

TEST REPORT

No. AR19-0034263-01

Information technology equipment – Safety – Part 1: General requirements

performed in accordance with
EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013

| | |
|----------------------|---|
| PRODUCT | BTLE module |
| Model | BLUENRG-M0A |
| TRADE MARK(s) |  |
| RATINGS | 1.7 to 3.6 V \equiv |

| | |
|------------------|---|
| APPLICANT | STMicroelectronics S.r.l. Via Camillo Olivetti, 2 I-20864 Agrate Brianza (MB) |
|------------------|---|

| | | |
|--------------------|---|--|
| Tested by | M. Giacometti <i>[Laboratory Technician]</i> | |
| Approved by | S. Bilotta <i>[Laboratory Manager]</i> | |

Revision Sheet

| Release No. | Date | Revision Description |
|-------------|------------|----------------------|
| Rev. 0 | 12.02.2019 | First edition |

GENERAL DATA

| SAMPLE | | |
|-----------------------------------|---|---------------------------------------|
| Samples received on | 17.12.2018 | Item(s) sampled and sent by applicant |
| IMQ reference samples | BEM | 93653 |
| Samples tested No. | 1 | |
| Samples accepted on | 17.12.2018 | |
| Object under analysis recognition | Not carried out Except where stated, characteristics of products were taken from client description and were not verified by the laboratory | |

| TESTING LOCATION | |
|--------------------|--|
| Testing dates | 28.01.2019 ÷ 12.02.2019 |
| Testing laboratory | IMQ S.p.A. Milano - Via Quintiliano, 43 – 20138 Milano |
| Testing site | IMQ S.p.A. Milano - Via Quintiliano, 43 – 20138 Milano |

| ENVIRONMENTAL CONDITION | |
|-------------------------|-----------------|
| <i>Parameter</i> | <i>Measured</i> |
| Ambient Temperature | 23 °C |
| Relative Humidity | 46 % |
| Atmospheric Pressure | 1010 mbar |

REFERENCE DOCUMENT

| | DOCUMENT | DATE | TITLE |
|-------------------------------------|----------------|------|--|
| <input checked="" type="checkbox"/> | EN 60950-1 | 2006 | Information technology equipment – Safety – Part 1: General requirements |
| <input checked="" type="checkbox"/> | EN 60950-1/A11 | 2009 | Information technology equipment – Safety – Part 1: General requirements |
| <input checked="" type="checkbox"/> | EN 60950-1/A1 | 2010 | Information technology equipment – Safety – Part 1: General requirements |
| <input checked="" type="checkbox"/> | EN 60950-1/A12 | 2011 | Information technology equipment – Safety – Part 1: General requirements |
| <input checked="" type="checkbox"/> | EN 60950-1/A2 | 2013 | Information technology equipment – Safety – Part 1: General requirements |

SUMMARY OF CONTENTS

| Attachment # | Description | Page |
|--------------|-------------|------|
| 1 | PICTURES | 2 |

Note:

Attachments may include Schematics, Components information, Component test Reports, Particular Standard test Reports, Standard test Reports, Information from accompanying documents and similar.

EQUIPMENT UNDER TEST (EUT) DETAILS

| MODEL (basic) | Description |
|--------------------|-----------------------------|
| BLUENRG-M0A | Bluetooth low energy module |
| VARIANTS (derived) | Description |
| / | / |

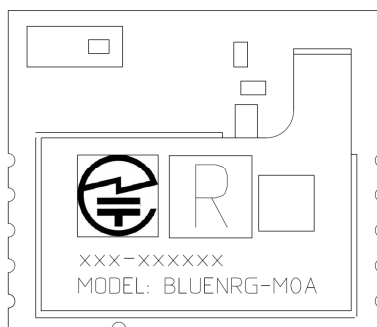
| MANUFACTURER | STMicroelectronics |
|-------------------|--------------------|
| ASSEMBLY PLANT(s) | / |

GENERAL PRODUCT INFORMATION:

The BLUENRG-M0A is an open frame board.
The BLUENRG-M0A is a Very low power network processor module for Bluetooth® low energy v4.2 with embedded ceramic antenna.

