



EMI - TEST REPORT

- Human Exposure -

Type / Model Name : Type 2850-000 / Model 850A

Product Description : BLE/IR remote control

Applicant : ruwido austria gmbh

Address : Köstendorfer Str. 8

5202 NEUMARKT, AUSTRIA

Manufacturer : ruwido austria gmbh

Address : Köstendorfer Str. 8

5202 NEUMARKT, AUSTRIA

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

POSITIVE

Test Report No. : **T46631-00-02SK**

23. September 2020

Date of issue



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

FCC ID: XYN850A

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ATTACHMENT A as separate supplement

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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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 . |
| KDB 447498 D01 v06 | RF Exposure procedures and equipment authorisation policies for mobile and portable devices, October 23, 2015. |
| KDB 865664 D01 v01r04 | SAR Measurement Requirements for 100 MHz to 6 GHz, August 7, 2015. |
| 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 |

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2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

2.3 Photo documentation of the EUT – See ATTACHMENT A

2.4 Equipment type, category

Bluetooth Low Energy device, portable equipment.

2.5 Short description of the equipment under test (EUT)

The EUT is a Bluetooth Low Energy wireless BLE 5.0 remote control.
A single PCB antenna is used within the system. The EUT has only one integrated antenna, no temporary connector and no external antenna can be connected. The modulation used by the EUT is GFSK with a data rate of 1 Mbit/s and 2Mbits/s.

| | | | |
|--------------------------|---|-------------------|--------------------|
| Number of tested samples | : | 1 radiated sample | 1 conducted sample |
| Serial number | : | 16886606 | prototype |
| Firmware number | : | 0x00260101 | 0x00260101 |
| Type | : | 2850-000 | 2850-000 |

| Items | Description |
|------------------|-----------------------------|
| BLE type | 5.0 |
| BLE chipset type | Texas Instruments CC2642R1F |
| Modulation | GFSK |
| Frequency range | 2400 MHz to 2483.5 MHz |
| Channel numbers | 40 |
| Data rate (kbps) | 1000, 2000 |
| Antenna type | PCB |

EUT configuration:

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

2.6 Variants of the EUT

There are no variants of the EUT

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2.7 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 37 | 2402 | 18 | 2442 |
| 0 | 2404 | 19 | 2444 |
| 1 | 2406 | 20 | 2446 |
| 2 | 2408 | 21 | 2448 |
| 3 | 2410 | 22 | 2450 |
| 4 | 2412 | 23 | 2452 |
| 5 | 2414 | 24 | 2454 |
| 6 | 2416 | 25 | 2456 |
| 7 | 2418 | 26 | 2458 |
| 8 | 2420 | 27 | 2460 |
| 9 | 2422 | 28 | 2462 |
| 10 | 2424 | 29 | 2464 |
| 38 | 2426 | 30 | 2466 |
| 11 | 2428 | 31 | 2468 |
| 12 | 2430 | 32 | 2470 |
| 13 | 2432 | 33 | 2472 |
| 14 | 2434 | 34 | 2474 |
| 15 | 2436 | 35 | 2476 |
| 16 | 2438 | 36 | 2478 |
| 17 | 2440 | 39 | 2480 |

Note: the marked frequencies are determined for final testing.

2.8 Transmit operating modes

The EUT uses GFSK modulation and provides following data rates:

- 1 Mbps (Mbps = *megabits per second*)
- 2 Mbps (Mbps = *megabits per second*)

2.9 Antennas

The following antennas shall be used with the EUT:

| Number | Characteristic | Plug | Frequency range (GHz) | Gain (dBi) |
|--------|----------------|------|-----------------------|------------|
| 1 | PCB | - | 2.4 – 2.4835 | +3.8 |

2.10 Power supply system utilised

Power supply voltage, V_{nom} : 3 V/DC (2 x AAA battery)

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3 TEST RESULT SUMMARY

BLE device using digital modulation:

Operating in the 2400 MHz – 2483.5 MHz band:

| FCC Rule Part | RSS Rule Part | Description | Result |
|-------------------|----------------|------------------------------|----------------|
| KDB 447498, 7.1 | RSS 102, 2.5.2 | MPE | not applicable |
| KDB 447498, 4.3.1 | RSS 102, 2.5.1 | SAR exclusion consideration | passed |
| KDB 447498, 7.2 | 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 : 15 September 2020

Testing concluded on : 15 September 2020

Checked by:

Tested by:

Klaus Gegenfurtner
Teamleader Radio

Sabine Kugler
Radio Team

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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: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

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 / 2011 + A1 / 2014 „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.

