CDMA2000 1x Deployment and Associated Multimedia Services Launched in Japan

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Cellular Market Outlook in Japan : Shifting to Multimedia Gateway

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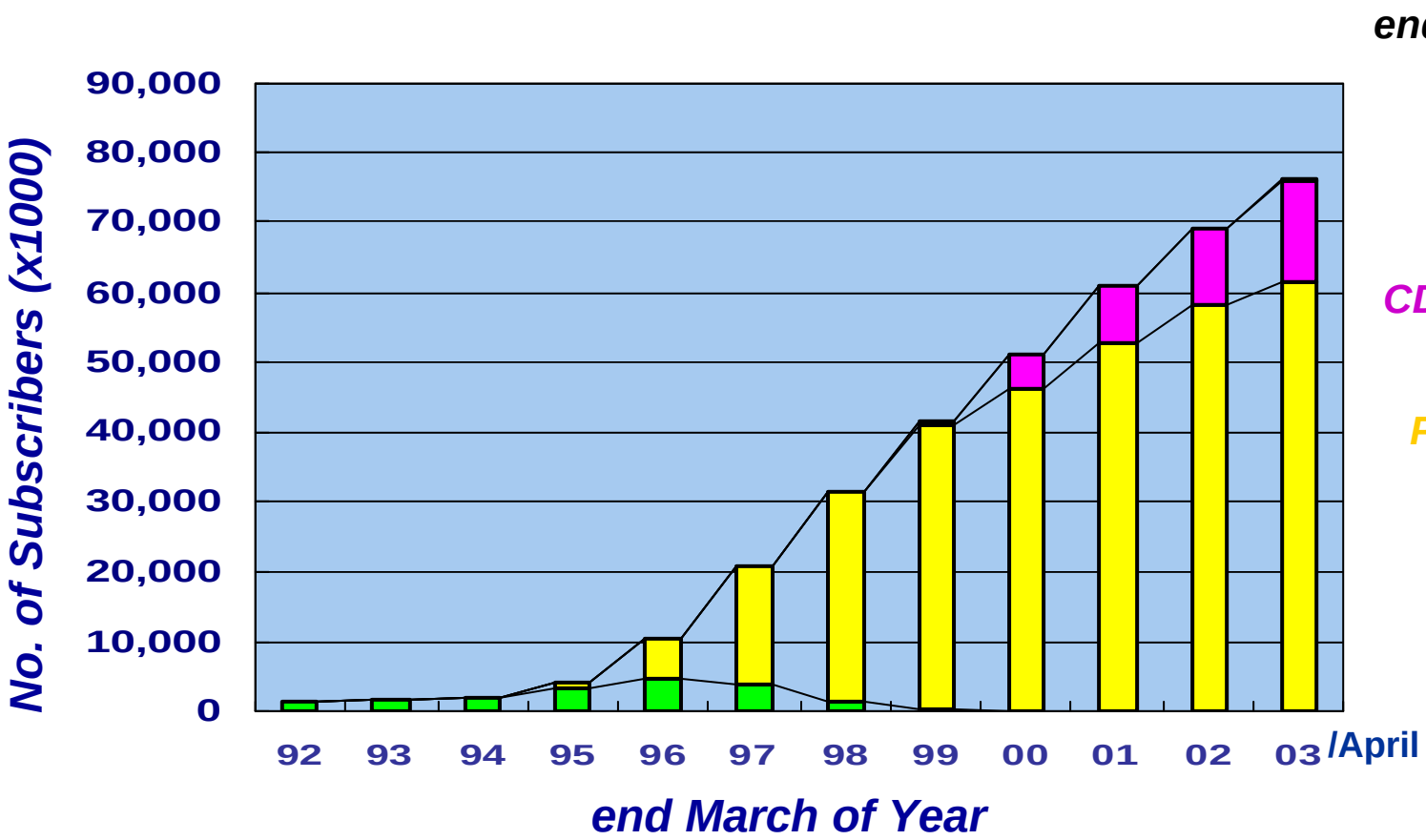
Cellular Subscriber Growth in Japan



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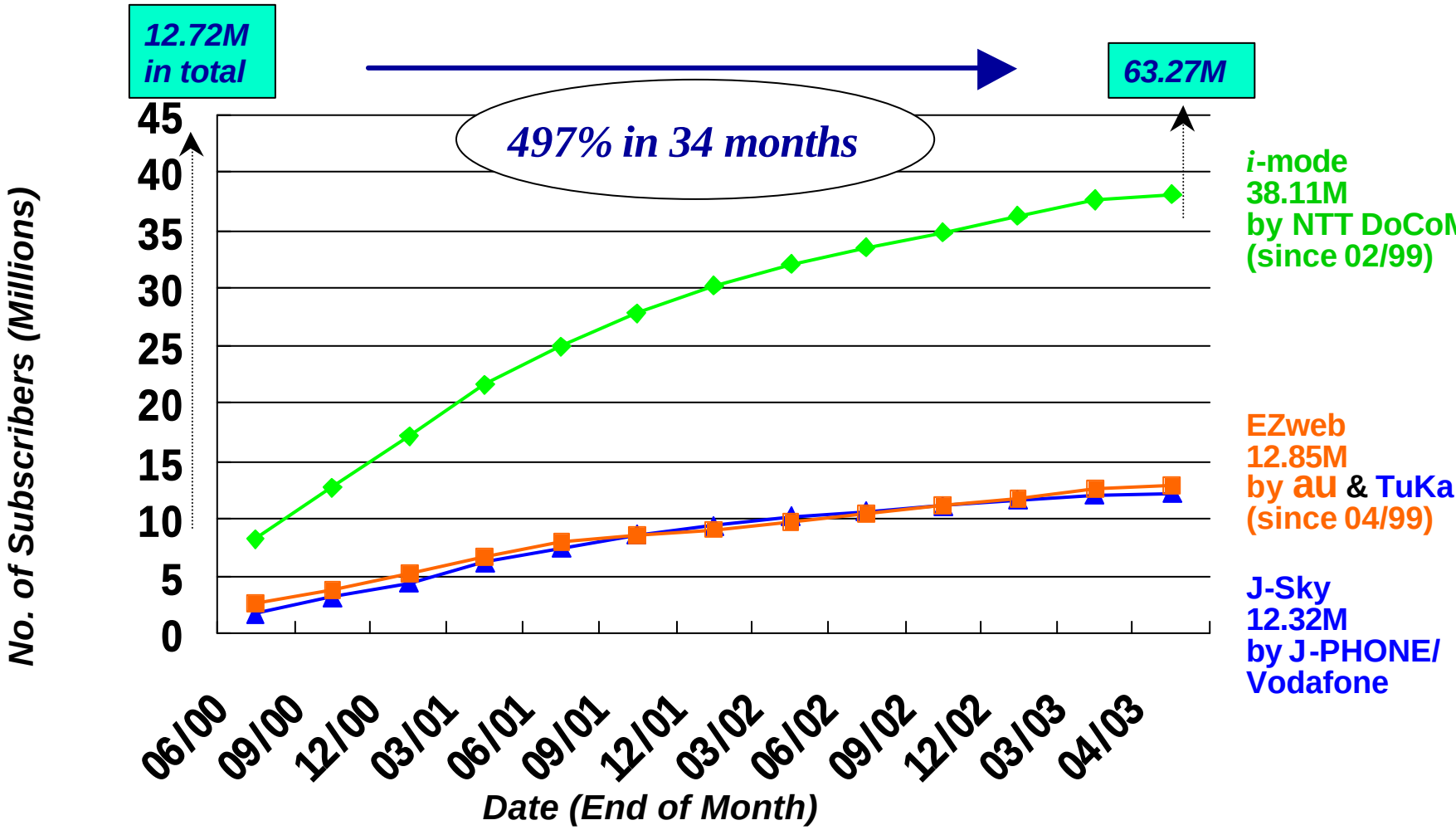
Mobile Internet Subscriber Growth



