

ESD Classification of AH1 Devices

The AH1 device has been classified as a Class 1B device (Highest Voltage Level Passed between 500V and 1000V) for Human Body Model (HBM) testing according to JEDEC Standard JESD22-A114, failing at voltage levels of 800V and higher. This device has also been classified at least as high as a Class IV device (Highest Voltage Level Passed between 1000V and 2000V) for Charged Device Model (CDM) testing according to JEDEC Standard JESD22-C101. It passed at all 6 voltage levels through 1000V.

Thirty-eight devices were selected from a single lot, C658. These parts were serialized and the RF characteristics were tested. Each device was tested three times to account for error due to test equipment inaccuracies. The parts were then sent to Amkor Test Services in San Jose, California to receive the controlled HBM and CDM discharges. For each of the following six voltage levels, three parts received a discharge (HBM Voltage Levels: 250, 400, 500, 600, 800, 1000V; CDM Voltage Levels: 200, 400, 500, 600, 800, 1000V). The remaining two parts were used as control units, not receiving any discharge. After the respective discharges, the parts were returned to WJ Communications to determine the post-discharge RF characteristics. The parts were again tested three times each. Failure of the parts was determined using the error-adjusted percentage change in RF characteristics as indicated in Equation 1 where CU Pre and CU Post are the averages of six test readings (three readings each for two control units). The Typ Pre value was determined by averaging all 114 test readings (3 tests each for 38 devices).

$$(Equation 1) \quad Error \text{ Adjusted Percent Change} = [Pre - Post - (CU \text{ Pre} - CU \text{ Post})] / Typ \text{ Pre}$$

If the average difference from all three test results for each part varied by more than 15% between post-discharge and pre-discharge results, the parts were considered failures. As seen in the results, the majority of the failed devices displayed a complete loss of functionality as opposed to partial degradation of the RF characteristics. If any one of the three devices failed at a given voltage level, the device was said to fail at that level. In our tests, at the threshold voltage level, all three test units failed. The classification level was assigned according to the last voltage level at which all three parts passed Post-ESD RF testing according to the test specifications set by WJ Communications.

Any questions about the procedures or results of these tests can be directed either to Peggy Cleary at 408-577-6220.