

RRA-EMIESS22O609NGA-03Av0

Radio test report

According to the standard:

CFR 47 FCC PART 15

Equipment under test:

***SPORT EDGE DEVICE
BOXY01***

FCC ID: 2A940-BOXY01

Company:

BALLY'S CORPORATION

Distribution: Mr FREMONT

(Company: NG-AI)

Number of pages: 13 with 2 annexes

Ed.	Date	Modified Page(s)	Technical Verification and Quality Approval	
			Name and Function	Visa
0	21-Jun-23	Creation	M. DUMESNIL, Radio Laboratory Manager	

Duplication of this document is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above.

This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.

Information in italics are declared by the manufacturer/customer and are under his responsibility

DESIGNATION OF PRODUCT: ***SPORT EDGE DEVICE***

Serial number (S/N): 4622-0038

Reference / model (P/N): *BOXY01*

Software version: *1.0.00027*

MANUFACTURER: *NG-AI*

COMPANY CERTIFYING THE PRODUCT:

Company: BALLY'S CORPORATION

Address: 100 Westminster Street, Providence
ROHDE ISLAND 02903
UNITED STATES

Responsible: Mr MIRI

COMPANY SUBMITTING THE PRODUCT:

Company: NG-AI

Address: 1, RUE FERMAND TRUFFAUT
14800 DEUVILLE
FRANCE

Responsible: Mr FREMONT
Person present during the tests: Mr Bioret (the first day)

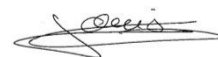
DATES OF TEST: From 5-Dec-22 to 20-Jun-23

TESTING LOCATION: EMITECH ANGERS laboratory at JUIGNE SUR LOIRE (49) FRANCE

FCC Accredited under US-EU MRA Designation Number: FR0009
Test Firm Registration Number: 873677

TESTED BY: S. LOUIS

VISA:



WRITTEN BY: S. LOUIS

CONTENTS

TITLE	PAGE
1. INTRODUCTION	4
2. PRODUCT DESCRIPTION	4
3. NORMATIVE REFERENCE	5
4. TEST METHODOLOGY	6
5. TEST EQUIPMENT CALIBRATION DATES	6
6. TESTS RESULTS SUMMARY	7
7. MEASUREMENT UNCERTAINTY	8
8. ANTENNA GAIN CALCULATION	9
APPENDIX 1: TEST EQUIPMENT LIST	12
APPENDIX 2: CONDUCTED MEASUREMENT – TEST SET UP	13

REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	21-Jun-23	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment **SPORT EDGE DEVICE, Model: BOXY01**, in accordance with normative reference.

The equipment under test integrates a Bluetooth Low Energy radio function.

This report is a justification statement for antenna as stated in 'Timco' newsletter for Part 15 applications with equipment classes DTS, DSS, NII, 6ID, etc. which require the antenna gain for compliance with EIRP limits.

2. PRODUCT DESCRIPTION

Class:	B
Utilization:	Residential
Antenna type and gain:	Low Channel: 1.10 dBi / integral PCB antenna Central Channel: 1.23 dBi / integral PCB antenna High Channel: 1.98 dBi / integral PCB antenna
Operating frequency band:	From 2400 MHz to 2483.5 MHz
Number of channels:	40
Frequencies tested:	2402 MHz, 2426 MHz and 2480 MHz
Channel spacing:	2MHz
Modulation:	GFSK
Power source:	3.7Vdc by lithium battery
Power settings:	10dBm (adjusted by software)

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below.

They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2023) Radio Frequency Devices

ANSI C63.10 2013
Procedures for Compliance Testing of Unlicensed Wireless Devices.

558074 D01 DTS v05 r02 Guidance for compliance measurements on digital transmission system,
frequency hopping spread spectrum system, and hybrid system devices
operating under section 15.247 of the FCC rules.

4. TEST METHODOLOGY

Justification statement:

For antenna as stated in 'Timco' newsletter for Part 15 applications with equipment classes DTS, which require the antenna gain for compliance with EIRP limits.