Note: The number of subscribers for EZweb or i-mode is counted based on the paid contract, while that for J-Sky represents number of browser enabled phones.

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CDMA2000 1x Launch by au

(“au” is the brand of KDDI’s cellular service.)

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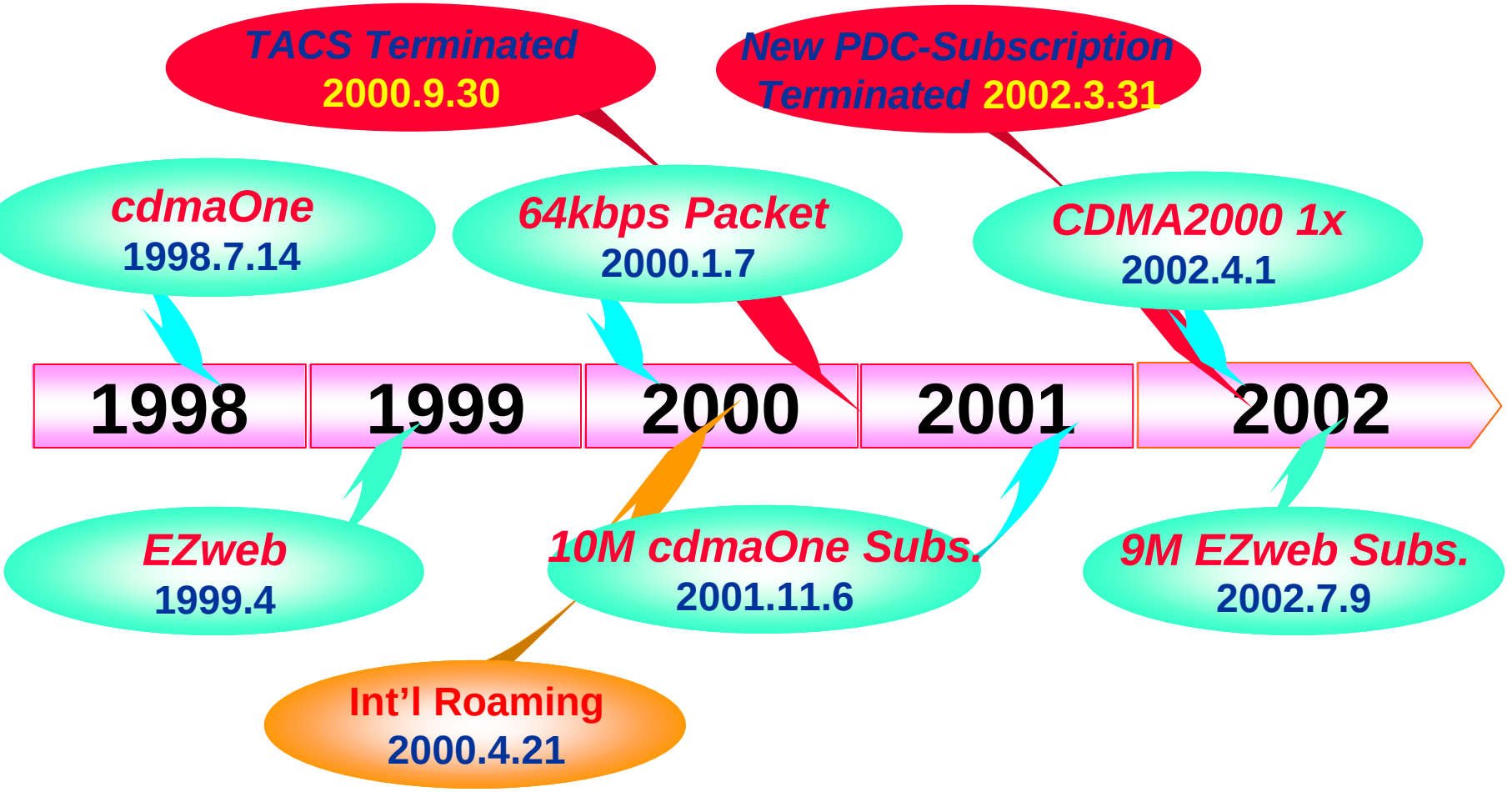
History of au : towards Multi-media Era



