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LOAD, RF, COAXIAL, TYPE SMA 2.9, DC - 31.5GHz ESCC Detail Specification No. 3403/009

Issue 5 February 2016



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DCR No.	CHANGE DESCRIPTION
959	Specification upissued to incorporate editorial and technical changes per DCR.



ESCC Detail Specification

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1 **GENERAL**

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 <u>APPLICABLE DOCUMENTS</u>

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 3403.

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 340300901

Detail Specification Reference: 3403009

Component Type Variant Number: 01 (as required)

1.4.2 Component Type Variants and Range of Components

The component type variants and range of components applicable to this specification are as follows:

Variant Number	Description	Voltage Standing Wave Ratio	Weight Max
		DC to 31.5GHz	(g)
01	Male Load	≤ 1.5	5
02	Female Load	≤ 1.5	5



1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
RF Power	P_{RF}	500	mW	Note 1 T _{amb} ≤ +25°C
Peak Power	P _P	50	W	duration 1µs 1% duty cycle
DC Power	P _{DC}	500	mW	T _{amb} ≤ +25°C
Impedance	Z	47.5 to 52.5	Ω	-
Frequency Range	f _{op}	DC to 40	GHz	-
RF Leakage	Е	-60	dBi	-
Operating Temperature Range	T _{op}	-55 to +125	°C	T _{amb}
Storage Temperature Range	T_{stg}	-55 to +125	°C	-
Coupling Nut Torque	Tq	120	N.cm	Note 2

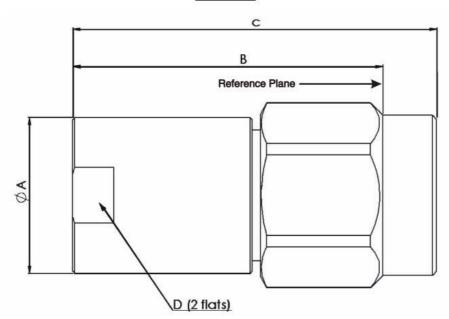
NOTES:

- 1. For $T_{amb} > +25$ °C, derate linearly to 0W at +125°C.
- 2. Coupling Proof Torque: 170N.cm.



