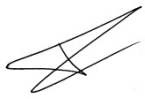
Titre / Title

RF LOADS FIXED COAXIAL
DC – 22 GHz
SMP series
DETAIL SPECIFICATION

Rédigé par / Written by	**Responsabilité / Responsibility**	**Date**	**Signature**
S. POIZAT	Space Project Manager	16/05/2022	
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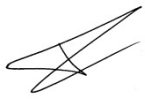
S POIZAT	Space B. U. Manager	16/05/2022	
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DOCUMENTATION CHANGE NOTICE

REVISION OR ISSUE	DATE	CHANGE
1/-	30/09/2011	Initial edition
1/A	02/02/2012	Added Anti Rock ring on variant 501 to improve RF leakage performance
2/-	19/09/2012	Added new variant of load: 503: SMP Lock Female Load DC-2GHz
2/A	05/12/2012	Updated the VSWR limit for variant 503
2/B	10/07/2013	Updated the VSWR limit for variants 502-503 (according to RFW 13044 accepted by TAS in July 9th, 2013)
2/C	01/08/2016	Updated to correct the Table 6: Drift value for VSWR at 5% instead of 2% (to be in accordance with Table 3).
2/D	01/04/2019	Updated with new generic specification (RAD-GEN-ATCH-002), two variants only SMP Load up to 22GHz & SMP-Lock Load up to 22GHz
2/E	08/08/2019	Updated to canceled the coupling proof torque test in Table 7: Not Applicable for SMP series
2/F	16/05/2022	Updated VSWR requirement

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1. SCOPE

This Detail Technical Sheet details the ratings and electrical characteristics for RF Load Fixed SMP series, 0 -22 GHz

2. APPLICABLE DOCUMENT

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

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

3. TYPE VARIANT

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

Table 1: *Type variants*

VARIANT	VSWR	
	0 ≤ F ≤ 22 GHz	
502	≤ 1.25	

VARIANT	VSWR
	0 ≤ F ≤ 22 GHz
503	≤ 1.20

4. MAXIMUM RATINGS

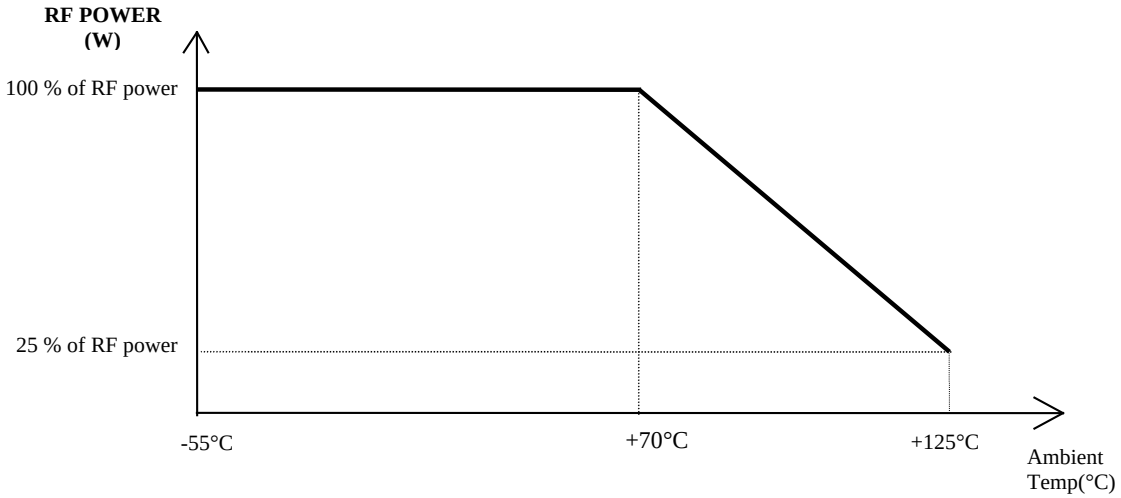
Maximum Ratings of the basic type covered by the relevant Generic Specification are given Table 2.

Table 2: *Maximum ratings*

N°	Characteristics	Symbol	Maximum Rating		Unit
			Min	Max	
1	RF Power	P	-	1	W (1)
2	Peak Power (at 25°) (2)	Pp	-	100	W
3	Operating Temperature Range	T_{op}	-55	+125	°C
4	Storage Temperature Range	T_{stg}	-55	+125	°C
5	Frequency Range	F	0	22	GHz
6	Impedance	Z	47.5	52.5	Ohms
7	RF Leakage	E	See note (3)	-	dBi

NOTES: (1) See Figure 1.
(2) Duration 1µs, cyclic rate 1ms
(3) For variant 502: ≥ -60dBi from DC to 12GHz, ≥ -50dBi 12 to 16GHz, ≥ -45dBi 16 to 22GHz
For variant 503: ≥ -90dBi (requirement to use a SMP-L Male receptacle)

FIGURE 1 – *Parameter Derating Information*



RF POWER VERSUS TEMPERATURE

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 ± 3 °C.
The measurement shall be performed with five points of frequency:
Variant 502 & 503: 2GHz – 8GHz – 12.4GHz – 18 GHz and 22GHz

5.1. HIGH AND LOW TEMPERATURE ELECTRICAL MEASUREMENTS

Characteristics	Symbol	Test Method and Conditions	Maximum Rating		Unit
		(Note 1)	Min	Max	
Temperature coefficient of Resistance	TC_R	DC test reference temperature	-	3×10^{-4}	Ω/Ω/°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 ± 3°C. The parameter drift value (Δ) applicable to the parameters scheduled, shall not be exceeded. In additional 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 is given in Table 4. After test, a visual inspection shall be performed and no damage shall be appeared.

