**CETECOM™****CETECOM ICT Services**
consulting - testing - certification >>>

TEST REPORT

Test report no.: 1-4254/12-76-23

Deutsche
Akkreditierungsstelle
D-PL-12076-01-01

Testing laboratory

CETECOM ICT Services GmbH
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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

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Manufacturer

Sony Mobile Communications AB
Nya Vattentornet
22188 Lund / SWEDEN

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.

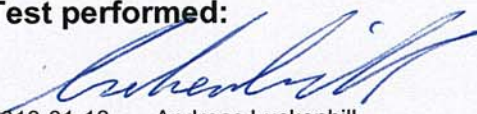
Test Item

Kind of test item:	Tablet PC GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VII/XIX; LTE FDD1/19/21; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS
Model name:	TM-0000-BV
FCC ID:	PY7TM-0000
IC:	4170B-TM0000
Frequency:	ISM-band 2400 MHz to 2483.5 MHz lowest channel: 2412 MHz; highest channel: 2462 MHz
Technology tested:	WLAN
Antenna:	Integrated antenna
Power Supply:	3.7 V DC by Li-ION battery
Temperature Range:	-20°C to +55 °C

Test report authorised:


2013-01-18 Stefan Bös
Senior Testing Manager

Test performed:


2013-01-18 Andreas Luckenbill
Expert

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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In no case this test report can be considered as a Letter of Approval.

2.2 Application details

Date of receipt of order:	2012-12-14
Date of receipt of test item:	2012-12-14
Start of test:	2013-01-01
End of test:	2013-01-16
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 Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

3.1 Measurement guidance

DTS : KDB 558074	2012-04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
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4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+55 °C during high temperature tests
	T_{min}	-20 °C during low temperature tests
Relative humidity content:		42 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li-ION battery
	V_{max}	4.4 V
	V_{min}	3.3 V

5 Test item

Kind of test item	:	Tablet PC GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VI/XIX; LTE FDD1/19/21; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS
Type identification	:	TM-0000-BV
S/N serial number	:	Rad. CB5A1MD99N, CB5A1MD99Z Cond. CB5A1MD994, CB5A1MD98S
HW hardware status	:	AP
SW software status	:	10.1.E.0.61
Frequency band [MHz]	:	ISM-band 2400 MHz to 2483.5 MHz lowest channel: 2412 MHz; highest channel: 2462 MHz
Type of radio transmission	:	DSSS, OFDM
Use of frequency spectrum	:	
Type of modulation	:	BPSK, QPSK, 16-QAM, 64-QAM
Number of channels	:	11
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by Li-ION battery
Temperature range	:	-20°C to +55 °C

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	2013-02-19	-/-

Test specification clause	Test case	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	☒	☐	☐	☐	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth - 6dB bandwidth	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth - 20dB bandwidth	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(b)(3) RSS-210 / A8.4(4)	Maximum output power	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	DSSS OFDM g & n	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	DSSS OFDM	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	DSSS OFDM	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	-/-	☒	☐	☐	☐	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	DSSS OFDM	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	DSSS OFDM	☒ ☒	☐ ☐	☐ ☐	☐ ☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurements

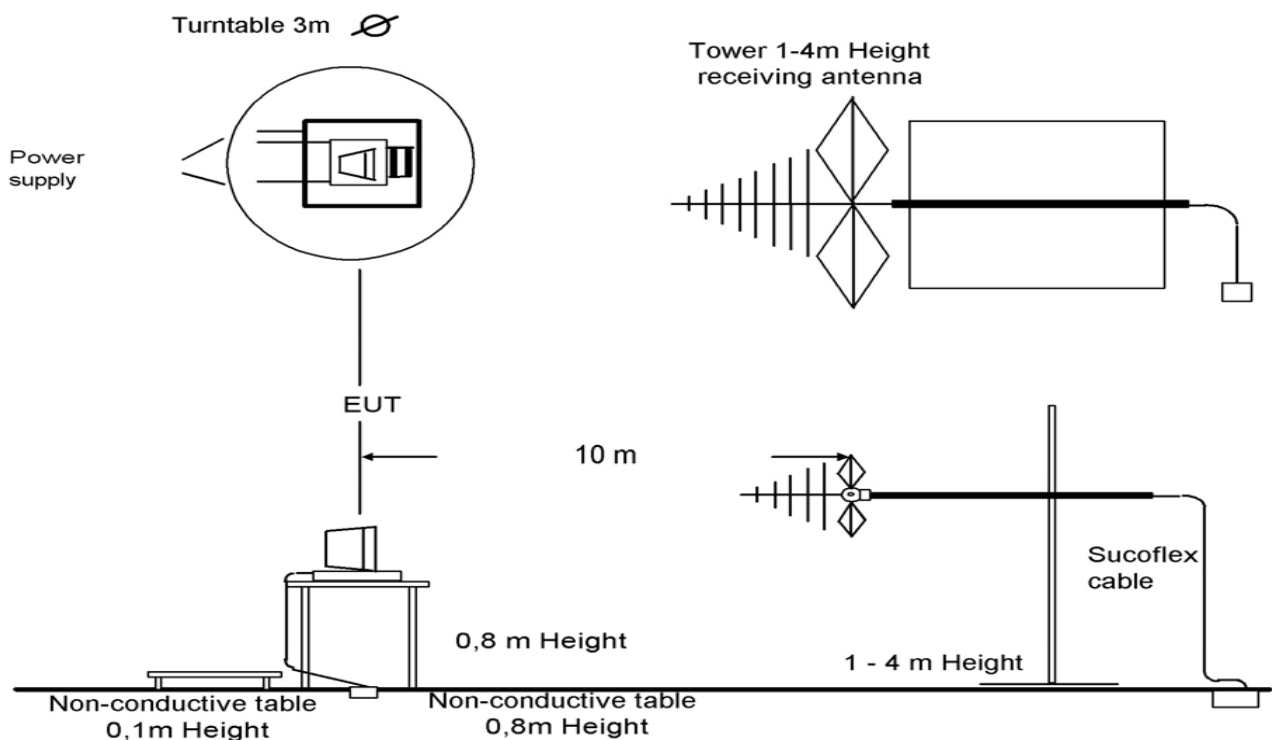
8.1 Description of test setup

8.1.1 Radiated measurements

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

Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



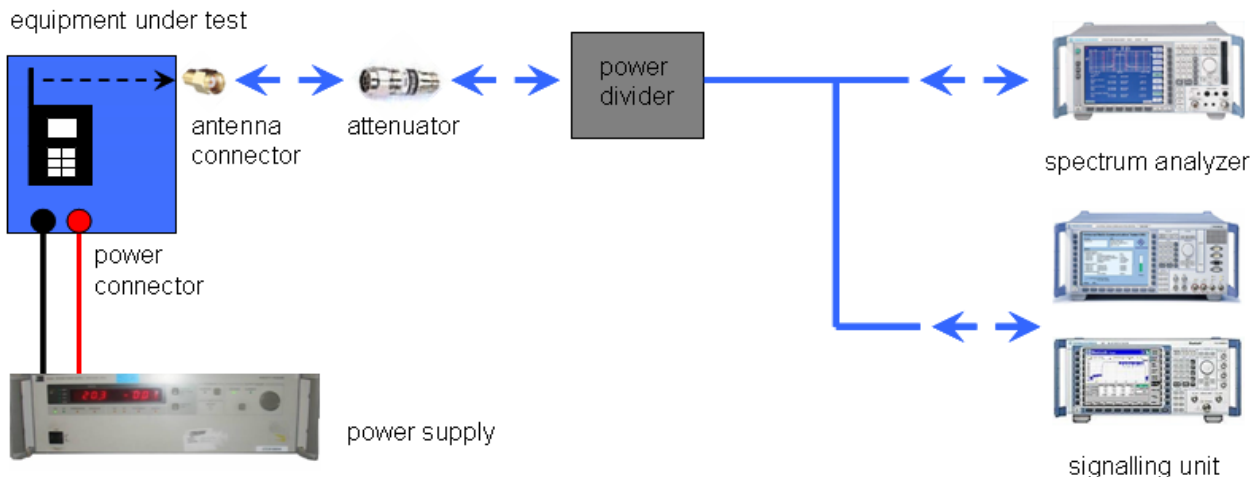
Picture 1: Diagram radiated measurements

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

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

8.1.2 Conducted measurements

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



Picture 2: Diagram conducted measurements

8.2 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

Test mode:

- ☐ No test mode available.
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 Measurement results

9.1 Output power verification (conducted)

Description:

Measurement of the maximum output power conducted. This measurement is performed only at the middle channel in both modes and all data rates to determine the data rate per mode which results in the highest output power. This mode will be selected for all further measurements.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	> EBW
Video bandwidth:	$\geq 3 \times \text{RBW}$ (or the maximum of the analyzer)
Span:	Zero span
Trace-Mode:	Max hold (allow trace to fully stabilize)

Results:

DSSS / b – mode Data Rate [MBit/s]	Maximum Output Power Conducted [dBm]			
	1	2	5.5	11
Ch 6 - 2437 MHz	17.3	17.3	17.4	17.3
Measurement uncertainty	$\pm 0.5 \text{ dB}$			

OFDM / g – mode Data Rate [MBit/s]	Maximum Output Power Conducted [dBm]							
	6	9	12	18	24	36	48	54
Ch 6 - 2437 MHz	22.2	22.2	22.5	22.2	22.2	22.5	22.4	22.3
Measurement uncertainty	$\pm 0.5 \text{ dB}$							

OFDM / n – mode Data Rate [MBit/s]	Maximum Output Power Conducted [dBm]							
	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Ch 6 - 2437 MHz	22.1	22.4	22.4	22.3	22.3	22.3	22.1	22.2
Measurement uncertainty	$\pm 0.5 \text{ dB}$							

Result: Selected data rate for all measurements:

DSSS / b – mode:

OFDM / g – mode:

OFDM / n – mode:

5.5 MBit/s

12 MBit/s

MCS2

9.2 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 OFDM-mode (g-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 OFDM modulation		15.5	16.2	15.4
Radiated power [dBm] Measured with OFDM modulation		14.4	14.1	14.1
Gain [dBi] Calculated		-1.1	-2.1	-1.3
Measurement uncertainty			± 1.5 dB (cond.) / ± 3 dB (rad.)	

Result: **Passed**

9.3 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. The determination of these data rates was performed at the beginning of the tests.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 MHz / 10 MHz (at least 1 MHz)
Video bandwidth:	$\geq 3 \times \text{RBW}$ (or maximum of available setting)
Span:	> DTS bandwidth
Trace-Mode:	Max hold (allow trace to fully stabilize)

Limits:

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

Results: DSSS / b – mode

DSSS / b – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak Output Power Conducted	17.2	17.2	15.0
Output Power Radiated – EIRP*)	16.1	15.1	13.7
Measurement uncertainty	$\pm 1.5 \text{ dB (cond.)} / \pm 3 \text{ dB (rad.)}$		

*) calculated with Antenna gain

Result: **Passed**

Results: OFDM / g – mode

OFDM / g – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak Output Power Conducted	20.6	21.7	20.5
Output Power Radiated – EIRP*)	19.5	19.6	19.2
Measurement uncertainty	± 1.5 dB (cond.) / ± 3 dB (rad.)		

*) calculated with Antenna gain

Result: Passed**Results: OFDM / n – mode**

OFDM / n – mode Frequency	Maximum Output Power [dBm]		
	2412 MHz	2437 MHz	2462 MHz
Peak Output Power Conducted	21.4	21.9	20.9
Output Power Radiated – EIRP*)	20.3	19.8	19.6
Measurement uncertainty	± 1.5 dB (cond.) / ± 3 dB (rad.)		

*) calculated with Antenna gain

Result: Passed

9.4 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	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	≥ 3 kHz
Video bandwidth:	$\geq 3 \times$ RBW
Span:	1.5 times of the DTS BW
Trace-Mode:	Max hold (allow trace to fully stabilize)

Limits:

FCC	IC
Power Spectral Density	
8 dBm (conducted)	

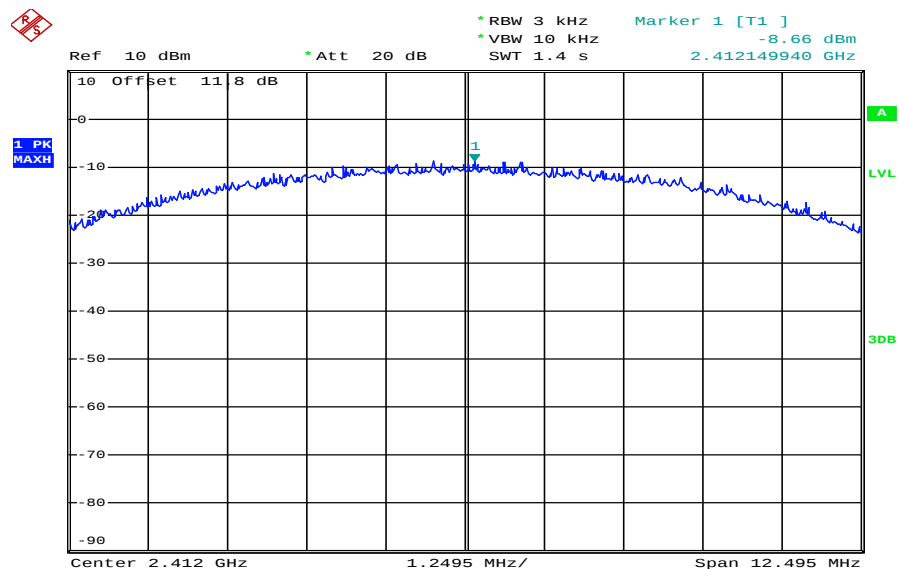
Results:

Modulation Frequency	Power Spectral density [dBm]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	-8.7	-9.3	-9.5
OFDM / g – mode	-11.7	-12.6	-14.3
OFDM / n – mode	-14.4	-13.4	-14.1
Measurement uncertainty	± 1.5 dB		

Result: **Passed**

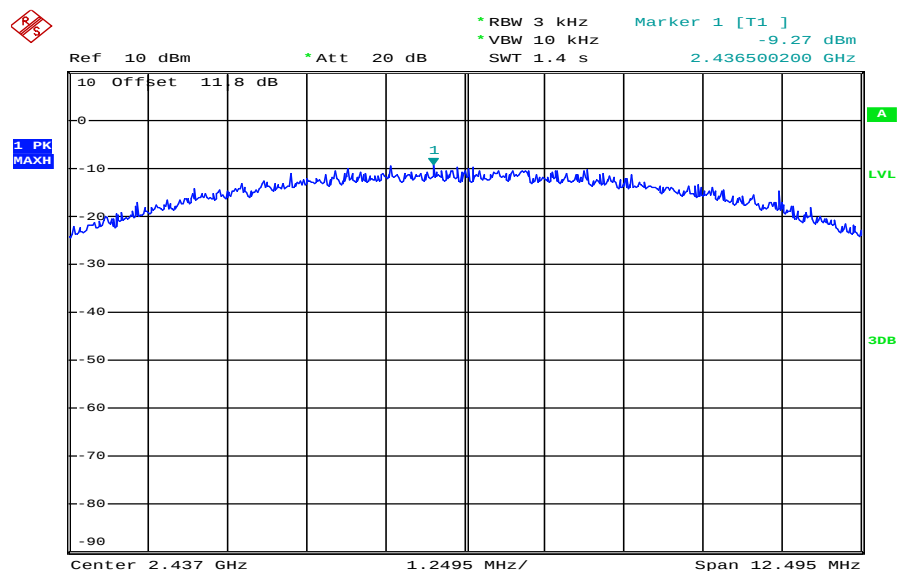
Plots: DSSS / b – mode

Plot 1: TX mode, lowest channel



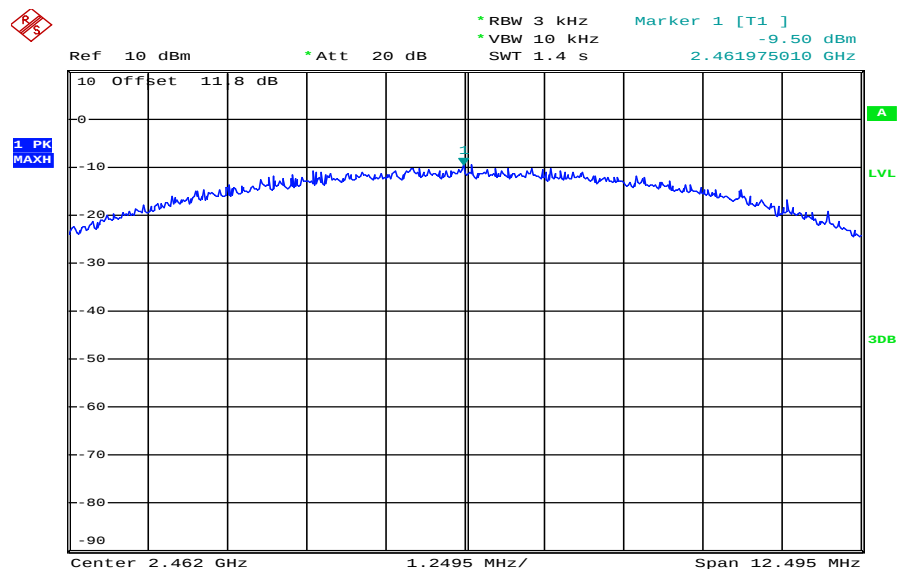
Date: 14.JAN.2013 13:25:51

Plot 2: TX mode, middle channel



Date: 14.JAN.2013 13:28:27

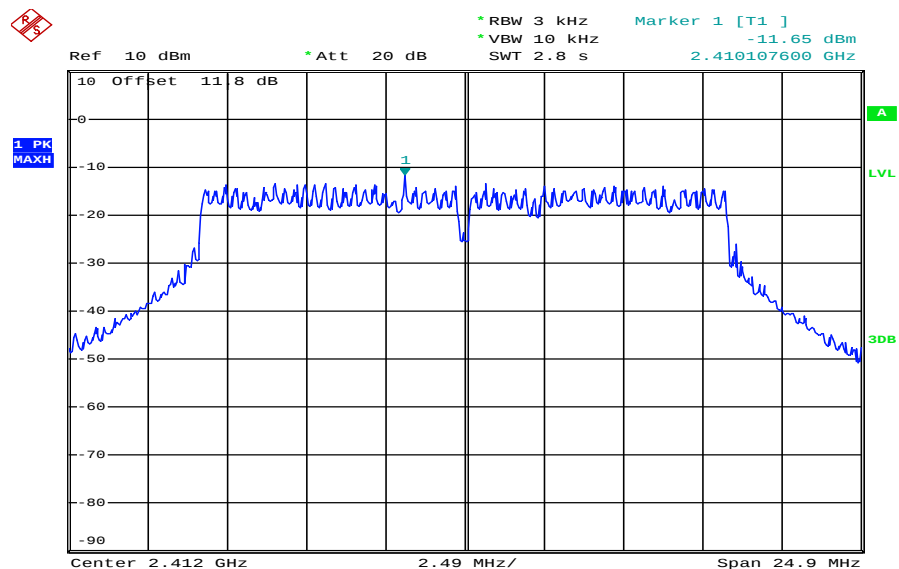
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 13:34:03

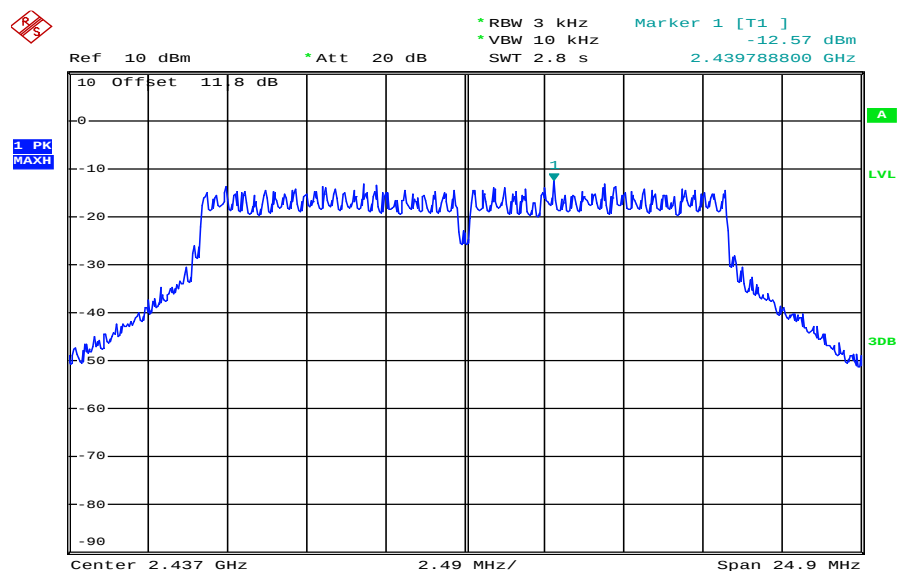
Plots: OFDM / g – mode

Plot 1: TX mode, lowest channel



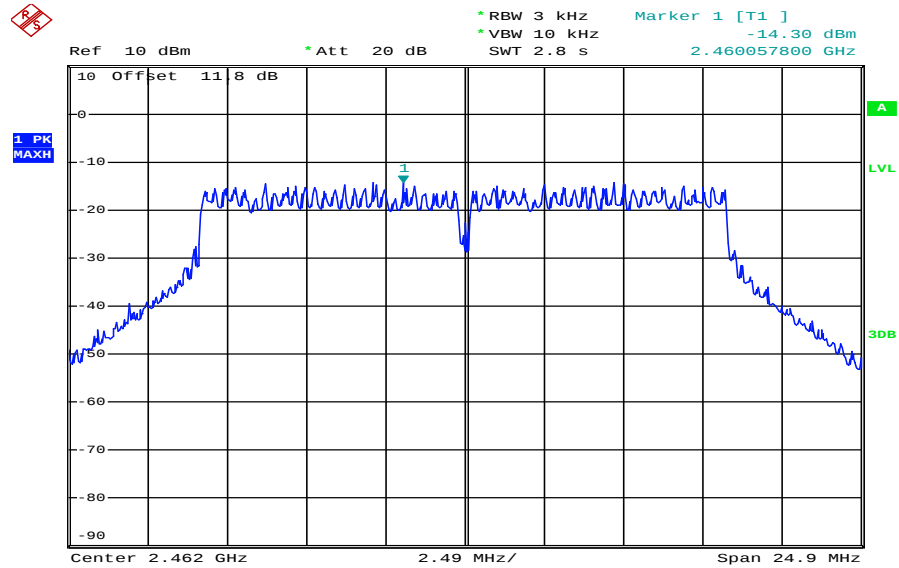
Date: 14.JAN.2013 13:40:51

Plot 2: TX mode, middle channel



Date: 14.JAN.2013 13:42:37

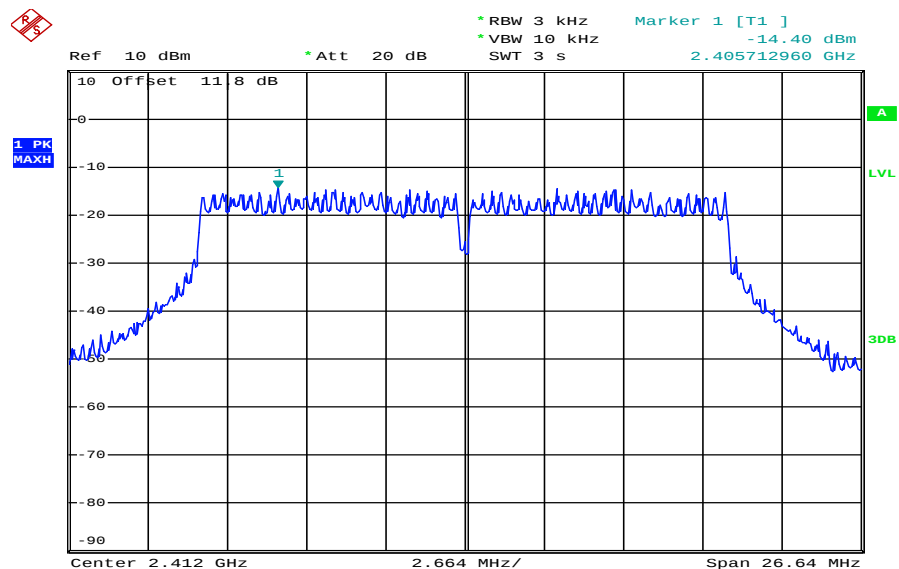
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 13:44:48

