



ITU-TRAI TRAINING ON CONSUMER PROTECTION

New Delhi, India

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TRC's initiatives on QoS in Cambodia

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March 2016

⦿ General Overview

- Cambodia's Telecom Market
- User Perception on Telecommunication Services

⦿ Initiatives on QoS

- Mandate on QoS
- Framework on QoS to be considered

⦿ Way forward for Cambodia

Cambodia's Telecom Market

Telecom Services Operators

License Types	# of Operators
International Gateway	3
Mobile Phone	7
Fixed Phone (PSTN & WLL)	8
VoIP	18
ISP	31
Submarine Optical Cable Network	3
Optical Cable Network	3

Terrestrial Fiber Optical Network

Operators	Length
CFOCN	8,300 km
Viettel (Cambodia)	17,200 km
Telecom Cambodia	1,600 km
Total:	27,100 km

Core Statistics as of EoY 2015

Mobile Phone Subscriptions: **20,850,543 (135.35%)**

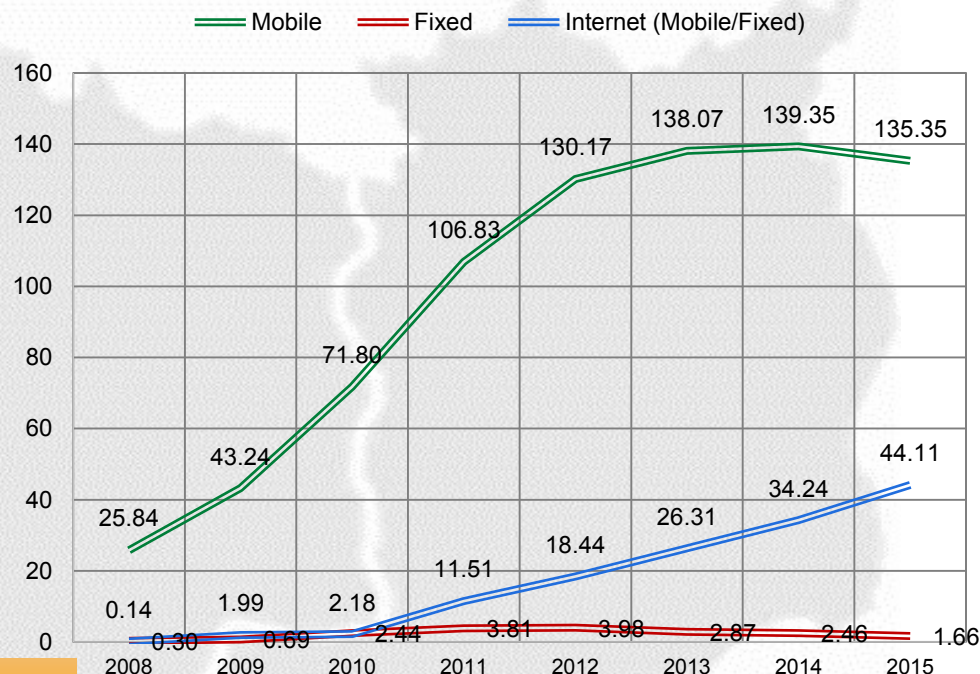
Fixed Phone Subscriptions: **256,387 (1.66 %)**

Internet Subscriptions: **6,795,908 (44.11%)**

Mobile Internet Subscriptions: 6,710,524

Fixed Internet Subscriptions: 85,384

PENETRATION



Telecom Services Fee

Year	2005	2008	2015
International Phone Call per Minute	2.76 US\$	0.86 US\$	0.035 US\$
Retail Internet Price for 1 Mbps	1000 US\$ / Mbps	350 US\$ / Mbps	10 US\$ - 20\$ / Mbps

Operator	Frequency (MHz)	Band	Duplex Mode	Launch Date
Viettel (Cambodia)	1800	3	FDD	Jan 2014
SEATel	850	5	FDD	July 2015
Viettel (Cambodia)	1800	3	FDD	Nov 2015
CamGSM (Mobitel)	1800	3	FDD	Nov 2015

