Adeunis RF
TWIMO RF Modules
Starter Kit

User Guide

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English

Preliminary information

Precautions

Like most evaluation kits, this product is designed for use in office and laboratory environments.

The following practices will help ensure its proper operation.

This product uses low power CMOS circuits which can be damaged by electrostatic discharge. Partially damaged circuits can function erroneously, leading to misleading results.
Observe ESD precautions at all times when handling this product.

Documents

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1. Product overview

This Starter Kit is designed to help the user to achieve his objectives as quickly as possible. The new generation of Adeunis RF starter kit consists on the addition of an Adeunis extension board (embedding the TWIMO module) and a Raisonance Open4 platfom.

Evaluate the Adeunis-RF products
The user can transfer data from one Starter Kit to another Starter Kit. This enables the user to quickly find out how well the Adeunis-RF products fit the intended application.

Perform RF measurements
Through the Adeunis RF application software, running into the Open4 platform, the user can configure the radio module with custom parameters that suit the intended application and easily measure sensitivity, output power and other RF parameters.
• The documentation can be downloaded on the Adeunis website : www.adeunis-rf.com

2. Kit content

In order to perform tests with the TWIMO extension board, you must use at least one Raisonance Open4 plate-form («received level» and «scanner» modes) or two plateforms with extension boards if you wish to run «TX/RX mode».

Each Extension board includes :
• 1 x Soldered TWIMO module (ARF7581AA or ARF7580AA).
• 1 x 869 MHz antenna (LINX)
• 1 x User's guide

Each Open4 platform includes :
•   1 x USB cable
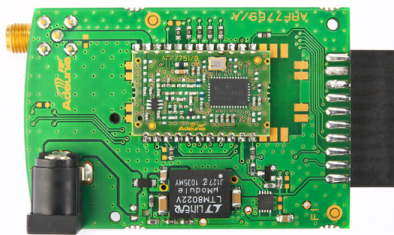
Adeunis RF
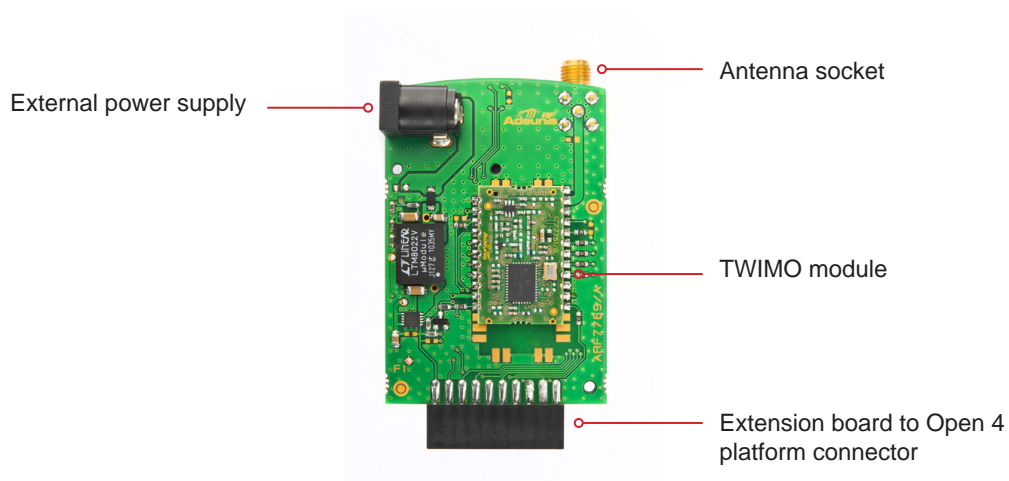TWIMO extension board

