Qualification Test Report:
Report number: 501-90021 Rev. 0

Product specification 108-71060 Rev.0

Tested product:

Board to Board connector

Date: 11/10/2002

By order of:

Mr. Sebastien Kempter
CDC

Executed by:
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DR: E. Desimpelaere	DATE 11/10/2002	APVD: Dop Jooren	DATE 11/10/2002

S u m m a r y

Contents :	
	TSG 1a / b Sinusoidal vibration. TSG 2 a / b: Temperature life. TSG 3 a / b: Mixed flowing gas (4 gasses). TSG 4: Return - / Insertion loss. TSG 5: Shielding effectiveness.
Appendices:	
Description of Test samples:	Board to board connector 619127-1 with Fomblin lubricant. Base board coated with SnPb Target board coated with SnPb and coated with Au
Summary of remarks:	TSG 1a / b: ok. TSG 2a / b: ok. TSG 3a / b: ok. TSG 4: ok. TSG 5: ok.
Remark: - Acceptance criterion: c = 0. - Test results are available on: ooss908a\labo1\239_502\xxx.	

Original report published in duplicate:
First set for: CDC.
Second set for: PE VT.
Copies: ---

Tyco Electronics Belgium EC N.V. PE VT REPORT Nr.: 501_90021 Rev. 0 Date: 11/10/2002 Gemis Project nr:B031472 Tekoplan:239.502	Test eng.: Eddy Desimpelaere Signature :	Manager: Dop Jooren. Signature :

Remark : All measurements were (when not nearer specified in the test spec.) performed under normal climatic circumstances, definied by DIN IEC 60068 , Part 1 , subclause 5.3 (15 - 35 °C ; 45 - 75 % rel.F. ; 86 - 106 kPa)

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	∉ (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**

Testgroup 1a: Sinusoidal vibration.

10 Samples PN 619127.
1 Base board coated with SnPb, and fitted for 10 samples.
1 Target board coated with SnPb, and fitted for 10 samples.

1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks
2a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10	With SnPb target board: min: 7.2 mΩ max: 65.1 mΩ avg: 15 mΩ
2b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With SnPb target board: min: 1.6 mΩ max: 2.6 mΩ avg: 2.0 mΩ
3	Rapid change of temperature.	IEC 60512 6-11d AMP 108-71060 3.6 C13	•Mate the specimens with the target board at maximum stack height (15 mm). •10 Cycles between –40°C and 105°C. •Exposure time: 30 minutes.	-	-/10	

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**
3a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10	With SnPb target board: min: 6.3 mΩ max: 46 mΩ avg: 11.7 mΩ
3b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With SnPb target board: min: 2.3 mΩ max: 8.4 mΩ avg: 4.3 mΩ
4	Sinusoidal vibration.	IEC 60512-4-6d AMP 108-71060 3.6 C11	•1 Cycle ~ 10 Hz - 500 Hz - 10Hz . •10 – 58 Hz: constant amplitude of 1.5 mm. •58 – 500 Hz: constant acceleration of 200 m/s^2. •Sweep rate: 1 octave/minute. •Duration: 2 hours in each of 3 mutually perpendicular directions. •Mate the samples with the target board at maximum stack height.	No physical damage	0/10 outer conductor 0/10 center conductor	No remarks No remarks
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10	With SnPb target board: min: 6.2 mΩ max: 70.1 mΩ avg: 14.2 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With SnPb target board: min: 2.7 mΩ max: 13.7 mΩ avg: 5.8 mΩ

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	∉ (d/t)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**
5	Sinusoidal vibration.	IEC 60512-4-6d AMP108-71060 3.6 C10	•1 Cycle ~ 10 Hz - 2000 Hz - 10Hz . •10 – 58 Hz: constant amplitude of 0.75 mm. •58 – 2000 Hz: constant acceleration of 100 m/s^2. •Sweep rate: 1 octave/minute. •Duration: 2 hours in each of 3 mutually perpendicular directions. •Mate the samples with the target board at maximum stack height.	No discontinuities lasting 1 µs or more. No physical damage	0/10	No remarks
6a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10	With SnPb target board: min: 6.3 mΩ max: 25.3 mΩ avg: 9.4 mΩ
6b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1 C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With SnPb target board: min: 2.0 mΩ max: 4.1 mΩ avg: 2.8 mΩ
7	Visual examination.	IEC 512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**

Testgroup 1b: Sinusoidal vibration.

10 Samples PN 619127.
1 Base board coated with SnPb, and fitted for 10 samples.
1 Target board coated with Au, and fitted for 10 samples.

1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks
2a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With Au target board: min: 7.2 mΩ max: 9.35 mΩ avg: 8.2 mΩ
2b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10	With Au target board: min: 1.85 mΩ max: 2.3 mΩ avg: 2.1 mΩ
3	Rapid change of temperature.	IEC 60512 6-11d AMP 108-71060 3.6 C13	•Mate the specimens with the target board at maximum stack height (15 mm). •10 Cycles between –40°C and 105°C. •Exposure time: 30 minutes.	-	-/10	

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
3a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With Au target board: min: 6.7 mΩ max: 7.4 mΩ avg: 7.1 mΩ
3b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10	With Au target board: min: 1.5 mΩ max: 2.0 mΩ avg: 1.8 mΩ
4	Sinusoidal vibration.	IEC 60512-4-6d AMP 108-71060 3.6 C11	•1 Cycle ~ 10 Hz - 500 Hz - 10Hz . •10 – 58 Hz: constant amplitude of 1.5 mm. •58 – 500 Hz: constant acceleration of 200 m/s^2. •Sweep rate: 1 octave/minute. •Duration: 2 hours in each of 3 mutually perpendicular directions. •Mate the samples with the target board at maximum stack height.	No physical damage	0/10 outer conductor 0/10 center conductor	No remarks No remarks
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With Au target board: min: 7.4 mΩ max: 7.8 mΩ avg: 7.6 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10	With Au target board: min: 1.6 mΩ max: 2.2 mΩ avg: 1.9 mΩ

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/**t** (**d/t**)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**
5	Sinusoidal vibration.	IEC 60512-4-6d AMP108-71060 3.6 C10	•1 Cycle ~ 10 Hz - 2000 Hz - 10Hz . •10 – 58 Hz: constant amplitude of 0.75 mm. •58 – 2000 Hz: constant acceleration of 100 m/s^2. •Sweep rate: 1 octave/minute. •Duration: 2 hours in each of 3 mutually perpendicular directions. •Mate the samples with the target board at maximum stack height.	No discontinuities lasting 1 µs or more. No physical damage	0/10	No remarks
6a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10	With Au target board: min: 6.6 mΩ max: 7.7 mΩ avg: 7.0 mΩ
6b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1 C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10	With Au target board: min: 1.5 mΩ max: 2.0 mΩ avg: 1.8 mΩ
7	Visual examination.	IEC 512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/**t** (**d/t**)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**

Testgroup 2a: Mechanical life.

10 Samples PN 619127.
1 Base boards coated with SnPb, and fitted for 10 samples.
1 Target board coated with SnPb, and fitted for 10 samples.

