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To: American Telecommunications Certification Body, Inc.
6731 Whittier Ave., McLean, VA 22101
Attn: Timothy R. Johnson, Examining Engineer

REF: FCC ID # QBGUS2001OHDTX

Dear Sir,

After reviewing your comments as to items which still need to be addressed on the application for FCC approval, I would like to address each item individually. Referencing your letter of July 31, 2002.

Item #1. Encoder pulse train.

As background information, this transmitter is basically the same as a garage door opener. It is a purchased module from Linx Technologies model #TXE418-KH. This is a single chip, to which you attach power, an antenna, and a code selection switching system. The code selection system, usually, in a garage door opener, is a 3 position dip switch of 10 poles. This will yield $10^3$ possible code combinations. If the transmitter is activated, it sends out this code number to be matched up by a similarly programmed receiver. Page #3 of the Linx document supplied shows how the code pulse stream is produced. In our application, in lieu of putting in a DIP switch, we are tying the code selection inputs either high, low, or unconnected to select operator codes.

In our particular application, we are using two different codes. This would be similar to using a multiple button garage door opener, where the large button opens the door and one of the smaller buttons turns on the light, etc. In our application, one code number activates the system when power is applied to the module, and the other code number is sent if, at the same time as the power is applied, that the small IC chip recognizes that the power supply (battery) voltage has dropped below 2.85 Volts.

These signals are picked up by the receiver about 5 feet away. The first code is an alarm used to shut down the machinery, and the second code number tells the system that the battery is getting low in the transmitter and it is in need of being replaced. Our service personnel will test this system at each service call and check to see if the battery needs replacement at that time. There is no data being sent through this transmission—only the code.

Item #2. Intended use of the transmitter

You had some questions and you explained your concept as to what the transmitter was used for. Evidently, the information you received was in error. The device does not detect fluid levels. Let me explain.

This transmitter is being used as an additional backup safety device for a carwash machine. The carwash machine is the type that you see in many gas stations around the U.S. and the world. The machine is on tracks and travels forward and backward spraying water at high pressure from all angles on the vehicle. This machine accomplishes this through a robotic arm that traverses the perimeter of the vehicle at a set distance from the vehicle surface.

If, for some reason, things do not operate as designed or the vehicle moves in the carwash bay unexpectedly, there is the chance that the robotic arm could contact the vehicle. To minimize damage to the vehicle, the arm is heavily padded. Still, in very rare cases, the arm could come in contact with the vehicle hard enough to break a shear pin at the pivot point on the arm. Our desire is for the machine to stop immediately and shut down, alarming to the attendant that something is not operating properly. A large Klaxon horn is provided to annunciate this condition, as well as electronic signaling to local and/or remote service personnel.

When the robotic arm is spraying high pressure and high volume water on the car, the water pressure produces a moment in the spray arm in the opposite direction to that of the water spray. Therefore, the shear pin is necessary to keep the arm from moving.

The transmitter system is being used, in this case, in lieu of a commutator system. Due to the large amounts of water and chemicals, etc. that are present in the area, it was determined that a commutator system to be used to signal a breakage of the shear pin was not practical. It would be nearly impossible to keep clean and operable all of the time under all conditions. For the above reason, the transmitter/ receiver system was developed. If the shear pin breaks, the relative position of the arm is noted by a tilt switch located on the rotating robotic arm assembly. This tilt switch applies power to the transmitter. The transmitter sends the proper code (see item #1 above for details). The code is received by the receiver. The receiver sends signals to the PLC that controls the carwash machine. Under this condition, the PLC shuts down the carwash machine immediately. It will not move or spray water. The service attendant is notified of the condition.

Once the shear pin is broken, the force of the water pressure pushes the arm away from the vehicle and the tilt switch is activated. As soon as the PLC shuts off the water to the arm, the force of gravity is greater than the water pressure as it is reduced to zero, and the arm returns to a more normal location where the tilt switch is not activated, and the transmitter is shut off.

Since we are dealing with water pressure and some mechanical systems, it is not possible to come up with an exact time that the transmitter is capable of being kept on. Depending on the installation and site water pressure, this time is somewhere between 2 and 4 seconds maximum.

