

TEST REPORT

No. AR21-0065297-04

Partially test performed in accordance with

ETSI EN 300 328 V2.2.2 (2019:07)

§ 4.3.2.11 Receiver Blocking

PRODUCT	Bluetooth low energy module
MODEL(s) TESTED	BLUENRG-M2SA
TRADE MARK(s)	STMicroelectronics

APPLICANT	STMicroelectronics S.r.l. Centro Direzionale Colleoni – Palazzo Andromeda 3 I-20864 Agrate Brianza (MB)
------------------	---

Tested by	Robertino Torri <i>[Laboratory technician]</i>	
Approved by	Gianluca Mastrodomenico <i>[Operations Area manager]</i>	

Revision Sheet

Release No.	Date	Revision Description
Rev. 0	2021-05-07	First edition Digital signed - AR21-0065297-04_TR_ETSI EN 300 328 V2.2.2 - STMICROLELECTRONICS - BLUENRG-M2SA

The results of tests and checks reported in this Test Report refer exclusively to the samples tested and described in the Report itself.

This Report shall not be reproduced partially the written approval of IMQ S.p.A..

The authenticity of this Test Report and its contents can be verified by contacting IMQ S.p.A., responsible for this Test Report.

1. GENERAL DATA

SAMPLE		
Samples received on	2021-05-05	(Item(s) sampled and sent by applicant)
IMQ reference samples	BEM	104026
Samples tested No.	1	
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	
Date of acceptance of test item	2021-05-06	
TEST LOCATION		
Testing dates	2021-05-06	
Testing laboratory.	IMQ S.p.A. - Via Quintiliano, 43 – I-20138 Milano	
Testing site	Viale Lombardia, 20 – I-20021 Bollate (MI)	
ENVIRONMENTAL CONDITIONING		
Parameter	Measured	
Ambient Temperature	23.2 ÷ 24.8°C	
Relative Humidity	53 ÷ 65 %	
Atmospheric Pressure	998 ÷ 1001 mbar	
The laboratory is monitored by a continuous environmental conditions measurements system. Temperature, humidity and pressure data are recorded on a weekly basis and stored in local archive.		
REMARKS		
Throughout this report a point is used as the decimal separator. The ability or reliability of this product to perform its intended function in a particular application has not been investigated. IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.		

2. REFERENCE DOCUMENT

DOCUMENT	DATE	TITLE
ETSI EN 300 328 V2.2.2	2019-07	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonized Standard for access to radio spectrum

3. EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL DATA

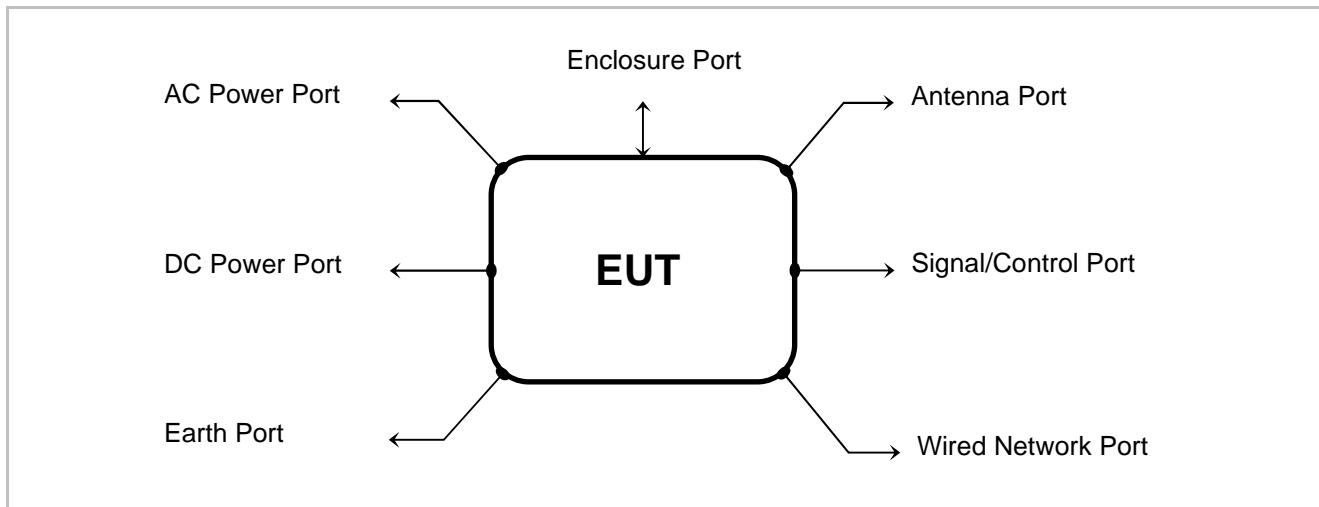
MODEL (basic)	Description
BLUENRG-M2SA	Bluetooth low energy module
VARIANTS (derived)	Description
/	/