1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks.
2	Mating force.	AMP 108-71060 3.6.C16	•Measure the force necessary to place the target board at the minimum stack height (13 mm), and at the maximum stack height (15 mm).	Center conductor: 0.8 to 4 N.	0/10	TSG 2a.: 10 Samples for the SnPb target board, after one push till the minimum stack height. Max. stack height: min: 1.06 N, max: 1.19 N, avg: 1.14 N Min. stack height: min: 3.09 N, max: 3.85 N, avg: 3.36 N
				Outer conductor: 2.5 to 10 N.	0/10	TSG 2a.: 10 Samples for the SnPb target board, after one push till the minimum stack height. Max. stack height: min: 3.41 N, max: 3.87 N, avg: 3.65 N Min. stack height: min: 4.68 N, max: **7.99** N, avg: 5.39 N

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# **(d/t)**	**d**efect samples / total **(d/t)** **RESULTS AND COMMENTS**
3a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 5.3 mΩ max: 7.9 mΩ avg: 6.5 mΩ
3b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 2.6 mΩ max: 4.2 mΩ avg: 3.1 mΩ
4	Temperature life.	IEC 60512 6-11l AMP 108-71060 3.6 C15	•Mate the test samples with the target board at nominal stack height (14 mm). •1000 Hours at 125 °C.	-	-/10	No remarks.
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 100 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 4.9 mΩ max: 8.2 mΩ avg: 5.9 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 20 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 2.8 mΩ max: 4.9 mΩ avg: 3.7 mΩ

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
5a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 7.8 mΩ max: 24.4 mΩ avg: 13.3 mΩ
5b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10 SnPb	2a. With SnPb target board: min: 2.9 mΩ max: 5.4 mΩ avg: 3.7 mΩ

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/**t** (**d/t**)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**
6	Mating force.	AMP 108-71060 3.6.C16	•Measure the force necessary to place the target board at the minimum stack height (13 mm), and at the maximum stack height (15 mm).	Center conductor: 0.8 to 4 N.	0/10	TSG 2a.: 10 Samples for the SnPb target board: Max. stack height: min: 1.0 N, max: 1.22 N, avg: 1.12 N Min. stack height: min: 3.05 N, max: 3.65 N, avg: 3.38 N Difference :before/after test min: -0.05 N, max: 0.12 N, avg: 0.04 N Difference :before/after test min: -0.38 N, max: 0.07 N, avg: -0.11 N
				Outer conductor: 2.5 to 10 N.	0/10	TSG 2a.: 10 Samples for the SnPb target board: Max. stack height: min: 3.15 N, max: 3.50 N, avg: 3.36 N Min. stack height: min: 4.64 N, max: 9.6 N, avg: 5.36 N Max. stack height: Difference before / after test min: 0.15 N, max: 0.50 N, avg: 0.30 N Min. stack height: Difference :before / after test min: -1.61 N, max: 0.30 N, avg: 0.04 N

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/t (**d/t**)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**
7	Visual examination.	IEC 512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	7/10	**TSG 2a.: 10 Samples for the SnPb target board:** ***Base board with board to board connector:*** Center-conductor: Gold plating shaved off, Ni visible Sn flakes visible in the contactarea. Outer conductor: very slight Sn traces in the contact-area ***SnPb target board:*** Center-conductor: SnPb plating shave off, Cu visible Corrosion visible Outer conductor: corrosion visible See pictures on pages 18--20

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**

Testgroup 2b: Mechanical life.

10 Samples PN 619127.
1 Base boards coated with SnPb, and fitted for 10 samples.
1 Target board coated with Au, and fitted for 10 samples.

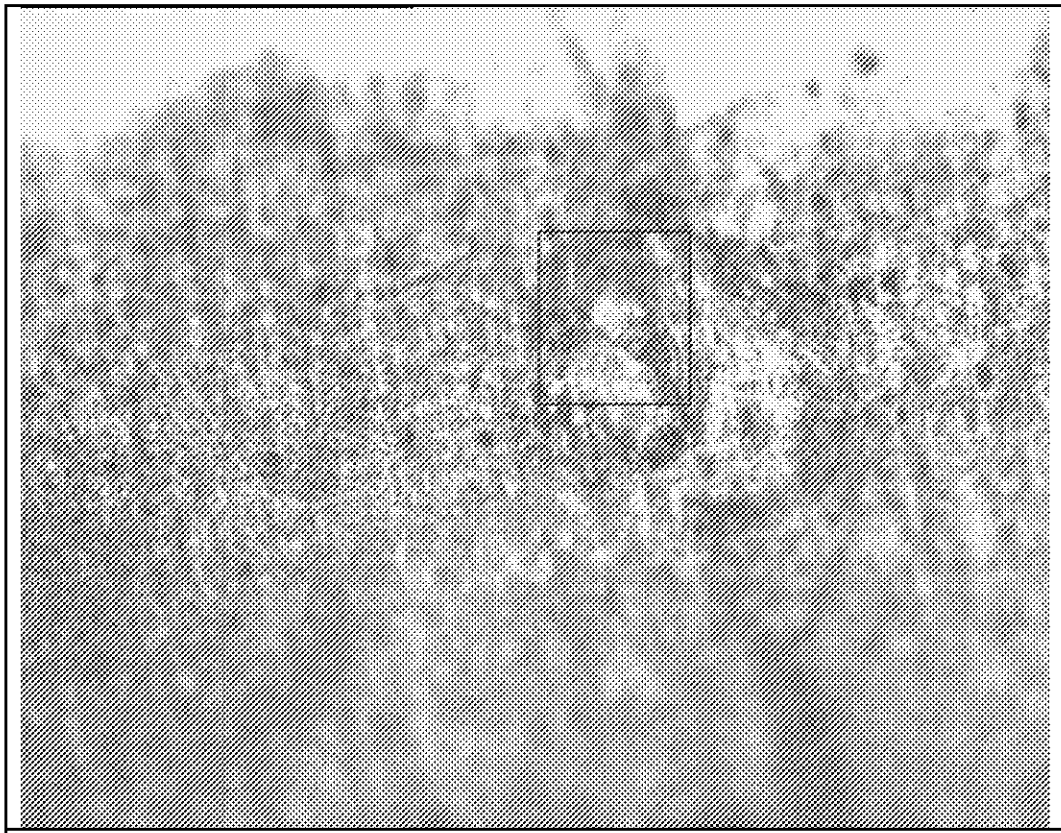
1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	No remarks.
2	Mating force.	AMP 108-71060 3.6.C16	•Measure the force necessary to place the target board at the minimum stack height (13 mm), and at the maximum stack height (15 mm).	Center conductor: 0.8 to 4 N.	0/10	TSG 2b.: 10 Samples for the Au target board, after one push till the minimum stack height. Max. stack height: min: 1.07 N max: 1.19 N avg: 1.12 N Min. stack height: min: 2.97 N max: 3.59 N avg: 3.21 N
				Outer conductor: 2.5 to 10 N.	0/10	TSG 2b.: 10 Samples for Au the target board, after one push till the minimum stack height. Max. stack height: min: 3.38 N max: 3.93 N avg: 3.60 N Min. stack height: min: 4.92 N max: 5.40 N avg: 5.11 N

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
3a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10 Au	2b. With Au target board: min: 5.8 mΩ max: 8.6 mΩ avg: 7.3 mΩ
3b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10 Au	2b. With Au target board: min: 2.3 mΩ max: 4.3 mΩ avg: 3.5 mΩ
4	Temperature life.	IEC 60512 6-11l AMP 108-71060 3.6 C15	•Mate the test samples with the target board at nominal stack height (14 mm). •1000 Hours at 125 °C.	-	-/10	No remarks.
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 20 mΩ.	0/10 Au	2b. With Au target board: min: 4.3 mΩ max: 6.1 mΩ avg: 5.0 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 10 mΩ.	0/10 Au	2b. With Au target board: min: 2.8 mΩ max: 4.7 mΩ avg: 3.8 mΩ

