

TEST REPORT

Test report no.: 1-7425/13-01-03



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 Communications & EMC (RCE)

Applicant

Bury GmbH & Co. KG
Robert-Koch-Str. 1-7
32584 Löhne / GERMANY
Phone: +49 5732 9706-0
Fax: +49 5732 9706-209
Contact: Christoph Koston
e-mail: koston@bury.com
Phone: +49 5732 9706-284

Manufacturer

Bury GmbH & Co. KG
Robert-Koch-Str. 1-7
32584 Löhne / GERMANY

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 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

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

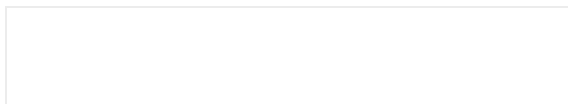
Test Item

Kind of test item:	App Gateway
Model name:	M0877_07
FCC ID:	QZ9-APPGATEWAY
IC:	5927A-APPGATEWAY
Frequency:	ISM band 2400 MHz to 2483.5 MHz (lowest channel 01 – 2412 MHz, highest channel 11 – 2462 MHz)
Technology tested:	WLAN
Antenna:	Integrated inverted F antenna
Power supply:	12.0V DC by car battery
Temperature range:	-30°C to +80°C



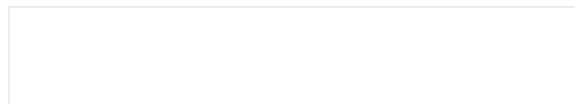
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorised:



Marco Bertolino
Testing Manager

Test performed:



Tobias Wittenmeier
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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2.2 Application details

Date of receipt of order:	2014-03-04
Date of receipt of test item:	2014-03-10
Start of test:	2014-03-10
End of test:	2014-03-14
Person(s) present during the test:	-/-

3 Test standard/s

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

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+80 °C during high temperature tests
	T_{min}	-30 °C during low temperature tests
Relative humidity content:		55 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	12.0 V DC by car battery
	V_{max}	16.0 V
	V_{min}	9.0 V

5 Test item

Kind of test item	:	App Gateway
Type identification	:	M0877_07
S/N serial number	:	00000000000000000000
HW hardware status	:	HW004
SW software status	:	Skoda SW0830 / Porsche SW2101
Frequency band [MHz]	:	ISM band 2400 MHz to 2483.5 MHz (lowest channel 01 – 2412 MHz, highest channel 11 – 2462 MHz)
Type of radio transmission	:	DSSS, OFDM
Use of frequency spectrum	:	
Type of modulation	:	CCK, BPSK, QPSK, 16-QAM, 64QAM
Number of channels	:	11
Antenna	:	Integrated inverted F antenna
Power supply	:	12.0 V DC by car battery
Temperature range	:	-30°C to +80 °C

5.1 Additional information

Test setup- and EUT-photos are included in test report: 1-7425/13-01-01_AnnexB
 1-7425/13-01-01_AnnexC
 1-7425/13-01-01_AnnexD

6 Test laboratories sub-contracted

None

7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8	Passed	2014-04-15	-/-

Test specification clause	Test case	Guideline	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	-/-	Nominal	Nominal	DSSS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	KDB 558074 DTS clause: 10.2	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth – 6 dB bandwidth	KDB 558074 DTS clause: 8.2	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
RSS Gen clause 4.6.1	Occupied bandwidth	-/-	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(b)(3) RSS-210 / A8.4(4)	Maximum output power	KDB 558074 DTS clause: 9.1.2	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	KDB 558074 DTS clause: 13.2.1	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.205 RSS-210 / A8.5	Band edge compliance radiated	-/-	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	KDB 558074 DTS clause: 11.1 & 11.2	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	-/-	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.109 RSS-Gen	RX spurious emissions radiated	-/-	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	-/-	Nominal	Nominal	DSSS OFDM g & n	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	complies
§15.107(a) §15.207	Conducted emissions < 30 MHz	-/-	Nominal	Nominal	DSSS OFDM g & n	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	Battery powered

Note: NA = Not Applicable; NP = Not Performed

8 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode:

- No test mode available.
Iperf was used to ping another device with the largest support packet size
- Special software is used.
EUT is transmitting pseudo random data by itself

9 RSP100 test report cover sheet / performance test data

Test report number	:	1-7425/13-01-03				
Equipment model number:		AppGateway				
Certification number	:	5927A-APPGATEWAY				
Manufacturer (complete address)	:	Bury GmbH & Co. KG Robert-Koch-Str. 1-7 32584 Löhne / GERMANY				
Tested to radio standards specification no.	:	RSS 210, Issue 8				
Open area test site IC No. :		IC 3462C-1				
Frequency range	:	ISM band 2400 MHz to 2483.5 MHz				
RF-power (max.)	:	Conducted values:				
		Band	b – mode	g – mode	n HT20 – mode	n HT40 – mode
		2412 – 2462 MHz	3.81 mW	5.09 mW	3.94	
		2422 – 2462 MHz				-/-
		Radiated values:				
		Band	b – mode	g – mode	n HT20 – mode	n HT40 – mode
2412 – 2462 MHz	5.35 mW	6.98 mW	5.14			
2422 – 2462 MHz				-/-		
Occupied bandwidth (99%-BW)	:	Band	b – mode	g – mode	n HT20 – mode	n HT40 – mode
		2412 – 2462 MHz	12.18 MHz	16.73 MHz	17.60	
		2422 – 2462 MHz				-/-
Necessary bandwidth (calculated)	:	Band	b – mode	g – mode	n HT20 – mode	n HT40 – mode
		2412 – 2462 MHz	12.80 MHz	16.88 MHz	16.88	
		2422 – 2462 MHz				-/-
Emission classification	:	(according TRC-43)	G1D	G7D	G7D	-/-
Type of modulation	:	DSSS & OFDM technology with BPSK, QPSK, 16 and 64 – QAM modulation.				
Antenna information	:	Integrated inverted F antenna				
Transmitter spurious [dBµV/m @ 3m]	:	44.18 @ 24.4 GHz (noise floor)				

ATTESTATION: DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory manager:

2014-04-15
Date

Tobias Wittenmeier
Name

Signature

10 Measurement results

10.1 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

Measurement parameters:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 MHz
Video bandwidth:	3 MHz
Trace-Mode:	Max hold

Limits:

FCC	IC
Antenna Gain	
6 dBi	

Results:

T _{nom}	V _{nom}	lowest channel 2412 MHz	middle channel 2437 MHz	highest channel 2462 MHz
Conducted power [dBm] Measured with DSSS modulation		7.29	7.31	7.44
Radiated power [dBm] Measured with DSSS modulation		8.55	8.81	8.59
Gain [dBi] Calculated		1.26	1.50	1.15
Measurement uncertainty			± 1.5 dB (cond.) / ± 3 dB (rad.)	

Result: **Passed**

10.2 Identify worst case data rate

Measurement:

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

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

Measurement parameters:

Average Power Meter

Results:

Modulation	Modulation scheme / bandwidth		
	2412 MHz	2437 MHz	2462 MHz
Frequency			
DSSS / b – mode	11 Mbit/s	11 Mbit/s	11 Mbit/s
OFDM / g – mode	48 Mbit/s	48 Mbit/s	48 Mbit/s
OFDM / HT20 – mode	MCS1	MCS1	MCS1

10.3 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. The measurements are performed using the data rate producing the highest conducted output power.

Measurement:

Measurement parameter	
According to DTS clause: 9.1.2	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Span:	40 MHz
Integration bandwidth:	75 % power - bandwidth (DTS BW)
Trace-Mode:	Max hold (allow trace to fully stabilize)
Measurement function:	Channel power with DTS BW

Limits:

FCC	IC
Maximum Output Power	
Conducted: 1.0 W – Antenna Gain max. 6 dBi	

Results:

Conducted:

DSSS / b – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	5.81	4.98	5.26
OFDM / g – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	7.18	6.86	7.28
OFDM / n HT20 – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	5.92	5.80	5.96
Measurement uncertainty	± 1.5 dB (cond.)		

Radiated:

DSSS / b – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	7.07	6.48	6.41
OFDM / g – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	8.44	8.36	8.43
OFDM / n HT20 – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak output power conducted Worst case data rate	7.18	7.30	7.11
Measurement uncertainty	± 1.5 dB (cond.)		

Result: Passed

10.4 Power spectral density

Description:

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

Measurement:

Measurement parameter	
According to DTS clause: 10.2	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 kHz
Video bandwidth:	10 kHz
Span:	40 MHz
Trace-Mode:	Max hold (allow trace to fully stabilize)

Limits:

FCC	IC
Power Spectral Density	
8 dBm (conducted)	

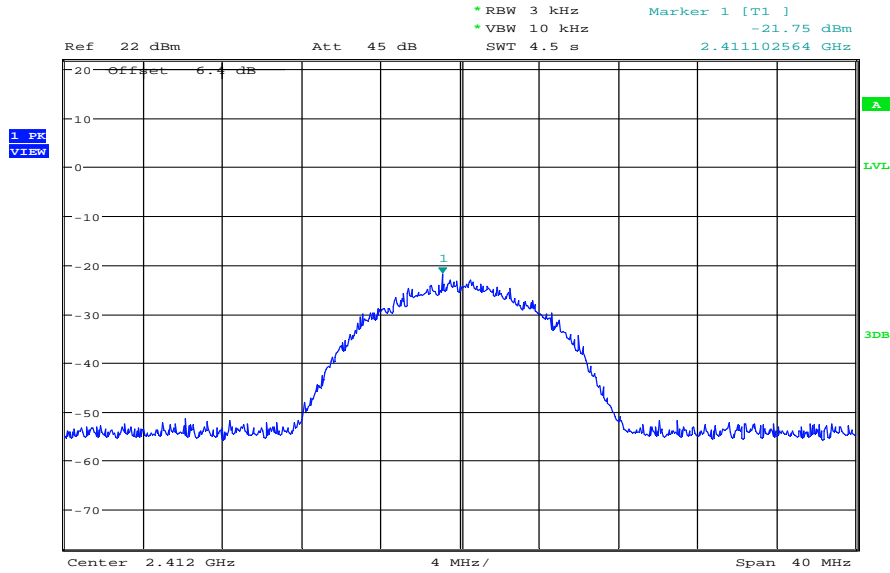
Results:

Modulation	Power Spectral density [dBm]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	-21.75	-21.29	-22.87
OFDM / g – mode	-25.75	-25.34	-24.89
OFDM / HT20 – mode	-26.44	-25.66	-26.13
Measurement uncertainty	± 1.5 dB (cond.)		

Result: **Passed**

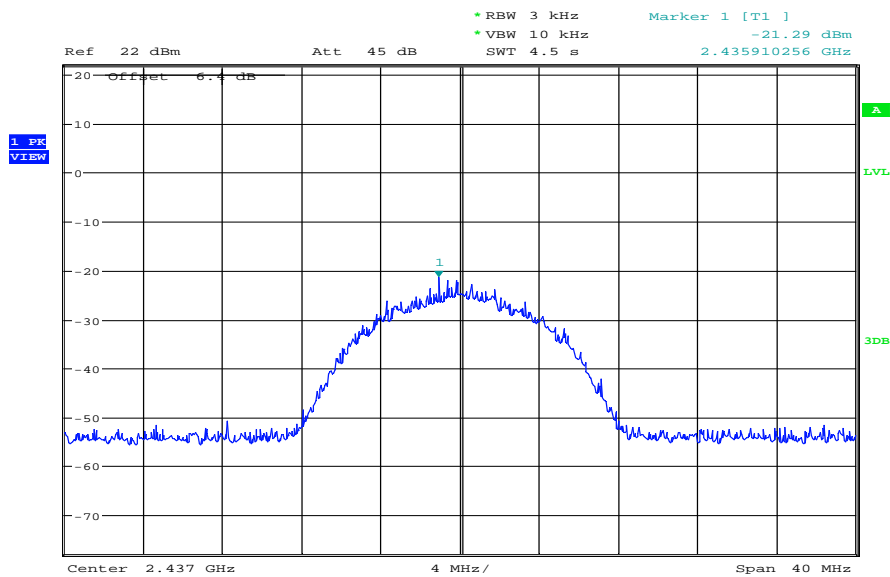
Plots: DSSS / b – mode

Plot 1: TX mode, lowest channel



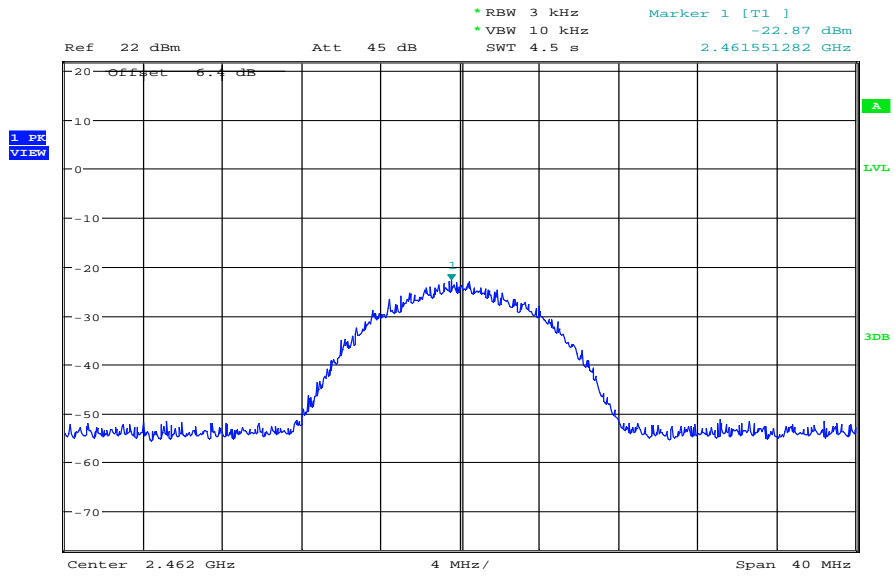
Date: 12.MAR.2014 11:37:26

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:39:05

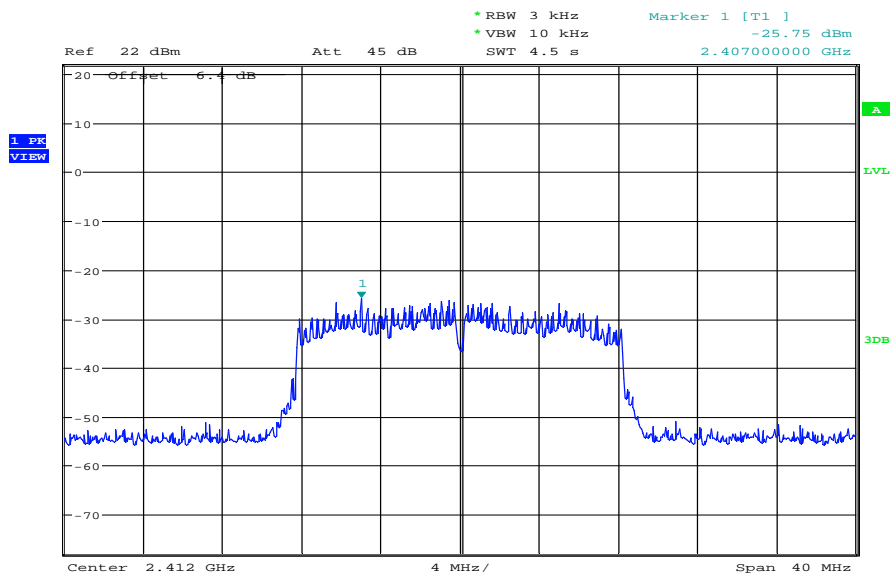
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:40:39

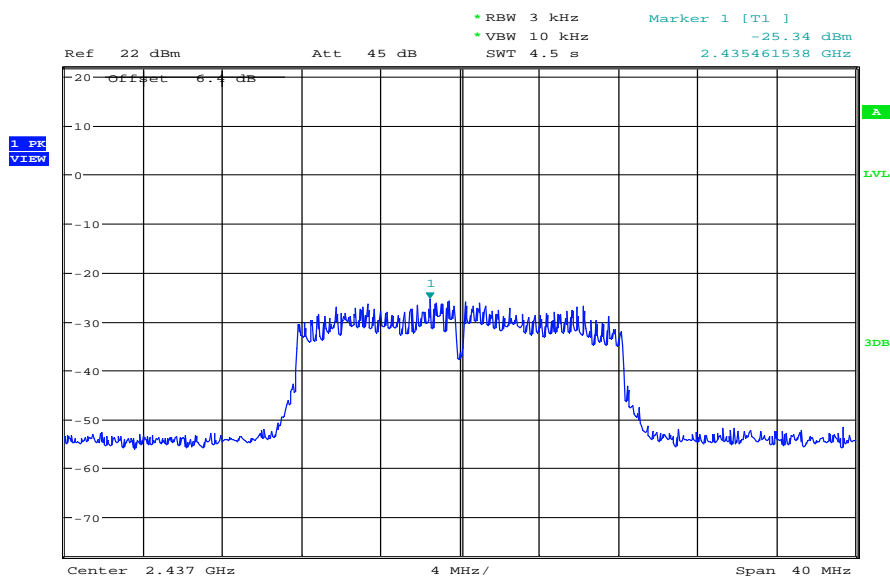
Plots: OFDM / g – mode

Plot 1: TX mode, lowest channel



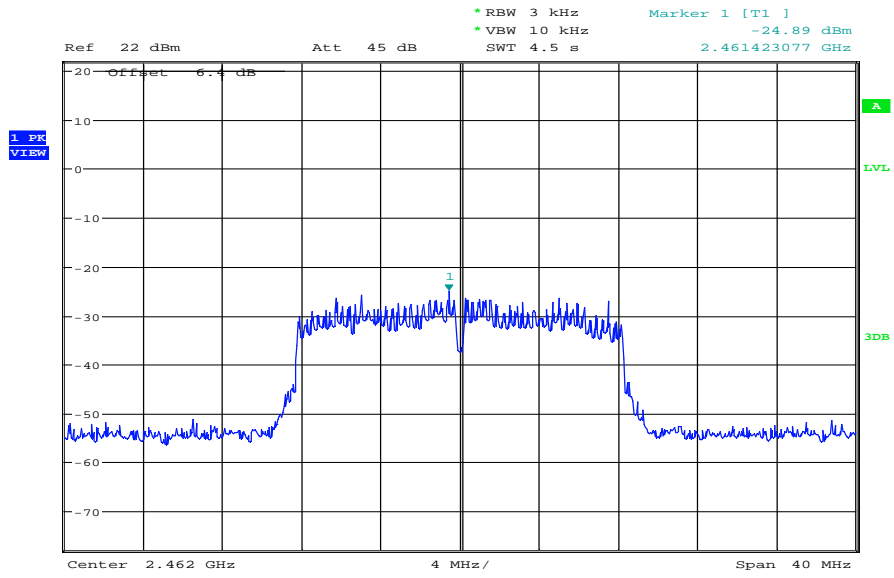
Date: 12.MAR.2014 11:41:53

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:43:35

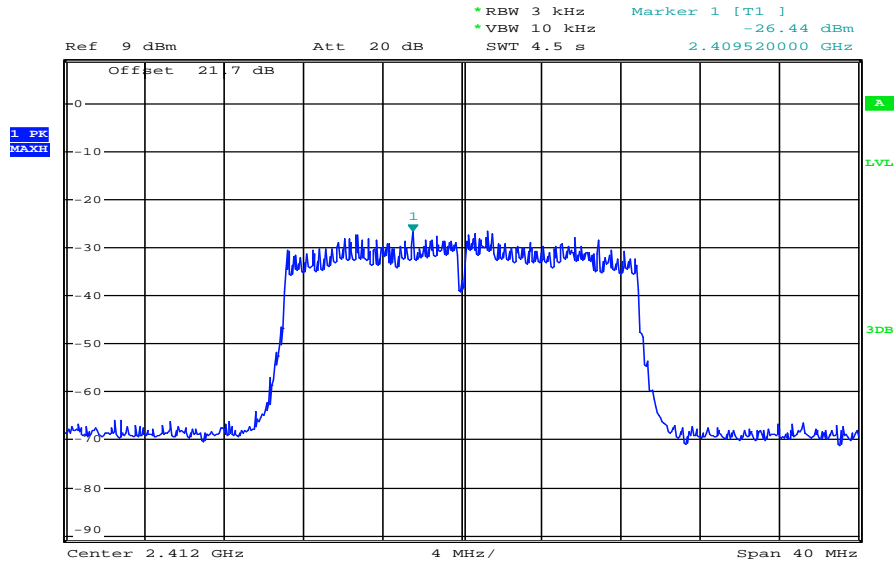
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:45:14

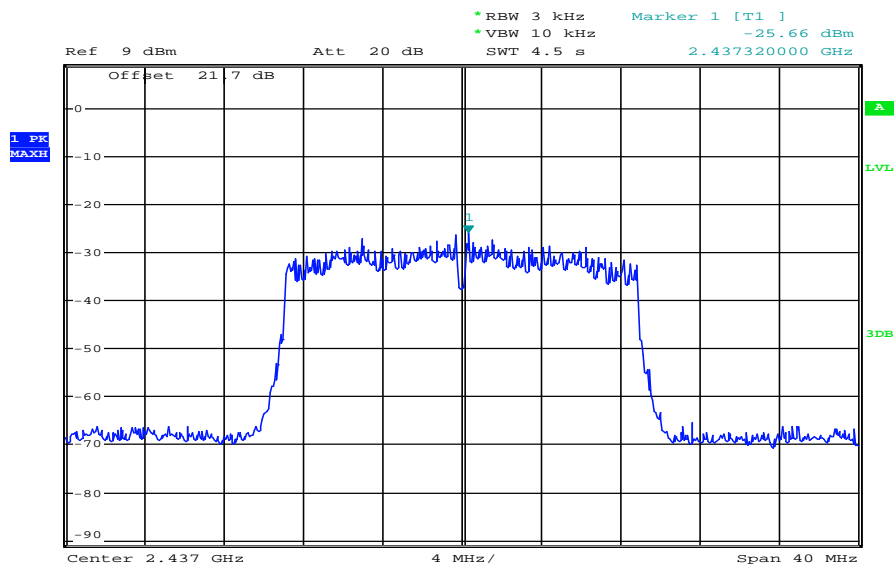
Plots: OFDM / HT20 – mode

Plot 1: TX mode, lowest channel



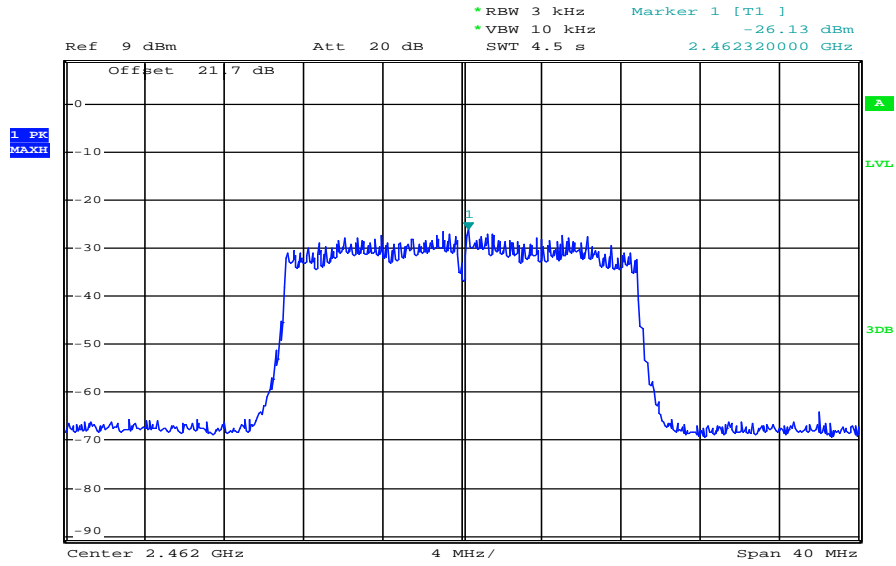
Date: 8.APR.2014 14:27:47

Plot 2: TX mode, middle channel



Date: 8.APR.2014 14:26:47

Plot 3: TX mode, highest channel



Date: 8.APR.2014 14:25:54

10.5 Spectrum bandwidth – 6 dB

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to DTS clause: 8.2	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	500 kHz
Video bandwidth:	3 MHz
Span:	40 MHz
Measurement procedure:	Measurement of the 75% bandwidth using the integration function of the analyzer
Trace-Mode:	Max hold (allow trace to stabilize)

Limits:

FCC	IC
Spectrum Bandwidth – 6 dB	
Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.	

