

Applicant Name: Merit Network, Inc.

**EasyGrants Number: 153** 

Organization Type (from Question 1D on BTOP application): Non-Profit Corporation

Proposed Period of Performance: 1/12/10 through 1/11/13

Total Project Costs: \$ 41,611,526

Total Federal Grant Request: \$33,289,221

Total Matching Funds (Cash): \$8,322,305

Total Matching Funds (In-Kind): \$

Total Matching Funds (Cash + In-Kind): \$8,322,305

**Total Matching Funds (Cash + In-Kind) as Percentage of Total Project Costs: %20** 

# 1. Administrative and legal expenses

### • \$1,836,009

- \$68,704, 16% of this category, includes pre-award expenses for a grant writer, writing assistant, accountants, research assistants, and travel expense to two of the Stimulus seminars. The regular staffing costs are taken directly from timesheets and travel expenses are from the airline and hotel invoices. The hourly rate and fringe benefit costs utilized are the same as their rounded, on-going rates, no adjustments were made for corporate overhead. Consultants (the grant writer and the writing assistant) submitted timesheets and were hired at a set hourly rate and FICA charges. All timesheets were reviewed and signed by managers for appropriateness.
- The following table lists all hours and rates for these expenses:



Pre Award Expense							
<u>Staff</u>	<u>Hours</u>	<u>Rate*</u>			<u>Cost</u>		
Research	16	\$	16	\$	256		
Research	126	\$	22	\$	2,753		
Research	2	\$	31	\$	62		
Research	5	\$	31	\$	155		
Research	3	\$	34	\$	103		
Research	17	\$	41	\$	692		
Research	45	\$	55	\$	2,493		
Research	26	\$	65	\$	1,697		
Research	102	\$	88	\$	8,928		
Admin	78	\$	34	\$	2,618		
Admin	25	\$	38	\$	939		
Admin	145	\$	66	\$	9,516		
Admin	63	\$	128	\$	8,058		
Consultant	116	\$	16	\$			
Consultant	266	\$	102	\$	27,132		
Travel 1	Minne	аро	lis	\$	523		
Travel 2	Los An	•		\$	906		
		-	tal		68,704		
* Rounded to th	he neares	t dol	llar, inclu				
standard corpo							

- \$353,325 in this category is for an administration grant specialist to be hired during the project period to handle mandated compliance requirements, project time keeping, invoicing, project related financials, and serve as an assistant to the project managers. The estimated salary for this position is \$44/hour and the fringe benefits are estimated at 28.5% (standard for this pay rate within the corporation). It is expected that this will be a 40 hour per week position and will be entitled to all standard benefits offered by the corporation. Merit Network, Inc. has utilized grant administrators over the course of its history and is very familiar with the going rates. This position will be limited to the duration of the project.
- \$1,390,480 includes five Merit staff positions: a project manager, statistical engineer, and three network engineers. These positions are not contractual. The staffing will be utilized for network and optical transport equipment configuration, installation, provisioning and testing of system. This also includes fiber testing using optical testing equipment by operations engineering staff and travel. Travel for the engineering team is estimated at \$34,525 over three years and is based upon current experience of traveling within the state, hotel rates, mileage reimbursement at 0.55/mile, average distance traveled per month for prior fiber builds.
- Rates are based upon similar or current salaried positions within the corporation and the standard fringe benefit package. Time and costs are based upon Merit's experience in implementing an optical and IP network. These positions are fulltime and will continue after the project is completed (except for the consultant).
- The standard fringe benefit package includes Merit's portion of FICA, health insurance and dental insurance, group insurance, retirement plan, long-term disability, and 1.9% for the University of Michigan's

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administration of the benefit programs. The average cost for this program is \$0.285 per dollar of salary. Once an hourly estimate for salary was established for each position the hourly salary was then increased by 28.5% to cover the fringe benefit package. The rate for each position includes salary and this fringe benefit amount only. No other costs were added to the rates. The 28.5% does not include any other indirect or direct costs, (i.e.) overhead, facilities, general or administrative costs, etc. nor were any of these costs added to the proposal.

Project Engineering Staff						
Staff	Hours/Yr	# of Yrs	Rate*	Total Cost		
Project Manager	2080	3	\$45/hr	\$	282,675	
Statistical Engineer	2080	3	\$44/hr	\$	274,560	
Netw ork Engineer	2080	3	\$43/hr	\$	268,320	
Netw ork Engineer	2080	3	\$43/hr	\$	268,320	
Netw ork Engineer	2080	3	\$42/hr	\$	262,080	
Travel				\$	34,525	
			Total	\$	1,390,480	
* Rounded to the nea	arest dollar,	includes				
standard corporate f	fringe benefi	it rate.				

• Below is a table listing the project engineering positions, rates, and hours:

- Lawyer expense is estimated at \$23,000 for construction contract review and is based on the average legal cost per mile (\$24) Merit has experienced with fiber construction. It also includes \$500 for legal work during the pre-award stage.
- All expenses are to be 20% supported by cash matching funds.

## 2-9 Note

REACH-3MC will primarily use fiber contractors for the majority of the work defined in the ARRA broadband infrastructure proposal. Since the proposal will be leveraging contractors Merit consulted with them on the allocation of costs for Form 424C. The contractors recommend the following allocations for the fiber construction part of the project.

	Recommendation	Used
Land, structure, right of ways, appraisals, etc.	2%	2%
Architectural and engineering fees	10%-15%	13%
Project inspection fees	5%	5%
Site work	5%	5%
Construction	70%-75%	75%

Merit applied the percentages to the fiber construction costs recommended by the construction companies. Merit then added the remaining costs of the project that did not apply to the fiber contractors.

OUTSIDE PLAI	Unit Cost	# Units	\$ 33,809,950	
	Fiber Build 72 Strands	\$34,500	706.3	\$24,367,350
Cables	Fiber Build 36 Strands	\$32,800	173.9	\$5,703,920
	Fiber Build 12 Strands	\$28,750	74.9	\$2,153,375
	Central Office Access	\$25,000	8	\$200,000
Cables	Central Office Access	\$35,000	7	\$245,000
	Central Office Wiring Materials	\$95,105	1	\$95,105
	Anchor Tenant Access	\$30,000	25	\$750,000
Poles		\$1,550	144	\$223,200
Other	Hang Tags	\$3	28,800	\$72,000

The following aggregated information pertains to budget categories 2 is	2 through 9:
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#### **Cables**

- ✓ 72 strand fiber armored bundle to be installed on existing utility poles and underground conduit where required. Fiber specifications will require operation in the C-Band transmission window with non-zero chromatic dispersion to facilitate dense wave division multiplexing (DWDM) for high capacity systems. Consultation with two fiber vendors established that the cost of the fiber installation will average \$34,500 per mile with the total number of miles being 706.3. The route miles were determined using Merit's route mapping tool.
- ✓ 36 strand fiber armored bundle to be installed on existing utility poles and underground conduit where required. Fiber specifications will require operation in the C-Band transmission window with non-zero chromatic dispersion to facilitate dense wave division multiplexing (DWDM) for high capacity systems. Consultation with two fiber vendors established that the cost of the fiber installation will average \$32,800 per mile with the total number of miles being 173.9. The route miles were determined using Merit's route mapping tool.
- ✓ 12 strand fiber armored bundle to be installed on existing utility poles and underground conduit where required. Fiber specifications will require operation in the C-Band transmission window with non-zero chromatic dispersion to facilitate dense wave division multiplexing (DWDM) for high capacity systems. Consultation with two fiber vendors established that the cost of the fiber installation will average \$28,750 per mile with the total number of miles being 74.9. The route miles were determined using Merit's route mapping tool.

#### **Central Office Access**

✓ Central office access to 8 of the more rural proposed central offices is estimated to cost \$25,000 per site based upon experience and estimates from the vendors. The access includes fiber and conduit entrance into the facility. Also included is site preparation and collocation such as rack and power installation. Each central office will have diverse attachments to the outside plant infrastructure.

- ✓ Central office access to 7 of the more urban proposed central offices is estimated to cost 35,000 per site based upon experience and estimates from the vendors. The access includes fiber and conduit entrance into the facility. Also included is site preparation and collocation such as rack and power installation. Each central office will have diverse attachments to the outside plant infrastructure.
- ✓ Wiring materials to connect project central office equipment to the local ILEC and outside plant infrastructure. Includes low voltage copper, fiber, and power cabling. Cost from equipment vendor for the TDM central office equipment.
- ✓ General installation and wiring for central office equipment. This is from equipment quote from vendor which will be installing the TDM equipment at central offices.

#### Anchor Tenant Access

✓ Anchor tenant access includes conduit to the outside plant fiber, building penetration, inside conduit, equipment racks and power for each of the anchor tenants. Cost is estimated from consultation with outside plant fiber installation vendors, inside plant vendors and Merit's own experience installing fiber into anchor tenants.

#### **Miscellaneous**

- ✓ Engineering consultant used to certify proposal for submission to ARRA. The cost included time and materials to review hardware and fiber route installations and timelines and is based upon vendor quote.
- ✓ System lineup and testing for the TDM equipment to be located at the central offices. This includes onsite engineers provisioning and acceptance testing of all of the TDM and network equipment to interface with the local ILEC and other CLECs located at the central office based upon vendor quote.
- ✓ Deployment charge is the travel expenses for the vendor engineers to install and test the TDM equipment located in the central offices and is based upon vendor quote..
- ✓ General installation and system testing for optical, router and switch equipment to be deployed at anchor tenants and central offices. Includes installation, testing, and provisioning of the equipment. Cost includes staffing and travel and is based upon vendor estimate.

# 2. Land, structure, rights-of-way, appraisals, etc.

#### • \$676,200

- The cost will go to pole and conduit make-ready fees, construction permits, and right of way permits.
- This amount is an estimate from the fiber construction company which also aligns with Merit's construction experience.
- All expenses are to be 20% supported by cash matching funds.