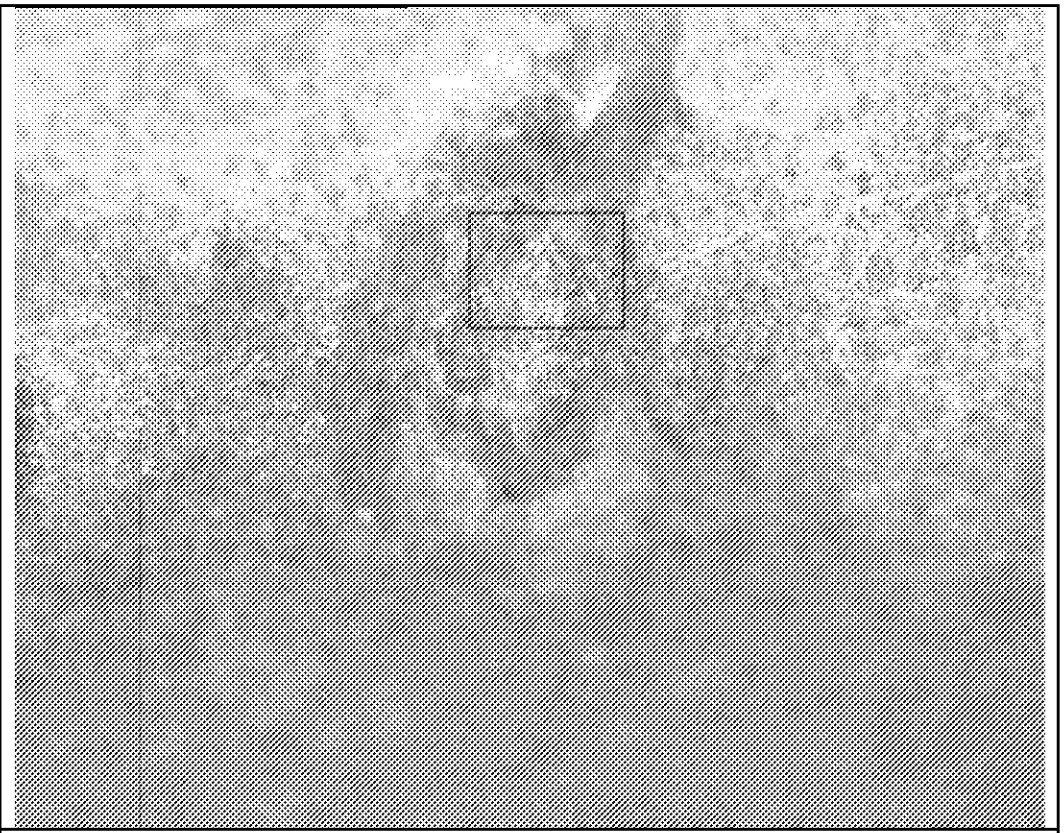
test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**
5a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/10 Au	2b. With Au target board: min: 7.5 mΩ max: 11.9 mΩ avg: 8.9 mΩ
5b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/10 Au	2b. With Au target board: min: 2.7 mΩ max: 4.4 mΩ avg: 3.7 mΩ
6	Mating force.	AMP 108-71060 3.6.C16	•Measure the force necessary to place the target board at the minimum stack height (13 mm), and at the maximum stack height (15 mm).	Center conductor: 0.8 to 4 N.	0/10	TSG 2b.: 10 Samples for the Au target board: Max. stack height: min: 1.02 N, max: 1.16 N, avg: 1.07 N Min. stack height: min: 2.94 N, max: 3.72 N, avg: 3.28 N Difference :before / after test min: -0.02 N, max: 0.10 N, avg: 0.06 N Difference :before / after test min: -0.28 N, max: 0.05 N, avg: -0.07 N
				Outer conductor: 2.5 to 10 N.	0/10	TSG 2b.: 10 Samples for the Au target board: Max. stack height: min: 3.25 N, max: 3.53 N, avg: 3.34 N Min. stack height: min: 4.70 N, max: 5.08 N, avg: 4.86 N

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
						Difference :before/after test min: 0.12 N max: 0.41 N avg: 0.25 N / Difference :before/after test min: 0.13 N max: 0.42 N avg: 0.26 N
7	Visual examination.	IEC 512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/10	**TSG 2b: 10 Samples for the Au target board:** ***Base board with board to board connector:*** Center- / outer conductor: no remarks ***Au target board:*** o.k.

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d** (**d/t**)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**

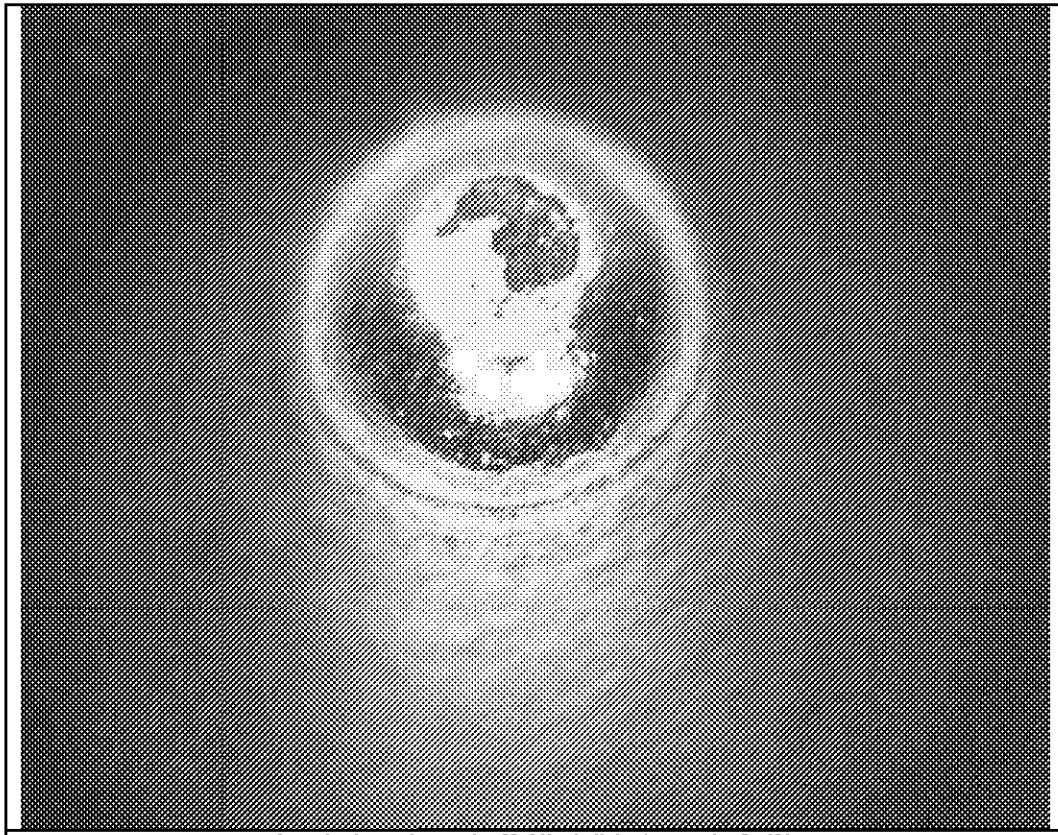


SnPb plating shaved off, Cu visible (target board)

