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TEST REPORT

Test Report Reference: R60502_A Edition 1

Equipment under Test: cB-OWLAN211bx-02 / cB-OWLAN211bi-02

FCC ID: PVH090402

Serial Number: none

Applicant: connectBlue AB

Manufacturer: connectBlue AB

Test Laboratory (CAB) accredited by DATech GmbH in compliance with DIN EN ISO/IEC 17025 under the Reg. No. DAT-P-105/99-21 and FCC Test site registration number 90877



Contents: F	' age
1 IDENTIFICATION	3
1.1 APPLICANT	3
1.2 MANUFACTURER	3
1.3 DATES	3
1.4 TEST LABORATORY	4
1.5 RESERVATION	4
1.6 NORMATIVE REFERENCES	4
1.7 TEST RESULTS	4
2 TECHNICAL DATA OF EQUIPMENT	5
2.1 DEVICE UNDER TEST	5
2.2 PERIPHERY DEVICES	6
3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES	6
4 APPLICATION OVERVIEW	7
5 TEST RESULTS	8
5.1 6 dB BANDWIDTH	8
5.1.1 METHOD OF MEASUREMENT (BANDWIDTH)	8
5.1.2 TEST RESULTS (BANDWIDTH)	9
5.2 MAXIMUM PEAK OUTPUT POWER	11
5.2.1 METHOD OF MEASUREMENT (MAXIMUM PEAK OUTPUT POWER)	11
5.2.2 TEST RESULTS (MAXIMUM PEAK OUTPUT POWER)	12
5.3 POWER SPECTRAL DENSITY	13
5.3.1 METHOD OF MEASUREMENT (POWER SPECTRAL DENSITY)	13
5.3.2 TEST RESULTS (POWER SPECTRAL DENSITY)	14
5.4 BAND-EDGE COMPLIANCE	16
5.4.1 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE)	16
5.5 RADIATED EMISSIONS (TRANSMITTER)	/ ۱ 10
	10
5.5.2 TEST RESULTS (RADIATED EMISSIONS)	
5.5.2.1 PRELIMINARY MEASUREMENT WITH EXTERNAL PLANAR ANTENNA	
(30 MHz to 25 GHz)	23
5.5.2.2 FINAL MEASUREMENT WITH EXTERNAL PLANAR ANTENNA (1 GHz to 25 GHz)	31
(30 MHz to 25 GHz)	33
5.5.2.4 FINAL MEASUREMENT WITH EXTERNAL MONOPOLE ANTENNA (1 GHz to 25 GH	z).41
5.5.2.5 PRELIMINARY MEASUREMENT WITH INTERNAL ANTENNA (30 MHz to 25 GHz)	43
5.6 CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 kHz to 30 MHz)	51 54
5.6.1 METHOD OF MEASUREMENT	54
5.6.2 TEST RESULTS (CONDUCTED EMISSIONS ON POWER SUPPLY LINES)	55
6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS	57
7 LIST OF ANNEXES	61



1 IDENTIFICATION

1.1 APPLICANT

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1.2 MANUFACTURER

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Address:	Norra Vallgatan 64 3V
	Malmö SE-211 19
Country:	Sweden
Name for contact purposes:	Mr. Martin Engdahl
Tel:	+ 46 40 63 07 100
Fax:	+ 46 40 23 71 37
e-mail address:	martin.engdahl@connectblue.se

1.3 DATES

Date of receipt of test sample:	13 July 2006
Start of test:	20 July 2006
End of test:	27 July 2006



1.4 TEST LABORATORY

The	tests	were	carried	out at:	
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PHOENIX TESTLAB GmbH Königswinkel 10 D-32825 Blomberg Germany

Phone: +49 (0) 52 35 / 95 00-0 +49 (0) 52 35 / 95 00-10

accredited by DATech GmbH in compliance with DIN EN ISO/IEC 17025 under Reg. No. DAT-P-105/99-21 and FCC Test site registration number 90877

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Test report checked:	Bernd STEINER	B. Sleve	17 August 2006
	Name	PHOENIX TESTLAB GmbH Königswinkei 10 32825 Blomberg Tel. 0 52 35 / 95 00-0 Fax 0 52 35 / 95 00-10	Date
		Stamp	

1.5 RESERVATION

	This	test	report	i s	only	valid	i n	its	original	form.
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Any reproduction of its contents without written permission of the accredited test laboratory PHOENIX TESTLAB GmbH is prohibited.

The test results herein refer only to the tested sample. PHOENIX TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the PHOENIX TESTLAB Logo and the TEST REPORT REFERENCE.

1.6 NORMATIVE REFERENCES

- [1] ANSI C63.4-2003 American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- [2] FCC CFR 47 Part 15 (February 2006) Radio Frequency Devices
- [3] FCC KDB Publication No. 55807 (March 2005) Measurement of Digital Transmission Systems Operating under Section 15.247

1.7 TEST RESULTS

The requirements of this test document are fulfilled by the equipment under test. The complete test results are presented in the following.



