
Title Qualification Plan for Ceramic Chip Antenna

1. SCOPE

1.1. Content

This specification describes characteristic, test and quality requirements for TE Connectivity (TE) Ceramic Chip 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 501-160969 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

- [501-160969](#) 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 Ceramic Chip Material
- B. Finished : Au plating

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 3.5.

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.	High Temperature Exposure	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Temperature: 125°C, 96hr
3.5.6.	Temperature Cycling	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	Temperature profile: as shown in Fig.3 -40°C/30Min.↔125°C /30Min, 100 Cycles
3.5.7.	Humidity (Steady state)	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	85±3°C and 85% R.H for 100hr.

3.5.8.	Low Temperature Exposure	No physical damage allowed. (Meet 3.5.2) Meet VSWR (item 3.5.3)	-40±3°C for 96hr. Then in shall be subjected to standard atmospheric condition for 1hr, after which measurement shall be made.
3.5.9.	Terminal Strength (SMD)	Push on the side of product Measure Peak force	F>3kgf Test Condition: as shown in Fig.4

i **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
	TEST SEQUENCE (b)					
Initial examination of product	1	1	1	1	1	1
V.S.W.R	2	2,4	2,4	2,4	2,4	
High Temperature Exposure		3				
Temperature Cycling			3			
Humidity				3		
Low Temperature Exposure					3	
Terminal Strength (SMD)						2
Final examination of product	3	5	5	5	5	3

i **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. **FIRURES (EXAMPLE)**

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

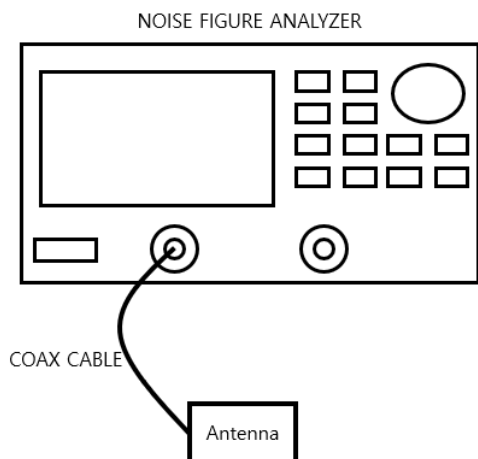


Figure 1 - VSWR Test

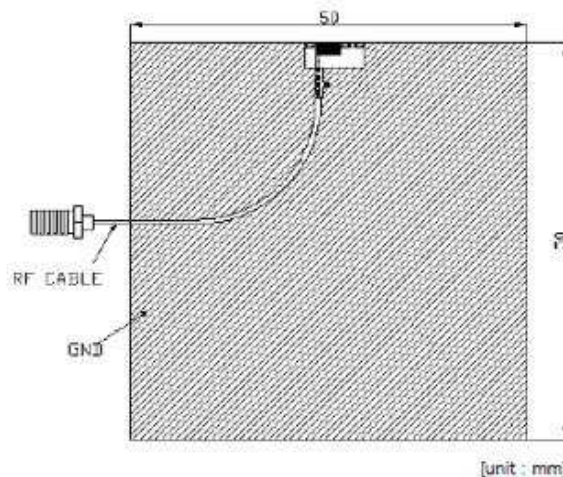


Figure 2 - Mounted PCB for V.S.W.R test

5.2. Temperature profile of reflow soldering

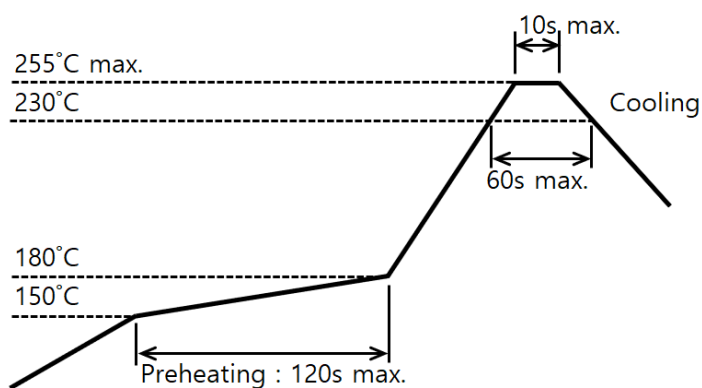


Figure 3 - Temperature Profile of Reflow soldering

5.3. Adhesive Strength of Termination

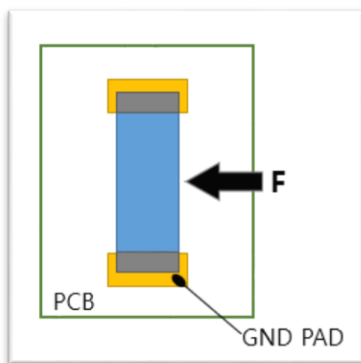


Figure 4 – Applied force on SMD chip detached point from PCB

6. HISTORY

LTR	REVISION RECORD	PREPARED BY	APPROVED BY	DATE
TENTATIVE	Initial Release			17-APR-23