Hong Kong, China: The Case for LTE 2.6 / 1.8 GHz and DC-HSPA+

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Agenda

CSL Overview and Current Situation
The Need for LTE at 2.6 and 1.8 GHz
The Need for DC-HSPA+
Roaming Considerations
Conclusions
Established in 1983, CSL was Hong Kong’s first mobile operator
Subsidiary of Telstra, Australia’s leading operator
Awarded a 4G FD-LTE 2.6 GHz license in January 2009
First to launch All IP 21 Mbps network in March 2009
Started a wide-area LTE Trial in November 2009
Launched World’s First Dual Band 2.6G/1.8G LTE/DC-HSPA+ network in November 2010
The Need for LTE at 2.6GHz and 1.8GHz
(1) Capacity
(2) Coverage
The Mobile Data Explosion Continues

- Data Traffic > 100X since Next G launch in Mar-09
- Data Traffic still growing 4X YOY
- Data Traffic > 85% of total network traffic

- LTE/DC-HSPA+ Launch
- iPhone 4
- World Cup
- Next G Launch
### CSL – Current Spectrum Holdings

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz</td>
<td>8.3 MHz X 2</td>
</tr>
<tr>
<td>1800 MHz</td>
<td>23 MHz X 2</td>
</tr>
<tr>
<td>2100 MHz</td>
<td>14.8 MHz X 2</td>
</tr>
<tr>
<td></td>
<td>5 MHz X 1</td>
</tr>
<tr>
<td>2600 MHz</td>
<td>15 MHz X 2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>127.6 MHz</strong></td>
</tr>
</tbody>
</table>
The Data Explosion – the Need for LTE

1.8G LTE Capacity

2.6G LTE Capacity

3G Capacity

Forecasted Data Demand

LTE at 1800MHz and 2600MHz is Needed to Meet Traffic Demand
HK is a very mature mobile network with nearly 50% of sites located indoors

- Use LTE 1800MHz to provide coverage and leverage existing DAS investments
The Need for DC-HSPA+
LTE 1800+2600 is Required For Deployment and Capacity Reasons; DC-HSPA+ is Required as the Coverage Layer for LTE
DC-HSPA+ as LTE Coverage Layer

- **LTE (2.6 / 1.8)**
  - Performance Layer

- **DC-HSPA+**
  - Coverage Layer

<table>
<thead>
<tr>
<th>Performance</th>
<th>DL</th>
<th>UL</th>
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</thead>
<tbody>
<tr>
<td>LTE (15MHz)</td>
<td>~4X</td>
<td>~5X</td>
</tr>
<tr>
<td>DC-HSPA+</td>
<td>~2X</td>
<td>~1X</td>
</tr>
<tr>
<td>HSPA+ Baseline</td>
<td>1X</td>
<td>1X</td>
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DC-HSPA+ Required to Maintain User Experience
Roaming Considerations
A global device should have the following minimum frequency support:

- DC-HSPA+ 850MHz
- DC-HSPA+ 900MHz
- DC-HSPA+ 2100MHz
- LTE 1800MHz
- LTE 2600MHz
In Closing

- CSL is deploying LTE @ 1800MHz for capacity and coverage reasons
- Device support for LTE 1800MHz + DC-HSPA + Roaming bands is critical
Thank You!
Introducing the First LTE/DC-HSPA+ UE

- Collaboration with ZTE and Qualcomm since November 2009
- Bring a device optimized to bring best customer experience leveraging 3G and LTE networks

Frequency and Technology Support
- LTE-FDD 1800 / 2600 MHz
- DC-HSPA+ 850 / 900 / 2100 MHz
- EDGE/GSM 900 / 1800 MHz

Peak Data Rates:
- LTE: DL 100Mbps / UL 50Mbps
- DC-HSPA+: DL 42Mbps / UL 5.76Mbps