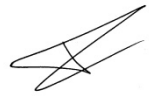






Titre / Title

**RF COAXIAL FIXED LOADS
DC – 40 GHz**

DETAIL SPECIFICATION

Rédigé par / Written by	Responsabilité / Responsibility	Date	Signature
S. POIZAT	Space Project Manager	05/04/2018	
Vérifié par / Verified by			
V. EUDELIN	Space B. U. Manager	05/04/2018	
Approuvée par / Approved by			
C. DAVENEL	Space Quality Manager	05/04/2018	

Radial



DETAIL SPECIFICATION

REF.: RAD-DET-ATCH-014

Date:
April 5th, 18

ED/REV:
1 / A

PAGE:
2/ 12

DOCUMENTATION CHANGE NOTICE

REVISION OR ISSUE	DATE	CHANGE
1 / -	06/12/17	Initial edition
1 / A	05/04/18	Updated to correct the variant number in Table 5: 701 instead of 301 and 702 instead of 302



	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 3/ 12

TABLE OF CONTENTS

1.	Scope	4
2.	Applicable document	4
3.	Type variant	5
4.	Maximum ratings	5
5.	Electrical measurements	6
5.1.	High and Low temperature electrical measurements	6
6.	Connectors repeatability:	6
7.	Operating life	6
7.1.	Parameter drift values	6
7.2.	Conditions for operating life	6
8.	Mechanical dimension	8
8.1.	Dimension for variant 701	8
8.2.	Dimension for variant 702	8
8.3.	Interchangeability for SMA 2.9 series	9
8.3.1.	SMA 2.9 jack	9
8.3.2.	SMA 2.9 plug	10

LIST OF TABLES AND FIGURES

Table 1:	Type variants	5
Table 2:	Maximum ratings	5
FIGURE 1 –	Parameter Derating Information	5
Table 3:	Parameter drift values for Operating Life	6
Table 4:	Conditions for Operating Life testing	6
FIGURE 2 –	Circuit for electrical measurement	7
Table 5:	Radiall Part Number	11
Table 6:	Measurements and inspections on completion of environment and endurance tests	11

	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 4/ 12


1. SCOPE

This Detailed Technical Sheet details the ratings and electrical characteristics for RF Fixed Load, 0 -40 GHz

2. APPLICABLE DOCUMENT

The following documents shall be read in conjunction with this specification:

RAD-GEN-ATCH-002: General Specification: RF Coaxial Attenuators and Fixed Loads

	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 5/ 12

3. TYPE VARIANT

Variants of the basic type covered by the relevant Generic Specification are given in Table 1.

Table 1: Type variants

	VARIANT	VSWR	
		0 ≤ F ≤ 24 GHz	24 ≤ F ≤ 31.5 GHz
Male	701	1.20	1.25
Female	702	1.20	1.25

4. MAXIMUM RATINGS

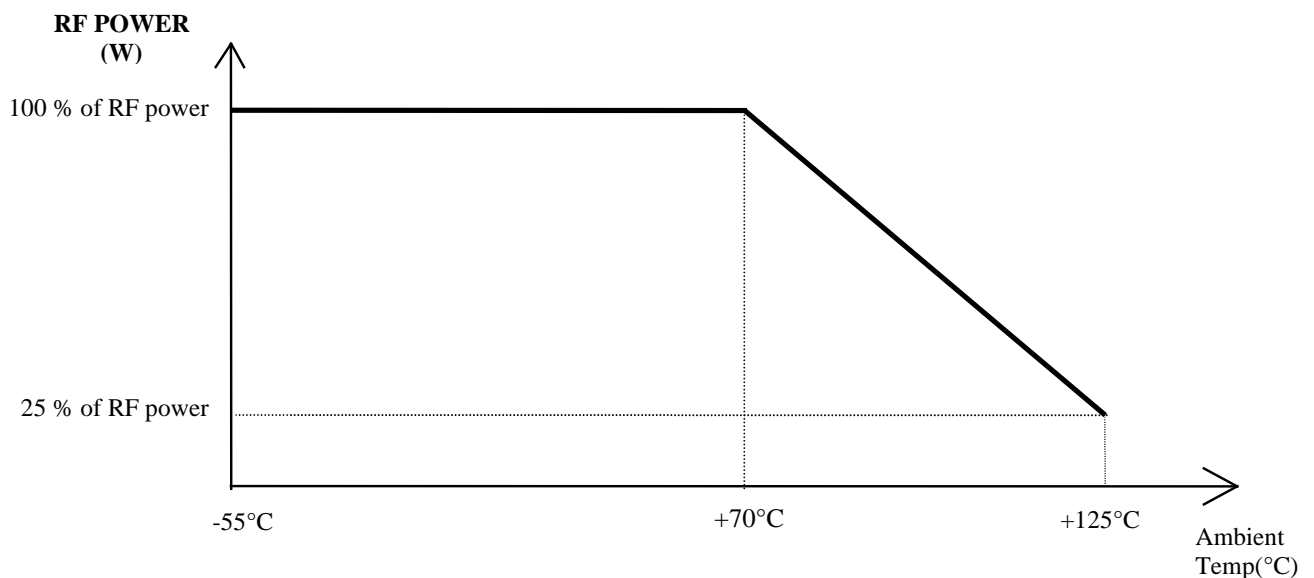
Maximum Ratings of the basic type covered by the relevant Generic Specification are given in Table 2.

