

EMI – TEST REPORT

- Human Exposure -

Type / Model Name : EBI 10-System (EBI 10, EBI 100)

Product Description : Wireless data logger system

Applicant : Xylem Analytics Germany GmbH

Address : Dr.-Karl-Slevogt-Strasse 1

82362 WEILHEIM, GERMANY

Manufacturer : Xylem Analytics Germany GmbH

Address : Dr.-Karl-Slevogt-Strasse 1

82362 WEILHEIM, GERMANY

Licence holder : Xylem Analytics Germany GmbH

Address : Dr.-Karl-Slevogt-Strasse 1

82362 WEILHEIM, GERMANY

Test Result according to the standards
listed in clause 1 test standards:

POSITIVE

Test Report No. : **T40058-00-13HS**

23. August 2016

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-01
D-PL-12030-01-02

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test results
without the written permission of the test laboratory.

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ATTACHMENT A as separate supplement

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 1, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310 Radiofrequency radiation exposure limits

Part 1, Subpart 2, Section 2.1091 Radiofrequency radiation exposure evaluation: **mobile devices**.

Part 1, Subpart 2, Section 2.1093 Radiofrequency radiation exposure evaluation: **portable devices**.

OET Bulletin 65, 65A, 65B Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

KDB 447498 D01 v05r02 Mobile and portable devices RF Exposure procedures and equipment authorisation policies, February 7, 2014.

KDB 865664 D01 SAR Measurement Requirements for 100 MHz to 6 GHz, February 7, 2014.

ANSI C95.1: 2005 IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

ETSI TR 100 028 V1.3.1: 2001-03, Electromagnetic Compatibility and Radio Spectrum Matters (ERM);
Uncertainties in the Measurement of Mobile Radio Equipment
Characteristics—Part 1 and Part 2

2 EQUIPMENT UNDER TEST

2.1 Photo documentation of the EUT – See ATTACHMENT A

2.2 Equipment type, category

ZigBee, portable equipment

2.3 Short description of the equipment under test (EUT)

Data logger for temperature, pressure and humidity. Up to 4 mobile data logger (EBI10 Series, EBI100 Series) can be used by one interface. The interface identifies a logger in the programming slot via 13.56 MHz RFID-Transceiver. In the mobile data logger is a RFID-Tag only. A 2.4 GHz “ZigBee” port (Chipset according IEEE 802.15.4) is used for data exchange, communication and programming the data logger, if the logger is enabled for communication via 13.56 MHz signal. This enable signal is necessary to the logger to activate the 2.4 GHz interface, otherwise no communication is possible.

Number of tested samples: 1
Serial number, Logger: 15000003, Firmware number: 3.08.2

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

2.1 Variants of the EUT

The EUT has following variants:

Variant	Device-Name	Comment	Antenna
T01	EBI 10-Txxx	temperature	integrated
T02	EBI 10-THxxx	humidity sensor	integrated
T03	EBI 10-TPxxx	pressure sensor	integrated
T04	EBI 100-Txxx	temperature	integrated
T05	EBI 100-THxxx	humidity sensor	integrated
T06	EBI 100-TPxxx	pressure sensor	integrated

Note: The logger EBI 10 TPxxx is as worst case selected for test.

2.2 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel plan:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440	26	2480

Note: The marked frequencies are determined for final testing.

2.3 Transmit operating modes

The EUT allows the user to switch the transmission on or off. There are no further operating modes.
The EUT use O-QPSK modulation and may provide following data rate:
- 250 kbps (kbps = kilobits per second)

2.4 Antenna

The following antennas shall be used with the EUT:

Number	Type	Certification name	Plug	Gain
1	Omni	PCB meander (logger)	-	5.0

2.5 Power supply system utilised

Power supply voltage range: : 3.6 VDC, li battery

2.6 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- _____ Model : - _____
- _____ Model : _____
- _____ Model : _____

2.7 Determination of worst case conditions for final measurement

As worst case, the following channels and test modes are selected for the final test:

The EUT is tested as system, normal transmission is initiated.

IEEE Standard	Available channel	Tested channels	Power setting	Modulation	Modulation type	Data rate
802.15.4	11 to 26	11, 18, 26	Pmax	DSSS	O-QPSK	250 kbps

Note: The 802.15.4 is only used physically. No other common device is able connect to.

2.8 Test jig

No special test jig is used for testing.

2.9 Test software

For testing, the base station and the logger are set in TX-continuous mode. The test software is available for testing only.