2 TECHNICAL DATA OF EQUIPMENT

2.1 DEVICE UNDER TEST

Type of equipment: *	802.11b Wireless LAN module
Type designation: *	cB-OWLAN211bx-02 / cB-OWLAN211bi-02
FCC ID: *	PVH090402
Antenna type: *	External or internal
Antenna gain: *	Refer table below
Antenna connector: *	With internal antenna, no antenna connector is mounted. Using an external antenna, a UFL connector is used.
Power supply: *	3.3 V DC to 5.0 V DC
Type of modulation: *	DSSS (CCK and DQPSK, depends on data-rate)
Operating frequency range:*	2.412 to 2.462 GHz (11 channels with 5 MHz channel separation)
Data rate:*	1, 2, 5.5 and 11 MBit/s
Number of channels: *	11
Temperature range: *	-30 °C to +85 °C

*: declared by the applicant

Used antennas:

model name*	Antenna type	Rated Antenna gain*
NanoBlue-IP04	external	+2.0 dBi
MircoBlue CAP24235	external	+1.5 dBi
WCR-2400-IP04	external	+2.0 dBi
Notebookantenna NB-2400	external	+2.0 dBi
SPA 2400/75/8/0/V	external	+7.5 dBi
SOA 2400/360/5/0/V_C	external	+5.0 dBi
PSTG0-2400HS	external	0 dBi
IG-103	external	+8.5 dBi
2.4 GHz Mica SMD Antenna	internal	+2.7 dBi
2.4 GHz Flying Lead Straigth Antenna IHF-242	external	+2.0 dBi

*: declared by the applicant

The following external I/O cables were used:

Cable	Length	Shielding	Connector
DC in	2 m *	No	6.3 mm jack plug
SPI bus (not connected during test)	40 cm	No	20 pole terminal block

*: Length during the test if no other specified.



2.2 PERIPHERY DEVICES

The following equipment was used as control unit and ancillary equipment:

- The EUT was connected to a carrier board (cB-0703-02), which was delivered by the applicant. The carrier board was supplied via an external power supply with 5.0 V DC.
- A personal computer (ACER TravelMate 525TXV, model No. 1904) with a configuration-software was used, connected temporary to the EUT via a Ethernet switch (NETGEAR ProSafe 5 Port 10/100 switch FS105 v2) and a EUT initiator (cB-0717-02), for setting the equipment into the necessary operation mode. During the measurement procedures the personal computer, the Ethernet switch and the EUT initiator were disconnected.

3 OPERATIONAL STATES AND PHYSICAL BOUNDARIES

The EUT is intended to be used in several WLAN applications. Because the EUT is a module, which will be implemented in a final application, it was mounted on a carrier board to change the operation modes of the EUT from a Laptop with test software. The tests were carried out with one unmodified sample with integral antenna and another unmodified sample with an antenna connector and external antennas. Because the antenna WRC2400-IP04 (with UFL connector) was not available at the moment of testing the identical antenna with a SMA connector (WRC2400-SMA) was used instead.

The EUT has a UFL connector, which is regarded to be unique.

During the tests the test sample was powered by an external power supply via the carrier board with 5.0 V DC. The emission measurement on AC mains was carried out by using a mascot power supply type 2121.

If not otherwise stated, for modulating the transmitter, a pseudo random bit sequence with a data rate of 11 MBit/s was used because pretests have shown that this is the operation mode, which causes the highest spurious emissions and occupies the largest bandwidth.

For selecting an operation mode, a personal computer with a software delivered by the applicant was connected to the EUT via a Ethernet switch (NETGEAR ProSafe 5 Port 10/100 switch FS105 v2) and a EUT initiator (cB-0717-02). After adjusting the operating mode, the personal computer, the Ethernet switch and the EUT initiator were removed. To do this the test-engineer was instructed by the applicant.

During the tests, the EUT was not labelled with a FCC-label.

The following operation modes were used during the tests:

Operation mode	Description of the operation mode
1	Continuous transmitting on 2412 MHz
2	Continuous transmitting on 2437 MHz
3	Continuous transmitting on 2462 MHz





4 APPLICATION OVERVIEW

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section	Status	Refer page
6 dB bandwidth	General	15.247 (a) (2)	Passed	8 et seq.
Maximum peak output power	2400.0 – 2483.5	15.247 (b) (3), (4)	Passed	11 et seq.
Power spectral density	2400.0 - 2483.5	15.247 (e)	Passed	13 et seq.
Band edge compliance	2400.0 - 2483.5	15.247 (d)	Passed	16 et seq.
Radiated emissions (transmitter)	30 – 25,000	15.205 (a) 15.209 (a)	Passed	19 et seq.
Conducted emissions on supply line	0.15 – 30	15.207 (a)	Passed	54 et seq.



5 TEST RESULTS

5.1 6 dB BANDWIDTH

5.1.1 METHOD OF MEASUREMENT (BANDWIDTH)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on, the transmitter shall work with its maximum data rate.

The following spectrum analyser settings shall be used:

- Span: App. 2 to 3 times the 6 dB bandwidth, centred on the actual channel.
- Resolution bandwidth: 100 kHz.
- Video bandwidth: 100 kHz.
- Sweep: Auto.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 6 dB below the first line (or the peak marker). The frequency lines shall be set on the intersection points between the second display line and the measured curve.

The measurement will be performed at the upper, the lower end and the middle of the assigned frequency band.

