



**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**HUAWEI TECHNOLOGIES CO., LTD.
HUAWEI OCEANSTOR DORADO2100 G2**

SPC-1 V1.14

**Submitted for Review: May 22, 2013
Submission Identifier: A00133**

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
Test Sponsor Primary Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Eric He – eric.heji@huawei.com Huawei Chengdu Base No. 1899, Xiyuan Avenue Chengdu, 611731 P.R. China Phone: 86 28 65281999 FAX: 86 28 62282516
Test Sponsor Alternate Contact	Huawei Technologies Co., Ltd. – http://www.huawei.com/en/ Xu Zhong – xuzhong@huawei.com Huawei Chengdu Base No. 1899, Xiyuan Avenue Chengdu, 611731 P.R. China Phone: 86 28 65281927 FAX: 86 28 62282516
Auditor	Storage Performance Council – http://www.storageperformance.org Walter E. Baker – AuditService@StoragePerformance.org 643 Bair Island Road, Suite 103 Redwood City, CA 94063 Phone: (650) 556-9384 FAX: (650) 556-9385

Revision Information and Key Dates

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.14
SPC-1 Workload Generator revision number	V2.3.0
Date Results were first used publicly	May 22, 2013
Date the FDR was submitted to the SPC	May 22, 2013
Date the Priced Storage Configuration is available for shipment to customers	currently available
Date the TSC completed audit certification	May 20, 2013

Tested Storage Product (TSP) Description

Huawei OceanStor Dorado2100 G2 (the Dorado2100 G2 for short) is a SAN-based solid state storage product designed for the enterprise-level high-performance storage market. The Dorado2100 G2 uses a full-SSD architecture and employs advanced cache management and I/O scheduling mechanisms. It offers an ideal choice for various storage scenarios that are performance-demanding such as database, VDI, and high-performance computing.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: Huawei OceanStor Dorado2100 G2	
Metric	Reported Result
SPC-1 IOPS™	400,587.11
SPC-1 Price-Performance™	\$0.57/SPC-1 IOPS™
Total ASU Capacity	3,801.046 GB
Data Protection Level	Protected 2 (<i>Mirroring</i>)
Total Price	\$227,062.00
Currency Used	U.S. Dollars
Target Country for availability, sales and support	USA

SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

SPC-1 Price-Performance™ is the ratio of **Total Price** to SPC-1 IOPS™.

Total ASU (Application Storage Unit) **Capacity** represents the total storage capacity available to be read and written in the course of executing the SPC-1 benchmark.

A **Data Protection Level** of **Protected 2** using *Mirroring* configures two or more identical copies of user data.

***Protected 2:** The single point of failure of any **component** in the configuration will not result in permanent loss of access to or integrity of the SPC-1 Data Repository.*

