

From: [Jan Vercaemmen \(6233\) – R&D Mortsel Electronics](#)

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**Concerning: DSRFID reader modular Transmitter and 47 CFR part 15 subpart C (concerns FCC ID: HPL-DR100SRFID)**

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**This note describes the 47 CFR part 15 subpart C test configuration for radio type testing and the modular character of the RFID tag reader (or reader for short).**

The reader is a small printed circuit board with local shielding, local power supply regulation and filtering. The internal code for the reader is A813168.X, where X is version number. The current version number is 1, the mass production version number will be 2 (due to PCB manufacturing correction for vias solder fill).

The reader is an intentional radiator that is based on inductive coupling to power a passive tag using ISO/IEC 14443 A protocol. Protocols B or Felicia are not used. The carrier frequency is 13.56MHz – section 15.225. The reader needs to comply with 47 CFR 15 subpart C – 15.207 and 15.209.

The reader is integrated into a mobile imaging unit (manufactured by Agfa NV) using modular approval. The transmitter is an NXP PN7150 chip. Note: NXP has an FCC modular approved module with FCC ID: OWROM5578-PN7150S. We re-used the test modes of this NXP module, that is, we used (1) carrier-only modulation and (2) modulated data. The modulated data is a pseudo-random bitstream at 106kbit/s for 100ms duration with a period of 1s (duty-cycle is 10%) – see NXP EMC report page 5 of FCC ID: OWROM5578-PN7150S.

The RFID module is on the left hand side, the white enclose area represents the radio part. The other circuits (yellow circled) are part of the digital device (these are the push button and the lighting LED bar, these circuits are not electrically connected to the radio part). The RFID module is controlled by a controller RFIDCONTROL (article number A813169). RFIDCONTROL is a digital device, it has more functions than just control of the RFID module. RFIDCONTROL instructs the NXP PN7150 chip to select the correct protocol and communication speed (106kbit/s).

The RFID module is tested as is shown on the photo next page. We did not test using the high-voltage battery input (100-200V DC) but used a laboratory bench 5V power supply to power RFIDCONTROL after the switch-mode power supply transformer. The conducted emissions were tested on the mains of the laboratory bench 5V power supply. The battery power supply connection is tested in the host application (part 15 subpart B unintentional radiators). For radio type testing details see EMC report PCC-RAD-4932.pdf and photo's PCC-RAD-4932\_photo.pdf.



The reader complies with all requirements of modular transmitters – section 15.212:

- (i) The radio element is shielded by a local PCB shield, i.e. the transmitter PN7150 is shielded
- (ii) The data interface is buffered by I2C buffer
- (iii) The module has local regulators for 3.3V
- (iv) The antenna is fixed in the printed circuit board
- (v) The module is tested stand-alone, see test report DSRFID PCC-EMC-4932.pdf
- (vi) The module has an FCC ID label on the PCB and a label on the application that it contains a transmitter with FCC ID corresponding to the FCC ID on the reader.
- (vii) The reader module is not sold to external parties or the general public. The integration of the reader is fixed to mobile imaging units, which are manufactured by Agfa.
- (viii) RF exposure is not applicable to the reader – see details next page

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## Medical Imaging

**RF exposure details.** The reader module is an inductive type operating at 13.56MHz for short range inductive RFID applications. The reader is not mobile but is assembled into a mobile imaging device (also called modality). The reader module is not body-worn.

The reader is assembled into the front panel of the modality where the operator can use his (personal) RFID card to unlock the modality for use.

The shortest distance from the antenna surface to the external cover is 2cm. Without an RFID tag present the PN7150 is using a low power mode (snooping for RFID tags), in this mode the RF inductive field is (on average) very low. The frequency of 13.56MHz is too low to have significant electromagnetic radiation (almost all energy is stored in the inductive near-field).

Below the RFID card area is shown (yellow rectangle). The size of the RFID card area is roughly credit card sized. The RFID module antenna size is 3.6cm x 7cm. The RFID printed circuit is the same size as the keypad cover (area green rectangle), the size is roughly 8cm x 11cm.



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