

TEST REPORT

Test report no.: 1-4254/12-26-10-A



Testing laboratory

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Accredited Testing Laboratory:
 The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
 The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
 Area of Testing: Radio/Satellite Communications

Applicant

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 Fax: +46 46 19 32 95
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 Phone: +46 46 19 35 59

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: GSM Mobile Phone GPRS/EGPRS 850/900/1800/1900; UMTS
 FDDI/FDDII/FDDIV/FDDV/FDDVIII; HSPA; BT3.1; WLAN a/b/g/n; AGPS; RFID, FM Rx

Model name: PM-0030-BV

FCC ID: PY7PM-0030

IC: 4170B-PM0030

Frequency: ISM band 5725 MHz to 5850 MHz
 (lowest channel 149 – 5745 MHz, highest channel 165 – 5825 MHz)

Technology tested: WLAN (OFDM a, n HT20 & n HT40)

Antenna: Integrated antenna

Power Supply: 3.7 V DC by Li-polymer battery

Temperature Range: -20°C to +55 °C

Test report authorised:

2012-08-30 Andreas Luckenbill

Test performed:

2012-08-30 Tobias Wittenmeier

1 Table of contents	
1	Table of contents2
2	General information3
2.1	Notes and disclaimer3
2.2	Application details.....3
3	Test standard/s3
4	Test environment.....4
5	Test item4
6	Test laboratories sub-contracted4
7	Summary of measurement results5
8	RF measurements6
8.1	Description of test setup6
8.1.1	Radiated measurements.....6
8.1.2	Conducted measurements.....7
8.2	Additional comments7
8.3	RSP100 test report cover sheet / performance test data8
9	Measurement results.....9
9.1	Output power verification (conducted)9
9.2	Antenna gain9
9.3	Maximum output power10
9.4	Power spectral density12
9.5	Spectrum bandwidth – 6 dB / 75 % power bandwidth (EBW)12
9.6	Spectrum bandwidth – 20 dB / 99 % power bandwidth12
9.7	Band edge compliance conducted12
9.8	Band edge compliance radiated12
9.9	TX spurious emissions conducted12
9.10	TX spurious emissions radiated.....13
9.11	RX spurious emissions radiated35
9.12	TX spurious emissions radiated < 30 MHz40
9.13	TX spurious emissions conducted < 30 MHz.....42
10	Test equipment and ancillaries used for tests45
11	Observations46
Annex A	Photographs of the test setup47
Annex B	External photographs of the EUT51
Annex C	Internal photographs of the EUT54
Annex D	Document history61
Annex E	Further information.....61
Annex F	Accreditation Certificate62

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:	2012-04-27
Date of receipt of test item:	2012-08-06
Start of test:	2012-08-06
End of test:	2012-08-10
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
DTS : KDB 558074	2012-01	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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:		56 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li-polymer battery
	V_{max}	-/-
	V_{min}	-/-

5 Test item

Kind of test item	:	GSM Mobile Phone GPRS/EGPRS 850/900/1800/1900; UMTS FDDI/FDDII/FDDIV/FDDV/FDDVIII; HSPA; BT3.1; WLAN a/b/g/n; AGPS; RFID, FM Rx
Type identification	:	PM-0030-BV
S/N serial number	:	Rad. CB511ZY9L6, CB511ZY9PB
HW hardware status	:	AP 1.2
SW software status	:	7.0.A.1.107
Frequency band [MHz]	:	ISM band 5725 MHz to 5850 MHz (lowest channel 149 – 5745 MHz, highest channel 165 – 5825 MHz)
Type of radio transmission	:	OFDM
Use of frequency spectrum	:	
Channel access method	:	FDMA
Type of modulation	:	QPSK, 16-QAM, 64-QAM
Number of channels	:	a & n HT20 – mode: 5 n HT40 – mode: 2
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by Li-polymer 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	2012-08-30	Only radiated measurement!

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	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth - 6dB bandwidth	Nominal	Nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(2) RSS 210 / A8.2(a)	Spectrum bandwidth - 20dB bandwidth	Nominal	Nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(b)(3) RSS-210 / A8.4(4)	Maximum output power	Nominal	Nominal	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	OFDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	OFDM	<input checked="" 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	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	OFDM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurements

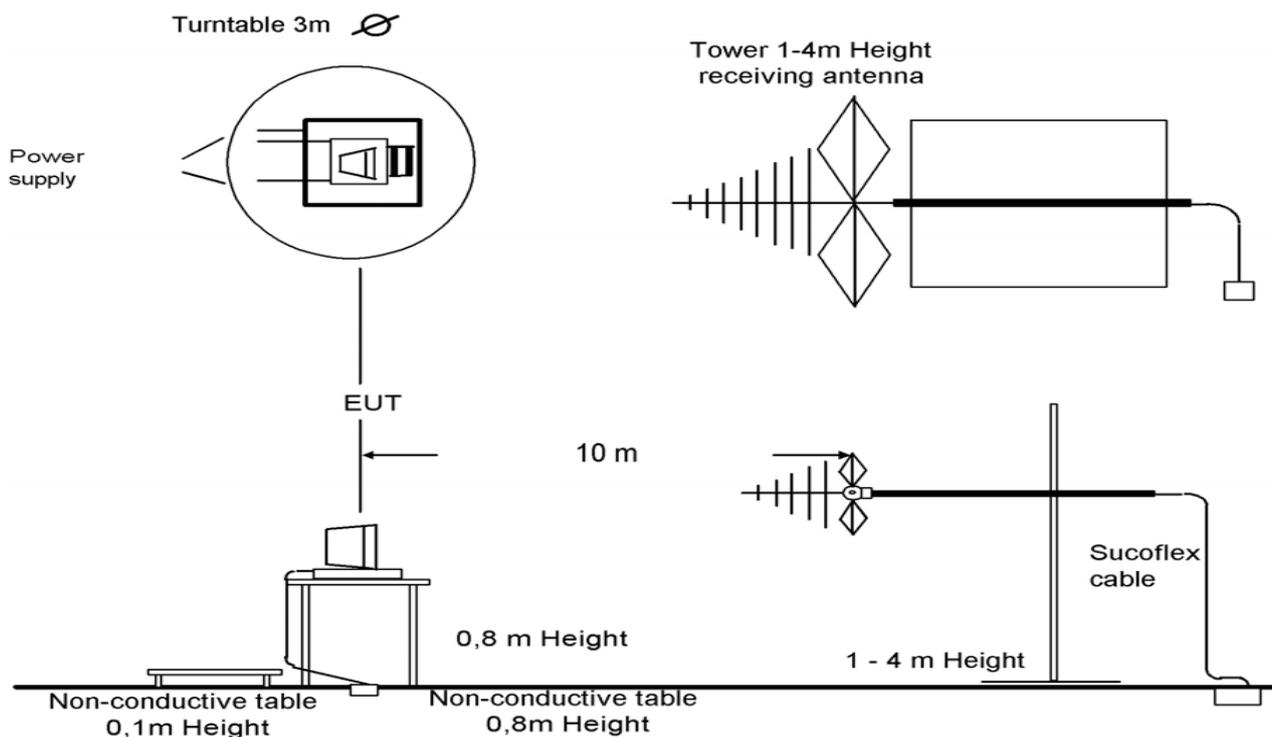
8.1 Description of test setup

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 C63.4-2003 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 C63-4-2003 clause 4.2.

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

Semi anechoic chamber



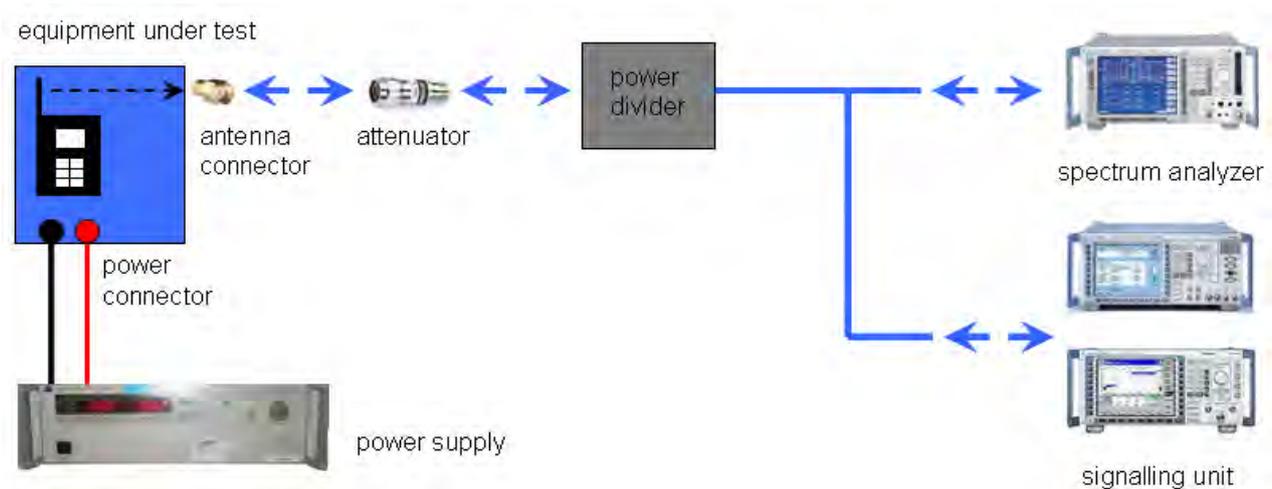
Picture 1: Diagram radiated measurements

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.
lperf was used to ping another device with the largest support packet size
- Special software is used.
EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

Test report number	:	1-4254/12-26-10-A and 1-4254/12-16-14
Equipment model number	:	PM-0030-BV
Certification number	:	4170B-PM0030
Manufacturer (complete address)	:	Sony Mobile Communications AB Nya Vattentornet 22188 Lund / SWEDEN
Tested to radio standards specification no.	:	RSS 210, Issue 8
Open area test site IC No.	:	IC 3462C-1
Frequency range	:	ISM band 5725 MHz to 5825 MHz (lowest channel 5745 MHz, highest channel 5825 MHz)
RF-power [W] (max.)	:	Conducted output power: 98.63 mW (OFDM / a – mode) 91.62 mW (OFDM / n – mode HT20) 123.59 mW (OFDM / n – mode HT40) Radiated output power: 60.3 mW (OFDM / a – mode) 60.3 mW (OFDM / n – mode HT20) 60.3 mW (OFDM / n – mode HT40)
Occupied bandwidth (99%-BW) [kHz]	:	OFDM / a – mode: 18.27 MHz OFDM / n – mode HT20: 18.51 MHz OFDM / n – mode HT40: 36.41 MHz
Type of modulation	:	QPSK, 16 – QAM, 64 – QAM
Emission designator (TRC-43)	:	18M3G7D (OFDM / a – mode) 18M5G7D (OFDM / n – mode HT20) 36M4G7D (OFDM / n – mode HT40)
Antenna information	:	Integrated antenna
Transmitter spurious (worst case) [dB μ V/m @ 3m]:		49 dB μ V/m (noise floor)
Receiver spurious (worst case) [dB μ V/m @ 3m]:		49 dB μ V/m (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:

2012-08-30
Date

Tobias Wittenmeier
Name


Signature

9 Measurement results

9.1 Output power verification (conducted)

Not performed!

9.2 Antenna gain

Not performed!

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:	5 s
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)

Limits:

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

Results: OFDM / a – mode

OFDM / a – mode Frequency	Maximum Output Power [dBm]		
	5745 MHz	5785 MHz	5825 MHz
Peak Output Power Conducted	-/-	-/-	-/-
Output Power Radiated – EIRP	17.8	17.7	17.7
Measurement uncertainty	$\pm 1.5 \text{ dB (cond.)} / \pm 3 \text{ dB (rad.)}$		

Result: **Passed**

Results: OFDM / n – mode HT20

OFDM / n – mode Ht20 Frequency	Maximum Output Power [dBm]		
	5745 MHz	5785 MHz	5825 MHz
Peak Output Power Conducted	-/-	-/-	-/-
Output Power Radiated – EIRP	17.8	17.8	17.7
Measurement uncertainty	± 1.5 dB (cond.) / ± 3 dB (rad.)		