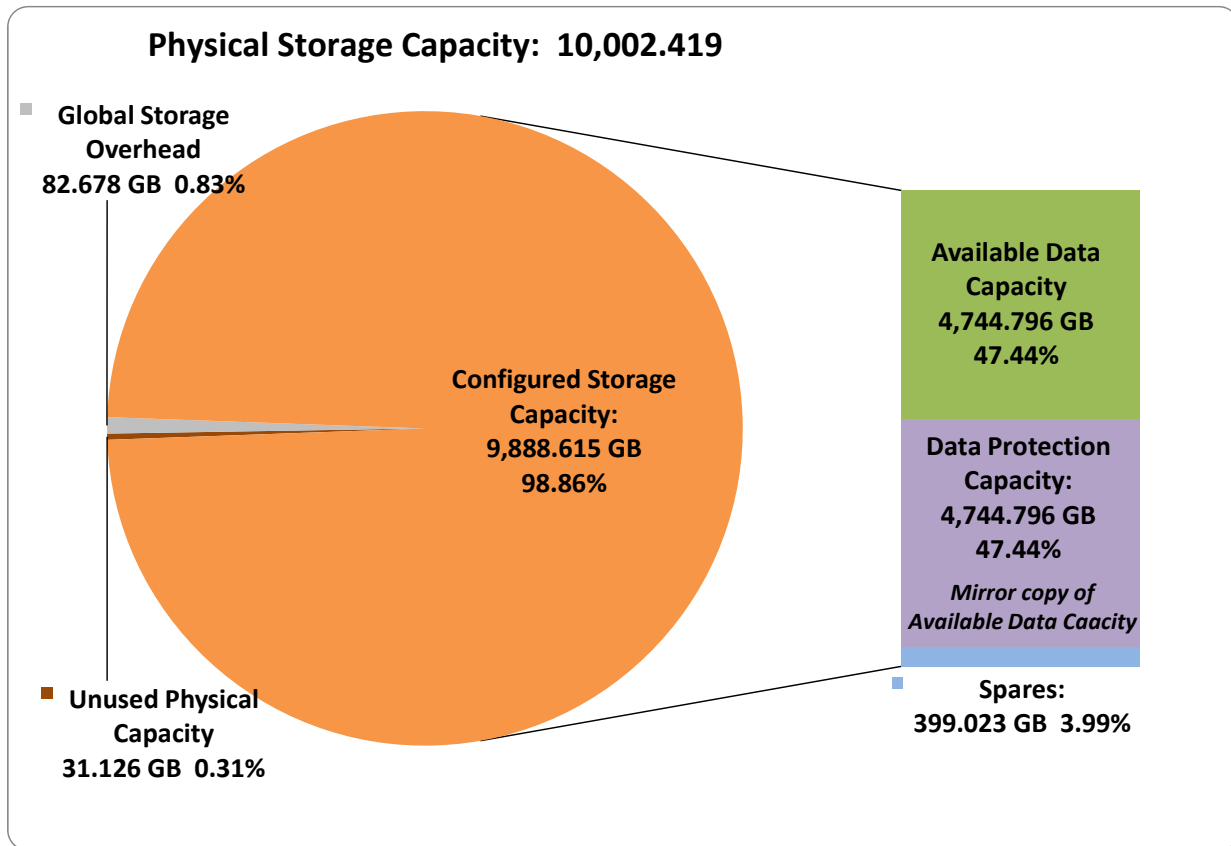
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 8.