Adeunis RF
TWIMO extension board
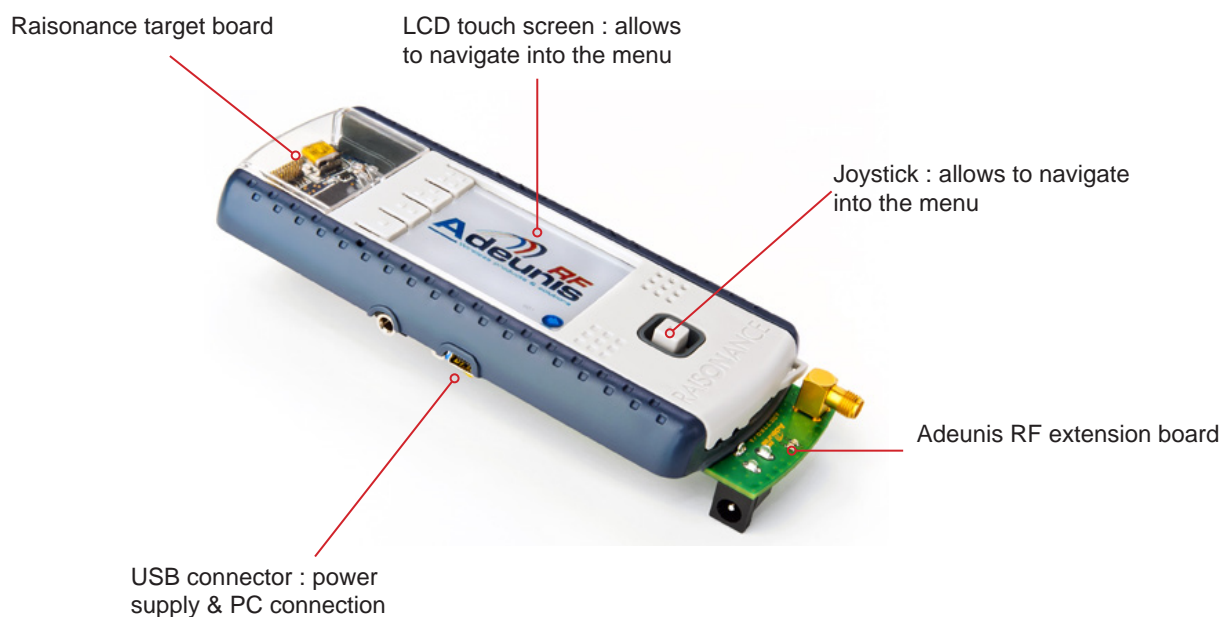&
Raisonance Open4 platform

3. Getting around the TWIMO Starter Kit

The Adeunis RF extension board must be combined to the Raisonance Open4 platform to run the evaluation. The Open 4 platform embeds the Adeunis RF application software, the user's interface (LCD screen) and the battery, all mandatory to implement the TWIMO module.

3.1. Extension board overview

External power supply

Antenna socket

TWIMO module

Extension board to Open 4 platform connector

3.2. Open4 platform overview

Raisonance target board

LCD touch screen : allows to navigate into the menu

Joystick : allows to navigate into the menu

Adeunis RF extension board

USB connector : power supply & PC connection

All needed and usefull information can be found on the Raisonance website (www.raisonance.com). User manual of the OPEN4 platform can be found here : Open4 manual

4. Before starting

4.1. Connect the extension board to the Open4 platform

The extension board must be connected to the Open4 platform. Procedure :
• Unscrew the bottom case of the Open 4 by removing the four screws.

• Remove the bottom cover.
• Install the extension board as showed below. The module must faces you. Gently push on the extension (see red arrow) board to insure a proper connection. Be very careful when proceeding. The extension socket must be held when inserting the extension board as showed with the orange arrow !!
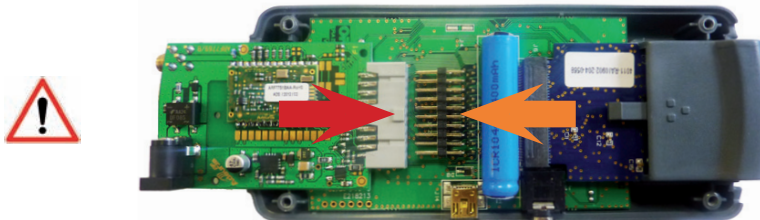
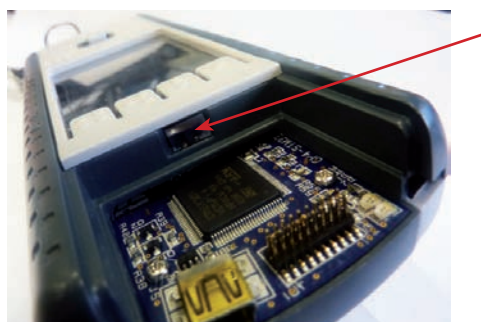• Re-install the bottom cover and screws.
• Install the antenna on the extension board antenna socket.

