Interoperability, Standardisation and FRAND Licensing with SEPs

IBA Communication and Competition Conference

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Founder, WiseHarbor

Prague, May 2014
Outline

• Standards: more than just interfaces for interoperability

• Licensing methods

• Smartphone patent wars

• FRAND licensing success story facts and figures
Two From Among 27,000 British Standards

BS 1363

BS 1254
ICT Standards Define Entire Complex Systems

• Audio and Video Codecs
  – “H.264/MPEG-4 AVC is a block-oriented motion-compensation-based video compression standard developed by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC JTC1 Moving Picture Experts Group (MPEG)” (Wikipedia)
  – Many thousands of lines of software code required to implement
  – Used in conjunction with other standards (e.g., Blu-Ray, defining color of laser, disk track physical specifications)

• Mobile Communications
  – “GSM (Global System for Mobile Communications) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones.” (Wikipedia)
  – >124,000 patented technologies declared to ETSI as essential to 3GPP standards including GSM, WCDMA and LTE
  – “Protocols” include radio modulation, audio and data encoding, bit error detection and correction, handover, power control, encryption, interference detection and cancellation etc, etc
Licensing Methods and Examples

The following are not all mutually exclusive:

- **Royalty-free standards**
  - HTML (W3C)
  - Bluetooth (Bluetooth Special Interest Group)
  - ODF (OASIS)

- **FRAND-based licensing standards**
  - H.264 (ITU-T)
  - GSM, WCDMA, LTE (3GPP)
  - WiFi (IEEE)

- **Patent pooling**
  - H.264 (MPEG LA)
  - WCDMA (PlatformWCDMA)

- **Open source software**
  - x264
  - Android
Smartphone Patent War Considerations

• Disputes include SEPs and non-SEPs
  – Apple: little or nothing in SEPs at the outset
  – Samsung: relative strength in SEPs

• Rival business models
  – Technology developer licensors (SEPs in particular)
  – Product implementer licensees
  – Vertically integrated

• Theories of actual or possible harm
  – Impede market growth
  – Stifle innovation
  – Inhibit competition and market entry
  – Raise prices
FRAND Licensing Health Check: Market Growth

Total Numbers of Global Cellular Connections, 2000-2013; by Technology

Source: GSMA Intelligence database: https://gsmaintelligence.com
FRAND Licensing Health Check: Market Growth

Cellular Phones Sold Worldwide, 2008-2012

- **Smartphones**
- **Other Cellular Phones**

![Chart showing cellular phone sales worldwide from 2008 to 2012, with a focus on growth trends.]
FRAND Licensing Health Check: Market Growth

Worldwide Mobile Voice and Data Traffic, 2007-3Q2013

### FRAND Licensing Health Check: Innovation (2G/3G)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Motorola V60</td>
<td>Ericsson T68</td>
<td>Nokia 7210</td>
<td>BlackBerry 7230</td>
<td>Motorola RAZR V3</td>
<td>Apple iPhone 2G</td>
<td>Apple iPhone 4S</td>
</tr>
<tr>
<td><strong>Display(s)</strong></td>
<td>Monochrome graphic 96 x 64 pixels Second: monochrome</td>
<td>1.7&quot; STN 256 colors 101 x 80 pixels</td>
<td>1.5&quot; CSTN 4,096 colors 128 x 128 pixels (121 ppi)</td>
<td>2.6&quot; TFT reflective 65,000 colors 240 x 160 pixels (111 ppi)</td>
<td>2.2&quot; TFT 256,000 colors: 176 x 220 pixels Second: CSTN 4,096 colors</td>
<td>3.5&quot; TFT capacitive touchscreen 16,000,000 colors 320 x 480 pixels (165 ppi)</td>
<td>3.5&quot; LED-backlit IPS TFT, capacitive touchscreen 16,000,000 colors 690 x 960 pixels (330 ppi)</td>
</tr>
<tr>
<td><strong>Data</strong></td>
<td>2G GPRS 32-40 kbps</td>
<td>2G GPRS 24-36 kbps</td>
<td>2G GPRS 24-36 kbps</td>
<td>2G GPRS (&lt;56kpbs)</td>
<td>2G GPRS (38-42 kbps)</td>
<td>2G EDGE (&lt;300kpbs) WiFi</td>
<td>3G HSDPA 14.4 Mbps 3G HSUPA 5.8Mbps WiFi</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>SMS, WAP 1.1 browser, games</td>
<td>SMS, MMS, Email, WAP 1.2.1</td>
<td>SMS, MMS, Email, WAP 1.2.1 browser, games</td>
<td>SMS, Email, BlackBerry HTML browser Qwerty keyboard</td>
<td>SMS, Email, WAP 2.0/xHTML browser Video player 0.3MP camera</td>
<td>SMS, Email, HTML Safari Video player 2MP camera 412 MHz CPU</td>
<td>SMS, Email, HTML Safari HD 1080p video @ 30 fps 8MP camera Dual core 1GHz CPU</td>
</tr>
</tbody>
</table>
## FRAND Licensing Health Check: Innovation (4G)

