



## Connectivity Guide

# HKEx Orion Market Data Platform Securities Market & Index Datafeed Products

Version 1.1

**31 Oct 2012**

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## DOCUMENT HISTORY

| Document Version | Date         | Change Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0              | 30 July 2012 | First issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1.1              | 31 Oct 2012  | <p>Section 2.1.1, 2.2.1 – include Broker Queue (54) message in Securities Level 2 Conflated Channels</p> <p>Section 2.1.2, 2.2.2 – remove News (22) from Securities Status Channel</p> <p>Section 2.2.1 – update the correct Line A multicast IP address for Securities Status Channel</p> <p>Section 2 – add some descriptive reference on network connection to OMD</p> <p>Section 3 &amp; 4 – add some guidelines on SDNet lines or HSN connection, e.g. estimated bandwidth requirements, sharing of SDNet/2 or HSN, additional RTS login ID/IP address for Retransmission etc</p> |

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## 1. Overview

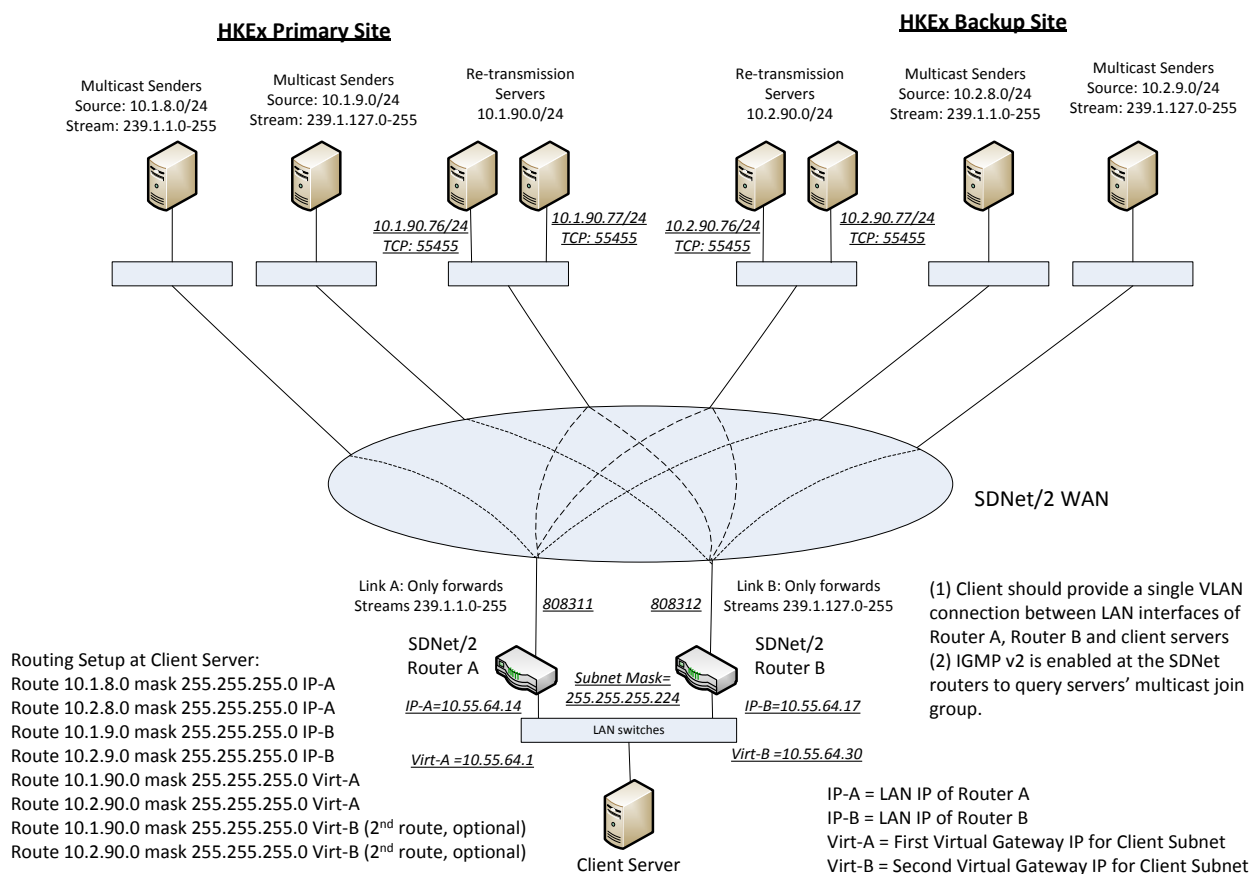
This document aims to provide network configuration information and guidance to assist information vendors and end-users (“clients”) in setting up their networks for making connection to OMD testing and production environments.

This document contains:

- Configuration information, i.e. IP addresses of the channels assigned for each of the OMD datafeed products in OMD Production environment and Open/Certification Test environment
- Guidelines / policies for SDNet/2 and HSN connection

## 2. Configuration Information

OMD adopts multicast transmission protocol for real-time data transmission with retransmission recovery service running on Unicast. Clients are required to set correct network configurations in order to establish proper connection to the corresponding OMD multicast server and retransmission server. Below is a sample connection diagram which provides an overview of SDNet/2 network connection to OMD for reference.



Sample OMD Network Setup with SDNet/2

For OMD connection via SDNet/2, a client system has to set up routing to the HKEx host subnets as the diagram depicted. To receive multicast stream, IGMP version 2 is employed at the SDNet/2 routers to query the multicast groups which the client system subscribes. The client system should enable the IGMP function and issue join messages to the SDNet/2 routers for the entitled multicast groups.

For OMD connection by co-location at HKEx Host Data Centre (HDC), clients are required to provide their own routers to connect to the HKEx network. The protocols used in HDC network are BGP4 and Multicast PIM sparse mode. For details, please refer to the Interface Specification on Connectivity Services and Timing Service of HKEx Hosting or contact HKEx Hosting Services team via email [hostingservices@hkex.com.hk](mailto:hostingservices@hkex.com.hk).