# 3. Relocation expenses and payment

Not Applicable

# 4. Architectural and engineering fees

#### • \$4,703,356

- These budget costs are for fiber route surveying and engineering, documentation including as-built drawings, engineering/project management of fiber build projects. Also included in the cost are engineering and documentation for entrance into anchor tenants and central offices.
- This amount is an estimate from the fiber construction company and Merit's experience managing fiber construction projects. Merit's partner has also included a portion of an engineering position based upon current salaries within their corporation.
- Pre–award engineering costs are also included. \$3,500 was charged by the professional engineer to validate the engineering plans, Engineering Certification Q31, for the project and costs are from invoices.
- All expenses are to be 20% supported by cash matching funds.

# 5. Other architectural and engineering fees

#### • \$33,823

- The cost for the initial consultation with a design engineering firm is included at approximately \$150/hour (current rates) with an estimate of 225 hours in the first six months.
- All expenses are to be 20% supported by cash matching funds.

# 6. Project inspection fees

- \$1,690,498
- Fees are for pole and right of way owner inspection of proposed routes and verification of acceptance once work is completed.
- Expense estimates are from the fiber construction company and Merit's experience in fiber construction projects.
- All expenses are to be 20% supported by cash matching funds

## 7. Site work

### • \$1,696,898

- This includes inside plant preparation work including conduit, fiber panel, and power installation for network and optical equipment. Also in this budget category are the added costs of working with local telecommunication companies to penetrate the indentified central offices in the proposal. This category also includes costs for power improvement by the partner.
- The cost is based upon estimates from a fiber construction company and is aligned with Merit's experience in preparing a facility for network and optical equipment. Power improvement costs based upon vendor quote.
- All expenses are to be 20% supported by cash matching funds.



## 8. Demolition and removal

### Not Applicable

## 9. Construction

- \$25,357,463
- This category includes installation of fiber on utility poles for approximately 80% of the 955 fiber miles, directional boring and conduit installation for underground fiber installation along approximately 20% of the project route. Construction materials, fiber, hang tags, messenger cable, poles, conduit, hand holes, and other materials related to fiber installation, and work crews to install the fiber are part of this category.
- These costs are from estimates from the fiber construction company and align with Merit's experience with fiber installation on utility poles and underground work.
- All expenses are to be 20% supported by cash matching funds.

# 10. Equipment

- \$5,485,955
- Optical and network equipment to be installed for service delivery.
- The cost is from equipment quotes from optical transport, telecom and network equipment vendors.
- Below is a comprehensive listing of all of the equipment along with the quotes from the vendors:

			er 10Gbps Layer 3 Switches to Be Deployed At All DWDM OADM Sites*		
Site	Qty	Model	Description	Price	Extended
Muskegon	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	759	1,517
Traverse C	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	759	1,517
Mackinaw	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 13 10nm; 40km reach on single-mode fiber	100	200
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550 nm;	759	1,517

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T			24 Port 10/100/1000 10 Gbps Uplinl	s Total	148,718
	4	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	758	3,032
	4	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	400
	2	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	3,200
	2	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	2,200
	2	CBL-EX-PWR-C13-US	Power Cable, US	28	56
	2	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	550
Spares	2	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	17,600
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	758	1,517
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
Benton Ha	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	758	1,517
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
Hillsdale	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	758	1,517
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
Monroe	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
	2	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550 nm;	758	1,517
	2	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	100	200
	1	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	1	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	1	CBL-EX-PWR-C13-US	Power Cable, US	28	28
	1	EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
Midland	1	EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	8,800
		XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	758	1,517
	-	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 13 10 nm; 40 km reach on single-mode fiber	100	200
	-	EX-24-AFL	Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,600	1,600
	-	EX-UM-2XFP	EX 4200 and EX 3200 2-Port 10G XFP Uplink Module	1,100	1,100
	-	CBL-EX-PWR-C13-US		273	273
niiinan		EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
Hillman		EX4200-24F	EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	1,517 8,800
	-	XFP-10Gbsp	XFP 10GBASE-ZR; LC connector; 1550nm;	100 759	200
	-	EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber	1,600	
	_	EX-UM-2XFP EX-24-AFL	EX 4200 and EX 3200 2-Port 10G XFP Uplink M odule Advanced Feature License for EX 3200-24T/P and EX 4200-24T/P/F SKUs	1,100	1,100 1,600
	-	CBL-EX-PWR-C13-US	· · · · ·	28	28
		EX-PWR-320-AC	EX 4200 and EX 3200 320W AC Power Supply (power cord needs to be ordered separate	275	275
	4		EX 4200, 24-port 1000BaseX SFP + 320W AC PS, Includes 50cm VC cable	8,800	275



			Juniper Metro 10Gbps Ethernet Router		
Site	Qty	Model	Description	Price	Extended
Mackinaw	1	MX480-PREMIUM-AC	Base system with redundant RE-2000,SCB,and power	107,000	107,000
	1	JUNOS-WW	JUNOS Worldwide Version	10,000	10,000
	4	CBL-M-PWR-RA-US	M 120/M 320/M X960 AC Power Cord,USA/Canada (N6/20),C19,20A/250V,2.5m,Right Angle	75	300
	1	JS-IPv6	IPv6 Support on JUNOS	10,000	10,000
	1	DPCE-R-4XGE-XFP	4x10GE Enahnced DPC for MX, requires optics sold separately	96,000	96,000
	3	XFP-10G-L-OC192-SR	Dual Rate 10G pluggable transceiver for 10GE and OC 192, 1310nm for 10Km transmission.	4,800	14,400
	1		J-Care NextDay Support for MX480 Chassis (includes RE/SCB/PWR/JUNOS)	4,140	4,140
Mt. Pleasa	1		Base system with redundant RE-2000,SCB,and power	107,000	107,000
	1	JUNOS-WW	JUNOS Worldwide Version	10,000	10,000
	4	CBL-M-PWR-RA-US	M 120/M 320/M X960 AC Power Cord,USA/Canada (N6/20),C19,20A/250V,2.5m,Right Angle	75	300
	1	JS-IPv6	IPv6 Support on JUNOS	10,000	10,000
	1	DPCE-R-4XGE-XFP	4x10GE Enahnced DPC for MX, requires optics sold separately	96,000	96,000
	3	XFP-10G-L-OC192-SR	Dual Rate 10G pluggable transceiver for 10GE and OC 192, 13 10nm for 10Km transmission.	4,800	14,400
	1	SVC-ND-MX480	J-Care NextDay Support for MX480 Chassis (includes RE/SCB/PWR/JUNOS)	4,140	4,140
			Metro 10Gbps Ethernet Ro	uter Total	483,680
			Core Router with OC3 Interfaces		
Site	Qty	Model	Description	Price	Extended
TBD	1	Cisco 7206	Cisco 7206 Router with OC3 Card G2	68,155	68,155
			Core Router with OC3 Interf	aces Total	68,155
		c	isco 1Gbps Layer 3 Switches to Be Deployed At All DWDM ILA Sites		
Site	Qty	Model	Description	Price*	
Zeeland	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Manistee	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Petoskey	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
, Gaylord	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Grayling	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Gladwin	_	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Bay City		WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
	_	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	7,254
Pinconnin				7,234	
	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7 254	
Oscoda		WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254	
Oscoda Adrian	1	WS-C3750G-12S-E WS-C3750G-12S-E WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch	7,254 7,254 7,254	7,254
Pinconnin Oscoda Adrian Spare	1	WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch	7,254 7,254	7,254 7,254 14,508 <b>87,048</b>
Oscoda Adrian Spare	1	WS-C3750G-12S-E WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch	7,254 7,254	7,254 14,508
Oscoda Adrian Spare	1	WS-C3750G-12S-E WS-C3750G-12S-E	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch 12 Port 10/100/1000 Sw	7,254 7,254	7,254
Oscoda Adrian Spare	1	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch 12 Port 10/100/1000 Sw evious quotes received by Merit Western Cooridor DWDM System Description	7,254 7,254	7,254 14,508
Oscoda Adrian Spare * Cost est	1 2 imat	WS-C3750G-12S-E WS-C3750G-12S-E es are based on pr Model	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves	7,254 7,254 ritch Total Price	7,254 14,508 87,048 Extended
Oscoda Adrian Spare * Cost est	1 2 imat Qty 11	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch 12 Port 10/100/1000 Sw evious quotes received by Merit Western Cooridor DWDM System Description	7,254 7,254 /itch Total Price 2,377	7,254 14,508 87,048 Extended 26,152
Oscoda Adrian Spare * Cost est	1 2 mat 0ty 11	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch 12 Port 10/100/1000 Sw evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required	7,254 7,254 iitch Total Price 2,377 650	7,254 14,508 87,048 Extended 26,152 7,153
Oscoda Adrian Spare * Cost est	1 2 mat 11 11 11	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410 1063708463	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional	7,254 7,254 itch Total Price 2,377 650 782	7,254 14,508 87,048 Extended 26,152 7,153 8,606
Oscoda Adrian Spare * Cost est	1 2 mat 11 11 11 21	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410 1063708463 0061705993	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required Optical Supervisory Channel M odule with 2 pluggable network ports SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510	7,254 7,254 itch Total Price 2,377 650 782 1,006	7,254 14,508 87,048 Extended 26,152 7,153 8,600 21,123
Oscoda Adrian Spare * Cost est	1 2 mat 11 11 11 21 21	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410 1063708463 006 1705993 1063708481	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required Optical Supervisory Channel M odule with 2 pluggable network ports SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510 Optical Supervisory Channel Filter M odule, 1510 nm	7,254 7,257 7,254 7,257	7,254 14,508 87,048 Extended 26,152 7,153 8,606 21,123 14,295
Oscoda Adrian Spare * Cost est	1 2 mat 11 11 11 21 21	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410 1063708463 0061705993	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required Optical Supervisory Channel M odule with 2 pluggable network ports SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510 Optical Supervisory Channel Filter M odule, 1510 nm Dummy card 5HU	7,254 7,254 itch Total Price 2,377 650 782 1,006	7,254 14,508 <b>87,048</b>
Oscoda Adrian Spare * Cost est	1 2 mat 11 11 11 21 21 90	WS-C3750G-12S-E WS-C3750G-12S-E tes are based on pr Model 78700001 0063708410 1063708463 006 1705993 1063708481	Cisco 3750 12 Port 10/100/1000 Switch Cisco 3750 12 Port 10/100/1000 Switch <b>12 Port 10/100/1000 Sw</b> evious quotes received by Merit Western Cooridor DWDM System Description FSP 3000R7 Commons and Shelves 7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required Optical Supervisory Channel M odule with 2 pluggable network ports SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510 Optical Supervisory Channel Filter M odule, 1510 nm	7,254 7,257 7,254 7,257	7,254 14,508 87,048 Extended 26,152 7,153 8,606 21,123 14,295



