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Quality estimation methods and application guidelines for mitigation measures based on particle radiation tests

Recommendation ITU-T K.138

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Summary

Recommendation ITU-T K.138 describes the reliability estimation methods based on the results of a neutron irradiation test taking into account the severity of the effect caused by soft errors. The soft error rate in the natural environment has to be calculated from the number of soft errors that occur during a neutron irradiation test. The severity of the impact of a soft error on telecommunications systems, such as the impact on the client signal and control system is analysed from the error logs created during the test.

Additional mitigation measures should be applied if the equipment is less reliable than the target level. This Recommendation also provides guidelines for applying these mitigation measures in light of the results of soft error tests.

History

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Introduction

Highly integrated and miniaturized semiconductor devices are indispensable for the telecommunication equipment that makes up carrier telecommunications networks which have large capacity, high functionality, and high reliability. However, preventing the occurrence of soft errors in these semiconductor devices is not possible at an acceptable cost. Accordingly, it is necessary to implement soft error measures that reduce the impact of soft errors on the operation of the equipment at the time when devices and equipment are designed. This Recommendation provides the methods to determine whether equipment satisfies each type of reliability requirement described in [ITU-T K.139] based on the results of a neutron irradiation test described in [ITU-T K.130].