User Perception on Telecommunication Services

"គ្មានអ្វីដូចគ្នាទាំងអស់នោះទេ"

និយាយមែនទែនទៅ អ្នកទិញទូរសព្ទដៃប្រើ ដំបូងលើយទិញដើម្បីងាយស្រួល ទាក់ទងគ្នា តែបន្ទាប់ពីប្រើយូរទៅ គឺចេះតែចង់អាចប្រើសម្រាប់ លេងហ្គេម ថតរូប លេងអ៊ីនធឺណិតលើទូរសព្ទដៃរបស់ខ្លួន។ មិនខុសគ្នាអី និងអ្នកភ្ជាប់ អ៊ីនធឺណិត តាមផ្ទះទេ ដំបូងគិតថាប្រើតាមអ៊ីនធឺណិត គ្រប់ហើយតែក្រោយមកទៀតគាត់ចាប់ផ្តើមឮឃ្លាថា មានតាដែលៗ។ បើ គាត់ចាប់ផ្តើមចង់...មើលកូនតាមអ៊ីនធឺណិត...មើល YOUTUBE កំរិត HD ... ដោយសារតែល្បឿនទាន់ចិត្តអីណាស់ណាចឹងទៀតទៅ។... See More



9,672 Views

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- Jury Kang Dach** internet everyday
Like · Reply · May 11 at 10:09am
- Oudom Sim** Sor ta fast speed tar slow Jong ngob 🙄🙄🙄🙄
Like · Reply · May 11 at 11:01am
- B'Den 0nlizz HB** Fast os yey
Like · Reply · 1 · May 11 at 11:54am



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- Write a comment...
- Piseth Panhavath** U're cheating customers, SMART! I'm on fire with u now!
Like · Reply · June 11 at 2:40pm
- Smart Axiata** Hello what is your problem? May I help you sir?
Like · June 11 at 3:07pm
- View more replies
- Yang Mara Smart** ឥឡូវ យើង ណាស់ internet and fb
Like · Reply · June 11 at 12:39pm
- Smart Axiata** hi dear Please kindly tell us about your phone



Like · Comment · Share

- Metfone and 794 others like this.
- Most Relevant
- Write a comment...
- Maryan Sen Daisy** Signal at srok cherng prey kompong cham province is weak.
Like · Reply · April 18 at 11:35am
- Metfone** Dear Maryan Sen Daisy thanks you for information provide could you tell us about contact number? we will check for you



Slow
Internet!

Weak
Coverage!

Call
Disconnected!

