



Approval Sheet

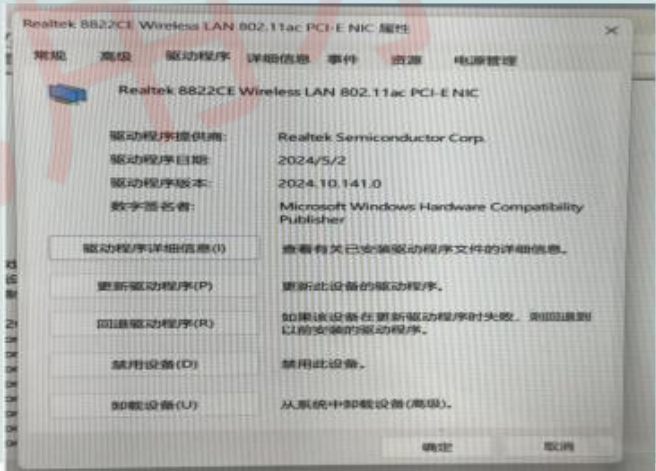
Customer	Huayao	Data	2026/07/03		
Product	WiFi/BT天线	Models	NX15N-Y		
P/N	Main: F667D-14RB-520 Aux: F291K-14RG-400	Customer P/N			
规格描述 Specifications	Black FPC; Main Cable: RF0.81 4th-gen connector black coaxial cable, L=520mm Aux Cable: RF0.81 4th-gen connector gray coaxial cable, L=400mm				
Vender Approved By		Customer Approved By			
Checked By:		Checked By:			
Audit By:		Audit By:			
Approval By:		Approval By:			
Document Revision Resume					
Version	Revise The Content	Revused	Approval	Date	Note



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Specification	
1.1 Electrical Properties	
Characteristics	Specifications
Working Band	2.4GWiFi/BT; 5GWiFi
Antenna From	PIFA
Impedance	50 Ω
Polarization	Linear
Peak Effi	48%@2.4G; 56%@5G
Peak Gain	ANT(main): 2.31dBi@2.4G; ANT(AUX): 2.38dBi@2.4G; ANT(main): 3.13dBi@5.15G-5.25G; ANT(AUX): 1.24dBi@5.15G-5.25G; ANT(main): 3.42dBi@5.725G-5.825G; ANT(AUX): 3.6dBi@5.725G-5.825G;
1.2 Physical Properties	
Characteristics	Specifications
Operating Temp	-10°C~+60°C
Storage Temp	-10°C~+70°C
Humidity	10~95%RH

WiFi Ant Test Information

Frequency	2. 4G (2402~2483) Mhz	5G (5150~5850) Mhz
Module information		
Driver version information		

Antenna Placement



Test Data

S11 Parameter-VSWR



Frequency(MHZ)	2400	2500	5150	5850
VSWR	2.18	1.51	1.15	1.59
Return Loss(DB)	-8.64	-14.44	-22.73	-12.76



Frequency(MHZ)	2400	2450	2483	5150
VSWR	1.79	1.45	1.43	1.34
Return Loss(DB)	-11	-15.4	-14.88	-16.6

Efficiency Table (2.4G Ant1)

Passive Test For WIFI2.4								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2400	34.03	-4.68	0.68	-1.47	14.603	19.431	0.68	-14.77
2410	33.21	-4.79	0.58	-1.57	13.765	19.443	0.58	-16.68
2420	38.52	-4.14	1.34	-0.81	15.638	22.881	1.34	-18.71
2430	39.1	-4.08	1.55	-0.6	15.679	23.42	1.55	-22.83
2440	38.77	-4.12	1.56	-0.59	15.087	23.683	1.56	-22.28
2450	41.48	-3.82	2	-0.15	15.584	25.9	2	-18.92
2460	42.64	-3.7	2.23	0.08	15.606	27.029	2.23	-16.35
2470	41.76	-3.79	2.13	-0.02	15.546	26.219	2.13	-17.09
2480	43.35	-3.63	2.16	0.01	16.409	26.942	2.16	-17.53
2490	45.01	-3.47	2.29	0.14	17.404	27.606	2.29	-17.16
2500	38.78	-4.11	1.86	-0.29	15.451	23.33	1.86	-16.94