3 TEST RESULT SUMMERY

WLAN device using digital modulation:

Operating in the 2400 MHz – 2483.5 MHz and 5725 MHz – 5850 MHz band:

FCC Rule Part	RSS Rule Part	Description	Result
15.247(i)	RSS 102, 2.5.2	MPE	not applicable
KDB 447498	RSS 102, 2.5.1	SAR exclusion consideration	passed
OET Bulletin 65	RSS102, 3.2	Co-location, Co-transmission	not applicable

The mentioned RSS Rule Parts in the above table are related to:
RSS 102, Issue 5, March 2015

3.1 Final assessment

The equipment under test fulfills the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 22 August 2016

Testing concluded on : 22 August 2016

Checked by:

Tested by:

Klaus Gegenfurtner
Teamleader Radio

Hermann Smetana
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY**

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 °C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>86-106 kPa</u>

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement uncertainty table	
Measurement output power, conducted	± 1.5 dB
Measurement output power, radiated	± 3.0 dB
Measurement PSD, conducted	± 1.5 dB
Measurement PSD, radiated	± 3.0 dB
Measurement spurious emissions, conducted	± 3.0 dB
Measurement spurious emissions, radiated	± 6.0 dB
Measurement frequency	$\pm 1 \times 10^{-8}$

4.1 Measurement protocol for FCC and ISED

4.1.1 General information

The Open Area test site is a listed Open Site under the Canadian Test-Sites File-No:

IC 3009A-1

The Anechoic chamber is a listed test site under the Canadian Test-Sites File-No:

IC 3009A-2

In compliance with RSS 247 testing for RSS compliance may be achieved by following the procedures set out in ANSI C63.10 and applying the CISPR 22 limits.

5 TEST CONDITIONS AND RESULTS

5.1 Maximum peak conducted output power

For test instruments and accessories used see section 6 Part **CPR 3**.

5.1.1 Description of the test location

Test location: NONE

5.1.2 Applicable standard

According to FCC Part 15, Section 15.247(b)(3):

For systems using digital modulation in the 2400-2483.5 MHz and 5725 – 5850 MHz bands, the maximum peak output power of the transmitter shall not exceed 1 Watt. The limit is based on transmitting antennas of directional gain that do not exceed 6 dBi.

5.1.3 Description of Measurement

The maximum peak conducted output power is measured using a peak power meter following the procedure set out in KDB 558074, item 9.1.2. The EUT is set in TX continuous mode while measuring.

5.1.4 Test result

Note: The output power is taken from the Test Report T40058-0011HS.

The maximum fieldstrength is 79.0 dBµV/m.

The fieldstrength is converted to output power with the formula $E = \text{EIRP} - (20 \cdot \log_{10} 3) + 104.8$.

$\text{EIRP} = E + (20 \cdot \log_{10} 3) - 104.8 = 79.0 + 9.5 - 104.8 = -16.3 \text{ dBm} = \underline{\underline{0.0234 \text{ mW}}}$.

Remarks:

6 HUMAN EXPOSURE

6.1 Maximum permissible exposure (MPE)

For test instruments and accessories used see section 6 Part **CPC 3**.

6.1.1 Description of the test location

Test location: NONE

Remarks: Not applicable, the EUT is portable.

6.2 Co-location and Co-transmission

Applicable standard:

OET Bulletin 65, Edition 97-01, Section 2: Multiple-transmitter sites and Complex Environments

The FCC's MPE limits vary with frequency. Therefore, in mixed or broadband RF fields where several sources and frequencies are involved, the fraction of the recommended limit (in terms of power density or square of the electric or magnetic field strength) incurred within each frequency interval should be determined, and the sum of all fractional contributions should not exceed 1.0, or 100 % in terms of percentage.

Remarks: Not applicable, the EUT has one transmitter only.

6.3 Exemption limits for routine evaluation - SAR evaluation

6.3.1 Applicable standard

According to RSS-102, item 2.5.1:

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance 4, 5

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤ 5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤ 300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

4 The exemption limits in Table 1 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from a linear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from a third order polynomial fit.

5 Transmitters operating between 0.003-10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in Section 4.

6.3.2 Conclusion according RSS-102.

The radiating structure of the EUT is 10 mm away from limb.
Maximum output power at 2450 MHz, **0.0234 mW** is < 7 mW;

For the EUT is SAR measurement is NOT necessary

The requirements are **FULFILLED**.

Remarks:

7 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
-	-	-	-	-	-	-