

How Accurate is our Model? 83.4%, to be precise !

IEMR's White Paper on the accuracy of our Global Mobile Forecast Model





**Author:** Yui Funayama & Nizar Assanie

© 2008 IE Market Research Corp. All rights reserved.

Reproduction of material contained herein, in whole or in part, or use for any public purpose is only permitted with the prior approval of IE Market Research Corp. Courtesy copies of reproduced material are appreciated. Electronic reuse of the data published herein is strictly prohibited. Information contained herein is based on best available resources.

Opinions reflect analyst judgments at the time of writing and are subject to change without notice. IE Market Research Corp. does not accept any responsibility for the accuracy or comprehensiveness of the information contained herein. In no event shall IE Market Research Corp. be liable for any loss or damage arising in connection with the use of this information.

## ■ Forecast accuracy in IEMR's Mobile Forecasts

The joke among forecasters is that “the hardest thing to forecast is the future”. At IEMR, we breath that reality every day! When looking at any forecast, clients are naturally concerned with its accuracy. Every quarter, IE Market Research Corp. produces Mobile Forecasts which contain forecasts of upto 65 metrics on more than 200 wireless operators around the world. Simply put, IEMR produces one of the most comprehensive and detailed forecasting models in the marketplace covering 80% of the world's population.

This White Paper discusses the level of accuracy in these forecasts.

## ■ Methodology

We investigate forecast accuracy by comparing the annual forecast for CY 2007 as contained in our 1Q.2007 Global Mobile Forecast (published in January 2007) and our 1Q.2008 Global Mobile Forecast (published in January 2008) with actual numbers reported by operators for CY 2007. We report the Mean Absolute Percentage Error (MAPE), one of the most commonly used indicators of forecast accuracy. MAPE is calculated as follows:

$$\text{MAPE} = \frac{\text{Sum of absolute errors}}{\text{Sum of actual values}}$$

where absolute errors are differences between actual values and the corresponding forecast values in absolute terms.

We define forecast accuracy (%) as follows:

$$\text{Forecast Accuracy (\%)} = 100 - \text{MAPE (\%)}$$

Having two points of reference, 1Q.2007 and 1Q.2008, enables us to see if forecast accuracy improves as we get closer to the published dates of actual values, as reported by operators worldwide.

## ■ Results

We present the Forecast Accuracy for key metrics from IEMR's Mobile Forecasts across operators in **Table 1**.

The results demonstrate that, overall, IEMR's forecasting models achieve a high level of accuracy across all data categories and operators. The number of subscribers (post-paid subscribers, prepaid subscribers, and overall subscribers) as

well as individual operators' market shares by subscribers are forecasted with above 90% accuracy (i.e. MAPE of less than 10%). In addition, forecasts of reported revenue are above 95% accurate (i.e. MAPE is below 5%).

On metrics such as ARPU, Data ARPU, EBITDA margins, and network usage metrics such as MOU per subscriber, we think that our 2007 model was fairly accurate, with model accuracy of 91.3% on ARPU and 83% - 88% on measures such as Data ARPU, EBITDA margins and MOU per subscriber.

Finally, on metrics such as Voice revenue per minute and monthly churn, we think that our model is not as accurate as it could be, primarily because of low model accuracy in emerging markets. On Voice revenue per minute, our model achieved a 75.8% accuracy and on monthly churn, our model achieved a 72.9% accuracy.

**Table 1** also shows that our forecasts get better, the closer we get to the end of a calendar year (given that we've included more recent data from operators). This result confirms that IEMR's forecasting models are able to incorporate the most recent data as they become available, and produce more accurate forecasts as we get closer to the published date of the actual numbers.

**Table 1:** Forecast Accuracy of IEMR's Global Mobile Forecast (1Q.2007 and 1Q.2008 compared to actual CY 2007 results as reported by operators)

	Actual Values reported by operators compared to Forecast Values from 1Q07	Actual Values reported by operators compared to Forecast Values from 1Q08
Subscriber	94.7%	97.2%
Post-paid subscribers	90.1%	93.2%
Prepaid subscribers	90.5%	93.2%
Share of total subs	93.7%	95.8%
Reported revenue	95.2%	95.3%
ARPU	91.3%	90.1%
MOU per subscriber	87.3%	89.7%
EBITDA / reported revenue	87.9%	94.8%
CAPEX / reported revenue	84.7%	84.5%
Data % of service revenue	86.1%	86.1%
Data ARPU	83.0%	83.0%
Voice revenue per minute	75.8%	79.4%
Monthly churn	72.9%	86.4%

Source: IEMR



■ **Forecast accuracy for individual operators**

For individual operators, we used the following formula for forecast error.

