edge, a – mode, channel 64	60.1 dB μ V/m (PEAK) 47.4 dB μ V/m (AVG)
band edge, a – mode, channel 100	58.5 dB μ V/m (PEAK) 43.4 dB μ V/m (AVG)
band edge, a – mode, channel 140	-47.3 dBm (PEAK)
band edge, n – mode, channel 36	57.8 dB μ V/m (PEAK) 39.5 dB μ V/m (AVG)
band edge, n – mode, channel 64	64.0 dB μ V/m (PEAK) 43.0 dB μ V/m (AVG)
band edge, n – mode, channel 100	54.6 dB μ V/m (PEAK) 40.7 dB μ V/m (AVG)
band edge, n – mode, channel 140	-37.9 dBm (PEAK)
Measurement uncertainty	± 3 dB

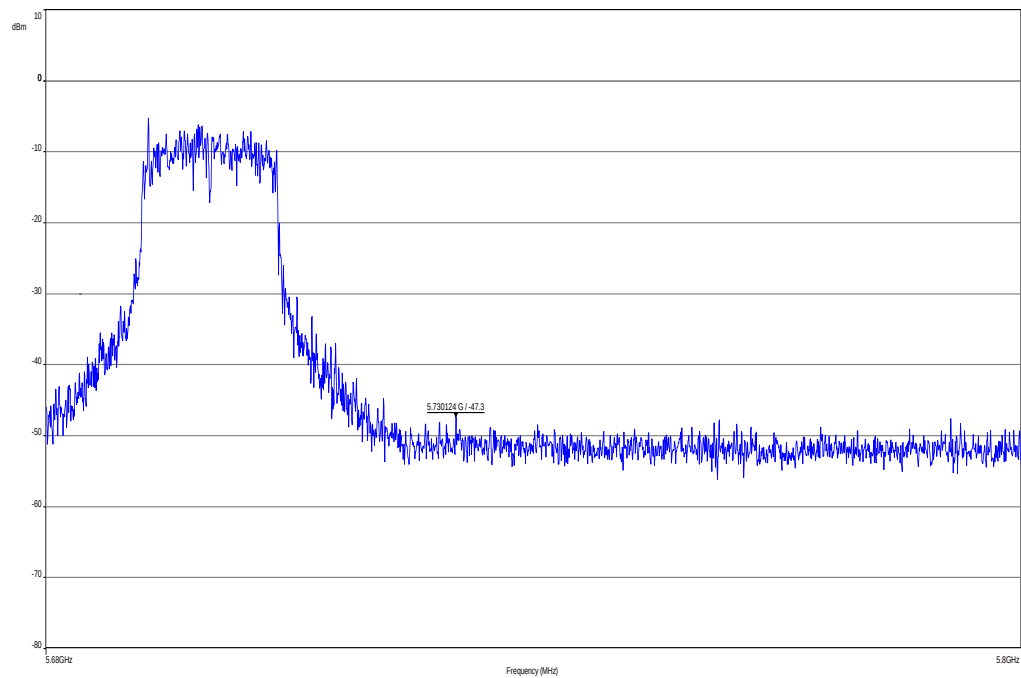
Result: **Passed**

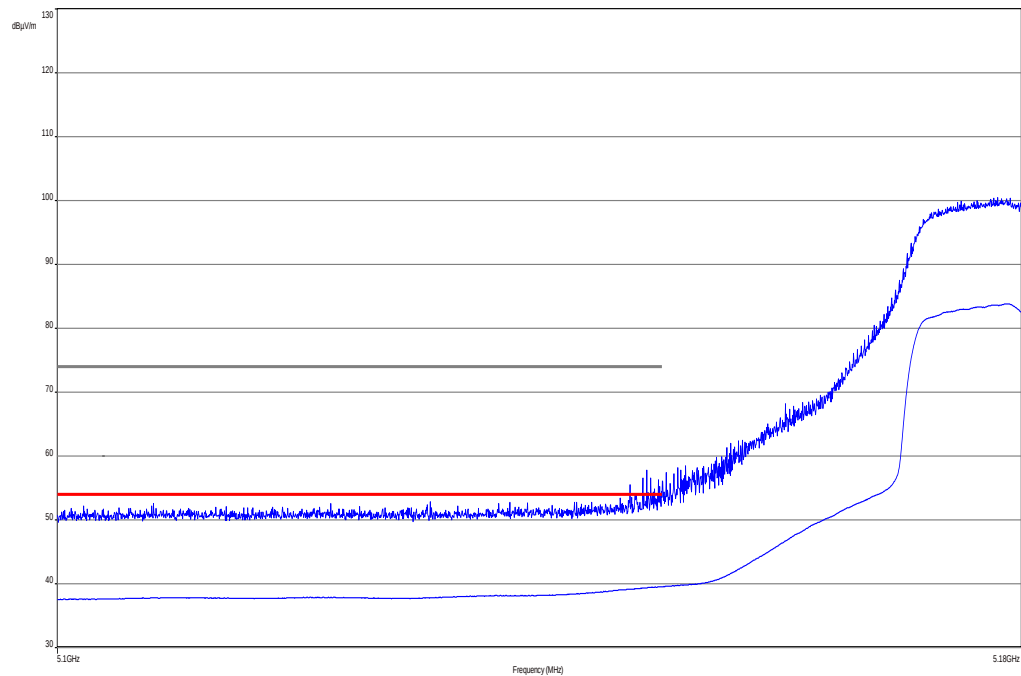
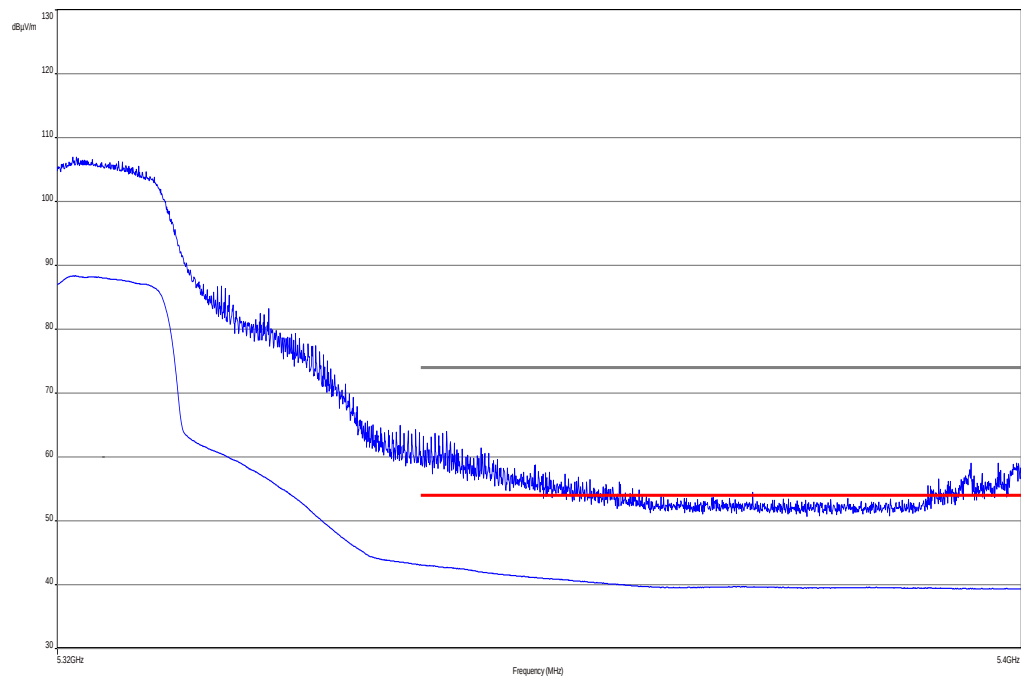
Plots:**Plot 1:** lower band edge, vertical & horizontal polarization (a mode), channel 36**Plot 2:** upper band edge, vertical & horizontal polarization (a mode), channel 64

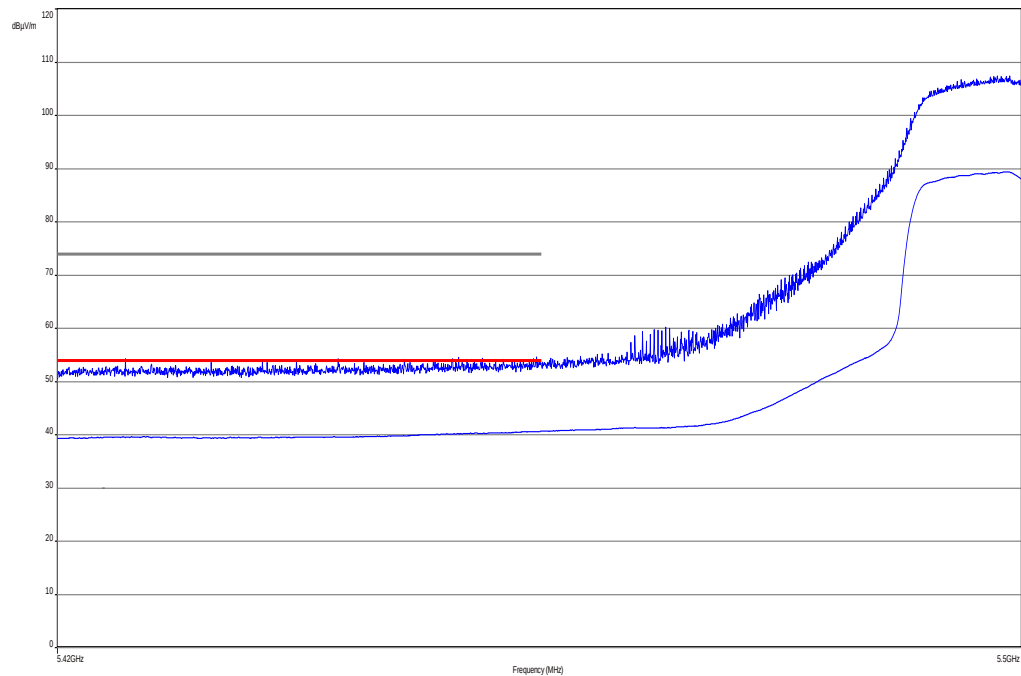
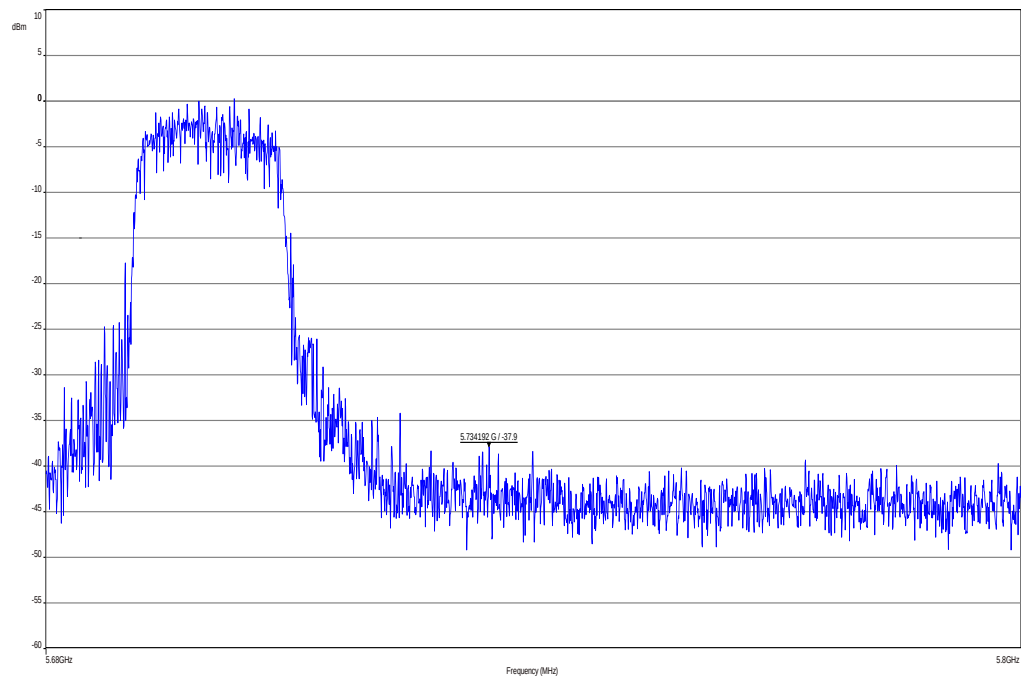
Plot 3: lower band edge, vertical & horizontal polarization (a mode), channel 100



Plot 4: lower band edge, vertical & horizontal polarization (a mode), channel 140 (Limit -27 dBm)



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:** lower band edge, vertical & horizontal polarization (n HT 20 mode), channel 140 (Limit -27 dBm)**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 (dB μ V/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								
channel 5180 MHz			channel 5240 MHz			channel 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.		
No emissions detected closer than 20 dB below the limit.			No emissions detected closer than 20 dB below the limit.			No emissions detected closer than 20 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]
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.		
No emissions detected closer than 20 dB below the limit.						No emissions detected closer than 20 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								
channel 5180 MHz			channel 5240 MHz			channel 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.		
No emissions detected closer than 20 dB below the limit.			No emissions detected closer than 20 dB below the limit.			No emissions detected closer than 20 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]
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.		
No emissions detected closer than 20 dB below the limit.						No emissions detected closer than 20 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

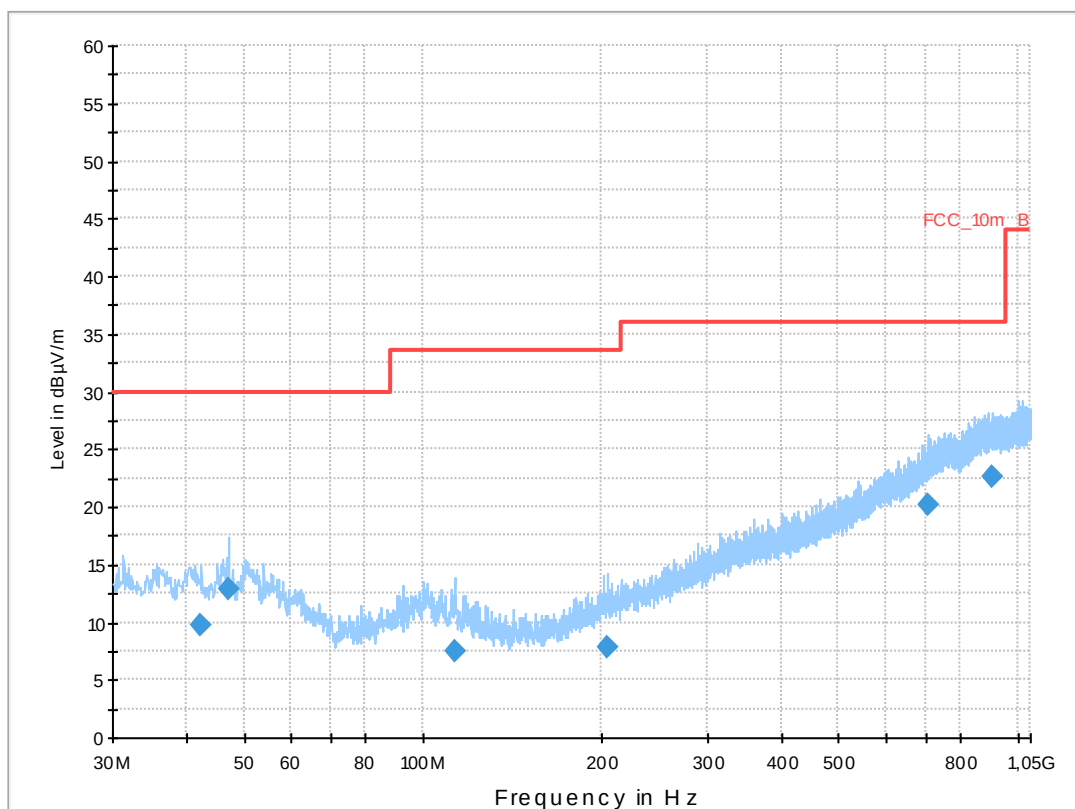
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11a tx ch36
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