Radio performance tests procedures given in CFR 47 part 15:

Subpart C – Intentional Radiators

Paragraph 247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last calibration	Calibration interval (years)	Next calibration due
0	BAT-EMC V3.18.0.26	Software	/	/	/
4088	R&S FSP40	Spectrum Analyzer	13/05/2022	2	12/05/2024
7279	SUCOFLEX SF104 N 1.5m	Cable	20/05/2022	2	19/05/2024
8535	EMCO 3115	Antenna	13/04/2023	3	12/04/2026
8548	Midwest Microwave 10dB	Attenuator	08/02/2023	3	07/02/2026
8593	SIDT Cage 2	Anechoic chamber	31/03/2022	3	30/03/2025
8750	La Crosse Technology WS-9232	Meteo station	24/10/2022	1	24/10/2023
8896	ACQUISYS GPS8	Satellite synchronized frequency standard	/	/	/
12911	Huber + Suhner N-2m	cable	20/05/2022	2	19/05/2024
14736	MATURO	Turntable and mat controller MCU	/	/	/
14831	Fluke 177	Multimeter	01/02/2022	2	01/02/2024
15812	COMP-POWER PAM-118A	Low-noise amplifier 18GHz	23/07/2022	1	23/07/2023
18413	MechANC - N - 5m	Cable	15/02/2022	2	15/02/2024

6. TESTS RESULTS SUMMARY

6.1 CFR 47 part 15 requirements

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.247	OPERATION WITHIN THE BANDS 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz					
	(b) Maximum peak output power	X				Note 1
	(c) Operation with directional antenna gains > 6 dBi			X		

NAp: Not Applicable

NAs: Not Asked

Note 1: First, a measurement was performed using the radiated method, then a conducted measurement was performed with the same sample replacing the integral antenna by a SMA connector.

Gain antenna is calculated by subtracting conducted power measurement from radiated power measurement.

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%.

Parameter	Emitech Uncertainty
RF power, conducted	$\pm 0.8\text{dB}$
Radiated emission valid to 26 GHz	
9kHz – 30MHz	$\pm 2.7. \text{ dB}$
30MHz – 1GHz	$\pm 5.0 \text{ dB}$
1GHz – 18GHz	$\pm 5.3 \text{ dB}$
18GHz – 40GHz	$\pm 6.1 \text{ dB}$
AC Power Lines conducted emissions	$\pm 3.4 \text{ dB}$
Temperature	$\pm 1 \text{ }^{\circ}\text{C}$
Humidity	$\pm 5 \%$

8. ANTENNA GAIN CALCULATION

Temperature (°C) : 22

Humidity (%HR): 30

Date : June 20, 2023

Technician : S. LOUIS

Standard: FCC Part 15
RSS-247

Test procedure:

For FCC Part 15: paragraph 15.247 (b)

For RSS-247: paragraph 5.4

RBW≥DTS bandwidth method of paragraph 11.9.1.1 of ANSI C63.10

Radiated Method Measurement:

First an exploratory radiated measurement was performed. During this phase the product is oriented in these two normal positions.

Then the final measurement is realized with the product on the most critical orientation.

The system is tested in anechoic chamber, the EUT is placed on a rotating table, 1.5 m from a ground plane.

Zero degree azimuths correspond to the front of the device under test.