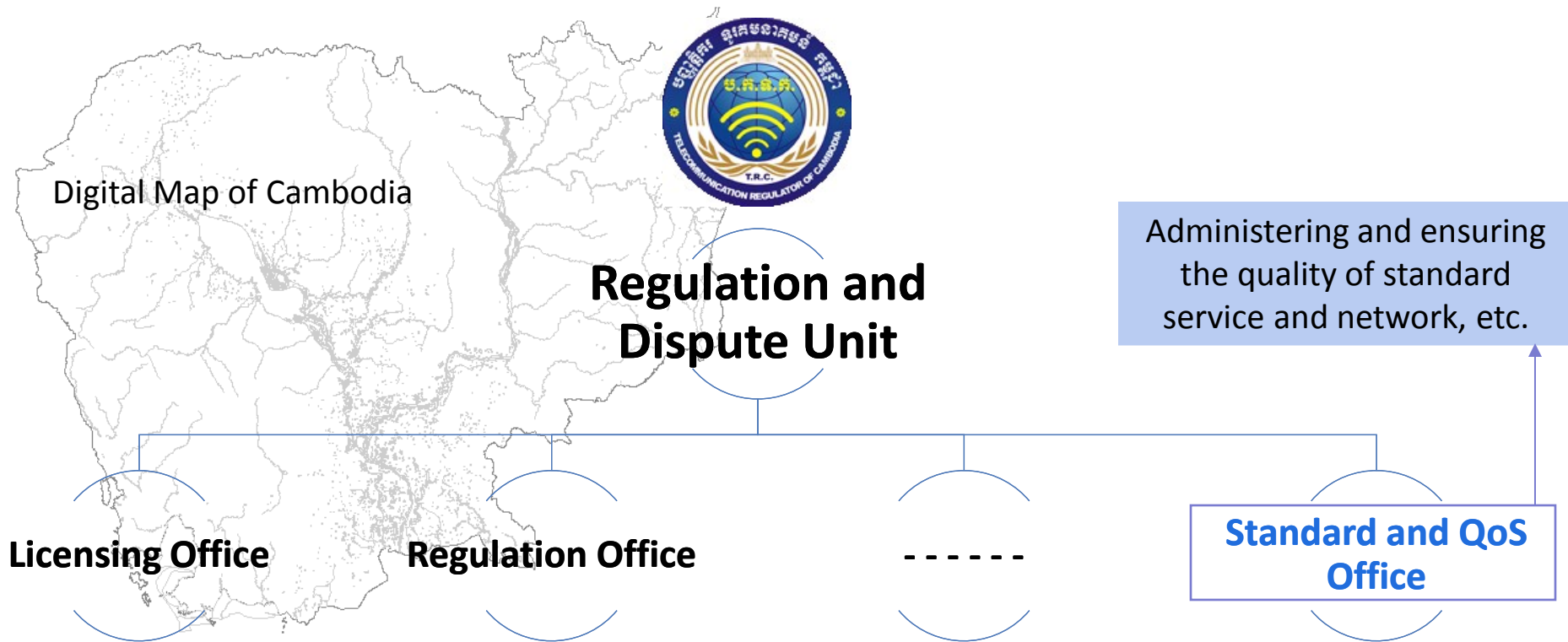
Cannot
Call out!

Mandates on QoS

- ⊙ One of the objectives stating in Article 1 of Law on Telecommunications of Cambodia: ***“To ensure the utilization and provision of effective, safe, quality, reliable, and affordable telecommunication infrastructure, networks and services in response to the needs of social and economic development”***
- ⊙ Dedicatedly, Part 3 of Chapter 5 of Law on Telecommunications is specific for STANDARD, QUALITY OF SERVICES AND TELECOMMUNICATIONS EQUIPMENT: ***“MPTC* shall set criteria of standard of providing quality telecommunication services”***
- ⊙ Various meetings and workshops with the industry have been incorporated in the agenda on Quality of Service.
- ⊙ Since 2015, TRC has been equipped with a complete set of Nemo drive test tool and a R&S Scanner.

*MPTC: Ministry of Posts and Telecommunications, the sector ministry.

Mandates on QoS (Cont.)



