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Test Report

Report Number: F121150E2

Applicant:

SIMAC Electronics Handel GmbH

Manufacturer:

B-LINK ELECTRONIC LIMITED

Equipment under Test (EUT):

USBN

Laboratory (CAB) accredited by
Deutsche Gesellschaft für Akkreditierung mbH
in compliance with DIN EN ISO/IEC 17025
under the Reg. No. DGA-PL-105/99-22,
FCC Test site registration number 90877 and
Industry Canada Test site registration IC3469A-1

REFERENCES

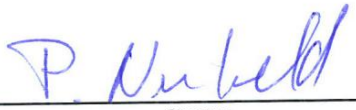
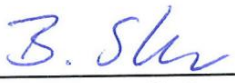
[1] **ANSI C63.4-2009** American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

[2] **FCC CFR 47 Part 15 (August 2011)** Radio Frequency Devices

[3] **ICES-003 Issue 4 (February 2004)** Digital Apparatus

TEST RESULT

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test.
The complete test results are presented in the following.

Test engineer:	Paul NEUFELD Name	 Signature	2.05.2012 Date
Authorized reviewer:	Bernd STEINER Name	 Signature	2.05.2012 Date

RESERVATION

This test report is only valid in its original form.

Any reproduction of its contents in extracts 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 generalizations 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 NUMBER.

Contents: Page

1 IDENTIFICATION

1.1 Applicant

Name:	B-LINK ELECTRONIC LIMITED
Address:	Kelvinstr. 5 47506 Neukirchen-Vluyn
Country:	Germany
Name for contact purposes:	Mr. Dennis Paratsch
Phone:	+ 47 2845 9360 27
Fax:	+ 47 2845 936079
eMail Address:	d.paratsch@simac-gmbh.de
Applicant represented during the test by the following person:	-

1.2 Manufacturer

Name:	B-LINK ELECTRONIC LIMITED
Address:	No 268 ,FuQian Rd,JuTang Community ,GuanLan Town, BaoAn district, Shenzhen,518110
Country:	China
Name for contact purposes:	Cindy He
Phone:	+86-755-28023440;
Fax:	+86-755-28029002
eMail Address:	he@lefen.com, lefenhe@hotmail.com
Applicant represented during the test by the following person:	-

1.3 Test laboratory

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

accredited by DGA Deutsche Gesellschaft für Akkreditierung mbH in compliance with DIN EN ISO/IEC 17025 under Reg. No. DGA-PL-105/99-22, FCC Test site registration number 90877 and Industry Canada Test site registration IC3469A-1.

1.4 EUT (Equipment Under Test)

Test object: *	150Mbps Wireless N Mini USB Adapter
Type: *	USBN
Article number: *	AYR-N
Serial number: *	10206A-N
Hardware version: *	Not available
Software version: *	Not available
Highest internal frequency: *	Not available

1.5 Technical data of equipment

Channel 01	RX:	2412 MHz	TX:	2412 MHz
Channel 02	RX:	2417 MHz	TX:	2417 MHz
Channel 03	RX:	2422 MHz	TX:	2422 MHz
Channel 04	RX:	2427 MHz	TX:	2427 MHz
Channel 05	RX:	2432 MHz	TX:	2432 MHz
Channel 06	RX:	2437 MHz	TX:	2437 MHz
Channel 07	RX:	2442 MHz	TX:	2442 MHz
Channel 08	RX:	2447 MHz	TX:	2447 MHz
Channel 09	RX:	2452 MHz	TX:	2452 MHz
Channel 10	RX:	2457 MHz	TX:	2457 MHz
Channel 11	RX:	2462 MHz	TX:	2462 MHz

Fulfills WLAN specification: *	IEEE 802.11n, 802.11g, 802.11b
Antenna type: *	Integral antenna
Antenna gain: *	2 dBi
Antenna connector: *	none
Power supply	Powered by USB
Type of modulation: *	802.11b: CCK, DQPSK, DBPSK 802.11g: OFDM 802.11n: OFDM
Operating frequency range:*	2412 MHz to 2462 MHz
Number of channels: *	11
Temperature range: *	0 °C to +40 °C
Lowest / highest Internal clock frequency: *	1 MHz / 2.4835 GHz

* declared by the applicant.

