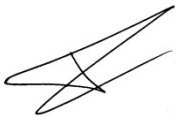





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Titre / Title

**RF ATTENUATORS COAXIAL
DC – 31.5 GHz
SMP-Lock series
DETAIL SPECIFICATION**

Rédigé par / Written by	Responsabilité / Responsibility	Date	Signature
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DOCUMENTATION CHANGE NOTICE

REVISION OR ISSUE	DATE	CHANGE
1/-	16/05/2018	Initial issue
1/A	08/08/2019	Updated to canceled the coupling proof torque test in Table 6: Not Applicable for SMP series



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1. SCOPE

This Detail Technical Sheet details the ratings and electrical characteristics for RF Attenuators, Coaxial 0-20 dB, 0 – 31.5 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

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

Table 1: Type variants

Var. N°	Attenuation	Maximum Input Power	Attenuation tolerance Vs frequency			Flatness	VSWR
			0 < F ≤ 18GHz dB (±)	18 < F ≤ 22GHz dB (±)	22 < F ≤ 31.5GHz dB (±)		
	dB	W				dB	
01	0 (DC shunt)	10	0.3	0.4	0.5	F ≤ 13 GHz 0.05 dB/1GHz	
02	0.5	10	0.3	0.4	0.5		
03	1	7	0.3	0.4	0.5		
04	1.5	5.5	0.3	0.4	0.5		
05	2	4.5	0.3	0.4	0.5		
06	2.5	4	0.3	0.4	0.5	13 < F ≤ 22GHz 0.07 dB/1GHz	0 < F ≤ 18.4GHz < 1.20
07	3	3.5	0.3	0.4	0.5		
08	3.5	3.5	0.3	0.4	0.5		
09	4	3	0.3	0.4	0.5		
10	4.5	3	0.3	0.4	0.5		
11	5	2.5	0.3	0.4	0.5	F > 22GHz N/A	18.4 < F < 22GHz < 1.25
12	5.5	2.5	0.3	0.4	0.5		
13	6	2.5	0.3	0.4	0.5		
14	6.5	2.5	0.3	0.4	0.5		
15	7	2	0.4	0.5	0.6	F ≤ 13 GHz 0.07 dB/1GHz	22 < F < 31.5GHz < 1.50
16	7.5	2	0.4	0.5	0.6		
17	8	2	0.4	0.5	0.6		
18	8.5	2	0.4	0.5	0.6		
19	9	2	0.4	0.5	0.6		
20	9.5	2	0.4	0.5	0.6		
21	10	2	0.4	0.5	0.6		
22	15	1.33	0.5	0.6	0.7	F > 22GHz N/A	
23	20	1.33	0.5	0.6	0.7		

Use SMP Kit of calibration with S1P parameter for RF measurements

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4. MAXIMUM RATINGS

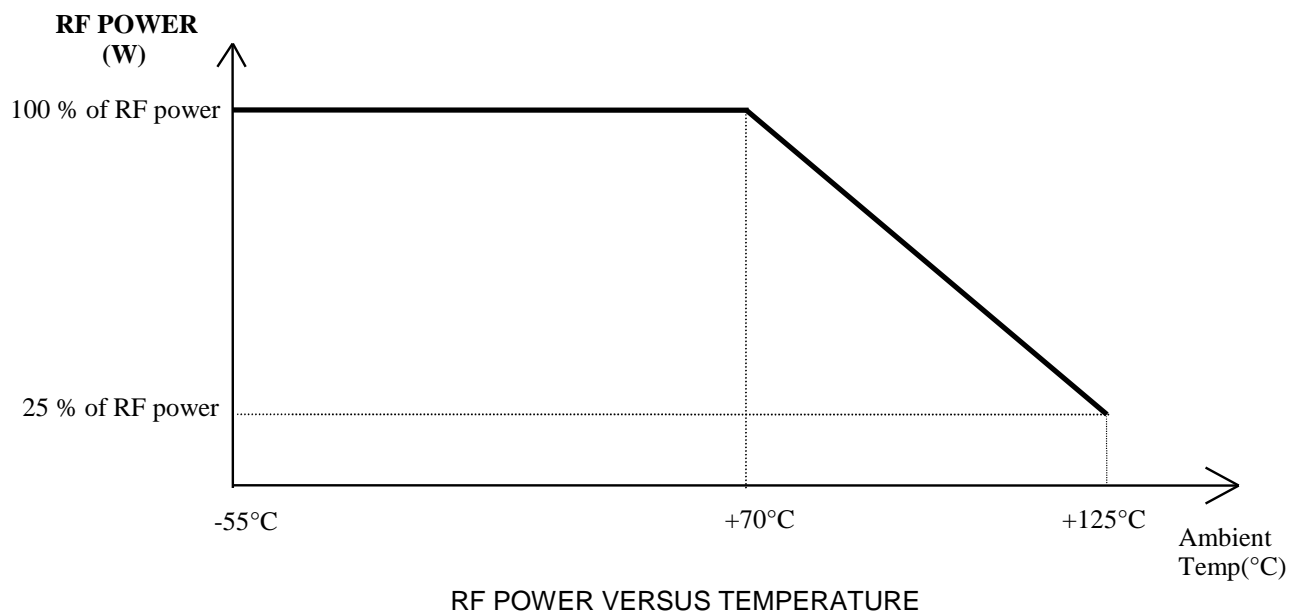
Maximum Ratings of the basic type covered by the relevant Generic Specification are given Table 2.