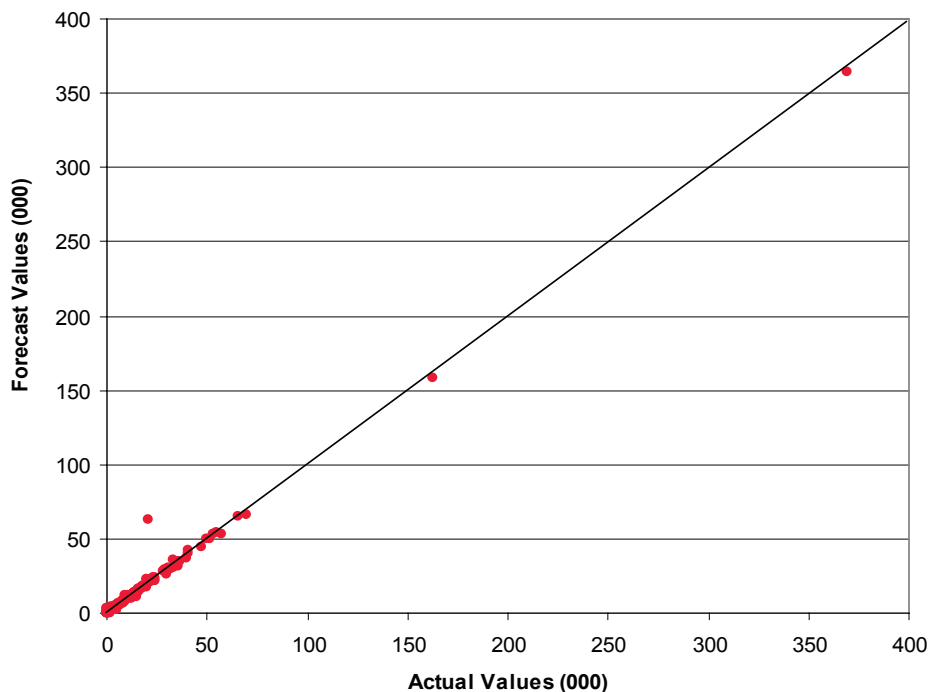
$$\text{Forecast error (\%)} = \frac{|(\text{Actual value} - \text{Forecast value})|}{\text{Actual value}}$$

Then, we defined forecast accuracy (%) as follows.

$$\text{Forecast accuracy (\%)} = 1 - \text{Forecast error (\%)}$$

**Chart 1** presents a scatterplot of all of the combinations of actual values and the forecast values for subscriber data on 200+ operators we cover. For example, we achieved a forecast accuracy of 96.6% for Sprint-Nextel in the United States where our forecast value was 42.2 million (1Q.2007) and the actual reported value by Sprint-Nextel was 40.7 million (for CY 2007).

**Chart 1:** Forecast accuracy in number of subscribers: Comparison of forecast values from 3Q.2007 with actual values from 3Q.2008



Sprint-Nextel  
Actual: 40,748  
Forecast: 42,155  
Forecast accuracy: 96.55%

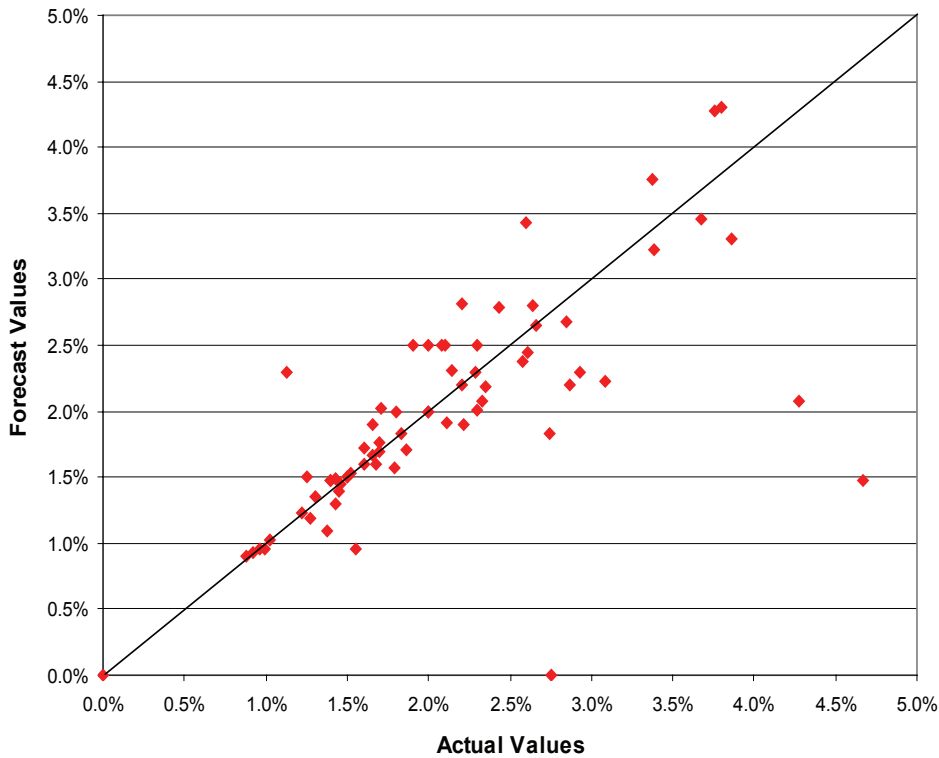
China Unicom  
Actual: 162,491  
Forecast: 158,766  
Forecast accuracy: 97.71%

