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Qualification and Performance Specification for High Frequency (Microwave) Printed Boards

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Developed by the High Speed/High Frequency Board Performance Subcommittee (D-22) of the High Speed/High Frequency Committee (D-20) of IPC

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Qualification and Performance Specification for High Frequency (Microwave) Printed Boards

1 SCOPE

1.1 Scope This specification covers end product inspection and test of high frequency (microwave) printed boards for microstrip, stripline, mixed dielectric and multilayer stripline applications with or without buried/blind vias, and metal cores.

The printed board may contain embedded active or passive circuitry with distributive capacitive planes, capacitive or resistive components conforming to IPC-6017. The printed board may contain build up High Density Interconnect (HDI) layers.

1.2 Purpose The purpose of this specification is to provide requirements for qualification and performance of high frequency (microwave) printed boards.

1.3 Performance Classification and Types

1.3.1 Classifications This specification establishes acceptance criteria for the performance classification of high frequency printed boards based on customer and/or end-use requirements. Printed boards are classified by one of three general Performance Classes as defined in IPC-6011.

1.3.1.1 Requirement Deviations Requirements deviating from these heritage classifications **shall** be as agreed between user and supplier (AABUS).

1.3.1.2 Space and Military Avionics Requirement Deviations

Space and military avionics performance classification deviations are provided in the IPC-6018DS Addendum and are applicable when the addendum is specified within the procurement documentation.

1.3.2 Printed Board Type This specification will define eight types of high frequency (microwave) printed boards.

Type 1 – Single Sided

Type 2 – Double Sided

Type 3 – Homogeneous Dielectric Multilayer Construction

Type 4 – Mixed Dielectric Multilayer

Type 5 – Homogeneous Dielectric Multilayer with blind and/or buried vias

Type 6 – Mixed Dielectric Multilayer with blind and/or buried vias

Type 7 – Metal and/or composite backed printed boards, single sided or double sided

Type 8 – Multilayer metal and/or composite backed or core printed boards with or without blind and/or buried vias

1.3.3 Selection for Procurement For procurement purposes, Performance Class **shall** be specified in the procurement documentation.

The documentation **shall** provide sufficient information to the supplier so that he can fabricate the printed board and ensure that the user receives the desired product. Information that should be included in the procurement documentation is to be in accordance with IPC-2611 and IPC-2614.

The procurement documentation should specify the thermal stress test method to be used to meet the requirement of 3.6.1. Selection **shall** be from those depicted in 3.6.1.1, 3.6.1.1.1, 3.6.1.2 and 3.6.1.3. If not specified (see 6.1), the default **shall** be per Table 1-1.

During the selection process, the user should take into consideration the following when determining the appropriate thermal stress test method:

- Wave solder, selective solder, hand solder assembly processes (see 3.6.1.1 and 3.6.1.1.1)
- Conventional SnPb reflow processes (see 3.6.1.2)
- Lead-free reflow processes (see 3.6.1.3)

IPC-6016, a sectional performance specification for HDI printed boards, was canceled by the IPC. Relevant HDI conformance and acceptance criteria has been transferred to this revision of this specification.

The addition of IPC-2221 Appendix A conformance coupons (beginning with Revision B of the design standard) by the printed board manufacturer to the manufacturing panel **shall** be AABUS.