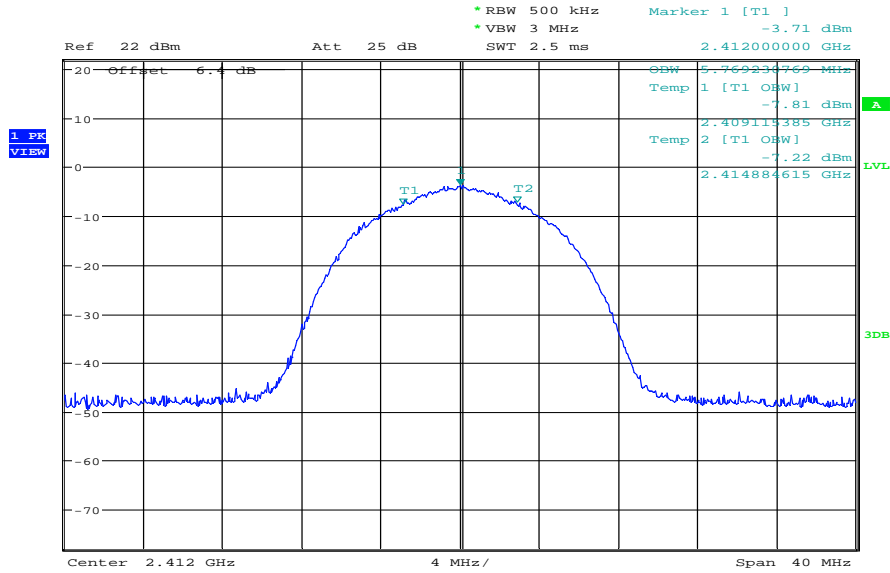
Results:

Frequency	6 dB bandwidth [MHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	5.77	5.77	5.77
OFDM / g – mode	11.22	11.22	11.22
OFDM / HT20 – mode	11.76	11.60	11.68
Measurement uncertainty	± RBW		

Result: Passed

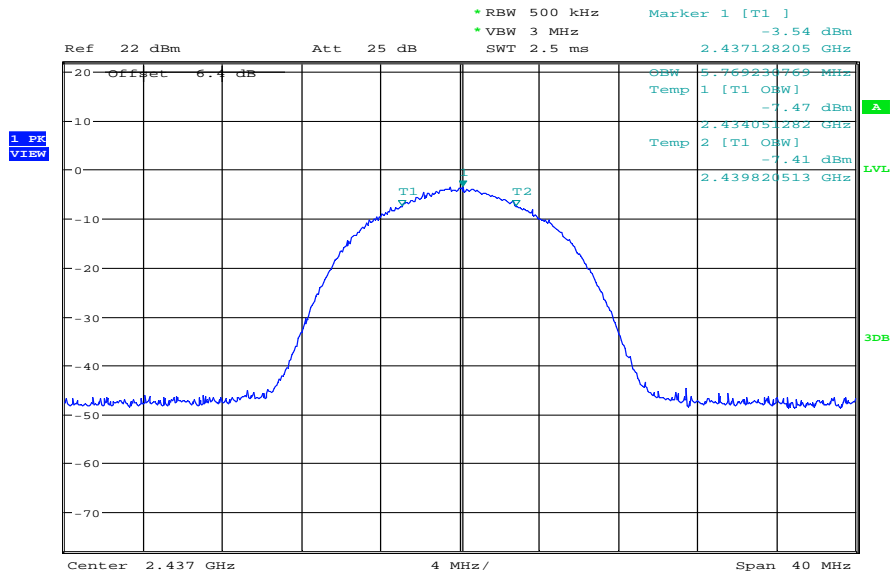
Plots: DSSS / b – mode

Plot 1: TX mode, lowest channel



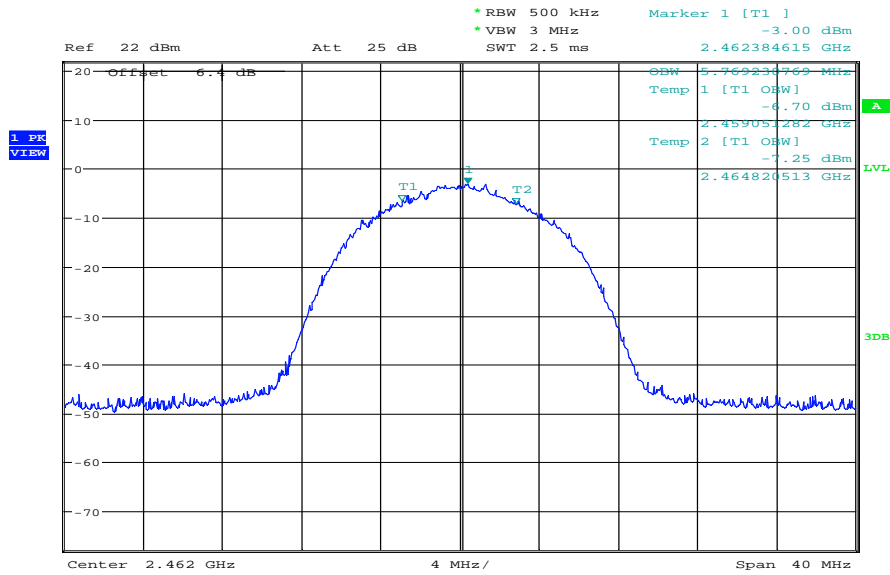
Date: 12.MAR.2014 11:32:27

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:33:34

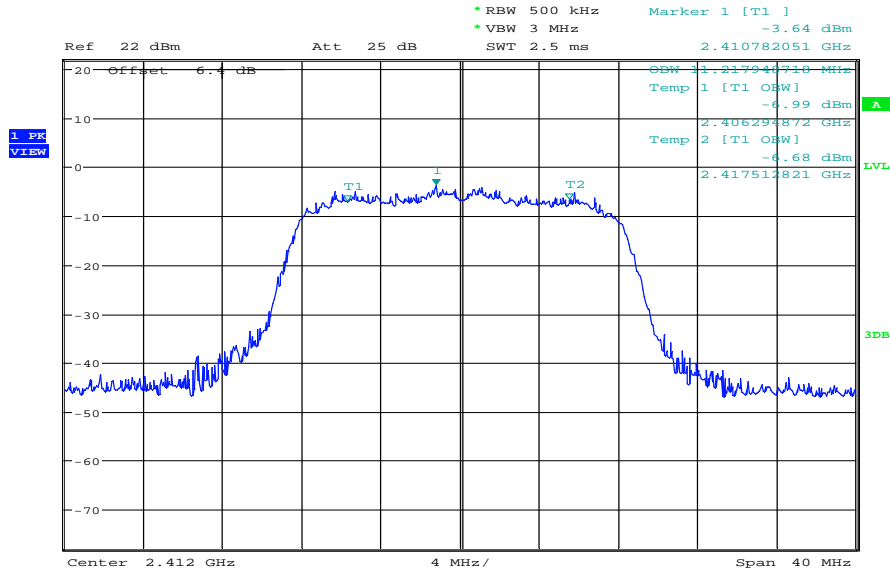
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:34:59

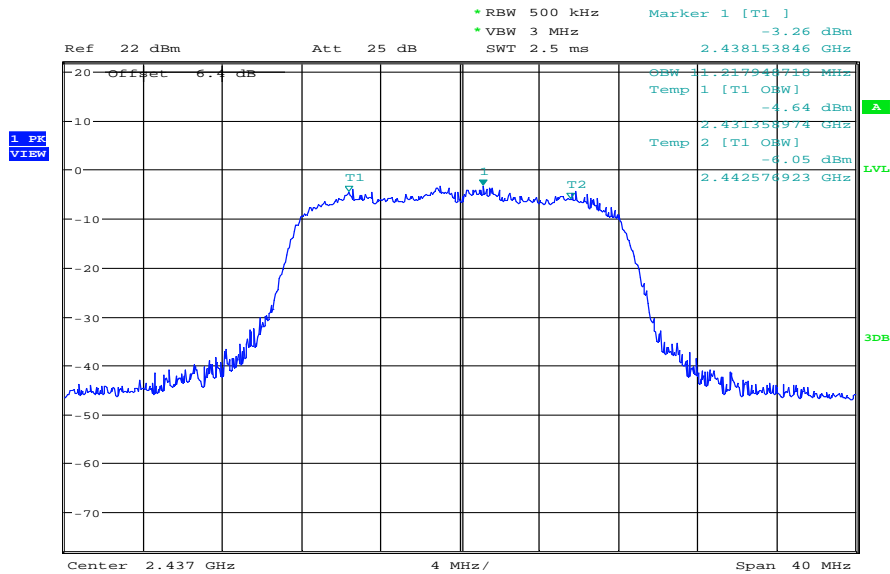
Plots: OFDM / g – mode

Plot 1: TX mode, lowest channel



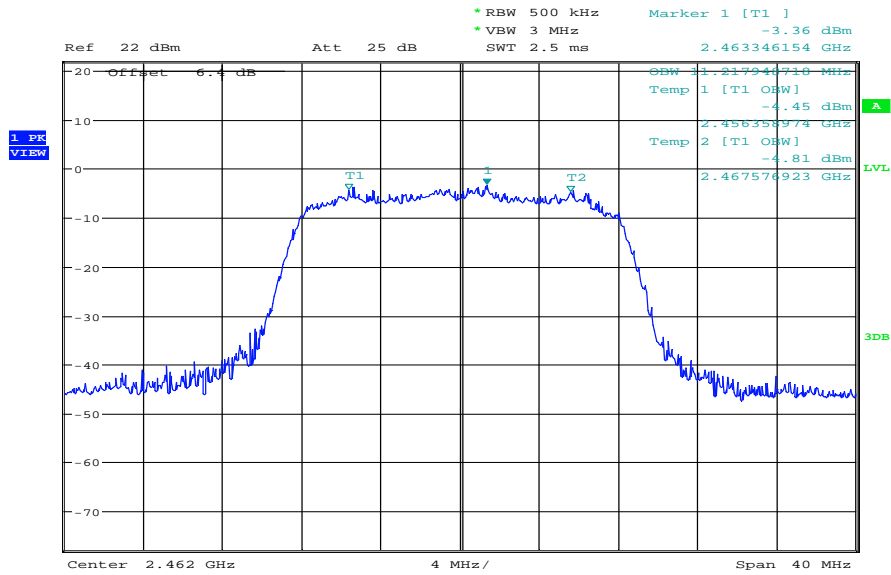
Date: 12.MAR.2014 11:30:06

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:31:24

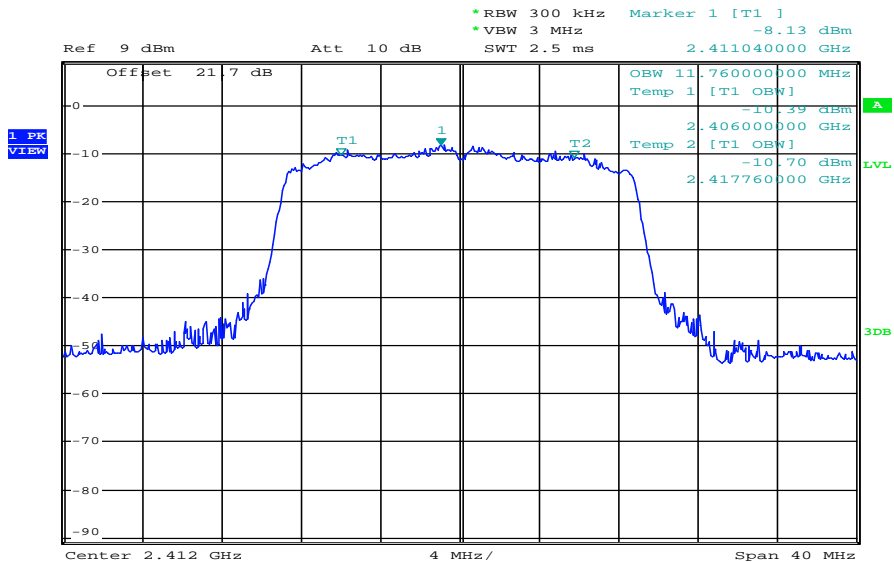
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:28:52

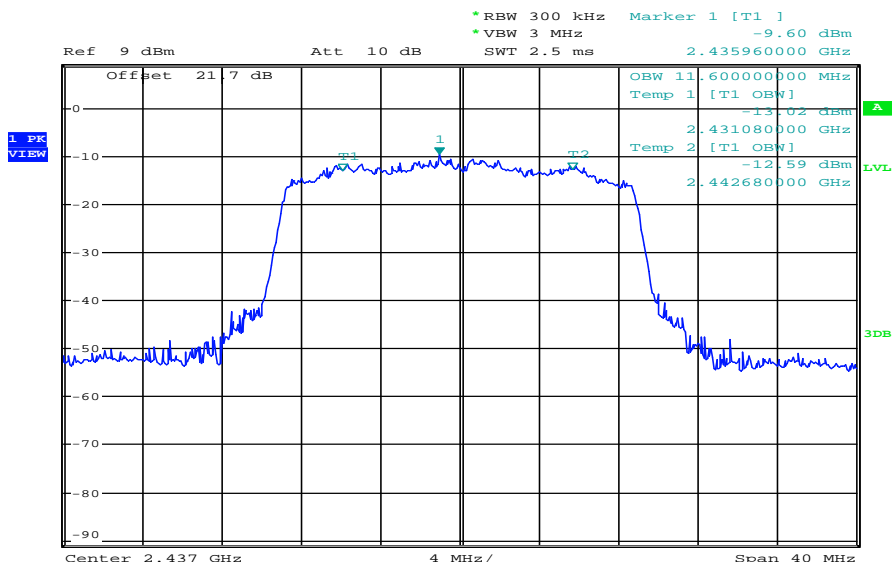
Plots: OFDM / HT20 – mode

Plot 1: TX mode, lowest channel



Date: 8. APR. 2014 14:32:54

Plot 2: TX mode, middle channel



Date: 8. APR. 2014 14:33:45

10.6 Occupied bandwidth – 99% emission bandwidth

Description:

Measurement of the 99% bandwidth of the modulated signal acc. RSS-GEN.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	500 kHz
Video bandwidth:	3 MHz
Span:	40 MHz
Measurement procedure:	Measurement of the 99% bandwidth using the integration function of the analyzer
Trace-Mode:	Max hold (allow trace to stabilize)

Usage:

-/-	IC
Occupied Bandwidth – 99% emission bandwidth	
OBW is necessary for Emission Designator	

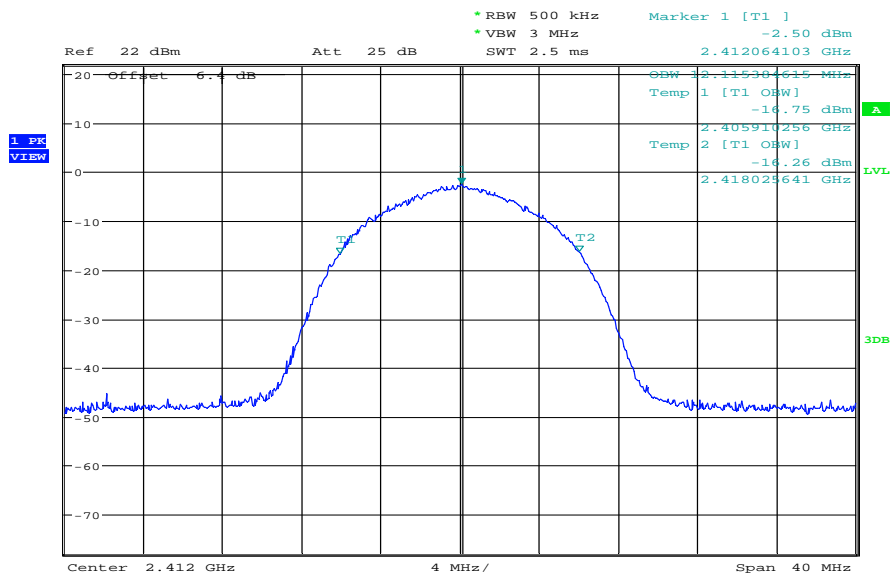
Results:

Modulation Frequency	20 dB bandwidth [MHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	12.12	12.12	12.18
OFDM / g – mode	16.73	16.73	16.73
OFDM / HT20 – mode	17.60	17.60	17.60
Measurement uncertainty	± RBW		

Result: Passed

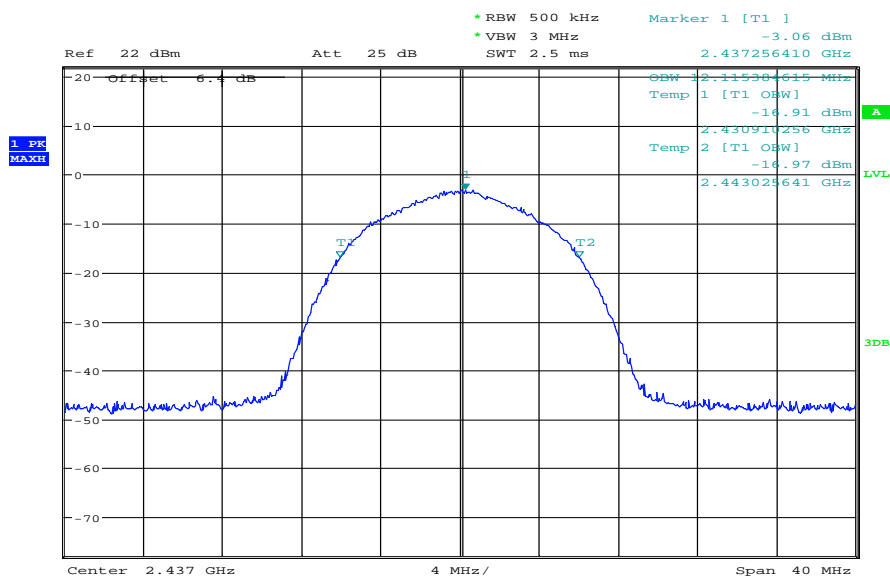
Plots: DSSS / b – mode

Plot 1: TX mode, lowest channel



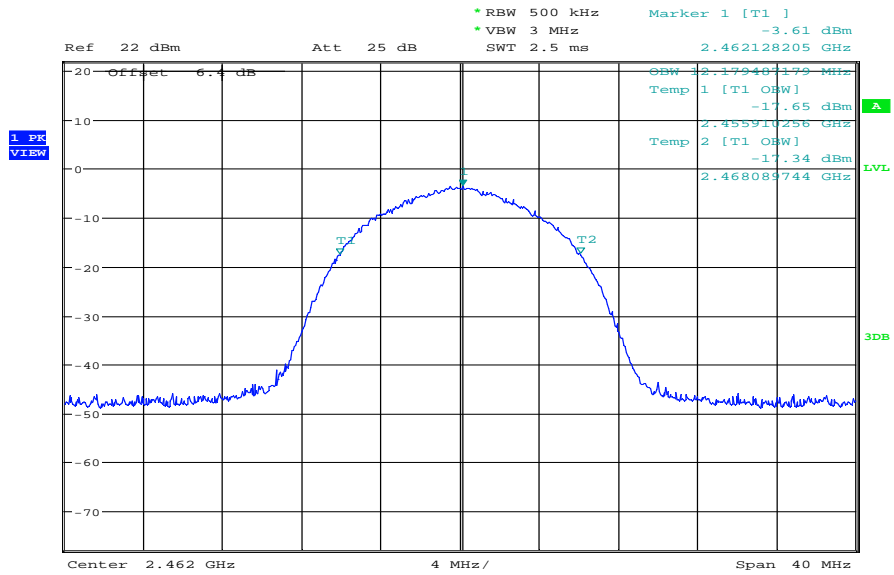
Date: 12.MAR.2014 11:22:02

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:23:48

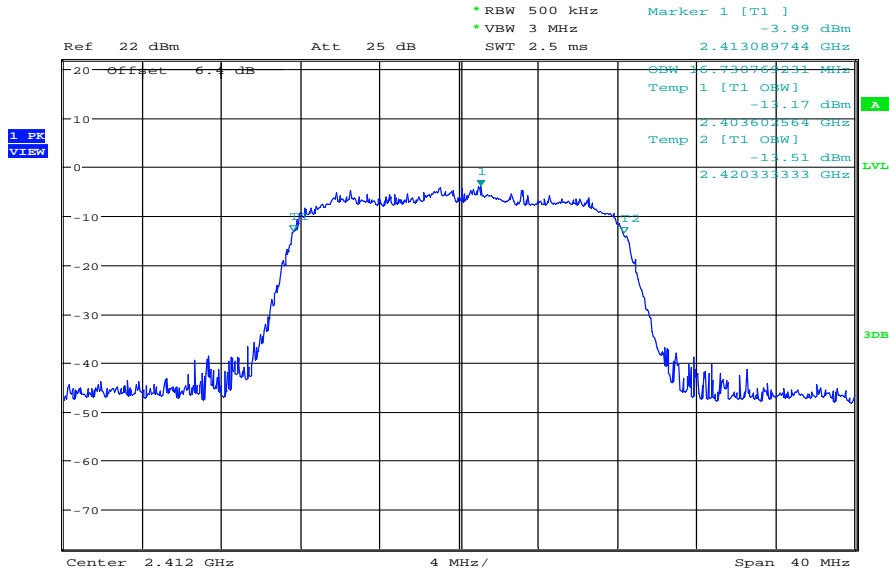
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:24:44

