

# Performance Specification: 20/26 GHz Connector Contact

REVIEW/REVISION DATE	REVISION CHANGE	REVIEWED/REVISED BY	APPROVED BY
12-10-15	Original Release	D. Ashby	Engineering Team
2-12-2020	Reformat/Style Change	F. Childress	K. Kenyon
6-12-20	Specification Update	F. Childress	D. Ashby

## 1. Scope

### 1.1 Content

This specification covers the performance, tests and quality requirements for the 20/26 GHz contact and connector system. This contact is a separable electrical connection device for assembly to a coaxial cable.

### 1.2 Qualification Testing

When tests are performed on subject product line, the following procedures shall be used: All inspections shall be performed using applicable inspection plans and product drawings. Upon completion of qualification testing, this specification will be assigned a number and be classified, as a Product Qualification Report which will be identified in section 2.

## 2. Applicable Documents

### 2.1 Content

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

### 2.2 Documents

#### A. EIA Standards

EIA 364-09  
EIA 364-13  
EIA 364-108  
Mil STD 1344  
Mil STD 202

#### C. Product Drawings

510108240  
510109298  
510109296  
510160114  
510161114  
510160115  
510161115  
510104281

#### B. Product Qualification Reports

TR2006-162  
TR2006-173  
TR2007-186  
TR2013-283  
TR2016-313  
TR2016-313

#### Contacts

610102109  
610102119  
610102135  
610102110  
610102118  
610102134

# Performance Specification: 20/26 GHz Connector Contact

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## 3. Requirements

### 3.1 Design and Construction

Product shall be of design, construction and physical dimensions specified on applicable product drawings.

### 3.2 Materials

#### A. Female Contact

Shield:	Brass with gold over nickel plating
Shield Conductor:	Beryllium Copper with gold over nickel plating
Center Conductor:	Beryllium Copper with gold over nickel plating
Dielectric:	PTFE (polytetrafluoroethylene)

#### B. Male Contact

Shield:	Brass with gold over nickel plating
Center Conductor:	Beryllium Copper with gold over nickel plating
Dielectric:	PTFE (polytetrafluoroethylene)

#### C. Housing

Black PPS or FR4 Glass Filled Epoxy

### 3.3 Ratings

#### A. Impedance

50 Ohms

#### B. Frequency Range

DC – 26 GHz  
Dependent upon RF cable and other connectors

#### C. Temperature

-55°C to +125°C Operating

### 3.4 Performance and Test Description

Product is designed to meet electrical, mechanical, and environmental requirements specified in Figure 1. Unless otherwise specified, all tests performed at room ambient environmental conditions.

# Performance Specification: 20/26 GHz Connector Contact

## 3.5 Test Requirements & Procedures Summary

TABLE 3.1	TEST DESCRIPTION	REQUIREMENT	PROCEDURE
PREMINARY	Examination of Product	Meets requirements of product drawing	Visual, dimensional, and functional examination per applicable quality inspection plan
	ELECTRICAL	Initial Contact Resistance	5 mΩ center contact maximum
3 mΩ shield contact maximum			
Current Rating		5 Ampere DC maximum	Material Specification
Dielectric Withstanding Voltage		800 V rms shield to center conductor	EIA-364-20: Applied voltage between conductors and in module between pins for 60 seconds. Current level ≤ 0.5 mA
		1000 V rms between contacts in module	
Insulation Resistance		2000 MΩ min.	EIA 364-21: Test between adjacent contacts assembled in housing at 500VDC
Insertion Loss		.06+√f(GHz) dB Single Contact	Measured with a Network Analyzer
Impedance		50 Ohms	Characteristic Impedance-
Crosstalk/Isolation		≤ 90dB	Crosstalk between adjacent contacts
VSWR		1.15+0.01(f) GHz Single Contact	Measured with a Network Analyzer. Cable type dependent
Frequency Range		DC to 26 GHz	Measured with a Network Analyzer
MECHANICAL	Durability	20,000 cycles	EIA-364-09: Mate and un-mate sample
	Mating Force	≤ 3.0 lbs.	EIA-364-13: Measure force necessary to mate samples at a normal rate of engagement of the ITA, Repeat sequence for Un-mating
	Un-mating Force	≤ 4.0 lbs.	
	Axial Mating	.090 inch max	Axial mating tolerance
ENVIRONMENTAL	Operating Temperature Range	-55°C to +125°C	Material specifications