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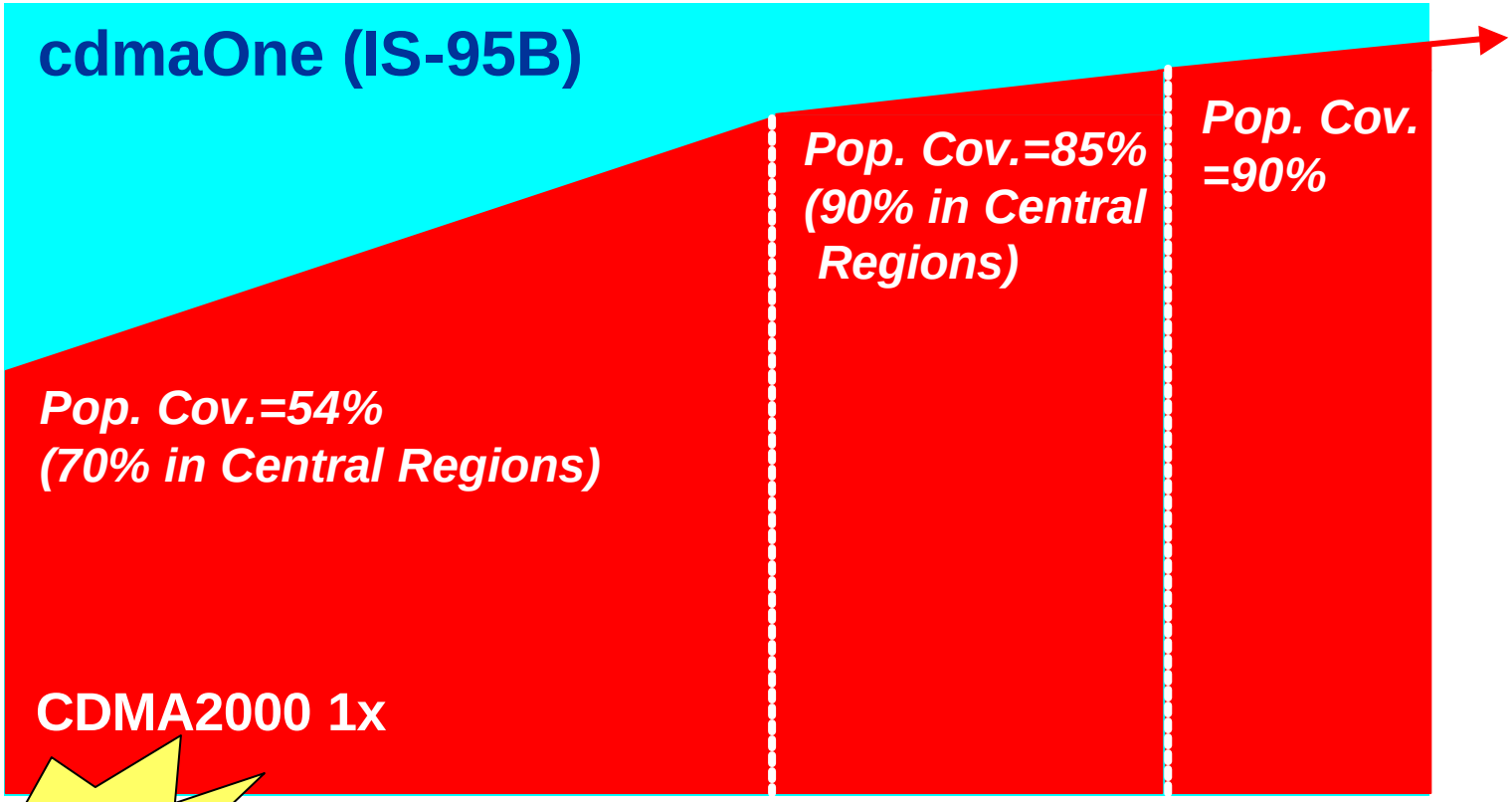
Rapid CDMA2000 1x Rollout by au

Population Coverage 99.9%



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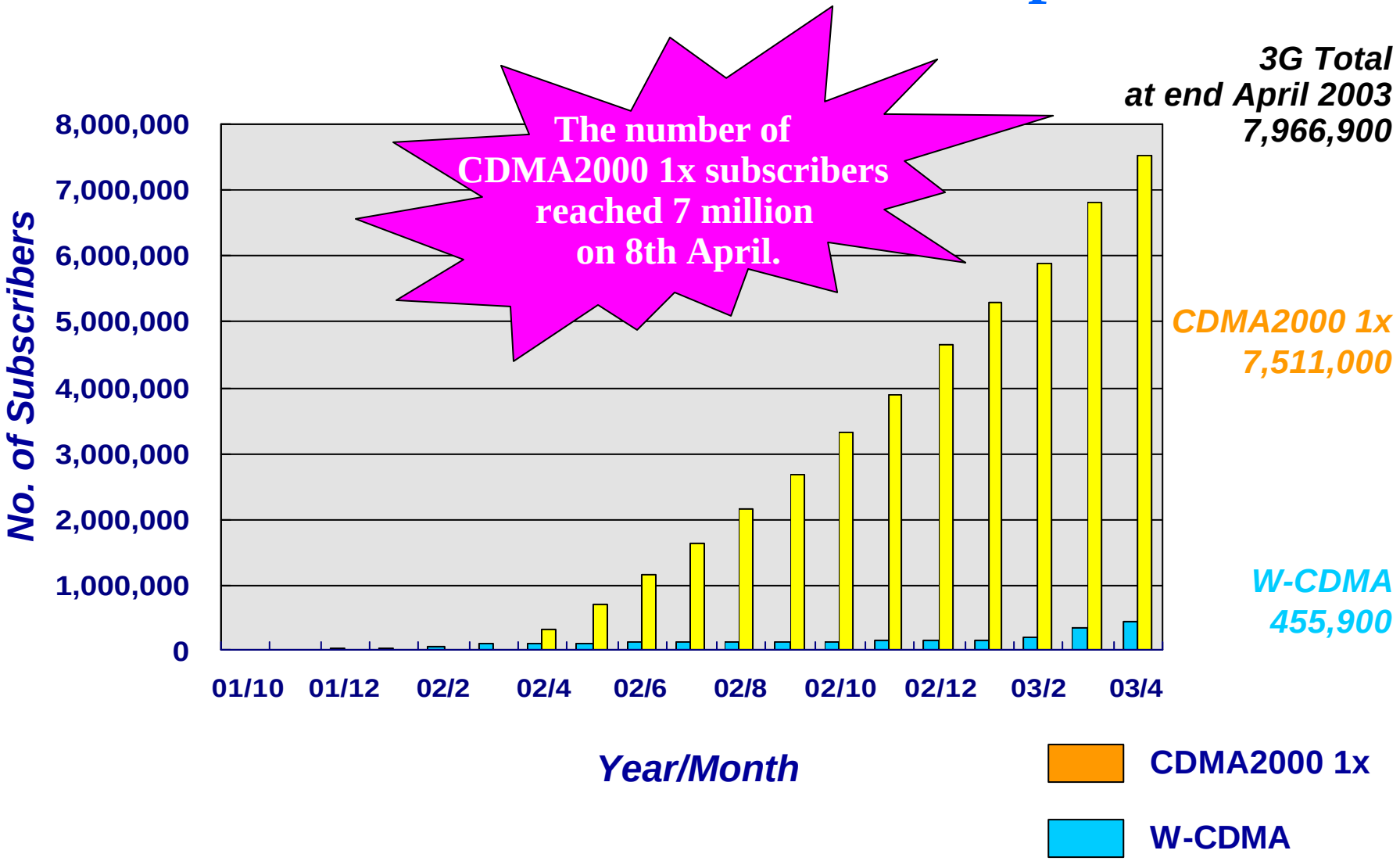
3G Subscriber Growth in Japan