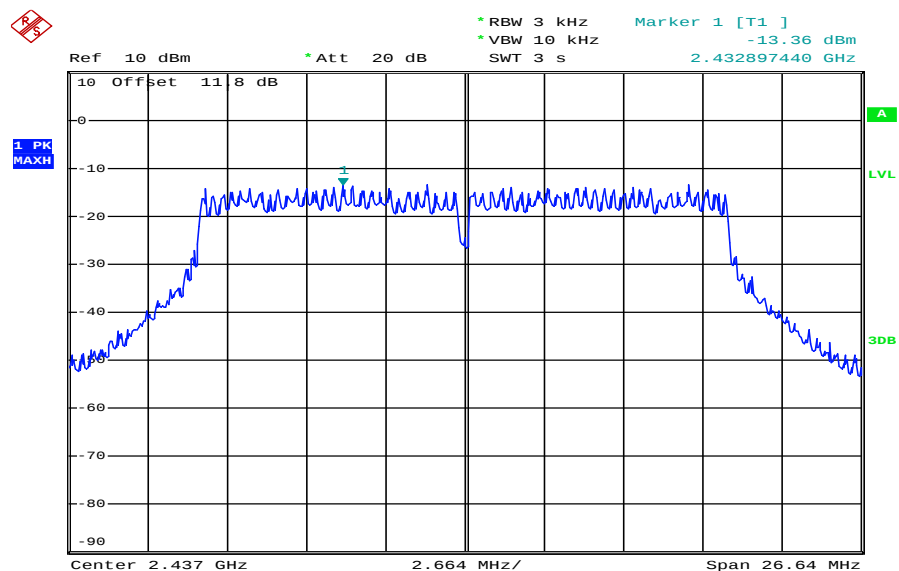
Plots: OFDM / n – mode

Plot 1: TX mode, lowest channel



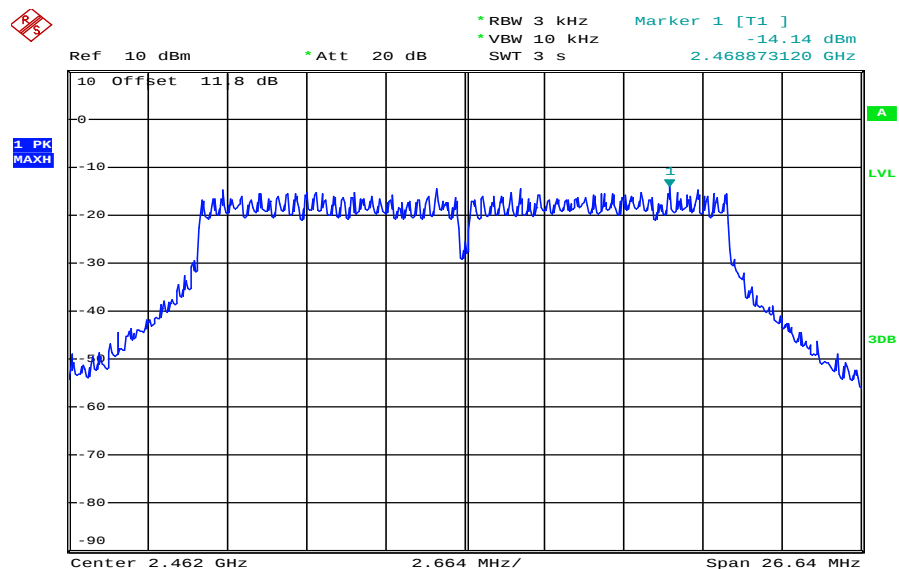
Date: 14.JAN.2013 13:47:38

Plot 2: TX mode, middle channel



Date: 14.JAN.2013 13:50:19

Plot 3: TX mode, highest channel



Date: 14.JAN.2013 13:51:51

9.5 Spectrum bandwidth – 6 dB

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 - 5% of the DTS BW but not exceed 100 kHz
Video bandwidth:	$\geq 3 \times \text{RBW}$
Span:	Complete signal
Trace-Mode:	Max hold (allow trace to stabilize)

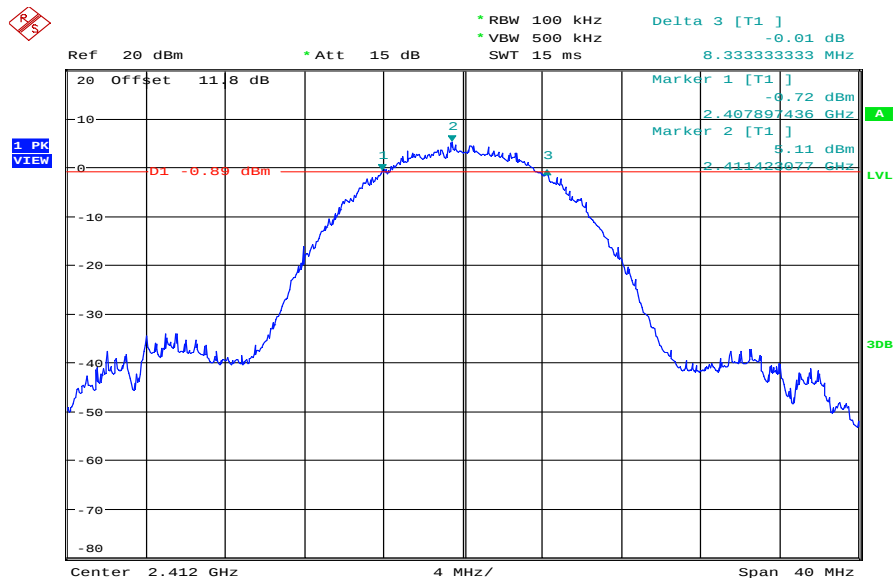
Limits:

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.	

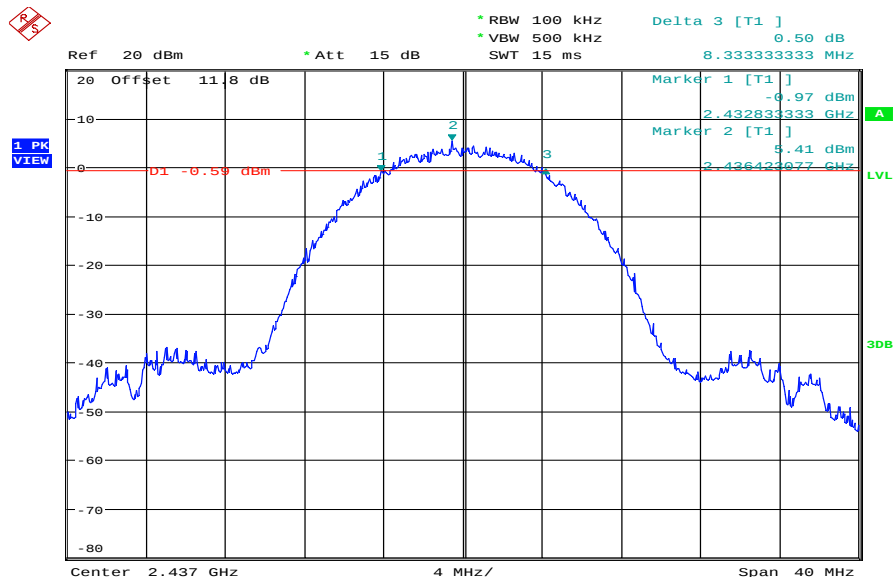
Results:

Modulation Frequency	6 dB bandwidth [MHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	8.3	8.3	8.1
OFDM / g – mode	16.5	16.6	16.5
OFDM / n – mode	17.7	17.8	17.6
Measurement uncertainty	$\pm \text{RBW}$		

Result: **Passed**

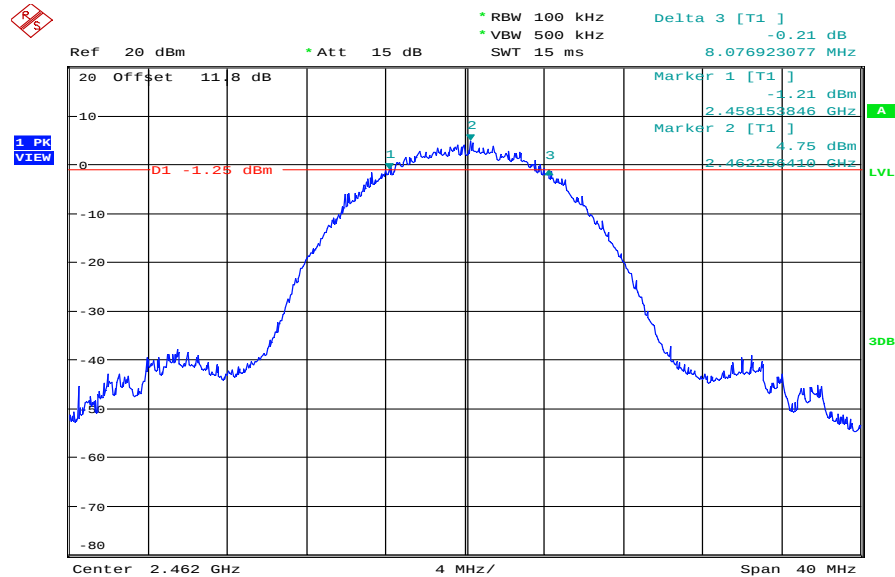
Plots: DSSS / b – mode**Plot 1: TX mode, lowest channel**

Date: 14.JAN.2013 12:03:52

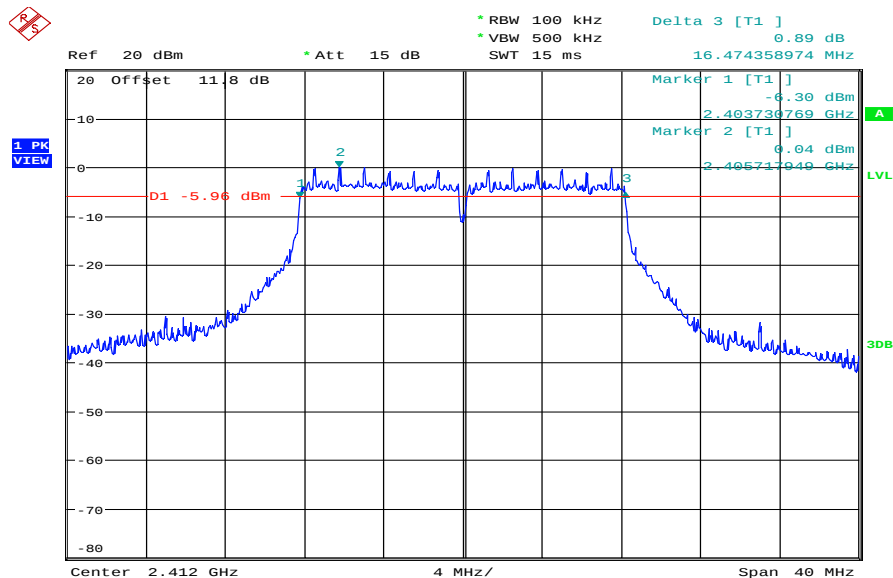
Plot 2: TX mode, middle channel

Date: 14.JAN.2013 12:08:31

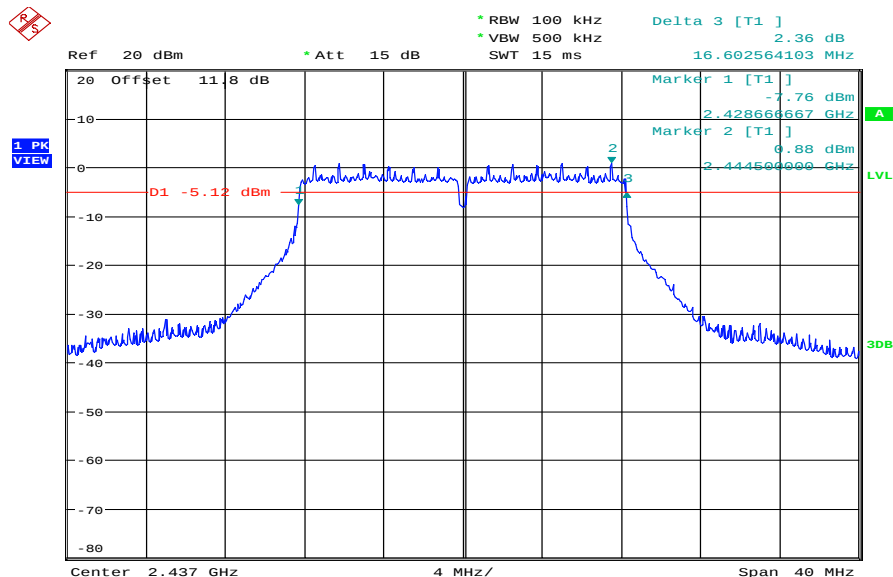
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:11:25

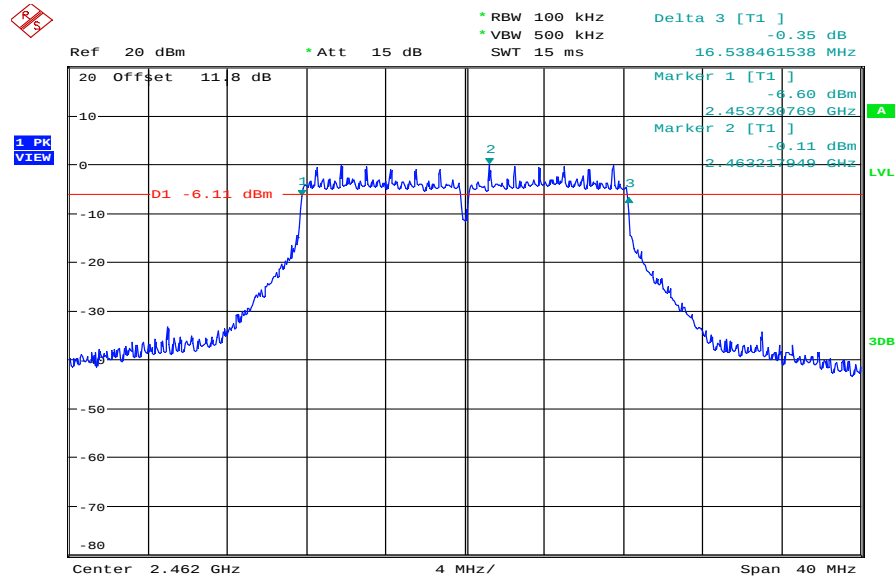
Plots: OFDM / g – mode**Plot 1: TX mode, lowest channel**

Date: 14.JAN.2013 12:15:21

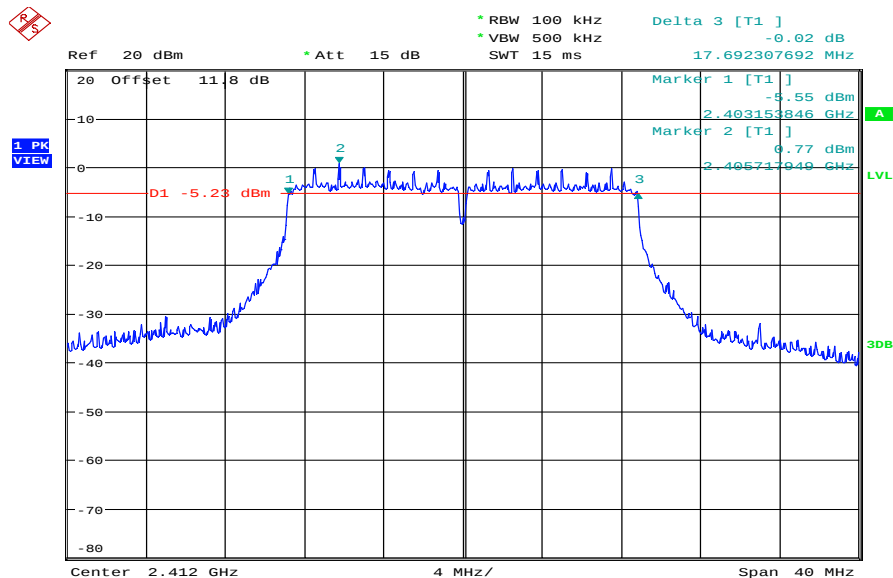
Plot 2: TX mode, middle channel

Date: 14.JAN.2013 12:27:19

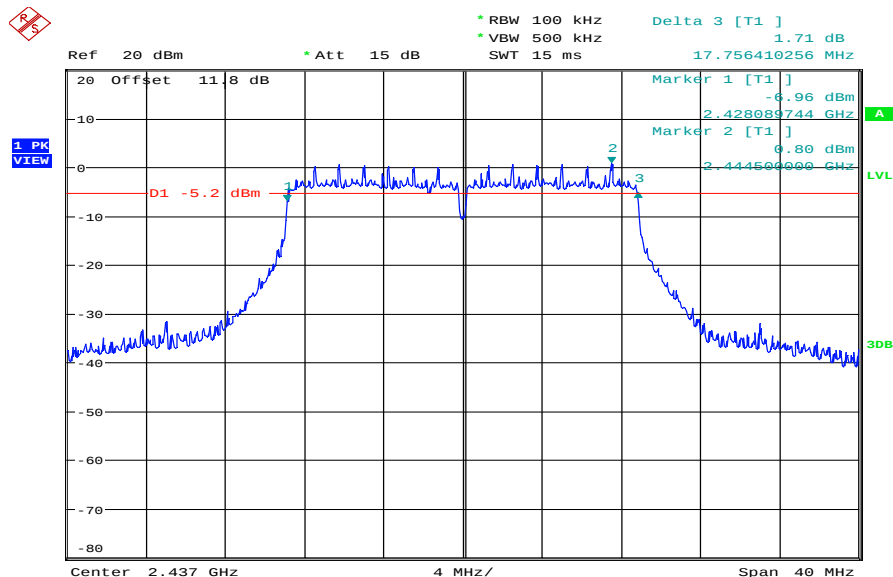
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:31:19

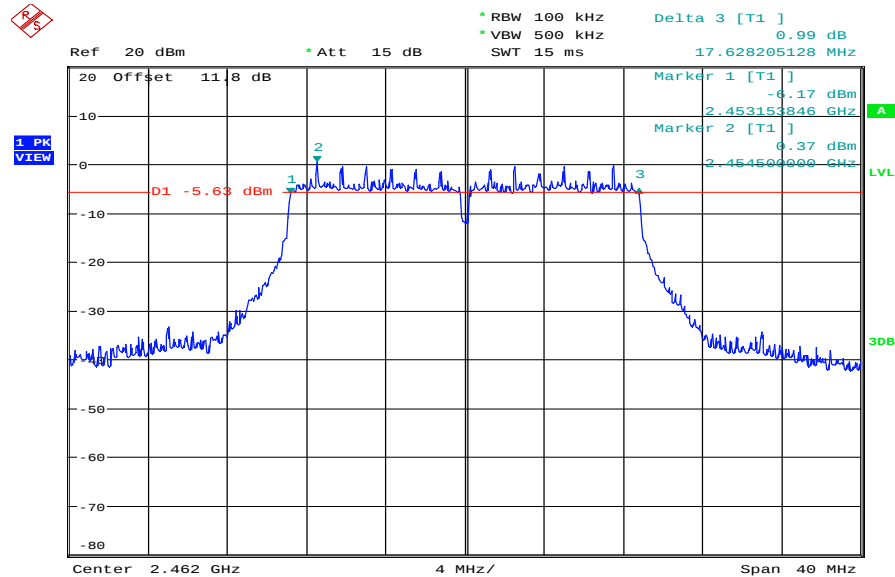
Plots: OFDM / n – mode**Plot 1: TX mode, lowest channel**

Date: 14.JAN.2013 12:34:40

Plot 2: TX mode, middle channel

Date: 14.JAN.2013 12:36:26

Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:43:51

9.6 Spectrum bandwidth – 20 dB

Description:

Measurement of the 20 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 - 5% of the DTS BW but not exceed 100 kHz
Video bandwidth:	$\geq 3 \times \text{RBW}$
Span:	Complete signal
Trace-Mode:	Max hold (allow trace to stabilize)

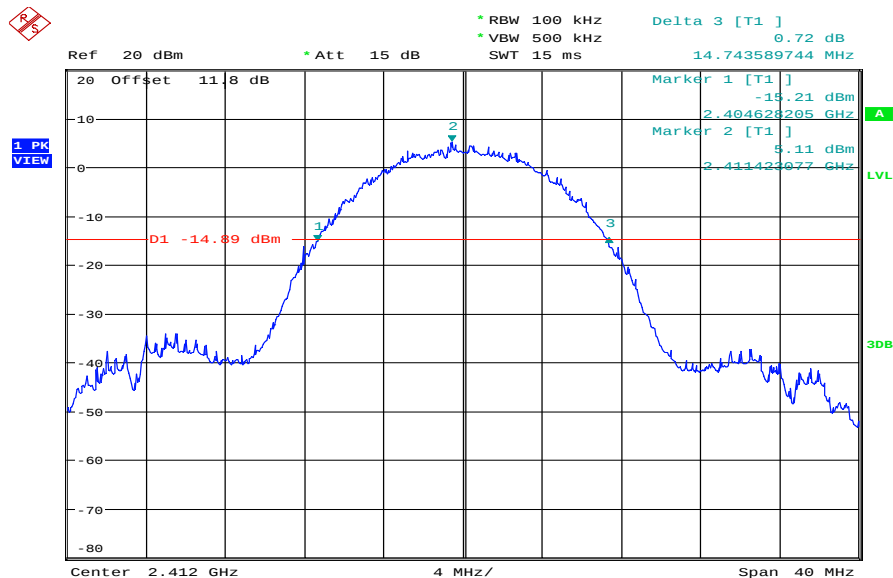
Limits:

FCC	IC
Spectrum Bandwidth – 20 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.	

