May 2013

Machine-2-Machine Optimizations for CDMA2000 1X Rev. F

Contact: James.Jones@alcatel-lucent.com
CDMA2000 1X Rev. F M2M Enhancements

Global M2M Connection Revenue by Region (ABI)

25% CAGR

Cost Effective + Power Efficient Solution

Growth ↑↑ but Low ARPU.

Signalling protocol enhancement features
Maximize RAN resource efficiency
Optimize device connection and transmission time

↑ Battery Life (up to 10x) OR ↓ device BOM

↑ M2M Devices supported ↓ RAN Signalling Load

Leverage existing networks, Maximize ROI
Target new market segments

Jumpstart the 1X M2M market.

All Rights Reserved © Alcatel-Lucent 2013
CDMA2000 1X Rev. F Performance Gains

Simple App: 1X, M2M module uploads report (200 bytes) daily

**Metering Application: Module power consumption improvement**

- Implementation only uses shorter preamble for with RACH
- Implementation + Stds
  - DoS w/ 38.4k R-EACH @ 0dBm
  - Connection w/ R-FCH @ 20dBm

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m2m capability indicators</td>
</tr>
<tr>
<td>2 Skip overhead channel read (PN_EXT in GPM)</td>
</tr>
<tr>
<td>3 Fast Connection Setup (SO33 default in ECAM)</td>
</tr>
<tr>
<td>4 Direct Channel Assignment</td>
</tr>
<tr>
<td>5 R-EACH (coupled with F-PCH) RL Data-over-Signaling [Access State]</td>
</tr>
<tr>
<td>6 Smart Blanking (same as 1x-RevE) for SO33</td>
</tr>
<tr>
<td>7 Longer timer-based registration timer value for mam (capability) devices</td>
</tr>
<tr>
<td>8 Longer SCI (up to 163sec)</td>
</tr>
</tbody>
</table>

(Not complete set of feature descriptions)
Benefits / Opportunities / Interests

North America
Telematics
Security
Remote monitoring
Telehealth

CDMA REV-F delivers much longer battery life OR Lower device cost (radio module + battery)

Asia Pacific
ATM/POS
Telematics
Remote monitoring

CDMA Rev-F helps with network scaling as M2M grows.

Europe
Utility Metering and monitoring; CDMA 450

Far less impact to existing 1X resources