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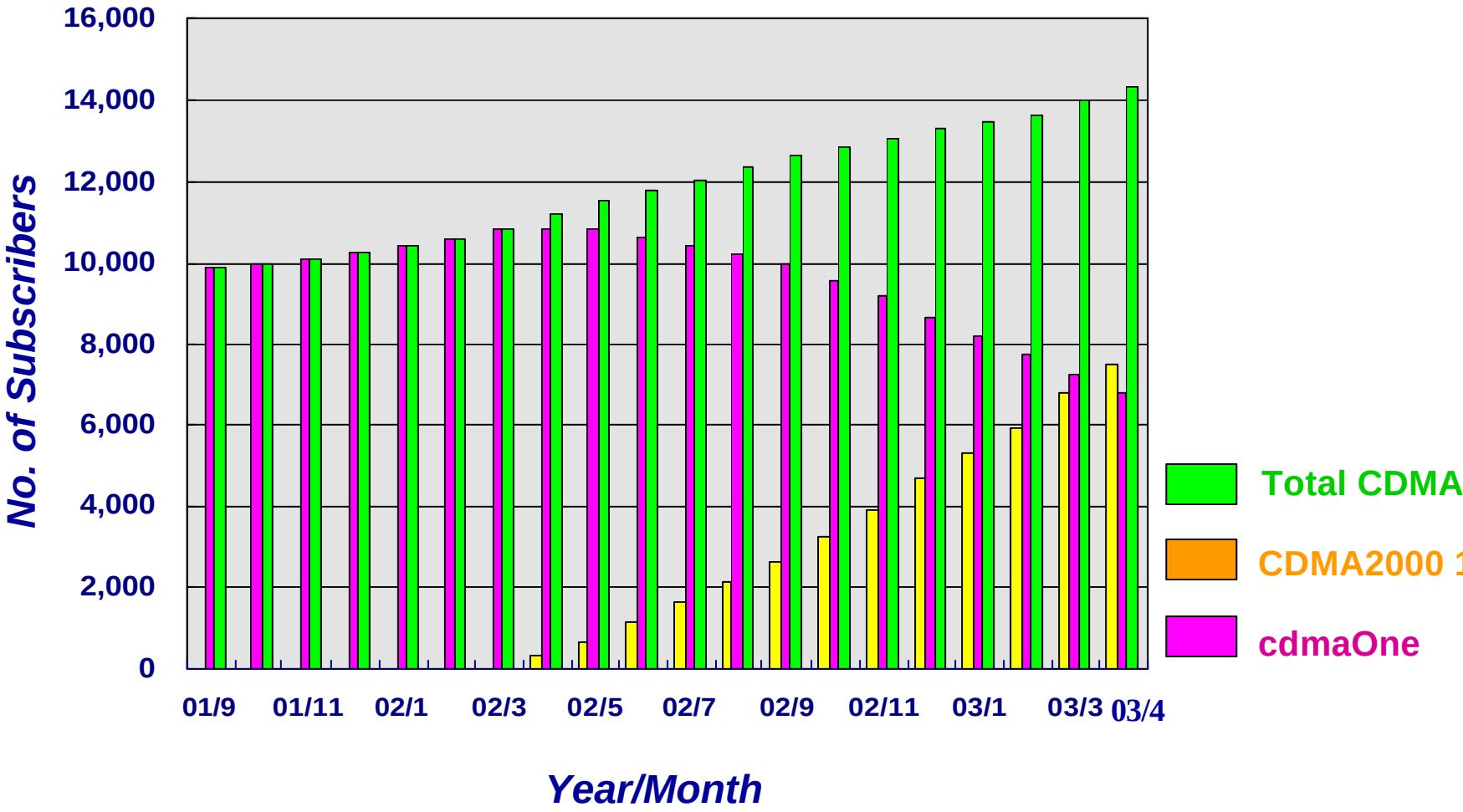
3G Penetration in au's Subscriber



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Secret of au's Success in CDMA2000 1x Launch

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Technology Led to Success

- ✓ ***CDMA2000 1x's inherent backward compatibility to IS-95,*** **Service coverage was virtually equivalent to the existing cdmaOne service area from Day One**
- ✓ ***Existing equipment upgrade path,*** **enabled rapid roll-out with low cost**
- ✓ ***Technology maturity inherited from cdmaOne,*** **led to;**
  - **No increase in handset physical dimensions**
  - **No degradation in handset battery life time**
  - **Same operational stability as cdmaOne**
  - **Minimal increase in handset cost**

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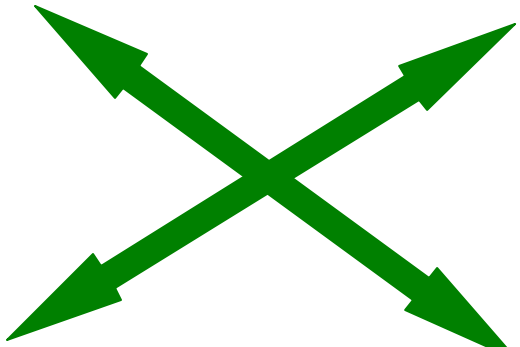
CDMA2000 1x Advantage: Backward Compatibility with cdmaOne (IS-95)

cdmaOne (IS-95) BTS

CDMA2000 1x BTS

cdmaOne (IS-95) - mode



CDMA2000 1x - mode

cdmaOne (IS-95) - mode that enabled;

