

Test Report

Electromagnetic Compatibility

Test Report - Nr.: 07KFE007857-T-FCC-01

Date: 2008-01-16

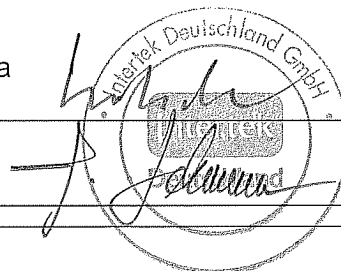
| | |
|-----------------------|--|
| Type: | JA-80PB |
| Description: | Wireless PIR motion/glass-break detector |
| Serial number: | 0704223-004 |

| | |
|----------------------------|--|
| Manufacturer: | Jablotron s.r.o. |
| Customer: | Jablotron s.r.o. |
| Address (Customer): | Pod Skalkou 33 CZ 646601 Jablonec nad Nisou Czech Republic |

| | |
|---------------------------------|--|
| Test Laboratory: | Intertek Deutschland GmbH, Innovapark 20, D- 87600 Kaufbeuren |
| FCC registration number: | 90714 |

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| Compiled by: | Marek Svoboda Technical Leader |
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| Approved by: | J. Lehmann Project Engineer |
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This test report consists of 20 pages. All measurement results exclusively refer to the equipment, which was tested. Reproduction of this report except in its entirety is not permitted without written approval of Intertek Deutschland GmbH.

Table of Contents

| | |
|---|-----------|
| 1. General description..... | 4 |
| 1.1. Product description | 4 |
| 1.2. Related submittal(s) Grants..... | 4 |
| 1.3. Test Methodology..... | 4 |
| 1.4. Test Facility | 5 |
| 1.5. List of exhibits | 5 |
| 2. Measurements And Test Specifications..... | 6 |
| 3. Description Of EUT | 7 |
| 3.1. Configuration / Operating Conditions | 7 |
| 3.2. Major Subassemblies Or Internal Peripherals..... | 7 |
| 3.3. Peripheral Devices Used For Testing..... | 7 |
| 3.4. Supply- And Interconnecting Cables | 8 |
| 4. Test Results - Overview | 8 |
| 5. Measurement results detailed | 9 |
| 5.1. Duty cycle and Averaging factor..... | 9 |
| 5.2. Bandwidth | 12 |
| 5.3. Radiated Emission 30 MHz – 10 GHz..... | 13 |
| 5.3.1. Field strength calculation..... | 13 |
| 5.3.2. Normative references | 14 |
| 5.3.3. Emission Test results | 15 |
| 6. Test setup Photo documentation..... | 18 |
| 7. EUT Photo documentation | 20 |
| 8. Technical specification | 20 |

| | |
|---|----|
| 8.1. Block Diagram Of The EUT | 20 |
| 8.2. Circuit Diagram Of The Layout..... | 20 |
| 8.3. Instruction manual..... | 20 |
| 8.4. Product Labelling | 20 |

1. General description

1.1. Product description

The JA-80PB is a component of Jablotron's Oasis 80 alarm system. It consists of two independent detectors which occupy two separate enrollment addresses in the control panel. The motion detector uses a PIR sensor. The glass-break detector uses the analysis of air pressure variations combined with the characteristic sound of glass breaking. The product is designed for internal use in buildings. The battery-powered detector communicates via OASIS radio protocol.

Battery types :

PIR sensor, Transmitter Lithium battery type CR14505 (AA 3.0V)

GBS sensor Lithium battery type CR14250SL (1/2AA 3.0V)

Antenna type : Monopole type, Internal, soldered on the PCB.

Under normal operating conditions (no alarm state) the device transmits 30 ms data pulse to control unit once in 540 s (9 minutes).

In alarm state the device will transmit 3 data pulses.

1.2. Related submittal(s) Grants

This is application for certification of the transmitter.

No related devices are present.

1.3. Test Methodology

☒ The test setup and test was done according to: **ANSI C63.4: 2003**
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

☐ The test setup and test was done according to: **CISPR 22: 1998 + Corrigendum: 2003 + A1: 2000 + A2: 2003 and ANSI C63.4: 2003**
Compliance with CISPR 22 is being used to demonstrate conformity with FCC DoC requirements. This conforms with FCC Part 15.109(g).

The test results detailed in this report apply only to the JA-80P with the test setup described. Any modification such as a change, addition to or inclusion of another device into this product will require an additional evaluation.