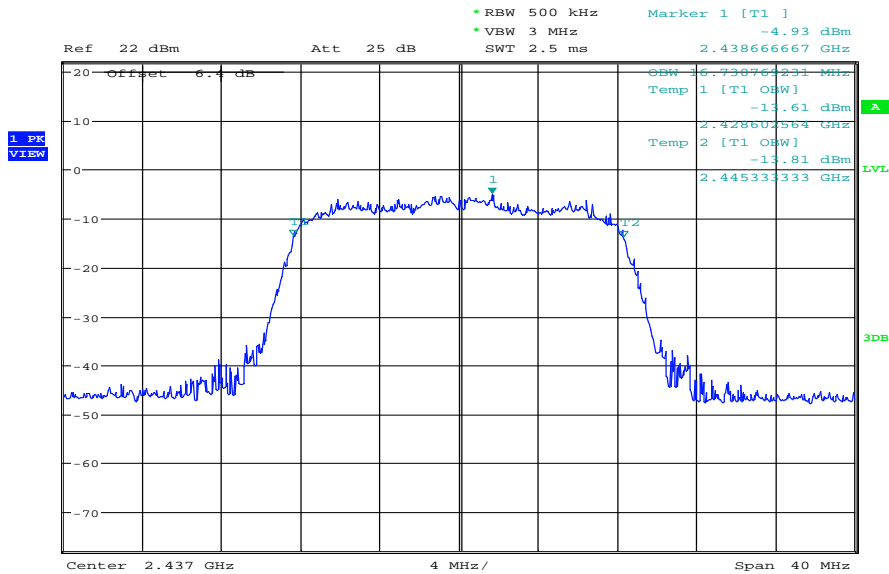
Plots: OFDM / g – mode

Plot 1: TX mode, lowest channel



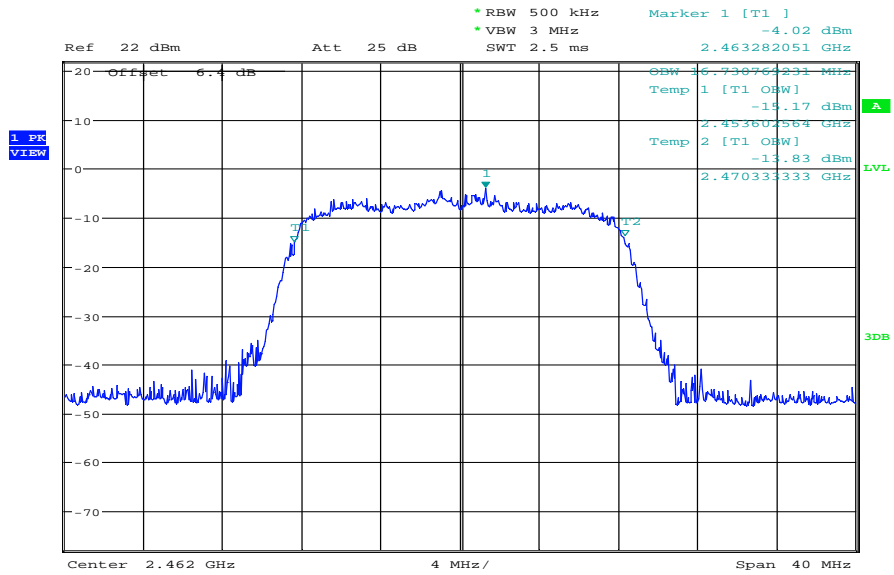
Date: 12.MAR.2014 11:26:04

Plot 2: TX mode, middle channel



Date: 12.MAR.2014 11:26:58

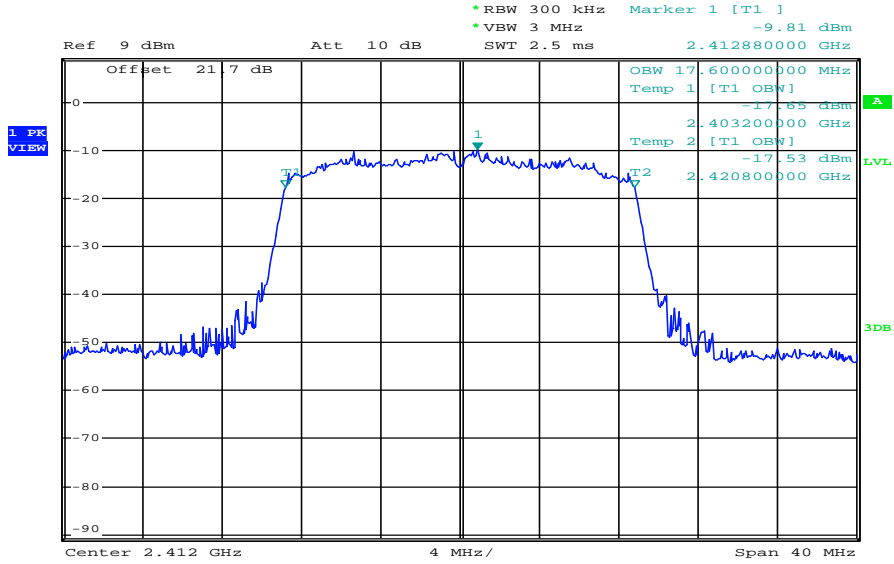
Plot 3: TX mode, highest channel



Date: 12.MAR.2014 11:27:53

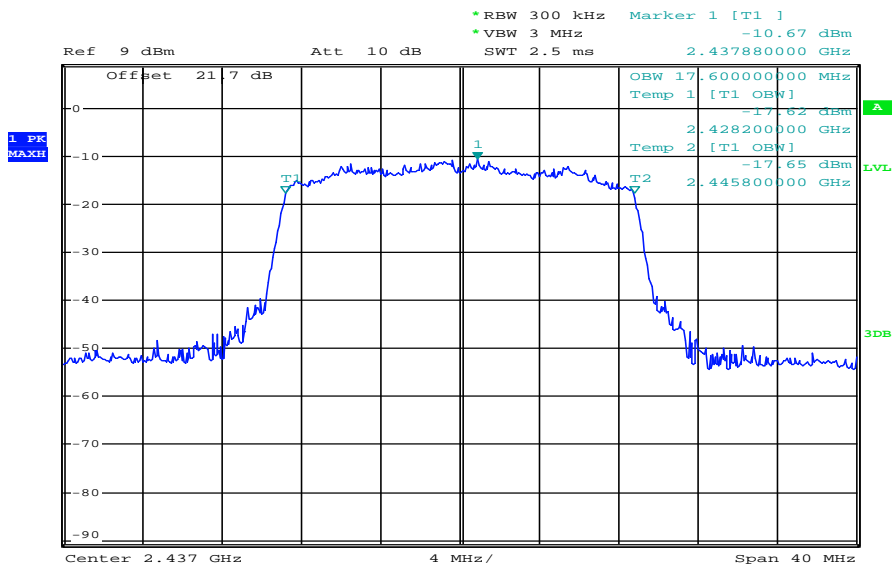
Plots: OFDM / HT20 – mode

Plot 1: TX mode, lowest channel



Date: 8. APR. 2014 14:36:38

Plot 2: TX mode, middle channel



Date: 8. APR. 2014 14:35:59

10.7 Band edge compliance conducted

Description:

Measurement of the conducted band edge compliance. EUT is measured at the lower and upper band edge in both modes.

Measurement:

Measurement parameter	
According to DTS clause: 13.2.1	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	500 kHz
Span:	Lower Band Edge: 2300 – 2425 MHz Upper Band Edge: 2450 – 2550 MHz
Trace-Mode:	Max hold

Limits:

FCC	IC
Band Edge Compliance Conducted	
<p>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.</p>	

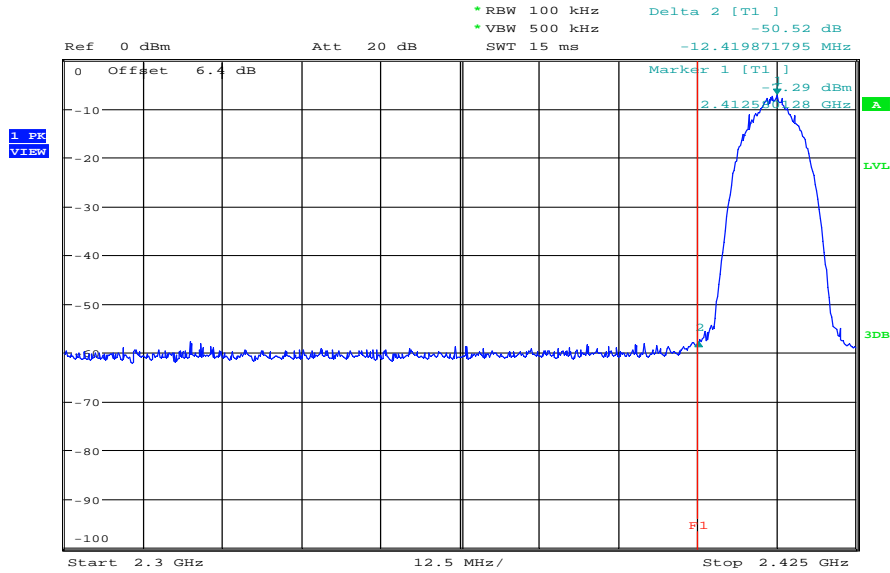
Results:

Scenario	Band Edge Compliance Conducted [dB]		
	DSSS / b – mode	OFDM / gmode	OFDM / HT20 – mode
Lower Band Edge – Channel 1	> 20 dB	> 20 dB	> 20 dB
Upper Band Edge – Channel 11	> 20 dB	> 20 dB	> 20 dB
Measurement uncertainty	± 1.5 dB		

Result: Passed

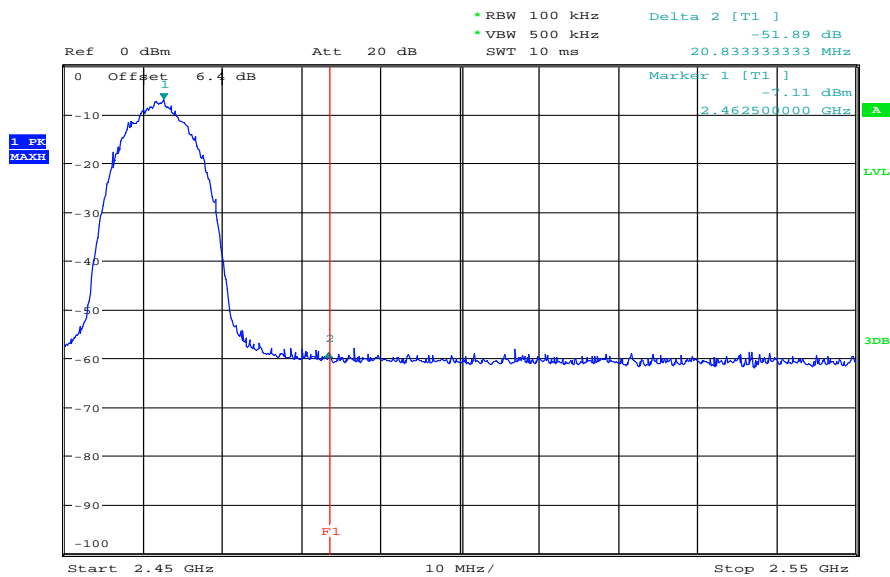
Plots: DSSS / b – mode

Plot 1: TX mode, lower band edge



Date: 12.MAR.2014 13:15:21

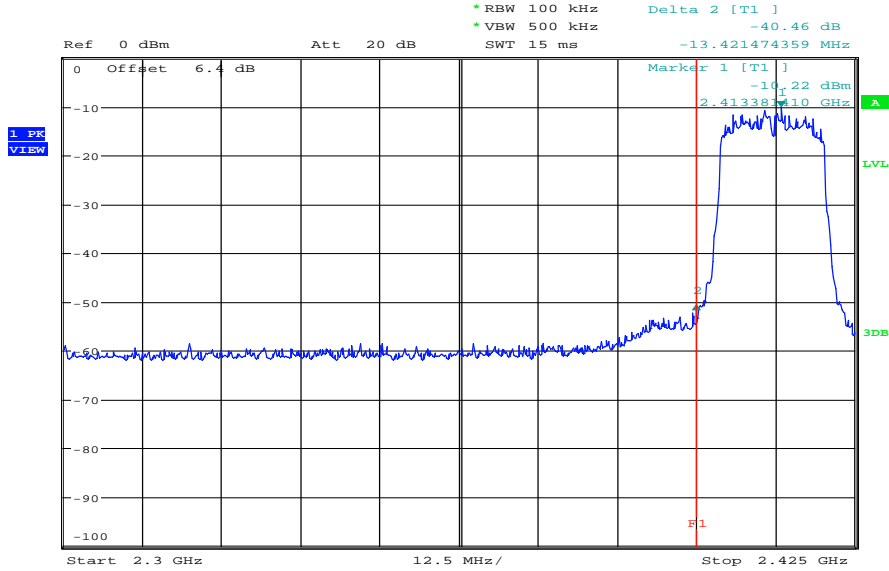
Plot 2: TX mode, upper band edge



Date: 12.MAR.2014 13:19:42

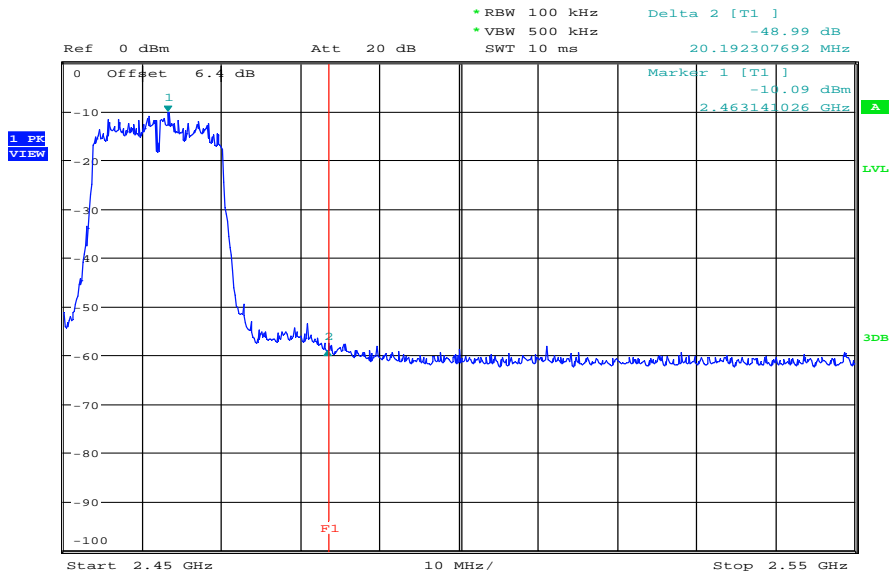
Plots: OFDM / g – mode

Plot 1: TX mode, lower band edge



Date: 12.MAR.2014 13:16:55

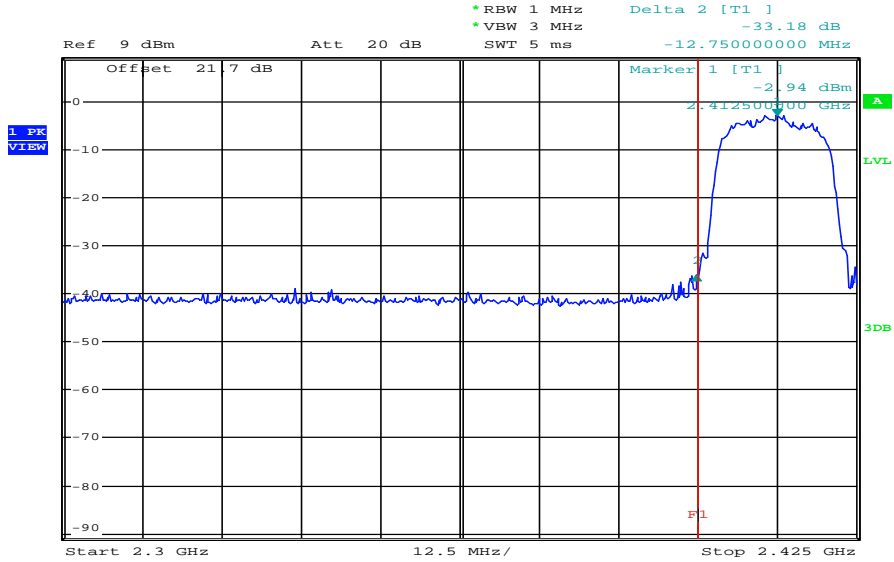
Plot 2: TX mode, upper band edge



Date: 12.MAR.2014 13:24:38

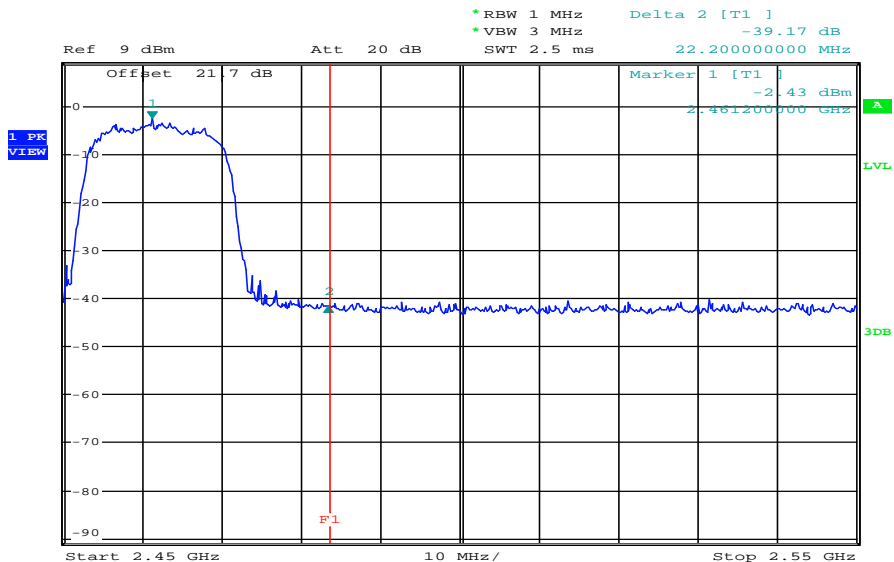
Plots: OFDM / HT20 – mode

Plot 1: TX mode, lower band edge



Date: 8.APR.2014 15:02:10

Plot 2: TX mode, upper band edge



Date: 8.APR.2014 15:00:28

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 channel 1 for the lower restricted band and to channel 11 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 MHz / 1 MHz
Video bandwidth:	1 MHz / 10 Hz
Span:	See plot!
Trace-Mode:	Max Hold

Limits:

FCC	IC
Band Edge Compliance Radiated	
<p>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)).</p>	
74 dB μ V/m Peak 54 dB μ V/m AVG	

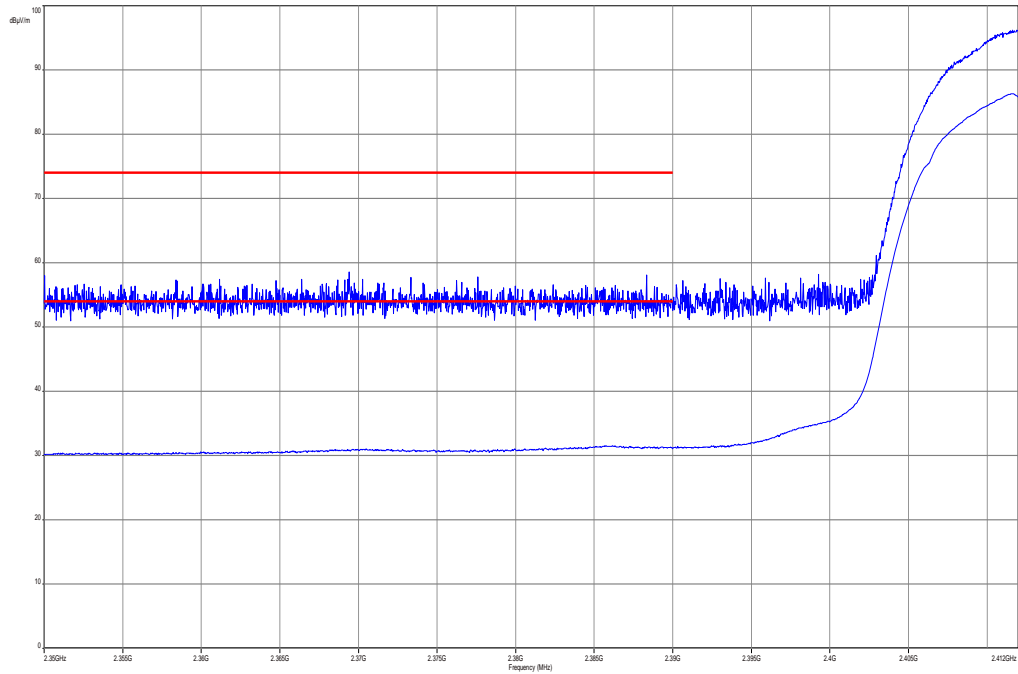
Results:

Scenario	Band Edge Compliance Conducted [dB]	
	DSSS / b – mode	OFDM / g – mode
Lower Band Edge – Channel 1	> 20 dB (Peak) > 20 dB (AVG)	> 10 dB (Peak) > 20 dB (AVG)
Upper Band Edge – Channel 11	> 20 dB (Peak) > 20 dB (AVG)	> 10 dB (Peak) > 20 dB (AVG)
Measurement uncertainty	± 3 dB	

