Test Report

Concerning: Chart F4 SG1 & 2 & 3 on load double-sided TNC ESCC340301001

Test samples identification :	**Addressees :**
Load double-sided TNC Radiall identification R404370670, batch 1836352606 quantity 10 ESCC identification ESCC340301001	Poizat S Dumortier C Raquin B ESA
Applicant : Poizat S / Raquin B **Department** : Space department	**Started** : 05/11/2018 **Finished** : 18/12/2018
Written by : Richier F **Verified by** : Chambert L **Approved by** : Akli E.	**Date :** 18/12/2018
Tests : - Vibration - Mechanical shock - Rapid change of temperature - Climatic sequence - Coupling proof torque - Mating and unmating forces - Operating life - Permanence of marking - RF leakage - Peak power - Radiographic inspection	**Purpose :** Chart F4 SG 1 & 2 & 3 on load double-sided TNC RF R404370670 according to Generic specification ESCC3403 issue 6 and Detail specification ESCC3403010 issue 4

Conclusion:

All the samples fulfilled requirements according to generic specification ESCC3403 issue 6 and detail specification ESCC3403010 issue 4.

Each RF measurement has been done twice using two different Calibrations. One calibration has been done using a GPC7 calibration, this is used by Radiall to measure Load R340301001 (R404370600) The other calibration has been done with TNC calibration Kit, this measurement is simpler and more accurate, Radiall wants to measure the new TNC load R340301001 (R404370670) with this method

That's why both measurement methods have been performed, to compare the RF curves on the same pieces at the same time.

To be measured using a TNC kit calibration, VSWR requirement should be changed as follows
V S.W R. $\leq$ 1.15 from DC to 18GHz

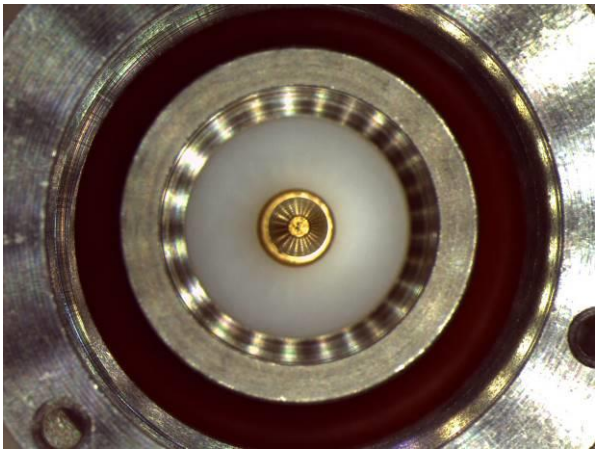
REVISION

Rev.	Date	Page	DESCRIPTION OF CHANGES	Responsibility
-	21/03/2019	-	Initial edition	Richier F.

CHART F4 SG 1 & 2 & 3 on Load double-sided TNC										
Batch	1836A									
Identification	ESCC340301001									
S/N	03	05	06	09	12	13	14	17	19	23
Environmental / Mechanical Subgroup										
Vibration	✓	✓								
Mechanical shock	✓	✓								
Rapid change of temperature			✓	✓						
Climatic sequence	✓	✓	✓	✓						
Glitches	N.A.	N.A.	N.A.	N.A						
Coupling proof torque	✓	✓	✓	✓						
Mating and unmating	✓	✓	✓	✓						
Radiographic inspection	✓	✓	✓	✓						
Endurance Subgroup										
Connector repeatability					N.A.	N.A.	N.A.			
Glitches					N.A.	N.A.	N.A.			
Operating life					✓	✓	✓			
Permanence of marking					✓	✓	✓			
Radiographic inspection					✓	✓	✓			
Electrical Subgroup										
Residual Magnetism *								N.A.	N.A.	N.A.
RF leakage								✓	✓	✓
Peak power								✓	✓	✓
Radiographic inspection								✓	✓	✓

N.A. : Not applicable, * gold plated with copper underplate version only
Devices are calibrated periodically according to ISO9001

R404370670 ESCC340301001



Environmental / Mechanical Subgroup

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03 and 05

Equipment :

Vibration testing system LDS V380-185TSPA10K and Amplifier LDS SPAK 10/10KVA 2936-004/1 n° 3018 001 0695
Vibration control system LDS DACTRON – module n°1 – LAS-200 – n°3095 057 0611
Vibration control system LDS DACTRON – module n°2 – LAS-200 – n°3095 058 0611
Accelerometers BRUEL&KJÆR n° 3018 063 0312 and n° 3018 065 0312
Discontinuity detector ADVEOTEC n°3018 077 0114
Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511

Room temperature :	**Room humidity :**	**Room pressure :**
20 ± 10 °C	25 - 70 % RH	860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 07/11/2018

Test description:

Sine vibration test was performed according to generic specification ESCC3403 issue 6 §8.5.2 and detail specification ESCC3403010 issue 4 with the following conditions on all axes:

Envelope: Grms = 50	
Frequency Range	Level
20 to 100 Hz	+6db/Octave
100 to 1000 Hz	1.54g²/Hz
1000 to 2000 Hz	-3db/Octave

During the last cycle in each direction, an electrical measurement was made to determine intermittent contact of 0.5ms or longer duration, or open or short circuiting.

Duration: 180s in each of the 3 mutually perpendicular axes.

Requirements:

- No discontinuity > 0.5ms
- Attenuation drift: ≤ 0.05 dB

V.S.W.R. ≤ 1.08 from 0.01 to 4 GHz
≤ 1.10 from 4 to 8 GHz
≤ 1.15 from 8 to 12.5 GHz
≤ 1.20 from 12.5 to 18 GHz

- Impedance 47.5 Ω to 52.5 Ω

Results:

No discontinuity > 0.5 ms detected.

- RF measurement with TNC CAL KIT :

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.08	1.07		0.93
18.0		1.05	1.05		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(mΩ)
	47.5 ≤ x ≤ 52.5	49.81	49.83	± 250m Ω	2

R404370670 sample 05					
Frequency	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.06	1.07		0.94
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.03	50.00	± 250m Ω	3

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.03	1.03		0.00
18.0		1.02	1.03		0.98
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.16	49.95	± 250m Ω	210

R404370670 sample 05					
Frequency	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.02	± 2 %	
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.07	49.98	± 250m Ω	90

N.A. : not applicable
See RF measurement graphs in appendix 1.
See vibration graphs in appendix 2.

Conclusion:

Pass.

Mechanical shock

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03 and 05

Equipment :

Shock machine IND0066
Charge amplifier LCE0108
Oscilloscope LCE0144
Accelerometer LCE0203
Software chocsA.tst
Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Labessede F/ Richier F.	**Department :** SOPAVIB / IDA laboratory	**Date of test :** 11/07/2018

Test description:

Mechanical shock test was performed according to generic specification ESCC3403 issue 6 §8.9 and detail specification ESCC3403010 issue 4 with the following conditions:

Mechanical Shock profile:

Each Axis	
Frequency	SRS (g) / Q = 10 (See Notes)
100 Hz	70g
3000 Hz	2000g
10000 Hz	2000g

- Duration of pulse: 6 ms
- Number of shocks : 18 (3 shocks in each direction in the 3 perpendicular axes of the test specimen)

The samples shall be visually examined.

Requirements:

- Visual inspection : no damage
- V.S.W.R. ≤ 1.08 from 0.01 to 4 GHz
  ≤ 1.10 from 4 to 8 GHz
  ≤ 1.15 from 8 to 12.5 GHz
  ≤ 1.20 from 12.5 to 18 GHz
- Impedance 47.5 Ω to 52.5 Ω

Results:

No damage.

- RF measurement with TNC CAL KIT:

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.01	± 2 %	0.98
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.05	1.05		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.83	49.78	± 250m Ω	50

R404370670 sample 05					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.07	1.06		0.93
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.00	50.00	± 250m Ω	0.00

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.03	1.02		0.97
18.0		1.03	1.03		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.90	50.06	± 250m Ω	160

R404370670 sample 05					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.01	± 2 %	0.98
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.98	50.06	± 250m Ω	80

N.A. : not applicable
See RF measurement graphs in appendix 1.
See mechanical shock graphs in appendix 3.

Conclusion:

Pass.

Rapid change of temperature

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 06 and 09

Equipment :

Climatic chamber MPC 01-208 n°3053 016 0583
Climatic chamber MEMMERT UFE 400 n°3051 035 0606
Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511

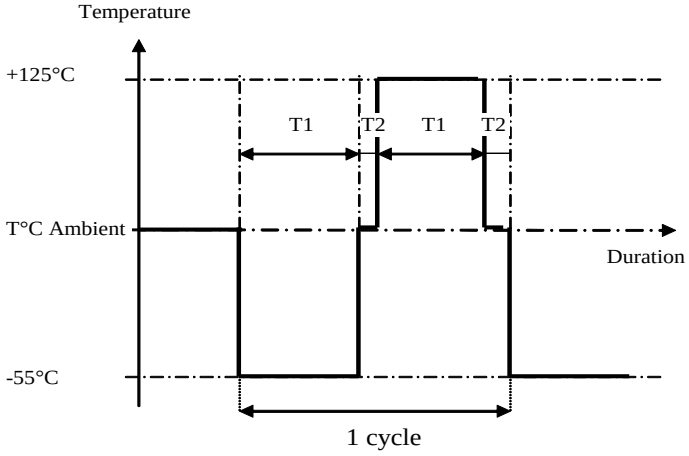
Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Jaffre E / Richier F.	**Department :** IDA laboratory	**Date of test :** 19/11/2018

Test description:

Rapid change of temperature test was performed according to generic specification ESCC3403 issue 6 §8.11 and detail specification ESCC3403010 issue 4.

- number of cycles : 100
- duration exposure : 15 minutes at each temperature
- duration transfer : 2 to 3 minutes
- low temperature : -55°C
- high temperature : +125°C

T1 : Duration exposure 30 minutes
T2 : Duration transfer 2 to 3 minutes



Requirements:

- Visual inspection : no damage

Results:

- RF measurement with TNC CAL KIT:

R404370670 sample 06					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.06	1.06		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 06					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.13	50.19	± 250m Ω	60

R404370670 sample 09					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.05	1.05		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.000
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.07	1.06		0.93
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 09					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.12	50.15	± 250m Ω	50

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 06					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.06	1.06	± 2 %	0.00

R404370670 sample 06					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.28	50.12	± 250m Ω	160

R404370670 sample 09					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.01	1.01		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.06	1.07	± 2 %	0.94

R404370670 sample 09					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.08	50.03	± 250m Ω	50

N.A. : not applicable
See RF measurement graphs in appendix 1.

Conclusion:

Pass.

Climatic sequence

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03, 05, 06 and 09

Equipment :

Climatic chamber BIA MTH6-60 n° 3053 115 1211
Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511
Vacuum chamber BIOBLOCK n° 3016 001 0399
Multimeter HEWLETT PACKARD 34401A n° 8062 037 0296
Climatic chamber BIA CLIMATIC CL6-35-T° ET HUMIDIT 2007004 n° 3053 103 1107
Stabilized alimentation ITT instruments AX322 Metrix n° 8050 016 0195

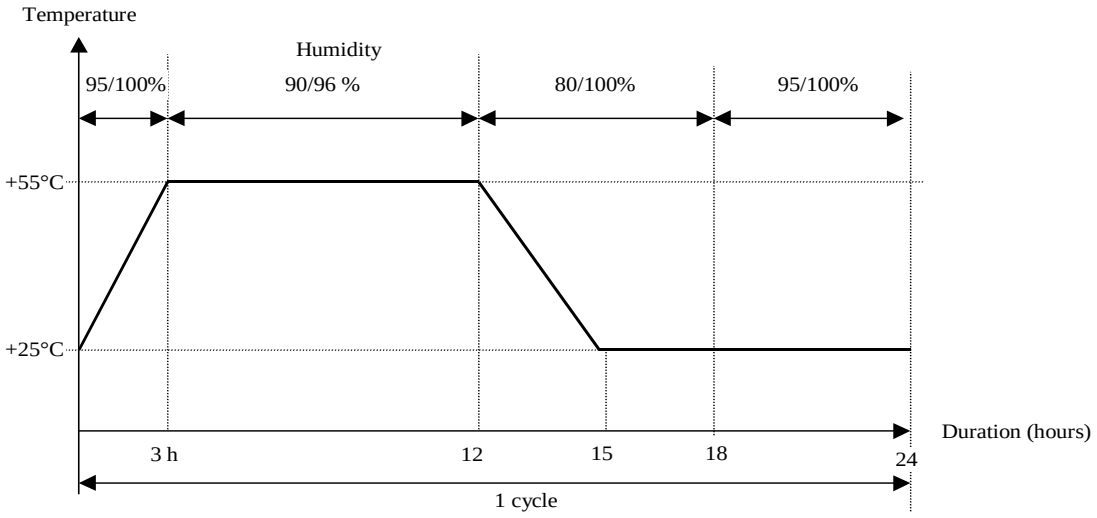
Room temperature :	**Room humidity :**	**Room pressure :**
20 ± 10 °C	25 - 70 % RH	860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** started: 03/12/2018 finished: 17/12/2018

Test description:

The climatic sequence test was performed according to generic specification ESCC3403 issue 6 §8.12 and detail specification ESCC3403010 issue 4, with the following conditions :

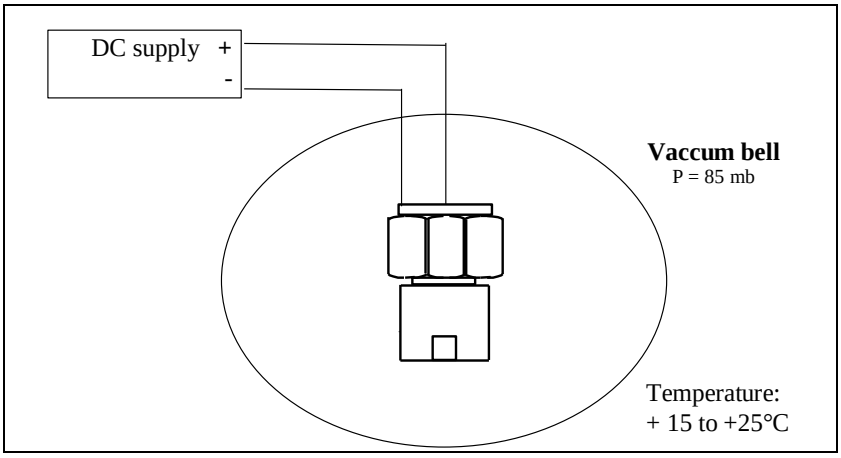
- Dry heat test (IEC 68-2-2 test Ba) :
  Temperature : +125°C
  Duration before measurements : 2 hours

- Damp heat test (first cycle IEC 68-2-30 test D) :
  Temperature : +55°C
  Humidity : 80 to 100 % R.H. see drawing below
  Duration : 1 cycle 24 hours



- Cold test (IEC 60068-2-1 test Aa) :
  Temperature : -55°C
  Duration before measurements : 2 hours

- Low air pressure (IEC 60068-2-13 test M) :
  Temperature : +15°C/+25°C
  Duration : 1 to 2 minutes
  DC power : 0.5W
  Pressure : 85 mb
  No measurement during this test



- Damp heat test (remaining cycles IEC 60068-2-4 test D) :
  Temperature : +55°C
  Humidity : 80 to 100 % R.H. see drawing below
  Duration : 5 cycles
  No measurement during this test

Requirement :

- Visual inspection : no damage
- V.S.W.R. ≤ 1.08 from 0.01 to 4 GHz
  ≤ 1.10 from 4 to 8 GHz
  ≤ 1.15 from 8 to 12.5 GHz
  ≤ 1.20 from 12.5 to 18 GHz
- Impedance 47.5 Ω to 52.5 Ω

- Temperature coefficient of attenuation: $TC_{imp} \leq 4.10^{-4}$dB/ dB/°C

$$TC_{imp} = \frac{\frac{\text{Resistance}_{dryheat} - \text{Resistance}_{cold}}{\text{Resistance}_{ambient}}}{T_{max} - T_{min}}$$

Results:

- RF measurement with TNC CAL KIT :

R404370670 sample 3						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.03	1.04	1.02	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.07	1.09	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.06	1.07	1.07		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.08	1.08	1.12		-

R404370670 sample 3						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	49.78	50.10	49.88	3×10^{-4}	2.46E-05

R404370670 sample 5						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.04	1.04	1.03	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.07	1.09	1.06		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.07	1.08	1.07		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.07	1.08	1.10		-

R404370670 sample 5						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.00	50.22	49.74	3×10^{-4}	5.33E-05

R404370670 sample 6						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.04	1.05	1.03	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.08	1.09	1.06		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.07	1.08	1.08		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.07	1.07	1.12		-

R404370670 sample 6						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.19	51.47	49.87	3×10^{-4}	6.64E-05

R404370670 sample 9						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.03	1.04	1.02	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.07	1.08	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.07	1.08	1.08		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.07	1.07	1.11		-

R404370670 sample 9						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.15	50.38	49.91	3×10^{-4}	5.21E-05

- RF measurement with GPC7 CAL KIT:

R404370670 sample 3						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.02	1.01	1.03	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.03	1.04	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.08	1.07	1.08		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.08	1.07	1.09		-

R404370670 sample 3						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.06	50.09	49.04	3×10^{-4}	1.17E-04

R404370670 sample 5						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.02	1.01	1.03	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.03	1.04	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.07	1.06	1.08		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.07	1.13	1.08		-

R404370670 sample 5						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.19	50.24	49.01	3×10^{-4}	1.15E-04

R404370670 sample 6						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.01	1.03	1.02	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.03	1.05	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.06	1.06	1.08		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.06	1.06	1.08		-

R404370670 sample 6						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.12	50.33	48.91	3×10^{-4}	1.57E-04

R404370670 sample 9						
Frequency	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
V.S.W.R at frequency points						
DC ≤ x ≤ 4.0 GHz	≤ 1.08	1.02	1.03	1.03	-	-
4.0 ≤ x ≤ 8.0 GHz	≤ 1.10	1.03	1.03	1.05		-
8.0 ≤ x ≤ 12.5 GHz	≤ 1.15	1.06	1.06	1.07		-
12.5 ≤ x ≤ 18.0 GHz	≤ 1.20	1.07	1.07	1.08		-

R404370670 sample 9						
Impedance (Ω)	Requirements	Ambient	Cold	Hot	Drift requirement	Drift
	47.5 ≤ x ≤ 52.5	50.03	50.18	49.77	3×10^{-4}	4.55E-05

- Damp heat test (first cycle) :

- Low air pressure

Nothing to noticed during low air pressure test.

- Damp heat test (remaining cycles)

Nothing to noticed during damp heat test.

- Final measurements:

- RF measurement with TNC CAL KIT :

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.05		0.94
8.0		1.04	1.03		0.96
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.07	1.08		0.93
18.0		1.05	1.06		0.95
Max 0.01 to 18.0	-	1.08	1.09	± 2 %	0.93

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.78	49.89	± 250m Ω	110

R404370670 sample 05					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.07	1.08	± 2 %	0.93

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.00	49.96	± 250m Ω	40

R404370670 sample 06					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.07		0.94
16.0	≤ 1.20	1.06	1.06		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 06					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.19	50.06	± 250m Ω	130

R404370670 sample 09					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.05	1.05		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 09					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.15	50.18	± 250m Ω	30

- RF measurement with GPC7 CAL KIT:

R404370670 sample 03					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.02	1.03		0.98
18.0		1.03	1.02		0.97
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 03					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.06	50.03	± 250m Ω	30

R404370670 sample 05					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.02	± 2 %	0.99
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.03		0.96
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 05					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.06	50.14	± 250m Ω	80

R404370670 sample 06					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.03		0.98
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.01	1.00		0.99
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.06	1.06	± 2 %	0.00

R404370670 sample 06					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.12	50.25	± 250m Ω	130

R404370670 sample 09					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.01	1.02		0.99
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.04	1.03		0.96
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 09					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.03	49.95	± 250m Ω	80

N.A. : not applicable
See RF measurement graphs in appendix 1.

Conclusion:

Pass.

Coupling proof torque

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03, 05, 06 and 09

Equipment :

Interface calliper TNC socket MITUTOYO n°3002 526 1108
Wrench TNC torque TNC RADIALL 339 N.cm n° 1030 263 1005

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 18/12/2018

Test description:

The coupling proof torque test was performed according to generic specification ESCC3403 issue 6 §8.13 and detail specification ESCC34030010 issue 4, with the following conditions:

The interface dimension was measured.

- The connector was completely engaged from its mating part, with the coupling nut torque (tightened to 339N.cm).
- After one minute the connector was disengaged from its mating part.
- The interface dimension was measured.

Requirements:

- The coupling mechanism shall not be dislodged.
- Interface dimensions shall be conforming to the detail specification:
  Recess between centre contact and reference plane: 5.28mm ≤ d ≤ 5.38mm
  recess between reference plane and insulator : 5.35mm ≤ d ≤ 5.50mm
- Visual inspection: no damage.

Resultat:

No damage.

Interface dimensions (mm)				
Samples	Insulator		Centre contact	
	Before	After	Before	After
Requirements	5.28 / 5.38		5.35 / 5.50	
R404370670 –1836A – 003	5.28	5.30	5.38	5.38
R404370670 –1836A – 005	5.29	5.31	5.36	5.37
R404370670 –1836A – 006	5.29	5.28	5.41	5.41
R404670670 –1836A – 009	5.31	5.29	5.39	5.39

Conclusion:

Pass.

Mating and unmating forces

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03, 05, 06 and 09

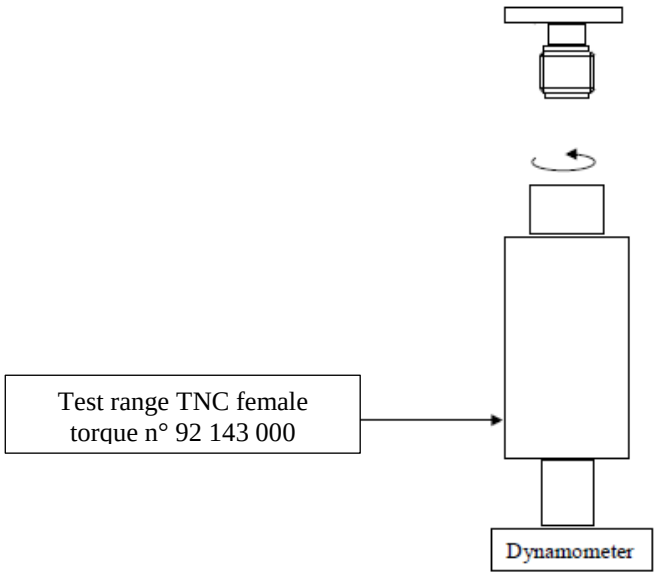
Equipment :

Dynamometric wrench n°3014 120 1111
Test range TNC female torque n° 92 143 000
Wrench TNC torque

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 17/12/2018

Test description:

The mating and unmating forces test was performed according to generic specification ESCC3403 issue 6 §8.14 with the following conditions:
A screw-coupling connector is fully mated with its mating gauge when their reference planes coincide.



Requirements:

During the entire mating or unmating cycle, the necessary torque shall not exceed 22.6 N.cm.

Results:

Torque measurements:

Mating and unmating (N.cm)			
Samples	Requirement	Female connector	
		Mating	Unmating
R404370670 –1836A – 003	< 22.6.N.cm	Pass	Pass
R404370670 –1836A – 005		Pass	Pass
R404370670 –1836A – 006		Pass	Pass
R404670670 –1836A – 009		Pass	Pass

Conclusion:

Pass.

Radiall	Radiographic inspection (1)

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 03, 05, 06 and 09

Equipment :

X-ray machine

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 18/12/2018

Test description:

X-ray test was performed according to generic specification ESCC3403 issue 6 §8.15 and detail specification ESCC3403010 issue 4.

Radiographs shall be taken of the solder joints between the foil and the connector and the pin and the centre conductor.

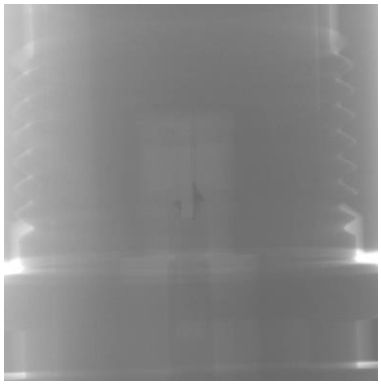
Requirements:

No cracks or breaks in the solder joints.

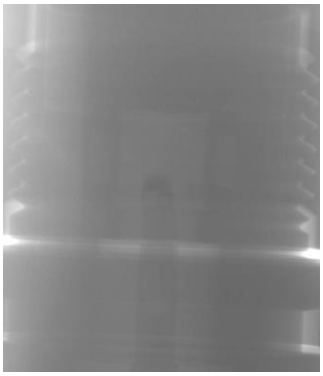
Results:

R404370670 batch 1836A

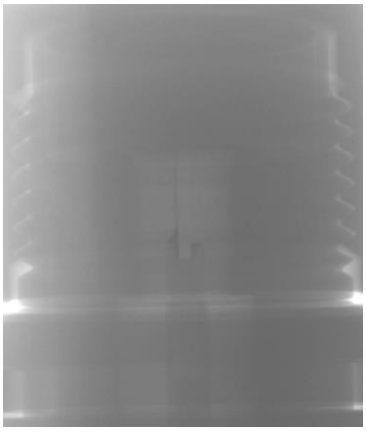
Sample 03

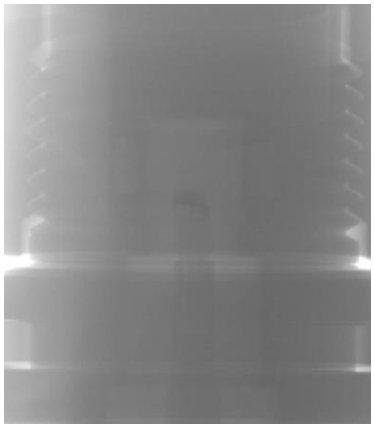


Sample 05



Sample 06





Sample 09

Nota : The contrast is low due to the density of materials.

Endurance Subgroup

Operating life

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 12, 14 and 17

Equipment :

Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511
Power sensor ROHDE & SCHWARZ A n°8033 033 0111
Generator ROHDE & SCHWARZ SMF 100A n°8009 014 0111
Amplifier BONN TWAL 0418-20 n°8022 008 0807

Room temperature :	**Room humidity :**	**Room pressure :**
20 ± 10 °C	25 - 70 % RH	860 -1060 mbar
Operator : Chambert L / Richier F.	**Department :** IDA laboratory	**Date of test :** started: 05/11/2018 finished: 17/12/2018

Test description:

Operating life test was performed according to generic specification ESCC3403 issue 6 §8.17 and detail specification ESCC3403010 issue 4, with the following conditions :

- RF average power: 2W

- Frequency: 18.0 GHz.

The devices were tested 1000 hours at rated input power applied in cycles of 1.5 hours « on » and 0.5 hour « off » throughout the test.

On completion of the 1000-hour operating life, the components shall be subjected to an additional 20 hours at T_{amb} = +70°C, applied in cycles of 1.5 hours 'on' and 0.5 hours 'off'.

Requirements:

- Visual inspection : no damage

- V.S.W.R. ≤ 1.08 from 0.01 to 4 GHz
  ≤ 1.10 from 4 to 8 GHz
  ≤ 1.15 from 8 to 12.5 GHz
  ≤ 1.20 from 12.5 to 18 GHz

- Impedance 47.5 Ω to 52.5 Ω

Results:

Measurement after 1000 hours operating life.

- RF measurement with TNC CALT KIT:

R404370670 sample 12					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.05	1.05		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 12					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.37	50.36	± 250m Ω	10

R404370670 sample 14					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.07	1.08		0.93
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 14					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.31	50.48	± 250m Ω	170

R404370670 sample 17					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.00	1.00	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.09	1.08		0.92
16.0	≤ 1.20	1.03	1.04		0.97
18.0		1.08	1.08		0.00
Max 0.01 to 18.0	-	1.09	1.09	± 2 %	0.00

R404370670 sample 17					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.24	49.35	± 250m Ω	110

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 12					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.00	1.00		0.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.01	1.01		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 12					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.28	50.29	± 250m Ω	10

R404370670 sample 14					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.03	1.03		0.00
18.0		1.03	1.03		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 14					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.01	50.01	± 250m Ω	0.00

R404370670 sample 17					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.00	1.00	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.02	1.02		0.00
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.02	1.02		0.00
18.0		1.07	1.07		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 17					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.43	50.43	± 250m Ω	0.00

Measurement after 20 hours at temperature +70°C.

- RF measurement with TNC CALT KIT:

R404370670 sample 12					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.03		0.96
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.07	1.06		0.93
16.0	≤ 1.20	1.05	1.05		0.00
18.0		1.04	1.05		0.96
Max 0.01 to 18.0	-	1.07	1.08	± 2 %	0.93

R404370670 sample 12					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.36	50.40	± 250m Ω	40

R404370670 sample 14					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.03		0.96
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.08	1.08		0.0
18.0		1.04	1.05		0.96
Max 0.01 to 18.0	-	1.08	1.07	± 2 %	0.93

R404370670 sample 14					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.48	50.44	± 250m Ω	80

R404370670 sample 17					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.00	1.00	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.04	1.04		0.00
18.0		1.08	1.08		0.00
Max 0.01 to 18.0	-	1.09	1.09	± 2 %	0.00

R404370670 sample 17					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.35	49.38	± 250m Ω	30

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 12					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.02		1.92
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.00	1.01		1.00
12.5	≤ 1.15	1.07	1.05		1.87
16.0	≤ 1.20	1.01	1.02		0.99
18.0		1.06	1.05		0.94
Max 0.01 to 18.0	-	1.07	1.06	± 2 %	0.93

R404370670 sample 12					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.29	50.09	± 250m Ω	200

R404370670 sample 14					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.08	1.08		0.00
16.0	≤ 1.20	1.03	1.03		0.00
18.0		1.03	1.03		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.93

R404370670 sample 14					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.01	49.66	± 250m Ω	350

R404370670 sample 17					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.00	1.00	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.02	1.01		0.98
12.5	≤ 1.15	1.06	1.05		0.94
16.0	≤ 1.20	1.02	1.03		0.98
18.0		1.07	1.08		0.93
Max 0.01 to 18.0	-	1.07	1.08	± 2 %	1.87

R404370670 sample 17					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.43	50.09	± 250m Ω	340

N.A. : not applicable
See RF measurement graphs in appendix 1.

Conclusion:

Pass.

Permanence of marking

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 12, 14 and 17

Equipment :

Toothbrush
Isopropyl alcohol
Ethyl alcohol
Binocular microscope WILD M3C

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 18/12/2018

Test description:

The permanence of marking test was performed according to generic specification ESCC3403 issue 6 §8.17 with the following conditions:

- The sampling was divided in two groups:
  - The first group was submitted to the ethyl alcohol solution: R404370670 batch 1836A 012
  - The second group was submitted to the isopropyl alcohol solution: samples R404370670 batch 1836A 014 and 017.
- The components were completely immersed in the solution for 1 minute.
- After 1 minute, the surface containing the marking was brushed using a toothbrush 10 times on the marking zone.
- The operation was repeated 3 times (3 immersions and 3 brushings).
- 5 minutes waiting before visual inspection.

Requirement :

No visible deterioration of the marking to the naked eye.

Results:

Visual inspection on ethyl alcohol solution group:

R404370670 batch 1836A sample 12	
Before test	After test :
	

Visual inspection on isopropyl alcohol solution group:

R404370670 batch 1836A sample 14	
Before test	After test
	
R404370670 batch 1836A sample 17	
Before test	After test :
	

Nothing to report.

Conclusion:

Pass.

Radiall	Radiographic inspection (2)

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample12, 14 and 17

Equipment :

X-ray machine

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 18/12/2018

Test description:

X-ray test was performed according to generic specification ESCC3403 issue 6 §8.15 and detail specification ESCC3403010 issue 4.

Radiographs shall be taken of the solder joints between the foil and the connector and the pin and the centre conductor.

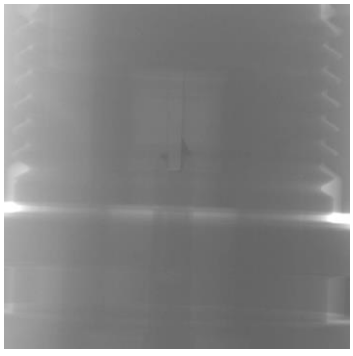
Requirements:

No cracks or breaks in the solder joints.

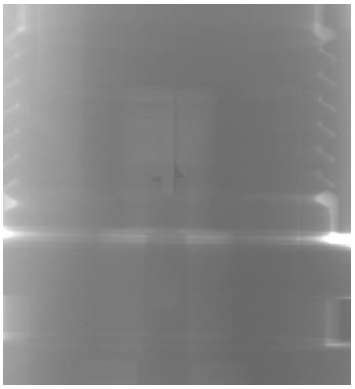
Results:

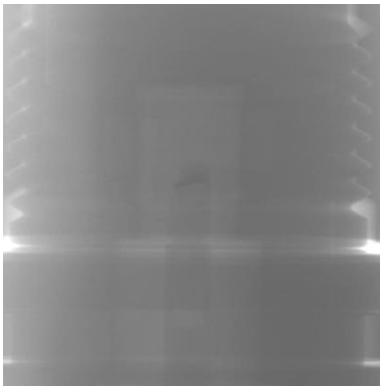
R404370670 batch 1836A

Sample 12

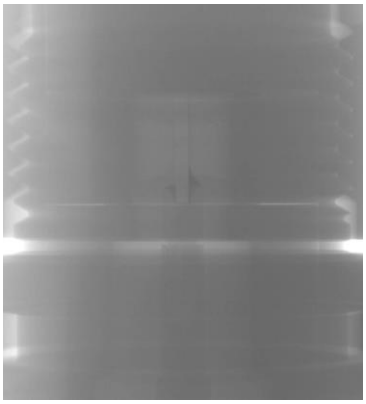


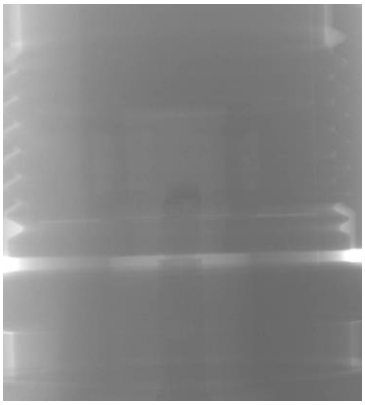
Sample 14





Sample 17





Conclusion:

Pass.

Electrical Subgroup

RF Leakage

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 13, 19 and 23

Equipment :

Faraday Cage SIEMENS 8M^3 LCE0134
Spectrum analyzer H.P. 71210 A SN: 2715A00970 LCE0060
Synthetized sweeper H.P. 8341B SN: 2910A02399 LCE0061
Amplifier 1990 MATECH FS4-00102-00-55-10P SN: 187605 IND0027

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F / Male B.	**Department :** LCE Voreppe / IDA laboratory	**Date of test :** 27/11/2018

Test description:

The test was performed according to test method FIQL-ES-101 Rev. B. The test procedure for shielding effectiveness measurement in reverberation chamber. The device under test was submitted to a homogeneous and isotropic electromagnetic field of known power in order to give shielding effectiveness level. The test was performed with 120 measurement points over the frequency range

Requirement :

RF Leakage ≤ -[80 - f(GHz)] dBi from DC to 18 GHz

Results:

RF leakage							
Samples	From DC to 18GHz						
Frequency (dB)	0	3	6	9	12	15	18
Requirement (dB)	≤ -80 dBi	≤ -77 dBi	≤ -74 dBi	≤ -71 dBi	≤ -68 dBi	≤ -65 dBi	≤ -62 dBi
R404370670 1836A 013	-131	-122	-111	-110	-100	-92	-95
R404370670 1836A 019	-131	-125	-113	-109	-100	-93	-95
R404370670 1836A 023	-131	-125	-111	-108	-100	-95	-95

See RF leakage measurement graphs in appendix 4.

Conclusion:

Pass.

Radiall	Peak power

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 13, 19 and 23

Equipment :

Power amplifier BONN ELECTRONIK BLMA 10840-400/200D n°8022 011 0214
Signal generator ROHDE & SCHWARZ SMB 100A n°8009 020 0915
Microhmmeter Sefelec MGR10 n°8063 004 0106
Network analyzer AGILENT PNA N5227A US51270399 n° 8025 062 0914
TNC S Calibration kit ROSENBERGER BH007 n°8039 121 0914
GPC-7 Calibration Kit Model 3651 n° 8039 117 0511

Room temperature :	**Room humidity :**	**Room pressure :**
20 ± 10 °C	25 - 70 % HR	860 -1060 mbar
Operator : Richier F / Chambert L.	**Department :** IDA laboratory	**Date of test :** 03/12/2018

Test description:

The peak power test was performed according to generic specification ESCC3403 issue 6 § 8.20 and detail specification ESCC3403010 issue 4 with following conditions:

- Peak power: 200 watts
- Pulse duration: 1µs
- Repetition rate: 100µs
- Duration test: 1 ms
- Temperature: room temperature

Requirements:

- Visual inspection : no damage
- V.S.W.R. ≤ 1.08 from 0.01 to 4 GHz
  ≤ 1.10 from 4 to 8 GHz
  ≤ 1.15 from 8 to 12.5 GHz
  ≤ 1.20 from 12.5 to 18 GHz
- Impedance 47.5 Ω to 52.5 Ω

Results:

- RF measurement with TNC CAL KIT :

R404370670 sample 13					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.01	1.01	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.05		0.96
12.5	≤ 1.15	1.06	1.06		0.00
16.0	≤ 1.20	1.06	1.06		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 13					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.92	49.96	± 250m Ω	40

R404370670 sample 19					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.05		0.96
12.5	≤ 1.15	1.05	1.05		0.00
16.0	≤ 1.20	1.07	1.07		0.00
18.0		1.04	1.04		0.00
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 19					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.14	49.99	± 250m Ω	150

R404370670 sample 23					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.06	1.06		0.00
8.0		1.04	1.04		0.00
12.5	≤ 1.15	1.05	1.06		0.95
16.0	≤ 1.20	1.08	1.08		0.00
18.0		1.06	1.06		0.00
Max 0.01 to 18.0	-	1.08	1.07	± 2 %	0.93

R404370670 sample 23					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	49.85	49.86	± 250m Ω	10

- RF measurement with GPC-7 CAL KIT :

R404370670 sample 13					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.00	1.01		1.00
12.5	≤ 1.15	1.07	1.07		0.00
16.0	≤ 1.20	1.00	1.02		2.00
18.0		1.05	1.04		0.95
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

R404370670 sample 13					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.55	50.63	± 250m Ω	80

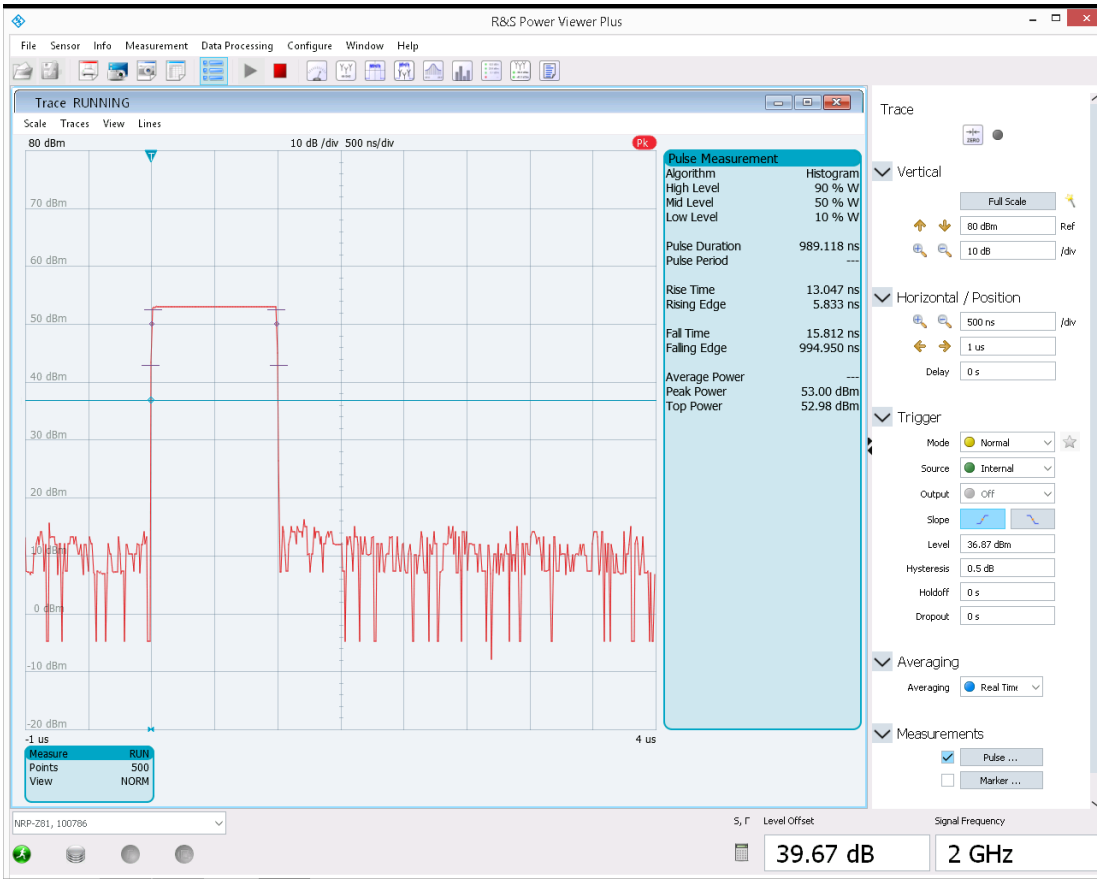
R404370670 sample 19					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.02	1.02		0.00
8.0		1.01	1.00		0.99
12.5	≤ 1.15	1.08	1.10		1.85
16.0	≤ 1.20	1.02	1.03		0.98
18.0		1.04	1.05		0.96
Max 0.01 to 18.0	-	1.07	1.07	± 2 %	0.00

R404370670 sample 19					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.08	50.27	± 250m Ω	190