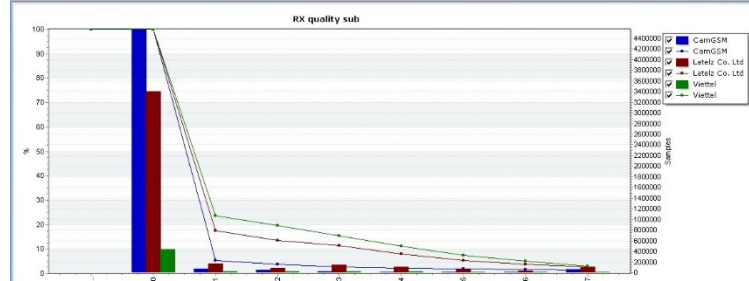
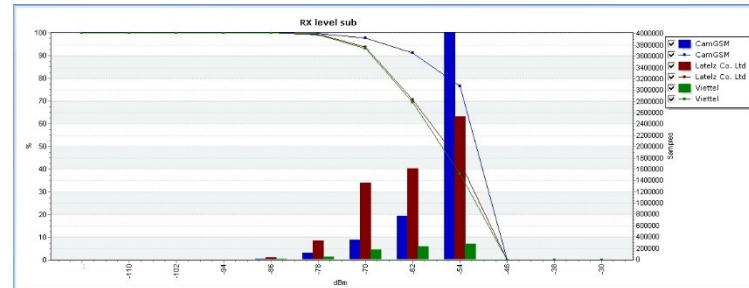
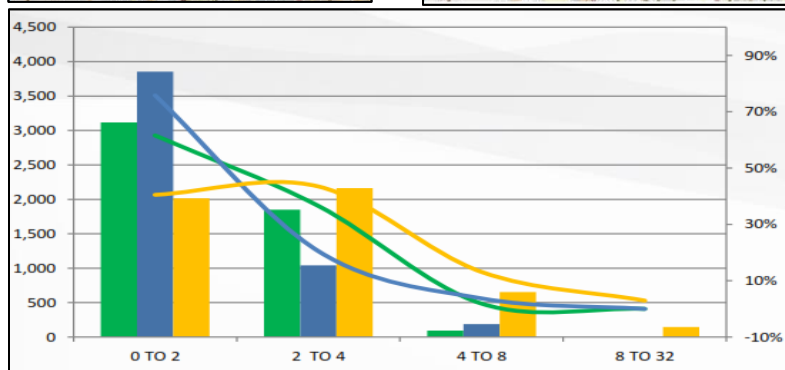
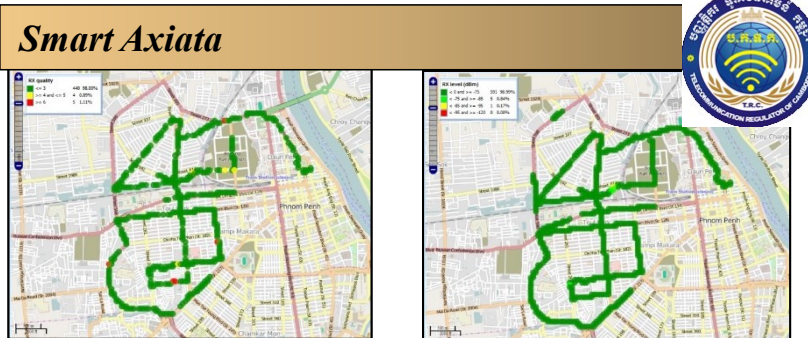
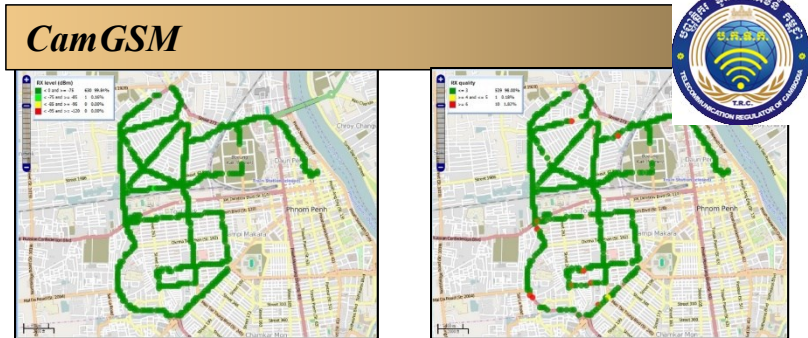
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NEMO
User Club



Mandates on QoS (Cont.)

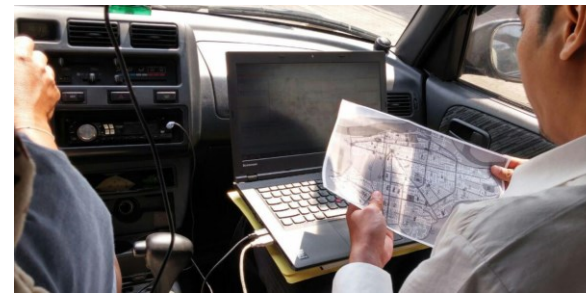
☉ Drive Test are performed regularly by TRC to monitor the level of QoS.