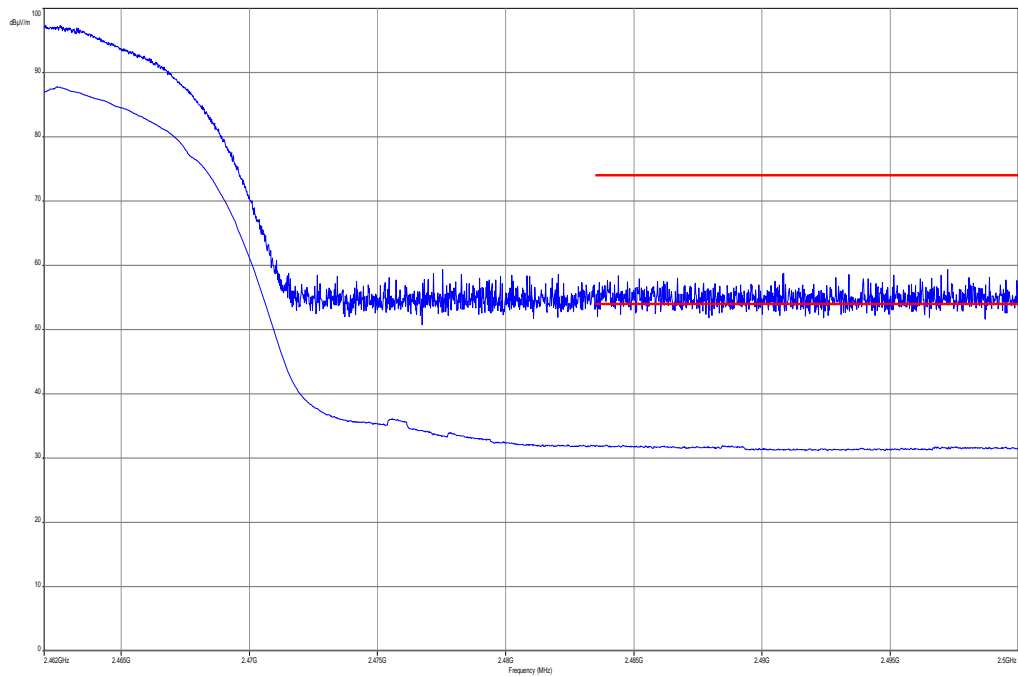
Result: Passed

Plots: DSSS/ b – mode peak / average

Plot 1: TX mode, lower band edge, vertical & horizontal polarization

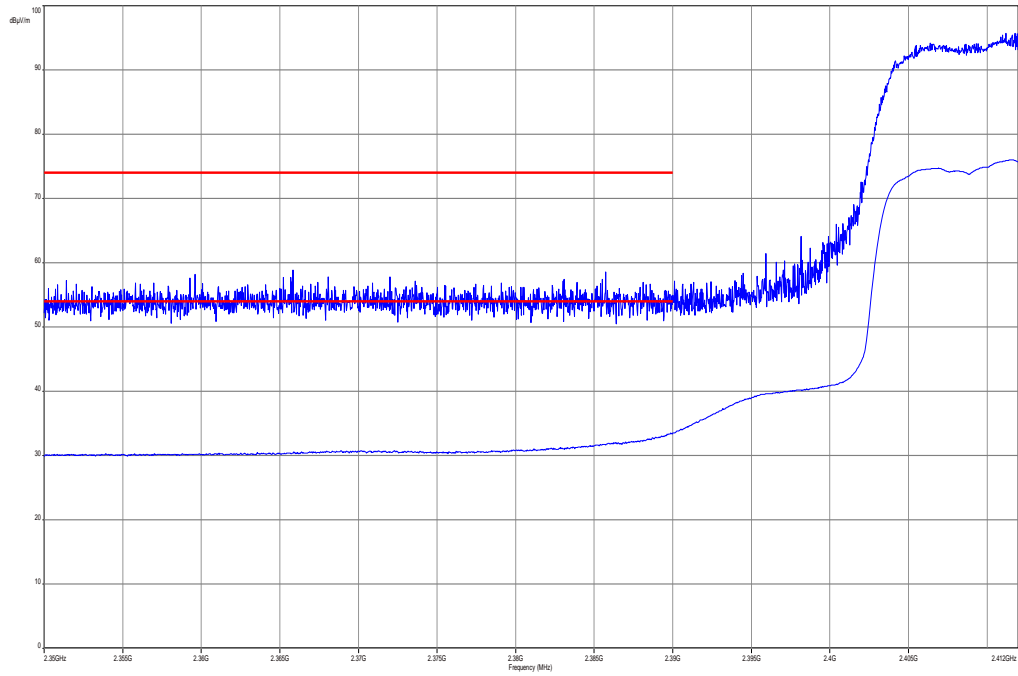


Plot 2: TX mode, upper band edge, vertical & horizontal polarization

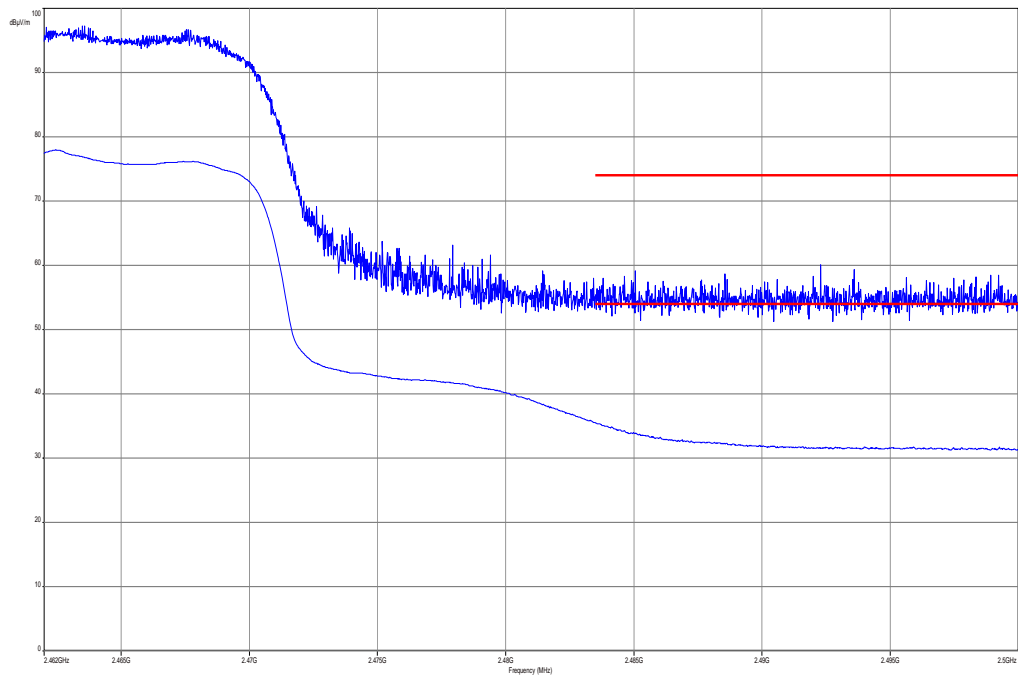


Plots: OFDM / g – mode peak / average

Plot 1: TX mode, lower band edge, vertical & horizontal polarization

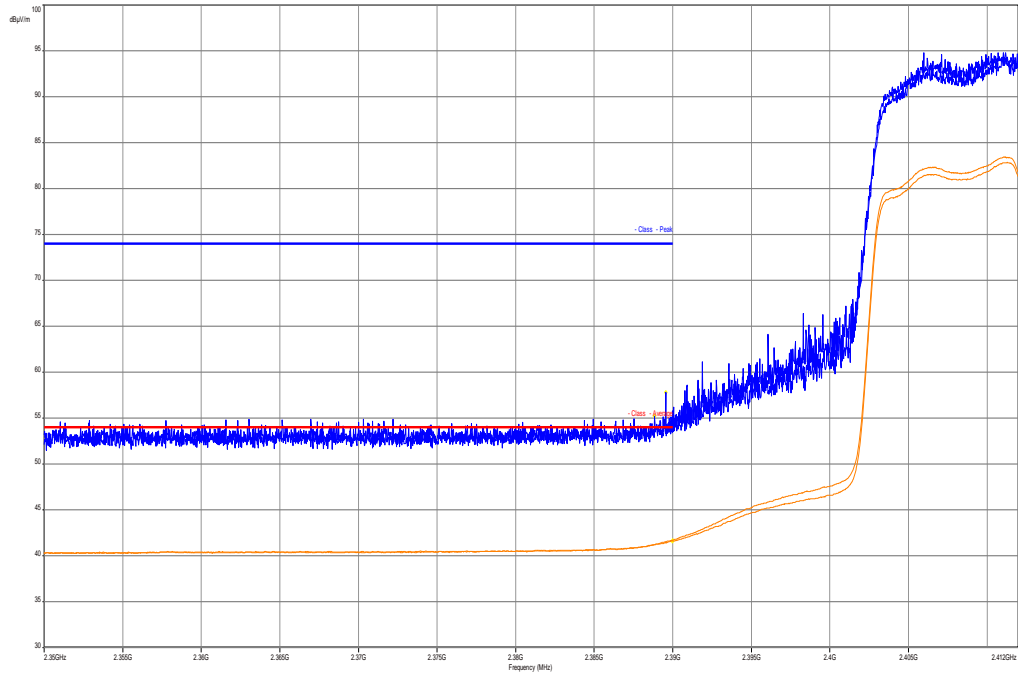


Plot 2: TX mode, upper band edge, vertical & horizontal polarization

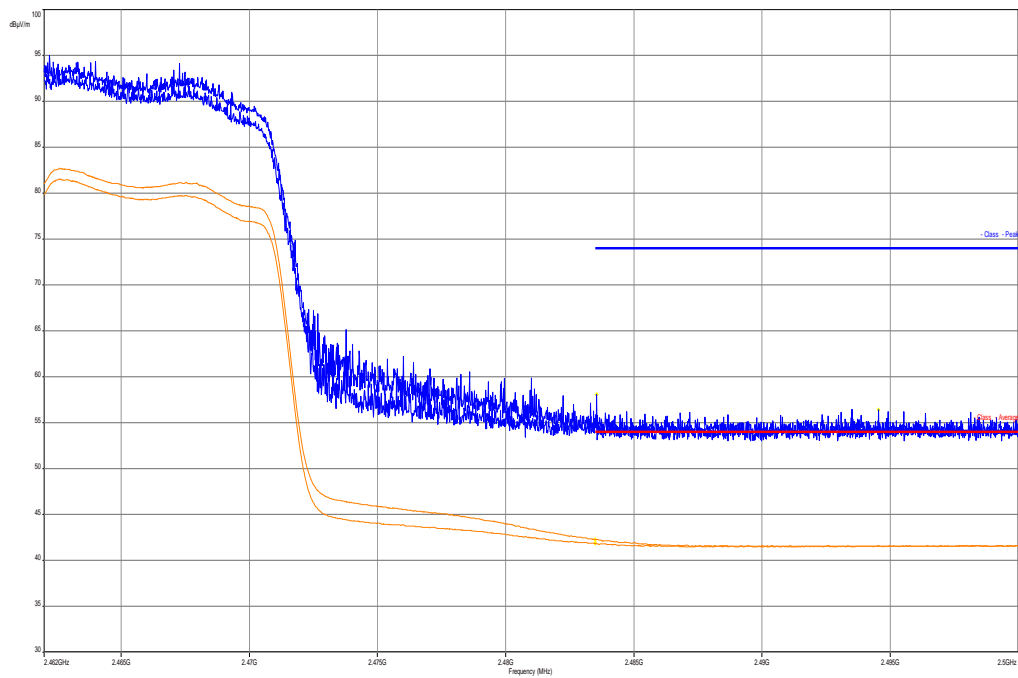


Plots: OFDM / HT20 – mode peak / average

Plot 1: TX mode, lower band edge, vertical & horizontal polarization



Plot 2: TX mode, upper band edge, vertical & horizontal polarization



10.9 TX spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 kHz
Video bandwidth:	500 kHz
Span:	9 kHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
TX Spurious Emissions Conducted	
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	

Results: DSSS / b – mode

TX Spurious Emissions Conducted					
DSSS / b – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-8.69	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2437		-10.09	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2462		-10.00	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
Measurement uncertainty		± 3 dB			

Result: Passed

Results: OFDM / g – mode

TX Spurious Emissions Conducted					
OFDM / g – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-11.66	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2437		-11.78	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2462		-10.75	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
Measurement uncertainty		± 3 dB			

Result: Passed

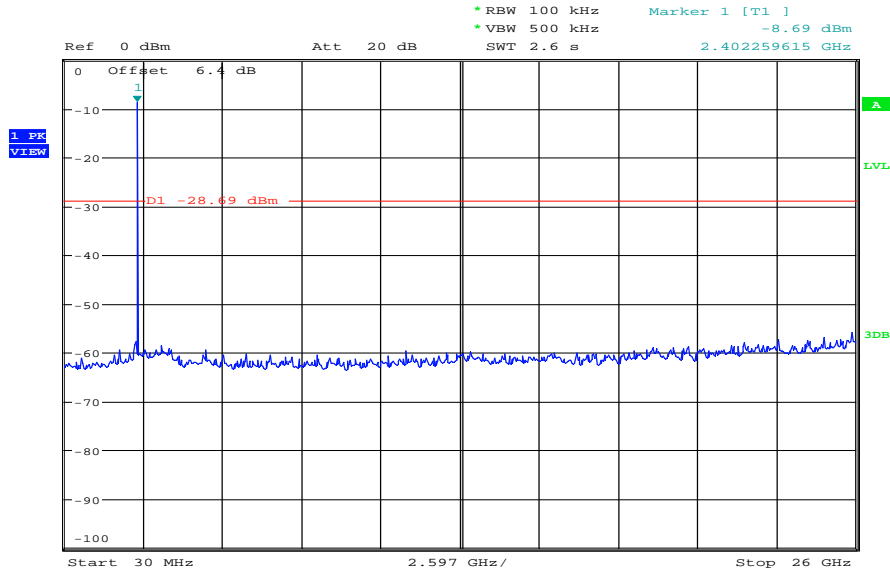
Results: OFDM / HT20 – mode

TX Spurious Emissions Conducted					
OFDM / HT20 – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		-11.66	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2437		-11.78	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
2462		-10.75	30 dBm		Operating frequency
No peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak) -30 dBc (average)		complies
Measurement uncertainty		± 3 dB			

Result: Passed

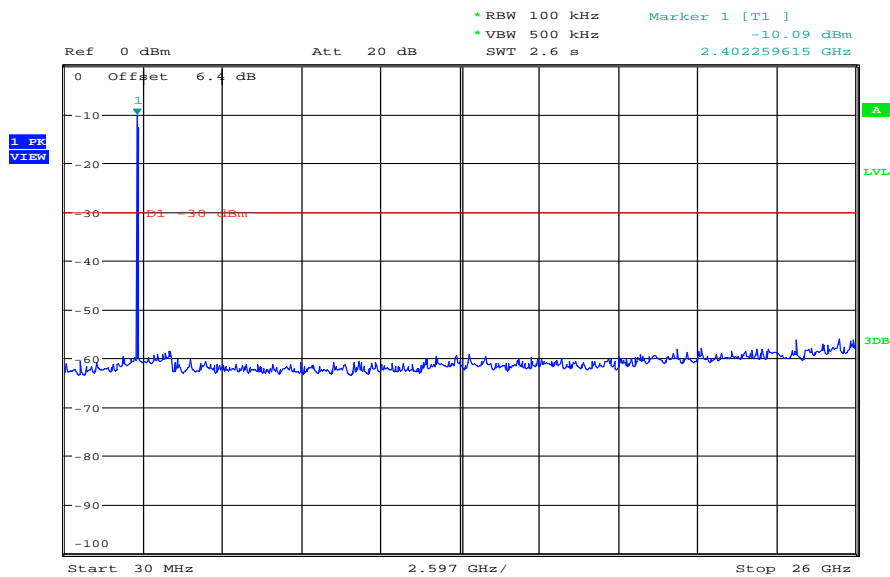
Plots: DSSS / b – mode

Plot 1: TX mode, lowest channel, up to 26 GHz



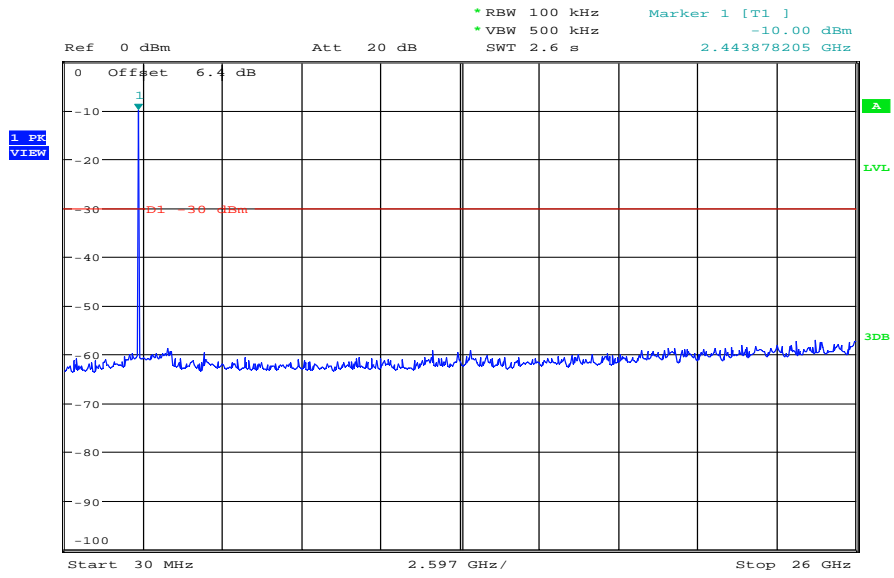
Date: 12.MAR.2014 13:30:32

Plot 2: TX mode, middle channel, up to 26 GHz



Date: 12.MAR.2014 13:32:28

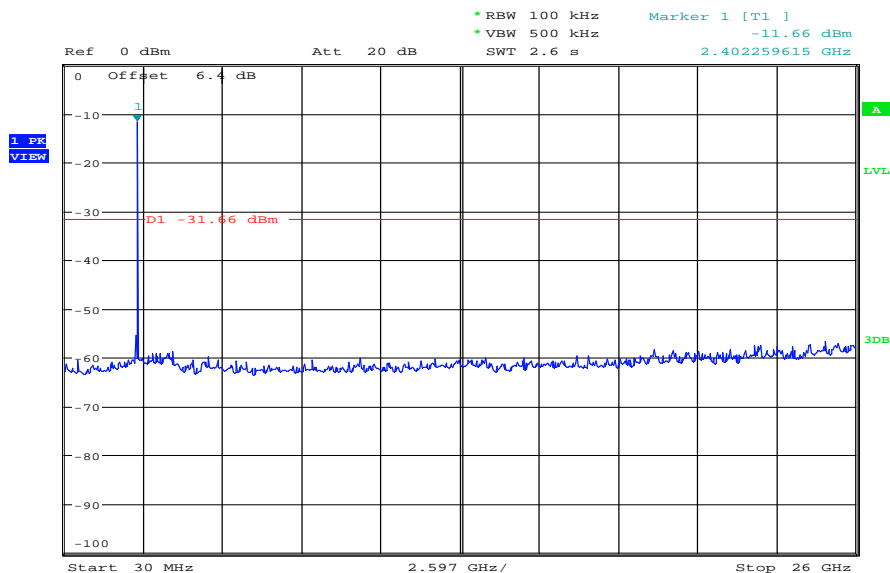
Plot 3: TX mode, highest channel, up to 26 GHz



Date: 12.MAR.2014 13:33:21

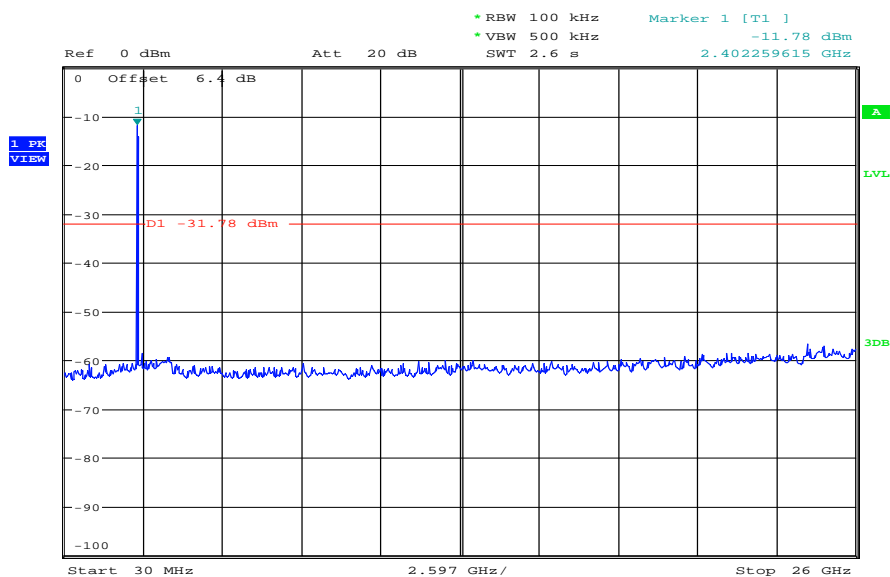
Plots: OFDM / g – mode

Plot 1: TX mode, lowest channel, up to 26 GHz



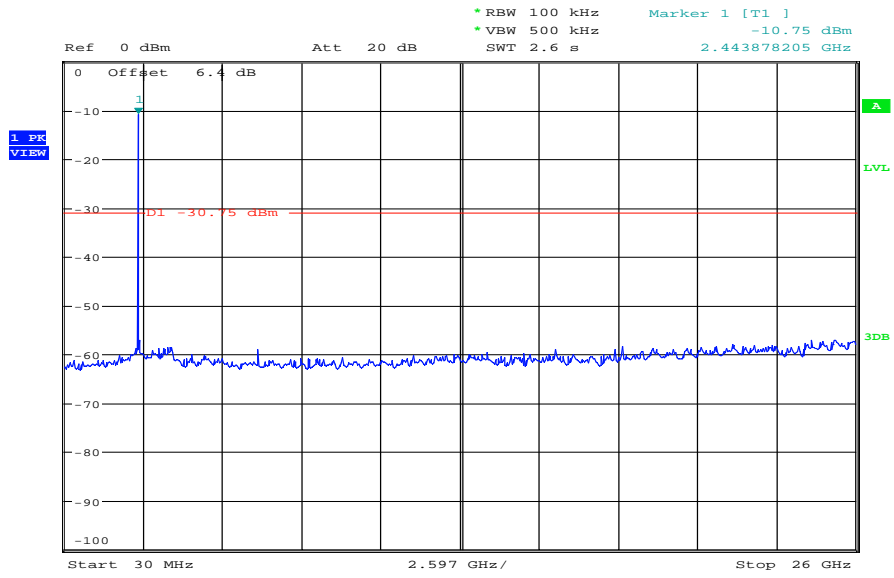
Date: 12.MAR.2014 13:34:51

Plot 2: TX mode, middle channel, up to 26 GHz



Date: 12.MAR.2014 13:35:54

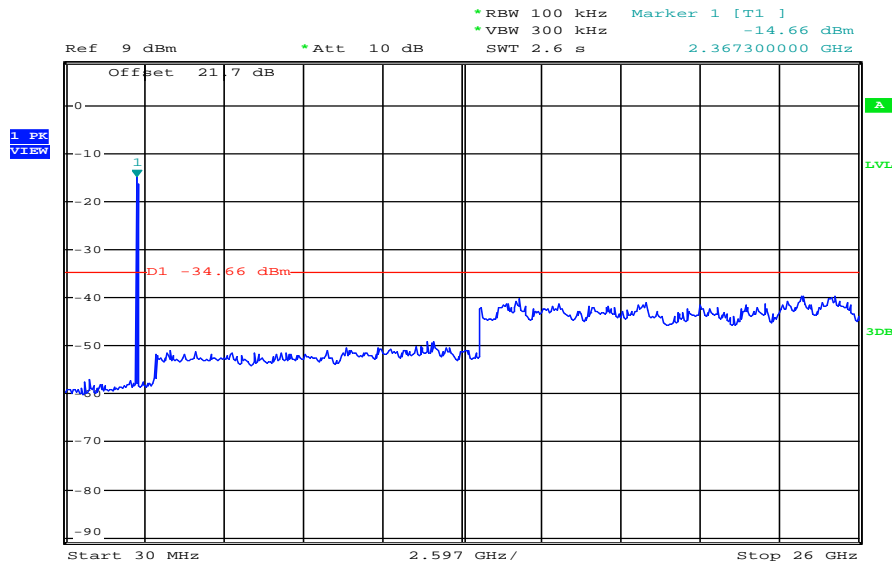
Plot 3: TX mode, highest channel, up to 26 GHz



Date: 12.MAR.2014 13:37:24

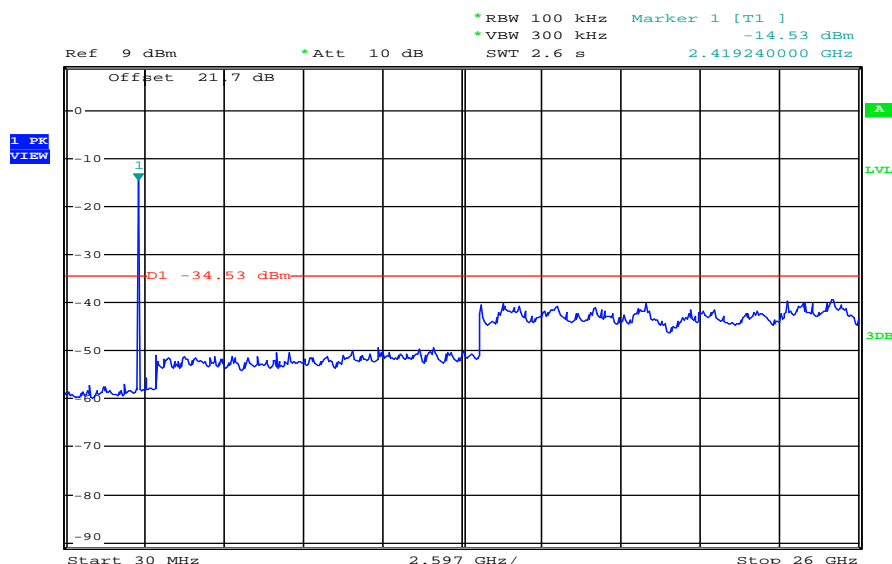
Plots: OFDM / HT20 – mode

Plot 1: TX mode, lowest channel, up to 26 GHz



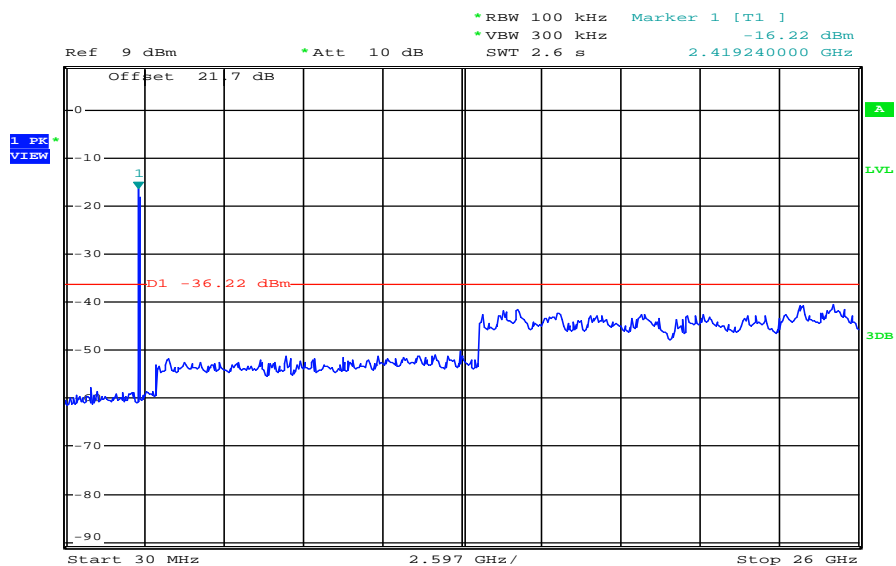
Date: 8.APR.2014 15:10:02

Plot 2: TX mode, middle channel, up to 26 GHz



Date: 8.APR.2014 15:11:58

Plot 3: TX mode, highest channel, up to 26 GHz



Date: 8.APR.2014 15:13:43

10.10 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The measurement is performed at channel 1, 6 and 11. The measurement is repeated for all modulations.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak / RMS
Sweep time:	Auto
Resolution bandwidth:	F > 1 GHz: 1 MHz F < 1 GHz: 100 kHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz / 3 MHz
Span:	30 MHz to 26 GHz
Trace-Mode:	Max Hold
Measured Modulation	<input checked="" type="checkbox"/> DSSS b – mode <input checked="" type="checkbox"/> OFDM g – mode <input checked="" type="checkbox"/> OFDM n – mode

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

FCC		IC	
TX Spurious Emissions 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).			
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance	
30 - 88	30.0	10	
88 – 216	33.5	10	
216 – 960	36.0	10	
Above 960	54.0	3	

Results: DSSS / b – mode

TX Spurious Emissions Radiated [dBµV/m]								
DSSS / b – mode								
2412 MHz			2437 MHz			2462 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 spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / g – mode

TX Spurious Emissions Radiated [dBµV/m]								
OFDM / g – mode								
2412 MHz			2437 MHz			2462 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 spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / HT20 – mode

TX Spurious Emissions Radiated [dBµV/m]								
OFDM / HT20 – mode								
2412 MHz			2437 MHz			2462 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 spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.			No spurious emissions above 1 GHz detected.		
Measurement uncertainty			± 3 dB					