Table 2: Maximum ratings


N°	Characteristics	Symbol	Maximum Rating		Unit
			Min	Max	
1	RF Power	P	-	1	W (1)
2	Peak Power (at 25°C) (2)	P _p	-	50	W
3	Operating Temperature Range	T _{op}	-55	+125	°C
4	Storage Temperature Range	T _{stg}	-55	+125	°C
5	Frequency Range	F	0	40	GHz
6	Impedance	Z	47.5	52.5	Ohms
7	RF Leakage (3)	E	-85	-	dBi
8	Coupling Nut Torque	T _q	80	120	N.cm

- NOTES:**
- (1) See Figure 1.
 - (2) Duration 1μs, cyclic rate 1ms
 - (3) Between DC to 31.5GHz only.

FIGURE 1 – Parameter Derating Information



RF POWER VERSUS TEMPERATURE

	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 6 / 12

5. ELECTRICAL MEASUREMENTS

The parameters to be measured at room temperature are scheduled in Table 1. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3$ °C.

The measurement shall be performed with six points of frequency:

4GHz – 10GHz – 17.5GHz – 24GHz and 31.5GHz

5.1. HIGH AND LOW TEMPERATURE ELECTRICAL MEASUREMENTS

Characteristics	Symbol	Test Method and Conditions (Note 1)	Maximum Rating		Unit
			Min	Max	
Temperature coefficient of Resistance	TC_R	DC test reference temperature	-	3×10^{-4}	$\Omega/\Omega/^\circ C$

Note 1: Measurements shall be performed during LAT or Qualification test

6. CONNECTORS REPEATABILITY:

Not applicable for loads.

7. OPERATING LIFE

7.1. PARAMETER DRIFT VALUES

The parameter drift values applicable to burn-in are specified in Table 3 of this specification. Unless otherwise stated, measurements shall be performed at $T_{amb} = +22 \pm 3$ °C. The parameter drift value (Δ) applicable to the parameters scheduled, shall not be exceeded. In addition to these drift value requirements for a given parameter, the appropriate limit value specified in Table 1 shall not be exceeded.

7.2. CONDITIONS FOR OPERATING LIFE

The condition for Operating life are given in Table 4. After test, a visual inspection shall be performed and no damage shall have appeared.

Table 3: Parameter drift values for Operating Life

N°	Characteristics	Symbol	Test condition	Limits	Unit
1	Resistance change	ΔR	As per Table 1	250	m Ω
2	VSWR change	$\frac{\Delta VSWR}{VSWR}$	As per Table 1	± 2	%

Table 4: Conditions for Operating Life testing

N°	Characteristics	Symbol	Limits	Unit	Note
1	RF Power	P_{in}	1	W	-
2	Frequency	F	DC ⁽¹⁾ or 10 or 18	GHz	-
3	Ambient Temperature	T_{amb}	+70	°C	-

NOTES: (1) The dissipated power at DC or in frequency is the same.

Test mounting for Operating life: The DUT (load under test) shall be mounted directly on the Hybrid coupler without SR cable between the coupler and the DUT.


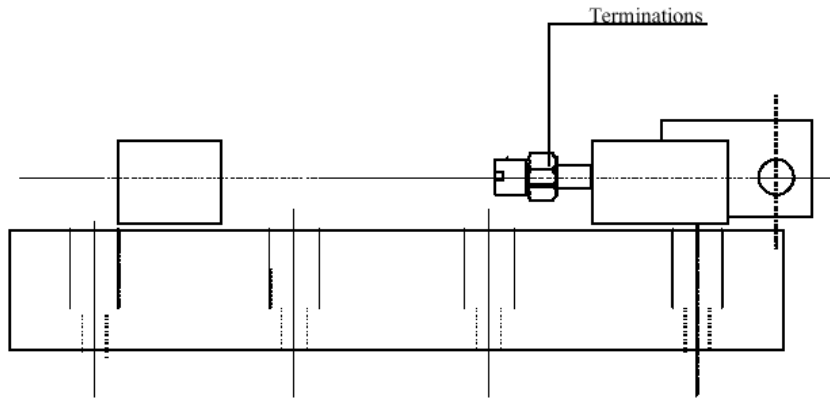
	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 7 / 12