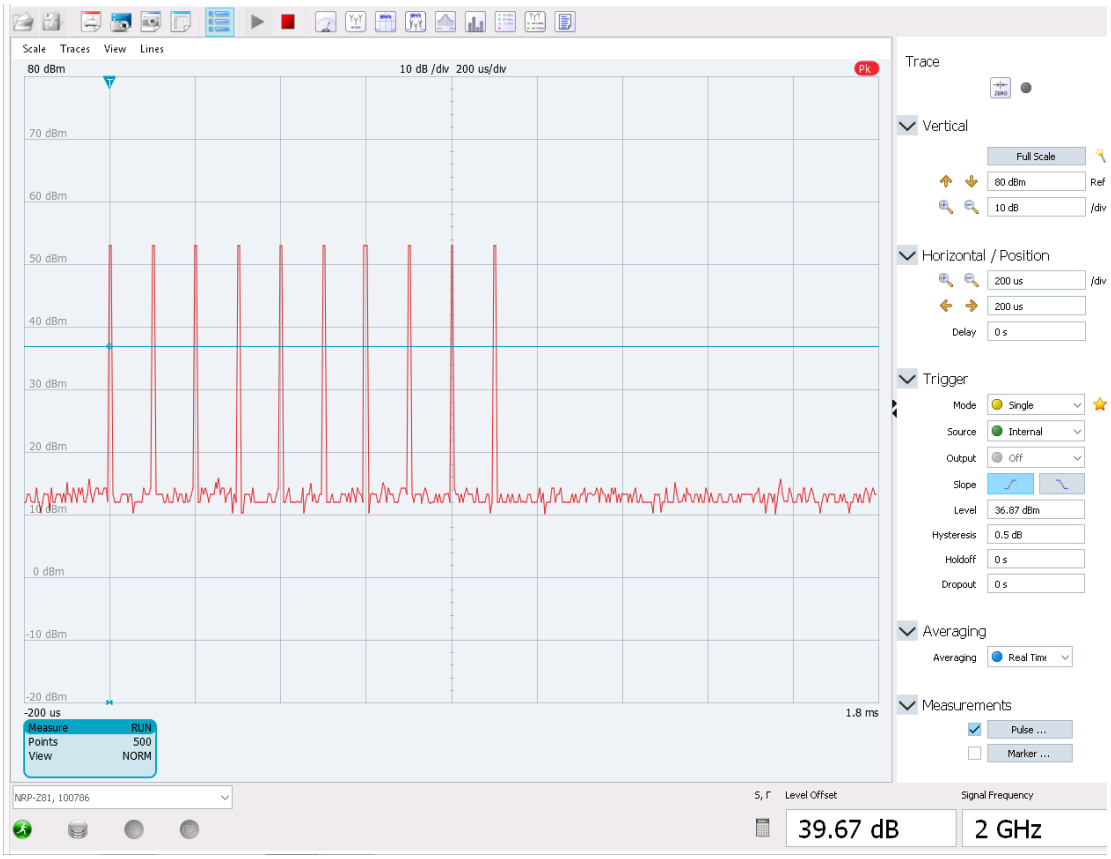
R404370670 sample 23					
Frequency (GHz)	Requirements	Before	After	Drift requirement	Drift (%)
V.S.W.R at frequency points					
0.01	≤ 1.08	1.02	1.02	± 2 %	0.00
4.0		1.04	1.04		0.00
5.0	≤ 1.10	1.01	1.02		0.99
8.0		1.01	1.01		0.00
12.5	≤ 1.15	1.07	1.08		0.93
16.0	≤ 1.20	1.02	1.03		0.98
18.0		1.03	1.03		0.00
Max 0.01 to 18.0	-	1.08	1.08	± 2 %	0.00

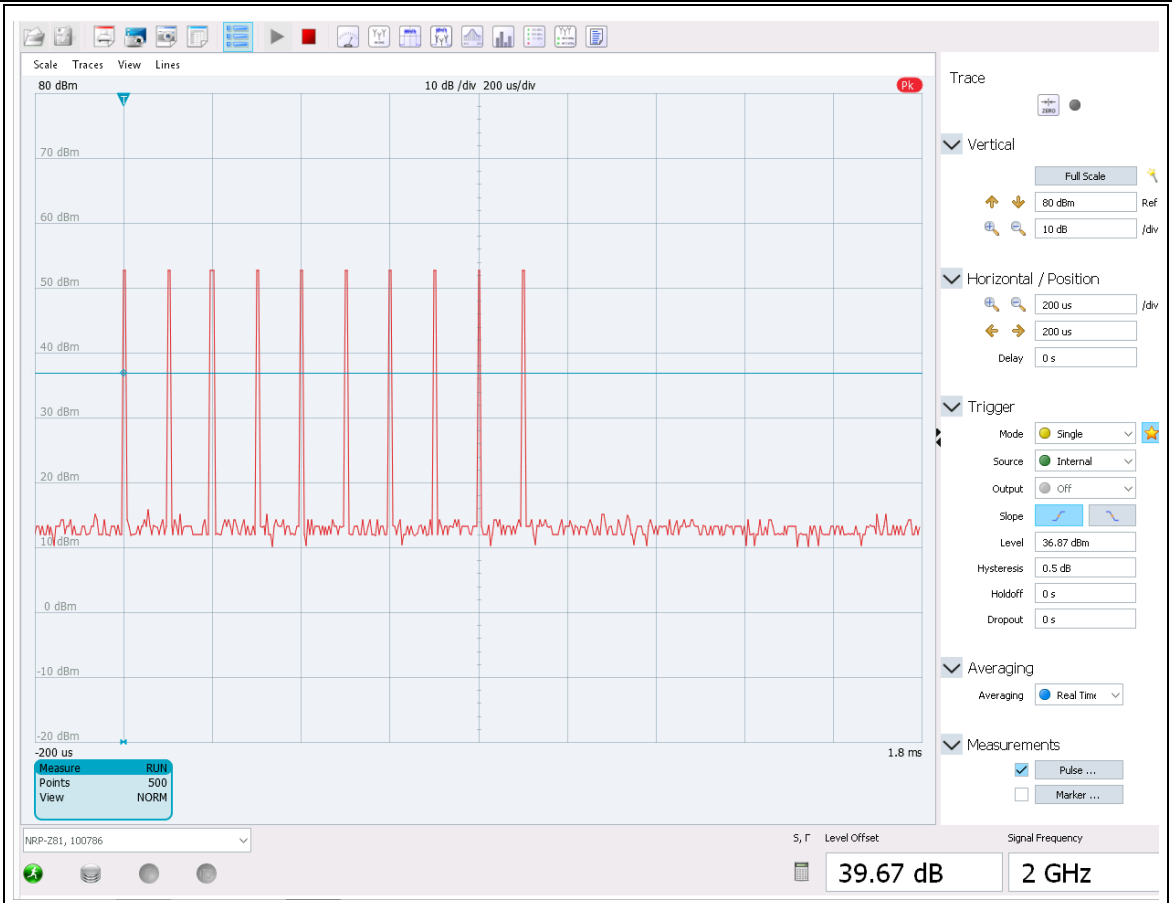
R404370670 sample 23					
Impedance (Ω)	Requirements	Before	After	Drift requirement	Drift(m Ω)
	47.5 ≤ x ≤ 52.5	50.01	50.13	± 250m Ω	120

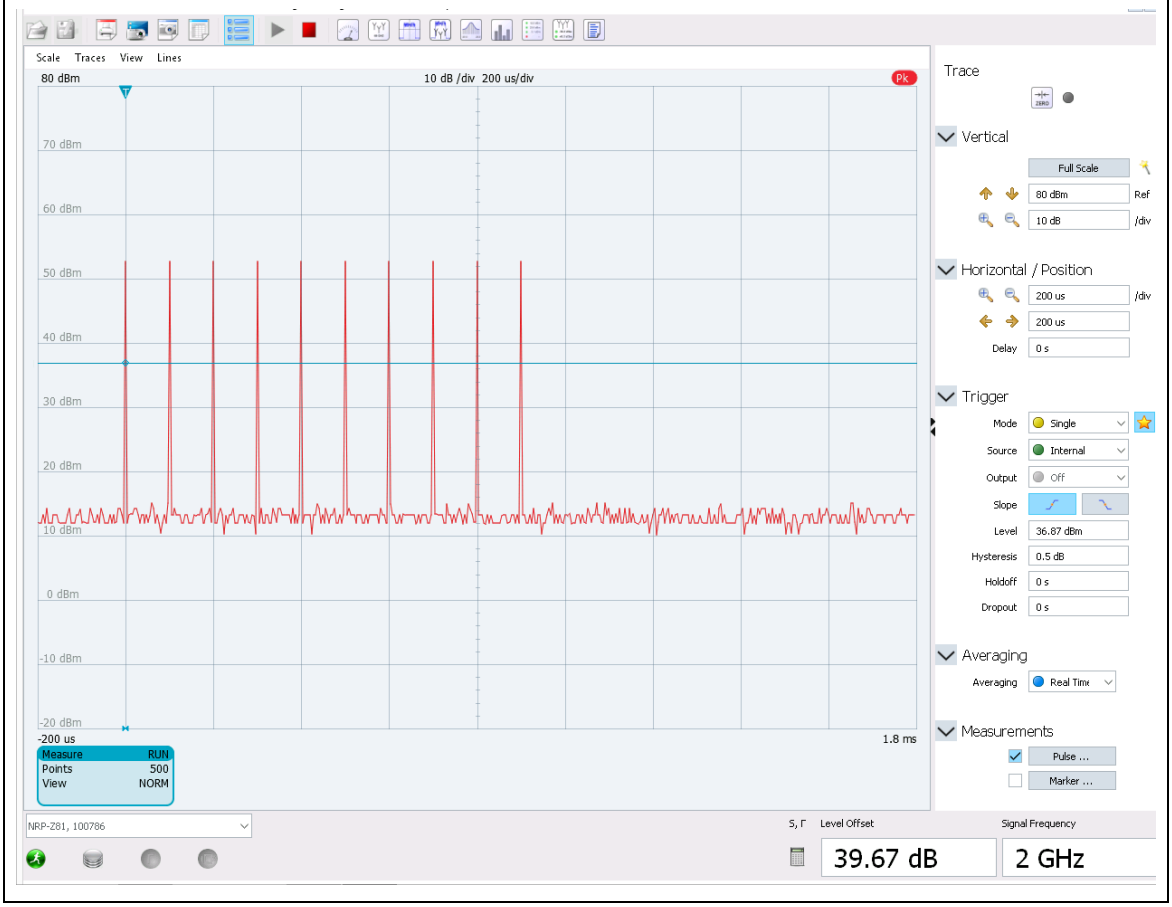
N.A. : not applicable
See RF measurement graphs in appendix 1.



R404370670 sample 13







See RF measurements graphs in appendix 1.

Conclusion:

Pass.

Radiall	Radiographic inspection (3)

Specification :

General specification ESCC3403 issue 06
Detailed specification ESCC3403010 issue 04

Sampling :

RF load TNC R404370670 ESCC340301001, batch 1836A sample 13, 19 and 23

Equipment :

X-ray machine

Room temperature : 20 ± 10 °C	**Room humidity :** 25 - 70 % RH	**Room pressure :** 860 -1060 mbar
Operator : Richier F.	**Department :** IDA laboratory	**Date of test :** 18/12/2018

Test description:

X-ray test was performed according to generic specification ESCC3403 issue 6 §8.15 and detail specification ESCC3403010 issue 4.

Radiographs shall be taken of the solder joints between the foil and the connector and the pin and the centre conductor.

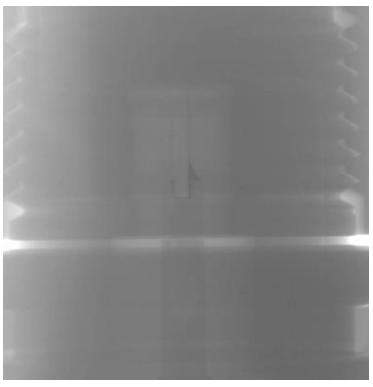
Requirements:

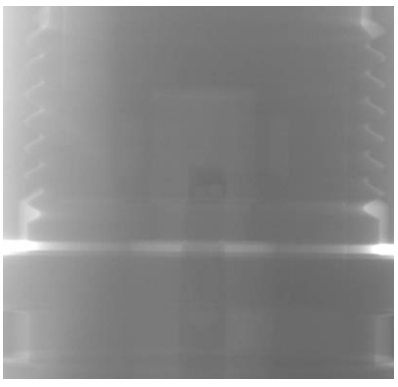
No cracks or breaks in the solder joints.

Results:

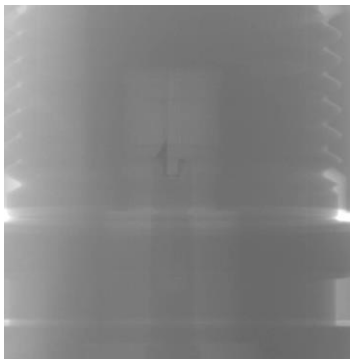
R404370670 batch 1836A

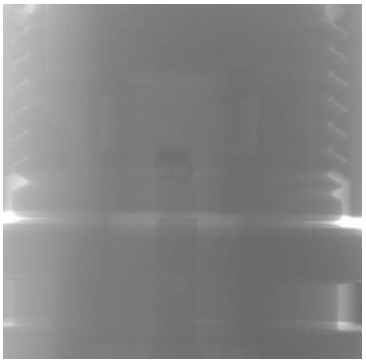
Sample 13



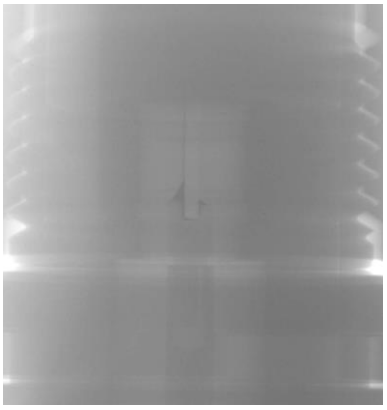


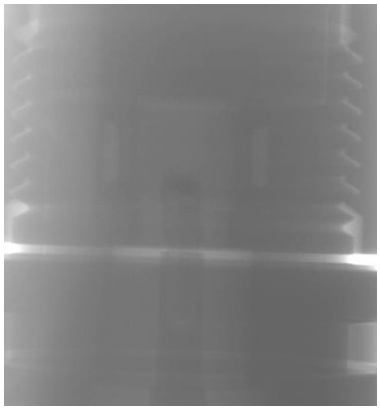
Sample 19





Sample 23



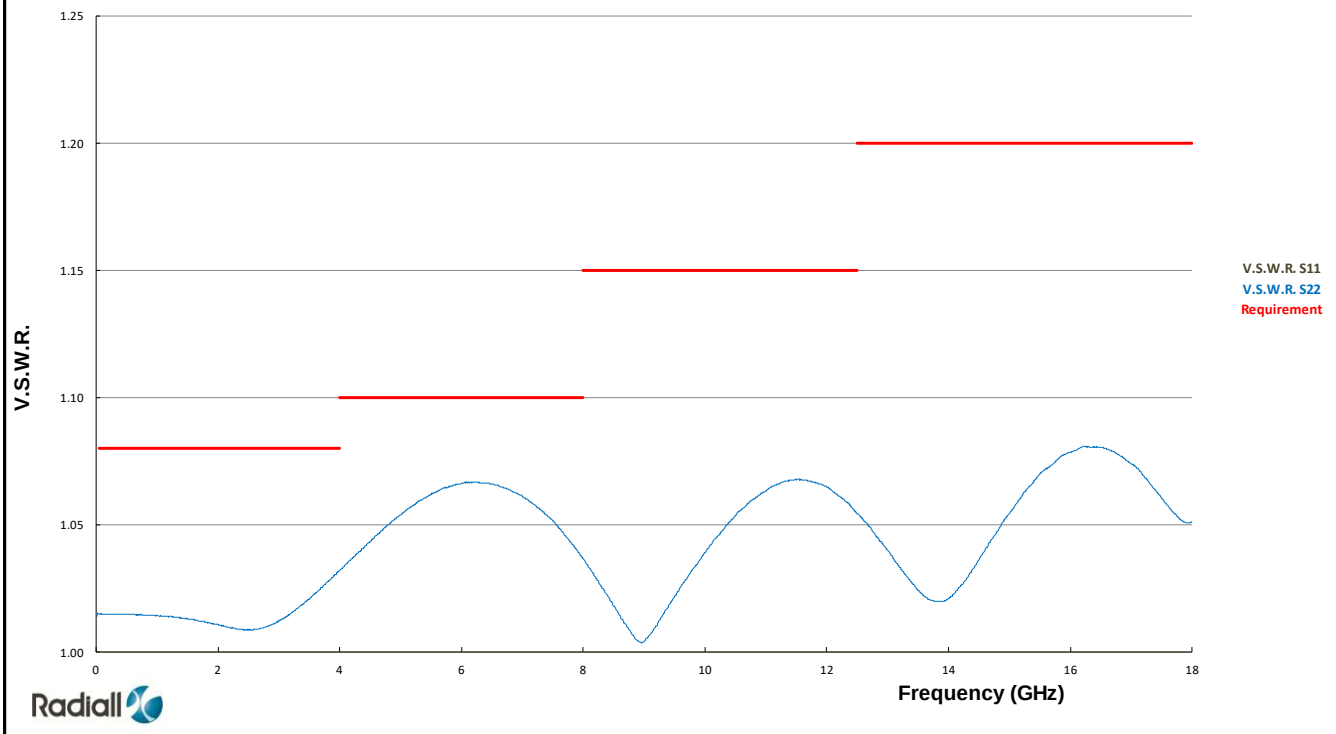


Conclusion:

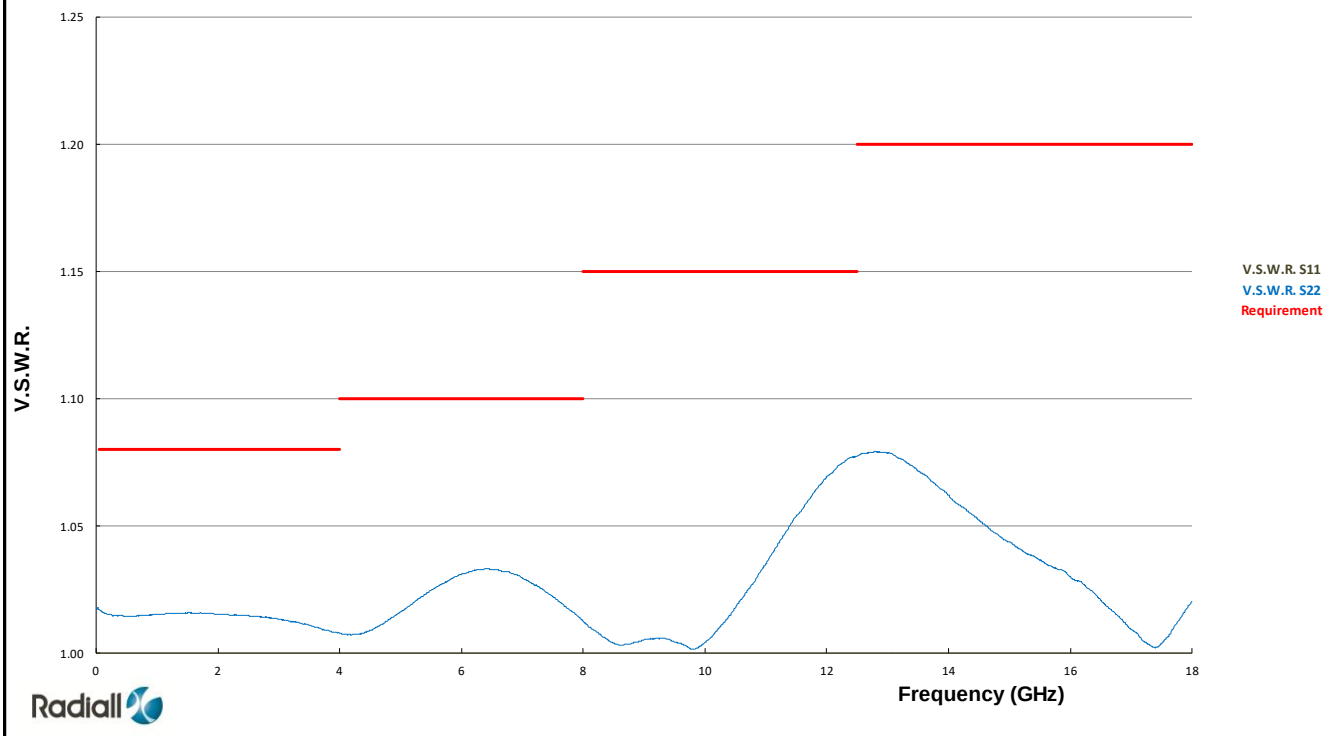
Pass.

RF measurement graphs

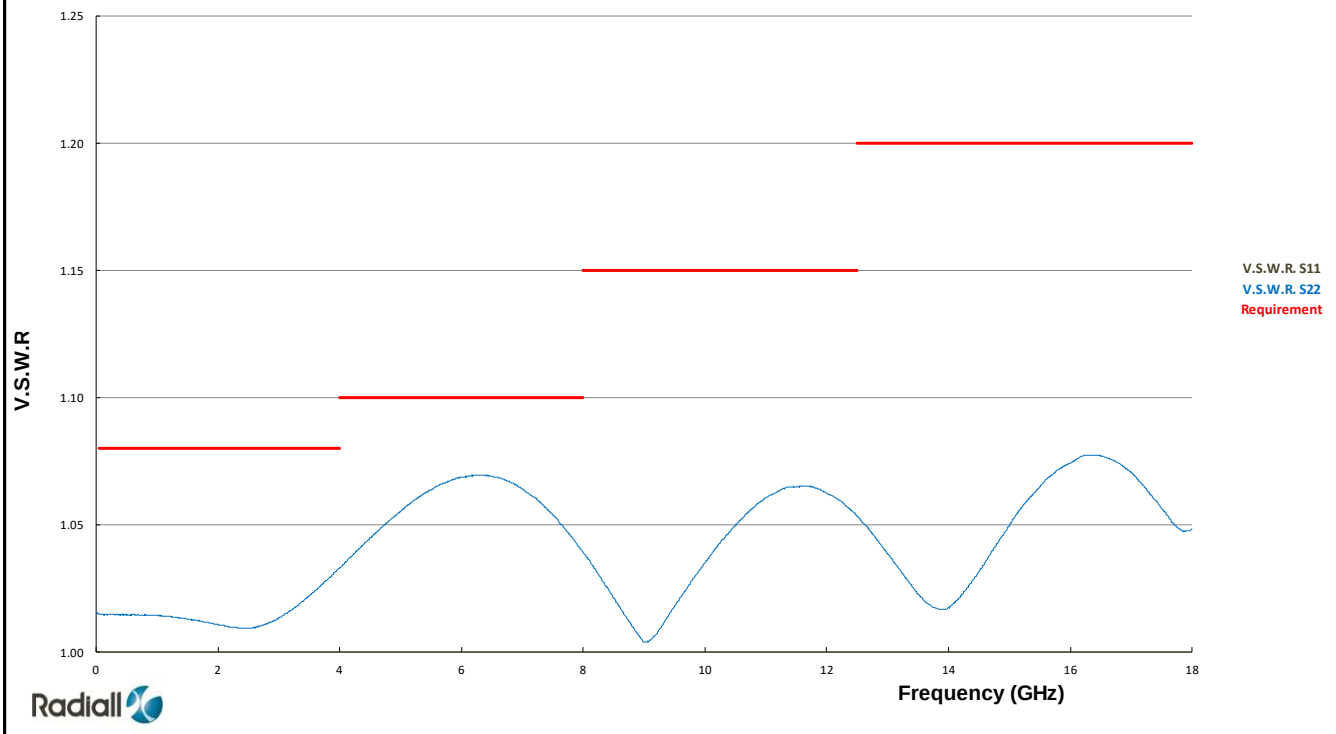
Initial measurement / V.S.W.R.
R404370670 sample 03 (with TNC KIT)



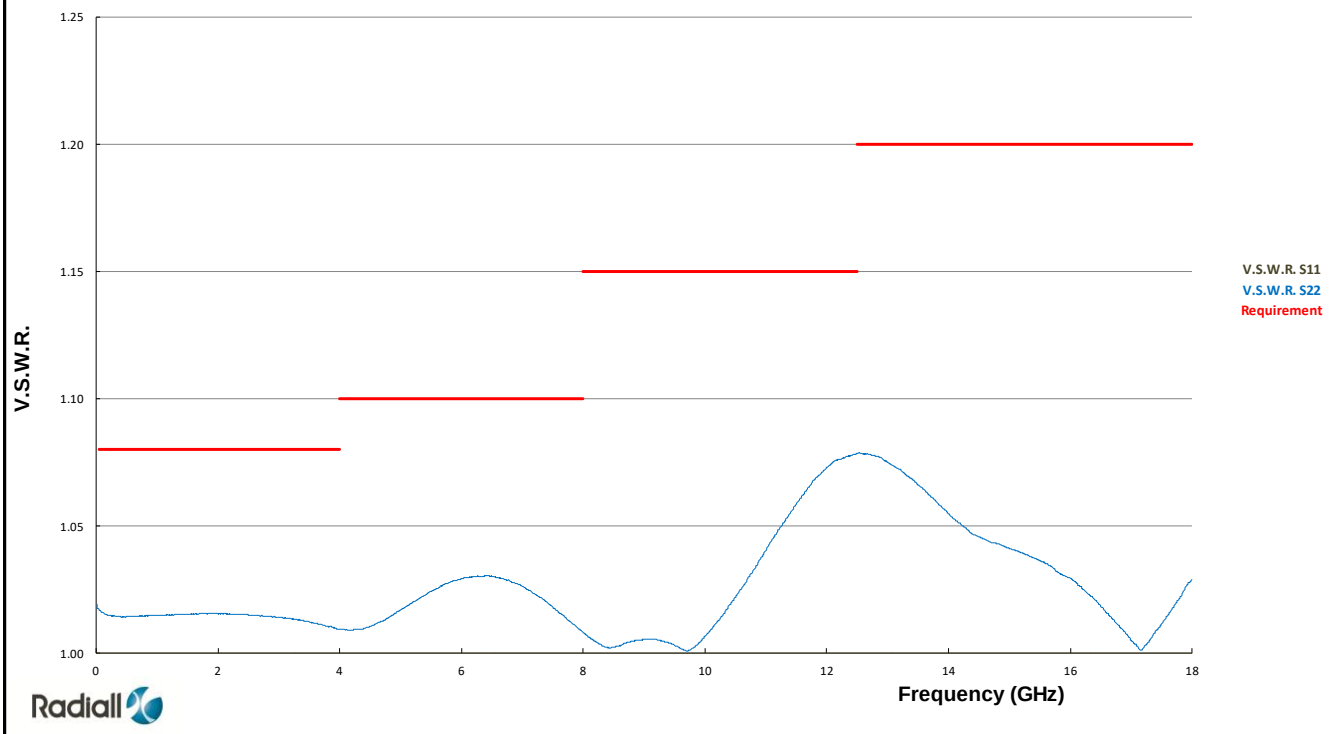
Initial measurement / V.S.W.R.
R404370670 sample 03 (with GPC7 KIT)



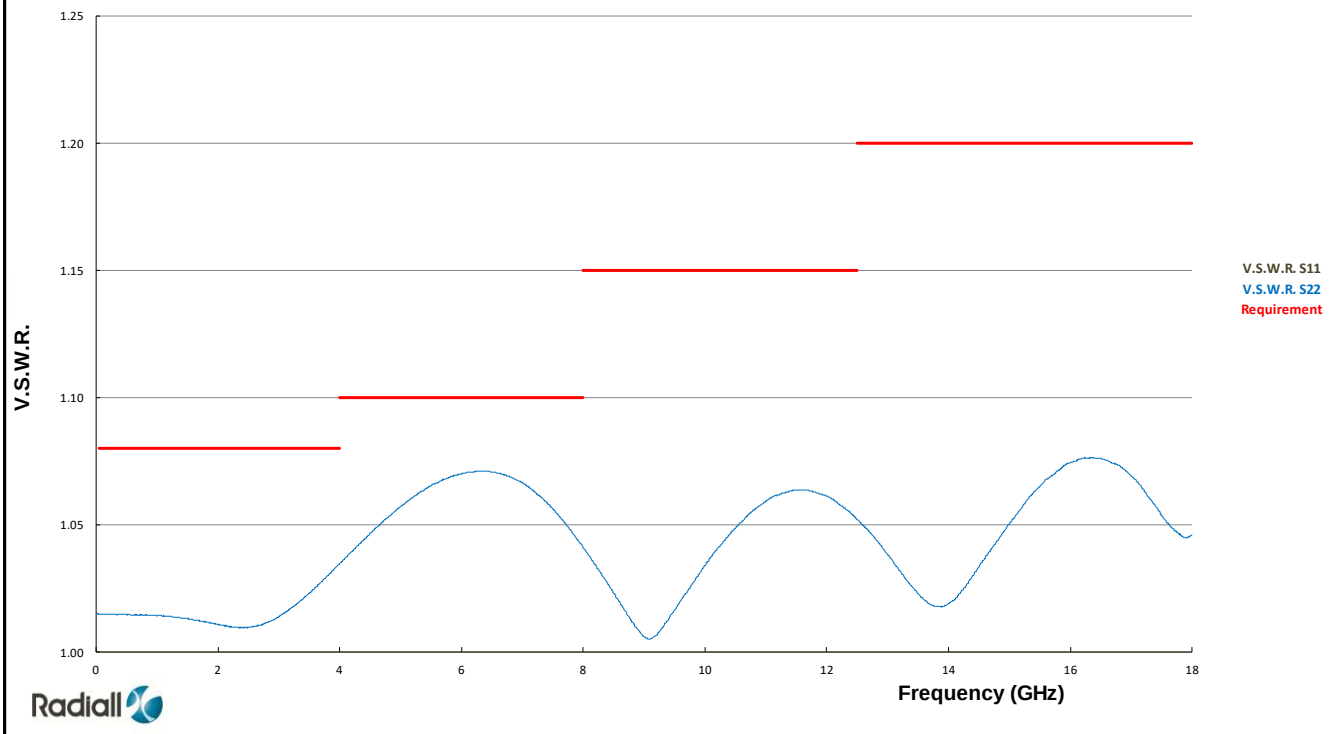
Measurement after vibrations / V.S.W.R.
R404370670 sample 03 (with TNC KIT)



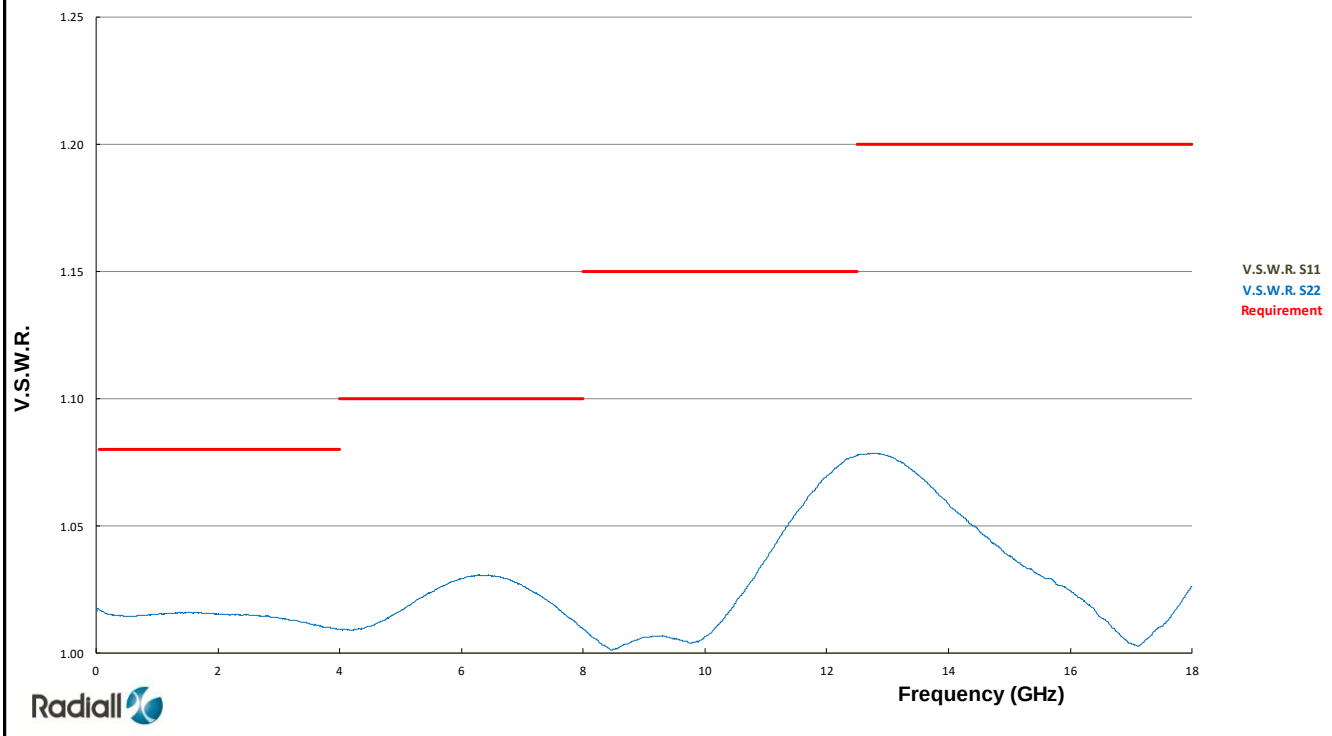
Measurement after vibrations / V.S.W.R.
R404370670 sample 03 (with GPC7 KIT)



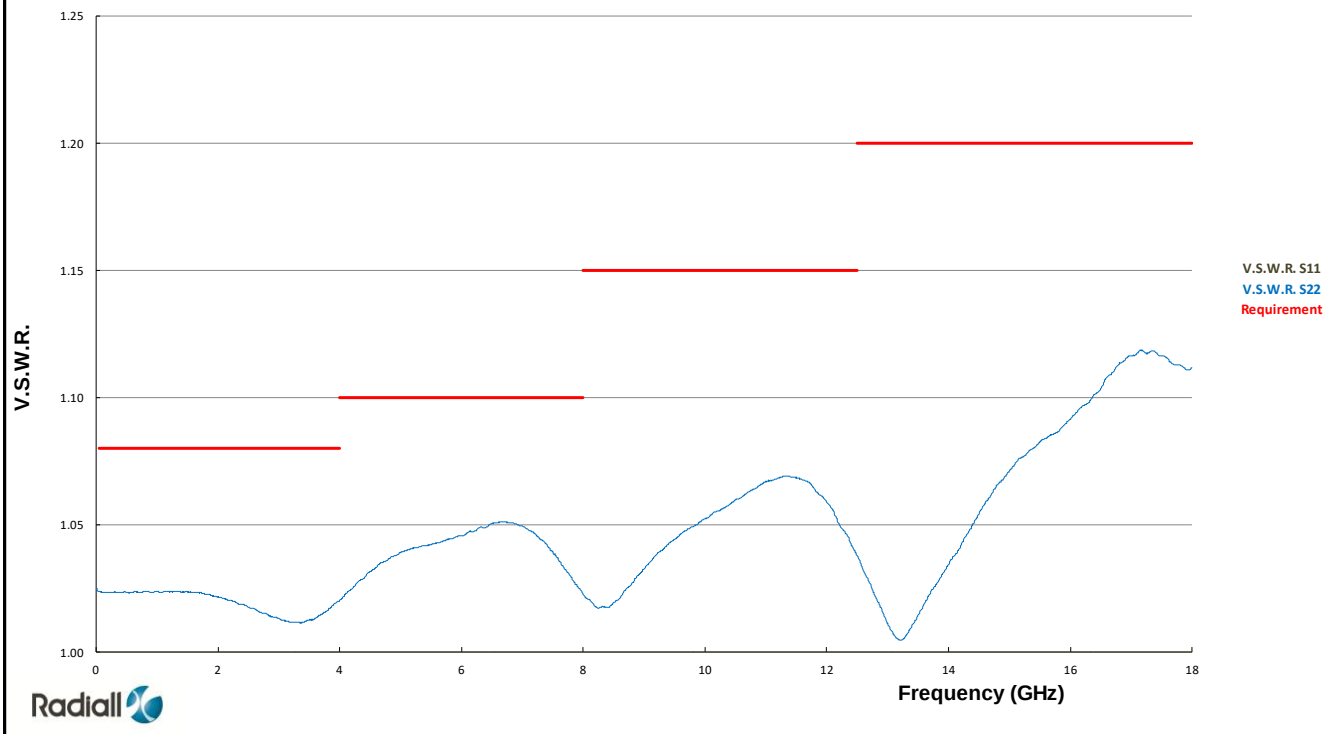
Measurement after shock / V.S.W.R.
R404370670 sample 03 (with TNC KIT)



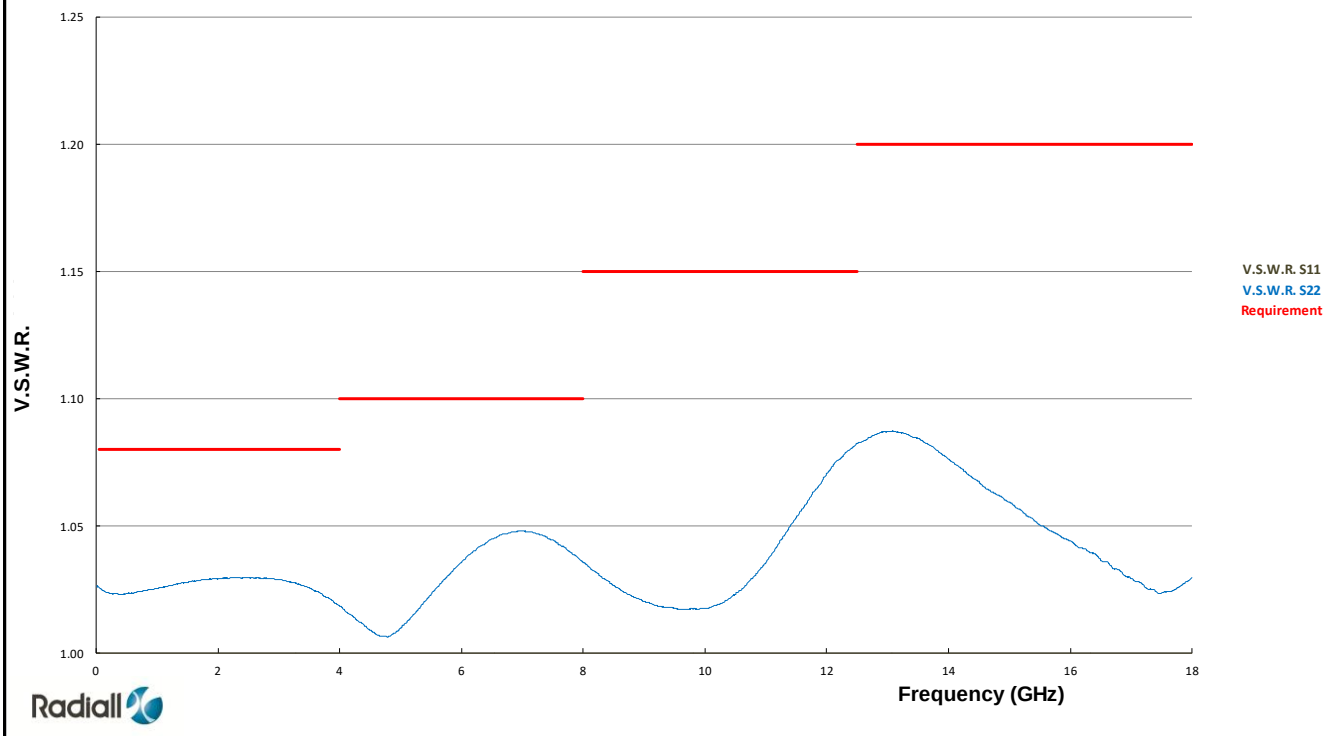
Measurement after shock / V.S.W.R.
R404370670 sample 03 (with GPC7 KIT)



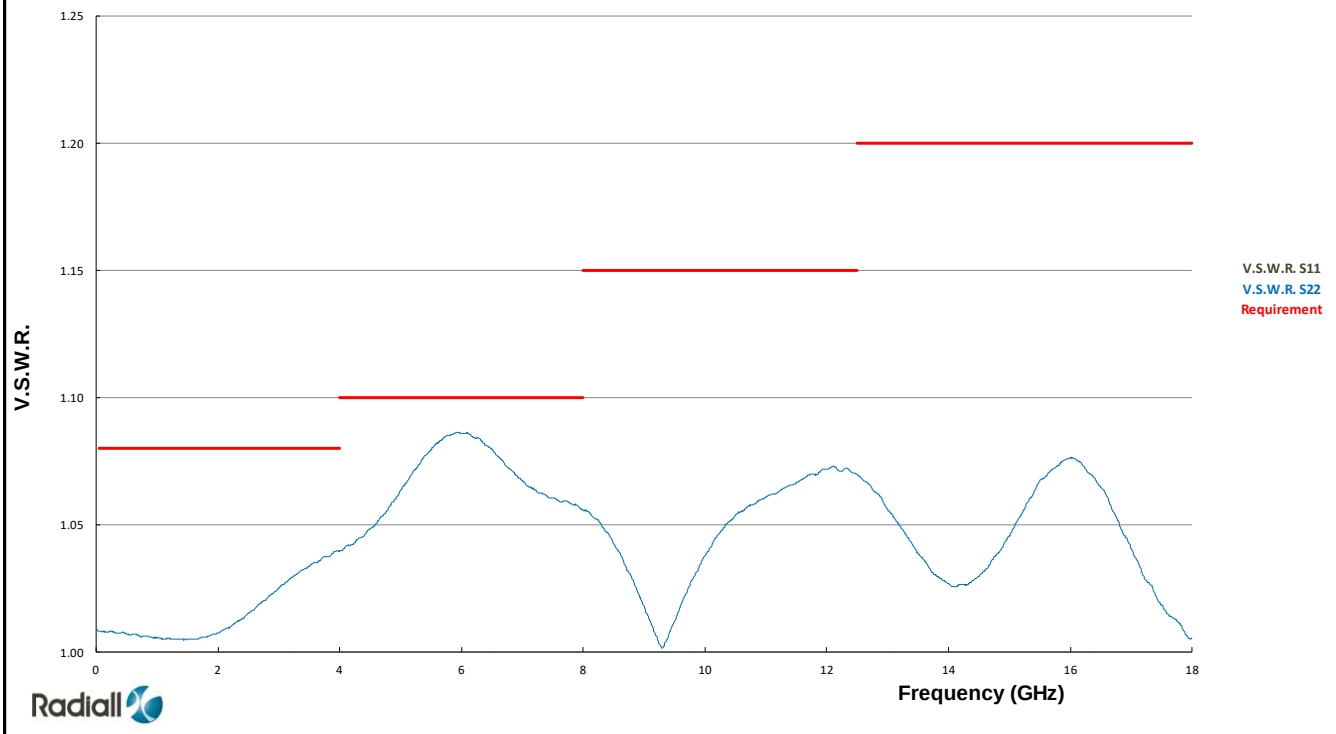
Measurement after climatic sequence-hot/ V.S.W.R
R404370670 sample 03 (with TNC KIT)