4.2. Turn on the system

To turn on the system, you must activate the On/Off switch located above the target board. See picture below.

The Open4 platform must be charged before use. It can be charged on a PC through the USB cable supplied with the package.

Note concerning the power supply : in the case of evaluating an Adeunis RF module functionning at 500mW, you may have to use an external power supply to run the maximum module power for more than an hour. The extension board is equiped with an external power supply socket (Jack 3.5). Please contact us for details and power supply specifications.

- When switching on the Starter kit, the system will first ask you to calibrate the screen, proceed.
- When the screen calibration has been done, press the «one dot» button to launch the Adeunis RF application.

«one dot» button —

5. Running the evaluation

The evaluation can be ran on three different modes :
- TX/RX mode
- Received level mode
- Scanner mode

Set-up the Starter Kit

When the Adeunis RF application has been launched, the following screens will assist you in the set-up procedure.

5.1. Start-up screen

The home screen shows the application software version and the battery level. Press «Go» to access the menu.

Version → ← Battery level

«Go» icon

5.2. Home screen
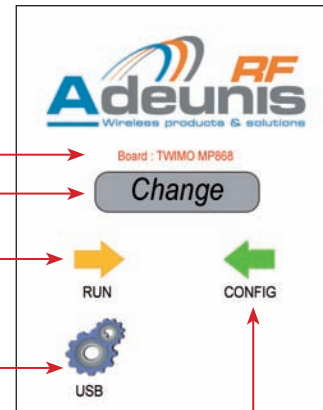
The following screen allows to :
- select the type of module to be evaluated.
- modify the configuration.
- run the evaluation.
- switch to USB mode.

Module type & set-up →

Module type selection →

Run the evaluation →

USB mode →

Set-up the module

5.3. Select the type of module

Press the «change» icon. A list of the available Adeunis RF extension board appears.

Select the proper board and press the «validate» icon.

5.4. Modify the configuration

5.4.1 RF Power

Press the «Config» icon.
Choose the RF Power :
- TWIMO MP (17dBm, 14dBm, 10dBm)
- TWIMO HP (27dBm, 23dBm, 20dBm)
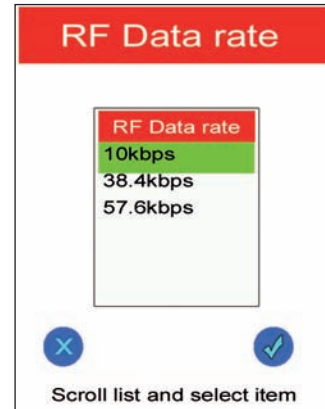Press the «validate» icon

5.4.2 RF data rate

Following the RF Power mode, the RF Data rate must be selected.

Choose the RF Data rate :
•   TWIMO MP & HP : 10kbps, 38.4kbps, 57.6kbps
Press the «validate» icon

5.4.3 Channel (frequency)

Following the RF Data rate, the Channel must be selected.

Choose the channel
Press the «validate» icon

Importante note :
According to the RF Power and Data rate previously chosen, the list of avai-
lable channels is adapted to the European regulation and standards. Please
refer to the table below :