The support equipment listed as part of the emission tests is required to properly exercise and test the device under test.

1.4. Test Facility

The test site was semi-anechoic chamber Intertek Germany (PM KF 1150). Measurement distance EUT – Antenna was $d = 3$ m.

1.5. List of exhibits

Following exhibits are delivered as separate pdf files. The name of file corresponds with description of exhibit with extension **.pdf**

| | |
|-----------|--------------------------------|
| EXHIBIT 1 | Test setup photo documentation |
| EXHIBIT 2 | External Photos |
| EXHIBIT 3 | Internal Photos |
| EXHIBIT 4 | Operational description |
| EXHIBIT 5 | Block diagram |
| EXHIBIT 6 | Circuit diagram |
| EXHIBIT 7 | Instruction manual |
| EXHIBIT 8 | Product label |
| EXHIBIT 9 | Confidentiality request |

2. Measurements And Test Specifications

Emission - Requirements according to

- ☐ FCC, Part 15, Class A, verification
- ☐ FCC, Part 15, Class B, DoC
- ☐ FCC, Part 15, Class B, certification
- ☒ FCC, Part 15, intentional radiator, certification

3. Description Of EUT

3.1. Configuration / Operating Conditions

☒ table-top EUT

☐ floor-standing EUT

The device is battery operated. Battery types :

PIR sensor, Transmitter Lithium battery type CR14505 (AA 3.0V)

GBS sensor Lithium battery type CR14250SL (1/2AA 3.0V)

The batteries delivered by producer were new.

There were two samples of the device delivered :

Sample 1: was modified by manufacturer to transmit continuously. This sample was used for measurement of bandwidth and field strength ;

Sample 2 : has normal operation as specified by manufacturer . It was used for measurement of the duty cycle.

The equipment under test (EUT) is placed on wooden table 0,8 m above ground plane.

At all interference frequencies the height of the antenna is scanned in the range 1 m to 4 m with horizontal and vertical polarization and the turntable is rotated in the range 0° to 360° to obtain the highest field strength.

Measurements in frequency range 30 MHz – 3 GHz were performed with bilog antenna HL 562, measurements in frequency range 3 GHz – 10 GHz were performed with horn antenna HF 906 with preamplifier.

3.2. Major Subassemblies Or Internal Peripherals

| Device | Manufacturer | Type | SN | FCC ID |
|--------|--------------|------|----|--------|
| none | | | | |

3.3. Peripheral Devices Used For Testing

| Device | Manufacturer | Type | SN | FCC ID |
|--------|--------------|------|----|--------|
| none | | | | |

3.4. Supply- And Interconnecting Cables

| Line | Length | shielded | non shielded | Shield on GND / PE |
|------|--------|--------------------------|--------------------------|--------------------|
| none | | <input type="checkbox"/> | <input type="checkbox"/> | |

4. Test Results - Overview

| | required | passed | passed with modification | not passed |
|-------------------|--------------------------------|-------------------------------------|--------------------------|--------------------------|
| Bandwidth | < 2.17 MHz, 0.25 % f_{op} | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Duty cycle | < 2 s in 1 hour | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emission | | | | |
| 30 MHz - 3000 MHz | FCC 15.231 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 GHz – 10 GHz | FCC 15.231 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. Measurement results detailed

5.1. Duty cycle and Averaging factor

The averaging factor was measured by means of the measuring receiver/spectrum analyzer ESIB 26 in “Analyzer mode”.

Fig. 1 shows the length of single data pulse in 100 ms window.

Fig. 2 demonstrates the duty cycle under normal operation in 600 s window – system integrity check (1 pulse 30 ms).

Fig. 3 displays transmission after activating to alarm state (3 pulses each 30 ms).