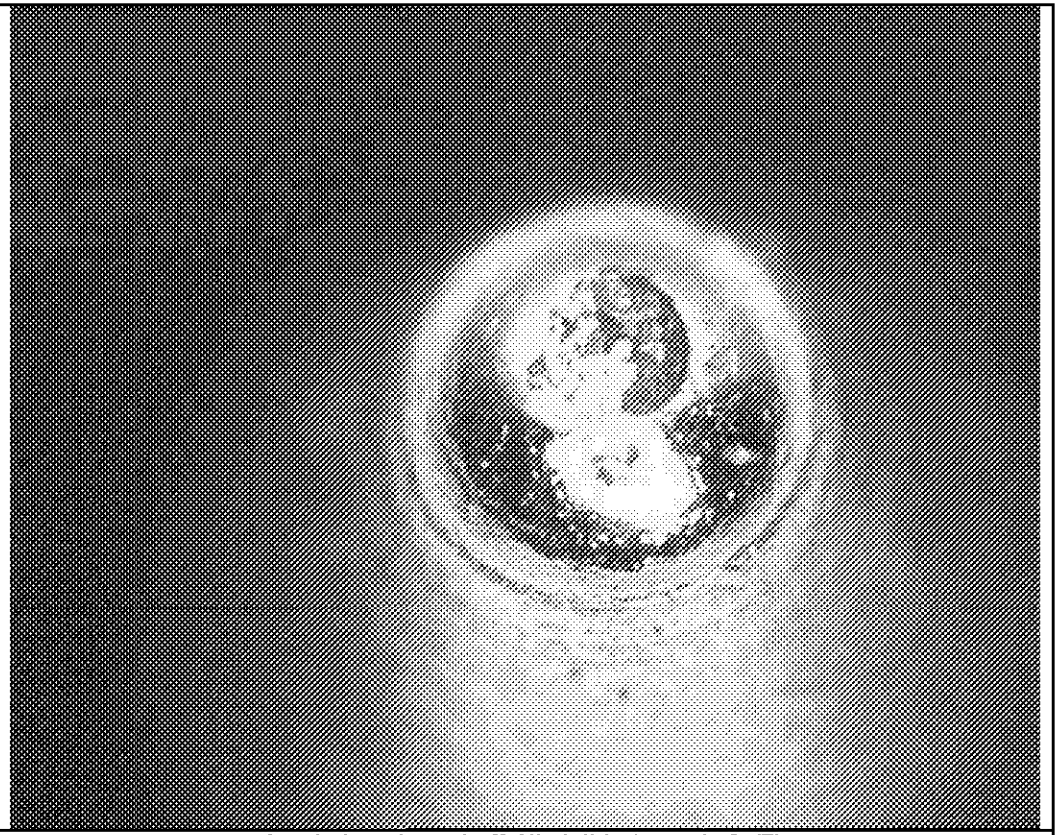


SnPb plating shaved off, Cu visible (target board)

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**efect samples / total (**d/t**)	**RESULTS AND COMMENTS**

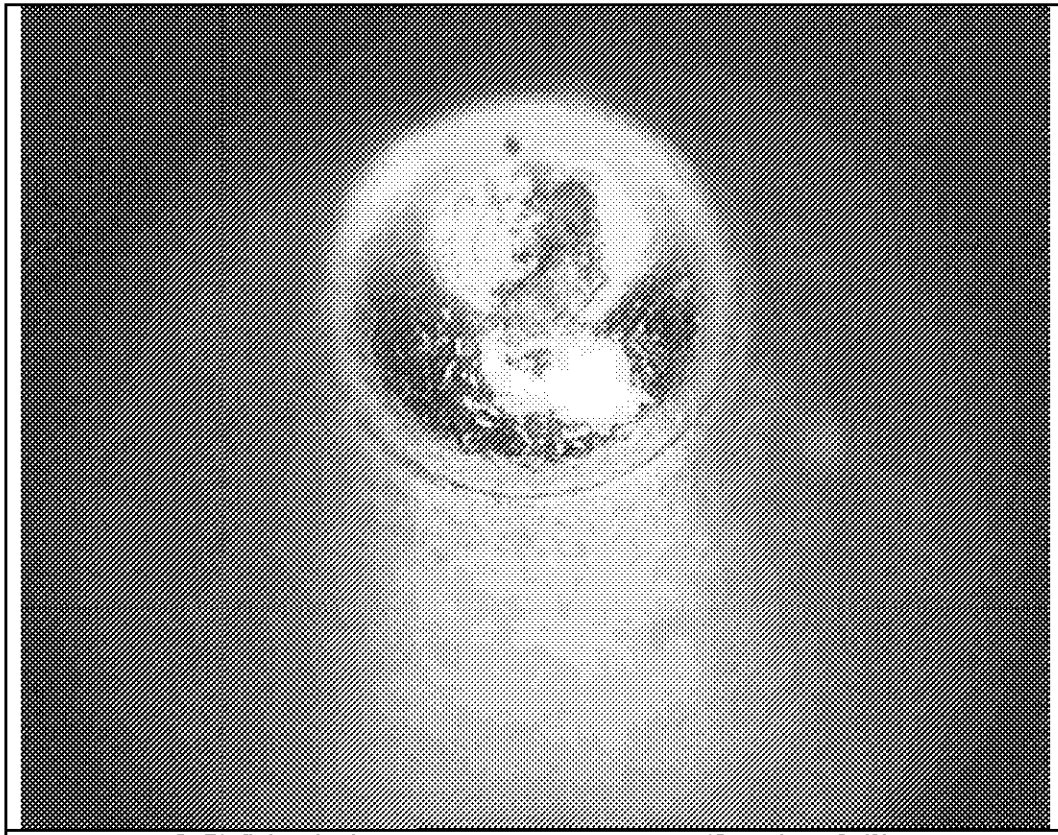


Au plating shaved off, Ni visible (sample 2a/3)

