



Title Qualification Plan for MID Antennas

1. SCOPE

1.1. Content

This specification describes characteristic, tests and quality requirements for the TE Connectivity (TE) STANDARD MID TYPE ANTENNA

1.2. Qualification

Unless otherwise specified when tests are performed on the subject product line, shall meet the requirement of the test description by specified procedure and measurement method in Figure 1 & Figure 2 of example shall be used.

All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

For a successful qualification test for that product line, refer to 501-61150 qualification test report in paragraph 2.1.

1.4. Revision Summary

Revisions to this specification include :

- Initial release of specification.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of the specification and the reference documents, this specification shall take precedence.

2.1. TE Documents

- TE-Parts Product drawing of MID antenna
- [118-5068-1](#) TE Process Manual "Adhesion Cross-Cut Test"
- [109-19030](#) TE Test Specification "Determination of Change in Antenna RF Performance"
- [501-61150](#) Qualification Test Report

2.2. Industry Documents

- IEC 60512 Basic testing procedures and measuring methods for electromechanical components, and electronic equipment.
- IEC 60068 Basic environmental testing procedures.

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Materials and Finished

3.2.1 LDS Antenna (if applicable)

- A. Molded substrate - Refer to applicable product drawing
- B. Plating - Refer to applicable product drawing

C. Painting - Refer to applicable product drawing

3.2.2 2-Shot Antenna (if applicable)

- A. First shot material - Refer to applicable product drawing
- B. Second shot material - Refer to applicable product drawing
- C. Plating - Refer to applicable product drawing
- D. Painting - Refer to applicable product drawing.

3.3. Ratings

Characteristic Impedance	Temperature
50Ω (Reference)	-40°C to 85°C (Operation) -40°C to 85°C (storage)

3.4. Performance Requirements and Test Descriptions

The Product shall be designed to meet the electrical, mechanical and environmental performance requirement specified in Paragraph 3.6.

All tests shall be performed in the room temperature, unless otherwise specified.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and if applicable performed with each antenna loaded inside its dedicated fixture (antenna in mated condition inside the fixture).

3.5. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Para.	TEST DESCRIPTION	REQUIREMENT	PROCEDURE
3.5.1.	Initial examination of product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan. In acc. With IEC60512-1-1 Magnification 100x
3.5.2	Final examination of product	Meets visual requirements.	Visual, dimensional and functional per applicable inspection.

ELECTRICAL

3.5.3.	VSWR	Low and high band-edge frequency (It depends on the RF test jig condition) should be in range of product drawing specification.	Measured VSWR with dedicated network analyzer. In acc. With TE Connectivity Test Specification 109-19030 See Fig. 1&2
3.5.4.	Efficiency	Low and high band-edge frequency (It depends on the RF test jig condition) should be in range of product drawing specification.	Measured efficiency with dedicated anechoic chamber.

MECHANICAL

3.5.5.	Examination of product	Meets requirements of product drawings admit of appearances and their section to be not occurred the	No physical damage to cause antenna
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		antennas performance damages as a special case	performance degradation.
ENVIRONMENTAL			
3.5.6.	Damp Heat cyclic	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	25/40°C 12hrs / 12hrs cycles RH 95% -10 cycles In acc. With IEC60512-11-12
3.5.7.	Rapid change of temperature	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	-40/+85°C 30 min / 30 min, 10 cycles. In acc. with IEC 60512-11-4 and IEC 68-2-14.
3.5.8.	Heat age test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	Temperature 85°C. Duration: 240 hours. In acc. with IEC 60512-11-10.
3.5.9.	Cold storage	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	Temperature: -40°C. Duration: 240 hours. In acc. with IEC 60512-11-6
3.5.10.	Corrosion, Salt Mist	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	+35°C, 5%NaCl, duration 96 hours.(Make sure proper rinsing occurs) In acc. with IEC 60512-11-6
3.5.11	Vibration	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3) Meet Efficiency (item 3.5.4)	Frequency: 10 - 100 Hz: 3 m2/s3 100 - 500 Hz: -3dB/Oct. for: 3 x 60 min (X- Y- and Z-axis) in minimum deflection position. In acc. with IEC 60068-2-64Fh.
3.5.12.	Adhesion Test: Cross cut method	Over 20% of peeling is not allowed	Plating is cut in 1.5mm grid pattern. A piece of adhesive tape is pressed over the surface where the grid cut pattern was made. In acc. with TE Connectivity Process Specification 118-5068-1


NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Paragraph 3.6.