<table>
<thead>
<tr>
<th>Introduced</th>
<th>2012</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Motorola DROID 4" /></td>
<td><img src="image2.png" alt="Apple iPad 3" /></td>
<td><img src="image3.png" alt="iPad 3" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Motorola DROID 4</th>
<th>Apple iPad 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>4.00” TFT 16M colors 540 x 960 pixels (275ppi)</td>
<td>9.7” IPS LCD capacitive touchscreen 16M colors 2048 x 1536 pixels (264 ppi)</td>
</tr>
<tr>
<td>Processors</td>
<td>Dual core, 1.2GHz TI OMAP4430</td>
<td>Dual core, 1 GHz, Apple A5X and Quad core PowerVR SGX543MP4 for graphics</td>
</tr>
<tr>
<td>Data</td>
<td>LTE 700 MHz Class 13, CDMA EV-Do Rev A</td>
<td>LTE 700 MHz Class 17, 1700/2100 MHz HSDPA+ (42.2Mbps), UMTS, EDGE, GPRS</td>
</tr>
<tr>
<td>Features</td>
<td>Android 2.3.5, HTML5, Flash, 8MP and 1.3MP cameras, accelerometer, gyroscope and barometer</td>
<td>iOS 5.1, HTML5, 5MP and 0.3MP cameras, accelerometer, gyroscope, compass and voice commands</td>
</tr>
</tbody>
</table>
FRAND Licensing Health Check: Innovation (R&D)

Total Sales and R&D for Leading Cellular Technology Companies (US $)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Sales (millions)</th>
<th>Total R&amp;D (millions)</th>
<th>R&amp;D/Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$399,917</td>
<td>$27,990</td>
<td>7.0%</td>
</tr>
<tr>
<td>2009</td>
<td>$353,836</td>
<td>$27,854</td>
<td>7.9%</td>
</tr>
<tr>
<td>2010</td>
<td>$401,722</td>
<td>$30,829</td>
<td>7.7%</td>
</tr>
<tr>
<td>2011</td>
<td>$510,840</td>
<td>$37,922</td>
<td>7.4%</td>
</tr>
<tr>
<td>2012</td>
<td>$555,555</td>
<td>$39,878</td>
<td>7.2%</td>
</tr>
</tbody>
</table>
FRAND Licensing Health Check: Competition

Global Shares of Leading Smartphone Industry Participants

Sources: Bloomberg Finance, IDC
Herfindahl–Hirschman Index Market Concentration, 2006-2013

Herfindahl–Hirschman Index calculated from published vendor market share figures
Royalties More and More Reasonable

Aggregate royalty rates based on total ownership expenses

* For companies with no IP to cross-license

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## So Much More for your Money Now