Test set-up:





5.1.2 TEST RESULTS (BANDWIDTH)

	Ambient temperature	21 °C		Relative humidity	61 %
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60502_63.wmf: (6 dB bandwidth at the lower end of the assigned frequency band):



60502_66.wmf: (6 dB bandwidth at the middle of the assigned frequency band):







60502_67.wmf: (6 dB bandwidth at the upper end of the assigned frequency band):

Channel number	Channel number Channel frequency [MHZ]			
1	2412	9.178		
6	6 2437			
11 2462		9.138		
Measurem	< ± 1*10 ⁻⁷			

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54



5.2 MAXIMUM PEAK OUTPUT POWER

5.2.1 METHOD OF MEASUREMENT (MAXIMUM PEAK OUTPUT POWER)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed. The EUT has to be switched on.

The following power meter settings shall be used:

- Filter No. auto.
- Measuring time 0.136 s to 26 s.
- Used peak sensor NRV –Z32.

The measurement will be performed at the upper and lower end and the middle of the assigned frequency band.

Test set-up:





5.2.2 TEST RESULTS (MAXIMUM PEAK OUTPUT POWER)

Ambient temperature	21 °C	Relative humidity	61 %

Because the maximum antenna gain exceed the 6.0 dBi, the limit is reduced by the amount of the exceedance.

Channel number	Channel frequency [MHz]	Maximum peak output power [dBm]	Antenna gain [dBi]	Calculated EIRP [dBm]	Peak power limit [dBm]
1	2412	14.9	8.5	23.4	27.5
6	2437	15.1	8.5	23.6	27.5
11	2462	15.0	8.5	23.5	27.5
Measurement uncertainty				+0.66 dB / -0).72 dB

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

46, 54, 55



5.3 POWER SPECTRAL DENSITY

5.3.1 METHOD OF MEASUREMENT (POWER SPECTRAL DENSITY)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed.

The following spectrum analyser settings shall be used:

- Span: 1.5 MHz, centred on the actual channel.
- Resolution bandwidth: 3 kHz.
- Video bandwidth: 30 kHz.
- Sweep: 500 s.
- Detector function: peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The indicated level is the power spectral density.

Test set-up:





5.3.2 TEST RESULTS (POWER SPECTRAL DENSITY)

21 °C

Relative humidity 61 %

60502_62.wmf (power spectral density (transmit on channel 1)):



60502_61.wmf (power spectral density (transmit on channel 6)):







60502_60.wmf (power spectral density (transmit on channel 11)):

Operation mode	Power spectral density [dBm / 3 kHz] *	Power spectral density limit [dBm / 3 kHz]
Transmit on channel 1	-10.9	8
Transmit on channel 6	-11.1	8
Transmit on channel 11	-10.8	8
M	+1.1 dB / -1.5 dB	

* cable loss of 0.9 dB respected

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54



5.4 BAND-EDGE COMPLIANCE

5.4.1 METHOD OF MEASUREMENT (BAND-EDGE COMPLIANCE)

The calibration of the spectrum analyser has to be checked with the help of a known signal from a signal generator. The EUT has to be connected to the spectrum analyser via a low loss cable. If the EUT is not equipped with an antenna connector, a temporary antenna connector has to be installed.

The following spectrum analyser settings shall be used:

- Span: Wide enough to capture the peak level of the emission on the channel closest to the band-edge, as well as any modulation products, which fall outside the assigned frequency band.
- Resolution bandwidth: \geq 1 % of the span, but not below 30 kHz.
- Video bandwidth: \geq the resolution bandwidth.
- Sweep: Auto.
- Detector function: Peak.
- Trace mode: Max hold.

After trace stabilisation the marker shall be set on the signal peak. The first display line has to be set on this value. The second display line has to be set 20 dB below the first line (or the peak marker). The frequency line shall be set on the edge of the assigned frequency band. Set the second marker on the emission at the band-edge, or on the highest modulation product outside of the band, if this level is higher than that at the band-edge. After this the difference between this emission level and the signal peak will be calculated. With the value of measured field strength of the signal peak and the calculated difference to the emission level, the level of the field strength of the emission will be calculated.

The measurement will be performed at the upper and lower end of the assigned frequency band.

Test set-up:





5.4.2 TEST RESULT (BAND-EDGE COMPLIANCE)

Ambient temperature

21 °C

Relative humidity

61 %

60502_70.wmf (band-edge compliance, lower band edge):



60502_69.wmf (band-edge compliance, upper band edge):





The plots on the page before are showing the band-edge compliance for the upper and lower band-edge. The display line 1 (D1) in these plots represents the highest level within the assigned frequency band. The display line 2 (D2) represents the 20 dB offset to this highest level and shows the compliance with FCC 47 CFR Part 15.247 (d). The frequency line 1 (F1) shows the edge of the assigned frequency.

	Band-edge compliance							
Band-edge	Difference to the signal peak [dB]	Field strength of this signal peak [dBµV/m]	Field strength at the band edge [dBµV/m]	Limit [dBµV/m]				
Upper	50.9	104.4	53.5	54.0				
Lower	35.1	103.8	68.7	83.8				
	Measurement uncert	+2.2 dB / -3.6	dB					

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

31, 46, 54



5.5 RADIATED EMISSIONS (TRANSMITTER)

5.5.1 METHOD OF MEASUREMENT (RADIATED EMISSIONS)

The radiated emission measurement is subdivided into three stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna heights in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 1 GHz to 25 GHz.