MANUFACTURER	STMicroelectronics
ASSEMBLY PLANT(s)	/

EUT IDENTIFICATION

EUT type		Radio module mounted on a dongle unit	
FW version		/	
SW version		/	
EUT use		<input type="checkbox"/> Fixed	<input type="checkbox"/> Vehicular <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Other
EUT single or system		<input checked="" type="checkbox"/> Single	<input type="checkbox"/> System
EUT standing		To be integrated into final application	
Supply voltage		5 V DC by evaluation board USB connected to notebook	
Radio Data (necessary only for EUT with radio module)			
Radio module(s) model		BLUENRG-M2SA	
Radio module(s) type		<input checked="" type="checkbox"/> Bluetooth <input type="checkbox"/> IEEE802.11 <input type="checkbox"/> 802.15.4 <input type="checkbox"/> Proprietary <input type="checkbox"/> Other	
Adaptive / non-adaptive		<input checked="" type="checkbox"/> Adaptive <input type="checkbox"/> Non-Adaptive <input type="checkbox"/> Adaptive operate in non-Adaptive mode	
Receiver category		<input type="checkbox"/> Category 1 <input checked="" type="checkbox"/> Category 2 <input type="checkbox"/> Category 3	
Modulation Type		<input type="checkbox"/> FHSS <input checked="" type="checkbox"/> DSSS, OFDM, etc.	
Number of channels		40	Channel bandwidth/spacing2MHz
Operating frequency		2400 ÷ 2483.5 MHz	
Antenna	Model/Gain:	2450AT18A100E of JOHANSON TECHNOLOGY / +0.5 dBi max peak	
	Type:	<input type="checkbox"/> Integral <input checked="" type="checkbox"/> Dedicated <input type="checkbox"/> External <input type="checkbox"/> Smart antenna systems*	
	Number*	<input checked="" type="checkbox"/> single antenna <input type="checkbox"/> multiple, no beamforming <input type="checkbox"/> multiple, with beamforming	

EUT PORTS



Port	Description	Cable >3 m	Cable Shielded
Enclosure	Open frame		
AC power	/	/	/
DC power	5 V DC by USB port of notebook	/	/
Earth	/	/	/
Wired network	/	/	/
Signal/ Control	/	/	/
Antenna	Dedicated	/	/

STATE OF THE EUT DURING TESTS

Ref.	Mode	Description
#1	Operating	Continuous reception (single channel reception 2402MHz, 2480MHz) with GFSK modulation. The EUT is installed on module device board (dongle). The dongle is powered from the USB cable port.

SUPPORT EQUIPMENT

Defined as equipment needed for correct operation or loading of the EUT, but not considered as tested:

Equipment	Manufacturer	Model
Dongle furnished by manufacturer for supply and management of radio module	STMicroelectronics	PC44B V01
PC with dedicated software for RF transmission management.	/	/
Software used for testing: BlueNRG GUI (STM V.3.2.1) This software was running on PC connected via USB to the Dongle. It was used to enable the test operation mode.		

ELECTROMAGNETICALLY RELEVANT COMPONENTS

Component	No.	Manufacturer	Model
BLE radio module	1	STMICROELECTRONICS	BLUENRG-M2SA

RFI SUPPRESSION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

EMI PROTECTION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

EUT TECHNICAL DOCUMENTATION

Document	Reference
/	/

EUT PERFORMANCE ASSESSMENT

As declared by manufacturer:

Primary function	Radio communication link
Representative parameter	Continuous communication link. Continuous data exchange with another RF module.
Acceptable level of performance	For receiver blocking For equipment that supports a PER or FER: the minimum performance criterion shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

4. SUMMARY OF TEST RESULTS

POSSIBLE TEST CASE VERDICTS:	
Test object meets the requirement	PASS
Test object does not meet the requirement	FAIL
Test case does not apply to the test object	N.A.
Test not performed	N.P.

TEST FOR OTHER TYPES OF WIDE BAND MODULATION (non-FHSS)		
EUT PART	ENVIRONMENTAL PHENOMENON	RESULT
Receiver	Receiver Blocking	PASS

5. TEST RESULTS

5.1 RECEIVER BLOCKING

TEST REQUIREMENT	
Reference standard	ETSI EN 300 328 § 5.4.11
Test set-up	§ 5.4.11.2
Test method	<input checked="" type="checkbox"/> Conducted (§ 5.4.11.2.1) <input type="checkbox"/> Radiated (§ 5.4.11.2.2)
Test condition	<input checked="" type="checkbox"/> Normal (§ 5.1.2) <input type="checkbox"/> Extreme (§ 5.1.3)
Limit	<input type="checkbox"/> Hopping equipment (§ 4.3.1.12.4) <input checked="" type="checkbox"/> Wide Band (§ 4.3.2.11.4)
Deviation to test procedure	None
EUT operating condition	#1
Testing dates	2021-05-06

