



<b>Procedure</b> JPS0042P	<b>Tunable Laser Source</b> Manf Agilent Model 81689a	<b>Sheet 1 of 7</b>
<b>Serial Number</b>	<b>Customer Reference Number</b>	<b>Certificate Number</b>
<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

**Wavelength Accuracy**

UUT Setpoint (nm)	Tolerance (+/-) nm	Min Limit (nm)	Max Limit (nm)	Master Meter Reading (nm)	Status
1524.0000	0.300	1523.7000	1524.300	1523.9756	PASS
1525.0000	0.300	1524.7000	1525.300	1524.9820	PASS
1526.0000	0.300	1525.7000	1526.300	1525.9791	PASS
1527.0000	0.300	1526.7000	1527.300	1526.9766	PASS
1528.0000	0.300	1527.7000	1528.300	1527.9731	PASS
1529.0000	0.300	1528.7000	1529.300	1528.9779	PASS
1530.0000	0.300	1529.7000	1530.300	1529.9779	PASS
1531.0000	0.300	1530.7000	1531.300	1530.9781	PASS
1532.0000	0.300	1531.7000	1532.300	1531.9733	PASS
1533.0000	0.300	1532.7000	1533.300	1532.9776	PASS
1534.0000	0.300	1533.7000	1534.300	1533.9719	PASS
1535.0000	0.300	1534.7000	1535.300	1534.9803	PASS
1536.0000	0.300	1535.7000	1536.300	1535.9789	PASS
1537.0000	0.300	1536.7000	1537.300	1536.9743	PASS
1538.0000	0.300	1537.7000	1538.300	1537.9747	PASS
1539.0000	0.300	1538.7000	1539.300	1538.9790	PASS
1540.0000	0.300	1539.7000	1540.300	1539.9736	PASS
1541.0000	0.300	1540.7000	1541.300	1540.9755	PASS
1542.0000	0.300	1541.7000	1542.300	1541.9686	PASS
1543.0000	0.300	1542.7000	1543.300	1542.9801	PASS
1544.0000	0.300	1543.7000	1544.300	1543.9663	PASS
1545.0000	0.300	1544.7000	1545.300	1544.9735	PASS
1546.0000	0.300	1545.7000	1546.300	1545.9540	PASS
1547.0000	0.300	1546.7000	1547.300	1546.9531	PASS
1548.0000	0.300	1547.7000	1548.300	1547.9551	PASS
1549.0000	0.300	1548.7000	1549.300	1548.9432	PASS
1550.0000	0.300	1549.7000	1550.300	1549.9407	PASS
1551.0000	0.300	1550.7000	1551.300	1550.9567	PASS
1552.0000	0.300	1551.7000	1552.300	1551.9547	PASS
1553.0000	0.300	1552.7000	1553.300	1552.9508	PASS
1554.0000	0.300	1553.7000	1554.300	1553.9477	PASS
1555.0000	0.300	1554.7000	1555.300	1554.9497	PASS
1556.0000	0.300	1555.7000	1556.300	1555.9390	PASS
1557.0000	0.300	1556.7000	1557.300	1556.9457	PASS
1558.0000	0.300	1557.7000	1558.300	1557.9364	PASS
1559.0000	0.300	1558.7000	1559.300	1558.9489	PASS
1560.0000	0.300	1559.7000	1560.300	1559.9472	PASS
1561.0000	0.300	1560.7000	1561.300	1560.9520	PASS
1562.0000	0.300	1561.7000	1562.300	1561.9459	PASS
1563.0000	0.300	1562.7000	1563.300	1562.9465	PASS
1564.0000	0.300	1563.7000	1564.300	1563.9567	PASS
1565.0000	0.300	1564.7000	1565.300	1564.9374	PASS
1566.0000	0.300	1565.7000	1566.300	1565.9379	PASS
1567.0000	0.300	1566.7000	1567.300	1566.9454	PASS
1568.0000	0.300	1567.7000	1568.300	1567.9484	PASS
1569.0000	0.300	1568.7000	1569.300	1568.9532	PASS
1570.0000	0.300	1569.7000	1570.300	1569.9380	PASS
1571.0000	0.300	1570.7000	1571.300	1570.9396	PASS
1572.0000	0.300	1571.7000	1572.300	1571.9309	PASS
1573.0000	0.300	1572.7000	1573.300	1572.9207	PASS
1574.0000	0.300	1573.7000	1574.300	1573.9398	PASS
1575.0000	0.300	1574.7000	1575.300	1574.9624	PASS
1576.0000	0.300	1575.7000	1576.300	1575.9536	PASS

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<b>Serial Number</b>	<b>Customer Reference Number</b>	<b>Certificate Number</b>
<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

**Relative Wavelength Accuracy**


Repetition 1		
UOI Setpoint (nm)	Master Meter (nm)	Deviation (nm)
1525.000	1524.9818	-0.0182
1535.000	1534.9772	-0.0228
1545.000	1544.9489	-0.0511
1555.000	1554.9495	-0.0505
1565.000	1564.9357	-0.0643
1575.000	1574.9620	-0.0380
<b>Maximum Deviation (nm)</b>		-0.0182
<b>Minimum Deviation (nm)</b>		-0.0643

