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

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November 2011

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Association Connecting Electronics Industries



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

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

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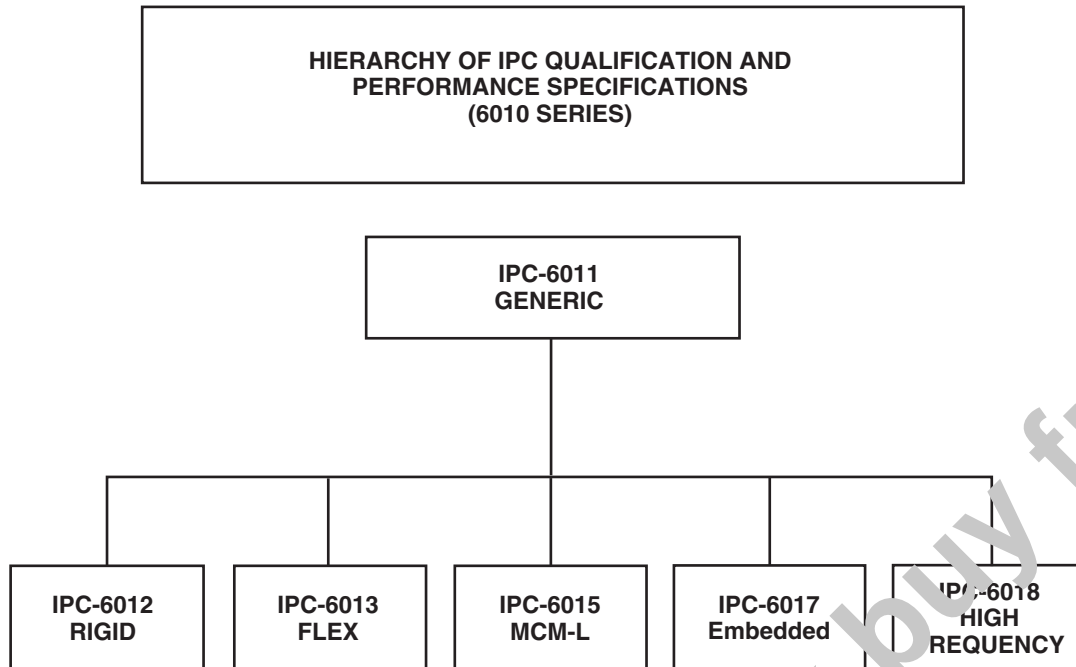
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FOREWORD

This specification is intended to provide information on the detailed performance criteria of high frequency printed boards. It supersedes IPC-6018B and was developed as a revision to that document. The information contained herein is also intended to supplement the generic requirements identified in IPC-6011. When used together, these documents should lead both manufacturer and customer to consistent terms of acceptability.

IPC's documentation strategy is to provide distinct documents that focus on specific aspects of electronic packaging issues. In this regard, document sets are used to provide the total information related to a particular electronic packaging topic. A document set is identified by a four digit number that ends in zero (0) (i.e., IPC-6010).

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Failure to have all information available prior to building a board may result in a conflict in terms of acceptability.

As technology changes, a performance specification will be updated, or new focus specifications will be added to the document set. IPC invites input on the effectiveness of the documentation and encourages user response through completion of "Suggestions for Improvement" forms located at the end of each document.

Acknowledgment

Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the High Speed/High Frequency Board Performance Subcommittee (D-22) of the High Speed/High Frequency Committee (D-20) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