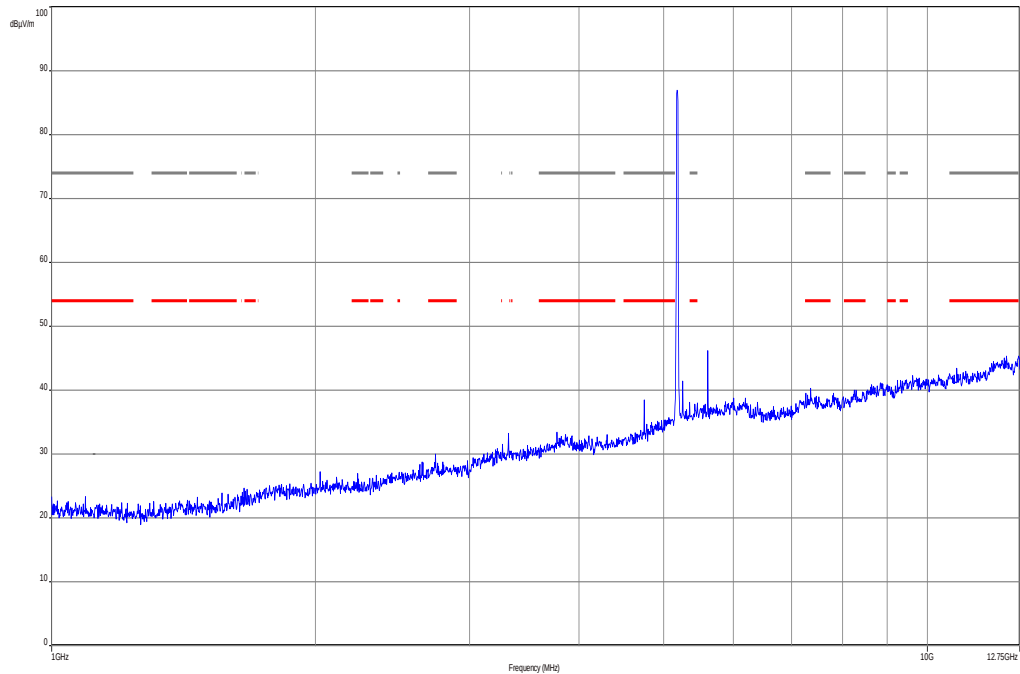
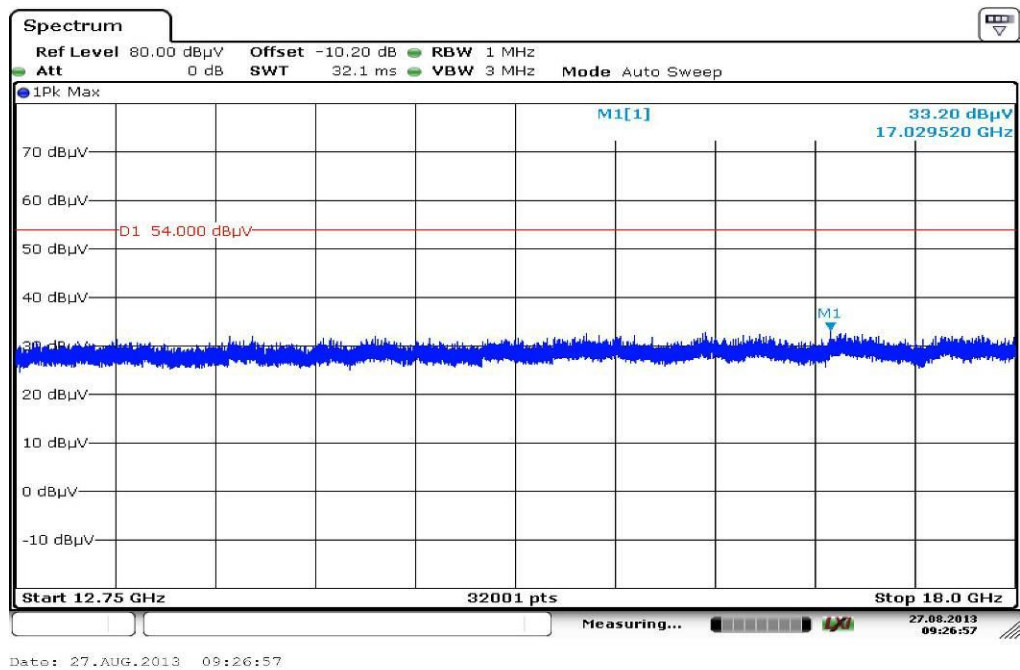
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBμV/m

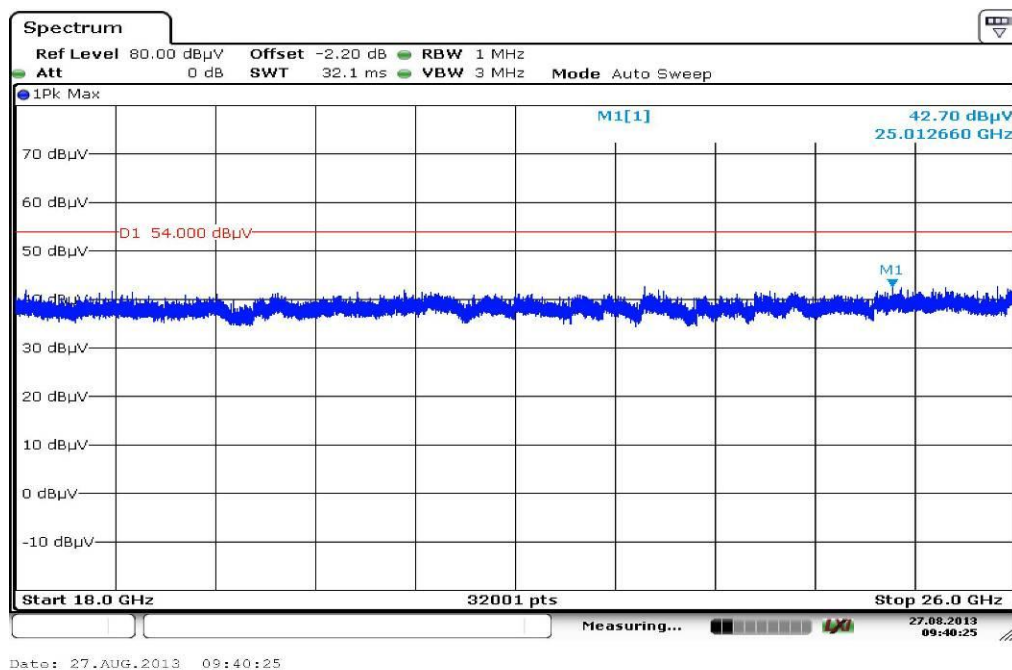
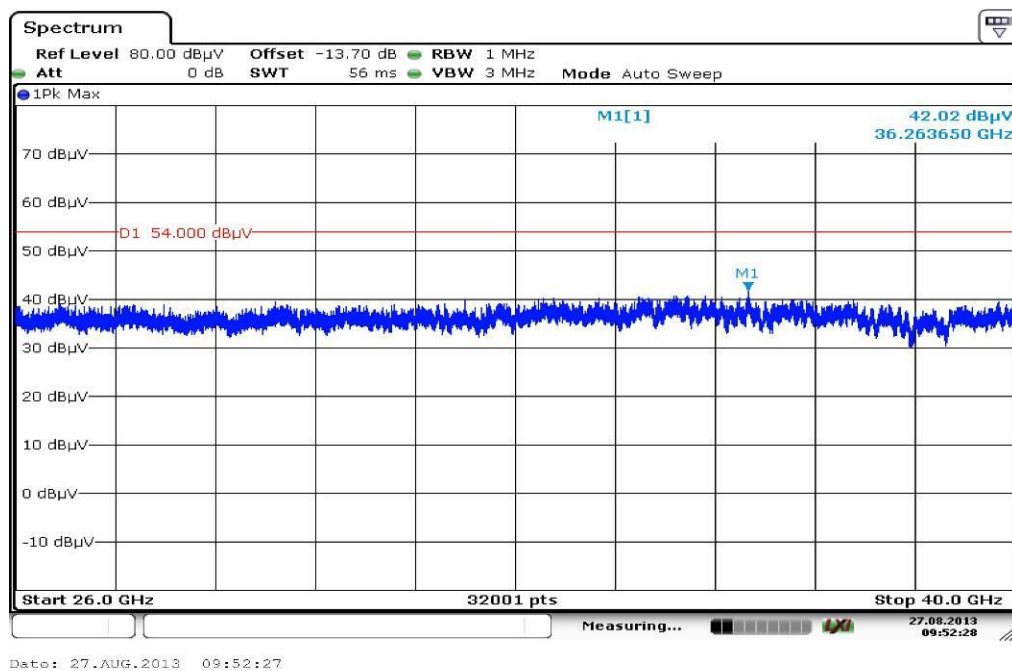
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



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
42.360000	9.7	1000.0	120.000	270.0	V	284.0	13.4	20.3	30.0	
47.040000	12.9	1000.0	120.000	98.0	V	338.0	13.3	17.1	30.0	
112.800000	7.5	1000.0	120.000	270.0	V	236.0	10.8	26.0	33.5	
203.880000	7.9	1000.0	120.000	210.0	V	72.0	11.8	25.6	33.5	
707.760000	20.1	1000.0	120.000	270.0	H	18.0	22.7	15.9	36.0	
907.200000	22.6	1000.0	120.000	270.0	V	0.0	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

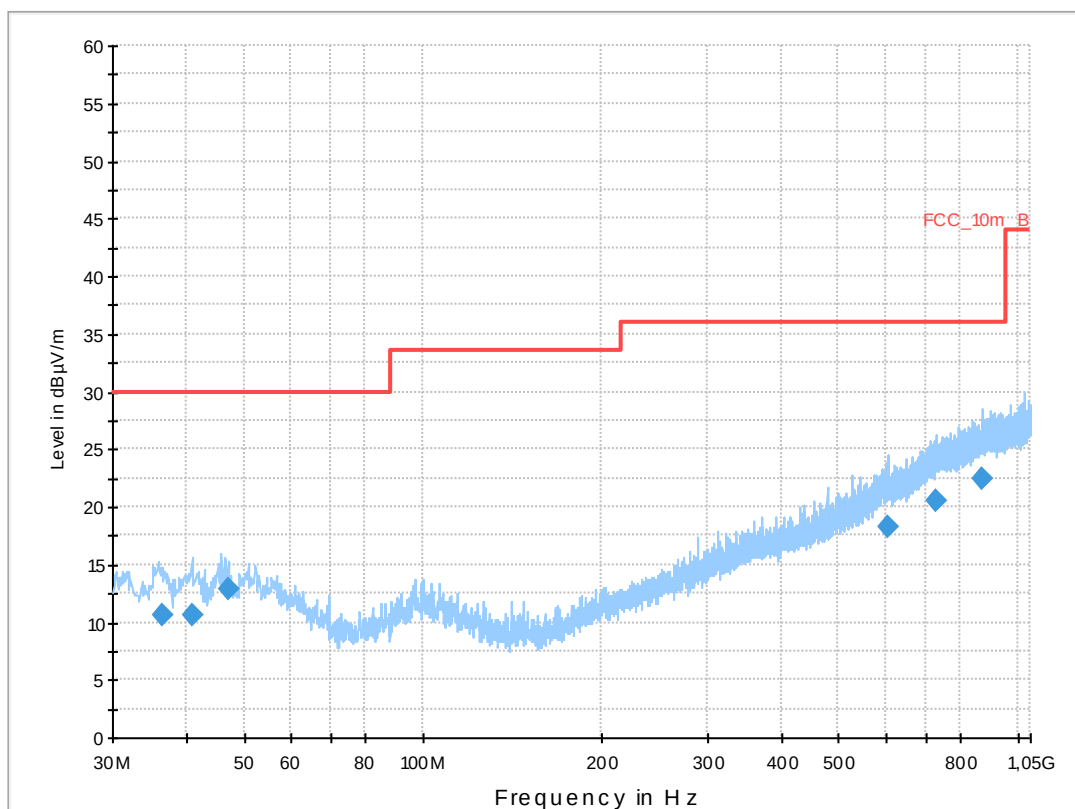
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11a tx ch48
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

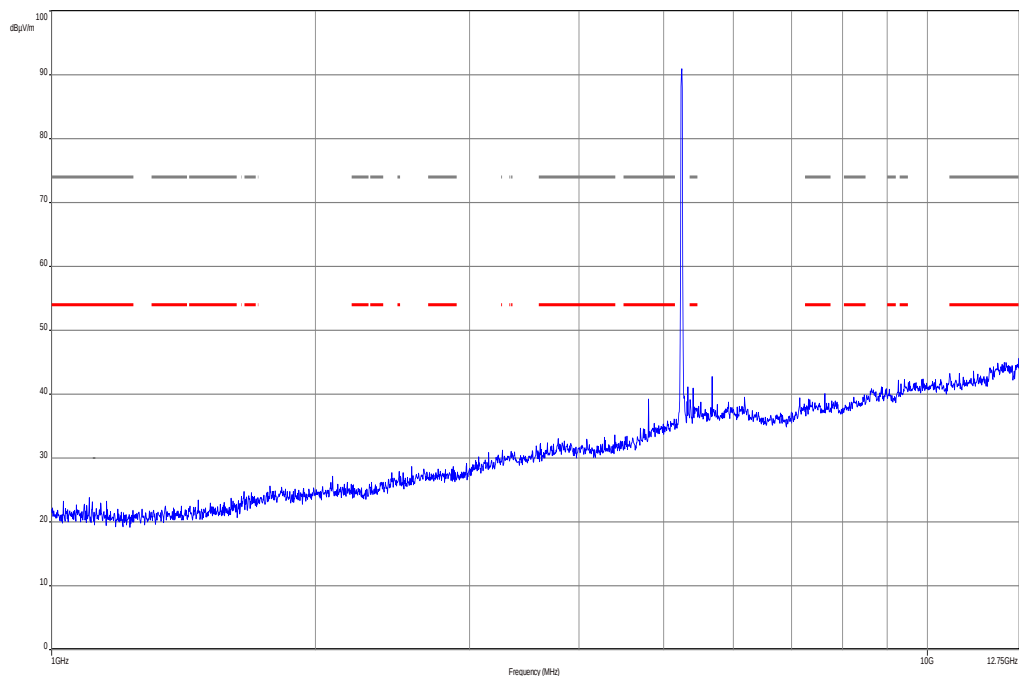
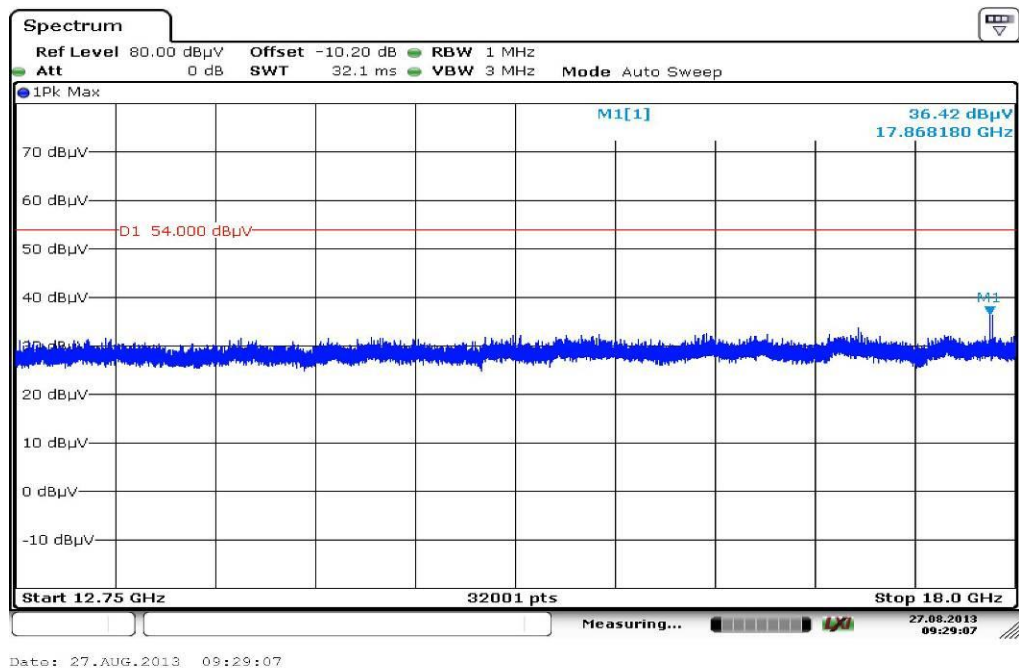
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/m