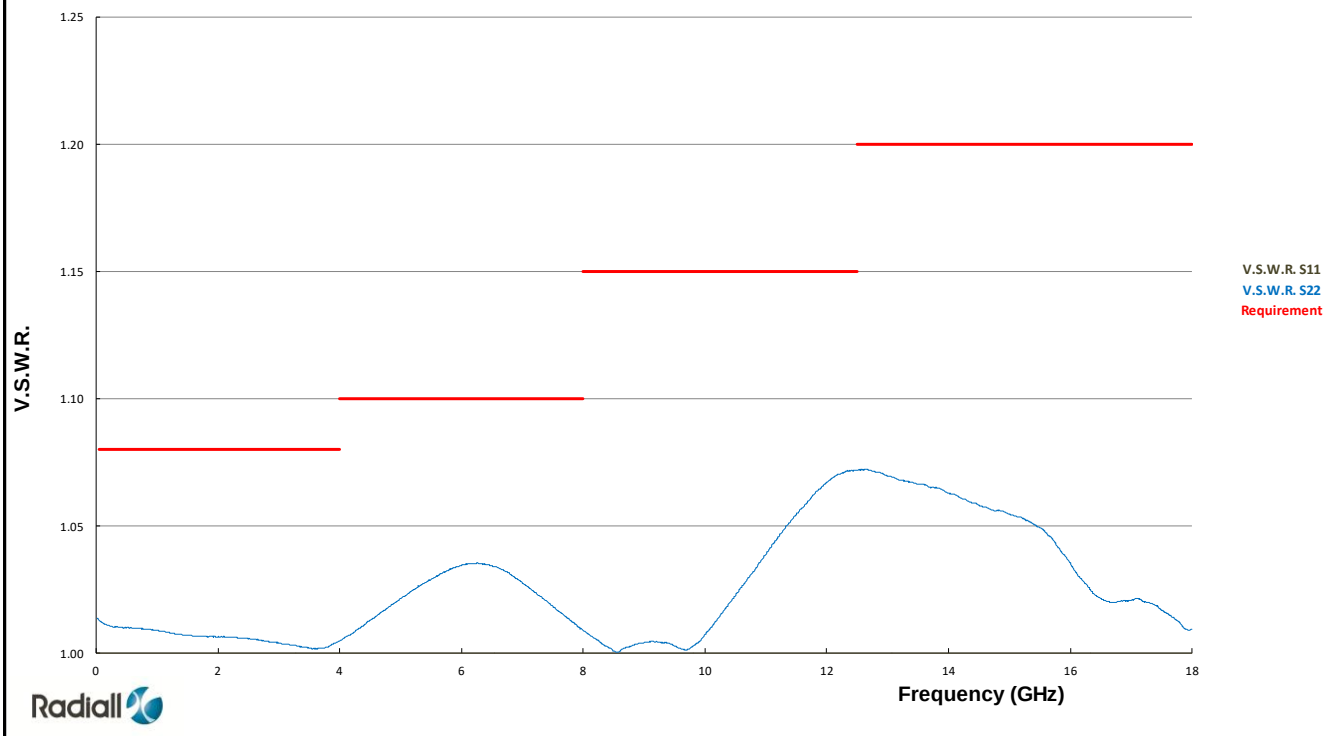
Measurement after climatic sequence-hot/ V.S.W.R
R404370670 sample 03 (with GPC7 KIT)



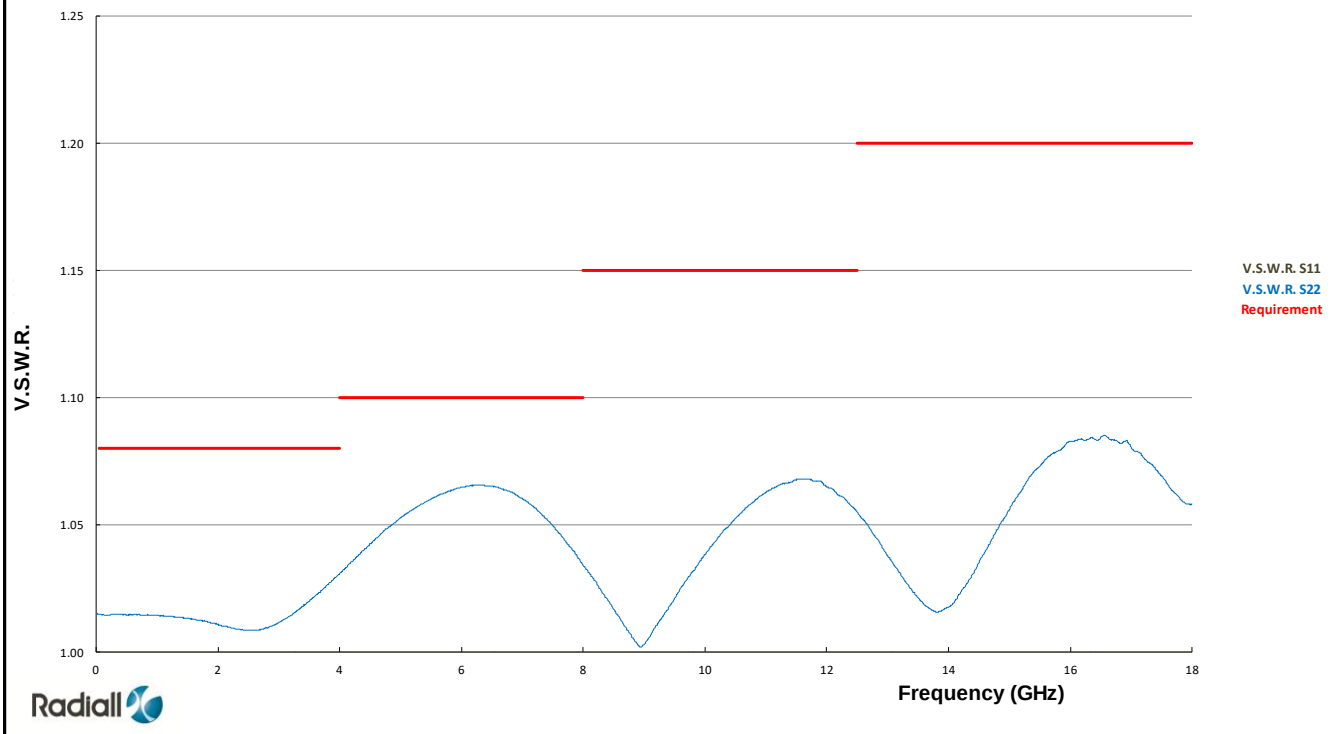
Measurement after climatic sequence-cold/ V.S.W.R
R404370670 sample 03 (with TNC KIT)



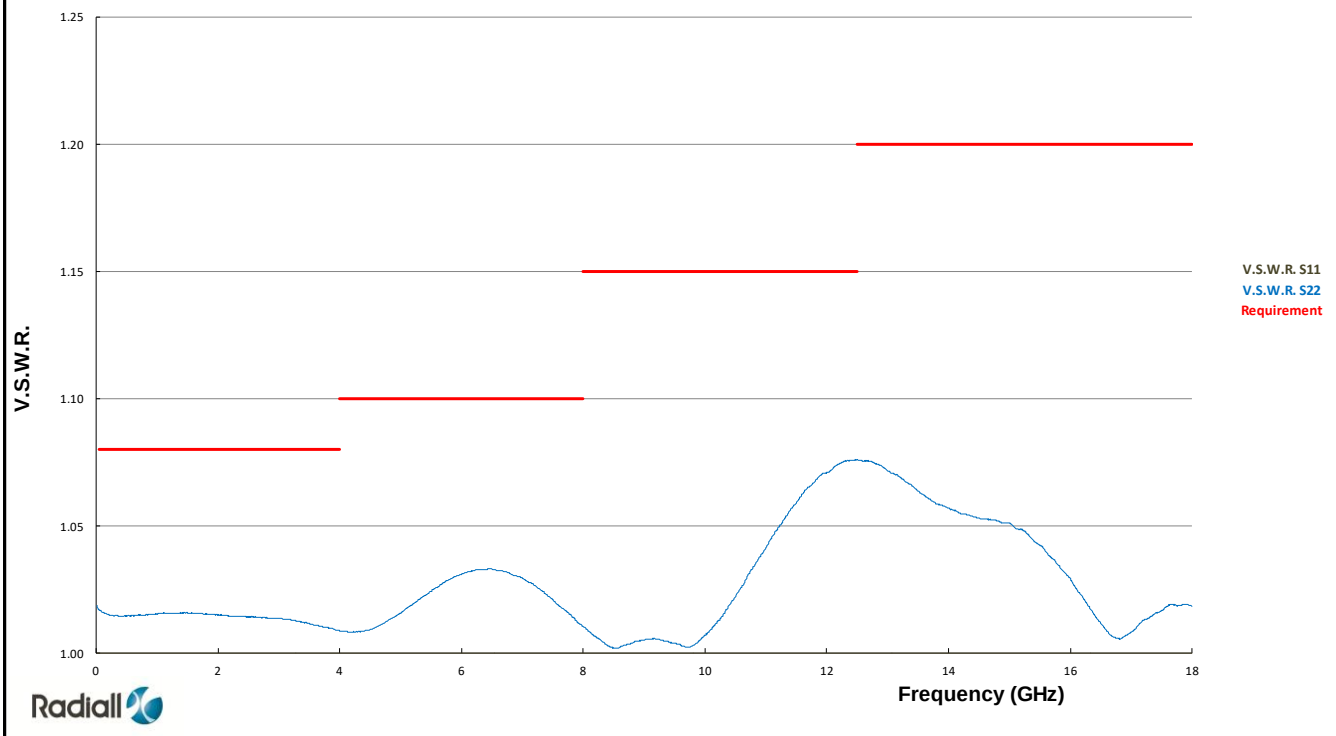
Measurement after climatic sequence-cold/ V.S.W.R
R404370670 sample 03 (with GPC7 KIT)



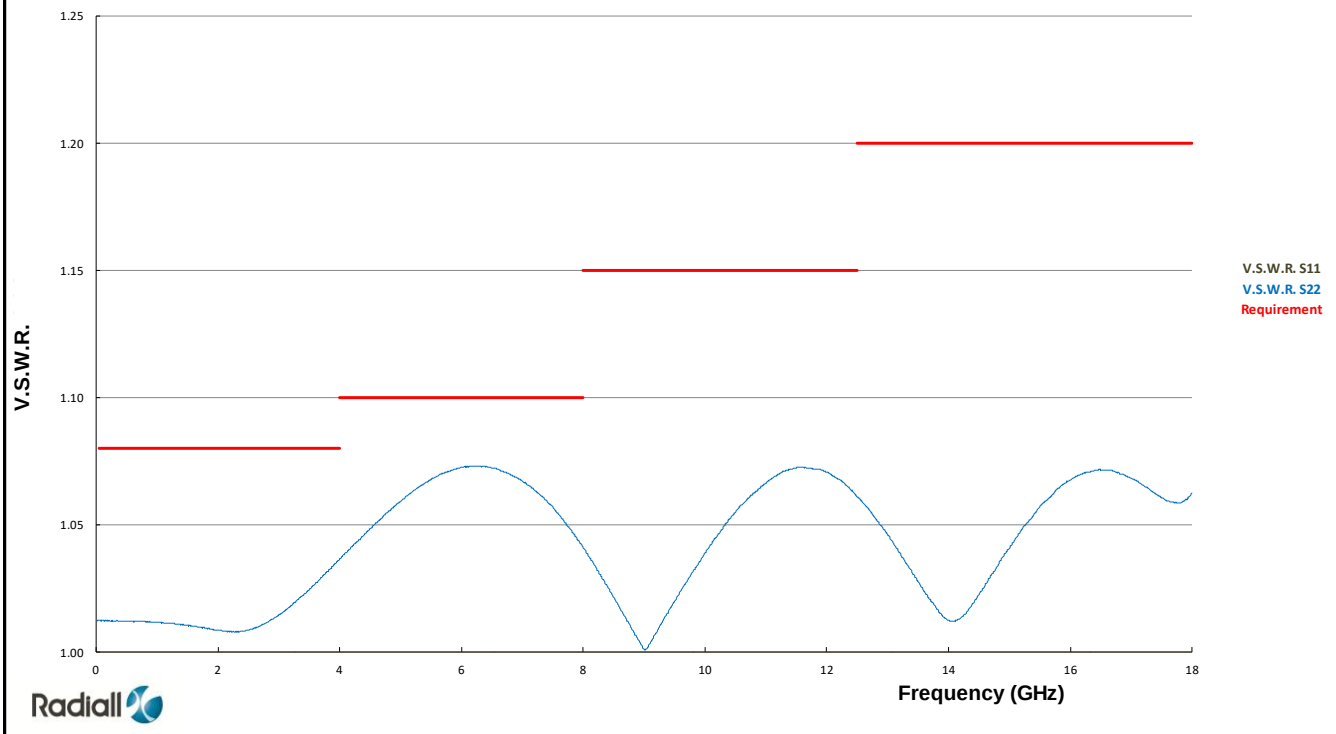
Measurement after climatic sequence-final/ V.S.W.R
R404370670 sample 03 (with TNC KIT)



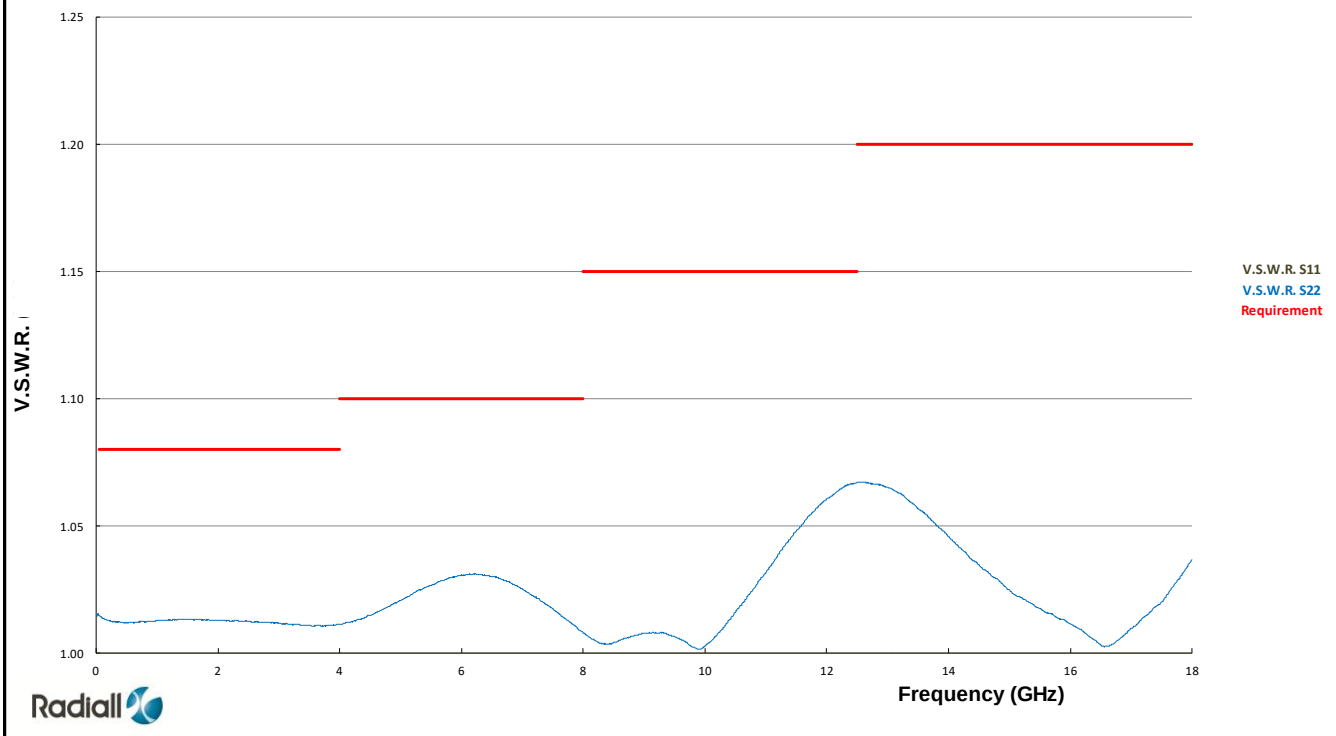
Measurement after climatic sequence-final/ V.S.W.R
R404370670 sample 03 (with GPC7 KIT)



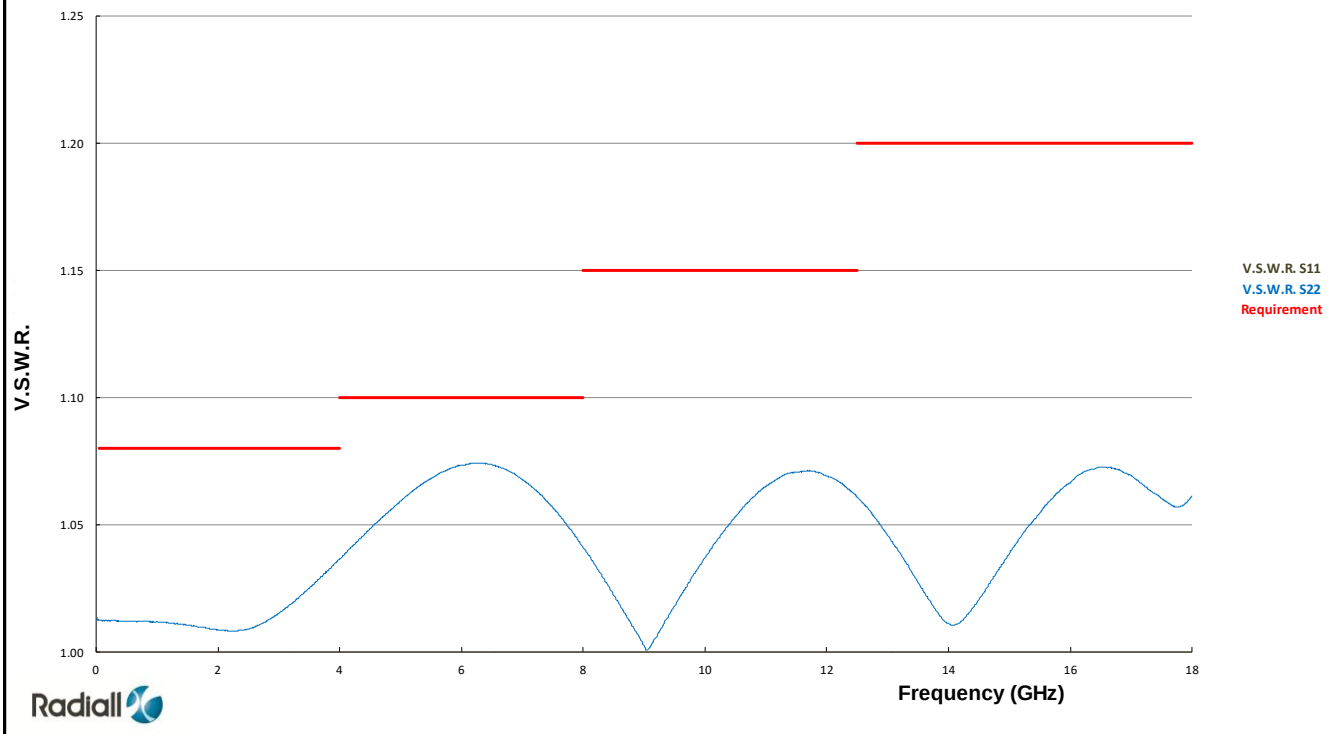
Initial measurement / V.S.W.R.
R404370670 sample 05 (with TNC KIT)



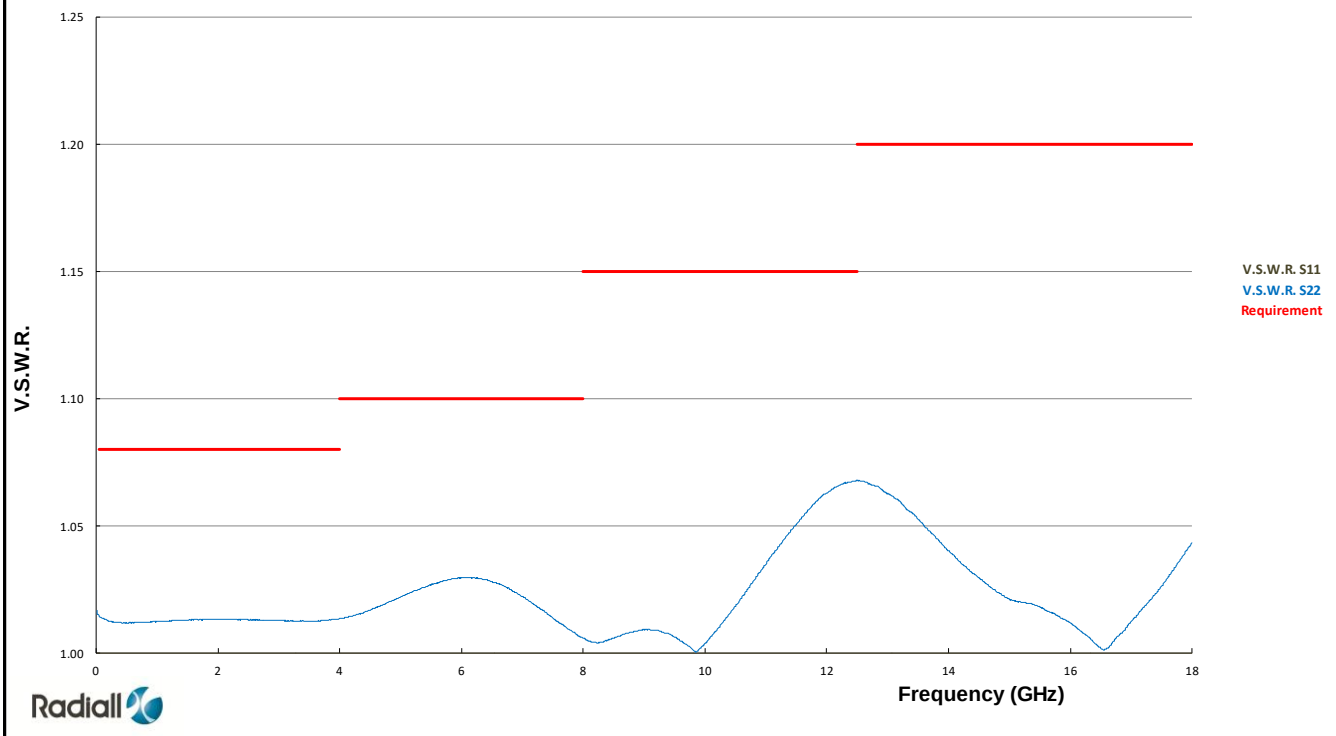
Initial measurement / V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



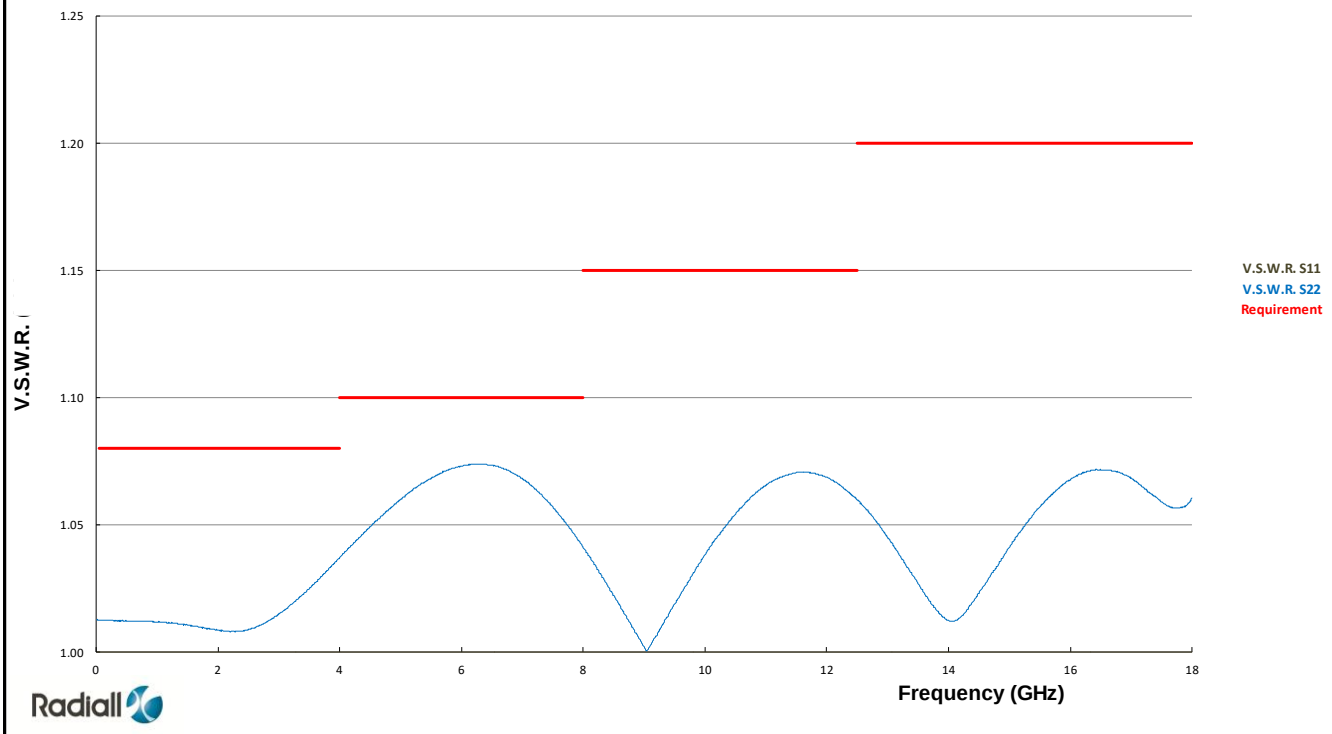
Measurement after vibrations / V.S.W.R.
R404370670 sample 05 (with TNC KIT)



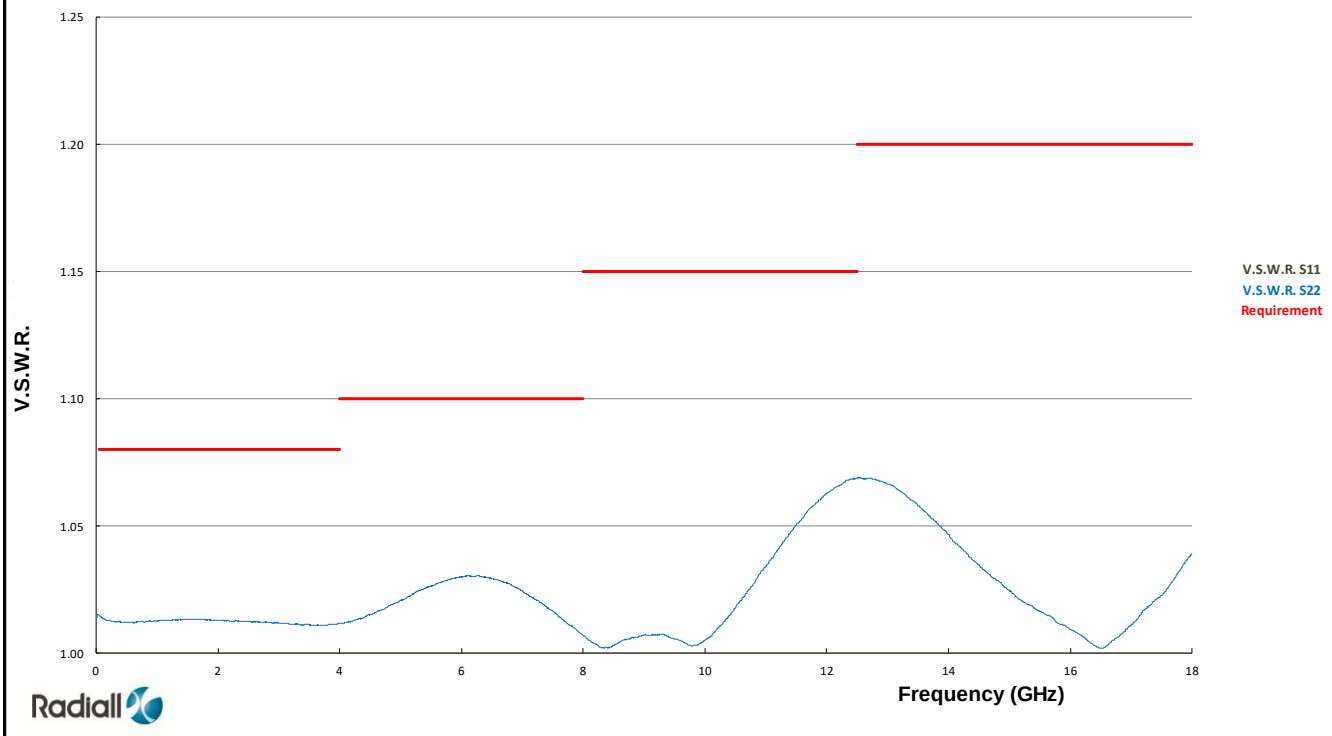
Measurement after vibrations / V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



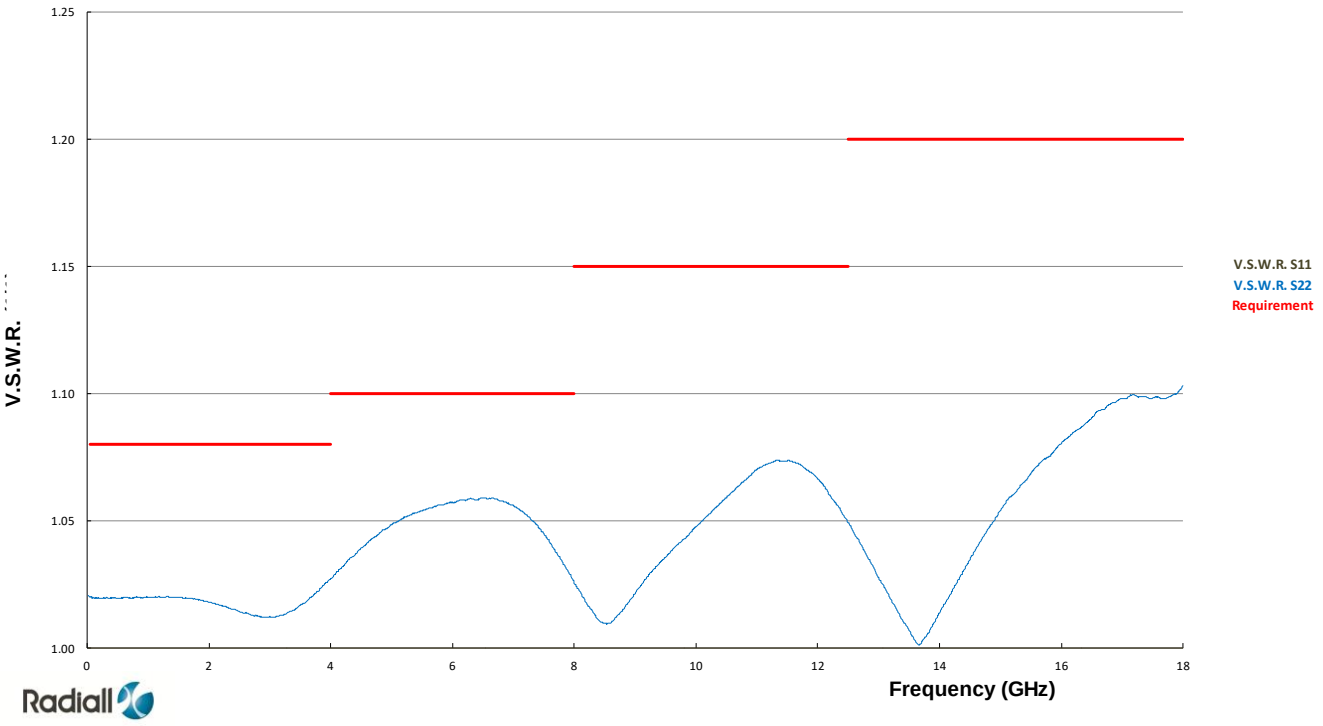
Measurement after shock / V.S.W.R.
R404370670 sample 05 (with TNC KIT)



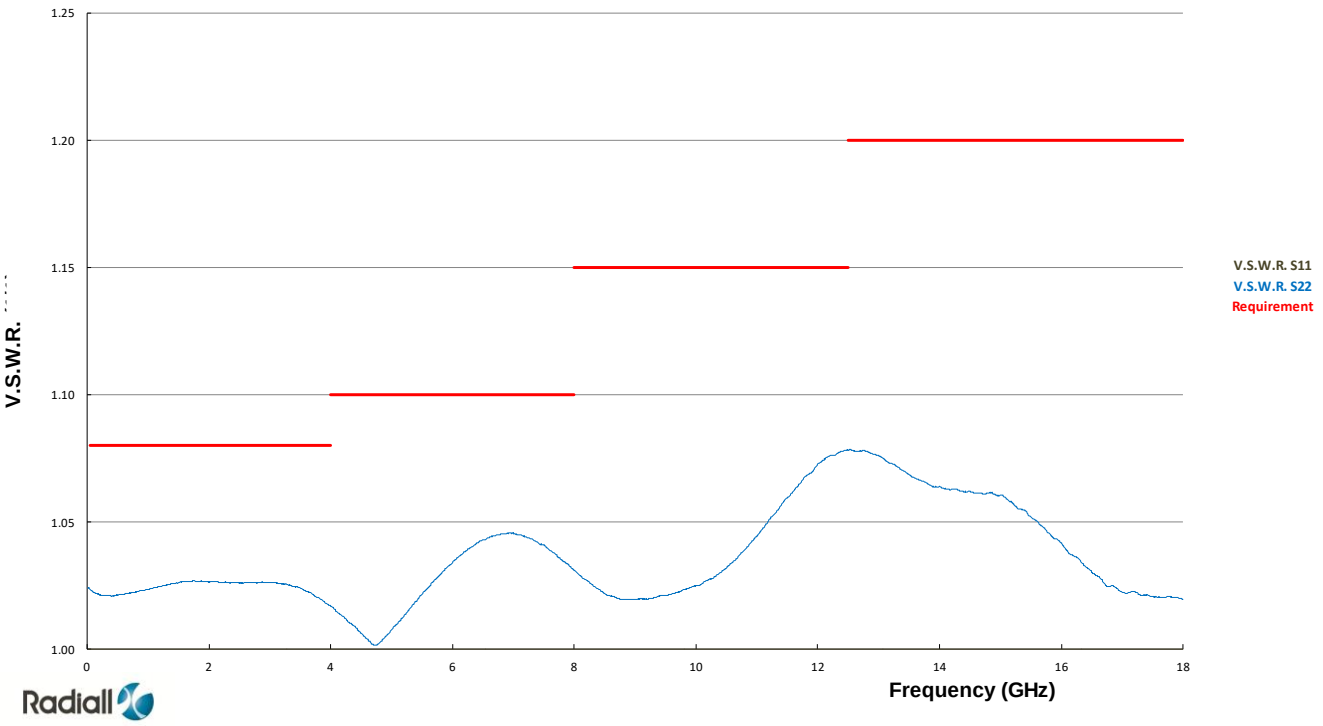
Measurement after shock / V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



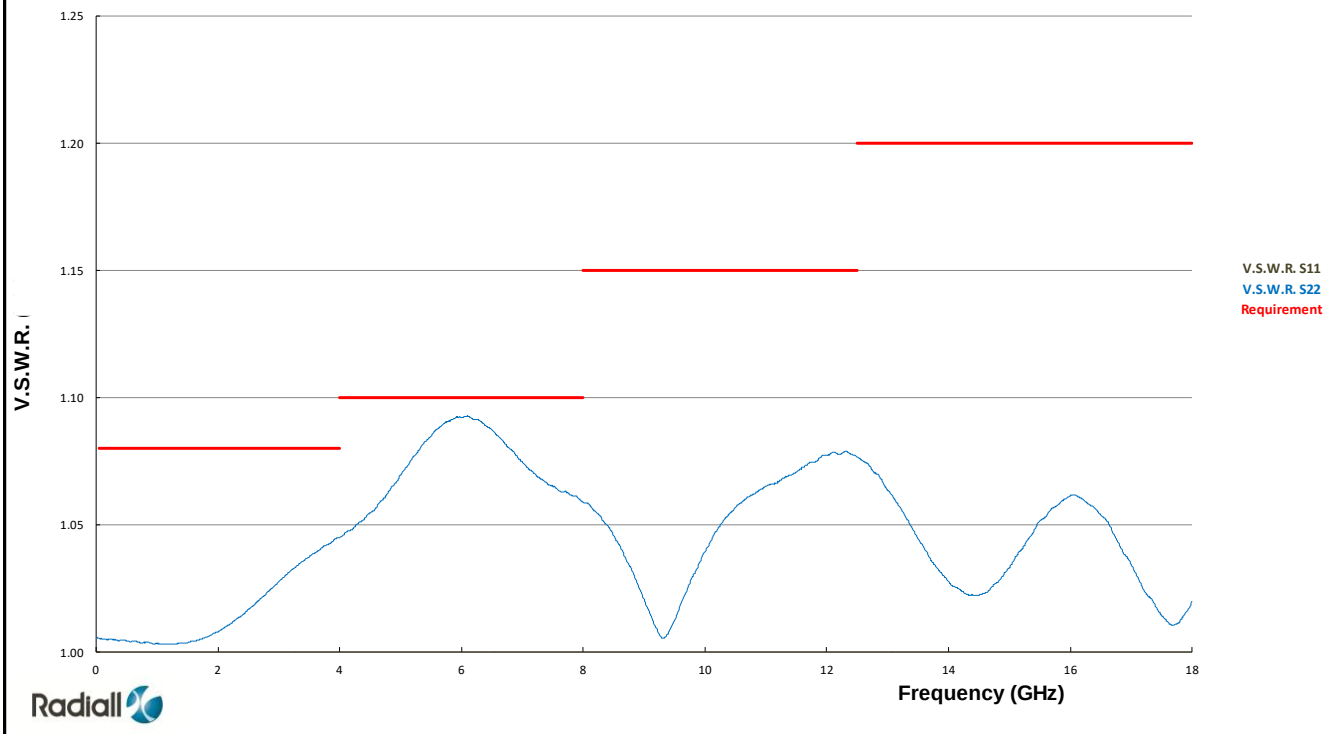
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 05 (with TNC KIT)



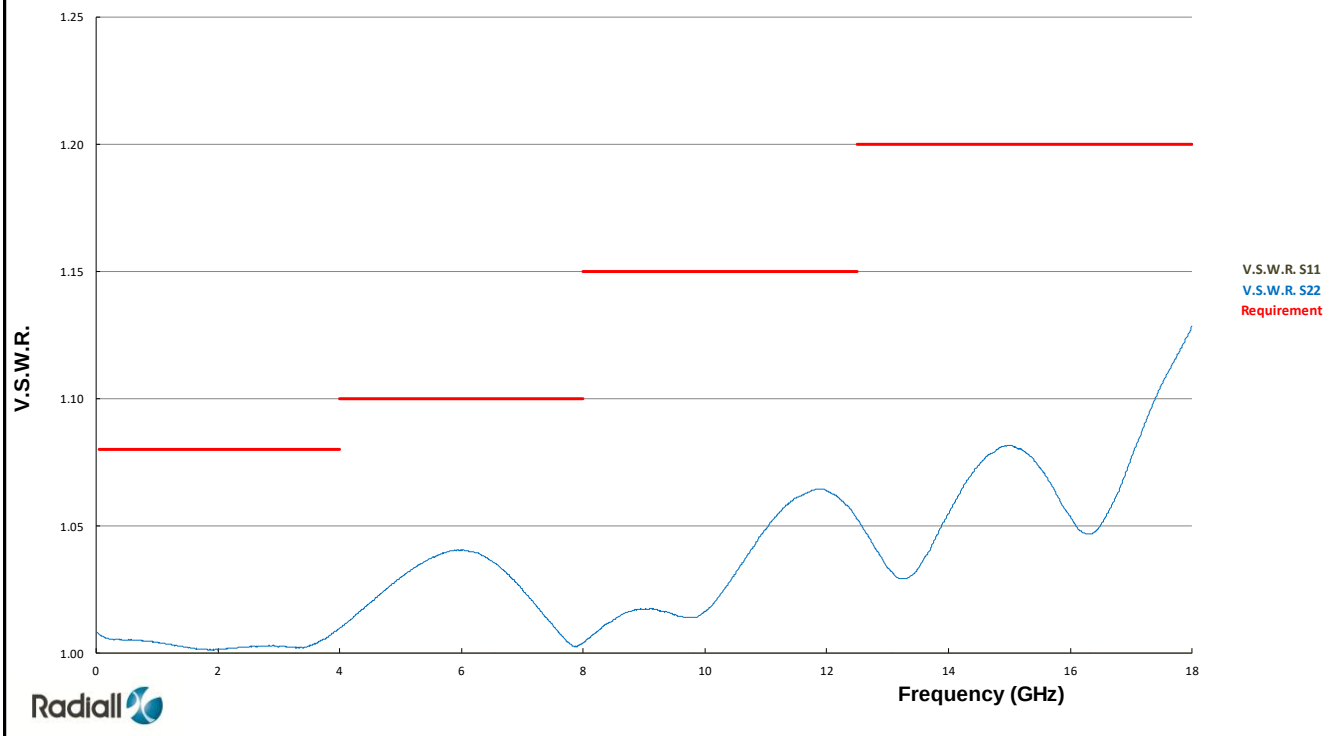
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



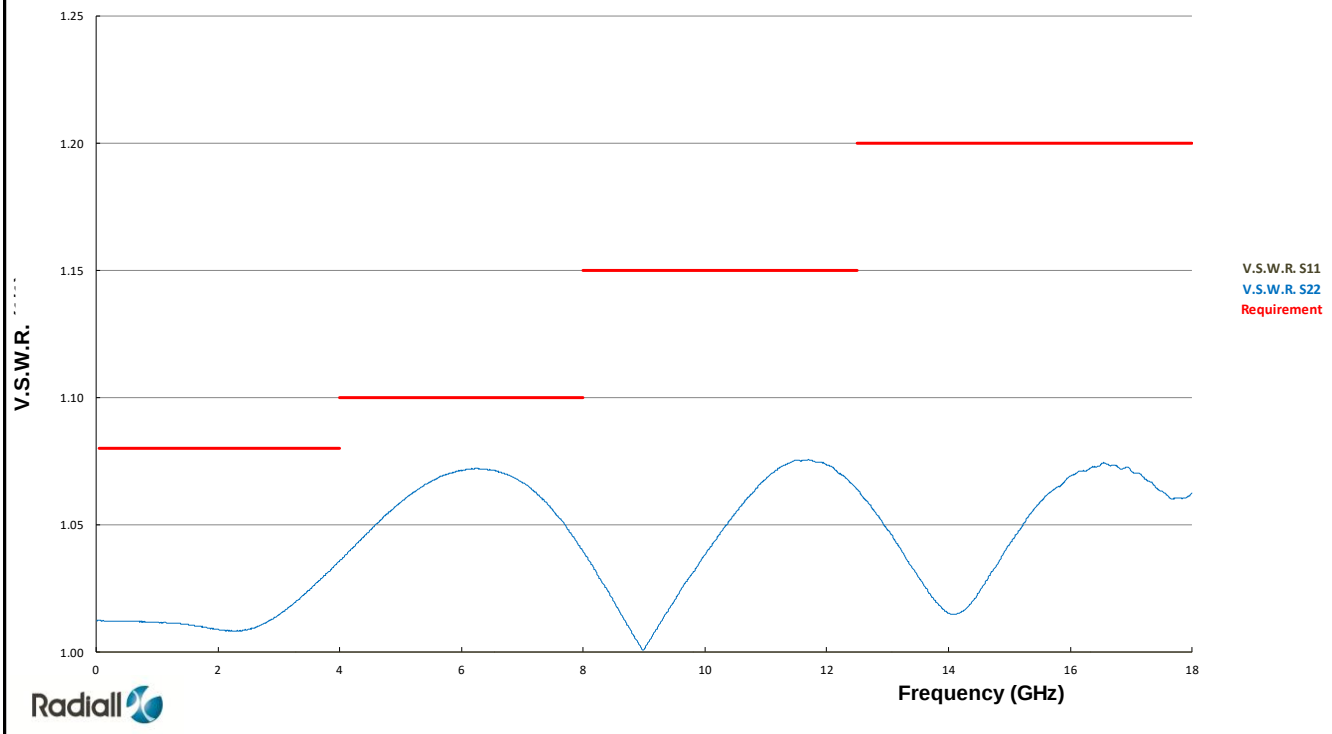
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 05 (with TNC KIT)