Distance of antenna: 3 meters

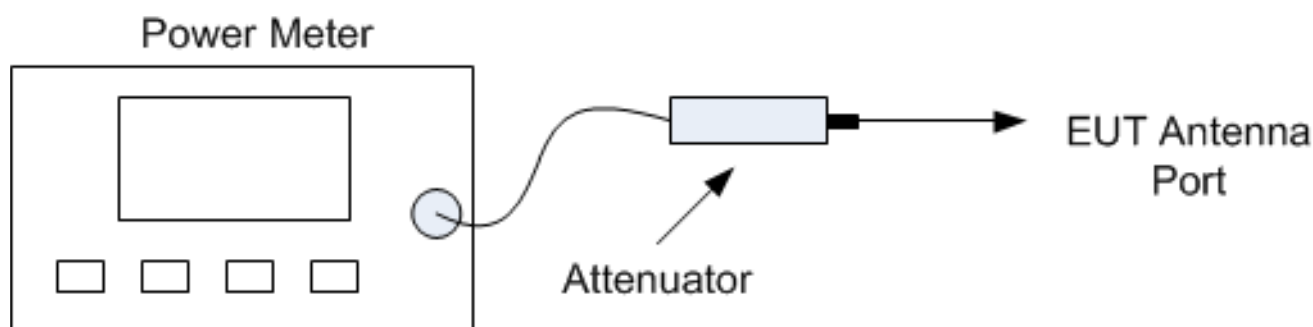
Antenna height: 1.5 meter

Antenna polarization: vertical and horizontal (only the highest level is recorded)

The measurement of the radiated electro-magnetic field is realized with an analyser and peak detector. The resolution bandwidth is adjusted at 10 MHz and video bandwidth at 10 MHz. (11.9.1.1 of ANSI C63.10)

Conducted Method Measurement:

Conducted test



The measure is realized in conducted mode with an analyser and peak detector. The resolution bandwidth is adjusted at 10 MHz and video bandwidth at 10 MHz. (11.9.1.1 of ANSI C63.10)

Equipment under test operating condition:

The equipment is blocked in continuous modulated transmission mode by an internal data signal at the highest power level at which the transmitter is intended to operate.

P Software adjusted to +10dBm

We used for power source the internal 3.7Vdc lithium battery fully charged of the equipment.

Results:

Sample N° 1 Low Channel (F = 2402 MHz)

	Radiated Output power measured at 3 meters (dBμV/m):	Conducted Output Power computed (1) (dBm)	Conducted Output Power measured (dBm)	Antenna Gain calculation (dBi)
Nominal supply voltage: 3.7Vdc	103.4	8.14	7.04	1.10

Polarization of test antenna: Horizontal (height: 150 cm)

Position of equipment: Flat Position - (azimuth: 270 degrees)

(1) Conducted output power:

EIRP(dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance in meters and antenna Gain = 0dBi (considered)

Sample N° 1 Central Channel (F = 2426 MHz)

	Radiated Output power measured at 3 meters (dBμV/m):	Conducted Output Power computed (1) (dBm)	Conducted Output Power measured (dBm)	Antenna Gain calculation (dBi)
Nominal supply voltage: 3.7Vdc	103.6	8.34	7.01	1.33

Polarization of test antenna: Horizontal (height: 150 cm)

Position of equipment: Flat Position - (azimuth: 270 degrees)

(1) Conducted output power:

EIRP(dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance in meters and antenna Gain = 0dBi (considered)

Sample N° 1 High Channel (F = 2480 MHz)

	Radiated Output power measured at 3 meters (dBμV/m):	Conducted Output Power computed (1) (dBm)	Conducted Output Power measured (dBm)	Antenna Gain calculation (dBi)
Nominal supply voltage: 3.7Vdc	104.1	8.84	6.86	1.98

Polarization of test antenna: Horizontal (height: 150 cm)

Position of equipment: Flat Position - (azimuth: 270 degrees)

(1) Conducted output power:

EIRP(dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance in meters and antenna Gain = 0dBi (considered)

□□□ End of report, 1 appendix to be forwarded □□□

APPENDIX 1: Test equipment list**Antenna Gain Calculation**

TYPE	MANUFACTURER	EMITECH NUMBER
Anechoic Chamber	EMITECH	8593
Turntable controller 1060C	MATURO	14736
Satellite synchronized frequency standard GPS8	ACQUISYS	8896
Spectrum Analyzer FSP40	Rohde & Schwarz	4088
Antenna 3115	EMCO	8535
Low-noise amplifier PAM-118A	COM-POWER	15812
N-1.5M Cable	SUCOFLEX	7279
N-2M Cable	Huber + Suhner	12911
N-5M Cable	MechANC	18413
Attenuator 10dB	Midwest Microwave	8548
Multimeter 177	Fluke	14831
Meteo station WS-9232	La Crosse Technology	8750
Software	BAT-EMC V3.18.0.26	0000

APPENDIX 2: Conducted measurement – Test set up