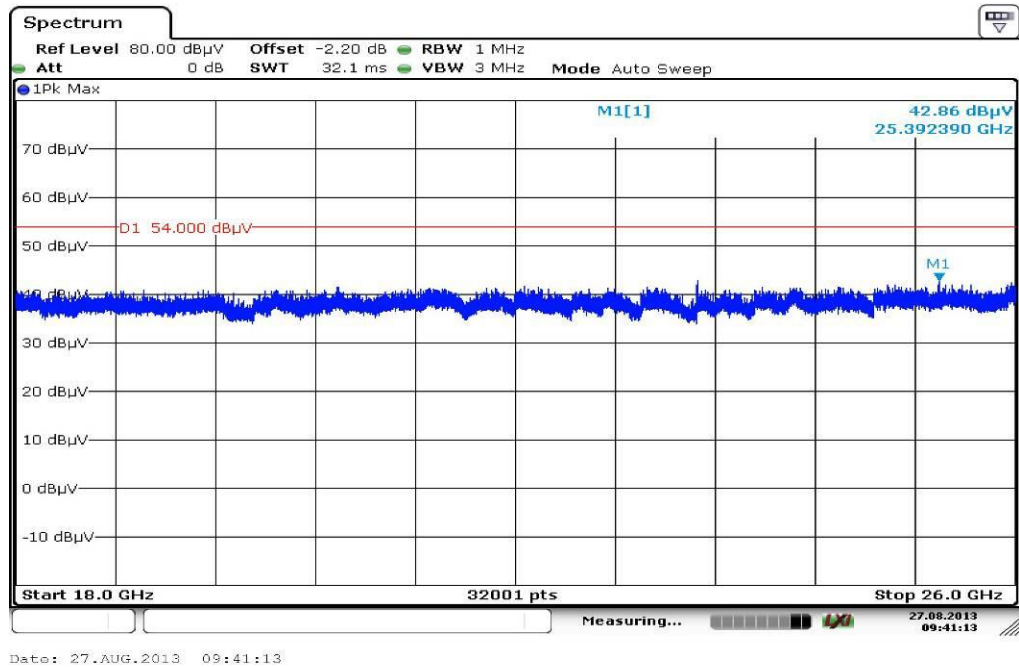
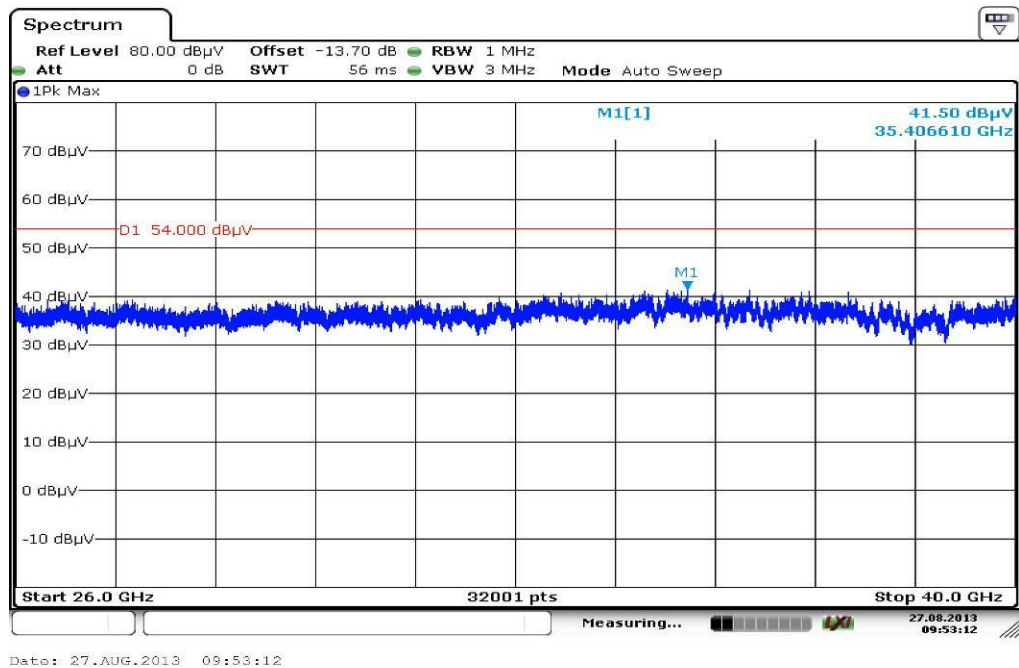
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
36.360000	10.5	1000.0	120.000	256.0	V	112.0	13.1	19.5	30.0	
40.800000	10.7	1000.0	120.000	170.0	V	90.0	13.4	19.3	30.0	
47.040000	12.9	1000.0	120.000	98.0	V	50.0	13.3	17.1	30.0	
606.600000	18.2	1000.0	120.000	113.0	H	274.0	20.8	17.8	36.0	
730.320000	20.5	1000.0	120.000	224.0	H	120.0	23.2	15.5	36.0	
873.000000	22.4	1000.0	120.000	246.0	H	90.0	24.9	13.6	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

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

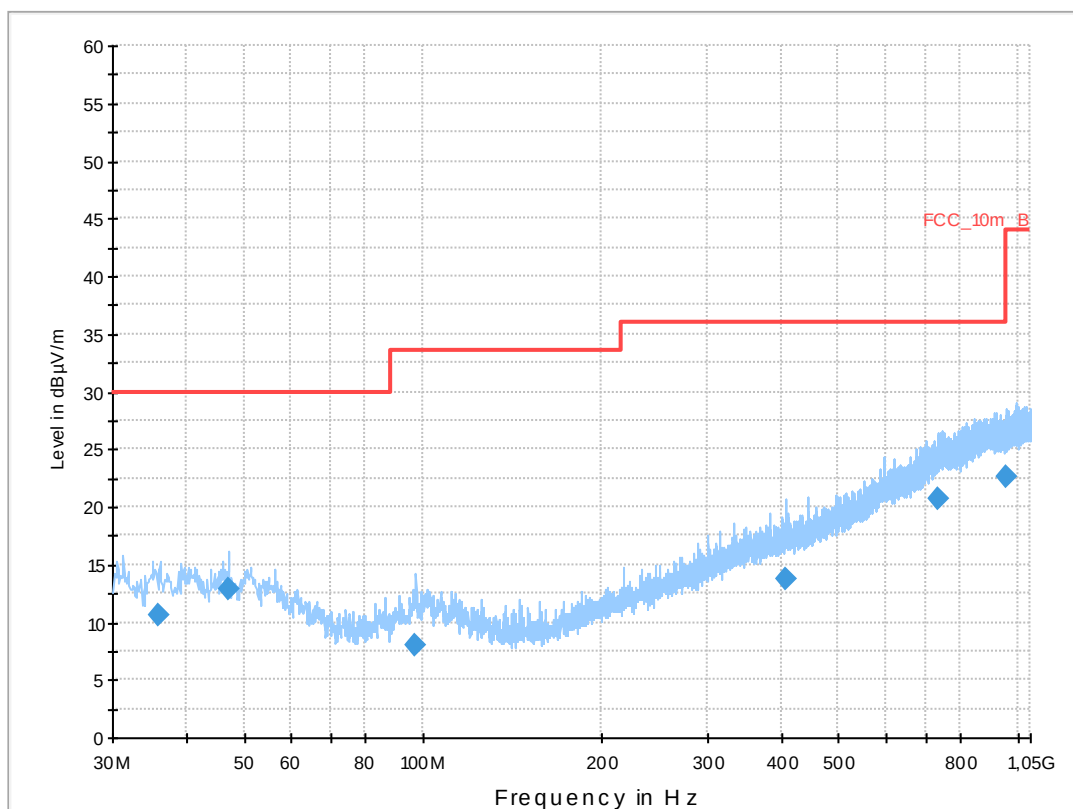
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11a tx ch64
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

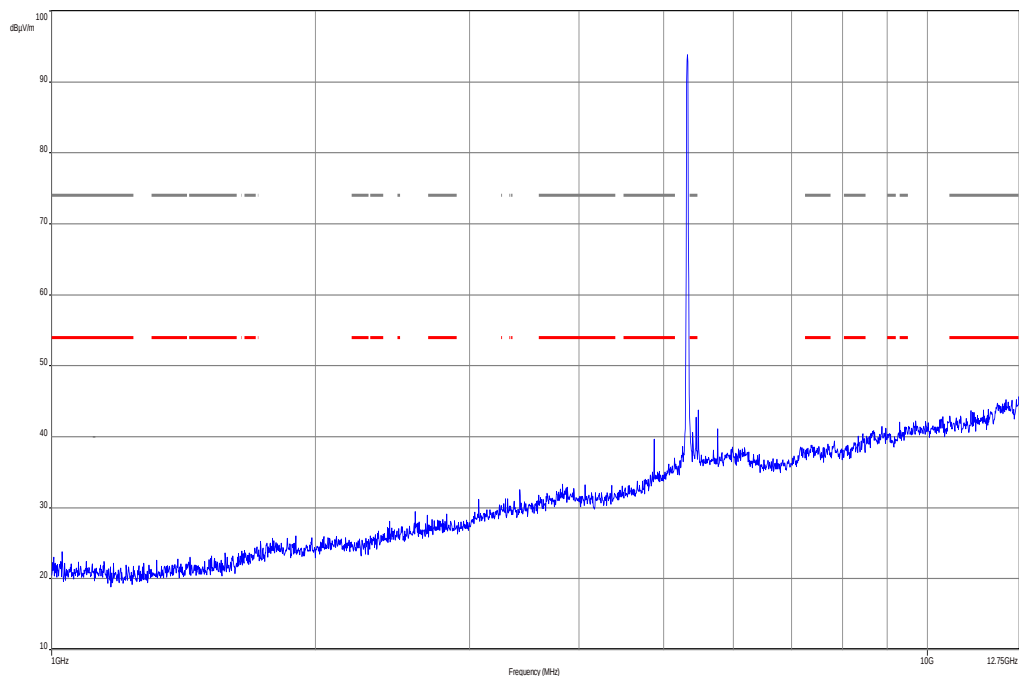
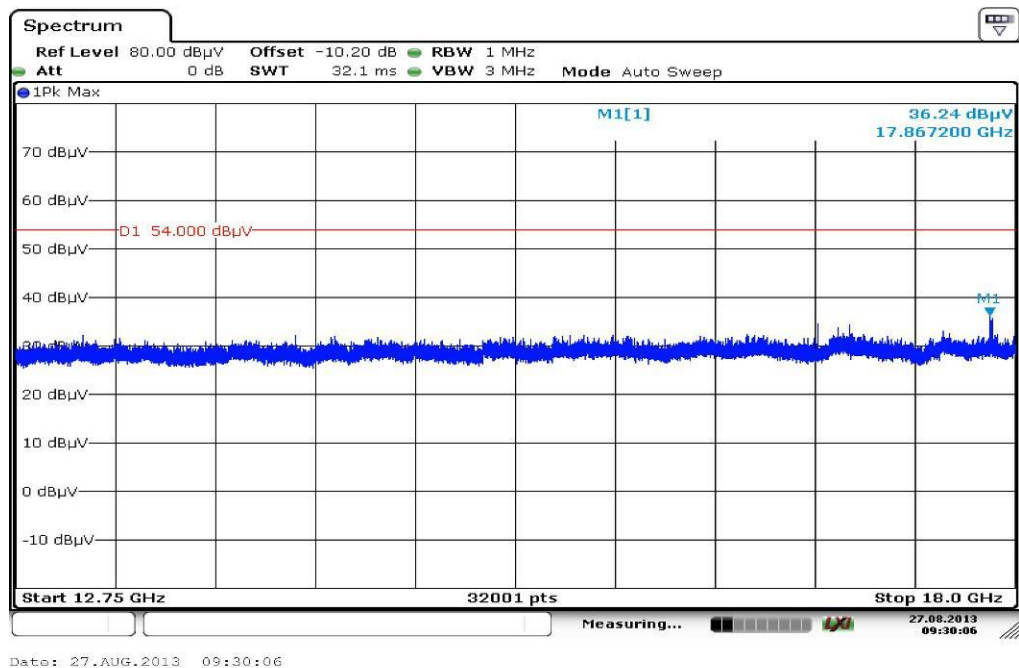
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/m

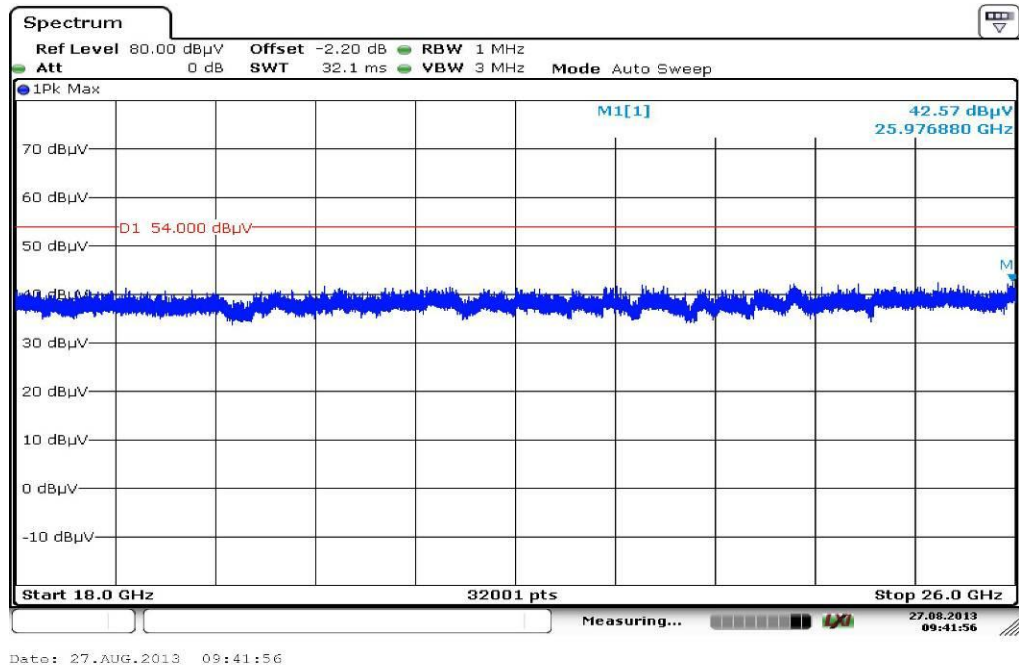
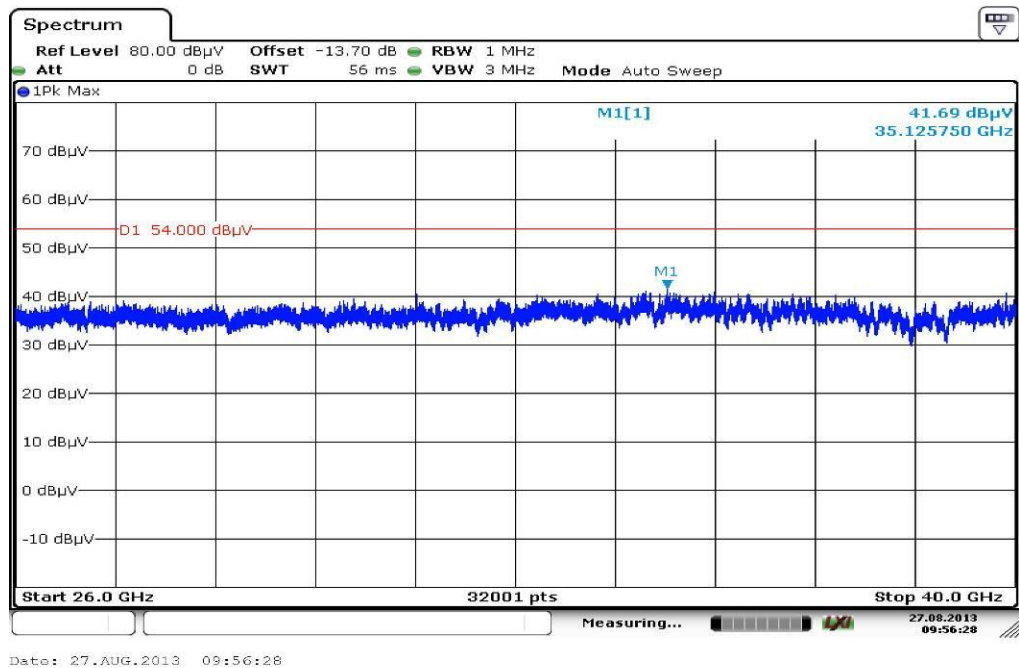
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
35.880000	10.6	1000.0	120.000	98.0	V	262.0	13.1	19.4	30.0	
47.040000	12.9	1000.0	120.000	98.0	V	88.0	13.3	17.1	30.0	
97.200000	8.1	1000.0	120.000	263.0	V	26.0	11.5	25.4	33.5	
405.840000	13.7	1000.0	120.000	270.0	H	0.0	17.0	22.3	36.0	
734.760000	20.6	1000.0	120.000	98.0	H	347.0	23.3	15.4	36.0	
954.840000	22.7	1000.0	120.000	270.0	H	107.0	25.4	13.3	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