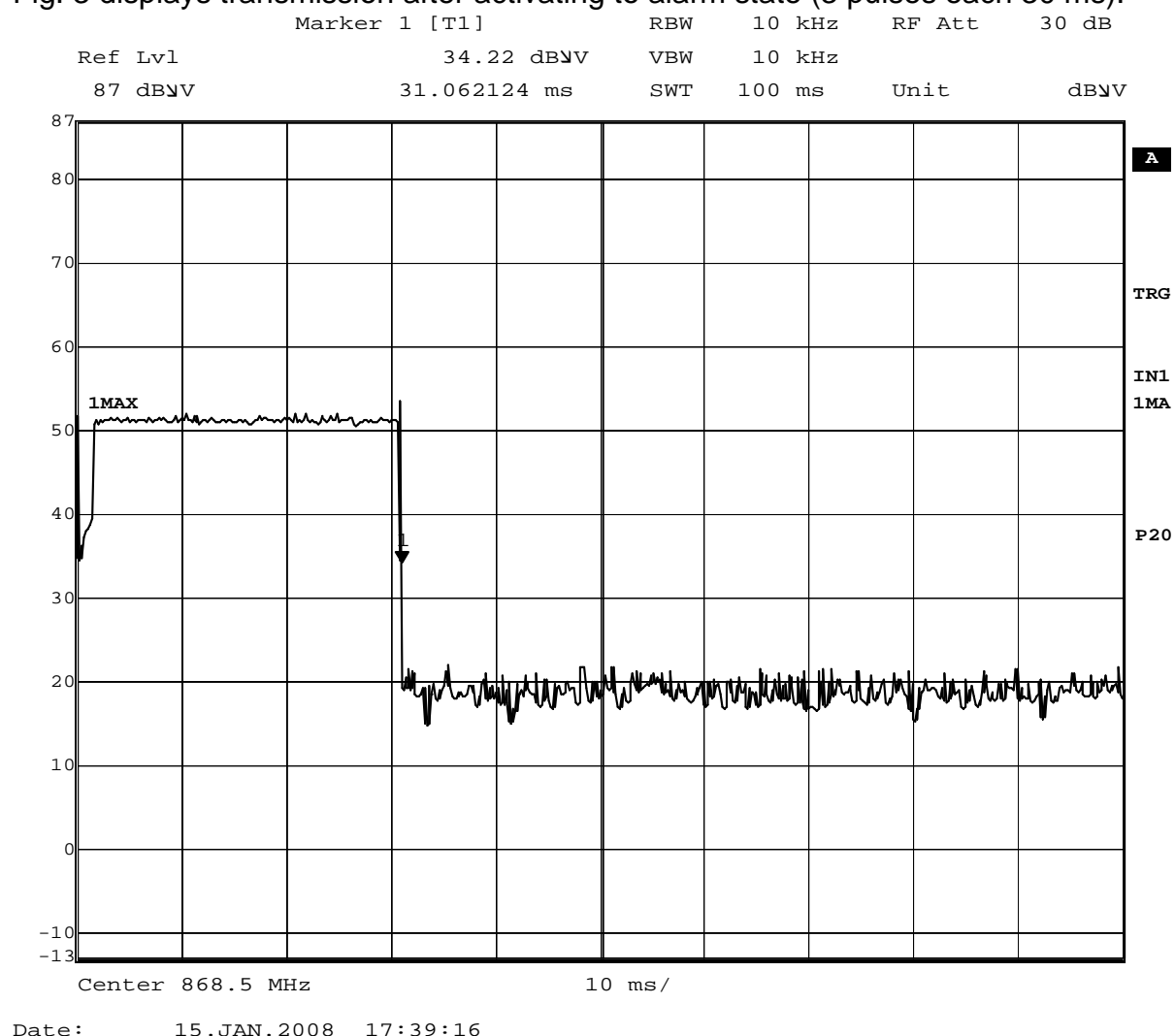


Fig .1

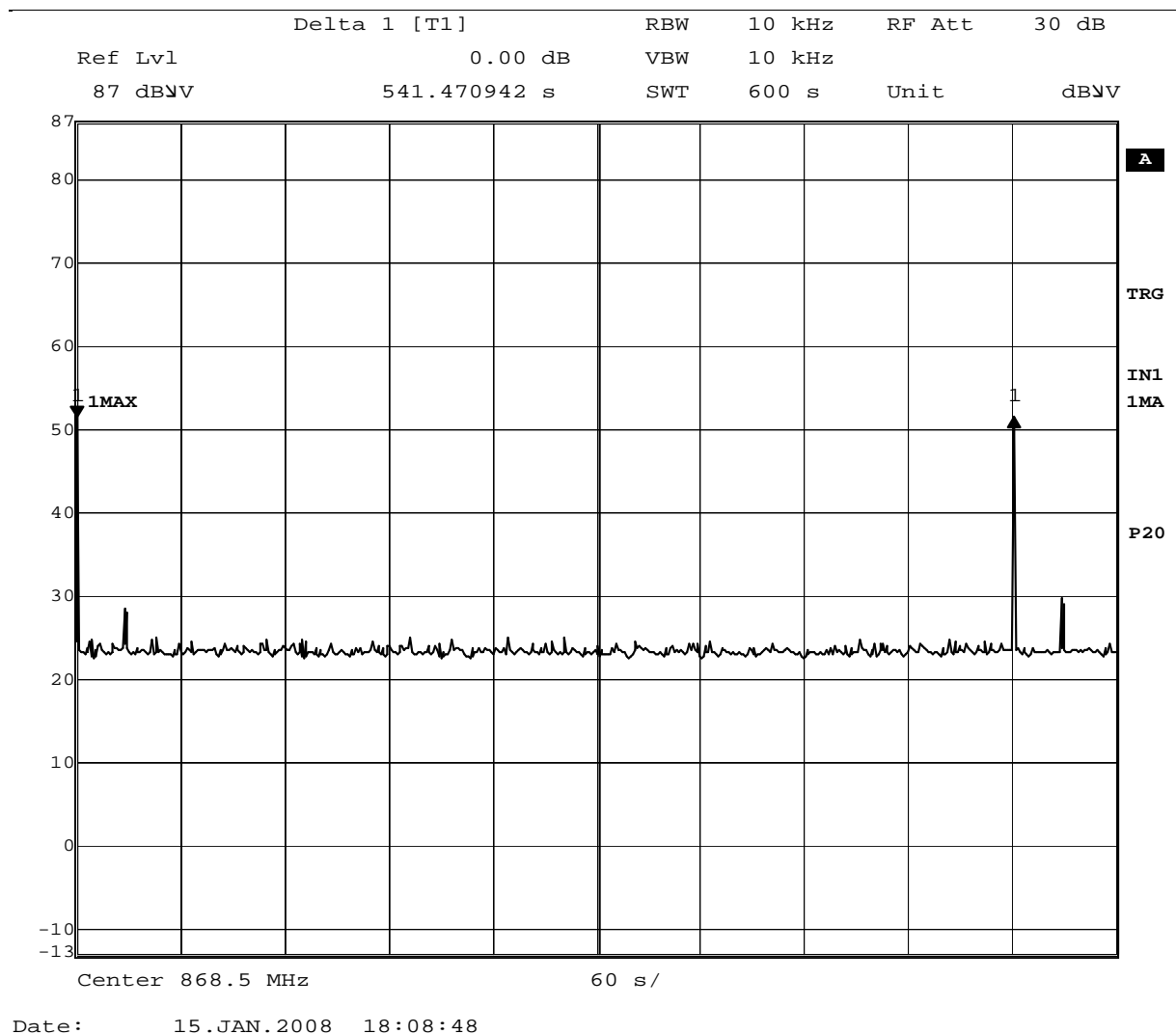


Fig .2

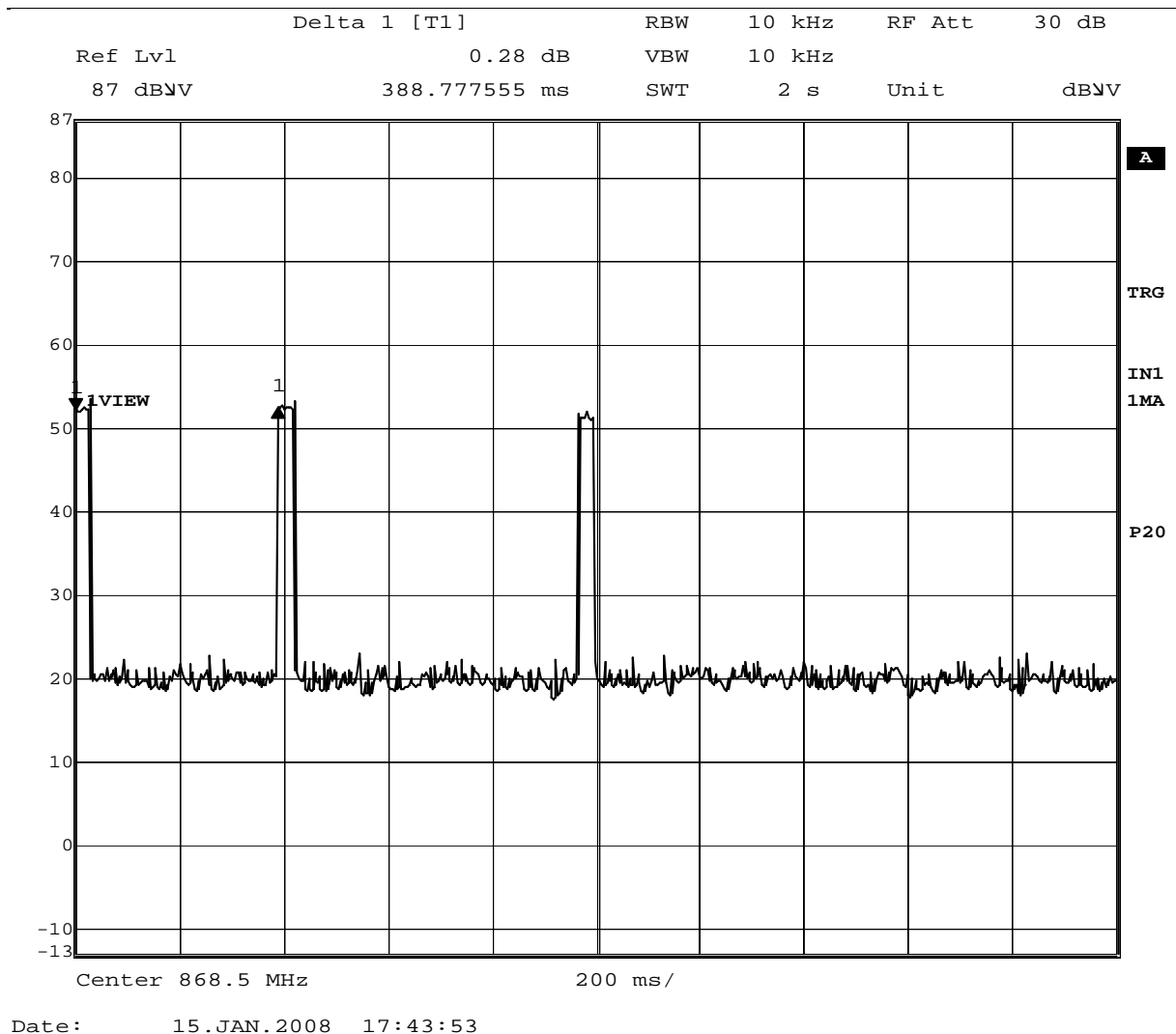


Fig. 3

Total transmission time in period $T = 100$ ms is $t = 31,06$ ms.

The pulse is transmitted once in 541.47 s, that is once in 9.02 minutes

The Averaging factor is:

$$20 \cdot \log (31,06/100) = -10,155 \text{ dB.}$$

The measured peak values are to be reduced by averaging factor to obtain average values.

Transmission time in 1 hour period is :

