

TB-2258

GENERAL PRODUCT SPECIFICATION FOR InfinX
HS MEZZANINE INTERCONNECT SYSTEM

Revision “F”

Specification Revision Status

<u>Revision</u>	<u>SCR No.</u>	<u>Description</u>	<u>Initial</u>	<u>Date</u>
"A"	S3253	New Release	DMM	12/17/14
"B"	S3425	Corrected Withdrawal/Separation force values in Section 8.0	DMM	04/16/15
"C"	S4829	Added T0,TW, TY Beam specific forces in section 8.0. Added additional resistance values in section 4.0	KDL/DMM	08/04/16
"D"	S5157	Revised TW, TY Beam specific forces in section 8.0.	KDL/DMM	12/02/16
"E"	S6157	Revised Beam specific forces in section 8.0. to add TV Beam specification	KDL/DMM	8/14/17
"F"	S8488	Revised Contact Metallization section to remove the advanced plating process in section 14.1	MDC	9/17/20

Amphenol TCS

A Division of Amphenol Corporation

Amphenol TCS
200 Innovative Way, Suite 201
Nashua, NH 03062
603.879.3000

www.amphenol-tcs.com

Aptera, Chameleon, Crossbow, eHSD, GbX, HD Plus, HDM Plus, HDM, HD-Optyx, InfinX, Lynx, NeXLev, Paladin, Ventura, VHDM, VHDM-HSD, and XCede, are trademarks or registered trademarks of Amphenol Corporation. AirMax VS is a registered trademark of FCI. Information contained in this document is summary in nature and subject to change without notice. Appearance of the final, delivered product may vary from the photographs shown herein.

1.0 SCOPE

1.1 Content

1.1.1 This specification covers the performance, test, and quality requirements for the InfinX HS mezzanine interconnect system. These connectors are two-piece devices that connect two parallel printed circuit boards. Receptacle connectors and plug connectors are surface mount devices with a ball grid array style pcb interface, arranged in an array pattern. The InfinX HS connector family consists of modular configurations from 20-108 differential pair circuit sizes

1.2 Qualification

1.2.1 When tests are performed on subject product line, procedures specified in EIA-364-B shall be used per the test sequences outlined in Amphenol Technical Bulletin TB2023. All inspections shall be performed using applicable inspection plan and product drawings.

2.0 REFERENCE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Amphenol Documents

TB2023 Amphenol Commercial Connector Qualification Plan

TB2xxx HS Interconnection System Electrical Characterization Report

TB2240 HS PWB Routing Guidelines

TB2241 InfinX DFM and Application Design Guide

2.2 Commercial Standards

2.2.1 EIA-364-B Electrical Connector Test Procedure Including Environmental Classifications

2.2.2 GR-1217-CORE – Generic Requirements for Separable Electrical Connectors used in Telecommunications Hardware

2.2.3 IEC-512 – Electromechanical components for electronic equipment – Basic testing procedures and measuring method

3.0 MATERIAL FINISHES

3.1 Contacts

3.1.1 Plug Signal and ground blades are 0.15 mm thick high performance copper alloy. Blades are plated per EGS205.

3.1.2 Receptacle signal and ground contacts are 0.15 mm thick high performance copper alloy. Contacts are plated per EGS205.

Notes:

1. All contacts meet lead free requirements, refer to EGS205

3.2 Sub-Components

Component	Material	Specification
Insulators	Glass reinforced polyester (LCP)	UL 94V-0 Rating, Color Black or grey
Vacuum Caps	Glass reinforced polyester (LCP) or 30X Stainless Steel	N/A

4.0 SIGNAL BULK RESISTANCE RATINGS

6 pair, Mated height	4 pair, Mated height	BULK RESISTANCE ^(1,2,3) , Signal, mΩ	BULK RESISTANCE ^(1,2,3) , End Ground, mΩ	BULK RESISTANCE ^(1,2,3) , Wide ground, mΩ
10 mm	N/A	12	10	5
12 mm	N/A	12	11	5
15 mm	N/A	13	11	5
17 mm	N/A	14	12	5
20 mm	N/A	18	15	6
23 mm	N/A	24	15	6
25 mm	N/A	24	16	7
27 mm	N/A	24	16	7
28 mm	N/A	24	16	7
30 mm	N/A	25	16	7
32 mm	N/A	25	16	7
36 mm	N/A	26	26	8
38 mm	N/A	26	18	8
40 mm	N/A	26	18	8
42 mm	N/A	26	18	8
N/A	15 mm	13	11	5
N/A	19.5 mm	18	15	6
N/A	23 mm	24	15	6
N/A	24.5 mm	24	15	6
N/A	28 mm	25	16	7
N/A	30.5 mm	25	16	7
N/A	35 mm	25	18	7
N/A	40 mm	26	18	8

NOTES:

1. The values reported include the contributions of PWB pads and solder joints.
2. The values reported are obtained by a process of laboratory measurements of actual connector samples.