China Mobile  
Actual: 369,339  
Forecast: 363,732  
Forecast accuracy: 98.48%

Source: IEMR

As described above, our forecasts of monthly churn are not as accurate as our forecasts for subscriber data. **Chart 2** presents the combinations of actual values and forecast values for the 200+ operators we cover. For example, forecast accuracy for Sprint-Nextel was 85.59% as our forecast value was 1.90% and the actual value was 2.22%.

**Chart 2:** Forecast accuracy in Monthly Churn: Comparison of forecast values from 3Q.2007 with actual values from 3Q.2008



Sprint-Nextel  
Actual: 2.22%  
Forecast: 1.90%  
Forecast accuracy: 85.59%

China Unicom  
Actual: 2.57%  
Forecast: 2.37%  
Forecast accuracy: 92.16%

China Mobile  
Actual: 2.64%  
Forecast: 2.80%  
Forecast accuracy: 93.94%

Source: IEMR

In Table 2 below, we provide detailed operator-level forecast accuracy figures for selected key metrics to give our clients a solid sense of how accurate our forecasts are for specific operators. With an average forecast accuracy ranging from 81% - 92% and a standard deviation of between 10% - 15%, we see that IEMR's forecast model is fairly robust across operators in different parts of the world. On average, for all of the metrics we cover combined, our 2007 forecasts had an accuracy of 83.4%.



**Table 2:** Forecast Accuracy for selected metrics in IEMR's Global Mobile Forecast (1Q.2007 compared to actual CY 2007 results as reported by selected operators)

Country	Selected Operator	Subscribers	Monthly Churn	Reported Revenue	ARPU	Data ARPU	MOU per subscriber	EBITDA Margins	CAPEX/ Reported Revenue
Algeria	Djezzy	98.90%		96.47%	98.89%			97.76%	86.54%
Argentina	Telecom Argentina (TI)	97.68%	93.98%	96.95%	95.05%		88.15%	85.13%	
	Movistar	96.36%		97.30%	97.98%		5.47%	99.80%	
	CTI (AMX)	94.22%	90.15%	97.21%	95.73%		94.45%	97.39%	92.33%
Australia	Nextel	99.62%	96.47%	98.45%	98.08%			96.80%	
	Telstra	97.97%	85.14%	88.30%	89.46%	75.89%	89.54%	97.98%	
	Optus	98.21%	91.23%	96.53%	98.26%	85.75%	93.92%	96.24%	35.90%
	Vodafone	94.67%	100.00%	95.58%	99.77%	80.67%	99.81%	97.86%	
Austria	Hutchison	84.34%	0.00%	79.36%	87.26%	90.90%	98.67%	64.18%	59.05%
	Mobilkom	95.23%		98.07%	98.31%			98.57%	72.31%
	T-Mobile	97.16%		96.44%	83.28%			73.36%	92.17%
Bangladesh	Connect Austria	92.83%		88.59%					
	Bangalink/Sheba	86.74%		78.31%	87.95%			133.48%	65.62%
	GrameenPhone	98.51%		93.98%	93.50%			81.91%	68.74%
Belgium	Proximus	98.41%		80.24%	84.80%			87.15%	85.51%
	Mobistar (Orange)	96.50%		88.36%	98.37%			99.50%	84.73%
Brazil	Base	99.13%		90.96%	80.46%			98.72%	84.23%
	Vivo	91.89%	99.62%	88.95%	93.79%	94.23%	98.27%	92.59%	82.82%
	TIM Brazil (TI)	94.20%	76.62%	93.26%	95.37%	94.79%	99.95%	94.93%	96.87%
	Claro Brazil	92.52%	85.52%	92.16%	96.39%	97.89%	93.48%	98.54%	99.63%
Canada	Oi	96.58%	78.40%	94.63%	97.95%	75.99%		42.08%	92.91%
	Bell Mobility	98.49%	96.03%	89.19%	96.47%		92.36%	99.28%	76.65%
	Rogers Wireless (incl. Microcell)	96.85%	92.70%	92.57%	90.91%	75.81%	97.25%	96.97%	95.25%
	Telus Mobility	98.82%	99.31%	96.08%	95.09%	76.92%	97.40%	99.22%	97.15%
Chile	Movistar Chile	93.88%	72.39%	82.07%	82.16%		97.72%	49.54%	
	Entel Chile	97.75%	88.10%	92.83%	90.38%	89.77%	99.20%	95.67%	
	Claro Chile	63.98%	48.57%	82.98%	98.26%		97.72%	284.50%	
China	China Mobile	98.48%	93.94%	97.98%	97.44%	97.92%	97.21%	97.99%	96.64%
	China Unicom	97.71%	92.16%	96.09%	94.27%	98.68%	94.88%	94.89%	97.89%
Colombia	Comcel (AMX)	99.54%	87.36%	94.48%	93.93%		97.78%	80.34%	73.55%
	Movistar	93.46%	88.56%	96.54%	85.62%			98.97%	
	Tigo Colombia	87.99%	31.56%	72.11%	54.97%			57.23%	
Czech Republic	Telefonica O2	96.79%	61.53%	85.34%	87.57%			95.94%	
	T-Mobile	97.70%	79.62%	88.20%	82.92%				
	Vodafone	92.53%	93.19%	79.44%	90.28%				
Denmark	TDC Mobil								
	Orange	86.18%		96.16%	98.02%			98.52%	69.79%
	3 (Hutchison)	79.30%		89.35%	97.80%			54.03%	90.85%
<b>Average Accuracy</b>		<b>90.26%</b>	<b>83.41%</b>	<b>90.55%</b>	<b>88.48%</b>	<b>80.56%</b>	<b>89.10%</b>	<b>91.57%</b>	<b>82.90%</b>