All measurements will be carried out with the EUT working on the middle and upper and lower edge of the assigned frequency band.

Preliminary measurement (30 MHz to 1 GHz)

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

The resolution bandwidth of the EMI Receiver will be set to the following values:





Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz. The following procedure will be used:

- 1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
- 2. Manipulate the system cables within the range to produce the maximum level of emission.
- 3. Rotate the EUT by 360 ° to maximize the detected signals.
- 4. Make a hardcopy of the spectrum.
- 5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 6. Repeat 1) to 4) with the other orthogonal axes of the EUT if handheld equipment.
- 7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

Final measurement (30 MHz to 1 GHz)

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of

0 $^{\circ}$ to 360 $^{\circ}$, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:





Procedure final measurement:

The following procedure will be used:

- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m.
- 7) Set the antenna to the position where the maximum value is found.
- 8) Measure while moving the turntable +/- 45° .
- 9) Set the turntable to the azimuth where the maximum value is found.
- 10) Measure with Final detector (QP and AV) and note the value.
- 11) Repeat 5) to 10) for each frequency.
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT if handheld equipment.

Preliminary and final measurement (1 GHz to 25 GHz)

This measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

Preliminary measurement (1 GHz to 25 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °. If the EUT is larger than the antenna beamwidth, the antenna will be moved to various positions, to cover the whole surface of the EUT. It might be possible to shorter the measuring distance to higher the measurement sensitivity.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	100 kHz
4 GHz to 12 GHz	100 kHz
12 GHz to 18 GHz	100 kHz
18 GHz to 25 GHz	100 kHz

Final measurement (1 GHz to 25 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to MAX Hold mode and a resolution bandwidth of 1 MHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °. If the EUT is larger than the antenna beamwidth, the antenna will be moved to various positions, to cover the whole surface of the EUT. It might be possible to shorter the measuring distance to higher the measurement sensitivity.



The resolution bandwidth of the EMI Receiver will be set to the following values:

Resolution bandwidth
1 MHz
1 MHz
1 MHz
1 MHz



Procedure of measurement:

The measurements were performed in the frequency range 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz and 18 GHz to 25 GHz.

The following procedure will be used:

- 1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
- Rotate the EUT by 360 ° to maximize the detected signals.
- 3) Change the antenna polarisation.
- 4) Rotate the EUT by 360 ° to maximize the detected signals.
- 5) Make a hardcopy of the spectrum.
- 6) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
- 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarisation and azimuth and the peak and average detector, which causes the maximum emission.
- 8) Repeat steps 1) to 7) with the other orthogonal axes of the EUT if handheld equipment.
- 9) Repeat steps 1) to 8) for the next antenna spot if the EUT is lager than the antenna beamwidth.

Step 1) to 6) are defined as preliminary measurement.



5.5.2 TEST RESULTS (RADIATED EMISSIONS)

5.5.2.1 PRELIMINARY MEASUREMENT WITH EXTERNAL PLANAR ANTENNA (30 MHz to 25 GHz)

Ambient temperature		20 °C	Relative humidity	60 %
Position of EUT:	The EUT w between El	as set-up on a non-co JT and antenna was	onducting table of a height of 0.8 3 m.	3 m. The distance
Cable guide:	The cable of the cable g	of the EUT was fixed uide refer to the pictu	on the non-conducting table. Fo res in annex A of this test report	r further information of t.
Test record:	Where not there was r	otherwise stated the the the the the the the the other states and the other states are states as the states are	test was carried out in test mode her test modes. All results are s	e 2 of the EUT, because hown in the following.
Supply voltage:	During all n	neasurements the EU	IT was supplied with 5.0 V DC v	ia the carrier board.
Remark:	As external this antenna highest spu	antenna the SPA 24 a type. Additionally pr irious emissions of al	00/75/8/0/V was used, because e-tests have shown that this and I planar antennas.	of the highest gain of enna caused the

60502_58.wmf (30 MHz to 230 MHz):



TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



60502_59.wmf (230 MHz to 1 GHz):



No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the open area test site.



Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

60502_23.wmf (1 GHz to 4 GHz):



60502_26.wmf (4 GHz to 12 GHz):





60502_38.wmf (12 GHz to 18 GHz):



60502_45.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.824 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.412 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

60502_22.wmf (1 GHz to 4 GHz):



60502 27.wmf (4 GHz to 12 GHz):





60502_39.wmf (12 GHz to 18 GHz):



60502_44.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.874 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.437 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

60502_24.wmf (1 GHz to 4 GHz):



60502 25.wmf (4 GHz to 12 GHz):





60502_40.wmf (12 GHz to 18 GHz):



60502_41.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.934 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.467 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



5.5.2.2 FINAL MEASUREMENT WITH EXTERNAL PLANAR ANTENNA (1 GHz to 25 GHz)

Ambient temperature		20 °C		Relative humidity	60 %	
Position of EUT:	The EUT was set-up on a non-conducting table of a height of 0.8 m. The distand between EUT and antenna was 3 m.					
Cable guide:	The cable of the cable g	The cable of the EUT was fixed on the non-conducting table. For further information of the cable guide refer to the pictures in annex A of this test report.				
Supply voltage:	During all n	During all measurements the EUT was supplied with 5.0 V DC via the carrier board.				
Resolution bandwidth:	For all measurements a resolution bandwidth of 1 MHz was used.					
Remark:	As external this antenna highest spu	antenna the SPA a type. Additionally irious emissions of	2400/ pre-te all pla	75/8/0/V was used, because ests have shown that this ant anar antennas.	of the highest gain of tenna caused the	