Efficiency Table (2.4G Ant2)

Passive Test For 2.4G						
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)
2400	48.81	-3.12	2.83	0.68	18.816	29.989
2410	45.3	-3.44	2.38	0.23	17.294	28.01
2420	46.01	-3.37	2.32	0.17	17.408	28.6
2430	45.65	-3.41	2.29	0.14	17.118	28.536
2440	45.94	-3.38	2.28	0.13	17.058	28.886
2450	46.97	-3.28	2.32	0.17	17.351	29.624
2460	44.63	-3.5	2.07	-0.08	16.357	28.273
2470	43.75	-3.59	1.87	-0.28	16.122	27.625
2480	44.9	-3.48	2.29	0.14	16.618	28.285
2490	45.39	-3.43	2.41	0.26	17.01	28.38
2500	41.77	-3.79	2.43	0.28	15.723	26.046

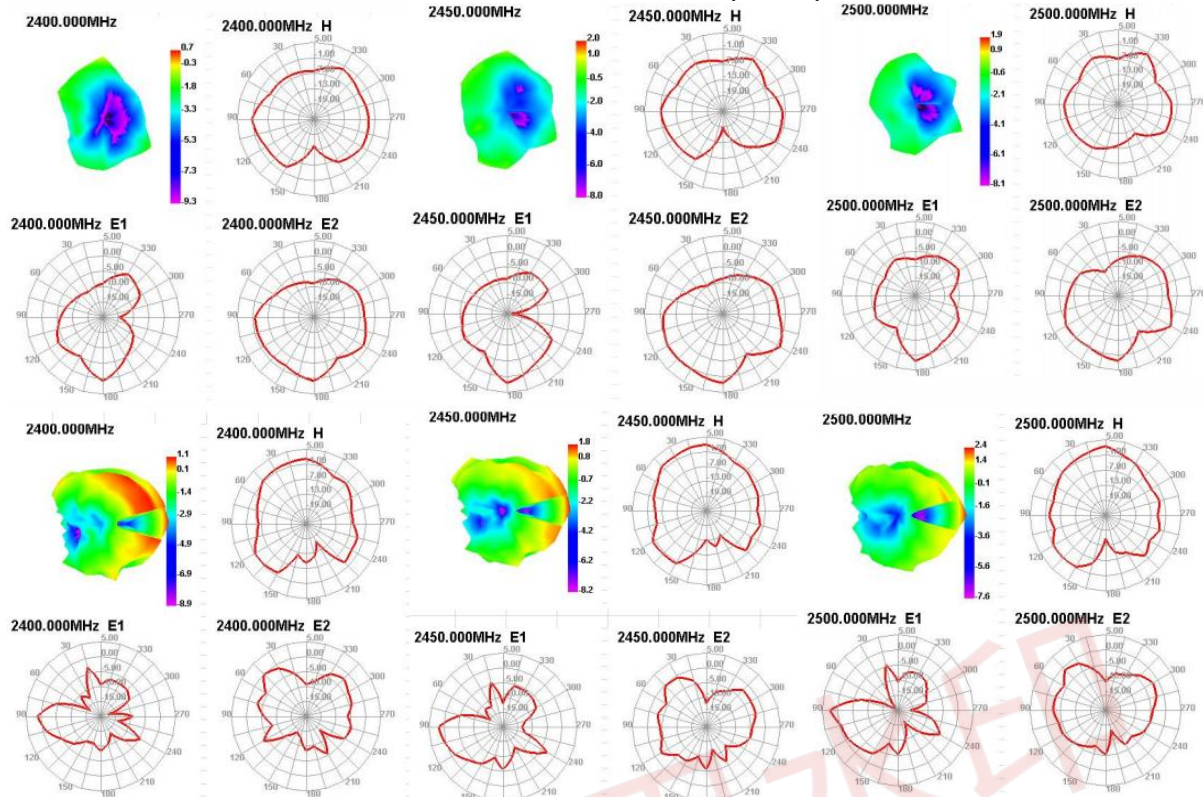
Efficiency Table (5G Ant1)