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Table of Contents

1	SCOPE	1	3.2.9	Fusing Fluids and Fluxes	12
1.1	Statement of Scope	1	3.2.10	Marking Inks	12
1.2	Purpose	1	3.2.11	Hole Fill Insulation Material	12
1.3	Performance Classification and Types	1	3.2.12	Metal and/or Composite, External	12
1.3.1	Classifications	1	3.2.13	Via Protection	12
1.3.2	Printed Board Type	1	3.2.14	Embedded Passive Materials	12
1.3.3	Selection for Procurement	1	3.3	Visual	12
1.3.4	Material, Plating Process and Final Finish	3	3.3.1	Edges of Microwave Printed Board	12
1.4	Terms and Definitions	3	3.3.2	Laminate Imperfections	12
1.4.1	White Spots	3	3.3.3	Plating and Coating Voids in the Hole	13
1.4.2	Hybrid (Composite) Printed Board	3	3.3.4	Lifted Lands	14
1.4.3	As Agreed Between User and Supplier (AABUS)	3	3.3.5	Marking	14
1.4.4	High Density Interconnects (HDI)	4	3.3.6	Solderability	14
1.5	Interpretation	4	3.3.7	Plating Adhesion	14
1.6	Presentation	4	3.3.8	Edge Printed Board Contact, Junction of Gold Plating and Solder Finish	15
1.7	Revision Level Changes	4	3.3.9	Workmanship	15
1.8	Master Drawing	4	3.4	Printed Board Dimensional Requirements	15
2	APPLICABLE DOCUMENTS	4	3.4.1	Hole Size, Hole Pattern Accuracy, Pattern Feature Accuracy and Slots	15
2.1	IPC	4	3.4.2	Annular Ring and Breakout (External)	16
2.2	Joint Industry Standards	6	3.4.3	Bow and Twist	17
2.3	Federal	6	3.5	Conductor Definition	18
2.4	American Society for Testing and Materials	6	3.5.1	Undercutting	18
2.5	Underwriters Lab	6	3.5.2	Conductor Widths and Thicknesses and Spacing	18
2.6	National Electrical Manufacturers Association	7	3.5.3	Conductive Surfaces	19
2.7	American Society for Quality	7	3.6	Structural Integrity	21
2.8	AMS	7	3.6.1	Thermal Stress Testing	22
2.9	American Society of Mechanical Engineers	7	3.6.2	Requirements for Microsectioned Coupons or Printed Boards	23
3	REQUIREMENTS	7	3.7	Solder Mask Requirements on non-PTFE laminates	36
3.1	General	7	3.7.1	Solder Mask Coverage	36
3.2	Materials Used in this Specification	7	3.7.2	Solder Mask Cure and Adhesion	37
3.2.1	Laminates and Bonding Material for Multilayer or Mixed Dielectric Printed Boards	7	3.7.3	Solder Mask Thickness	37
3.2.2	External Bonding Materials	7	3.8	Electrical Requirements	37
3.2.3	Other Dielectric Materials	7	3.8.1	Dielectric Withstanding Voltage	37
3.2.4	Metal Foils	7	3.8.2	Electrical Continuity and Isolation Resistance	38
3.2.5	Metal Core/Backed	8	3.8.3	Circuit Shorts	38
3.2.6	Base Metallic Plating Depositions and Conductive Coatings	8	3.8.4	Circuit/PTH Shorts to Metal Substrate	38
3.2.7	Final Finish Depositions and Coatings – Metallic and Nonmetallic	8	3.8.5	Moisture and Insulation Resistance (MIR)	38
3.2.8	Polymer Coating (Solder Mask)	12	3.8.6	Dielectric Withstanding Voltage After MIR	38