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

OFDM / n – mode Ht40 Frequency	Maximum Output Power [dBm]		
	5755 MHz	5795 MHz	-/-
Peak Output Power Conducted	-/-	-/-	-/-
Output Power Radiated – EIRP	17.8	16.6	-/-
Measurement uncertainty	± 1.5 dB (cond.) / ± 3 dB (rad.)		

Result: Passed

9.4 Power spectral density

Not performed!

9.5 Spectrum bandwidth – 6 dB / 75 % power bandwidth (EBW)

Not performed!

9.6 Spectrum bandwidth – 20 dB / 99 % power bandwidth

Not performed!

9.7 Band edge compliance conducted

Not applicable! No restricted band close to used band!

9.8 Band edge compliance radiated

Not applicable! No restricted band close to used band!

9.9 TX spurious emissions conducted

Not performed!

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	<input checked="" type="checkbox"/> OFDM a – mode <input checked="" type="checkbox"/> OFDM n – mode HT20 <input checked="" type="checkbox"/> OFDM n – mode HT40

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		
<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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</p>		
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: OFDM / a – mode

TX Spurious Emissions Radiated [dBµV/m]								
OFDM / a – mode								
5745 MHz			5785 MHz			5825 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.		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / n – mode HT20

TX Spurious Emissions Radiated [dBµV/m]								
OFDM / n – mode HT20								
5745 MHz			5785 MHz			5825 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.		
Measurement uncertainty			± 3 dB					

Result: Passed

Results: OFDM / n – mode HT40

TX Spurious Emissions Radiated [dBµV/m]								
OFDM / n – mode HT40								
5755 MHz			5795 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.			-/-		
Measurement uncertainty			± 3 dB					

Result: Passed

Plots: OFDM / a, n – mode HT20 (worst case)

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

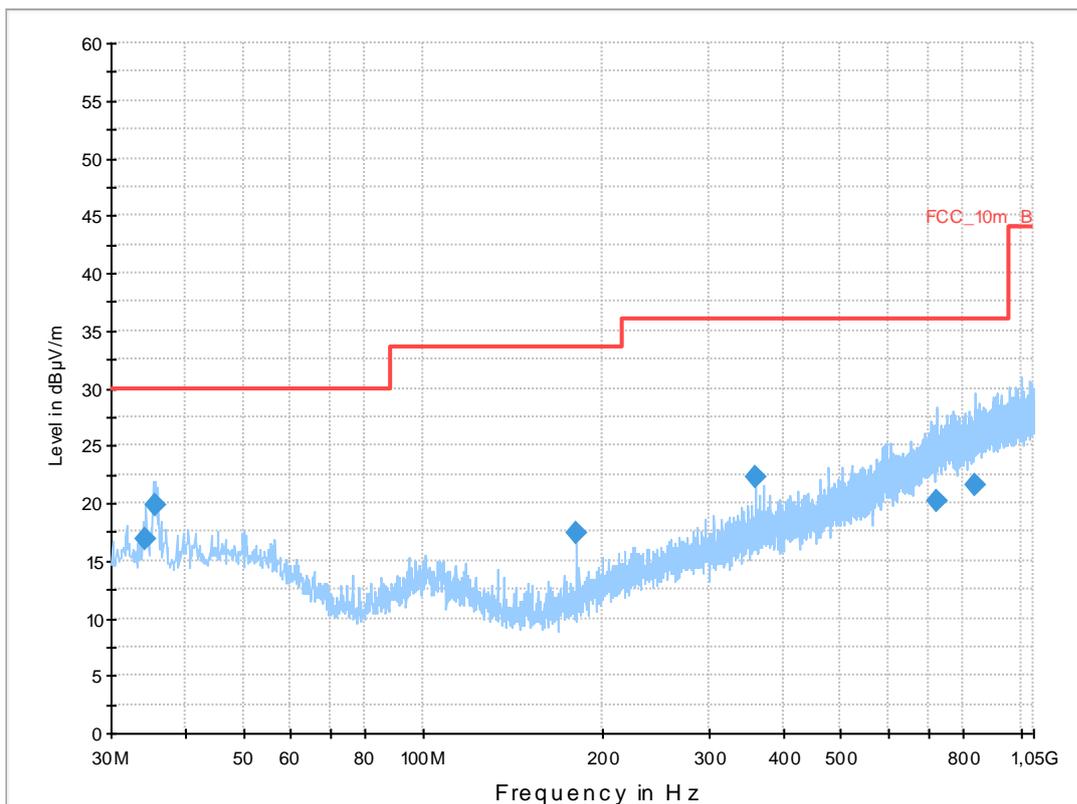
Common Information

EUT: PM-0030-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: TX WLAN n-mode HT20, CH 149 + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

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

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



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
34.288050	16.9	1000.0	120.000	170.0	V	85.0	13.0	13.1	30.0	
35.672250	19.8	1000.0	120.000	105.0	V	-5.0	13.1	10.2	30.0	
180.012600	17.3	1000.0	120.000	98.0	V	265.0	10.4	16.2	33.5	
360.013500	22.3	1000.0	120.000	98.0	V	178.0	16.2	13.7	36.0	
723.529350	20.2	1000.0	120.000	132.0	V	190.0	23.1	15.8	36.0	
837.015000	21.5	1000.0	120.000	144.0	H	100.0	24.4	14.5	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

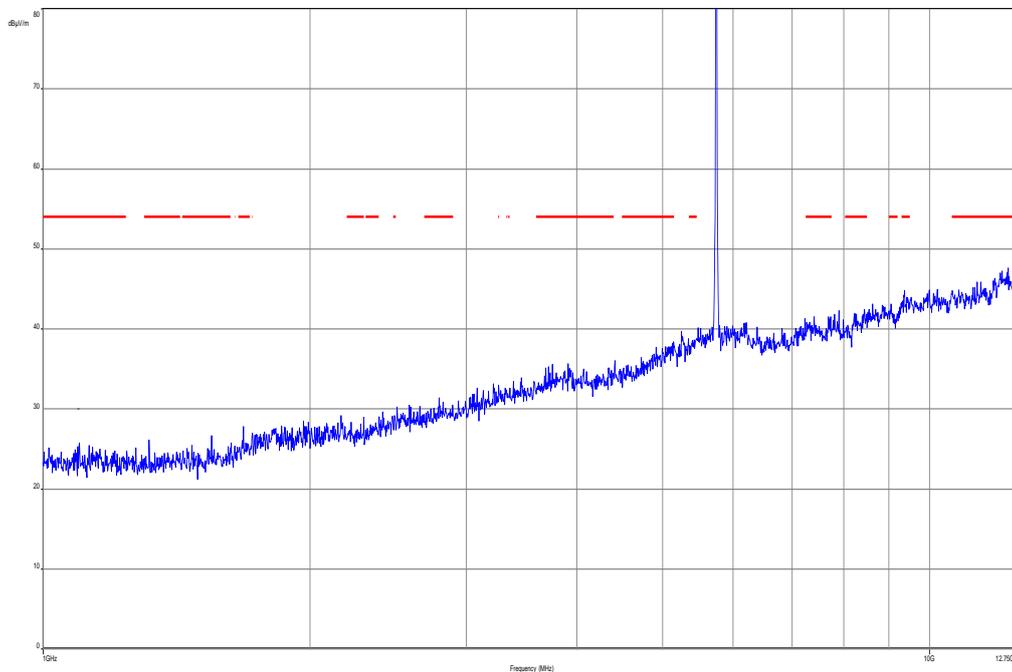
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

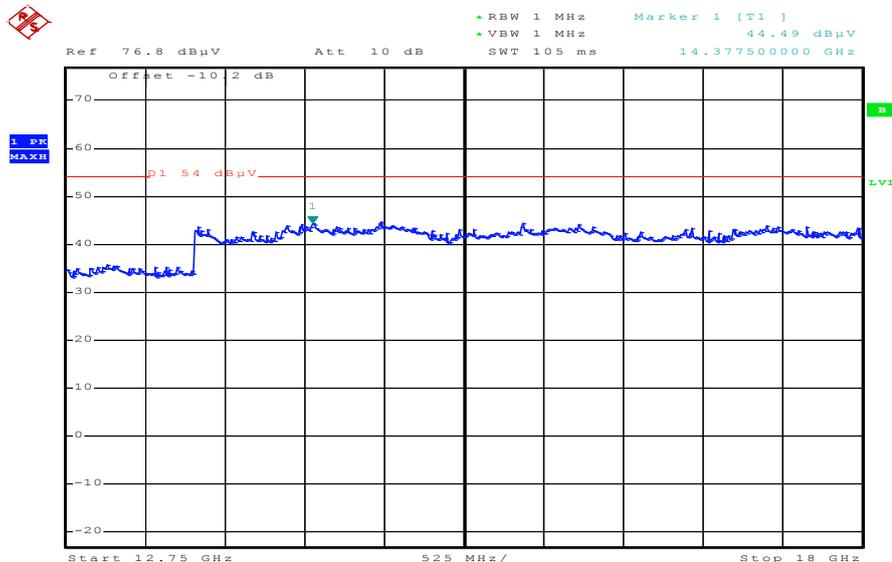
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