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
5150	35.25	-4.53	2.57	0.42	16.639	18.616	2.57	-23.15
5170	35.38	-4.51	2.54	0.39	16.363	19.018	2.54	-23.5
5190	37.04	-4.31	2.79	0.64	16.879	20.164	2.79	-21.86
5210	37.52	-4.26	2.81	0.66	17.103	20.413	2.81	-20.97
5230	38.02	-4.2	2.9	0.75	17.342	20.681	2.9	-22.19
5250	40.38	-3.94	3.13	0.98	18.263	22.116	3.13	-21.07
5270	43.04	-3.66	3.32	1.17	19.279	23.76	3.32	-22.27
5290	42.8	-3.69	3.24	1.09	19.261	23.538	3.24	-21.01
5310	38.5	-4.15	2.8	0.65	17.551	20.947	2.8	-21.84
5330	40.2	-3.96	2.9	0.75	18.695	21.503	2.9	-17.35
5350	41.12	-3.86	2.91	0.76	19.3	21.815	2.91	-17.26
5370	41.74	-3.79	2.65	0.5	19.696	22.046	2.65	-18.73
5390	36.44	-4.38	1.64	-0.51	17.305	19.138	1.64	-23.72
5410	45.96	-3.38	2.76	0.61	22.105	23.859	2.76	-25.49
5430	40.07	-3.97	2.64	0.49	19.062	21.01	2.64	-20.01
5450	47.38	-3.24	3.71	1.56	22.249	25.136	3.71	-16.54
5470	42.95	-3.67	3.34	1.19	19.854	23.093	3.34	-16.13
5490	45.48	-3.42	3.53	1.38	20.972	24.505	3.53	-15.49
5510	46.58	-3.32	3.88	1.73	21.543	25.042	3.88	-16.21
5530	49.01	-3.1	4.24	2.09	22.227	26.785	4.24	-18.43
5550	50.5	-2.97	4.12	1.97	22.672	27.83	4.12	-14.99
5570	48	-3.19	3.58	1.43	21.748	26.256	3.58	-16.24
5590	49.52	-3.05	3.56	1.41	22.672	26.847	3.56	-17.28
5610	46.28	-3.35	3.27	1.12	21.368	24.916	3.27	-19.26
5630	46.8	-3.3	3.05	0.9	21.656	25.148	3.05	-17.11
5650	46.03	-3.37	2.46	0.31	21.653	24.375	2.46	-15.61
5670	44.15	-3.55	2.3	0.15	21.087	23.058	2.3	-14.62
5690	46.66	-3.31	3.12	0.97	22.34	24.317	3.12	-14.42
5710	42.16	-3.75	2.83	0.68	19.921	22.244	2.83	-13.54
5730	46.35	-3.34	3.42	1.27	22.012	24.339	3.42	-12.84
5750	40.09	-3.97	2.94	0.79	19.133	20.955	2.94	-12.37
5770	43.23	-3.64	3.4	1.25	20.667	22.564	3.4	-12.28
5790	39.46	-4.04	2.81	0.66	18.993	20.471	2.81	-14.26
5810	42.31	-3.74	2.85	0.7	20.665	21.648	2.85	-14.05
5830	42.19	-3.75	2.86	0.71	20.894	21.296	2.86	-13.07
5850	45.16	-3.45	3.15	1	22.526	22.63	3.15	-12.97