$$t = \text{int}(60/9.02) \cdot 31,06 = 6 \cdot 31,06 = 186,3 \text{ ms}$$

5.2. Bandwidth

The measured 20 dB bandwidth is shown on Fig. 3

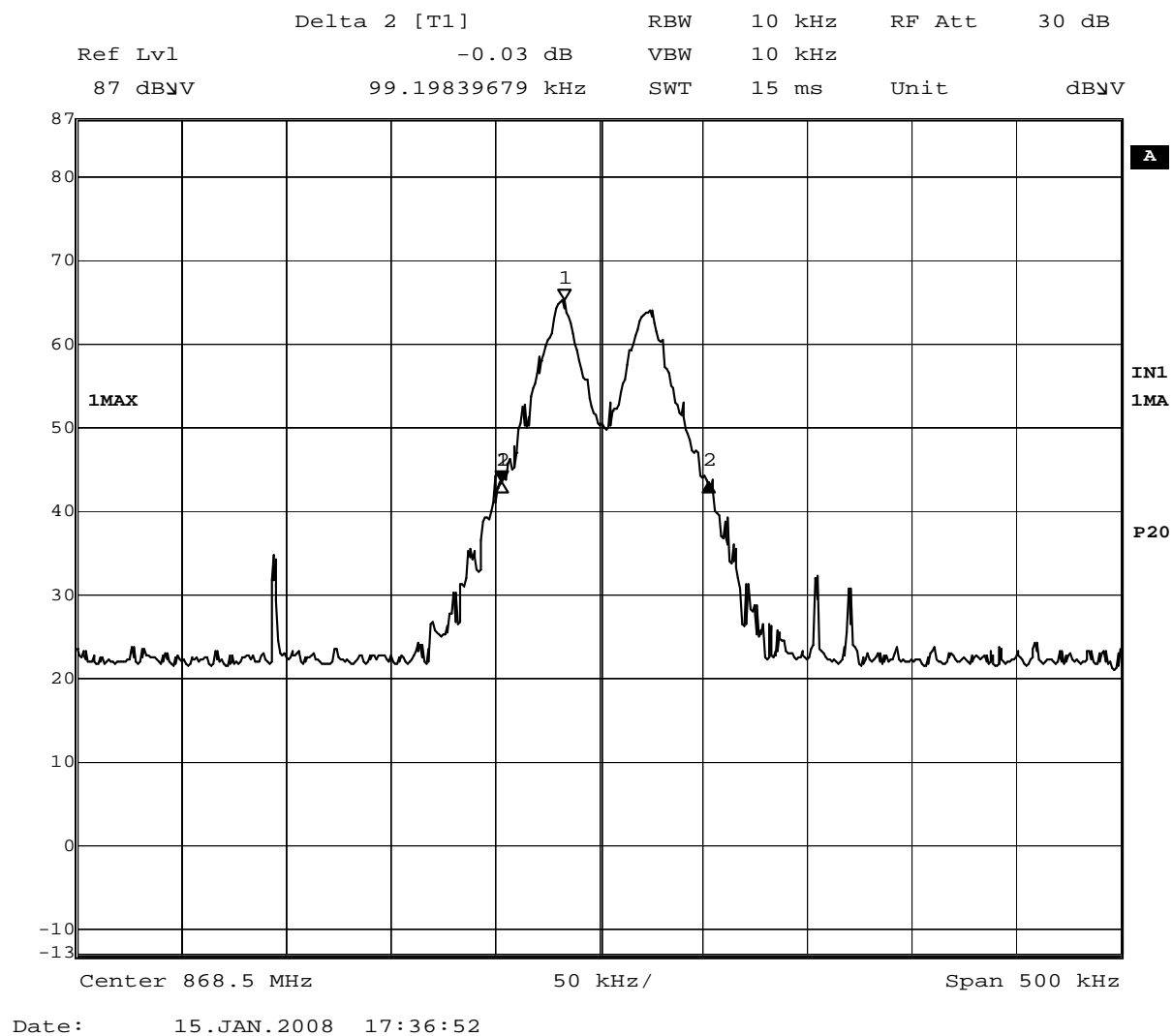


Fig .3

The BW is 99 kHz, operating frequency $f = 868.5$ MHz.

5.3. Radiated Emission 30 MHz – 10 GHz

Data was measured for worst case configuration which resulted in highest emission levels. A sample calculation, configuration photographs and data tables of emissions are included.

The detector used was PEAK.

5.3.1. Field strength calculation

The field strength is calculated by adding the reading on the measuring receiver to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when the specified limit is related to average detector and measurements are made with peak detector).

A sample of calculation is included below :

$$E = RR + AF + CF - AG + PD + AV$$

Where

| | |
|----|---|
| E | field strength in dB μ V/m |
| RR | receiver reading including preamplifier in dB μ V |
| CF | cable attenuation factor in dB |
| AF | antenna factor in dB/m |
| AG | amplifier gain in dB |
| PD | pulse desensitization in dB |
| AV | average factor in dB |

Example :

Assume that measured values and factors are as follows :

| | |
|----|-----------------|
| RR | = 60 dB μ V |
| CF | = 1.2 dB |
| AF | = 12.6 dB/m |
| AG | = 20 dB |
| PD | = 0 dB |
| AV | = -10 dB |

Then

$$E = 60 + 1.2 + 12.6 - 20 + 0 - 10 = 43.8 \text{ dB}\mu\text{V/m}$$

The radiated emission tables which follow the graphical presentation of results were created by the EMC 32 software by Rohde-Schwarz. The data of field strength (peak detector) include the components given above with the exception of PD and AV.