9         0683708200         VIC Corr XPOR with XPP client []: LR GSNR spiritural C-Bard Tunble DWDM Network         10,150         91,34/           9         0683708200         Figs 30087 Pluggals Optics				FSP 3000R7 WDM Channel Modules - Core Type		
B         0         0043702200         FF 300877 Pluggable Optics         10,150         91,443           9         0051701811         105 XPP I for 30mm, standard meth, 8035 Obtics 1400 Obtivs         752         6,76           1         063708320         th XPP I for 30mm, standard meth, 8035 Obtics 1400 Obtivs         17,922         17,922         17,922           5         063708320         th Module, 2-Depree, MPSS-Based, 40 C-Band Wavelengths, 100 Obt, with WSS, 100 Obt S, 100 Not						
9         006 070 811         ING XFP VF for 150m, standard reach, 9.83 Gardy -1.400 GbV3         752         6,765           1         063708320         KR ADM Motids, 6-Degree, WSS-Baser, 40.0-Bard Wavelengths, 00 Gitz, with WSS, 12 Pues Splitter, and lengrated OPM, RADAM -CAU/OPM         17,922         17,922         17,922           5         063708320         WS Baser, 40.0-Bard Wavelengths, 00 Gitz, with WSS, 12 Pues Splitter, and lengrated OPM, RADAM -CAU/OPM         396         2,37           6         093708440         Passive Splitter, and lengrated OPM, RADAM -CAU/OPM         396         2,37           6         093708440         Passive Splitter, and lengrated OPM, RADAM -CAU/OPM         396         2,37           6         093708404         Passive Splitter, and lengrated OPM, RADAM -CAU/OPM         396         2,37           7         00010         Argent application, Single Stage 20048 meanum output prove, 4,562         27,37         300         300         301,31,87           7         003708051         Optical Anciller for Booter application, Single Stage 20048 meanum output prove, 4,562         25,55         55         55           7         003800000         DC Power Cale length 300 m, 31 Wave, High Power         25         555           7         003800000         0ptical Attenuator & Adaptors         752         004,73		9	0063700200		10,150	91,349
C         FP 3097 Optical Filters         Filters         Filters           1         063708320         RODM Modine, Jourge WSB Meeregates CPM, BROADM-C40/07PM, WKSB, the Power Splitter, and Integrated CPM, RROADM-C40/07PM, WKS, the Power Splitter, and Integrated CPM, ROADM-C40/07PM, WKS, the Power Splitter, and Integrated CPM, Power Spli				FSP 3000R7 Pluggable Optics		
1         983708320         ROADM Module, 8-Dagree, WSS-Based, 3C - Cand Wavelengths, 20 GHz, with WSB, 52         17,922         17,922           5         98370830         WSS, bar News Splitter, and Integrated OVM, RACAM-CAUO/OM         396         2,37           6         98370840         Passive Shart Control Unit         396         2,37           6         108370840         Passive Shart Control Unit         396         2,37           6         108370840         Passive Shart Control Unit         396         2,37           6         108370840         Passive Shart Control Unit         396         2,37           6         1083708000         Obtical Amplifier for Booster application, Single Stage 20dBm meaninamoutput power, valiable gan, gain controlled (C-Band) with Duit Mountoing Pars, EDPA-C-320-COE-DM         4,562         27,37           7         0183708005         Obtical Amplifier for Booster application, Single Stage 20dBm meaninamoutput power, valiable gan, gain controlled (C-Band) with Duit Mountoing Pars, EDPA-C-320-COE-DM         6,594         131,87           14         0089000584         FSP 3000R7 Dispersion Compensation         7,158         100.020           14         1083700000         Deriver Cable Institution Trav Wave Resound Stope FTB, stand-store         7,158         100.020           14         008900059         Jumeer for internei		9	0061701811	11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	752	6,767
1         063.0063.00         ba Power Splitter, and inergrated CPM, BROADM-C40/07/074         17,922         17,922           5         063.708.00         MCADMA dotab. C-Organe, MSS-Basel, B.OBad WaverEight, B.O.E. Off. 2005FL, with WSS, bc. Power Splitter, and inergrated CPM, NADAM-C80/07/OPM         11,166         55,821           6         063.708.400         PBSCU Interface Cable (EEEED54 type)         24         144           6         073.708.700         40 - Channel XMW Warbens, XD GOTAB Splatface 2FU shaft         7,610         45,552           7         083.708.500         Optical Amplifter To Boots angulation, Single Stage-2GDB maximum output power, and correlate (C-Band) with bulk Monitoring Peris, EDFA.C-Stav.C-GB.W.M.         45,562         27,37.           7         083.708.051         Optical Amplifter To Boots angulations Companiation optical monitoring the single-done         45,552         27.37.           7         083.708.051         Optical Amplifter To Boots angulations Companiation optical monitoring the single-done         6,594         131,87.           7         083.708.061         FFP 30.008.7 Disperison Companiation Companiation Companiation Companiation Companiation Companiation Companiation Companiation Companiation Companies and Sub-site         7.158         100.020           22         03670.0001         Optical Attenuator sequencind         46         1,000         1.000         1.000         1.000				-		
S         06370830         ROADM Module_2-begree WSS-Baact, 80 C-Band Wavelergth, 50 CH2 100GHz, with 11,166         11,166         55,821           G         1083708440         Peasive Shifts, and Inogrado QM, ROADM. CS0/0/OPM         336         2,377           G         1083708440         Peasive Shifts, and Inogrado QM, ROADM. CS0/0/OPM         336         2,377           G         1083708400         40-Charrel AVG Mur/Omzn, 100 GHz, CFand, Separate 214 Jettil         7,610         45,562           G         1083708400         40-Charrel AVG Mur/Omzn, 100 GHz, CFand, Separate 214 Jettil         7,610         45,562         227,37           20         0637080801         Optical Archiffer for Sooser explication, Single Stage 20dBm meatrum output power, apti controllet (C-Band) with Dut Montring Ports, EDFA-C, 220-40C-DM         6,594         131,877           20         063708001         CP result archifers and with Dut Montring Ports, EDFA-C, 220-40C-DM         6,594         131,877           21         0083000554         CP result archifers and with Dut Montring Ports, EDFA-C, 220-40C-DM         6,594         131,877           22         0036700000         Optical Archifers Adaptors         7,158         100,201           22         0036700000         Optical Archifers Adaptors         6         6         20,377         14,260           22		1	1063708320		17,922	17,922
6         1083708440         Peake Self Corrol Unit         396         2,37           6         10837008400         PROL Interface Cable (EEE393 4 yps)         24         144           6         1075708790         QCI         144         145           6         1083708070         PROL Interface Cable (EEE393 4 yps)         24         144           6         1075708790         44-Chemal AMD Mul/Dams, 200 GBR, Coland, Sage 2008m monumoupp power, gam controllet (C-Bard) with Dua Montomy Ports, EDFA-C-202-CGD-DM         45.552         27.337           20         D83708051         Optical Amplific Poole Sage 20 GBm mosimum output power, gam controllet (C-Bard) with Dua Montomy Ports, EDFA-C-202-CGD-DM         6.594         131,877           21         D83708051         DC Power Cable lengt no on 3 Wire, High Power         25         5551           22         D83708000         DC Power Cable lengt no on 3 Wire, High Power         25         5551           22         D05500000         Jumper for internal cabling - connector, length and mode not specified         46         20,344           44         055000000         Jumper for internal cabling - connector, length and mode not specified         46         20,344           45         0057000001         FNB 300087 C Commons and Shelves         714,266         36,00         30,00         <		5	1063708310	ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with	11 166	55 920
6         036000570         PSCU Interface Cable (IEEE194 type)         2.24         1.44           6         036000570         40-Chamol AVG MuxDomax, to Gitz, C-Bard, Separate 2HJ ahell         7,610         45,651           6         03700050         Optical Amplifier for BooRT Optical Amplifiers         60-00000000000000000000000000000000000		-			•	
6         078708790         40-Charmel AWG Mus/Demax, '00 GHz, C-Bard, Separate 2HJ shell         7,610         45,651           6         1083709050         Optical Amplifier for Boost explosition, 'Bigli Sagaz 20 GHm maximum output power,						
C         FSP 30087 Optical Amplifiers         File         File           6         th63709050         Optical Amplifier Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Amplifier, Date Straig 2005 maximum output power, end to power, optical Attenuators & Adaptors         7,158         100,200           22         038700004         DC Power Cable length 300 cm 3 Wires, High Power         2,5         555           22         038700000         Jurger for internal cabling - connector, length and modenot specified         46         20,3,44           4##         005000000         Jurger for internal cabling - connector, length and modenot specified         46         20,3,44           6         0078700001         7HJ Sheff With Sheff Control Unit and redundate DC PSUs included         2,377         14,2,66           6         0078700001         7HJ Sheff With Sheff Control Unit and redundate DC PSUs included         2,377         14,2,66           6         007870001         7HJ Sheff With Sheff Control Unit and redundate DC PSUs included						146
6         1063700000         Optical Amplifier for Boatser application, Single Stage 20.0Bm maximum output power, variable grin gain gain controlled (C-Band) with Dual Montoring Ports, EDFA-C-520-COB-DM         4,562         27,37           20         1063708051         Optical Amplifier, Double Stage 20.0Bm maximum output power, variable grin gain controlled (C-Band) with Dual Montoring Ports, EDFA-C-520-COB-DM         6,594         1131,87           14         008900584         Ummarged Dispersion Compression Compensation         7,158         1000,200           21         036700004         DC Power Cable length 300 cm, 3 Wites, Hgh Power         225         555           22         0088300000         Optical Attenuator s & Adaptors         46         1,000           31         mit optical Cables		6	1078708790		7,610	45,659
6         bb3/0000         gain controlled (C-Band) with biad Monitoring Ports, EDFA-C-320-CGC-DM         4,552         22,337           20         b63708051         Optical Amplitien, Double Stage 20 dBm maximum obup yows, variable gain, gain controlled (C-Band) with Daw Monitoring Ports, EDFA-C-320-CGC-DM         6,594         131,877           14         0689000524         Ummanged Dispersion Compression for True Ware Reduced Stope Fiber, stand-atone HU shift, 80km         7,158         100,201           2         035700004         DC Power Cablesgin3300 cm 3 Wine, Hgh Power         25         555           2         035700000         Optical Attenuators & Adaptors         46         1,000           2         0059300000         Jumper for internal cabling - connector, length and mode not specified         46         20,341           3         005900000         Jumper for internal cabling - connector, length and mode not specified         46         20,341           4         005900000         Jumper for internal cabling - connector, length and mode not specified         46         20,341           5         00078700001         7HU Shaft With Sheft Control Unit MG redundart DC PSUs included         2,377         14,266           6         0078700001         7HU Shaft With Sheft Control Unit MG redundart DC PSUs included         2,377         14,266           6         0		_		· · ·		
20         bits / sourcelled (C-Bardy with Dual Monitoring Ports, EDFA-C-D20-VGC-DM*         6,594         131,87           14         008900054         Ummanaged Dispersion Compression Compressinter Compressint Compression Compression Compression Compression		-		gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM	-	27,371
14     008900084     Ummaraged Dispersion Compression for True Wave Reduced Slope Fiber, stand-alone Hut Jerld, BOKm     7,158     100,200       22     0036700004     DC Power Cable length 300 cm, 3 Wires, Hgh Power     25     559       22     0053300000     Optical Attenuators & Adaptors     25       23     0058000000     Optical Attenuator unspecified     46     1,000       44     005800000     Jumper for internal cabling - connector, length and mode not specified     46     20,344       50     007700001     Jumper for internal cabling - connector, length and mode not specified     46     20,344       Central Cooridor DWDM System       Site     Qty     Model     FSP 3000R7 Commons and Shelves     F       6     0078700001     74U Shelf with Shelf Corritol Unit (NCU2E), 2.5H High, 2.RU45 Ethernet ports, additional     650     3.900       6     0083708449     Rtwork Etheret Control Unit (NCU2E), 2.5H Jugh, 2.RU45 Ethernet ports, additional     650     3.900       6     0083708449     Rtwork Etheret Control Unit (NCU2E), 2.5H Jugh, 2.RU45 Ethernet ports, additional     650     3.900       10     0087708441     Pricet & FSP 3000R7 Software and Licenses     782     4,659       10     0087708411     Dummy card SHU     782     3.823 <td></td> <td>20</td> <td>1063709051</td> <td></td> <td>6,594</td> <td>131,877</td>		20	1063709051		6,594	131,877
14         Ubushul Usski         FJP 3000R7 Electrical Cables         7,158         100,200           22         1036700004         DC Power Cable length 300 cm, 3 Wires, Hgh Power         25         555           22         1036700004         DC Power Cable length 300 cm, 3 Wires, Hgh Power         25         555           24         0058300000         Optical Attenuators & Adaptors         46         1,000           411         005500000         Jumper for internal cabling - connector, length and mode not specified         46         20,341           411         005500000         Jumper for internal cabling - connector, length and mode not specified         46         20,341           5ite         Qty         Model         Central Cooridor DWDM System         71,14,261           5ite         Qty         Model         FSP 3000R7 Commons and Shelves         71,14,261           6         007870001         7HJ Sheff with Sheff Control Unit and redundant DC PSUs included         2,377         14,4261           6         0063708443         Optical Supervisory Channel Module with 2 pluggble network ports         782         4,659           71         006705993         SFP client FJ For Shum, Utalong reach, 254 bit/s only, for use with 0550-FN and 0,066         100,055           10         0063709401         Dummy ca				FSP 3000R7 Dispersion Compensation		
22         1036700004         DC Power Cable length 300 cm, 3 Wires, Hgh Power         25         555           22         0058300000         Optical Attenuators & Adaptors         46         1,000           22         0058300000         Jumper for internal cabiling - connector, length and mode not specified         46         20,341           44         00500000         Jumper for internal cabiling - connector, length and mode not specified         46         20,341           51         Qty         Model         Description         Price         Extended           51         Qty         Model         Description         Price         Extended           6         0063708410         Network Element Control Unit (NCU2E), 2.5 HU Hgh, 2.8 MS Element ports, additional Representation         650         3.900           6         0063708440         Optical Supervisory Channel Module with 2 pluggable network ports         782         4.659           10         006705993         SFP client // For Storm, utraiong reach, 12MbH/s only, for use with 0SCM-PN and 0G97M 4* 550         10.006         10.0051           10         00670001         Right to use CMDM and DWDM using Access and Core cards         1.372         8.231           6         00970000         Right to use CMDM and DWDM using Access and Core cards         1.372         8.231		14	0089000584	1HU shelf, 80km	7,158	100,208
Image: Control of the second				FSP 3000R7 Electrical Cables		
22         0958300000         Optical Attenuator unspecified         46         1,000           ##         005000000         Jumper for internal cabling - connector, length and mode not specified         46         20,343           ##         005000000         Jumper for internal cabling - connector, length and mode not specified         46         20,343           Site         Qty         Model         Central Cooridor DWDM System         Frice         Extended           Site         Qty         Model         Description         Price         Extended           6         0078700001         7HJ Sheff with Shell Control Unit (NCU2E), 2.5HJ light, 2.RJ45 Ethernet ports, additional         650         3,900           6         0063708410         Network Element Control Unit (NCU2E), 2.5HJ light, 2.RJ45 Ethernet ports, additional         650         3,900           10         066709843         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,693           10         066709803         OSFILENT IF for 150 mm, uitra long reach, 125M bit/s only, for use with OSCM-PN and         1,006         10,055           10         1063708481         Optical Supervisory Channel Filter M odue, 150 m         681         6,800           10         1063708020         Dummy card SHU         FSP 3000R7 Software and Licenses<		22	1036700004	DC Power Cable length 300 cm, 3 Wires, High Power	25	559
Image: state in the state				Optical Attenuators & Adaptors		
##         005100000         Jumper for internal cabling - connector, length and mode not specified         46         20,344           6         0         0         623,841         623,841         623,841           Central Cooridor DWDM System           Site         Qty         Model         Description         Price         Extended           6         0078700001         7FU Shelf with Shelf Control Uni and redurdant DC PSUs included         2,377         14,263           6         00637084 10         Network Element Control Uni (NCU2E), 2.6 HU high, 2 RJ45 Ethernet ports, additional         650         3,900           6         1063708463         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,669           10         0061705993         SFP client // Fort Storm, utralong reach, 125M bit/s only, for use with OSCM-PN and         1,006         10,005           10         0063709901         Dummy card SHU         FSP 3000R7 Software and Licenses         1,372         8,230           6         009170000         Right to use GMPL8 Control plane functionality         2,530         15,177           FSP 3000R7 PUDM Channel Modules - Core Type         1,372         8,230           6         0063700200         Right to use GMPL8 Control plane functio		22	0058300000	Optical Attenuator unspecified	46	1,006
Image         Central Cooridor DWDM System           Site         Oty         Model         Central Cooridor DWDM System           Site         Oty         Model         FSP 3000R7 Commons and Shelves         Price         Extended           6         0078700001         7HU Sheff with Sheff Control Unit and redundant DC PSUs included         2,377         14,263           6         0063708410         Network Element Control Unit and redundant DC PSUs included         2,377         14,264           10         0061705993         SFP client UF for 150m, ultralong reach, 125M bit/s only, for use with OSCM-PN and         1,006         100,053           10         0063708481         Optical Supervisory Channel Filter M odule, 150 nm         681         6,800           54         0091700040         Right to use CWDM and DWDM using Access and Core cards         1,372         8,230           6         0091700040         Right to use GMPLS Control plane functionality         2,530         15,172           5         006370810         If GX FP UF for 1310m, standard reach, 9,953 Gbit/s-11400 Gbit/s         752         3,752           5         0063700200         Right to use GMPLS Control plane functionality         2,530         17,922           6         091700040         Right no use GMPLS Control plane functionality         10,				Optical Cables		
Site         Qty         Model         Description         Price         Extended           6         0078700001         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         2,377         14,261           6         0083708410         Network Element Control Unit (NCU2E), 2.5HU high, 2 RJ45 Ethemet ports, additional         650         3,900           6         1063708463         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,694           10         0061705993         GPF client VF for 150nm, utralong reach, 125M bit/s only, for use with OSCM-PN and OGSFM +# 550         10,006         10,006           10         063708481         Optical Supervisory Channel Filter Module, 150 nm         681         6,800           5         006370901         Dummy card SHU         24         1,312           FSP 3000R7 WDM Channel Modules - Core Type           6         0091700010         Right to use CMDM and DWDM using Access and Core cards         1,372         8,230           5         006370200         Wight to Lies CMDM and DWDM using Access and Core cards         1,372         3,755           6         1091700010         Right to use CMDM and Access and Core cards         1,372         8,233           5         0063700200         Right ro Lies CMDM and Acceoly associa		##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	20,341
SiteQtyModelDescriptionPriceExtended6078700017HU Shelf with Shelf Control Unit and redundant DC PSUs included2,37714,266600637084/0Network Element Control Unit and redundant DC PSUs included2,37714,266610637084/3Optical Supervisory Channel Module with 2 pluggable network ports7824,669100061705993SFF client UF for 150mm, ultra long reach, 128M bit/s only, for use with OSCM-PN and OSFM # 1501,00610,0055400637084/81Optical Supervisory Channel Hodule, 1510 nm6816,800540063709901Dummy card SHUFSP 3000R7 Software and Licenses241,31161091700010Right to use GMPLS Control plane functionality2,53015,1797FSP 3000R7 WDM Channel M odules - Core Type773,75270063700200106 Gore XPDR with XFP client F, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LM# DC10,015050,74450063700200106 XFP I/F tor 1310m, standard reach, 9.953 Gbit/s-11400 Gbit/s17,9223,755711063708320ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with11,166111,16611063708310ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with11,96211,922						623,849
SiteQtyModelDescriptionPriceExtended6078700017HU Shelf with Shelf Control Unit and redundant DC PSUs included2,37714,266600637084/0Network Element Control Unit and redundant DC PSUs included2,37714,266610637084/3Optical Supervisory Channel Module with 2 pluggable network ports7824,669100061705993SFF client UF for 150mm, ultra long reach, 128M bit/s only, for use with OSCM-PN and OSFM # 1501,00610,0055400637084/81Optical Supervisory Channel Hodule, 1510 nm6816,800540063709901Dummy card SHUFSP 3000R7 Software and Licenses241,31161091700010Right to use GMPLS Control plane functionality2,53015,1797FSP 3000R7 WDM Channel M odules - Core Type773,75270063700200106 Gore XPDR with XFP client F, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LM# DC10,015050,74450063700200106 XFP I/F tor 1310m, standard reach, 9.953 Gbit/s-11400 Gbit/s17,9223,755711063708320ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with WSS WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with11,166111,16611063708310ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with11,96211,922						
FSP 3000R7 Commons and Shelves         FSP 3000R7 Commons and Shelves           6         0078700001         7HU Shelf with Shel Control Unit and redundant DC PSUs included         2,377         14,269           6         00637084 10         Network Element Control Unit (NCU2E), 2.5 HU High, 2 RJ45 Ethernet ports, additional RTU license required         650         3,900           6         1063708463         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,690           10         0061705993         SFP client UF for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and 0OSFM # 1510         10,006         10,0051           10         1063708481         Optical Supervisory Channel Filter M odule, 1510 nn         681         6,800           54         0063709901         Dummy card SHU         24         1,311           FSP 3000R7 Software and Licenses           6         0091700040         Right to use GWDM and DWDM using Access and Core cards         1,372         8,230           5         0063700200         fSP 3000R7 WDM Channel M dulues - Core Type         10,150         50,749           5         0063700200         fSP 9 3000R7 Pluggable Optics         10,150         50,749           FSP 3000R7 Optical Filters            fS PS 30				Central Cooridor DWDM System		
6         0078700001         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         2,377         14,265           6         0063708410         Network Element Control Unit (NCU2E), 2.5HU high, 2.RJ45 Ethernet ports, additional RTU license required         650         3,900           6         1063708463         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,694           10         0061705993         OSFM ## 150         10.006         10,0051           10         1063708481         Optical Supervisory Channel Filter Module, 1510 nm         681         6,800           54         006370901         Dummy card SHU         24         1,311           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,233           6         091700010         Right to use GM PLS Control plane functionality         2,530         15,179           7         0063700200         106 Core XPDR with XPP client IF, LP CSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LW #DC         10,150         50,743           5         0063700200         106 XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11400 Gbit/s         752         3,759           7         1         1063708320         ROADM Module, 2-Degree, WSS-Based, AO C-Band Wavelengths, 100 GHz, with WSS, 128 Po	Site	Qty	Model	Description	Price	Extended
6         0078700001         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         2,377         14,265           6         0063708410         Network Element Control Unit (NCU2E), 2.5HU high, 2.RJ45 Ethernet ports, additional RTU license required         650         3,900           6         1063708463         Optical Supervisory Channel Module with 2 pluggable network ports         782         4,694           10         0061705993         OSFM ## 150         10.006         10,0051           10         1063708481         Optical Supervisory Channel Filter Module, 1510 nm         681         6,800           54         006370901         Dummy card SHU         24         1,311           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,233           6         091700010         Right to use GM PLS Control plane functionality         2,530         15,179           7         0063700200         106 Core XPDR with XPP client IF, LP CSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LW #DC         10,150         50,743           5         0063700200         106 XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11400 Gbit/s         752         3,759           7         1         1063708320         ROADM Module, 2-Degree, WSS-Based, AO C-Band Wavelengths, 100 GHz, with WSS, 128 Po						
0         06         063708410         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         650         3,900           6         1063708463         Optical Supervisory Channel M odule with 2 pluggable network ports         782         4,690           10         0061705993         SFP client I/F for 15/0nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM ## 1510         1,006         10,005           10         1063708481         Optical Supervisory Channel Filter M odule, 15/0 nm         681         6,800           54         006370901         Dummy card 5HJ         24         1,312           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,233           6         0091700040         Right to use CMPLS Control plane functionality         2,530         15,179           7         5         0063700200         106 Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-106-LW# DC         10,150         50,743           7         5         006370830         TSP 3000R7 Pluggable Optics         17,922         17,922           1         1063708320         ROADM Module, 8-Degree, WSS-Based, 80 C-Band Wavelengths, 100 GHz, with WSS, M2 Power Splitter, and Integrated OPM, RADADM-C40/0/OPM         17,922         17,922		_				
6         00037084.0         RTU license required         660         3,900           6         1003708463         Optical Supervisory Channel M odule with 2 pluggable network ports         782         4,694           10         0061705993         SPP client // F for 150mm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         1,006         10,005           10         1063708481         Optical Supervisory Channel Filter M odule, 1510 nm         681         6,800           54         0063709901         Dummy card SHU         FSP 3000R7 Software and Licenses         24         1,312           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,233           6         1091700040         Right to use GM PLS Control plane functionality         2,530         15,179           7         106 Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LIM# DC         10,150         50,749           5         0061701811         11G XFP I/F for 1310nn, standard reach, 9,963 GM/s-114,00 Gbit/s         752         3,750           7         5         0061701811         11G XFP I/F for 93000R7 Optical Filters         17,922         17,922           1         1063708320         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with W						
10         006 1705993         SFP client VF for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         1,006         1,006           10         1063708481         Optical Supervisory Channel Filter M odule, 1510 nm         681         6,801         6,81		6	0078700001	7HU Shelf with Shelf Control Unit and redundant DC PSUs included	2,377	14,265
10         006 //05993         OSFM +# 1510         1,006         10,005           10         1063708481         Optical Supervisory Channel Filter Module, 1510 nm         681         6,800           54         0063709901         Dummy card 5HU         24         1,311           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,230           6         1091700040         Right to use GMPLS Control plane functionality         2,530         15,172           7         FSP 3000R7 WDM Channel Modules - Core Type         10,150         50,743           6         0091700040         Right to use GMPLS Control plane functionality         2,530         15,172           7         0063700200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LW# DC         10,150         50,743           7         0063708200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LW# DC         10,150         50,743           7         0061701811         11G XFP VF for 1310m, standard reach, 9.953 Gbit/s-11400 Gbit/s         752         3,752           1         1063708320         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 50 GHz, vith WSS, tx 2 Power Splitter, and Integrated OPM, ROADM -C40/0/OPM         11,166		-		7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional		14,265 3,901
54         0063709901         Dummy card 5HU         24         1,312           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,230           6         0091700040         Right to use GMPLS Control plane functionality         2,530         15,179           6         0091700040         Right to use GMPLS Control plane functionality         2,530         15,179           7         FSP 3000R7 WDM Channel Modules - Core Type         10,150         50,749           7         0063700200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network In,150         50,749           7         0063700200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network In, 10,150         50,749           7         0063700200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network In, 10,150         50,749           8         0061701811         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11400 Gbit/s         752         3,759           1         1063708320         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 100 GHz, with WSS, tx8 Power Splitter, and Integrated OPM, ROADM -C40/0/OPM         11,166         11,1,166           1         1063708340         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/ 100GHz, with WSS, tx2 Power Splitt		6	0063708410	7HU Shelf with Shelf Control Unit and redundant DC PSUs included Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required Optical Supervisory Channel M odule with 2 pluggable network ports	650	
54         0063709901         Dummy card 5HU         24         1,311           6         0091700010         Right to use CWDM and DWDM using Access and Core cards         1,372         8,230           6         1091700040         Right to use GMPLS Control plane functionality         2,530         15,179           6         1091700040         Right to use GMPLS Control plane functionality         2,530         15,179           7         6         0063700200         Right to use GMPLS Control plane functionality         2,530         15,179           7         7         6         0063700200         Right to use GMPLS Control Plane functionality         10,150         50,749           7         0063700200         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         10,150         50,749           7         0061701811         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11400 Gbit/s         752         3,759           7         0063708320         ROADM Module, 8-Degree, WSS-Based, 90 C-Band Wavelengths, 100 GHz, with WSS, tx8 Power Splitter, and Integrated OPM, ROADM -C40/0/OPM         11,166         11,166           1         1063708310         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/ 100GHz, with WSS, tx8 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM         11,166         11,166 <td></td> <td>6</td> <td>0063708410 1063708463</td> <td>7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and</td> <td>650 782</td> <td>3,901</td>		6	0063708410 1063708463	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and	650 782	3,901
Image: space of the system o		6 6 10	0063708410 1063708463 0061705993	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510	650 782 1,006	3,901 4,694 10,058
Image: Constraint of the second of		6 6 10 10	0063708410 1063708463 0061705993 1063708481	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm	650 782 1,006 681	3,901 4,694 10,058 6,807
6109170040Right to use GM PLS Control plane functionality2,53015,1791010FSP 3000R7 WDM Channel Modules - Core Type105006370020010G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC10,15050,7495006170181111G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s7523,759611063708320FSP 3000R7 Optical Filters1011063708320ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, tx8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM11,16611,16611063708310ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, tx2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM11,16611,16621063708440Passive Shelf Control Unit39679221036000570PSCU Interface Cable (IEEE1394 type)244462107870879040-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf7,61015,22021063709050Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM4,5629,12440Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, variable gain, gain6,5046,504		6 6 10 10	0063708410 1063708463 0061705993 1063708481	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU	650 782 1,006 681	3,901 4,694 10,058
Image: style s		6 6 10 10 54	0063708410 1063708463 0061705993 1063708481 0063709901	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses	650 782 1,006 681 24	3,901 4,694 10,058 6,807 1,317
S         0063700200         IF, WCC-PCTN-10G-LN# DC         10,150         50,743           Image: S         0061701811         IfF, WCC-PCTN-10G-LN# DC         10,150         50,743           S         0061701811         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         752         3,759           Image: S         0063708320         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 17,922         17,922         17,922           1         1063708320         ROADM Module, 2-Degree, WSS-Based, 40 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 12 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         11,166         111,166           1         1063708310         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 12 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM         11,166         111,166           2         1063708440         Passive Shelf Control Unit         396         792           2         1036000570         PSCU Interface Cable (IEEE1394 type)         24         449           2         1078708790         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         7,610         15,220           1         063709050         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM         4,562         9,		6 6 10 10 54 6	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards	650 782 1,006 681 24 1,372	3,901 4,694 10,058 6,807 1,317 8,230
Image: Second		6 6 10 10 54 6	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality	650 782 1,006 681 24 1,372	3,901 4,694 10,058 6,807 1,317
5         0061701811         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         752         3,759           1         063708320         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 17,922         17,922         17,922           1         1063708320         ROADM Module, 2-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 17,922         17,922         17,922           1         1063708310         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 12 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM         11,166         11,166           2         1063708440         Passive Shelf Control Unit         396         792           2         1036000570         PSCU Interface Cable (IEEE1394 type)         24         449           2         1078708790         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         7,610         15,220           C         1063709050         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM         4,562         9,124           10         1063709051         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain         6,504         65,04		6 6 10 10 54 6	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and CSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network	650 782 1,006 681 24 1,372 2,530	3,901 4,694 10,058 6,807 1,317 8,230 15,179
1       1063708320       ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 17,922       17,922         1       1063708320       ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 17,922       17,922         1       1063708310       ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 12 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM       11,166       11,166         2       1063708440       Passive Shelf Control Unit       396       792         2       1036000570       PSCU Interface Cable (IEEE1394 type)       24       44         2       1078708790       40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf       7,610       15,220         FSP 3000R7 Optical Amplifiers         2       1063709050       Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM       4,562       9,124         10       1063709051       Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain       6, ED 4       6, ED 4       6, ED 4		6 6 10 10 54 6	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC	650 782 1,006 681 24 1,372 2,530	3,901 4,694 10,058 6,807 1,317 8,230
11063708320ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM17,92217,92211063708310ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM11,16611,16621063708440Passive Shelf Control Unit39679221036000570PSCU Interface Cable (IEEE1394 type)244492107870879040-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf7,61015,22021063709050Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM4,5629,124101063709051Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain6, E0,46, E0,23		6 6 10 10 54 6 6 6 5 5	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics	650 782 1,006 681 24 1,372 2,530 10,150	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749
1       1063708320       1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM       17,922       17,922         1       1063708320       ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM       11,166       11,166         2       1063708440       Passive Shelf Control Unit       396       792         2       1036000570       PSCU Interface Cable (IEEE1394 type)       24       44         2       1078708790       40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf       7,610       15,220         FSP 3000R7 Optical Amplifiers         2       1063709050       Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM       4,562       9,124         10       1063709051       Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain       6, E0,04       6, E0,04		6 6 10 10 54 6 6 6 5 5	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network         IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	650 782 1,006 681 24 1,372 2,530 10,150	3,901 4,694 10,058 6,807 1,317 8,230 15,179
1       106370830       WSS, tx2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM       11,166       11,166         2       1063708440       Passive Shelf Control Unit       396       792         2       1036000570       PSCU Interface Cable (IEEE1394 type)       24       449         2       1078708790       40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf       7,610       15,220         2       1078709050       Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-S20-GCB-DM       4,562       9,124         10       1063709051       Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain       6,504       65,041		6 6 10 10 54 6 6 6 5 5	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel Module with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter Module, 1510 nm         Dummy card SHU         Image: State Colspan="2">State Colspan= Colspan="2">State Colspan="2">State Colsp	650 782 1,006 681 24 1,372 2,530 10,150	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749
2       1063708440       Passive Shelf Control Unit       396       792         2       1036000570       PSCU Interface Cable (IEEE1394 type)       24       44         2       1078708790       40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf       7,610       15,220         Image: Comparison of the state o		6 10 10 54 6 6 5 5 5	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use GWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 13 10nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS,	650 782 1,006 681 24 1,372 2,530 10,150 752	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749
2         1036000570         PSCU Interface Cable (IEEE1394 type)         24         44           2         1078708790         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         7,610         15,220           2         10787090         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         7,610         15,220           2         1063709050         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM         4,562         9,124           10         1063709051         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain         6,504         6,504		6 10 10 54 6 6 6 5 5 5 1	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200 0061701811	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel Modules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922
2     1078708790     40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf     7,610     15,220       2     1063709050     FSP 3000R7 Optical Amplifiers     7       2     1063709050     Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM     4,562     9,124       10     1063709051     Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain     6,504     65,041		6 6 10 10 54 6 6 6 6 5 5 5 1 1	0063708410 1063708463 0061705993 1063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708310	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         Experiment of the State of	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166
2       1063709050       Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM       4,562       9,124         10       1063709051       Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain       6,504       6,504		6 6 10 54 6 6 6 5 5 5 1 1 1 2	0063708410 1063708463 0061705993 1063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708310 1063708440	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card SHU         ESP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, ROADM-C40/0/OPM         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM         Passive Shelf Control Unit	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166 396	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166 792
2       1063709050       Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM       4,562       9,124         10       1063709051       Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain       6,504       6,504		6 6 10 10 54 6 6 6 7 5 5 7 1 1 2 2	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708310 1063708310	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card SHU         Image: State S	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166 396 24	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166 792 49
2     1063709050     gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM     4,562     9,124       10     1063709051     Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain     6,504     6,504		6 6 10 10 54 6 6 6 7 5 5 7 1 1 2 2	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708310 1063708310	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card SHU         Experiment Control plane Filter M odule, 1510 nm         Dummy card SHU         Sight to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel Modules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network         IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 80 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, ROADM -C40/0/OPM         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM -C80/0/OPM         Passive Shelf Control Unit       PSCU Interface Cable (IEEE1394 type)         40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166 396 24	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166 792 49
		6 6 10 10 54 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708320 1063708440 1036000570 1078708790	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         8 Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel Modules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, ROADM -C40/0/OPM         ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM -C80/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166 396 24 7,610	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166 792 49 15,220
		6 6 10 10 54 6 6 6 6 7 5 5 7 7 7 7 2 2 2 2	0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 0063700200 0061701811 1063708320 1063708320 1063708310 1063708310 1063708709 1078708790	7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use GWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 WDM Channel M odules - Core Type         10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC         FSP 3000R7 Pluggable Optics         11G XFP I/F for 13 10nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         ROADM Module, 2-Degree, WSS-Based, 30 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster a	650 782 1,006 681 24 1,372 2,530 10,150 752 17,922 11,166 396 24 7,610 4,562	3,901 4,694 10,058 6,807 1,317 8,230 15,179 50,749 3,759 17,922 11,166 792 49 15,220