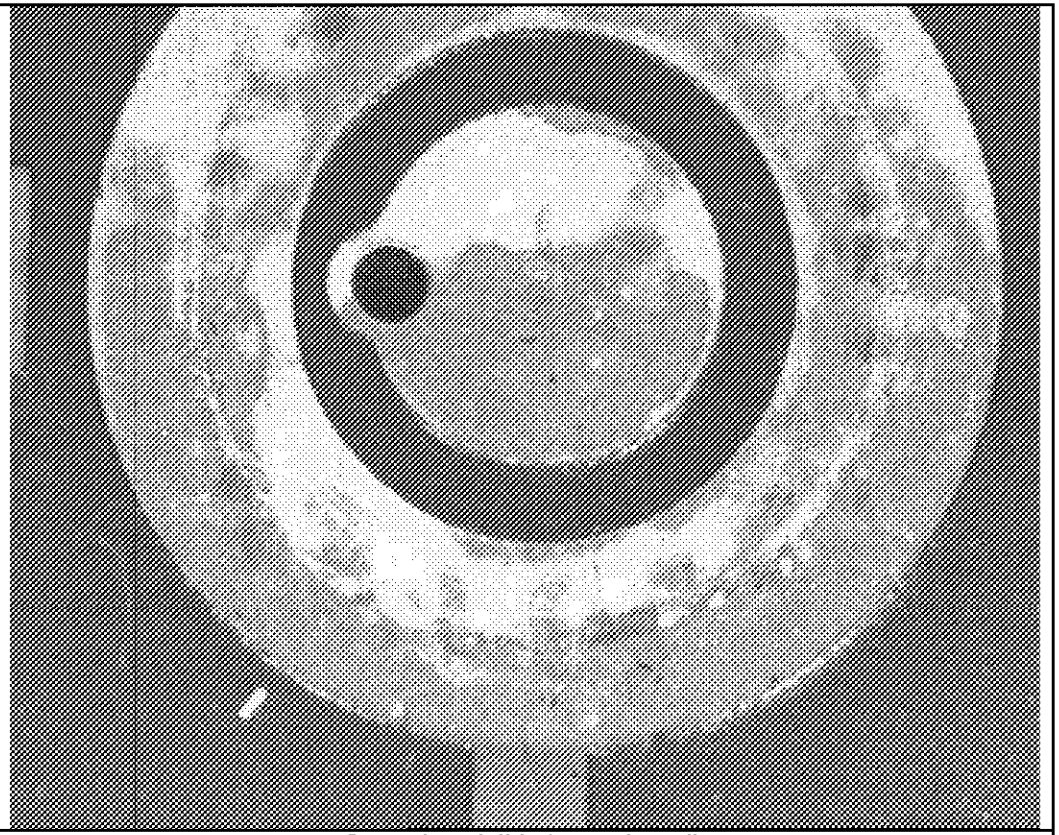


Au plating shaved off, Ni visible (sample 2a/7)

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**efect samples / total (**d/t**) (**d/t**)	**RESULTS AND COMMENTS**



SnPb flakes in the contactarea center contact (Sample nr 2a/9)



Corrosion visible (target board)

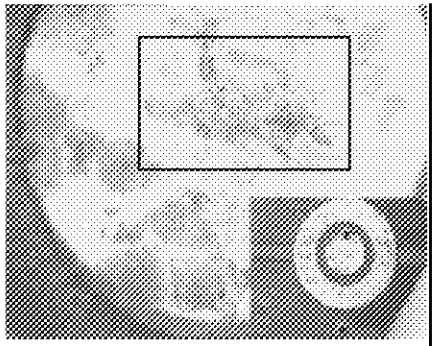
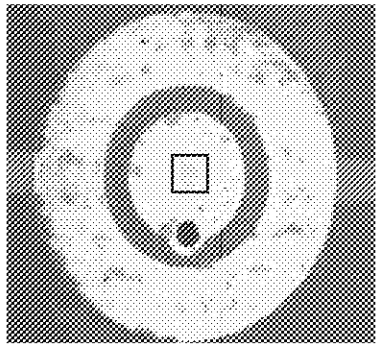
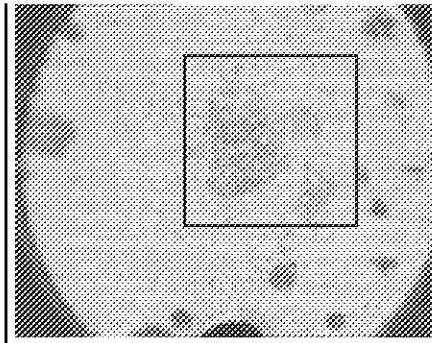
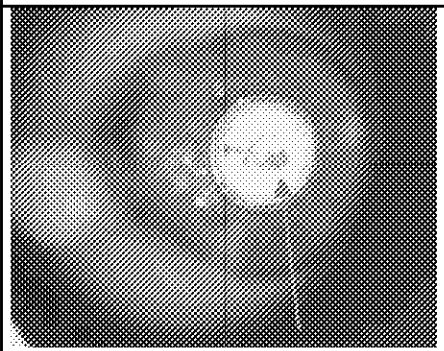
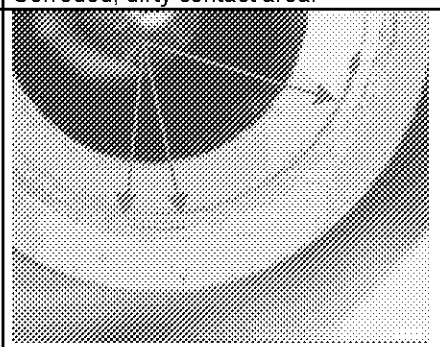
test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/**t** (**d/t**)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**

Testgroup 3a: Mixed gas.

20 Samples PN 619127.
2 Base boards coated with SnPb, and fitted for 10 samples.
2 Target boards coated with SnPb, and fitted for 10 samples.

1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/2 assemblies	No remarks.
2a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/20 SnPb	3a. With SnPb target board: min: 5.85 mΩ max: 11.5 mΩ avg: 7.6 mΩ
2b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/20 SnPb	3a. With SnPb target board: min: 2.3 mΩ max: 5.0 mΩ avg: 3.3 mΩ
3	Mixed flowing gas.	IEC 60068-2-60 Test Ke Method4 AMP 108-71060 3.6.C16	•Prepare the samples with mated target board at nominal stack height (14 mm). •4 Gasses: SO_2 / H_2S / Cl_2 / NO_2 •Duration: 10 days.	-	0/2 assemblies	No remarks.

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 100 mΩ.	0/20 SnPb	3a. With SnPb target board: min.: 4.2 mΩ max.: 14.8 mΩ avg.: 5.9 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 20 mΩ.	0/20 SnPb	3a. With SnPb target board: min.: 2.8 mΩ max.: 7.7 mΩ avg.: 4.0 mΩ
4c	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 100 mΩ.	0/20 SnPb	3a. With SnPb target board: min.: 6.5 mΩ max.: 34.1 mΩ avg.: 10.7 mΩ
4d	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/20 SnPb	3a. With SnPb target board: min.: 2.7 mΩ max.: 8.0 mΩ avg.: 4.1 mΩ
5	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	-/20 SnPb	- 3a. Tinned target board: - Both inner and outer conductor are corroded on the target board (Fig. 5.1 - 5.4). - The board-to-board connectors are slightly corroded, and partly covered with Sn-flakes originated from the PCB (Fig. 5.5 - 5.6). - The contact spots on the target board are very small (Fig. 5.1 - 5.4). Remark: these defect don't impair normal operation since all contact resistance values are within specification.

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**efect samples / total (**d/t**)	**RESULTS AND COMMENTS**
			 Fig. 5.1: TSG. 3a.: SnPb target board, inner conductor: Corroded; dirty contact area.	 Fig. 5.2: TSG. 3a.: SnPb target board: Corroded; dirty contact area.		 Fig. 5.3: TSG. 3a.: SnPb target board, inner conductor (Detail of Fig. 5.2): Corroded; dirty contact area.
			 Fig. 5.4: TSG. 3a.: SnPb target board, inner conductor: Corroded; dirty contact area.	 Fig. 5.5: TSG. 3a.: Board-to-board connector with Sn-flakes in the contact-area.		 Fig. 5.6: TSG. 3a.: Board-to-board connector with very slight Sn-traces in the contact-area.

