

# Quanta Computer

## QOCA PORTABLE ECG MONITORING DEVICE User Manual

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CI6418-01 Ver.: 3A



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## SAFETY NOTES

- The QOCA PORTABLE ECG MONITORING DEVICE is to be used for clinical assessment and personal reference only.
- The QOCA PORTABLE ECG MONITORING DEVICE consists entirely of sophisticated medical electrical parts. Maintenance can only be carried out by professional technicians. Unauthorized disassembly of the device by the user is not allowed.
- The QOCA PORTABLE ECG MONITORING DEVICE must be used with its specified accessories and body patch. The use of accessories and body patch from other brands can damage the device or cause inaccurate readings.
- Do not allow the connectors or contacts on the devices to come into contact with any kind of power source during use.
- Damaged or faulty accessories and electrodes should not be used.
- When the QOCA PORTABLE ECG MONITORING DEVICE is low on battery power, it will automatically stop taking measurements and the corresponding indicator lights will blink. Please charge the sensor's battery as soon as it shows a low battery state.

- Avoid using devices that can affect the accuracy of the readings when the QOCA PORTABLE ECG MONITORING DEVICE is taking measurements (e.g., using a blood pressure monitor will affect the ECG's pulse measurement).
- Avoid using other electronic devices when the QOCA PORTABLE ECG MONITORING DEVICE is taking measurements. If using another other electronic device is necessary, please make sure the QOCA PORTABLE ECG MONITORING DEVICE continues to take measurements normally. See The QOCA ecg APP to see how to do device test.
- Do not use the QOCA PORTABLE ECG MONITORING DEVICE near open flames or in excessive heat.
- When ambient temperature is 104°F – 113°F (40 – 45°C), do not use the QOCA PORTABLE ECG MONITORING DEVICE because it may cause low temperature burns.
- Pay attention to ensure that the QOCA PORTABLE ECG MONITORING DEVICE is not swallowed by pets or children.
- Cardiac pacemakers or other electrical stimulators may affect the accuracy of the measurements of the QOCA PORTABLE ECG MONITORING DEVICE.

- The conductive parts of the electrodes and associated connectors for type BF applied parts, which are parts that make conductive contact with the heart, including the neutral electrode, should not make contact with other conductive parts including the ground. Direct contact with other conductive parts may result in electric shock.
- Please read through this user guide carefully before using QOCA PORTABLE ECG MONITORING DEVICE.
- If QOCA PORTABLE ECG MONITORING DEVICE must be used to take measurements over an extended period of time, please inspect the contact point of the body patch at least once every 24 hours to make sure that the body patch is in the right position and that there is no allergic reaction on the user's skin.
- Do not use high-frequency instruments or electrical medical equipment such as defibrillators when using the QOCA PORTABLE ECG MONITORING DEVICE.
- The QOCA PORTABLE ECG MONITORING DEVICE can only take measurements while the subject is stationary (e.g., while sitting or lying down) or engaging in ordinary activity. Any activities not

permitted by the attending physician may affect the accuracy of the measurements.

- Do not expose QOCA PORTABLE ECG MONITORING DEVICE to extreme temperatures, extremely moist environments, dust, or direct sunlight.
- Do not clean the QOCA PORTABLE ECG MONITORING DEVICE with corrosive or abrasive cleaning agents.
- The QOCA PORTABLE ECG MONITORING DEVICE and its accessories should be disposed of properly. Disposal of the device and its accessories should comply with the relevant local regulations.
- The QOCA PORTABLE ECG MONITORING DEVICE has been tested and certified to international electro-magnetic compatibility (EMC) standards for medical equipment (EN 60601-1 and EN 60601-1-2). If abnormal behavior is observed due to EMC disturbances, please relocate the device accordingly.
- Battery Caution: There is a risk of explosion if the battery for the QOCA PORTABLE ECG MONITORING DEVICE is replaced by an incorrect battery type.
- The QOCA PORTABLE ECG MONITORING DEVICE is NOT intended for use on patients



weighing less than 45lbs (20 kg). It is intended for use on adult patients only.

