



## Medical Imaging *RDE*

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### **Concerning: Regulatory and hardware instructions for integration of Cirrus RFID reader into host applications (concerns FCC ID: HPL5243)**

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*This document describes the **regulatory elements** and measures for the integration of a full modular short-range RFID reader into host applications. The internal company reference of the RFID reader (**or reader for short**) is A800626.*

The reader is a small printed circuit board with local shielding, local power supply regulation and filtering, here is a short summary of the measures taken to control (spurious) emissions:

- The reader transmitter (chip) has a local PCB shield
- The reader module power supply is 5V+/-10% and using a local low dropout regulator a 3.3V+/-2% is used on board for all electric circuits, there is also sufficient bulk and high-frequency decoupling
- A common-mode (CM) choke is used on the 5V power supply as a means to limit unwanted CM conducted- and radiated emissions
- The tuning circuit uses low tolerance components (1% or 2%) to limit circuit variations

The **full-modular approval** allows the integration of the reader into various applications without the need for radio type testing of the application, however, the user needs to take a number of **measures and comply with regulatory requirements**.



## Medical Imaging RDE

### FCC Regulatory requirements

When integrating the reader (A800626) into an application the user should respect the following **regulatory requirements** – taken from Code of Federal Regulations April 28<sup>th</sup>, 2011, part 15 subpart C (intentional radiators) paragraph 15.212 (A):

*If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.*

As the reader has a permanent affixed label (with the text "FCC ID: HPL5243") and, because the module is not visible from the outside, an **external label is required** that has the text "Contains Transmitter Module FCC ID: HPL5243" or "Contains FCC ID: HPL5243."

This text could be integrated into the identification plate of the host application.

### Additional regulatory information

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

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



## Medical Imaging *RDE*

### Additional restrictions are that:

1. the reader cannot be sold to external parties, that is, it is restricted to company-internal products
2. the reader cannot be standalone, that is, a declaration of conformity (DoC) is not possible – note that the reader as standalone unit cannot function (per definition)

### Host application integration recommendations

The recommendations are based on laboratory measurements, electromagnetic solver simulations and FCC radio type testing experience/measurements.

When integrating the reader (A800626) into an application the user should respect the following instructions:

1. Metal parts (of the enclosure) and wiring (of the cable harness) should be kept at a reasonable distance from the reader. As the reader distance (reader to tag) is of the order of 25mm it is recommended to respect at least the double or triple of this value (50 to 75mm or more).
2. Limit the integration of the reader cable into the wiring harness of the application and if this is not possible then limit the coupling length to values below 50cm or use dielectric spacers to have at least 5mm spacing between the reader cable and other cables (= 3 times the reader cable wire pitch).
3. The reader cable length should be limited to 120cm.
4. If the reader is used for reading tags on X-ray cassettes then the plane of the tag should be near the plane of the (copper or lead) foil used and both planes need to be parallel. The center of tag and reader coils need to be aligned for proper operation. Note that the foil **does not** necessarily decrease the coupling between the reader and tag and **does not** changes the electromagnetic behavior of the inductive field, the magnetic field distribution is only altered in space. This is confirmed in measurements and simulations (using FastHenry, a magnetic field solver) at the carrier frequency.

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