

REPORT

ON

AUDIT & ASSESSMENT OF QUALITY OF SERVICE

OF

CELLULAR MOBILE TELEPHONE SERVICE

FOR

SOUTH ZONE – KERALA CIRCLE

Report Period: April 2011 - June 2011

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- Not conducted for this quarter
- III. Broadband Service Providers
- Not conducted for this quarter

CHAPTER-1: INTRODUCTION

I. Background

TRAI's mission is to create and nurture conditions for growth of telecommunications in the country in a manner and at a pace, which will enable India to play a leading role in emerging global information society. One of the main objectives of Telecom Regulatory Authority of India (TRAI) is to provide a fair and transparent policy environment, which promotes a level playing field and facilitates fair competition.

In pursuance of above objective TRAI has issued from time to time a large number of regulations, orders and directives to deal with issues coming before it and provided the required direction to the evolution of Indian telecom market from a Government owned monopoly to a multi-operator multi service open competitive market.

The directions, orders and regulations issued cover a wide range of subjects including tariff, interconnection and quality of service as well as governance of the Authority.

The purpose of laying down Quality of Service Parameters is to:

- i) Create conditions for consumer satisfaction by making known the quality of service, which the service provider is required to provide, and the user has a right to expect.
- ii) Measure the Quality of Service provided by the Service Providers from time to time and to compare them with the norms so as to assess the level of performance.
- iii) Generally protect the interests of consumers of telecommunication services.

TRAI has been carrying out regular reviews of the status of quality of service of the networks of all operators. In continuation to these efforts, TRAI has selected through bidding process TCIL as the Audit Agency to audit and assess the Quality of Service rendered by the service providers' namely Basic (Wireline) Services, Cellular Mobile Telephone (Wireless) Services and Broadband Services. The Audit for various telecom circles within the Zones has been distributed across four quarterly periods.

The parameters that need to be measured for Basic and Cellular Mobile Services have been specified in the TRAI notification on Quality of Service of Basic (Wireline) and Cellular Mobile (wireless) Services, 2009. The parameters for Broadband Services have been specified in the TRAI notification for Quality of Services of Broadband Service Regulation, 2006.

II. Objectives and Methodology

The primary objective is to audit and assess the Quality of Service being rendered by Basic, Cellular Mobile & Broadband services against the parameters notified by TRAI. The audit and assessment of Quality of Service is conducted for all the basic service providers, unified access service providers, cellular mobile service providers and ISPs (Internet Service Provider) for basic wireline, Cellular Mobile Telephone Services and broadband service. TCIL has undertaken the following audit works as per the Terms of Reference (TOR):

- i) Verification of the data submitted by the service providers to TRAI as part of QoS monitoring reports i.e. Quarterly Performance Monitoring Reports (PMRs) and monthly Point of Interconnection (POI) Congestion Reports with reference to the records maintained by the service provider.
- ii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using live measurement for 3 days during the month in which the audit and assessment is carried out.
- iii) Verification of the performance of service providers against the Quality of Service benchmarks laid down by TRAI using the data for the entire month during which the live measurement is carried out.
- iv) Drive tests of the mobile networks both operators assisted and independent drive test (as and where required).
- v) Billing and call center's data verification.
- vi) Live testing of the efficiency of the call center / customer care help line.

To fulfill the above mentioned Scope of Work audit was performed on different Systems, Facilities and Field data collection.

Systems audited:-

1. Network Switching Centre (NSS)
2. Base Station Subsystem(BSS)
3. Billing Applications
4. Customer Care applications

Facilities audited:-

1. Billing documents.
2. Customer Care records.

Field data collections carried out:-

1. RF network coverage including KPIs (Key Performance Index)
2. Inter Operator Call Assessment
3. Checking of Customer Billing/Refund Complaints (Random sample)
4. Customer Care efficiency
5. The live calling was made to assess the quality of services for Inter Operator Call Assessment, Customer Billing/Refund Complaints and Customer Care efficiency.

In order to carry out the above scope of work:-

- ✓ TCIL auditors visited all the NSS (Network Sub System) and BSS (Base-station Sub System) to check data for all the operators in their respective service area.
- ✓ All the NSS and BSS data for the relevant details were collected either directly from the centralized NOC or through a remote access to the NOC.
- ✓ The Radio parameters were audited/verified from the data collected from OMC-R (Operation and Maintenance Center – Radio, as part of BSS data).
- ✓ The Drive test was conducted in high, low and medium dense areas including highways, commercial complex and residential areas and special attention was paid for the areas for which TRAI has received complaints.
- ✓ The POI and other network related parameters were audited/verified from the data collected from the OMC-S (Operation and Maintenance Center – Switch as part of NSS data).
- ✓ The data related to Billing and Customer care was checked for the previous month and verified with the customers by calling them on random basis. The process of registration and handling of the complaints was also studied for the various operators. Call centre number were called for measuring the efficiency of the call centre.
- ✓ The inter operator call assessment test was carried out during the time period as is specified in the tender document. TCBH (Time Consistent Busy Hour) is taken after observation of the traffic consistently for 3 days prior to the audit activity.
- ✓ Data has been collected for busy hour of network in case of live assessment & month of audit for all service providers & verified that service providers are providing busy hour data only for QoS service. We found that TCBH hour is matching with network busy hour as provided by service providers for Kerala circle. But for parameters such as ‘Worst affected cell exceeding 3% TCH drop’ and ‘BTSS accumulated down time’ CBBH (Cell Bouncing Busy Hour) was taken instead of TCBH (Time Consistent Busy Hours) as per the TRAI new regulation 2009.

CHAPTER-2: EXECUTIVE SUMMARY

I. Preface

This report highlights the findings for the audit & assessment of Quality of Service of Cellular Mobile Services in Kerala Circle in 2nd quarter (April–June 2011). The primary data collection and verification of records (PMR data verification – quarterly) maintained by various operators was undertaken for the period October-December 2010.

Following are the various operators covered in Kerala circle (South Zone) for Cellular Mobile (Wireless) services QoS audit & assessment. The Month of audit & TCBH information is also given below:

S/N	Name of Service Provider	Month of Audit	TCBH Hour
GSM Operators			
1	Aircel Ltd	May-2011	1900-2000 hrs
2	Airtel Ltd	May-2011	2000-2100 hrs
3	BSNL	May-2011	2000-2100 hrs
4	Idea	May-2011	2000-2100 hrs
5	Tata Communications (GSM)	May-2011	2000-2100 hrs
6	Vodafone	May-2011	2000-2100 hrs
7	Reliance Communication (GSM)	May-2011	1900-2000 hrs
8	Uninor	May-2011	2000-2100 hrs
9	Etisalat	May-2011	1900-2000 hrs
10	Videocon	May-2011	2000-2100 hrs
CDMA Operators			
11	MTS (CDMA)	May-2011	1900-2000 hrs
12	Reliance Communication (CDMA)	May-2011	1900-2000 hrs
13	Tata Communications (CDMA)	May-2011	2000-2100 hrs

II. Findings from Quality of Service Audit (Operator wise for each parameter)

(A) Cellular Mobile Telephone Services

3 days Live Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators			
1	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	≥95%	99.44%	98.86%	98.78%	99.82%	99.86%	99.79%	99.16%	99.60%	98.95%	97.35%	98.91%	99.79%	99.75%
	b) SDCCH/PAGING congestion	≤1%	0.01%	0.19%	0.18%	0%	0.34%	0.06%	0.09%	0%	0%	0.20%	0%	0%	0%
	c) TCH congestion	≤2%	0.01%	0.17%	0.82%	0%	0.41%	0.02%	0.17%	0%	0.01%	2.27%	0%	0.03%	0%
2	Connection maintenance (retainability)														
	a) CDR	≤2%	0.49%	0.98%	0.40%	0.39%	0.82%	0.23%	0.82%	1.02%	0.99%	0.50%	0.40%	0.24%	0.25%
	b) Worst affected cells>3% TCH drop	≤3%	3.44%	1.55%	2.23%	3.22%	2.72%	0.90%	5.77%	12.75%	0.76%	1.62%	1.95%	0.92%	0.77%
	c) Good voice quality	≤95%	97.80%	96.61%	98.98%	99.30%	95.78%	98.67%	98.08%	98%	97.96%	97.14%	100%		
3	Number of POI having ≥0.5% POI congestion		0	0	6	0	0	0	0	0	0	0	0	0	0
4	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	≤95%	98%	NP	95.10%	100%	99.31%	100%	100%	100%	96.30%	NP	99.72%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	≤90%	98.05%	80%	NP	100%	96.49%	64.39%	98.19%	100%	92.70%	96.50%	91.46%	62.10%	93.73%

NA: Not Applicable, NP: Not Provided

From the 3 days live data assessment, it is found that all the operators are meeting the network parameters by and large, except for parameter “Worst affected cells >3% TCH drop” Aircel, Etisalat, Tata (GSM) & Uninor are not meeting the benchmark with the value of 3.44%, 3.22, 5.77% & 12.75% respectively, for parameter “TCH congestion” Vodafone is not meeting benchmark with the value of 2.27%. For Parameter “Number of POI having ≥0.5% POI congestion” BSNL having high congestion in 6 POI. Network Parameter “Good voice quality” for RCOM CDMA & TATA CDMA are not system generated.