1.6 Dates

Date of receipt of test sample:	27 February 2012
Start of test:	22 March 2012
End of test:	04 April 2012

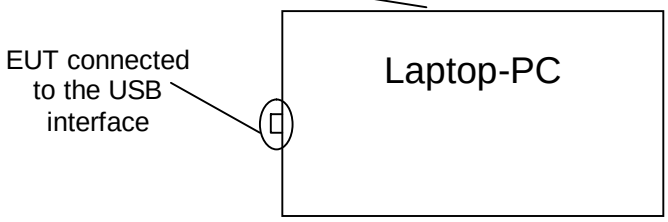
2 OPERATIONAL STATES

The tests were carried out with the one delivered test sample. The EUT was plugged into a laptop PC of the brand Medion with the model number MD 96500 and the serial number 914W801DS0538122C5K000.

For the test, the typical user drivers were installed on the test laptop and a test communication was established. The EUT was plugged into the laptop and the empirically investigated worst case WLAN mode “b/g” was set.

During the tests the test samples were powered with the normal USB supply voltage of 5V

Test setup for the EUT FWN-652N



3 ADDITIONAL INFORMATION

none

4 OVERVIEW

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	ICES-003, Issue 4 [3]	Status	Refer page
Radiated emissions	30 – 1000	15.105 (a) 15.109 (a)	5.4 [4]	Passed	8 et seq.
Conducted emissions on supply line	0.15 - 30	15.107 (a)	5.2 [4]	Passed	15 et seq.

5 TEST RESULTS

5.1 Radiated emissions

5.1.1 Method of measurement (radiated emissions)

The radiated emission measurement is subdivided into two 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.

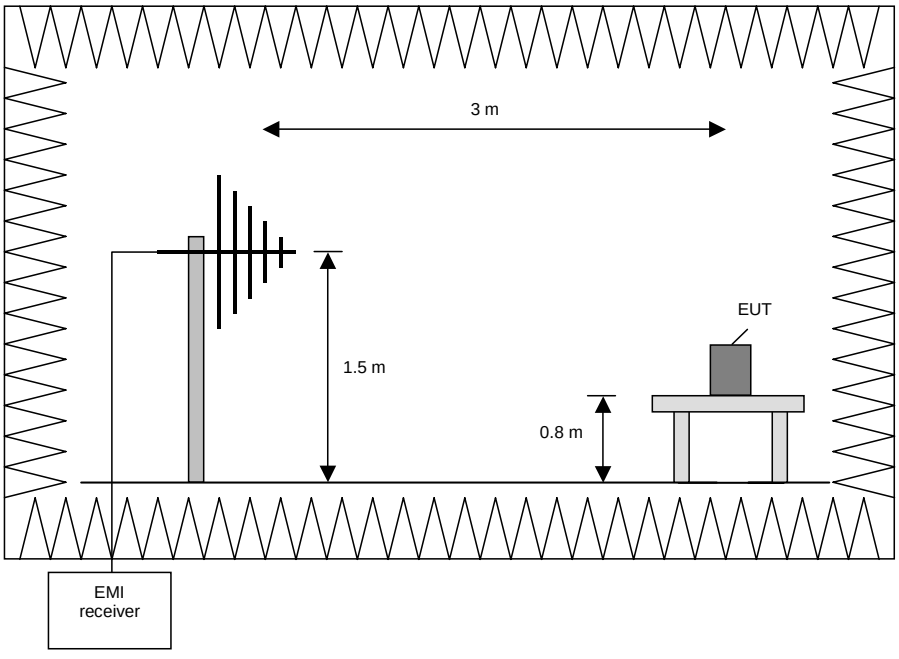
Preliminary measurement (30 MHz to 1 GHz)