(i) rapid 1x network rollout without service area reduction

(ii) continued use of existing handsets without any service degradation

cdmaOne (IS-95) Handset

CDMA2000 1x Handset

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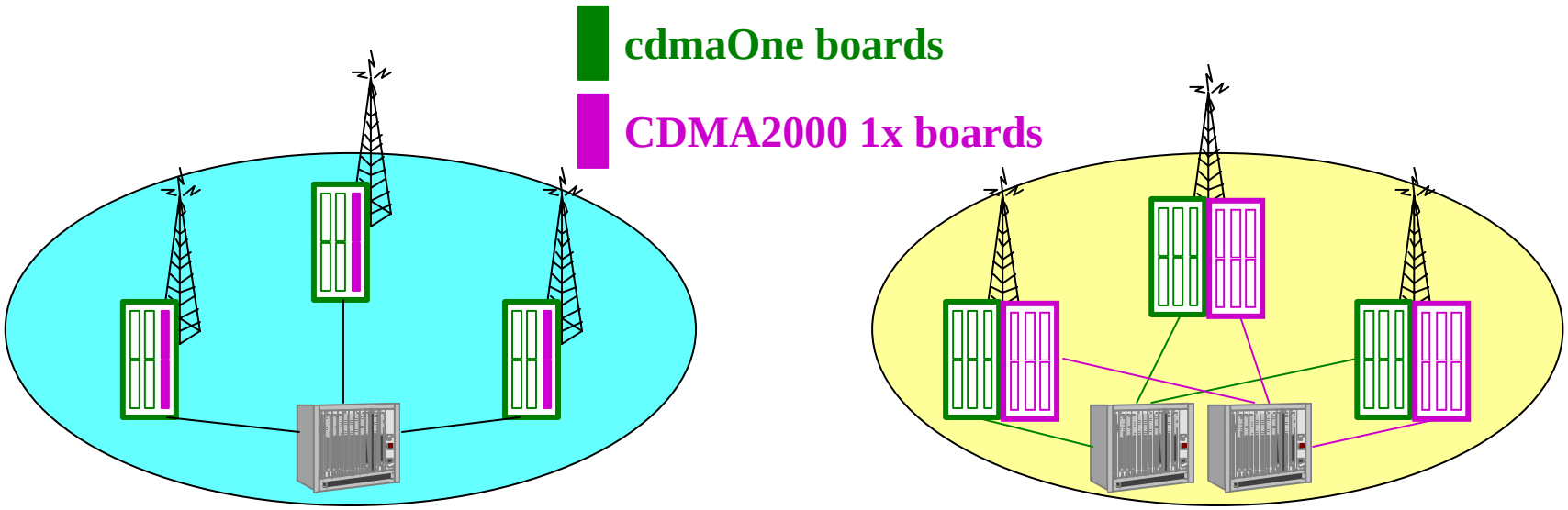
Upgrading-approach vs. Overlaid-approach for CDMA2000 1x Network Rollout



cdmaOne RAN Upgrade

Pros: **less CAPEX needed**

Cons: **modification may be required in the current cdmaOne software, causing service interruption risk**

Overlaid CDMA2000 1x Rollout

Pros: **no essential modification required in the current cdmaOne software, causing less risk**

Cons: **more CAPEX needed**

KDDI had adopted Upgrading-approach.

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Multimedia Services by au

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au's Mobile Multimedia Services

eznavigation

- More accurate **location-based services** powered by **gpsOne**
- Many new contents associated with **ezplus**

ezplus

- **Java™** application services
- support of **Mobile agent** function using **HTTP**
- Automatic application update from servers

ezmovie

- **Video Distribution** (available nationwide from Day One)
- using **Industry Standards**, i.e. **MPEG-4** for video coding and **MP4** for video file format

EZweb@mail – *IMAP4-based e-mail platform*

EZweb – *WAP2.0-based Internet Access and Browsing Platform*

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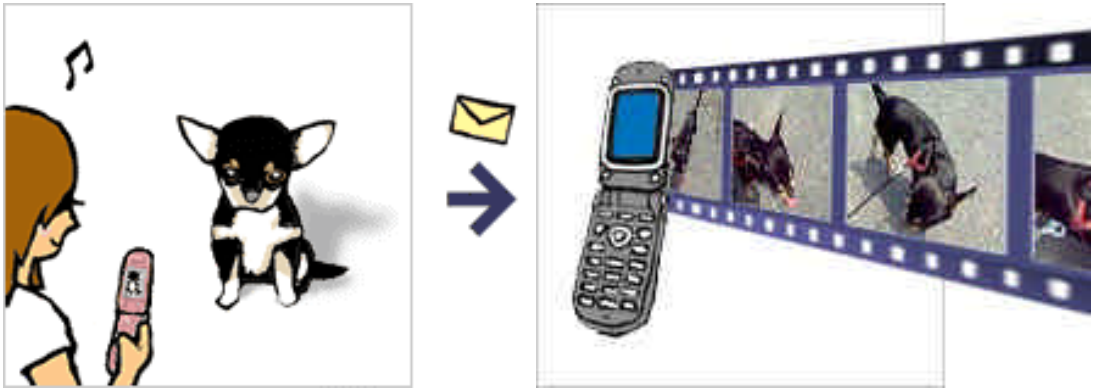
もっとタノシイ。
ムービーメール

Movie-mail

15 sec max recording

96x80 dpf

Smooth movie at 7.5 fps max



Capable of dubbing

Capable of text superposition

Capable of location advice indicated on a map using GPS

Capable of movie exchange with PCs

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Movie-mail Terminal

- **Movie-mail capable**
- **Photo-mail capable**
- **CoCo-SECOM EZ capable**

- **310,000-pixel CCD camera**
- **SD Memory Card for video/picture file storage**
- **260,000-color TFT display**
- **40-chord melody ring**

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Photo-mail

Take a picture anytime, Anywhere.

Send the picture by e-mail as an attachment.

PNG, JPEG or GIF format available

Location of the spot can also be advised using eznaviagtion-feature, which can b reproduced in a map format on the recipient side.

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Photo-mail Terminal

- 110,000-pixel CMOS camera
- 65,536-color TFT display
- 40-chord melody ring

- 110,000-pixel CCD camera
- 65,536-color TFT display
- 40-chord melody ring

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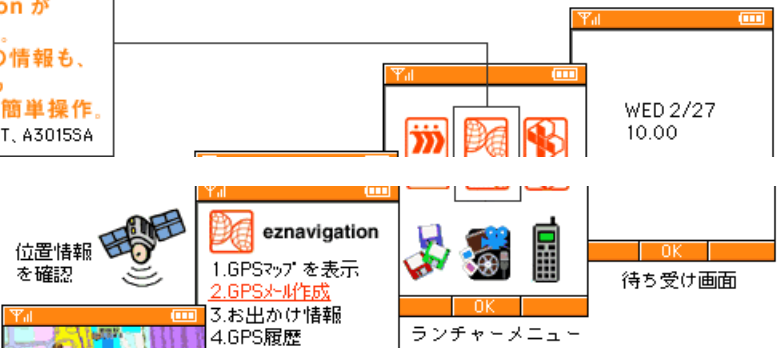
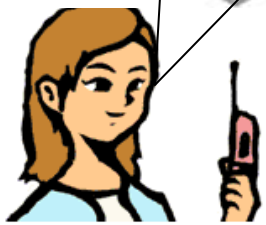
GPS-mail

今までより更にスピーディに、今いる場所が分かる＆メールで送信

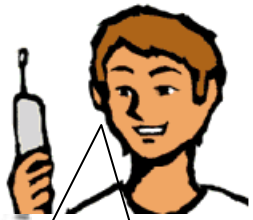
ランチャーメニューに
eznavigation が
加わりました。
今いる場所の情報も、
メール送信も
メニューから簡単操作。
対応機種: A5301T、A3015SA



Wow, an e-mail comes in from him! Now I get where he is on a map.