Table 2: Maximum ratings

N°	Characteristics	Symbol	Maximum Rating		Unit	Comment
			Min	Max		
1	RF Power dissipation ⁽¹⁾	P	-	2	W ⁽²⁾	-
2	Peak Power (at 25°C) ⁽³⁾	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	31.5	GHz	-
6	Impedance	Z	47.5	52.5	Ω	-
7	DC impedance		3	10	KΩ	between coaxial line and body
8	RF Leakage	E	-85	-	dBi	-
9	Glitches		0	0.05	dB	

- NOTES:**
- (1) See Table 1 for RF input Power value vs attenuation
 - (2) See Figure 1.
 - (3) Duration 1μs, 1% duty cycle

FIGURE 1 – Temperature derating



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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 - 31.5GHz.

6. CONNECTORS REPEATABILITY:

The test shall be performed according to the following conditions:

- Attenuation shall be recorded at three points of frequency: 4GHz – 17.5GHz – 31.5GHz
- Ten complete engagements and separations shall be performed, both end separately
- Attenuators shall be rotated through the full 360° with an increment of approximately 36° for each engagement.
- Attenuation drift value: ± 0.05 dB
- Side thrust is not permitted during the test
- Cleaning of connectors or reshaping of contacts was not permitted during the sequence

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 be appeared.

Table 3: Parameter drift values for Operating Life


N°	Characteristics	Symbol	Test condition	Limits	Unit
1	Attenuation Drift	Δ Att	As per Table 1	± 0.10 or ± 1 ⁽¹⁾	dB %

NOTES: (1) Whichever is greater, % of nominal attenuation

Table 4: Conditions for Operating Life testing

N°	Characteristics	Symbol	Limits	Unit	Note
1	RF Power	P_{in}	See Table 1	W	
2	Frequency	F	DC ⁽¹⁾ or 10 or 18 10 or 18	GHz GHz	For attenuation ≥ 1 dB For attenuation < 1 dB
3	Ambient Temperature	T_{amb}	+25	°C	-

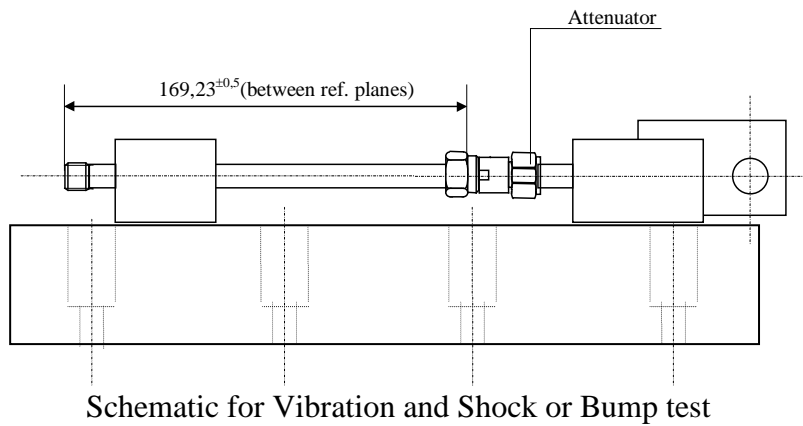
NOTES: (1) The response of the attenuation is flat over the frequency bandwidth.
The dissipated power at DC or in frequency is the same.