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

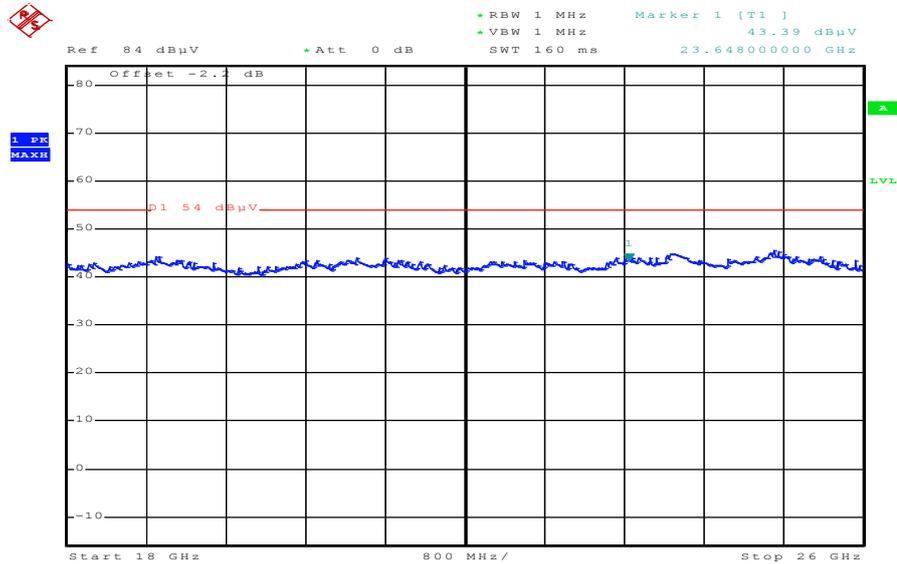


Plot 3: Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



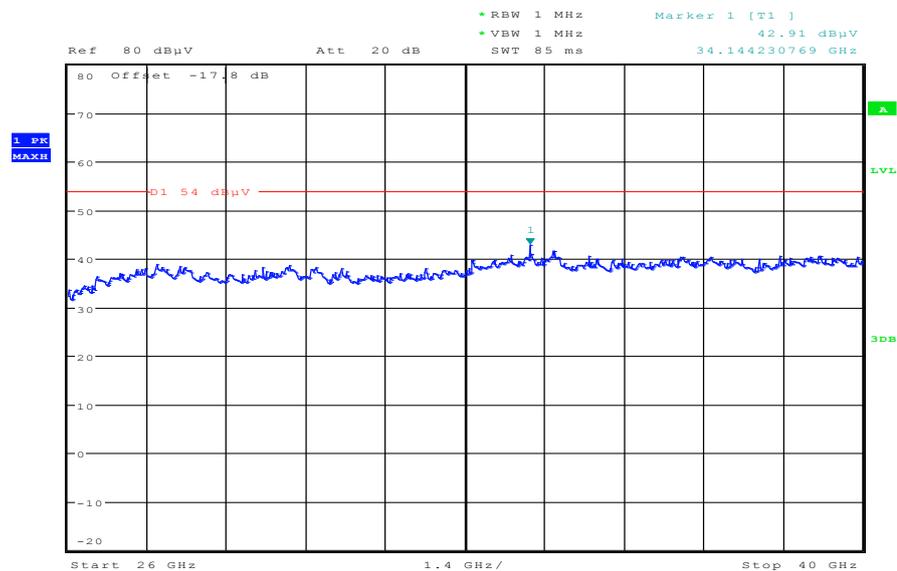
Date: 8.AUG.2012 13:54:28

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



Date: 8.AUG.2012 13:37:16

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



Date: 8.AUG.2012 13:46:20

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

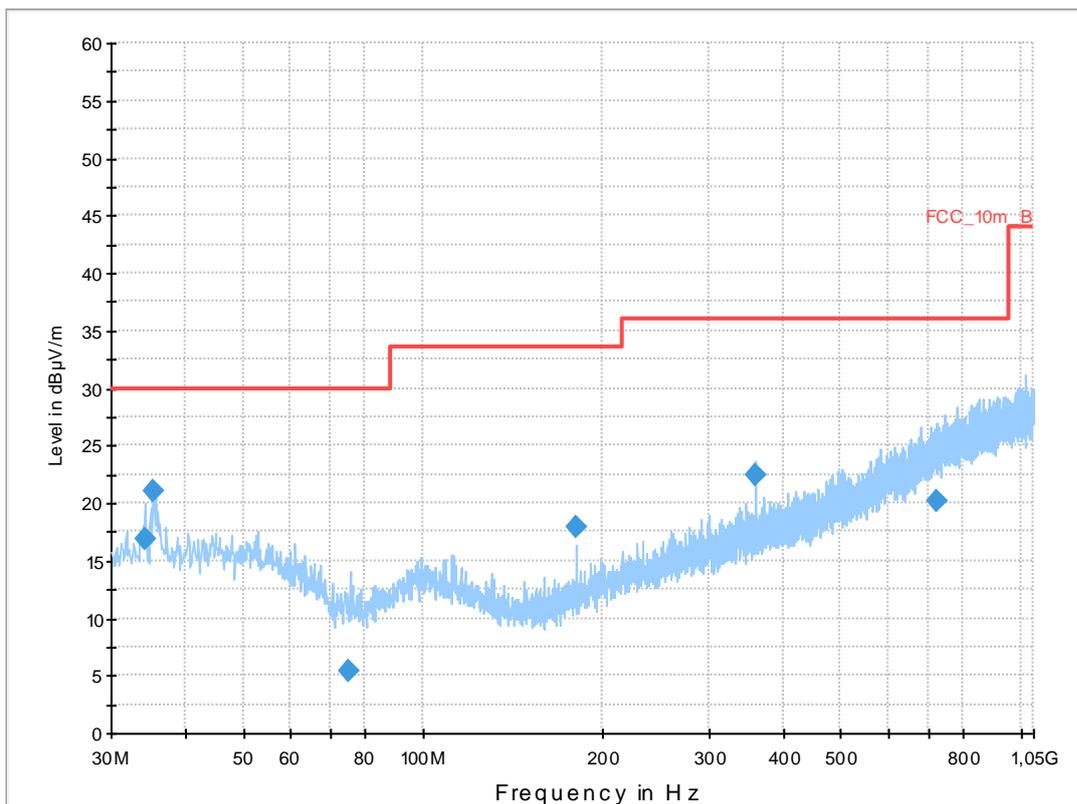
Common Information

EUT: PM-0030-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: TX WLAN n-mode HT20, CH 157 + charging
 Operator Name: Wolsdorfer
 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



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
34.299300	16.9	1000.0	120.000	170.0	V	-10.0	13.0	13.1	30.0	
35.315850	21.0	1000.0	120.000	98.0	V	265.0	13.1	9.0	30.0	
75.246750	5.5	1000.0	120.000	170.0	H	86.0	9.2	24.5	30.0	
180.006600	18.0	1000.0	120.000	98.0	V	-3.0	10.4	15.5	33.5	
360.001800	22.4	1000.0	120.000	98.0	V	-10.0	16.2	13.6	36.0	
724.328850	20.2	1000.0	120.000	98.0	V	170.0	23.1	15.8	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

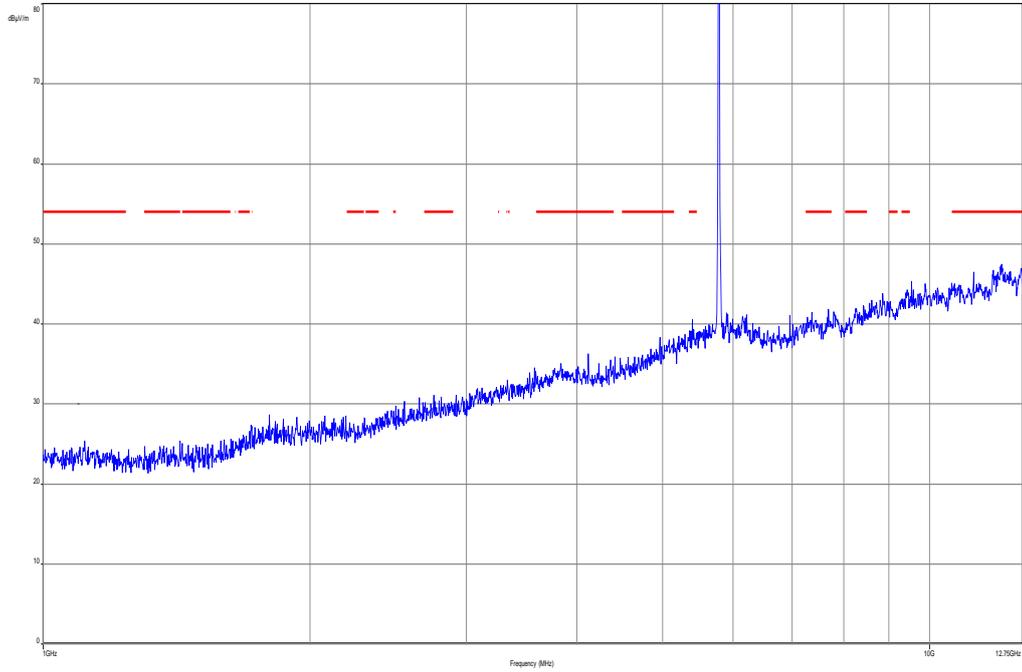
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

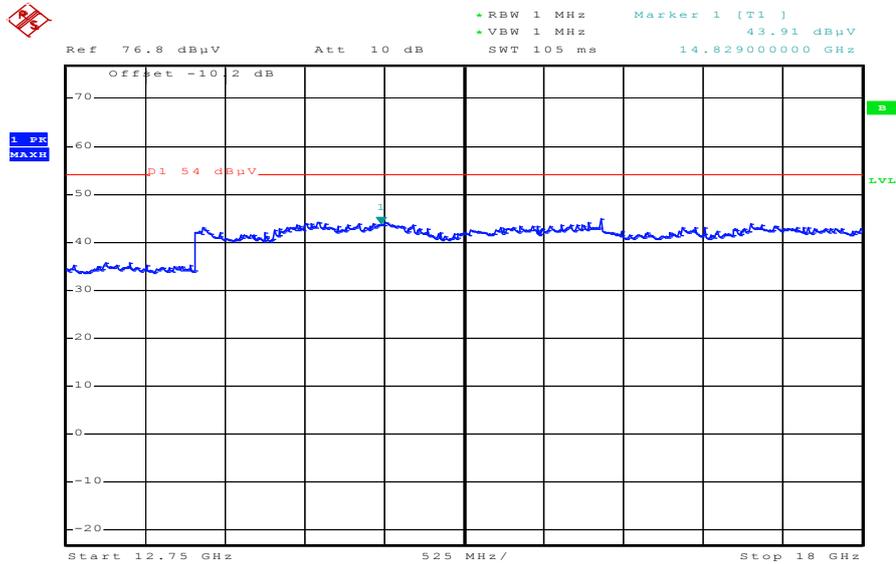
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

Plot 7: Middle channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization

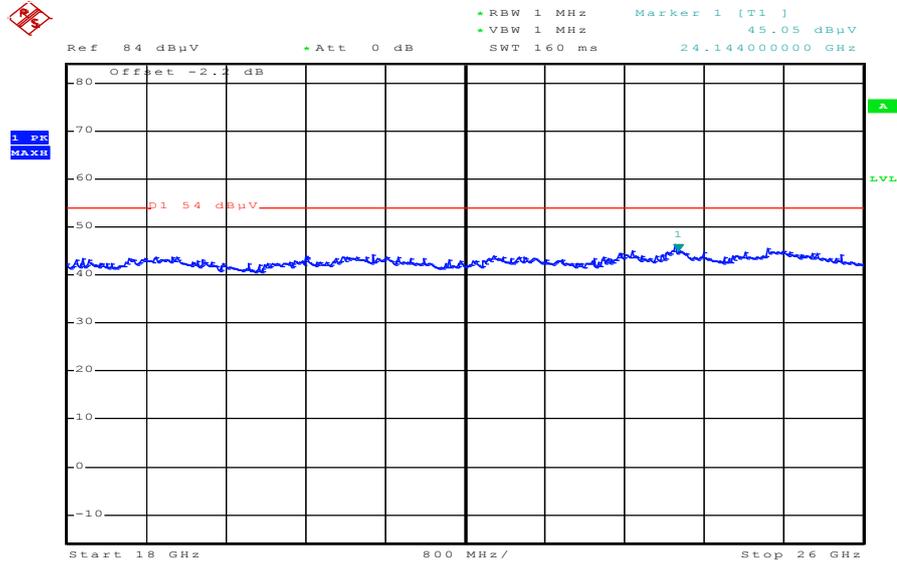


Plot 8: Middle channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



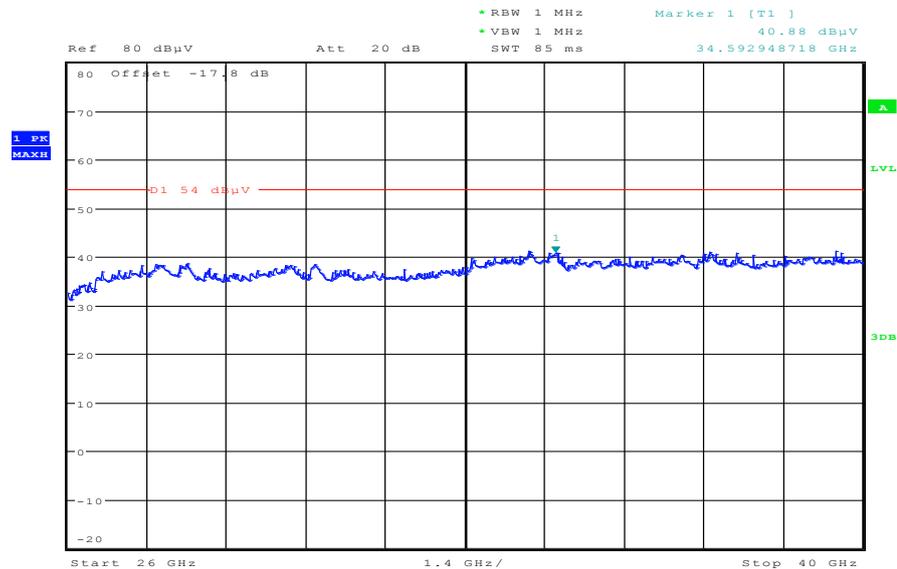
Date: 8.AUG.2012 13:52:34

Plot 9: Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 15:24:20

Plot 10: Middle channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 13:44:02