あ、彼からだ。
ここに居るのかぁ。



遅いなぁ。
また迷ってるのかな？

She is too late! She may be lost. Let's advise her where I am.

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GPS Terminal

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Ezweb-capable Terminal

(CDMA2000 1x-based)

(CDMA2000 1x-based)

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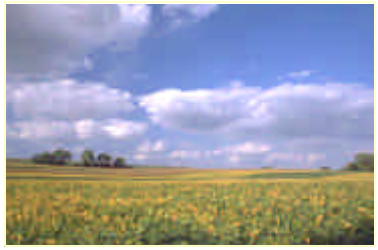
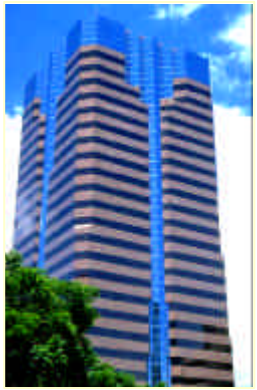
eznavigation (GPS Terminal) Associated with Photo-mail

Storing location information with pictures

Restaurants or Shops
to Recommend



Impressed Views
during Travel



Meeting Place

- **easy to advise a recommendable place**
- **recall vividly memory of travel by pictures with location information**
- **and for business applications**

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Communications by Photo-mail/GPS Terminal

Determine location

Store location info and take a picture

Lovely dishes! Take a picture!

Send a Mail with picture and location info attached

Let's advise her!

"Hey! I found a nice restaurant!"

Receive the Mail

Look nice! Aha! That restaurant!

Since an URL of map site can be inserted in the text part of e-mail, this combined information can also be received by any EZweb-enabled handsets without camera

Map image is drawn by contents available on Ezweb

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Photo-mail/GPS Terminal

- 110,000-pixel CCD camera
- 260,000-color TFT display
- 40-chord melody ring

- 310,000-pixel CCD camera
- 260,000-color Crystal-Fine LCD display
- 40-chord melody ring

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Objectives and Goal for 3G Migration:
au's Next Step

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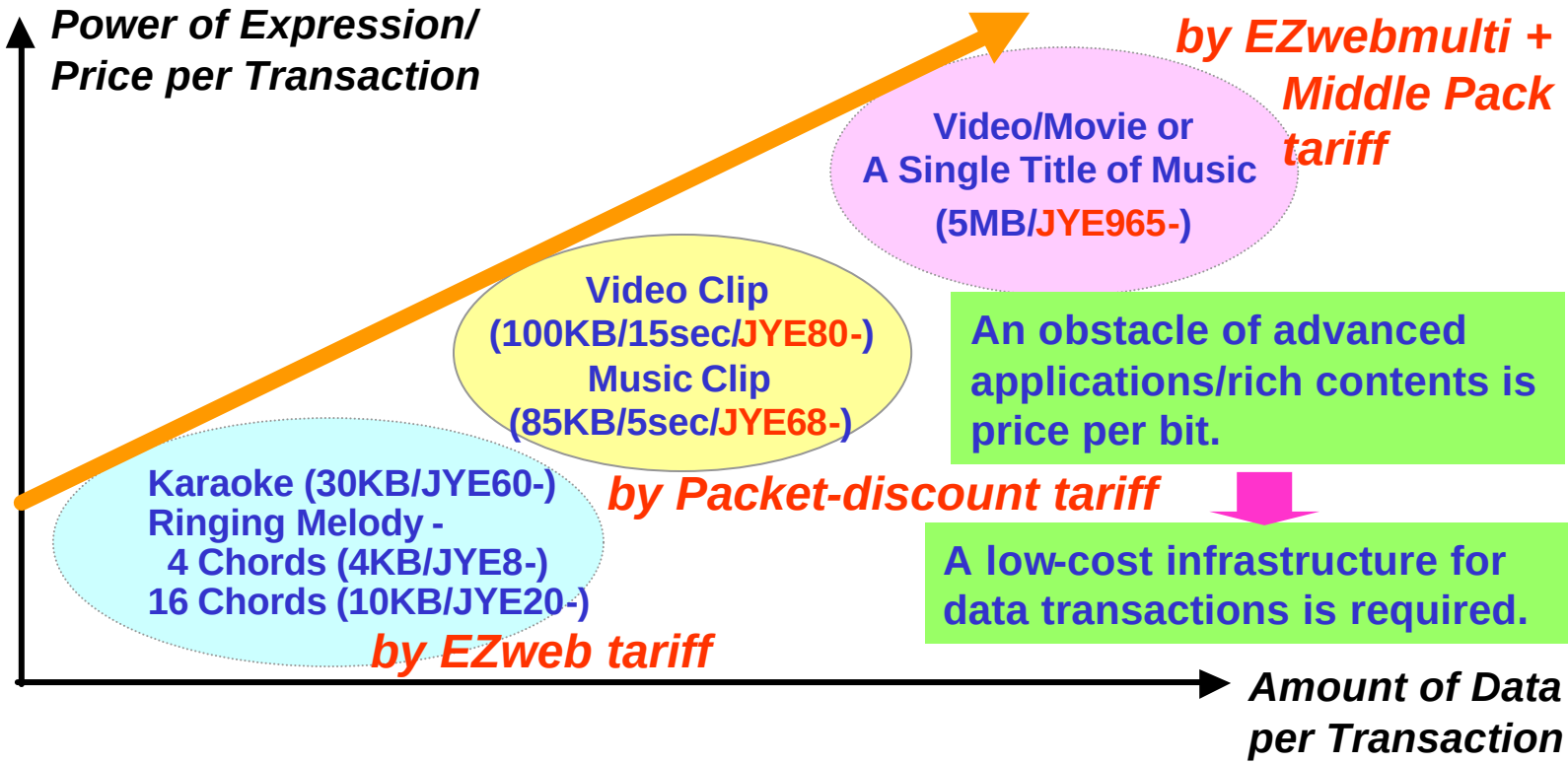
What Do Customers Want for 3G? - Obviously Large-Volume Contents with Low Price

❒ Reducing price/bit is essential to provide rich contents.