3. Mated bulk resistance values are typical values.

5.0 ELECTRICAL RATINGS

Description	Target Values
Separable Interface Contact Resistance	10 mΩ Maximum ⁽¹⁾
SMT lead to SMT pad Resistance	3 mΩ Maximum ⁽¹⁾
Insulation Resistance	1,000 Mega OhmsΩ ⁽¹⁾
Dielectric Withstanding Voltage	750 Volts RMS ⁽¹⁾

6.0 CURRENT AND TEMPERATURE RATINGS, MATED

Description	Value
Signal and Ground Contact, Narrow	1.0 Amp per contact ^(3.)
Ground Contact, Wide	2.0 Amp per contact ^(3.)
Maximum Operating Temperature Rating	105 degrees C
Minimum Operating Temperature Rating	-40 degrees C

7.0 HIGH FREQUENCY SIGNAL INTEGRITY RATINGS

Description	Value
Observed Differential Impedance Range Corresponding to Measured Reflection Levels at $t_{rise} = 35$ ps (20%-80%)	100 ohms +/- 5 ohms ⁽¹⁾ 85 ohms +/- 5 ohms
Multiline Forward Crosstalk Measured at $t_{rise} = 35$ ps (20%-80%)	< 3% / -30dB
Multiline Backward Crosstalk Measured at $t_{rise} = 35$ ps (20%-80%)	< 3% / -30dB
Connector Attenuation (S_{21}) at (20) GHz	Less than 3dB ⁽¹⁾
Signal Path Delays	SEE SECTION 4.0

Description	Value
Observed Single Ended Impedance Range Corresponding to Measured Reflection Levels at $t_{rise} = 50$ ps (20%-80%)	50 ohms +/- 5 ohms ⁽¹⁾
Multiline Forward Crosstalk Measured at $t_{rise} = 50$ ps (20%-80%)	< 3% / -30dB
Multiline Backward Crosstalk Measured at $t_{rise} = 50$ ps (20%-80%)	< 3% / -30dB
Connector Attenuation (S_{21}) at (5) GHz	Less than 3dB ⁽¹⁾

NOTES:

1. Measured using an 8 copper layer 2mm thick Amphenol RF test board fixture, including the recommended InfinX footprint with 10 mil signal vias, and with all test connections made to the lowest stripline layer.

2. Sum of the peak absolute values of the 8 largest single-driven-pin contributors.
3. Product was tested in near worst-case conditions where the PCB had a minimal power/ground plane. For other test conditions please contact TCS Application Engineering.
4. Refer to C379- and C380- series customer drawings and technical bulletin TB2240 [InfinX Routing Guidelines](#) for drilled hole and SMT pad requirements.

8.0 MECHANICAL RATINGS

Description	Value, per contact	
	Grams (lbs.)	Newtons
Signal and Ground Contact Normal Force	30 End Of Life (EOL)	0.30
Signal and Ground Contact Engagement Force, Individual, Maximum	27 – T0 Beam	0.26
	37 – TV, TW, TY Beam	0.33
Signal and Ground Contact Separation Force, Individual, Minimum	8 (Initial), 6(EOL)	0.08, 0.06
Mating Force /wafer- Maximum	6 Pair - 702 (1.55 lbs.) – T0 Beam	6.88
	6 Pair - 867 (1.95 lbs.) TV, TW, TY Beam	8.50
	4 Pair - 486 (1.07 lbs.) – T0 Beam	4.77
	4 Pair - 612 (1.35 lbs.) TV, TW, TY Beam	6.00
Withdrawal Force/wafer- Minimum, EOL	6 Pair -160 (0.35 lbs.)	1.57
	4 Pair -107 (0.24 lbs.)	1.05
Signal, Shield, and Power Contact Durability	Rated for 200 Mating Cycles	
Contact Mechanical Wipe Nominal (Worst Case Minimum) Values	4 and 6 Pair- 2.01 mm nominal (1.90) Exception 10mm stack height – 1.35mm nominal	

9.0 SMT LEAD INTERFACE

Description	Value per Pin, Newtons (lbs)
Signal and Shield SMT ball pull strength	9.0 (2 lbs)

