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Mux Demux Optical Layer Performance Test Report

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Introduction

This report presents FS's standardized optical performance test procedure for Mux Demux, exemplified by the 40-channel DWDM Mux Demux (P/N: FMU-D402160M3). The test process is fully standardized, repeatable, and traceable, in full compliance with ITU-T standard.

The same methodology is applicable to all FS Mux Demux modules, including DWDM, CWDM, and LWDM Mux Demux, ensuring consistent reliability, performance, and stability, underscoring FS's commitment to delivering high-quality optical networking solutions.



Test Objectives

- To test key optical parameters for the FS Mux Demux, including insertion loss, passband ripple, optical bandwidth, polarization dependent loss (PDL), channel isolation, etc.
- To test key optical parameters for the FS Mux Demux, including insertion loss, optical bandwidth, polarization dependent loss (PDL), channel isolation, etc.
- Test results serves as a basis for network design, equipment selection and performance evaluation.

Test Highlights

- Comprehensive optical parameter assessment: Covers key metrics including insertion loss, passband ripple, optical bandwidth, polarization dependent loss (PDL), and channel isolation.
- Real-time automated measurement: Utilizes a WDM Automated Test Platform to synchronously capture and analyze multiple parameters, ensuring precise and reliable measurements.
- Performance consistency verification: Test results validate the stability and performance of FS Mux Demux within high-reliability optical network environments.
- Value endorsement: Provides standardized, repeatable, and traceable data, offering objective grounds for customer selection, deployment, and trust establishment.
- Broad applicability: The methodology applies to FS DWDM, CWDM, and LWDM Mux Demux modules, ensuring consistent performance verification across diverse application scenarios.

Test Environment

1. Test Product List

Equipment Name	P/N	Function
Mux Dmeux	FMU-D402160M3	Device under test, employed to assess its optical performance and key characteristics.
Light Source	TSL-550	Provides stable optical signals at the target wavelengths for Mux/Demux.
Optical Switch Unit	OSU-100	Automatically routes optical signals between different Mux/Demux channels and test equipment for sequential or parallel measurements.
Polarization Controller	PCU-100	Adjusts the polarization state of input signals to evaluate polarization dependent loss (PDL) and overall device performance.

Optical Power Meter	UC8728	Measures the power of each Mux/Demux channel to assess insertion loss and overall optical performance.
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2. Testbed Description

This test environment encompasses both hardware and software components. The hardware section primarily comprises the equipment listed in the table: the Mux Demux under test, light source, optical switch unit, polarization controller, and optical optical power meter. The software section employs a WDM Automated Test Platform to collect optical parameters from each channel in real time, enabling simultaneous measurement of multiple indicators and data analysis to ensure precise and reliable test results.



3. Test Environment

The light source, optical switch unit, polarization controller, and optical power meter form an integrated system that is ready for immediate use without additional configuration. During testing, the polarization controller is connected to the testing board and the Mux Demux under test (FMU-D402160M3), which is then connected to the optical power meter. The complete test environment is successfully established and the WDM Automated Test Platform performs real-time test of relevant optical layer performance metrics, synchronously acquires multiple parameters for comprehensive analysis.



I Test Results

All relevant optical performance parameters of the Mux Demux have been thoroughly measured under standardized test conditions. The detailed results are presented in the table below.

Parameter	Value
Insertion Loss	≤5.0dB
Passband Ripple	≤1.5dB
1dB Optical Bandwidth	≥0.25nm
3dB Optical Bandwidth	≥0.44nm
Polarization Dependent Loss (PDL)	≤0.7dB
Adjacent Channel Isolation	≥25dB
Non-adjacent Channel Isolation	≥29dB

1. Insertion Loss Test

During the Insertion Loss Test, we employ a WDM Automated Test Platform to capture real-time insertion loss values for each channel and validate variations between different channels. The test results precisely quantify the loss characteristics of each channel, ensuring all remain within standard range. For customers, this signifies that the FS Mux Demux exhibits low insertion loss, guaranteeing high reliability and stable performance. It also provides objective, referenceable data for network design and equipment selection.