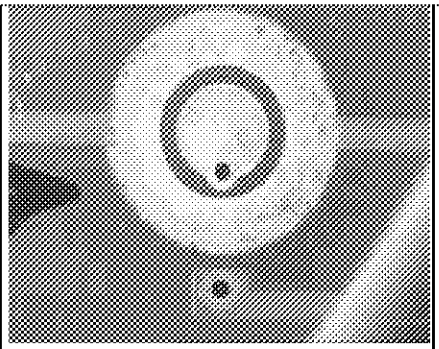
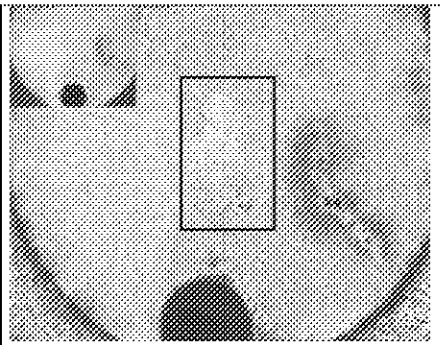
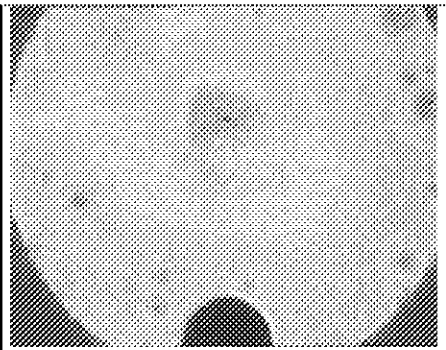
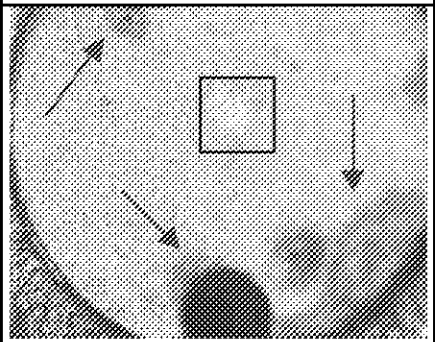
test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**

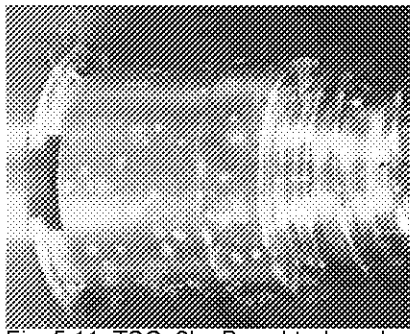
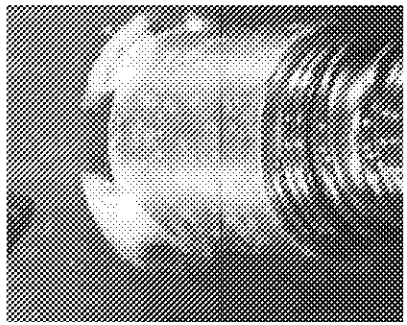
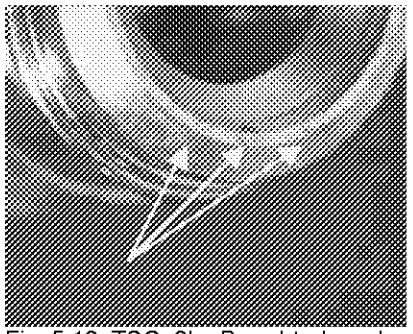
Testgroup 3b: Mixed gas.

20 Samples PN 619127.
2 Base boards coated with SnPb, and fitted for 10 samples.
2 Target boards coated with Au, and fitted for 10 samples.

1	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C1	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/2 assemblies	No remarks.
2a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/20 Au	3b. With Au target board: min: 6.0 mΩ max: 8.1 mΩ avg: 6.8 mΩ
2b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/20 Au	3b. With Au target board: min: 2.2 mΩ max: 4.5 mΩ avg: 3.1 mΩ
3	Mixed flowing gas.	IEC 60068-2-60 Test Ke Method4 AMP 108-71060 3.6.C16	•Prepare the samples with mated target board at nominal stack height (14 mm). •4 Gasses: SO_2 / H_2S / Cl_2 / NO_2 •Duration: 10 days.	-	0/2 assemblies	No remarks.

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	Ø (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**
4a	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 20 mΩ.	0/20 Au	3b. With Au target board: min.: 4.4 mΩ max.: 5.8 mΩ avg.: 5.0 mΩ
4b	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at nominal stack height (14 mm).	Maximum 10 mΩ.	0/20 Au	3b. With Au target board: min.: 2.5 mΩ max.: 4.2 mΩ avg.: 3.1 mΩ
4c	Contact resistance of the center conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 20 mΩ.	0/20 Au	3b. With Au target board: min.: 6.4 mΩ max.: 10.8 mΩ avg.: 8.7 mΩ
4d	Contact resistance of the outer conductor.	IEC 60512 2-2a AMP 108-71060 3.7.1C3	•Measure R between the target board and the base board. •Measure R with the target board at maximum stack height (15 mm).	Maximum 10 mΩ.	0/20 Au	3b. With Au target board: min.: 2.3 mΩ max.: 7.0 mΩ avg.: 3.5 mΩ
5	Visual examination.	IEC 60512 2-1a AMP 108-71060 3.7.1 C2	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	-/20 Au	- 3b. Gilded target board: - Both inner and outer conductor are corroded on the target board (Fig. 5.7 - 5.10). - The board-to-board connectors are slightly corroded (Fig. 5.11 - 5.13). - The base board is slightly discoloured near the outer connector. - The contact spots on the target board are tiny (Fig. 5.7 -5.10). Remark: these defect don't impair normal operation since all contact resistance values are within specification.

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**
			 Fig. 5.7: TSG. 3b.: Target board: Corrosion on the contact surfaces.	 Fig. 5.8: TSG. 3b.: Target board, inner conductor (Detail of Fig. 5.7): Light corrosion; very slight contact traces.		 Fig. 5.9: TSG. 3b.: Target board, inner conductor: Slightly corroded in the contact spots.
			 Fig. 5.10: TSG. 3b: Target board, inner conductor: Corrosion; the contact spot is clearly visible.			

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	$\sqrt{F}$ (**d/t**)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**
			 Fig. 5.11: TSG. 3b.: Board-to-board connector: The outer surface is corroded.	 Fig. 5.12: TSG. 3b.: Board-to-board connector: The outer surface is corroded.		 Fig. 5.13: TSG. 3b.: Board-to-board connector: Corrosion in the contact area.