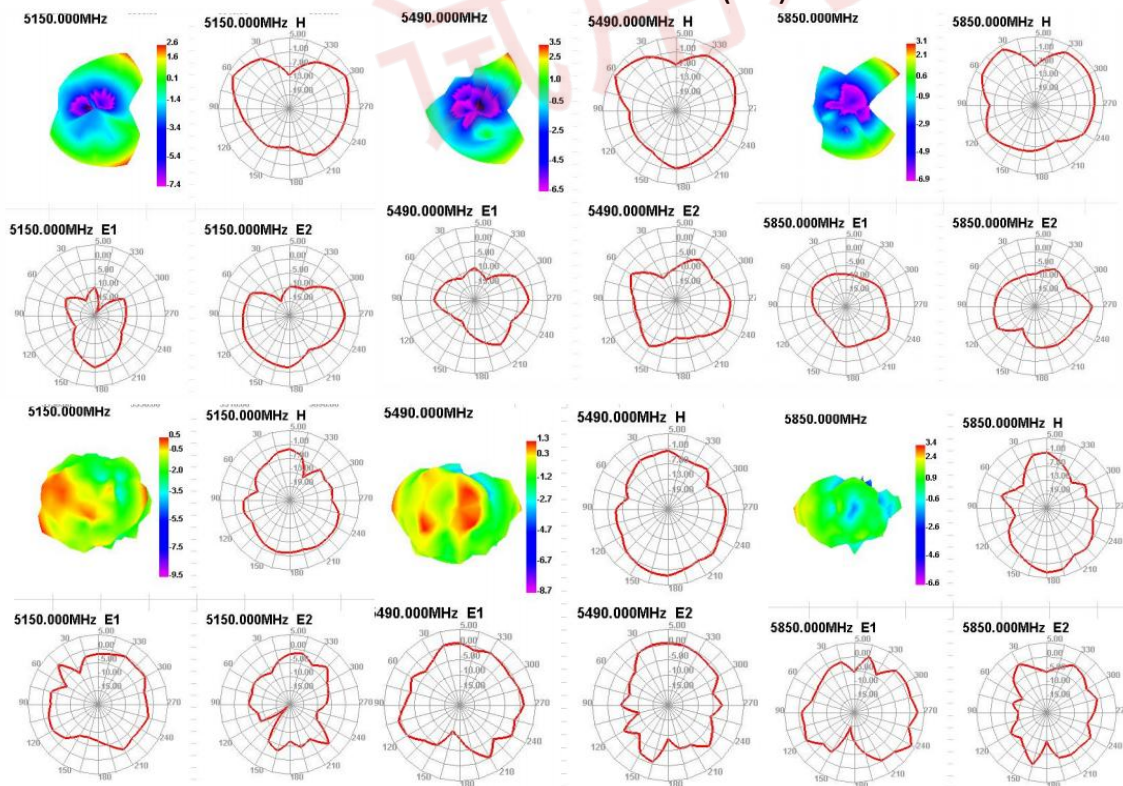
Efficiency Table (5G Ant2)