KPI	CamGSM	Smart Axiata
Call Attempts	144	161
Blocked Calls	0	0
Blocked Call Rate	0.00%	0.00%
Call Connected	136	158
Call Setup Success Rate	94.44%	98.14%
Dropped Calls	1	4
Dropped Call Rate	0.74%	2.53%
Handover Success	263	98
Handover Failure	0	1
Handover Success Rate	100.00%	0.98%

Awareness and Capacity Building on QoS

- A workshop between TRC and the operators with QoS agenda on the surface of discussion was held in Phnom Penh in June 2015.
- For capacity building, TRC organized and dispatched its staffs for training on QoS both in the country and oversea.



Framework on QoS to be considered

TRC's initiatives

Collaboration on Experience and Best Practice on QoS

Input for Draft of framework on QoS for Cambodia

Awareness and implementation the QoS

[Establishment of telecommunication services which are accepted by users]

[Help the operators to manage and provide the services with good quality]

[Ensure inter-operability]

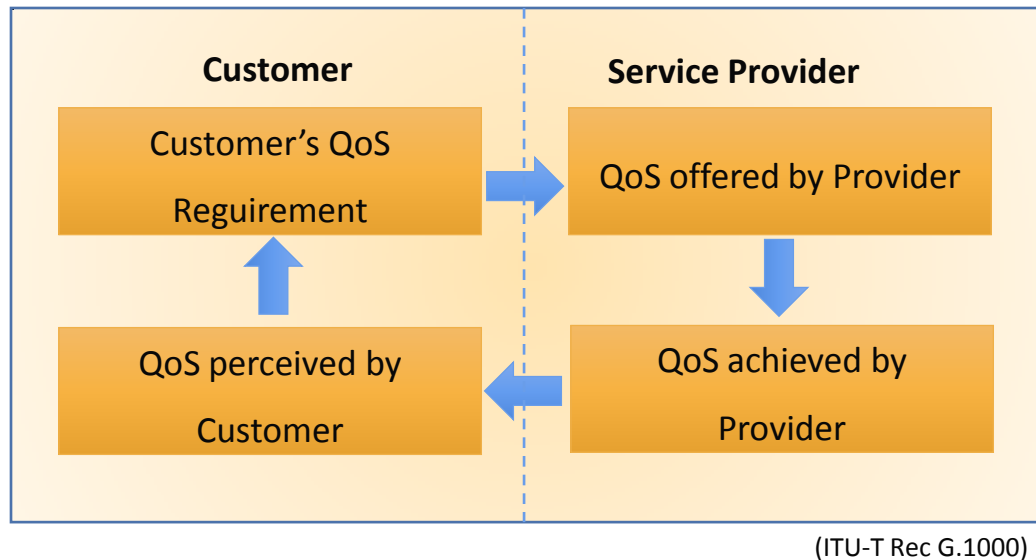
[Ensure the value for money of users]

[Stimulate for fair competition through quality of service]

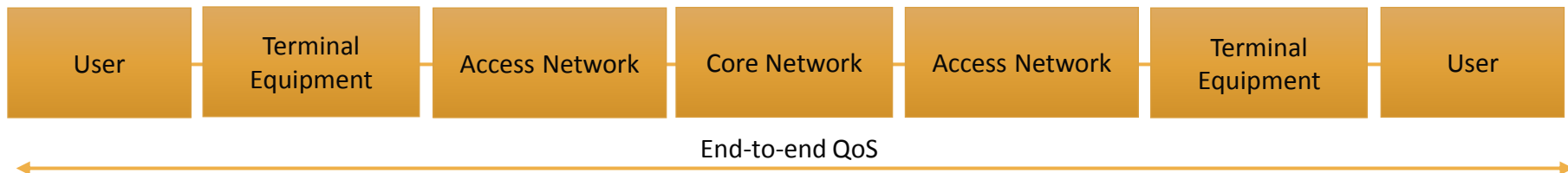
Customer Protection

Framework on QoS to be considered (Cont.)