# Performance Specification: 20/26 GHz Connector Contact

## 3.6 Product Qualification & Requalification Test Sequence

	TEST OR EXAMINATION	TEST GROUP		
		I	II	III
<b>TABLE 3.2</b>	Examination of Product	1	1	1
	Termination Resistance	4	2,9	
	Current Rating		4	6
	Dielectric Withstanding Voltage	2	5	7
	Insulation Resistance	3		8
	Frequency Range	6		
	Insertion Loss	5	3,10	
	VSWR			4
	Durability		8	
	Mating Force		6,11	2
	Un-mating Force		7,12	3
	Crosstalk			5

\*Test Sequence: Numbers indicate the sequence in which the tests are preformed. For test group sample selection see 4.1 A.

# Performance Specification: 20/26 GHz Connector Contact

## 3.7 Insertion Loss

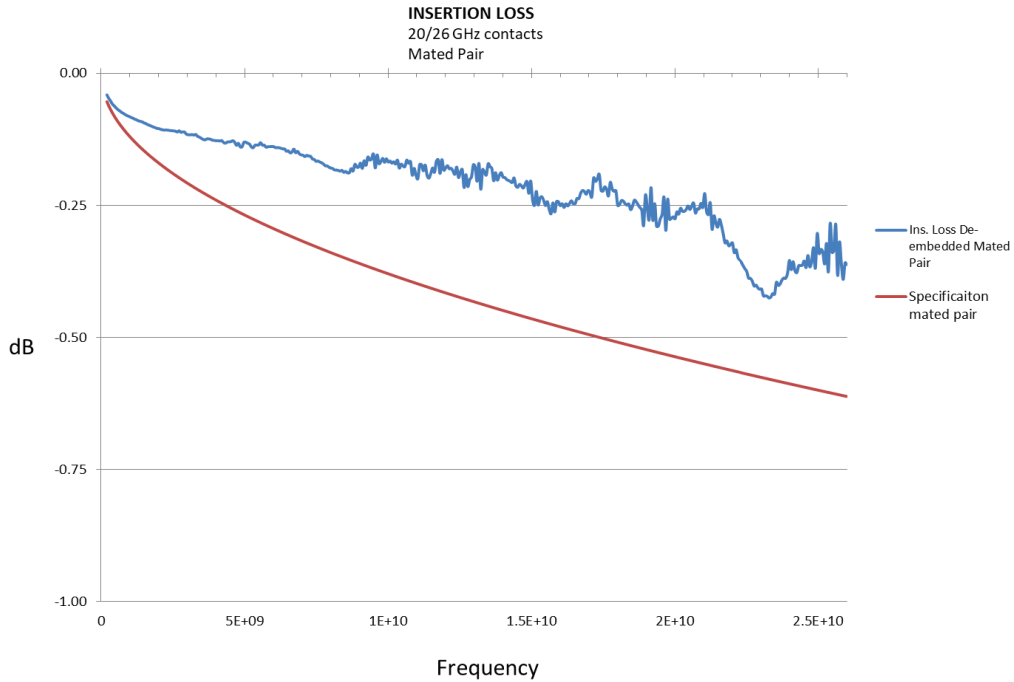


Figure 3.7:  
Insertion loss for de-embedded mated contact pair receiver and ITA.