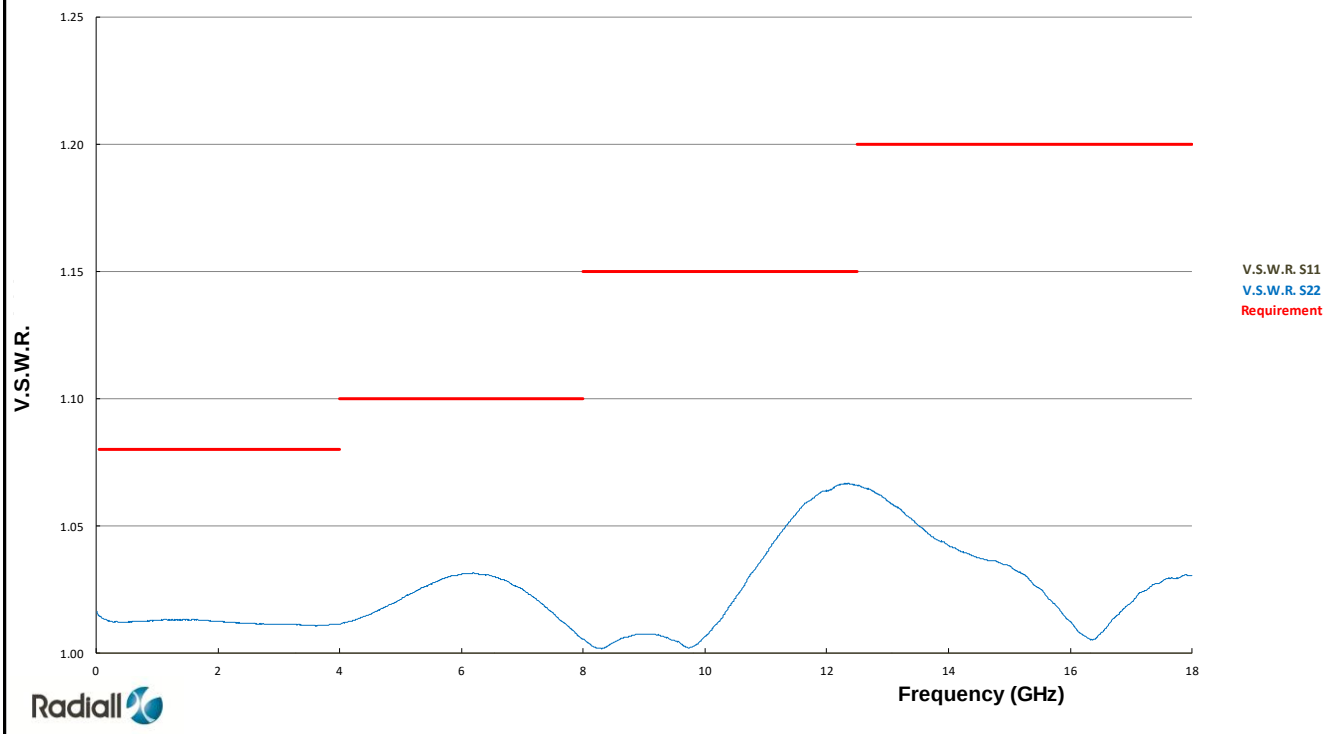
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



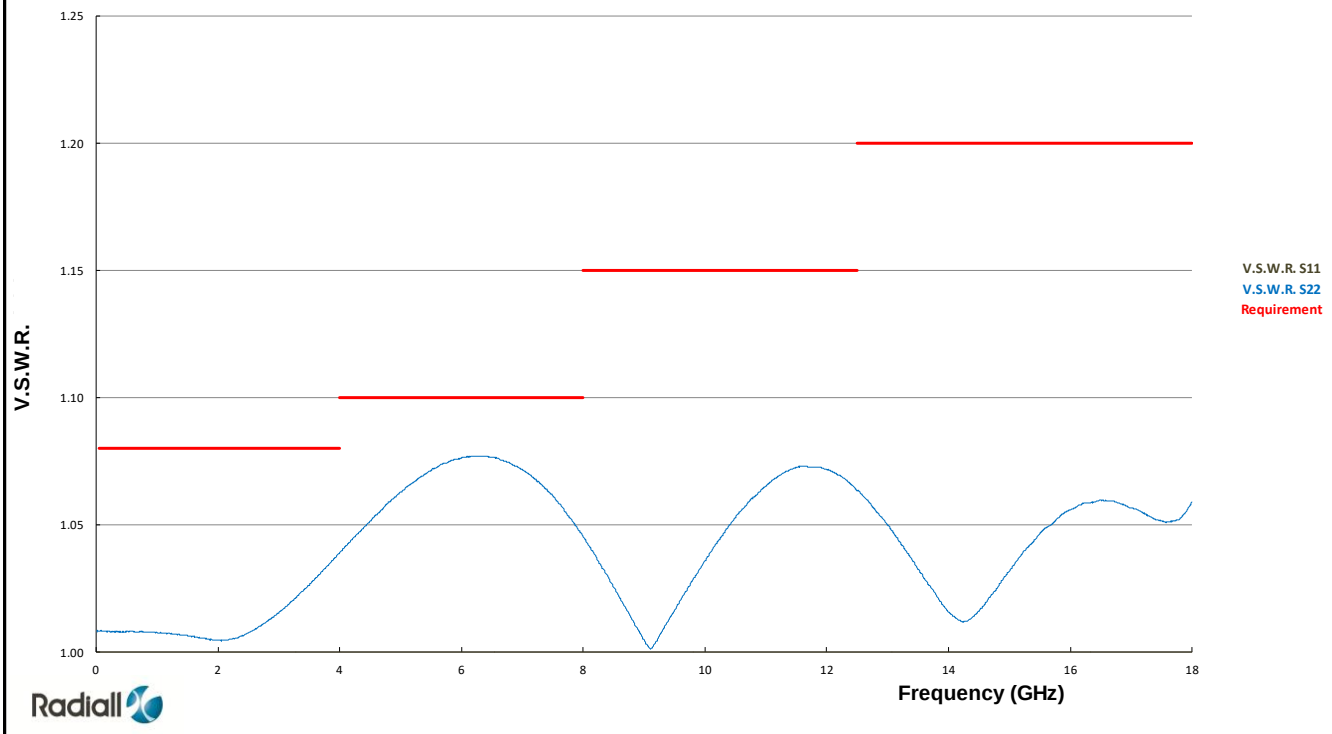
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 05 (with TNC KIT)



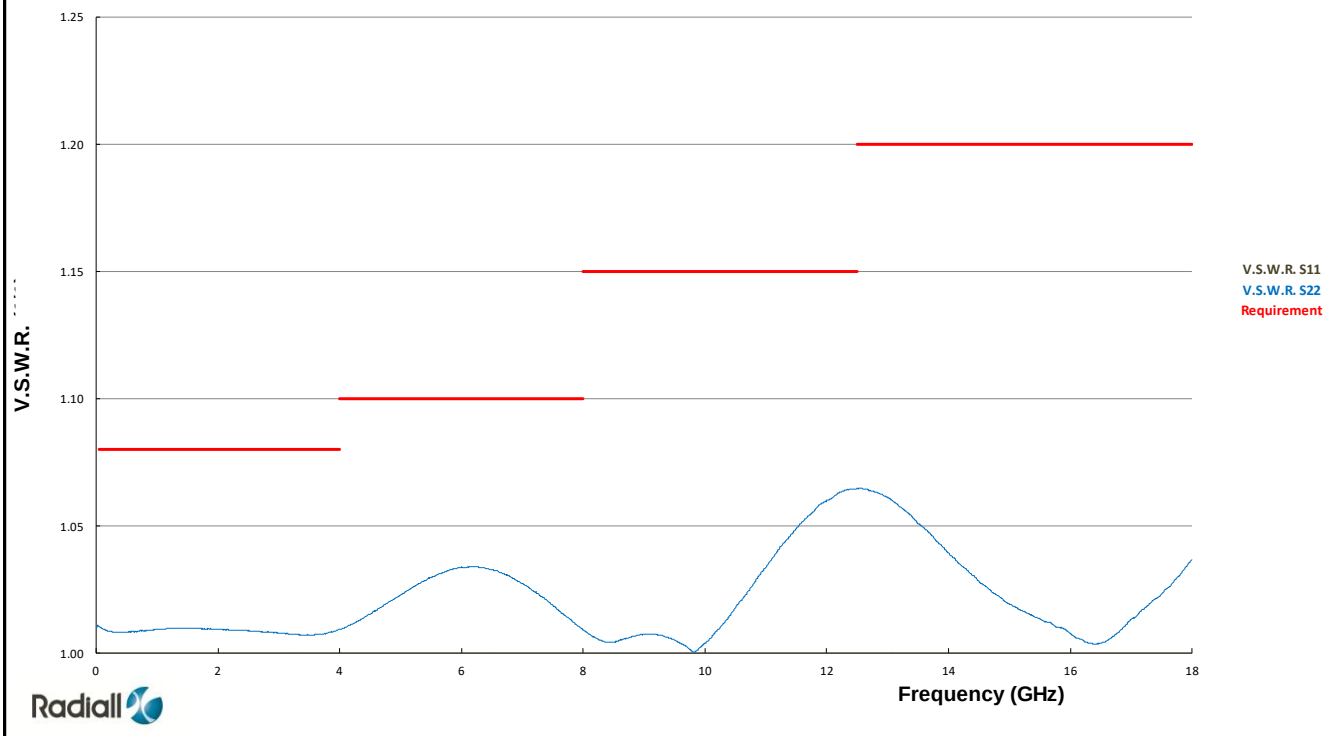
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 05 (with GPC7 KIT)



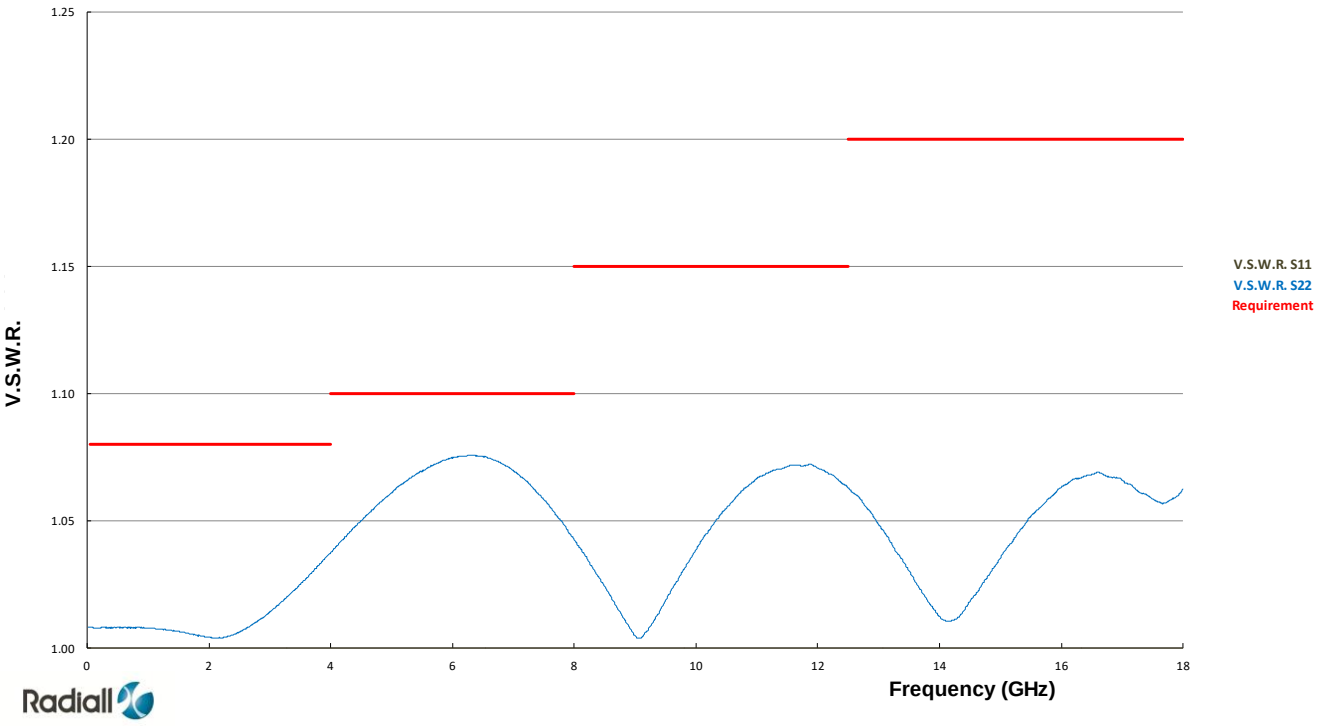
Initial measurement / V.S.W.R.
R404370670 sample 06 (with TNC KIT)



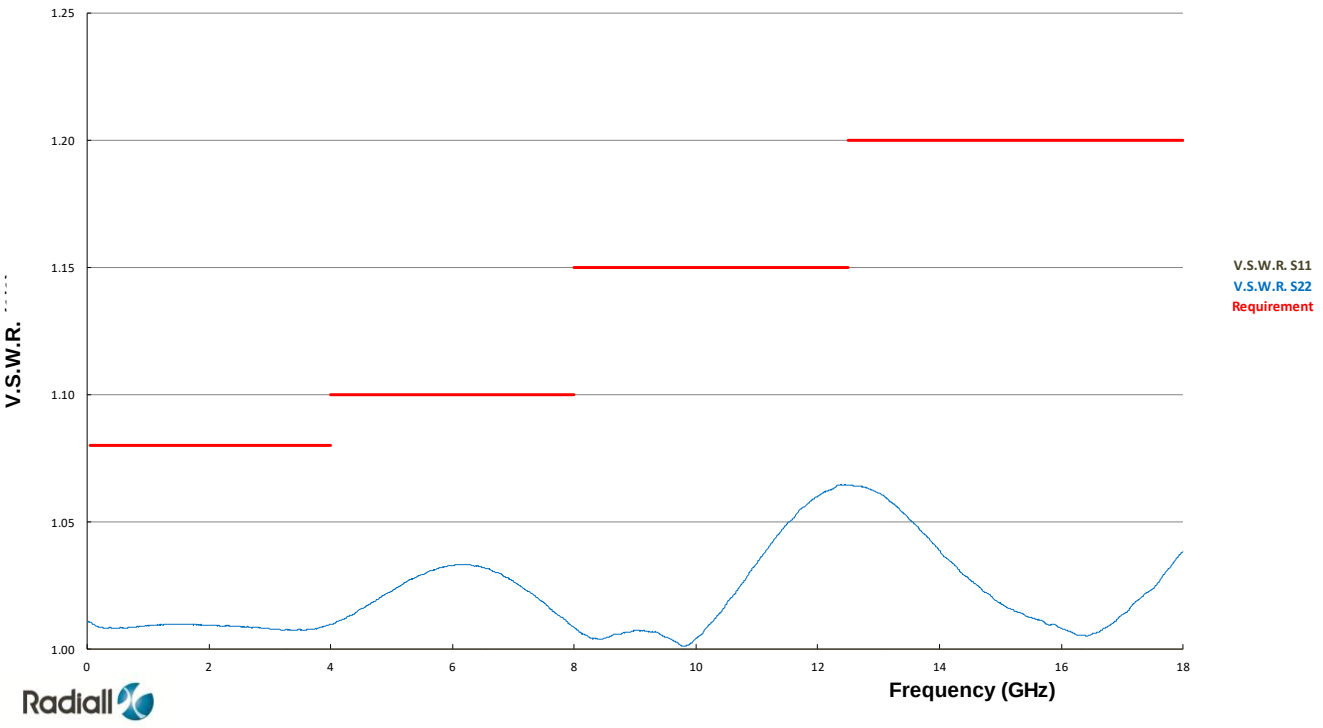
Initial measurement / V.S.W.R.
R404370670 sample 06 (with GPC7 KIT)



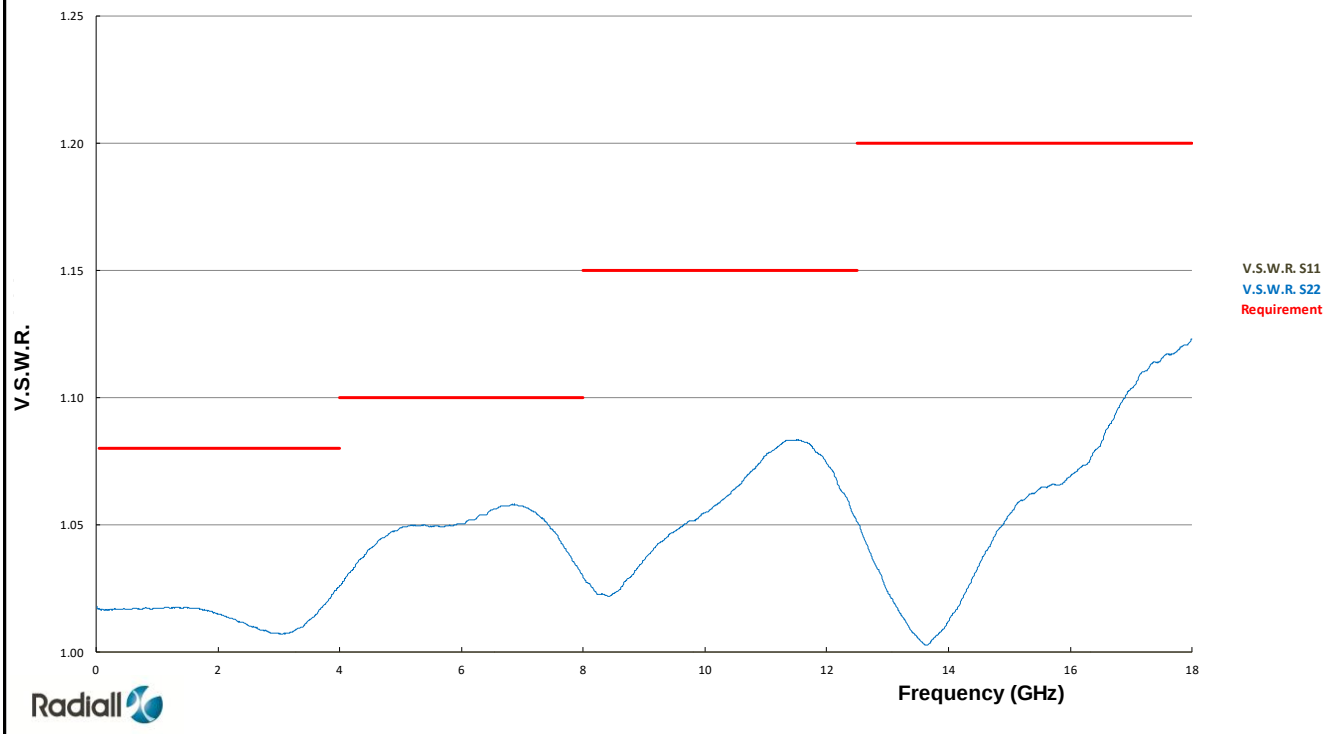
Measurement after rapid change of temperature / V.S.W.R.
R404370670 sample 06 (with TNC KIT)



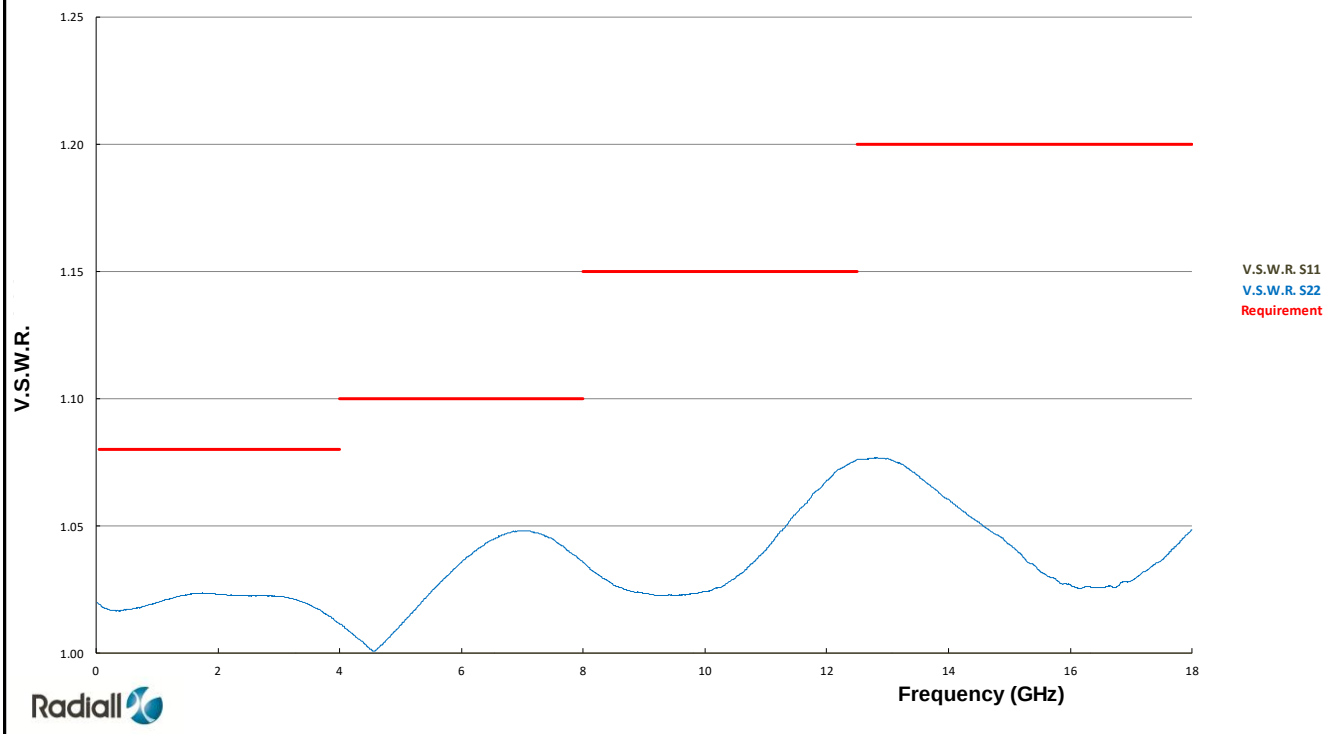
Measurement after rapid change of temperature / V.S.W.R.
R404370670 sample 06 (with GPC7 KIT)



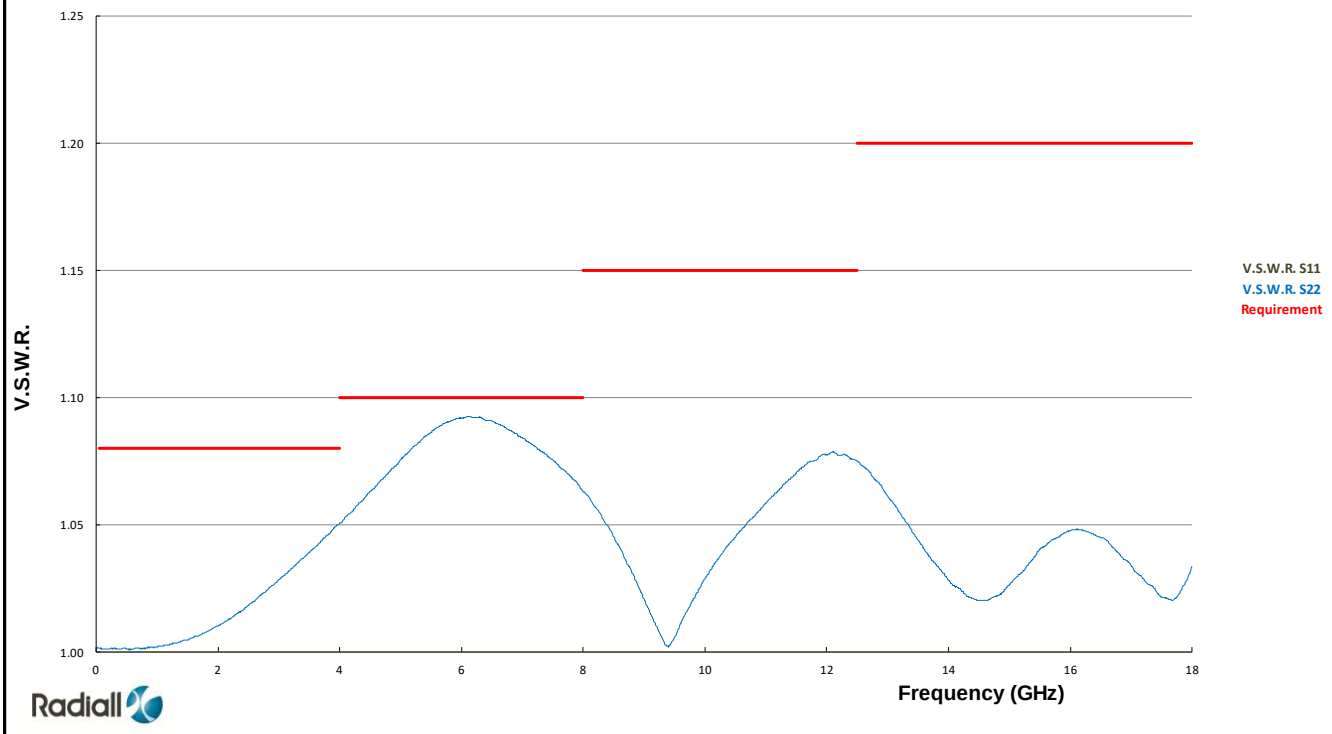
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 06 (with TNC KIT)



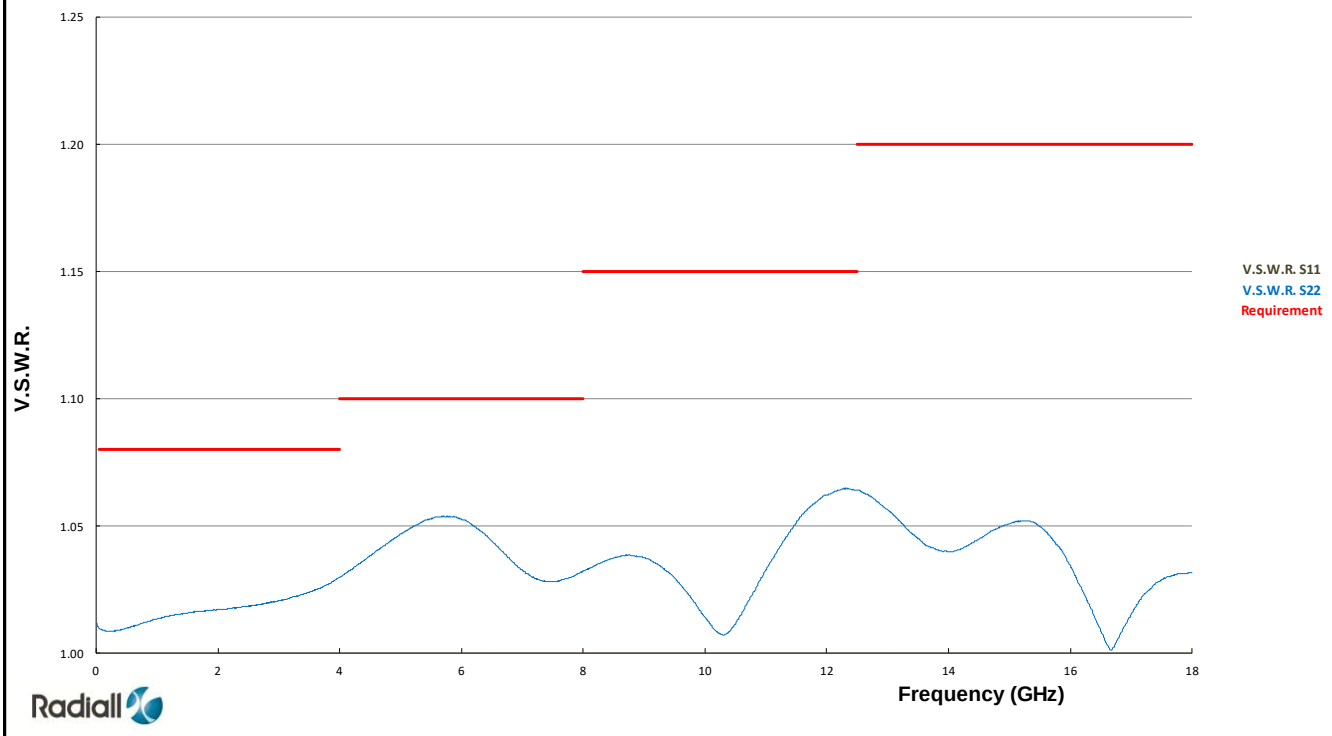
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 06 (with GPC7 KIT)



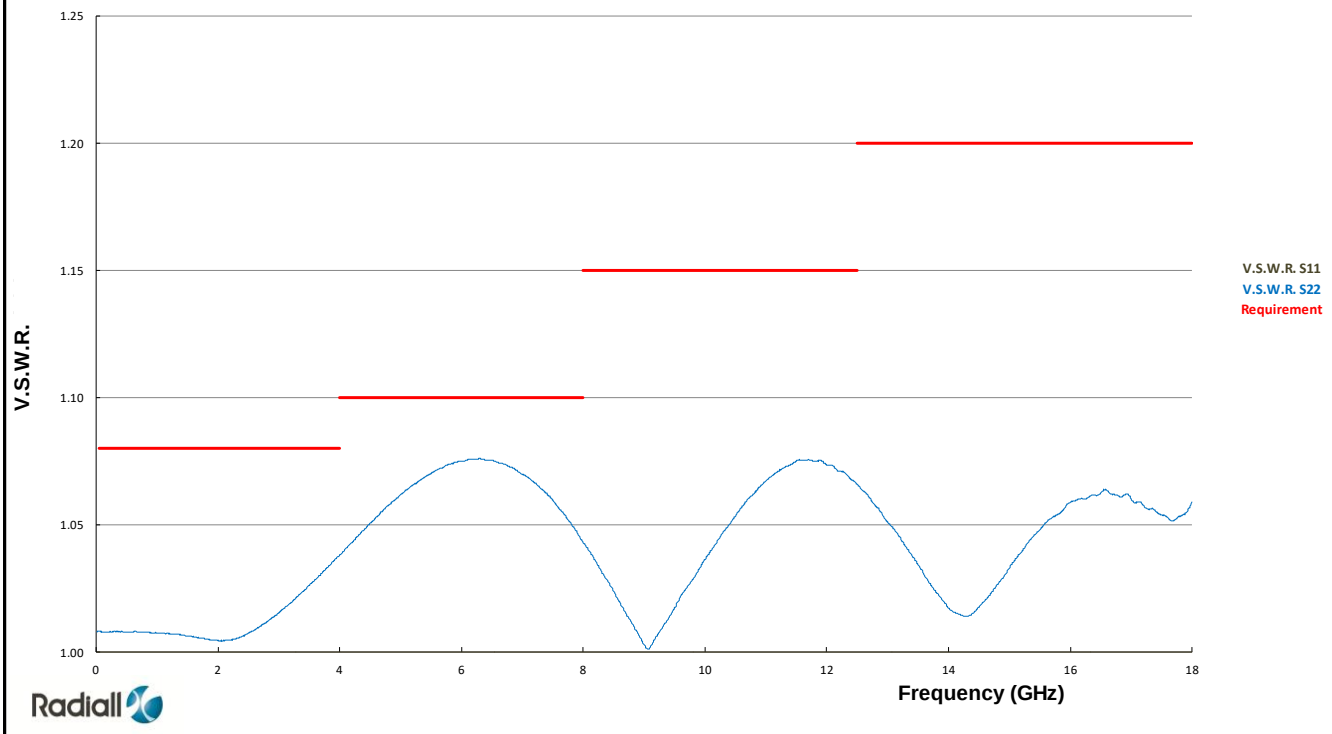
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 06 (with TNC KIT)



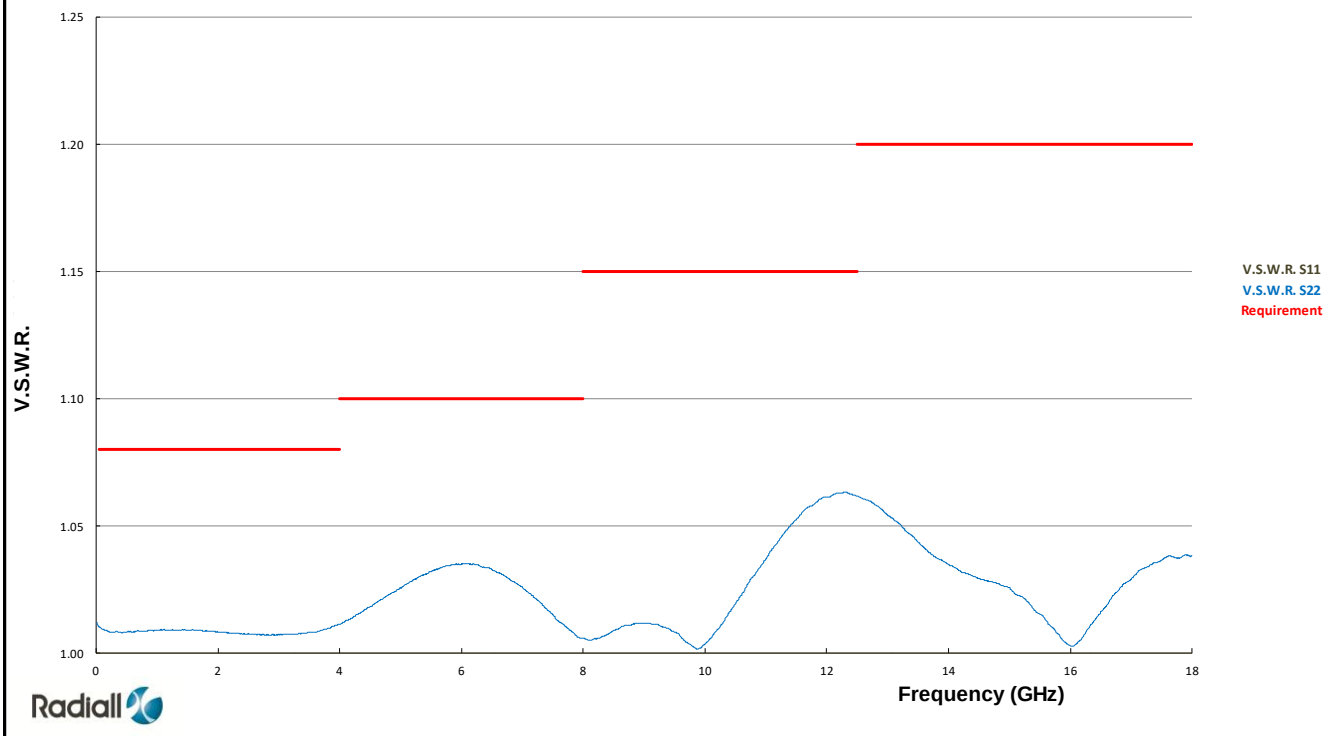
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 06 (with GPC7 KIT)



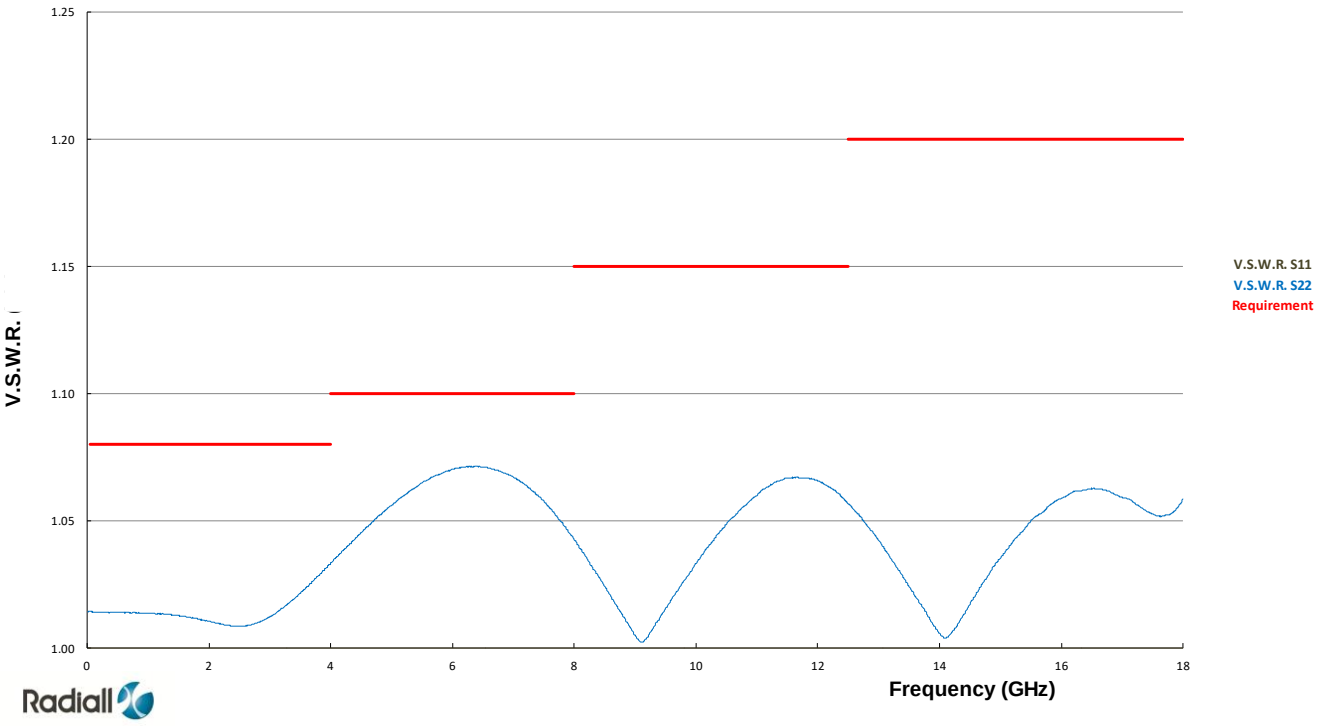
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 06 (with TNC KIT)



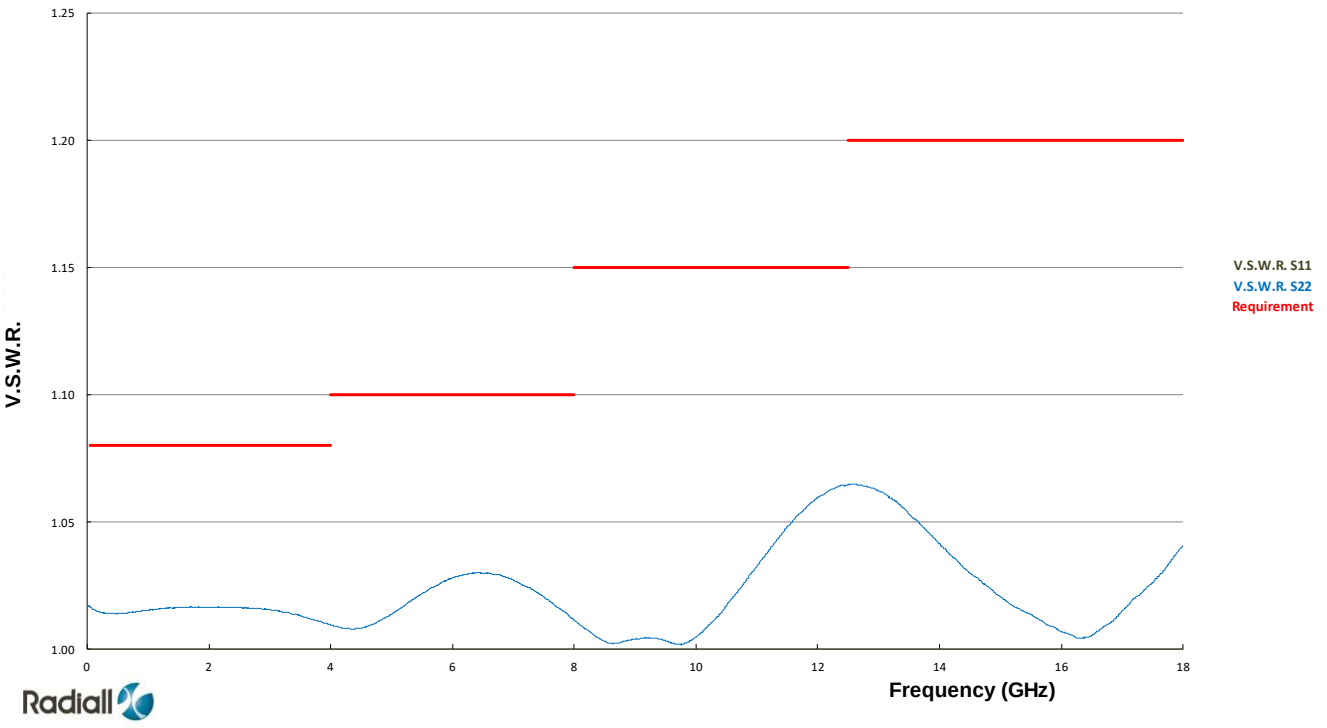
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 06 (with GPC7 KIT)