Result: Passed

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

Plots: DSSS / b – mode

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

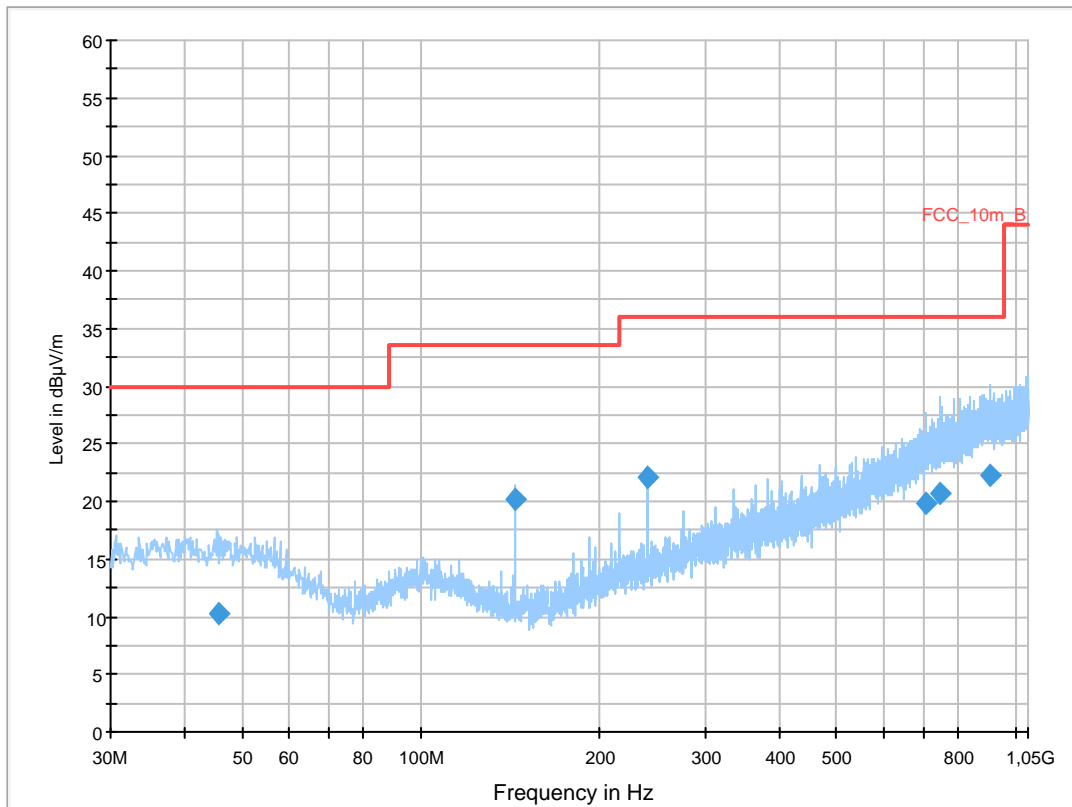
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN b-mode TX Ch. 1
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 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
45.531900	10.3	1000.0	120.000	153.0	V	2.0	13.3	19.7	30.0	
143.998200	20.1	1000.0	120.000	111.0	V	280.0	8.8	13.4	33.5	
240.004500	22.1	1000.0	120.000	98.0	V	260.0	13.0	13.9	36.0	
704.187450	19.9	1000.0	120.000	170.0	H	100.0	22.6	16.2	36.0	
747.772650	20.8	1000.0	120.000	170.0	V	280.0	23.6	15.2	36.0	
906.453450	22.3	1000.0	120.000	153.0	H	184.0	25.2	13.7	36.0	

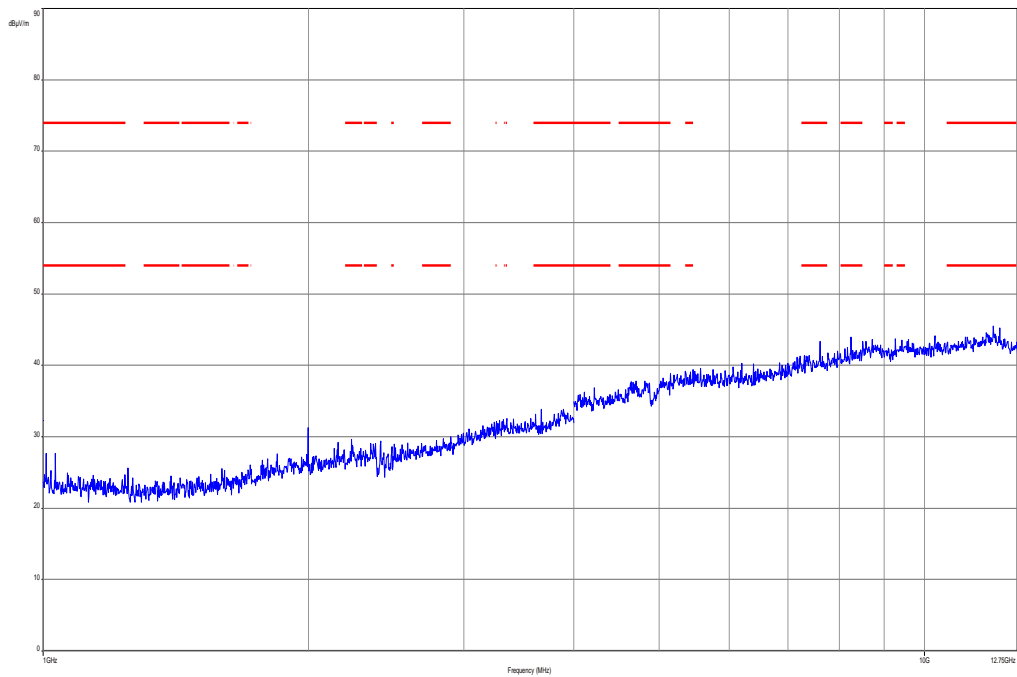
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

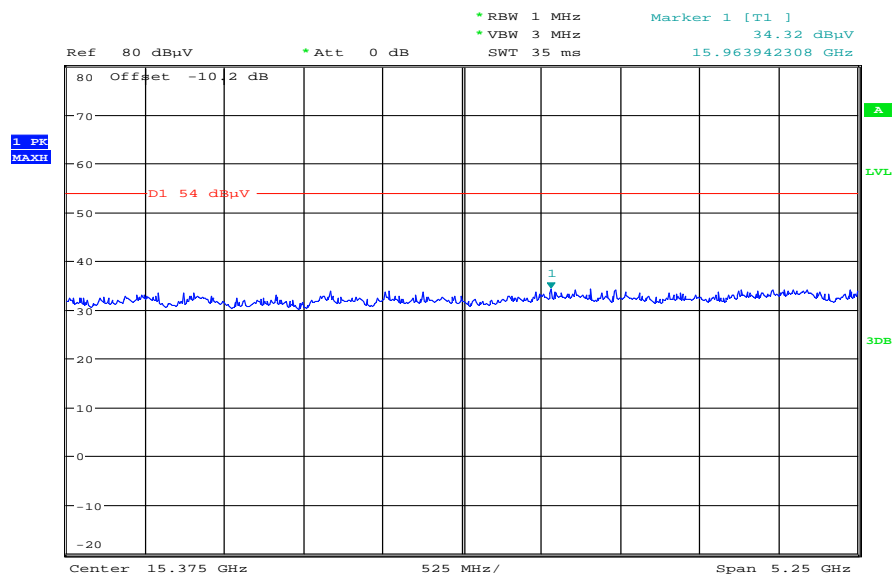
EMC 32 Version 8.52

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



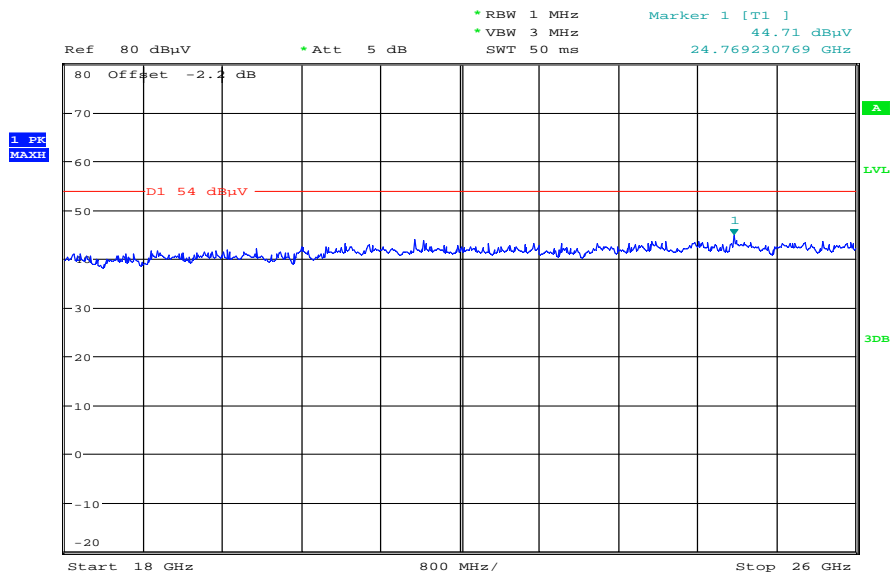
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 12.MAR.2014 13:52:05

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



Date: 12.MAR.2014 14:24:01

Plot 5: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

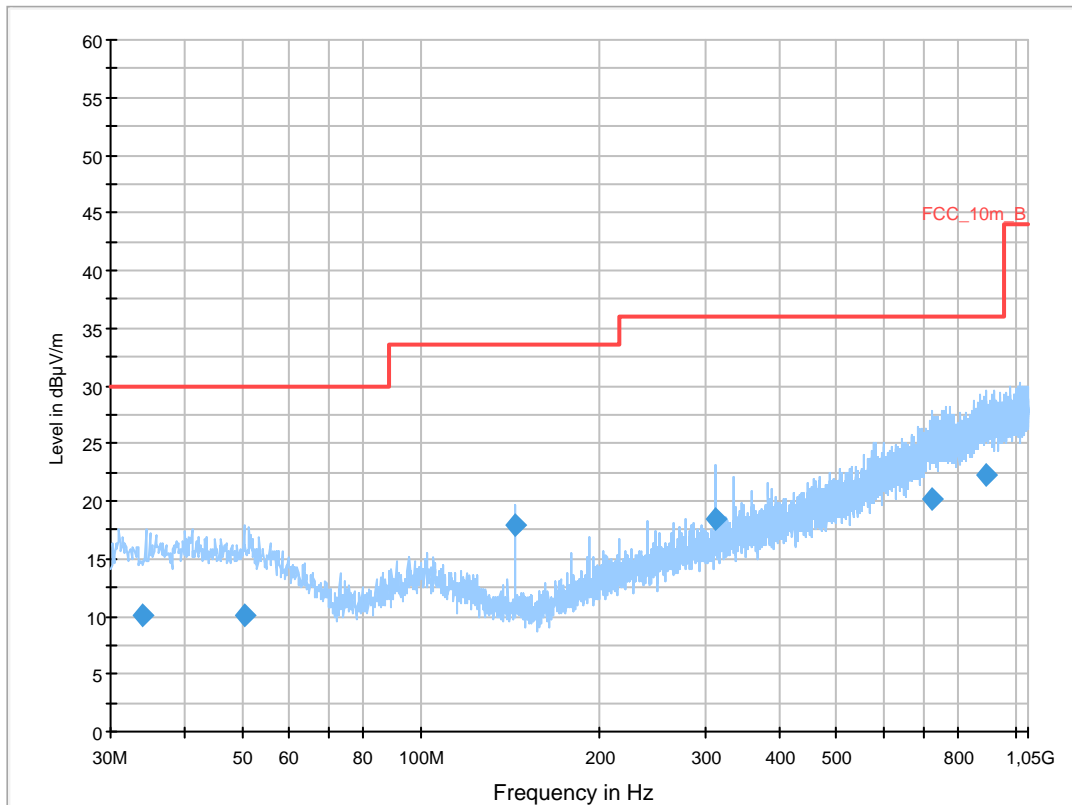
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN b-mode TX Ch. 6
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

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

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
33.981150	10.0	1000.0	120.000	170.0	V	265.0	12.9	20.0	30.0	
50.325150	10.1	1000.0	120.000	170.0	H	178.0	13.3	19.9	30.0	
144.035700	17.9	1000.0	120.000	98.0	V	-9.0	8.8	15.6	33.5	
311.915700	18.5	1000.0	120.000	113.0	V	280.0	14.9	17.5	36.0	
722.251950	20.2	1000.0	120.000	170.0	H	268.0	23.0	15.8	36.0	
890.692050	22.3	1000.0	120.000	111.0	V	261.0	25.1	13.7	36.0	

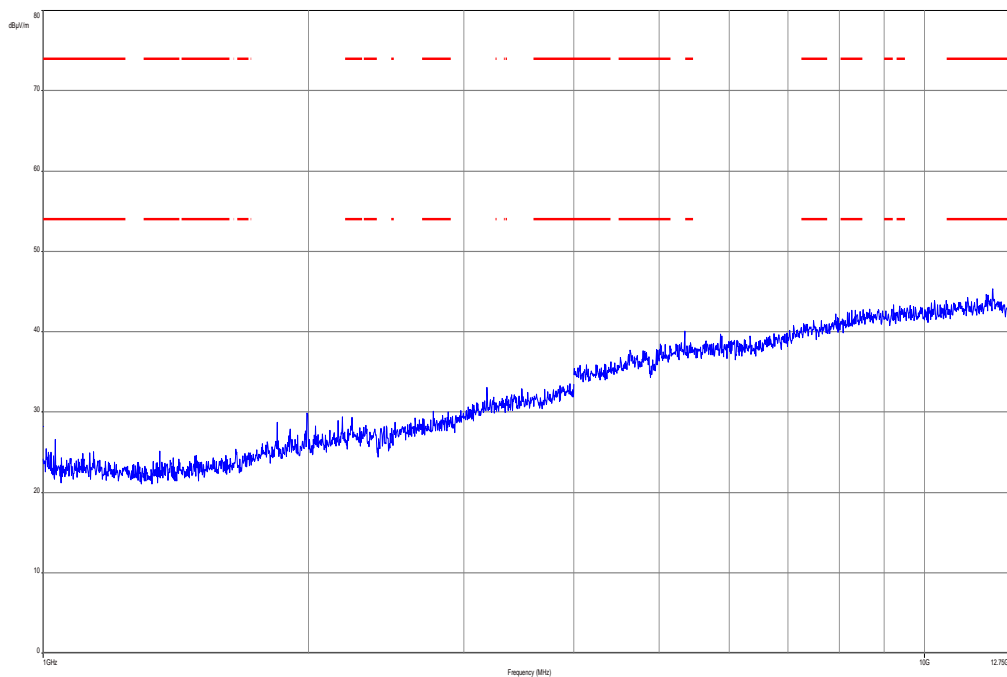
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

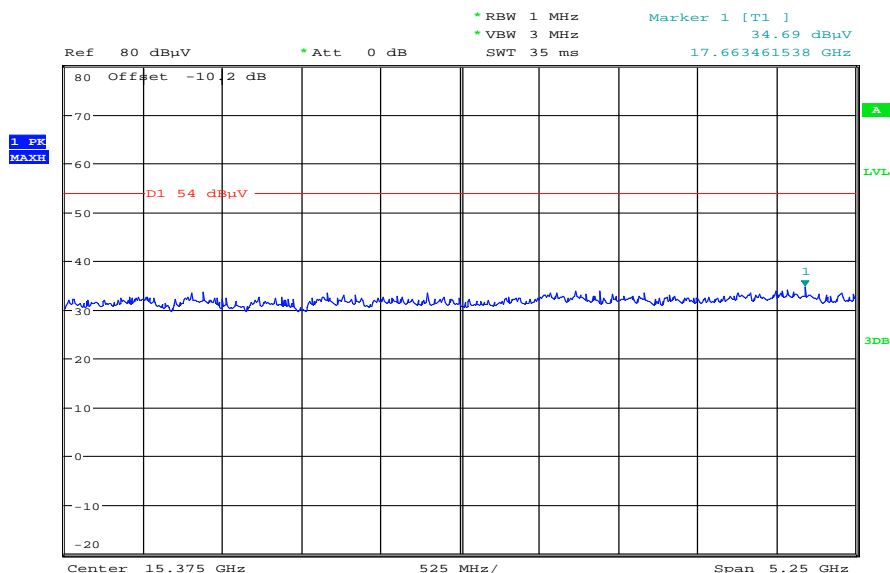
EMC 32 Version 8.52

Plot 6: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



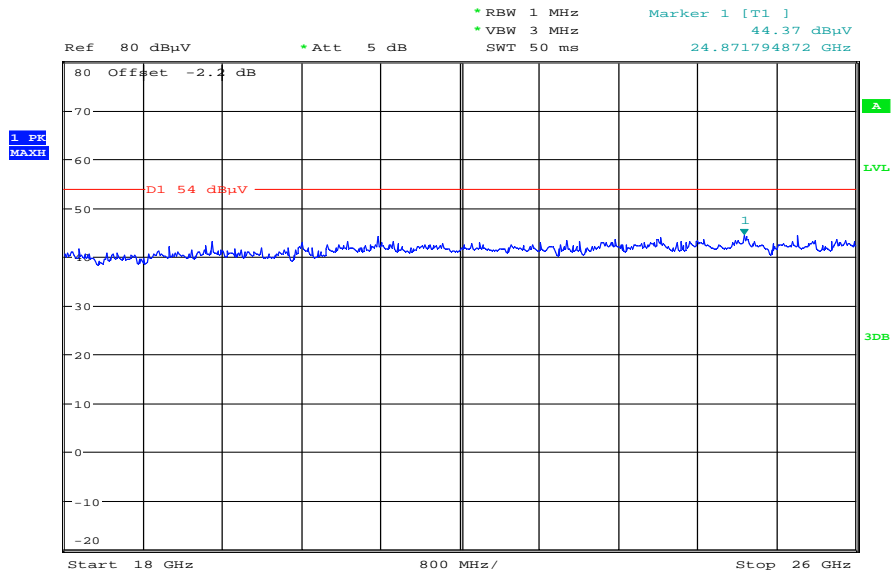
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 7: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 13:53:08

Plot 8: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:24:49

Plot 9: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

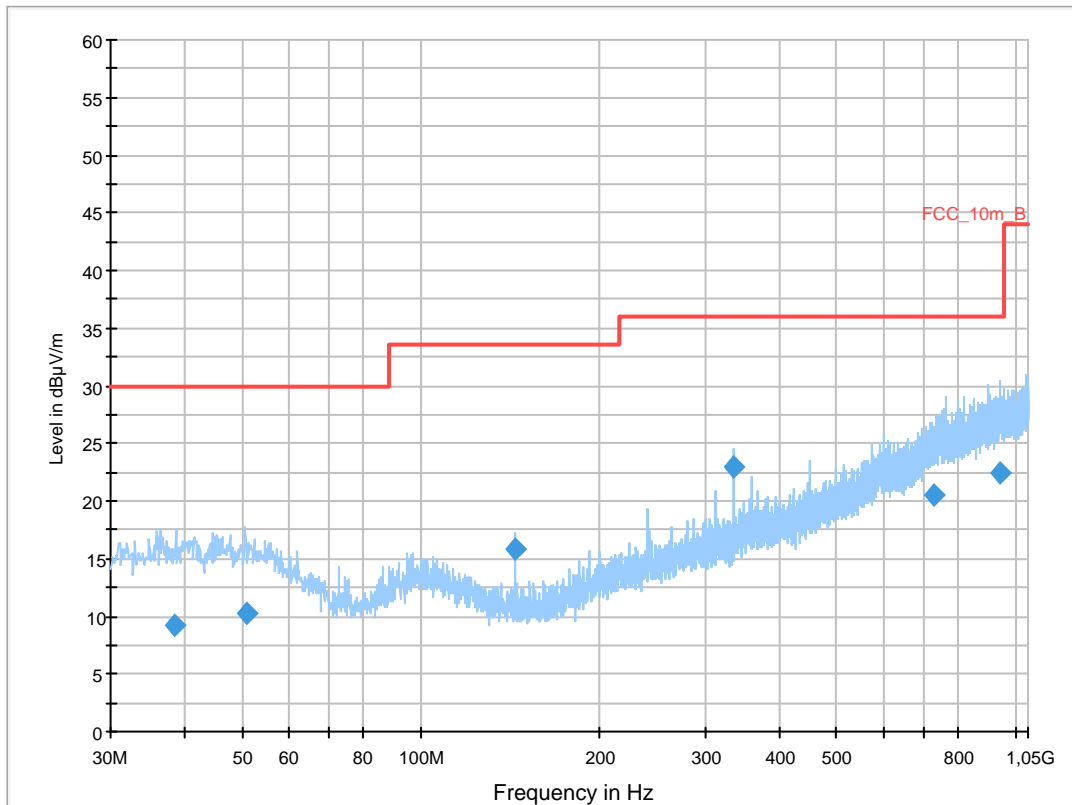
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN b-mode TX Ch. 11
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

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

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.486100	9.2	1000.0	120.000	170.0	V	81.0	13.3	20.8	30.0	
50.981850	10.3	1000.0	120.000	170.0	H	88.0	13.3	19.7	30.0	
143.984250	15.8	1000.0	120.000	105.0	V	10.0	8.8	17.7	33.5	
336.032400	22.9	1000.0	120.000	98.0	V	280.0	15.6	13.1	36.0	
731.573250	20.4	1000.0	120.000	170.0	V	-10.0	23.2	15.6	36.0	
944.718000	22.4	1000.0	120.000	120.0	V	261.0	25.3	13.6	36.0	

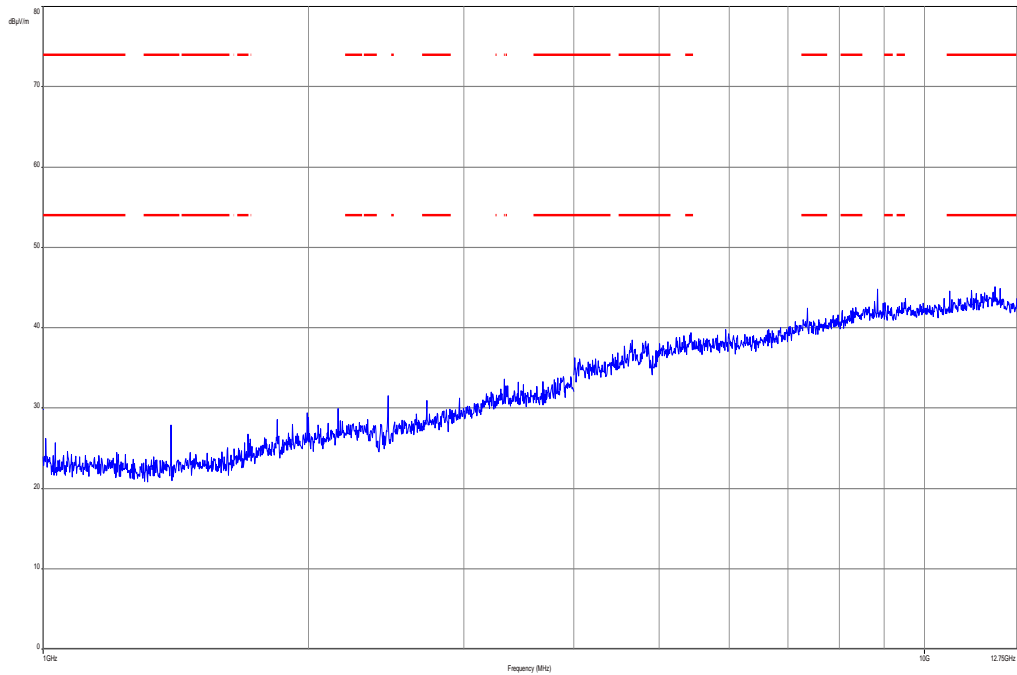
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