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

Result measured with the peak detector:

Frequency	Corr.	Limit	Margin	Readings	Antenna	Preamp	Cable	Height	Pol.	Restr.
	value				factor		loss			Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	111.1	-	-	79.8	28.5	0.0	2.8	150	Vert.	-
4.824	49.6	74.0	24.4	38.4	33.1	25.7	3.8	150	Hor.	Yes
Measurement uncertainty					+2.2	dB / -3.6	dB			

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	102.6	-	-	71.3	28.5	0.0	2.8	150	Vert.	-
4.824	34.6	54.0	19.4	23.4	33.1	25.7	3.8	150	Hor.	Yes
	Me	asuremen	t uncerta			+2.2	dB / -3.6	dB		



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	Cm		
2.437	111.7	-	-	80.2	28.7	0.0	2.8	150	Vert.	-
4.874	49.7	74.0	24.3	38.2	33.4	25.7	3.8	150	Hor.	Yes
			+2.2	dB / -3.6	dB					

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	Cm		
2.437	103.2	-	-	71.7	28.7	0.0	2.8	150	Vert.	-
4.874	35.4	54.0	18.6	23.9	33.4	25.7	3.8	150	Hor.	Yes
			+2.2	dB / -3.6	dB					

Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.467	112.1	-	-	80.6	28.7	0.0	2.8	150	Vert.	-
4.934	54.6	74.0	19.4	42.9	33.5	25.6	3.8	150	Hor.	Yes
			+2.2	dB / -3.6	dB					

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band	
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm			
2.467	103.4	-	-	71.9	28.7	0.0	2.8	150	Vert.	-	
4.934	39.4	54.0	14.6	27.7	33.5	25.6	3.8	150	Hor.	Yes	
	Me	asuremen	t uncerta	inty		+2.2 dB / -3.6 dB					

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



5.5.2.3 PRELIMINARY MEASUREMENT WITH EXTERNAL MONOPOLE ANTENNA (30 MHz to 25 GHz)

Ambient temperature		20 °C	Relative humidity	60 %
Position of EUT:	The EUT w between El	as set-up on a non-co JT and antenna was	onducting table of a height of 0.8 3 m.	3 m. The distance
Cable guide:	The cable of the cable g	of the EUT was fixed uide refer to the pictu	on the non-conducting table. Fo res in annex A of this test report	r further information of t.
Test record:	Where not there was r	otherwise stated the to otherwise stated the to otherwise stated the otherwise stated the otherwise states and the otherwise states and the s	test was carried out in test mode ther test modes. All results are s	≥ 2 of the EUT, because hown in the following.
Supply voltage:	During all n	neasurements the EL	JT was supplied with 5.0 V DC v	ia the carrier board.
Remark:	As external type. Additi emissions o	antenna the IG-103 onally pre-tests have of all monopole anten	was used, because of the highe shown that this antenna caused nas.	st gain of this antenna I the highest spurious

60502_36.wmf (30 MHz to 230 MHz):



TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



60502_37.wmf (230 MHz to 1 GHz):



No significant frequencies above the noise floor of the system were found during the preliminary radiated emission test, so no measurements were carried out on the open area test site.



Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

60502_33.wmf (1 GHz to 4 GHz):



60502_30.wmf (4 GHz to 12 GHz):





60502_47.wmf (12 GHz to 18 GHz):



60502_46.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.824 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.412 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

60502_34.wmf (1 GHz to 4 GHz):



60502 32.wmf (4 GHz to 12 GHz):





60502_48.wmf (12 GHz to 18 GHz):



60502_49.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.874 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.437 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

60502_35.wmf (1 GHz to 4 GHz):



60502 31.wmf (4 GHz to 12 GHz):





60502_51.wmf (12 GHz to 18 GHz):



60502_50.wmf (18 GHz to 25 GHz):



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 4.924 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.462 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



5.5.2.4 FINAL MEASUREMENT WITH EXTERNAL MONOPOLE ANTENNA (1 GHz to 25 GHz)

Ambient temperature		20 °C	F	Relative humidity	60 %	
Position of EUT:	The EUT w between El	as set-up on a non JT and antenna wa	-condu is 3 m.	cting table of a height of 0.8	3 m. The distance	
Cable guide:	The cable of the cable gives t	of the EUT was fixe uide refer to the pic	d on th tures in	ne non-conducting table. For n annex A of this test report	further information o	of
Supply voltage:	During all m	neasurements the E	EUT wa	as supplied with 5.0 V DC v	ia the carrier board.	
Resolution bandwidth:	For all mea	surements a resolu	ution ba	andwidth of 1 MHz was used	d.	
Remark:	As external type. Additio emissions o	antenna the IG-10 onally pre-tests hav of all monopole ante	3 was i /e shov ennas.	used, because of the highe wn that this antenna caused	st gain of this antenn the highest spurious	a

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	112.4	-	-	81.1	28.5	0.0	2.8	150	Vert.	-
4.824	55.2	74.0	18.8	44.0	33.1	25.7	3.8	150	Vert.	Yes
			+2.2	dB / -3.6	dB					