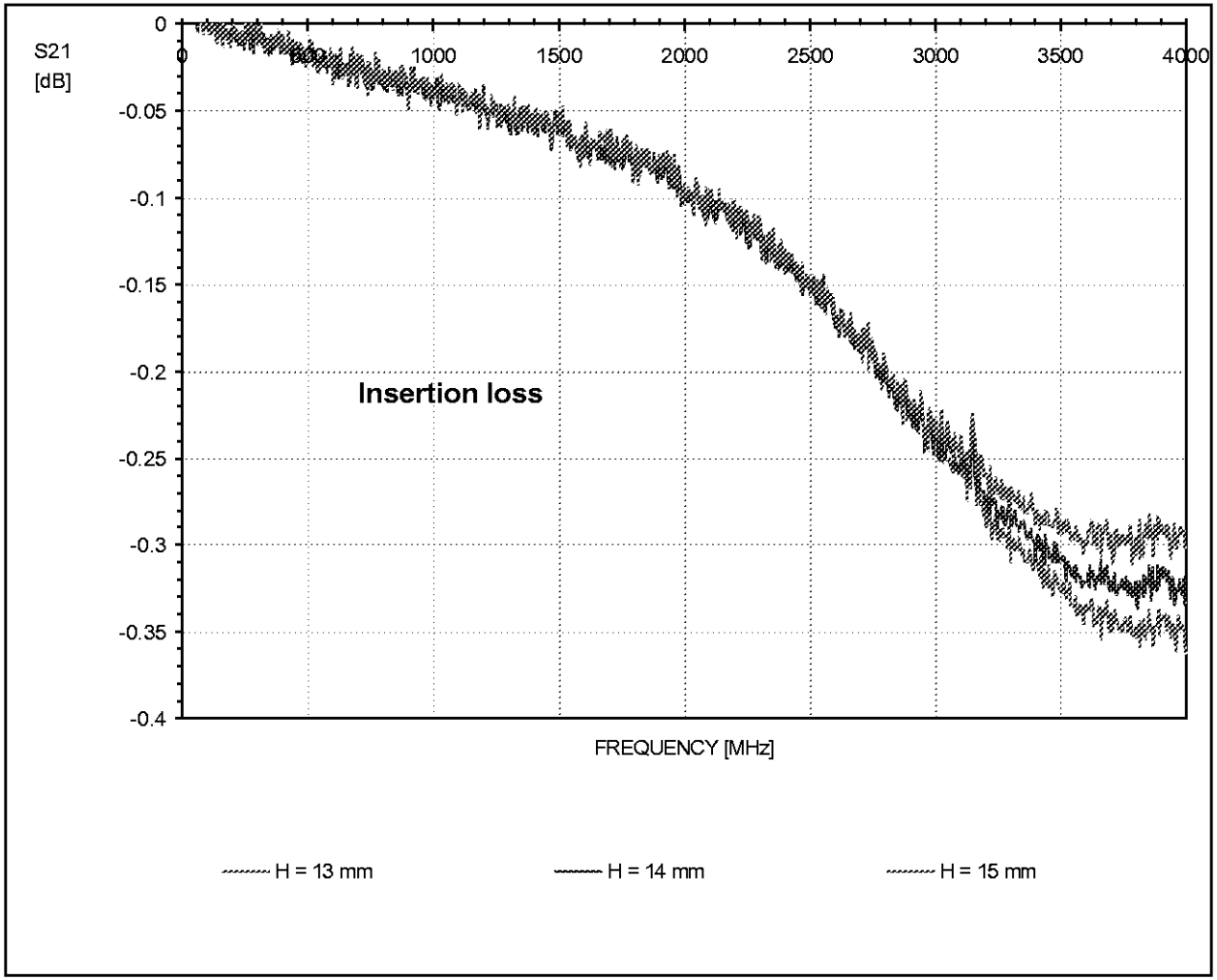
test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	**d**efect samples / **t**otal (**d/t**) **RESULTS AND COMMENTS**

Testgroup 4: HF Characteristics

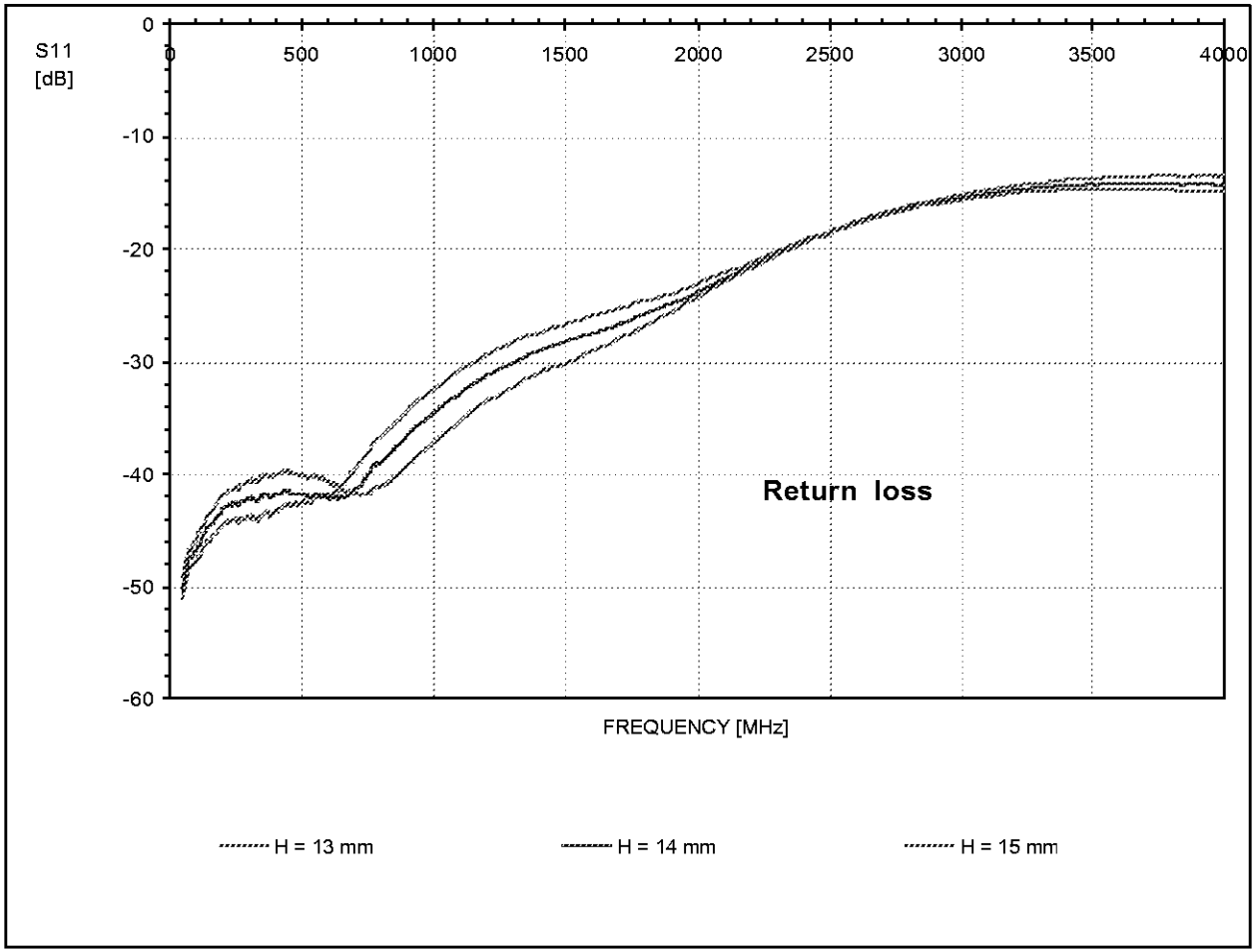
1 sample PN 619127 measured at min, nominal, and max stack heights (H = 13 mm; 14 mm; 15 mm)
2 RF Boards with SnPb: 1 for the Base with the sample; 1 for the Target.

