

Date: April 17, 2006

Saturn 5000 operational description

The SAT5000 is a Contactless Smart Card Interface. It acts as a reader for ISO14443 Proximity cards.

As common to such readers, card operation (as the card has no battery) and data reception requires constant carrier transmission where Card to Reader data modulation is performed by the card modulating the load it represents to the reader antenna.

Reader to Card data transmission is achieved using AM technique.

The carrier frequency is 13.56 MHz.

Transmission power is about 400 mW over 50 Ohm, measured field strength of carrier is 87 dB μ V/m at 3 m distance. The difference is due to the use of a **very small** loop antenna, which makes it a very inefficient radiator, or in other words antenna which has a **very low Radiation Resistance** so the radiated power is actually spent as heat in the antenna ohmic resistance, and the magnetic field around the antenna is of reactive type where energy is exchanged back and forth between the antenna and the small volume around it during each carrier cycle.

Radiation resistance of small loop is $R_r = 31200(A/\lambda^2)^2$ where A is the antenna loop area. This resistance may be considered as if connected in series with the antenna matched 50 Ohm resistance. So only a very small portion of the power is actually transmitted out to space.

The antenna assembly also accommodate 4 status signaling LEDs.

The host communication is via RS232 or USB.

An on board SMPS regulate the input DC supply down to 5VDC.

A transformer based wall mount 12VDC (non regulated) power supply is usually used. For US an 110VAC version of it used.

Hemy Itay
OTI