



EUROFINS ETS PRODUCT SERVICE GMBH

TEST - REPORT

**FCC RULES PART 15 / SUBPART C §15.249
RSS 210 Issue 7**

FCC ID: OMO-TX50U

Test report no.: G0M20805-1792-C-1



Certificate # 1983.01



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TABLE OF CONTENTS

1	General Information	2
1.1	Notes	2
1.2	Testing laboratory	3
1.2.1	Location	3
1.2.2	Details of accreditation status	3
1.2.3	Details of approval holder	3
1.4	Application details	4
1.5	Test item	4
1.6	Test standards	5
2	Technical test	5
2.1	Summary of test results	5
2.2	Test environment	5
2.3	Test equipment utilized	6
2.4	General Test Procedure	7
3.	Test results (enclosure)	8
3.1	Output Power (Field Strength) FCC § 15.249 (a)	9
3.1.2	De facto equivalent isotropic radiated power	9
3.1.3	Transmitter	9
3.2	RF Exposure Compliance Requirements	10
3.3	Radiated Emissions; FCC § 15.249 (d)(e)	10
3.4	Radiated Emissions on the bandedge; FCC 15.249(d)(e), 15.35(b)	12
3.5	Antenna requirement; FCC § 15.203	12
3.6	Conducted Measurement at (AC) Power Line; FCC § 15.207	13
3.7	20 dB bandwidth §15.215 (c)	14
4	Receiver parameters	15
4.1	Radiated emissions	15
Annex A	Pictures	8 pages
Annex B	Fundamental Field Strength	6 pages
Annex C	Harmonics and Spurious Emissions radiated - Transmitter operating	30 pages
Annex D	Occupied Bandwidth	3 pages

1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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Operator:

12.06.2008 D. Hoppe



Date	Eurofins ETS-Lab	Name	Signature
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Technical responsibility for area of testing:

12.06.2008 K.Damm



Date	Eurofins ETS	Name	Signature
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Test Report No.: G0M20805-1792-C-1

1.2 Testing laboratory

1.2.1 Location

EUROFINS ETS PRODUCT SERVICE GMBH
Storkower Strasse 38c
D- 15526 Reichenwalde
Germany
Telephone : + 49 33631 888 00
Telefax : + 49 33631 888 660

1.2.2 Details of accreditation status

DAR ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-268/08

RECOGNIZED NOTIFIED BODY EMC
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

RECOGNIZED NOTIFIED BODY R&TTE
REGISTRATION NUMBER: BNetzA-bS-02/51-53

FCC FILED TEST LABORATORY
REG.-No. 96970

A2LA ACCREDITED TESTING LABORATORY
CERTIFICATE NO. 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

INDUSTRY CANADA FILED TEST LABORATORY
REG. No. IC 3470

1.2.3 Details of approval holder

Name : Proficell Batterien & Co. Vertriebs-KG
Street : Gewerbepark Berlin Wildau, Gewerbeparkstr. 10
Town : 15745 Wildau
Country : Germany
Telephone : +49 3375 21 60 52
Fax : +49 3375 21 60 60

Contact : Mrs. Evelin Sarrazin
Telephone : +49 3375 21 60 52

1.4 Application details

Date of receipt of application : 30.04.2008
Date of receipt of test item : 30.04.2008
Date of test : 15.05.2008 – 16.05.2008

1.5 Test item

Description of test item : Transmitter
Type identification : TX-50U
Serial number : without
Photos : See Annex A

Technical data

Frequency band : 902 MHz - 928 MHz
Frequency (ch 1) : 903 MHz
Frequency (ch 2) : 915 MHz
Frequency (ch 3) : 927 MHz
Antenna : internal
Power supply : 3.0 V (2 x 1.5 V DC battery)
Operating mode : simplex
Type of modulation : F3D

Manufacturer:

Name : LaCrosse Technology Asia Limited
Street : A3, 12/F., Kailey Ind. Centre, No. 12 Fung Yip St.
Town : Chaiwan
Country : Hong Kong

1.6 Test standards

Technical standard : FCC RULES PART 15 / SUBPART C § 15.249
IC Standards: RSS 210 Issue 7 Annex 2.9

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.

