







## GENERAL INFORMATION

FCCID: 2AB2JPHYS5POMOC

### 1.1. Product description



#### Unique features

- ✓ Waterproof and dust resistant 
- ✓ Multi-standard wireless connectivity   
- ✓ Long-term motion recording and on-board processing 
- ✓ microUSB port for rapid file transfer and universal charging 

#### Software

- > Standard txt/htf file format with raw data and 3D angles
- > Free companion App to sync, check battery, and program sensors
- > Free MATLAB/Python/C/C++ routines to sync, stream, read, plot
- > Professional applications for:  
Gait, Running, Activity, Posture, Shoulder function
- > On-demand custom algorithm libraries and OEM/licencing

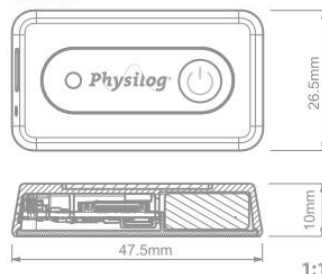
#### Accessories

- > Rubber clip (for shoe laces/belt)
- > Elastic Velcro® straps
- > Bio-compatible patches (for skin)
- > Transport case
- > microUSB<>USB cables
- > External sync. with lab systems

#### Specifications

Component	Manufacturer	Remarks
Inertial Sensors	STMicroelectronics	3D Accelerometer up to 16g 3D Gyroscope up to 2000°/s
Ambient Sensor	STMicroelectronics	Barometric altitude from 260 to 1260 hPa Temperature sensor accuracy of +/-1.5°C
Radio Chip	Nordic Semiconductors	Multi-standard: Bluetooth Low Energy (BLE), Ant+, and Near field communication (NFC)
Internal Memory	Apacer	Class 10 microSD Card, 8Gb
Microcontroller	Nordic Semiconductors	ARM® Cortex® M4 with floating-point for on-board processing
Micro-usb interface	Amphenol FCI & Microchip	Waterproof IP67, with dedicated chip for fast data transfer. High-speed USB 2.0
Battery	Renata	Lithium Ion Polymer Accumulators 3.7V 140mAh
Plastic Enclosure	ABS Polylac® PA-757	Biocompatible with bi-color LED and 8mm button
Operating Temperature		From -40° to 45°C
Assembly	Locatis Electronics SA (CH)	Weight 9 grammes Dimensions 26,5x47,5x10 mm
Extension Board (optional)	Ublox Melexis	Low-power GPS/GNSS module High-quality 3D Magnetometer

#### Size



#### Certifications

Medical CE class 1 pending, ISO 13485 pending  
(IEC 60950, IP67, RT&TE, FCC, IC)





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*POMOCUP:*



## TECHNICAL DATA

Data transfer:	Bluetooth low energy (BLE), Ant+, NFC, High speed micro-usb
Certifications:	CE, FCC, IC, IP67
Battery:	30h life, Rechargeable Lithium Ion Polymer, Mini-usb cable to charge
Dimensions:	68.1 x 33.6 x 17.7 mm
Weight:	24 grams (including ski fixation system)
Internal memory:	microSD Card, 8GB (>500h)
Waterproof:	IP67 (immersion up to 1 meter for up to 30 minutes)
Operating temperature:	-20°C to 45°C
Attachment system:	2 magnets (Neodymium, N45, ~3kg force)

The BLE and ANT protocol have the same usage. There was the need of implementing these two different protocols to connect a Physilog5/Pomocup to a large variety of equipment.

For example the BLE is compatible with a wide range of tablets and smartphones running on android and iOS.

The ANT protocol on the other hand is compatible with watches and accessories from brands such as Suunto or Garmin.

These two protocols are used to transfer data between the Physilog5/Pomocup to an equipment and vice versa.

The type of data transferred by the Physilog5/Pomocup to an equipment is typically:

Raw sensors data (accelerometer data, gyroscope data and barometric pressure data)

Informations on the state of the Physilog5/Pomocup. Such as the battery level, configuration of the sensors etc

The type of data sent from the equipment to the Physilog5/Pomocup is typically:

A request to start a measurement.