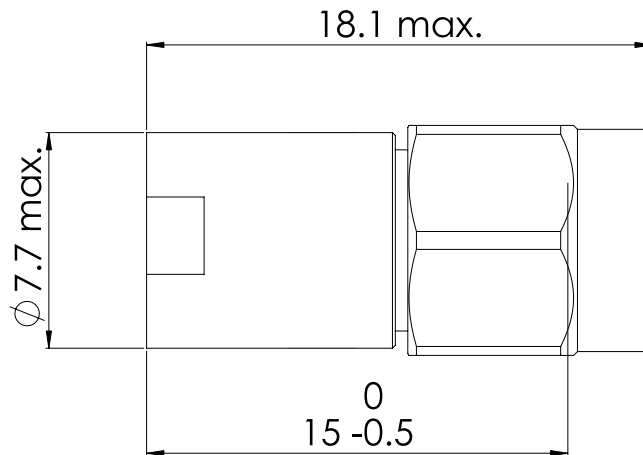
FIGURE 2 – *Circuit for electrical measurement*



Schematic for Vibration and Shock or Bump test

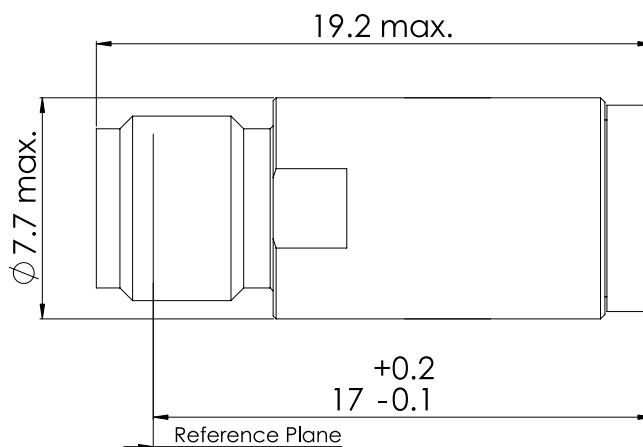
8. MECHANICAL DIMENSION

8.1. DIMENSION FOR VARIANT 701



General Tolerance: $\pm 0.5 \text{ mm}$
 Connectors: SMA2.9 Male per ESCC3402
 Weight: $\leq 5.5 \text{ grams}$