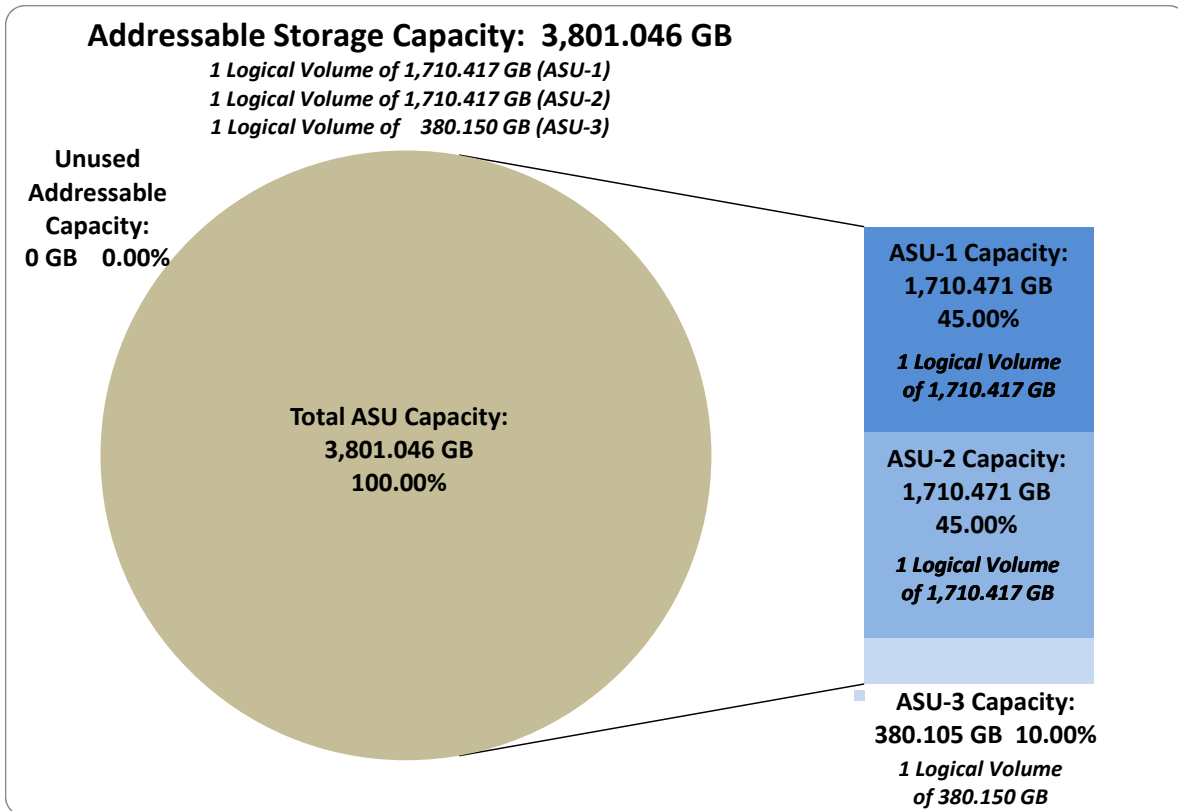
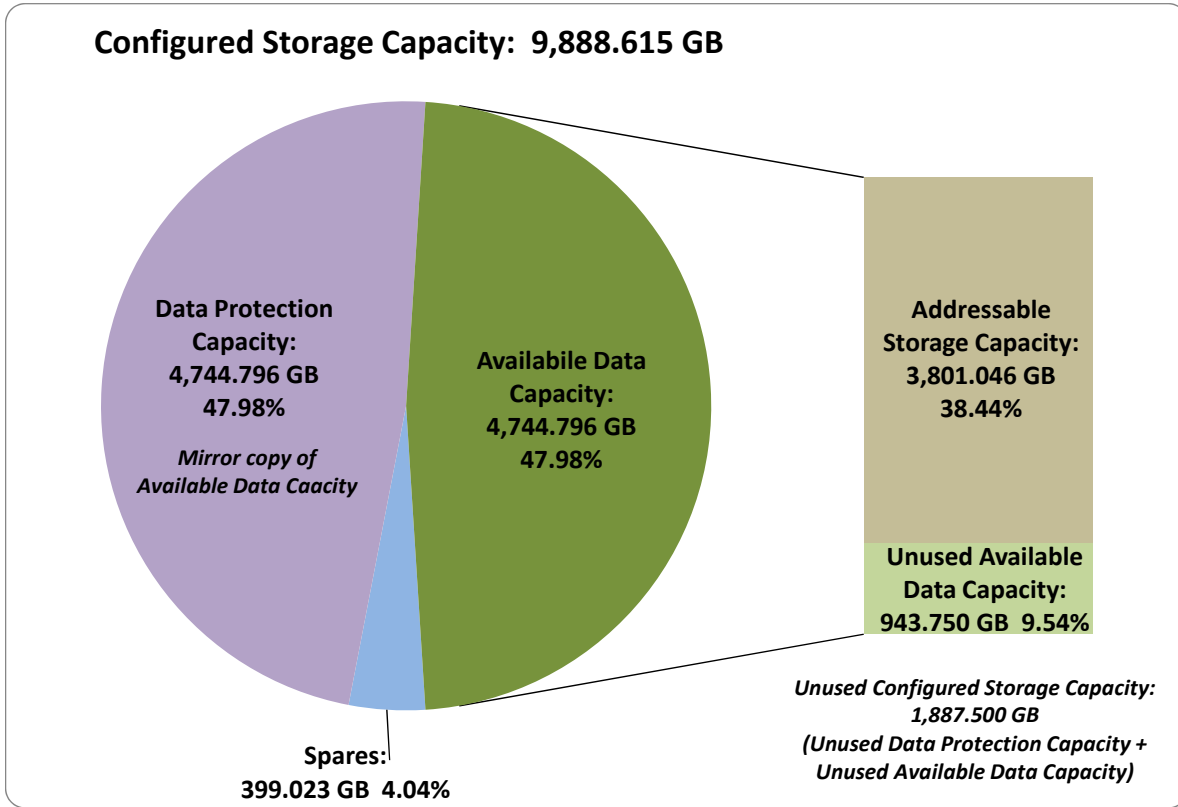
Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country (*non-local currency*).