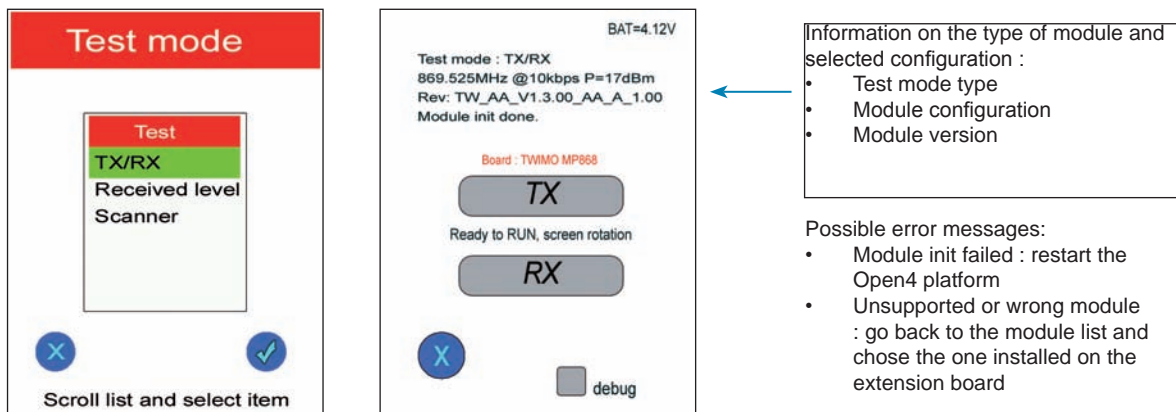| Power	RF Data Rate	Available Channels (frequencies)
27dBm	10kbps 38.4kbps 57.6kbps	869.525MHz
23dBm	10kbps 38.4kbps 57.6kbps	869.525MHz
20dBm	10kbps 38.4kbps 57.6kbps	869.525MHz
17dBm	10kbps 38.4kbps 57.6kbps	869.525MHz
14dBm	10kbps	869.525MHz
	38.4kbps	869.525MHz 868.420MHz 868.320MHz 868.220MHz 868.120MHz
	57.6kbps	869.525MHz
10dBm	10kbps	869.525MHz
	38.4kbps	869.525MHz 868.420MHz 868.320MHz 868.220MHz 868.120MHz
	57.6kbps	869.525MHz

6. Test mode

The test mode allows to select how the module will operate. Three different modes can be ran :

6.1. TX/RX mode

This mode allows a conventional «send/receive» function. The «TX» sends a frame and the «RX» receive it. Each «RX» and «TX» LCD show the frame structure, allowing to check the proper transmission. This mode is used to test the range covered by the Adeunis RF TWIMO modules.

• Choose the mode and press the «validate» icon
• Press the «TX» or «RX» icon to run the transmission.

Information on the type of module and selected configuration :
• Test mode type
• Module configuration
• Module version

Possible error messages:
• Module init failed : restart the Open4 platform
• Unsupported or wrong module : go back to the module list and chose the one installed on the extension board

Note 1 : this mode forces to select one Starter kit as «TX» and the other as «RX».

Note 2 : particular case of «TX/RX» and «Received level» modes. When selecting the role :
• **Tx** : the Starter kit behaves as a «master», transmits every seconds and waits for an answer
Rx : the Starter kit waits for an reception and it answers by an identical frame.

TX Mode : send a frame every seconds

First column : TX counter
Second column : reception status
• if there is a reception : the rx counter increases.
• if there is no reception the column displays «not received».

RXcnt : number of frame received
TXcnt : number of frame emitted

The **PER** can deducted by : **(TXcnt-RXcnt) / TXcnt**

RX mode

First column : RX counter
Second column : sent frame counter (= received frames counter)

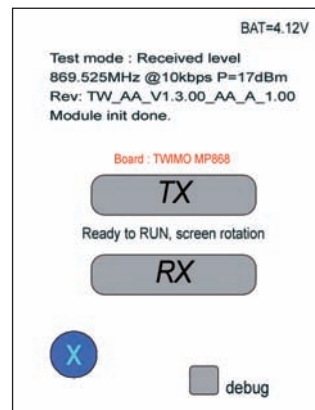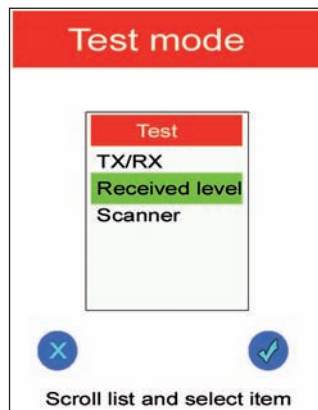**RXcnt** : number of frame received
FrameLost : lost frame counter

The **PER** can deducted by : **FrameLost / TXcnt**

6.2. «Received level» mode

The «received level mode allows to run a permanent test between :
• Two Starter kits
• One Starter kit (in RX mode) and a TWIMO module installed in another device.