Type	IL		IL				
Rx C21	0.304		4.34264				
Rx C22	0.303		4.60092				
Rx C23	0.303		4.0209				
Rx C24	0.304		3.98299				
Rx C25	0.304	0.45	3.93399	0.172	35.489	36.074	23.36786
Rx C26	0.303	0.45	4.10387	0.174	35.492	36.76	24.33643
Rx C27	0.303	0.447	3.81407	0.113	36.194	36.587	23.64889
Rx C28	0.306	0.449	3.83707	0.182	36.947	36.689	23.65936
Rx C29	0.302	0.447	3.66243	0.137	34.387	36.762	23.54832
Rx C30	0.302	0.447	3.66243	0.05	34.129	37.105	23.69188
Rx C31	0.303	0.445	4.11793	0.136	34.744	37.017	23.40145
Rx C32	0.303	0.445	3.71165	0.172	34.952	36.231	23.44933
Rx C33	0.306	0.444	3.84364	0.148	36.323	37.243	23.56473
Rx C34	0.309	0.444	3.80501	0.207	34.447	36.457	23.70391
Rx C35	0.301	0.445	3.79011	0.209	33.232	37.032	23.53457
Rx C36	0.309	0.444	3.73516	0.147	34.177	36.49	23.48485
Rx C37	0.309	0.442	3.70595	0.189	33.995	37.033	23.45085
Rx C38	0.307	0.442	3.93781	0.208	33.832	36.996	23.34222
Rx C39	0.306	0.444	3.79744	0.183	33.805	36.412	23.27517
Rx C40	0.303	0.442	3.71139	0.231	33.49	36.42	23.24647
Rx C41	0.303	0.441	3.76688	0.213	33.236	36.614	23.48055
Rx C42	0.306	0.441	3.82696	0.219	32.867	36.312	23.3466
Rx C43	0.307	0.44	4.15982	0.215	32.543	36.095	23.25683
Rx C44	0.308	0.442	3.87628	0.258	32.499	36.701	23.38016
Rx C45	0.301	0.441	3.82451	0.203	31.795	36.375	23.30035
Rx C46	0.306	0.439	3.61736	0.238	32.141	36.748	23.49348
Rx C47	0.307	0.44	3.87628	0.254	31.811	36.853	23.11525
Rx C48	0.301	0.442	3.82451	0.282	31.989	36.44	23.3896
Rx C49	0.303	0.441	3.82451	0.258	31.807	36.501	23.23579
Rx C50	0.306	0.439	3.69051	0.21	31.695	36.475	23.18914
Rx C51	0.303	0.442	3.87628	0.282	31.133	36.488	23.09379
Rx C52	0.303	0.442	3.87628	0.282	31.234	36.457	23.18036
Rx C53	0.301	0.439	3.69974	0.29	30.819	36.622	23.5759
Rx C54	0.303	0.441	4.10497	0.248	30.795	36.13	23.22735
Rx C55	0.305	0.441	3.78172	0.319	30.104	36.884	23.32837
Rx C56	0.306	0.442	3.90561	0.28	30.456	36.966	23.45287
Rx C57	0.30	0.439	3.93762	0.356	30.337	36.899	23.31961
Rx C58	0.309	0.444	3.85407	0.385	29.932	36.103	23.14887
Rx C59	0.304	0.441	3.6926	0.294	29.833	36.282	23.32882
Rx C60	0.306	0.442	3.90205	0.312	29.713	36.214	23.31584
Rx C61	0.307	0.441	3.92293	0.315	29.414	36.388	23.42434
Rx C62	0.307	0.441	3.92293	0.35	29.423	36.18	23.36488
Rx C63	0.307	0.442	3.9772	0.411	29.14	36.583	23.39394
Rx C64	0.303	0.44	4.33472	0.362	29.082	37.149	23.32888
Rx C65	0.317	0.46	3.9257	0.495	41.083	36.105	47.793
Rx C66	0.310	0.457	3.90139	0.517	39.542	37.117	47.821
Rx C67	0.310	0.453	3.90139	0.391	40.543	37.128	47.48
Rx C68	0.303	0.442	4.58067	0.521	41.244	38.35	42.312
Rx C69	0.303		4.88156				
Rx C70	0.303		4.39954				
Rx C71	0.303		4.43456				

2. Passband Ripple Test

During Passband Ripple Test, we measured the optical power across each channel's passband using the WDM Automated Test Platform to record passband ripple in real time. Test results confirm that passband ripple for all channels meet specifications. For customers, this signifies that the FS Mux/Demux reliably transmits optical signals, effectively mitigating the risk of signal distortion caused by passband non-flatness, thereby ensuring long-term stable and reliable network operation.