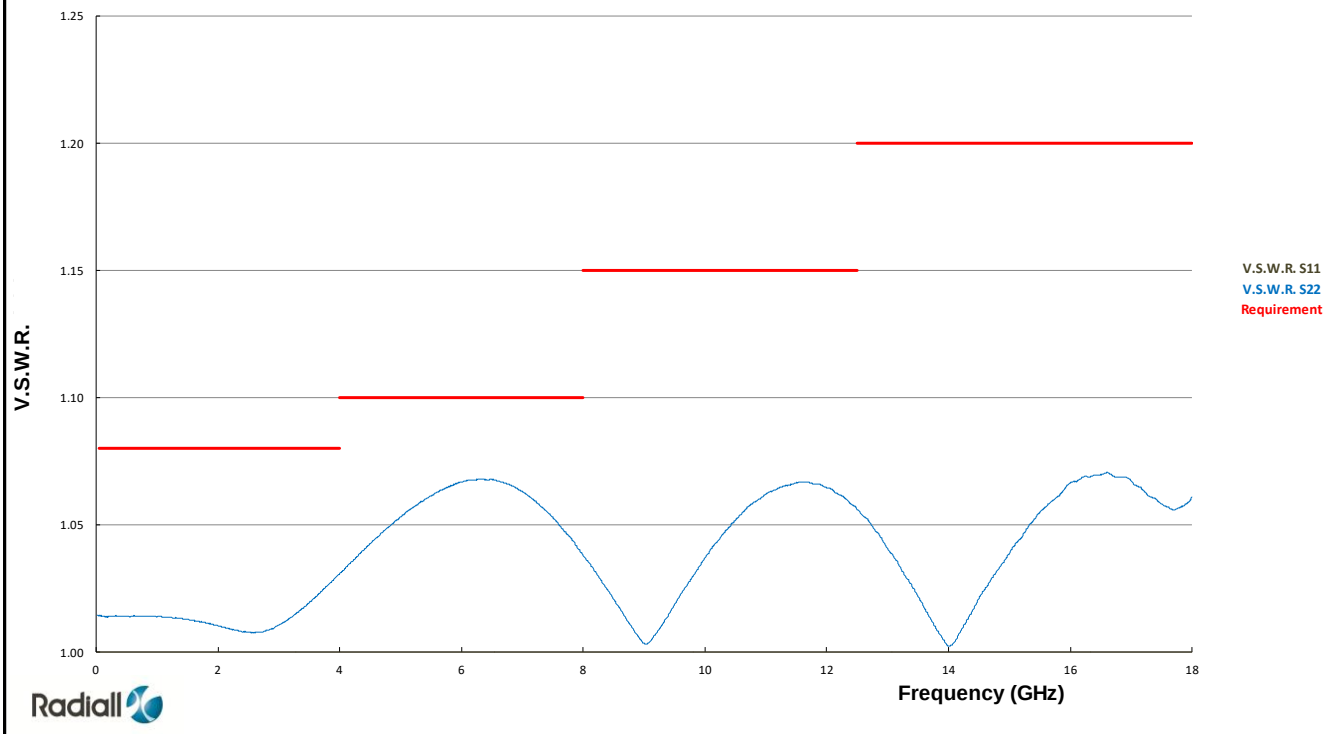
Initial measurement / V.S.W.R
R404370670 sample 09 (with TNC KIT)



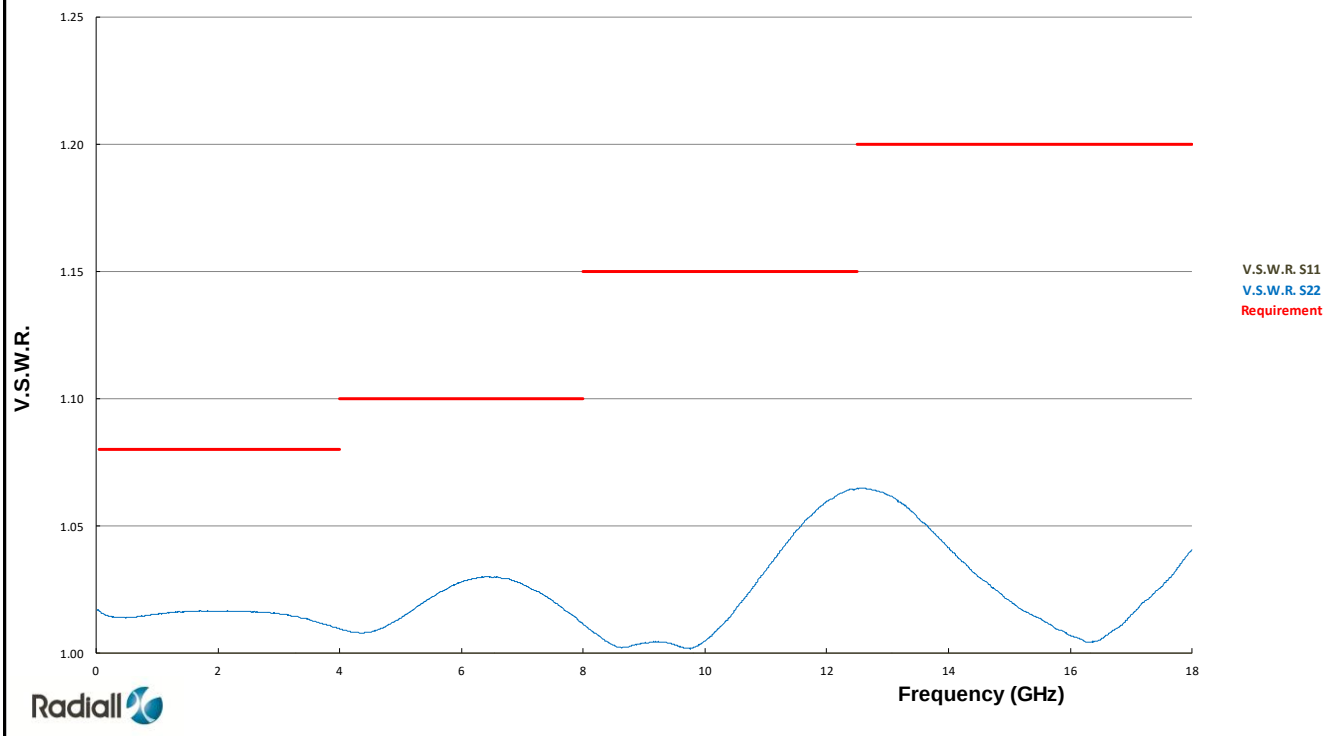
Initial measurement / V.S.W.R
R404370670 sample 09 (with GPC7 KIT)



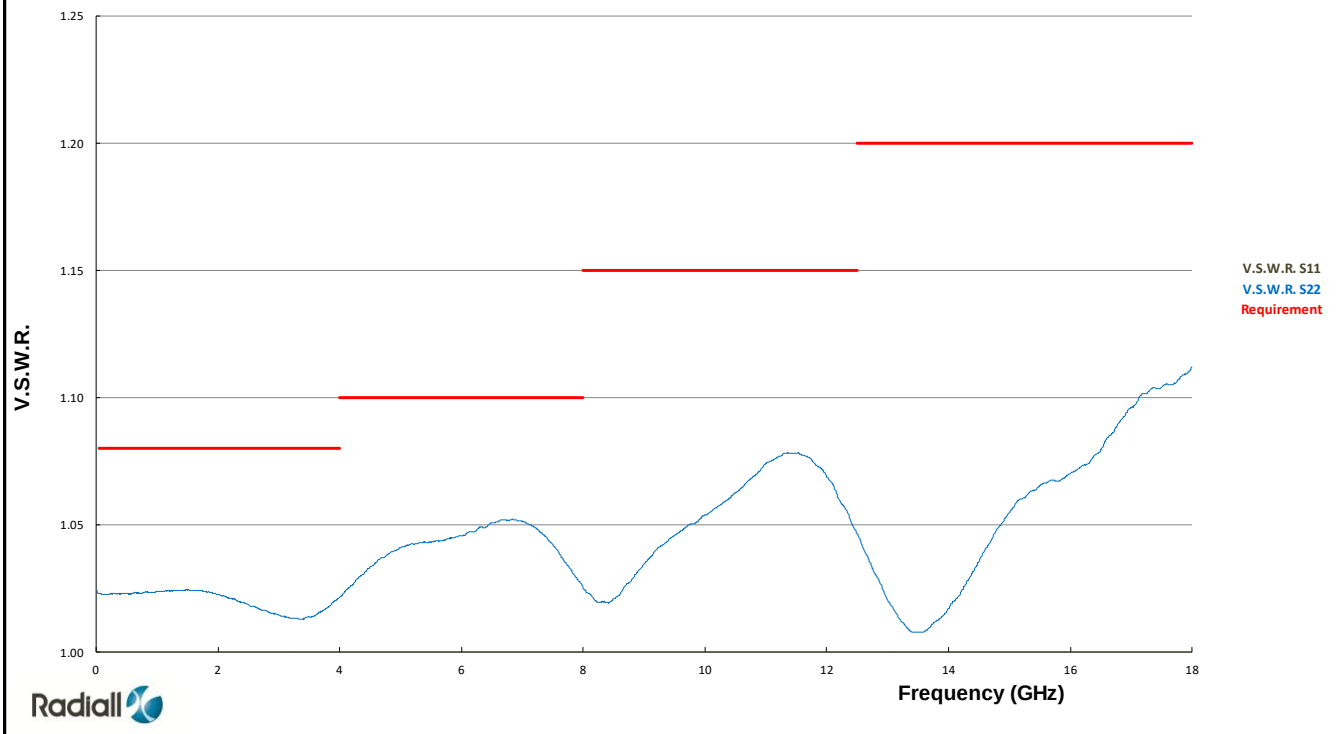
Measurement after rapid change of temperature / V.S.W.R.
R404370670 sample 09 (with TNC KIT)



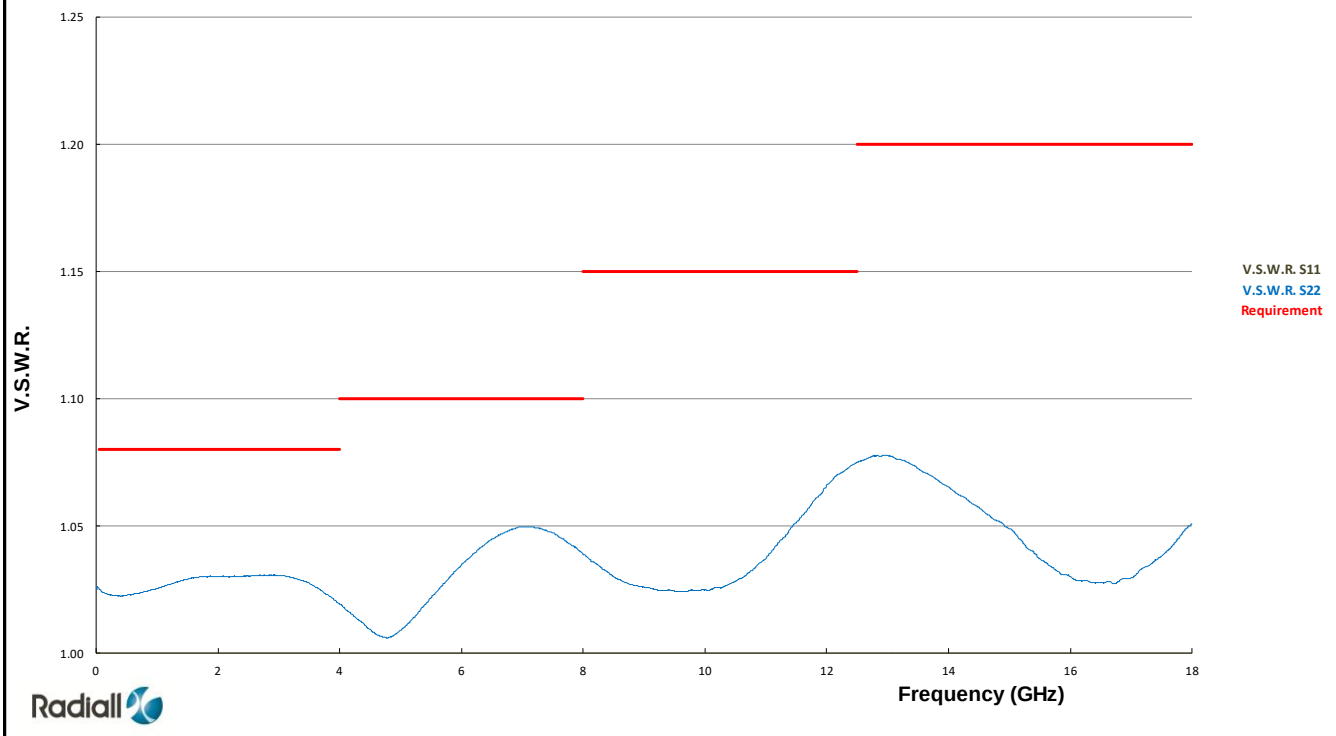
Measurement after rapid change of temperature / V.S.W.R.
R404370670 sample 09 (with GPC7 KIT)



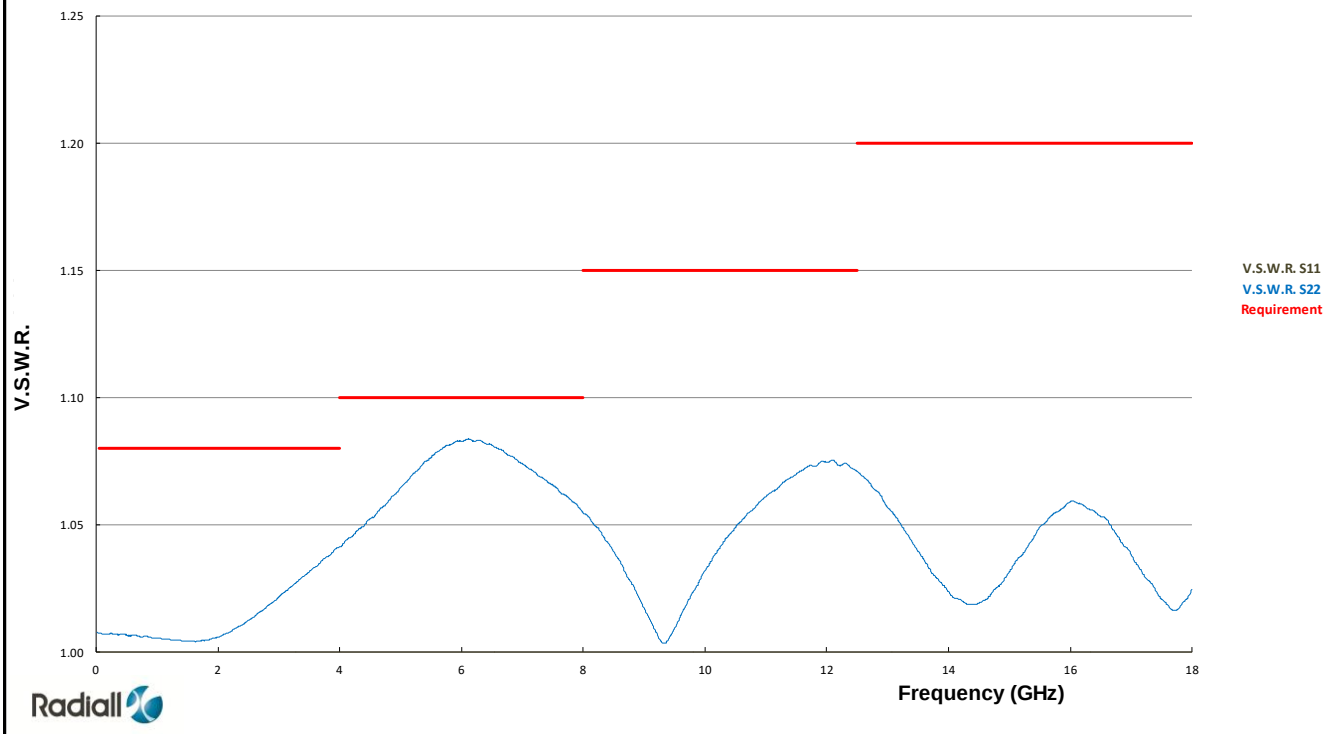
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 09 (with TNC KIT)



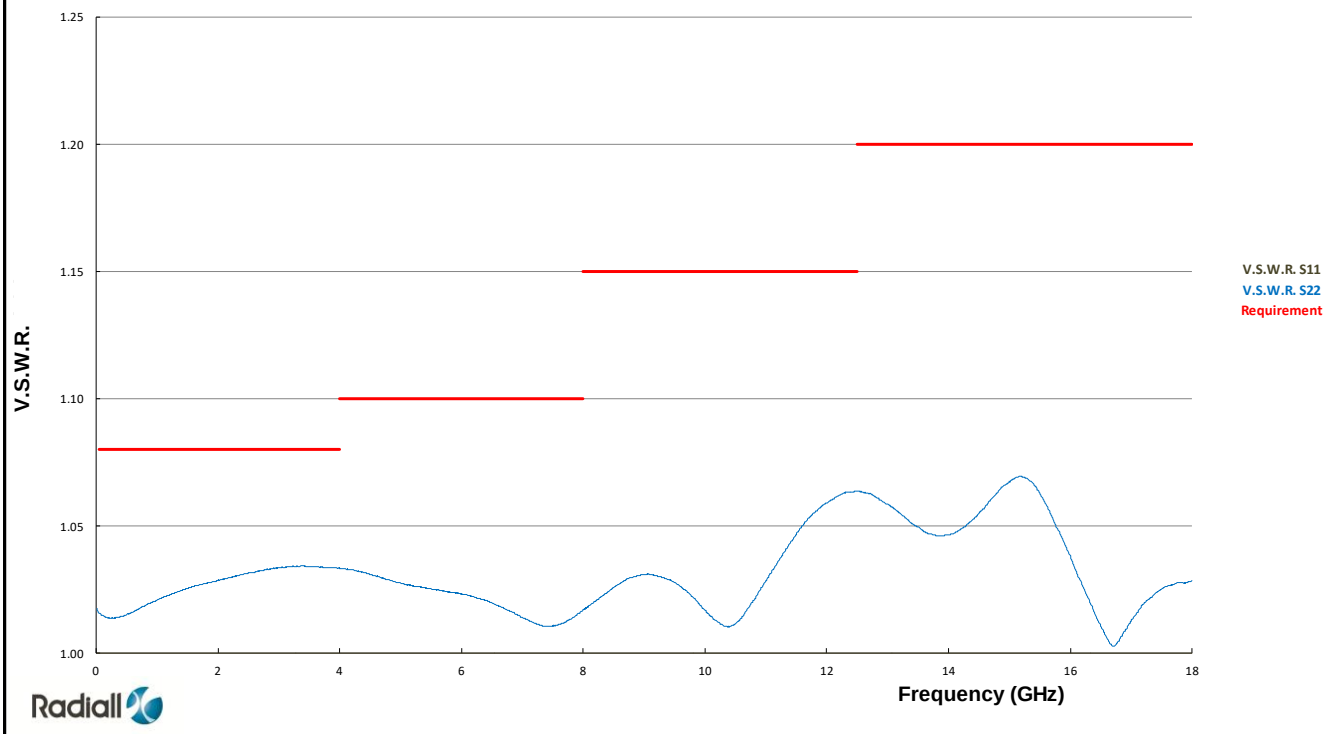
Measurement after climatic sequence-hot/ V.S.W.R.
R404370670 sample 09 (with GPC7 KIT)



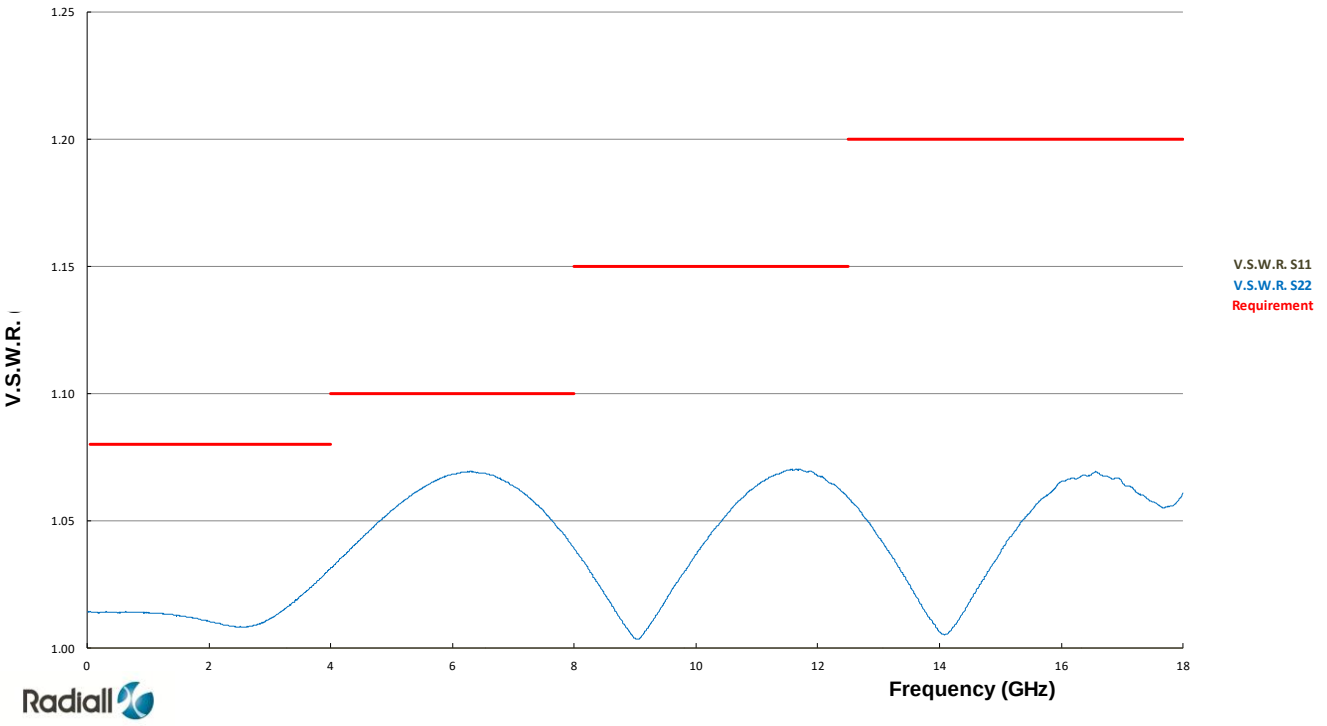
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 09 (with TNC KIT)



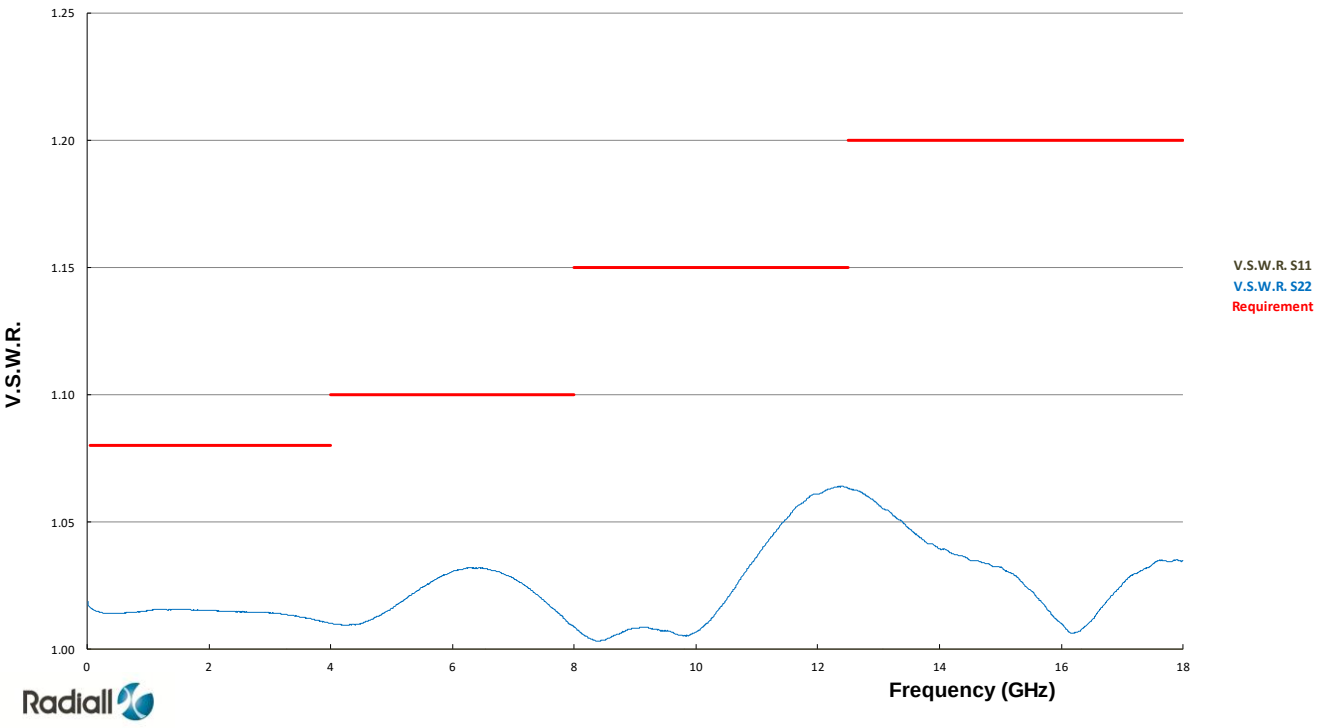
Measurement after climatic sequence-cold/ V.S.W.R.
R404370670 sample 09 (with GPC7 KIT)



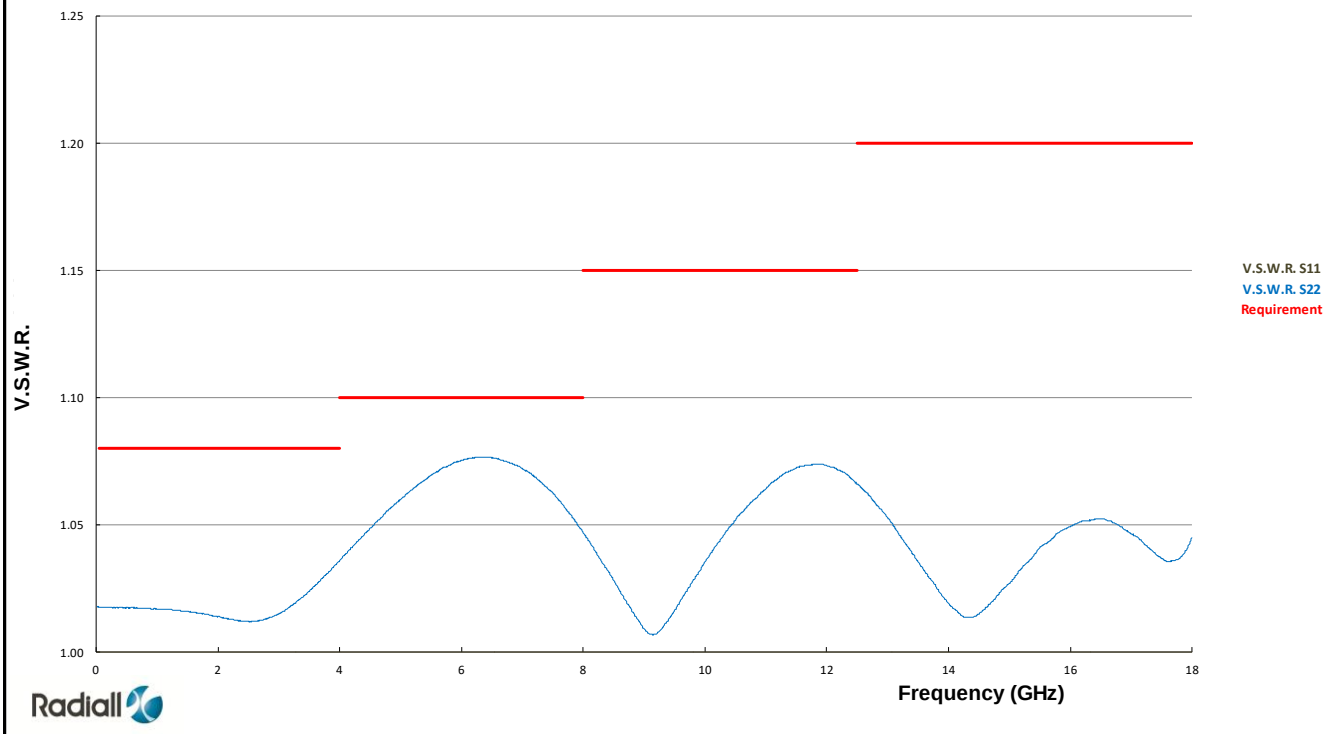
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 09 (with TNC KIT)



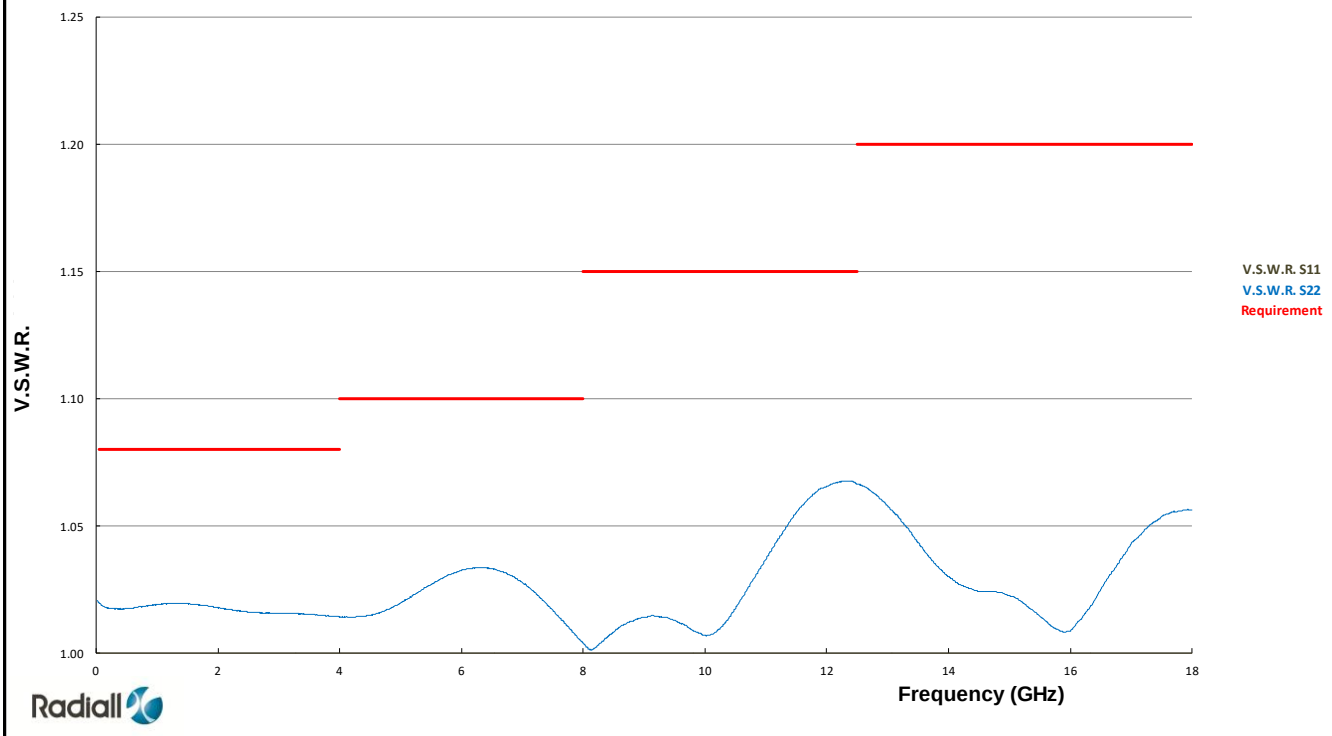
Measurement after climatic sequence-final/ V.S.W.R.
R404370670 sample 09 (with GPC7 KIT)



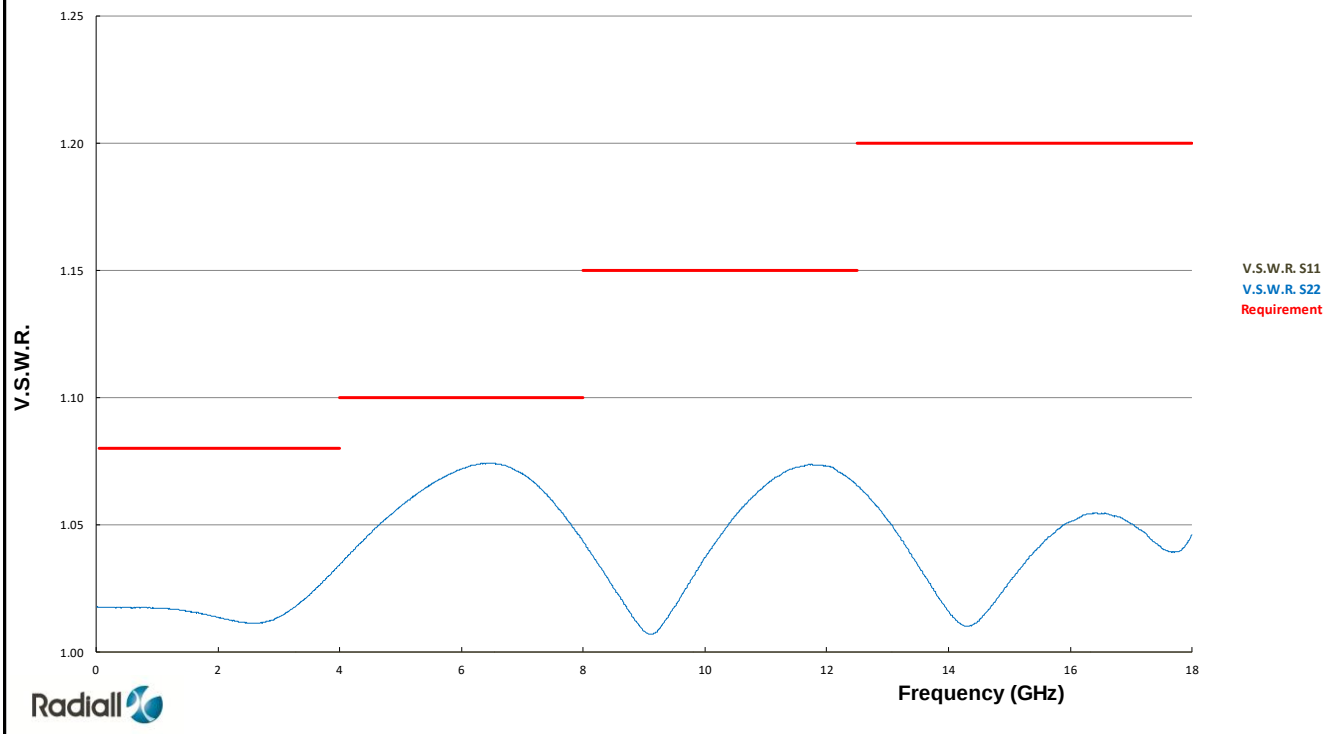
Initial measurement / V.S.W.R.
R404370670 sample 12 (with TNC KIT)



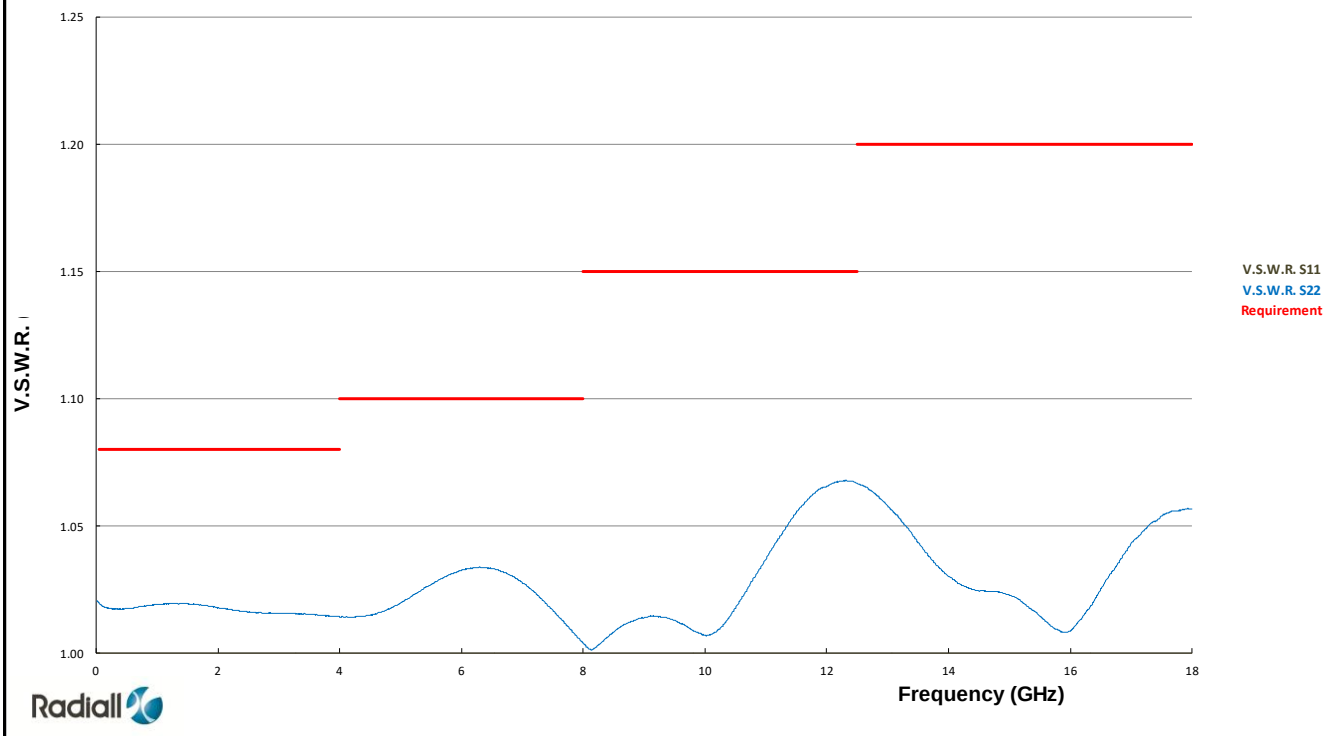
Initial measurement / V.S.W.R.
R404370670 sample 12 (with GPC7 KIT)



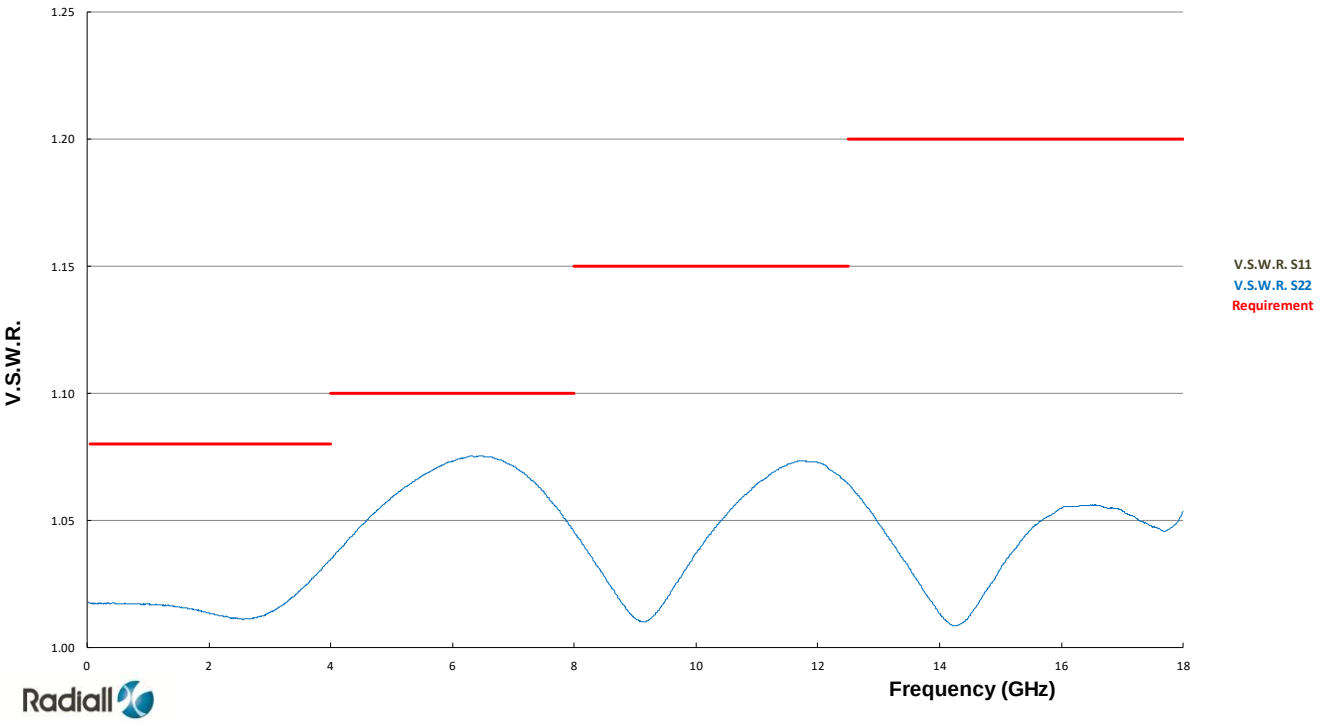
Measurement after operating life / V.S.W.R.
R404370670 sample 12 (with TNC KIT)



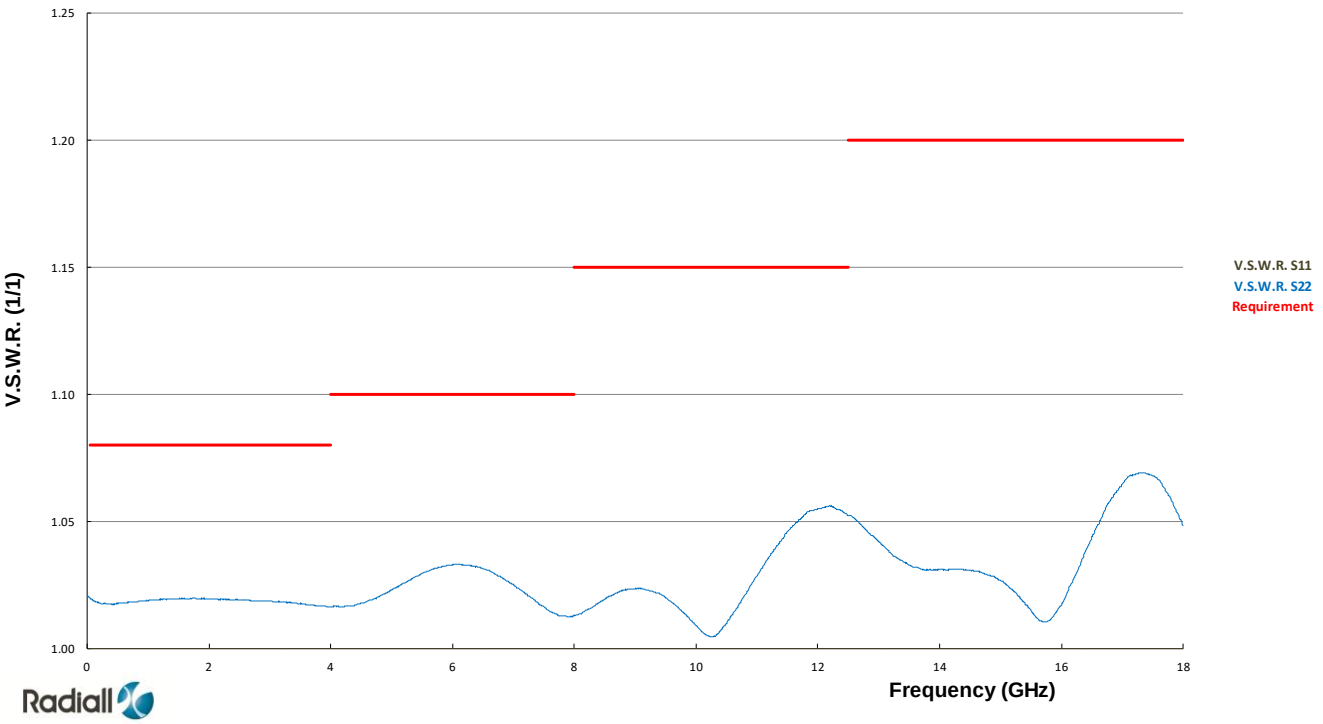
Measurement after operating life / V.S.W.R.
R404370670 sample 12 (with GPC7 KIT)



