

Remote Diagnostic Technologies Ltd.

FCC 47 CFR Part 15 Submission (via TUV PS Ltd.)
Relating to the

Tempus IC Patient Monitor

**Exhibit 12 - Description of the
Device**

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1 Operational Description of the Tempus IC Patient Monitor

1.1 Purpose of the Device

The Tempus IC is a vital signs monitor designed for use in remote locations by trained non-medical expert personnel. The device monitors a variety of vital signs and transmits the data via existing wired or wireless telecommunications that are available locally that are available in the remote location.

The Tempus is fitted with a Bluetooth module which enables it to transmit and receive data from peripherals over short range (up to 100m). The module is a class I V1.2 EDR Bluetooth device which already has the relevant FCC grants for its use.

The Tempus is fitted with a WiFi (802.11 b/g) card which enables it to transmit data to the local communications system for onward global transmission. This is used instead of a wired Ethernet connection but is used at the same time as the Bluetooth device.

The WiFi card has an existing FCC grant.

No parts of the modules (including their antennas) have been modified as a result of their integration into the Tempus IC. The integration of both modules has been performed with the support of the technical representatives of the Bluetooth and WiFi manufacturers.

The Tempus is battery powered and while it has a bespoke connection for the use of a mains power supply, none will be used at the point of the initial FCC grant i.e. the unit will be battery powered only.

1.2 The Features of the Device

The Tempus includes:

- Integral hands-free voice link
- Non Invasive Blood Pressure monitor - NIBP
- Pulse rate and blood oxygen monitor - SpO₂
- Respiration rate and exhaled CO₂ monitor - ETCO₂ (side-stream capnometer)
- 12 lead Electrocardiogram - ECG
- Full colour, still and moving video camera
- Touchscreen
- LCD display

1.3 Construction of the Tempus

The Tempus is housed within an overmoulded plastic enclosure. This provides a faraday cage for the internal electronics with small apertures through which the wireless module antennas protrude. The antennas are protected by an unscreened cover.

The device contains the following main assemblies:

- Camera module and backlight
- LCD display and mounting assembly
- Single Board Computer (SBC) PCB – this unit houses the wireless modules

- System PCB – this unit houses the OTS medical PCBs (ECG, Spo2, NIBP) and the two modems

1.4 WiFi Specifications

The OEM WiFi module has the following specifications:

WiFi Specification	
SKU #	North America WL6221-668 International WL6227-674
Transmit Power	CCK: 12 dBm typical OFDM: 9 dBm typical 63mW emission designation 11M5F9W to spec RSS210
Indoor Range	~ 300 feet (typical office environment)
Standards Conformance	Wi-Fi Certified Meets 802.1x requirements WPA2-Enterprise IEEE 802.11b and 802.11g
Certification/ Compliance	FCC: Part 15, Class C FCC ID LUBP300SD-1 Industry Canada license 2529A-WLANSADIO
Data Rate:	802.11g: Data rate dynamically shifts between 54, 48, 36, 24, 18, 12, 9 and 6 Mbps based on signal strength, for maximum availability and reliability of connection. OFDM with BPSK, QPSK, 16-QAM and 54-QAM (at 6/9, 12/18, 24/36, and 48/54 Mbps, respectively) 802.11b: Data rate dynamically shifts between 11, 5, 5M, 2M, and 1 Mbps based on signal strength, for maximum availability and reliability of connection. (802.11g: DSSS with BPSK, QPSK, and CCK (at 1,2, and 5.5/11 Mbps, respectively)
Frequency Range:	North America: 2.412-2.462 GHz, channels 1-11 Europe ETSI: 2.412-2.472 GHz, channels 1-13 Japan: 2.412-2.484 GHz, channels 1-14
Security Encryption/Authentication Hardware Support:	<ul style="list-style-type: none"> - WEP: Open and Shared - WPA-PSK, WPA2-PSK (Personal): TKIP and AES-CCMP encryption - WPA-E, WPA2-E (Enterprise): TKIP, AES-CCMP, and all EAP authentication processes including LEAP, EAP-TLS, EAP-FAST, PEAP 0 (PEAPMSCHAP), PEAP 1 (PEAP-GTC) and EAP-TTLS - Wi-Fi Multimedia (WMM), a standard for Quality of Service (QoS)

1.5 Bluetooth Specifications

The OTS Bluetooth module has the following specifications:

Bluetooth Specification		
	Specification	Note
Operating frequency range	(2400 ... 2483,5) MHz	ISM Band
Range	Class 1, range up to 300 meters	
Lower guard band	2 MHz	
Upper guard band	3,5 MHz	
Carrier frequency	2402 MHz ... 2480 MHz	$f = 2402 + k$, $k = 0 \dots 78$
Modulation method	GFSK (1 Mbps) P/4 DQPSK (2Mbps)	
Hopping	1600 hops/s, 1 MHz channel space	
Maximum data rate	GFSK:	Asynchronous, 723.2 kbps / 57.6 kbps Synchronous: 433.9 kbps / 433.9 kbps
	P/4 DQPSK:	Asynchronous, 1448.5 kbps / 115.2 kbps Synchronous: 869.7 kbps / 869.7 kbps
	8DQPSK:	Asynchronous, 2178.1 kbps / 177.2 kbps Synchronous: 1306.9 kbps / 1306.9 kbps
Receiving signal range	-82 to -20 dBm	
Receiver IF frequency	1.5 MHz	
Transmission power	Min	-11 ... -9 dBm
	Max	+14 ... +18 dBm
	RSS210	22mW emission designation 1M21G2D
RF input impedance	50Ω	
Compliance	Bluetooth specification, version 2.0 + EDR	
Certification/Compliance	FCC: Part 15, FCC ID QOQWT11 Industry Canada license 5123A-BGTWT11E	

1.6 Bluetooth & WiFi Technical Description

The technical description (modulation technique, antenna path etc.) of the Bluetooth and WiFi modules is not provided as the modules are already provided with an FCC Grant and the information is proprietary to the manufacturers of the devices (and so not available to RDT).