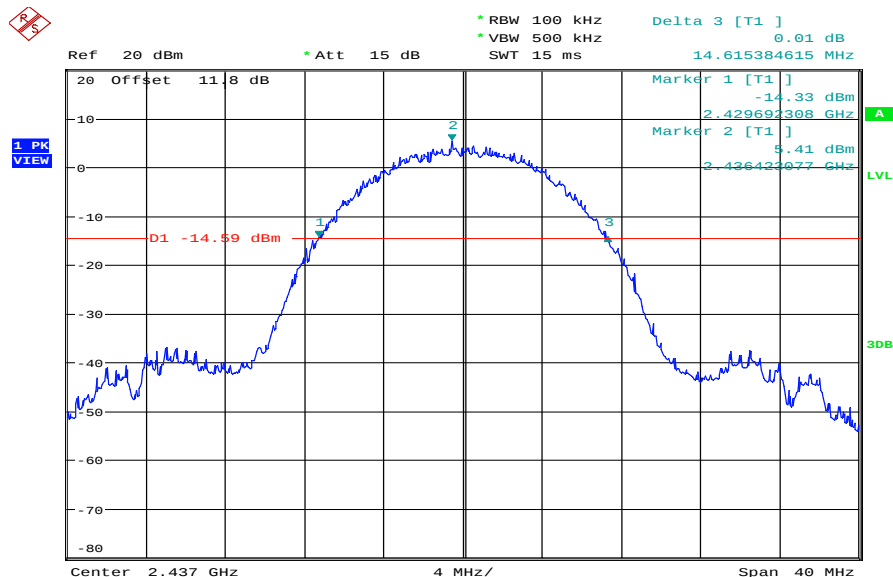
Results:

Modulation Frequency	20 dB bandwidth [MHz]		
	2412 MHz	2437 MHz	2462 MHz
DSSS / b – mode	14.7	14.6	14.6
OFDM / g – mode	18.5	18.6	18.3
OFDM / n – mode	18.9	19.2	19.0
Measurement uncertainty	$\pm \text{RBW}$		

Result: **Passed**

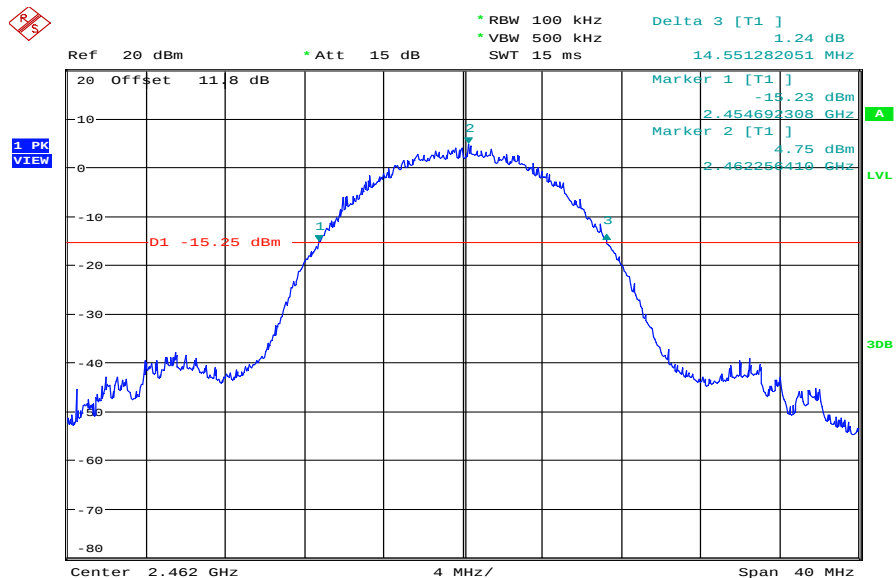
Plots: DSSS / b – mode**Plot 1: TX mode, lowest channel**

Date: 14.JAN.2013 12:04:44

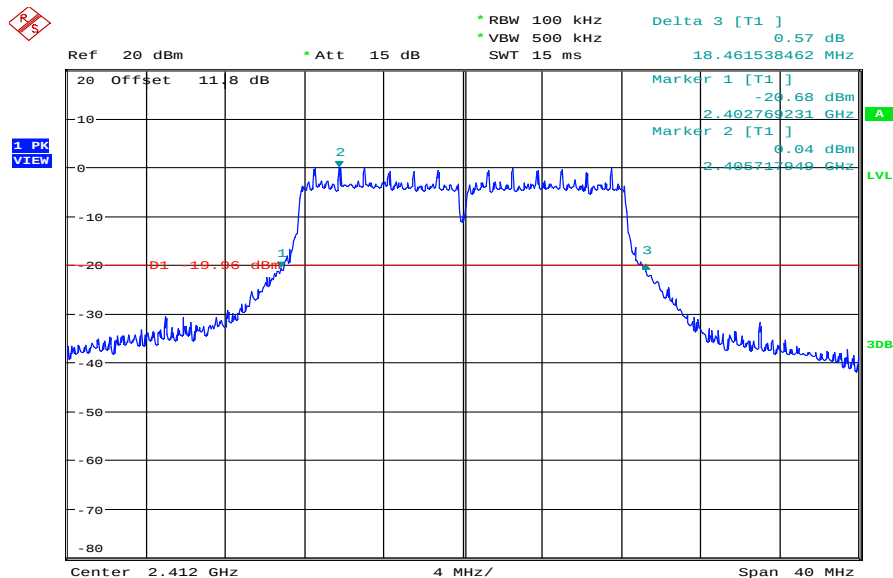
Plot 2: TX mode, middle channel

Date: 14.JAN.2013 12:09:15

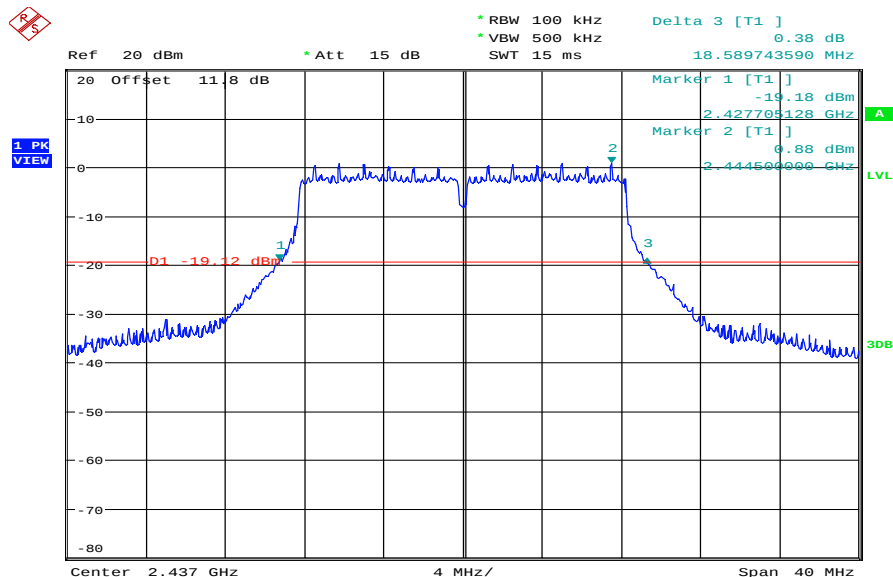
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:11:56

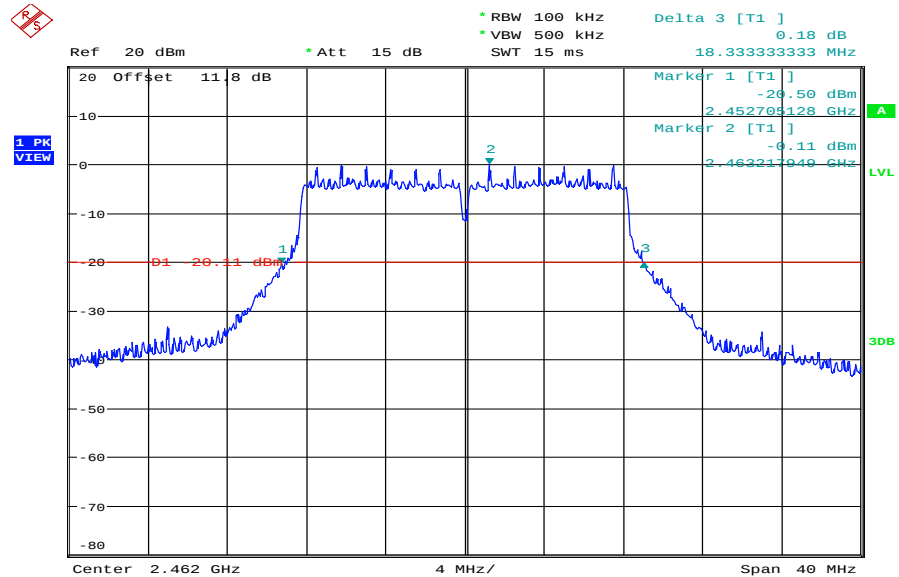
Plots: OFDM / g – mode**Plot 1: TX mode, lowest channel**

Date: 14.JAN.2013 12:16:11

Plot 2: TX mode, middle channel

Date: 14.JAN.2013 12:28:03

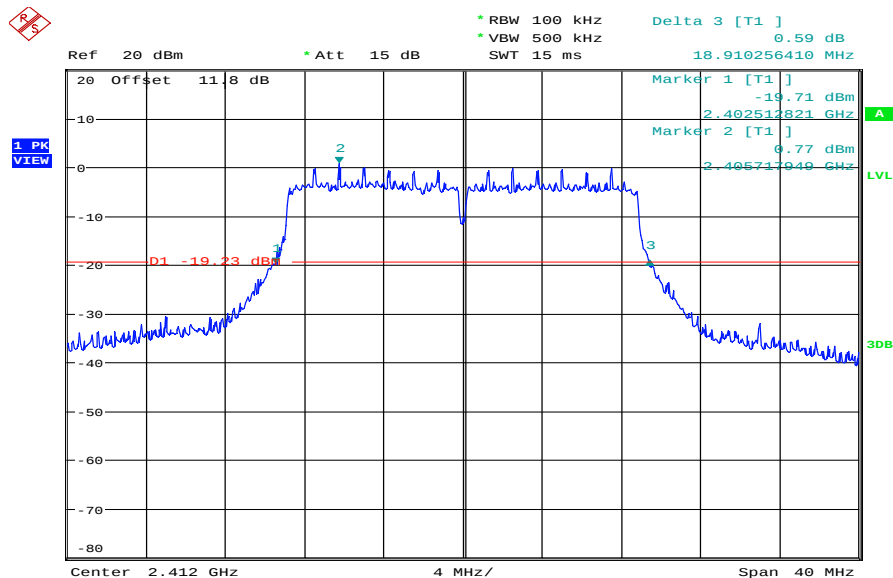
Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:32:05

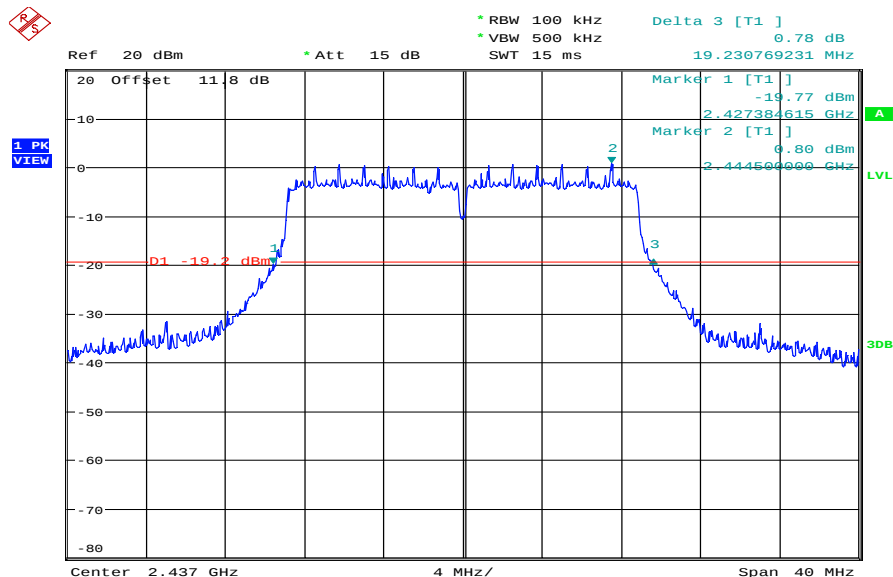
Plots: OFDM / n – mode

Plot 1: TX mode, lowest channel



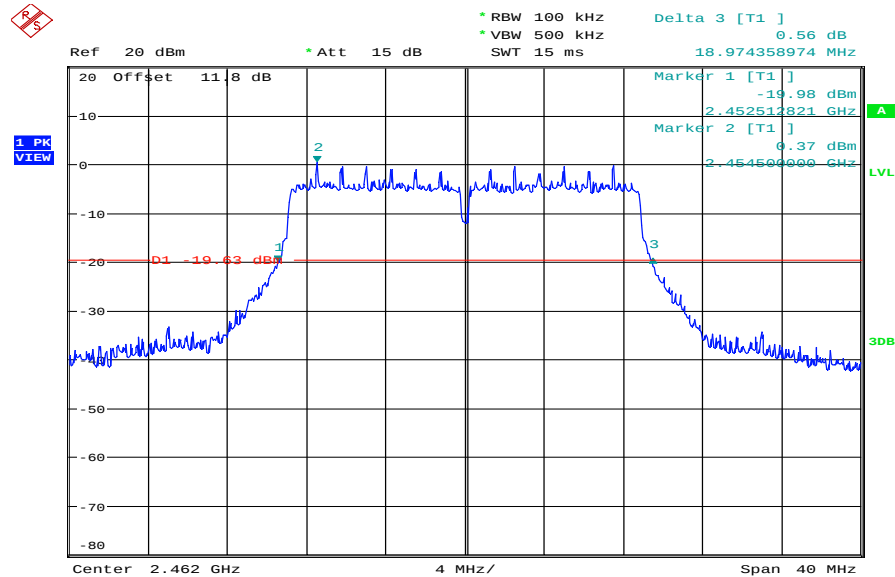
Date: 14.JAN.2013 12:35:08

Plot 2: TX mode, middle channel



Date: 14.JAN.2013 12:37:19

Plot 3: TX mode, highest channel



Date: 14.JAN.2013 12:44:23

9.7 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	
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

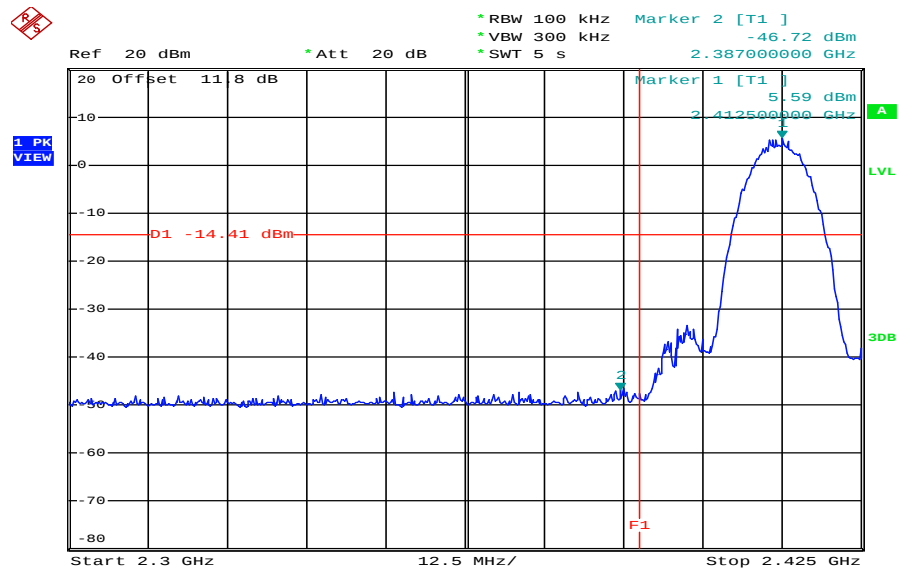
Limits:

FCC	IC
Band Edge Compliance Conducted	
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.	

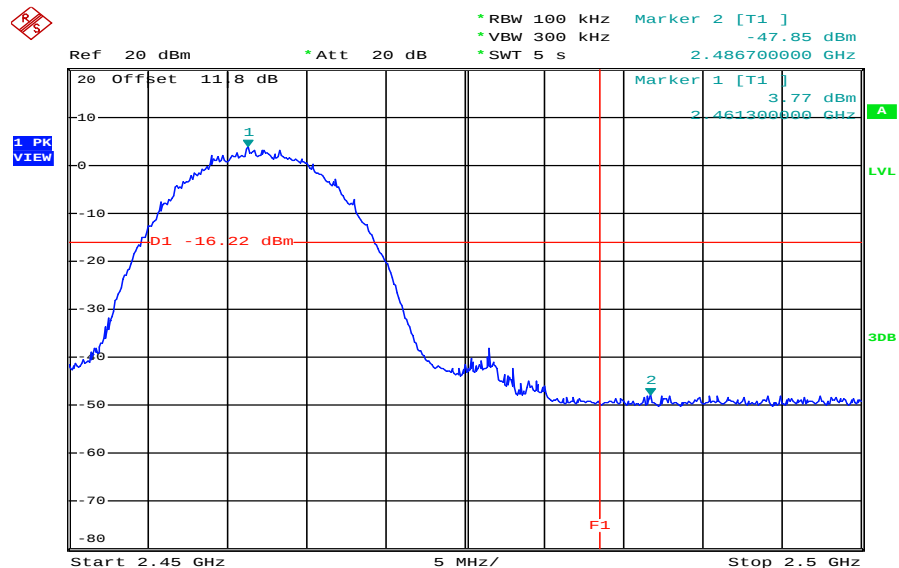
Results:

Scenario Modulation	Band Edge Compliance Conducted [dB]		
	DSSS / b – mode	OFDM / g – mode	OFDM / n – mode
Lower Band Edge – Channel 1	> 20 dB (see plot 1)	> 20 dB (see plot 3)	> 20 dB (see plot 5)
Upper Band Edge – Channel 11	> 20 dB (see plot 2)	> 20 dB (see plot 4)	> 20 dB (see plot 6)
Measurement uncertainty	± 1.5 dB		