Result measured with the average detector:

Frequency	Corr.	Limit	Margin	Readings	Antenna	Preamp	Cable	Height	Pol.	Restr.
	value				factor		loss			Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	103.8	-	-	72.5	28.5	0.0	2.8	150	Vert.	-
4.824	40.2	54.0	13.8	29.0	33.1	25.7	3.8	150	Vert.	Yes
	Ме	asuremen	t uncerta			+2.2	dB / -3.6	dB		



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	Cm		
2.437	113.3	-	-	81.8	28.7	0.0	2.8	150	Vert.	-
4.874	53.9	74.0	20.1	42.4	33.4	25.7	3.8	150	Vert.	Yes
			+2.2	dB / -3.6	dB					

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	Cm		
2.437	104.7	-	-	73.2	28.7	0.0	2.8	150	Vert.	-
4.874	38.5	54.0	15.5	27.0	33.4	25.7	3.8	150	Vert.	Yes
	Ме	asuremen	t uncerta			+2.2	dB / -3.6	dB		

Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.462	113.2	-	-	81.7	28.7	0.0	2.8	150		-
4.924	53.8	74.0	20.2	42.1	33.5	25.6	3.8	150	Vert.	Yes
			+2.2	dB / -3.6	dB					

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.462	104.4	-	-	72.9	28.7	0.0	2.8	150		-
4.924	38.7	54.0	15.3	27.0	33.5	25.6	3.8	150	Hor.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



5.5.2.5 PRELIMINARY MEASUREMENT WITH INTERNAL ANTENNA (30 MHz to 25 GHz)

Ambient temperature		20 °C	Relative humidity	60 %
Position of EUT:	The EUT w between E	/as set-up on a non-c UT and antenna was	conducting table of a height of 3 m.	0.8 m. The distance
Cable guide:	The cable of the cable g	of the EUT was fixed uide refer to the pict	l on the non-conducting table. I ures in annex A of this test rep	For further information of ort.
Test record:	Where not there was r	otherwise stated the no difference to the c	test was carried out in test mo other test modes. All results are	ode 2 of the EUT, because e shown in the following.
Supply voltage:	During all n	neasurements the E	UT was supplied with 5.0 V DC	C via the carrier board.

60502_12.wmf (30 MHz to 230 MHz):





60502_13.wmf (230 MHz to 1 GHz):



No significant emissions above the noise floor found during the preliminary emission test. So no final test has to be carried out on an open area test site.

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

60502_1.wmf (1 GHz to 4 GHz):



60502 6.wmf (4 GHz to 12 GHz):





60502_15.wmf (12 GHz to 18 GHz):



60502_20.wmf (18 GHz to 25 GHz):



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 4.824 GHz and 19.296 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.412 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

60502_2.wmf (1 GHz to 4 GHz):



60502 5.wmf (4 GHz to 12 GHz):





60502_16.wmf (12 GHz to 18 GHz):



60502_19.wmf (18 GHz to 25 GHz):



The following frequencies were found inside the restricted bands during the preliminary radiated emission test:

- 4.874 GHz and 19.496 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.437 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

60502_3.wmf (1 GHz to 4 GHz):



60502 4.wmf (4 GHz to 12 GHz):





60502_17.wmf (12 GHz to 18 GHz):



60502_18.wmf (18 GHz to 25 GHz):



The following frequency was found inside the restricted bands during the preliminary radiated emission test:

- 4.924 GHz.

The following frequency was found outside the restricted bands during the preliminary radiated emission test:

- 2.462 GHz.

These frequencies have to be measured in a final measurement. The results were presented in the following.



5.5.2.6 FINAL MEASUREMENT WITH INTERNAL ANTENNA (1 GHz to 25 GHz)

Ambient temperature		20 °C		Relative humidity	60 %
Position of EUT:	The EUT w between El	as set-up on a nor JT and antenna wa	n-cond as 3 m	ucting table of a height of 0.8 1.	3 m. The distance
Cable guide:	The cable of the cable g	of the EUT was fixe uide refer to the pi	ed on ctures	the non-conducting table. For in annex A of this test report	r further information of
Supply voltage:	During all n	neasurements the	EUT ۱	vas supplied with 5.0 V DC vi	ia the carrier board.
Resolution bandwidth:	For all mea	surements a resol	ution I	pandwidth of 1 MHz was used	d.

Transmitter operates at the lower end of the assigned frequency band (operation mode 1)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	104.6	-	-	73.3	28.5	0.0	2.8	150	Hor.	-
4.824	50.3	74.0	23.7	39.1	33.1	25.7	3.8	150	Vert.	Yes
19.296	48.2	74.0	25.8	46.6	37.0	37.0	1.6	100	Hor.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	

Result measured with the average detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.412	96.1	-	-	64.8	28.5	0.0	2.8	150	Hor.	-
4.824	39.5	54.0	14.5	28.3	33.1	25.7	3.8	150	Vert.	Yes
19.296	36.9	54.0	17.1	35.3	37.0	37.0	1.6	100	Hor.	Yes
	Measurement uncertainty							dB / -3.6	dB	