Table 3: *Parameter drifts values for Operating Life*

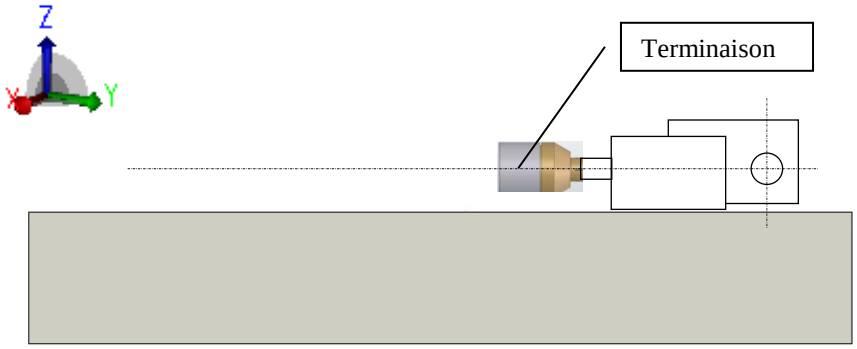
N°	Characteristics	Symbol	Test condition	Limits	Unit
1	Resistance change	ΔR	As per Table 1	250	mΩ
2	VSWR change	$\frac{\Delta VSWR}{VSWR}$	As per Table 1	±5	%

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	GHz	-
3	Ambient Temperature	T_{amb}	+25	°C	-

NOTES: (1) The dissipated power at DC or in frequency is the same.
For variant 502 & 503, uses only DC

FIGURE 2 – Circuit for electrical measurement



Schematic for Vibration and Shock test

8. DEVIATION FROM THE GENERIC SPECIFICATION

8.1. DEVIATION FROM SHOCK (SHOCKS LEVEL)

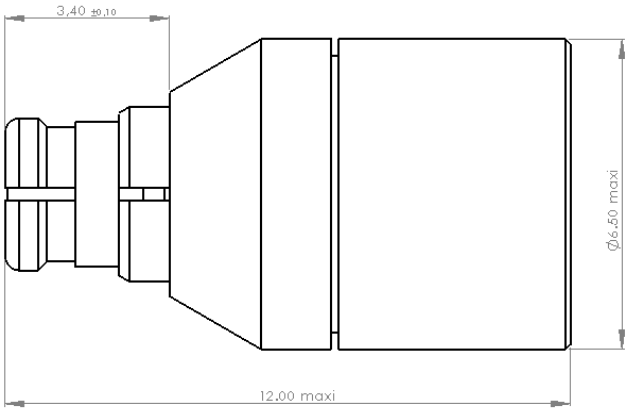
The Shock level for Variant 502 is given by Table 5

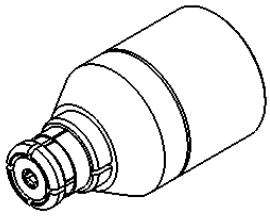
Table 5: *Shock level (Variant 502 only)*

All axis	
Frequency	**Shock Response spectrum (g) / Q=10**
100 Hz 3 000 Hz 10 000 Hz	70 g 1 200 g 1 200 g
Number of events: 3 shocks per axis	
Min tolerances: 0dB within (100Hz – 10000Hz)	

9. MECHANICAL DIMENSION

9.1. DIMENSION FOR VARIANT 502:

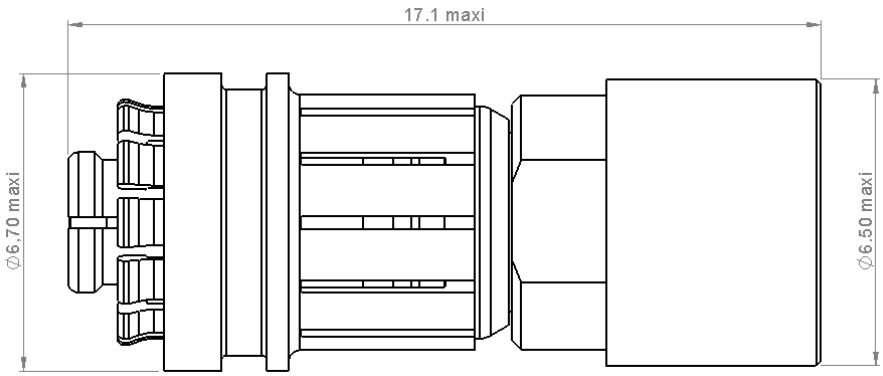


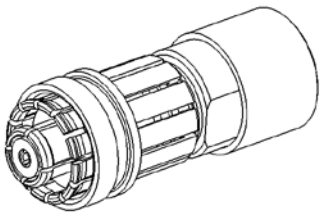


All dimensions are in millimeters (mm)