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 C63.4-2009 [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:

Frequency range	Resolution bandwidth
30 MHz to 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



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:

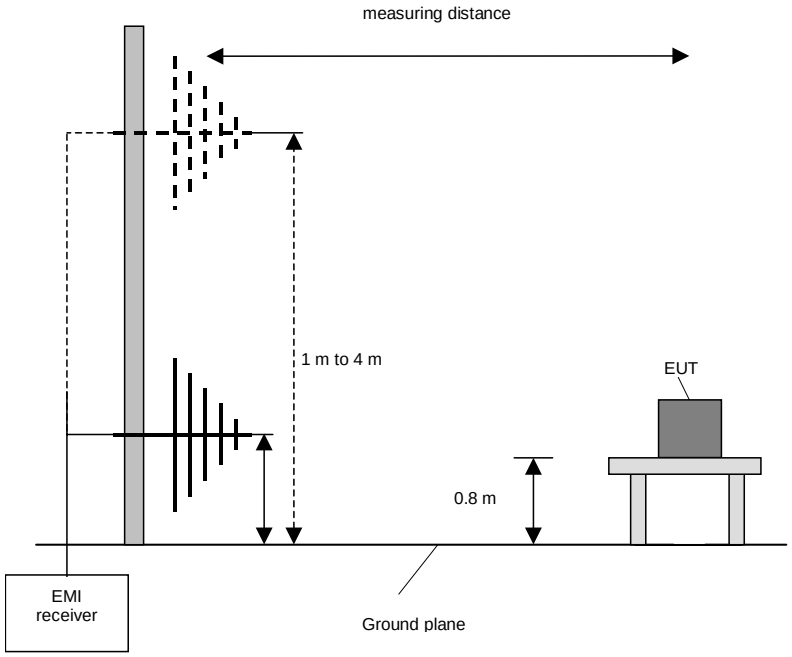
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the 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 (because of EUT is a module and might be used in a handheld equipment application).
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 ° to 360 °, 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:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



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 (because of EUT is a module and might be used in a handheld equipment application).

5.1.2 Test results (radiated emissions)

5.1.2.1 Preliminary emission measurement (30 MHz to 1 GHz)

Ambient temperature	20 °C	Relative humidity	31 %

Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m..