Performance related to customer care data it is found that for the parameter “% call answered by operators(voice to voice) within 60 sec” all the operator meeting the benchmark except Aircel, RCom (GSM) & RCom (CDMA) are not meeting the benchmark with the value of 80%, 64.39% & 62.10% .

One Month Data Audit		Bench- mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
S/N	Name of Parameter		GSM Operators									CDMA Operators			
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	≥95%	96%	99%	95.06%	100%	99.31%	100%	100%	99.50%	99.14%	100%	99.57%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	97.50%	88.74%	NP	100%	97.67%	72.09%	96.99%	98.93%	95.09%	83.33%	90.15%	73.53%	96.56%
9	Termination/closure of service	≤7days	74.32%	100%	100%	NA	100%	100%	100%	NA	NA	100%	NA	100%	100%
10	Time taken for refunds of deposits after closures (within 60 days).	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	97.42%	NA	100%	100%

NA: Not Applicable, **NP:** Not Provided

From the month data assessment, it is found that all the operators are meeting the network parameters by and large, except for parameter “Worst affected cells>3% TCH drop” Etisalat, Tata (GSM) & Uninor are not meeting the benchmark with the value of 3.28%, 5.60% & 13.23% respectively and %. For Parameter “Number of POI having ≥0.5% POI congestion” BSNL having high congestion in 6 POI. Network Parameter “Good voice quality” for RCOM CDMA & TATA CDMA are not system generated.

Performance related to customer care data is not found to be satisfactory for most of the operators especially for the parameter “calls answered by operators (voice-to-voice) within 60 sec” Airtel, RCom (GSM), Vodafone & RCom (CDMA) are not meeting the benchmark with the value of 88.74%, 72.09%, 83.33% & 73.53% respectively, For parameter “Resolution of billing/ charging complaints(within 4 weeks)” BSNL is not meeting the benchmark with the value of 69% ,For parameter “Termination/closure of service” Aircel is not meeting the benchmark with the value of 74.32% and for the parameter “Time taken for refunds of deposits after closures (within 60 days)” Vodafone is not meeting the benchmark with the value of 97.42%.

Operator-Assisted Drive Test

The Operator assisted Drive Test was conducted at Kerala for all the operators. Route covered was about around 80-100Km depending on city areas within the speed limit of 30Km/hr. The cities covered were Cochin, Calicut & Trivandrum. In all the cities, zones were selected for covering different density areas (High, Medium & Low).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators									CDMA Operators		
1.1	Blocked Call Rate ($\leq 3\%$)	Cochin	0%	0%	0%	0%	2.1%	0%	0%	0%	1.2%	0%	0%	0%
		Calicut	0%	1.8%	0%	1.1%	0%	0%	0%	0%	1.2%	0%	0%	0%
		Trivandrum	0%	3.8%	4.4%	0.6%	1.7%	1.4%	0%	2%	6.9%	0.5%	0%	0%
1.2	Dropped Call Rate ($\leq 2\%$)	Cochin	0%	0%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	0%
		Calicut	0%	0%	0%	0%	1%	1.1%	0%	0%	1.2%	0%	2.1%	0%
		Trivandrum	0%	0%	0.9%	0.6%	0%	1.4%	0%	0.7%	1.7%	0.5%	1.1%	0%
1.3	Percentage of connections with good voice quality ($\geq 95\%$)													
	(i) 0-4 (w/o frequency hopping)	Cochin	NA									99.86%	99.54%	99.24%
		Calicut	NA									99.55%	97.66%	97.95%
		Trivandrum	NA									99.19%	96.89%	99.18%
	(ii) 0-5 (with frequency hopping)	Cochin	96.72%	90.21%	97.60%	91.95%	97.79%	97%	94.67%	96.92%	93.79%	NA		
		Calicut	96.40%	93.07%	98.03%	93.02%	93.37%	99.40%	95.67%	99.30%	94%	NA		
Trivandrum		94.34%	91.53%	92.50%	91.15%	97.40%	94.17%	94.67%	96.38%	94.33%	NA			
1.4	Call Setup Success Rate ($\geq 95\%$)	Cochin	100%	100%	99.4%	100%	97.22%	100%	100%	98.02%	99%	100%	100%	100%
		Calicut	100%	100%	100%	99.42%	100%	100%	100%	99.2%	98%	100%	100%	100%
		Trivandrum	99%	93.1%	95.82%	99.63%	98.6%	99.07%	100%	99.64%	95%	99%	100%	100%

Key observations as could be derived from the table are as under:

- “Blocked Call Rate” benchmark is not met by Airtel, BSNL & Vodafone in Trivandrum with the value of 3.8%, 4.4% & 6.9% respectively.
- “Dropped Call Rate” benchmark is not met by RCom(CDMA) in Calicut with the value of 2.1%.
- “% of connection with good voice quality” benchmark is not met by Aircel, Airtel, BSNL, Idea, RCom(GSM), Tata(GSM), Uninor & Vodafone.
- “Call Setup Success Rate” benchmark is not met by Airtel in Trivandrum with the value of 93.1%.

Independent Drive Test

The Independent Drive Test was conducted at Kerala in Trivandrum. Here again, zones were selected for covering different density areas (High, Medium & Low dense areas).

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators										CDMA Operators		
1.1	Blocked Call Rate ($\leq 3\%$)	Trivandrum	0.78%	1.69%	6.19%	32.78%	1.64%	1.74%	0%	2.04%	3.63%	0.56%	0%	0%	
1.2	Dropped Call Rate ($\leq 2\%$)		0%	0%	0.88%	4.98%	1.64%	2.61%	2.76%	1.36%	2.07%	0%	0.56%	0%	
1.3	Percentage of connections with good voice quality ($\geq 95\%$)														
	(i) 0-4 (w/o frequency hopping)		NA										99.07%	97.70%	99.12%
	(ii) 0-5 (with frequency hopping)		93.43%	84.32%	93.13%	86%	95.29%	93%	95.89%	99.30%	92.39%	NA			
1.4	Call Setup Success Rate ($\geq 95\%$)	100%	98.08%	93.86%	72%	96.7%	98.35%	98.03%	97.28%	96.31%	99%	100%	100%		

Key observations as could be derived from the table are as under:

- “Blocked Call Rate” benchmark is not met by BSNL, Idea & Vodafone with the value of 6.19%, 32.78% & 3.63% respectively.
- “Dropped Call Rate” benchmark is not met by Idea, Tata (GSM), Uninor & Vodafone with the value of 4.98%, 2.61%, 2.76% & 2.07% respectively.
- “% of connection with good voice quality” benchmark is not met by Aircel, Airtel, BSNL, Idea, Tata (GSM) & Vodafone.
- “Call Setup Success Rate” benchmark is not met by BSNL & Idea with the value of 93.86% & 72% respectively.