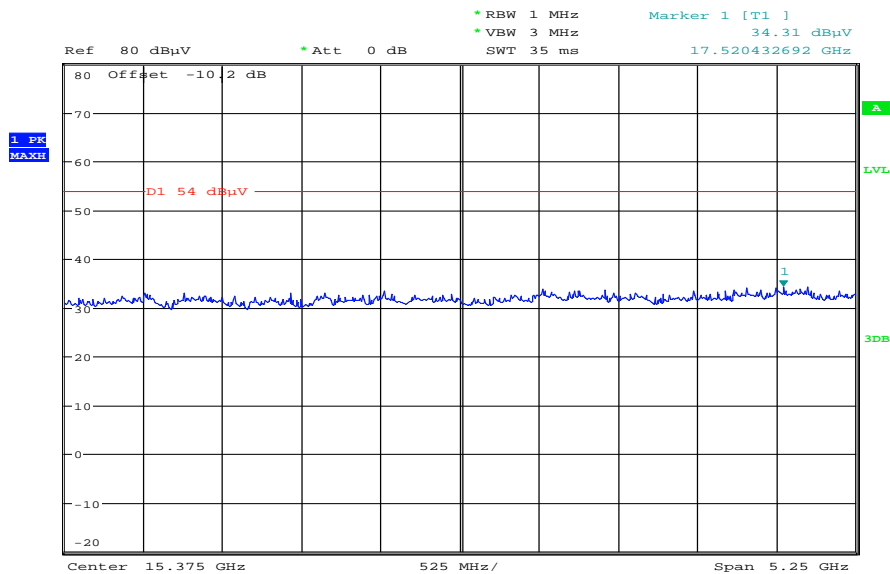
EMC 32 Version 8.52

Plot 10: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



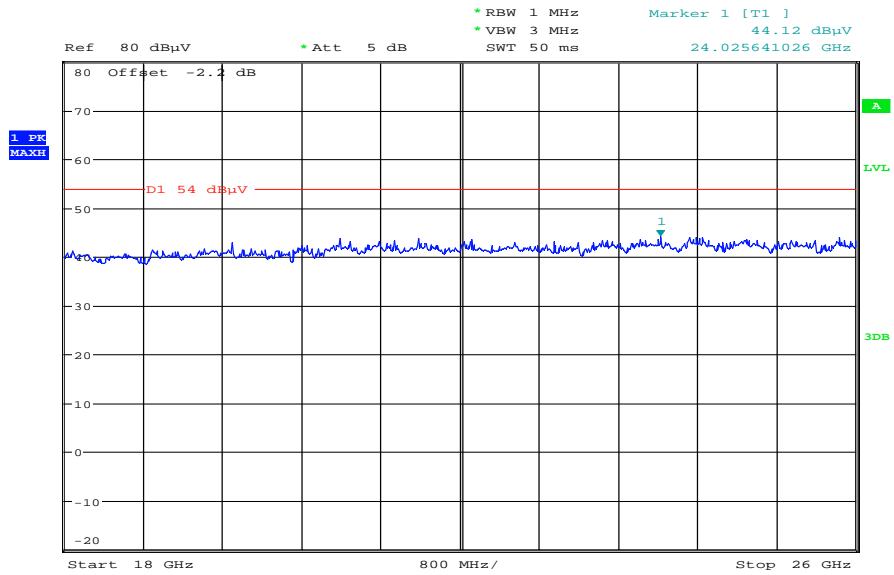
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 11: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 13:54:09

Plot 12: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:25:44

Plots: OFDM / g – mode

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

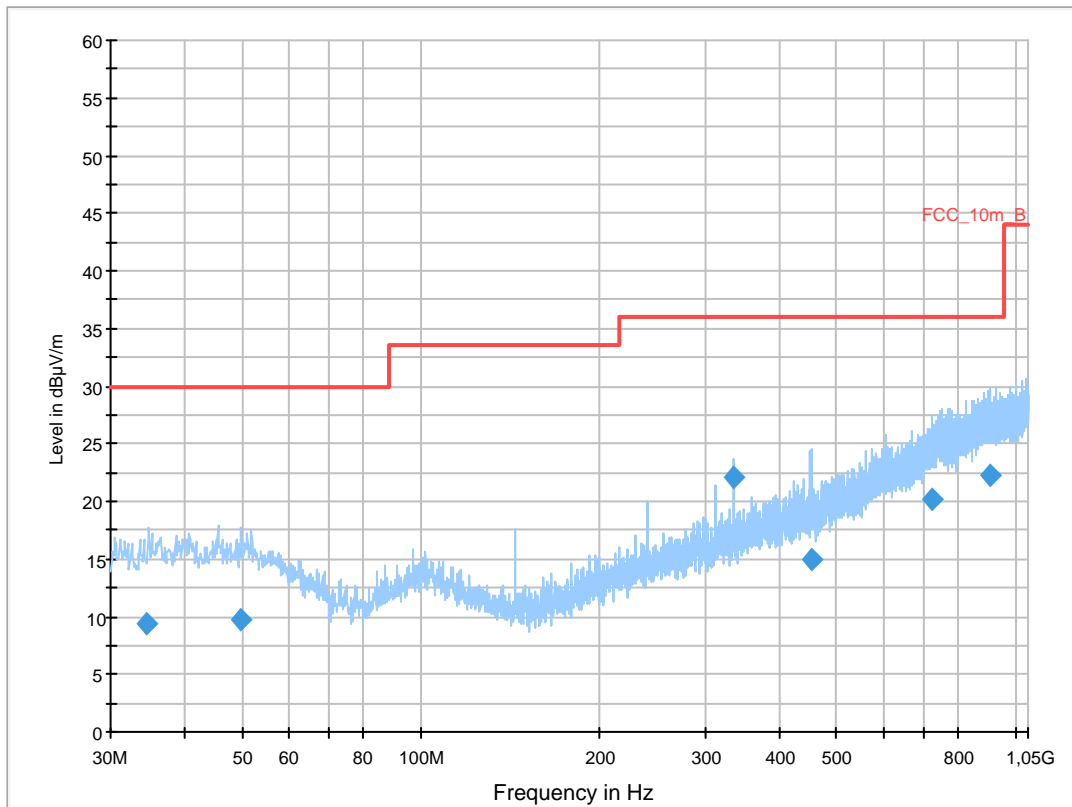
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN g-mode TX Ch. 1
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 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
34.575150	9.4	1000.0	120.000	161.0	H	0.0	13.0	20.6	30.0	
49.620900	9.8	1000.0	120.000	170.0	V	260.0	13.4	20.2	30.0	
336.022050	22.0	1000.0	120.000	170.0	V	272.0	15.6	14.0	36.0	
452.622600	15.0	1000.0	120.000	161.0	V	2.0	17.7	21.0	36.0	
721.995300	20.2	1000.0	120.000	111.0	H	2.0	23.0	15.8	36.0	
906.811050	22.3	1000.0	120.000	111.0	V	280.0	25.2	13.7	36.0	

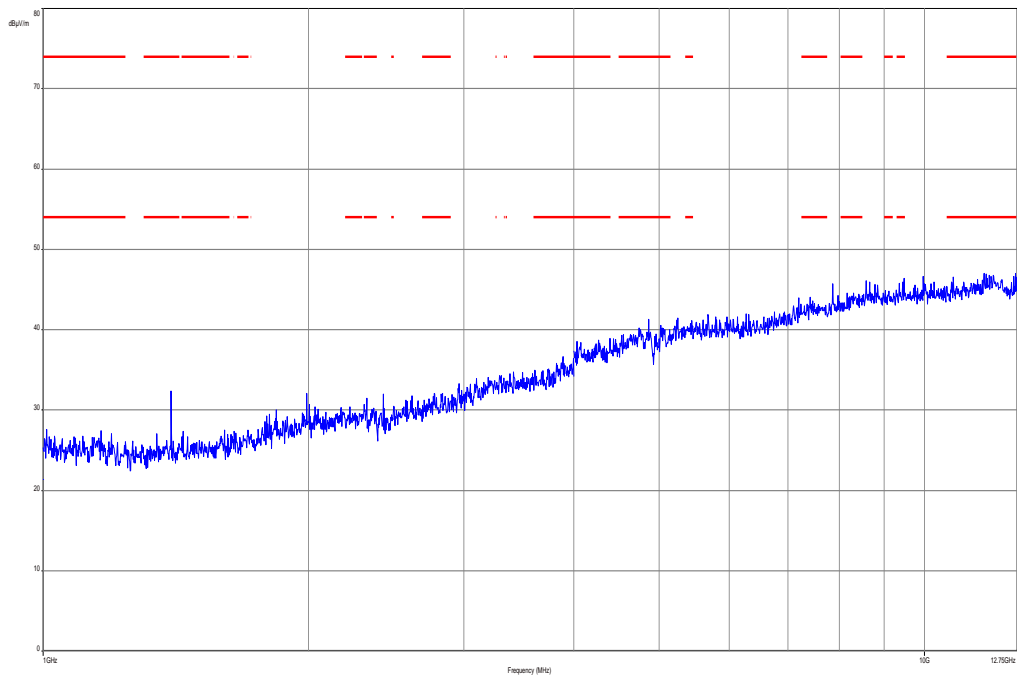
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

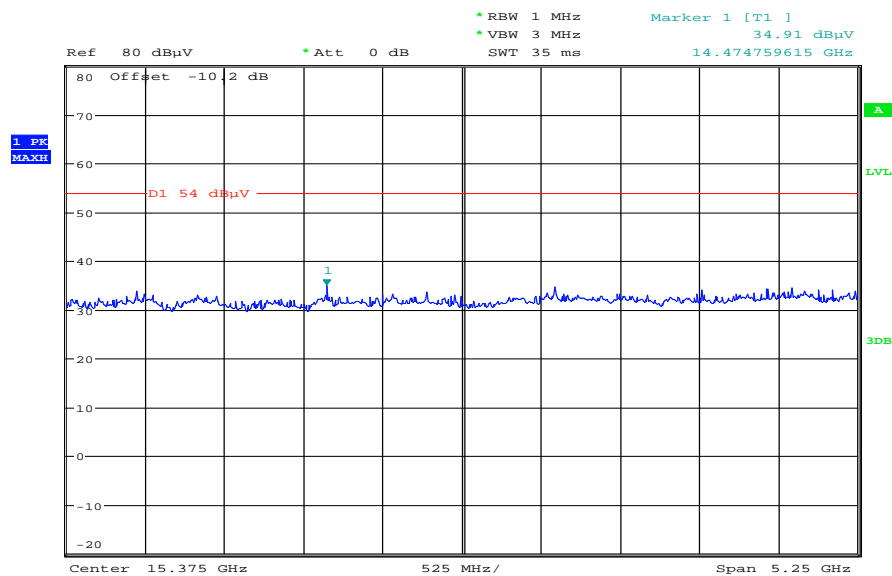
EMC 32 Version 8.52

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



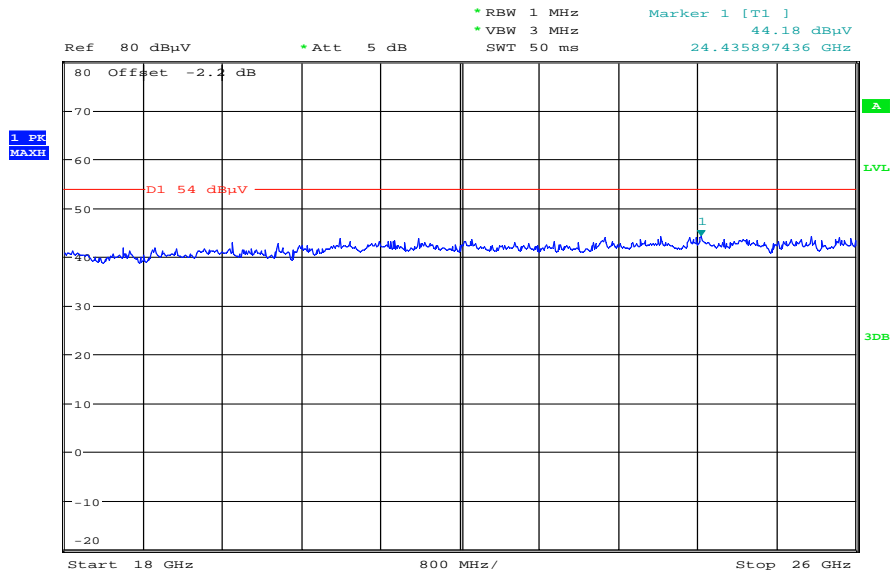
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 12.MAR.2014 13:55:20

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



Date: 12.MAR.2014 14:26:35

Plot 5: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

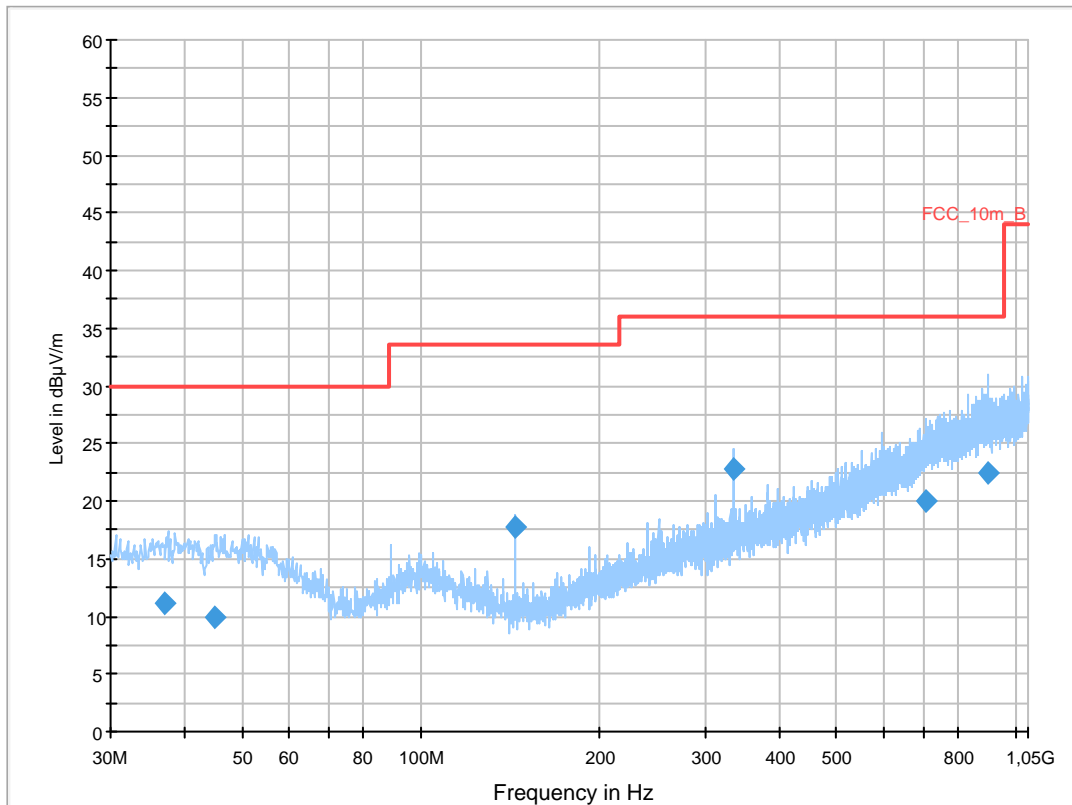
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN g-mode TX Ch. 6
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 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
36.993150	11.2	1000.0	120.000	170.0	V	178.0	13.2	18.8	30.0	
44.745600	9.8	1000.0	120.000	144.0	V	190.0	13.3	20.2	30.0	
144.011850	17.7	1000.0	120.000	98.0	V	280.0	8.8	15.8	33.5	
335.985300	22.8	1000.0	120.000	98.0	V	260.0	15.6	13.2	36.0	
705.838650	20.0	1000.0	120.000	170.0	H	10.0	22.6	16.0	36.0	
902.445750	22.4	1000.0	120.000	98.0	H	182.0	25.2	13.6	36.0	

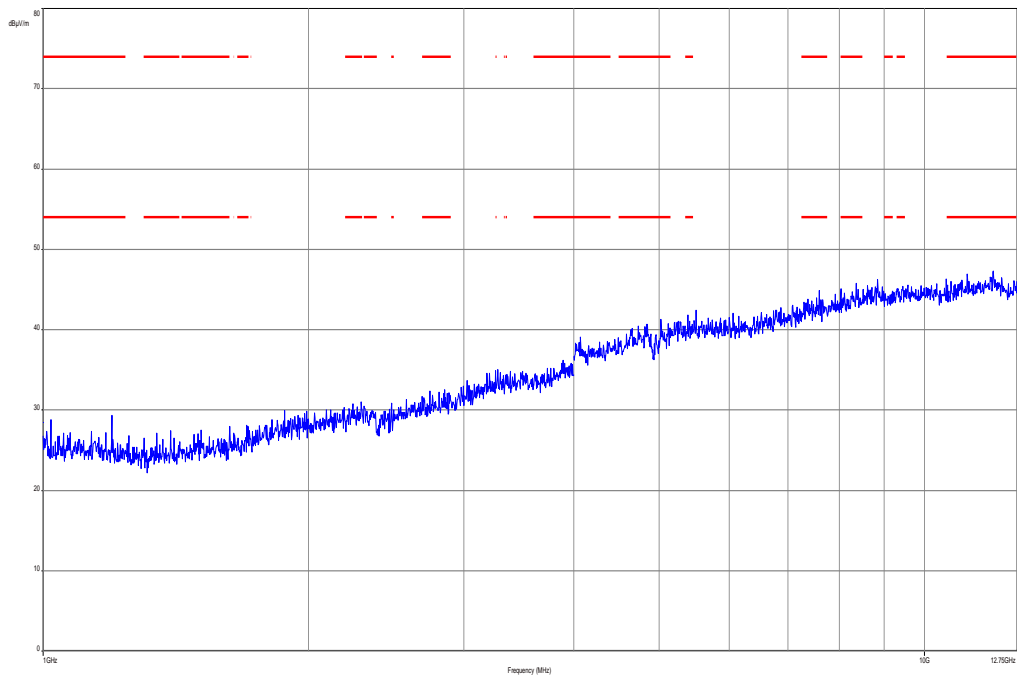
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

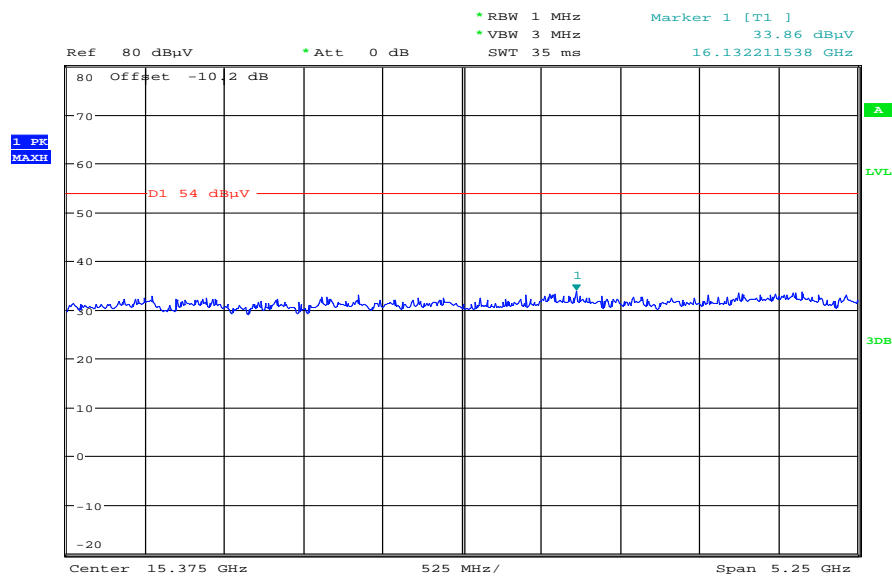
EMC 32 Version 8.52

Plot 6: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



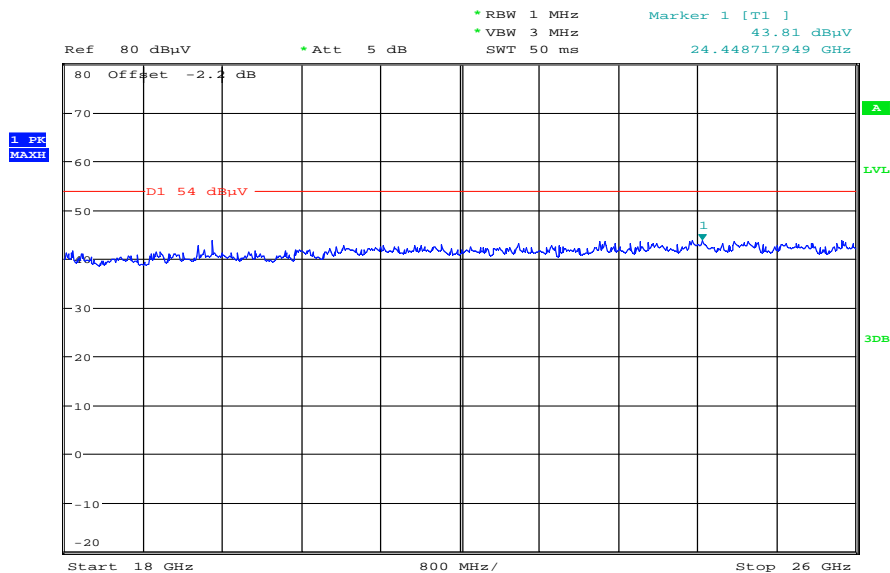
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 7: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:15:40

Plot 8: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:27:22

Plot 9: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

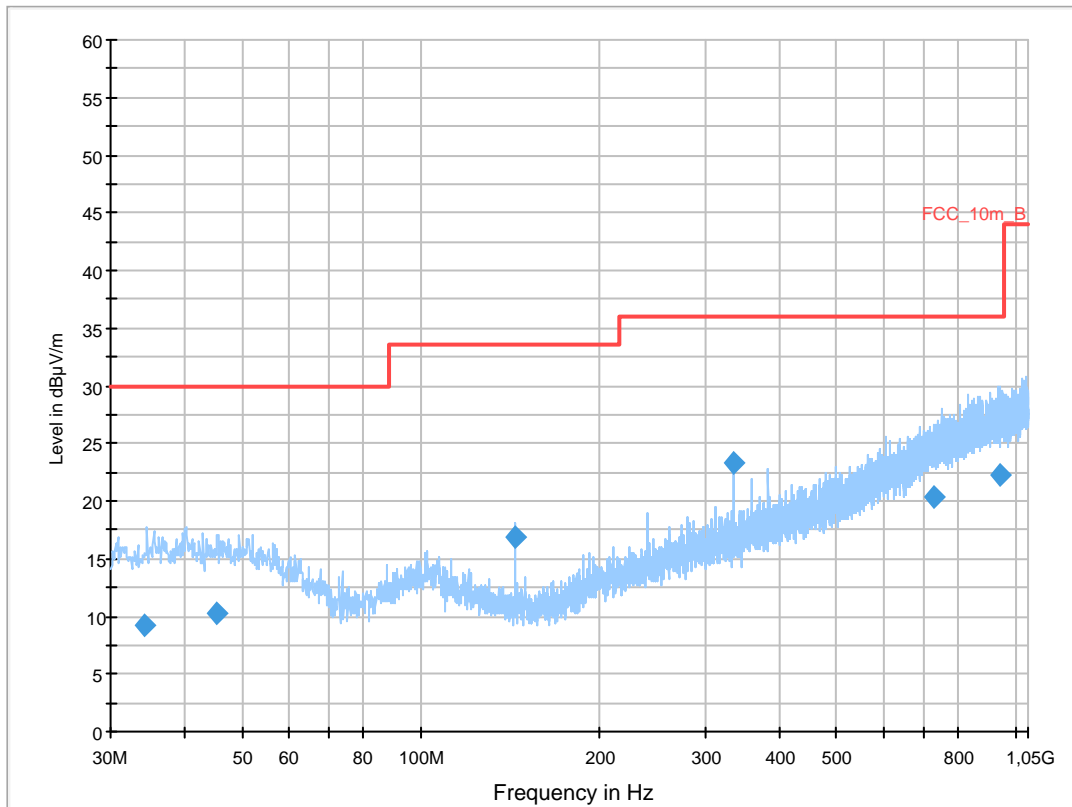
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN g-mode TX Ch. 11
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 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
34.321200	9.2	1000.0	120.000	161.0	H	100.0	13.0	20.8	30.0	
45.200850	10.2	1000.0	120.000	143.0	V	190.0	13.3	19.8	30.0	
144.001650	16.9	1000.0	120.000	98.0	V	-5.0	8.8	16.6	33.5	
336.023100	23.3	1000.0	120.000	98.0	V	261.0	15.6	12.7	36.0	
727.887600	20.4	1000.0	120.000	170.0	H	-3.0	23.2	15.6	36.0	
939.016950	22.3	1000.0	120.000	170.0	H	175.0	25.3	13.7	36.0	