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

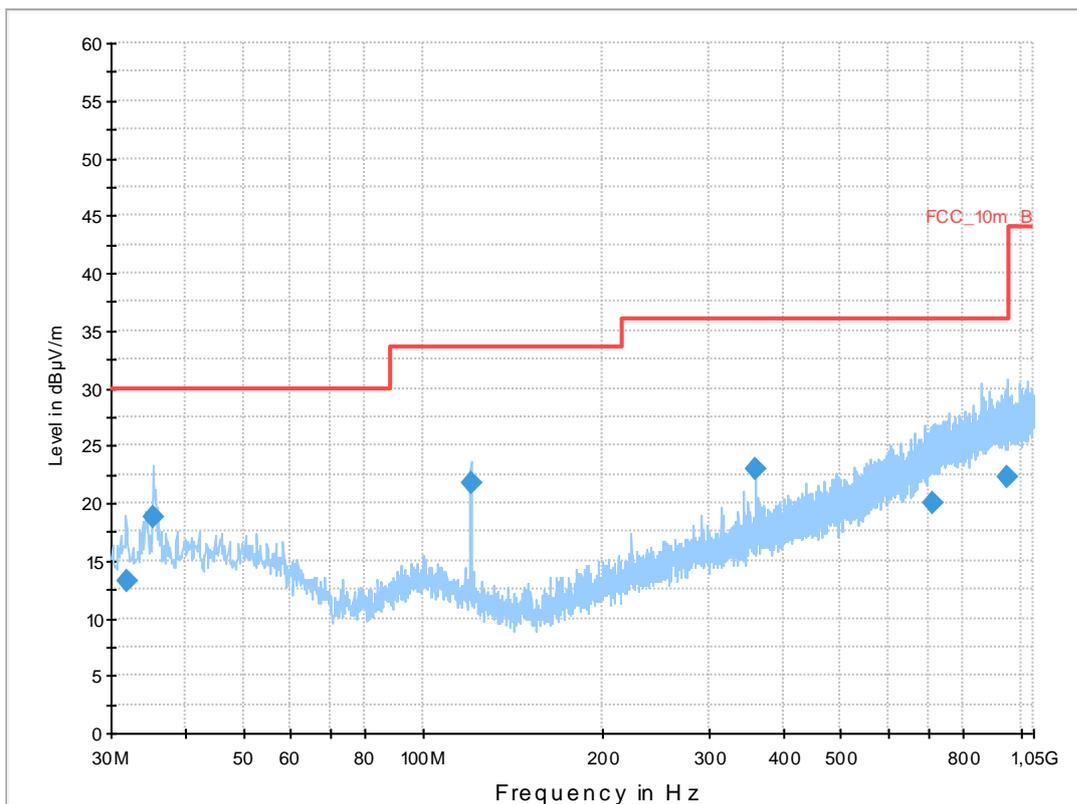
Common Information

EUT: PM-0030-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: TX WLAN n-mode HT20, CH 165 + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz

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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
31.953600	13.1	1000.0	120.000	170.0	V	180.0	12.7	16.9	30.0	
35.281350	18.9	1000.0	120.000	170.0	V	190.0	13.0	11.1	30.0	
120.010950	21.7	1000.0	120.000	170.0	V	270.0	10.2	11.8	33.5	
359.996250	22.9	1000.0	120.000	98.0	V	90.0	16.2	13.1	36.0	
714.750150	20.1	1000.0	120.000	170.0	H	280.0	22.8	15.9	36.0	
947.997750	22.3	1000.0	120.000	170.0	H	-5.0	25.3	13.7	36.0	

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

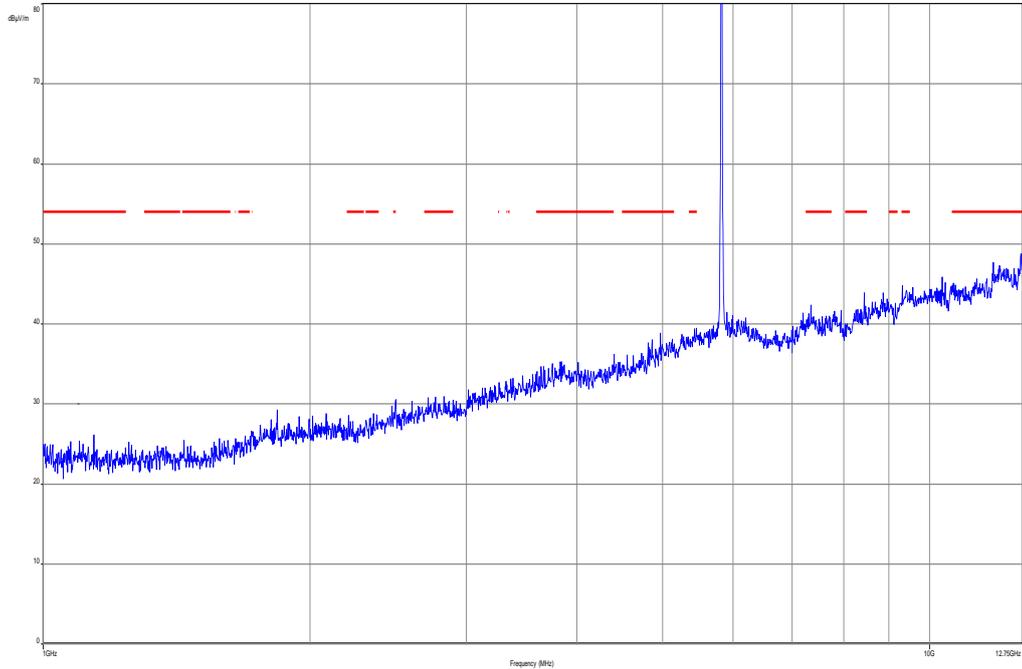
Subrange 1

Frequency Range: 30 MHz - 2 GHz

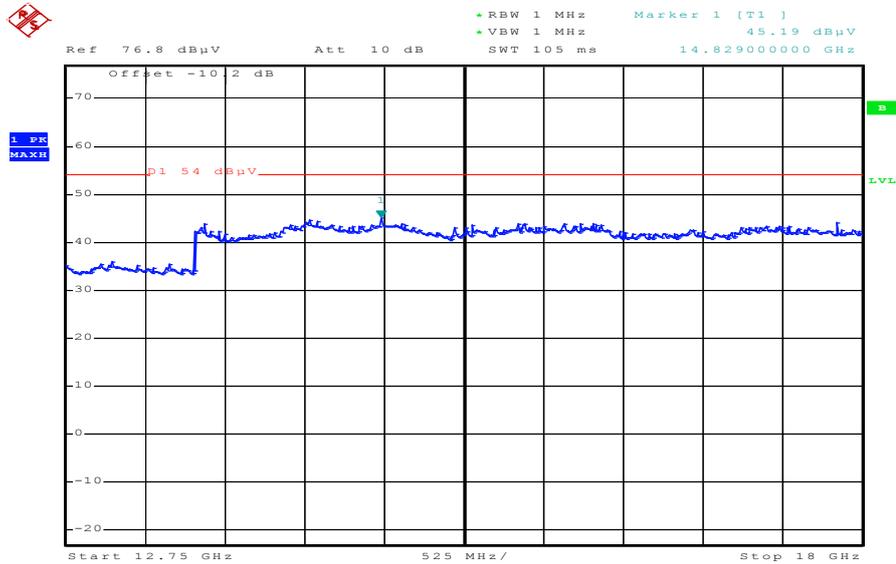
Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch
FW 1.0Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (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 12: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization

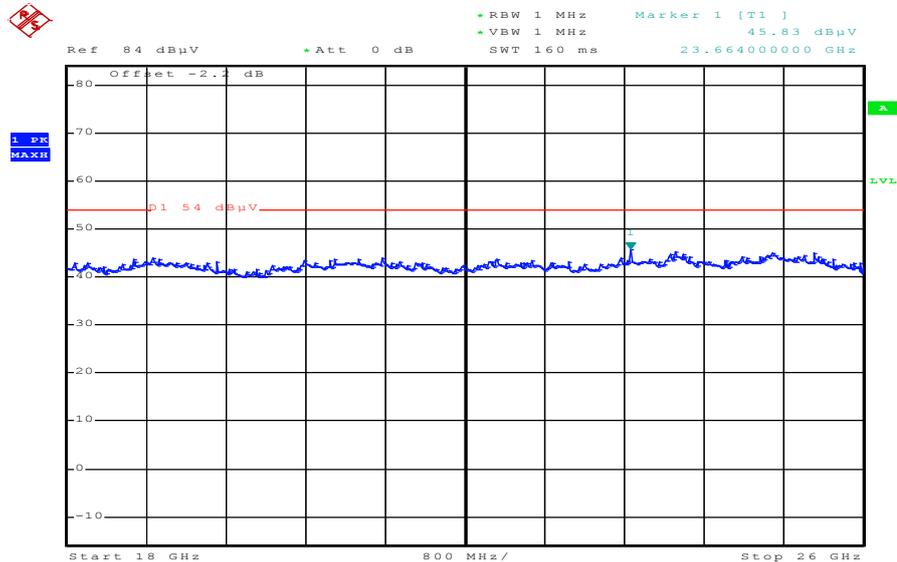


Plot 13: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



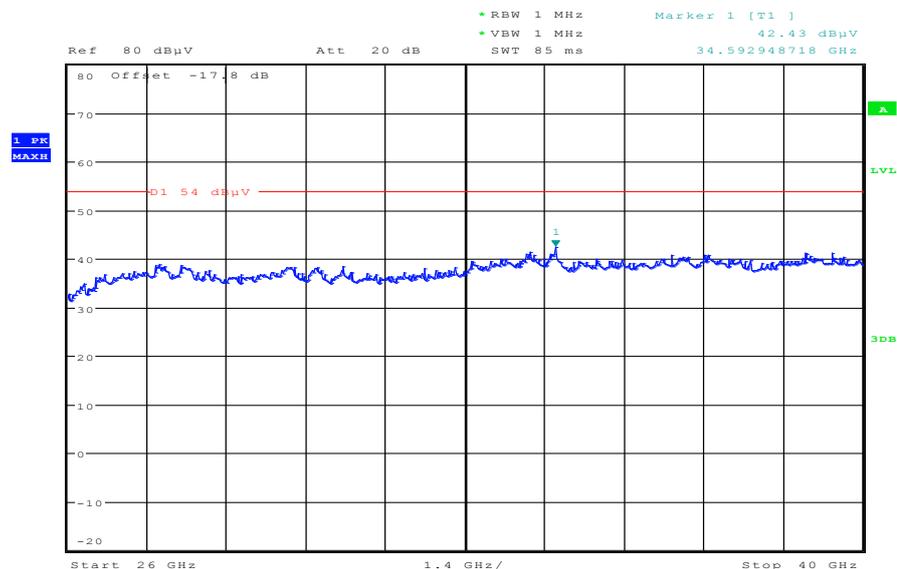
Date: 8.AUG.2012 13:48:50

Plot 14: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 15:25:22

Plot 15: Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 13:41:41

Plots: OFDM / n – mode HT40

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

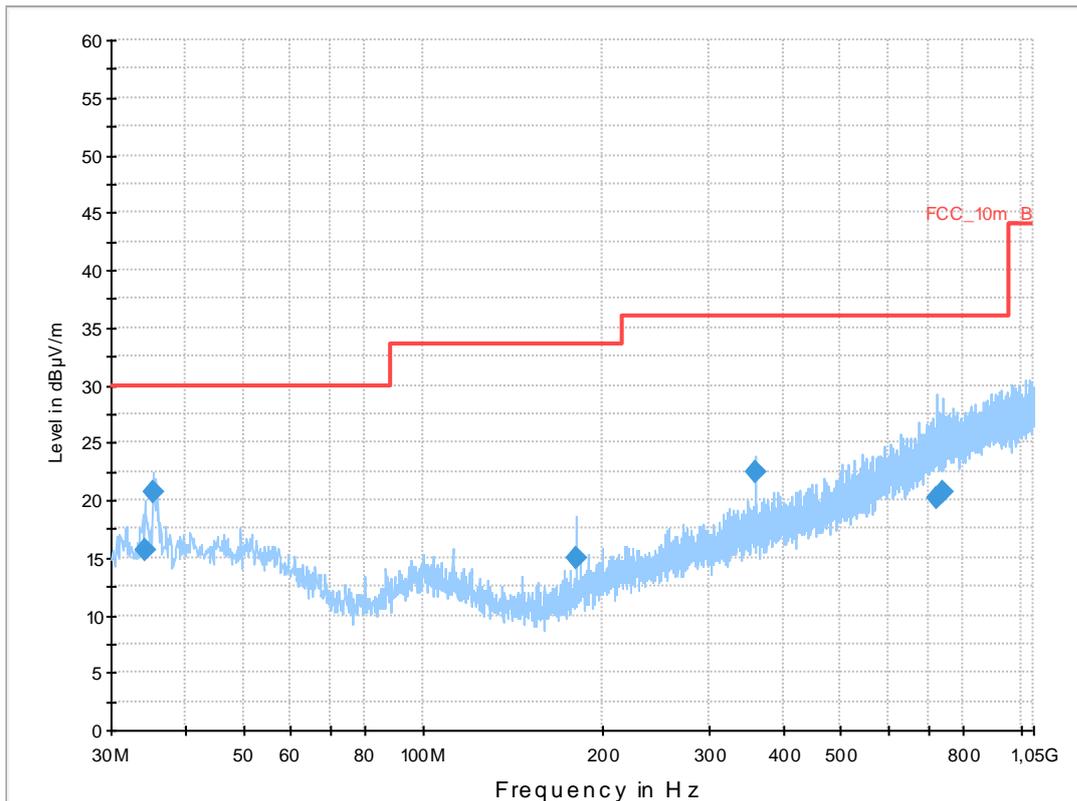
Common Information

EUT: PM-0070-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: TX WLAN n-mode HT40, CH 151 + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz

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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
34.262850	15.7	1000.0	120.000	153.0	V	190.0	13.0	14.3	30.0	
35.334450	20.7	1000.0	120.000	98.0	V	280.0	13.1	9.3	30.0	
180.005100	14.9	1000.0	120.000	98.0	V	88.0	10.4	18.6	33.5	
360.011400	22.4	1000.0	120.000	98.0	V	265.0	16.2	13.6	36.0	
721.537050	20.2	1000.0	120.000	170.0	H	10.0	23.0	15.8	36.0	
738.974100	20.7	1000.0	120.000	170.0	H	179.0	23.4	15.3	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

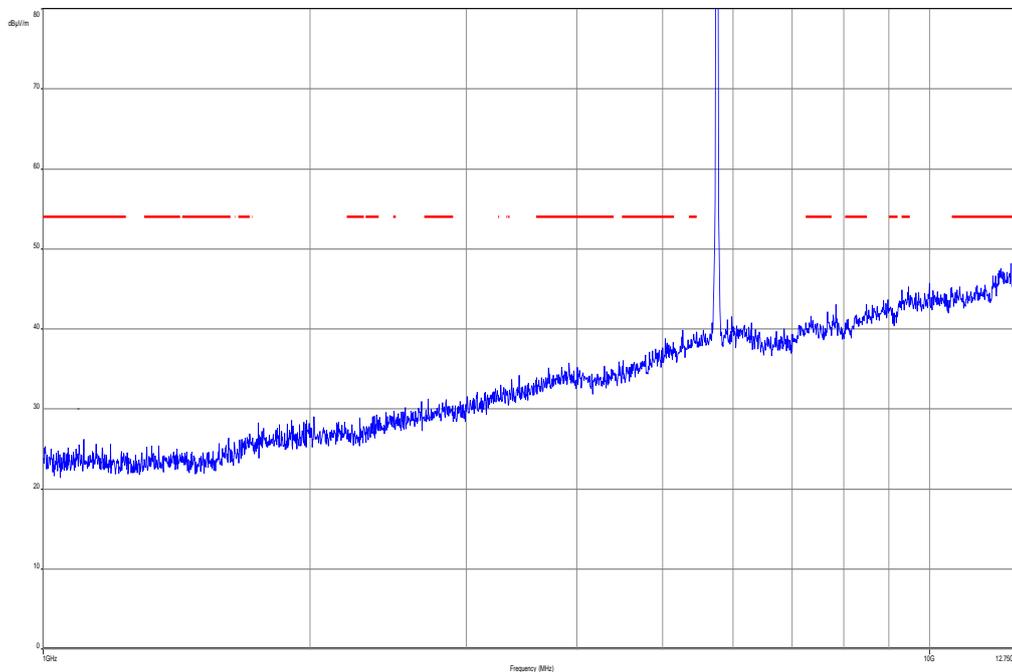
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

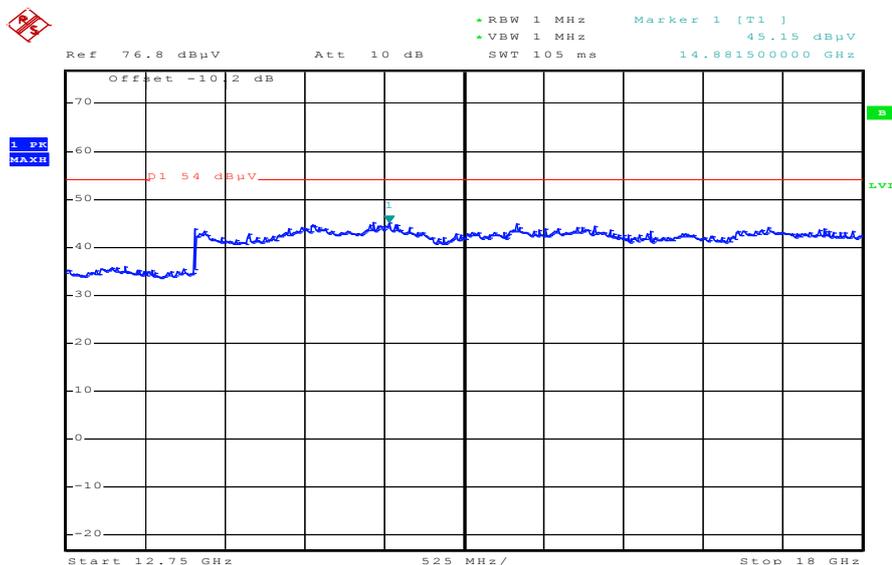
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

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

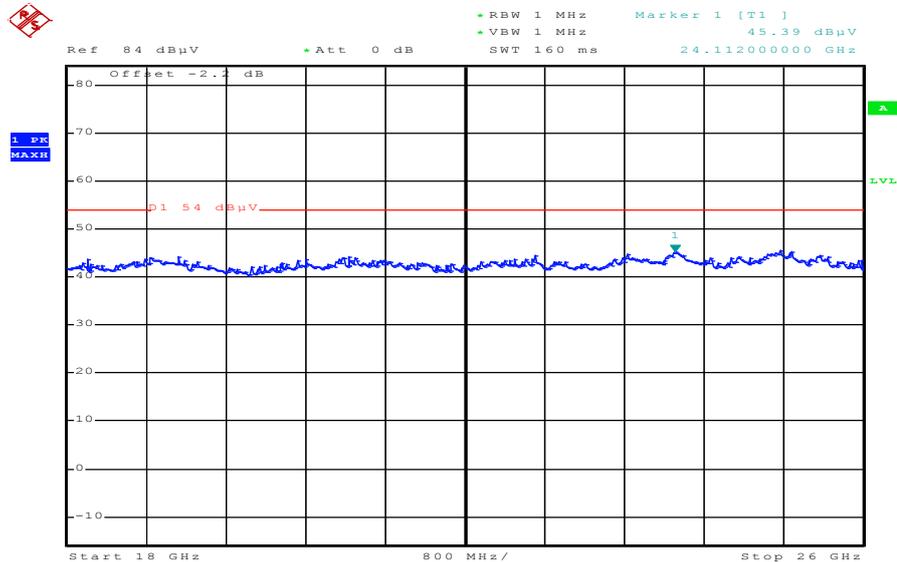


Plot 3: Lowest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



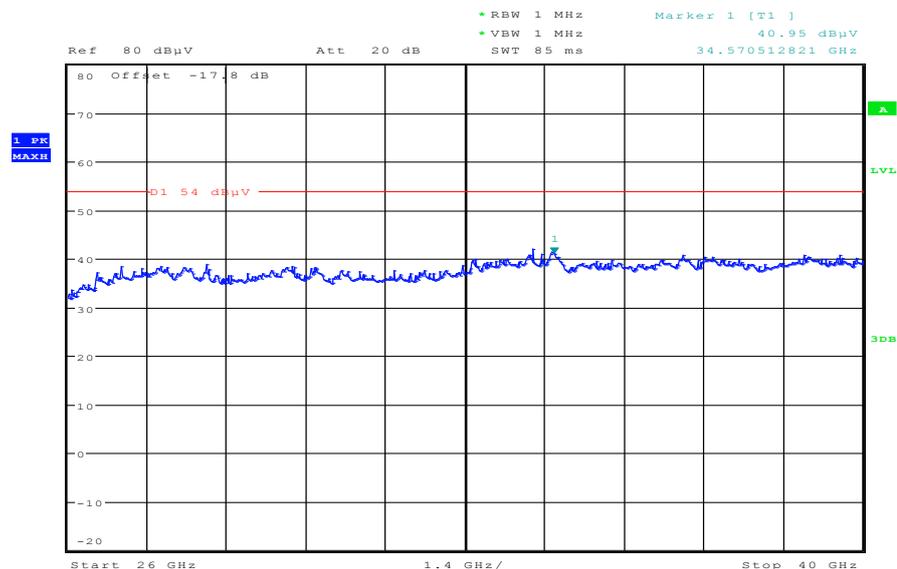
Date: 8.AUG.2012 14:20:42

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



Date: 8.AUG.2012 15:27:36

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



Date: 8.AUG.2012 14:12:30

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

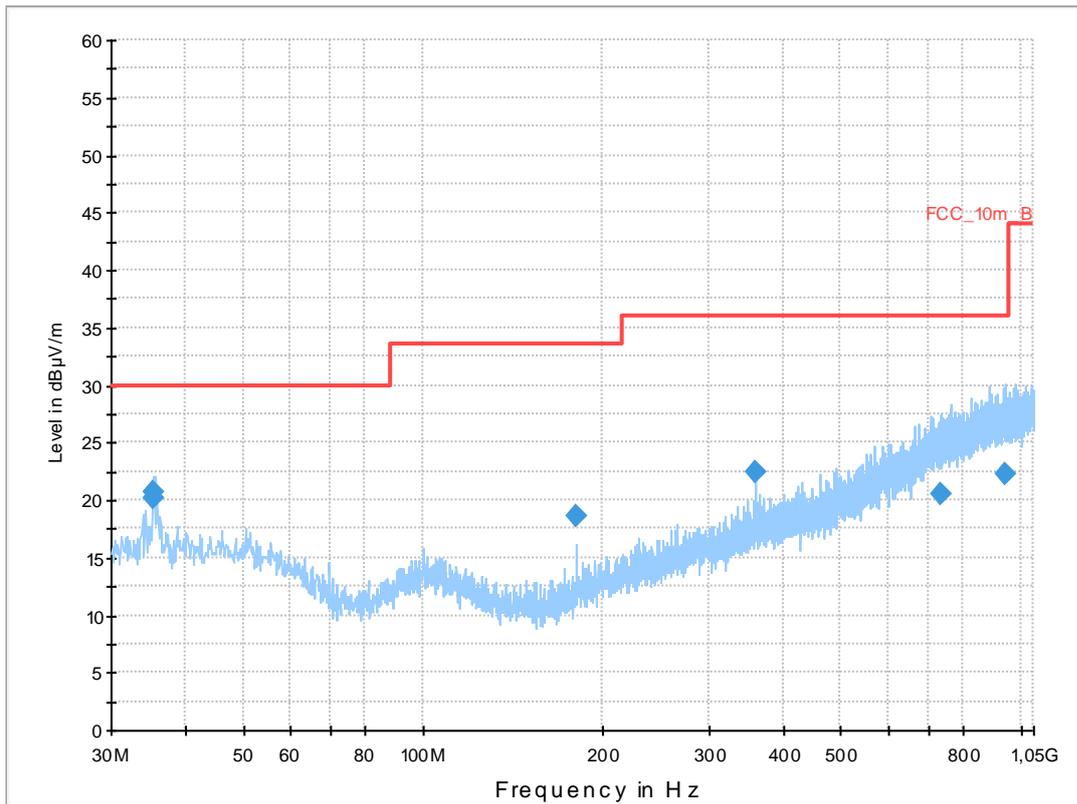
Common Information

EUT: PM-0070-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: TX WLAN n-mode HT40, CH 159 + charging
 Operator Name: Wolsdorfer
 Comment: AC: 115 V / 60 Hz