CHAPTER-3: AUDIT-PMR VERIFICATION

I. Cellular Mobile Telephone Service

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA		
S/N	Name of Parameter			GSM Operators									CDMA Operators					
(A)	Network Service Quality Parameter																	
1	Network Availability																	
	BTS Accumulated Downtime	≤2%	Reported	0.01%	0.08%	0.39%	0.07%	0.06%	0.02%	0.02%	0.12%	0.08%	0.01%	0.03%	0.02%	0.01%		
			Verified	0.01%	0.08%	0.39%	0.07%	0.06%	0.02%	0.02%	0.12%	0.08%	0.01%	0.03%	0.02%	0.01%		
	Worst affected BTSs due to downtime	≤2%	Reported	0%	0.05%	1.01%	0%	0.05%	0%	0.08%	0.07%	0%	0.01%	0%	0%	0%	0%	
Verified			0%	0.05%	1.01%	0%	0.05%	0%	0.08%	0.07%	0%	0.01%	0%	0%	0%	0%		
2	Connection Establishment (Accessibility)																	
	CSSR (Call Setup Success Rate)	≥95%	Reported	99.37%	99.44%	98.14%	99.48%	99.88%	99.78%	98.98%	99.01%	99.28%	98.98%	99.07%	99.70%	99.86%		
			Verified	99.37%	99.44%	98.14%	99.48%	99.88%	99.78%	98.98%	99.01%	99.28%	98.98%	99.07%	99.70%	99.86%		
	SDCCH/PAGING congestion	≤1%	Reported	0.01%	0.22%	0.09%	0.26%	0.19%	0.05%	0.14%	0.04%	0.01%	0.10%	0%	0%	0%		
Verified			0.01%	0.22%	0.09%	0.26%	0.19%	0.05%	0.14%	0.04%	0.01%	0.10%	0%	0%	0%			
TCH congestion	≤2%	Reported	0.01%	0.24%	1.49%	0.03%	0.56%	0.14%	0.44%	0.05%	0%	0.70%	0%	0.05%	0%			
		Verified	0.01%	0.24%	1.49%	0.03%	0.56%	0.14%	0.44%	0.05%	0%	0.70%	0%	0.05%	0%			
3	Connection maintenance (retainability)																	
	CDR	≤2%	Reported	0.58%	0.75%	0.68%	0.38%	0.95%	0.25%	0.75%	1.24%	0.86%	0.63%	0.37%	0.69%	0.19%		
			Verified	0.58%	0.75%	0.68%	0.38%	0.95%	0.25%	0.75%	1.24%	0.86%	0.63%	0.37%	0.69%	0.19%		
	Worst affected cells>3% TCH drop	≤3%	Reported	2.59%	2.09%	2.40%	3.94%	1.44%	2.19%	1.40%	1.35%	0.95%	0.72%	0.37%	1.85%	0.08%		
Verified			2.59%	2.09%	2.40%	3.94%	1.44%	2.19%	1.40%	1.35%	0.95%	0.72%	0.37%	1.85%	0.08%			
Good voice quality	≥95%	Reported	97.49%	98.36%	99.91%	98.26%	95.61%	98.96%	98.03%	99.16%	98.61%	97.46%	99.92%	98.95%	99.76%			
		Verified	97.49%	98.36%	99.91%	98.26%	95.61%	98.96%	98.03%	99.16%	98.61%	97.46%	99.92%	98.95%	99.76%			
4	Number of POI having ≥ 0.5% POI congestion	≤0.5%	Reported	0	0	0	0	0	0	0	0	1	0	0	0	0		
			Verified	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
(B)	Customer Service Quality Parameters																	
5	Metering/billing credibility-Post paid	≤0.1%	Reported	0.02%	0.03%	0%	NA	0.06%	0.08%	0%	NA	NA	0.09%	0%	0.09%	0.02%		
			Verified	0.02%	0.03%	0%	NA	0.06%	0.08%	0%	NA	NA	0.09%	0%	0.09%	0.02%		
6	Metering /billing credibility-Pre paid	≤0.1%	Reported	0.01%	0.11%	0.10%	0%	0%	0.06%	0%	0%	0.06%	0.03%	0.05%	0.04%	0.04%		
			Verified	0.01%	0.11%	0.10%	0%	0%	0.06%	0%	0%	0.06%	0.03%	0.05%	0.04%	0.04%		

PMR		Bench- mark	Audit	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA		
S/N	Name of Parameter			GSM Operators										CDMA Operators				
7	Resolution of billing/ charging complaints (within 4 weeks)	100%	Reported	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
			Verified	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	≤1 week	Reported	100%	100%	100%	NA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
			Verified	100%	100%	100%	NA	100%	100%	100%	NA	100%	100%	100%	100%	100%	100%	100%
8	Response time to customers for assistance																	
	Accessibility of call centre/Customer Care	≥95%	Reported	100%	100%	100%	99.05%	99%	92%	99%	100%	100%	100%	100%	99.59%	84%	97%	
			Verified	100%	100%	100%	99.05%	99%	92%	99%	100%	100%	100%	100%	99.59%	84%	97%	
	% call answered by operators(voice to voice) within 60 sec.	≥90%	Reported	90.09%	87%	93%	96.94%	99%	93%	95%	95.10%	100%	99%	90.17%	92%	94%		
Verified			90.09%	87%	93%	96.94%	99%	93%	95%	95.10%	100%	99%	90.17%	92%	94%			
9	Termination/closure of service																	
	No.of requests for Termination / Closure of service complied within 7 days during the quarter	≤7days	Reported	100%	100%	100%	NA	100%	100%	99.90%	NA	NA	100%	NA	100%	100%		
Verified			100%	100%	100%	NA	100%	100%	99.90%	NA	NA	100%	NA	100%	100%			
10	Time taken for refunds of deposits after closures.(within 60 days	100%	Reported	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	NA	100%	98%		
			Verified	100%	100%	100%	NA	100%	100%	100%	NA	NA	100%	NA	100%	98%		

Critical Analysis (PMR Verification):

- The figures proved by all the operators match the figures obtained on verification.
- Etisalat is not meeting the respective benchmarks for parameter "Worst affected cells>3% TCH drop".
- Videocon is showing congestion ≥0.5% in 1 POI for parameter "POI congestion".
- "Accessibility of call centre/Customer Care." benchmark is not met by both RCom (GSM) & RCom (CDMA).
- "% call answered by operator (voice to voice) within 60 sec." benchmark is not met by Airtel.
- Tata (GSM) is not meeting the 7 days' benchmark for parameter "Termination/closure of service".
- Tata CDMA is not meeting the 60 days' benchmark for parameter "Refund of deposits after closure of connection".

CHAPTER-4: DETAILED FINDINGS & ANALYSIS

I. Cellular Mobile Telephone Service

(A) MSC Audit

(1) 3 Days Live Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
A	Network Service Quality Parameter														
1	Connection Establishment (Accessibility)														
	a) CSSR	≥95%	99.44%	98.86%	98.78%	99.82%	99.86%	99.79%	99.16%	99.60%	98.95%	97.35%	98.91%	99.79%	99.75%
	b) SDCCH/PAGING congestion	≤1%	0.01%	0.19%	0.18%	0%	0.34%	0.06%	0.09%	0%	0%	0.20%	0%	0.0%	0.0%
	c) TCH congestion	≤2%	0.01%	0.17%	0.82%	0%	0.41%	0.02%	0.17%	0%	0.01%	2.27%	0%	0.03%	0.00%
2	Connection maintenance														
	a) CDR	≤2%	0.49%	0.98%	0.40%	0.39%	0.82%	0.23%	0.82%	1.02%	0.99%	0.50%	0.40%	0.24%	0.25%
	b) Cells having > 3% TCH drop	≤3%	3.44%	1.55%	2.23%	3.22%	2.72%	0.90%	5.77%	12.75%	0.76%	1.62%	1.95%	0.92%	0.77%
	c) Good voice quality	≥95%	97.80%	96.61%	98.98%	99.30%	95.78%	98.67%	98.08%	98%	97.96%	97.14%	100%		
	d) No. of cells > 3% TCH drop		241	206	280	4	402	171	332	510	21	194	40	11	13
	e) Total no. of cells in the network		7008	13247	12534	114	14765	6312	5750	3999	2748	11979	2049	1194	1679
3	Number of POI having ≥0.5% POI congestion		0	0	6	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Idea, Airtel, Vodafone, Uninor, Aircel, TTSL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of circuits on POI		18931	118402	46076	2431	121074	200372	20221	288329	6139	117948	12635	200372	28020
	c) Avg No. of call attempts on POI		535422	3109177	1055316	271	2837983	207214	380598	69869	50813	1874155	184032	207214	46967
	d) Avg traffic served on POI (Erlang)		28937	62858	36278	16	81571	33205	31925	7227	3824	74283	17665	33205	41348
	e) Total number of working POI Service Area wise		614	41	12	25	120	12	11	47	28	36	47	12	94
	f) Equipped Capacity of Network in respect of Traffic in erlang		1915515	171847	675131	26152	209871	70000	75737	1242466	56797	309169	57000	142000	3591567
	g) Total traffic handled in TCBH in erlang		1915515	171847	675131	26,152	209871	70000	75737	1242466	56797	309169	57000	142000	3591567

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators											CDMA Operators	
(B)	Customer Service Quality Parameters														
4	Response time to customers for assistance														
	a) Accessibility of call centre	≥95%	98%	NP	95.10%	100%	99.31%	100%	100%	100%	96.30%	NP	99.72%	100%	100%
	b) % of call answered by operators(voice to voice) within 60 sec	≥90%	98.05%	80%	NP	100%	96.49%	64.39%	98.19%	100%	92.70%	96.50%	91.46%	62.10%	93.73%
	c) No. of call attempts to call centre / customer care nos. during TCBH (Avg)		65109	1267965	NP	212	158833	128746	656175	113319	11252	1370817	8363	122592	124623
	d) No. of calls connected and answered successfully to call centre / customer care nos. during TCBH (Avg)		63479	1125173	NP	212	155134	92814	636436	112112	10700	1142270	7539	90144	120337

NA: Not Applicable, NP: Not Provided

Parameter wise Findings (Live Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Kerala Service Area are as given below:-

- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 97.35% and 99.95%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.34%. Reliance CDMA & Tata CDMA have not provided data.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 0.82% except Vodafone with the value of 2.27%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.23% and 1.02%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 3\%$):** Except for Aircel, Etisalat, Tata (GSM) & Uninor, all the operators are satisfying the benchmark with value in between 0.76% and 2.72%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 95.78% and 99.98%.
- **Number of POI having $\geq 0.5\%$ POI congestion:** All the operators meeting the benchmark except BSNL show high POI congestion in 6 POI.
- **%age of call answered by operator (electronically) (benchmark $>95\%$):** All the operators are meeting the benchmark with values lying between 95.10% to 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $>90\%$):** All the operators are meeting the benchmark except Airtel, Reliance GSM & Reliance CDMA are not meeting the benchmark value of 90%.