## 2.1 Production Environment Connectivity Details

### 2.1.1 OMD Securities Standard (conflated)

|                                              |                                                                                                                                                                                              | Real-time Market Data Services |                                            | Refresh Snapshot Data Services |                                              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------|
| Multicast Service                            | Contents                                                                                                                                                                                     | Channel ID                     | Multicast Channel Subscriptions            | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Reference Data Channel</b>     | Market Definition (10)<br>Security Definition (11)<br>Liquidity Provider (13)<br>Currency Rate (14)                                                                                          | 1                              | A: 239.1.1.1:51000<br>B: 239.1.127.1:51000 | 501                            | A: 239.1.1.11:51000<br>B: 239.1.127.11:51000 |
| <b>Securities Status Channel</b>             | Trading Session Status (20)<br>Security Status (21)                                                                                                                                          | 2                              | A: 239.1.1.1:51001<br>B: 239.1.127.1:51001 | 502                            | A: 239.1.1.11:51001<br>B: 239.1.127.11:51001 |
| <b>Securities Value Add Data Channel</b>     | Market Turnover (61)                                                                                                                                                                         | 3                              | A: 239.1.1.1:51002<br>B: 239.1.127.1:51002 | 503                            | A: 239.1.1.11:51002<br>B: 239.1.127.11:51002 |
| <b>Securities News Channel</b>               | News (22)                                                                                                                                                                                    | 4                              | A: 239.1.1.1:51003<br>B: 239.1.127.1:51003 | 504                            | A: 239.1.1.11:51003<br>B: 239.1.127.11:51003 |
| <b>Securities Level 2 Conflated Channels</b> | Trade Ticker (52)<br>Nominal Price (40)<br>Indicative Equilibrium Price (41)<br>Closing Price (62)<br>Aggregate Order Book Update (53)<br>Statistics (60)<br>Yield (44)<br>Broker Queue (54) | 10                             | A: 239.1.1.2:51000<br>B: 239.1.127.2:51000 | 510                            | A: 239.1.1.12:51000<br>B: 239.1.127.12:51000 |

**2.1.2 OMD Securities Premium (streaming)**

| Multicast Service                            | Contents                                                                                            | Real-time Market Data Services |                                             | Refresh Snapshot Data Services |                                              |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------|--------------------------------|----------------------------------------------|
|                                              |                                                                                                     | Channel ID                     | Multicast Channel Subscriptions             | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Reference Data Channel</b>     | Market Definition (10)<br>Security Definition (11)<br>Liquidity Provider (13)<br>Currency Rate (14) | 1                              | A: 239.1.1.1:51000<br>B: 239.1.127.1:51000  | 501                            | A: 239.1.1.11:51000<br>B: 239.1.127.11:51000 |
| <b>Securities Status Channel</b>             | Trading Session Status (20)<br>Security Status (21)                                                 | 2                              | A: 239.1.1.1: 51001<br>B: 239.1.127.1:51001 | 502                            | A: 239.1.1.11:51001<br>B: 239.1.127.11:51001 |
| <b>Securities Value Add Data Channel</b>     | Market Turnover (61)                                                                                | 3                              | A: 239.1.1.1:51002<br>B: 239.1.127.1:51002  | 503                            | A: 239.1.1.11:51002<br>B: 239.1.127.11:51002 |
| <b>Securities News Channel</b>               | News (22)                                                                                           | 4                              | A: 239.1.1.1:51003<br>B: 239.1.127.1:51003  | 504                            | A: 239.1.1.11:51003<br>B: 239.1.127.11:51003 |
| <b>Securities Level 2 Streaming Channels</b> | Trade (50)                                                                                          | 20                             | A: 239.1.1.3:51000<br>B: 239.1.127.3:51000  | 520                            | A: 239.1.1.13:51000<br>B: 239.1.127.13:51000 |
|                                              | Trade Cancel (51)                                                                                   |                                |                                             |                                |                                              |
|                                              | Nominal Price (40)                                                                                  |                                |                                             |                                |                                              |
|                                              | Indicative Equilibrium Price (41)                                                                   | 21                             | A: 239.1.1.3:51001<br>B: 239.1.127.3:51001  | 521                            | A: 239.1.1.13:51001<br>B: 239.1.127.13:51001 |
|                                              | Closing Price (62)                                                                                  |                                |                                             |                                |                                              |
|                                              | Aggregate Order Book Update (53)                                                                    | 22                             | A: 239.1.1.3:51002<br>B: 239.1.127.3:51002  | 522                            | A: 239.1.1.13:51002<br>B: 239.1.127.13:51002 |
|                                              | Statistics (60)                                                                                     |                                |                                             |                                |                                              |
|                                              | Yield (44)                                                                                          | 23                             | A: 239.1.1.3:51003<br>B: 239.1.127.3:51003  | 523                            | A: 239.1.1.13:51003<br>B: 239.1.127.13:51003 |
|                                              |                                                                                                     | 24                             | A: 239.1.1.3:51004<br>B: 239.1.127.3:51004  | 524                            | A: 239.1.1.13:51004<br>B: 239.1.127.13:51004 |
|                                              |                                                                                                     | 25                             | A: 239.1.1.3:51005<br>B: 239.1.127.3:51005  | 525                            | A: 239.1.1.13:51005<br>B: 239.1.127.13:51005 |
|                                              |                                                                                                     | 26                             | A: 239.1.1.3:51006<br>B: 239.1.127.3:51006  | 526                            | A: 239.1.1.13:51006<br>B: 239.1.127.13:51006 |
|                                              |                                                                                                     | 27                             | A: 239.1.1.3:51007<br>B: 239.1.127.3:51007  | 527                            | A: 239.1.1.13:51007<br>B: 239.1.127.13:51007 |
|                                              |                                                                                                     | 28                             | A: 239.1.1.3:51008<br>B: 239.1.127.3:51008  | 528                            | A: 239.1.1.13:51008<br>B: 239.1.127.13:51008 |