A packet to update the time and date of the Physilog5/Pomocup.

For the RF mode, it is different. We are using this protocol only if no equipment is used with the Physilog5/Pomocup.

In this case, we use the RF protocol to transfer data between several Physilog5 or between several Pomocup.

The type of data sent are typically:

A synchronization packet that allows several Physilog5/Pomocup to measure at the same time.



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## 1.2. Tested System Details

### 2.1. JUSTIFICATION

All test are performed on the product <Pomocup>, the <Physilog> product has the same electronic board. The difference is the plastic enclosure (shape) and the internal battery.

Products	Rating	Mark / Model
Pomocup	3.7vdc 240mAh	RENATA / ICP521630PM-01
Physilog	3.7cdc 155mAh	RENATA / ICP641620PA-01

### 2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

#### Equipment under test (EUT):

Pomocup

Serial Number: PHY5\_55 & PHY5\_05



Photography of EUT

#### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 3.7VDC

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Mark / Model	Comments
Internal Supply	<input type="checkbox"/> AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Battery	3.7Vdc	RENATA / ICP521630PM-01	-



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**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Access1	µUSB	0.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-

**Auxiliary equipment used during test:**

Type	Reference	Model	Comments
Laptop	LENOVO	L450	-

**Equipment information:**

Bluetooth LE Type:	<input checked="" type="checkbox"/> BLE	<input type="checkbox"/> v4.0	<input type="checkbox"/> v4.1	<input type="checkbox"/> v4.2
Frequency band:	[2400 – 2483.5] MHz			
Spectrum Modulation:	<input checked="" type="checkbox"/> DSSS (Tested like it)			
Number of Channel:	40			
Spacing channel:	2MHz			
Channel bandwidth:	1MHz			
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Temporary for test	
Transmit chains:	1			
	Single antenna			
	Gain: 0.5dBi			
Beam forming gain:	No			
Receiver chains	1			
Type of equipment:	<input type="checkbox"/> Stand-alone	<input checked="" type="checkbox"/> Plug-in	<input type="checkbox"/> Combined	
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Adaptivity mode:	<input type="checkbox"/> Yes (Load Based)	<input type="checkbox"/> Off mode	<input checked="" type="checkbox"/> No	
	Clear Channel Assessment Time:			Xµs
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty	
Equipment type:	<input type="checkbox"/> Production model		<input checked="" type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input type="checkbox"/> X°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 55°C	<input type="checkbox"/> X°C
Type of power source:	<input type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input type="checkbox"/> 230V/50Hz	<input checked="" type="checkbox"/> 3.7Vdc	
Geo-location capability:	<input type="checkbox"/> Yes (The geographical location determined by the equipment is not accessible to the end user as defined in section 4.3.2.12.2 of ETSI EN 300 328 V2.1.1 standard)		<input checked="" type="checkbox"/> No	
Minimum performance criteria for Receiver blocking test:	<input checked="" type="checkbox"/> PER less than or equal to 10%		<input type="checkbox"/> Alternative performance criteria (4)	



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CHANNEL PLAN			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>Cmin: 0</b>	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
<b>Cmid:19</b>	2440	<b>Cmax: 39</b>	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	<input checked="" type="checkbox"/>

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Ant	<b>Nordic</b>		
Frequency band:	[2400 – 2483.5] MHz		
Sub-band REC7003:	Annex 3 (a)		
Spectrum Modulation:	<input checked="" type="checkbox"/> DSSS or Other modulation (Tested like it)		
Number of Channel:	40		
Spacing channel:	2 MHz		
Channel bandwidth:	1 MHz		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Antenna connector:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Temporary for test
Transmit chains:	<input checked="" type="checkbox"/> 1		
	Single antenna		
	Gain: 0.5 dBi		
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	<input type="checkbox"/> Stand-alone	<input checked="" type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model
Operating temperature range:	Tmin:	<input checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 55°C
Type of power source:	<input type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery
Operating voltage range:	Vnom:	<input type="checkbox"/> 230V/50Hz	<input checked="" type="checkbox"/> 3.7Vdc