Item #3. This issue I do not know anything about or what you mean by this. The frequency of the device was chosen by what was available from the manufacturer of the modules. The only frequencies offered are 315Mhz, 418Mhz, and 433Mhz. We chose 418Mhz for our application for no particular reason. Since we only need to transmit about 20 feet at the most, the DbuV/m allowed appeared and tested to be more than adequate for our needs.

Item #4. I do not know why you did not receive the owner's manual information. The information below is the exact text of what is printed in the Owner's Manual for the machine in which the transmitter is installed. As one can see, there is no user interaction. The transmitter is installed and it operates. It is only being used as a safety device which should be used only on very rare occasions. The entire manual is not printed below. Since the actual manual (hundreds of pages) is for a very large and complex machine, only the pertinent section is excerpted for your needs.

## OPTIONAL SPRAY ARM BREAK AWAY

The optional Spray Arm Break Away system allows the UltraSonic 2001-Overhead machine to shut down in the event that a customer drives their vehicle into the spray arm when it is in front of or behind the vehicle. To prevent damage if this occurs, a shear bolt in the spray arm mechanism breaks to prevent damage to the vehicle or the wash equipment. When this happens a tilt switch activates a small radio transmitter that is mounted on the spray arm. A radio receiver mounted in the machine gantry terminal box signals the machine controls causing the machine to immediately shut down and no longer operate. The machine is in a no-operation condition and can no longer arm for a wash. It remains in this state until it is reset. The machine's 2-digit display will show an 08 diagnostic code and a 4-digit diagnostic code 8608 will be recorded. The bay switch buzzer will sound for 5 seconds and the machine movement beeper alarm will sound continuously.

### RETURNING THE MACHINE TO OPERATION

**STEP 1**: Inspect the spray arm for safe continued operation.

**STEP 2**: Remove the white screw caps from the heads of the four (4) screws that secure the white plastic cover to the horizontal spray arm. Remove the plastic cover and the mounting clamp with transmitter off of the spray arm by removing the four (4) screws. **Note:** The transmitter assembly will still be connected to the tilt switch and should be kept near enough to the spray arm to prevent interfering with this connection.

**STEP 3**: Remove and save the existing flat 3/8" (10 mm) washer and nut from the broken shear bolt. Install the new shear bolt into the spray arm where the broken bolt was removed.

**CAUTION! USE ONLY THE SHEAR BOLT RECOMMENDED FOR THIS EQUIPMENT. USE OF ANOTHER BOLT WILL NOT ALLOW THE SPRAY ARM BREAK AWAY TO OPERATE PROPERLY AND MAY CASUE DAMAGE TO THE MACHINE OR TO VEHICLES. WHEN ORDERING REPLACEMENT PARTS, CONTACT THE RYKO PARTS DEPARTMENT IF UNSURE OF THE PROPER PART TO ORDER,.**

Install the flat 3/8" (10 mm) stainless steel washer under the nut when replacing a broken shear bolt. Do not install the washer under the head of the shear bolt. Draw the two stainless steel blocks (where the bolt goes through) of the break-away assembly together by tightening the nut. After drawing the two halves together, loosen the nut until the washer under the nut can spin freely (approximately 1/4 turn).

**STEP 4**: Reassemble the white plastic cover and the mounting clamp with transmitter onto the horizontal spray arm using the four (4) screws previously removed. Reattach the four (4) screw caps previously removed. Refer to the Top Spray Arch Cover Installation drawing in the Installation Manual.

**WARNING! NEVER RESET THE MACHINE TO ALLOW FURTHER OPERATION WITHOUT FIRST REPLACING THE SHEAR BOLT AND INSPECTING THE SPRAY ARM AND MACHINE FOR CONTINUED SAFE OPERATION. FAILING TO DO SO MAY RESULT IN DAMAGE TO THE MACHINE OR A VEHICLE. IF IN DOUBT, CONTACT RYKO CUSTOMER SERVICE FOR ASSISTANCE.**

**STEP 5**: The machine will not operate again until it is reset via the Test Function FC "Arm Break Away Reset". Refer to the Test Function Information document included in the Owner's Manual to reset the machine movement beeper alarm and allow the machine to operate normally.

Spray Arm Break away Radio Transmitter information:
This equipment complies with part 15 of the FCC Rules. Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC ID. QBGUS2001OHDTX
This device complies with Part 15 of the FSS Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Roger E. Bocox

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