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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
35.297100	20.8	1000.0	120.000	105.0	V	10.0	13.0	9.2	30.0	
35.301450	20.1	1000.0	120.000	170.0	V	2.0	13.0	9.9	30.0	
179.997900	18.6	1000.0	120.000	113.0	V	261.0	10.4	14.9	33.5	
359.979900	22.5	1000.0	120.000	98.0	V	178.0	16.2	13.5	36.0	
734.902950	20.5	1000.0	120.000	170.0	H	190.0	23.3	15.5	36.0	
938.997300	22.3	1000.0	120.000	170.0	H	171.0	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

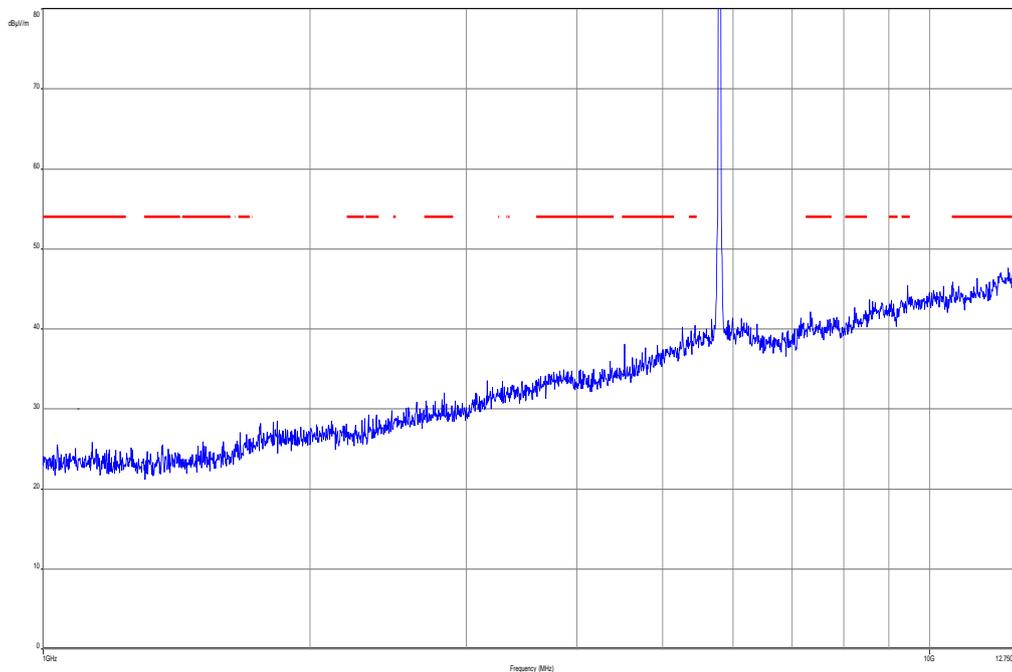
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

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

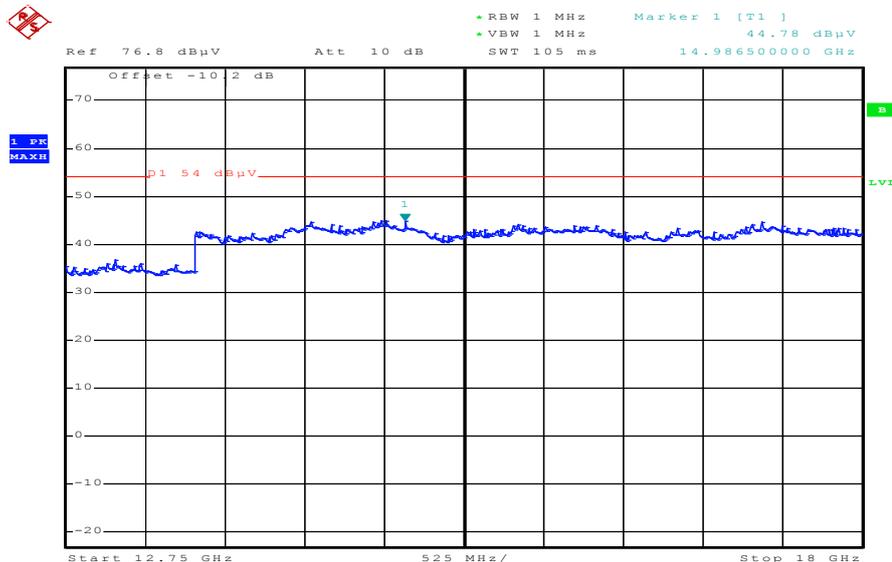
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.52

Plot 7: Highest channel, 1 GHz to 12.75 GHz, vertical & horizontal polarization

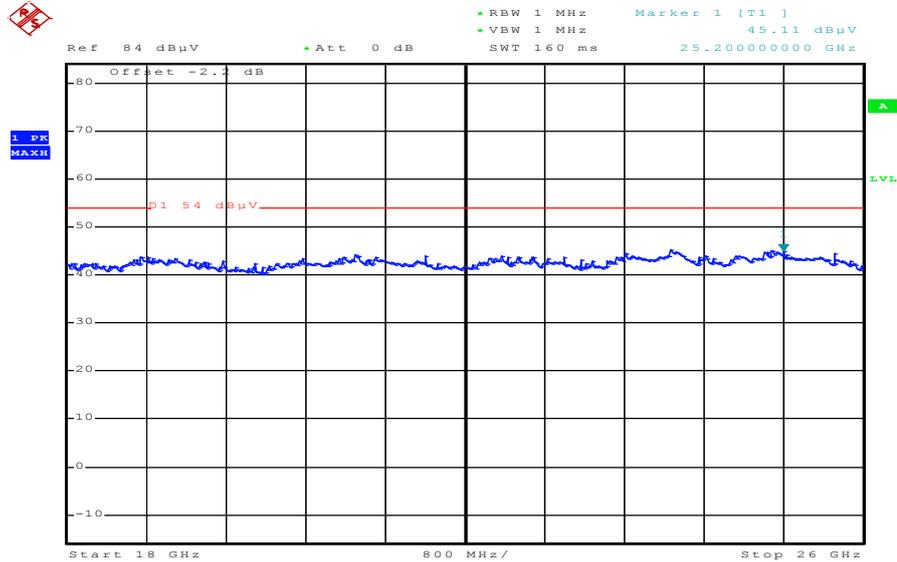


Plot 8: Highest channel, 12.75 GHz to 18 GHz, vertical & horizontal polarization



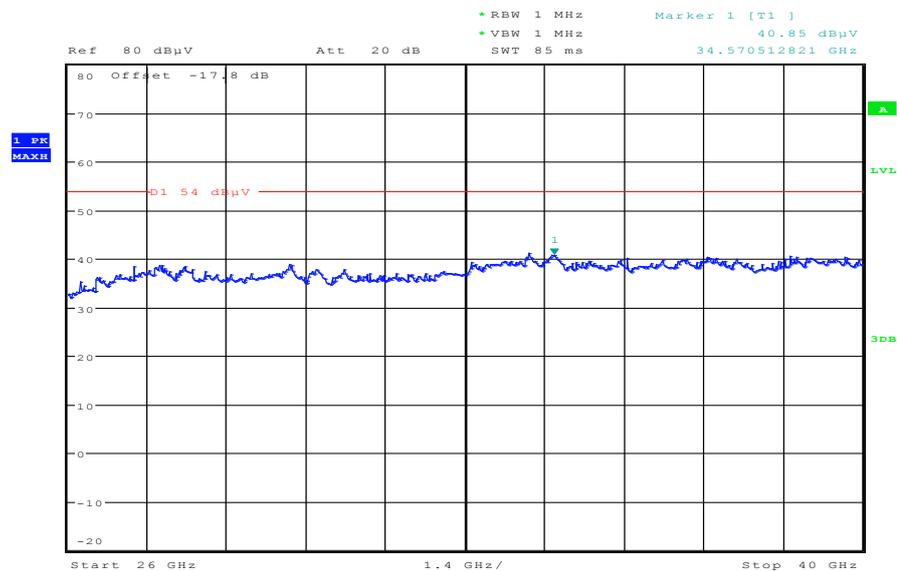
Date: 8.AUG.2012 14:23:12

Plot 9: Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 15:29:08

Plot 10: Highest channel, 26 GHz to 40 GHz, vertical & horizontal polarization



Date: 8.AUG.2012 14:14:46

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 (dBµV/m)	Measurement distance	
30 - 88	30.0	10	
88 – 216	33.5	10	
216 – 960	36.0	10	
Above 960	54.0	3	

Results:

RX Spurious Emissions Radiated [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
Measurement uncertainty	± 3 dB	

Result: Passed.

Plots: RX / Idle – mode

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

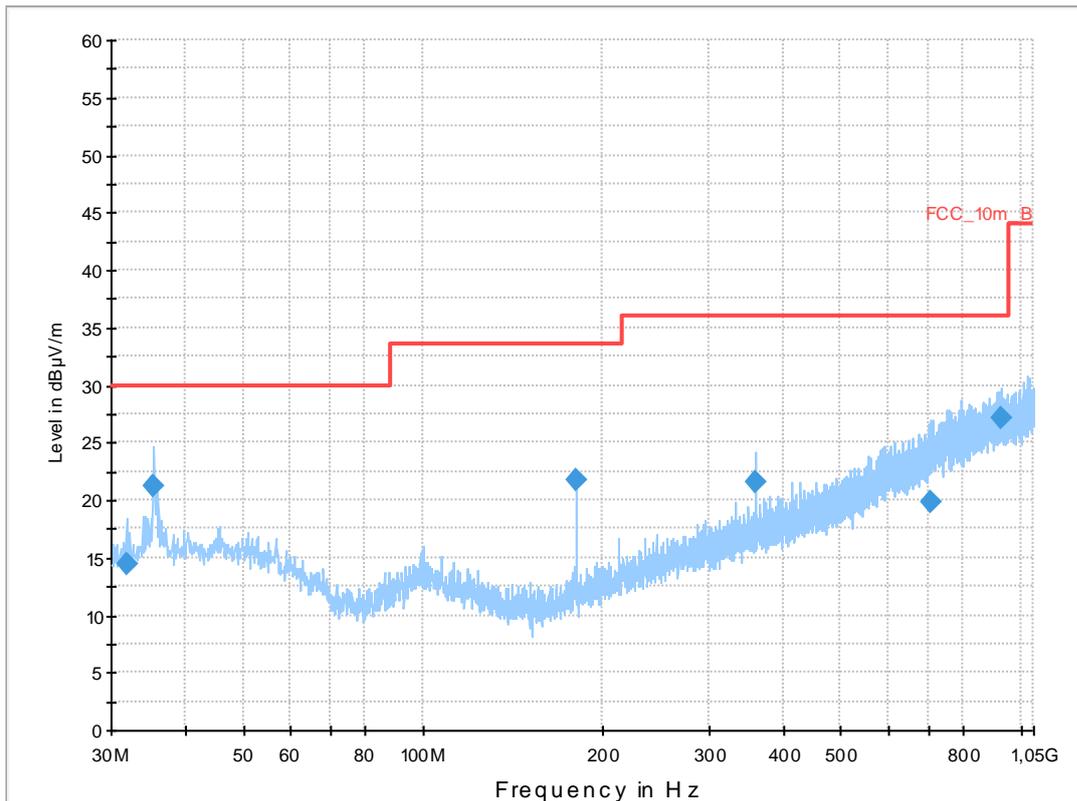
Common Information

EUT: PM-0030-BV
 Serial Number: CB511ZY9PB
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: WLAN idle/RX + 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: 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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
31.971900	14.4	1000.0	120.000	154.0	V	88.0	12.7	15.6	30.0	
35.360100	21.1	1000.0	120.000	111.0	V	88.0	13.1	8.9	30.0	
180.004350	21.7	1000.0	120.000	105.0	V	190.0	10.4	11.8	33.5	
360.010950	21.6	1000.0	120.000	170.0	V	280.0	16.2	14.4	36.0	
708.342750	19.8	1000.0	120.000	170.0	V	0.0	22.7	16.2	36.0	
927.447150	27.2	1000.0	120.000	134.0	V	268.0	25.3	8.8	36.0	