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Test mounting for Operating life:

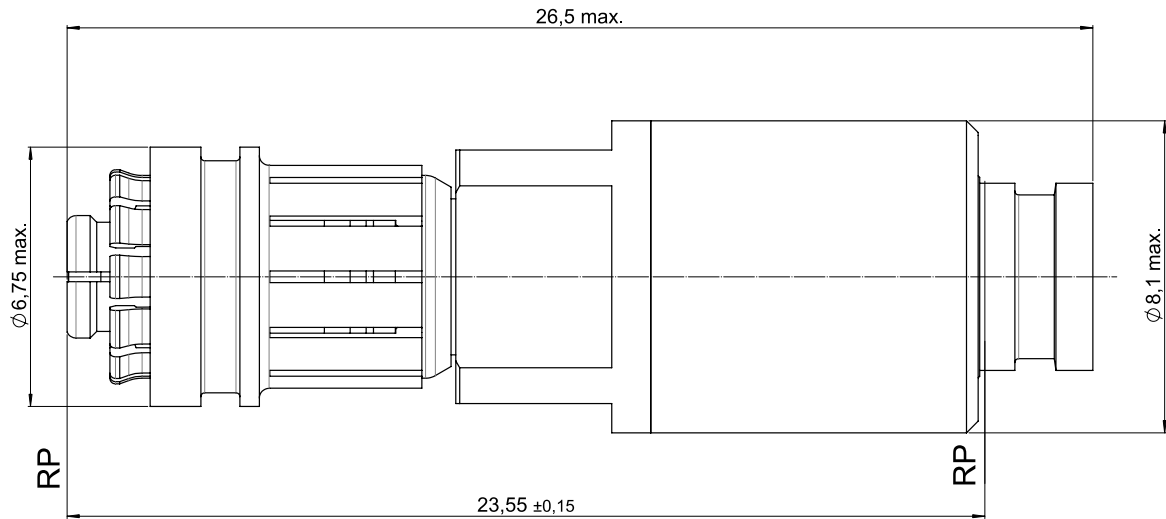
The DUT (attenuator under test) shall be mounted directly on the Hybrid coupler without SR cable between the coupler and the DUT.