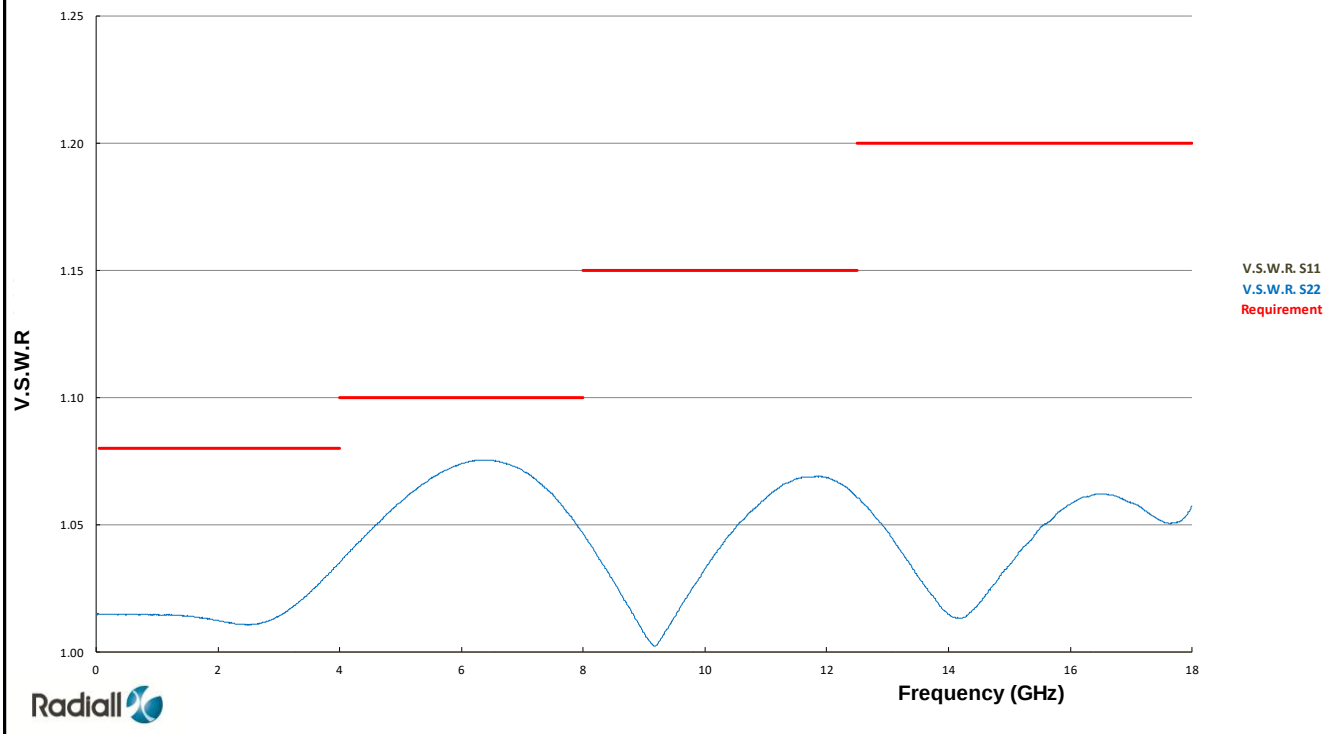
Measurement after operating life (20h at +70°C) / V.S.W.R.
R404370670 sample 12 (with TNC KIT)



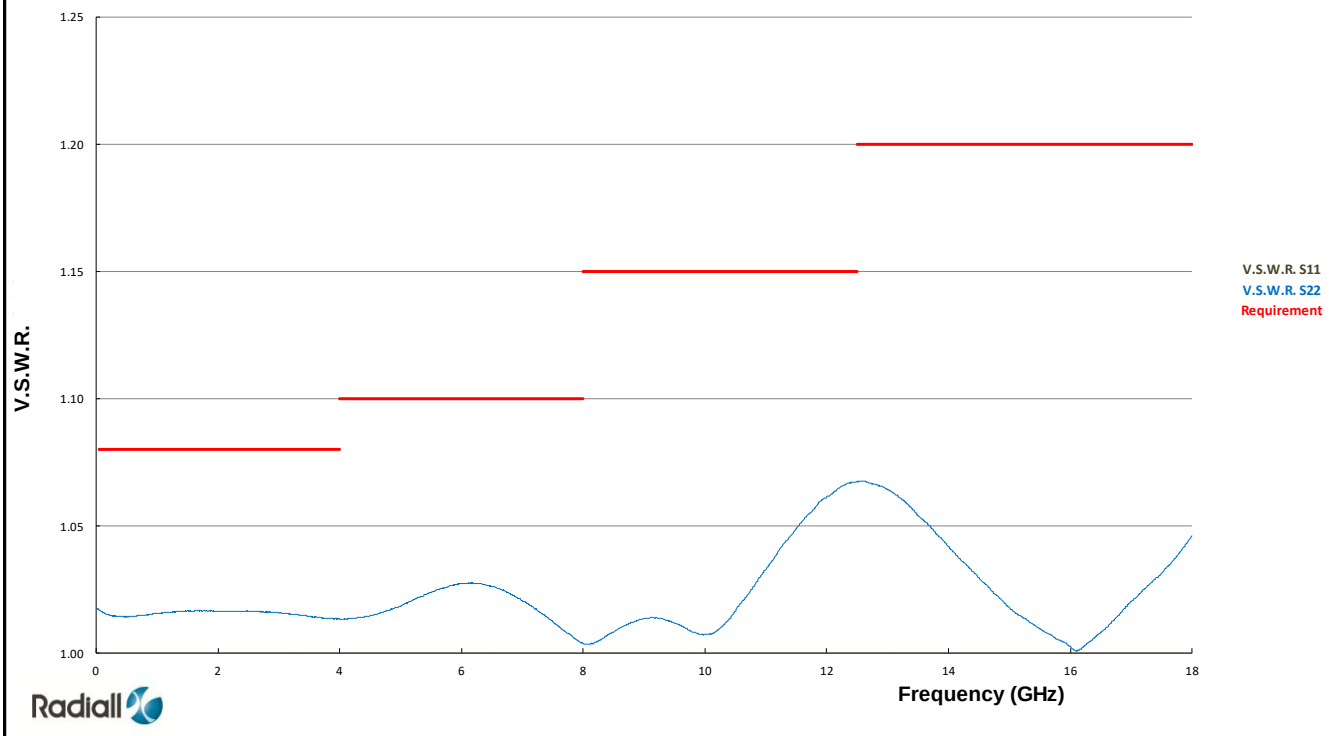
Measurement after operating life (20h at +70°C) / V.S.W.R.
R404370670 sample 12 (with GPC7 KIT)



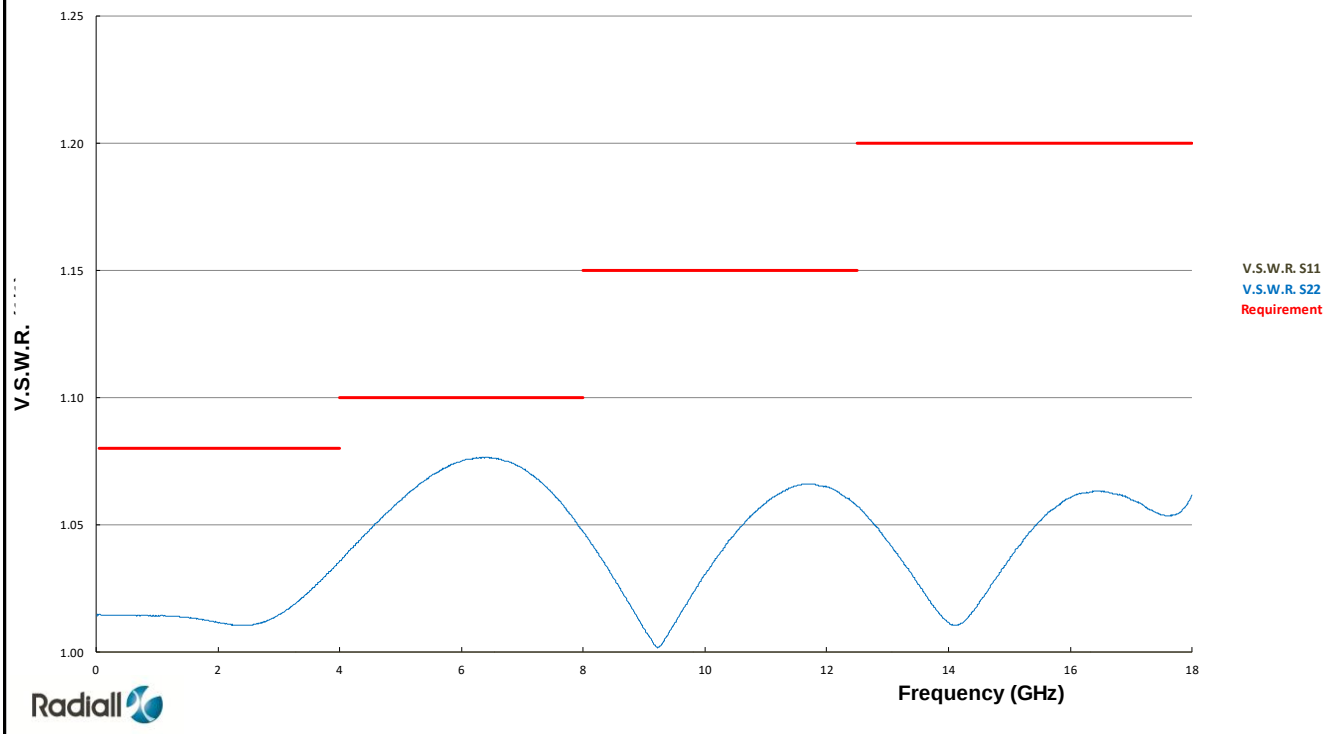
Initial measurement / V.S.W.R.
R404370670 sample 13 (with TNC KIT)



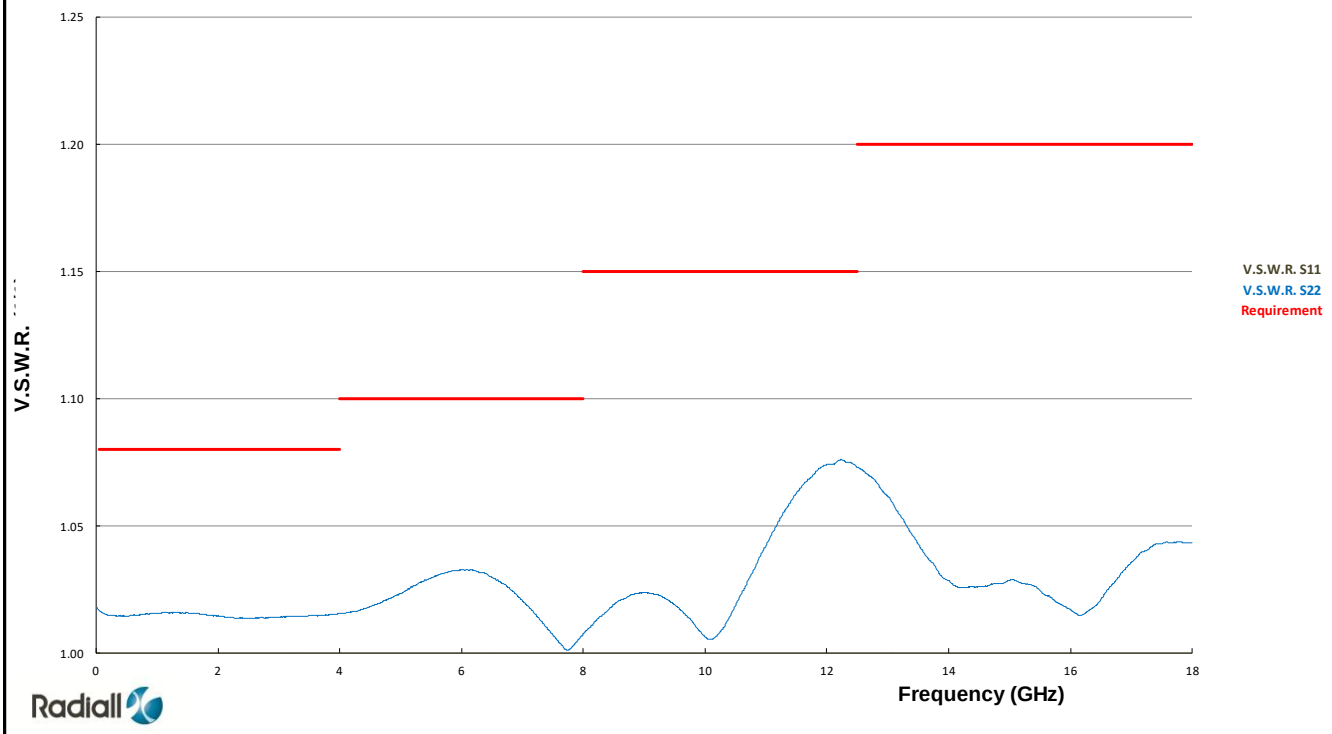
Initial measurement / V.S.W.R.
R404370670 sample 13 (with GPC7 KIT)



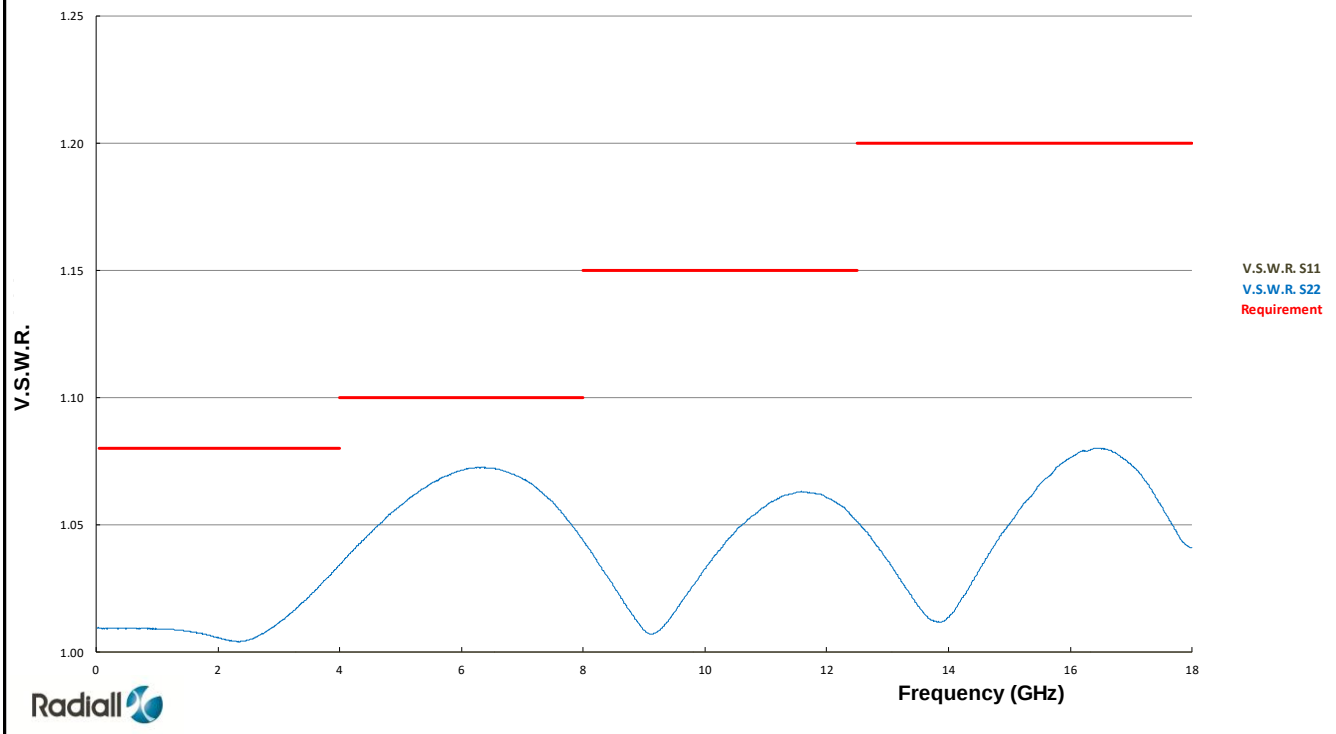
After peak power / V.S.W.R.
R404370670 sample 13 (with TNC KIT)



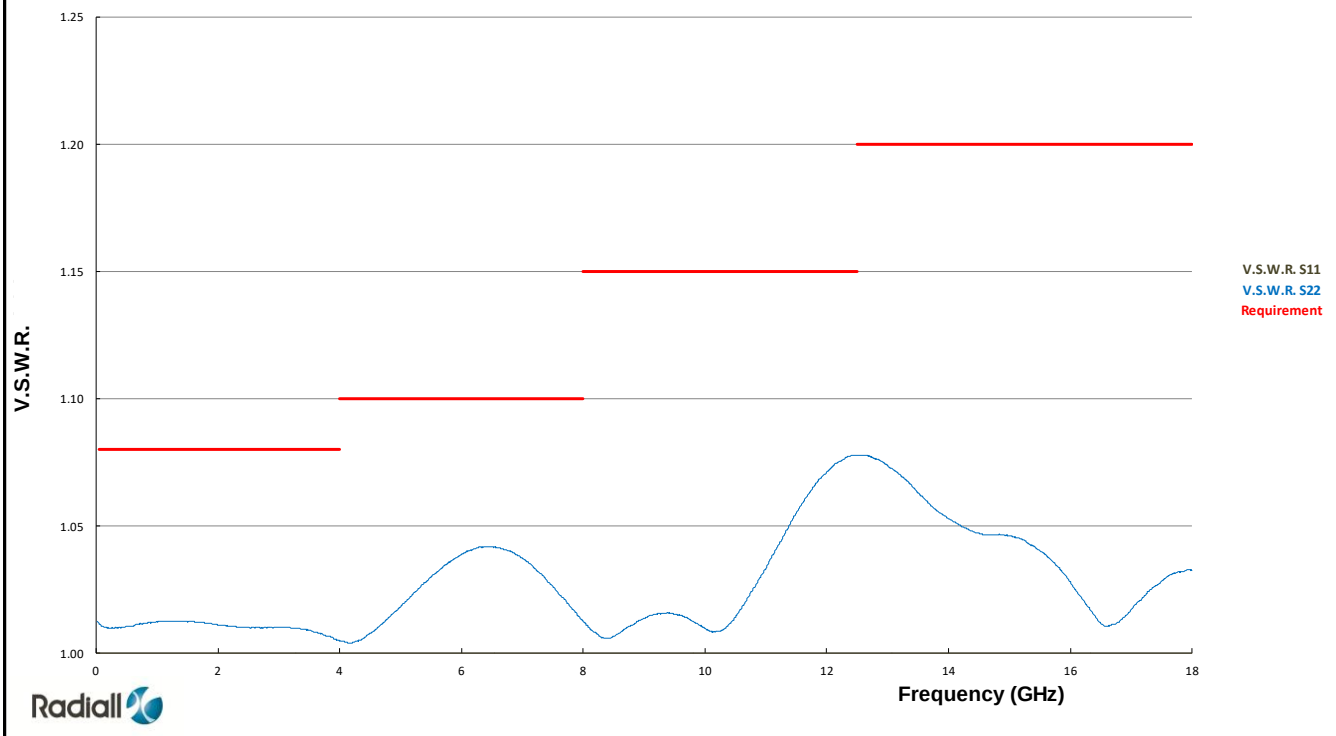
After peak power / V.S.W.R.
R404370670 sample 13 (with GPC7 KIT)



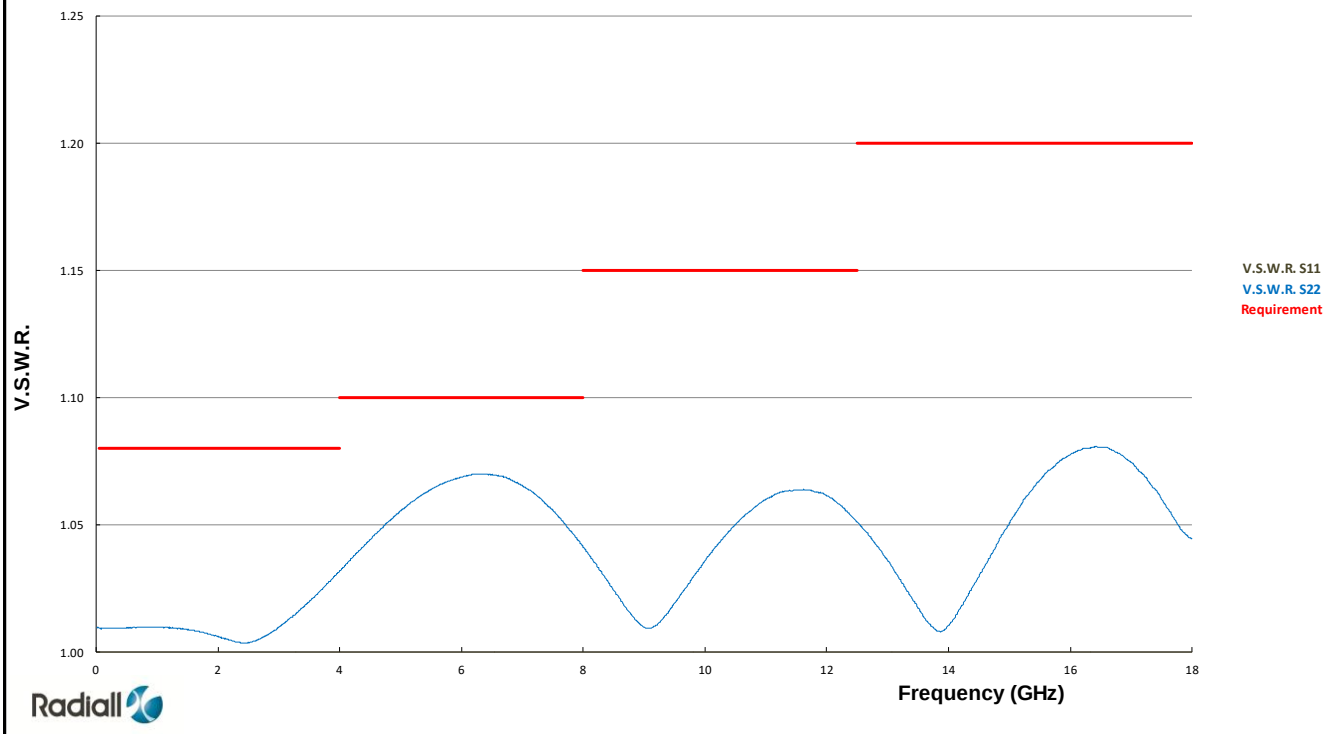
Initial measurement / V.S.W.R.
R404370670 sample 14 (with TNC KIT)



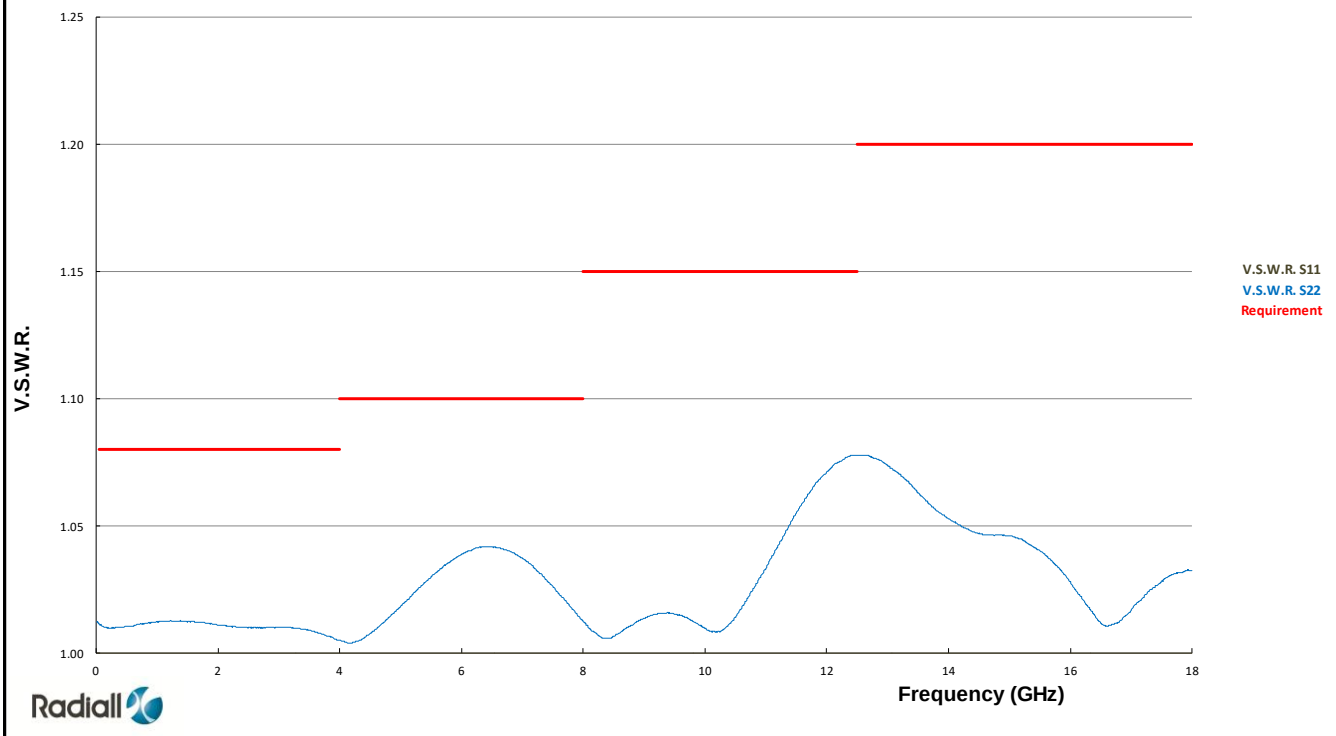
Initial measurement / V.S.W.R.
R404370670 sample 14 (with GPC7 KIT)



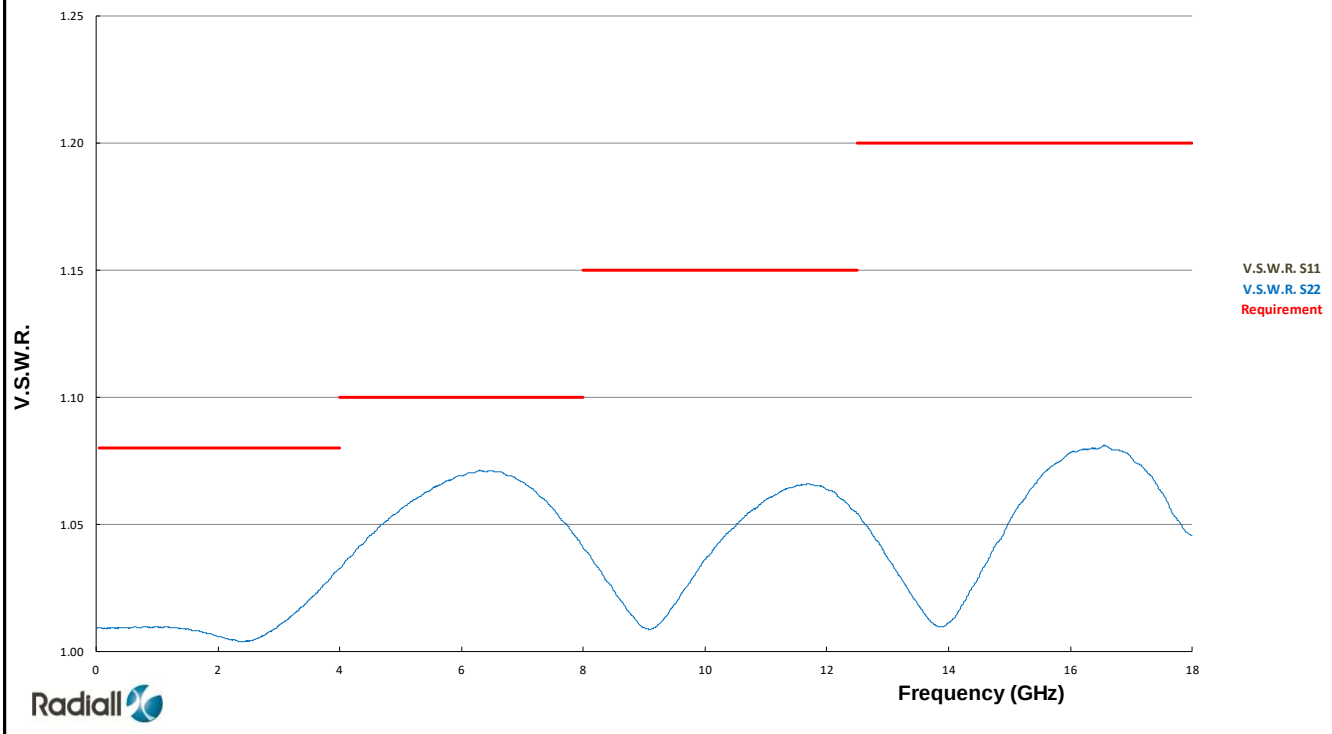
Measurement after operating life / V.S.W.R.
R404370670 sample 14 (with TNC KIT)



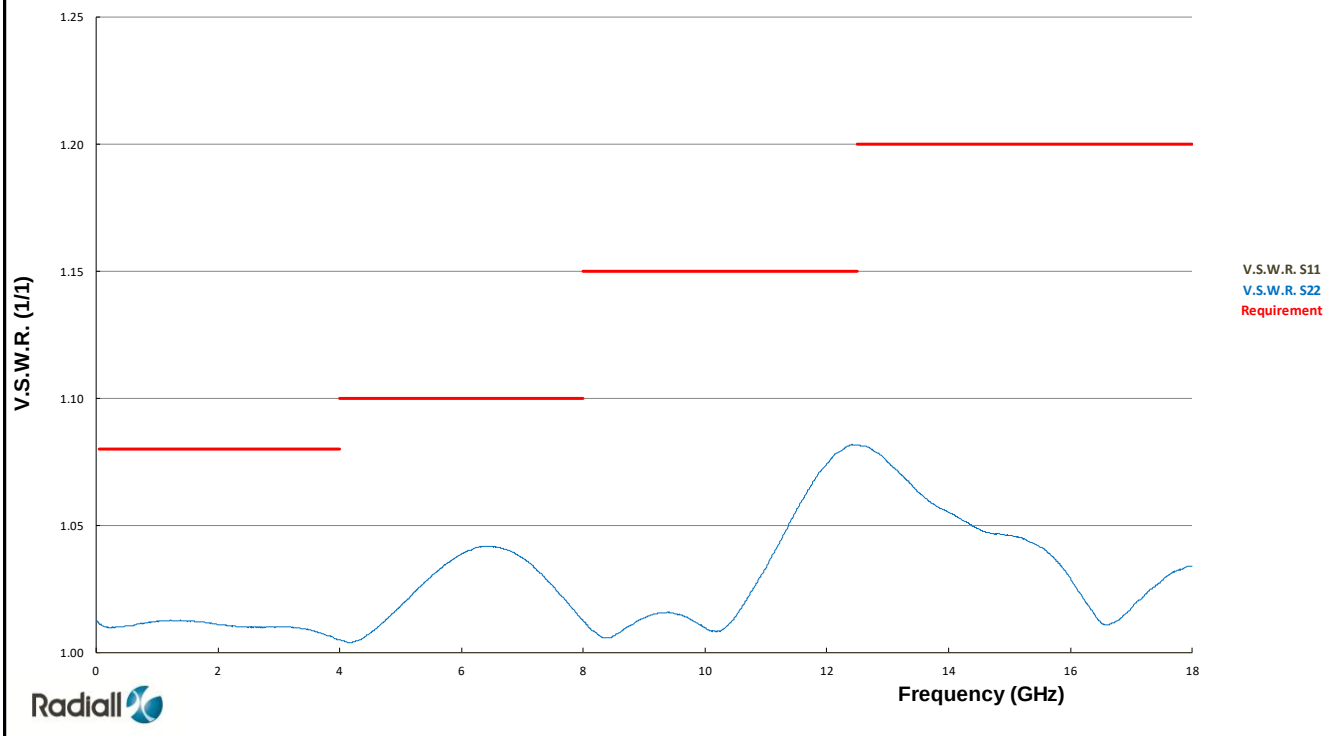
Measurement after operating life / V.S.W.R.
R404370670 sample 14 (with GPC7 KIT)



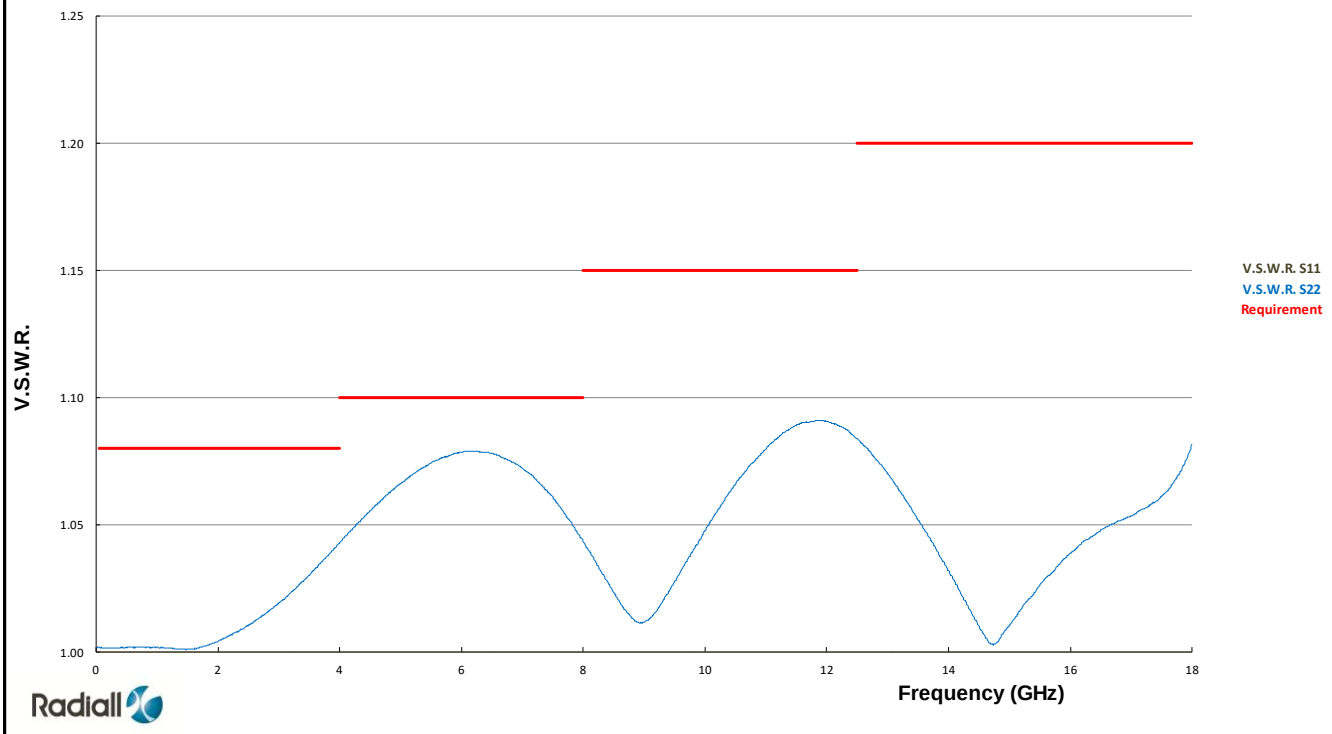
Measurement after operating life (20h at +70°C) / V.S.W.R.
R404370670 sample 14 (with TNC KIT)



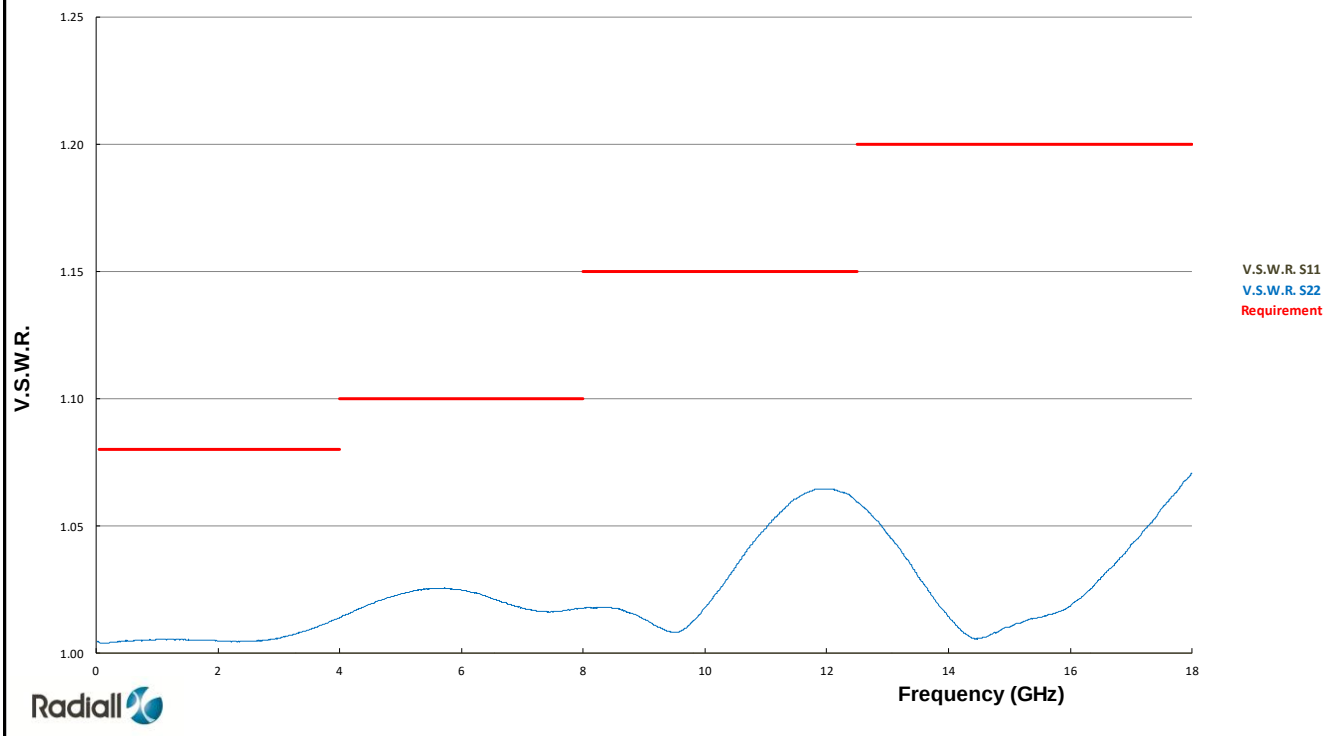
Measurement after operating life (20h at +70°C)/ V.S.W.R.
R404370670 sample 14 (with GPC7 KIT)



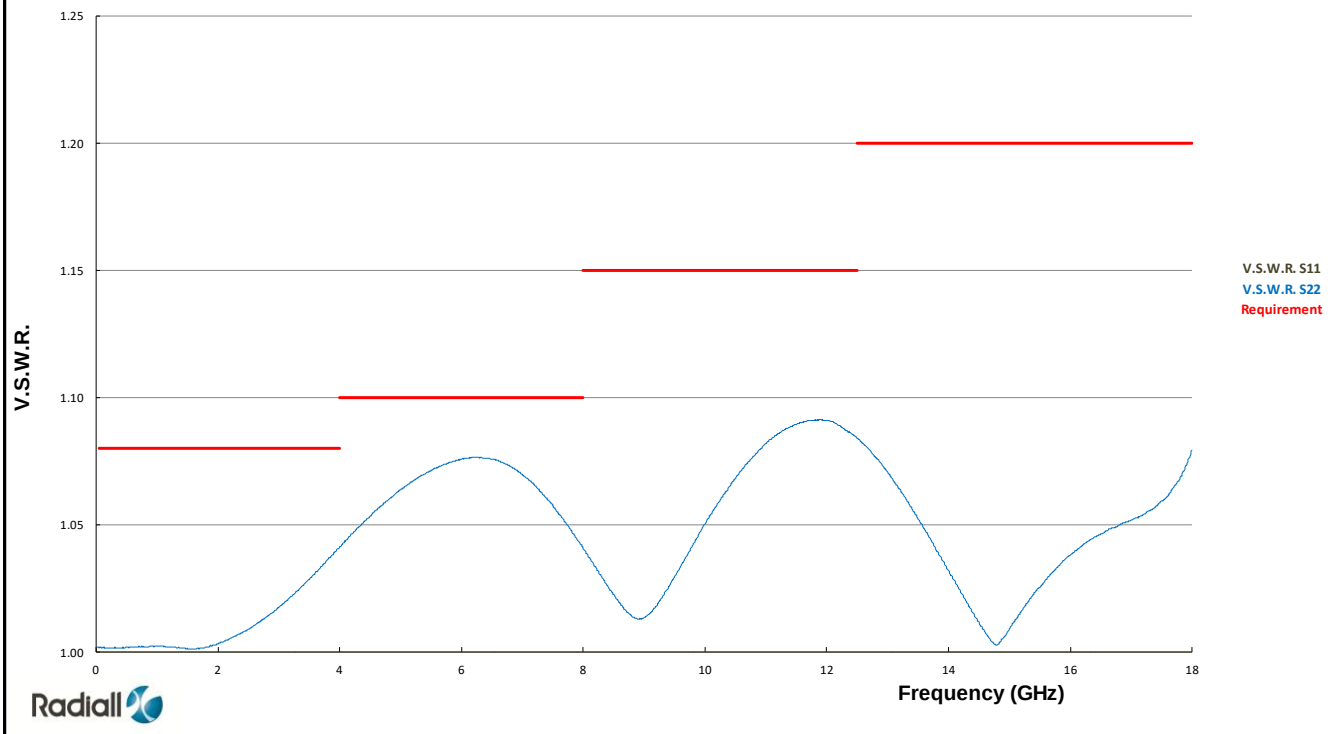
Initial measurement / V.S.W.R.
R404370670 sample 17 (with TNC KIT)