Type	Ripple							
Rx C21	0.711							
Rx C22	0.663							
Rx C23	0.67							
Rx C24	0.607							
Rx C25	0.104	0.45	4.34004	0.711	23.93	36.499	36.034	23.96799
Rx C26	0.167	0.453	4.59002	0.697	35.492	35.75	37.856	24.23943
Rx C27	0.263	0.46	4.10209	0.737	36.194	36.267	37.401	23.44889
Rx C28	0.263	0.447	3.96009	0.737	36.947	36.489	37.647	23.10094
Rx C29	0.263	0.440	3.93208	0.603	34.387	36.792	36.034	23.54032
Rx C30	0.262	0.447	4.10387	0.697	34.139	37.195	37.977	23.89188
Rx C31	0.262	0.448	3.91407	0.746	34.784	37.917	38.231	23.46148
Rx C32	0.26	0.444	3.93707	0.678	35.282	36.811	38.231	23.43903
Rx C33	0.263	0.445	3.95043	0.672	35.351	37.043	37.953	23.06473
Rx C34	0.259	0.444	4.11793	0.725	34.447	36.457	37.702	23.70091
Rx C35	0.259	0.444	3.71145	0.655	33.232	37.202	38.023	23.28457
Rx C36	0.261	0.445	3.94304	0.629	34.177	36.48	38.019	23.43495
Rx C37	0.259	0.444	3.90501	0.638	33.965	37.033	37.633	23.45695
Rx C38	0.259	0.442	3.79516	0.642	33.870	36.954	38.12	23.74232
Rx C39	0.257	0.439	3.70005	0.645	33.505	36.612	37.607	23.27517
Rx C40	0.25	0.444	3.93781	0.651	33.48	36.82	38.238	23.24647
Rx C41	0.253	0.441	3.79744	0.683	33.236	36.414	37.918	23.48025
Rx C42	0.253	0.441	3.71139	0.652	35.857	36.912	38.008	23.7446
Rx C43	0.25	0.441	3.79688	0.744	32.563	36.025	37.984	23.23683
Rx C44	0.259	0.442	3.92008	0.652	32.499	36.761	38.103	23.36516
Rx C45	0.256	0.439	4.14982	0.744	31.796	36.375	38.038	23.33035
Rx C46	0.257	0.44	3.61736	0.659	32.141	36.788	37.793	23.09349
Rx C47	0.259	0.442	3.87638	0.728	31.811	36.563	37.792	23.13525
Rx C48	0.251	0.441	3.80451	0.678	31.989	36.66	37.78	23.7696
Rx C49	0.256	0.439	3.69051	0.667	31.887	36.901	37.693	23.33878
Rx C50	0.25	0.441	3.58784	0.695	31.606	36.478	37.939	23.18914
Rx C51	0.253	0.442	3.69974	0.732	31.151	36.489	37.42	23.09079
Rx C52	0.251	0.439	4.10497	0.725	31.224	36.457	37.94	23.19036
Rx C53	0.253	0.441	3.70172	0.717	30.919	36.422	37.545	23.5759
Rx C54	0.256	0.442	3.66861	0.717	30.706	36.13	37.77	23.22715
Rx C55	0.256	0.442	3.98182	0.716	30.104	36.356	37.616	23.38837
Rx C56	0.25	0.439	3.95407	0.78	30.459	36.766	37.852	23.40237
Rx C57	0.259	0.444	3.6909	0.762	30.337	36.988	37.741	23.31961
Rx C58	0.259	0.448	3.80208	0.706	29.932	36.103	37.601	23.14487
Rx C59	0.254	0.441	3.92003	0.775	29.933	36.282	37.676	23.26382
Rx C60	0.256	0.442	3.99722	0.839	29.711	36.014	37.657	23.37704
Rx C61	0.257	0.441	4.23432	0.728	29.414	36.389	37.854	23.40434
Rx C62	0.257	0.442	3.7027	0.761	29.423	36.16	37.635	23.76458
Rx C63	0.253	0.44	3.96139	0.804	29.15	36.263	37.413	23.3894
Rx C64	0.277	0.46	4.50567	0.823	29.682	37.149	37.698	23.33989
Rx C65	0.282	0.467	4.96198	0.713	41.093	36.195	47.793	
Rx C66	0.276	0.463	4.39994	0.66	39.542	37.117	47.401	
Rx C67	0.283	0.466	4.40405	0.45	40.043	37.128	47.48	
Rx C68				0.45	41.344	37.49	47.317	
Rx C69				0.447				