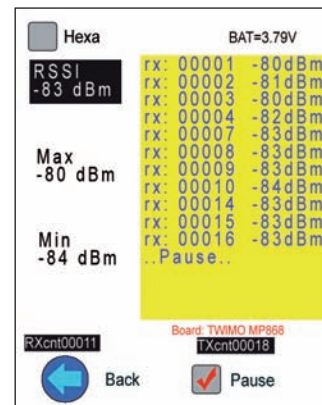**TX Mode** : send a frame every seconds

First column : TX counter
Second column : RSSI level of the received frames

RXcnt : number of frame received
TXcnt : number of frame emitted

The lost frames can be calculated by: **TXcnt - RXcnt**

The **PER** can deducted by : **(TXcnt-RXcnt) / TXcnt**

RX mode

First column :
- Frame emitted by a Starter kit : number of frame received (when receiving a frame from a Starter kit, the Starter kit -sets in Rx mode-answers).
- Frame emitted by a TWIMO module : the screen displays «Rx level» and the Starter kit does not answer.

Second column : RSSI level of the received frames

RXcnt : number of frame received
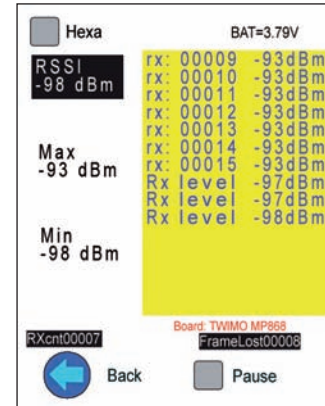**FrameLost** : lost frame counter

The **PER** can deducted by : **FrameLost / TXcnt**

RSSI -98dBm : RSSI level of the last frame received
Max -93dBm : Higher RSSI level of the frames received
Min -98dBm : Lower RSSI level of the frames received

Note : by using the «pause» box, the Max and Min RSSI levels are reinitialized.
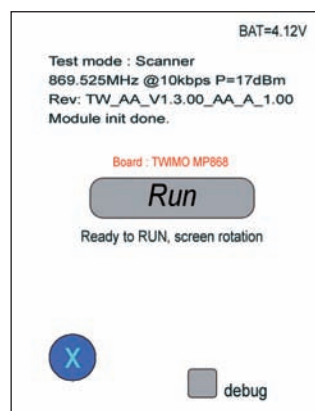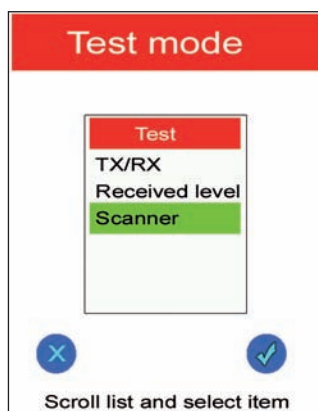

6.3.   «Scanner» mode

The Scanner mode allows to visualize the RSSI level on a selected channel (frequency).

Following the RF power, data rate and channel selection,
- Press «Scanner» on the Test mode window.
- Then press «Run» icon.

RSSI -88dBm : latest RSSI level measured

Max -52dBm : higher RSSI level seen by the Starter kit

Average -87dBm : average RSSI level in the selected channel

Min -98dBm : lower RSSI level seen by the Starter kit

On the right side a bargraph shows the three RSSi levels (max, Average, Min) as well as a real time measured RSSI (yellow pod).

Note : by using the «pause» box, the Max and Min RSSI levels are reinitialized.
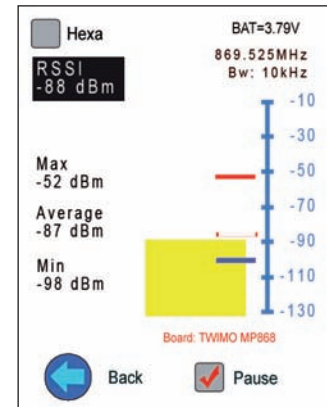
6.4. USB mode

The USB mode allows to connect the Extension board to a PC. It's mainly used for Data Loggin.

- From the Home Screen, clic on the «USB» icon
- Connect the USB socket located on the target board (don't use the one from the Open4 platform) to a PC
- Check that the correct drivers are installed.
- Clic on «Reset» icon if you need to reset the module.
- Clic on «Cmd Enter» to enter command mode.
- The Open4 platform is now acting as a virtual port com (direct access to the TWIMO module at 115.2kbps) and any type of Terminal can be used.
- To exit the «USB» mode, clic on the «Back» icon.
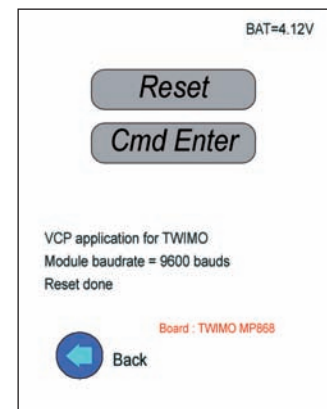
6.5. Running screen

When the evaluation is launched the Starter kit is showing a screen which displays the received frames. The frames can be display as Ascii or hexadecimal.