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)							
	1	2	3	4	5	6	7	8
	TEST SEQUENCE (b)							
Initial examination of product	1	1	1	1	1	1	1	1
V.S.W.R	2	2,5	2,5	2,5	2,5	2,5	2,5	
Efficiency	3	3,6	3,6	3,6	3,6	3,6	3,6	
Damp Heat cyclic		4						
Rapid change of temperature			4					
Heat age test				4				
Cold storage					4			
Corrosion, Salt Mist						4		
Vibration							4	
Adhesion Test; Cross cut method								2
Final examination of product	4	7	7	7	7	7	7	3



NOTE

- (a) See a paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Samples shall be prepared in accordance with applicable instructions and shall be selected random from current production. Unless details to perform test require otherwise, plugs shall be terminated on cables according to applicable instructions and requirements specified in appropriate Application Specification and Instruction Sheet.

Unless otherwise specified all tests group shall consist of a minimum of 8 antennas of applicable type. In case of multi-cavity molded parts, each test group should include at least one antenna per cavity. In case of 2-shot molded parts, each test group should include at least one antenna per ejector side cavity.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in paragraph 3.6.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate re-qualification testing, consisting of all or part of original testing sequence as determined by product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that product meets requirements of Para 3.5. Failures attributed to

equipment, test set-up, test sub-components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before re-submittal.

4.4. Quality Conformance Inspection

Applicable TE Connectivity quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.

5. FIGURES(EXAMPLE)

5.1. Measurement Method of V.S.W.R

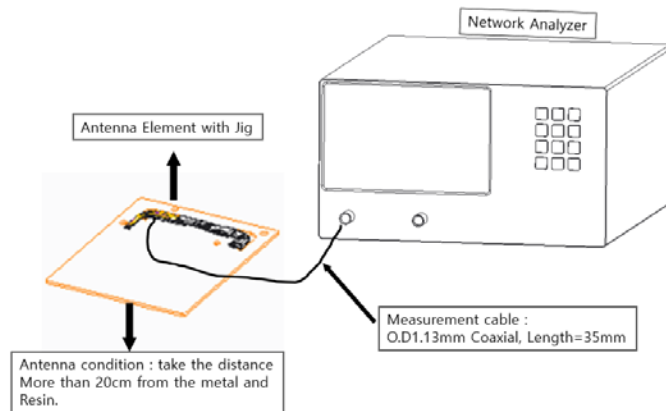


Figure 1-VSWR Test

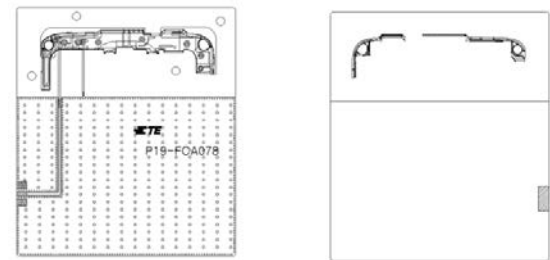


Figure 2- RF jig for VSWR test

6. HISTORY

LTR	REVISION RECORD	PREPARED BY	APPROVED BY	DATE
A	Initial release	Sjoerd van Geffen		10-NOV-09
B	Change test spec.	Sjoerd van Geffen		22-JUN-10
C2	Change test spec.	SJ. Noh	JH. KIM	05-APR-18
D	Change test spec.	DW. PARK	JH. KIM	12-OCT-18
E	Change test spec.	H.Shin	JH. KIM	15-APR-19