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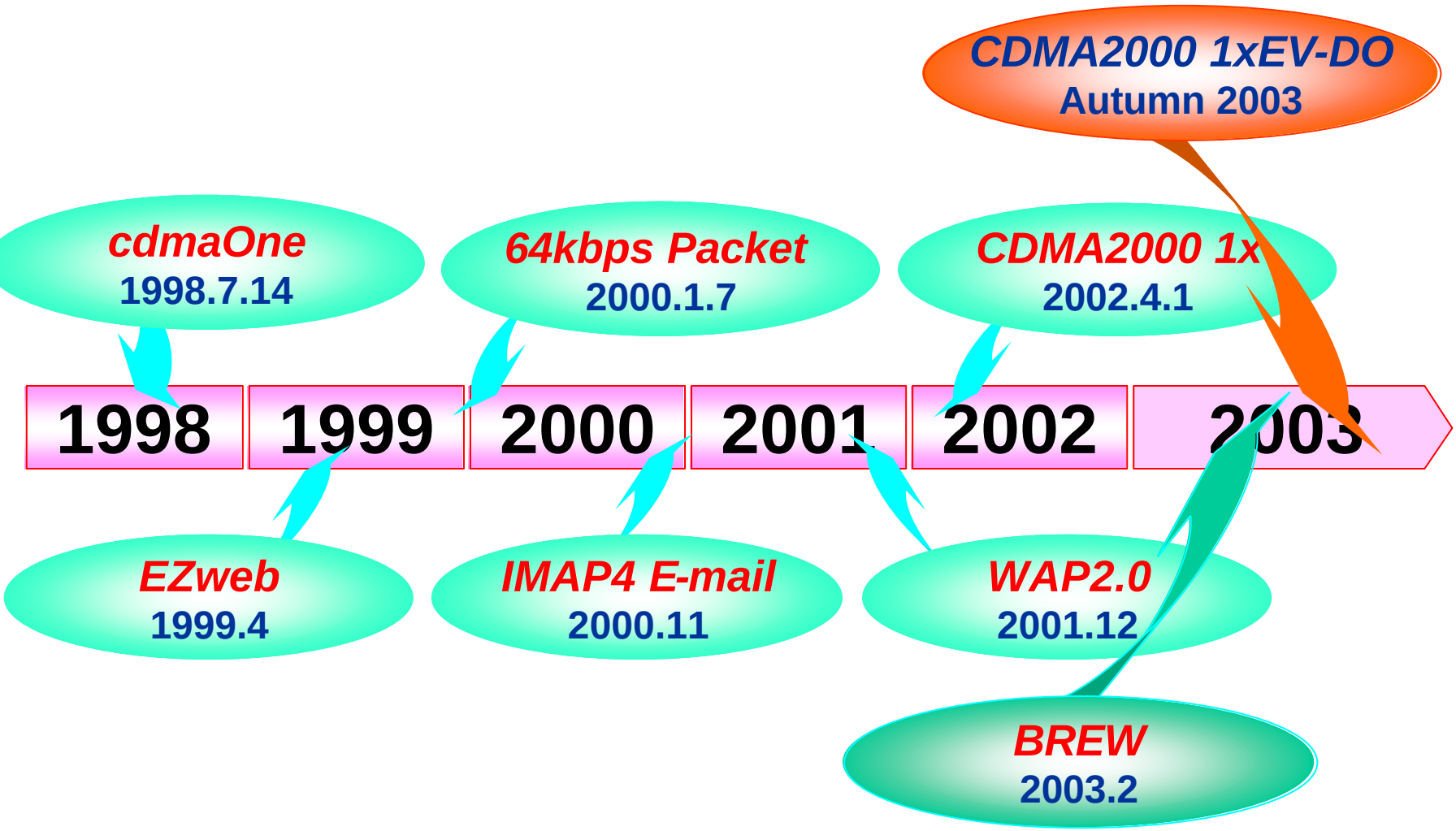
au's Approach towards Multi-media Era: Evolutional Approach



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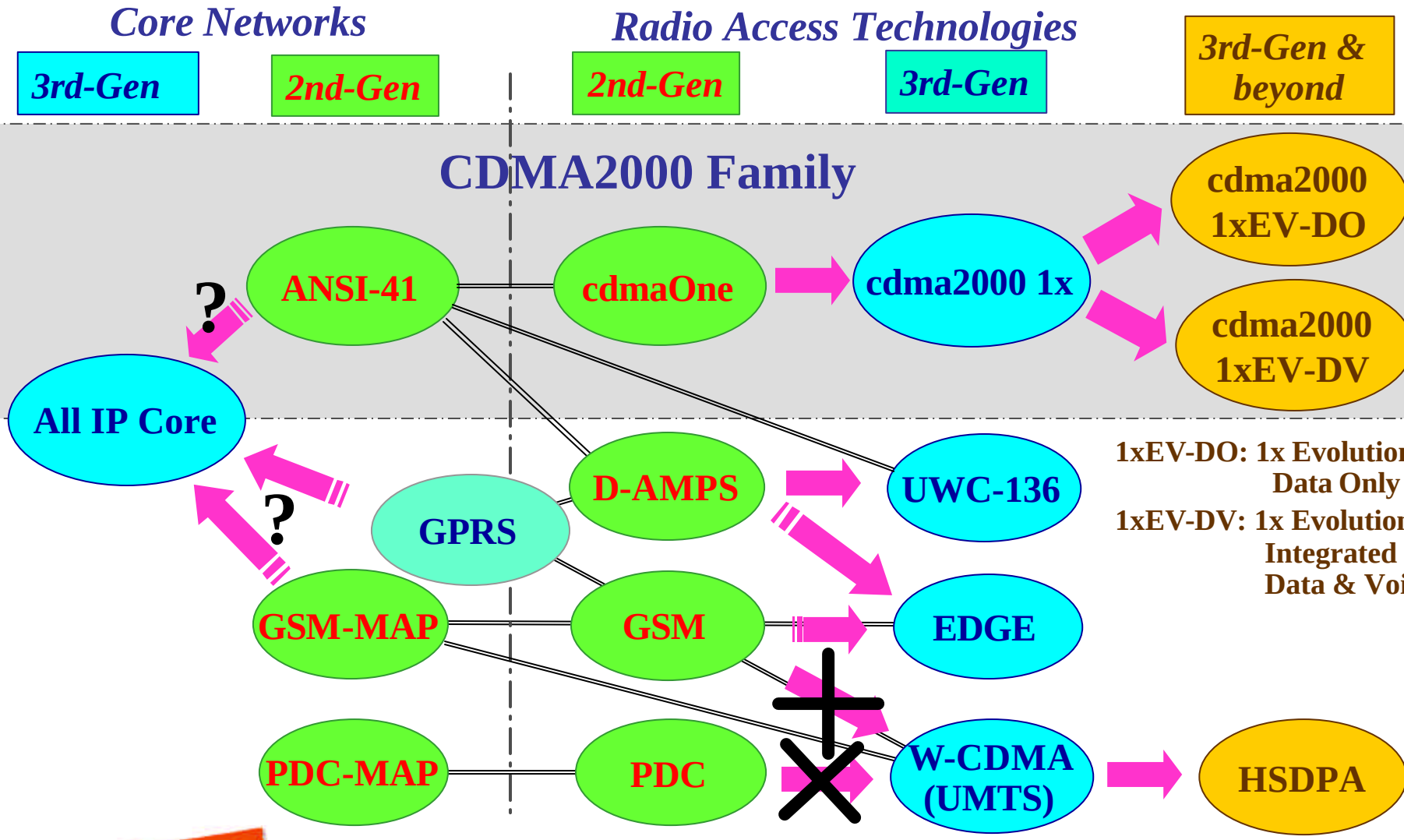
3G Migration Paths for Major Mobile System Standards



