



White Paper



DMP Wireless: Rigorous Testing Proves Reliable Performance and Compliance With UL High Security and Fire Standards

The DMP wireless system and devices are a closed network of products. The system uses 900 MHz frequency-hopping spread spectrum that is designed only to transfer the states of physical inputs or information from remote sensors or devices to the control system. There is no access via this wireless link into the networking interface of the system.



Our wireless products are designed and manufactured to very high quality levels, and to ensure the reliable performance of DMP wireless systems and devices, we perform functional testing of 100% of our finished products. Additionally, DMP wireless is tested by independent, third-parties like Underwriters Laboratories.

UL Short-Range Radio Frequency Device Testing and DMP Wireless

The UL standards that DMP wireless adheres to and maintains in order to comply with high security and fire standards contain specific requirements for wireless initiating devices and receivers. These requirements are designed to ensure that communication between transmitter and receiver is reliable under the worst possible operating conditions. The different test conditions as stated below is to outline the rigorous amount of testing that DMP wireless must perform in order to meet those standards.

Reference Level Determination

This test introduces attenuation between transmitter and receiver in order to find the minimum signal strength under which the system will operate. The test is conducted by placing the transmitter and receiver in separate shielded enclosures connected by a coaxial cable. Attenuation is then added and

removed until the transmitter signal strength at the receiver is at the lowest level that will allow communication. The system is placed in this worst-case condition during the rest of the short-range RF tests. This “closed system” method of testing was developed by DMP while working with Underwriters Laboratories to list the first 1100 Series wireless products in 2005 and has since been included in the standards. UL data shows that DMP 1100 Series wireless operates with a signal level as low as -93 dB.

Interference Immunity and Protection

In addition to the attenuation, radio frequency interference is injected up to 10 dB below the minimum signal level. White noise, sine wave and square wave signals are injected across the receiver’s operating frequency band. Under these conditions, the 1100 Series wireless system continued to operate without reporting a false alarm. Interference that prevents the receiver from receiving messages from the transmitter is reported at the keypad within 20 seconds.

Error (Falsing) Rate

This test evaluates the ability of the receiver to distinguish between legitimate messages and false messages that are very similar to correct signals. While the attenuation and injected noise described above are in place, a modified transmitter repeatedly sends messages that have one incorrect bit. UL test data shows that after 100,000 transmissions, none of the incorrect messages were accepted by the DMP 1100 Series receiver. UL does not require further testing if the first 100,000 signals are rejected. If an incorrect signal is accepted the test continues until a total of 3 million messages are sent.

Throughput

This test replaces the incorrect messages from the Error Rate test with correct messages to test the receiver’s ability to process a high volume of messages. UL test data shows that no messages were missed out of 100,000 transmissions. No further testing was required.

Clash and Clash Error

This test verifies that an alarm signal is not lost if two transmitters are activated at the same time. DMP demonstrated that if two transmitters attempt to send messages at the same time, the clash is detected and the transmitters use a predetermined algorithm to retry at different intervals to eliminate the clash.

Testing also verified that the receiver does not interpret the two simultaneous messages as a false alarm by repeating this test for 100,000 cycles.

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