Source: IEMR

**Table 2:** Forecast Accuracy for selected metrics in IEMR's Global Mobile Forecast (1Q.2007 compared to actual CY 2007 results as reported by selected operators)

Country	Selected Operator	Subscribers	Monthly Churn	Reported Revenue	ARPU	Data ARPU	MOU per subscriber	EBITDA Margins	CAPEX/Reported Revenue
Egypt	ECMS	85.87%	80.00%	88.81%	97.55%	82.94%	92.15%	95.30%	92.04%
	Vodafone	87.66%	100.00%	86.72%	95.65%	85.22%	93.55%	96.04%	83.88%
	Etisalat	31.76%	100.00%	96.99%					
Finland	Sonera	86.85%		95.32%	98.96%			91.08%	97.75%
	Elisa	99.60%		98.51%	98.02%			99.24%	100.00%
France	Orange	97.28%		95.62%	95.11%			97.13%	75.80%
	SFR	96.71%		99.10%	95.84%			97.39%	60.12%
	Bouygues	98.47%		93.78%	95.58%			96.24%	98.87%
Germany	T-Mobile	88.72%		96.43%	96.96%			97.36%	33.48%
	D2	92.74%		98.94%	98.34%			88.41%	93.92%
	E-Plus	93.56%		97.93%	97.58%			89.71%	97.83%
	O2	94.41%		92.61%	99.48%			12.84%	70.82%
Greece	Panafon	97.10%		97.13%	96.73%			91.22%	95.81%
	Cosmote	92.34%		97.62%	93.47%			95.76%	91.58%
Hong Kong	Hutchison	93.42%	86.84%						
	SmarTone	99.82%	91.30%	94.20%	95.53%			96.56%	88.91%
Hungary	T-Mobile	95.86%	95.90%	95.70%	92.53%			89.94%	
	Pannon	84.69%		83.36%	89.58%			92.54%	
	Vodafone	95.86%		95.97%	95.45%				
India	RCom	98.93%		88.66%	89.22%			98.76%	94.02%
	Vodafone-Essar	91.55%							
	Bharti-Airtel	98.68%		94.11%	94.90%			96.24%	74.14%
	BSNL	91.83%							
Indonesia	Telkomsel	92.65%		99.25%	95.58%			95.20%	99.61%
	Satelindo + IM3	91.56%		96.88%	99.17%			87.73%	30.04%
	Excelcomindo	96.44%		96.29%	99.62%			96.88%	96.07%
	Telkom Flexi	95.95%		80.67%					
	StarOne	65.86%		80.83%					
Ireland	Vodafone	96.11%		94.30%	97.14%			98.86%	98.80%
	O2	97.81%		88.68%	93.49%			78.40%	72.95%
	Meteor	69.65%		76.74%				71.71%	
Israel	Cellcom	99.18%		89.14%	86.64%	65.84%		91.37%	94.31%
	Pelephone	96.35%	100.00%	86.14%	91.48%	41.11%	91.41%	95.46%	90.24%
	Partner	97.27%	80.00%	85.00%	87.98%	81.06%	92.43%	99.29%	97.20%
Italy	TIM	95.10%		97.27%	97.81%			96.74%	100.00%
	OPI Vodafone	92.41%		94.27%	98.37%			98.37%	97.11%
	Wind	99.15%			97.31%				
Japan	NTT DoCoMo	99.63%	97.07%	99.71%	99.07%	96.46%	99.33%	99.91%	69.78%
	KDDI (au)	98.95%	97.25%	96.95%	97.80%	97.67%	99.93%	95.71%	95.71%
	Softbank Mobile	93.22%	95.49%	95.14%	97.40%	94.38%		99.71%	67.87%
<b>Average Accuracy</b>		<b>90.26%</b>	<b>83.41%</b>	<b>90.55%</b>	<b>88.48%</b>	<b>80.56%</b>	<b>89.10%</b>	<b>91.57%</b>	<b>82.90%</b>