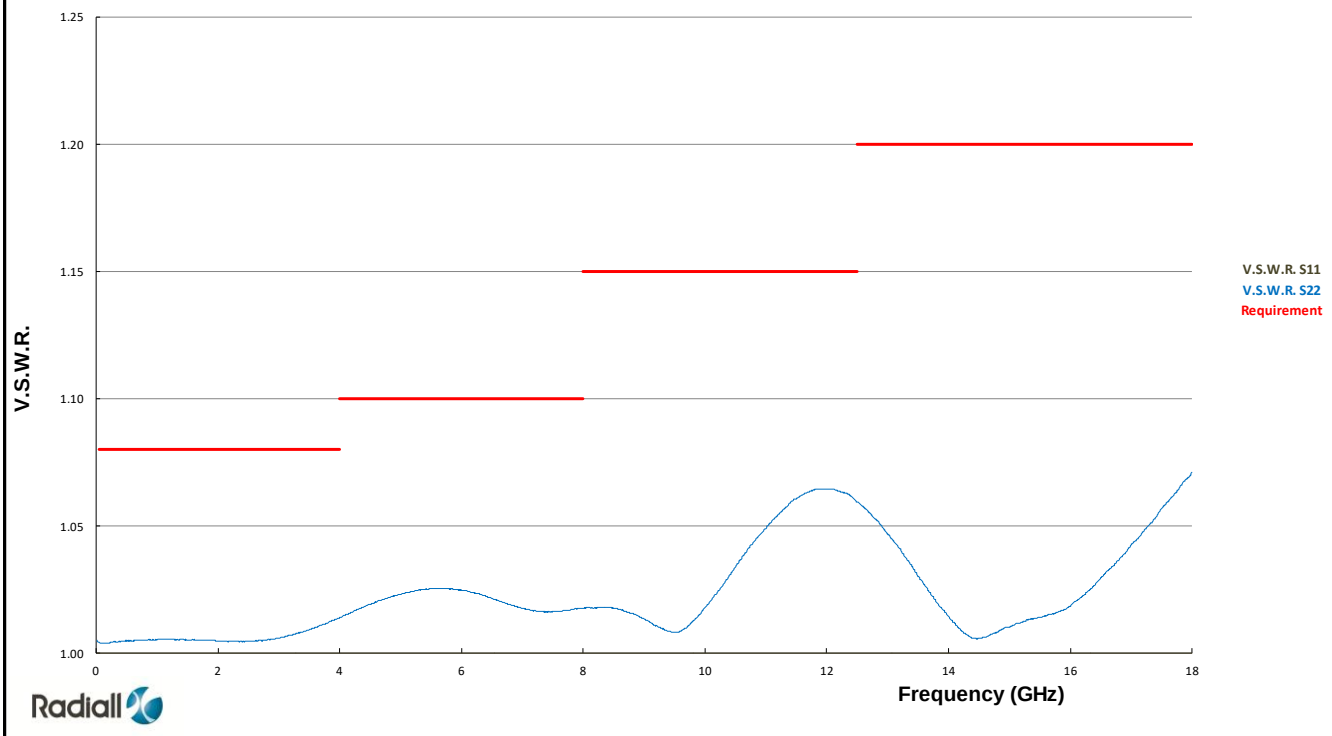
Initial measurement / V.S.W.R.
R404370670 sample 17 (with GPC7 KIT)



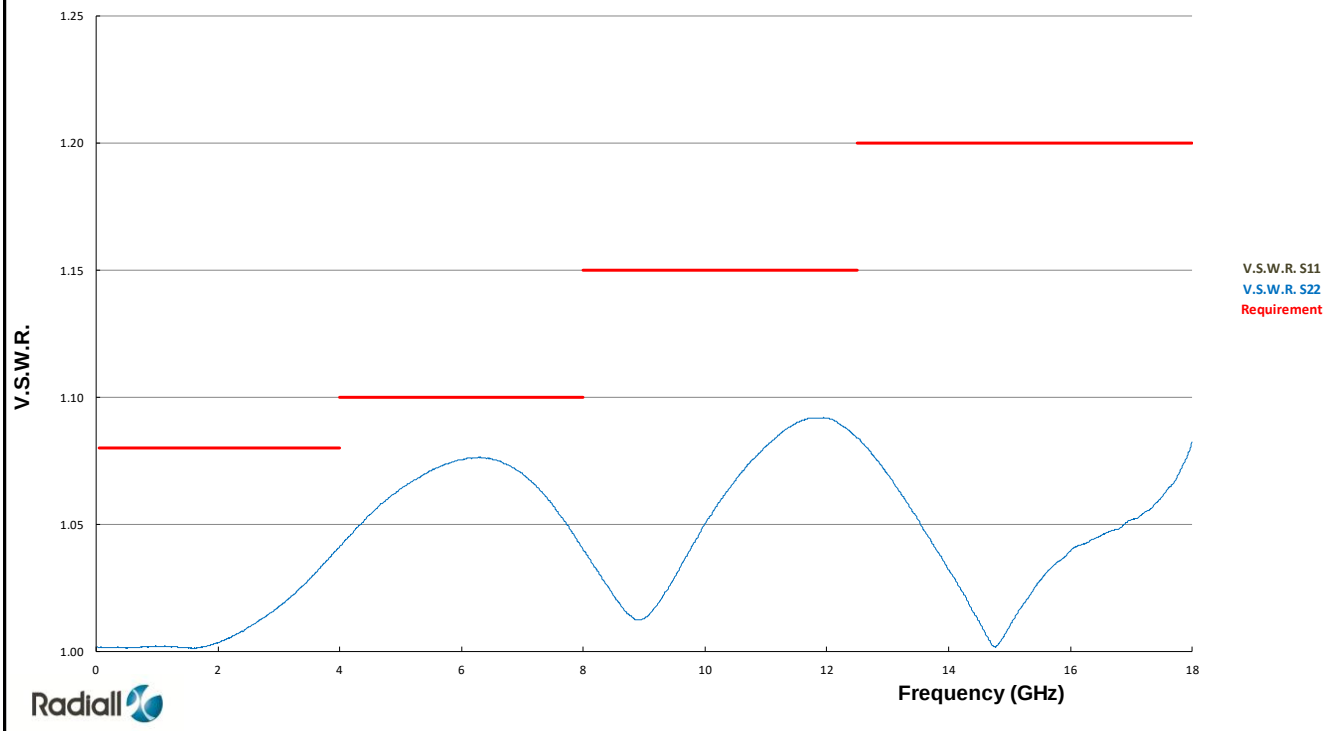
Measurement after operating life / V.S.W.R.
R404370670 sample 17 (with TNC KIT)



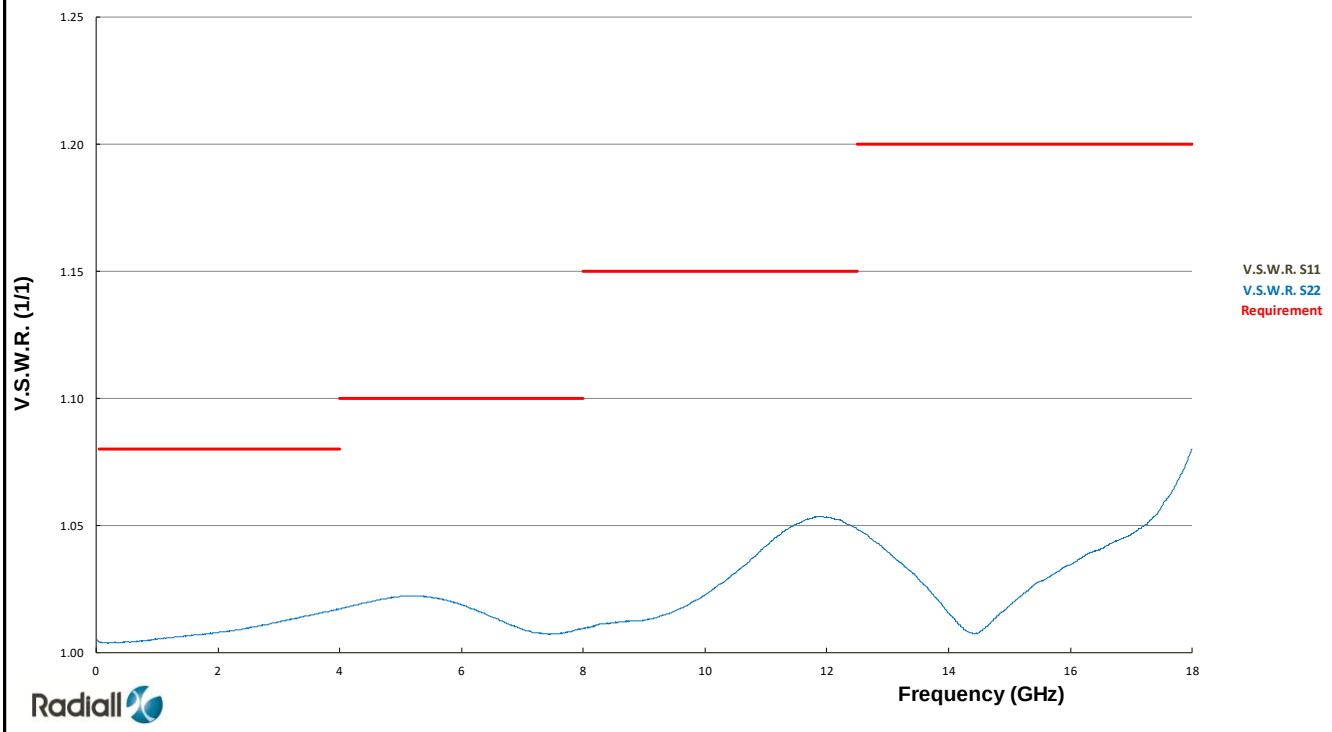
Measurement after operating life / V.S.W.R.
R404370670 sample 17 (with GPC7 KIT)



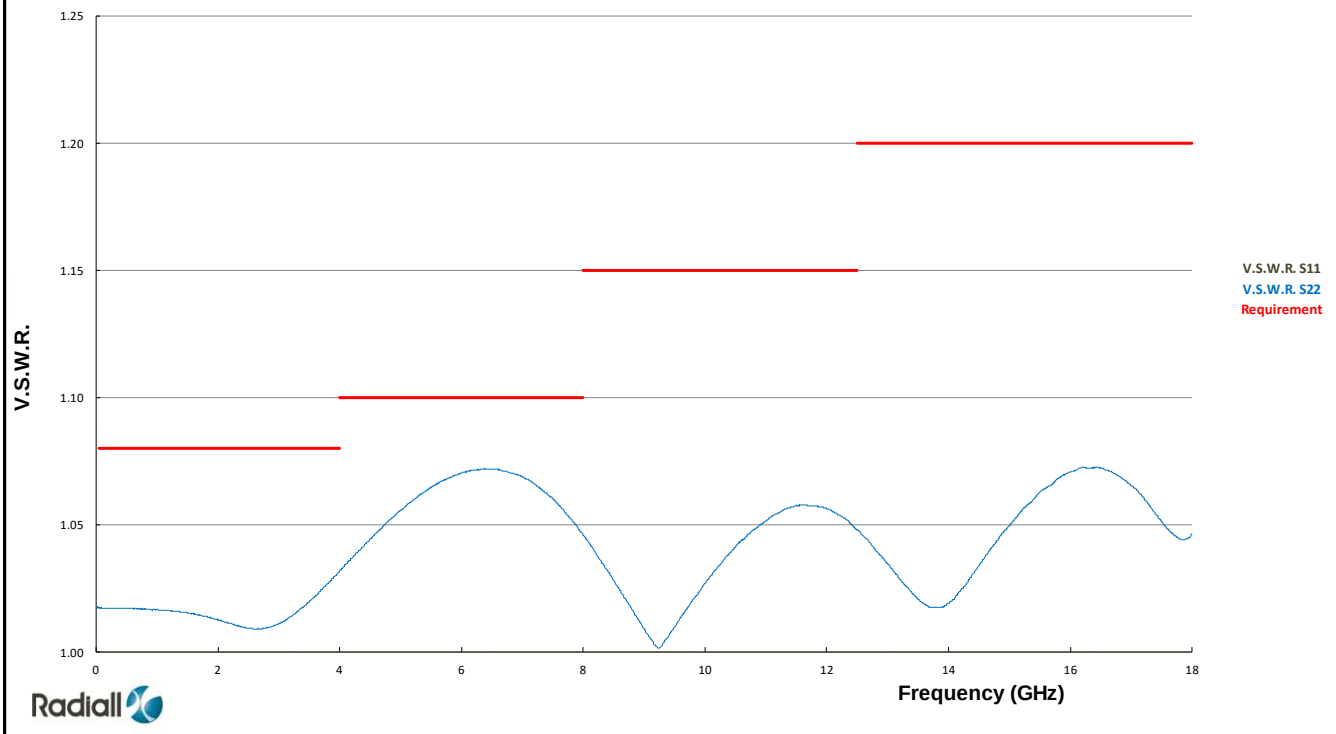
Measurement after operating life(20h at +70°C) / V.S.W.R.
R404370670 sample 17 (with TNC KIT)



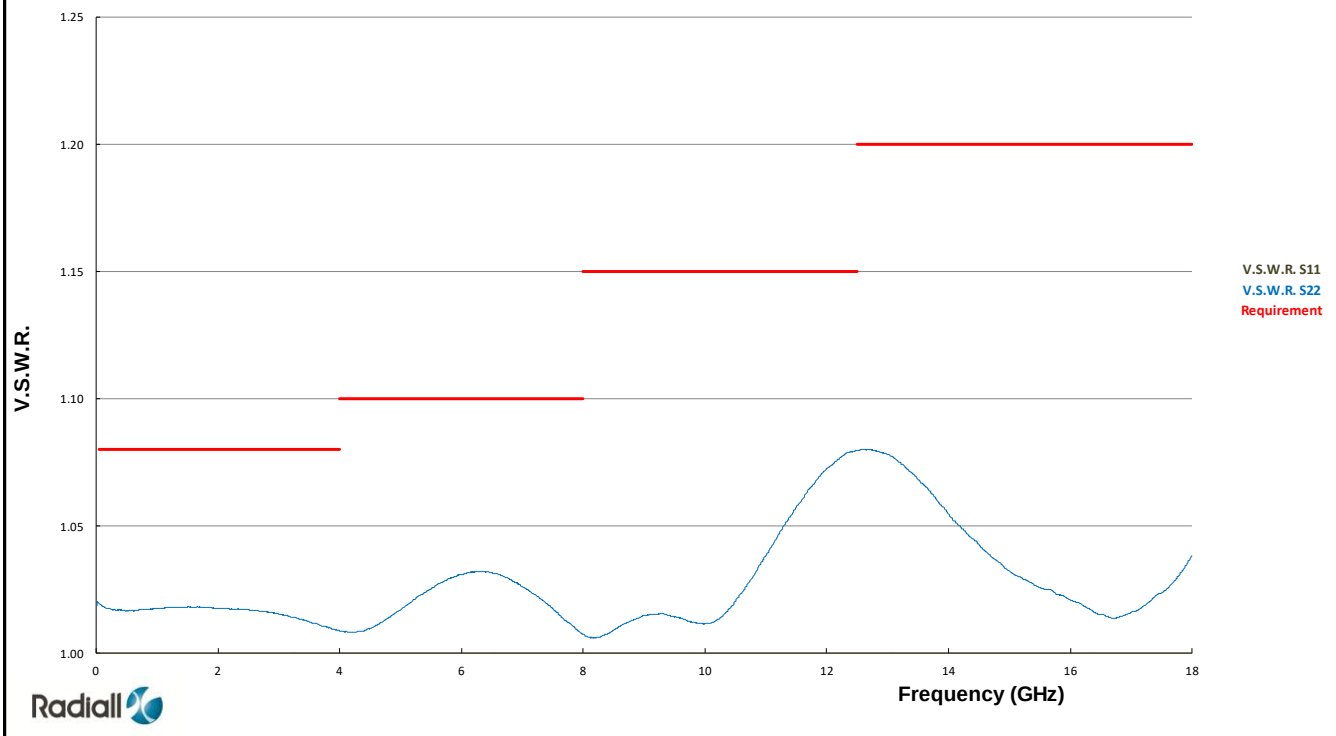
Measurement after operating life (20h at +70°C) / V.S.W.R.
R404370670 sample 17 (with GPC7 KIT)



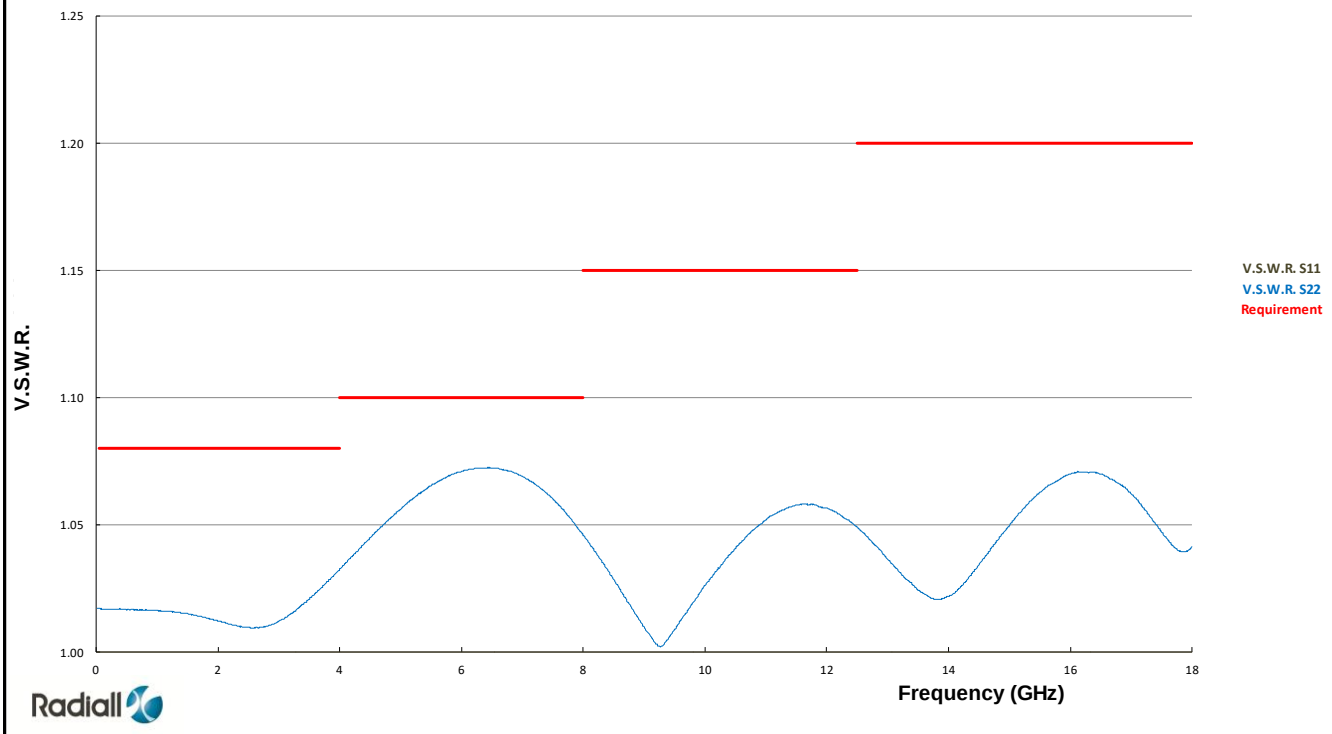
Initial measurement / V.S.W.R.
R404370670 sample 19 (with TNC KIT)



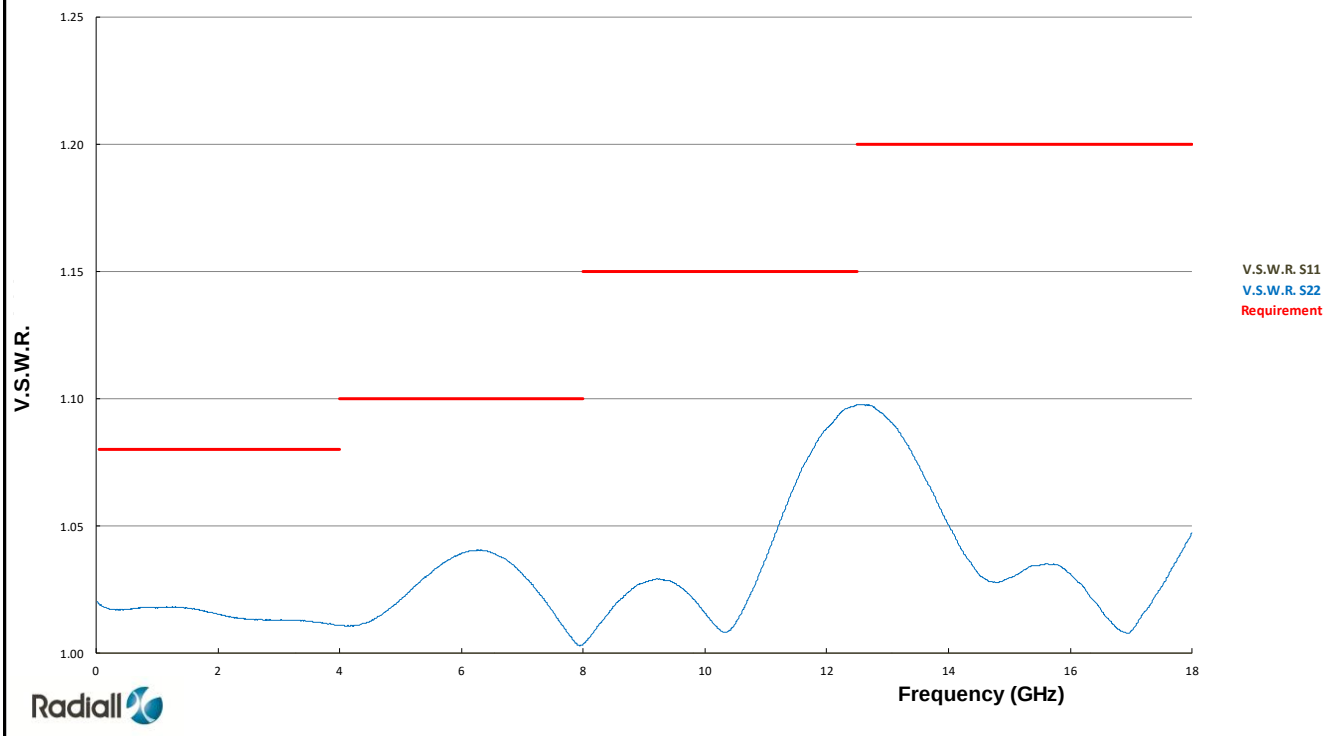
Initial measurement / V.S.W.R.
R404370670 sample 19 (with GPC7 KIT)



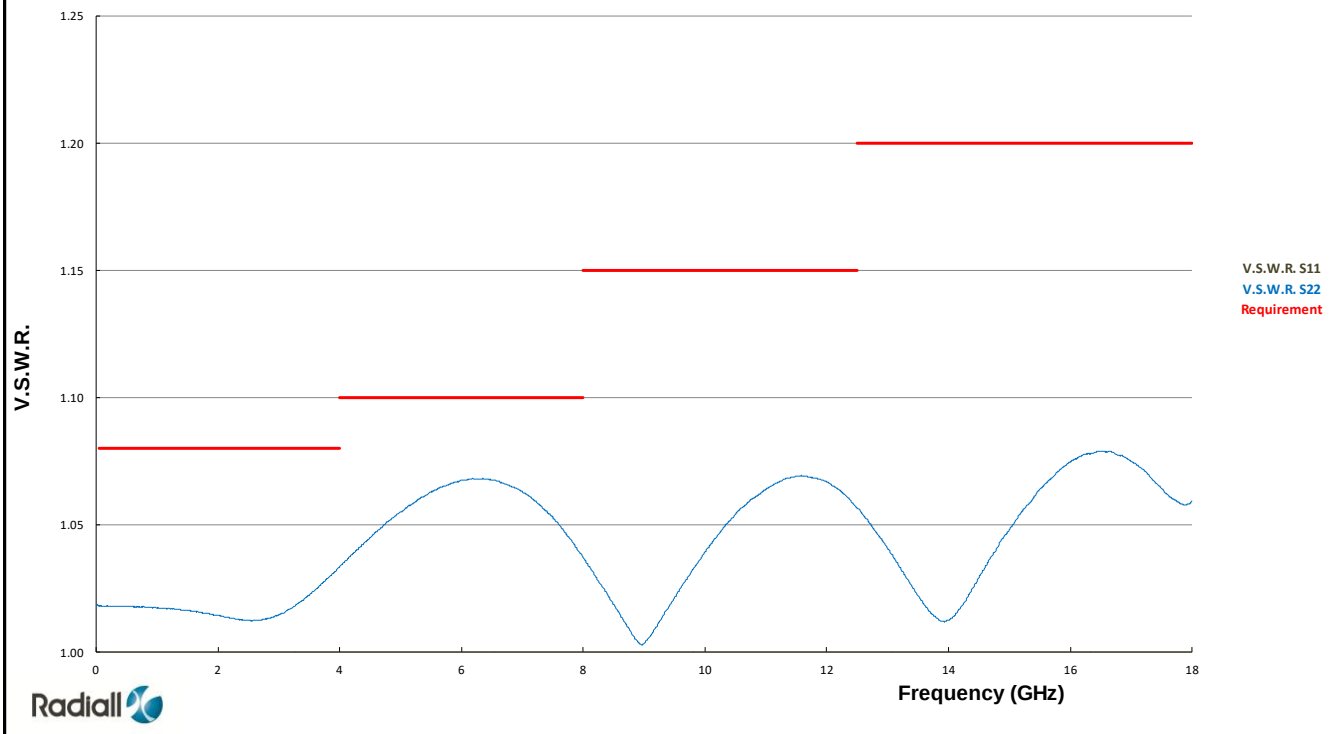
After peak power / V.S.W.R.
R404370670 sample 19 (with TNC KIT)



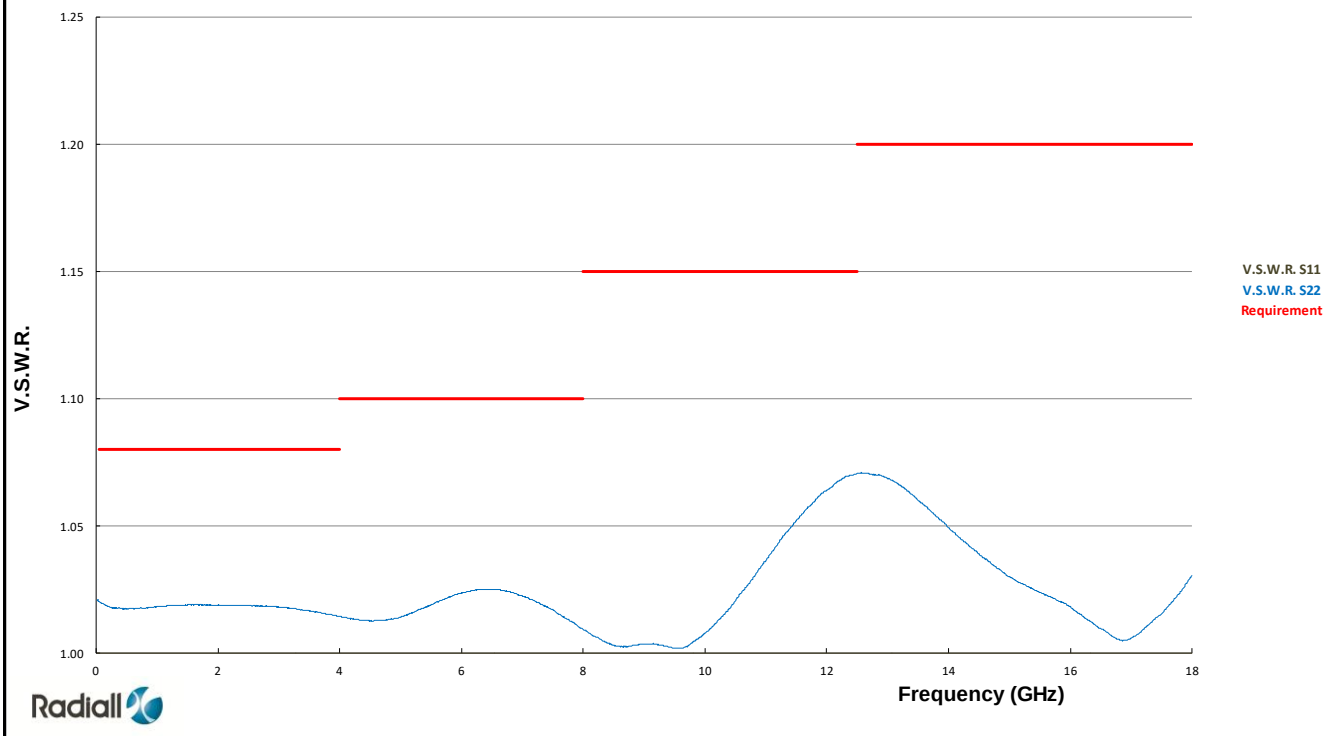
After peak power / V.S.W.R.
R404370670 sample 19 (with GPC7 KIT)



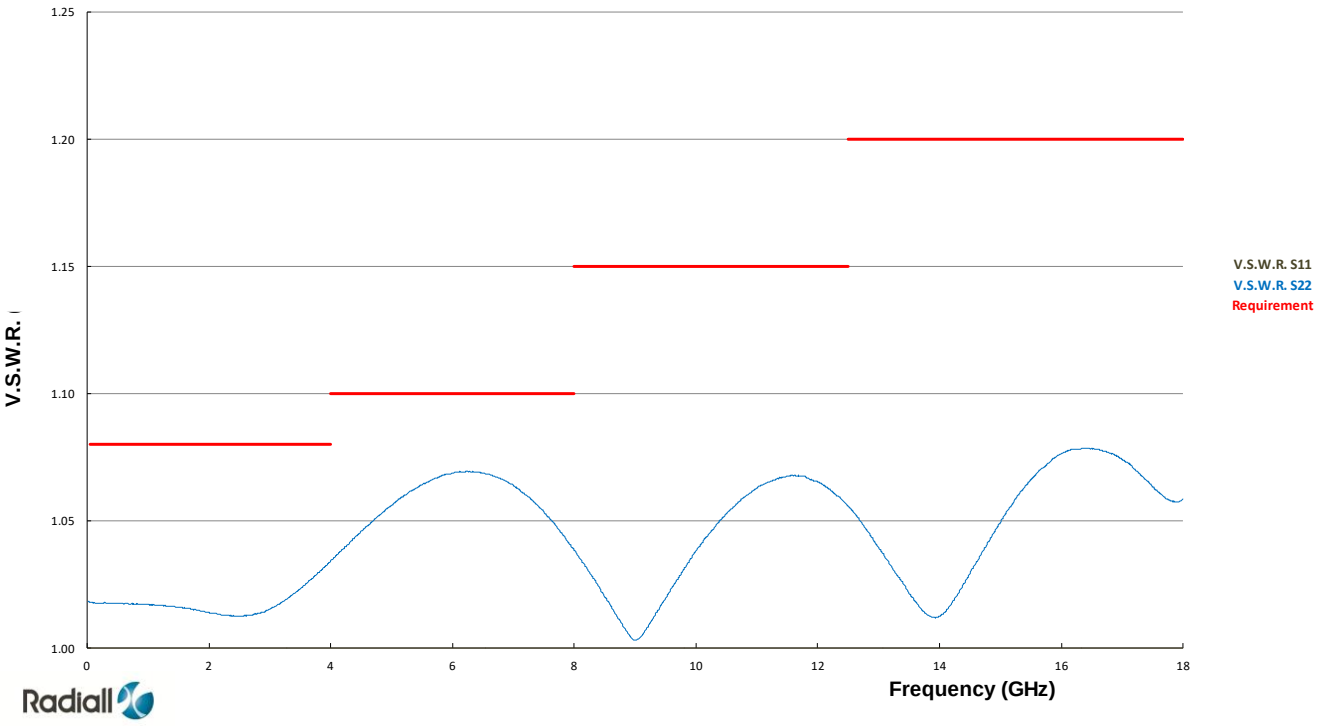
Initial measurement / V.S.W.R.
R404370670 sample 23 (with TNC KIT)



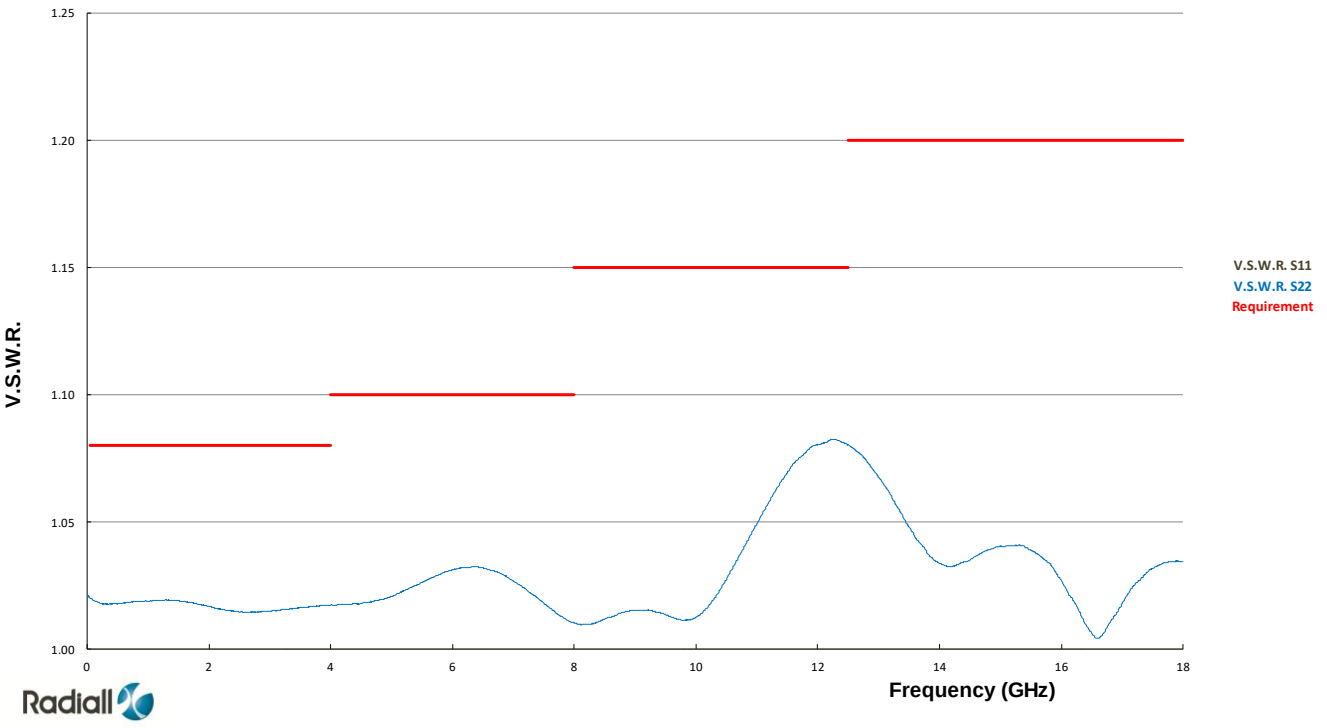
Initial measurement / V.S.W.R.
R404370670 sample 23 (with GPC7 KIT)



After peak power / V.S.W.R.
R404370670 sample 23 (with TNC KIT)

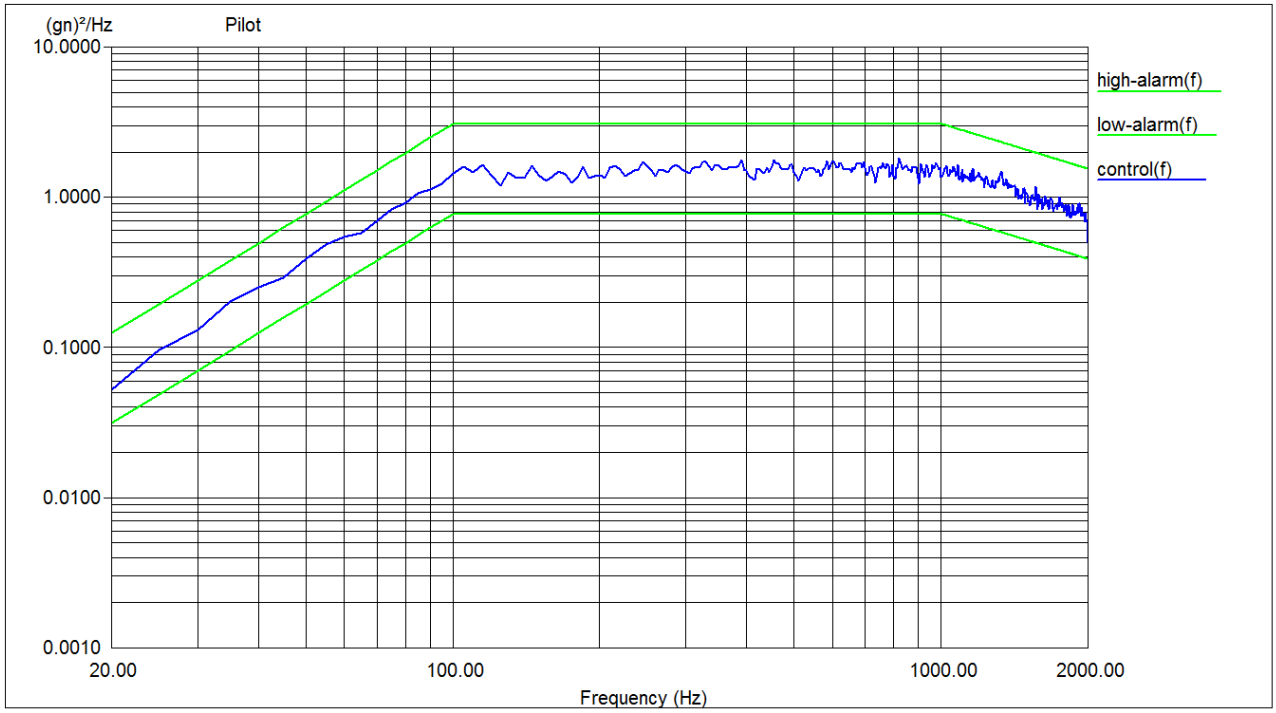


After peak power / V.S.W.R.
R404370670 sample 23 (with GPC7 KIT)



Vibration graphs

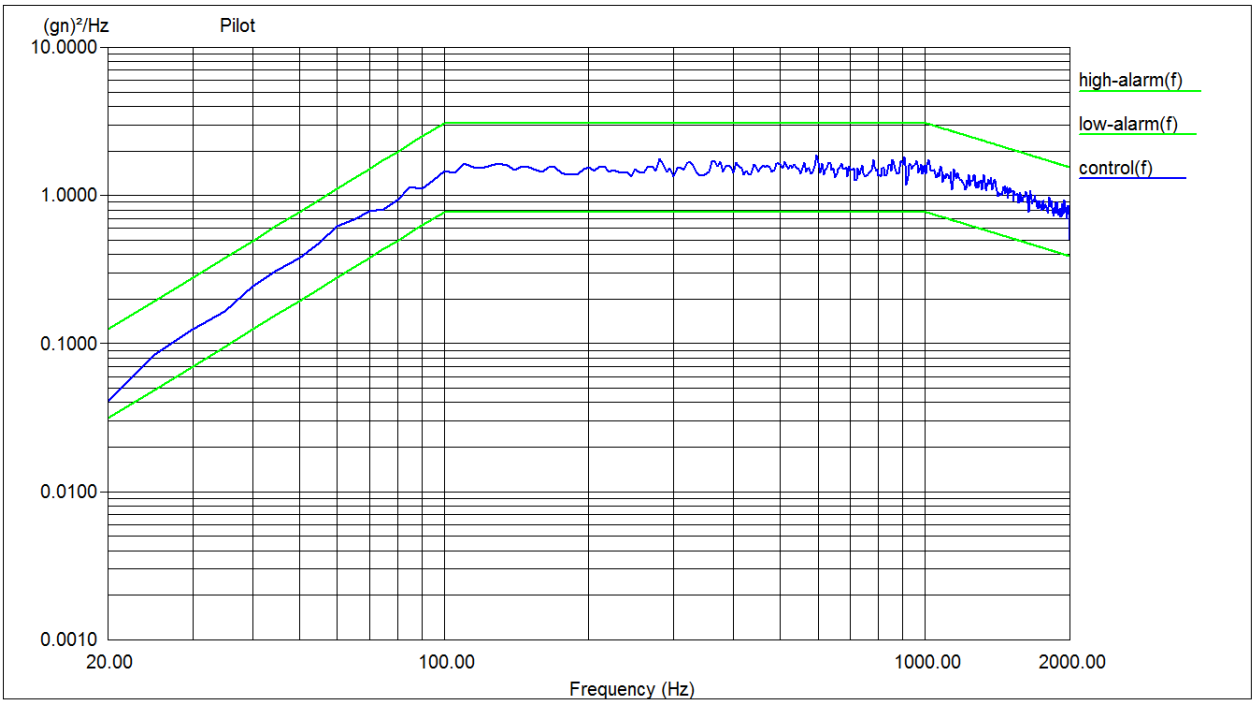
Axis X



Level: 100 %

Control RMS:	50.062775 gn	Full Level Elapsed Time:	00:03:00	Lines:400		Frame Time:	0.200000 s
Demand RMS:	50.068832 gn	Remaining Time:	00:00:00	DOF:154		dF:	5.000000 Hz

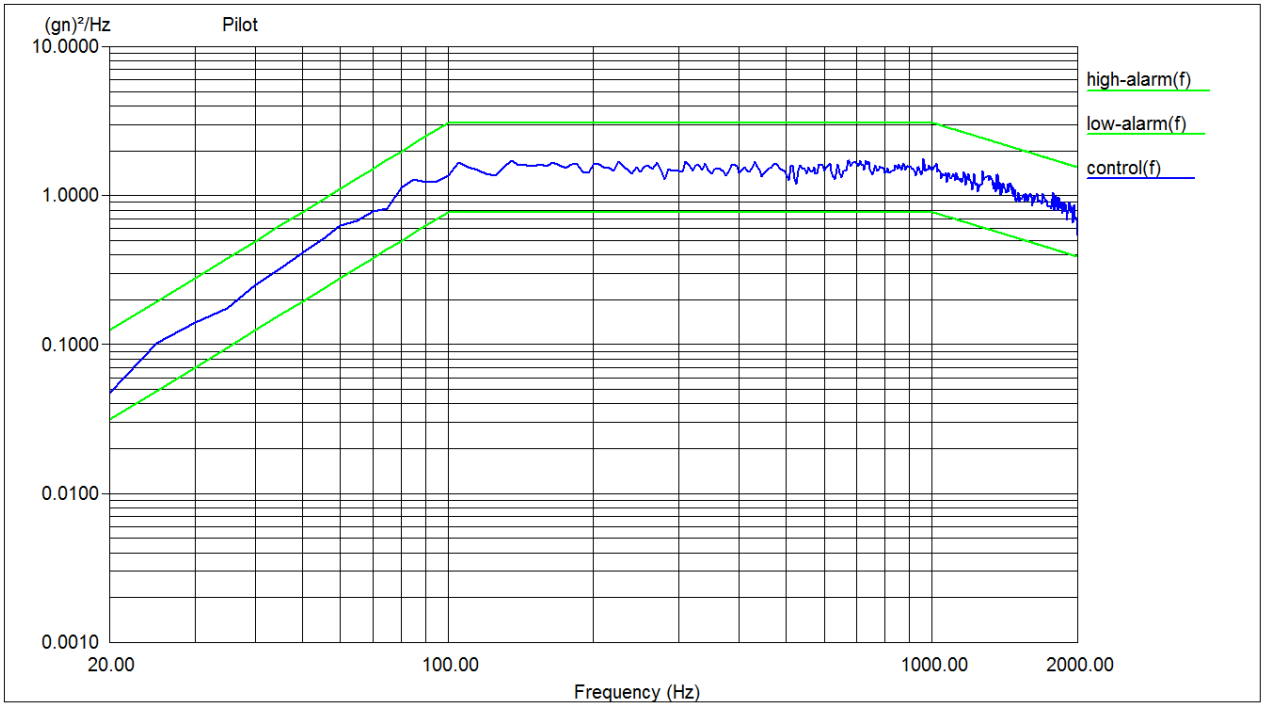
Axis Y



Level: 100 %

Control RMS:	49.886261 gn	Full Level Elapsed Time:	00:03:00	Lines:	400	Frame Time:	0.200000 s
Demand RMS:	50.068832 gn	Remaining Time:	00:00:00	DOF:	154	dF:	5.000000 Hz