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
5150	43.35	-3.63	0.48	-1.67	23.721	19.629	0.48	-20.47
5170	42.41	-3.73	0.49	-1.66	23.509	18.903	0.49	-18.27
5190	43.98	-3.57	0.51	-1.64	24.645	19.337	0.51	-19.44
5210	41.39	-3.83	0.37	-1.78	23.576	17.815	0.37	-20.5
5230	44.69	-3.5	1.24	-0.91	25.828	18.862	1.24	-18.84
5250	42.59	-3.71	1.13	-1.02	24.828	17.759	1.13	-18.26
5270	46.98	-3.28	1.66	-0.49	27.473	19.506	1.66	-17.51
5290	48.71	-3.12	2.1	-0.05	28.565	20.145	2.1	-17.82
5310	47.7	-3.21	2.15	0	28.058	19.646	2.15	-16.95
5330	49.03	-3.1	2.02	-0.13	28.725	20.3	2.02	-17.91
5350	51.36	-2.89	2.43	0.28	29.775	21.586	2.43	-19.62
5370	49.58	-3.05	2.12	-0.03	28.47	21.115	2.12	-19.74
5390	47.48	-3.24	1.63	-0.52	27.193	20.284	1.63	-20.16
5410	57.86	-2.38	2.36	0.21	32.947	24.917	2.36	-21.03
5430	55.05	-2.59	1.98	-0.17	30.949	24.099	1.98	-19.35
5450	55.51	-2.56	1.81	-0.34	30.806	24.705	1.81	-15.72
5470	55.34	-2.57	1.37	-0.78	30.703	24.637	1.37	-15.4
5490	54.15	-2.66	1.31	-0.84	30.062	24.084	1.31	-15.5
5510	53.3	-2.73	1.28	-0.87	29.174	24.129	1.28	-14.9
5530	53.69	-2.7	2.06	-0.09	28.997	24.694	2.06	-16.92
5550	53.17	-2.74	2.29	0.14	28.71	24.456	2.29	-20.09
5570	52.92	-2.76	2.26	0.11	28.576	24.342	2.26	-19.94
5590	51.92	-2.85	2.53	0.38	27.662	24.261	2.53	-20.74
5610	50.81	-2.94	2.96	0.81	26.705	24.103	2.96	-20.81
5630	49.46	-3.06	2.9	0.75	25.987	23.473	2.9	-17.44
5650	51.12	-2.91	2.97	0.82	26.952	24.164	2.97	-18.49
5670	50.16	-3	3.15	1	26.213	23.948	3.15	-22.22
5690	48.33	-3.16	3.27	1.12	24.934	23.395	3.27	-19.29
5710	51.24	-2.9	3.6	1.45	26.482	24.753	3.6	-18.1
5730	49.38	-3.06	3.18	1.03	25.765	23.619	3.18	-18.41
5750	51.38	-2.89	3.25	1.1	26.809	24.571	3.25	-17.13
5770	49.41	-3.06	3.2	1.05	25.678	23.735	3.2	-15.55
5790	50.35	-2.98	3.33	1.18	26.271	24.079	3.33	-16.04
5810	52.02	-2.84	3.29	1.14	27.48	24.539	3.29	-17.19
5830	56.58	-2.47	3.6	1.45	30.04	26.537	3.6	-15.21
5850	54.01	-2.68	3.43	1.28	28.541	25.468	3.43	-14.69

Radiation Pattern(2.4G)



Radiation Pattern(5G)



WIFI Active test data

802.11b	Frequency	TRP		TIS	
	2412	CH1 11Mbps	11.9	CH1 11Mbps	-73.16
	2437	CH6 11Mbps	13.27	CH6 11Mbps	-76.95
	2467	CH11 11Mbps	12.79	CH11 11Mbps	-76.49
802.11a		TRP		TIS	
	5180	CH36 6Mbps	6.39	CH36 54Mbps	-70.31
	5300	CH60 6Mbps	8	CH60 54Mbps	-64.23
	5805	CH161 6Mbps	0.48	CH161 54Mbps	-70.24

BT Test

Test Environment: Open Space (Corridor)
 Test Equipment: Bluetooth Speaker
 Test Distance: 10 m
 Test Result: Music playback is smooth with no noise.

Throughput Test (2.4G)