1.6 PHYSICAL DIMENSIONS

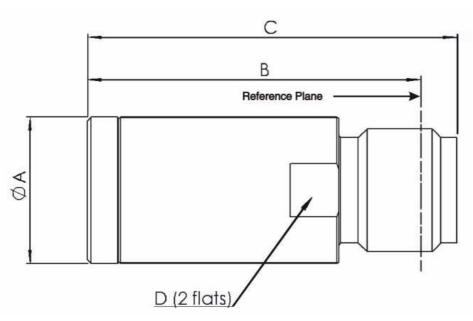
MALE LOAD



Symbols	Dimensions mm		
	Min	Max	
ØA	7	8	
В	14.5	15.5	
С	-	18.5	
D	6.5	7.5	



FEMALE LOAD

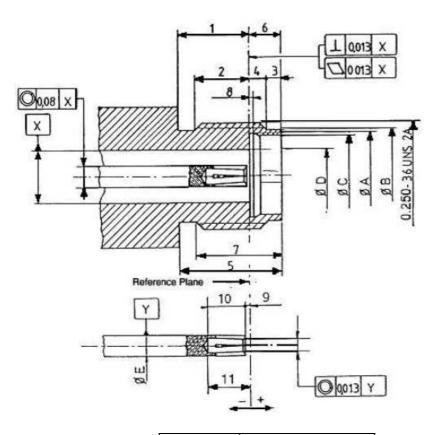


Symbols	Dimensions mm		
	Min	Max	
ØA	7	8	
В	16.5	17.5	
С	-	19.5	
D	6.5	7.5	



1.6.1 <u>Interface Dimensions</u>

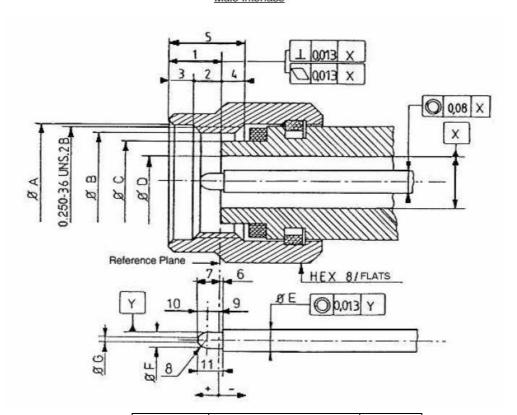
Female Interface



Symbols	Dimensions mm		
	Min	Max	
1	3.82	4.32	
2	2.87	3.27	
3	0.65	0.95	
4	0.93	1.33	
5	5.8	6.2	
6	1.88	1.98	
7	4.85	5.15	
8	0.3	0.5	
9	0	0.08	
10	2.8	3.2	
11	2.8	3.28	
ØA	4.8	5	
ØB	5.3	5.35	
ØC	4.6	4.63	
ØD	2.905	2.945	
ØE	1.26	1.28	



Male Interface

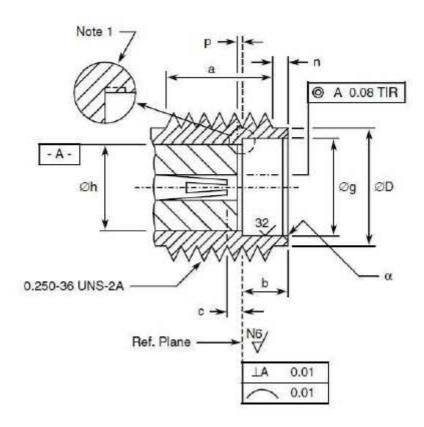


Symbols	Dimensi	Notes	
	Min	Max	Notes
1	2.63	3.25	
2	1.58	2.2	
3	0.75	1.15	
4	0.85	1.47	
5	3.8	4.2	
6	0	0.08	
7	1.42	1.6	
8	0.8	0.9	Radius
9	0.693	0.984	
10	0.616	0.727	
11	1.5	1.6	
ØA	6.6	6.7	
ØB	5.59	-	
ØC	4.55	4.58	
ØD	2.905	2.94	
ØE	1.26	1.28	
ØF	0.92	0.94	
ØG	0.2	0.34	

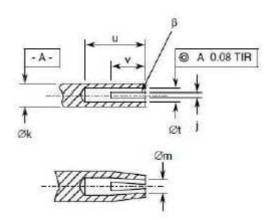


1.6.2 <u>Mating Gauge Dimensions</u>

Female Interface



Detailed view of centre contact





Symbols	Dimensi		
	Min	Max	Notes
а	3.81	-	
b	1.88	1.98	
С	0	0.08	Contact recess
ØD	5.28	5.49	
Øg	4.6	4.67	
Øh	4.1	4.13	
j	0.13	0.23	2 or more slots
Øk	1.27	1.29	
Øm	0.72	0.84	After closing
n	0.38	1.14	
р	0	0.05	Insert recess
u	2.54	-	
Øt	0.94	0.99	
V	1.91	2.41	
α		0.25	45° Chamfer

β

0.99

NOTES:

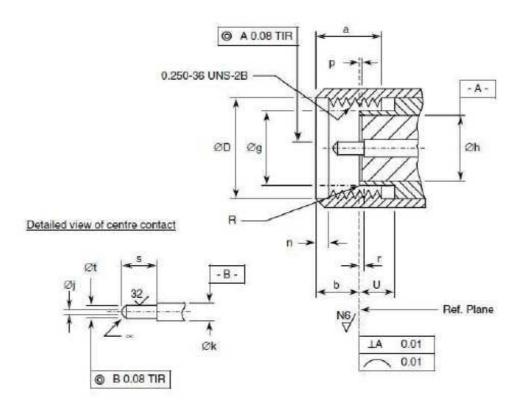
1. No fillet permitted. Radial undercut 0.2mm maximum deep x 0.89mm maximum long permitted.

