SAR Compliance Test Report

Date of Report	31/01/2020	**Client's Contact person:**	Leonida Del Linz
Number of pages:	7	**Responsible Test engineer:**	Ilari Kinnunen
Testing laboratory:	**Verkotan Oy** Elektroniikkatie 17 90590 Oulu Finland	**Client:**	**VI-grade Srl** Via Galileo Galilei 42 33010 Tavagnacco Italy
Tested devices	**VI-BioTelemetry**		
Related reports:	-		
Testing has been carried out in accordance with:	**47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **FCC published RF exposure KDB procedures** **RSS-102** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory		
Test Results:	**The DUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		

Date and signatures:

For the contents:

31.01.2020

Miia Nurkkala

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Laboratory Manager

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1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Device under Test (DUT):

Product:	VI-BioTelemetry
Manufacturer:	VI-Grade
Model:	BioBox
Hardware Version:	v1.0
FCC ID:	2AU4RBIOTELEMETRY
IC ID:	25643-BIOTEL
Document ID:	FCC SAR test report_VI-BioTelemetry_ID3838_29012019.docx
Notes:	-

1.2 Evaluation Results

The device conforms to the requirements of the standards when the maximum time averaged output power is less than or equal to the Test Exclusion Threshold/Exemption Limit.

Regulator	System	Equipment Class	Test Exclusion Threshold/ Exemption Limit [mW]	Maximum Time Average Output Power [mW]	Result
FCC	**WLAN**	**DTS**	48	**34.34**	**PASS**
ISED	**WLAN**	**NA**	52	**34.34**	**PASS**

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT is a hardware and software turn-key solution provided by VI-Grade to acquire, elaborate and stream some physiological signals generated by human body.

The separation distance from the DUT antenna to human body is 25mm.

Exposure Environment	General population, uncontrolled

2.1 Supported Frequency Bands and Operational Modes

Bands	**Modes of Operation**	**Transmitter Frequency Range (GHz)**
2.4	802.11 b/g/n	2.412 – 2.462

2.2 Test Exclusions

FCC SAR test exclusion thresholds in 447498D01 are shown in a table below.

Appendix A

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

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

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	

ISED Test exclusion based on RSS-102 are shown in a table below.

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

3. OUTPUT POWER

3.1 Maximum Output Power

Transmission mode	Output power [dBm]	Output power [mW]	Maximum Duty cycle [%]	Maximum Time-average output power	Maximum Time-average output power
802.11 b/g/n	22	158.49	21.67	15.36	34.34

3.2 Maximum duty cycle

According to the manufacturer the device sends a packet in every 80 ms. Due to the way the device was designed and build there is no way to change these values. The maximum duty cycle found was measured by the test laboratory and confirmed by the manufacturer. Duty cycle was measured using R&S NRP-Z81 power sensor.

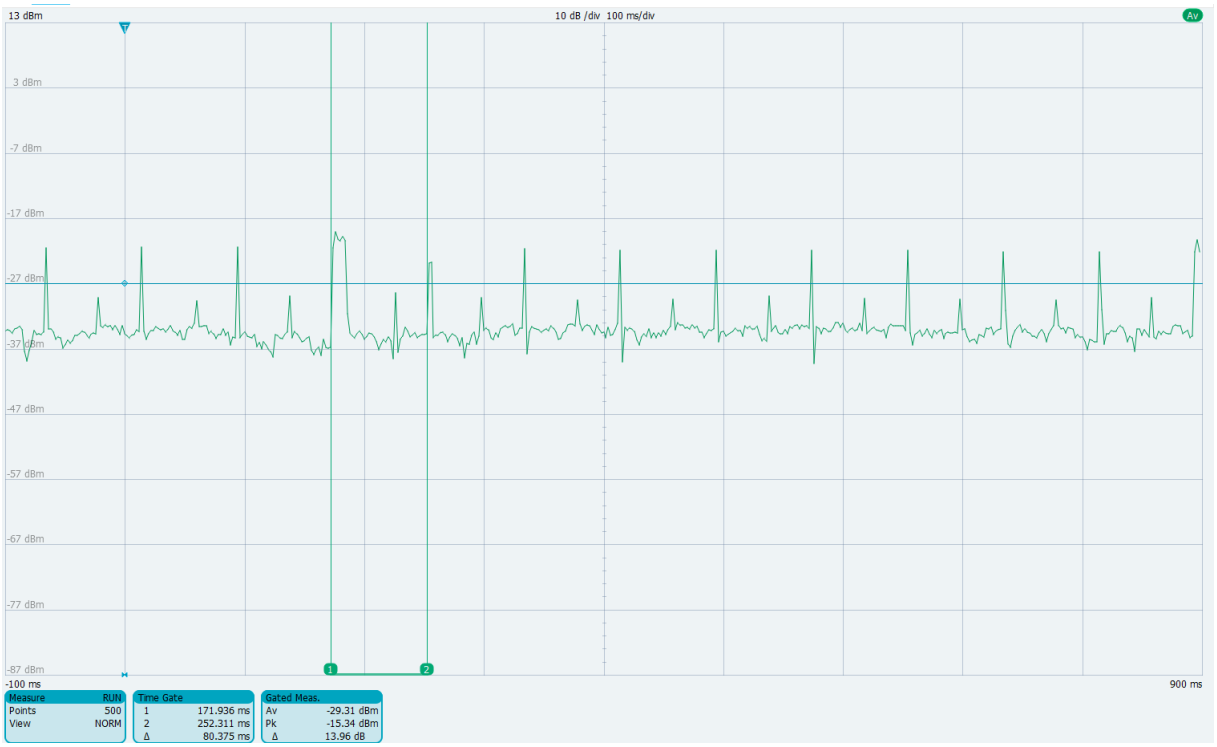

Figure 1 Duty cycle measurement

4. RESULTS

4.1 FCC results

According Appendix A in 447498D01 the SAR test exclusion power threshold for 2450MHz is 48mW at 25mm separation distance.

The maximum time-average output power of the DUT is 34.34mW and the separation distance from human body is 25mm thus it is below the test exclusion threshold.

4.2 ISED results

According Table 1 in RSS-102, the SAR test exclusion power threshold for 2450MHz is 52mW at 25mm separation distance.

The maximum time-average output power of the DUT is 34.34mW and the separation distance from human body is 25mm thus it is below the test exclusion threshold.