Source: IEMR



**Table 2:** Forecast Accuracy for selected metrics in IEMR's Global Mobile Forecast (1Q.2007 compared to actual CY 2007 results as reported by selected operators)

Country	Operator	Subscribers	Monthly Churn	Reported Revenue	ARPU	Data ARPU	MOU per subscriber	EBITDA Margins	CAPEX/ Reported Revenue
Malaysia	Maxis	95.91%		96.87%	79.25%			100.00%	100.00%
	Celcom	96.54%		88.47%	65.47%			98.66%	90.51%
	DiGi.Com	99.24%		88.91%	84.37%			94.12%	95.86%
Mexico	Telcel (AMX)	99.90%	95.15%	97.20%	95.57%	52.66%	95.10%	98.12%	2.06%
	Iusacell	60.30%	86.20%	83.58%	99.33%			73.66%	
	Movistar	92.57%	67.92%	83.30%	86.10%		61.37%	85.61%	
	Nextel Intl	98.44%	91.78%	98.18%	96.17%		96.10%	93.34%	
Morocco	Maroc Telecom	95.12%	100.00%	86.57%	93.61%			93.49%	96.19%
	Medi Tel	89.80%		73.24%	56.47%			91.11%	
	KPN Mobile	94.46%		98.61%	95.82%			92.05%	87.72%
	Vodafone	97.08%		89.60%	90.96%			90.33%	84.26%
New Zealand	TCNZ	92.19%	100.00%	91.04%	86.76%	87.33%	84.08%	100.00%	
	Vodafone	97.44%	100.00%	99.18%	97.12%	97.12%	85.04%	100.00%	
Nigeria	MTN	98.65%		86.02%	82.20%			90.55%	
Norway	Telenor Mobil	93.31%		97.11%	98.36%			88.22%	98.78%
	Netcom	97.61%		98.67%	96.59%			88.12%	99.02%
Pakistan	Mobilink	98.34%			63.13%				
	Ufone	87.06%			57.39%				
	Paktel	57.51%			78.30%				
Peru	Movistar Peru	82.54%		92.42%	93.61%			83.17%	
	Claro Peru	91.95%	92.81%	97.37%	92.51%		91.19%	83.87%	
	Nextel	95.37%	89.27%	98.39%	91.92%			92.12%	
Philippines	Globe	87.11%		84.98%	86.40%	97.15%		98.24%	94.14%
	PLDT	87.14%		80.40%	99.39%	87.92%		94.94%	64.59%
Poland	PTC (T-Mobile)	97.71%	80.95%	84.05%	87.71%		89.47%	100.00%	
	Polkomtel	96.33%	68.42%	87.46%	82.83%		93.75%	100.00%	
	PTK Centertel	97.29%	75.00%	87.86%	56.22%		86.27%	100.00%	
Portugal	TMN	94.30%		95.26%	97.06%			97.74%	94.60%
	Telecel	96.09%		92.81%	94.22%			92.80%	84.28%
	Optimus	91.49%		93.90%	99.49%			75.94%	
Russia	MTS	92.84%	100.00%	90.47%	92.31%	91.43%	65.34%	99.92%	85.08%
	VimpelCom	97.17%	66.91%	91.18%	75.11%	71.88%	76.65%	97.45%	96.85%
Singapore	SingTel	80.64%	100.00%	92.08%	98.38%	91.73%	100.00%	78.38%	
	Mobile One	88.84%	100.00%	95.36%	99.13%	95.09%	100.00%	89.75%	72.91%
	StarHub	93.54%	100.00%	91.40%	93.21%	93.21%	100.00%	89.66%	
South Africa	Vodacom	93.63%		95.39%	97.03%			97.20%	
	MTN (M-Cell)	97.31%		93.60%	99.10%			93.60%	
	Cell C	75.84%		93.15%	81.00%				
<b>Average Accuracy</b>		<b>90.26%</b>	<b>83.41%</b>	<b>90.55%</b>	<b>88.48%</b>	<b>80.56%</b>	<b>89.10%</b>	<b>91.57%</b>	<b>82.90%</b>

Source: IEMR

**Table 2: Forecast Accuracy for selected metrics in IEMR's Global Mobile Forecast (1Q.2007 compared to actual CY 2007 results as reported by selected operators)**