**2.1.3 OMD Securities FullTick (streaming)**

|                                            |                                   | Real-time Market Data Services |                                 | Refresh Snapshot Data Services |                                 |
|--------------------------------------------|-----------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|
| Multicast Service                          | Contents                          | Channel ID                     | Multicast Channel Subscriptions | Channel ID                     | Multicast Channel Subscriptions |
| <b>Securities Reference Data Channel</b>   | Market Definition (10)            | 1                              | A: 239.1.1.1:51000              | 501                            | A: 239.1.1.11:51000             |
|                                            | Security Definition (11)          |                                | B: 239.1.127.1:51000            |                                | B: 239.1.127.11:51000           |
|                                            | Liquidity Provider (13)           |                                |                                 |                                |                                 |
|                                            | Currency Rate (14)                |                                |                                 |                                |                                 |
| <b>Securities Status Channel</b>           | Trading Session Status (20)       | 2                              | A: 239.1.1.1:51001              | 502                            | A: 239.1.1.11:51001             |
|                                            | Security Status (21)              |                                | B: 239.1.127.1:51001            |                                | B: 239.1.127.11:51001           |
| <b>Securities Full Order Book Channels</b> | Trade (50)                        | 30                             | A: 239.1.1.4:51000              | 530                            | A: 239.1.1.14:51000             |
|                                            | Trade Cancel (51)                 |                                | B: 239.1.127.4:51000            |                                | B: 239.1.127.14:51000           |
|                                            | Add Order (30)                    |                                |                                 |                                |                                 |
|                                            | Modify Order (31)                 | 31                             | A: 239.1.1.4:51001              | 531                            | A: 239.1.1.14:51001             |
|                                            | Delete Order (32)                 |                                | B: 239.1.127.4:51001            |                                | B: 239.1.127.14:51001           |
|                                            | Indicative Equilibrium Price (41) | 32                             | A: 239.1.1.4:51002              | 532                            | A: 239.1.1.14:51002             |
|                                            |                                   |                                | B: 239.1.127.4:51002            |                                | B: 239.1.127.14:51002           |
|                                            |                                   | 33                             | A: 239.1.1.4:51003              | 533                            | A: 239.1.1.14:51003             |
|                                            |                                   |                                | B: 239.1.127.4:51003            |                                | B: 239.1.127.14:51003           |
|                                            |                                   | 34                             | A: 239.1.1.4:51004              | 534                            | A: 239.1.1.14:51004             |
|                                            |                                   |                                | B: 239.1.127.4:51004            |                                | B: 239.1.127.14:51004           |
|                                            |                                   | 35                             | A: 239.1.1.4:51005              | 535                            | A: 239.1.1.14:51005             |
|                                            |                                   |                                | B: 239.1.127.4:51005            |                                | B: 239.1.127.14:51005           |
|                                            |                                   | 36                             | A: 239.1.1.4:51006              | 536                            | A: 239.1.1.14:51006             |
|                                            |                                   |                                | B: 239.1.127.4:51006            |                                | B: 239.1.127.14:51006           |
|                                            |                                   | 37                             | A: 239.1.1.4:51007              | 537                            | A: 239.1.1.14:51007             |
|                                            |                                   |                                | B: 239.1.127.4:51007            |                                | B: 239.1.127.14:51007           |
|                                            |                                   | 38                             | A: 239.1.1.4:51008              | 538                            | A: 239.1.1.14:51008             |
|                                            |                                   |                                | B: 239.1.127.4:51008            |                                | B: 239.1.127.14:51008           |



### 2.1.4 OMD Index (Streaming)

| Multicast Service            | Contents                                 | Real-time Market Data Services |                                            | Refresh Snapshot Data Services |                                              |
|------------------------------|------------------------------------------|--------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------|
|                              |                                          | Channel ID                     | Multicast Channel Subscriptions            | Channel ID                     | Multicast Channel Subscriptions              |
| <b>HSI Index Channel</b>     | Index Definition (70)<br>Index Data (71) | 41                             | A: 239.1.1.5:51000<br>B: 239.1.127.5:51000 | 541                            | A: 239.1.1.15:51000<br>B: 239.1.127.15:51000 |
| <b>CSI Index Channel</b>     | Index Definition (70)<br>Index Data (71) | 42                             | A: 239.1.1.6:51000<br>B: 239.1.127.6:51000 | 542                            | A: 239.1.1.16:51000<br>B: 239.1.127.16:51000 |
| <b>S&amp;P Index Channel</b> | Index Definition (70)<br>Index Data (71) | 43                             | A: 239.1.1.7:51000<br>B: 239.1.127.7:51000 | 543                            | A: 239.1.1.17:51000<br>B: 239.1.127.17:51000 |

### 2.1.5 Conflated Broker Queue

| Multicast Service                             | Contents          | Real-time Market Data Services |                                            | Refresh Snapshot Data Services |                                              |
|-----------------------------------------------|-------------------|--------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------|
|                                               |                   | Channel ID                     | Multicast Channel Subscriptions            | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Market Broker Queue Channel</b> | Broker Queue (54) | 60                             | A: 239.1.1.8:51000<br>B: 239.1.127.8:51000 | 560                            | A: 239.1.1.18:51000<br>B: 239.1.127.18:51000 |

### 2.1.6 Odd Lot Order (Streaming)

| Multicast Service                              | Contents                                           | Real-time Market Data Services |                                            | Refresh Snapshot Data Services |                                              |
|------------------------------------------------|----------------------------------------------------|--------------------------------|--------------------------------------------|--------------------------------|----------------------------------------------|
|                                                |                                                    | Channel ID                     | Multicast Channel Subscriptions            | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Market Odd Lot Order Channel</b> | Add Odd Lot Oder (33)<br>Delete Odd Lot Order (34) | 70                             | A: 239.1.1.9:51000<br>B: 239.1.127.9:51000 | 570                            | A: 239.1.1.19:51000<br>B: 239.1.127.19:51000 |
|                                                |                                                    | 71                             | A: 239.1.1.9:51001<br>B: 239.1.127.9:51001 | 571                            | A: 239.1.1.19:51001<br>B: 239.1.127.19:51001 |
|                                                |                                                    | 72                             | A: 239.1.1.9:51002<br>B: 239.1.127.9:51002 | 572                            | A: 239.1.1.19:51002<br>B: 239.1.127.19:51002 |
|                                                |                                                    | 73                             | A: 239.1.1.9:51003<br>B: 239.1.127.9:51003 | 573                            | A: 239.1.1.19:51003<br>B: 239.1.127.19:51003 |
|                                                |                                                    | 74                             | A: 239.1.1.9:51004<br>B: 239.1.127.9:51004 | 574                            | A: 239.1.1.19:51004<br>B: 239.1.127.19:51004 |
|                                                |                                                    | 75                             | A: 239.1.1.9:51005<br>B: 239.1.127.9:51005 | 575                            | A: 239.1.1.19:51005<br>B: 239.1.127.19:51005 |
|                                                |                                                    | 76                             | A: 239.1.1.9:51006<br>B: 239.1.127.9:51006 | 576                            | A: 239.1.1.19:51006<br>B: 239.1.127.19:51006 |
|                                                |                                                    | 77                             | A: 239.1.1.9:51007<br>B: 239.1.127.9:51007 | 577                            | A: 239.1.1.19:51007<br>B: 239.1.127.19:51007 |
|                                                |                                                    | 78                             | A: 239.1.1.9:51008<br>B: 239.1.127.9:51008 | 578                            | A: 239.1.1.19:51008<br>B: 239.1.127.19:51008 |

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### 2.1.7 HKEx OMD Retransmission Unicast Connectivity

HKEx provides a Retransmission Service to its OMD clients to recover lost multicast packet. Functional details of the Retransmission Service are provided in the Interface Specification. Find below the Unicast Addresses to connect to the OMD Retransmission Servers in production environment.

| Retransmission Server            | IP Unicast Address |
|----------------------------------|--------------------|
| Primary server in primary site   | 10.1.90.76:55455   |
| Secondary server in primary site | 10.1.90.77:55455   |
| Primary server in DR site        | 10.2.90.76:55455   |
| Secondary server in DR site      | 10.2.90.77:55455   |

