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October 31, 2000

Albert Alvareztorres
ARRL
225 Main Street
Newington, CT 06111

Dear Mr. Alvareztorres:

Toyota is well aware that there is a sizable group of ham radio enthusiasts in the U.S. market. In fact, per capita, that population is even larger in Japan. Obviously, we would not intentionally turn our backs on these potential vehicle buyers.

As you know, the operating systems in today's vehicles are controlled by a growing number of very sophisticated electronic control modules. Most of these ECM's utilize MOSFET technology, which can be easily damaged by electromagnetic radiation from high power radio transceivers and associated system components.

Understandably, Toyota and the other automotive manufacturers have to be concerned about such potential problems, because they could affect the operation of electronic systems that control vital vehicle functions such as the ignition system, fuel management system, supplemental restraint system, cruise control, anti-lock brakes, and others. The very conservative position stated in selected Toyota technical manuals recognizes that, as the vehicle manufacturer, we have no control over the wide range of variable circumstances and unforeseen conditions that could be involved in the after-sale installation and operation of those system components.

In a "worst case" situation, vehicle electronic components could be damaged, and/or the proper and safe operation of the vehicle might be compromised if, for example, any of the following situations (and potentially others) existed:

- The transceiver is not "type-accepted."
- The power and/or antenna cables radiate RF current.
- Routing of the power and/or antenna cables results in inductive or capacitive coupling.
- Transmitter, feedline and/or antenna inefficiencies result in an unacceptable level of RF radiation exposure to the ECM's.

- The standing wave ratio is unacceptably high.
- The antenna ground plane is inadequate.

We can understand your interest in obtaining information from Toyota that would provide detailed recommendations on how to properly install ham radio components in our vehicles or, conversely, how to avoid specific potential problems. As a result of several inquiries such as yours, Toyota Motor Sales, U.S.A., Inc. petitioned our parent company in Japan to provide as much information as possible that would assist ham radio enthusiasts in making informed decisions.

Their response provides basic installation guidelines (outlined in the attachment) which we trust will be of assistance to you. Although it may not fully answer all your specific requests, Toyota must take reasonable precautions to limit our potential legal liability, because the full range of possible variables noted earlier could never be fully anticipated. Also, more detailed information that would provide the operational details of Toyota's electronic system is considered proprietary.

Contacts such as yours are always welcomed, because it allows us to monitor specific consumer interests in the U.S. market. Thank you for the time you have taken to call us, and your interest in Toyota vehicles.

Sincerely,

A handwritten signature in cursive script that reads "Richlynn Kaiser".

Richlynn Kaiser
National Customer Relations

Attachment

2-WAY RADIOS IN TOYOTA VEHICLES

Installation of a 2-way radio in Toyota vehicles should not present problems under the following conditions:

- * The transceiver must be type-accepted by the FCC, and not modified in any way.
- * Maximum output power complies with FCC regulations (100 watts).
- * All installation and operating instructions provided by Toyota and the equipment manufacturer must be followed closely.
- * The antenna must be installed as far away as possible from all vehicle electronic control modules (ECM) or other onboard computer/sensors.
- * The antenna cabling must be routed no closer than 20 cm (7-7/8 inches) to any ECM or other onboard computers/sensors.
- * Antenna and power cabling must not be routed along side or in conjunction with the vehicles wire harness. It is always preferable to cross vehicle harness at right angles when possible. Antenna and antenna cabling should be properly adjusted to obtain the lowest possible standing wave ratio (SWR).

It must be emphasized that, under the terms of Toyota's new vehicle warranty, and damage caused by RF energy from a higher power mobile radio is specifically excluded from coverage because it is not the result of faulty materials or workmanship. Accordingly, all such responsibility is assumed by the owner.