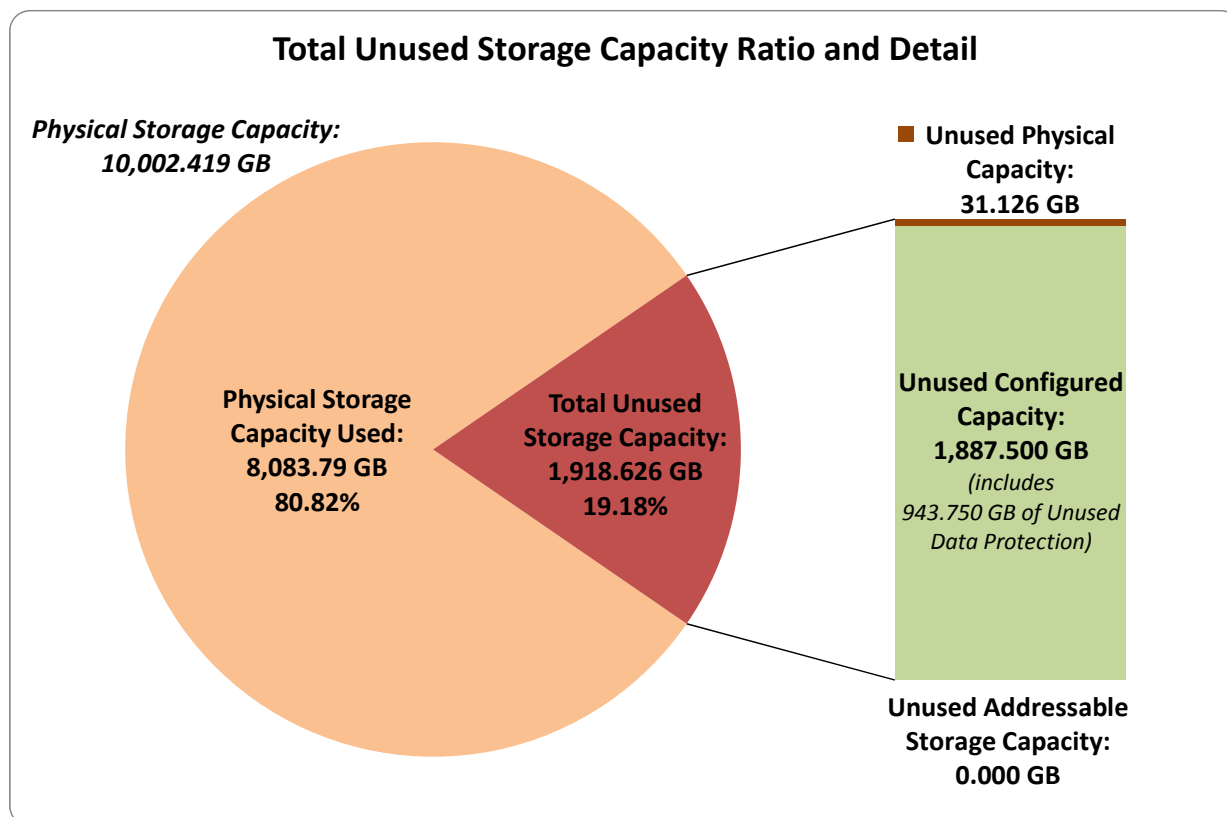
The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

Storage Capacities, Relationships, and Utilization

The following four charts and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.