5.3.2. Normative references

| | |
|------------------------------------|--|
| Limits equivalent: | FCC, Part 15.231, Part 15.209 where appropriate |
| Methods of Measurement equivalent: | ANSI C63.4, CISPR 22 |

Test requirement

| | |
|------------------------|--------------------|
| Class | B |
| Distance Antenna – EUT | 3 m |
| Frequency range | 30 MHz - 10000 MHz |

Place of measurement

- ☒ Semi anechoic chamber Intertek Germany PM KF 1150.
☐ Open Area Test Site

Measurement devices

| Measurement device | Manufacturer | Type | SN | Asset No. | Last Calibr. at ion | Inter- val |
|---|-----------------|-----------------|--------|------------|---------------------|------------|
| <input checked="" type="checkbox"/> Test receiver, 20Hz-26GHz | ESIB26 | Rohde & Schwarz | 100150 | PM KF 0948 | 07-03 | 1 |
| <input checked="" type="checkbox"/> Antenna, 30-3000 MHz | HL562 | Rohde & Schwarz | 100354 | PM KF 1123 | 07-03 | 2 |
| <input checked="" type="checkbox"/> Horn antenna, 1-18 GHz | Rohde & Schwarz | HF906 | 100188 | PM KF 0947 | 07-05 | 2 |
| <input checked="" type="checkbox"/> Horn antenna preamp. | Bonn | BLMA0118-4A | 35352 | PM KF 0946 | 07-05 | 2 |