2.2 Test environment

Temperature : 23 °C

Relative humidity content : 51 %

Air pressure : 936 hPa

Details of power supply : 220...240 V AC

Extrem conditions parameters: : test voltage - extreme nom.: 3.0 V DC
min.: -- V DC
max: -- V DC

Additional information : none

2.3 Test equipment utilized

ID No.	Test equipment	Type	Manufacturer
ETS 0012	Biconical Antenna	HK 116	R & S
ETS 0013	LPD Antenna	HL 223	R & S
ETS 0014	Log Periodical Antenna	HL 025	R & S
ETS 0015	Log Periodical Antenna	HL 025	R & S
ETS 0018	Horn antenna	BBHA 9120D	Schwarzbeck
ETS 0125	Reference dipole	3126-1880	ETS Lindgren
ETS 0228	Climatic chamber	VT 4010	Vötsch
ETS 0253	Spectrum Analyzer	FSIQ26	R & S
ETS 0271	Spectrum Analyzer	FSEK30	R & S
ETS 0288	Artificial mains	ESH2-Z5	R & S
ETS 0311	Anechoic chamber	AC 4	Frankonia
ETS 0474	EMI Test Receiver	ESCS 30	R&S

2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 μ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The resolution bandwidth of the spectrum analyzer was 100 kHz for measurements below 1 GHz and RBW 1 MHz was used above 1 GHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 23 °C with a humidity of 43 %.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz) METER READING + ACF + CABLE LOSS (to the receiver) = FS
33 20 dB μ V + 10.36 dB + 6 dB = 36.36 dB μ V/m @ 3 m

ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5 m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings. Measurements were made by EUROFINS ETS PRODUCT SERVICE GMBH at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde, Germany.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

ANTENNA & GROUND:

The unit use internal antenna. There is no provision for an external antenna (see photo).

3. Test results (enclosure)

TEST CASE	FCC 49CFR PART	IC RSS-	Required	Test passed	Test failed
<i>Transmitter parameter</i>					
Output Power (Field Strength)	15.249(a)	RSS 210 A 2.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated - Transmitter operating	15.249 (d)(e)	RSS 210 A 2.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions conducted - Transmitter operating	15.249 (d)(e)	RSS 210 A2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB bandwidth / Occupied bandwidth	15.215(c);	RSS 210 A 8.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Out of Band Spurious Emission, Bandedge-Transmitter operating	15.249 (d)(e)	RSS 210 A 2.9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Measurement at (AC) Power Line	15.207	Gen 7.2.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Receiver Parameter</i>					
Radiated emissions	15.107	Gen 7.2.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.1 Output Power (Field Strength) FCC § 15.249 (a), RSS 210 A2.9

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

Limits:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 - 928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

The power was measured with modulation (declared by the applicant).

Test conditions	lowest frequency [dB μ V/m]	middle frequency [dB μ V/m]	highst frequency [dB μ V/m]
$T_{nom} = 23 \text{ }^\circ\text{C}$ $V_{nom} = 3.0 \text{ V}$	89.94	89.32	89.18
Measurement uncertainty	< 3 dB		

Test equipment used: ETS 0018, ETS 0271, 0253, ETS 0311

Remark: See attached diagrams Annex B

3.1.2 De facto equivalent isotropic radiated power

Because using an permanent antenna there are no deviations from the radiated test results according 3.1.

3.1.3 Transmitter

At the transmitter the measurement was transacted with the modulation declared by the manufacturer and the maximum available output power of the EUT.

3.2 RF Exposure Compliance Requirements

Not applicable for this kind of device for the low power level.

3.3 Radiated Emissions; FCC § 15.249 (d)(e); , RSS 210 A2.9

Out of Band Radiated Emissions

FCC Rule: 15.249(d)(e) , 15.35(b); RSS 210 A2.9

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Limits:

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

For frequencies above 1GHz (Peak measurements).

Limit + 20 dB

54.0 dB μ V/m + 20 dB= 74 dB μ V/m

or

46.0 dB μ V/m + 20 dB= 66 dB μ V/m

Must be antenuatted at least 50 dB below the level of fundamental emission

Spurious emission was measured with modulation (declared by manufacturer).

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance with point 2.3.

The peak and average spurious emission plots was measured with the average limits.
The critical peak value listed in the table agree with the above calculated limits.