- The expected service life of the QOCA PORTABLE ECG MONITORING DEVICE is 2 years.
- If you feel very itching or find redness when wearing the body patch, remove the body patch immediately.
- Do not use QOCA PORTABLE ECG MONITORING DEVICE in MRI or X-ray room.
- This device should not be used adjacent to or stacked with other equipment.
- Please do not use any other cables or accessories not approved by the manufacturer in this manual to avoid negative influence on electromagnetic compatibility.
- Due to electrostatic discharge (ESD) sparks may cause sparks. QOCA PORTABLE ECG MONITORING DEVICE is not suitable for use in an explosive environment.
- QOCA PORTABLE ECG MONITORING DEVICE does not support with the devices that apply high-frequency voltage to patients (such as electrosurgical equipment and some respiratory sensors); if such devices are used at the same time, it may cause adverse consequences. For procedures that require the use of high-frequency surgical equipment, QOCA

PORTABLE ECG MONITORING DEVICE should be removed beforehand.

- Avoid using heavy electronic equipment or other sources of electromagnetic interference (such as electric blankets) when using the QOCA PORTABLE ECG MONITORING DEVICE.
- When the ECG signal is always unstable, please contact the manufacturer.
- The body patch is a single-use part.
- Re-use of the body patch will decrease its adhesion and cause incorrect ECG and heart rate measurement.
- Do not use the body patch if the user is allergic to hydrogel or tape adhesive.
- The body patch should be placed on patients by trained medical personnel.
- The wear time of the body patch is up to 7 days. The wear duration may decrease by improper placement or differ by individual skin condition and activity level. We suggest users avoid sweating to extend the wearing time.
- Before wearing the body patch, the applied skin area should be properly prepared by following the steps described in Wearing the ECG Sensor section.

- Do not submerge, bath, or swim with QOCA Portable ECG monitoring device and the body patch.
- Do not apply any lotion or skin care products on applied area.
- Remove the body patch with cautions and do not damage the skin. If the skin at the contact point develops a rash, blisters, reddening, or other irritation, please contact a medical professional or physician.

## PRODUCT OVERVIEW

### Indication for Use

The QOCA Portable ECG Monitoring Device is intended for use by trained medical personnel and trained adults to measure Electrocardiogram (ECG) and heart rate (HR) in hospitals, healthcare institutes, or home environments. The transmission, storage, and display of ECG and HR data are available with dedicated software.

The device is intended for use on adult patients who are not in critical condition.

### Package Contents

After purchasing the QOCA PORTABLE ECG MONITORING DEVICE , please check the product package to ensure that the following items are included:

QOCA®ecg701 product package

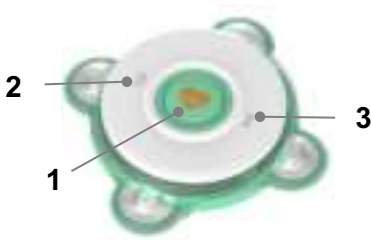
		
<b>QOCA®ecg701 ECG Sensor x 1</b>	<b>Charger (ecg701- C1) x 1</b>	<b>Protection bag x 1</b>
		  
<b>USB Charging Cable x 1</b>	<b>User Manual x 1</b>	<b>Body patch (ecg701-P1)* x 1</b>

\*The body patches are consumables and are sold along with sensor but in a standalone package. Contact with manufacturer for procurement.