Result: Passed

Plots: DSSS / b – mode**Plot 1: TX mode, lower band edge**

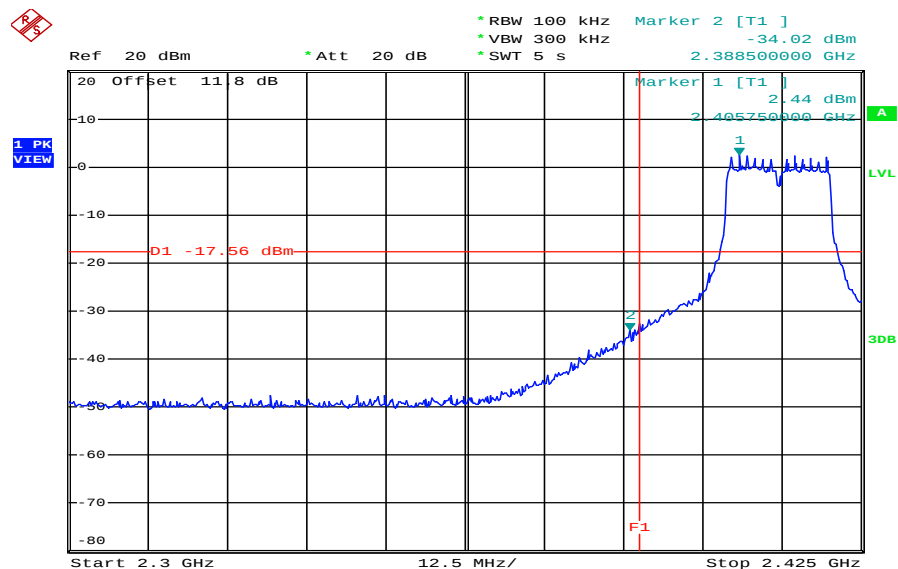
Date: 14.JAN.2013 14:05:04

Plot 2: TX mode, upper band edge

Date: 14.JAN.2013 14:01:56

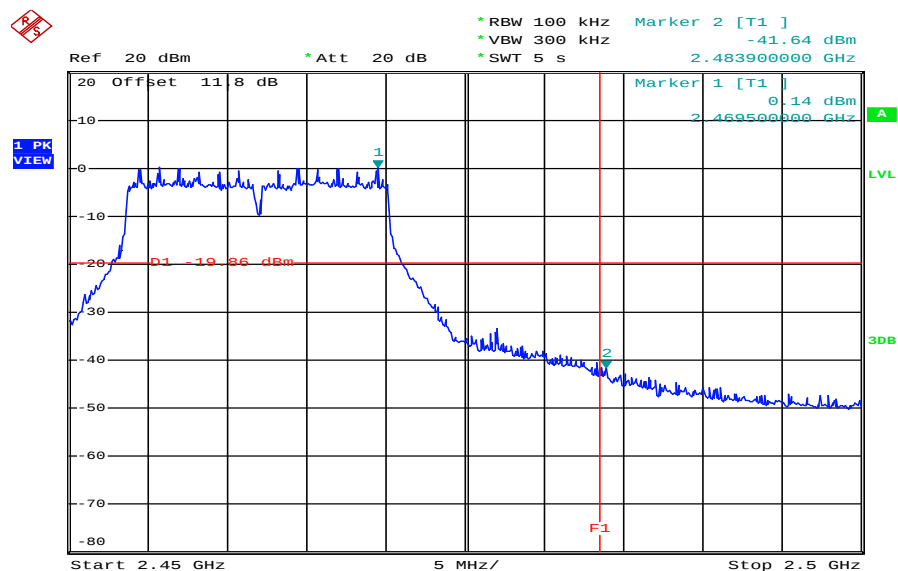
Plots: OFDM / g – mode

Plot 1: TX mode, lower band edge



Date: 14.JAN.2013 14:07:55

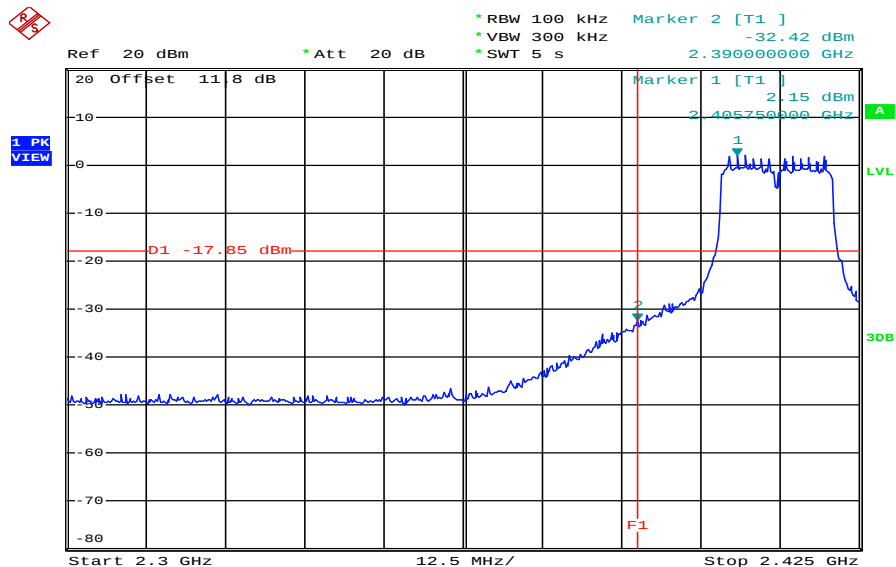
Plot 2: TX mode, upper band edge



Date: 14.JAN.2013 13:59:40

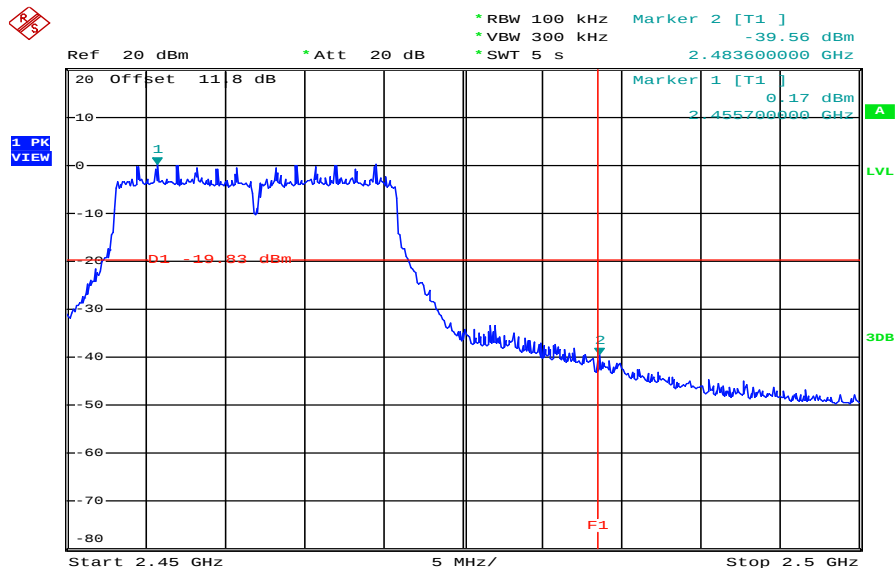
Plots: OFDM / n – mode

Plot 1: TX mode, lower band edge



Date: 14.JAN.2013 14:10:38

Plot 2: TX mode, upper band edge



Date: 14.JAN.2013 13:55:52

9.8 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

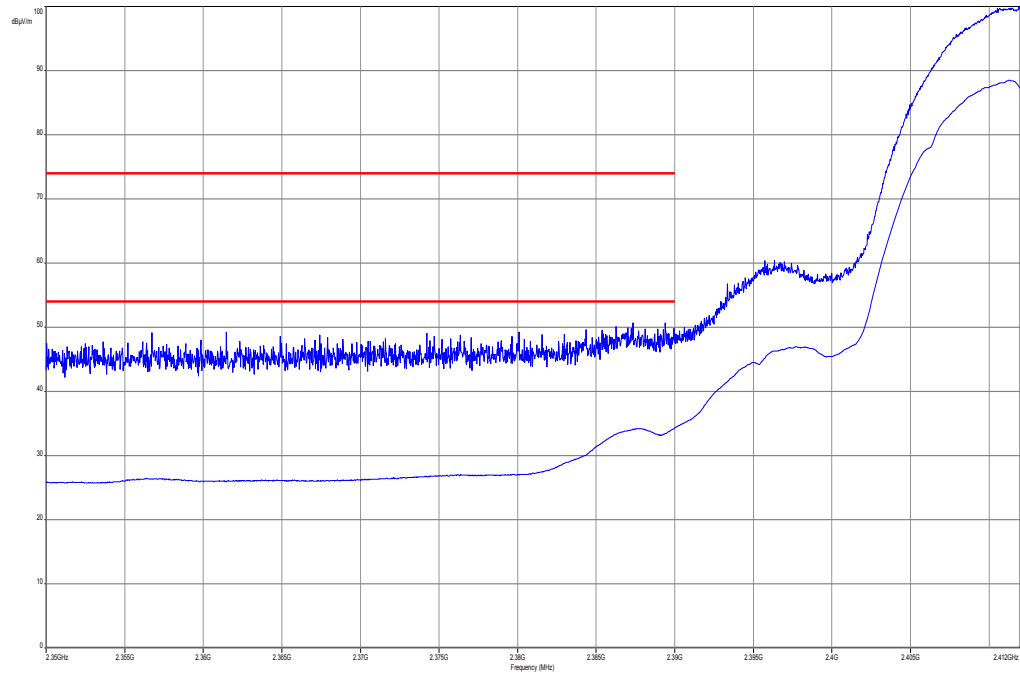
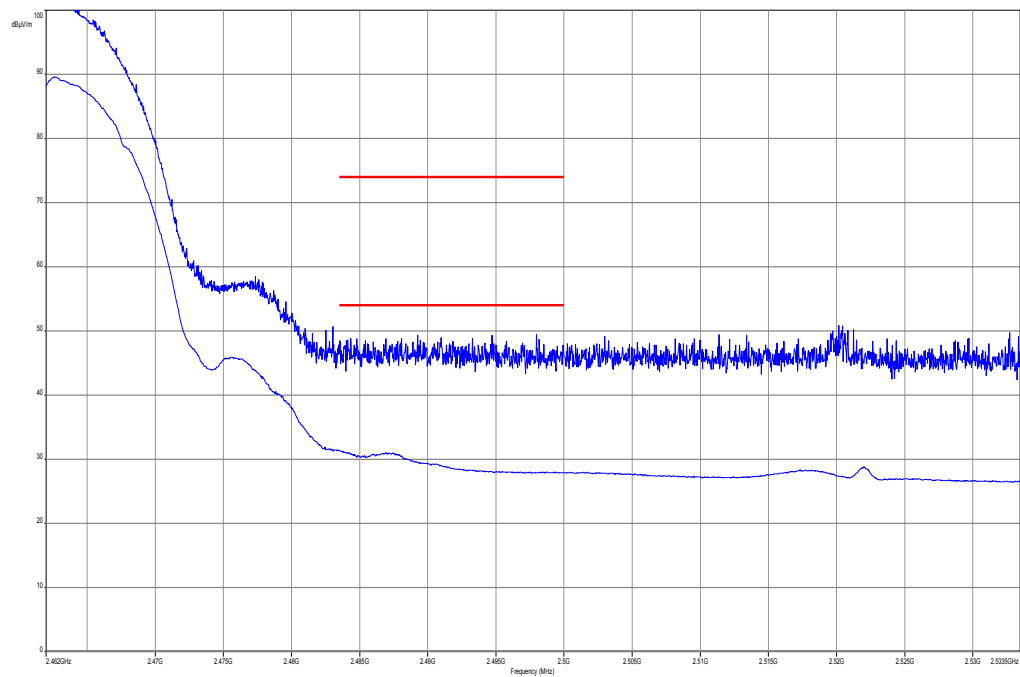
Limits:

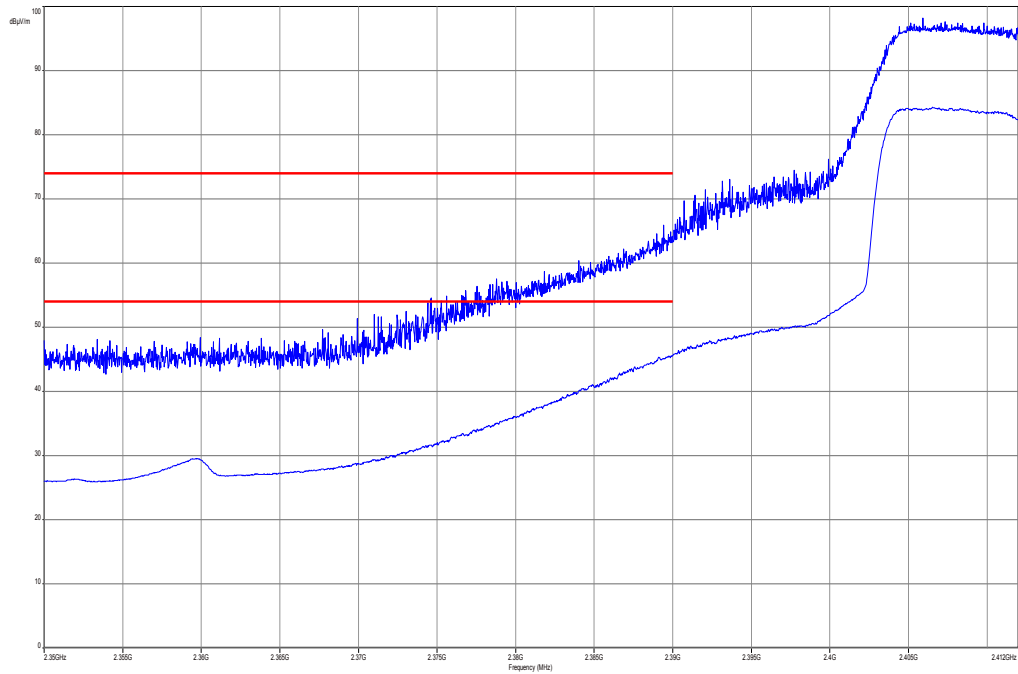
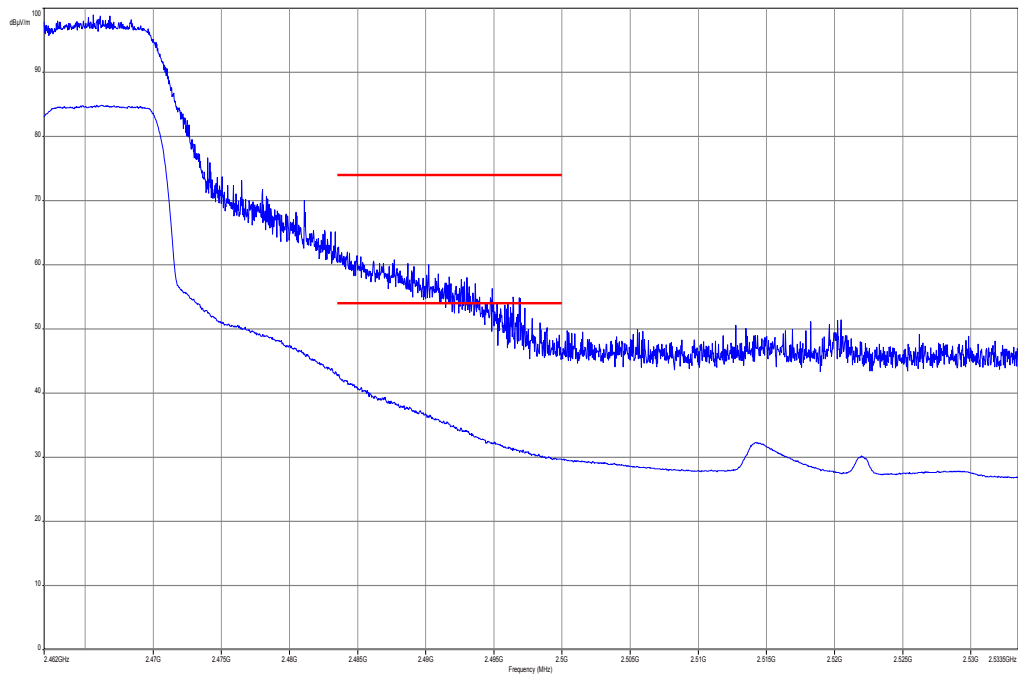
FCC	IC
Band Edge Compliance Radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth 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)).	
54 dB μ V/m AVG	

Results:

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

Result: Passed

Plots: DSSS**Plot 1: TX mode, lower band edge, vertical & horizontal polarization****Plot 2: TX mode, upper band edge, vertical & horizontal polarization**

Plots: OFDM**Plot 1: TX mode, lower band edge, vertical & horizontal polarization****Plot 2: TX mode, upper band edge, vertical & horizontal polarization**

9.9 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:	1s / 100 MHz
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		7.8	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2437		8.7	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2462		8.9	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
Measurement uncertainty		± 3 dB			

Result: Passed**Results: OFDM / g – mode**

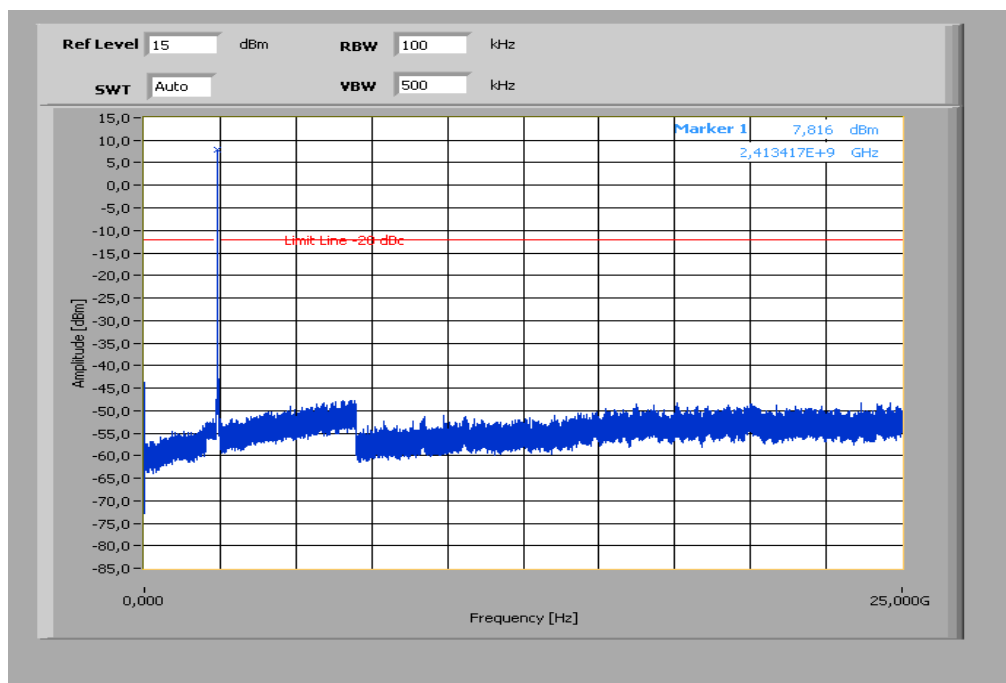
TX Spurious Emissions Conducted					
OFDM / g – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		0.8	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2437		0.8	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2462		1.2	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
Measurement uncertainty		± 3 dB			

Result: Passed

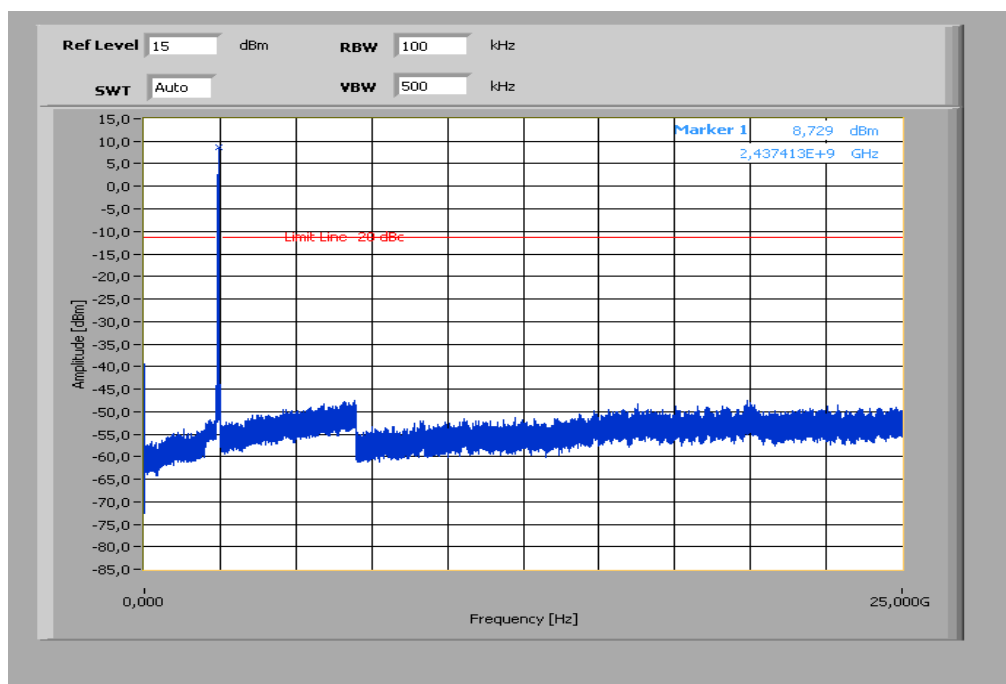
Results: OFDM / n – mode

TX Spurious Emissions Conducted					
OFDM / n – mode					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2412		0.6	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2437		1.1	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
2462		1.1	30 dBm		Operating frequency
No critical peaks detected. All detected emissions are below the -20 dBc criteria.			-20 dBc (peak)		complies
			-30 dBc (average)		
Measurement uncertainty		± 3 dB			

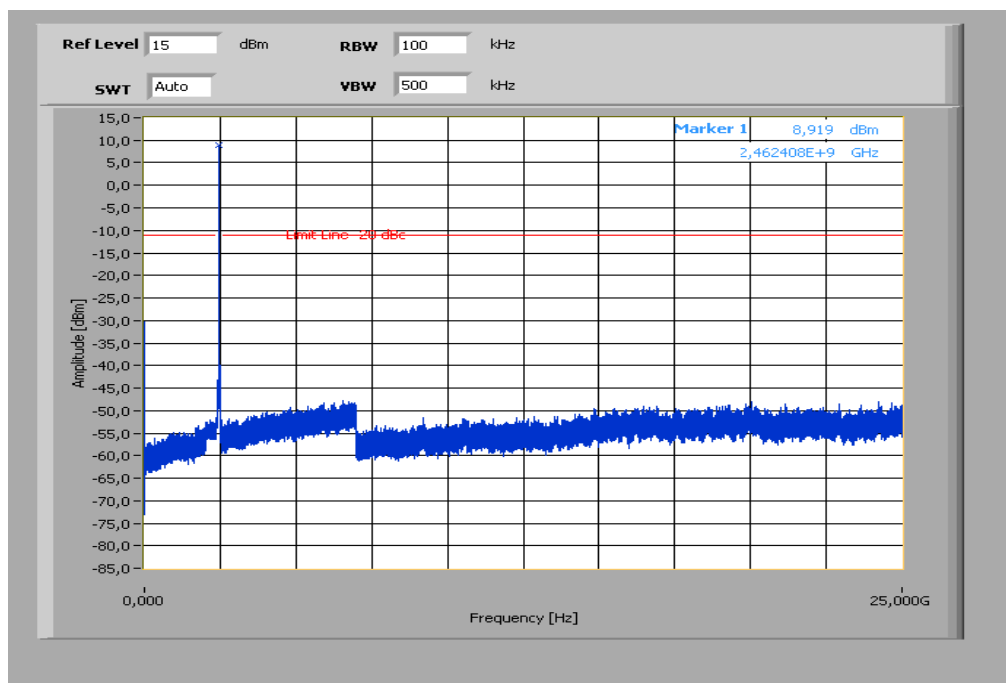
Result: Passed

Plots: DSSS / b – mode**Plot 1:** TX mode, lowest channel, up to 25 GHz

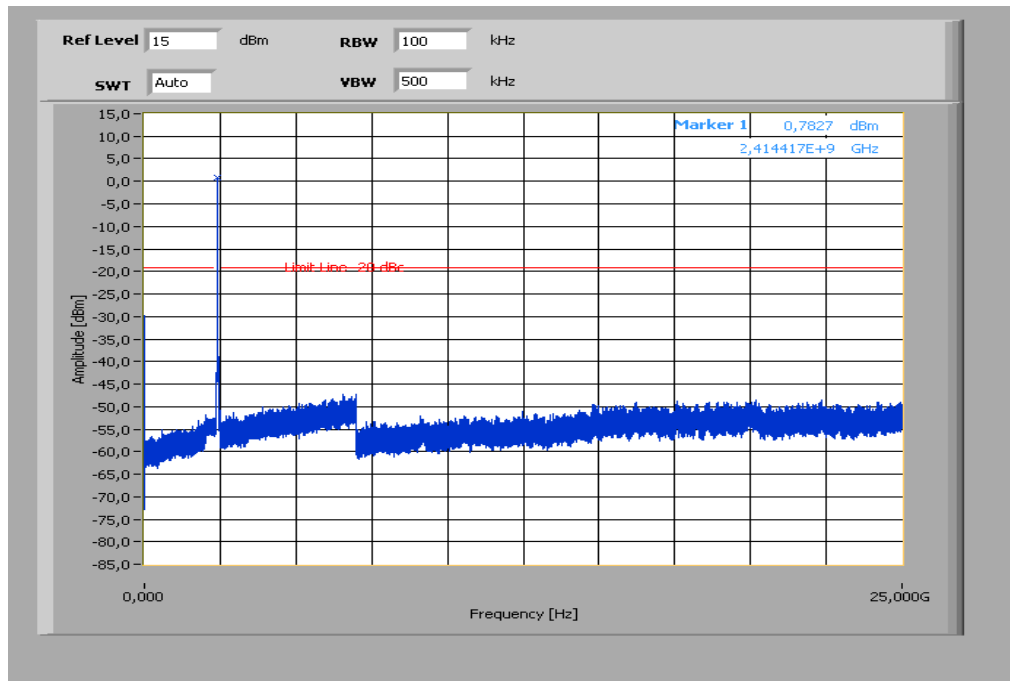
The peak at the beginning of the plot is the LO from the SA.

Plot 2: TX mode, middle channel, up to 25 GHz

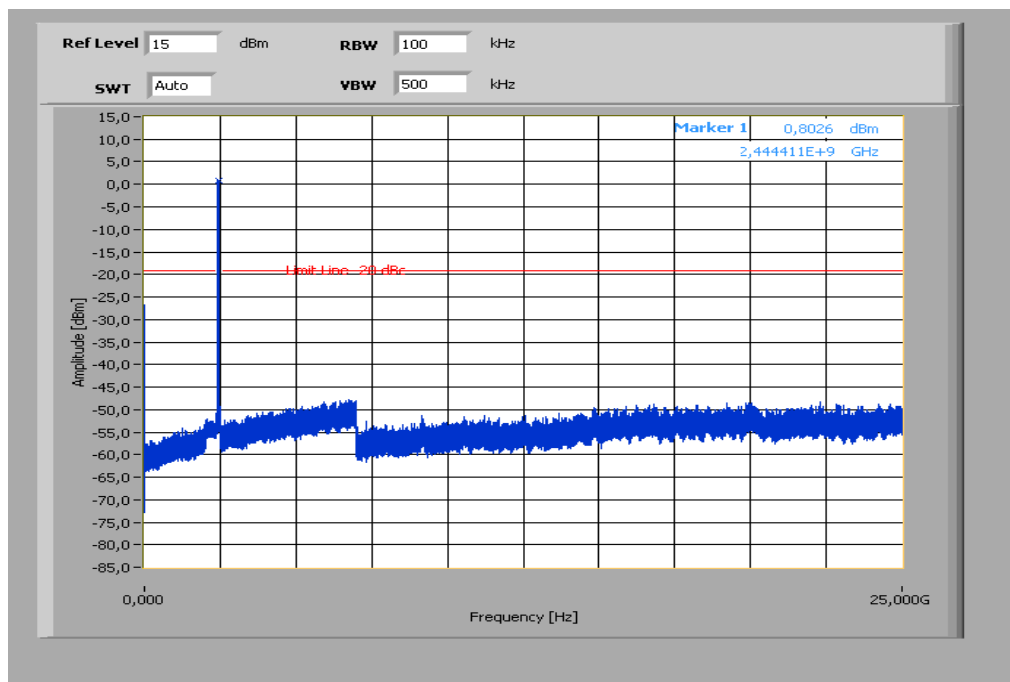
The peak at the beginning of the plot is the LO from the SA.

