

EMF ASSESSMENT REPORT

No. AR22-00776887-03

performed in accordance with

FCC Rules: Code of Federal Regulations (CFR) no. 47
Part 15 Subpart C Section 15.247(i)

and

INDUSTRY CANADA

Spectrum Management and Telecommunications Radio Standards Specification
RSS-102:2015 + Amendment 1:2021 § 2.5.1
Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus
(All Frequency Bands)

PRODUCT	Dual-mode Basic Rate (BR), Enhanced Data Rate (EDR) and Low Energy (LE) Bluetooth® radio module
MODEL(s) TESTED	05010BTH
FCC ID	2A6P2-117569
IC ID	29967-117569
TRADE MARK(s)	C.E.I.A.

APPLICANT	COSTRUZIONI ELETTRONICHE INDUSTRIALI AUTOMATISMI C.E.I.A. S.P.A. Zona industriale, 54 – IT-52041 VICIOMAGGIO (AR)
-----------	--

Assessed by	Robertino Torri <i>[Laboratory technician]</i>	
Approved by	Roberto Colombo <i>[Laboratory manager]</i>	

Revision Sheet

Release No.	Date of Issue	Revision Description
Rev. 0	2023-04-03	First edition Digital signed - AR22-0077688-03_TR_RF exposure FCC ed IC_CEIA - modulo BT 05010BTH - Robertino.doc

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	2022-09-19	(Item(s) sampled and sent by applicant)
IMQ reference samples	BEM	110224
Samples tested No.	1	
Object under analysis recognition	Not carried out	
TEST LOCATION		
Assessment date	2023-01-185	
Assessment laboratory	IMQ S.p.A. - Via Quintiliano, 43 – IT-20138 Milano	
Assessment site	Viale Lombardia, 20 – IT-20021 Bollate (MI)	
ENVIRONMENTAL CONDITIONING		
Parameter	Measured	
Ambient Temperature	23.7 °C	
Relative Humidity	52 %	
Atmospheric Pressure	1001 mbar	
<p>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.</p>		
REMARKS		
<p>Throughout this report a point is used as the decimal separator.</p> <p>The ability or reliability of this product to perform its intended function in a particular application has not been investigated.</p> <p>The test results apply to the sample as received.</p> <p>All information relating to the details of the equipment under test at the § 3 of this document was provided by the applicant.</p> <p>IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.</p>		

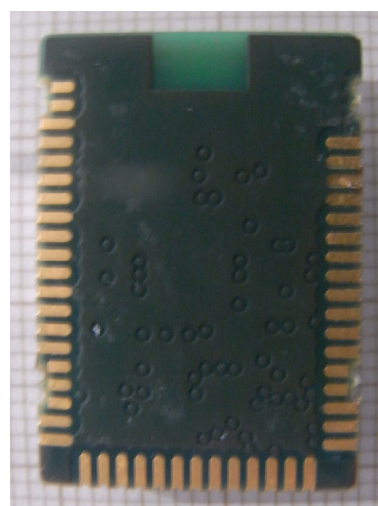
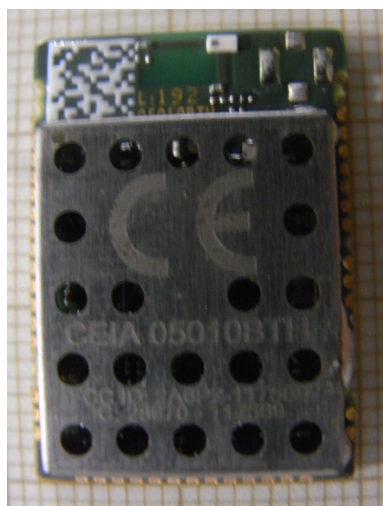
2. REFERENCE DOCUMENT

	DOCUMENT	DATE	TITLE
<input checked="" type="checkbox"/>	47 CFR Part 15	2015	Radio Frequency Device
<input checked="" type="checkbox"/>	ANSI C63.4	2014	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
<input checked="" type="checkbox"/>	ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<input checked="" type="checkbox"/>	RSS-102 Amd.1	2015 2021	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

3. EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL DATA

MODEL (basic)	Description
05010BTH	Dual-mode Basic Rate (BR), Enhanced Data Rate (EDR) and Low Energy (LE) Bluetooth® radio module mounted on dedicated evaluation board.
VARIANTS (derived)	Description
/	/
FCC ID	2A6P2-117569
IC ID	29967-117569
Manufacturer	COSTRUZIONI ELETTRONICHE INDUSTRIALI AUTOMATISMI CEIA S.p.A. Zona industriale, 54 – IT-52041 Arezzo
Type of equipment	DTS - Digital transmission equipment FHSS – Frequency hopping system
Operating frequency	2400-2483.5MHz
Max RF conducted power	DTS : 9.62 dBm FHSS : 9.58 dBm
Modulation	BLE : <input checked="" type="checkbox"/> GFSK 1Mbps, <input type="checkbox"/> GFSK 2Mbps BR : <input checked="" type="checkbox"/> GFSK; EDR : <input checked="" type="checkbox"/> $\pi/4$ -DQPSK, <input checked="" type="checkbox"/> 8DPSK
Number of channels	DTS : 40 FHSS : 79
Antenna	CHIP antenna, gain 1.6 dBi max
Remarks	None



4. SUMMARY OF EMF ASSESSMENT 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.

REF. OF RSS 102	TITLE	RESULT
RSS 102 - § 2.5.1	RF humane exposure	PASS

CFR47 Part 15	TITLE	RESULT
§ 15.247(i), § 47CFR 1.1307(b)(1)	RF humane exposure	PASS

5. RF Exposure Evaluation

5.1 FCC

TEST REQUIREMENT

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines § 1.1310.

EUT classification (fixed, mobile or portable devices)

Portable according to § 2.1093(b) of this Chapter

LIMITS

According to § 2.1093 of this Chapter, by means of the following guidelines: OET Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies (447498 D01 General RF Exposure Guidance v06)

Testing dates

2023-01-18

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

447498 D01 General RF Exposure Guidance v06 – Appendix A

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

The test separation distances ≥ 5 mm is applied to determine SAR test exclusion.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

447498 D01 General RF Exposure Guidance v06 § 4.3

Frequency (MHz)	Conducted power (dBm)	Tune-up (dB)	Max Power (mW)	Distance (mm)	$\frac{\text{max. power (mW)}}{\text{min. distance (mm)}} \times \sqrt{f(\text{GHz})}$	Limits
2402	8.97	0.6	9	6	2.32	≤ 3.0 for 1-g head SAR or ≤ 7.5 for 10-g extremity SAR
2440	9.33	0.6	10	6	2.60	
2480	9.62	0.6	11	6	2.88	

TEST RESULT

This value is less than the low threshold limit. No SAR test is required.

Maximum radiated power was taken into consideration to establish the worst case aggregate maximum output power.

5.2 IC

TEST REQUIREMENT

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	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 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

Remark: If the operating frequency of the device is between two frequencies located in Table, linear interpolation is applied for the applicable separation distance.

Evaluation of Exemption Limit (separation distance ≤20mm)

Frequency (MHz)	Declared by manufacturer					Exemption Limit (obtained by linear interpolation) (mW)
	Max. conducted power	Tolerance of radiated power (Tune-up)	Max. antenna gain (peak)	Max level		
	(dBm)	(dB)	(dBi)	(dBm)	(mW)	
2402	8.97	0.6	1.6	11.17	13.09	30.28
2440	9.33	0.6	1.6	11.53	14.22	30.01
2480	9.62	0.6	1.6	11.82	15.21	30.05

Max level = Max. radiated power + Tolerance of radiated power + Max. antenna gain

TEST RESULT

SAR evaluation is not required because the output power value is less than exemption limit.

END OF ASSESSMENT REPORT