## Components

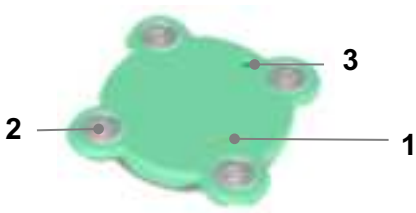
### Sensor (ecg701)

Front



1	Power Button
2	Battery LED (see <i>LED Indicators</i> for more information)
3	Indicator LED (see <i>LED Indicators</i> for more information)

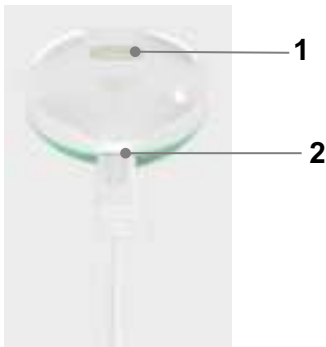
Back



1	Charging Contacts
2	Holder Connectors
3	Positioning groove

**NOTE:** *Electrode button connector will support plug in/off test under 1000 times.*

## Charger(ecg701-C1)

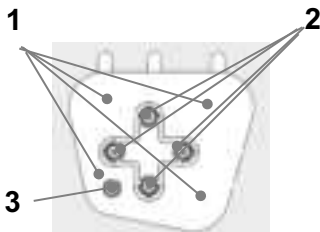


1	Charging Contacts
2	USB Charging Port



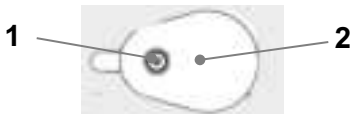
## Body Patch (ecg701-P1)

### Main patch (ecg701-P1a)



Main patch	
1	Gel
2	Sensor connector
3	Cable connector
Material	Made from Nonwoven

### Chest lead patch (ecg701-P1b)



1	Cable connector
2	gel
Material	Made from Nonwoven

### Sensor cable (ecg701-P1c)



1/2	Patch connector
-----	-----------------

## 12-unit Charger (optional, charging 12 sensors at the same time)



### Specification:

Charging indicator	LED on Sensor
Working temp	5 ~ 35°C (Sensor working temp is 5 ~ 35°C when it is charging)
Storage temp	-20 ~ 60°C
Input	12V/2A
Size	241.3 mm * 166.4 mm * 66.25 mm

- ***NOTE:*** The 12-unit charger is an optional accessory and can only be used by trained person/adult.

## Product Requirements

In order to properly use the QOCA PORTABLE ECG MONITORING DEVICE the following items are required:

- The ECG Sensor
- The Body Patch
- A Bluetooth-enabled Android Smartphone\* (with Android version 8.x or above and a display resolution of 1920x1080 or 2560x1440)
- The QOCA ecg APP \*

*\* Items not included in the product package.*

## BEFORE YOU START

Before you start using the QOCA PORTABLE ECG MONITORING DEVICE you must:

1. Charge the battery on the Sensor
2. Install the QOCA ecg APP on your Android smartphone
3. Enable Bluetooth on your smartphone

## Charging the Battery



To charge the battery:

1. Plug the charger's AC adapter (with 5V/1A and conform to standard 60950) into a power source (i.e., wall outlet) and connect the charging cable. Connect the other end of the charging cable to the charger. AC adaptor part is not included in the package. Please must use compatible AC adaptor.
2. Place the sensor into the charger so that the sensor snaps into the charger and the charging contacts on both the sensor and charger make contact.
3. Allow the sensor to charge until the charging indicator light on the charger shows solid blue. This indicates that the battery is fully charged.

## Installing the App

To install the app, search for and download “QOCA ecg APP” on Google Play Store.

***NOTE:** In order to install the QOCA ecg APP your smartphone will need at least 5MB of storage capacity available.*

## Enabling Bluetooth

To enable Bluetooth, enter the Settings menu on your smartphone and enable Bluetooth.