Transmitter operates at the middle of the assigned frequency band (operation mode 2)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.437	105.0	-	-	73.5	28.7	0.0	2.8	150	Hor.	-
4.874	52.9	74.0	21.1	41.4	33.4	25.7	3.8	150	Hor.	Yes
19.496	47.7	74.0	26.3	46.1	37.0	37.0	1.6	100	Hor.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	

Result measured with the average detector:

Frequency	Corr.	Limit	Margin	Readings	Antenna	Preamp	Cable	Height	Pol.	Restr.
	value				factor		loss			Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.437	96.6	-	-	65.1	28.7	0.0	2.8	150	Hor.	-
4.874	37.3	54.0	16.7	25.8	33.4	25.7	3.8	150	Hor.	Yes
19.496	37.5	54.0	16.5	35.9	37.0	37.0	1.6	100	Hor.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	



Transmitter operates at the upper end of the assigned frequency band (operation mode 3)

Result measured with the peak detector:

Frequency	Corr. value	Limit	Margin	Readings	Antenna factor	Preamp	Cable loss	Height	Pol.	Restr. Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.462	105.1	-	-	73.6	28.7	0.0	2.8	150	Hor.	-
4.924	52.1	74.0	21.9	40.4	33.5	25.6	3.8	150	Vert.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	

Result measured with the average detector:

Frequency	Corr.	Limit	Margin	Readings	Antenna	Preamp	Cable	Height	Pol.	Restr.
	value				factor		loss			Band
GHz	dBµV/m	dBµV/m	dB	dBµV	1/m	dB	dB	cm		
2.462	96.6	-	-	65.1	28.7	0.0	2.8	150	Hor.	-
4.924	36.8	54.0	17.2	25.1	33.5	25.6	3.8	150	Vert.	Yes
Measurement uncertainty							+2.2	dB / -3.6	dB	

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

29, 31 – 37, 39, 43, 46, 49 – 51, 54



5.6 CONDUCTED EMISSIONS ON POWER SUPPLY LINES (150 kHz to 30 MHz)

5.6.1 METHOD OF MEASUREMENT

This test will be carried out in a shielded chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices will be placed directly on the ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003 [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase (or plus pole in case of DC powered devices) of the AC mains network. If levels detected 10 dB below the appropriable limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz





5.6.2 TEST RESULTS (CONDUCTED EMISSIONS ON POWER SUPPLY LINES)

Ambient temperature		20 °C		Relative humidity	43 %			
Position of EUT:	The EUT w	as set-up on a nor	-cond	lucting table of a height of 0.8	3 m.			
Cable guide:	The cable of the cable g	The cable of the EUT was fixed on the non-conducting table. For further information the cable guide refer to the pictures in annex A of this test report.						
Test record:	All results a	Il results are shown in the following.						
Supply voltage:	During all n the mascot	During all measurements the EUT was supplied with 5.0 V DC via the carrier board and he mascot AC/DC adaptor.						
Measurement uncertainty:	+3.6 dB / -4	l.5 dB						
Title: EUT: Manufacturer: Operating Condition: Test site: Operator: Test Specification: Comment:	AC Powerli protective g WLAN mod connectBlu produce_ed PHOENIX Th. KÜHN with MASC Fibre optics	ne Conducted Emi ground conductor s lule e AB cho running TEST-LAB Blombe OT AC Adapter s / Ethernet conver	ssion imula rg M4 ter we	Test with ting network ere used for decoupling				



Data record name: 60502v3



Result measured with the quasipeak detector: (These values are marked in the above diagram by x)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.499740 0.590820 0.642390 0.799800 0.961530 1.119120 28.574790 28.770270 28.931460	45.30 34.90 43.50 42.70 42.70 40.00 49.70 47.60 47.70	0.8 0.8 0.7 0.8 0.7 3.2 3.2 3.2 3.3	56.0 56.0 56.0 56.0 56.0 56.0 60.0 60.0	10.7 21.1 12.5 13.3 13.3 16.0 10.3 12.4 12.3	L1 L1 N N L1 N	FLO FLO FLO FLO FLO FLO FLO FLO FLO
29.130990 29.490450 29.852520	48.80 58.20 51.80	3.3 3.3 3.2	60.0 60.0 60.0	11.2 1.8 8.2	L1 L1 L1	FLO FLO FLO

Data record name: 60502v3_fin QP

Result measured with the average detector: (These values are marked in the above diagram by +)

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.245760 0.328920 0.410460	30.80 28.00 24.70	0.9 0.9 0.9	51.9 49.5 47.6	21.1 21.5 22.9	L1 L1 L1	FLO FLO FLO
0.494070 0.660840 0.744990 26.609730	20.80 27.70 26.60 33.50	0.8 0.8 0.8 3.0	46.0 46.0 50.0	17.5 18.3 19.4 16.5	L1 L1 L1 N	FLO FLO FLO
28.685850 29.113260 29.234400	37.60 36.30 39.30	3.0 3.2 3.3 3.3	50.0 50.0 50.0	10.3 12.4 13.7 10 7	L1 L1 L1	FLO FLO FLO
29.784300 29.906790	34.60 36.10	3.3 3.2	50.0 50.0	15.4 13.9	L1 L1	FLO FLO