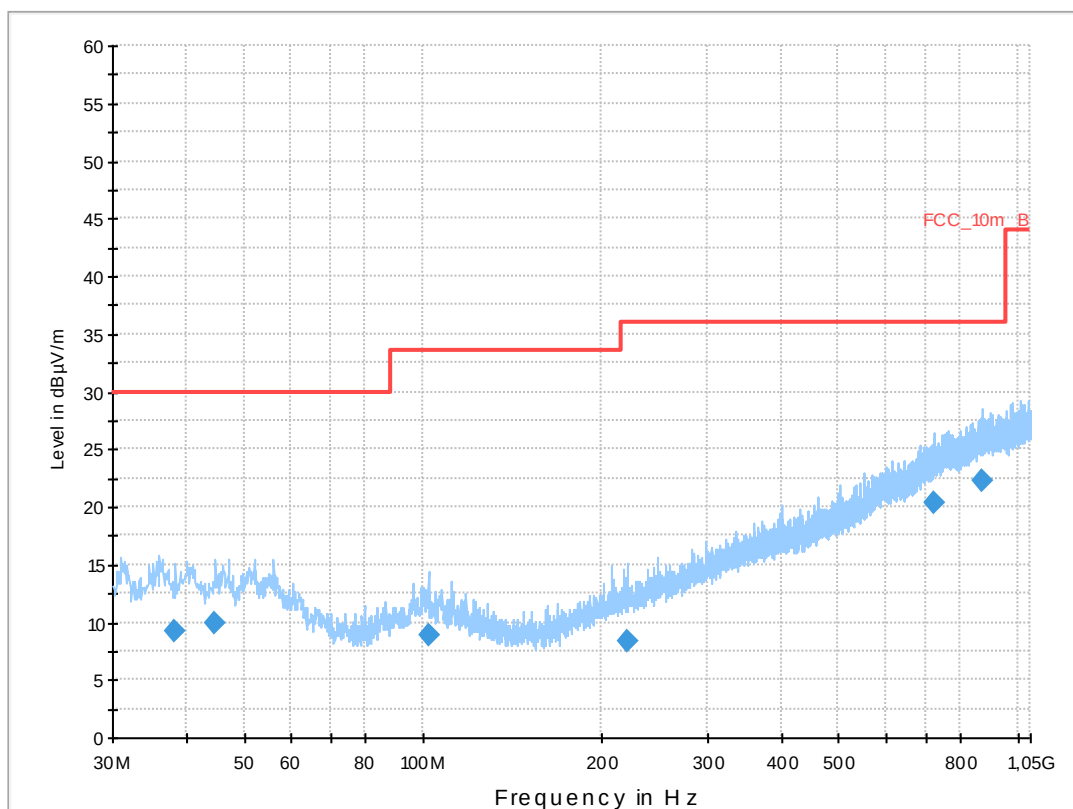
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11a tx ch100
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

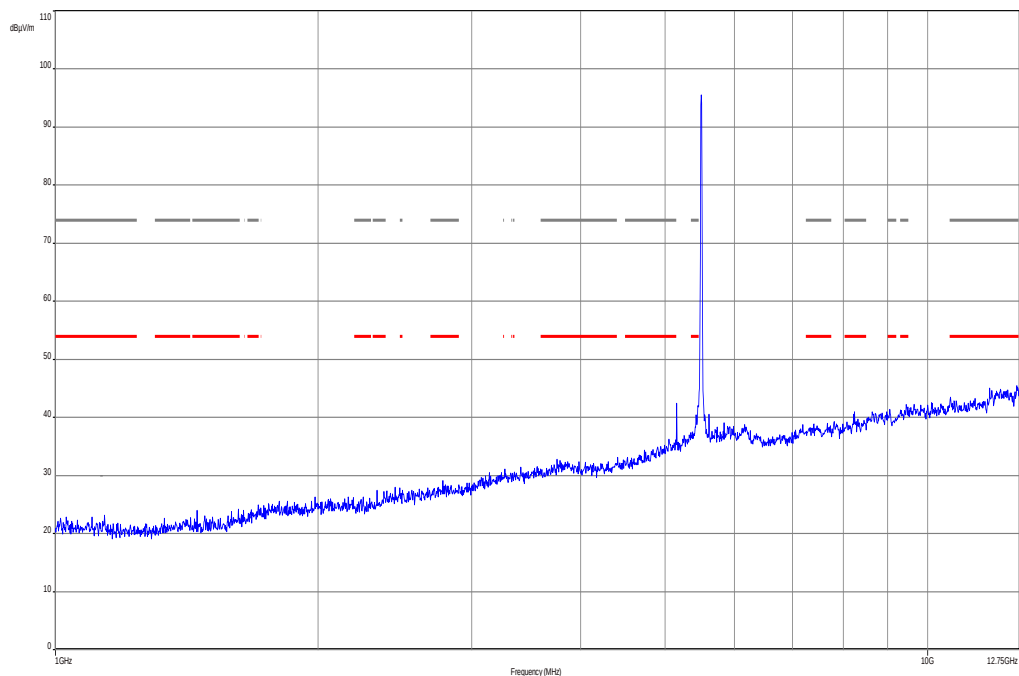
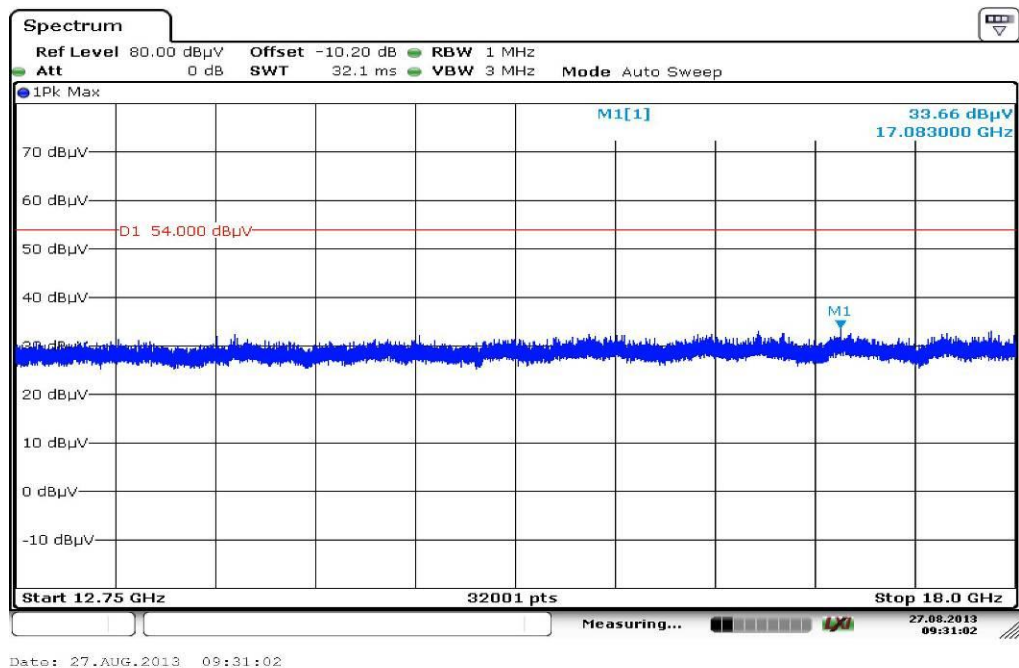
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/m

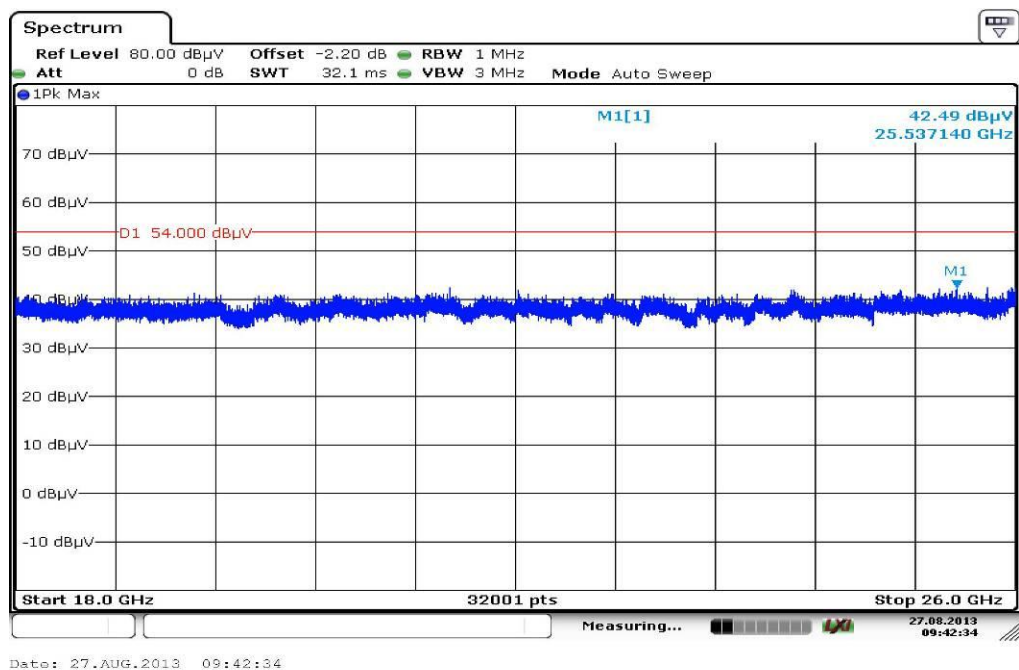
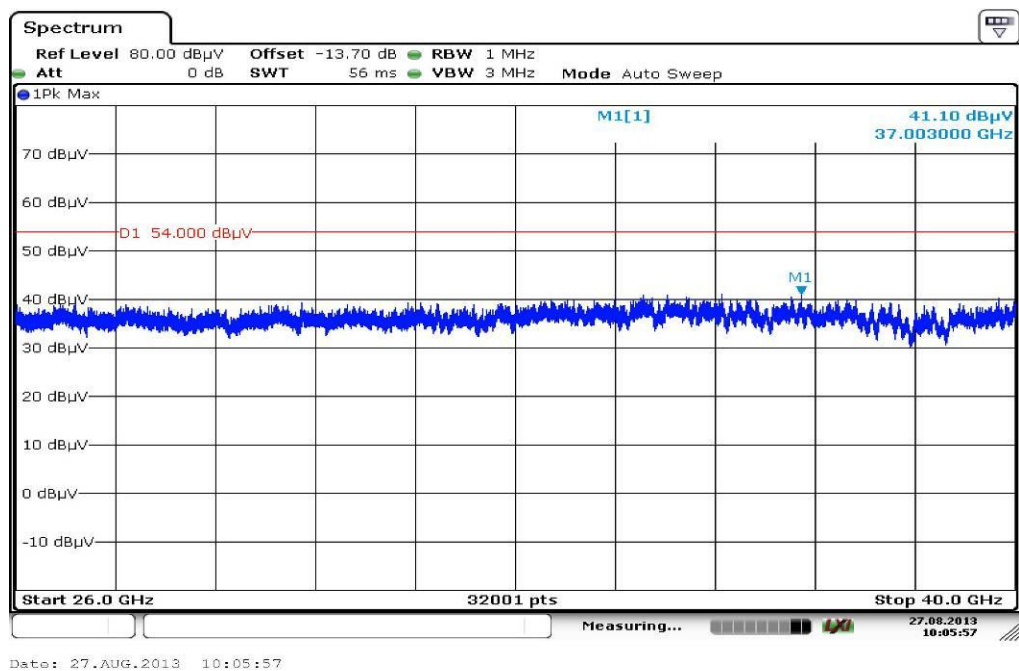
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
38.280000	9.2	1000.0	120.000	157.0	H	132.0	13.3	20.8	30.0	
44.640000	9.9	1000.0	120.000	98.0	H	77.0	13.3	20.1	30.0	
102.000000	8.8	1000.0	120.000	262.0	V	166.0	11.7	24.7	33.5	
220.200000	8.4	1000.0	120.000	270.0	V	32.0	12.4	27.6	36.0	
723.000000	20.3	1000.0	120.000	270.0	H	207.0	23.0	15.7	36.0	
871.560000	22.3	1000.0	120.000	270.0	V	207.0	24.8	13.7	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

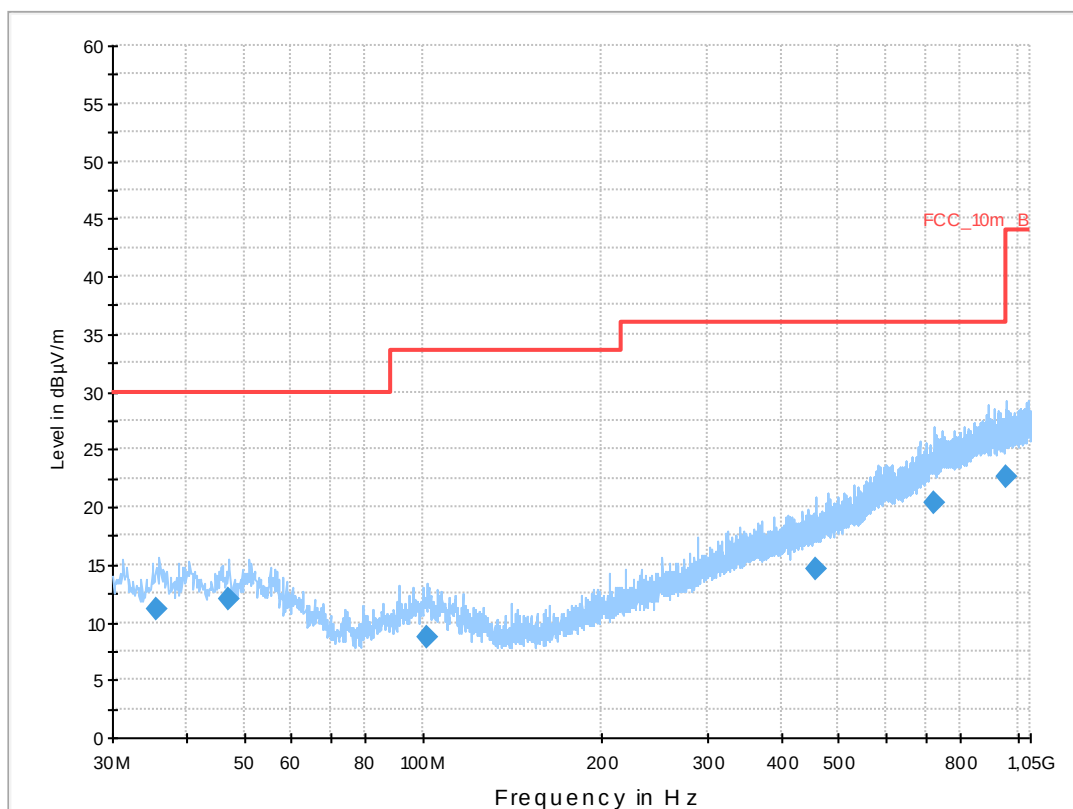
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11a tx ch140
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