## GETTING STARTED

Once you have completed the steps described in *Before You Start*, you can begin using the QOCA PORTABLE ECG MONITORING DEVICE by following these steps:

1. Pair your smartphone to the QOCA PORTABLE ECG MONITORING DEVICE via Bluetooth
2. Wear the QOCA PORTABLE ECG MONITORING DEVICE

### Pairing

Launch the QOCA ecg App and choose sensor type to pair the sensor to your smartphone:



1. After selecting CI6, it would show the nearby CI6 devices. Please select the name “CI6XSXXXXXXX” which is the same as serial number on the back of sensor.
2. It takes a few seconds to do the pairing. Please wait for a while.
3. After pairing, the App will guide you to do device test. Place fingers on the four holder connectors on the bottom side of the sensor. You should see ECG waveform (one lead only) shortly. Click Complete when the test is done.



4. After test is done, the App will return to the page as illustrated below.





Note: At this moment the sensor is not yet applied to the body. Once your fingers are released from the sensor, the QOCA ecg app should pop up lead-off notification on the screen. This notification will go off once the sensor is worn on body.



## Wearing the ECG Sensor

### IMPORTANT:

- *The body patch is a single-use part.*
- *Re-use of the body patch will decrease its adhesion and cause incorrect ECG and heart rate measurement.*
- *Do not use the body patch if the user is allergic to hydrogel or tape adhesive.*
- *The body patch should be placed on patients by trained medical personnel.*
- *The wear time of the body patch is up to 7 days. The wear duration may decrease by improper placement or differ by individual skin condition and activity level. We suggest users avoid sweating to extend the wearing time.*
- *Before wearing the body patch, the applied skin area should be properly prepared by following the steps described in Wearing the ECG Sensor section.*
- *Do not submerge, bath, or swim with QOCA Portable ECG monitoring device and the body patch.*

- *Do not apply any lotion or skin care products on applied area.*
- *Remove the body patch with cautions and do not damage the skin. If the skin at the contact point develops a rash, blisters, reddening, or other irritation, please contact a medical professional or physician.*

Step 1.

- (1) . Install the sensor on the body patch before putting on body. The heart mark tip should point downward




- (2) . Connect main patch and chest lead patch with the sensor cable



- (3) . If the sensor is powered off, press the power button until the LEDs flashes green and then release the button (After powered on, the



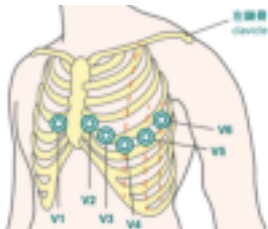
LED “” will keep flashing orange until the patch is well attached to user body.

## Step 2. Prepare the skin of applied area

- (1) . Confirm the applied main patch area. A. Point the main patch label arrow up towards the collarbone junction. B. Make sure ECG heart mark tip point downward.



Confirm the applied chest lead area (Choose any one from V1~V6. Here V4 is illustrated as the example.)



Chest Lead	location
V1	Fourth intercostal space at the right sternal border
V2	Fourth intercostal space at the left sternal border
V3 (C3)	Half way between V2 and V4
V4	Fifth intercostal space in the midclavicular line

V5	Left anterior axillary line on the same horizontal plane as V4.
V6	Left midaxillary line on the same horizontal plane as V4 and V5

- (2) . Remove body hair in the area of patch placement.
- (3) . Use abrader disc to clean the skin first (horizontal by 10 times and vertical by 10 times) and alcohol pad cleaning. Allow site to dry.



*Note: If necessary, medical personnel may adjust chest lead area to fit different body shape or skin condition.*

### Step 3. Place body patch

- (1) . Remove the central release paper. Do not touch the stick area.



- (2) . Point the main patch label arrow up towards the collarbone junction. User's arms are placed on the side. Press the central area to stick the patch on body (avoid pressing the power button)





- (3) . Remove the left release paper. Press the left area to stick the patch on body.




- (4) . Remove the right release paper. Press the right area to stick the patch on body.



- (5) . Remove the release paper of chest lead patch.  
Point the red positioning dot to the chest lead  
appointed by the physician.
- (6) . Press and stick the patch on chest lead area.





(7) . After completing the steps above, the event LED “” will flash blue 5 times and then distinguish.