SPC-1 Storage Capacity Utilization	
Application Utilization	38.00%
Protected Application Utilization	75.97%
Unused Storage Ratio	23.17%

Application Utilization: Total ASU Capacity (3,801.046 GB) divided by Physical Storage Capacity (10,002.419 GB)

Protected Application Utilization: Total ASU Capacity (3,801.046 GB) plus total Data Protection Capacity (4,741.644 GB) minus unused Data Protection Capacity (943.750 GB) divided by Physical Storage Capacity (10,002.419 GB)

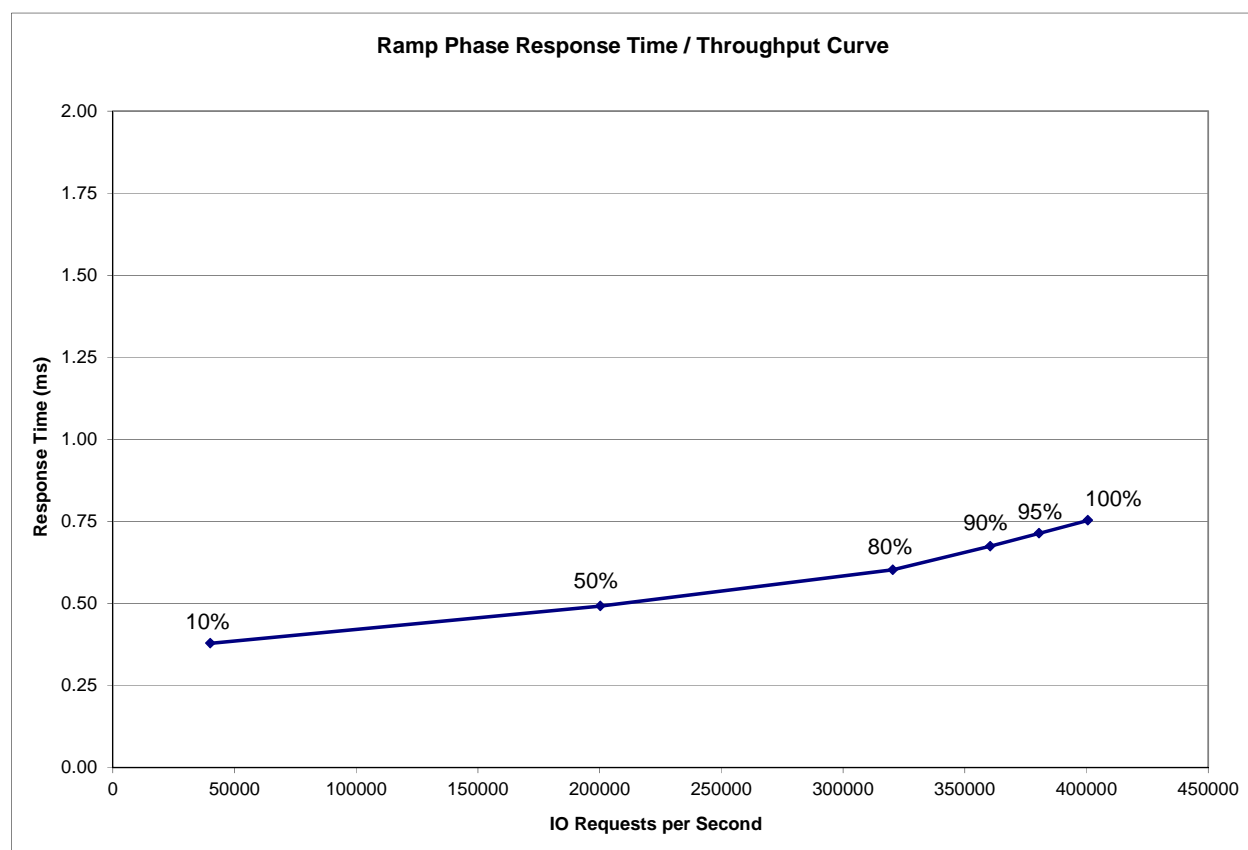
Unused Storage Ratio: Total Unused Capacity (GB) divided by Physical Storage Capacity (10,002.419 GB) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 22-23 in the Full Disclosure Report.

