US006553214B1

(12) **United States Patent**
Rabinovich et al.

(10) **Patent No.: US 6,553,214 B1**
(45) **Date of Patent: Apr. 22, 2003**

(54) **ACTIVE WINDOW GLASS ANTENNA SYSTEM WITH AUTOMATIC OVERLOAD PROTECTION CIRCUIT**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/565,706**

(22) Filed: **May 5, 2000**

Related U.S. Application Data

(60) Provisional application No. 60/132,623, filed on May 5, 1999.

(51) **Int. Cl.**[7] **H04B 1/16**

(52) **U.S. Cl.** **455/217**; 455/561; 455/562; 455/277.1; 455/277.2; 343/701; 343/704

(58) **Field of Search** 455/217, 561, 455/562, 277.1, 277.2, 269, 280; 343/701, 704, 713

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(57) **ABSTRACT**

A window glass antenna system for the reception of AM and FM radio broadcasts in an automobile includes an antenna grid applied to a window of a vehicle, that is electrically separate from a heater grid applied to the rear window. An antenna module connected to the vehicle window antenna grid is comprised of a low noise amplifier, matching, and overload protection circuits. The overload protection circuit is included between the antenna grid and the RF amplifier. When the received radio antenna signal is at the typical operating level of the amplifier, the overload protection circuit connects the output of the antenna grid to the RF amplifier.

When the received signal is higher than the linear dynamic range of the amplifier the overload protection circuit provides linearity of the signal that is applied to the car radio. This process consists of two steps. In the first step, the overload protection circuit automatically decreases the signal applied to the amplifier so that the amplifier output signal does not change. In the second step, when the output antenna signal is very high, the overload protection circuit automatically provides bypassing of the amplifier and connects the antenna directly to the car radio without the amplifier stage.

20 Claims, 5 Drawing Sheets