COPY OF MARKING PLATE:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



PRODUCT DOCUMENTATION

| Document | Reference |
|------------------------|--|
| Preliminary data sheet | DocID027851 Rev 10 issued on December 2018 |

SUMMARY OF TEST

| POSSIBLE TEST CASE VERDICTS: | |
|---|--------|
| Test object does meet the requirement | P(ass) |
| Test object does not meet the requirement | F(ail) |
| Test case does not apply to the test object | N.A. |
| Test object has not been checked | N.C. |

| TEST PERFORMED | CLAUSE | ITEM NUMBER |
|----------------------|--------|-------------|
| Thermal requirements | 4.5 | 1 |

GENERAL REMARKS:

Throughout this report a point (coma) is used as the decimal separator.

Unless otherwise stated the uncertainties for the tests and measurements are evaluated in according to IMQ Operational Instruction IO-LAB-001 and IO-LAB-004.

The uncertainties evaluation has been carried out in accordance with IEC Guide 115 "Application of Uncertainty of measurement's to Conformity Assessment Activity in the Electrotechnical Sector" and IECCE OD 5014.

Internal Procedure PG-037 ensure that the requirements for traceability of calibrations, of all test equipment requiring calibration, and calibration intervals are met.

The ability or reliability of this product to perform its intended function in a particular application has not been investigated.

Unless otherwise specified, warnings, installation instruction and/or user manual provided with the sample have been checked in Italian or English version only.

IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.

Device tested in conditions of supply.

Conditions of acceptability:

- The equipment must be powered by a SELV circuit or the accessibility must be evaluated in the final installation.
- The interconnection of equipment must be evaluated in the final installation.
- The mechanical and fire enclosure must be evaluated in the final installation.
- Stability must be evaluated in the final installation.
- Temperature tests must be re-evaluated in the final installation.
- Fault must be evaluated in the final installation.
- Materials for components and other parts inside fire enclosures must be re-evaluated in the final installation.

REQUIREMENTS AND TESTS

| | | | |
|------------|--|---|-----|
| 1.5 | Components | | - |
| 1.5.1 | General | | - |
| | Comply with IEC 60950-1 or relevant component standard | (see appended tables 1.5.1) | P |
| 1.5.2 | Evaluation and testing of components | PCB only. | P |
| 1.6 | Power interface | | - |
| 1.6.1 | AC power distribution systems | | N/A |
| 1.6.2 | Input current | | N/A |
| 1.6.3 | Voltage limit of hand-held equipment | | N/A |
| 1.6.4 | Neutral conductor | | N/A |
| 1.7 | Marking and instructions | | - |
| 1.7.1 | Power rating and identification markings | See Preliminary data sheet DocID027851 Rev 10 | P |
| 1.7.1.1 | Power rating marking | | N/A |
| | Multiple mains supply connections.....: | | N/A |
| | Rated voltage(s) or voltage range(s) (V) | | N/A |
| | Symbol for nature of supply, for d.c. only | | N/A |
| | Rated frequency or rated frequency range (Hz) ... | | N/A |
| | Rated current (mA or A) | | N/A |
| 1.7.1.2 | Identification markings | | - |
| | Manufacturer's name or trade-mark or identification mark | See Pictures. | P |
| | Model identification or type reference | | N/A |
| | Symbol for Class II equipment only | | N/A |
| | Other markings and symbols : | | N/A |
| 1.7.1.3 | Use of graphical symbols | | N/A |
| 1.7.2 | Safety instructions and marking | | -- |
| 1.7.2.1 | General | See Preliminary data sheet DocID027851 Rev 10 | P |
| 1.7.2.2 | Disconnect devices | | N/A |
| 1.7.2.3 | Overcurrent protective device | | N/A |
| 1.7.2.4 | IT power distribution systems | | N/A |
| 1.7.2.5 | Operator access with a tool | | N/A |
| 1.7.2.6 | Ozone | | N/A |
| 1.7.3 | Short duty cycles | Continuous operation. | N/A |
| 1.7.4 | Supply voltage adjustment | | - |
| | Methods and means of adjustment; reference to | | N/A |

