Player Analysis Technology Approval report

BigBow Champion Sensor

Test code: PAT-14-007

Serial no: n/a

Software versions:
BigBowMobile (Windows 8.1) 1.0.0.0
BigBow Reader (Windows 8.1) 1.0.0.0

Firmware version: 7.0.1

Issue date: 4 January 2016

Objective: To test and evaluate the BigBow Champion Sensor Player Analysis Technology according to Rule 31 of the 2014 Rules of Tennis.

Result: Approved

SUMMARY

The BigBow Champion Sensor 'pod' (mass 4.5 g) containing electronic sensors is typically attached to the butt of the racket to record the orientation, acceleration and vibration of the racket. Data collected by the pod are sent to an auxiliary device either via a wireless (Bluetooth®) connection, e.g. to a smartphone, or via a wired (USB) connection, e.g. to a laptop.

The pod can be wirelessly paired with multiple auxiliary devices, though not simultaneously, with no authorisation required. Real-time data can only be transmitted from the pod to a single auxiliary device.

Coaching information including shot type, ball spin direction and racket swing speed is available on the auxiliary device.

Restrictions on the access by a player to the BigBow Champion Sensor components during periods when coaching is and is not allowed are as follows:

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

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

COMPONENT	FUNCTION(S)
Pod with Bluetooth® radio	Record motion and vibration of the racket, store and transmit data
Charger	Transmit data and charge pod's power supply
BigBowMobile app	Process and view data
BigBow Reader software	Transmit data
Auxiliary device (e.g. smartphone)	Communicate, store and transmit data

Table 1. Description of the components of the BigBow Champion Sensor system.

Figure 1. Components of the BigBow Champion Sensor system (from left to right): Champion pod; charger; auxiliary device (smartphone).

DATA CAPTURE AND PROCESSING

A 'pod' containing electronic sensors (a triaxial gyroscope, triaxial accelerometer and triaxial magnetometer) is attached to the object of interest (e.g. a racket). Typically, the pod is attached to the butt of a racket (see figure 2). The sensors in the pod measure the orientation, acceleration and vibration of the object of interest. The mass of the pod is 4.5 g, including the battery.

Figure 2. Champion pod, fitted with protective cover, attached to the butt of a racket.

Data capture is started by disconnecting the charger from the pod (see figure 3) or moving the pod (to activate the sensors). Data capture is stopped by connecting the charger to the pod or after several minutes of inactivity.

Figure 3. Disconnecting charger from Champion pod.

To transmit the data wirelessly, the pod must be connected to a Bluetooth® enabled auxiliary device, e.g. smartphone. The pod must be initially paired with the auxiliary device. There is no authorisation process, e.g. password protection, to pair the pod with the auxiliary device. Once the pod has been paired with the auxiliary device it automatically connects to that device when both devices are switched on and within range.

Although the pod can be paired with multiple auxiliary devices, it cannot be connected simultaneously to more than one device. Therefore, real-time data are only available on a single device.

Data can also be transmitted from the pod to an auxiliary device, e.g. laptop, using a wired connection. The charger is initially connected to the auxiliary device using a USB cable. The pod is then clipped to the charger (see figure 4) and the data can be transmitted from the pod to the auxiliary device using BigBow Reader software.

Figure 4. Champion pod connected to charger and charger connected to an auxiliary device (e.g. laptop) via USB cable.

Once the data is downloaded to the auxiliary device, the user is given the option to delete the data from the pod memory.

COMMENTS

The pod must be activated to record data.

There is no signal that the pod is transmitting data wirelessly.

The pod can be paired with multiple auxiliary devices, though not simultaneously, with no authorisation required. Real-time data can only be transmitted from the pod to a single auxiliary device.

Alternatively, the data can be transmitted via USB cable (and the charger) to an auxiliary device.

DATA COMMUNICATION

Access to data obtained by wireless transmission is via the BigBowMobile app installed on a smartphone/tablet. Data downloaded via USB is saved as a file on the auxiliary device.

Information available on the auxiliary device includes: identification of shot type (forehand/backhand); ball spin direction (lift/slice/straight); and racket swing speed.

COMMENTS

The pod does not have a means to communicate data directly to the user. The data must be transmitted to an auxiliary device via Bluetooth® or USB connection.

Coaching information is available on the auxiliary device. Therefore, players must not have access to auxiliary devices, e.g. smartphone, when coaching is prohibited.

ADDITIONAL INFORMATION

Client:
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Date received: 14 August 2014

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Report authorised by: Stuart Miller
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Please note:
Approval does not attempt to, nor does it in fact, establish the accuracy or reliability of data or fidelity of its transmission.