5.3.3. Emission Test results

Test requirements

☒ passed

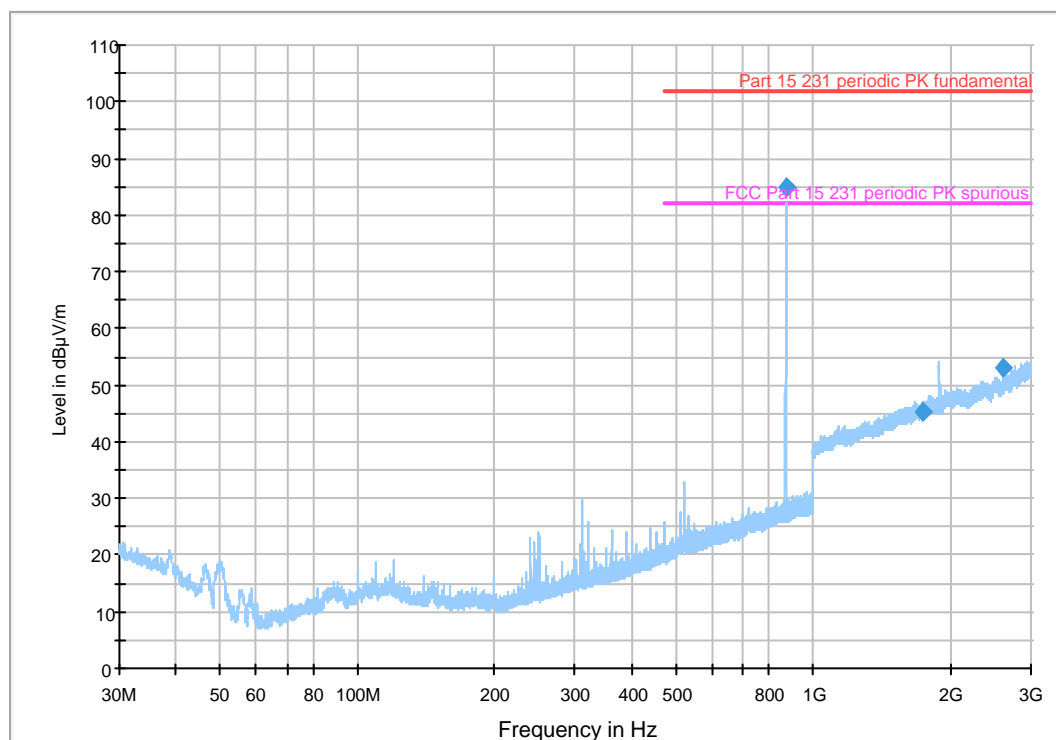
☐ passed with
modification

☐ not passed

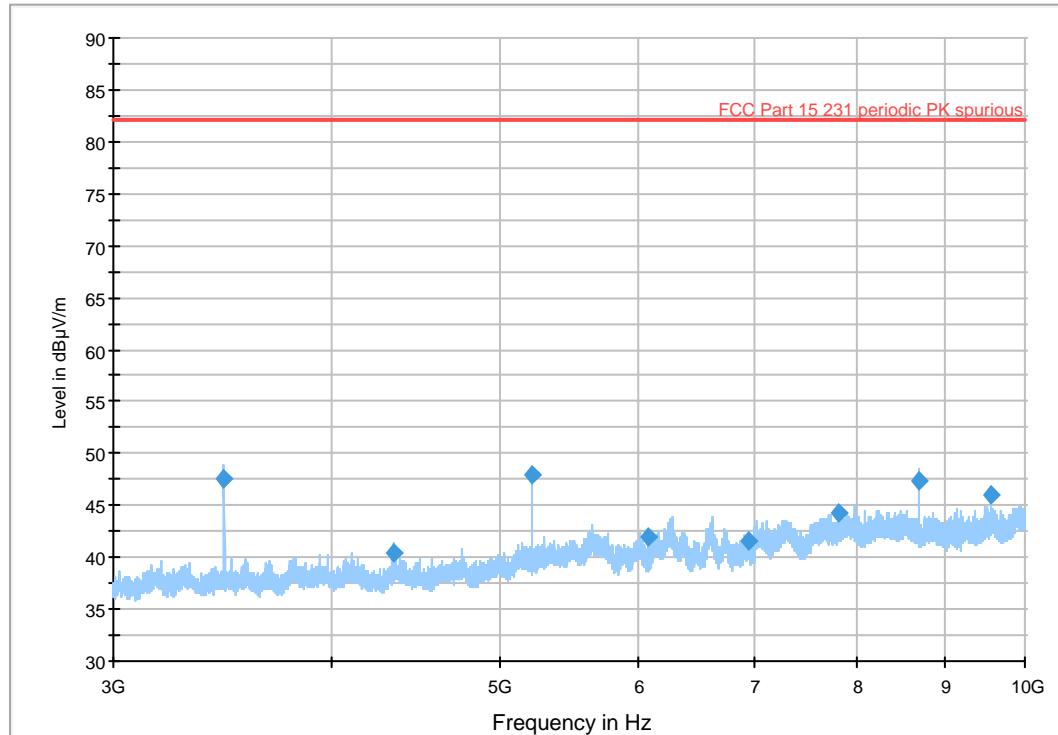
Comment:

The radiated emissions between 30 MHz and 10 000 MHz are under the limit
specified in FCC 15.231

5.3.3.1 Radiated Emission 30 MHz – 3 GHz



5.3.3.2 Radiated Emission 3 GHz – 10 GHz



5.3.3.3 Radiated Emission : table 30 MHz – 10 GHz

Measurements based on a measurement time of 10 ms unless otherwise noted.
Measurement bandwidth is 120 kHz bellow 1 MHz, and 1 MHz above 1000 MHz.

| Frequency (MHz) | MaxPeak E (dBμV/m) | Averaging factor (dB) | Average value E (dBμV/m) | Limit Average (dBμV/m) | Margin average (dB) | Limit peak (dBμV/m) | Margin peak (dB) |
|--------------------|-----------------------|-----------------------------|--------------------------------|------------------------------|---------------------------|---------------------------|------------------------|