Data record name: 60502v3_fin AV

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

1-3, 5, 6



6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS



Emission measurement at AC mains and DC in / out ports at M4					
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
1	Shielded chamber M4	-	Siemens	B83117S1-X158	480088
2	Measuring receiver	ESAI	Rohde & Schwarz	831953/001 833181/018	480025 480026
3	LISN	NSLK8128	Schwarzbeck	8128155	480058
4	DC-filter	B84266-A21- E13	Siemens	940164525	480099
5	AC-filter	B84299-D87- E3	Siemens	930262292	480097
6	EMI-Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M5					
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
7	Fully anechoic chamber M5	-	Siemens	B83177-S1-X156	480073
8	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
9	Controller	HD100	Deisel	100/324	480067
10	Antenna support	MA240	Deisel	228/314	480069
11	Turntable	DS412	Deisel	412/317	480070
12	Antenna	CBL6112C	Chase	2689	480327
13	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Radiated emission measurement at M6					
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
14	Open area test site	-	Phoenix Test-Lab	-	480085
15	Measuring receiver	ESVS30	Rohde & Schwarz	829673/012	480024
16	Controller	HD100	Deisel	100/670	480139
17	Turntable	DS420HE	Deisel	420/620/80	480087
18	Antenna support	AS615P	Deisel	615/310	480086
19	Antenna	CBL6111 A	Chase	1643	480147
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111



Radiated emission measurement at M8						
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No	
21	Fully anechoic chamber M8	-	Siemens	B83117-E7019- T231	480190	
22	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180	
23	Measuring receiver	ESCS 30	Rohde & Schwarz	828985/014	480270	
24	Controller	HD100	Deisel	100/427	480181	
25	Turntable	DS420	Deisel	420/435/97	480186	
26	Antenna support	AS615P	Deisel	615/310	480187	
27	Antenna	CBL6112 A	Chase	2034	480185	
28	EMI Software	ES-K1	Rohde & Schwarz	-	480111	

Radia	ated emission measurement at N	V120			
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439- T232	480303
30	Measuring receiver	ESMI	Rohde & Schwarz	843977/001 843530/018	480179 480180
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355
32	Controller	HD100	Deisel	100/670	480326
33	Turntable	DS420HE	Deisel	420/620/80	480315
34	Antenna support	AS615P	Deisel	615/310	480187
35	Antenna	CBL6112 B	Chase	2688	480328
36	Antenna	3115 A	EMCO	9609-4918	480183
37	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294
38	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	482	480295
39	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297
40	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	410	480296
41	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	469	480299



No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
42	Standard Gain Horn 26.4 GHz – 40.1 GHz	22240-20	Flann Microwave	468	480298
43	RF-cable No. 30	RTK 081	Rosenberger	-	410141
44	RF-cable No. 31	RTK 081	Rosenberger	-	410142
45	RF-cable 1m	KPS-1533- 400-KPS	Insulated Wire	-	480300
46	RF-cable 1m	KPS-1533- 400-KPS	Insulated Wire	-	480301
47	RF-cable 2m	KPS-1533- 400-KPS	Insulated Wire	-	480302
48	RF-cable No. 5	RTK 081	Rosenberger		410097
49	Preamplifier	JS3- 00101200- 23-5A	Miteq	681851	480337
50	Preamplifier	JS3- 12001800- 16-5A	Miteq	571667	480343
51	Preamplifier	JS3- 18002600- 20-5A	Miteq	658697	480342
52	Preamplifier	JS3- 26004000- 25-5A	Miteq	563593	480344
53	EMI Software	ES-K1	Rohde & Schwarz	-	480111

Ancilla	ary equipment used for testing				
No.	Test equipment	Туре	Manufacturer	Serial No.	PM-No
54	Power supply	TOE 8852	Toellner	51712	480233
55	Peak Power Sensor	NRV-Z32	Rohde & Schwarz	849745/016	480551
-	-	-	-	-	-
-	-	-	_	-	-

All used measurement equipment was calibrated (if necessary). The calibration intervals and the calibration history will be given out on request.



7 LIST OF ANNEXES

Annex A	Photographs of the test set-ups:	7 pages
	OWLAN211b with external monopole antenna, test set-up fully anechoic chamber	60502_15.jpg
	OWLAN211b with external planar antenna, test set-up fully anechoic chamber OWLAN211b with internal antenna, test set-up fully anechoic chamber OWLAN211b with external monopole antenna	60502_4.jpg 60502_13.jpg
	test set-up fully anechoic chamber OWLAN211b with external planar antenna.	60502_1.jpg
	test set-up fully anechoic chamber OWLAN211b with internal antenna, test set-up fully anechoic chamber OWLAN211b test set-up conducted emission measurement	60502_6.jpg 60502_5.jpg 60502_22.jpg
ANNEX B	INTERNAL PHOTOGRAPHS OF THE TEST SAMPLE:	7 pages
	OWLAN211b sample for external antenna, top view OWLAN211b sample with internal antenna, top view OWLAN211b, bottom view cB-0703-02, carrier board with test sample, top view cB-0703-02, carrier board, top view cB-0703-02, carrier board, bottom view EUT initiator, top view	60502_c.jpg 60502_h.jpg 60502_b.jpg 60502_g.jpg 60502_f.jpg 60502_e.jpg 60502_a.jpg

ANNEX C EXTERNAL PHOTOGRAPHS OF THE TEST SAMPLE: - pages

Because the EUT is a module, which is intended to be implemented inside a final application, no external photographs were available