1	Initial examination of product	IEC 60512-2-1a	Visually examine each test specimen, noting in detail any manufacturing or material defects.	No defects that would impair normal operation.	0/5	No remarks
2	**Return loss**	AMP 108-71060 3.6 C4	• Measure return loss up to 4'000 MHz at H = 13 mm; 14 mm; 15 mm	20 dB maximum for f ≤ 2'100 MHz without gating	0/5	ok. (see on page nr.30)
3	**Insertion loss**	AMP 108-71060 3.6 C5	• Measure return loss up to 4'000 MHz at H = 13 mm; 14 mm; 15 mm	0.2 dB maximum for f ≤ 2'000 MHz	0/5	ok. (see on page nr .29)

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	∅ (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**



test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	# (d/t)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**



test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	**d**/t (**d/t**)	**d**efect samples / total (**d/t**) **RESULTS AND COMMENTS**

Testgroup 5: Shielding effectiveness

2 samples PN 619127 measured at nominal stack heights (H = 14 mm)

Discription :

The electromagnetic performance of the coaxial board-to-board connector is measured following standard prEN 50289-1-6.
Requirements: -60dB maximum for f ≤ 2500MHz (Absorbing Clamp Method in IEC 60096-1 Amendment 2)

Content :

test-phase	**title of test (load)** or measurement	Norm/ spec.n°	Description of conditions	Requirements	∅ (d/t)	defect samples / total (d/t) **RESULTS AND COMMENTS**

Measurement Setup

Measurement method

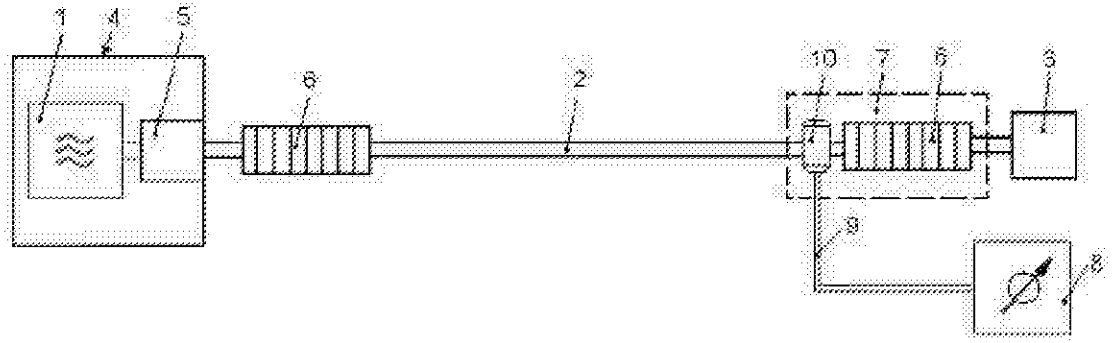
The measurements are performed following standard prEN 50289-1-6

PrEN 50289-1-6 (Draft 3) : Communication cables – Specification for test methods
Part 1-6 : Electrical test methods – Electromagnetic performance

The method used is described in chapter 9 : 'Coupling attenuation or screening attenuation, absorbing clamp method'.

Test setup

The setup can be seen as follows :



1. High-frequency generator
2. Semi Rigid Cable (Z_0=50Ω; length=6m)
3. DUT and terminating resistance
4. Screening of generator (not necessary)
5. Attenuator
6. Ferrite sleeve
7. Absorbing clamp
8. Measuring receiver
9. Measuring cable
10. Ferrite current transformer

Figure 1: Measurement configuration according tp prEN 50289-1-6

The picture in figure 1 is the description as to measure cables. By replacing the cable (2) by a semi rigid cable and by turning the absorbing clamp (7) 180°, it is possible to use this test setup for measuring the shielding effectiveness of connectors.

Test Equipement

The following test equipement is used in the test setup :

→ Signal Generator (Fig 1, part 1) : Rohde&Schwarz Signal Generator SML03
→ Measuring Receiver (Fig 1, part 8) : Rohde&Schwarz EMI Test Receiver ESPI3
→ Absorbing clamp (Fig 1, part 7) : Rohde&Schwarz Absorbing Clamp MDS22

Test Fixture

To measure the EMC-behaviour of the Board-to-Board coaxial connector, a special fixture has been designed.
The fixture was designed in that way that only one adapter was necessary and that the influence of the PCB's would be as low as possible.

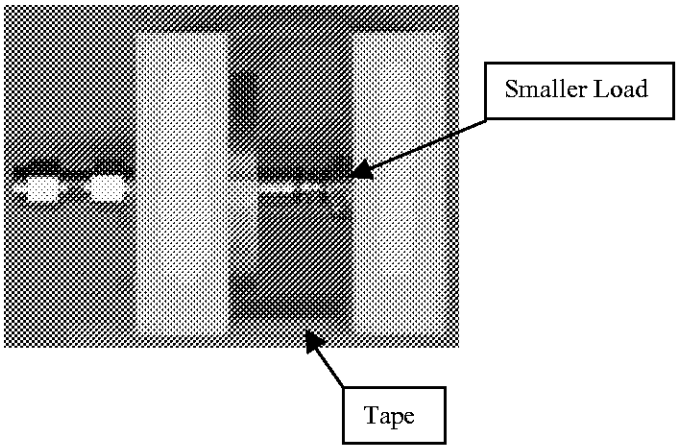


Figure 1 : Test Fixture

Sample setup

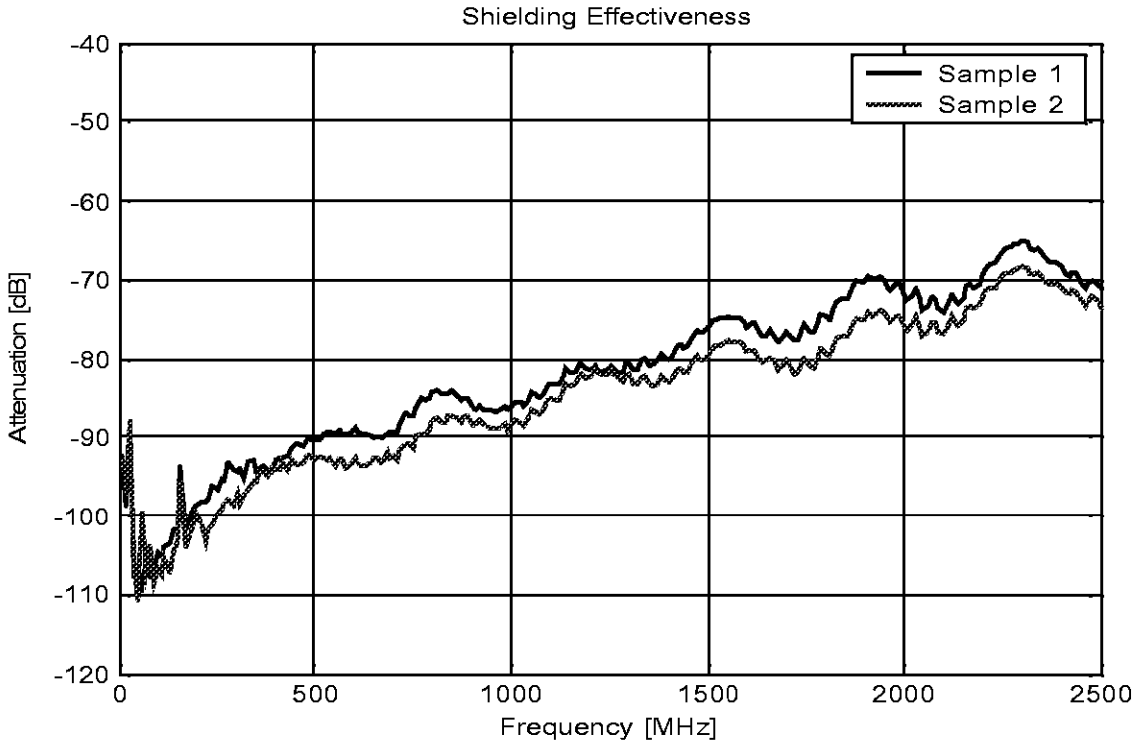
In order to mount the samples in the test fixture, each sample is soldered on a appropriate PCB.

Performing the measurements

The high frequency signal is feeded into the connector over a semi rigid cable.
The energy leaked out of the connector will return to the source and creates a standing wave over the semi rigid cable.
The maximum energy is picked up by moving the absorbing clamp and taking the maximum of the energy at each frequency point.

Measurement Results

Overview of results



Conclusion

The two samples show a very good correlation.