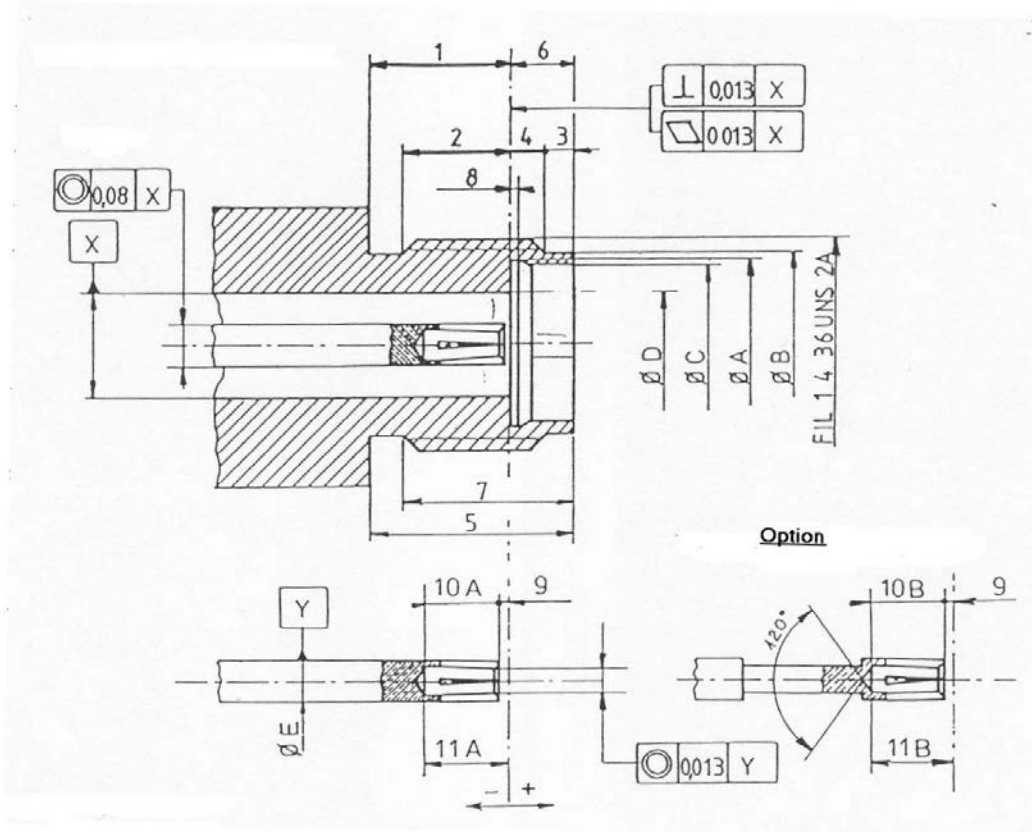
8.2. DIMENSION FOR VARIANT 702



General Tolerance: $\pm 0.5 \text{ mm}$
 Connectors: SMA2.9 Female per ESCC3402
 Weight: $\leq 5.5 \text{ grams}$

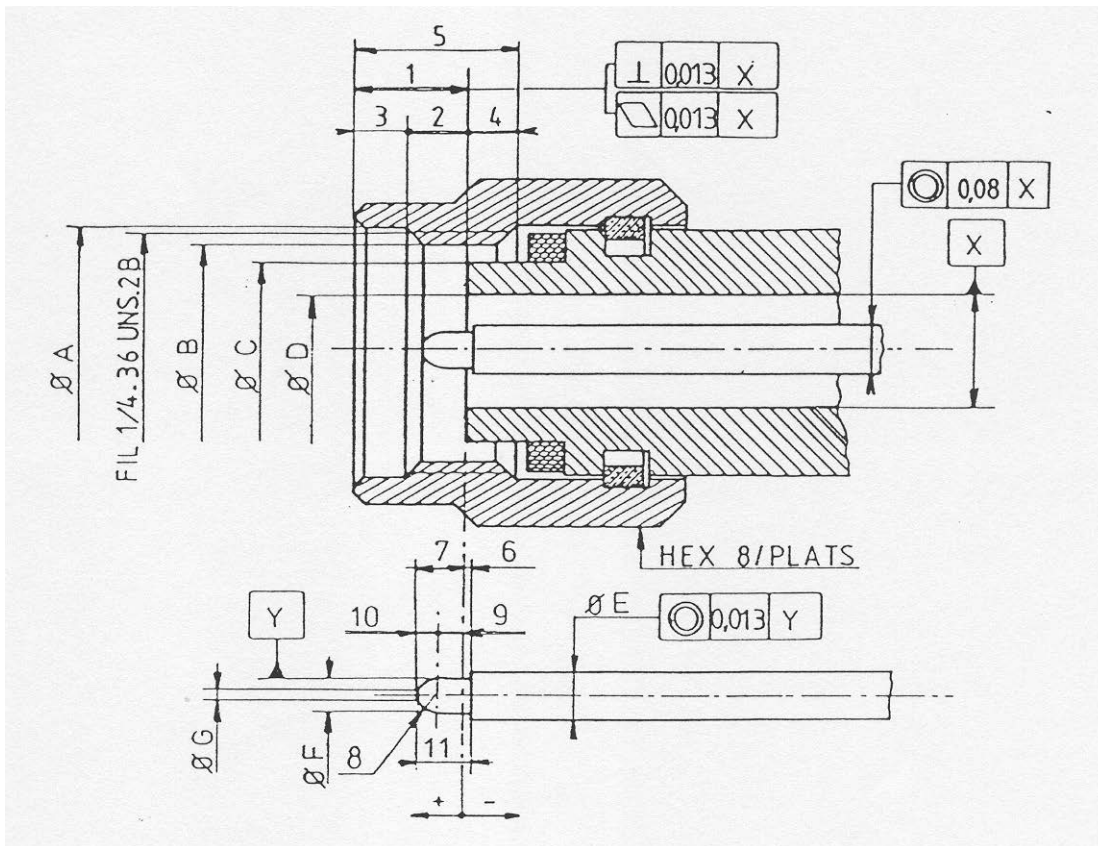
8.3. INTERCHANGEABILITY FOR SMA 2.9 SERIES