3. Optical Bandwidth Test

In Optical Bandwidth Test, the 1dB and 3dB optical bandwidths were measured for each channel respectively. Using the WDM Automated Test Platform, the wavelength range at which power decayed to maximum values of 1dB and 3dB is recorded. Results confirm all channel bandwidths meet the standard, ensuring signal integrity and spectrum efficiency. For customers, this demonstrates FS Mux Demux's capability to reliably transmit signals in multi-channel environments, supporting high-capacity network deployments without introducing channel interference.

Type	1dB Bandwidth	3dB Bandwidth	Wavelength	Power	Adjacent Isolation Left	Adjacent Isolation Right	Excursion Isolation	SLR(dB)
Ch C21	0.064	0.45	157.11	0.172	33.93	36.489	36.034	23.94789
Ch C22	0.067	0.451	157.163	0.174	36.492	37.896	36.79	24.27643
Ch C23	0.063	0.45	157.167	0.113	36.194	36.267	37.601	23.64189
Ch C24	0.063	0.447	157.167	0.182	35.947	36.459	37.667	23.40936
Ch C25	0.066	0.449	157.171	0.137	34.267	36.792	36.034	23.54832
Ch C26	0.062	0.447	157.167	0.126	34.229	37.197	37.977	23.97939
Ch C27	0.062	0.448	157.171	0.136	34.764	37.517	36.231	23.45148
Ch C28	0.06	0.444	157.167	0.172	35.252	36.911	36.231	23.43702
Ch C29	0.063	0.445	157.167	0.146	35.321	37.243	37.953	23.58473
Ch C30	0.068	0.444	157.167	0.207	34.447	36.467	37.702	23.70381
Ch C31	0.061	0.445	157.167	0.209	33.232	37.022	36.023	23.58467
Ch C32	0.069	0.444	157.171	0.147	34.177	36.49	36.019	23.49485
Ch C33	0.066	0.442	157.171	0.169	33.965	37.033	37.033	23.45685
Ch C34	0.066	0.442	157.171	0.208	33.832	36.956	36.12	23.54222
Ch C35	0.067	0.439	157.171	0.208	33.832	36.412	37.407	23.27617
Ch C36	0.067	0.439	157.171	0.208	33.48	36.92	36.236	23.58467
Ch C37	0.06	0.444	157.171	0.213	33.216	36.914	37.916	23.45225
Ch C38	0.063	0.441	157.171	0.219	32.807	36.912	36.089	23.5466
Ch C39	0.068	0.441	157.171	0.215	32.503	36.005	37.094	23.58683
Ch C40	0.066	0.441	157.171	0.208	32.499	36.701	36.183	23.56556
Ch C41	0.066	0.439	157.171	0.203	31.795	36.376	36.026	23.58035
Ch C42	0.066	0.439	157.171	0.238	32.141	36.769	37.793	23.49369
Ch C43	0.067	0.44	157.171	0.254	31.811	36.563	37.792	23.11825
Ch C44	0.068	0.442	157.171	0.262	31.699	36.46	37.78	23.5894
Ch C45	0.061	0.441	157.171	0.256	31.407	36.501	37.693	23.5876
Ch C46	0.066	0.439	157.171	0.21	31.456	36.478	37.939	23.18914
Ch C47	0.06	0.441	157.171	0.262	31.101	36.469	37.42	23.58079
Ch C48	0.063	0.442	157.171	0.262	31.024	36.467	37.54	23.18066
Ch C49	0.063	0.442	157.171	0.29	30.919	36.422	37.545	23.5769
Ch C50	0.061	0.439	157.171	0.246	30.706	36.13	37.77	23.57156
Ch C51	0.063	0.441	157.171	0.319	30.104	36.856	37.515	23.52837
Ch C52	0.065	0.441	157.171	0.36	30.456	36.966	37.952	23.45207
Ch C53	0.066	0.442	157.171	0.366	30.237	36.999	37.781	23.51961
Ch C54	0.06	0.439	157.171	0.298	29.832	36.123	37.491	23.54667
Ch C55	0.06	0.439	157.171	0.264	29.632	36.282	37.676	23.52302
Ch C56	0.069	0.444	157.171	0.312	29.711	36.914	37.667	23.57704
Ch C57	0.069	0.445	157.171	0.316	29.414	36.989	37.694	23.42434
Ch C58	0.064	0.441	157.171	0.36	29.423	36.18	37.696	23.56469
Ch C59	0.066	0.442	157.171	0.411	29.18	36.263	37.613	23.5894
Ch C60	0.067	0.441	157.171	0.362	29.002	37.149	37.699	23.52899
Ch C61	0.067	0.441	157.171	0.406	41.093	36.195	47.793	
Ch C62	0.067	0.442	157.171	0.417	39.542	37.117	47.493	
Ch C63	0.06	0.44	157.171	0.393	40.542	37.129	47.49	
Ch C64	0.063	0.439	157.171	0.421	41.584	37.25	47.517	