Repetition 2		
UOI Setpoint (nm)	Master Meter (nm)	Deviation (nm)
1525.000	1524.9827	-0.0173
1535.000	1534.9773	-0.0227
1545.000	1544.9494	-0.0506
1555.000	1554.9497	-0.0503
1565.000	1564.9366	-0.0634
1575.000	1574.9630	-0.0370
<b>Maximum Deviation (nm)</b>		-0.0173
<b>Minimum Deviation (nm)</b>		-0.0634

Repetition 3		
UOI Setpoint (nm)	Master Meter (nm)	Deviation (nm)
1525.000	1524.9832	-0.017
1535.000	1534.9778	-0.022
1545.000	1544.9500	-0.050
1555.000	1554.9499	-0.050
1565.000	1564.9380	-0.062
1575.000	1574.9631	-0.037
<b>Maximum Deviation (nm)</b>		-0.017
<b>Minimum Deviation (nm)</b>		-0.062

Repetition 4		
UOI Setpoint (nm)	Master Meter (nm)	Deviation (nm)
1525.000	1524.9827	-0.0173
1535.000	1534.9786	-0.0214
1545.000	1544.9505	-0.0495
1555.000	1554.9503	-0.0497
1565.000	1564.9375	-0.0625
1575.000	1574.9638	-0.0362
<b>Maximum Deviation (nm)</b>		-0.0173
<b>Minimum Deviation (nm)</b>		-0.0625

Repetition 5		
UOI Setpoint (nm)	Master Meter (nm)	Deviation (nm)
1525.000	1524.9833	-0.0167
1535.000	1534.9793	-0.0207
1545.000	1544.9497	-0.0503
1555.000	1554.9504	-0.0496
1565.000	1564.9368	-0.0632
1575.000	1574.9639	-0.0361
<b>Maximum Deviation (nm)</b>		-0.0167
<b>Minimum Deviation (nm)</b>		-0.0632

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<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b>	R.H.	
<b>Reference Equipment Used</b>		

**Wavelength Accuracy (Summary of all Repetitions)**


<b>Largest Maximum Deviation</b>	-0.0167 nm		
<b>Smallest Minimum Deviation</b>	-0.0643 nm		
<b>Relative Wavelength Accuracy Result (Max Dev - Min Deviation)</b>	0.0476 nm	<b>Max Lim:</b>	0.6nm
<b>Absolute Wavelength Accuracy Result (Largest of max or min)</b>	0.0643 nm	<b>Max Lim:</b>	1.0nm

**Wavelength Repeatability**

\*Wavelength Repeatability = Largest Measured Wavelength - Smallest Measured Wavelength

Repeatability of 1525.000nm (= reference)		
Initial Setting REF =	1524.9843	nm
From 1535.000nm to REF	1524.9843	nm
From 1540.000nm to REF	1524.9851	nm
From 1550.000nm to REF	1524.9858	nm
From 1560.000nm to REF	1524.9860	nm
From 1575.000nm to REF	1524.9860	nm
<b>Largest Measured Wavelength</b>	1524.9860	nm
<b>Smallest Measured Wavelength</b>	1524.9843	nm
<b>*Wavelength Repeatability</b>	0.0017	nm
<b>Specification</b>	0.10	nm
<b>Result</b>	<b>PASS</b>	

Repeatability of 1550.000nm (= reference)		
Initial Setting REF =	1549.9416	nm
From 1525.000nm to REF	1549.9676	nm
From 1535.000nm to REF	1549.9688	nm
From 1540.000nm to REF	1549.9690	nm
From 1560.000nm to REF	1549.9470	nm
From 1575.000nm to REF	1549.9732	nm
<b>Largest Measured Wavelength</b>	1549.9732	nm
<b>Smallest Measured Wavelength</b>	1549.9416	nm
<b>*Wavelength Repeatability</b>	0.0316	nm
<b>Specification</b>	0.10	nm
<b>Result</b>	<b>PASS</b>	

<b>Procedure</b> JPS0042P	<b>Tunable Laser Source</b> Manf Agilent Model 81689a	<b>Sheet 4 of 7</b>
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<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

**Wavelength Repeatability (continuation)**


Repeatability of 1575.000nm (= reference)		
Initial Setting REF =	1574.9681	nm
From 1525.000nm to REF	1574.9678	nm
From 1535.000nm to REF	1574.9674	nm
From 1540.000nm to REF	1574.9664	nm
From 1550.000nm to REF	1574.9670	nm
From 1560.000nm to REF	1574.9665	nm
Largest Measured Wavelength	1574.9681	nm
Smallest Measured Wavelength	1574.9664	nm
*Wavelength Repeatability	0.0017	nm
Specification	0.10	nm
<b>Result</b>	<b>PASS</b>	

**Maximum Power Test**

Wavelength Setting	Power Measured (dBm)	Min Specification (dBm)	Status
1525.000nm	6.632	6.00	PASS
1535.000nm	6.640	6.00	PASS
1540.000nm	6.660	6.00	PASS
1550.000nm	6.679	6.00	PASS
1560.000nm	6.721	6.00	PASS
1570.000nm	6.727	6.00	PASS
1575.000nm	6.737	6.00	PASS

