MAY 6 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Kenichi Kato
General Manager, Toyota Motor Corporation
U.S. Office
9 West 57th Street, Suite 4550
New York, NY 10019

NEF-12gdc
EA35-045

Dear Mr. Kato:

This is in reference to my letters of September 20, 1985, and February 28, 1986, and your responses dated December 6, 1985, February 21 (from Mr. Teiji Iida) and March 28, 1986, concerning alleged sudden acceleration of certain Toyota Cressida vehicles. The purpose of this letter is to request additional information pertaining to failure or malfunction of some cruise control systems in regard to the effects of electromagnetic interference and to request Toyota's reconsideration of its action toward our recall request.

The rapidly increasing application of complex automotive electronic systems to improve fuel economy, reduce exhaust emissions, ensure vehicle safety, and provide assistance to the driver in operating the vehicle has resulted in a growing need to assure compatibility with the electromagnetic environment. Low level signals from sensors and transducers used to monitor vehicle performance may have sensitivity to the electromagnetic environment. The transmission of digital data in the vehicle has increased the potential for radiated emission interference. This letter in part concerns electromagnetic compatibility (EMC) of electrical and electronic systems in the subject vehicles with the environment. Specifically, this office wants to determine whether the automatic speed control computer assembly, the electronic fuel injection (EFI) control unit, or other electrical and electronic systems in the subject vehicles can fail or malfunction due to electromagnetic interference (EMI), and to evaluate whether the type of failure or malfunction, if it exists, is potentially severe enough to cause sudden vehicle acceleration without operator input or is merely a nuisance.

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For purposes of this information request, the following terms are defined unless otherwise described:

- Subject vehicles: all 1981 through 1984 Toyota Cressida vehicles.
- Toyota: all the personnel and files of the Toyota Motor Corporation including all field personnel.
- Alleged problem: shall refer to inadvertent vehicle sudden acceleration.
- Electromagnetic compatibility (EMC): represents a condition in which there exists no unacceptable electromagnetic interaction between the automobile and the external environment (such as other automobiles or externally located transmitters, etc.) and/or between subsystems or components of the automobile (such as transient interference with electronic devices, over-voltage stresses, etc.)

Pursuant to Sections 108 and 112 of the National Traffic and Motor Vehicle Safety Act (the Act), please provide numbered responses to the following items. Please repeat each item verbatim before the response. If any information has been provided to this office in response to a previous information request on this matter, that information need not be resubmitted. All other information must be submitted as requested. The submitted information is to include, but not be limited to, all written reports or documents; transcriptions, notes, or other documentation of oral communications; and information contained on electronic storage media. All submitted documents written in Japanese must be translated into English.

1. Has Toyota conducted any electromagnetic field surveys in the U.S. and/or Japan to identify certain locations, frequencies, and durations of electromagnetic occurrance and its source and modulation such as police or amateur radio, AM or FM broadcast, radar, etc.? If so, provide a copy of the survey summary and results, and describe the application of this survey. If not, explain why such a survey is not necessary.

2. Has Toyota established an in-house EMC standard applicable to design and testing of electrical and electronic devices in the subject vehicles? If so, provide a copy of the standard and describe the basis and background information regarding its development. If not, explain why such a standard is not deemed necessary.

3. Has Toyota conducted EMC road-testing of subject or prototype vehicles at key locations in U.S. or Japan chosen on the basis of field strengths observed and frequencies to which vehicular electronic systems are particularly susceptible? If so, provide a copy of documents related to test procedures, conditions, instrumentation, test results, test evaluation, and analysis.

4. Has Toyota performed EMC testing of the subject or prototype vehicles in test chambers? If so, provide a copy of documents related to test procedures, conditions, instrumentation, test results, test evaluation and analysis, including correlation of performance in the field to chamber testing.

5. Has Toyota performed subject vehicular component testing as a means of determining relative component immunity to EMI? If so, furnish the name of each tested component and provide a copy of documents pertaining to test procedures, conditions, instrumentation, test results, test evaluation and analysis, including correlation of performance in the field to component testing.

6. Explain how each of the tests described above associate with (1) transient immunity, (2) electronics immunity to on-board transmitters, (3) radiated emissions from electronics potentially resulting in communication receiver interference, and (4) immunity to external narrow band radiation.

7. Describe all obvious EMI reduction techniques incorporated in the subject vehicles such as shielding and filtering; avoidance of resonances; adjustment of component size, location, and orientation; etc. Also, furnish the date, model, and model year of the subject vehicles in which the techniques were introduced.

9. Furnish Toyota's opinion of the likelihood of the alleged problem occurring due to EMI in the subject vehicles. Please include an assessment of the following:

   a. the potential EMI causal or contributing factors which may result in the alleged problem;

   b. the failure mode; and

   c. any warning of EMI and what that warning might be.

. In reference to Attachment X, item 5, of your letter of December 6, 1985, you indicated in October 1983 that Toyota added some resistances

and capacitors to the speed control computer assembly for improvement of electromagnetic interference resistance. Based on the above, please respond to the following:

a. Provide a circuit diagram showing locations and capacity of added resistances and capacitors.
b. Furnish a copy of the documents related to tests and analysis which show different effects on the speed control computer due to EMI before and after the resistances and capacitors were added.

10. In reference to item 1 of Mr. Iida's letter dated February 21, 1986, describe in detail some "unknown" reasons or some possible causes which can lead the computer ground circuit "A" and the two earth points which are connected to "A" becoming open or partially open.

11. In reference to item 2 of Mr. Iida's letter dated February 21, 1986, describe in detail some "unknown" reasons or some possible causes which can result in the voltage at "OUT-B" of the IC having a continuously low level output.