Four viewpoints of QoS

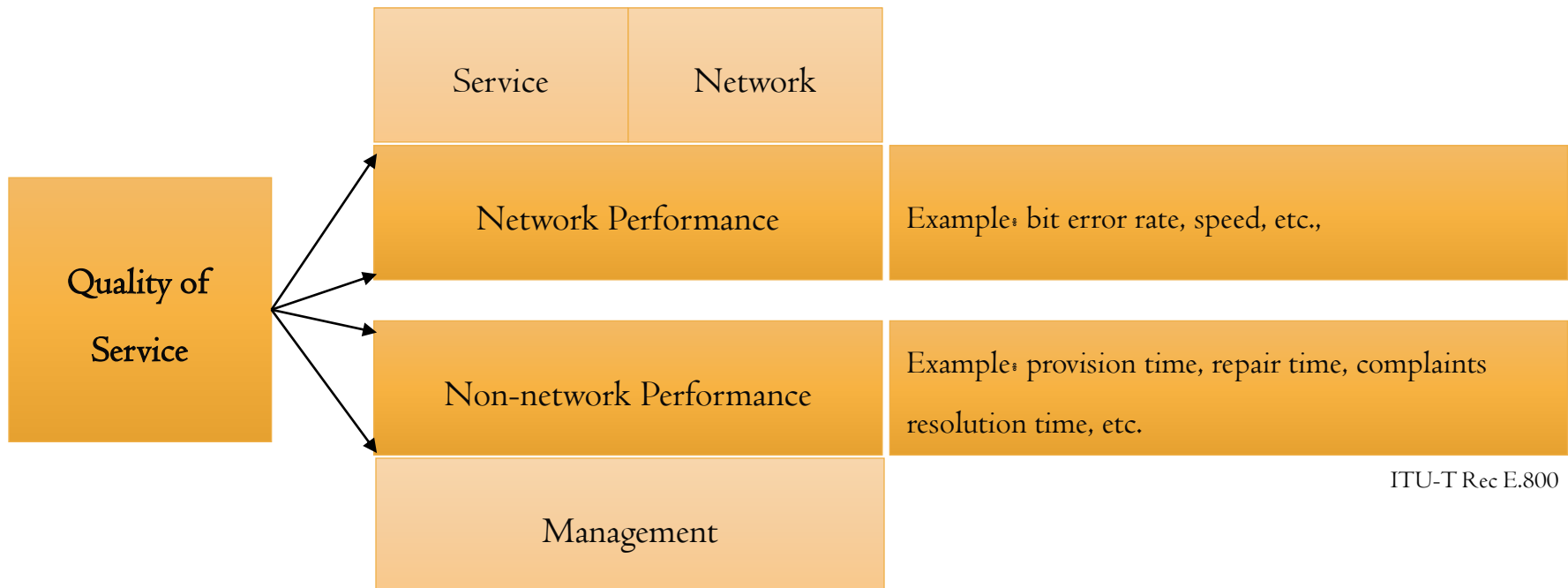


The end-to-end QoS depends on the contributions made by the components as illustrated below:



Framework on QoS to be considered (Cont.)

- TRC shall focus on the two aspects of QoS performance, which comprise both Network Performance and Non-Network related performance. Examples of NP are bit error rate, latency, etc., and for non-network performance provision time, repair time, range of tariffs and complaints resolution time, etc.



Framework on QoS to be considered (Cont.)