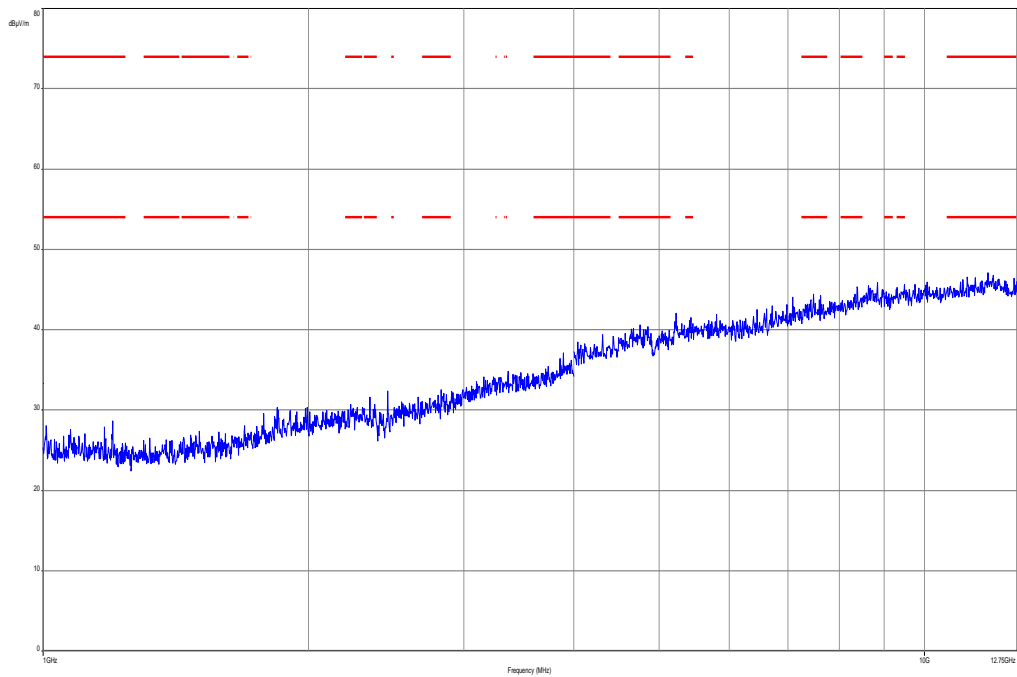
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

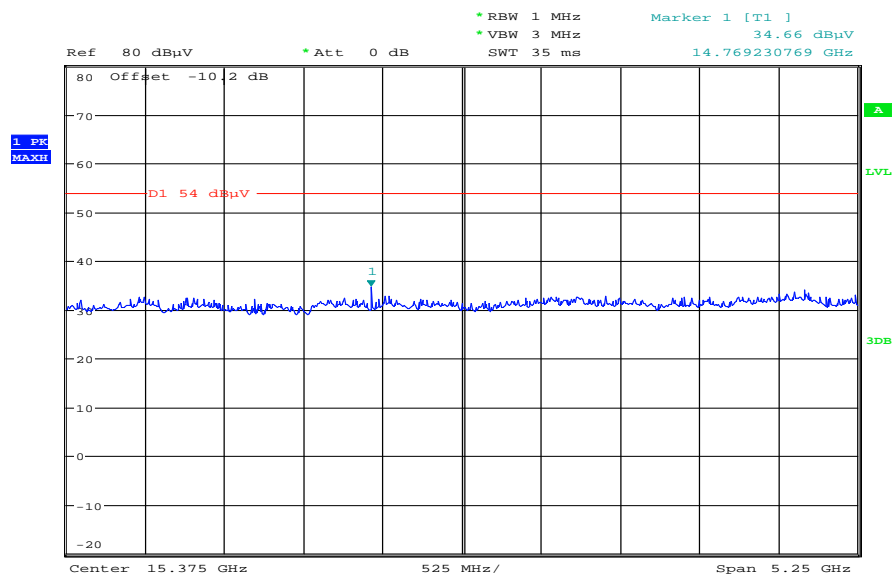
EMC 32 Version 8.52

Plot 10: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



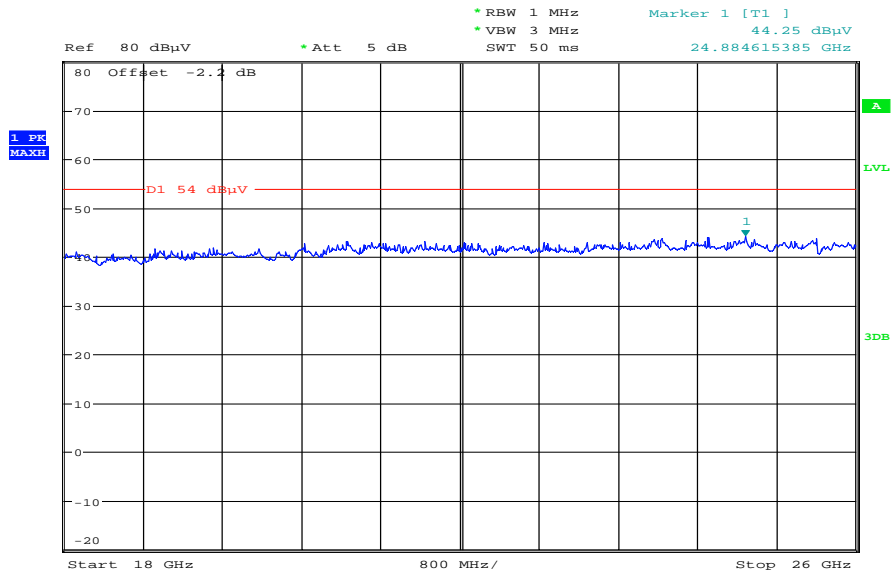
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 11: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:16:31

Plot 12: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:28:07

Plots: OFDM / HT20 – mode

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

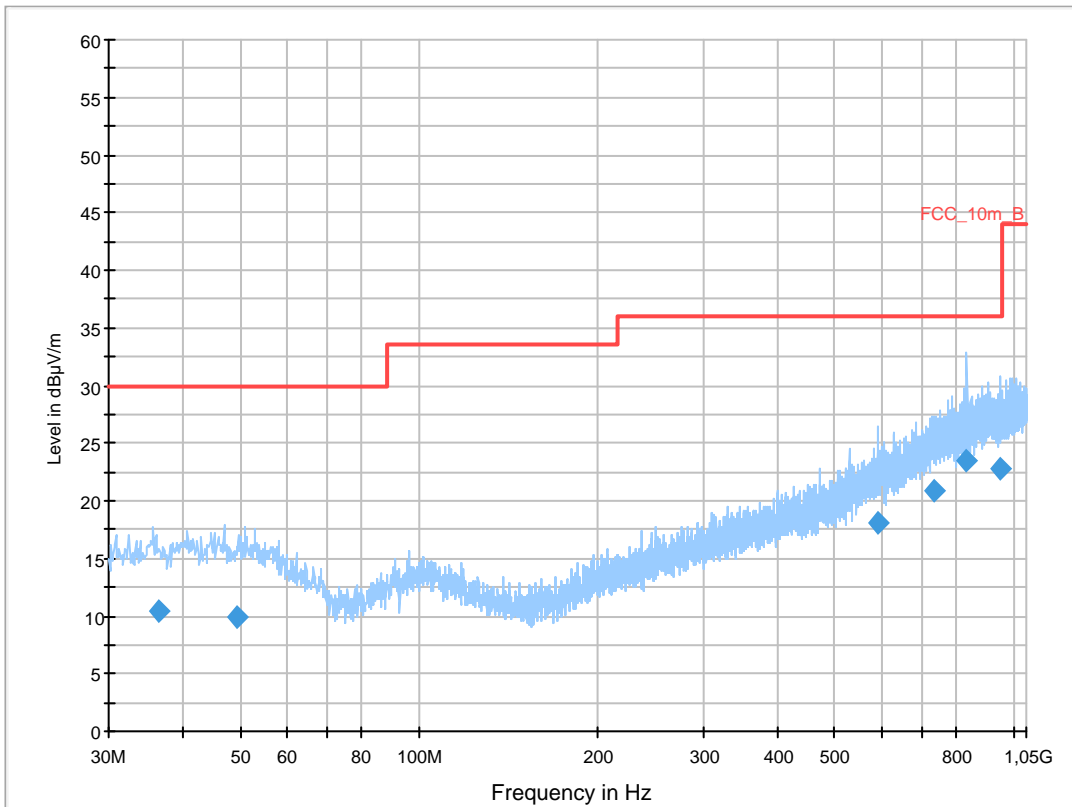
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN HT20-mode TX Ch. 1
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

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

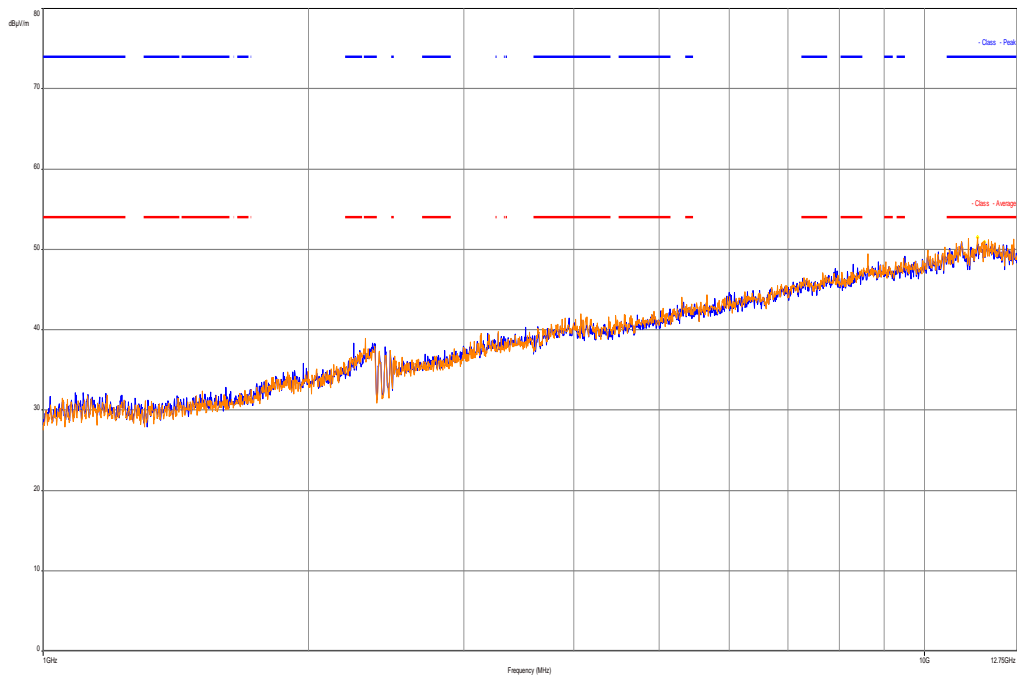
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

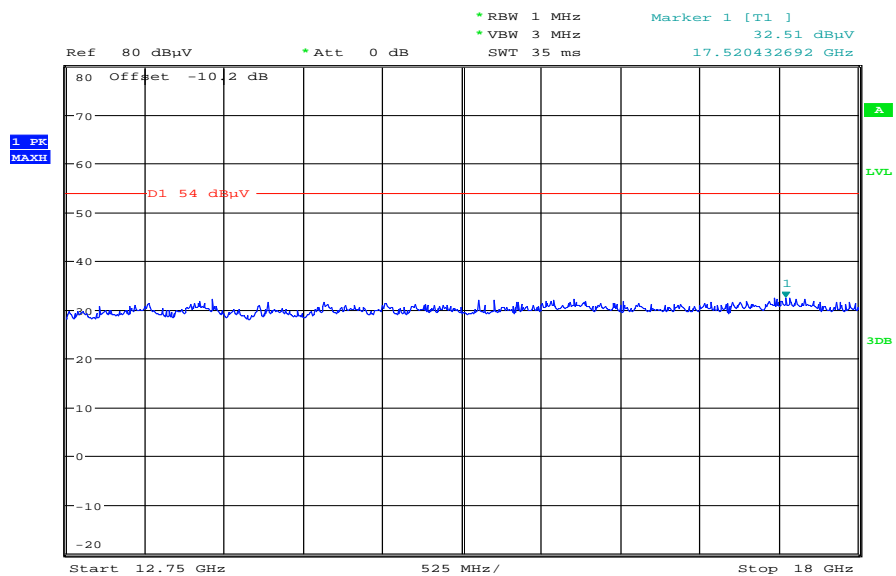
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
36.443700	10.5	1000.0	120.000	132.0	V	2.0	13.1	19.5	30.0	
49.391550	9.9	1000.0	120.000	98.0	V	261.0	13.4	20.1	30.0	
593.249850	18.1	1000.0	120.000	170.0	H	2.0	20.6	17.9	36.0	
732.365250	20.8	1000.0	120.000	120.0	H	10.0	23.3	15.2	36.0	
834.975900	23.5	1000.0	120.000	170.0	V	80.0	24.3	12.5	36.0	
947.664750	22.7	1000.0	120.000	170.0	H	92.0	25.3	13.3	36.0	

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



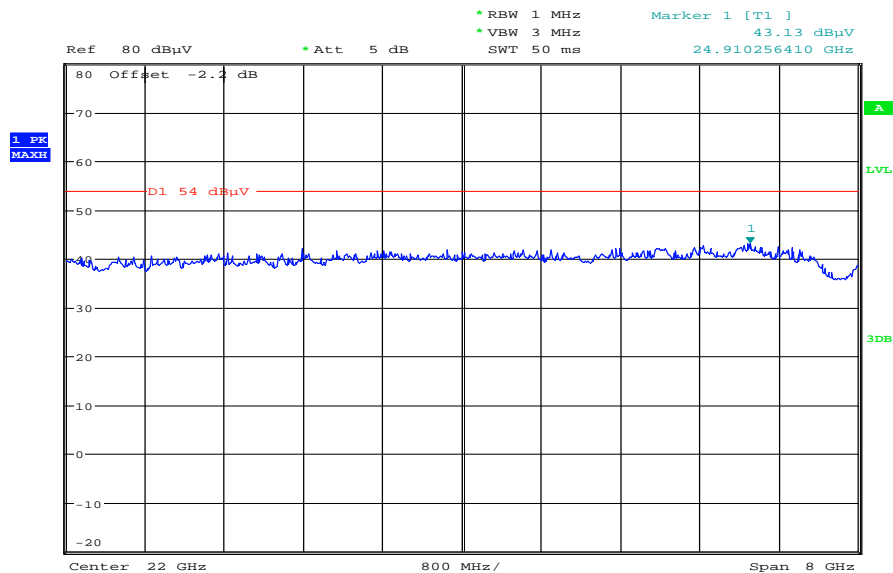
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 9.APR.2014 14:10:59

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



Date: 9.APR.2014 14:12:52

Plot 5: Middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

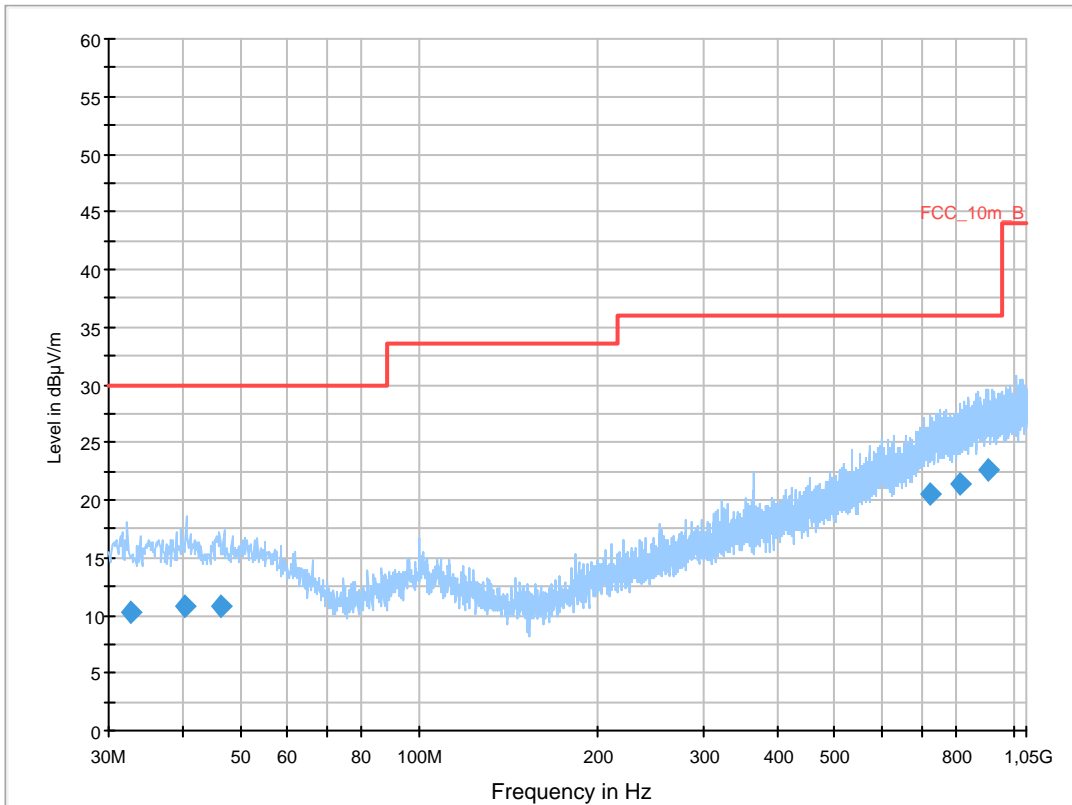
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN HT20-mode TX Ch. 6
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

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

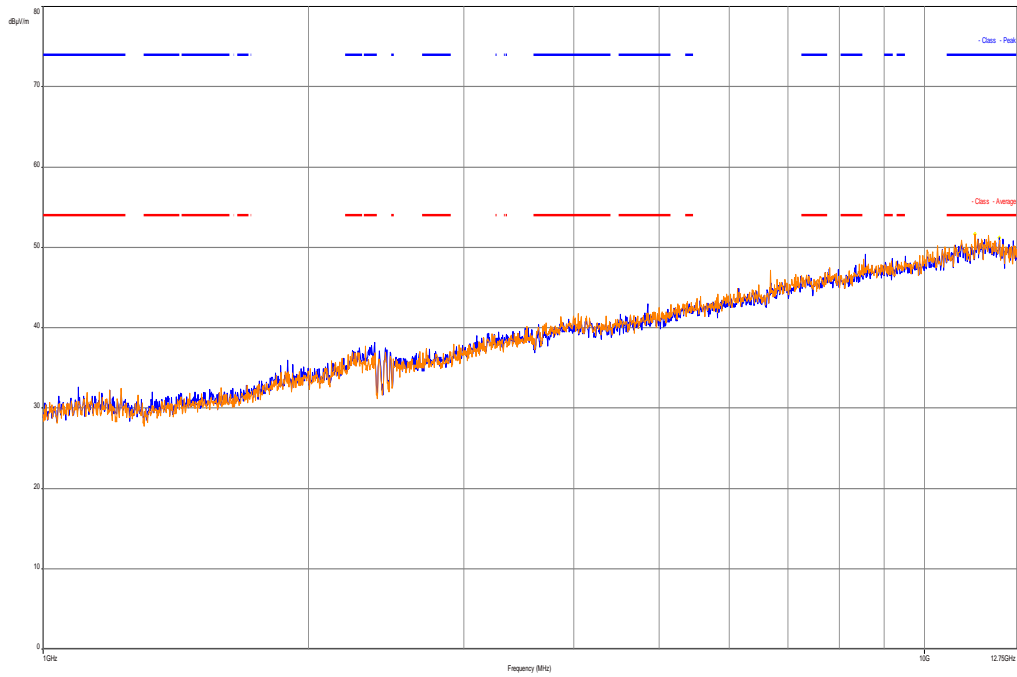
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

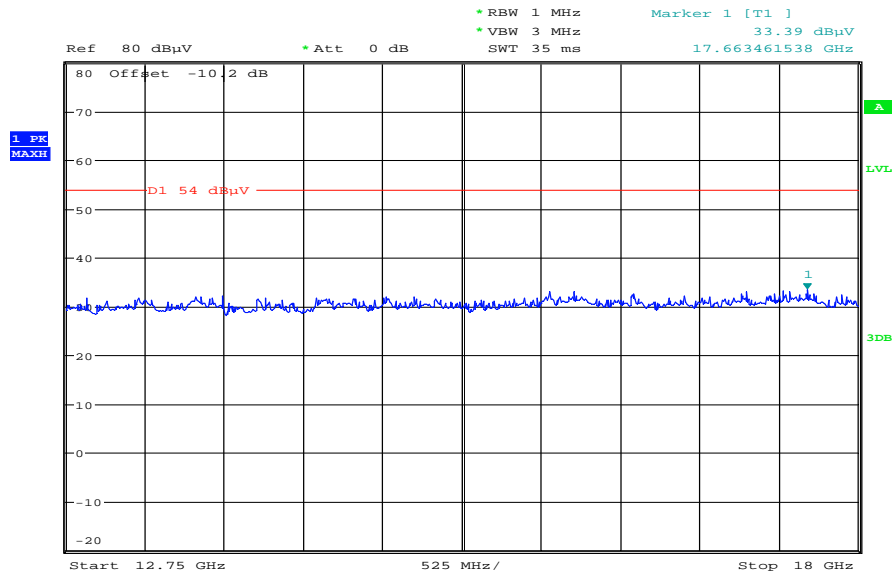
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
32.583750	10.3	1000.0	120.000	170.0	V	180.0	12.8	19.7	30.0	
40.138650	10.8	1000.0	120.000	98.0	H	270.0	13.4	19.2	30.0	
46.254900	10.8	1000.0	120.000	98.0	V	10.0	13.3	19.2	30.0	
722.095650	20.6	1000.0	120.000	112.0	V	171.0	23.0	15.4	36.0	
814.285050	21.4	1000.0	120.000	154.0	V	190.0	24.0	14.6	36.0	
904.444350	22.6	1000.0	120.000	111.0	H	88.0	25.2	13.4	36.0	

Plot 6: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



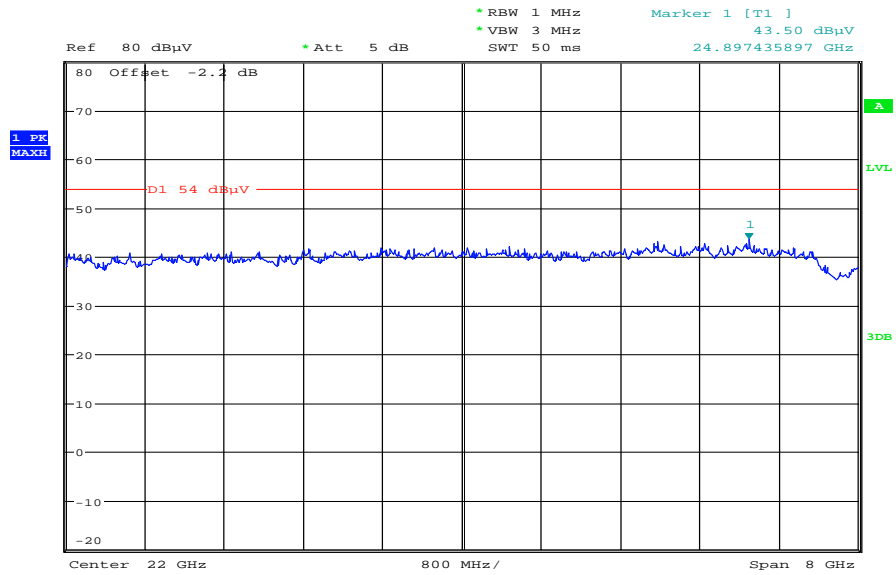
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 7: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 9.APR.2014 14:11:36