			FSP 3000R7 Dispersion Compensation		
	2	0089000584	Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 80km	7,158	14,315
	4	0089000585	Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 100km	8,021	32,085
			FSP 3000R7 Electrical Cables		
	12	1036700004	DC Power Cable length 300 cm, 3 Wires, High Power	25	305
			Optical Attenuators & Adaptors		
	12	0058300000	Optical Attenuator unspecified	46	549
			Optical Cables		
	##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	11,095
					297,520
					237,320
			Southern Cooridor DWDM System		1
Site	Qty	Model	Description	Price	Extended
			FSP 3000R7 Commons and Shelves		
	7	0078700001	7HU Shelf with Shelf Control Unit and redundant DC PSUs included	2,377	16,642
		0063708410	Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional	,	
	7	0003708410	RTU license required	650	4,552
	7	1063708463	Optical Supervisory Channel Module with 2 pluggable network ports	782	5,476
	13	0061705993	SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and	1,006	13,076
	-	1063708481	OSFM +# 1510 Optical Supervisory Channel Filter Module, 1510 nm	-	
	13			681	8,849
	57	0063709901	Dummy card 5HU	24	1,390
	_		FSP 3000R7 Software and Licenses		
	7	0091700010	Right to use CWDM and DWDM using Access and Core cards	1,372	9,601
	7	1091700040	Right to use GM PLS Control plane functionality	2,530	17,709
			FSP 3000R7 WDM Channel Modules - Core Type		
	7	0063700200	10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC	10,150	71,049
			FSP 3000R7 Pluggable Optics		
	7	006 170 18 11	11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	752	5,263
	/		FSP 3000R7 Optical Filters	752	5,205
			ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with		
	4	1063708310	WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM	11,166	44,663
	4	1063708440	Passive Shelf Control Unit	396	1,585
	4	1036000570	PSCU Interface Cable (IEEE1394 type)	24	98
	4	1078708790	40-Channel AWG M ux/Demux, 100 GHz, C-B and, Separate 2 HU shelf	7,610	30,439
			FSP 3000R7 Optical Amplifiers		
	4	1063709050	Optical Amplifier for Booster application, Single Stage 20dBm maximum output power,	4,562	18,247
	4		gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM	4,302	10,247
	12	1063709051	Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM	6,594	79,126
			FSP 3000R7 Dispersion Compensation		
	c	0089000584	Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone	7 1 5 0	42.046
	6	0003000304	1HU shelf, 80km	7,158	42,946
			FSP 3000R7 Electrical Cables		
	14	1036700004	DC Power Cable length 300 cm, 3 Wires, High Power	25	356
			Optical Attenuators & Adaptors		
	14	0058300000	Optical Attenuator unspecified	46	640
			Optical Cables		
	##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	12,944
					384,652
			Eastern Cooridor DWDM System		
Site	Qty	Model	Description	Price	Extended
			FSP 3000R7 Commons and Shelves		
	6	0078700001	7HU Shelf with Shelf Control Unit and redundant DC PSUs included	2,377	14,265
	-		Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional	-	
	6	0063708410	RTU license required	650	3,901
	6	1063708463	Optical Supervisory Channel Module with 2 pluggable network ports	782	4,694
	10	0061705993	SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and	1,006	10,058
	-		OSFM +# 1510 Optical Supervisory Channel Filter Module 1510 pm	-	
	10	1063708481	Optical Supervisory Channel Filter Module, 1510 nm	681	6,807
	59	0063709901	Dummy card 5HU	24	1,438