## 2.2 Open/Certification Test Environment Connectivity Details

### 2.2.1 OMD Securities Standard (conflated)

|                                              |                                                                                                                                                                                              | Real-time Market Data Services |                                              | Refresh Snapshot Data Services |                                              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------|--------------------------------|----------------------------------------------|
| Multicast Service                            | Contents                                                                                                                                                                                     | Channel ID                     | Multicast Channel Subscriptions              | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Reference Data Channel</b>     | Market Definition (10)<br>Security Definition (11)<br>Liquidity Provider (13)<br>Currency Rate (14)                                                                                          | 1                              | A: 239.1.1.21:51000<br>B: 239.1.127.21:51000 | 501                            | A: 239.1.1.31:51000<br>B: 239.1.127.31:51000 |
| <b>Securities Status Channel</b>             | Trading Session Status (20)<br>Security Status (21)                                                                                                                                          | 2                              | A: 239.1.1.21:51001<br>B: 239.1.127.21:51001 | 502                            | A: 239.1.1.31:51001<br>B: 239.1.127.31:51001 |
| <b>Securities Value Add Data Channel</b>     | Market Turnover (61)                                                                                                                                                                         | 3                              | A: 239.1.1.21:51002<br>B: 239.1.127.21:51002 | 503                            | A: 239.1.1.31:51002<br>B: 239.1.127.31:51002 |
| <b>Securities News Channel</b>               | News (22)                                                                                                                                                                                    | 4                              | A: 239.1.1.21:51003<br>B: 239.1.127.21:51003 | 504                            | A: 239.1.1.31:51003<br>B: 239.1.127.31:51003 |
| <b>Securities Level 2 Conflated Channels</b> | Trade Ticker (52)<br>Nominal Price (40)<br>Indicative Equilibrium Price (41)<br>Closing Price (62)<br>Aggregate Order Book Update (53)<br>Statistics (60)<br>Yield (44)<br>Broker Queue (54) | 10                             | A: 239.1.1.22:51000<br>B: 239.1.127.22:51000 | 510                            | A: 239.1.1.32:51000<br>B: 239.1.127.32:51000 |

**2.2.2 OMD Securities Premium (streaming)**

| Multicast Service                            | Contents                                                                                            | Real-time Market Data Services |                                              | Refresh Snapshot Data Services |                                              |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------|--------------------------------|----------------------------------------------|
|                                              |                                                                                                     | Channel ID                     | Multicast Channel Subscriptions              | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Reference Data Channel</b>     | Market Definition (10)<br>Security Definition (11)<br>Liquidity Provider (13)<br>Currency Rate (14) | 1                              | A: 239.1.1.21:51000<br>B: 239.1.127.21:51000 | 501                            | A: 239.1.1.31:51000<br>B: 239.1.127.31:51000 |
| <b>Securities Status Channel</b>             | Trading Session Status (20)<br>Security Status (21)                                                 | 2                              | A: 239.1.1.21:51001<br>B: 239.1.127.21:51001 | 502                            | A: 239.1.1.31:51001<br>B: 239.1.127.31:51001 |
| <b>Securities Value Add Data Channel</b>     | Market Turnover (61)                                                                                | 3                              | A: 239.1.1.21:51002<br>B: 239.1.127.21:51002 | 503                            | A: 239.1.1.31:51002<br>B: 239.1.127.31:51002 |
| <b>Securities News Channel</b>               | News (22)                                                                                           | 4                              | A: 239.1.1.21:51003<br>B: 239.1.127.21:51003 | 504                            | A: 239.1.1.31:51003<br>B: 239.1.127.31:51003 |
| <b>Securities Level 2 Streaming Channels</b> | Trade (50)                                                                                          | 20                             | A: 239.1.1.23:51000<br>B: 239.1.127.23:51000 | 520                            | A: 239.1.1.33:51000<br>B: 239.1.127.33:51000 |
|                                              | Trade Cancel (51)                                                                                   |                                |                                              |                                |                                              |
|                                              | Nominal Price (40)                                                                                  |                                |                                              |                                |                                              |
|                                              | Indicative Equilibrium Price (41)                                                                   | 21                             | A: 239.1.1.23:51001<br>B: 239.1.127.23:51001 | 521                            | A: 239.1.1.33:51001<br>B: 239.1.127.33:51001 |
|                                              | Closing Price (62)                                                                                  |                                |                                              |                                |                                              |
|                                              | Aggregate Order Book Update (53)                                                                    | 22                             | A: 239.1.1.23:51002<br>B: 239.1.127.23:51002 | 522                            | A: 239.1.1.33:51002<br>B: 239.1.127.33:51002 |
|                                              | Statistics (60)                                                                                     |                                |                                              |                                |                                              |
|                                              | Yield (44)                                                                                          | 23                             | A: 239.1.1.23:51003<br>B: 239.1.127.23:51003 | 523                            | A: 239.1.1.33:51003<br>B: 239.1.127.33:51003 |
|                                              |                                                                                                     | 24                             | A: 239.1.1.23:51004<br>B: 239.1.127.23:51004 | 524                            | A: 239.1.1.33:51004<br>B: 239.1.127.33:51004 |
|                                              |                                                                                                     | 25                             | A: 239.1.1.23:51005<br>B: 239.1.127.23:51005 | 525                            | A: 239.1.1.33:51005<br>B: 239.1.127.33:51005 |
|                                              |                                                                                                     | 26                             | A: 239.1.1.23:51006<br>B: 239.1.127.23:51006 | 526                            | A: 239.1.1.33:51006<br>B: 239.1.127.33:51006 |
|                                              |                                                                                                     | 27                             | A: 239.1.1.23:51007<br>B: 239.1.127.23:51007 | 527                            | A: 239.1.1.33:51007<br>B: 239.1.127.33:51007 |
|                                              |                                                                                                     | 28                             | A: 239.1.1.23:51008<br>B: 239.1.127.23:51008 | 528                            | A: 239.1.1.33:51008<br>B: 239.1.127.33:51008 |