6.6. General notes

When the evaluation is launched, the LCD screen automaticaly turns 180°, meaning that the Starter kit must be handled with the antenna facing the top to maximize the performances.

Each of the three Test modes (TX/RX, Received level and Scanner) are offering a «debug» function located on the «Run» screen. Select this function to check the configuration exchange through the UART.

7. Verify or Evaluate an installation

It's possible and even recommended to use the TWIMO Starter kit to verify or evaluate an existing installation.

7.1. Method # 1

First step :
- Set the TWIMO Starter kit in «Scanner» mode.
- Shut down all existing transmitters.
- Note the RSSI average level (from the Scanner mode).
- You can eventually reinitialize the RSSI Max and Min level by using the «Pause» box.

Second step :
- Set the TWIMO Starter kit in «Received level» mode.
- Use another TWIMO Starter kit or a TWIMO module to transmit frames (in TX mode).
- Note the RSSI Min of the received frames.
- You can eventually reinitialize the RSSI Max and Min level by using the «Pause» box.

Idealy, you should find : **RSSI Min (received level) > (RSSI Max + 12dB)**

7.2. Method # 2

First step :
- Set the TWIMO Starter kit in «Scanner» mode.
- Shut down all existing transmitters.
- Note the RSSI average level (from the Scanner mode).
- You can eventually reinitialize the RSSI Max and Min level by using the «Pause» box.

Second step :
- Use a TWIMO module embedded in your application.
- Set the TWIMO module in test ATT21 (permanent modulated transmission).
- Note the RSSI Min of the received frames (Starter kit in «Scanner» mode).
- You can eventually reinitialize the RSSI Max and Min level by using the «Pause» box.

Idealy, you should find : **RSSI Min (Scanner) > (RSSI Max + 12dB)**

8. Products references

Plateform	Part number
Open4 Plateform	ARF7868AA
Extension board + antenna + user's guide	**Part number**
Wireless M-Bus Extension Pack	ARF7863AA
BTC1-Bluetooth® Class 1 Extension Pack	ARF7861AA
BTC2-Bluetooth® Class 2 Extension Pack	ARF7862AA
TWIMO HP868 Extension Pack	ARF7864AA
TWIMO MP868 Extension Pack	ARF7865AA
NB169 Extension Pack	ARF7889AA
NB458 Extension Pack	ARF7890AA
NB868 Extension Pack	ARF7891AA

9. DECLARATION OF CONFORMITY (CE0081)

We ADEUNIS RF
283 rue LOUIS NEEL
38920 CROLLES FRANCE

declare under our own responsibility that the products

Name   TWIMO HP868 Extension Pack
Reference   ARF7864AA (including modules ARF7581AA)

and

Name   TWIMO MP868 Extension Pack
Reference   ARF7865AA (including module ARF7580AA)

to which this declaration refers conforms with the relevant standards or other standardising documents:

- EN 300 220-2 (v2.1.2) (2007-06)
- EN 300 220-2 (V2.3.1) (2010-02)
- EN 60950-1 (2001) + A11 (2004)
- EN62311 (2008)
- EN301 489-1 (v1.8.1) (2008-04)
- EN 301 489-3 (v1.4.1) (2002-08)

According to the RTTE Directive 99/5/EC

Notes:
- Conformity has been evaluated according to the procedure described in Annex IV of the RTTE directive
- (Statement of opinion from a notify body N°102158-604317-1/2)
- Conformity has been evaluated with ARF7580AA module integrated on ADEUNIS RF TWIMO Extension Pack (ref ARF7865AA) and with ARF7581AA module integrated on ADEUNIS RF TWIMO Extension Pack (ref ARF7864AA).
- According to the 1999/519/EC «RF signal» recommendations, a minimum distance of 10cm between the
- product and the body is required.
- Receiver class (if applicable): 2

Crolles, January 6th, 2012   VINCENT Hervé - CEO