Plot 3: TX mode, highest channel, up to 25 GHz

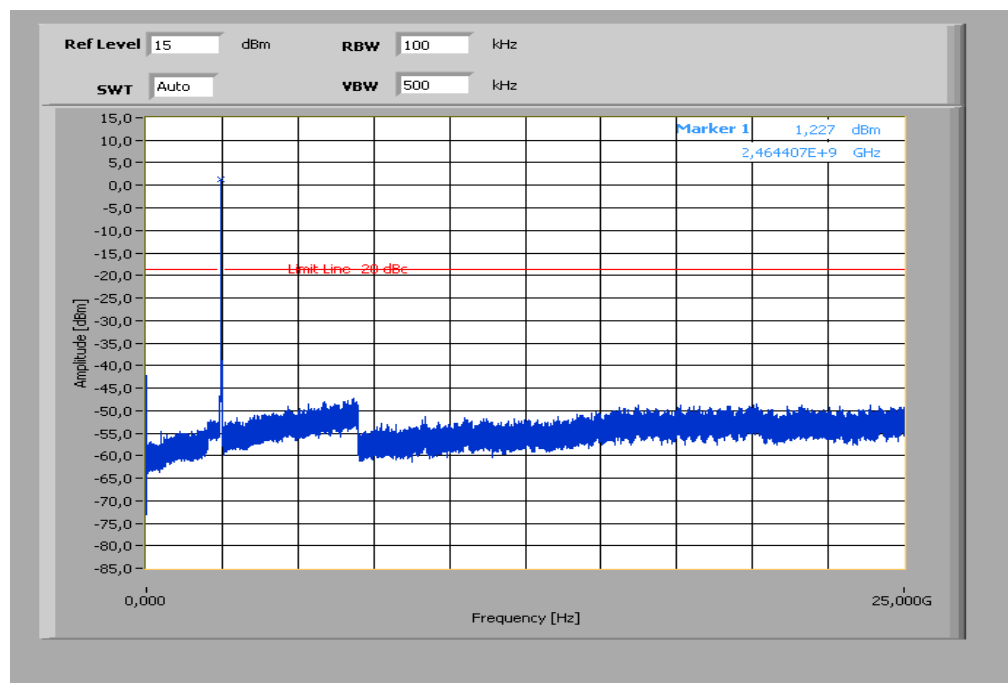
The peak at the beginning of the plot is the LO from the SA.

Plots: OFDM / g – mode**Plot 1:** TX mode, lowest channel, up to 25 GHz

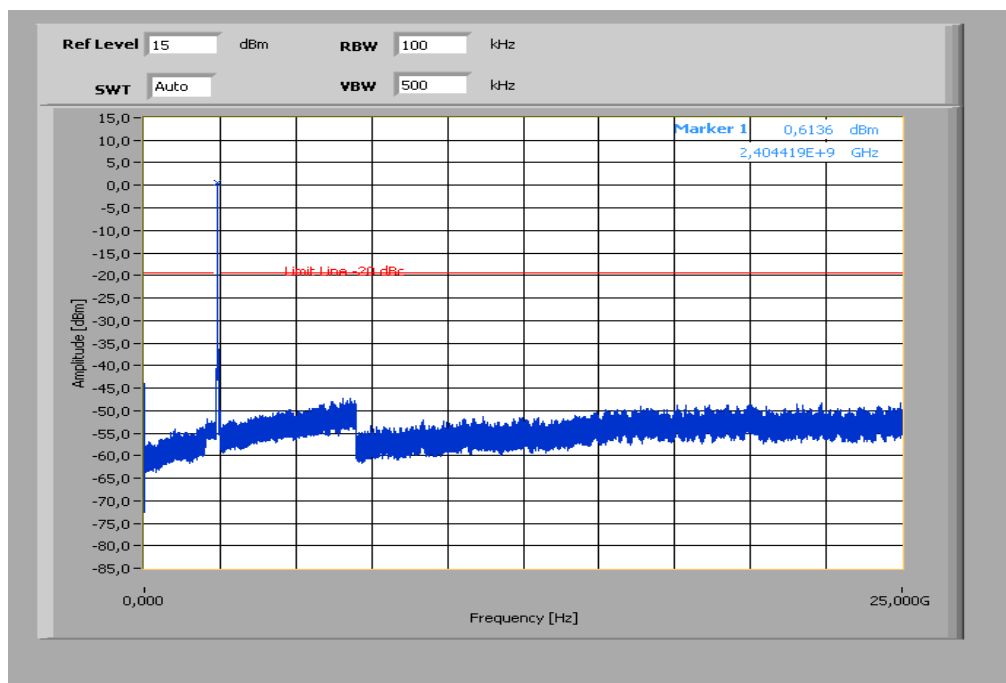
The peak at the beginning of the plot is the LO from the SA.

Plot 2: TX mode, middle channel, up to 25 GHz

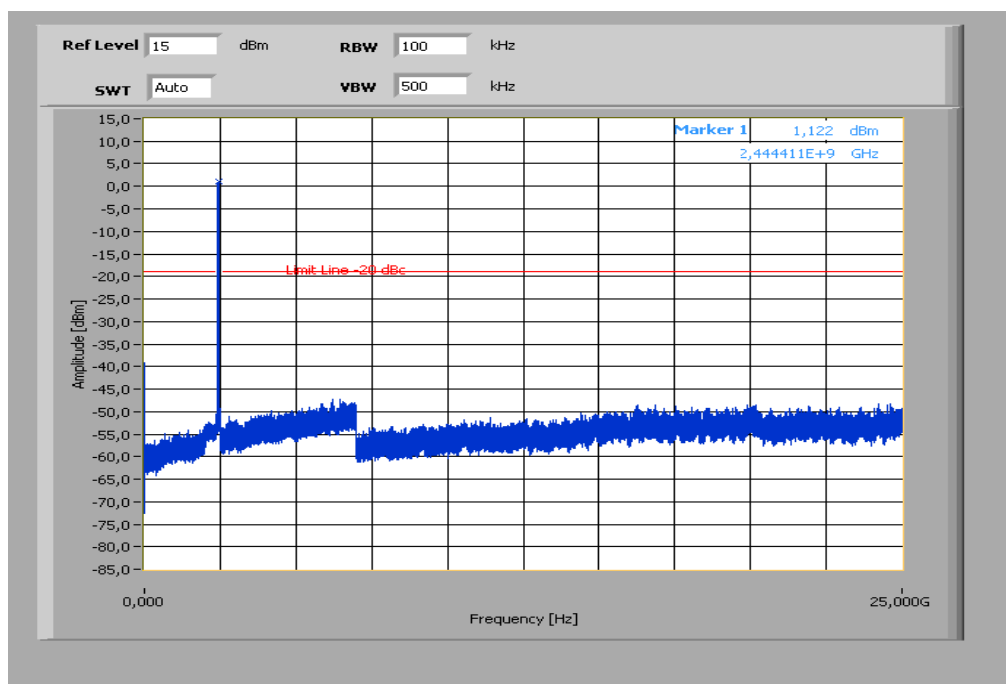
The peak at the beginning of the plot is the LO from the SA.

Plot 3: TX mode, highest channel, up to 25 GHz

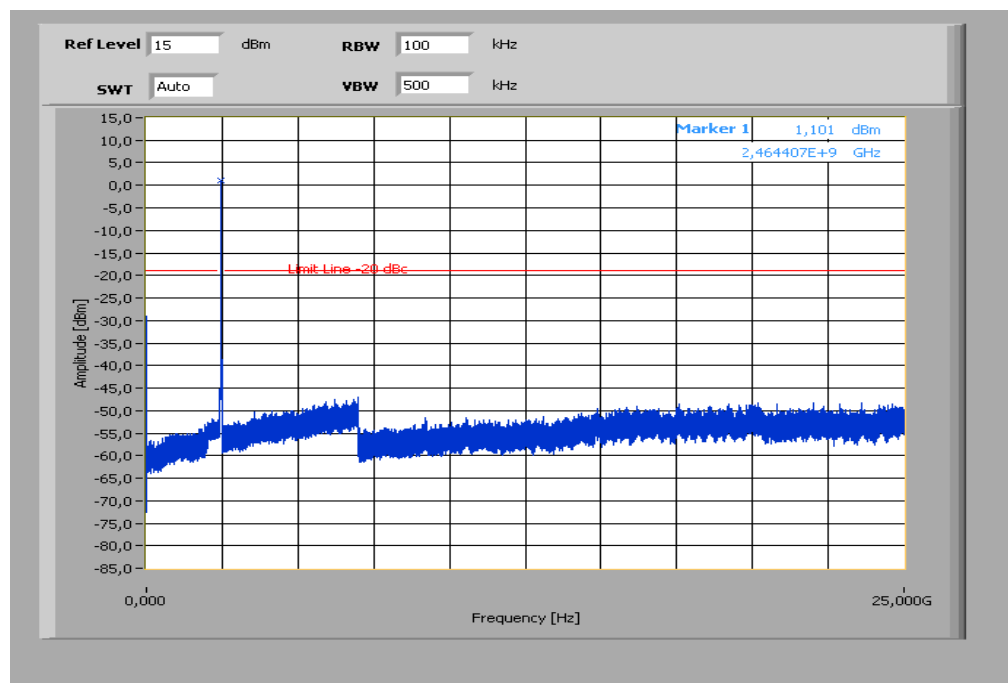
The peak at the beginning of the plot is the LO from the SA.

Plots: OFDM / n – mode**Plot 1:** TX mode, lowest channel, up to 25 GHz

The peak at the beginning of the plot is the LO from the SA.

Plot 2: TX mode, middle channel, up to 25 GHz

The peak at the beginning of the plot is the LO from the SA.

Plot 3: TX mode, highest channel, up to 25 GHz

The peak at the beginning of the plot is the LO from the SA.

9.10 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:	Sweep: 100 kHz Remeasurement: 10 Hz / 3 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold
Measured Modulation	☒ DSSS b – mode ☒ OFDM g – mode ☐ 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

TX Spurious Emissions Radiated [dB μ V/m]								
DSSS								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
Measurement uncertainty			± 3 dB					

Result: Passed**Results: OFDM**

TX Spurious Emissions Radiated [dB μ V/m]								
OFDM								
2412 MHz			2437 MHz			2462 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
Measurement uncertainty			± 3 dB					

Result: Passed

Plots: DSSS**Plot 1:** Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization**Common Information**

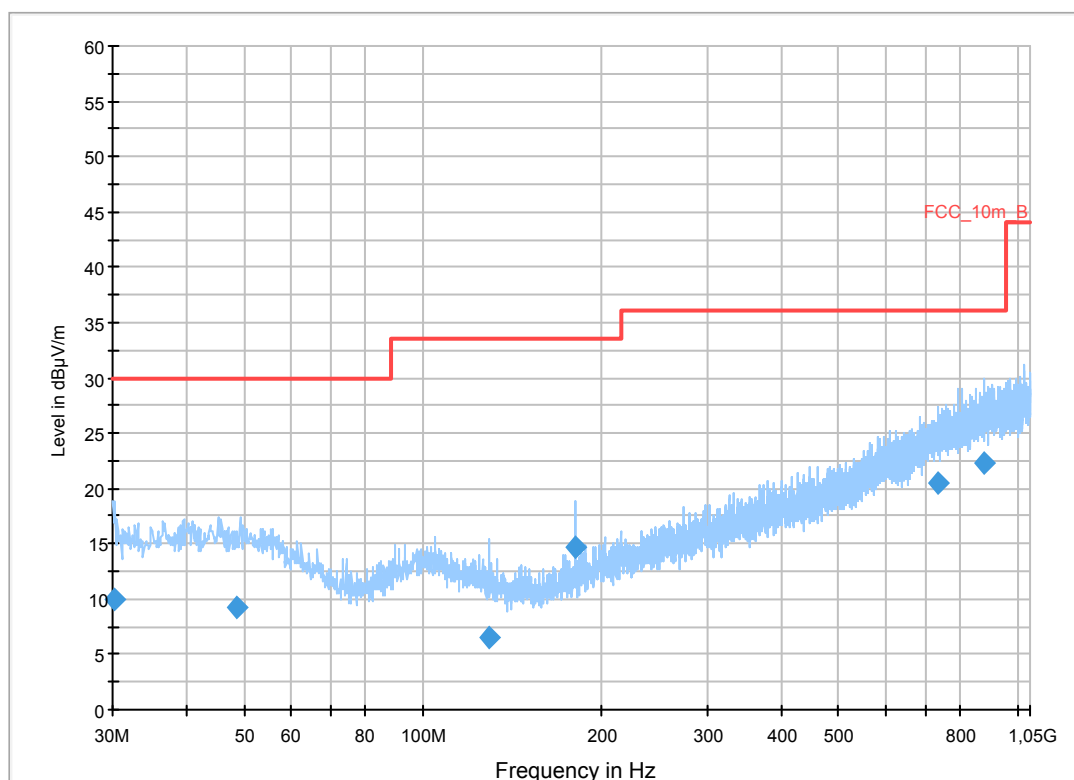
EUT:	TM-0000-BV
Serial Number:	CB5A1MD99N
Test Description:	FCC part 15 class B @ 10m
Operating Conditions:	TX WLAN b-mode Ch. 1 + charging
Operator Name:	Hennemann
Comment:	AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
30.162878	9.9	1000.0	120.000	122.0	V	10.0	12.5	20.1	30.0	
48.541350	9.2	1000.0	120.000	162.0	H	190.0	13.3	20.8	30.0	
129.072900	6.6	1000.0	120.000	170.0	V	87.0	9.5	26.9	33.5	
180.059400	14.7	1000.0	120.000	133.0	V	10.0	10.4	18.8	33.5	
733.636500	20.5	1000.0	120.000	170.0	H	10.0	23.3	15.5	36.0	
880.320900	22.2	1000.0	120.000	107.0	V	-10.0	24.9	13.8	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

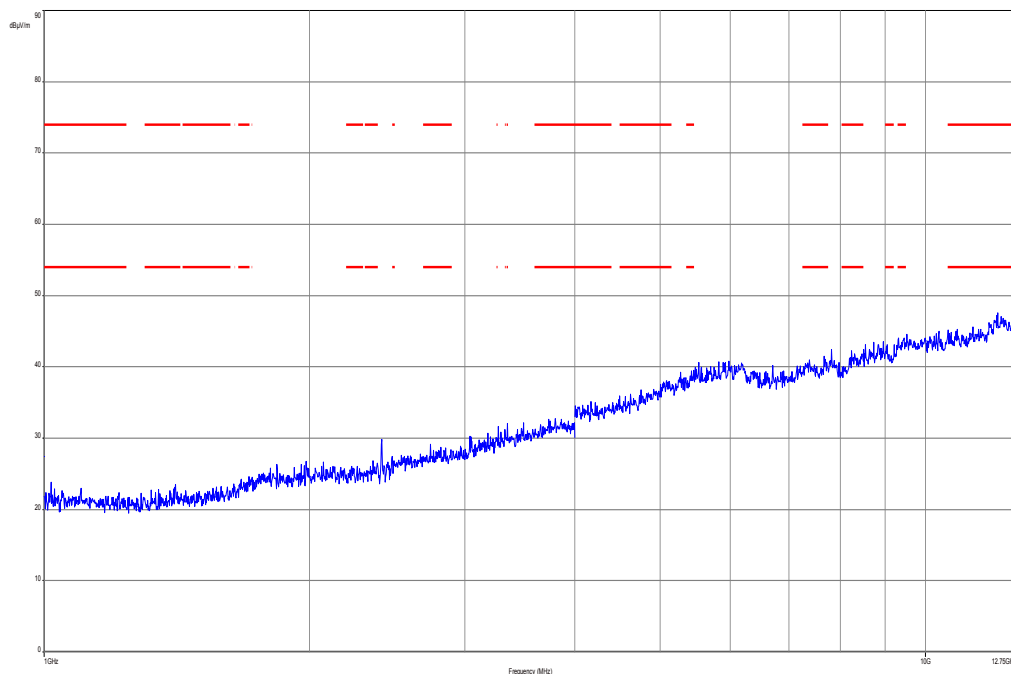
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

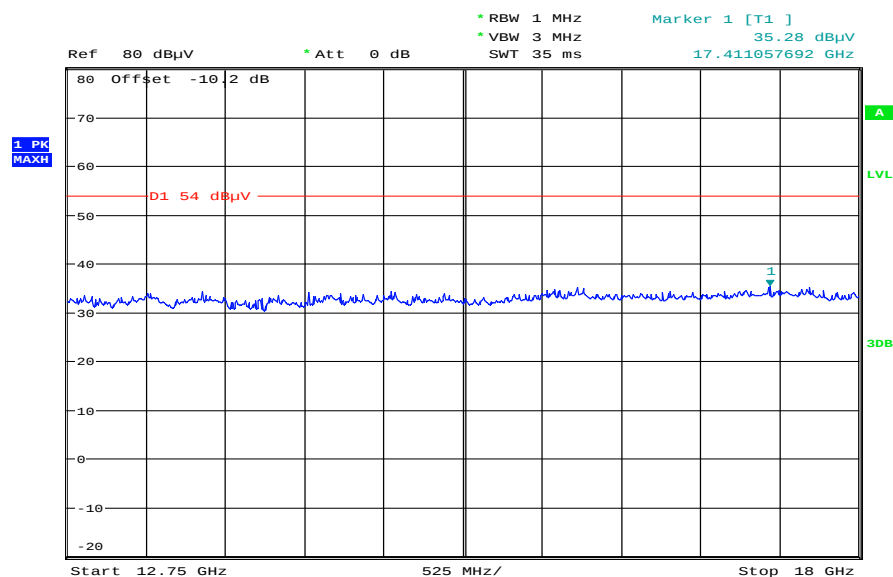
EMC 32 Version 8.52

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



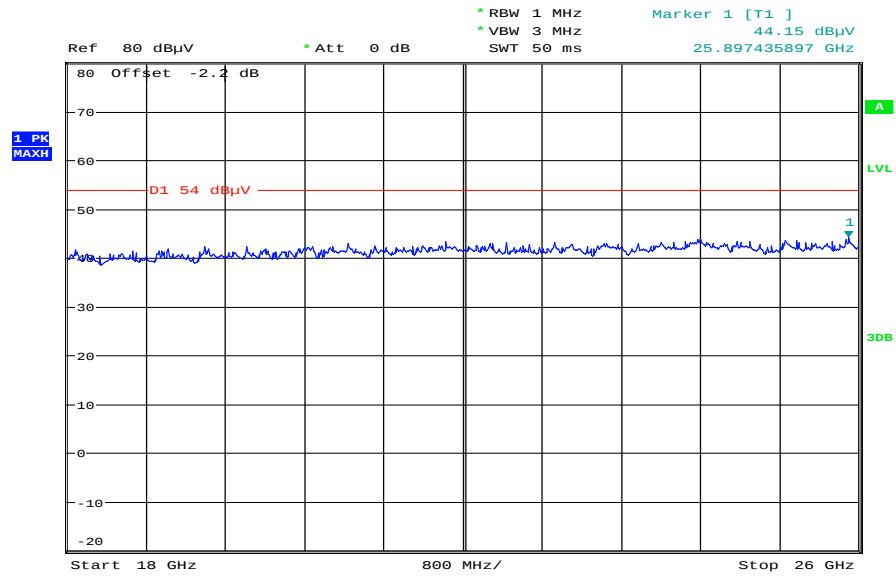
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:26:37

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



Date: 11.JAN.2013 13:00:16

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

Common Information

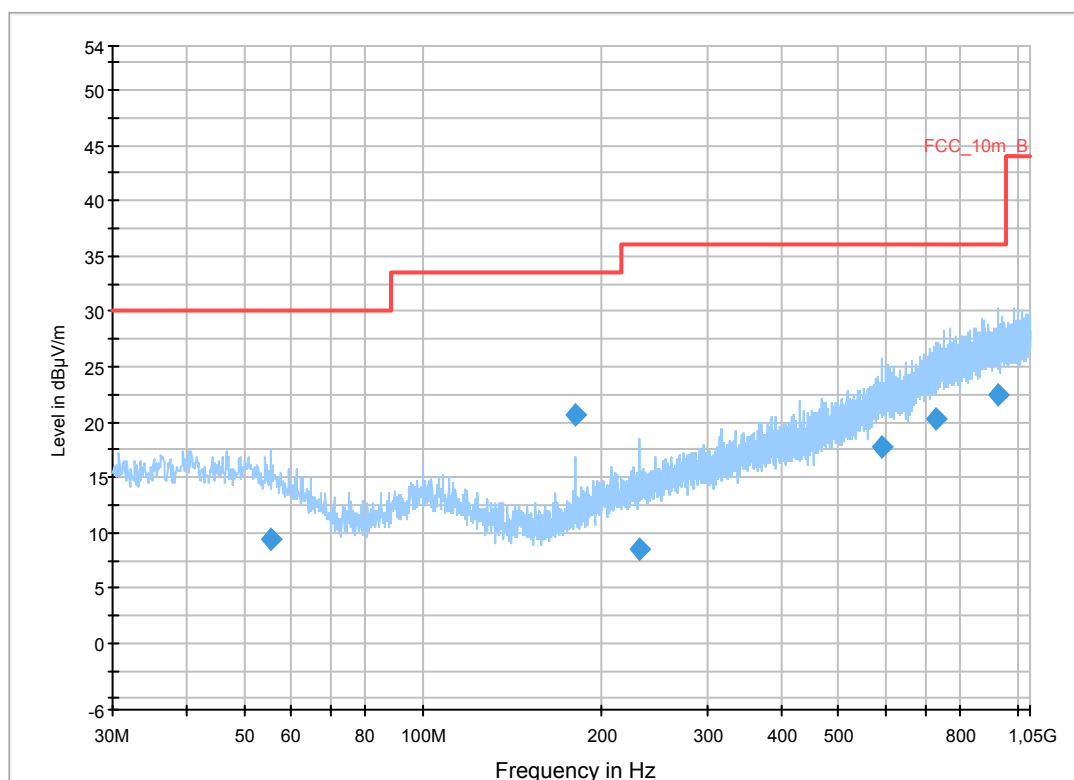
EUT: TM-0000-BV
 Serial Number: CB5A1MD99N
 Test Description: FCC part 15 class B @ 10m
 Operating Conditions: TX WLAN b-mode Ch. 6 + charging
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
55.464750	9.4	1000.0	120.000	162.0	H	280.0	12.8	20.6	30.0	
179.985150	20.7	1000.0	120.000	170.0	V	0.0	10.4	12.8	33.5	
231.250800	8.6	1000.0	120.000	170.0	H	272.0	12.7	27.4	36.0	
592.115250	17.7	1000.0	120.000	170.0	V	177.0	20.6	18.3	36.0	
729.364200	20.3	1000.0	120.000	98.0	H	10.0	23.2	15.7	36.0	
927.374250	22.5	1000.0	120.000	170.0	V	272.0	25.3	13.5	36.0	

