

Player Analysis Technology Approval report

Artengo Personal Coach

Test code: PAT-13-005

Serial no(s):

8247319 (pod model number)
1642980 (watch)

Software version(s):

ONconnect v3.6

Firmware version(s):

FW702 (pod)
v2.8 (watch)



Issue date: 17 July 2014

Objective: To test and evaluate the Artengo Personal Coach Player Analysis Technology according to Rule 31 of the 2014 Rules of Tennis.

Result: Approved

SUMMARY

A 'pod' (mass 24 g) containing electronic sensors is attached to the throat of the racket to record the orientation and acceleration of the racket. Data collected by the pod are sent to a purpose-built watch via a wireless (ANT+) connection or to an auxiliary device, e.g. laptop, via wired (USB) connection.

Wireless streaming of data is 'open', in that no password is required to authorise the connection between pod and watch, and multiple watches can be connected to the pod, with no notification provided to the user of the additional connections.

Coaching information, such as ball impact location on the stringbed, is available on the watch and auxiliary devices with active internet connection.

Restrictions on the access by a player to Artengo Personal Coach components during periods when coaching is and is not allowed are as follows:

COMPONENT	NO COACHING	COACHING
Pod	Permitted	Permitted
Watch	Not permitted	Permitted
Auxiliary device (e.g. PC)	Not permitted	Permitted

MAIN COMPONENTS

The main components of the system are described in table 1 and depicted in figure 1.

COMPONENT	FUNCTION(S)
Pod	Record motion of the racket, store and transmit data
Watch	Receive, communicate and store data
ONconnect software	Transmit data
Artengo server	Store and process data
artengo.com website	Communicate data
Auxiliary device, e.g. personal computer (PC)	Communicate, transmit data

Table 1. Description of the components of the Artengo Personal Coach system.



Figure 1. Components of the Artengo Personal Coach system (from left to right): pod; watch; auxiliary device (laptop).

DATA CAPTURE AND TRANSMISSION

A 'pod' containing electronic sensors (a gyroscope and accelerometer) is attached to the throat of the racket (using Velcro straps) to measure its orientation and acceleration (see figure 2). The mass of the pod is 24 g.



Figure 2. Personal Coach pod attached to the throat of a racket.

The pod is switched on by pressing the yellow power button on the top (see figure 3). Initially, one, two or three white lights are illuminated, indicating the battery level (see figure 3).



Figure 3. LED display on pod.



Figure 4. USB connection to the pod.

Following the battery status report, two flashing white lights are emitted from the pod, indicating that it is recording data and can be (or is) wirelessly connected to an ANT+ enabled device, such as the Personal Coach watch (see figure 1). If the pod is not connected to a watch (for example) within 5 minutes, it reverts to 'recording only' mode (and cannot be wirelessly connected to another device without turning it off and then on again) and only one flashing white light is emitted.

In either case, the racket motion is being recorded. Data capture is stopped by pressing the power button on the pod (the light turns off).

Data can be transmitted from the pod via a wireless (ANT+) or wired (USB) connection to another device.

The ANT+ wireless protocol allows multiple ANT+ enabled devices to connect to one another. The Personal Coach watch is one such device, which is compatible with the pod. The watch must be wirelessly connected to the pod shortly after the pod is switched on (before it reverts to recording only mode).

The user selects one of the following three operation modes from the watch's Tennis menu to automatically search for a pod with which to connect:

1. Training
2. Match (includes score entry on the watch)
3. Challenge (enables multi-player use, i.e. multiple pods connected to one watch)

There is no authorisation process, e.g. password protection, to connect the watch to the pod. Multiple watches can be connected to the pod, and no notification is provided to the user of the pod (or the watch) when this occurs. ANT+ enabled devices can be wirelessly connected to the pod at any time it is in 'broadcasting' mode, i.e. two flashing white lights are emitted from the pod. The data are 'streamed' via the ANT+ wireless connection, i.e. collected and transmitted continuously, from the pod to compatible ANT+ enabled devices.

Data can be downloaded to the Artengo server by connecting the pod to an auxiliary device, e.g. a PC, using a USB cable (see figure 4). The user must be logged in to their Personal Coach account using the ONconnect software, in order to download the data.

COMMENTS

The pod must be switched on to record data. Two flashing white lights are emitted from the pod to notify the user that it is wirelessly connected to another device, or devices.

Wireless streaming of data is 'open', in that no password is required to authorise the connection, and multiple watches can be connected to the pod, with no notification provided to the user of the additional recipients.

DATA PROCESSING AND COMMUNICATION

Access to processed data is via an ANT+ enabled device, e.g. the watch, or artengo.com.

Information available on the watch includes: score (as entered by the user); number and classification of shots (i.e. forehand/backhand/serve); estimate of serve speed; and ball impact location on the stringbed. In addition to streamed (live) information, previously recorded (historic) data are available on the watch in the Statistics menu.

Additional information available on artengo.com includes: duration of the session and stroke rate.

COMMENTS

The pod does not have a means to communicate data collected. Another device, e.g. the Personal Coach watch, is required to receive data from the pod and subsequently display the data.

Coaching information is available on compatible ANT+ enabled devices with user-feedback capability and devices with internet access. Therefore, players must not have access to ANT+ enabled devices with user-feedback or internet-enabled devices, e.g. smartphone, tablet, laptop, when coaching is prohibited.

ADDITIONAL INFORMATION

Client:

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Date received: 16 December 2013

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