| | | | |
|-------------|--|---------------|-----|
| | installation instructions | | |
| 1.7.5 | Power outlets on the equipment | | N/A |
| 1.7.6 | Fuse identification (marking, special fusing characteristics, cross-reference) | | N/A |
| 1.7.7 | Wiring terminals | | - |
| 1.7.7.1 | Protective earthing and bonding terminals | | N/A |
| 1.7.7.2 | Terminals for a.c. mains supply conductors | | N/A |
| 1.7.7.3 | Terminals for d.c. mains supply conductors | | N/A |
| 1.7.8 | Controls and indicators | | - |
| 1.7.8.1 | Identification, location and marking | | N/A |
| 1.7.8.2 | Colours | | N/A |
| 1.7.8.3 | Symbols according to IEC 60417 | | N/A |
| 1.7.8.4 | Markings using figures | | N/A |
| 1.7.9 | Isolation of multiple power sources | | N/A |
| 1.7.10 | Thermostats and other regulating devices | | N/A |
| 1.7.11 | Durability | | N/A |
| 1.7.12 | Removable parts | | N/A |
| 1.7.13 | Replaceable batteries | | N/A |
| | Language(s) | | — |
| 1.7.14 | Equipment for restricted access locations | | N/A |
| 2 | PROTECTION FROM HAZARDS | | - |
| 2.1 | Protection from electric shock and energy hazards | | N/A |
| 2.2 | SELV circuits | SELV powered. | P |
| 2.3 | TNV circuits | Not provided. | N/A |
| 2.4 | Limited current circuits | | N/A |
| 2.5 | Limited power sources | | N/A |
| 2.6 | Provisions for earthing and bonding | | N/A |
| 2.7 | Overcurrent and earth fault protection in primary circuits | | N/A |
| 2.8 | Safety interlocks | | N/A |
| 2.9 | Electrical insulation | | N/A |
| 2.10 | Clearances, creepage distances and distances through insulation | | N/A |
| 3 | WIRING, CONNECTIONS AND SUPPLY | | - |

| | | | |
|------------|--|--|-----|
| 3.1 | General | | N/A |
| 3.2 | Connection to a mains supply | | N/A |
| 3.3 | Wiring terminals for connection of external conductors | Terminals are suitable for the application. | P |
| 3.4 | Disconnection from the mains supply | | N/A |
| 3.5 | Interconnection of equipment | | N/A |
| 4 | PHYSICAL REQUIREMENTS | | - |
| 4.1 | Stability | | N/A |
| 4.2 | Mechanical strength | | - |
| 4.2.1 | General | | N/A |
| 4.2.10 | Wall or ceiling mounted equipment; force (N) | | N/A |
| 4.3 | Design and construction | | N/A |
| 4.3.13 | Radiation | | - |
| 4.3.13.5 | Lasers (including laser diodes) and LEDs | | N/A |
| 4.3.13.5.1 | Lasers (including laser diodes) | | N/A |
| | Laser class | | — |
| 4.4 | Protection against hazardous moving parts | | N/A |
| 4.5 | Thermal requirements | | - |
| 4.5.1 | General | Considered. | P |
| 4.5.2 | Temperature tests | Considered. | P |
| | Normal load condition per Annex L | | — |
| 4.5.3 | Temperature limits for materials | (see appended table 4.5) | P |
| 4.5.4 | Touch temperature limits | (see appended table 4.5) | N/A |
| 4.5.5 | Resistance to abnormal heat | (see appended table 4.5.5) | N/A |
| 4.6 | Openings in enclosures | | N/A |
| 4.7 | Resistance to fire | | - |
| 4.7.1 | Reducing the risk of ignition and spread of flame | | P |
| | Method 1, selection and application of components wiring and materials | Method 1 | P |
| | Method 2, application of all of simulated fault condition tests | | N/A |
| 4.7.2 | Conditions for a fire enclosure | See “Conditions of acceptability”. | N/A |
| 4.7.2.1 | Parts requiring a fire enclosure | | N/A |
| 4.7.2.2 | Parts not requiring a fire enclosure | See Table 1.5.1 and Conditions of acceptability. | P |
| 4.7.3 | Materials | | - |
| 4.7.3.1 | General | | N/A |
| 4.7.3.2 | Materials for fire enclosures | | N/A |
| 4.7.3.3 | Materials for components and other parts outside | | N/A |