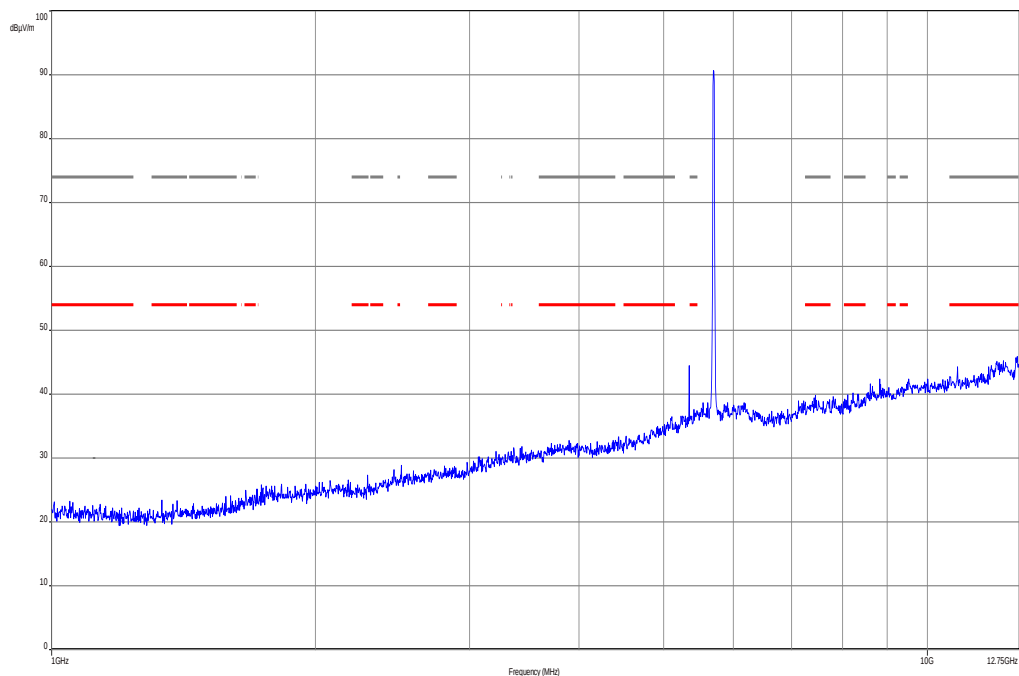
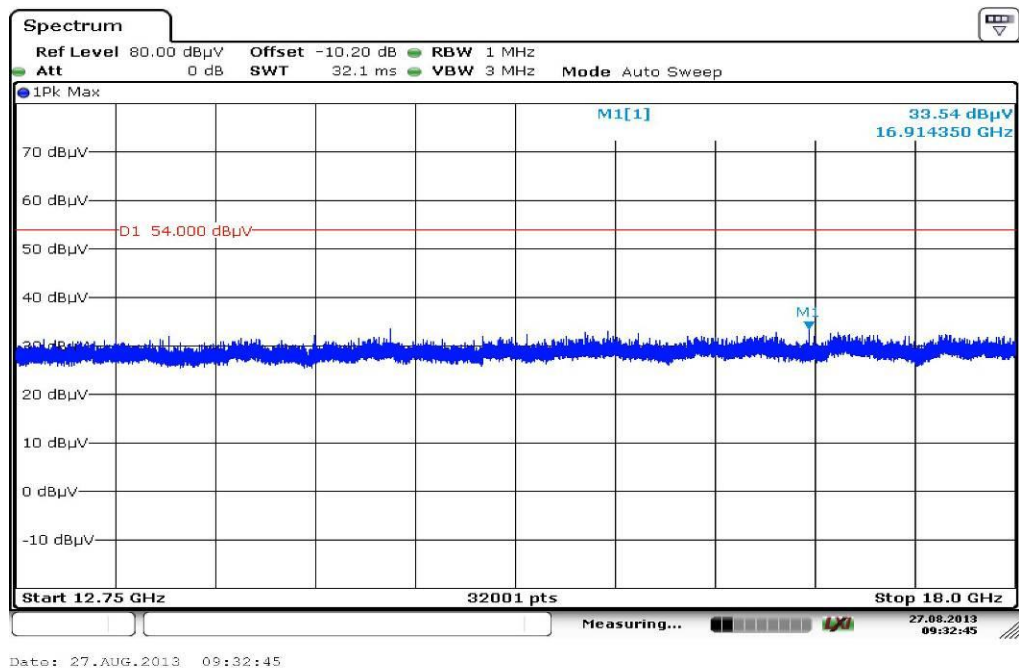
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBμV/m

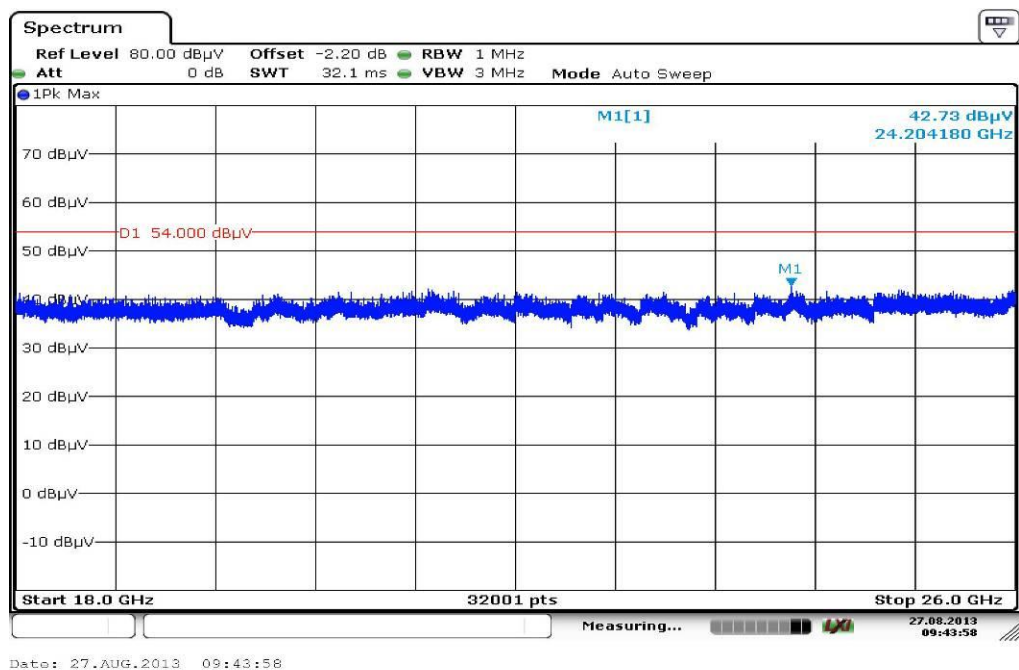
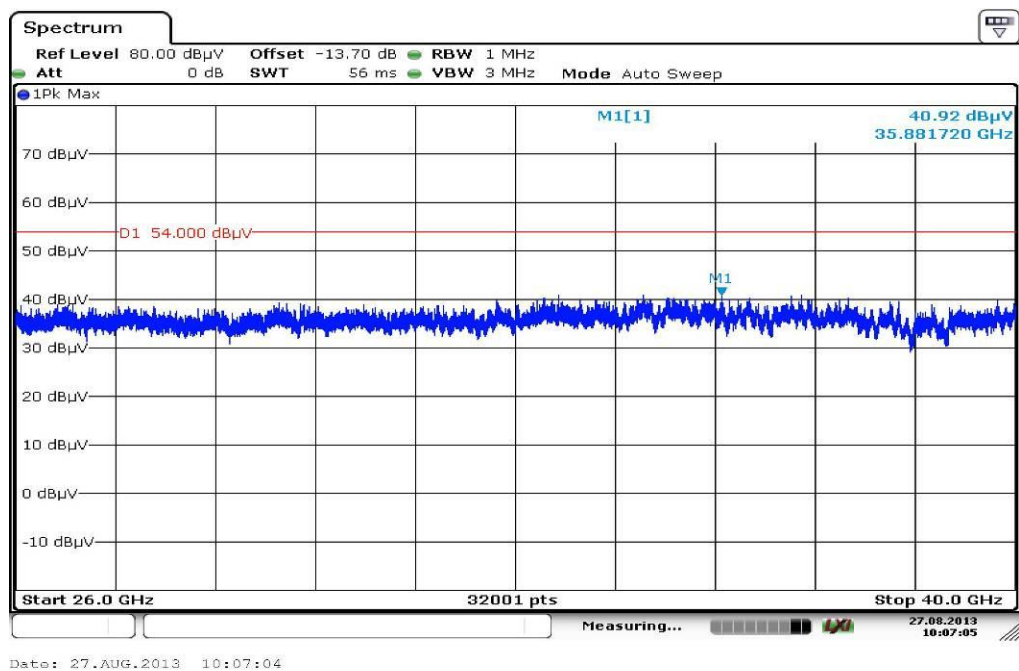
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



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
35.520000	11.2	1000.0	120.000	157.0	V	32.0	13.1	18.8	30.0	
47.040000	12.0	1000.0	120.000	146.0	V	0.0	13.3	18.0	30.0	
101.640000	8.8	1000.0	120.000	171.0	V	10.0	11.8	24.7	33.5	
457.200000	14.6	1000.0	120.000	262.0	H	72.0	17.8	21.4	36.0	
724.560000	20.3	1000.0	120.000	270.0	H	197.0	23.1	15.7	36.0	
955.560000	22.7	1000.0	120.000	234.0	V	72.0	25.4	13.3	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

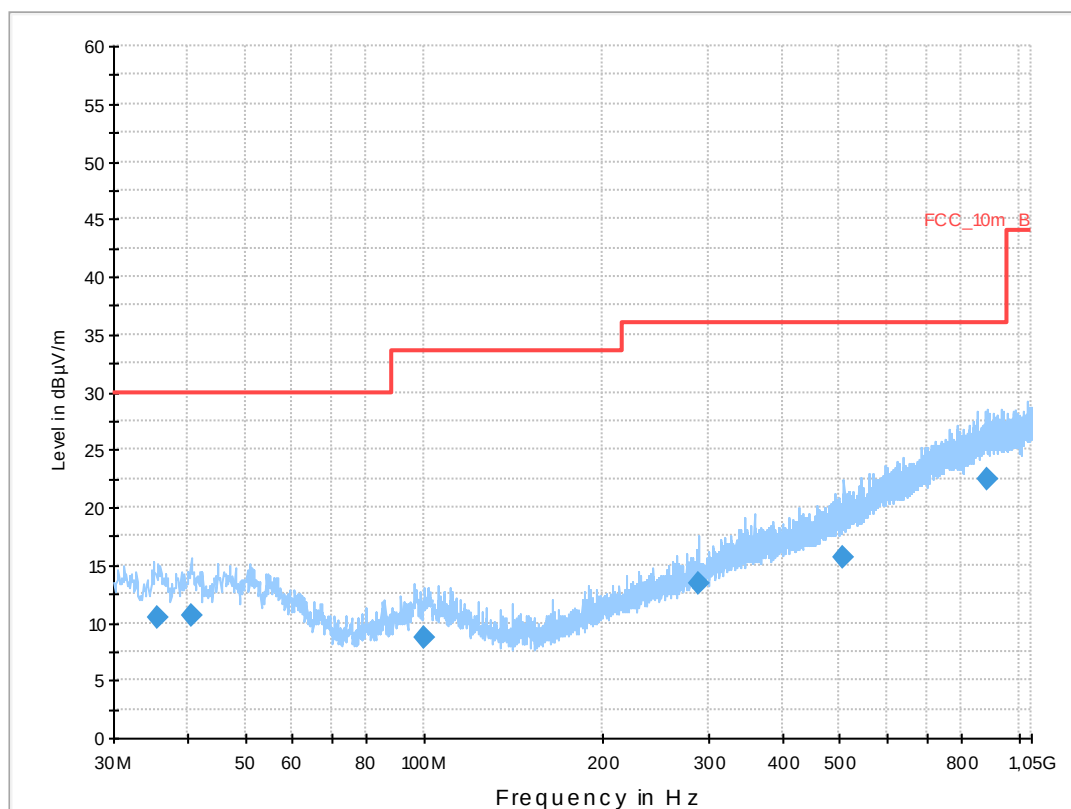
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11n tx ch36
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

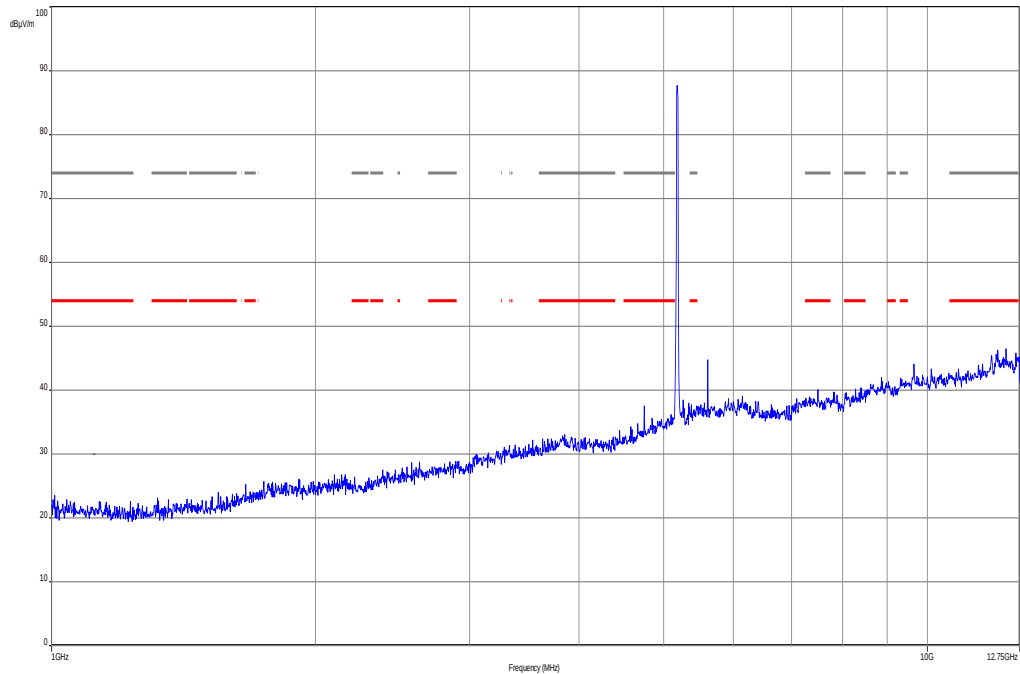
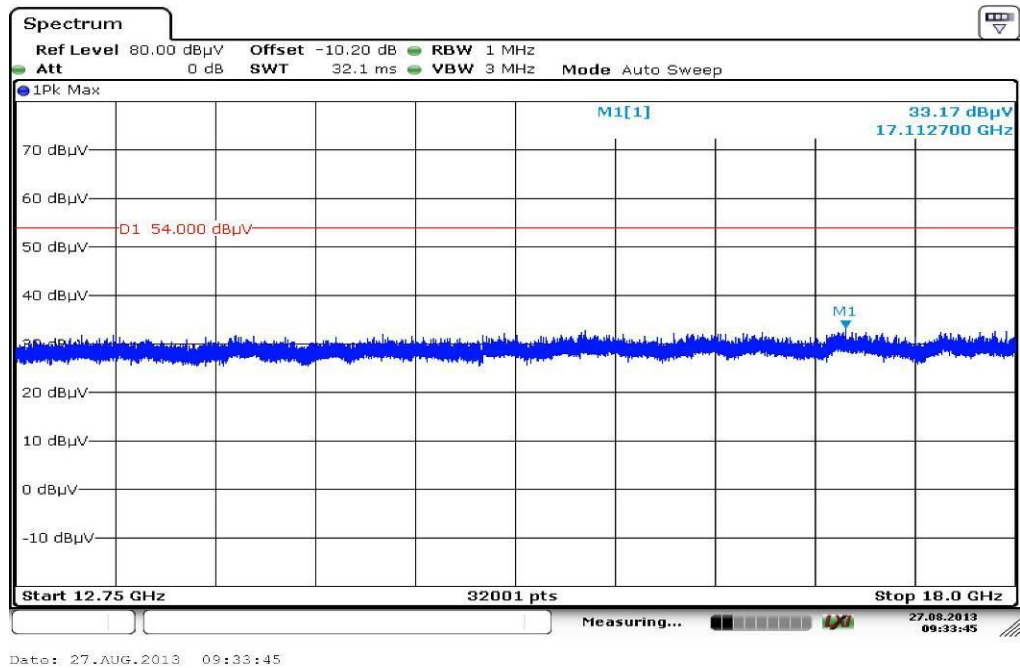
Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 3]
 Level Unit: dB μ V/m