(2) Month Data Assessment & Summarized Findings

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
(A)	Network Service Quality Parameter														
1	Network Availability														
	a) BTS Accumulated Downtime	≤2%	0.01%	0.02%	0.69%	0%	0.05%	0.03%	0.03%	0.03%	0.07%	1.19%	0.01%	0.02%	0%
	b) Worst affected BTSs due to downtime	≤2%	0%	0.11%	1.99%	0%	0.06%	0%	0.05%	0%	0%	0%	0%	0%	0%
	c) Total no. of BTSs in the licensed service area		2,344	4,470	4,277	38	4,899	2,104	1,935	1,340	916	455	683	1,194	559
	d) Sum of downtime of BTSs in a month in hours i.e. total outage time of all BTSs in hours during a month		93.24	638.94	21,856	0	1,758	507	492	272	456	4,018	74	161	1.46
	e) No. of BTSs having accumulated downtime of >24 hours in a month		0	5	85	0	3	0	1	0	0	0	0	0	0
2	Connection Establishment (Accessibility)														
	a) CSSR (Call Setup Success Rate)	≥95%	99.36%	98.63%	98.02%	99.59%	99.86%	98.77%	99.20%	99.53%	98.89%	97.65%	98.92%	99.85%	99.70%
	b) SDCCH/PAGING congestion	≤1%	0.02%	0.39%	0.26%	0%	0.35%	0.12%	0.10%	0.01%	0.02%	0.32%	0%	0.0%	0.0%
	c) TCH congestion	≤2%	0.05%	0.19%	1.44%	0%	0.56%	0.14%	0.14%	0.04%	0.20%	1.83%	0%	0.03%	0%
3	Connection maintenance (retainability)														
	a) CDR	≤2%	0.51%	1.06%	0.52%	0.63%	0.88%	0.26%	0.81%	1.07%	1.14%	0.53%	0.43%	0.23%	0.30%
	b) Worst affected cells>3% TCH drop	≤3%	2.10%	1.62%	1.85%	3.28%	2.82%	0.89%	5.60%	13.23%	0.91%	1.76%	2.39%	0.59%	0.83%
	c) Good voice quality	≤95%	97.78%	96.63%	99.61%	98.60%	95.63%	98.57%	98.07%	97.93%	97.79%	97.03%	100%		
	d) Total No. of cells exceeding 3% TCH drop (call drop)		147	214	232	4	417	56	322	529	25	211	49	7	14
	e) Total no. of cells in the network		7008	13247	12534	114	14765	6312	5750	3999	2748	11979	2049	1194	1679
4	Number of POI having ≥0.5% POI congestion		0	0	6	0	0	0	0	0	0	0	0	0	0
	a) Name of POI not meeting the benchmark		Nil	Nil	Idea,Airtel,Vodafone,Uninor,Aircel,TTSL	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	b) Total No. of call attempts on POI (Avg.)		533791	3447017	1010232	170	2789782	32243	370352	69735	54904	2256029	189850	249886	444073
	c) Total traffic served on POI (Erlang) (Avg.)		287824	70739	34426	6	79008	53920	320682	50769	39150	324422	5963	53920	427270
	d) Total No. of circuits on POI		18931	118402	46076	2431	121074	200372	20221	288329	6139	117948	12635	200372	28020
	e) Total number of working POI Service Area wise		614	41	12	25	120	12	11	47	28	36	47	12	0
	f) Capacity of POI		18290	99170	46076	2006	116275	183255	19619	237556	16636	117685	11398	183255	25394

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
5	Network Data														
	a) Equipped Capacity of Network Erlang		1915515	171,847	675,131	26,152	209871	70,000	75737	1242466	56797	309,169	57000	142000	3591567
	b) Total traffic in TCBH in erlang (Avg.)		496086	106261	3943237	161	210468	34182	30585	87547	12359	435613	22984	54048	814781
	c) Total no. of customers served (as per VLR) on last day of the month		690488	3065856	3785674	1389	6404942	NP	925113	NP	92070	4291767	278998	NP	NP
(B)	Customer Service Quality Parameters														
5	Metering/billing credibility-Post paid	≤0.1%	0.05%	0.03%	0.03%	NA	0.07%	0.10%	0.59%	NA	NA	0.09%	NA	0.02%	0%
	a) No. of bills issued during the period		4372	130876	179081	NA	221923	10172	7822	NA	NA	174583	NA	228353	37992
	b) No. of bills disputed including billing complaints during the period		2	33	58	NA	152	10	46	NA	NA	154	NA	35	0
6	Metering /billing credibility-Pre paid	≤0.1%	0.02%	0%	0.02%	0.01%	0%	0.01%	0.06%	0.06%	0.05%	0.16%	0.01%	0.01%	0.01%
	a) No. of charging / credit / validity complaints during the quarter		345	40	1,250	1	54	145	1,612	389	211	8,272	66	225	84
	b) Total no. of pre-paid customers at the end of the quarter		2181093	4737976	5272921	8435	6602728	1466939	2486367	695433	427742	5166503	529014	2180071	697196
7	Resolution of billing/ charging complaints(within 4 weeks)	100%	100%	100%	69%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	a) No. of billing/(post paid) and charging, credit/validity (pre paid) complaints resolved within 4 weeks during the quarter		347	16352	40	1	206	155	1658	389	211	8426	66	260	84
	b) Total no. of billing (post paid) and charging, credit / validity (pre paid) complaints received during the quarter		347	16352	58	1	206	155	1658	389	211	8426	66	260	84
	c) No. of billing complaints (post paid) and charging, credit/ validity complaints (pre paid) resolved in favour of the customer during the quarter		65	73	40	0	196	71	0	389	211	8419	7	67	84
	d) No. of complaints disposed on account of not considered as valid complaints during the quarter		282	16279	0	1	10	84	1658	0	0	7	52	193	0
	e) Period of applying credit/waiver/adjustment to the customer's account from the date of resolutions of complaints	≤1 week	≤1 week	≤1 week	≥1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week	≤1 week

S/N	Name of Parameter	Bench mark	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
			GSM Operators										CDMA Operators		
(B)	Customer Service Quality Parameters														
8	Response time to customers for assistance														
	a) Accessibility of call centre/Customer Care	≥95%	96%	99%	95.06%	100%	99.31%	100%	100%	99.50%	99.14%	100%	99.57%	100%	100%
	b) % call answered by operators(voice to voice) within 60 sec.	≥90%	97.50%	88.74%	NP	100%	97.67%	72.09%	96.99%	98.93%	95.09%	83.33%	90.15%	73.53%	96.56%
	c) Total no. of call attempts to call centre & customer care nos. during TCBH (Avg.).		65109	1267965	NP	212	158833	128746	656175	113319	11252	1370817	8363	122592	124623
	d) No. of calls connected and answered successfully to call centre & customer care nos. during TCBH (Avg.).		63479	1125173	NP	212	155134	92814	636436	112112	10700	1142270	7539	90144	120337
9	Termination/closure of service	≤7days	74.32%	100%	100%	NA	100%	100%	100%	NA	NA	100%	NA	100%	100%
	a) Total No. of requests for Termination / Closure of service received during the quarter		257	529	3451	NA	1449	63	104	NA	NA	520	NA	373	685
	b) No.of requests for Termination / Closure of service complied within 7 days during the quarter		191	529	3451	NA	1449	63	104	NA	NA	520	NA	373	685
10	Time taken for refunds of deposits after closures.(within 60 days)	100%	100%	100%	100%	NA	100%	100%	100%	NA	NA	97.42%	NA	100%	100%

NA: Not Applicable, NP: Not Provided

Parameter-wise Findings (Month Data Assessment):

The parameter wise key takeouts for the Cellular Mobile Telephone Services providers in Kerala Service Area are as given below:-

