
Title Qualification Plan for Dielectric Patch Antenna

1. SCOPE

1.1. Content

This specification describes characteristic, test and quality requirements for TE Connectivity (TE) Dielectric Patch 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-XXXXXX 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

- [501-XXXXXX](#) Qualification Test Report

2.2. Industry Documents

- IEC 60512 Basic testing procedures and measuring methods for electromechanical components, and electronic equipment.
- EIA 364-108 TP-108 Impedance, Reflection Coefficient, Return Loss and VSWR Measured in the Time and Frequency Domain Test Procedure for Electrical Connectors, Cable
- 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

Materials used in the construction of this production shall be as specified on the applicable TE drawing.

- A. Material : Based on Dielectric Patch Material
- B. Finished : Au plating

3.3. Ratings

Characteristic Impedance	Temperature
50Ω (Reference)	-40°C to 105°C (Operation) -40°C to 105°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 3.5.

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 10x
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 (per functional antenna frequency band) should be in range of product drawing specification.	Measured 50Ω system of Network Analyzer with dedicated VSWR test See Fig.1 & 2
MECHANICAL			
3.5.4.	Examination of product	Meets requirements of product drawings admit of appearances and their section to be not occurred the antennas performance damages as a special case	No physical damage to cause antenna performance degradation.
ENVIRONMENTAL			
3.5.5.	Low Temperature Exposure	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Expose the specimen to -40°C for 400 hours and then to normal temperature/humidity for 24 hours or more.
3.5.6.	High Temperature Exposure	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Expose the specimen to +105°C for 400 hours and then to normal temperature/humidity for 24 hours or more.
3.5.7.	High-temperature/high-humidity test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Subject the object to the environmental conditions of +60°C and 90-95 % r.h.

			for 96 hours, then expose to normal temperature/humidity for 24 hours or more.
3.5.8.	Thermal shock test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Subject the object to cyclic temperature change (-40 °C, 2 hours ↔ +85°C, 2 hours) for 100 cycles, then expose to normal temperature/ humidity for 24 hours or more.
3.5.9.	Sinusoidal vibration test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Subject the object to vibrations of 5 to 200 to 5Hz swept in 10 minutes, 4.5G at Maximum(2mmamplitude), in X and Y directions for two hours each and in Z direction for four hours.
3.5.10	Vibration test in packaged condition	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Subject the object, which is packaged as illustrated, to vibrations of 15 to 60to 15Hz swept in 6 minutes, 4G at maximum (2mm amplitude at maximum), applied in X, Y and Z directions for two hours each, i.e. six hours in total.
3.5.11	Free fall test in packaged condition	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Drop the object, which is packaged as illustrated, to a concrete surface from the height of 90 cm, on one corner, three edges and six faces once each, i.e. 10 times in total.
3.5.12.	Soldering heat resistance test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	The lead pins of the unit are soaked in Solder bath at 260 ± 5°C for 10 seconds.
3.5.13.	Adhesion test	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	The device is subjected to be soldered on test PCB. Then apply 0.5Kg (5N) of force for 5±1 seconds in the direction of parallel to the substrate. (be done by reflow and heat shock conditions)


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	9	10
	TEST SEQUENCE (b)									
Initial examination of product	1	1	1	1	1	1	1	1	1	1
V.S.W.R	2	2,4	2,4	2,4	2,4	2,4	2,4	2,4	2,4	2,4
Low Temperature Exposure		3								
High Temperature Exposure			3							
High-Temperature/High Humidity				3						
Thermal shock					3					
Sinusoidal vibration						3				
Vibration test in packaged condition							3			
Free fall test in packaged								3		
Soldering heat resistance									3	
Adhesion										3
Final examination of product	3	5	5	5	5	5	5	5	5	



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

Specimens shall be prepared in accordance with applicable procedure and shall be selected at random from current production. Each test group shall consist of a minimum of 5 Antennas.

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

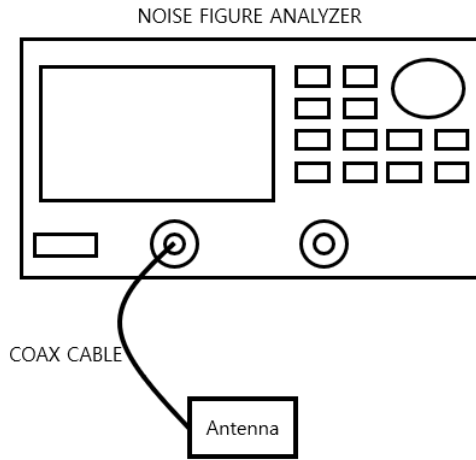


Figure 1 - VSWR Test

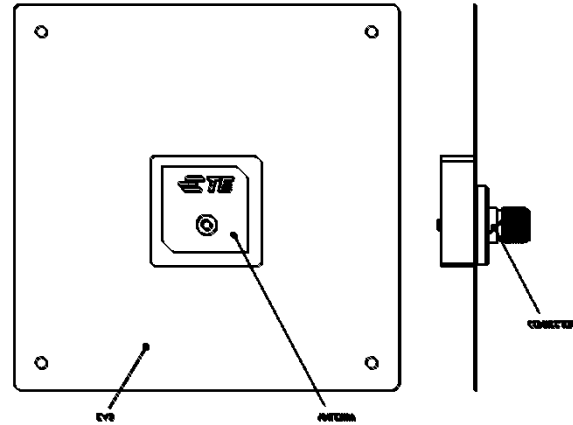


Figure 2 - Mounted PCB for V.S.W.R test

5.2. Adhesive Strength of Termination

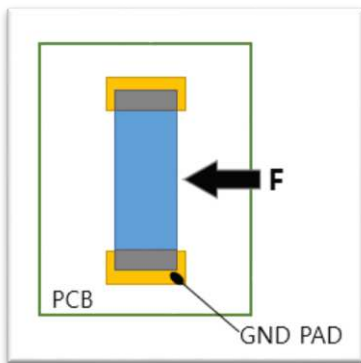


Figure 3- Applied force on SMD chip detached point from PCB

6. HISTORY

LTR	REVISION RECORD	PREPARED BY	APPROVED BY	DATE
TENTATIVE	Initial Release	DW.PARK		11-NOV24