			FSP 3000R7 Software and Licenses		
	6	0091700010	Right to use CWDM and DWDM using Access and Core cards	1,372	8,230
	6	1091700040	Right to use GM PLS Control plane functionality	2,530	15,179
			FSP 3000R7 WDM Channel Modules - Core Type		
	3	0063700200	10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network	10,150	30,450
	3		IF, WCC-PCTN-10G-LN# DC	10,150	50,450
	-	0004704044	FSP 3000R7 Pluggable Optics		
	3	0061701811	11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	752	2,256
			FSP 3000R7 Optical Filters		
	1	1063708320	ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM	17,922	17,922
	1	1063708310	ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM	11,166	11,166
	2	1063708440	Passive Shelf Control Unit	396	792
	2	1036000570	PSCU Interface Cable (IEEE1394 type)	24	49
	2	1078708790	40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf	7,610	15,220
			FSP 3000R7 Optical Amplifiers		
	2	1063709050	Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM	4,562	9,124
	10	1063709051	Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM	6,594	65,938
			FSP 3000R7 Dispersion Compensation		
	4	0089000586	Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 120km	8,885	35,540
			FSP 3000R7 Electrical Cables		
	12	1036700004	DC Power Cable length 300 cm, 3 Wires, High Power	25	305
			<b>Optical Attenuators &amp; Adaptors</b>		
	12	0058300000	Optical Attenuator unspecified	46	549
			Optical Cables		
	##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	11,095
					264,977
					201,577
			Fast AB Cooridor DWDM System		
Site	Otv	/ Model	East AB Cooridor DWDM System Description	Price	Extended
Site	Qty	/ Model	Description	Price	Extended
Site					
Site	<b>Qty</b> 3 3	Model 0078700001 0063708410	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional	<b>Price</b> 2,377 650	Extended 7,132 1,951
Site	3	0078700001 0063708410	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required	2,377 650	7,132 1,951
Site	3 3 3	0078700001 0063708410 1063708463	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports	2,377 650 782	7,132 1,951 2,347
Site	3	0078700001 0063708410	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required	2,377 650	7,132 1,951
Site	3 3 3 4 4	0078700001 0063708410 1063708463 0061705993 1063708481	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports           SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and	2,377 650 782	7,132 1,951 2,347
Site	3 3 3 4 4	0078700001 0063708410 1063708463 0061705993	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports           SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510	2,377 650 782 1,006	7,132 1,951 2,347 4,023
Site	3 3 3 4 4	0078700001 0063708410 1063708463 0061705993 1063708481	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports           SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510           Optical Supervisory Channel Filter M odule, 1510 nm	2,377 650 782 1,006 681	7,132 1,951 2,347 4,023 2,723
Site	3 3 3 4 4	0078700001 0063708410 1063708463 0061705993 1063708481	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports           SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510           Optical Supervisory Channel Filter M odule, 1510 nm           Dummy card 5HU	2,377 650 782 1,006 681	7,132 1,951 2,347 4,023 2,723
Site	3 3 3 4 4 29	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901	Description           FSP 3000R7 Commons and Shelves           7HU Shelf with Shelf Control Unit and redundant DC PSUs included           Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required           Optical Supervisory Channel M odule with 2 pluggable network ports           SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510           Optical Supervisory Channel Filter M odule, 1510 nm           Dummy card 5HU           FSP 3000R7 Software and Licenses	2,377 650 782 1,006 681 24	7,132 1,951 2,347 4,023 2,723 707
Site	3 3 3 4 4 29 3	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards	2,377 650 782 1,006 681 24 1,372	7,132 1,951 2,347 4,023 2,723 707 4,115
Site	3 3 3 4 4 29 3	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client //F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality	2,377 650 782 1,006 681 24 1,372	7,132 1,951 2,347 4,023 2,723 707 4,115
Site	3 3 3 4 4 29 3 3 3	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM ## 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS,	2,377 650 782 1,006 681 24 1,372 2,530	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590
Site	3 3 4 4 29 3 3 3 2	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM ## 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM	2,377 650 782 1,006 681 24 1,372 2,530 17,922	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844
Site	3 3 3 4 29 29 3 3 3 3 2 2 2	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM ## 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792
Site	3 3 3 4 4 29 3 3 3 3 2 2 2 2 2	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708320 1063708440 1036000570	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit       PSCU Interface Cable (IEEE1394 type)	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49
Site	3 3 3 4 4 29 3 3 3 3 2 2 2 2 2	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708320 1063708440 1036000570	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWGM ux/Demux, 100 GHz, C-Band, Separate 2HU shelf	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49
Site	3 3 3 4 29 3 3 3 3 3 3 2 2 2 2 2 2 2 2	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM ## 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM M odule, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM -C40/0/OPM         Passive Shelf Control Unit       PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf       FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power,       Potical Amplifier for Booster application, Single Stage 20dBm maximum output power,	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220
Site	3         3         3         4         29         3         3         3         4         29         3         3         3         3         3         3         3         3         3         3         2         3         3         3         3         3         3         3         3         3         3         3         <	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708320 1063708440 1036000570 1078708790	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-S20-GCB-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124
Site	3         3         3         4         29         3         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         3         3         3         3 <t< td=""><td>0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050</td><td>Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-CB-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM         FSP 3000R7 Dispersion Compensation         Ummanaged Dispersion Comp</td><td>2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610 4,562 6,594</td><td>7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375</td></t<>	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-CB-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM         FSP 3000R7 Dispersion Compensation         Ummanaged Dispersion Comp	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610 4,562 6,594	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375
Site	3         3         3         4         29         3         3         3         4         29         3         3         3         3         3         3         3         3         3         3         2         3         3         3         3         3         3         3         3         3         3         3         <	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708320 1063708440 1036000570 1078708790	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM -C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-S20-GCB-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-D20-VGC-DM         FSP 3000R7 Dispersion Compensation         Ummanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf,	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124
Site	3         3         3         4         29         3         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         3         3         3         3 <t< td=""><td>0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050</td><td>Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20 dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM         FSP 3000R7 Dispersion Compensation         Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 80km</td><td>2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610 4,562 6,594</td><td>7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375</td></t<>	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG Mux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20 dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM         FSP 3000R7 Dispersion Compensation         Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 80km	2,377 650 782 1,006 681 24 1,372 2,530 17,922 396 24 7,610 4,562 6,594	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375
Site	3         3         3         4         29         3         3         3         4         29         3         3         3         3         3         3         3         3         3         3         3         3         3         3         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         3         3         3         3         3         3         3         3         3          3          3          3          3 <td>0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050</td> <td>Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, tx8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-D20-VGC-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-D20-VGC-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, stand-alone HU she</td> <td>2,377 650 782 1,006 681 24 7,530 17,922 396 24 7,610 4,562 6,594</td> <td>7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375</td>	0078700001 0063708410 1063708463 0061705993 1063708481 0063709901 0091700010 1091700040 1063708320 1063708440 1036000570 1078708790 1063709050 1063709050	Description         FSP 3000R7 Commons and Shelves         7HU Shelf with Shelf Control Unit and redundant DC PSUs included         Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required         Optical Supervisory Channel M odule with 2 pluggable network ports         SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM-PN and OSFM +# 1510         Optical Supervisory Channel Filter M odule, 1510 nm         Dummy card 5HU         FSP 3000R7 Software and Licenses         Right to use CWDM and DWDM using Access and Core cards         Right to use GM PLS Control plane functionality         FSP 3000R7 Optical Filters         ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, tx8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM         Passive Shelf Control Unit         PSCU Interface Cable (IEEE1394 type)         40-Channel AWG M ux/Demux, 100 GHz, C-Band, Separate 2HU shelf         FSP 3000R7 Optical Amplifiers         Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-D20-VGC-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual M onitoring Ports, EDFA-C-D20-VGC-DM         Optical Amplifier, Double Stage 20 dBm maximum output power, stand-alone HU she	2,377 650 782 1,006 681 24 7,530 17,922 396 24 7,610 4,562 6,594	7,132 1,951 2,347 4,023 2,723 707 4,115 7,590 35,844 792 49 15,220 9,124 26,375