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

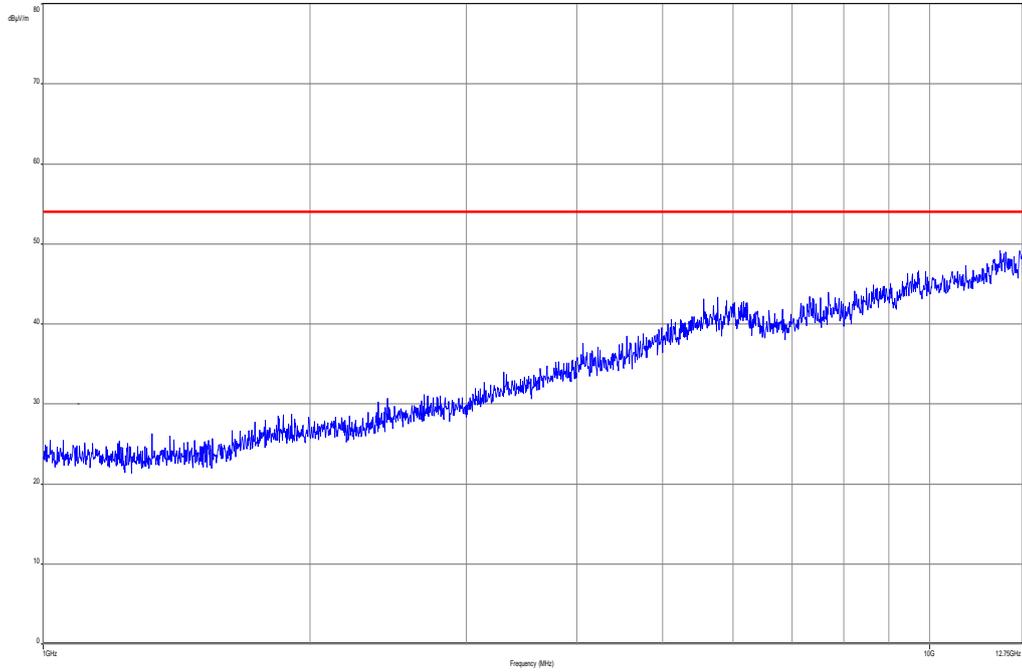
Subrange 1

Frequency Range: 30 MHz - 2 GHz

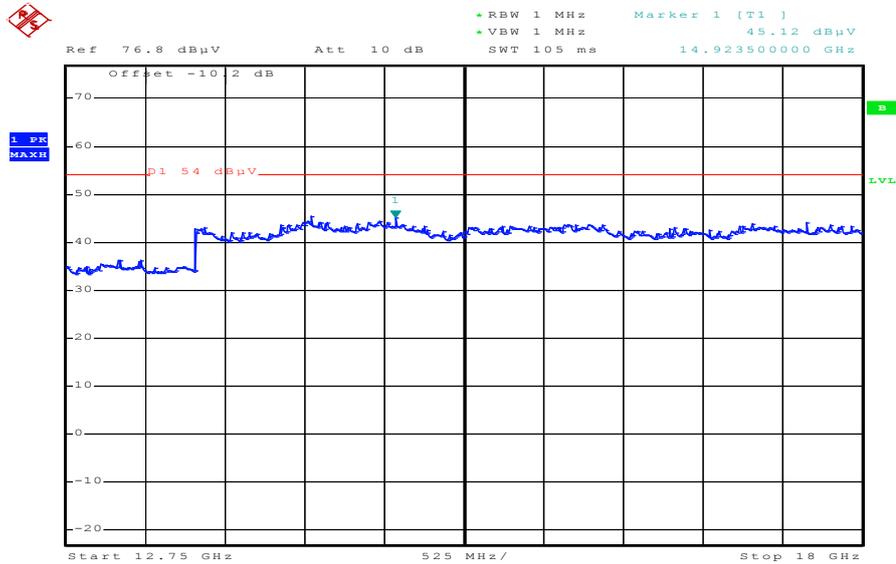
Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42Signal Path: without Notch
FW 1.0Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (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 2: 1 GHz to 12.75 GHz, vertical & horizontal polarization

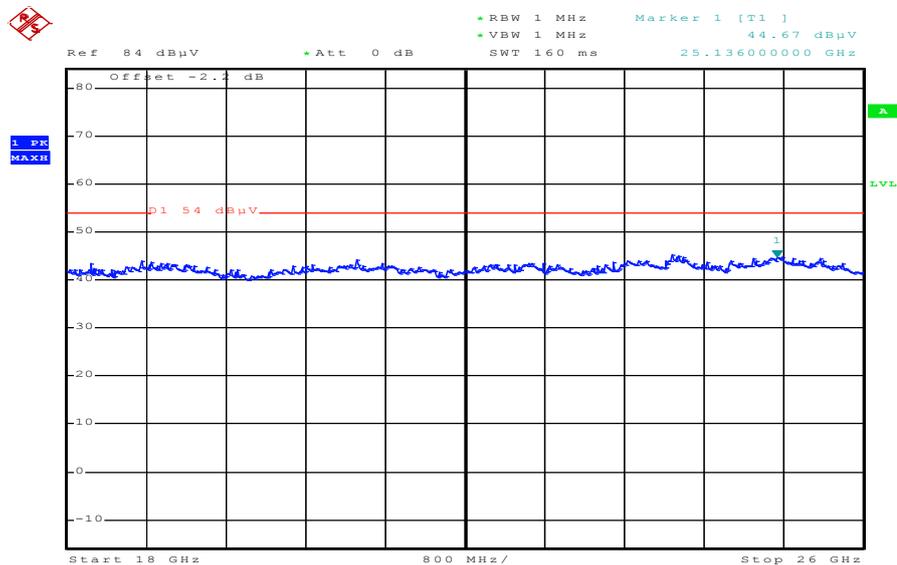


Plot 3: 12.75 GHz to 18 GHz, vertical & horizontal polarization



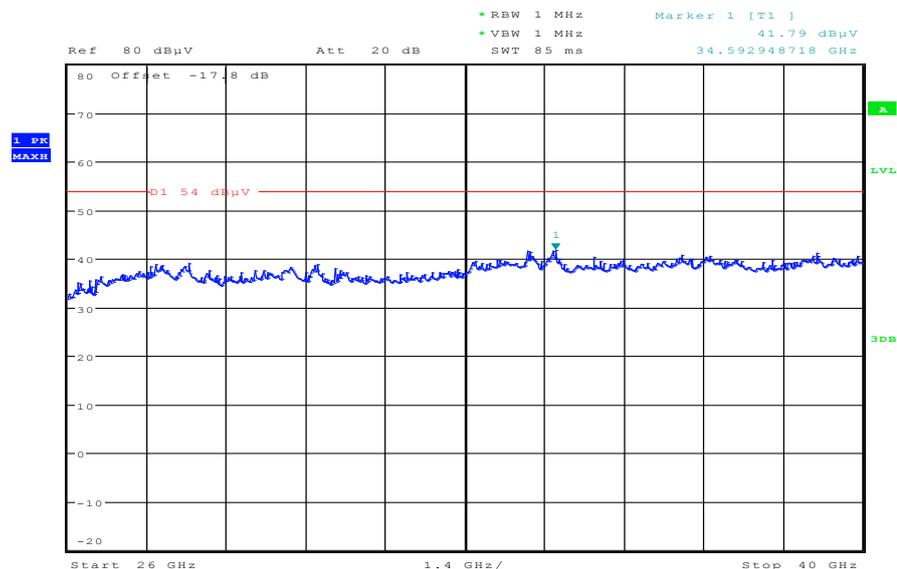
Date: 8.AUG.2012 14:24:46

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



Date: 8.AUG.2012 15:30:15

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



Date: 8.AUG.2012 14:16:12

9.12 TX 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 (dBµV/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

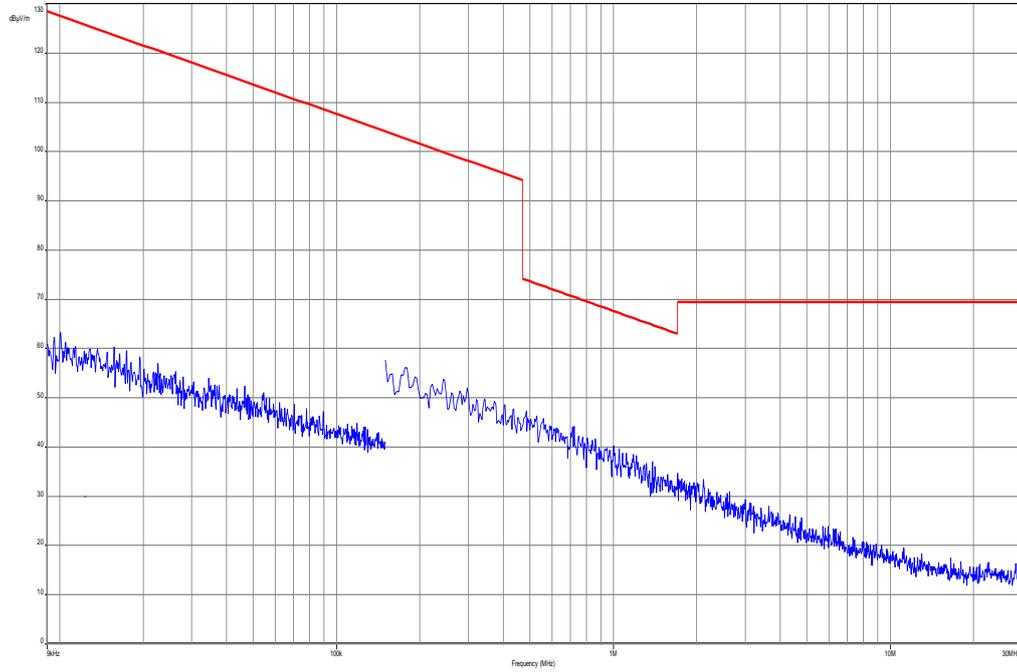
Results:

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

Result: Passed

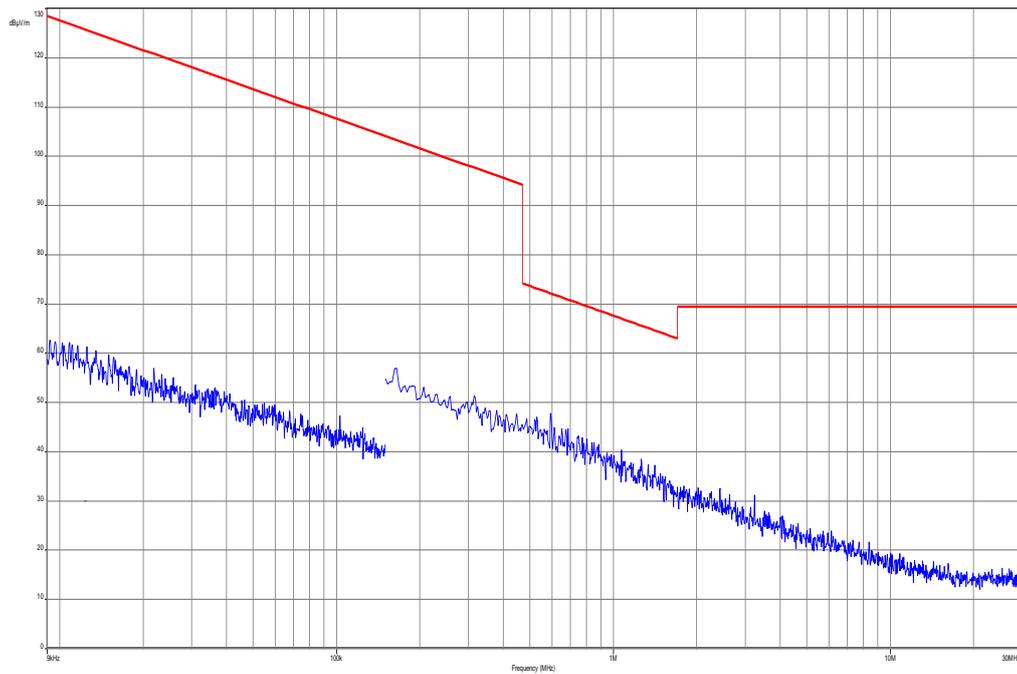
Plots: TX mode

Plot 1: 9 kHz to 30 MHz



Plots: RX / Idle – mode

Plot 1: 9 kHz to 30 MHz



9.13 TX 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

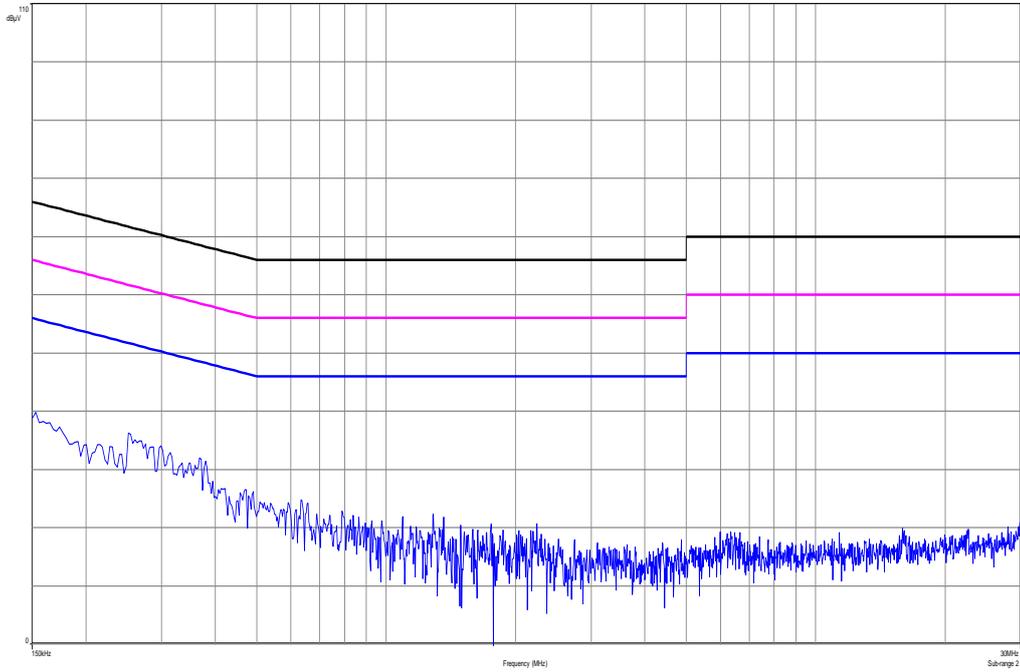
Results:

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	

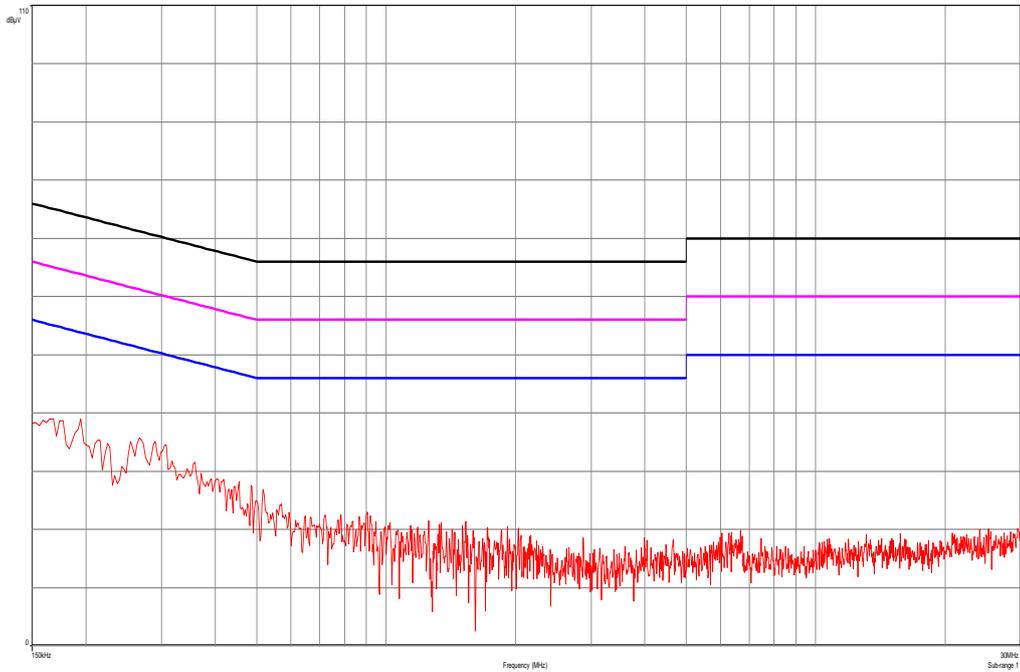
Result: Passed

Plots:

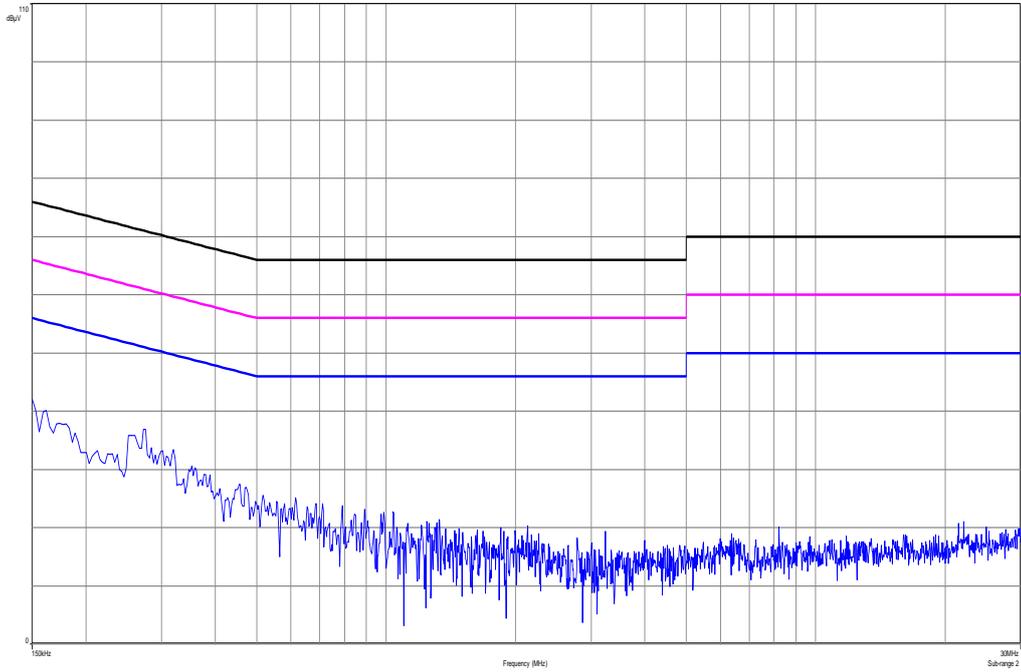
Plot 1: TX mode, 9 kHz to 30 MHz, phase line



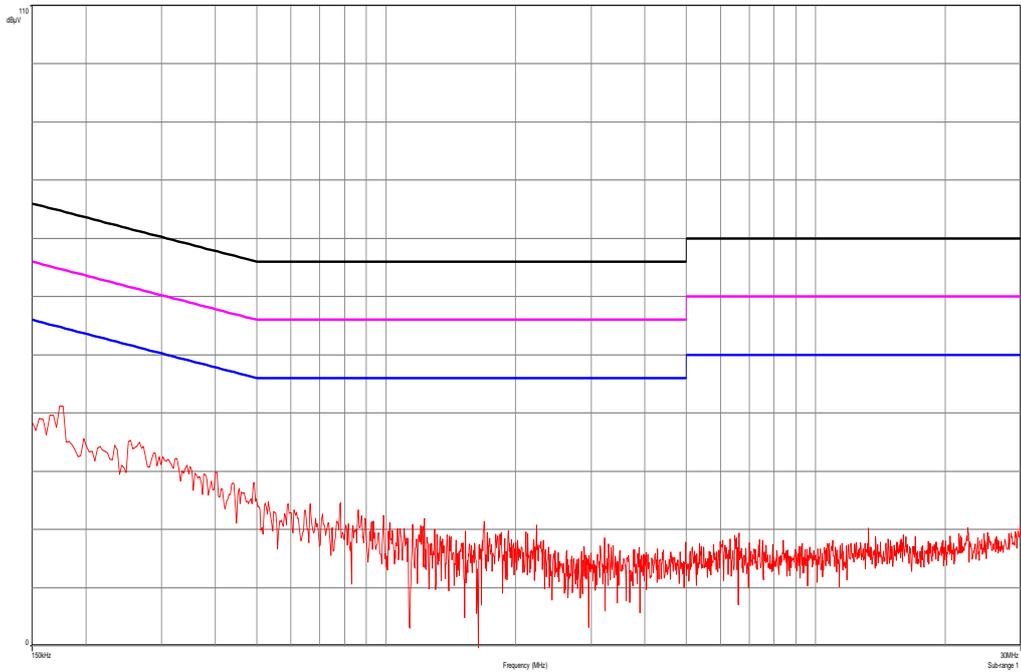
Plot 2: TX mode, 9 kHz to 30 MHz, neutral line



Plot 3: RX / Idle – mode, 9 kHz to 30 MHz, phase line



Plot 4: RX / Idle – mode, 9 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	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000787	ne		
2	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300002442	ne		
3	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	F5U50	R&S	200012	300003443	ve	01.07.2010	
4	n. a.	Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm	F5P30	R&S	100886	300003575	k	07.09.2010	07.09.2012
5	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	11.05.2011	11.05.2013
6	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
7	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Highpass Filter	WHKX7.0/1 8G-8SS	Wainwright	18	300003789	ne		
16	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	371	300003854	vIKI!	14.10.2011	14.10.2014
17	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	19.12.2011	19.12.2012
18	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
19	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
20	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B597 9	300000210	ne		
21	n. a.	EMI Test Receiver	ESCI 1166.5950. 03	R&S	100083	300003312	k	04.01.2012	04.01.2013
22	n. a.	Analyzer- Reference- System (Harmonics and	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013

		Flicker)							
23	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
24	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
25	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
26	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
27	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	
28	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	06.01.2012	06.01.2014

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 | | |
| NK! | Attention: not calibrated | *) | next calibration ordered / currently in progress |

11 Observations

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

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2012-08-16
-A	Editorial changes (RSP-100 Sheet / References)	2012-08-30

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