**2.2.3 OMD Securities FullTick (streaming)**

| Multicast Service                          | Contents                          | Real-time Market Data Services |                                 | Refresh Snapshot Data Services |                                 |
|--------------------------------------------|-----------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|
|                                            |                                   | Channel ID                     | Multicast Channel Subscriptions | Channel ID                     | Multicast Channel Subscriptions |
| <b>Securities Reference Data Channel</b>   | Market Definition (10)            | 1                              | A: 239.1.1.21:51000             | 501                            | A: 239.1.1.31:51000             |
|                                            | Security Definition (11)          |                                | B: 239.1.127.21:51000           |                                | B: 239.1.127.31:51000           |
|                                            | Liquidity Provider (13)           |                                |                                 |                                |                                 |
|                                            | Currency Rate (14)                |                                |                                 |                                |                                 |
| <b>Securities Status Channel</b>           | Trading Session Status (20)       | 2                              | A: 239.1.1.21:51001             | 502                            | A: 239.1.1.31:51001             |
|                                            | Security Status (21)              |                                | B: 239.1.127.21:51001           |                                | B: 239.1.127.31:51001           |
| <b>Securities Full Order Book Channels</b> | Trade (50)                        | 30                             | A: 239.1.1.24:51000             | 530                            | A: 239.1.1.34:51000             |
|                                            | Trade Cancel (51)                 |                                | B: 239.1.127.24:51000           |                                | B: 239.1.127.34:51000           |
|                                            | Add Order (30)                    |                                |                                 |                                |                                 |
|                                            | Modify Order (31)                 | 31                             | A: 239.1.1.24:51001             | 531                            | A: 239.1.1.34:51001             |
|                                            | Delete Order (32)                 |                                | B: 239.1.127.24:51001           |                                | B: 239.1.127.34:51001           |
|                                            | Indicative Equilibrium Price (41) | 32                             | A: 239.1.1.24:51002             | 532                            | A: 239.1.1.34:51002             |
|                                            |                                   |                                | B: 239.1.127.24:51002           |                                | B: 239.1.127.34:51002           |
|                                            |                                   | 33                             | A: 239.1.1.24:51003             | 533                            | A: 239.1.1.34:51003             |
|                                            |                                   |                                | B: 239.1.127.24:51003           |                                | B: 239.1.127.34:51003           |
|                                            |                                   | 34                             | A: 239.1.1.24:51004             | 534                            | A: 239.1.1.34:51004             |
|                                            |                                   |                                | B: 239.1.127.24:51004           |                                | B: 239.1.127.34:51004           |
|                                            |                                   | 35                             | A: 239.1.1.24:51005             | 535                            | A: 239.1.1.34:51005             |
|                                            |                                   |                                | B: 239.1.127.24:51005           |                                | B: 239.1.127.34:51005           |
|                                            |                                   | 36                             | A: 239.1.1.24:51006             | 536                            | A: 239.1.1.34:51006             |
|                                            |                                   |                                | B: 239.1.127.24:51006           |                                | B: 239.1.127.34:51006           |
|                                            |                                   | 37                             | A: 239.1.1.24:51007             | 537                            | A: 239.1.1.34:51007             |
|                                            |                                   |                                | B: 239.1.127.24:51007           |                                | B: 239.1.127.34:51007           |
|                                            |                                   | 38                             | A: 239.1.1.24:51008             | 538                            | A: 239.1.1.34:51008             |
|                                            |                                   |                                | B: 239.1.127.24:51008           |                                | B: 239.1.127.34:51008           |

### 2.2.4 OMD Index (Streaming)

| Multicast Service            | Contents                                 | Real-time Market Data Services |                                              | Refresh Snapshot Data Services |                                              |
|------------------------------|------------------------------------------|--------------------------------|----------------------------------------------|--------------------------------|----------------------------------------------|
|                              |                                          | Channel ID                     | Multicast Channel Subscriptions              | Channel ID                     | Multicast Channel Subscriptions              |
| <b>HSI Index Channel</b>     | Index Definition (70)<br>Index Data (71) | 41                             | A: 239.1.1.25:51000<br>B: 239.1.127.25:51000 | 541                            | A: 239.1.1.35:51000<br>B: 239.1.127.35:51000 |
| <b>CSI Index Channel</b>     | Index Definition (70)<br>Index Data (71) | 42                             | A: 239.1.1.26:51000<br>B: 239.1.127.26:51000 | 542                            | A: 239.1.1.36:51000<br>B: 239.1.127.36:51000 |
| <b>S&amp;P Index Channel</b> | Index Definition (70)<br>Index Data (71) | 43                             | A: 239.1.1.27:51000<br>B: 239.1.127.27:51000 | 543                            | A: 239.1.1.37:51000<br>B: 239.1.127.37:51000 |

### 2.2.5 Conflated Broker Queue

| Multicast Service                             | Contents          | Real-time Market Data Services |                                              | Refresh Snapshot Data Services |                                              |
|-----------------------------------------------|-------------------|--------------------------------|----------------------------------------------|--------------------------------|----------------------------------------------|
|                                               |                   | Channel ID                     | Multicast Channel Subscriptions              | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Market Broker Queue Channel</b> | Broker Queue (54) | 60                             | A: 239.1.1.28:51000<br>B: 239.1.127.28:51000 | 560                            | A: 239.1.1.38:51000<br>B: 239.1.127.38:51000 |

### 2.2.6 Odd Lot Order (Streaming)

| Multicast Service                              | Contents                                           | Real-time Market Data Services |                                              | Refresh Snapshot Data Services |                                              |
|------------------------------------------------|----------------------------------------------------|--------------------------------|----------------------------------------------|--------------------------------|----------------------------------------------|
|                                                |                                                    | Channel ID                     | Multicast Channel Subscriptions              | Channel ID                     | Multicast Channel Subscriptions              |
| <b>Securities Market Odd Lot Order Channel</b> | Add Odd Lot Oder (33)<br>Delete Odd Lot Order (34) | 70                             | A: 239.1.1.29:51000<br>B: 239.1.127.29:51000 | 570                            | A: 239.1.1.39:51000<br>B: 239.1.127.39:51000 |
|                                                |                                                    | 71                             | A: 239.1.1.29:51001<br>B: 239.1.127.29:51001 | 571                            | A: 239.1.1.39:51001<br>B: 239.1.127.39:51001 |
|                                                |                                                    | 72                             | A: 239.1.1.29:51002<br>B: 239.1.127.29:51002 | 572                            | A: 239.1.1.39:51002<br>B: 239.1.127.39:51002 |
|                                                |                                                    | 73                             | A: 239.1.1.29:51003<br>B: 239.1.127.29:51003 | 573                            | A: 239.1.1.39:51003<br>B: 239.1.127.39:51003 |
|                                                |                                                    | 74                             | A: 239.1.1.29:51004<br>B: 239.1.127.29:51004 | 574                            | A: 239.1.1.39:51004<br>B: 239.1.127.39:51004 |
|                                                |                                                    | 75                             | A: 239.1.1.29:51005<br>B: 239.1.127.29:51005 | 575                            | A: 239.1.1.39:51005<br>B: 239.1.127.39:51005 |
|                                                |                                                    | 76                             | A: 239.1.1.29:51006<br>B: 239.1.127.29:51006 | 576                            | A: 239.1.1.39:51006<br>B: 239.1.127.39:51006 |
|                                                |                                                    | 77                             | A: 239.1.1.29:51007<br>B: 239.1.127.29:51007 | 577                            | A: 239.1.1.39:51007<br>B: 239.1.127.39:51007 |
|                                                |                                                    | 78                             | A: 239.1.1.29:51008<br>B: 239.1.127.29:51008 | 578                            | A: 239.1.1.39:51008<br>B: 239.1.127.39:51008 |

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### 2.2.7 HKEx OMD Retransmission Unicast Connectivity

HKEx provides a Retransmission Service to its OMD clients to recover multicast packet loss. Functional details of the Retransmission Service are provided in the Interface Specification. Find below the Unicast Addresses to connect to the OMD Retransmission Servers in test environment.