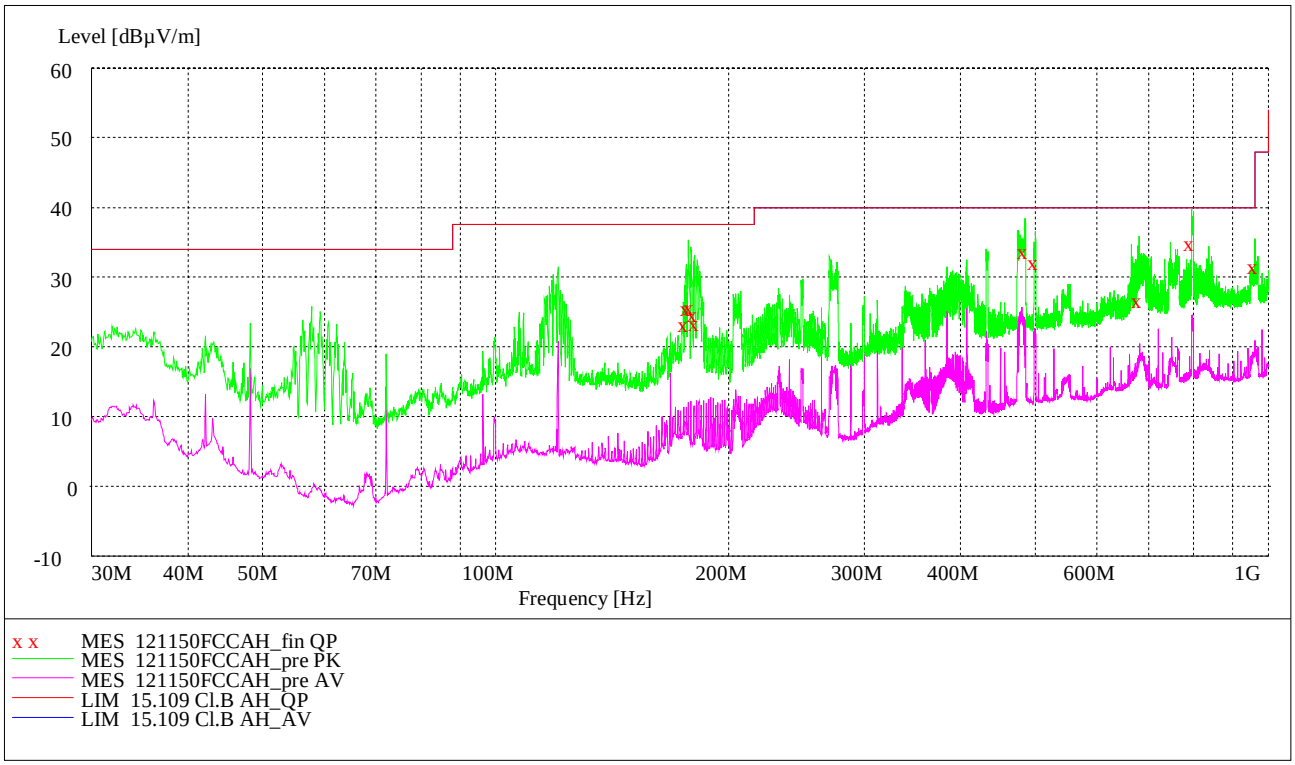
Cable guide: For detail information of test set-up and the cable guide refer to the photographs in annex A of this test report.

Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 5 V DC via the laptop PC.

Title: Emissionmeasurement according EN55022
EMI Test receiver ESI Rohde & Schwarz
EUT: USB WLAN dongle
Manufacturer: SIMAC GmbH
Operating Condition: Cont. transmission in ad hoc mode with Iperf
Test site: fully anechoic chamber M20; PHOENIX TEST LAB GmbH
Operator: P. Neufeld
Test Specification: With Medion laptop
Comment:
02.04.2012 / 15:41:27

The limit line and measurement curve shown in the diagram below refer to the preliminary measurements. Here, it must be noted that because of the reduced measuring distance and because of the floor absorbers, the measured values do not comply with the values of the above mentioned standard; they only serve as orientation in determining which frequencies must be measured on the open area test site.
The limit line is achieved with the applied standard by converting to a 3 m measurement distance (+ 10 dB) and the correction for the free space in which in the "worst case" the reflected floor wave is missing entirely (– 6 dB). Therefore 4 dB is added to the limit line of the standard concerned.
The curves in the diagram only represent the maximum measured value for each frequency point of all preliminary measurements, which were carried out with the EUT in various positions.
The top measured curve represents the peak measurement. The measured points marked with “x” are frequency points for which later measurements with a quasi-peak detector were carried out. These values are indicated in the following table. The bottom measured curve represents average values (marked with “+”), which are only required for control purposes.



Data record name: 121150FCCAH of 02.04.2012

Result measured with the quasipeak detector (marked by x):

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
176.244000	23.40	9.9	37.5	14.1	150.0	90.00	HORIZONTAL
177.744000	25.70	9.9	37.5	11.8	150.0	93.00	HORIZONTAL
179.232000	25.90	9.8	37.5	11.6	150.0	89.00	HORIZONTAL
180.756000	25.00	9.7	37.5	12.5	150.0	98.00	HORIZONTAL
182.232000	23.70	9.8	37.5	13.8	150.0	91.00	HORIZONTAL
484.144000	34.00	19.1	40.0	6.0	150.0	136.00	VERTICAL
499.876000	32.40	19.2	40.0	7.6	150.0	163.00	VERTICAL
680.104000	27.00	20.9	40.0	13.0	150.0	43.00	VERTICAL
796.192000	35.10	22.3	40.0	4.9	150.0	135.00	VERTICAL
959.992000	31.80	23.4	40.0	8.2	150.0	353.00	HORIZONTAL

In this case it was necessary to carry out subsequent measurements because at some frequency points a value was above the Qualify limit curve during the preliminary measurements. The results from the standard subsequent measurements on the open area test site are presented in the following.