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

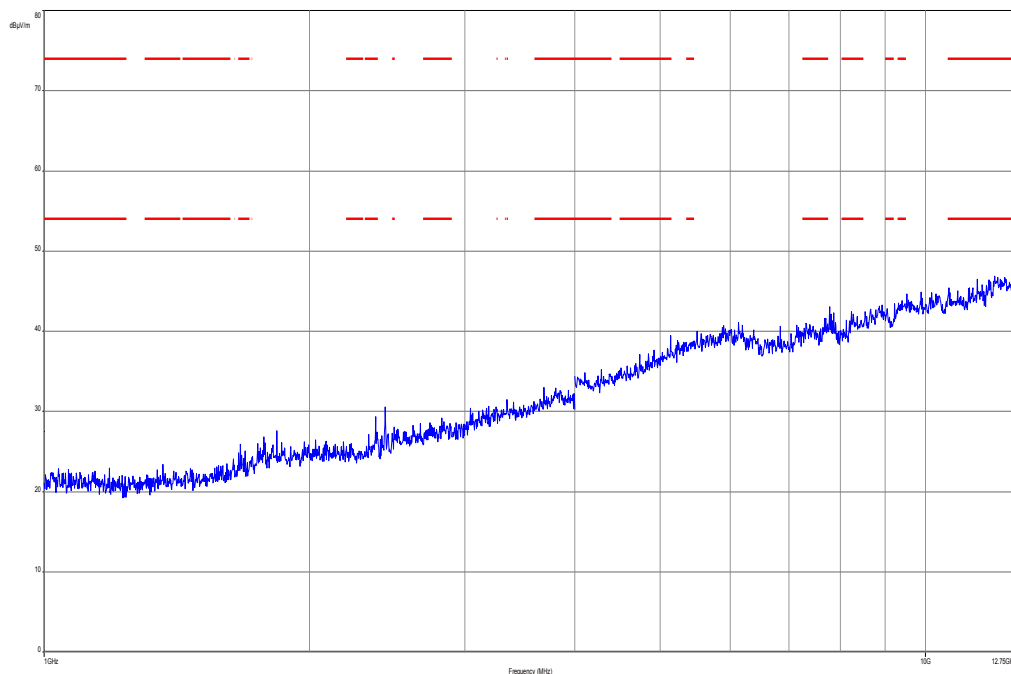
Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch
FW 1.0Antenna: 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 3.12Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

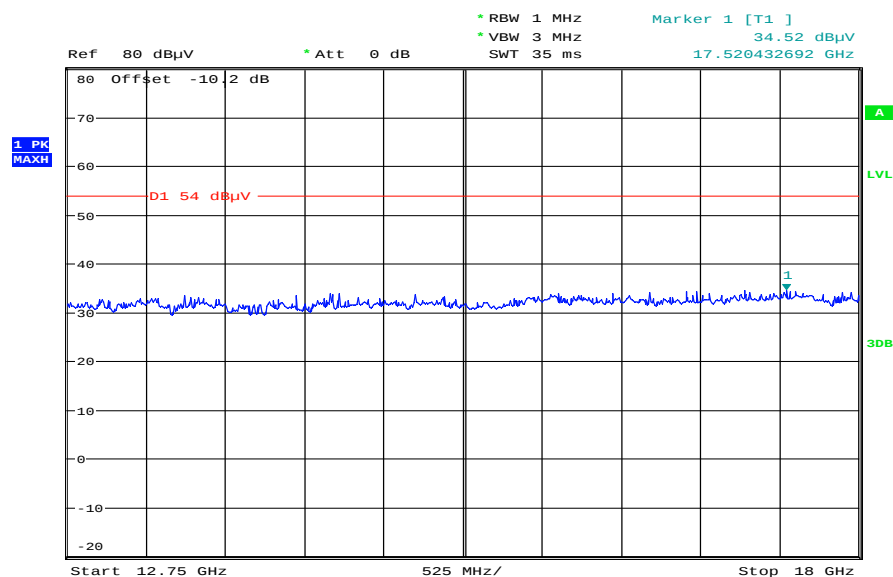
EMC 32 Version 8.52

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



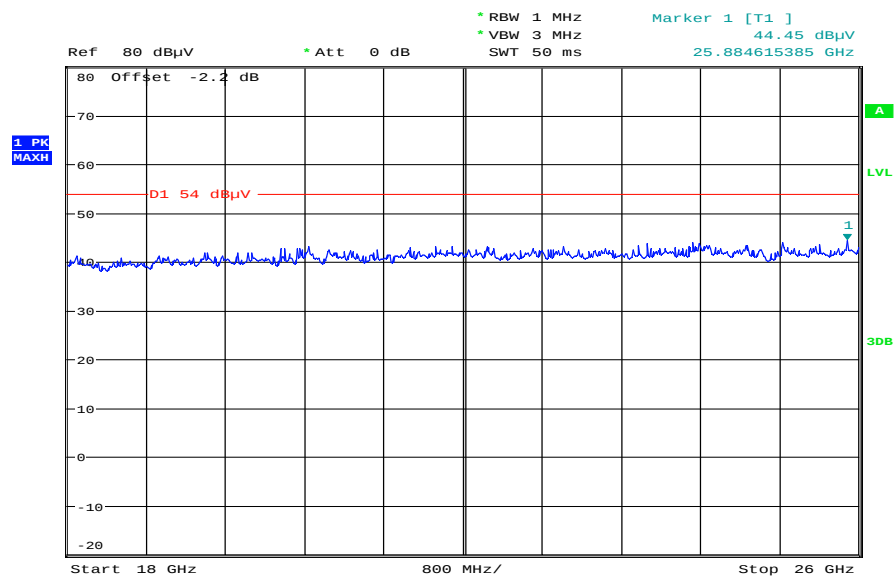
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:27:56

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



Date: 11.JAN.2013 13:00:53

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

Common Information

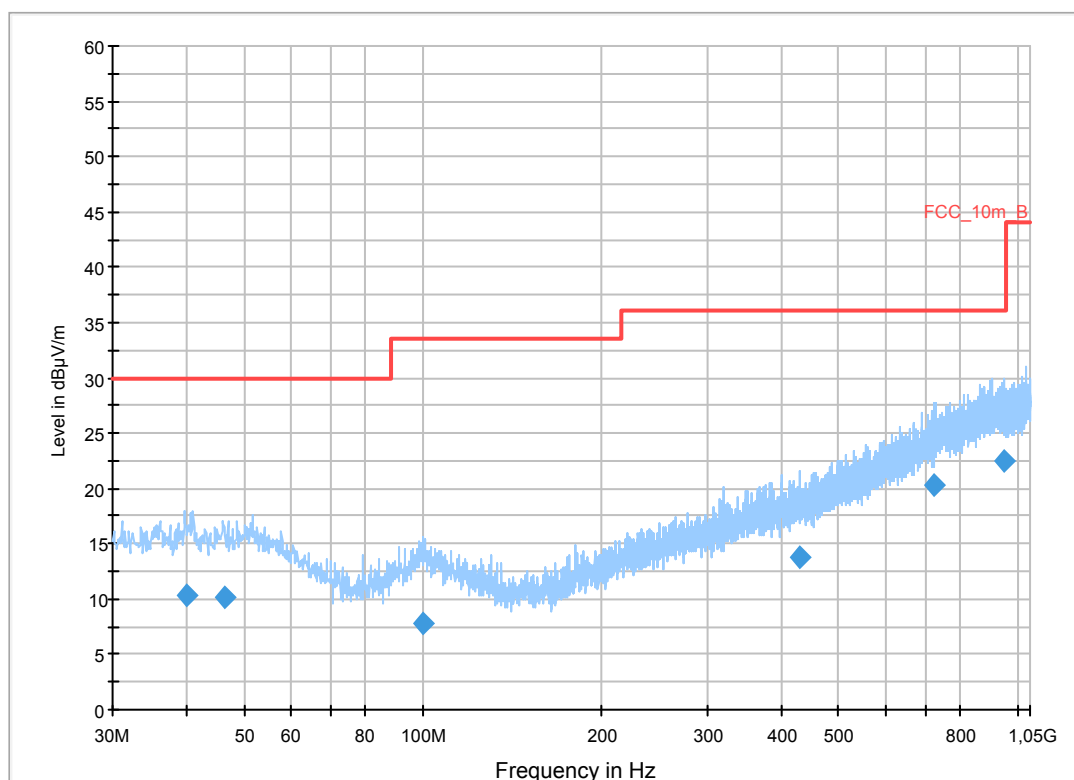
EUT: TM-0000-BV
 Serial Number: CB5A1MD99N
 Test Description: FCC part 15 class B @ 10m
 Operating Conditions: TX WLAN b-mode Ch. 11 + charging
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
39.974550	10.3	1000.0	120.000	170.0	H	2.0	13.4	19.7	30.0	
46.280700	10.1	1000.0	120.000	170.0	V	10.0	13.3	19.9	30.0	
99.773250	7.8	1000.0	120.000	170.0	H	100.0	11.9	25.7	33.5	
430.110900	13.7	1000.0	120.000	109.0	V	100.0	17.4	22.3	36.0	
725.203500	20.2	1000.0	120.000	170.0	H	0.0	23.1	15.8	36.0	
951.641700	22.4	1000.0	120.000	170.0	H	4.0	25.4	13.6	36.0	

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

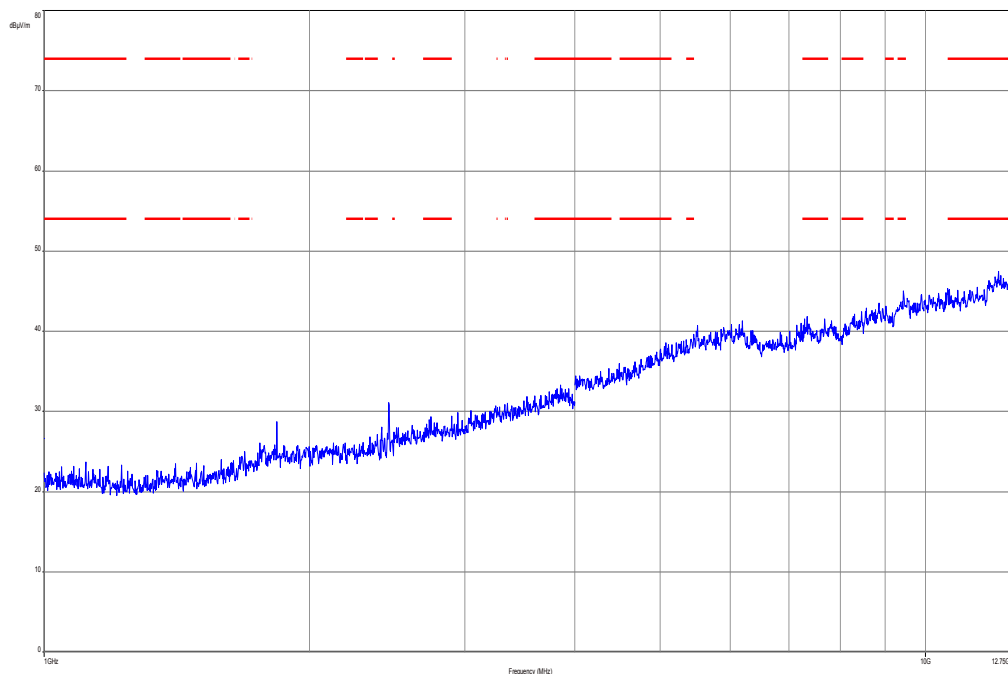
Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch
FW 1.0Antenna: 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 3.12Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

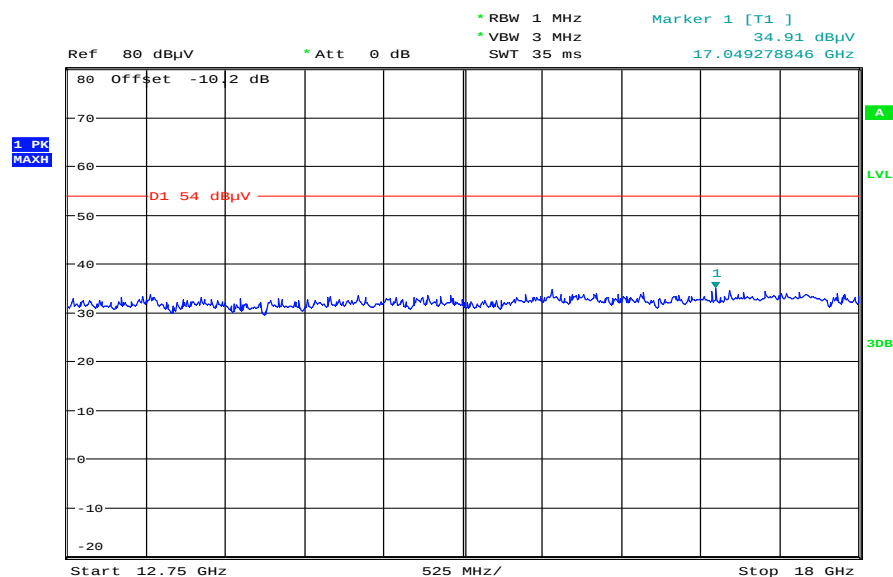
EMC 32 Version 8.52

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



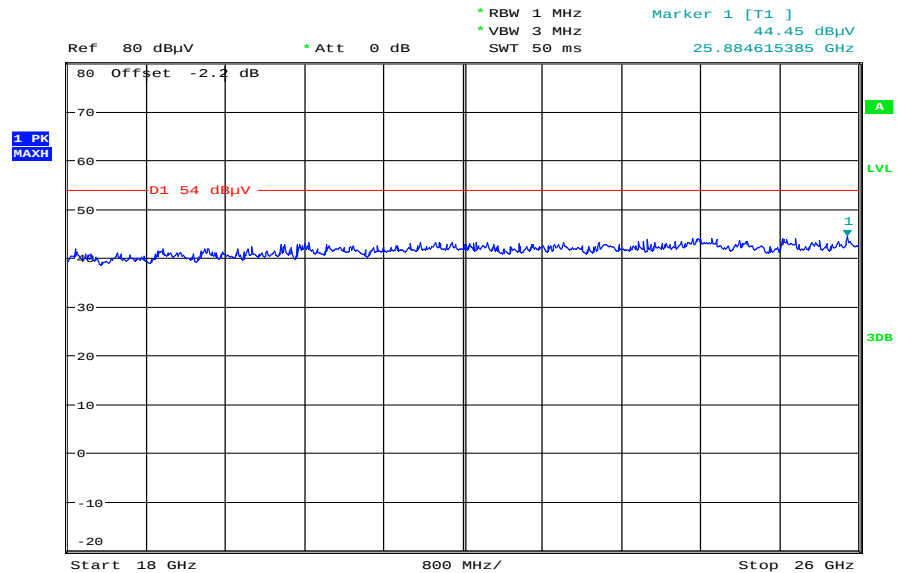
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:28:57

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



Date: 11.JAN.2013 13:01:44

Plots: OFDM**Plot 1:** Lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization**Common Information**

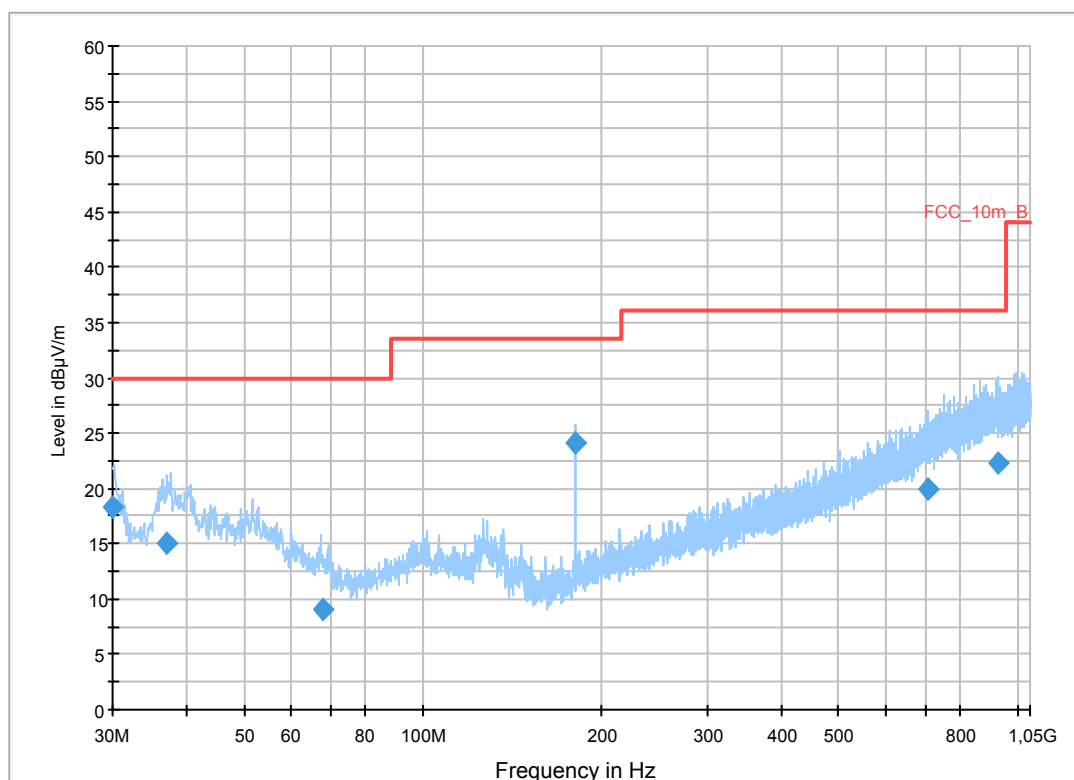
EUT: TM-0000-BV
Serial Number: CB5A1MD99N
Test Description: FCC part 15 class B @ 10m
Operating Conditions: TX WLAN g-mode Ch. 1 + charging
Operator Name: Hennemann
Comment: AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
30.000182	18.3	1000.0	120.000	143.0	V	280.0	12.5	11.7	30.0	
37.077900	15.1	1000.0	120.000	170.0	V	2.0	13.2	14.9	30.0	
67.565100	9.1	1000.0	120.000	170.0	V	-10.0	9.8	20.9	30.0	
180.015450	24.1	1000.0	120.000	98.0	V	80.0	10.4	9.4	33.5	
709.112400	20.0	1000.0	120.000	170.0	H	178.0	22.7	16.0	36.0	
928.456200	22.3	1000.0	120.000	98.0	H	10.0	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

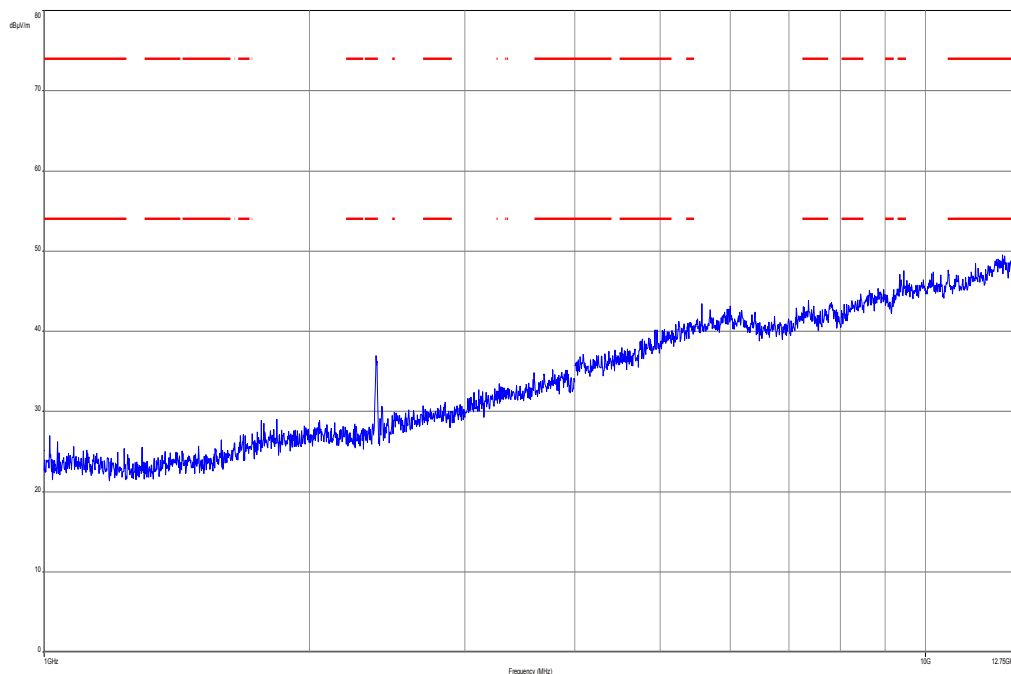
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