Data reflects values for single SMT lead pull strength

10.0 QUALIFICATION TESTING

- 10.1 Sample Selection: Refer to Telcordia GR-1217-CORE Specification for minimum recommended sample connector size.
- 10.2 Test Sequence: Qualification testing shall be performed per the sequences listed in Section 14 of this document.
- 10.3 of the InfinX connector system was performed with the 4-pair interconnect and, by similarity, the 6 pair interconnect is considered qualified

11.0 REQUALIFICATION TESTING

- 11.1 If changes affecting form, fit or function are made to the product or to the manufacturing process, Product Engineering and Mechanical Integrity Engineering shall coordinate re-qualification testing, consisting of all or part of the original testing sequence.

12.0 ACCEPTANCE

- 12.1 Acceptance is based on verification that the product meets the requirements of Section 13. Failures attributed to equipment, test set-up, or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Verification of corrective action is required before re-submittal.

13.0 QUALITY CONFORMANCE INSPECTION

- 13.1 The applicable RSIR (Raw Stock Inspection Report) and Plating Quality Inspection Plan shall specify the acceptable stamping and molding quality levels to be applied. Dimensional and functional requirements shall be in accordance with the applicable product drawings and this product specification.

14.0 SPECIFICATION SUMMARY

14.1 Material

Parameters	Specification Value	InfinX Value	Reference Document
Plating Integrity	Acceptable Porosity	3 pores per cm ²	EIA-364-53A
Contact Metallization	30μin Gold min 50μin Nickel min or	30μin Gold min 50μin Nickel min or	GR-1217-CORE Per paragraph 9.1.1.2 EIA-364-TP09
Durability	200 Cycles	200 cycles	GR-1217-CORE
Flammability Rating	94V-0	Must Pass Requirement	UL94

14.2 Mechanical

Parameters	Specification Value	InfinX Value	Reference Document
Contact Normal Force	30 Grams End of Life (EOL)	35 Grams End of Life (EOL)	GR-1217-CORE EIA-364-TP04
Engagement Force	N/A	SEE SECTION 8.0	EIA-364-TP37A
SignalContact Wipe Distance	0.51 mm(0.020") minimum	2.01 mm (.079") nominal Exception 6Pair 10mm stack height is 1,35mm(0.053") nominal	GR-1217-CORE
Polarization Force	100 N (22.5 lbs)	Mate Samples 180 degrees out of phase	GR-1217-CORE Per paragraph 6.2.1 EIA-364-TP70
Contact Geometry	Minimum one curved surface in mating area	Minimum one curved surface in mating area	GR-1217-CORE
Hertz Stress	N/A	Greater than 150Kpsi	N/A

14.3 Electrical

Parameters	Specification Value	InfinX Value	Reference Document
Contact Resistance Stability(LLCR)	Less than 10mΩ change from initial reading	Less than 10mΩ change from initial reading	GR-1217-CORE EIA-364-TP23
SMT Solder Ball to SMT Pad Resistance	1mΩ maximum	1mΩ maximum	GR-1217-CORE EIA-364-TP23
Mated Bulk Resistance	N/A	SEE SECTION 4.0	N/A
Signal Continuity	Less than 10 nanosecond interrupt	Less than 10 nanosecond interrupt	GR-1217-CORE
Current Rating	Less than 30° C Temperature Rise	SEE SECTION 6.0	GR-1217-CORE
Insulation Resistance	1,000 Megaohms	1,000 Megaohms	GR-1217-CORE
Dielectric Withstanding Voltage	750 VAC Peak	750 VAC Peak	GR-1217-CORE