		Subscribers	Monthly Churn	Reported Revenue	ARPU	Data ARPU	MOU per subscriber	EBITDA Margins	CAPEX/ Reported Revenue
South Korea	SK Telecom	95.96%	93.96%	95.28%	97.58%	97.63%	97.43%	96.40%	88.22%
	KTF	99.55%	85.53%	97.20%	96.71%	96.55%	98.28%	61.73%	97.76%
	LG Telecom	96.20%	93.86%	93.98%	98.48%	85.27%	96.79%	38.96%	96.75%
Spain	Telefonica Moviles	95.70%		94.53%	96.68%			99.89%	86.26%
	Vodafone	93.49%		94.80%	98.18%			94.09%	93.67%
	Orange	93.93%		98.34%	93.59%			88.69%	81.86%
	Xfera	87.59%		94.73%	76.79%			153.41%	96.55%
Sweden	Telia	97.91%		93.70%	98.70%			90.30%	93.84%
	Tele 2	86.80%		97.81%	93.14%			90.06%	57.28%
	Telenor	99.57%		94.45%	98.62%			100.00%	96.86%
	3 (Hutchison)	97.48%							
Switzerland	Swisscom	94.69%		89.06%	94.15%			90.56%	80.50%
	Orange	93.05%		86.72%	80.58%				
	Sunrise/TDC	91.07%		97.23%	92.92%			93.85%	
Taiwan	Chunghwa	99.86%			98.38%		100.00%		
	Taiwan Cellular Corp.	99.94%	82.23%		99.66%		98.06%		
	Far Eastone	98.31%	92.08%		96.15%		96.52%		
Thailand	Advanced Info Service	91.77%	100.00%	69.05%	96.75%		100.00%	94.21%	49.13%
	Total Access	92.10%		75.94%	95.68%			95.83%	69.13%
	TA Orange	79.28%		88.24%	91.49%				
Turkey	Turkcell	97.26%	99.48%	87.65%	86.89%	70.03%	96.25%	96.07%	74.88%
	Vodafone	98.38%			93.34%				
Ukraine	UMC	86.16%	89.29%	97.69%	91.44%	91.94%	90.44%	99.99%	64.81%
	Kyivstar	98.76%		97.78%	93.04%		97.10%	98.93%	
United Kingdom	Vodafone	95.68%		97.70%	99.83%			98.24%	99.98%
	O2	99.73%		96.88%	92.84%			97.98%	88.78%
	Orange	98.34%		94.11%	96.18%			60.56%	52.33%
	T-Mobile (One2One)	99.97%		99.21%	82.54%			90.59%	87.75%
	3 (Hutchison)	97.52%			86.45%				
United States	Verizon Wireless	99.76%	99.18%	98.53%	99.89%	93.91%	97.08%	96.91%	94.69%
	Cingular Wireless	94.16%	95.52%	97.17%	99.12%	93.41%	99.30%	94.08%	64.12%
	AT&T Wireless								
	Sprint-Nextel	96.55%	85.59%	99.62%	99.91%	68.29%	96.99%	93.26%	74.25%
	T-Mobile USA	98.80%	0.00%	99.53%	0.00%	0.00%	0.00%	97.48%	83.65%
Venezuela	Movilnet	95.83%		92.12%	76.99%	47.41%	94.43%	79.08%	
	Movistar	92.42%		93.90%	99.89%			89.68%	
<b>Average Accuracy</b>		<b>90.26%</b>	<b>83.41%</b>	<b>90.55%</b>	<b>88.48%</b>	<b>80.56%</b>	<b>89.10%</b>	<b>91.57%</b>	<b>82.90%</b>

Source: IEMR



## ***IEMR's Clients Include:***

Nokia ● Motorola ● Qualcomm ● Samsung (Germany) ● Palm  
Canada ● Google ● SK Telecom ● Tellabs ● PCCW ● Meteor  
Mobile ● Sunrise Communications AG ● Djezzy (Algeria) ● Anovoss ● Brightpoint de Colombia ● Embarq Corporation ● Topoly Optoelectronics ● SES Americom ● Total Choice Communications ● Goldman Sachs ● Deutsche Bank ● Lazard ● Stifel Financial Corp. ● Tatica Asset Management ● TA Associates ● Bain Capital ● Westpac Banking Corporation ● PWC ● KPMG ● McKinsey ● Oliver Wyman ● Booz Allen Hamilton ● Monitor Group ● Bain & Company ● Womble Carlyle LLP ● Salomaa Group/AS-Grey Oy ● OC&C Strategy Consultants ● Accenture ● Merrill Lynch ● Telus ● Cyrte Investments ● Jetro Japan ● AT&T ● Analysys ● Mason Everett Harris & Co. ● Xcerion AB ● Brevan Howard Asset Management LLP ● Implementation Force AG ● Dreamsecurity Co. Ltd. ● Alacra ● Turkcell ● Blackhill Partners LLC ● Verisign ● Noonday Global Management Ltd. ● Advantis ● Deloitte (Italy) ● Voxpartners Inc. ● Mobilink ● Sunbay Group Limited ● Evercore Partners ● Hutchison Telecommunications Australia Ltd. ● ABC Australia ● Comverse Inc. ● Shared Access LLC ● Standard Chartered Bank PLC ● Madison Dearborn Partners ● 1to1 Media ● KPMG Canada ● Deloitte (United Kingdom) ● Glenview Capital ● First National Bank Mobile and Transaction Solutions ● AsiaCell ● Global Intelligence Alliance Group ● Australian Communications and Media Authority ● Anite PLC ● Minnow Wireless ● RMG Connect ● British Telecom ● Verizon Wireless