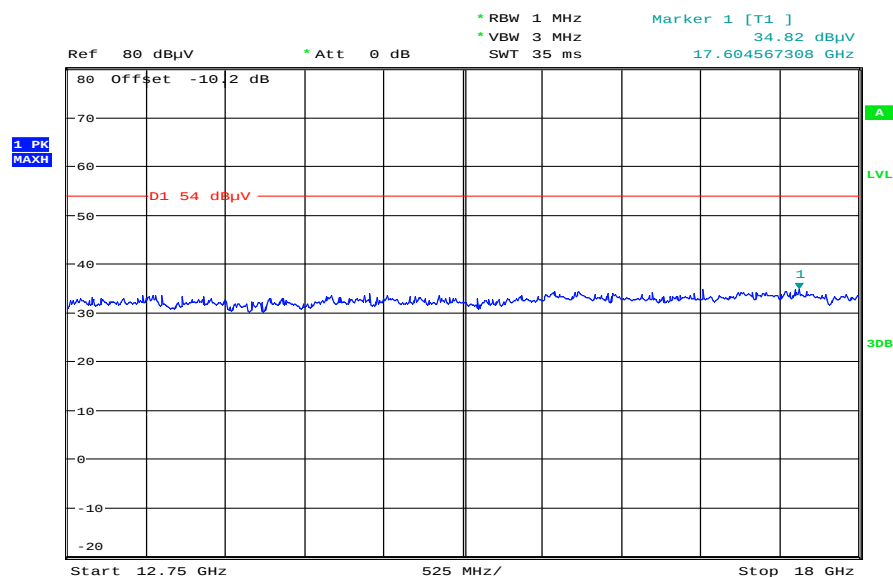
EMC 32 Version 8.52

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

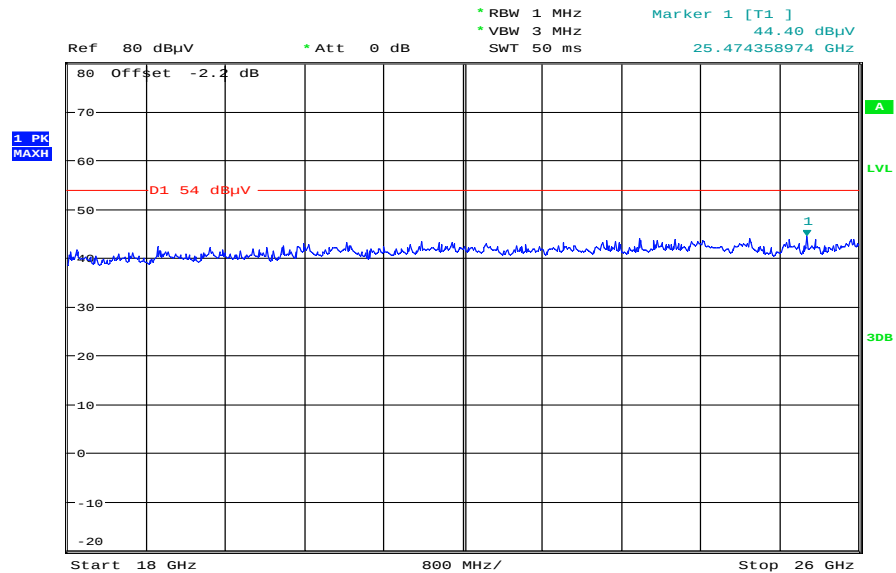


The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:32:04

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

Date: 11.JAN.2013 12:55:57

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

Common Information

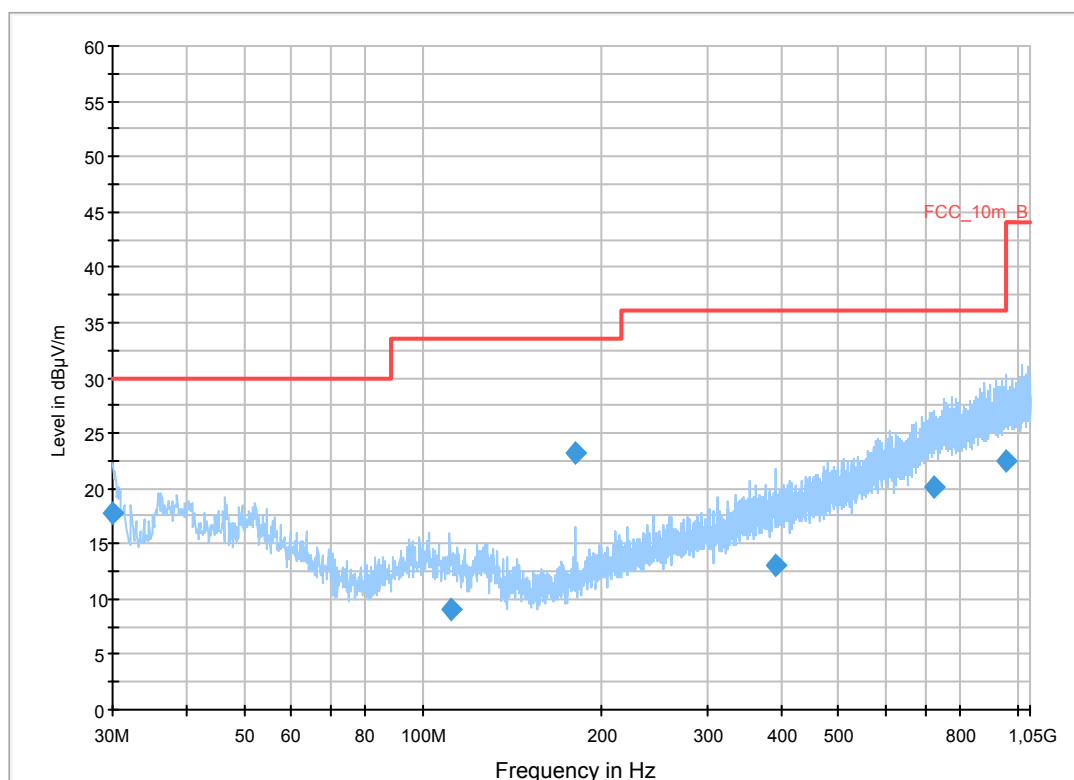
EUT: TM-0000-BV
 Serial Number: CB5A1MD99N
 Test Description: FCC part 15 class B @ 10m
 Operating Conditions: TX WLAN g-mode Ch. 6 + charging
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
30.109050	17.8	1000.0	120.000	142.0	V	100.0	12.5	12.2	30.0	
110.987250	9.1	1000.0	120.000	170.0	V	86.0	10.9	24.4	33.5	
180.025650	23.2	1000.0	120.000	98.0	V	85.0	10.4	10.3	33.5	
391.504200	13.1	1000.0	120.000	170.0	H	265.0	16.8	22.9	36.0	
721.448850	20.1	1000.0	120.000	170.0	V	190.0	23.0	15.9	36.0	
957.837300	22.4	1000.0	120.000	140.0	V	280.0	25.4	13.6	36.0	

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

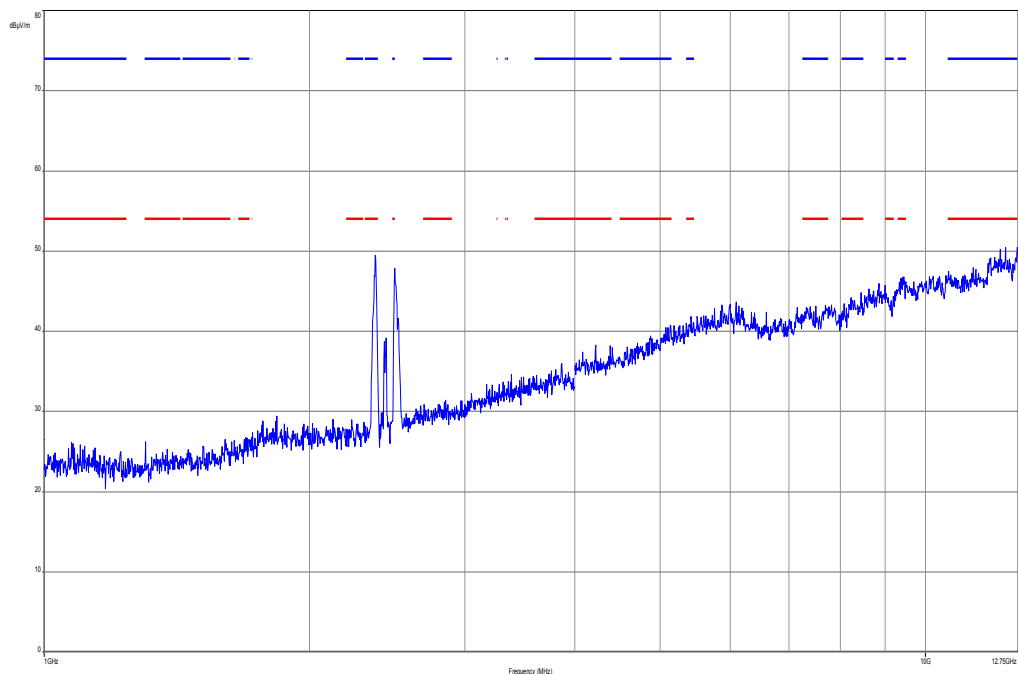
Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch
FW 1.0Antenna: 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 3.12Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

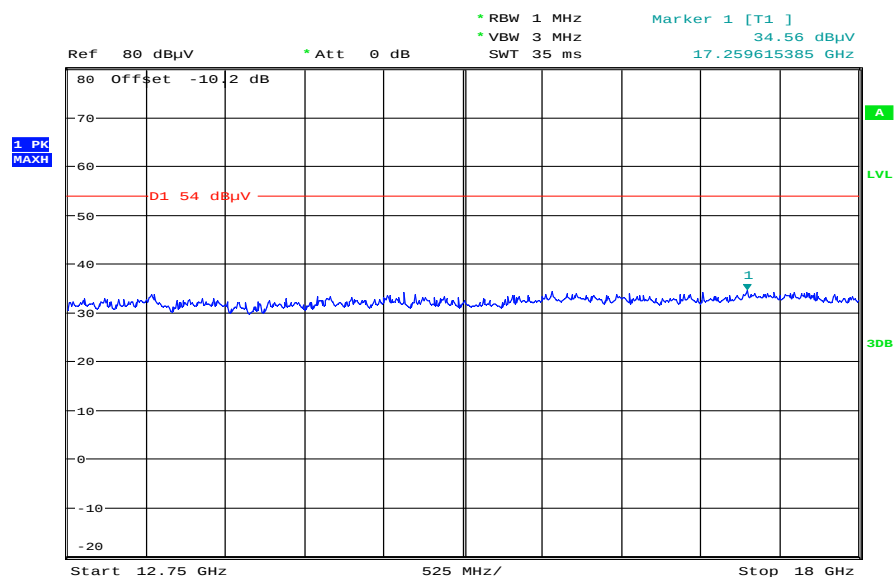
EMC 32 Version 8.52

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



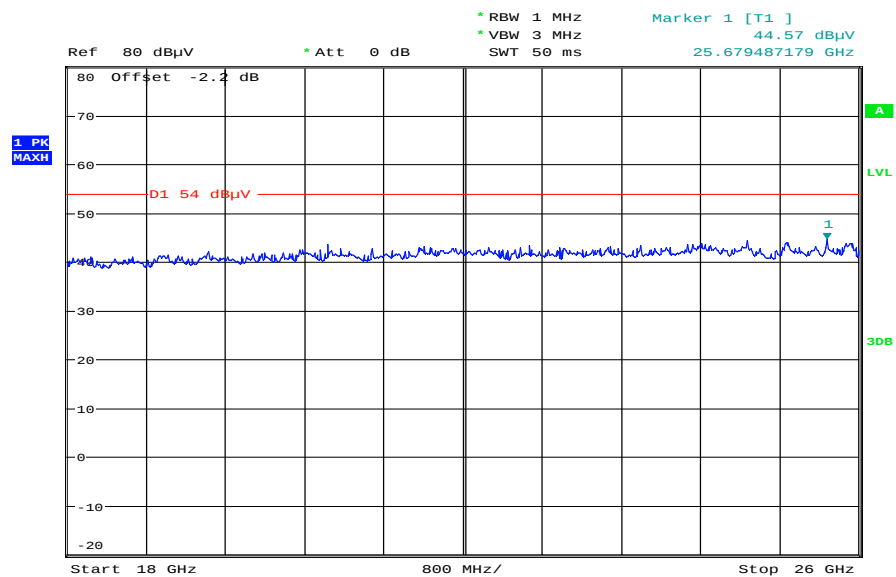
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:33:54

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



Date: 11.JAN.2013 12:56:57

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

Common Information

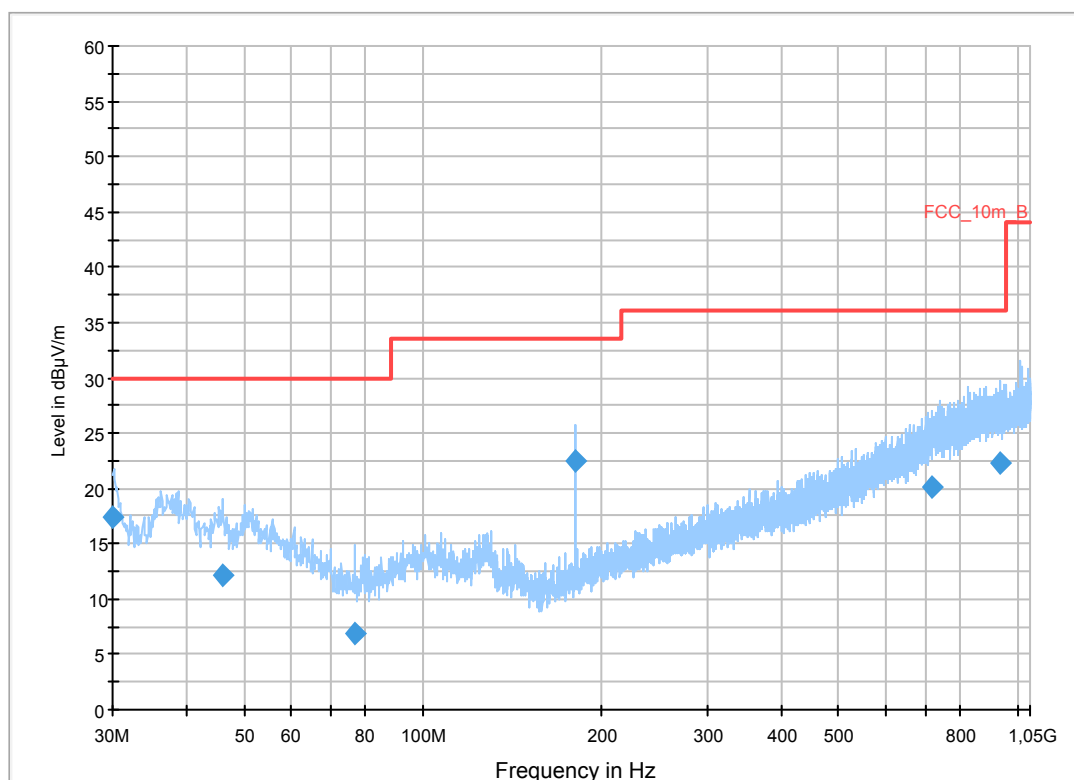
EUT: TM-0000-BV
Serial Number: CB5A1MD99N
Test Description: FCC part 15 class B @ 10m
Operating Conditions: TX WLAN g-mode Ch. 11 + charging
Operator Name: Hennemann
Comment: AC: 115 V / 60 Hz

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

FCC_10m(B)_3



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
30.110762	17.4	1000.0	120.000	111.0	V	0.0	12.5	12.6	30.0	
45.990450	12.1	1000.0	120.000	170.0	V	-5.0	13.3	17.9	30.0	
76.576800	7.0	1000.0	120.000	170.0	V	-5.0	9.1	23.0	30.0	
180.033750	22.5	1000.0	120.000	170.0	V	10.0	10.4	11.0	33.5	
717.705150	20.1	1000.0	120.000	98.0	V	267.0	22.9	15.9	36.0	
931.065600	22.3	1000.0	120.000	98.0	V	100.0	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

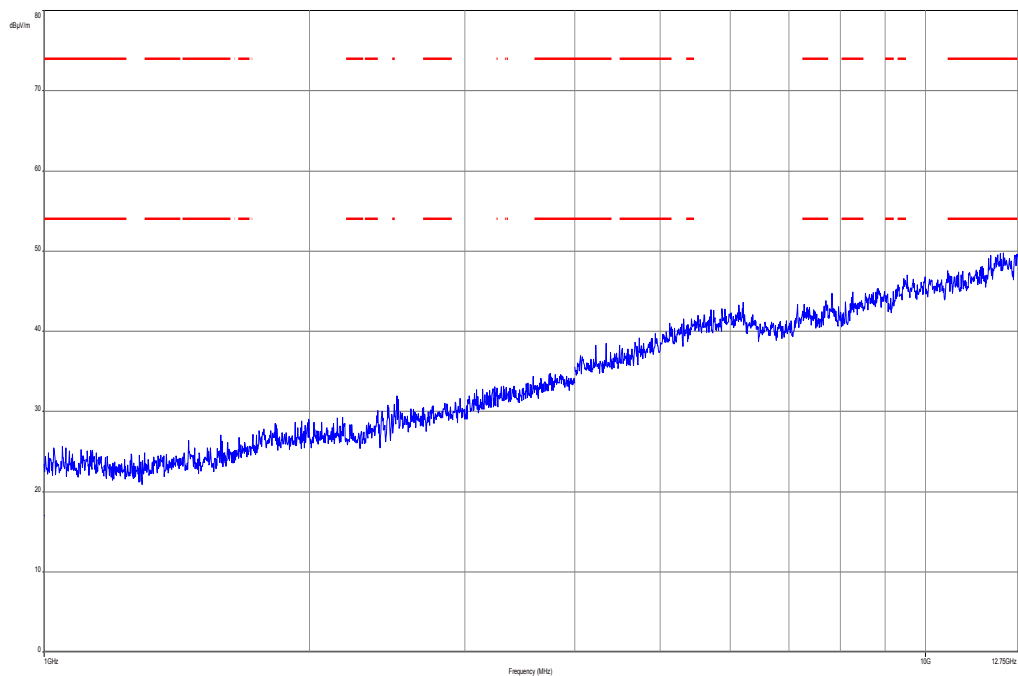
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

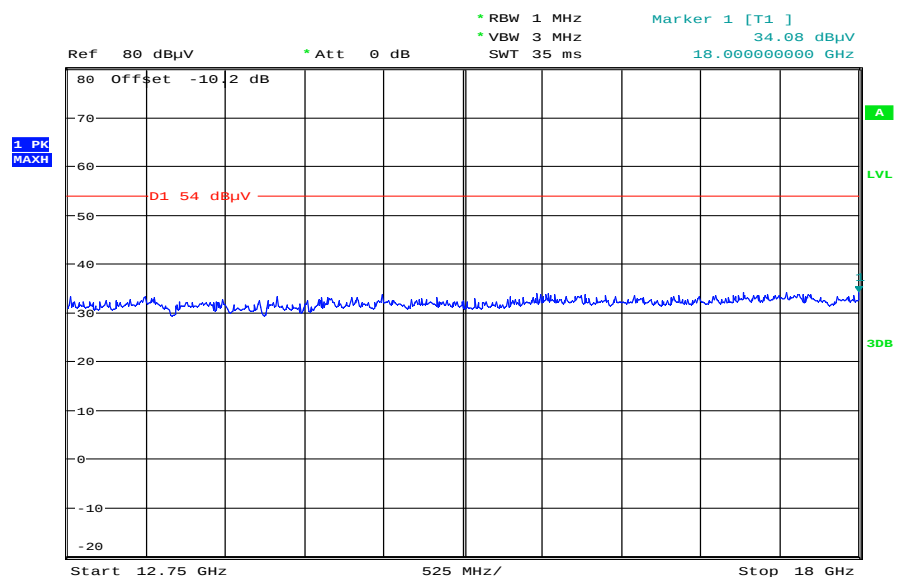
EMC 32 Version 8.52

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



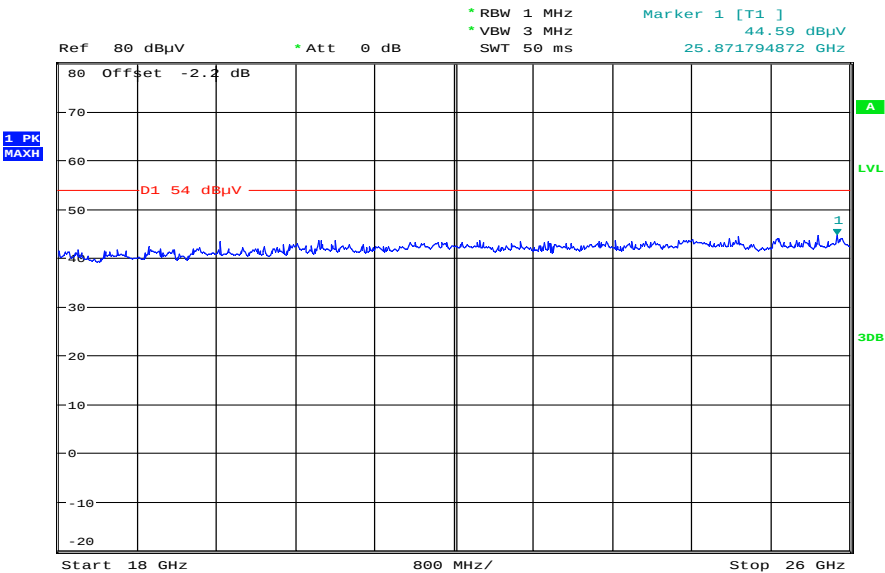
The carrier signal is notched with a 2.4 GHz band rejection filter.

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



Date: 11.JAN.2013 11:34:46

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



Date: 11.JAN.2013 12:58:54

9.11 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:	Sweep: 100 kHz Remeasurement: 10 Hz / 3 MHz
Span:	30 MHz to 25 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.		
Measurement uncertainty	± 3 dB	

Result: Passed.