Connector: SMP Female per MIL-STD 348a, notice 6, figure 326-1
Weight: ≤ 2.5 grams

9.2. DIMENSION FOR VARIANT 503:





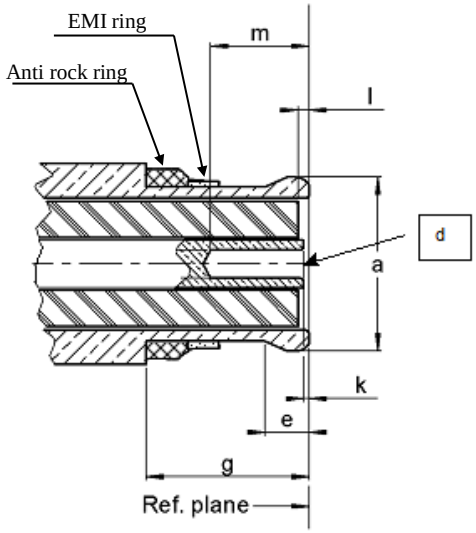
All dimensions are in millimeters (mm)

Connector: SMP Lock Female interface per MIL-STD 348a, notice 6, figure 326-1
Weight: ≤ 3.20 grams

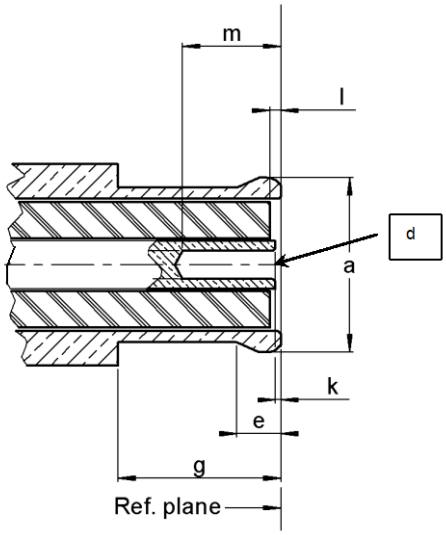
9.3. INTERCHANGEABILITY FOR SMP

9.3.1. SMP Female: MIL-STD 348a, NOTICE 6, FIGURE 326-1

Variant 502



Variant 503



	MIL-STD-348A				Comments
	Inch (original)		mm		
	mini.	maxi.	mini.	maxi.	
a	-	0.135	-	3.43	Dia, opened slots
d	-	-	-	-	Dia, Accept 0,015 +/-0,001 (inch) dia pin
e	0.018	0.025	0.46	0.64	Uncabled connector
g	0.112	-	2.84	-	
k	0.000	0.008	0.00	0.20	Contact recession
l	0.000	-	0.00	-	Dielectric recession
m	0.070	-	1.78	-	

Table 6: *Radiall Part Number*

Variant	Radiall Reference	Designation
502	R404262660	RF fixed load SMP DC - 22GHz
503	R4042L9660	RF fixed load SMP Lock DC - 22GHz

Table 7: *Measurements and inspections on completion of environment and endurance tests*

N°	Radiall 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 of Generic specification 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 - - - –2	 - 250 +2	 Ω - - - mΩ %
02	Shock	Para 13.2.7 of Generic specification, figure 2 & Para 8.1 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 - - –2	 250 +2	 Ω - - mΩ %
03	Rapid Change of Temperature	Para 13.2.8 of Generic specification	**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 - - –2	 250 +2	 Ω - - mΩ %
04	Climatic sequence	Para 13.2.9 of Generic specification Dry heat: para 13.2.9.1 of Generic specification Cold heat: para 13.2.9.3 of Generic specification	 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	 - -2	 3.10^{-4} 3.10^{-4} 250 +2	 Ω/Ω/°C Ω/Ω/°C - mΩ %
05	Coupling proof torque	Para 13.2.10 of Generic specification	Interface dimensions	Para 13.2.11	-	Not Applicable		-
06	Mating and unmating forces	Para 13.2.11 of Generic specification	Torque	Para 13.2.11	-	Not Applicable		N.cm
07	Operating Life	Para 13.2.12 of Generic specification 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 - - –2	 250 +2	 Ω - - mΩ %
08	RF leakage	Para 13.2.13 of Generic specification	**RF leakage**	Table 2	E	-	-90	dBi
09	Peak power	Para 13.2.14 of Generic specification and table 2 of this specification	**Final measurement** Impedance	Table 2	Z	Table 1		
10	Permanence of marking	Para 13.2.16 of Generic specification	**Final measurement** Visual Examination	No corrosion or obliteration of marking	-	-		-

Notes:

(1) The tests in this table refer to either paragraph 11 and 12 of Generic specification and shall be used as applicable

(2) Measurement to be made on 2 samples only.