Response Time – Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the any of the above load points cannot exceed 30 milliseconds or the benchmark measurement is invalid.



Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	40,046.55	200,314.88	320,467.29	360,458.56	380,547.56	400,587.11
Average Response Time (ms):						
All ASUs	0.38	0.49	0.60	0.67	0.71	0.75
ASU-1	0.37	0.49	0.60	0.67	0.71	0.74
ASU-2	0.42	0.55	0.68	0.76	0.80	0.84
ASU-3	0.38	0.48	0.58	0.65	0.69	0.74
Reads	0.41	0.54	0.67	0.74	0.78	0.82
Writes	0.36	0.46	0.56	0.63	0.67	0.71

Differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration

There were no differences between the TSC and Priced Storage Configuration.

Priced Storage Configuration Pricing

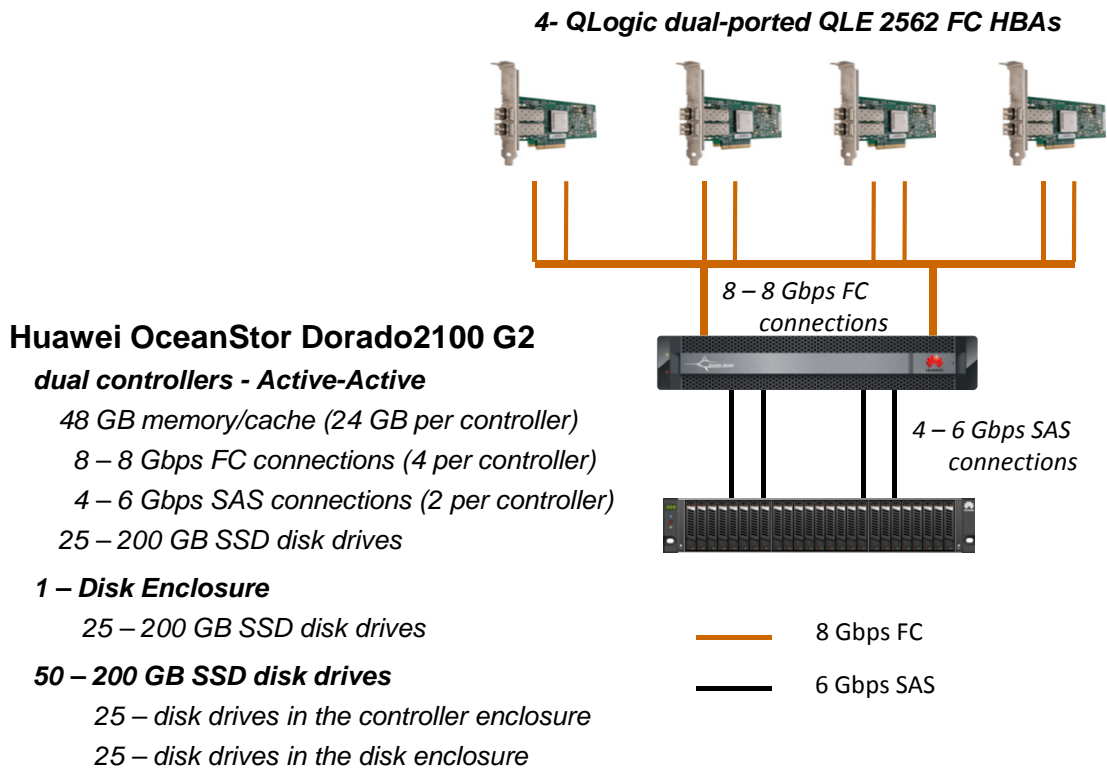
PART #	DESCRIPTION	QTY	Net Price	Ext
	Dorado2100 G2 Main Equipment			
	Storage Processor Enclosure			
STTZ03STTS	OceanStor Dorado2100 G2 High Performance Solid State Storage System-5.0TB(AC,25*200GB SLC SSD,600K IOPS,48Gbps Bandwidth,8*8G FC Port,with HW Solid-state Storage System Software,SPE51C0225)	1	\$89,446.00	\$89,446.00
	Disk Enclosure			
STTZ05DAE25	High Performance Solid State Storage System Disk Enclosure-5.0TB(2U,AC,25*200GB SLC,with HW SAS in Band Management Software,DAE12525U2)	1	\$80,640.00	\$80,640.00
	Installation Material			
SS-OP-D-LC-M-3	Patchcord,DLC/PC-DLC/PC,Multimode,2mm Parallel,3m	8	\$13.00	\$104.00
mini-SAS-3	Outsourcing Cable,External Mini SAS Cable,3.0m,External Mini SAS 26 Pin Plug,28AWG*8P BLACK(S),External Mini SAS 26 Pin Plug,Key2,4,6	1	\$74.00	\$74.00
	Software			
LIC-Dorado-ISM02	HW Integrated Storage Manager-Device Management License for Dorado	1		
	Third Party			
N8GHBA000	QLOGIC QLE2562 HBA Card,PCIe,8Gbps DualPort ,Fiber Channel Multimode LC Optic Interface,English Manual,Driver CD	4	\$1,698.00	\$6,792.00