CHANNEL PLAN			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Cmin: 0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
Cmid: 19	2439	Cmax: 39	2480

DATA RATE		
Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	<input checked="" type="checkbox"/>



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<b>RF module:</b>	Nordic			
<b>Frequency band:</b>	[2400 – 2483.5] MHz			
<b>Sub-band REC7003:</b>				
<b>RF mode:</b>	<input checked="" type="checkbox"/> Transmitter	<input type="checkbox"/> Transceiver	<input checked="" type="checkbox"/> Receiver	<input type="checkbox"/> Standby
<b>Spread Spectrum Modulation:</b>	<input checked="" type="checkbox"/> DSSS		<input type="checkbox"/> FHSS	<input type="checkbox"/> None
<b>-6dB Channel bandwidth:</b>	<input type="checkbox"/> Up to 20MHz	<input type="checkbox"/> Up to 1MHz	<input checked="" type="checkbox"/> Other: 1MHz	
<b>Number of Channel:</b>	79			
<b>Channel separation:</b>	1MHz			
<b>Transmit chains:</b>	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
	<input checked="" type="checkbox"/> Single antenna		<input type="checkbox"/> Symmetrical	<input type="checkbox"/> Asymmetrical
	Gain 1: 0.5dBi	Gain 2: dBi	Gain 3: dBi	Gain 4: dBi
<b>Receiver classification § 4.1.1</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	
<b>Receiver bandwidth:</b>	1MHz			
<b>Antenna type:</b>	<input type="checkbox"/> External:		<input checked="" type="checkbox"/> Internal:	
<b>Antenna gain:</b>	dBi			
<b>Extreme temperature range:</b>	<input checked="" type="checkbox"/> Category I (General) -20°C to +55°C		<input type="checkbox"/> Category II (Portable) -10°C to +55°C	<input type="checkbox"/> Category III (Indoor) +5°C to +35°C
<b>Test source voltage:</b>	<input type="checkbox"/> AC:	<input type="checkbox"/> DC: VDC	<input checked="" type="checkbox"/> Battery: 3.7VDC / Lithium-Ion	
<b>Extreme test source voltage:</b>	<input type="checkbox"/> ±10%:		<input checked="" type="checkbox"/> other: 3.1Vdc	
<b>Equipment type:</b>	<input type="checkbox"/> Production model		<input checked="" type="checkbox"/> Prototype	

CHANNEL PLAN					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>Cmin: 0</b>	<b>2402</b>	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	<b>Cmid 37</b>	<b>2439</b>	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	<b>Cmax: 78</b>	<b>2480</b>
25	2427	52	2454		
26	2428	53	2455		

Hardware information			
Highest internal frequency (PLL, Quartz, Clock, Microprocessor...):	<b>F<sub>Highest</sub>:</b>	<b>64</b>	<b>MHz</b>
Firmware (if applicable):	<b>V. :</b>	1.0.0	



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### **1.3. Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 or ANSI C63.10, FCC Part 15 Subpart C.

Radiated testing was performed at an antenna to EUT distance of 10 meters. During testing, all equipment's and cables were moved relative to each other in order to identify the worst case set-up.

### **1.4. Test facility**

Tests have been performed **May 15th to 22th, 2017**.

This test facility has been fully described in a report and accepted by FCC as compliant with the radiated and AC line conducted test site criteria in ANSI C63.4 and ANSI C63.10 (registration number 94821).

This test facility has also been accredited by COFRAC (French accreditation authority for European Union test lab accreditation organization) according to NF EN ISO/IEC 17025, accreditation number 1-1633 as compliant with test site criteria and competence in 47 CFR Part 15/ANSI C63.4 and EN55022/CISPR22 norms for 89/336/EEC European EMC Directive application. All pertinent data for this test facility remains unchanged.