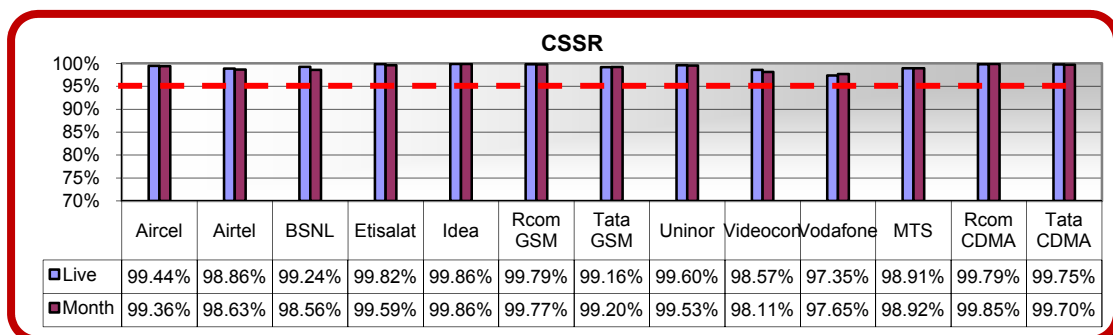
- **BTS accumulated downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.01% and 1.19%.
- **Worst affected BTSs due to downtime (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.99%.
- **Call setup success rate (benchmark $\geq 95\%$):** All operators are meeting the benchmark with values lying between 98.02% and 99.86%.
- **SDCCH/PAGING Channel congestion (benchmark $\leq 1\%$):** All operators are meeting the benchmark with values lying between 0% and 0.39%. Reliance CDMA & Tata CDMA have not provided the data.
Note: CDMA operators have provided the data for Paging Channel congestion and GSM operators provided SDCCH Channel congestion.
- **TCH congestion (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0% and 1.83%.
- **Call drop rate (benchmark $\leq 2\%$):** All operators are meeting the benchmark with values lying between 0.23% and 1.14%.
- **Cell exceeding 3% TCH drop (benchmark $\leq 5\%$):** Except for Etisalat, TATA GSM, Uninor, all the operators are satisfying the benchmark with value in between 0.59% and 2.82%.
- **Connections with good voice quality (benchmark $\geq 95\%$):** CDMA service providers have declared that the parameter is not system generated. GSM operators are meeting the benchmark with values lying between 95.63% and 100%.
- **Number of POI having $\geq 0.5\%$ POI congestion:** All the operators meeting the benchmark except BSNL show high POI congestion in 6 POI.
- **%age of call answered by operator (electronically) (benchmark $> 95\%$):** All the operators are meeting the benchmark with values lying between 95.06% and 100%.
- **%age of call answered by operator (Voice to voice) (benchmark $> 90\%$):** All the operators are meeting the benchmark except Airtel, Reliance GSM, Reliance CDMA & Vodafone are not meeting.
- **Metering and billing credibility-Post paid (benchmark $\leq 0.1\%$):** All other operators are meeting the benchmark.
- **Metering and billing credibility-Pre paid (benchmark $\leq 0.1\%$):** All the operators are meeting the benchmark.
- **Resolution of billing/ charging complaints (benchmark 100% within 4 weeks):** Except for BSNL with the value of 69%, All operators are meeting the benchmark.
- **Termination/Closure of service (Benchmark ≤ 7 days):** All operators, except Aircel (74.32%), have satisfied the benchmark.
- **Time taken for refunds of deposits after closures (benchmark 100% within ≤ 60 days):** All operators, except Vodafone (97.42%) have satisfied the benchmark.

(1) Sample Coverage*Switches/BSC/BTS details of operators:*

S/N	Name of Service Provider	No. of MSC	No. of BSC	No. of BTS
GSM Operators				
1	Aircel Ltd	1	14	2349
2	Airtel Ltd	11	40	4470
3	BSNL	9	64	4298
4	Etisalat	3	3	38
5	Idea	18	82	4944
6	Reliance Communication (GSM)	3	10	2104
7	Tata Communications (GSM)	2	15	1935
8	Vodafone	8	64	4028
9	Vediocon	1	6	916
10	Uninor	2	18	1330
CDMA Operators				
11	MTS (CDMA)	1	2	683
12	Reliance Communication (CDMA)	3	10	1194
13	Tata Communications (CDMA)	3	6	559

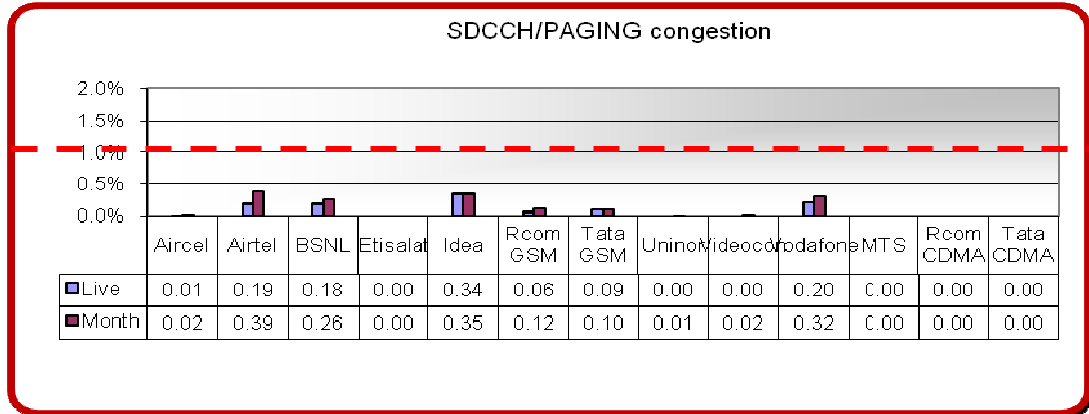
(2) Performance (Graphical Representation)**Comparison between Live measurements and One month data Audit – Cellular Mobile Telephone Services****A) NETWORK PERFORMANCE**

- I. Call setup success rate:** All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.

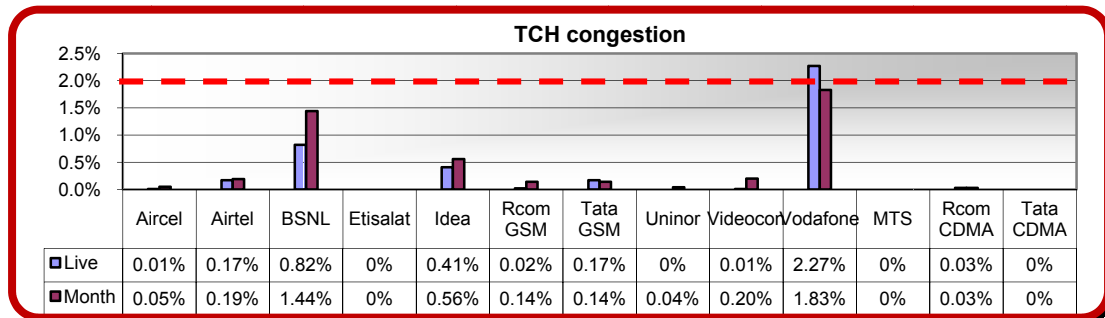


II. Blocked call rate:

SDCCH congestion: All operators are meeting the TRAI benchmarks ($\leq 1\%$) for both one month data and 3 days live data taken in the month of audit. CDMA operators Reliance & Tata have not provided the data.

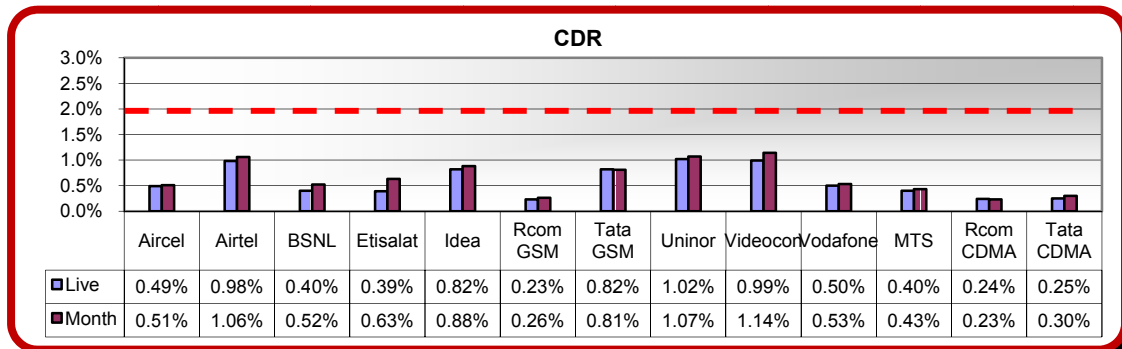


TCH congestion: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit except Vodafone with the value of 2.27% in one-month audit data verification.

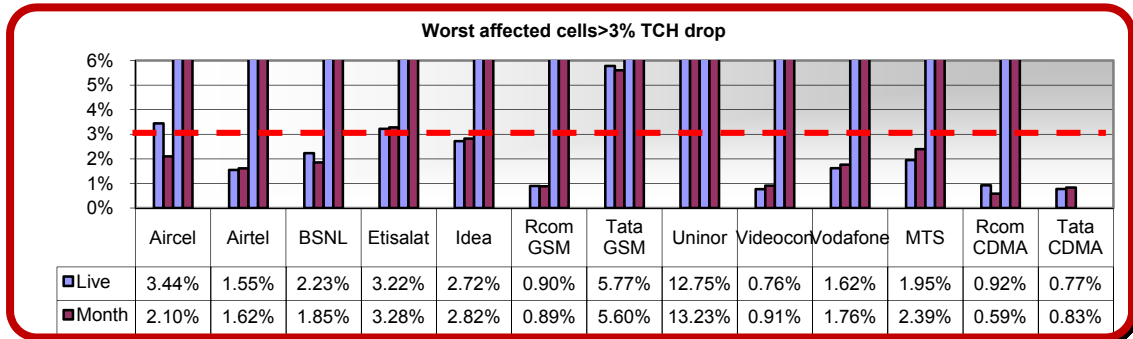


III. Connection Maintainability (Retainability):

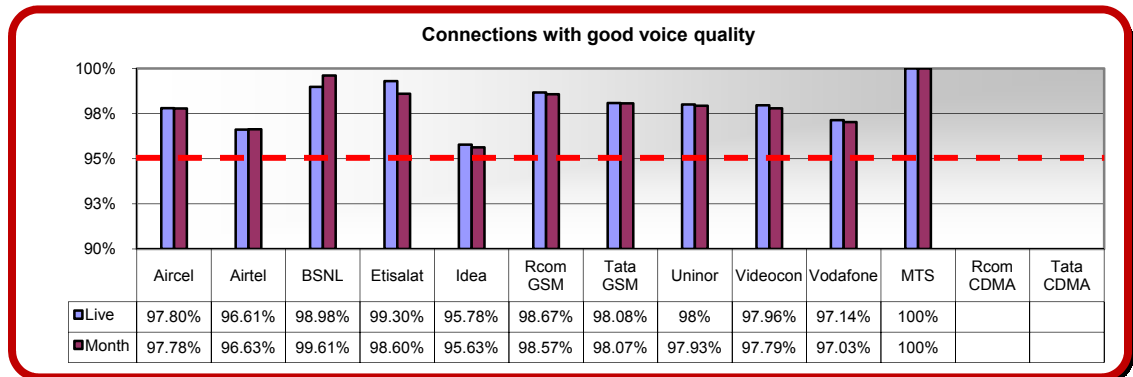
Call drop rate: All operators are meeting the TRAI benchmarks ($\leq 2\%$) for both one month data and 3 days live data taken in the month of audit.



