Applied Wireless Identifications Group, Inc.
18300 Sutter Blvd., Morgan Hill, CA 95037 • Voice 1-408-825-1100 • Fax 1-408-782-7402 • www.awid.com

Technical Reference

Credentials for UHF Long-Range Readers --
Alternatives for "Difficult" Cars

There is no definitive list of cars in which RF-encoded tags may have difficulty sending their codes to the readers. Features of the cars that can interfere with successful code reading are usually options for the cars' owners – either factory-installed "packages" or after-market purchases. This memo suggests solutions to assure successful code reading. It applies to credentials for all AWID UHF readers (LR-2000, LR-2200, LR-3000, LR-911 and others).

This information may be needed for only a small number of cars at a site. Most cars will work uniformly with the selected tag at a consistent location in all vehicles. A few high-end cars may need this special attention.

Sources of Interference

Metal coating on the windshield -- Tags inside vehicles may have their code transmission blocked by coatings for --
(a) sun-glare reduction by reflecting polarized light (the windshield often has a purple color outside the windshield), and
(b) absorption of infrared and ultraviolet light, and
(c) sensing rain drops on the windshield to start automatic windshield wipers.

Metal embedded in the windshield -- Tags inside vehicles may have shorter read range because of –
(a) heated conductors printed on the glass to evaporate mist from the glass, and
(b) radio antenna wires between the windshield's glass layers .

Tinting the windshield by metal -- Older vehicles (up to the early 2000s) used metal in the glass for tinting, usually in a band at the top of the windshield. This is seldom a factor in reading a tag's codes now.

RF transmission from devices in the vehicle -- Codes sent by tags inside or outside the vehicles may be hidden by transmission from --
(a) collision avoidance systems, which send and receive RF radiation like a radar set from both ends of the car, and
(b) radio communications equipment in the vehicle, operating at UHF (but cell phones, GPS, OnStar, etc. are OK).

Characteristics of AWID's Credentials

For permanent, one-time application -- **WS windshield tags** and **RV-UHF rear-view mirror tag** are designed for use inside a vehicle. They are attached by strong adhesive . They will not read if they are pulled off their mounting surface after the adhesive cures. The WS tags generate their rated reading distance only when they are permanently adhered to windshield glass.

For portability inside a vehicle or between vehicles -- **VT-UHF sun-visor tag** and **HT-UHF hangtag** are easily clipped or hooked inside a vehicle. Then they may be carried to another vehicle, or held in the fingers, for reading.

For reading either inside or outside a vehicle -- **MT bar-type tags** and **ST-UHF Supertag** may be fastened outside a vehicle and exposed to weather. They also read through the windshield if they are inside a vehicle.

For people holding a card at a reader for gate access or at a small reader for door access -- **CS-UHF clamshell card** and **GR-UHF graphics-quality card** are held squeezed between thumb and finger, and aimed at the reader.

Solutions for Particular Situations

If metal on or in the windshield glass affects code reading -- Alternatives =

(a) Move the WS windshield tag to the clear space at *top-center* of the windshield, where the metal is omitted to accommodate toll highway tags. This may be indicated by a dot-pattern printed on the glass, about 8 inches wide by 6 inches high. Locate the WS tag so that it faces the AWID reader head-on – aligned and parallel at the reading distance.

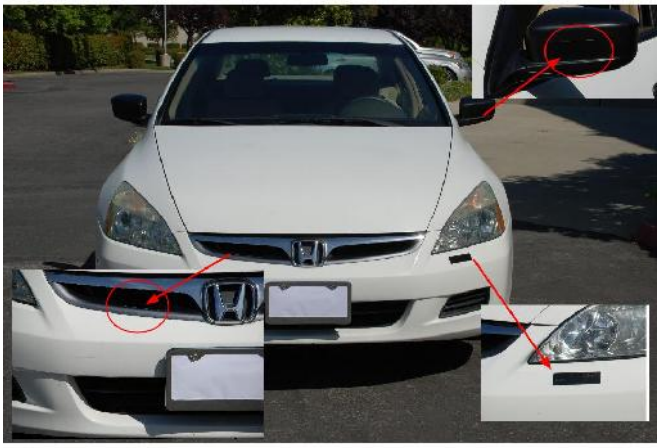
(b) On a few high-end cars, the clear space without metal is visible at the lower left corner of the windshield. If so, try the WS windshield tag there.

(c) The RV-UHF rear-view mirror tag, adhered to the mirror's shell, is already inside the top-center of the windshield. A reader mounted above the center of the vehicle lane may read the RV-UHF tag well.

If a tag will not read anywhere *inside* the windshield -- Alternatives =

(a) Use the MT tag or the ST-UHF tag *outside* the vehicle. See instructions for these tags (download from Web site).

(b) Use the RV-UHF tag *outside* the vehicle, as in the picture. Try a flat surface in the grille, or on the bumper under the headlamps, or on a side-view mirror. Align the tag with its black side facing the reader at the reading distance. Attach the tag to a clean surface by its adhesive.



(c) Reposition the reader at the side of the lane, aimed toward the side window of the vehicle through which the tag can be read without interference.

(d) Substitute a CS-UHF or GR-UHF hand-held card for the vehicle tag. The driver can present the card through the driver's side window, aimed toward the reader on that side when the card is at the reading distance from the reader.

If external radiation interferes with code reading -- Alternatives =

(a) Experiment with other tags and cards, used in others ways in or on the vehicle. Try each credential.

(b) Move the MT tag to a position on the vehicle where it is close to the reader, directly facing the reader.

(c) Identify the source of the offending radiation. Then locate the vehicle's tag as far from the RF source as possible.

Notes

1. AWID's LR-2000KIT Test Kit contains a sample of each encoded credential for the LR-2000 through LR-3000 readers, except the ST-UHF Supertag.

2. With an existing reader, the LR-TEK LR Reader Tech Kit has a test unit for stand-alone testing. The LR-3000 reader can serve as a stand-alone portable tester.

3. MT tags are not designed for fastening on license (registration) plates. They need to be mounted on a large area of metal for best reading. They are directional, so the tag needs to face the reader head-on.

4. CS-UHF and GR-UHF cards are not a hands-free solution. These cards must be squeezed between fingertips, with the hand behind the card, and then aimed facing the reader head-on.

Reference

- Product sheets and instruction sheet for UHF credentials. (Download from AWID's Web site.)