45° Chamfer

1.19



Male Interface



Symbols	Dimensions mm		Natas
	Min	Max	Notes
а	3.71	4.32	
b	2.59	3.35	
ØD	6.48	6.73	
Øg	4.34	4.59	
Øh	4.1	4.13	
Øj	-	0.38	Flat
Øk	1.27	1.29	
n	0.64	1.14	
р	0	0.05	Insert recess
r	0	0.08	Contact recessed
R	-	0.08	Radius
S	2.03	2.29	
Øt	0.9	0.93	
U	2.03	-	
α	-	-	45 ±3° Chamfer



1.7 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

- Shell, Coupling Nut: Amagnetic Stainless Steel, electro-passivated
- Centre Contact: Beryllium Copper, with nickel underplate (2μm minimum) and Gold plating (1.3μm minimum). Measurements of plating thickness shall be performed inside the female centre contact at a maximum distance of 0.4mm from the end and on the male centre contact on pin diameter ØF (see Interface Dimensions).
- Inserts: ULTEM 1000Gaskets: Silicone rubber.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 <u>Deviations from the Generic Specification</u>

2.1.1.1 Deviations from Qualification and Periodic Tests - Chart F4

(a) Residual Magnetism: is not applicable.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component shall be:

- (a) The ESCC qualified components symbol (for ESCC qualified components only).
- (b) The ESCC Component Number.
- (c) Traceability information.



2.3 CONTACT ENGAGEMENT AND SEPARATION FORCES TEST

Ref. Contact Engagement and Separation Forces in the ESCC Generic Specification.

(a) Oversize Test Pin

Pin diameter: 0.95/0.955mmInsertion depth: 0.76/1.14mm

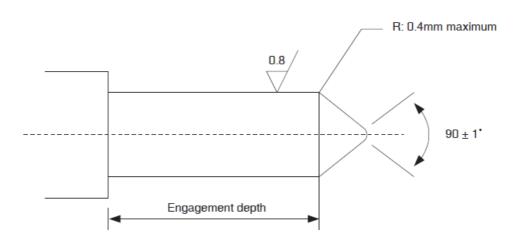
(b) Maximum Diameter Test Pin

Pin diameter: 0.94/0.946mmEngagement depth: 1.27/1.9mm

• Engagement force: 1380g maximum.

(c) Minimum Diameter Test Pin

Pin diameter: 0.89/0.902mm
Separation depth: 1.27/1.9mm
Separation force: 28g minimum.



2.4 COUPLING PROOF TORQUE TEST

Ref. Coupling Proof Torque in the ESCC Generic Specification.

Coupling Proof Torque: 170N.cm.

2.5 MATING AND UNMATING FORCES TEST

Ref. Mating and Unmating Forces in the ESCC Generic Specification.

Maximum torque during mating or unmating: 24N.cm.

2.6 <u>ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES</u>

The measurements shall be performed at room, high and low temperatures.



2.6.1 Room Temperature Electrical Measurements

The measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

Characteristics	-,		Test Method and Limits Conditions		Units
		Conditions	Min	Max	
Voltage Standing Wave Ratio	VSWR	ESCC No. 3403 f = 0 to 31.5GHz	-	1.5	-
Resistance	R	Test current < 50mA DC to 2kHz max.	47.5	52.5	Ω

2.6.2 <u>High and Low Temperatures Electrical Measurements</u>

The measurements shall be performed at $T_{amb} = +125 (+0 -3)^{\circ}C$ and $T_{amb} = -55 (+3 -0)^{\circ}C$.

Characteristics	Symbols	Test Method and Conditions (Note 1)	Lim	nits	Units
		Conditions (Note 1)	Min	Max	
Temperature Coefficient of Resistance	TC _R	Test current < 50mA DC to 2kHz max.	-	3 x 10 ⁻⁴	Ω/Ω/°C

NOTES:

1. Measurements shall be performed during Screening Tests on a sample of 2 components. In the event of any failure a 100% inspection shall be performed.