FIGURE 2 – *Circuit for electrical measurement*



8. MECHANICAL DIMENSION

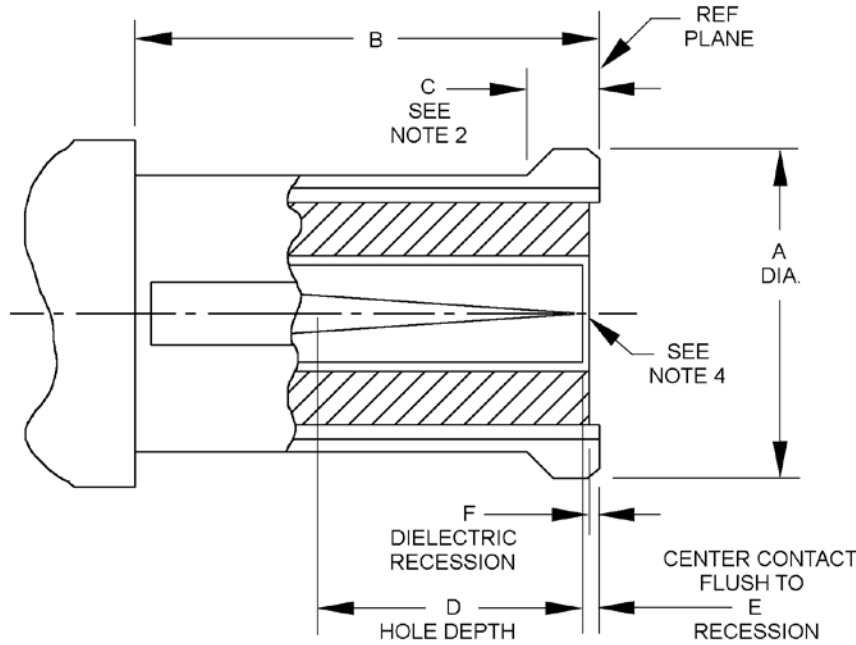
8.1. DIMENSION FOR VARIANTS 01 TO 23



Connectors: SMP per MIL-STD 348B
Weight: ≤ 7 grams

8.2. INTERCHANGEABILITY FOR SMP

FIGURE 326-1

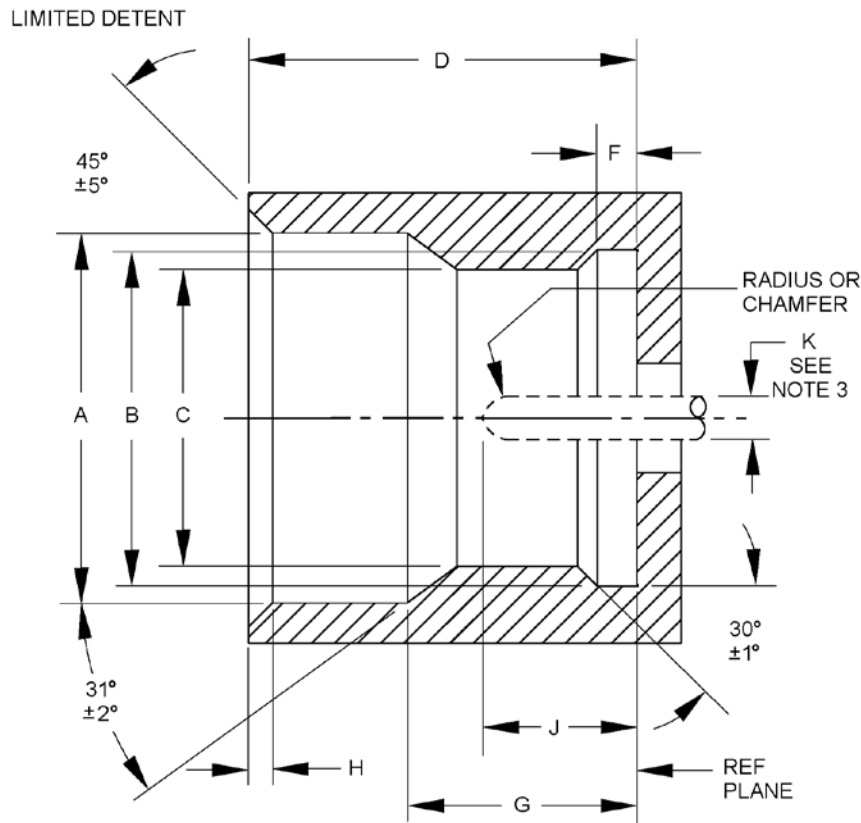


Letter	Inches (mm)	
	Minimum	Maximum
A	-----	.135 (3.43)
B	.112 (2.84)	-----
C	.018 (0.46)	.025 (0.64)
D	.070 (1.78)	-----
E	.000	.008 (0.20)
F	.000 (0.00)	-----

NOTES:

1. Dimensions are in inches. Metric equivalents are given for information purposes only.
2. Form and dimension of outer conductor to meet electrical and mechanical requirements.
3. Interface shall meet the force to engage and disengage requirements in accordance with DSCC drawing 94007.
4. Dimension to meet force to engage and disengage in accordance with specification or drawing.

FIGURE 326-3



Letter	Inches (mm)	
	Minimum	Maximum
A	.139 (3.53)	.145 (3.68)
B	.124 (3.15)	.126 (3.20)
C	.119 (3.02)	.121 (3.07)
D	.108 (2.74)	.112 (2.84)
E	-----	-----
F	.0205 (0.521)	.0235 (0.597)
G	.073 (1.85)	.077 (1.96)
H	.003 (0.08)	.008 (0.20)
J	.045 (1.14)	.055 (1.40)
K	.014 (0.36)	.016 (0.41)

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information purposes only.
3. Pin may not be shipped with shroud, refer to applicable specification.