Step 4. Hand pressure on both main and chest lead patch (especially on the connect point) for 30 seconds.

**IMPORTANT:** The Patch needs 24 hours to fully stick to your skin, we recommend showering briefly with your back to the water, and avoid any activities that cause sweating during this period.

## THE QOCA ECG APP

### Main Screen

Once you have successfully launched and worn the ECG sensor, the QOCA ecg APP's main screen will display on your mobile phone. The main screen (shown below) displays ECG records which should be shown to a medical professional for evaluation.



Main screen without records



Main screen with records

**NOTE:** When the Bluetooth is disconnected, it would show the BT disconnected message below.



**NOTE:** When the ECG sensor is worn inappropriately, it would show the lead off message below.




## Event record

The ECG data is automatically saved in the embedded storage in the sensor. When you feel a symptom, you can press the button on the sensor or the heart button on the main screen to record this event. The recorded event will be saved in the sensor as well as in the QOCA ecg app. You can find the recorded event in the main screen.

The ECG data will also be stored in the sensor's embedded storage for back up.

## Check the Device Information

Tap the user icon  on the left top side of the main screen to check device information and access other settings.



Set the chest lead : You can choose any chest lead from V1~V6).

Event record duration: Options include 30 seconds/1 min/2 mins/5 mins (default setting is 30 secs)



**Device Test:** You can see real-time waveform with this option, but the waveform will not be saved to App.

**Clear data:** You can unpair the sensor from the mobile phone by using this option. All data will be erased from the App.



## ADDITIONAL INFORMATION

### LED Indicators

The following tables describe the indicators on both the sensor and charger:

#### Sensor Status Indicator

Event	Action	Behavior
Power on	Press power button	<ul style="list-style-type: none"><li>Both Battery LED &amp; Indicator LED keep flashing and then extinguish when power on is done. Indicator LED will flash orange until the device is lead-on.</li></ul>

Power off	Long press power button for 5 seconds	<ul style="list-style-type: none"> <li>• Solid blue light for both Battery LED and Indicator LED while press the button</li> <li>• After 5 seconds turn off lights</li> </ul>
Lead off	User do not wear device	<ul style="list-style-type: none"> <li>• Indicator LED flashing orange light</li> </ul>
Event Recording	When it's lead on and press power button	<ul style="list-style-type: none"> <li>• Indicator &amp; battery LEDs flashing blue light</li> </ul>
Low battery	N/A	<ul style="list-style-type: none"> <li>• Battery LED flashing orange light</li> </ul>
Charging	Put on charger	<ul style="list-style-type: none"> <li>• Battery LED flashing blue light</li> </ul>

Fully charged	Put on charger	• Battery LED solid blue light
USB connected	Plug sensor to USB	• Indicator LED with solid blue light

## Cleaning

The table below describes the appropriate cleaning methods for each item included with the QOCA PORTABLE ECG MONITORING DEVICE:

Item	Cleaning Method
<b>Sensor</b>	Wipe with a dry cloth when it's dirty. And clean it every day if it is frequently used.
<b>Charger</b>	Wipe with a dry cloth when it's dirty. And clean it every day if it is frequently used.

## Specifications

### Sensor Specifications

Item	Spec(design input)
ECG Sensor	Continuous ECG data acquisition and Measuring Lead: lead I, II, III, aVR, aVL, aVF and one chest lead(choose any one from V1~V6)
	Frequency Response: Monitor 0.05 to 40 Hz
	Heart rate measurement range*: 30 – 240
	Heart rate accuracy: $\pm 3$ bpm or $\pm 3\%$
	Differential Input Impedance: $> 10M\Omega$
	Common Mode Rejection Ratio: $> 70$ dB
	Sampling rate: 256Hz
	<i>*Heart rate is calculated based on the R-R</i>
	<i>** If the heart rate falls out of the 30 – 240</i>
Data Transmission	(1) Bluetooth BLE 5.0: Transmit distance: 10 meters (open space)
Battery	3.8V/530mAh
Battery Life	Up to 7 days @ 256 Hz sampling rate, holter