			<b>Optical Attenuators &amp; Adaptors</b>		
	6	0058300000	Optical Attenuator unspecified	46	274
			Optical Cables		
	##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	5,548
					153,461
			Northern Cooridor DWDM System		
Site	Qty	Model	Description	Price	Extended
			FSP 3000R7 Commons and Shelves		
	5	0078700001	7HU Shelf with Shelf Control Unit and redundant DC PSUs included	2,377	11,887
	5	0063708410	Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required	650	3,251
	5	1063708463	Optical Supervisory Channel Module with 2 pluggable network ports	782	3,912
	8	0061705993	SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and OSFM +# 1510	1,006	8,047
	8	1063708481	Optical Supervisory Channel Filter Module, 1510 nm	681	5,446
	48	0063709901	Dummy card 5HU	24	1,170
			FSP 3000R7 Software and Licenses		
	5	0091700010	Right to use CWDM and DWDM using Access and Core cards	1,372	6,858
	5	1091700040	Right to use GM PLS Control plane functionality	2,530	12,649
			FSP 3000R7 WDM Channel Modules - Core Type		
	2	0063700200	10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC	10,150	20,300
			FSP 3000R7 Pluggable Optics		
	2	0061701811	11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	752	1,504
			FSP 3000R7 Optical Filters		
	1	1063708320	ROADM Module, 8-Degree, WSS-Based, 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM	17,922	17,922
	1	1063708310	ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM	11,166	11,166
	2	1063708440	Passive Shelf Control Unit	396	792
	2	1036000570	PSCU Interface Cable (IEEE1394 type)	24	49
	2	1078708790	40-Channel AWG M ux/Demux, 100 GHz, C-B and, Separate 2 HU shelf	7,610	15,220
			FSP 3000R7 Optical Amplifiers		
	2	1063709050	Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM Optical Amplifier, Dauble Stage 20d Bm maximum output power, writeble acting acting	4,562	9,124
l	8	1063709051	Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM	6,594	52,751
			FSP 3000R7 Dispersion Compensation		
	6	0089000585	Unmanaged Dispersion Compensation for True Wave Reduced Slope Fiber, stand-alone 1HU shelf, 100km	8,021	48,128
			FSP 3000R7 Electrical Cables		
	10	1036700004	DC Power Cable length 300 cm, 3 Wires, High Power	25	254
			Optical Attenuators & Adaptors		
	10	0058300000	Optical Attenuator unspecified	46	457
			Optical Cables		
	##	0051000000	Jumper for internal cabling - connector, length and mode not specified	46	9,246
					240,132
			DWDM System Spares		<u>.</u>
Site	Qty	Model	Description	Price	Extended
-			FSP 3000R7 Commons and Shelves		
	1	0078700001	7HU Shelf with Shelf Control Unit and redundant DC PSUs included	2,377	2,377
	1	0063708410	Network Element Control Unit (NCU2E), 2.5 HU high, 2 RJ45 Ethernet ports, additional RTU license required	650	650
l	1	1063708463	Optical Supervisory Channel Module with 2 pluggable network ports	782	782
	_	0061705993	SFP client I/F for 1510nm, ultra long reach, 125M bit/s only, for use with OSCM -PN and		
	1		OSFM +# 1510	1,006	1,006
	1	1063708481	Optical Supervisory Channel Filter Module, 1510 nm	681	681
			FSP 3000R7 WDM Channel Modules - Core Type		
l	1	0063700200	10G Core XPDR with XFP client IF, LR OSNR optimized C-Band Tunable DWDM Network IF, WCC-PCTN-10G-LN# DC	10,150	10,150