| Retransmission Server            | IP Unicast Address |
|----------------------------------|--------------------|
| Primary server in primary site   | 10.1.90.40:55455   |
| Secondary server in primary site | 10.1.90.41:55455   |
| Primary server in DR site        | 10.1.90.42:55455   |
| Secondary server in DR site      | 10.1.90.43:55455   |

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## 2.3 Individual Client Configuration Details

Individual clients will be provided with the following configuration details for each set of product feed subscription:

- One Retransmission User ID (Username)
- The subnet and subnet mask of the client segment
- Two unicast client allowable IP addresses for connection with re-transmission servers
- Two physical IP addresses and two Virtual IP address of SDNet/2 routers
- HSRP/VRRP groups used by SDNet/2 routers

Individual client testing configuration information will be provided separately prior to the Open Test/Certification Test whilst the client specific production configuration information will be provided upon the client's successful completion of the Certification Test and prior to the Market Rehearsals/Post Release Test. Please refer to Appendix B for an example of Client Configuration information.

### 3. Guidelines on SDNet/2 lines / HSN connection

#### 3.1 Mode of OMD connection

- For resilience purpose, at least 2 SDNet/2 or HSN lines are required for OMD connection either for individual OMD datafeed product or sharing among different OMD datafeed products.
- The set of 2 SDNet/2 lines is required to locate in the same location. If clients require receiving OMD data in multiple locations, 1 set of 2 SDNet/2 lines are required to install in each location.

#### 3.2 Bandwidth Requirement

Full suite of OMD datafeed products for Securities Market data and respective estimated bandwidth requirements are as follows.

| Datafeed plus add-ons           | Alone   | With Odd Lot Order (OLO) | With Conflated Broker Queue (CBQ) | With Index Feed (Index) | SDNet/2 High Performance Option* |
|---------------------------------|---------|--------------------------|-----------------------------------|-------------------------|----------------------------------|
| <b>Securities Standard (SS)</b> | 10 Mbps | 10 Mbps                  | N/A                               | 10 Mbps                 | Not necessarily required         |
| <b>Securities Premium (SP)</b>  | 30 Mbps | 30 Mbps                  | 40 Mbps                           | 40 Mbps                 | Required                         |
| <b>Securities FullTick (SF)</b> | 30 Mbps | 30 Mbps                  | 30 Mbps                           | 30 Mbps                 | Required                         |

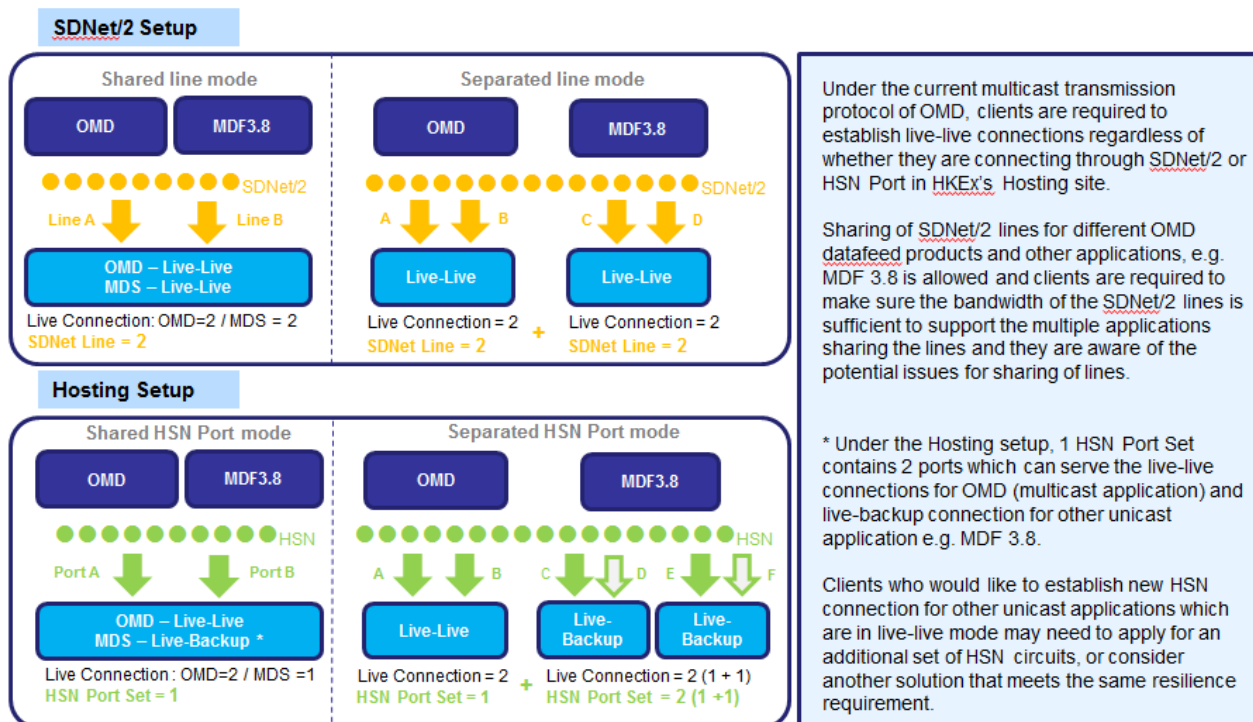
\* Update rates of individual indices depend on respective index providers.

\*\* High Performance Option of SDNet/2 line is required for streaming feeds.



### 3.3 Sharing of SDNet/2 lines or HSN port set

Clients may opt to use separated sets or same set of SDNet/2 lines/ HSN ports for receiving data of different OMD datafeed products and other HKEx datafeeds, e.g. MDF3.8 subject to certain limitations. Diagram below depicts the OMD connection in shared line mode and separated line mode:



In addition, clients should note the following policies on sharing of SDNet/2 or HSN lines for OMD datafeed products:

- Sharing of same set of production SDNet/2 / HSN circuits for **more than 1 OMD datafeed products of different markets** (i.e. securities market datafeed and derivatives market datafeed) **is allowed**.
- Sharing of same set of production / HSN circuits for **OMD and existing datafeed products (e.g. MDF3.8) within the same market is allowed after the 2-week stabilisation period of OMD**. However, clients are only allowed to relocate the MDF3.8 connection to the newly installed production SDNet/2 / HSN circuits for OMD connection but not the other way round. In other words, existing MDF3.8 lines cannot be used for the sharing with OMD connections.
- Sharing of the same SDNet/2 / HSN circuits for both product and testing purposes is **NOT ALLOWED**.
- Clients should note and consider the followings if they are going to adopt shared line mode:
  - i) In case of failure/interruption of the shared circuits, all datafeed products using this set of circuits will be affected.
  - ii) Troubleshooting for network related issues (e.g. performance, latency or packet loss etc.) will be much more difficult and time consuming and assistance from network carriers and HKEx will be limited in such troubleshooting. Clients must accept this risk in making the line sharing decision.
  - iii) Due to the difference in operating hours and testing windows between securities and derivatives markets, clients should make sure any maintenance/testing of one of the systems does not affect the rest of the systems sharing the same set of circuits.