TEST EQUIPMENT USED FOR THE TEST:

29, 31 - 35, 47

5.1.2.2 Final radiated emission measurement (30 MHz to 1 GHz)

Ambient temperature	21 °C	Relative humidity	30 %

Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m..

Cable guide: For detail information of test set-up and the cable guide refer to the photographs in annex A of this test report.

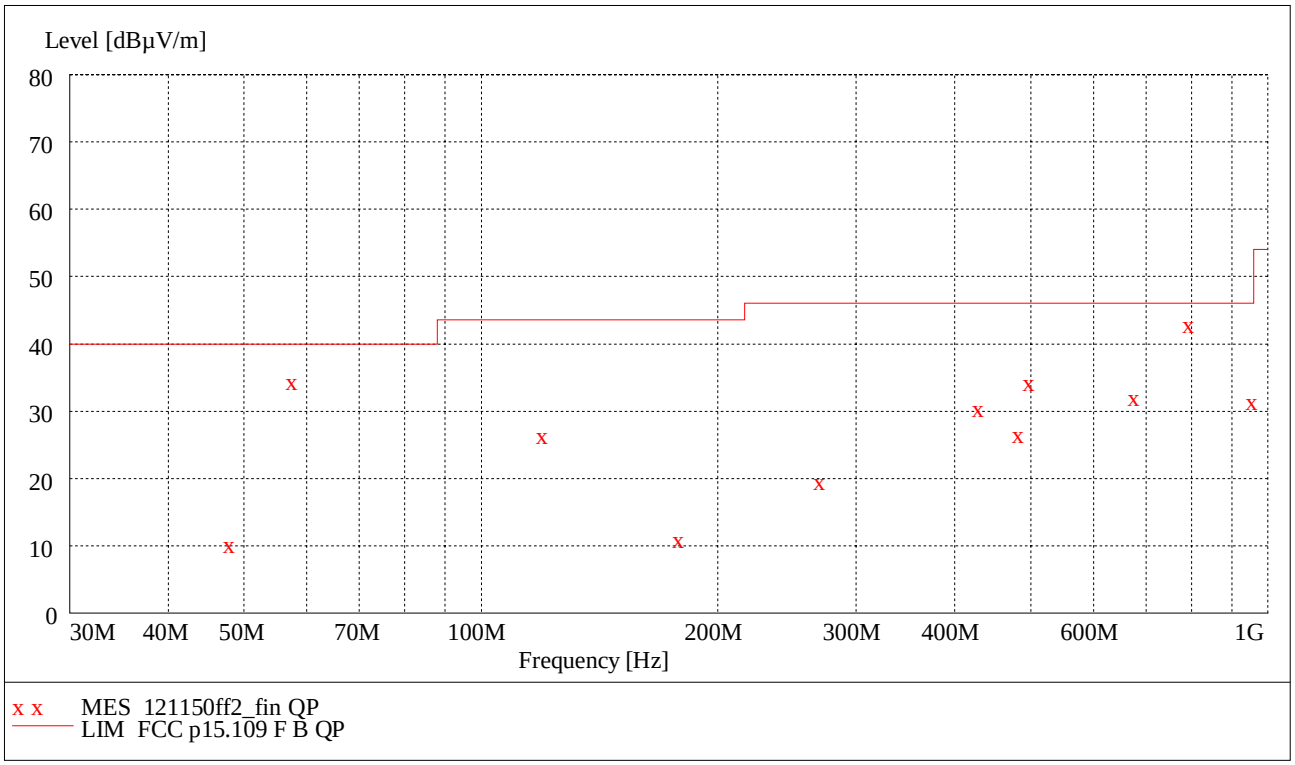
Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 5 V DC via the laptop PC.