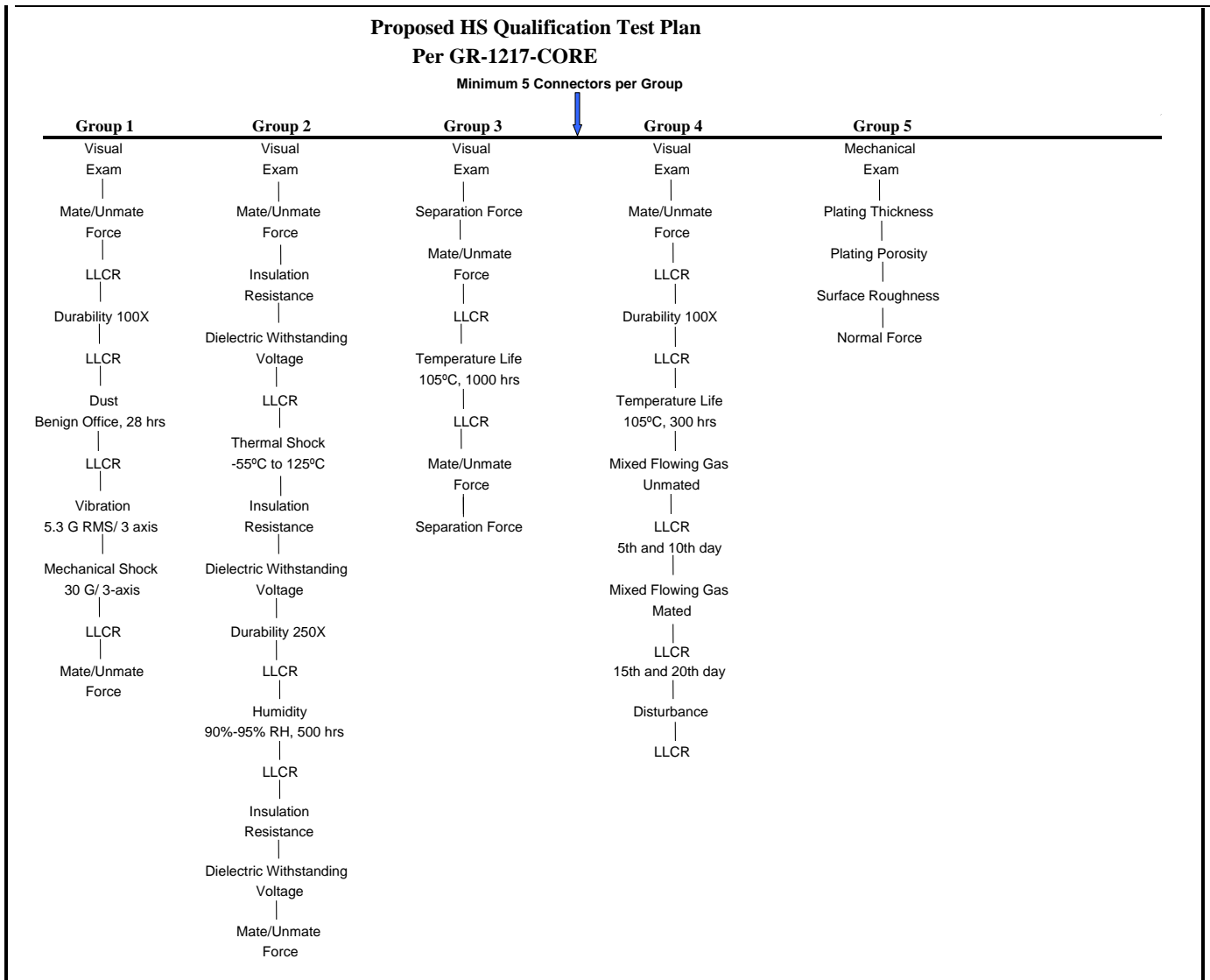
14.4 Environmental

Parameters	Specification Value	InfinX Value	Reference Document
Temperature Life	No Change in LLCR greater than 10m Ω	10 m Ω Maximum Change	GR-1217-CORE EIA-364-TP17
Thermal Shock	Same as above	Same as above	GR-1217-CORE EIA-364-TP32
Moisture Resistance	Same as above	Same as above	GR-1217-CORE EIA-364-TP31
Dust	Same as above	Same as above	GR-1217-CORE EIA-364-TP91
Vibration	Same as above	Same as above	GR-1217-CORE EIA-364-TP28
Mechanical Shock	Same as above	Same as above	GR-1217-CORE EIA-364-TP27
Mixed Flowing Gas	Same as above	Same as above	GR-1217-CORE EIA-364-TP65

15.0 TELCORDIA QUALIFICATION TEST GROUP SUMMARY

15.1 Test Groups

- Group 1: Vibration and mechanical shock with dust and durability
- Group 2: Thermal shock and humidity with dust and durability
- Group 3: Temperature life, 500 hrs @ 105°C
- Group 4: Mixed flowing gas, 4 gases with durability- thermal pre-conditioning
- Group 6: Porosity and plating thickness



15.2 Each test group will have at a minimum of 4 connectors and 200 LLCR-CPIR measurements.

15.3 Definitions

- 15.3.1 LLCR- Low Level Contact Resistance
- 15.3.2 CPIR- Compliant Pin Interface Resistance
- 15.3.3 DWV- Dielectric Withstanding Voltage
- 15.3.4 IR- Insulation Resistance

16.0 RESISTANCE MEASUREMENT SET-UP