4. Polarization Dependent Loss (PDL) Test

Polarization Dependent Loss Test involves adjusting the input signal's polarization state via a polarization controller, whilst simultaneously measuring output power variations across each channel to determine PDL values. Test results indicate that the PDL for each channel of the FS Mux Demux remains within standard limits, demonstrating the equipment's capability to reliably transmit signals of varying polarization states. For customers, this ensures signals within the optical network do not experience differential attenuation due to polarization shifts, thereby enhancing the system's long-term reliability and operational stability.

Type*					PDL				
Ex C21					0.172				
Ex C22					0.174				
Ex C23					0.113				
Ex C24					0.182				
Ex C25	1dB Bandwidth	3dB Bandwidth	IL	Ripple	0.137	Port Isolation Left	Adjacent Isolation Right	Non-adjacent Isolation	IL0000
Ex C26	0.284	0.48	4.34084	0.711	0.25	36.889	36.034	36.034	23.56788
Ex C27	0.287	0.485	4.59092	0.683	0.136	36.76	37.856	37.856	24.23643
Ex C28	0.283	0.48	4.0209	0.67	0.172	36.287	37.691	37.691	23.64389
Ex C29	0.282	0.447	3.98289	0.667	0.145	36.659	37.687	37.687	23.65938
Ex C30	0.286	0.449	3.93399	0.711	0.207	36.762	36.034	36.034	23.64632
Ex C31	0.282	0.447	4.42897	0.687	0.209	37.036	37.917	37.917	23.69188
Ex C32	0.282	0.448	3.81487	0.737	0.147	37.017	36.233	36.233	23.46148
Ex C33	0.28	0.444	3.83707	0.683	0.189	36.811	36.233	36.233	23.43783
Ex C34	0.283	0.445	3.46243	0.697	0.208	37.043	37.863	37.863	23.58473
Ex C35	0.258	0.444	4.11793	0.746	0.231	36.467	37.700	37.700	23.70391
Ex C36	0.258	0.444	3.71495	0.676	0.213	37.302	36.023	36.023	23.53467
Ex C37	0.261	0.445	3.94264	0.672	0.219	36.69	36.019	36.019	23.48485
Ex C38	0.259	0.444	3.95501	0.725	0.215	37.033	37.633	37.633	23.45985
Ex C39	0.259	0.442	3.79411	0.685	0.258	36.894	36.12	36.12	23.54222
Ex C40	0.256	0.441	3.78816	0.659	0.203	36.612	37.607	37.607	23.23517
Ex C41	0.257	0.442	3.76005	0.638	0.238	36.62	36.228	36.228	23.54647
Ex C42	0.257	0.439	3.93701	0.642	0.254	36.614	37.918	37.918	23.45025
Ex C43	0.26	0.444	3.79744	0.645	0.282	36.912	36.088	36.088	23.5446
Ex C44	0.253	0.441	3.71139	0.651	0.29	36.505	37.884	37.884	23.58683