Plots: RX / Idle – mode**Plot 1:** 30 MHz to 1 GHz, vertical & horizontal polarization**Common Information**

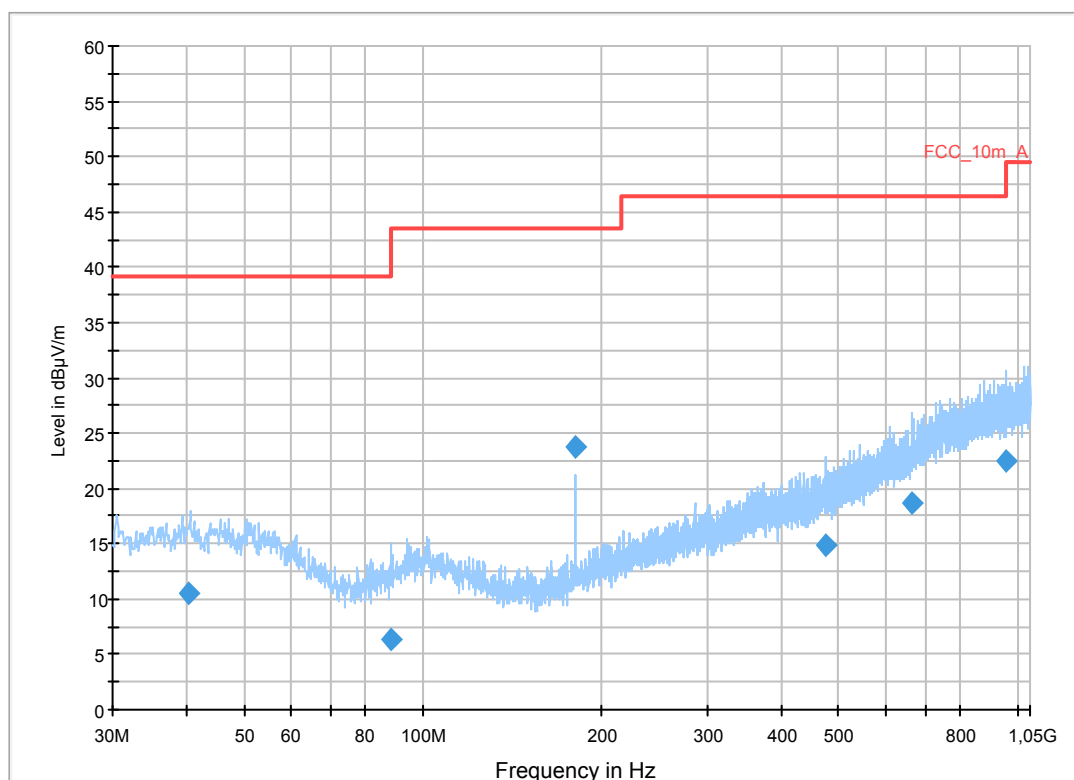
EUT: TM-0000-BV
 Serial Number: CB5A1MD99N
 Test Description: FCC part 15 class B @ 10m
 Operating Conditions: WLAN RX + charging
 Operator Name: Medrow
 Comment: AC: 115 V / 60 Hz

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

FCC_10m(A)_3



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
40.249350	10.5	1000.0	120.000	220.0	V	-39.0	13.4	28.6	39.1	
88.567350	6.3	1000.0	120.000	220.0	H	67.0	10.3	37.2	43.5	
179.984400	23.8	1000.0	120.000	132.0	V	230.0	10.4	19.7	43.5	
475.435950	14.8	1000.0	120.000	220.0	V	175.0	18.2	31.6	46.4	
664.126950	18.7	1000.0	120.000	220.0	V	9.0	21.5	27.7	46.4	
953.589450	22.6	1000.0	120.000	122.0	V	34.0	25.4	23.8	46.4	

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

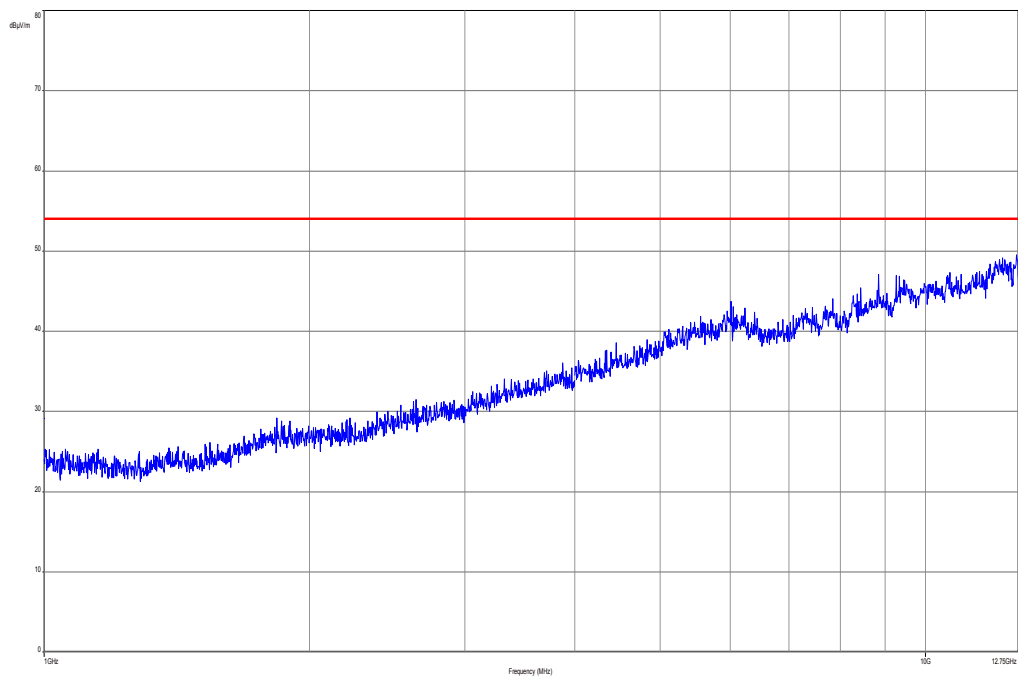
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

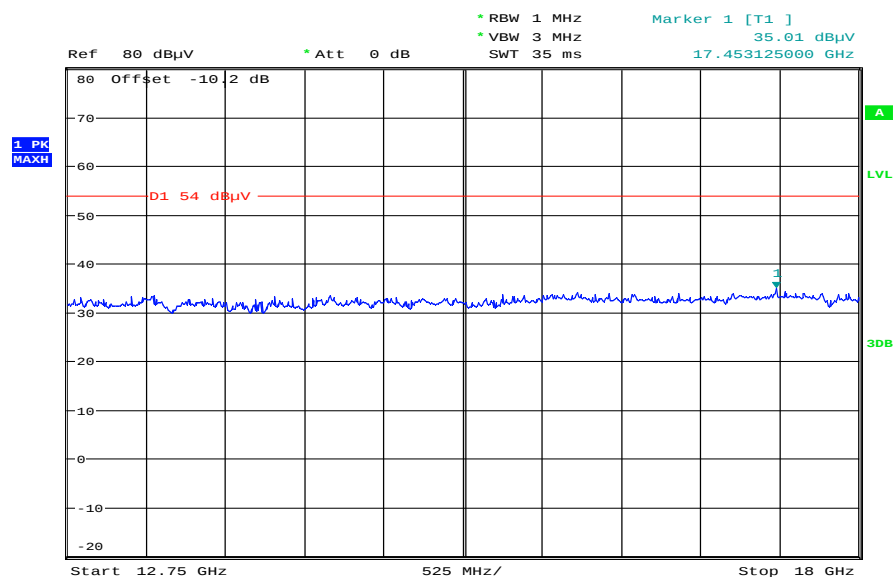
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

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

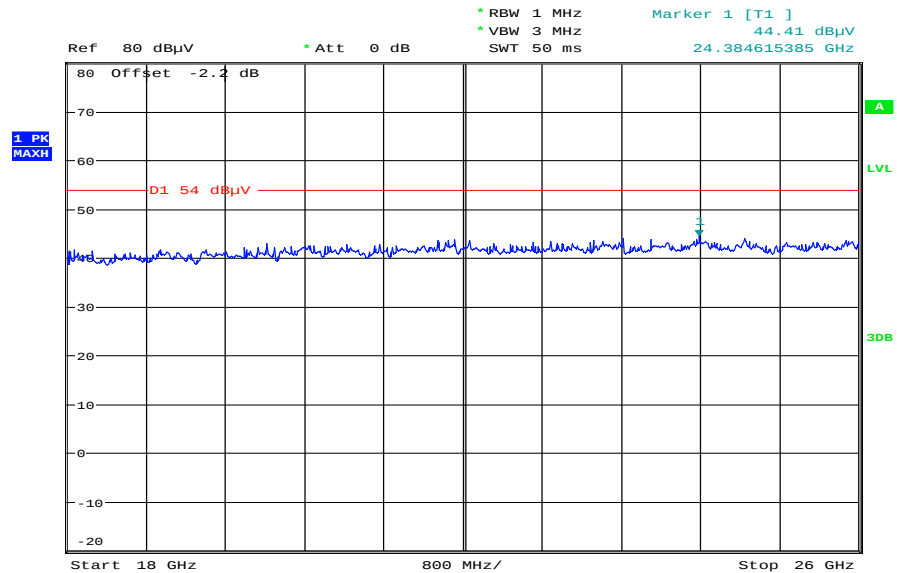


Plot 3: 12.75 GHz to 18 GHz, vertical & horizontal polarization



Date: 11.JAN.2013 11:41:52

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



Date: 11.JAN.2013 12:22:21

9.12 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 critical 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

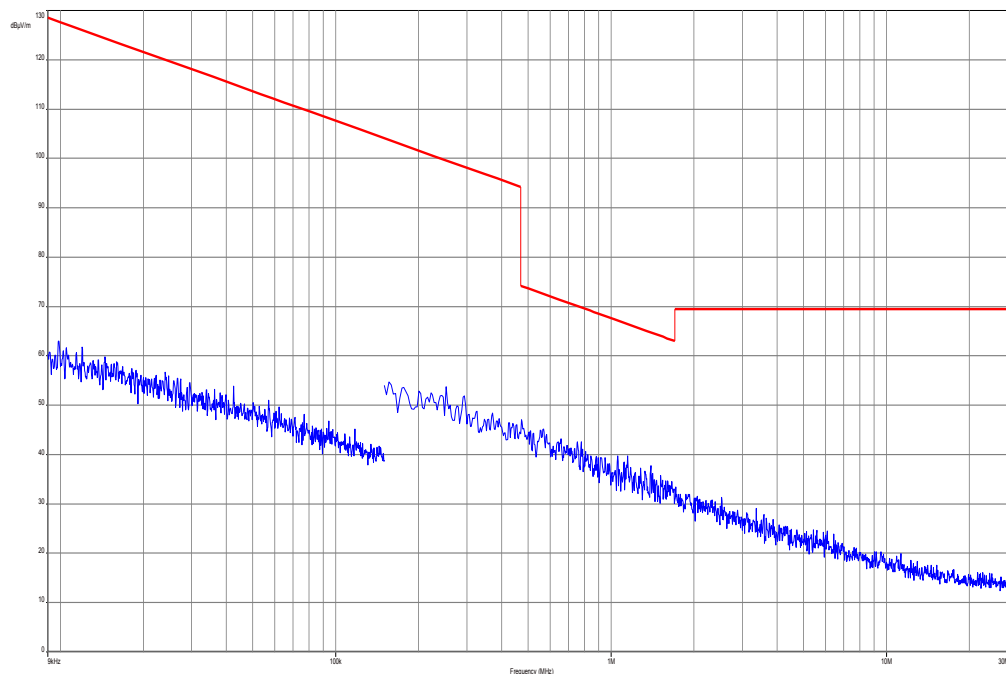
Results:

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

Result: Passed

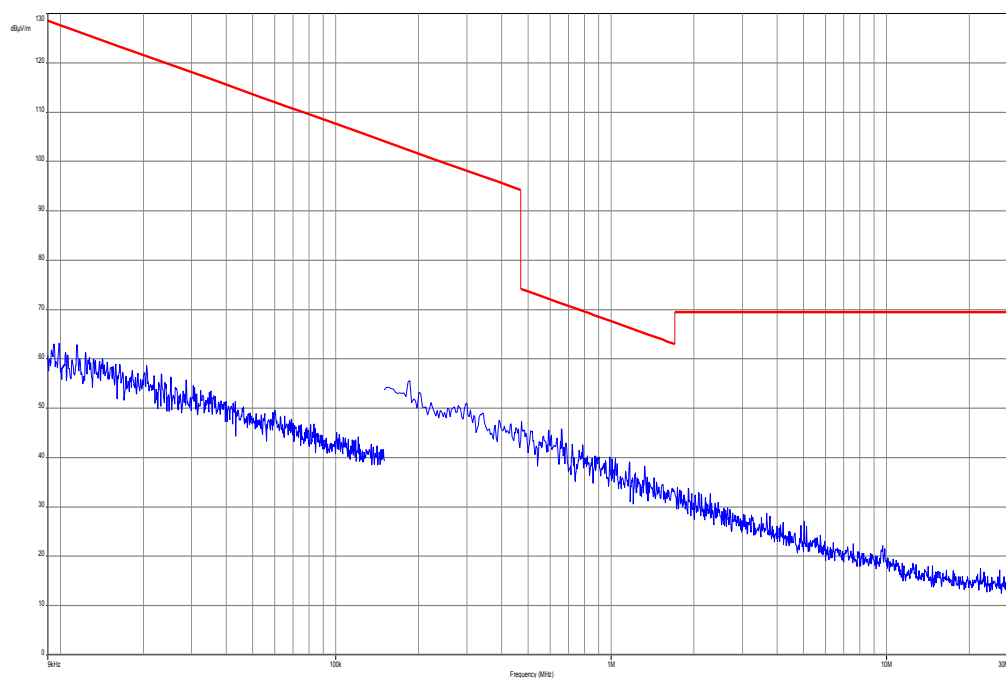
Plots: TX mode

Plot 1: 9 kHz to 30 MHz



Plots: RX / Idle – mode

Plot 1: 9 kHz to 30 MHz



9.13 Spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to channel 6. This measurement is repeated for DSSS and OFDM modulation. If critical 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.

Measurement:

Measurement parameter	
Detector:	Peak - Quasi Peak / Average
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 Conducted < 30 MHz		
Frequency (MHz)	Quasi-Peak (dBμV/m)	Average (dBμV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

*Decreases with the logarithm of the frequency

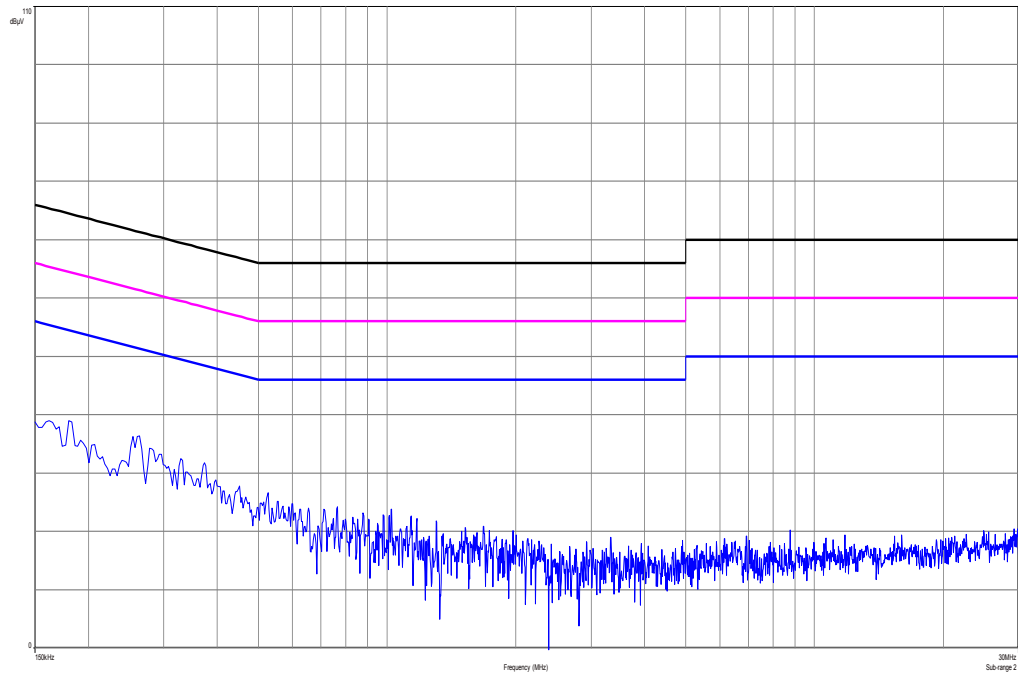
Results:

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

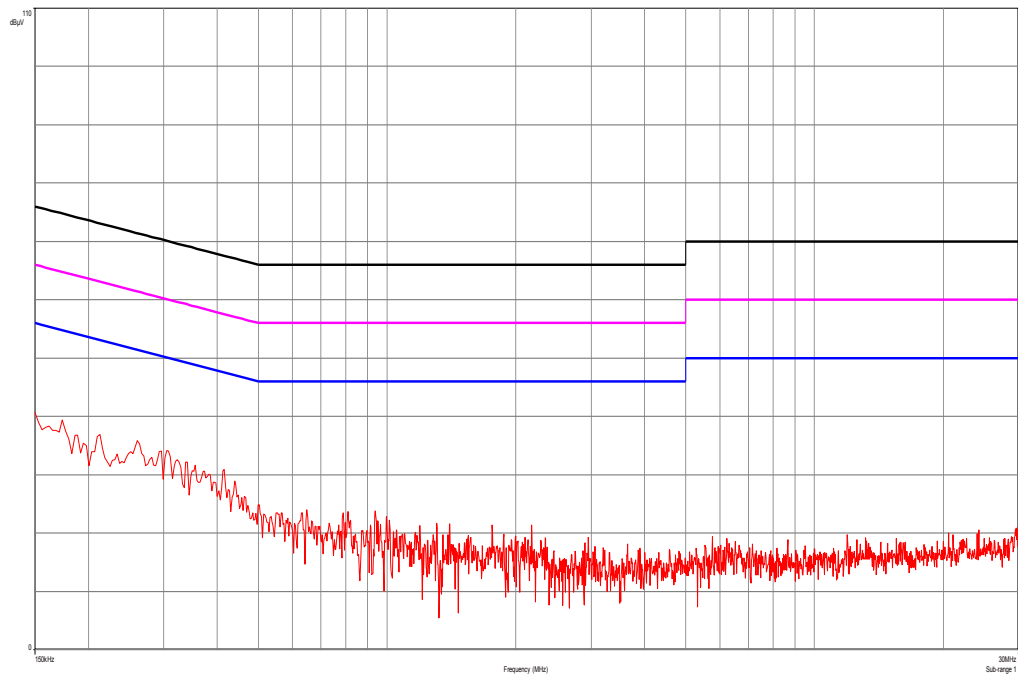
Result: Passed

Plots:

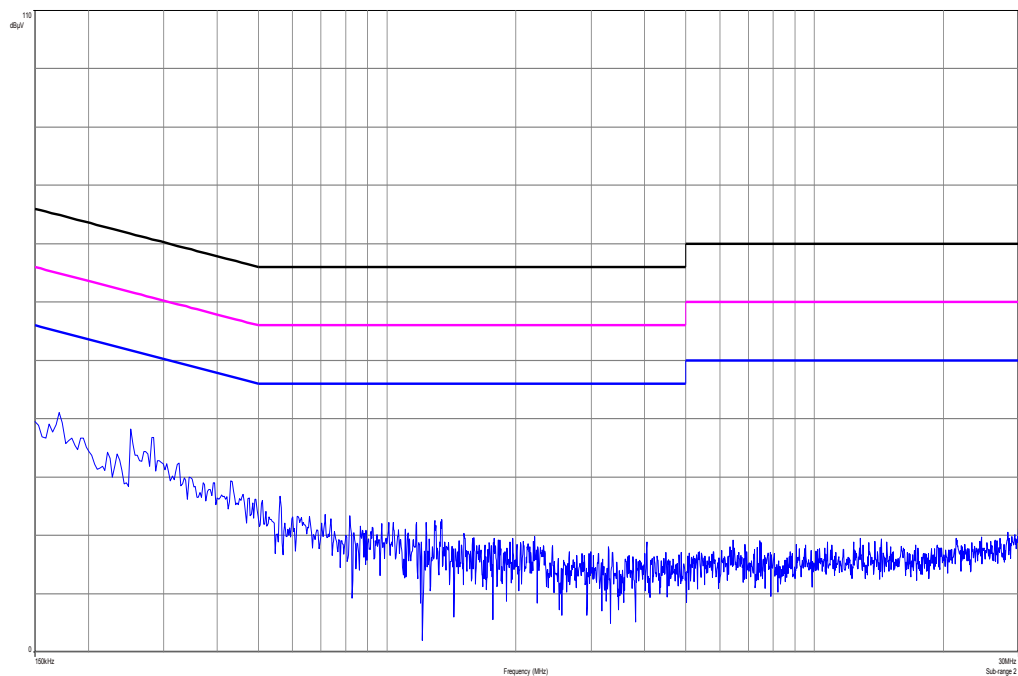
Plot 1: TX mode, 150 kHz to 30 MHz, phase line



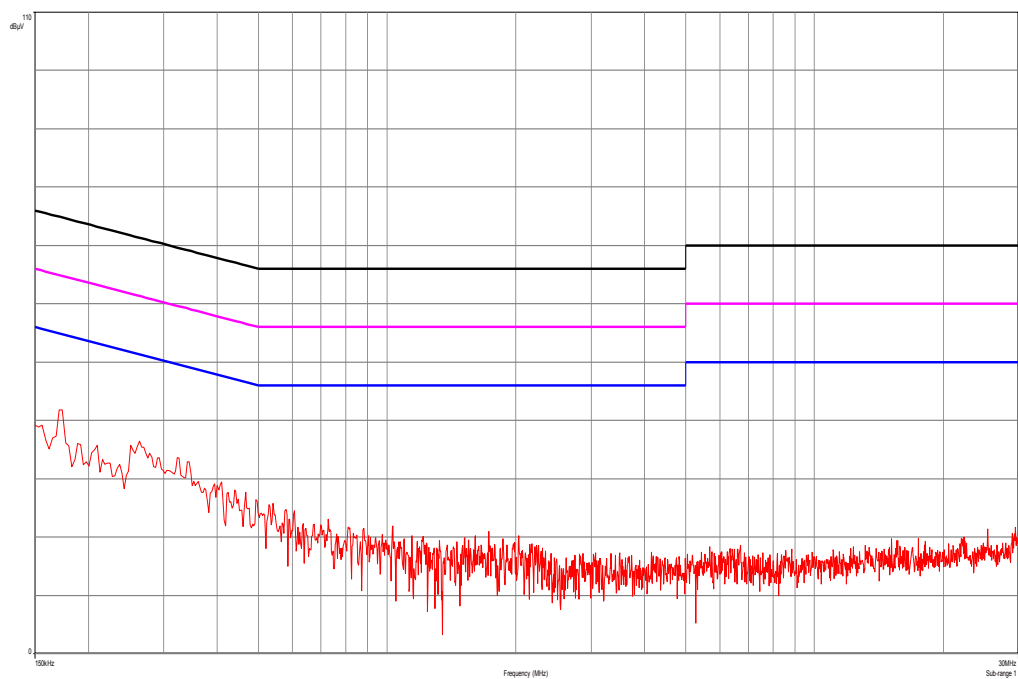
Plot 2: TX mode, 150 kHz to 30 MHz, neutral line



Plot 3: RX / Idle – mode, 150 kHz to 30 MHz, phase line



Plot 4: RX / Idle – mode, 150 kHz to 30 MHz, neutral line



10 Test equipment and ancillaries used for tests

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

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

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vKI!	11.05.2011	11.05.2013
2	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
3	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
4	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
5	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
6	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
7	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
8	n. a.	Band Reject filter	WRCG240 0/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
9	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vKI!	14.10.2011	14.10.2014
10	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	19.12.2011	
11	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
12	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
13	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
14	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
15	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
16	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081; B5979	300000210	ne		
17	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	04.01.2012	
18	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
19	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
20	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
21	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
22	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
23	n. a.	TRILOG	VULB9163	Schwarzbeck	295	300003787	k	12.04.2012	12.04.2014

		Broadband Test-Antenna 30 MHz - 3 GHz		ck					
24	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	06.01.2012	06.01.2014
25	11b	Microwave System Amplifier, 0.5- 26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
26	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
27	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		

Agenda: Kind of Calibration

k calibration / calibrated
 ne not required (k, ev, izw, zw not required)
 ev periodic self verification
 Ve long-term stability recognized
 vlkl! Attention: extended calibration interval
 NK! Attention: not calibrated

EK limited calibration
 zw cyclical maintenance (external cyclical maintenance)
 izw internal cyclical maintenance
 g blocked for accredited testing
 *) next calibration ordered / currently in progress

11 Observations

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

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-02-15

Annex E 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 F Accreditation Certificate



Front side of certificate



Back side of certificate

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/fileadmin/de/CETECOM_D_Saarbruecken/accreditations_Jan_2010/DAKKS_Akkredi_Urk_EN17025-En_incl_Annex.pdf