12. Item 3 of Mr. Iida's letter dated February 21, 1986, states in part "When the brake pedal is depressed, 'Switch A' of the stop lamp switch assembly is engaged, sending a signal to the computer assembly to shut off the actuator circuit." Based on the above statement, is it possible that the computer may fail or malfunction and not shut off the actuator circuit? If so, describe the possible causes of such failure or malfunction. If not, explain the reason for adding Switch B in the stop lamp switch assembly.

13. Reference to item 3 of your letter dated March 26, 1986, states in part: "We can assure you that the product improvements made in our cruise control systems were not made as a result of discovery of design of manufacturing defects, but were incorporated to minimize the likelihood of danger should any kind of failures occur in the cruise control system." Please describe the kind of possible failure mode of the cruise control system which would likely cause "danger." Also, explain what is the likelihood of danger.

It is recognized that the vehicle sudden acceleration is a high risk incident which can result in property damage, injuries, and sometimes fatalities. Although the possible causes of such incidents could be mechanical, electrical, human, or a combination of the three, any of those causes could produce the same effect. We believe if any potential cause of the sudden acceleration incident is identified, proper remedy must be

taken to prevent the failure from occurring. As the Cressida case, as indicated in my letter of February 21, 1986, a potential cause of the vehicle sudden acceleration was identified in certain Cressida vehicles as lack of adequate fail-safe protection for the cruise control system. When the cruise control computer fails, under these conditions, the actuator can automatically engage and cause sudden vehicle acceleration without the driver's input. The acceleration can be avoided if adequate fail-safe protection is provided.

Toyota implies in its letter of February 21, 1986, that the cruise control computer in certain subject vehicles may fail or malfunction in such a way that the actuator can automatically activate. This actuator engagement can cause sudden vehicle acceleration. Although Toyota did not mention specific possible causes of the failure modes, it introduced three specific remedies; i.e., adding three additional fail-safe protection circuits to the 1984 and later model Cressida vehicles, to avoid actuator engagement in case of failure of the cruise computer. These remedies, as stated in your letter dated March 28, 1986, were incorporated to minimize the likelihood of danger should any kind of failure occur in the cruise control system.

The cruise control computer in certain subject vehicles can fail and did fail as evidenced in part by part sales as well as Toyota and the Office of Defects Investigation's (ODI) investigations. Although the causes of the failure in the cruise control computer and the frequency of such failure occurrences have not been determined, sudden acceleration was produced and duplicated on a 1982 and 1983 Cressida, equipped with a defective cruise control computer. In this case, the cruise control system cannot be cutoff by depressing the brake pedal, placing the selector lever in "N," and/or setting the parking brake. However, we observed from our testing that an added switch directly connected to the actuator circuit without interaction from the computer assembly, when turned off, can cutoff the actuator engagement to avoid vehicle sudden acceleration. This demonstrates that one of your fail-safe protective circuits, as described in item 3 of Toyota's February 21, 1986, letter, works and can be used to avoid sudden acceleration should any kind of failure occur in the cruise control system.

We appreciate Toyota's actions in making product improvements in its cruise control systems in the subject vehicles to minimize the likelihood of danger. If the likelihood of danger does exist without the product improvements, as demonstrated in ODI testing, then those improvements should be incorporated into the "old" systems. To further minimize the likelihood of danger, we also believe that the possible failure/malfunction modes and defects of the cruise control computer

should be identified, specifically (1) what could possibly cause weak or no ground at ground circuit point "A," (2) what could possibly cause the low voltage at the "OUT-B" of the IC, and (3) what could possibly cause failure of the cruise computer to shut off the actuator circuit when the brake pedal is depressed and "Switch A" of the stop lamp switch assembly is engaged and sending a signal to the computer (Reference Toyota's letter of February 21, 1996). In this regard, we will provide an opportunity for Toyota to examine and test the failed computer in our possession under the following conditions: (1) the inspection and test shall be performed in the U.S. and under ODI observation; (2) the inspection and test shall be non-destructive to the computer and its components; (3) the proposed inspection and test methods and procedures as well as the instrumentation and equipment to be used shall be reviewed with ODI beforehand; (4) the computer will be safeguarded by one of our engineers during testing; and (5) a copy of the test and inspection report will be provided to this office within 30 working days after inspection.

Based on the above, regardless of the outcome of the test results, we are again recommending that Toyota conduct a voluntary safety recall of the potentially affected Cressida vehicles to provide total fail-safe protection for the cruise control system to minimize the likelihood of danger.

It is important that Toyota respond to this letter on time. This letter is being sent pursuant to Section 112 of the Act, which authorizes this agency to conduct any investigation which may be necessary to enforce Title I of the Act. Failure to respond promptly and fully to this letter may be construed as a violation of Section 108(a)(1)(B) of the Act.

Your written response, in duplicate, referencing the identification codes in the upper right hand corner of page 1 of this letter, must be submitted to this office within 40 working days from your receipt of this letter. If you find that you cannot respond within the allotted time, with all the requested information, you must request an extension from the Director, Office of Defects Investigation, no later than 5 working days prior to the due date for your response. A telephone request for an extension may be made to the Director at (202) 426-2850, but it must be confirmed in writing. On-time delivery of partial submissions should be made when circumstances prevent meeting the required delivery schedule.

If any portion of your response is considered confidential information, include all such material in a separate enclosure marked confidential. In addition, you must submit a copy of all such confidential material directly to the Chief Counsel of the National Highway Traffic Safety Administration and comply with all other requirements of 49 CFR Part 512, Confidential Business Information.

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If you have any technical questions concerning this matter, please contact Dr. George Chiang of my staff at (202) 426-2847.

Sincerely,

/s/ Philip W. Davis

Philip W. Davis, Director
Office of Defects Investigation
Enforcement

cc:
Mr. Teiji Iida
Mr. Dan M. Koda