	Product Support Service			
0235G7ES_88134ULJ_1	OceanStor Dorado2100 G2 High Performance Solid State Storage System-5.0TB(AC,25*200GB SLC SSD,600K IOPS,48Gbps Bandwidth,8*8G FC Port,with HW Solid-state Storage System Software,SPE51C0225)_Warranty Upgrade To Hi-Care Onsite Premier 24x7x4H Engineer Onsite Service_3 Year(s)	1	\$26,297.00	\$26,297.00
0235G7EW_88134ULJ_1	High Performance Solid State Storage System Disk Enclosure-5.0TB(2U,AC,25*200GB SLC,with HW SAS in Band Management Software,DAE12525U2)_Warranty Upgrade To Hi-Care Onsite Premier 24x7x4H Engineer Onsite Service_3 Year(s)	1	\$23,709.00	\$23,709.00
	TOTAL			\$227,062.00

The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

Huawei Technologies Co., Ltd. only sells its products to third-party resellers, who in turn, sell those products to U.S. customers. The above pricing, which also includes the required three-year maintenance and support, was obtained from one of those third-party resellers. See page 71 (*Appendix F: Third-Party Quotations*) of the Full Disclosure Report for a copy of the third-party reseller quotation.

Priced Storage Configuration Diagram



Priced Storage Configuration Components

Priced Storage Configuration:
4 – Qlogic dual-port QLE2562 FC HBAs
Huawei OceanStor Dorado2100 G2 dual-controllers – Active Active 48 GB memory/cache (24 GB per controller) 8 – 8 Gbps FC front-end ports (4 per controller) (8 – 8 Gbps connections used) 4 – 24 Gbps SAS backend ports (2 per controller) (4 – 6 Gbps connections used) 25 – 200 GB SSD disk drives
1 – Disk Enclosure 25 – 200 GB SSD disk drives
50 – 200 GB SSD disk drives 25 – SSD disk drives in the controller enclosure 25 – SSD disk drives in the disk enclosure