			FSP 3000R7 Pluggable Optics		
	1	006 170 18 11	11G XFP I/F for 1310nm, standard reach, 9.953 Gbit/s-11.400 Gbit/s	752	752
			FSP 3000R7 Optical Filters		
	1	1063708320	ROADM Module, 8-Degree, WSS-Based , 40 C-Band Wavelengths, 100 GHz, with WSS, 1x8 Power Splitter, and Integrated OPM, 8ROADM-C40/0/OPM	17,922	17,92
	1	1063708310	ROADM Module, 2-Degree, WSS-Based, 80 C-Band Wavelengths, 50 GHz/100GHz, with WSS, 1x2 Power Splitter, and Integrated OPM, ROADM-C80/0/OPM	11,166	11,16
	1	1063708440	Passive Shelf Control Unit	396	39
	1	1036000570	PSCU Interface Cable (IEEE1394 type)	24	2
	1	1078708790	40-Channel AWG M ux/Demux, 100 GHz, C-B and, Separate 2 HU shelf	7,610	7,61
			FSP 3000R7 Optical Amplifiers		
	1	1063709050	Optical Amplifier for Booster application, Single Stage 20dBm maximum output power, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-S20-GCB-DM	4,562	4,56
	1	1063709051	Optical Amplifier, Double Stage 20 dBm maximum output power, variable gain, gain controlled (C-Band) with Dual Monitoring Ports, EDFA-C-D20-VGC-DM	6,594	6,59
			DWDM Software Operating System		64,67
Site	Qty	Model	Description	Price	Extended
Site	QLy	WIDGEI	FSP Network Manager	FILE	Extended
	-	0091001200	FSP Network Manager Server License (Solaris 9/10)	2,540	2,54
	-	1091002010	FSP Network Manager Connection Licenses for 5 shelves of type FSP 3000R7	7,620	60,96
	-	1091002510	FSP Service Manager Connection Licenses for 5 shelves of type FSP 3000R7	7,620	60,96
				7,020	
			DWDM System Maintenance		124,46
Site	Qty Model Description		Price	Extended	
Site		Bronz	Annual Maintenance	129,223	129,22
	1	BIOIL		129,223	129,22
			40 Wave DWDM Optical Netwo	ork Total	2,282,947
	10	Traverse 2000	Transport Equipment - Configuration for lower density Interconnect CO'	110,759	1,107,59
			Force10 Network Traverse 2000 M ultiprotocol Optical/Switching System		
			OC-192 Optical Network Transport system with Add/Drop Mutiplexing & DCS		
			Accommodates 112 DS1's, 2 -GE Interfaces, 16 10/100 Interfaces, 1 OC-48 Port, 12 DS3 Interfaces	faces	
	5	Traverse 2000	Transport Equipment - Configuration for higher density Interconnect CO	s	
			Force10 Network Traverse 2000 M ultiprotocol Optical/Switching System	236,687	1,183,43
			OC-192 Optical Network Transport system with Add/Drop Mutiplexing & DCS		
			Accommodates 112 DS1's, 12 -GE Interfaces, 16 10/100 Interfaces, 1 OC-48 Port, 48 DS3 Inter	erfaces,	
			4 OC-12 & 8 OC3 Interfaces		
	1		Transport Equipment Maintenance Spares - common spares for all sites	124,381	124,38
			Multiprotocol Optical/Switching System Total		2,415,40
			System Total		