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### 3.4 Bandwidth for shared SDNet/2 lines or HSN port set

- i) Shared SDNet/2 / HSN circuits must have sufficient bandwidth to support the data transmission of multiple products/devices. Please see below examples for reference:

Example 1: Sharing of a set of SDNet/2 lines for OMD SP and OMD SF:-

The estimated bandwidth requirements for SP and SF are 30 Mbps each (with no optional feed), a set of SDNet/2 lines with 60Mbps will be required.

Example 2: Sharing of a set of SDNet/2 lines for OMD SF, MDF3.8, IIS:-

The estimated bandwidth requirements for the OMD SF (with index and CBQ feeds), MDF3.8 and IIS are 30Mbps, 6Mbps and 2Mbps respectively. The bandwidth for the common set of SDNet/2 lines will therefore be 40Mbps (minimum incremental bandwidth threshold is 10Mbps for SDNet/2 lines of 10Mbps-90Mbps)

- ii) Clients can allocate bandwidth of the shared lines to different products as they wish as long as the bandwidth allocated to each datafeed product meets the estimated bandwidth requirement specified by HKEx.

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### 3.5 SDNet/2 High Performance Option

High Performance Option of SDNet/2 lines which transmits data in relatively higher packet rates is highly recommended for clients who subscribe to OMD streaming feeds, i.e. SP and SF,. Please refer to Appendix A for details on high performance options provided by different SDNet/2 providers.

## 4. Other Guidelines on OMD Connections

### 4.1 Additional Login IDs/Client IP addresses for Unicast Retransmission Service

To facilitate different clients' internal setup or operational requirement, an additional set of login ID and IP address for retransmission service can be offered to clients **at a cost** on a per request basis.

### 4.2 Installation of SDNet/2 and HSN lines

#### 4.2.1 SDNet/2 lines

Clients are required to contact the SDNet/2 Accredited Vendors for installation of SDNet/2 lines for OMD connection. Details of the SDNet/2 Accredited Vendors and reference costs charged by different SDNet/2 Accredited Vendors can be found in Appendix A.

#### 4.2.2 HSN lines

Clients who will use HKEx's Hosting Service for OMD connection should contact our Hosting Service team directly for details on the HSN lines.

## Appendix A – SDNet/2 Accredited Vendors Information

SDNet/2 services are provided by Accredited Vendors for the provision of circuits from EP/CP/IV locations to HKEx's data centres.

To become an Accredited Vendor, the Vendor's SDNet/2 service must comply with the technical requirements set out by HKEx. The compliance of these technical requirements ensures the Accredited Vendor will deliver a stable, reliable and high quality networking services to the EPs/CPs/IVs.

Initially, three Accredited Vendors have been selected and accredited to provide SDNet/2 network services. These vendors are (in alphabetical order):

- Hong Kong Telecommunications (HKT) Limited (also known as PCCW)
- Hutchison Global Communications Limited (HGC)
- Wharf T&T Limited (Wharf T&T)

### Price of SDNet/2 Circuit

SDNet/2 services are provided by the Accredited Vendors directly to EPs/CPs/IVs. EPs/CPs/IVs shall apply the services and engage into commercial agreements with the Accredited Vendors directly. However, all Accredited Vendors shall offer SDNet/2 services to EPs/CPs/IVs according to a capped price scheme. Accredited Vendors should offer SDNet/2 services to EPs/CPs/IVs with prices not higher than the capped prices. Prices are applicable to both production circuits and testing circuits.

**Note:** *All prices provided in this information package are capped price for reference only. EPs/CPs/IVs are advised to contact the respective Accredited Vendors for more information on prices and subscription terms.*

#### a. One-time Charge for New Circuit Installation

There is no one-time charge for installation of new SDNet/2 circuit.

#### b. Monthly Charge for Circuit Rental

The following table shows the capped prices of different bandwidth ranges by each Accredited Vendor for circuit rental:

| Bandwidth   | Capped Price of Monthly Charge for Circuit Rental<br>by Accredited Vendors (per single circuit) <sup>1</sup> |     |           |
|-------------|--------------------------------------------------------------------------------------------------------------|-----|-----------|
|             | PCCW                                                                                                         | HGC | Wharf T&T |
| 1M Circuit  | ≤ HK\$1,300                                                                                                  |     |           |
| 2M Circuit  | ≤ HK\$1,900                                                                                                  |     |           |
| 3M Circuit  | ≤ HK\$2,400                                                                                                  |     |           |
| 4M Circuit  | ≤ HK\$2,900                                                                                                  |     |           |
| 5M Circuit  | ≤ HK\$3,000                                                                                                  |     |           |
| 6M Circuit  | ≤ HK\$3,100                                                                                                  |     |           |
| 7M Circuit  | ≤ HK\$3,200                                                                                                  |     |           |
| 8M Circuit  | ≤ HK\$3,300                                                                                                  |     |           |
| 9M Circuit  | ≤ HK\$3,400                                                                                                  |     |           |
| 10M Circuit | ≤ HK\$3,500                                                                                                  |     |           |

<sup>1</sup> Prices are on a per circuit basis. A dual-circuit configuration will cost 2 times the cost of a single circuit.

|              |              |              |              |
|--------------|--------------|--------------|--------------|
| 20M Circuit  | ≤ HK\$4,500  |              |              |
| 30M Circuit  | ≤ HK\$7,040  | ≤ HK\$7,800  | ≤ HK\$5,850  |
| 40M Circuit  | ≤ HK\$8,360  | ≤ HK\$8,600  | ≤ HK\$6,750  |
| 50M Circuit  | ≤ HK\$9,680  | ≤ HK\$9,400  | ≤ HK\$7,650  |
| 60M Circuit  | ≤ HK\$10,900 | ≤ HK\$10,200 | ≤ HK\$7,880  |
| 70M Circuit  | ≤ HK\$12,100 | ≤ HK\$11,000 | ≤ HK\$8,410  |
| 80M Circuit  | ≤ HK\$13,300 | ≤ HK\$11,800 | ≤ HK\$8,940  |
| 90M Circuit  | ≤ HK\$14,600 | ≤ HK\$12,700 | ≤ HK\$9,470  |
| 100M Circuit | ≤ HK\$15,800 | ≤ HK\$14,000 | ≤ HK\$10,000 |
| 1G Circuit   | ≤ HK\$42,200 | ≤ HK\$32,000 | ≤ HK\$15,000 |