| | | | |
|------------|--|--|-----|
| | fire enclosures | | |
| 4.7.3.4 | Materials for components and other parts inside fire enclosures | See Table 1.5.1 and Conditions of acceptability. | N/A |
| 4.7.3.5 | Materials for air filter assemblies | | N/A |
| 4.7.3.6 | Materials used in high-voltage components | | N/A |
| 5 | ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS | | - |
| 5.1 | Touch current and protective conductor current | | N/A |
| 5.2 | Electric strength | | N/A |
| 5.3 | Abnormal operating and fault conditions | EUT powered by SELV. See also Conditions of acceptability. | P |
| 6 | CONNECTION TO TELECOMMUNICATION NETWORKS | | N/A |
| 7 | CONNECTION TO CABLE DISTRIBUTION SYSTEMS | | N/A |

TABLES

| 1.5.1 | TABLE: List of critical components | | | | | |
|------------------------------------|---|------------|---|------------------------------|--|--|
| Object/part No. | Manufacturer/ trademark | Type/model | Technical data | Standard (Edition / year) | Mark(s) of conformity ¹⁾ | |
| PCB boards | Various | Various | Flame class UL94V-0, min. 105°C, Thk 1.6mm | / | / | |
| 1) Components used as alternative. | | | | | | |

| | | | | | | | |
|--|---|---------------------|--------------------|---------------------|--------------------|--------|------------------------------------|
| 4.5 | TABLE: Thermal requirements | | | | | | |
| | Supply voltage (V) | 5V | / | / | / | / | — |
| | Maximum measured temperature T of part/at.....: | T (°C) | | | | | Allowed T _{max} (85°C) |
| | BLUENRG-M0A (PCB) | 26 | / | / | / | / | 45 |
| Supplementary information: limits recalculated for an ambient temperature of 80°C. Ambient temperature 23°C. USB powered 5Vdc. | | | | | | | |
| | Temperature T of winding: | t ₁ (°C) | R ₁ (Ω) | t ₂ (°C) | R ₂ (Ω) | T (°C) | Allowed T _{max} (°C) |
| | / | / | / | / | / | / | / |

| | | | | |
|------------------------------|--|-----------------------|--------------------------|-----|
| 4.5.5 | TABLE: Ball pressure test of thermoplastic parts | | | N/A |
| | Allowed impression diameter (mm): | ≤ 2 mm | | — |
| Part | | Test temperature (°C) | Impression diameter (mm) | |
| / | | / | / | |
| Supplementary information: / | | | | |

| 5.3 | TABLE: Fault condition tests | | | | | |
|------------------------------|-------------------------------------|--------------------------|--------------|--------|------------------------|-------------|
| Component No. | Fault | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Observation |
| / | / | / | / | / | / | / |
| Supplementary information: / | | | | | | |