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Images not to scale</strong></td>
<td><img src="image1.png" alt="Nokia N93" /></td>
<td><img src="image2.png" alt="Samsung Galaxy S III" /></td>
</tr>
<tr>
<td><strong>2G Network</strong></td>
<td>GSM 900/1800/1900</td>
<td>GSM 850/900/1800/1900</td>
</tr>
<tr>
<td><strong>3G Network</strong></td>
<td>UMTS (WCDMA) 2100</td>
<td>HSDPA 850/900/2100</td>
</tr>
<tr>
<td><strong>4G Network</strong></td>
<td>No</td>
<td>LTE 700/2100 or LTE 800/1800/2600*</td>
</tr>
<tr>
<td><strong>Data Speed</strong></td>
<td>384 kbps (3G)</td>
<td>50 Mbps (LTE)</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>Nokia/TI baseband processor and Texas Instruments OMAP 2420 Applications Processor</td>
<td>Qualcomm MSM 8960 or Exynos 4412 Quad*</td>
</tr>
<tr>
<td><strong>Central processor</strong></td>
<td>332 MHz Dual ARM 11</td>
<td>Dual core 1.5 GHz or Quad core 1.4 GHz Cortex-A9*</td>
</tr>
<tr>
<td><strong>Graphics processor</strong></td>
<td>3D Graphics hardware accelerator</td>
<td>Adreno 225 or Mali-400MP*</td>
</tr>
<tr>
<td><strong>Operating System</strong></td>
<td>Symbian OS 9.1, Series 60 3rd edition UI</td>
<td>Android OS v4.0 (Ice Cream Sandwich) or Android OS v4.1.1 (Jelly Bean)*</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>TFT, 256K colours, 240 x 320 pixels, 2.4 inches, 36 x 48mm, 167 pixels per inch</td>
<td>Super AMOLED, 16M colours, 720 x 1,280 pixels, 4.8 inches, 306 pixels per inch</td>
</tr>
<tr>
<td><strong>Touchscreen</strong></td>
<td>No</td>
<td>Capacitive multitouch</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>50MB storage +64 MB RAM +128 MB miniSD Card</td>
<td>16GB storage, 2GB RAM, up to 64 GB microSD</td>
</tr>
<tr>
<td><strong>Cameras</strong></td>
<td>3.15 megapixels, VGA @30 fps: secondary CIF videocall camera</td>
<td>8MP, autofocus, LED flash: secondary 1.9MP, 720p @30 fps</td>
</tr>
<tr>
<td><strong>Price without subsidy</strong></td>
<td>Euro 550 x $1.26 = $693</td>
<td>$599-$649 (24% cheaper with 14% cumulative inflation)</td>
</tr>
</tbody>
</table>
FRAND Licensing Health Check: Prices

Cellular Prices Flat or Falling versus Rising CPI

Vibrant Mobile Markets in Devices and Network Services

• 7 billion subscribers, $1.2 trillion for operators and $400 bn for manufacturers annually in only 30 years
  – Smartphone market revolution with increasing product choice, changing vendor market shares, market entry without SEPs
  – Data speeds with 4G LTE 1,000 times faster than 56kbps for 2G GPRS only one decade ago
  – Hundreds of companies including SMEs contribute to and implement 3GPP (ETSI is a partner) standards
  – 124,000 patents declared possibly essential to 3GPP standards
  – Relentless innovation: a major 3GPP release every 1-2 years
  – Aggregate royalty rates at around 10% with minimal pooling
  – Low-end (unsubsidised) prices of <$20 for phones and <$100 for smartphones
Thank You

WiseHarbor helps its clients solve commercial problems using market research and analysis.

Keith Mallinson is a regular columnist with IP Finance (http://ipfinance.blogspot.com) “where money issues meet IP rights”. This weblog looks at financial issues for intellectual property rights. Keith Mallinson writes on the subject of intellectual property in standardised technologies such as those used in 2G, 3G and 4G mobile communications.

Here are links to a couple of articles on matters discussed here http://ipfinance.blogspot.co.il/2013/05/theories-of-harm-with-sep-licensing-do.html
http://ipfinance.blogspot.co.uk/2013/11/absurd-frand-licensing-rate.html

Articles written for IP Finance and other in cellular communications trade publications are listed and linked on the WiseHarbor web site: http://www.wiseharbor.com/publications.html

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