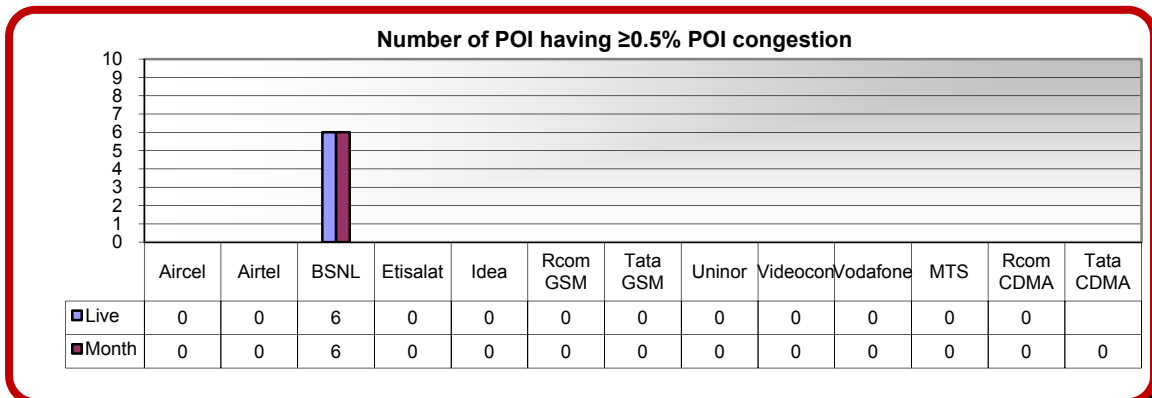
Worst affected Cell exceeding 3% TCH Drop: For both live and month data, TATA GSM & Uninor are found not meeting the benchmark of $\leq 3\%$. Rest of the operators are meeting the benchmark for both cases.



Percentage of connections with good voice quality: All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



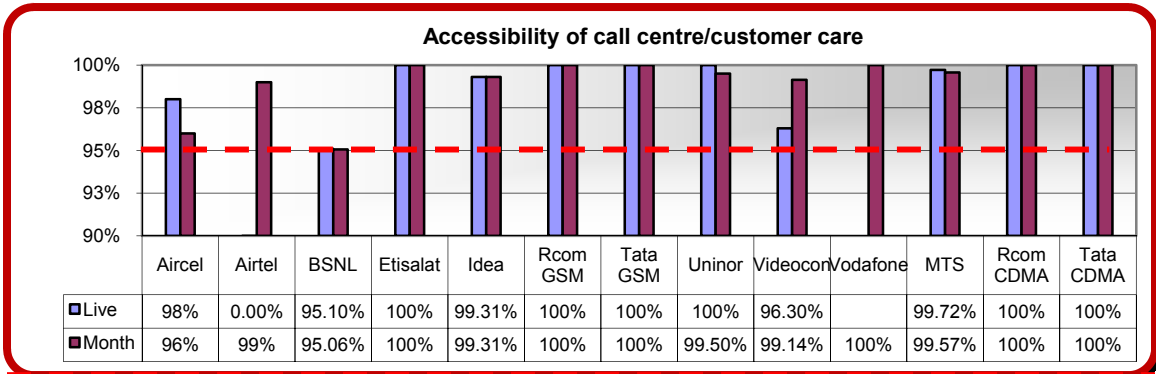
POI Congestion: For both live and month data, In 6 POI, BSNL are found not meeting the benchmark $\geq 0.5\%$. Rest of the operators are meeting the benchmark for both cases.



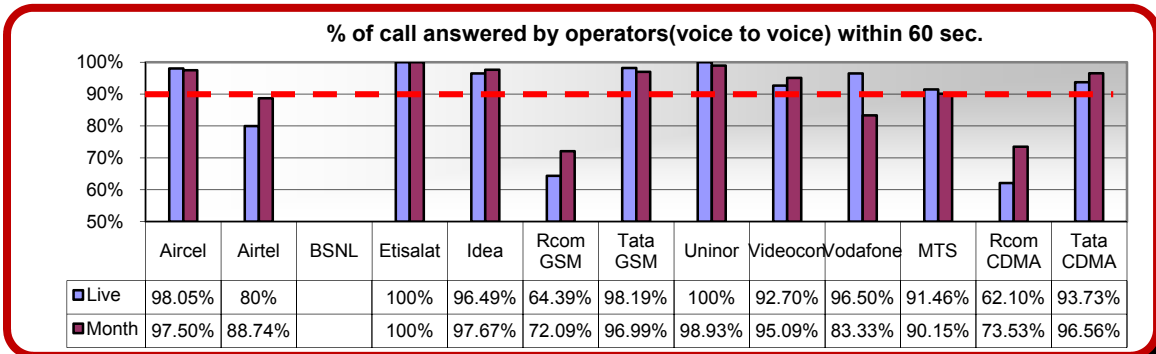
B) CUSTOMER SERVICE QUALITY PARAMETERS

(A) Response time to the customer for assistance:

Percentage of call answered (Electronically): All operators are meeting the TRAI benchmarks ($\geq 95\%$) for both one month data and 3 days live data taken in the month of audit.



Percentage of call answered by operators (Voice to voice) within 60 sec: Airtel, Reliance GSM, Reliance CDMA & Vodafone do not meet the 90% benchmark against this parameter. Data has not been provided by BSNL against this parameter.



(3) Critical Analysis

The above comparative study between live data & month data shows similar trends & consistency in both the cases. However, inconsistency in live & month data was found for parameter “%age of calls answered by operator” for Airtel, Reliance GSM and Reliance CDMA , For parameter “Worst affected cells>3% TCH drop” for TATA GSM and Uninor & For parameter “POI Congestion” for BSNL.

(B) Redressal**(1) Sample coverage**

A sample of billing complaints was taken for each operator and calls were made for assessing the resolution of billing/charging complaints within 4 weeks as claimed by the respective operators.

(2) Performance (live calling for billing complaints)

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Total No. of calls	2	7	5	1	13	10	10	5	5	6	5	7	5
Cases resolved with 4 weeks	2	7	5	1	13	10	10	5	5	6	5	7	5
%age of cases resolved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(3) Live calling to Call center:

Fifty nos. of calls were made at Cochin in each half and below given no. of calls got connected to the call center within 60 Sec.

	OPERATORS NAME												
	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom	Tata	Videocon	Vodafone	Uninor	MTS	Rcom	Tata
	GSM										CDMA		
1ST HALF (10AM to 01 PM)	42	47	44	46	48	44	48	47	46	47	47	45	47
2ND HALF (04PM to 07 PM)	45	36	39	44	43	33	42	40	37	39	41	31	40
In % age	87.00	83.00	83.00	90.00	91.0	77.00	90.00	87.00	83.00	86.00	88.00	76.00	87.00

(4) Level 1 Calling:

Level 1 calling such as calling at emergency no. (Police, Fire, Hospital), Railway enquiry system etc were made in few nos. so as to check the service of such short codes. In Cochin it was found to be functional.

(5) Critical Analysis

Random numbers were selected from the operators' database of billing/metering complaints and calls were made to the customers to get their feedback for complaint redressal. It was found that the operators had made refunds in 100% cases as claimed by their records.

(C) Inter operator call assessment**(1) Sample coverage**

A sample of 2x50 test calls per Service Providers with in the licensed service area (Kerala Circle) were made between 1100 to 1400 hrs and between 1600 to 1900 hrs.

(2) Performance based on live measurement

Calling Operator	Aircel	Airtel	BSNL	Etisalat	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA
Aircel	-	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Airtel	100%	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BSNL	100%	100%	-	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%
Etisalat	100%	100%	100%	-	100%	100%	100%	100%	97%	100%	100%	98%	100%
Idea	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%	100%
Reliance (GSM)	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%	100%
Tata (GSM)	99%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%	100%
Uninor	100%	98%	100%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
Videocon	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%	97%
Vodafone	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%	100%
MTS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%	100%
Reliance (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100%
Tata (CDMA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-

(3) Critical Analysis

In the inter-operator call assessment test, calls were made from one operator to other operators so as to check congestion on both the operators' network. In such cases, the radio part, switch part & the POI in-between the operators are involved and hence if any congestion is found in the network, it may be due to any of these parts. The result shows that there is not much congestion on the operator networks.