2.7 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic where specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Drift Value Δ	Units
Voltage Standing Wave Ratio	ΔVSWR VSWR	±2	%
Resistance	ΔR	±250	mΩ



2.8 <u>INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS</u>

Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}C$.

Unless otherwise specified, test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic where specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Test Reference per	Characteristics	0	Limits		11.26.
ESCC No. 3403		Symbols	Min	Max	Units
Vibration Initial Measurements	Resistance VSWR f = 0 to 31.5GHz	R VSWR	47.5 -	52.5 1.5	Ω -
Measurements during last cycle	Intermittent contact	-	No discontinuity > 0.5ms No open or short circuit		-
Final Measurements	Resistance	R	47.5	52.5	Ω
	Resistance Drift	ΔR	-	±250	mΩ
	VSWR f = 0 to 31.5GHz	VSWR	-	1.5	-
	VSWR Drift f = 0 to 31.5GHz	ΔVSWR VSWR	-	±2	%
Mechanical Shock Initial Measurements	Resistance (Note 1) VSWR (Note 1) f = 0 to 31.5GHz	R VSWR	47.5 -	52.5 1.5	Ω -
Final Measurements	Resistance	R	47.5	52.5	Ω
	Resistance Drift	ΔR	-	±250	mΩ
	VSWR f = 0 to 31.5GHz	VSWR	-	1.5	-
	VSWR Drift f = 0 to 31.5GHz	ΔVSWR VSWR	-	±2	%
Rapid Change of Temperature					
Initial Measurements	Resistance VSWR f = 0 to 31.5GHz	R VSWR	47.5 -	52.5 1.5	Ω -
Final Measurements	Resistance	R	47.5	52.5	Ω
	Resistance Drift	ΔR	-	±250	mΩ
	VSWR f = 0 to 31.5GHz	VSWR	-	1.5	-
	VSWR Drift f = 0 to 31.5GHz	ΔVSWR VSWR	-	±2	%



Test Reference per	Characteristics	0	Limits		
ESCC No. 3403		Symbols	Min	Max	Units
Climatic Sequence Initial Measurements	Resistance (Note 1) VSWR (Note 1) f = 0 to 31.5GHz	R VSWR	47.5 -	52.5 1.5	Ω -
Measurements during Dry Heat	Temperature Coefficient of Resistance	TC _R	-	3 x 10 ⁻⁴	Ω/Ω/°C
Measurements during Cold	Temperature Coefficient of Resistance	TC _R	-	3 x 10 ⁻⁴	Ω/Ω/°C
Final Measurements	Resistance	R	47.5	52.5	Ω
	Resistance Drift	ΔR	-	±250	mΩ
	VSWR f = 0 to 31.5GHz	VSWR	-	1.5	-
	VSWR Drift f = 0 to 31.5GHz	ΔVSWR VSWR	-	±2	%
Operating Life					
Initial Measurements	Resistance (Note 1) VSWR (Note 1) f = 0 to 31.5GHz	R VSWR	47.5 -	52.5 1.5	Ω -
Final Measurements	Resistance	R	47.5	52.5	Ω
	Resistance Drift	ΔR	-	±250	mΩ
	VSWR f = 0 to 31.5GHz	VSWR	-	1.5	-
	VSWR Drift f = 0 to 31.5GHz	ΔVSWR VSWR	-	±2	%
RF Leakage	RF leakage f = 0 to 21.5GHz f = 21.4 to 31.5GHz	E	-70 -60	-	dBi
Peak Power					
Final Measurements	Resistance	R	47.5	52.5	Ω

NOTES:

^{1.} This test need not be repeated. The most recent result from the previous test may be used instead.



2.9 <u>BURN-IN CONDITIONS</u>

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T _{amb}	+125	°C
Power	P _{in}	0	W

2.10 OPERATING LIFE CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T _{amb}	+25	°C
Power	P _{in}	500	mW
Frequency	f _{in}	18	GHz