## **Disclaimers and Disclosures**

The opinions expressed in this report are the true opinions of the analyst(s) and IE Market Research Corp. (IEMR) about the firm(s) and/or industry appearing in this report. Any “forward looking statements” are the best estimates and opinions of the analyst(s) and IEMR based upon information that is publicly available and that the analyst(s) and IEMR believes to be correct. There is no guarantee that forecasts appearing in this report will materialize.

The analyst(s) responsible for preparing this research report received compensation that is based upon various factors, including total revenues of IEMR, a portion of which are or have been generated by consulting and contract research activities undertaken by IEMR for firm(s) appearing in this report. The analyst(s) and/or IEMR does not own any shares of the firm(s) appearing in this report, does not make or offer for sale shares of the firm(s) appearing in this report, and does not have any investment banking business with firm(s) appearing in this report. IEMR may have been contracted by firm(s) appearing in this report to undertake competitive intelligence, business strategy, market research, branding research, and/or public opinion research activities. No part of the compensation of the responsible analyst(s) named herein is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the responsible analyst(s) in this report.

### **Forward Looking Statements**

This report contains forward looking statements. Forward looking statements regarding firm(s) inherently involve risks and uncertainties that could cause actual results to differ from such forward looking statements. Factors that could cause or contribute to such differences include, but are not limited to, continued acceptance of the firm(s)' products/services in the marketplace; acceptance in the marketplace of the firm(s)' new products/services; competitive factors; new products/services introductions by others; technological changes; dependence on suppliers; mergers and acquisitions; systematic risks and other risks discussed in the firm(s)' periodic report filings, including interim reports, annual reports, and annual information forms filed with the appropriate securities regulators. By making these forward looking statements, the analyst(s) and IEMR undertake no obligation to update these statements for revisions or changes after the date of this report.

### **Warranties**

The information contained in this report has been compiled by IEMR from sources believed to be reliable, but no representation or warranty, express or implied, is made by IEMR or any other person as to its accuracy, completeness or correctness. IEMR does not make any warranties, expressed or implied, as to results to be obtained from using this information and makes no express or implied warranties or fitness for a particular use. Clients using this report assume full responsibility for whatever results they obtain from whatever use the information was put to. To the full extent permitted by law neither IEMR nor any other person accept any liability whatsoever for any direct or consequential loss arising from any use of this report or the information contained herein.

### **Dissemination of Research**

IEMR endeavours to make all reasonable efforts to provide research simultaneously to all eligible clients. However, IEMR's premium clients may have access to IEMR research prior to research being disseminated more widely. IEMR's research is posted to our proprietary website to ensure eligible clients receive intelligence in a timely manner. Additional distribution may be done by IEMR's sales personnel via email, fax or regular mail. Clients may also receive our research via third party vendors. Please contact our research department at 1-888-322-IEMR for more information regarding our research.



#### Licensing Agreement

Any survey data, forecasting data, and research reports and the information contained therein are the intellectual property of IEMR, and permission to use the same is granted on a single-user or multi-user basis to all Clients. IE Market Research Corp. will not distribute in any way, shape, or form results of contract research that would, in any way, harm the competitive position of its Client.