Title: final measurement on 3 m open area test site

EUT: USB WLAN dongle
Manufacturer: SIMAC GmbH
Operating Condition: Cont. transmission in ad hoc mode with Iperf
Test site: PHOENIX TESTLAB GmbH, BLOMBERG; open area test site M6
Operator: P. Neufeld
Test Specification: With Medion laptop
Comment:
03.04.2012 / 15:43:16

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above mentioned standard. The measured points marked with “x” are the measured results of the standard subsequent measurement on the open area test site.



Data record name: 121150ff2 of 03.04.2012

The results of the standard subsequent measurement on the open area test site are indicated in the table below. The limits as well as the measured results (levels) refer to the above mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

Result measured with the quasipeak detector (marked by x):

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
48.160000	10.50	11.6	40.0	29.5	102.0	91.00	VERTICAL
57.760000	34.80	7.8	40.0	5.2	105.0	226.00	VERTICAL
120.400000	26.70	14.0	43.5	16.8	313.0	359.00	HORIZONTAL
179.232000	11.30	12.0	43.5	32.2	104.0	156.00	VERTICAL
270.720000	20.00	15.6	46.0	26.0	100.0	341.00	HORIZONTAL
431.200000	30.80	20.3	46.0	15.2	202.0	242.00	HORIZONTAL
484.144000	26.80	21.6	46.0	19.2	162.0	257.00	HORIZONTAL
499.876000	34.60	21.9	46.0	11.4	150.0	296.00	HORIZONTAL
680.104000	32.40	24.9	46.0	13.6	101.0	17.00	VERTICAL
796.192000	43.20	26.9	46.0	2.8	143.0	316.00	VERTICAL
959.992000	31.70	30.2	46.0	14.3	100.0	293.00	VERTICAL

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
14 - 20

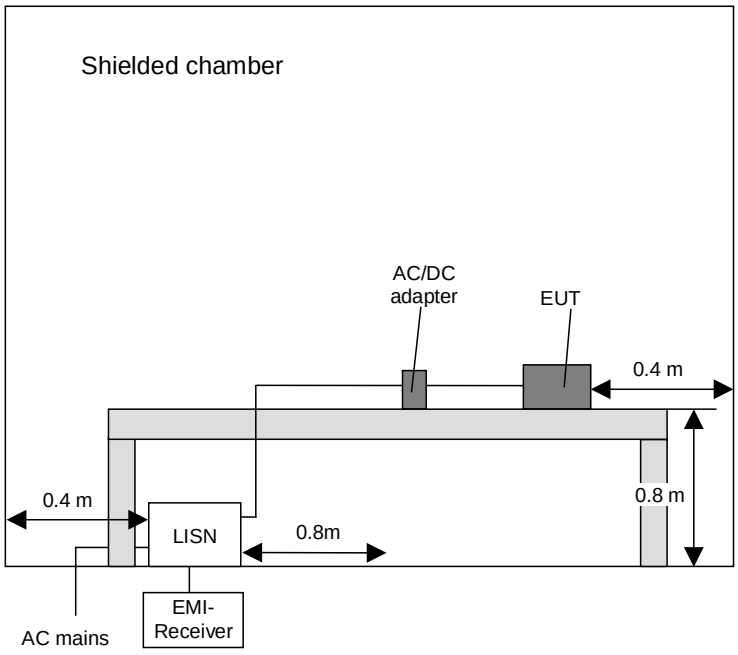
5.2 Conducted emissions on power supply lines (150 kHz to 30 MHz)

5.2.1 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 C63.4-2009 [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