## 3.8 Voltage Standing Wave Ratio

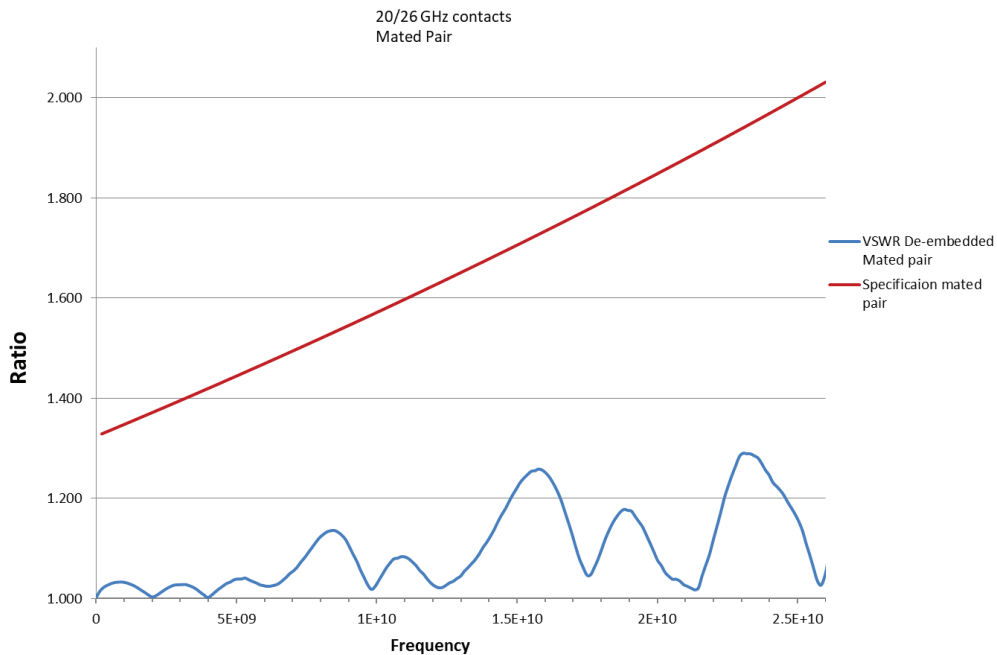


Figure 3.8:  
VSWR for de-embedded mated contact pair receiver and ITA.

# Performance Specification: 20/26 GHz Connector Contact

## 3.9 Crosstalk Isolation

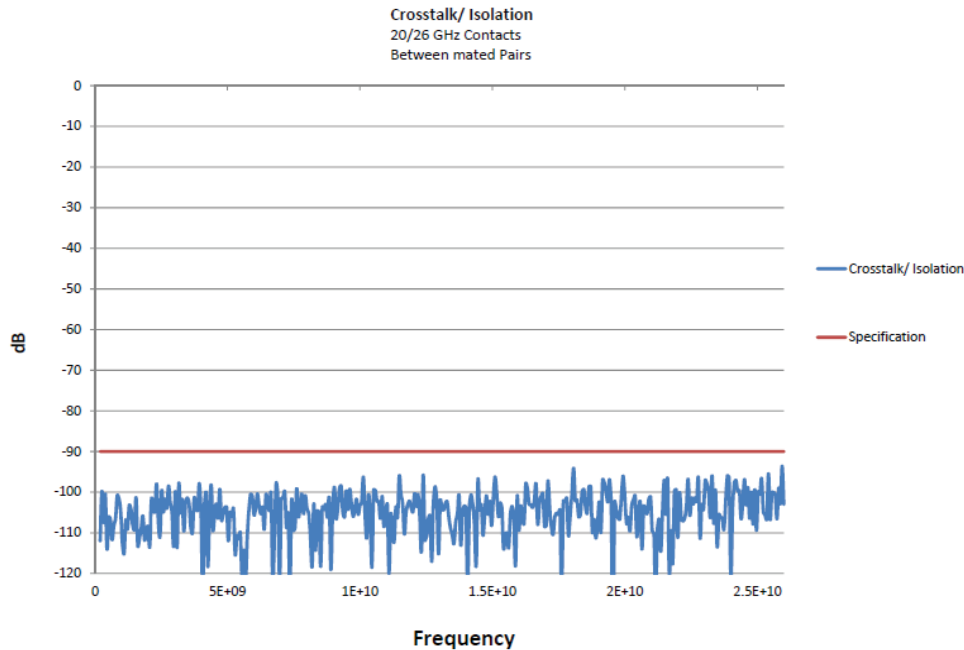


Figure 3.9:

Crosstalk Isolation for de-embedded mated contact pair receiver and ITA.

## 4. Quality Assurance Provisions

### 4.1 Qualification Testing

#### A. Sample Selection

Samples shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

#### B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Table 3.2:

### 4.2 Requalification Testing

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

# Performance Specification: 20/26 GHz Connector Contact

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## 4. Quality Assurance Provisions Continued

### 4.3 Acceptance

Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

### 4.4 Quality Conformance Inspection

A Certificate of Conformance (C of C) dimensional inspection must be completed for all samples prior to Qualification testing. The applicable 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.