Uplink	125M	Downlink	174M
image	[396] 17.0-18.0 sec 17.3 MBytes 145 Mbits/sec	[364] 16.0-17.0 sec 23.1 MBytes 194 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 18.0-19.0 sec 17.5 MBytes 147 Mbits/sec	[364] 17.0-18.0 sec 23.2 MBytes 195 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 19.0-20.0 sec 15.1 MBytes 126 Mbits/sec	[364] 18.0-19.0 sec 21.9 MBytes 184 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 20.0-21.0 sec 15.7 MBytes 132 Mbits/sec	[364] 19.0-20.0 sec 21.9 MBytes 184 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 21.0-22.0 sec 16.6 MBytes 139 Mbits/sec	[364] 20.0-21.0 sec 23.6 MBytes 198 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 22.0-23.0 sec 16.7 MBytes 140 Mbits/sec	[364] 21.0-22.0 sec 19.2 MBytes 161 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 23.0-24.0 sec 12.4 MBytes 104 Mbits/sec	[364] 22.0-23.0 sec 22.1 MBytes 185 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 24.0-25.0 sec 16.7 MBytes 140 Mbits/sec	[364] 23.0-24.0 sec 23.1 MBytes 194 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 25.0-26.0 sec 17.0 MBytes 143 Mbits/sec	[364] 24.0-25.0 sec 22.7 MBytes 190 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 26.0-27.0 sec 16.6 MBytes 139 Mbits/sec	[364] 25.0-26.0 sec 21.4 MBytes 180 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 27.0-28.0 sec 16.9 MBytes 141 Mbits/sec	[364] 26.0-27.0 sec 21.6 MBytes 181 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 28.0-29.0 sec 16.7 MBytes 140 Mbits/sec	[364] 27.0-28.0 sec 23.5 MBytes 197 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 29.0-30.0 sec 17.2 MBytes 145 Mbits/sec	[364] 28.0-29.0 sec 22.5 MBytes 189 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 0.0-30.0 sec 449 MBytes 125 Mbits/sec	[364] 29.0-30.0 sec 23.1 MBytes 194 Mbits/sec	
		[ID] Interval Transfer Bandwidth	
		[364] 0.0-30.0 sec 623 MBytes 174 Mbits/sec	

Throughput Test (5G)

Uplink	463M	Downlink	538M
image	[396] 17.0-18.0 sec 53.5 MBytes 449 Mbits/sec	[360] 18.0-19.0 sec 61.4 MBytes 515 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 18.0-19.0 sec 54.2 MBytes 455 Mbits/sec	[360] 19.0-20.0 sec 64.2 MBytes 538 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 19.0-20.0 sec 56.8 MBytes 476 Mbits/sec	[360] 20.0-21.0 sec 67.8 MBytes 569 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 20.0-21.0 sec 54.5 MBytes 457 Mbits/sec	[360] 21.0-22.0 sec 68.0 MBytes 570 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 21.0-22.0 sec 49.4 MBytes 415 Mbits/sec	[360] 22.0-23.0 sec 68.8 MBytes 577 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 22.0-23.0 sec 52.6 MBytes 441 Mbits/sec	[360] 23.0-24.0 sec 66.1 MBytes 555 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 23.0-24.0 sec 49.2 MBytes 413 Mbits/sec	[360] 24.0-25.0 sec 68.6 MBytes 575 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 24.0-25.0 sec 50.6 MBytes 424 Mbits/sec	[360] 25.0-26.0 sec 67.9 MBytes 570 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 25.0-26.0 sec 55.5 MBytes 466 Mbits/sec	[360] 26.0-27.0 sec 69.3 MBytes 581 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 26.0-27.0 sec 56.1 MBytes 471 Mbits/sec	[360] 27.0-28.0 sec 69.0 MBytes 579 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 27.0-28.0 sec 52.0 MBytes 436 Mbits/sec	[360] 28.0-29.0 sec 66.7 MBytes 559 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 28.0-29.0 sec 56.0 MBytes 470 Mbits/sec	[360] 29.0-30.0 sec 69.2 MBytes 580 Mbits/sec	
	[ID] Interval Transfer Bandwidth	[ID] Interval Transfer Bandwidth	
	[396] 29.0-30.0 sec 59.8 MBytes 502 Mbits/sec	[360] 0.0-30.0 sec 1.88 GBytes 538 Mbits/sec	
	[ID] Interval Transfer Bandwidth		
	[396] 0.0-30.0 sec 1.62 GBytes 463 Mbits/sec		

Antenna Assembly