Axis Z

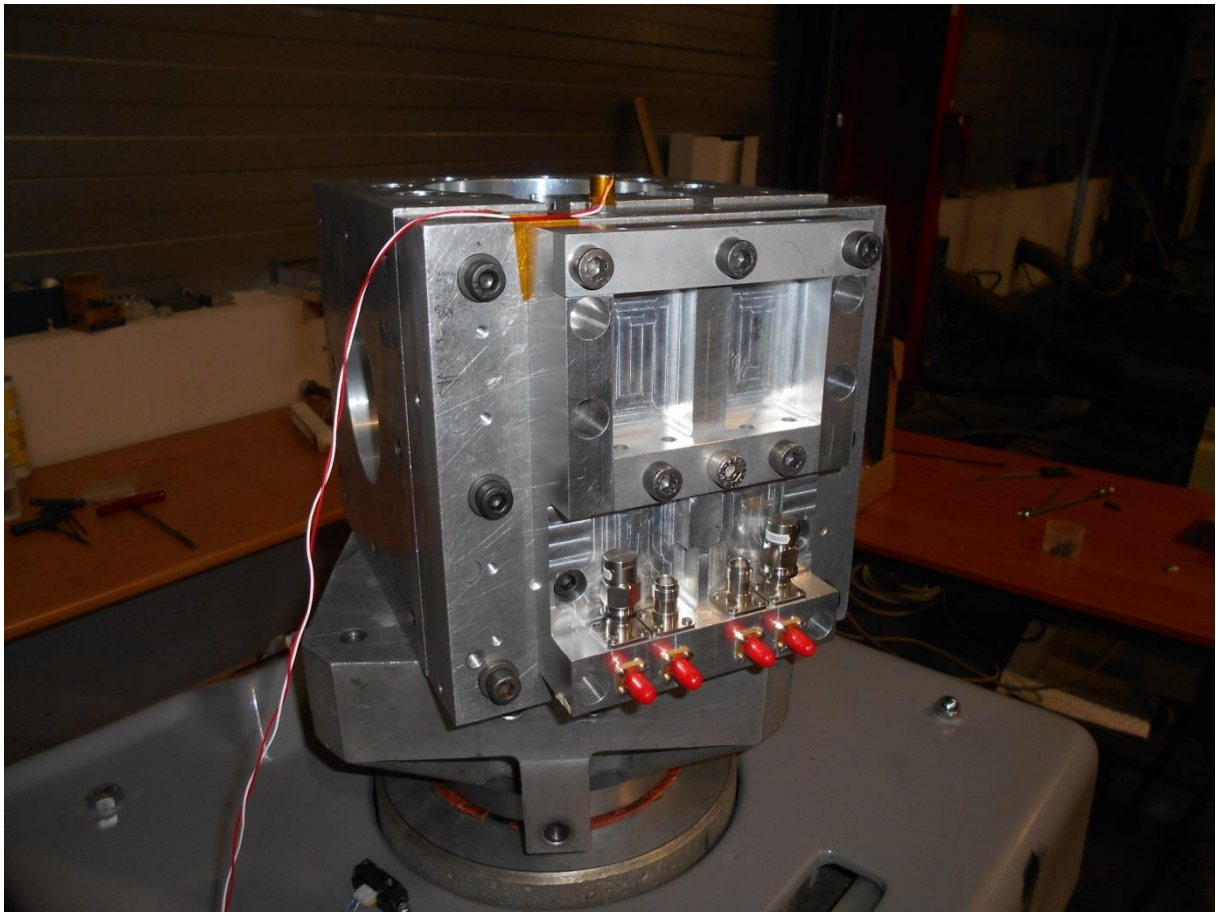


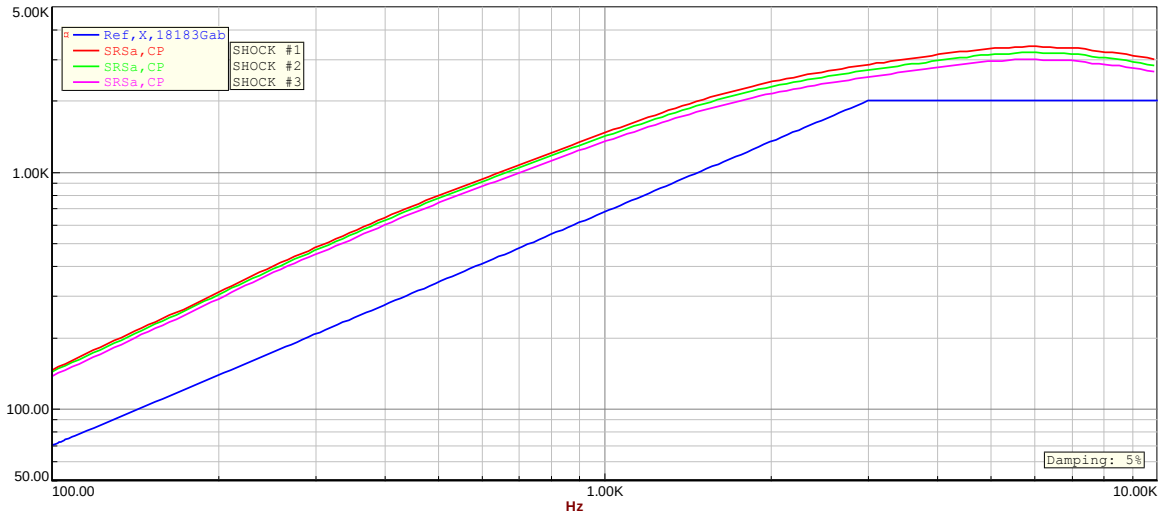
Level: 100 %

Control RMS:	49.998833 gn	Full Level Elapsed Time:	00:03:00	Lines:	400	Frame Time:	0.200000 s
Demand RMS:	50.068832 gn	Remaining Time:	00:00:00	DOF:	154	dF:	5.000000 Hz

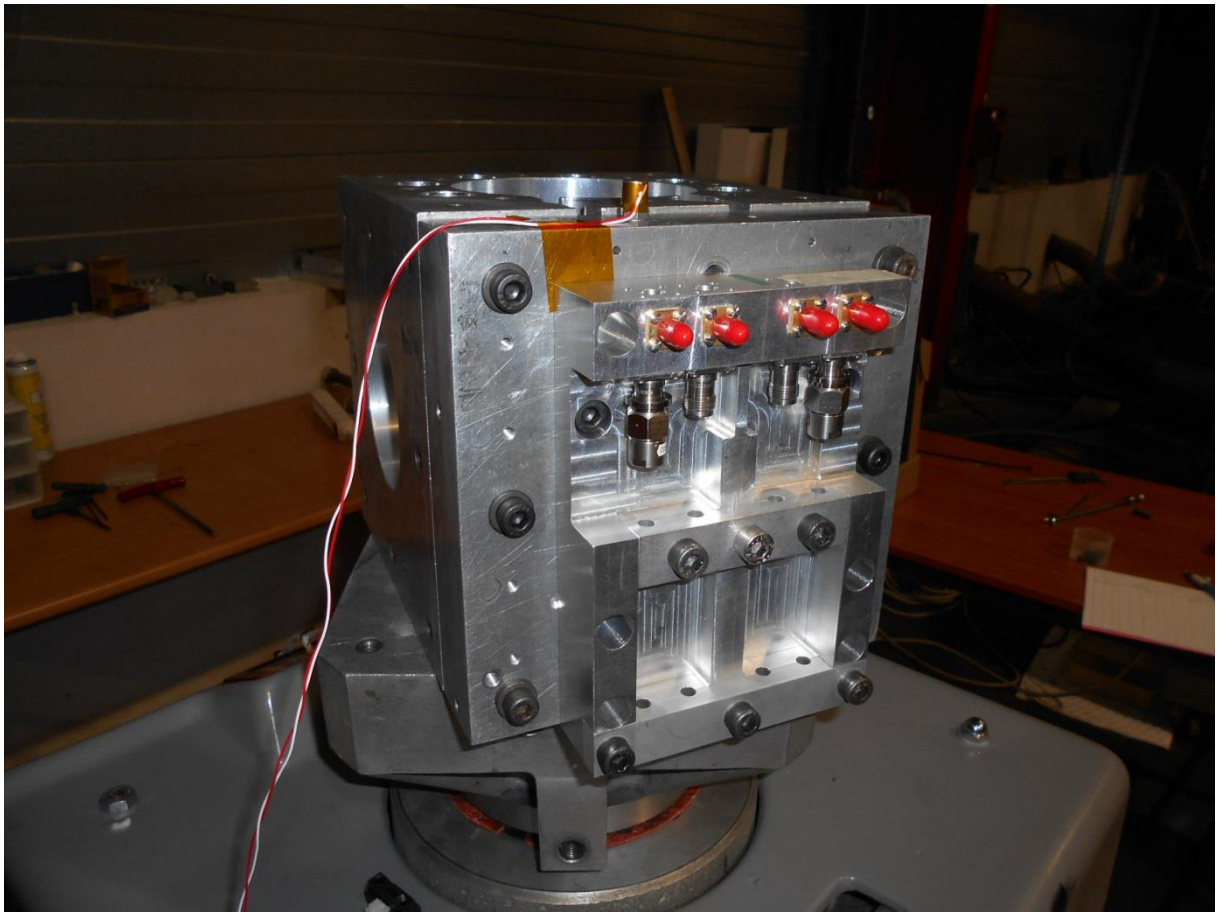
Mechanical shock graphs

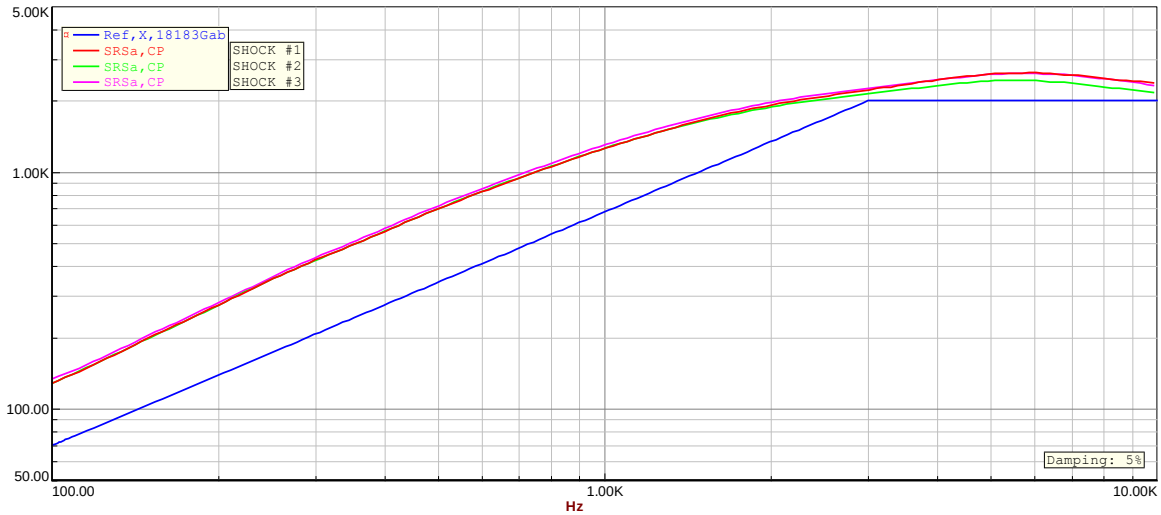
Axis X+



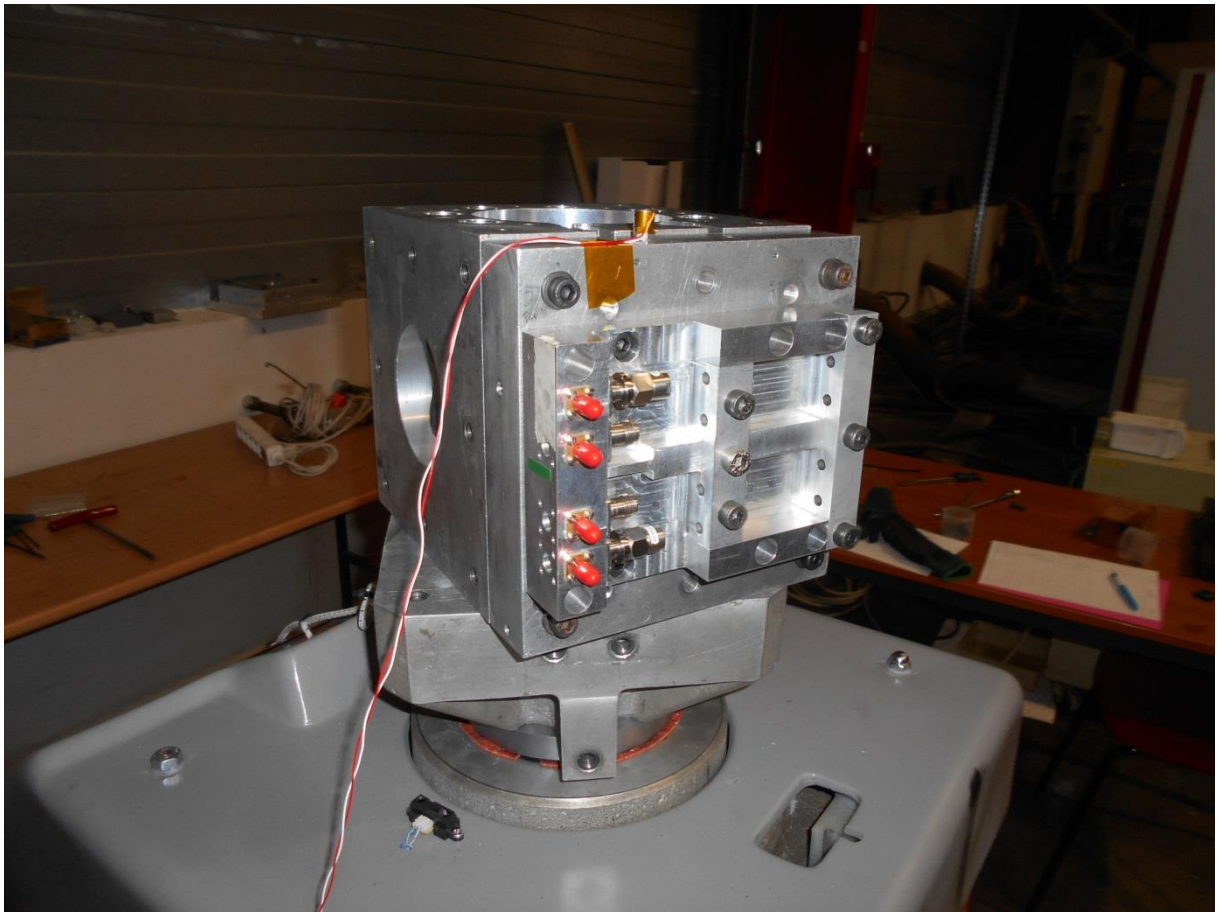

5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

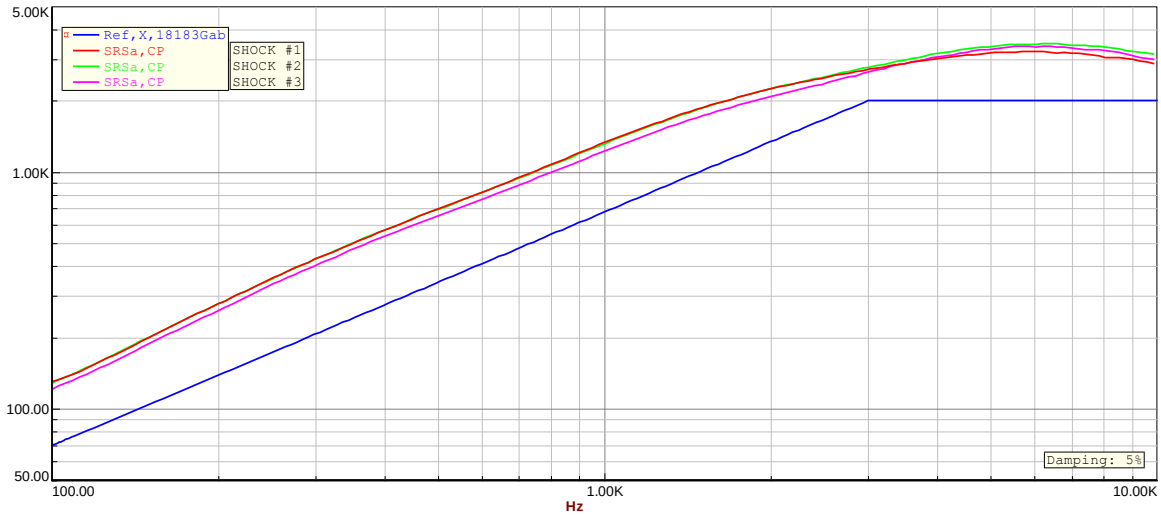
Axis X-



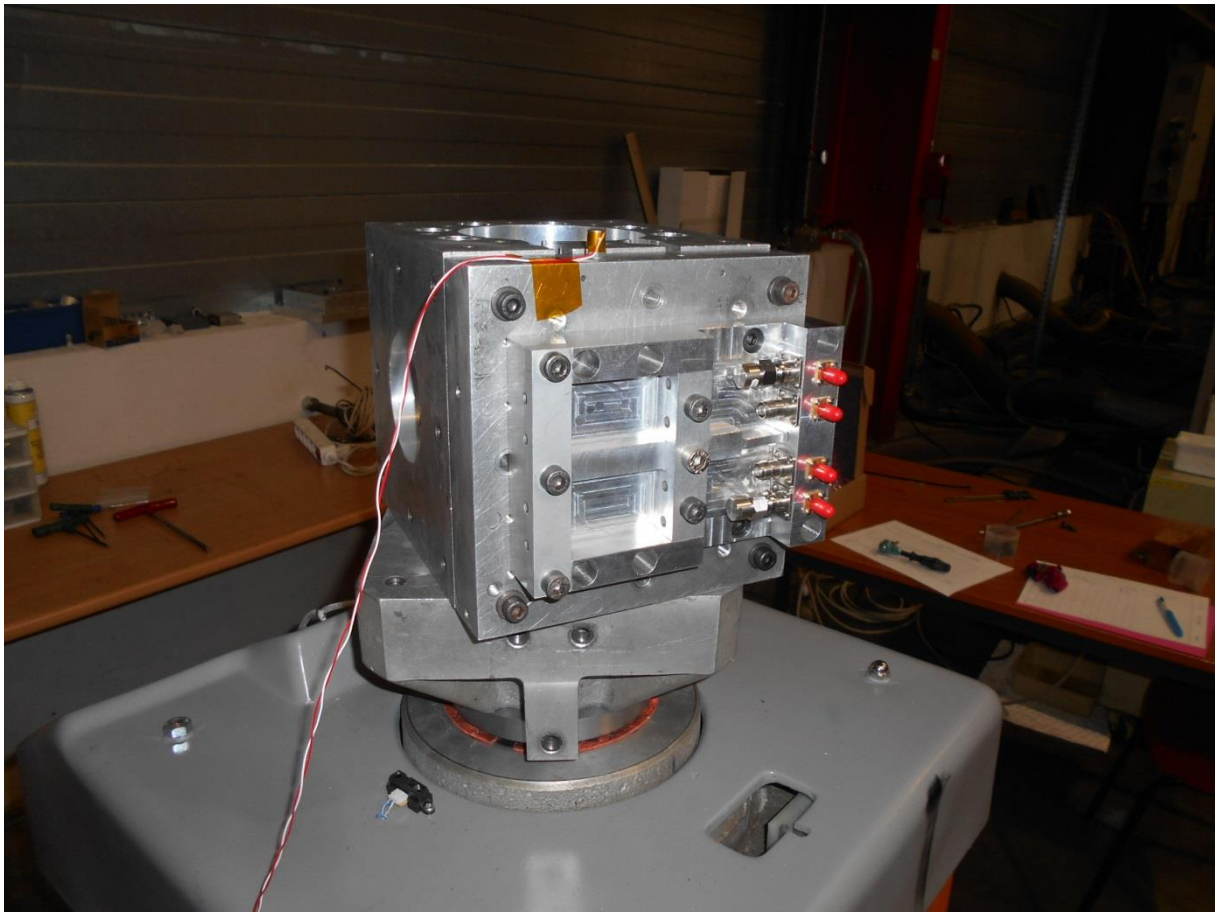

5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

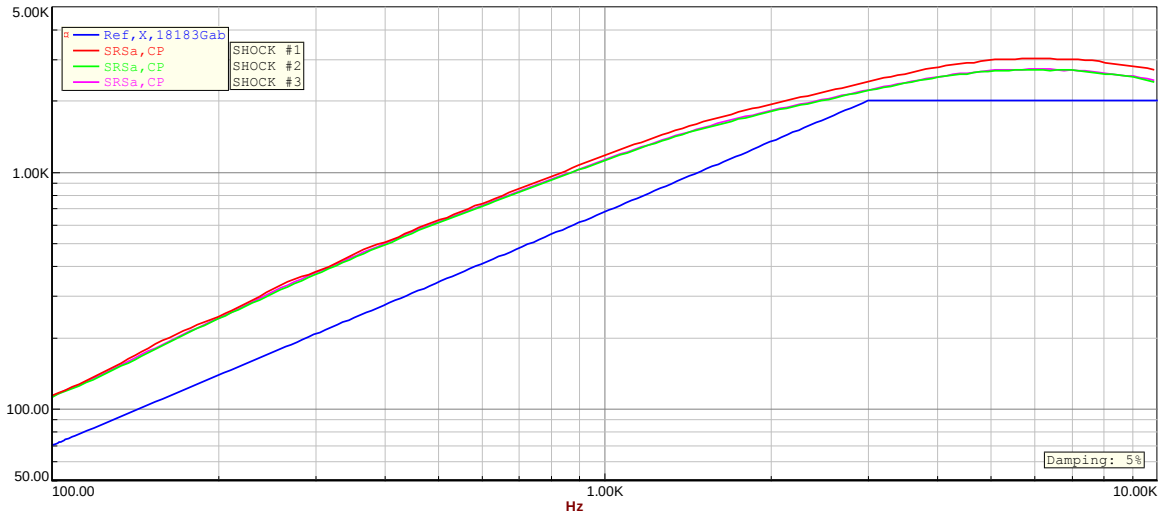
Axis Y+



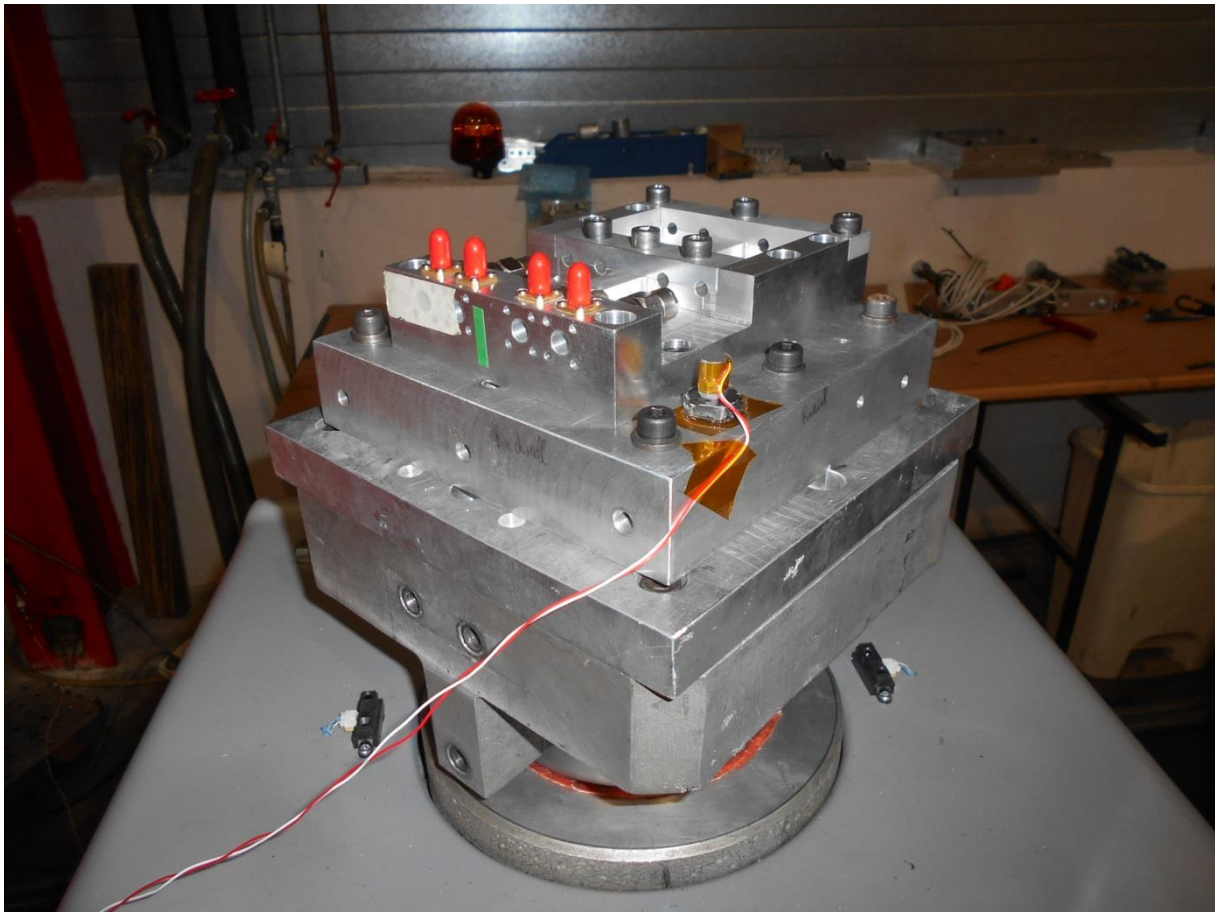

5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

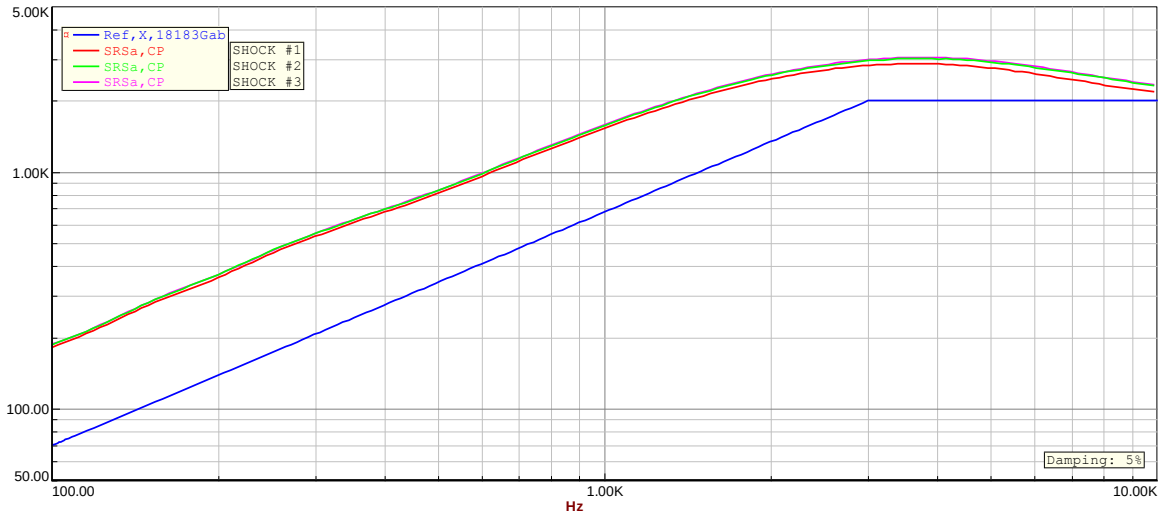
Axis Y-



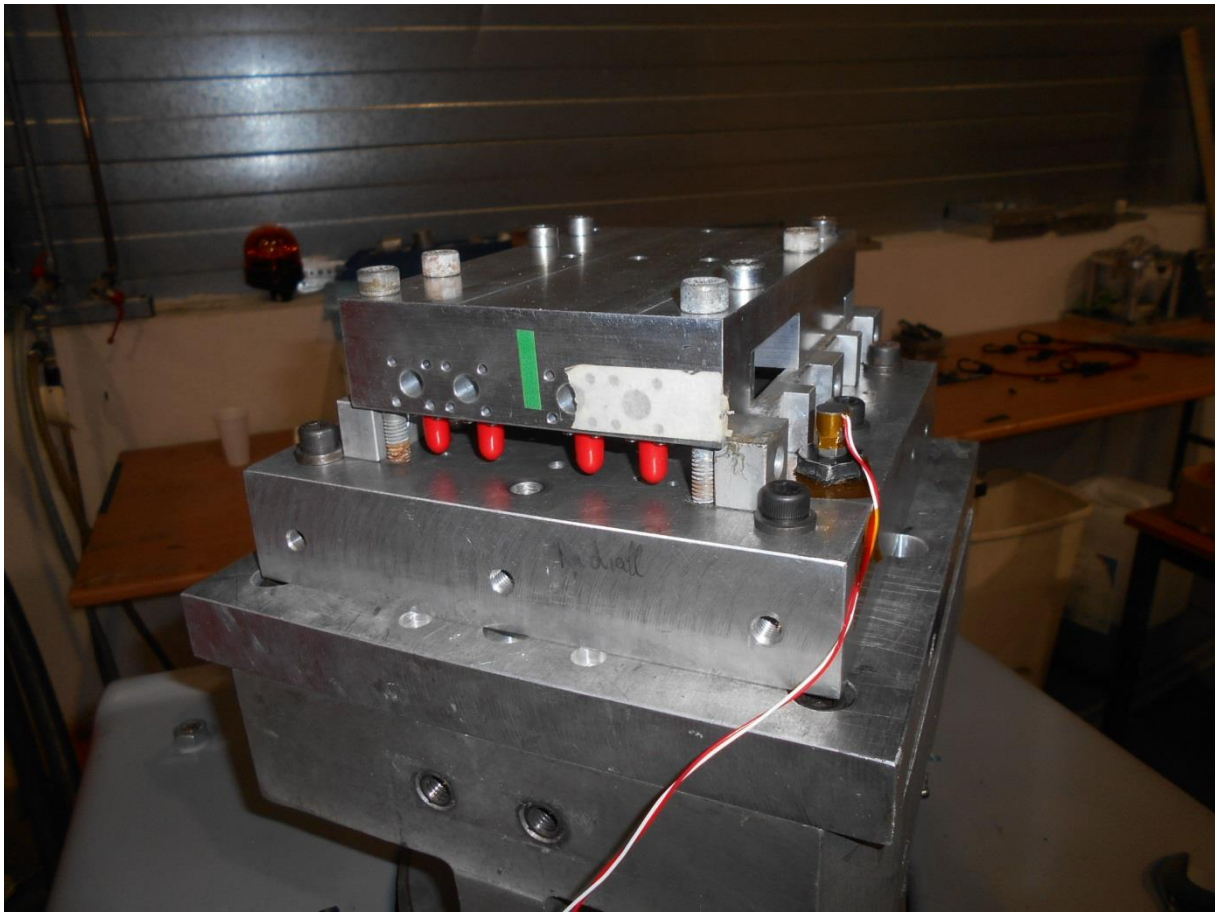

5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

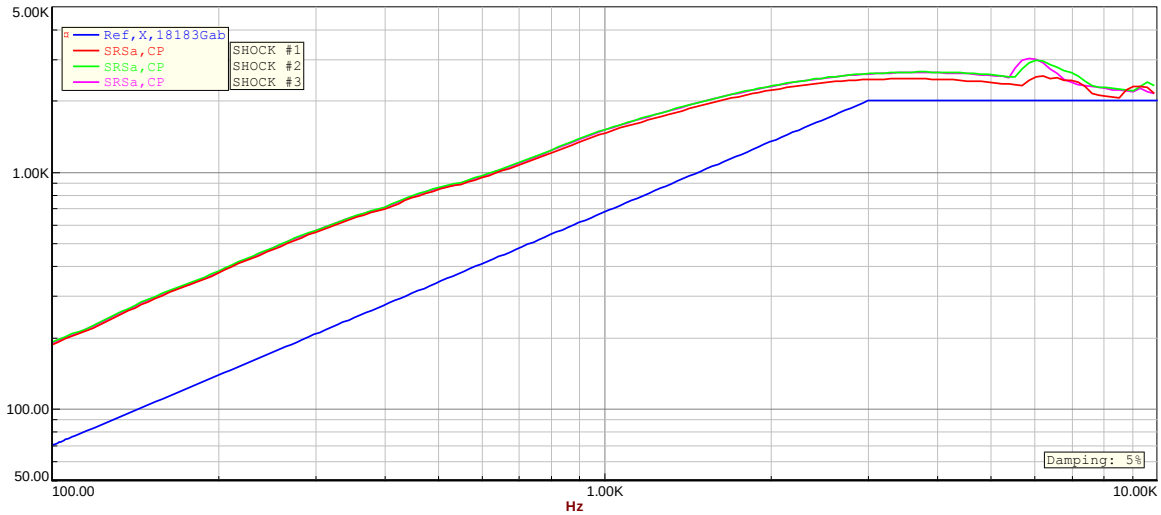
Axis Z+




5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

Axis Z-

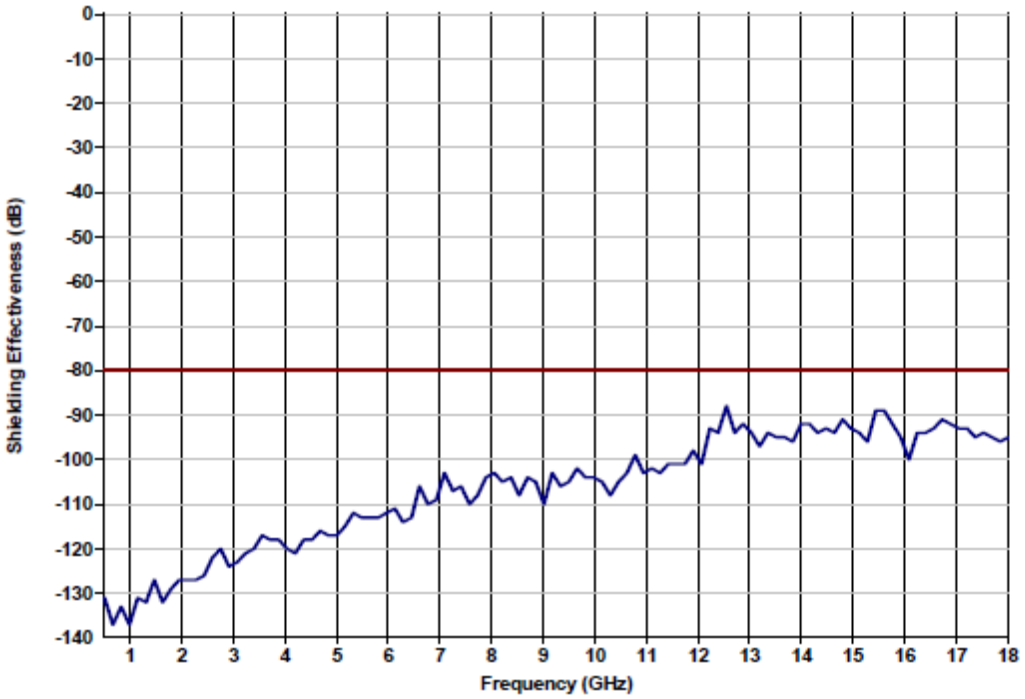



5.00K
1.00K
100.00
50.00
Ref,X,18183Gab
SRSa,CP
SRSa,CP
SRSa,CP
SHOCK #1
SHOCK #2
SHOCK #3
Damping: 5%
100.00
1.00K
10.00K
Hz

RF leakage graphs

Site Centr'Alp
642 rue E. Romanet B.P. 35
38340 VOREPPE

Charge R340301002 1836A 013



Worst value : -116 dB From 0.5 GHz to 4.674 GHz
Worst value : -103 dB From 4.835 GHz to 9.009 GHz
Worst value : -88 dB From 9.17 GHz to 13.344 GHz
Worst value : -89 dB From 13.505 GHz to 18 GHz

Worst value : -88 dB Frequency : 12.541 GHz

Measurement uncertainty : ± 3 dB

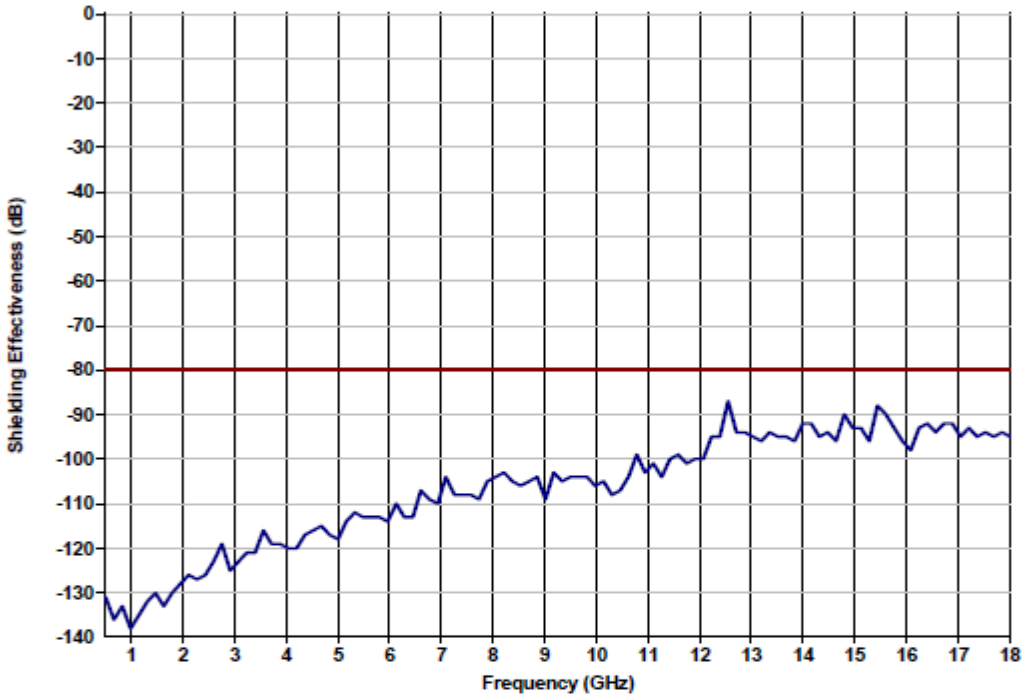
File name : Charge n°13.mes

Operator : B. MALE Date : 27/11/18

Test report No : 1127 Rev. Page :

Site Centr'Alp
642 rue E. Romanet B.P. 35
38340 VOREPPE

Charge R340301002 1836A 019



Worst value : -115 dB From 0.5 GHz to 4.674 GHz
Worst value : -103 dB From 4.835 GHz to 9.009 GHz
Worst value : -87 dB From 9.17 GHz to 13.344 GHz
Worst value : -88 dB From 13.505 GHz to 18 GHz

Worst value : -87 dB Frequency : 12.541 GHz

Measurement uncertainty : ± 3 dB

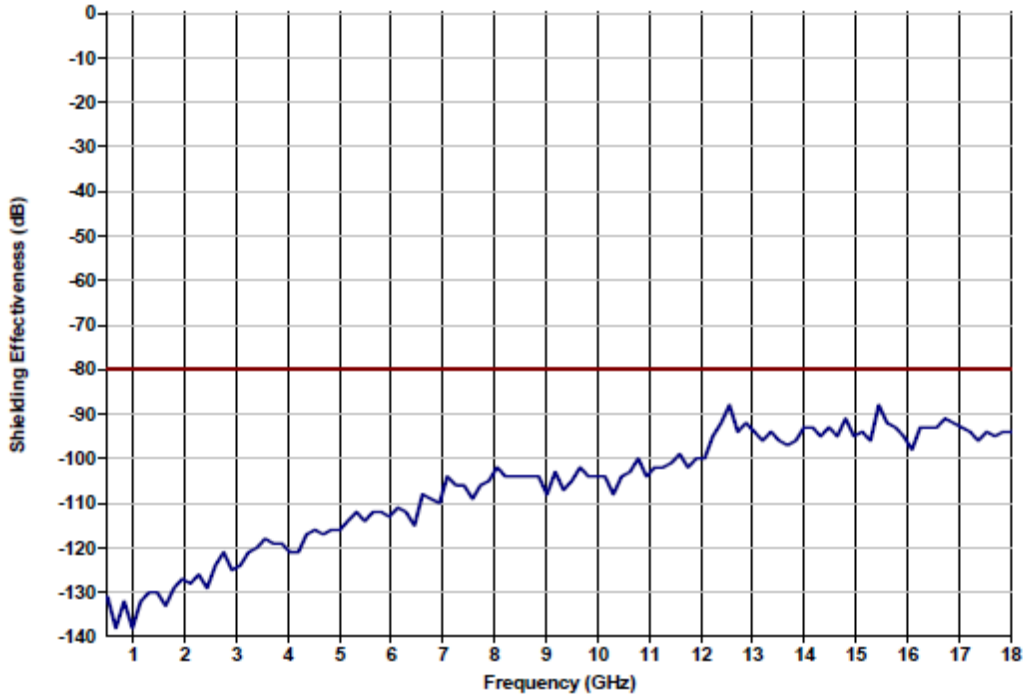
File name : Charge n°19.mes

Operator : B. MALE Date : 27/11/18

Test report No : 1127 Rev. Page :

Site Centr'Alp
642 rue E. Romanet B.P. 35
38340 VOREPPE

Charge R340301002 1836A 023



Worst value : -116 dB From 0.5 GHz to 4.674 GHz
Worst value : -102 dB From 4.835 GHz to 9.009 GHz
Worst value : -88 dB From 9.17 GHz to 13.344 GHz
Worst value : -88 dB From 13.505 GHz to 18 GHz

Worst value : -88 dB Frequency : 12.541 GHz

Measurement uncertainty : ± 3 dB

File name : Charge n°23.mes

Operator : B. MALE Date : 27/11/18

Test report No : 1127 Rev. Page :