

CCM Project

Communication Center Module

Operational Description GPRS

Overview

The CCM GPRS includes 2 integrated RF-modules.

GSM and BT modules:

Telit GE865-QUAD GSM/DCS/PCS module

Bluegiga WT11-A BT version 2.0 + EDR, Class 1

CCM Operational Description

The Communication Center Module (CCM) device inputs data from medical measurement devices that are attached to it (for example, at a patient's home). The CCM then transmits this data to a remote Medical Center (MC) for analysis and diagnosis. The CCM can receive instructions from the MC, which can be played for the patient.

The use of the device is always in conjunction with a medical center capable of receiving and handling the data.

CCM Communication Options

CCM ↔ MC

The CCM can communicate with the MC via LAN as its default. In addition, a CCM have a Cellular balcony card installed inside it.

- **LAN Interface:** Uses the Internet or Local Area Network (LAN) connected to it. The CCM uses this communication method as the default option, even when a balcony card is installed.
- **Cellular Modem (GPRS):** Uses the cellular modem balcony card in the CCM.

CCM ↔ Measurement Devices

Measurement devices can communicate with the CCM using one of the following methods:

- **Bluetooth Wireless:** The CCM can communicate with up to seven measurement devices simultaneously via Bluetooth wireless communication.
- **Serial Port:** The CCM can communicate with up to two measurement devices simultaneously via the two RJ-45 connectors at the rear of the CCM.
- **USB:** The CCM can communicate with a measurement device via the mini-USB port on the CCM.

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Cellular Communication to MC

The communication to the MC is handled via a Cellular connection when no LAN (Internet) communication is available and a cellular balcony card is installed in the CCM.

After power on the CCM the cellular communication is initiated.

The transmission is intermittent, that is, very short data transmission (less than 100 KB) several times per day (maximum).

GSM Operation

The CCM GPRS device contains a Telit GE865-QUAD GSM modem operating in the United States on GSM 850 / PCS 1900 MHz to communicate user medical data to the central medical centre. The modem is used to establish a GPRS data session over the cellular network (voice communications is not supported). The GE865-QUAD module used has GPRS Class 10 functionality and has a nominal peak output power of 2 watts (+33dBm) at GSM 850 and 1 watt (+30dBm) at PCS 1900) respectively.

GSM burst frequency is 216Hz = 4,63ms

There are 8 timeslots so 4,63 / 8 = 578us

GPRS class10 is 2 TX timeslot, 2 of 8 slots = 25%

Therefore the duty cycle is 25%

Antenna

The antenna is designed as a PCB printed antenna.

The GE865-QUAD uses a PCB printed antenna antenna, which has a maximum gain of 2.30dBi at 850 MHz and 3.01dBi at 1900 MHz.

The modulation type used is GMSK.

Handling BT Devices

The CCM is defined to interact with different devices via Bluetooth.

Bluetooth Operation

The CCM GPRS device contains a Bluegiga WT11-A module operating in the 2402 to 2480 MHz ISM frequency band.

The maximum output power is 63 mW (+18dBm)

This device is a Frequency Hopping device with 79 hopping frequencies
Modulation types used are GFSK, pi/4-DQPSK and 8DPSK.

Data rates up to 1 Mbps are supported with GFSK modulation.

Data rates up to 2 Mbps are supported with pi/4-DQPSK modulation.

Data rates up to 3 Mbps are supported with 8DPSK modulation.

Bluetooth Antenna

The antenna is an integrated chip antenna and is build in the Bluegiga WT11-A module.

The antenna is ACX AT3216, Chip Antenna, 0.5dBi.