5.2.2 Test results (conducted emissions on power supply lines)

Ambient temperature	21 °C	Relative humidity	30 %

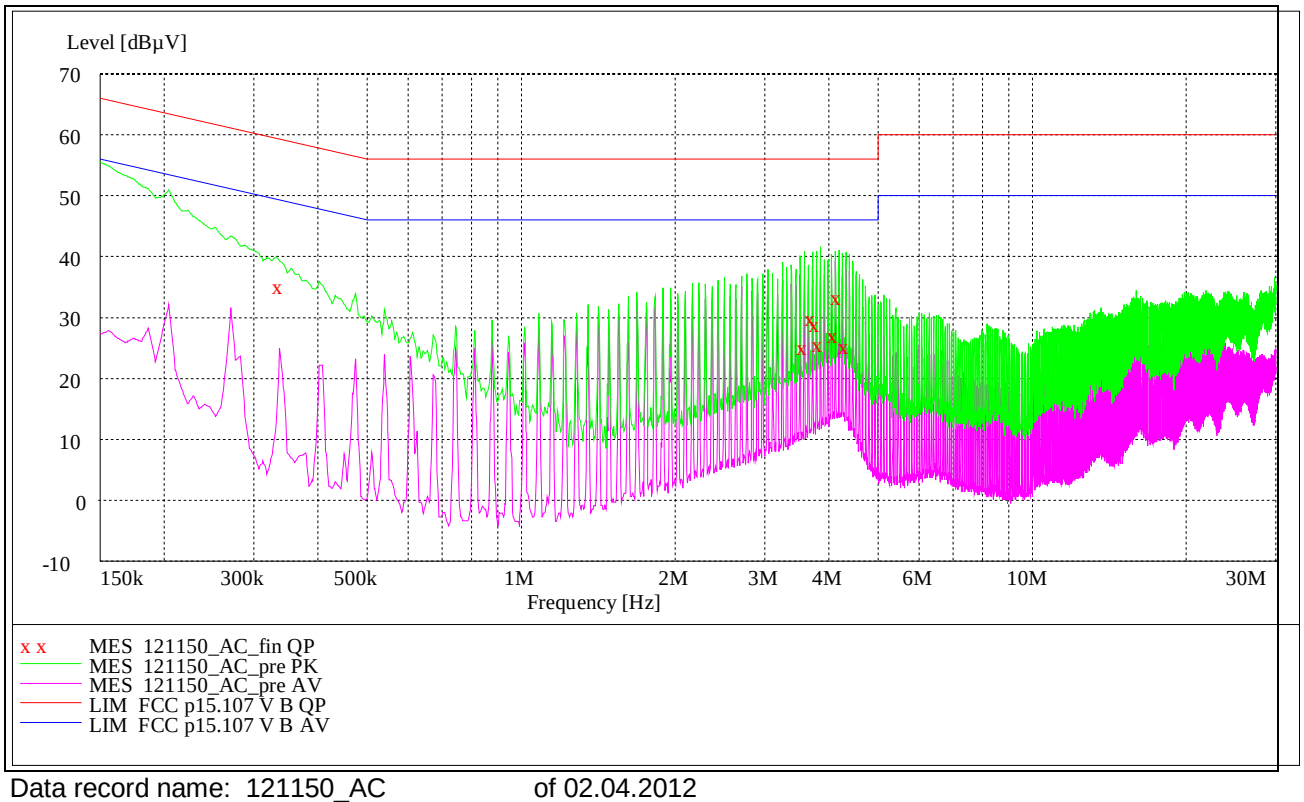
Position of EUT: The EUT was plugged into a laptop PC. The laptop PC with the inserted EUT was set-up on a non-conducting table of a height of 0.8 m. The distance between EUT and antenna was 3 m..

Cable guide: For detail information of test set-up and the cable guide refer to the photographs in annex A of this test report.

Test record: All results are shown in the following.