4.4 Conformity Decision Rule

The conformity decision rule is based on the ILAC G8 published at the time of reporting.

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5 HUMAN EXPOSURE

5.1 Maximum permissible exposure (MPE)

Remarks: Not applicable.

The distance between the user and the EUT is below 20 cm, therefore SAR exclusion
consideration is applicable.

5.2 Co-location and Co-transmission

Remarks: Not applicable.

The EUT has only one transmitter.

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5.3 SAR test exclusion considerations

5.3.1 Applicable standard

According to RF exposure guidance:

Systems operating under the provisions of this section shall be operated in a manner that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

5.3.2 Determination of the standalone SAR test exclusion threshold

For BLE device:

The minimum separation distance results from the application of the EUT which is handled by hand. This distance is assumed to ≤ 50 mm from antenna to the hand of the user.

The hand of the user is the nearest extremity of a human being therefore the threshold for 10g is determined.

The formula under KDB 447498 4.3.1 a) for 100 MHz to 6 GHz for standalone equipment is used:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 7.5;;$$

The max conducted average power is according the equipment:

| | | |
|-----------------------|----------|----------|
| Rated output power: | 0.8 mW | -1.0 dBm |
| Tune-up tolerance: | 0.5 dB | |
| Maximum output power: | -0.5 dBm | 0.9 mW |
| Antenna gain max: | 3.8 dBi | |
| Maximum EIRP: | 3.3 dBm | 2.2 mW |
| Minimum distance r: | 5.0 mm | |

| Channel frequency (MHz) | A (mW) | Threshold level | Limit 10g | Margin 10g |
|-------------------------|--------|-----------------|-----------|------------|
| 2402 | 0.9 | 0.3 | 7.5 | -7.2 |
| 2442 | 0.9 | 0.3 | 7.5 | -7.2 |
| 2480 | 0.9 | 0.3 | 7.5 | -7.2 |

Conclusion: The Threshold level is much lower than the limit, SAR measurement is NOT necessary.

The requirements are **FULFILLED**.

Remarks: None

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5.4 Exemption limits for routine evaluation - SAR evaluation
5.4.1 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 |

| Frequency (MHz) | Exemption Limits (mW) | | | | |
|-----------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|
| | At separation distance of 30 mm | At separation distance of 35 mm | At separation distance of 40 mm | At separation distance of 45 mm | At separation distance of ≥50 mm |
| ≤ 300 | 223 mW | 254 mW | 284 mW | 315 mW | 345 mW |
| 450 | 141 mW | 159 mW | 88 mW | 195 mW | 213 mW |
| 835 | 80 mW | 92 mW | 177 mW | 117 mW | 130 mW |
| 1900 | 99 mW | 153 mW | 225 mW | 316 mW | 431 mW |
| 2450 | 83 mW | 123 mW | 173 mW | 235 mW | 309 mW |
| 3500 | 86 mW | 124 mW | 170 mW | 225 mW | 290 mW |
| 5800 | 56 mW | 71 mW | 85 mW | 97 mW | 106 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.

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5.4.2 Conclusion according RSS-102.

| | | |
|-----------------------|----------|----------|
| Rated output power: | 0.8 mW | -1.0 dBm |
| Tune-up tolerance: | 0.5 dB | |
| Maximum output power: | -0.5 dBm | 0.9 mW |
| Antenna gain max: | 3.8 dBi | |
| Maximum EIRP: | 3.3 dBm | 2.2 mW |
| Minimum distance r: | 5.0 mm | |

Maximum output power at 2450 MHz **2.2 mW** is < 4 mW;

For the EUT SAR measurement is NOT necessary

The requirements are **FULFILLED**.

Remarks: None

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.

FCC ID: XYN850A**6 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. |
|----------------|-------------------|----------------------|--------------------|--------------------|--------------------|--------------------|
|----------------|-------------------|----------------------|--------------------|--------------------|--------------------|--------------------|