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12/ 13**Table 5: Radiall Part Number**

Variant	Radiall Reference	Designation	
1	R413L00660	Attenuator SMP-L DC - 31.5GHz	0 dB
2	R413L01660	Attenuator SMP-L DC - 31.5GHz	0.5 dB
3	R413L02660	Attenuator SMP-L DC - 31.5GHz	1 dB
4	R413L03660	Attenuator SMP-L DC - 31.5GHz	1.5 dB
5	R413L04660	Attenuator SMP-L DC - 31.5GHz	2 dB
6	R413L05660	Attenuator SMP-L DC - 31.5GHz	2.5 dB
7	R413L06660	Attenuator SMP-L DC - 31.5GHz	3 dB
8	R413L07660	Attenuator SMP-L DC - 31.5GHz	3.5 dB
9	R413L08660	Attenuator SMP-L DC - 31.5GHz	4 dB
10	R413L09660	Attenuator SMP-L DC - 31.5GHz	4.5 dB
11	R413L10660	Attenuator SMP-L DC - 31.5GHz	5 dB
12	R413L11660	Attenuator SMP-L DC - 31.5GHz	5.5 dB
13	R413L12660	Attenuator SMP-L DC - 31.5GHz	6 dB
14	R413L13660	Attenuator SMP-L DC - 31.5GHz	6.5 dB
15	R413L14660	Attenuator SMP-L DC - 31.5GHz	7 dB
16	R413L15660	Attenuator SMP-L DC - 31.5GHz	7.5 dB
17	R413L16660	Attenuator SMP-L DC - 31.5GHz	8 dB
18	R413L17660	Attenuator SMP-L DC - 31.5GHz	8.5 dB
19	R413L18660	Attenuator SMP-L DC - 31.5GHz	9 dB
20	R413L19660	Attenuator SMP-L DC - 31.5GHz	9.5 dB
21	R413L20660	Attenuator SMP-L DC - 31.5GHz	10 dB
22	R413L30660	Attenuator SMP-L DC - 31.5GHz	15 dB
23	R413L40660	Attenuator SMP-L DC - 31.5GHz	20 dB

TABLE 6: 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 this specification of Generic specification and figure 2 of this specification	Initial measurements Attenuation During Last Cycle Intermittent contact Final measurement Visual Examination Attenuation drift	Table 1 >0.5ms No open or short circuits No damage Table 1	Att - - ΔAtt	Record values - - ±0.05 ±0.5		- - dB or %(2)
02	Shock or Bump	Para 13.2.7 of this specification of Generic specification and figure 2 of this specification	Initial measurements Attenuation Final measurement Visual Examination Attenuation drift	Table 1 No damage Table 1	Att - - ΔAtt	Record values - ±0.05 ±0.5		- - dB or %(2)
03	Rapid Change of Temperature	Para 13.2.8 of this specification of Generic specification	Initial measurements Attenuation Final measurement Visual Examination Attenuation drift	Table 1 After recovery time of 24±2hrs No damage Table 1	Att - - ΔAtt	Record values - ±0.05 ±0.5		- - dB or %(2)
04	Climatic sequence	Para 13.2.9 of this specification of Generic specification Dry heat: para 13.2.9.1 of this specification of Generic specification Cold heat: para 13.2.9.3 of this specification of Generic specification	Temp coeff of attenuation Temp coeff of attenuation Final measurement Visual Examination Attenuation drift	At +125°C, Freq: 4GHz – 17.5 - 31.5GHz At -55°C, Freq: 4GHz – 17.5 - 31.5GHz After recovery time between 1 hr and 24 hrs No damage Table 1	ΔAtt ΔAtt - ΔAtt	- - -0.1 -1.0	7.10 ⁻⁴ (3) 7.10 ⁻⁴ (3) +0.1 +1.0	dB/dB/°C dB/dB/°C dB or %(2)
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	Connector Repeatability	Para 6 of this specification	Attenuation drift	Table 1	ΔAtt	±0.05 ±0.5		dB or %(2)
08	Operating Life	Para 13.2.12 of Generic specification and table 3 and 4 of this specification	Initial measurements Attenuation Final measurement Visual Examination Attenuation drift	Table 1 No damage Table 1	Att - - ΔAtt	Record values - ±0.10 ±1		- - dB or %(2)
09	RF leakage	Para 13.2.13 of Generic specification	RF leakage	Para 13.2.13	E	-	-85	DB
10	Peak power	Para 13.2.14 of Generic specification and table 2 of this specification	Final measurement Attenuation	Table 1	Att	Table 1		
11	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 para 11 and 12 of Generic specification and shall be used as applicable
- (2) Whichever is greater
- (3) or ±0.1dB whichever is greater.