| 868,48 | 84,8 | -10,15 | 74,65 | 82 | -7,35 | 102 | -17,2 |
| 1737,2 | 45,3 | -10,15 | 35,15 | 62 | -26,85 | 82 | -36,7 |
| 2605,5 | 52,9 | -10,15 | 42,75 | 62 | -19,25 | 82 | -29,1 |
| 3474,1 | 47,5 | -10,15 | 37,35 | 62 | -24,65 | 82 | -34,5 |
| *)4342,6 | 40,5 | -10,15 | 30,35 | 53,9 | -23,55 | 73,9 | -33,4 |
| 5210,7 | 47,9 | -10,15 | 37,75 | 62 | -24,25 | 82 | -34,1 |
| 6079,2 | 41,9 | -10,15 | 31,75 | 62 | -30,25 | 82 | -40,1 |
| 6947,7 | 41,5 | -10,15 | 31,35 | 62 | -30,65 | 82 | -40,5 |
| 7816,2 | 44,3 | -10,15 | 34,15 | 62 | -27,85 | 82 | -37,7 |

*) Frequencies governed by 15.209

6. Test setup Photo documentation

EXHIBIT 1



Fig. 1 Front view



Fig. 2 Rear view

7. EUT Photo documentation

External Photos : EXHIBIT 2

Internal Photos : EXHIBIT 3

8. Technical specification

Operational description : EXHIBIT 4

8.1. Block Diagram Of The EUT

EXHIBIT 5

8.2. Circuit Diagram Of The Layout

EXHIBIT 6

8.3. Instruction manual

EXHIBIT 7

8.4. Product Labelling

EXHIBIT 8