Battery charging	3 hours
Working	5 – 45°C, 10% – 95% non-condensing
Storage	-20 – 60°C, 10% – 95% non-condensing
Atmospheric	800 hPa to 1013 hPa
Altitude	2000m
Enclosure Rating	IP26
Material flame	PC+ABS, UL94V2
Weight	27.5± 0.5 g
Dimension	65.8 x 65.8 x 10.2 ±0.2 mm

## Charger Specifications

Item	Spec(design input)
Input	5V/0.5A
Working	5 – 35°C, 10% – 95% non-condensing
Storage	-20 – 60°C, 10% – 95% non-
Enclosure	IP21
Weight	18± 0.5 g
Dimension	51.7 x 51.7 x 12.65 ±0.2 mm

## Troubleshooting

- 1) Make sure the Bluetooth function of your mobile phone is enabled. If the problem is not resolved, contact manufacturer for assistance.

## Gateway mode information

When using QOCA PORTABLE ECG MONITORING DEVICE, the data needs to be transmitted from many different ECG-sensors to server at the same time. The Gateway part is not included in the package. You must use compatible gateway device for the multi-ECG-sensors to work properly. System setting will allow ECG-sensors (not over 6 sets) to connect gateway data transmission together, or any gateway device that meeting the following specifications:

### Gateway Compatible Specifications

<b>Blue tooth</b>	BT 4.2 or above
<b>WIFI</b>	2.4GHz/5GHz 802.11 a/b/g/n/ac
<b>Storage</b>	4GB
<b>Ethernet</b>	10/100/1000M
<b>Connectivity</b>	Up to 6 ECG sensor devices

The gateway mode is designed to collect multi-ECG-sensors data information only.





## Customer Support

For additional technical information, contact Quanta Customer Support Department.



Quanta Computer Inc.(QCI)

Address:

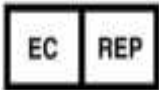
No. 188, Wenhua 2nd Rd.,  
Guishan Dist., Taoyuan City 333, Taiwan

TEL: +886-3-327-2345

FAX: +886-3-318-4207

Email: [MedicalService@quantatw.com](mailto:MedicalService@quantatw.com)

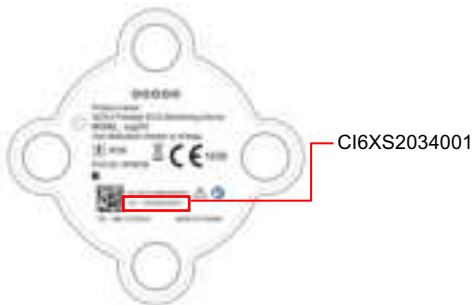
### EU Representative



**EU Representative:** MedNet EC-REP GmbH

**Address:** Borkstrasse 10, 48163 Münster, Germany

### Label Information:



In the serial number at the bottom side of the product:

- The 6th and 7th character from the left represents the sensor and charger's year of manufacture, and
- The 8th and 9th character represents the week of manufacture.

In the example shown, the “20” represents a manufacture year of 2020 and the “34” represents the 34th week of 2020.

## **Federal Communications Commission (FCC) Statement**

**The FCC ID is HFSCI6**

### **15.21**

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause interference and
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

### **15.105(b)**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### FCC RF Radiation Exposure Statement:

1) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines

### **Regulatory Marks**

The QOCA PORTABLE ECG MONITORING DEVICE conforms to the following regulatory requirements.

Administrative Regulations on Low Power Radio Waves Radiated Devices (930322)

#### Article 12



Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic






as well as performance to an approved low power radio-frequency devices.



#### Article 14

The low power radio-frequency devices shall not influence aircraft security and interfere with legal communications. If found, the user shall cease operation immediately until no interference is achieved.

