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To: FCC

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From: Duane R. Bagdons

James Mason product Model: J.M.A. Computer & Wireless Auto Measuring System

**OPERATION DESCRIPTION:**

This device consists of two parts: 1) TRAM assembly, and 2) Transmitter box attached to a computer. The function of this device is to compare dimensions of a vehicle from after a vehicle repair to the original dimensions from the factory. This device (TRAM) is placed on the repaired vehicle and when desired, a push button switch on the TRAM part of the device is pressed and this transmits measured data from the TRAM to the identical transceiver in the Transmitter box which is connected to the computer. This information is then recorded in the computer. Both ends of the device (TRAM and Transmitter box) contain identical transmitter and receiver units. The device operates on the frequency of 916 Mhz and is pulse modulated. The maximum length of a transmitted burst is 190 mS. A typical message is considerably shorter.

During periods of no activity, the communication is constantly looking for a complete communication circuit by polling with ACK's , NAK's which are 20 mS bursts of signal. A poll message is sent from the PC side (Transmitter box). If the remote unit (TRAM) has anything to transmit (New measurement), a data message is transmitted back. If there are no new measurements, the remote unit will not reply. ACK or NAK messages are sent in reply to data messages. Microprocessors, on both sides, control the data transmission. A Data buffer in the microprocessor (internal RAM) holds the message data. All messages are fixed length.

There are two modes of operation for the system:

- Idle mode - No radio transmissions, so we can ignore this mode of operation.
- Recording mode - In the recording mode, system is transmitting "data messages" (all data messages are always 190ms) and "control messages" (all control messages POLL and ACK are always 20ms). The length of these messages is controlled by micro FW on both sides (PC and black box side).

There are three possible situations in the recording mode:

- PC side needs to send data to the black box (operator is starting or stopping the recording mode of operation). In this situation, instead of sending a regular POLL control message, PC side sends a data message (190ms) to the black box. If this message is received by the black box, it will reply with ACK control message. When PC side receives this ACK control message, this instance of data transfer from PC to the black box is completed and regular POLL control messages will resume, but only after another 800ms delay.
- Black box needs to send data to the PC (operator has pressed transmit button on the black box). Black box will wait for the POLL control message from the PC side. When this POLL control message is received, black box will send back the data message (190ms). Upon receiving this data message, PC side will send back ACK control message to the black box. This completes the data transfer from black box to the PC side. The next POLL control message from the PC side will be sent after the 800ms delay.

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\* Neither PC nor black box side needs to transfer data - PC side is sending POLL control messages every 800ms. Black box will not reply to these messages.

The situation where our system will transmit the most messages is case 2 where black box needs to transfer data to the PC side. Our system will transmit POLL control message (20ms - sent by PC side), immediately followed by data message (190ms – send by black box), immediately followed by ACK control message (20ms – sent by PC side). This means the system will transmit for 240ms, followed by 800ms delay.