(D) Drive test of the mobile network of service providers**(1) Sample Coverage**

The Operator Assisted Drive Test was conducted at Kerala for all the operators. Route covered was about around 300Km depending on city areas within the speed limit of 40Km/hr.

Drive Test Locations**Cochin**

HIGH DENSE:	PANAMPILLY NAGAR, SOUTH OVER BRIDGE, MG ROAD , KSRTC ,SOUTH RLY STN, KACHERYPADY, KALOOR, JN STADIUM, PALARIVATTOM,PILLY NAGAR, VYTILLA, KADVANTHRA, M.G. ROAD, BANERJEE, RD, KALOOR, HIGH COURT, PALARIVATTOM
MEDIUM DENSE:	KAKKANAD, VAZHAKKALA, UNICHIRA, EDAPALLY TOLL, KALAMASSERY
LOW DENSE:	KALAMASSERY, PRIMIER JN, ALUVA, PARAVOOR KAVALA

Calicut

HIGH DENSE:	WESTHIL, NADAKAVU, MAVOOR ROAD, PALAYAM, PUTHIYARA
MEDIUM DENSE:	RAMANATTUKARA, CHEVAYUR, THIRUVANNURKUND AYITHODE
LOW DENSE:	KUNNAMANGALAM, MALAPARAMBU, TONDAYAD, PULLIKKAL, AIRPORT

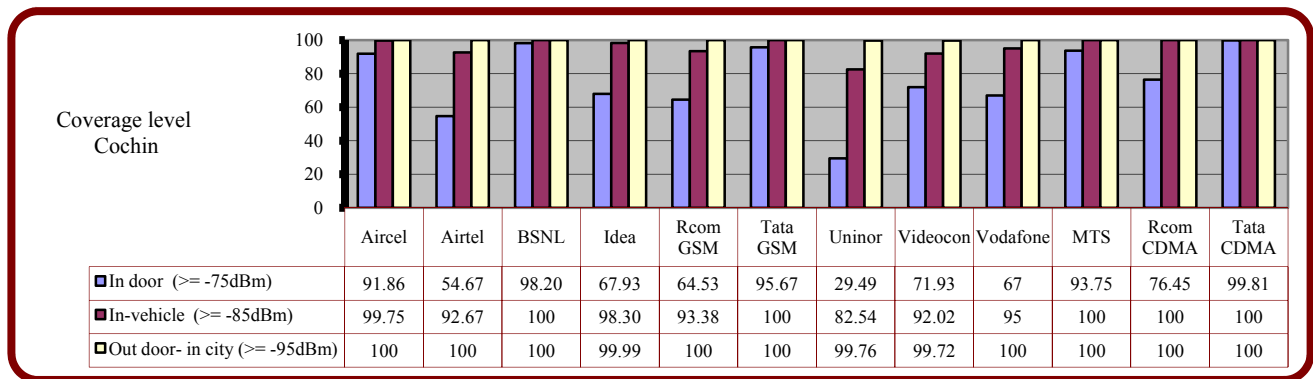
Trivandrum

HIGH DENSE:	SREEKARYAM, KESAVADASAPURAM, KOWDIAR, EAST FORT
MEDIUM DENSE:	KAZHAKOOTTAM, ANAYARA, PETTAH, KIMS, AIRPORT, KOVALAM
LOW DENSE:	PACHALOOR, KOCHUVELI KINFRA PARK, VAZHAMUTTOM, VALIYAVELI KALAMASSERY, PRIMIER JN, ALUVA, PARAVOOR KAVALA

2) Performance (for the respective cities)

S/N	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	V-fone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators									CDMA Operators			
1.1	Call Attempts	Cochin	131	78	80	84	95	91	94	101	83	102	92	74	
		Calicut	109	112	88	181	96	91	74	125	83	136	96	96	
		Trivandrum	210	184	114	169	177	140	129	149	175	182	187	110	
1.2	Blocked Call Rate ($\leq 3\%$)	Cochin	0%	0%	0%	0%	2.1%	0%	0%	0%	1.2%	0%	0%	0%	
		Calicut	0%	1.8%	0%	1.1%	0%	0%	0%	0%	1.2%	0%	0%	0%	
		Trivandrum	0%	3.8%	4.4%	0.6%	1.7%	1.4%	0%	2%	6.9%	0.5%	0%	0%	
1.3	Dropped Call Rate ($\leq 2\%$)	Cochin	0%	0%	0%	0%	0%	0%	0%	0%	1.2%	0%	0%	0%	
		Calicut	0%	0%	0%	0%	1%	1.1%	0%	0%	1.2%	0%	2.1%	0%	
		Trivandrum	0%	0%	0.9%	0.6%	0%	1.4%	0%	0.7%	1.7%	0.5%	1.1%	0%	
1.4	Percentage of connections with good voice quality ($\geq 95\%$)														
	(i) 0-4 (w/o frequency hopping)	Cochin	NA									99.86%	99.54%	99.24%	
		Calicut	NA									99.55%	97.66%	97.95%	
		Trivandrum	NA									99.19%	96.89%	99.18%	
	(ii) 0-5 (with frequency hopping)	Cochin	96.72%	90.21%	97.60%	91.95%	97.79%	97%	94.67%	96.92%	93.79%	NA			
		Calicut	96.40%	93.07%	98.03%	93.02%	93.37%	99.40%	95.67%	99.30%	94%	NA			
Trivandrum		94.34%	91.53%	92.50%	91.15%	97.40%	94.17%	94.67%	96.38%	94.33%	NA				
1.5	Service Coverage														
	In door ($\geq -75\text{dBm}$)	Cochin	91.86	54.67	98.20	67.93	64.53	95.67	29.49	71.93	67	93.75	76.45	99.81	
		Calicut	76.44	72	63.40	65.02	60.64	87.67	32.02	80.02	67	97	89.96	89	
		Trivandrum	54.88	77	75.44	73.75	58.28	63.19	39.57	68.73	50.33	78.95	54.27	91	
	In-vehicle ($\geq -85\text{dBm}$)	Cochin	99.75	92.67	100	98.30	93.38	100	82.54	92.02	95	100	100	100	
		Calicut	94.56	95	93.11	98.03	91.68	98.43	79.76	95.23	96	100	100	96	
		Trivandrum	86.15	97	95.71	98.57	88.71	92.91	84.73	90.42	89.67	98.69	93.59	98	
	Outdoor- in city ($\geq -95\text{dBm}$)	Cochin	100	100	100	99.99	100	100	99.76	99.72	100	100	100	100	
		Calicut	97.64	99	99.85	99.98	98.64	99.4	98.59	99.16	95	99.55	100	100	
Trivandrum		97.43	100	99.8	99.83	97	99.20	99.94	98.75	91.33	100	100	100		
1.6	CSSR ($\geq 95\%$)	Cochin	100%	100%	99.4%	100%	97.22%	100%	100%	98.02%	99%	100%	100%	100%	
		Calicut	100%	100%	100%	99.42%	100%	100%	100%	99.2%	98%	100%	100%	100%	
		Trivandrum	99%	93.1%	95.82%	99.63%	98.6%	99.07%	100%	99.64%	95%	99%	100%	100%	

Graphical Representation (Cochin):

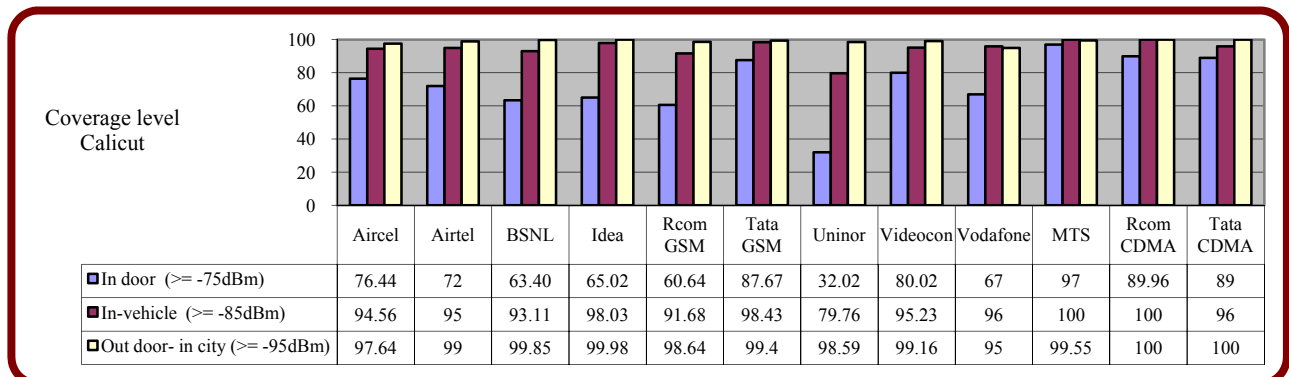


Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Percentage of connections with good voice quality” Airtel, Idea, Uninor & Vodafone is not meeting benchmark.