The said legal communications means radio communications is operated in compliance with the Telecommunications Act. The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

	CE Mark: Indicates that the body sensor has been certified and conforms to EC Directive 93/42/EEC on medical devices.
	Type applied part

	<p>Indicates that the body sensor is classified as electrical or electronic equipment requiring proper disposal (WEEE Directive)</p>
	<p>Indicates the manufacturer's catalogue number</p> <p><b>Attention: Catalogue number may also be referred to as the reference number or reorder number.</b></p>
	<p>Indicates the manufacture's serial number.</p>
	<p>Indicates the manufacturer's name and address</p>
	<p>To indicate on the rating plate that the equipment is suitable for alternating current only; to identify relevant terminals.</p>

	<p>Indicates the need for the user to consult the instructions for use for important cautionary information such as warnings and precautions that cannot, for a variety of reasons, be presented on the medical device itself</p>
	<p>Indicates the need for the user to consult the instructions for use.</p>
<p>IP26</p>	<p>Protected against solid objects down to 12mm. Protection against low pressure jets of water, limited ingress permitted.</p>

## Supplier's Declaration

The QOCA PORTABLE ECG MONITORING DEVICE conforms to the international EN 60601-1 and EN 60601-1-2 standards for electromagnetic compatibility with medical electrical devices and systems.



### **Manufacturer's declaration-electromagnetic emissions**

The QOCA®ecg701 is intended for use in the electromagnetic environment (for home and professional healthcare) specified below.

The customer or the user of the QOCA®ecg701 should assure that it is used in such an environment.

<b>Emission test</b>	<b>Compliance</b>	<b>Electromagnetic environment-guidance (for home and professional healthcare environment)</b>
RF emissions CISPR 11	Group 1	The <u>QOCA®ecg701</u> uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The <u>QOCA®ecg701</u> is suitable for use in all establishments, including domestic establishments and those directly
Harmonic emissions IEC 61000-3-2	Class A	

Voltage fluctuations /flicker emissions IEC 61000-3-3	Compliance	connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
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#### Bluetooth Technical Specification:

Technical Specification	Value
Operating Frequencies	2402~2480MHz
Channel Spacing	2MHz
Channel number	40
Operating Voltage	1.8V
Modulation	GFSK
Antenna Gain	Chip Antenna, Peak Gain: -1.45 dBi
Rated Power (EIRP)	4.03dBm

#### **Manufacturer's declaration-electromagnetic immunity**

The QOCA®ecg701 is intended for use in the electromagnetic environment (for home and professional healthcare) specified below.

The customer or the user of the QOCA®ecg701 should assure that it is used in such an environment.


<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment-guidance (for home and professional healthcare environment)</b>
<b>Electrostatic discharge (ESD)</b>  IEC 61000-4-2	Contact: $\pm 8$ kV  Air $\pm 2$ kV, $\pm 4$ kV, $\pm 8$ kV, $\pm 15$ kV	Contact: $\pm 8$ kV  Air $\pm 2$ kV, $\pm 4$ kV, $\pm 8$ kV, $\pm 15$ kV	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%
Electrical fast transient/ burst  IEC 61000-4-4	$\pm 2$ kV for power supply lines  $\pm 1$ kV for input/output lines	$\pm 2$ kV for power supply lines  Not applicable	Mains power quality should be that of a typical home healthcare environment.
Surge	$\pm 0.5$ kV, $\pm 1$ kV	$\pm 0.5$ kV, $\pm 1$ kV line(s) to	Mains power quality should be that of a typical