Ex C45	0.258	0.441	3.79688	0.683	0.246	36.701	36.189	36.189	23.58616
Ex C46	0.256	0.441	3.82886	0.652	0.319	36.375	36.026	36.026	23.50035
Ex C47	0.256	0.439	4.18982	0.744	0.26	36.768	37.793	37.793	23.69368
Ex C48	0.257	0.44	3.61736	0.659	0.356	36.663	37.795	37.795	23.11825
Ex C49	0.258	0.442	3.81628	0.758	0.285	36.46	37.78	37.78	23.5894
Ex C50	0.251	0.441	3.82451	0.678	0.284	36.591	37.493	37.493	23.52878
Ex C51	0.256	0.439	3.49581	0.667	0.312	36.476	37.939	37.939	23.18914
Ex C52	0.26	0.441	3.58764	0.685	0.315	36.688	37.62	37.62	23.69039
Ex C53	0.253	0.442	3.48974	0.732	0.36	36.467	37.64	37.64	23.18586
Ex C54	0.251	0.439	4.10497	0.725	0.382	36.422	37.645	37.645	23.5789
Ex C55	0.253	0.441	3.78132	0.717	0.29	36.13	37.77	37.77	23.52715
Ex C56	0.255	0.441	3.98561	0.716	0.246	36.864	37.616	37.616	23.58837
Ex C57	0.256	0.442	3.99762	0.78	0.319	36.766	37.852	37.852	23.45037
Ex C58	0.26	0.439	3.85497	0.762	0.26	36.898	37.741	37.741	23.58761
Ex C59	0.259	0.441	3.48884	0.786	0.356	36.103	37.493	37.493	23.14487
Ex C60	0.259	0.448	3.92005	0.776	0.386	36.282	37.676	37.676	23.58382
Ex C61	0.254	0.441	3.92003	0.839	0.285	36.014	37.657	37.657	23.37784
Ex C62	0.256	0.442	3.89722	0.728	0.284	36.388	37.454	37.454	23.48314
Ex C63	0.257	0.441	4.19472	0.761	0.312	36.18	37.436	37.436	23.78486
Ex C64	0.257	0.442	3.8257	0.804	0.315	36.283	37.613	37.613	23.3884
Ex C65	0.253	0.44	3.98139	0.823	0.36	37.149	37.498	37.498	23.58889
Ex C66	0.277	0.48	4.59067	0.713	0.411	36.195	47.793	47.793	
Ex C67	0.282	0.487	4.88186	0.68	0.362	37.117	47.451	47.451	
Ex C68	0.276	0.483	4.28944	0.68	0.495	37.128	47.48	47.48	
Ex C69	0.282	0.489	4.45485	0.687	0.517	37.32	47.317	47.317	
Ex C70					0.391				
Ex C71					0.521				

5. Channel Isolation Test

Channel Isolation Test measures signal crosstalk between adjacent and non-adjacent channels. Test results demonstrate that the FS Mux Demux meets design specifications for isolation, effectively minimising interference between signals of different wavelengths. For customers, this signifies robust signal independence across channels within multi-channel optical networks, ensuring high transmission quality and reliability for stable service operation.