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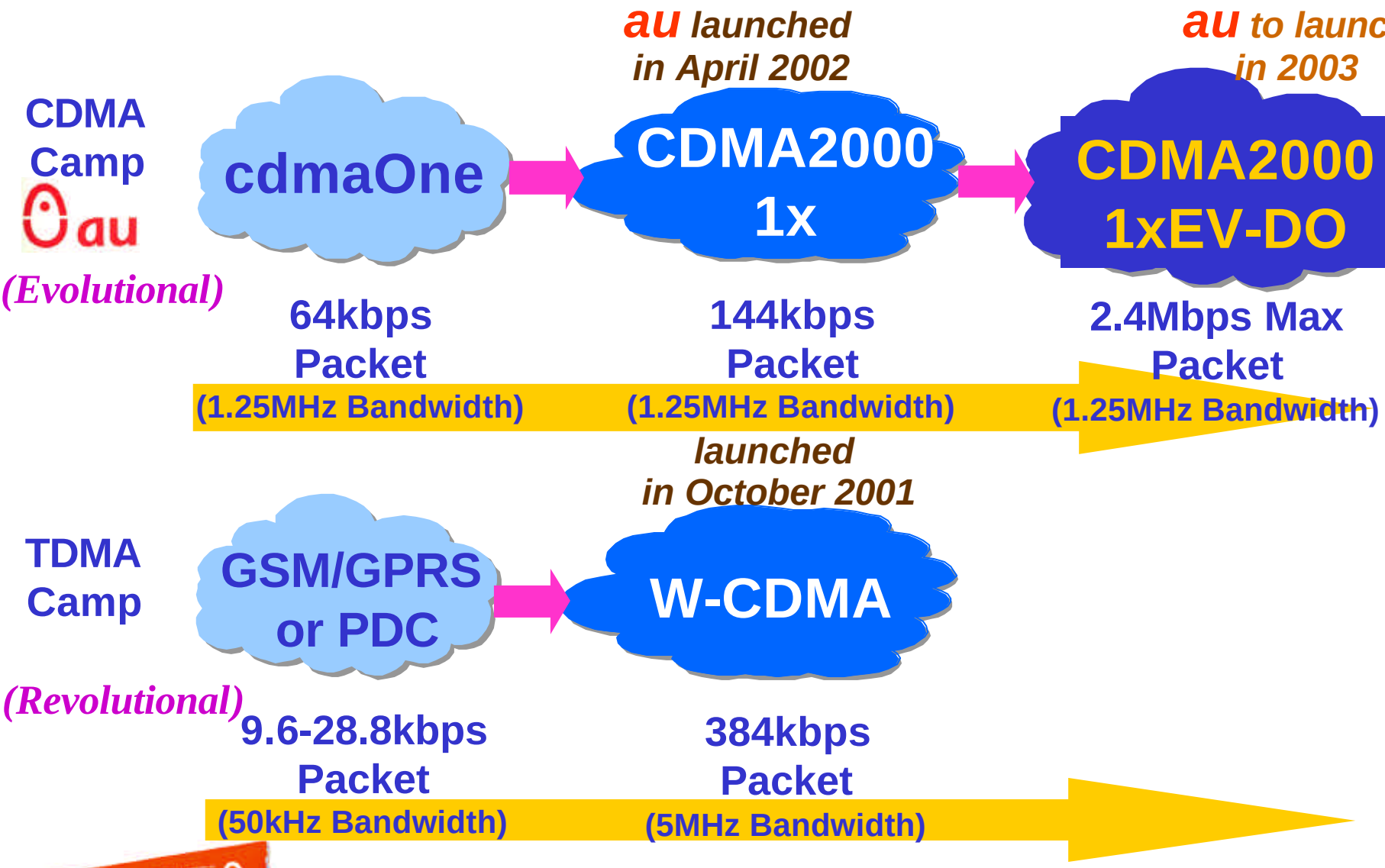
au's Scenario for Mobile Data Infrastructure



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CDMA2000 1xEV-DO: Further Upgrade Path towards Multimedia Era

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CDMA2000 1xEV-DO (1x Evolution-Data Only)

- ***A radio interface tailored for asymmetric high data rate packet communication with mobility***
  - ✓ A forward link sector throughput at the rate of 600kbps or higher average with 2.4Mbps peak, which performs very much higher (bps/Hz) than CDMA2000 1x or W-CDMA
  - ✓ Best-effort type wireless data communication system, where subscriber terminals with better link conditions will automatically have higher data rates
  - ✓ 1.25MHz spectrum occupancy per radio carrier that is compatible with CDMA2000 1x
  - ✓ A simple IP-based core network design
- ***A radio interface of the cdmaOne/CDMA2000 family***
  - ✓ Spectrum Occupancy, RF Characteristics and Link Budgets equivalent to CDMA2000 1x, allowing collocation of CDMA2000 1xEV-DO carriers and base stations with those of CDMA2000 1x network

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Positioning of CDMA2000 Family in Major Mobile System Standards

System		CDMA2000 1xEV-DO	cdmaOne (IS-95B)	CDMA2000 1x	W-CDMA
Spectrum Occupancy		1.25 MHz	1.25 MHz	1.25 MHz	5 MHz
Services		Data Only	Voice + Data	Voice + Data	Voice + Data
Connection Mode		Packet Only	Circuit + Packet	Circuit + Packet	Circuit + Packet
Max Data Rate per User	F/L	2.4 Mbps	64 kbps	153.6 kbps	384 kbps (up to 2Mbps)
	R/L	153.6 kbps	14.4 kbps	64 kbps (153.6 kbps)	64 kbps (384 kbps)
Sector Throughput (F/L)		600 kbps or more	approx. 125 kbps	approx. 220 kbps	approx. 1000 kbps
Spectral Effi-ciency (bps/Hz)		0.48	0.1	0.18	0.2

Higher Spectral Efficiency

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Thank You

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