

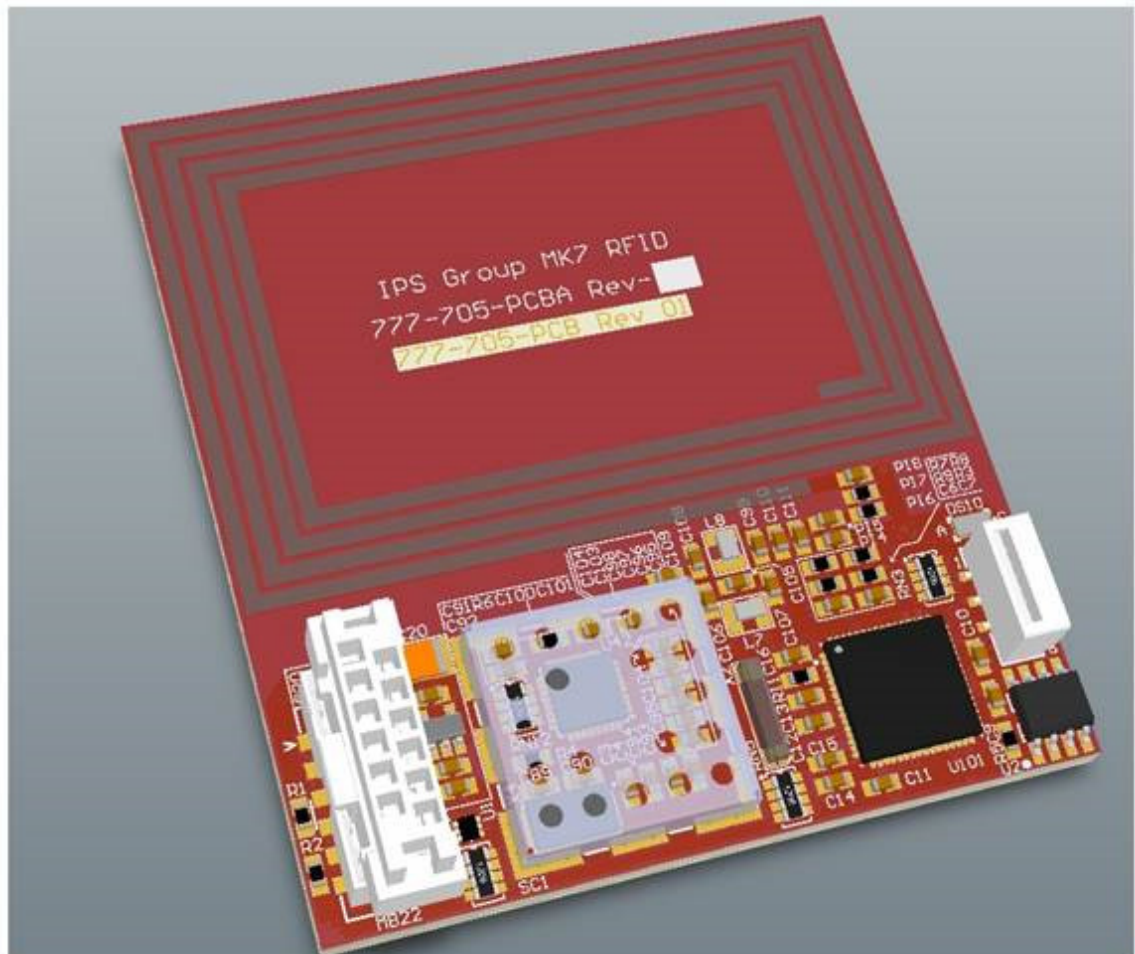
IPS GROUP RFID MODULE

Product Overview:

The IPS RFID Module permits the standalone reader to be remotely located within IPS parking metering products. The RFID Module is a fully integrated 13.56 MHz RFID analog front end and data framing reader system.

Key Features:

- Complete RFID reader system implemented
- TRF7960 is controlled by the Ultra-low power MSP430 microcontroller
- On board PCB antenna
- Independent, on board LED indicators to identify detection of the tags supported.



Antenna Impedance Matching

A three element match is used as it has the added advantage of allowing the circuit Q to be a chosen value and unity gain matched.

Impedance matching is calibrating the network analyzer. This is done by connecting a RF test connector on three blank circuit boards, one with a 50 load, second with a short (0- Ω resistor), and third with an open. By using the application board in the calibration, PCB parasitic effects are accounted for.

Following the calibration step, the antenna trace is connected to the test connector as required by 0- Ω resistors. The antenna trace is measured and the resulting measurement is the starting impedance which is matched to 50 Ω .

The measured antenna impedance ($0.4648 + j107.42$) at 13.56 MHz. A minimum bandwidth (BW) of 2 MHz was chosen in order to accommodate the upper and lower RFID sidebands for various data rates given in ISO15693 & ISO14443 A/B.

As a final test to ensure the antenna elements will radiate, a test set up was established. A 0-dBm CW signal is applied to the Tx antenna; the Rx antenna is placed 8.5 inches from the Tx antenna (the width of a standard piece of office paper). The output from the Rx antenna is measured on a spectrum analyzer which shows a -49.5-dBm signal level. Both Tx & Rx antenna are PCB RFID reader antennas.

FCC/IC Warning

"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment"

"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."

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1) l'appareil ne doit pas produire de brouillage; 2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."