Summary table with radiated data of the test plots

Freq.	Used Ch.	Frequency Marker [GHz]	Polarization	Max. Field Strength [dB μ V/m]	Compliance Limit [dB μ V/m]	Detector	BW [MHz]	Margin [dB]
3	L	1.806	V	49.07	54	P	1	<u>-4.93</u>
3	L	2.707	H	51.86	54	P	1	<u>-2.14</u>
3	M	1.830	V	49.91	54	P	1	<u>-4.09</u>
3	M	2.743	H	52.98	54	P	1	<u>1.02</u>
3	H	2.780	V	51.87	54	P	1	<u>-2.13</u>
3	H	1.854	H	51.41	54	P	1	<u>-2.59</u>

Freq. – Frequency Range:

- 1: – 30 – 200 MHz
- 2: – 200–1000 MHz
- 3: – 1 – 4 GHz
- 4: – 4 – 8 GHz
- 5: – 8 – 12 GHz

TEST RESULT (Transmitter): The unit DOES meet the FCC requirements.

Test equipment used: ETS 0012; ETS 0013; ETS 0015; ETS 0018; ETS 0271; ETS 0253; ETS 0311

Remark: See attached diagrams Annex C.

3.4 Radiated Emissions on the bandedge; FCC 15.249(d)(e), 15.35(b); RSS 210 A2.9

From the following plots, they show that the fundamental emissions are confined in the specified band and they are at least 50 dB below the carrier level at band edge (2400 and 2483,5 MHz) or below the emission limits in section 15.209. It meets the requirement of section 15.249(d).

Test equipment used: ETS 0012; ETS 0013; ETS 0015; ETS 0018; ETS 0271; ETS 0253;
ETS 0311

Remark: n.a.

3.5 Antenna requirement; FCC § 15.203

In this arrangement the EUT fulfils the requirements of the FCC rules § 15.203 subpart c. This unit uses permanent antenna. There is no provision for an external antenna (see photo).

3.6 Conducted Measurement at (AC) Power Line; FCC § 15.207 RSS-Gen 7.2.2

Reference

FCC	CFR part 15.207
IC	RSS-Gen 7.2.2

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Frequency	Level	
	quasi-peak	average
150 kHz to 30 MHz	--	--

Limits:

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used: ETS 0125; ETS 0288; ETS 0474

Remark: n.a.

3.7 20 dB bandwidth §15.215 (c); RSS 210 A 8.1

Measurement of Necessary Bandwidth (BN)

Test results

Test conditions	lowest frequency	highest frequency
	MHz	MHz
$T_{nom} = 23\text{ °C}$ $V_{nom} = 3.0\text{ V}$	--	--
Measurement uncertainty	< 10 Hz	

Remarks: The 20 dB bandwidth is approximately 6 MHz as one can get from ‘carrier power (Field strength)’ diagram. Because of the distance of the three transmitting frequencies (910, 915, 920 MHz) to the bandedges (902 MHz, 928 MHz) this requirement is considered as fulfilled.

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Occupied Bandwidth (99%) – RSS Gen

Test conditions	Channel 1 905 MHz	Channel 2 913 MHz	Channel 3 923 MHz
	kHz	kHz	kHz
$T_{nom} = 23\text{ °C}$ $V_{nom} = 3.0\text{ V}$	118.236	116.232	125.250
Measurement uncertainty	< 10 Hz		

Remark: See attached diagrams Annex D.

4 Receiver parameters

4.1 Radiated emissions

Reference

FCC	Part 15.109
IC	RSS-Gen 7.2.3

Method of measurement

The compliance of the EUT Receiver with the Limits of spurious emissions was performed according to the radiated measurement method.

The spectrum analyzer RBW was set to 100 kHz for measurements below 100 kHz and 1.0 MHz above 1.0 GHz. The measurement results are evaluated according to the procedure described in section 2.4 of this test report.

Limits

	Spurious frequency	Field strength
	MHz	microvolt/m at 3 meter
FCC & IC	30 - 88	100
	88 - 216	150
	216 - 960	200
	above 960	500

Test Results

Device Frequency 2441 MHz	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [$\mu\text{V}/\text{m}$]	Compliance limit [$\mu\text{V}/\text{m}$]	Results [$\mu\text{V}/\text{m}$]

Remark: n.a.

Test equipment: ETS 0014, ETS 0294, ETS 0295, ETS 0310, ETS 0416, ETS 0484

ANNEX

- A Pictures
- B Fundamental Field Strength
- C Spurious Emissions radiated - Transmitter operating
- D Occupied Bandwidth