**Power Linearity**


Power Setting from start (dBm)	Measured Relative Power (dB)	Power Reduction (dB)	Power Linearity (dB)
6.00	Ref	0.00	0.000
5.00	-1.000	1.00	0.000
4.00	-2.001	2.00	-0.001
3.00	-3.001	3.00	-0.001
2.00	-4.002	4.00	-0.002
1.00	-5.004	5.00	-0.004
0.00	-6.004	6.00	-0.004
-1.00	-7.003	7.00	-0.003
-2.00	-8.004	8.00	-0.004
-3.00	-9.005	9.00	-0.005
<b>Maximum Power Linearity (dB)</b>		0.000	
<b>Minimum Power Linearity (dB)</b>		-0.005	
<b>Total Power Linearity (dBpp)</b>		0.005	
<b>Specification (dBpp)</b>		0.5	
<b>Result</b>		<b>PASS</b>	

<b>Procedure</b> JPS0042P	<b>Tunable Laser Source</b> Manf Agilent Model 81689a	<b>Sheet 5 of 7</b>
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<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

**Power Flatness**

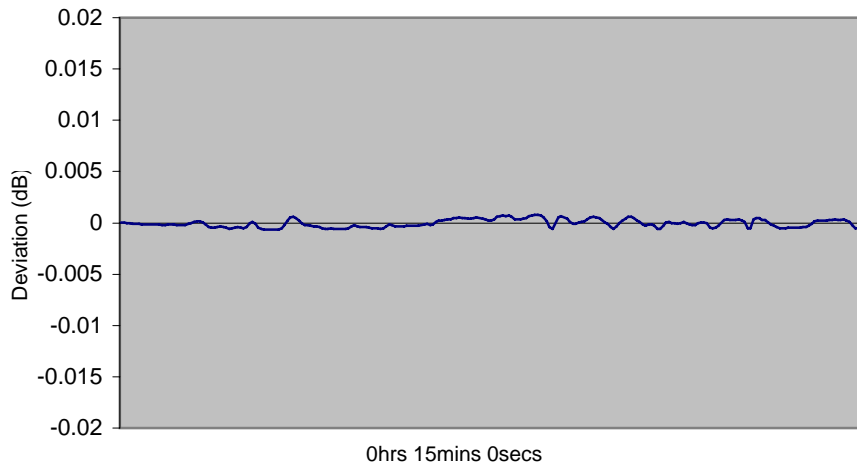
<b>@ 2.00 dBm</b>	
<b>Wavelength (nm)</b>	<b>Power Deviation (dB)</b>
1525.000	REF
1530.000	-0.018
1540.000	0.022
1550.000	0.047
1560.000	0.085
1570.000	0.089
1575.000	0.099
<b>Maximum Deviation</b>	0.099
<b>Minimum Deviation</b>	-0.018
<b>Flatness</b>	0.117
<b>Specification (dBpp)</b>	0.6
<b>Result</b>	<b>PASS</b>

<b>@ -3.00 dBm</b>	
<b>Wavelength (nm)</b>	<b>Power Deviation (dB)</b>
1525.000	REF
1530.000	-0.019
1540.000	0.021
1550.000	0.046
1560.000	0.085
1570.000	0.091
1575.000	0.102
<b>Maximum Deviation</b>	0.102
<b>Minimum Deviation</b>	-0.019
<b>Flatness</b>	0.121
<b>Specification (dBpp)</b>	0.6
<b>Result</b>	<b>PASS</b>


<b>Procedure</b> JPS0042P	<b>Tunable Laser Source</b> Manf Agilent Model 81689a	<b>Sheet 6 of 7</b>
<b>Serial Number</b>	<b>Customer Reference Number</b>	<b>Certificate Number</b>
<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

**Power Stability**

**Stability Plot**



<b>Set Wavelength</b>	1540.000 nm
<b>Set Power</b>	-3.00 dBm
<b>Maximum Deviation</b>	0.0008 dB
<b>Minimum Deviation</b>	-0.0007 dB
<b>Power Stability</b>	0.0014 dBpp
<b>Specification</b>	0.06 dBpp
<b>Result</b>	<b>PASS</b>

<b>Procedure</b> JPS0042P	<b>Tunable Laser Source</b> Manf Agilent Model 81689a	<b>Sheet 7 of 7</b>
<b>Serial Number</b>	<b>Customer Reference Number</b>	<b>Certificate Number</b>
<b>Customer</b>	<b>Calibrated By</b>	<b>Date</b>
<b>Ambient Temp</b> 21 +/- 1C	<b>R.H.</b> 43 +/- 5%	
<b>Reference Equipment Used</b>		

<b>Comments</b>						
Procedure: As detailed in Agilent 81689a TLS Users Guide Fifth Edition p53 Ref JPSSL0022						
Specifications: As detailed in Agilent 81689a TLS Users Guide Fifth Edition p48 Ref JPSSL0022						
Reference Equipment:						
Reference	Manf	Model	Serial	Description	Cal Due	