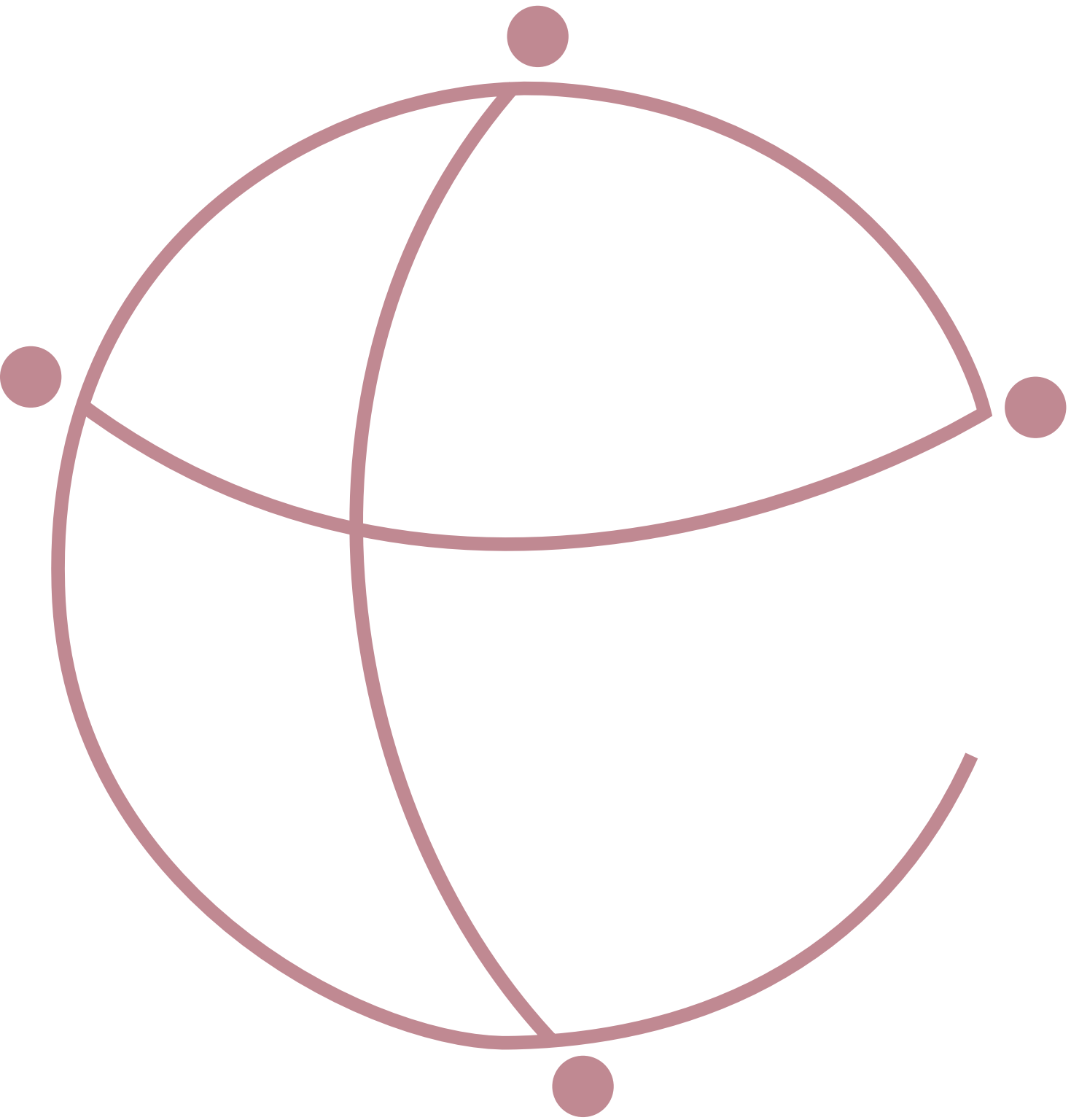
IE Market Research Corp. will be entitled to the copyright in all reports and other documents or electronic media produced by it in connection with work undertaken independently of any Client contract. In performing services, IE Market Research Corp. may use without limitation any of its property including hardware, software, IE Market Research Corp.'s proprietary products and confidential information and trade secrets of IE Market Research Corp. Such property will remain the property of IE Market Research Corp. and the Client shall acquire no right or interest in it.

IEMR's licensing agreement is perhaps the most liberal in the industry. Two licensing options are available for our Clients:

- **Single-user License:** Allows Clients to read, print, and distribute printed copies of IEMR survey data, forecasting data, and research reports (and all purchased elements therein) within the Client's organization, provided that IEMR is cited as the source. Clients are also allowed to use and manipulate this data for their internal corporate purposes, provided that IEMR is cited as the source. A Single-user License does not give the Client the right to electronically distribute IEMR survey data, forecasting data, and research reports to any other individual either within an organization or outside it.
- **Multi-user License:** Allows Clients to read, print, and distribute printed and electronic copies of IEMR survey data, forecasting data, and research reports (and all purchased elements therein) within the Client's organization, provided that IEMR is cited as the source. Clients are also allowed to use and manipulate this data for their internal corporate purposes, provided that IEMR is cited as the source. A Multi-user License does not give the Client the right to distribute IEMR survey data, forecasting data, and research reports to other individuals outside the Client's organization.

**CONSUMEREADY™** and **EXPORTREADY™** are registered trademarks of IEMR. Reproduction of material contained herein, in whole or in part or use for any public purpose is only permitted with the prior approval of IEMR. Courtesy copies of reproduced material are appreciated. Electronic reuse of the data contained herein is strictly prohibited.

© 2008 IE Market Research Corp.  
All rights reserved.





Excellence and Integrity in Research

Top Quality Service to Clients

Commitment to Client's Success

Transparency and Respect toward Employees

IE Market Research Corp.  
2300-1066 West Hastings Street  
Vancouver, B.C.  
V6E 3X2  
CANADA  
Tel: 1-888-322-IEMR  
Fax: +1-604-669-3844  
email: [info@iemarketresearch.com](mailto:info@iemarketresearch.com)  
Internet: [www.iemarketresearch.com](http://www.iemarketresearch.com)