**c. One-time Charge for Circuit Bandwidth Upgrade/Downgrade/Relocation**

The following table shows the charges by each Accredited Vendor for circuit bandwidth upgrade / downgrade / internal relocation / external relocation:

| Service                                                  | Capped Price of One-time Charge by Accredited Vendors (per circuit) |            |           |
|----------------------------------------------------------|---------------------------------------------------------------------|------------|-----------|
|                                                          | PCCW                                                                | HGC        | Wharf T&T |
| Circuit Bandwidth Upgrade /Downgrade <sup>2</sup> Charge | HK\$1,500                                                           | Free       | Free      |
| Internal Relocation <sup>3</sup>                         | HK\$1,500                                                           | HK\$1,500  | HK\$1,500 |
| External Relocation                                      | 1M – 20M:                                                           | HK\$5,000  | HK\$5,000 |
|                                                          | 30M – 100M:                                                         | HK\$17,760 |           |
|                                                          | 1G:                                                                 | HK\$44,400 |           |

**d. Minimum Subscription Period and Termination Notice**

For all SDNet/2 circuits, a minimum subscription period and advance termination notice is applicable.

|                             |          |
|-----------------------------|----------|
| Minimum Subscription Period | 3 months |
| Advance Termination Notice  | 1 month  |

<sup>2</sup> Circuit bandwidth downgrade may involve contract termination and should subject to related clauses in the contract agreement between EPs/CPs/IVs and the Accredited Vendors

<sup>3</sup> Relocation of circuit within the same building

**e. SDNet/2 for HKEx Orion Market Data (OMD) Platform (For future use)**

HKEx plans to launch OMD for derivatives market in Q4 2013. To support OMD, SDNet/2 comes with a High Performance Option, where the circuits can support high data throughput required by the new application. The table below shows the capped prices of different bandwidth ranges of the High Performance Option for reference. Should EPs/CPs/IVs have interested in OMD for derivatives market, more information will be available in HKEx's website in due course.

| Bandwidth    | Capped Price of Monthly Charge for Circuit Rental<br>by Accredited Vendors (per circuit) |     |              |
|--------------|------------------------------------------------------------------------------------------|-----|--------------|
|              | PCCW                                                                                     | HGC | Wharf T&T    |
| 30M Circuit  | ≤ HK\$10,560                                                                             | N/A | ≤ HK\$6,410  |
| 40M Circuit  | ≤ HK\$12,540                                                                             | N/A | ≤ HK\$7,310  |
| 50M Circuit  | ≤ HK\$14,520                                                                             | N/A | ≤ HK\$8,210  |
| 60M Circuit  | ≤ HK\$16,350                                                                             | N/A | ≤ HK\$8,440  |
| 70M Circuit  | ≤ HK\$18,150                                                                             | N/A | ≤ HK\$8,970  |
| 80M Circuit  | ≤ HK\$19,950                                                                             | N/A | ≤ HK\$9,500  |
| 90M Circuit  | ≤ HK\$21,900                                                                             | N/A | ≤ HK\$10,030 |
| 100M Circuit | ≤ HK\$23,700                                                                             | N/A | ≤ HK\$10,560 |
| 1G Circuit   | ≤ HK\$63,300                                                                             | N/A | ≤ HK\$15,560 |

## Appendix B Sample Client Configuration Information

### Client End Network Information (Sample):

|    |                                                                                                       |                                 |
|----|-------------------------------------------------------------------------------------------------------|---------------------------------|
| 1  | Username                                                                                              | CLIENT1                         |
| 2  | OMD LAN Subnet                                                                                        | 10.55.64.0                      |
| 3  | OMD LAN Subnet Mask                                                                                   | 255.255.255.224                 |
| 4  | Vendor Allowable IP Address 1 for retransmission                                                      | 10.55.64.2                      |
| 5  | Vendor Allowable IP Address 2 for retransmission                                                      | 10.55.64.29                     |
| 6  | SDNet/2 Primary Circuit Number                                                                        | 808311                          |
| 7  | SDNet/2 Router A LAN IP Address (IP-A)                                                                | 10.55.64.14                     |
| 8  | SDNet/2 Secondary Circuit Number                                                                      | 808312                          |
| 9  | SDNet/2 Router B LAN IP Address (IP-B)                                                                | 10.55.64.17                     |
| 10 | SDNet/2 OMD LAN 1 <sup>st</sup> Virtual Gateway IP Address (Virt-A)                                   | 10.55.64.1                      |
| 11 | HSRP/VRRP Group Number used by SDNet/2 Router for Virt-A                                              | 14                              |
| 12 | SDNet/2 OMD LAN 2 <sup>nd</sup> Virtual Gateway IP Address (Virt-B)                                   | 10.55.64.30                     |
| 13 | HSRP/VRRP Group Number used by SDNet/2 Router for Virt-B                                              | 17                              |
| 14 | Multicast Protocol used by SDNet/2 Routers                                                            | IGMPv2                          |
| 15 | SDNet/2 Router Physical Interface for OMD                                                             | gi1/0/1                         |
| 16 | SDNet/2 Router Port Speed for OMD                                                                     | Auto Sense up to 1Gbps          |
| 17 | SDNet/2 Router Port Duplex Mode for OMD                                                               | Auto Negotiation                |
| 18 | IP address ranges usable by Vendors (IP addresses outside these ranges are used and reserved by HKEx) | 10.55.64.9-13<br>10.55.64.18-22 |

### Host End Network Information (Sample):

|    |                                                                                                      |               |
|----|------------------------------------------------------------------------------------------------------|---------------|
| 1  | Multicast Source Segment of Stream A in Primary Site forwarded by Vendor SDNet/2 Router A            | 10.1.8.0/24   |
| 2  | Multicast Source Segment of Stream A in Backup Site forwarded by Vendor SDNet/2 Router A             | 10.2.8.0/24   |
| 3  | Multicast Source Segment for multicast stream B in Primary Site forwarded by Vendor SDNet/2 Router B | 10.1.9.0/24   |
| 4  | Multicast Source Segment for multicast stream B in Backup Site forwarded by Vendor SDNet/2 Router B  | 10.2.9.0/24   |
| 5  | Primary Site Primary Retransmission Server IP Address                                                | 10.1.90.76/24 |
| 6  | Primary Site Primary Retransmission Server TCP Port Number                                           | 55455         |
| 7  | Primary Site Secondary Retransmission Server IP Address                                              | 10.1.90.77/24 |
| 8  | Primary Site Secondary Retransmission Server TCP Port Number                                         | 55455         |
| 9  | Backup Site Primary Retransmission Server IP Address                                                 | 10.2.90.76/24 |
| 10 | Backup Site Primary Retransmission Server TCP Port Number                                            | 55455         |
| 11 | Backup Site Secondary Retransmission Server IP Address                                               | 10.2.90.77/24 |
| 12 | Backup Site Secondary Retransmission Server TCP Port Number                                          | 55455         |