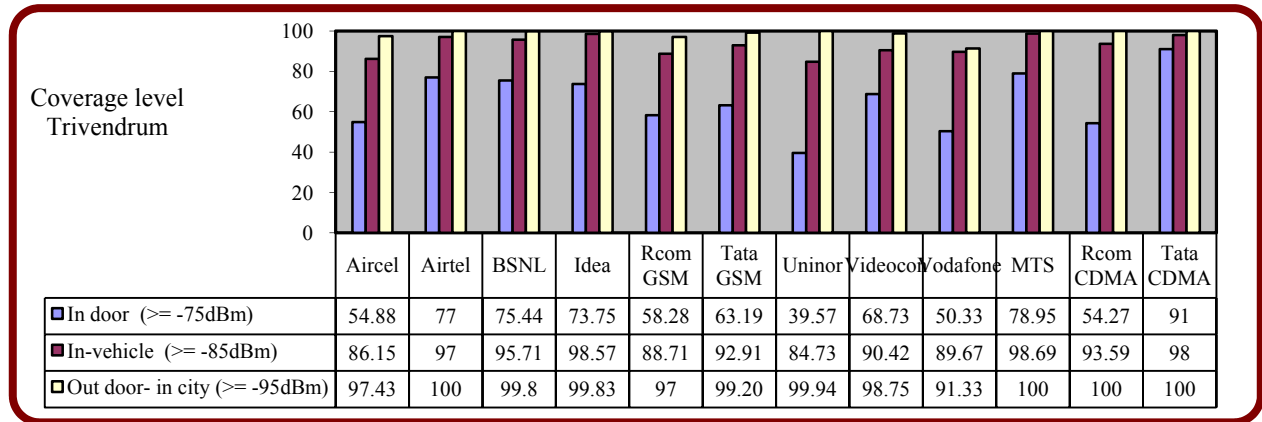
Graphical Representation (Calicut):



Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Percentage of connections with good voice quality” Airtel, Idea, RCom(GSM) & Vodafone is not meeting benchmark.
- For parameter “Dropped Call Rate” RCom (CDMA) is not meeting benchmark with the value of 2.1%.

Graphical Representation (Trivandrum):**(3) Critical Analysis**

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Blocked Call Rate” Airtel, BSNL & Vodafone are not meeting the benchmark.
- For parameter “Percentage of connections with good voice quality” Aircel, Airtel, BSNL, Idea, Tata (GSM), Uninor & Vodafone.

- **Independent Drive Test**

(1) Sample Coverage

The Independent Drive Test was conducted at Kerala after operators assisted drive test was over for respective operators. Route cover was about around 250 Km depending on city areas within the speed limit of 40Km/hr.

Drive Test Locations

Trivandrum

HIGH DENSE: SREEKARYAM, KESAVADASAPURAM, KOWDIAR, EAST FORT

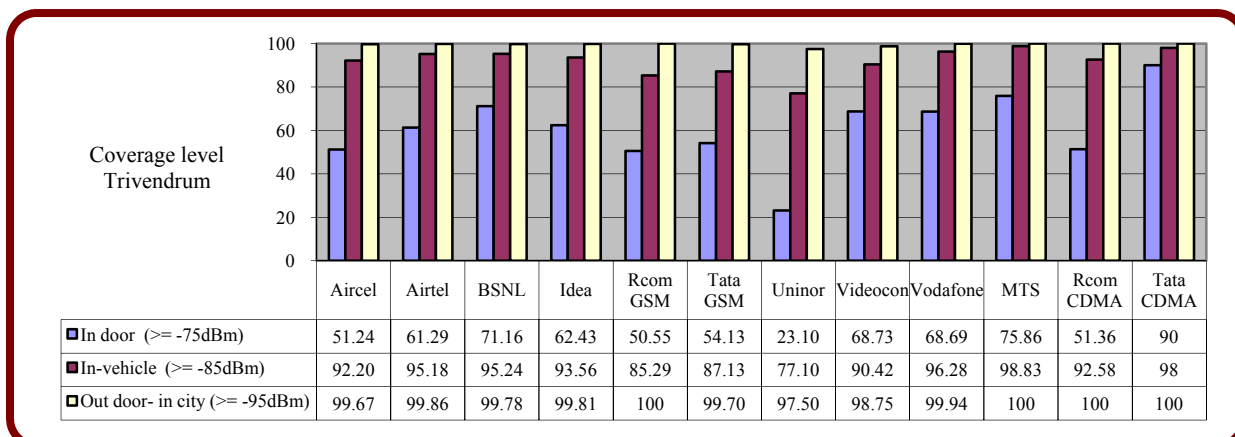
MEDIUM DENSE: KAZHAKOOTTAM, ANAYARA, PETTAH, KIMS,
AIRPORT, KOVALAM

LOW DENSE: PACHALLOOR, KOCHUVELI KINFRA PARK, VAZHAMUTTOM,
VALIYAVELI KALAMASSERY, PRIMIER JN, ALUVA, PARAVOOR
KAVALA

2) Performance (for the respective city)

SN	Parameter	City Name	Aircel	Airtel	BSNL	Idea	Rcom GSM	Tata GSM	Uninor	Videocon	Vodafone	MTS	Rcom CDMA	Tata CDMA	
			GSM Operators									CDMA Operators			
1.1	Call Attempts	Trivandrum	129	177	113	241	183	115	217	147	193	180	177	113	
1.2	Blocked Call Rate ($\leq 3\%$)		0.78%	1.69%	6.19%	32.78%	1.64%	1.74%	0%	2.04%	3.63%	0.56%	0%	0%	
1.3	Dropped Call Rate ($\leq 2\%$)		0%	0%	0.88%	4.98%	1.64%	2.61%	2.76%	1.36%	2.07%	0%	0.56%	0%	
1.4	Percentage of connections with good voice quality ($\geq 95\%$)														
	(i) 0-4 (w/o frequency hopping)		NA									99.07%	97.70%	99.12%	
	(ii) 0-5 (with frequency hopping)		93.43%	84.32%	93.13%	86%	95.29%	93%	95.89%	99.30%	92.39%	NA			
1.5	Service Coverage														
	In door (≥ -75 dBm)		51.24%	61.29%	71.16%	62.43%	50.55%	54.13%	23.10%	68.73%	68.69%	75.86%	51.36%	90%	
	In-vehicle (≥ -85 dBm)		92.20%	95.18%	95.24%	93.56%	85.29%	87.13%	77.10%	90.42%	96.28%	98.83%	92.58%	98%	
	Outdoor- in city (≥ -95 dBm)		99.67%	99.86%	99.78%	99.81%	100%	99.70%	97.50%	98.75%	99.94%	100%	100%	100%	
1.6	Call Setup Success Rate ($\geq 95\%$)	100%	98.08%	93.86%	72%	96.7%	98.35%	98.03%	97.28%	96.31%	99%	100%	100%		

Graphical Representation Trivandrum (Independent):



Critical Analysis

The drive test data was found to be satisfactory for most of the parameters. However, a few deviations found are listed below:

- For parameter “Blocked Call Rate” BSNL, Idea & Vodafone are not meeting the benchmark with the value 6.19%, 32.78% & 3.63% respectively.
- For parameter “Dropped Call Rate” Idea, Tata (GSM), Uninor & Vodafone are not meeting the benchmark with the value 4.98%, 2.61%, 2.76% & 2.07% respectively.
- For parameter “Percentage of connections with good voice quality” Aircel, Airtel, BSNL, Idea, Tata (GSM) & Vodafone are not meeting benchmark.
- For Parameter CSSR ($\geq 95\%$), BSNL and Idea are not meeting the benchmark with the value of 93.86% & 72% respectively.

(E) Compliance report (Status of service providers with respect to the QoS)

From live, month, PMR and Drive Tests findings, it can be concluded that on an average, performance of the operators in the service area (Kerala) is by and large satisfactory for **Network Parameters**. However, Aircel, Etisalat, Tata (GSM) & Uninor are not meeting the benchmark for “Worst affected cells >3% TCH drop”. BSNL have shown high POI congestion.

Under **Customer Service Quality Parameter** “operator answered calls (voice-to-voice) within 60 seconds” parameter Airtel, RCom (GSM), Vodafone & RCom (CDMA) are not fulfilling TRAI benchmark of $\geq 90\%$.

Regarding **Resolution of billing/ charging complaints** issues, BSNL are not fulfilling TRAI benchmark of $\geq 100\%$ with high marginally.

During **Drive Tests**, high “Blocked Call Rates” were found in case of Airtel, BSNL, Idea & Vodafone and “Dropped Call Rates” in case of Idea, Tata (GSM), Uninor, & Vodafone & RCom (CDMA). Most of the GSM operators have met the benchmark for “%age of connections with good voice quality” except for Idea & Vodafone.

III. Basic Telephone Service (Wireline) Providers

.....Audit not done for this quarter

IV. Broadband Service Providers

.....Audit not done for this quarter