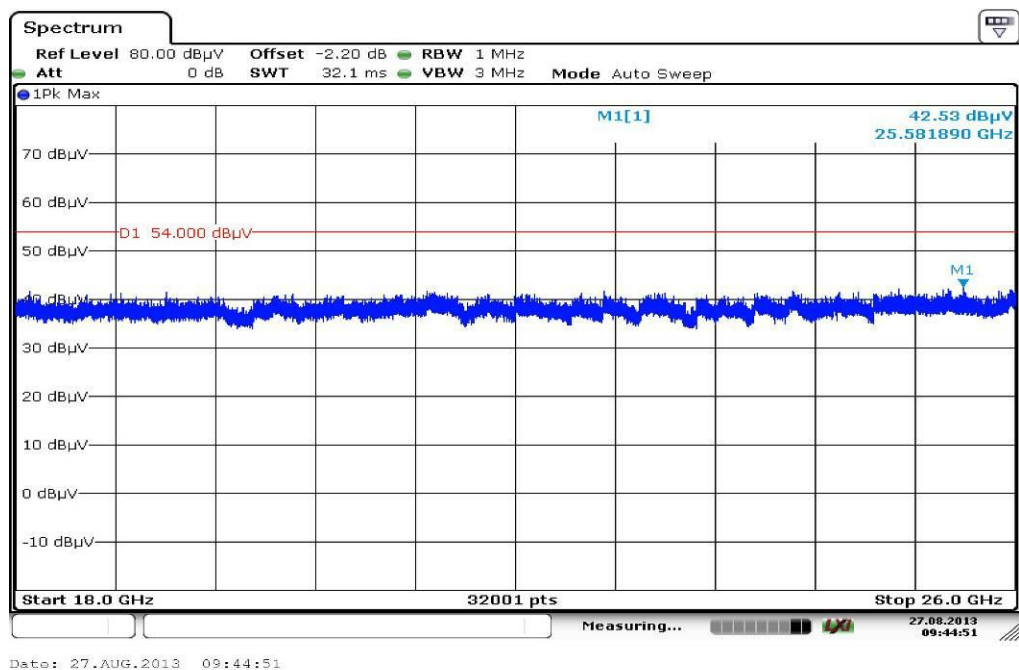
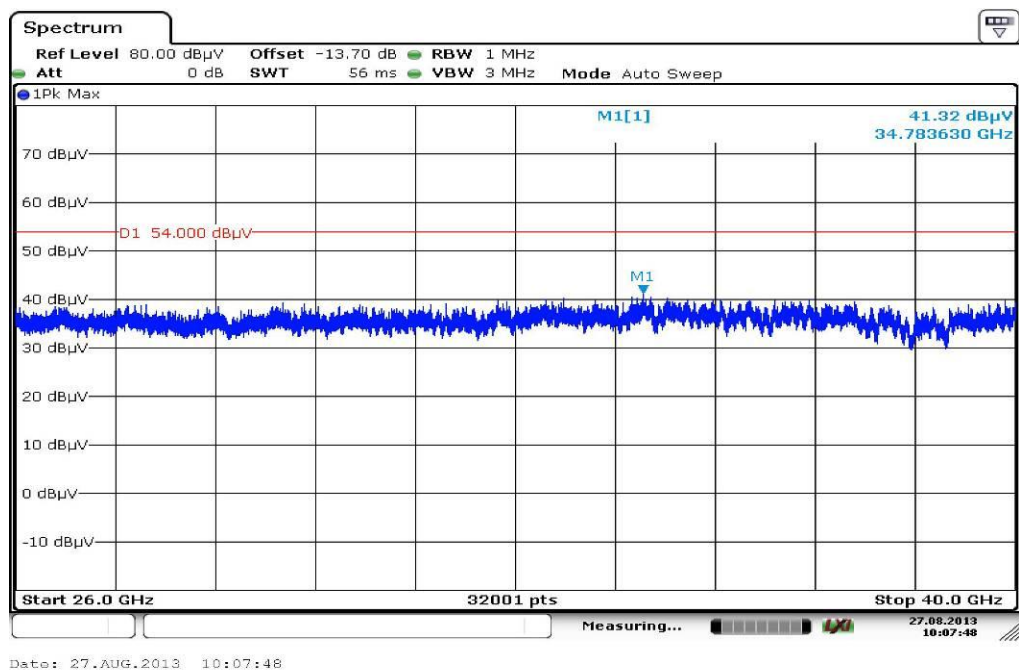
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
35.640000	10.4	1000.0	120.000	234.0	H	69.0	13.1	19.6	30.0	
40.560000	10.7	1000.0	120.000	270.0	H	69.0	13.4	19.3	30.0	
99.960000	8.7	1000.0	120.000	121.0	V	103.0	11.9	24.8	33.5	
290.040000	13.3	1000.0	120.000	270.0	V	117.0	14.3	22.7	36.0	
508.080000	15.6	1000.0	120.000	98.0	V	319.0	18.8	20.4	36.0	
884.520000	22.4	1000.0	120.000	195.0	H	268.0	25.0	13.6	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, 5260 MHz, vertical & horizontal polarization

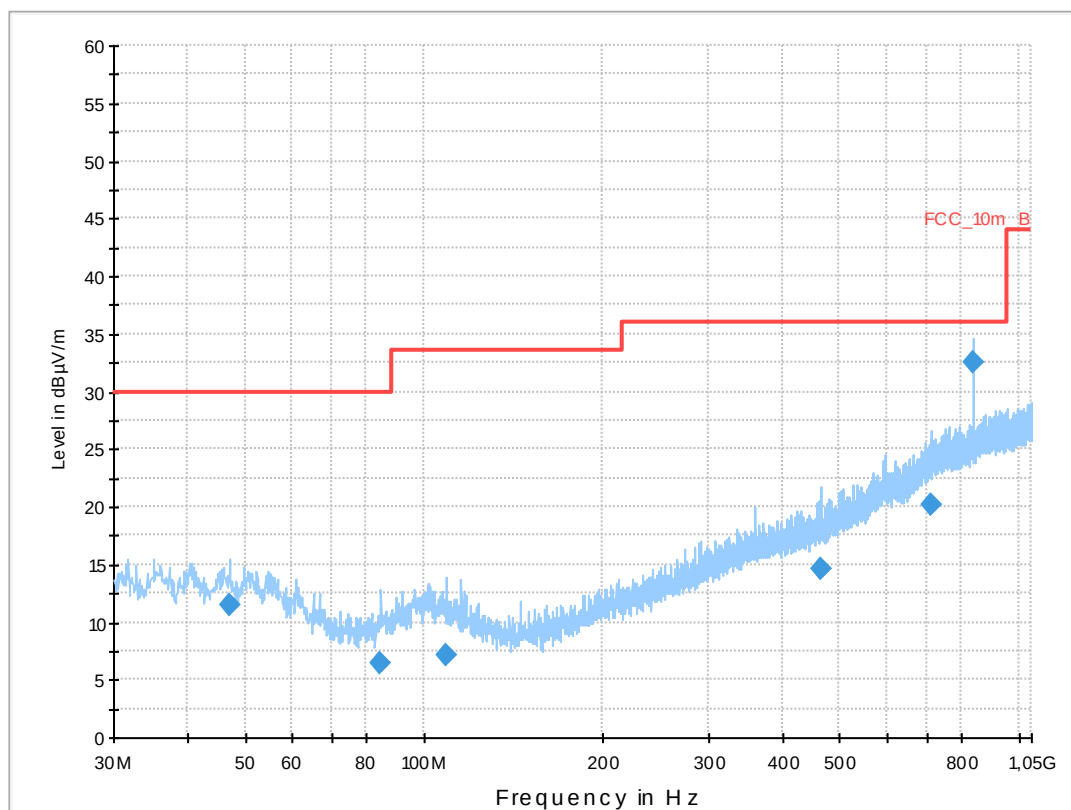
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11n tx ch48
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

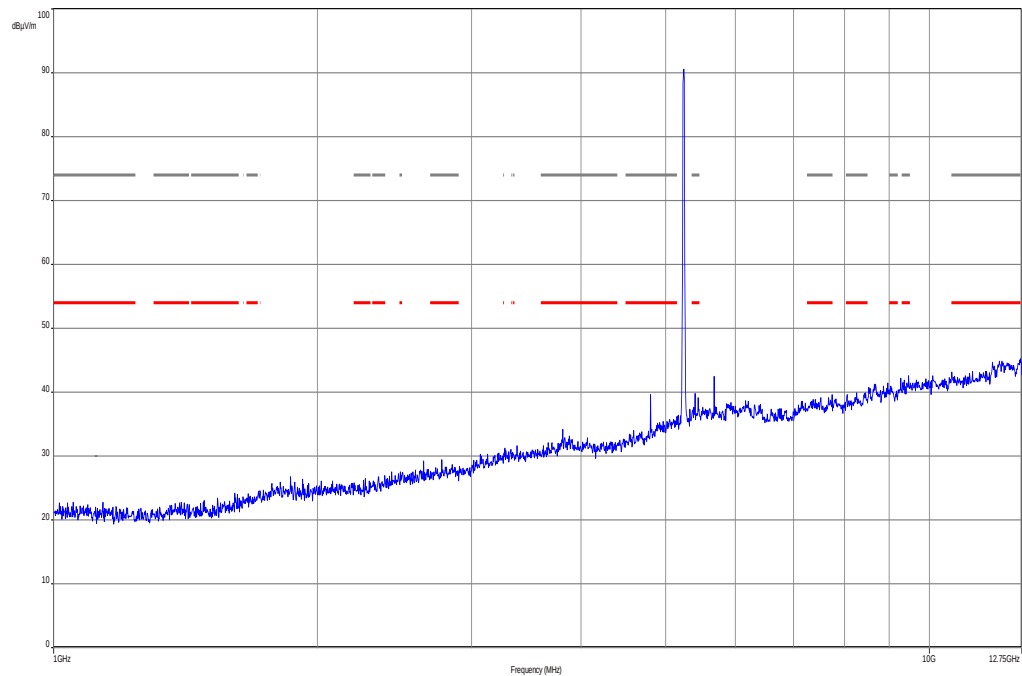
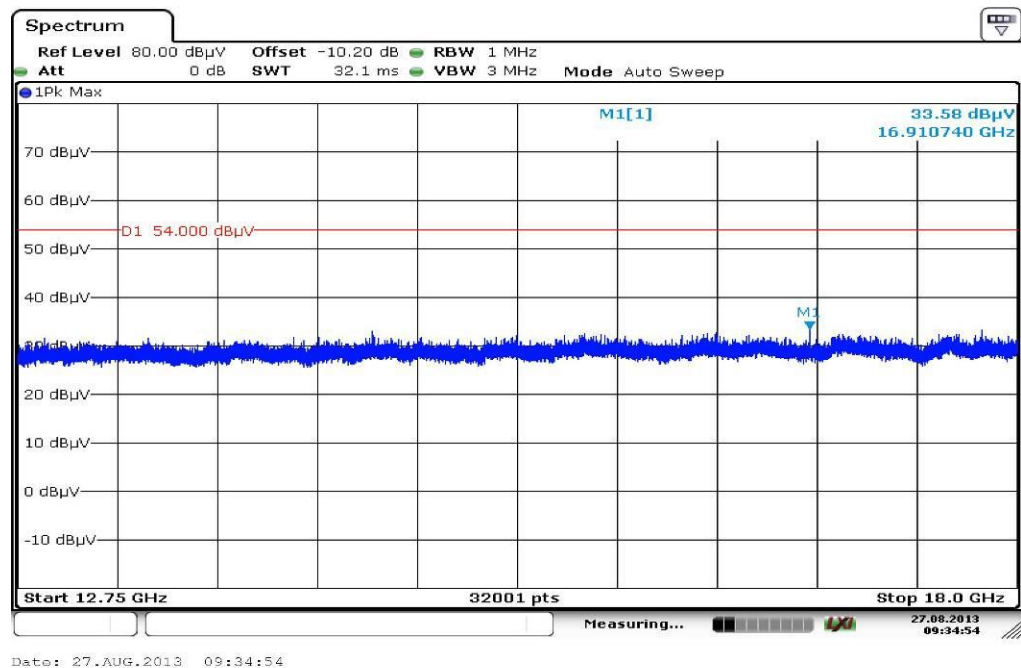
Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 3]
 Level Unit: dB μ V/m

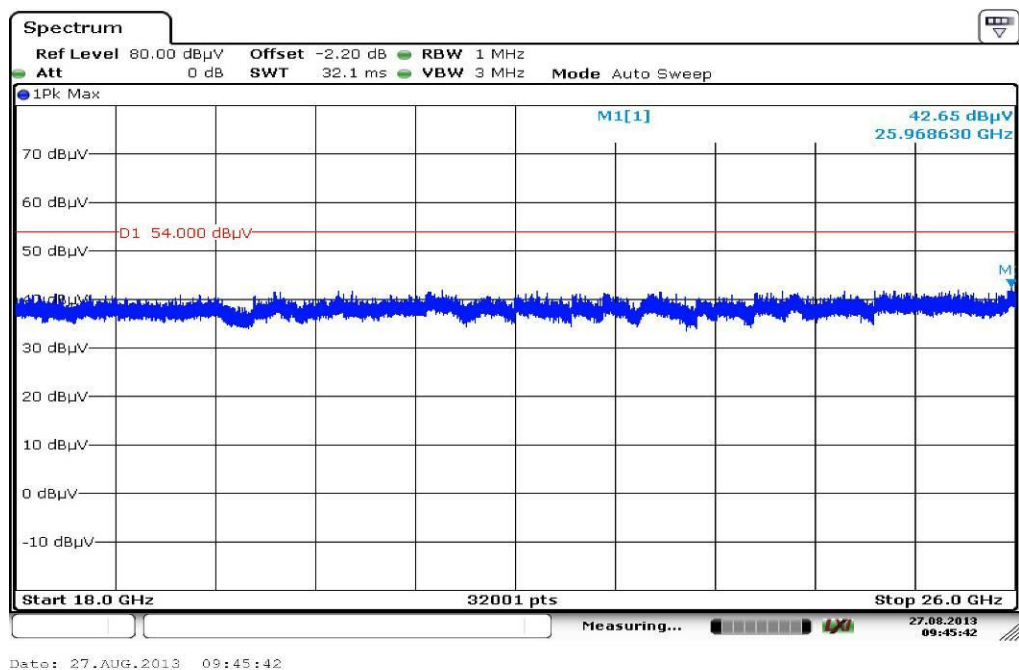
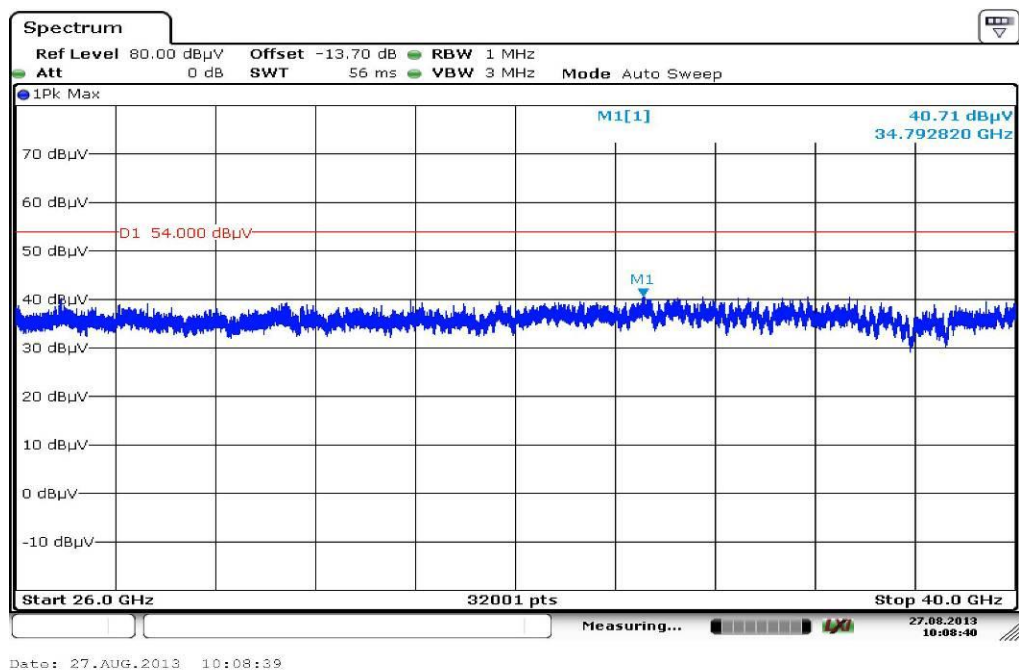
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
47.040000	11.4	1000.0	120.000	240.0	V	242.0	13.3	18.6	30.0	
84.480000	6.4	1000.0	120.000	270.0	V	58.0	9.7	23.6	30.0	
108.840000	7.1	1000.0	120.000	170.0	V	95.0	11.1	26.4	33.5	
463.920000	14.6	1000.0	120.000	270.0	H	338.0	18.0	21.4	36.0	
711.600000	20.2	1000.0	120.000	185.0	V	232.0	22.8	15.8	36.0	
836.520000	32.6	1000.0	120.000	180.0	V	338.0	24.4	3.4	36.0	

