

## MORE DETAILS for question 7:

The system is composed of an implantable cardiac defibrillator able to wirelessly communicate with a base station (called "Home Monitor") placed in the bedroom of the implanted patient. The base station (indoor equipment) wakes-up the implant using the ISM band in the 2400 to 2483 MHz frequency band. The communication is then established within the MICS band (402 to 405MHz) and data are transferred from the implanted device to the base station.

### **Operating Modes:**

#### Wake-up operating mode (ISM band):

##### Transmission method

- Tx Only, super heterodyne transmitter using one LO
- No Rx
- PLL based on a 24 MHz crystal (30 ppm : aging 10 ppm, temperature 10 ppm, precision 10 ppm compensated in prod)

##### Modulation

- an OOK modulation scheme will be used
- min modulation depth : 30 dB

##### Baud rate

- 350 kbit/s max

##### Spectral occupancy

- 3 MHz @ -20 dBc (to be confirmed)
- full FHSS occupancy TBD (@ 50 dBc)

##### Output radiated power

- Pout : +20 dBm max (Power is set for each channel and is fixed for each antennas)

##### Frequency band

- Frequency range : 2400 MHz to 2483 MHz
- First frequency : 2406.75 MHz
- Last frequency : 2476.75 MHz
- Channel number : with at least 15 channels,
- Channel separation : 5 MHz

- Dwell time : 100 ms on each channel
- Sequence duration : 1.5 s.

#### Data transmission operating mode (MICS band):

##### Transmission method

- Tx
- Rx
- PLL based on a 26 MHz crystal
- super heterodyne transmitter using one LO (low frequency 380 KHz IF)

##### Modulation

- an 2-FSK modulation scheme will be used
- frequency deviation of 100 KHz (total)

##### Baud rate

- 200 kb/s max

##### Spectral occupancy

- 300 kHz @ -36 dBm max

##### Output radiated power

- Pout = -16 dBm max (Power is set for each channel and is fixed)

##### Frequency band

- Frequency range : 402 to 405 MHz
- Channel number : with at least 10 channels
- Channel separation: 300 kHz

Note: All the following modes supported are accessible for test purposes :

- CW on both bands ISM and MICS on any channel on each antenna
- Modulated CW on both bands ISM and MICS on any channel on each antenna
- Dynamic sequence for FHSS
- Full maintained RF connection for EMC purposes

## **Antennas**

### Implantable device:

Loop antenna is internal and cannot be removed

- HP Max Gain : TBD dBi max
- VP Max Gain : TBD dBi max

### Home Monitor (Wake-up operating mode - ISM band):

Monopole antenna (customized by Sorin CRM)

This antenna is internal and can not be removed.

- HP Max gain : -1 dBi max
- VP Max gain : +2 dBi max main axis

IFA antenna (customized by Sorin CRM)

This antenna is internal and can not be removed.

- HP Max gain : -6 dBi max
- VP Max gain : -8 dBi max main axis

### Home Monitor (Data transmission operating mode - MICS band)

IFA antenna

This antenna is internal and can not be removed.

- HP Max gain : 0 dBi max
- VP Max gain : 0 dBi max main axis