Plot 8: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 9.APR.2014 14:13:22

Plot 9: Highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

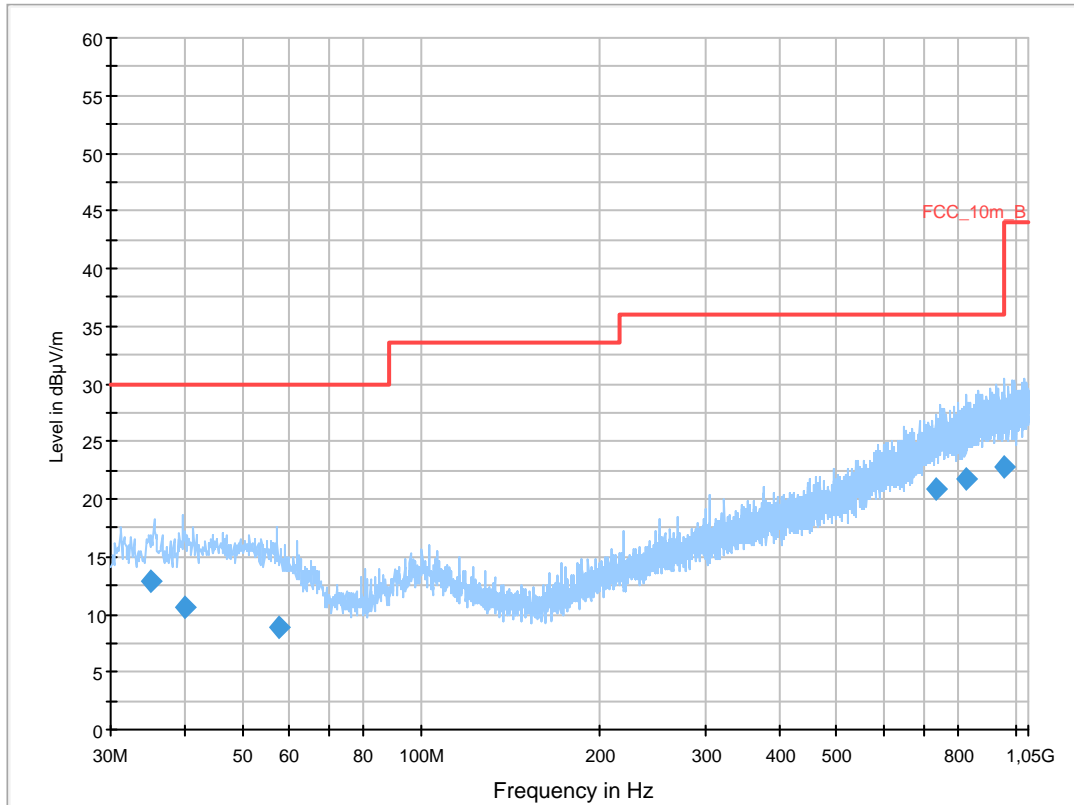
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN HT20-mode TX Ch. 11
 Operator Name: Hennemann
 Comment: DC: 12 V

Scan Setup: STAN_Fin [EMI radiated]

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

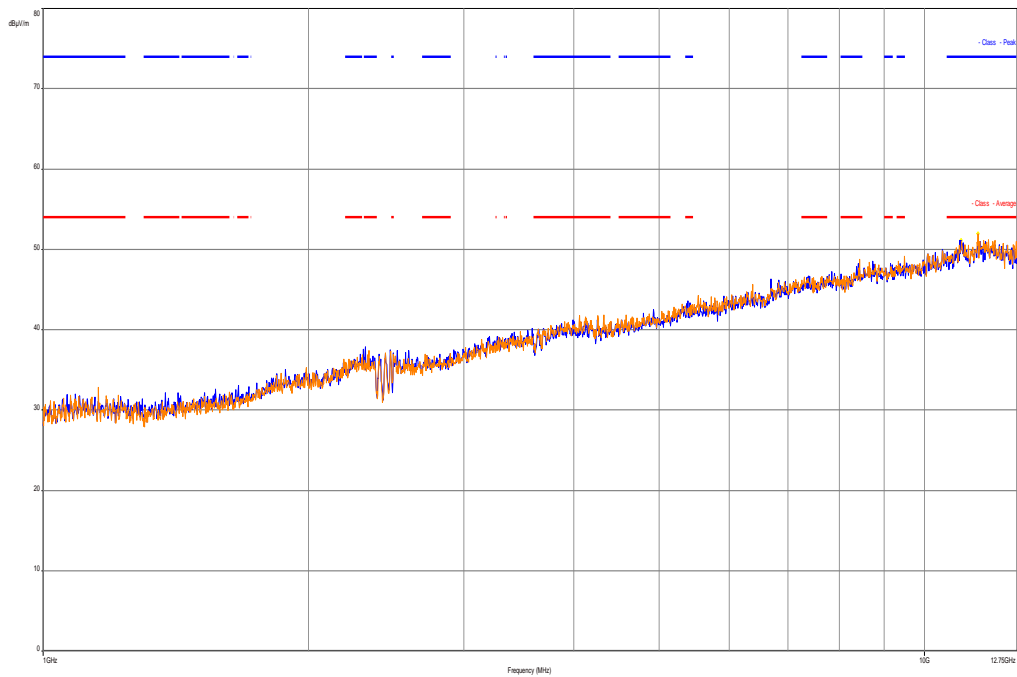
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

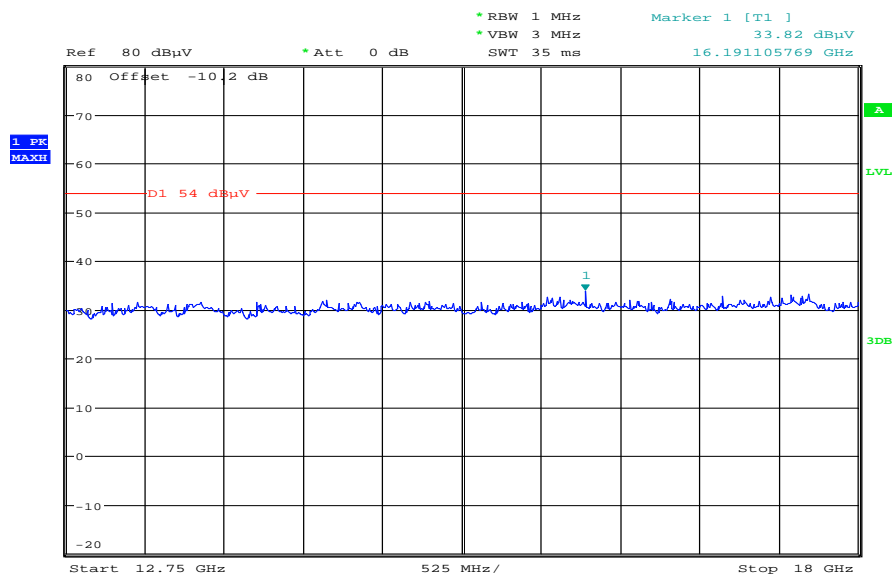
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
35.023350	12.8	1000.0	120.000	154.0	V	280.0	13.0	17.2	30.0	
39.979200	10.7	1000.0	120.000	170.0	H	10.0	13.4	19.3	30.0	
57.738300	8.9	1000.0	120.000	170.0	H	-10.0	12.2	21.1	30.0	
732.177300	20.8	1000.0	120.000	111.0	V	-9.0	23.3	15.2	36.0	
824.792250	21.7	1000.0	120.000	112.0	H	81.0	24.2	14.3	36.0	
958.245300	22.8	1000.0	120.000	170.0	V	88.0	25.4	13.2	36.0	

Plot 10: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization



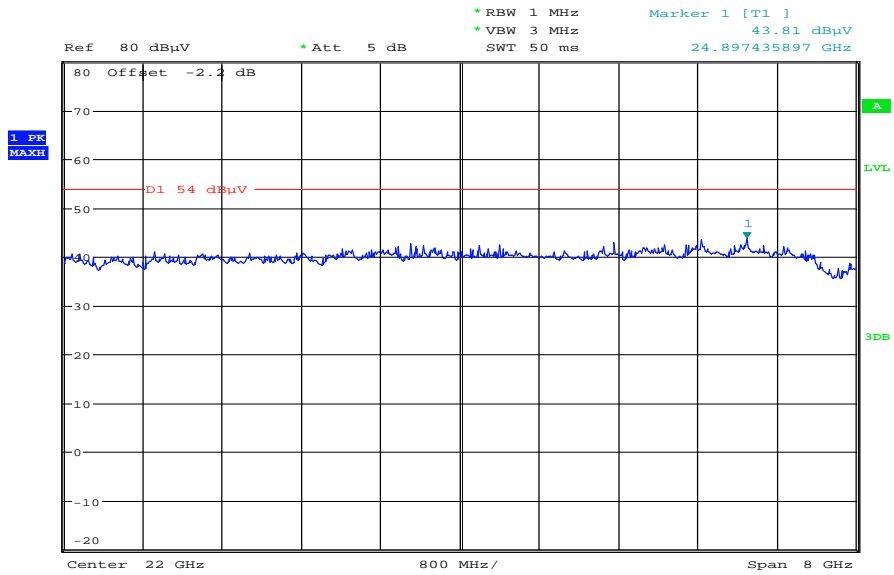
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 11: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 9.APR.2014 14:12:06

Plot 12: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 9.APR.2014 14:13:44

10.11 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The results are valid for both modes.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak / RMS
Sweep time:	Auto
Resolution bandwidth:	F > 1 GHz: 1 MHz F < 1 GHz: 100 kHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz / 3 MHz
Span:	30 MHz to 26 GHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
RX Spurious Emissions Radiated		
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

Results:

RX Spurious Emissions Radiated [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
No spurious emissions above 1 GHz detected.		
Measurement uncertainty	± 3 dB	

Result: Passed.

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

Plots: RX / Idle – mode

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

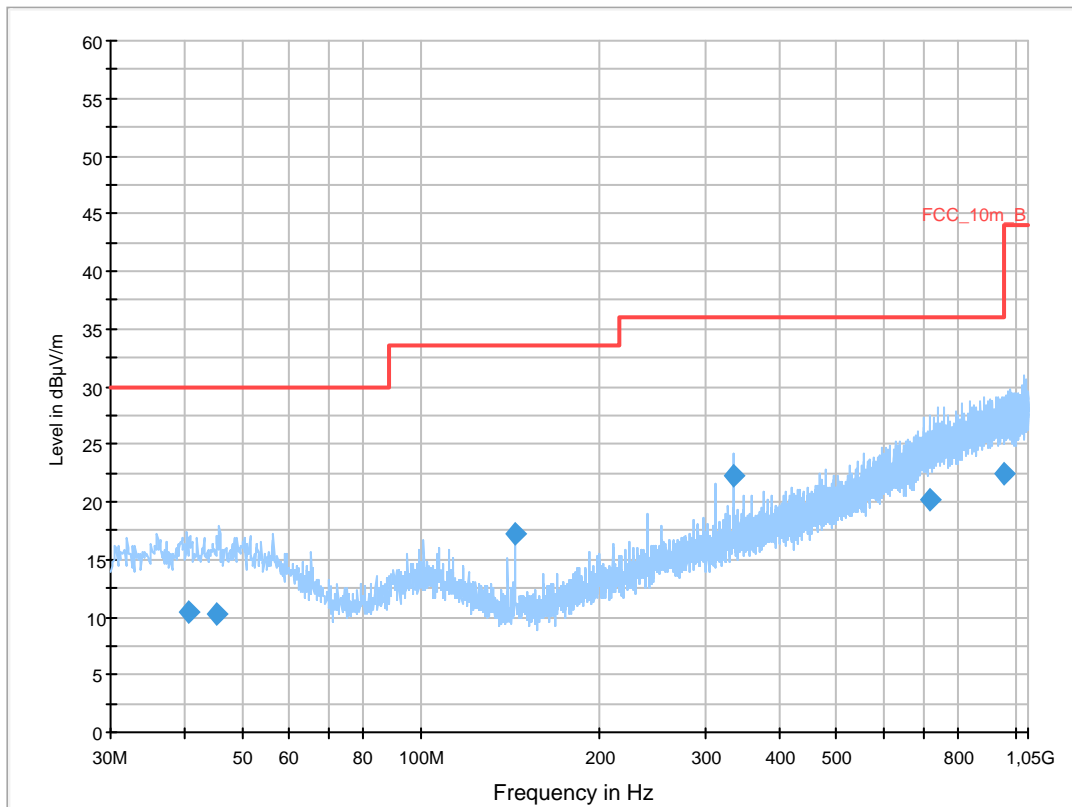
Common Information

EUT: M0877_07
 Serial Number: unknown
 Test Description: FCC part 15 class B
 Operating Conditions: WLAN RX
 Operator Name: Hennemann
 Comment: DC: 12 V

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
40.694850	10.5	1000.0	120.000	170.0	H	270.0	13.4	19.5	30.0	
45.321150	10.2	1000.0	120.000	170.0	H	80.0	13.3	19.8	30.0	
144.008550	17.2	1000.0	120.000	162.0	V	280.0	8.8	16.3	33.5	
336.007050	22.2	1000.0	120.000	170.0	V	280.0	15.6	13.8	36.0	
719.125650	20.1	1000.0	120.000	170.0	H	267.0	22.9	15.9	36.0	
955.446750	22.5	1000.0	120.000	105.0	H	2.0	25.4	13.5	36.0	

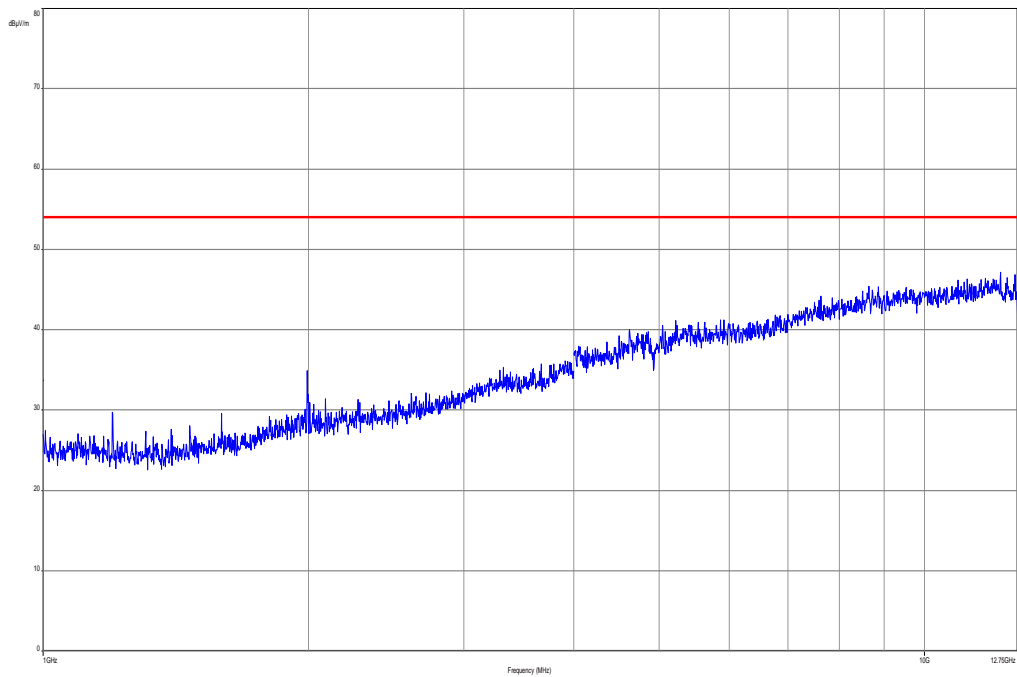
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

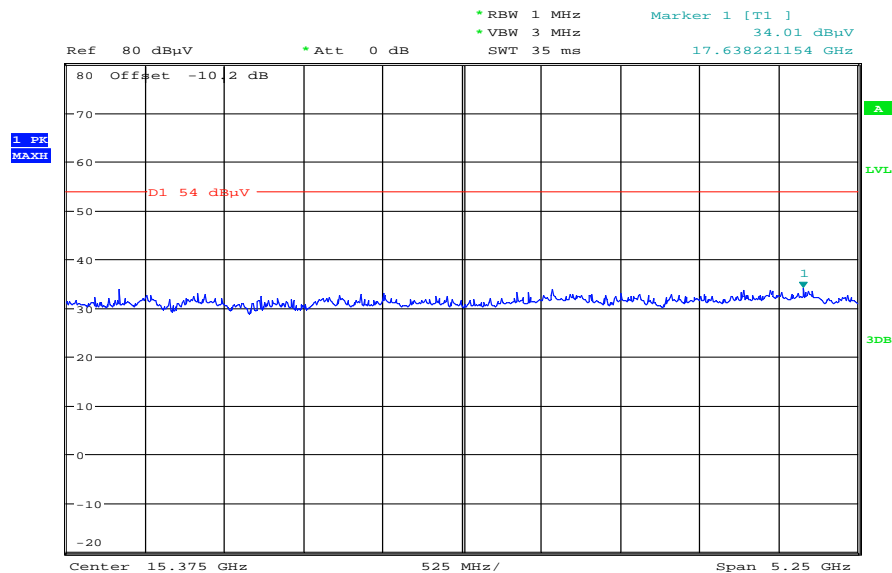
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table (vertical): Cable_EN_1GHz (1005) Correction Table (horizontal): Cable_EN_1GHz (1005)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

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

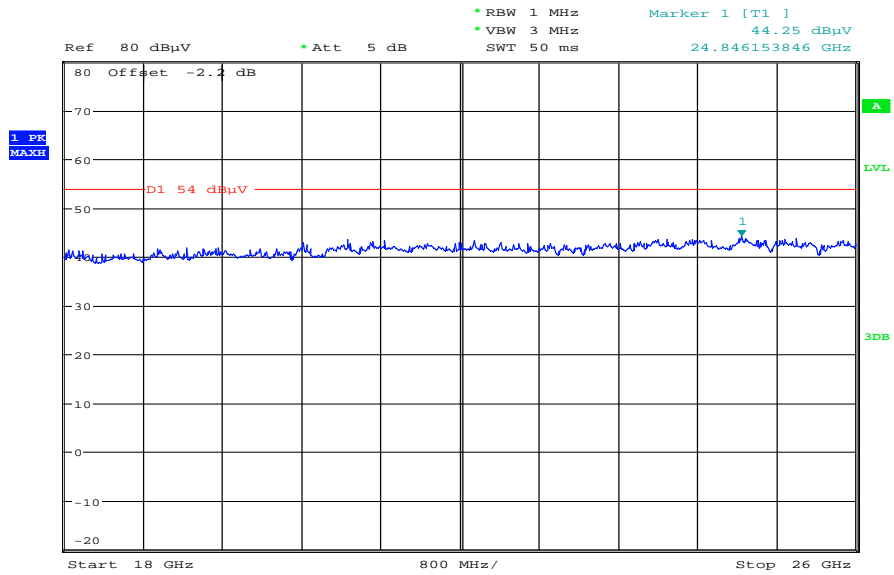


Plot 3: 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 12.MAR.2014 14:17:54

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



Date: 12.MAR.2014 14:23:00

10.12 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to channel 6. This measurement is representative for all channels and modes. If peaks are found channel 1 and channel 11 will be measured too. The measurement is performed with the data rate producing the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
TX Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dB μ V/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

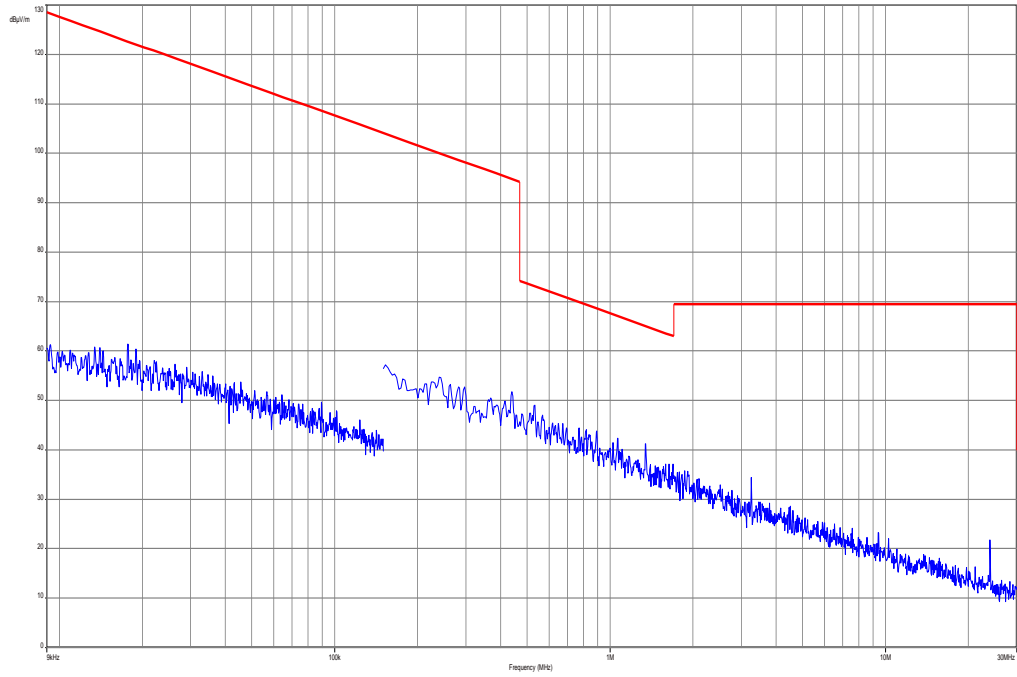
Results:

TX Spurious Emissions Radiated < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No peaks detected.		
Measurement uncertainty	± 3 dB	

Result: Passed

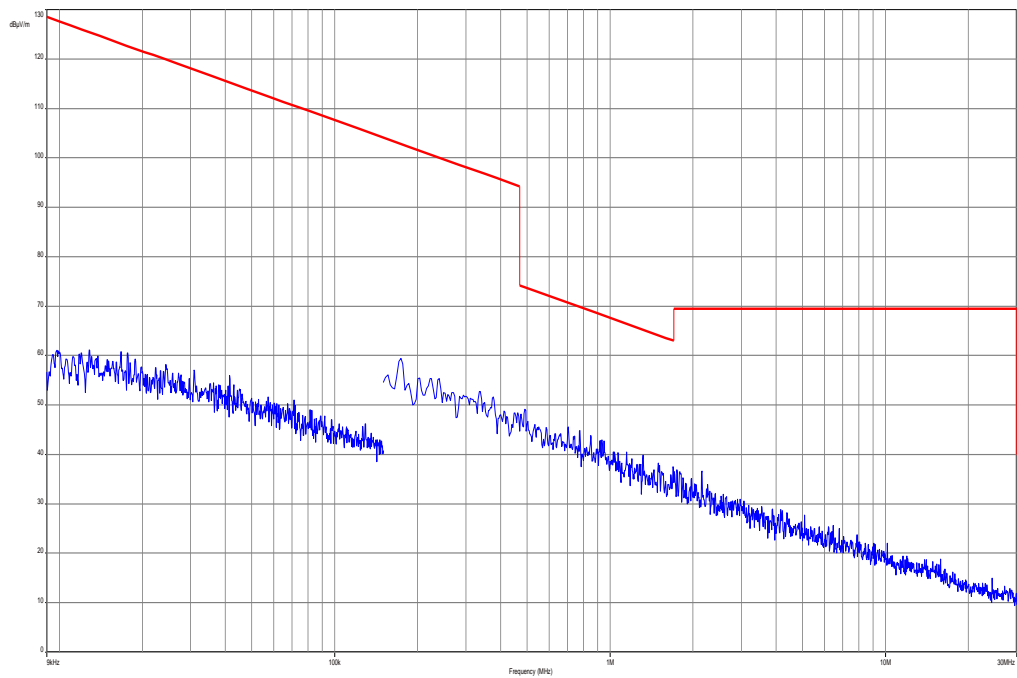
Plots: TX mode

Plot 1: 9 kHz to 30 MHz



Plots: RX / Idle – mode

Plot 1: 9 kHz to 30 MHz



10.13 Spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to channel 6. This measurement is repeated for DSSS and OFDM modulation. If peaks are found channel 1 and channel 11 will be measured too. The measurement is performed with the data rate producing the highest output power. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

Not applicable; EUT is powered by car battery only.

11 Test equipment and ancillaries used for tests

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

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

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
2	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
3	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
4	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
5	n. a.	Band Reject filter	WRCG185 5/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
6	n. a.	Band Reject filter	WRCG240 0/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
7	n. a.	Highpass Filter	WHKX7.0/1 8G-8SS	Wainwright	18	300003789	ne		
8	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vKI!	14.10.2011	14.10.2014
9	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	21.02.2014	21.02.2016
10	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
11	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
12	n. a.	Power Supply	LA30/5GA	Zentro Elektronik	2046	300000711	NK!		
13	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	F5U50	R&S	200012	300003443	Ve	09.10.2012	09.10.2014
14	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/84193	300003889	Ve	26.09.2013	26.09.2015
15	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
16	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
17	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
18	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	27.01.2014	27.01.2015
19	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	11.02.2014	14.01.2016
20	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
21	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		

22	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
23	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	12.04.2012	12.04.2014
25	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	16.01.2014	16.01.2016
26	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
27	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vkI!	08.05.2013	08.05.2015
28	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
29	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		

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

12 Observations

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

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2014-04-15

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

Befehlense 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 Akkreditierungskunde 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
Siehe Hinweis auf der Rückseite

Im Auftrag
 Dr. Ingrid Pflüger
 Abteilungsleiter

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 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>