Plot 7: 1 GHz to 12.75 GHz, 5260 MHz, vertical & horizontal polarization**Plot 8:** 12 GHz to 18 GHz, 5260 MHz, vertical & horizontal polarization

Plot 9: 18 GHz to 26 GHz, 5260 MHz, vertical & horizontal polarization**Plot 10:** 26 GHz to 40 GHz, 5260 MHz, vertical & horizontal polarization

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

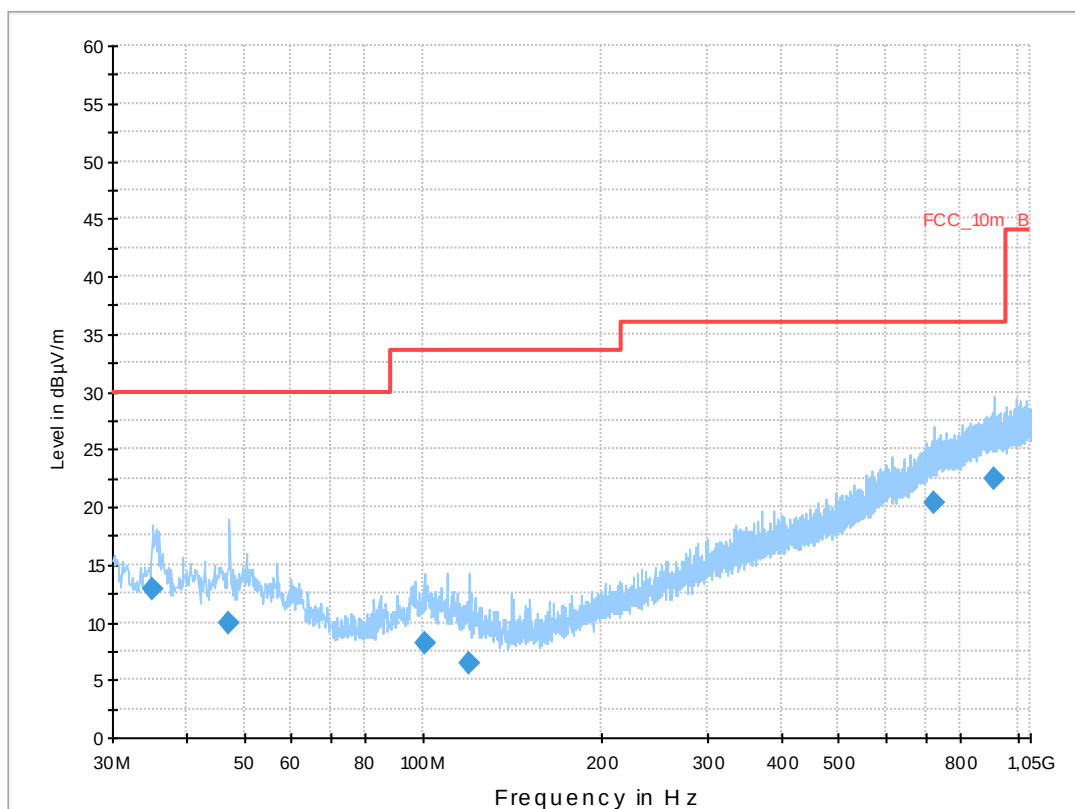
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11n tx ch64
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

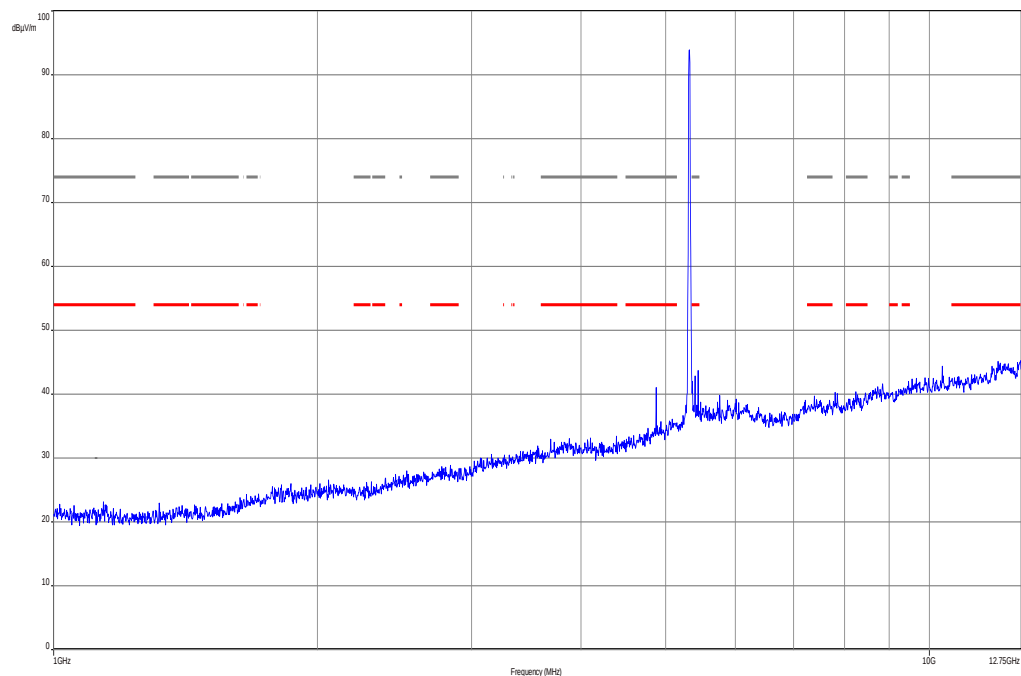
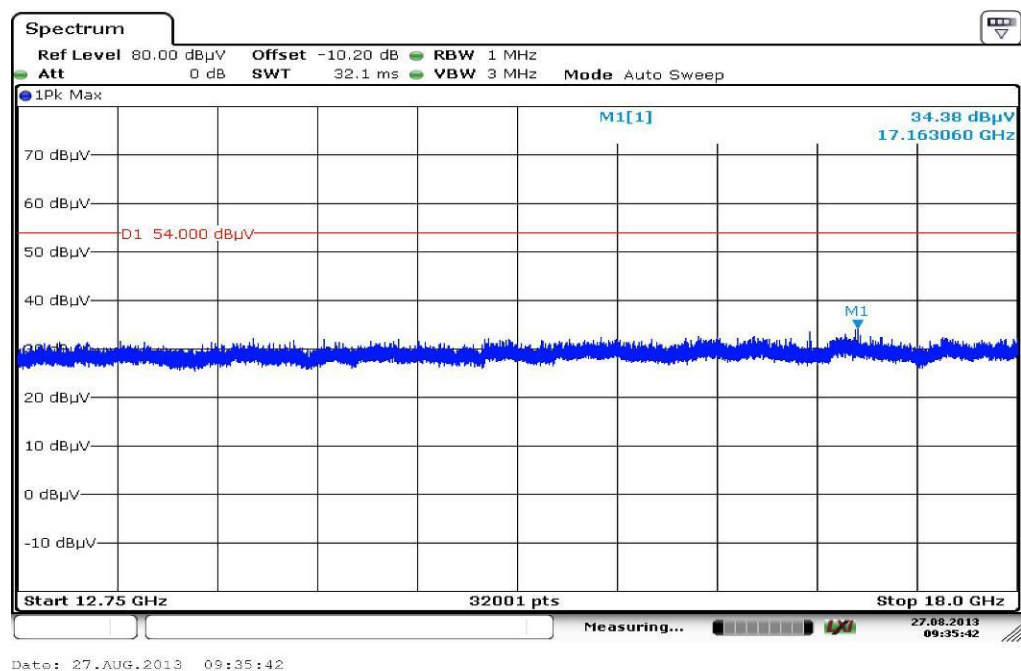
Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBμV/m

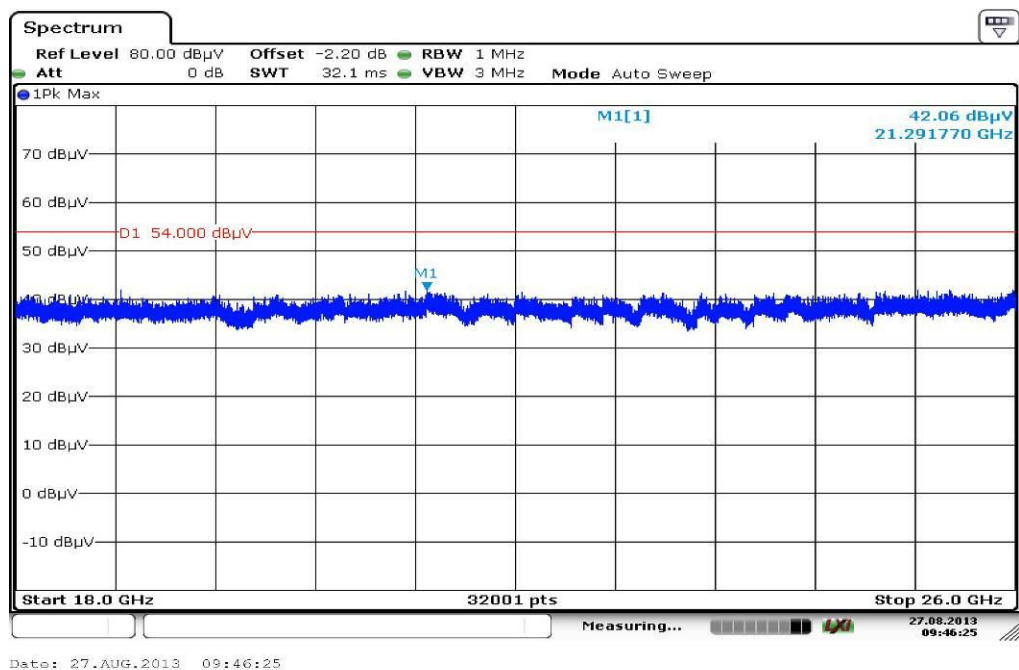
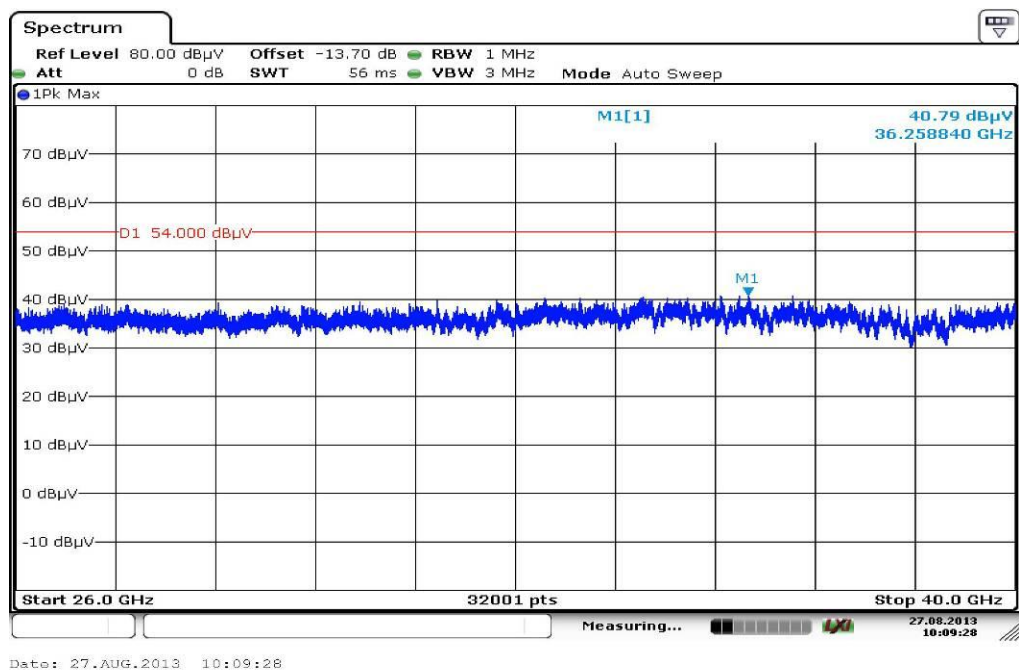
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



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
35.040000	12.8	1000.0	120.000	145.0	V	331.0	13.0	17.2	30.0	
47.160000	10.0	1000.0	120.000	259.0	V	43.0	13.3	20.0	30.0	
100.320000	8.1	1000.0	120.000	270.0	V	353.0	11.9	25.4	33.5	
119.160000	6.5	1000.0	120.000	226.0	V	298.0	10.3	27.0	33.5	
720.840000	20.3	1000.0	120.000	147.0	H	249.0	23.0	15.7	36.0	
909.960000	22.5	1000.0	120.000	174.0	V	192.0	25.2	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

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

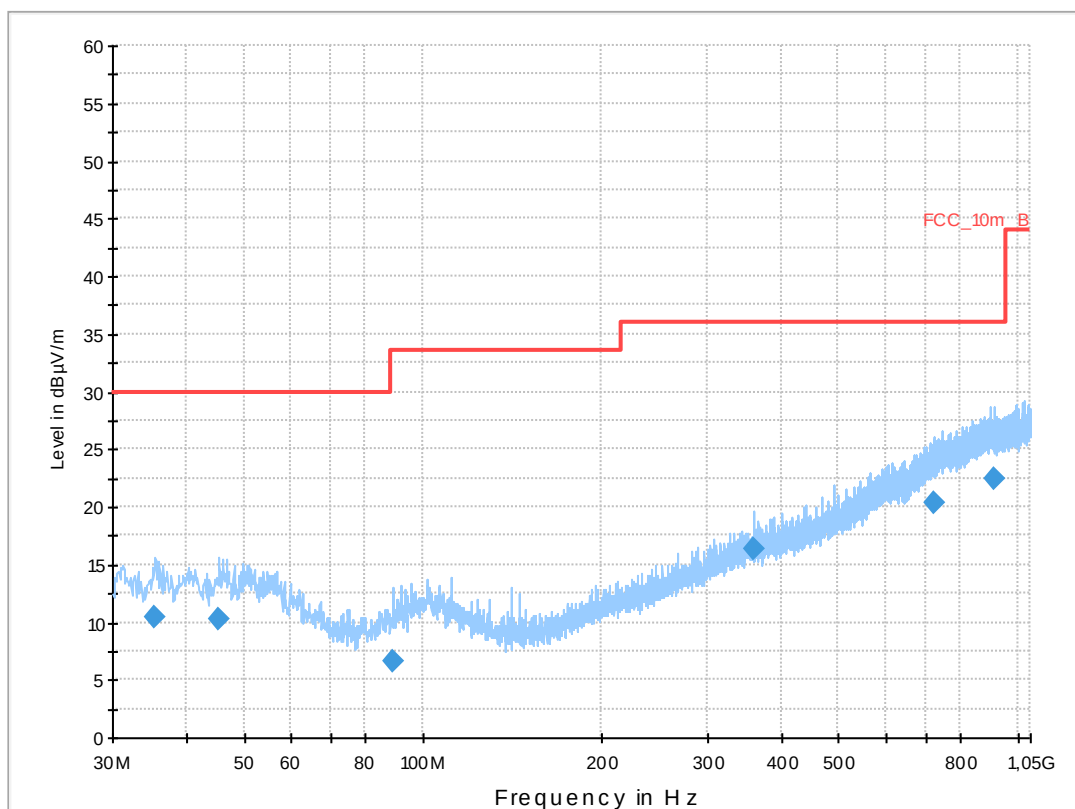
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11n tx ch100
 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
35.400000	10.4	1000.0	120.000	248.0	H	92.0	13.1	19.6	30.0	
45.240000	10.3	1000.0	120.000	185.0	H	208.0	13.3	19.7	30.0	
89.040000	6.6	1000.0	120.000	213.0	V	153.0	10.4	26.9	33.5	
360.000000	16.4	1000.0	120.000	120.0	V	80.0	16.2	19.6	36.0	
725.280000	20.4	1000.0	120.000	144.0	H	136.0	23.1	15.6	36.0	
912.000000	22.5	1000.0	120.000	270.0	H	66.0	25.2	13.5	36.0	