8.3.1. SMA 2.9 jack



Symbol	Millimetres		notes
	min	max	
ØA	4.80	5.00	
ØB	5.30	5.35	
ØC	4.60	4.63	
ØD	2.905	2.945	
ØE	1.26	1.28	
1	3.82	4.32	
2	2.87	3.27	
3	0.65	0.95	
4	0.93	1.33	
5	5.80	6.20	
6	1.88	1.98	
7	4.85	5.15	
8	0.30	0.50	
9	0.00	0.08	
10A	2.80	3.12	
10B	2.40	2.60	
11A	2.80	3.20	
11B	2.40	2.68	

8.3.2. SMA 2.9 plug



Symbol	Millimeters		notes
	min	max	
ØA	6.60	6.70	
ØB	5.59	-	
ØC	4.55	4.58	
ØD	2.905	2.945	
ØE	1.26	1.28	
ØF	0.92	0.94	
ØG	0.20	0.34	
1	2.63	3.25	
2	1.58	2.20	
3	0.75	1.15	
4	0.85	1.47	
5	3.80	4.20	
6	0.000	0.080	
7	1.22	1.40	
8	R 0.80	R 0.90	
9	0.493	0.784	
10	0.616	0.727	
11	1.30	1.40	


	DETAIL SPECIFICATION		
	REF.: RAD-DET-ATCH-014		
	Date: April 5 th , 18	ED/REV: 1 / A	PAGE: 11 / 12

Table 5: Radiall Part Number

Variant	Radiall Reference	Designation
701	R404280660	RF fixed load SMA2.9 DC - 40GHz - Male
702	R404285660	RF fixed load SMA2.9 DC - 40GHz - Female

Table 6: Measurements and inspections on completion of environment and endurance tests

N°	Radial Generic Spec. RAD-GEN-ATCH-002		Measurements and Inspections		Symbol	Limits		Unit
	Environmental and Endurance Test (1)	Test Method and Conditions	Identification	Conditions		Min	Max	
01	Vibration	Para. 13.2.6 and figure 2 of this specification	Initial measurements Impedance VSWR During Last Cycle Intermittent contact Final measurement Visual Examination Resistance change VSWR change	Table 2 Table 1 >0,5ms No open or short circuits No damage Table 3 Table 3	Z VSWR - ΔR ΔVSWR	Record values Record values - - 250 -2 +2	Ω - - mΩ %	
02	Shock	Para 13.2.7 and figure 2 of this specification	Initial measurements Impedance VSWR Final measurement Visual Examination Resistance change VSWR change	Table 2 Table 1 No damage Table 3 Table 3	Z VSWR - ΔR ΔVSWR	Record values Record values - - 250 -2 +2	Ω - - mΩ %	
03	Rapid Change of Temperature	Para 13.2.8	Initial measurements Impedance VSWR Final measurement Visual Examination Resistance change VSWR change	Table 2 Table 1 After recovery time of 24±2hrs No damage Table 3 Table 3	Z VSWR - ΔR ΔVSWR	Record values Record values - - 250 -2 +2	Ω - - mΩ %	
04	Climatic sequence	Para 13.2.9 Dry heat: para 13.2.9.1 Cold heat: para 13.2.9.3	Resistance drift (2) Resistance drift (2) Final measurement Visual Examination Resistance change VSWR change	At +125°C, At -55°C, After recovery time between 1 hr and 24 hrs No damage Table 3 Table 3	TC _R TC _R - ΔR ΔVSWR	3.10 ⁻⁴ 3.10 ⁻⁴ - 250 -2 +2	Ω/Ω/°C Ω/Ω/°C - mΩ %	
05	Coupling proof torque	Para 13.2.10	Interface dimensions	Para 13.2.11	-	Figure of para 13.2.11	-	
06	Mating and unmating forces	Para 13.2.11	Torque	Para 13.2.11	-	- 24	N.cm	
07	Operating Life	Para 13.2.12 and table 3 and 4 of this specification	Initial measurements Impedance VSWR Final measurement Visual Examination Resistance change VSWR change	Table 2 Table 1 No damage Table 3 Table 3	Z VSWR - ΔR ΔVSWR	Record values Record values - - 250 -2 +2	Ω - - mΩ %	
08	RF leakage	Para 13.2.13	RF leakage	Table 2	E	- -90	dBi	
09	Peak power	Para 13.2.14 and table 2 of this specification	Final measurement Impedance	Table 2	Z	Table 1		
10	Permanence of marking	Para 13.2.16	Final measurement Visual Examination	No corrosion or obliteration of marking	-	-	-	

Notes:

- (1) The tests in this table refer to either para 11 or 12 of RAD-GEN-ATCH-002 specification and shall be used as applicable
- (2) Measurement to be made on only 2 samples.