⊙ Sources of data for QoS monitoring and evaluation:

- **Drive Test:** the actual environment at the field
- **Network Element Counters:** the situation seen in the operator's network

⊙ Parameters for QoS monitoring:

- Indicators for Fixed Phone Service
- Indicators for Mobile Phone Service
- Indicators for Internet Services



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en\Google Drive\

⊙ Example of some parameters to be focused for drive test and ranges of color legend in the QoS framework:

4G Serving Cell RSRP (dBm)		3G CPICH RSCP (dBm)		2G RxLevSub (dBm)		Classification
	Range		Range		Range	
	>= - 85		>= -80		>= -75	Excellence
	>= -95 and < -85		>= -87 and <-80		>= -82 and <-75	Good
	>= 105 and < -95		>=-100 and <-87		>=-95 and <-82	Fair
	>= 120 and < -105		<-100		-95	Poor

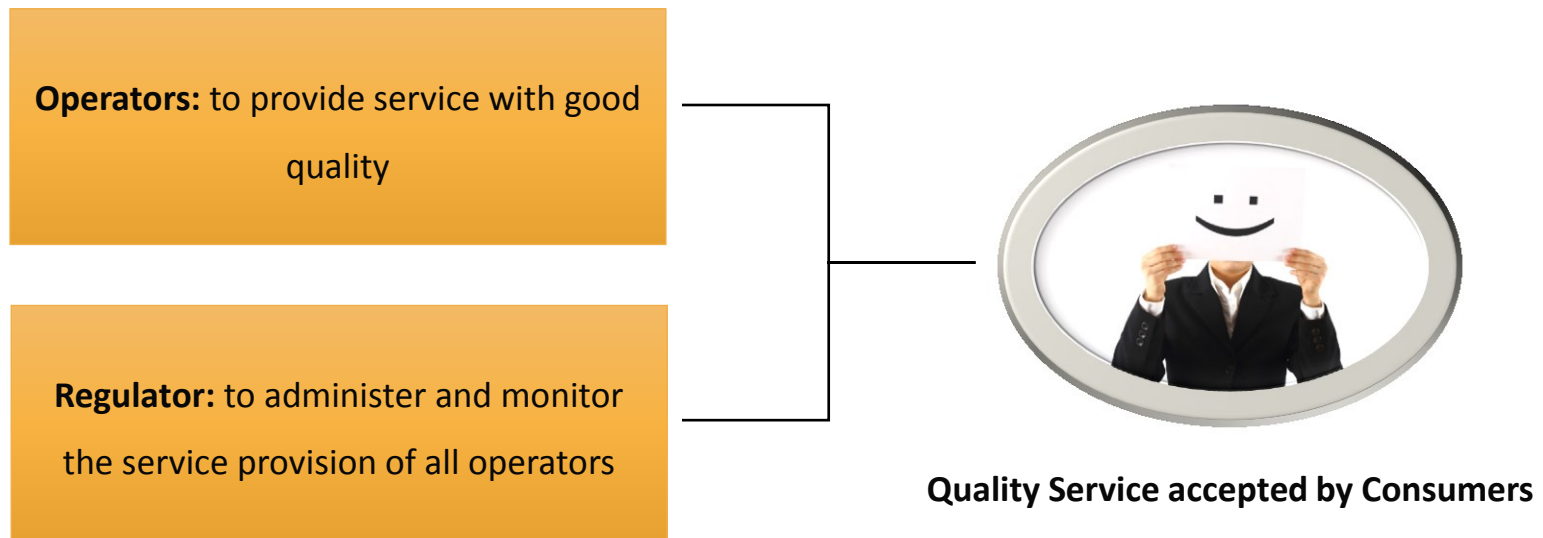
← For 2G/3G/4G Signal Strength

For 2G/3G/4G Signal Quality →

4G RSRQ		3G Ec/No		2G RxQual		Classification
	Range		Range		Range	
	>=-12 and <=-3		>= -12		>=0 and <3	Excellence
	>=-14 and <-12		>=-14 and <-12		>=3 and <6	Fair
	<-15		<-14		>=6 and <=7	Poor

Way forward for Cambodia

- ⊙ To move on, the guideline on QoS shall be drafted and mandated:
 - The quality of service's compliance monitoring and evaluation
 - To improve the performance and maintain the service quality
 - To make QoS information available to consumers
- ⊙ All stakeholders need to play their roles:





Thank you!

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