Receiver Blocking parameters receiver category 2 equipment							
Wanted signal mean power from companion device (dBm)	Unwanted signal (dBm)	Type of blocking signal	Blocking signal frequency (MHz)	% PER measured		Max. PER Limit	Result
				CH Lowest	CH Highest		
(-139 dBm + 10 × log ₁₀ (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less	-34	CW	2380	1.71	/	10%	PASS
			2504	/	1.13	10%	PASS
			2300	1.78	/	10%	PASS
			2584	/	1.41	10%	PASS
Pmin.=-66 dBm							

6. TESTS UNCERTAINTY

Unless otherwise stated the uncertainties for the tests and measurements are evaluated in according to IMQ Operational Instruction IO-LAB-001, IO-LAB-004 and IO-LAB-009.

The expanded uncertainty was calculated for all measurements and tests listed in this test report according to CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainty in EMC Measurements", with UKAS document LAB 34 and is documented in the quality system accordance to ISO/IEC 17025.

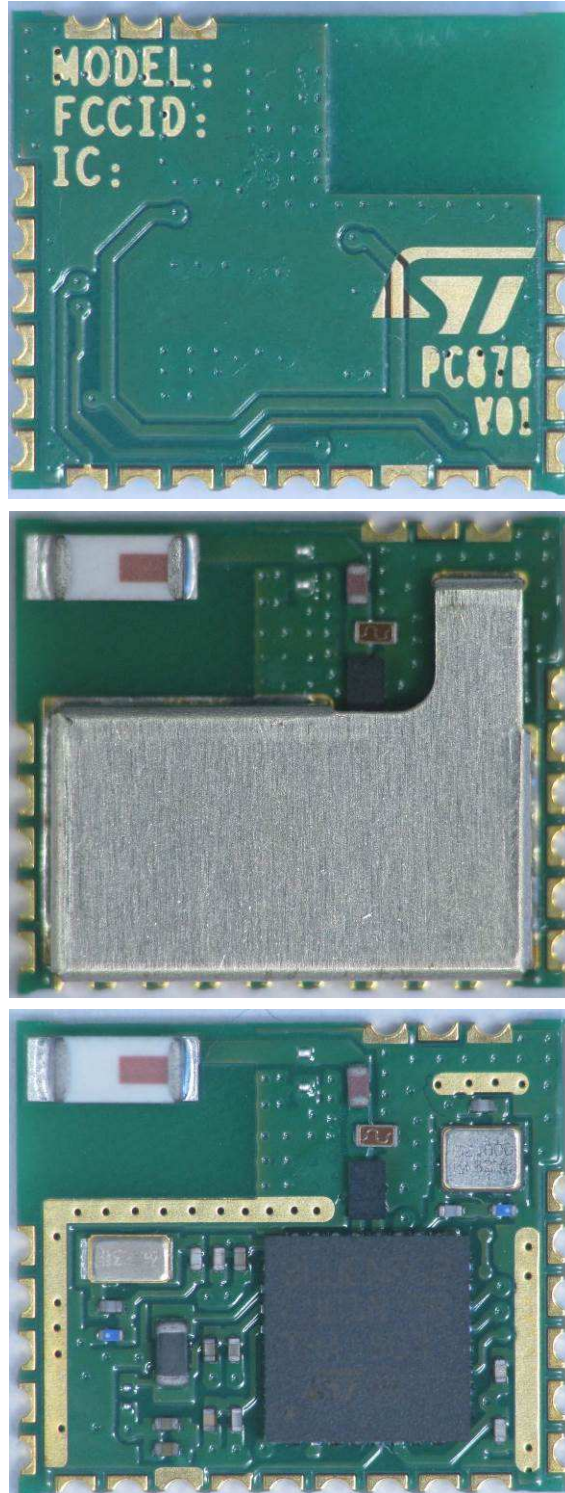
Internal Procedure PG-037 ensures that the requirements for traceability of calibrations, of all test equipment requiring calibration, and calibration intervals are met.

7. MEASUREMENT EQUIPMENT AND INSTRUMENTATION

Instrument	Manufacturer	Model	IMQ Ref.	Cal. Date	Cal. Due
Shielded anechoic chamber	/	/	P-00491	/	/
Signal generator	ROHDE & SCHWARZ	SMR20	S-03707	2020-06-05	2021-06-30
EMI receiver	ROHDE & SCHWARZ	ESU8	S-05562	2020-08-10	2021-08-31
Power splitter	WEINSCHEL	1870A	S-04937	/	/
Attenuator 110dB + 11dB	HEWLETT PACKARD	8494B + 8496B	S-06533	2020-11-05	2021-11-30
Shielded box for RF test	JRE TEST	JRE2525	P-03477	/	/

8. PHOTOGRAPHIC DOCUMENTATION

EUT IDENTIFICATION



END OF TEST REPORT