Type						Adjacent Isolation Left	Adjacent Isolation Right	Non-adjacent Isolation
Ex C21						33.93	36.699	38.034
Ex C22						36.492	36.75	37.856
Ex C23						36.194	36.267	37.601
Ex C24	1dB Bandwidth	3dB Bandwidth	IL	Ripple	FW	36.947	36.659	37.667
Ex C25	0.104	0.45	4.34014	0.711	0.172	34.387	36.762	38.024
Ex C26	0.167	0.483	4.10002	0.693	0.174	34.129	37.105	37.977
Ex C27	0.203	0.48	4.1609	0.67	0.113	34.764	37.017	38.231
Ex C28	0.106	0.447	3.90209	0.687	0.165	36.252	36.811	38.231
Ex C29	0.102	0.447	4.10307	0.697	0.15	36.321	37.243	37.953
Ex C30	0.182	0.448	3.91407	0.737	0.136	34.447	36.657	37.702
Ex C31	0.16	0.444	3.93307	0.693	0.172	33.232	37.202	38.023
Ex C32	0.183	0.445	3.68243	0.697	0.145	34.177	36.49	38.019
Ex C33	0.158	0.444	4.11793	0.746	0.207	33.955	37.033	37.833
Ex C34	0.159	0.444	3.71105	0.679	0.209	33.832	36.956	38.12
Ex C35	0.181	0.445	3.74344	0.672	0.147	33.505	36.612	37.807
Ex C36	0.159	0.444	3.9001	0.735	0.189	33.48	36.82	38.226
Ex C37	0.156	0.444	3.79611	0.685	0.208	33.216	36.614	37.918
Ex C38	0.159	0.442	3.70898	0.638	0.231	32.807	36.912	38.008
Ex C39	0.157	0.439	3.93781	0.642	0.213	32.563	36.005	37.964
Ex C40	0.16	0.444	3.79744	0.645	0.219	32.499	36.701	38.183
Ex C41	0.153	0.441	3.71139	0.651	0.215	31.795	36.375	38.028
Ex C42	0.159	0.441	3.79688	0.683	0.239	32.141	36.768	37.793
Ex C43	0.156	0.441	3.48404	0.682	0.203	31.811	36.563	37.792
Ex C44	0.159	0.439	4.15982	0.744	0.238	31.989	36.66	37.78
Ex C45	0.157	0.441	3.61736	0.689	0.254	31.807	36.501	37.693
Ex C46	0.151	0.441	3.97628	0.738	0.202	31.606	36.478	37.939
Ex C47	0.159	0.441	3.80881	0.687	0.21	31.101	36.688	37.62
Ex C48	0.16	0.441	3.58784	0.696	0.282	31.224	36.457	37.54
Ex C49	0.153	0.442	3.49974	0.732	0.282	30.919	36.622	37.545
Ex C50	0.151	0.439	4.10497	0.725	0.29	30.705	36.13	37.77
Ex C51	0.153	0.441	3.70172	0.717	0.246	30.104	36.956	37.515
Ex C52	0.159	0.442	3.48404	0.73	0.28	30.456	35.966	37.552
Ex C53	0.156	0.439	3.95407	0.782	0.266	30.337	36.899	37.741
Ex C54	0.159	0.444	3.6909	0.788	0.285	29.832	36.103	37.601
Ex C55	0.159	0.445	3.90205	0.775	0.264	29.033	36.252	37.575
Ex C56	0.154	0.441	3.95203	0.839	0.312	29.711	36.014	37.557
Ex C57	0.157	0.442	3.98772	0.728	0.315	29.414	36.388	37.654
Ex C58	0.157	0.441	4.23472	0.761	0.35	29.423	36.18	37.635
Ex C59	0.153	0.44	3.9257	0.804	0.411	29.16	36.283	37.613
Ex C60	0.153	0.44	3.76139	0.803	0.362	29.002	37.169	37.688
Ex C61	0.157	0.48	4.58827	0.713	0.485	41.083	36.105	47.793
Ex C62	0.152	0.487	4.38936	0.56	0.517	39.542	37.117	47.621
Ex C63	0.153	0.483	4.39954	0.49	0.391	40.043	37.128	47.48
Ex C64	0.153	0.485	4.40458	0.4847	0.321	41.344	37.35	47.312

Conclusion

The Mux Demux has passed all standardized performance tests conducted in accordance with industry and FS internal requirements. All optical and functional metrics meet specifications, with stable operation and no critical defects observed. The equipment meets design expectations and is approved for commercial deployment.

Note:

1. The results relate only to the items tested.
2. The test results are random, and they are within specifications.



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