• All expenses are to be 20% supported by cash matching funds.



## 11. Miscellaneous

### • \$131,324

- This category includes computers for the three new engineers and the grant administrator that will be working directly and exclusively on the project. It also includes cell phones for the engineers.
- The computers are estimated at \$2,100 each. The cell phones are estimated at \$80/month including the initial startup charges based upon current corporate usage and have an estimated total of \$8,640.
- \$40,784 is estimated for fiber splicing, OTDR, and optical installation and management training for Merit and partner engineering staff. These expenses are based upon known costs for the training classes and the number of engineers that will be participating.
- \$50,000 for the OTDR and OSA testing equipment. Optical Time-Domain Reflectometer, an optoelectronic instrument used to characterize an optical fiber, is used for estimating a fiber's length and overall attenuation, including splice and mated-connector losses. It may also be used to locate faults, such as breaks, and to measure optical return loss and to evaluate the quality of a connection during installation, maintenance and repair. Optical Spectrum Analyzer, a device used to examine the spectral composition of an optical signal, displays a power measure of each frequency component over a given frequency range, changing the display as the properties of the signal change. Used to evaluate the quality of a communications channel signal during installation and repair. Vendor will be performing this service and cost is based upon the vendor estimates.
- There is also \$7,500 of cost for network management of the optical transport equipment. The \$7500 is the cost for the Network Management appliance and software for the optical transport system LYNX will be operating. This is the one time cost to purchase the software and hardware to run the software to operate the management system. This cost comes from a vendor quote.
- Merit hired a consultant during the award preparation to review unserved and underserved locations. The cost, \$16,000, is taken directly from the invoice.
- All expenses are to be 20% supported by cash matching funds.

# <u>Addendum</u>

Except for fringe benefits no other indirect costs are included in the budget.

Merit's fringe benefit package is controlled by the University of Michigan since all Merit employees are contracted to Merit from the university per a five year hosting agreement. No Merit employee has access to special packages or rates. The package includes the employer's portion of FICA, pro rata health insurance subsidy, and dental insurance, group insurance, retirement plan, long-term disability, and 1.9% for university administration of the programs. The university rates currently average 28.5% per dollar of salary. This is the rate that was used to estimate total salary and fringe benefits for new positions. For current staffing their known rate was applied.

The fringe benefit costs included in the salary rates refers only to this package. It does not include any other indirect costs, (i.e.) overhead, facilities, general or administrative, etc.