IEC 61000-4-5	line(s) to line(s) $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , $\pm 2\text{kV}$ line(s) to earth	line(s)_Not applicable	home healthcare environment.
Voltage Dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	Voltage dips: 0 % $UT$ ; 0,5 cycle 0 % $UT$ ; 1 cycle 70 % $UT$ ; 25/30 cycles  Voltage interruptions: 0 % $UT$ ; 250/300 cycle	Voltage dips: 0 % $UT$ ; 0,5 cycle 0 % $UT$ ; 1 cycle 70 % $UT$ ; 25 cycles  Voltage interruptions: 0 % $UT$ ; 250 cycle	Mains power quality should be that of a typical home healthcare environment. If the user of the <u>QOCA®ecg701</u> requires continued operation during power mains interruptions, it is recommended that the <u>QOCA®ecg701</u> be powered from an uninterruptible power supply or a battery.
Power frequency(50, 60 Hz) magnetic field	30 A/m 50 Hz or 60 Hz	30 A/m 50 Hz	The <u>QOCA®ecg701</u> power frequency magnetic fields should be at levels characteristic of a typical location in a

IEC 61000-4-8			typical home healthcare environment.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

<b>Manufacturer's declaration-electromagnetic immunity</b>			
<p>The <u>QOCA®ecg701</u> is intended for use in the electromagnetic environment (for home and professional healthcare) specified below.</p> <p>The customer or the user of the <u>QOCA®ecg701</u> should assure that it is used in such and environment.</p>			
<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment-guidance (for home and professional healthcare environment)</b>
<p>Conducted RF</p> <p>IEC 61000-4-6</p>	<p>3 Vrms:</p> <p>0,15 MHz – 80 MHz</p> <p>6 Vrms:</p> <p>in ISM and amateur</p>	<p>3 Vrms:</p> <p>0,15 MHz – 80 MHz</p> <p>6 Vrms:</p> <p>in ISM and amateur radio bands between 0,15 MHz and 80 MHz</p>	<p><b>Portable and mobile RF communications equipment should be used no closer to any part of the <u>QOCA®ecg701</u> including cables, than the recommended separation distance calculated from the</b></p>

<p>Radiated RF</p> <p>IEC 61000-4-3</p>	<p>radio bands between 0,15 MHz and 80 MHz</p> <p>80 % AM at 1 kHz</p> <p>10 V/m</p> <p>80 MHz – 2,7 GHz</p> <p>80 % AM at 1 kHz</p>	<p>80 % AM at 1 kHz</p> <p>10 V/m</p> <p>80 MHz – 2,7 GHz</p> <p>80 % AM at 1 kHz</p>	<p>equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance:</b></p> <p><math>d = 1,2 \sqrt{P}</math></p> <p><math>d = 1,2 \sqrt{P}</math> 80MHz to 800 MHz</p> <p><math>d = 2,3 \sqrt{P}</math> 800MHz to 2,7 GHz</p> <p>Where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and</p>
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			<p><math>d</math> is the recommended separation distance in metres (m).</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>NOTE1 At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE2 These guidelines may not apply in all situations.</p> <p>Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			



**Recommended separation distance between  
portable and mobile RF communications equipment and  
the QOCA®ecg701**

The QOCA®ecg701 is intended for use in an electromagnetic environment (for home and professional healthcare) in which radiated RF disturbances are controlled. The customer or the user of the QOCA®ecg701 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the QOCA®ecg701 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = 1,2\sqrt{P}$	80 MHz to 800 MHz $d = 1,2\sqrt{P}$	800 MHz to 2,7 GHz $d = 2,3\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where  $p$  is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE2 These guidelines may not apply in all situations.

Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<b>Manufacturer's declaration-electromagnetic emissions</b>		
<p>The <u>QOCA®ecg701</u> is intended for use in the electromagnetic environment (for home and professional healthcare) specified below.</p> <p>The customer or the user of the <u>QOCA®ecg701</u> should assure that it is used in such an environment.</p>		
<b>Emission test</b>	<b>Compliance</b>	<b>Electromagnetic environment-guidance (for home and professional healthcare environment)</b>

RF emissions CISPR 11	Group 1	The <u>QOCA®ecg701</u> uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The <u>QOCA®ecg701</u> is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations /flicker emissions IEC 61000-3-3	Compliance	