Spectrum

Ref Level 80.00 dBμV Offset -10.20 dB RBW 1 MHz
 Att 0 dB SWT 32.1 ms VBW 3 MHz Mode Auto Sweep

1Pk Max

M1[1] 32.68 dBμV 17.115160 GHz

D1 54.000 dBμV

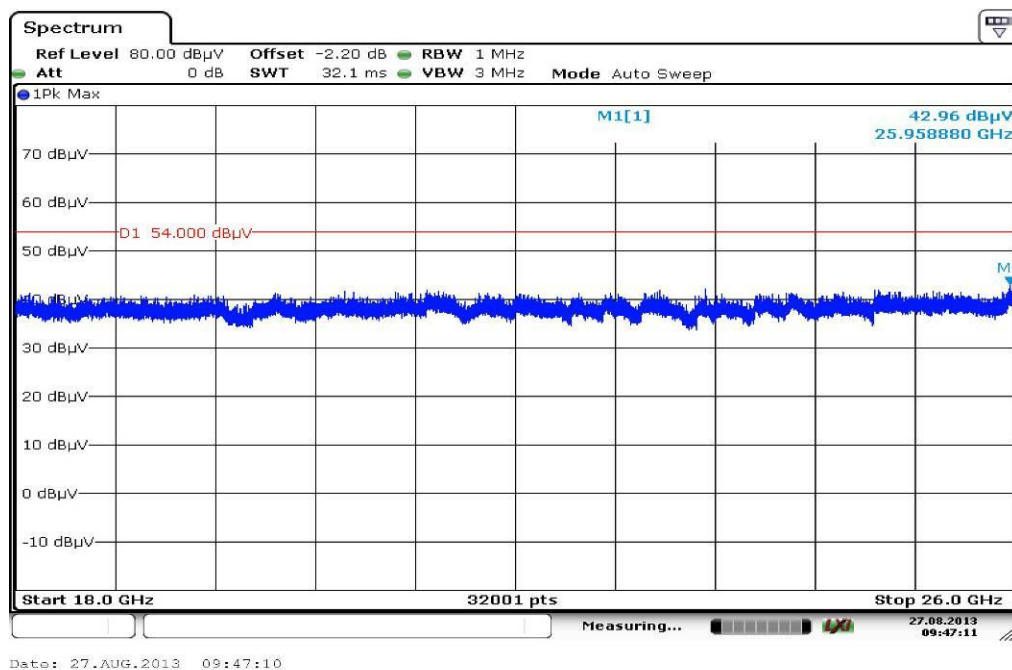
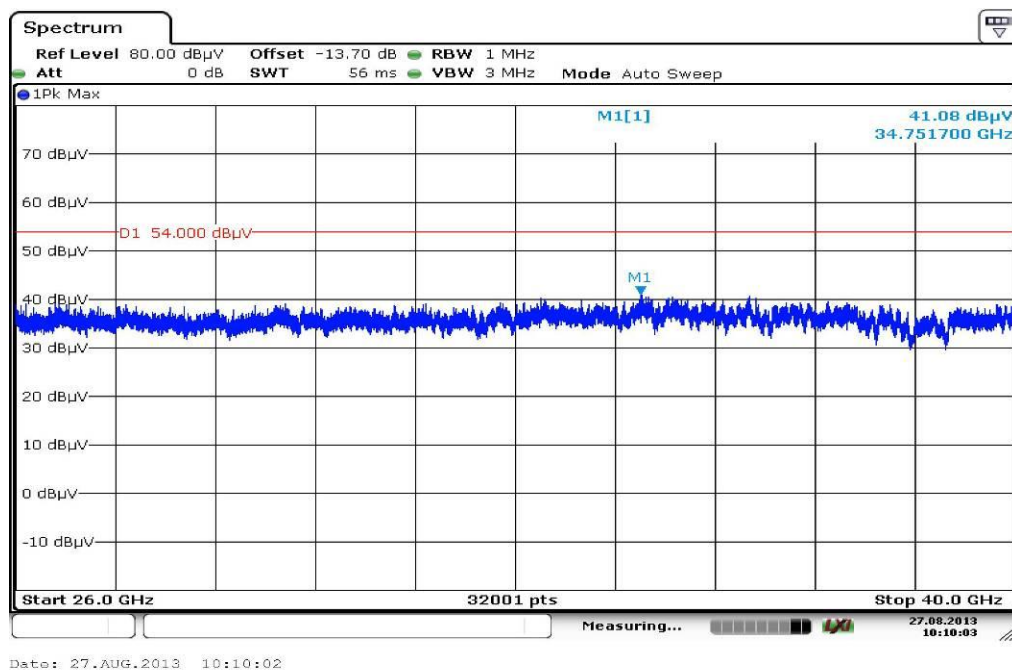
M1

Start 12.75 GHz 32001 pts Stop 18.0 GHz

Measuring...

27.08.2013 09:36:29

Date: 27.AUG.2013 09:36:28

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

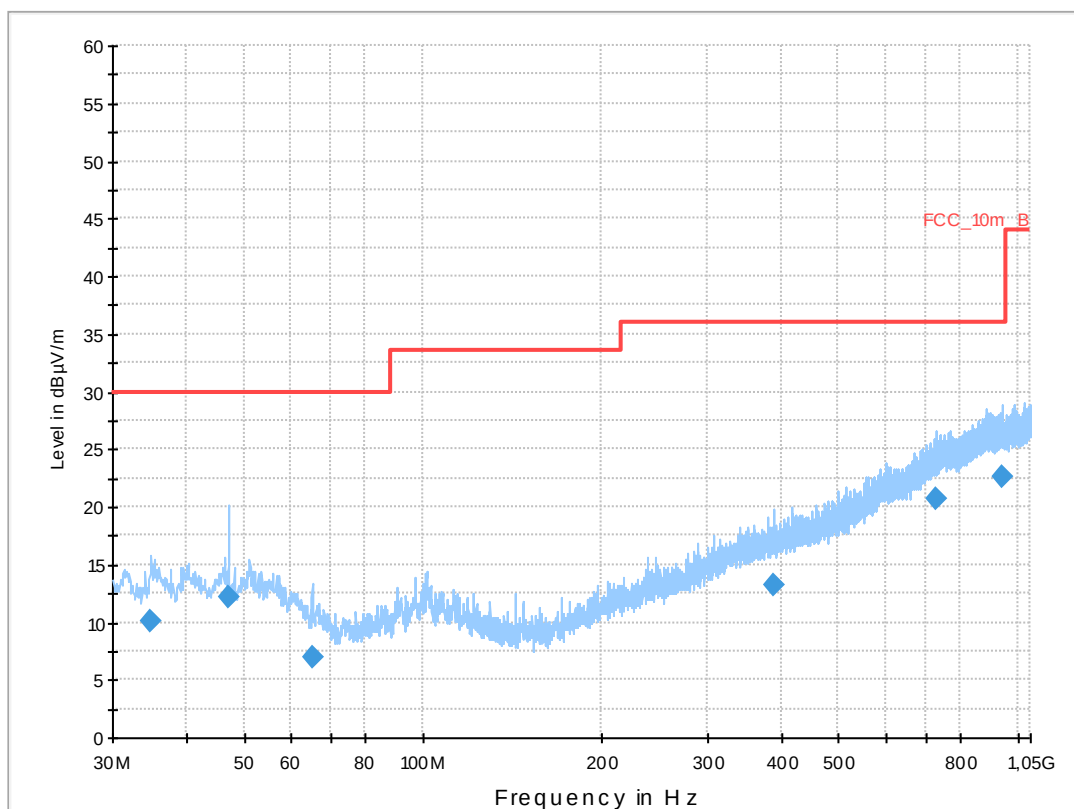
Common Information

EUT: RGF111LW
 Serial Number: imei: 004402242479065
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN 802.11n tx ch140
 Operator Name: Wolsdorfer
 Comment: battery powered

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
34.800000	10.0	1000.0	120.000	221.0	V	224.0	13.0	20.0	30.0	
47.040000	12.1	1000.0	120.000	157.0	V	27.0	13.3	17.9	30.0	
65.040000	7.0	1000.0	120.000	248.0	V	151.0	10.4	23.0	30.0	
387.600000	13.3	1000.0	120.000	270.0	H	125.0	16.7	22.7	36.0	
731.520000	20.6	1000.0	120.000	270.0	H	230.0	23.2	15.4	36.0	
943.200000	22.7	1000.0	120.000	270.0	H	237.0	25.3	13.4	36.0	

The graph displays the frequency response of a 100 MHz PLL. The x-axis represents Frequency (MHz) on a logarithmic scale from 1 to 12.75. The y-axis represents the power spectral density in dBm/Hz, ranging from 0 to 100. A blue line shows the noise floor, which starts at approximately 20 dBm/Hz at 1 MHz and rises to about 45 dBm/Hz at 12.75 MHz. A red dashed line is positioned at 54 dBm/Hz, and a black dashed line is at 74 dBm/Hz. A prominent peak at 10.75 MHz reaches a value of 91 dBm/Hz.

Spectrum

Ref Level 80.00 dBμV Offset -10.20 dB RBW 1 MHz
 Att 0 dB SWT 32.1 ms VBW 3 MHz Mode Auto Sweep

1Pk Max

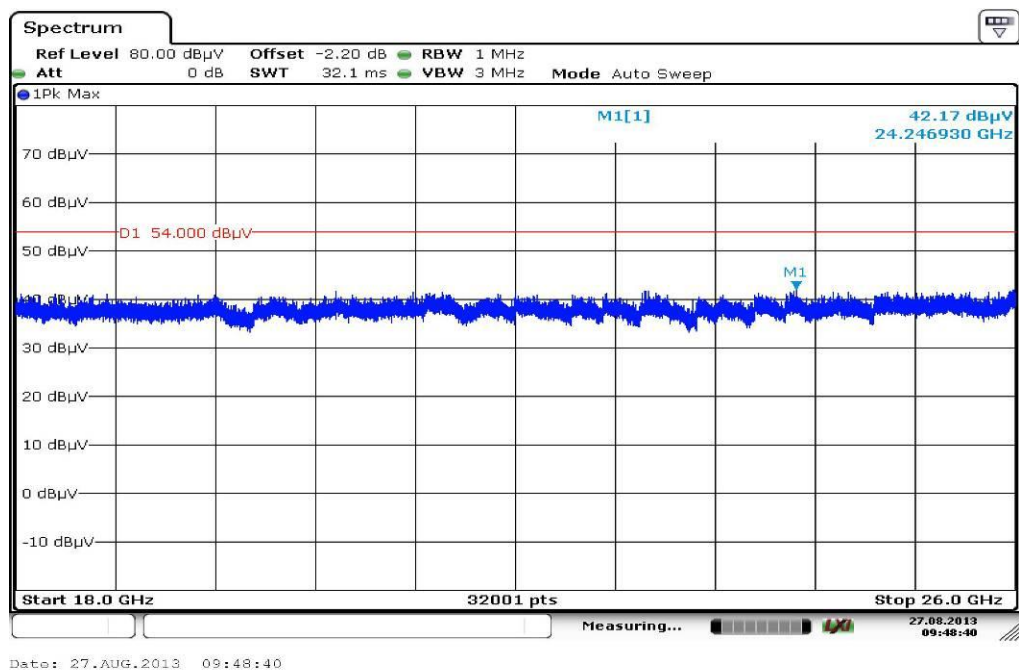
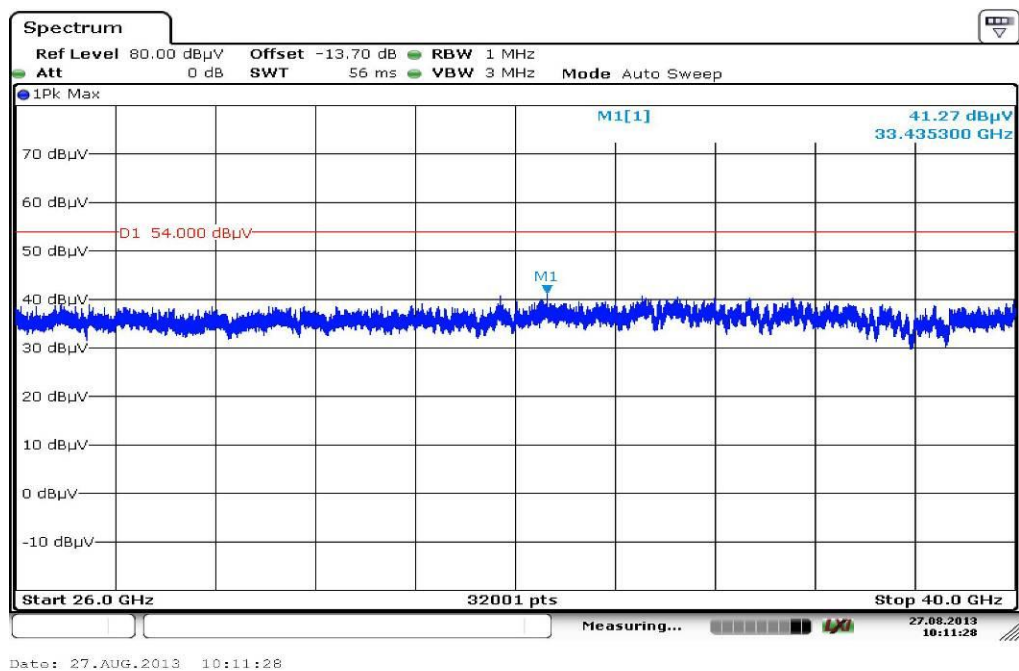
M1[1] 36.30 dBμV 16.911230 GHz

D1 54.000 dBμV

Start 12.75 GHz 32001 pts Stop 18.0 GHz

Measuring...

27.08.2013 09:38:24

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 test plan.

10.11 Spurious emissions radiated < 30 MHz

Not performed – tests according to manufacturer test plan.

10.12 Spurious emissions conducted < 30 MHz

Not performed – tests according to manufacturer test 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;B597 9	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	Ve	14.07.2011	14.01.2014
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	Schwarzbe ck	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	vIKI!	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	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
17	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
18	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	371	300003854	vIKI!	14.10.2011	14.10.2014
19	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	21.02.2013	21.02.2014
20	11b	Microwave System Amplifier, 0.5- 26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
21	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
22	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		

23	n. a.	Broadband Low Noise Amplifier 18-50 GHz	CBL18503 070-XX	CERNEX	19338	300004273	ne		
24	n. a.	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	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
vlk!	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	2013-09-03

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



Deutsche Akkreditierungsstelle GmbH

Befähigung 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
Seite 1 von 1 auf der Rückseite

Im Auftrag
Ulrich Pöhl, Abteilungsleiter

Back side of certificate

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Die auszugsweise Veröffentlichung der Akkreditierungsurkunde bedarf der vorherigen schriftlichen Zustimmung der Deutschen Akkreditierungsstelle GmbH (DAKKS). Ausgenommen davon ist die separate Weiterverbreitung des Deckblatts 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>