MEASUREMENT EQUIPMENT AND INSTRUMENTATION

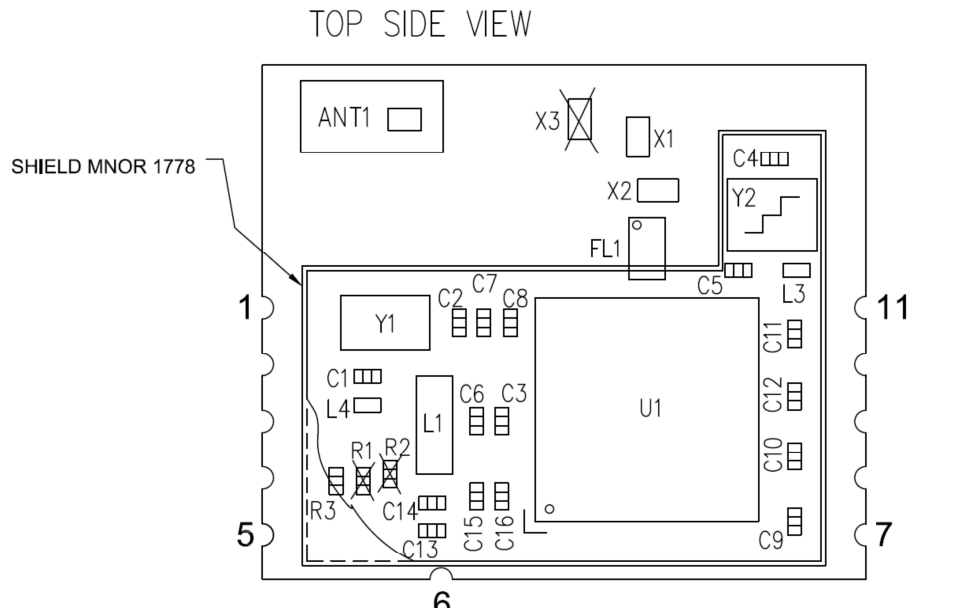
| Measurement /testing | Testing / measuring equipment / material used/ IMQ ID | Range used | Calibration date |
|---------------------------|---|--------------|--------------------------|
| §4.5 Thermal requirements | Hybrid recorder/ Yokogawa, 3081-21/ S00590 | 0°C to 100°C | 19-03-2018 31-03-2019 |
| | Thermocouples/Tersid/ type T/S07663 | 0° to 400°C | 15-09-2017 30-09-2020 |
| | Multimeter/Fluke/45/S01861 | 30V; 10A | 19-01-2018 31-01-2019 |
| | Power Supply/ELIND/200 HS /P00323 | 200V; 2A | / |

PICTURES

EUT IDENTIFICATION

| REV. | DATE | DESCRIPTION OF REVISION AND AUTHOR | |
|------|----------|------------------------------------|-------|
| V1 | 14.11.18 | FIRST ISSUE | Galli |

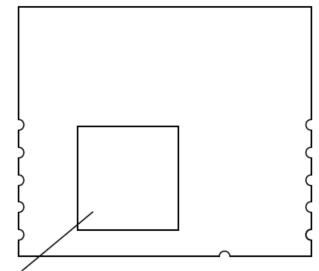
TOP SIDE VIEW





SHIELD MNOR 1778

- 1) Solder the components on p.c.b. using Nitrogen Atmosphere Furnace.
- 2) Assemble the shield MNOR 1778.
- 3) Execute the functional test.
- 4) The assembling must be compliant with IPC norms, ref. to "IPC A 610 class".
- 5) Components with ~~X~~ are NOT MOUNTED.

BOTTOM SIDE VIEW
(NOT IN SCALE)



FREE AREA NO TEXT/LOGO

| | | | | | | |
|--|--|--|--|------------------------|-------------|--------------|
|  Subsystem Product Group Page size Material A4 |  | COMPONENTS LAYOUT | | Doc. ref. BLUENRG-M0A | | |
| | | (PC97B) | | Drawing No. DM00553770 | | |
| Colour | | ROUGHNESS (um) | TOLERANCES (except where otherwise stated) | | Scale 8 : 1 | |
| | | Machine finish | ANG. MEASURES | | Drawn by | |
| ALL DIMENSIONS ARE IN mm (inch). REMOVE ALL BURRS AND SHARP EDGES. | <input checked="" type="checkbox"/> 125 / <input checked="" type="checkbox"/> 32 / <input checked="" type="checkbox"/> 0.8 / <input checked="" type="checkbox"/> 0.2 | No decimal = ±1mm .X = ±0.2mm .XXX = ±0.05mm .XX = ±0.1mm .XXXX = ±0.025mm | No decimal = ±1° .X = ±0°30' | Passed by | Approved by | |
| | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | | | Date | Sheet 1 of 1 |



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