3.9	Cleanliness	38	Figure 3-4	Breakout of 90° and 180°	17
3.9.1	Cleanliness Prior to Solder Mask Application	38	Figure 3-5	Usage of Modified Land Shapes in Breakout Conditions	17
3.9.2	Cleanliness After Solder Mask, Solder, or Alternative Surface Coating Application	38	Figure 3-6	Example of Intermediate Target Land in a Microvia	17
3.9.3	Cleanliness of Inner Layers After Oxide Treatment Prior to Lamination	38	Figure 3-7	Conductor Edge Definitions	18
3.10	Special Requirements	38	Figure 3-8	Undercut	18
3.10.1	Outgassing	39	Figure 3-9	Rectangular Surface Mount Lands	20
3.10.2	Fungus Resistance	39	Figure 3-10	Round Surface Mount Lands	20
3.10.3	Vibration	39	Figure 3-11	Printed Board Edge Connector Lands	21
3.10.4	Mechanical Shock	39	Figure 3-12	Plated Hole Microsection (Grinding/Polishing) Tolerance	22
3.10.5	Impedance Testing	39	Figure 3-13	An Example of Plating to Target Land Separation	23
3.10.6	Coefficient of Thermal Expansion (CTE)	39	Figure 3-14	Separations at External Foil	25
3.10.7	Thermal Shock	39	Figure 3-15	Crack Definition	25
3.10.8	Surface Insulation Resistance (As Received)	39	Figure 3-16	Plating Folds/Inclusions – Minimum Measurement Points	25
3.10.9	Wire Bond Adhesion	39	Figure 3-17	Typical Microsection Evaluation Specimen	26
3.10.10	Die Bond Adhesion	39	Figure 3-18	Measurement for Dielectric Removal	26
3.10.11	Rework Simulation	40	Figure 3-19	Etchback in Contact with PTFE Layer	27
3.10.12	Metal Core (Horizontal Microsection)	40	Figure 3-20	Measurement Locations for PTFE Resin	27
3.10.13	Peel Strength Requirements (For Foil Laminated Construction Only)	40	Figure 3-21	Negative Etchback	28
3.10.14	Destructive Physical Analysis	40	Figure 3-22	Annular Ring Measurement (Internal)	28
3.10.15	Lap Shear	40	Figure 3-23	Microsection Rotations for Breakout Detection	29
3.11	Repair	40	Figure 3-24	Comparison of Microsection Rotations	29
3.11.1	Circuit Repairs	40	Figure 3-25	Example of Nonconforming Dielectric Spacing Reduction Due to Breakout at Microvia Target Land	30
3.12	Rework	40	Figure 3-26	Surface Copper Wrap Measurement for Filled Holes	30
4	QUALITY ASSURANCE PROVISIONS	40	Figure 3-27	Surface Copper Wrap Measurement for Nonfilled Holes	30
4.1	General	40	Figure 3-28	Wrap Copper in Type 4 Printed Board (Acceptable)	31
4.1.1	Qualification	41	Figure 3-29	Wrap Copper Removed by Excessive Sanding/Planarization/Etching (Not Acceptable)	31
4.1.2	Sample Test Coupons	41	Figure 3-30	Copper Cap Thickness	32
4.2	Acceptance Tests	42	Figure 3-31	Copper Cap Filled Via Height (Bump)	32
4.2.1	C=0 Zero Acceptance Number Sampling Plan	42	Figure 3-32	Copper Cap Depression (Dimple)	32
4.2.2	Referee Tests	42	Figure 3-33	Copper Cap Plating Voids	32
4.3	Quality Conformance Testing	42	Figure 3-34	Example of Acceptable Voiding in a Cap Plated, Copper Filled Microvia	33
4.3.1	Coupon Selection	42	Figure 3-35	Example of Acceptable Voiding in a Copper Filled Microvia without Cap Plating	33
5	PACKAGING	47	Figure 3-36	Example of Nonconforming Void in a Cap Plated, Copper Filled Microvia	33
6	NOTES	47	Figure 3-37	Example of Nonconforming Void in a Copper Filled Microvia	33
6.1	Ordering Data	47	Figure 3-38	Microvia Contact Dimension	33
6.2	Dispersed Specifications	47			
Figures					
Figure 3-1	Microvia Definition	8			
Figure 3-2	Adhesive Band Near Exposed Conductor	15			
Figure 3-3	Annular Ring Measurement (External)	17			

Figure 3-39 Exclusion of Separations in Microvia Target Land Contact Dimension 33

Figure 3-40 Penetration of Microvia Target Land 34

Figure 3-41 Metal Core to PTH Spacing 35

Figure 3-42 Measurement of Minimum Dielectric Spacing 35

Figure 3-43 Fill Material in Blind/Through Vias When Cap Plating Not Specified 36

Table 3-8 Edge Board Contact Gap 15

Table 3-9 Minimum Annular Ring 16

Table 3-10 Maximum Percent of Allowable Conductor Width Deviations 18

Table 3-11 Percent of Allowable Conductor Space Deviations 19

Table 3-12 Percent of Allowable Conductor Width Reduction Caused By Pin Holes 19

Table 3-13 Percent of Reduction In Dielectric Material Thickness 19

Table 3-14 Plated-Through Hole Integrity After Stress 24

Table 3-15 Cap Plating Requirements for Plated Holes 32

Table 3-16 Microvia Contact Dimension 34

Table 3-17 Internal Layer Foil Thickness After Processing 34

Table 3-18 External Conductor Thickness after Plating 35

Table 3-19 Solder Mask Adhesion 37

Table 3-20 Dielectric Withstanding Voltages 37

Table 3-21 Insulation Resistance 38

Table 4-1 Qualification Test Coupons 41

Table 4-2 AQL Sampling Plan per Lot Size 42

Table 4-3 Acceptance Testing and Frequency 43

Table 4-4 Quality Conformance Testing 47

Tables

Table 1-1 Default Requirements 2

Table 1-2 Technology Adder Examples 2

Table 3-1 Metal Core Substrate 8

Table 3-2 Maximum Limits of SnPb Solder Bath Contaminant 9

Table 3-3 Final Finish and Coating Requirements 10

Table 3-4 Surface and Hole Copper Plating Minimum Requirements for Buried Vias > 2 Layers, Through-Holes, and Blind Vias 11

Table 3-5 Surface and Hole Copper Plating Minimum Requirements for Microvias (Blind and Buried) 11

Table 3-6 Surface and Hole Copper Plating Minimum Requirements for Buried via cores (2 layers) 11

Table 3-7 Plating and Coating Voids Visual Examination 13

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

1 SCOPE

1.1 Statement of 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-6018CS 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 (eutectic) 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 cancelled by the IPC. Relevant HDI conformance and acceptance criteria has been transferred to this revision of this specification.