

FCC From 442 Exhibit # 1.

The research and experimentation that the Corporation WAVE ID is proposing to undertake with this license is: Advanced Radio Frequency Identification Systems.

WAVE ID is a spin-off company fostered by research previously conducted at Pacific Northwest National Laboratory in Richland Washington, into Advanced Long Range High Performance Radio Frequency Identification Systems using Modulated Back-scatter as the information transfer medium.

- (a) The complete program of research and experimentation will include, investigation into new ways of accomplishing modulated backscatter links for passive and semi-passive RFID systems and active transmitter RFID systems by changing antenna types, modulation types, receiver types, RF source types and protocol types. This will be performed with commercial off the shelf equipment as well as custom equipment built in house.

The theory of operation for the passive and semi-passive modulated backscatter systems is based on two key pieces of equipment, one is called a "Reader" or "Interrogator" and the other is called a "Tag" or "Transponder". The Tag is programmed with customer information and placed on an item or equipment that the customer wants to track remotely. The Tag can also receive input from or control output to the item that it is placed on.

The Reader illuminates the Tag with CW (Continuous Wave) RF (Radio Frequency) and can modulate this CW signal to ask the Tag to respond or depending on the type of Tag it may start to respond automatically in the presents of RF within its frequency band. The Tag responds by modulating the CW signal that is illuminating it with some or all of its programmed information. The modulation of this CW signal from the Reader by the Tag is called modulated backscatter. This backscatter signal is received, demodulated and processed by the Reader into data that is then utilized by the customer.

The theory of operation for the active transmitter systems is basically the same as for any full or half duplex radio link. For a full duplex system both the Reader and the Tag are capable transmit and receive to establish a bi-directional radio link. For a half duplex system depending on the system requirements the Reader may either be transmit or receive only and the Tag may be either transmit or receive only to establish a uni-directional radio link.

- (b) The specific objectives sought are to develop, market, manufacture and sell High Performance RFID systems to government and commercial customers for profit.
- (c) This program of experimentation has already extended the art of radio as over 40 Invention reports have been filed for work already accomplished, 8 of which patents have been applied for and it is intended that this trend will continue.