Supply voltage: During all measurements the EUT was supplied with 5 V DC via the laptop PC.

The curves in the diagram only represent for each frequency point the maximum measured value of all preliminary measurements which were made for each power supply line. The top measured curve represents the peak measurement and the bottom measured curve the average measurement. The quasi-peak measured points are marked by “x” and the average measured points by “+”.



Data record name: 121150_AC of 02.04.2012

Result measured with the quasipeak detector (marked by x):

Frequency MHz	Level dBµV	Transducer dB	Limit dBµV	Margin dB	Line	PE
0.337200	35.30	0.7	59.3	24.0	N	FLO
3.578100	25.30	0.9	56.0	30.7	L1	FLO
3.714000	30.00	0.9	56.0	26.0	N	FLO
3.785100	29.00	0.9	56.0	27.0	N	FLO
3.843600	25.70	0.9	56.0	30.3	N	FLO
4.116300	27.30	1.0	56.0	28.7	N	FLO
4.175700	33.60	1.0	56.0	22.4	N	FLO
4.318800	25.50	1.0	56.0	30.5	L1	FLO

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:
1 - 4, 20

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. due
1	Shielded chamber M47	-	Albatross Projects	B83117-C6439-T262 -	480662	Weekly verification (system cal.)	
2	EMI Receiver	ESIB 26	Rohde & Schwarz	1088.7490	481182	03/09/2012	03/2014
3	LISN	NSLK8128	Schwarzbeck	8128161	480138	12/13/2011	12/2012
4	High pass filter	HR 0.13-5ENN	FSY Microwave Inc.	DC 0109 SN 002	480340	Weekly verification (system cal.)	
14	Open area test site	-	Phoenix Test-Lab	-	480085	Weekly verification (system cal.)	
15	Measuring receiver	ESIB7	Rohde & Schwarz	100304	480521	02/15/2010	02/2014
16	Controller	HD100	Deisel	100/670	480139	-	-
17	Turntable	DS420HE	Deisel	420/620/80	480087	-	-
18	Antenna support	MA240-0	Inn-Co GmbH	MA240-0/030/6600603	480086	-	-
19	Antenna	CBL6111 D	Chase	25761	480894	28/09/2011	09/2014
20	EMI Software	ES-K1	Rohde & Schwarz	-	480111	-	-
29	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Weekly verification (system cal.)	
31	Measuring receiver	ESI 40	Rohde & Schwarz	100064	480355	02/13/2012	02/2014
32	Controller	MCU	Maturo	MCU/043/971107	480832	-	-
33	Turntable	DS420HE	Deisel	420/620/80	480315	-	-
34	Antenna support	AS620P	Deisel	620/375	480325	-	-
35	Antenna	CBL6112 B	Chase	2688	480328	04/21/2011	04/2014
47	RF-cable-No 36	Sucoflex 106B	Huber&Suhner	0587/6B / Kabel 36	480865	Weekly verification (system cal.)	

7 REPORT HISTORY

Report Number	Date	Comment
F120020E2	19 April 2012	Document created
-	-	-
-	-	-

8 LIST OF ANNEXES

ANNEX A TEST SET-UP PHOTOGRAPHS 4 pages

121150_2: Test set-up: fully anechoic chamber (Preliminary measurement 30 MHz – 1000 MHz)
121150_16: Test set-up: open area test site (Final measurement 30 MHz – 1 GHz)
121150_17: Test set-up: Conducted emissions on power supply lines
121150_23: USBN plugged into the test laptop-PC

ANNEX B EXTERNAL PHOTOGRAPHS OF THE EUT 4 pages

121150_24: USBN Top view 1
121150_25: USBN Top view 2
121150_26: USBN Bottom view 1
121150_27: USBN Bottom view 2

ANNEX C INTERNAL PHOTOGRAPHS OF THE EUT 3 pages

121150_29: USBN PCB top view
121150_28: USBN PCB bottom view
121150_30: USBN – internal antenna